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REFERENCE: P-5705B

PROJECT: 44475

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY MECKLENBURG  
 PROJECT DESCRIPTION CHARLOTTE GATEWAY  
STATION AND TRACK AND SAFETY  
IMPROVEMENTS  
 SITE DESCRIPTION BRIDGE ON TRACK 2 (-S2-) OVER  
WEST 5TH STREET (-Y3-) BETWEEN WEST TRADE  
STREET AND WEST 6TH STREET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705B	1	13

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

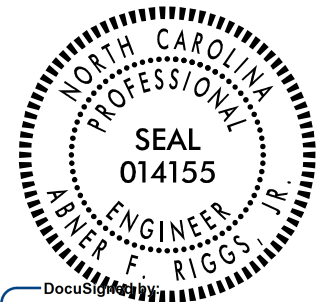
PERSONNEL

<u>RIGGS, A. F.</u>	<u>DUGGINS, W. T.</u>
<u>WERITZ, M. A.</u>	<u>J. R. TURNAGE</u>
<u>WEAVER, L. A.</u>	<u>EKLUND, M. A.</u>
<u>COGAR, T. E.</u>	<u>MASHBURN, S. R.</u>
<u>McMILLIAN, M.</u>	<u>STUDNICKY, R. T.</u>

INVESTIGATED BY TERRACON CONSULTANTS  
 DRAWN BY FIELDS, W. D.  
 CHECKED BY RIGGS, A. F.  
 SUBMITTED BY TERRACON CONSULTANTS  
 DATE JULY 2017

Prepared in the Office of:

**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 PHONE: (919) 873-2211 FAX: (919) 873-9555  
 NC REGISTERED FIRM: F-0869



DocuSign  
 Abner F. Riggs, Jr.

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 7/20/2017

SIGNATURE DATE

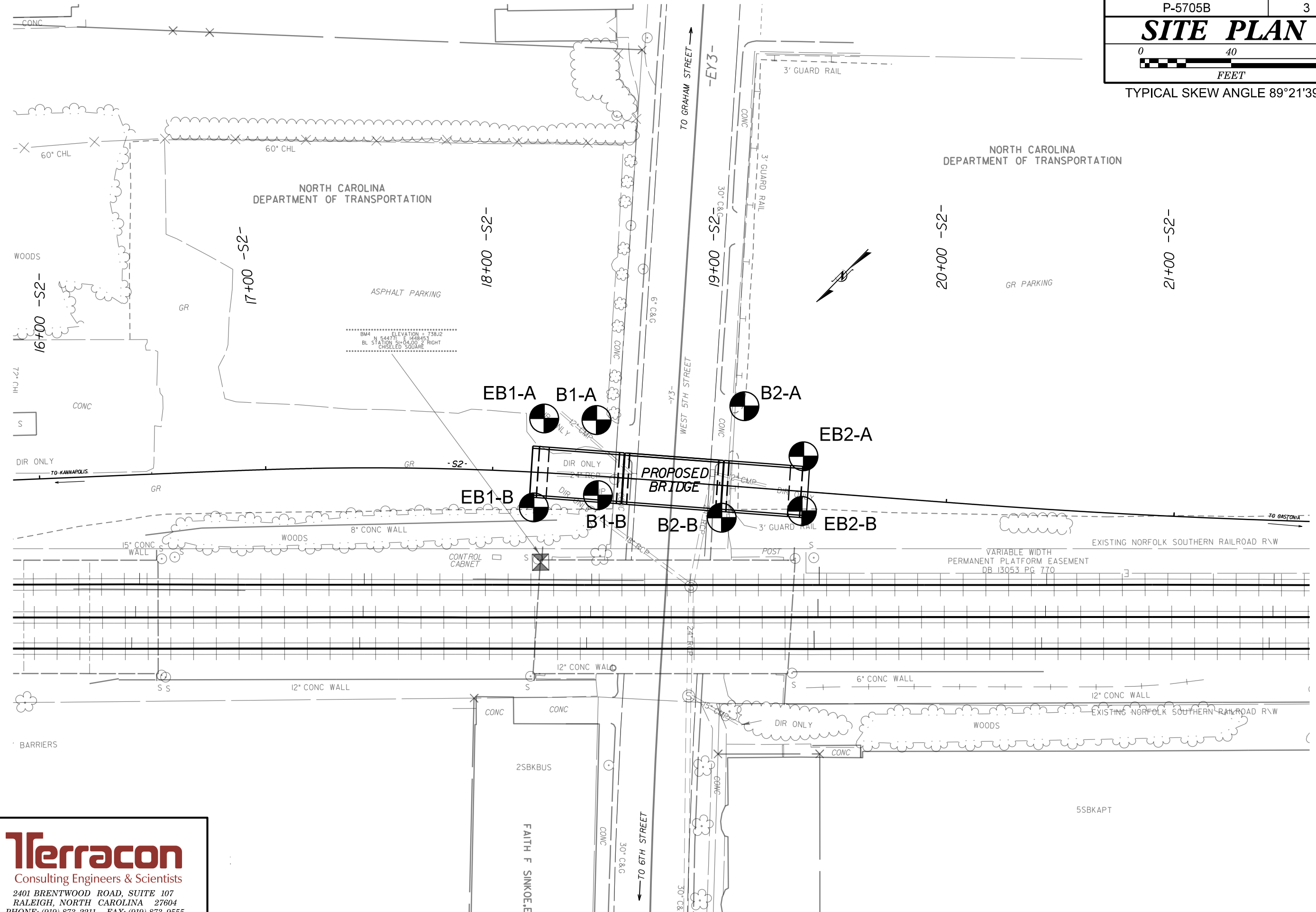
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

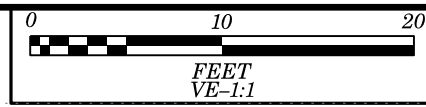
SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS																																																																																																																																																																																																																																														
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</p>				<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>				<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>				<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																																																																														
<p><b>SOIL LEGEND AND AASHTO CLASSIFICATION</b></p> <table border="1"> <tr> <th rowspan="2">GENERAL CLASS.</th> <th colspan="6">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="6">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</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></th> <th></th> <th></th> </tr> <tr> <th>GROUP CLASS.</th> <td>A-1-a</td> <td>A-1-b</td> <td>A-2-4</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></td> <td></td> <td></td> </tr> <tr> <th>SYMBOL</th> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <th>% PASSING</th> <td colspan="3">50 MX</td> <td colspan="3">30 MX</td> <td colspan="3">15 MX</td> <td colspan="3">25 MX</td> <td colspan="3">51 MN</td> <td colspan="3">35 MX</td> <td colspan="3">35 MX</td> <td colspan="3">35 MX</td> <td colspan="3">36 MN</td> <td colspan="3">36 MN</td> <td colspan="3">36 MN</td> </tr> <tr> <th>MATERIAL PASSING #40 #200</th> <td colspan="3">-</td> <td colspan="3">-</td> <td colspan="3">40 MX</td> <td colspan="3">41 MN</td> <td colspan="3">40 MX</td> <td colspan="3">41 MN</td> <td colspan="3">40 MX</td> <td colspan="3">41 MN</td> <td colspan="3">40 MX</td> <td colspan="3">41 MN</td> </tr> <tr> <th>GROUP INDEX</th> <td colspan="3">0</td> <td colspan="3">0</td> <td colspan="3">0</td> <td colspan="3">4 MX</td> <td colspan="3">8 MX</td> <td colspan="3">12 MX</td> <td colspan="3">16 MX</td> <td colspan="3">NO MX</td> <td colspan="3"></td> <td colspan="3"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="3">STONE FRAGS. GRAVEL AND SAND</td> <td colspan="3">FINE SAND</td> <td colspan="3">SILTY OR CLAYEY GRAVEL AND SAND</td> <td colspan="3">SILTY SOILS</td> <td colspan="3">CLAYEY SOILS</td> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3"></td> <td colspan="3"></td> </tr> <tr> <th>GEN. RATING AS SUBGRADE</th> <td colspan="6">EXCELLENT TO GOOD</td> <td colspan="6">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSUITABLE</td> <td colspan="6"></td> </tr> </table>				GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS			A-1	A-3	A-2	A-2-4	A-2-5	A-2-6	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7				GROUP CLASS.	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7	A-4	A-5	A-6	A-7	A-1, A-2	A-3	A-4, A-5	A-6, A-7				SYMBOL																		% PASSING	50 MX			30 MX			15 MX			25 MX			51 MN			35 MX			35 MX			35 MX			36 MN			36 MN			36 MN			MATERIAL PASSING #40 #200	-			-			40 MX			41 MN			40 MX			41 MN			40 MX			41 MN			40 MX			41 MN			GROUP INDEX	0			0			0			4 MX			8 MX			12 MX			16 MX			NO MX									USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND			FINE SAND			SILTY OR CLAYEY GRAVEL AND SAND			SILTY SOILS			CLAYEY SOILS															GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR	POOR	UNSUITABLE							<p><b>MINERALOGICAL COMPOSITION</b></p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>				<p><b>COMPRESSIONIBILITY</b></p> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p>				<p><b>PERCENTAGE OF MATERIAL</b></p> <table border="1"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table>				ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	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
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PROJECT REFERENCE NO.	SHEET NO.
P-5705B	3
<b>SITE PLAN</b>	
TYPICAL SKEW ANGLE 89°21'39"	



**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 PHONE: (919) 873-2211 FAX: (919) 873-9555  
 NC REGISTERED FIRM: F-0869

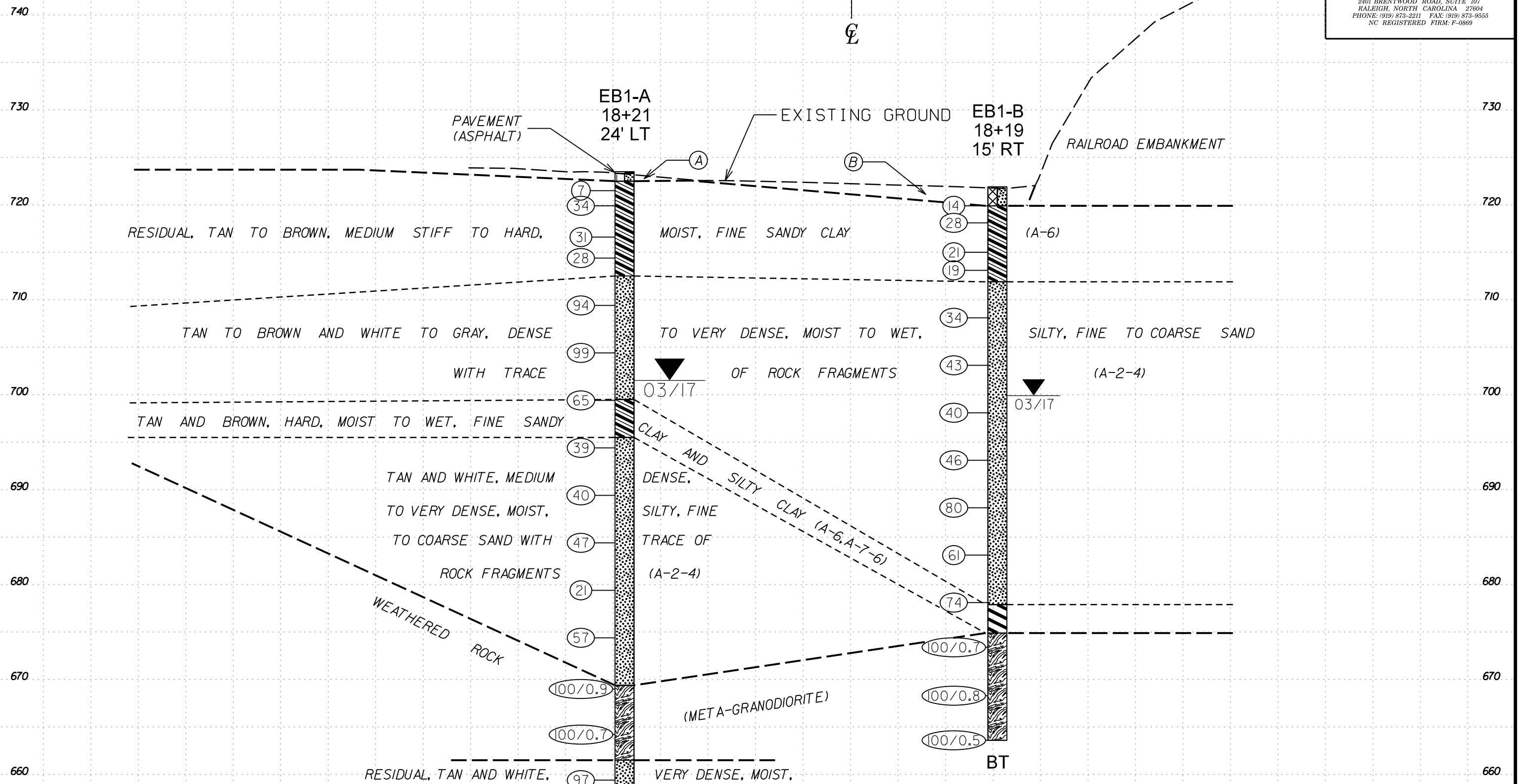




PROJECT REFERENCE NO. <b>P-5705B</b>	SHEET NO. <b>4</b>
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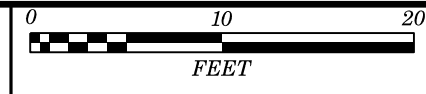
**Terracon**  
Consulting Engineers & Scientists  
2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
PHONE: (919) 873-2211 FAX: (919) 873-9555  
NC REGISTERED FIRM: P-0869

### CROSS SECTION THROUGH END BENT 1 AT STA. 18+17 -S2-

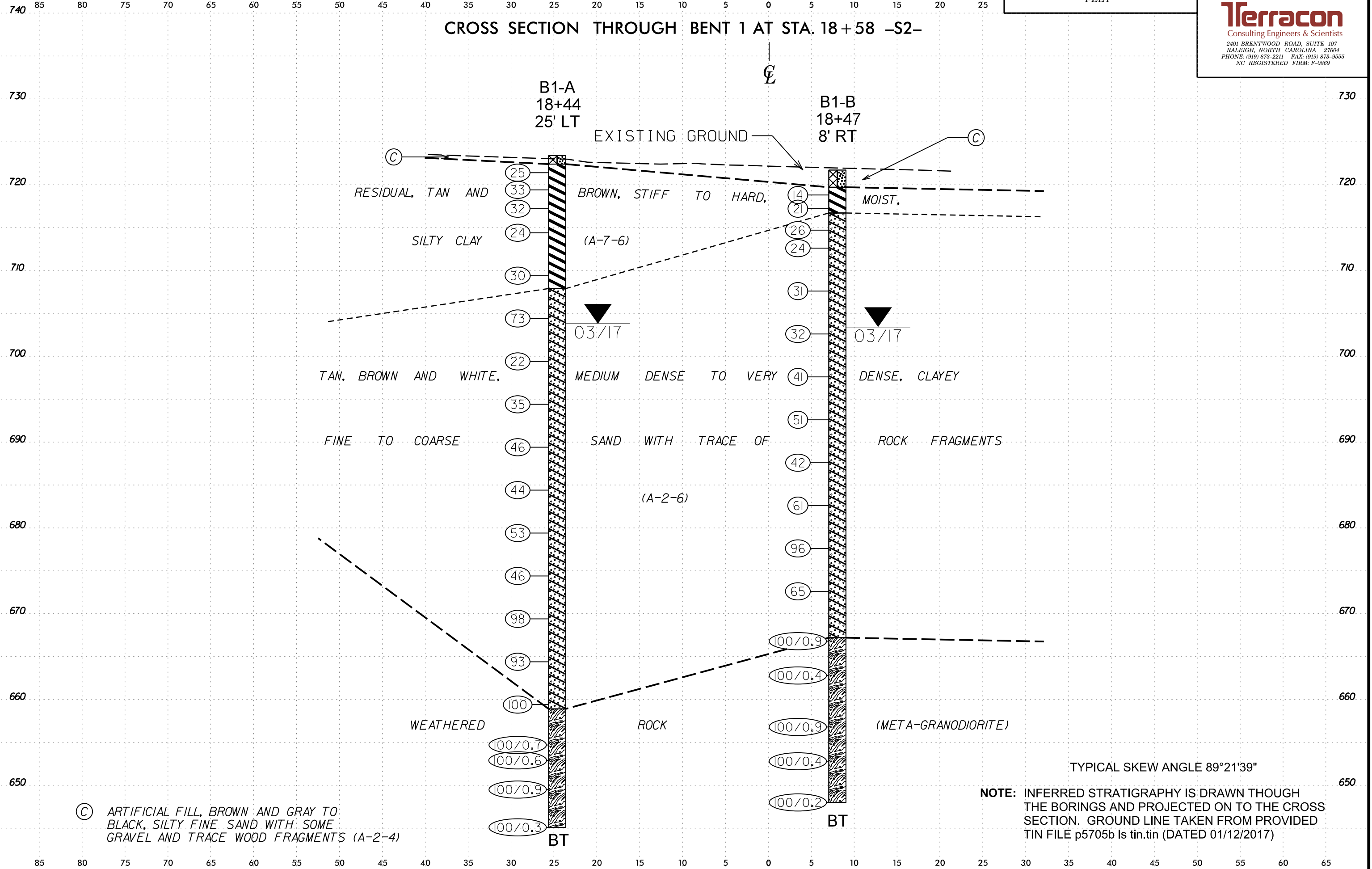


- (A)** ROADWAY EMBANKMENT, BLACK AND GRAY, SILTY FINE SAND (A-2-4)
- (B)** ARTIFICIAL FILL, GRAY, MOIST, SILTY FINE SAND WITH SOME GRAVEL (A-2-4)

**NOTE:** INFERRED STRATIGRAPHY IS DRAWN THOUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b Is tin.tin (DATED 01/12/2017)



### CROSS SECTION THROUGH BENT 1 AT STA. 18+58 -S2-

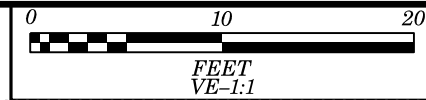


© ARTIFICIAL FILL, BROWN AND GRAY TO BLACK, SILTY FINE SAND WITH SOME GRAVEL AND TRACE WOOD FRAGMENTS (A-2-4)

NOTE: INFERRED STRATIGRAPHY IS DRAWN THOUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b Is tin.tin (DATED 01/12/2017)

TYPICAL SKEW ANGLE 89°21'39"

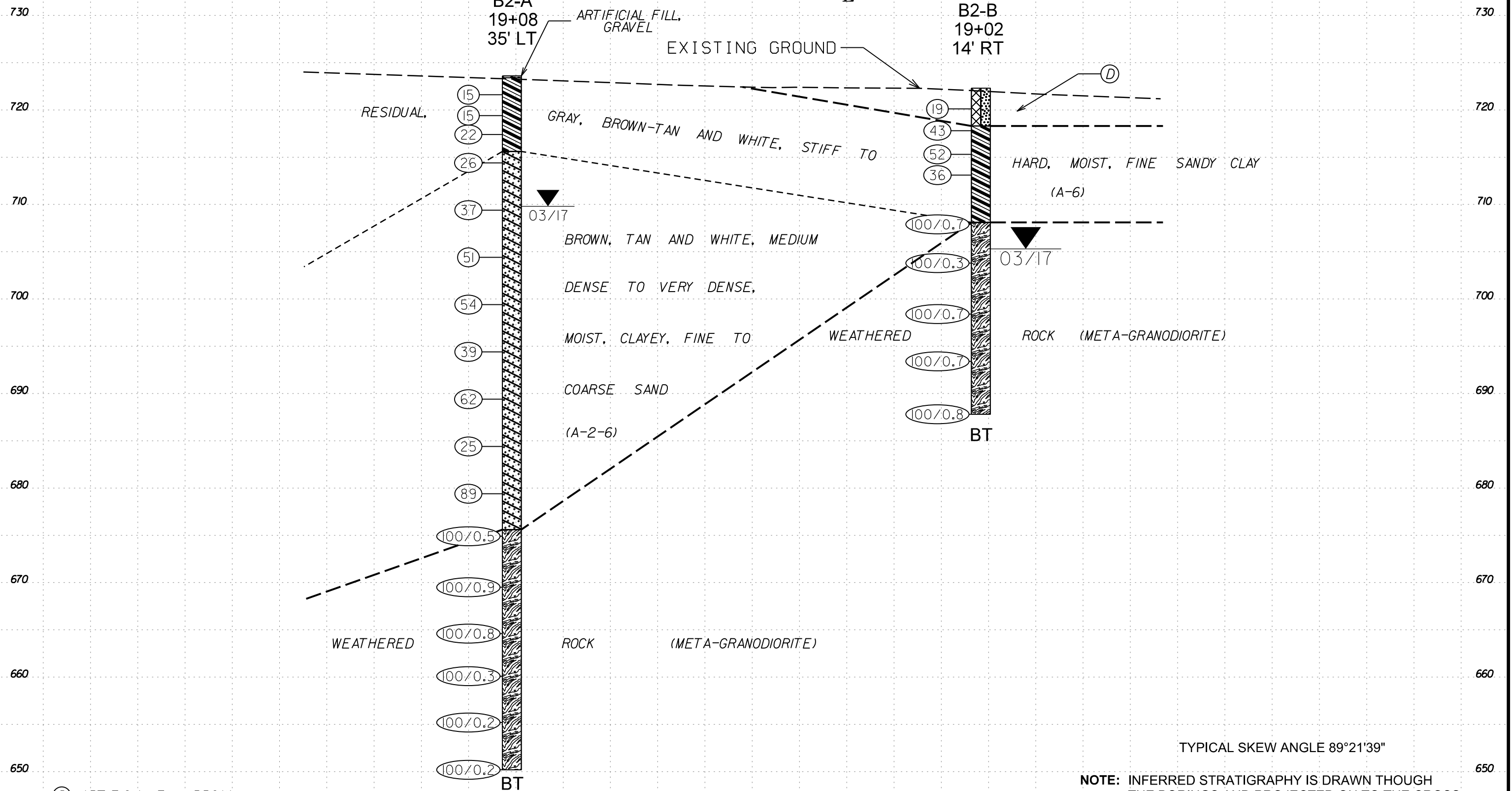
85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25



PROJECT REFERENCE NO. <b>P-5705B</b>	SHEET NO. <b>6</b>
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**Terracon**  
Consulting Engineers & Scientists  
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RALEIGH, NORTH CAROLINA 27604  
PHONE: (919) 873-2211 FAX: (919) 873-9555  
NC REGISTERED FIRM: P-0869

### CROSS SECTION THROUGH BENT 2 AT STA. 19+01 -S2-

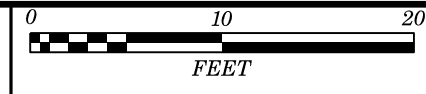


**(D)** ARTIFICIAL FILL, BROWN, SILTY, FINE TO COARSE SAND WITH SOME GRAVEL (A-2-4)

**NOTE:** INFERRED STRATIGRAPHY IS DRAWN THOUGH THE BORINGS AND PROJECTED ON TO THE CROSS SECTION. GROUND LINE TAKEN FROM PROVIDED TIN FILE p5705b Is tin.tin (DATED 01/12/2017)

85 80 75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65

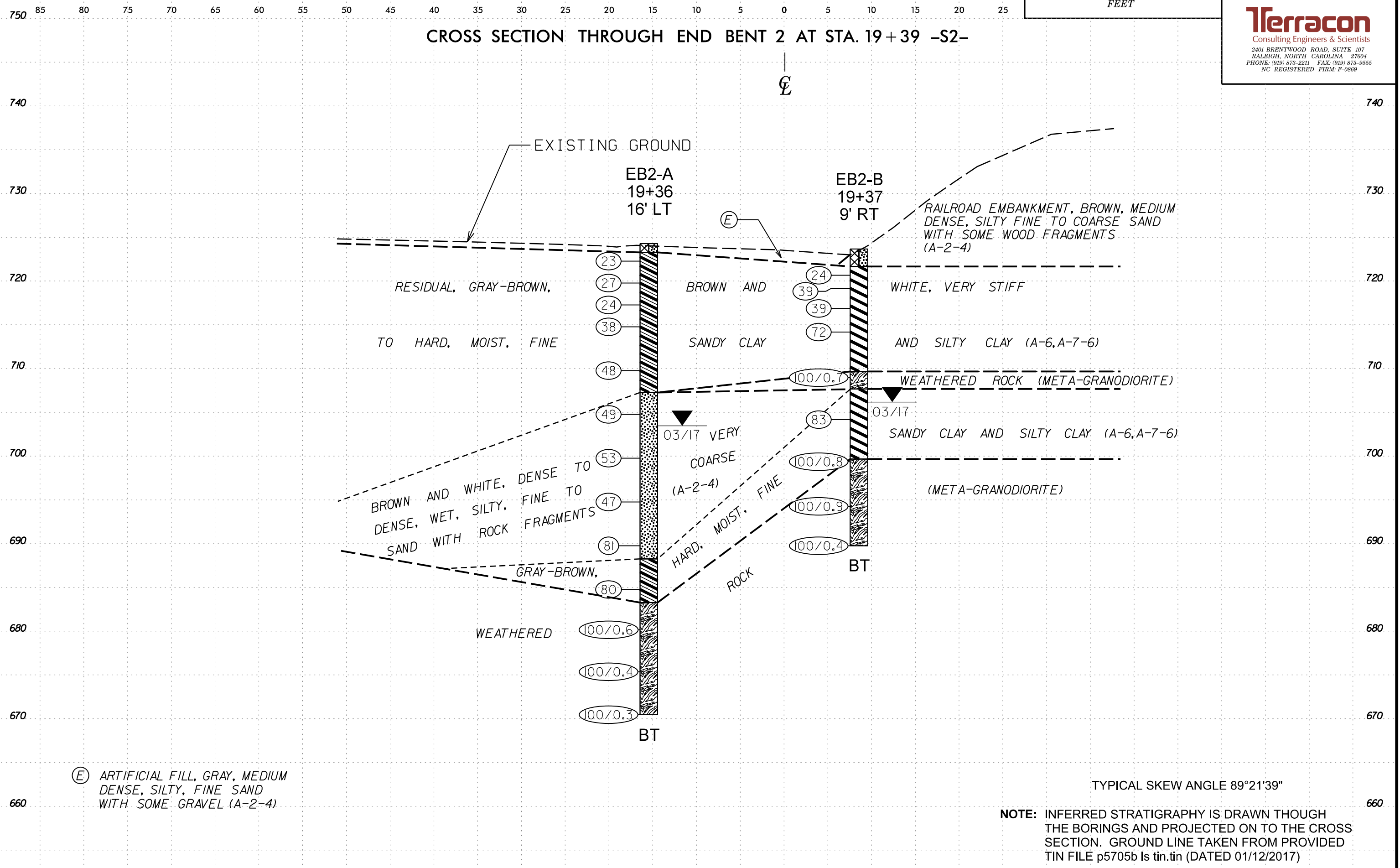
TYPICAL SKEW ANGLE 89°21'39"



PROJECT REFERENCE NO. <b>P-5705B</b>	SHEET NO. <b>7</b>
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**Terracon**  
Consulting Engineers & Scientists  
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RALEIGH, NORTH CAROLINA 27604  
PHONE: (919) 873-2211 FAX: (919) 873-9555  
NC REGISTERED FIRM: P-0869

### CROSS SECTION THROUGH END BENT 2 AT STA. 19+39 -S2-



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST WEAVER, L. A.										
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 18+21		OFFSET 24 ft LT		ALIGNMENT -S2-										
COLLAR ELEV. 723.5 ft		TOTAL DEPTH 64.6 ft		NORTHING 544,726		EASTING 1,448,498										
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 94% 03/09/2017		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER DUGGINS, W. T.		START DATE 03/07/17		COMP. DATE 03/08/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
725																
	722.5	1.0														
	720.9	2.6	2	2	5											
	717.6	5.9	5	12	19											
	715.4	8.1	5	12	16											
	710.4	13.1	16	37	57											
	705.4	18.1	33	55	44											
	700.4	23.1	14	35	30											
	695.4	28.1	10	17	22											
	690.4	33.1	13	15	25											
	685.4	38.1	15	24	23											
	680.4	43.1	9	9	12											
	675.4	48.1	12	23	34											
	670.4	53.1	22	47	53/0.4											
	665.4	58.1	31	62	38/0.2											
	660.4	63.1	33	52	45											

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST WEAVER, L. A.										
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 18+19		OFFSET 15 ft RT		ALIGNMENT -S2-										
COLLAR ELEV. 721.9 ft		TOTAL DEPTH 58.3 ft		NORTHING 544,756		EASTING 1,448,473										
DRILL RIG/HAMMER EFF./DATE TER92-0 ACKER RENEGADE 94% 03/09/2017		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER DUGGINS, W. T.		START DATE 03/06/17		COMP. DATE 03/07/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
725																
	720.9	1.0	5	8	6											
	719.1	2.8	8	12	16											
	716.0	5.9	5	9	12											
	714.1	7.8	7	8	11											
	709.1	12.8	13	18	16											
	704.1	17.8	7	17	26											
	699.1	22.8	10	18	22											
	694.1	27.8	14	21	25											
	689.1	32.8	18	31	49											
	684.1	37.8	16	27	34											
	679.1	42.8	12	27	47											
	674.1	47.8	68	34/0.2												
	669.1	52.8	57	43/0.3												
	664.1	57.8	100/0.5													

NCDOT BORE DOUBLE P5705B\_GEO\_BRDG\_5TH ST\_S2\_GPJ\_NC\_DOT\_GDT 7/19/17



GEOTECHNICAL BORING REPORT BORE LOG

Table for Bore Log B1-A. Includes header information (WBS 44475.1.2, TIP P-5705B, COUNTY MECKLENBURG, GEOLOGIST WEAVER, L. A.), site description, boring details (B1-A, Station 18+44, Offset 25 ft LT, Alignment -S2-), collar and total depths, drill rig/hammer info, and a detailed data table with columns for ELEV (ft), DRIVE ELEV (ft), DEPTH (ft), BLOW COUNT (0.5ft, 0.5ft, 0.5ft), BLOWS PER FOOT (0, 25, 50, 75, 100), SAMP. NO., LOG, and SOIL AND ROCK DESCRIPTION. The log shows soil layers from 725 ft to 645.1 ft, including artificial fill, residual silty clay, and weathered rock (meta-granodiorite).

