STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33708.1.1 (B-4456)	1	12

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *33708.1.1 (B-4456)* F.A. PROJ. *BRSTP-16(25)*

COUNTY *CATAWBA*

PROJECT DESCRIPTION *BRIDGE OVER I-40 ON NC 16 BETWEEN SR 1484 AND SR 1485*

SITE DESCRIPTION *BRIDGE #49 OVER I-40 ON NC 16*

ID: B-4456

PROJECT: 33708.1.1

CONTENTS

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.

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PERSONNEL

J. K. STICKNEY

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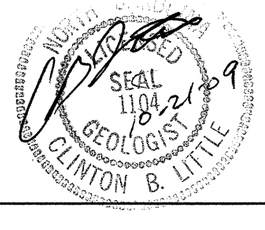
INVESTIGATED BY *J. E. BEVERLY*

CHECKED BY *C. B. LITTLE*

SUBMITTED BY *C. B. LITTLE*

DATE *OCTOBER, 2009*



DRAWN BY: *J. E. ROLFSMEYER*

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PROJECT REFERENCE NO.	SHEET NO.
33708.1.1 (B-4456)	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 #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		NP	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

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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >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
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

SAMPLE DESIGNATIONS

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

ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" 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: (GPS B4456-1) LOCATED AT -BL- STA. 12+46.14
N 723831.8860 E 1342173.4480 UTILIZED FOR DETERMINATION OF BORING ELEVATIONS. ELEVATION: 983.67 FT.

NOTES:
UNABLE TO DRILL EB2-B HOLE DUE TO: SLOPE DID NOT ALLOW SAFE ACCESS TO EB2-B LOCATION.

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
33708.1.1 (B-4456)	3

SITE PLAN

0 100 200

FEET

NAD 83

SKEW = 40° 57' 36"

BEGIN CONSTRUCTION
-Y- STA. 14+50.00

BEGIN STATE PROJECT B-4456
-L- STA. 18+70.00

END STATE PROJECT B-4456
-L- STA. 30+40.00

END CONSTRUCTION
-Y- STA. 26+75.00

I-40

N 64° 28' 35.6" E

GPS B4456-1 12+46.14

GPS B4456-2 18+42.06

PINC

-BL-4 7+14.78 PINC
6+23.16 POT
5+00.00 POB

00.00 POT
-BT1-7

PINC 16+87.40

PT Sta 20+32.25

PC Sta 30+90.20

EB1-A

B1-A

EB2-A

EB1-B

B1-B

SAMUEL S. LYNCH
DB 2200 PG 976
DB 2037 PG 1347

TOWN OF CONOVER
PB 18 PG 232

JOHN CHANDLER YORK
TRACT 1
DB 2875 PG 707

JOHN CHANDLER YORK
TRACT 2
DB 2875 PG 707

JOHN CHANDLER YORK
TRACT 3
DB 2875 PG 707

JET KLEEN INC.
DB 2278 PG 126

McCAULEY & MCDONALD
INVESTMENTS, INC.
DB 1598 PG 630

RHODES AND BEAL OIL CO
DB 2181 PG 099

-L-	-L-
PI Sta 17+80.90	PI Sta 32+95.07
Δ = 9° 56' 23.0" (RT)	Δ = 17° 45' 00.8" (RT)
D = 1° 58' 20.3"	D = 4° 22' 01.4"
L = 503.96'	L = 406.46'
T = 252.61'	T = 204.87'
R = 2,905.00'	R = 1,312.00'
SE = SEE PLANS	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS

PROJECT REFERENCE NO.	SHEET
33708.1.1 (B-4456)	4
BRIDGE #49 OVER I-40 ON NC 16	
-L- PROFILE	

0 100 200
FEET

BORING DESCRIPTIONS

- (A) (ROADWAY EMBANKMENT) SOFT RED-ORANGE MOIST CLAYEY SANDY SILT (A-6)
- (B) (RESIDUAL) MED. STIFF TAN-ORANGE-BLACK MOIST CLAYEY SANDY SILT (A-5)
- (C) (RESIDUAL) DENSE TAN-GRAY-BLACK MOIST MICA. SILTY SAND (A-2-4)
- (D) (RESIDUAL) MED. STIFF TO HARD TAN-ORANGE TO GRAY-GREEN-WHITE MOIST CLAYEY SANDY SILT (A-5)

