

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34915.1.1 (U-3308)	1	28

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 34915.1.1 (U-3308) F.A. PROJ. STP-55(20)  
COUNTY DURHAM  
PROJECT DESCRIPTION WIDENING OF NC 55 (ALSTON AVE.) FROM  
NC 147 (BUCK DEAN FREEWAY) TO US 70 BUS/NC 98  
(HOLLOWAY ST.)  
SITE DESCRIPTION BRIDGES ON -NSRR- AND -CSX- OVER -L-  
(NC 55)

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**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 RALESBY BY CONTRACTORS THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

**PROJECT: 34915.1.1 ID: U-3308**

PERSONNEL

J. L. PEDRO

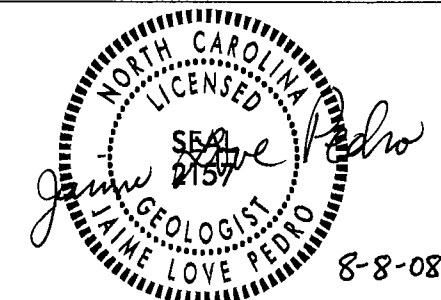
CONSULTANT: TIERRA

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE JULY 2008



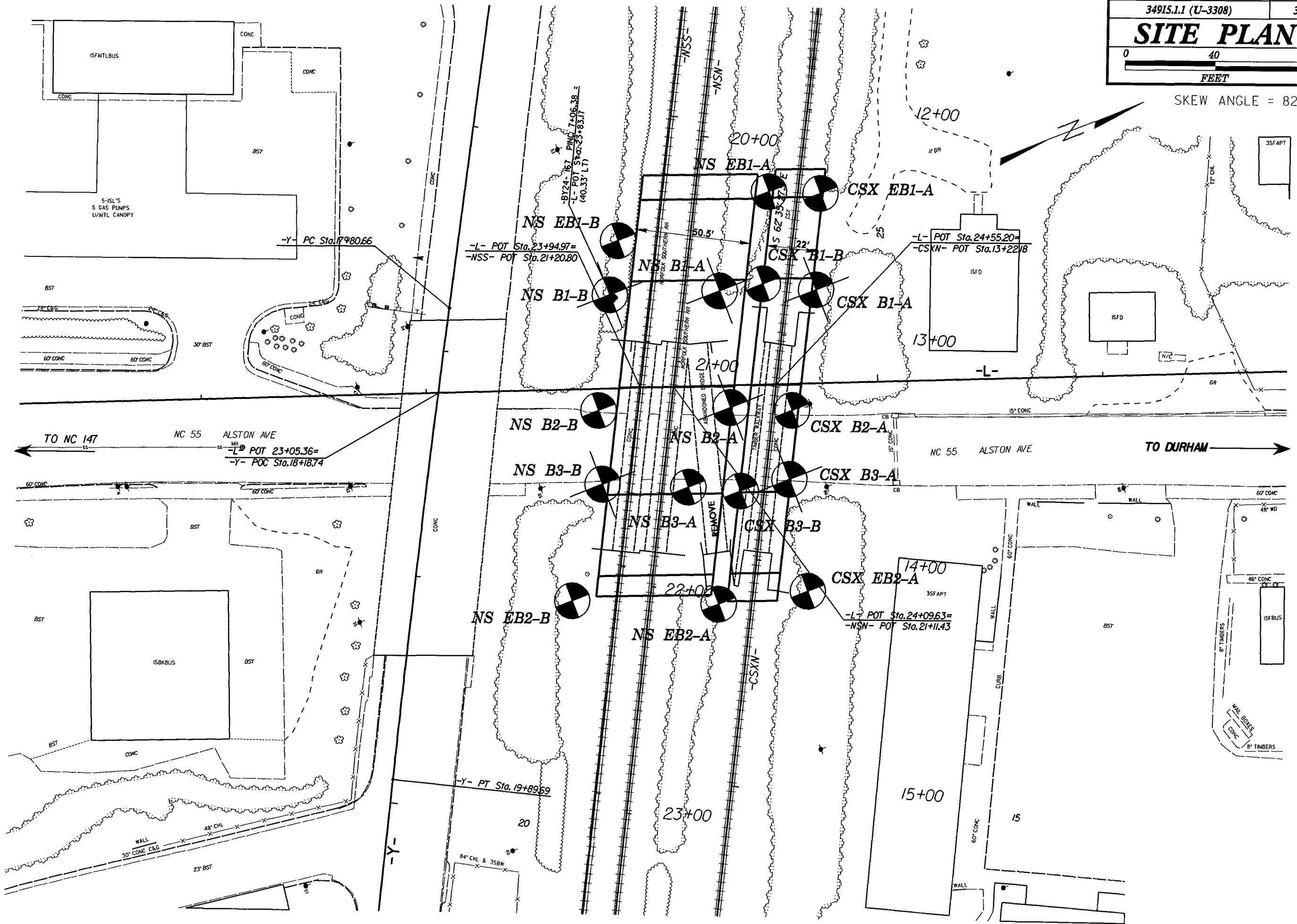
DRAWN BY: J. L. PEDRO, R. E. BEARD

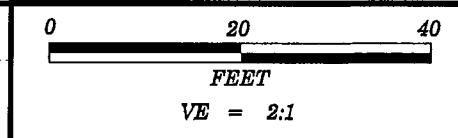
NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.



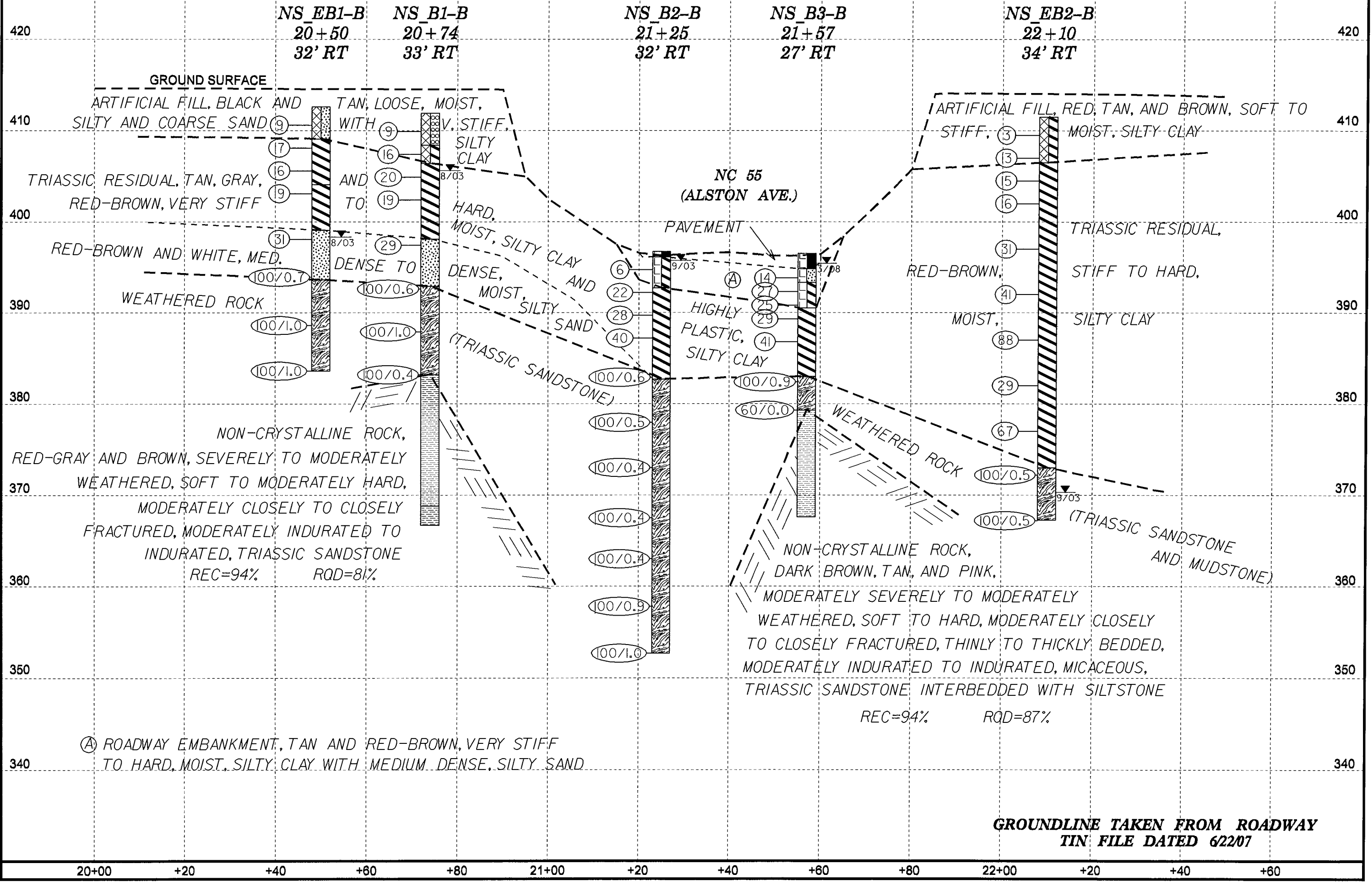
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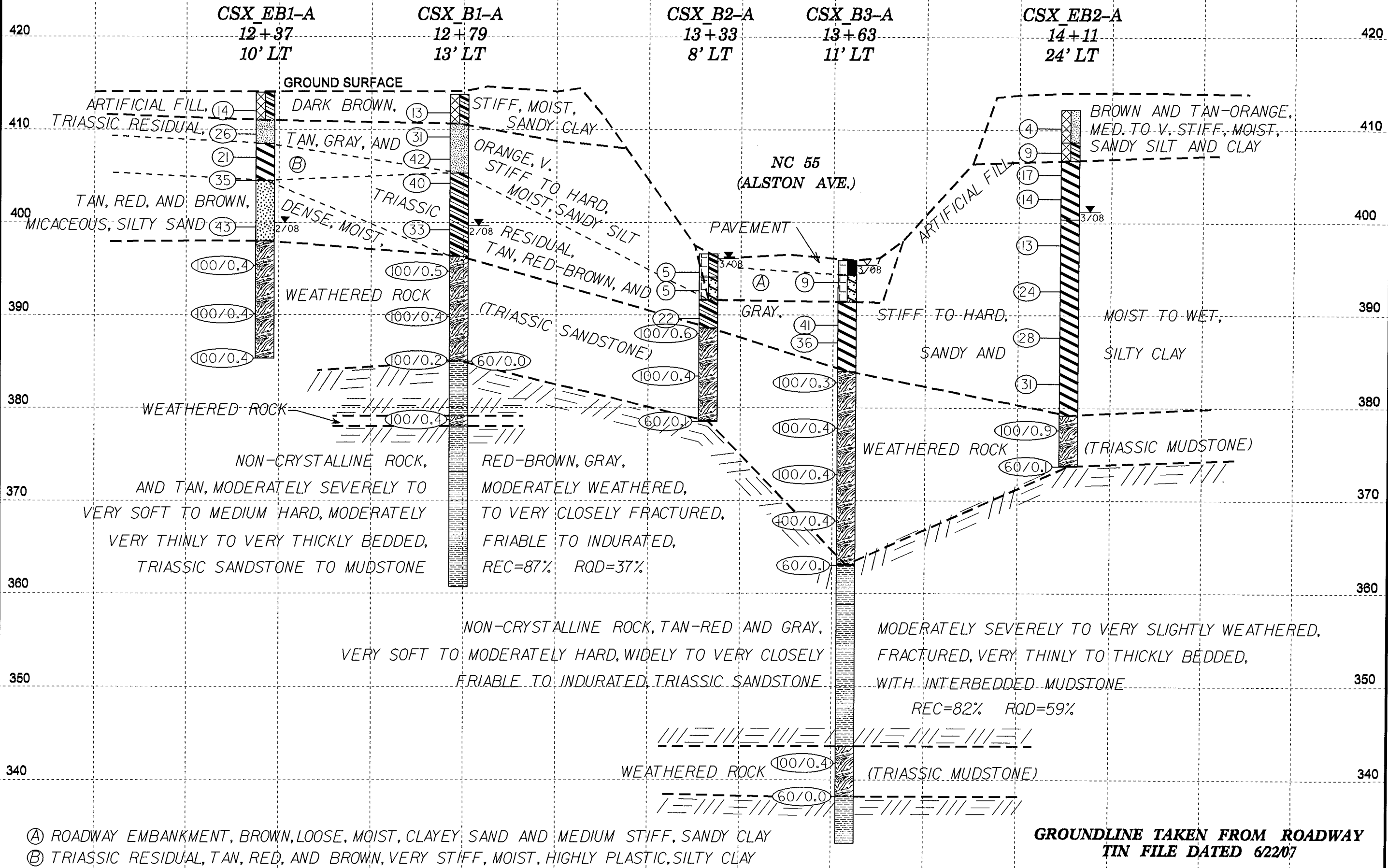