Table for Bore Log B1-B. Includes header information (WBS 44475.1.2, TIP P-5705B, COUNTY MECKLENBURG, GEOLOGIST WERTIZ, M. A.), site description, boring details (B1-B, Station 18+47, Offset 8 ft RT, Alignment -S2-), collar and total depths, drill rig/hammer info, and a detailed data table with columns for ELEV (ft), DRIVE ELEV (ft), DEPTH (ft), BLOW COUNT (0.5ft, 0.5ft, 0.5ft), BLOWS PER FOOT (0, 25, 50, 75, 100), SAMP. NO., LOG, and SOIL AND ROCK DESCRIPTION. The log shows soil layers from 725 ft to 648.0 ft, including artificial fill, residual silty clay with wood fragments, and weathered rock (meta-granodiorite).

NCDOT BORE DOUBLE P5705B GEO\_BRDG 5TH ST\_S2.GPJ NC\_DOT.GDT 7/19/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST RIGGS, A. F.											
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)										
BORING NO. B2-A		STATION 19+08		OFFSET 35 ft LT		ALIGNMENT -S2-											
COLLAR ELEV. 723.6 ft		TOTAL DEPTH 73.4 ft		NORTHING 544,659		EASTING 1,448,440											
DRILL RIG/HAMMER EFF./DATE TER373 DIEDRICH D-50 99% 03/09/2017		DRILL METHOD Wash Boring		HAMMER TYPE Automatic													
DRILLER TURNAGE, J. R.		START DATE 03/10/17		COMP. DATE 03/10/17		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)			
725																	
	722.6	1.0	6	6	9												
720	720.4	3.2	5	6	9												
	718.4	5.2	6	9	13												
715	715.4	8.2	8	12	14												
710	710.4	13.2	13	15	22												
705	705.4	18.2	22	21	30												
700	700.4	23.2	23	24	30												
695	695.4	28.2	26	21	18												
690	690.4	33.2	21	24	38												
685	685.4	38.2	10	10	15												
680	680.4	43.2	38	39	50												
675	675.4	48.2	100/0.5														
670	670.4	53.2	78	22/0.4													
665	665.4	58.2	56	44/0.3													
660	660.4	63.2	100/0.3														
655	655.4	68.2	100/0.2														
	650.4	73.2	100/0.2														

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST WERTZ, M. A.											
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)										
BORING NO. B2-B		STATION 19+02		OFFSET 14 ft RT		ALIGNMENT -S2-											
COLLAR ELEV. 722.3 ft		TOTAL DEPTH 34.5 ft		NORTHING 544,700		EASTING 1,448,412											
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Wash Boring		HAMMER TYPE Automatic													
DRILLER EKLUND, M. A.		START DATE 03/08/17		COMP. DATE 03/08/17		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)			
725																	
	721.1	1.2	11	11	8												
720	718.8	3.5	10	22	21												
	716.3	6.0	17	26	26												
715	714.1	8.2	10	14	22												
710	709.1	13.2	26	45	55/0.2												
705	704.1	18.2	100/0.3														
700	699.1	23.2	76	24/0.2													
695	694.1	28.2	66	34/0.2													
690	689.1	33.2	36	45	55/0.3												

NCDOT BORE DOUBLE P5705B\_GEO\_BRDG\_5TH\_ST\_S2\_GPJ\_NC\_DOT\_GDT\_7/19/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST WERITZ, M. A.									
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)								
BORING NO. EB2-A		STATION 19+36		OFFSET 16 ft LT		ALIGNMENT -S2-									
COLLAR ELEV. 724.4 ft		TOTAL DEPTH 53.8 ft		NORTHING 544,656		EASTING 1,448,406									
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Wash Boring		HAMMER TYPE Automatic											
DRILLER EKLUND, M. A.		START DATE 03/10/17		COMP. DATE 03/13/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
725															724.4 GROUND SURFACE 0.0
	723.4	1.0	11	10	13										723.4 ARTIFICIAL FILL 1.0
	720.9	3.5	10	13	14										GRAY, SILTY FINE SAND WITH SOME GRAVEL
	718.4	6.0	7	10	14										RESIDUAL BROWN AND WHITE, FINE SANDY CLAY
	715.9	8.5	12	16	22										
	710.9	13.5	15	20	28										
	705.9	18.5	14	24	25										707.4 BROWN AND WHITE, SILTY, FINE TO COARSE SAND WITH ROCK FRAGMENTS 17.0
	700.9	23.5	15	22	31										
	695.9	28.5	21	26	21										
	690.9	33.5	23	29	52										
	685.9	38.5	26	35	45										688.4 GRAY-BROWN, FINE SANDY CLAY 36.0
	680.9	43.5	76	24/0.1											683.4 WEATHERED ROCK (META-GRANODIORITE) 41.0
	675.9	48.5	100/0.4												
	670.9	53.5	100/0.3												670.6 Boring Terminated at Elevation 670.6 ft IN WEATHERED ROCK (META-GRANODIORITE) 53.8

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST WERITZ, M. A.									
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND SAFETY IMPROVEMENTS - WEST 5TH STREET BRIDGE ON -S2-							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 19+37		OFFSET 9 ft RT		ALIGNMENT -S2-									
COLLAR ELEV. 723.8 ft		TOTAL DEPTH 33.9 ft		NORTHING 544,673		EASTING 1,448,389									
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD Wash Boring		HAMMER TYPE Automatic											
DRILLER EKLUND, M. A.		START DATE 03/08/17		COMP. DATE 03/08/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
725															723.8 GROUND SURFACE 0.0
	721.8	2.0	6	8	16										721.8 RAILROAD EMBANKMENT 2.0
	720.3	3.5	12	15	24										BROWN, SILTY FINE TO COARSE SAND WITH SOME GRAVEL AND TRACE OF WOOD FRAGMENTS
	718.0	5.8	11	16	23										RESIDUAL GRAY-BROWN AND WHITE, SILTY CLAY
	715.3	8.5	16	26	46										
	710.3	13.5	30	71	29/0.2										
	705.3	18.5	19	34	49										709.8 WEATHERED ROCK (META-GRANODIORITE) 14.0
	700.3	23.5	29	61/0.3											707.8 RESIDUAL GRAY-BROWN, SILTY CLAY 16.0
	695.3	28.5	30	70/0.4											
	690.3	33.5	100/0.4												699.8 WEATHERED ROCK (META-GRANODIORITE) 24.0
															Boring Terminated at Elevation 689.9 ft IN WEATHERED ROCK (META-GRANODIORITE) 33.9

NCDOT BORE DOUBLE P5705B\_GEO\_BRDG\_5TH\_ST\_S2.GPJ NC\_DOT\_GDT 7/19/17

LABORATORY TESTING SUMMARY

PROJECT NUMBER: 44475.1.2

TIP: P-5705B

COUNTY: MECKLENBURG

DESCRIPTION: Charlotte Gateway Station and Track and Safety Improvements - West 5th Street Bridge on -S2-

Sample No.	Alignment	Station	Offset (feet)	Depth Interval (feet)	AASHTO Class.	L.L.	P.I.	% by Weight				% Retained #4 Sieve	% Passing (sieves)			% Moisture	% Organic	Ave. Wet Unit Wt. (pcf)	Shear Strength Values			
								Coarse Sand	Fine Sand	Silt	Clay		#10	#40	#200				Total Cohesion (psf)	Total Friction (φ)	Effective Cohesion (psf)	Effective Friction (φ')
SS-1	-S2-	18+21	24 LT	5.9-7.4	A-6 (8)	39	14	14.8	26.7	41.7	16.8	0	100	92	67	17.6	N/D	N/D	N/D	N/D	N/D	N/D
SS-2	-S2-	18+21	24 LT	13.1-14.6	A-2-4 (0)	19	NP	58.7	19.6	13.4	8.3	1	94	52	24	N/D	N/D	N/D	N/D	N/D	N/D	N/D
SS-4	-S2-	18+47	8 RT	6.0-7.5	A-2-6 (0)	34	12	46.9	24.1	17.8	11.2	1	92	60	32	N/D	N/D	N/D	N/D	N/D	N/D	N/D
SS-6	-S2-	19+08	35 LT	18.2-19.7	A-2-6 (0)	34	12	51.5	22.5	17.4	8.6	0	94	57	29	N/D	N/D	N/D	N/D	N/D	N/D	N/D
SS-7	-S2-	19+36	16 LT	33.5-35.0	A-2-4 (0)	28	9	57.8	20.1	14.2	7.9	12	68	36	18	N/D	N/D	N/D	N/D	N/D	N/D	N/D
SS-8	-S2-	19+37	9 RT	3.5-5.0	A-7-6 (10)	41	14	11.4	21.0	46.9	20.7	1	98	91	73	21.1	N/D	N/D	N/D	N/D	N/D	N/D

N/D - NOT DETERMINED

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number



SITE PHOTOGRAPHS

CHARLOTTE GATEWAY STATION AND TRACK IMPROVEMENTS - WEST 5th STREET BRIDGE ON -S2-



PHOTOGRAPH NO. 1: EAST APPROACH TO END BENT NO. 1 ON -S2- ALIGNMENT, LOOKING WEST



PHOTOGRAPH NO. 3: ON WEST 5TH STREET (-Y3-), NORTHWEST OF -S2- ALIGNMENT, LOOKING SOUTHEAST



PHOTOGRAPH NO. 2: ON WEST 5TH STREET (-Y3-), SOUTHEAST OF -S2- ALIGNMENT, LOOKING NORTHWEST



PHOTOGRAPH NO. 4: WEST APPROACH TO END BENT NO.2 ON -S2- ALIGNMENT, LOOKING EAST



REFERENCE: P-5705B

PROJECT: 44475

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4-23	BORE LOGS, CORE REPORTS, AND CORE PHOTOGRAPHS

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY MECKLENBURG  
PROJECT DESCRIPTION CHARLOTTE GATEWAY  
STATION AND TRACK AND SAFETY  
IMPROVEMENTS  
SITE DESCRIPTION PROPOSED CANOPY ON  
CHARLOTTE GATEWAY AT STATION 21+39  
TO 27+53 -SI- BETWEEN WEST 5TH STREET AND  
WEST 4TH STREET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705B	1	23

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

**NOTES:**

- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
- BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

**PERSONNEL****PERSONNEL**SCHLEMM, T. S.EKLUND, M. A.STUDNICKY, R. T.COGAR, T. E.INVESTIGATED BY TERRACON CONSULTANTSDRAWN BY FIELDS, W. D.CHECKED BY RIGGS, Jr., A. F.SUBMITTED BY TERRACON CONSULTANTSDATE NOVEMBER 2017

Prepared in the Office of:

**Terracon**  
Consulting Engineers & Scientists

2401 BRENTWOOD ROAD, SUITE 107  
RALEIGH, NORTH CAROLINA 27604  
NC REGISTERED ENGINEERING FIRM: F-0869  
NC REGISTERED GEOLOGIC FIRM: C-367



DocuSigned by:

Abner F. Riggs, Jr.

11/16/2017

5228073BBA4F482

SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL**  
**UNLESS ALL SIGNATURES COMPLETED**

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION table with columns for General Class, Group Class, Symbol, % Passing #10 #40 #200, Material Passing #40 LL PI, Group Index, Usual Types of Major Materials, Gen. Rating as Subgrade, and Soil Legend symbols for Granular, Silty-clay, and Organic materials.

CONSISTENCY OR DENSENESS table with columns for Primary Soil Type, Compactness or Consistency, Range of Standard Penetration Resistance (N-value), and Range of Unconfined Compressive Strength (tons/ft²).

TEXTURE OR GRAIN SIZE table with columns for U.S. Std. Sieve Size Opening (mm), Boulder (Bldr.), Cobble (Cob.), Gravel (Gr.), Coarse Sand (Cse. Sd.), Fine Sand (F Sd.), Silt (Sl.), and Clay (Cl.).

SOIL MOISTURE - CORRELATION OF TERMS table with columns for Soil Moisture Scale (Atterberg Limits), Field Moisture Description, and Guide for Field Moisture Description.

PLASTICITY table with columns for Plasticity Index (PI) and Dry Strength.

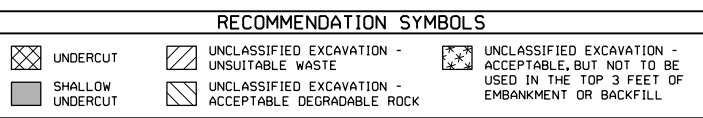
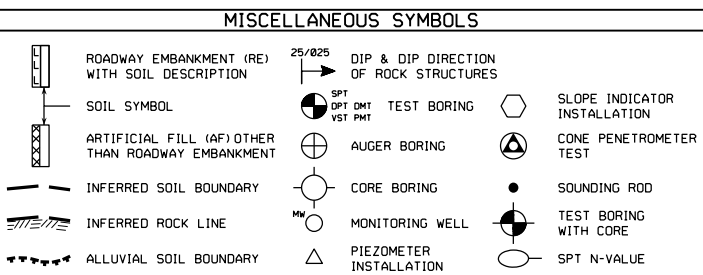
COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

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

PERCENTAGE OF MATERIAL ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC > 10%



- ABBREVIATIONS 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. - SILTY, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WE. - WEATHERED UG - UNIT WEIGHT UG - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO

- EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, D-50 (TER346) ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2% STEEL TEETH, TRICONE TUNG-CARB., CORE BIT, DRAG BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: -B, -N, -H 03 HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST

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

WEATHERING FRESH ROCK FRESH, CRYSTALS 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 MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROUDED 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 GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.

FRACTURE SPACING and BEDDING tables with columns for Term, Spacing, and Thickness.

INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS ALLUVIUM (ALLUV) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENISE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BM4: N:544.771, E:1,448.453 BL STATION: 51+04.00, 2.0' RIGHT, CHISELED SQUARE CONCRETE VWV ELEVATION: 738.12 FEET

NOTES: FIAD - FILLED IMMEDIATELY AFTER DRILLING PROJECT WAS DRAFTED USING NCDOT PROVIDED TIN FILE FILE: p5705b\_Is\_tin (DATED: 01/12/2017) DATE: 8-15-14

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

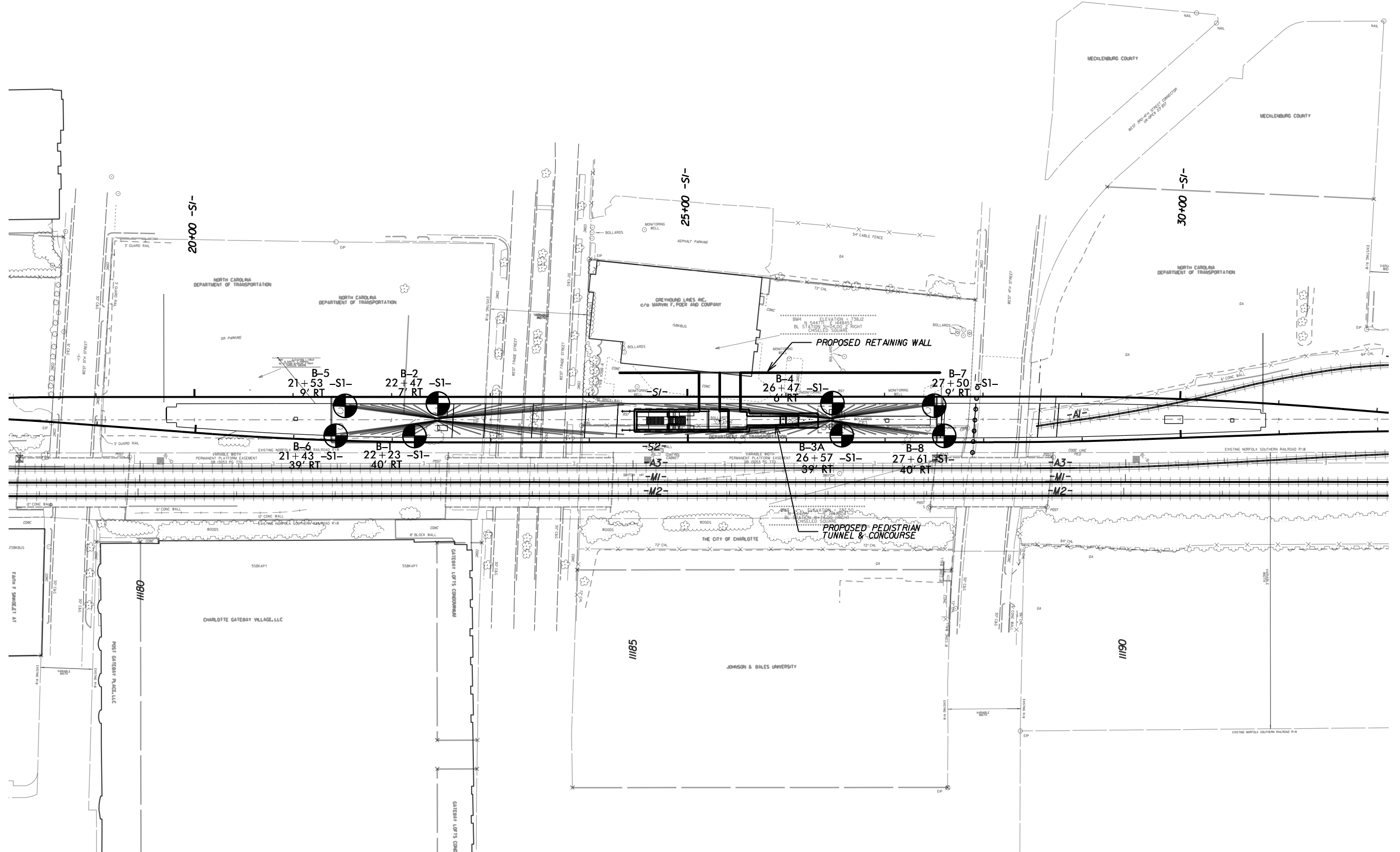
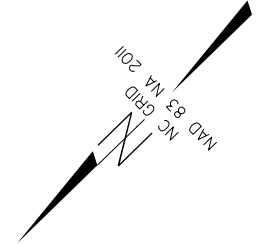
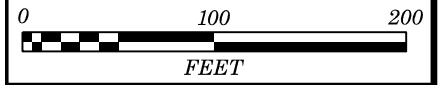
**SUBSURFACE INVESTIGATION**

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

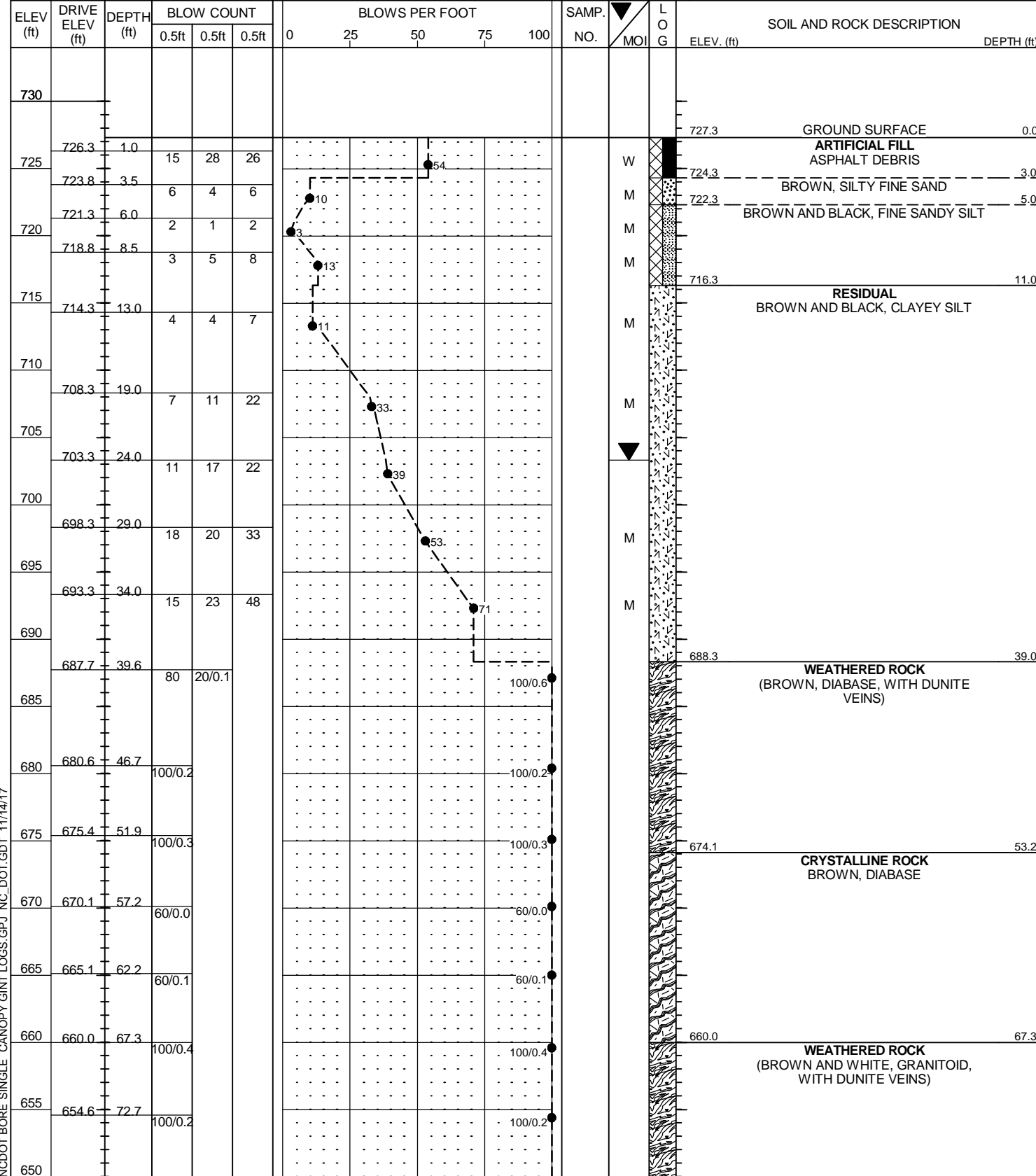
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)				
From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.		VERY GOOD Very rough, fresh unweathered surfaces	GOOD Rough, slightly weathered, iron stained surfaces	FAIR Smooth, moderately weathered and altered surfaces	POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments	VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings	From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.		VERY GOOD - Very Rough, fresh unweathered surfaces	GOOD - Rough, slightly weathered surfaces	FAIR - Smooth, moderately weathered and altered surfaces	POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments	VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings
STRUCTURE		DECREASING SURFACE QUALITY →					COMPOSITION AND STRUCTURE						
INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities		90			N/A	N/A	<b>A. Thick bedded, very blocky sandstone</b> The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.	70					
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets		80					<b>B. Sandstone with thin inter-layers of siltstone</b>	60					
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets			70				<b>C. Sandstone and siltstone in similar amounts</b>		50				
BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			60				<b>D. Siltstone or silty shale with sandstone layers</b>			40			
DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				50			<b>E. Weak siltstone or clayey shale with sandstone layers</b>				30		
LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes				40			<b>F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure</b>					20	
				30			<b>G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers</b>						10
				20			<b>H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.</b>						
				10									
		N/A	N/A										
							→ Means deformation after tectonic disturbance						



# GEOTECHNICAL BORING REPORT BORE LOG

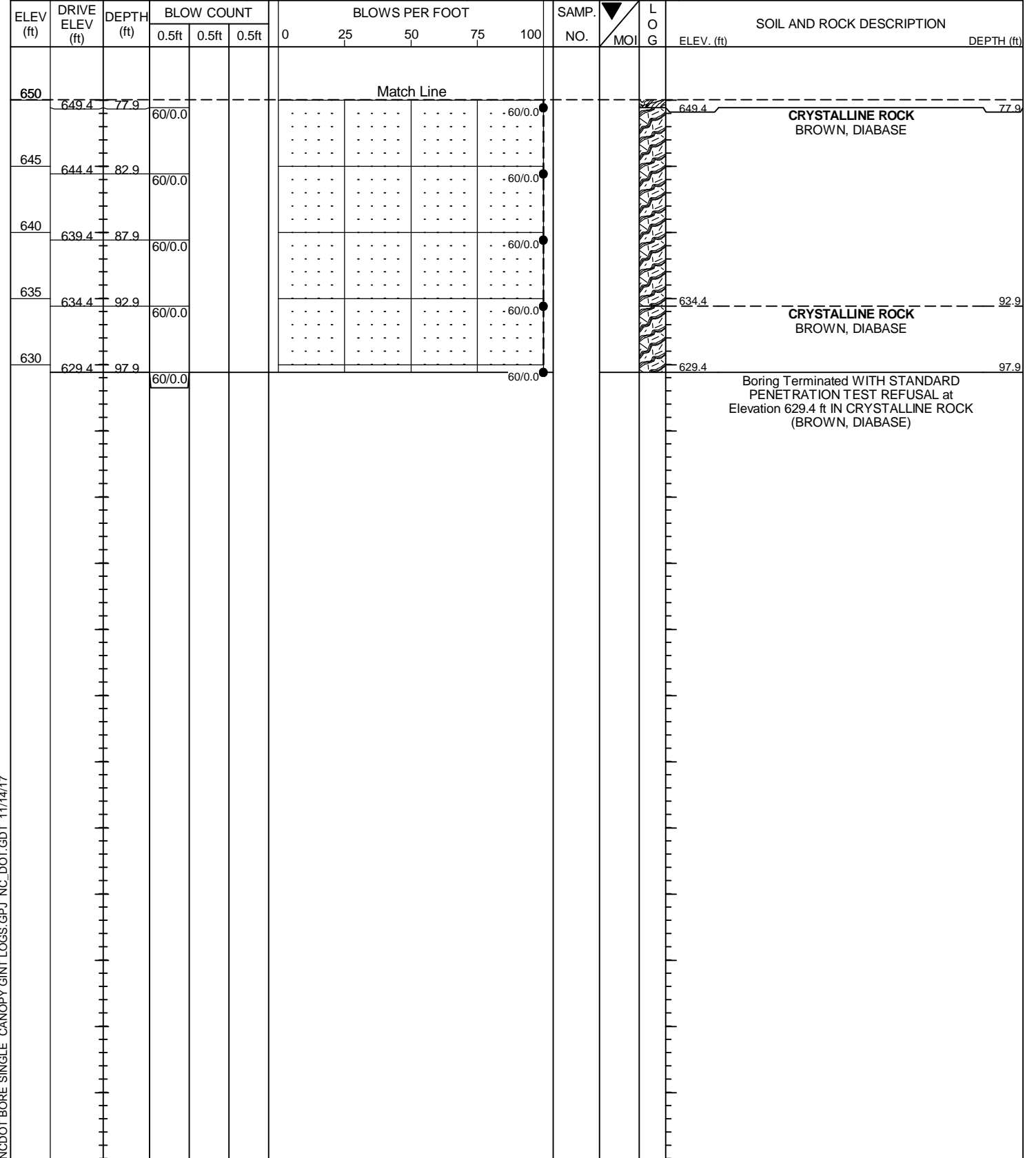
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SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-1	STATION 22+23	OFFSET 40 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 727.3 ft	TOTAL DEPTH 97.9 ft	NORTHING 544,468	EASTING 1,448,190
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	
DRILLER EKLUND, M.A.		START DATE 09/28/17	COMP. DATE 10/03/17
SURFACE WATER DEPTH N/A			



