

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-4159 33507.1.1	1	20

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4 - 7	CROSS SECTIONS
8	PROFILE
9 - 15	BORE LOG & CORE REPORTS
16 - 20	CORE PHOTOGRAPHS

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. B-4159 33507.1.1 F.A. PROJ. BRZ-1002(13)
 COUNTY JACKSON
 PROJECT DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE
TUCKASEGEE RIVER

SITE DESCRIPTION _____

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF SITE PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PRELIMINARY DESIGN. THE VARIOUS FIELD BORING LOGS, BORE LOGS, AND SOIL TEST DATA AND LOGS MAY BE REVIEWED OR INSPECTED IN PERSON BY CONTACTING THE GEOTECHNICAL ENGINEERING UNIT, DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1000 EAST-COAST, NICHOLS DRIVE, RALEIGH, NORTH CAROLINA 27601. FOR THE FIELD BORING LOGS, BORE LOGS, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

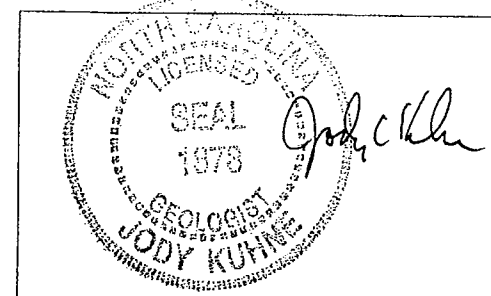
