

PROJECT: 33446.1.1 ID: B-4088

SHEET NO.:

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

STRUCTURE
SUBSURFACE INVESTIGATION

STATE PROJECT: 33446.1.1 I.D. NO.: B-4088
 F.A. PROJECT: BRSTP-1615(2)
 COUNTY: CRAVEN
 PROJECT DESCRIPTION: BRIDGE 74 OVER
 MORGAN SWAMP RUN ON SR 1615

SITE DESCRIPTION:

For Letting

DRAWN BY: STEVEN V. HUDSON, P.G., CWD

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.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4088	01	25
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
33446.1.1	BRSTP-1615(2)	P.E. CONST.	

CAUTION NOTICE

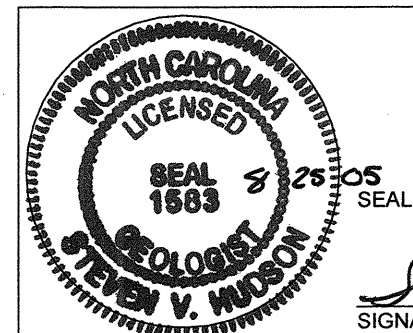
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INVESTIGATED BY: CATLIN ENGINEERS AND SCIENTISTS
 SUBMITTED BY: STEVEN V. HUDSON, P.G., CWD
 CHECKED BY: CATLIN ENGINEERS & SCIENTISTS
 DATE: July 21, 2005, Rev. August 23, 2005

PERSONNEL:
 CHARLES W. RAY
 THOMAS STETLER
 BOBBIE D FOWLER, CWD
 MICHAEL D. MASON



[Handwritten Signature]
 SIGNATURE

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, CONSISTENCY OR DENSENESS, TEXTURE OR GRAIN SIZE, SOIL MOISTURE - CORRELATION OF TERMS, PLASTICITY, COLOR, GRADATION (WELL GRADED, ANGLE OF GRAINS), ROCK DESCRIPTION (WEATHERED ROCK, CRYSTALLINE ROCK, NON-CRYSTALLINE ROCK), TERMS AND DEFINITIONS (ALLUVIUM, AQUIFER, ARENACEOUS, ARGILLACEOUS, ARTESIAN, CALCAREOUS, COLLUVIUM, CORE RECOVERY, DIKE, DIP, DIP DIRECTION, FAULT, FISSILE, FLOAT, FLOOD PLAIN, FORMATION, JOINT, LEDGE, LENS, MOTTLED, PERCHED WATER, RESIDUAL SOIL, ROCK QUALITY DESIGNATION, SAPROLITE, SILL, SLICKENSIDE, STANDARD PENETRATION TEST, STRATA CORE RECOVERY, STRATA ROCK QUALITY DESIGNATION, TOPSOIL), SOIL LEGEND AND AASHTO CLASSIFICATION (GENERAL CLASS, GRANULAR MATERIALS, SILT-CLAY MATERIALS, ORGANIC MATERIALS), CONSISTENCY OR DENSENESS (PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE), TEXTURE OR GRAIN SIZE (U.S. STD. SIEVE SIZE, BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY), SOIL MOISTURE - CORRELATION OF TERMS (SOIL MOISTURE SCALE, FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION), PLASTICITY (PLASTICITY INDEX, DRY STRENGTH), COLOR (DESCRIPTORS), GRADATION (WELL GRADED, ANGLE OF GRAINS), ROCK DESCRIPTION (WEATHERED ROCK, CRYSTALLINE ROCK, NON-CRYSTALLINE ROCK), TERMS AND DEFINITIONS (ALLUVIUM, AQUIFER, ARENACEOUS, ARGILLACEOUS, ARTESIAN, CALCAREOUS, COLLUVIUM, CORE RECOVERY, DIKE, DIP, DIP DIRECTION, FAULT, FISSILE, FLOAT, FLOOD PLAIN, FORMATION, JOINT, LEDGE, LENS, MOTTLED, PERCHED WATER, RESIDUAL SOIL, ROCK QUALITY DESIGNATION, SAPROLITE, SILL, SLICKENSIDE, STANDARD PENETRATION TEST, STRATA CORE RECOVERY, STRATA ROCK QUALITY DESIGNATION, TOPSOIL), SOIL LEGEND AND AASHTO CLASSIFICATION (GENERAL CLASS, GRANULAR MATERIALS, SILT-CLAY MATERIALS, ORGANIC MATERIALS), CONSISTENCY OR DENSENESS (PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE), TEXTURE OR GRAIN SIZE (U.S. STD. SIEVE SIZE, BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY), SOIL MOISTURE - CORRELATION OF TERMS (SOIL MOISTURE SCALE, FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION), PLASTICITY (PLASTICITY INDEX, DRY STRENGTH), COLOR (DESCRIPTORS), GRADATION (WELL GRADED, ANGLE OF GRAINS), ROCK DESCRIPTION (WEATHERED ROCK, CRYSTALLINE ROCK, NON-CRYSTALLINE ROCK), TERMS AND DEFINITIONS (ALLUVIUM, AQUIFER, ARENACEOUS, ARGILLACEOUS, ARTESIAN, CALCAREOUS, COLLUVIUM, CORE RECOVERY, DIKE, DIP, DIP DIRECTION, FAULT, FISSILE, FLOAT, FLOOD PLAIN, FORMATION, JOINT, LEDGE, LENS, MOTTLED, PERCHED WATER, RESIDUAL SOIL, ROCK QUALITY DESIGNATION, SAPROLITE, SILL, SLICKENSIDE, STANDARD PENETRATION TEST, STRATA CORE RECOVERY, STRATA ROCK QUALITY DESIGNATION, TOPSOIL)

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**BRIDGE FOUNDATION
INVESTIGATION**

Description:
Bridge 74 Over Morgan Swamp Run on SR 1615

Project Number: 33446.1.1
TIP Number: B-4088
F.A. Number: BRSTP-1615(2)
County: Craven

July 21, 2005
Rev.: August 23, 2005

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F.A. Number: BRSTP-1615(2)

County: Craven

July 21, 2005

Rev. August 23, 2005

1.0 PROJECT DESCRIPTION

1.1 PURPOSE

CATLIN Engineers and Scientists (CATLIN) was retained by the North Carolina Department of Transportation (NCDOT) Geotechnical Engineering Unit to conduct geotechnical investigations for bridge and roadway projects under an Annual Limited Services Agreement (Agreement) dated December 6, 2004. The primary purpose of this Bridge Foundation Investigation was to collect subsurface information with respect to construction design to allow NCDOT to design and ultimately construct a safe, cost effective foundation.

1.2 SITE DESCRIPTION

The proposed bridge is located in central Craven County at the site of existing NCDOT Bridge Number 74 on SR 1615 where it crosses Morgan Swamp Run, approximately four miles north of Bridgeton, North Carolina. A Site Vicinity Map is provided on the attached Sheet 08.

1.3 PROPOSED STRUCTURE

According to the site plan provided by NCDOT and personal communication, the proposed structure appears to be a three-bent, two-span configuration oriented along alignment -L- with an estimated width of 33.0 feet. The structure has been proposed with the following dimensions:

SPAN	LENGTH	BENT	SKEW
A	45.0 Feet	EB1	90°00'00"
B	45.0 Feet	B1	90°00'00"
		EB2	90°00'00"

A site plan depicting the proposed bridge layout is provided on the attached Sheet 09.

1.4 FIELD METHODS

CATLIN personnel utilized a Central Mining Equipment (CME) 45B drill rig mounted on an Ardco articulating all-terrain vehicle (ATV) to perform the drilling investigation in June of 2005. Six test borings were advanced during this investigation. Boring depths ranged from 45.0 feet (ft) to 50ft. below land surface (BLS). Collar elevations ranged from 7.8 ft. to 17.6 above mean sea level (MSL). Borings were advanced along the exterior edges of the three proposed bents. Two of the six boring were advanced through the existing Bridge 74 bridge deck within access holes cut by local NCDOT Bridge Maintenance personnel. While drilling activities were conducted, traffic control and lane closure was conducted by NCDOT Bridge Maintenance personnel to facilitate field activities.

Proposed boring locations were horizontally located in the field by CATLIN personnel utilizing a Trimbel Global Positioning System (GPS) in conjunction with a TSC1 data logger. Traditional surveying techniques were used to established vertical control in addition to substantiating the boring locations as determined with the GPS.

The North Carolina Geodetic Survey (NCGS) monument "ROWES AS MK" was utilized as a temporary benchmark and subsequently referenced to NCDOT survey point "BL-2" located at northing 525234.4 and easting 2596830.7 with an elevation of 17.5 (17.53 stated elevation) feet.

Borings were advanced using mud rotary drilling techniques. While mud rotary drilling techniques were implemented, the field geologist routinely checked the viscosity, density, and temperature of the drilling fluid. Viscosity was checked using a Marsh funnel viscometer, and density was checked using a mud balance. Viscometer times ranged from 50 to 60 seconds, while densities averaged 9.43 pounds per gallon (lbs/gal). Standard Penetration Testing (SPT) was performed in accordance with American Association of State Highway and Transportation Officials (AASHTO) Standard Method T206-87 using a 140-pound manually advanced hammer. The project geologist visually described soil samples in the field using AASHTO Designation M145-91. All SPT results and sample descriptions were recorded in the field on modified NCDOT field boring logs.

Two undisturbed soil samples were collected using three-inch inner diameter thin-walled sampling tubes (Shelby tubes) in accordance with AASHTO Standard Method T 207. One sample, ST-01 was collected from the creek bottom in boring B1-B from 0.0 to 2.0 feet below the mud line (elevation 8.0ft to 6.0ft MSL). The second sample, ST-02, was collected from a depth of 20.0 to 22.0 feet BLS (elevation -2.7ft to -0.7ft MSL) from boring EB2B.

Two additional hand-augered borings were advanced to approximately one foot BLS to obtain representative samples of the stream bank and bed material.

Where possible, water level measurements were taken in open boreholes a minimum of 24 hours after completion of the borings. Unless otherwise noted, fieldwork was conducted in accordance with NCDOT *Geotechnical Unit Guidelines and Procedures Manual for Subsurface Investigations*

1.5 LABORATORY TESTING

To confirm the field geologist's observations and to assist in soil classifications, laboratory testing was performed on 18 soil samples collected from the split-spoon samplers in addition to the two samples collected via hand-auger. Atterberg limits (when applicable), moisture content, grain size analysis, and AASHTO Classification (as modified by NCDOT) were completed by the CATLIN Geotechnical Laboratory. Results of the laboratory analysis of site soils are provided on Sheets 22 and 23. Selection of samples for laboratory analysis was based on representation of the predominant, unconsolidated, lithologic units encountered. The analyses performed on the selected soil samples are listed as follows:

AASHTO Method	Description of Test
T 87-86	Dry Preparation of Disturbed Soil*
T 88-90	Particle Size Analysis*
T 89-90	Liquid Limit*
T 90-87	Plastic Limit*

* as modified by NCDOT

Laboratory analysis of the Shelby tube samples was completed by NCDOT Materials and Testing Unit located in Raleigh, North Carolina. Sample ST-01 was laboratory analyzed by an Erosion Function Apparatus (EFA). Sample ST-02 was analyzed for consolidation per AASHTO T-216.

2.0 PHYSIOGRAPHY AND GEOLOGY

2.1 REGIONAL GEOLOGY

The area of investigation lies within the Coastal Plain physiographic province. The North Carolina Coastal Plain is approximately 90 to 150 miles wide from the Atlantic Ocean westward to its boundary with the Piedmont Province. Two natural subdivisions of the Coastal Plain were described by Stuckey (1965): The Tidewater region and the Inner Coastal Plain. The project area is located within the Tidewater region, which consists of the Coastal area where large streams and many tributaries are affected by ocean tides. The Tidewater region generally exhibits low relief and is often swampy in low-lying areas.

The Coastal Plain comprises a wedge shaped sequence of stratified marine and non-marine sedimentary rocks deposited on crystalline basement. The sedimentary sequences range in age from Recent to lower Cretaceous.

The crystalline basement rocks in the New Bern area are overlain by 700 to 1,800 feet of unconsolidated sediments. The surficial Quaternary age deposits range from 23 to 80 feet. These deposits are underlain by Pliocene age sediments of the Yorktown Formation and Oligocene age materials of the River Bend Formation. Underlying Cretaceous age rocks range in thickness from 700 to more than 1,400 feet and include the Peedee, Black Creek, and upper and lower Cape Fear Formations (Winner Jr., and Coble, 1989).

2.2 SITE TOPOGRAPHY AND GEOMORPHOLOGY

The project site is located within a flood plain associated with Morgan Swamp Run. The flood plain is approximately 900 feet wide, extending approximately 500 feet to the north-northeast and 400 feet to the south-southwest of Bridge 74. Relief in the immediate area is limited to the roadway embankment along existing SR 1615. The land surface within the flood plain is vegetated with lowland hardwoods and brush. Predominant land use beyond the flood plain consists of rural residential and agricultural. A beaver dam was identified approximately 45 feet west-northwest (upstream) of the project site. The dam appeared to be approximately three to five feet in height. Water depth within Morgan Swamp Run at the time of the investigation was approximately three feet deep and the water surface was located 10 feet below the bridge deck. Water velocity was very low to stationary during the length of the field investigation. No visible evidence suggested that there are great fluctuations in velocity. However, due to the width of the flood plain with relation to the bridge width, increases in velocity are likely during times of increased rainfall and flooding.

