STATE	STATE PROJECT REFERENCE NO.		SHEET NO.	TOTAL SHEETS
N.C.	42330.1.1 (B-5173)		1	7
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION		
42330.1.1	BRZ-1328(6)	P.E.		
		R/W & UTIL.		

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 42330.1.1 (B-5173) F.A. PROJ. BRZ-1328(6)

COUNTY SURRY

PROJECT DESCRIPTION BRIDGE # 39 ON SR 1328 (HAYSTACK RD) OVER MITCHELL RIVER

INVENTORY

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.

PERSONNEL

J. E. ESTEP

C. C. MURRAY

M. R. MOORE

INVESTIGATED BY R. Q. CALLAWAY

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE SEPTEMBER 2012

NORTH CAROLINA LICENSED SEAL 1104 GEOLOGIST CLINTON B. LITTLE

11-9-12

ID: B-5173

CONTRACT:

DRAWN BY: C. E. BURRIS

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.

PROJECT REFERENCE NO.	SHEET NO.
42330.1.1 (B-5173)	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													
#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	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
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 MX	11 MN	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	
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	N/A
	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
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

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

SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

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

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
- [X] TRICONE 2 15/16" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

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

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

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 (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

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:

ELEVATION: _____ FT.

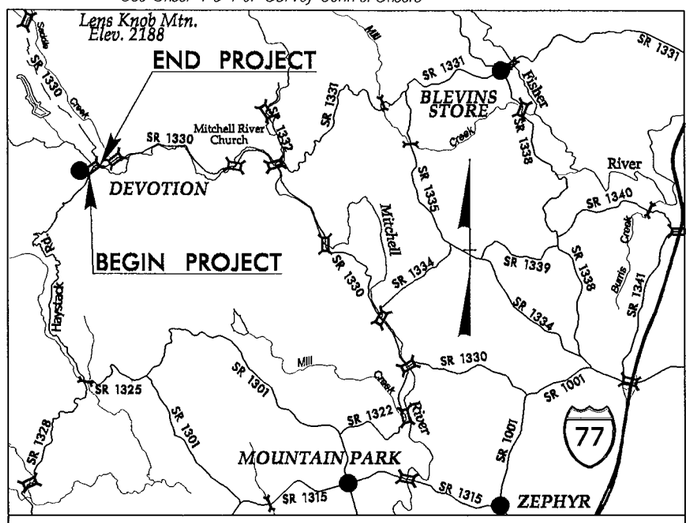
NOTES:
BORINGS EB1-A AND EB2-A WERE DRILLED FOR THE PURPOSE OF BRIDGE FOUNDATION DESIGN AND ARE NOT SHOWN ON THE PROFILE OF THIS PROJECT. THE LOGS FOR THESE BORINGS ARE ATTACHED FOR INFORMATIONAL PURPOSES.

REVISED 09/23/09

05/30/50

TIP PROJECT: B-5173

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols
See Sheet 1-C For Survey Control Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

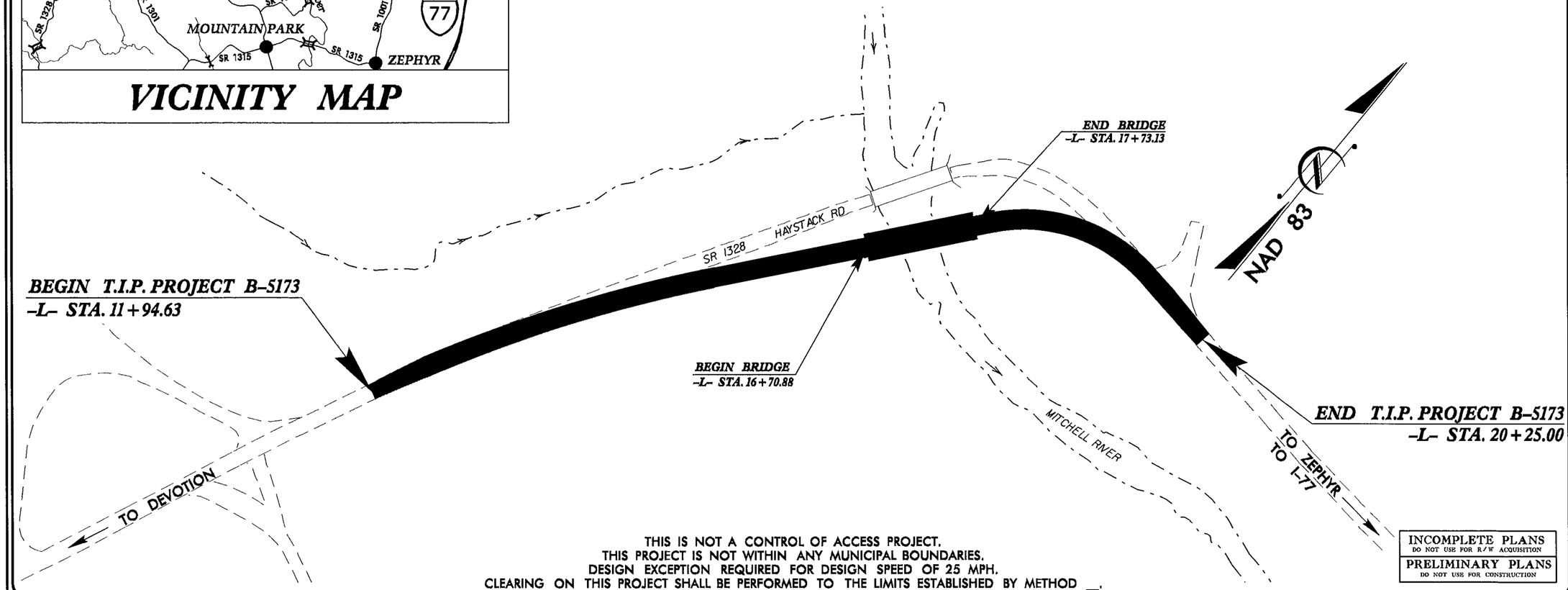
SURRY COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5173	2A	7