PI = 24+45.00
EL = 990.59'
VC = 409'
K = 154
V = 60 mph

PI = 20+46.00
EL = 986.60'
VC = 336'
K = 96
V = 50 mph

BEGIN BRIDGE
-L- STA. 23+02.07

℄ BRIDGE -L- STA. 24+46.07
SKEW 40^-57'-55"
G.P. EL. 989.232'

PI = 20+65.00
EL = 982.01'
VC = 140'
K = 161
V = 60 mph

BEGIN GRADE
-L- STA. 18+70
EL = 991.00'

END BRIDGE
-L- STA. 25+92.07

END GRADE
-L- STA. 30+40
EL = 980.12'

SS-16
SS-17
SS-18
SS-19
B1-A
24+18.00 -L-
37.2 LT

SS-14
EB1-A
22+74.00 -L-
25.1 LT

SS-1
SS-2
SS-3
SS-4
SS-5
EB2-A
25+66.00 -L-
26.1 LT

(-)12.5000% (+)1.0000% (+)1.0000% (-)1.6500% (-)1.6500% (-)2.5200%

ROADWAY EMBANKMENT (FILL)

SOFT TO MED. STIFF RED-ORANGE-BRN-TAN-YELLOW MOIST SILTY SANDY CLAY (A-7)

RESIDUAL
MED. STIFF TAN-ORANGE-RED MOIST MICA. SILTY SANDY CLAY (A-7)

MED. STIFF TO STIFF TAN-BRN MOIST MICA. CLAYEY SANDY SILT (A-5)

MED. DENSE TO DENSE PINK-WHITE-GRAY-GREEN-TAN-BRN MOIST MICA. CLAYEY SILTY SAND (A-2)

GROUND SURFACE

09/09 CAVED 09/09 09/09

BT BT

ROADWAY EMBANKMENT (FILL)

SOFT TAN-ORANGE MOIST HIGH (PI=44) PLASTICITY SILTY SANDY CLAY (A-7)

RESIDUAL
MED. STIFF BRN-ORANGE MOIST V. MICA. CLAYEY SANDY SILT (A-5)

MED. STIFF TAN-YELLOW-WHITE-BRN-ORANGE MOIST MICA. LOW (PI=11) PLASTICITY SILTY SANDY CLAY (A-7)

LOOSE TAN-YELLOW MOIST CLAYEY SILTY SAND (A-2)

V. STIFF TAN-ORANGE-WHITE MOIST CLAYEY SANDY SILT (A-5)

V. DENSE BRN-GRAY-WHITE SILTY SAND (A-2)

BT SEVERELY WEATHERED CRYSTALLINE ROCK

1000 990 980 970 960 950 940 930 920 910 900 890 880

19 20 21 22 23 24 25 26 27 28 29 30 31

PROJECT REFERENCE NO.	SHEET
33708.1.1 (B-4456)	5

SECTION THRU END BENT ONE
STA. 23+02.07 -L-
SKEW=40° 57' 36"

0 10 20
FEET

SS-14

EB1-A
22+74.00 -L-
25.1 LT

SS-7
SS-8
SS-9
SS-10
SS-11
SS-12
SS-13

EB1-B
23+40.00 -L-
32.0 RT

GROUND SURFACE

ROADWAY EMBANKMENT (FILL)

SOFT TO MED. STIFF RED-ORANGE-BRN-TAN-YELLOW MOIST SILTY SANDY CLAY (A-7)

MED. STIFF TAN-ORANGE-RED MOIST MICA. SILTY SANDY CLAY (A-7)

RESIDUAL

MED. STIFF TO SOFT TAN-ORANGE-RED-BLACK MOIST MICA. MED. (PI=16, 21) PLASTICITY SILTY SANDY CLAY (A-7)

