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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

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, *VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS					
	A-1	A-3	A-2	A-4	A-5	A-7	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7					
GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7					A-3							
SYMBOL																		
% PASSING	50 MX 30 MN 15 ML	50 MX 25 MN	51 MN 10 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT	
MATERIAL PASSING #40 LL PI	— 6 MX	— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	40 MX 10 MX	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS		
GROUP INDEX	0	0	0	4 MX	0 MX	0 MX	12 MX	16 MX	NO MX									
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS., GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS	CLAYEY SOILS										
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSATURABLE									
	PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																	

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

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
BOULDER (BLDR.)						
COBBLE (COB.)						
GRAVEL (GR.)						
COARSE SAND (CSE, SD.)						
FINE SAND (F SD.)						
SILT (SL.)						
CLAY (CL.)						
GRAIN SIZE	305	75	2.0	0.25	0.05	0.005
SIZE IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
LL	LIQUID LIMIT	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
PL	PLASTIC LIMIT	
OM	OPTIMUM MOISTURE SHRINKAGE LIMIT	
	- SATURATED - (SAT.)	
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

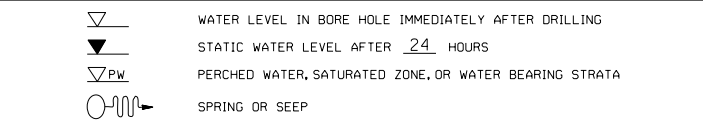
COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE LL < 31
MODERATELY COMPRESSIBLE LL = 31 - 50
HIGHLY COMPRESSIBLE LL > 50

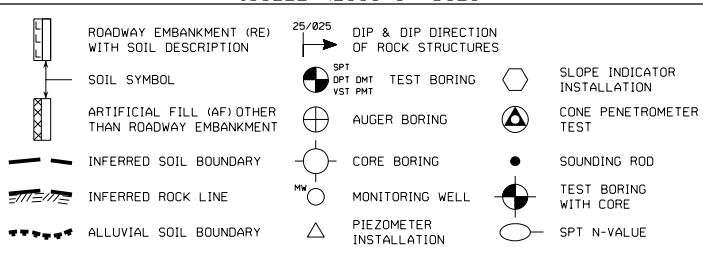
PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY
			35% AND ABOVE

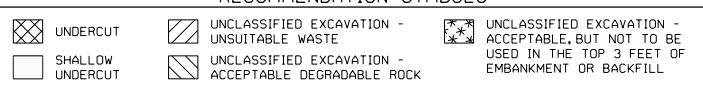
GROUND WATER



MISCELLANEOUS SYMBOLS



RECOMMENDATION SYMBOLS



ABBREVIATIONS

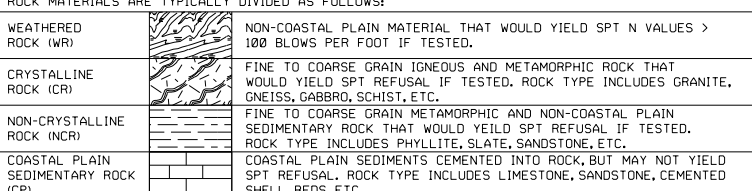
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST
BT - BORING TERMINATED	MICA. - MICACEOUS	WEA. - WEATHERED
CL. - CLAY	MOD. - MODERATELY	U - UNIT WEIGHT
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	U _d - DRY UNIT WEIGHT
CSE. - COARSE	ORG. - ORGANIC	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	SAMPLE ABBREVIATIONS
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITIC	S - BULK
ϕ - 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 RATIO
HI. - HIGHLY	V - VERY	

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	
<input checked="" type="checkbox"/> CME-550	<input type="checkbox"/> 8" HOLLOW AUGERS	CORE SIZE:
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -B <input type="checkbox"/> -H
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	<input type="checkbox"/> -N
	<input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER	HAND TOOLS:
	<input checked="" type="checkbox"/> TRICONE 2 15/16" STEEL TEETH	<input type="checkbox"/> POST HOLE DIGGER
	<input type="checkbox"/> TRICONE " TUNG-CARB.	<input type="checkbox"/> HAND AUGER
	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> SOUNDING ROD
	<input checked="" type="checkbox"/> 2 1/4" HOLLOW AUGERS	<input type="checkbox"/> VANE SHEAR TEST

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:



WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V 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.
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.
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.
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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i>
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i>
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED 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.
SOFT	CAN BE GROOVED 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.
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.

