

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	45359.1.5 BD-5113E	1	13

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

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. BD-5113E F.A. PROJ. _____
COUNTY MADISON
PROJECT DESCRIPTION BRIDGE NO. 516 ON SR 1196 OVER WALNUT CREEK

SITE DESCRIPTION _____

CAUTION NOTICE

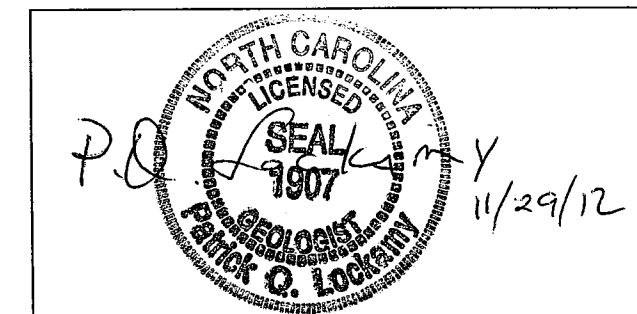
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. 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 DEFERRING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL
P.Q. LOCKAMY
D.O. CHEEK
C.J. COFFEY

INVESTIGATED BY **P.Q. LOCKAMY**
CHECKED BY **W.D. FRYE**
SUBMITTED BY **W.D. FRYE**
DATE **11/2**



PROJECT: 45359.1.5 ID: BD-5113E

DRAWN BY: **J.T. WILLIAMS**

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.

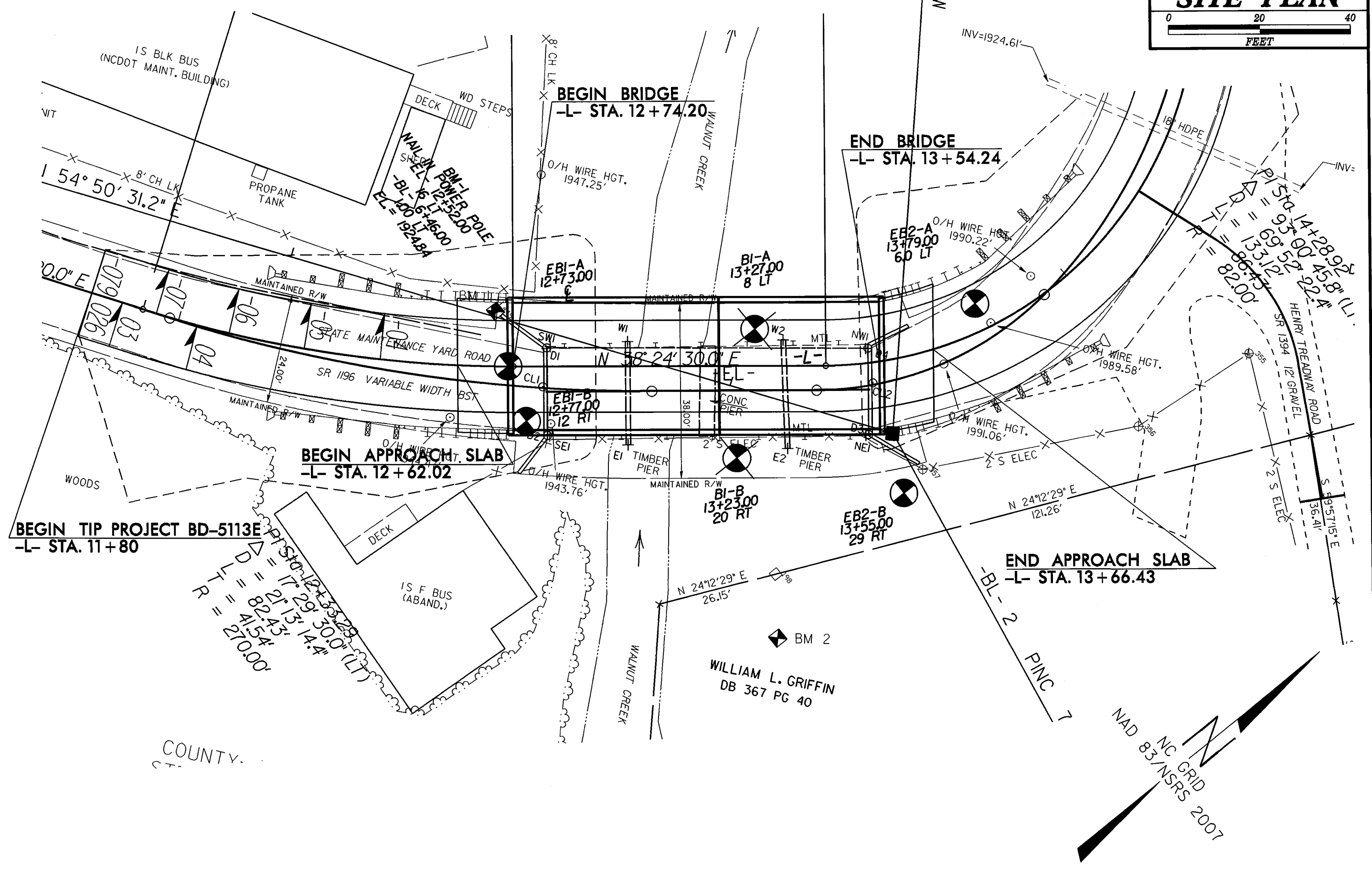
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																						
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:</p> <p style="text-align: center;"><i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i></p>		<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)</p> <p>GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p style="text-align: center;">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>		<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS, IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.</p> <p>ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>		<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p>AQUIFER - A WATER BEARING FORMATION OR STRATA.</p> <p>ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p>ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p>ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.</p> <p>CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p>COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p>CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p>ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p>SAPROLITE (SAP) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p>SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.</p> <p>SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																						
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<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>																																																																																												