3.0 FOUNDATION MATERIALS

Sample descriptions along with laboratory soil analysis of SPT samples collected during the advancement of the soil borings were utilized in compiling the subsurface geologic descriptions. The following is a bent-by-bent description of the lithologic units encountered during the field investigation. Boring logs are included on Sheets 13 through 19. A geologic profile constructed 17 feet right of -L- is included on Sheet 10.

END BENT 1

Borings EB1A and EB1B were installed within the floodplain at the location of the proposed End Bent 1. Borings were advanced to 50ft BLS to an elevation of approximately -32.5ft MSL. Three feet of roadway embankment consisting of fine-grained, medium stiff sandy silt (A-4) extended from the ground surface (EB1A collar elevation of 17.6ft and EB1B collar elevation of 17.5ft) to an average elevation 14.5ft. Alluvial material consisting of loose to very loose, silty to clayey, fine to coarse grained sand (A-2-4) was encountered beneath the roadway embankment to an average elevation of 10.8ft. A fine-grained, medium stiff to soft, sandy silt (A-4) was identified beneath the A-2-4 material to an average elevation of 5.5ft. Loose to medium dense, poorly graded fine sand (A-2-4) with trace clay and little coarse sand underlie the A-4 material to an average elevation of -0.5ft. Sediments of the Pliocene age Yorktown Formation were identified at an average elevation of -0.5ft. This material consisted of approximately 6.5ft of very soft to soft silty clay (A-6) with medium plasticity and fine to coarse sand. Three feet of very loose silty, fine-grained sand (A-2-4) extended from the base of the clay to an elevation of -10.0ft. Medium dense to dense sand (A-3) was revealed from beneath the silty sand to an average elevation of -24ft. Silty to clayey, medium dense to dense shell fragments with fine-grained sand (A-1-b) and medium dense poorly graded fine-grained sand with shell fragments (A-3) lie beneath the A-3 sediments to the boring terminations. A geologic section through End Bent 1 is presented on Sheet 11.

BENT 1

Borings B1A (collar elevation 7.8 ft) and B1B (collar elevation 8.0ft) were advanced through the creek bed to an average elevation of -37.1ft. Alluvial sediments consisting of medium dense to loose fine sand and silty fine to coarse sand (A-2-4) were encountered from the mud line to an elevation of 3.0ft in B1B and medium stiff fine-grained sandy silt with clay (A-4) were identified from the mud line to an elevation of 0.2ft in B1B. Very soft to stiff clays (A-6) of the Yorktown Formation, similar to those beneath End Bent 1, were identified from elevation 3.0ft to -6.5ft in B1A and 0.2ft to -8.2ft in B1B. Sand ranging from loose, silty, fine-grained clayey sand (A-2-4) to medium dense to dense, coarse to fine-grained sand with trace clay (A-3 and (A-1-b) extended from below the clay layer to an elevation of approximately -25ft. Medium dense to dense sand with varying amounts of shell fragments underlie the sand to an elevation of -32.2ft in boring B1A and -34.0ft in B1B. Stiff silty clay (A-7) with medium plasticity was identified beneath the shelly sand layer to the borings termination at elevations of -37.2ft and -37.0ft in B1A and B1B, respectively. A geologic section through Bent 1 is presented on Sheet 11.

END BENT 2

Borings EB2A (collar elevation 17.1ft) and EB2B (collar elevation 17.3ft) were advanced within the floodplain at the proposed location of End Bent 2. Roadway embankment consisting of medium stiff sandy silt (A-4) extended from land surface to an average elevation of 14.2ft. The embankment material is underlain by alluvial sandy silt (a-4) material that appears to have been the source for the embankment material. Loose to medium dense clayey to silty fine-grained sand (A-2-4) was encountered beneath the alluvial sandy silt in borings EB2A and EB2B to elevations of -0.9ft and -0.7ft, respectively. Very soft to soft silty, fine-grained sandy clay with medium plasticity (A-6) of the Yorktown Formation was documented beneath the alluvium. The clay was approximately ten feet thick in EB1A and eight feet thick in EB2B. Dense to medium dense, fine to coarse-grained sand (A-3) extended to an approximate average elevation of -24ft in both borings. Loose to medium dense, clayey, coarse-grained shell fragments with fine sand (A-1-b) was identified beneath the A-3 material to the boring termination elevation of -27.9ft in boring EB2A and to an elevation of -29.7ft in EB2B. Fine to coarse-grained sand with some shell fragments (A-3) extended beneath the A-1-b material in boring EB2B to the boring termination elevation of -32.7ft. A geologic section through End Bent 2 is presented on Sheet 12.

4.0 ROCK PROPERTIES

No indurated or semi-indurated rock was encountered during the investigation.

5.0 GROUNDWATER

Groundwater beneath the subject site was measured at the 24-hour gauging events at an average elevation of approximately four feet beneath proposed End Bent 1 and seven feet beneath End Bent 2. Based on the lithology encountered beneath the site and the geomorphology of the immediate surrounding area, two aquifers appear to be present with the depth of the investigation. The unconfined surficial aquifer which extends from land surface to an elevation of approximately zero to three feet, and the Castle Hayne Aquifer which includes the Yorktown Formation. The clay unit identified at an elevation ranging from approximately zero to three feet is believed to be the confining unit that designates the upper portion of the Castle Hayne Aquifer in the area. The elevation of Morgan Swamp Run water level at the time of the investigation was approximately 11.5 feet. The elevation of the Run surface as compared to the 24-hour groundwater measurements within the borings indicates that the clay layer identified beneath the site at an average elevation of zero is an active confining unit or aquitard to the underlying Castle Hayne Aquifer. The difference in hydraulic head between the Run surface and 24-hour depth to water measurements in the borings additionally indicates a negative vertical gradient between the two aquifers. A negative vertical gradient suggests the potential for downward migration of surficial groundwater to the underlying aquifers.

6.0 CONSTRUCTION CONSIDERATIONS

A beaver dam is located approximately 45 feet west-northwest (upstream) of the existing bridge. No beavers were observed during the filed investigation. However, based on the condition of the dam, the beavers appear to be actively maintaining the structure.

7.0 CLOSING STATEMENTS

The geotechnical foundation investigation, analysis, and conclusions included in this report are based on verbal communication with NCDOT personnel and a proposed bridge layout drawing supplied by NCDOT.

If any significant changes are made in the design or location of the proposed structure, the subsurface information and conclusions will have to be reviewed and modified as necessary.

8.0 REFERENCES

American Association of State Highway and Transportation Officials, The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes, AASHTO Designation M145-91.

American Association of State Highway and Transportation Officials, Standard Specifications for Transportation Materials and Methods for Sampling and Testing, 17th Ed., Penetration Test and Split-Barrel Sampling of Soils, AASHTO Designation T206-87.

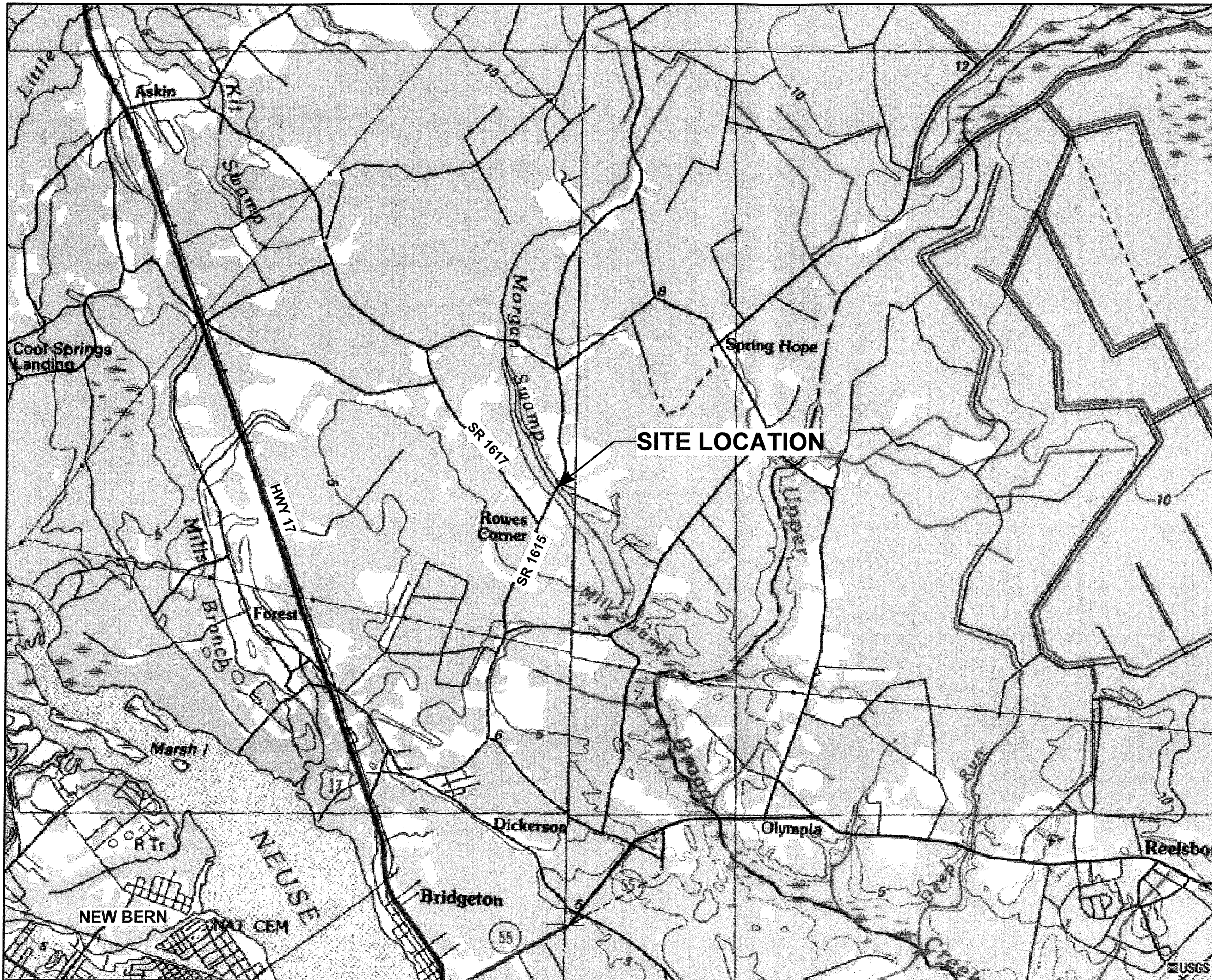
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State of North Carolina Department of Transportation, Geotechnical Unit Guidelines and Procedures Manual for Subsurface Investigations, Revised March 1994, Volume No. 203.

Stuckey, J.L., 1965, North Carolina: Its Geology and Mineral Resources; North Carolina Department of Conservation & Development, Raleigh, North Carolina, 550 pp.

Winner, Jr., M.D., and Coble, R.W., 1989, Hydrogeologic Framework of the North Carolina Coastal Plain Aquifer System; US Geological Survey, Open File Report 87-690, 150 pp.

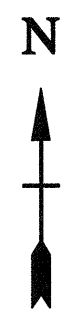


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	T.I.P. NO.: B-4088	TOTAL SHEETS: 25
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	COUNTY: CRAVEN	

SCALE: 1000 1000 0 2000 FEET

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**ASKIN AND REELSBORO
USGS TOPOGRAPHICAL
QUADRANGLES
CRAVEN COUNTY, NORTH CAROLINA**