PROJECT REFERENCE NO.	SHEET
34915.1.1 (U-3308)	4

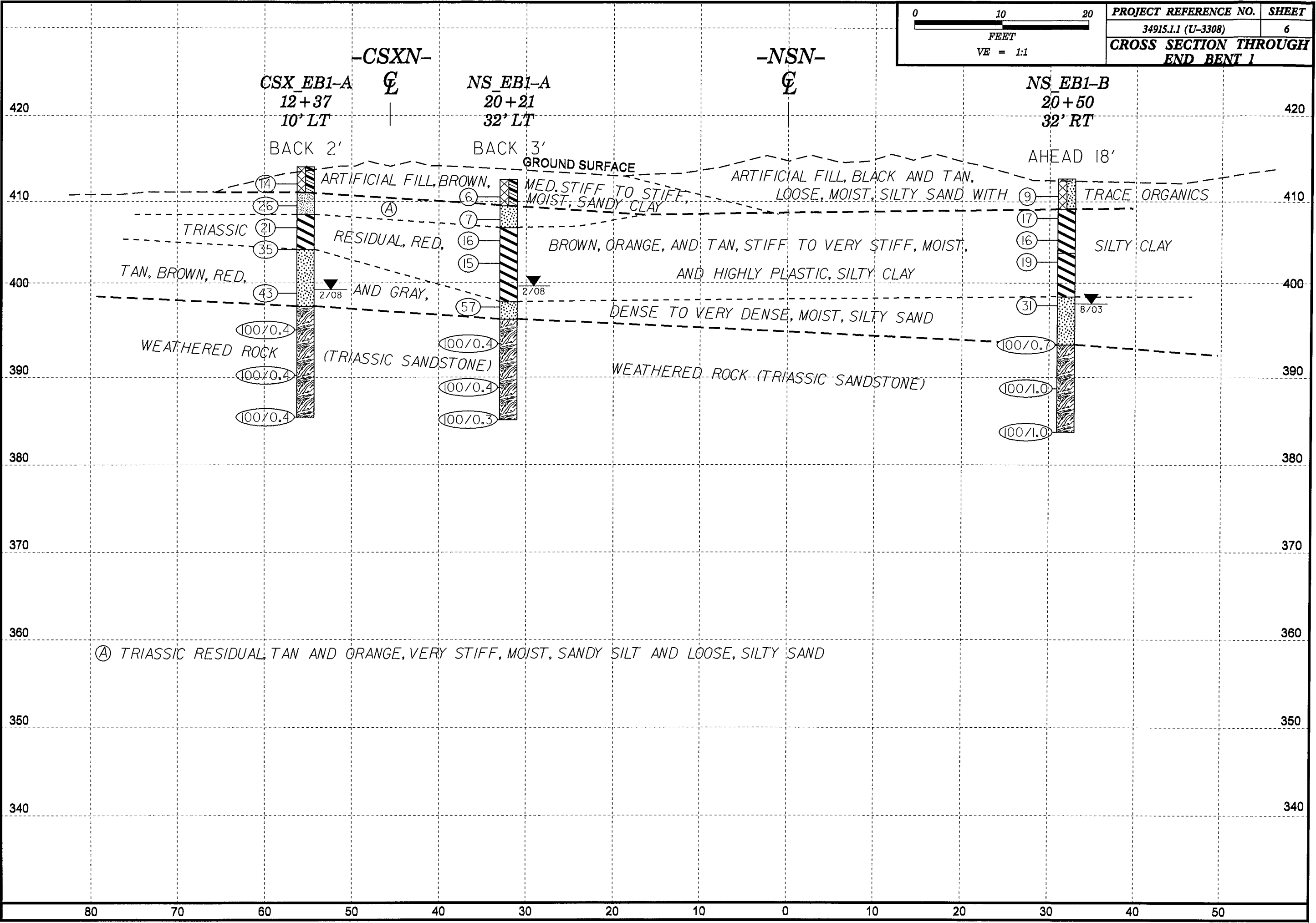
**FENCE DIAGRAM OF BORINGS  
PROJECTED ALONG -NSN-**