BEGIN TIP PROJECT BD-5113E
-L- STA. 11+80

BEGIN APPROACH SLAB
-L- STA. 12+62.02

BEGIN BRIDGE
-L- STA. 12+74.20

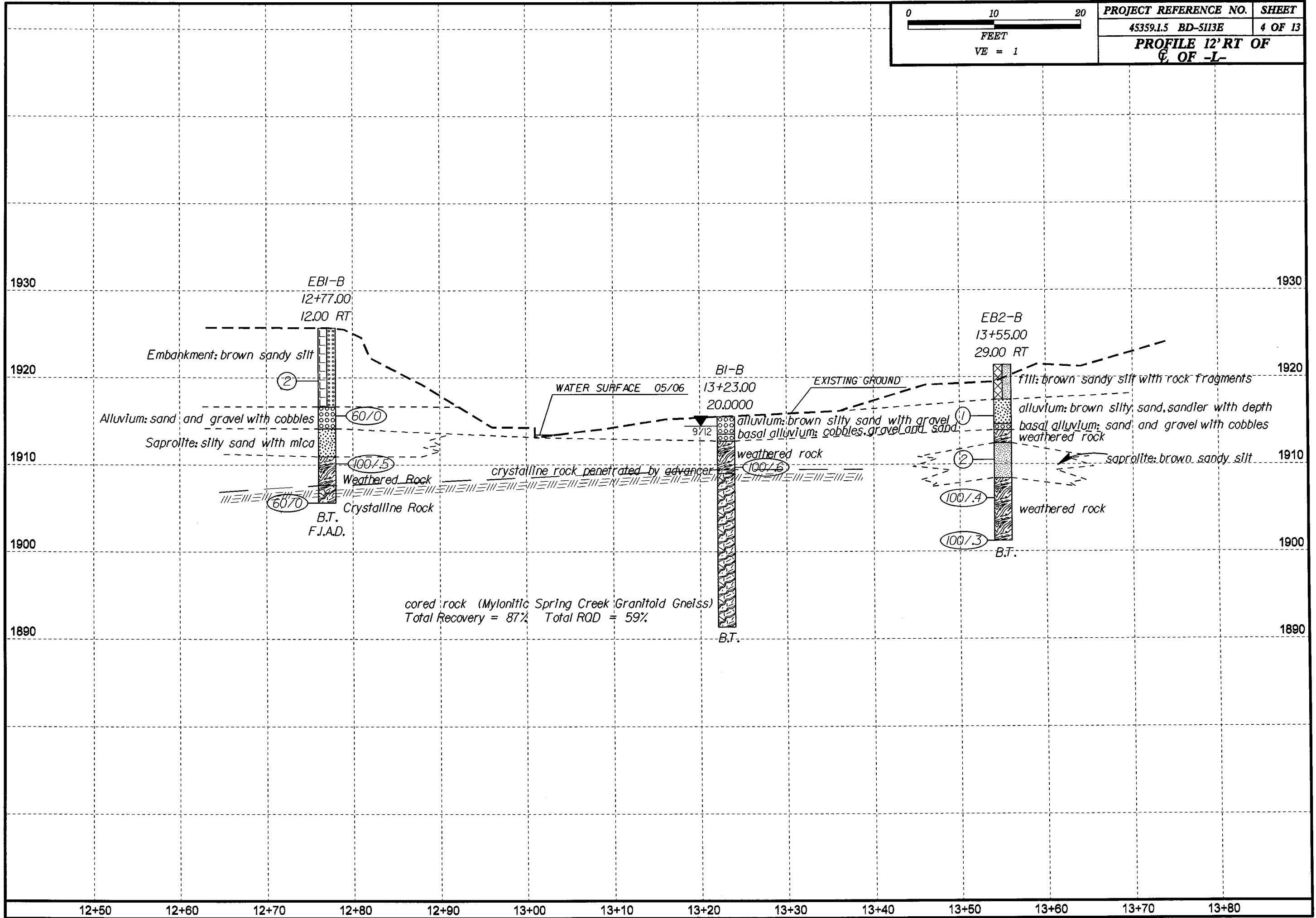
END BRIDGE
-L- STA. 13+54.24

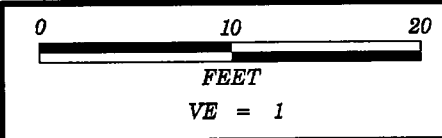
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-L- STA. 13+66.43

