

REFERENCE: SF-900012

PROJECT: 17BP.5.R.62

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

STRUCTURE  
SUBSURFACE INVESTIGATION

COUNTY VANCE  
PROJECT DESCRIPTION BRIDGE NO.12 ON SR 1105  
(KITTRELL COLLEGE ROAD) OVER LONG CREEK

SITE DESCRIPTION 19+65 -L-

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
2A	SUPPLEMENTAL LEGEND (GSI)
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-II	BORE LOGS & CORE REPORT
12	LAB TEST RESULTS
13	CORE PHOTOGRAPH
14	SITE PHOTOGRAPH

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	SF-900012	1	15

CAUTION NOTICE

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

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

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

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

PERSONNEL

CT TANG, EI

CAROLINA DRILLING

M. RAEFORD

R. DILWORTH

INVESTIGATED BY CT TANG, EI

DRAWN BY D BROWN, PE

CHECKED BY E MAYR, PE

SUBMITTED BY D BROWN, PE

DATE FEBRUARY 2017



2/15/2017

DocuSigned by:

C06817E5F770411

SIGNATURE

DATE

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



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

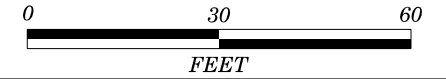
**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS**

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)

<p><b>GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)</b></p> <p>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.</p> <p><b>STRUCTURE</b></p>	<p><b>SURFACE CONDITIONS</b></p> <p>VERY GOOD Very rough, fresh unweathered surfaces</p> <p>GOOD Rough, slightly weathered, iron stained surfaces</p> <p>FAIR Smooth, moderately weathered and altered surfaces</p> <p>POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments</p> <p>VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings</p> <p>DECREASING SURFACE QUALITY →</p>					<p><b>GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)</b></p> <p>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.</p> <p><b>COMPOSITION AND STRUCTURE</b></p>	<p><b>SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)</b></p> <p>VERY GOOD - Very Rough, fresh unweathered surfaces</p> <p>GOOD - Rough, slightly weathered surfaces</p> <p>FAIR - Smooth, moderately weathered and altered surfaces</p> <p>POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments</p> <p>VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings</p>				
<p><b>STRUCTURE</b></p> <p>INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities</p> <p>BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets</p> <p>VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets</p> <p>BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity</p> <p>DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces</p> <p>LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes</p> <p>DECREASING INTERLOCKING OF ROCK PIECES ↓</p>	<p>90</p> <p>80</p> <p>70</p> <p>60</p> <p>50</p> <p>40</p> <p>30</p> <p>20</p> <p>10</p> <p>N/A</p> <p>N/A</p>					<p><b>A. Thick bedded, very blocky sandstone</b> The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.</p> <p><b>B. Sandstone with thin inter-layers of siltstone</b></p> <p><b>C. Sandstone and siltstone in similar amounts</b></p> <p><b>D. Siltstone or silty shale with sandstone layers</b></p> <p><b>E. Weak siltstone or clayey shale with sandstone layers</b></p> <p><b>F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure</b></p> <p><b>G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers</b></p> <p><b>H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.</b></p> <p>→ Means deformation after tectonic disturbance</p>	<p>70</p> <p>60</p> <p>50</p> <p>40</p> <p>30</p> <p>20</p> <p>10</p> <p>A</p> <p>B</p> <p>C</p> <p>D</p> <p>E</p> <p>F</p> <p>G</p> <p>H</p>				