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
42330.1.1	BRZ-1328(6)	PE

LOCATION: BRIDGE No. 39 ON SR 1328 (HAYSTACK RD) OVER MITCHELL RIVER

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE



THIS IS NOT A CONTROL OF ACCESS PROJECT.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED OF 25 MPH.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD __.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

DESIGN DATA

ADT 2010 = 150
ADT 2035 = 250
DHV = 10 %
D = 60 %
T = 5 % *
** V = 55 MPH
* TTST = 2% DUAL 3%
FUNC CLASS = RURAL LOCAL
SUB REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT B-5173 = 0.138 MI

LENGTH STRUCTURE T.I.P. PROJECT B-5173 = 0.019 MI

TOTAL LENGTH OF T.I.P. PROJECT B-5173 = 0.157 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: FEBRUARY 20, 2015

LETTING DATE: FEBRURAY 16, 2016

JASON MOORE, PE
PROJECT ENGINEER

NYA K. BOAYUE, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
42330.1.1 (B-5173)	3

EARTHWORK BALANCE SHEET

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

September 29, 2012

STATE PROJECT:	42330.1.1 (B-5173)
FEDERAL PROJECT:	BRZ-1328(6)
COUNTY:	Surry
DESCRIPTION:	Bridge 39 on SR 1328, (Haystack RD) over Mitchell River.
SUBJECT:	Geotechnical Report – Inventory

Project Description

The project location is in the west edge of Surry County, near the junction of the borders of Alleghany, Wilkes and Surry, about 5 miles northwest of US 21 on SR 1328. SR 1328 (Haystack Road), is a rural, two-lane unpaved roadway. The existing bridge over Mitchell River is 77.6' long, single lane, one span, steel pony truss bridge on concrete abutments. The historical significance of the bridge is unknown. Proposed improvements will relocate the bridge and approaches approximately 20' to the south. Total length of the project is 831'.

This report addresses the roadway portion of the project. The approach roadway will be widened to provide two 9' travel lanes plus 4' shoulders. The new bridge approaches are all on embankment section, up to 7' thick at the bridge.

The Geotechnical Engineering Unit conducted a total of eight Standard Penetration Test borings, four at the bridge end bents, and four in the approaches. The object of concern was possible soft soil in the flood plain. The subsurface soil was found to be coarse grained alluvial sediment, around 5 feet thick, over residual soil, a favorable subgrade material.

Areas of Special Geotechnical Interest

This is a stream classified as high quality water, with trout.

Physiography and Geology

The new roadway begins at elevation 1360.35' at –L- 11+94, and follows the existing embankment, gradually diverging to the south and widening the existing road. At about –L- 14+50, the centerline of the new road has left the existing road and is at about 1357' elevation. The roadway will approach and cross the new bridge at about elevation 1356, so as the ground drops away, an embankment of about 3' thickness is required at the end bent 1 approach, and 7' on the end bent 2 approach. After crossing the bridge the road descends on embankment fill to rejoin the existing roadway embankment at L- 20+25, elevation 1351.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850
Fax: 919-250-4237

www.ncdot.gov/doh/preconstruct/highway/geotech

LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

Hydrology

The streambed elevation is about 1341' without well-developed stream banks at the bridge location. Alluvial deposits, mostly gravel, are deeper on the east side of the river and indicate a residual surface sloping slightly to the east.