BM 2
WILLIAM L. GRIFFIN
DB 367 PG 40

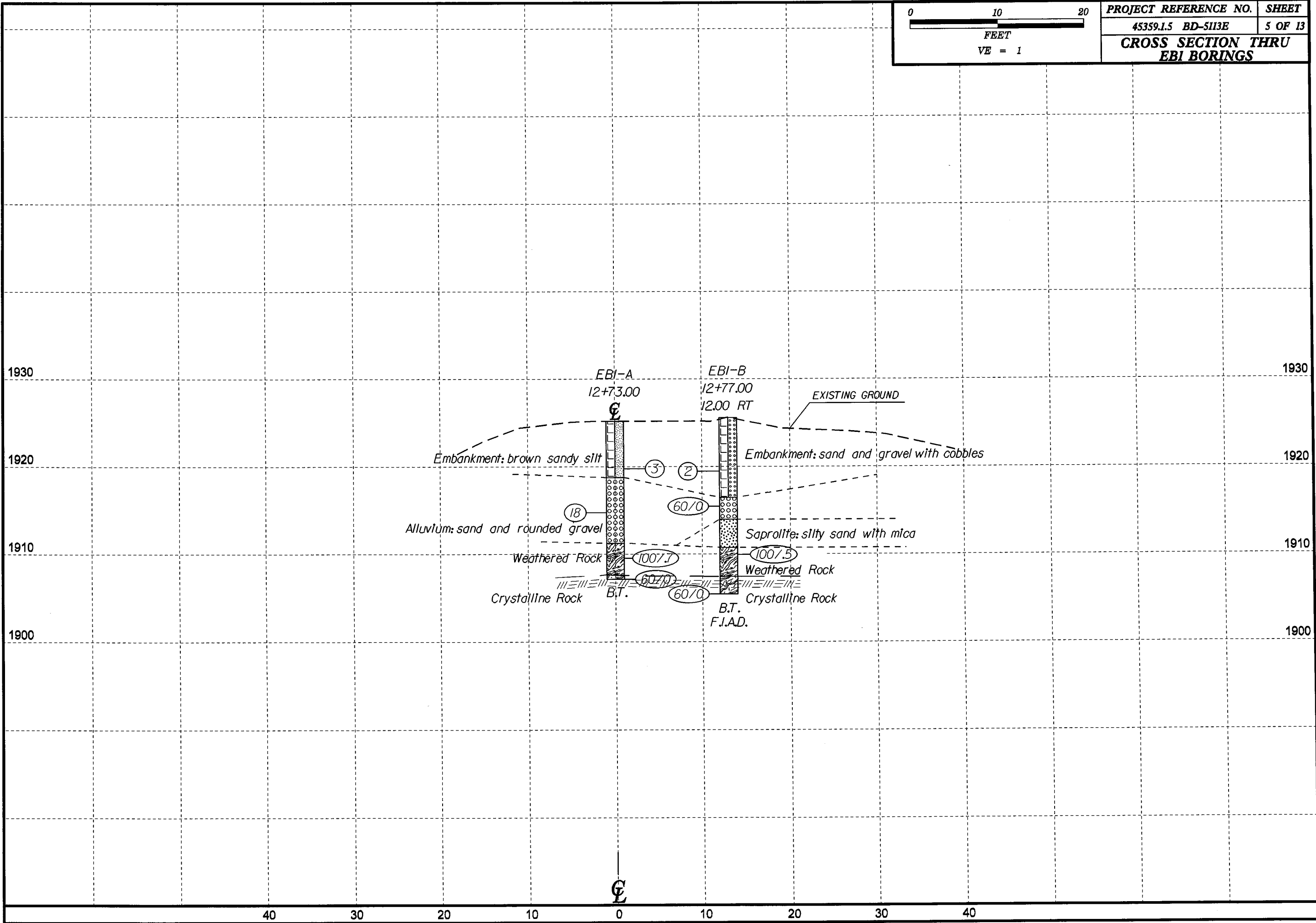
NAD 83/NSRS 2007

COUNTY.





PROJECT REFERENCE NO.	SHEET
45359.1.5 BD-5113E	5 OF 13
CROSS SECTION THRU EBI BORINGS	



1930
1920
1910
1900

1930
1920
1910
1900

40 30 20 10 0 10 20 30 40

EBI-A
12+73.00

EBI-B
12+77.00
12.00 RT

EXISTING GROUND

Embankment: brown sandy silt

Embankment: sand and gravel with cobbles

Alluvium: sand and rounded gravel

Saprolite: silty sand with mica

Weathered Rock

Weathered Rock

Crystalline Rock

Crystalline Rock

B.T.

B.T.
F.I.A.D.

