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REFERENCE: I-4400C BB

PROJECT: 36030

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-4700C 440233	1	31

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY HENDERSON

PROJECT DESCRIPTION I-4400C, I-26 FROM US 25 TO NC 280

SITE DESCRIPTION BRIDGE NO. 233 ON I-26 OVER CANE CREEK

NOTE: BORING LOCATIONS UPDATED TO LOCATIONS ON ALIGNMENT FOR I-4400C, SEPTEMBER, 2018

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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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT 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 THE 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.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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.

PERSONNEL

F&R CONSULTANTS

B HOWEY

L GILCHRIST

INVESTIGATED BY

DRAWN BY

CHECKED BY

SUBMITTED BY J KUHNE

DATE UPDATE 10/2018

NORTH CAROLINA PROFESSIONAL SEAL 027361 ENGINEER JODY C. KUHNE

DocuSigned by:

Jody C. Kuhne

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SIGNATURE

11/1/2018

DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.		SHEET NO.
I-4400C	440228	2

SITE PLAN

0 40 80

FEET

SKEW = 90

EB2-A

B2-A

EB1-A

B1-A

EB2-C

B2-C

EB1-C

B1-C

EB2-B

B2-B

EB1-B

B1-B

EIP

48" WW & ISBW

EXISTING R/W

CANE CREEK

755

24" RC

MTL

NOTE: BORING LOCATIONS UPDATED TO LOCATIONS ON ALIGNMENT FOR I-4400C, SEPTEMBER, 2018

PROJECT: 8.1952001 ID: I-4400

CONTENTS:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-4400	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
8.1952001	NHF-26-1-(62)23	P.E.	
		CONST.	

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT 8.1952001 I.D. NO. I-4400

F.A. PROJECT NHF-26-1-(62)23

COUNTY HENDERSON

PROJECT DESCRIPTION I-26 FROM NC 225 (US 25 CONNECTOR) TO NC 280 IN HENDERSON AND BUNCOMBE COUNTIES

SITE DESCRIPTION BRIDGE NOS. 233 & 234 ON I-26 OVER CANE CREEK

DRAWN BY: F.W. RACEY, Jr.

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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 UNIT @ (919) 250-4088. THE SUBSURFACE PLANS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA, AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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.

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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.

INVESTIGATED BY L.B. GILCHRIST PERSONNEL D. CARR

CHECKED BY E.C. HOWEY, L.G., P.E. J. GILCHRIST

SUBMITTED BY F&R, INC. M. RENZA

DATE 2/01 J. LOWERY

NORTH CAROLINA LICENSED SEAL 671 GEOLOGIST ELIZABETH C. HOWEY

3/7/01 SEAL

Elizabeth C. Howey

SIGNATURE ELIZABETH C. HOWEY, L.G., P.E.

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
I-4400	8.1952001	2	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL 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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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 • 40 • 200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 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 PLASTIC INDEX	6 MX		N.P.	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
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

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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 0.5
	MEDIUM STIFF	4 TO 8	0.5 TO 1
	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	2.0	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
NON PLASTIC	0-5	VERY LOW
SLIGHT 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, YEL-BRN, 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 ARE 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 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 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 24-48 HOURS.
- PW — PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA
- SPRING OR SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/825 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- 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
RS- ROCK SAMPLE
RT- RECOMPACTED TRIAXIAL SAMPLE
CBR - CBR 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
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- ☐ MOBILE B-___
- ☐ BK-51
- ☐ CME-45
- ☐ CME-550
- ☐ PORTABLE HOIST
- ☒ OTHER CME-550 TRACK
- ☐ OTHER_____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☐ 6" CONTINUOUS FLIGHT AUGER
- ☒ 8" HOLLOW AUGERS
- ☐ HARD FACED FINGER BITS
- ☐ TUNG.-CARBIDE INSERTS
- ☐ CASING ☐ W/ ADVANCER
- ☐ TRICONE_____" STEEL TEETH
- ☒ TRICONE 2 7/8 " TUNG.-CARB.
- ☐ CORE BIT
- ☒ OTHER 3 1/4" I.D. HSA

HAMMER TYPE:
- ☒ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ☒ -N WD4 SICB
- ☐ -H_____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 YIELDS SPT N VALUES > 100 BLOWS PER FOOT.
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 ROCKS 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 GEOLOGISTS 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 GEOLOGISTS 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 GEOLOGISTS 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 WHICH 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 IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - 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.

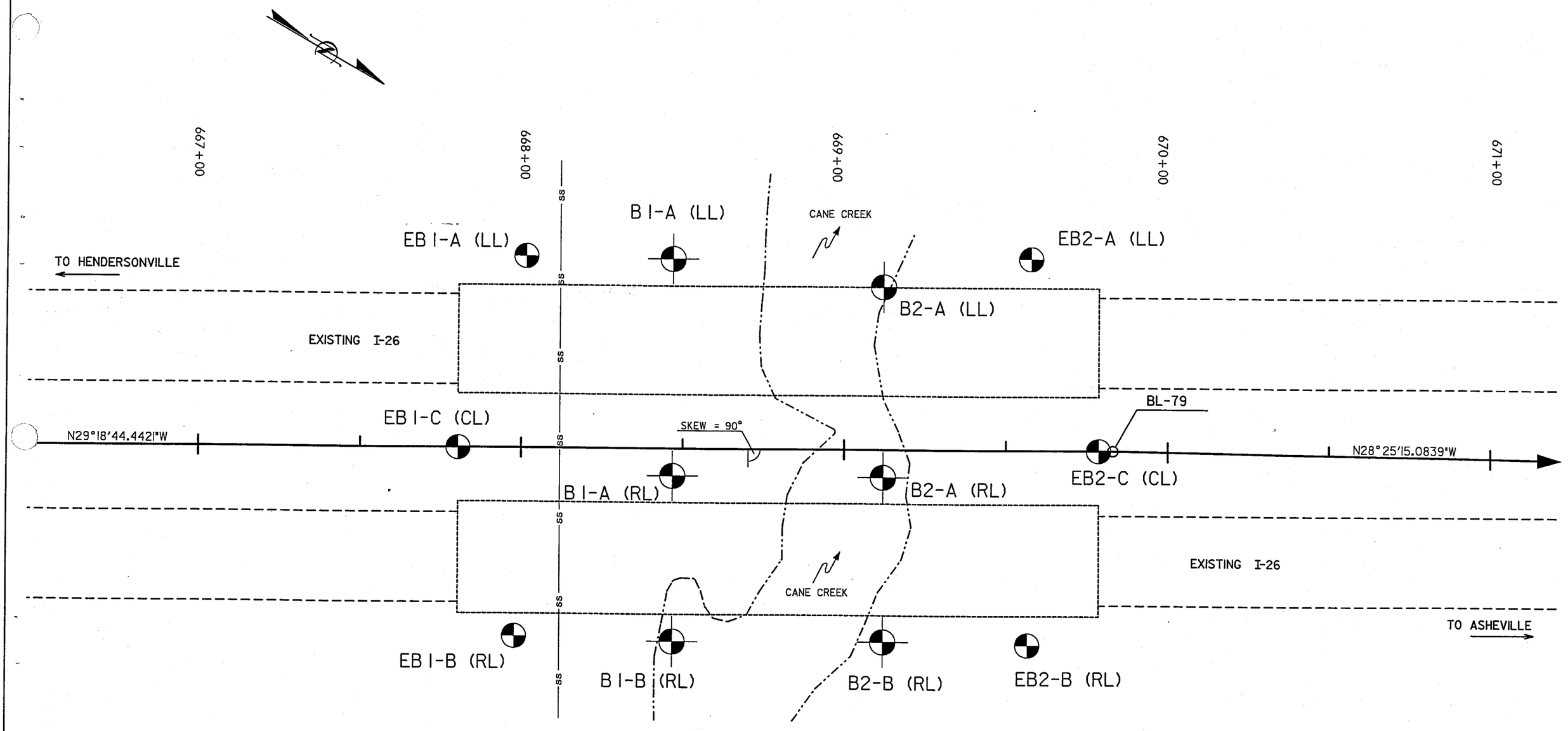
TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL POINT #79
NORTHING=625,527.4150 EASTING=950,332.8530
ELEVATION: 2070.3460'

NOTES:

REVISED 09/15/00

TEST SITE PLAN



NOTES:
1) CREEK BANKS SURVEYED BY F&R 1/2001.
2) BL-79 = 625527.4150,950332.8530

0 15' 30'
SCALE IN FEET

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(919) 828-3441; Fax: (919) 828-5751

CLIENT: N.C. Department of Transportation	
LOCATION: Bridge nos. 233 & 234 on I-26 over Cane Creek	
STATE PROJ. No.: 8.1952001	COUNTY: Henderson
TIP No.: I-4400	FA No.: NHF-26-1-(62)23
DATE: 2/01 SCALE: 1"=30'	DRAWING No.: 1

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB1-A (LL)	BORING LOCATION ~~Sta 551+52~~ 755+52	OFFSET ~~59 Lt~~ 61 Lt	ALIGNMENT ~~-L-~~ L	0 HR. 26.0
COLLAR ELEV. 2056.1 ft	NORTHING 625,339.84	EASTING 950,369.81	48 HR. 9.2
TOTAL DEPTH 28.6 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/17/01	COMPLETED 1/17/01	SURFACE WATER DEPTH N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2056.1					Ground Surface				2056.1ft 0.0ft
2055									-ARTIFICIAL FILL- Rip Rap 1.0'-4.0' in diameter.
									2051.1ft 5.0ft
2050	6.5	2	2	3	5		M		-ALLUVIUM- Light tan-orange, SILT (A-4), with trace coarse sand.
	8.5	1	2	2	4	SS-2	23.8%		2047.3ft 8.8ft
2045	13.5								Tan and brown, fine sandy SILT (A-4), with trace coarse sand & trace clay.
		7	10	8	18		W		2042.6ft 13.5ft
									2041.1ft Gray, tan & green, sl. f. to cse. SAND (A-1-b), w/ some f. to cse. rndd. gravel 0.12' in dia. 15.0ft
2040	18.5								2040.1ft -RESIDUAL- Lusterous gray, SILT (A-4), saprolitic. 16.0ft
		100/0.3'			100+		M		-WEATHERED ROCK- Lusterous gray, thinly laminated PHYLLONITE.
2035	23.5	100/0.5'			100+		M		
2030	28.5	100/0.1'			100+				2027.5ft 28.6ft
									Boring terminated at elev. 2027.5 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 8.8'.
2) Wet spoon at 13.5'.
3) Geologist indicates strata change in bottom of split spoon at 15.0'.
4) Driller indicates resistance at 16.0'.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB1-C (CL)	BORING LOCATION ~~667+80.4~~ 755+31	OFFSET CL	ALIGNMENT ~~EB~~ -L- 0 HR. 30.7
COLLAR ELEV. 2070.4 ft	NORTHING 625,350.71	EASTING 950,432.06	48 HR. 25.3
TOTAL DEPTH 34.5 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/15/01	COMPLETED 1/15/01	SURFACE WATER DEPTH N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2070.4					Ground Surface				2070.4ft 0.0ft
2070	0.0	2	3	4	7		M		**-ROADWAY EMBANKMENT-** Tan clayey SILT (A-4), with trace fine to coarse sand.
	3.5								
2065		6	3	4	7	SS-2	27.5%		
	8.5								2061.6ft 8.8ft
2060		10	4	3	7		M		Light gray-green to tan, silty CLAY (A-7-5), with trace angular gravel 0.1' in diameter.
	13.5								2056.9ft 13.5ft
2055		2	2	8	10	SS-4	29.3%		Gray-green & tan, clayey SILT (A-4), with trace fine to coarse sand.
	18.5								2051.7ft 18.7ft
2050		4	4	2	6	SS-5	35.6%		**-ALLUVIUM-** Gray, clayey SILT (A-4), with organics, mica, trace coarse sand & some fine sand.
	23.5								2046.9ft 23.5ft
2045		2	2	4	6	SS-6			Gray, fine to coarse SAND (A-3), with trace rounded gravel 0.05'-0.1' in diameter, trace silt & trace clay.
	28.5								2043.4ft 27.0ft
2040		100/0.3'			100+		D		**-WEATHERED ROCK-** Lusterous gray, thinly laminated PHYLLONITE.
	33.5	100/0.2'			100+		D		2035.9ft 34.5ft