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND RELATED HORIZONARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU UNPLIQUET TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OF SOIL MIGHT BE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS AND AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OF SOIL MIGHT BE CONDITIONS THAT VARY CONSIDERABLY WITH TIME DEPENDING ON CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN IN 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 PROVIDED BY 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.

PERSONNEL
 AMEC CONSULTANTS

DC ELLIOTT NCDOT

INVESTIGATED BY JC KUHNE
 CHECKED BY _____
 SUBMITTED BY JC KUHNE
 DATE 2/18/2014



PROJECT: 33507.1.1 ID: B-4159

DRAWN BY: JC KUHNE CJ COFFEY

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 TAKES ANY CLAIM FOR INCREASED COMPENSATION OR EXTENSION OF TIME RESULTING FROM DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

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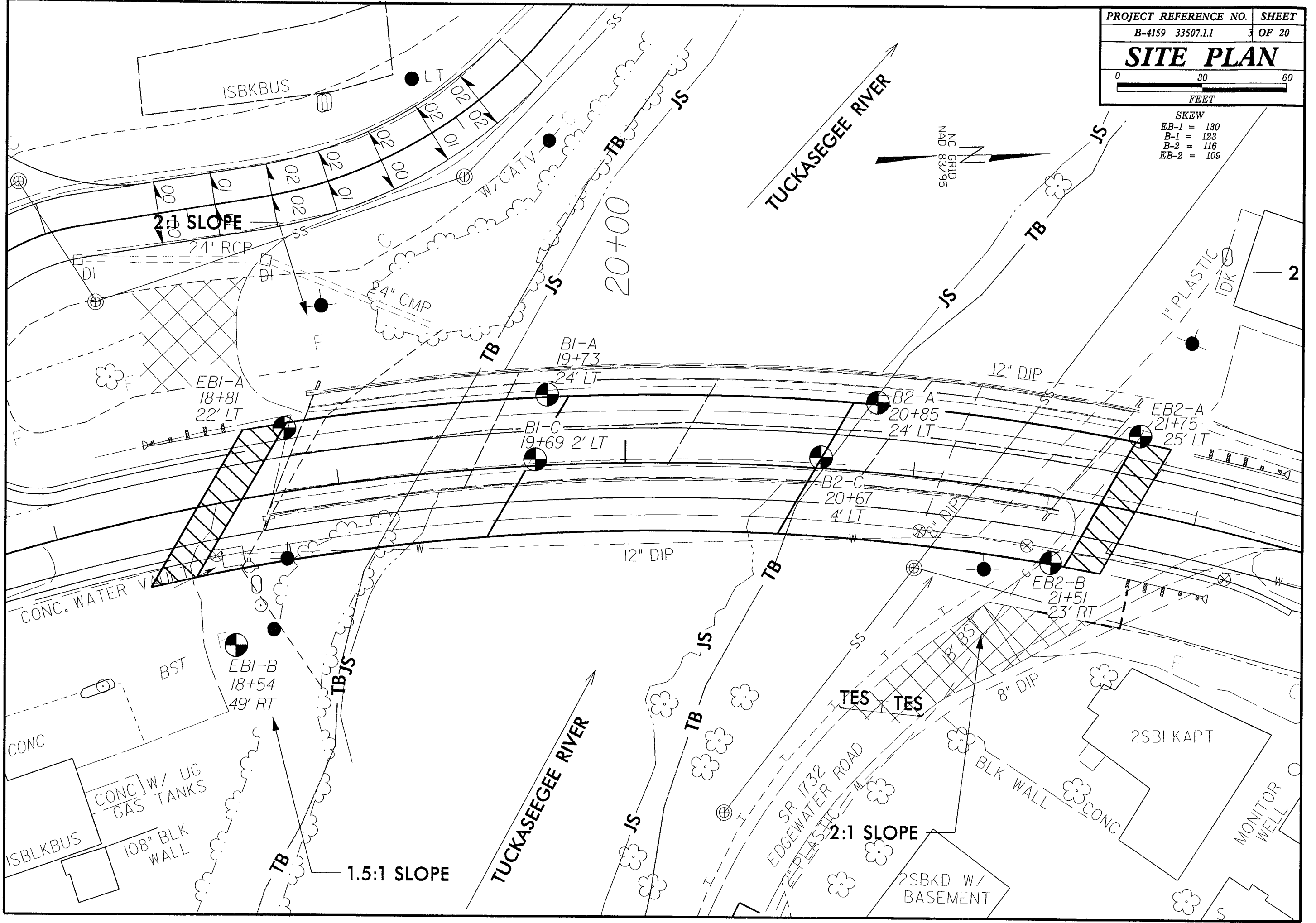
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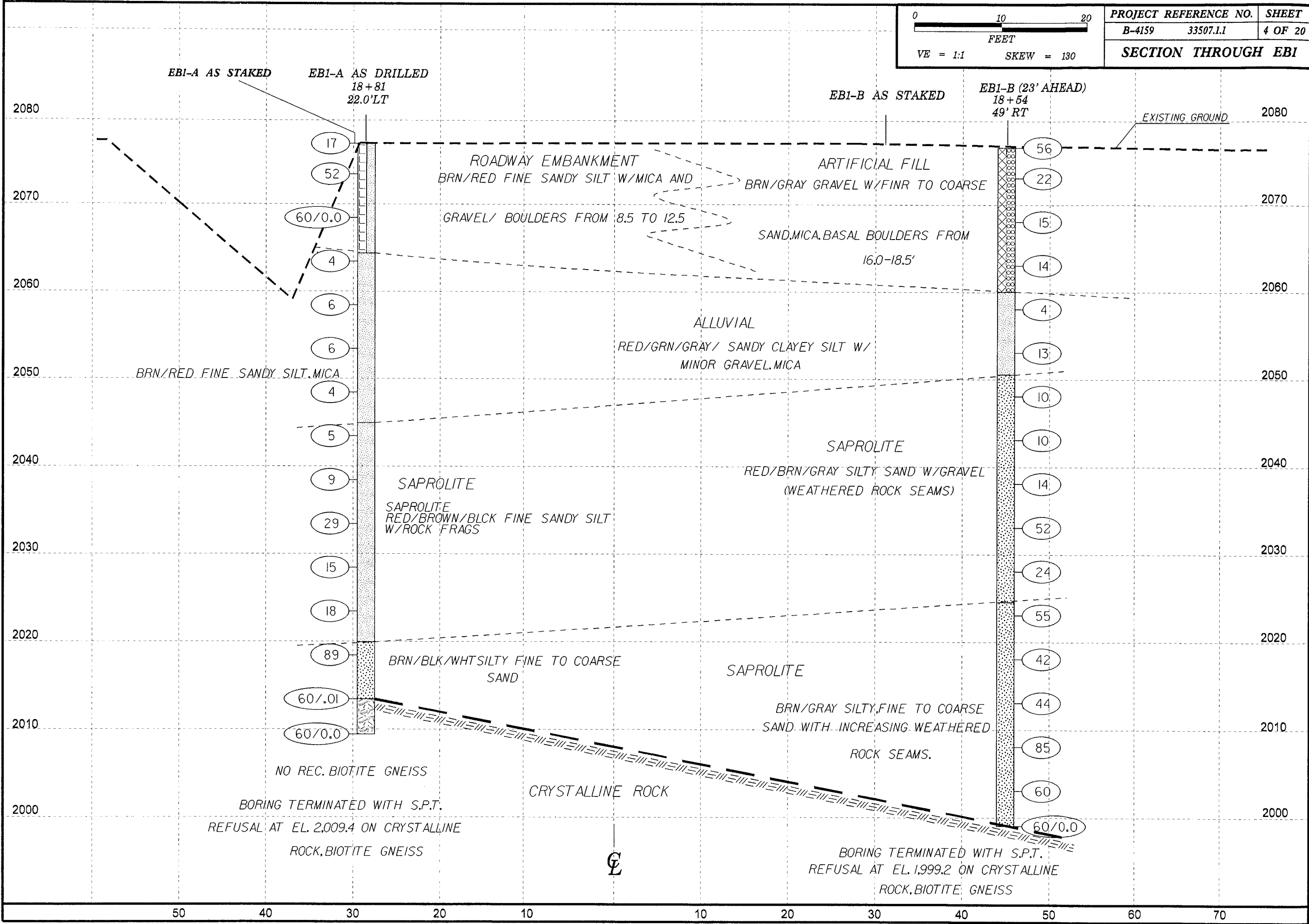
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