MED. STIFF TO STIFF TAN-BRN MOIST MICA. CLAYEY SANDY SILT (A-5)

MED. STIFF TAN-BRN-WHITE MOIST MICA. CLAYEY SANDY SILT (A-5) (W/LAYERS OF QUARTZ ROCK)

MED. DENSE TO DENSE PINK-WHITE-GRAY-GREEN-TAN-BRN MOIST MICA. CLAYEY SILTY SAND (A-2)

MED. DENSE TO DENSE GRAY-GREEN-WHITE MOIST MICA. SILTY SAND (A-2) (W/QUARTZ ROCK)

SEVERELY WEATHERED CRYSTALLINE ROCK SEAM

DENSE GRAY-WHITE MOIST SILTY SAND (A-2) (W/QUARTZ ROCK)

BT

BT

980 970 960 950 940 930 920 910 900

60 50 40 30 20 10 0 10 20 30 40 50 60

PROJECT REFERENCE NO.	SHEET
33708.1.1 (B-4456)	6

SECTION THRU BENT ONE
STA. 24+46.07 -L-
SKEW=40° 57' 36"

0 10 20
FEET

SS-16
SS-17
SS-18
SS-19

B1-A
24+18.00 -L-
37.2 LT

B1-B
24+72.00 -L-
32.0 RT

GROUND SURFACE

ROADWAY EMBANKMENT (FILL)

SOFT RED-ORANGE MOIST CLAYEY SANDY SILT (A-5)

RESIDUAL

MED. STIFF TAN-ORANGE-BLACK MOIST CLAYEY SANDY SILT (A-5)

DENSE TAN-GRAY-BLACK MOIST MICA. SILTY SAND (A-2-4)

MED. STIFF TO HARD TAN-ORANGE TO GRAY-GREEN-WHITE MOIST CLAYEY SANDY SILT (A-5)

SOFT TO MED. STIFF RED-BRN-ORANGE-WHITE MOIST MICA. CLAYEY SANDY SILT (A-5)

MED. STIFF TO V. STIFF TAN-ORANGE TO GRAY-GREEN MOIST CLAYEY SANDY SILT (A-5)

CAVED 09/09

BT

BT
NM
(09/09)

970 960 950 940 930 920 910 900 890

60 50 40 30 20 10 0 10 20 30 40 50 60

PROJECT REFERENCE NO.	SHEET
33708.1.1 (B-4456)	7

SECTION THRU END BENT TWO
STA. 25+92.07 -L-
SKEW=40° 57' 36"

0 10 20
FEET

SS-1 SS-3
SS-2 SS-4

EB2-A
25+66.00 -L-
26.1 LT

GROUND SURFACE

ROADWAY EMBANKMENT (FILL)

(3) (PI=44)

VERY SOFT TO SOFT TAN-ORANGE MOIST HIGH (PI=44) PLASTICITY SILTY SANDY CLAY (A-7)

(0)

(5)

MED. STIFF BRN-ORANGE MOIST V. MICA. CLAYEY SANDY SILT (A-5)

(7) (PI=11)

RESIDUAL

NOTE: SLOPE CONDITIONS DID NOT ALLOW SAFE ACCESS TO EB2-B LOCATION.

(4) 09/09

MED. STIFF TAN-YELLOW-WHITE-BRN-ORANGE MOIST MICA. LOW (PI=11) PLASTICITY SILTY SANDY CLAY (A-7)

(5)

(5)

(5)

(7)

LOOSE TAN-YELLOW MOIST CLAYEY SILTY SAND (A-2)

(7)

(6)

(15)

(15)

V. STIFF TAN-ORANGE-WHITE MOIST CLAYEY SANDY SILT (A-5)

(19)

(17)

(18)

(76)