The Mitchel River valley runs from west to east, with numerous side creeks dropping into it from higher ground to the north and south. At the bridge, the stream channel is about 35' wide; depth of water is two foot or less at normal flow.

Geology

The lithology underlying the site is within the Blue Ridge Belt, Zabg, gneiss of the Alligator Back Formation. Rock core samples were not obtained.

Rock

Drilling for the bridge found rock at elevation 1315, about 30 feet below land surface.

Soils

Alluvial

The boring at –L- 14+00 found silt soil with gravel and cobbles. From –L- 15+50 to the end of project at –L-20+25 the soil from the borings was consistently coarse sand to cobbles of quartzite, around 5' thick.

Residual

Residual soil below the alluvium was highly weathered gneiss and schist, slightly to strongly micaceous, 20' thick over weathered rock.

Fill

Fill soil was drilled at the beginning and end of the project where the new road will meet the existing embankment. The embankment soil was analyzed as A-6, apparently derived from an unknown borrow pit outside of the alluvial soil of the valley floor.

Groundwater

Most of the borings found the water table to be at 1345, somewhat higher than the stream surface elevation; possibly an effect of the frequent rains this summer.

Respectfully Submitted,

Roger Q Callaway
Project Engineering Geologist

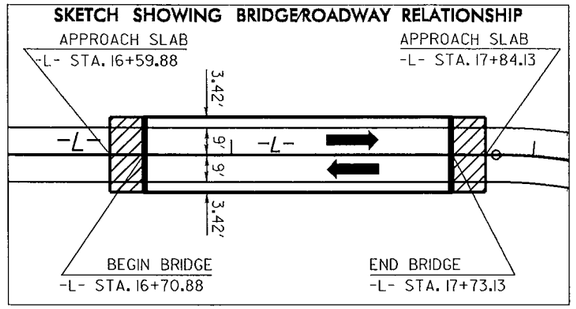
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
B-5173	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SKETCH SHOWING BRIDGE/ROADWAY RELATIONSHIP



BM1 ELEVATION - 1355.13'
N 982359. E 1436167.
BL STATION 11+93.00 7.00' LEFT
DISK IN HEADWALL 145 HLZ 1969

BEGIN TIP PROJECT B-5173
-L- STA. 11+94.53

-L- PC Sta. 11+42.98

-BL- 4 POT

-L- POT Sta. 10+00.00

-L- PCC Sta. 11+94.53

-L- PT Sta. 15+26.41

-BL- 5 PINC
-BYI- 7 POT

-L- PC Sta. 17+87.66

REMOVE EXIST. BRIDGE

-BYI- 8 POT

-L- PT Sta. 19+48.63

END TIP PROJECT B-5173
-L- STA. 20+25.00

-L- POT Sta. 21+67.99

-BL- 6 POT

ROADWAY EMBANKMENT

ALLUVIAL

ARCADIA LLC.
DB 0511 PG 1434

KATHRYN TAYLOR REYNOLDS
DB 1101 PG 364

GRASS

CORN FIELD

WOODS

MITCHELL RIVER

TO US 21

TO I-77

-L-		
PI Sta 11+68.76 Δ = 1° 28' 35.8" (RT) D = 2° 51' 53.2" L = 51.54' T = 25.77' R = 2,000.00' V_d = 50 MPH	PI Sta 13+61.31 Δ = 14° 05' 07.6" (RT) D = 4° 14' 38.9" L = 331.88' T = 166.78' R = 1,350.00' V_d = 25 MPH	PI Sta 18+76.37 Δ = 59° 53' 28.3" (RT) D = 37° 12' 18.2" L = 160.98' T = 88.72' R = 154.00' V_d = 50 MPH

SEE SHEET 5 FOR PROFILE

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-5173	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L- SR 1328 HAYSTACK RD.

