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REFERENCE: B-4616

PROJECT: 33798

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION REPLACE BRIDGE 18 ON  
NC 211 OVER CSX RAILROAD

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4616	1	11

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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.

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  - 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

M. WALKO, P.E.

J. BRADSHAW, E.I.

A. ROTH

AMERIDRILL

INVESTIGATED BY ECS CAROLINAS, LLP

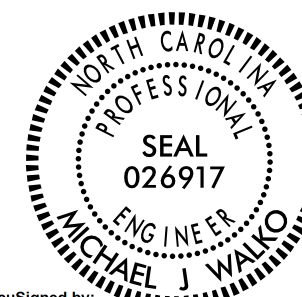
DRAWN BY M. BREWER, P.E.

CHECKED BY E. FREEBURG, P.E.

SUBMITTED BY M. WALKO, P.E.

DATE FEBRUARY 2016

NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED



DocuSigned by:  
Michael J. Walko, P.E. 17/2016

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SIGNATURE DATE

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, MOST 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, Material Passing #40, #100, #200, and Usual Types of Major Materials. Includes subgroups A-1 through A-7 and Organic Materials.

CONSISTENCY OR DENSENESS
Table with columns for Primary Soil Type, Compactness or Consistency, Range of Standard Penetration Resistance, and Range of Unconfined Compressive Strength.

TEXTURE OR GRAIN SIZE
Table with columns for U.S. Std. Sieve Size (mm) and Grain Size (mm/IN). Includes categories for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

SOIL MOISTURE - CORRELATION OF TERMS
Table with columns for Soil Moisture Scale (Atterberg Limits), Field Moisture Description, and Guide for Field Moisture Description. Includes Plastic Limit and Shrinkage Limit.

PLASTICITY
Table with columns for Plasticity Index (PI) and Dry Strength. Includes categories for Non-Plastic, Slightly Plastic, Moderately Plastic, and Highly Plastic.

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.

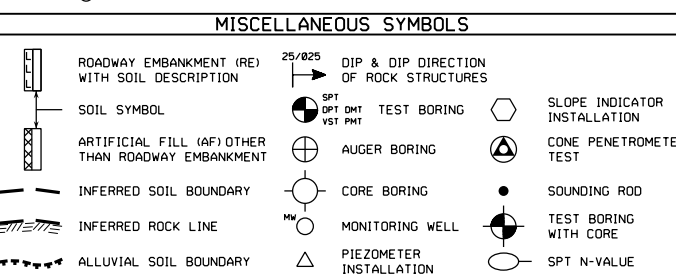
ANGULARITY OF GRAINS
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:
ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

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
Table with columns for Organic Material, Granular Soils, Silt-Clay Soils, and Other Material. Includes categories for Trace of Organic Matter, Little Organic Matter, Moderately Organic, and Highly Organic.

GROUND WATER
Water level in bore hole immediately after drilling
Static water level after 24 hours
Perched water, saturated zone, or water bearing strata
Spring or seep

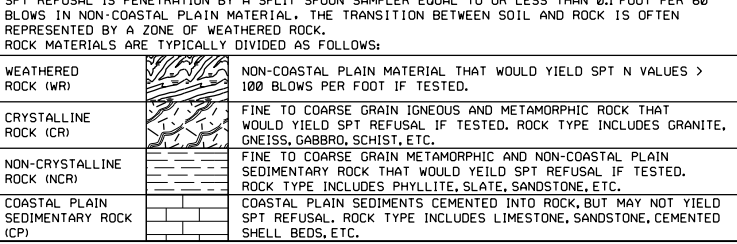


RECOMMENDATION SYMBOLS
UNDERCUT, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK, UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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, FRAGMENTS, HL - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, w - UNIT WEIGHT, w - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST
ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2 1/16" STEEL TEETH, TRICONE \* TUNG-CARB., CORE BIT, 2 1/4" H.S.A.
HAMMER TYPE: AUTOMATIC, MANUAL
CORE SIZE: -B, -H, -N
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:



WEATHERING
FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.

VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.
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. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF.
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. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF.
COMPLETE - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS
VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD - CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT - CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.

FRACTURE SPACING
TERM SPACING
VERY WIDE MORE THAN 10 FEET
WIDE 3 TO 10 FEET
MODERATELY CLOSE 1 TO 3 FEET
CLOSE 0.16 TO 1 FOOT
VERY CLOSE LESS THAN 0.16 FEET

BEDDING
TERM THICKNESS
VERY THICKLY BEDDED 4 FEET
THICKLY BEDDED 1.5 - 4 FEET
THINLY BEDDED 0.16 - 1.5 FEET
VERY THINLY BEDDED 0.03 - 0.16 FEET
THICKLY LAMINATED 0.008 - 0.03 FEET
THINLY LAMINATED < 0.008 FEET

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 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 (ROQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

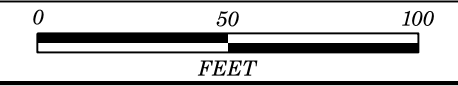
SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SRC) - 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.

