STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33438 (B-4076)	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33438 (B-4076) F.A. PROJ. _

COUNTY CLEVELAND

PROJECT DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804

SITE DESCRIPTION _

ID: B-4076

PROJECT: 33438

CONTENTS

CAUTION NOTICE

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PERSONNEL

M. SMITH

C. BURRIS

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INVESTIGATED BY R.W. TODD

CHECKED BY C. LITTLE / JEB

SUBMITTED BY C. LITTLE

DATE 10-7-05

NORTH CAROLINA LICENSED SEAL 1104 GEOLOGIST CLINTON B. LITTLE

10-7-05

DRAWN BY: C. LITTLE

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PROJECT REFERENCE NO.	SHEET NO.
34438 (B-4076)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MN	11 MX	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

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.

GRADATION

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.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RM - RESILIENT MODULUS SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [x] CME-550
- [ ] PORTABLE HOIST
- [ ] OTHER _____
- [ ] OTHER _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [x] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [x] TUNG.-CARBIDE INSERTS
- [x] CASING [x] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [x] CORE BIT (NXWL)
- [ ] OTHER _____

HAMMER TYPE:
- [x] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [x] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] OTHER _____

ROCK DESCRIPTION

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)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	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.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
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.
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. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
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. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
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.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

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 DISLODGED 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 (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.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

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.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

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.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-11
-L- 17+56.32
10.23' RT. ELEVATION: 821.53 FT.

NOTES:

REVISED 03/07/05

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MIKE F. EASLEY
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LYNDO TIPPETT
SECRETARY

October 04, 2005

STATE PROJECT: 33438
I.D. : B-4076
COUNTY: Cleveland
DESCRIPTION: Bridge 156 over Buffalo Creek on SR 1804

SUBJECT: Geotechnical Report - Bridge Foundation Investigation

Project Description

The site is in east-central Cleveland County, near the town of Waco. SR 1804 (Jim Elliot Road) is a two-lane rural road. The existing bridge is a one-lane timber deck structure with four spans. The bridge will be replaced at the existing location.

The proposed structure as investigated is a two span bridge (1@95', 1@85'), approximately 39' wide, centered at Station 18+31 –L-. The proposed skew is 90°.

The Geotechnical Field investigation was conducted in July 2005. A total of five test borings were conducted with a CME 550 drill rig utilizing 8" hollow stem augers (End Bents) or NW casing with NXWL core tools (interior bent). Borings EB1-A and EB2-A were performed on the shoulder of the existing roadway. Boring EB2-B was performed on the floodplain near the toe of the existing embankment. The interior bent borings (B1-A, B1-B) were conducted on the floodplain below/adjacent to the existing structure. Standard Penetration tests were conducted at five foot intervals in soil materials; representative bulk samples were collected and tested for grain size and Atterburg Limits. Hard rock materials were drilled and sampled on the interior bent with NXWL coring tools. Two rock core samples were submitted to the NCDOT lab for strength testing.

Physiography and Geology

The site is in an area of moderately rolling topography. Elevations immediately adjacent range from approximately 860 down to the flow elevation of the stream at about 788. The normal water surface elevation of the stream is 800.5. The 100-year flood

elevation is 811.32 (per the Hydraulics Unit report). The land immediately adjacent is undeveloped and lightly wooded.

The site is in the Piedmont Physiographic Region, Inner Piedmont Geologic Belt. This region is characterized by metamorphic rocks (amphibolite, schist, gneiss) with some granitic intrusions. Locally, the rock encountered is a thinly layered, biotite schist. Rock is exposed in the stream bed. Rock core samples obtained were all fresh and hard with high recovery and RQD rates.

Foundation Description

Soils encountered at the site include embankment fill soils associated with the existing roadway, alluvial soils (sandy silt and silty sand) within the floodplain, residual soils (micaceous coarse sand saprolite) with variable thickness, and weathered rock (transitional between saprolite and hard rock). There is a general pattern of thickening of the residual soil strata and increasing depth to rock from End Bent One toward End Bent Two.

