

**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

REFERENCE: B-4964

PROJECT: 40242

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM
PROJECT DESCRIPTION BRIDGE NO. 85 ON SR 2600
(MIZPAH CHURCH ROAD) OVER NORFOLK-
SOUTHERN RAILROAD

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5	CROSS SECTIONS
6, 7	BORE LOGS
8	SITE PHOTOGRAPH

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4964	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.

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

N. MOHS, LG

E. MAYR, PE

TRIGON

R. TOOTHMAN

W. ALLEN

INVESTIGATED BY N. MOHS, LG

DRAWN BY N. MOHS, LG

CHECKED BY D. BROWN, PE

SUBMITTED BY D. BROWN, PE

DATE NOVEMBER 2015



DocuSigned by:

Nathan Mohs

7/22/2016

95B48AF1918348A8

DATE

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

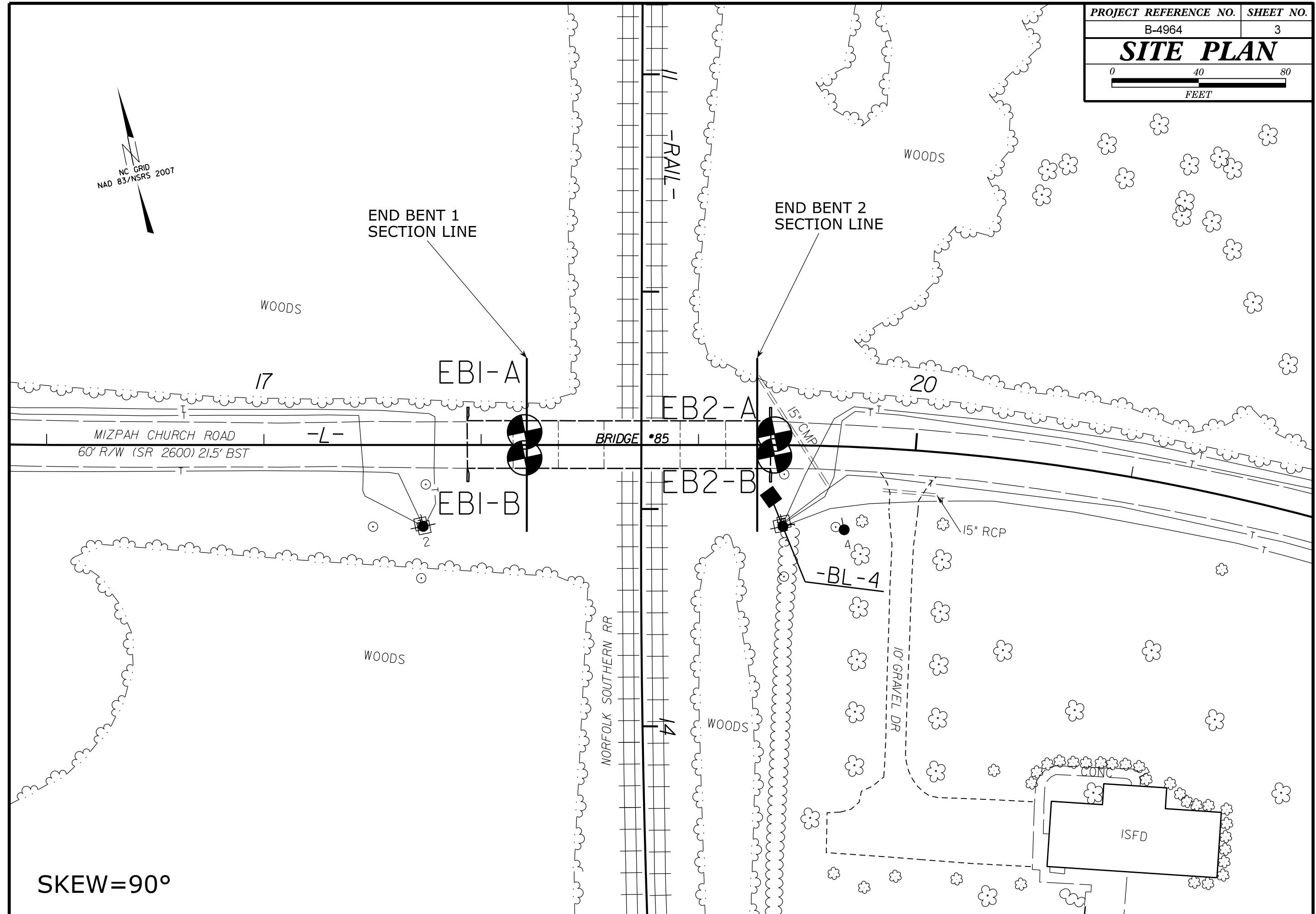
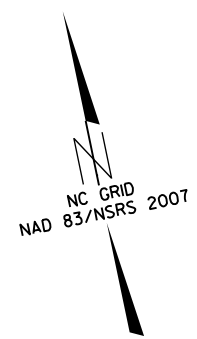
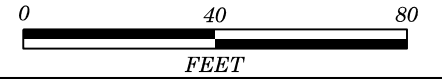
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

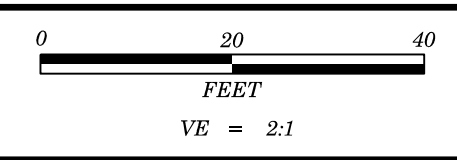
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It contains detailed technical specifications, legends, and definitions for geotechnical engineering.

