

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34901.1.1 (U-3110B)	1	11

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

STRUCTURE
SUBSURFACE INVESTIGATION

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-6	CROSS SECTION(S)
7-9	BORE LOG(S)
10	SOIL TEST RESULTS
11	SITE PHOTOGRAPH(S)

PROJ. REFERENCE NO. 34901.1.1 (U-3110B) F.A. PROJ. STP-0701(7)
COUNTY ALAMANCE
PROJECT DESCRIPTION SR 1311 (COOK RD.) IMPROVEMENTS AND
CONNECTOR FROM SR 1309 (WESTBROOK AVE.) TO NC 100
(HAGGARD AVE.)
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER
-Y3- (HAGGARD AVENUE) AT STATION 58+97

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PROJECT: 34901.1.1 ID: U-3110B

PERSONNEL

N. D. MOHS

J. R. MATULA

CONSULTANTS:

SUMMIT ENG.

SUB-TECH

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

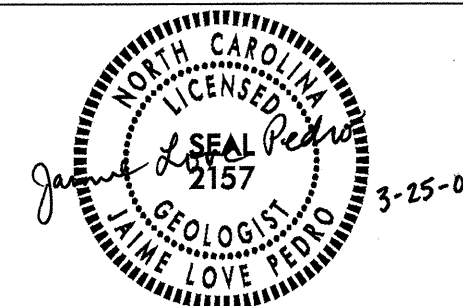
SUBMITTED BY J. L. PEDRO

DATE MARCH 2009

DRAWN BY: J. L. PEDRO

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

NOTE - 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.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBSURFACE INVESTIGATION

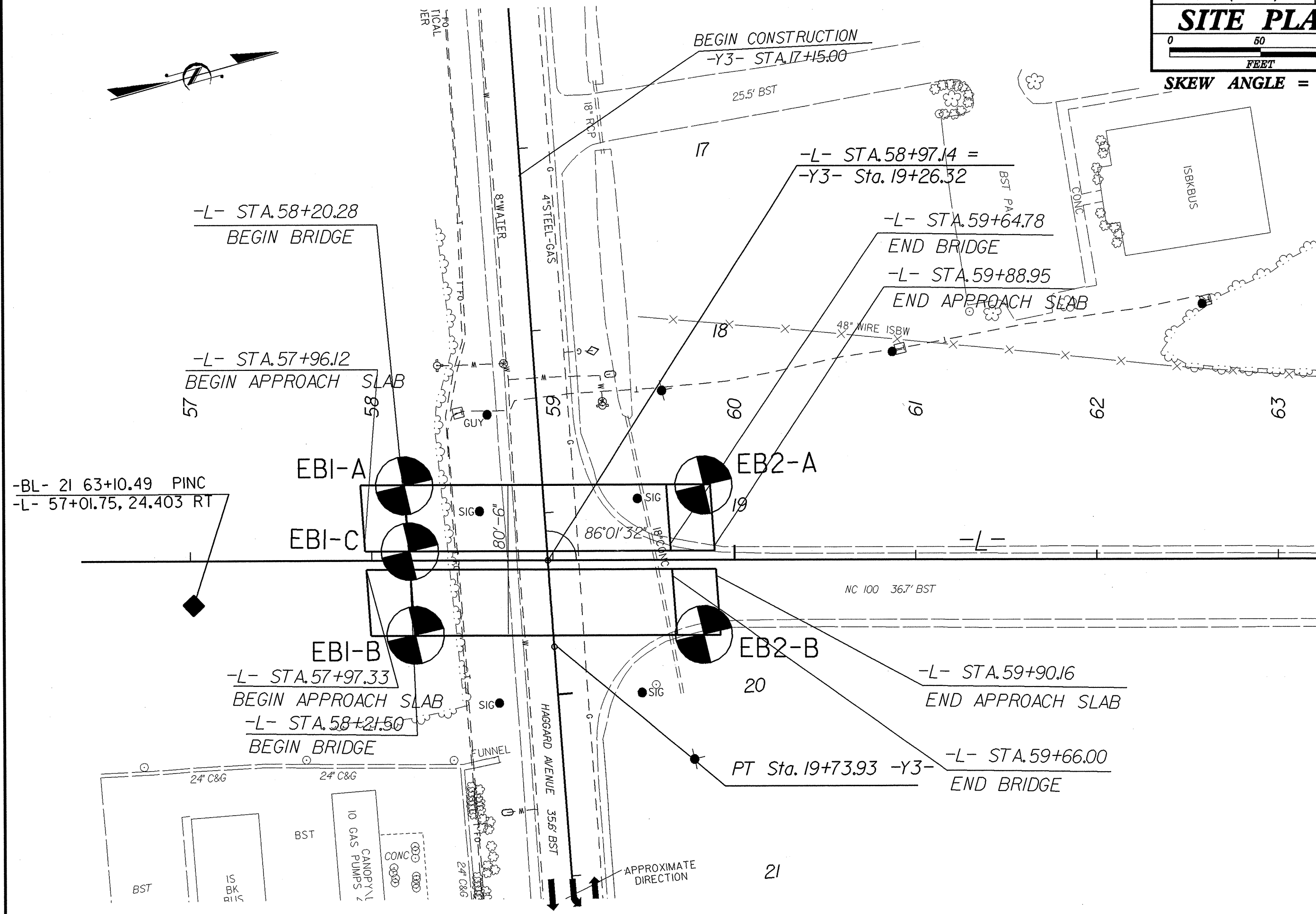
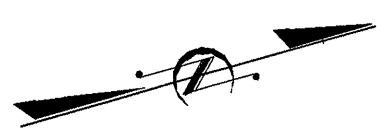
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

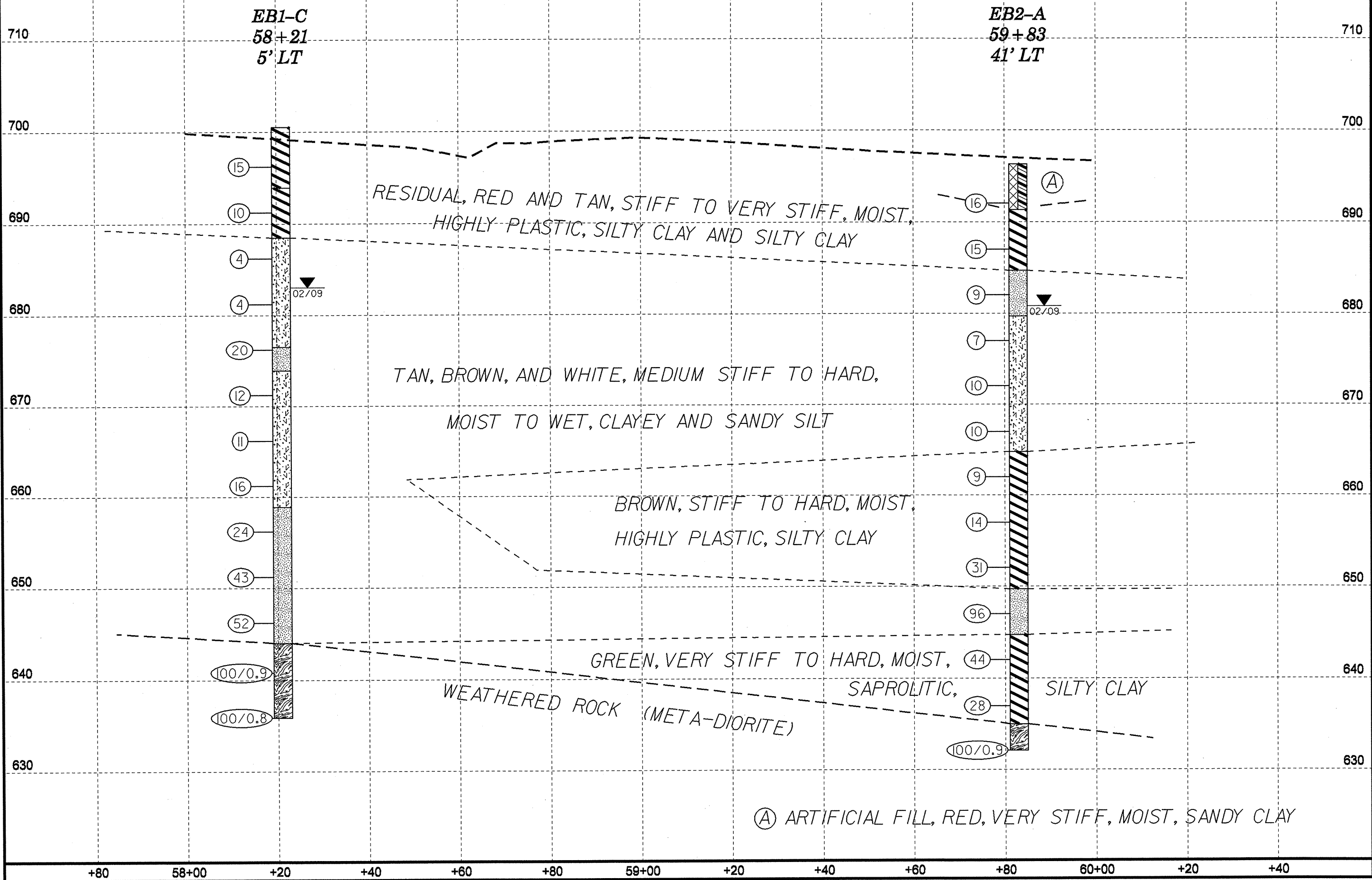
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																					
<p>SOIL IS CONSIDERED TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST 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. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>	<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, 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:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) 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>NON-CRYSTALLINE ROCK (NCR) 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 SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>	<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>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.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>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.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - 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.</p> <p>SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>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 INTRODUCED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>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.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>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.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																					
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="7">GRANULAR MATERIALS (<= 35% PASSING #200)</th> <th colspan="7">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th><th>A-1-b</th><th>A-3</th><th>A-2</th><th>A-2-5</th><th>A-2-6</th><th>A-2-7</th> <th>A-4</th><th>A-5</th><th>A-6</th><th>A-7</th><th>A-1, A-2</th><th>A-3</th><th>A-4, A-5</th><th>A-6, A-7</th> <th>A-1, A-2</th><th>A-3</th><th>A-4, A-5</th> </tr> <tr> <th>GROUP CLASS.</th> <td colspan="2">A-1</td><td>A-3</td><td>A-2</td><td>A-2-5</td><td>A-2-6</td><td>A-2-7</td> <td>A-4</td><td>A-5</td><td>A-6</td><td>A-7</td> <td>A-1, A-2</td><td>A-3</td><td>A-4, A-5</td><td>A-6, A-7</td> <td>A-1, A-2</td><td>A-3</td><td>A-4, A-5</td> </tr> <tr> <th>SYMBOL</th> <td colspan="2">[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td> <td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td> <td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td> <td>[Symbol]</td><td>[Symbol]</td><td>[Symbol]</td> </tr> <tr> <th>% PASSING</th> <td>10</td><td>40</td><td>200</td><td colspan="7"></td><td colspan="7"></td><td colspan="3"></td> </tr> <tr> <th>LIQUID LIMIT PLASTIC INDEX</th> <td colspan="2">6 MX</td><td>NP</td><td>40 MX</td><td>41 MN</td><td>40 MX</td><td>41 MN</td><td>40 MX</td><td>41 MN</td><td>40 MX</td><td>41 MN</td><td>40 MX</td><td>41 MN</td><td>40 MX</td><td>41 MN</td><td colspan="2">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td><td>HIGHLY ORGANIC SOILS</td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="2">0</td><td>0</td><td>0</td><td>4 MX</td><td>8 MX</td><td>12 MX</td><td>15 MX</td><td>No MX</td><td colspan="8"></td><td></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS GRAVEL AND SAND</td><td>FINE SAND</td><td colspan="3">SILTY OR CLAYEY GRAVEL AND SAND</td><td>SILTY GRAVEL</td><td colspan="2">CLAYEY SILT</td><td colspan="8"></td><td></td> </tr> <tr> <th>GENERAL RATING AS A SUBGRADE</th> <td colspan="7">EXCELLENT TO GOOD</td><td colspan="7">FAIR TO POOR</td><td>FAIR TO POOR</td><td>POOR</td><td>UNSUITABLE</td><td colspan="3"></td> </tr> </table> <p style="text-align: center;">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</p>	GENERAL CLASS.	GRANULAR MATERIALS (<= 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS			A-1	A-1-b	A-3	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	A-1, A-2	A-3	A-4, A-5	GROUP CLASS.	A-1		A-3	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	A-1, A-2	A-3	A-4, A-5	SYMBOL	[Symbol]		[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	[Symbol]	% PASSING	10	40	200																		LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS	GROUP INDEX	0		0	0	4 MX	8 MX	12 MX	15 MX	No MX										USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND			SILTY GRAVEL	CLAYEY SILT											GENERAL RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR							FAIR TO POOR	POOR	UNSUITABLE				<p style="text-align: center;">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p style="text-align: center;">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50</p> <p style="text-align: center;">PERCENTAGE OF MATERIAL</p> <table border="1" style="width: 100%; text-align: center;"> <tr> <th rowspan="2">ORGANIC MATERIAL</th> <th colspan="2">GRANULAR SOILS</th> <th colspan="2">SILT - CLAY SOILS</th> <th colspan="2">OTHER MATERIAL</th> </tr> <tr> <th>2 - 3%</th><th>3 - 5%</th><th>3 - 5%</th><th>5 - 12%</th><th>TRACE</th><th>1 - 10%</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td><td>2 - 3%</td><td>3 - 5%</td><td>3 - 5%</td><td>5 - 12%</td><td>LITTLE</td><td>10 - 20%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td><td>3 - 5%</td><td>5 - 12%</td><td>5 - 12%</td><td>12 - 20%</td><td>SOME</td><td>20 - 35%</td> </tr> <tr> <td>MODERATELY ORGANIC</td><td>5 - 10%</td><td>12 - 20%</td><td>12 - 20%</td><td>> 20%</td><td>HIGHLY</td><td>35% AND ABOVE</td> </tr> <tr> <td>HIGHLY ORGANIC</td><td>> 10%</td><td>> 20%</td><td>> 20%</td><td>> 20%</td><td></td><td></td> </tr> </table> <p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>	ORGANIC MATERIAL	GRANULAR SOILS		SILT - CLAY SOILS		OTHER MATERIAL		2 - 3%	3 - 5%	3 - 5%	5 - 12%	TRACE	1 - 10%	TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	3 - 5%	5 - 12%	LITTLE	10 - 20%	LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	5 - 12%	12 - 20%	SOME	20 - 35%	MODERATELY ORGANIC	5 - 10%	12 - 20%	12 - 20%	> 20%	HIGHLY	35% AND ABOVE	HIGHLY ORGANIC	> 10%	> 20%	> 20%	> 20%			<p style="text-align: center;">WEATHERING</p> <p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</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>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>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.</p> <p>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.</p> <p>VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN.</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 style="text-align: center;">ROCK HARDNESS</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>HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>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.</p> <p>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.</p> <p>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.</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>
GENERAL CLASS.		GRANULAR MATERIALS (<= 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)							ORGANIC MATERIALS																																																																																																																																																																																																								
	A-1	A-1-b	A-3	A-2	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7	A-1, A-2	A-3	A-4, A-5																																																																																																																																																																																																						
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LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS																																																																																																																																																																																																						
GROUP INDEX	0		0	0	4 MX	8 MX	12 MX	15 MX	No MX																																																																																																																																																																																																															
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND			SILTY GRAVEL	CLAYEY SILT																																																																																																																																																																																																																
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SITE PLAN



SKIEW ANGLE = 86°





E1-A
58+18
41' LT

E1-C
58+21
5' LT

E1-B
58+24
41' RT

710

710



700

700

(17)

(15)

(18)

(12)

(10)

(8)

(13)

(4)

(7)

02/09

02/09

02/09

(9)

(20)

(7)

(20)

(12)

(27)

(38)

(11)

(14)

(23)

(16)

(19)

(16)

(24)

(14)

(27)

(43)

(16)

(100/0.4)

(52)

(100/0.4)

(100/0.9)

(100/0.9)

(60/0.1)

(100/0.2)

(100/0.8)

(60/0.1)

630

630

620

620

610

610

600

600

590

590

580

580

AND TAN, MED. TO VERY STIFF,
SILTY CLAY AND SILTY CLAY

TAN, BROWN,
AND WHITE, LOOSE
TO MED. DENSE, WET,
SILTY SAND

STIFF TO

CLAYEY AND SANDY SILT

(META-DIORITE)

WEATHERED ROCK

CRYSTALLINE ROCK
(META-DIORITE)

