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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY ALAMANCEPROJECT DESCRIPTION REPLACE BRIDGE NO. 14
ON NC 87 OVER CANE CREEK

STATE	STATE PROJECT REFERENCE NO.	sheet no.	total sheets
N.C.	BR-0060	1	

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.

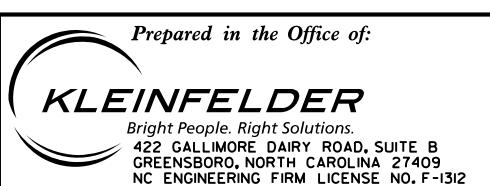
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU IN-PLACED 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 PERFORM INDEPENDENT SUBSURFACE INVESTIGATIONS AND MAKE INTERPRETATIONS AS NECESSARY TO CONFIRM CONDITIONS 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

J. KARDONTRIGON EXPLORATIONINVESTIGATED BY J. KARDONDRAWN BY T. WELLSCHECKED BY X. BARRETTSUBMITTED BY KLEINFELDER, INC.DATE FEBRUARY 2023DocuSigned by:
 Thomas Wells

02/13/2023

7DA5D2D0518F4B0
 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

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

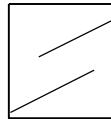
SUPPLEMENTAL LEGEND, GEOLOGICAL FROM AASHTO LRFD BRIDGE STRENGTH INDEX (GSI) TABLES DESIGN SPECIFICATIONS

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

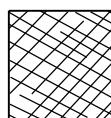
GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

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.

STRUCTURE



INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities



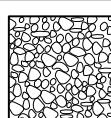
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



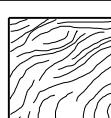
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



BLOCKY/DISTURBED/SEAMY -
folded with angular blocks
formed by many intersecting
discontinuity sets. Persistence
of bedding planes or schistosity



DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces.



LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

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

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)

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.

COMPOSITION AND STRUCTURE

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

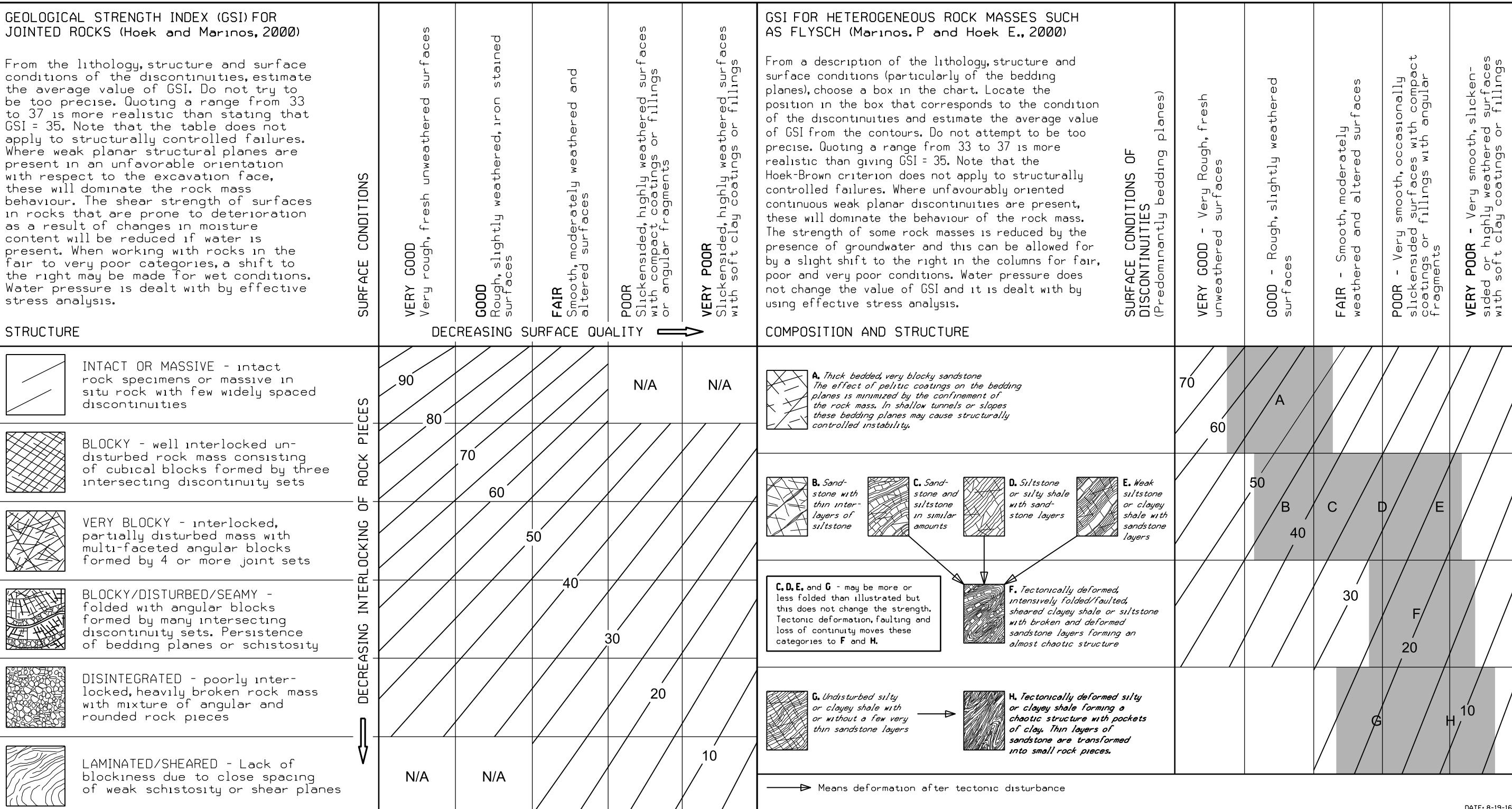
VERY GOOD - Very Rough, fresh unweathered surfaces