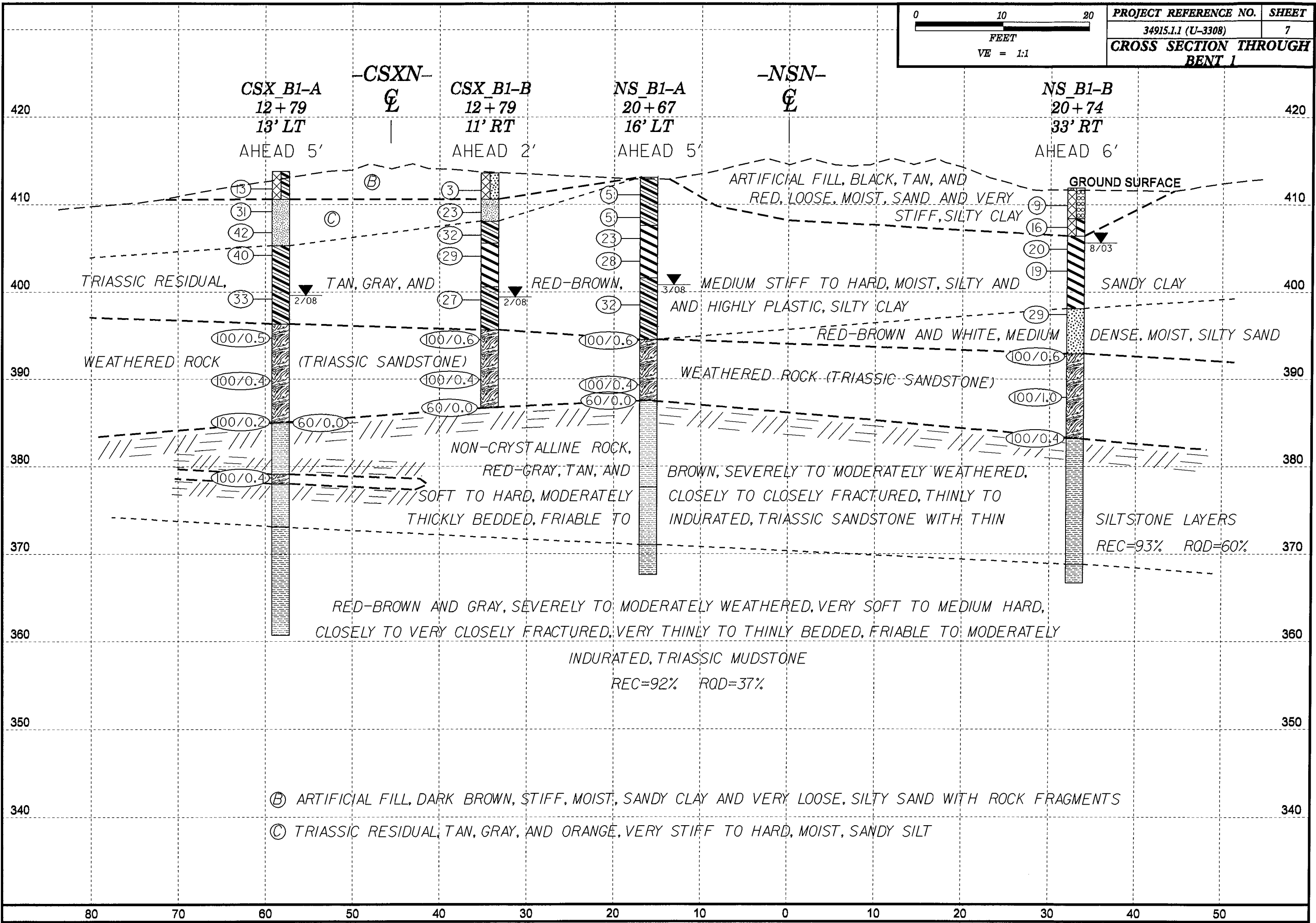




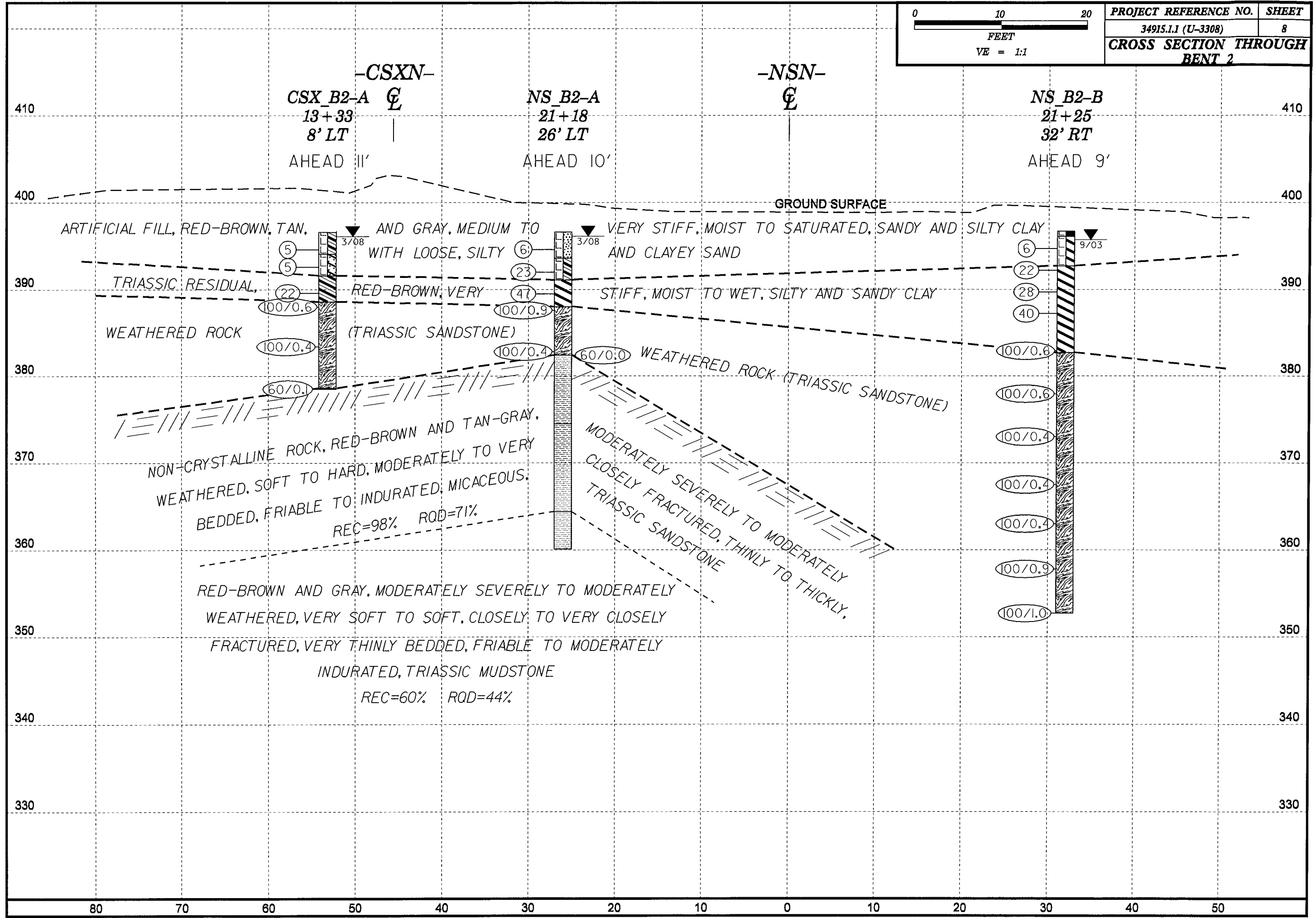
- (A) ROADWAY EMBANKMENT, BROWN, LOOSE, MOIST, CLAYEY SAND AND MEDIUM STIFF, SANDY CLAY
- (B) TRIASSIC RESIDUAL, TAN, RED, AND BROWN, VERY STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY

**GROUNDLINE TAKEN FROM ROADWAY  
TIN FILE DATED 6/22/07**

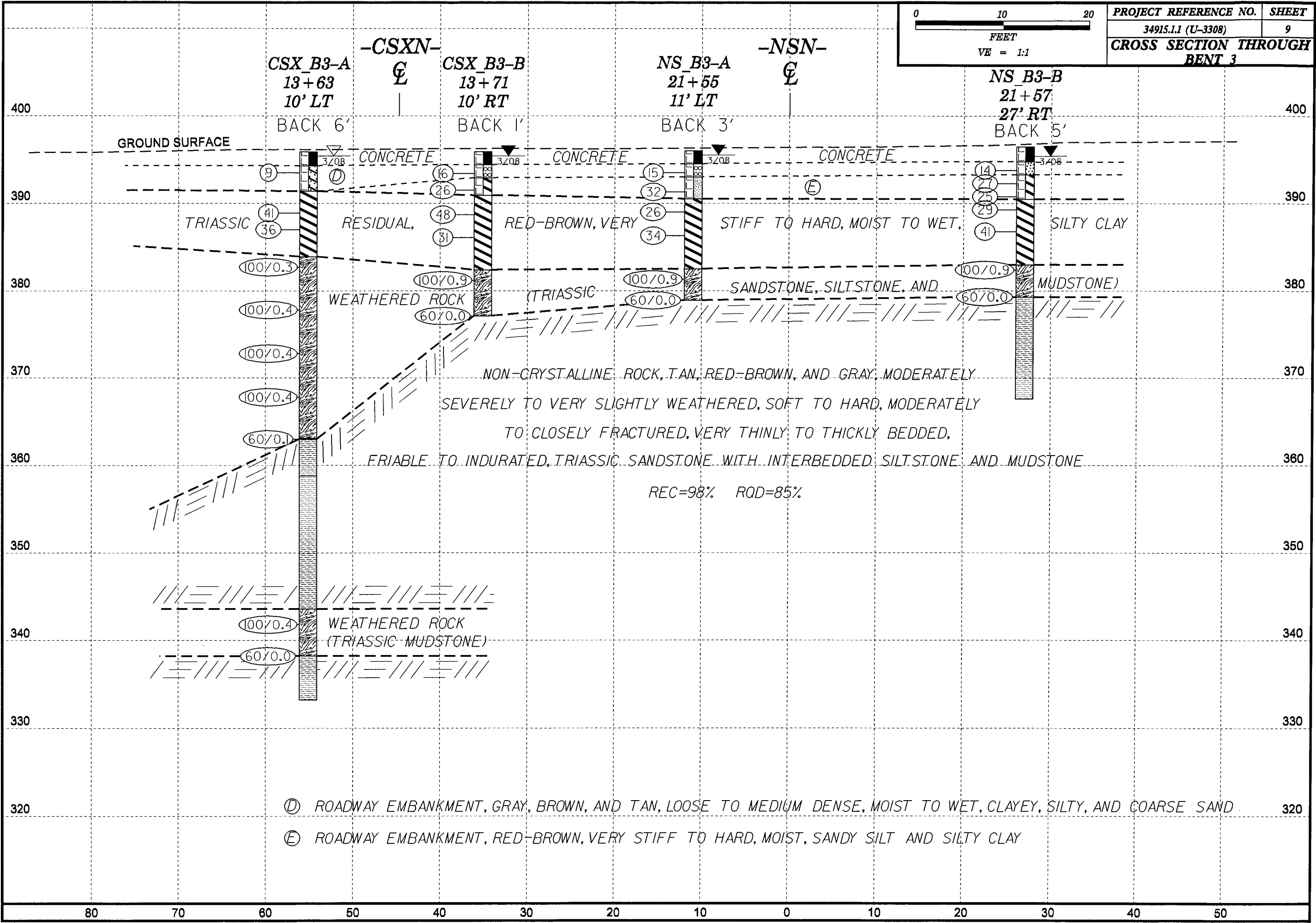


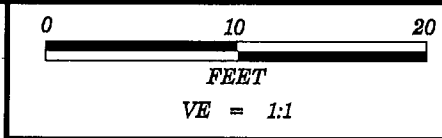




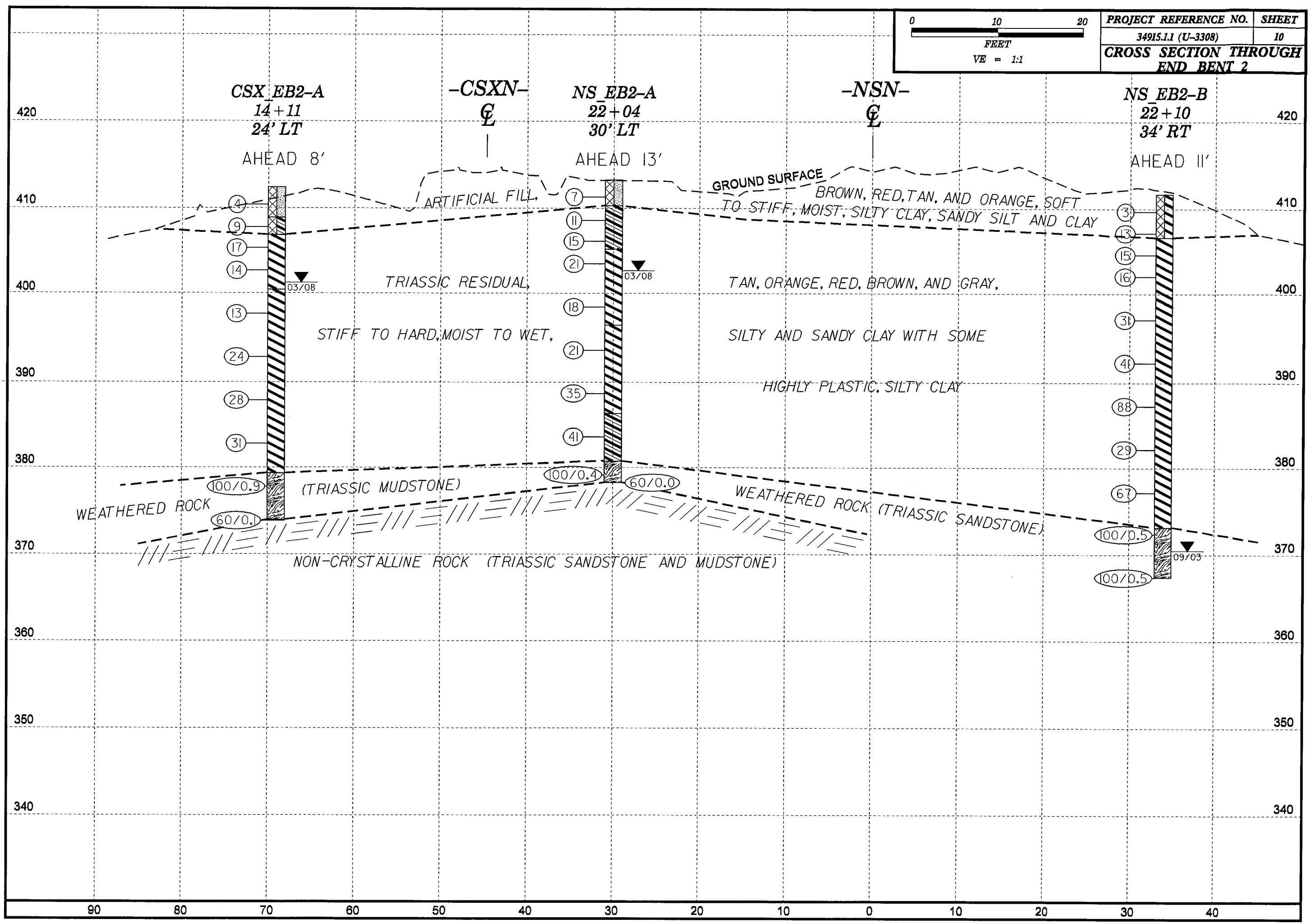








PROJECT REFERENCE NO.	SHEET
34915.1.1 (U-3308)	10
CROSS SECTION THROUGH END BENT 2	

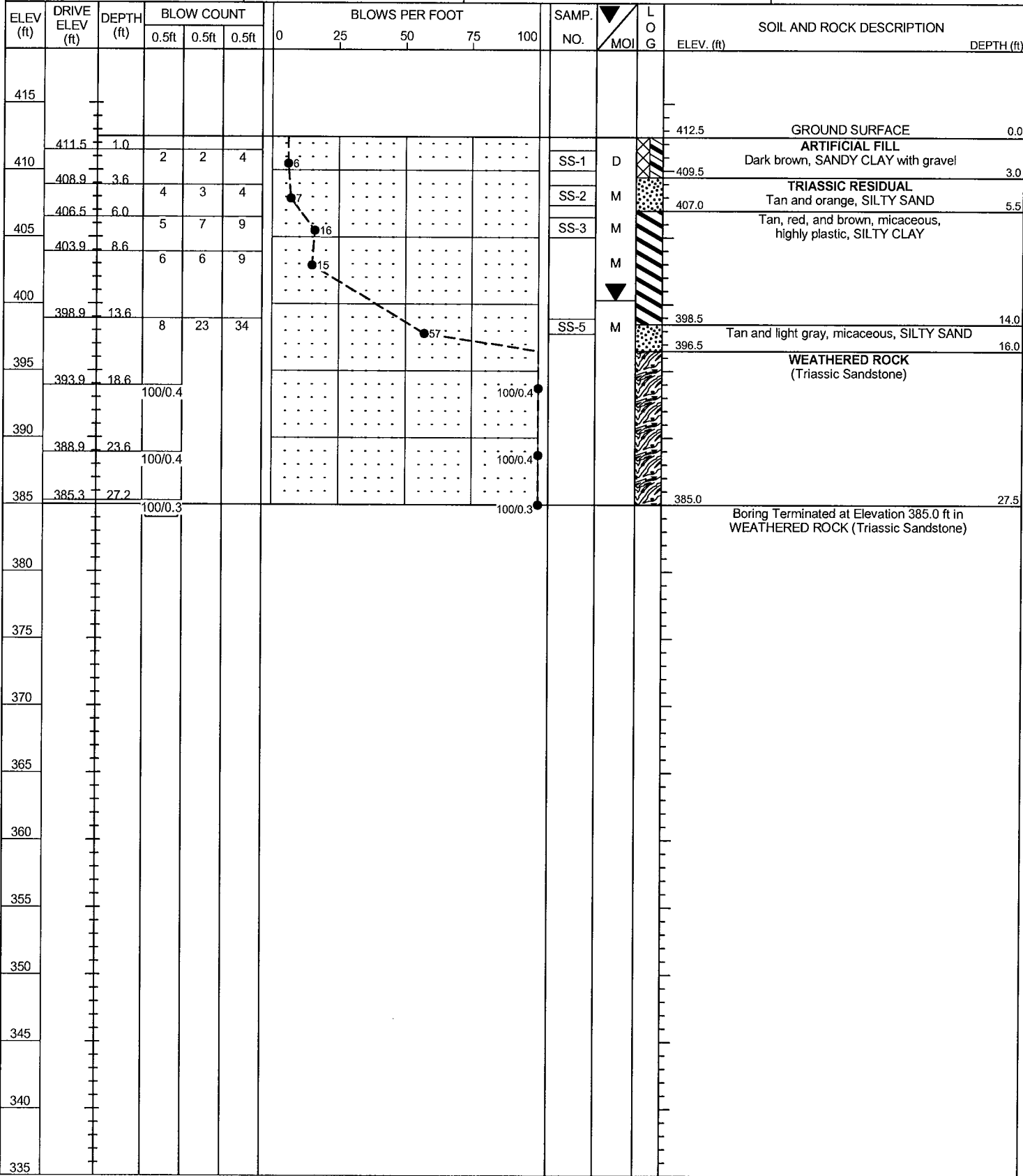




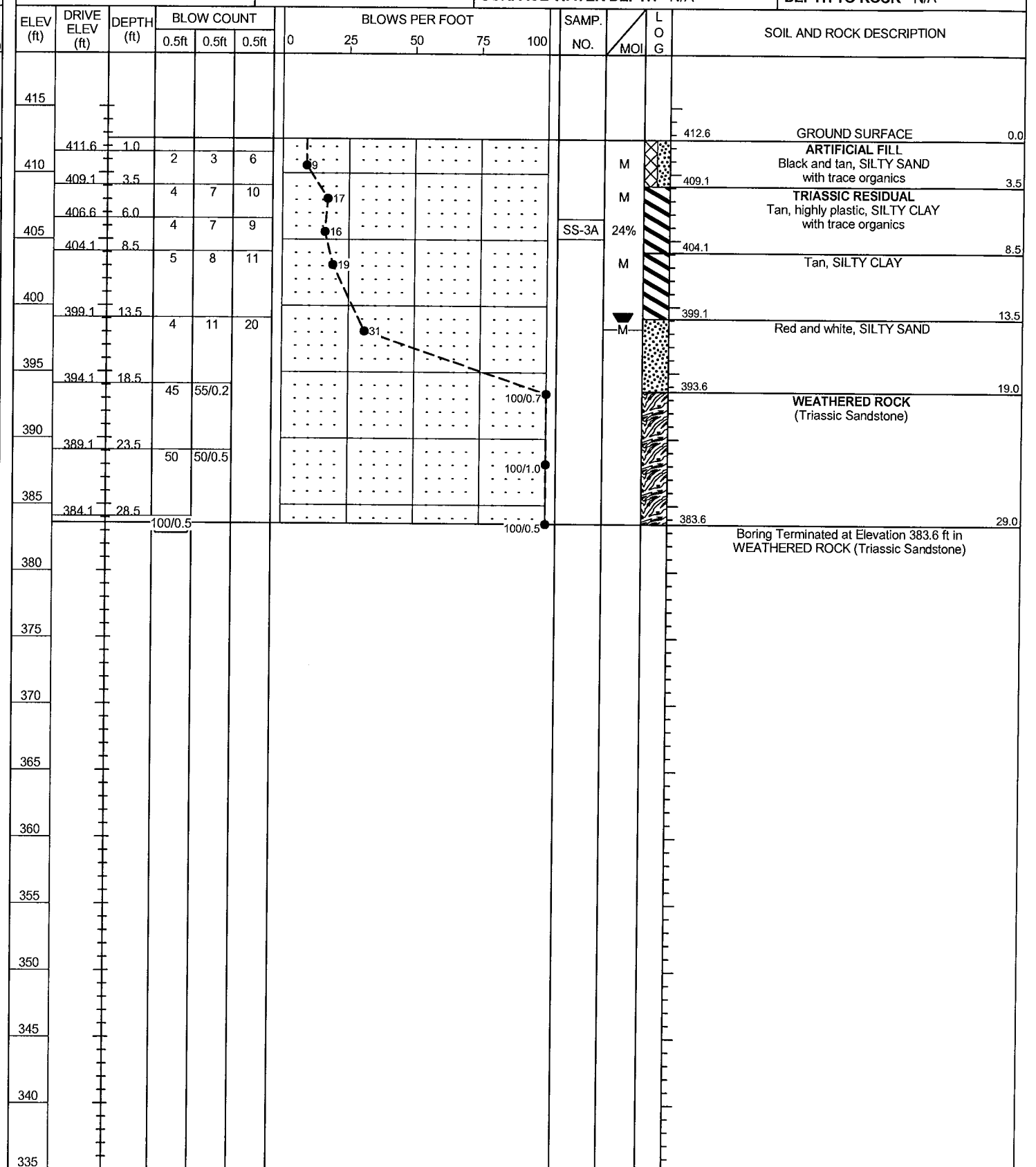
# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST C. Bruinsma
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_EB1A	STATION 20+21	OFFSET 32ft LT	ALIGNMENT NSN
COLLAR ELEV. 412.5 ft	TOTAL DEPTH 27.5 ft	NORTHING 813,236	EASTING 2,032,618
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/19/08	COMP. DATE 02/19/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST J. Howard
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_EB1B	STATION 20+50	OFFSET 32ft RT	ALIGNMENT NSN
COLLAR ELEV. 412.6 ft	TOTAL DEPTH 29.0 ft	NORTHING 813,166	EASTING 2,032,614
DRILL MACHINE DIEDRICH D50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/28/03	COMP. DATE 08/28/03	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE U3308\_GEO\_BH.GPJ NC\_DOT.GDT 08/08/08

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B1A	STATION 20+67	OFFSET 16ft LT	ALIGNMENT NSN
COLLAR ELEV. 413.1ft	TOTAL DEPTH 45.5 ft	NORTHING 813,200	EASTING 2,032,651
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/28/08	COMP. DATE 03/03/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 25.6 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B1A	STATION 20+67	OFFSET 16ft LT	ALIGNMENT NSN
COLLAR ELEV. 413.1 ft	TOTAL DEPTH 45.5 ft	NORTHING 813,200	EASTING 2,032,651
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/28/08	COMP. DATE 03/03/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 25.6 ft

