

REFERENCE: B-4794

PROJECT: 38564

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4794	1	19

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

**CONTENTS**

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COUNTY RANDOLPH  
PROJECT DESCRIPTION BRIDGE NO. 18 OVER BETTIE  
McGEE'S CREEK ON SR 1107 (LASSITER MILL  
ROAD)

**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

M. BAHIRADHAN

J. WHITT

C. BUTLER

F&R

INVESTIGATED BY J. WHITT

DRAWN BY C. BUTLER

CHECKED BY M. BAHIRADHAN

SUBMITTED BY SCHNABEL ENG.

DATE MARCH 2017



DocuSigned by:  
Mahalingam Bahiradhan  
4DEAD345C9264A2 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

Main table containing sections: SOIL DESCRIPTION, SOIL LEGEND AND AASHTO CLASSIFICATION, GRADATION, MINERALOGICAL COMPOSITION, COMPRESSION, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, ROCK DESCRIPTION, WEATHERING, ROCK HARDNESS, FRACTURE SPACING, BEDDING, INDURATION, TERMS AND DEFINITIONS.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

**SUBSURFACE INVESTIGATION**

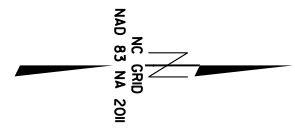
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES  
FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

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

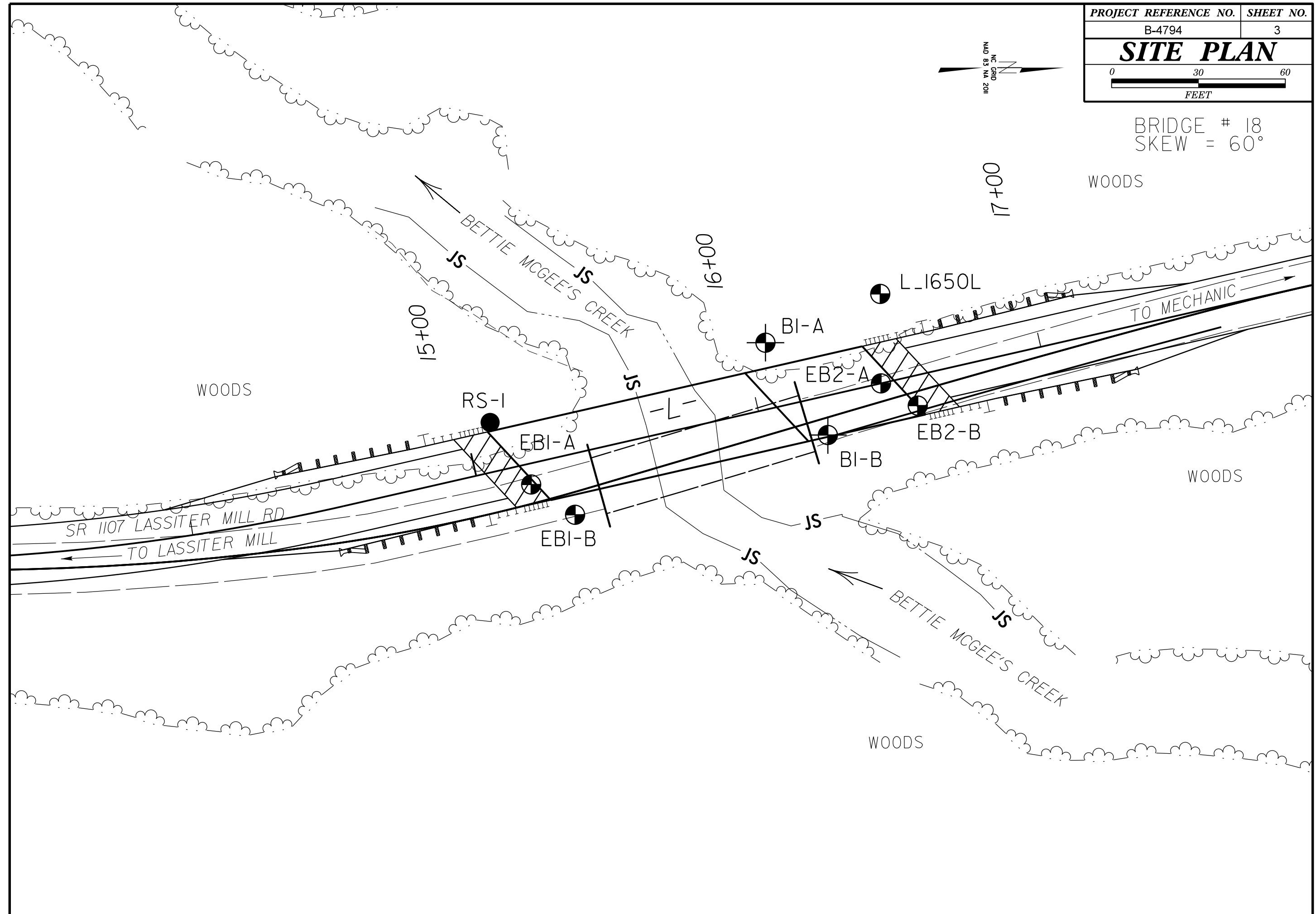
AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

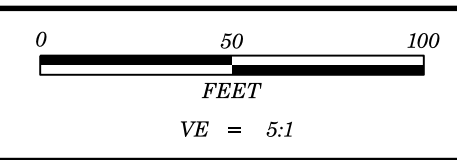
<p><b>GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)</b></p> <p>From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 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>DECREASING INTERLOCKING OF ROCK PIECES</b></p> <p>↓</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>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>				