Auger refusal at elev. 2035.9 feet on PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 8.8'.
2) Geologist indicates strata change in split spoon at 18.7'.
3) Driller indicates resistance at 27.0'.
4) No moisture test on SS-6.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

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N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB1-B (RL)	BORING LOCATION ~~357+96.0~~ 755+49	OFFSET 58.6' Rt.	ALIGNMENT ~~BK~~ L
COLLAR ELEV. 2056.2 ft	NORTHING 625,394.75	EASTING 950,474.54	0 HR. 20.7
TOTAL DEPTH 23.7 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/17/01	COMPLETED 1/17/01	SURFACE WATER DEPTH N/A	48 HR. 10.7

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2056.2					Ground Surface				2056.2ft 0.0ft
2055	5.0	2	4	4	8		M		**-ARTIFICIAL FILL-** Rip Rap 1.0'-4.0' in diameter. 2051.2ft 5.0ft
2050	8.5	2	2	40	42		M		**-ALLUVIUM-** Gray-tan to light brown, silty CLAY (A-7-5), with trace to little dark gray organics, trace fine sand & little mica. 2046.7ft 9.5ft
2045	13.5	70	30/0.1'		100+		M		**-RESIDUAL-** Gray, SILT (A-4), saprolitic. 2042.7ft 13.5ft
2040	18.5	100/0.2'			100+		M		**-WEATHERED ROCK-** Lusterous gray, thinly laminated PHYLLONITE.
2035	23.5	100/0.2'			100+		D		2032.5ft 23.7ft Boring terminated at elev. 2032.5 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 9.5'.
2) Wet spoon at 18.5'.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

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N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. B1-A (LL)	BORING LOCATION ~~568+46.9~~ 755+97	OFFSET 59.0' Lt.	ALIGNMENT ~~-BK-~~ -L	0 HR. 10.5
COLLAR ELEV. 2054.4 ft	NORTHING 625,379.81	EASTING 950,348.06	24 HR. 9.1
TOTAL DEPTH 45.0 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/17/01	COMPLETED 1/22/01	SURFACE WATER DEPTH N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2054.4					Ground Surface				2054.4ft 0.0ft
	0.0	1	1	2	3	SS-1-	22.4%		-ALLUVIUM- Brown, fine sandy SILT (A-4), with little clay & little coarse sand.
	3.5								2050.9ft 3.5ft
2050		2	2	3	5	SS-2	6.4%		Tan, fine to coarse SAND (A-2-4), with trace silt, trace clay & trace mica.
	8.5								2045.9ft 8.5ft
2045		2	2	5	7				2045.1ft Tan-brown, SILT (A-4), with trace mica & trace fine sand. 9.3ft
	13.5								Brown-orange, silty, f. to cse. SAND (A-3), w/ some fine to 0.16" dia. rounded gravel.
2040		100/0.5'			100+				2040.9ft 13.5ft
	18.8								2039.9ft -WEATHERED ROCK- Gray, severely weathered, thinly laminated PHYLLONITE, relict foliation at 45 deg. 14.5ft
2035		4	3	5					-NON-CRYSTALLINE ROCK- Gray, light green & white, mod. weathered, med. to mod. hard PHYLLONITE.
									2035.6ft 18.8ft
									2034.1ft -WEATHERED ROCK- Gray, completely weathered PHYLLONITE, with white quartz fragments. 20.3ft
2030									-NON-CRYSTALLINE ROCK- Gray to green, moderately severe to slightly weathered, medium to moderately hard PHYLLONITE.
2025									
2020									2020.8ft 33.6ft
									Light gray, very slightly weathered to fresh, hard to very hard QUARTZ PHYLLONITE.
2015									2011.9ft 42.5ft
									Gray to green, moderately weathered, moderately hard to hard PHYLLONITE.
2010									2009.4ft 45.0ft
									Coring terminated at elev. 2009.4 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 9.3'.
2) Driller switched to coring techniques at 14.0'.
3) N-value at 18.8' is not representative of material recovered.

NCDOT_BORE CANE_3PJ NCDOT.GDT 3/2/01

DATE: 01/22/01

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B1-A (LL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,054.4 ft. TOTAL DEPTH: 45.0 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,040.4 ft (14.0 ft)
2,040.4	14.0	1:51	4.8	4.2/4.8	1.2/4.8	1	LT. G	9 joints @ 45° parallel to foliation and lamination 1 joint @ 30° parallel to foliation and lamination 1 joint @ 45° perpendicular to main joint set STRATA REC. = 80% STRATA RQD. = 0%
		2:34		87.5%	25%			
		2:57						14.0 - 14.5 feet Gray and white severely weathered, soft phyllonite
		2:43						*Strata Change* 2,039.9 ft. (14.5 ft.)
		2:34/0.8'						14.5 - 18.8 feet Gray, Lt. green and white moderately weathered, medium hard to moderately hard phyllonite with wavy foliation and lamination at 45°. With white quartz and plagioclase between the laminations. Close fracture spacing. Trace pyrite and marcasite. STRATA REC. = 88% STRATA RQD. = 28%
2,035.6	18.8							*Strata Change* 2,035.6 ft. (18.8 ft.)
								SPT taken between 18. 8 - 20.3 feet, N = 8 Gray weathered phyllonite with white quartz fragments (Note: N value is not representative of material recovered) *Strata Change* 2,034.1 ft. (20.3 ft.)
2,034.1	20.3	4:07	4.7	4.6/4.7	2.6/4.7	2	LT. G	12 joints @ 45° parallel to foliation and lamination 2 joints @ 0° 1 joint @ 80° STRATA REC. = 97% STRATA RQD. = 41%
		5:06		97.9%	55.3%			
		4:24						20.3 - 25.0 feet Gray and green - gray moderate to slightly weathered, moderately hard phyllonite with wavy foliation and white plagioclase quartz. between foliations. Close fracture spacing. Trace pyrite and marcasite. Lusterous gray along cleaved lamination surfaces.
		3:59						
2,029.4	25.0	2:41/0.7'						
2,029.4	25.0	2:49	5	4.7/5.0	1.2/5.0	3	LT. G	12 joints @ 45° parallel to foliation and lamination 1 joint @ 0° 1 joint @ 60°
		4:10		94%	24%			
		4:06						25.0 - 30.0 feet Dark and light gray to green - gray moderately severe to moderately weathered, medium hard phyllonite with foliation and lamination at 45° and white quartz and plagioclase between foliations. Very close to close fracture spacing. Trace marcasite and pyrite. Silky luster on cleavage.
		2:17						
2,024.4	30.0	2:44						
2,024.4	30.0	2:32	5	5.0/5.0	1.7/5.0	4	LT. G	10 joints @ 45° parallel to foliation 6 joints @ 0° 1 joint @ 60°
		2:58		100%	34%			
		3:34						30.0 - 33.6 feet Lusterous gray to green - gray and white moderate to slightly weathered, moderately hard phyllonite with wavy foliation and thin laminations at 45°. Some white quatrz interfolded. Close fracture spacing. Trace pyrite and marcasite. Silky luster on most cleaved surfaces. From 33.6 to 35.0 feet the rock is composed of mostly quartz.
		3:05						
		3:30						*Strata Change* 2,020.8 ft. (33.6 ft.)
2,019.4	35.0							
2,019.4	35.0	3:32	5	4.9/5.0	1.97/5.0	5	LT. G	8 joints @ 45° parallel to foliation 4 joints @ 45° perpendicular to foliation 2 joints @ 80° STRATA REC. = 99% STRATA RQD. = 43%
		4:52		98%	39.4%			
		3:54						33.6 feet to 40.0 feet Light gray very slightly weathered, hard to very hard quartz phyllonite with interbedded thinly laminated phyllonite layers. Close fracture spacing. Trace pyrite and marcasite. White veining throughout the quartz phyllonite.
		3:42						
2,014.4	40.0	3:22						*Rock Test 2 between 35.6 - 36.4 feet, unconfined compressive strength = 7144.74 psi*

Continued on next sheet

SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 14.0 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 14.0 - 45.0 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

DATE: 01/22/01

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B1-A (LL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,054.4 ft. TOTAL DEPTH: 45.0 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
2014.4	40.0		5	5.0/5.0	1.85/5.0	6		2,014.4 ft. (40.0 ft.)
		2:10		100%	37%		LT. G	5 joints between 15° and 30° along foliation
		2:26						40.0 - 42.5 feet
		3:10						Light gray fresh, hard quartz phyllonite with white quartz veining. Close to moderately close fracture spacing.
		3:09						*Strata Change* 2,011.9 ft (42.5 ft)
		2:30						8 joints between 0° and 15° along foliation **STRATA REC. = 100%** **STRATA RQD. = 0%**
2009.4	45.0							42.5 - 45.0 feet Dark gray to light gray and gray green moderately weathered, moderately hard to hard phyllonite with white quartz and plagioclase between foliations. Close fracture spacing. 2,009.4 ft. (45.0 ft.)