V. DENSE BRN-GRAY-WHITE SILTY SAND (A-2)

(100/.7) BT

SEVERELY WEATHERED CRYSTALLINE ROCK

980 970 960 950 940 930 920 910 900 890

60 50 40 30 20 10 0 10 20 30 40 50 60

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 22+74	**OFFSET** 25ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 979.6 ft	**TOTAL DEPTH** 72.6 ft	**NORTHING** 723,937	**EASTING** 1,342,163	**24 HR.** 21.4
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic	
START DATE 09/21/09	**COMP. DATE** 09/22/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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
980										979.6 GROUND SURFACE 0.0
975	973.5	6.1	0	1	2	3		M		**ROADWAY EMBANKMENT** SOFT TO MED. STIFF RED-ORANGE-BRN-TAN-YELLOW MOIST SILTY SANDY CLAY (A-7)
970	968.5	11.1	0	2	4	6		M		
965	963.5	16.1	1	2	4	6		M		963.5 16.1 **RESIDUAL** MED. STIFF TAN-ORANGE-RED MOIST MICA. SILTY SANDY CLAY (A-7)
960	958.5	21.1	1	2	4	6		M		
955	953.5	26.1	1	2	2	4		M		954.6 25.0 **RESIDUAL** MED. STIFF TO STIFF TAN-BRN MOIST MICA. CLAYEY SANDY SILT (A-5)
950	948.5	31.1	4	4	8	12		M		
945	943.5	36.1	2	3	4	7		M		
940	938.5	41.1	8	7	11	18	SS-14	M		939.6 40.0 **RESIDUAL** MED. DENSE TO DENSE PINK-WHITE-GRAY-GREEN-TAN-BRN MOIST MICA. CLAYEY SILTY SAND (A-2)
935	933.5	46.1	10	11	13	24		M		
930	928.5	51.1	6	6	11	17		M		
925	923.5	56.1	22	25	29	54		M		
920	918.5	61.1	16	23	25	48		M		
915	913.5	66.1	10	17	22	39		M		
910	908.5	71.1	15	19	29	48		M		907.0 72.6 Boring Terminated at Elevation 907.0 ft IN DENSE TAN-BRN-GRAY MOIST MICA. CLAYEY SILTY SAND (A-2)
905										
900										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 23+40	**OFFSET** 32ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 978.1 ft	**TOTAL DEPTH** 76.6 ft	**NORTHING** 723,974	**EASTING** 1,342,242	**24 HR.** 21.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic	
START DATE 09/16/09	**COMP. DATE** 09/16/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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)
980										GROUND SURFACE	978.1	0.0
975	973.0	5.1	3	4	6	10	SS-7	M		**ROADWAY EMBANKMENT** MED. STIFF RED-ORANGE-BRN-TAN-YELLOW MOIST MED. (PI=29, 22) PLASTICITY SILTY SANDY CLAY (A-7)		
970	968.0	10.1	2	2	4	6	SS-8	M			963.0	15.1
965	963.0	15.1	1	2	3	5	SS-9	M		**RESIDUAL** MED. STIFF TO SOFT TAN-ORANGE-RED-BLACK MOIST MICA. MED. (PI=16, 21) PLASTICITY SILTY SANDY CLAY (A-7)		
960	958.0	20.1	0	1	2	3		M				
955	953.0	25.1	1	1	2	3	SS-10	M				
950	948.0	30.1	1	1	3	4		M				
945	943.0	35.1	1	2	3	5	SS-11	M			944.1	34.0
940	938.0	40.1	1	3	4	7		M		**RESIDUAL** MED. STIFF TAN-BRN-WHITE MOIST MICA. CLAYEY SANDY SILT (A-5) (W/ LAYERS OF QUARTZ ROCK)		
935	933.0	45.1	2	3	3	6		M				
930	928.0	50.1	7	10	10	20	SS-12	M			930.1	48.0
925	923.0	55.1	15	15	23	38	SS-13	M		**RESIDUAL** MED. DENSE TO DENSE GRAY-GREEN-WHITE MOIST MICA. SILTY SAND (A-2) (W/ QUARTZ ROCK)		
920	918.0	60.1	7	9	19	28		M				
915	913.0	65.1	10	12	35	47		M				
910	908.0	70.1	20	48	52/.4	100/.9		M			907.5	70.6
905										**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK SEAM	905.1	73.0
903.0	75.1	22	22	21	43		M			**RESIDUAL** DENSE GRAY-WHITE MOIST SILTY SAND (A-2) (W/ QUARTZ ROCK)	901.5	76.6
900												