PROJECT REFERENCE NO.	SHEET NO.
B-4794	3
<b>SITE PLAN</b>	

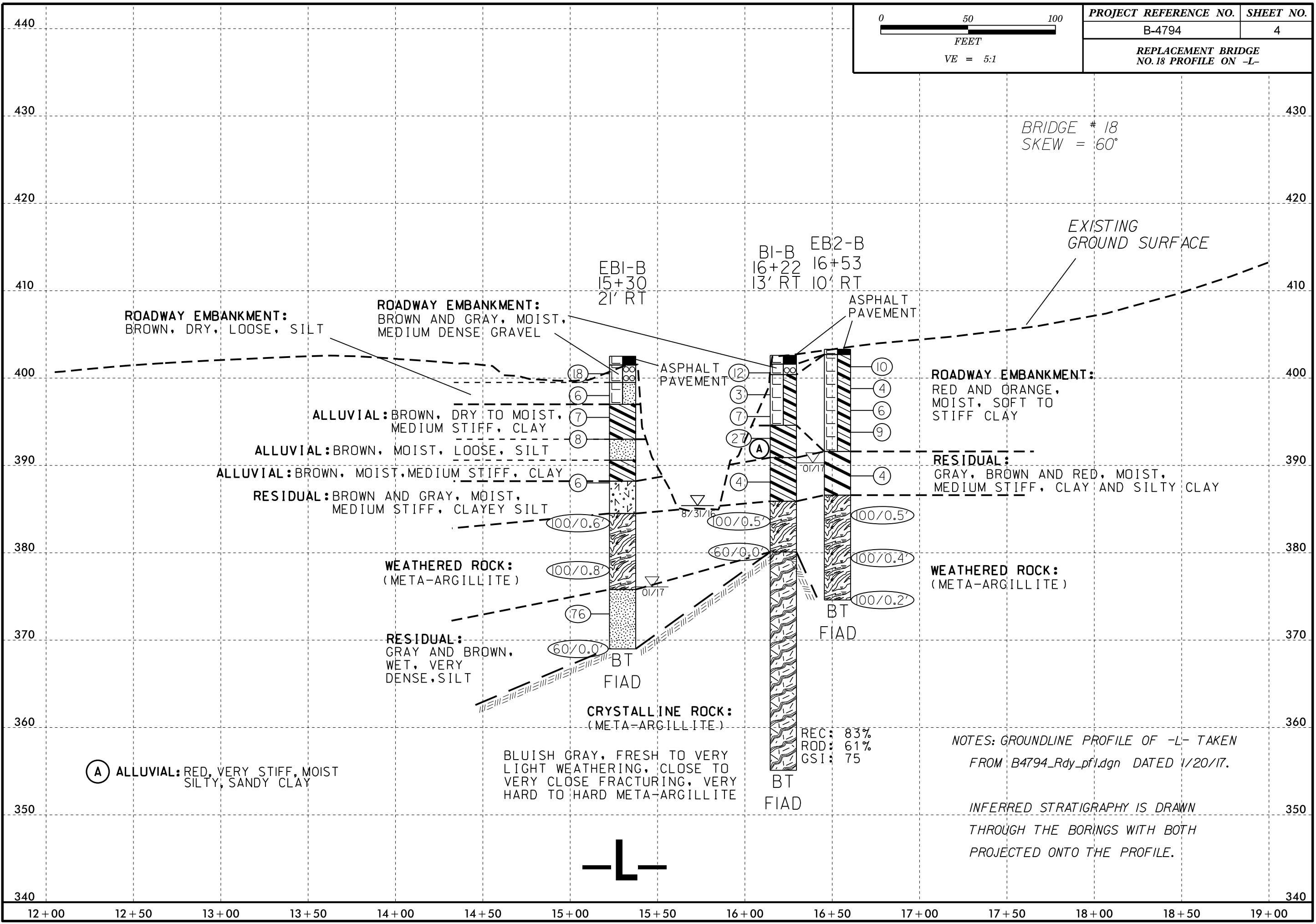


BRIDGE # 18  
SKEW = 60°





<b>PROJECT REFERENCE NO.</b>	<b>SHEET NO.</b>
B-4794	4
<b>REPLACEMENT BRIDGE NO. 18 PROFILE ON -L-</b>	



BRIDGE # 18  
SKEW = 60°

ROADWAY EMBANKMENT:  
BROWN, DRY, LOOSE, SILT

ROADWAY EMBANKMENT:  
BROWN AND GRAY, MOIST,  
MEDIUM DENSE GRAVEL

BI-B 16+22  
13' RT

EB2-B 16+53  
10' RT

EBI-B 15+30  
21' RT

ASPHALT  
PAVEMENT

EXISTING  
GROUND SURFACE

ROADWAY EMBANKMENT:  
RED AND ORANGE,  
MOIST, SOFT TO  
STIFF CLAY

ALLUVIAL: BROWN, DRY TO MOIST,  
MEDIUM STIFF, CLAY

ALLUVIAL: BROWN, MOIST, LOOSE, SILT

ALLUVIAL: BROWN, MOIST, MEDIUM STIFF, CLAY

RESIDUAL: BROWN AND GRAY, MOIST,  
MEDIUM STIFF, CLAYEY SILT

RESIDUAL:  
GRAY, BROWN AND RED, MOIST,  
MEDIUM STIFF, CLAY AND SILTY CLAY

WEATHERED ROCK:  
(META-ARGILLITE)

RESIDUAL:  
GRAY AND BROWN,  
WET, VERY  
DENSE, SILT

WEATHERED ROCK:  
(META-ARGILLITE)

