

REFERENCE: B-5353

PROJECT: 46067

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY GUILFORD  
 PROJECT DESCRIPTION REPLACE BRIDGE NO. 147 ON  
US 2970 & I-85 BR OVER SR 1009 WITH DUAL  
BRIDGES - LEFT LANE BRIDGE NO. 147, RIGHT LANE  
BRIDGE NO. 1289

**CONTENTS**

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN (BRIDGE NO. 147)
4	PROFILE(S) (BRIDGE NO. 147)
5-6	CROSS SECTION(S) (BRIDGE NO. 147)
7-10	BORE LOG(S) & CORE REPORT(S) (BRIDGE NO. 147)
11-14	CORE PHOTOGRAPHS (BRIDGE NO. 147)
15	SOIL TEST RESULTS (BRIDGE NO. 147)
16	SITE PHOTOGRAPH(S) (BRIDGE NO. 147)
17	SITE PLAN (BRIDGE NO. 1289)
18	PROFILE(S) (BRIDGE NO. 1289)
19-20	CROSS SECTION(S) (BRIDGE NO. 1289)
21-24	BORE LOG(S) & CORE REPORT(S) (BRIDGE NO. 1289)
25-28	CORE PHOTOGRAPHS (BRIDGE NO. 1289)
29	SOIL TEST RESULTS (BRIDGE NO. 1289)
30	SITE PHOTOGRAPHS (BRIDGE NO. 1289)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5353	1	30

**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

A. BLYTHE

J. SWARTLEY

J. WHITE

INVESTIGATED BY S&ME, Inc.

DRAWN BY J. SWARTLEY

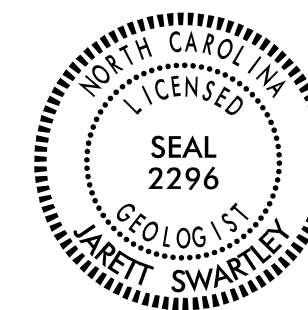
CHECKED BY J. DAILY

SUBMITTED BY J. DAILY

DATE AUGUST 2020



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 CHARLOTTE, NC 28273  
 (704) 523-4726



*Jarett Swartley*

10/12/2020

SIGNATURE

DATE

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

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

## SUBSURFACE INVESTIGATION

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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																												
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p><b>WELL GRADED</b> - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. <b>UNIFORMLY GRADED</b> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <b>GAP-GRADED</b> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p><b>ALLUVIUM (ALLUV.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. <b>AQUIFER</b> - A WATER BEARING FORMATION OR STRATA. <b>ARENACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. <b>ARGILLACEOUS</b> - 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. <b>ARTESIAN</b> - 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. <b>CALCAREOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. <b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. <b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. <b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. <b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. <b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. <b>FAULT</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. <b>FISSILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. <b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. <b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. <b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. <b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. <b>LEDGE</b> - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. <b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. <b>MOTTLED (MOT.)</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. <b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. <b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. <b>ROCK QUALITY DESIGNATION (RQD)</b> - 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. <b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. <b>SILL</b> - 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. <b>SLICKENSIDE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. <b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - 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. <b>STRATA CORE RECOVERY (SREC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. <b>STRATA ROCK QUALITY DESIGNATION (SROD)</b> - 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. <b>TOPSOIL (TS.)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																												
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>										<b>ANGULARITY OF GRAINS</b>										<b>WEATHERED ROCK (WR)</b>										<b>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</b>																																																												
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<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL &lt; 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL &gt; 50</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>										<p><b>FRESH</b> - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p><b>VERY SLIGHT (V SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p><b>SLIGHT (SL.)</b> - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p><b>MODERATE (MOD.)</b> - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p><b>MODERATELY SEVERE (MOD. SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p><b>SEVERE (SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i></p> <p><b>VERY SEVERE (V SEV.)</b> - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i></p> <p><b>COMPLETE</b> - ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>										<p><b>CRISTALLINE ROCK (CR)</b></p> <p><b>NON-CRYSTALLINE ROCK (NCR)</b></p> <p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b></p>																																																		
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<p>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.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>																																																												

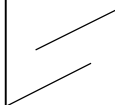
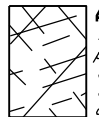
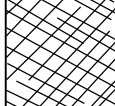








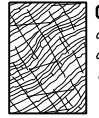

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

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

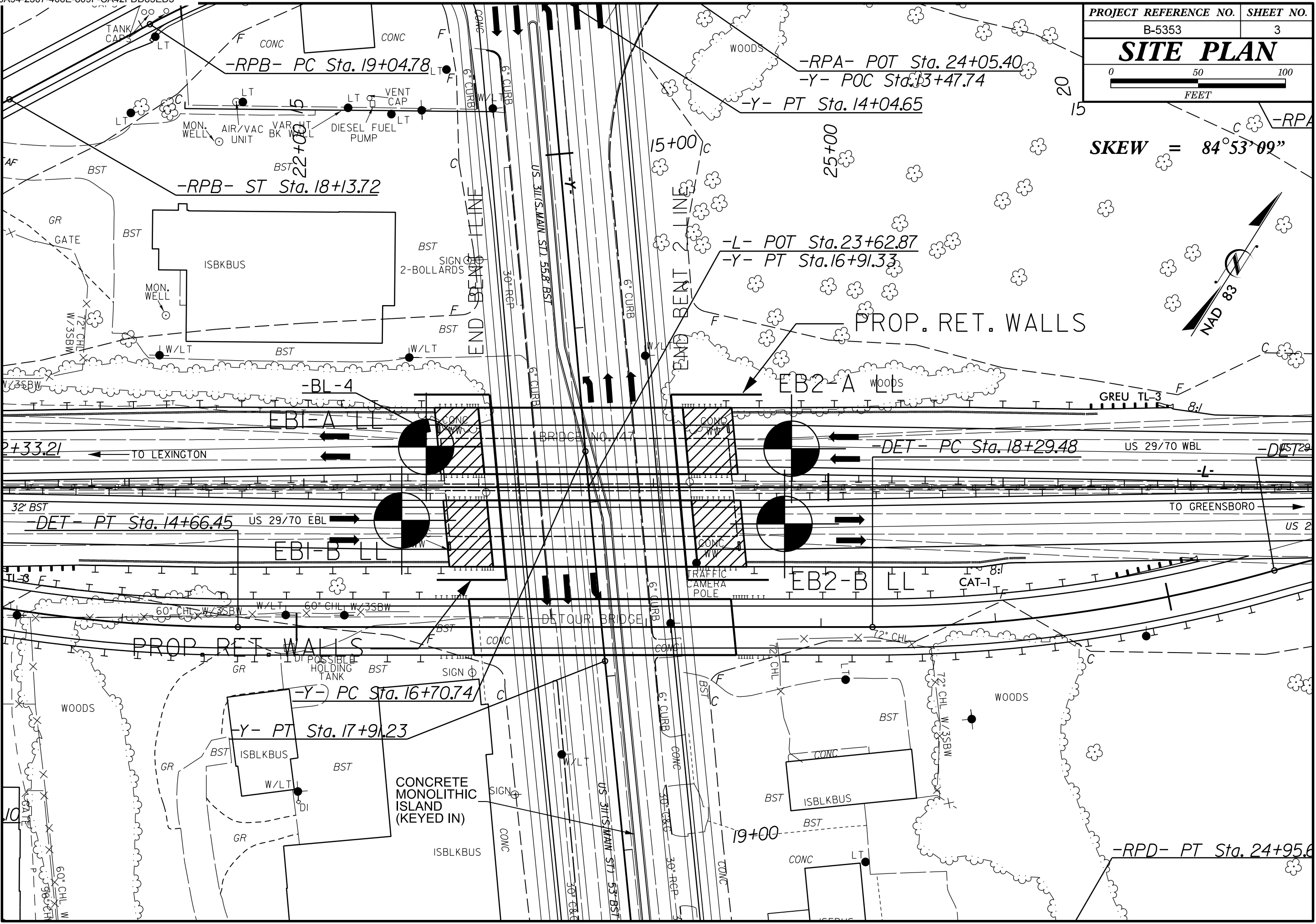
AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

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

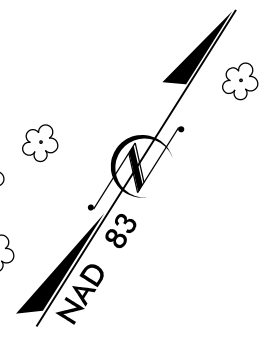
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)		SURFACE CONDITIONS					GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)		SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)					
From the lithology, structure and surface conditions 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	GOOD	FAIR	POOR	VERY POOR	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	GOOD	FAIR	POOR	VERY POOR	
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		A						
	BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets	80	70						50	B	C	D	E	
	VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets		60	50										
	BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity			40										
	DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces				30									
	LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes	N/A	N/A		20									
					10									

→ Means deformation after tectonic disturbance

PROJECT REFERENCE NO.	SHEET NO.
B-5353	3
<b>SITE PLAN</b>	
 FEET	



SKEW = 84°53'09"



