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Ö REFERENCE

> 5048 S

STATE OF NORTH CAROLINA

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

CONTENTS

SHEET NO. **DESCRIPTION** TITLE SHEET LEGEND SITE PLAN CROSS SECTION(S) 4-7 8-13 BORE AND CORE LOG(S) 14-19 CORE PHOTOS

STRUCTURE SUBSURFACE INVESTIGATION

OUNTY <u>CABARRUS</u>
ROJECT DESCRIPTION BRIDGE NO. 103 OVER
DUTCH BUFFALO CREEK ON NC 49 BETWEEN
SR 1006 AND SR 2444
ITE DESCRIPTION

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5548	1	19

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 (199) 707-6805. 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 DESCRIPTION OF THE DESCRIPTION OF THE STANDARD TEST METHOD. THE DISSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS MOVICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL 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 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 SATISTY 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.

- 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.

J.K. STICKNEY C.L. SMITH M.R. MOORE R.W. TODD R.J. TUCKER R.S. HINSON

PERSONNEL

INVESTIGATED BY J.E. BEVERLY DRAWN BY J.E. BEVERLY SEB CHECKED BY ____C.B. LITTLE SUBMITTED BY <u>C.B.</u> LITTLE DATE FEBRUARY 2016



PROJECT REPERENCE NO. SHEET NO.

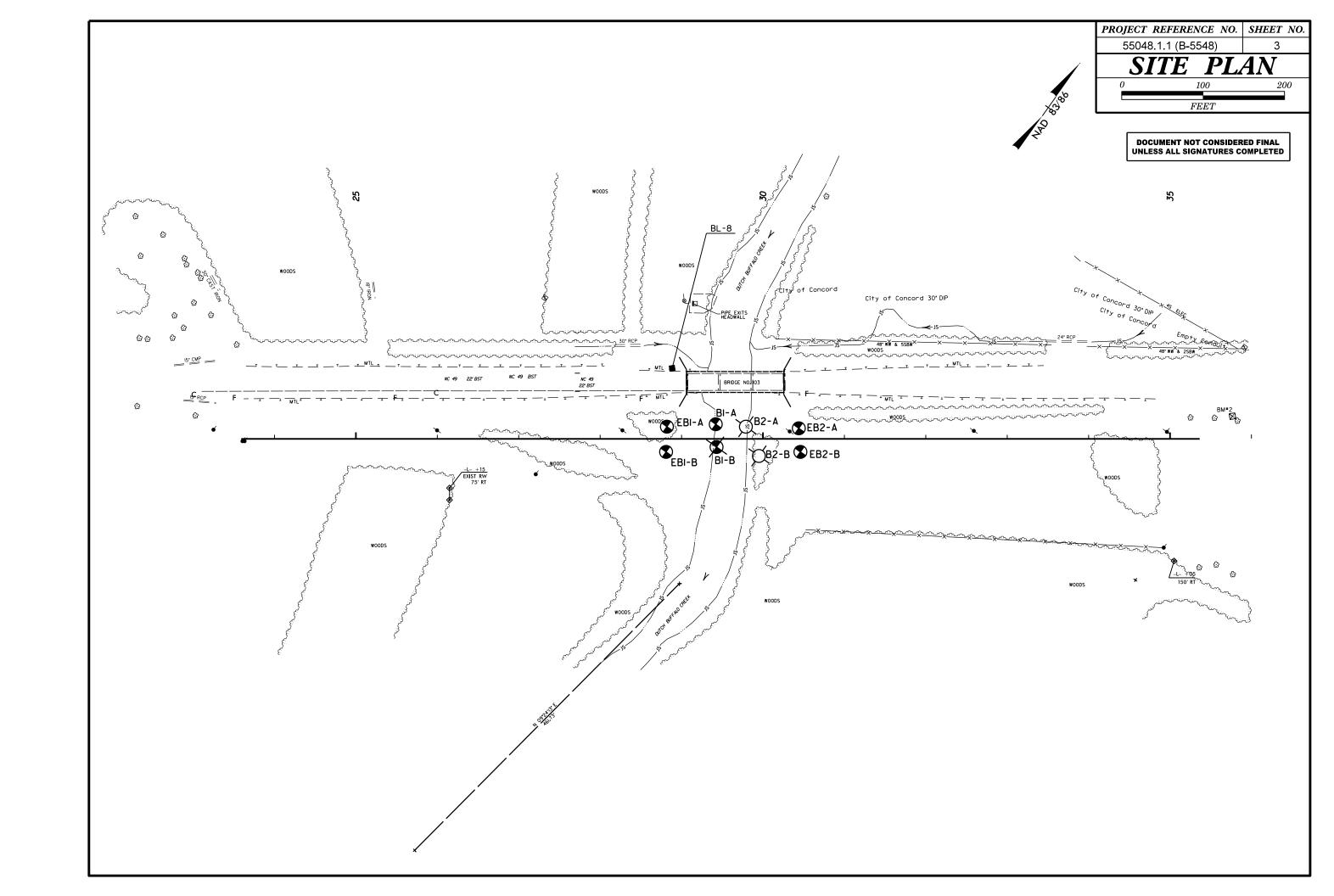
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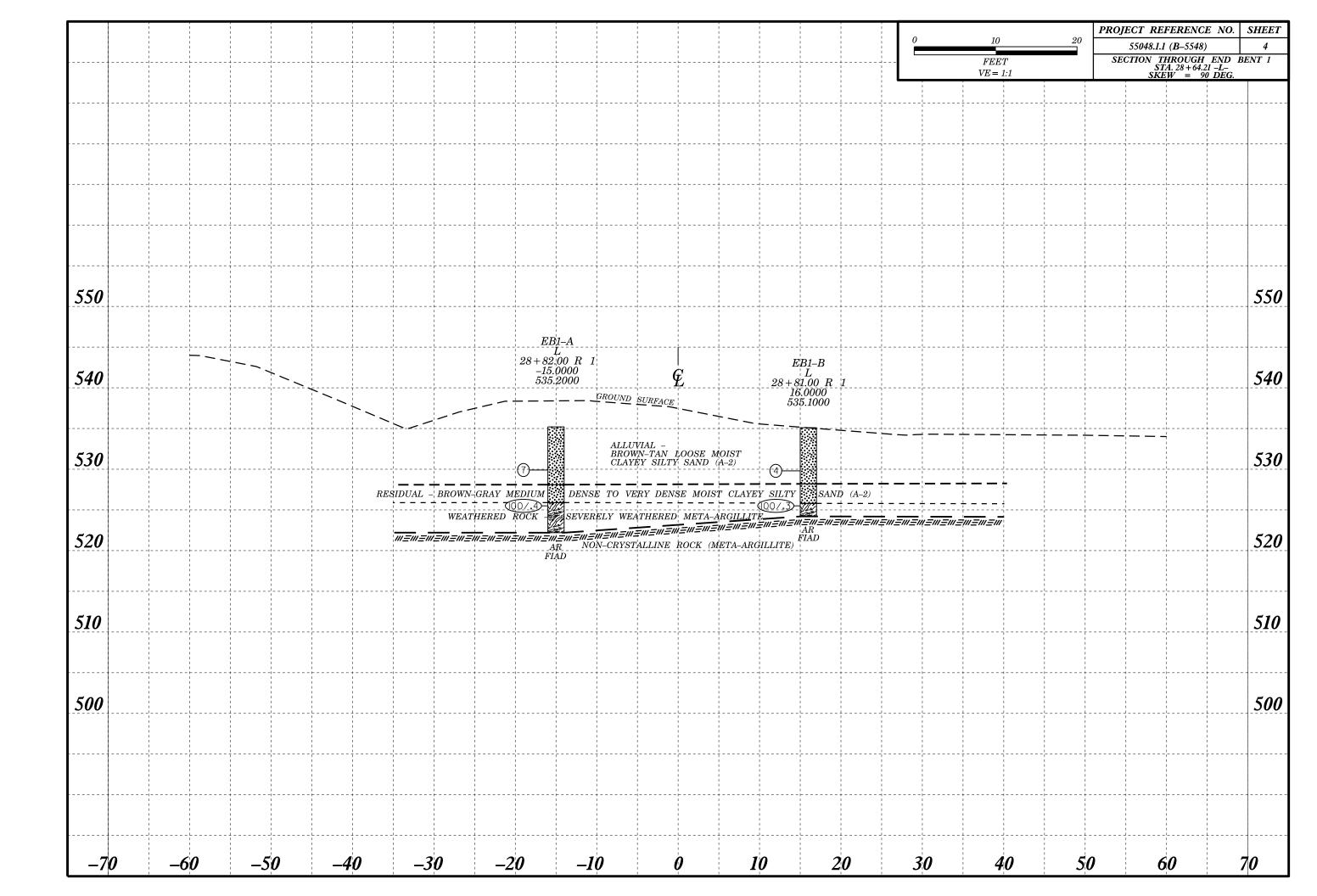
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