End Bent One

Twelve feet of roadway fill, soft to stiff sandy silt rests on a thin (1.5') layer of sandy saprolite over hard rock. Groundwater was at the base of the fill, elevation 810±. *Top of rock elevation was about 809.*

Interior Bent One

Alluvial soils extend from the ground surface to depths of 8.5 to 10 feet. The sediment is predominantly soft wet clayey sandy silt. A lens of loose sand was encountered in boring B1-A at the base of the deposit. Residual materials were encountered at depths of 8 to 10 feet, consisting of a one to two foot layer of saprolite gradational to weathered rock. Hard rock was encountered at a depth of 11.7 and 12.1 feet in the two borings. *This places the top of hard rock between elevations 795 and 796*. Groundwater was present within the alluvial layer, between elevation 800-805. Groundwater elevations will be variable with weather conditions and can be expected to rise near the ground surface within the floodplain during wet periods.

End Bent Two

Sixteen feet of roadway fill was encountered in boring EB2-A. It rests on alluvial soil consisting of loose sand or soft sandy silt. The alluvial soils were saturated. Residual soils were encountered at elevation 792 – 795. Thickness of residual soil varied from 3'(right) to 11'(left*). Weathered rock was encountered near elevation 780(left) and 792(right). The weathered rock grades into hard rock within one to two feet.*

Submitted by:

Clint Little, LG
Regional Engineering Geologist

PROJECT REFERENCE NO.	SHEET
33438 (B-4076)	4

SITE PLAN

0 50 100

FEET

S 55° 54.9" E

TO SR 1903

60' EXISTING R/W

14' GRAVEL

12" CONC

12' GRAVEL

C

15

VIM ELLIOTT ROAD SR-1804 19' BST

F

PT Sta. 17+04.02

N81°03'55"E

30.44'

EB1-A

8' WOOD WW

BI-A

12' CONC WW

EB2-A

TO SR 1908

N 39° 37' 20.4" E

5' CONC WW

8' WOOD WW

BI-B

EB2-B

BUFFALO CREEK

20

PCSta. 21+14.51

BRIDGE 156 OVER BUFFALO CREEK ON SR 1804
CLEVELAND COUNTY

33438 (B-4076)