# SITE PLAN

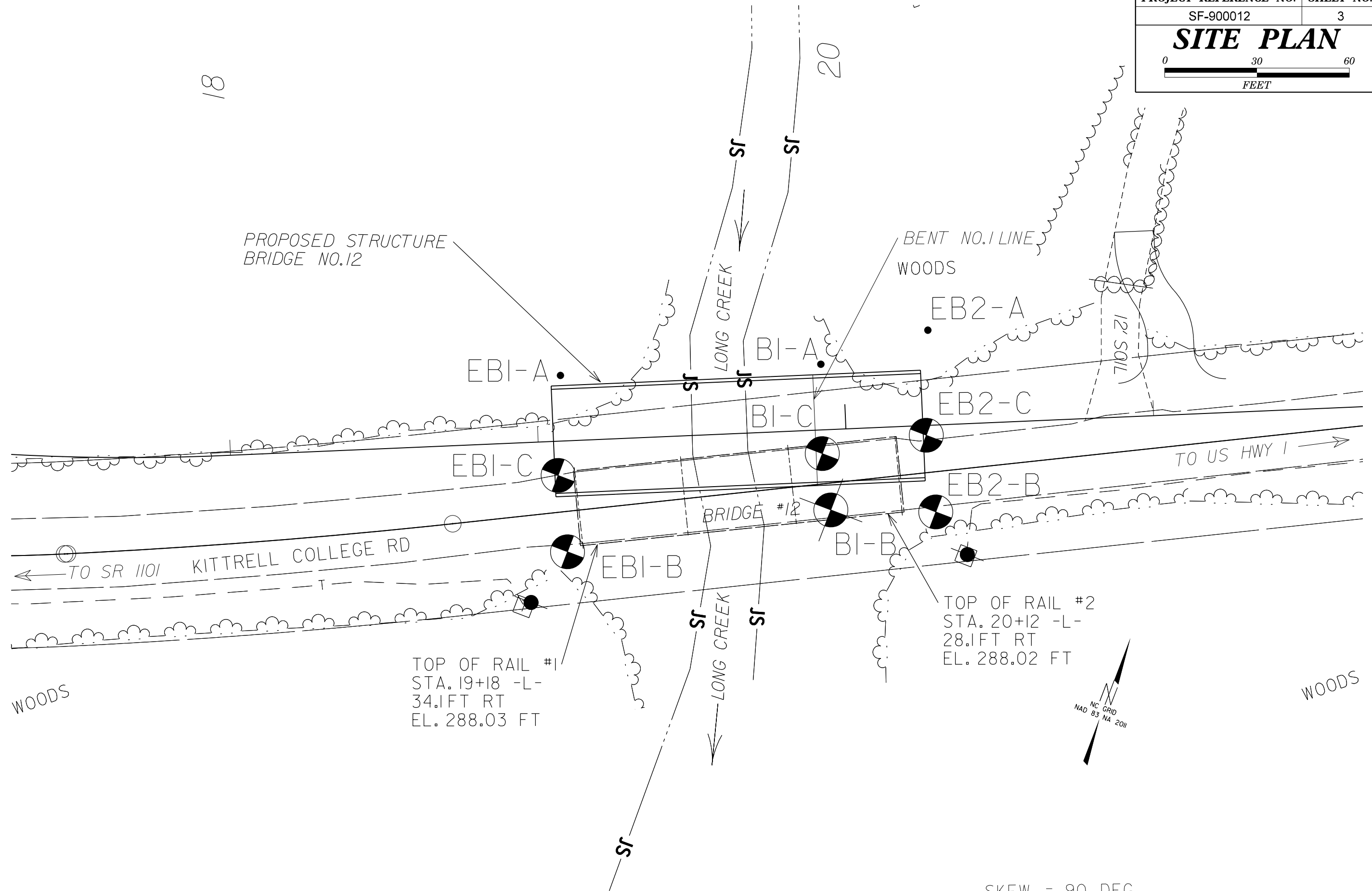


18

20

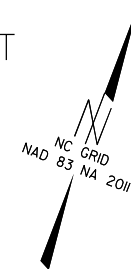
PROPOSED STRUCTURE  
BRIDGE NO.12

BENT NO.1 LINE  
WOODS

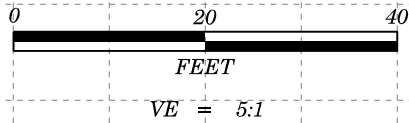