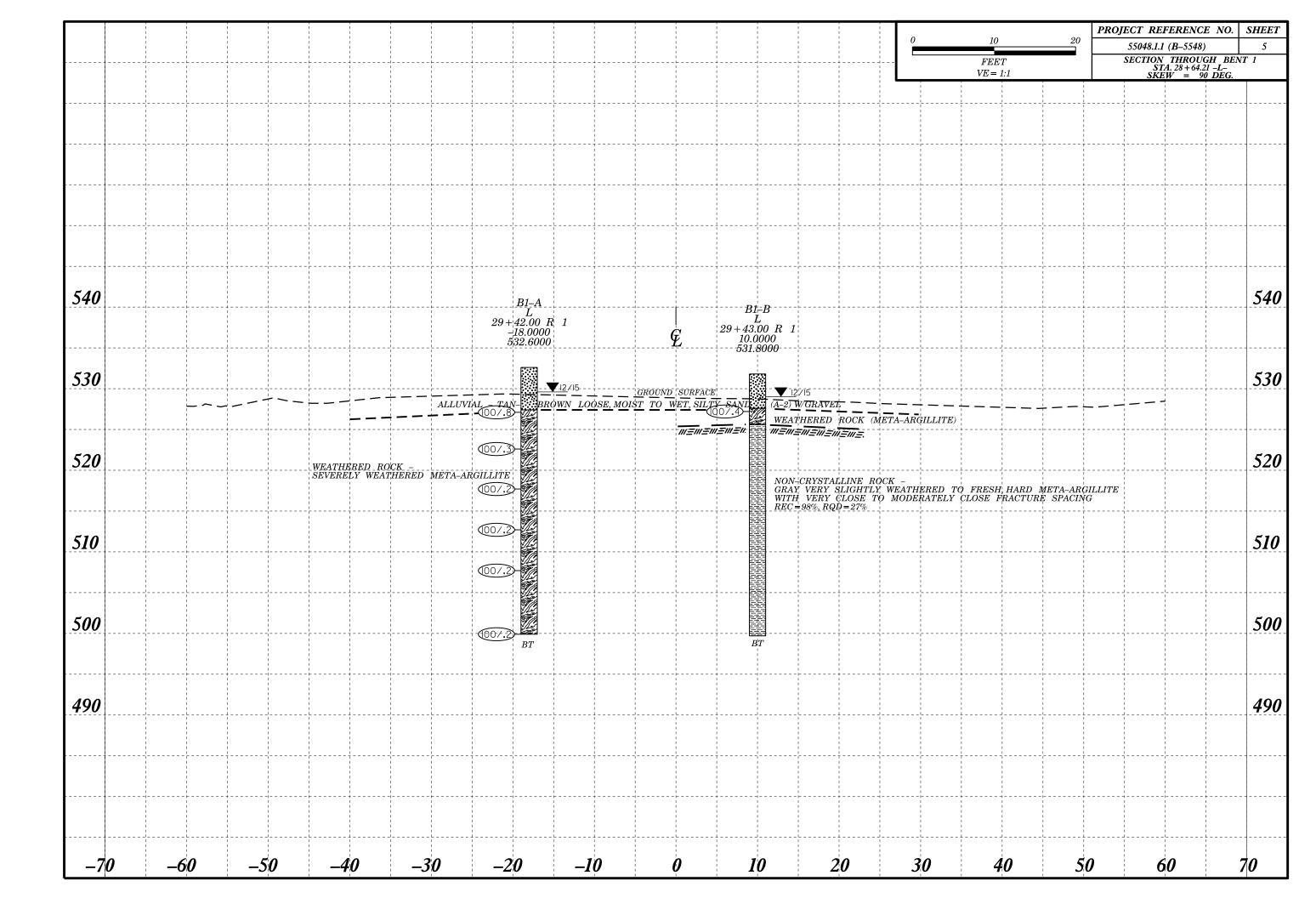
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