PI = 16+45.00
EL = 827.71'
VC = 200'
K = 73

BEGIN BRIDGE
STA 17+41.00

END BRIDGE
STA 19+21.00

PI = 21+35.00
EL = 818.47'
VC = 410'
K = 37*

(-)14.610%

(-)11.8857%

(-)11.8857%

(+)9.1209%

820

810

800

790

780

17

18

19

20

HARD CRYSTALLINE ROCK

WEATHERED ROCK

HARD CRYSTALLINE ROCK

HARD CRYSTALLINE ROCK

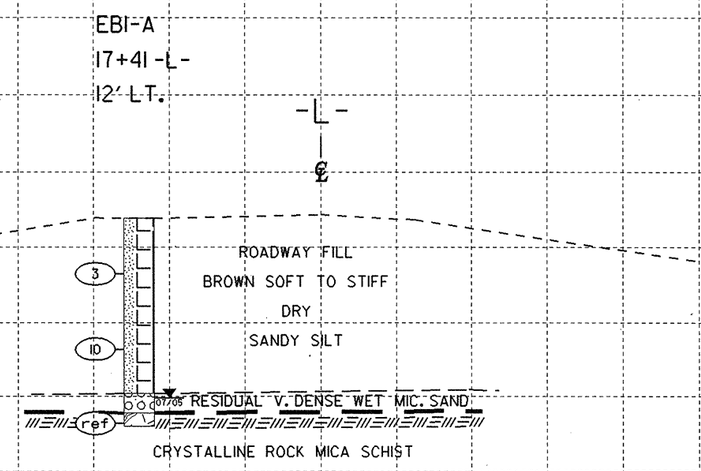
A) ROADWAY FILL
BROWN LOOSE DRY SILTY CLAYEY SAND & SOFT TO STIFF SANDY SILT

B) RESIDUAL BROWN MICACEOUS SILTY SAND

C) ALLUVIAL BROWN & GRAY SOFT WET SANDY SILT

D) ALLUVIAL GRAY-BROWN V. LOOSE SATURATED SAND

SECTION THROUGH EBI-A



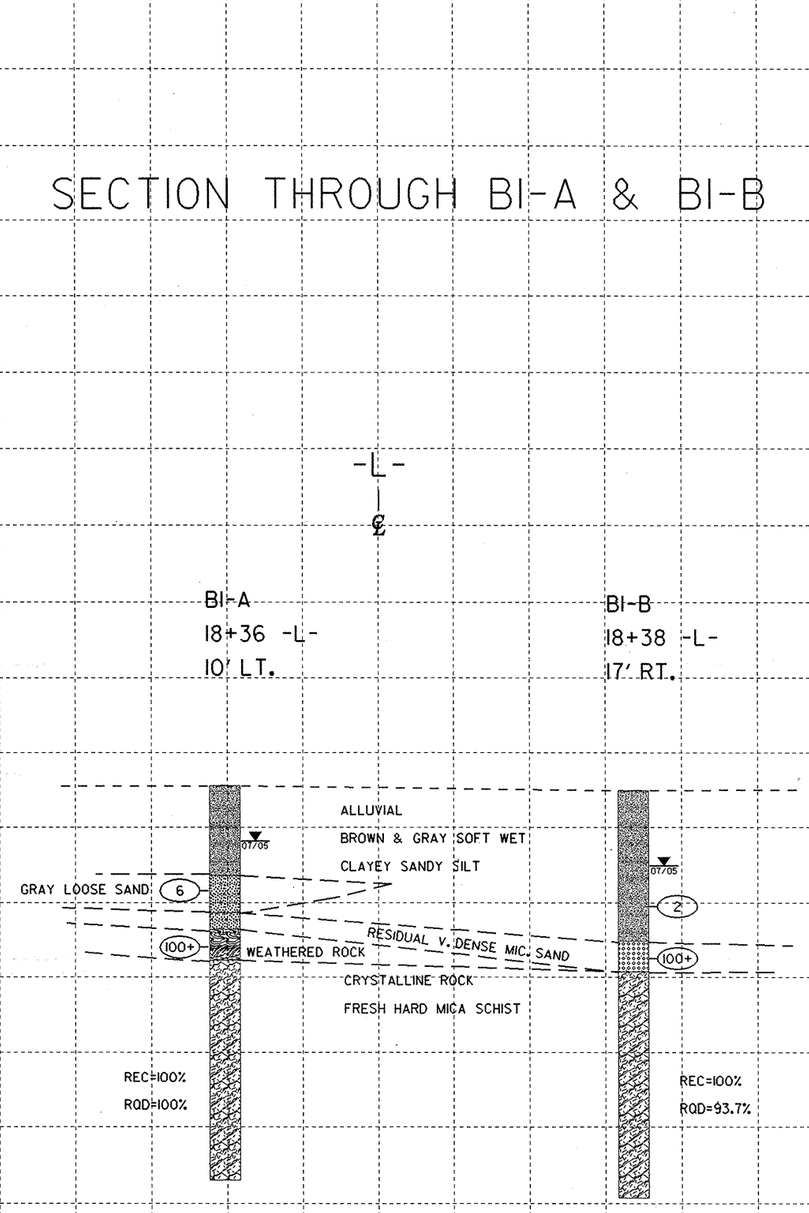
0 5	clittle AT GEH221409	SHEET NO.
	33438 (B-4076)	7

SECTION THROUGH BI-A & BI-B

-L-
|
℄

BI-A
18+36 -L-
10' LT.

BI-B
18+38 -L-
17' RT.



0 5	cliffie AT GEH221409 33438 (B-4076)	SHEET NO. 3

SECTION THROUGH EB2-A

EB2-A
19+21 -L-
12.5' LT.

EB2-B
19+21 -L-
40' RT.

