

REFERENCE: I-2513AA

PROJECT: 34165

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
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STATE OF NORTH CAROLINA
 DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY BUNCOMBE
 PROJECT DESCRIPTION I-40 FROM 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 RETAINING WALL NO. W1002, FROM
-RPC- STATION 23 + 68.60, 88.85' RT TO -RPC-
STATION 29 + 85.00, 60.00' RT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-2513AA	1	7

CAUTION NOTICE

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

- NOTES:
- 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.

PERSONNEL

CG2

GOODNIGHT, D.J.

INVESTIGATED BY FALCON ENG.

DRAWN BY CROCKETT, S.C.

CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE JANUARY 2024



DocuSigned by:
Stephen Crockett 1/30/2024
 C5CA5FED48E0435...
 SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED

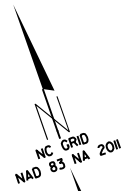
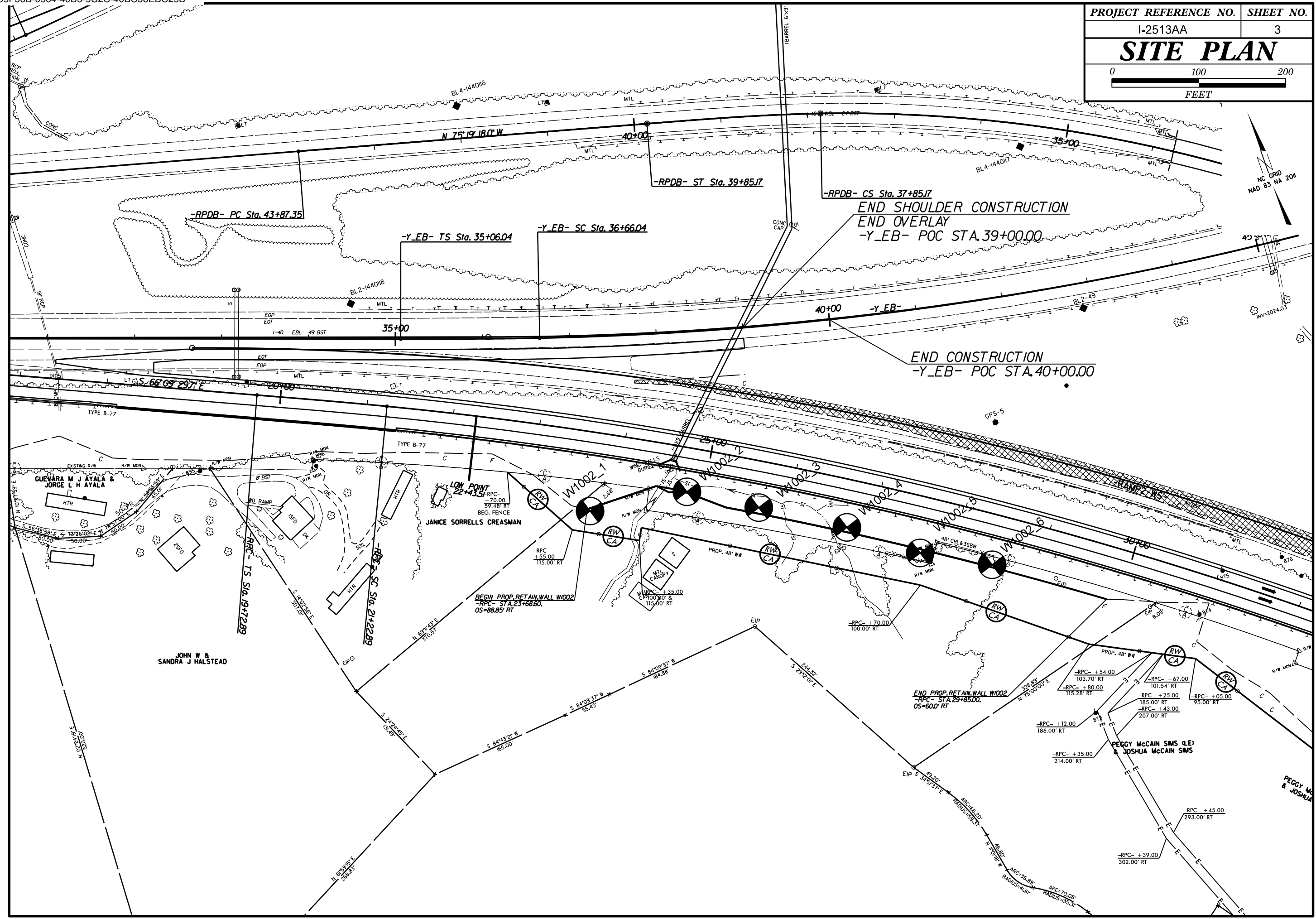
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