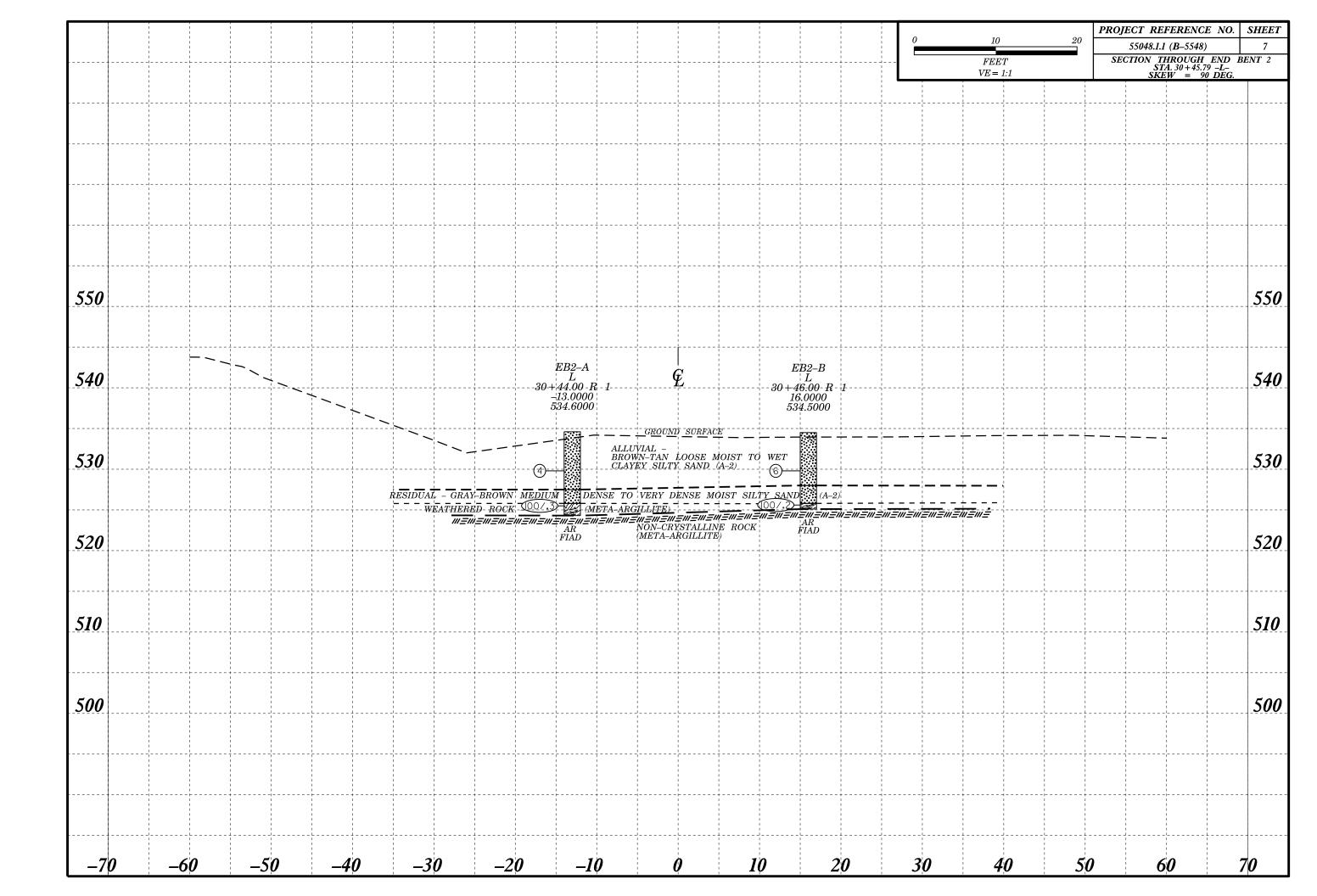
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.	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	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING:	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO 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: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-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	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 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.
	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOOLD TIELD 3FT REFUSAL IF TESTED. ROCK TIFE INCLODES GRANTE, GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
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-1-0 A-1-0 A-2-4 A-2-5 A-2-6 A-2-7 A-4-5 A-5 A-6 A-7 A-1, A-2 A-4, A-5 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
000000000000000000000000000000000000000	SLIGHTLY COMPRESSIBLE LL < 31	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 SILT- GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC.	BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
*40 30 MX 50 MX 51 MN SOILS 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 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.	HORIZONTAL.
II _ AG MY AT MN AG MY AT MN AG MY AT MN AG MY AT MN SULLS WITH	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, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	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 10 MX 10 MX 11 MN 11 MN MODERATE HIGHLY	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 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 SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
USUAL TYPES STONE FRAGS. FINE SULTY OR CLAYEY SULTY CLAYEY MATTER		(SLI.) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
OF MAJOR GRAVEL, AND SAND GRAVEL AND SAND SOILS SOILS	lacktright 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
CEN RATING	<u> </u>	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	PARENT MATERIAL.
AS SUBGRADE 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	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	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	POADWAY EMPANYMENT (DE) 25/025 DID 0 DID DIDECTION	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) 23/825 DIP & DIP DIRECTION WITH SOIL DESCRIPTION OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
VERY LODGE (4	SPI SUBSTITUTE OF SPI SUBSTITU	(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.
CRANULAR LOOSE 4 TO 10	SOIL SYMBOL OPT DMT TEST BORING INSTALLATION SLOPE INDICATOR INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL NENSE 10 10 50 N/H	ARTIFICIAL FILL (AF) OTHER 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	THAN ROADWAY EMBANKMENT THOUER BURING TEST	SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE
VERY SOFT < 2 < 0.25	── INFERRED SOIL BOUNDARY - CORE BORING • SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR	OF AN INTERVENING IMPERVIOUS STRATUM.
GENERALLY SOFT 2 TO 4 0.25 TO 0.5 SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MIN MONITORING WELL TEST BORING	VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL STIFF 8 TO 15 1 TO 2	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 HARD > 30 > 4	→ PIEZOMETER — SPT N-VALUE 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
		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 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	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
	SHALLOW UNCLASSIFIED EXCAVATION - USED IN THE TOP 3 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL SAND SAND SILT CLAY	UNDERCUT ACCEPTABLE DEGRADABLE ROCK	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