-L-
℄

820
815
810
805
800
795
790
785
780
775

-40 -30 -20 -10 0 10 20 30 40

ROADWAY FILL
BROWN LOOSE DRY
SILTY CLAYEY SAND

ALLUVIAL
GRAY-BROWN
VERY LOOSE SATURATED
SILTY SAND W/ GRAVEL TRACES

RESIDUAL
BROWN MICACEOUS
LOOSE TO V. DENSE
SILTY SAND

WEATHERED ROCK

CRYSTALLINE ROCK
FRESH HARD MICA SCHIST

ALLUVIAL BROWN
SOFT WET
SANDY SILT

CRYSTALLINE ROCK
FRESH HARD MICA SCHIST

7
6
6
2
2
4
9
100+
07/05
2
1
38
ref

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33438	**ID** B-4076	**COUNTY** CLEVELAND	**GEOLOGIST** TODD	
SITE DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804				**GND WATER**
BORING NO EB1-A	**NORTHING** 0.00	**EASTING** 0.00		**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 17+41.000	**OFFSET** 12.00ft LT		**24 HR** 12.00ft
COLLAR ELEV 821.90ft	**TOTAL DEPTH** 13.90ft	**START DATE** 7/28/05	**COMPLETION DATE** 07/28/05	
DRILL MACHINE CME 550	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC	
SURFACE WATER DEPTH	**DEPTH TO ROCK** N/A		**Log EB1-A, Page 1 of 1**	

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION
821.90						Ground Surface				
820.00										
	3.70	2	1	2	1.0	3	SS-9	D		ROADWAY FILL BROWN SANDY SILT
	8.70	3	4	6	1.0	10				
810.00								▼		
808.00	13.70	100			0.1	100				RESIDUAL V. DENSE MICACEOUS SAND
						AUGER REFUSAL ON ROCK AT 13.9' ELEVATION 808.0				CRYSTALLINE ROCK MOD. SEVERELY WEATHERED MICA SCHIST

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33438	**ID** B-4076	**COUNTY** CLEVELAND	**GEOLOGIST** TODD	
SITE DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804				**GND WATER**
BORING NO B1-A	**NORTHING** 0.00	**EASTING** 0.00		**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 18+36.000	**OFFSET** 10.00ft LT		**24 HR** 3.50ft
COLLAR ELEV 807.60ft	**TOTAL DEPTH** 26.30ft	**START DATE** 7/26/05	**COMPLETION DATE** 07/26/05	
DRILL MACHINE CME 550	**DRILL METHOD** SPT CORE BORING		**HAMMER TYPE** AUTOMATIC	
SURFACE WATER DEPTH	**DEPTH TO ROCK** N/A		**Log B1-A, Page 1 of 1**	

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
807.60						Ground Surface				
							SS-3	▼		ALLUVIAL BROWN SOFT CLAYEY F. SANDY SILT
800.00	7.00	1	3	3	1.0	6	SS-3A	W		GRAY LOOSE SAND
	10.80	100			0.5	100				RESIDUAL V. DENSE MICACEOUS SAND
										WEATHERED ROCK
790.00										FRESH HARD MICA SCHIST REC=100% RQD = 100%
781.30						TERMINATED AT 26.3' ELEVATION 781.3 IN FRESH HARD MICA SCHIST				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33438	**ID** B-4076	**COUNTY** CLEVELAND	**GEOLOGIST** TODD	
SITE DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804				**GND WATER**
BORING NO B1-B	**NORTHING** 0.00	**EASTING** 0.00		**0 HR** N/A
ALIGNMENT EL	**BORING LOCATION** 18+38.000	**OFFSET** 17.00ft RT		**24 HR** 5.00ft
COLLAR ELEV 807.50ft	**TOTAL DEPTH** 27.10ft	**START DATE** 7/17/05	**COMPLETION DATE** 07/27/05	
DRILL MACHINE CME 550	**DRILL METHOD** SPT CORE BORING		**HAMMER TYPE** AUTOMATIC	
SURFACE WATER DEPTH	**DEPTH TO ROCK** N/A		**Log B1-B, Page 1 of 1**	