CRYSTALLINE ROCK:  
(META-ARGILLITE)

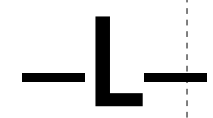
BLUISH GRAY, FRESH TO VERY  
LIGHT WEATHERING, CLOSE TO  
VERY CLOSE FRACTURING, VERY  
HARD TO HARD META-ARGILLITE

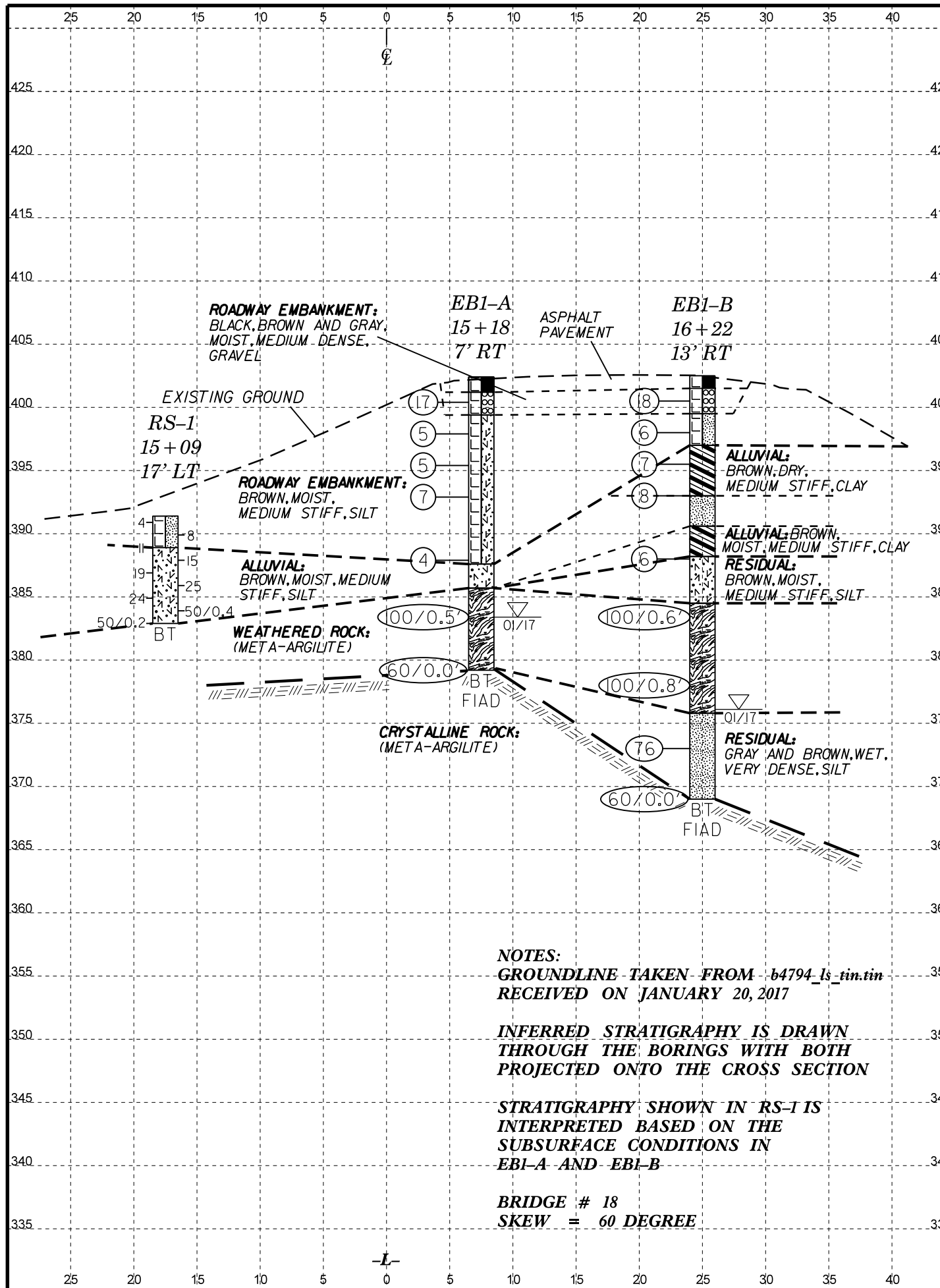
REC: 83%  
ROD: 61%  
GSI: 75

NOTES: GROUNDLINE PROFILE OF -L- TAKEN  
FROM B4794\_Rdy\_pf1.dgn DATED 1/20/17.

INFERRED STRATIGRAPHY IS DRAWN  
THROUGH THE BORINGS WITH BOTH  
PROJECTED ONTO THE PROFILE.