ASKIN QUADRANGLE

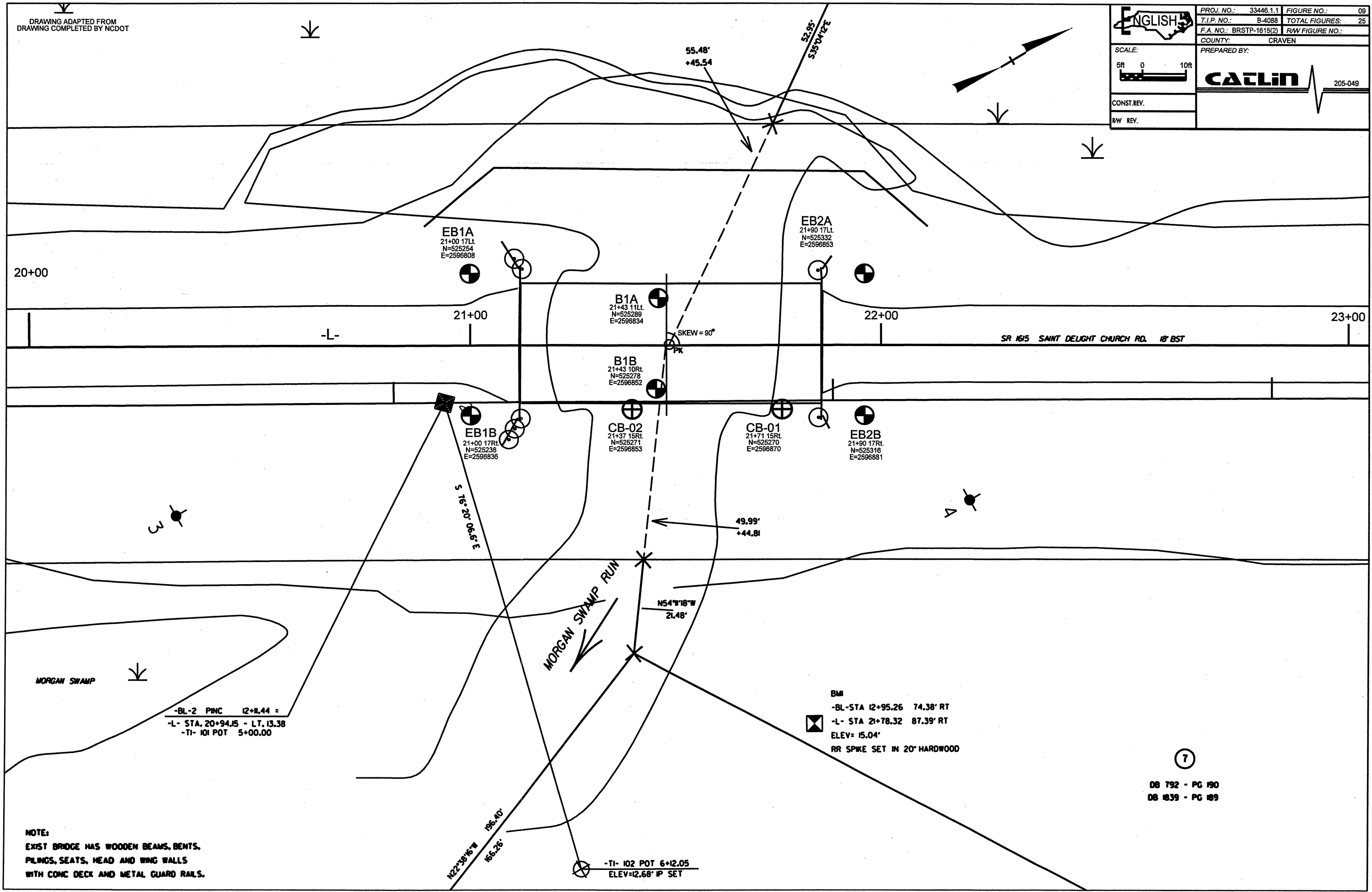
REELSBORO QUADRANGLE

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PROJ. NO.:	33446.1.1	FIGURE NO.:	09
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PREPARED BY:	CAELIN		
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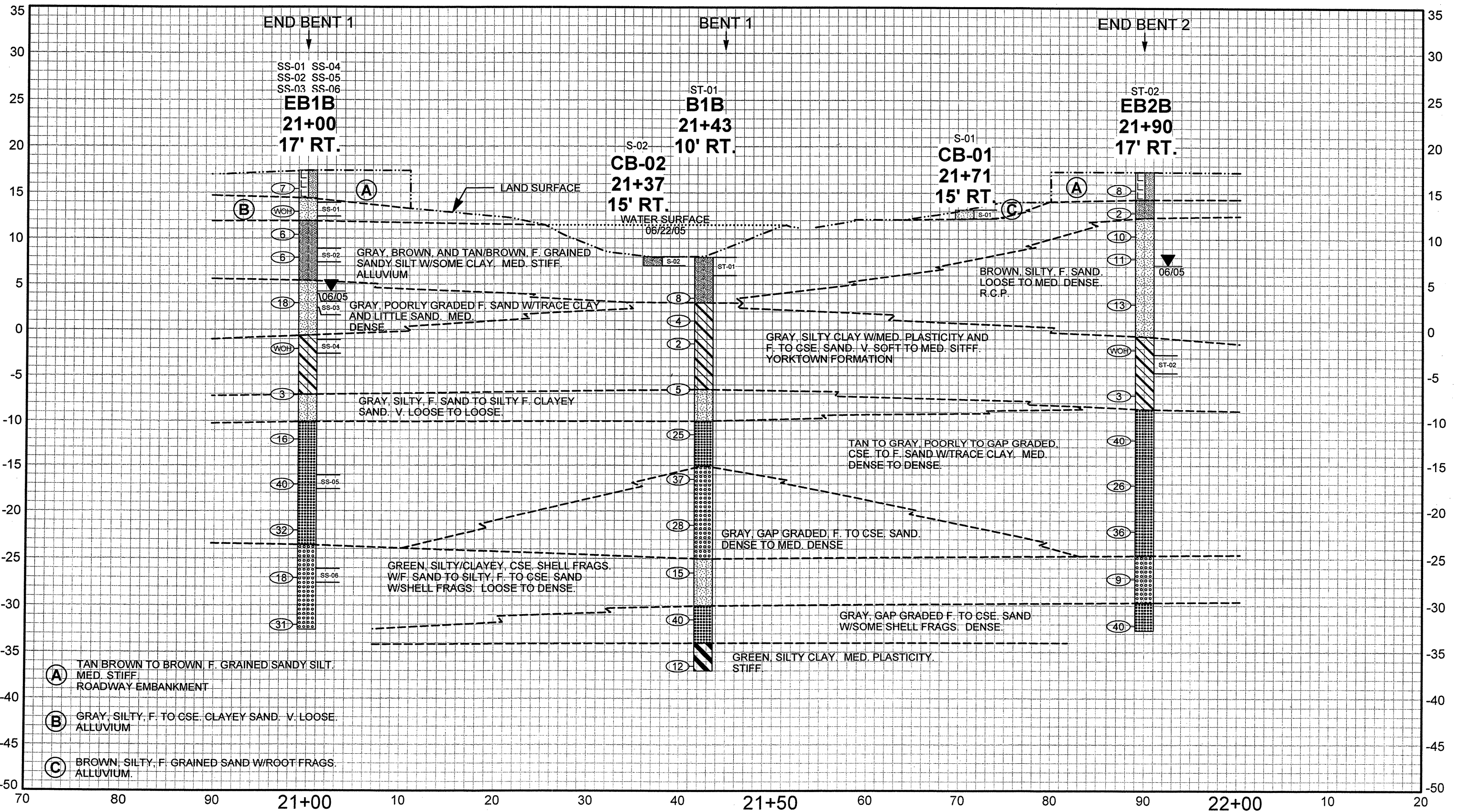


NOTE:
EXIST BRIDGE HAS WOODEN BEAMS, BENTS,
PLINGS, SEATS, HEAD AND WING WALLS
WITH CONC DECK AND METAL GUARD RAILS.

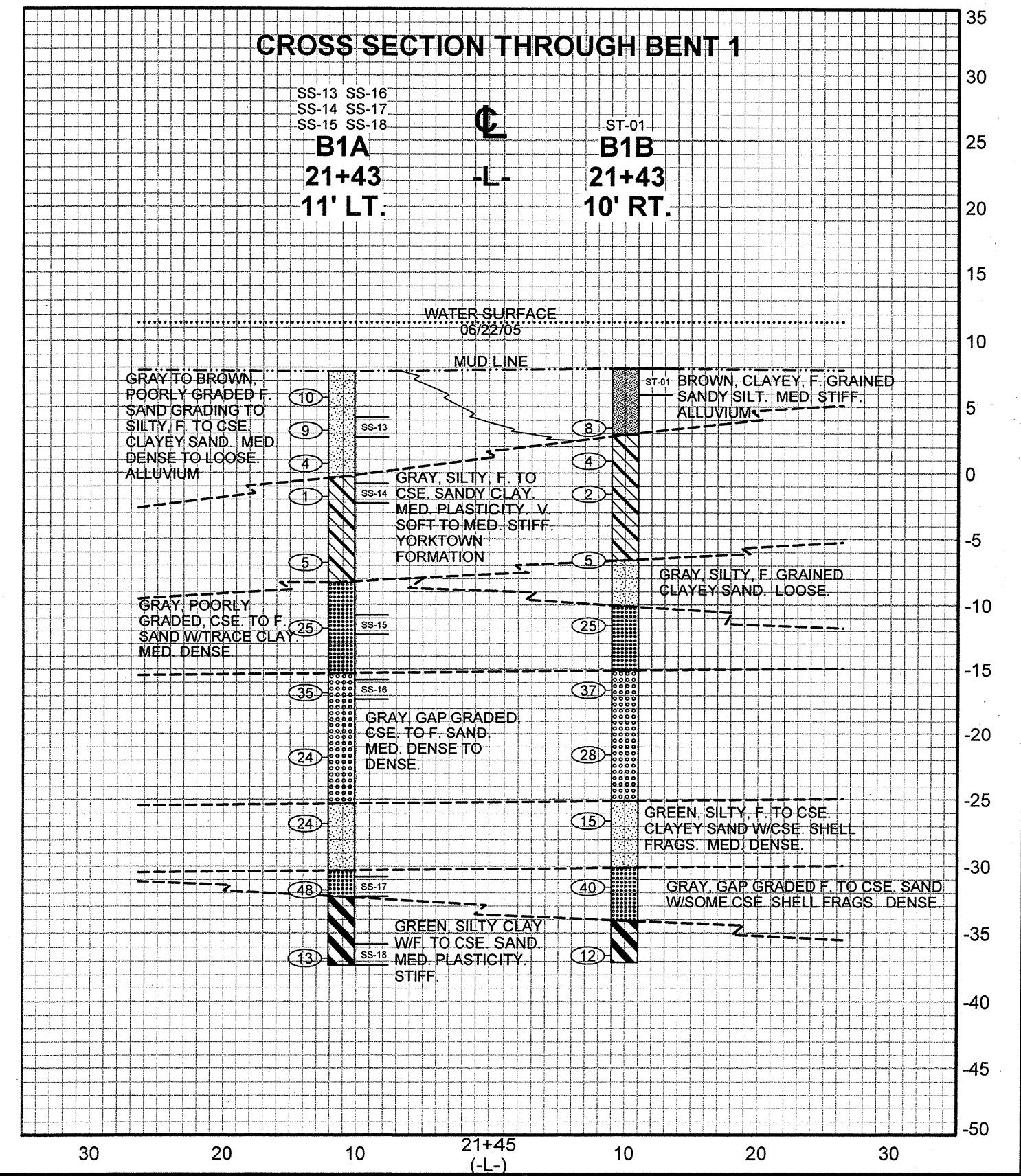
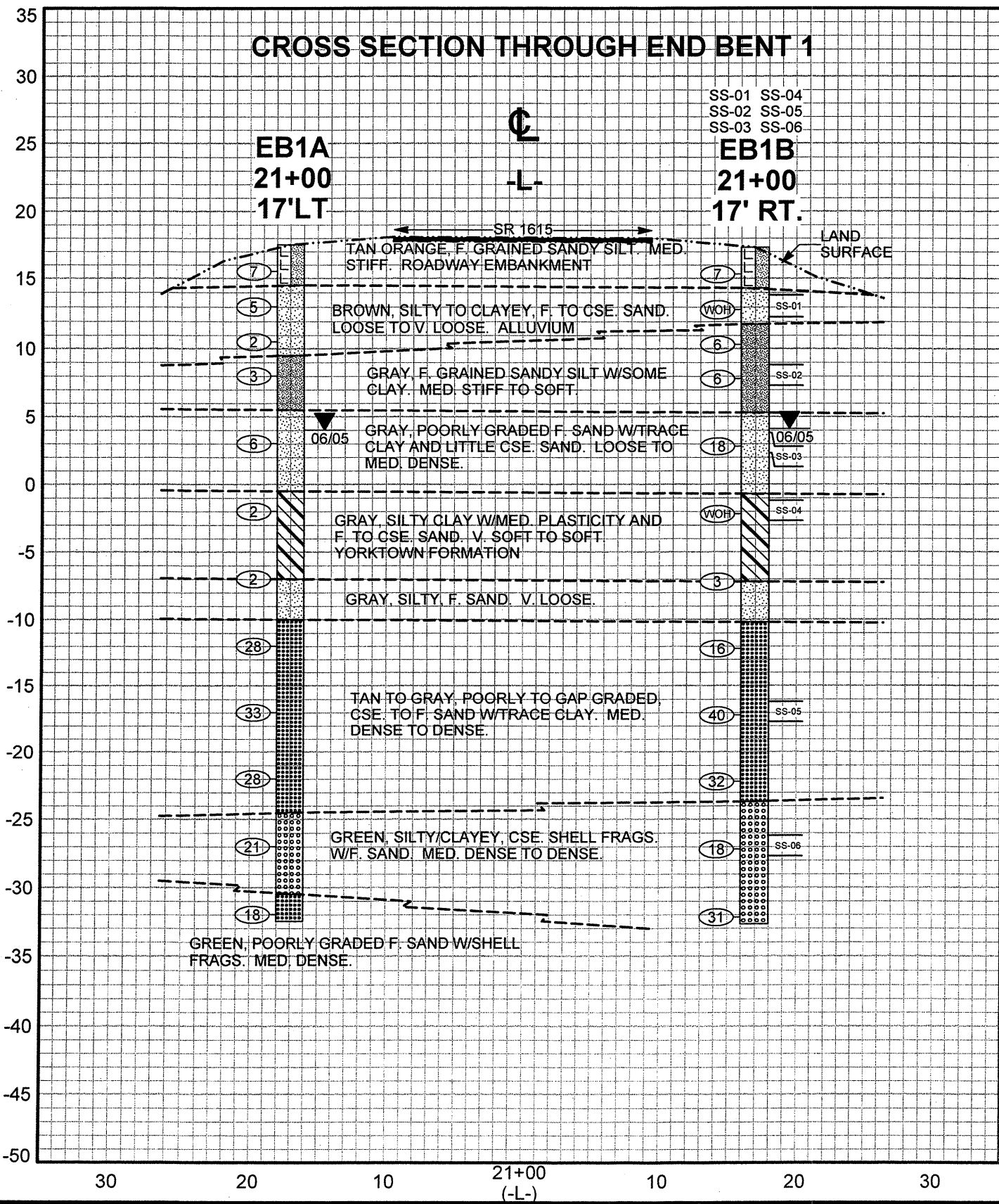
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PROFILE: 17Ft. RIGHT OF -L-