FRACTURE SPACING

TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
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
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET

INDURATION

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.

TERMS AND DEFINITIONS

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 DISLOADED 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 (SRQD)	A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TOPSOIL (TS.)	SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

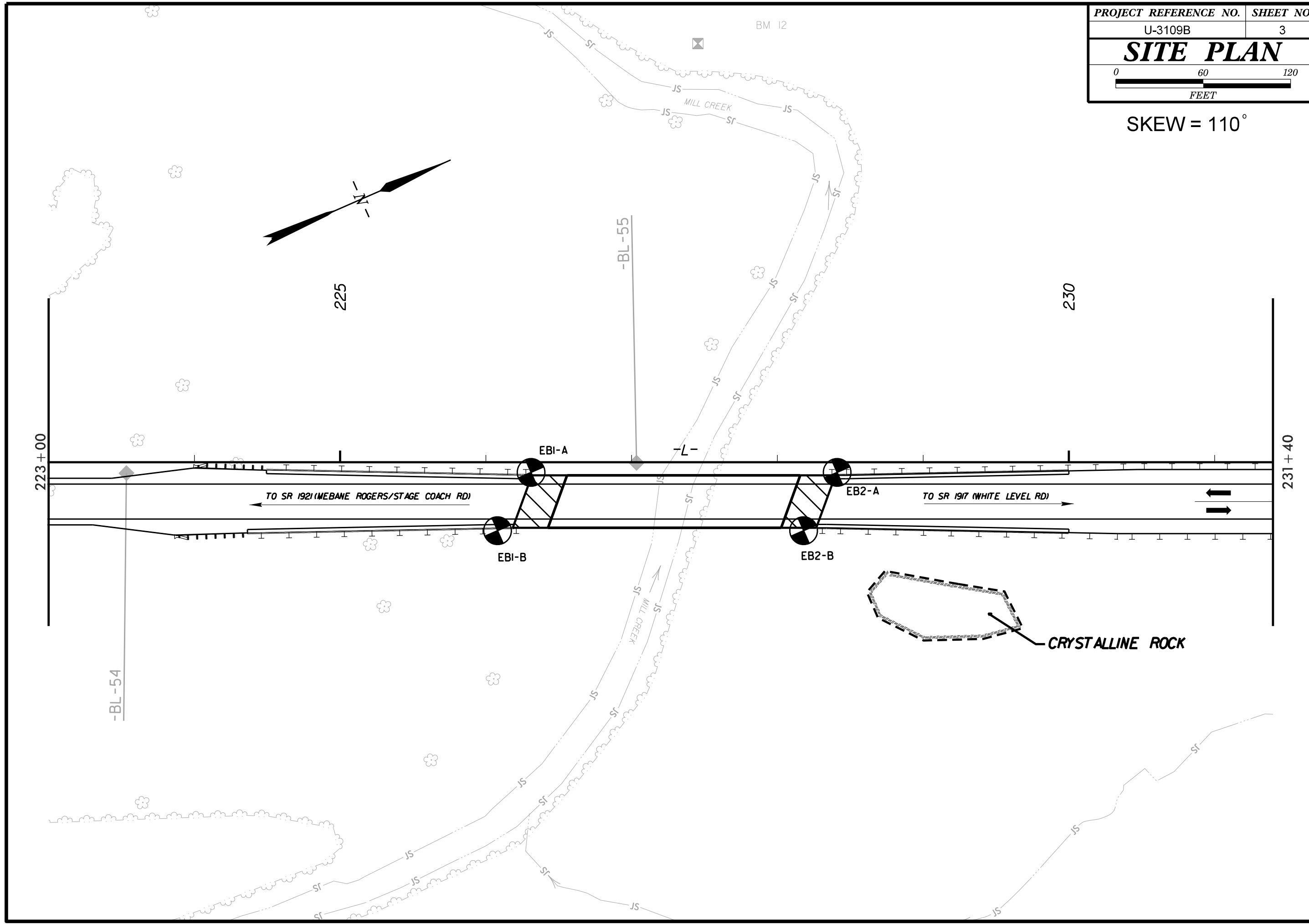
BENCH MARK: BL-55

N: 861605.0338 E: 1916694.3011 ELEVATION: 556.81 FEET

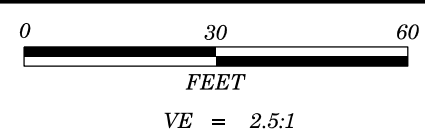
NOTES:

PROJECT REFERENCE NO.	SHEET NO.
U-3109B	3
SITE PLAN	

SKEW = 110°



7/2/99



PROJECT REFERENCE NO.	SHEET NO.
U-3109B	4
-L- PROFILE	

600

600

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

580

580

- (A) MEDIUM STIFF TO HARD, ORANGE, RED, BROWN, AND WHITE, CLAYEY SILT (A-5) AND SILTY CLAY (A-7-6), DRY TO MOIST (RESIDUAL)
- (B) GRAY, METAVOLCANIC, WEATHERED ROCK

560

560

540

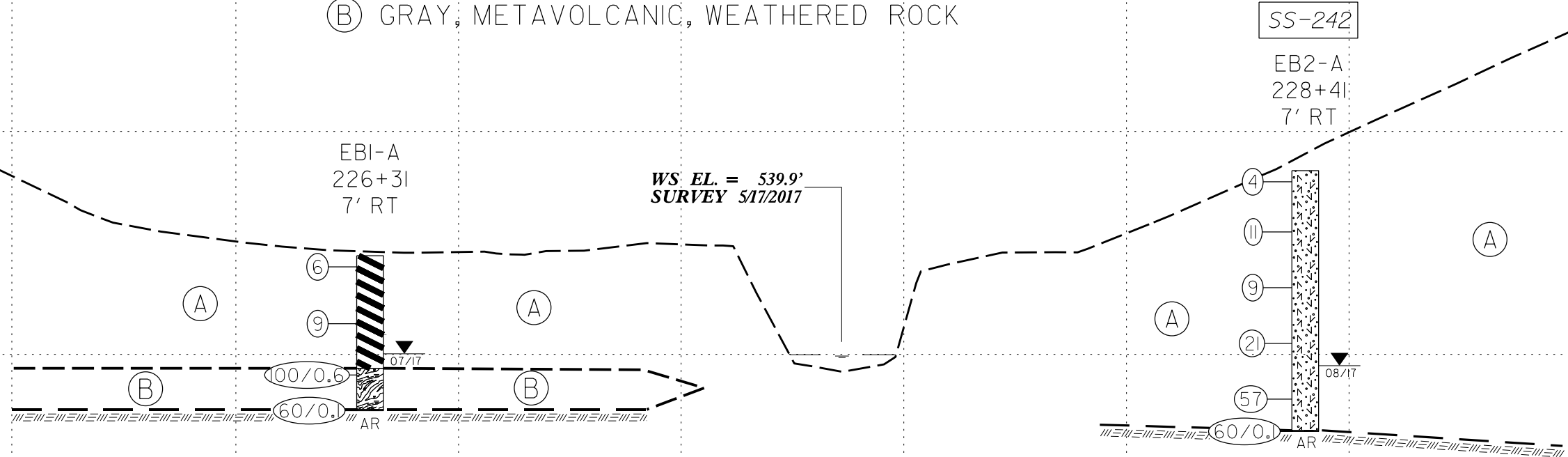
540

520

520

500

500



GRAY, METAVOLCANIC, CRYSTALLINE ROCK

GRAY, METAVOLCANIC, CRYSTALLINE ROCK

NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM U3109b Is tin 170502.tin RECEIVED ON 1/5/2018