TOP OF RAIL #1  
STA. 19+18 -L-  
34.1FT RT  
EL. 288.03 FT

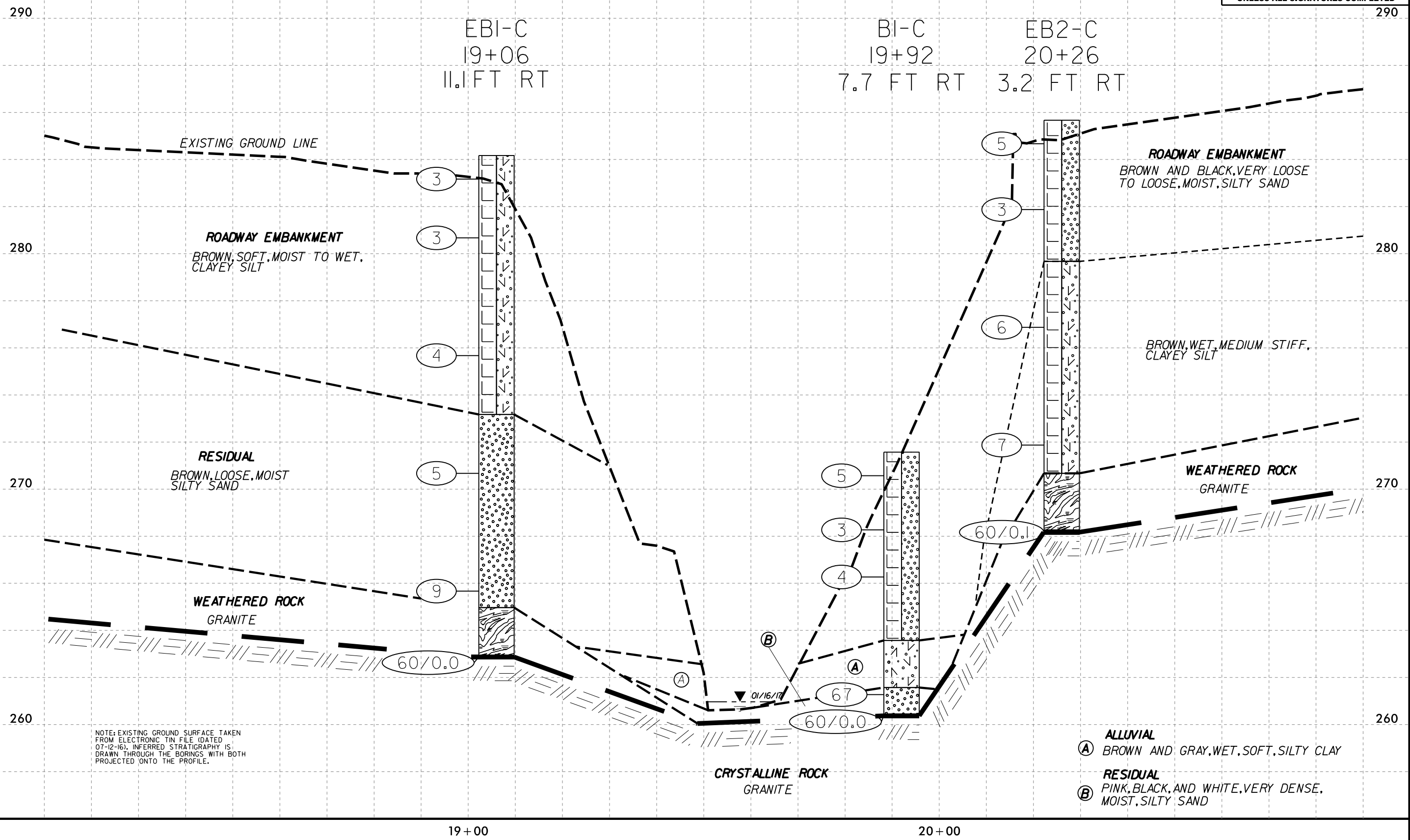
TOP OF RAIL #2  
STA. 20+12 -L-  
28.1FT RT  
EL. 288.02 FT



SKEW = 90 DEG.