(BLDR.) (COB.) (GR.) (CSE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	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	CPT - CONE PENETRATION TEST NP - NON PLASTIC $\dot{\gamma}_{ m d}$ - 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			STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY
- (ALLEDDEDC LIMITE) DECEDITION SOLDE SOLD SECTION FIOR	CSE COARSE ORG ORGANIC	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	TOTAL LENGTH OF CIDATIN AND EVENTACE AS A SECONDARY
(ATTERBERG LIMITS) DESCRIPTION OF THE PROJECT OF TH	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	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	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. 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
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	DMT - DILATOMETER TEST	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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.
- SATURATED - USUALLY LIQUID: VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PLASTIC - LIQUID LIMIT - SEMISOLID, BEQUIPES, DRYING, TO	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PLASTIC - WET - (W) SEMISOLID; REQUIRES DRYING TO	DMT - DILATOMETER TEST	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. FRACTURE SPACING BEDDING	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE LL LIQUID LIMIT PLASTIC SEMISOLID; REQUIRES DRYING TO	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS, - FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. FRACTURE SPACING BEDDING TERM SPACING TERM THICKNESS	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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 (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK; BL-8 N 613291.1170 E 1579698.9470 STA. 23+38.52
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PLASTIC RANGE PLASTIC LIMIT PLASTIC	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK 9 - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO EQUIPMENT USED ON SUBJECT PROJECT	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. FRACTURE SPACING BEDDING	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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.
PLASTIC (PI) PLASTIC LIMIT - SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SQ SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CB - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO BOUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. FRACTURE SPACING IERM SPACING VERY WIDE MORE THAN 10 FEET WIDE MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 0.16 - 1.5 FEET	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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-8 @ N 6/3291.1170 E 1579698.9470 STA. 23+38.52 ELEVATION: 543.02 FEET
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PLASTIC LIMIT OM OPTIMUM MOISTURE SL SHRINKAGE LIMIT DESCRIPTION - SATURATED - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS DPT - DYNAMIC PENETRATION TEST SQ SAROLSANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE FOSS FOSSILIFEROUS SLI SLICHTLY RS - ROCK FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS FRAGMENTS W - MOISTURE CONTENT CR - CALIFORNIA BEARING HI HIGHLY V - VERY RATIO CME-45C	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. FRACTURE SPACING IERM SPACING VERY WIDE MORE THAN 10 FEET WIDE MODERATELY CLOSE 1 TO 3 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET VERY CLOSE USES THAN 0.16 FEET THICKLY LAMINATED C.0.008 FEET THINLY LAMINATED C.0.008 FEET	TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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-8 @ N 6/3291.1170 E 1579698.9470 STA. 23+38.52 ELEVATION: 543.02 FEET NOTES: SOIL STRATIGRAPHY IS THROUGH THE BORINGS.
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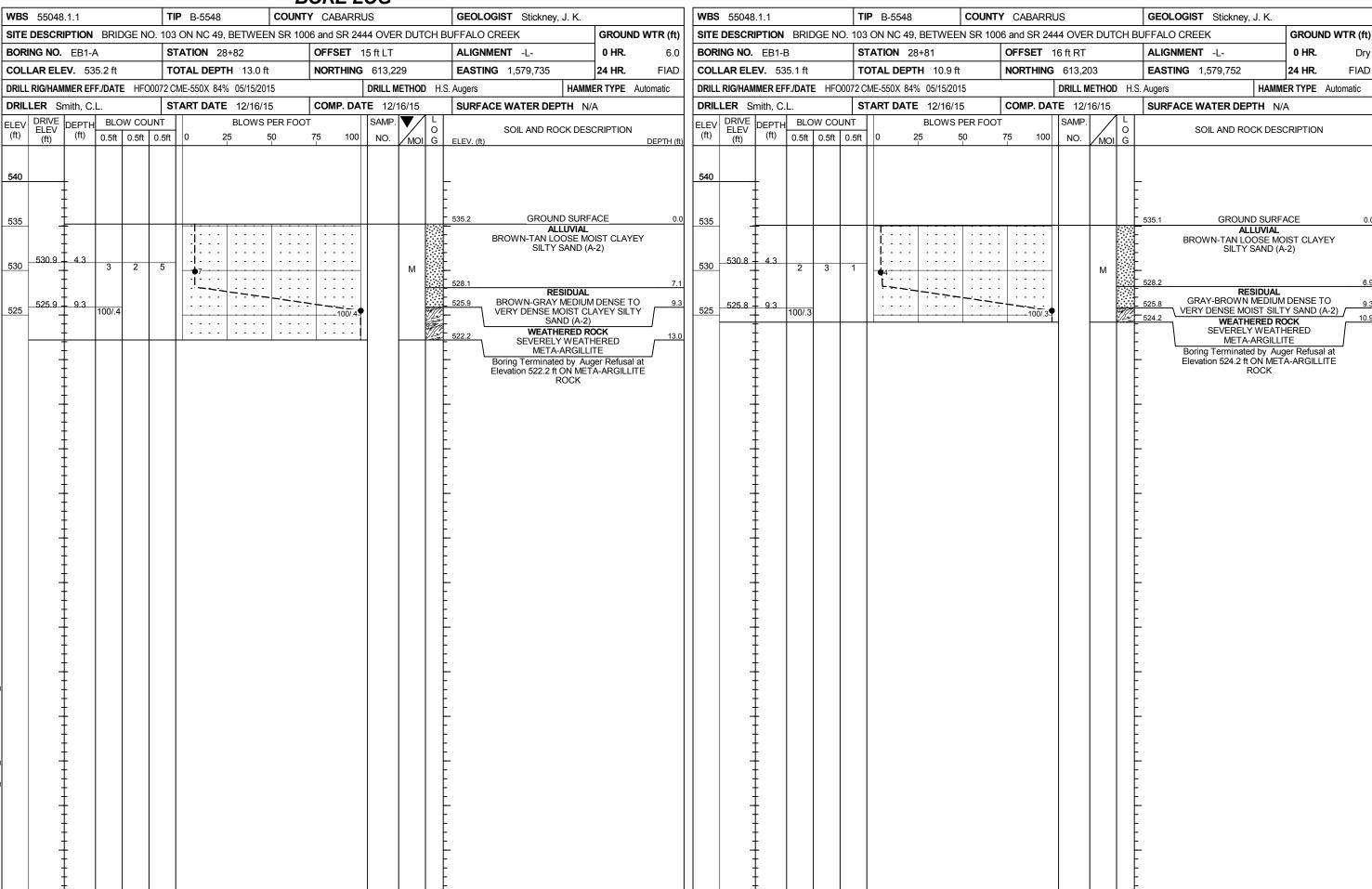