Ⓐ RESIDUAL, TAN, MEDIUM DENSE, WET, SILTY SAND



VE = 1:1

CROSS SECTION THROUGH END BENT 1

SKEW ANGLE = 86°

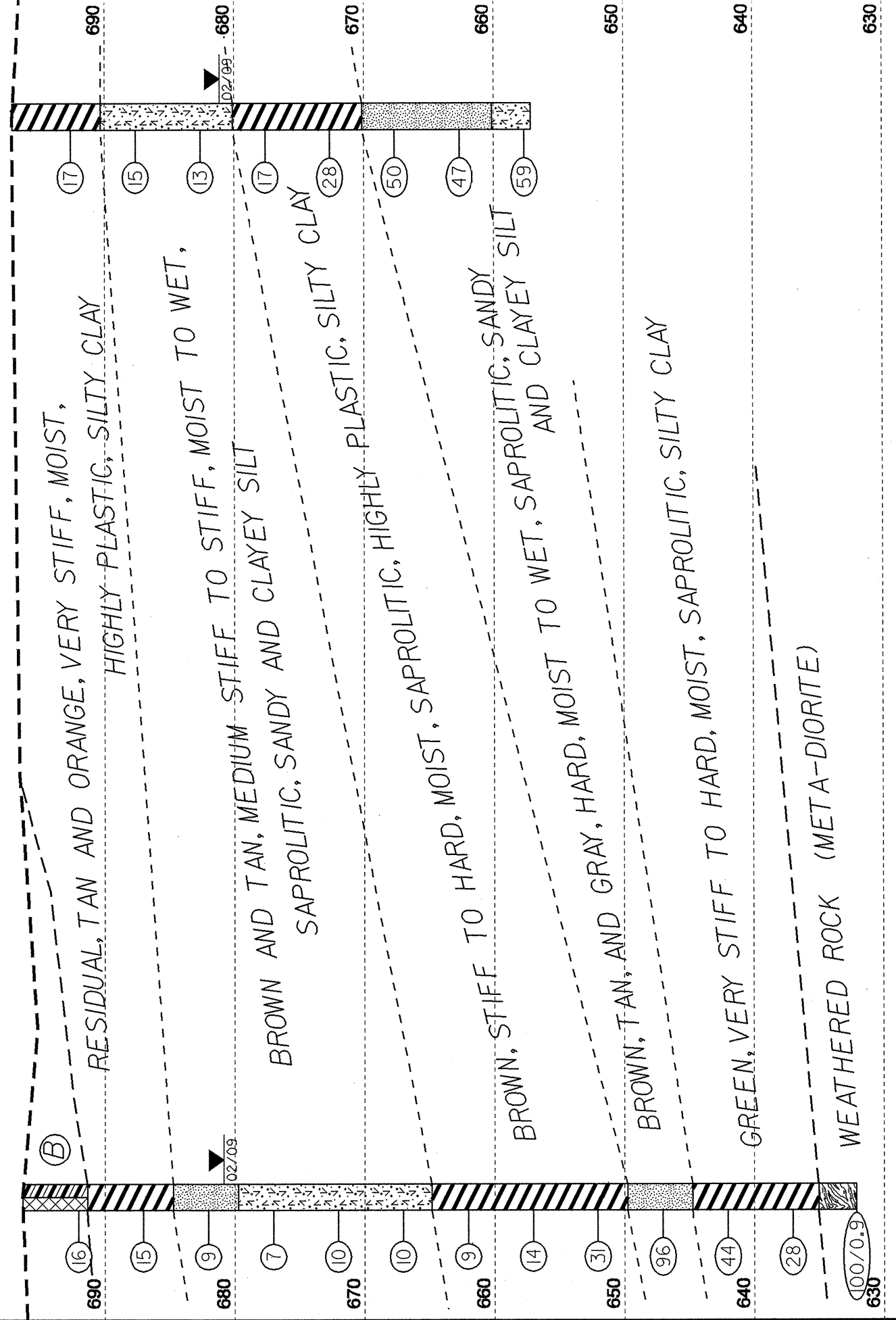
EB2-B
59+83
41' RT

BACK 9' 700

EB2-A
59+83
41' LT

BACK 4' 700

℄



HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

CROSS SECTION THROUGH END BENT 2

SKEW ANGLE = 86°

700

690

680

670

660

650

640

630

620

610

600

590

580

570

700

690

680

670

660

650

640

630

620

610

600

590

580

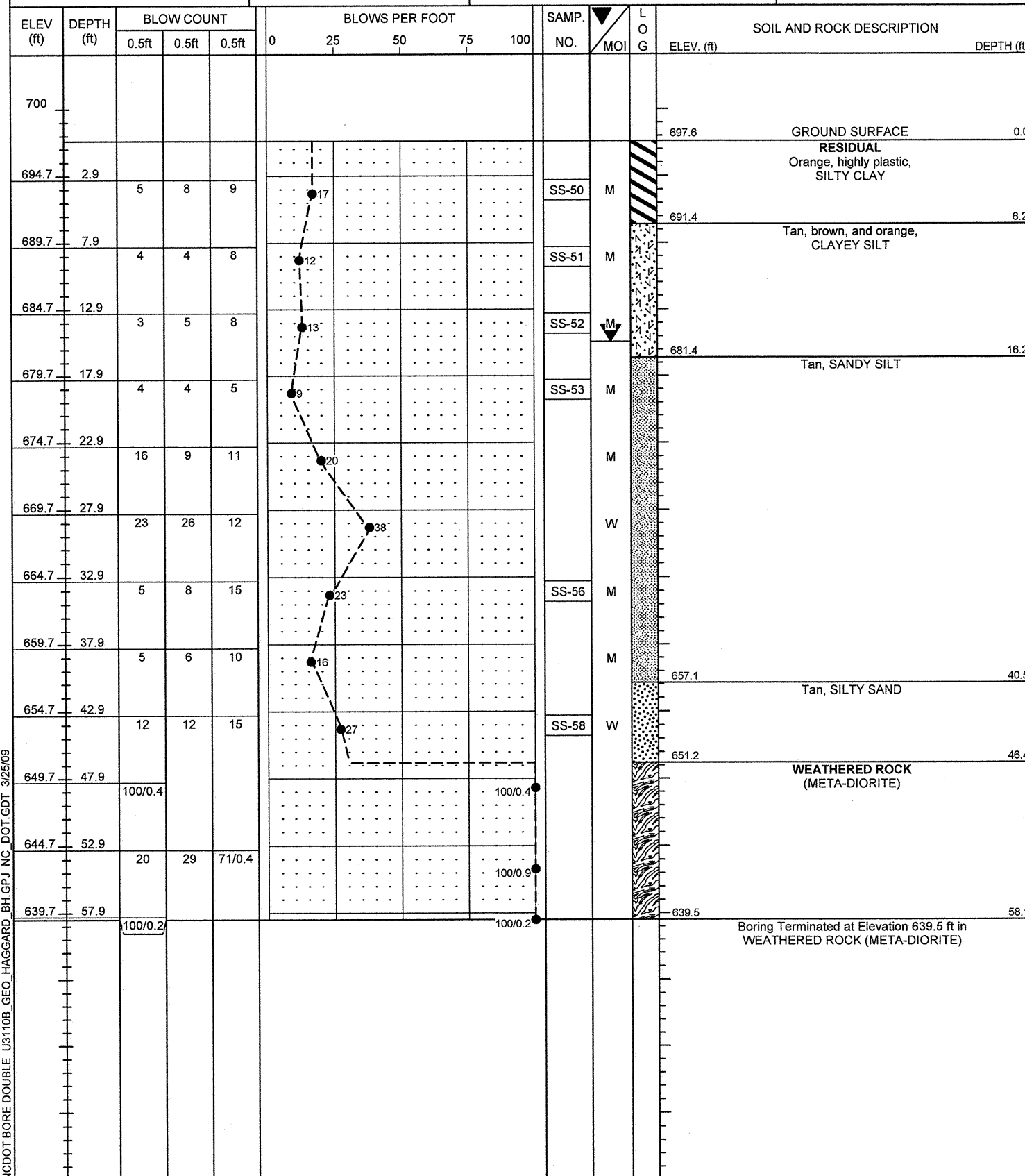
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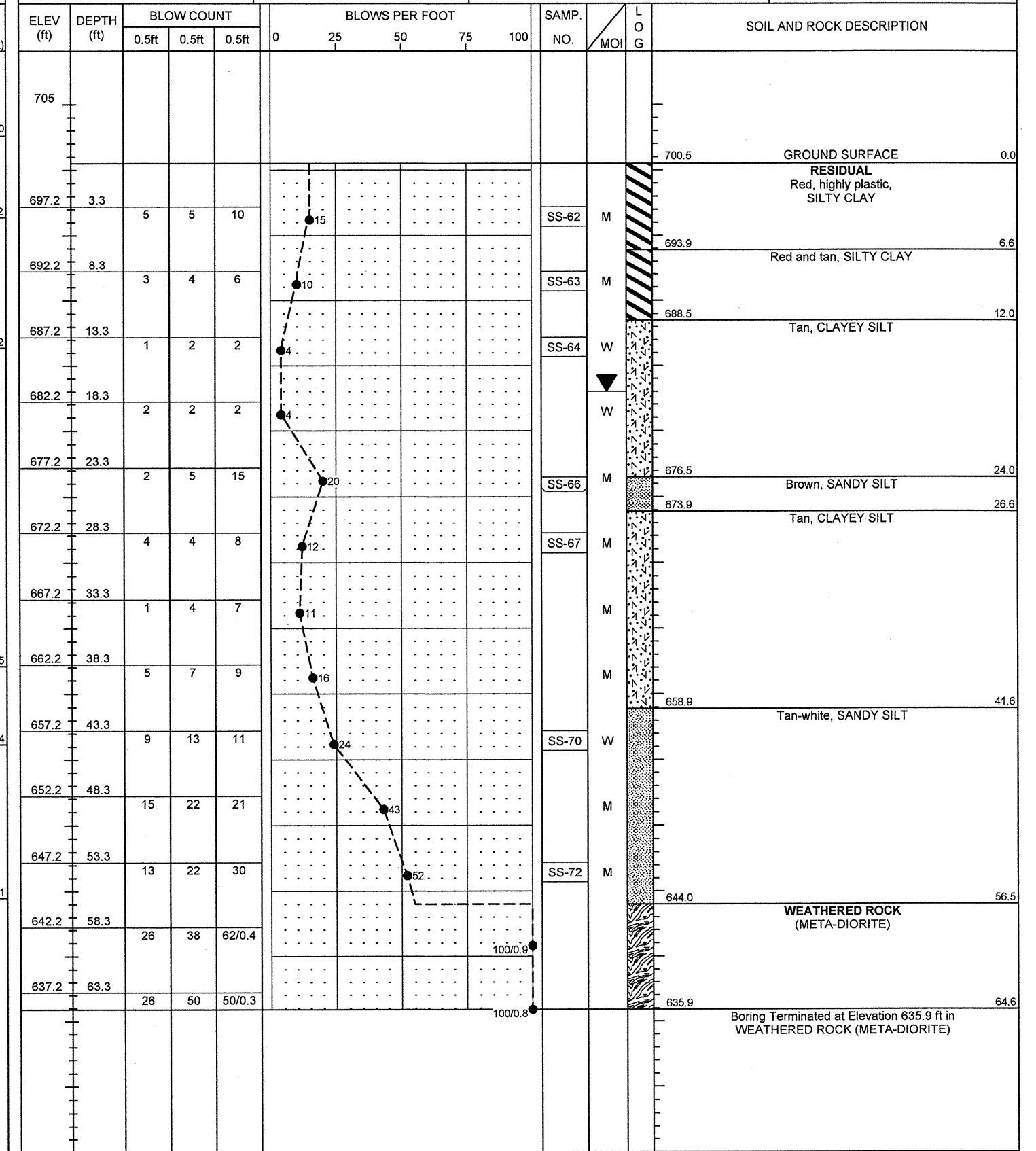
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Contract Geologist
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER HAGGARD AVENUE			GROUND WTR (ft)
BORING NO. EB1-A	STATION 58+18	OFFSET 41ft LT	ALIGNMENT -L-
COLLAR ELEV. 697.6 ft	TOTAL DEPTH 58.1 ft	NORTHING 856,700	EASTING 1,846,243
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/25/09	COMP. DATE 02/25/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Contract Geologist
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER HAGGARD AVENUE			GROUND WTR (ft)
BORING NO. EB1-C	STATION 58+21	OFFSET 5ft LT	ALIGNMENT -L-
COLLAR ELEV. 700.5 ft	TOTAL DEPTH 64.6 ft	NORTHING 856,694	EASTING 1,846,279
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/25/09	COMP. DATE 02/26/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE U3110B GEO_HAGGARD_BH.GPJ NC_DOT.GDT 3/25/09

PROJECT NO. 34901.1.1		ID. U-3110B		COUNTY Alamance		GEOLOGIST Contract Geologist							
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER HAGGARD AVENUE							GROUND WTR (ft)						
BORING NO. EB1-B		STATION 58+24		OFFSET 41ft RT		ALIGNMENT -L-	0 HR. 21.9						
COLLAR ELEV. 701.9 ft		TOTAL DEPTH 63.5 ft		NORTHING 856,687		EASTING 1,846,324	24 HR. 19.0						
DRILL MACHINE D-50		DRILL METHOD H.S. Augers				HAMMER TYPE Automatic							
START DATE 02/26/09		COMP. DATE 02/26/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK 63.4 ft							
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
705													701.9 GROUND SURFACE 0.0
698.5	3.4												RESIDUAL Red, highly plastic, SILTY CLAY
		5	8	10						SS-75	M		
693.5	8.4	3	3	5							M		
688.5	13.4	3	3	4						SS-77	M		687.9 Tan, CLAYEY SILT 14.0
683.5	18.4	2	2	2						SS-78	W		685.2 Tan, brown, and white, SILTY SAND 16.7
678.5	23.4	4	3	4						SS-79	W		
673.5	28.4	9	14	13							W		
668.5	33.4	5	6	8						SS-81	W		670.2 Tan, SANDY SILT 31.7
663.5	38.4	3	4	15						SS-82	W		665.2 Brown, CLAYEY SILT 36.7
658.5	43.4	7	5	9						SS-83	W		659.9 Brown, SANDY SILT 42.0
653.5	48.4	6	7	9							W		
648.5	53.4	6	6	10							W		
643.5	58.4												645.4 WEATHERED ROCK (META-DIORITE) 56.5
638.5	63.4												638.5 CRYSTALLINE ROCK (META-DIORITE) 63.4
		60/0.1											638.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 638.4 ft in CRYSTALLINE ROCK (META-DIORITE) 63.4

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Contract Geologist
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER HAGGARD AVENUE			GROUND WTR (ft)
BORING NO. EB2-A	STATION 59+83	OFFSET 41ft LT	ALIGNMENT -L-
COLLAR ELEV. 696.3 ft	TOTAL DEPTH 64.2 ft	NORTHING 856,860	EASTING 1,846,281
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/27/09	COMP. DATE 02/27/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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				
700												GROUND SURFACE	0.0
693.0	3.3											ARTIFICIAL FILL Red, SANDY CLAY	5.0
688.0	8.3	4	7	9						SS-100	M	RESIDUAL Tan, highly plastic, saprolitic, SILTY CLAY	11.6
683.0	13.3	3	6	9						SS-101	M	Tan, saprolitic, SANDY SILT	16.6
678.0	18.3	3	4	5						SS-102	M	Brown and tan, saprolitic, CLAYEY SILT	31.5
673.0	23.3	1	3	4						SS-103	M	Brown, saprolitic, highly plastic, SILTY CLAY	46.6
668.0	28.3	3	4	6						SS-104	M	Green, saprolitic, SILTY CLAY	61.3
663.0	33.3	3	3	7						SS-105	M	WEATHERED ROCK (META-DIORITE)	64.2
658.0	38.3	3	4	5						SS-106	M		
653.0	43.3	3	4	5									
648.0	48.3	3	4	5									
643.0	53.3	3	4	5									
638.0	58.3	3	4	5									
633.0	63.3	3	4	5									
		55	45/0.4										

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Contract Geologist
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER HAGGARD AVENUE			GROUND WTR (ft)
BORING NO. EB2-B	STATION 59+83	OFFSET 41ft RT	ALIGNMENT -L-
COLLAR ELEV. 697.1 ft	TOTAL DEPTH 40.0 ft	NORTHING 856,842	EASTING 1,846,361
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/27/09	COMP. DATE 02/27/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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				
700												GROUND SURFACE	0.0
693.6	3.5											RESIDUAL Tan and orange, highly plastic, SILTY CLAY	6.8
688.6	8.5	6	7	10						SS-88	M	Tan, CLAYEY SILT	17.0
683.6	13.5	4	6	9						SS-89	W	Brown, SILTY CLAY	27.0
678.6	18.5	4	6	7						SS-91	M	Brown, tan, and gray, SANDY SILT	37.0
673.6	23.5	4	6	7						SS-92	W	Brown, CLAYEY SILT	40.0
668.6	28.5	7	9	19						SS-93	W		
663.6	33.5	16	24	26						SS-95	W		
658.6	38.5	13	19	28									
		26	31	28									

NCDOT BORE DOUBLE U3110B GEO HAGGARD_BH.GPJ NC_DOT.GDT 3/25/09

EB1-A

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-50	41 LT	58+18	2.9-4.4	A-7-5(21)	60	27	13.4	17.9	17.9	50.8	100	95	72	-	-
SS-51	41 LT	58+18	7.9-9.4	A-5(5)	44	10	21.7	28.3	33.7	16.3	100	89	57	-	-
SS-52	41 LT	58+18	12.9-14.4	A-5(10)	49	6	4.9	18.9	66.1	10.2	100	97	86	-	-
SS-53	41 LT	58+18	17.9-19.4	A-4(0)	36	5	39.0	24.2	26.6	10.2	98	73	41	-	-
SS-56	41 LT	58+18	32.9-34.4	A-4(0)	32	4	27.4	34.8	31.7	6.1	100	86	46	-	-
SS-58	41 LT	58+18	42.9-44.4	A-2-4(0)	24	1	41.9	29.5	20.5	8.1	88	63	30	-	-

EB2-B

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-88	41 RT	59+83	3.5-5.0	A-7-5(30)	64	29	4.1	11.2	29.9	54.9	100	99	87	-	-
SS-89	41 RT	59+83	8.5-10.0	A-5(9)	41	9	2.4	24.8	52.4	20.3	100	99	82	-	-
SS-91	41 RT	59+83	18.5-20.0	A-7-5(16)	48	16	4.7	17.9	55.1	22.4	100	98	83	-	-
SS-92	41 RT	59+83	24.0-25.0	A-7-6(13)	44	16	10.0	20.9	50.8	18.3	100	95	76	-	-
SS-93	41 RT	59+83	28.5-30.0	A-4(0)	32	6	39.4	26.6	27.8	6.1	96	70	38	-	-
SS-95	41 RT	59+83	38.5-40.0	A-5(7)	42	10	14.6	24.4	48.8	12.2	100	92	68	-	-

EB1-C

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-62	5 LT	58+21	3.3-4.8	A-7-5(44)	82	38	3.7	9.3	24.0	63.0	100	98	90	-	-
SS-63	5 LT	58+21	8.3-9.8	A-7-5(30)	68	25	2.4	12.8	38.0	46.7	100	99	90	-	-
SS-64	5 LT	58+21	13.3-14.8	A-5(10)	60	7	8.9	30.5	44.3	16.3	100	95	73	-	-
SS-66	5 LT	58+21	24.0-24.8	A-4(2)	36	1	1.0	50.6	44.3	4.1	100	100	72	-	-
SS-67	5 LT	58+21	28.3-29.8	A-5(8)	45	7	1.8	35.2	54.9	8.1	100	99	79	-	-
SS-70	5 LT	58+21	43.3-44.8	A-4(1)	33	3	14.2	46.5	33.1	6.1	100	95	56	-	-
SS-72	5 LT	58+21	53.3-54.8	A-4(4)	35	5	1.2	40.9	51.8	6.1	100	100	77	-	-

EB1-B

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-75	41 RT	58+24	3.4-4.9	A-7-5(37)	76	30	3.7	6.5	20.7	69.1	100	99	92	-	-
SS-77	41 RT	58+24	14.0-14.9	A-5(4)	42	8	18.5	34.3	32.9	14.2	100	93	57	-	-
SS-78	41 RT	58+24	18.4-19.9	A-2-5(0)	41	NP	31.3	42.3	22.4	4.1	100	88	35	-	-
SS-79	41 RT	58+24	23.4-24.9	A-2-5(0)	42	NP	30.5	45.5	19.9	4.1	100	87	33	-	-
SS-81	41 RT	58+24	33.4-34.9	A-4(3)	39	2	4.3	39.8	49.8	6.1	100	98	76	-	-
SS-82	41 RT	58+24	38.4-39.9	A-5(2)	41	4	16.7	41.9	37.4	4.1	100	92	54	-	-
SS-83	41 RT	58+24	43.4-44.9	A-4(5)	37	5	2.6	38.0	53.3	6.1	100	99	79	-	-

EB2-A

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-100	41 LT	59+83	3.3-4.8	A-6(9)	39	17	19.3	23.4	20.7	36.6	100	90	62	-	-
SS-101	41 LT	59+83	8.3-9.8	A-7-6(29)	56	27	1.4	14.0	50.0	34.6	100	100	91	-	-
SS-102	41 LT	59+83	13.3-14.8	A-4(3)	36	6	16.1	32.1	35.6	16.3	100	95	59	-	-
SS-103	41 LT	59+83	18.3-19.8	A-5(11)	49	9	2.6	24.4	60.8	12.2	100	99	83	-	-
SS-104	41 LT	59+83	33.3-34.8	A-7-5(34)	65	34	2.0	17.3	54.3	26.4	100	99	87	-	-
SS-105	41 LT	59+83	48.3-49.8	A-4(0)	28	4	35.0	31.5	27.4	6.1	99	77	40	-	-
SS-106	41 LT	59+83	53.3-54.8	A-7-5(12)	44	12	3.0	23.0	59.8	14.2	100	99	82	-	-

SITE PHOTOGRAPH

Dual Bridges on -L- (NC 100) over Haggard Avenue



Looking East along -Y3- (Haggard Ave.)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34901.1.1 (U-3110B)	1	20

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34901.1.1 (U-3110B) F.A. PROJ. STP-1311(5)

COUNTY ALAMANCE

PROJECT DESCRIPTION SR 1311 (COOK RD.) IMPROVEMENTS AND
CONNECTOR FROM SR 1309 (WESTBROOK AVE.) TO NC 100
(HAGGARD AVE.)

SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER
NORFOLK SOUTHERN RAILROAD AT STATION 54+70

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-8	CROSS SECTION(S)
9-17	BORE LOG(S)
18-19	SOIL TEST RESULTS
20	SITE PHOTOGRAPHS)

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 (UN-PLACED) 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.