SITE PLAN

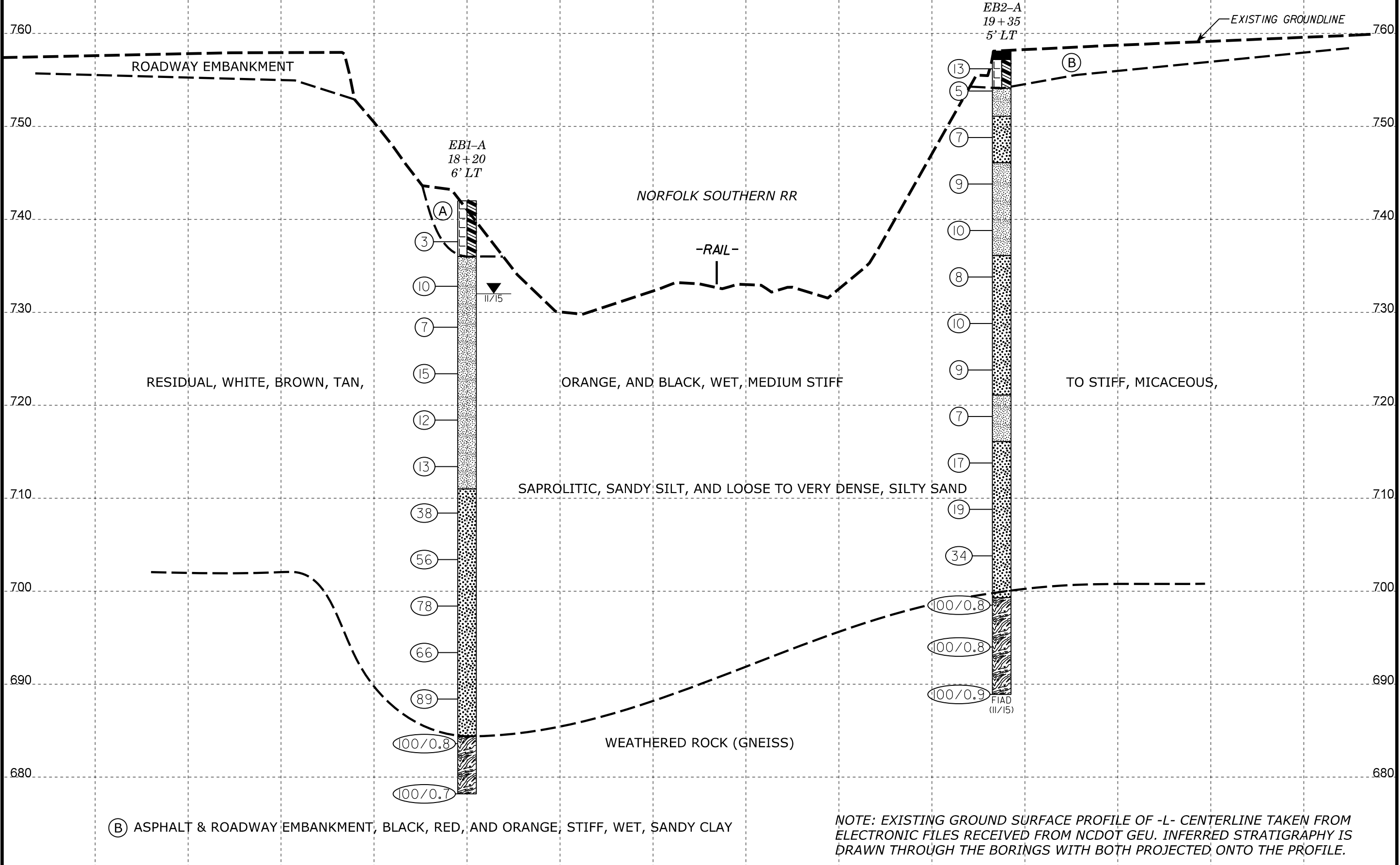


SKEW=90°



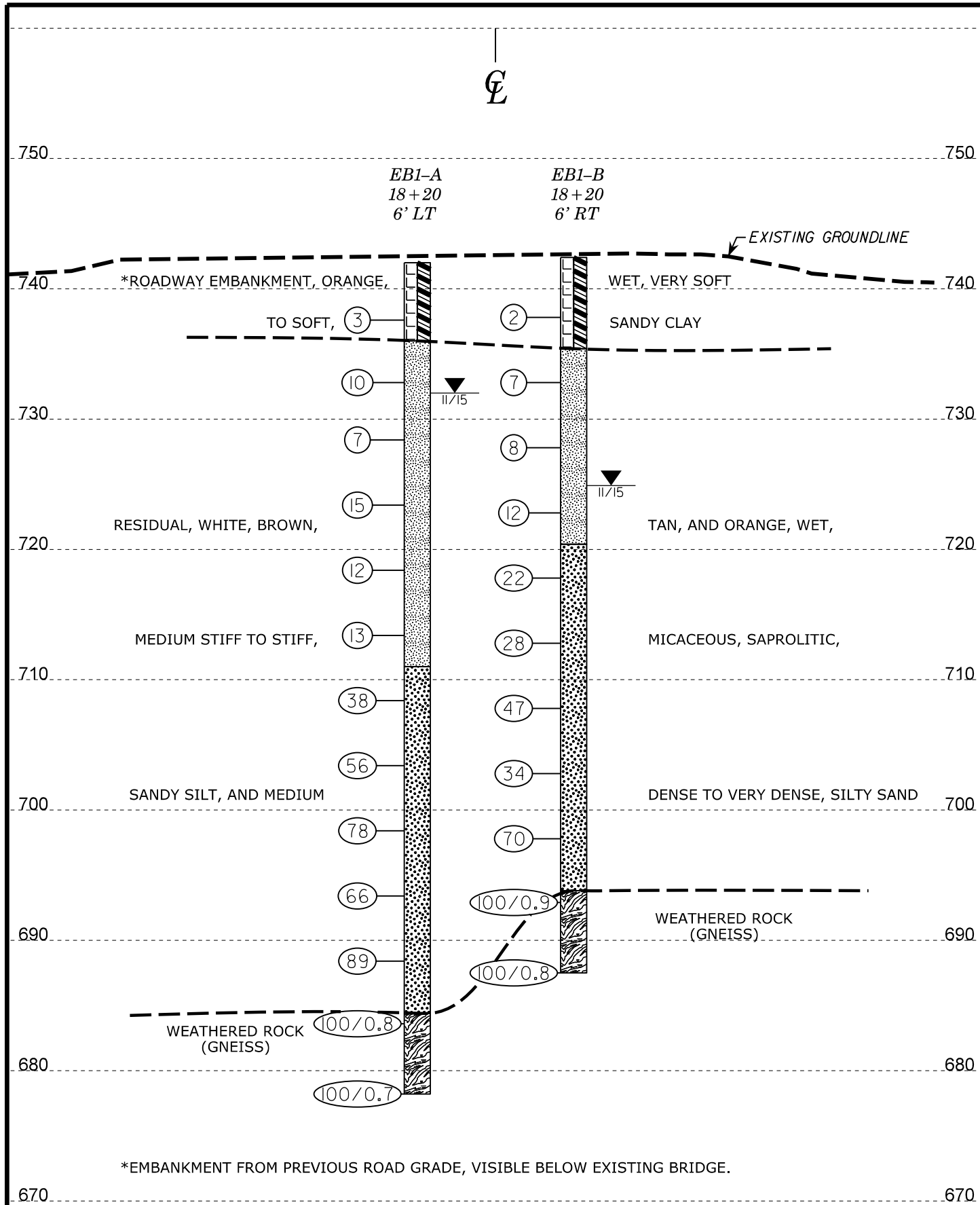
PROJECT REFERENCE NO.	SHEET NO.
B-4964	4
PROFILE OF BORINGS ALONG -L-	

(A) ROADWAY EMBANKMENT*, ORANGE, BROWN, AND BLACK, WET, SOFT, SANDY CLAY
 *EMBANKMENT FROM PREVIOUS ROAD GRADE, VISIBLE BELOW EXISTING BRIDGE.



(B) ASPHALT & ROADWAY EMBANKMENT, BLACK, RED, AND ORANGE, STIFF, WET, SANDY CLAY

NOTE: EXISTING GROUND SURFACE PROFILE OF -L- CENTERLINE TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.