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
807.50						Ground Surface				
								▼		ALLUVIAL GRAY SOFT F. SANDY SILT
800.00	7.70	1	1	1	1.0	2	SS-1			
	11.20	8	100		1.0	100	SS-2 RS-1	W		RESIDUAL GRAY-WHITE MICACEOUS SAND
790.00							RS-2			FRESH HARD MICA SCHIST REC=100% RQD=70% BREAKS ON 5 DEG. FOLIATION
										FRESH HARD MICA SCHIST REC=100% RQD=100%
										FRESH HARD MICA SCHIST REC=100% RQD=98% BREAKS ON FOLIATION
780.40						TERMINATED AT 27.1' ELEVATION 780.4 IN FRESH HARD MICA SCHIST				FRESH HARD MICA SCHIST REC=100% RQD=93% BREAKS ON FOLIATION

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33438	**ID** B-4076	**COUNTY** CLEVELAND	**GEOLOGIST** TODD
SITE DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804			**GND WATER**
BORING NO EB2-A	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 19+21.000	**OFFSET** 12.50ft LT	**24 HR** N/A
COLLAR ELEV 819.40ft	**TOTAL DEPTH** 39.40ft	**START DATE** 7/28/05	**COMPLETION DATE** 07/28/05
DRILL MACHINE CME 550	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** N/A		**Log EB2-A, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION
819.40						Ground Surface				
	3.50	2	3	4	1.0	7	SS-7	D		ROADWAY FILL BROWN SILTY CLAYEY SAND
810.00	8.50	3	3	3	1.0	6				
	13.50	2	3	3	1.0	6		D		
800.00	18.50	1	1	1	1.0	2	SS-8	SAT		ALLUVIAL GRAY-BROWN SAND W/ GRAVEL TRACES
	23.50	1	1	1	1.0	2				
790.00	28.50	2	2	2	1.0	4		SAT		RESIDUAL BROWN MICACEOUS SILTY SAND
	33.50	2	4	5	1.0	9		W		
780.00	38.50	100			0.2	100				WEATHERED ROCK (MICA SCHIST)
						AUGER REFUSAL ON ROCK AT 39.4' ELEVATION 780.0				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33438	**ID** B-4076	**COUNTY** CLEVELAND	**GEOLOGIST** TODD
SITE DESCRIPTION BRIDGE 156 OVER BUFFALO CREEK ON SR 1804			**GND WATER**
BORING NO EB2-B	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 19+21.000	**OFFSET** 40.00ft RT	**24 HR** 3.00ft
COLLAR ELEV 809.50ft	**TOTAL DEPTH** 20.00ft	**START DATE** 7/28/05	**COMPLETION DATE** 07/28/05
DRILL MACHINE CME 550	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** N/A		**Log EB2-B, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	▼ MOI	LOG	SOIL AND ROCK DESCRIPTION
809.50						Ground Surface				
	4.00	1	1	1	1.0	2	SS-4	W		ALLUVIAL BROWN FINE SANDY SILT
800.00	9.00	0	0	1	1.0	1	SS-5	SAT		GRAY SILTY FINE SAND
	14.00	3	4	34	1.0	38	SS-6	W		
790.00	19.00	100			0.1	100				RESIDUAL BROWN VERY MICACEOUS SILTY SAND
789.50						AUGER REFUSAL ON ROCK AT 20.0' ELEVATION 789.5				WEATHERED ROCK (MICA SCHIST)
										CRYSTALLINE ROCK MOD. SEVERELY WEATHERED MICA SCHIST

12/15

M & T Form 503

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

T. I. P. No. B-4076

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	33834.1.1	**County**	CLEVELAND	**Owner**	
Date: Sampled	7/5/05	**Received**	8/9/05	**Reported**	8/11/2005
Sampled from	BRIDGE			**By**	J P ROGERS
Submitted by	N WAINAINA				1995 **Standard Specifications**

725087 TO 725096
8/15/05

TEST RESULTS

Proj. Sample No.		SS-1	SS-2	SS-3	SS-3A	SS-4	SS-5
Lab. Sample No.		725087	725088	725089	725090	725091	725092
Retained #4 Sieve	%	-	51	-	-	-	-
Passing #10 Sieve	%	100	37	100	100	100	100
Passing #40 Sieve	%	99	23	98	98	97	96
Passing #200 Sieve	%	43	10	68	31	46	26