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							
415																	
413.1																	GROUND SURFACE
412.1	412.1	1.0															TRIASSIC RESIDUAL
410	409.5	3.6	1	2	3												Tan-orange, SANDY CLAY
407.1	407.1	6.0	1	1	4												Tan and red-gray, SILTY CLAY
405	404.5	8.6	7	10	13												
400	399.5	13.6	8	14	14												Red-brown to gray, SANDY CLAY
395	394.5	18.6	6	12	20												WEATHERED ROCK (Triassic Sandstone)
390	389.5	23.6	30	60	40/0.1												
387.5	387.5	25.6	100/0.4														
385	387.5	25.6	60/0.0														
380																	
375																	
370																	
365																	
360																	
355																	
350																	
345																	
340																	
335																	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC (ft) %	RQD (ft) %		REC (ft) %	RQD (ft) %			
387.5	387.5	25.6	2.4	1:13/1.0	(2.3)	(2.1)		(9.2)	(6.9)		Begin Coring @ 25.6 ft	25.6
385	385.1	28.0	2.5	1:05/1.0	96%	88%		93%	70%		NON-CRYSTALLINE ROCK	
				0:28/0.4			RS-1				Red-gray, tan, and brown, moderately severely weathered, soft to hard, moderately closely to closely fractured, very thickly bedded, friable to indurated, TRIASSIC SANDSTONE	
	382.6	30.5	5.0	0:30/0.5	(2.2)	(1.9)						
				2:51/1.0	88%	76%						
380				3:36/1.0	(4.7)	(2.9)						
				3:50/1.0	94%	58%						
				7:39/1.0								
				2:05/1.0								
				1:52/1.0								
				2:32/1.0								
375				8:30/1.0	(4.7)	(3.1)		(6.5)	(4.0)		Red-gray to tan, moderately severely to moderately weathered, soft to hard, moderately closely to very closely fractured, thinly to thickly bedded, indurated to friable, micaceous, interbedded TRIASSIC SANDSTONE and SILTSTONE	35.5
				6:30/1.0	94%	62%		98%	61%			
				5:51/1.0			RS-2					
				6:02/1.0								
				4:39/1.0								
370				6:00/1.0	(4.7)	(2.7)		(2.9)	(1.8)		Red-gray, moderately severely to moderately weathered, very soft to medium hard, closely to very closely fractured, very thin to thin bedded, moderately indurated to friable, TRIASSIC MUDSTONE	42.1
				6:00/1.0	94%	54%		85%	53%			
				6:00/1.0								
				6:00/1.0								
365				6:00/1.0							Boring Terminated at Elevation 367.6 ft in NON-CRYSTALLINE ROCK (Triassic Mudstone)	45.5
360												
355												
350												
345												
340												
335												
330												
325												
320												
315												
310												

NCDOT BORE DOUBLE US3308\_GEO\_BH.GPJ NC\_DOT.GDT 8/7/08

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST J. Howard
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B1B	STATION 20+74	OFFSET 33ft RT	ALIGNMENT NSN
COLLAR ELEV. 411.9 ft	TOTAL DEPTH 45.2 ft	NORTHING 813,154	EASTING 2,032,635
DRILL MACHINE DIEDRICH D50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/28/03	COMP. DATE 08/29/03	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.7 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST J. Howard
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B1B	STATION 20+74	OFFSET 33ft RT	ALIGNMENT NSN
COLLAR ELEV. 411.9 ft	TOTAL DEPTH 45.2 ft	NORTHING 813,154	EASTING 2,032,635
DRILL MACHINE DIEDRICH D50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 08/28/03	COMP. DATE 08/29/03	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.7 ft

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						
415														411.9	GROUND SURFACE	0.0
410	410.9	1.0	2	3	6							M	ARTIFICIAL FILL Black, SAND with trace organics	3.5		
	408.4	3.5	5	7	9							M	Tan and red, SILTY CLAY	5.5		
405	405.9	6.0	8	8	12							M	TRIASSIC RESIDUAL Tan and gray, SILTY CLAY			
	403.4	8.5	5	8	11							M				
400												M				
	398.4	13.5	5	13	16							M	Red-brown and white, SILTY SAND	13.8		
395																
	393.4	18.5	29	84	16/0.1								WEATHERED ROCK (Triassic Sandstone)	19.0		
390																
	388.4	23.5	50	50/0.5												
385																
	383.4	28.5	100/0.2										NON-CRYSTALLINE ROCK Red-gray and brown, severely to moderately weathered, soft to moderately hard, moderately closely to closely fractured, moderately indurated to indurated, TRIASSIC SANDSTONE REC=94% RQD=81%	28.7		
380												RS-1A				
375																
370												RS-2A				
365													Red-gray, severely weathered, soft, closely to very closely fractured, friable to moderately indurated, TRIASSIC MUDSTONE REC=100% RQD=24%	43.1		
													Boring Terminated at Elevation 366.7 ft in NON-CRYSTALLINE ROCK (Triassic Mudstone)	45.2		
360																
355																
350																
345																
340																
335																

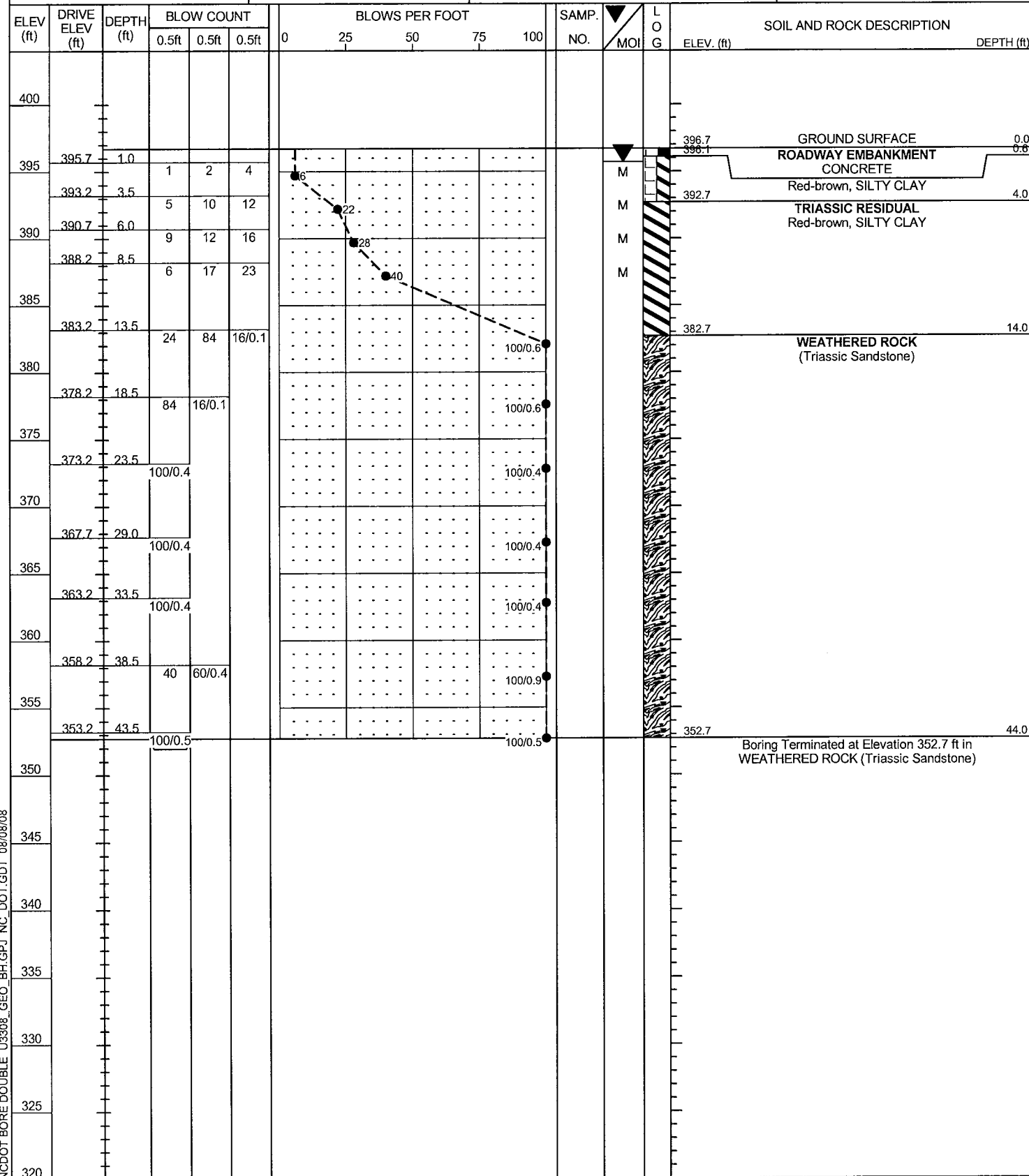
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
383.2	383.2	28.7	1.8	4:00/1.0 1:15/0.8	(1.6)	(1.5)		(13.6)	(11.7)		Begin Coring @ 28.7 ft NON-CRYSTALLINE ROCK	28.7
380	381.4	30.5	4.8	4:45/1.0 13:00/1.0 7:00/1.0 3:30/1.0 2:00/0.8	(4.5)	(3.2)	RS-1A	94%	67%		Red-gray and brown, severely to moderately weathered, soft to moderately hard, moderately closely to closely fractured, moderately indurated to indurated, TRIASSIC SANDSTONE	
375	376.6	35.3	4.9	4:00/1.0 4:00/1.0 2:45/1.0 2:30/1.0 2:30/0.9	(4.9)	(4.9)		100%	100%			
370	371.7	40.2	5.0	3:45/1.0 4:00/1.0 11:30/1.0 20:00/1.0 4:30/1.0	(4.7)	(2.6)	RS-2A	94%	52%			
365	366.7	45.2			(2.1)	(0.5)		100%	24%		Red-gray, severely weathered, soft, closely to very closely fractured, friable to moderately indurated, TRIASSIC MUDSTONE Boring Terminated at Elevation 366.7 ft in NON-CRYSTALLINE ROCK (Triassic Mudstone)	45.2
360												
355												
350												
345												
340												
335												