(A) ALLUVIAL: RED, VERY STIFF, MOIST  
SILTY, SANDY CLAY





**NOTES:**  
GROUNDLINE TAKEN FROM b4794\_ls\_tin.tin  
RECEIVED ON JANUARY 20, 2017

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

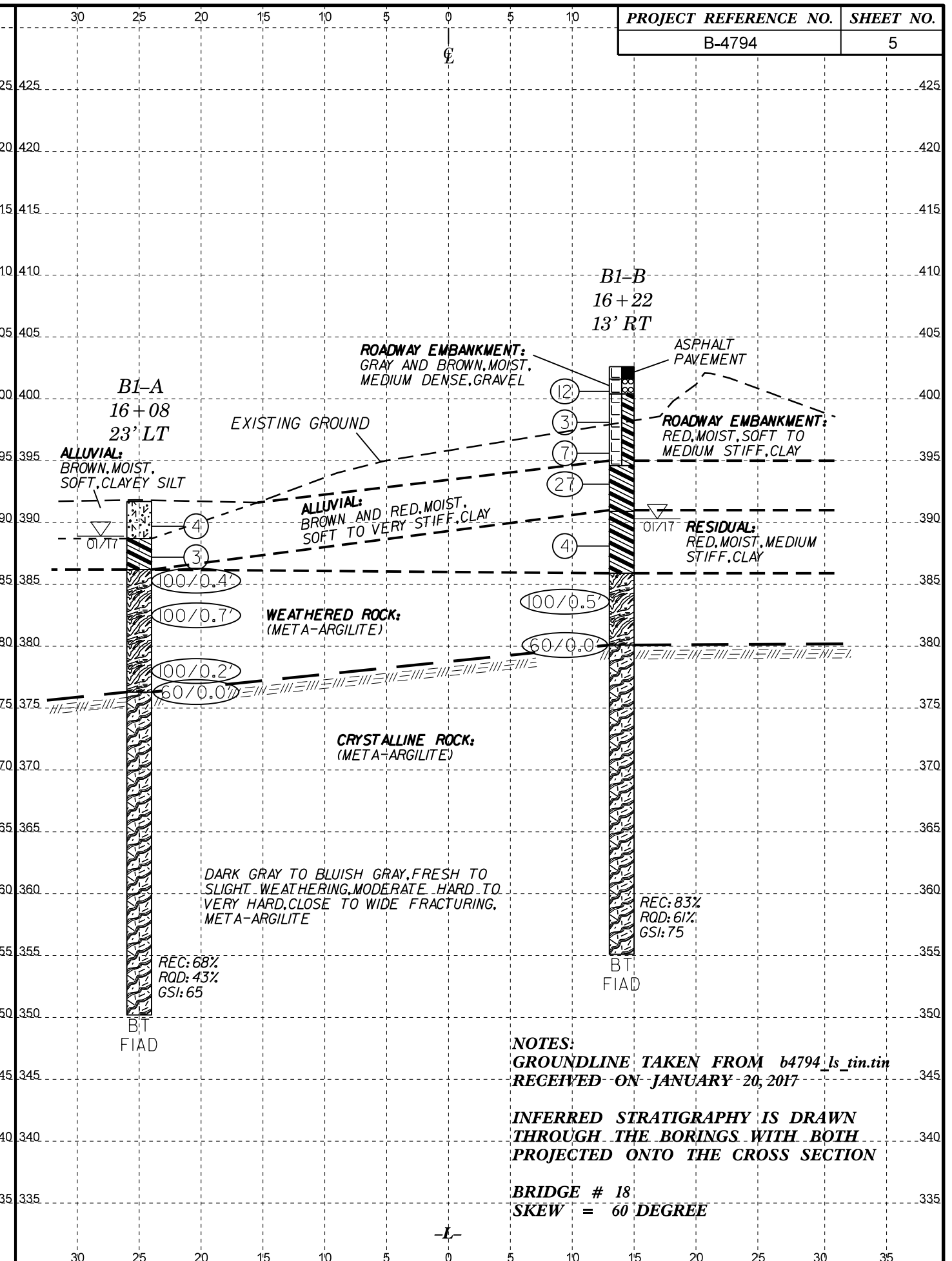
STRATIGRAPHY SHOWN IN RS-1 IS INTERPRETED BASED ON THE SUBSURFACE CONDITIONS IN EB1-A AND EB1-B

BRIDGE # 18  
SKEW = 60 DEGREE



VE = 1:1

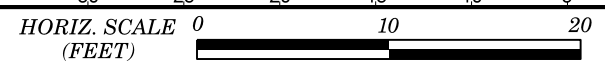
**END BENT NO. 1 CROSS SECTION AT STA. 15+16**