GOOD - Rough, slightly weathered

FAIR - Smooth, moderately

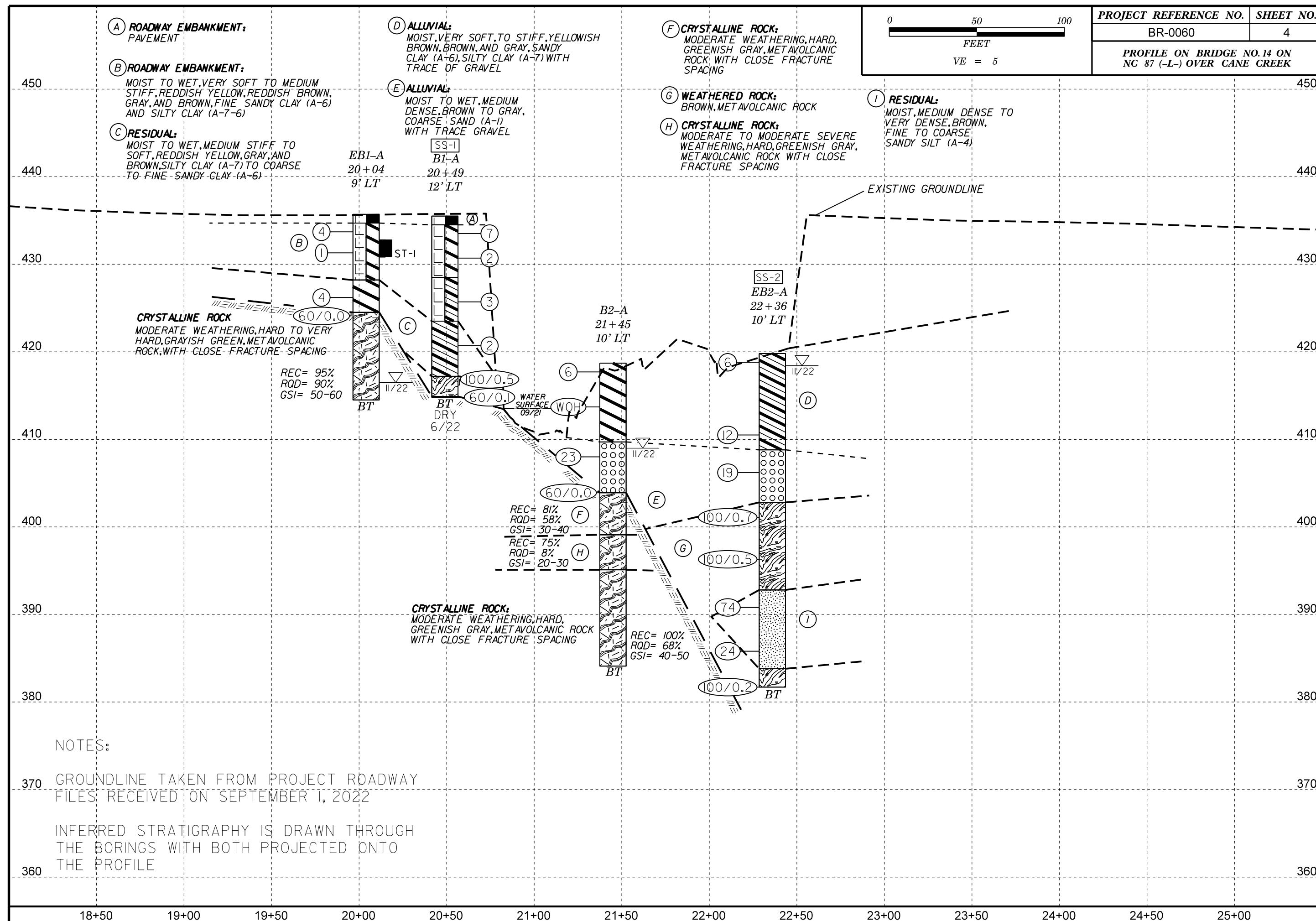
POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular elements.

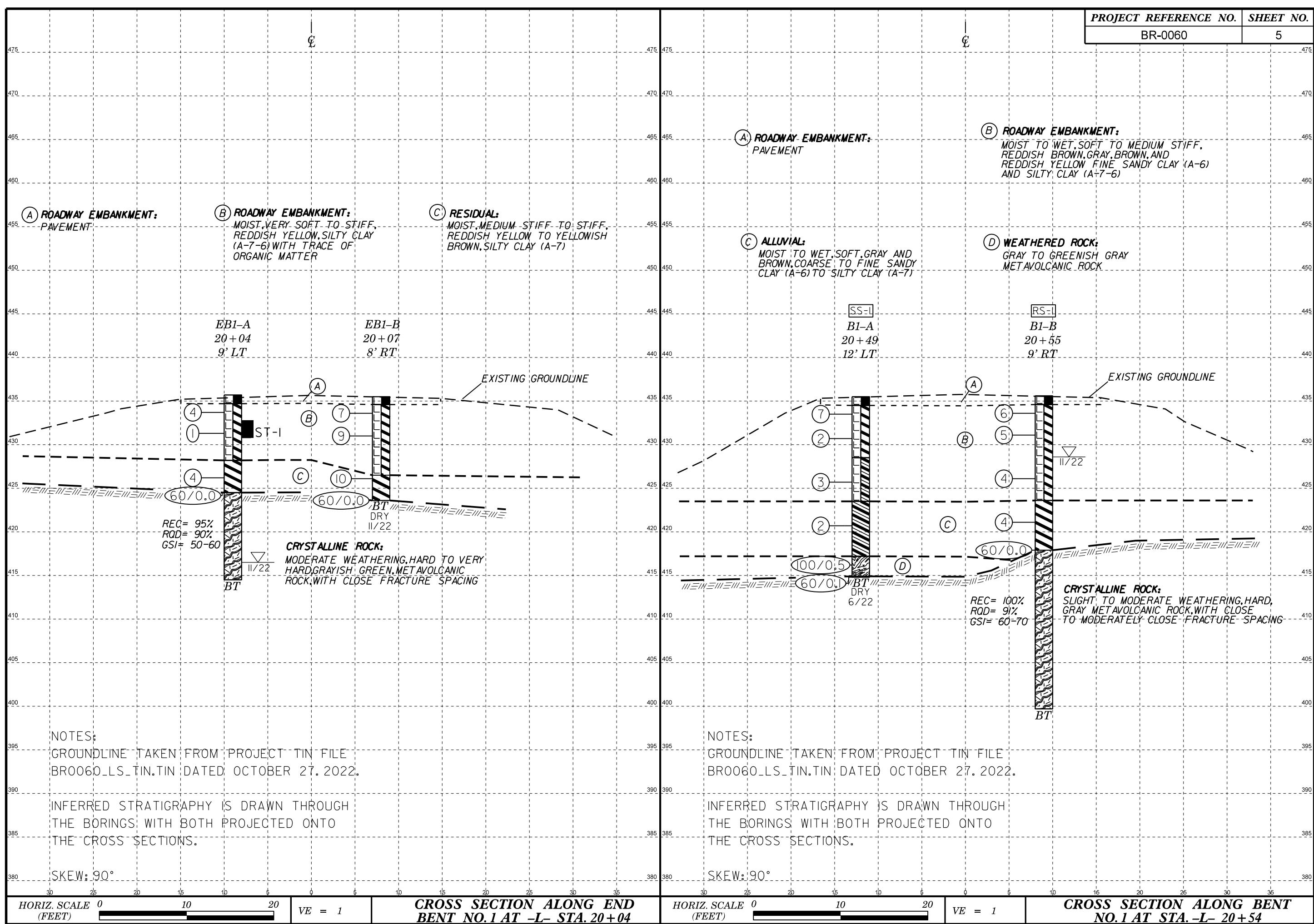
VERY POOR - Very smooth, slickened-sided or highly weathered surfaces with soft clay coatings or fillings