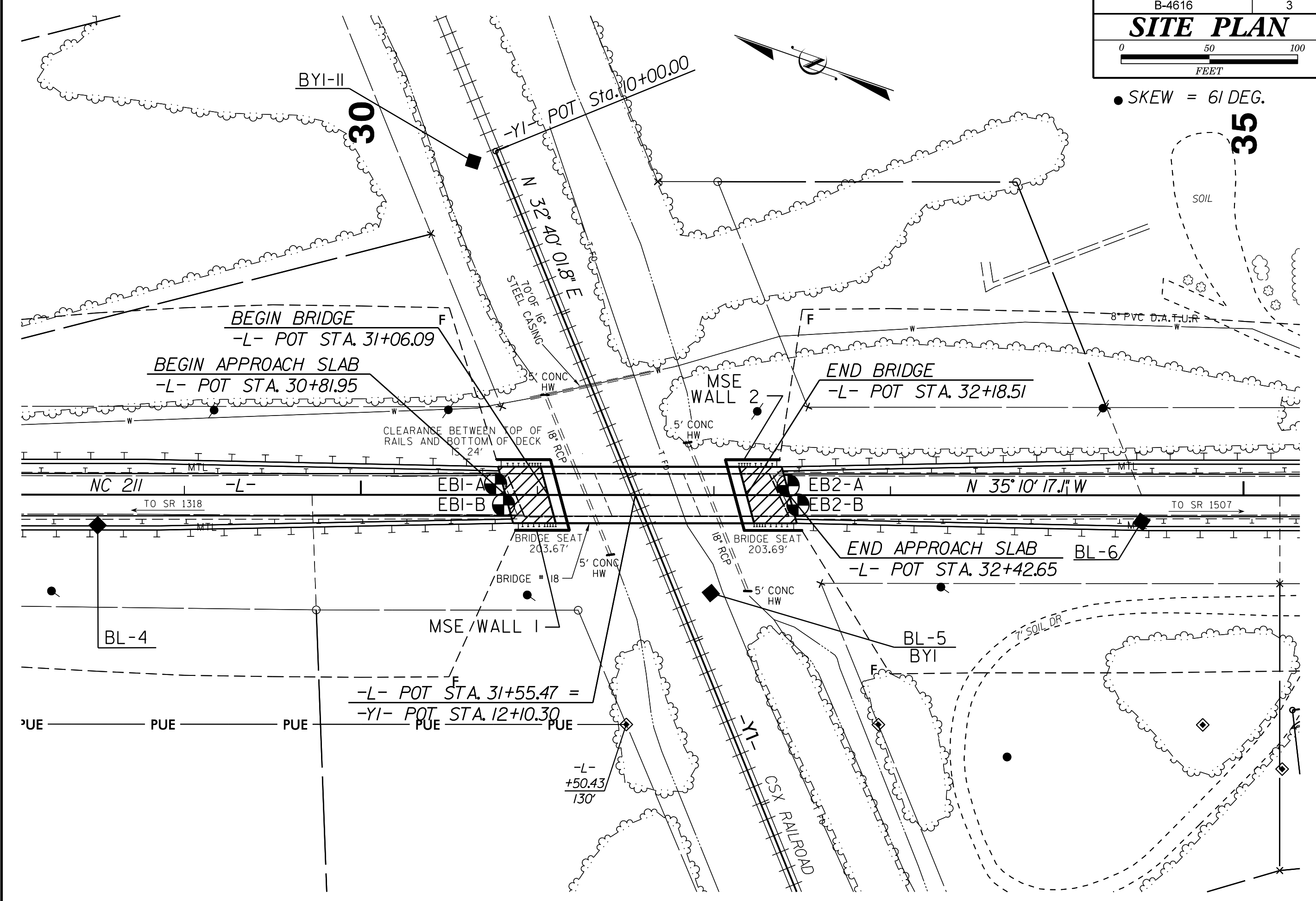
BENCH MARK: -L- STA. 22+77.74, 66.45' RT; RR SPIKE IN BASE OF 40" OAK TREE ELEVATION: 180.63 FEET
NOTES: BORING LOCATIONS, ELEVATIONS, AND COORDINATES WERE OBTAINED USING A TRIMBLE G607X HANDHELD H-STAR UNIT W/ SUB-FOOT ACCURACY.

FIAD = FILLED IN AFTER DRILLING
DATE: 8-15-14

# SITE PLAN



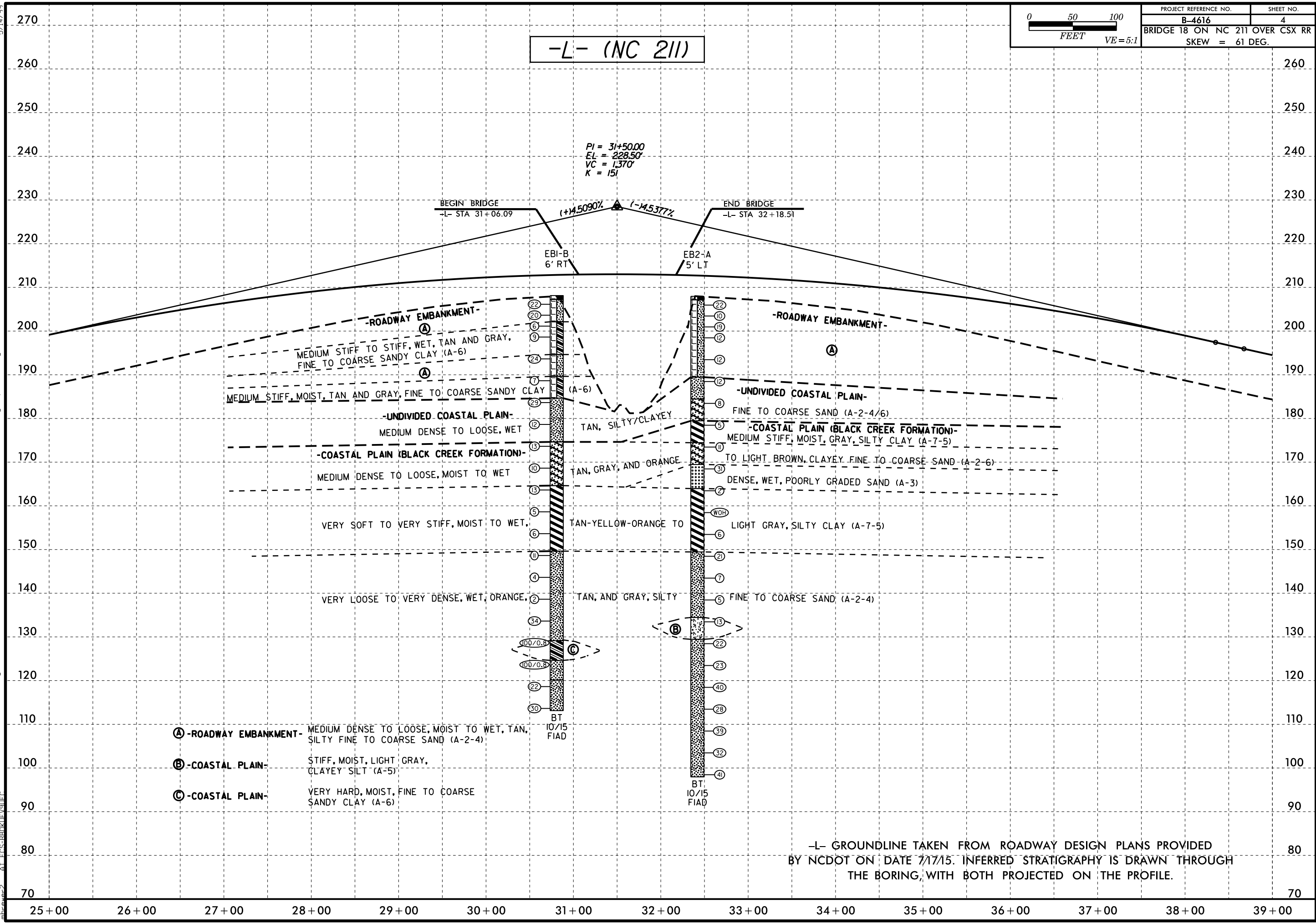
● SKEW = 61 DEG.