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-1	STATION 22+23	OFFSET 40 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 727.3 ft	TOTAL DEPTH 97.9 ft	NORTHING 544,468	EASTING 1,448,190
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	
DRILLER EKLUND, M.A.		START DATE 09/28/17	COMP. DATE 10/03/17
SURFACE WATER DEPTH N/A			



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17



# GEOTECHNICAL BORING REPORT

## CORE LOG

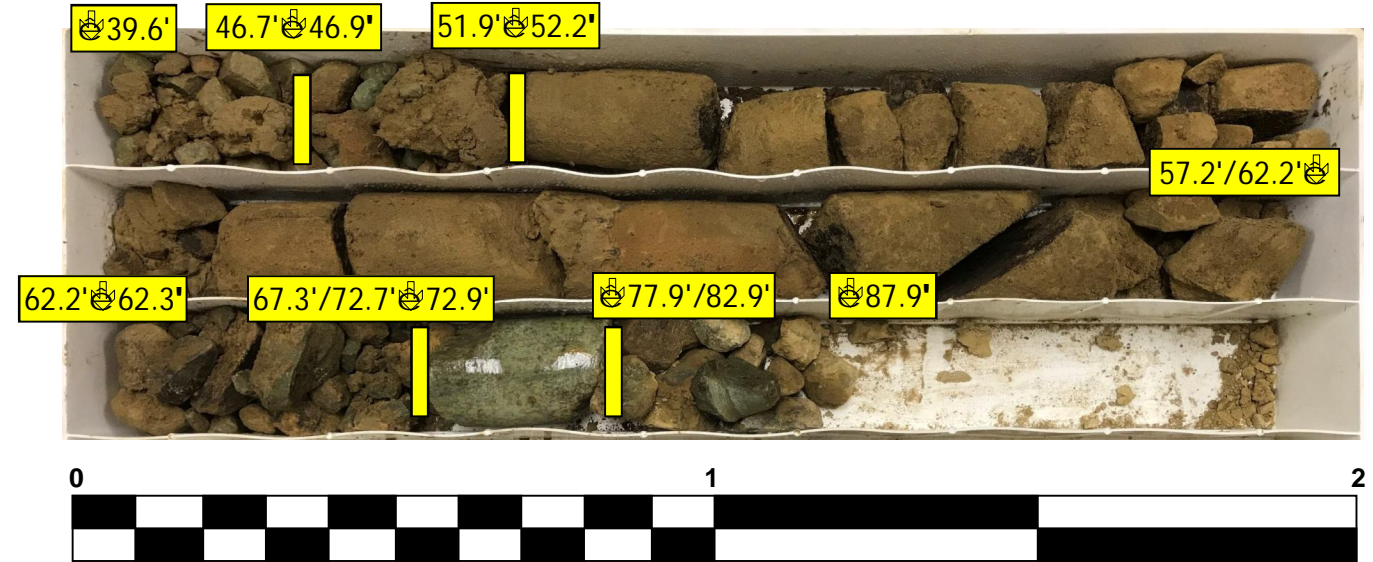
WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-1	STATION 22+23	OFFSET 40 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 727.3 ft	TOTAL DEPTH 97.9 ft	NORTHING 544,468	EASTING 1,448,190
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 09/28/17	COMP. DATE 10/03/17	SURFACE WATER DEPTH N/A
CORE SIZE HQ3	TOTAL RUN 57.1 ft		

**Project No. 44475.1.2 (P-5705B)**  
**Charlotte Gateway Station and Track and Safety Improvements**

## CORE PHOTOGRAPHS

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
687.7	687.7	39.6	7.1	0:15/0.1	(0.3)	(0.0)					Begin Coring @ 39.6 ft	
685				2:58/1.0	4%	0%					WEATHERED ROCK	
				3:21/1.0							(BROWN, DIABASE, WITH DUNITE VEINS) (continued)	
				4:35/1.0								
				5:15/1.0								
				6:47/1.0								
				7:16/1.0								
				6:17/1.0								
680	680.6	46.7	5.0	N=100/0.2	(0.3)	(0.0)						
	680.4	46.9		3:13/1.0	6%	0%						
				2:26/1.0								
				4:01/1.0								
				3:02/1.0								
				2:44/1.0								
675	675.4	51.9	5.0	N=100/0.3	(3.1)	(0.7)						
	675.1	52.2		3:57/1.0	62%	14%		(3.4)	(0.7)		674.1	53.2
				5:51/1.0				24%	5%			
				5:19/1.0								
				2:39/1.0								
				2:15/1.0								
				N=60/0.0	(0.0)	(0.0)						
				4:33/1.0	0%	0%						
				4:13/1.0								
				3:37/1.0								
				3:15/1.0								
				3:13/1.0								
665	665.1	62.3	5.0	N=60/0.1	(0.4)	(0.0)						
	665.0	62.3		4:06/1.0	8%	0%						
				4:42/1.0								
				3:54/1.0								
				4:25/1.0								
				3:53/1.0								
660	660.0	67.3	5.0	N=100/0.4	(0.0)	(0.0)						
	659.6	67.3		3:10/1.0	0%	0%						
				3:01/1.0								
				3:19/1.0								
				3:08/1.0								
				2:46/1.0								
				N=100/0.2	(0.3)	(0.0)						
				5:01/1.0	6%	0%						
				1:27/1.0								
				1:19/1.0								
				1:20/1.0								
				1:23/1.0								
655	654.6	72.7	5.0	N=60/0.0	(0.0)	(0.0)						
	654.4	72.9		4:21/1.0	0%	0%		(0.4)	(0.0)		649.4	77.9
				1:06/1.0				3%	0%			
				1:37/1.0								
				2:34/1.0								
				4:33/1.0								
				N=60/0.0	(0.2)	(0.0)						
				6:34/1.0	4%	0%						
				7:27/1.0								
				3:54/1.0								
				4:27/1.0								
				2:40/1.0								
				N=60/0.0	(0.2)	(0.0)						
				5:28/1.0	4%	0%						
				10:41/1.0								
				9:18/1.0								
				8:38/1.0								
				5:04/1.0								
635	634.4	92.9	5.0	N=60/0.0	(4.3)	(0.0)		(4.3)	(0.0)		634.4	92.9
				5:41/1.0	86%	0%						
				8:59/1.0								
				8:52/1.0								
				3:55/1.0								
				3:37/1.0								
630	629.4	97.9		N=60/0.0								

**B-1**  
**BOX 1: 39.6 - 87.9 FEET**

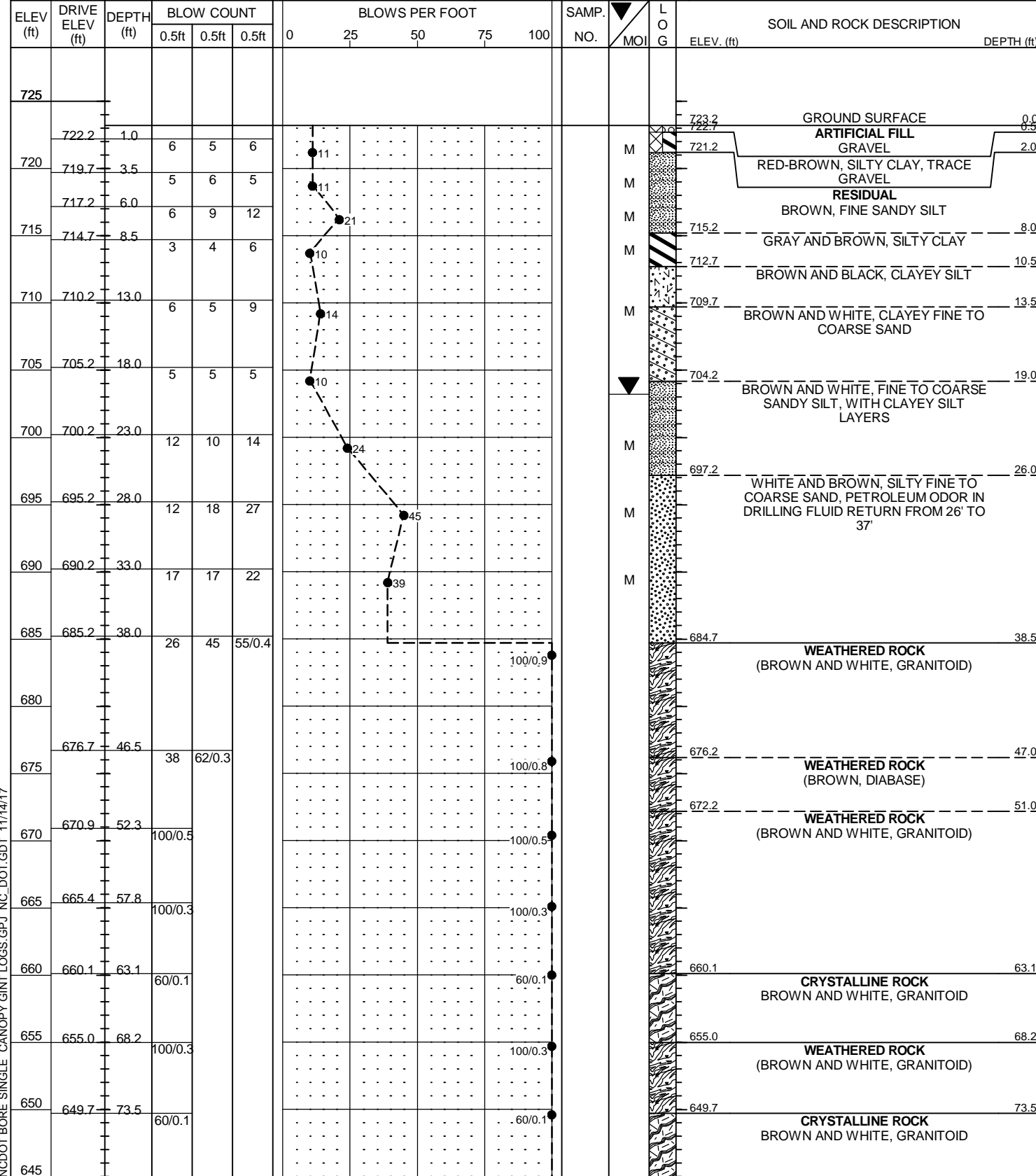


**B-1**  
**BOX 2: 87.9 - 97.9 FEET**



# GEOTECHNICAL BORING REPORT BORE LOG

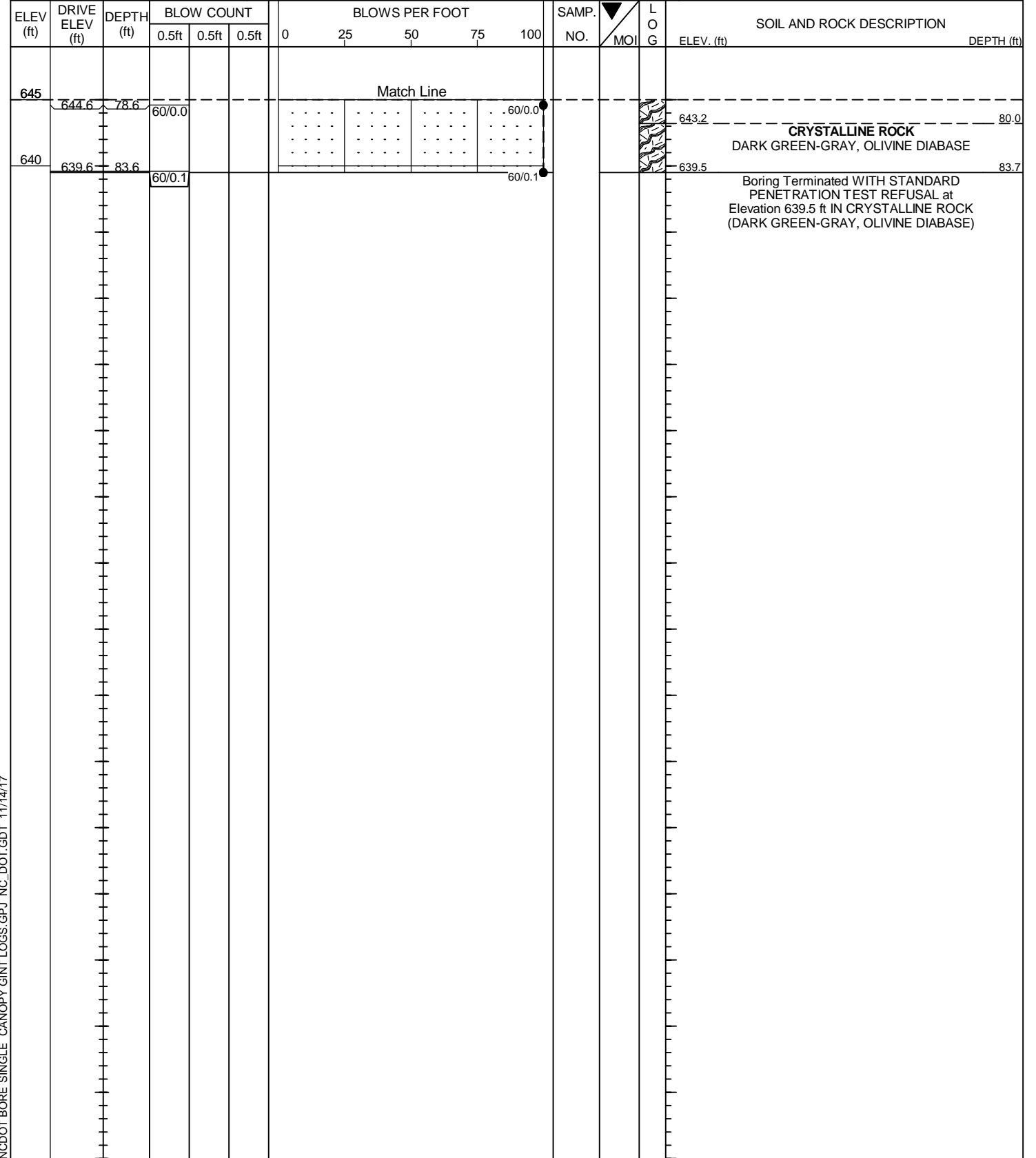
WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-2	STATION 22+47	OFFSET 7 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 723.2 ft	TOTAL DEPTH 83.7 ft	NORTHING 544,428	EASTING 1,448,197
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 09/27/17	COMP. DATE 09/27/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-2	STATION 22+47	OFFSET 7 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 723.2 ft	TOTAL DEPTH 83.7 ft	NORTHING 544,428	EASTING 1,448,197
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 09/27/17	COMP. DATE 09/27/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17



# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-2	STATION 22+47	OFFSET 7 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 723.2 ft	TOTAL DEPTH 83.7 ft	NORTHING 544,428	EASTING 1,448,197
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 09/27/17	COMP. DATE 09/27/17	SURFACE WATER DEPTH N/A
CORE SIZE HQ3	TOTAL RUN 42.0 ft		

**Project No. 44475.1.2 (P-5705B)**  
**Charlotte Gateway Station and Track and Safety Improvements**

## CORE PHOTOGRAPHS

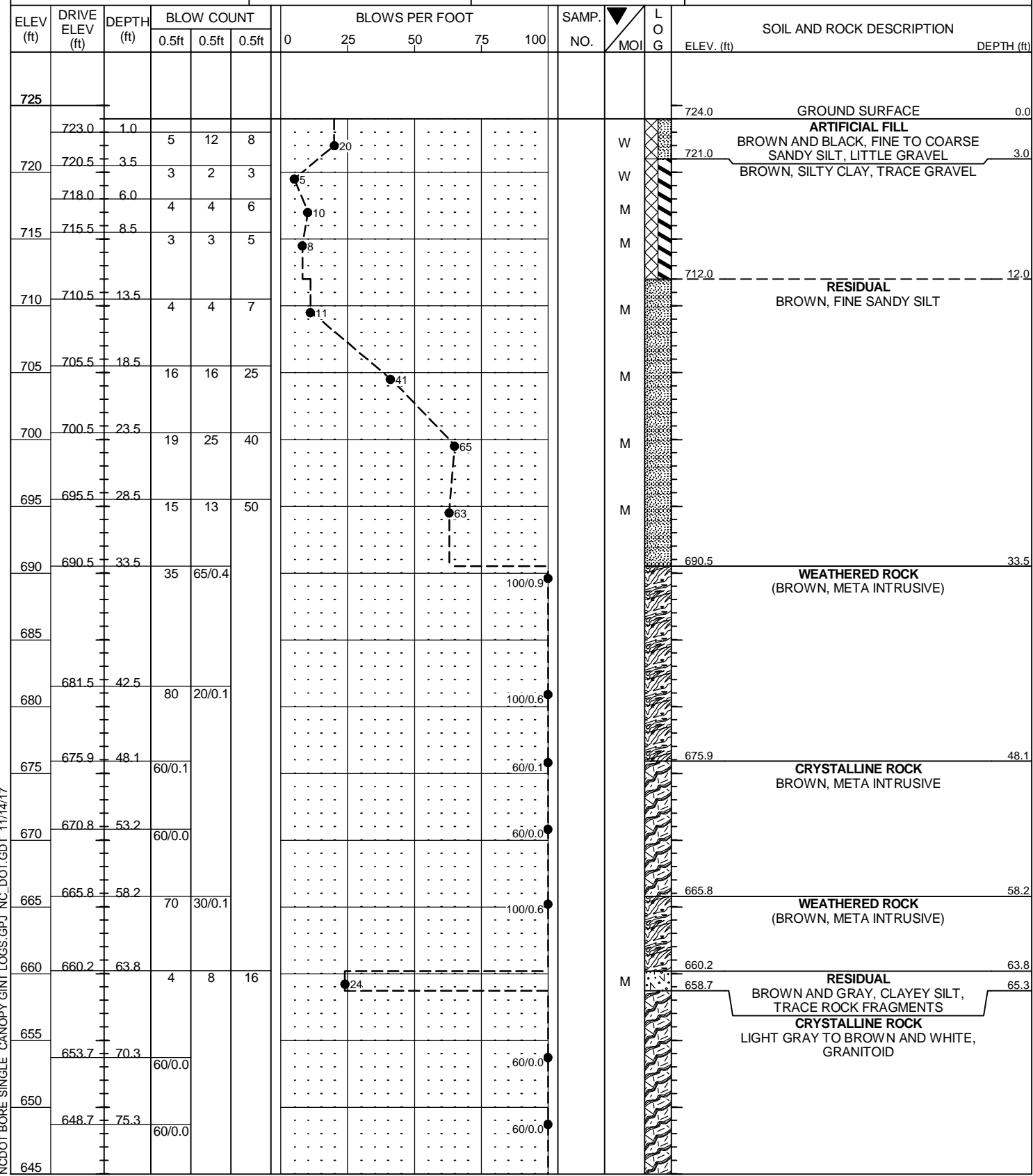
**B-2**  
**BOX 1: 39.5 - 83.7 FEET**

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (%)	RQD (%)		REC. (%)	RQD (%)				
683.7	683.7	39.5	2.0	1:46/1.0	(0.0)	(0.0)						Begin Coring @ 39.5 ft	
	681.7	41.5		1:28/1.0	0%	0%						WEATHERED ROCK (BROWN AND WHITE, GRANITOID) (continued)	
680			5.0	0:57/1.0	(0.0)	(0.0)							
				1:20/1.0	0%	0%							
				1:15/1.0	0%	0%							
				0:54/1.0	0%	0%							
				0:43/1.0	0%	0%							
675	676.7	46.5	5.0	1:43/1.0	(0.7)	(0.0)						676.2	WEATHERED ROCK (BROWN, DIABASE) 47.0
	675.9	47.3		1:48/1.0	14%	0%							
				1:25/1.0	0%	0%							
				0:56/1.0	0%	0%							
				1:18/1.0	0%	0%							
670	670.9	52.3	5.0	1:20/1.0	(0.0)	(0.0)						672.2	WEATHERED ROCK (BROWN AND WHITE, GRANITOID) 51.0
	670.4	52.8		0:58/1.0	0%	0%							
				1:01/1.0	0%	0%							
				1:08/1.0	0%	0%							
665	665.4	57.8	5.0	0:57/1.0	(0.0)	(0.0)							
	665.1	58.1		1:00/1.0	0%	0%							
				1:35/1.0	0%	0%							
				0:52/1.0	0%	0%							
				1:12/1.0	0%	0%							
660	660.1	63.1	5.0	1:04/1.0	(0.0)	(0.0)						660.1	CRYSTALLINE ROCK BROWN AND WHITE, MODERATELY SEVERE TO SEVERELY WEATHERED, SOFT, VERY CLOSELY FRACTURED, MASSIVE, GRANITOID GSI 40 - 45 63.1
	660.0	63.2		1:52/1.0	0%	0%		(0.0)	(0.0)				
				2:36/1.0	0%	0%							
				1:24/1.0	0%	0%							
				1:32/1.0	0%	0%							
				1:27/1.0	0%	0%							
655	655.0	68.2	5.0	2:47/1.0	(0.1)	(0.0)						655.0	WEATHERED ROCK (BROWN AND WHITE, GRANITOID) 68.2
	654.7	68.5		1:56/1.0	2%	0%							
				1:16/1.0	0%	0%							
				1:08/1.0	0%	0%							
				1:05/1.0	0%	0%							
650	649.7	73.5	5.0	0:52/1.0	(0.0)	(0.0)						649.7	CRYSTALLINE ROCK BROWN AND WHITE, MODERATELY SEVERE WEATHERED, SOFT, VERY CLOSELY FRACTURED, MASSIVE, GRANITOID GSI 40 - 45 73.5
	649.6	73.6		1:39/1.0	0%	0%							
				2:36/1.0	0%	0%							
				2:48/1.0	0%	0%							
				2:15/1.0	0%	0%							
645	644.6	78.6	5.0	2:25/1.0	(2.8)	(0.0)						643.2	CRYSTALLINE ROCK DARK GREEN-GRAY, VERY SLIGHTLY WEATHERED, HARD, CLOSELY FRACTURED, OLIVINE DIABASE GSI 80 - 85 80.0
				2:31/1.0	56%	0%		(2.8)	(0.0)				
				5:38/1.0	0%	0%							
				9:03/1.0	0%	0%							
640	639.6	83.6	5.0	10:32/1.0	(2.8)	(0.0)						639.5	CRYSTALLINE ROCK DARK GREEN-GRAY, VERY SLIGHTLY WEATHERED, HARD, CLOSELY FRACTURED, OLIVINE DIABASE GSI 80 - 85 83.7
				N=60/0.1									



# GEOTECHNICAL BORING REPORT BORE LOG

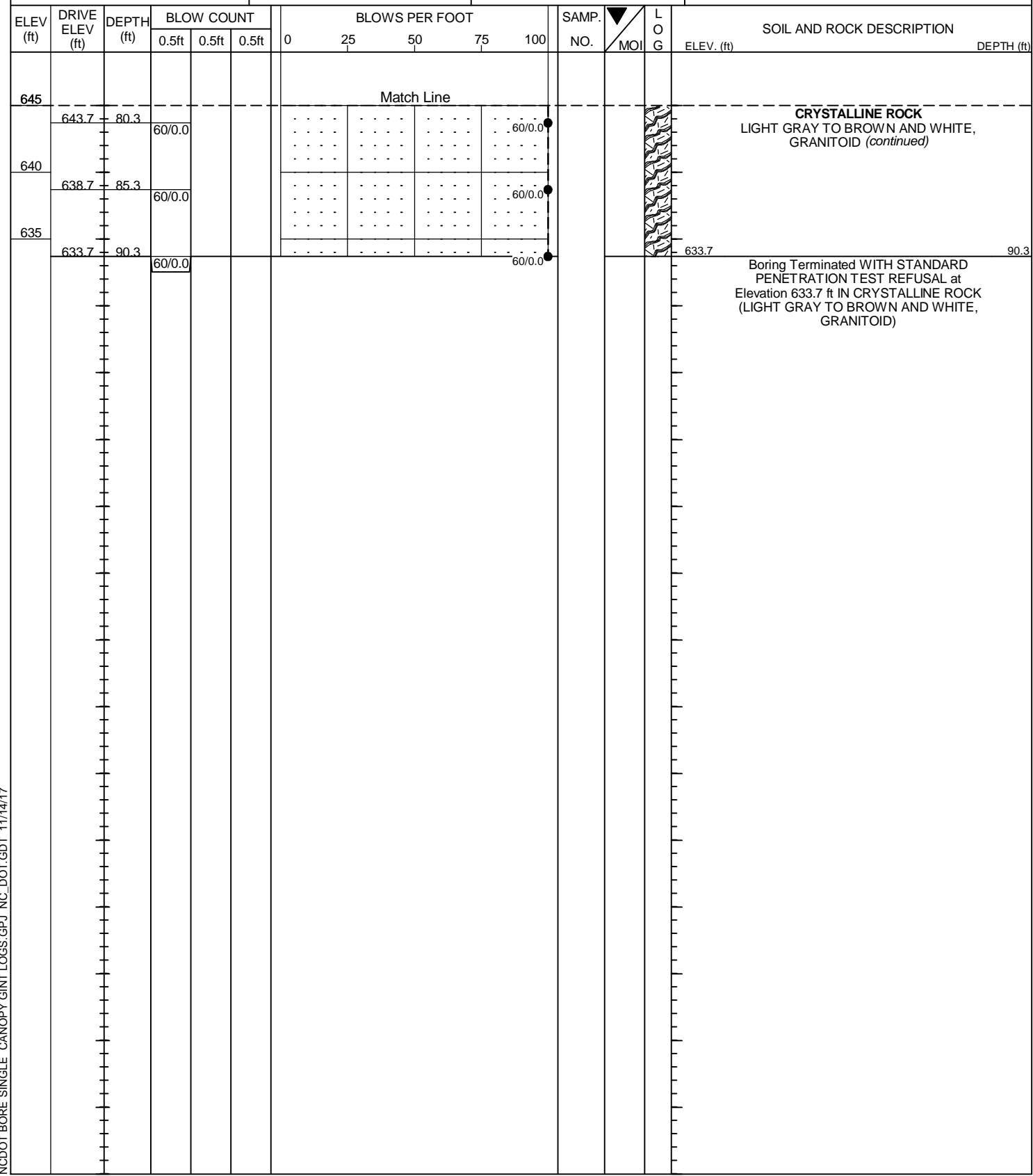
WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-3A	STATION 26+57	OFFSET 39 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 724.0 ft	TOTAL DEPTH 90.3 ft	NORTHING 544,187	EASTING 1,447,888
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/13/17	COMP. DATE 10/18/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-3A	STATION 26+57	OFFSET 39 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 724.0 ft	TOTAL DEPTH 90.3 ft	NORTHING 544,187	EASTING 1,447,888
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/13/17	COMP. DATE 10/18/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S						
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)					
BORING NO. B-3A		STATION 26+57		OFFSET 39 ft RT		ALIGNMENT -S1-						
COLLAR ELEV. 724.0 ft		TOTAL DEPTH 90.3 ft		NORTHING 544,187		EASTING 1,447,888						
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER EKLUND, M.A.		START DATE 10/13/17		COMP. DATE 10/18/17		SURFACE WATER DEPTH N/A						
CORE SIZE HQ3		TOTAL RUN 52.5 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
689	689.0	35.0	7.5	4:31/1.0 6:30/1.0 4:09/0.5 7:27/1.0 4:00/1.0 3:00/1.0 3:44/1.0 4:18/1.0	(5.2) 69%	(1.8) 24%					Begin Coring @ 35.0 ft <b>WEATHERED ROCK</b> (BROWN, META INTRUSIVE) (continued)	
685												
680	681.5 680.9	42.5 43.1	5.0	<del>N=100/0.6</del> 3:56/1.0 5:24/1.0 3:32/1.0 4:23/1.0 4:19/1.0	(3.0) 60%	(1.7) 34%						
675	675.9 675.8	48.1 48.2	5.0	<del>N=60/0.1</del> 4:35/1.0 6:05/1.0 5:11/1.0 6:20/1.0 4:51/1.0	(2.7) 54%	(0.7) 14%	(5.2) 51%	(1.3) 13%			<b>CRYSTALLINE ROCK</b> BROWN, MODERATELY SEVERE WEATHERED, SOFT, CLOSELY FRACTURED, META INTRUSIVE GSI 40 - 45	48.1
670												
665	665.8 665.2	58.2 58.8	5.0	<del>N=60/0.0</del> 6:53/1.0 6:51/1.0 3:52/1.0 4:49/1.0 3:43/1.0	(2.5) 50%	(0.6) 12%						675.9
660	660.2	63.8	5.0	<del>N=100/0.6</del> 2:49/1.0 4:12/1.0 4:20/1.0 4:33/1.0 3:55/1.0	(1.7) 34%	(1.2) 24%					<b>WEATHERED ROCK</b> (BROWN, META INTRUSIVE)	58.2
655	658.7	65.3	5.0	<del>N=24</del> 5:01/1.0 5:28/1.0 5:19/1.0 5:20/1.0 5:12/1.0	(2.2) 44%	(0.6) 12%					<b>RESIDUAL</b> BROWN AND GRAY, CLAYEY SILT	63.8
650	653.7	70.3	5.0	<del>N=60/0.0</del> 8:15/1.0 10:26/1.0 19:40/1.0 2:28/1.0 3:12/1.0	(4.9) 98%	(0.9) 18%	(19.9) 80%	(4.1) 16%			<b>CRYSTALLINE ROCK</b> LIGHT GRAY TO BROWN AND WHITE, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY HARD TO MODERATELY HARD, CLOSELY FRACTURED, MASSIVE, GRANITOID, WITH BROWN AND GREEN INTRUSIVE DIABASE DIKES AND SILLS BELOW 80.3' DEPTH GSI 45 - 50	65.3
645	648.7	75.3	5.0	<del>N=60/0.0</del> 4:04/1.0 4:51/1.0 4:53/1.0 4:15/1.0 4:57/1.0	(4.8) 96%	(2.6) 52%						
640	643.7	80.3	5.0	<del>N=60/0.0</del> 6:31/1.0 2:37/1.0 11:49/1.0 3:27/1.0 4:19/1.0	(4.9) 98%	(0.0) 0%						
635	638.7	85.3	5.0	<del>N=60/0.0</del> 3:33/1.0 4:40/1.0 5:57/1.0 5:49/1.0	(3.1) 62%	(0.0) 0%						
	633.7	90.3		<del>N=60/0.0</del>								633.7
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 633.7 ft IN CRYSTALLINE ROCK (LIGHT GRAY TO BROWN AND WHITE, GRANITOID)												