18

3

2

60/0

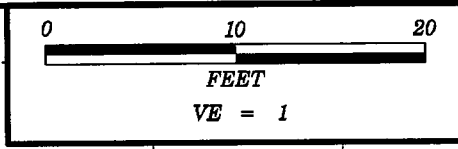
100/7

60/0

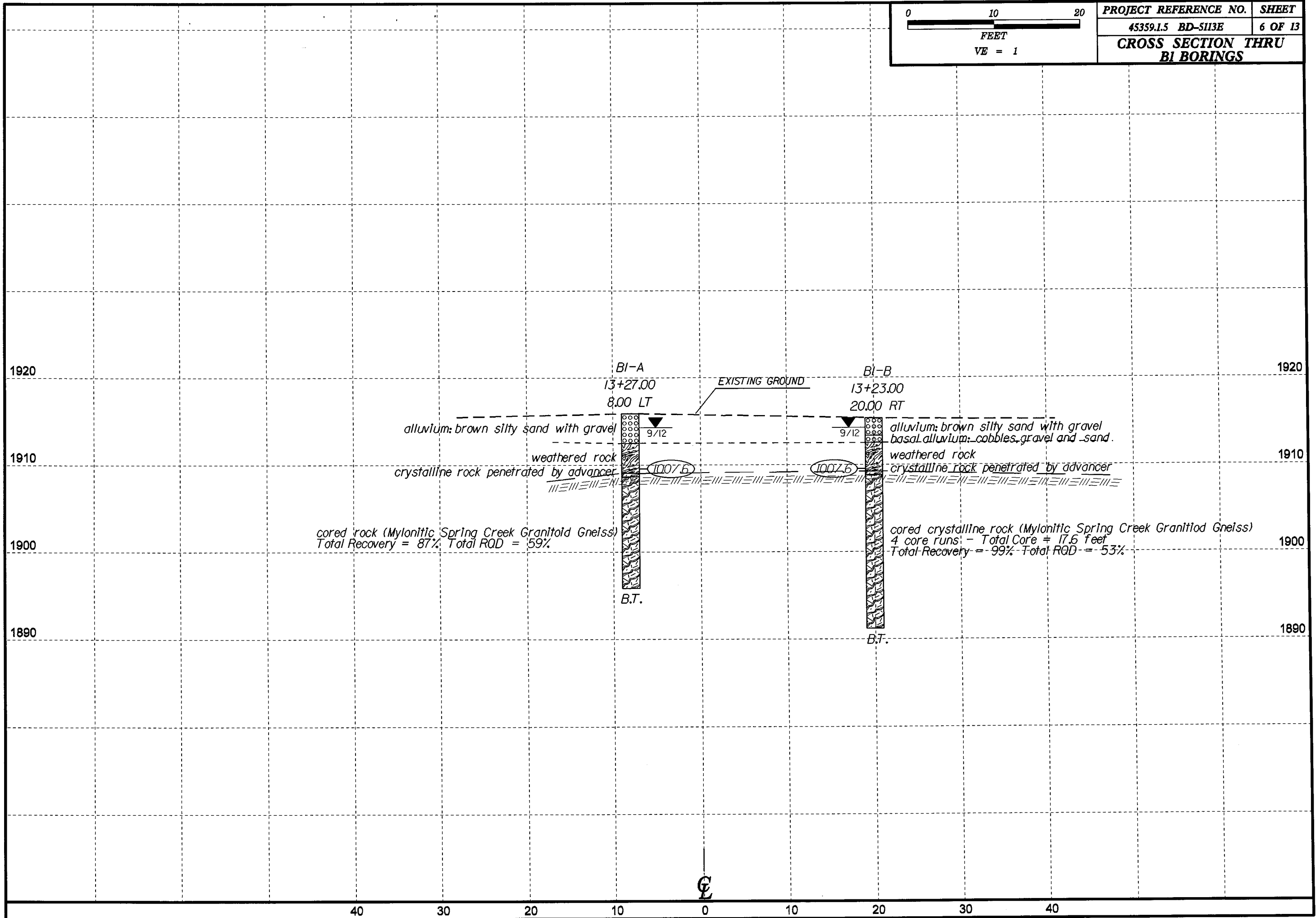
100/5

60/0

CL



PROJECT REFERENCE NO.	SHEET
45359.15 BD-5113E	6 OF 13
CROSS SECTION THRU BI BORINGS	



1920
1910
1900
1890

1920
1910
1900
1890

BI-A
13+27.00
8.00 LT

EXISTING GROUND

BI-B
13+23.00
20.00 RT

alluvium: brown silty sand with gravel

weathered rock

crystalline rock penetrated by advancer

1007.6

9/12

9/12

alluvium: brown silty sand with gravel
basal alluvium: cobbles, gravel and sand.

weathered rock

crystalline rock penetrated by advancer

1007.6

9/12

9/12

cored rock (Mylonitic Spring Creek Granitoid Gneiss)
Total Recovery = 87% Total RQD = 59%

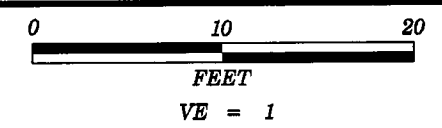
B.T.

cored crystalline rock (Mylonitic Spring Creek Granitoid Gneiss)
4 core runs - Total Core = 17.6 feet
Total Recovery = 99% Total RQD = 53%

B.T.