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PROJECT: 34901.1.1 ID: U-3110B

PERSONNEL

N. D. MOHS

J. R. MATULA

CONSULTANTS:

SUMMIT ENG.

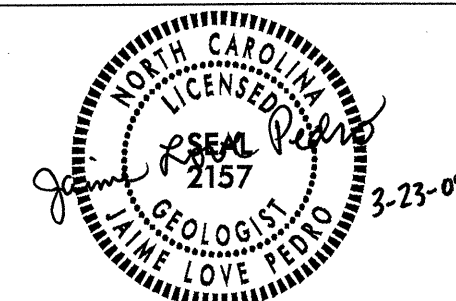
SUB-TECH

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE MARCH 2009



DRAWN BY: J. L. PEDRO

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

NOTE - 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.





NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

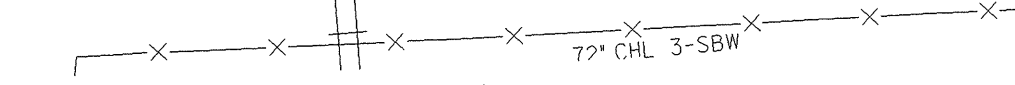
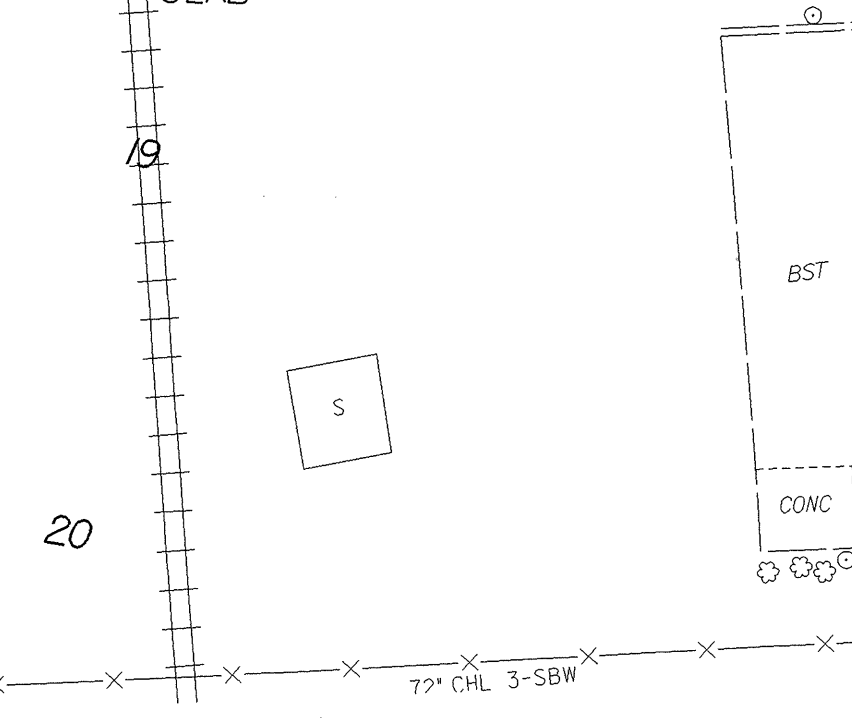
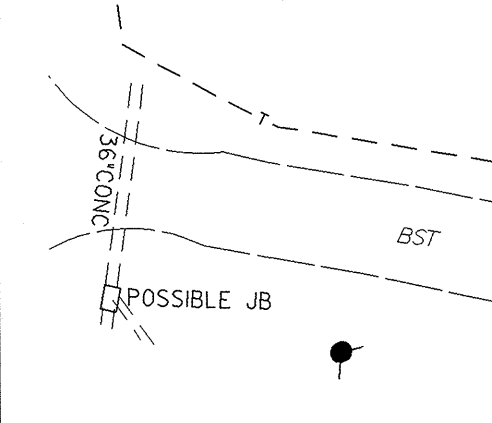
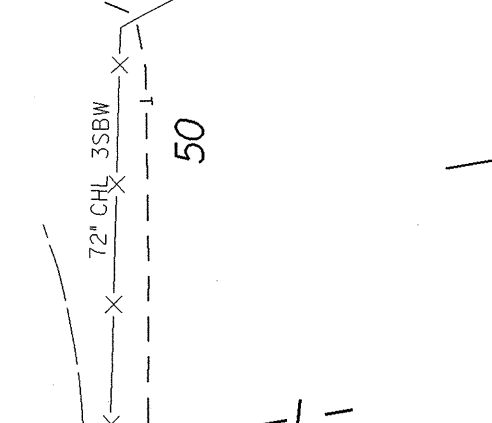
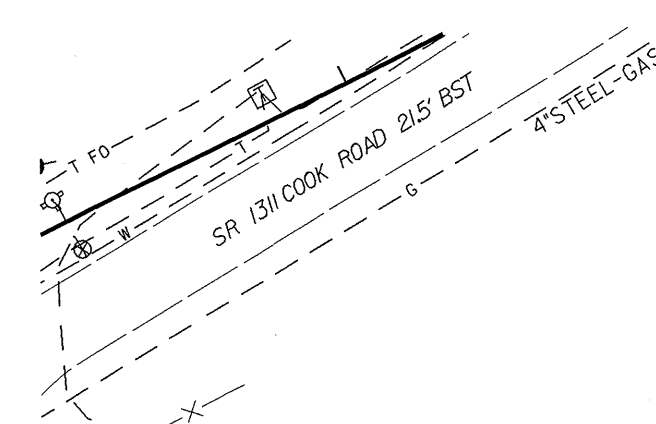
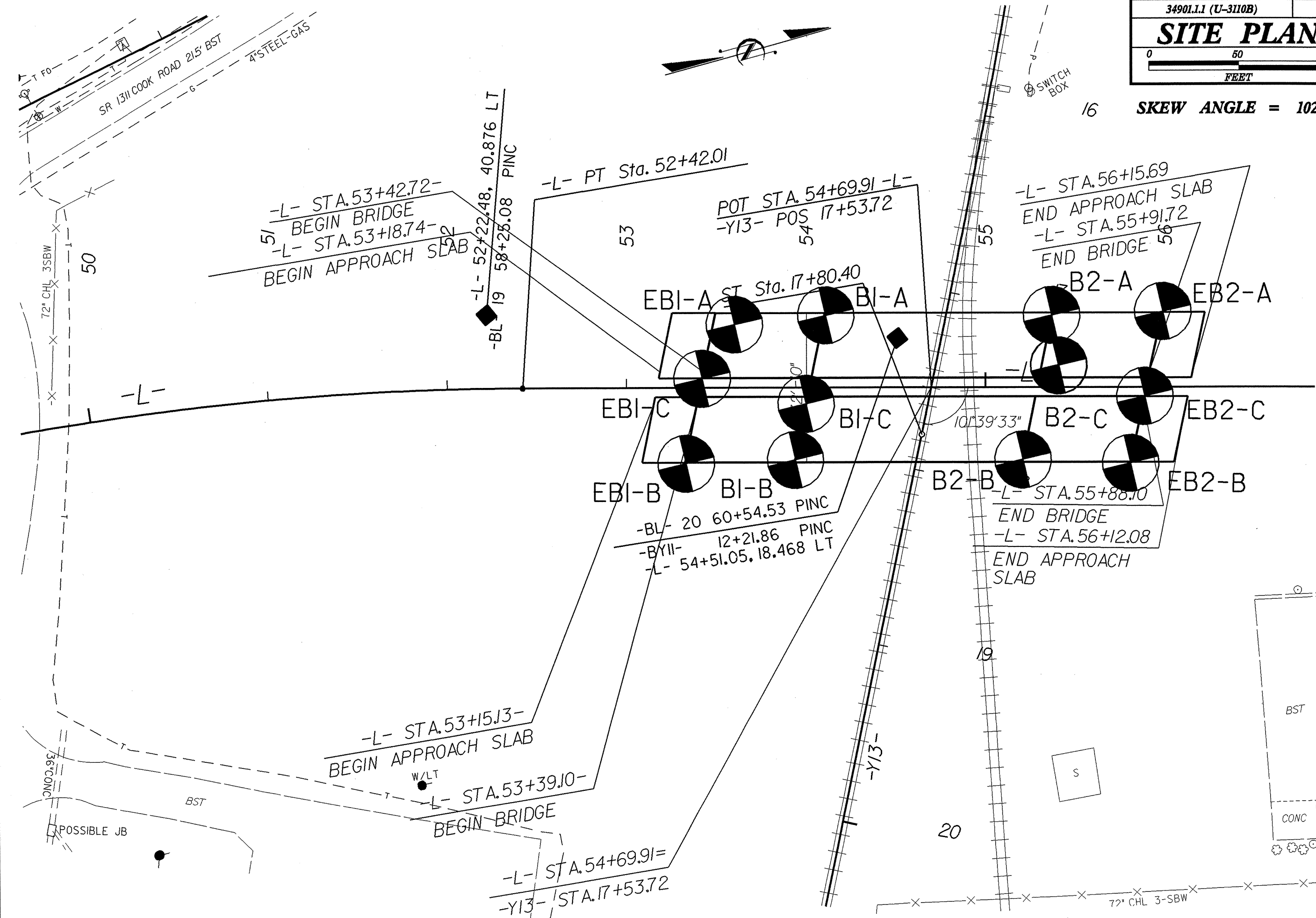
SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. 34901.11(U-310B)	SHEET NO. 2
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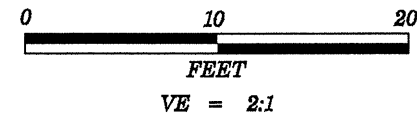
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES: <i>VERY STIFF, SANDY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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: WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR)  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. COASTAL PLAIN SEDIMENTARY ROCK (CPS)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		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, 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. FLOOD - 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 (SPEC) - 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.			
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING					
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		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. 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. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF 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.					
CONSISTENCY OR DENSENESS		GROUND WATER		MISCELLANEOUS SYMBOLS					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL			
TEXTURE OR GRAIN SIZE		MISCELLANEOUS SYMBOLS		MISCELLANEOUS SYMBOLS					
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL					
SOIL MOISTURE - CORRELATION OF TERMS		ABBREVIATIONS		MISCELLANEOUS SYMBOLS					
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS		HI. - HIGHLY 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					
PLASTICITY		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST D-50		ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE 2 5/16" * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT					
COLOR		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
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.		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							
FRACATURE SPACING		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							
BEDDING		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
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		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							
INDURATION		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							
BENCH MARK		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
(1) BL-19, -L- Sta. 52+22.48, Offset - 40.9' Lt and (2) BL-20, -L- Sta. 54+51.05, Offset - 18.5' Lt (1) ELEVATION: 696.02 FT. (2) ELEVATION: 704.68 FT.		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							
NOTES:		EQUIPMENT USED ON SUBJECT PROJECT		MISCELLANEOUS SYMBOLS					
		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST							

16 SKEW ANGLE = 102°



715

NSRR TRACKS



PROJECT REFERENCE NO.	SHEET
34901.1.1 (U-3110B)	4
FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-	

EB1-C
53+42
5' LT

B1-C
54+00
9' RT

B2-C
55+41
12' LT

EB2-C
55+89
5' RT

705

695

685

675

665

655

645

635

625

705

695

685

675

665

655

645

635

625

RESIDUAL

RED-ORANGE

RED, ORANGE, AND

STIFF TO VERY STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY

BLACK, SOFT TO VERY STIFF, MOIST TO WET, SAPROLITIC,

SILTY CLAY

RED, BROWN, TAN, ORANGE, BLACK, AND WHITE,

MEDIUM STIFF TO HARD, MOIST TO WET,

SANDY AND CLAYEY SILT WITH SILTY CLAY

WEATHERED ROCK
(DIABASE)

CRYSTALLINE ROCK (META-VOLCANIC)

(A) RESIDUAL, BROWN, TAN, AND WHITE, HARD, MOIST TO WET,
SAPROLITIC, SILTY CLAY WITH V. DENSE, SILTY SAND

+20

+40

+60

+80

54+00

+20

+40

+60

+80

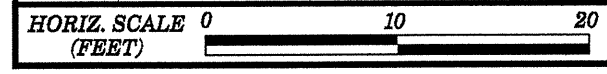
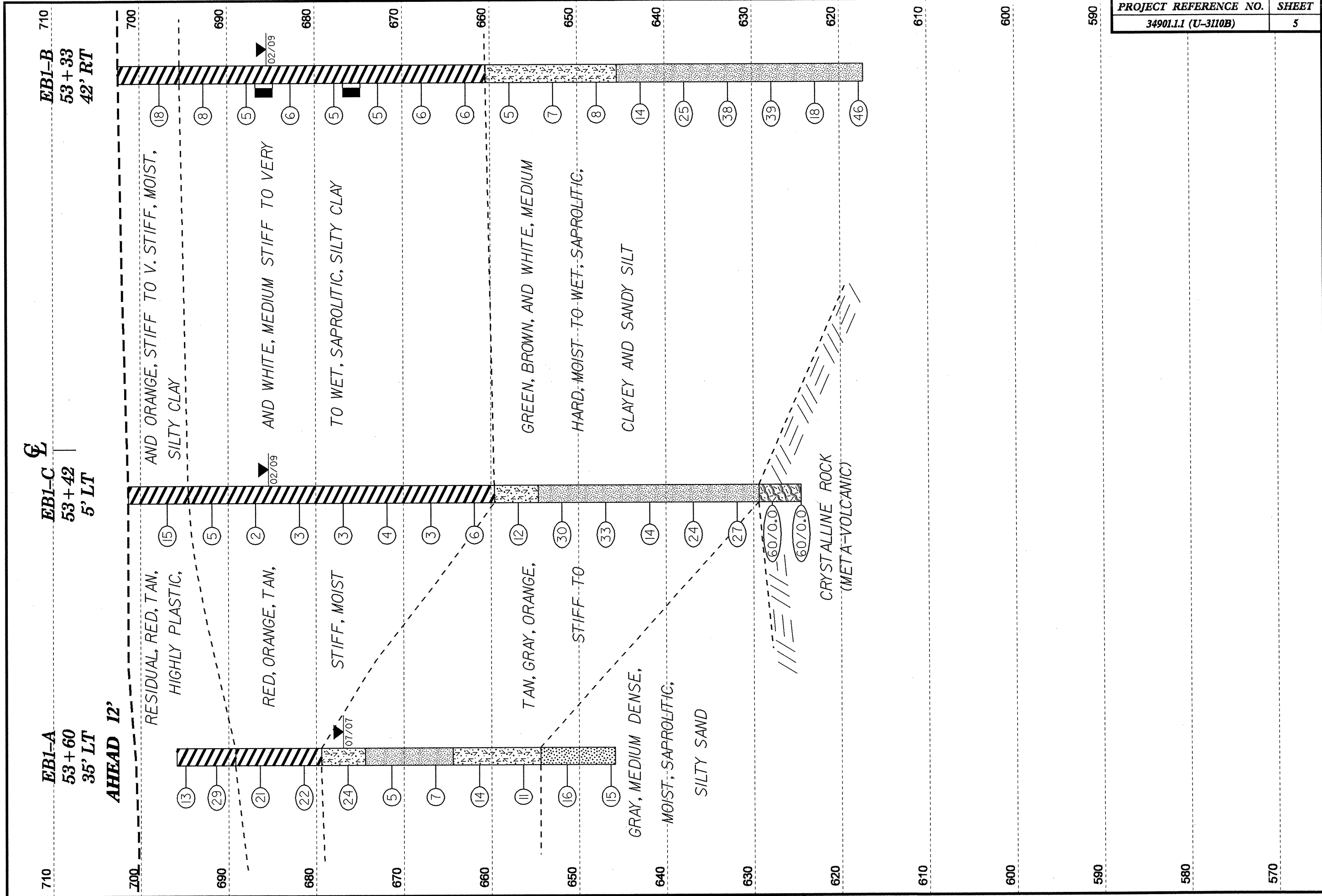
55+00

+20

+40

+60

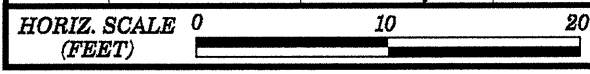
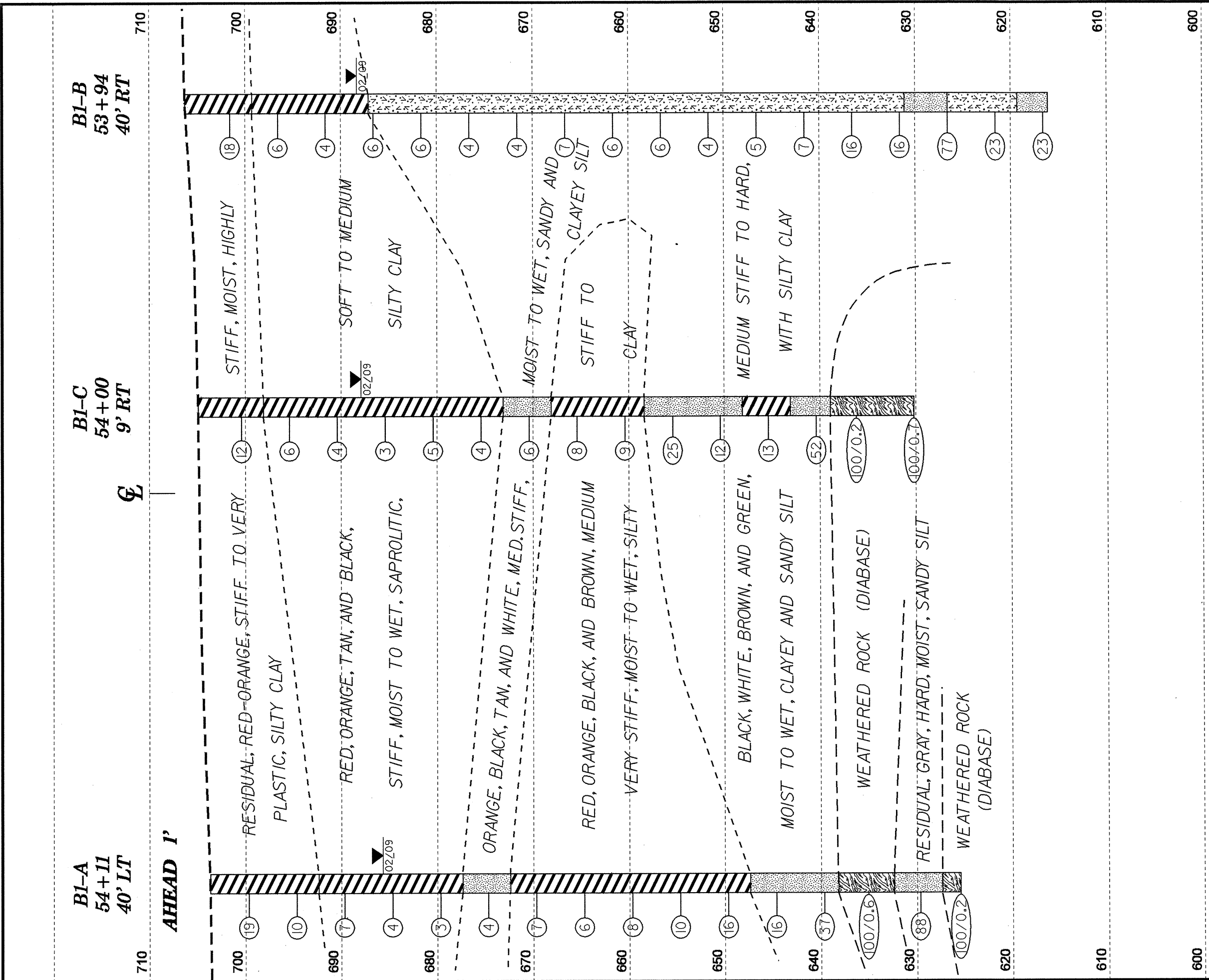
+80



