

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33460.1.1 (B-4104)	1	19

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33460.1.1 (B-4104) F.A. PROJ. BRSTP-801(5)
COUNTY DAVIE
PROJECT DESCRIPTION BRIDGE NO. 21 OVER FULTON CREEK
ON NC 801

SITE DESCRIPTION _____

CONTENTS

<u>SHEET</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	GEOTECHNICAL REPORT
4	SITE PLAN
5	PROFILE(S)
6-9	CROSS SECTION(S)
10-15	BORE LOG & CORE REPORT(S)
16	SOIL TEST RESULTS
17	SCOUR REPORT
18-19	CORE PHOTOGRAPH(S)

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 DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PROJECT: 33460.1.1
ID: B-4104

PERSONNEL

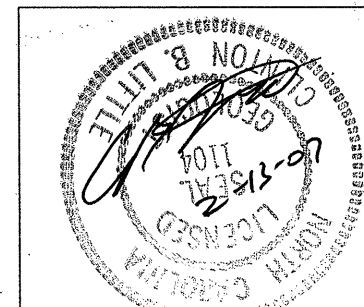
J.K. STICKNEY
C.L. SMITH
H.K. WISE

INVESTIGATED BY J.E. BEVERLY

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE FEBRUARY 2007



DRAWN BY: J.E. BEVERLY

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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

PROJECT REFERENCE NO. 33460.II(B-4104)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS																																																																																																																																																																																																																
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: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HEAVY PLASTIC, A-7-6</i>	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) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED. MINERALOGICAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	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: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. 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. 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. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. 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. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROQ) - 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.																																																																																																																																																																																																																
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BOULDER (BLDR.)																																																																																																																																																																																																																			
	305	75	2.0	0.25	0.05	0.005																																																																																																																																																																																																													
COBBLE (COB.)																																																																																																																																																																																																																			
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			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.																																																																																																																																																																																																																
			TERMS AND DEFINITIONS																																																																																																																																																																																																																
			<p>BENCH MARK: MONUMENT BL-4 AT -BL- STA. 23+56</p> <p style="text-align: right;">ELEVATION: 676.31 FT.</p> <p>NOTES:</p>																																																																																																																																																																																																																



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY P.O. BOX 25201, RALEIGH, N.C. 27611-5201 LYNDO TIPPETT
GOVERNOR SECRETARY

February 8, 2007

STATE PROJECT: 33460.1.1 (B-4104)
COUNTY: Davie
DESCRIPTION: Bridge 21 on NC 801 over Fulton Creek
SUBJECT: Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement for bridge number 21 on NC 801 over Fulton Creek. The new structure is located approximately 50 feet downstream from the existing bridge. The proposed structure is comprised of 3 spans at 45', 55' and 45' totaling 145 feet in length. The bridge is designed on a 90 degree skew utilizing 45" prestressed concrete girders. Total bridge width is 38'3" (out to out).

Two borings were performed at each proposed bent location to determine subsurface conditions. The type of equipment used for this investigation was a CME 550X drill machine, NW casing with roller cone, NQWL, and an automatic drop hammer. The field investigation for this project was performed in September of 2006.

Physiography/Geology

The site is located along the eastern edge of Davie County inside an approximately 400 foot wide floodplain associated with Fulton Creek. The creek empties into the Yadkin River which is just a short distance from the project area. Geologically the area is part of the Charlotte Belt and is underlain by Pennsylvanian and Permian age granite from the Churchland Plutonic Suite.

Site specific soils noted during our investigation include roadway embankment fill associated with NC 801, artificial fill from prior backhoe activity, alluvial soils from Fulton Creek, and local residual soils. Roadway fill is comprised of sandy silty clay (A-6). Artificial fill is comprised of silty clay (A-6, A-7-6). Alluvial soil consists of silty sandy clay (A-6). Residual soils occur as silty sand (A-2-4) and silty sandy clay (A-6).

Foundation Materials

End Bent 1:

Two borings were performed west of Fulton Creek at this bent location. Two feet of roadway embankment fill was present at EB1-A and consists of red-brown medium stiff sandy silty clay (A-6). Alluvium extends across the entire bent and consists of roughly 3 feet of red-brown soft silty sandy clay (A-6) overlying residual soil. Residual white and gray medium dense to very dense silty sand (A-2-4) is first encountered between elevation 662 and 664 feet. Residual soil ranges in thickness from 2 to 6 feet and overlies weathered rock. Boring EB1-A achieved roller-cone refusal in crystalline rock and boring EB1-B terminated in moderately severely weathered granite. The following is a listing of weathered and crystalline rock elevations at each boring location:

<u>Boring Location</u>	<u>Weathered Rock Elev. (feet)</u>	<u>Rock Elev. (feet)</u>
EB1-A		656.8 (SPT Refusal)
EB1-B	662.0	656.8

Bent 1:

Each of the 2 borings performed at this bent location encountered 5 – 7.6 feet of alluvium consisting of tan-brown medium stiff to stiff silty sandy clay (A-6) overlying residual soil. The residual soil horizon occurs between elevation 653.5 – 647.1 feet and is followed by approximately 1 to 2.5 feet of tan-brown dense to very dense sand (A-2-4). Lying beneath residual soil is weathered rock and/or crystalline rock. Each boring was cored to evaluate the characteristics and composition of the rock. The following is a listing of weathered and crystalline rock elevations at each boring location:

<u>Boring Location</u>	<u>Weathered Rock Elev. (feet)</u>	<u>Rock Elev. (feet)</u>
B1-A	652.7	650.5
B1-B	N/A	644.5

Bent 2:

These 2 borings fall east of the creek and encountered 2 – 3 feet of artificial fill consisting of brown and gray very soft to soft sandy silty clay (A-7-6). The fill material is disturbed alluvium from previous backhoe activity. Beneath fill soil lies 2 to 6 feet of alluvium consisting of gray very soft sandy silty clay (A-6). Alluvium directly overlies weathered rock and is quickly followed by crystalline rock. Each boring was cored to evaluate the characteristics and composition of the rock. The following is a listing of weathered and crystalline rock elevations at each boring location:

<u>Boring Location</u>	<u>Weathered Rock Elev. (feet)</u>	<u>Rock Elev. (feet)</u>
B2-A	642.7	642.1
B2-B	646.0	643.0

End Bent 2:

These final 2 bridge borings encountered 3 feet of artificial fill (disturbed alluvium) that consists of red-brown medium stiff silty sandy clay (A-6). Residual soil directly underlies the fill at elevation 656.5 feet. Residual soil is first comprised of 5 feet of gray and white stiff to very stiff silty sandy clay (A-6). It then makes a change to gray and white loose to very dense silty sand (A-2-4) for an additional 10+ feet. Weathered rock followed by crystalline rock is encountered with depth beneath residual material. Roller cone refusal was achieved in each boring at this bent. The following is a listing of weathered and crystalline rock elevations at each boring location:

<u>Boring Location</u>	<u>Weathered Rock Elev. (feet)</u>	<u>Rock Elev. (feet)</u>
EB2-A	646.4	644.8
EB2-B	644.0	642.5

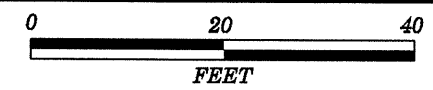
Groundwater

Static groundwater table ranges from elevation 647 to 656 feet at the site. This is based on water measurements taken at each boring location 24+ hours after drilling. The water surface of the creek was noted at elevation 646 feet.