CL

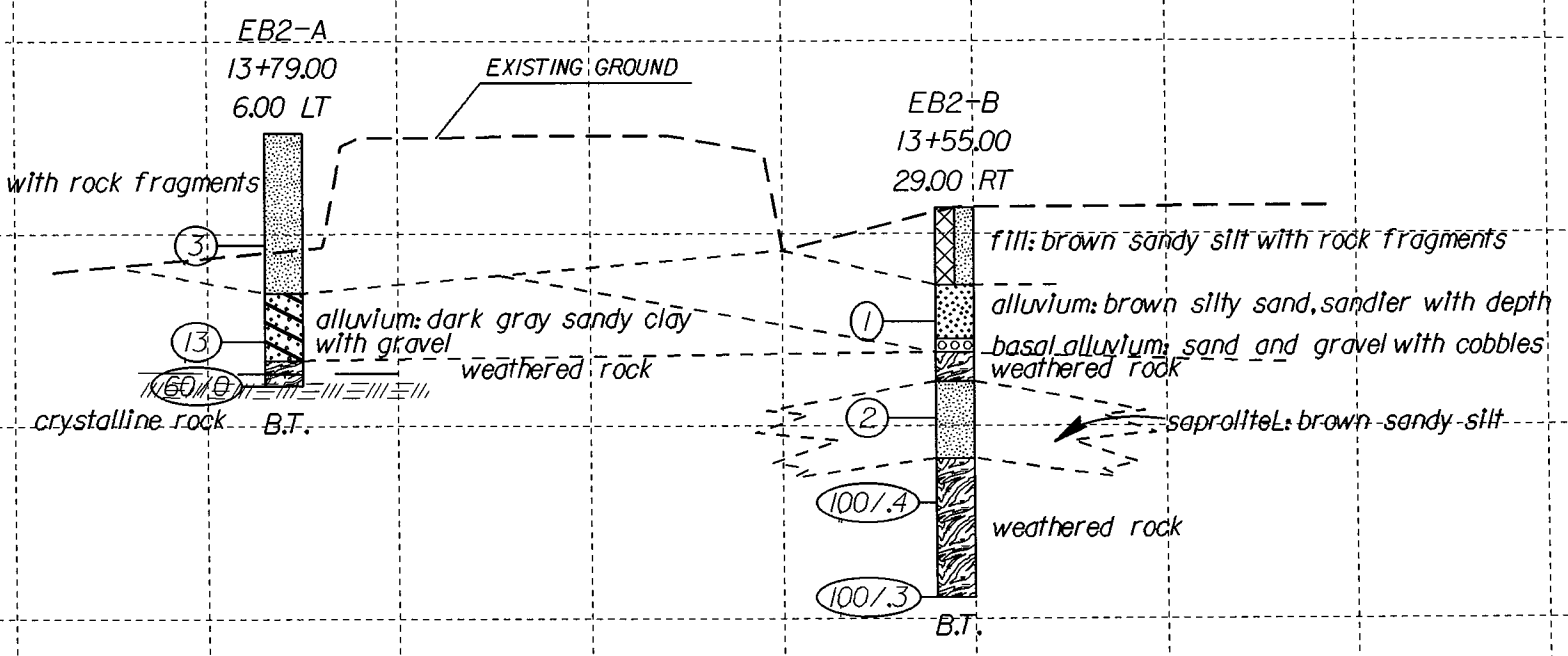
40 30 20 10 0 10 20 30 40



PROJECT REFERENCE NO.	SHEET
45359.1.5 BD-5113E	7 OF 13
CROSS SECTION THRU EXISTING EB2	

1930
1920
1910
1900

1930
1920
1910
1900



20 10 0 10 20 30 40 50

WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.									
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 12+73		OFFSET CL		ALIGNMENT L									
COLLAR ELEV. 1,925.1 ft		TOTAL DEPTH 18.0 ft		NORTHING 770,984		EASTING 906,984									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 09/12/12		COMP. DATE 09/12/12		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1930															
1925														1,925.1	0.0
															GROUND SURFACE Embankment: brown sandy silt
1920	1,920.7	4.4	2	2	1									1,918.7	6.4
															Alluvium: sand and rounded gravel
1915	1,915.7	9.4	11	8	10									1,911.2	13.9
															Weathered Rock
1910	1,910.7	14.4	32	54	46/2									1,907.6	17.5
														1,907.1	18.0
	1,907.1	18.0	60/0												Crystalline Rock Boring Terminated with Standard Penetration Test Refusal at Elevation 1,907.1 ft in crystalline rock

NCDOT BORE SINGLE BD5113E GEO_BRD0516 BORINGS.GPJ NC_DOT.GDT 11/19/12

WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.									
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)								
BORING NO. EB1-B		STATION 12+77		OFFSET 12 ft RT		ALIGNMENT L									
COLLAR ELEV. 1,925.5 ft		TOTAL DEPTH 20.1 ft		NORTHING 770,979		EASTING 906,996									
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic											
DRILLER Coffey, Jr., C.		START DATE 09/13/12		COMP. DATE 09/13/12		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