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	<u> </u>	+	_ + +	 _ + -				<u>INDȚSURFACE </u>							
<i>520</i>	NON-CRYST.	ALLINE ROCK -								翼					520
320	META-ARGII	ALLINE ROCK – RATELY WEATHERED LITE WITH VERY CL 2D=6%	O TO FRESH, MO LOSE TO CLOSE	ODERATELY HARD E FRACTURE SPAC	O TO HARD CING					· 🗐 - 🛚	NON-CRYSTALLINE	ROCK -	<u>-</u>		320
	REC = 76%, R	QD = 0%			!						NON-CRYSTALLINE GRAY MODERATELY META-ARGILLITE W REC=53% RQD=10%	WEATHERED TO TTH VERY CLOSE	FRESH, MODERA TO CLOSE FRA	ATELY HARD TO I CTURE SPACING	HARD
						[분명 경도역				- 	REC = 53% $RQD = 10%$; ;			¦
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GEOTECHNICAL BORING REPORT BORE LOG



GEOTECHNICAL BORING REPORT

SHEET 9

							_	B	ORE I	<u> LOG</u>			 			
	5504					P B-5548			Y CABAR				GEOLOGIST Stickney	, J. K.		
				IDGE I	т.			EEN SR				DUT	CH BUFFALO CREEK		-1	ID WTR (ft)
). B1-A				TATION 29			OFFSET				ALIGNMENT -L-		0 HR.	0.0
		.EV. 53				OTAL DEPT			NORTHIN				EASTING 1,579,782		24 HR.	3.0
				TE H		CME-550X 8		_	I .			D N	W Casing w/ SPT	Ь		Automatic
DRIL	,	Smith, C	T			TART DATE			COMP. D		1	1 []	SURFACE WATER DEP	TH N/	′Α	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		0 2		PER FOOT 50	75 100	SAMP. NO.	MOI	0	SOIL AND RO	CK DESC	CRIPTION	DEPTH (ft)
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		‡	<u> </u>			 				 	<u> </u>			UVIAL		0.0
530		‡								-	\blacksquare		- TAN-BROWN LOOS - (SE MOIS (A-2)	I SILIY S	AND
	527.9	4.7	1	100/.3				+			М	12:17	- - 527.4			5.2
525		‡	'						100/.8	T			- WEATHE - SEVERELY	WEATH	HERED	
	522.9	9.7											NOTE: BARREL PL		AT 29.7 F	
		+ 3.2	100/.3	3					100/.3	•			SO COULD NO	MAKE	SPT DRIV	E
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500	499_9	32 7	100/.2	<u> </u> !	-				100/.2	\blacksquare	-	V/L2)	499.9Boring Terminated	at Eleva	tion 499.9	32.7 ft IN
													SEVERELY META-ARC META-AR			