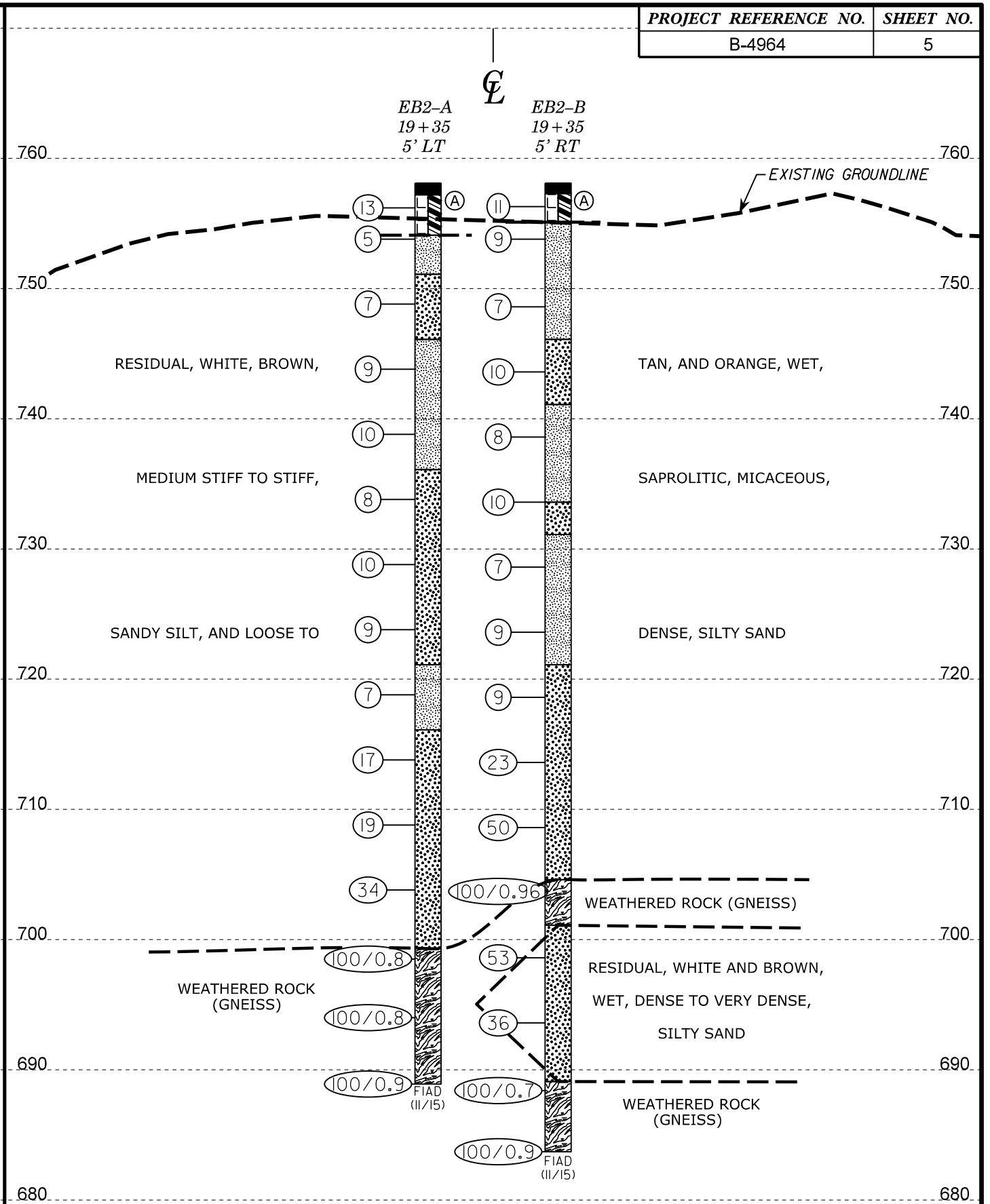


NOTE: EXISTING GROUND SURFACE CROSS SECTION AT -L- 18+21 TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

SKREW=90°

HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

END BENT 1 CROSS SECTION



NOTE: EXISTING GROUND SURFACE CROSS SECTION AT -L- 19+27 TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION.

SKREW=90°

HORIZ. SCALE 0 10 20 (FEET) VE = 1:1

END BENT 2 CROSS SECTION

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 40242.1.1		TIP B-4964		COUNTY ROCKINGHAM		GEOLOGIST E. Mayr										
SITE DESCRIPTION Bridge No. 85 on SR 2600 (Mizpah Church Road) over Norfolk Southern Railroad							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 18+20		OFFSET 6 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 742.0 ft		TOTAL DEPTH 63.8 ft		NORTHING 925,825		EASTING 1,808,728										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 11/03/15		COMP. DATE 11/03/15		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						
745																
740	738.6	3.4	3	2	1											
735	733.8	8.2	3	4	6											
730	729.4	12.6	2	3	4											
725	724.4	17.6	2	6	9											
720	719.4	22.6	4	5	7											
715	714.4	27.6	7	5	8											
710	709.4	32.6	8	18	20											
705	704.4	37.6	13	25	31											
700	699.4	42.6	9	17	61											
695	694.4	47.6	22	31	35											
690	689.4	52.6	24	46	43											
685	684.4	57.6	50	44/0.3												
680	679.4	62.6	31	54	46/0.2											

WBS 40242.1.1		TIP B-4964		COUNTY ROCKINGHAM		GEOLOGIST E. Mayr										
SITE DESCRIPTION Bridge No. 85 on SR 2600 (Mizpah Church Road) over Norfolk Southern Railroad							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 18+20		OFFSET 6 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 742.4 ft		TOTAL DEPTH 54.9 ft		NORTHING 925,813		EASTING 1,808,725										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic										
DRILLER R. Toothman		START DATE 10/29/15		COMP. DATE 10/29/15		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						
745																
740	738.8	3.6	1	0	2											
735	733.8	8.6	2	3	4											
730	728.8	13.6	4	3	5											
725	723.8	18.6	2	4	8											
720	718.8	23.6	5	9	13											
715	713.8	28.6	13	10	18											
710	708.8	33.6	13	27	20											
705	703.8	38.6	12	18	16											
700	698.8	43.6	31	31	39											
695	693.8	48.6	24	76/0.4												
690	688.8	53.6	28	53	47/0.3											