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

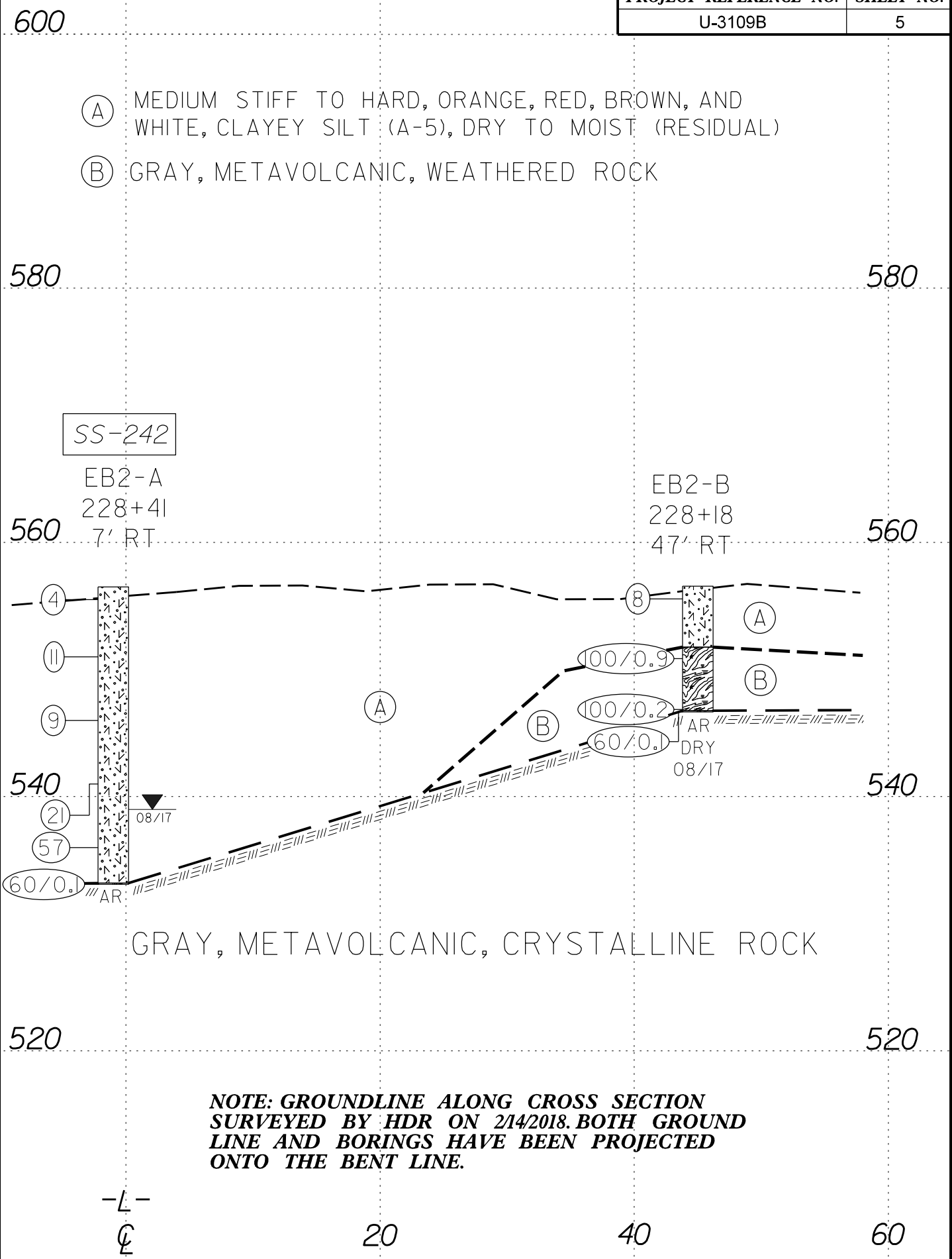
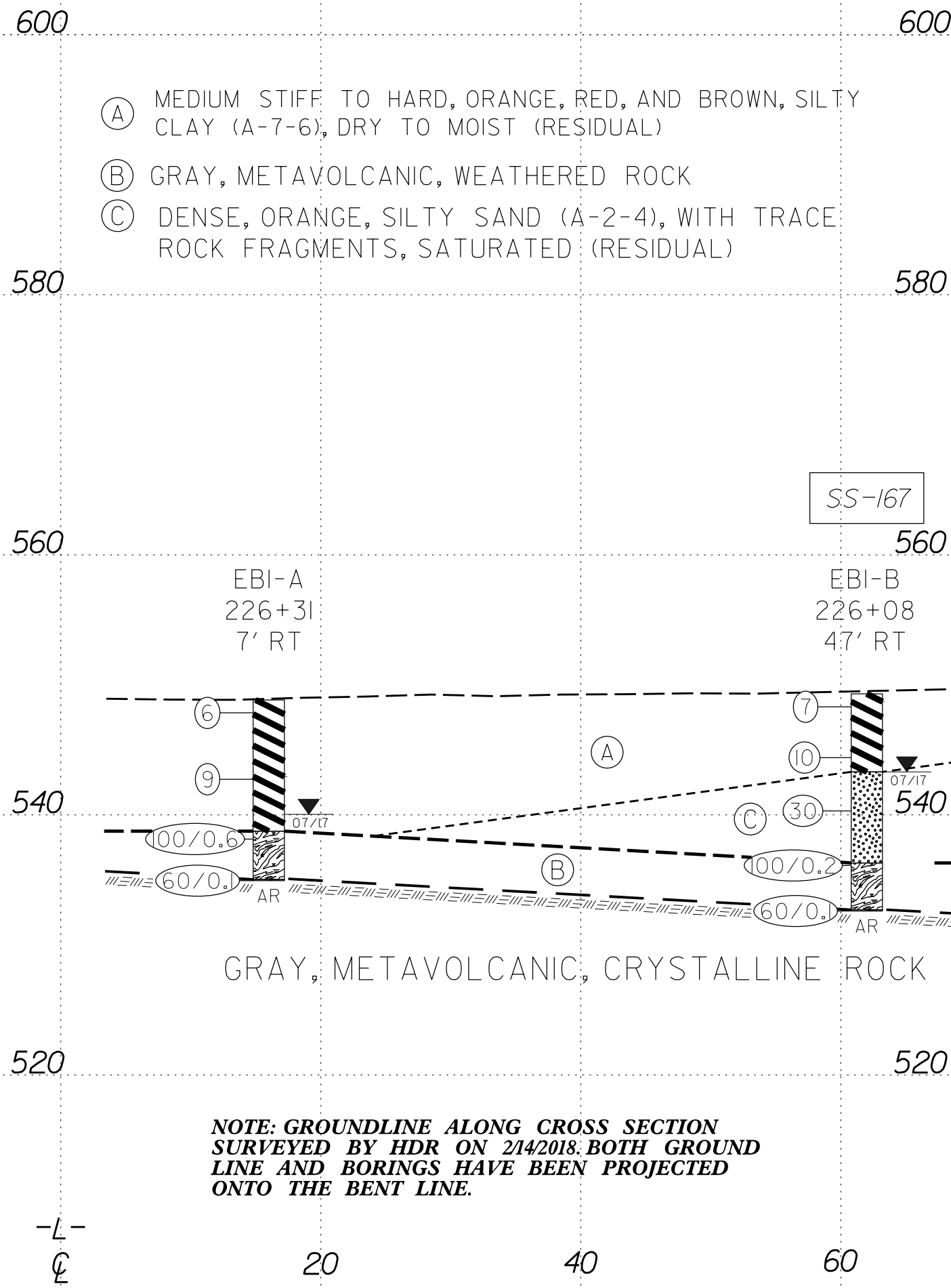
226+00