Respectfully submitted,

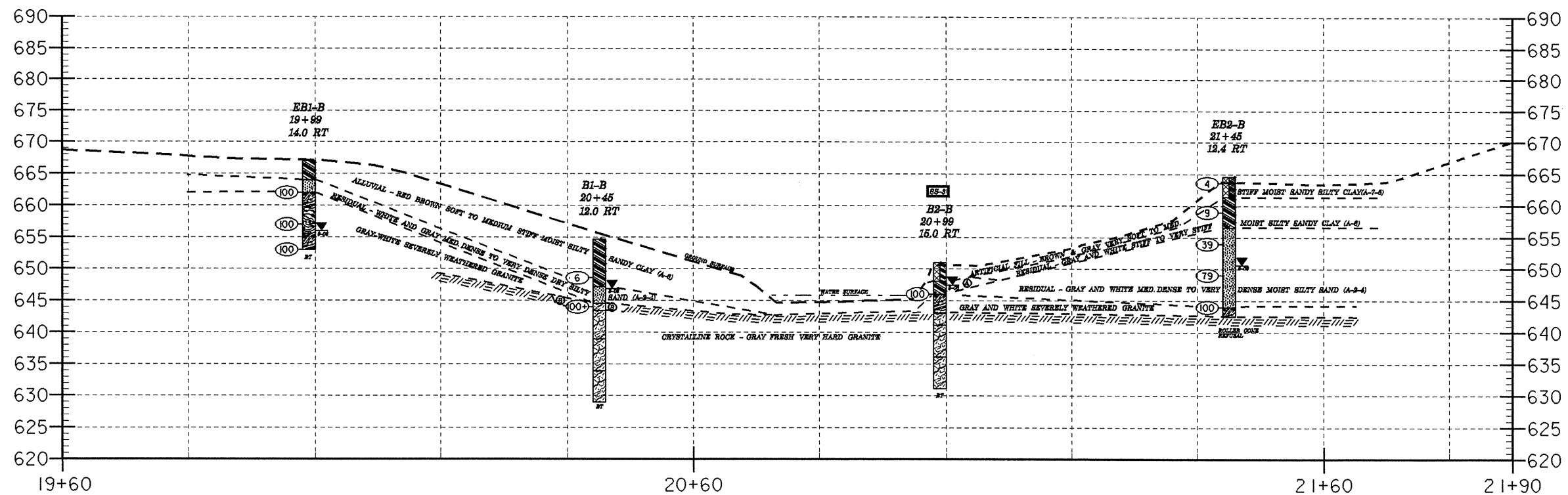
J.E. Beverly, Project Geologic Engineer



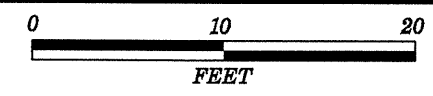


PROJECT REFERENCE NO.	SHEET
33460.1.I (B-4104)	5
-L- 19+60 - 21+90, 14' RT.	

PROFILE 14' RIGHT OF -L-

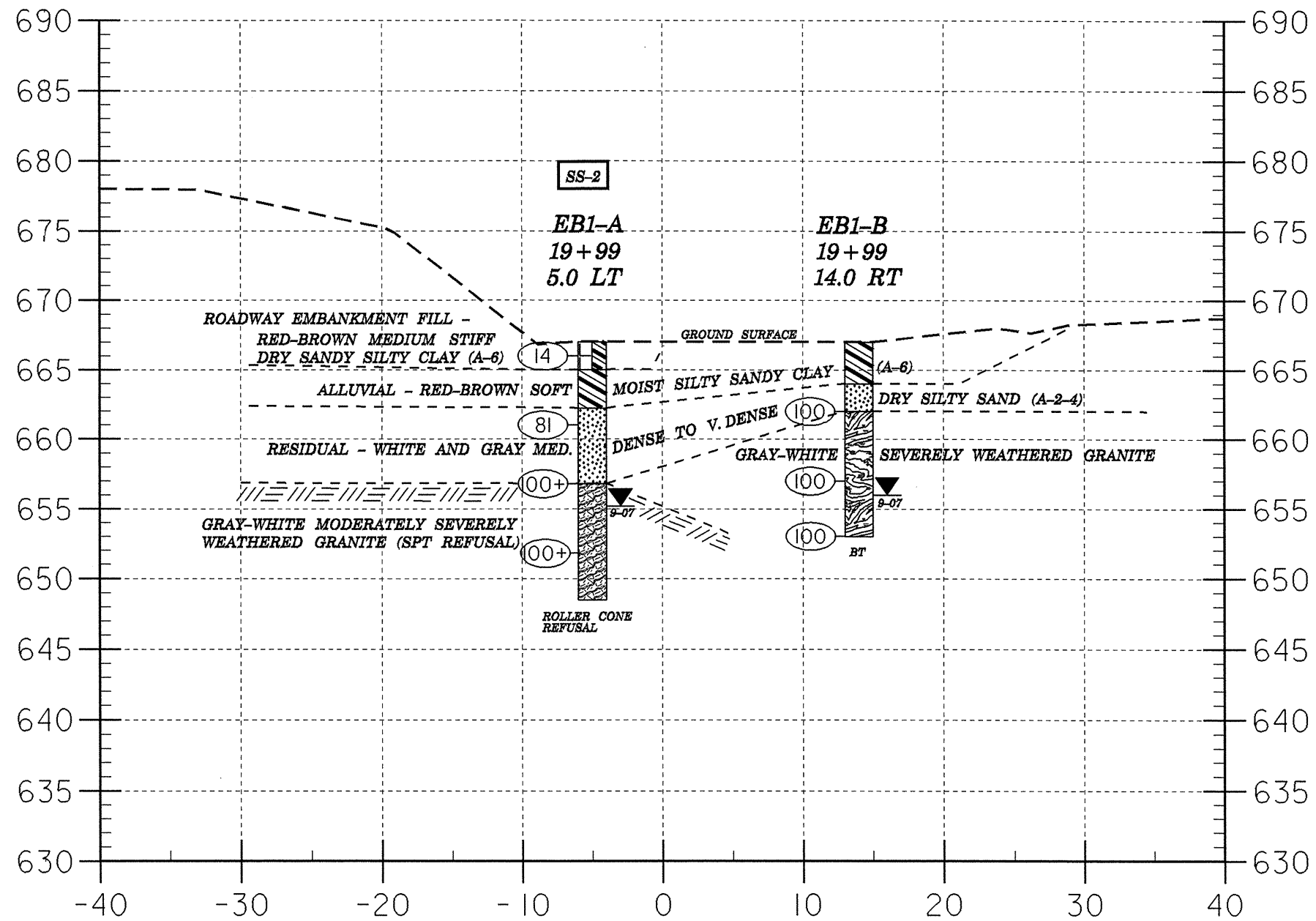


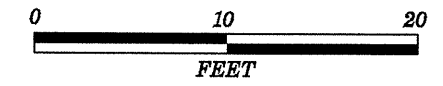
(A) ALLUVIAL GRAY VERY SOFT MOIST SANDY SILTY CLAY
 (B) GRAY WHITE MOD. SEVERELY WEATHERED GRANITE



PROJECT REFERENCE NO.	SHEET
33460.1.1 (B-4104)	6
STA. 19+99 -L- (SKEW=90)	

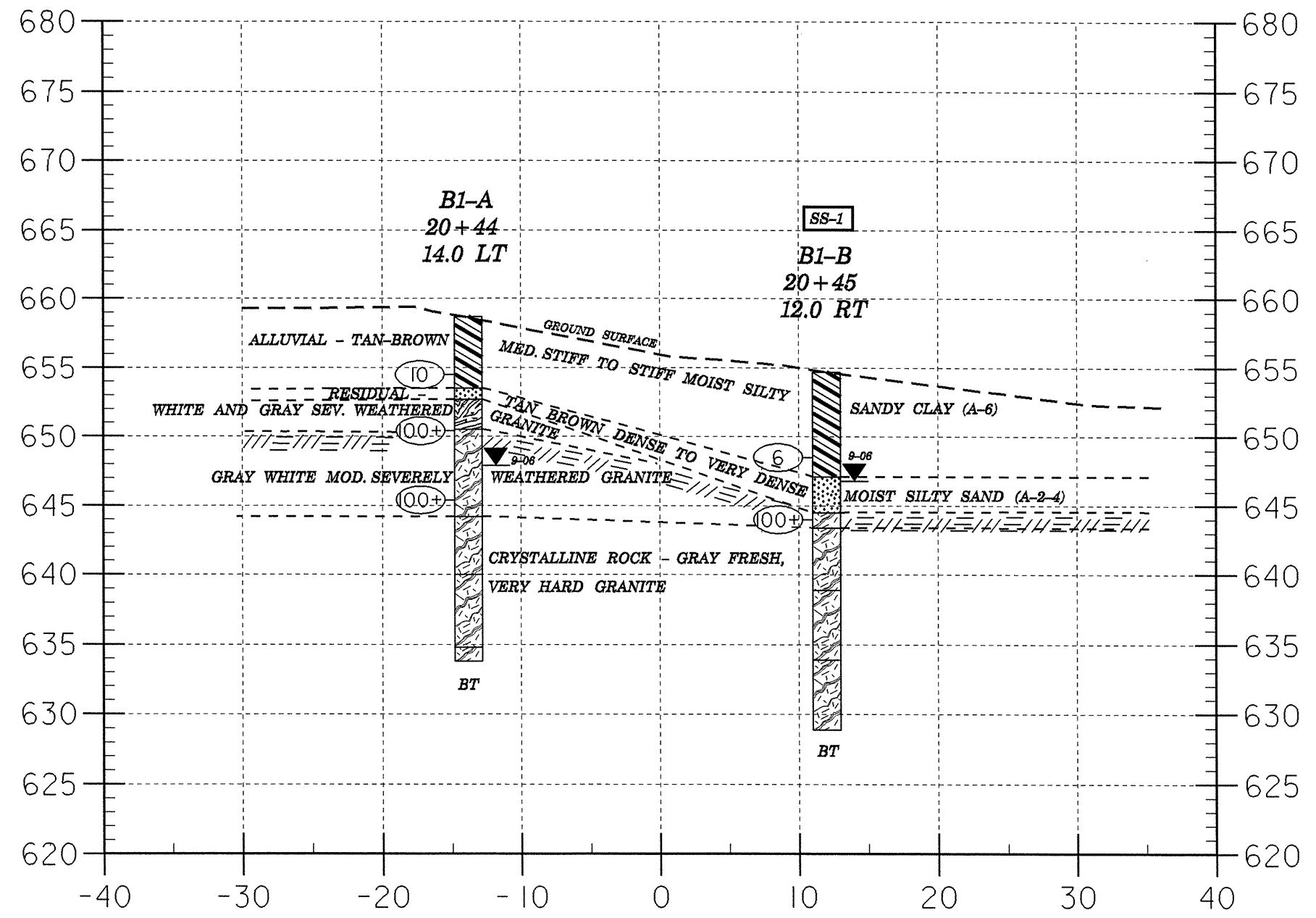
SECTION THROUGH END BENT 1





PROJECT REFERENCE NO.	SHEET
33460.1.1 (B-4104)	7
STA. 20+44 -L- (SKEW=90)	