Coring terminated at elev. 2,009.4 feet in phyllonite

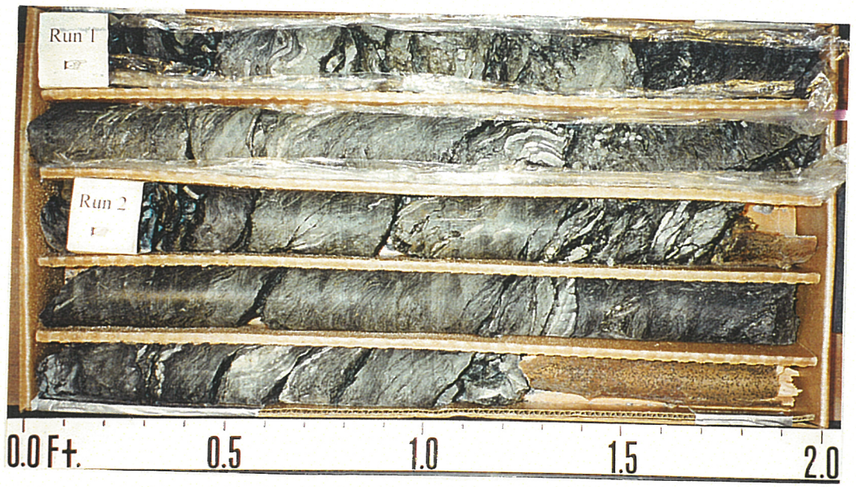
SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 14.0 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 14.0 - 45.0 feet.

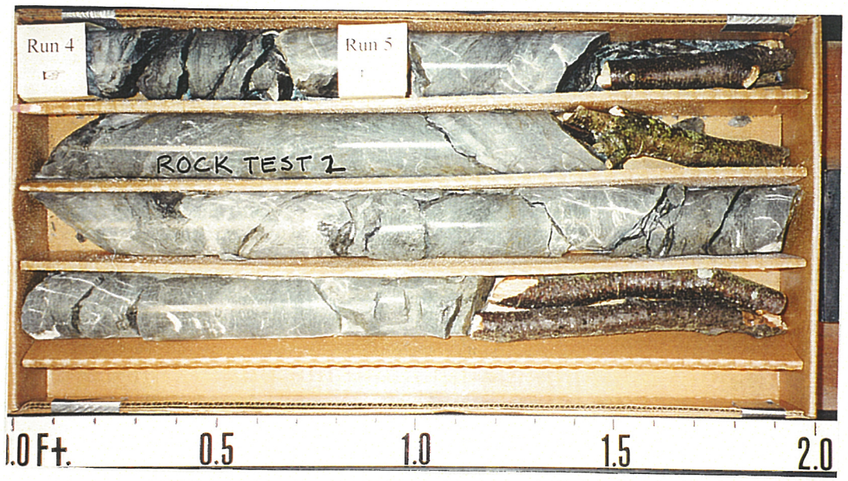
WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

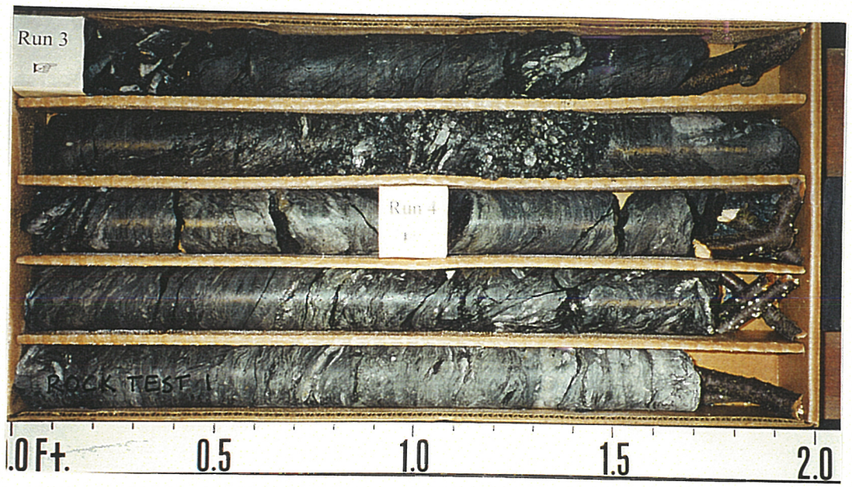
CORE PHOTOGRAPHS



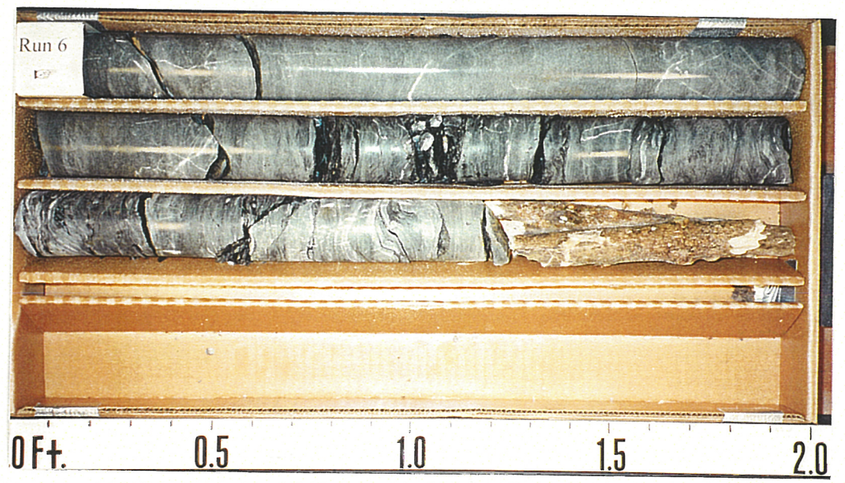
B1-A (LL): Run 1 and Run 2



B1-A (LL): Run 4 (cont.) and Run 5



B1-A (LL): Run 3 and Run 4 (part)
Note: Rock Test 1 broke during trimming and could not be tested.



B1-A (LL): Run 6

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. ~~B1-A (RL)~~ B1-C	BORING LOCATION ~~668+40.9~~ 755+97	OFFSET ~~85 RT~~ 8 RT	ALIGNMENT ~~-L-~~ L	0 HR. 7.1
COLLAR ELEV. 2051.7 ft	NORTHING 625,412.86	EASTING 950,406.92		48 HR. 5.8
TOTAL DEPTH 47.4 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic	
DATE STARTED 1/23/01	COMPLETED 1/23/01	SURFACE WATER DEPTH N/A		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2051.7					Ground Surface				2051.7ft 0.0ft
2050	2.0	1	4	4	8		M		-ALLUVIUM- Tan, silty fine SAND (A-2-4), with trace to little mica.
2045	7.0	1	2	4	6		W		2044.7ft 7.0ft; 2043.5ft Brown, silty CLAY (A-7-5), with some fine sand, trace mica, some leaves. 8.2ft; Silty, fine to coarse SAND (A-1-b) and 0.15' dia. rounded gravel. 2040.7ft 11.0ft; -WEATHERED ROCK- Gray PHYLLONITE. 2039.3ft 12.4ft
2040	12.0	100/0.4			100+				-NON-CRYSTALLINE ROCK- Gray-green & white, moderately severe to moderately weathered, medium to moderately hard PHYLLONITE.
2035									
2030									
2025									
2020									
2015									
2010									
2005									2004.3ft 47.4ft Coring terminated at elev. 2004.3 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 8.2'.
2) Driller indicates resistance at 11.0'.
3) Driller switched to coring techniques at 12.4'.

NCDOT_BORE CANE_3PJ NCDOT.GDT 3/2/01

DATE: 01/23/01

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B1-A (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,051.7 ft. TOTAL DEPTH: 47.4 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,039.3 ft. (12.4 ft)
2,039.3	12.4	4:37	5	5.0/5.0	0.0/5.0	1	LT. G	18 joints @ 45° parallel to foliation and laminations 6 joints between 0° and 10° 1 joint @ 80° 1 joint @ 45° perpendicular to main joint set **STRATA REC. = 94%** **STRATA RQD. = 11%** 12.4 - 17.4 feet Gray and white moderately severe to moderately weathered, medium hard thinly laminated phyllonite with white plagioclase and quartz lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnet.
		4:08		100%	0%			
		3:35						
		3:24						
2,034.3	17.4	3:50						
2,034.3	17.4	3:52	5	4.8/5.0	0.72/5.0	2	LT. G	14 joints @ 45° parallel to foliation and lamination 3 joints @ 60° parallel to foliation and lamination 12 joints @ 0° parallel to foliation and lamination 1 joint @ 80° 17.4 - 22.4 feet Gray - green and white moderately weathered, medium hard thinly laminated phyllonite with white plagioclase and quartz lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnet. Lusterous gray on cleaved surfaces. Very severely weathered from 17.7 to 17.8 feet. Very close fracture spacing from 17.4 to 17.6 feet. The missing recovery washed out in this zone.
		3:29		96%	14.4%			
		5:18						
		4:58						
2,029.3	22.4	4:46						
2,029.3	22.4	3:57	5	3.85/5.0	0.0/5.0	3	LT. G	13 joints @ 45° parallel to foliation 8 joints @ 0° 22.4 - 27.4 feet Gray and white moderately weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnet. Increased percentage of quartz in the rock matrix. Lusterous gray on cleaved surfaces. Very close fracture spacing from 25.2 to 25.3 feet. Missing recovery washed out in this zone.
		4:45		77%	0%			
		4:58						
		3:51						
2,024.3	27.4	3:06						
2,024.3	27.4	3:04	5	4.35/5.0	0.75/5.0	4	LT. G	10 joints @ 45° parallel to foliation 15 joints @ 0° 1 joint @ 60° 27.4 - 32.4 feet Gray - white and green - gray moderately weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnets. Decreased percentage of quartz in the rock matrix. Lusterous gray on cleaved surfaces. Very close fracture spacing from 31.1 to 31.2 feet Missing recovery washed out in this zone.
		3:31		87%	15%			
		3:55						
		3:52						
2,019.3	32.4	4:11						
2,019.3	32.4	3:49	5	5.0/5.0	0.5/5.0	5	LT. G	15 joints @ 45° parallel to foliation 9 joints @ 0° 1 joint @ 80° 32.4 - 37.4 feet Gray - white and green - gray moderately weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace marcasite. Lusterous gray on cleaved surfaces. Very close fracture spacing from 36.2 to 36.4 feet.
		4:42		100%	10%			
		4:15						
		4:00						
2,014.3	37.4	4:12						2,014.3 ft. (37.4 ft.)