PROJECT REFERENCE NO.		SHEET NO.
BR-0060		3
SITE PLAN		
0	40	80
 FEET		

SKEW: 90°





475 NOTES:
476 GROUNDLINE TAKEN FROM PROJECT TIN FILE
477 BR0060_L\$_.TIN.DATED OCTOBER 27, 2022.

465 INFERRED STRATIGRAPHY IS DRAWN THROUGH
466 THE BORINGS WITH BOTH PROJECTED ONTO
467 THE CROSS SECTIONS.

460 SKEW: 90°

445 (A) **ALLUVIAL:**
446 MOIST, VERY SOFT TO
447 STIFF, BROWN TO GRAY,
448 SILTY CLAY (A-7) WITH
449 TRACE GRAVEL

435 (B) **ALLUVIAL:**
436 WET, MEDIUM DENSE,
437 BROWN AND GRAY,
438 COARSE SAND (A-1)
439 WITH TRACE GRAVEL

445 (C) **WEATHERED ROCK:**
446 GRAY METAVOLCANIC ROCK

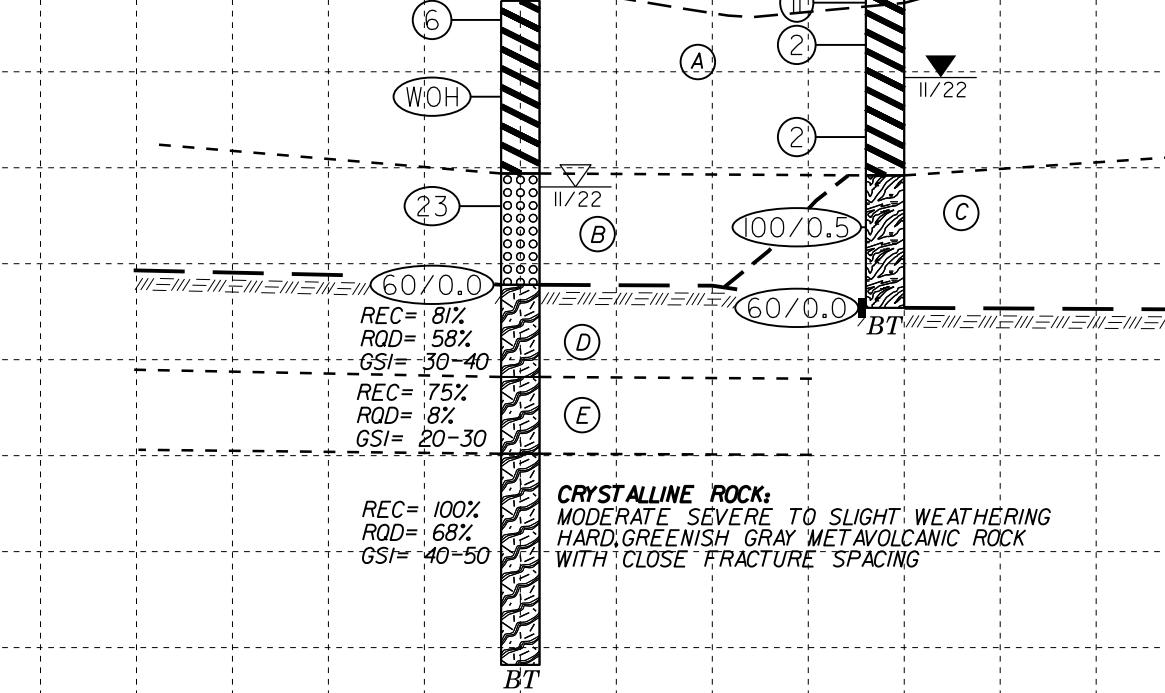
435 (D) **CRYSTALLINE ROCK**
436 MODERATE WEATHERING, HARD,
437 GREENISH GRAY, METAVOLCANIC ROCK
438 WITH CLOSE FRACTURE SPACING

445 (E) **CRYSTALLINE ROCK**
446 MODERATE TO MODERATE SEVERE
447 WEATHERING, HARD, GREENISH GRAY,
448 METAVOLCANIC ROCK, WITH CLOSE
449 FRACTURE SPACING

425 B2-A
426 21+45
427 10' LT

425 B2-B
426 21+47
427 9' RT

425 EXISTING GROUNDLINE



HORIZ. SCALE 0
(FEET)

10 20
VE = 1

CROSS SECTION ALONG BENT
NO. 2 AT -L- STA. 21+49

475 NOTES:
476 GROUNDLINE TAKEN FROM PROJECT TIN FILE
477 BR0060_L\$_.TIN.DATED OCTOBER 27, 2022.

465 INFERRED STRATIGRAPHY IS DRAWN THROUGH
466 THE BORINGS WITH BOTH PROJECTED ONTO
467 THE CROSS SECTIONS.

460 SKEW: 90°

440 (A) **ALLUVIAL:**
441 MOIST, MEDIUM STIFF TO
442 HARD, YELLOWISH BROWN
443 TO GRAY, SILTY CLAY (A-7-6)
444 TO COARSE TO FINE SAND SILT
445 (A-4) WITH TRACE GRAVEL

