

REFERENCE: SF-520087

PROJECT: 17BP.8.R.113

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY LEE
PROJECT DESCRIPTION BRIDGE NO. 87 ON SR 1133
(LEE AVE.) OVER GASTORS CREEK

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.8.R.113	1	8

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.

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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

B. WORLEY, PG

L. GONZALEZ

D. SUTTON

INVESTIGATED BY B. WORLEY, PG

DRAWN BY B. WORLEY, PG

CHECKED BY D. DEWEY, PE

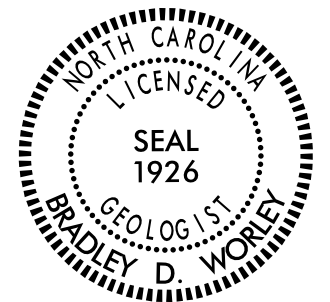
SUBMITTED BY Summit Design and Engineering Services, PLLC

DATE OCTOBER, 2016

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Brad Worley

11/4/2016

CA8721209ECB476
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...

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.

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.

TERMS AND DEFINITIONS
ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
AQUIFER - A WATER BEARING FORMATION OR STRATA.

SOIL LEGEND AND AASHTO CLASSIFICATION
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS

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

WEATHERING
FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.

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.

CONSISTENCY OR DENSENESS
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)

MISCELLANEOUS SYMBOLS
ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
SOIL SYMBOL
ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT

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.

SLIP PLANE - 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.

SOIL MOISTURE - CORRELATION OF TERMS
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION

RECOMMENDATION SYMBOLS
UNDERCUT
SHALLOW UNDERCUT
UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK

ABBREVIATIONS
AR - AUGER REFUSAL
BT - BORING TERMINATED
CL - CLAY

TEXTURE OR GRAIN SIZE
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)

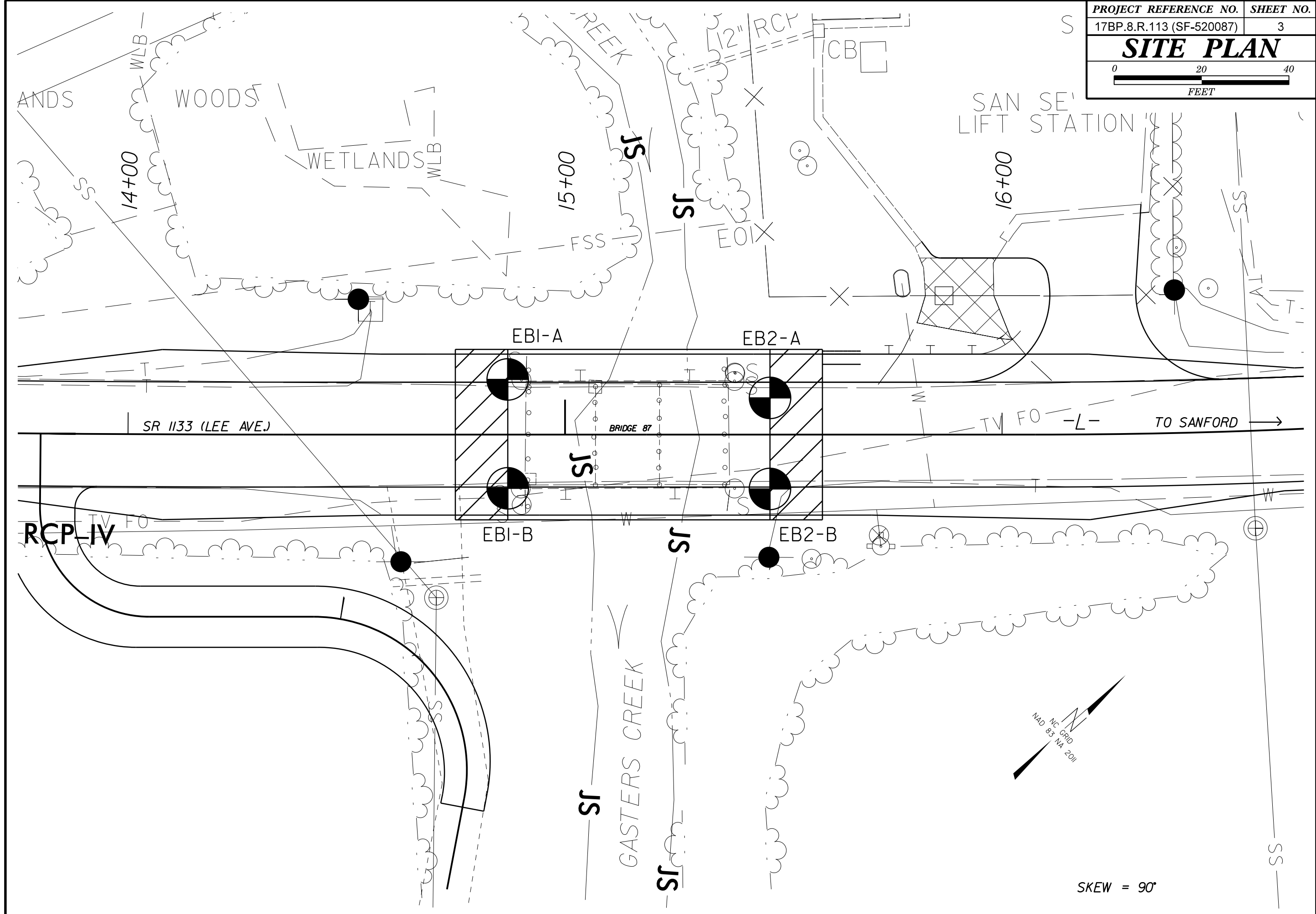
PLASTICITY
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC

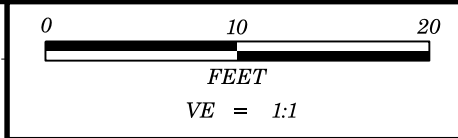
EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: CME-45C, CME-55, CME-550X, VANE SHEAR TEST, PORTABLE HOIST

FRACTURE SPACING
TERM SPACING
VERY WIDE MORE THAN 10 FEET
WIDE 3 TO 10 FEET

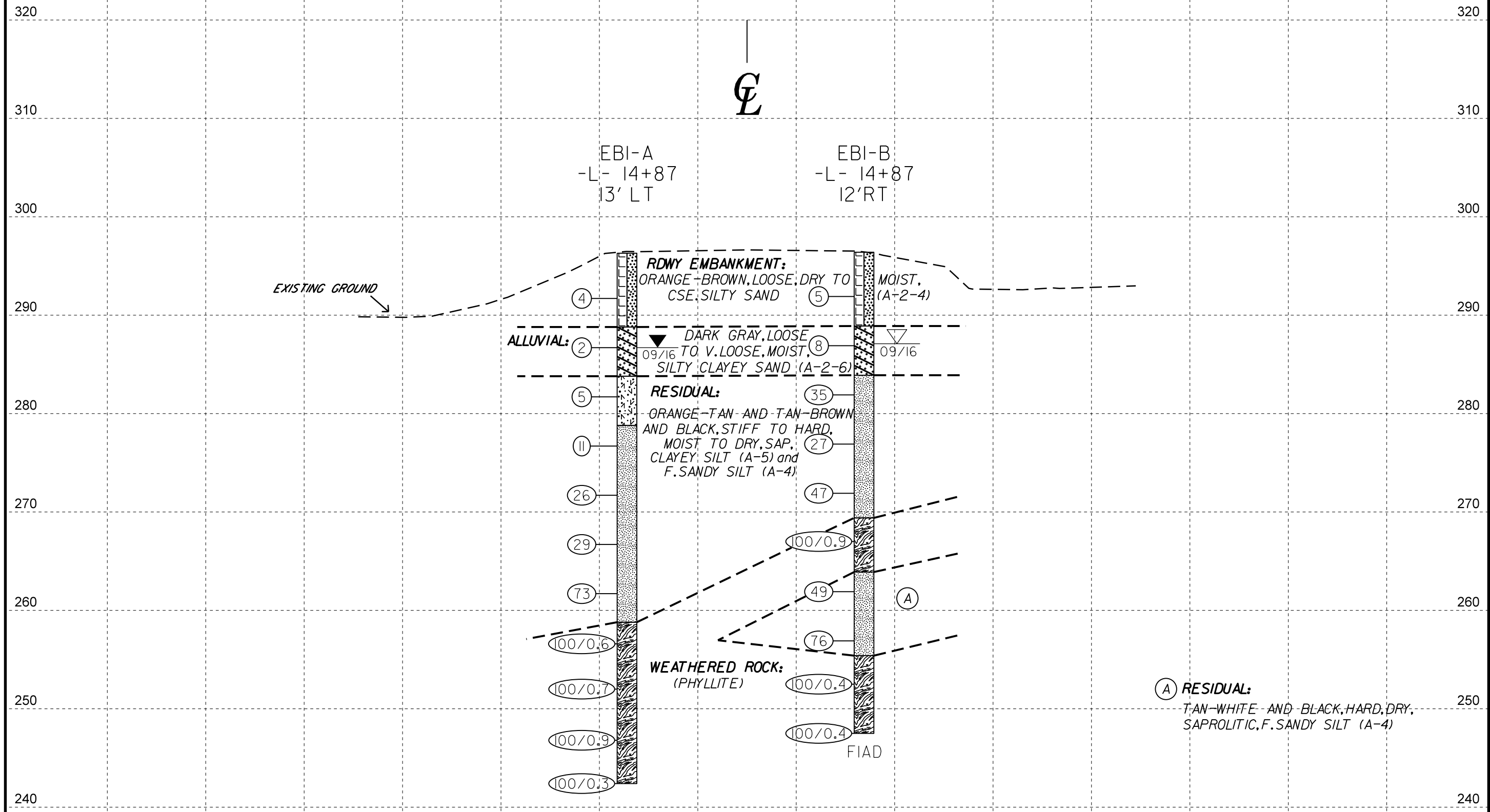
INDURATION
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.