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	8.1	49.6	5.2	12.9	9.3	20.2
Fine Sand Ret - #270	%	57.7	30.6	37.7	58.9	51.6	60.3
Silt 0.05 - 0.005 mm	%	20.2	15.7	28.8	15.1	19.0	10.5
Clay < 0.005 mm	%	14.1	4.0	28.2	13.1	20.2	9.1
Passing #40 Sieve	%	-	-	-	-	-	-
Passing #200 Sieve	%	-	-	-	-	-	-

L. L.		25	23	35	23	25	27
P. I.		6	NP	10	4	4	NP
AASHTO Classification		A-4(0)	A-1-a(0)	A-4(6)	A-2-4(0)	A-4(0)	A-2-4(0)
Station							
LOCATION		B1-B	B1-B	B1A	B1A	EB2-B	EB2-B
Hole No.							
Depth (Ft)		7.70	11.20	0.00	7.00	4.00	9.00
	to	9.20	11.90	6.00	8.50	5.50	10.50

cc: J P ROGERS
Soils File

Soils Engineer

M & T Form 503

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

T. I. P. No. B-4076

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33834.1.1 County CLEVELAND Owner
Date: Sampled 7/5/05 Received 8/9/05 Reported 8/11/2005
Sampled from BRIDGE By J P ROGERS
Submitted by N WAINAINA 1995 Standard Specifications

725087 TO 725096
8/15/05

TEST RESULTS

Proj. Sample No.		SS-6	SS-7	SS-8	SS-9		
Lab. Sample No.		725093	725094	725095	725096		
Retained #4 Sieve	%	48	13	-	3		
Passing #10 Sieve	%	45	82	100	93		
Passing #40 Sieve	%	35	69	99	75		
Passing #200 Sieve	%	16	35	31	37		

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	31.9	26.6	10.0	28.4		
Fine Sand Ret - #270	%	41.1	35.5	65.6	37.7		
Silt 0.05 - 0.005 mm	%	19.0	15.7	12.3	13.7		
Clay < 0.005 mm	%	8.1	22.2	12.1	20.2		
Passing #40 Sieve	%	-	-	-	-		
Passing #200 Sieve	%	-	-	-	-		

L. L.		29	28	22	24		
P. I.		NP	10	NP	8		
AASHTO Classification		A-1-b(0)	A-2-4(0)	A-2-4(0)	A-4(0)		
Station							
LOCATION		EB2-B	EB2A	EB2A	EB1-A		
Hole No.							
Depth (Ft)		14.00	3.50	18.50	3.70		
	to	15.50	5.00	20.00	5.20		

Soils Engineer

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33438 TIP: B-4076 COUNTY: Cleveland

DESCRIPTION(1): Bridge 156 over Buffalo Creek on SR 1804

EXISTING BRIDGE

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

Bridge No.: 156 Length: 155 Total Bents: 5 Bents in Channel: 1 Bents in Floodplain: 4
Foundation Type: UNKNOWN

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE

Interior Bents: NONE

Channel Bed: NONE

Channel Bank: NONE

EXISTING SCOUR PROTECTION

Type(3): RIP-RAP

Extent(4): 20' LT. OF CL TO 50' DOWNSTREAM - BOTH CHANNEL BANKS

Effectiveness(5): GOOD (PLACED FOR AFTER WATER LINE INSTALLATION)

Obstructions(6): NONE

DESIGN INFORMATION

Channel Bed Material(7): ROCK

Channel Bank Material(8): SOFT ALLUVIAL SANDY SILT AS SS-3, SS-4

Channel Bank Cover(9): TREES - MOST LEANING TOWARD STREAM

Floodplain Width(10): 400'

Floodplain Cover(11): WOODS

Stream is(12): Aggrading ____ Degrading X Static ____

Channel Migration Tendency(13): NONE

Observations and Other Comments: ____

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS		
EB1	B1	EB2
816.5	796	NA

Comparison of GASE to Hydraulics Unit theoretical scour:
EB1 GASE = Theoretical
B1 GASE = Theoretical which is also coincident with top of rock.