**NOTES:**  
GROUNDLINE TAKEN FROM b4794\_ls\_tin.tin  
RECEIVED ON JANUARY 20, 2017

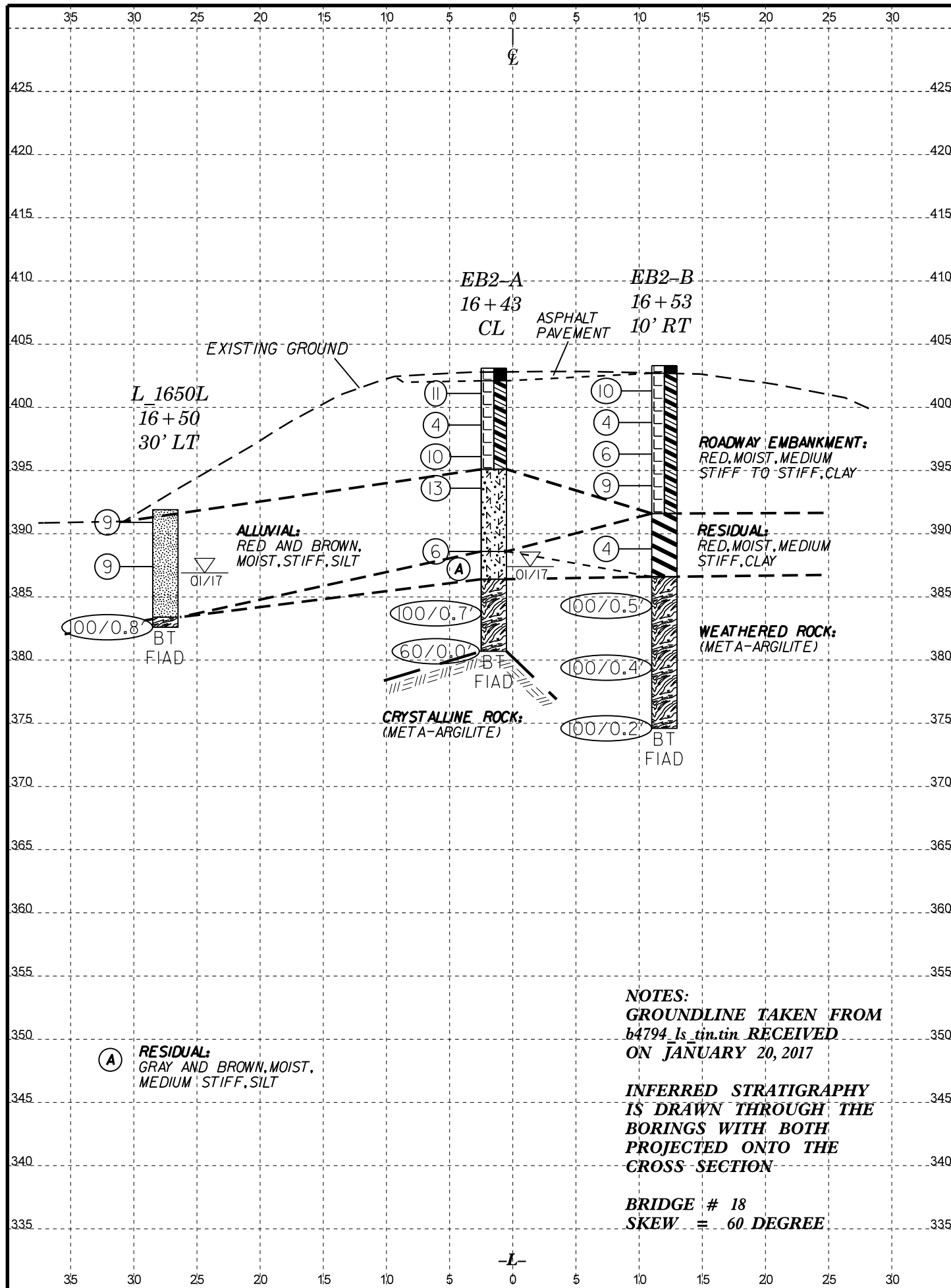
INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE CROSS SECTION

BRIDGE # 18  
SKEW = 60 DEGREE



VE = 1:1

**INTERIOR BENT NO. 1 CROSS SECTION AT STA. 16+06**



(A) **RESIDUAL:**  
GRAY AND BROWN, MOIST,  
MEDIUM STIFF, SILT

**NOTES:**  
GROUNDLINE TAKEN FROM  
b4794 Is in tin RECEIVED  
ON JANUARY 20, 2017

**INFERRED STRATIGRAPHY  
IS DRAWN THROUGH THE  
BORINGS WITH BOTH  
PROJECTED ONTO THE  
CROSS SECTION**

**BRIDGE # 18  
SKEW = 60 DEGREE**



VE = 1:1

**END BENT NO. 2 CROSS SECTION  
AT STA. 16+47**

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.									
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 15+18		OFFSET 7 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 402.4 ft		TOTAL DEPTH 23.2 ft		NORTHING 678,438		EASTING 1,715,741									
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Boyce, C.		START DATE 01/17/17		COMP. DATE 01/17/17		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					
405															
	401.4	1.0	24	11	6									402.4	0.0
400	398.9	3.5	3	2	3									401.2	1.2
	396.4	6.0	2	3	2									399.4	3.0
395	393.9	8.5	3	3	4										
	388.9	13.5	2	2	2									387.6	14.8
390	383.9	18.5	72	28/0.0'										385.7	16.7
385															
380	379.2	23.2	60/0.0'											379.2	23.2

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.									
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 15+30		OFFSET 21 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 402.5 ft		TOTAL DEPTH 33.5 ft		NORTHING 678,454		EASTING 1,715,751									
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Boyce, C.		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					
405															
	401.5	1.0	38	12	6									402.5	0.0
400	399.0	3.5	3	3	3									401.5	1.0
	396.5	6.0	3	3	4									399.5	3.0
395	394.0	8.5	3	4	4									397.0	5.5
	389.0	13.5	3	2	4									393.0	9.5
390	384.0	18.5	76	24/0.1'										390.6	11.9
385	379.0	23.5	26	47	53/0.3'									388.2	14.3
	374.0	28.5	30	29	47									384.5	18.0
380	369.0	33.5	60/0.0'											384.5	18.0
375															
370															

NCDOT BORE DOUBLE B4794\_GEO\_BRDG018.GPJ NC\_DOT.GDT 3/24/17



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 38564.1.1	TIP B-4794	COUNTY RANDOLPH	GEOLOGIST Whitt, J.
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek			GROUND WTR (ft)
BORING NO. RS-1	STATION 15+09	OFFSET 17 ft LT	ALIGNMENT -L-
COLLAR ELEV. 391.4 ft	TOTAL DEPTH 8.5 ft	NORTHING 678,424	EASTING 1,715,719
DRILL RIG/HAMMER EFF./DATE N/A		DRILL METHOD Rod Sounding	HAMMER TYPE N/A
DRILLER N/A	START DATE 01/18/17	COMP. DATE 01/18/17	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	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
395															
	391.4	0.0													391.4
	390.4	1.0	N/A	2	2										390.4
390	389.4	2.0	N/A	3	5										389.4
	388.4	3.0	N/A	5	6										388.4
	387.4	4.0	N/A	7	8										387.4
	386.4	5.0	N/A	9	10										386.4
385	385.4	6.0	N/A	12	13										385.4
	384.4	7.0	N/A	12	12										384.4
	383.4	8.0	N/A	12	12										383.4
			N/A	20	50/0.4										382.9
			N/A	50/0.2											382.9