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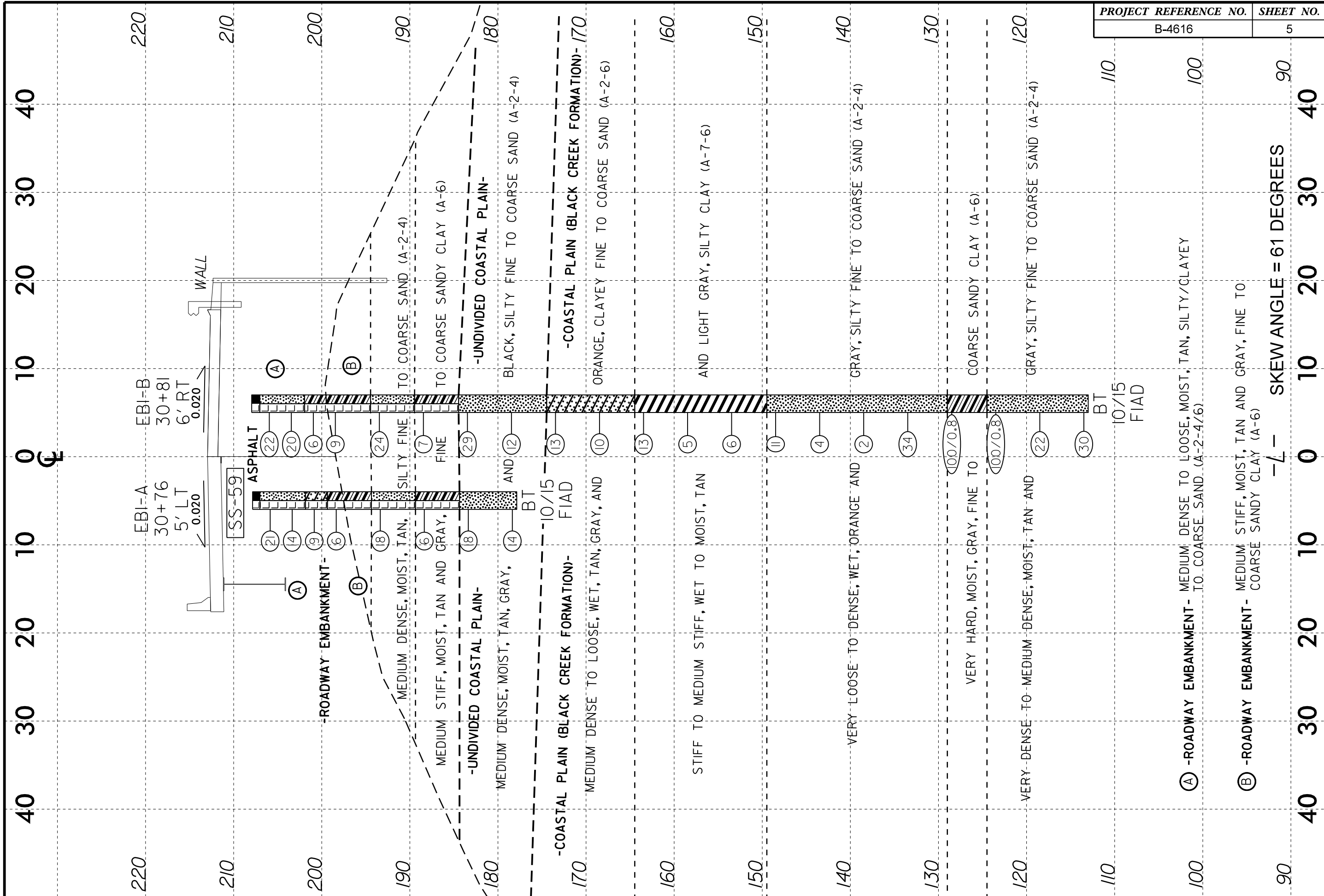
PROJECT REFERENCE NO.	SHEET NO.
B-4616	4
BRIDGE 18 ON NC 211 OVER CSX RR	
SKEW = 61 DEG.	

-L- (NC 211)



- A -ROADWAY EMBANKMENT- MEDIUM DENSE TO LOOSE, MOIST TO WET, TAN, SILTY FINE TO COARSE SAND (A-2-4)
- B -COASTAL PLAIN- STIFF, MOIST, LIGHT GRAY, CLAYEY SILT (A-5)
- C -COASTAL PLAIN- VERY HARD, MOIST, FINE TO COARSE SANDY CLAY (A-6)

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 7/17/15. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.