PROP. RET. WALLS

PROP. RET. WALLS

TO LEXINGTON

TO GREENSBORO

BRIDGE NO. 147

DETOUR BRIDGE

TRAFFIC CAMERA POLE

GREU TL-3

US 29

US 29

-RPD- PT Sta. 24+95.6

19+00

15+00

25+00

22+00

-RPA- POT Sta. 24+05.40

-Y- POC Sta. 13+47.74

-Y- PT Sta. 14+04.65

-RPA- ST Sta. 18+13.72

-L- POT Sta. 23+62.87

-Y- PT Sta. 16+91.33

-DET- PC Sta. 18+29.48

-DET- PT Sta. 14+66.45

-Y- PC Sta. 16+70.74

-Y- PT Sta. 17+91.23

-RPD- PT Sta. 24+95.6

ISBKBUS

CONCRETE MONOLITHIC ISLAND (KEYED IN)

ISBKBUS

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

CONC

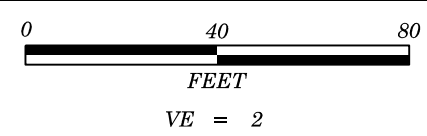
CONC

CONC

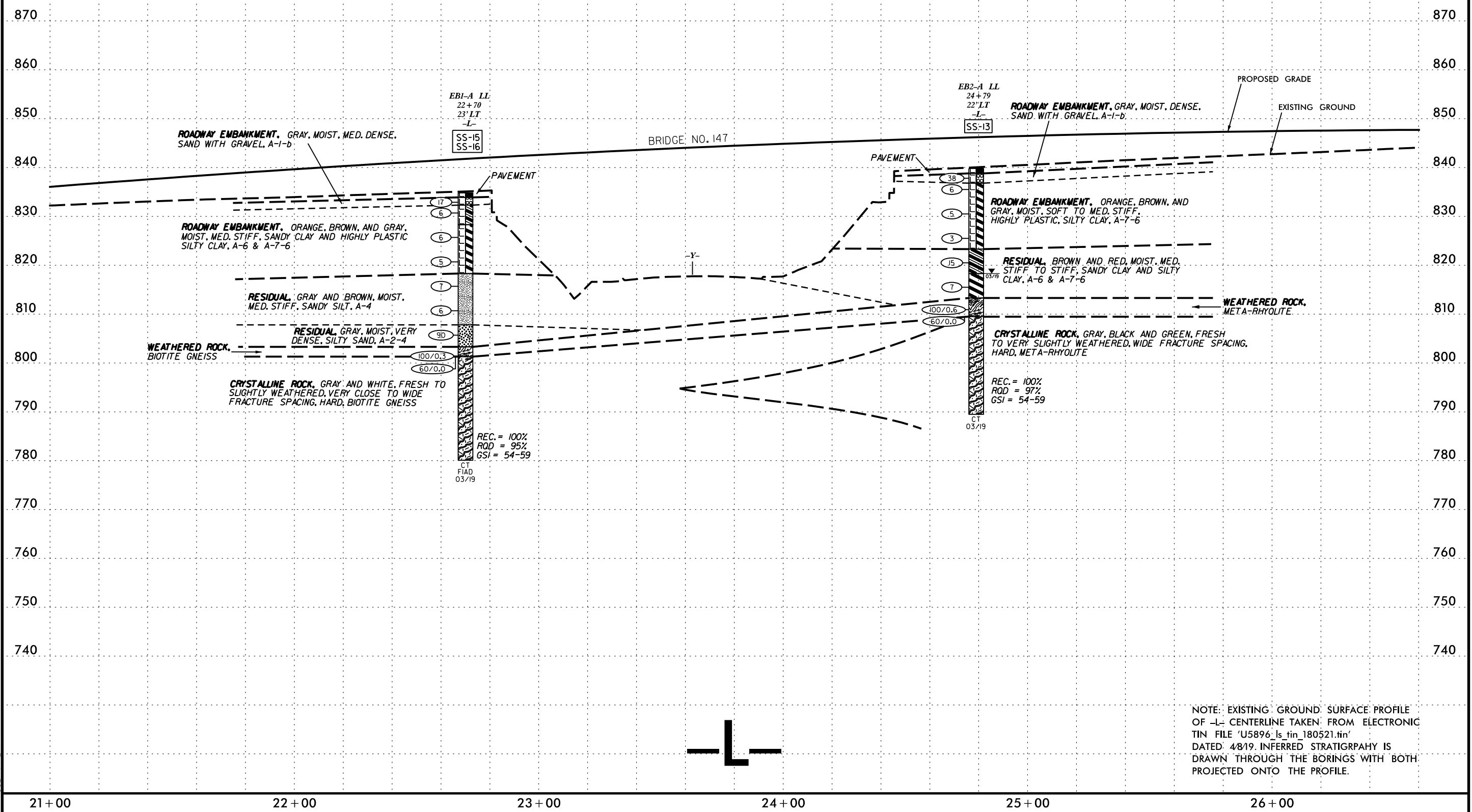
CONC

CONC

5/14/99



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5353	4
<b>PROFILE PROJECTED ALONG -L-</b>	

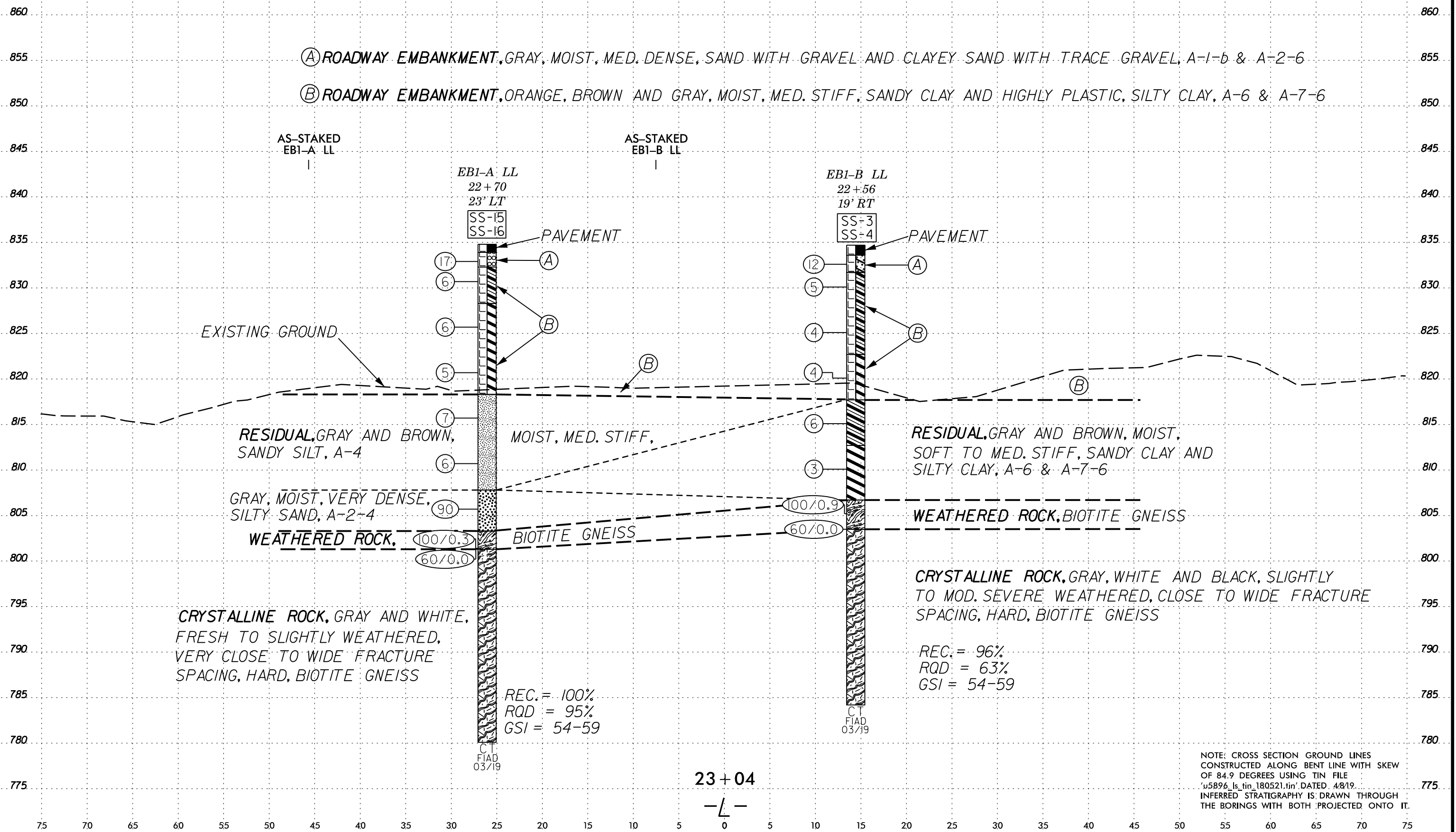


NOTE: EXISTING GROUND SURFACE PROFILE OF -L- CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'U5896' Is tin\_180521.tin' DATED 4/8/19. INFERRED STRATIGRAHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

SYSTEMS  
 DESIGN  
 ARCHITECTS  
 ENGINEERS  
 P.C.  
 1100  
 11th  
 Street  
 San  
 Francisco  
 CA  
 94103  
 415.774.1100  
 www.ssdna.com