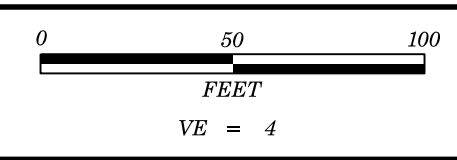
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

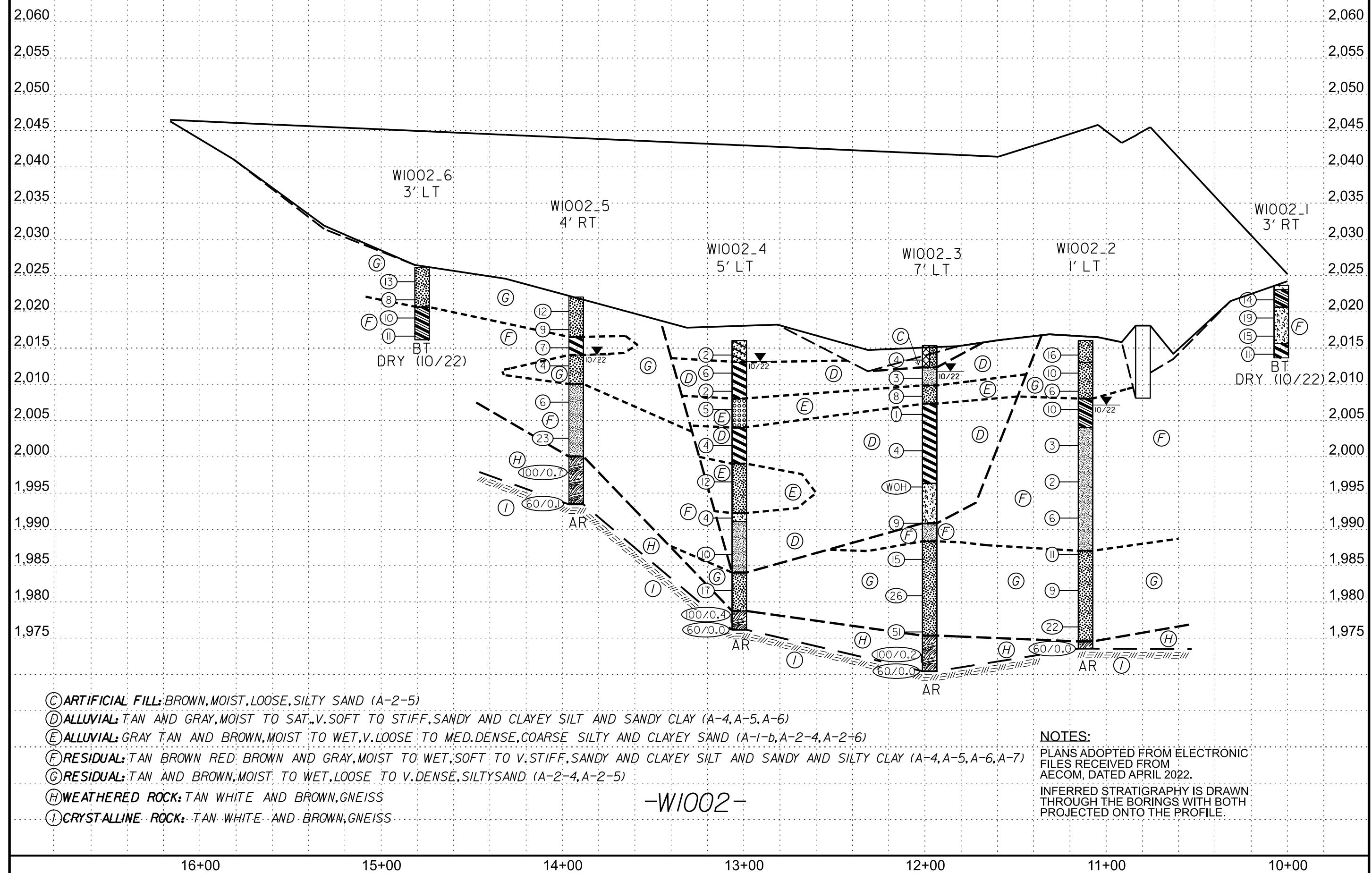
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																													
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER 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: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>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 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 REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. 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.</p>																													
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)									
<p>MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>										<p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p>										<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>									
COMPRESSION										PERCENTAGE OF MATERIAL										WEATHERING										GROUND WATER																													
<p>SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE</p>										<p>LL < 31 LL = 31 - 50 LL > 50</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>										<p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p>																													
<p>TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10%</p>										<p>GRANULAR SOILS 2 - 3% SILT - CLAY SOILS 3 - 5% OTHER MATERIAL TRACE 1 - 10% LITTLE 10 - 20% SOME 20 - 35% HIGHLY 35% AND ABOVE</p>										<p>VERY SLIGHT (IV SLI) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p>										<p>STATIC WATER LEVEL AFTER 24 HOURS</p>																													
<p>GROUP INDEX 0 GENERAL RATING AS SUBGRADE EXCELLENT TO GOOD</p>										<p>GROUP INDEX 0 GENERAL RATING AS SUBGRADE FAIR TO POOR</p>										<p>SLIGHT (SLI) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p>										<p>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p>																													
<p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>										<p>PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>										<p>MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p>										<p>SPRING OR SEEP</p>																													
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										ROCK HARDNESS										TEXTURE OR GRAIN SIZE																													
<p>PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p>										<p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>										<p>U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>																													
<p>GENERALY GRANULAR MATERIAL (NON-COHESSIVE) VERY LOOSE MEDIUM DENSE DENSE VERY DENSE</p>										<p>DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION</p>										<p>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p>										<p>BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CS.E. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)</p>																													
<p>GENERALY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT MEDIUM STIFF STIFF VERY STIFF HARD</p>										<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p>										<p>MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL</p>										<p>GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3</p>																													
SOIL MOISTURE - CORRELATION OF TERMS										RECOMMENDATION SYMBOLS										SOFT										VERY SOFT																													
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p>										<p>UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>VERY SOFT CAN BE GROVED OR GOUGED 0.25 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>										<p>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 PIECES CAN BE BROKEN BY FINGER PRESSURE.</p>																													
<p>LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SHRINKAGE LIMIT</p>										<p>ABBREVIATIONS MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p>										<p>MEDIUM HARD CAN BE GROVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>										<p>VERY SOFT 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 FINGER NAIL.</p>																													
<p>PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH</p>										<p>EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: CME-45C CME-55 CME-550X VANE SHEAR TEST PORTABLE HOIST</p>										<p>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 ALSO AN EXAMPLE.</p>										<p>TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>																													
<p>NON PLASTIC 0-5 SLIGHTLY PLASTIC 6-15 MODERATELY PLASTIC 16-25 HIGHLY PLASTIC 26 OR MORE</p>										<p>ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG-CARB. CORE BIT</p>										<p>VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>										<p>TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>																													
COLOR										FRACTURE SPACING										BEDDING										INDURATION																													
<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET</p>										<p>TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>																													