NCDOT BORE DOUBLE U3308\_GEO\_BH.GPJ NC\_DOT.GDT 08/08/08

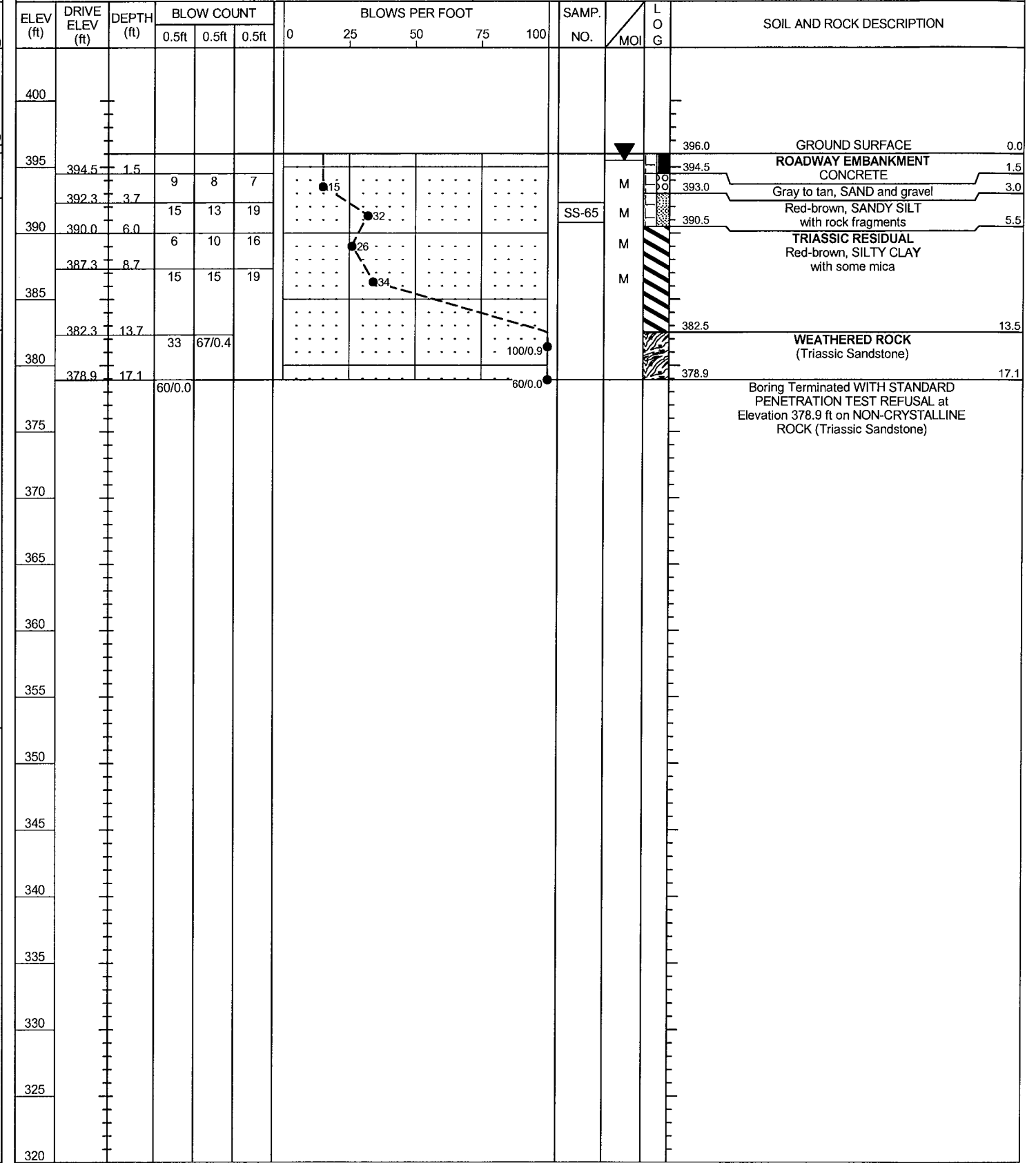


**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST J. Howard
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B2B	STATION 21+25	OFFSET 32ft RT	ALIGNMENT NSN
COLLAR ELEV. 396.7 ft	TOTAL DEPTH 44.0 ft	NORTHING 813,131	EASTING 2,032,681
DRILL MACHINE DIEDRICH D50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 09/04/03	COMP. DATE 09/04/03	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_B3A	STATION 21+55	OFFSET 11ft LT	ALIGNMENT NSN
COLLAR ELEV. 396.0 ft	TOTAL DEPTH 17.1 ft	NORTHING 813,156	EASTING 2,032,727
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 03/05/08	COMP. DATE 03/05/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 17.1 ft



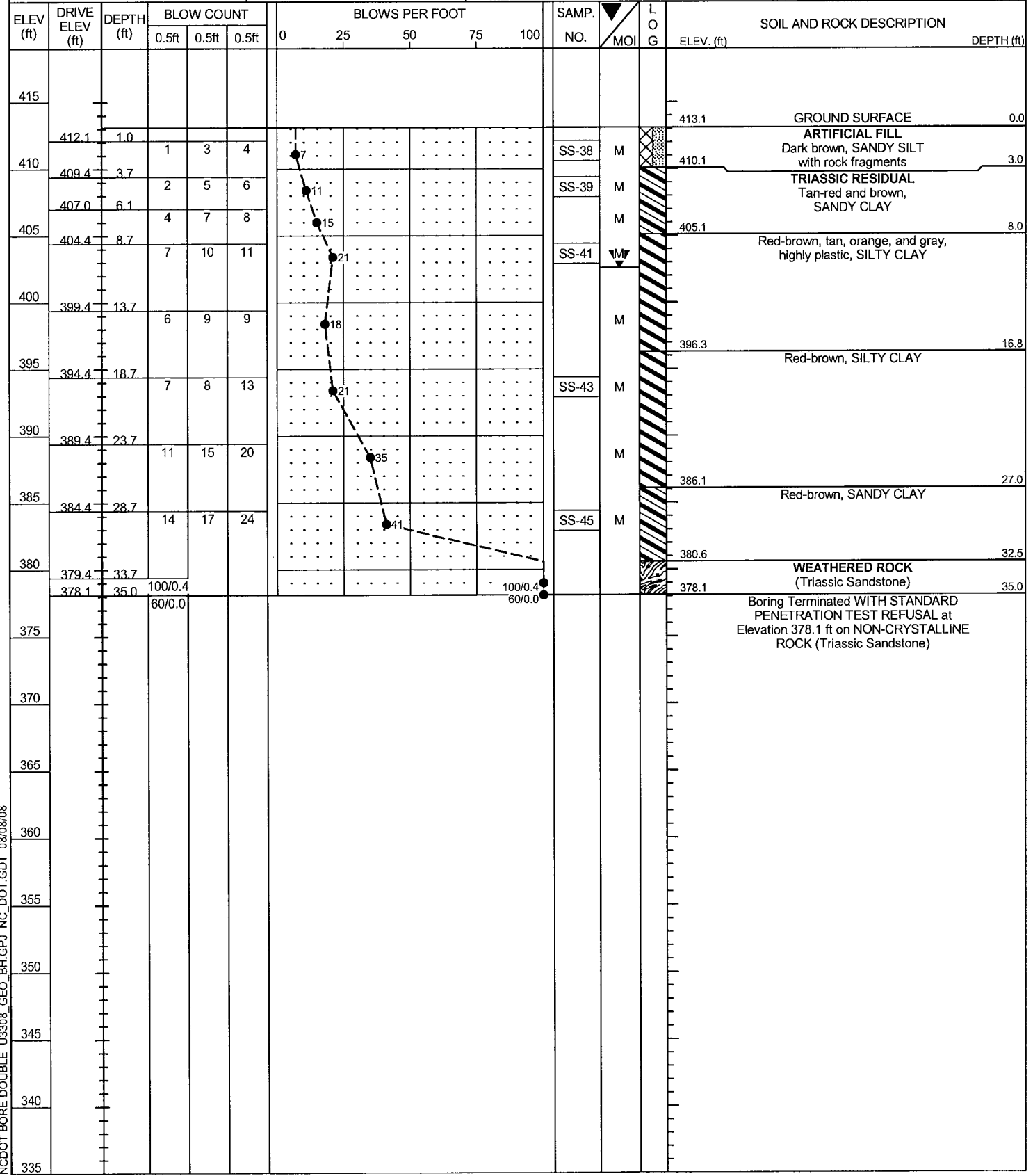
NCDOT BORE DOUBLE U3308\_GEO\_BH.GPJ NC DOT.GDT 08/08/08



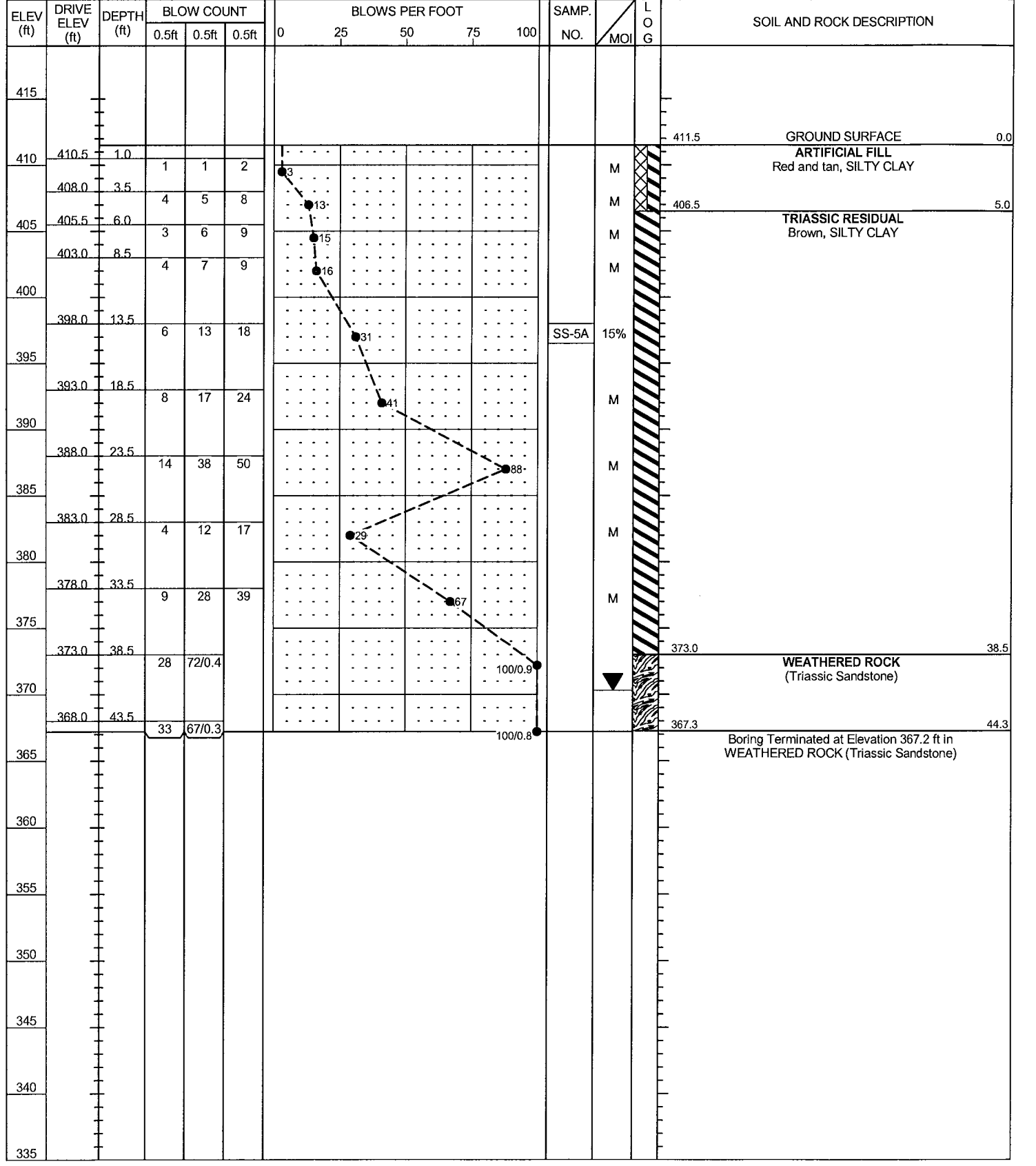


**NCDOT GEOTECHNICAL ENGINEERING UNIT**  
**BORELOG REPORT**

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_EB2A	STATION 22+04	OFFSET 30ft LT	ALIGNMENT NSN
COLLAR ELEV. 413.1 ft	TOTAL DEPTH 35.0 ft	NORTHING 813,150	EASTING 2,032,780
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/29/08	COMP. DATE 02/29/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 35.0 ft



PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST J. Howard
SITE DESCRIPTION Bridge on -NSRR- over -L- (NC55)			GROUND WTR (ft)
BORING NO. NS_EB2B	STATION 22+10	OFFSET 34ft RT	ALIGNMENT NSN
COLLAR ELEV. 411.5 ft	TOTAL DEPTH 44.3 ft	NORTHING 813,090	EASTING 2,032,755
DRILL MACHINE DIEDRICH D50	DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
START DATE 09/02/03	COMP. DATE 09/02/03	SURFACE WATER DEPTH N/A	DEPTH TO ROCK N/A



NCDOT BORE DOUBLE U3308\_GEO\_BH.GPJ, NC\_DOT\_GDT\_08/08/08





PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -CSX- over -L- (NC55)			GROUND WTR (ft)
BORING NO. CSX_B1A	STATION 12+79	OFFSET 13ft LT	ALIGNMENT CSX
COLLAR ELEV. 413.8 ft	TOTAL DEPTH 53.1 ft	NORTHING 813,240	EASTING 2,032,666
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/26/08	COMP. DATE 02/27/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.8 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST T. Nielsen
SITE DESCRIPTION Bridge on -CSX- over -L- (NC55)			GROUND WTR (ft)
BORING NO. CSX_B1A	STATION 12+79	OFFSET 13ft LT	ALIGNMENT CSX
COLLAR ELEV. 413.8 ft	TOTAL DEPTH 53.1 ft	NORTHING 813,240	EASTING 2,032,666
DRILL MACHINE CME-45B	DRILL METHOD Mud Rotary	HAMMER TYPE Manual	
START DATE 02/26/08	COMP. DATE 02/27/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 28.8 ft

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						
415														413.8	GROUND SURFACE	0.0
	412.8	1.0													ARTIFICIAL FILL Dark brown, SANDY CLAY with rock fragments	3.2
410	410.2	3.6	2	6	7										TRIASSIC RESIDUAL Tan, gray, and orange, SANDY SILT	
	407.8	6.0	7	14	17											
405	405.2	8.6	17	20	22										Tan, red-brown, and gray, micaceous, SANDY CLAY	8.5
	402.8	11.0														
400	400.2	13.6	15	20	20											
	397.8	16.0	9	12	21											
395	395.2	18.6														
	392.8	21.0														
390	390.2	23.6														
	387.8	25.8														
385	385.2	28.6														
	382.8	31.0														
380	379.1	34.7														
	376.7	37.1														
375																
370																
365																
360																
355																
350																
345																
340																
335																

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
385												
	385.0	28.8	1.0	0:30/1.0	(0.0)	(0.0)		(4.7)	(3.1)		Begin Coring @ 28.8 ft	28.8
	384.0	29.8	4.9	0:30/1.0	0%	0%		80%	53%		NON-CRYSTALLINE ROCK	
				1:00/1.0	(4.7)	(3.1)					Red-gray, tan, brown, moderately severely weathered, soft to medium hard, closely to very closely fractured, very thickly bedded, friable to indurated, TRIASSIC SANDSTONE	
				0:53/1.0	96%	63%						
				1:48/1.0								
				1:03/0.9								
380	379.1	34.7						(0.2)	(0.0)		WEATHERED ROCK	34.7
	378.7	35.1	4.4	N=100/0.4	(3.5)	(1.2)		18%	0%		(Triassic Sandstone)	35.8
				1:30/1.0	80%	27%						
				1:33/1.0								
				1:56/1.0				(4.9)	(1.6)		NON-CRYSTALLINE ROCK	
				1:37/1.0				100%	33%		Red-brown to tan, moderately severely to moderately weathered, soft to medium hard, moderately closely to very closely fractured, thinly to thickly bedded, friable to indurated, TRIASSIC SANDSTONE	
375	374.7	39.1										
	374.3	39.5	4.0	2:14/1.0	(3.1)	(0.4)						
				2:50/1.0	78%	10%						
				3:03/1.0								
				3:00/1.0				(11.4)	(4.3)		Red-brown and green-gray, moderate severely to moderately weathered, very soft to medium hard, closely to very closely fractured, very thin to thinly bedded, friable to moderately indurated, TRIASSIC MUDSTONE	
370	370.7	43.1										
			5.0	3:34/1.0	(5.0)	(2.0)						
				5:05/1.0	100%	40%						
				7:02/1.0								
				6:14/1.0								
				5:48/1.0								
365	365.7	48.1										
			5.0	8:02/1.0	(4.9)	(2.3)	RS-6					
				6:30/1.0	98%	46%						
				8:41/1.0								
				9:45/1.0								
				11:20/1.0								
360	360.7	53.1										
355												
350												
345												
340												
335												

NCDOT BORE DOUBLE U3308 GEO BH.GPJ NC\_DOT.GDT 08/08/08

NCDOT CORE SINGLE U3308 GEO BH.GPJ NC\_DOT.GDT 07/15/08





PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST C. Bruinsma
SITE DESCRIPTION Bridge on -CSX- over -L- (NC55)			GROUND WTR (ft)
BORING NO. CSX_B3A	STATION 13+63	OFFSET 10ft LT	ALIGNMENT CSX
COLLAR ELEV. 395.9 ft	TOTAL DEPTH 62.7 ft	NORTHING 813,199	EASTING 2,032,740
DRILL MACHINE CME-45B	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 03/10/08	COMP. DATE 03/11/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.8 ft

PROJECT NO. 34915.1.1	ID. U-3308	COUNTY Durham	GEOLOGIST C. Bruinsma
SITE DESCRIPTION Bridge on -CSX- over -L- (NC55)			GROUND WTR (ft)
BORING NO. CSX_B3A	STATION 13+63	OFFSET 10ft LT	ALIGNMENT CSX
COLLAR ELEV. 395.9 ft	TOTAL DEPTH 62.7 ft	NORTHING 813,199	EASTING 2,032,740
DRILL MACHINE CME-45B	DRILL METHOD Wash Boring	HAMMER TYPE Manual	
START DATE 03/10/08	COMP. DATE 03/11/08	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 32.8 ft

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					
400															
395	394.5	1.4	7	5	4									395.9	0.0
390	389.9	6.0												394.3	1.6
385	388.0	7.9	8	12	24									391.4	4.5
380	383.0	12.9												383.9	12.0
375	378.0	17.9													
370	373.0	22.9													
365	368.0	27.9													
360	363.1	32.8												363.1	32.8
355														363.0	32.9
350														358.8	37.1
345															
340	342.2	53.7												343.6	52.3
335	338.2	57.7												338.2	57.7
330														333.2	62.7

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
363												
360	363.0	32.9	1.6	4:30/1.0	(1.5)	(1.5)		(4.1)	(4.1)		363.0	32.9
	361.4	34.5	5.0	2:00/0.6	94%	94%		98%	98%			
355	356.4	39.5	5.0	5:00/1.0	(4.9)	(4.3)		(15.0)	(8.3)		358.8	37.1
				5:30/1.0	98%	86%		99%	55%			
350	351.4	44.5	5.0	5:00/1.0	(4.9)	(1.6)						
				8:15/1.0	98%	32%						
345	346.4	49.5	4.2	6:45/1.0	(5.0)	(4.6)						
				7:45/1.0	100%	92%						
340	342.2	53.7	3.6	6:45/1.0	(2.8)	(0.4)		(0.0)	(0.0)		343.6	52.3
	341.8	54.1	5.0	6:15/1.0	0%	0%		0%	0%			
335	338.2	57.7	5.0	7:15/1.0	(5.0)	(5.0)		(5.0)	(5.0)		338.2	57.7
				4:00/1.0	100%	100%		100%	100%			
330	333.2	62.7		2:00/1.0								
				1:45/0.6								
325				W=60/0.0								
320				4:00/1.0								
				4:00/1.0								
				2:00/1.0								
				5:30/1.0								
				6:00/1.0								

NCDOT BORE DOUBLE U3308\_GEO\_BH.GPJ\_NC\_DOT.GDT\_8/7/08

NCDOT CORE SINGLE U3308\_GEO\_BH.GPJ\_NC\_DOT.GDT\_07/15/08





NS EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	32 LT	20+21	1.0-2.5	A-6(4)	29	14	24.9	26.5	6.1	42.5	100	88	53	-	-
SS-2	32 LT	20+21	3.6-5.1	A-2-4(0)	23	NP	43.7	28.5	17.6	10.1	100	73	32	-	-
SS-3	32 LT	20+21	6.0-7.5	A-7-5(21)	56	26	6.7	21.1	19.6	52.6	100	95	76	-	-
SS-5	32 LT	20+21	14.0-15.1	A-2-4(0)	21	3	51.4	19.8	18.6	10.1	100	74	32	-	-

NS EB1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-3A	32 RT	20+50	6.0-7.5	A-7-6	65	37	-	-	-	-	-	-	74	24	-

NS B1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-31	16 LT	20+67	1.0-2.5	A-6(4)	38	15	22.9	26.7	20.0	30.4	93	77	49	-	-
SS-32	16 LT	20+67	3.6-5.1	A-6(2)	24	11	31.0	25.3	19.4	24.3	99	82	46	-	-
SS-33	16 LT	20+67	6.0-7.5	A-7-6(11)	45	18	17.8	20.0	17.6	44.5	100	90	65	-	-
SS-35	16 LT	20+67	13.6-15.1	A-6(6)	34	13	2.0	42.5	31.2	24.3	100	99	62	-	-

NS B1-A

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	16 LT	20+67	28.3-29.0	TRIASSIC SANDSTONE	153.1	2.56	0.38
RS-2	16 LT	20+67	38.6-39.0	TRIASSIC SANDSTONE	168.0	8.37	2.11

NS B1-B

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, PSI	SECTION MOD. @ 40% MPSI
RS-1A	33 RT	20+74	30.0-30.6	TRIASSIC SANDSTONE	142.1	1286	-
RS-2A	33 RT	20+74	41.8-42.5	TRIASSIC MUDSTONE	152.6	3503	-