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RODELOG

SHEET 10

GEOTECHNICAL BORING REPORT

VBS	55048	3,1.1			ŢI	IP B-5	548		Тс			BARF	OG RUS			GEOLOGIST Stickney	, J. K.	-	
			N BR	IDGE	I			, BET						VER	DUT	CH BUFFALO CREEK		GROUN	D WTR (fi
	NG NO					TATION							10 ft RT			ALIGNMENT -L-		0 HR.	0.0
	AR ELI					OTAL D			1 ft				613,2			EASTING 1,579,800		24 HR.	2.8
				-		CME-55				 5	l		·		D N	W Casing w/ Core	HAMN	JER TYPE	
	LER S					TART [CON	1P. DA	TE 12/			SURFACE WATER DE			
LEV	DRIVE	DEPTH		ow co		П				R FOOT	<u> </u>		SAMP.	T	11				
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	0.5ft	0	2	5	50		75	100	NO.	мо	0 I G	SOIL AND RC ELEV. (ft)	CK DES	CRIPTION	DEPTH
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		[ļ	ļ	<u> </u>	[Τ.			ļ			D SURF LUVIAL	ACE	
0	-	-												V		TAN-BROWN LOG (A-2) WITH GRAVE	SE WE	T SILTY SA	ND 5-4-2'
1	527.6	4.2	100/.4	 -			· · ·	. <u></u> :							un	- 527.6 WEATH			7-4.2
5		Ŧ	1007.4								-	100/.4				- 525.6 BLUE-GRAY SE\	ERELY	WEATHER	ED
	-	Ŧ														NON-CRYS	ARGILL TALLIN		
		‡														GRAY VERY SLIG FRESH, HARD M			
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GEOTECHNICAL BORING REPORT

SHEET 10

									C	0	RE L	OG	•								
WBS	55048	3.1.1			TIP	B-554	18	С	OUNT	Υ	CABARR	US			GE	OLOGI	ST S	tickne	y, J. K.		
SITE	DESCR	IPTION	I BRI	DGE NO	WEE	N SR	1006	and SR	2444	OVER	DUTC	H BU	FFALC	CRE	EK		GROUN	ND WTR (ft)			
BOR	ING NO.	B1-B	3		STA	ΓΙΟΝ	29+43			OF	FSET 1	0 ft R	Т		ALI	GNME	NT -L			0 HR.	0.0
COLI	LAR ELE	E V . 53	31.8 ft		TOT	AL DE	PTH 32	.1 ft		NC	ORTHING	613	,244		EAS	STING	1,579	9,800		24 HR.	2.8
DRILL	. RIG/HAN	MMER E	FF./DA	TE HFOO	072 CN	IE-550>	(84% 05)	15/2015	5			DRILL	METHO	D NW	Casin	ig w/ Coi	re		HAMN	IER TYPE	Automatic
DRIL	LER S	mith, C	.L.		STAI	RT DA	TE 12/1	5/15		CC	OMP. DAT	TE 12	2/15/15		SUF	RFACE	WATE	ER DE	PTH N	/A	
COR	E SIZE	NW					N 25.91														
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	JN RQD (ft) %	SAMP. NO.	STF REC. (ft) %	RQD (ft) %	L O G	ELEV. (fi	1)		D	ESCR	RIPTION	AND F	REMAR	KS		DEPTH (ft)
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325											525.6 -		GRAY	/ VERY		I-CRYS [.] ITLY W			:K O FRESH	, HARD	6.2
	522.0	9.8	5.0	3:30/1.0			-	M	ETA-AR		F	RACTU	RE SPA	CING		ELY CLOS	E				
520		-	5.0	3.30/1.0	(5.0) 100%	(1.6) 32%					-			R1=7,	R2=8	, R3=10	, R4=6 KTYPE	, R5=7,	RMR=38		
l	517.0	14.8									-										
515	317.0	14.0	5.0	3:15/1.0	(4.8)	(2.4)	-	ŀ			}										
313	_	-			96%	48%					-										İ
	512.0	19.8	- F 0	2,4544.0	(4.0)	(4.2)					-										
510	_	-	5.0	3:45/1.0	(4.8) 96%	(1.3) 26%					_										
	507.0	24.8								屋	-										
505	307.0	24.0	5.0	NM	(5.0)	(0.5)					}										
303	-	-			100%	10%					-										
	502.0	29.8	2.3	NM	(2.2)	(0.0)		ļ			}										
500	499.7	32.1	2.3	INIVI	(2.3) 100%					薑	499.7										32.1
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GE NO. 103 ON NC 49, BETWEEN SR 1006 and SR 2444 OVER DUTCH BUFFALO CREEK GROUND WTR (# STATION 29+79 OFFSET 15 ft LT
TOTAL DEPTH 30.6 ft NORTHING 613,285 EASTING 1,579,814 24 HR. N/ E Drilled in July 1999 DRILL METHOD NW Casing w/ Core HAMMER TYPE Automatic START DATE 07/14/99 COMP. DATE 07/14/99 SURFACE WATER DEPTH N/A V COUNT 0.5ft 0.5ft 0.5ft 0.25 50 75 100 NO. MOI G SURFACE WATER DEPTH N/A SOIL AND ROCK DESCRIPTION DEPTH SOIL AND ROCK
E Drilled in July 1999 DRILL METHOD NW Casing w/ Core HAMMER TYPE Automatic START DATE 07/14/99 COMP. DATE 07/14/99 SURFACE WATER DEPTH N/A SOIL AND ROCK DESCRIPTION DEPTH SOIL O. 5rt 0.5rt 0
START DATE 07/14/99 COMP. DATE 07/14/99 SURFACE WATER DEPTH N/A V COUNT D.Stt 0.5tt
SAMP. 0.5ft
0.5ft 0.5ft 0 25 50 75 100 NO. MOI G ELEV.(ft) SOIL AND ROCK DESCRIPTION DEPTH
S27.6 GROUND SURFACE NON-CRYSTALLINE ROCK GRAY MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD META-ARGILLITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING 497.0 Boring Terminated at Elevation 497.0 ft IN META-ARGILLITE ROCK This boring from metric project R-2533CC
NON-CRYSTALLINE ROCK GRAY MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD META-ARGILLITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING 497.0 Boring Terminated at Elevation 497.0 ft IN META-ARGILLITE ROCK This boring from metric project R-2533CC
NON-CRYSTALLINE ROCK GRAY MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD META-ARGILLITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING 497.0 Boring Terminated at Elevation 497.0 ft IN META-ARGILLITE ROCK This boring from metric project R-2533CC
GRAY MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD META-ARGILLITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING 497.0 Boring Terminated at Elevation 497.0 ft IN META-ARGILLITE ROCK This boring from metric project R-2533CC
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META-ARGILLITE ROCK This boring from metric project R-2533CC
This boring from metric project R-2533CC
performed in 7/1999