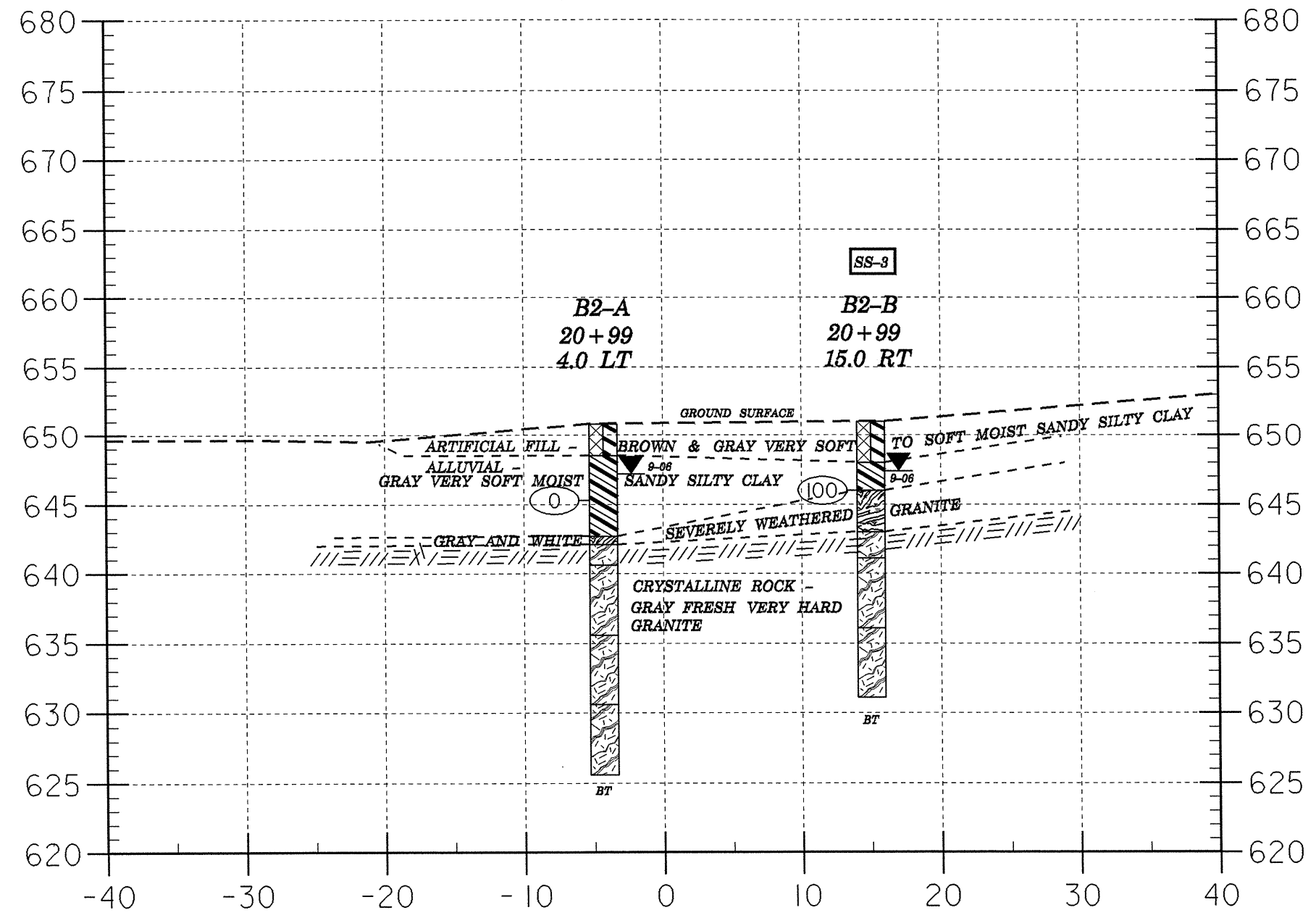
SECTION THROUGH BENT 1

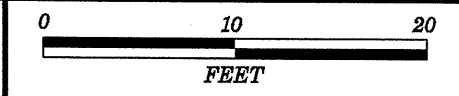




PROJECT REFERENCE NO.	SHEET
33460.1.1 (B-4104)	8
STA 20+99 -L- (SKEW=90)	