NCDOT CORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

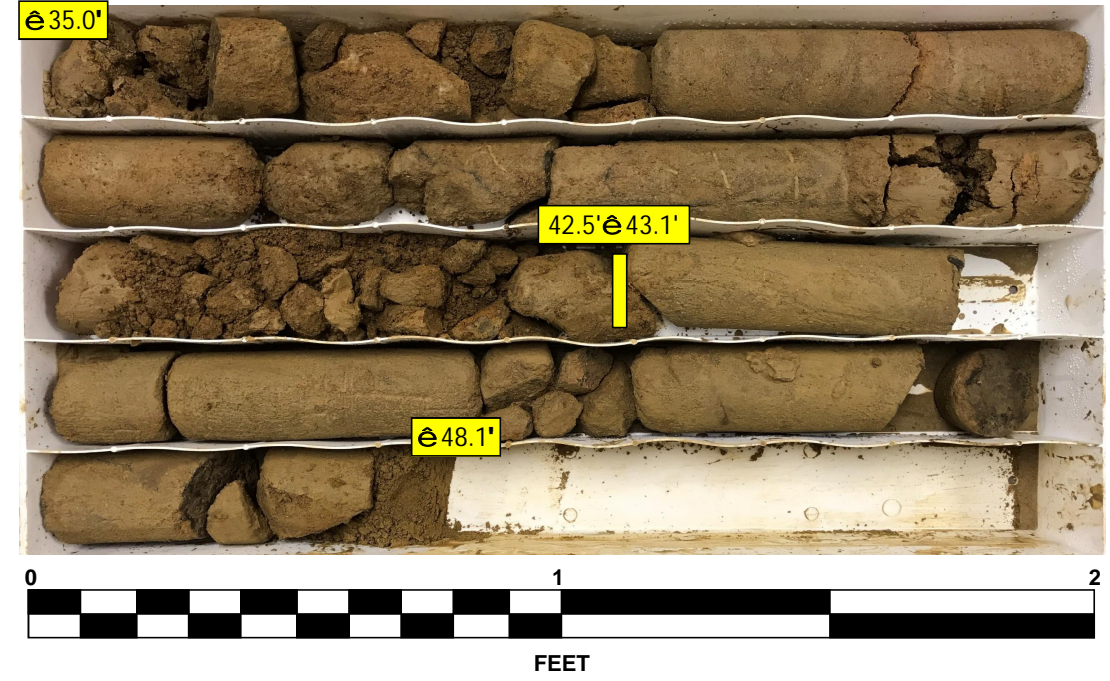


Project No. 44475.1.2 (P-5705B)  
Charlotte Gateway Station and Track and Safety Improvements

CORE PHOTOGRAPHS

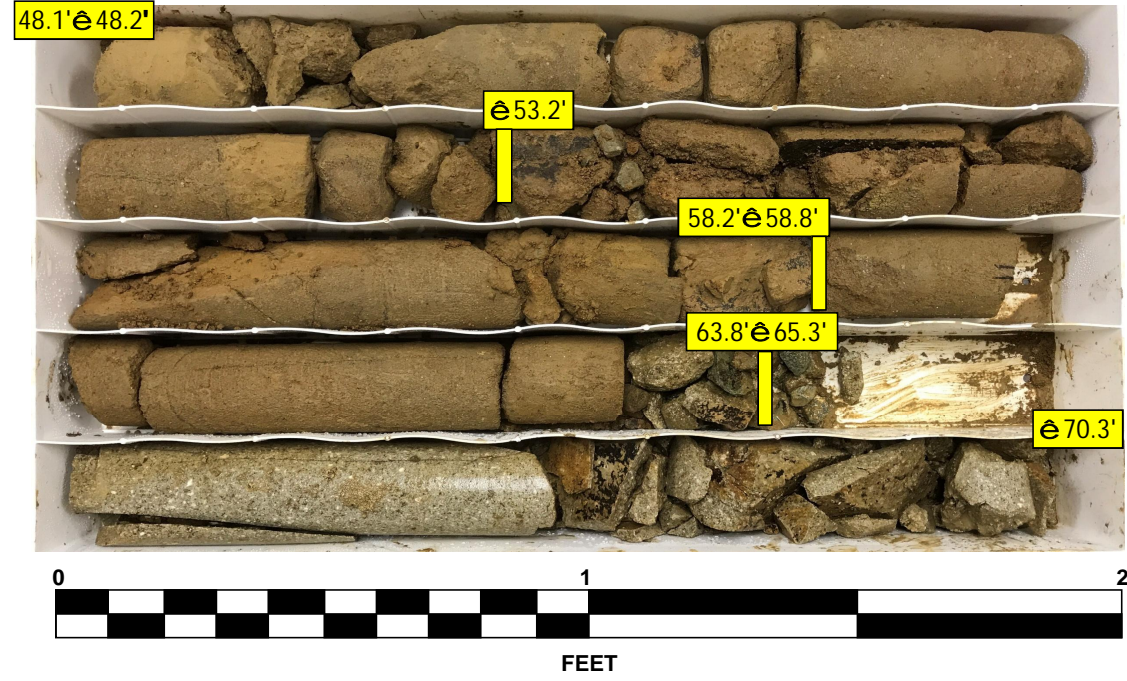
B-3A

BOX 1: 35.0 - 48.1 FEET



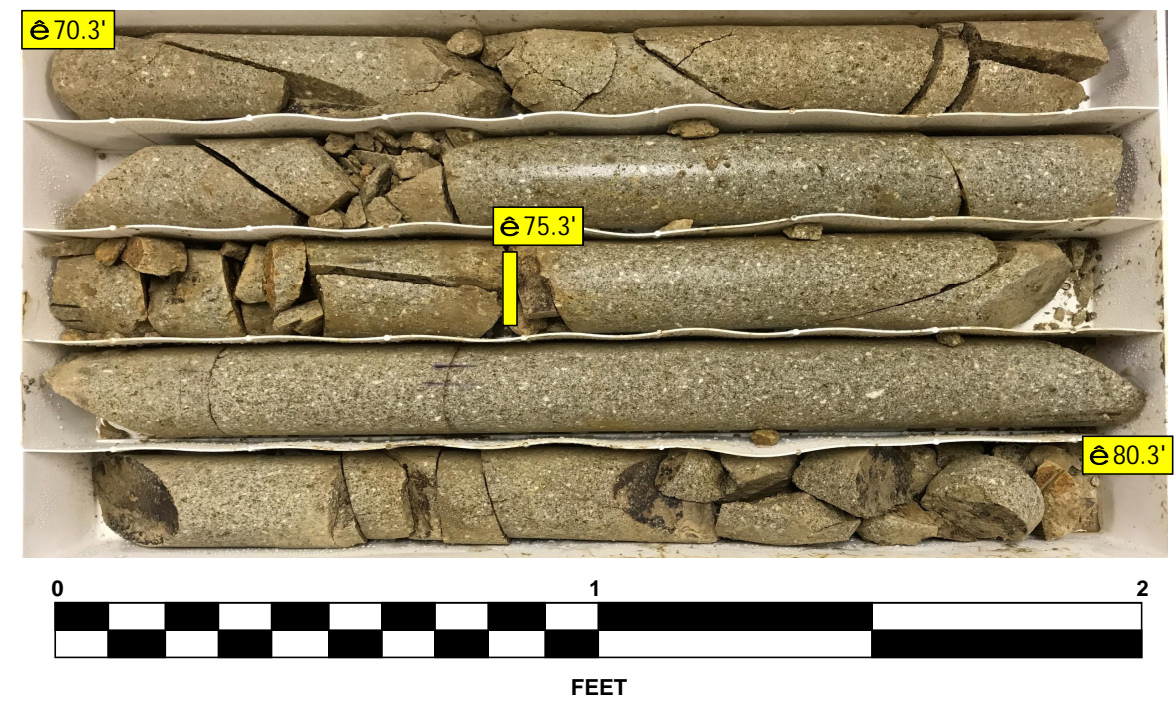
B-3A

BOX 2: 48.1 - 70.3 FEET



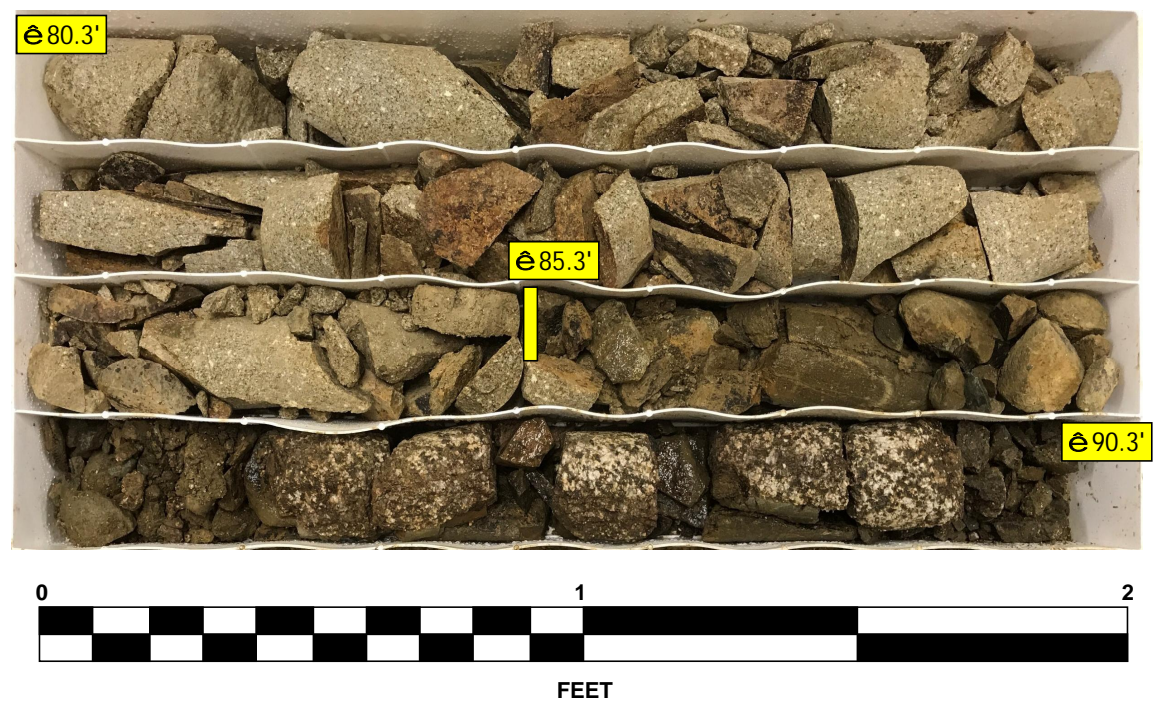
B-3A

BOX 3: 70.3 - 80.3 FEET



B-3A

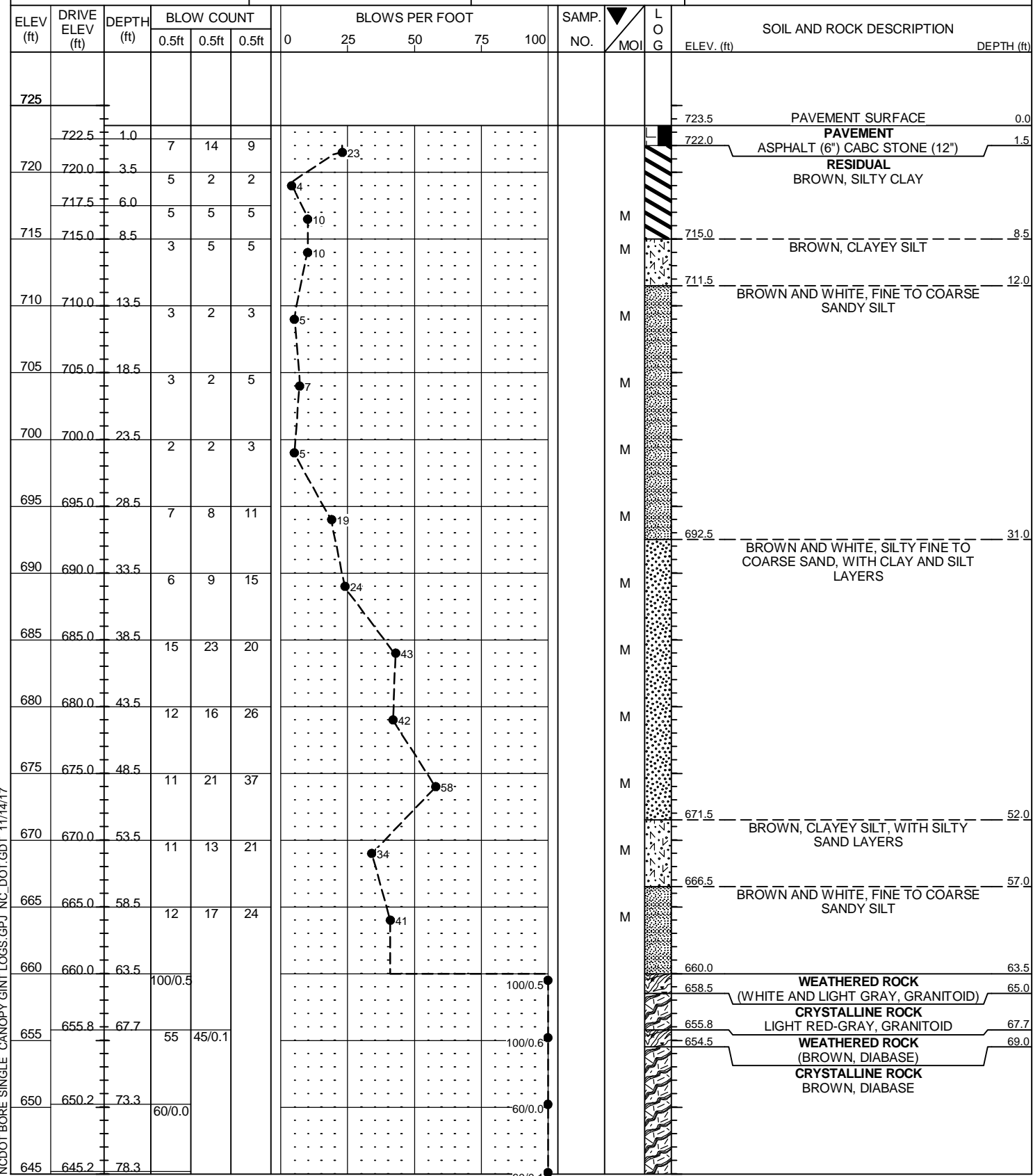
BOX 4: 80.3 - 90.3 FEET





# GEOTECHNICAL BORING REPORT BORE LOG

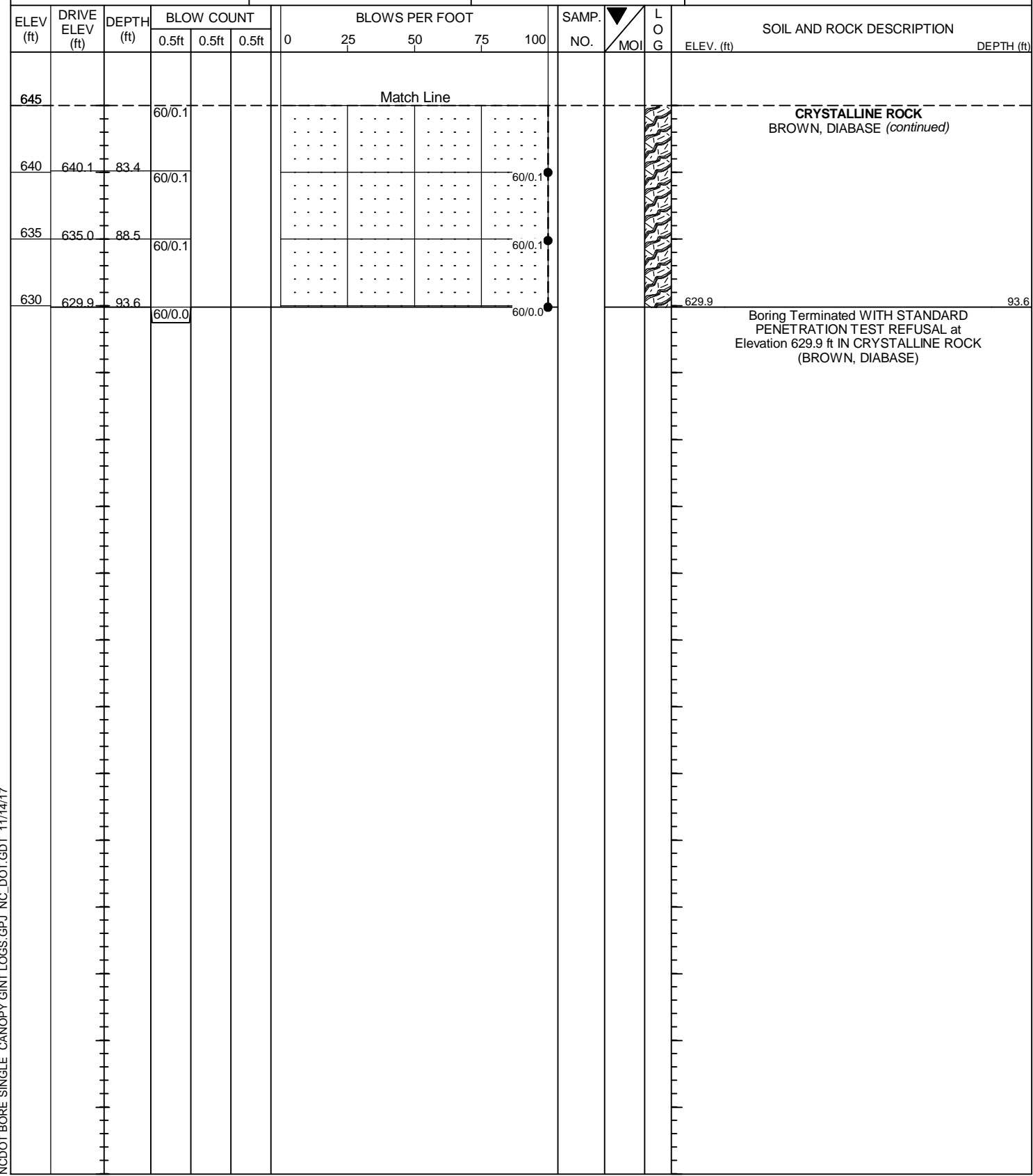
<b>WBS</b> 44475.1.2	<b>TIP</b> P-5705B	<b>COUNTY</b> MECKLENBURG	<b>GEOLOGIST</b> SCHLEMM, T.S
<b>SITE DESCRIPTION</b> CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-4	<b>STATION</b> 26+47	<b>OFFSET</b> 6 ft RT	<b>ALIGNMENT</b> -S1-
<b>COLLAR ELEV.</b> 723.5 ft	<b>TOTAL DEPTH</b> 93.6 ft	<b>NORTHING</b> 544,141	<b>EASTING</b> 1,447,918
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
<b>DRILLER</b> EKLUND, M.A.	<b>START DATE</b> 09/21/17	<b>COMP. DATE</b> 09/26/17	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

<b>WBS</b> 44475.1.2	<b>TIP</b> P-5705B	<b>COUNTY</b> MECKLENBURG	<b>GEOLOGIST</b> SCHLEMM, T.S
<b>SITE DESCRIPTION</b> CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-4	<b>STATION</b> 26+47	<b>OFFSET</b> 6 ft RT	<b>ALIGNMENT</b> -S1-
<b>COLLAR ELEV.</b> 723.5 ft	<b>TOTAL DEPTH</b> 93.6 ft	<b>NORTHING</b> 544,141	<b>EASTING</b> 1,447,918
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
<b>DRILLER</b> EKLUND, M.A.	<b>START DATE</b> 09/21/17	<b>COMP. DATE</b> 09/26/17	<b>SURFACE WATER DEPTH</b> N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

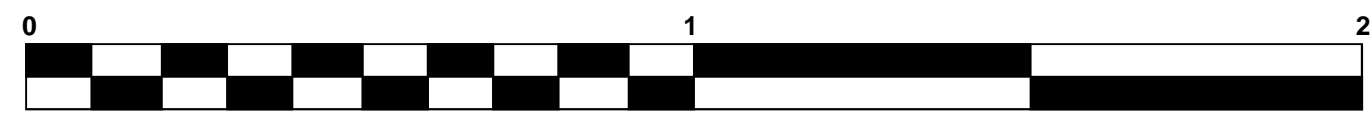
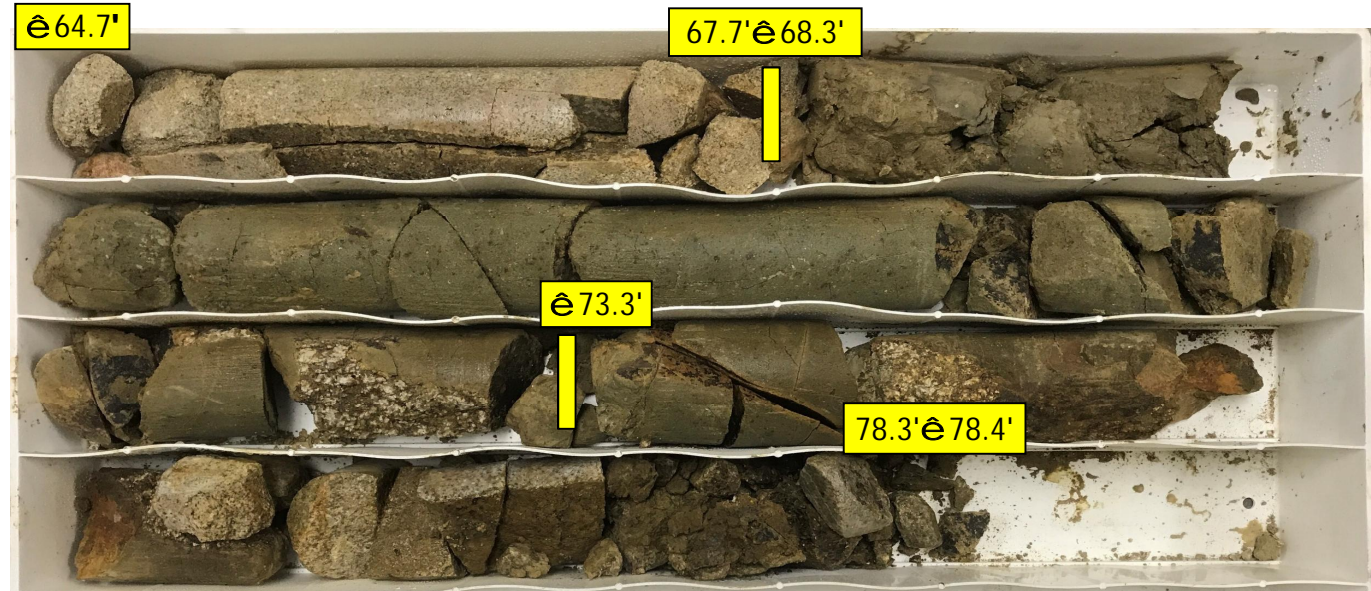
WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S					
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)				
BORING NO. B-4		STATION 26+47		OFFSET 6 ft RT		ALIGNMENT -S1-					
COLLAR ELEV. 723.5 ft		TOTAL DEPTH 93.6 ft		NORTHING 544,141		EASTING 1,447,918					
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic					
DRILLER EKLUND, M.A.		START DATE 09/21/17		COMP. DATE 09/26/17		SURFACE WATER DEPTH N/A					
CORE SIZE HQ3		TOTAL RUN 28.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %			
658.8	658.8	64.7	3.0	2:42/1.0 5:36/1.0 4:10/1.0	(1.1) 37%	(0.0) 0%	(1.1) 41%	(0.0) 0%		65.0	
	655.8 655.2	67.7 66.3								65.8	
655			5.0	N=100/0.6 3:13/1.0 5:58/1.0 8:55/1.0 7:34/1.0 7:31/1.0	(3.6) 72%	(0.9) 18%	(17.1) 70%	(8.4) 34%		65.5	
650	650.2	73.3	5.0	N=60/0.0 8:00/1.0 6:38/1.0 6:11/1.0 7:40/1.0 6:28/1.0	(2.3) 46%	(0.5) 10%				69.0	
645	645.2 645.1	78.3 78.4	5.0	N=60/0.1 6:31/1.0 8:12/1.0 4:59/1.0 3:33/1.0 5:11/1.0	(3.5) 70%	(2.4) 48%					
640	640.1 640.0	83.4 83.5	5.0	N=60/0.1 4:10/1.0 3:38/1.0 3:36/1.0 4:26/1.0 3:28/1.0	(3.9) 78%	(2.4) 48%					
635	635.0 634.9	88.5 88.6	5.0	N=60/0.1 4:26/1.0 4:19/1.0 5:52/1.0 4:35/1.0 3:30/1.0	(3.8) 76%	(2.2) 44%					
630	629.9	93.6		N=60/0.0						629.9	
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 629.9 ft IN CRYSTALLINE ROCK (BROWN, DIABASE)											