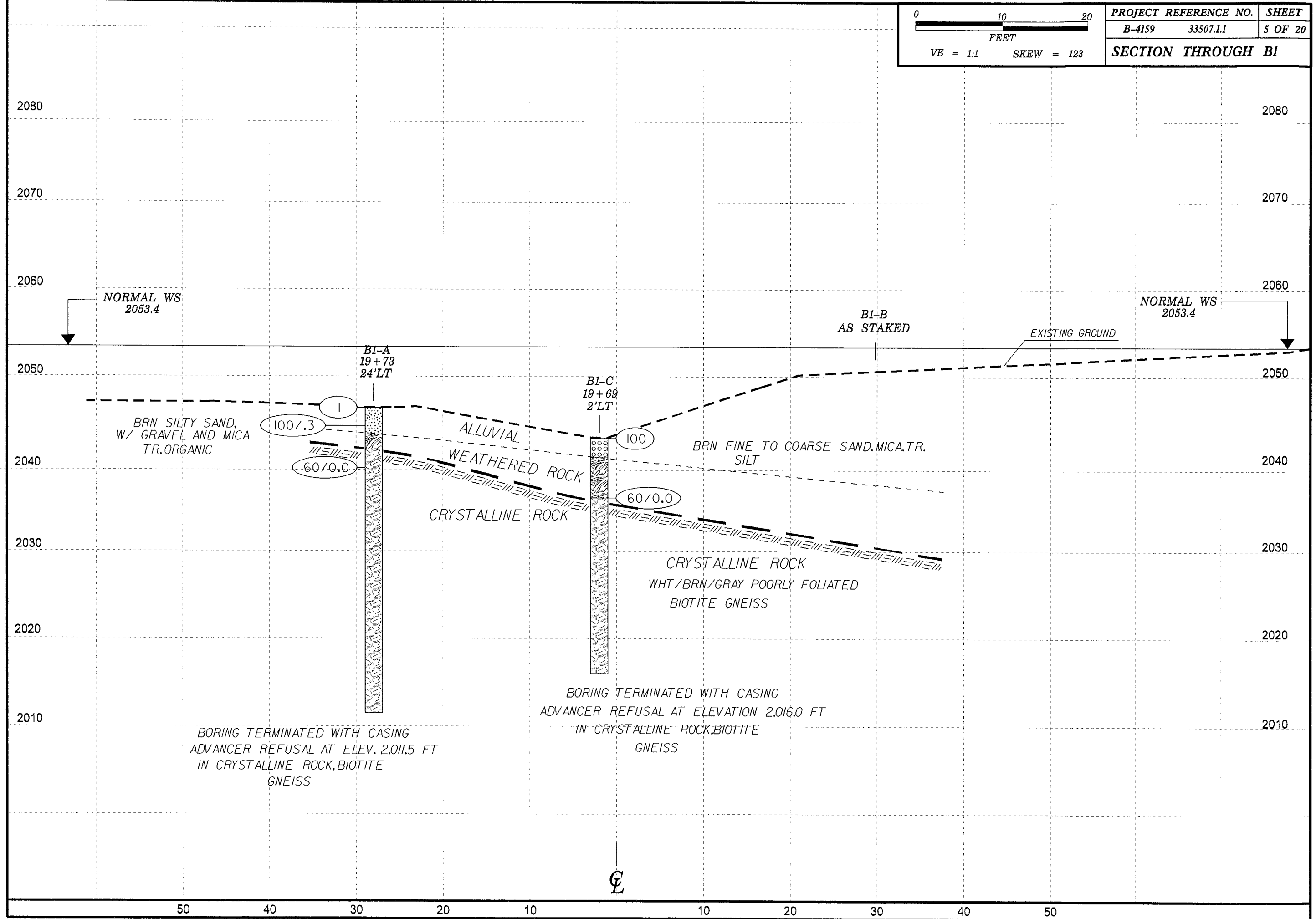
SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS																																																																																																																							
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED 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, HEAVY 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>POORLY GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</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. 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 DISLODGED 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 INTRODUCED 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 IN 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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ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p>		<p>WEATHERED ROCK (WR) [Symbol]</p> <p>CRYSTALLINE ROCK (CR) [Symbol]</p> <p>NON-CRYSTALLINE ROCK (NCR) [Symbol]</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) [Symbol]</p>		<p>FRESH - ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1/2 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (V SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i></p> <p>COMPLETE - ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>	
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SKEW
 EB-1 = 130
 B-1 = 123
 B-2 = 116
 EB-2 = 109