Continued on next sheet

SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 12.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 12.4 - 47.4 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

DATE: 01/23/01

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B1-A (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,051.7 ft. TOTAL DEPTH: 47.4 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,014.3 ft. (37.4 ft.)
2,014.30	37.4	2:38 3:41 3:51 3:40 4:03	5	5.0/5.0 100%	1.15/5.0 23%	6	G	18 @ 45° parallel to foliation 8 joints between 0° and 10° 37.4 - 42.4 feet Dark gray to gray - white and green - gray slightly weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace marcasite. Lusterous dark gray on cleaved surfaces. Very close fracture spacing from 41.95 to 42.1 feet. Foliation and lamination generally @ 45°, but the foliation is also wavy and recumbant. ***Rock Test 3 between 40.0 and 40.5 feet, unconfined compressive strength = 975.08 psi***
2,009.30	42.4	2:45 3:16 4:08 4:15 4:36	5	5.0/5.0 100%	0.74/5.0 14.8%	7	G	12 @ 45° parallel to foliation 9 joints between 0° and 10° 42.4 - 47.4 feet Dark gray to gray - white and green - gray slightly weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace marcasite and pyrite. Lusterous dark gray on cleaved surfaces. Very close fracture spacing from 43.3 to 43.6 feet.
2,004.30	47.4							2,004.3 ft. (47.4 ft.)
								Coring terminated at elev. 2,004.3 feet in phyllonite

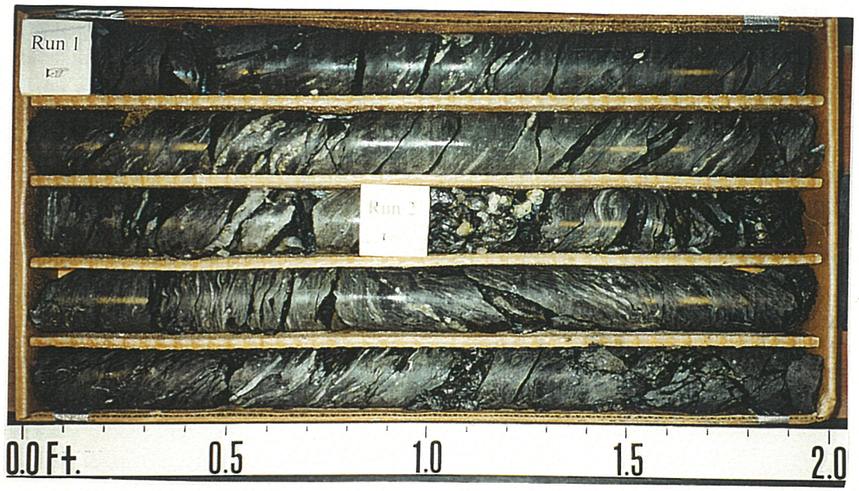
SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 12.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 12.4 - 47.4 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray (lead) LT. G = light gray
T = tan

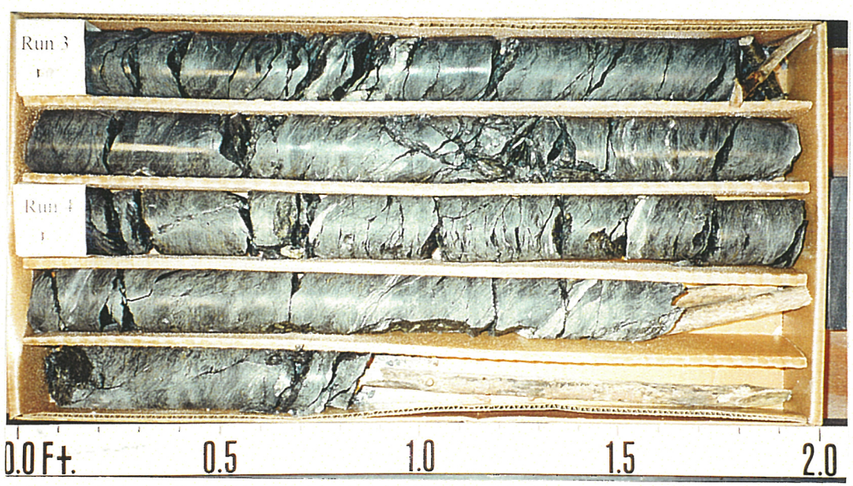
NOTES:
Joints are listed according to run number.

CORE PHOTOGRAPHS

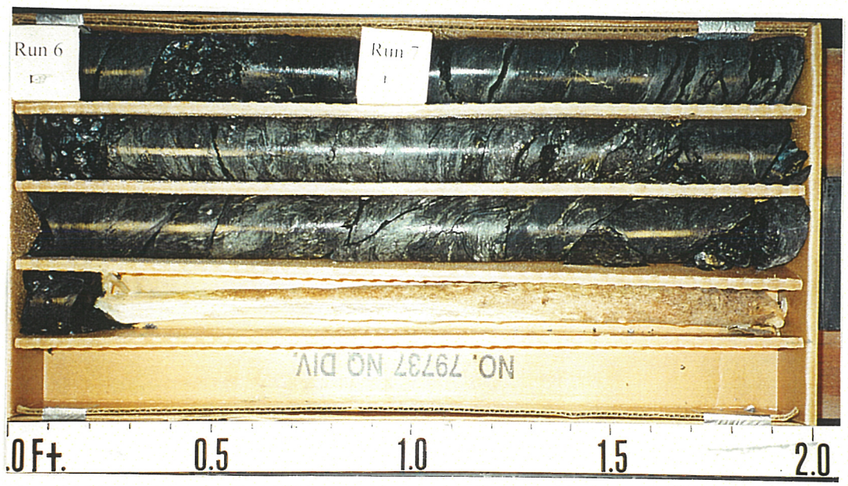


B1-A (RL): Run 1 and Run 2

B1-A (RL): Run 5 and Run 6 (part)



B1-A (RL): Run 3 and Run 4



B1-A (RL): Run 6 (cont.) and Run 7

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. B1-B (RL)	BORING LOCATION ~~356+46.9~~ 755+97	OFFSET 60.0' Rt.	ALIGNMENT ~~XBLX~~ L	0 HR. See Notes
COLLAR ELEV. 2044.3 ft	NORTHING 625,438.07	EASTING 950,451.83		24 HR. See Notes
TOTAL DEPTH 27.5 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/31/01	COMPLETED 1/31/01	SURFACE WATER DEPTH 1.1'	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2045.4					Water Surface				
2045					Ground Surface				2044.3ft 0.0ft
	2.5		100/0.2'		100+		M		-ALLUVIUM- Tan-brown, silty fine SAND (A-2-4) and fine sandy SILT, with little mica. 2041.8ft 2.5ft
2040									2041.6ft 2.7ft -WEATHERED ROCK- Gray PHYLLONITE.
	7.5		50/0.1'		100+				-NON-CRYSTALLINE ROCK- Gray-green, moderately weathered, medium hard PHYLLONITE.
2035									
2030									
2025									
2020									2016.8ft 27.5ft

Coring terminated at elev. 2016.8 feet in PHYLLONITE.

Notes:

1) Driller switched to coring techniques at 2.7'.
2) Boring in creek.
3) Core barrel sheared off in boring. Unable to recover core from 22.5'-27.5'.

NCDOT_BORE CANEL...3PJ NCDOT.GDT 3/2/01

DATE: 01/31/01

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B1-B (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,044.3 ft TOTAL DEPTH: 27.5 ft

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,041.6 ft (2.7 ft.)
2,041.6	2.7	3:38	4.8	4.17/4.80	0/4.80	1	LT. G	16 joints @ 45° parallel to foliation 6 joints between 0° and 10° 2 joints @ 80°
		4:19		86.9%	0%			STRATA REC. = 93% STRATA RQD. = 16%
		4:35						2.7 - 7.5 feet Gray to green - gray and white moderately weathered, medium hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite and marcasite. Very close fracture spacing from 3.1 to 3.5. Severely weathered and very close fracture spacing from 5.6 to 5.8 feet Missing recovery was washed out in these two zones.
		4:27						
2,036.8	7.5	5:02/0.8'						SPT taken between 7.5 - 7.6 feet, N = 50/.1 Gray phyllonite -WR-
2,036.7	7.6	3:01	4.9	4.6/4.90	0/4.90	2	LT. G	15 joints @ 45° parallel to foliation 5 joints between 0° and 10° 2 joints @ 45° perpendicular to foliation 1 joint @ 80°
		3:07		92.8%	0%			
		4:38						7.6 - 12.5 feet Gray to green - gray and white moderately weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnet.
		4:23						
2,031.8	12.5	4:39/0.9'						
2,031.8	12.5	4:33	5	4.8/5.0	1.38/5.0	3	LT. G	14 joints @ 45° parallel to foliation 7 joints between 0° and 10° 3 joints @ 60°
		5:14		96%	27.6%			
		5:12						12.5 - 17.5 feet Gray to green - gray and white moderately weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite and marcasite.
		5:11						
2,026.8	17.5	5:06						
2,026.8	17.5	4:26	5	4.75/5.0	1.68/5.0	4	LT. G	20 joints @ 45° parallel to foliation 2 joints between 0° and 10° 1 joint @ 80°
		5:11		95%	33.6%			
		5:07						17.5 - 22.5 feet Gray to green - gray and white moderately weathered, moderately hard phyllonite with little quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite, marcasite and garnet. Very close fracture spacing from 17.5 to 17.6 feet. Missing recovery washed out in this zone.
		4:51						
2,021.8	22.5	5:00						*Rock Test 4 between 19.45 and 19.95 feet, unconfined compressive strength = 963.62 psi*
2,021.8	22.5	3:52	5			5	LT. G	22.5 - 27.5 feet Core barrel sheared off in boring. Unable to recover core.
		4:39						
		3:51						
		3:40						
2,016.8	27.5	4:39						2,016.8 ft (27.5 ft.)

Coring terminated at elev. 2,016.8 feet in

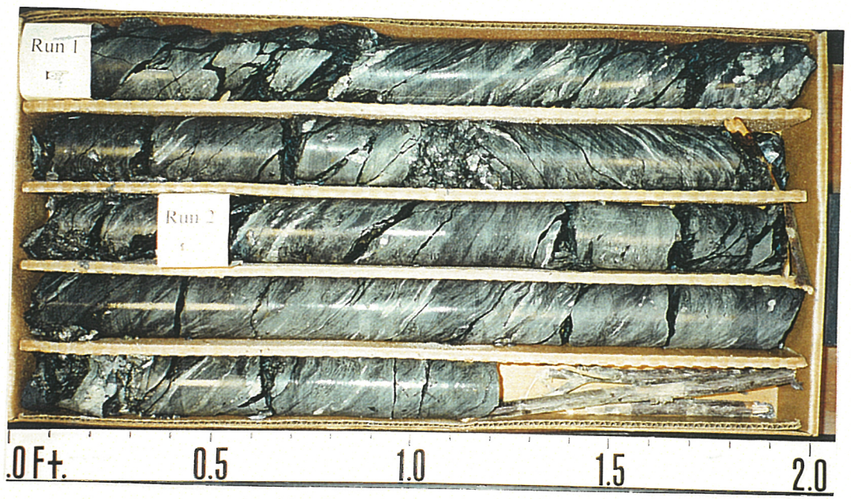
SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 2.7 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 2.7 - 27.5 feet.