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 23+40	**OFFSET** 32ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 978.1 ft	**TOTAL DEPTH** 76.6 ft	**NORTHING** 723,974	**EASTING** 1,342,242	**24 HR.** 21.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic	
START DATE 09/16/09	**COMP. DATE** 09/16/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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)
900						Match Line				Boring Terminated at Elevation 901.5 ft IN DENSE GRAY-WHITE MOIST SILTY SAND (A-2) (W/ QUARTZ ROCK)		
895												
890												
885												
880												
875												
870												
865												
860												
855												
850												
845												
840												
835												
830												
825												
820												

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 24+18	**OFFSET** 37ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 962.3 ft	**TOTAL DEPTH** 55.7 ft	**NORTHING** 724,074	**EASTING** 1,342,210	**24 HR.** CV@6.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic	
START DATE 09/24/09	**COMP. DATE** 09/24/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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)
										GROUND SURFACE	962.3	0.0
										ROADWAY EMBANKMENT SOFT RED-ORANGE MOIST CLAYEY SANDY SILT (A-5)		
	958.1	4.2	0	1	3	4		M			956.3	6.0
										RESIDUAL MED. STIFF TAN-ORANGE-BLACK MOIST CLAYEY SANDY SILT (A-5)		
	953.1	9.2	1	2	5	7	SS-16	M				
											949.3	13.0
										RESIDUAL DENSE TAN-GRAY-BLACK MOIST MICA. SILTY SAND (A-2-4)		
	948.1	14.2	6	15	16	31	SS-17	M				
											944.3	18.0
										RESIDUAL MED. STIFF TO HARD TAN-ORANGE TO GRAY-GREEN-WHITE MOIST CLAYEY SANDY SILT (A-5)		
	943.1	19.2	2	3	4	7	SS-18	M				
	938.1	24.2	2	4	6	10		M				
	933.1	29.2	4	6	8	14		M				
	928.1	34.2	3	5	6	11	SS-19	M				
	923.1	39.2	4	6	7	13		M				
	918.1	44.2	3	4	8	12		M				
	913.1	49.2	8	16	19	35		M				
	908.1	54.2	14	17	29	46		M			906.6	55.7
										Boring Terminated at Elevation 906.6 ft IN HARD GRAY-GREEN-WHITE MOIST CLAYEY SANDY SILT (A-5)		

NCDOT BORE SINGLE B4456_GEO_BH_BRDG0049.GPJ NC_DOT.GDT 10/16/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.	
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+72	**OFFSET** 32ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 961.9 ft	**TOTAL DEPTH** 56.1 ft	**NORTHING** 724,096	**EASTING** 1,342,295	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic	
START DATE 09/24/09	**COMP. DATE** 09/25/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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)
										GROUND SURFACE	961.9	0.0
										ROADWAY EMBANKMENT SOFT RED-ORANGE MOIST CLAYEY SANDY SILT (A-5)		
	957.3	4.6	0	1	1	2		M			957.3	4.6
										RESIDUAL SOFT TO MED. STIFF RED-BRN-ORANGE-WHITE MOIST MICA. CLAYEY SANDY SILT (A-5)		
	952.3	9.6	1	1	1	2		M				
	947.3	14.6	0	1	2	3		M				
	942.3	19.6	1	1	2	3		M				
	937.3	24.6	1	2	2	4		M				
	932.3	29.6	1	2	3	5		M				
	927.3	34.6	1	2	2	4		M				
	922.3	39.6	1	2	3	5		M				
	917.3	44.6	1	2	4	6		M				
	912.3	49.6	6	9	12	21		M				
	907.3	54.6	8	10	13	23		M			905.8	56.1
										Boring Terminated at Elevation 905.8 ft IN V. STIFF GRAY-GREEN MOIST CLAYEY SANDY SILT (A-5)		