BM#1 DISK IN HEADWALL 145 HLZ 1969
N 982359 E 1436167 ELEV = 1355.13'

***DESIGN EXCEPTION REQUIRED FOR VERTICAL CURVE K-VALUES AND ASSOCIATED SSD.**

PI = 13+97.00
EL = 1,356.90'
K = 115
VC = 162'
V = 55

PI = 18+40.00
EL = 1,355.57'
K = 32*
VC = 100'
V = 35

PI = 19+75.00
EL = 1,351.01'
K = 28*
VC = 100'
V = 25

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2,400	CFS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 1350.1	FT
BASE DISCHARGE	= 3,479	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 1350.78	FT
OVERTOPPING DISCHARGE	= N/A	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= N/A	FT
	=	FT
DATE OF SURVEY	=	
W.S. ELEVATION AT DATE OF SURVEY	= 1344.5	FT

BEGIN GRADE
-L- STA. 11+94.53
ELEV. 1,360.35'

BEGIN BRIDGE
-L- STA. 16+70.88

END BRIDGE
-L- STA. 17+73.13

BEGIN APPROACH SLAB
-L- STA. 16+59.88

END APPROACH SLAB
-L- STA. 17+84.13

END GRADE
-L- STA 20+25.00
ELEV. = 1,351.13'

SS-6 SS-9 — 14+00 -L- 15' RT — (-)17.040%
SS-8 SS-7 — 16-20 -L- C/L — (-)0.3002%
SS-3 SS-4 SS-5 — EB1-B 16+87 -L- 15' RT
EB2-B 17+73 -L- 15' RT — 18+45 -L- C/L — (-)3.3778%
SS-10 — 20+15 -L- 10' RT — (+)0.2500%

ROADWAY EMBANKMENT
RED-BROWN MED. STIFF MOIST SILTY SANDY CLAY (A-6)

ALLUVIAL
GRAY MOIST MED. STIFF CLAYEY SANDY SILT WITH GRAVEL AND COBBLES (A-4)

RESIDUAL
TAN, MOIST, STIFF, CLAYEY SANDY SILT, POSSIBLY MICACEOUS

ALLUVIAL
TAN MEDIUM DENSE MOIST SILTY SAND, GRAVEL AND COBBLES (A-1-b)

RESIDUAL
MED. STIFF, MOIST, BROWN CLAYEY SANDY SILT, PROBABLY MICACEOUS. (A-6)

RESIDUAL
MOIST, STIFF TO HARD, OLIVE GREEN CLAYEY SANDY SILT

SEVERELY WEATHERED NON-CRYSTALLINE ROCK (MICA SCHIST)

NON-CRYSTALLINE ROCK (SCHIST)

LOW SIDE, LOW STEEL

ALLUVIAL
MEDIUM DENSE, WET, GRAY SAND, GRAVEL AND COBBLES

RESIDUAL
STIFF MOIST, TAN-BROWN SANDY CLAYEY SILT, PROBABLY MICACEOUS

SEVERELY WEATHERED CRYSTALLINE ROCK W/ LAYER OF CRYSTALLINE ROCK FROM 22.9-23.0'

CRYSTALLINE ROCK

ROADWAY EMBANKMENT
RED-BROWN MED. STIFF MOIST SILTY SANDY CLAY

ALLUVIAL
LOOSE TO DENSE WET SAND, GRAVEL AND COBBLES, HIGH N VALUES POSSIBLE FROM GRAVEL OR COBBLES.

RESIDUAL
HARD MOIST TO WET, GRAY-WHITE-TAN SANDY SILT, PROBABLY MICACEOUS.

BT

BORING DESCRIPTIONS

(A) ALLUVIAL, MED. STIFF, MOIST TO WET, GRAY & TAN SANDY SILT AND GRAVEL (A-4)
(B) RESIDUAL, STIFF TO HARD, MOIST TO WET, GRAY & TAN VERY MICACEOUS CLAYEY SANDY SILT (A-5)
(C) RESIDUAL, VERY STIFF TO HARD, WET, TAN SLIGHTLY MICA., SANDY SILT (A-4)
(D) LOOSE SAND AND GRAVEL WITH COBBLES

1,395 1,385 1,375 1,365 1,355 1,345 1,335 1,325 1,315 1,305 1,295 1,285 1,275

10 11 12 13 14 15 16 17 18 19 20 21

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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	Line or Boring ID
							C.SAND	F.SAND	SILT	CLAY	10	40	200			
SS-1	15 LT	17+73	0.0-1.5		*	*	44.2	39.0	16.8	0.0	60	44	13	-	-	L
SS-2	15 LT	17+73	7.0-9.5	A-4(0)	35	NP	37.4	34.9	27.7	0.0	96	68	36	-	-	L
SS-3	15 RT	16+67	0.0-1.5	A-4(2)	36	5	7.5	46.5	29.9	16.2	95	91	56	-	-	L
SS-4	15 RT	16+67	17.0-18.5	A-5(0)	43	NP	1.4	80.4	16.2	2.0	100	100	38	-	-	L
SS-5	15 RT	16+67	22.2-23.7	A-4(0)	37	NP	3.4	67.3	25.3	4.0	100	100	47	-	-	L
SS-6	CL	16+20	0.0-2.0	A-1-b(0)	27	NP	31.3	38.4	22.2	8.1	41	32	16	-	-	L
SS-7	CL	16+20	9.0-10.5	A-5(4)	47	7	6.5	50.9	34.5	8.1	98	95	59	-	-	L
S-8	15 RT	14+00	0.0-1.5	A-6(4)	35	12	12.9	37.8	21.0	28.3	87	79	51	-	-	L
SS-9	15 RT	14+00	3.8-5.3	A-4(0)	28	NP	5.7	61.2	21.0	12.1	100	98	44	-	-	L
SS-10	10 RT	20+15	4.0-5.5	A-4(0)	29	NP	14.5	49.3	24.0	12.1	94	88	43	-	-	L