# PROFILE ALONG -L- CENTERLINE



19+00

20+00

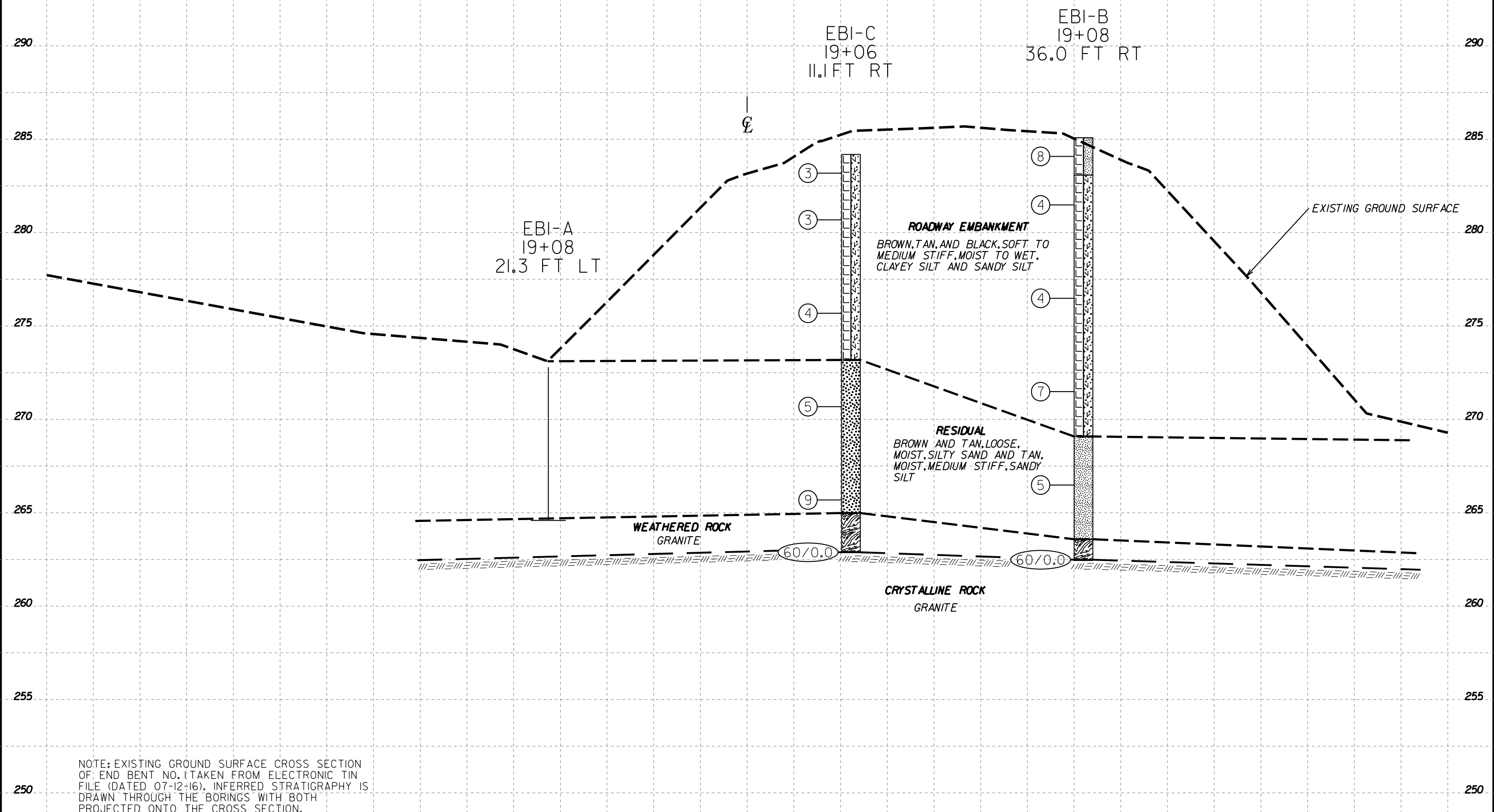
VE = 2:1



PROJ. REFERENCE NO.	SHEET NO.
SF-900012	5

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

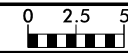
# END BENT NO. 1 CROSS SECTION



19 + 03.81

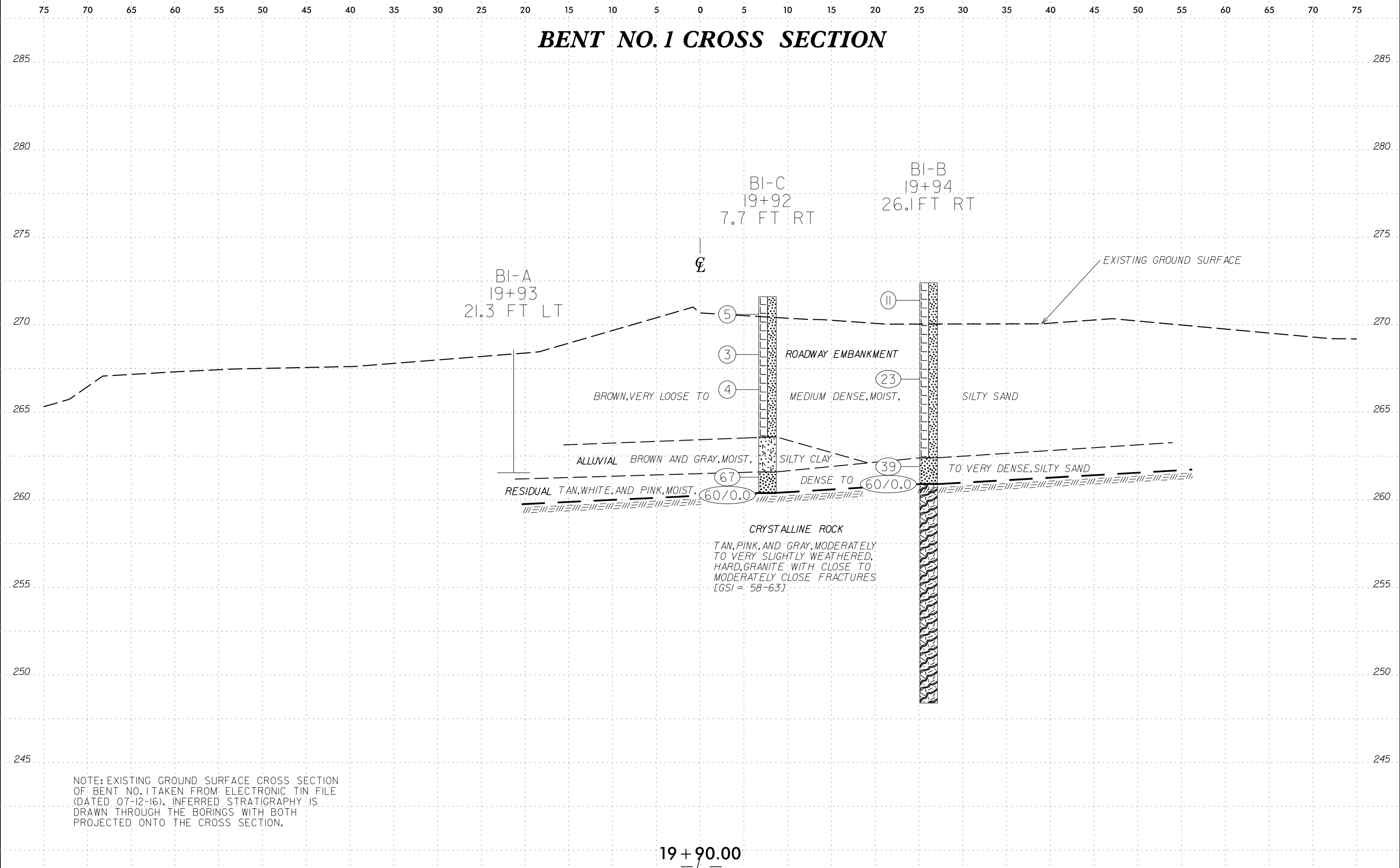
-L-

NOTE: EXISTING GROUND SURFACE CROSS SECTION OF END BENT NO. 1 TAKEN FROM ELECTRONIC TIN FILE (DATED 07-12-16). INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