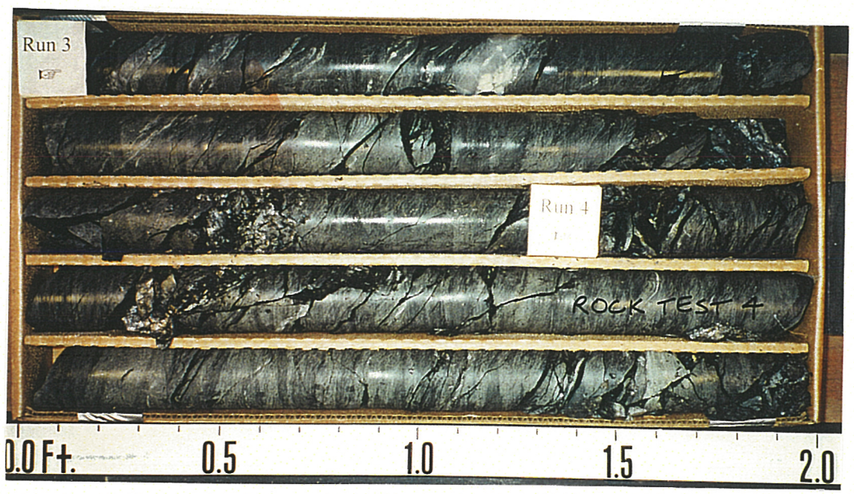
WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

CORE PHOTOGRAPHS



B1-B (RL): Run 1 and Run 2



B1-B (RL): Run 3 and Run 4

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. B2-A (LL)	BORING LOCATION ~~569+12.1~~ 776+63	OFFSET ~~507.1~~ 52 LT	ALIGNMENT ~~XK-L~~
COLLAR ELEV. 2043.4 ft	NORTHING 625,440.77	EASTING 950,323.35	0 HR. See Notes
TOTAL DEPTH 38.4 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/25/01	COMPLETED 1/26/01	SURFACE WATER DEPTH 1.7'	24 HR. See Notes

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2045.1					Water Surface				
					Ground Surface				2043.4ft 0.0ft
	3.0								-ALLUVIUM- Brown, fine to coarse rounded sandy & clayey SILT (A-4), with little mica.
2040		20	24	20	44		S		2039.6ft 3.8ft
	8.0								-RESIDUAL- Green-gray & brown, SILT (A-4), saprolitic, with thin laminations (crumbles when removed from split spoon).
2035		13	23	25	48		M		
	13.0								
2030		12	30	35	65		M		
	18.0								
2025		12	7	7	14		M		
	23.0								2020.4ft 23.0ft
2020		100/0.4'			100+				2020.0ft 23.4ft -WEATHERED ROCK- Gray PHYLLONITE.
2015									-NON-CRYSTALLINE ROCK- Gray-green, moderately to slightly weathered, moderately hard PHYLLONITE.
2010									
2005									2005.0ft 38.4ft

Coring terminated at elev. 2005.0 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 3.8'.
2) Driller switched to coring techniques at 23.4'.
3) Boring in creek.

NCDOT_BORE_CANEC...GPJ NCDOT.GDT 3/2/01

Sheet 1 of 1

DATE: 01/25/2001 & 01/26/2001

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B2-A (LL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,043.4 ft. TOTAL DEPTH: 38.4 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,020.0 ft.(23.4 ft.)
2,020.0	23.4	3:10	5	5.0/5.0	1.24/5.0	1	LT. G	20 joints @ 45° parallel to foliation **STRATA REC. = 99%**
				100%	24.8%			1 joint @ 80° **STRATA RQD. = 36%**
		3:25						23.4 - 28.4 feet
		3:21						Gray and green gray moderately weathered, moderately hard thinly laminated phyllonite with little white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. Cleaved surfaces have a silky gray luster.
		2:53						
2,015.0	28.4	2:46						
2,015.0	28.4	2:10	5	5.0/5.0	1.6/5.0	2	LT. G	11 joints @ 45° parallel to foliation
				100%	32%			4 joints between 0° and 10°
		3:18						1 joint @ 45° perpendicular to foliation
		3:16						28.4 - 33.4 feet
		3:23						Gray and green - gray moderately weathered, moderately hard thinly laminated phyllonite with some white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. Cleaved surfaces have a silky light gray luster. Very close fracture spacing from 28.4 to 28.85 feet.
2,010.0	33.4	3:26						
2,010.0	33.4	2:36	5	4.9/5.0	2.6/5.0	3	LT. G	5 joints @ 45° parallel to foliation and lamination
				98%	52%			9 joints between 0° and 10°
		3:11						33.4 - 38.4 feet
		2:39						Gray and green - gray slightly weathered, moderately hard thinly laminated phyllonite with some white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. Cleaved surfaces have a silky light gray luster.
		3:07						
2,005.0	38.4	3:07						*Rock Test 5 between 36.3 and 36.9 feet, unconfined compressive strength = 3752.51 psi*
								2,005.0 ft. (38.4 ft.)
								Coring terminated at elev. 2,005.0 feet in phyllonite

SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 23.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 23.4 - 38.4 feet.

WATER COLOR:
C = clear
W = white
G = gray
T = tan
B = brown
R = red
LT. G = light gray

NOTES:
Joints are listed according to run number.

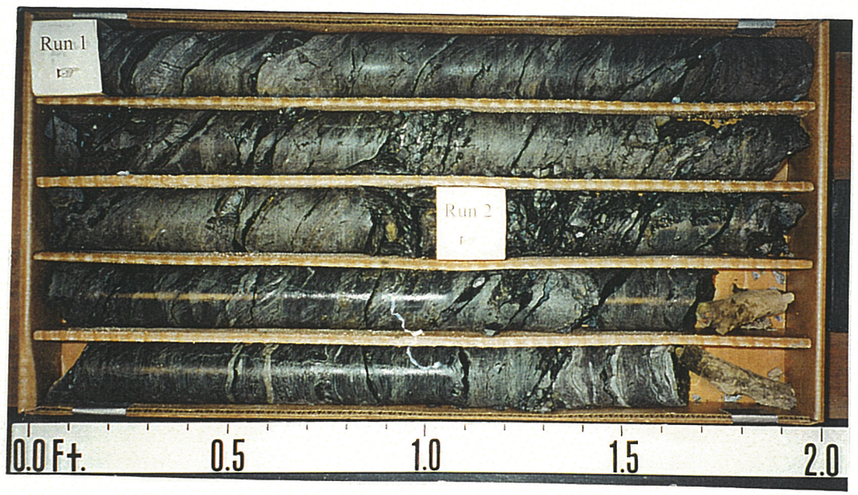
PROJECT REFERENCE NO.	SHEET NO.
I-4400C 440233	

SUBMITTED BY: JODY KUHNE DS

SUBSURFACE INVENTORY

PT 2 OF 2

CORE PHOTOGRAPHS



B2-A (LL): Run 1 and Run 2 (part)

B2-A (LL): Run 2 (cont.) and Run 3

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. ~~B2-A(RL)~~ B2-C	BORING LOCATION ~~632+12.1~~ 756+63	OFFSET ~~8.5 Rt~~ 7 RT	ALIGNMENT ~~-L-~~ L	0 HR. See Notes
COLLAR ELEV. 2042.5 ft	NORTHING 625,469.80	EASTING 950,375.06		24 HR. See Notes
TOTAL DEPTH 34.6 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic	
DATE STARTED 1/30/01	COMPLETED 1/31/01	SURFACE WATER DEPTH 3.0'		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2045.5					Water Surface				
2045					Ground Surface				2042.5ft 0.0ft
2040	5.0						M		-ALLUVIUM- Brown, fine sandy SILT & silty fine SAND (A-2-4).
		100/0.4'			100+		M		2037.5ft 5.0ft
2035	9.5								-WEATHERED ROCK- Green-gray & white, severely weathered, soft to medium hard PHYLLONITE.
2030		50/0.1'			100+				
	14.6								2027.8ft 14.7ft
2025		50/0.1'			100+				-NON-CRYSTALLINE ROCK- Gray to green & white, moderately weathered, moderately hard PHYLLONITE.
2020									2021.6ft 20.9ft
2015									Light gray, moderately to slightly weathered, moderately hard to hard QUARTZ PHYLLONITE.
2010									2007.9ft 34.6ft
									Coring terminated at elev. 2007.9 feet in QUARTZ PHYLLONITE.

Notes:

1) Driller switched to coring techniques at 5.4'.
2) Boring in creek.