EBI-A  
30+76  
5' LT  
0.020

EBI-B  
30+81  
6' RT  
0.020

SS-59

ASPHALT

WALL

-ROADWAY EMBANKMENT-

-ROADWAY EMBANKMENT-

MEDIUM DENSE, MOIST, TAN,

MEDIUM DENSE, MOIST, TAN,

MEDIUM STIFF, MOIST, TAN AND GRAY,

MEDIUM STIFF, MOIST, TAN AND GRAY,

-UNDIVIDED COASTAL PLAIN-

-UNDIVIDED COASTAL PLAIN-

MEDIUM DENSE, MOIST, TAN, GRAY,

BLACK, SILTY FINE TO COARSE SAND (A-2-4)

-COASTAL PLAIN (BLACK CREEK FORMATION)-

-COASTAL PLAIN (BLACK CREEK FORMATION)-

MEDIUM DENSE TO LOOSE, WET, TAN, GRAY, AND

ORANGE, CLAYEY FINE TO COARSE SAND (A-2-6)

STIFF TO MEDIUM STIFF, WET TO MOIST, TAN

AND LIGHT GRAY, SILTY CLAY (A-7-6)

VERY LOOSE TO DENSE, WET, ORANGE AND

GRAY, SILTY FINE TO COARSE SAND (A-2-4)

VERY HARD, MOIST, GRAY, FINE TO

COARSE SANDY CLAY (A-6)

VERY DENSE TO MEDIUM DENSE, MOIST, TAN AND

GRAY, SILTY FINE TO COARSE SAND (A-2-4)

BT  
10/15  
FIAD

Ⓐ -ROADWAY EMBANKMENT-

MEDIUM DENSE TO LOOSE, MOIST, TAN, SILTY/CLAYEY  
TO COARSE SAND (A-2-4/6)

Ⓑ -ROADWAY EMBANKMENT-

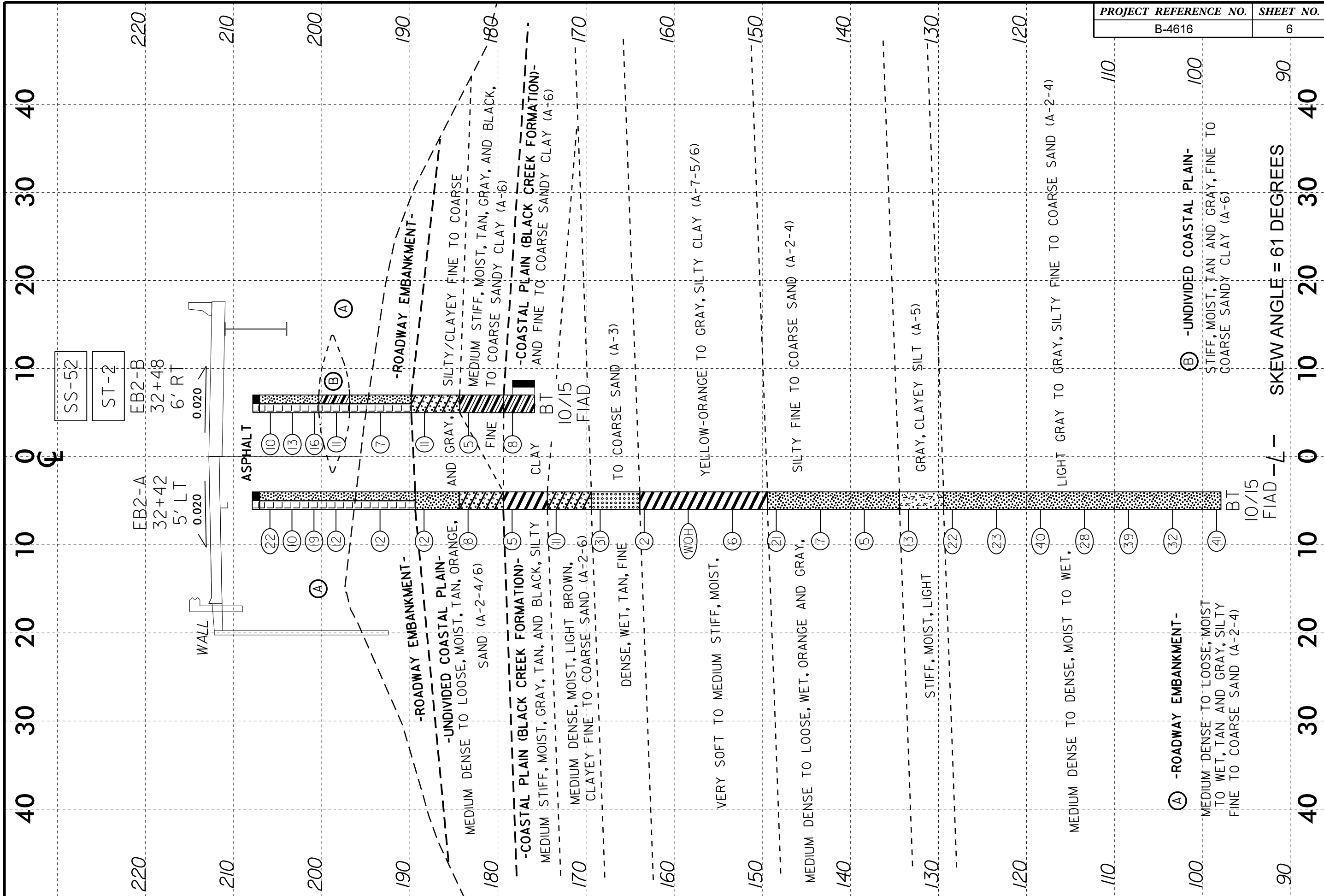
MEDIUM STIFF, MOIST, TAN AND GRAY, FINE TO  
COARSE SANDY CLAY (A-6)

-L- SKEW ANGLE = 61 DEGREES

HORIZ. SCALE 0 10 20 (FEET)

VE = 1:1

END BENT NO. 1  
CROSS SECTION THROUGH 31+06.09



VE = 1:1

END BENT NO. 2  
CROSS SECTION THROUGH 32+18.51

SKUEW ANGLE = 61 DEGREES

(A)

(B)

(A) -ROADWAY EMBANKMENT-  
MEDIUM DENSE TO LOOSE, MOIST TO WET, TAN, AND GRAY, SILTY FINE TO COARSE SAND (A-2-4)

(B) -UNDIVIDED COASTAL PLAIN-  
STIFF, MOIST, TAN AND GRAY, FINE TO COARSE SANDY CLAY (A-6)