VE = 1:1

CROSS SECTION THROUGH END BENT 1

SKEW ANGLE = 102°



VE = 1:1

CROSS SECTION THROUGH BENT 1

SKEW ANGLE = 102°

710 700 690 680 670 660 650 640 630 620 610 600 590 580

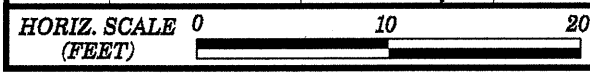
B2-A
55 + 37
40' LT

B2-C
55 + 41
12' LT

B2-B
55 + 21
40' RT

AHEAD 9'

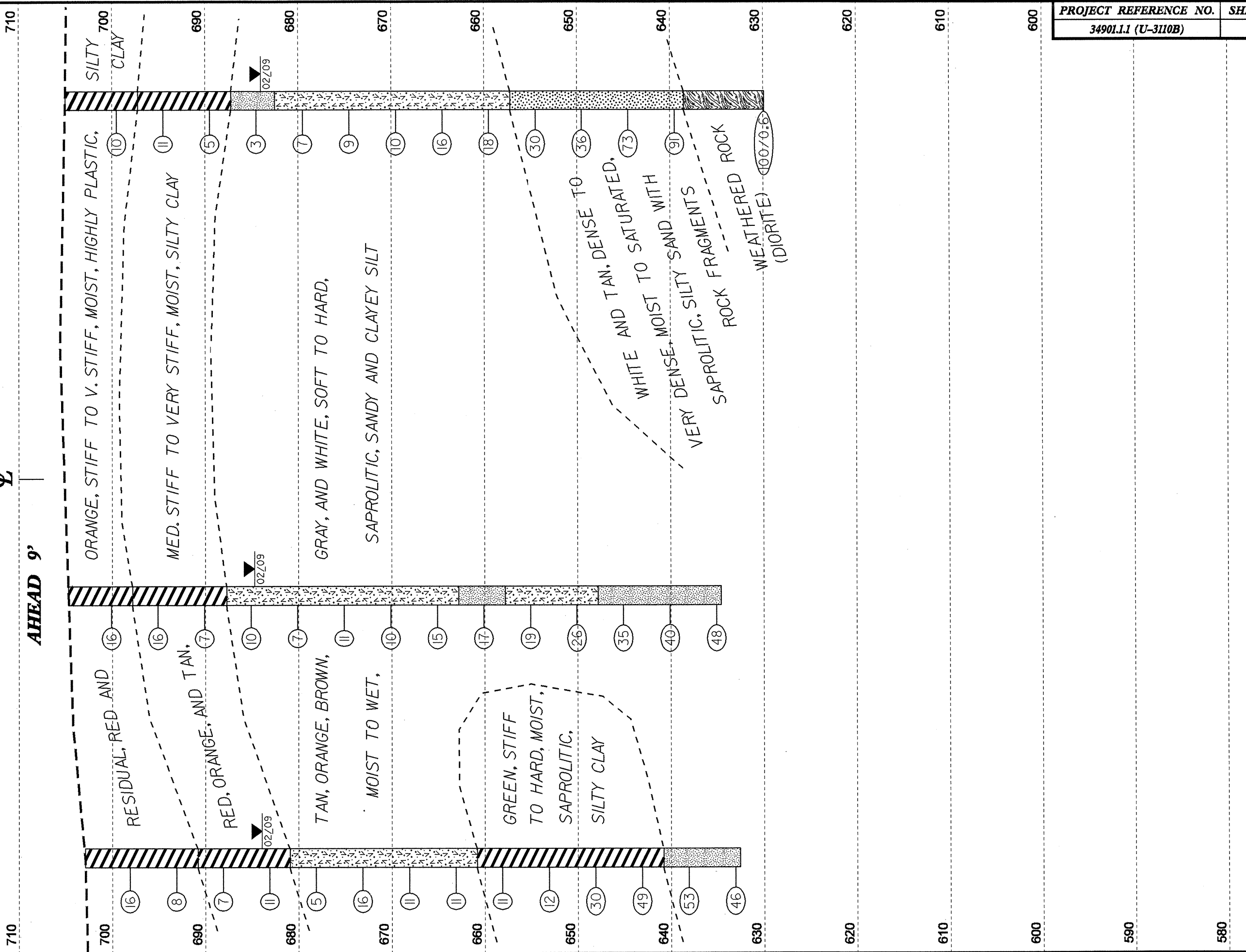
CL



VE = 1:1

CROSS SECTION THROUGH BENT 2

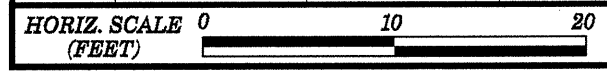
SKEW ANGLE = 102°



EB2-A
55 + 99
42' LT

EB2-C
55 + 89
5' RT

EB2-B
55 + 81
42' RT



VE = 1:1

CROSS SECTION THROUGH END BENT 2

SKIEW ANGLE = 102°



PROJECT NO. 34901.1.1		ID. U-3110B		COUNTY Alamance		GEOLOGIST Mohs, N. D.								
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)							
BORING NO. EB1-A		STATION 53+60		OFFSET 35ft LT		ALIGNMENT -L-								
COLLAR ELEV. 695.9 ft		TOTAL DEPTH 50.0 ft		NORTHING 856,252		EASTING 1,846,144								
DRILL MACHINE CME-45B		DRILL METHOD H.S. Augers				HAMMER TYPE Automatic								
START DATE 07/25/07		COMP. DATE 07/25/07		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A								
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
700														
695.9	0.0													695.9 GROUND SURFACE 0.0
692.4	3.5	5	6	7	13					SS-48	M		RESIDUAL Red and tan, highly plastic, SILTY CLAY	
689.2	6.7	10	12	17	29					SS-49	M			
687.4	8.5	6	9	12	21					SS-50	M		Orange and tan, SILTY CLAY	
682.4	13.5	6	10	12	22					SS-51	M			
679.4	16.5	8	11	13	24					SS-52	M		Tan, CLAYEY SILT	
677.4	18.5	3	2	3	5					SS-53	M		Gray, SANDY SILT	
672.4	23.5	2	3	4	7					SS-54	M			
667.4	28.5	2	3	11	14					SS-55	W		Gray, CLAYEY SILT	
662.4	33.5	4	5	6	11						M			
657.4	38.5	5	6	10	16					SS-56	M		Gray, SILTY SAND	
652.4	43.5	4	6	9	15						M			
647.4	48.5													
														645.9 Boring Terminated at Elevation 645.9 ft in RESIDUAL (SILTY SAND) 50.0



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB1-B	STATION 53+33	OFFSET 42ft RT	ALIGNMENT -L-
COLLAR ELEV. 702.5 ft	TOTAL DEPTH 85.2 ft	NORTHING 856,208	EASTING 1,846,213
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/19/09	COMP. DATE 02/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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				
705												GROUND SURFACE	0.0
698.8	3.7											RESIDUAL Red and orange, highly plastic, SILTY CLAY	
693.8	8.7	6	8	10							M		
688.8	13.7	2	4	4							SS-17		
683.8	18.7	1	2	3							M		
678.8	23.7	2	2	4							M		
673.8	28.7	1	2	3							M		
668.8	33.7	1	2	3							M		
663.8	38.7	2	2	4							M		
658.8	43.7	2	2	3							SS-18	Orange and white, saprolitic, CLAYEY SILT	42.0
653.8	48.7	3	3	4							SS-19		
648.8	53.7	3	3	5							M		
643.8	58.7	5	6	8							M	Gray, white, and green, saprolitic, SANDY SILT	57.0
638.8	63.7	9	10	15							M		
633.8	68.7	11	15	23							M		
628.8	73.7	19	22	17							M		

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB1-B	STATION 53+33	OFFSET 42ft RT	ALIGNMENT -L-
COLLAR ELEV. 702.5 ft	TOTAL DEPTH 85.2 ft	NORTHING 856,208	EASTING 1,846,213
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/19/09	COMP. DATE 02/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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				
625													
623.8	78.7											Match Line	
618.8	83.7	4	7	11							M	Gray, white, and green, saprolitic, SANDY SILT (continued)	
		8	19	27							M		
												Boring Terminated at Elevation 617.3 ft in RESIDUAL (SANDY SILT)	85.2
												Other Samples: ST-1 (15.7 - 17.7) ST-2 (25.7 - 27.7)	

NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ NC_DOT.GDT 03/19/09

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 54+11	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 78.2 ft	NORTHING 856,303	EASTING 1,846,151
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/16/09	COMP. DATE 02/16/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 54+11	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 78.2 ft	NORTHING 856,303	EASTING 1,846,151
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/16/09	COMP. DATE 02/16/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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					
705													GROUND SURFACE	0.0
700.7	3.0	5	7	12						SS-1	M		RESIDUAL Red-orange, highly plastic, SILTY CLAY	
695.7	8.0	3	4	6							M			
690.7	13.0	3	3	4						SS-2	M		Red and orange, saprolitic, SILTY CLAY	11.3
685.7	18.0	1	2	2							M			
680.7	23.0	1	1	2							W			
675.7	28.0	2	1	3						SS-3	Sat.		Orange and white, saprolitic, SANDY SILT	26.3
670.7	33.0	2	3	4							W		Orange, tan, and brown, saprolitic, SILTY CLAY	31.3
665.7	38.0	3	2	4							W			
660.7	43.0	3	3	5							W			
655.7	48.0	4	4	6							W			
650.7	53.0	4	7	9							W			
645.7	58.0	5	6	10						SS-4	M		Black and white, saprolitic, SANDY SILT	56.3
640.7	63.0	8	13	24							M			
635.7	68.0	90	10/0.1										WEATHERED ROCK (DIABASE)	65.5
630.7	73.0	20	31	57						SS-5	M		RESIDUAL Gray, SANDY SILT	71.3
625.7	78.0												WEATHERED ROCK (DIABASE)	78.2

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					
625													Match Line	
														Boring Terminated at Elevation 625.5 ft in WEATHERED ROCK (DIABASE)

NC DOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ_NC_DOT_GDT_03/19/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-B	STATION 53+94	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 706.3 ft	TOTAL DEPTH 90.2 ft	NORTHING 856,268	EASTING 1,846,225
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/18/09	COMP. DATE 02/18/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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						
710														706.3	0.0
702.6	3.7		5	9	9										
697.6	8.7	3	2	4						SS-7	M			699.3	7.0
692.6	13.7	1	2	2							M				
687.6	18.7	1	2	4						SS-8	M			687.1	19.2
682.6	23.7	2	2	4							M				
677.6	28.7	1	2	2							M				
672.6	33.7	1	2	2							Sat.				
667.6	38.7	2	3	4							Sat.				
662.6	43.7	2	2	4						SS-9	M				
657.6	48.7	2	2	4							M				
652.6	53.7	1	1	3							W				
647.6	58.7	1	2	3							M				
642.6	63.7	2	2	5							M				
637.6	68.7	3	6	10							M				
632.6	73.7	4	6	10							M			631.1	75.2

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-B	STATION 53+94	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 706.3 ft	TOTAL DEPTH 90.2 ft	NORTHING 856,268	EASTING 1,846,225
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/18/09	COMP. DATE 02/18/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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						
630															
627.6	78.7	3	30	47						SS-10	M			626.6	79.7
622.6	83.7	5	9	14							M			619.3	87.0
617.6	88.7	10	11	12							M			616.1	90.2
Boring Terminated at Elevation 616.1 ft in RESIDUAL (SANDY SILT)															

NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ_NC_DOT.GDT 03/19/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-A	STATION 55+37	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 702.9 ft	TOTAL DEPTH 70.3 ft	NORTHING 856,426	EASTING 1,846,180
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/25/09	COMP. DATE 02/25/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
705														GROUND SURFACE	0.0
700	699.1	3.8	4	8	8									RESIDUAL Red, highly plastic, SILTY CLAY	
695	694.1	8.8	3	3	5										
690	689.1	13.8	2	3	4									Orange, saprolitic, SILTY CLAY	12.1
685	684.1	18.8	2	4	7										
680	679.1	23.8	1	2	3									Orange and brown, saprolitic, CLAYEY SILT	22.0
675	674.1	28.8	4	6	10										
670	669.1	33.8	2	4	7										
665	664.1	38.8	3	3	8										
660	659.1	43.8	4	4	7									Green, saprolitic, SILTY CLAY	42.1
655	654.1	48.8	4	4	8										
650	649.1	53.8	9	14	16										
645	644.1	58.8	16	23	26										
640	639.1	63.8	15	25	28									Gray, saprolitic, SANDY SILT	62.1
635	634.1	68.8	16	20	26										
630														Boring Terminated at Elevation 632.6 ft in RESIDUAL (SANDY SILT)	70.3

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-C	STATION 55+41	OFFSET 12ft LT	ALIGNMENT -L-
COLLAR ELEV. 704.7 ft	TOTAL DEPTH 70.1 ft	NORTHING 856,423	EASTING 1,846,208
DRILL MACHINE CME-550	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 02/23/09	COMP. DATE 02/23/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
705														GROUND SURFACE	0.0
700	701.1	3.6	6	7	9									RESIDUAL Red, highly plastic, SILTY CLAY	
695	696.1	8.6	6	7	9									Red and orange, SILTY CLAY	6.9
690	691.1	13.6	2	3	4										
685	686.1	18.6	4	4	6									Orange, tan, white, and brown, CLAYEY SILT	17.0
680	681.1	23.6	2	3	4										
675	676.1	28.6	2	4	7										
670	671.1	33.6	3	4	6										
665	666.1	38.6	3	5	10										
660	661.1	43.6	10	7	10									Brown, saprolitic, SANDY SILT	41.9
655	656.1	48.6	4	8	11									Brown, saprolitic, CLAYEY SILT	46.9
650	651.1	53.6	6	10	16										
645	646.1	58.6	10	16	19									Tan-brown, saprolitic, SANDY SILT	56.9
640	641.1	63.6	30	16	24										
635	636.1	68.6	27	22	26										
630														Boring Terminated at Elevation 634.6 ft in RESIDUAL (SANDY SILT)	70.1

NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ NC_DOT.GDT 3/19/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-B	STATION 55+21	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 705.0 ft	TOTAL DEPTH 75.1 ft	NORTHING 856,392	EASTING 1,846,254
DRILL MACHINE CME-550	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 02/24/09	COMP. DATE 02/24/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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						
705														705.0	GROUND SURFACE	0.0
700	700.5	4.5	7	5	5									697.2	RESIDUAL Red-orange, highly plastic, SILTY CLAY	7.8
695	695.5	9.5	3	5	6									687.2	Red-tan, saprolitic, SILTY CLAY	17.8
690	690.5	14.5	2	2	3									682.5	Tan, saprolitic, SANDY SILT	22.5
685	685.5	19.5	1	1	2									682.5	Orange, brown, and gray, saprolitic, CLAYEY SILT	22.5
680	680.5	24.5	1	3	4									657.2	Tan and white, saprolitic, SILTY SAND	47.8
675	675.5	29.5	3	4	5									638.5	WEATHERED ROCK (DIORITE)	66.5
670	670.5	34.5	3	4	6									629.9	Boring Terminated at Elevation 629.9 ft in WEATHERED ROCK (DIORITE)	75.1
665	665.5	39.5	5	7	9											
660	660.5	44.5	6	10	8											
655	655.5	49.5	11	15	15											
650	650.5	54.5	10	23	13											
645	645.5	59.5	23	37	36											
640	640.5	64.5	42	45	46											
635																
630	630.5	74.5	50	50/0.1												
625																

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB2-A	STATION 55+99	OFFSET 42ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 65.5 ft	NORTHING 856,487	EASTING 1,846,192
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/25/09	COMP. DATE 02/25/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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						
705														703.7	GROUND SURFACE	0.0
700	699.7	4.0	5	7	10									691.4	RESIDUAL Red, highly plastic, SILTY CLAY	12.3
695	694.7	9.0	3	3	4									676.7	Red and orange, saprolitic, SILTY CLAY	27.0
690	689.7	14.0	3	3	4									666.2	Brown, saprolitic, CLAYEY SILT	37.5
685	684.7	19.0	2	2	3									638.2	Boring Terminated at Elevation 638.2 ft in RESIDUAL (SILTY CLAY)	65.5
680	679.7	24.0	3	3	7											
675	674.7	29.0	3	3	6											
670	669.7	34.0	6	11	17											
665	664.7	39.0	6	8	12											
660	659.7	44.0	9	13	17											
655	654.7	49.0	10	12	16											
650	649.7	54.0	10	17	22											
645	644.7	59.0	15	16	26											
640	639.7	64.0	30	26	36											
635																
630																
625																

NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ NC_DOT_GDT 3/19/09



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1		ID. U-3110B		COUNTY Alamance		GEOLOGIST Mohs, N. D.									
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)								
BORING NO. EB2-C	STATION 55+89	OFFSET 5ft RT	ALIGNMENT -L-			0 HR. 21.5									
COLLAR ELEV. 705.6 ft	TOTAL DEPTH 66.2 ft	NORTHING 856,466	EASTING 1,846,236			24 HR. 22.0									
DRILL MACHINE CME-550		DRILL METHOD H.S. Augers			HAMMER TYPE Manual										
START DATE 02/26/09		COMP. DATE 02/26/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75					100	
710															
705													705.6	GROUND SURFACE	0.0
700	700.9	4.7	6	9	10									RESIDUAL Red, highly plastic, SILTY CLAY	
695	695.9	9.7	4	4	5									Orange, SILTY CLAY	8.0
690	690.9	14.7	4	4	5									Red-tan, saprolitic, CLAYEY SILT	13.0
685	685.9	19.7	4	4	8									Red, SILTY CLAY	18.0
680	680.9	24.7	4	6	8										
675	675.9	29.7	3	4	8									Tan, CLAYEY SILT	28.0
670	670.9	34.7	4	7	10									Brown, saprolitic, SILTY CLAY	33.0
665	665.9	39.7	4	7	12									Brown, saprolitic, CLAYEY SILT	38.0
660	660.9	44.7	5	7	13									Brown, saprolitic, SILTY CLAY	43.0
655	655.9	49.7	8	16	20										
650	650.9	54.7	10	28	36									Tan-white, SILTY SAND	56.2
645	645.9	59.7	36	40	45									Brown, saprolitic, SILTY CLAY	63.0
640	640.9	64.7	18	22	32									Brown, saprolitic, SILTY CLAY	66.2
635														Boring Terminated at Elevation 639.4 ft in RESIDUAL (SILTY CLAY)	
630															

PROJECT NO. 34901.1.1		ID. U-3110B		COUNTY Alamance		GEOLOGIST Mohs, N. D.									
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)								
BORING NO. EB2-B	STATION 55+81	OFFSET 42ft RT	ALIGNMENT -L-			0 HR. 21.0									
COLLAR ELEV. 706.5 ft	TOTAL DEPTH 69.5 ft	NORTHING 856,450	EASTING 1,846,270			24 HR. 22.5									
DRILL MACHINE CME-550		DRILL METHOD H.S. Augers			HAMMER TYPE Manual										
START DATE 02/26/09		COMP. DATE 02/26/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75					100	
710															
705													706.5	GROUND SURFACE	0.0
700	702.7	3.8	7	9	13									RESIDUAL Red, highly plastic, SILTY CLAY	
695	698.5	8.0	4	5	7									Orange, saprolitic, SILTY CLAY	10.0
690	693.5	13.0	2	2	3										
685	688.5	18.0	2	1	3										
680	683.5	23.0	2	2	3										
675	678.5	28.0	2	4	5										
670	673.5	33.0	3	6	8									Brown and green, saprolitic, CLAYEY SILT	31.3
665	668.5	38.0	6	8	10										
660	663.5	43.0	4	7	8										
655	658.5	48.0	7	11	15										
650	653.5	53.0	10	16	15									Brown, saprolitic, SANDY SILT	51.3
645	648.5	58.0	10	10	14										
640	643.5	63.0	9	18	15									Brown and white, saprolitic, SILTY SAND	61.3
635	638.5	68.0	6	13	16										
630														Boring Terminated at Elevation 637.0 ft in RESIDUAL (SILTY SAND)	