NCDOT BORE SINGLE B4794\_GEO\_BRDGO18.GPJ NC\_DOT.GDT 3/24/17

Boring Terminated at Elevation 382.9 ft  
Potentially In Weathered Rock

\* Stratigraphy is interpreted based on subsurface conditions in EB1-A & EB1-B



# GEOTECHNICAL BORING REPORT

## CORE LOG

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.						
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)					
BORING NO. B1-A		STATION 16+08		OFFSET 23 ft LT		ALIGNMENT -L-						
COLLAR ELEV. 391.7 ft		TOTAL DEPTH 41.5 ft		NORTHING 678,519		EASTING 1,715,692						
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic						
DRILLER Boyce, C.		START DATE 01/18/17		COMP. DATE 01/19/17		SURFACE WATER DEPTH N/A						
CORE SIZE 2"		TOTAL RUN 26.1 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
376.3										Begin Coring @ 15.4 ft		
375	376.3	15.4	6.1	N=60/0.0 3:10/1.3 3:51/1.0 2:13/1.0 4:07/1.0 2:56/1.0 3:37/0.8	(2.9) 48%	(1.2) 20%	(17.7) 68%	(11.3) 43%		NON-CRYSTALLINE ROCK DARK GRAY, FRESH WEATHERING, VERY CLOSE TO CLOSE FRACTURING, HARD TO MODERATELY HARD, META-ARGILLITE AT 21.5': VERY SLIGHT TO SLIGHT WEATHERING AT 26.5': FRESH WEATHERING AT 31.9': CLOSE TO WIDE FRACTURING GSI = 70	15.4	
370	370.2	21.5	5.0	2:26/1.0 3:07/1.0 3:20/1.0 2:54/1.0 5:50/1.0	(1.5) 30%	(0.5) 10%						
365	365.2	26.5	4.0	2:43/1.0 2:59/1.0 8:13/1.0 15:30/1.0	(2.8) 70%	(0.9) 23%						
360	361.2 360.2	30.5 31.5	1.0 5.0	4:37/1.0 2:25/1.0 2:34/1.0 2:49/1.0 2:56/1.0 2:49/1.0	(0.6) 60%	(0.4) 40%						
355	355.2	36.5	5.0	2:31/1.0 3:10/1.0 3:07/1.0 2:57/1.0 4:06/1.0	(5.0) 100%	(5.0) 100%						
	350.2	41.5									Boring Terminated at Elevation 350.2 ft In Non-Crystalline Rock (Meta-argillite)	41.5