PROJECT REFERENCE NO.	SHEET NO.
I-2513AA	3
SITE PLAN	
0 100 200 FEET	





PROJECT REFERENCE NO.	SHEET NO.
I-2513AA	4
RETAINING WALL NO. W1002, FROM	
-RPC- STA. 23+68.60, 88.85' RT TO	
-RPC- STA. 29+85.00, 60.00' RT	



- Ⓒ **ARTIFICIAL FILL:** BROWN, MOIST, LOOSE, SILTY SAND (A-2-5)
- Ⓓ **ALLUVIAL:** TAN AND GRAY, MOIST TO SAT., V. SOFT TO STIFF, SANDY AND CLAYEY SILT AND SANDY CLAY (A-4, A-5, A-6)
- Ⓔ **ALLUVIAL:** GRAY TAN AND BROWN, MOIST TO WET, V. LOOSE TO MED. DENSE, COARSE SILTY AND CLAYEY SAND (A-1-b, A-2-4, A-2-6)
- Ⓕ **RESIDUAL:** TAN BROWN, RED, BROWN AND GRAY, MOIST TO WET, SOFT TO V. STIFF, SANDY AND CLAYEY SILT AND SANDY AND SILTY CLAY (A-4, A-5, A-6, A-7)
- Ⓖ **RESIDUAL:** TAN AND BROWN, MOIST TO WET, LOOSE TO V. DENSE, SILTY SAND (A-2-4, A-2-5)
- Ⓗ **WEATHERED ROCK:** TAN WHITE AND BROWN, GNEISS
- Ⓘ **CRYSTALLINE ROCK:** TAN WHITE AND BROWN, GNEISS