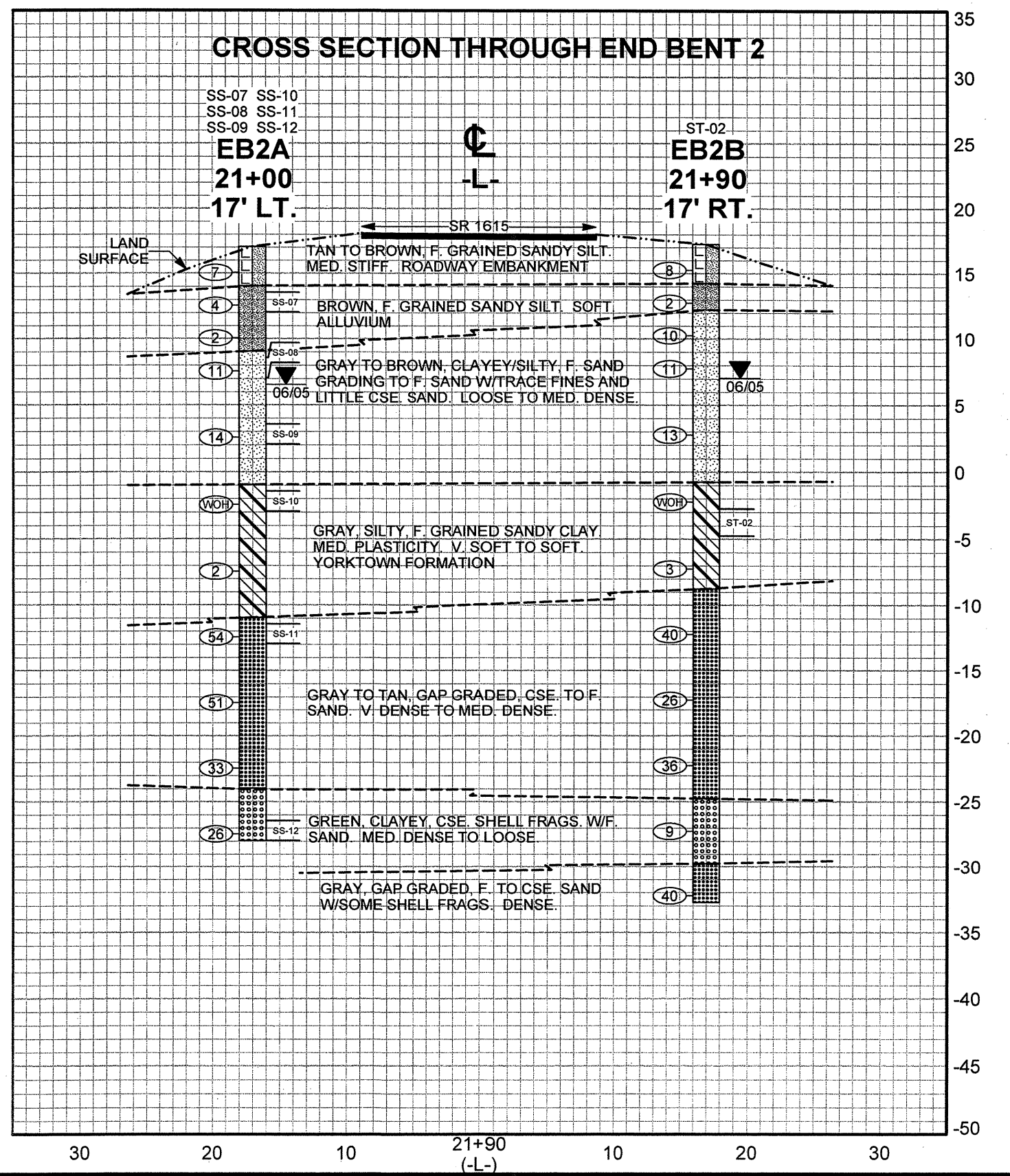
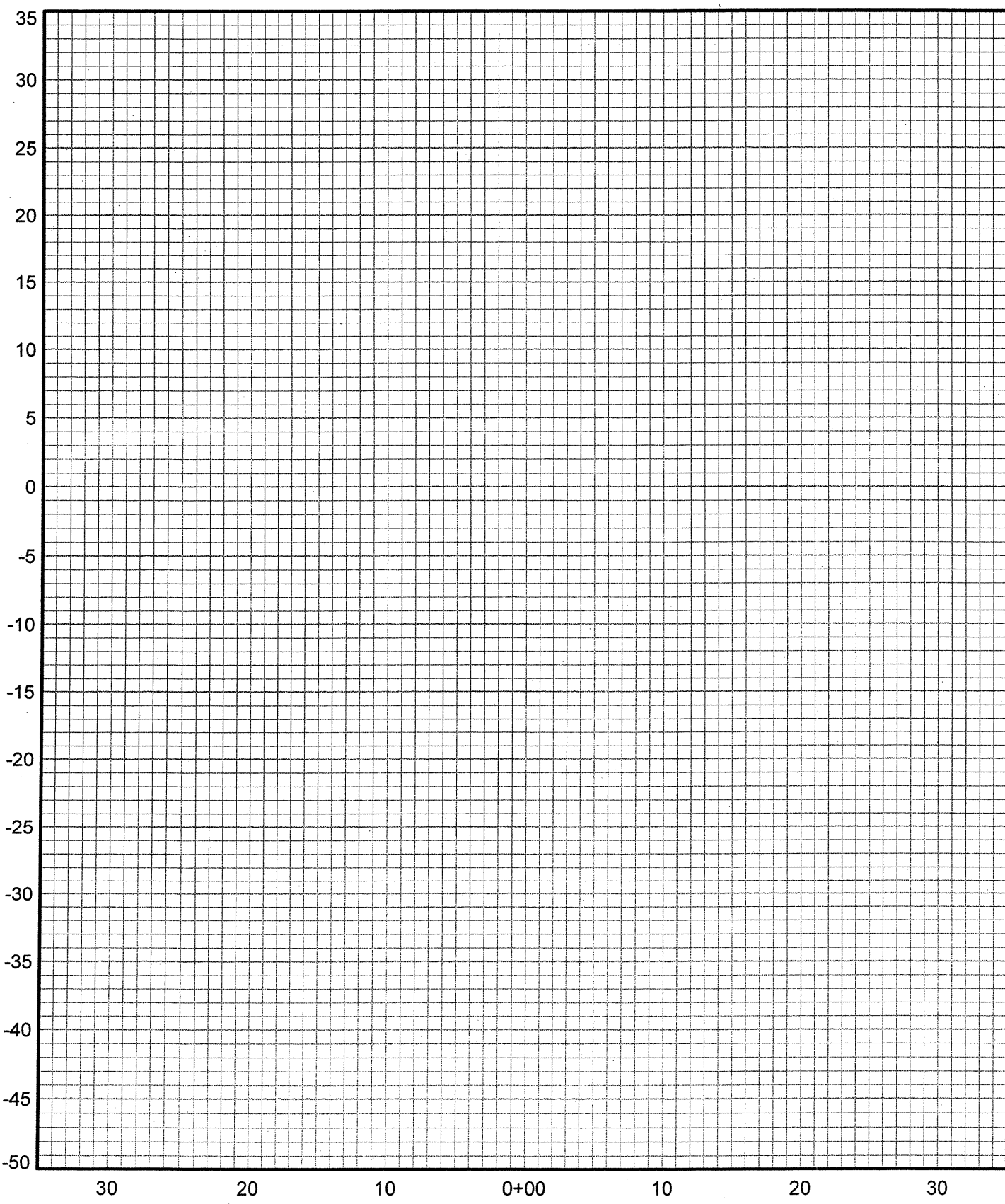
DESCRIPTION: BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615		PROJ. NO.: 33446.1.1 SHEET NO.: 10
		T.I.P. NO.: B-4088 TOTAL SHEETS: 25
	ENGLISH	F.A. NO.: BRSTP-1615(2) RW SHEET NO.:
	SCALE: VERTICAL AND HORIZONTAL: 1" = 10'	COUNTY: CRAVEN
	CONST. REV.	 205-049 ENGINEERS and SCIENTISTS
	R/W REV.	



- (A) TAN BROWN TO BROWN, F. GRAINED SANDY SILT, MED. STIFF, ROADWAY EMBANKMENT
- (B) GRAY, SILTY, F. TO CSE. CLAYEY SAND, V. LOOSE, ALLUVIUM
- (C) BROWN, SILTY, F. GRAINED SAND W/ROOT FRAGS, ALLUVIUM



DESCRIPTION: BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615		PROJ. NO.: 33446.1.1 SHEET NO.: 12
		T.I.P. NO.: B-4088 TOTAL SHEETS: 25
	SCALE: VERTICAL AND HORIZONTAL: 1" = 10'	F.A. NO.: BRSTP-1615(2) R/W SHEET NO.:
	CONST. REV.	COUNTY: CRAVEN
	R/W REV.	 205-049 ENGINEERS and SCIENTISTS
		Wilmington, North Carolina





NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

PROJECT NO. 33446.1.1		ID. B-4088		COUNTY CRAVEN		GEOLOGIST Charles Ray							
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615							GROUND WATER (ft)						
BORING NO. EB1A		BORING LOCATION 21+00		OFFSET 17ft Lt		ALIGNMENT -L-							
COLLAR ELEV. 17.6		NORTHING 525,254		EASTING 2,596,808		24 HR. 13.5							
TOTAL DEPTH 50.0 ft		DRILL MACHINE CME 45B ATV		DRILL METHOD Mud Rotary		HAMMER TYPE Manual							
DATE STARTED 6/29/05		COMPLETED 6/29/05		CORE BARREL TYPE NA		SURFACE WATER DEPTH NA							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
													LAND SURFACE
16.6	1.0	2	3	4								DRY	Tan orange, CLAYEY, f. grained SANDY SILT. Med. stiff. ROADWAY EMBANKMENT
14.1	3.5	WOH	2	3								DRY	Brown, SILTY, f. SAND. Loose to v. loose. ALLUVIUM
11.6	6.0	WOH	1	1								MOI	
9.1	8.5	WOH	1	2								MOI	Gray, f. grained SANDY SILT w/some clay. Soft.
4.1	13.5		4	3	3							SAT	Gray, SILTY, f. SAND. Loose.
-0.9	18.5	WOH	1	1								SAT	Gray, SILTY CLAY w/med. plasticity. Soft. YORKTOWN FORMATION
-5.9	23.5		1	1	1							SAT	Gray, SILTY, f. SAND. V. loose.
-10.9	28.5												

CATLIN PROJECT NO.: 205-049 NCDOT BRIDGE 74 GPT. NC. DOT GDI 07/19/05



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

PROJECT NO. 33446.1.1		ID. B-4088		COUNTY CRAVEN		GEOLOGIST Charles Ray							
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615							GROUND WATER (ft)						
BORING NO. EB1A		BORING LOCATION 21+00		OFFSET 17ft Lt		ALIGNMENT -L-							
COLLAR ELEV. 17.6		NORTHING 525,254		EASTING 2,596,808		24 HR. 13.5							
TOTAL DEPTH 50.0 ft		DRILL MACHINE CME 45B ATV		DRILL METHOD Mud Rotary		HAMMER TYPE Manual							
DATE STARTED 6/29/05		COMPLETED 6/29/05		CORE BARREL TYPE NA		SURFACE WATER DEPTH NA							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
													Continued from previous page
-15.9	33.5	6	12	16								SAT	
-20.9	38.5	10	14	19								SAT	Gray, poorly to gap graded, f. SAND grading to f. to cse. sand. Med. dense to dense. (continued)
-25.9	43.5	9	14	14								SAT	
-30.9	48.5	4	8	13								SAT	Green, SILTY/CLAYEY, cse. SHELL FRAGS w/f. sand. Med. dense.
		4	8	10								SAT	Green, poorly graded f. SAND w/shell frags. Med. dense.
													Boring Terminated at Elevation -32.4 ft in green, poorly graded f. SAND w/shell frags. Med. dense. YORKTOWN FORMATION

PROJ. NO.: 33446.1.1 SHEET NO.: 13
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN





NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

PROJECT NO. 33446.1.1		ID. B-4088		COUNTY CRAVEN		GEOLOGIST Charles Ray							
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615							GROUND WATER (ft)						
BORING NO. EB1B		BORING LOCATION 21+00		OFFSET 17ft Rt		ALIGNMENT -L-							
						0 HR. 10.0							
COLLAR ELEV. 17.4		NORTHING 525,238		EASTING 2,596,836		24 HR. 13.2							
TOTAL DEPTH 50.0 ft		DRILL MACHINE CME 45B ATV		DRILL METHOD Mud Rotary		HAMMER TYPE Manual							
DATE STARTED 6/28/05		COMPLETED 6/28/05		CORE BARREL TYPE NA		SURFACE WATER DEPTH NA							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
													LAND SURFACE
16.4	1.0	4	4	3								DRY	Brown, f. grained SANDY SILT. Med. stiff. ROADWAY EMBANKMENT
13.9	3.5	WOH	WOH	WOH							SS-01	MOI	Gray, SILTY, f. to cse. CLAYEY SAND. V. loose. ALLUVIUM
11.4	6.0	WOH	2	4								MOI	
8.9	8.5	1	2	4							SS-02	WET	Gray, f. grained SANDY SILT w/some clay. Med. stiff.
3.9	13.5	7	10	8							SS-03	WET	Gray, poorly graded f. SAND w/trace clay and little cse. sand. Med. dense.
-1.1	18.5	WOH	WOH	WOH								SAT	Gray, SILTY CLAY w/med. plasticity and f. to cse. sand. V. soft. YORKTOWN FORMATION
-6.1	23.5	WOH	1	2								SAT	Gray, SILTY, f. SAND. V. loose.
-11.1	28.5												