NCDOT CORE SINGLE B4794\_GEO\_BRDG018.GPJ NC\_DOT\_GDT 3/24/17

**CORE PHOTOGRAPH**  
**REPLACE BRIDGE 18 ON SR 1107 OVER BETTIE MCGEE'S CREEK**

**B1-A**  
**BOX 1 OF 2: 15.4 - 33.1 FEET**



APPROXIMATE SCALE IN FEET

**B1-A**  
**BOX 2 OF 2: 33.1 - 41.5 FEET**



APPROXIMATE SCALE IN FEET



# GEOTECHNICAL BORING REPORT

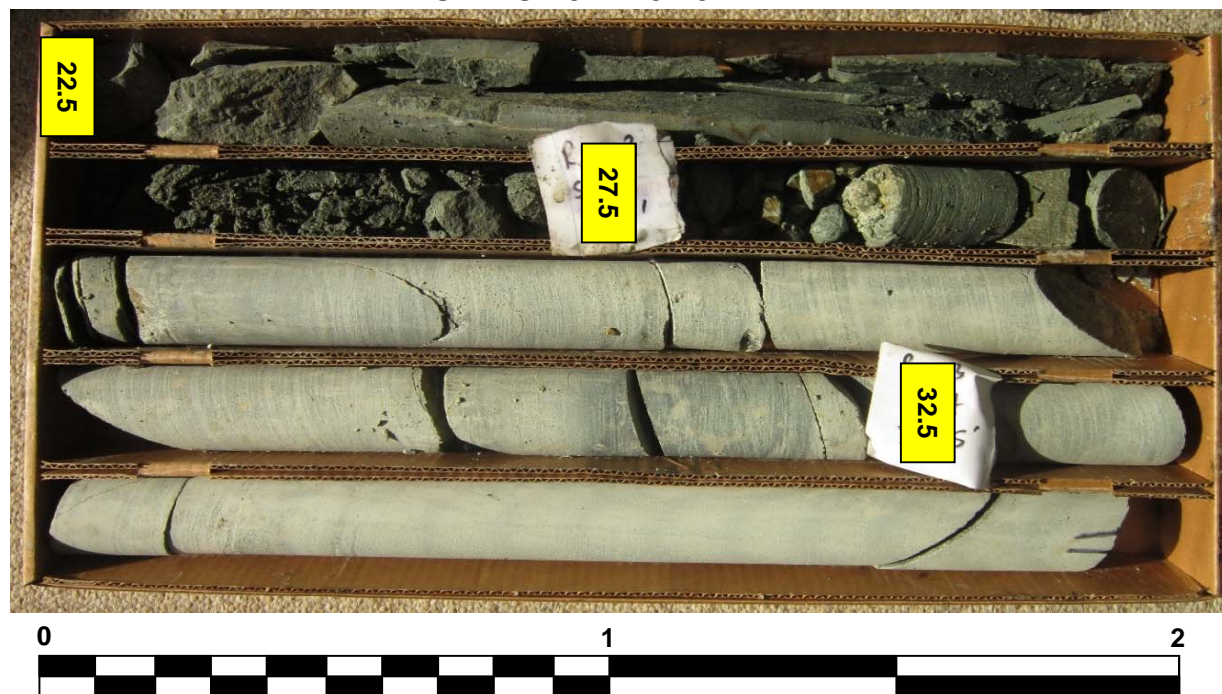
## CORE LOG

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.						
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)					
BORING NO. B1-B		STATION 16+22		OFFSET 13 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 402.6 ft		TOTAL DEPTH 47.5 ft		NORTHING 678,541		EASTING 1,715,724						
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic						
DRILLER Boyce, C.		START DATE 01/16/17		COMP. DATE 01/17/17		SURFACE WATER DEPTH N/A						
CORE SIZE 2'		TOTAL RUN 25.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %	REC. (ft) %	RQD (ft) %				
380.1	380.1	22.5	5.0	N=60/0.0' 4:34/1.0 3:04/1.0 8:37/1.0 3:11/1.0 2:24/1.0	(3.0) 60%	(1.2) 24%	(20.7) 83%	(15.2) 61%		Begin Coring @ 22.5 ft <b>NON-CRYSTALLINE ROCK</b> BLUISH GRAY, FRESH TO VERY SLIGHT WEATHERING, CLOSE TO VERY CLOSE FRACTURING, VERY HARD TO HARD, META-ARGILLITE AT 32.5': MODERATELY CLOSE TO VERY CLOSE FRACTURING GSI = 75	22.5	
375	375.1	27.5	5.0	2:45/1.0 4:23/1.0 2:54/1.0 2:54/1.0 3:26/1.0	(3.0) 60%	(2.0) 40%						
370	370.1	32.5	5.0	2:44/1.0 2:24/1.0 2:35/1.0 2:30/1.0 2:55/1.0	(4.9) 98%	(3.7) 74%						
365	365.1	37.5	5.0	3:00/1.0 2:01/1.0 1:58/1.0 1:59/1.0 2:19/1.0	(5.0) 100%	(4.3) 86%				RS-2		
360	360.1	42.5	5.0	6:24/1.0 2:55/1.0 3:08/1.0 3:11/1.0 3:16/1.0	(4.8) 96%	(4.0) 80%						
	355.1	47.5									Boring Terminated at Elevation 355.1 ft In Non-Crystalline Rock (Meta-argillite)	47.5