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 33798.1.1		TIP B-4616		COUNTY ROBESON		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 18 on NC 211 over CSX Railroad							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 30+76		OFFSET 5 ft LT		ALIGNMENT L										
COLLAR ELEV. 207.8 ft		TOTAL DEPTH 30.0 ft		NORTHING N/A		EASTING N/A										
DRILL RIG/HAMMER EFF./DATE AME9533 CME-550X 83% 01/15/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER B. Boyce		START DATE 10/07/15		COMP. DATE 10/07/15		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						
210																
	206.8	1.0	8	13	8									207.8	0.0	GROUND SURFACE
														207.0	0.8	Asphalt (0.8')
205	204.3	3.5	4	8	6											ROADWAY EMBANKMENT
	201.8	6.0	4	5	4									201.8	6.0	Tan, medium dense, silty fine to coarse SAND (A-2-4), trace clay
200	199.3	8.5	2	3	3									199.3	8.5	Tan and gray, loose, clayey fine to coarse SAND (A-2-6)
	194.3	13.5	6	9	9									194.3	13.5	Tan and gray, medium stiff, fine to coarse sandy CLAY (A-6)
195	189.3	18.5	6	3	3									189.3	18.5	Tan, medium dense, silty fine to coarse SAND (A-2-4)
190	184.3	23.5	6	8	10									184.3	23.5	Tan and gray, medium stiff, fine to coarse sandy CLAY (A-6(4))
185	179.3	28.5	7	7	7									179.3	28.5	UNDIVIDED COASTAL PLAIN
180																Tan, gray and black, medium dense, silty fine to coarse SAND (A-2-4)
																Boring Terminated at Elevation 177.8 ft in COASTAL PLAIN silty SAND (A-2-4)
																Other Samples: ST-1 (20.0 - 22.0)

WBS 33798.1.1		TIP B-4616		COUNTY ROBESON		GEOLOGIST J. Bradshaw										
SITE DESCRIPTION Bridge No. 18 on NC 211 over CSX Railroad							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 32+48		OFFSET 6 ft RT		ALIGNMENT L										
COLLAR ELEV. 207.8 ft		TOTAL DEPTH 32.0 ft		NORTHING N/A		EASTING N/A										
DRILL RIG/HAMMER EFF./DATE AME9533 CME-550X 83% 01/15/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER B. Boyce		START DATE 10/07/15		COMP. DATE 10/07/15		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						
210																
	206.8	1.0	4	4	6									207.8	0.0	GROUND SURFACE
														207.0	0.8	Asphalt (0.8')
205	204.3	3.5	5	6	7											ROADWAY EMBANKMENT
	201.8	6.0	5	8	8									201.8	6.0	Tan and brown, medium dense, silty fine to coarse SAND (A-2-4), trace clay
200	199.3	8.5	4	5	6									199.3	8.5	Tan and gray, loose, clayey fine to coarse SAND (A-2-6)
	194.3	13.5	6	4	3									194.3	13.5	Tan and gray, stiff fine to coarse sandy CLAY (A-6)
195	189.3	18.5	2	5	6									189.3	18.5	Gray and tan, loose silty fine to coarse SAND (A-2-4)
190	184.3	23.5	2	2	3									184.3	23.5	UNDIVIDED COASTAL PLAIN
185	179.3	28.5	4	4	4									179.3	28.5	Tan, gray and black, medium dense, clayey fine to coarse SAND (A-2-6)
180																Tan, gray and black, medium stiff, fine to coarse sandy CLAY (A-6)
																COASTAL PLAIN
																Tan and black, medium stiff, fine to coarse sandy CLAY (A-6) (Black Creek Formation)
																Boring Terminated at Elevation 175.8 ft in COASTAL PLAIN sandy CLAY (A-6)
																Other Samples: ST-2 (30.0 - 32.0)

NCDOT BORE DOUBLE B4616\_GEO\_BRDG0018.GPJ NC\_DOT.GDT 2/3/16







### SOIL TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-59	EB1-A	5 RT	30+76	18.5-20.0	A-6(4)	39	21	38.8	21.8	7.8	31.6	99.0	76.0	42.0	17.0	-
SS-52	EB2-B	6 RT	32+48	23.5-25.0	A-6(2)	35	17	43.5	19.5	5.9	31.1	100.0	79.0	39.0	15.9	-

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% PASSING 200	% MOISTURE	SPECIFIC GRAVITY	COMPRESSION INDEX (C <sub>c</sub> )	RECOMPRESSION INDEX (C <sub>r</sub> )	INITIAL VOID RATIO
ST-2	EB2-B	6 RT	32+48	30.0-32.0	A-6(4)	40	22	41.0	15.6	2.650	0.17	0.010	0.602

SS = Split-Barrel Sample (ASTM D-1586)

ST = Shelby Tube (Undisturbed) Sample

Lab Technician: Amanda R. Roth

NCDOT Certification No.: 112-09-1003



**Site Photo No. 1: -YI- (CSX RR) Looking Upstation (West)**



**Site Photo No. 2: -YI- (CSX RR) Looking Downstation (East)**



**Site Photo No. 3: -L- (NC 211) Looking Downstation (North)**

REFERENCE: B-4616

PROJECT: 33798

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY ROBESON  
PROJECT DESCRIPTION REPLACE BRIDGE 18 ON  
NC 211 OVER CSX RAILROAD  
SITE DESCRIPTION MSE WALL 1: END BENT NO. 1  
MSE WALL 1: END BENT NO. 2

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	PLAN SHEET
4-5	RETAINING WALL ENVELOPES
6	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4616	1	6

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.

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- 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

M. WALKO, P.E.

J. BRADSHAW, E.I.

A. ROTH

AMERIDRILL

INVESTIGATED BY ECS CAROLINAS, LLP

DRAWN BY M. BREWER, P.E.

CHECKED BY E. FREEBURG, P.E.

SUBMITTED BY M. WALKO, P.E.

DATE FEBRUARY 2016



DocuSigned by:  
Michael J. Walko, P.E. 2/21/2016  
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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, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

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.

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 (CPS)

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 DISLODGED FROM PARENT MATERIAL.
FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.
JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
ROCK QUALITY DESIGNATION (ROQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SRCR) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

SOIL LEGEND AND AASHTO CLASSIFICATION table with columns for GENERAL CLASS, GROUP CLASS, SYMBOL, % PASSING, MATERIAL PASSING, GROUP INDEX, USUAL TYPES OF MAJOR MATERIALS, GEN. RATING AS SUBGRADE.