NCDOT BORE DOUBLE B4964_GEO_BRDG0085_BH.GPJ, NC_DOT.GDT 11/20/15

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 40242.1.1		TIP B-4964		COUNTY ROCKINGHAM		GEOLOGIST E. Mayr	
SITE DESCRIPTION Bridge No. 85 on SR 2600 (Mizpah Church Road) over Norfolk Southern Railroad							GROUND WTR (ft)
BORING NO. EB2-A		STATION 19+35		OFFSET 5 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 758.1 ft		TOTAL DEPTH 69.2 ft		NORTHING 925,800		EASTING 1,808,840	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 11/05/15		COMP. DATE 11/05/15		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					
760														758.1 GROUND SURFACE 0.0	
	757.2	0.9	2	8	5									757.2 Asphalt 0.9	
755	754.8	3.3	2	2	3									754.1 ROADWAY EMBANKMENT 4.0	
														Black, Red, and Orange, Sandy Clay with Gravel	
750	749.8	8.3	3	4	3									751.1 RESIDUAL 7.0	
														Tan and White, Micaceous, Sandy Silt	
745	744.8	13.3	3	4	5									746.1 White, Orange, Brown, and Black, Saprolitic, Sandy Silt 12.0	
740	739.8	18.3	3	4	6									746.1 Pink, Tan, and White, Saprolitic, Micaceous, Sandy Silt 12.0	
735	734.8	23.3	5	4	4									736.1 White, Tan, Orange, and Brown, Saprolitic, Micaceous, Silty Sand 22.0	
730	729.8	28.3	3	3	7									736.1 White, Tan, Orange, and Brown, Saprolitic, Micaceous, Silty Sand 22.0	
725	724.8	33.3	3	4	5										
720	719.8	38.3	4	2	5									721.1 Orange and Brown, Micaceous, Sandy Silt 37.0	
715	714.8	43.3	4	8	9									716.1 White and Black, Micaceous, Silty Sand 42.0	
710	709.8	48.3	9	6	13										
705	704.8	53.3	10	13	21										
700	699.8	58.3	27	50	50/0.3									699.3 WEATHERED ROCK (Gneiss) 58.8	
695	694.8	63.3	47	53/0.3											
690	689.8	68.3	45	55/0.4										688.9 Boring Terminated at Elevation 688.9 ft in Weathered Rock (Gneiss) 69.2	

WBS 40242.1.1		TIP B-4964		COUNTY ROCKINGHAM		GEOLOGIST E. Mayr	
SITE DESCRIPTION Bridge No. 85 on SR 2600 (Mizpah Church Road) over Norfolk Southern Railroad							GROUND WTR (ft)
BORING NO. EB2-B		STATION 19+35		OFFSET 5 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 758.1 ft		TOTAL DEPTH 74.4 ft		NORTHING 925,790		EASTING 1,808,838	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD Mud Rotary			HAMMER TYPE Automatic	
DRILLER R. Toothman		START DATE 11/04/15		COMP. DATE 11/04/15		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					
760														758.1 GROUND SURFACE 0.0	
	757.3	0.8	3	6	5									757.3 Asphalt 0.8	
755	754.8	3.3	3	3	6									755.1 ROADWAY EMBANKMENT 3.0	
														Black, Brown, and Orange, Sandy Clay	
750	749.6	8.5	2	3	4									751.1 RESIDUAL 7.0	
														Orange and Brown, Saprolitic, Sandy Silt	
745	744.6	13.5	3	4	6									746.1 White and Brown, Silty Sand 12.0	
740	739.6	18.5	3	3	5									741.1 Brown, Sandy Silt 17.0	
735	734.6	23.5	2	3	7									733.6 Pink, Silty Sand 24.5	
730	729.6	28.5	2	3	4									731.1 Orange and Brown, Sandy Silt 27.0	
725	724.6	33.5	2	4	5										
720	719.6	38.5	2	5	4									721.1 White, Tan, and Brown, Micaceous, Silty Sand 37.0	
715	714.6	43.5	6	10	13										
710	709.6	48.5	24	30	20										
705	704.6	53.5	48	52/0.4										704.6 WEATHERED ROCK (Gneiss) 53.5	
700	699.6	58.5	15	22	31									701.1 RESIDUAL 57.0	
695	694.6	63.5	20	12	24									White and Brown, Silty Sand	
690	689.6	68.5	34	64	36/0.2									689.1 WEATHERED ROCK (Gneiss) 69.0	
685	684.6	73.5	52	48/0.4										683.7 WEATHERED ROCK (Gneiss) 74.4	