NC GRID
 NAD 83/95







2080

2080

2070

2070

2060

2060

2050

2050

2040

2040

2030

2030

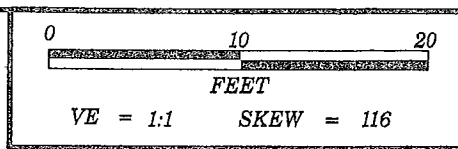
2020

2020

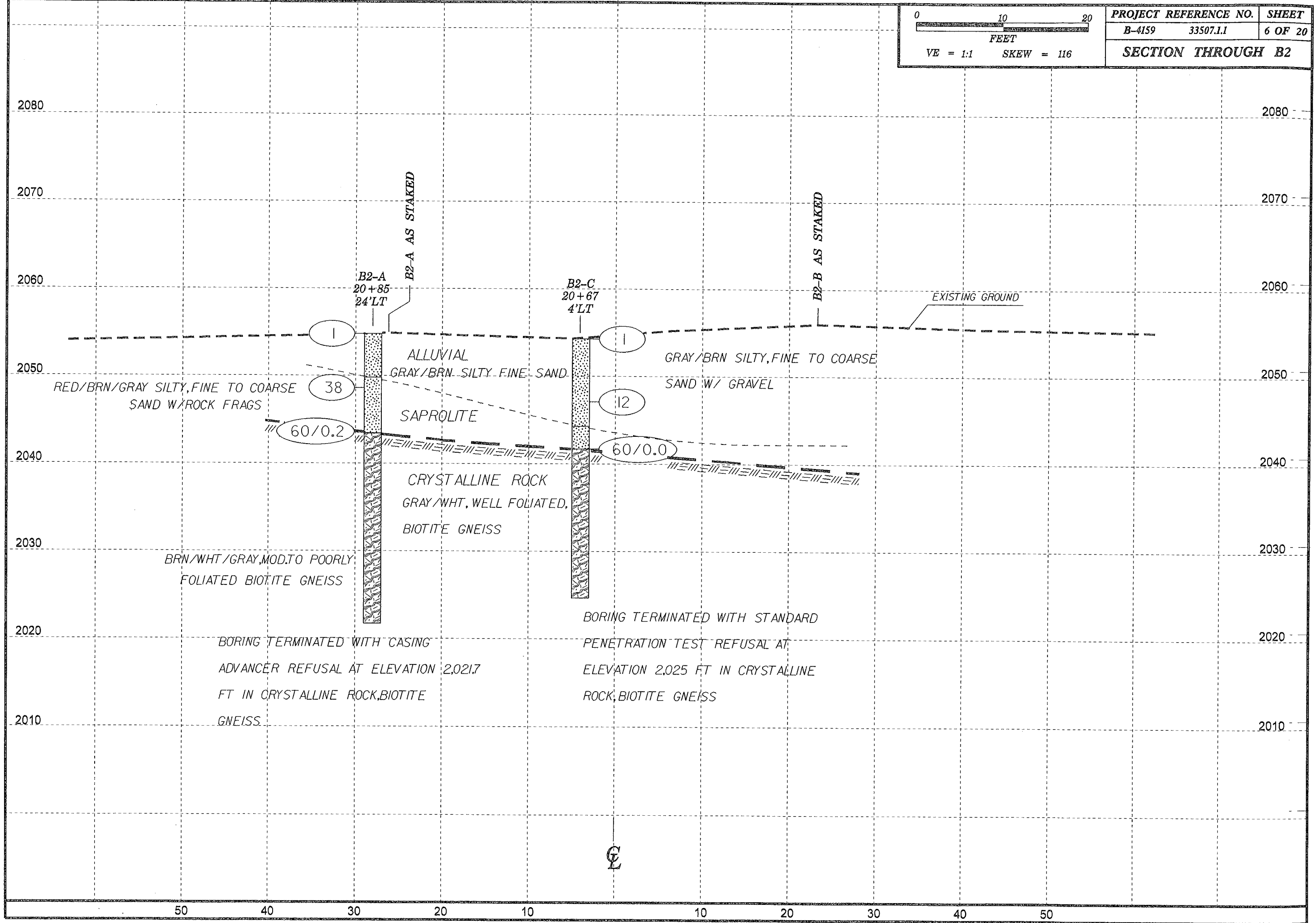
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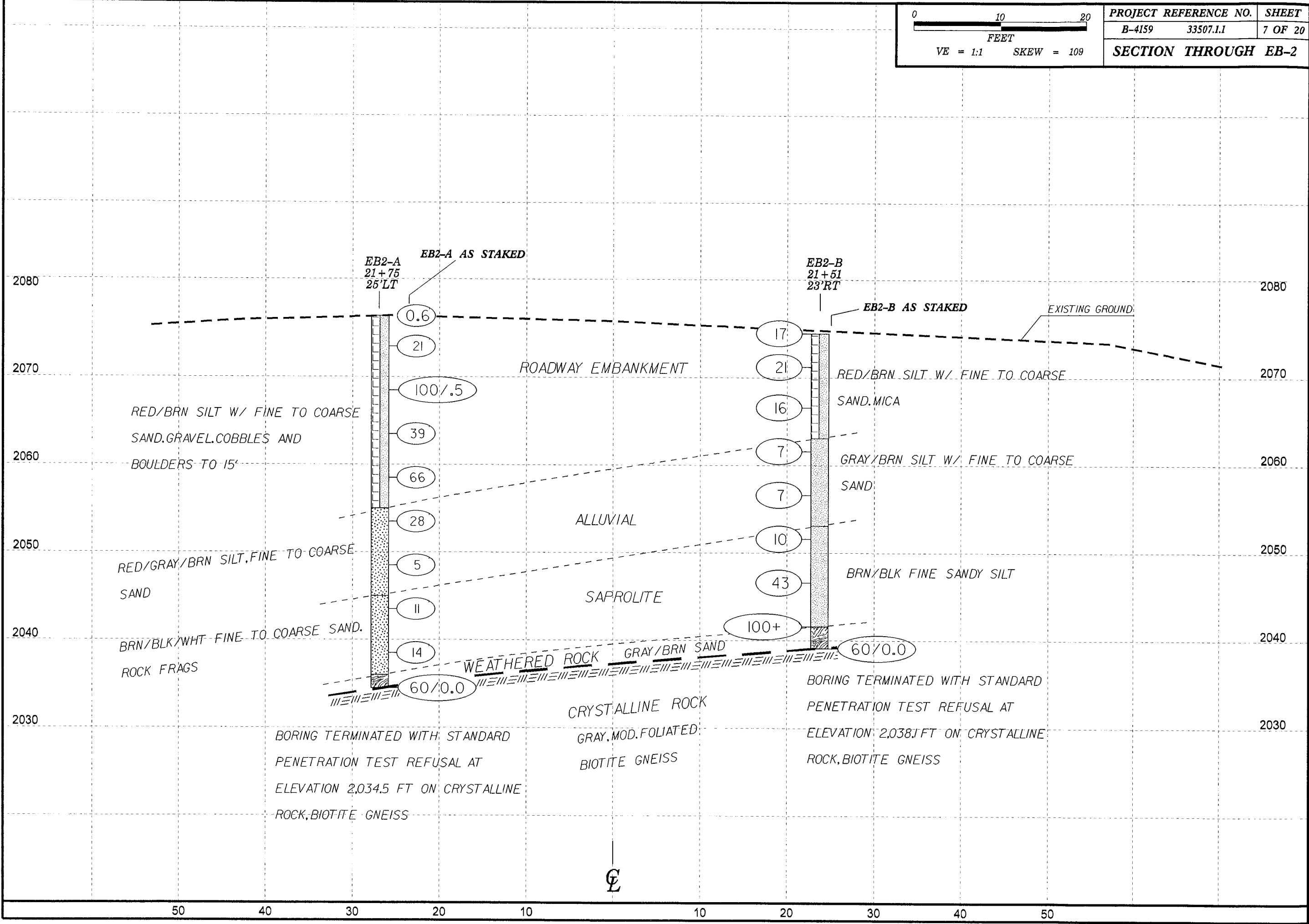
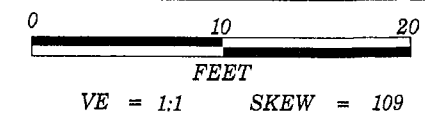
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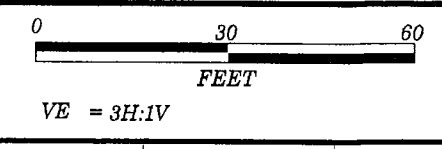
50 40 30 20 10 10 20 30 40 50