Other Samples:
ST-3 (17.0 - 19.2)
ST-4 (19.2 - 21.4)

NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ NC_DOT.GDT 3/19/09

E1-A

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-48	35' RT	53+60	0.0-1.5	A-7-5(38)	75	38	6.8	10.1	13.2	70.0	100	97	85	-	-
SS-49	35' RT	53+60	3.5-5.0	A-7-5(37)	76	28	1.4	6.2	28.6	63.8	100	99	95	-	-
SS-50	35' RT	53+60	8.5-10.0	A-7-5(29)	72	21	3.9	9.9	49.2	37.0	100	98	91	-	-
SS-51	35' RT	53+60	13.5-15.0	A-7-5(26)	71	20	3.9	12.8	44.2	39.1	100	98	87	-	-
SS-52	35' RT	53+60	18.5-20.0	A-5(9)	45	8	2.3	32.7	54.7	10.3	100	99	79	-	-
SS-53	35' RT	53+60	23.5-25.0	A-4(2)	39	5	10.9	39.1	39.7	10.3	100	97	59	-	-
SS-54	35' RT	53+60	28.5-30.0	A-4(1)	39	4	35.4	24.1	30.2	10.3	100	72	48	-	-
SS-55	35' RT	53+60	33.5-35.0	A-5(1)	44	6	37.7	20.4	31.7	10.3	100	72	46	-	-
SS-56	35' RT	53+60	43.5-45.0	A-2-5(0)	41	5	45.7	24.3	21.8	8.2	98	64	34	-	-

E1-C

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-11	5 LT	53+42	3.4-4.9	A-7-5(41)	81	33	2.4	7.1	29.8	60.7	100	99	93	-	-
SS-12	5 LT	53+42	8.5-10.0	A-7-5(18)	66	11	1.6	21.1	42.9	34.4	100	99	86	-	-
SS-13	5 LT	53+42	33.5-35.0	A-7-5(8)	51	13	24.9	20.0	40.9	14.2	100	82	62	-	-
SS-14	5 LT	53+42	43.5-45.0	A-5(5)	43	7	4.5	42.9	44.5	8.1	100	98	65	-	-
SS-15	5 LT	53+42	48.5-50.0	A-4(3)	36	7	10.1	40.7	41.1	8.1	100	97	60	-	-
SS-16	5 LT	53+42	68.5-70.0	A-4(0)	36	4	18.2	51.0	24.7	6.1	100	93	42	-	-

E1-B

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-17	42 RT	53+33	8.7-10.2	A-7-5(10)	58	14	17.4	28.5	29.8	24.3	100	92	62	-	-
ST-1	42 RT	53+33	15.7-17.9	A-5(15)	62	10	2.8	24.5	54.5	18.1	99	98	82	-	-
ST-2	42 RT	53+33	25.7-27.7	A-7-5(11)	61	12	11.9	31.6	46.4	10.1	100	94	67	-	-
SS-18	42 RT	53+33	43.7-45.2	A-5(6)	51	8	13.4	38.3	40.3	8.1	100	92	62	-	-
SS-19	42 RT	53+33	48.7-50.2	A-5(10)	54	8	4.0	34.2	49.6	12.1	100	99	75	-	-

B1-A

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-1	40 LT	54+11	3.0-4.5	A-7-5(38)	77	33	4.7	9.3	25.3	60.7	100	97	89	-	-
SS-2	40 LT	54+11	13.0-14.5	A-7-5(12)	58	13	6.1	32.4	43.3	18.2	100	97	72	-	-
SS-3	40 LT	54+11	28.0-29.5	A-4(0)	35	NP	29.8	39.1	23.1	8.1	100	88	38	-	-
SS-4	40 LT	54+11	58.0-59.5	A-4(0)	35	NP	19.4	46.4	26.1	8.1	97	88	43	-	-
SS-5	40 LT	54+11	73.0-74.5	A-4(0)	28	NP	22.3	50.0	19.6	8.1	100	91	38	-	-

B1-C

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-5A	9 RT	54+00	48.5-50.0	A-4(3)	38	6	7.5	42.3	42.1	8.1	100	99	60	-	-
SS-6	9 RT	54+00	63.5-65.0	A-4(1)	32	7	17.2	43.7	31.0	8.1	100	92	49	-	-

B1-B

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-7	40 RT	53+94	8.7-10.2	A-7-5(28)	70	24	1.4	17.4	46.8	34.4	100	99	87	-	-
SS-8	40 RT	53+94	19.2-20.2	A-5(1)	42	5	28.5	28.7	28.5	14.2	100	84	48	-	-
SS-9	40 RT	53+94	43.7-45.2	A-5(9)	52	6	2.2	31.8	51.8	14.2	100	100	79	-	-
SS-10	40 RT	53+94	78.7-80.2	A-4(0)	30	NP	23.1	49.6	21.3	6.1	100	92	37	-	-
SS-29	40 LT	55+37	43.8-45.3	A-7-5(26)	62	22	2.6	12.6	60.5	24.3	100	99	90	-	-
SS-30	40 LT	55+37	53.8-55.3	A-7-6(9)	43	14	5.9	32.4	47.5	14.2	100	98	69	-	-
SS-31	40 LT	55+37	63.8-65.3	A-4(1)	34	5	16.0	36.9	39.0	8.1	92	85	52	-	-

B2-A

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-20	12 LT	55+41	3.6-5.1	A-7-5(32)	77	34	7.5	17.6	26.2	48.6	100	97	79	-	-
SS-21	12 LT	55+41	8.6-10.1	A-7-5(6)	48	13	19.0	34.0	28.7	18.2	100	93	54	-	-
SS-22	12 LT	55+41	12.6-20.1	A-5(7)	54	8	8.7	37.7	41.4	12.2	96	92	66	-	-
SS-23	12 LT	55+41	28.6-30.1	A-5(6)	54	6	15.2	32.4	44.3	8.1	99	88	64	-	-
SS-24	12 LT	55+41	43.6-45.1	A-4(2)	38	5	13.6	35.1	45.3	6.1	91	85	56	-	-
SS-25	12 LT	55+41	58.6-60.1	A-4(3)	37	8	17.8	33.4	42.7	6.1	98	90	56	-	-

B2-B

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-26	40 RT	55+21	9.5-11.0	A-7-5(4)	49	11	38.9	16.8	34.1	10.1	98	68	48	-	-
SS-27	40 RT	55+21	19.5-21.0	A-4(1)	36	6	27.6	31.6	34.8	6.1	100	86	49	-	-
SS-27A	40 RT	55+21	39.5-41.0	A-5(0)	41	3	34.2	27.4	32.3	6.1	93	68	42	-	-
SS-28	40 RT	55+21	49.5-51.0	A-2-4(0)	30	NP	27.6	46.0	24.4	2.0	100	91	34	-	-

EB2-A

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-32	42 LT	55+99	4.0-5.5	A-7-5(28)	69	26	6.7	11.1	27.5	54.7	100	97	85	-	-
SS-33	42 LT	55+99	14.0-15.5	A-7-5(12)	61	11	6.9	28.4	52.6	12.2	100	97	74	-	-
SS-34	42 LT	55+99	19.0-20.5	A-7-5(22)	62	16	1.6	18.6	59.5	20.3	100	99	90	75.3	-
SS-35	42 LT	55+99	39.0-40.5	A-7-5(18)	53	16	1.2	22.3	62.3	14.2	100	100	88	-	-
SS-36	42 LT	55+99	44.0-45.5	A-7-5(6)	44	12	19.9	31.2	42.8	6.1	98	87	57	-	-

EB2-C

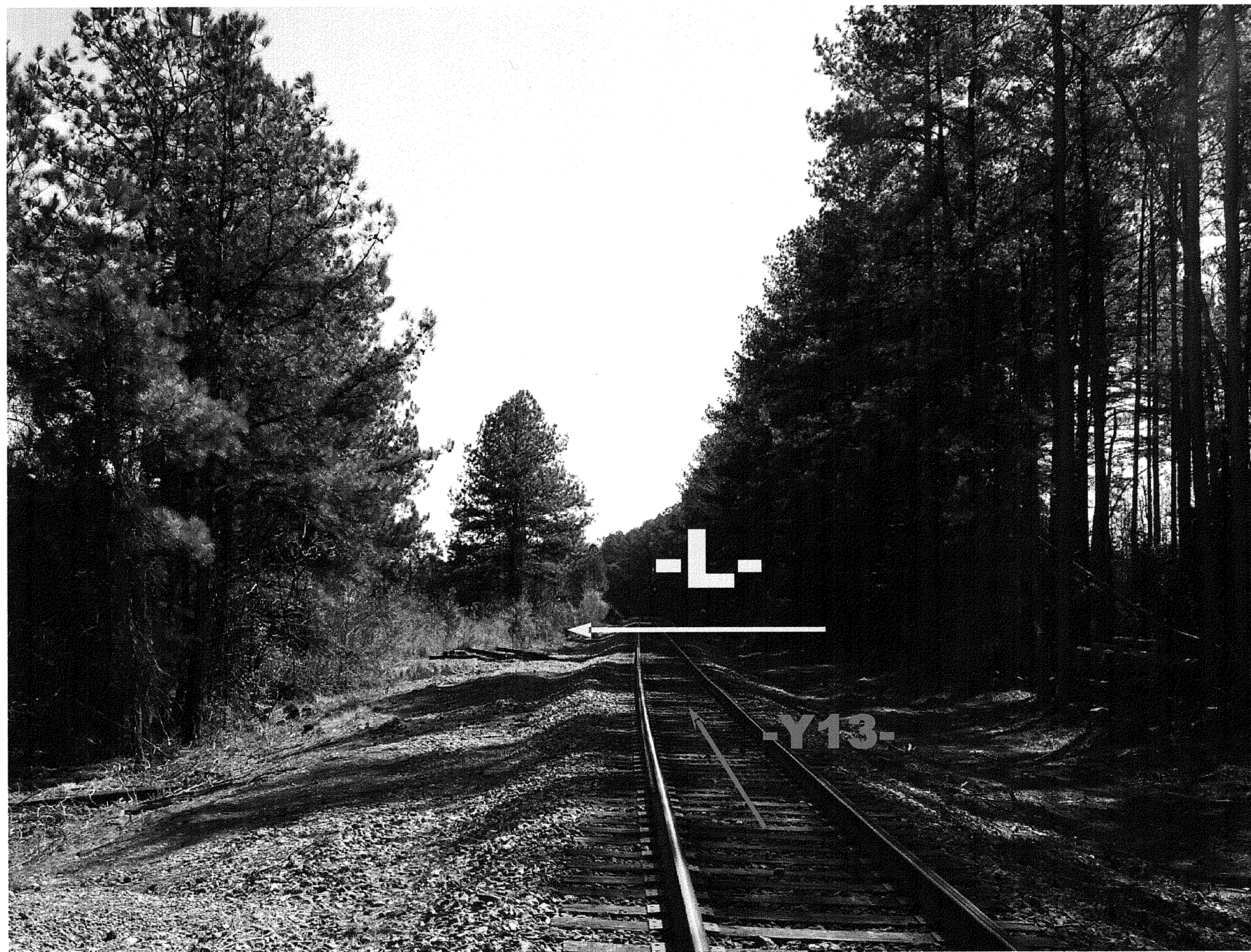
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-37	5 RT	55+89	14.7-16.2	A-5(3)	47	7	30.8	23.5	33.5	12.2	100	79	52	-	-
SS-38	5 RT	55+89	34.7-36.2	A-7-5(11)	58	14	16.0	28.2	45.7	10.1	98	88	66	-	-
SS-39	5 RT	55+89	59.7-61.2	A-2-4(0)	24	NP	29.2	46.0	22.8	2.0	100	92	31	-	-

EB2-B

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-40	42 RT	55+81	3.8-5.3	A-7-5(46)	82	35	1.0	2.4	27.7	68.9	100	100	97	-	-
SS-41	42 RT	55+81	13.0-14.5	A-7-5(26)	73	18	1.2	18.2	52.2	28.4	100	99	89	-	-
ST-3	42 RT	55+81	17.0-19.2	A-7-5(26)	71	17	1.2	11.7	61.0	26.2	100	99	94	-	-
SS-42	42 RT	55+81	18.0-19.5	A-7-5(25)	74	16	1.2	16.6	59.9	22.3	100	100	91	-	-
ST-4	42 RT	55+81	19.2-21.4	A-7-5(32)	70	23	1.0	5.7	69.0	24.3	100	99	97	-	-
SS-43	42 RT	55+81	33.0-34.5	A-5(12)	54	8	1.2	27.4	59.3	12.2	100	99	85	-	-
SS-44	42 RT	55+81	53.0-54.5	A-4(5)	39	10	16.4	26.1	45.3	12.2	96	86	63	-	-

SITE PHOTOGRAPH

Dual Bridges on -L- (NC 100) over Norfolk Southern Railroad



Looking East along -Y13-

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34901.1.1 (U-3110B) F.A. PROJ. STP-1311(5)
COUNTY ALAMANCE
PROJECT DESCRIPTION SR 1311 (COOK RD.) IMPROVEMENTS AND
CONNECTOR FROM SR 1309 (WESTBROOK AVE.) TO NC 100
(HAGGARD AVE.)
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER
NORFOLK SOUTHERN RAILROAD AT STATION 54+70

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-8	CROSS SECTION(S)
9-17	BORE LOG(S)
18-19	SOIL TEST RESULTS
20	SITE PHOTOGRAPH(S)

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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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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 THIS 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.

PERSONNEL

N. D. MOHS

J. R. MATULA

CONSULTANTS:

SUMMIT ENG.

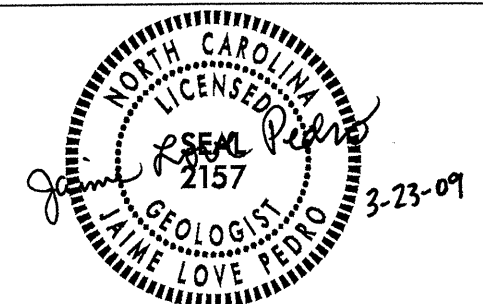
SUB-TECH

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE MARCH 2009



PROJECT: 34901.1.1 ID: U-3110B

DRAWN BY: J. L. PEDRO

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NOTE - 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.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

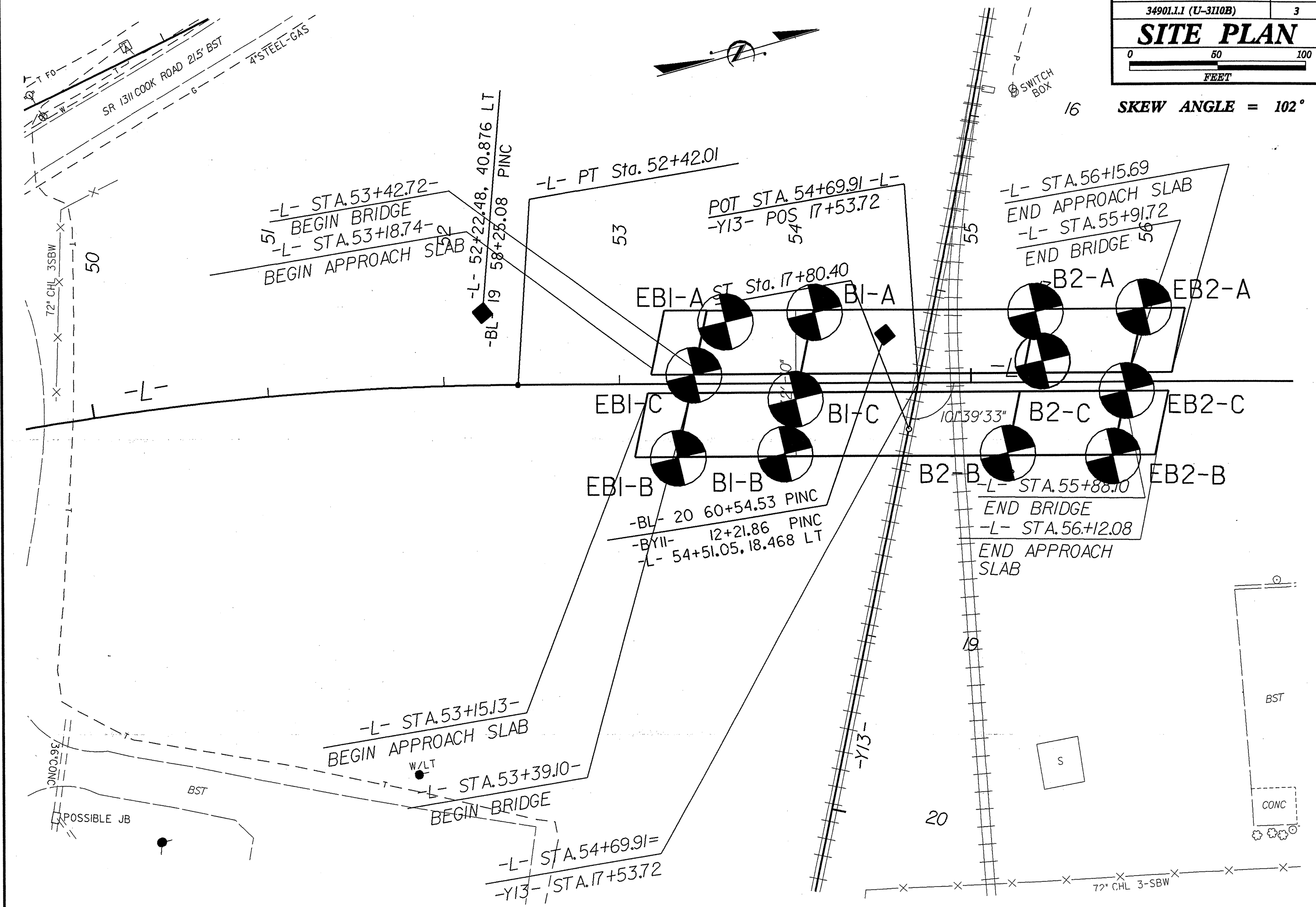
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

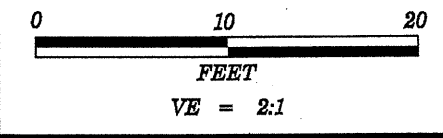
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES: <i>VERY STIFF, GRM, SAT. CLM, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>		WELL-GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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 60 BLOWS PER FOOT 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: WEATHERED ROCK (WR)  NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR)  FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR)  FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CP)  COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.		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, 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 DISLODGED 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 (RQD) - 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 IN 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 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SCREC) - 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.			
SOIL LEGEND AND AASHTO CLASSIFICATION		MINERALOGICAL COMPOSITION		WEATHERING		ROCK HARDNESS			
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		FRESH ROCK FRESH, CRYSTALLINE BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL) 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 (SL) 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. 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. VERY SEVERE (V SEV) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. 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.		SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		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.	
PERCENTAGE OF MATERIAL		GROUND WATER		ROCK HARDNESS		BEDDING			
ORGANIC MATERIAL GRANULAR SILT - CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE		WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP		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.		VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET MODERATELY 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			
CONSISTENCY OR DENSENESS		MISCELLANEOUS SYMBOLS		ROCK HARDNESS		INDURATION			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)		ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD		SPT DMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL		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.			
TEXTURE OR GRAIN SIZE		ABBREVIATIONS		ROCK HARDNESS		INDURATION			
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.00 0.42 0.25 0.075 0.053		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 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		# - MOISTURE CONTENT v - VERY VST - VANE SHEAR TEST WEA. - WEATHERED % - UNIT WEIGHT % - DRY UNIT WEIGHT		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
SOIL MOISTURE - CORRELATION OF TERMS		EQUIPMENT USED ON SUBJECT PROJECT		ROCK HARDNESS		INDURATION			
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST D-50 ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING TRICONE 2 5/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		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.		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.			
PLASTICITY		EQUIPMENT USED ON SUBJECT PROJECT		ROCK HARDNESS		INDURATION			
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST D-50 ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING TRICONE 2 5/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		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.		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.			
COLOR		EQUIPMENT USED ON SUBJECT PROJECT		ROCK HARDNESS		INDURATION			
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.		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST D-50 ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING TRICONE 2 5/16" STEEL TEETH TRICONE TUNG-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		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.		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.			