PROJECT REFERENCE NO.	SHEET NO.
17BP.8.R.113 (SF-520087)	3
SITE PLAN	





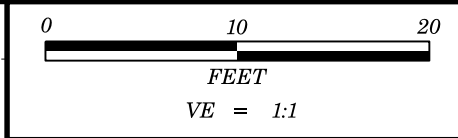
PROJECT REFERENCE NO.	SHEET
17BP.8.R.113 (SF-520087)	4
BRIDGE 87	
EBI CROSS SECTION	



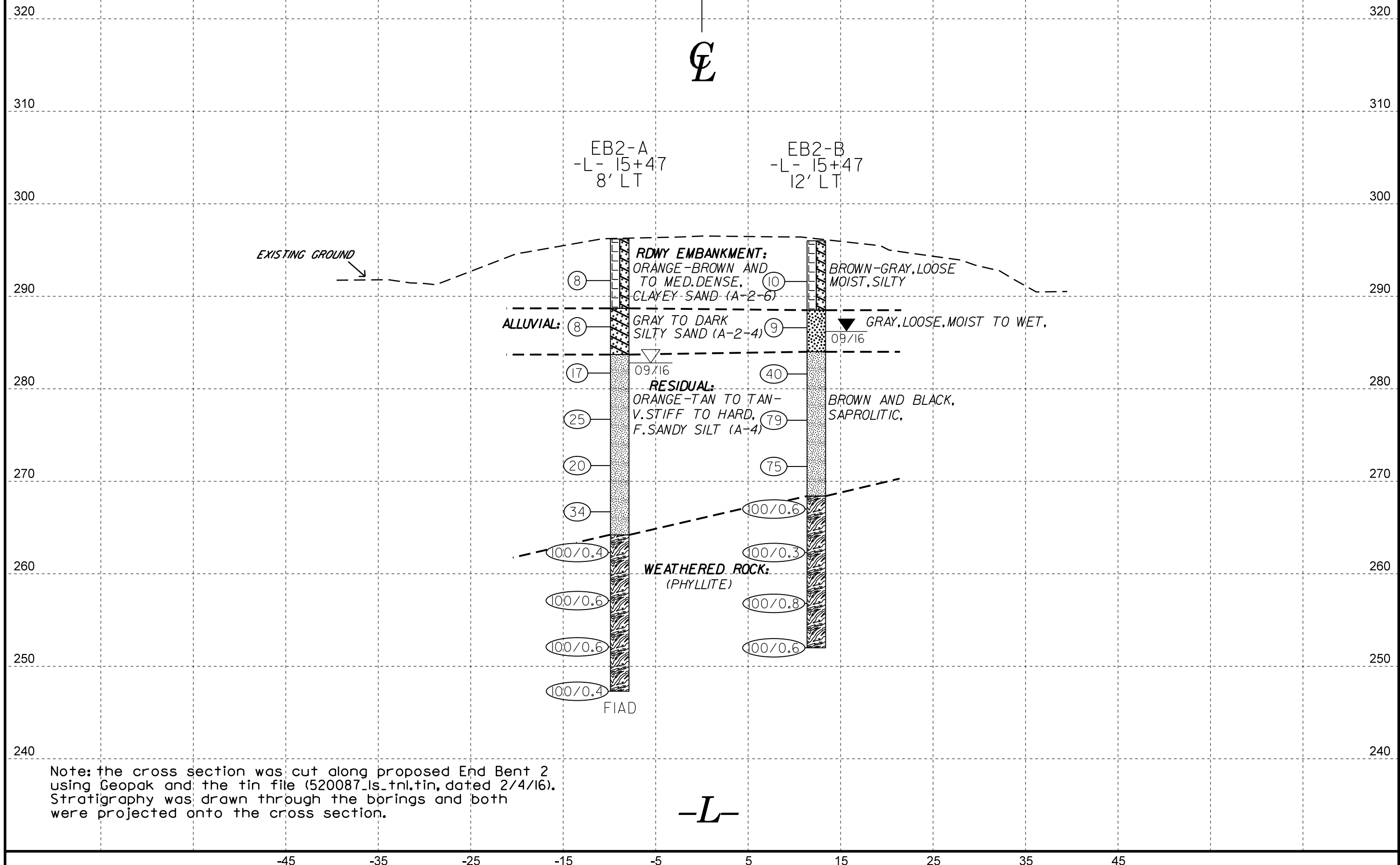
Note: the cross section was cut along proposed End Bent I using Geopak and the tin file (520087_ls_tnl.tin, dated 2/4/16). Stratigraphy was drawn through the borings and both were projected onto the cross section.