# CROSS SECTION ALONG END BENT 1

BRIDGE NO. 147



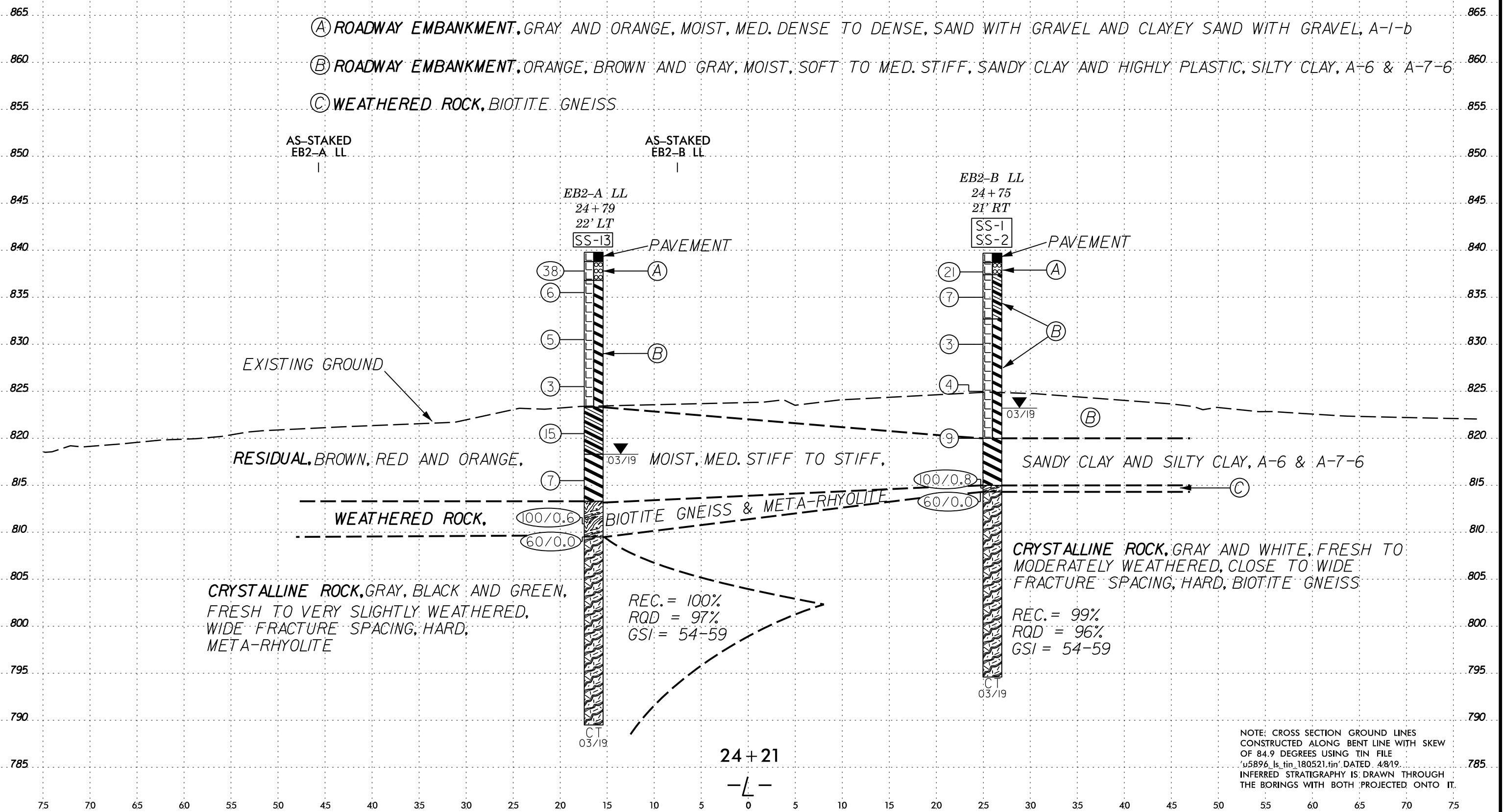
NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 84.9 DEGREES USING TIN FILE 'u5896\_ls\_tin\_180521.tin' DATED 4/8/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

6/23/16  
 SYSTEMS  
 DESIGN  
 CONSULTING  
 INC.  
 1000  
 UNIVERSITY  
 DRIVE  
 SUITE  
 100  
 WILSONVILLE  
 OR 97147  
 503.535.1100  
 www.sdci.com

# CROSS SECTION ALONG END BENT 2

BRIDGE NO. 147

- (A) ROADWAY EMBANKMENT, GRAY AND ORANGE, MOIST, MED. DENSE TO DENSE, SAND WITH GRAVEL AND CLAYEY SAND WITH GRAVEL, A-1-b
- (B) ROADWAY EMBANKMENT, ORANGE, BROWN AND GRAY, MOIST, SOFT TO MED. STIFF, SANDY CLAY AND HIGHLY PLASTIC, SILTY CLAY, A-6 & A-7-6
- (C) WEATHERED ROCK, BIOTITE GNEISS



CRYSTALLINE ROCK, GRAY, BLACK AND GREEN, FRESH TO VERY SLIGHTLY WEATHERED, WIDE FRACTURE SPACING, HARD, META-RHYOLITE

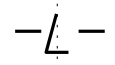
REC. = 100%  
RQD = 97%  
GSI = 54-59

CRYSTALLINE ROCK, GRAY AND WHITE, FRESH TO MODERATELY WEATHERED, CLOSE TO WIDE FRACTURE SPACING, HARD, BIOTITE GNEISS

REC. = 99%  
RQD = 96%  
GSI = 54-59

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 84.9 DEGREES USING TIN FILE 'u5896\_ls\_tin\_180521.tin'. DATED: 4/8/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.

24+21







# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.										
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)									
BORING NO. EB1-B LL		STATION 22+56		OFFSET 19 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 834.7 ft		TOTAL DEPTH 50.5 ft		NORTHING 796,599		EASTING 1,706,377										
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER White, J.		START DATE 03/18/19		COMP. DATE 03/19/19		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
835																834.7 GROUND SURFACE 0.0
	833.6	1.1	12	10	2								M			833.6 ROADWAY EMBANKMENT (PAVEMENT) 1.1
830	831.1	3.6	4	2	3								SS-3	25%		831.7 GRAY, CLAYEY SAND WITH TRACE GRAVEL, A-2-6 3.0
																GRAY AND ORANGE, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6
825	826.1	8.6	2	2	2								M			822.7 12.0
820	821.1	13.6	3	2	2								SS-4	32%		817.7 17.0
815	816.1	18.6	3	3	3								M			RESIDUAL BROWN, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6
810	811.1	23.6	2	2	1								M			812.7 22.0
805	806.1	28.6	33	67/0.4												806.7 28.0
																WEATHERED ROCK (BIOTITE GNEISS)
	803.5	31.2	60/0.0													803.5 31.2
800																CRYSTALLINE ROCK GRAY, WHITE AND BLACK, SLIGHTLY WEATHERED TO MODERTATELY SEVERE WEATHERED, CLOSE TO WIDE FRACTURE SPACING, HARD, BIOTITE GNEISS REC = 96% RQD = 63% GSI = 54-59
795																
790																
785																784.2 50.5
																Boring Terminated at Elevation 784.2 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

NCDOT BORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.				
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)			
BORING NO. EB1-B LL		STATION 22+56		OFFSET 19 ft RT		ALIGNMENT -L-				
COLLAR ELEV. 834.7 ft		TOTAL DEPTH 50.5 ft		NORTHING 796,599		EASTING 1,706,377				
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic				
DRILLER White, J.		START DATE 03/18/19		COMP. DATE 03/19/19		SURFACE WATER DEPTH N/A				
CORE SIZE NQ				TOTAL RUN 19.3 ft						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (%)	RQD (%)	REC. (%)	RQD (%)		
803.5	803.5	31.2	4.8	N=60/0.0 2:30/0.8 2:14/1.0 7:50/1.0 5:00/1.0 3:00/1.0	(4.0) 83%	(1.3) 27%	(18.5) 96%	(12.1) 63%		Begin Coring @ 31.2 ft
800	798.7	36.0	5.0	6:03/1.0 4:02/1.0 3:52/1.0 3:44/1.0 4:00/1.0	(5.0) 100%	(3.6) 72%				CRYSTALLINE ROCK GRAY, WHITE AND BLACK, SLIGHTLY WEATHERED TO MODERTATELY SEVERE WEATHERED, CLOSE TO WIDE FRACTURE SPACING, HARD, BIOTITE GNEISS REC = 96% RQD = 63% GSI = 54-59
795	793.7	41.0	5.0	2:45/1.0 2:17/1.0 2:50/1.0 2:35/1.0 3:02/1.0	(5.0) 100%	(4.3) 86%				
790	788.7	46.0	4.5	4:59/1.0 6:08/1.0 8:00/1.0 6:20/0.5	(4.5) 100%	(2.9) 64%				
785	784.2	50.5								Boring Terminated at Elevation 784.2 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