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42330.1.1	**TIP** B5173	**COUNTY** SURRY	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 16+68	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 1,350.5 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 982,321	**EASTING** 1,436,186	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/26/12	**COMP. DATE** 07/26/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
1355											
1350										1,350.5 GROUND SURFACE	0.0
1345										**ALLUVIAL** 0 - 7 ALLUVIAL, TAN MOIST MED. STIFF, MICACEOUS SANDY SILT AND GRAVEL	
	1,343.3	7.2	9	8	5	13		M		1,343.5	7.0
1340										**RESIDUAL** 7 - 26 RESIDUAL, TAN MOIST, HIGHLY MICACEOUS VERY STIFF TO HARD FINE SANDY SILT (MICA SCHIST)	
	1,338.3	12.2	5	7	11	18		M			
1335											
	1,333.0	17.5	8	5	10	15		M			
1330											
	1,328.5	22.0	14	19	19	38		M			
1325											
	1,323.5	27.0	44	56/.3		100/.8		M		1,324.5	26.0
1320										**WEATHERED ROCK** 26 - 28 WEATHERED ROCK (MICA SCHIST)	
	1,318.5	32.0	6	8	31	39		M		1,322.5	28.0
1315										**RESIDUAL** 28-38.5 RESIDUAL, TAN MOIST HARD HIGHLY MICACEOUS FINE SANDY SILT (MICA SCHIST)	
	1,313.5	37.0	15	39	51	90		M			
										1,312.0 Boring Terminated at Elevation 1,312.0 ft in highly micaceous fine sandy silt	38.5

NCDOT BORE SINGLE B5173_GEO_BH_BRDG0039_SURRY(BRIDGE2).GPJ NC_DOT.GDT 9/17/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 42330.1.1	**TIP** B5173	**COUNTY** SURRY	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE # 39 OVER MITCHELL RIVER BETWEEN SR 1301/1325 AND SR 1330 REYNOLDS RD				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 17+73	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.0
COLLAR ELEV. 1,346.8 ft	**TOTAL DEPTH** 28.3 ft	**NORTHING** 982,405	**EASTING** 1,436,250	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 80% 11/28/11		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/25/12	**COMP. DATE** 07/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
1350											
	1,346.8	0.0								1,346.8 GROUND SURFACE	0.0
1345			5	20	10	30	SS-1	M		**ALLUVIAL** 0 - 5 ALLUVIAL, MOIST, SAND PLUS COBBLES, LOOSE TO MEDIUM DENSE	
	1,344.8	2.0	15	25	3	28		M		1,341.8	5.0
1340										**RESIDUAL** 5 - 17.8 RESIDUAL, TAN TO GREEN, STIFF TO VERY STIFF, MOIST, SANDY SILT, SLIGHTLY MICACEOUS (A-4)	
	1,339.8	7.0	10	8	12	20	SS-2	M			
1335											
	1,335.0	11.8	2	3	8	11		M			
1330											
	1,330.0	16.8	13	65	60/.1	60/.1		M		1,329.0	17.8
1325										**NON-CRYSTALLINE ROCK** 17.8 - 22.4 NON-CRYSTALLINE ROCK LAYERED WITH SEVERELY WEATHERED NON-CRYSTALLINE ROCK	
	1,325.0	21.8	50	60/.1		60/.1		M		1,324.4	22.4
1320										**WEATHERED ROCK** 22.4 - 28.3 SEVERELY WEATHERED NON-CRYSTALLINE ROCK	
	1,320.0	26.8	13	37	63	100/.1		M		1,318.5 Boring Terminated at Elevation 1,318.5 ft in severely weathered non-crystalline rock	28.3

NCDOT BORE SINGLE B5173_GEO_BH_BRDG0039_SURRY(BRIDGE2).GPJ NC_DOT.GDT 9/17/12