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-45 -35 -25 -15 -5 5 15 25 35 45



PROJECT REFERENCE NO.	SHEET
17BP.8.R.113 (SF-520087)	5
BRIDGE 87	
EB2 CROSS SECTION	



Note: the cross section was cut along proposed End Bent 2 using Geopak and the tin file (520087_ls_tnl.tin, dated 2/4/16). Stratigraphy was drawn through the borings and both were projected onto the cross section.

-L-

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 17BP.8.R.113		TIP SF-520087		COUNTY LEE		GEOLOGIST B. Worley, PG									
SITE DESCRIPTION Bridge No. 87 on SR 1133 (Lee Ave) over Gastors Creek							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 14+87		OFFSET 13 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 296.3 ft		TOTAL DEPTH 53.9 ft		NORTHING 608,832		EASTING 1,958,399									
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 93% 11/06/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER L. Gonzalez		START DATE 09/14/16		COMP. DATE 09/14/16		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					
300														296.3	0.0
295	292.7	3.6	2	2	2							M	ROADWAY EMBANKMENT Brown and orange-brown, Silty cse. SAND (A-2-4)		
290	287.7	8.6	1	1	1							M	ALLUVIAL Dark gray, Silty Clayey SAND (A-2-6)	7.5	
285	282.7	13.6	1	2	3							M	RESIDUAL Orange-tan, saprolitic, Clayey SILT (A-5)	12.5	
280	277.7	18.6	4	5	6							M	Orange-tan and tan-brown and black, saprolitic, f. Sandy SILT (A-4)	17.5	
275	272.7	23.6	4	9	17							M			
270	267.7	28.6	5	10	19							D			
265	262.7	33.6	21	37	36							M			
260	257.7	38.6	17	80	20/0.1								WEATHERED ROCK (phyllite)	37.5	
255	252.7	43.6	27	73/0.2											
250	247.7	48.6	36	64/0.4											
245	242.7	53.6	100/0.3												
														242.4	53.9
Boring Terminated at Elevation 242.4 ft in Weathered Rock (phyllite)															