NCDOT CORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

# GEOTECHNICAL BORING REPORT

## BORE LOG

# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.							
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)						
BORING NO. EB2-A LL		STATION 24+79		OFFSET 22 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 839.8 ft		TOTAL DEPTH 50.3 ft		NORTHING 796,752		EASTING 1,706,544							
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020		DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic									
DRILLER White, J.		START DATE 03/19/19		COMP. DATE 03/19/19		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				
840												839.8 GROUND SURFACE 0.0	
	838.8	1.0	17	23	15						M	838.8 ROADWAY EMBANKMENT (PAVEMENT) 1.0	
	836.5	3.3	4	3	3						M	836.8 GRAY, SAND WITH GRAVEL, A-1-b ORANGE, BROWN, AND GRAY, HIGHLY PLASTIC, SILTY CLAY, A-7-6 3.0	
835													
	831.5	8.3	3	2	3								
830										SS-13	39%		
	826.5	13.3	3	2	1						M		
825													
	821.5	18.3	9	7	8						M	823.3 RESIDUAL BROWN AND RED, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6 16.5	
820													
	816.5	23.3	4	4	3						M	818.3 WEATHERED ROCK (META-RHYOLITE) 21.5	
815													
	811.5	28.3	81	19/0.1								813.3 WEATHERED ROCK (META-RHYOLITE) 26.5	
810													
	809.5	30.3	60/0.0									809.5 CRYSTALLINE ROCK GRAY, BLACK AND GREEN, FRESH TO VERY SLIGHTLY WEATHERED, WIDE FRACTURE SPACING, HARD, META-RHYOLITE REC = 100% RQD = 97% GSI = 54-59 30.3	
805													
800													
795													
790													
													789.5 Boring Terminated at Elevation 789.5 ft IN CRYSTALLINE ROCK (META-RHYOLITE) 50.3

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.						
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)					
BORING NO. EB2-A LL		STATION 24+79		OFFSET 22 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 839.8 ft		TOTAL DEPTH 50.3 ft		NORTHING 796,752		EASTING 1,706,544						
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020		DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic								
DRILLER White, J.		START DATE 03/19/19		COMP. DATE 03/19/19		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
809.5	809.5	30.3	5.0	N=60/0.0 5:18/1.0 3:18/1.0 2:53/1.0 3:01/1.0 2:57/1.0	(5.0) 100%	(5.0) 100%		(19.9) 100%	(19.3) 97%		Begin Coring @ 30.3 ft	
805	804.5	35.3	5.0	2:43/1.0 2:45/1.0 2:40/1.0 2:36/1.0 3:08/1.0	(5.0) 100%	(5.0) 100%						
800	799.5	40.3	5.0	3:34/1.0 3:20/1.0 4:23/1.0 2:55/1.0 3:12/1.0	(4.9) 98%	(4.9) 98%						
795	794.5	45.3	5.0	2:57/1.0 3:59/1.0 3:30/1.0 3:15/1.0 2:49/1.0	(5.0) 100%	(4.4) 88%						
790	789.5	50.3										789.5 Boring Terminated at Elevation 789.5 ft IN CRYSTALLINE ROCK (META-RHYOLITE) 50.3

NCDOT BORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

NCDOT CORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Swartley, J.										
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)									
BORING NO. EB2-B LL		STATION 24+75		OFFSET 21 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 839.7 ft		TOTAL DEPTH 45.1 ft		NORTHING 796,715		EASTING 1,706,563										
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic										
DRILLER White, J.		START DATE 03/17/19		COMP. DATE 03/18/19		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)		
840														839.7	0.0	GROUND SURFACE
	838.7	1.0	18	15	6								M	838.7	1.0	ROADWAY EMBANKMENT (PAVEMENT)
	836.0	3.7	3	3	4								SS-1	837.4	2.3	ORANGE, CLAYEY SAND WITH GRAVEL, A-1-b
835														832.7	7.0	ORANGE AND GRAY, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6
	831.0	8.7	2	1	2								M			
830																
	826.0	13.7	1	2	2								M			
825																
	821.0	18.7	2	2	7									820.0	19.7	RESIDUAL ORANGE AND BROWN, SILTY CLAY, A-7-6
820													SS-2			
	816.0	23.7	7	16	84/0.3									815.0	24.7	WEATHERED ROCK (BIOTITE GNEISS)
	814.3	25.4	60/0.0											814.3	25.4	CRYSTALLINE ROCK (BIOTITE GNEISS)
810																GRAY AND WHITE, FRESH TO MODERATELY WEATHERED, CLOSE TO WIDE FRATURE SPACING, HARD, BIOTITE GNEISS REC = 99% RQD = 96% GSI = 54-59
805																
800																
795														794.6	45.1	Boring Terminated at Elevation 794.6 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Swartley, J.						
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)					
BORING NO. EB2-B LL		STATION 24+75		OFFSET 21 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 839.7 ft		TOTAL DEPTH 45.1 ft		NORTHING 796,715		EASTING 1,706,563						
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic						
DRILLER White, J.		START DATE 03/17/19		COMP. DATE 03/18/19		SURFACE WATER DEPTH N/A						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	TOTAL RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		ELEV. (ft)	DEPTH (ft)
814.3												Begin Coring @ 25.4 ft
	814.3	25.4	0.7	N=60/0.0 4:00/0.7	(0.6)	(0.0)		(19.6)	(19.0)		814.3	25.4
	813.6	26.1	5.0	2:50/1.0 3:18/1.0 3:37/1.0 3:00/1.0 3:18/1.0	86%	0%		99%	96%			
810												
	808.6	31.1	5.0	3:19/1.0 3:45/1.0 5:45/1.0 6:57/1.0 8:10/1.0	(5.0)	(5.0)		100%	100%			
805												
	803.6	36.1	5.0	7:45/1.0 8:50/1.0 9:57/1.0 8:02/1.0 9:30/1.0	(5.0)	(5.0)		100%	100%			
800												
	798.6	41.1	4.0	8:00/1.0 9:00/1.0 9:46/1.0 11:26/1.0	(4.0)	(4.0)		100%	100%			
795												
	794.6	45.1									794.6	45.1
												Boring Terminated at Elevation 794.6 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)

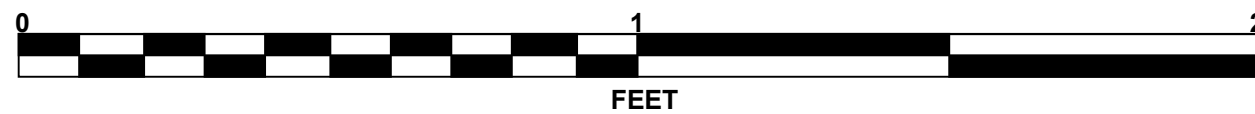
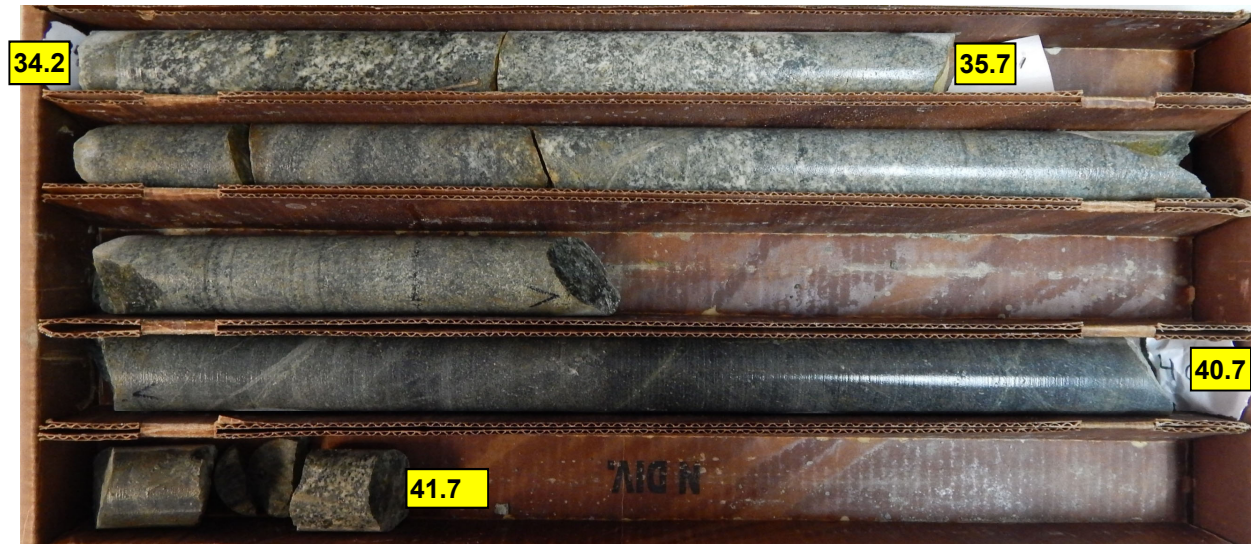
NCDOT BORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