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

PROJECT NO. 33446.1.1		ID. B-4088		COUNTY CRAVEN		GEOLOGIST Charles Ray							
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615							GROUND WATER (ft)						
BORING NO. EB1B		BORING LOCATION 21+00		OFFSET 17ft Rt		ALIGNMENT -L-							
						0 HR. 10.0							
COLLAR ELEV. 17.4		NORTHING 525,238		EASTING 2,596,836		24 HR. 13.2							
TOTAL DEPTH 50.0 ft		DRILL MACHINE CME 45B ATV		DRILL METHOD Mud Rotary		HAMMER TYPE Manual							
DATE STARTED 6/28/05		COMPLETED 6/28/05		CORE BARREL TYPE NA		SURFACE WATER DEPTH NA							
ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80				100
													Continued from previous page
-16.1	33.5	4	7	9								SAT	
		8	17	23								SS-05	Tan to gray, poorly to gap graded, cse. to f. SAND w/trace clay. Med. dense to dense. (continued)
-21.1	38.5	11	14	18								SAT	
-26.1	43.5	6	8	10								SS-06	Green, SILTY/CLAYEY, cse. SHELL FRAGS. w/f. sand. Med. Dense to dense.
-31.1	48.5	12	15	16								SAT	Boring Terminated at Elevation -32.6 ft in green, SILTY/CLAYEY, cse. SHELL FRAGS. w/f. sand. Med. Dense to dense. YORKTOWN FORMATION



PROJ. NO.: 33446.1.1 SHEET NO.: 14
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2) RAW SHEET NO.:
COUNTY: CRAVEN

NCDOT BORE LOG # 205-049 NC DOT GDT 07/19/05



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

Table with project metadata: PROJECT NO. 33446.1.1, ID. B-4088, COUNTY CRAVEN, GEOLOGIST Charles Ray, SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615, BORING NO. B1A, BORING LOCATION 21+43, OFFSET 11ft Lt, ALIGNMENT -L-, COLLAR ELEV. 7.8, NORTHING 525,289, EASTING 2,596,834, TOTAL DEPTH 45.0 ft, DRILL MACHINE CME 45B ATV, DRILL METHOD Mud Rotary, HAMMER TYPE Manual, DATE STARTED 6/29/05, COMPLETED 6/29/05, CORE BARREL TYPE NA, SURFACE WATER DEPTH 3.0

Main data table for Sheet 1. Columns include ELEV., DEPTH, BLOW COUNT (0.5ft, 0.5ft, 0.5ft), BLOWS PER FOOT (0, 20, 40, 60, 80, 100), SAMP. NO., LOG (MOI), and SOIL AND ROCK DESCRIPTION. Includes soil descriptions like 'Gray to brown, poorly graded f. SAND grading to SILTY, f. to cse. CLAYEY SAND. Med. dense to loose. ALLUVIUM' and 'Gray, SILTY, f. to cse. SANDY CLAY. Med. plasticity. V. soft. YORKTOWN FORMATION'.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

Table with project metadata (continued): PROJECT NO. 33446.1.1, ID. B-4088, COUNTY CRAVEN, GEOLOGIST Charles Ray, SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615, BORING NO. B1A, BORING LOCATION 21+43, OFFSET 11ft Lt, ALIGNMENT -L-, COLLAR ELEV. 7.8, NORTHING 525,289, EASTING 2,596,834, TOTAL DEPTH 45.0 ft, DRILL MACHINE CME 45B ATV, DRILL METHOD Mud Rotary, HAMMER TYPE Manual, DATE STARTED 6/29/05, COMPLETED 6/29/05, CORE BARREL TYPE NA, SURFACE WATER DEPTH 3.0

Main data table for Sheet 2. Columns include ELEV., DEPTH, BLOW COUNT, BLOWS PER FOOT, SAMP. NO., LOG, and SOIL AND ROCK DESCRIPTION. Includes soil descriptions like 'Gray, poorly graded, cse. to f. SAND w/trace clay. Med. dense. (continued)', 'Gray, gap graded, cse. to f. SAND. Dense.', and 'Green, SILTY, f. to cse. CLAYEY SAND w/cse. shell frags. Med. dense.' Boring terminated at elevation -37.2 ft.

Project info table: PROJ. NO.: 33446.1.1 SHEET NO.: 15, T.I.P. NO.: B-4088 TOTAL SHEETS: 25, F.A. NO.: BRSTP-1615(2) R/W SHEET NO.: COUNTY: CRAVEN

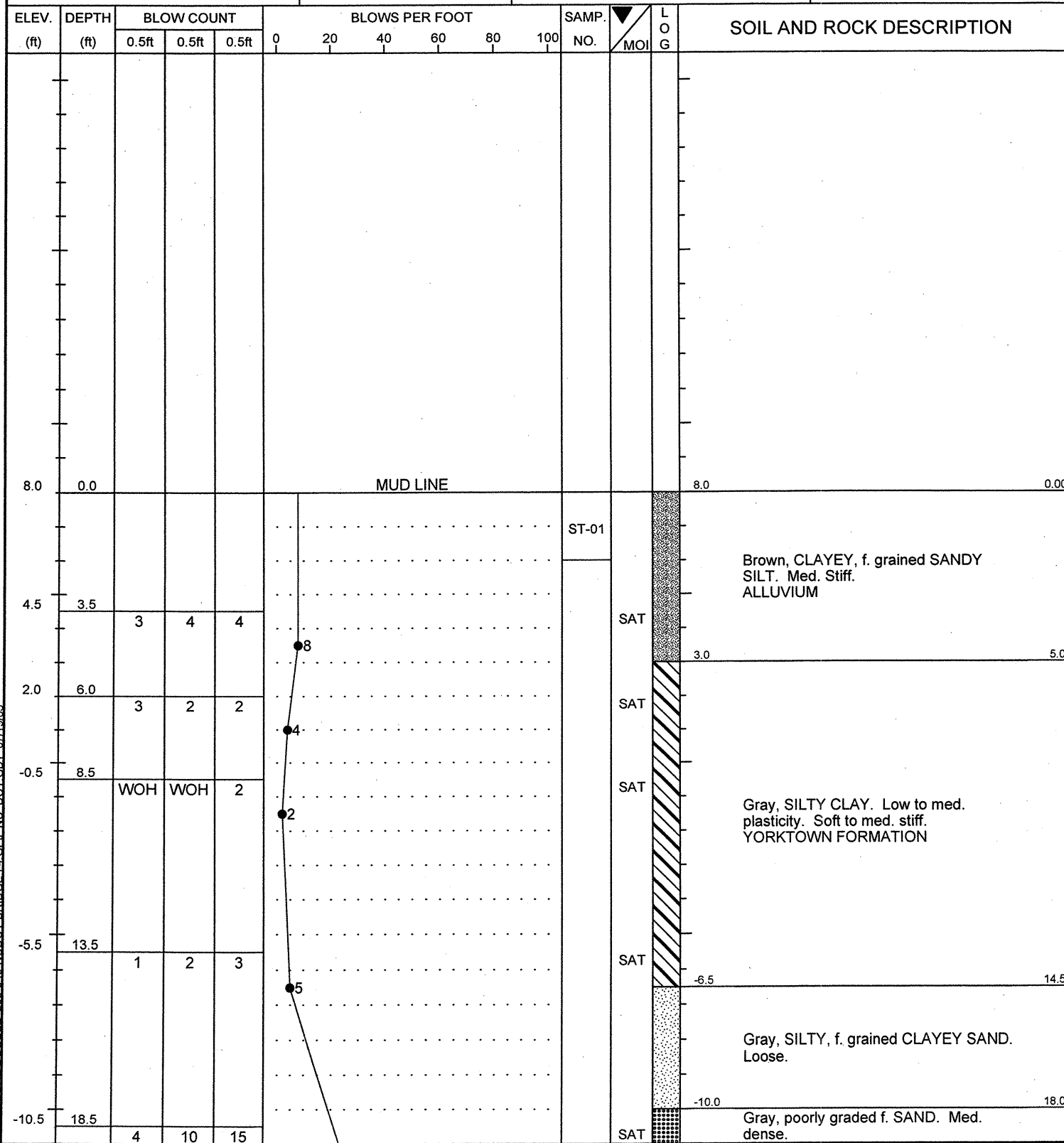


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. B1B	BORING LOCATION 21+43	OFFSET 10ft Rt	ALIGNMENT -L-
COLLAR ELEV. 8.0	NORTHING 525,278	EASTING 2,596,852	0 HR. NM
TOTAL DEPTH 45.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/28/05	COMPLETED 6/28/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH 3.0
24 HR. NM			

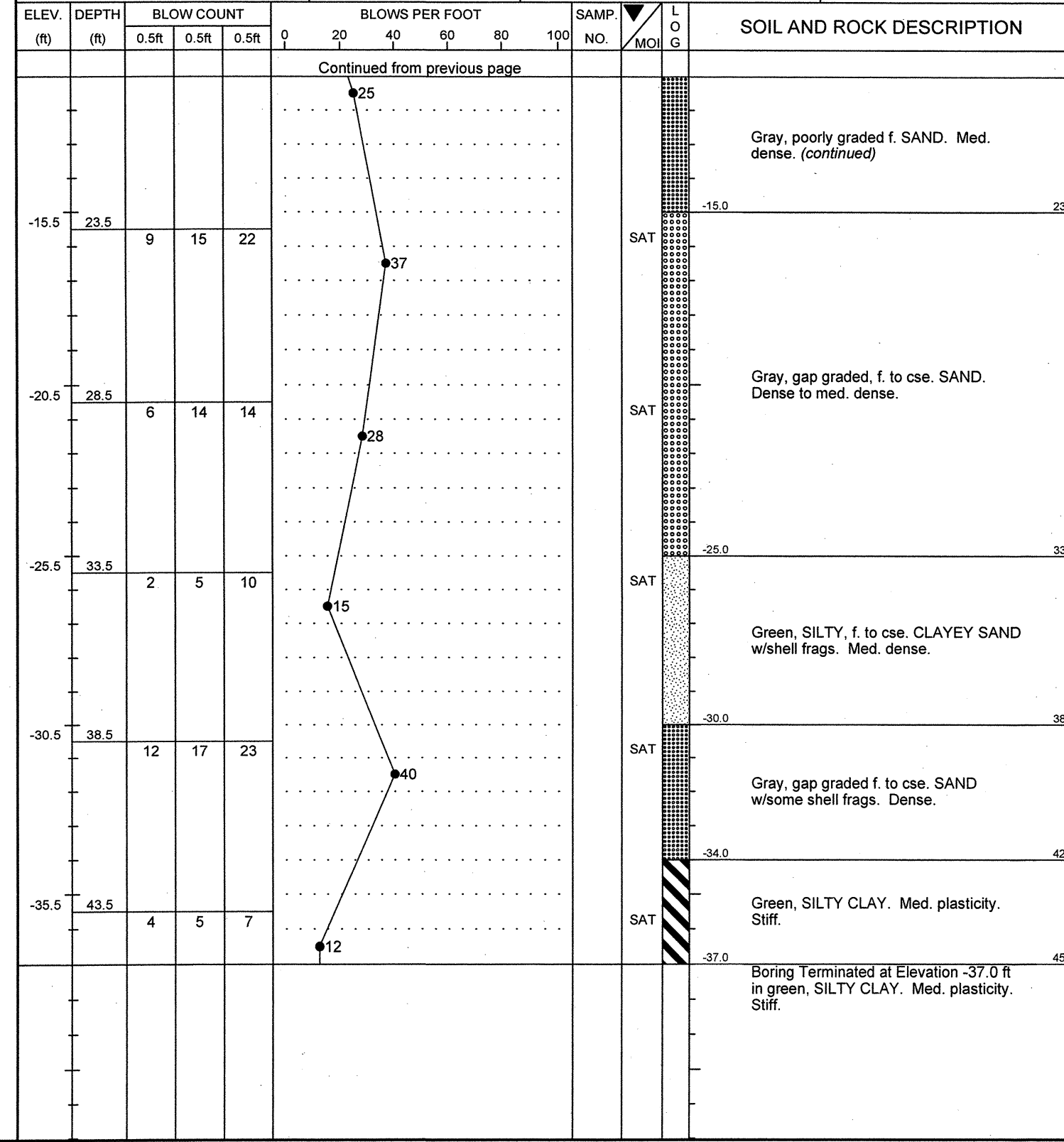


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. B1B	BORING LOCATION 21+43	OFFSET 10ft Rt	ALIGNMENT -L-
COLLAR ELEV. 8.0	NORTHING 525,278	EASTING 2,596,852	0 HR. NM
TOTAL DEPTH 45.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/28/05	COMPLETED 6/28/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH 3.0
24 HR. NM			



PROJ. NO.: 33446.1.1 SHEET NO.: 16
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN



SICDOT BORE DOUBLE-205-049 NCDOT BRIDGE-74 CPA NC DOT GDI 07/19/05

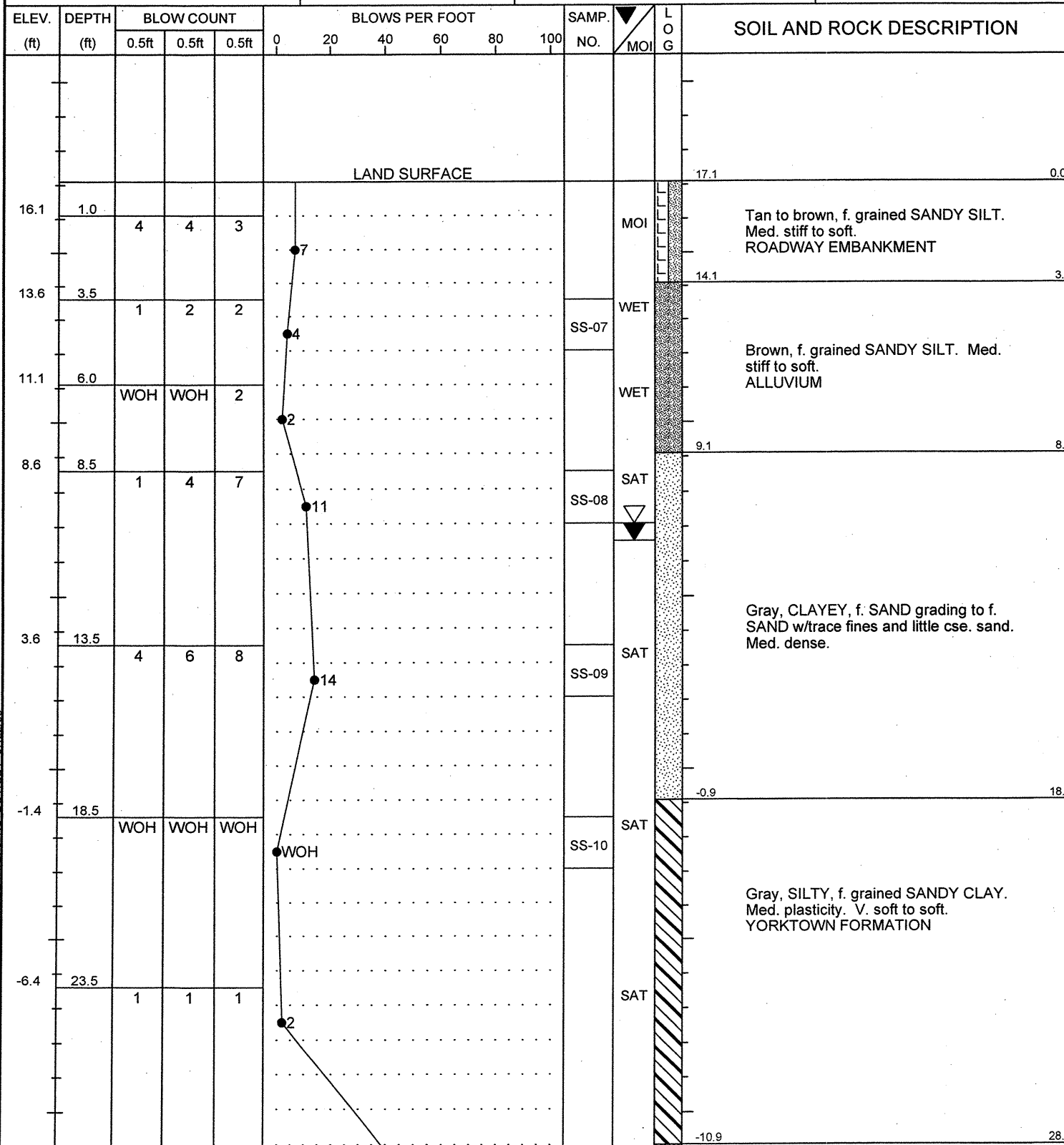


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. EB2A	BORING LOCATION 21+90	OFFSET 17ft Lt	ALIGNMENT -L-
COLLAR ELEV. 17.1	NORTHING 525,332	EASTING 2,596,853	0 HR. 10.0
TOTAL DEPTH 45.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/29/05	COMPLETED 6/29/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA



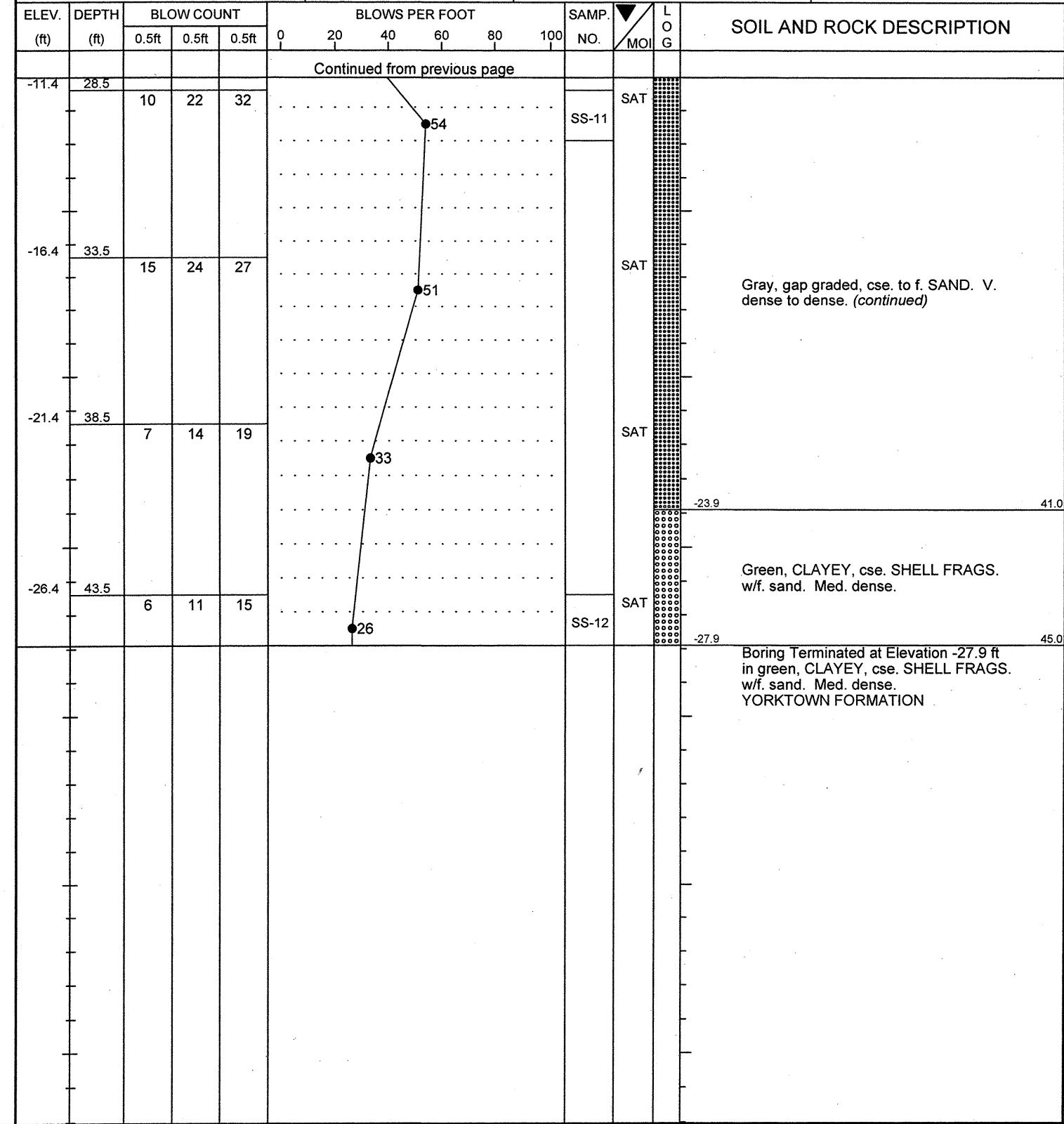
NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG



BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. EB2A	BORING LOCATION 21+90	OFFSET 17ft Lt	ALIGNMENT -L-
COLLAR ELEV. 17.1	NORTHING 525,332	EASTING 2,596,853	0 HR. 10.0
TOTAL DEPTH 45.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/29/05	COMPLETED 6/29/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA



NCDOT BORE DOUBLE 205-049 NCDOT BRIDGE 74 GEL NC DOT GDI 07/22/05

PROJ. NO.: 33446.1.1	SHEET NO.: 17
T.I.P. NO.: B-4088	TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2)	R/W SHEET NO.:
COUNTY: CRAVEN	

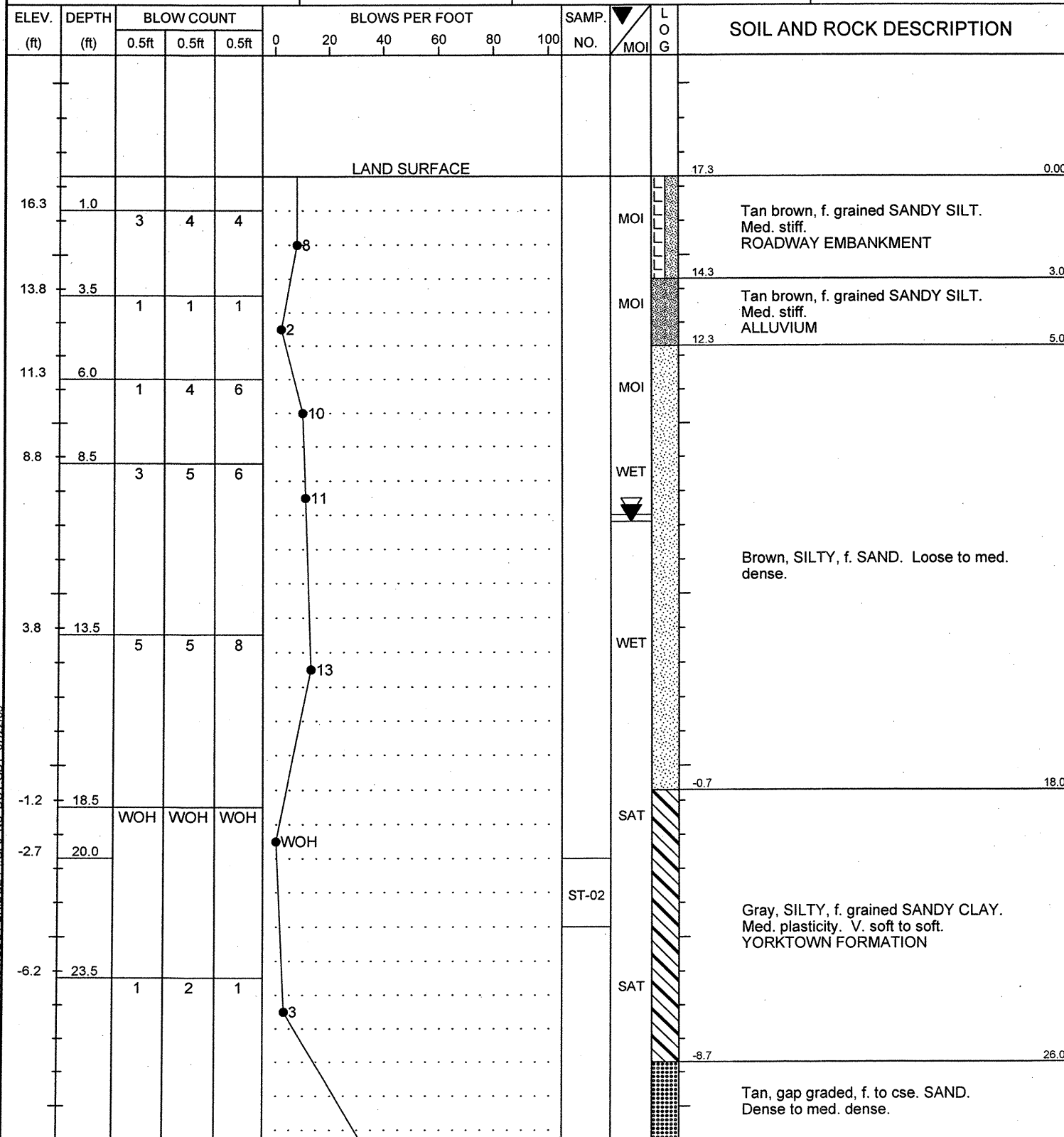


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. EB2B	BORING LOCATION 21+90	OFFSET 17ft Rt	ALIGNMENT -L-
COLLAR ELEV. 17.3	NORTHING 525,316	EASTING 2,596,881	0 HR. 10.0
TOTAL DEPTH 50.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/28/05	COMPLETED 6/28/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA

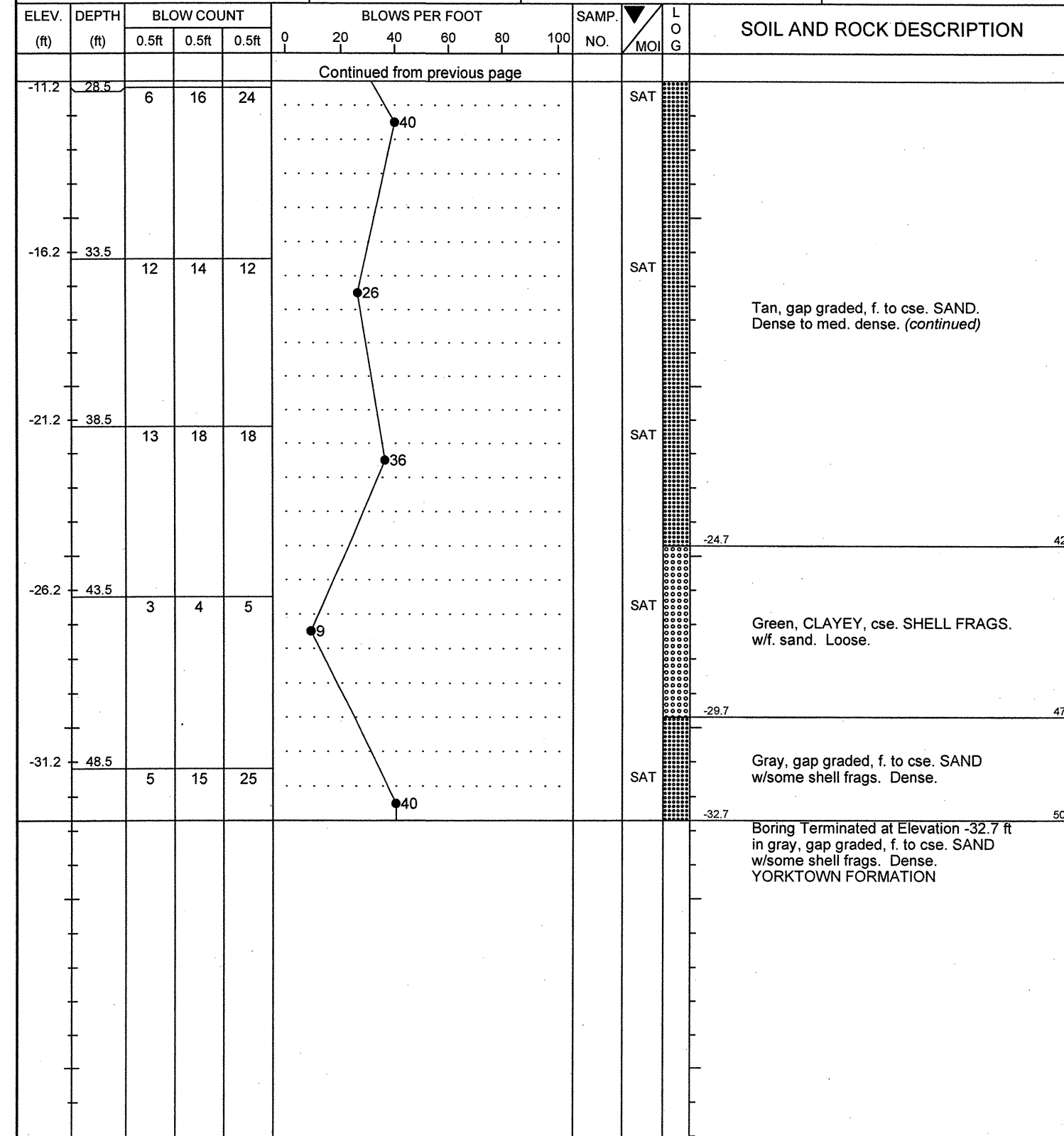


NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 2 OF 2

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Charles Ray
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. EB2B	BORING LOCATION 21+90	OFFSET 17ft Rt	ALIGNMENT -L-
COLLAR ELEV. 17.3	NORTHING 525,316	EASTING 2,596,881	0 HR. 10.0
TOTAL DEPTH 50.0 ft	DRILL MACHINE CME 45B ATV	DRILL METHOD Mud Rotary	HAMMER TYPE Manual
DATE STARTED 6/28/05	COMPLETED 6/28/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA



NCDOT FORM DOUBLE 205-049 INK DOT BRIDGE 74 GET NC DOT GDI 07/22/05

PROJ. NO.: 33446.1.1 SHEET NO.: 18
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2) RAW SHEET NO.:
COUNTY: CRAVEN



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 1

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Steven Hudson
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. CB-01	BORING LOCATION 21+71	OFFSET 15ft Rt	ALIGNMENT -L-
COLLAR ELEV. 12.3	NORTHING 525,300	EASTING 2,596,870	0 HR. NE
TOTAL DEPTH 1.0 ft	DRILL MACHINE Hand Auger	DRILL METHOD Hand Auger	HAMMER TYPE NA
DATE STARTED 6/22/05	COMPLETED 6/22/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA

ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80					100
12.3	0.0													LAND SURFACE
											S-01	WET		Brown, SILTY, f. grained SAND w/some root frags. ALLUVIUM Boring Terminated at Elevation 11.3 ft in brown, SILTY, f. grained SAND w/some root frags. ALLUVIUM



NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
CATLIN PROJECT NO.: 205-049

SHEET 1 OF 1

PROJECT NO. 33446.1.1	ID. B-4088	COUNTY CRAVEN	GEOLOGIST Steven Hudson
SITE DESCRIPTION BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615			GROUND WATER (ft)
BORING NO. CB-02	BORING LOCATION 21+37	OFFSET 15ft Rt	ALIGNMENT -L-
COLLAR ELEV. 8.1	NORTHING 525,271	EASTING 2,596,853	0 HR. NM
TOTAL DEPTH 1.0 ft	DRILL MACHINE Hand Auger	DRILL METHOD Hand Auger	HAMMER TYPE NA
DATE STARTED 6/22/05	COMPLETED 6/22/05	CORE BARREL TYPE NA	SURFACE WATER DEPTH NA

ELEV. (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		0.5ft	0.5ft	0.5ft	0	20	40	60	80					100
8.1	0.0													LAND SURFACE
											S-02	SAT		Dark brown, f. to cse. grained SANDY SILT. ALLUVIUM Boring Terminated at Elevation 7.1 ft in dark brown, f. to cse. grained SANDY SILT. ALLUVIUM



PROJ. NO.: 33446.1.1 SHEET NO.: 19
T.I.P. NO.: B-4088 TOTAL SHEETS: 25
F.A. NO.: BRSTP-1615(2) R/W SHEET NO.:
COUNTY: CRAVEN

CATLIN PROJECT NO.: 205-049 NC DOT BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615 07/21/05

GEOTECHNICAL ENGINEERING UNIT FIELD SCOUR REPORT

PROJECT: 33446.1.1 ID: B-4088 COUNTY: CRAVEN

DESCRIPTION(1): BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: _____ Pos: _____)
 other Preliminary Geotech Report

COUNTY BRIDGE NO. 74 BRIDGE LENGTH 70 NO. BENTS IN: CHANNEL 3 FLOOD PLAIN 2

FOUNDATION TYPE: Wooden piles with wooden seats and wing walls

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: No evidence

INTERIOR BENTS: General Scour

CHANNEL BED: No evidence

CHANNEL BANKS: General Scour

EXISTING SCOUR PROTECTION:

TYPE(3): Wooden wing walls on each endbent. No protection other than wing walls.

EXTENT(4): Extends approximately 5ft. Beyond width of bridge deck from ground surface to base of bridge deck.

EFFECTIVENESS(5): Appears effective.

OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): Beaver dam located approximately 45ft. West-northwest (upstream) of bridge.

Some timber debris located sporadically around interior bents.

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Dark brown, fine to coarse-grained SANDY SILT. (A-4)

Grab sample S-02 collected at -L- 21+37 15Rt from elevation of 8.1' to 7.1' ST-01 collected at -L- 21+43 10Rt.

CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Brown, SILTY, fine-grained SAND (A-2-4) w/root frags.

Grab sample S-01 collected at -L- 21+71 15Rt from elevation of 12.3'-11.3'.

CHANNEL BANK COVER(9): Vegetative cover consisting of grass and brush.

FLOOD PLAIN WIDTH(10): Approximately 900 feet. 500ft north-northeast & 400ft south-southwest.

FLOOD PLAIN COVER(11): Timber and brush

DESIGN INFORMATION CONT.

STREAM IS _____ DEGRADING AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS Stream appears to be stable. Flow within channel is very low.

Creek depth is approximately 4ft. deep and streambed is approximately 10ft. below existing deck.

CHANNEL MIGRATION TENDENCY (13) Low to no migration potential at bridge.

REPORTED BY: Steven V. Hudson, P.G., CWD DATE: 6/22/2005

CATLIN ENGINEERS AND SCIENTISTS

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):

The new structure at this location is planned to be 21 feet longer than the existing structure and will have a hydraulic opening larger than the existing structure. Therefore the potential for scour with the new structure will be lower than with the existing structure. Since the historical scour depth is at an elevation of -0.2 feet, the GASE for the new structure will also be an elevation of -0.2 feet.

REPORTED BY: *Chad M. Wally* DATE: 8/17/2005

NCDOT GEOTECHNICAL UNIT

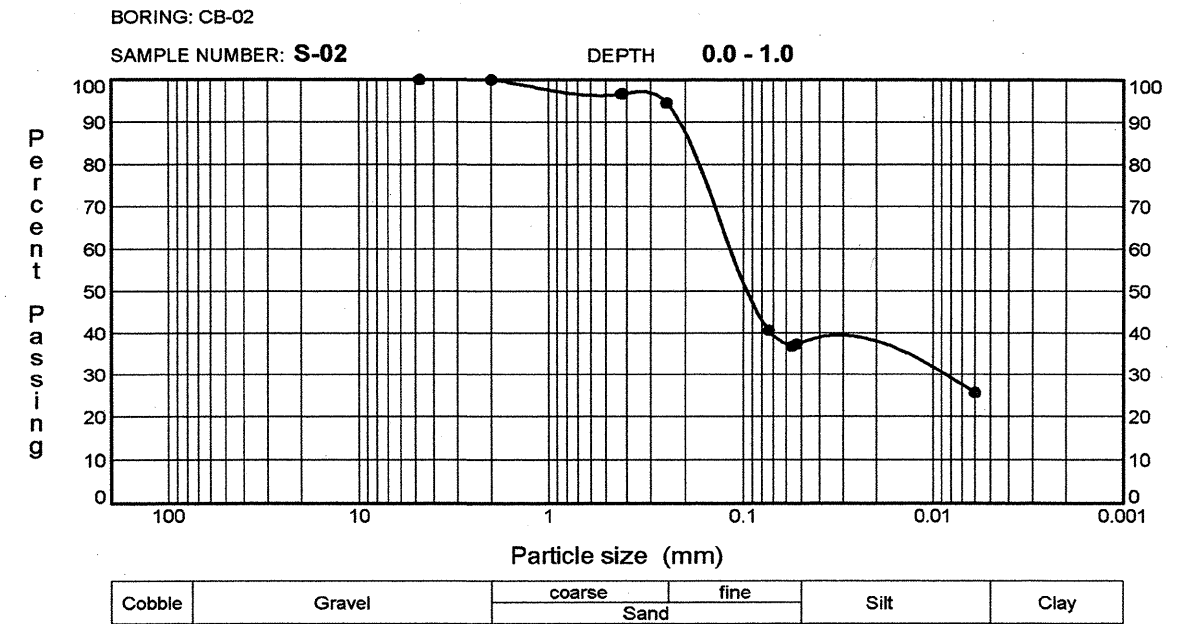
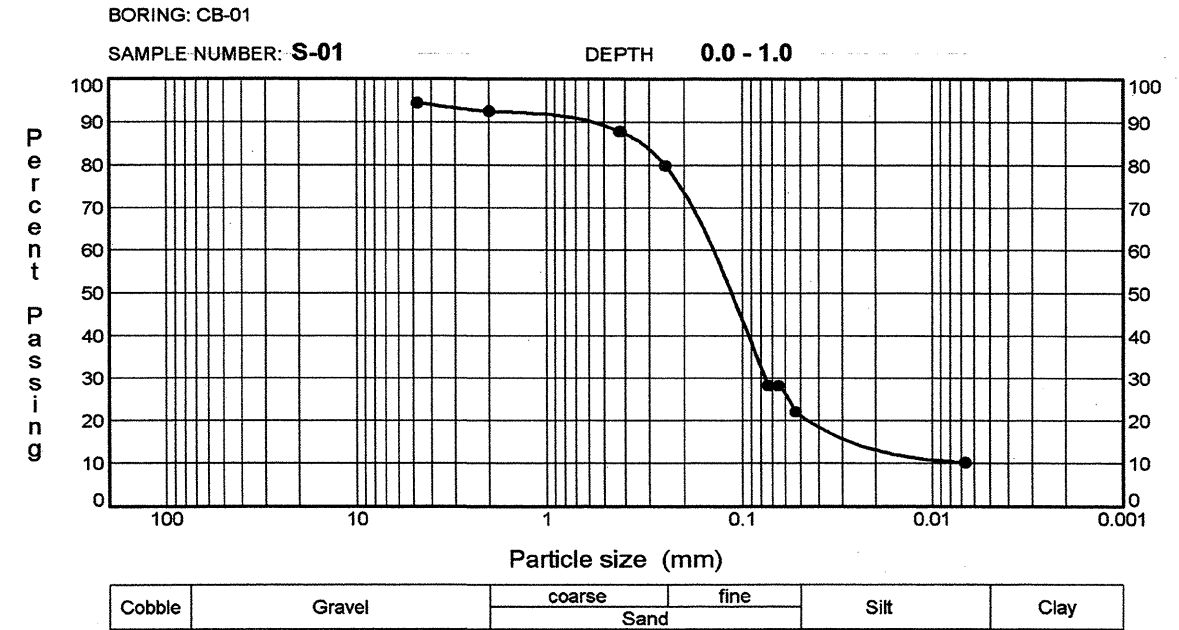
INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.