GEOTECHNICAL BORING REPORT

SHEET 11

									C	OF	RE LOG
WBS	55048	.1.1			TIP	B-554	18	С	OUNT	Υ	CABARRUS GEOLOGIST Stickney, J. K.
SITE	DESCR	IPTION	BRI	DGE NO	. 103 (ON NC	49, BET	WEE	N SR	1006	and SR 2444 OVER DUTCH BUFFALO CREEK GROUND WTR (ft)
BOR	ING NO.	B2-A			STA	TION	29+79			OF	FSET 15 ft LT ALIGNMENT -L- 0 HR. N/A
COL	LAR ELE	EV . 52	7.6 ft		тот	AL DE	PTH 30	.6 ft		NC	ORTHING 613,285 EASTING 1,579,814 24 HR. N/A
DRILL	RIG/HAI	MMER E	FF./DA	TE Drilled	in July	1999					DRILL METHOD NW Casing w/ Core HAMMER TYPE Automatic
DRIL	LER S	mith, C	.L.		STAI	RT DA	TE 07/1	4/99		co	MP. DATE 07/14/99 SURFACE WATER DEPTH N/A
COR	E SIZE	NW			1		N 30.6 f				
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	UN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft) DEPTH (ft)
527.6											Ground Surface
525	527.6 _ - 523.1 "	-	4.5		(2.9) 64%	(0.4) 9%		(23.2) 76%	(1.9) 6%		NON-CRYSTALLINE ROCK GRAY MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD META-ARGILLITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING
520	518.6 -	- - 9.0	4.5		(3.3) 73%	(0.0) 0%					
515	-		5.0		(4.4) 88%	(0.4) 8%					- - -
510	513.6 - - -	- 14.0 - -	4.8	***	(3.3) (0.0) 69% 0%						- - - -
	508.8	18.8	5.0		(5.0) 100%	(1.1) 22%					
505	503.8	23.8	6.8		(4.3) 63%	(0.0)					
500	497.0	30.6									497.0
	437.0	- 30.0		_							Boring Terminated at Elevation 497.0 ft IN META-ARGILLITE ROCK
	_	-	1								This boring from metric project R-2533CC performed in 7/1999
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GEOTECHNICAL BORING REPORT BORE LOG

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WBS				B-5548			٠		CA					GEOLOGIST Stickney	, J. K.	000				
				IDGE	Т					EEN	SR 1			· · · · · · · · · · · · · · · · · · ·	VER	DUT	CH BUFFALO CREEK		ł	ND WTR (
	NG NO.						ATION :							21 ft RT			ALIGNMENT -L-		0 HR.	N/
	AR ELI						TAL DEF	TH	30.2	ft ———		NOR	THING	613,2			EASTING 1,579,848		24 HR.	N/
	RIG/HAI	·		TE D			· · · · · · · · · · · · · · · · · · ·				T			DRILL N		D N	W Casing w/ Core	l		Automatic
DRILL	ER S	т	1			STA	ART DAT					COM	P. DA	TE 07/		L	SURFACE WATER DEF	TH N/	Α	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		t	0	25	BLOWS	50		75 L	100	SAMP.	MOI	0	SOIL AND RO	CK DESC	RIPTION	DEPTH
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		‡				1				1.		1::					 FRESH, MODERA 	TELY HA	RD TO H	ARD
525	_	Ţ						+		1		ļ : :					- META-ARGILLITE \ CLOSE FRAC			EIU
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GEOTECHNICAL BORING REPORT CORE LOG