VE = 2:1

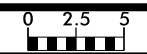
# BENT NO. 1 CROSS SECTION



NOTE: EXISTING GROUND SURFACE CROSS SECTION OF BENT NO. 1 TAKEN FROM ELECTRONIC TIN FILE (DATED 07-12-16). INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

19+90.00

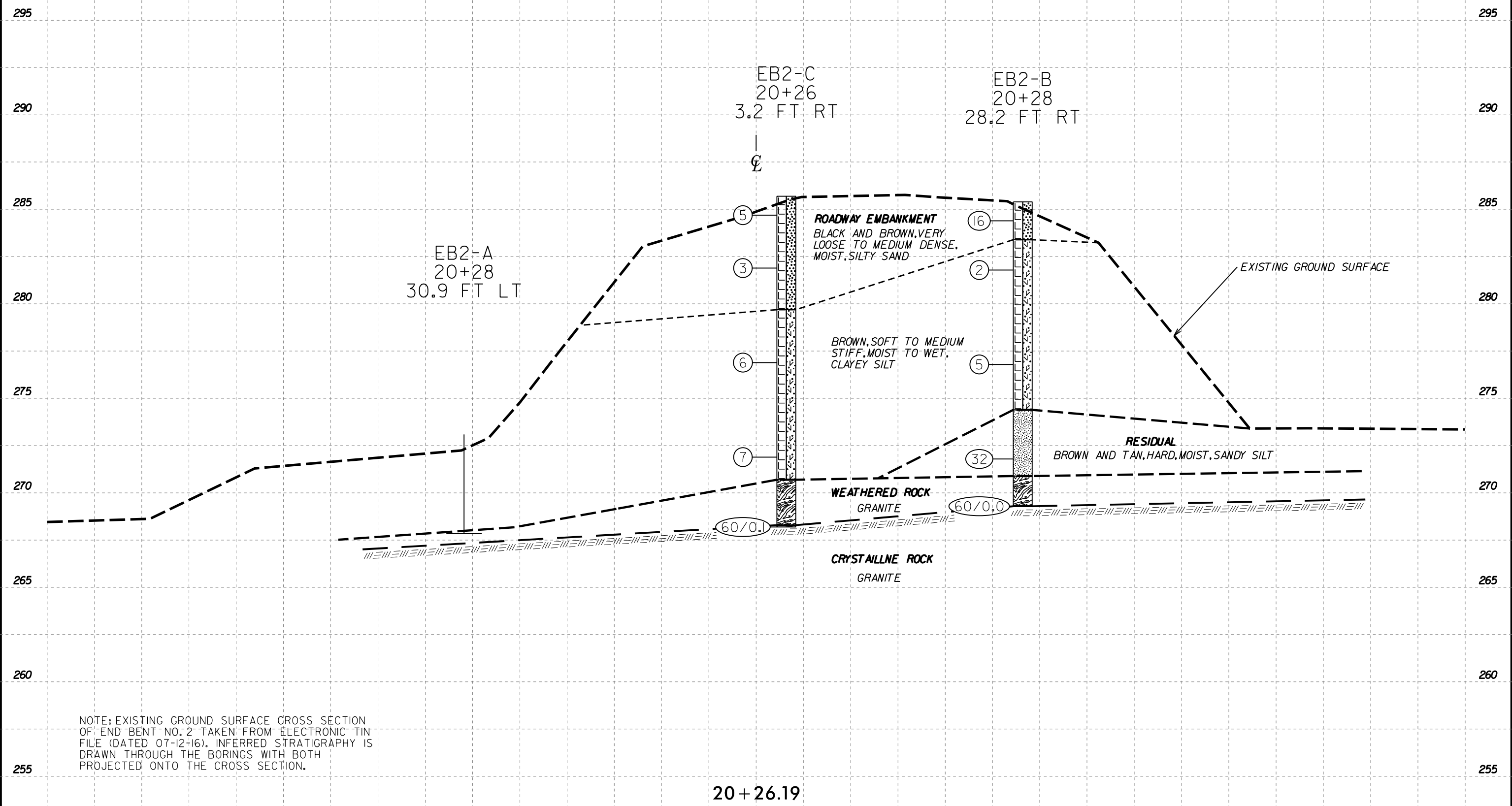
VE = 2:1



PROJ. REFERENCE NO.	SHEET NO.
SF-900012	7

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

# END BENT NO. 2 CROSS SECTION



NOTE: EXISTING GROUND SURFACE CROSS SECTION OF END BENT NO. 2 TAKEN FROM ELECTRONIC TIN FILE (DATED 07-12-16). INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.5.R.64		TIP SF-900012		COUNTY VANCE		GEOLOGIST C.T. Tang, EI									
SITE DESCRIPTION Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							GROUND WTR (ft)								
BORING NO. EB1-C		STATION 19+06		OFFSET 11 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 284.2 ft		TOTAL DEPTH 21.3 ft		NORTHING 901,166		EASTING 2,161,181									
DRILL RIG/HAMMER EFF./DATE BRI2974 CME-45C 84% 05/04/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Radford		START DATE 01/16/17		COMP. DATE 01/16/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
285	284.2	0.0											284.2	GROUND SURFACE	0.0
280	281.7	2.5	1	1	2							M	ROADWAY EMBANKMENT Brown, Clayey Silt, with Trace Roots and gravel		
	276.7	7.5	1	2	2							M			
270	271.7	12.5	2	2	3							W	RESIDUAL Brown and Tan, Silty Sand	11.0	
	266.7	17.5	17	5	4							M			
265	262.9	21.3	60/0.0									M	WEATHERED ROCK (Granite)	19.2	
													Boring Terminated with Standard Penetration Test Refusal at Elevation 262.9 ft on Crystalline Rock (Granite)		21.3

WBS 17BP.5.R.64		TIP SF-900012		COUNTY VANCE		GEOLOGIST C.T. Tang, EI									
SITE DESCRIPTION Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 19+08		OFFSET 36 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 285.1 ft		TOTAL DEPTH 22.6 ft		NORTHING 901,143		EASTING 2,161,192									
DRILL RIG/HAMMER EFF./DATE BRI2974 CME-45C 84% 05/04/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Radford		START DATE 01/16/17		COMP. DATE 01/16/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