440 (B) **ALLUVIAL:**
441 MOIST, MEDIUM DENSE,
442 GRAY, COARSE SAND (A-1)
443 WITH TRACE GRAVEL

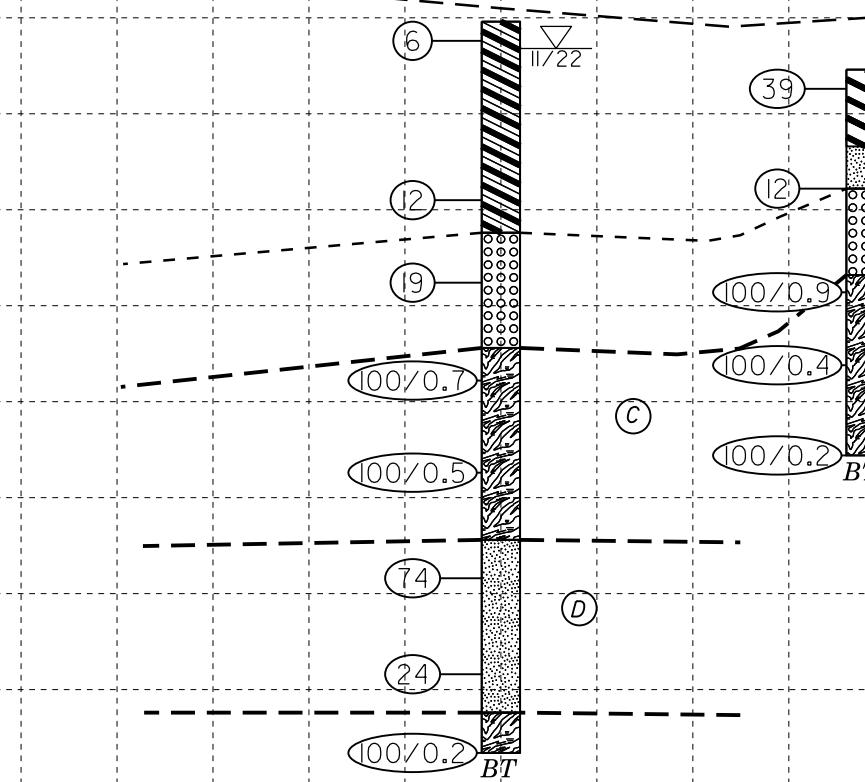
440 (C) **WEATHERED ROCK:**
441 BROWN TO GRAY
442 METAVOLCANIC ROCK

440 (D) **RESIDUAL:**
441 MOIST, VERY STIFF TO
442 HARD, BROWN, FINE TO
443 COARSE SANDY SILT (A-4)

430 SS-2
431 EB2-A
432 22+36
433 10' LT

430 SS-3
431 EB2-B
432 22+36
433 9' RT

430 EXISTING GROUNDLINE



HORIZ. SCALE 0
(FEET)

10 20
VE = 1

CROSS SECTION ALONG END
BENT NO. 2 AT -L- STA. 22+34

GEOTECHNICAL BORING REPORT
BORE LOG
GEOTECHNICAL BORING REPORT
CORE LOG

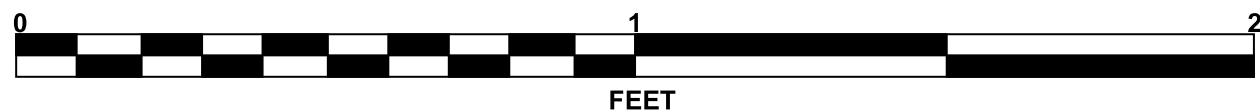
WBS 67060.1.1		TIP BR-0060		COUNTY ALAMANCE			GEOLOGIST J. Kardon			
SITE DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek					GROUND WTR (ft)					
BORING NO. EB1-A		STATION 20+04		OFFSET 9 ft LT		ALIGNMENT -L-		0 HR.	19.2	
COLLAR ELEV. 435.7 ft		TOTAL DEPTH 21.2 ft		NORTHING 777,141		EASTING 1,912,285		24 HR.	FIAD	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022					DRILL METHOD Mud Rotary/ NQ Core		HAMMER TYPE Automatic			
DRILLER R. Toothman		START DATE 11/22/22		COMP. DATE 11/23/22		SURFACE WATER DEPTH N/A				
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOWS PER FOOT			SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft				ELEV. (ft)	DEPTH (ft)
440										
435	434.7	1.0	4	2	2				435.7	0.0
430	432.3	3.4	1	1	0				434.7	1.0
425	427.2	8.5	1	3	1				428.2	7.5
420	424.5	11.2	60/0.0						424.5	11.2
415									414.5	21.2

WBS 67060.1.1		TIP BR-0060		COUNTY ALAMANCE			GEOLOGIST J. Kardon					
SITE DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek					GROUND WTR (ft)							
BORING NO. EB1-A		STATION 20+04		OFFSET 9 ft LT		ALIGNMENT -L-		0 HR.	19.2			
COLLAR ELEV. 435.7 ft		TOTAL DEPTH 21.2 ft		NORTHING 777,141		EASTING 1,912,285		24 HR.	FIAD			
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022					DRILL METHOD Mud Rotary/ NQ Core		HAMMER TYPE Automatic					
DRILLER R. Toothman			START DATE 11/22/22		COMP. DATE 11/23/22		SURFACE WATER DEPTH N/A					
CORE SIZE NQ Core		TOTAL RUN 10.0 ft			DESCRIPTION AND REMARKS							
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	L O G	ELEV. (ft)	DEPTH (ft)
424.5	424.5	11.2	5.0	N=60/0.0 13:45/1.0 10:25/1.0 4:07/1.0 3:45/1.0 6:30/1.0	(5.0) 100%	(4.5) 90%		(9.5) 95%	(9.0) 90%		424.5	11.2
420	419.5	16.2	5.0	6:00/1.0 4:30/1.0 5:52/1.0 5:00/1.0 5:30/1.0	(4.5) 90%	(4.5) 90%					414.5	21.2
415	414.5	21.2										

CORE PHOTOGRAPHS

EB1-A

BOX 1: 11.2 - 21.2 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

SHEET 9

GEOTECHNICAL BORING REPORT

BORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

SHEET 10

WBS 67060.1.1			TIP BR-0060		COUNTY ALAMANCE				GEOLOGIST J. Kardon					
SITE DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek										GROUND WTR (ft)				
BORING NO. B1-B			STATION 20+55		OFFSET 9 ft RT			ALIGNMENT -L-			0 HR.	7.0		
COLLAR ELEV. 435.6 ft			TOTAL DEPTH 35.9 ft		NORTHING 777,088			EASTING 1,912,297			24 HR.	FIAD		
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022						DRILL METHOD Mud Rotary/ NQ Core			HAMMER TYPE Automatic					
DRILLER R. Toothman			START DATE 11/10/22			COMP. DATE 11/14/22			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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)
440														
435	434.6	1.0										435.6	GROUND SURFACE	
432.1	432.1	3.5	8	3	3							434.6	ROADWAY EMBANKMENT	
430	427.1	8.5	2	2	3							Pavement: Asphalt (0.0 to 0.3 ft.) & ABC Stone (0.3 to 1.0 ft.)		
425	422.1	13.5	1	2	2							Reddish Yellow, Silty CLAY (A-7)		
420	417.9	17.7	WOH	1	3							423.6	ALLUVIAL	
415			60/0.0									417.9	Gray, Silty CLAY (A-7)	
410												399.7	CRYSTALLINE ROCK	
405													Gray METAVOLCANIC ROCK	
400														
													Boring Terminated at Elevation 399.7 ft in CRYSTALLINE ROCK: METAVOLCANIC ROCK	