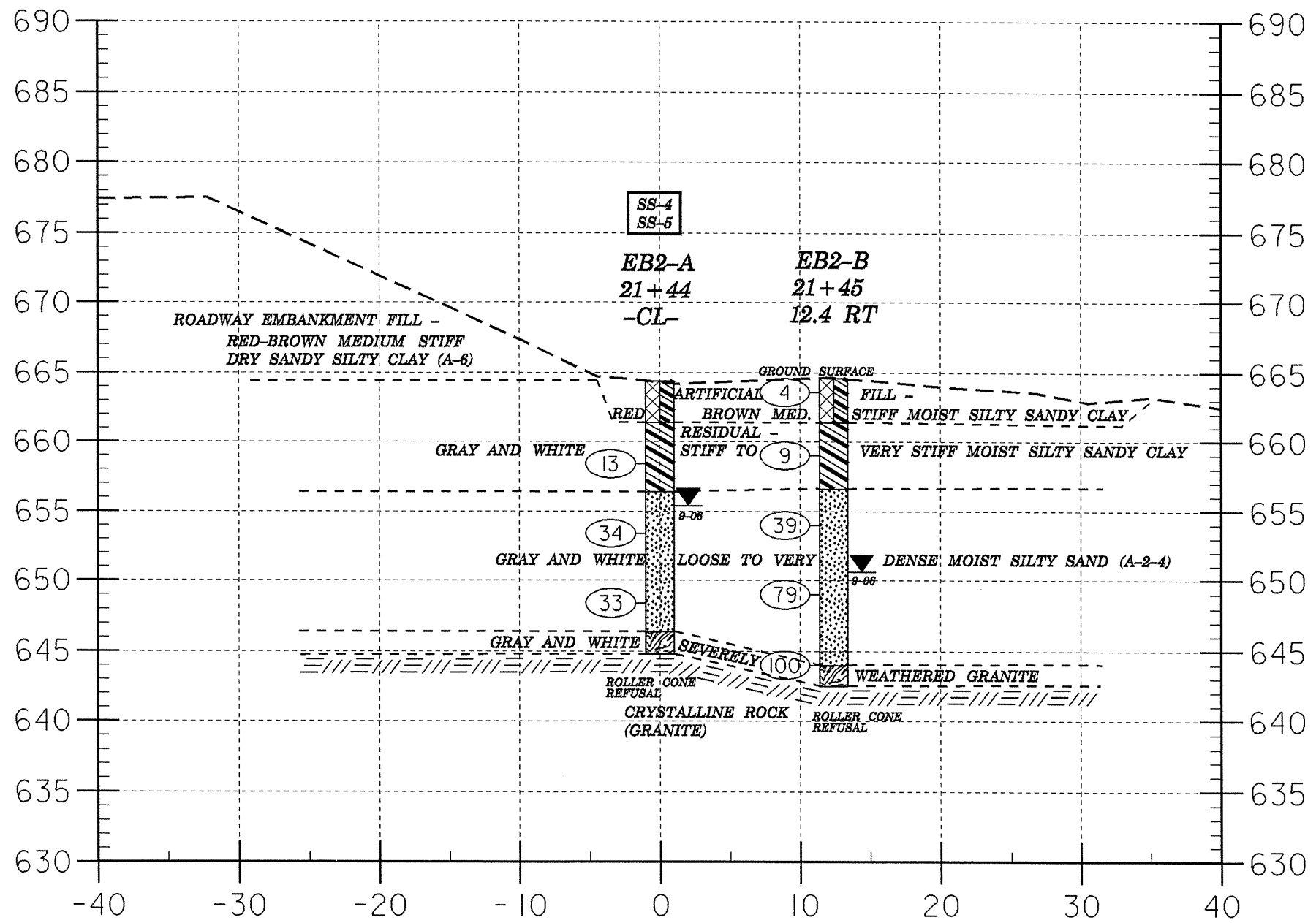
SECTION THROUGH BENT 2

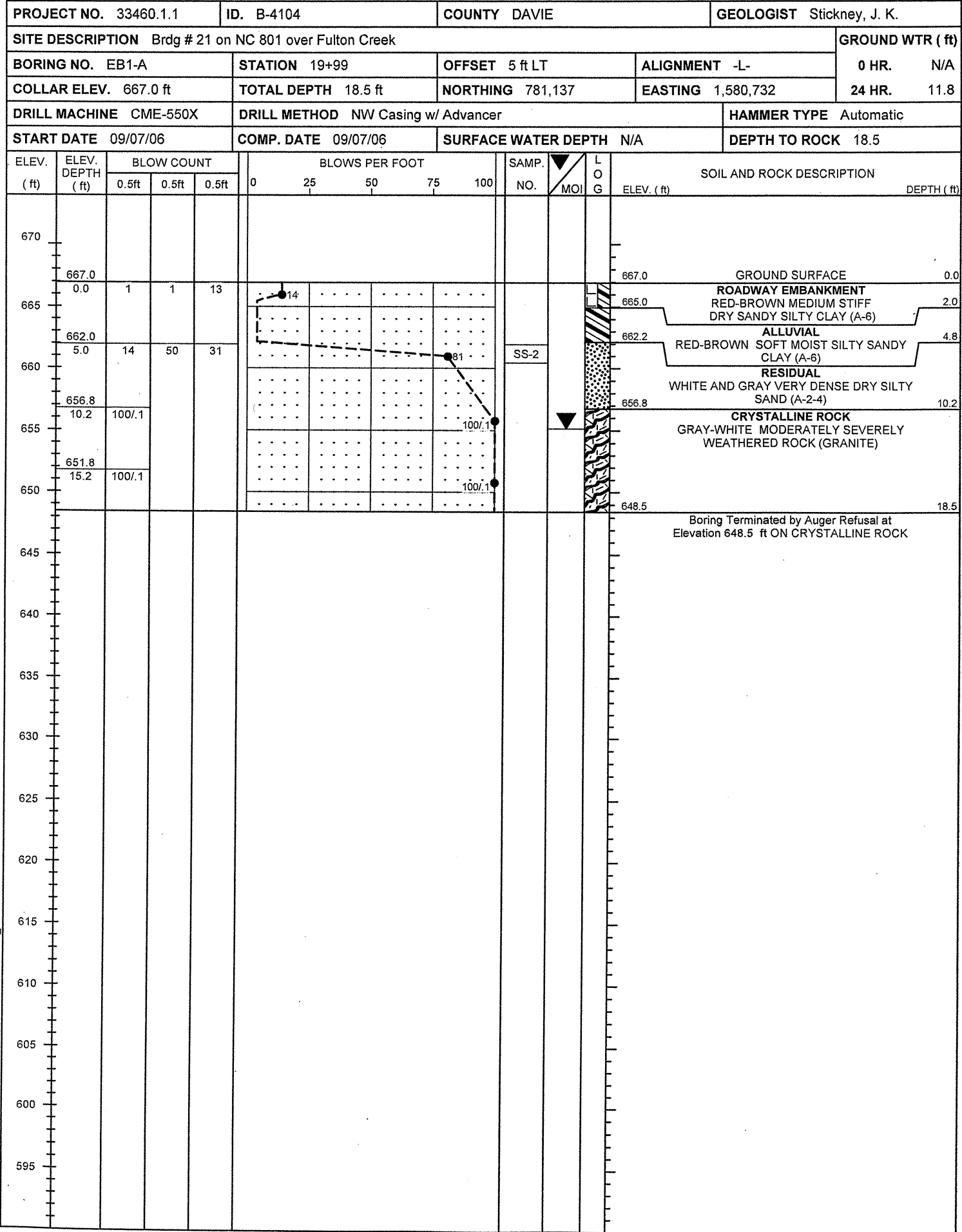




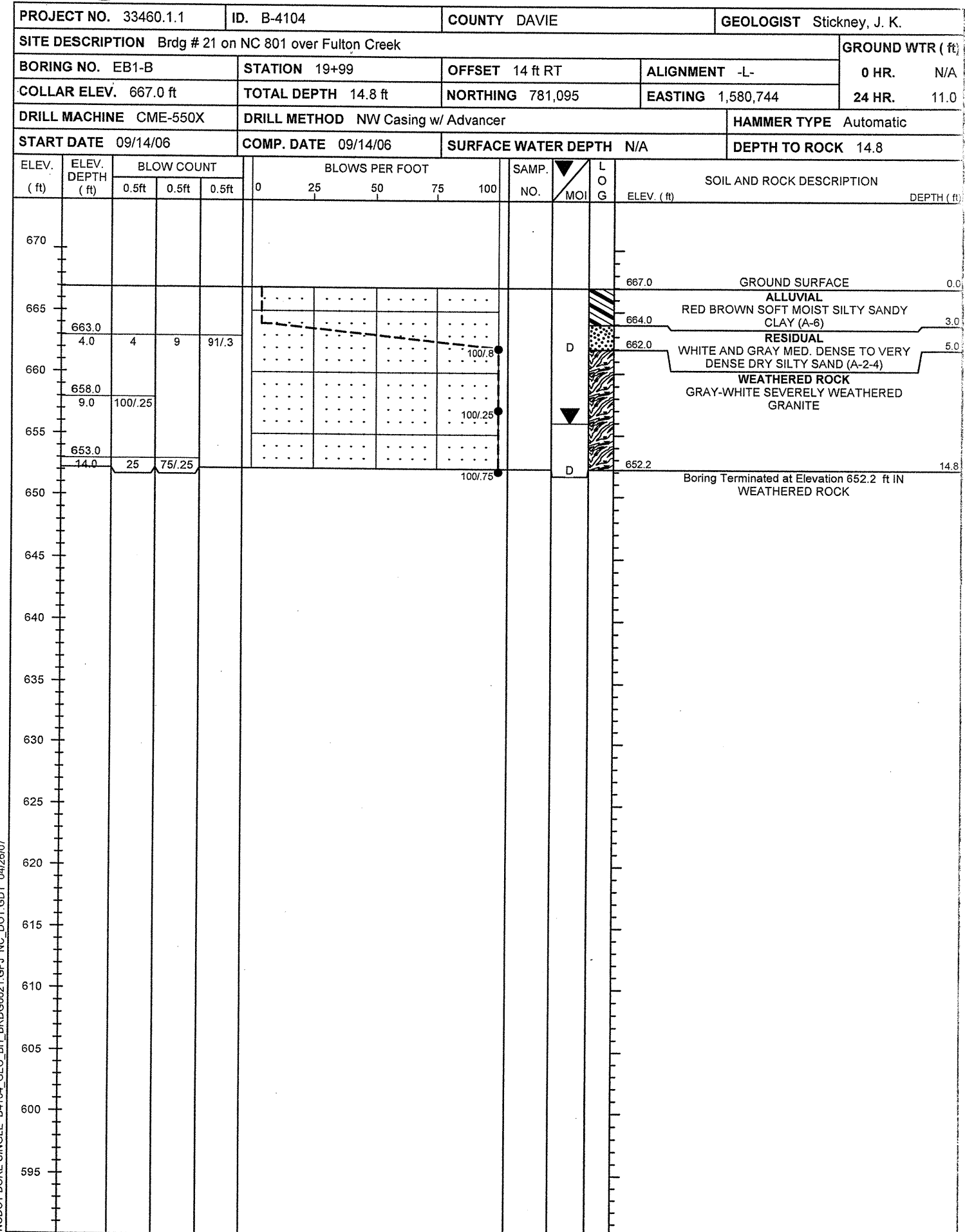
PROJECT REFERENCE NO.	SHEET
33460.1.1 (B-4104)	9
STA. 21+44 -L- (SKEW=90)	