227+00

228+00

229+00

7/2/99



HORIZ. SCALE 0 10 20 (FEET)

VE = N/A

EBI CROSS SECTION -L- STA 226+53
SKEW = 110°

HORIZ. SCALE 0 10 20 (FEET)

VE = N/A

EB2 CROSS SECTION -L- STA 228+13
SKEW = 110°

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34900.1.FR3		TIP U-3109B		COUNTY ALAMANCE		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION NC 119 RELOCATION FROM NORTH OF US 70 TO SOUTH OF SR 1918 (MRS WHITE ROAD)							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 226+31		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 548.9 ft		TOTAL DEPTH 13.9 ft		NORTHING 861,536		EASTING 1,916,672										
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 01/27/2015			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/26/17		COMP. DATE 07/26/17		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						
550	548.9	0.0	2	3	3									548.9	GROUND SURFACE	0.0
545	543.8	5.1	2	4	5									543.8	RESIDUAL Orange, silty CLAY (A-7-6), medium stiff to stiff	
540	538.8	10.1	88	12/0.1										538.8	WEATHERED ROCK Gray and green, METAVOLCANIC	10.1
535	535.1	13.8	60/0.1											535.1	CRYSTALLINE ROCK METAVOLCANIC	13.8
														535.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 535.0 ft in CRYSTALLINE ROCK (METAVOLCANIC)	13.9
															Auger Refusal @ 13.8'	