-W1002-

NOTES:
 PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM AECOM, DATED APRIL 2022.
 INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.										
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)									
BORING NO. W1002_1		STATION 23+72		OFFSET 90 ft RT		ALIGNMENT -RPC-										
COLLAR ELEV. 2,023.7 ft		TOTAL DEPTH 10.0 ft		NORTHING 676,237		EASTING 925,063										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Odom, C.		START DATE 10/07/22		COMP. DATE 10/07/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2025															2,023.7 GROUND SURFACE 0.0	
	2,022.7	1.0	6	6	8										2,023.1 TOPSOIL 0.9	
2020	2,020.2	3.5	5	7	12										2,020.7 RESIDUAL BROWN, STIFF, SANDY CLAY (A-6) 3.0	
	2,017.7	6.0	4	7	8										TAN-BROWN AND RED-TAN, STIFF TO V. STIFF, SANDY CLAYEY SILT (A-5)	
2015	2,015.2	8.5	3	5	6										2,015.7 TAN-GRAY, STIFF, SANDY SILTY CLAY (A-7) 8.0	
															2,013.7 Boring Terminated at Elevation 2,013.7 ft in RESIDUAL: (A-7) 10.0	

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.										
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)									
BORING NO. W1002_2		STATION 24+80		OFFSET 50 ft RT		ALIGNMENT -RPC-										
COLLAR ELEV. 2,016.1 ft		TOTAL DEPTH 42.5 ft		NORTHING 676,221		EASTING 925,176										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Odom, C.		START DATE 10/10/22		COMP. DATE 10/10/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2020															2,016.1 GROUND SURFACE 0.0	
2015	2,015.1	1.0	8	8	8										2,013.1 RESIDUAL BROWN, MED. DENSE, SILTY SAND (A-2-4) 3.0	
	2,012.6	3.5	5	5	5										TAN AND BROWN, LOOSE TO MED. DENSE, CLAYEY SILTY SAND (A-2-5)	
2010	2,010.1	6.0	3	2	4										2,008.1 TAN, STIFF, SANDY CLAY (A-6) 8.0	
	2,007.6	8.5	3	4	6										2,004.1 BROWN-TAN, SOFT TO MED. STIFF, SANDY SILT (A-4) 12.0	
2005	2,002.6	13.5	3	2	1											
2000	1,997.6	18.5	1	1	1											
1995	1,992.6	23.5	2	3	3											
1990	1,987.6	28.5	3	4	7											
1985	1,982.6	33.5	3	4	5											
1980	1,977.6	38.5	4	5	17											
1975	1,973.6	42.5	60	0	0											
															1,974.6 WEATHERED ROCK 41.5	
															1,973.6 TAN AND WHITE, GNEISS 42.5	
															Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,973.6 ft on CR: GNEISS	

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GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.									
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)								
BORING NO. W1002_3		STATION 25+66		OFFSET 53 ft RT		ALIGNMENT -RPC-									
COLLAR ELEV. 2,015.4 ft		TOTAL DEPTH 44.9 ft		NORTHING 676,177		EASTING 925,248									
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Odom, C.		START DATE 10/11/22		COMP. DATE 10/11/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2020															
2015	2,014.4	1.0		2	2	2									2,015.4 GROUND SURFACE 0.0
	2,011.9	3.5	WOH	1	2										2,012.4 ARTIFICIAL FILL BROWN, LOOSE, CLAYEY SILTY SAND (A-2-5) 3.0
2010	2,009.4	6.0		3	3	5									2,009.9 ALLUVIAL BROWN, SOFT, SANDY SILT (A-4) WITH TRACE ORGANICS 5.5
	2,006.9	8.5	WOH	WOH	1										2,007.4 GRAY, LOOSE, SILTY SAND (A-2-4) WITH SOME GRAVEL 8.0
2005	2,001.9	13.5		1	2	2									Sat. GRAY, V. SOFT TO SOFT, SILTY CLAY (A-7) 19.0
2000	1,996.9	18.5	WOH	WOH	WOH										1,996.4 RESIDUAL GRAY AND WHITE, STIFF, CLAYEY SILT (A-5) WITH TRACE ROCK FRAGMENTS 19.0
1995	1,991.9	23.5		3	4	5									1,990.9 GRAY AND WHITE, STIFF, SANDY SILT (A-4) WITH TRACE ROCK FRAGMENTS 24.5
1990	1,986.9	28.5		3	6	9									1,988.4 WHITE AND GRAY, MED. DENSE TO V. DENSE, SILTY SAND (A-2-4) WITH TRACE MICA 27.0
1985	1,981.9	33.5		8	13	13									M TAN, STIFF, SANDY SILT (A-4) WITH TRACE MICA 32.0
1980	1,976.9	38.5		8	15	36									M TAN AND BROWN, MED. DENSE, SILTY SAND (A-2-4) 32.0
1975	1,971.9	43.5		100/0.2											M WEATHERED ROCK TAN AND WHITE, GNEISS 37.3
	1,970.5	44.9		60/0.0											M Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,970.5 ft on CR: GNEISS 44.9