SECTION THROUGH END BENT 2





NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ_NC_DOT.GDT_04/26/07

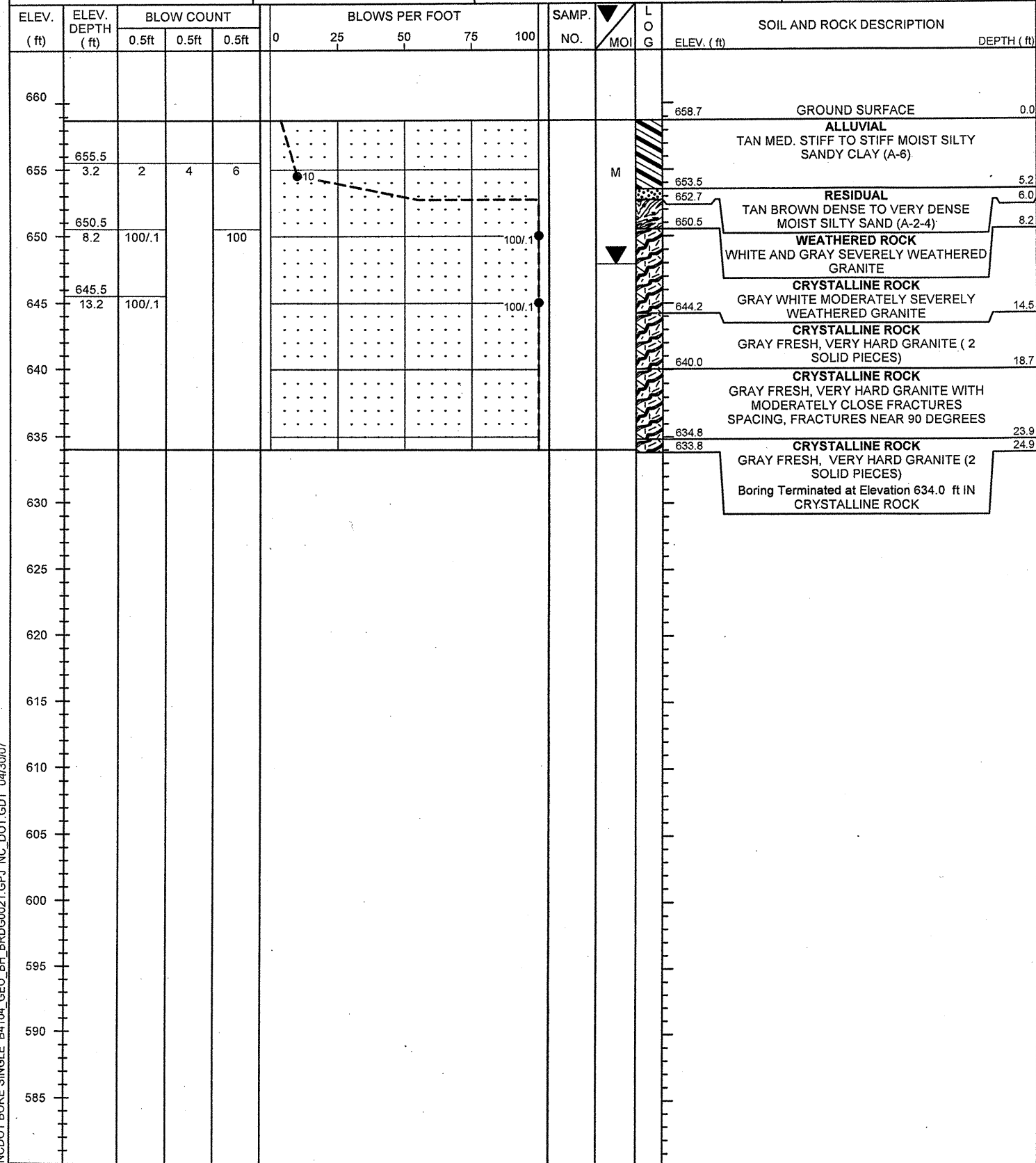


NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ_NC_DOT.GDT_04/26/07

PROJECT NO. 33460.1.1	ID. B-4104	COUNTY DAVIE	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Brg # 21 on NC 801 over Fulton Creek			GROUND WTR (ft)
BORING NO. B1-A	STATION 20+44	OFFSET 14 ft LT	ALIGNMENT -L-
COLLAR ELEV. 658.7 ft	TOTAL DEPTH 24.7 ft	NORTHING 781,079	EASTING 1,580,760
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic	
START DATE 09/08/06	COMP. DATE 09/08/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 8.2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33460.1.1	PROJECT ID: B-4104	COUNTY: DAVIE	GEOLOGIST: J.K. STICKNEY
SITE DESCRIPTION: BRIDGE #21 ON NC 801 OVER FULTON CREEK	BORING LOCATION (STA): 20+44	DRILLER: C.L. SMITH	OFFSET: 14' LT
BORING NO: B1-A	PERSONNEL: KEN WISE	CORE SIZE: NQWL	DATE STARTED: 9-8-06
COLLAR ELEV: 658.7	DRILL MACHINE: CME-550	DATE COMPLETED: 9-8-06	
TOTAL DEPTH: 24.9'	DRILL EQUIP: NW CASING / ROLLER		
TOTAL RUN: 10.4'			



ELEV. (FT)	RUN DEPTH	RUN REC	RUN RQD	STRATA DEPTH	STRATA REC	STRATA RQD	STRATA ELEV	SAMP NO.	FIELD CLASSIFICATION AND REMARKS
636.47	14.5	98	96	14.5	99	90	636.47		GRAY FRESH, VERY HARD GRANITE (2 SOLID PIECES)
632.27	18.7		80					RS-1	GRAY FRESH, VERY HARD GRANITE WITH MODERATE FRACTURE SPACING, FRACTURES NEAR 90 DEGREES
627.07	23.9	100	95						GRAY FRESH, VERY HARD GRANITE (2 SOLID PIECES)
626.07	24.9			24.9			626.07		

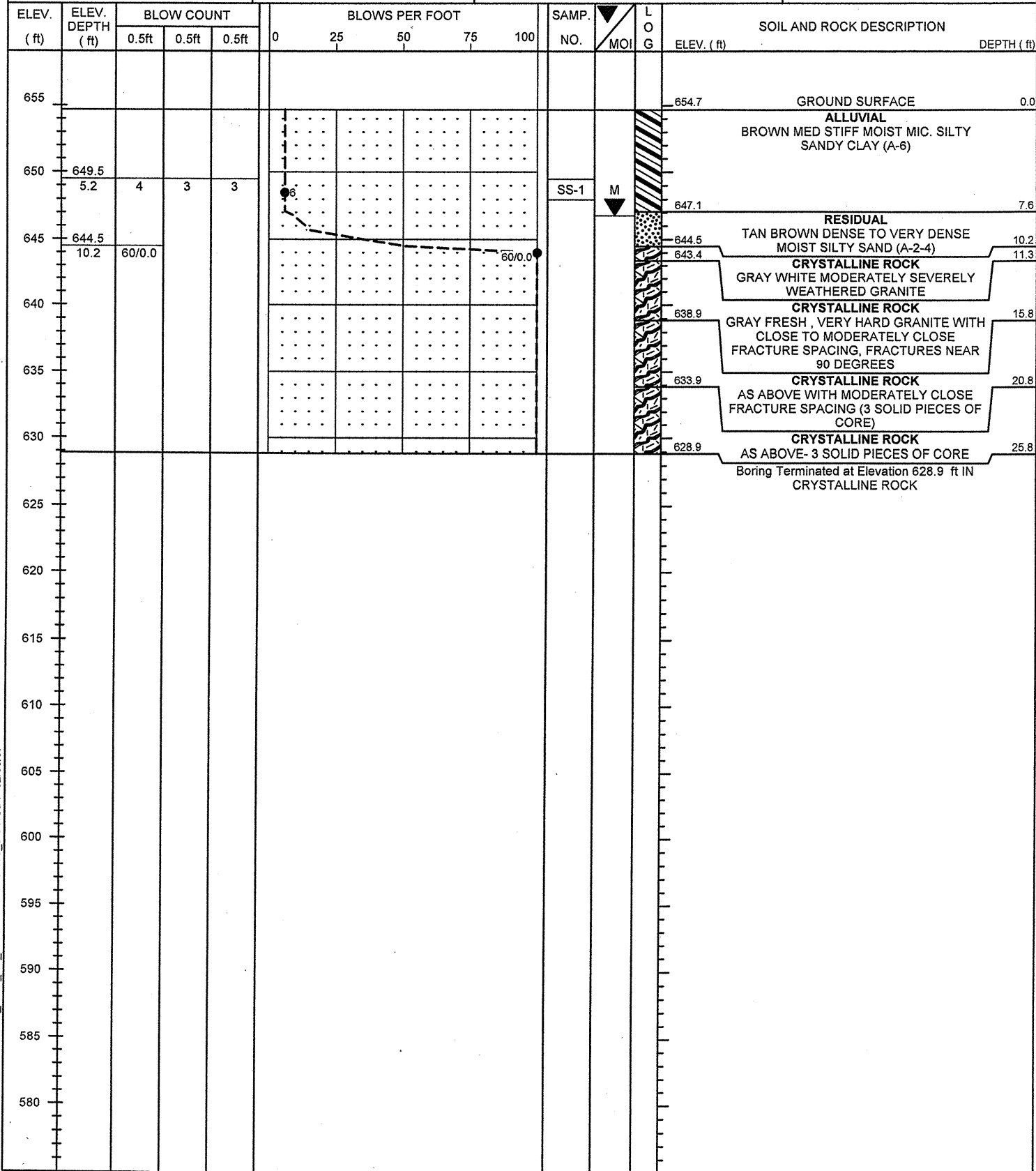
NOTES

NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ NC_DOT.GDT 04/30/07

PROJECT NO. 33460.1.1	ID. B-4104	COUNTY DAVIE	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Brdg # 21 on NC 801 over Fulton Creek			GROUND WTR (ft)
BORING NO. B1-B	STATION 20+45	OFFSET 12 ft RT	ALIGNMENT -L-
COLLAR ELEV. 654.7 ft	TOTAL DEPTH 25.8 ft	NORTHING 781,060	EASTING 1,580,778
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic	
START DATE 09/07/06	COMP. DATE 09/07/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 10.2 ft