16 **SKW ANGLE = 102°**



715

NSRR TRACKS



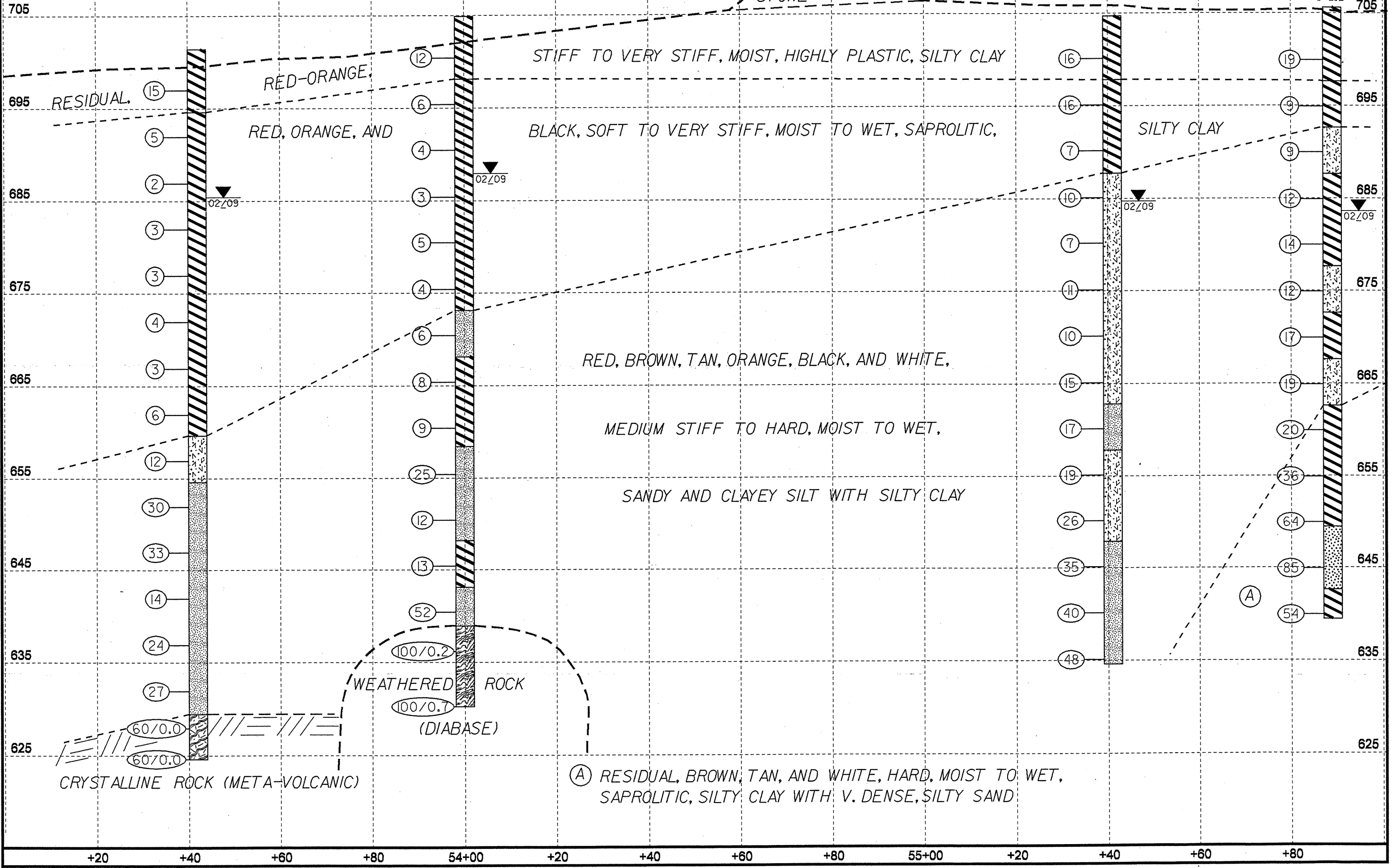
PROJECT REFERENCE NO.	SHEET
34901.1.1 (U-3110B)	4
FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-	

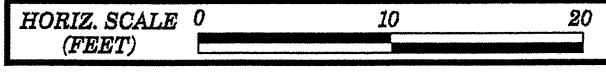
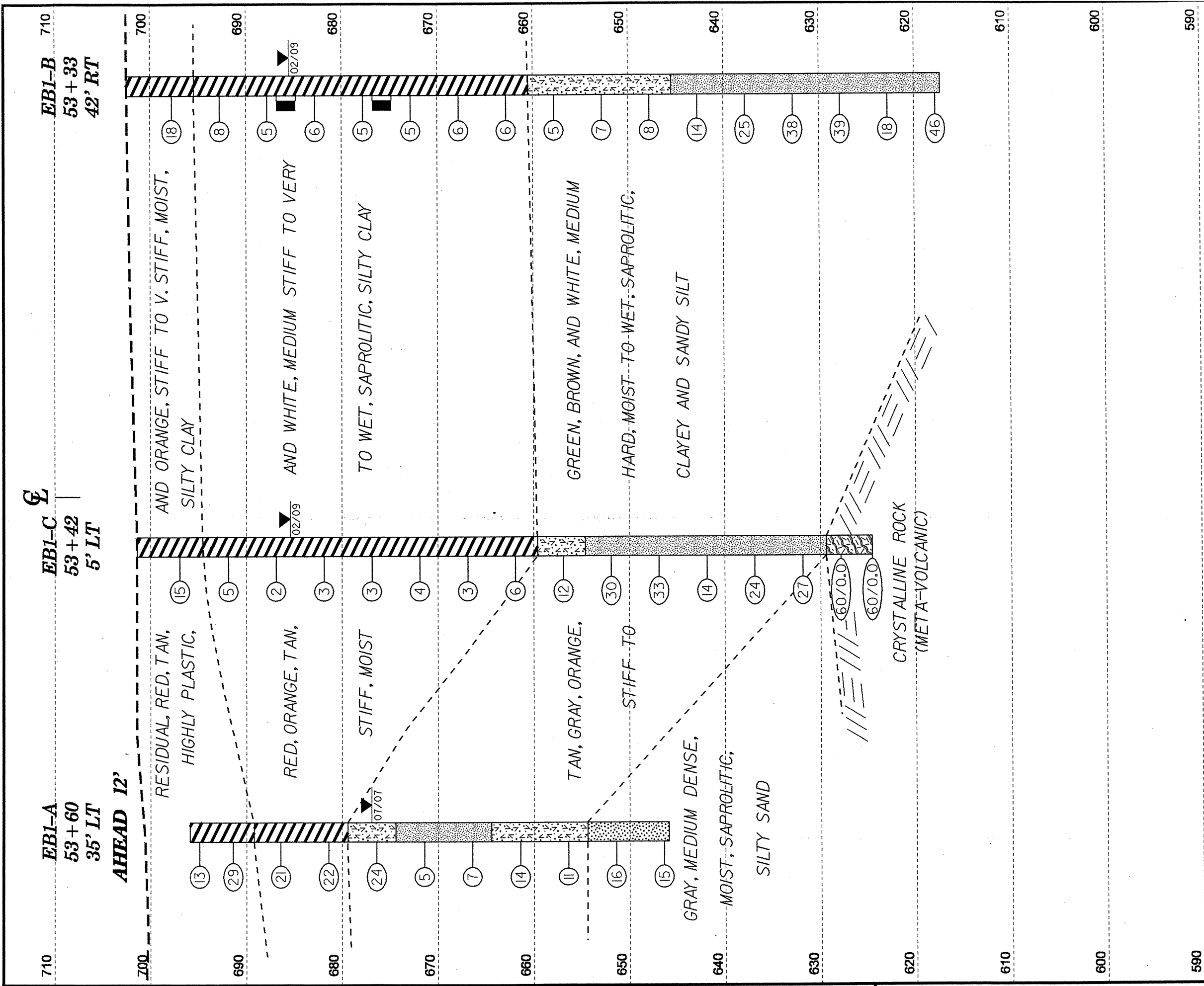
EB1-C
53+42
5' LT

B1-C
54+00
9' RT

B2-C
55+41
12' LT

EB2-C
55+89
5' RT





VE = 1:1

CROSS SECTION THROUGH END BENT 1

SKIEW ANGLE = 102°



VE = 1:1

CROSS SECTION THROUGH BENT 1

SKEW ANGLE = 102°

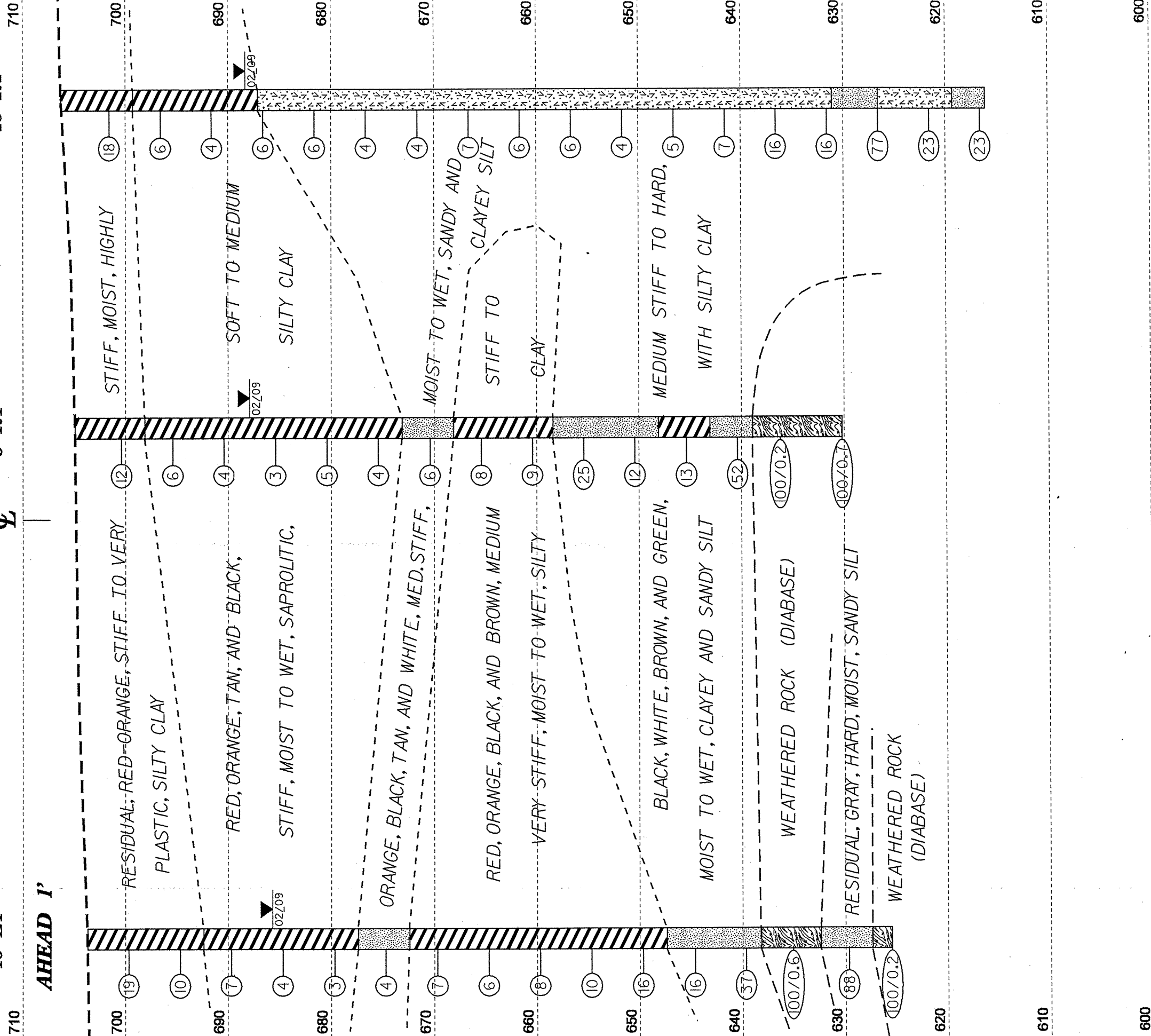
BI-A
54+11
40' LT

BI-C
54+00
9' RT

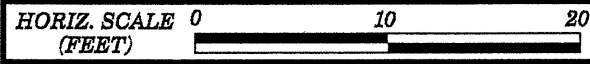
BI-B
53+94
40' RT

GL

AHEAD 1'



PROJECT REFERENCE NO.	SHEET
34901.1.1 (U-3110B)	6



VE = 1:1

CROSS SECTION THROUGH BENT 2

SKIEW ANGLE = 102°

B2-A
55 + 37
40' LT

B2-C
55 + 41
12' LT

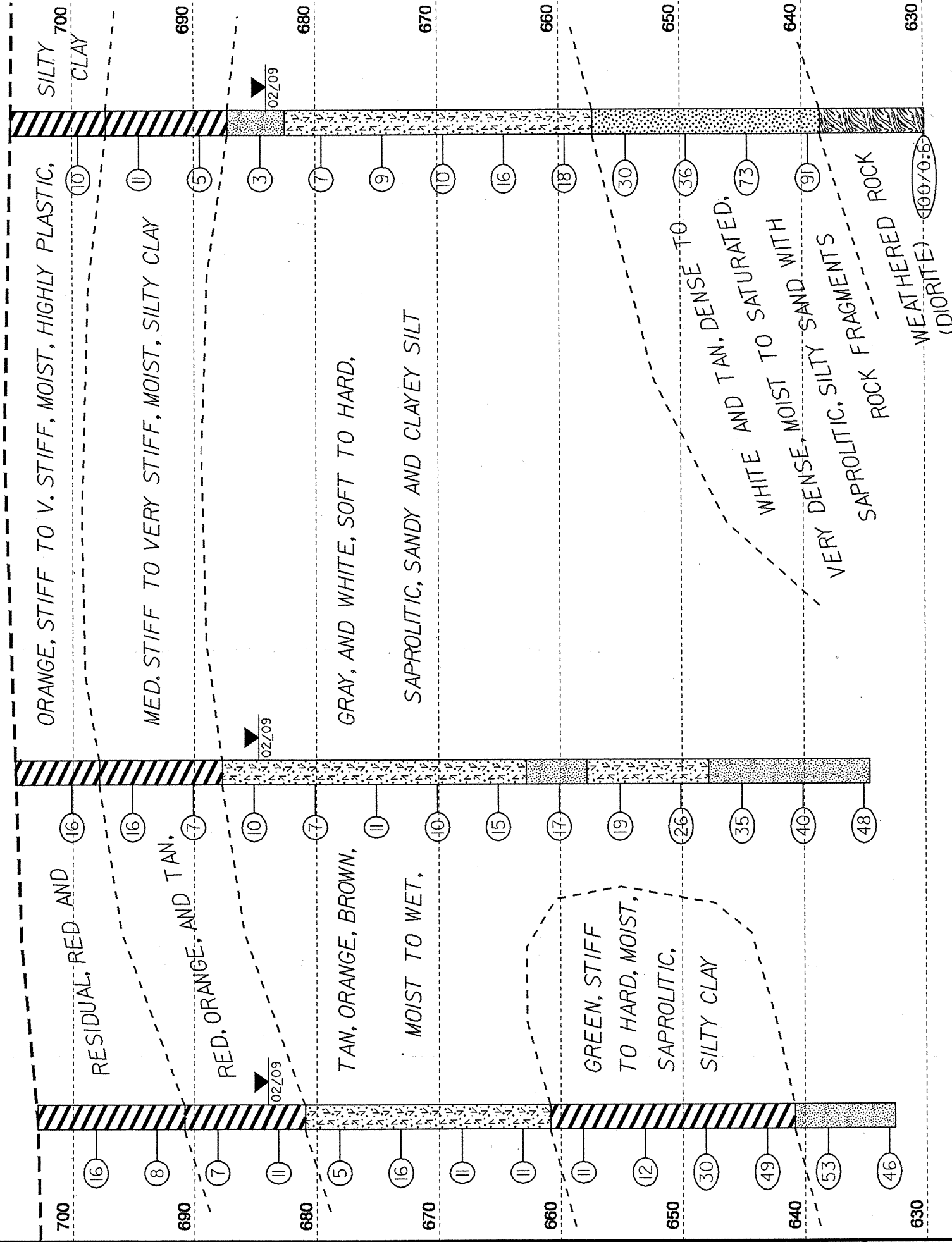
B2-B
55 + 21
40' RT

AHEAD 9'



710

710



710

700

690

680

670

660

650

640

630

620

610

600

590

580

EB2-A
55 + 99
42' LT

EB2-C
55 + 89
5' RT

EB2-B
55 + 81
42' RT

710

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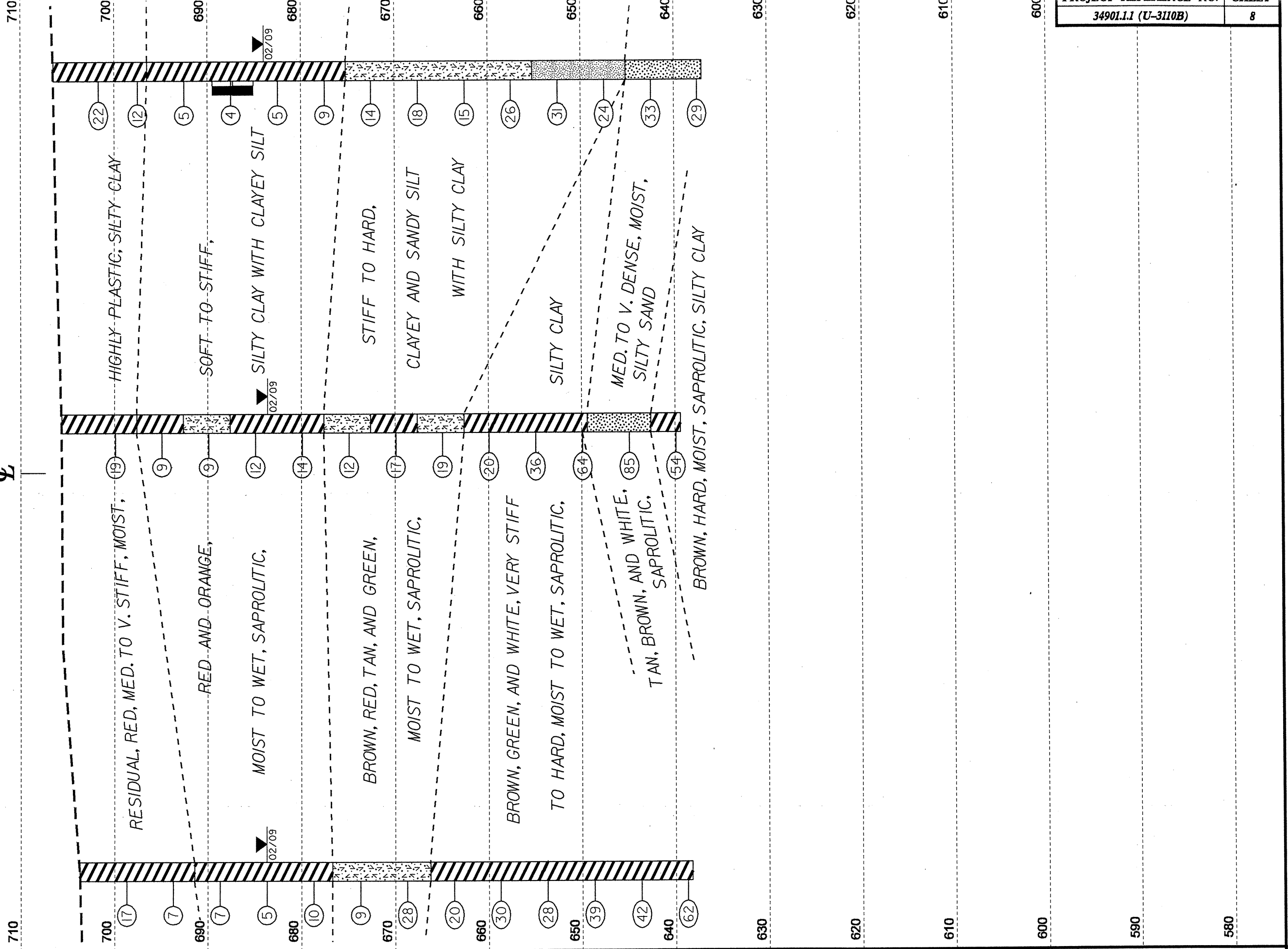
710