CORE PHOTOGRAPHS

B1-B

BOXES 1, 2 & 3: 17.7 - 35.9 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

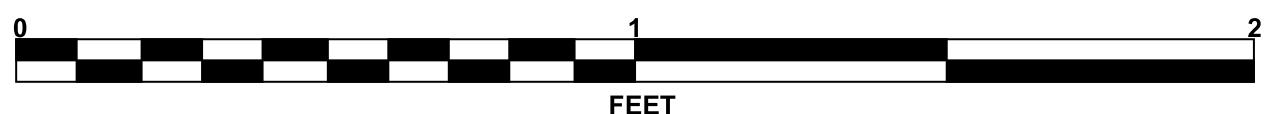
SHEET 12

GEOTECHNICAL BORING REPORT CORE LOG

CORE PHOTOGRAPHS

B2-A

BOXES 1 & 2: 14.8 - 34.6 FEET



GEOTECHNICAL BORING REPORT

BORE LOG

WBS 67060.1.1			TIP BR-0060		COUNTY ALAMANCE				GEOLOGIST J. Kardon						
SITE DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek										GROUND WTR (ft)					
BORING NO. B2-B			STATION 21+47			OFFSET 9 ft RT			ALIGNMENT -L-						
COLLAR ELEV. 419.6 ft			TOTAL DEPTH 16.9 ft			NORTHING 777,010			EASTING 1,912,345						
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022							DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER R. Toothman			START DATE 11/09/22			COMP. DATE 11/09/22			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	▼ MOI	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)
420														419.6 GROUND SURFACE 0.	
	419.6	0.0	3	5	6									ALLUVIAL	
	417.4	2.2	4	1	1									Brown to Gray, Silty CLAY (A-7) with Trace Gravel	
415															
	412.6	7.0	1	0	2									409.6 WEATHERED ROCK	
410														Gray METAVOLCANIC ROCK	
	407.4	12.2	100/0.5												
405															
	402.7	16.9	60/0.0											Boring Terminated with Standard Penetration Test Refusal at Elevation 402.7 ft on CRYSTALLINE ROCK: METAVOLCANIC ROCK	
														16.9	

WBS 67060.1.1			TIP BR-0060			COUNTY ALAMANCE				GEOLOGIST J. Kardon					
SITE DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek												GROUND WTR (ft)			
BORING NO. EB2-A			STATION 22+36			OFFSET 10 ft LT			ALIGNMENT -L-			0 HR.	1.4		
COLLAR ELEV. 419.8 ft			TOTAL DEPTH 38.1 ft			NORTHING 776,945			EASTING 1,912,409			24 HR.	FIAD		
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 87% 05/09/2022							DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER R. Toothman			START DATE 11/17/22			COMP. DATE 11/18/22			SURFACE WATER DEPTH N/A						
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
420														419.8 GROUND SURFACE	
415	419.8	0.0	1	3	3							SS-2	▽	ALLUVIAL Yellowish Brown to Gray, Sandy CLAY (A-6) with Trace Gravel	
410	411.5	8.3	WOH	2	10									M	408.8 Gray, Coarse SAND with Trace Gravel (A-1)
405	407.2	12.6		3	8	11								M	402.8 WEATHERED ROCK Brown METAVOLCANIC ROCK
400	401.8	18.0		26	74/0.2					100/0.7					392.8 RESIDUAL Brown, Fine to Coarse Sandy SILT (A-4)
395	396.8	23.0		100/0.5					100/0.5					M	383.8 WEATHERED ROCK Brown METAVOLCANIC ROCK
390	391.8	28.0		8	19	55				74					381.7 Boring Terminated at Elevation 381.7 ft in WEATHERED ROCK: METAVOLCANIC ROCK
385	386.8	33.0		9	10	14									381.7
	381.9	37.9		100/0.2					100/0.2						

GEOTECHNICAL BORING REPORT

BORE LOG

LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

SHEET 16

WBS NO. (TIP NO.): 67060.1.1 (BR-0060)