MINERALOGICAL COMPOSITION and COMPRESSIONIBILITY tables with columns for MINERAL NAMES, COMPRESSIONIBILITY (SLIGHTLY, MODERATELY, HIGHLY), and PERCENTAGE OF MATERIAL (ORGANIC, GRANULAR, SILT, OTHER).

GROUND WATER table with symbols for WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA, and SPRING OR SEEP.

WEATHERING table with categories FRESH, VERY SLIGHT, SLIGHT, MODERATE, MODERATELY SEVERE, SEVERE, VERY SEVERE, COMPLETE, and their corresponding descriptions.

MISCELLANEOUS SYMBOLS table with symbols for ROADWAY EMBANKMENT, SOIL SYMBOL, ARTIFICIAL FILL, INFERRED SOIL BOUNDARY, INFERRED ROCK LINE, ALLUVIAL SOIL BOUNDARY, DIP & DIP DIRECTION, TEST BORING, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD, TEST BORING WITH CORE, SPT N-VALUE.

CONSISTENCY OR DENSENESS table with columns for PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE, RANGE OF UNCONFINED COMPRESSIVE STRENGTH.

RECOMMENDATION SYMBOLS table with symbols for UNDERCUT, SHALLOW UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK, UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL.

ROCK HARDNESS table with categories VERY HARD, HARD, MODERATELY HARD, MEDIUM HARD, SOFT, VERY SOFT, and their corresponding descriptions.

TEXTURE OR GRAIN SIZE table with columns for U.S. STD. SIEVE SIZE, BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY.

ABBREVIATIONS table with columns for ADVANCING TOOLS, HAMMER TYPE, CORE SIZE, HAND TOOLS, and their corresponding symbols.

FRACTURE SPACING and BEDDING tables with columns for TERM, SPACING, THICKNESS, and their corresponding descriptions.

SOIL MOISTURE - CORRELATION OF TERMS table with columns for SOIL MOISTURE SCALE, FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION.

EQUIPMENT USED ON SUBJECT PROJECT table with checkboxes for DRILL UNITS, ADVANCING TOOLS, HAMMER TYPE, CORE SIZE, HAND TOOLS.

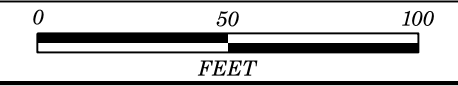
INDURATION table with categories FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED, and their corresponding descriptions.

PLASTICITY table with columns for PLASTICITY INDEX (PI), DRY STRENGTH, and COLOR.

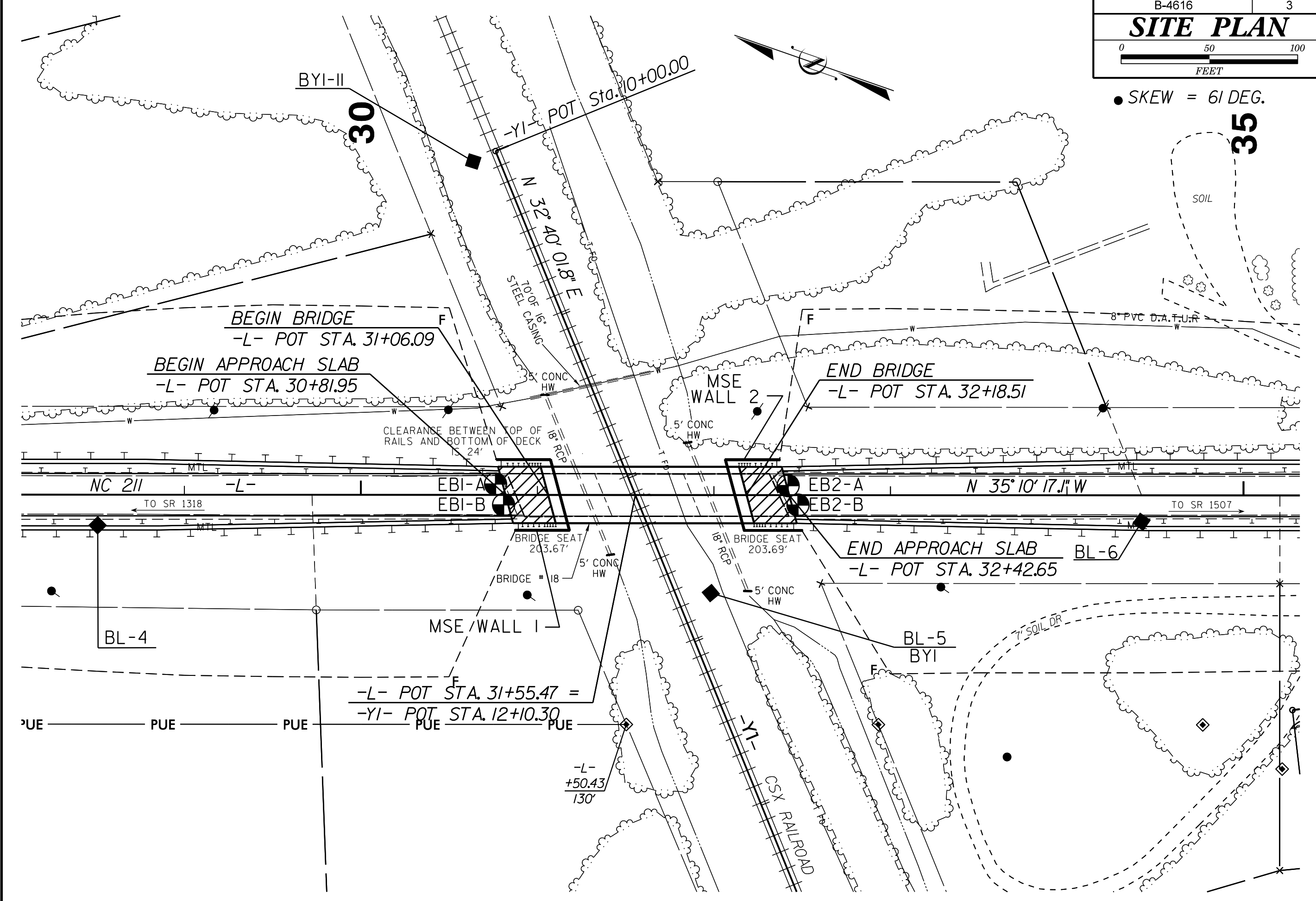
Table with checkboxes for various equipment and tools used in the project.