VE = 1:1

CROSS SECTION THROUGH END BENT 2

SKEW ANGLE = 102°



NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB1-B	STATION 53+33	OFFSET 42ft RT	ALIGNMENT -L-
COLLAR ELEV. 702.5 ft	TOTAL DEPTH 85.2 ft	NORTHING 856,208	EASTING 1,846,213
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/19/09	COMP. DATE 02/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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							
705														702.5	GROUND SURFACE	0.0
698.8	3.7													695.5	RESIDUAL Red and orange, highly plastic, SILTY CLAY	7.0
693.8	8.7	6	8	10										680.5	Red, white, and orange, saprolitic, SILTY CLAY	42.0
688.8	13.7	2	4	4										645.5	Orange and white, saprolitic, CLAYEY SILT	57.0
683.8	18.7	1	2	3											Gray, white, and green, saprolitic, SANDY SILT	
678.8	23.7	2	2	4												
673.8	28.7	1	2	3												
668.8	33.7	1	2	3												
663.8	38.7	2	2	4												
658.8	43.7	2	2	3												
653.8	48.7	3	3	4												
648.8	53.7	3	3	5												
643.8	58.7	5	6	8												
638.8	63.7	9	10	15												
633.8	68.7	11	15	23												
628.8	73.7	19	22	17												

NC DOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ, NC_DOT_GDT_03/19/09

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB1-B	STATION 53+33	OFFSET 42ft RT	ALIGNMENT -L-
COLLAR ELEV. 702.5 ft	TOTAL DEPTH 85.2 ft	NORTHING 856,208	EASTING 1,846,213
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/19/09	COMP. DATE 02/20/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

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							
625														617.3	Boring Terminated at Elevation 617.3 ft in RESIDUAL (SANDY SILT)	85.2
623.8	78.7															
618.8	83.7	4	7	11												
		8	19	27												

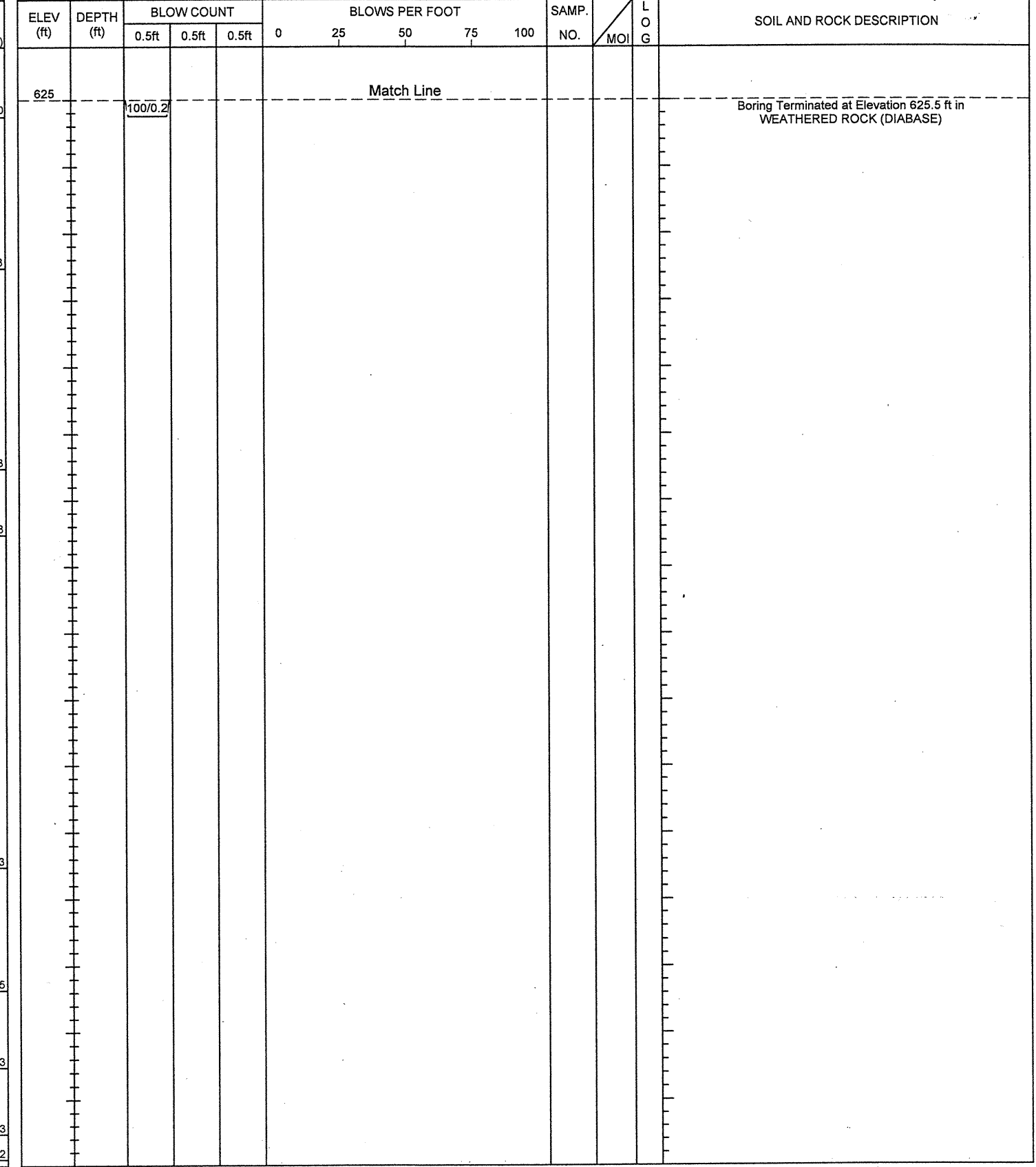
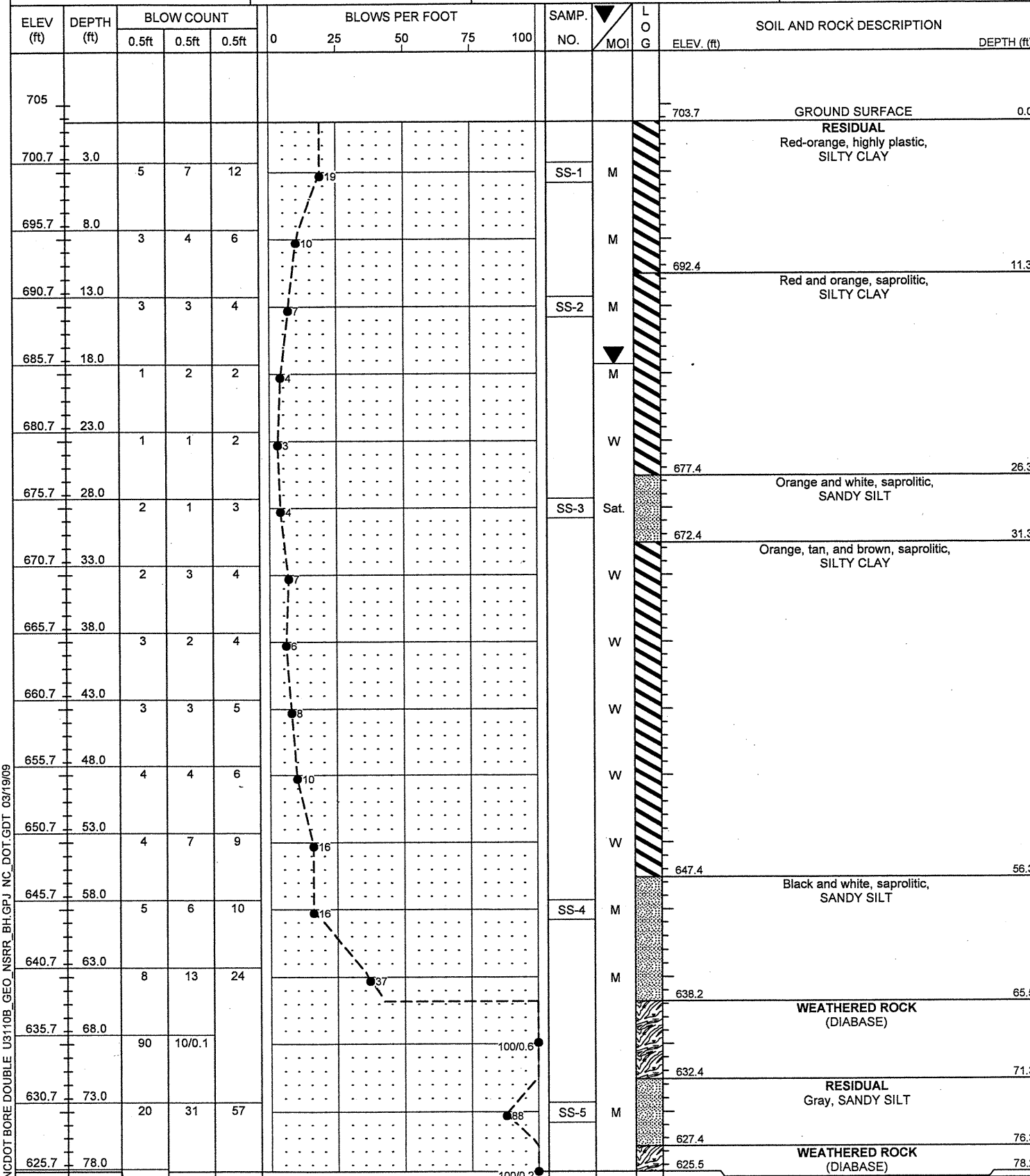
Match Line

Other Samples:
ST-1 (15.7 - 17.7)
ST-2 (25.7 - 27.7)

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 54+11	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 78.2 ft	NORTHING 856,303	EASTING 1,846,151
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/16/09	COMP. DATE 02/16/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-A	STATION 54+11	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 78.2 ft	NORTHING 856,303	EASTING 1,846,151
DRILL MACHINE D-50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 02/16/09	COMP. DATE 02/16/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NC DOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ, NC_DOT_GDT_03/19/09

PROJECT NO. 34901.1.1		ID. U-3110B		COUNTY Alamance		GEOLOGIST Mohs, N. D.								
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD							GROUND WTR (ft)							
BORING NO. B1-C		STATION 54+00		OFFSET 9ft RT		ALIGNMENT -L-	0 HR. N/A							
COLLAR ELEV. 704.9 ft		TOTAL DEPTH 74.7 ft		NORTHING 856,281		EASTING 1,846,196	24 HR. 17.0							
DRILL MACHINE D-50		DRILL METHOD Wash Boring				HAMMER TYPE Automatic								
START DATE 02/17/09		COMP. DATE 02/17/09		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A								
ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION		
		0.5ft	0.5ft	0.5ft	0	25	50	75	100					
705													704.9 GROUND SURFACE 0.0	
701.4	3.5	6	6	6								M	RESIDUAL Red-orange, highly plastic, SILTY CLAY	
696.4	8.5	2	2	4								M	Orange and black, saprolitic, SILTY CLAY	
691.4	13.5	3	2	2								M		
686.4	18.5	WOH	1	2								M		
681.4	23.5	1	2	3								W		
676.4	28.5	1	2	2								M		
671.4	33.5	2	2	4								W	Tan and black, SANDY SILT	
666.4	38.5	2	3	5								M	Red, black, and orange, saprolitic, SILTY CLAY	
661.4	43.5	3	3	6								M		
656.4	48.5	6	8	17								M	Brown and gray, saprolitic, SANDY SILT	
651.4	53.5	4	5	7								M		
646.4	58.5	5	5	8								M	Green, saprolitic, SILTY CLAY	
641.4	63.5	24	20	32								M	Gray, SANDY SILT	
636.4	68.5	100/0.2										M	WEATHERED ROCK (DIABASE)	
631.4	73.5	33	64	36/0.2								M		
														630.5 WEATHERED ROCK (DIABASE) 74.4
														Boring Terminated at Elevation 630.2 ft in WEATHERED ROCK (DIABASE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-B	STATION 53+94	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 706.3 ft	TOTAL DEPTH 90.2 ft	NORTHING 856,268	EASTING 1,846,225
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/18/09	COMP. DATE 02/18/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
710												GROUND SURFACE	0.0
702.6	3.7	5	9	9							M	RESIDUAL Red, highly plastic, SILTY CLAY	
697.6	8.7	3	2	4						SS-7	M	Orange and tan, SILTY CLAY	7.0
692.6	13.7	1	2	2							M		
687.6	18.7	1	2	4						SS-8	M	Tan-red, white, and orange, saprolitic, CLAYEY SILT	19.2
682.6	23.7	2	2	4							M		
677.6	28.7	1	2	2							M		
672.6	33.7	1	2	2							Sat.		
667.6	38.7	2	3	4							Sat.		
662.6	43.7	2	2	4						SS-9	M		
657.6	48.7	2	2	4							M		
652.6	53.7	1	1	3							W		
647.6	58.7	1	2	3							M		
642.6	63.7	2	2	5							M		
637.6	68.7	3	6	10							M		
632.6	73.7	4	6	10							M		75.2

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B1-B	STATION 53+94	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 706.3 ft	TOTAL DEPTH 90.2 ft	NORTHING 856,268	EASTING 1,846,225
DRILL MACHINE D-50	DRILL METHOD Wash Boring	HAMMER TYPE Automatic	
START DATE 02/18/09	COMP. DATE 02/18/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A

ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0.5ft	0	25	50	75	100				
630													
627.6	78.7	3	30	47						SS-10	M	White, saprolitic, SANDY SILT (continued)	79.7
622.6	83.7	5	9	14							M	Orange, saprolitic, CLAYEY SILT	87.0
617.6	88.7	10	11	12							M	White, saprolitic, SANDY SILT	90.2
Boring Terminated at Elevation 616.1 ft in RESIDUAL (SANDY SILT)													

NCDOT BORE DOUBLE U3110B GEO NSRR_BH.GPJ NC_DOT_GDT_03/19/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-A	STATION 55+37	OFFSET 40ft LT	ALIGNMENT -L-
COLLAR ELEV. 702.9 ft	TOTAL DEPTH 70.3 ft	NORTHING 856,426	EASTING 1,846,180
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/25/09	COMP. DATE 02/25/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
705														GROUND SURFACE	0.0
700	699.1	3.8	4	8	8									RESIDUAL Red, highly plastic, SILTY CLAY	
695	694.1	8.8	3	3	5										
690	689.1	13.8	2	3	4									Orange, saprolitic, SILTY CLAY	12.1
685	684.1	18.8	2	4	7										
680	679.1	23.8	1	2	3									Orange and brown, saprolitic, CLAYEY SILT	22.0
675	674.1	28.8	4	6	10										
670	669.1	33.8	2	4	7										
665	664.1	38.8	3	3	8										
660	659.1	43.8	4	4	7									Green, saprolitic, SILTY CLAY	42.1
655	654.1	48.8	4	4	8										
650	649.1	53.8	9	14	16										
645	644.1	58.8	16	23	26										
640	639.1	63.8	15	25	28									Gray, saprolitic, SANDY SILT	62.1
635	634.1	68.8	16	20	26										
630														Boring Terminated at Elevation 632.6 ft in RESIDUAL (SANDY SILT)	70.3

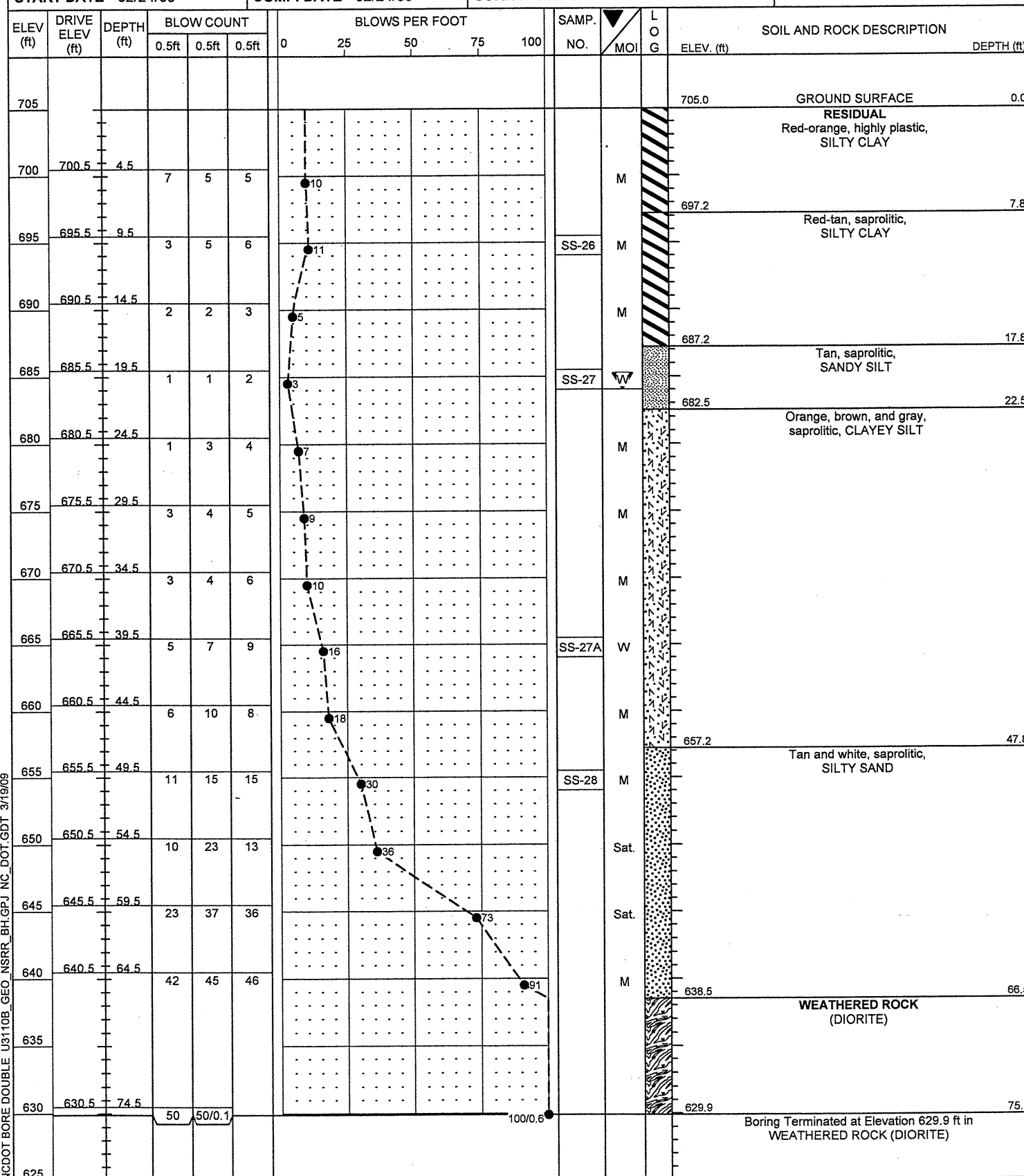
PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-C	STATION 55+41	OFFSET 12ft LT	ALIGNMENT -L-
COLLAR ELEV. 704.7 ft	TOTAL DEPTH 70.1 ft	NORTHING 856,423	EASTING 1,846,208
DRILL MACHINE CME-550	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 02/23/09	COMP. DATE 02/23/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
705														GROUND SURFACE	0.0
700	701.1	3.6	6	7	9									RESIDUAL Red, highly plastic, SILTY CLAY	
695	696.1	8.6	6	7	9									Red and orange, SILTY CLAY	6.9
690	691.1	13.6	2	3	4										
685	686.1	18.6	4	4	6									Orange, tan, white, and brown, CLAYEY SILT	17.0
680	681.1	23.6	2	3	4										
675	676.1	28.6	2	4	7										
670	671.1	33.6	3	4	6										
665	666.1	38.6	3	5	10										
660	661.1	43.6	10	7	10									Brown, saprolitic, SANDY SILT	41.9
655	656.1	48.6	4	8	11									Brown, saprolitic, CLAYEY SILT	46.9
650	651.1	53.6	6	10	16										
645	646.1	58.6	10	16	19									Tan-brown, saprolitic, SANDY SILT	56.9
640	641.1	63.6	30	16	24										
635	636.1	68.6	27	22	26										
630														Boring Terminated at Elevation 634.6 ft in RESIDUAL (SANDY SILT)	70.1