WBS 34900.1.FR3		TIP U-3109B		COUNTY ALAMANCE		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION NC 119 RELOCATION FROM NORTH OF US 70 TO SOUTH OF SR 1918 (MRS WHITE ROAD)							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 226+08		OFFSET 47 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 549.4 ft		TOTAL DEPTH 16.7 ft		NORTHING 861,499		EASTING 1,916,699										
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 01/27/2015			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Contract Driller		START DATE 07/26/17		COMP. DATE 07/26/17		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						
550	549.4	0.0	3	4	3									549.4	GROUND SURFACE	0.0
545	545.5	3.9	3	4	6									543.4	RESIDUAL Brown and red, silty CLAY (A-7-6), contains roots, medium stiff to stiff	
540	541.4	8.0	8	15	15									543.4	Orange, silty SAND (A-2-4), with trace rock fragments, dense	6.0
535	536.4	13.0	100/0.2											536.4	WEATHERED ROCK Gray, METAVOLCANIC	13.0
	532.8	16.6	60/0.1											532.8	CRYSTALLINE ROCK METAVOLCANIC	16.6
														532.7	Boring Terminated with Standard Penetration Test Refusal at Elevation 532.7 ft in CRYSTALLINE ROCK (METAVOLCANIC)	16.7
															Auger Refusal @ 16.6'	

NCDOT BORE DOUBLE U3109B_GEO_BRDG.GPJ NC_DOT.GDT 3/15/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 34900.1.FR3		TIP U-3109B		COUNTY ALAMANCE		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION NC 119 RELOCATION FROM NORTH OF US 70 TO SOUTH OF SR 1918 (MRS WHITE ROAD)							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 228+41		OFFSET 7 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 556.5 ft		TOTAL DEPTH 23.4 ft		NORTHING 861,728		EASTING 1,916,698										
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 01/27/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 08/02/17		COMP. DATE 08/02/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
560																
	556.5	0.0	1	1	3										556.5	GROUND SURFACE
555																RESIDUAL Red, orange, brown, and white clayey SILT (A-5), stiff to hard
	552.0	4.5	2	4	7											
550																
	547.0	9.5	3	4	5											
545																
	542.0	14.5	3	7	14											
540																
	537.0	19.5	6	2	55											
535																
	533.2	23.3	60/0.1			60/0.1									533.2	23.3
															533.1	23.4
CRYSTALLINE ROCK Gray, METAVOLCANIC Boring Terminated with Standard Penetration Test Refusal at Elevation 533.1 ft in CRYSTALLINE ROCK (METAVOLCANIC) Auger Refusal @ 23.3'																

WBS 34900.1.FR3		TIP U-3109B		COUNTY ALAMANCE		GEOLOGIST Crenshaw, J. K.										
SITE DESCRIPTION NC 119 RELOCATION FROM NORTH OF US 70 TO SOUTH OF SR 1918 (MRS WHITE ROAD)							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 228+18		OFFSET 47 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 556.6 ft		TOTAL DEPTH 9.9 ft		NORTHING 861,691		EASTING 1,916,783										
DRILL RIG/HAMMER EFF./DATE CAT1303 CME-550 77% 01/27/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Contract Driller		START DATE 08/02/17		COMP. DATE 08/02/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
560																
	556.6	0.0	2	3	5										556.6	GROUND SURFACE
555																RESIDUAL Brown and red, clayey SILT (A-5), medium stiff
	551.8	4.8	40	60/0.4											551.8	4.8
550																WEATHERED ROCK Tan and gray, METAVOLCANIC
	547.1	9.5	100/0.2			100/0.2									546.8	9.8
	546.8	9.8	60/0.1			60/0.1									546.7	9.9
CRYSTALLINE ROCK Gray, METAVOLCANIC Boring Terminated with Standard Penetration Test Refusal at Elevation 546.7 ft in CRYSTALLINE ROCK (METAVOLCANIC) Auger Refusal @ 9.8'																

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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS- 167	47' RT	226+08	3.9-5.4	A-7-6(24)	51	23	1.5	13.4	47.7	37.3	100	99	90	28	-
SS- 242	7' RT	228+18	4.5-6.0	A-5(6)	48	NP	4.6	7.3	43.5	43.8	99	96	90	30	-



Photo 1: Looking Northwest and Downstream at Mill Creek



Photo 2: Looking Southeast and Upstream at Mill Creek



Photo 3: Looking Southwest towards End Bent 1 (Mill Creek flows from left to right)



Photo 4: Looking Northeast towards End Bent 2 (Mill Creek flows from right to left)