NCDOT_BORE CANE_3PJ NCDOT.GDT 3/2/01

Sheet 1 of 2

DATE: 01/30/2001 & 01/31/2001

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B2-A (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,042.5 ft. TOTAL DEPTH: 34.6 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN/1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
2,037.1	5.4		4.2	2.9/4.2	0.4/4.2	1		2,037.1 ft.(5.4 ft.)
		3:19		69%	9.5%		LT. G	6 joints @ 45° parallel to foliation 3 joints @ 45° perpendicular to foliation. 6 joints @ 0° 1 joint @ 80°
		4:05						
		4:04						5.4 - 9.6 feet Gray to green - gray and white severely weathered, soft to medium hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Very close to close fracture spacing. Missing recovery washed out due to very close fracture spacing for the entire run. Joint surfaces have a silky luster.
		3:35						
2,032.9	9.6	0:48/0.2'						
								SPT take between 9.6 and 9.7 feet, N = 50/0.1 Gray weathered phyllonite -WR-
2,032.8	9.7		4.9	3.6/4.9	0.0/4.9	2		
		2:48		73%	0%		LT. G	12 joints @ 45° parallel to foliation 3 joints between 0° and 10° STRATA REC. = 71% STRATA RQD. = 4%
		2:46						
		3:05						9.7 - 14.6 feet Gray to green - gray and white moderately severe to severely weathered, soft to medium hard phyllonite with some white quartz and plagioclase lenses and augens between foliations. Very close to close fracture spacing. Joint surfaces have a silky luster. Missing recovery washed out due to very close fracture spacing for the entire run.
		8:18						
2,027.9	14.6	12:00/.9						
								SPT taken between 14.6 and 14.7 feet, N = 50/0.1 Gray weathered phyllonite -WR- *Strata Change* 2,027.8 ft. (14.7 ft.)
2,027.8	14.7		4.9	4.9/4.9	1.5/4.9	3		
		3:29		100%	30.6%		LT. G	20 joints @ 45° parallel to foliation 4 joints @ 45° perpendicular to foliation. 3 joints between 0° and 10° STRATA REC. = 100% STRATA RQD. = 40%
		3:30						
		3:47						14.7 - 19.6 feet Gray to green and white moderately weathered, moderately hard phyllonite with little white quartz and plagioclase lenses and augens between foliations. Close fracture spacing. Trace pyrite and marcasite. Joint surfaces have a silky luster Very close fracture spacing from 20.8 to 20.9 feet.
		3:31						
		3:42/.9						
2,022.9	19.6							
2,022.9	19.6		5	5.0/5.0	1.7/5.0	4		
		3:03		100%	34%		LT. G	4 joints @ 45° parallel to foliation 1 joint @45° perpendicular to foliation 1 joint @ 80°
		2:36						
		2:48						19.6 - 20.9 feet Gray slightly to moderately weathered, moderately hard phyllonite with trace white quartz and plagioclase lenses and augens. Close fracture spacing. Very close fracture spacing from 20.8 to 20.9 feet.
		3:33						
		3:59						*Strata Change* 2,021.6 ft. (20.9 ft.)
								15 joints @ 45° parallel 1 joint @ 0° 1 joint @ 80° STRATA REC. = 99% 1 Driller Break STRATA RQD. = 18%
								20.9 - 24.6 feet Light gray slightly to moderately weathered, moderately hard to hard quartz phyllonite, with trace white quartz and plagioclase lenses and augens. Some veining. Close fracture spacing. *Rock Test 6 between 23.55 and 24.05 feet, unconfined compressive strength = 1632.65 psi*
2,017.9	24.6							
2,017.9	24.6		5	5.0/5.0	0.95/5.0	5		
		3:09		100%	19%		LT. G	18 joints between 30° and 45° parallel to foliation 2 joints @ 45° perpendicular to foliation 3 joints between 0° and 10° 2 joints @ 60°
		2:56						
		3:09						24.6 - 29.6 feet Light gray and gray - green and white slightly weathered, moderately hard to hard quartz phyllonite with trace white quartz and plagioclase lenses and augens, some veining. Close fracture spacing. *Rock Test 7 between 27.8 and 28.3 feet, unconfined compressive strength = 6902.01 psi*
		3:17						
		3:11						
2,012.9	29.6							2,012.9 ft.(29.6 ft.)

Continued on next sheet

SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 5.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 5.4 - 34.6 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number except for Run 4.
The joints for Run 4 are listed according to strata.

DATE: 01/30/2001 & 01/31/2001

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B2-A (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,042.5 ft. TOTAL DEPTH: 34.6 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,012.9 ft.(29.6 ft.)
2012.9	29.6	3:38	5	4.9/5.0	0.8/5.0	6	LT. G/W	17 joints @ 45° parallel to foliation
				98%	16%			12 joints @ 0°
		3:01						3 joints @ 80°
		3:02						2 Driller Breaks
		3:03						29.6 - 34.6 feet
								Light gray and gray - green and white slightly weathered, moderately hard to hard quartz phyllonite with trace white quartz and plagioclase lenses and augens, some white veining. Close fracture spacing.
2007.9	34.6	3:10						2,007.9 ft. (34.6 ft.)

Coring terminated at elev. 2,007.9 feet in quartz phyllonite

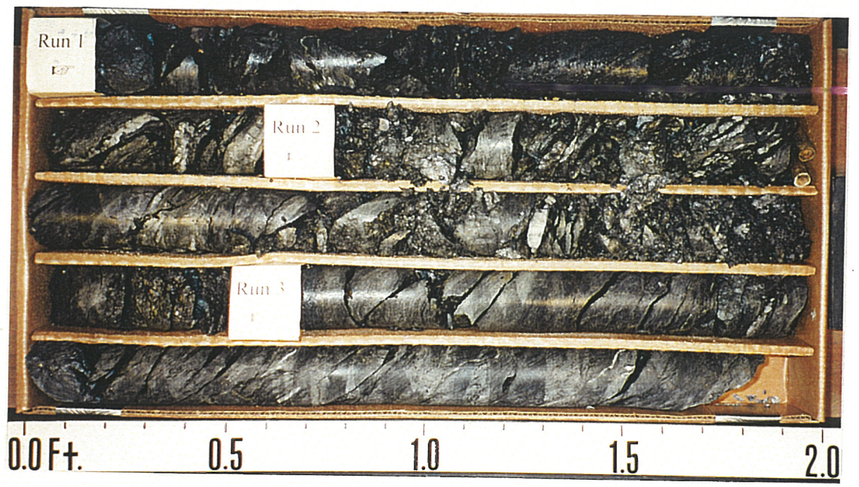
SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 5.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 5.4 - 34.6 feet.

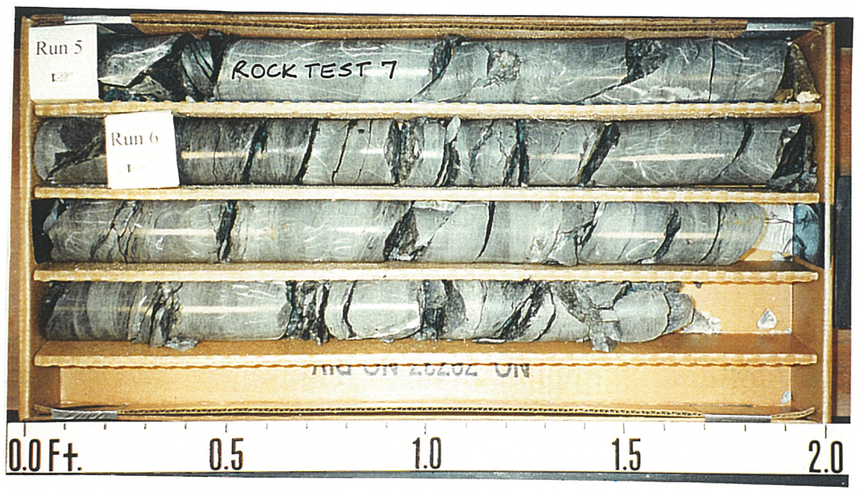
WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

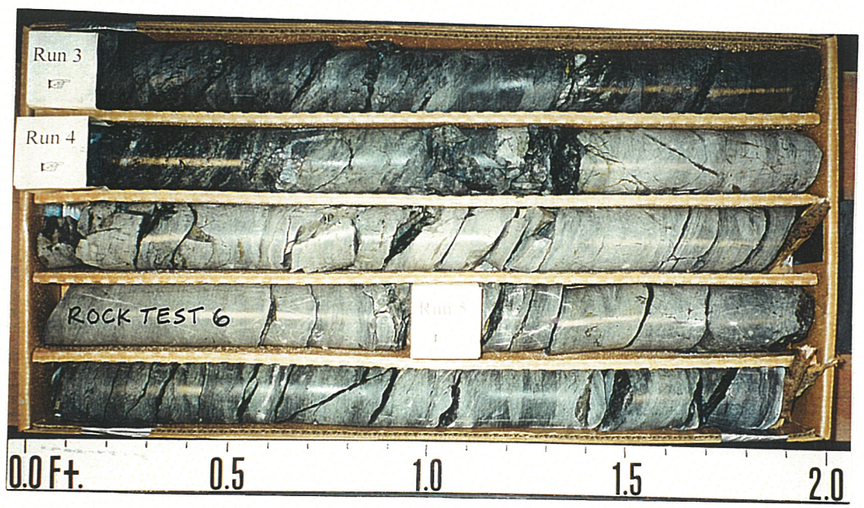
CORE PHOTOGRAPHS



B2-A (RL): Run 1, Run 2 and Run 3 (part)



B2-A (RL): Run 5 (cont.) and Run 6



B2-A (RL): Run 3 (cont.), Run 4 and Run 5 (part)

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. B2-B (RL)	BORING LOCATION ~~500X12.7~~ 756+63	OFFSET ~~99.8Rt.~~ 58 RT	ALIGNMENT ~~XX~~ -L
COLLAR ELEV. 2044.2 ft	NORTHING 625,494.87	EASTING 950,419.71	0 HR. See Notes
TOTAL DEPTH 38.4 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 3.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/29/01	COMPLETED 1/30/01	SURFACE WATER DEPTH 1.0'	24 HR. See Notes

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2045.2					Water Surface				
					Ground Surface				2044.2ft 0.0ft
	2.5						M		-ALLUVIUM- Fine sdy. SILT & silty fine SAND, w/ little mica. 2041.7ft 2.5ft
2040		45	55/0.4'		100+		M		2040.8ft -WEATHERED ROCK- Gray PHYLLONITE. 3.4ft
2035									-NON-CRYSTALLINE ROCK- Gray & green, moderately severe to moderately weathered, medium hard PHYLLONITE.
2030									
2025									
2020									2019.4ft 24.8ft
2015									Gray, green & white, moderately to slightly weathered, moderately hard to hard PHYLLONITE.
2010									2010.8ft 33.4ft
									-WEATHERED ROCK- Gray-green & white, severely weathered, soft to medium hard PHYLLONITE. 2005.8ft 38.4ft
									Coring terminated at elev. 2005.8 feet in PHYLLONITE.

Notes:

1) Driller switched to coring techniques at 3.4'.
2) Boring in creek.