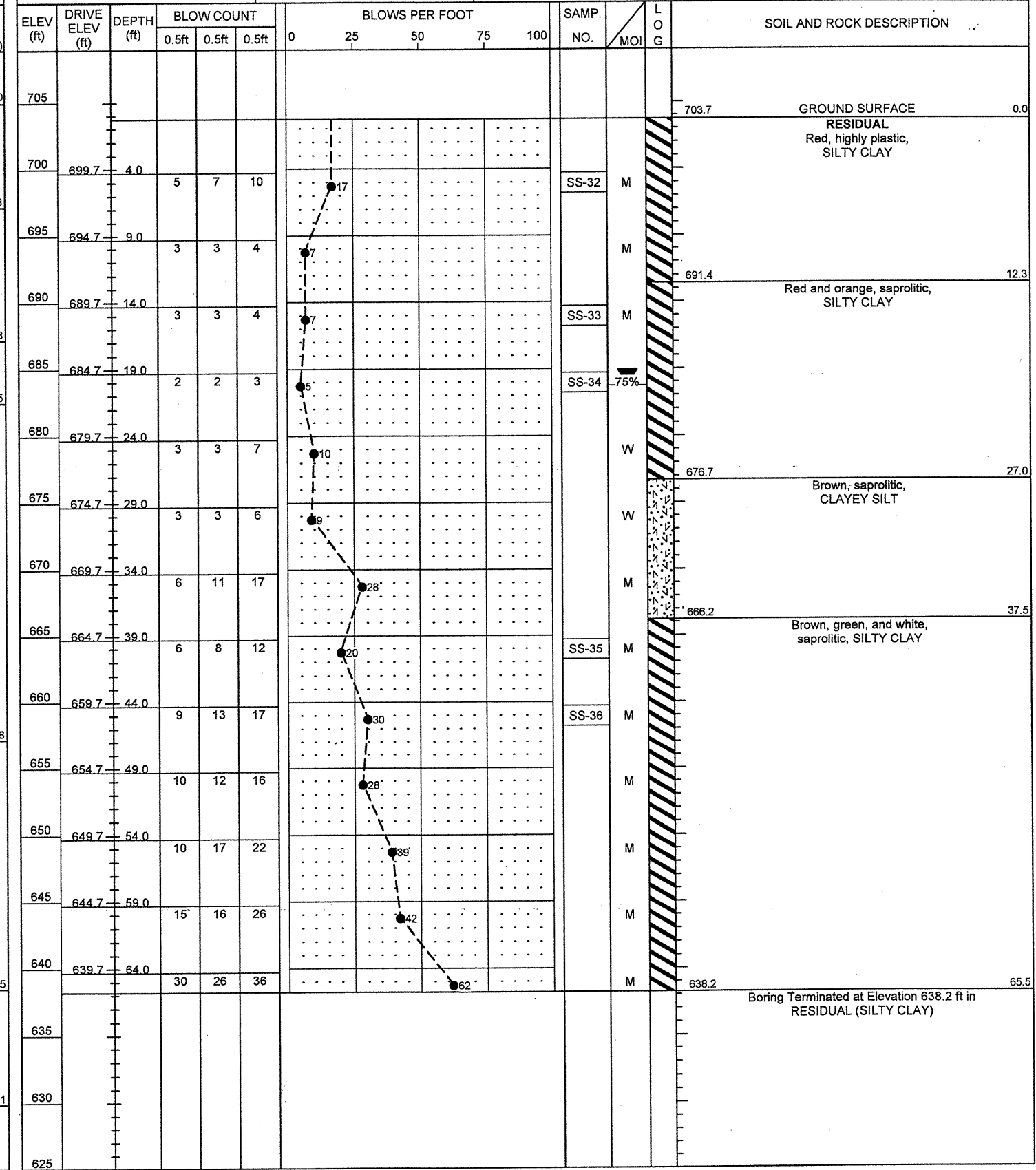
NCDOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ, NC_DOT_GDT_3/19/09

NC DOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. B2-B	STATION 55+21	OFFSET 40ft RT	ALIGNMENT -L-
COLLAR ELEV. 705.0 ft	TOTAL DEPTH 75.1 ft	NORTHING 856,392	EASTING 1,846,254
DRILL MACHINE CME-550	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 02/24/09	COMP. DATE 02/24/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB2-A	STATION 55+99	OFFSET 42ft LT	ALIGNMENT -L-
COLLAR ELEV. 703.7 ft	TOTAL DEPTH 65.5 ft	NORTHING 856,487	EASTING 1,846,192
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/25/09	COMP. DATE 02/25/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NC DOT BORE DOUBLE U3110B_GEO_NSRR_BH.GPJ NC DOT.GDT 3/19/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB2-C	STATION 55+89	OFFSET 5ft RT	ALIGNMENT -L-
COLLAR ELEV. 705.6 ft	TOTAL DEPTH 66.2 ft	NORTHING 856,466	EASTING 1,846,236
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/26/09	COMP. DATE 02/26/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
710															
705														GROUND SURFACE	0.0
700	700.9	4.7	6	9	10									RESIDUAL Red, highly plastic, SILTY CLAY	
695	695.9	9.7	4	4	5									Orange, SILTY CLAY	8.0
690	690.9	14.7	4	4	5						SS-37	M		Red-tan, saprolitic, CLAYEY SILT	13.0
685	685.9	19.7	4	4	8							W		Red, SILTY CLAY	18.0
680	680.9	24.7	4	6	8							W		Tan, CLAYEY SILT	28.0
675	675.9	29.7	3	4	8							W		Brown, saprolitic, SILTY CLAY	33.0
670	670.9	34.7	4	7	10						SS-38	W		Brown, saprolitic, CLAYEY SILT	38.0
665	665.9	39.7	4	7	12							M		Brown, saprolitic, CLAYEY SILT	43.0
660	660.9	44.7	5	7	13							W		Brown, saprolitic, SILTY CLAY	49.0
655	655.9	49.7	8	16	20							M		Tan-white, SILTY SAND	56.2
650	650.9	54.7	10	28	36							M		Brown, saprolitic, SILTY CLAY	63.0
645	645.9	59.7	36	40	45						SS-39	M		Boring Terminated at Elevation 639.4 ft in RESIDUAL (SILTY CLAY)	66.2
640	640.9	64.7	18	22	32							M			
635															
630															

PROJECT NO. 34901.1.1	ID. U-3110B	COUNTY Alamance	GEOLOGIST Mohs, N. D.
SITE DESCRIPTION DUAL BRIDGES ON -L- (NC 100) OVER NORFOLK SOUTHERN RAILROAD			GROUND WTR (ft)
BORING NO. EB2-B	STATION 55+81	OFFSET 42ft RT	ALIGNMENT -L-
COLLAR ELEV. 706.5 ft	TOTAL DEPTH 69.5 ft	NORTHING 856,450	EASTING 1,846,270
DRILL MACHINE CME-550	DRILL METHOD H.S. Augers	HAMMER TYPE Manual	
START DATE 02/26/09	COMP. DATE 02/26/09	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 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					
710															
705														GROUND SURFACE	0.0
700	702.7	3.8	7	9	13						SS-40	M		RESIDUAL Red, highly plastic, SILTY CLAY	
695	698.5	8.0	4	5	7							M		Orange, saprolitic, SILTY CLAY	10.0
690	693.5	13.0	2	2	3						SS-41	M		Red, SILTY CLAY	18.0
685	688.5	18.0	2	1	3							W		Tan, CLAYEY SILT	28.0
680	683.5	23.0	2	2	3							W		Brown, saprolitic, SILTY CLAY	33.0
675	678.5	28.0	2	4	5							W		Brown, saprolitic, CLAYEY SILT	38.0
670	673.5	33.0	3	6	8						SS-43	M		Brown and green, saprolitic, CLAYEY SILT	31.3
665	668.5	38.0	6	8	10							M		Brown, saprolitic, CLAYEY SILT	43.0
660	663.5	43.0	4	7	8							M		Brown, saprolitic, SILTY CLAY	49.0
655	658.5	48.0	7	11	15							M		Tan-white, SILTY SAND	56.2
650	653.5	53.0	10	16	15						SS-44	M		Brown, saprolitic, SANDY SILT	51.3
645	648.5	58.0	10	10	14							M		Brown and white, saprolitic, SILTY SAND	61.3
640	643.5	63.0	9	18	15							M		Boring Terminated at Elevation 637.0 ft in RESIDUAL (SILTY SAND)	69.5
635	638.5	68.0	6	13	16							M			
630															

NCDOT BORE DOUBLE U3110B GEO NSRR_BH.GPJ NC DOT.GDT 3/19/09

Other Samples:
ST-3 (17.0 - 19.2)
ST-4 (19.2 - 21.4)

EB1-A

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-48	35' RT	53+60	0.0-1.5	A-7-5(38)	75	38	6.8	10.1	13.2	70.0	100	97	85	-	-
SS-49	35' RT	53+60	3.5-5.0	A-7-5(37)	76	28	1.4	6.2	28.6	63.8	100	99	95	-	-
SS-50	35' RT	53+60	8.5-10.0	A-7-5(29)	72	21	3.9	9.9	49.2	37.0	100	98	91	-	-
SS-51	35' RT	53+60	13.5-15.0	A-7-5(26)	71	20	3.9	12.8	44.2	39.1	100	98	87	-	-
SS-52	35' RT	53+60	18.5-20.0	A-5(9)	45	8	2.3	32.7	54.7	10.3	100	99	79	-	-
SS-53	35' RT	53+60	23.5-25.0	A-4(2)	39	5	10.9	39.1	39.7	10.3	100	97	59	-	-
SS-54	35' RT	53+60	28.5-30.0	A-4(1)	39	4	35.4	24.1	30.2	10.3	100	72	48	-	-
SS-55	35' RT	53+60	33.5-35.0	A-5(1)	44	6	37.7	20.4	31.7	10.3	100	72	46	-	-
SS-56	35' RT	53+60	43.5-45.0	A-2-5(0)	41	5	45.7	24.3	21.8	8.2	98	64	34	-	-

EB1-C

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-11	5 LT	53+42	3.4-4.9	A-7-5(41)	81	33	2.4	7.1	29.8	60.7	100	99	93	-	-
SS-12	5 LT	53+42	8.5-10.0	A-7-5(18)	66	11	1.6	21.1	42.9	34.4	100	99	86	-	-
SS-13	5 LT	53+42	33.5-35.0	A-7-5(8)	51	13	24.9	20.0	40.9	14.2	100	82	62	-	-
SS-14	5 LT	53+42	43.5-45.0	A-5(5)	43	7	4.5	42.9	44.5	8.1	100	98	65	-	-
SS-15	5 LT	53+42	48.5-50.0	A-4(3)	36	7	10.1	40.7	41.1	8.1	100	97	60	-	-
SS-16	5 LT	53+42	68.5-70.0	A-4(0)	36	4	18.2	51.0	24.7	6.1	100	93	42	-	-

EB1-B

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-17	42 RT	53+33	8.7-10.2	A-7-5(10)	58	14	17.4	28.5	29.8	24.3	100	92	62	-	-
ST-1	42 RT	53+33	15.7-17.9	A-5(15)	62	10	2.8	24.5	54.5	18.1	99	98	82	-	-
ST-2	42 RT	53+33	25.7-27.7	A-7-5(11)	61	12	11.9	31.6	46.4	10.1	100	94	67	-	-
SS-18	42 RT	53+33	43.7-45.2	A-5(6)	51	8	13.4	38.3	40.3	8.1	100	92	62	-	-
SS-19	42 RT	53+33	48.7-50.2	A-5(10)	54	8	4.0	34.2	49.6	12.1	100	99	75	-	-

BL-A

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-1	40 LT	54+11	3.0-4.5	A-7-5(38)	77	33	4.7	9.3	25.3	60.7	100	97	89	-	-
SS-2	40 LT	54+11	13.0-14.5	A-7-5(12)	58	13	6.1	32.4	43.3	18.2	100	97	72	-	-
SS-3	40 LT	54+11	28.0-29.5	A-4(0)	35	NP	29.8	39.1	23.1	8.1	100	88	38	-	-
SS-4	40 LT	54+11	58.0-59.5	A-4(0)	35	NP	19.4	46.4	26.1	8.1	97	88	43	-	-
SS-5	40 LT	54+11	73.0-74.5	A-4(0)	28	NP	22.3	50.0	19.6	8.1	100	91	38	-	-

BL-C

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-5A	9 RT	54+00	48.5-50.0	A-4(3)	38	6	7.5	42.3	42.1	8.1	100	99	60	-	-
SS-6	9 RT	54+00	63.5-65.0	A-4(1)	32	7	17.2	43.7	31.0	8.1	100	92	49	-	-

BL-B

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-7	40 RT	53+94	8.7-10.2	A-7-5(28)	70	24	1.4	17.4	46.8	34.4	100	99	87	-	-
SS-8	40 RT	53+94	19.2-20.2	A-5(1)	42	5	28.5	28.7	28.5	14.2	100	84	48	-	-
SS-9	40 RT	53+94	43.7-45.2	A-5(9)	52	6	2.2	31.8	51.8	14.2	100	100	79	-	-
SS-10	40 RT	53+94	78.7-80.2	A-4(0)	30	NP	23.1	49.6	21.3	6.1	100	92	37	-	-
SS-29	40 LT	55+37	43.8-45.3	A-7-5(26)	62	22	2.6	12.6	60.5	24.3	100	99	90	-	-
SS-30	40 LT	55+37	53.8-55.3	A-7-6(9)	43	14	5.9	32.4	47.5	14.2	100	98	69	-	-
SS-31	40 LT	55+37	63.8-65.3	A-4(1)	34	5	16.0	36.9	39.0	8.1	92	85	52	-	-

B2-A

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-20	12 LT	55+41	3.6-5.1	A-7-5(32)	77	34	7.5	17.6	26.2	48.6	100	97	79	-	-
SS-21	12 LT	55+41	8.6-10.1	A-7-5(6)	48	13	19.0	34.0	28.7	18.2	100	93	54	-	-
SS-22	12 LT	55+41	12.6-20.1	A-5(7)	54	8	8.7	37.7	41.4	12.2	96	92	66	-	-
SS-23	12 LT	55+41	28.6-30.1	A-5(6)	54	6	15.2	32.4	44.3	8.1	99	88	64	-	-
SS-24	12 LT	55+41	43.6-45.1	A-4(2)	38	5	13.6	35.1	45.3	6.1	91	85	56	-	-
SS-25	12 LT	55+41	58.6-60.1	A-4(3)	37	8	17.8	33.4	42.7	6.1	98	90	56	-	-

B2-B

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-26	40 RT	55+21	9.5-11.0	A-7-5(4)	49	11	38.9	16.8	34.1	10.1	98	68	48	-	-
SS-27	40 RT	55+21	19.5-21.0	A-4(1)	36	6	27.6	31.6	34.8	6.1	100	86	49	-	-
SS-27A	40 RT	55+21	39.5-41.0	A-5(0)	41	3	34.2	27.4	32.3	6.1	93	68	42	-	-
SS-28	40 RT	55+21	49.5-51.0	A-2-4(0)	30	NP	27.6	46.0	24.4	2.0	100	91	34	-	-

EB2-A

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-32	42 LT	55+99	4.0-5.5	A-7-5(28)	69	26	6.7	11.1	27.5	54.7	100	97	85	-	-
SS-33	42 LT	55+99	14.0-15.5	A-7-5(12)	61	11	6.9	28.4	52.6	12.2	100	97	74	-	-
SS-34	42 LT	55+99	19.0-20.5	A-7-5(22)	62	16	1.6	18.6	59.5	20.3	100	99	90	75.3	-
SS-35	42 LT	55+99	39.0-40.5	A-7-5(18)	53	16	1.2	22.3	62.3	14.2	100	100	88	-	-
SS-36	42 LT	55+99	44.0-45.5	A-7-5(6)	44	12	19.9	31.2	42.8	6.1	98	87	57	-	-

EB2-C

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-37	5 RT	55+89	14.7-16.2	A-5(3)	47	7	30.8	23.5	33.5	12.2	100	79	52	-	-
SS-38	5 RT	55+89	34.7-36.2	A-7-5(11)	58	14	16.0	28.2	45.7	10.1	98	88	66	-	-
SS-39	5 RT	55+89	59.7-61.2	A-2-4(0)	24	NP	29.2	46.0	22.8	2.0	100	92	31	-	-

EB2-B

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-40	42 RT	55+81	3.8-5.3	A-7-5(46)	82	35	1.0	2.4	27.7	68.9	100	100	97	-	-
SS-41	42 RT	55+81	13.0-14.5	A-7-5(26)	73	18	1.2	18.2	52.2	28.4	100	99	89	-	-
ST-3	42 RT	55+81	17.0-19.2	A-7-5(26)	71	17	1.2	11.7	61.0	26.2	100	99	94	-	-
SS-42	42 RT	55+81	18.0-19.5	A-7-5(25)	74	16	1.2	16.6	59.9	22.3	100	100	91	-	-
ST-4	42 RT	55+81	19.2-21.4	A-7-5(32)	70	23	1.0	5.7	69.0	24.3	100	99	97	-	-
SS-43	42 RT	55+81	33.0-34.5	A-5(12)	54	8	1.2	27.4	59.3	12.2	100	99	85	-	-
SS-44	42 RT	55+81	53.0-54.5	A-4(5)	39	10	16.4	26.1	45.3	12.2	96	86	63	-	-

SITE PHOTOGRAPH

Dual Bridges on -L- (NC 100) over Norfolk Southern Railroad



Looking East along -Y13-