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO: 33460.1.1	PROJECT ID: B-4104	COUNTY: DAVIE	GEOLOGIST: J.K. STICKNEY
SITE DESCRIPTION: BRIDGE #21 ON NC 801 OVER FULTON CREEK	BORING LOCATION (STA): 20+45	DRILLER: C.L. SMITH	OFFSET: 12.0' RT
BORING NO: B1-B	PERSONNEL: KEN WISE	CORE SIZE: NQWL	DATE STARTED: 9-7-06
COLLAR ELEV: 654.68	DRILL MACHINE: CME-550	DATE COMPLETED: 9-7-06	
TOTAL DEPTH: 25.8	DRILL EQUIP: NW CASING / ROLLER		
TOTAL RUN: 14.5'			



ELEV. (FT)	RUN DEPTH	RUN REC	RUN RQD	STRATA DEPTH	STRATA REC	STRATA RQD	STRATA ELEV	SAMP NO.	FIELD CLASSIFICATION AND REMARKS
643.38	11.3	100	86	11.3	97	90	643.38	RS-2	GRAY FRESH, VERY HARD GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING, FRACTURES NEAR 90 DEGREES
638.88	15.8								AS ABOVE WITH MOSERATELY CLOSE FRACTURE SPACING (3 SOLID PIECES OF CORE)
633.88	20.8								AS ABOVE - 3 SOLID PIECES OF CORE
628.88	25.8			25.8			628.88		

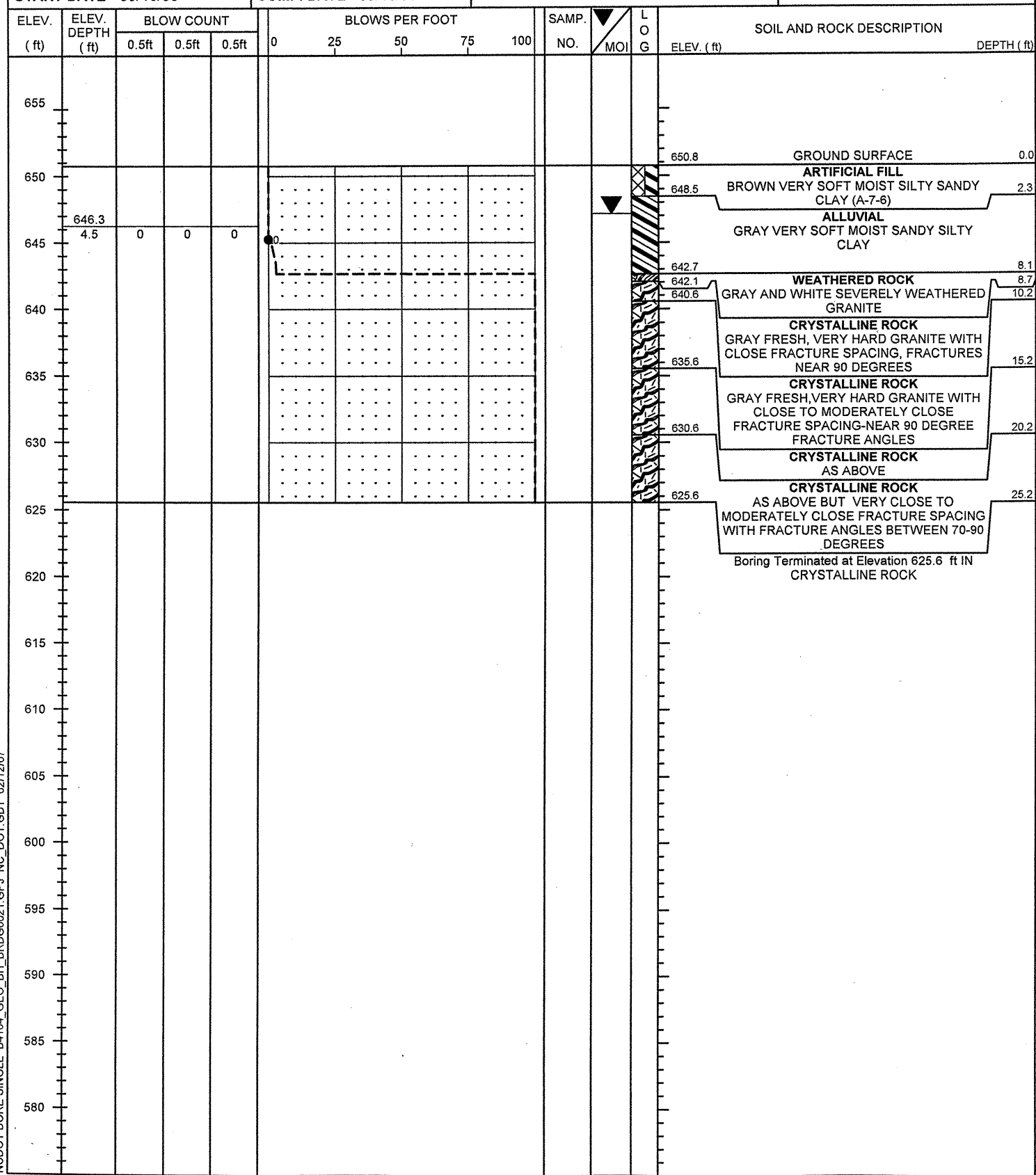
NOTES

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO. 33460.1.1	ID. B-4104	COUNTY DAVIE	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Brdg # 21 on NC 801 over Fulton Creek			GROUND WTR (ft)
BORING NO. B2-A	STATION 20+99	OFFSET 4 ft LT	ALIGNMENT -L-
COLLAR ELEV. 650.8 ft	TOTAL DEPTH 25.2 ft	NORTHING 781,079	EASTING 1,580,807
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic	
START DATE 09/18/06	COMP. DATE 09/18/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 8.7 ft

PROJECT NO: 33460.1.1 PROJECT ID: B-4104 COUNTY: DAVIE
 SITE DESCRIPTION: BRIDGE #21 ON NC 801 OVER FULTON CREEK
 BORING NO: B2-A BORING LOCATION (STA): 20+99
 COLLAR ELEV: 650.75 PERSONNEL: KEN WISE
 TOTAL DEPTH: 25.2 DRILL MACHINE: CME-550
 TOTAL RUN: 16.5 DRILL EQUIP: NW CASING / ROLLER

GEOLOGIST: J.K. STICKNEY
 DRILLER: C.L. SMITH
 OFFSET: 4.3' LT
 CORE SIZE: NQWL
 DATE STARTED: 9-18-06
 DATE COMPLETED: 9-18-06



ELEV. (FT)	RUN DEPTH	RUN REC	RUN RQD	STRATA DEPTH	STRATA REC	STRATA RQD	STRATA ELEV	SAMP NO.	FIELD CLASSIFICATION AND REMARKS
642.05	8.7	97	94	8.7	97	84		642.05	GRAY FRESH, VERY HARD GRANITE WITH CLOSE FRACTURE SPACING, FRACTURES NEAR 90 DEGREES
640.55	10.2								GRAY FRESH, VERY HARD GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING - NEAR 90 DEGREE FRACT. ANGLE
635.55	15.2	98	85					RS-3	AS ABOVE
630.55	20.2	100	70						AS ABOVE BUT VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING WITH FRACTURE ANGLES BETWEEN 70 - 90 DEGREES
625.55	25.2			25.2				625.55	