PROJECT ID: 41379

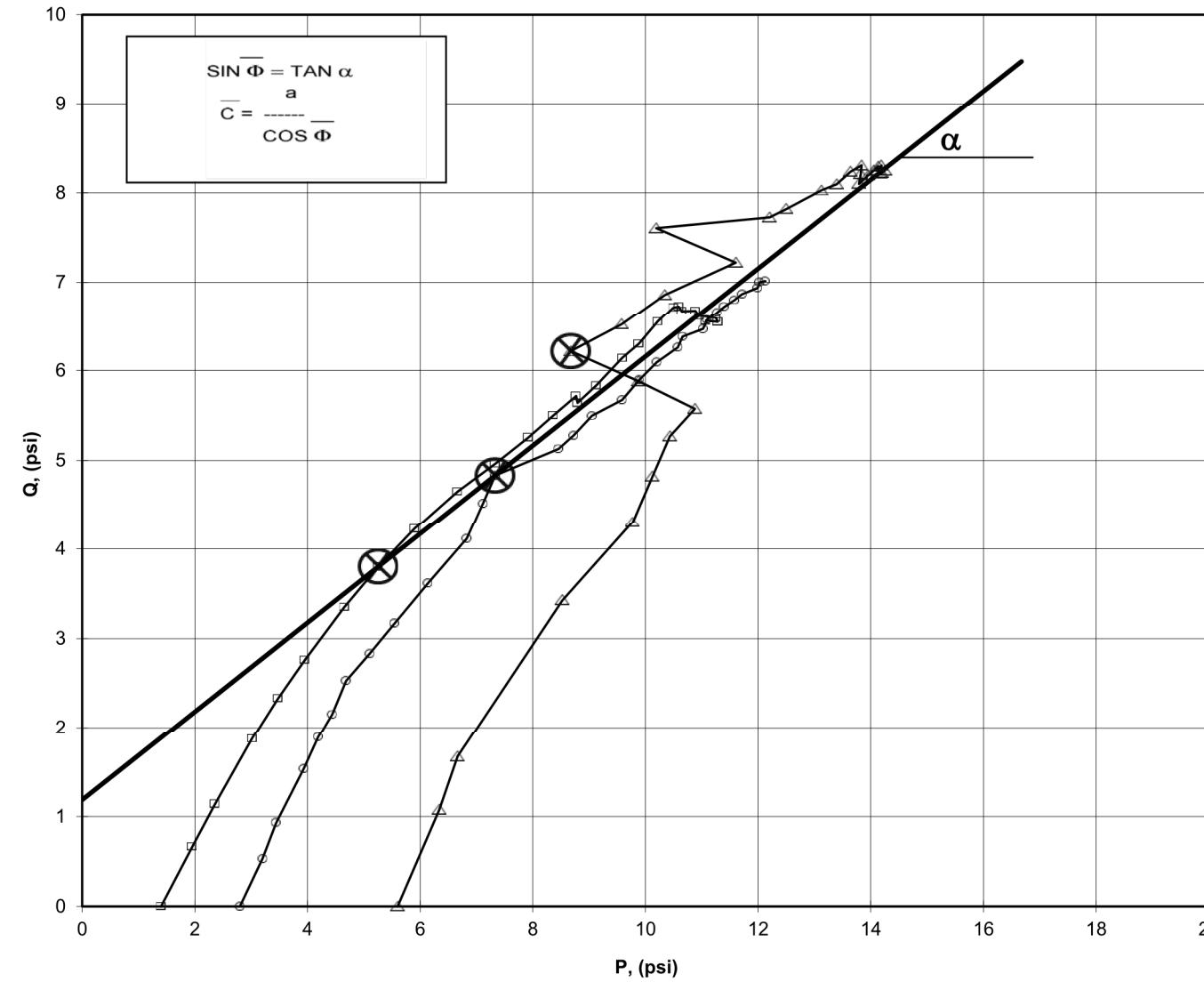
COUNTY: Alamance

DESCRIPTION: Replace Bridge No. 14 on NC 87 over Cane Creek

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
AASHTO T-297

Client: Kleinfelder
Client Reference: BR-0060
Project No.: R-2022-283-001
Lab ID: R-2022-283-001-001

Boring No.: EB1-A
Depth (ft): 2.9-4.9
Sample No.: ST-1

Consolidated Undrained Triaxial Test with Pore Pressure


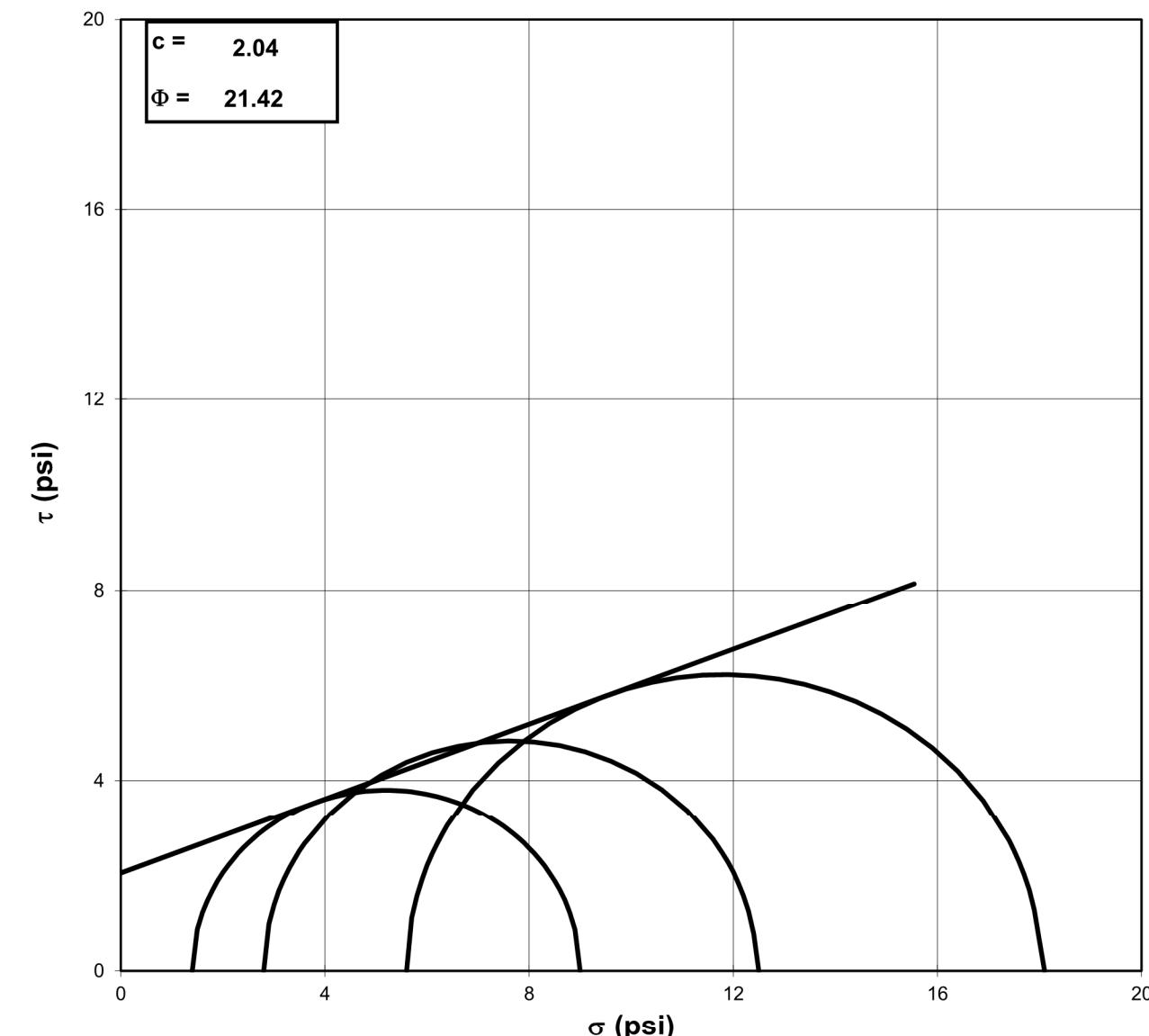
$a = 1.19$	$C = 1.37$
$\alpha = 26.4$	$\Phi = 29.81$