NCDOT CORE DOUBLE B5353\_GEO\_BRDG0147.GPJ NC\_DOT.GDT 5/29/20

# CORE PHOTOGRAPHS

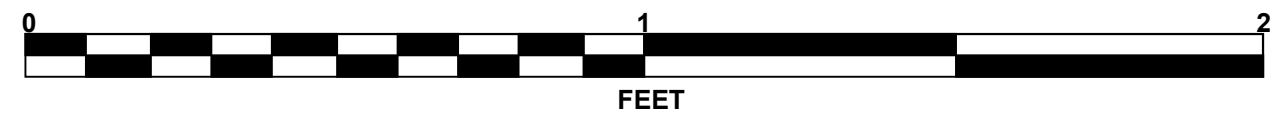
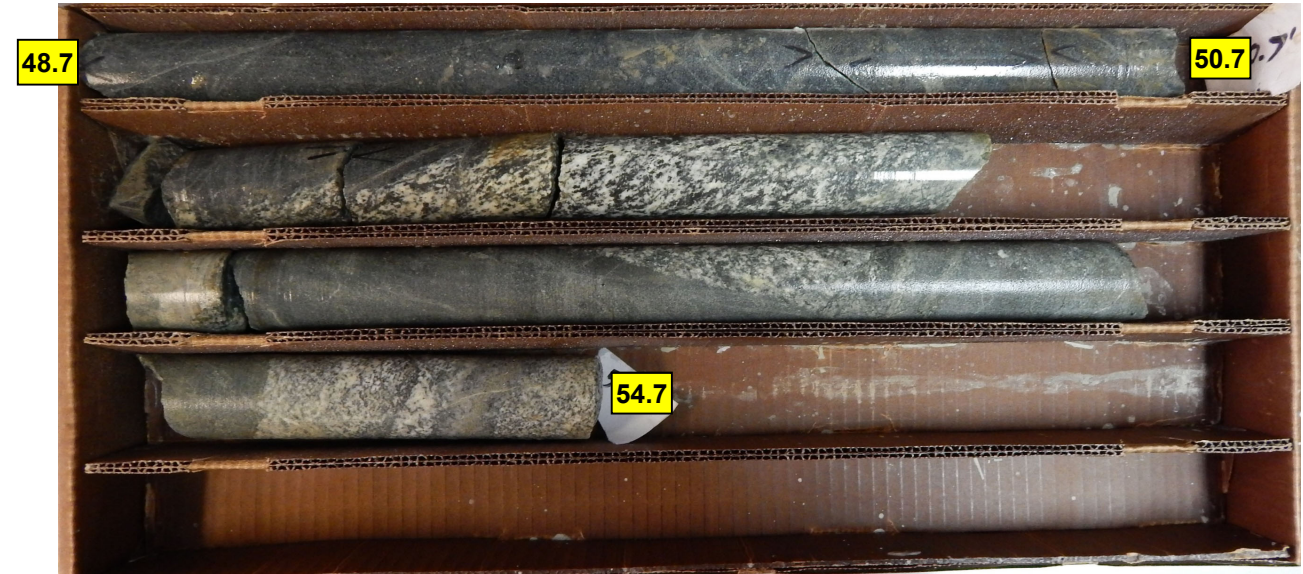
## EB1-A LL

BOXES 1 & 2: 34.2 - 48.7 FEET



## EB1-A LL

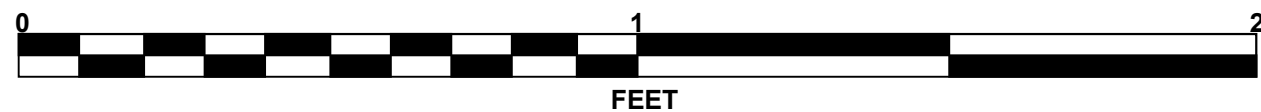
BOX 3: 48.7 - 54.7 FEET



# CORE PHOTOGRAPHS

## EB1-B LL

BOXES 1, & 2: 31.2 - 49.3 FEET



## EB1-B LL

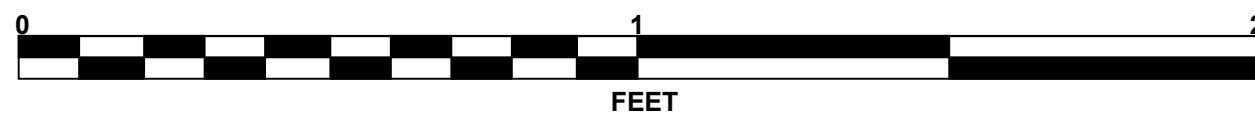
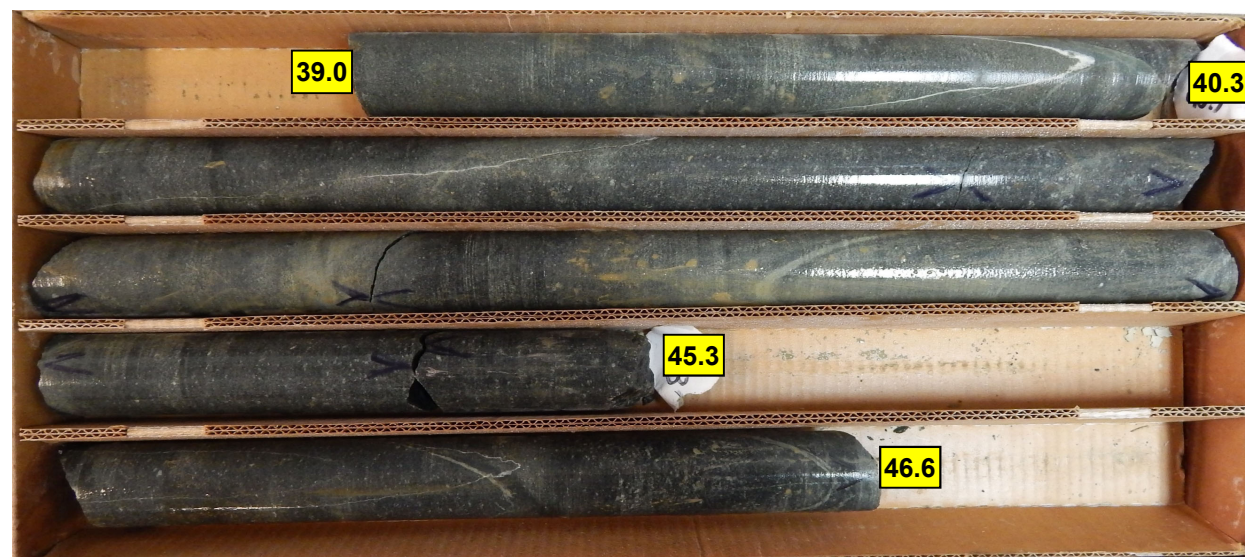
BOX 3: 49.3 - 50.5 FEET



# CORE PHOTOGRAPHS

## EB2-A LL

BOXES 1, & 2: 30.3 - 46.6 FEET



## EB2-A LL

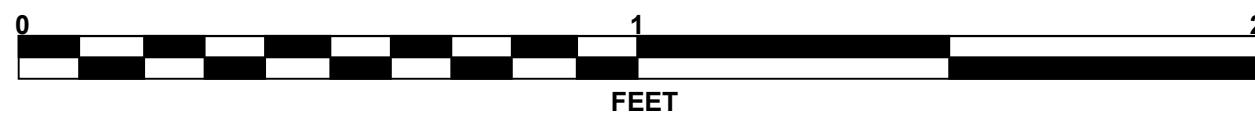
BOX 3: 46.6 - 50.3 FEET



# CORE PHOTOGRAPHS

## EB2-B LL

BOXES 1, & 2: 25.4 - 43.0 FEET



## EB2-B LL

BOX 3: 43.0 - 45.1 FEET



**SUMMARY OF LABORATORY TEST DATA**  
Soil Classification and Gradation



S&ME, Inc. Raleigh, 3201 Spring Forest Road, Raleigh, North Carolina 27616			
S&ME Project #:	6235-19-003	Date Report:	4/16/2019
State Project No.:	46067.1.1	County:	Guilford County
Federal ID No.:	NA	TIP No.:	B-5353
Project Name:	Replace Bridge No. 147 on US 29/70 & I-85 BR over SR 1009 with Dual Bridges – Left Lane Bridge No. 147, Right Lane Bridge No. 1289		
Client Name:	NCDOT GEU		
	Client Address: Raleigh, NC		

Sample No.	Boring No.	Station No.	Offset	Alignment	Sample Depth (ft)	AASHTO Classification		Total % Passing				Total Mortar Fraction (%)				LL	PL	PI	Organic	Moist. %	
								Sieve #				Coarse Sand	Fine Sand	Silt	Clay						
								10	40	60	200										
SS-1	EB2-B LL	24+75	21 RT	-L-	3.7 - 5.2	A-6	(6)	97	88	82	60	16	31	35	18	36	22	14	-	20.1	
SS-2	EB2-B LL	24+75	21 RT	-L-	18.7 - 20.2	A-7-5	(6)	99	80	70	49	29	27	22	22	49	30	19	-	39.5	
SS-3	EB1-B LL	22+56	19 RT	-L-	3.6 - 5.1	A-6	(6)	94	83	77	57	19	29	25	27	35	19	16	-	24.6	
SS-4	EB1-B LL	22+56	19 RT	-L-	13.6 - 15.1	A-7-6	(11)	100	96	91	74	9	26	37	29	41	26	15	-	31.6	
SS-13	EB2-A LL	24+79	22 LT	-L-	8.3 - 9.8	A-7-6	(19)	94	87	83	71	12	19	29	41	50	21	29	-	38.6	
SS-15	EB1-A LL	22+70	23 LT	-L-	8.1 - 9.6	A-7-6	(19)	96	89	86	74	11	19	33	38	48	21	27	-	33.4	
SS-16	EB1-A LL	22+70	23 LT	-L-	18.1 - 19.6	A-4	(0)	77	62	54	38	30	28	27	15	32	22	10	-	19.2	

References / Comments / Deviations: ND=Not Determined.

AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT      AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils      AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO M145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

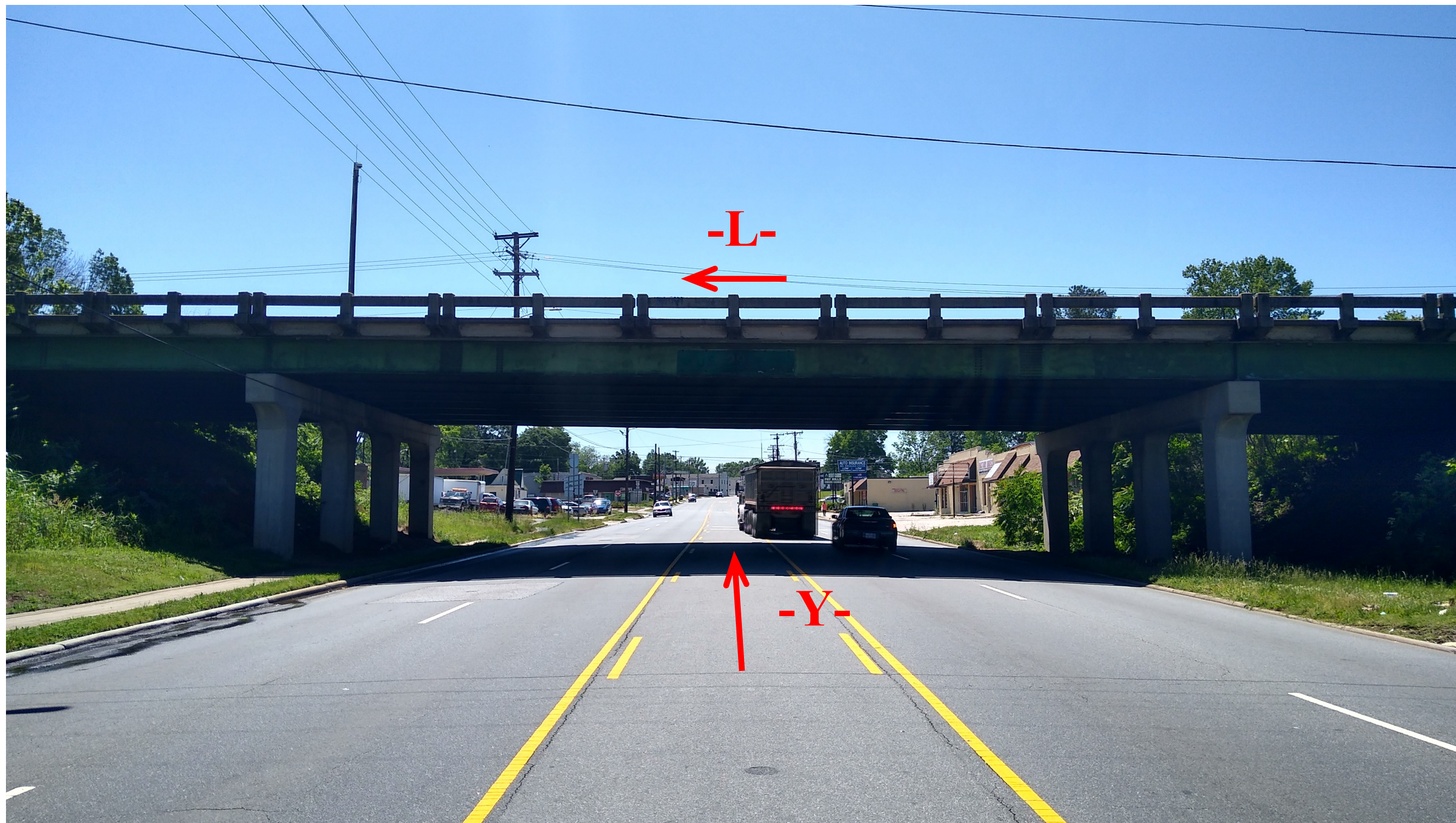
<u>Karen Warner</u>	_____	<u>NCDOT 118-06-0305</u>	<u>Joey Daily</u>	<u>Project Manager</u>
Technician Name:	Signature	Certification #	Technical Responsibility:	Position

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# SITE PHOTOGRAPH

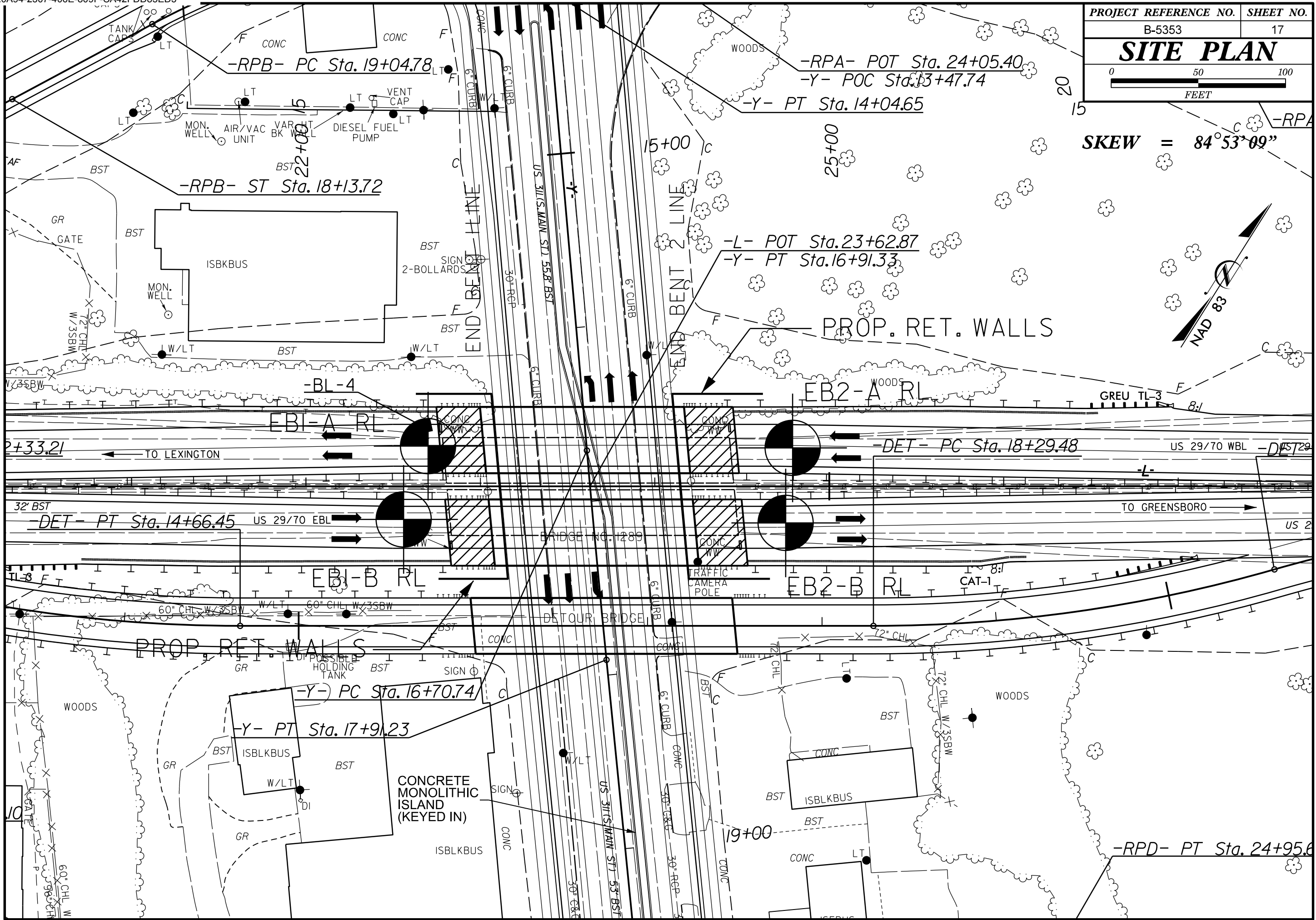
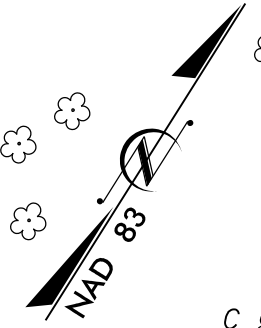
Bridge No. 147 on -L- (US 29/70) over SR 1009