NOTES

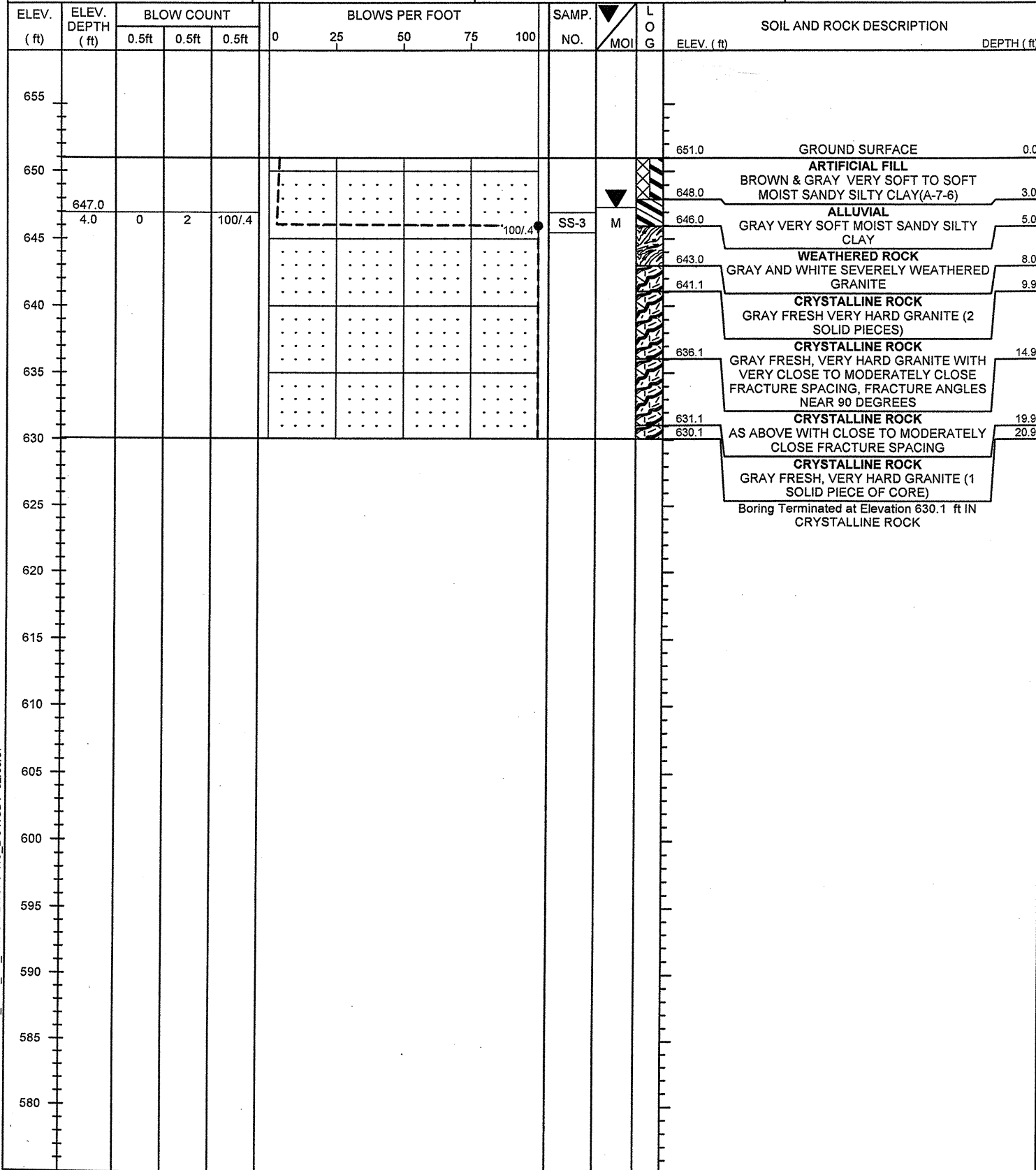
NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ NC_DOT_GDT_02/12/07

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO. 33460.1.1	ID. B-4104	COUNTY DAVIE	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION Brdg # 21 on NC 801 over Fulton Creek			GROUND WTR (ft)
BORING NO. B2-B	STATION 20+99	OFFSET 15 ft RT	ALIGNMENT -L-
COLLAR ELEV. 651.0 ft	TOTAL DEPTH 20.9 ft	NORTHING 781,028	EASTING 1,580,820
DRILL MACHINE CME-550X	DRILL METHOD NW Casing w/ Advancer	HAMMER TYPE Automatic	
START DATE 09/15/06	COMP. DATE 09/15/06	SURFACE WATER DEPTH N/A	DEPTH TO ROCK 8.0 ft

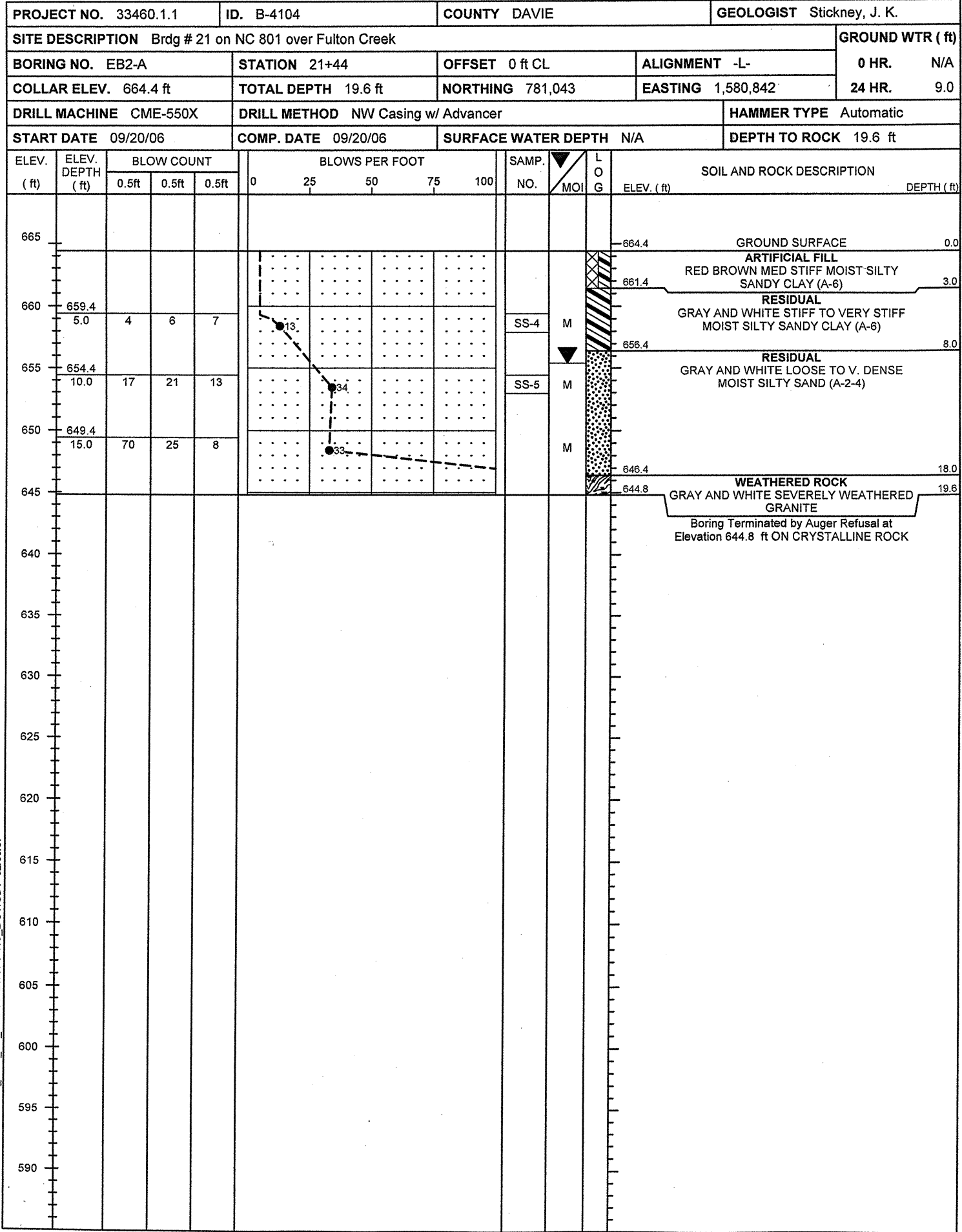
PROJECT NO: 33460.1.1 PROJECT ID: B-4104 COUNTY: DAVIE
 SITE DESCRIPTION: BRIDGE #21 ON NC 801 OVER FULTON CREEK
 BORING NO: B2-B BORING LOCATION (STA): 20+99
 COLLAR ELEV: 650.97' PERSONNEL: KEN WISE
 TOTAL DEPTH: 20.9' DRILL MACHINE: CME-550
 TOTAL RUN: 12.9' DRILL EQUIP: NW CASING / ROLLER

GEOLOGIST: J.K. STICKNEY
 DRILLER: C.L. SMITH
 OFFSET: 15' RT
 CORE SIZE: NQWL
 DATE STARTED: 9-15-06
 DATE COMPLETED: 9-15-06