NS B2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-75	26 LT	21+18	3.6-5.1	A-6(10)	33	12	3.3	5.7	45.8	45.1	96	94	89	-	-
SS-76	26 LT	21+18	6.1-7.6	A-7-6(12)	45	19	0.4	43.9	31.1	24.6	100	100	67	-	-

NS B2-A

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	26 LT	21+18	15.9-16.7	TRIASSIC SANDSTONE	149.1	1.76	0.40
RS-4	26 LT	21+18	30.5-31.0	TRIASSIC SANDSTONE	176.2	7.31	2.22

NS B3-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-65	11 LT	21+55	3.7-5.2	A-4(4)	31	10	4.9	27.1	33.1	34.9	84	82	61	-	-

NS B3-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-58	27 RT	21+57	1.7-3.2	A-2-4(0)	24	8	49.0	15.4	23.5	12.1	53	32	20	-	-
SS-59	27 RT	21+57	3.2-4.7	A-7-6(13)	42	17	5.9	7.0	31.7	55.4	84	80	75	-	-
SS-61	27 RT	21+57	6.2-7.7	A-7-6(22)	44	21	1.2	3.1	34.2	61.5	98	97	95	-	-

NS B3-B

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-5	27 RT	21+57	25.4-25.8	TRIASSIC SANDSTONE	162.6	4.29	1.49

NS EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-38	30 LT	22+04	1.0-2.5	A-4(0)	25	7	25.5	31.2	31.2	12.1	95	77	44	-	-
SS-39	30 LT	22+04	3.7-5.2	A-6(4)	31	13	27.3	22.9	17.4	32.4	97	82	51	-	-
SS-41	30 LT	22+04	8.7-10.2	A-7-6(51)	74	45	1.6	3.6	27.9	66.8	100	99	96	-	-
SS-43	30 LT	22+04	18.7-20.2	A-7-6(16)	41	16	0.2	16.4	47.0	36.4	100	100	90	-	-
SS-45	30 LT	22+04	28.7-30.2	A-6(13)	37	15	0.4	16.8	38.3	44.5	100	100	87	-	-

NS EB2-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-5A	34 RT	22+10	13.5-15.0	A-7-6	37	12	-	-	-	-	-	-	95	14.8	-

CSX EB1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-10	10 LT	12+36	3.5-5.0	A-4(0)	12	3	32.6	35.0	20.2	12.1	100	84	37	-	-
SS-11	10 LT	12+36	6.0-7.5	A-7-6(18)	52	28	20.4	15.4	19.6	44.5	100	93	67	-	-
SS-13	10 LT	12+36	13.5-15.0	A-2-4(0)	26	6	35.2	35.0	17.6	12.1	100	71	33	-	-

CSX B1-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-20	13 LT	12+79	6.6-8.1	A-6(8)	37	14	17.0	22.5	20.0	40.5	100	93	65	-	-
SS-21	13 LT	12+79	13.6-15.1	A-6(11)	40	19	2.4	39.7	27.5	30.4	100	99	66	-	-

CSX B1-A

ROCK TEST RESULTS							
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-6	13 LT	12+79	47.3-47.9	TRIASSIC MUDSTONE	155.8	0.66	0.06

CSX B1-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-25	11 RT	12+79	1.0-2.5	A-2-4(0)	27	7	34.8	21.7	21.3	22.3	73	56	34	-	-
SS-26	11 RT	12+79	3.5-5.0	A-4(0)	13	NP	22.5	44.7	20.6	12.1	100	84	37	-	-
SS-27	11 RT	12+79	6.1-7.6	A-6(9)	39	16	17.8	21.5	20.2	40.5	100	91	64	-	-
SS-28	11 RT	12+79	8.5-10.0	A-7-6(17)	47	26	14.2	20.2	23.1	42.5	100	93	69	-	-
SS-29	11 RT	12+79	13.5-15.0	A-6(6)	35	12	2.2	42.7	28.7	26.3	100	100	62	-	-

CSX B2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-79	8 LT	13+33	1.0-2.5	A-6(5)	35	14	21.7	21.3	24.1	32.8	87	74	53	-	-
SS-80	8 LT	13+33	3.0-4.5	A-2-6(1)	37	19	40.4	17.6	21.4	20.5	68	47	30	-	-
SS-81	8 LT	13+33	6.0-7.5	A-6(14)	40	19	2.9	31.6	36.8	28.7	100	98	78	-	-

CSX B3-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-84	10 LT	13+63	1.4-2.9	A-2-6(1)	Not	enough	26.3	16.0	16.7	41.0	19	15	11	-	-
SS-85	10 LT	13+63	6.0-7.5	A-7-6(17)	41	18	3.1	10.1	39.7	47.2	100	99	90	-	-

CSX B3-A

ROCK TEST RESULTS								
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT <sup>3</sup>	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI	
RS-7	10 LT	13+63	35.0-35.6	TRIASSIC SANDSTONE	170.7	8.33	-29.70	
RS-8	10 LT	13+63	46.2-46.7	TRIASSIC MUDSTONE	154.5	1.15	0.02	

CSX B3-B

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-69	10 RT	13+71	1.5-3.0	A-1-b(0)	20	3	49.4	30.6	9.7	10.3	56	30	12	-	-
SS-70	10 RT	13+71	3.4-4.9	A-7-6(16)	45	21	3.7	8.6	40.5	47.2	85	83	77	-	-
SS-71	10 RT	13+71	6.2-7.7	A-7-6(16)	41	15	1.0	7.2	42.6	49.2	98	97	92	-	-

CSX EB2-A

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-48	24 LT	14+11	1.0-2.5	A-4(1)	27	10	32.4	25.1	20.2	22.3	94	75	44	-	-
SS-49	24 LT	14+11	3.6-5.1	A-6(9)	38	20	21.9	23.5	18.2	36.4	99	87	58	-	-
SS-50	24 LT	14+11	6.0-7.5	A-7-6(23)	58	29	13.6	13.2	14.6	58.7	98	90	74	-	-
SS-52	24 LT	14+11	13.6-15.1	A-7-6(18)	45	22	1.2	22.3	32.0	44.5	97	96	81	-	-
SS-55	24 LT	14+11	28.6-30.1	A-7-6(24)	43	23	0.4	2.0	36.8	60.7	100	100	98	-	-



# CORE PHOTOGRAPHS

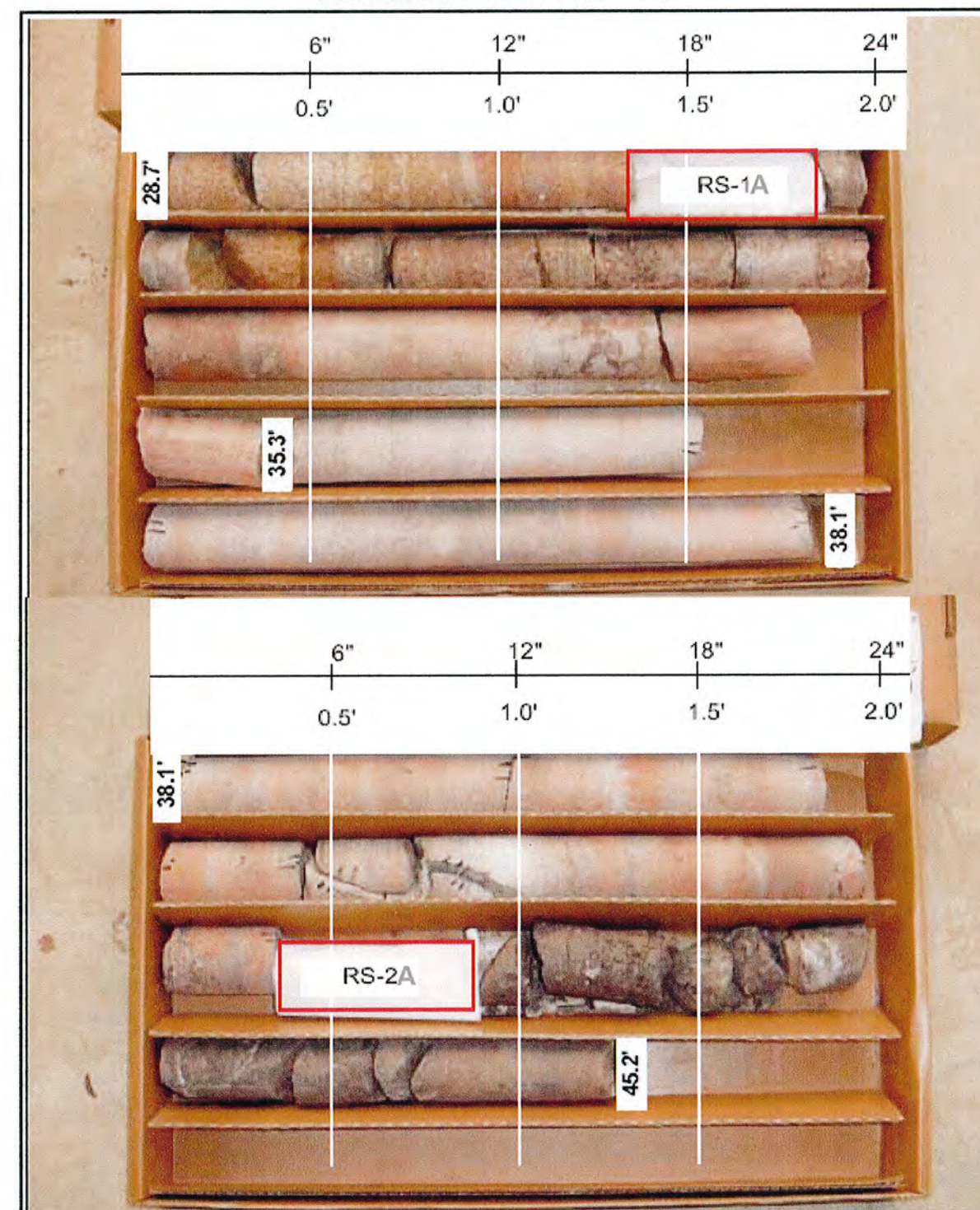
## NS\_B1-A

BOXES 1 & 2: 25.6-45.5 FEET



## NS\_B1-B

BOXES 1 & 2: 28.7-45.2 FEET





# CORE PHOTOGRAPHS

## NS\_B2-A

BOXES 1, 2, & 3: 14.2-36.5 FEET



FEET

## NS\_B3-B

BOXES 1 & 2: 17.2-28.9 FEET



FEET



# CORE PHOTOGRAPHS

## CSX\_B1-A

BOXES 1, 2, & 3: 28.8-53.1 FEET



## CSX\_B3-A

BOXES 1, 2, & 3: 32.9-62.7 FEET





# SITE PHOTOGRAPH

Bridges on -NSRR- and -CSX- over -L- (NC 55/Alston Ave.)



Looking South towards Railroad Bridges