PROJECT #: 33446.4.4 T.I.P. #: B-4088
 COUNTY: CRAVEN
 DESCRIPTION: Bridge 74 Over Morgan Swamp Run on SR 1615

SAMPLE #	CHANNEL BED MATERIAL		CHANNEL BANK MATERIAL			
	S-02	ST-01	S-01			
RETAINED #4	0		6			
PASSING #10	100		93			
PASSING #40	97		88			
PASSING #200	41		28			
COARSE SAND	5.4		20.1			
FINE SAND	57.3		57.9			
SILT	11.7		11.9			
CLAY	25.6		10.1			
LL	37		22			
PL	NP		NP			
AASHTO CLASSIFICATION	A-4(0)		A-2-4(0)			
STATION	21+37	21+43	21+71			
OFFSET	15Rt	10Rt	15Rt			
DEPTH	0.0 - 1.0	0.0 - 2.0	0.0 - 1.0			

PROJ. NO.: 33446.1.1 SHEET NO.:
 T.I.P. NO.: B-4088 TOTAL SHEETS:
 F.A. NO.: BRSTP-1615(2) RW SHEET NO.:
 COUNTY: CRAVEN



US GSD DOUBLE 205-049 NCDOT BRIDGE 74 GEL CATLIN GDT 07/4/05



ENGINEERS and SCIENTISTS
 GEOTECHNICAL LABORATORIES
Wilmington, North Carolina



CATLIN NAME: BRIDGE 74
 CATLIN NUM.: 205-049

GRAIN SIZE DISTRIBUTION
 PROJECT NAME: BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615
 PREPARED FOR: NCDOT

NCDOT LABORATORY SUMMARY SHEET

AASHTO Standard Specifications

(As modified by NCDOT, Material and Tests Unit, 2000.)

DESCRIPTION: BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615	ENGLISH	PROJ. NO.: 33446.1.1 SHEET NO.: 22 T.I.P. NO.: B-4088 TOTAL SHEETS: 25 F.A. NO. BRSTP-1615(2) R/W SHEET NO.: COUNTY: CRAVEN
	CATLIN PROJECT: 205-049	 GEOTECHNICAL LABORATORY Wilmington, North Carolina

TEST RESULTS

Field Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Lab Sample Number	SS-01	SS-02	SS-03	SS-04	SS-05	SS-06	SS-07	SS-08	SS-09	SS-10	SS-11	SS-12	SS-13	SS-14	SS-15
Retained #4 Sieve %	0	0	0	0	0	14	0	0	0	0	0	8	0	0	0
Passing #10 Sieve %	98	100	100	100	99	79	100	100	100	100	100	91	99	100	100
Passing #40 Sieve %	73	100	95	97	60	44	99	100	93	97	62	56	97	94	70
Passing #200 Sieve %	26	39	11	83	4	16	55	23	16	86	6	31	23	79	6

MINUS NUMBER 10 FRACTION

SOIL MORTAR - 100%															
Coarse Sand Ret.-#60 %	44.6	0.6	13.6	6.1	64.8	74.2	2.1	1.5	18.8	5.2	70.1	61.6	6.2	12.4	55.0
Fine Sand Ret.-#270 %	31.9	69.6	80.0	15.2	32.4	11.7	55.5	81.4	69.9	14.0	25.1	9.3	77.1	13.4	40.5
Silt 0.05 - 0.005mm %	5.4	18.4	4.5	48.3	1.9	6.2	22.1	7.0	7.3	50.3	0.8	19.0	10.7	60.0	3.5
Clay <0.005mm %	18.1	11.4	1.9	30.4	0.9	7.9	20.3	10.1	4.0	30.5	4.0	10.1	6.0	14.2	1.0

Liquid Limit (LL)	22	25	22	38	15	29	23	19	21	36	18	29	23	35	20
Plasticity Index (PI)	9	NP	NP	20	NP	NP	6	NP	NP	18	NP	NP	NP	17	NP
AASHTO Classification /Group Index	A-2-4(0)	A-4(0)	A-2-4(0)	A-6(16)	A-3(0)	A-1-b(0)	A-4(1)	A-2-4(0)	A-2-4(0)	A-6(15)	A-3(0)	A-2-4(0)	A-2-4(0)	A-6(12)	A-3(0)
Station	21+00	21+00	21+00	21+00	21+00	21+00	21+90	21+90	21+90	21+90	21+90	21+90	21+90	21+43	21+43
Offset	17ft RT	17ft RT	17ft RT	17ft RT	17ft RT	17ft RT	17ft LT	17ft LT	17ft LT	17ft LT	17ft LT	17ft LT	17ft LT	11ft LT	11ft LT
Alignment	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-	-L-
Boring Identification	EB1B	EB1B	EB1B	EB1B	EB1B	EB1B	EB2A	EB2A	EB2A	EB2A	EB2A	EB2A	EB2A	B1A	B1A
Depth from	1.0	8.5	13.5	18.5	33.5	43.5	3.5	8.5	13.5	18.5	28.5	43.5	3.5	8.5	18.5
to	2.5	10.0	15.0	20.0	35.0	45.0	5.0	10.0	15.0	20.0	30.0	45.0	5.0	10.0	20.0
Field Moisture Content	7	23	23	43	19	25	35	25	27	48	17	28	29	42	21
Tested By	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM	MDM
Submitted By	SVH	SVH	SVH	SVH	SVH	SVH	CWR	CWR	CWR	CWR	CWR	CWR	CWR	CWR	CWR
Date Submitted	06/29/05	06/29/05	06/29/05	06/29/05	06/29/05	06/29/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05	06/30/05

NP = Non-Plastic




 Laboratory Manager

Report Date: 7/18/2005
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NCDOT LABORATORY SUMMARY SHEET

AASHTO Standard Specifications

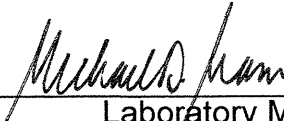
(As modified by NCDOT, Material and Tests Unit, 2000.)

DESCRIPTION: BRIDGE 74 OVER MORGAN SWAMP RUN ON SR 1615	ENGLISH	PROJ. NO.: 33446.1.1 SHEET NO.: 23 T.I.P. NO.: B-4088 TOTAL SHEETS: 25 F.A. NO. BRSTP-1615(2) R/W SHEET NO.: COUNTY: CRAVEN
	CATLIN PROJECT: 205-049	 205-049 ENGINEERS and SCIENTISTS GEOTECHNICAL LABORATORY Wilmington, North Carolina

TEST RESULTS

Field Sample Number	Lab Sample Number	Retained #4 Sieve %	Passing #10 Sieve %	Passing #40 Sieve %	Passing #200 Sieve %	SS-16	SS-17	SS-18	S-01	S-02
						SS-16	SS-17	SS-18	S-01	S-02
						1	0	0	6	0
						93	99	99	93	100
						41	79	94	88	97
						3	4	77	28	41
MINUS NUMBER 10 FRACTION										
SOIL MORTAR - 100%										
						78.3	51.0	9.8	20.1	5.4
						18.9	45.2	22.5	57.9	57.3
						2.8	1.8	43.0	11.9	11.7
						0.0	2.0	24.7	10.1	25.6
						21	20	46	22	37
						NP	NP	23	NP	NP
						A-1-b(0)	A-3(0)	A-7-6(18)	A-2-4(0)	A-4(0)
						21+43	21+43	21+43	21+71	21+37
						11ft LT	11ft LT	11ft LT	15ft RT	15ft RT
						-L-	-L-	-L-	-L-	-L-
						B1A	B1A	B1A	CB-01	CB-02
						23.5	38.5	43.5	0.0	0.0
						25.0	40.0	45.0	1.0	1.0
						23	25	43	32	58
						MDM	MDM	MDM	MDM	MDM
						CWR	CWR	CWR	SVH	SVH
						06/30/05	06/30/05	06/30/05	06/29/05	06/29/05

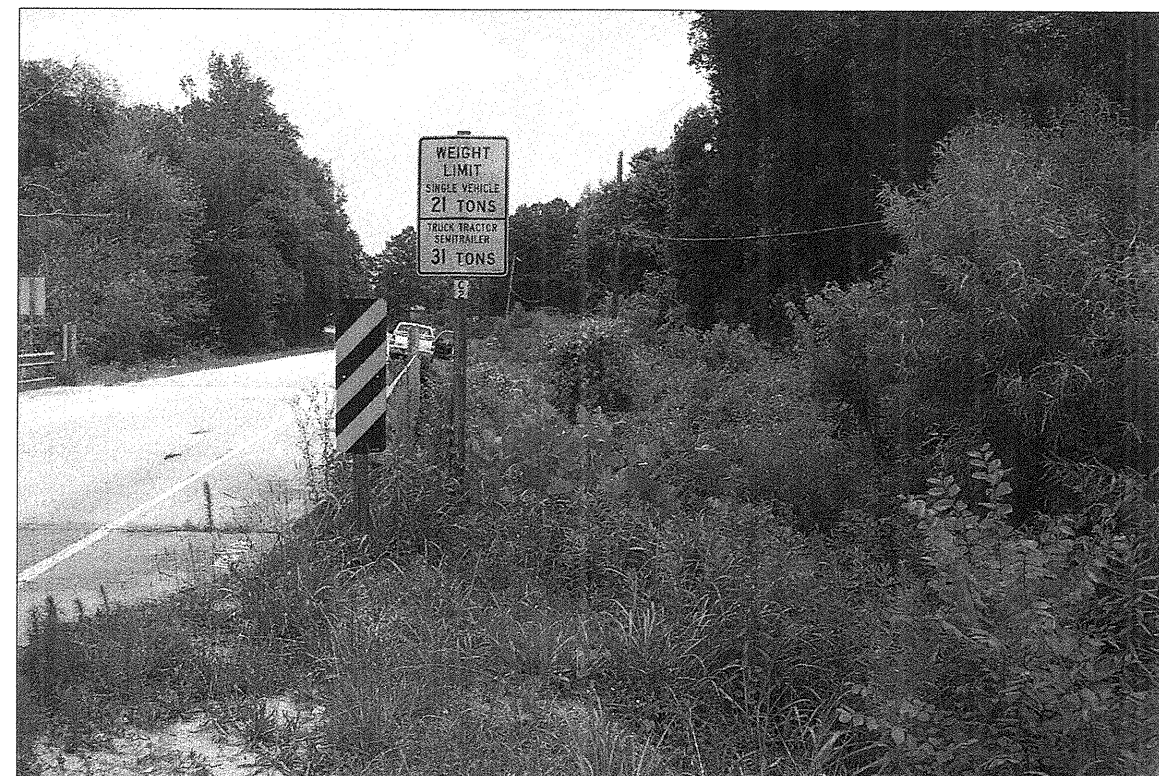
NP = Non-Plastic


 Laboratory Manager

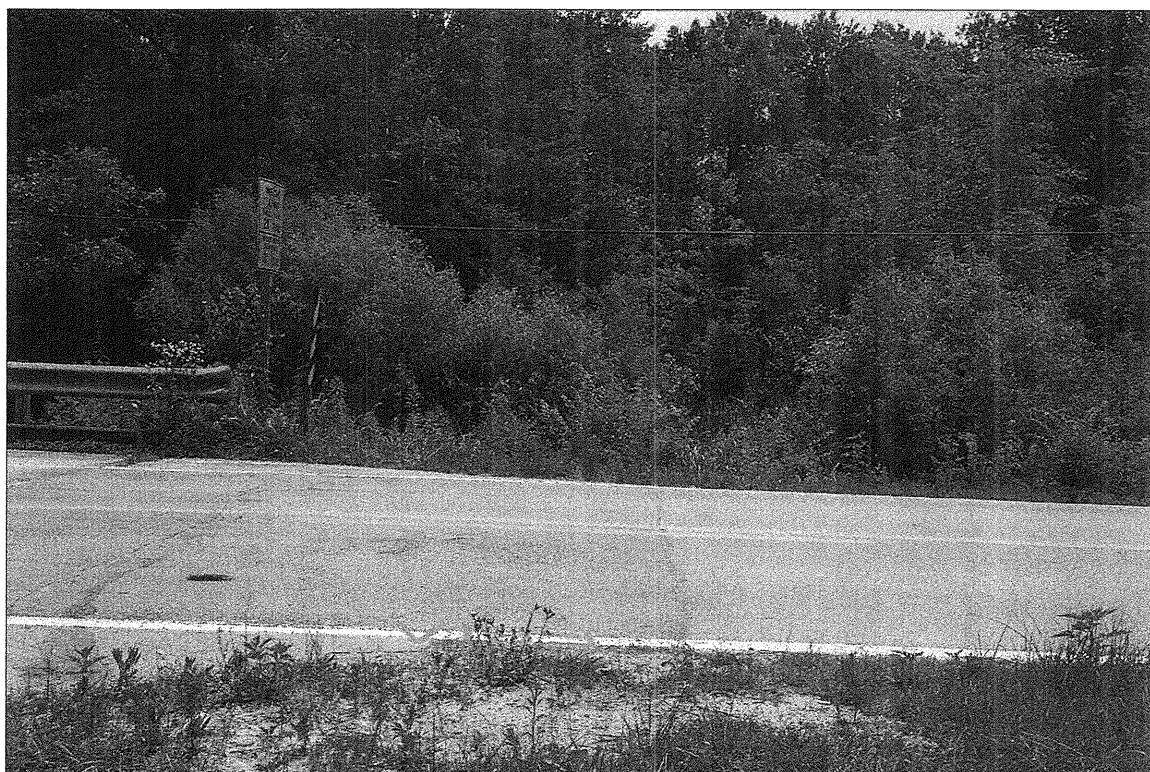
Report Date: 7/18/2005
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PROFILE ALONG A FACING SOUTHWEST
EB2A IN FOREGROUND



PROFILE ALONG B FACING NORTHEAST
EB1B IN FOREGROUND



SECTION ACROSS END BENT 1 FACING SOUTHEAST
EB1A IN FOREGROUND



SECTION ACROSS END BENT 2 FACING SOUTHEAST
EB2A IN FOREGROUND



CENTERLINE OF -L-
END BENT 1 IN FOREGROUND FACING NORTHEAST



BENT 1
FACING UPSTREAM TO THE NORTHWEST



CENTERLINE OF -L-
END BENT 2 IN FOREGROUND FACING SOUTHWEST



BENT 1
FACING DOWNSTREAM TO THE SOUTHEAST