1930															
1925														1,925.5	0.0
															GROUND SURFACE Embankment: brown sandy silt
1920	1,920.4	5.1	1	1	1									1,916.4	9.1
															Alluvium: sand and gravel with cobbles
1915	1,915.4	10.1	60/0											1,913.9	11.6
															Saprolite: silty sand with mica
1910	1,910.4	15.1	85	15/0										1,910.7	14.8
															Weathered Rock
														1,907.4	18.1
														1,905.4	20.1
	1,905.4	20.1	60/0												Crystalline Rock Boring Terminated with Standard Penetration Test Refusal at Elevation 1,905.4 ft in crystalline rock

NCDOT BORE SINGLE BD5113E GEO_BRD0516 BORINGS.11.20.12.GPJ NC_DOT.GDT 11/20/12

WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.											
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)										
BORING NO. EB2-A		STATION 13+79		OFFSET 6 ft LT		ALIGNMENT L											
COLLAR ELEV. 1,925.2 ft		TOTAL DEPTH 13.1 ft		NORTHING 771,071		EASTING 907,037											
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic													
DRILLER Coffey, Jr., C.		START DATE 09/12/12		COMP. DATE 09/12/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
1930																	
1925															1,925.2	GROUND SURFACE	0.0
																embankment: tan sandy clayey silt with rock fragments	
1920	1,920.4	4.8	1	1	2												
1915	1,915.4	9.8	2	5	8											alluvium: dark gray sandy clay with gravel	8.3
	1,912.1	13.1	60/0													weathered rock	11.8
																crystalline rock	12.5
																Boring Terminated with Casing Advancer Refusal and SPT refusal at Elevation 1,912.1 ft in crystalline rock	13.1