NCDOT CORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17



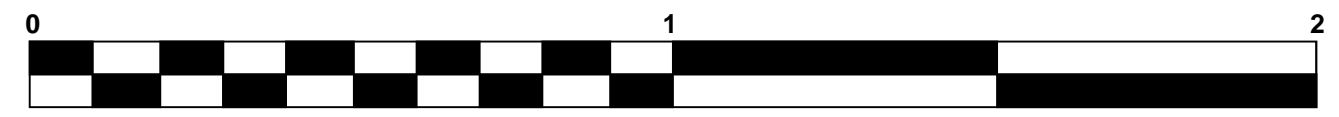
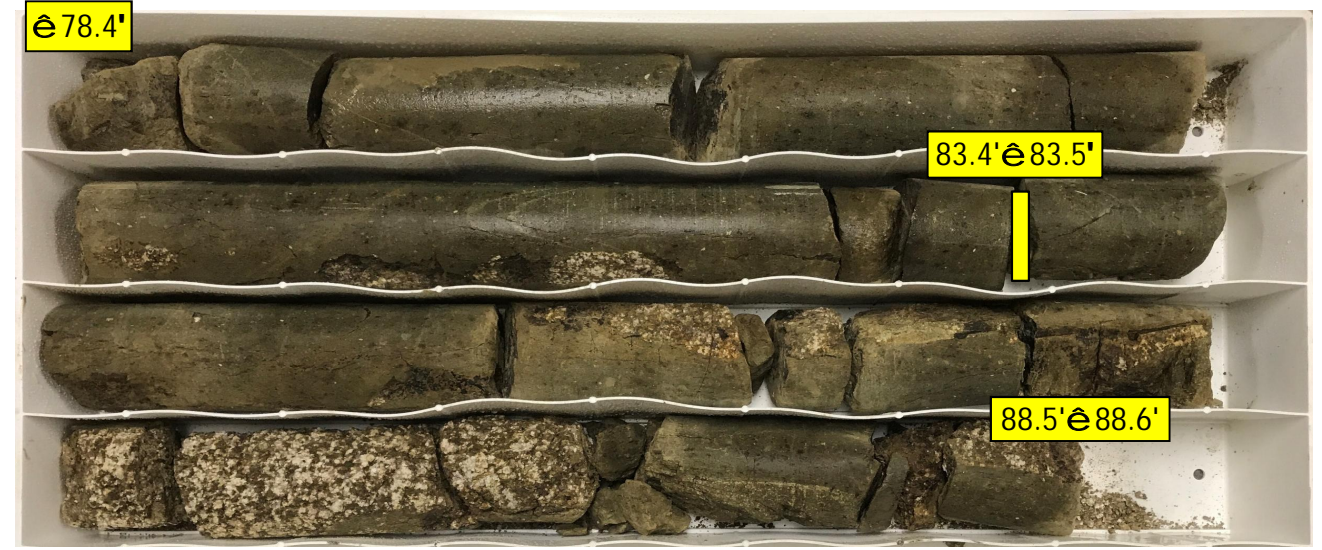
Project No. 44475.1.2 (P-5705B)  
 Charlotte Gateway Station and Track and Safety Improvements  
**CORE PHOTOGRAPHS**

**B-4**  
 BOX 1: 64.7 - 78.4 FEET



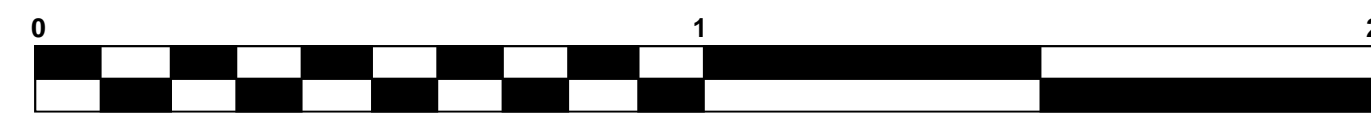
FEET

**B-4**  
 BOX 2: 78.4 - 88.6 FEET



FEET

**B-4**  
 BOX 3: 88.6 - 93.6 FEET



FEET

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-5	STATION 21+53	OFFSET 9 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 727.6 ft	TOTAL DEPTH 88.1 ft	NORTHING 544,497	EASTING 1,448,261
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/05/17	COMP. DATE 10/06/17	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
730														
	726.6	1.0	4	2	2								GROUND SURFACE	0.0
725	724.1	3.5	3	5	5								ARTIFICIAL FILL GRAVEL	1.0
	721.6	6.0											BROWN AND GRAY, SILTY CLAY, TRACE GRAVEL	5.0
720	719.1	8.5	11	15	18								RESIDUAL BROWN AND GRAY, CLAYEY SILT	
	718.1	9.5											BROWN AND WHITE, SILTY FINE TO COARSE SAND	9.5
715	714.1	13.5	10	11	14									
710	709.1	18.5	15	15	17									
705	704.1	23.5	16	20	27									
700	699.1	28.5	9	20	35									
695	694.1	33.5	16	27	56									
690	689.1	38.5	18	33	67									
685													WEATHERED ROCK (BROWN AND WHITE, GRANITOID)	39.5
680	680.6	47.0	50	43	57/0.4									
675	675.2	52.4											CRYSTALLINE ROCK BROWN AND WHITE, GRANITOID	52.4
670	670.1	57.5											CRYSTALLINE ROCK	57.5
665	665.0	62.6											WEATHERED ROCK (BROWN, DIABASE)	62.6
660	659.7	67.9											CRYSTALLINE ROCK BROWN, DIABASE	67.9
655	654.6	73.0												
650														

NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-5	STATION 21+53	OFFSET 9 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 727.6 ft	TOTAL DEPTH 88.1 ft	NORTHING 544,497	EASTING 1,448,261
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/05/17	COMP. DATE 10/06/17	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
650														
	649.5	78.1											Match Line	
645	644.5	83.1											CRYSTALLINE ROCK BROWN AND WHITE, GRANITOID	78.1
640	639.5	88.1											CRYSTALLINE ROCK BROWN, DIABASE	86.3
													Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 639.5 ft IN CRYSTALLINE ROCK (BROWN, DIABASE)	88.1

NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17



# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S						
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)					
BORING NO. B-5		STATION 21+53		OFFSET 9 ft RT		ALIGNMENT -S1-						
COLLAR ELEV. 727.6 ft		TOTAL DEPTH 88.1 ft		NORTHING 544,497		EASTING 1,448,261						
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic						
DRILLER EKLUND, M.A.		START DATE 10/05/17		COMP. DATE 10/06/17		SURFACE WATER DEPTH N/A						
CORE SIZE HQ3		TOTAL RUN 46.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
687.6	687.6	40.0	6.0	0:59/1.0 1:31/1.0 2:09/1.0 2:31/1.0 1:50/1.0 1:45/1.0	(0.0) 0%	(0.0) 0%					Begin Coring @ 40.0 ft <b>WEATHERED ROCK</b> (BROWN AND WHITE, GRANITOID) (continued)	
685												
680	681.6 680.2	46.0 47.4										
675	675.2 675.1	52.4 52.5	5.0	N=100/0.5 0:58/1.0 1:10/1.0 2:55/1.0 1:07/1.0 1:53/1.0	(0.0) 0%	(0.0) 0%						
670	670.1 670.0	57.5 57.6	5.0	N=60/0.1 1:28/1.0 1:39/1.0 2:31/1.0 1:55/1.0 2:12/1.0	(0.0) 0%	(0.0) 0%	(0.0) 0%	(0.0) 0%				
665	665.0 664.7	62.6 62.9	5.0	N=60/0.1 5:55/1.0 8:10/1.0 7:08/1.0 5:46/1.0 5:51/1.0	(4.0) 80%	(1.9) 38%	(4.0) 78%	(1.9) 37%				
660	659.7 659.6	67.9 68.0	5.0	N=100/0.5 3:41/1.0 2:29/1.0 1:04/1.0 1:59/1.0 1:48/1.0	(0.5) 10%	(0.0) 0%						
655	654.6 654.5	73.0 73.1	5.0	N=60/0.1 5:14/1.0 5:54/1.0 7:09/1.0 6:46/1.0 6:29/1.0	(1.6) 32%	(0.0) 0%	(4.9) 48%	(1.4) 14%				
650	649.5	78.1	5.0	N=60/0.1 4:13/1.0 5:55/1.0 5:22/1.0 12:29/1.0 6:13/1.0	(3.4) 68%	(1.4) 28%						
645	644.5	83.1	5.0	N=60/0.0 4:24/1.0 4:33/1.0 6:00/1.0 4:54/1.0 5:01/1.0	(1.3) 26%	(0.0) 0%	(3.9) 48%	(1.5) 18%				
640	639.5	88.1	5.0	N=60/0.0 4:23/1.0 4:50/1.0 5:03/1.0 4:29/1.0 3:10/1.0	(4.2) 84%	(2.0) 40%	(1.6) 89%	(0.5) 28%				
				N=60/0.0								

### Project No. 44475.1.2 (P-5705B)

### Charlotte Gateway Station and Track and Safety Improvements

## CORE PHOTOGRAPHS

**B-5**  
BOX 1: 40.0 - 78.1 FEET



0 1 2  
FEET

**B-5**  
BOX 2: 78.1 - 88.1 FEET



0 1 2  
FEET

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S										
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)									
BORING NO. B-6		STATION 21+43		OFFSET 39 ft RT		ALIGNMENT -S1-										
COLLAR ELEV. 727.3 ft		TOTAL DEPTH 98.3 ft		NORTHING 544,525		EASTING 1,448,246										
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER EKLUND, M.A.		START DATE 10/03/17		COMP. DATE 10/05/17		SURFACE WATER DEPTH 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						
730																
725	726.3	1.0	8	9	3											
	723.8	3.5	2	5	4											
720	721.3	6.0	5	6	9											
	718.8	8.5	5	5	12											
715	713.8	13.5	8	11	15											
710	708.8	18.5	10	15	22											
705	703.8	23.5	3	11	33											
700	698.8	28.5	23	30	53											
695	693.8	33.5	11	19	50											
690	688.8	38.5	30	53	47/0.4											
685																
680	680.9	46.4	100/0.4													
675	675.5	51.8	100/0.4													
670	670.1	57.2	100/0.4													
665	664.7	62.6	100/0.3													
660	659.4	67.9	60/0.1													
655	654.3	73.0	60/0.1													
650																

WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S										
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)									
BORING NO. B-6		STATION 21+43		OFFSET 39 ft RT		ALIGNMENT -S1-										
COLLAR ELEV. 727.3 ft		TOTAL DEPTH 98.3 ft		NORTHING 544,525		EASTING 1,448,246										
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic												
DRILLER EKLUND, M.A.		START DATE 10/03/17		COMP. DATE 10/05/17		SURFACE WATER DEPTH 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						
650	649.2	78.1														
645	644.1	83.2														
640	639.1	88.2														
635	634.0	93.3														
630	629.0	98.3														

NCDOT BORE DOUBLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/16/17

Match Line

**CRYSTALLINE ROCK**  
BROWN, BLACK, AND WHITE, GRANITOID (continued)

Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 629.0 ft IN CRYSTALLINE ROCK (BROWN, BLACK, AND WHITE, GRANITOID)



# GEOTECHNICAL BORING REPORT

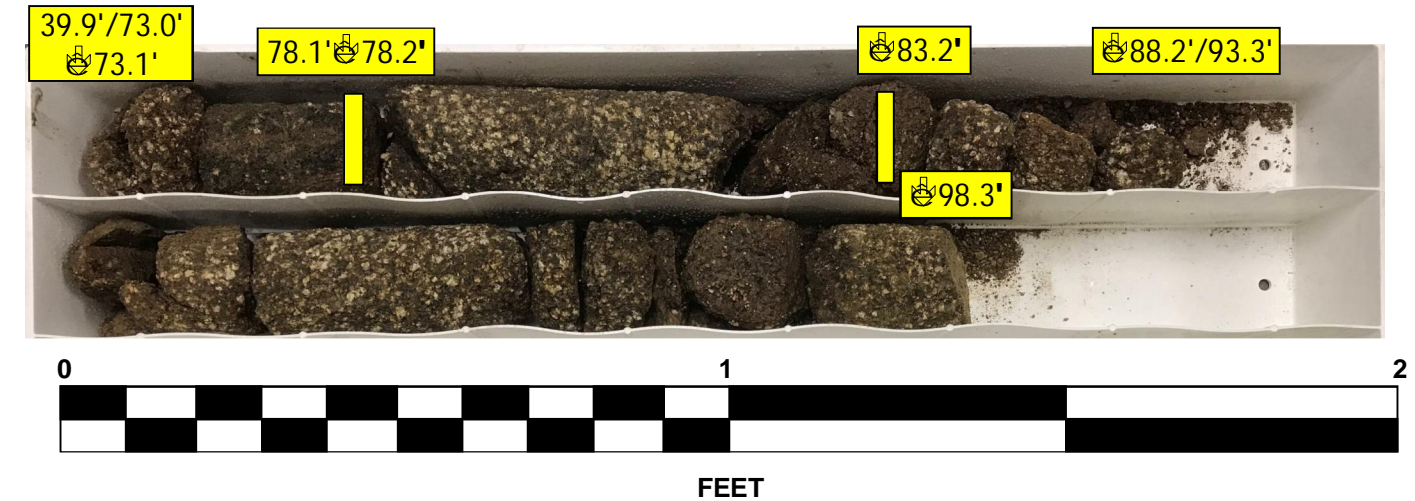
## CORE LOG

<b>WBS</b> 44475.1.2	<b>TIP</b> P-5705B	<b>COUNTY</b> MECKLENBURG	<b>GEOLOGIST</b> SCHLEMM, T.S
<b>SITE DESCRIPTION</b> CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-6	<b>STATION</b> 21+43	<b>OFFSET</b> 39 ft RT	<b>ALIGNMENT</b> -S1-
<b>COLLAR ELEV.</b> 727.3 ft	<b>TOTAL DEPTH</b> 98.3 ft	<b>NORTHING</b> 544,525	<b>EASTING</b> 1,448,246
<b>DRILL RIG/HAMMER EFF./DATE</b> TER346 DIEDRICH D-50 90% 03/10/2017		<b>DRILL METHOD</b> SPT Core Boring	<b>HAMMER TYPE</b> Automatic

**Project No. 44475.1.2 (P-5705B)**  
**Charlotte Gateway Station and Track and Safety Improvements**

### CORE PHOTOGRAPHS

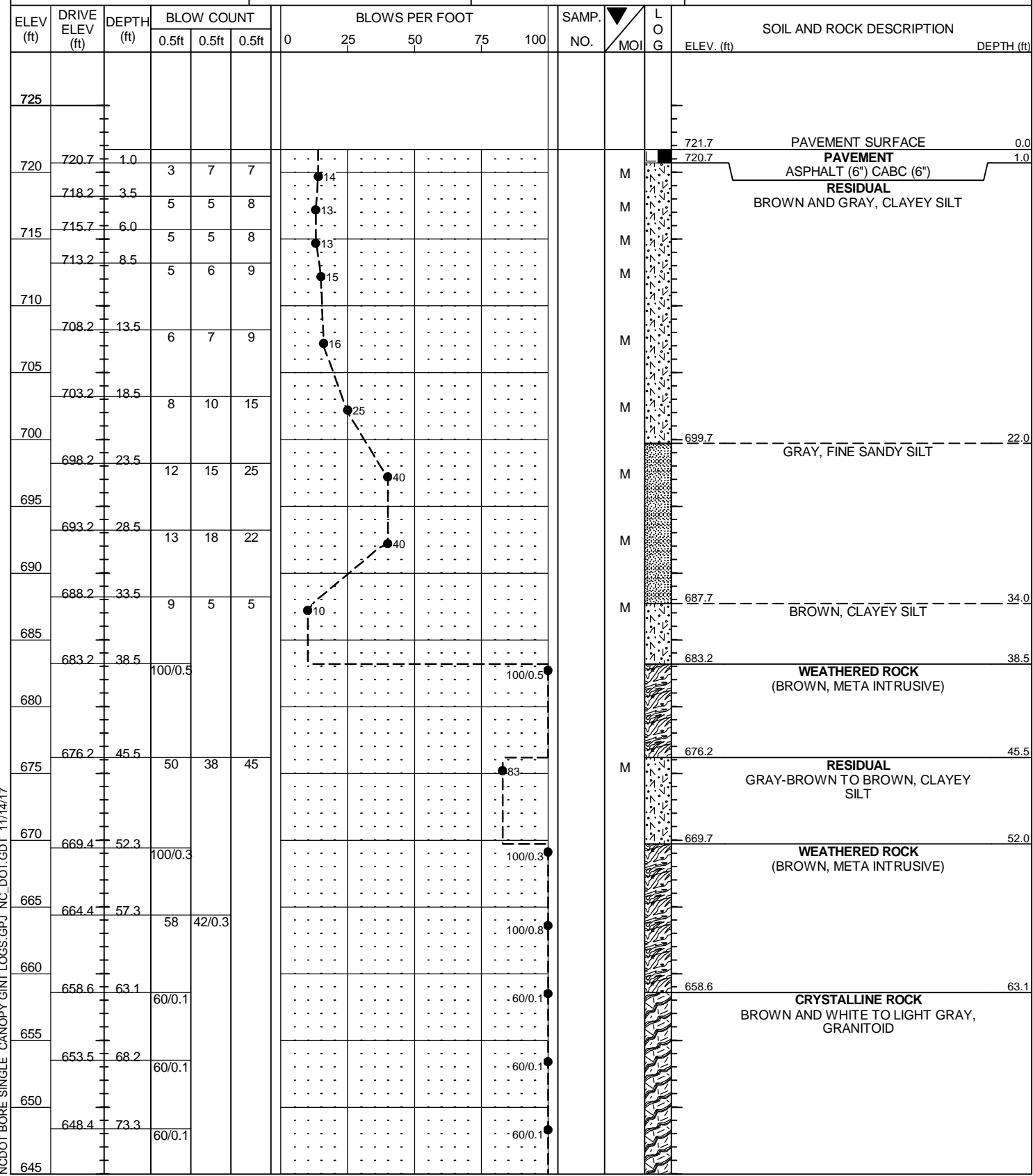
**B-6**  
**BOX 1: 39.9 - 98.3 FEET**



ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
687.4	687.4	39.9	6.5	4:01/1.0	(0.0)	(0.0)					Begin Coring @ 39.9 ft	
685				1:37/0.5 2:37/1.0 3:27/1.0 2:44/1.0 1:52/1.0 1:55/1.0	0%	0%					WEATHERED ROCK (BROWN AND WHITE, GRANITOID) (continued)	
680	680.9 680.5	46.4 46.8	5.0	1:08/1.0 3:55/1.0 1:26/1.0 3:40/1.0 3:22/1.0	(0.0)	(0.0)						
675	675.5 675.1	51.8 52.2	5.0	2:17/1.0 2:57/1.0 3:51/1.0 3:21/1.0 4:50/1.0	(0.0)	(0.0)						
670	670.1 669.7	57.2 57.6	5.0	2:07/1.0 2:15/1.0 2:13/1.0 2:42/1.0 2:46/1.0	(0.0)	(0.0)						
665	664.7 664.4	62.6 62.9	5.0	1:10/1.0 2:26/1.0 3:22/1.0 2:35/1.0 2:03/1.0	(0.0)	(0.0)						
660	659.4 659.3	67.9 68.0	5.0	2:07/1.0 4:19/1.0 4:40/1.0 3:59/1.0 4:10/1.0	(0.0)	(0.0)		(3.2) 11%	(0.9) 3%		CRYSTALLINE ROCK BROWN, BLACK, AND WHITE, MODERATELY SEVERE WEATHERED, SOFT TO MEDIUM HARD, CLOSELY FRACTURED, MASSIVE, GRANITOID GSI 40 - 45	67.9
655	654.3 654.2	73.0 73.1	5.0	2:51/1.0 4:14/1.0 3:59/1.0 6:25/1.0 3:05/1.0	(0.5)	(0.0)						
650	649.2 649.1	78.1 78.2	5.0	2:42/1.0 3:06/1.0 2:51/1.0 3:31/1.0 3:40/1.0	(0.9)	(0.5)						
645	644.1	83.2	5.0	3:54/1.0 3:38/1.0 3:24/1.0 4:35/1.0 3:18/1.0	(0.3)	(0.0)						
640	639.1 639.0	88.2 88.3	5.0	3:36/1.0 5:28/1.0 5:07/1.0 5:45/1.0 5:37/1.0	(0.0)	(0.0)						
635	634.0	93.3	5.0	4:50/1.0 8:12/1.0 4:08/1.0 5:15/1.0 2:26/1.0	(1.5)	(0.4)						
630	629.0	98.3									Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 629.0 ft IN CRYSTALLINE ROCK (BROWN, BLACK, AND WHITE, GRANITOID)	98.3

# GEOTECHNICAL BORING REPORT BORE LOG

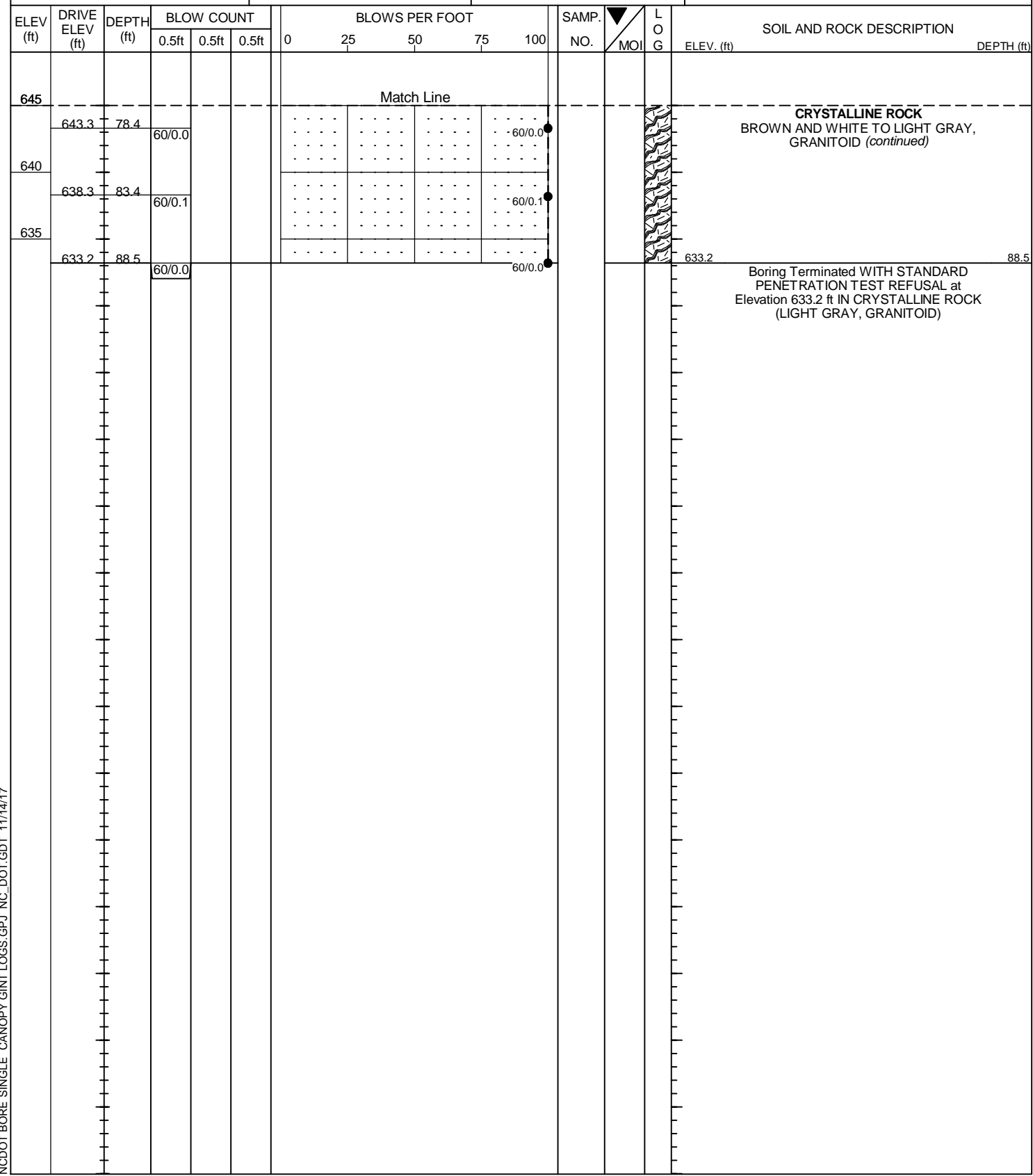
WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-7	STATION 27+50	OFFSET 9 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 721.7 ft	TOTAL DEPTH 88.5 ft	NORTHING 544,069	EASTING 1,447,844
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/09/17	COMP. DATE 10/11/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-7	STATION 27+50	OFFSET 9 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 721.7 ft	TOTAL DEPTH 88.5 ft	NORTHING 544,069	EASTING 1,447,844
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/09/17	COMP. DATE 10/11/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17





**GEOTECHNICAL BORING REPORT  
CORE LOG**

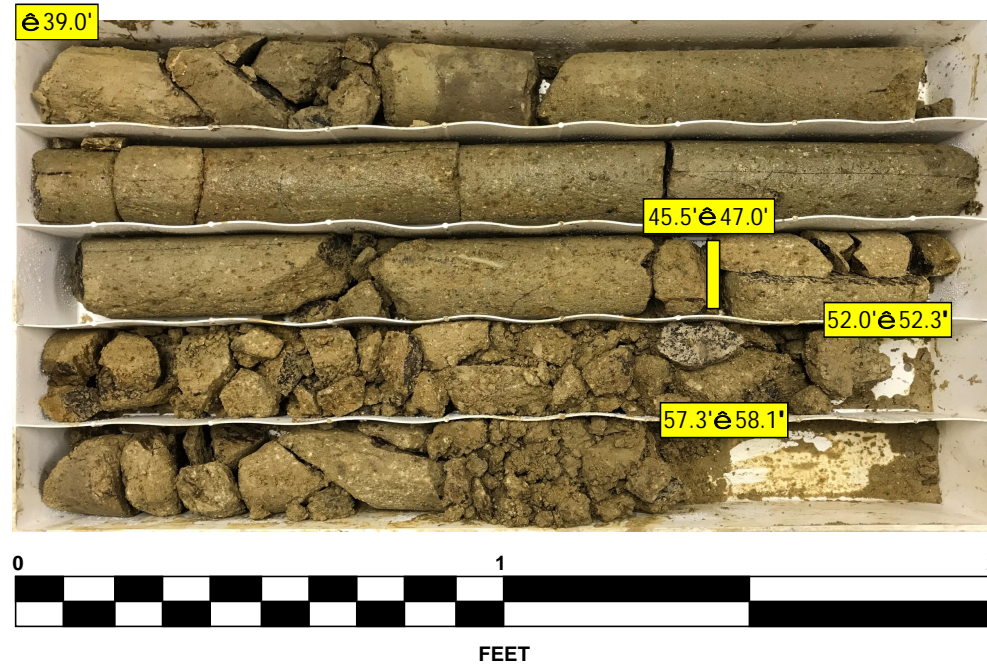
WBS 44475.1.2					TIP P-5705B					COUNTY MECKLENBURG					GEOLOGIST SCHLEMM, T.S				
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT										GROUND WTR (ft)									
BORING NO. B-7					STATION 27+50					OFFSET 9 ft RT					ALIGNMENT -S1-				
COLLAR ELEV. 721.7 ft					TOTAL DEPTH 88.5 ft					NORTHING 544,069					EASTING 1,447,844				
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017										DRILL METHOD SPT Core Boring					HAMMER TYPE Automatic				
DRILLER EKLUND, M.A.					START DATE 10/09/17					COMP. DATE 10/11/17					SURFACE WATER DEPTH N/A				
CORE SIZE HQ3					TOTAL RUN 46.5 ft														
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)							
					REC. (%)	RQD (%)		REC. (%)	RQD (%)										
682.7	682.7	39.0	6.5	4:05/1.0 1:58/0.5 3:13/1.0 3:36/1.0 3:54/1.0	(5.5)	(4.1)						Begin Coring @ 39.0 ft <b>WEATHERED ROCK</b> (BROWN, META INTRUSIVE) (continued)							
680				3:31/1.0 3:25/1.0	85%	63%													
675	676.2 674.7	45.5 47.0		N=83								676.2	RESIDUAL	45.5					
670	669.7 669.4	52.0 52.3	5.0	6:30/1.0 4:52/1.0 3:17/1.0 3:37/1.0 2:20/1.0	(2.3)	(0.0)						669.7		52.0					
665	664.4 663.6	57.3 58.1	5.0	N=100/0.7 9:07/1.0 3:26/1.0 6:51/1.0 6:41/1.0 3:11/1.0	(1.4)	(0.0)							<b>WEATHERED ROCK</b> (BROWN, META INTRUSIVE)						
660				N=100/0.8 1:44/1.0 8:30/1.0 8:10/1.0 4:33/1.0 4:51/1.0	(1.9)	(0.0)						658.6		63.1					
655	658.6 658.5	63.1 63.2	5.0	N=60/0.1 5:43/1.0 2:29/1.0 2:02/1.0 2:10/1.0 1:46/1.0	(4.7)	(0.8)	(14.5) 57%	(3.4) 13%					<b>CRYSTALLINE ROCK</b> BROWN AND WHITE TO LIGHT GRAY, MODERATELY SEVERE TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSELY FRACTURED, GRANITOID, DIABASE SILL INTRUSIONS GSI 50 - 60						
650	653.5 653.2	68.2 68.3	5.0	N=60/0.1 2:05/1.0 2:04/1.0 5:53/1.0 4:55/1.0 3:02/1.0	(2.2)	(0.0)													
645	648.4 648.3	73.3 73.4	5.0	N=60/0.1 7:37/1.0 8:54/1.0 4:27/1.0 3:39/1.0 3:52/1.0	(2.1)	(1.4)													
640	643.3	78.4	5.0	N=60/0.0 4:10/1.0 3:13/1.0 3:46/1.0 1:34/1.0 5:37/1.0	(3.5)	(1.2)													
635	638.3 638.2	83.4 83.5	5.0	N=60/0.1 2:51/1.0 12:42/1.0 6:32/1.0 5:21/1.0 5:57/1.0 N=60/0.0	(2.0)	(0.0)						633.2		88.5					
												Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 633.2 ft IN CRYSTALLINE ROCK (LIGHT GRAY, GRANITOID)							