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	55048				J	B-554					ABARRUS	GEOLOGIST Stickney			
SITE	DESCR	IPTION	BRI	DGE NO	. 103 (ON NC	49, BE1	WEEN	N SR	1006	and SR 2444 OVER DUTC	H BUFFALO CREEK		GROUN	ID WTR (ft)
BORI	NG NO.	B2-B	· -		STA	TION	29+95			OF	FSET 21 ft RT	ALIGNMENT -L-		0 HR.	N/A
COLL	AR ELE	E V . 53	33.1 ft		TOTA	AL DEI	PTH 30	.2 ft		NO	RTHING 613,265	EASTING 1,579,848		24 HR.	N/A
DRILL	RIG/HAN	MMER E	FF./DA	TE Drilled	in July	1999					DRILL METHOD NW	Casing w/ Core	HAMME	R TYPE	Automatic
DRIL	LER S	mith, C	L.		STAF	RT DA	TE 07/1	5/99		СО	MP. DATE 07/15/99	SURFACE WATER DEP	TH N/A	4	
COR	E SIZE	NW			TOTA	AL RUI	V 26.91								
ELEV	RUN ELEV	DEPTH	RUN	DRILL RATE	REC.	AL RUI JN RQD (ft) %	SAMP.	STR REC.	ATA RQD	ГО		ESCRIPTION AND REMARK	c		
(ft)	(ft)	(ft)	(ft)	(Min/ft)	(ft) %	(ft) %	NO.	(ft) %	RQD (ft) %	Ğ	ELEV. (ft)	ESCRIFTION AND REWARK			DEPTH (ft)
529.8												Begin Coring @ 3.3 ft			
	529.8	3.3	6.1		(1.5) 25%	(0.7) 11%		(14.3) 53%	(2.6) 10%		- 529.8 - GRAY MODERATEL	NON-CRYSTALLINE ROCK Y WEATHERED TO FRESH,		TELY HA	RD 3.3
	_	_										SILLITE WITH VERY CLOSE SPACING			
525	523.7 -	9.4										G/ //GING			
	020.7	- 0.7	4.9	-	(2.0) 41%	(0.0) 0%			l		- -				
520	-	-			41%	0%					- -				
	518.8	14.3			(0.7)	(0.0)					- -				
	-	-	5.0		(2.7) 54%	(0.0) 0%					- -				
515											- 				
	513.8	19.3	4.6		(3.7)	(0.8)					- -				
	_	_			80%	17%					- -				
510	509.2	23.9									_ -				
	_	_	6.3		(4.4) 70%	(1.1) 17%					<u>-</u> -				
505]	-								蒀	-				
	502.9	30.2													30.2
	- 502.5	- 00.2									Boring Terminated	at Elevation 502.9 ft IN META	4-ARGILL	ITE ROC	K
	-	-									- — This boring fron	n metric project R-2533CC pe	rformed ir	7/1999	
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GEOTECHNICAL BORING REPORT BORE LOG

BORE LOG																										_												
WBS 55048.1	1.1			TIP B-5548 COUNTY CABARRUS GEOLOGIST S										ST Stick	ney, J. K					WBS 55048.1.1						TIP B-5548 COUNTY CABARR									ney, J. k	<u> </u>		
SITE DESCRIP	SE NO.	03 ON NC	49, BE	TWEEN	SR 1006	06 and SR 2444 OVER DU				JTCH BUFFALO CREEK				GRO	GROUND WTR (ft)			SITE DESCRIPTION BRIDGE NO.									_			TCH B				GRO	GROUND WTR (ft)			
BORING NO. EB2-A				STATION 30+44				OFFSET 13 ft LT			ALIGNMENT -L-			0 H	0 HR. 5.9			BORING NO. EB2-B				STATION 30+46				OFFSET 16 ft RT				ALIGNMENT -L-			0 HI	R.	5.8			
COLLAR ELEV. 534.6 ft				TOTAL DEPTH 10.3 ft				NORTHING 613,32		613,321	321 EASTING 1,		1,579,86	69	24 H	24 HR. FIAD		COLLAR ELEV. 534.5 ft			TOTAL DEPTH 9.4 ft				NORTHING 613,298			EASTING 1,579,887		24 HR. FIAD								
DRILL RIG/HAMMER EFF./DATE HFO00				72 CME-550X 84% 05/15/2015				DRILL M		ORILL ME	METHOD H.S. Augers			HA	MMER TY	PE Au	itomatic	DRILL RIG/HAMMER EFF./DATE HFOO							DRILL METHOD			S. Augers		H/	AMMER TYP	E Autom	natic					
DRILLER Sm				START D						12/16		SUR	FACE	WATER	DEPTH	N/A			DRII	LLER S					ART DA				COMP. I			4	SURFAC	E WATER	DEPTH	N/A		
ELEV DRIVE ELEV (ft)	EPTH_ (ft)	0.5ft	0.5ft 0.9	oft 0	25 	OWS PE	R FOOT		100	NO.	' / 0	ELEV.		SOIL AND	ROCK D	ESCRIPT		DEPTH (f	ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft	JNT 0.5ft	0	25 	DWS PE	R FOOT		00 N	MP. O. MC	0 1 G		SOIL AND	ROCK I	DESCRIPTI	ON	
535				<u> </u>		1		1				534.6		GR	DUND SU			0.	535		<u> </u>				ļ,								- 534.5	GR		JRFACE		0.0
535 530.8 530.8 525 525.8 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525.8 525 525 525.8 525 525 525 525 525 525 525 525 525.8 525 525 525 525 525 525 525 525 525 52	Q Q	00/.3	2 2								w	534.6	G VEF	OWN-TAI CLAYE RAY-BRO RY DENSE WE SEVEF	RESIDU WN MED E MOIST S ATHEREI ETA-ARG nated by	AL MOIST T SAND (A-: IUM DEN: SILTY SAI D ROCK ATHEREI ILLITE Auger Re META-AR(SE TO ND (A-2 D	7. 8.2) 10.3	530	530.8	8.7	2	3	3	6	: : : : : : : : : : : : : : : : : : :			100	·	w		528.0 . 525.8 . 525.1	ROWN-TAI CLAYE GRAY-BRO VERY DE WE SEVER	RESIDU WN MED NSE SILT ATHERE ETA-ARG	JAL DIUM DENS TY SAND (A-2 DROCK EATHERED BILLITE Auger Ref	ETO A-2) usal at	6.5
EO_BRDG0103.GPJ NC_DO																				-	† - - - - - - - - - - - - - - - - - - -												- - - - - - - -					
CDOT BORE DOUBLE B5548_G																				-	† + + + + + + + + + + + + + + + + + + +												- - - - - - - -					