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.									
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)								
BORING NO. W1002_4		STATION 26+71		OFFSET 55 ft RT		ALIGNMENT -RPC-									
COLLAR ELEV. 2,016.1 ft		TOTAL DEPTH 39.9 ft		NORTHING 676,122		EASTING 925,336									
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Odom, C.		START DATE 10/11/22		COMP. DATE 10/11/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2020															
2015	2,015.1	1.0		2	1	1									2,016.1 GROUND SURFACE 0.0
	2,012.6	3.5		2	3	3									2,013.1 ALLUVIAL TAN-BROWN, V. LOOSE, CLAYEY SAND (A-2-6) 3.0
2010	2,010.1	6.0	WOH	WOH	2										2,008.1 TAN AND GRAY, SOFT TO MED. STIFF, SANDY SILTY CLAY (A-7) 8.0
	2,007.6	8.5		3	2	3									2,008.1 LIGHT GRAY, LOOSE, SILTY F. TO CSE. SAND (A-1-b) 8.0
2005	2,002.6	13.5	WOH	1	3										2,004.1 GRAY, SOFT TO MED. STIFF, SANDY SILTY CLAY (A-7) WITH LENSES OF CSE. SAND 12.0
2000	1,997.6	18.5		6	7	5									1,999.1 GRAY, MED. DENSE, SILTY SAND (A-2-4) 17.0
1995	1,992.6	23.5		3	2	2									1,992.3 DARK GRAY, SOFT TO MED. STIFF, SANDY CLAYEY SILT (A-5) WITH LITTLE MICA 23.8
1990	1,987.6	28.5		3	4	6									1,991.1 RESIDUAL TAN, STIFF, SANDY SILT (A-4) WITH TRACE MICA 25.0
1985	1,982.6	33.5		3	5	12									1,984.1 TAN AND BROWN, MED. DENSE, SILTY SAND (A-2-4) 32.0
1980	1,977.6	38.5		100/0.4											1,978.8 WEATHERED ROCK TAN AND WHITE, GNEISS 37.3
	1,976.2	39.9		60/0.0											1,976.2 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 1,976.2 ft on CR: GNEISS 39.9

NCDOT BORE DOUBLE I-1213AA_GEO.GPJ NC_DOT_GDT 9/8/23

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.										
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)									
BORING NO. W1002_5		STATION 27+61		OFFSET 64 ft RT		ALIGNMENT -RPC-										
COLLAR ELEV. 2,022.1 ft		TOTAL DEPTH 28.6 ft		NORTHING 676,067		EASTING 925,406										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Odom, C.		START DATE 10/12/22		COMP. DATE 10/12/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2025																
2020	2,021.1	1.0	8	6	6											
	2,018.6	3.5	5	4	5											
2015	2,016.1	6.0	2	3	4											
	2,013.6	8.5	2	2	2											
2010	2,008.6	13.5	2	3	3											
2005	2,003.6	18.5	2	8	15											
2000	1,998.6	23.5	40	60/0.2												
1995	1,993.6	28.5	60/0.1													

WBS 34165.1.2		TIP 1-2513AA		COUNTY BUNCOMBE		GEOLOGIST Goodnight, D.J.										
SITE DESCRIPTION RETAINING WALL NO. W1002, FROM -RPC- STA. 23+68.60, 88.85' RT TO -RPC- STA. 29+85.00, 60.00' RT							GROUND WTR (ft)									
BORING NO. W1002_6		STATION 28+46		OFFSET 57 ft RT		ALIGNMENT -RPC-										
COLLAR ELEV. 2,026.2 ft		TOTAL DEPTH 10.0 ft		NORTHING 676,027		EASTING 925,480										
DRILL RIG/HAMMER EFF./DATE CG24113 CME-550X 74% 04/08/2022				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Odom, C.		START DATE 10/10/22		COMP. DATE 10/10/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2030																
2025	2,025.2	1.0	6	6	7											
	2,022.7	3.5	5	4	4											
2020	2,020.2	6.0	10	5	5											
	2,017.7	8.5	3	5	6											

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