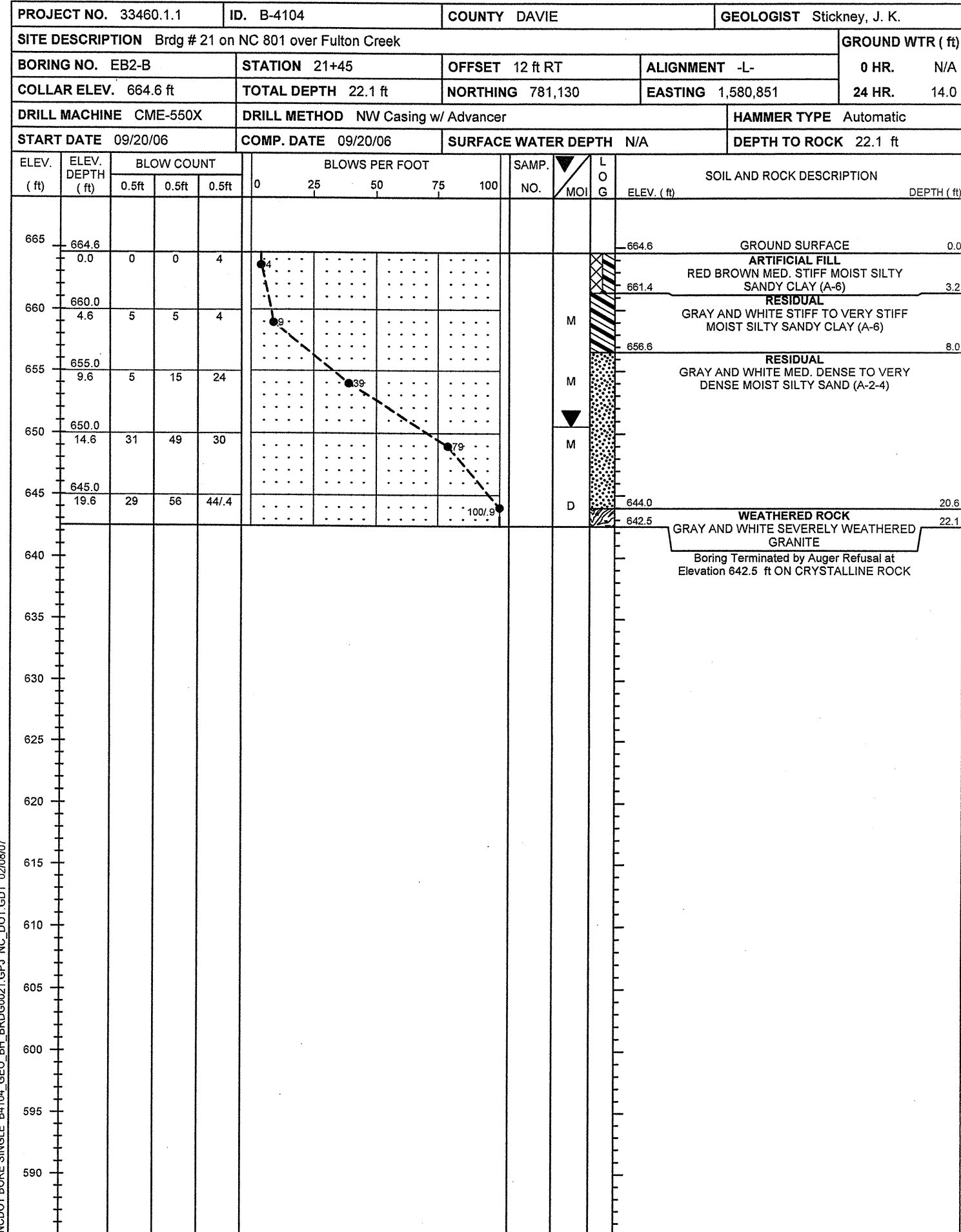


ELEV. (FT)	RUN DEPTH	RUN REC	RUN RQD	STRATA DEPTH	STRATA REC	STRATA RQD	STRATA ELEV	SAMP NO.	FIELD CLASSIFICATION AND REMARKS
651.0									GROUND SURFACE
648.0									ARTIFICIAL FILL BROWN & GRAY VERY SOFT TO SOFT MOIST SANDY SILTY CLAY(A-7-6)
646.0	8.0	81	63	8.0	94	86	642.97		ALLUVIAL GRAY VERY SOFT MOIST SANDY SILTY CLAY
643.0									WEATHERED ROCK GRAY AND WHITE SEVERELY WEATHERED GRANITE
641.1	9.9								CRYSTALLINE ROCK GRAY FRESH VERY HARD GRANITE (2 SOLID PIECES)
636.1	14.9	96	85					RS-4	CRYSTALLINE ROCK GRAY FRESH VERY HARD GRANITE WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, FRACTURE ANGLES NEAR 90°
631.1	19.9	100	96						CRYSTALLINE ROCK AS ABOVE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING
630.1	20.9	100	100						CRYSTALLINE ROCK GRAY FRESH VERY HARD GRANITE (1 SOLID PIECE OF CORE)
630.07	20.9			20.9			630.07		GRAY FRESH, VERY HARD GRANITE (1 SOLID PIECE OF CORE)

NOTES



NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ NC_DOT_GDT_02/08/07



NCDOT BORE SINGLE B4104_GEO_BH_BRD0021.GPJ NC_DOT_GDT_02/08/07

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY**

T. I. P. No. B-4104

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33460.1.1 **County** DAVIE **Owner** _____
Date: Sampled _____ **Received** 9/25/06 **Reported** 9/27/06
Sampled from BRIDGE **By** J E BEVERLY
Submitted by N WAINAINA 1995 Standard Specifications

733196 TO 733200
2/7/07

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5
Lab. Sample No.	733196	733197	733198	733199	733200
Retained #4 Sieve	19	4	-	-	8
Passing #10 Sieve	75	89	100	98	84
Passing #40 Sieve	61	65	98	80	58
Passing #200 Sieve	36	20	81	46	22

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					
Coarse Sand Ret - #60	29.9	45.5	6.1	28.9	47.6
Fine Sand Ret - #270	25.4	37.8	15.4	28.9	31.3
Silt 0.05 - 0.005 mm	18.3	12.6	33.7	11.8	11.0
Clay < 0.005 mm	26.4	4.1	44.7	30.5	10.2
Passing #40 Sieve	-	-	-	-	-
LOCATION	B1-B	FB1-A	B2-B	FB2-A	FB2-A

L. L.	37	27	44	28	25
P. I.	13	NP	17	12	NP
AASHTO Classification	A-6(1)	A-2-4(0)	A-7-6(15)	A-6(2)	A-2-4(0)
Station	20+45	19+99	20+99	21+44	21+44
	12 RT	5 LT	15 RT	C/L	C/L
Hole No.	L	L	L	L	L
Depth (Ft)	5.70	5.70	4.00	5.50	10.20
to	6.70	6.70	5.00	6.50	11.20

cc: J E BEVERLY
Soils File



FIELD SCOUR REPORT

WBS: 33460.1.1 TIP: B-4104 COUNTY: Davie

DESCRIPTION(1): Bridge #21 on NC 801 over Fulton Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
 Other (explain) _____

Bridge No.: 21 Length: 128 Total Bents: 4 Bents in Channel: 0 Bents in Floodplain: 4
 Foundation Type: RC caps at End Bents and timber piles at interior bents.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: Scour under bridge at EB2 and under protective concrete slope slab

Interior Bents: Bent 1 is washed out from surface water runoff

Channel Bed: None

Channel Bank: Stable

Extent(4): Entire embankment at EB2

Effectiveness(5): Fair - some failure under bridge

Obstructions(6): Small limbs, branches and trash at B1 and B2

INSTRUCTIONS

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, or aggrading.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoretical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): Sand, silt, cobbles and boulders

Channel Bank Material(8): silty clay (A-7-6) see SS-3

Channel Bank Cover(9): Mature trees

Floodplain Width(10): appx. 400 feet (18+50 - 22+50)

Floodplain Cover(11): Mature trees and grass

Stream is(12): Aggrading Degrading _____ Undetermined _____

Channel Migration Tendency(13): Slight to none

Observations and Other Comments: Local property owner Mr. Young said he has never seen water overtop the bridge and he has lived in the area since the 1930's.

DESIGN SCOUR ELEVATIONS(14)

Feet Meters _____

	BENTS									
	B1	B2	B3	B4						
B1-A	653									
B1-B	647									
B2-A		642.5								
B2-B		645.5								

*100 year event

Comparison of DSE to Hydraulics Unit theoretical scour:

Hydro theoretical scour at Bent 1 is 653.0' - Set DSE lower due to presence of alluvium as low as 647' at B1-B.
 Hydro theoretical scour at Bent 2 is 649.0' - Set DSE lower due to presence of alluvium as low as 642.7' at B2-A.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank									
Sample No.									
Retained #4									
Passed #10									
Passed #40									
Passed #200									
Coarse Sand									
Fine Sand									
Silt									
Clay									
LL									
PI									
AASHTO									
Station									
Offset									
Depth									

See Sheet # 16 for
"Soil Test Results"

Reported by: JKS / JEB / CBL

Date: 9/7/2006

33460.1.1 (B-4104)
DAVIE COUNTY
BRIDGE NO. 21 OVER FULTON CREEK ON NC 801

CORE PHOTOS



33460.1.1 (B-4104)
DAVIE COUNTY
BRIDGE NO. 21 OVER FULTON CREEK ON NC 801

CORE PHOTOS