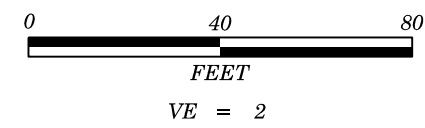
Looking Southeast

PROJECT REFERENCE NO.	SHEET NO.
B-5353	17
<b>SITE PLAN</b>	

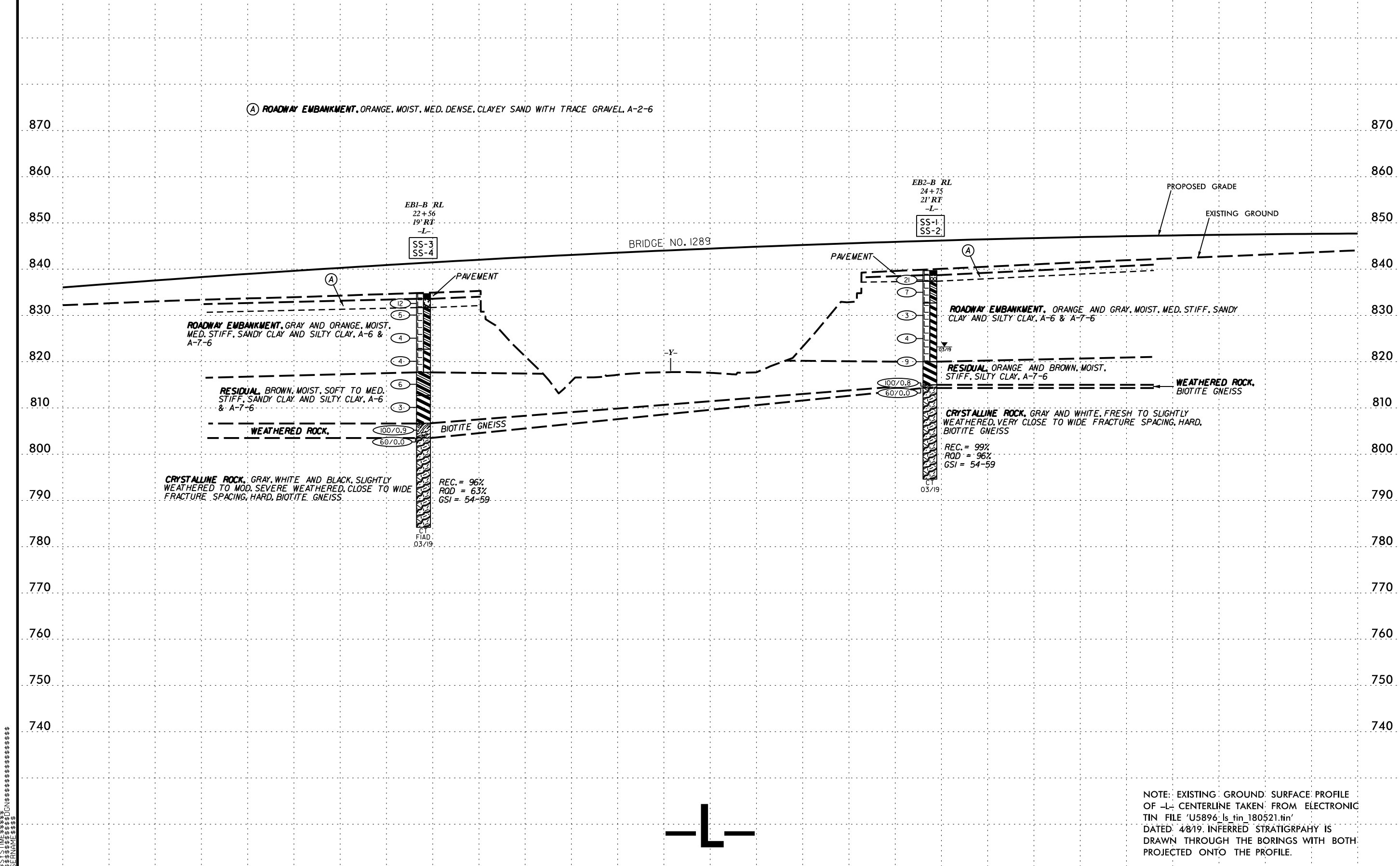
SKEW = 84° 53' 09"



5/14/99



<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-5353	18
<b>PROFILE PROJECTED ALONG -L-</b>	



NOTE: EXISTING GROUND SURFACE PROFILE OF -L- CENTERLINE TAKEN FROM ELECTRONIC TIN FILE 'U5896' Is tin\_180521.tin' DATED 4/8/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

21+00

22+00

23+00

24+00

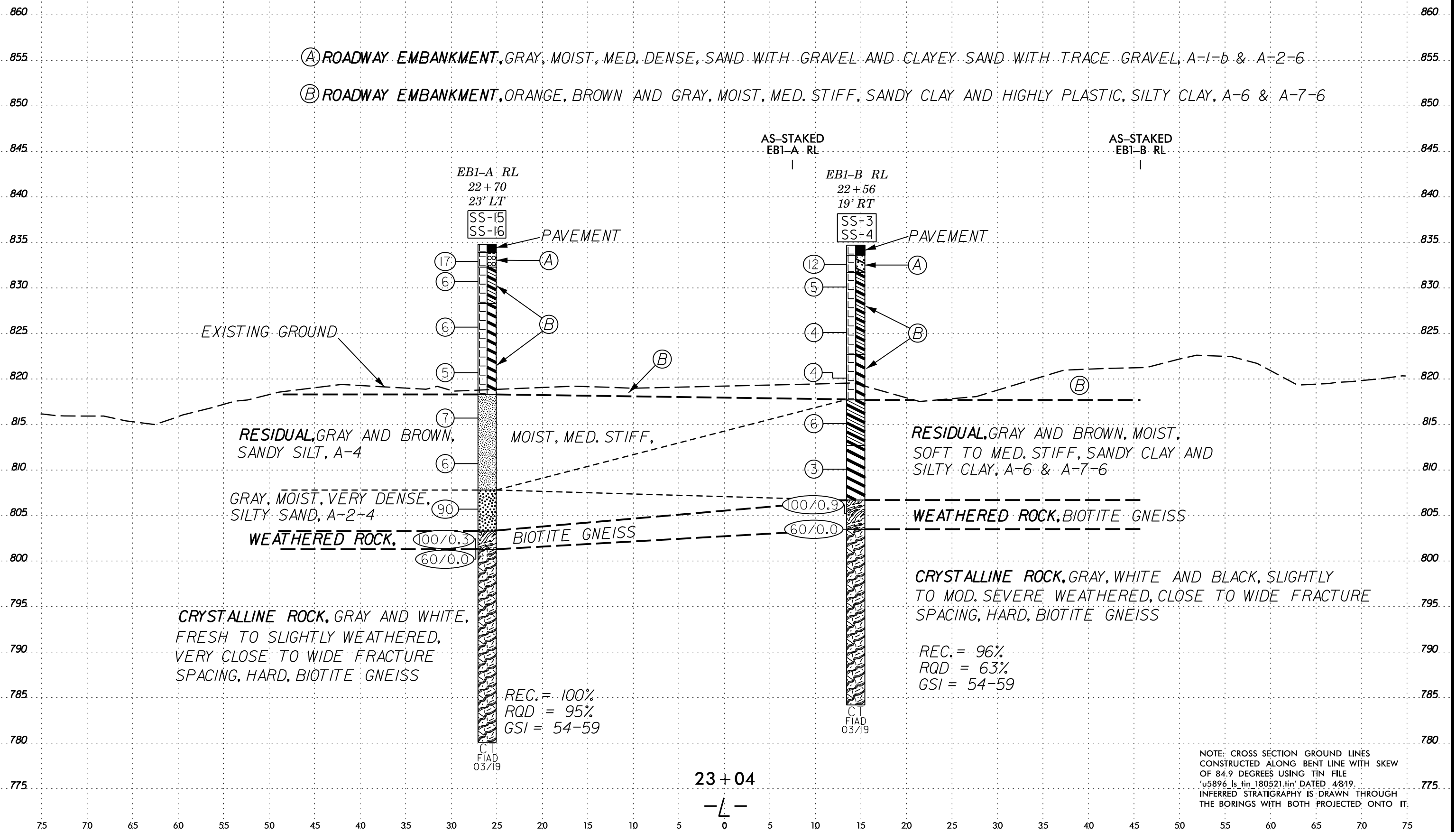
25+00

26+00

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 Tel: 415.774.2977  
 Fax: 415.774.2978  
 www.systemsdesign.com

# CROSS SECTION ALONG END BENT 1

BRIDGE NO. 1289



23 + 04

NOTE: CROSS SECTION GROUND LINES CONSTRUCTED ALONG BENT LINE WITH SKEW OF 84.9 DEGREES USING TIN FILE 'u5896\_ls.tin\_180521.tin' DATED 4/8/19. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO IT.