NCDOT BORE DOUBLE B4964_GEO_BRDG0085_BH.GPJ, NC_DOT.GDT 11/20/15

SITE PHOTOGRAPH



VIEW LOOKING NORTHWEST AT BRIDGE 85

REFERENCE: B-4964

PROJECT: 40242

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ROCKINGHAM
PROJECT DESCRIPTION BRIDGE NO. 85 ON SR 2600
(MIZPAH CHURCH ROAD) OVER NORFOLK-
SOUTHERN RAILROAD
SITE DESCRIPTION RETAINING WALLS AT END BENTS
NO. 1 AND NO. 2

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	WALL ENVELOPES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4964	1	5

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 1919 TOTT-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 CONTRACTOR 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

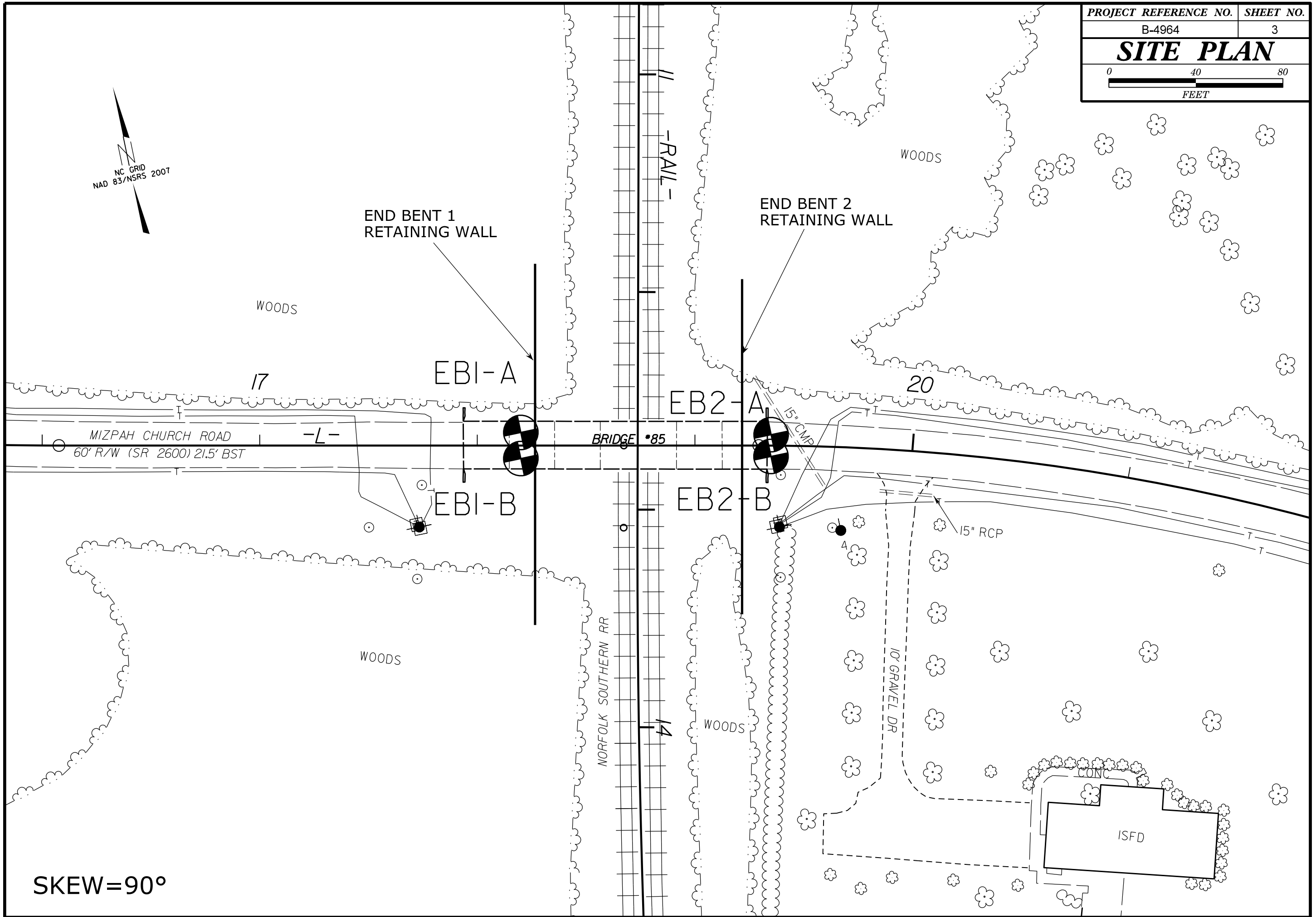
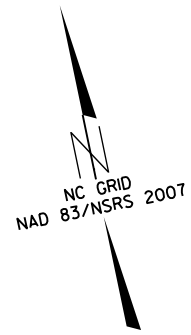
N. MOHS, LG
E. MAYR, PE
TRIGON
R. TOOTHMAN
W. ALLEN