NCDOT CORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

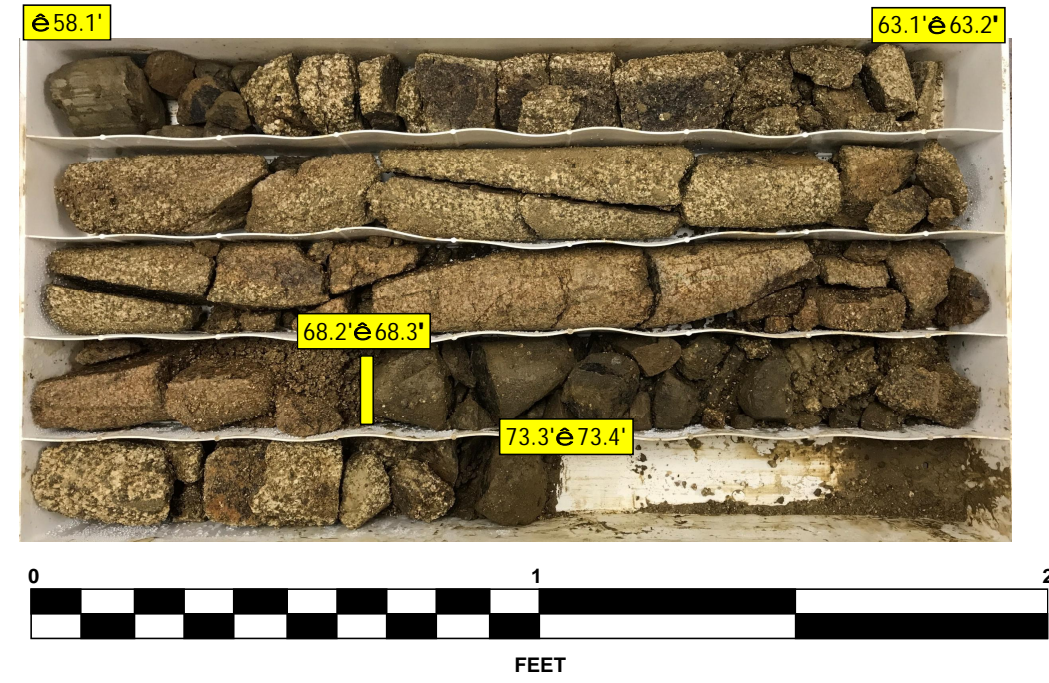
Project No. 44475.1.2 (P-5705B)  
Charlotte Gateway Station and Track and Safety Improvements

CORE PHOTOGRAPHS

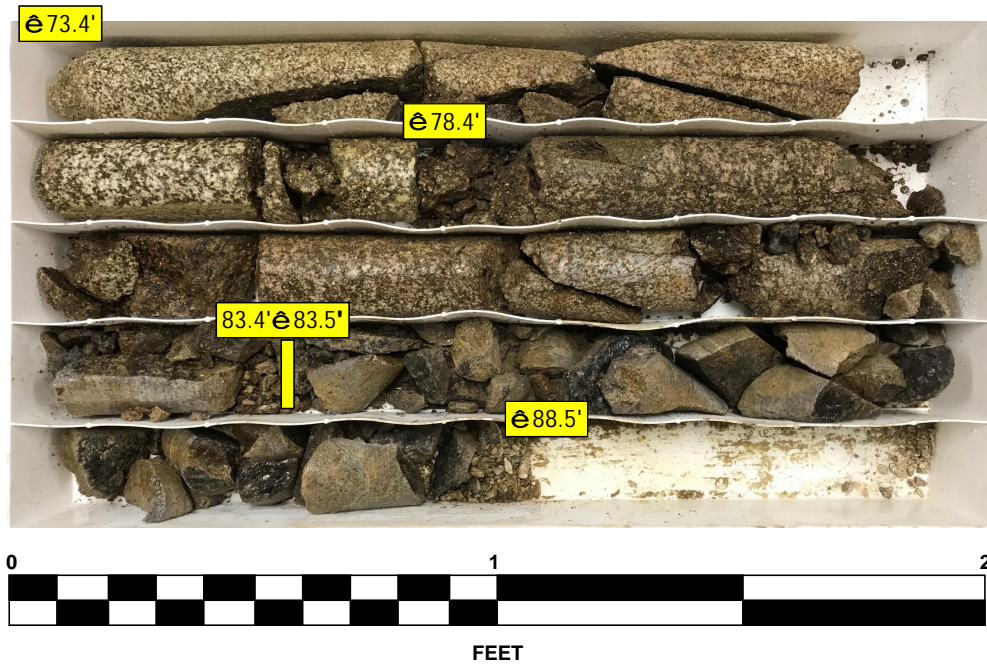
**B-7**  
BOX 1: 39.0 - 58.1 FEET



**B-7**  
BOX 2: 58.1 - 73.3 FEET



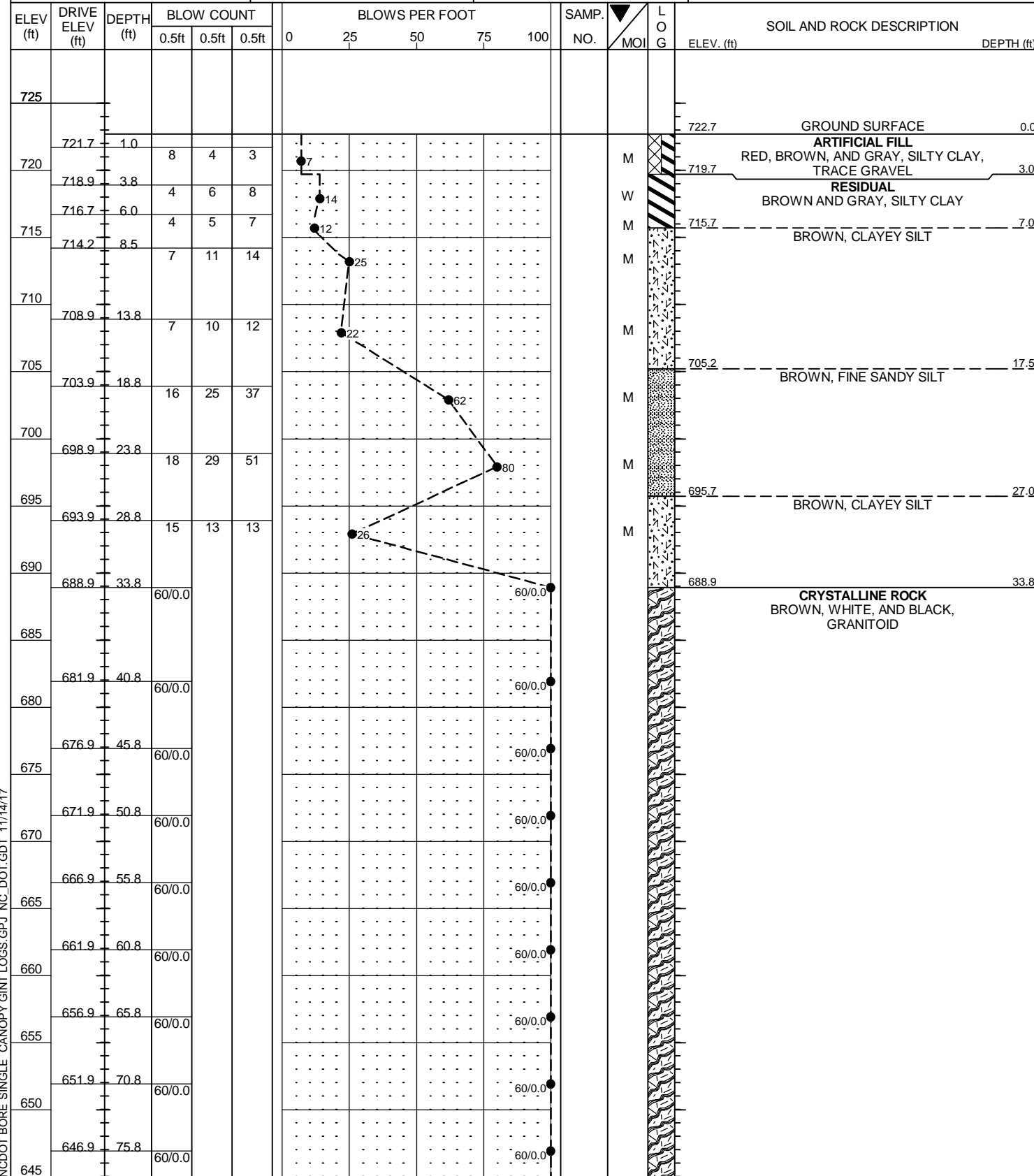
**B-7**  
BOX 3: 73.4 - 88.5 FEET





# GEOTECHNICAL BORING REPORT BORE LOG

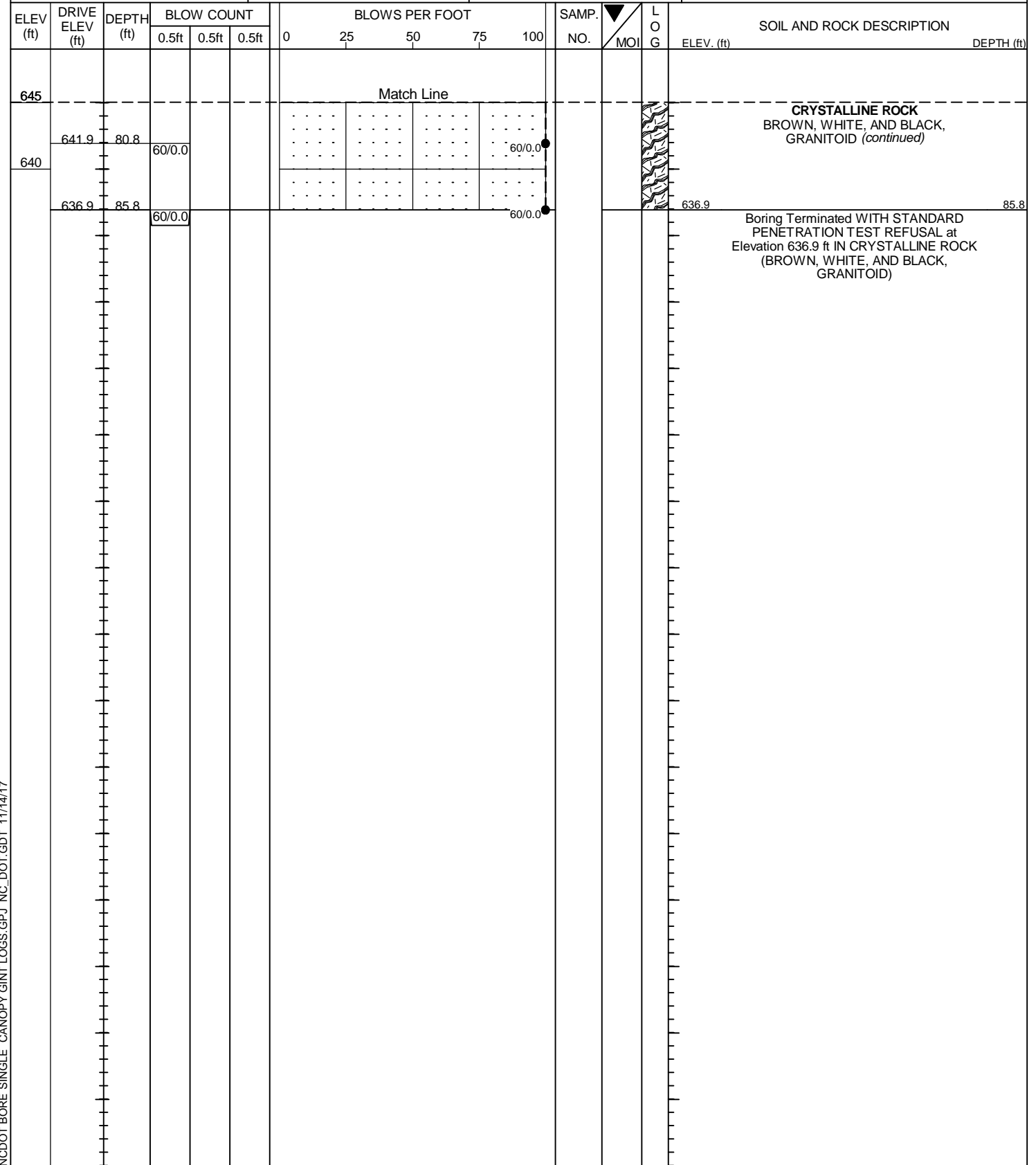
WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-8	STATION 27+61	OFFSET 40 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 722.7 ft	TOTAL DEPTH 85.8 ft	NORTHING 544,083	EASTING 1,447,815
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/11/17	COMP. DATE 10/13/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT BORE LOG

WBS 44475.1.2	TIP P-5705B	COUNTY MECKLENBURG	GEOLOGIST SCHLEMM, T.S
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT			GROUND WTR (ft)
BORING NO. B-8	STATION 27+61	OFFSET 40 ft RT	ALIGNMENT -S1-
COLLAR ELEV. 722.7 ft	TOTAL DEPTH 85.8 ft	NORTHING 544,083	EASTING 1,447,815
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER EKLUND, M.A.	START DATE 10/11/17	COMP. DATE 10/13/17	SURFACE WATER DEPTH N/A



NCDOT BORE SINGLE CANOPY GINT LOGS.GPJ NC\_DOT.GDT 11/14/17

# GEOTECHNICAL BORING REPORT

## CORE LOG

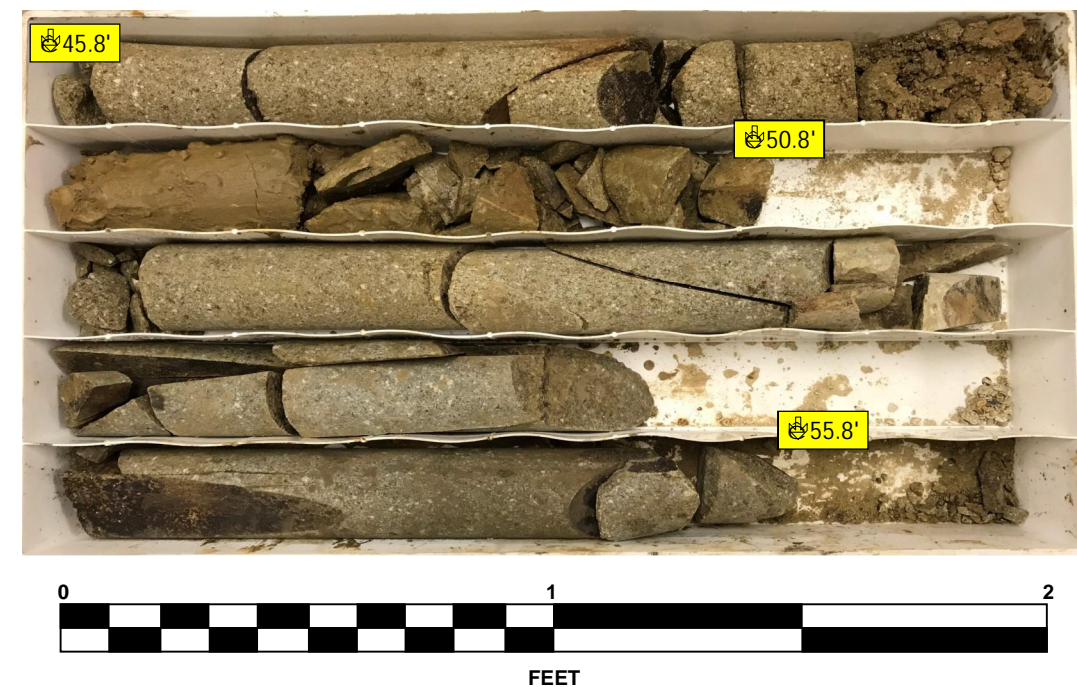
WBS 44475.1.2		TIP P-5705B		COUNTY MECKLENBURG		GEOLOGIST SCHLEMM, T.S							
SITE DESCRIPTION CHARLOTTE GATEWAY STATION AND TRACK AND SAFETY IMPROVEMENT							GROUND WTR (ft)						
BORING NO. B-8		STATION 27+61		OFFSET 40 ft RT		ALIGNMENT -S1-							
COLLAR ELEV. 722.7 ft		TOTAL DEPTH 85.8 ft		NORTHING 544,083		EASTING 1,447,815							
DRILL RIG/HAMMER EFF./DATE TER346 DIEDRICH D-50 90% 03/10/2017				DRILL METHOD SPT Core Boring		HAMMER TYPE Automatic							
DRILLER EKLUND, M.A.		START DATE 10/11/17		COMP. DATE 10/13/17		SURFACE WATER DEPTH N/A							
CORE SIZE HQ3		TOTAL RUN 52.0 ft											
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
688.9	688.9	33.8	7.0	1:31/1.0 3:53/1.0 2:54/1.0 2:53/1.0 3:17/1.0 6:10/1.0 2:15/1.0	(4.0) 57%	(1.0) 14%		(41.0) 79%	(16.8) 32%		688.9	33.8	
Begin Coring @ 33.8 ft													
<b>CRYSTALLINE ROCK</b>													
BROWN, WHITE, AND BLACK, TO BLACK, WHITE, AND GRAY, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO VERY HARD, CLOSELY FRACTURED, MASSIVE, GRANITOID, COMPLETELY WEATHERED DIABASE SILL INTRUSION AT 48.0' - 49.0'													
GSI 50 - 55													
685													
680	681.9	40.8	5.0	N=60/0.0 3:22/1.0 3:12/1.0 2:22/1.0 5:01/1.0 3:45/1.0	(4.4) 88%	(0.8) 16%							
675	676.9	45.8	5.0	N=60/0.0 4:15/1.0 2:39/1.0 2:34/1.0 3:22/1.0 4:06/1.0	(3.3) 66%	(0.6) 12%							
670	671.9	50.8	5.0	N=60/0.0 3:28/1.0 4:44/1.0 3:52/1.0 6:48/1.0 5:17/1.0	(4.2) 84%	(1.6) 32%							
665	666.9	55.8	5.0	N=60/0.0 5:31/1.0 5:15/1.0 5:17/1.0 4:56/1.0 4:07/1.0	(4.7) 94%	(3.4) 68%							
660	661.9	60.8	5.0	N=60/0.0 4:54/1.0 9:27/1.0 10:30/1.0 10:12/1.0 5:14/1.0	(4.7) 94%	(2.3) 46%							
655	656.9	65.8	5.0	N=60/0.0 6:50/1.0 5:42/1.0 7:05/1.0 6:52/1.0 7:38/1.0	(4.9) 98%	(1.9) 38%							
650	651.9	70.8	5.0	N=60/0.0 9:43/1.0 3:01/1.0 2:59/1.0 4:55/1.0 4:32/1.0	(1.3) 26%	(0.6) 12%							
645	646.9	75.8	5.0	N=50/0.0 10:33/1.0 8:20/1.0 4:29/1.0 4:29/1.0 3:50/1.0	(4.7) 94%	(2.1) 42%							
640	641.9	80.8	5.0	N=60/0.0 9:09/1.0 5:04/1.0 2:51/1.0 3:07/1.0 3:51/1.0	(4.8) 96%	(2.5) 50%							
	636.9	85.8		N=60/0.0							636.9	85.8	
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 636.9 ft IN CRYSTALLINE ROCK (BROWN, WHITE, AND BLACK, GRANITOID)													

Project No. 44475.1.2 (P-5705B)  
Charlotte Gateway Station and Track and Safety Improvements  
**CORE PHOTOGRAPHS**

**B-8**  
BOX 1: 33.8 - 45.8 FEET



**B-8**  
BOX 2: 45.8 - 55.8 FEET





Project No. 44475.1.2 (P-5705B)  
Charlotte Gateway Station and Track and Safety Improvements  
**CORE PHOTOGRAPHS**

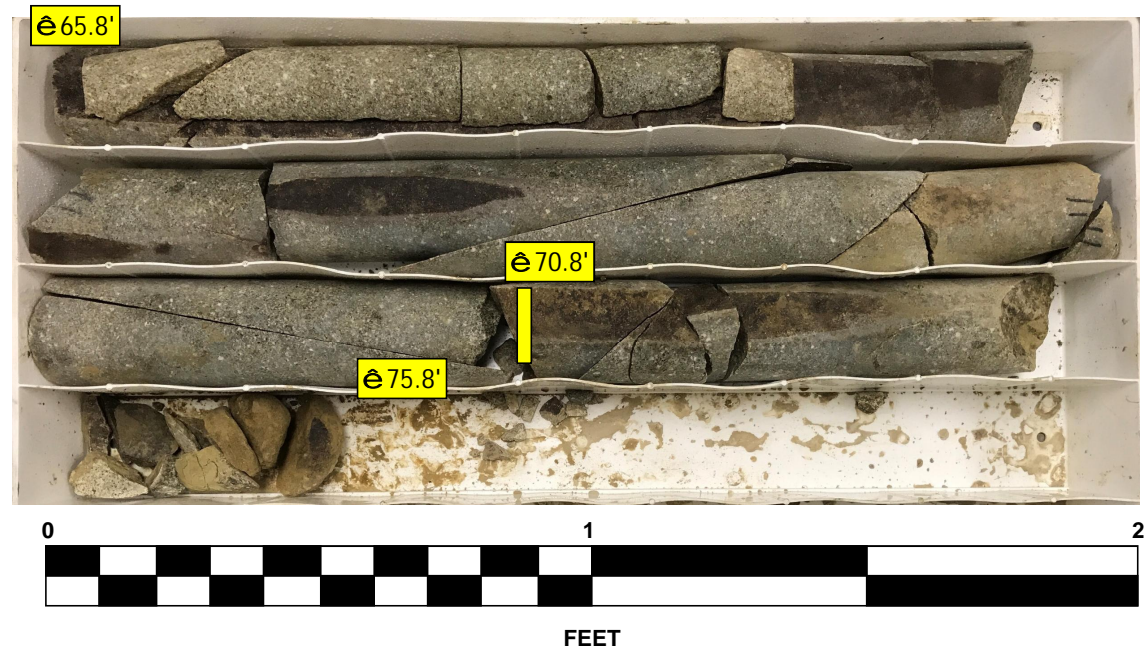
**B-8**  
BOX 3: 55.8 - 65.8 FEET



**B-8**  
BOX 5: 75.8 - 85.8 FEET



**B-8**  
BOX 4: 65.8 - 75.8 FEET





REFERENCE: P-5705B

PROJECT: 44475

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY MECKLENBURG  
 PROJECT DESCRIPTION CHARLOTTE GATEWAY  
 STATION AND TRACK AND SAFETY IMPROVEMENTS

SITE DESCRIPTION RETAINING WALL #1 AT STA. 13+11  
TO 14+52 ON -S1-  
RETAINING WALL #2 AT STA. 19+35 TO 22+57 ON -S2-  
RETAINING WALL #3 AT STA. 24+25 TO 27+52 ON -S2-  
RETAINING WALL #4 AT STA. 28+72 TO 35+88 ON -S1-  
RETAINING WALL #5 AT STA. 38+60 TO 40+50 ON -A1-  
RETAINING WALL #6 AT STA. 44+49 TO 45+99 ON -A1-  
RETAINING WALL #7 AT STA. 24+30 TO 27+34 ON -S1-

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3-8	SITE PLAN
9-15	PROFILE(S)
16	LABORATORY SUMMARY REPORT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5705B	1	16

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
  2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

RIGGS, A. F.

WEAVER, L. A.

EKLUND, M. A.

STUDNIKY, R. T.

TURNAGE, J. R.

WERITZ, M. A.

COGAR, T. E.

DUGGINS, W. T.

MASHBURN, S. R.

McMILLIN, M. F.

INVESTIGATED BY TERRACON CONSULTANTS

DRAWN BY FIELDS, W. D.

CHECKED BY RIGGS, A. F.