NCDOT BORE SINGLE BD5113E GEO BRDG0516 BORINGS.GPJ NC_DOT.GDT 11/19/12

WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.											
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 13+55		OFFSET 29 ft RT		ALIGNMENT L											
COLLAR ELEV. 1,921.4 ft		TOTAL DEPTH 20.2 ft		NORTHING 771,033		EASTING 907,059											
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing w/ SPT		HAMMER TYPE Automatic													
DRILLER Coffey, Jr., C.		START DATE 09/11/12		COMP. DATE 09/11/12		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
1925																	
1920															1,921.4	GROUND SURFACE	0.0
																fill: brown sandy silt with rock fragments	
1915	1,916.5	4.9	0	0	1											alluvium: brown silty sand, sandier with depth	4.0
	1,914.6	6.8														basal alluvium: sand and gravel with cobbles	7.5
	1,913.9	7.5														weathered rock	9.0
	1,912.4	9.0														saproliteL: brown sandy silt	
1910	1,911.5	9.9	0	0	2											weathered rock	13.0
	1,908.4	13.0														weathered rock	
1905	1,906.5	14.9	100/4														
	1,901.5	19.9	100/3														
																Boring Terminated at Elevation 1,901.2 ft in weathered rock	20.2

NCDOT BORE SINGLE BD5113E GEO BRDG0516 BORINGS.11.20.12.GPJ NC_DOT.GDT 11/20/12

WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.						
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)					
BORING NO. B1-A		STATION 13+27		OFFSET 8 ft LT		ALIGNMENT L						
COLLAR ELEV. 1,915.8 ft		TOTAL DEPTH 20.0 ft		NORTHING 771,029		EASTING 907,010						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 09/12/12		COMP. DATE 09/12/12		SURFACE WATER DEPTH N/A						
CORE SIZE N/A		TOTAL RUN 0.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN RQD (%)	SAMP. NO.	STRATA REC. (%)	STRATA RQD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
1915.8											Ground Surface	
1915											alluvium: brown silty sand with gravel	
												1,912.4 3.4
1910											weathered rock	
												1,909.0 6.8
											crystalline rock penetrated by advancer	
											hard and fresh (Mylonitic Spring Creek Granitoid Gneiss)	
											3 Runs - Total Core = 12.8 feet Total REC = 87% Total RQD = 59%	
1905											Weathering tends to progress on mylonite layers on way to linear foliation at 40 to 70 degrees with most fractures on foliation being only slightly stained or having small dendrites.	
												1,895.8 20.0
1900											Boring Terminated at Elevation 1,895.8 ft in crystalline rock	