INVESTIGATED BY N. MOHS, LG
DRAWN BY D. BROWN, PE
CHECKED BY CT TANG, EI
SUBMITTED BY D. BROWN, PE
DATE MAY 2017



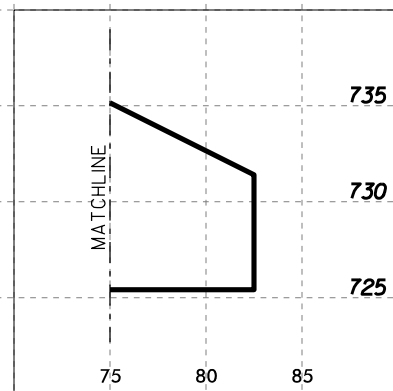
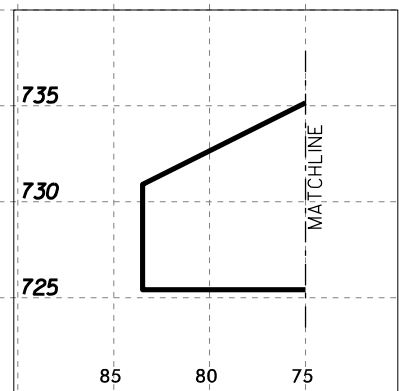
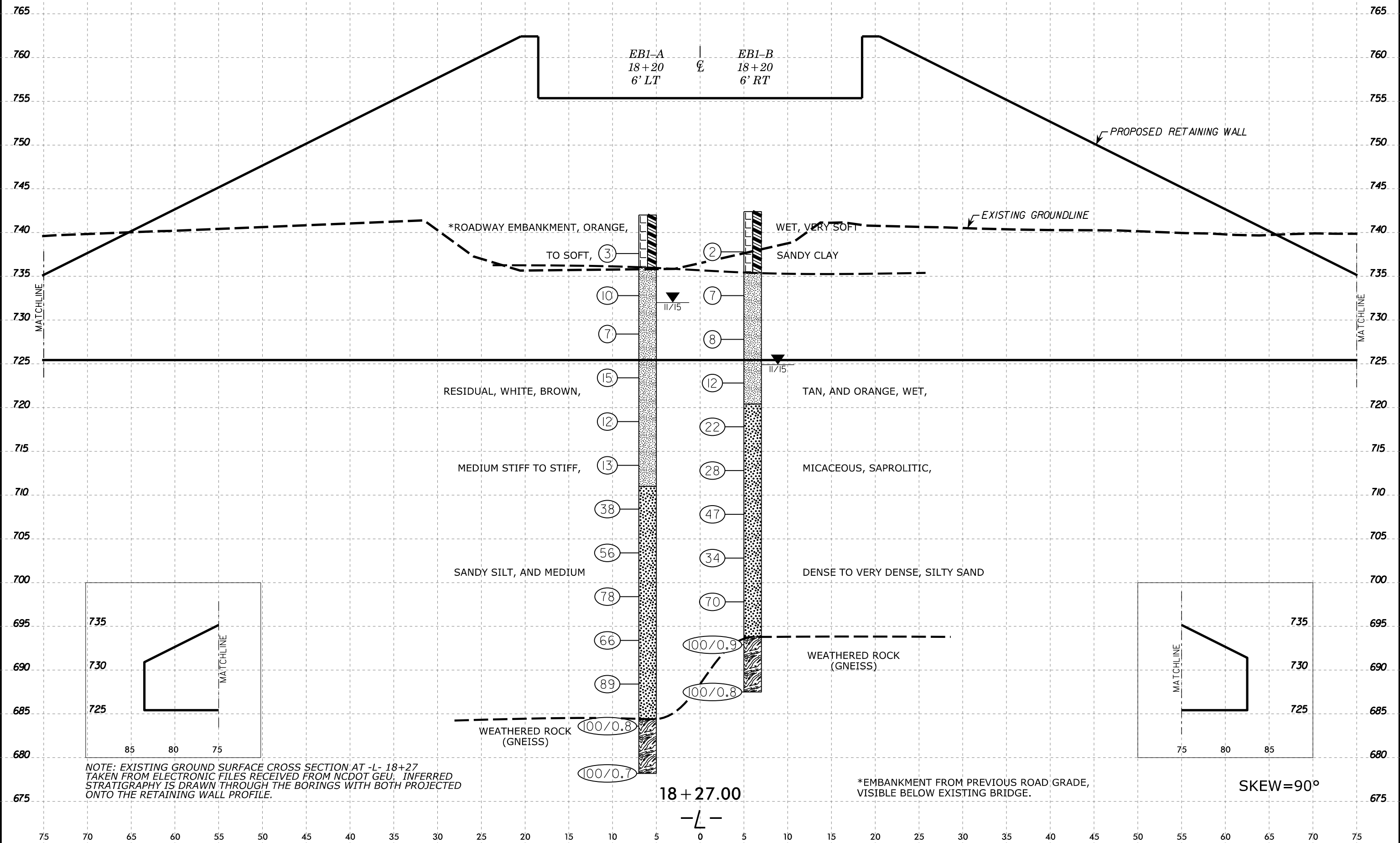
DocuSigned by:
Donald W. Brown Jr. 5/24/2017
SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