Tested By: 129-07-0411 Date: 12/16/22 Approved By: MPS Date: 12/21/22
page 1 of 10 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

MOHR TOTAL STRENGTH ENVELOPE
AASHTO T-297

Client: Kleinfelder
Client Reference: BR-0060
Project No.: R-2022-283-001
Lab ID: R-2022-283-001-001
Visual Description: Red Clay (UNDISTURBED)

Boring No.: EB1-A
Depth (ft): 2.9-4.9
Sample No.: ST-1



Failure Based on Maximum Effective Principal Stress Ratio

NOTE: GRAPH NOT TO SCALE

Tested By: 129-07-0411 Date: 12/16/22 Approved By: MPS Date: 12/21/22
page 2 of 10 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
 AASHTO T-297

 Client: Kleinfelder
 Client Reference: BR-0060
 Project No.: R-2022-283-001
 Lab ID: R-2022-283-001-001

Visual Description: Red Clay (UNDISTURBED)

Stage No.	0
Test No.	3

PRESURES (psi)

 Cell Pressure (psi) 65.6
 Back Pressure (psi) 60.0
 Eff. Conf. Pressure (psi) 5.6
 Pore Pressure Response (%) 99

MAXIMUM OBLIQUITY POINTS

 P = 8.68
 Q = 6.22

INITIAL SAMPLE DIMENSIONS (in)

 Length 1: 6.011 Diameter 1: 2.853
 Length 2: 6.018 Diameter 2: 2.849
 Length 3: 6.031 Diameter 3: 2.831
 Length 4: 6.057 Diameter 4: 2.851

VOLUME CHANGE

 Avg. Length: 6.029 Avg. Diam.: 2.846
 Initial Burette Reading (ml) 24.0
 Final Burette Reading (ml) 18.3
 Final Change (ml) 5.7

 Initial Dial Reading (mil) 200
 Dial Reading After Saturation (mil) 183
 Dial Reading After Consolidation (mil) 196

LOAD (LB)	DEFORMATION (IN)	PORE PRESSURE (PSI)
14.0	0.000	60.0
27.7	0.001	60.3
35.3	0.003	60.6
57.7	0.008	60.5
68.9	0.015	60.1
75.5	0.021	60.3
81.3	0.029	60.4
85.3	0.038	60.3
89.4	0.050	61.6
94.0	0.071	63.1
98.3	0.101	62.5
103.2	0.138	62.1
108.5	0.174	61.2
114.3	0.216	63.0
116.4	0.246	61.1
118.4	0.288	60.9
122.3	0.346	60.5
124.3	0.406	60.3
127.2	0.451	60.2
129.4	0.511	60.1
129.0	0.556	60.0
128.4	0.601	59.9
130.7	0.646	59.8
132.1	0.676	59.8
133.5	0.706	59.8
133.5	0.737	59.7
135.0	0.767	59.7
134.7	0.812	59.6
135.9	0.858	59.6
137.0	0.888	59.6
137.6	0.918	59.5

Tested By: 129-07-0411 Date: 12/16/2022 Input Checked By: GEM Date: 12/21/2022

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DCN: CT-S28 DATE: 4/12/13 REVISION: 3

**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
 AASHTO T-297

 Client: Kleinfelder
 Client Reference: BR-0060
 Project No.: R-2022-283-001
 Lab ID: R-2022-283-001-001

Visual Description: Red Clay (UNDISTURBED)

Effective Confining Pressure (psi)	5.6	Stage No.	0
Test No	3		

INITIAL DIMENSIONS

 Initial Sample Length (in) 6.03
 Initial Sample Diameter (in) 2.85
 Initial Sample Area (in²) 6.36
 Initial Sample Volume (in³) 38.36

VOLUME CHANGE

 Volume After Consolidation (in³) 38.33
 Length After Consolidation (in) 6.03
 Area After Consolidation (in²) 6.353