290															
285	285.1	0.0											285.1	GROUND SURFACE	0.0
	282.5	2.6	2	3	5							M	ROADWAY EMBANKMENT Black and Brown, Sandy Silt, with Trace Roots Brown and Tan, Clayey Silt, with some gravel	2.0	
280	277.5	7.6	2	2	2							M			
	272.5	12.6	1	2	2							M			
270	267.5	17.6	3	3	4							M	RESIDUAL Tan, Sandy Silt	16.0	
	262.5	22.6	3	3	2							M			
265	262.5	22.6	60/0.0										WEATHERED ROCK (Granite)	21.5	
													Boring Terminated with Standard Penetration Test Refusal at Elevation 262.5 ft on Crystalline Rock (Granite)		22.6

NCDOT BORE DOUBLE 900012\_GEO\_BRDG0012\_BH.GPJ NC\_DOT.GDT 02/08/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

<b>WBS</b> 17BP.5.R.64		<b>TIP</b> SF-900012		<b>COUNTY</b> VANCE		<b>GEOLOGIST</b> C.T. Tang, EI										
<b>SITE DESCRIPTION</b> Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							<b>GROUND WTR (ft)</b>									
<b>BORING NO.</b> B1-C		<b>STATION</b> 19+92		<b>OFFSET</b> 8 ft RT		<b>ALIGNMENT</b> -L-										
<b>COLLAR ELEV.</b> 271.6 ft		<b>TOTAL DEPTH</b> 11.2 ft		<b>NORTHING</b> 901,203		<b>EASTING</b> 2,161,258										
<b>DRILL RIG/HAMMER EFF./DATE</b> BRI2974 CME-45C 84% 05/04/2016				<b>DRILL METHOD</b> NW Casing w/ SPT		<b>HAMMER TYPE</b> Automatic										
<b>DRILLER</b> M. Radford		<b>START DATE</b> 01/17/17		<b>COMP. DATE</b> 01/17/17		<b>SURFACE WATER DEPTH</b> 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)		
275																
	271.6	0.0												271.6	0.0	GROUND SURFACE
	269.3	2.3	1	2	3	•	•	•	•	•		M				<b>ROADWAY EMBANKMENT</b>
	267.3	4.3	3	1	2	•	•	•	•	•		M				Brown, Silty Sand, with Trace Gravel
	265		2	2	2	•	•	•	•	•		M				
	262.3	9.3	3	32	35	•	•	•	•	•				263.6	8.0	<b>ALLUVIAL</b>
	260.4	11.2				•	•	•	•	•		M		261.6	10.0	Brown and Gray, Silty Clay
			60/0.0											260.4	11.2	<b>RESIDUAL</b>
																Pink, Black and White, Silty Sand, with Some Weathered Rock Fragments
																Boring Terminated with Standard Penetration Test Refusal at Elevation 260.4 ft on Crystalline Rock (Granite)