SUBMITTED BY TERRACON CONSULTANTS

DATE AUGUST 2017

**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 PHONE: (919) 873-2211 FAX: (919) 873-9555  
 NC REGISTERED FIRM: F-0869



*Abner F. Riggs, Jr.*

5228073BBA4F482...8/15/2017

SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

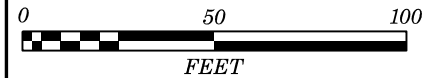
PROJECT REFERENCE NO.	SHEET NO.
P-5705B	2

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

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

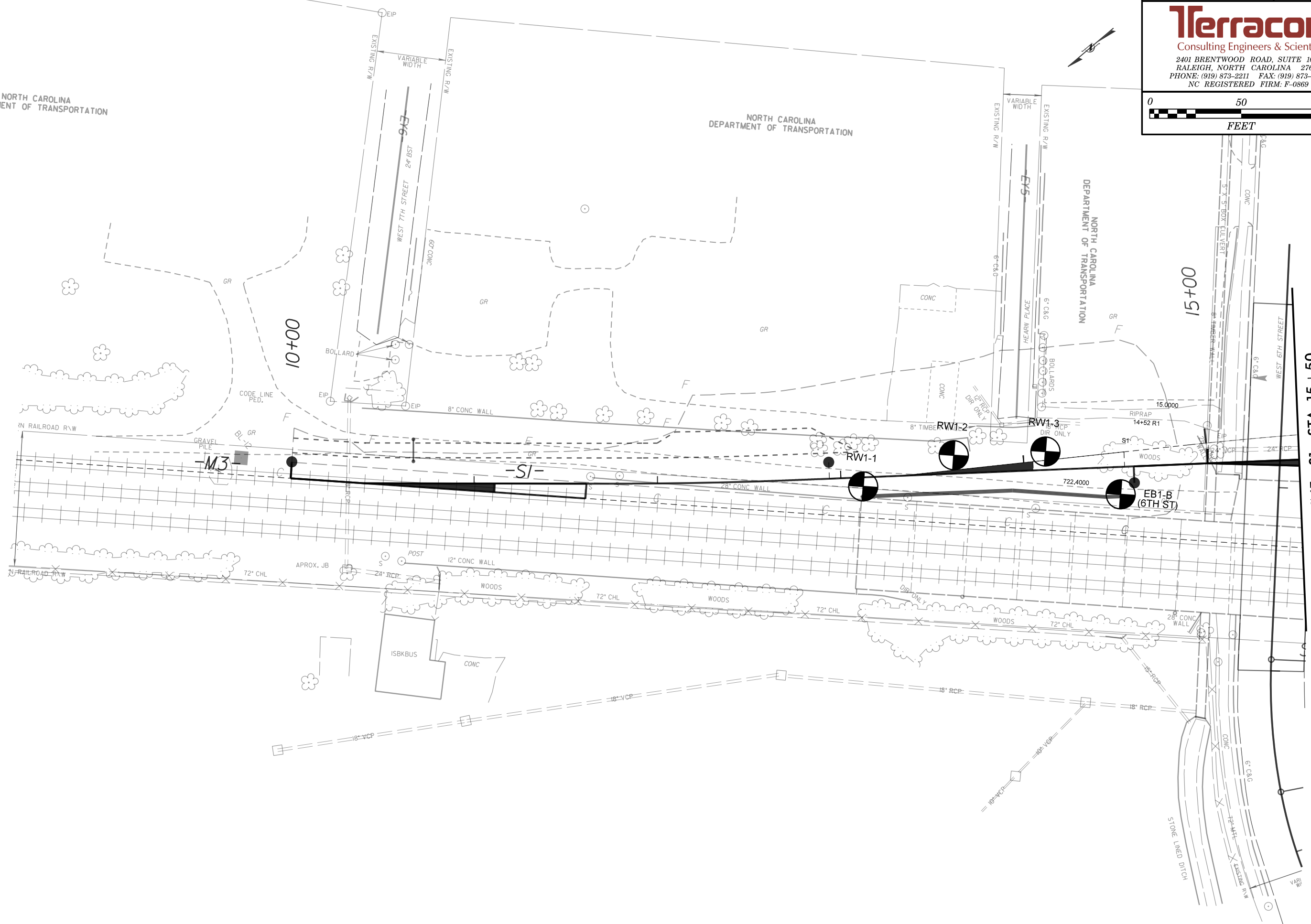
SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																																																																																																												
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																																																																																																																																																																																																																																																																																																												
<h4 style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</h4> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="6">GRANULAR MATERIALS (&lt;= 35% PASSING #200)</th> <th colspan="6">SILT-CLAY MATERIALS (&gt; 35% PASSING #200)</th> <th colspan="3">ORGANIC MATERIALS</th> </tr> <tr> <td>GROUP CLASS.</td> <td colspan="2">A-1</td> <td colspan="2">A-3</td> <td colspan="2">A-2</td> <td colspan="2">A-4</td> <td colspan="2">A-5</td> <td colspan="2">A-6</td> <td colspan="2">A-7</td> <td colspan="3">A-1, A-2</td> </tr> <tr> <td>SYMBOL</td> <td colspan="2">A-1-a</td> <td colspan="2">A-1-b</td> <td colspan="2">A-2-4</td> <td colspan="2">A-2-5</td> <td colspan="2">A-2-6</td> <td colspan="2">A-2-7</td> <td colspan="2">A-7-5</td> <td colspan="3">A-7-6</td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX</td> <td>51 MN 10 MX</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>35 MX</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> <td>36 MN</td> </tr> <tr> <td>MATERIAL PASSING #40</td> <td>LL</td> <td>PI</td> <td></td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>40 MX 11 MN</td> <td>41 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> </tr> <tr> <td>GROUP INDEX</td> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">0</td> <td colspan="2">4 MX</td> <td colspan="2">8 MX</td> <td colspan="2">12 MX</td> <td colspan="2">16 MX</td> <td colspan="2">NO MX</td> <td></td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <h4 style="text-align: center;">COMPRESSIBILITY</h4> <p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p> <h4 style="text-align: center;">PERCENTAGE OF MATERIAL</h4> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>ORGANIC MATERIAL</th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>&gt; 10%</td> <td>&gt; 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </table> <h4 style="text-align: center;">GROUND WATER</h4> <ul style="list-style-type: none"> <li> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</li> <li> STATIC WATER LEVEL AFTER 24 HOURS</li> <li> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</li> <li> SPRING OR SEEP</li> </ul> <h4 style="text-align: center;">MISCELLANEOUS SYMBOLS</h4> <ul style="list-style-type: none"> <li> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</li> <li> SOIL SYMBOL</li> <li> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</li> <li> INFERRED SOIL BOUNDARY</li> <li> INFERRED ROCK LINE</li> <li> ALLUVIAL SOIL BOUNDARY</li> <li> DIP &amp; DIP DIRECTION OF ROCK STRUCTURES</li> <li> SPT TEST BORING</li> <li> AUGER BORING</li> <li> CORE BORING</li> <li> MONITORING WELL</li> <li> PIEZOMETER INSTALLATION</li> <li> SLOPE INDICATOR INSTALLATION</li> <li> CONE PENETROMETER TEST</li> <li> SOUNDING ROD</li> <li> TEST BORING WITH CORE</li> <li> SPT N-VALUE</li> </ul> <h4 style="text-align: center;">RECOMMENDATION SYMBOLS</h4> <ul style="list-style-type: none"> <li> UNDERCUT</li> <li> SHALLOW UNDERCUT</li> <li> UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE</li> <li> UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</li> <li> UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL</li> </ul> <h4 style="text-align: center;">ABBREVIATIONS</h4> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>AR - AUGER REFUSAL</td> <td>BT - BORING TERMINATED</td> <td>CL - CLAY</td> <td>CPT - CONE PENETRATION TEST</td> <td>CSE - COARSE</td> <td>DMT - DILATOMETER TEST</td> <td>DPT - DYNAMIC PENETRATION TEST</td> <td>e - VOID RATIO</td> <td>F - FINE</td> <td>FOSS. - FOSSILIFEROUS</td> <td>FRAC. - FRACTURED, FRACTURES</td> <td>FRAGS. - FRAGMENTS</td> <td>HI. - HIGHLY</td> <td>MED. - MEDIUM</td> <td>MICA. - MICACEOUS</td> <td>MOD. - MODERATELY</td> <td>NP - NON PLASTIC</td> <td>ORG. - ORGANIC</td> <td>PMT - PRESSUREMETER TEST</td> <td>SAP. - SAPROLITIC</td> <td>SD. - SAND, SANDY</td> <td>SL. - SILTY, SILTY</td> <td>SLI. - SLIGHTLY</td> <td>TCR - TRICONE REFUSAL</td> <td>w - MOISTURE CONTENT</td> <td>V - VERY</td> <td>VST - VANE SHEAR TEST</td> <td>WEA. - WEATHERED</td> <td>UNIT WEIGHT</td> <td>DRY UNIT WEIGHT</td> </tr> <tr> <td colspan="13"></td> <td colspan="12"> <h4 style="text-align: center;">EQUIPMENT USED ON SUBJECT PROJECT</h4> <table border="1" style="width: 100%; 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<h4 style="text-align: center;">BENCH MARK:</h4> <p style="text-align: right;">ELEVATION: FEET</p>		<h4 style="text-align: center;">NOTES:</h4> <p>FIAD - FILLED IMMEDIATELY AFTER DRILLING</p> <p>BL-5; N: 542,885.1262, E: 1,446,655.7118, ELEV. 706.95 @ STA. 29+47.62  BL-6; N: 543,246.8513, E: 1,446,984.0832, ELEV. 713.51 @ STA. 29+86.19  BL-9; N: 543,315.6877, E: 1,448,007.2578, ELEV. 737.60 @ STA. 44+66.30  BM3; N: 544,105.1, E: 1,447,804, ELEV. 737.50 @ BL STA. 41+74.00  1' RIGHT CHISELED SQUARE  BM4; N: 544,771, E: 1,448,453, ELEV. 738.12 @ BL STA. 51+04.00  2' RIGHT CHISELED SQUARE</p>																																																																																																																																																																																																																																																																																																													



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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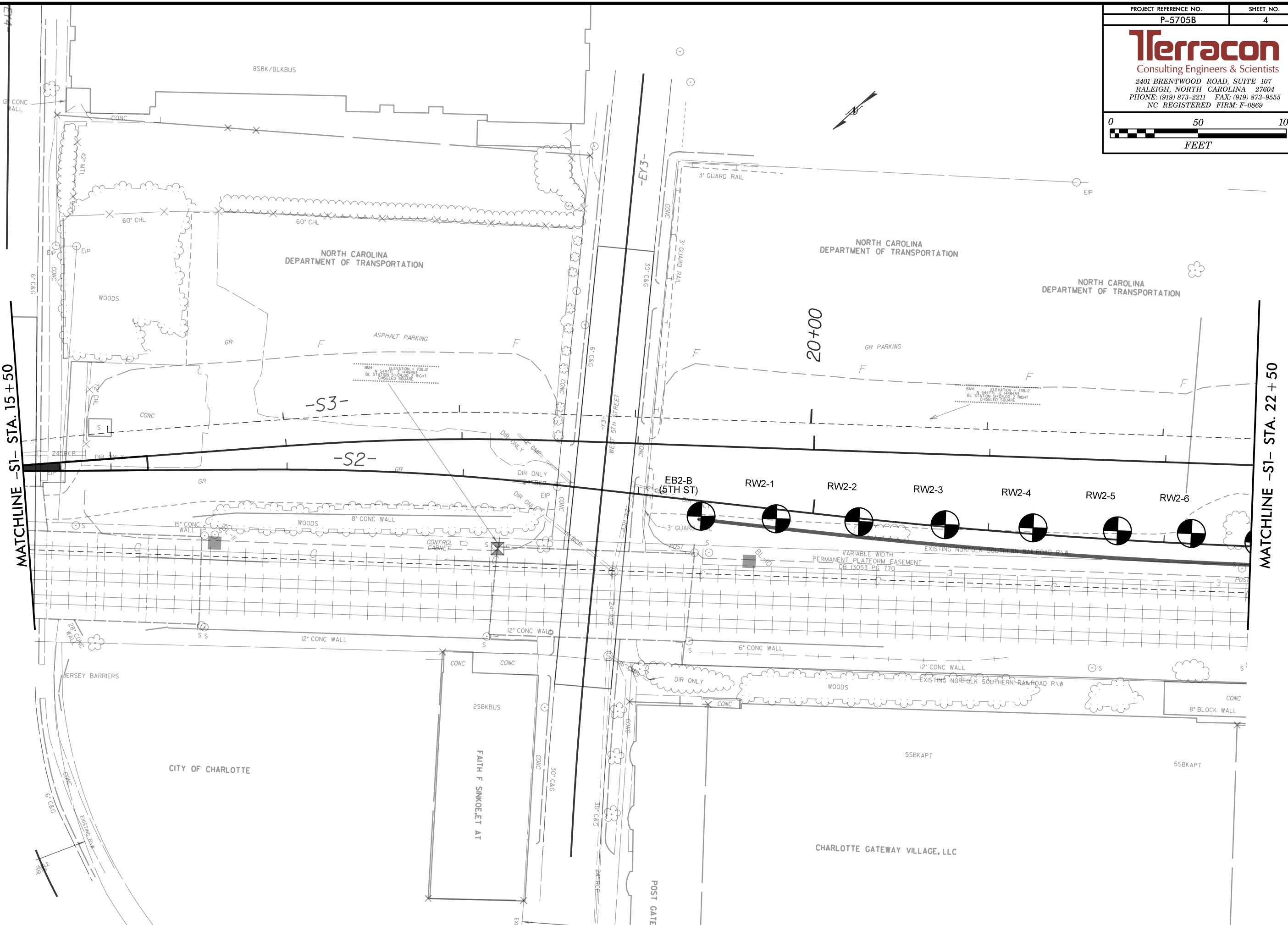
NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

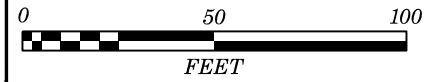


MATCHLINE -S1- STA. 15 + 50



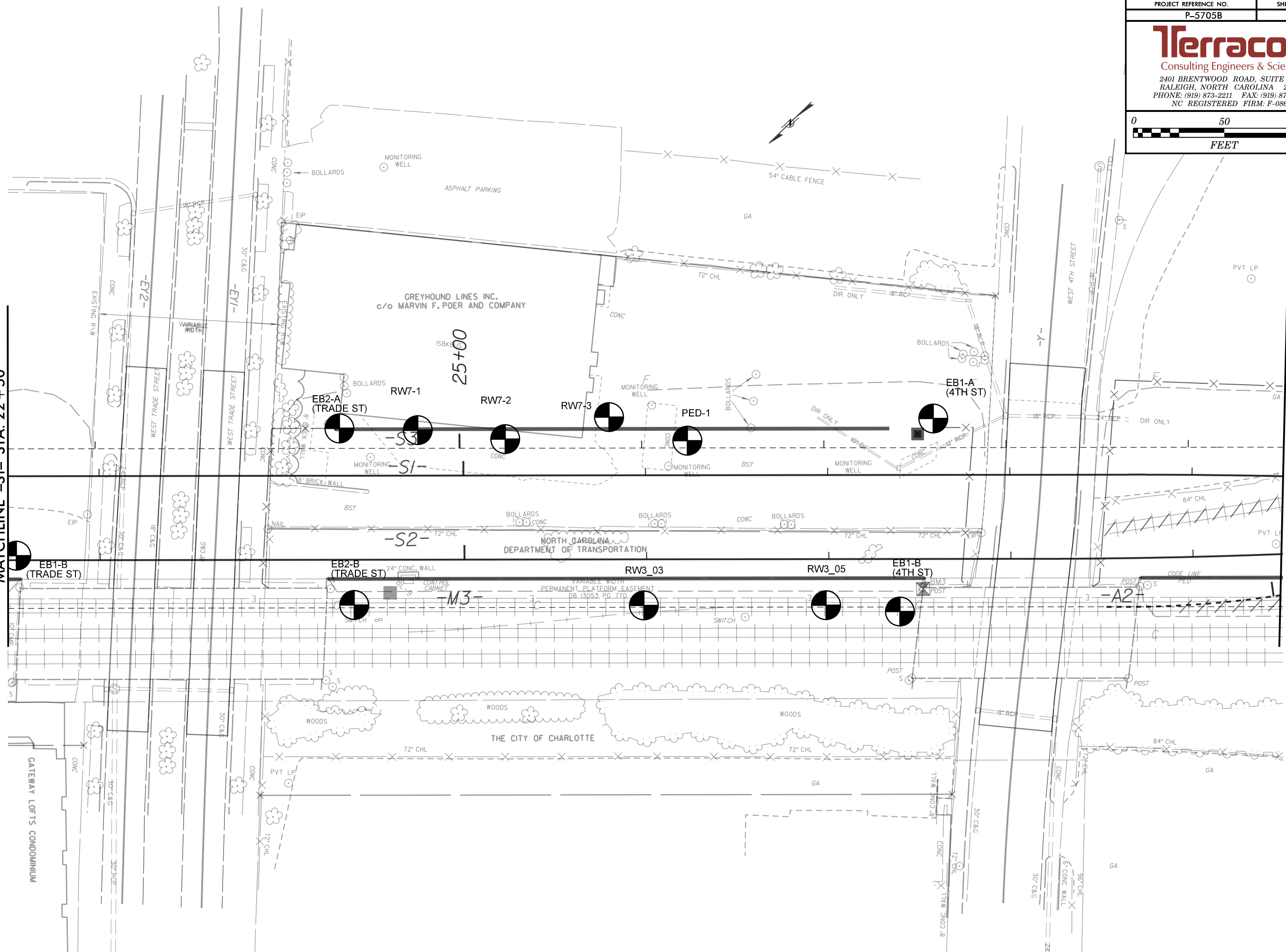
**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 PHONE: (919) 873-2211 FAX: (919) 873-9555  
 NC REGISTERED FIRM: F-0869





MATCHLINE -S1- STA. 22 + 50

MATCHLINE -S1- STA. 29 + 50



GATEWAY LOFTS CONDOMINIUM

GREYHOUND LINES INC.  
c/o MARVIN F. POER AND COMPANY

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

THE CITY OF CHARLOTTE

25+00

EB2-A (TRADE ST)

EB1-A (4TH ST)

EB1-B (TRADE ST)

EB2-B (TRADE ST)

EB1-B (4TH ST)

RW7-1

RW7-2

RW7-3

PED-1

-S1-

-S2-

-M3-

RW3\_03

RW3\_05

-A2A-

MONITORING WELL

MONITORING WELL

MONITORING WELL

MONITORING WELL

MONITORING WELL

WOODS

WOODS

WOODS

WOODS

ASPHALT PARKING

54\"/>

GA

72\"/>

DIR ONLY

18\"/>

WEST 4TH STREET

PVT LP

-Y-

DIR ONLY

10\"/>

72\"/>

DIR ONLY

24\"/>

PVT LP

CODE LINE

PEU

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GA

GA

72\"/>

30\"/>

30\"/>

30\"/>

30\"/>

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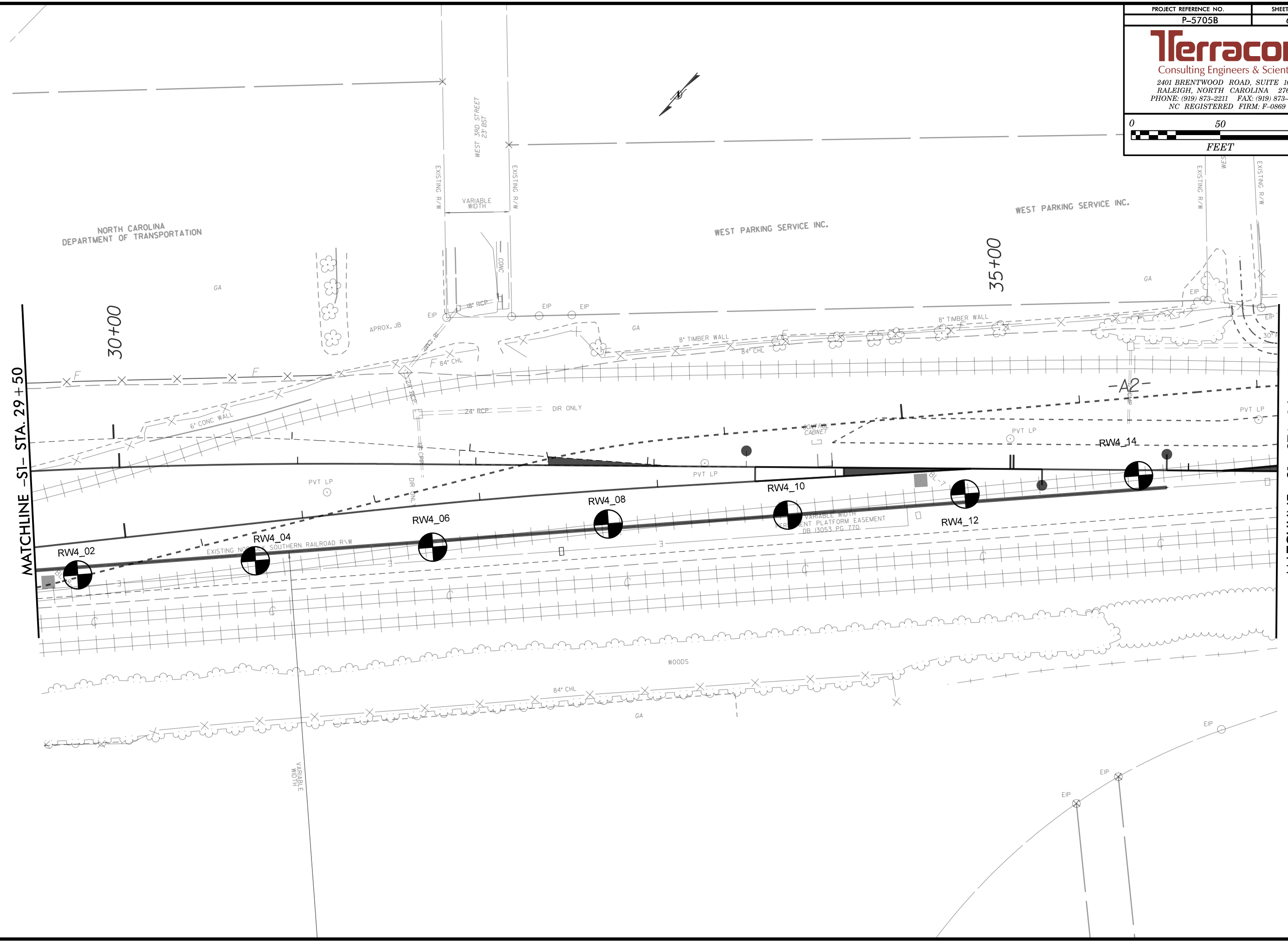
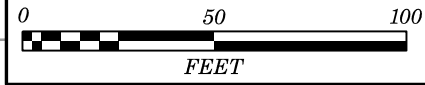
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MATCHLINE -S1- STA. 29+50

MATCHLINE -S1- STA. 36+50

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

WEST PARKING SERVICE INC.

WEST PARKING SERVICE INC.

30+00

35+00

RW4\_02

RW4\_04

RW4\_06

RW4\_08

RW4\_10

RW4\_12

RW4\_14

WEST 3RD STREET  
23' BST

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING R/W

EXISTING NORTH CAROLINA SOUTHERN RAILROAD R/W

WOODS

84" CHL

GA

EIP

EIP

EIP

APPROX. JB

EIP

EIP

EIP

EIP

EIP

84" CHL

84" CHL

8" TIMBER WALL

6" CONC WALL

24" RCP

DIR ONLY

CABINET

PVT LP

PVT LP

PVT LP

PVT LP

PVT LP

VARIABLE WIDTH  
EASEMENT  
PER DB 13053, PG. 770

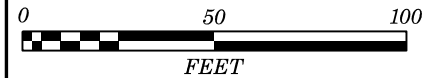
VARIABLE  
WIDTH





PROP. CONTROL POINT  
CP "GATEWAY"

**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
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 NC REGISTERED FIRM: P-0869



MATCHLINE -S1- STA. 36+50

MATCHLINE -S1- STA. 43+50

DUKE POWER  
 EASEMENT  
 DB 6505 PG. 661  
 REF. DWG 162-210

DUKE POWER  
 TRANSMISSION R/W  
 REF. DWG 511-20

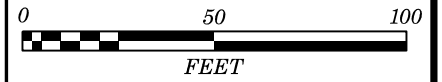
68.00'

THE CITY OF CHARLOTTE  
C/O PANTHERS STADIUM, LLC

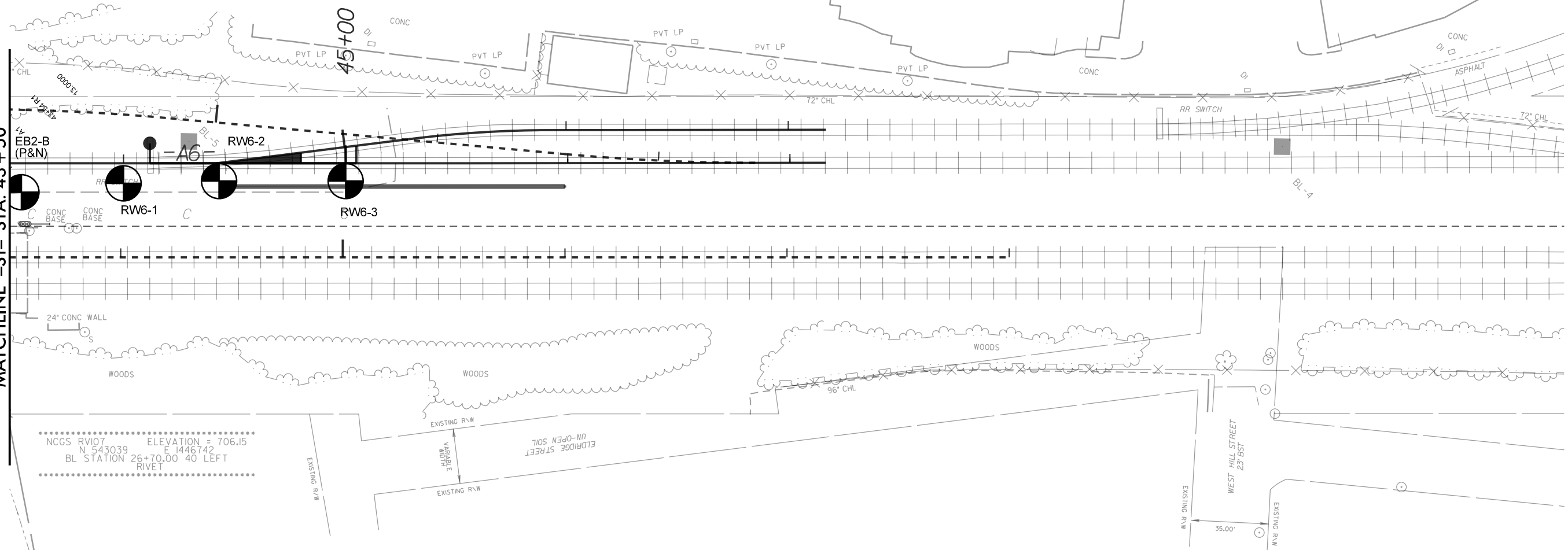
STADIUM

# Terracon

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NC REGISTERED FIRM: P-0869



MATCHLINE -S1- STA. 43 + 50



.....  
NCGS RV107 ELEVATION = 706.15  
N 543039 E 1446742  
BL STATION 26+70.00 40 LEFT  
RIVET  
.....

EXISTING R/W

EXISTING R/W  
VARIABLE WIDTH  
UN-OPEN SOIL  
ELDRIDGE STREET

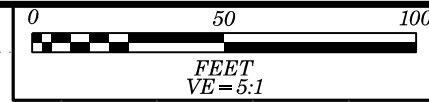
EXISTING R/W

WEST HILL STREET  
23' BST

EXISTING R/W

35.00'

EIP



PROJECT REFERENCE NO.	SHEET NO.
P-5705B	9

**Terracon**  
 Consulting Engineers & Scientists  
 2401 BRENTWOOD ROAD, SUITE 107  
 RALEIGH, NORTH CAROLINA 27604  
 PHONE: (919) 873-2211 FAX: (919) 873-9555  
 NC REGISTERED FIRM: F-0869

760

750

740

730

720

710

700

690

680

670

750

740

730

720

710

700

690

680

670

BEGIN WALL (RW 1)  
 -S1- STA. 13+10.85  
 O/S 11.00' RT  
 ELEV. 734.86' (TOP)  
 ELEV. 729.93' (BOT)

END WALL (RW 1)  
 -S1- STA. 14+51.81  
 O/S 16.58' RT  
 ELEV. 737.45' (TOP)  
 ELEV. 722.59' (BOT)

PROP.-SI-T/R PROFILE

PROP.-SI-T/R PROFILE

EXIST.T/R LRMF LEAD TRACK

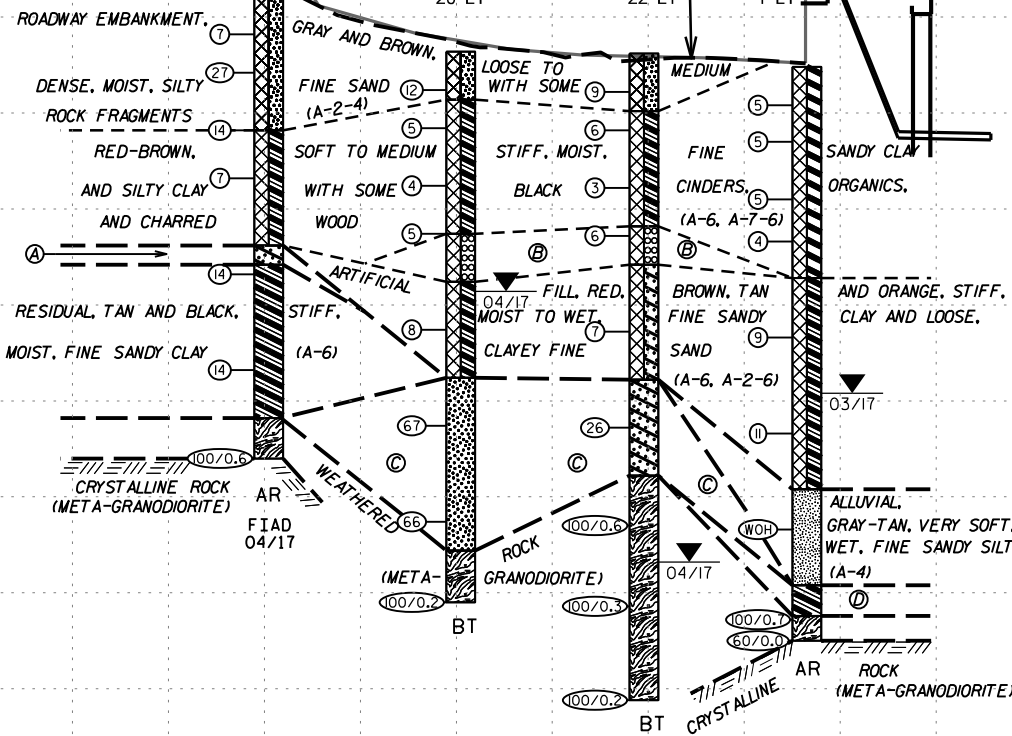
EXIST.T/R NSR MAIN TRACK NO.1

TOP OF RW 1

BOTTOM OF RW 1

PROP. BRIDGE OVER 6TH ST.