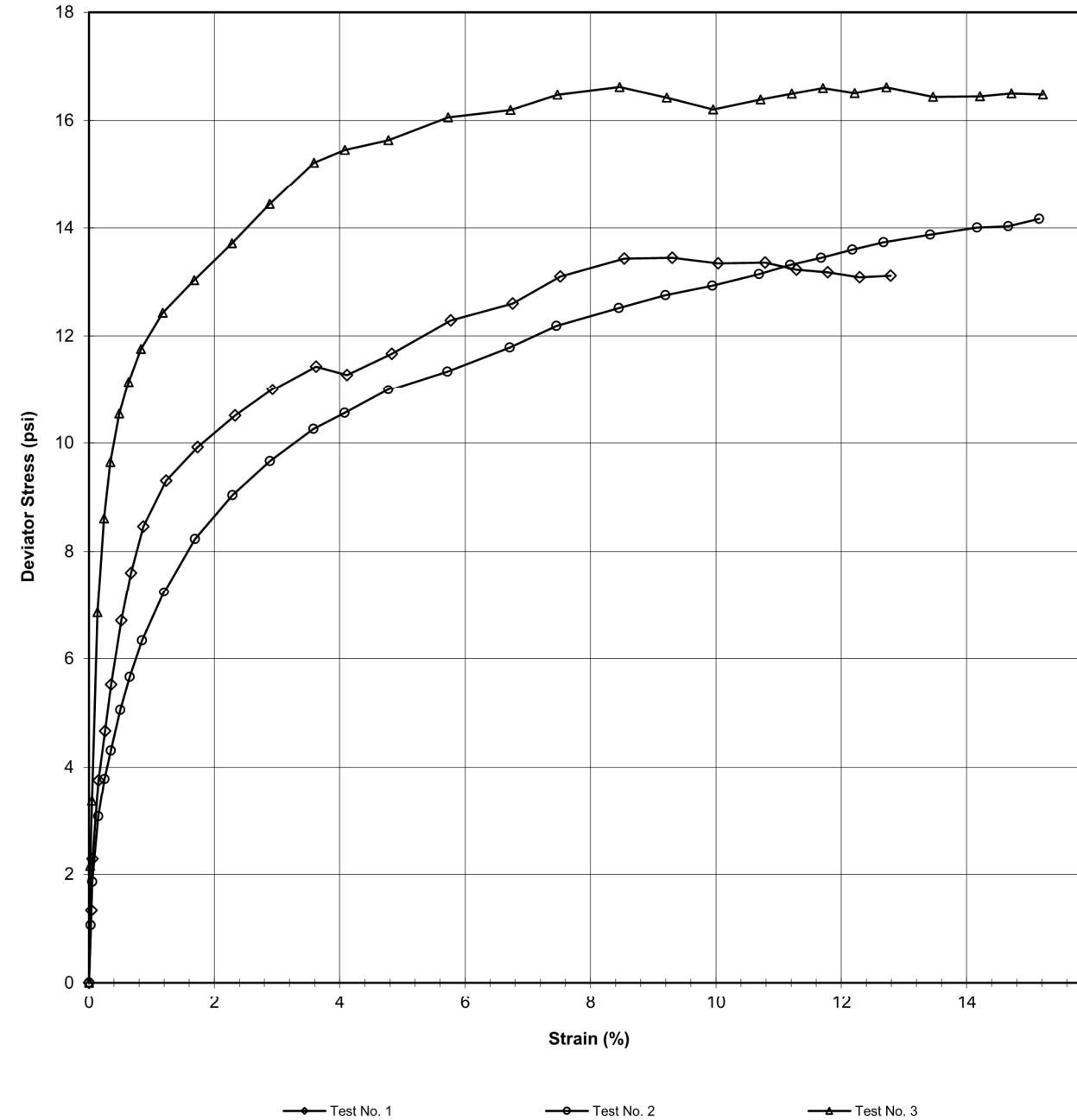
Strain (%)	Deviator Stress PSI	Δ U	$\bar{\sigma}_1$	$\bar{\sigma}_3$	Effective Principal Stress Ratio	\bar{A}	\bar{P}	\bar{Q}
0.02	2.15	0.34	7.41	5.3	1.408	0.16	6.34	1.07
0.05	3.35	0.61	8.34	5.0	1.671	0.18	6.67	1.67
0.14	6.85	0.50	11.95	5.1	2.344	0.07	8.53	3.43
0.24	8.61	0.13	14.07	5.5	2.574	0.02	9.77	4.30
0.34	9.64	0.29	14.95	5.3	2.817	0.03	10.13	4.82
0.48	10.54	0.43	15.70	5.2	3.040	0.04	10.44	5.27
0.63	11.14	0.30	16.45	5.3	3.101	0.03	10.88	5.57
0.83	11.76	1.60	15.76	4.0	3.936	0.14	9.88	5.88
1.17	12.43	3.14	14.89	2.5	6.054	0.26	8.68	6.22
1.68	13.03	2.54	16.09	3.1	5.258	0.20	9.58	6.52
2.28	13.72	2.12	17.20	3.5	4.936	0.16	10.34	6.86
2.88	14.44	1.22	18.83	4.4	4.295	0.09	11.60	7.22
3.59	15.21	3.02	17.80	2.6	6.887	0.20	10.19	7.61
4.08	15.45	1.12	19.93	4.5	4.453	0.07	12.20	7.73
4.78	15.64	0.92	20.32	4.7	4.340	0.06	12.50	7.82
5.73	16.06	0.50	21.16	5.1	4.151	0.03	13.13	8.03
6.72	16.19	0.30	21.49	5.3	4.055	0.02	13.40	8.10
7.47	16.48	0.20	21.88	5.4	4.049	0.01	13.64	8.24
8.46	16.62	0.07	22.15	5.5	4.006	0.00	13.84	8.31
9.21	16.42	-0.01	22.03	5.6	3.927	0.00	13.82	8.21
9.96	16.20	-0.09	21.89	5.7	3.846	-0.01	13.79	8.10
10.71	16.39	-0.16	22.15	5.8	3.845	-0.01	13.96	8.19
11.21	16.50	-0.21	22.30	5.8	3.840	-0.01	14.06	8.25
11.71	16.59	-0.24	22.43	5.8	3.842	-0.01	14.14	8.30
12.21	16.51	-0.26	22.37	5.9	3.815	-0.02	14.12	8.25
12.72	16.61	-0.28	22.49	5.9	3.824	-0.02	14.19	8.31
13.47	16.44	-0.36	22.39	6.0	3.760	-0.02	14.17	8.22
14.21	16.45	-0.37	22.42	6.0	3.753	-0.02	14.20	8.22
14.71	16.50	-0.40	22.51	6.0	3.748	-0.02	14.26	8.25
15.22	16.48	-0.45	22.53	6.1	3.724	-0.03	14.29	8.24

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**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
 AASHTO T-297

Client: Kleinfelder
 Client Reference: BR-0060
 Project No.: R-2022-283-001
 Lab ID: R-2022-283-001-001
 Visual Description: Red Clay (UNDISTURBED)

Boring No.: EB1-A
 Depth (ft): 2.9-4.9
 Sample No.: ST-1



Tested By: 129-07-0411

Date: 12/16/2022

Approved By: MPS

Date: 12/21/2022

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**CONSOLIDATED UNDRAINED TRIAXIAL TEST
WITH PORE PRESSURE READINGS**
 ASTM D4767-11

Client: Kleinfelder
 Client Reference: BR-0060
 Project No.: R-2022-283-001
 Lab ID: R-2022-283-001-001
 Visual Description: Red Clay (UNDISTURBED)

Specific Gravity (assumed) 2.68

SAMPLE CONDITION SUMMARY

Boring No.:	EB1-A	EB1-A	EB1-A
Depth (ft):	2.9-4.9	2.9-4.9	2.9-4.9
Sample No.:	ST-1	ST-1	ST-1
Test No.	T1	T2	T3
Deformation Rate (in/min)	0.002	0.002	0.002
Back Pressure (psi)	60.0	60.0	60.0
Consolidation Time (days)	1	1	1
Moisture Content (%) (INITIAL)	25.7	25.7	25.7
Total Unit Weight (pcf)	111.4	112.2	112.5
Dry Unit Weight (pcf)	88.6	89.3	89.5
Moisture Content (%) (FINAL)	46.7	36.7	35.3
Initial State Void Ratio, e	0.888	0.874	0.870
Void Ratio at Shear, e	0.885	0.887	0.869



Tested By: 129-07-0411

Date: 12/16/22

Input Checked By: GEM

Date: 12/21/22

page 10 of 10 DCN: CT-S28 DATE: 4/12/13 REVISION: 3

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

SHEET 22

PROJECT NO.: 67060.1.1 (BR-0060)

PROJECT ID: 41379

COUNTY: Alamance

DESCRIPTION Replace Bridge No. 14 on NC 87 over Cane Creek

SITE PHOTOGRAPH

Bridge No. 14 on NC 87 over Cane Creek



View of Existing Bridge No. 14 from West of Bridge Looking East