NCDOT_BORE CANE_JPJ NCDOT.GDT 3/2/01

DATE: 01/29/2001 & 01/30/2001

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B2-B (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,044.2 ft. TOTAL DEPTH: 38.4 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2,040.8 ft.(3.4 ft.)
2,040.8	3.4	1:10	5	1.2/5.0	0.0/5.0	1	LT. G	6 joints @ 45° parallel to foliation *Loss of water circulation @ 6.4 feet
		2:20		24%	0%			2 joints @ 80
		2:54						3.4 - 8.4 feet
		2:53						Gray and white moderately weathered, medium hard phyllonite with some white quartz and plagioclase lenses and augens
2,035.8	8.4	3:57						Very close to close fracture spacing for entire run. Trace pyrite and marcasite
								Missing recovery washed out due to very close fracture spacing for the entire run
2,035.8	8.4	3:45	5	2.55/5.0	0.4/5.0	2	LT. G	5 joints @ 45° parallel to foliation STRATA REC. = 53%
		2:47		51%	8%			2 joints @ 0° STRATA RQD. = 2%
		4:19						1 joint @ 80°
		3:13						8.4 - 13.4 feet
2,030.8	13.4	2:43						Gray and green - gray moderately severe weathered, medium hard phyllonite with little white quartz and plagioclase lenses and augens. Very close to close fracture spacing. Trace pyrite and marcasite
								Missing recovery washed out due to very close fracture spacing for the entire run
2,030.8	13.4	3:01	5	2.9/5.0	0.0/5.0	3	LT. G	9 joints @ 45° parallel to foliation
		3:27		58%	0%			9 joints @ 0°
		3:00						13.4 - 18.4 feet
		2:45						Gray and green - gray moderately severe weathered, medium hard phyllonite with some white quartz and plagioclase lenses and augens. Very close to close fracture spacing. Trace pyrite and marcasite
2,025.8	18.4	3:10						Missing recovery washed out due to very close fracture spacing for the entire run
2,025.8	18.4	1:59	5	3.35/5.0	0.0/5.0	4	LT. G	24 joints between 0° and 10° parallel to foliation
		3:18		67%	0%			1 joint @ 45°
		2:44						1 joint @ 80°
		3:08						18.4 - 23.4 feet
2,020.8	23.4	3:37						Gray and green - gray moderately severe weathered, medium hard phyllonite with some white quartz and plagioclase lenses and augens. Very close to close fracture spacing. Trace pyrite and marcasite
								Missing recovery washed out due to very close fracture spacing for the entire run
2,020.8	23.4	3:01	5	5.0/5.0	1.25/5.0	5	LT. G	6 joints @ 45° parallel to foliation
		3:56		100%	25%			13 joints between 0° and 10°
		4:25						23.4 - 24.8 feet
		4:33						Gray and green - gray and white moderately severe weathered, medium hard phyllonite with some white quartz and plagioclase lenses and augens. Very close fracture spacing.
		4:45						*Strata Change* 2,019.4 ft. (24.8 ft.)
								24.8 - 28.4 feet
2,015.8	28.4							Gray and green - gray and white slightly weathered, moderately hard phyllonite with some white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. STRATA REC. = 99% STRATA RQD. = 31%
								2,015.8 ft.(28.4 ft.)

Continued on next sheet

SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 3.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 3.4 - 38.4 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

NOTES:
Joints are listed according to run number.

DATE: 01/29/2001 & 01/30/2001

CORE BORING REPORT

PROJECT: 8.1952001 I.D. NO. I-4400 BORING NO: B2-B (RL) GEOLOGIST: D. Carr

DESCRIPTION: Dual Structures on I-26 (Bridges 233 & 234) over Cane Creek

COUNTY: Henderson COLLAR ELEVATION: 2,044.2 ft. TOTAL DEPTH: 38.4 ft.

ELEV (ft)	DEPTH (ft)	DRILL RATE MIN./1.0ft	RUN ft	REC ft %	RQD ft %	RUN #	WATER COLOR	FIELD CLASSIFICATION AND REMARKS
								2015.8 ft.(28.4 ft.)
2,015.8	28.4	3:25 4:38 4:12 4:41	5	4.9/5.0 98%	1.4/5.0 28%	6	LT. G	15 joints @ 45° parallel to foliation 1 joint @ 45°, perpendicular to foliation. 5 joints between 0 and 10°. 28.4 - 33.4 feet Gray and green - gray moderately weathered, moderately hard to hard phyllonite with some white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. Thinly laminated.
2,010.8	33.4	4:57						*Strata Change*
								2,010.8 ft. (33.4 ft.)
2,010.8	33.4	2:11 3:23 3:18 4:27	5	3.0/5.0 60%	0.4/5.0 8%	7	LT. G	9 joints @ 45° parallel to foliation 3 joints @ 0° **STRATA REC. = 60%** **STRATA RQD. = 8%** 33.4 - 38.4 feet Gray and green - gray and white moderately severe to severely weathered, soft to medium hard phyllonite with some white quartz and plagioclase lenses and augens. Close fracture spacing. Trace pyrite and marcasite. Very close fracture spacing from 33.4 to 34.3 feet. The missing recovery was washed out of this zone. Driller measured 1.35 feet of rock left in boring. Driller was unable to retreive the core left in the hole.
2,005.8	38.4	4:33						2,005.8 ft. (38.4 ft.)
								2,005.8 ft.(38.4 ft.)
								Coring terminated at elev. 2,005.8 feet in phyllonite

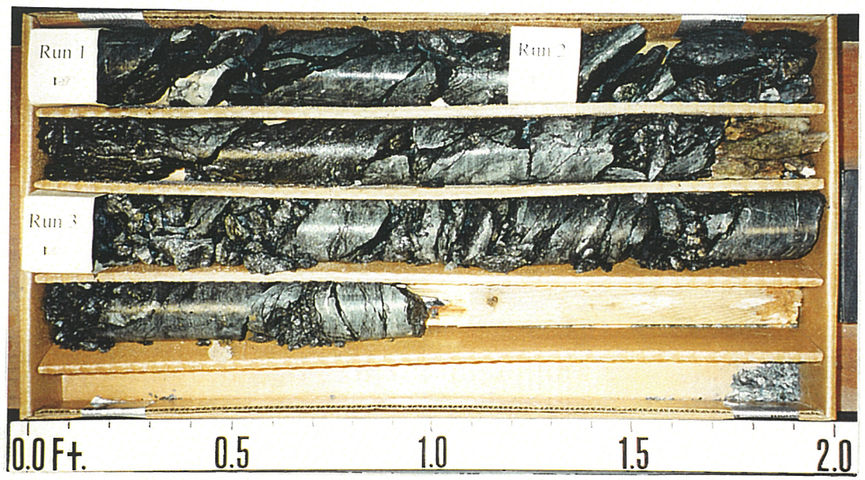
SENIOR DRILLER:
J.W. Gilchrist, Jr.
DRILLING ASSISTANT:
M.W. Renza

DRILLING EQUIPMENT:
CME - 550 with automatic hammer mounted on a track carrier.
HOLE ADVANCEMENT:
1. HSA from 0.0 - 3.4 feet using 3.25 inch hollow stem augers.
2. Cored using NWD4 SICB and a Series 8 NWD4 diamond impregnated bit from 3.4 - 38.4 feet.

WATER COLOR:
C = clear B = brown
W = white R = red
G = gray LT. G = light gray
T = tan

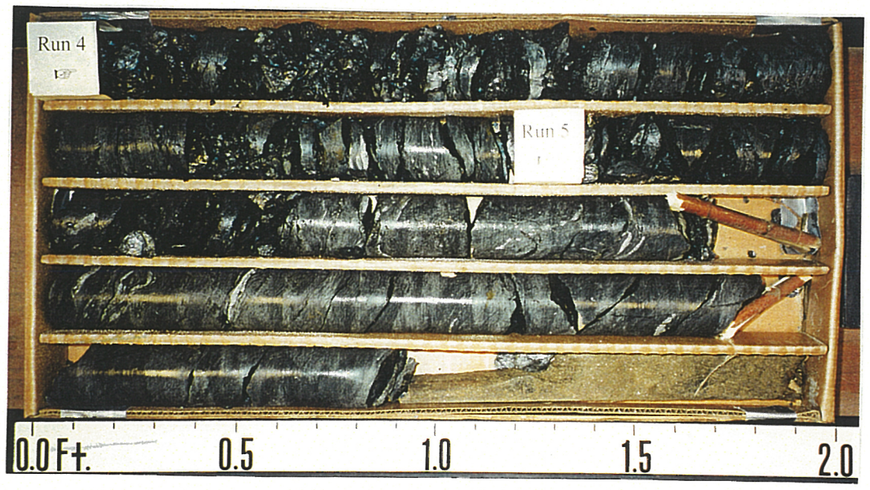
NOTES:
Joints are listed according to run number.

CORE PHOTOGRAPHS



B2-B (RL): Run 1, Run 2 and Run 3

B2-B (RL): Run 6 and Run 7



B2-B (RL): Run 4 and Run 5

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BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB2-A (LL)	BORING LOCATION ~~638+57.6~~ 557+08	OFFSET ~~59.6~~ 59.62 LT	ALIGNMENT -BL-	0 HR. 25.3
COLLAR ELEV. 2056.4 ft	NORTHING 625,476.09	EASTING 950,293.32		24 HR. 12.1
TOTAL DEPTH 48.8 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic	
DATE STARTED 1/16/01	COMPLETED 1/16/01	SURFACE WATER DEPTH N/A		

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2056.4					Ground Surface				2056.4ft 0.0ft
2055	6.0								**-ARTIFICIAL FILL-** Rip Rap 1.0'-4.0' in diameter. 2050.9ft 5.5ft
2050	8.5	2	2	3	5		M		**-ALLUVIUM-** Tan SILT (A-4), with some fine sand & little mica.
2045	13.5	2	3	2	5		M		2042.9ft 13.5ft
2040	18.5	8	3	8	11		M/W		2042.9ft 13.8ft Tan, silty CLAY (A-7-5), with trace mica. Gray-green, silty fine to coarse SAND (A-1-b), with rounded gravel 0.02'-0.12' in diameter. 2038.4ft 18.0ft
2035	23.5	22	22	29	51	SS-4	12.2%		**-RESIDUAL-** Brown & tan, silty coarse SAND (A-2-4), with some fine sand, trace clay, Phyllonitic bedding (crumbles when removed from split spoon). 2032.9ft 23.5ft
2030	28.5	13	29	30	59		▽		Brown & tan, SILT (A-4), with Phyllonitic bedding apparent, saprolitic (crumbles when removed from split spoon).
2025	33.5	9	24	40	64		M		
2020	38.5	16	16	23	39		M		2017.9ft 38.5ft
2015	43.5	35	65/0.2'		100+		M		**-WEATHERED ROCK-** Gray, brown & tan PHYLLONITE.
2010	48.5	62	38/0.1'		100+		M		2007.6ft 48.8ft
		100/0.3'			100+		D		Boring terminated at elev. 2007.6 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 13.8'.
2) Driller indicates resistance at 18.0'.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

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BORING LOG

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB2-C (CL)	BORING LOCATION ~~669+78.6~~ 757+29	OFFSET ~~0 LT~~ 3 LT	ALIGNMENT ~~BL~~ L — 0 HR. 32.5
COLLAR ELEV. 2070.7 ft	NORTHING 625,523.58	EASTING 950,335.01	24 HR. 25.8
TOTAL DEPTH 43.1 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/24/01	COMPLETED 1/24/01	SURFACE WATER DEPTH N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2070.7					Ground Surface				2070.7ft 0.0ft
2070	0.0	2	3	5	8		M		**-ROADWAY EMBANKMENT-** Tan & orange, silty CLAY (A-7-5), with trace fine to 0.06" dia. angular gravel. 2068.2ft 2.5ft
	2.5	2	2	4	6		M		2067.7ft 3.0ft Gray, silty, fine to coarse SAND (A-2-4), with trace fine angular gravel. Orange, clayey SILT (A-4), with some mica & trace coarse sand. 2063.2ft 7.5ft
2065	7.5	2	3	5	8		M		Orange & tan, silty CLAY (A-7-5), with little to some mica & trace coarse sand.
2060	12.5	3	4	4	8		M		
2055	17.5	WOH	1	2	3	SS-5	32.2%		2052.9ft 17.8ft **-ALLUVIUM-** Green-gray, silty CLAY (A-6), with trace mica, some fine sand & trace coarse sand. 2048.2ft 22.5ft
2050	22.5	1	3	4	7		M		Green-gray to gray with orange, silty CLAY (A-7-5), with little fine sand & trace mica. 2043.2ft 27.5ft
2045	27.5	3	15	7	22	SS-7	34.4%		**-RESIDUAL-** Green, light gray & orange, fine sandy SILT (A-4), saprolitic, with little coarse sand & trace clay. 2037.7ft 33.0ft
2040	32.5	4	27	73/0.2'	100+		W/S		**-WEATHERED ROCK-** Lusterous green-gray, thinly laminated PHYLLONITE, with foliation at 45 deg. 2027.6ft 43.1ft
2035	37.5	100/0.1'			100+		M		
2030	42.5	~~70~~	~~30/0.1'~~		100+		M		Boring terminated at elev. 2027.6 feet in PHYLLONITE.