6TH ST.

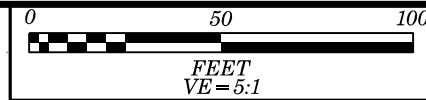


- Ⓐ ALLUVIAL GRAY, LOOSE TO MEDIUM DENSE, CLAYEY FINE SAND (A-2-6)
- Ⓑ RAILROAD EMBANKMENT, BLACK, LOOSE, MOIST, CINDERS (A-1-b)
- Ⓒ RESIDUAL TAN, BLACK, BROWN AND GREEN, MEDIUM DENSE TO VERY DENSE, MOIST, SILTY FINE SAND WITH SOME ROCK FRAGMENTS AND CLAYEY FINE SAND (A-2-4, A-2-6)
- Ⓓ RESIDUAL TAN-BROWN, HARD, WET, FINE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS (A-6)

# -WALL1-

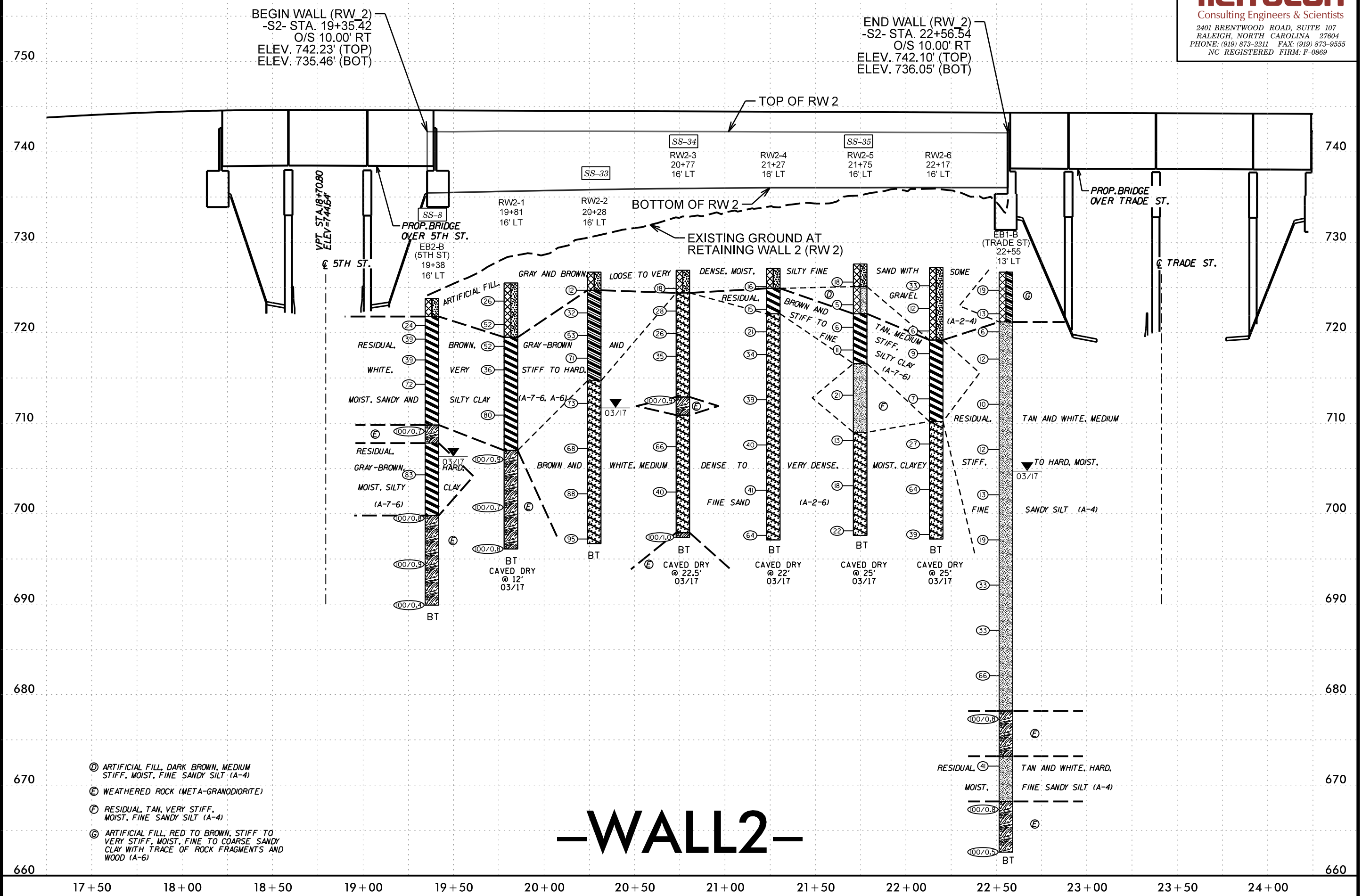
0+00      0+50      1+00      1+50      2+00      2+50





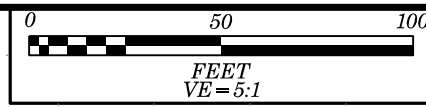
PROJECT REFERENCE NO.	SHEET NO.
P-5705B	10

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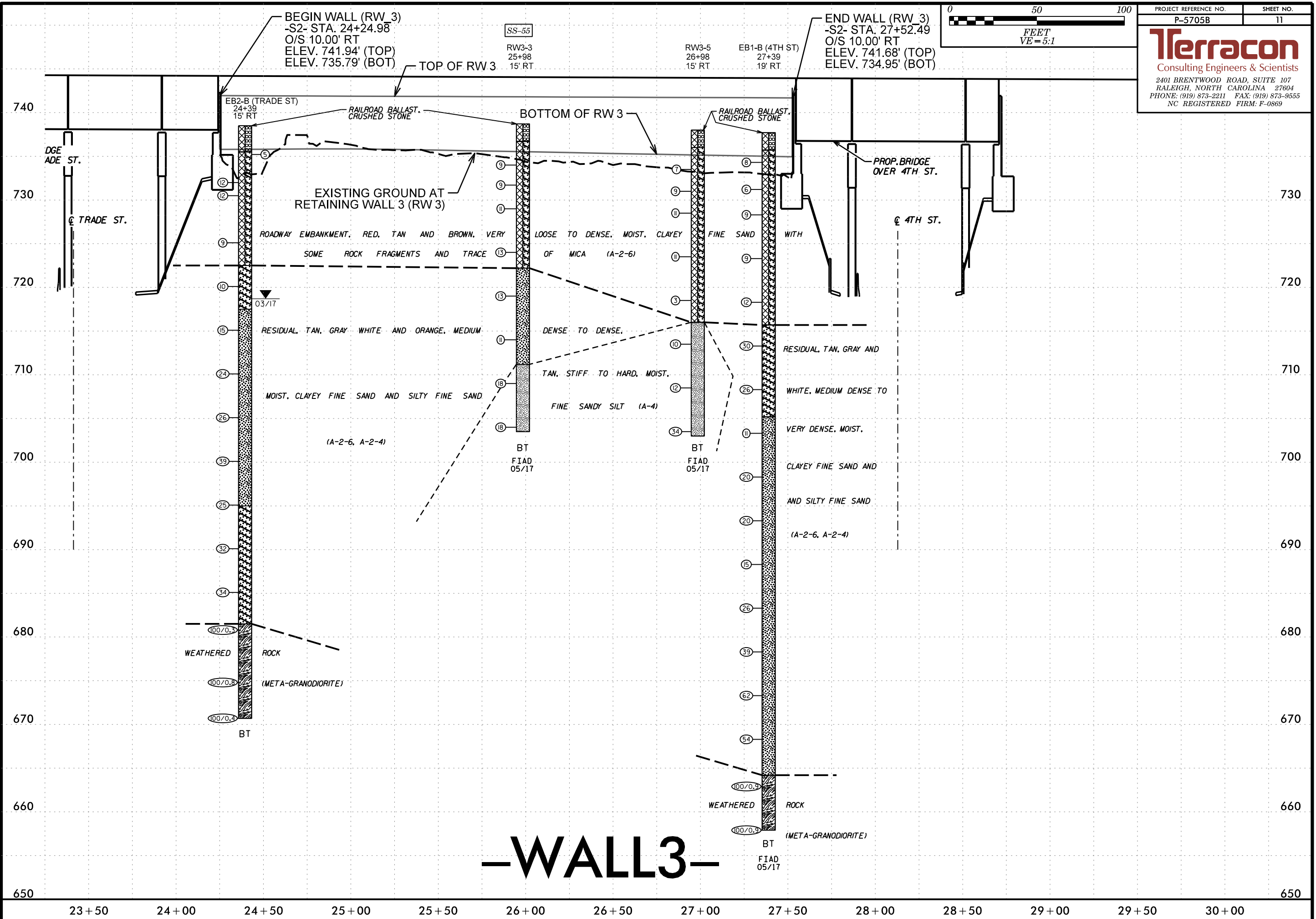
- Ⓚ ARTIFICIAL FILL, DARK BROWN, MEDIUM STIFF, MOIST, FINE SANDY SILT (A-4)
- Ⓛ WEATHERED ROCK (META-GRANODIORITE)
- Ⓜ RESIDUAL, TAN, VERY STIFF, MOIST, FINE SANDY SILT (A-4)
- Ⓨ ARTIFICIAL FILL, RED TO BROWN, STIFF TO VERY STIFF, MOIST, FINE TO COARSE SANDY CLAY WITH TRACE OF ROCK FRAGMENTS AND WOOD (A-6)

# -WALL2-

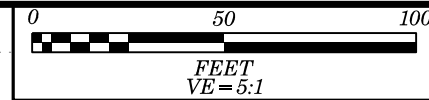


PROJECT REFERENCE NO.	SHEET NO.
P-5705B	11

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 NC REGISTERED FIRM: F-0869

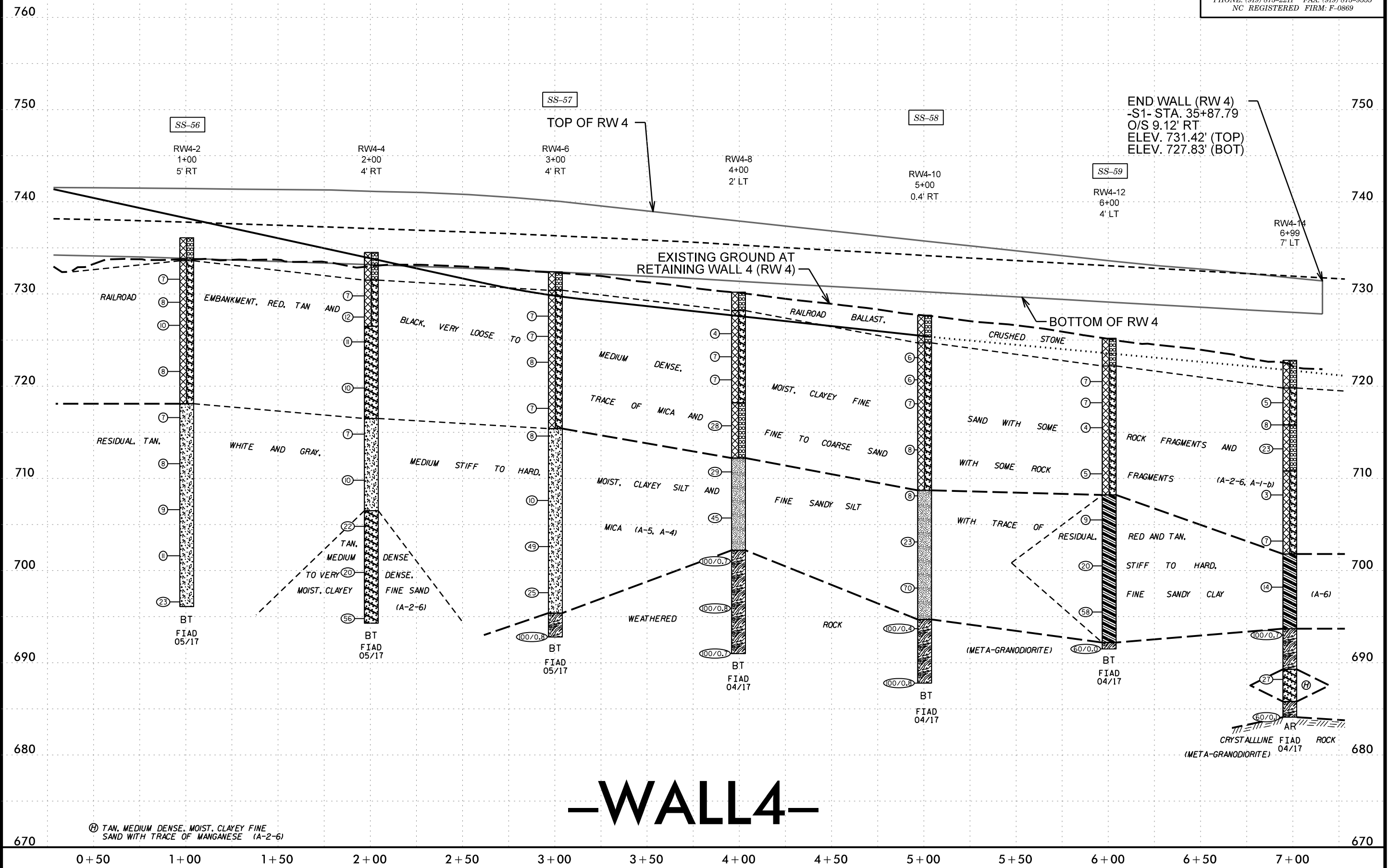


# -WALL 3-



PROJECT REFERENCE NO. P-5705B	SHEET NO. 12
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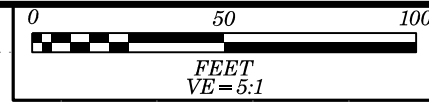
**Terracon**  
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NC REGISTERED FIRM: F-0869



(A-2-6) TAN, MEDIUM DENSE, MOIST, CLAYEY FINE SAND WITH TRACE OF MANGANESE (A-2-6)

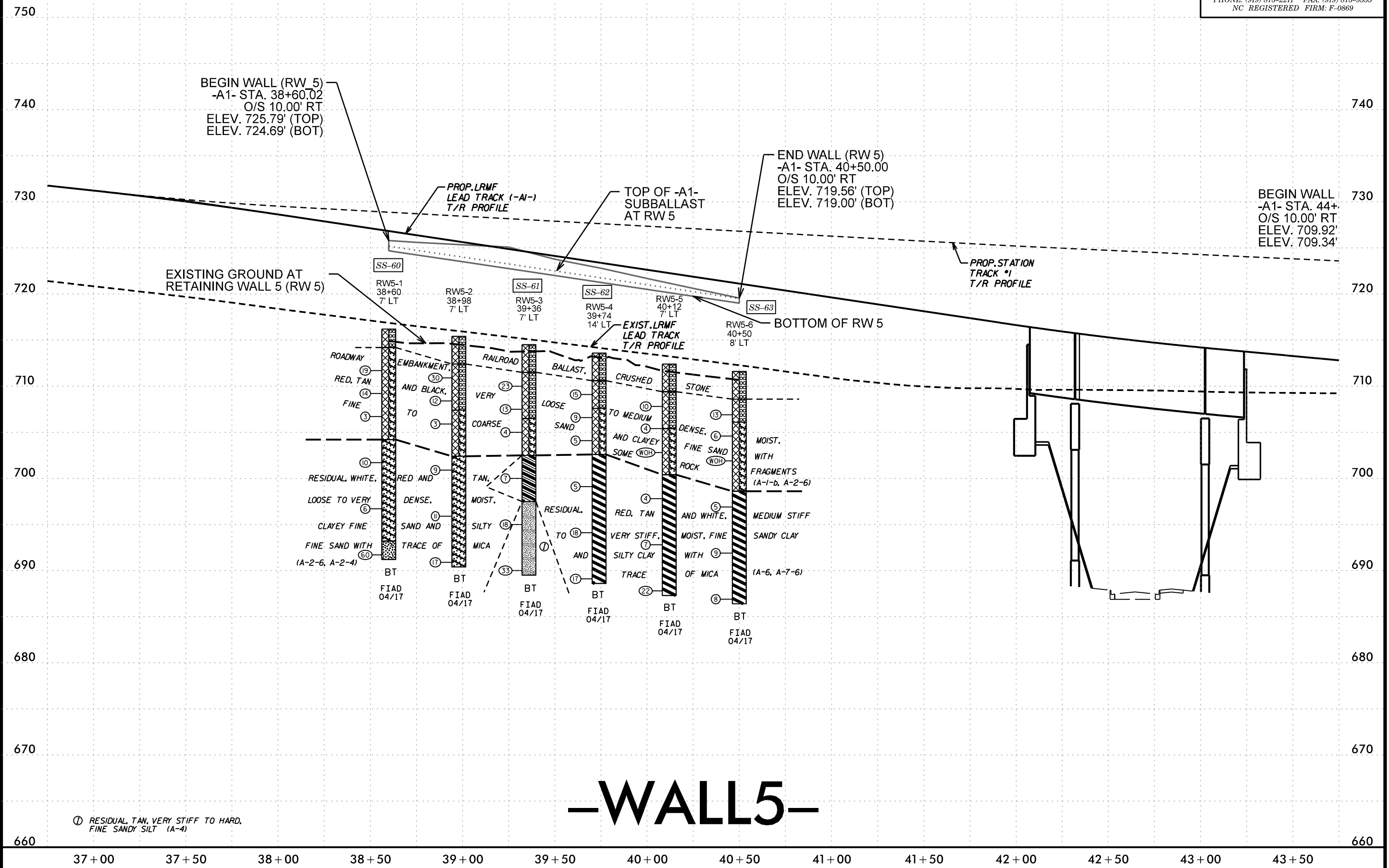
# -WALL 4-





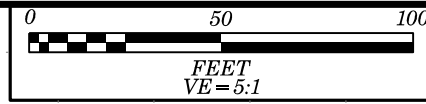
PROJECT REFERENCE NO.	SHEET NO.
P-5705B	13

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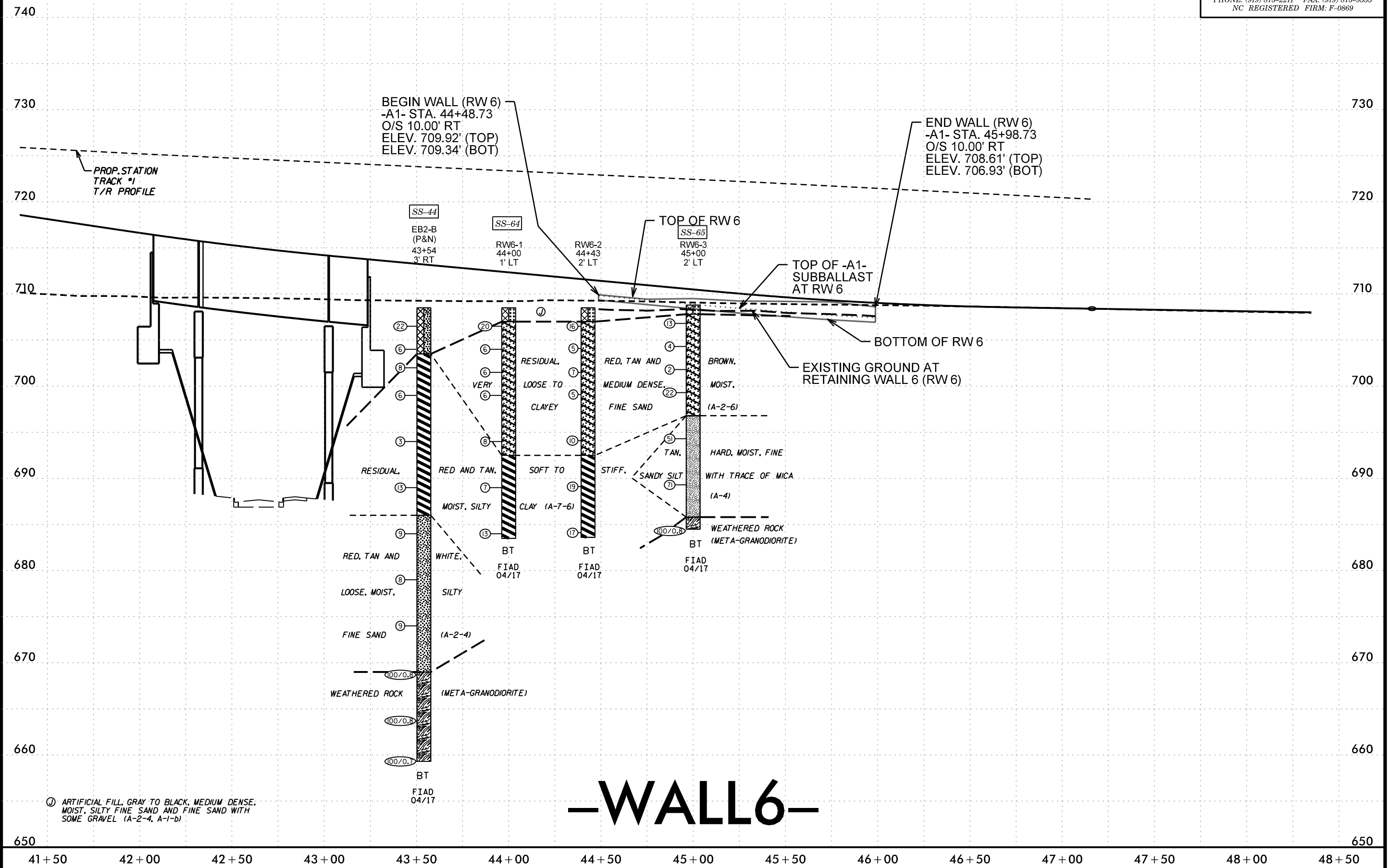
RESIDUAL, TAN, VERY STIFF TO HARD, FINE SANDY SILT (A-4)

# -WALL 5-



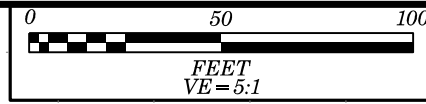
PROJECT REFERENCE NO. P-5705B	SHEET NO. 14
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NC REGISTERED FIRM: F-0869



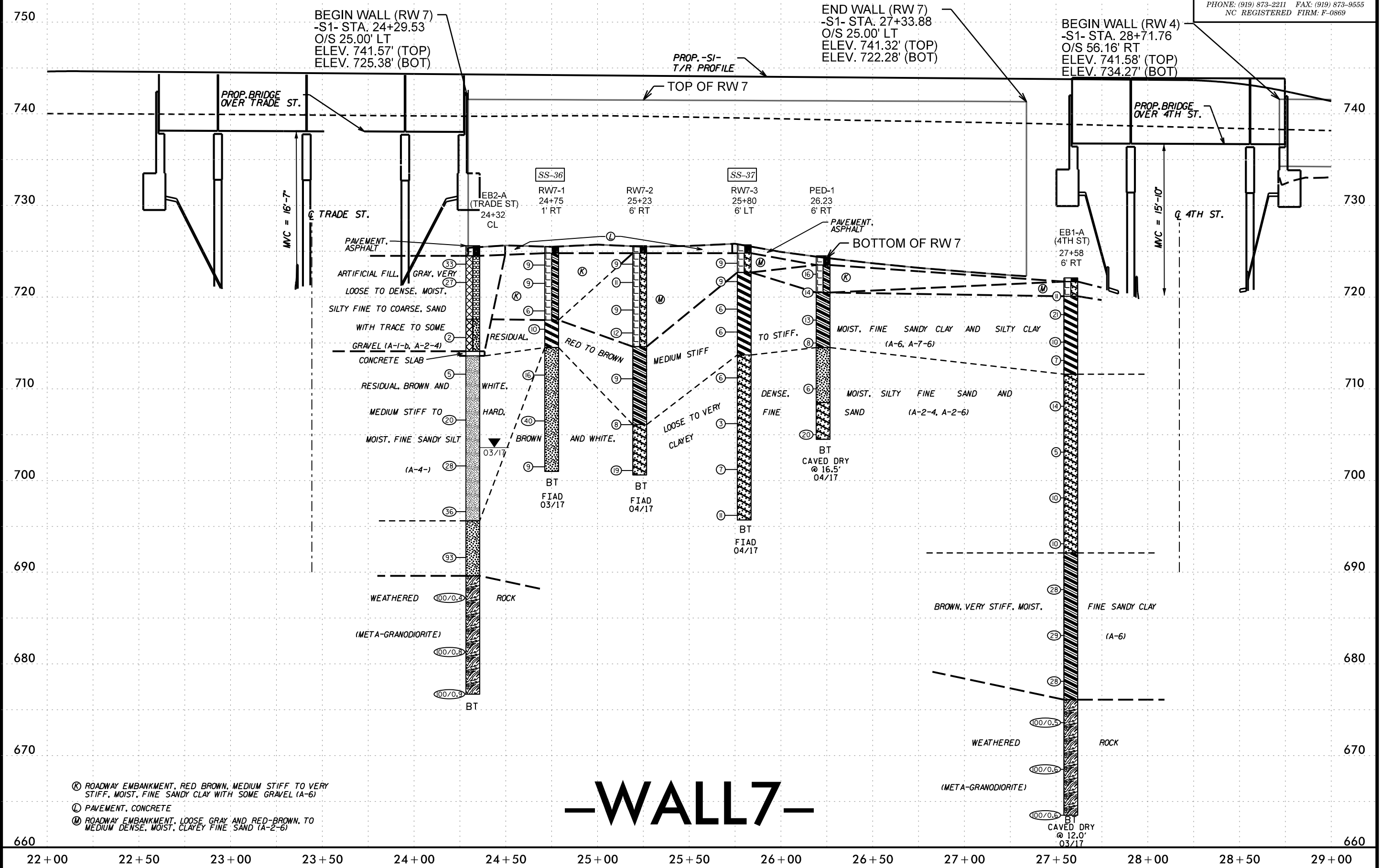
① ARTIFICIAL FILL, GRAY TO BLACK, MEDIUM DENSE, MOIST, SILTY FINE SAND AND FINE SAND WITH SOME GRAVEL (A-2-4, A-1-b)

# -WALL 6-



PROJECT REFERENCE NO.	SHEET NO.
P-5705B	15

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 NC REGISTERED FIRM: F-0869



# -WALL 7-

- Ⓚ ROADWAY EMBANKMENT, RED BROWN, MEDIUM STIFF TO VERY STIFF, MOIST, FINE SANDY CLAY WITH SOME GRAVEL (A-6)
- Ⓛ PAVEMENT, CONCRETE
- Ⓜ ROADWAY EMBANKMENT, LOOSE GRAY AND RED-BROWN, TO MEDIUM DENSE, MOIST, CLAYEY FINE SAND (A-2-6)

22+00    22+50    23+00    23+50    24+00    24+50    25+00    25+50    26+00    26+50    27+00    27+50    28+00    28+50    29+00



LABORATORY TESTING SUMMARY

PROJECT NUMBER: 44475.1.2

TIP: P-5705B

COUNTY: MECKLENBURG

DESCRIPTION: Retaining Walls 1, 2, 3, 4, 5, 6 and 7 -Charlotte Gateway Station and Track and Safety Improvements

Table with columns: Sample No., Alignment, Station, Offset (feet), Depth Interval (feet), AASHTO Class., L.L., P.I., % by Weight (Coarse Sand, Fine Sand, Silt, Clay), % Retained #4 Sieve, % Passing (sieves) (#10, #40, #200), % Moisture, % Organic, Ave. Wet Unit Wt. (pcf), Shear Strength Values (Total Cohesion, Total Friction, Effective Cohesion, Effective Friction).

N/D - NOT DETERMINED

Stephanie H. Huffman

Certified Lab Technician Signature

114-01-1203

Certification Number