PROJECT REFERENCE NO.	SHEET
B-4159 33507.1.1	6 OF 20
SECTION THROUGH B2	

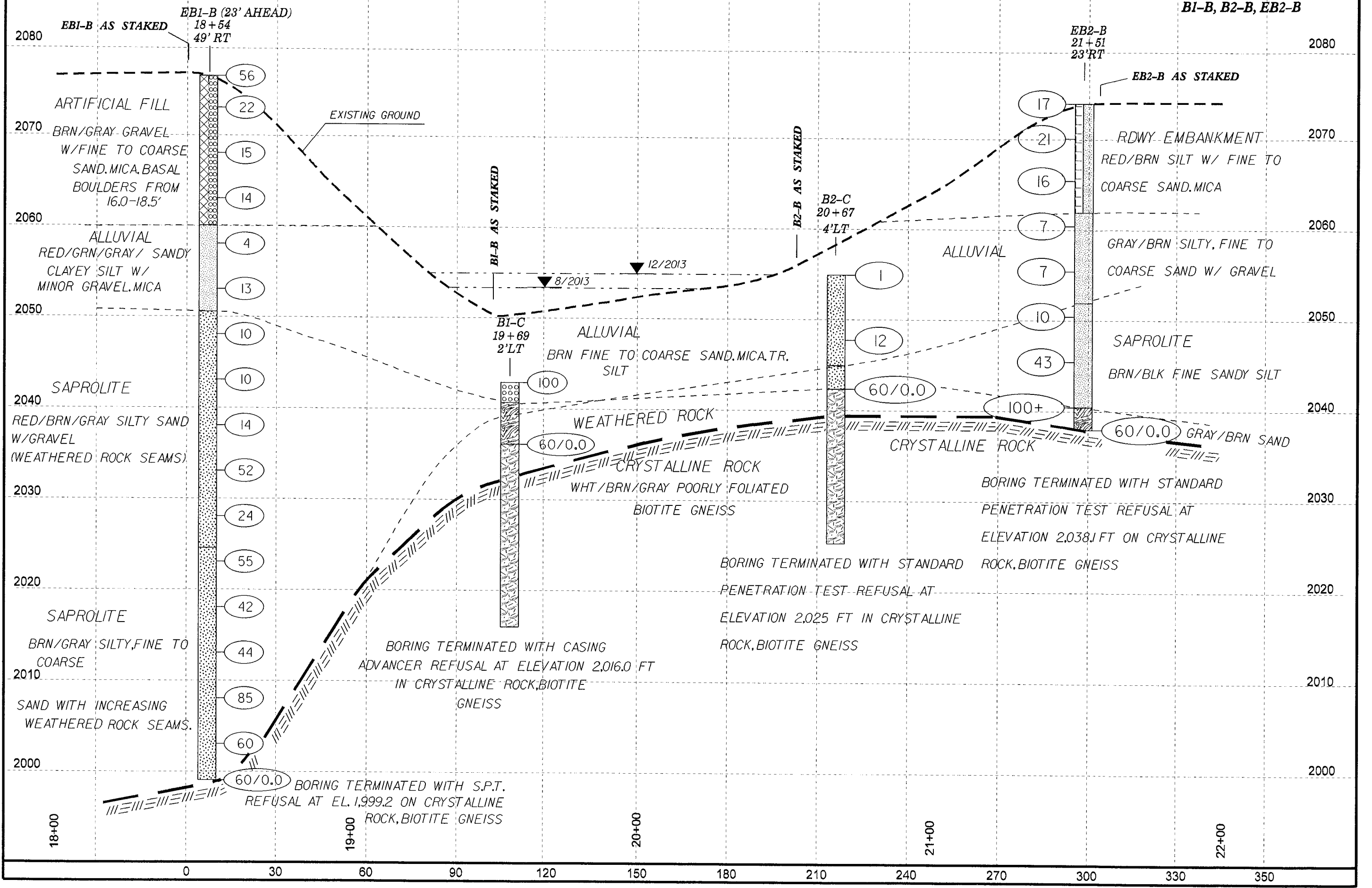


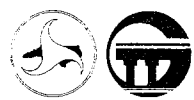




PROJECT REFERENCE NO.	SHEET
B-4159 33507.1.1	8 OF 20

PROFILE THROUGH: EB1-B, BI-B, B2-B, EB2-B





NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN										
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 18+81		OFFSET 22 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,076.9 ft		TOTAL DEPTH 67.5 ft		NORTHING 595,922		EASTING 754,056										
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER D WHITE		START DATE 12/17/13		COMP. DATE 12/18/13		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						
2080																
	2,076.9	0.0	7	8	9										2,076.9	0.0
2075																
	2,073.4	3.5	9	31	21											
2070																
	2,068.4	8.5	60/0.0													
2065																
	2,063.4	13.5	2	2	2											
2060																
	2,058.4	18.5	3	3	3											
2055																
	2,053.4	23.5	3	2	4											
2050																
	2,048.4	28.5	2	2	2											
2045																
	2,043.4	33.5	3	2	3											
2040																
	2,038.4	38.5	2	4	5											
2035																
	2,033.4	43.5	10	14	15											
2030																
	2,028.4	48.5	5	5	10											
2025																
	2,023.4	53.5	7	9	9											
2020																
	2,018.4	58.5	16	52	37											
2015																
	2,013.4	63.5	60/0.1		60/0.1											
2010																
	2,009.4	67.5	60/0.0		60/0.0											
Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 2,009.4 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS																

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN										
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 18+63		OFFSET 49 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,076.7 ft		TOTAL DEPTH 77.5 ft		NORTHING 595,917		EASTING 754,143										
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER D WHITE		START DATE 12/13/13		COMP. DATE 12/13/13		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						
2080																
	2,076.7	0.0	9	12	44										2,076.7	0.0
2075																
	2,073.2	3.5	47	12	10											
2070																
	2,068.2	8.5	4	6	9											
2065																
	2,063.2	13.5	6	5	9											
2060																
	2,058.2	18.5	4	2	2											
2055																
	2,053.2	23.5	11	7	6											
2050																
	2,048.2	28.5	4	5	5											
2045																
	2,043.2	33.5	5	5	5											
2040																
	2,038.2	38.5	7	7	7											
2035																
	2,033.2	43.5	25	27	25											
2030																
	2,028.2	48.5	12	12	12											
2025																
	2,023.2	53.5	31	25	30											
2020																
	2,018.2	58.5	9	25	17											
2015																
	2,013.2	63.5	9	17	27											
2010																
	2,008.2	68.5	9	34	51											
2005																
	2,003.2	73.5	46	29	31											
2000																

NCDOT BORE DOUBLE B-4159 GEO BORELOGS GPJ NC_DOT_GDT_2/12/14

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN									
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)								
BORING NO. B1-A		STATION 19+84		OFFSET 24 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 2,046.4 ft		TOTAL DEPTH 34.9 ft		NORTHING 596,029		EASTING 754,058									
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER D WHITE		START DATE 12/11/13		COMP. DATE 12/11/13		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					
2050															
2045	2,046.4	0.0	WOH	WOH	1								2,046.4	GROUND SURFACE	0.0
	2,044.3	2.1	WOH	1	100.3								2,043.3	ALLUVIAL BRN SILTY SAND, W/ GRAVEL AND MICA. TR. ORGANIC	3.1
2040	2,041.6	4.8	60/0.0										2,041.6	SAPROLITE WEATHERED BIOTITE GNEISS	4.8
2035														CRYSTALLINE ROCK GRAY/WHITE, POORLY TO MOD. FOLIATED BIOTITE GNEISS	
2030															
2025															
2020															
2015															
													2,011.5	Boring Terminated WITH CASING ADVANCER REFUSAL at Elevation 2,011.5 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS	34.9

NCDOT BORE SINGLE B-4159_GEO_BORELOGS.GPJ NC_DOT.GDT 2/12/14

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN							
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)						
BORING NO. B1-A		STATION 19+84		OFFSET 24 ft LT		ALIGNMENT -L-							
COLLAR ELEV. 2,046.4 ft		TOTAL DEPTH 34.9 ft		NORTHING 596,029		EASTING 754,058							
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic									
DRILLER D WHITE		START DATE 12/11/13		COMP. DATE 12/11/13		SURFACE WATER DEPTH N/A							
CORE SIZE NQ3				TOTAL RUN 30.3 ft									
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 (%)				
2041.6													
2040	2,041.6	4.8	5.0	N=60/0.0 3:03/1.0 2:50/1.0 3:03/1.0 2:49/1.0 4:26/1.0	(2.4) 48%	(1.6) 32%					2,041.6	Begin Coring @ 4.8 ft CRYSTALLINE ROCK	4.8
2035	2,036.6	9.8	5.0	3:00/1.0 4:02/1.0 3:27/1.0 3:39/1.0 3:45/1.0	(2.2) 44%	(0.0) 0%							
2030	2,031.6	14.8	5.0	2:12/1.0 2:30/1.0 2:40/1.0 4:49/1.0 5:30/1.0	(5.0) 100%	(3.2) 64%							
2025	2,026.6	19.8	5.0	3:52/1.0 4:10/1.0 3:56/1.0 3:49/1.0	(4.8) 96%	(4.5) 90%							
2020	2,021.8 2,021.6	24.6 24.8	5.3	3:27/0.8 3:37/1.0 4:06/1.0 3:59/1.0 4:15/1.0 5:24/1.3	(5.3) 100%	(4.3) 81%							
2015	2,016.5	29.9	5.0	4:02/1.0 3:56/1.0 4:10/1.0 3:49/1.0 4:07/1.0	(4.9) 98%	(4.6) 92%							
	2,011.5	34.9									2,011.5	Boring Terminated WITH CASING ADVANCER REFUSAL at Elevation 2,011.5 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS	34.9