NCDOT BORE DOUBLE 900012\_GEO\_BRDG0012\_BH.GPJ NC\_DOT.GDT 02/08/17

### GEOTECHNICAL BORING REPORT BORE LOG

<b>WBS</b> 17BP.5.R.62		<b>TIP</b> SF-900012		<b>COUNTY</b> VANCE		<b>GEOLOGIST</b> C.T. Tang, EI	
<b>SITE DESCRIPTION</b> Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B1-B		<b>STATION</b> 19+94		<b>OFFSET</b> 26 ft RT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 272.4 ft		<b>TOTAL DEPTH</b> 24.0 ft		<b>NORTHING</b> 901,186		<b>EASTING</b> 2,161,267	
<b>DRILL RIG/HAMMER EFF./DATE</b> BRI2974 CME-45C 84% 05/04/2016				<b>DRILL METHOD</b> NW Casing w/ SPT		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> M. Radford		<b>START DATE</b> 01/17/17		<b>COMP. DATE</b> 01/17/17		<b>SURFACE WATER DEPTH</b> 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)	
275																
272.4	272.4	0.0		5	7	4									272.4	
270																
267.9		4.5		9	12	11										
265																
262.9		9.5		16	15	24										
260.9		11.5		60/0												
260.9																
255																
250																

**ROADWAY EMBANKMENT**  
Brown, Silty Sand, with Trace Gravel

**RESIDUAL**  
Pink and Tan, Silty Sand, with Some Weathered Rock Fragments

**CRYSTALLINE ROCK**  
Tan, Pink, and Gray, Moderately to Very Slightly Weathered, Hard, Granite with Close to Moderately Close Fractures [GSI = 58-63]

Boring Terminated with Standard Penetration Test Refusal at Elevation 248.4 ft in Crystalline Rock (Granite)

<b>WBS</b> 17BP.5.R.62		<b>TIP</b> SF-900012		<b>COUNTY</b> VANCE		<b>GEOLOGIST</b> C.T. Tang, EI	
<b>SITE DESCRIPTION</b> Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B1-B		<b>STATION</b> 19+94		<b>OFFSET</b> 26 ft RT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 272.4 ft		<b>TOTAL DEPTH</b> 24.0 ft		<b>NORTHING</b> 901,186		<b>EASTING</b> 2,161,267	
<b>DRILL RIG/HAMMER EFF./DATE</b> BRI2974 CME-45C 84% 05/04/2016				<b>DRILL METHOD</b> NW Casing w/ SPT		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> M. Radford		<b>START DATE</b> 01/17/17		<b>COMP. DATE</b> 01/17/17		<b>SURFACE WATER DEPTH</b> N/A	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RQD (%)	SAMP. NO.	STRATA REC. (%)	RQD (ft)	LOG	TOTAL RUN 12.5 ft	
260.9	260.9	11.5	5.0	N=60/0.0 17:30/1.0 23:12/1.0 12:41/1.0 15:51/1.0 29:39/1.0	(3.9)	(3.1)		(11.4)	(10.0)			
255	255.9	16.5	5.0	49:30/1.0 9:09/1.0 10:58/1.0 11:15/1.0 12:49/1.0	(5.0)	(4.8)	RS-1 RS-2					
250	250.9	21.5	2.5	17:05 23:20/1.0 21:10/0.5	(2.5)	(2.1)						
248.4	248.4	24.0			100%	84%						

Begin Coring @ 11.5 ft

**CRYSTALLINE ROCK**  
Tan, Pink, and Gray, Moderately to Very Slightly Weathered, Hard, Granite with Close to Moderately Close Fractures [GSI = xx-yy]

Boring Terminated at Elevation 248.4 ft in Crystalline Rock (Granite)

NCDOT BORE DOUBLE 900012\_GEO\_BRDG0012\_BH.GPJ NC\_DOT.GDT 02/02/17

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 17BP.5.R.64		TIP SF-900012		COUNTY VANCE		GEOLOGIST C.T. Tang, EI									
SITE DESCRIPTION Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							GROUND WTR (ft)								
BORING NO. EB2-C		STATION 20+26		OFFSET 3 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 285.7 ft		TOTAL DEPTH 17.5 ft		NORTHING 901,220		EASTING 2,161,288									
DRILL RIG/HAMMER EFF./DATE BRI2974 CME-45C 84% 05/04/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Radford		START DATE 01/16/17		COMP. DATE 01/16/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
290															
285	285.7	0.0	2	2	3								M	285.7	0.0
	282.9	2.8	1	1	2								M		
280														279.7	6.0
	277.9	7.8	1	2	4								W		
275															
	272.9	12.8	2	4	3								W	270.7	15.0
270														270.7	15.0
	268.3	17.4												268.3	17.4
		60/0.1												268.2	17.5

WBS 17BP.5.R.64		TIP SF-900012		COUNTY VANCE		GEOLOGIST C.T. Tang, EI									
SITE DESCRIPTION Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek							GROUND WTR (ft)								
BORING NO. EB2-B		STATION 20+28		OFFSET 28 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 285.4 ft		TOTAL DEPTH 16.1 ft		NORTHING 901,198		EASTING 2,161,299									
DRILL RIG/HAMMER EFF./DATE BRI2974 CME-45C 84% 05/04/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Radford		START DATE 01/16/17		COMP. DATE 01/16/17		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
290															
285	285.4	0.0	2	12	4								M	285.4	0.0
	282.8	2.6	1	1	1								M	283.4	2.0
280															
	277.8	7.6	1	2	3								M		
275															
	272.8	12.6	20	21	11								M	274.4	11.0
270														270.9	14.5
	269.3	16.1												269.3	16.1
		60/0.0													