# GEOTECHNICAL BORING REPORT BORE LOG

# GEOTECHNICAL BORING REPORT CORE LOG

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.									
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)								
BORING NO. EB1-B RL		STATION 22+56		OFFSET 19 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 834.7 ft		TOTAL DEPTH 50.5 ft		NORTHING 796,599		EASTING 1,706,377									
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic									
DRILLER White, J.		START DATE 03/18/19		COMP. DATE 03/19/19		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					
835														834.7 GROUND SURFACE 0.0	
	833.6	1.1	12	10	2								M	833.6 ROADWAY EMBANKMENT (PAVEMENT) 1.1	
	831.1	3.6	4	2	3								SS-3 25%	831.7 GRAY, CLAYEY SAND WITH TRACE GRAVEL, A-2-6 3.0	
830														GRAY AND ORANGE, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6	
	826.1	8.6	2	2	2								M		
825															
	821.1	13.6	3	2	2								SS-4 32%		
820															
	816.1	18.6	3	3	3								M	817.7 RESIDUAL BROWN, SANDY CLAY AND SILTY CLAY, A-6 & A-7-6 17.0	
815															
	811.1	23.6	2	2	1								M		
810															
	806.1	28.6	33	67/0.4										806.7 WEATHERED ROCK (BIOTITE GNEISS) 28.0	
805															
	803.5	31.2	60/0.0											803.5 CRYSTALLINE ROCK 31.2	
800														GRAY, WHITE AND BLACK, SLIGHTLY WEATHERED TO MODERTATELY SEVERE WEATHERED, CLOSE TO WIDE FRACTURE SPACING, HARD, BIOTITE GNEISS	
														REC = 96% RQD = 63% GSI = 54-59	
795															
790															
785															
														784.2 Boring Terminated at Elevation 784.2 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS) 50.5	

WBS 46067.1.1		TIP B-5353		COUNTY GUILFORD		GEOLOGIST Blythe, J.						
SITE DESCRIPTION REPLACE BRIDGE NO. 147 ON US 29/70 & I-85 BR (-L-) OVER SR 1009							GROUND WTR (ft)					
BORING NO. EB1-B RL		STATION 22+56		OFFSET 19 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 834.7 ft		TOTAL DEPTH 50.5 ft		NORTHING 796,599		EASTING 1,706,377						
DRILL RIG/HAMMER EFF./DATE SME9563 CME-550X 87% 01/24/2020				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic						
DRILLER White, J.		START DATE 03/18/19		COMP. DATE 03/19/19		SURFACE WATER DEPTH N/A						
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) %			
803.5											Begin Coring @ 31.2 ft	
	803.5	31.2	4.8	N=60/0.0 2:30/0.8 2:14/1.0 7:50/1.0 5:00/1.0 3:00/1.0	(4.0) 83%	(1.3) 27%		(18.5) 96%	(12.1) 63%		803.5 CRYSTALLINE ROCK 31.2	
800											GRAY, WHITE AND BLACK, SLIGHTLY WEATHERED TO MODERTATELY SEVERE WEATHERED, CLOSE TO WIDE FRACTURE SPACING, HARD, BIOTITE GNEISS	
	798.7	36.0	5.0	6:03/1.0 4:02/1.0 3:52/1.0 3:44/1.0 4:00/1.0	(5.0) 100%	(3.6) 72%					REC = 96% RQD = 63% GSI = 54-59	
795												
	793.7	41.0	5.0	2:45/1.0 2:17/1.0 2:50/1.0 2:35/1.0 3:02/1.0	(5.0) 100%	(4.3) 86%						
790												
	788.7	46.0	4.5	4:59/1.0 6:08/1.0 8:00/1.0 16:57/1.0 6:20/0.5	(4.5) 100%	(2.9) 64%						
785												
	784.2	50.5									Boring Terminated at Elevation 784.2 ft IN CRYSTALLINE ROCK (BIOTITE GNEISS)	50.5

NCDOT BORE DOUBLE B5353\_GEO\_BRDG0289.GPJ NC\_DOT.GDT 5/29/20

NCDOT CORE DOUBLE B5353\_GEO\_BRDG0289.GPJ NC\_DOT.GDT 5/29/20



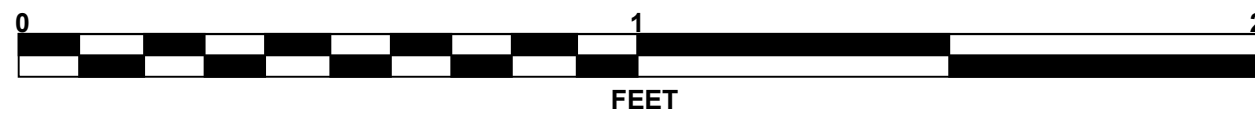




# CORE PHOTOGRAPHS

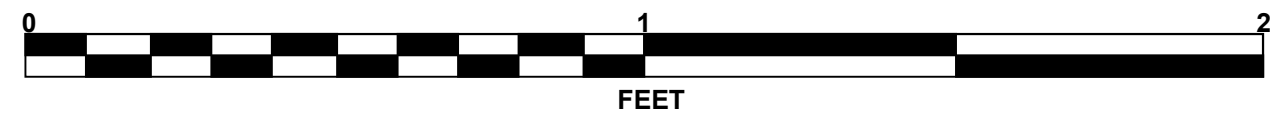
## EB1-A RL

BOXES 1 & 2: 34.2 - 48.7 FEET



## EB1-A RL

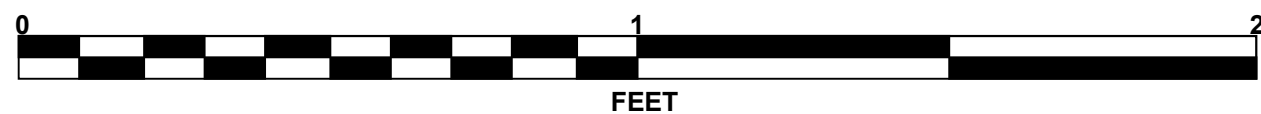
BOX 3: 48.7 - 54.7 FEET



# CORE PHOTOGRAPHS

## EB1-B RL

BOXES 1, & 2: 31.2 - 49.3 FEET



## EB1-B RL

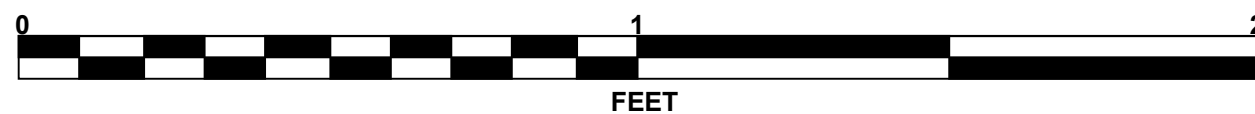
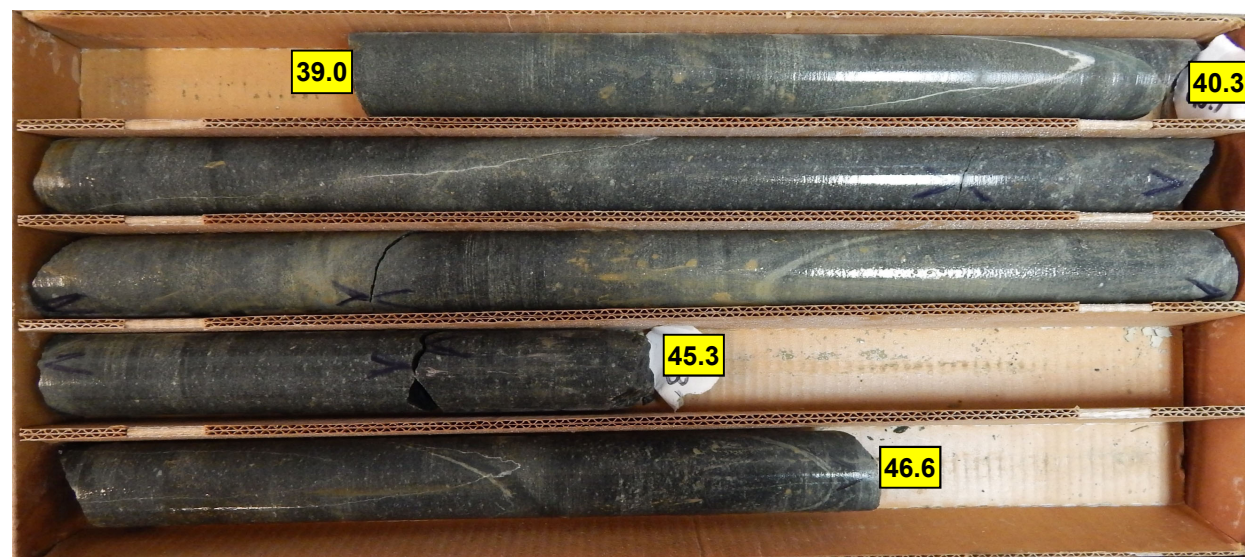
BOX 3: 49.3 - 50.5 FEET



# CORE PHOTOGRAPHS

## EB2-A RL

BOXES 1, & 2: 30.3 - 46.6 FEET



## EB2-A RL

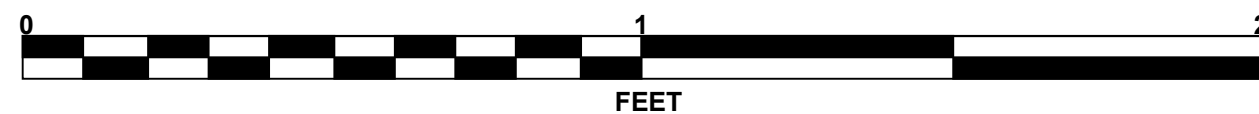
BOX 3: 46.6 - 50.3 FEET



# CORE PHOTOGRAPHS

## EB2-B RL

BOXES 1, & 2: 25.4 - 43.0 FEET



## EB2-B RL

BOX 3: 43.0 - 45.1 FEET





# SITE PHOTOGRAPH

Bridge No. 1289 on -L- (US 29/70) over SR 1009



Looking East towards End Bent 2