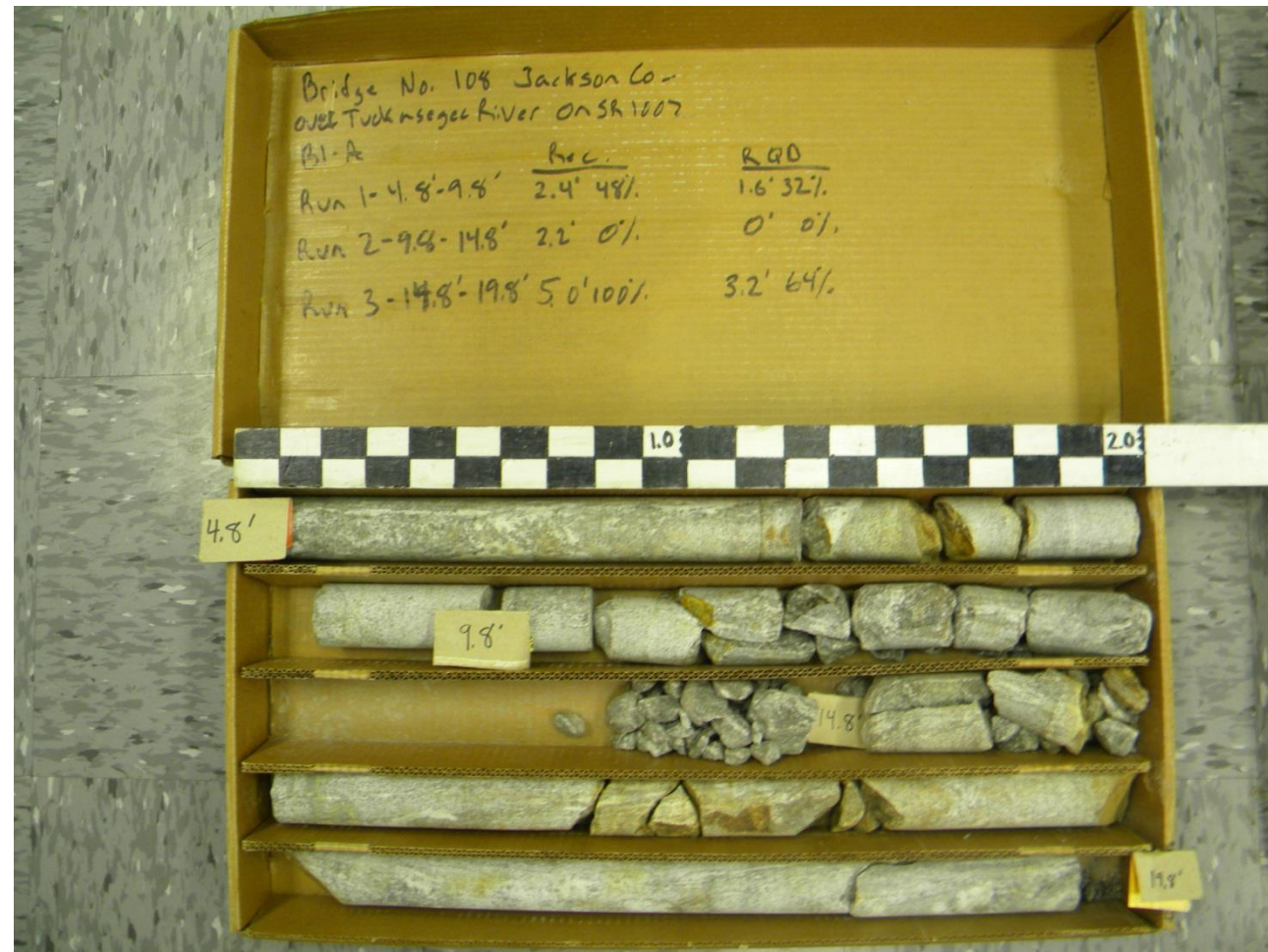
NCDOT BORE SINGLE B-4159_GEO_BORELOGS.GPJ NC_DOT.GDT 2/12/14

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN										
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)									
BORING NO. B1-C		STATION 19+54		OFFSET 2 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 2,042.9 ft		TOTAL DEPTH 26.9 ft		NORTHING 596,005		EASTING 754,079										
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Core Boring		HAMMER TYPE Automatic												
DRILLER D WHITE		START DATE 12/12/13		COMP. DATE 12/12/13		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						
2045	2,042.9	0.0												2,042.9	GROUND SURFACE	0.0
2040	2,040.7	2.2	WOH	WOH	WOH									2,040.7	ALLUVIAL BRN FINE TO COARSE SAND. MICA. TR. SILT	2.2
2035	2,038.1	6.8												2,038.1	WEATHERED ROCK BRN/GRAY SAND	6.8
2030															CRYSTALLINE ROCK WHT/BRN/GRAY POORLY FOLIATED BIOTITE GNEISS	
2025																
2020																
														2,016.0	Boring Terminated WITH CASING ADVANCER REFUSAL at Elevation 2,016.0 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS	26.9

NCDOT BORE SINGLE B-4159 GEO_BORELOGS.GPJ NC_DOT_GDT 2/12/14

WBS 33507.1.1		TIP B-4159		COUNTY JACKSON		GEOLOGIST C BALDWIN								
SITE DESCRIPTION BRIDGE NO. 108 ON SR 1002 OVER THE TUCKASEGEE RIVER							GROUND WTR (ft)							
BORING NO. B1-C		STATION 19+54		OFFSET 2 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 2,042.9 ft		TOTAL DEPTH 26.9 ft		NORTHING 596,005		EASTING 754,079								
DRILL RIG/HAMMER EFF./DATE CME-55 LC 331145		DRILL METHOD Core Boring		HAMMER TYPE Automatic										
DRILLER D WHITE		START DATE 12/12/13		COMP. DATE 12/12/13		SURFACE WATER DEPTH N/A								
CORE SIZE NQ3				TOTAL RUN 20.1 ft										
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) %					
2036.1	2,036.1	6.8	5.0	N=60/0.0 3:25/1.0 3:20/1.0 2:54/1.0 2:53/1.0 2:56/1.0	(4.4) 88%	(3.6) 72%					2,036.1	Begin Coring @ 6.8 ft CRYSTALLINE ROCK	6.8	
2030	2,031.1	11.8	5.0	3:00/1.0 2:56/1.0 2:37/1.0 2:40/1.0 2:29/1.0	(5.0) 100%	(4.0) 80%								
2025	2,026.1	16.8	5.1	4:57/1.0 3:34/1.0 2:37/1.0 2:49/1.0 3:20/1.1	(5.1) 100%	(4.1) 80%								
2020	2,021.0	21.9	5.0	2:41/1.0 2:37/1.0 2:50/1.0 2:26/1.0 2:49/1.0	(4.7) 94%	(3.5) 70%								
	2,016.0	26.9										2,016.0	Boring Terminated WITH CASING ADVANCER REFUSAL at Elevation 2,016.0 ft IN CRYSTALLINE ROCK, BIOTITE GNEISS	26.9