NCDOT BORE DOUBLE 900012\_GEO\_BRDG0012\_BH.GPJ NC\_DOT.GDT 02/08/17

# LAB TEST RESULTS



STEWART

## UNCONFINED COMPRESSIVE STRENGTH OF INTACT ROCK CORE SPECIMEN

ASTM D7012

WBS No.: 17BP.5.R.62

Test Date: 2/2/2017

TIP No.: SF-900012

Tested By: Jeff Evans

County: Vance

Description: Bridge No. 12 on SR 1105 (Kittrell College Road) over Long Creek

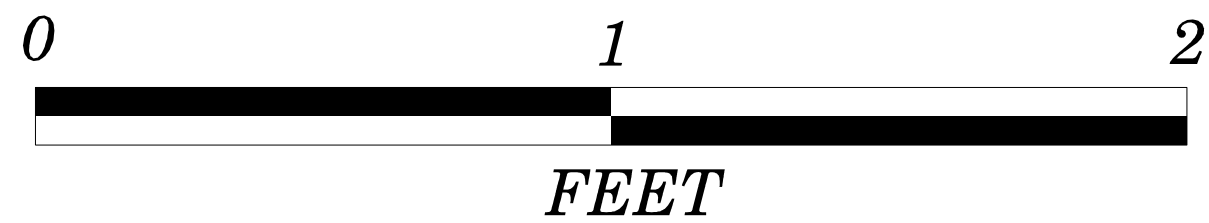
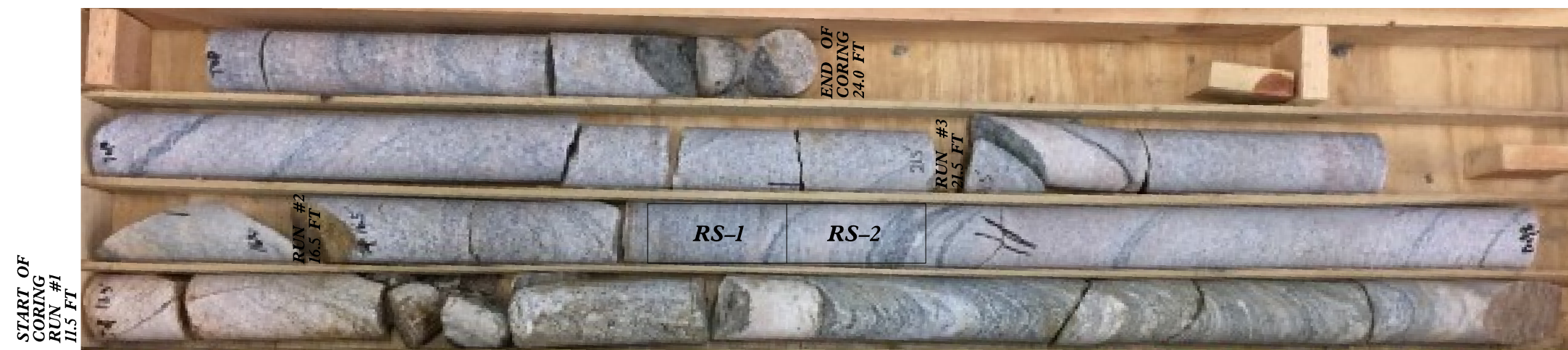
Test No.	1	2		
Boring ID	B1-B	B1-B		
Station	19+94	19+94		
Sample ID	RS-1	RS-2		
Sample Depth, ft	17.3	17.6		
Core Length #1, in.	4.020	4.000		
Core Length #2, in.	4.030	4.000		
Avg. Core Length, in.	4.025	4.000		
Core Dia. #1, in.	1.980	1.980		
Core Dia. #2, in.	1.980	1.980		
Avg. Core Dia., in.	1.980	1.980		
Length/Dia. Ratio	2.03	2.02		
X-Sectional Area, in <sup>2</sup>	3.08	3.08		
Weight, lb	1.22	1.21		
Unit Weight, pcf	170.11	169.77		
Break Type	2	2		
Load at Failure, lb	47,400	41,560		
Correction Factor	1.00	1.00		
<b>Comp. Strength, psi</b>	<b>15,390</b>	<b>13,490</b>		
<b>Comp. Strength, ksf</b>	<b>2,216</b>	<b>1,943</b>		

**Rock Descriptions:**

Test 1 and 2: Tan, pink, and gray, moderately to very slightly weathered, hard, granite with close to moderately close fractures

**Break Types:**

# CORE PHOTOGRAPH



# SITE PHOTOGRAPH



PHOTOGRAPH NO. 1: VIEW OF BRIDGE NO. 12 LOOKING EAST FROM END BENT NO. 1.