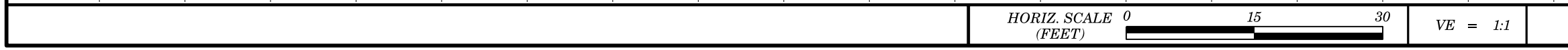
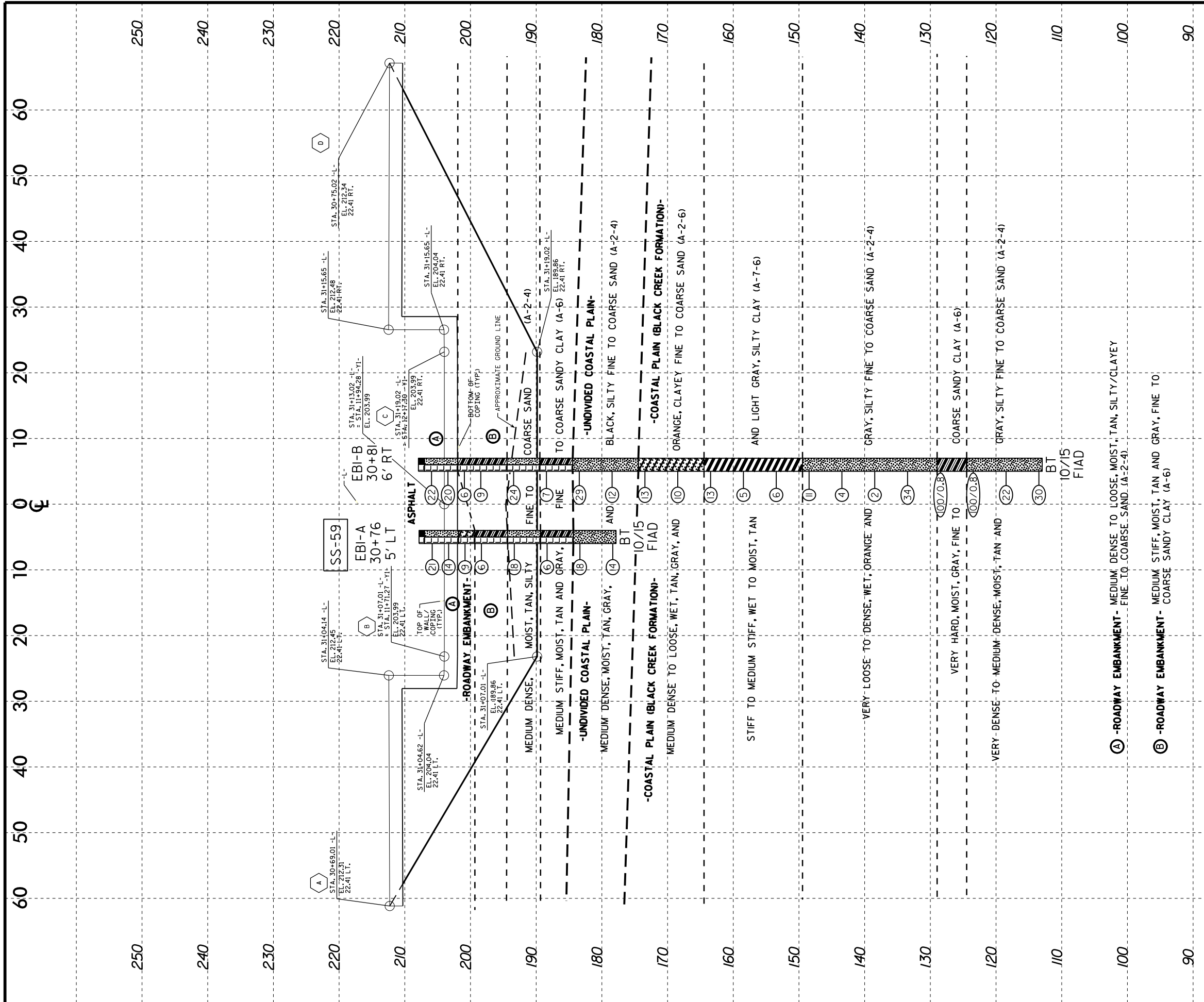
NOTES: BORING LOCATIONS, ELEVATIONS, AND COORDINATES WERE OBTAINED USING A TRIMBLE GEO7X HANDHELD H-STAR UNIT W/ SUB-FOOT ACCURACY.
FIAD = FILLED IN AFTER DRILLING
ELEVATION: 180.63 FEET
DATE: 8-15-14

# SITE PLAN



● SKEW = 61 DEG.