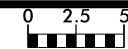


RETAINING WALL ENVELOPE AT END BENT NO. 1

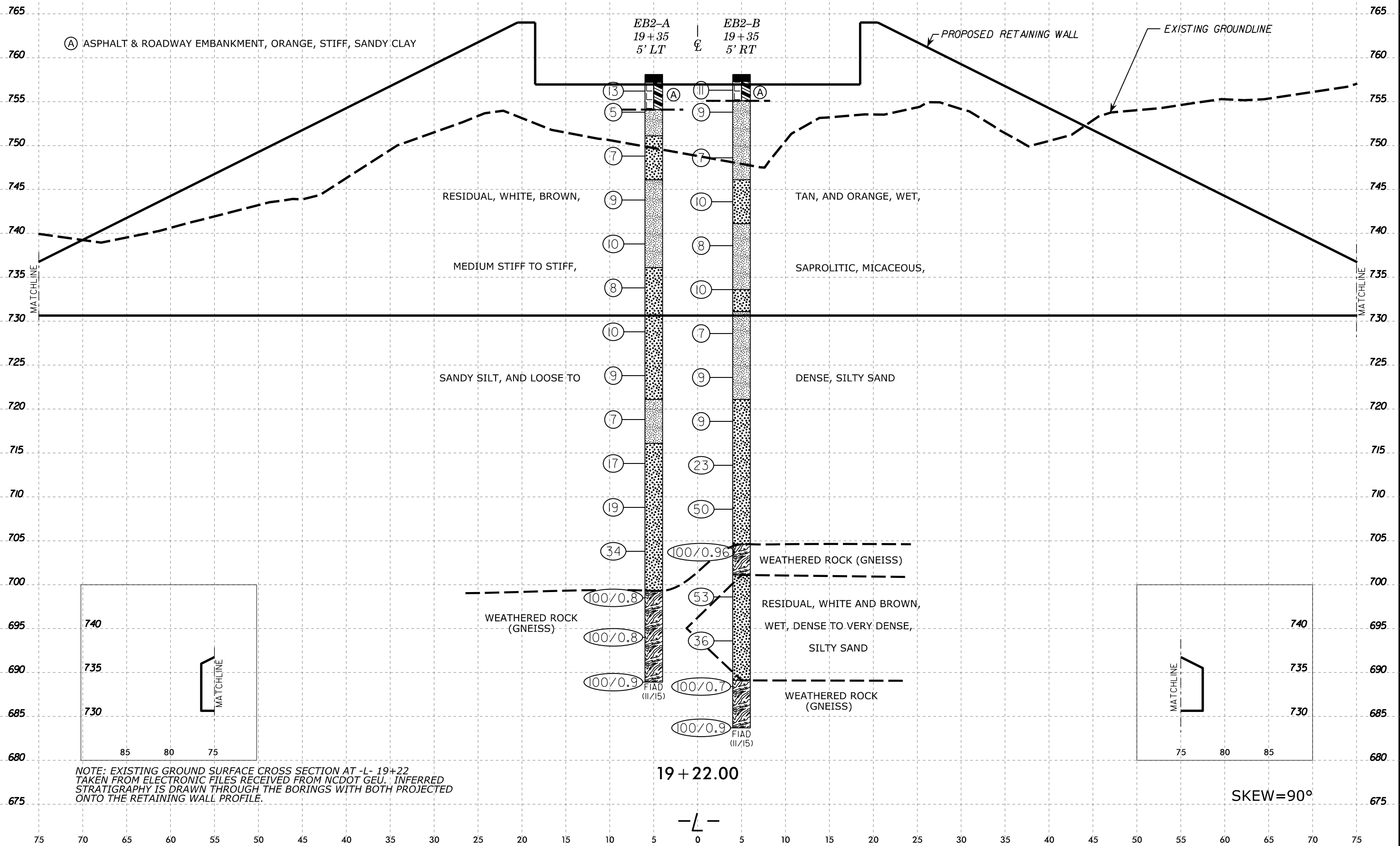


NOTE: EXISTING GROUND SURFACE CROSS SECTION AT -L- 18+27 TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE RETAINING WALL PROFILE.

*EMBANKMENT FROM PREVIOUS ROAD GRADE, VISIBLE BELOW EXISTING BRIDGE.



RETAINING WALL ENVELOPE AT END BENT NO. 2



NOTE: EXISTING GROUND SURFACE CROSS SECTION AT -L- 19+22 TAKEN FROM ELECTRONIC FILES RECEIVED FROM NCDOT GEU. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE RETAINING WALL PROFILE.