NCDOT CORE SINGLE B-4159 GEO_BORELOGS.GPJ NC_DOT_GDT 2/12/14



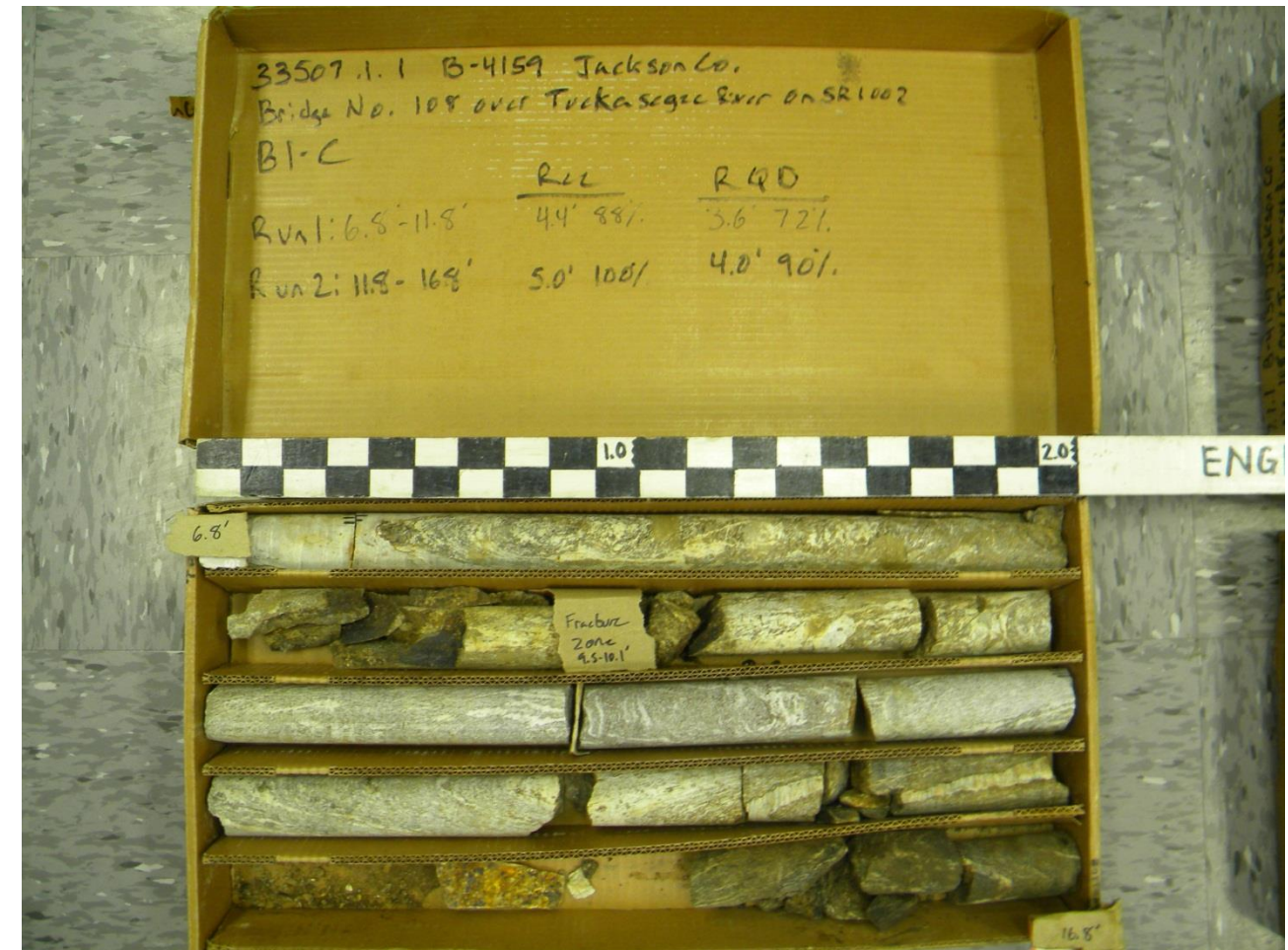
B-4159 33507.1.1
BORING B1-A
BOX 1 OF 3, 4.8 – 19.8'



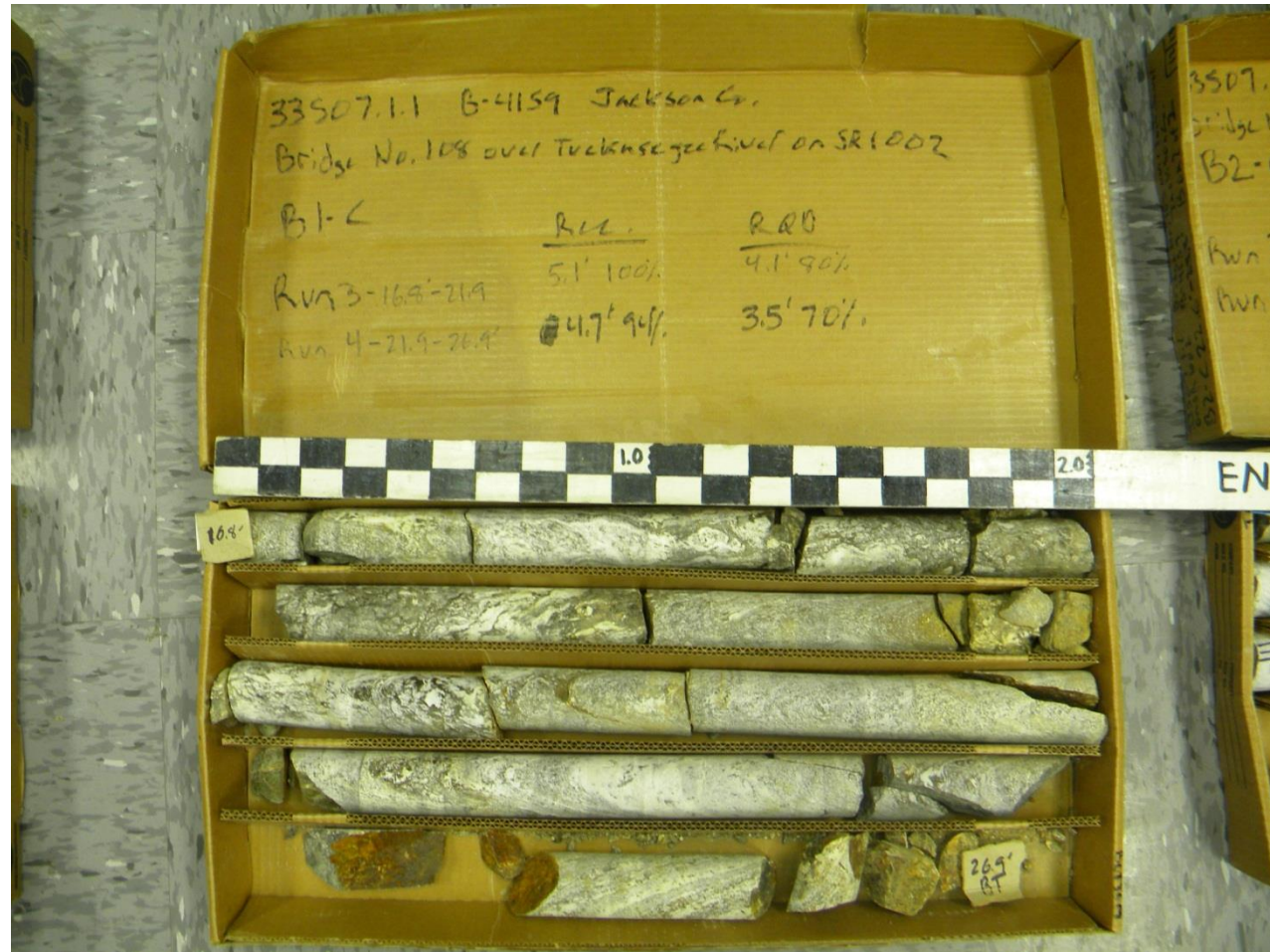
B-4159 33507.1.1
BORING B1-A
BOX 2 OF 3, 19.8 – 25.9'