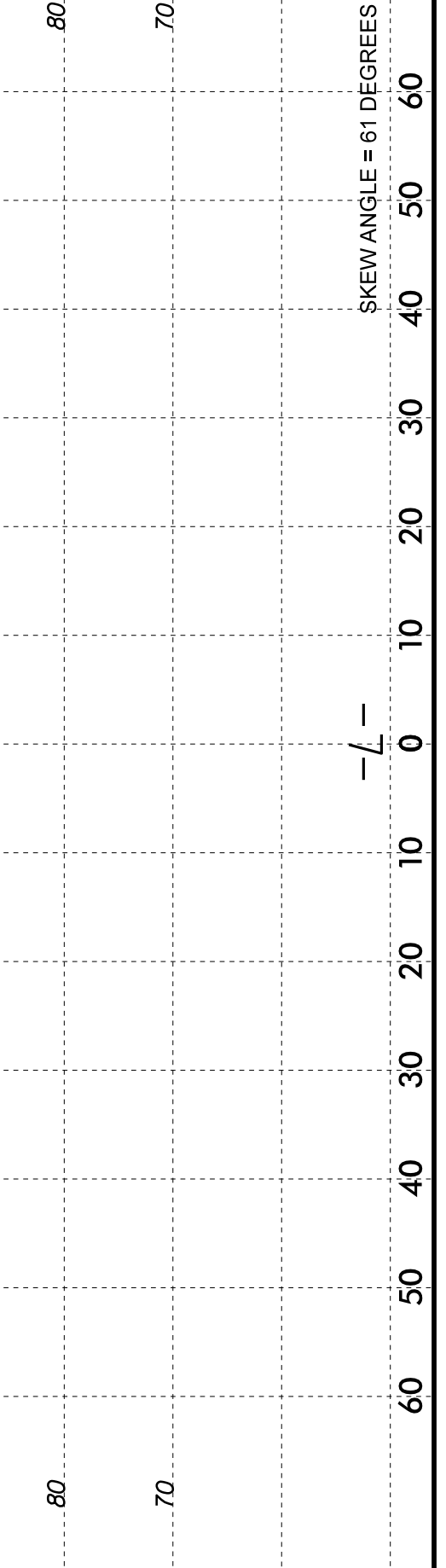
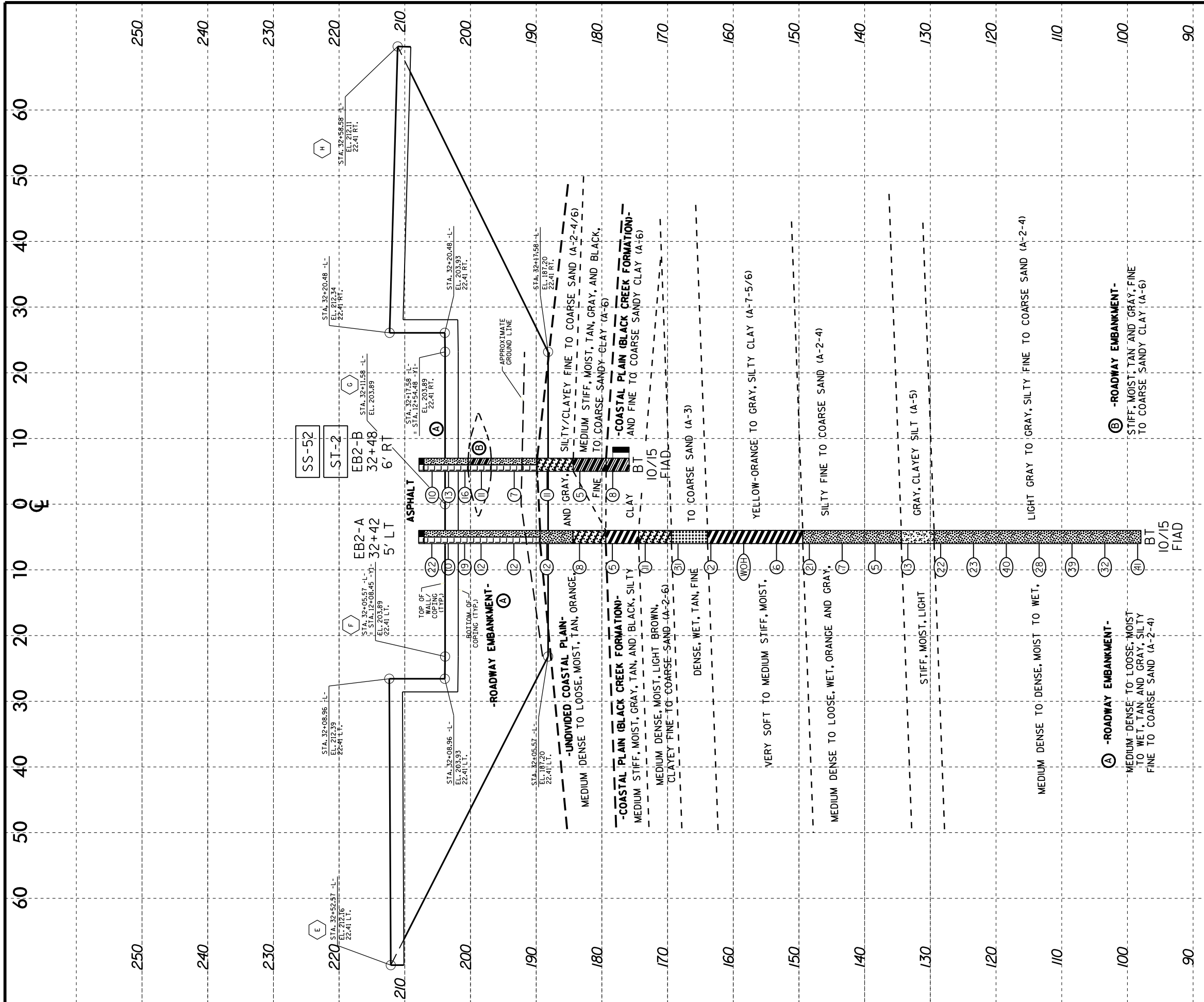


**MSE RETAINING WALL ONE  
- WALL ENVELOPE**

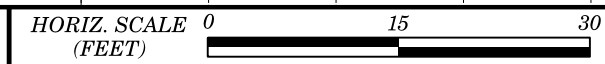
SKREW ANGLE = 61 DEGREES

-L-





SKREW ANGLE = 61 DEGREES



VE = 1:1

**MSE RETAINING WALL TWO - WALL ENVELOPE**

**SOIL TEST RESULTS**

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-59	EB1-A	5 RT	30+76	18.5-20.0	A-6(4)	39	21	38.8	21.8	7.8	31.6	99.0	76.0	42.0	17.0	-
SS-52	EB2-B	6 RT	32+48	23.5-25.0	A-6(2)	35	17	43.5	19.5	5.9	31.1	100.0	79.0	39.0	15.9	-

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% PASSING 200	% MOISTURE	SPECIFIC GRAVITY	COMPRESSION INDEX (C <sub>c</sub> )	RECOMPRESSION INDEX (C <sub>r</sub> )	INITIAL VOID RATIO
ST-2	EB2-B	6 RT	32+48	30.0-32.0	A-6(4)	40	22	41.0	15.6	2.650	0.17	0.010	0.602

SS = Split-Barrel Sample (ASTM D-1586)

ST = Shelby Tube (Undisturbed) Sample

Lab Technician: Amanda R. Roth

NCDOT Certification No.: 112-09-1003