Notes:

1) Geologist indicates strata change in split spoon at 3.0'.
2) Geologist indicates strata change in split spoon at 17.8'.
3) Wet spoon at 32.5'.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

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N.C.D.O.T. GEOTECHNICAL UNIT
BORING LOG

SHEET 1 OF 1

PROJECT NO. 8.1952001	ID. I-4400	COUNTY Henderson	GEOLOGIST D. Carr
SITE DESCRIPTION Bridge Nos. 233 & 234 on I-26 over Cane Creek			GROUND WATER (ft)
BORING NO. EB2-B (RL)	BORING LOCATION ~~869+56.6~~ 757+08	OFFSET ~~50.6 Rt.~~ 56 RT	ALIGNMENT ~~XX~~ -L — 0 HR. 31.5
COLLAR ELEV. 2058.1 ft	NORTHING 625,534.06	EASTING 950,398.62	24 HR. 20.3
TOTAL DEPTH 33.8 ft	DRILL MACHINE CME 550 Track	DRILL METHOD 2.25" ID HSA	HAMMER TYPE Automatic
DATE STARTED 1/15/01	COMPLETED 1/15/01	SURFACE WATER DEPTH N/A	

ELEV. (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 20 40 60 80 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
2058.1					Ground Surface				2058.1ft 0.0ft
									2057.1ft -ROADWAY EMBANKMENT- 1.0ft
									Brown to tan-orange, SILT (A-4), with some clay, roots & little sand.
2055	4.5	3	3	3	6		M		2053.6ft -ARTIFICIAL FILL- 4.5ft
									Rip Rap 1.0'-4.0' in diameter.
2050	8.5	1	1	1	2	SS-2	41.5%		-ALLUVIUM-
									Brown-tan to gray-brown, fine sandy SILT (A-4), with trace to little mica, trace coarse sand & little clay.
2045	13.5	11	5	6	11		M		2044.6ft 13.5ft
									2044.3ft Brown & orange, silty fine to coarse SAND 13.8ft
									(A-1-b), with rounded gravel 0.12' in diameter.
2040	18.5	24	37	50	87	SS-4	11.6%		-RESIDUAL-
									2039.6ft Dark gray-green to green & gray, SILT (A-4), saprolitic. 18.5ft
									Green & gray, silty, fine to coarse SAND (A-2-4), saprolitic, with little clay.
2035	23.5	26	49	51/0.3'	100+		D		2034.1ft 24.0ft
									-WEATHERED ROCK-
2030	28.5	100/0'			100+		D		Light gray to gray, thinly laminated PHYLLONITE.
2025	33.5	100/0.3'			100+		D		2024.3ft 33.8ft
									Boring terminated at elev. 2024.3 feet in PHYLLONITE.

Notes:

1) Wet spoon at 13.5'.
2) Geologist indicates strata change in split spoon at 13.8'.
3) Driller indicates resistance at 15.2'.

NCDOT_BORE CANECRK.GPJ NCDOT.GDT 3/2/01

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 8.1952001 (I-4400)
F.A. NO.: NHF-26-1-(62)23
COUNTY: HENDERSON
BRIDGE NOS. 233 & 234 ON I-26 OVER CANE CREEK

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Splitting Tensile Strength (PSI)	Remarks
RS-2	B1-A (LL)	35.6-36.4	Quartz Phyllonite	fs*	39.4	0.346	0.171	168.2	7144.74			
RS-3	B1-A (RL)	40.0-40.5	Phyllonite	fs*	23.0	0.351	0.170	170.1	975.08			
RS-4	B1-B (RL)	19.45-19.95	Phyllonite	fs*	33.6	0.301	0.171	175.3	963.62			
RS-5	B2-A (LL)	36.3-36.9	Phyllonite	fs*	52.0	0.353	0.171	169.4	3752.51			
RS-6	B2-A (RL)	23.55-24.05	Quartz Phyllonite	fs*	34.0	0.349	0.172	166.2	1632.65			
RS-7	B2-A (RL)	27.8-28.3	Quartz Phyllonite	fs*	19.0	0.350	0.171	167.1	6902.01			

*North Carolina Department of Natural Resources and Community Development
Division of Land Resources Geological Survey Section
Geological Map and Mineral Resources Summary of the Skyland Quadrangle N.C.
MRS 193-NE

North Carolina Department of Transportation
Division of Highways
Materials and Test Unit
Soils Laboratory

M&T Form 503

T.I.P. ID NO.: I-4400

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT:	8.1952001	COUNTY:	Henderson
DATE SAMPLED:	January 2001	RECEIVED:	1/29/01
SAMPLED FROM:	-BL-	REPORTED:	1/29/01
SUBMITTED BY:	E.C. Howey, L.G., P.E.	BY:	R.H. Calder

TEST RESULTS

2/14/01

PROJ. SAMPLE NO.	SS-2	SS-1	SS-2	SS-4
LAB SAMPLE NO.				
Retained #4 Sieve %	0.0	3.0	0.0	5.0
Passing #10 Sieve %	100.0	95.0	100.0	85.0
Passing #40 Sieve %	99.8	88.8	95.0	57.6
Passing #200 Sieve %	39.1	42.0	19.7	33.7

MINUS #10 FRACTION

SOIL MORTAR - 100%				
Coarse Sand Ret - #60 %	5.8	17.0	32.1	42.0
Fine Sand Ret - #270 %	60.9	43.6	49.8	21.9
Silt 0.053 - 0.010 mm %	23.9	28.3	8.1	30.5
Clay < 0.010 mm %	9.4	11.1	10.0	5.6
L.L.	34	33	22	37
P.L.	NP	29	NP	35
P.I.	NP	4	NP	2
AASHTO Classification	A-4(0)	A-4(0)	A-2-4(0)	A-2-4(0)
Northing	625,339.8442	625,379.8125	625,379.8125	625,476.0887
Easting	950,369.8140	950,348.0617	950,348.0617	950,293.3187
Hole No.	EB1-A (LL)	B1-A (LL)	B1-A (LL)	EB2-A (LL)
Depth (ft)	8.8	0.3	3.6	18.5
to	10.0	1.5	5.0	20.0
Moisture Content	23.8	22.4	6.4	12.2

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Soils Engineer

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PROJ. SAMPLE NO.	SS-2	SS-4	SS-5	SS-6
LAB SAMPLE NO.				
Retained #4 Sieve %	3.0	0.8	1.2	5.0
Passing #10 Sieve %	96.1	98.8	98.6	83.1
Passing #40 Sieve %	89.5	93.6	97.6	69.7
Passing #200 Sieve %	74.9	81.4	79.7	9.0

MINUS #10 FRACTION

SOIL MORTAR - 100%				
Coarse Sand Ret - #60 %	10.8	9.0	1.2	46.3
Fine Sand Ret - #270 %	12.3	9.6	24.7	45.2
Silt 0.053 - 0.010 mm %	56.0	55.6	47.4	6.6
Clay < 0.010 mm %	20.9	25.8	26.7	1.9
L.L.	33	35	38	18
P.L.	32	29	29	NP
P.I.	1	6	9	NP
AASHTO Classification	A-4(1)	A-4(5)	A-4(8)	A-3(0)
Northing	625,350.7115	625,350.7115	625,350.7115	625,350.7115
Easting	950,432.0642	950,432.0642	950,432.0642	950,432.0642
Hole No.	EB1-C (CL)	EB1-C (CL)	EB1-C (CL)	EB1-C (CL)
Depth (ft)	3.5	13.5	18.7	23.5
to	5.0	15.0	20.0	25.0
Moisture Content	27.5	29.3	35.6	☆

☆ No moisture test taken

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TEST RESULTS

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PROJ. SAMPLE NO.	SS-5	SS-7		
LAB SAMPLE NO.				
Retained #4 Sieve %	0.0	0.0		
Passing #10 Sieve %	100.0	99.6		
Passing #40 Sieve %	100.0	89.5		
Passing #200 Sieve %	81.0	62.1		

MINUS #10 FRACTION

SOIL MORTAR - 100%				
Coarse Sand Ret - #60 %	0.9	16.7		
Fine Sand Ret - #270 %	22.0	25.3		
Silt 0.053 - 0.010 mm %	55.3	49.8		
Clay < 0.010 mm %	21.8	8.2		
L.L.	40	38		
P.L.	29	34		
P.I.	11	4		
AASHTO Classification	A-6(10)	A-4(2)		
Northing	625,523.5785	625,523.5785		
Easting	950,335.0070	950,335.0070		
Hole No.	EB2-C (CL)	EB2-C (CL)		
Depth (ft)	17.5	27.5		
to	19.0	29.0		
Moisture Content	32.2	34.4		

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TEST RESULTS

2/14/01

PROJ. SAMPLE NO.	SS-2	SS-4		
LAB SAMPLE NO.				
Retained #4 Sieve %	0.0	0.8		
Passing #10 Sieve %	100.0	86.9		
Passing #40 Sieve %	100.0	63.2		
Passing #200 Sieve %	73.7	34.1		

MINUS #10 FRACTION

SOIL MORTAR - 100%				
Coarse Sand Ret - #60 %	0.3	38.8		
Fine Sand Ret - #270 %	31.9	23.9		
Silt 0.053 - 0.010 mm %	51.0	25.3		
Clay < 0.010 mm %	16.8	12.0		
L.L.	39	28		
P.L.	33	22		
P.I.	6	6		
AASHTO Classification	A-4(5)	A-2-4(0)		
Northing	625,534.0630	625,534.0630		
Easting	950,398.6185	950,398.6185		
Hole No.	EB2-B (RL)	EB2-B (RL)		
Depth (ft)	8.5	18.5		
to	10.0	20.0		
Moisture Content	41.5	11.6		

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