B-4159 33507.1.1
 BORING B1-A
 BOX 3 OF 3, 25.9 – 34.9'



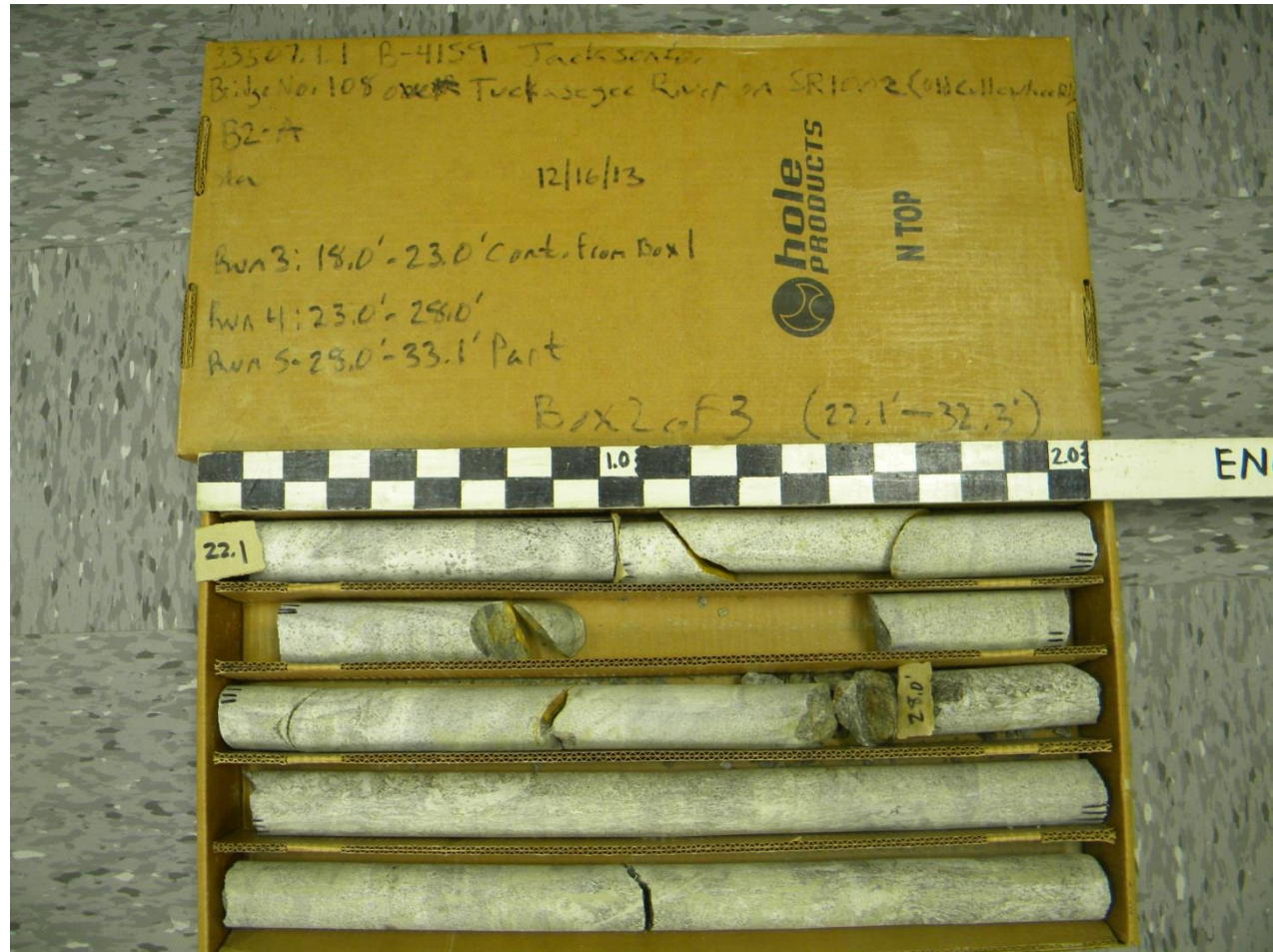
B-4159 33507.1.1
 BORING B1-C
 BOX 1 OF 2, 6.8 – 16.8'



B-4159 33507.1.1
 BORING B1-C
 BOX 2 OF 2, 16.8 – 26.9'



B-4159 33507.1.1
 BORING B2-A
 BOX 1 OF 3, 11.4 – 22.1'



B-4159 33507.1.1
BORING B2-A
BOX 2 OF 3, 22.1 – 32.3'



B-4159 33507.1.1
BORING B2-A
BOX 3 OF 3, 32.3 – 33.1'



B-4159 33507.1.1
 BORING B2-C
 BOX 1 OF 2, 12.6 – 22.6'



B-4159 33507.1.1
 BORING B2-C
 BOX 2 OF 2, 22.6 – 29.6'