NCDOT CORE SINGLE B4794\_GEO\_BRDG018.GPJ NC\_DOT\_GDT 3/24/17

**CORE PHOTOGRAPH**  
**REPLACE BRIDGE 18 ON SR 1107 OVER BETTIE MCGEE'S CREEK**

**B1-B**  
**BOX 1 OF 3: 22.5 - 34.7 FEET**



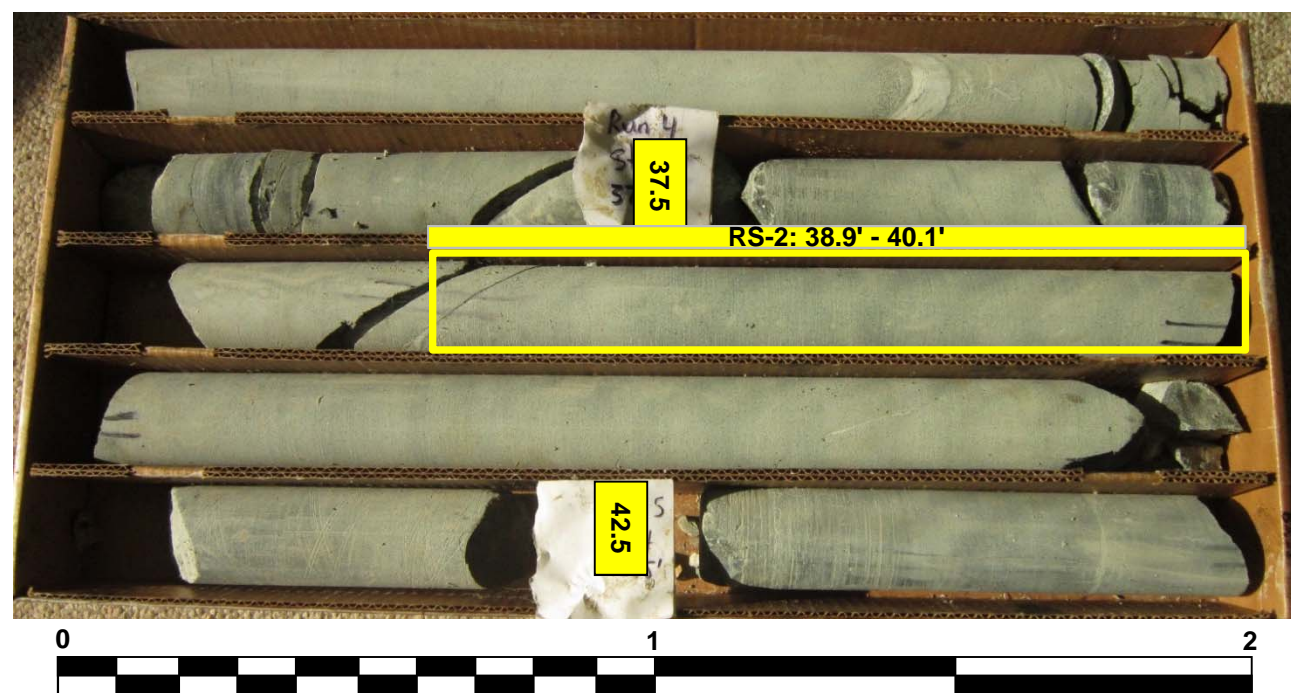
APPROXIMATE SCALE IN FEET

**B1-B**  
**BOX 3 OF 3: 43.3 - 47.5 FEET**



APPROXIMATE SCALE IN FEET

**B1-B**  
**BOX 2 OF 3: 34.7 - 43.3 FEET**



APPROXIMATE SCALE IN FEET

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.										
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 16+43		OFFSET CL		ALIGNMENT -L-										
COLLAR ELEV. 403.1 ft		TOTAL DEPTH 22.4 ft		NORTHING 678,559		EASTING 1,715,706										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Boyce, C.		START DATE 01/17/17		COMP. DATE 01/17/17		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						
405																
	402.1	1.0	5	5	6									403.1	0.0	GROUND SURFACE
	402.1													402.1	1.0	0.7' ASPHALT, 0.3' GRAVEL BASE
400	399.6	3.5	3	2	2											ROADWAY EMBANKMENT RED AND ORANGE, SILTY SANDY CLAY TRACE GRAVEL
	397.1	6.0														
395	394.6	8.5	4	4	6											
	389.6	13.5	4	3	3											
385	384.6	18.5	27	73/0.4'												
	380.7	22.4	60/0.0'													

WBS 38564.1.1		TIP B-4794		COUNTY RANDOLPH		GEOLOGIST Whitt, J.										
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107 (Lassiter Mill Rd.) over Bettie McGee's Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 16+53		OFFSET 10 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 403.3 ft		TOTAL DEPTH 28.7 ft		NORTHING 678,572		EASTING 1,715,714										
DRILL RIG/HAMMER EFF./DATE F&R3763 CME-550X 86% 11/14/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Boyce, C.		START DATE 01/17/17		COMP. DATE 01/17/17		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						
405																
	402.3	1.0	5	4	6									403.3	0.0	GROUND SURFACE
	399.8	3.5	2	2	2									402.7	0.6	0.4' ASPHALT, 0.2' GRAVEL BASE
400	397.3	6.0														ROADWAY EMBANKMENT RED, SILTY SANDY CLAY WITH TRACE GRAVEL AT 3.5': LITTLE GRAVEL
	394.8	8.5	3	6	3											
395	389.8	13.5	2	2	2											
	386.4	16.7														
385	384.8	18.5	70	30/0.0'												
	379.8	23.5	100/0.4													
380	379.8	23.5	100/0.4													
	374.8	28.5	100/0.2													
375	374.8	28.5	100/0.2													

NCDOT BORE DOUBLE B4794\_GEO\_BRDG018.GPJ NC\_DOT.GDT 3/24/17



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 38564.1.1	TIP B-4794	COUNTY RANDOLPH	GEOLOGIST D. Racey
SITE DESCRIPTION Replace Bridge No. 18 on SR 1107			GROUND WTR (ft)
BORING NO. L_1650L	STATION 16+50	OFFSET 30 ft LT	ALIGNMENT -L-
COLLAR ELEV. 391.9 ft	TOTAL DEPTH 9.3 ft	NORTHING 678,559	EASTING 1,715,675
DRILL RIG/HAMMER EFF./DATE F&R5785 CME-55 85% 2/17/2016		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER D. Tignor	START DATE 06/27/16	COMP. DATE 06/27/16	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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
395																
	391.9	0.0													391.9	0.0
390			1	3	6	9						M		GROUND SURFACE		
	388.4	3.5	4	4	5							SS-4		ALLUVIAL Red-Brown to Dark Brown, Clayey Fine to Coarse Sandy SILT (A-4) with Trace Roots from 0.0'-1.5'		
385												21%				
	383.4	8.5	52	48/0.3											383.4	8.5
														WEATHERED ROCK Gray-Tan (META-ARGILLITE)	382.6	9.3
														Boring Terminated at Elevation 382.6 ft in Weathered Rock (META-ARGILLITE)		
														Note: SURFICIAL ORGANIC SOILS = 0.0'-0.2'		

NCDOT BORE SINGLE B4794\_GEO\_RDWY\_BH.GPJ NC\_DOT.GDT 3/24/17

**REPLACE BRIDGE 18 ON SR 1107 OVER BETTIE MCGEE'S CREEK**

<b>ROCK TEST RESULTS</b>												
BORING	SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL (ft)	LENGTH (in.)	DIAMETER (in.)	AREA (sq. in.)	VOLUME		UNIT WEIGHT (pcf)	COMPRESSIVE	TESTING METHOD
								(in. <sup>3</sup> )	(cf)		STRENGTH (psi)	
<b>B1-A</b>	<b>RS-1</b>	<b>16+08</b>	<b>23FT LT</b>	<b>33.4 - 34.3</b>	<b>4.49</b>	<b>1.98</b>	<b>3.079</b>	<b>13.825</b>	<b>0.008</b>	<b>174.9418</b>	<b>6,080</b>	<b>ASTM D-7012-10 METHOD C</b>
<b>B1-B</b>	<b>RS-2</b>	<b>16+22</b>	<b>13FT RT</b>	<b>38.9 - 40.1</b>	<b>4.67</b>	<b>1.99</b>	<b>3.110</b>	<b>14.525</b>	<b>0.008</b>	<b>173.5793</b>	<b>6,466</b>	<b>ASTM D-7012-10 METHOD C</b>

**SITE PHOTOGRAPHS**  
**BRIDGE NO. 18 OVER BETTIE MCGEE'S CREEK ON SR 1107**



**View of SR 1107 looking north.**



**View of Bettie McGee's Creek looking south.**