NCDOT CORE SINGLE BD5113E_GEO_BRD0516_BORINGS.GPJ NC_DOT.GDT 11/19/12

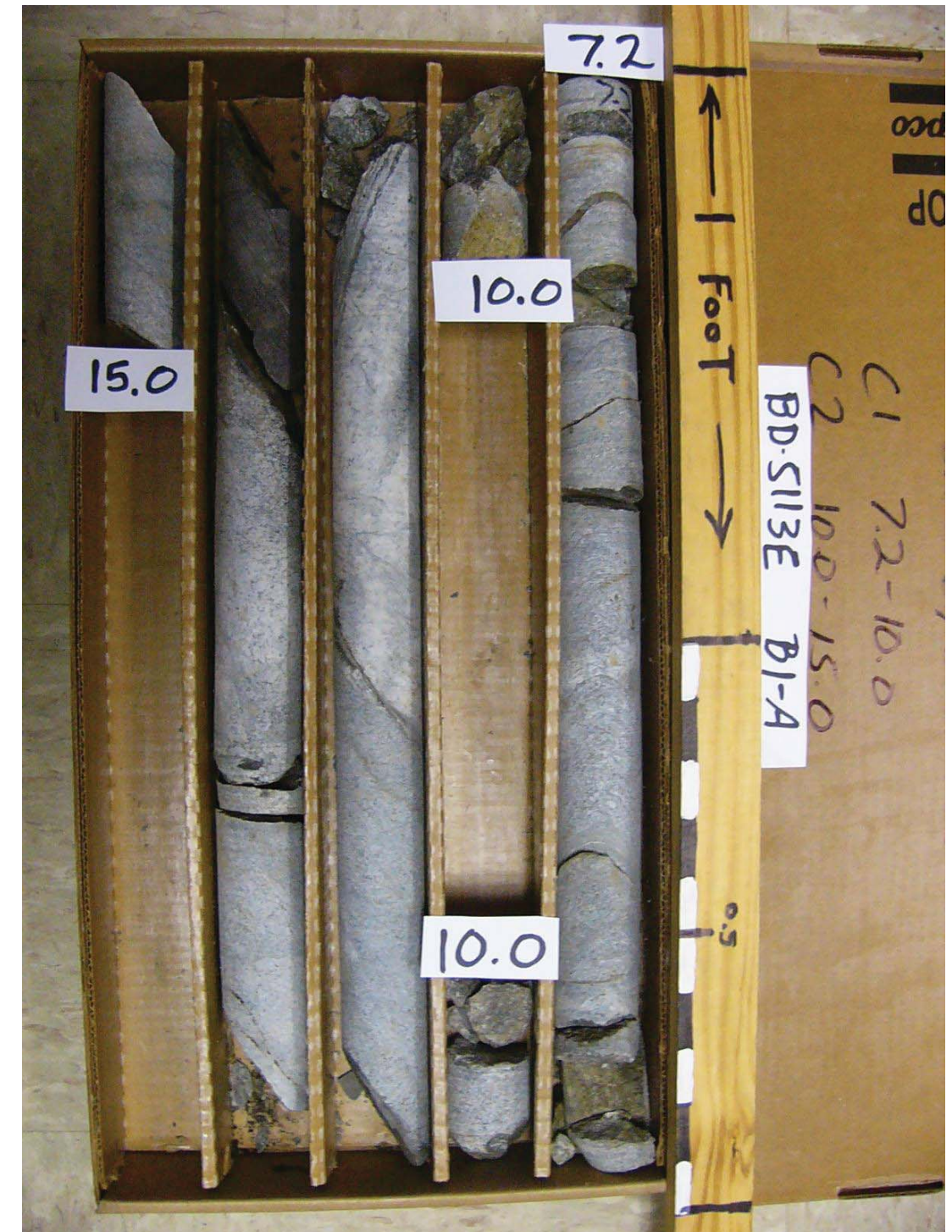
WBS 45359.1.5		TIP BD-5113E		COUNTY MADISON		GEOLOGIST Lockamy, P. Q.						
SITE DESCRIPTION Madison County Bridge No. 516 on SR-1196 over Walnut Creek							GROUND WTR (ft)					
BORING NO. B1-B		STATION 13+23		OFFSET 20 ft RT		ALIGNMENT L						
COLLAR ELEV. 1,915.3 ft		TOTAL DEPTH 24.1 ft		NORTHING 771,008		EASTING 907,031						
DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Coffey, Jr., C.		START DATE 09/10/12		COMP. DATE 09/11/12		SURFACE WATER DEPTH N/A						
CORE SIZE N/A		TOTAL RUN 0.0 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (%)	RUN RQD (%)	SAMP. NO.	STRATA REC. (%)	STRATA RQD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
1915.3											Ground Surface	
											alluvium: brown silty sand with gravel	
												1,913.3 2.0
											basal alluvium: cobbles, gravel and sand	
											weathered rock	
1910												1,909.2 6.1
											crystalline rock penetrated by advancer	
											cored crystalline rock (Mylonitic Spring Creek Granitoid Gneiss)	
											4 core runs - Total Core = 17.6 feet Total Recovery = 99% Total RQD = 53%	
1905											Most partings on well developed mylonitic foliation at 50 to 70 degrees. 6.5 to 14.0 feet is variably weathered, from hard and fresh to soft and moderately weathered with many breaks along foliation. 14.0 to 24.1 is very hard and fresh with few breaks.	
												1,891.2 24.1
1900											Boring Terminated at Elevation 1,891.2 ft in crystalline rock	

NCDOT CORE SINGLE BD5113E_GEO_BRD0516_BORINGS.GPJ NC_DOT.GDT 11/19/12

45359.1.5 BD-5113E Madison Co Br. No. 516 on SR-1196 over Walnut Creek



45359.1.5 BD-5113E Madison Co Br. No. 516 on SR-1196 over Walnut Creek



45359.1.5 BD-5113E Madison Co Br. No. 516 on SR-1196 over Walnut Creek



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