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 12, "Soil Test Results", for samples:
SS-3
SS-4

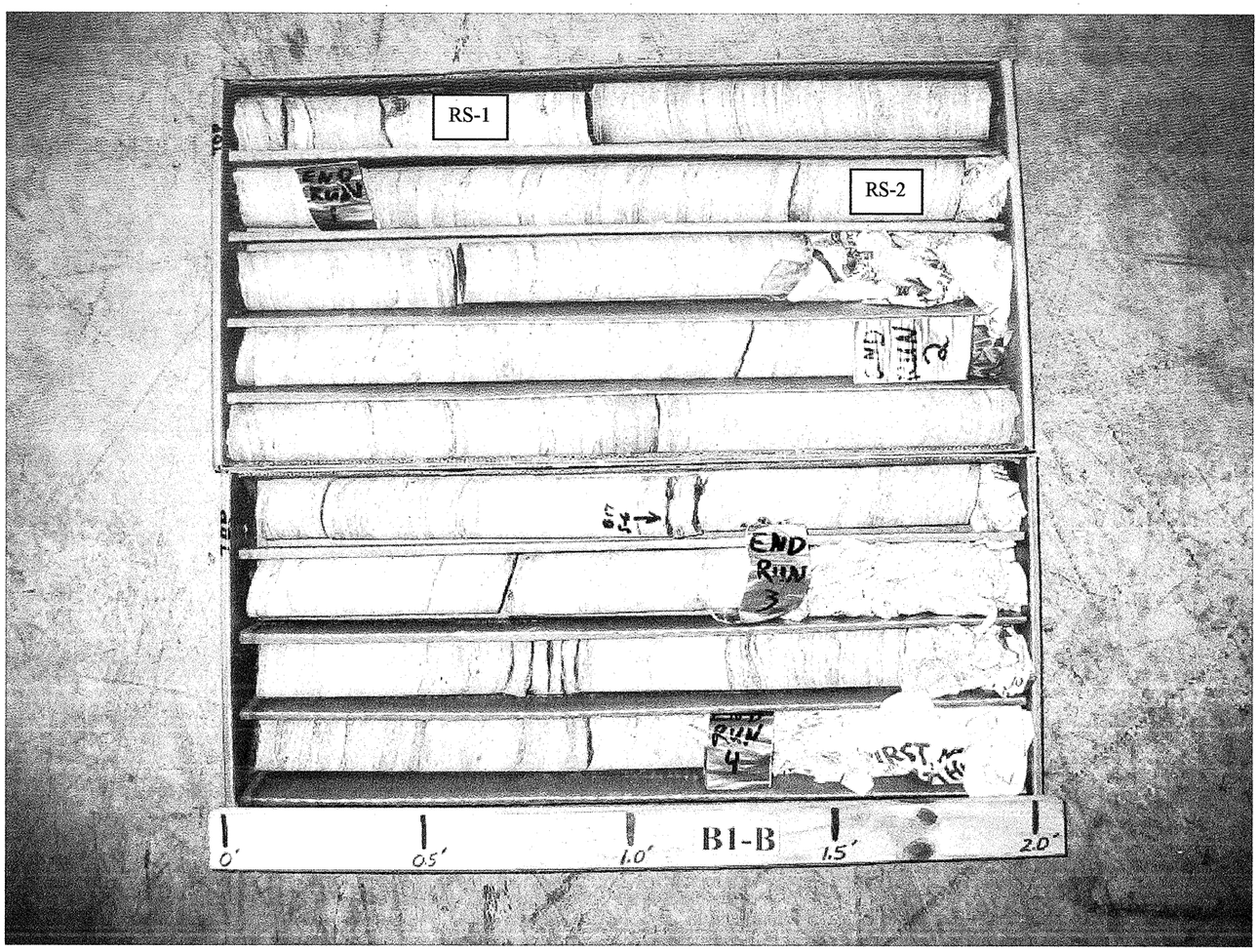
Template Revised 08/22/05

Reported by: ____ **Date:** 10/6/2005
Todd / Little

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, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the geotechnically adjusted scour elevation (GASE) 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 theoritical scour and the GASE. If the GASE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The GASE 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.

CORE PHOTOS



EXISTING BRIDGE LINE AHEAD

EXISTING BRIDGE LINE BACK