WBS 17BP.8.R.113		TIP SF-520087		COUNTY LEE		GEOLOGIST B. Worley, PG									
SITE DESCRIPTION Bridge No. 87 on SR 1133 (Lee Ave) over Gastors Creek							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 14+87		OFFSET 12 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 296.4 ft		TOTAL DEPTH 48.9 ft		NORTHING 608,816		EASTING 1,958,417									
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 93% 11/06/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER L. Gonzalez		START DATE 09/15/16		COMP. DATE 09/15/16		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					
300														296.4	0.0
295	292.9	3.5	1	2	3							D	ROADWAY EMBANKMENT Orange-brown, Silty, cse. SAND (A-2-4)		
290	287.9	8.5	1	3	5							D	ALLUVIAL Dark gray, Silty Clayey SAND (A-2-6)	7.5	
285	282.9	13.5	5	9	26							M	RESIDUAL Tan and black to gray, white, and black, saprolitic, f. Sandy SILT (A-4)	12.5	
280	277.9	18.5	3	8	19							D	(harder drilling at 27.0')		
275	272.9	23.5	11	17	30							D			
270	267.9	28.5	59	41/0.4								D	WEATHERED ROCK (phyllite)	27.0	
265	262.9	33.5	14	21	28							D	RESIDUAL Tan-white, and black, saprolitic, f. Sandy SILT (A-4)	32.5	
260	257.9	38.5	11	35	41							D	(harder drilling at 41.0')		
255	252.9	43.5	100/0.4									D	WEATHERED ROCK (phyllite)	41.0	
250	247.9	48.5	100/0.4									D			
Boring Terminated at Elevation 247.5 ft in Weathered Rock (phyllite)															

NCDOT BORE DOUBLE_SF520087_GEO_BRDG0087_GINT.GPJ_NC_DOT.GDT_10/21/16

GEOTECHNICAL BORING REPORT BORE LOG

WBS 17BP.8.R.113		TIP SF-520087		COUNTY LEE		GEOLOGIST B. Worley, PG												
SITE DESCRIPTION Bridge No. 87 on SR 1133 (Lee Ave) over Gastors Creek							GROUND WTR (ft)											
BORING NO. EB2-A		STATION 15+47		OFFSET 8 ft LT		ALIGNMENT -L-												
COLLAR ELEV. 296.2 ft		TOTAL DEPTH 48.9 ft		NORTHING 608,875		EASTING 1,958,441												
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 93% 11/06/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic													
DRILLER L. Gonzalez		START DATE 09/14/16		COMP. DATE 09/14/16		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)				
300																296.2	0.0	GROUND SURFACE
295																		ROADWAY EMBANKMENT
	292.7	3.5	3	3	5													Brown-gray, Silty Clayey SAND (A-2-6)
290																		
	287.7	8.5	1	3	5													ALLUVIAL
285																		
	282.7	13.5	4	8	9													RESIDUAL
280																		
	277.7	18.5	5	11	14													
275																		
	272.7	23.5	8	10	10													
270																		
	267.7	28.5	6	6	28													
265																		
	262.7	33.5	100/0.4															
260																		
	257.7	38.5	78	22/0.1														
255																		
	252.7	43.5	60	40/0.1														
250																		
	247.7	48.5	100/0.4															

WBS 17BP.8.R.113		TIP SF-520087		COUNTY LEE		GEOLOGIST B. Worley, PG												
SITE DESCRIPTION Bridge No. 87 on SR 1133 (Lee Ave) over Gastors Creek							GROUND WTR (ft)											
BORING NO. EB2-B		STATION 15+47		OFFSET 12 ft RT		ALIGNMENT -L-												
COLLAR ELEV. 296.0 ft		TOTAL DEPTH 44.0 ft		NORTHING 608,861		EASTING 1,958,457												
DRILL RIG/HAMMER EFF./DATE SUM3123 CME-550X 93% 11/06/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic													
DRILLER L. Gonzalez		START DATE 09/15/16		COMP. DATE 09/15/16		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)				
300																		GROUND SURFACE
295																		ROADWAY EMBANKMENT
	292.6	3.4	3	4	6													Orange-brown, Silty Clayey SAND (A-2-6)
290																		
	287.6	8.4	1	4	5													ALLUVIAL
285																		
	282.6	13.4	6	14	26													RESIDUAL
280																		
	277.6	18.4	14	38	41													
275																		
	272.6	23.4	13	37	38													
270																		
	267.6	28.4	79	21/0.1														
265																		
	262.6	33.4	100/0.3															
260																		
	257.6	38.4	34	66/0.3														
255																		
	252.6	43.4	49	51/0.1														

NCDOT BORE DOUBLE_SF520087_GEO_BRDG0087_GINT.GPJ_NC_DOT.GDT_10/21/16

SITE PHOTOGRAPH
Bridge No. 87 on SR 1133 (Lee Ave.) over Gastors Creek



View Facing South (Downstation)



View Facing North (Upstation)