NCDOT BORE SINGLE B4456_GEO_BH_BRDG0049.GPJ NC_DOT.GDT 10/16/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 25+66	**OFFSET** 26ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 982.1 ft	**TOTAL DEPTH** 91.4 ft	**NORTHING** 724,205	**EASTING** 1,342,279	**24 HR.** 26.5
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic
START DATE 09/15/09	**COMP. DATE** 09/15/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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
985										982.1 GROUND SURFACE 0.0
980										**ROADWAY EMBANKMENT** SOFT TO VERY SOFT TAN-ORANGE MOIST HIGH (PI=44) PLASTICITY SILTY SANDY CLAY (A-7)
	976.4	5.7								
975			0	1	2	3	SS-1	M		
	971.4	10.7								
970			0	0	0 WOH	0		M		
	966.4	15.7								966.4 15.7
965			1	1	4	5	SS-2	M		**RESIDUAL** MED. STIFF BRN-ORANGE MOIST V. MICA. CLAYEY SANDY SILT (A-5) 963.1 19.0
	961.4	20.7								**RESIDUAL** MED. STIFF TAN-YELLOW-WHITE-BRN-ORANGE MOIST MICA. LOW (PI=11) PLASTICITY SILTY SANDY CLAY (A-7)
960			4	5	2	7	SS-3	M		
	956.4	25.7								
955			1	2	2	4		M		
	951.4	30.7								
950			1	2	3	5		M		
	946.4	35.7								
945			1	2	3	5		M		
	941.4	40.7								943.1 39.0
940			2	2	3	5	SS-4	M		**RESIDUAL** LOOSE TAN-YELLOW MOIST CLAYEY SILTY SAND (A-2)
	936.4	45.7								
935			2	3	4	7		M		
	931.4	50.7								
930			2	3	4	7		M		
	926.4	55.7								
925			2	3	3	6		M		923.1 59.0
	921.4	60.7								**RESIDUAL** V. STIFF TAN-ORANGE-WHITE MOIST CLAYEY SANDY SILT (A-5)
920			4	7	8	15	SS-5	M		
	916.4	65.7								
915			3	6	9	15		M		
	911.4	70.7								
910			5	7	12	19		M		
	906.4	75.7								
905			6	6	11	17		M		

NCDOT BORE SINGLE B4456_GEO_BH_BRDG0049.GPJ NC_DOT.GDT 10/20/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33708.1.1	**ID.** B-4456	**COUNTY** CATAWBA	**GEOLOGIST** Stickney, J. K.
SITE DESCRIPTION BRIDGE #49 OVER I-40 ON NC 16			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 25+66	**OFFSET** 26ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 982.1 ft	**TOTAL DEPTH** 91.4 ft	**NORTHING** 724,205	**EASTING** 1,342,279	**24 HR.** 26.5
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer		**HAMMER TYPE** Automatic
START DATE 09/15/09	**COMP. DATE** 09/15/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 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
905						Match Line				
	901.4	80.7								
900			5	10	8	18		M		
	896.4	85.7								
895			10	28	48	76	SS-6	M		
	891.4	90.7								891.4 90.7
890			48	52/.2		100/.7				890.7 91.4 **WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK Boring Terminated at Elevation 890.7 ft IN SEVERELY WEATHERED CRYSTALLINE ROCK
885										
880										
875										
870										
865										
860										
855										
850										
845										
840										
835										
830										
825										

NCDOT BORE SINGLE B4456_GEO_BH_BRDG0049.GPJ NC_DOT.GDT 10/20/09

TEST RESULTS

PROJECT: 33708.1.1 (B-4456)
COUNTY: CATAWBA
SITE DESCRIPTION: BRIDGE NO. 49 OVER I-40 ON NC 16

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT C. SAND	% BY WEIGHT F. SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING SIEVES 10	% PASSING SIEVES 40	% PASSING SIEVES 200	% MOISTURE	% ORGANIC	UNIT WT. (d)	VOID RATIO
		EB1-A																
SS-14	25 LT	22+74 -L-	41.6-42.6	A-2-5(0)	18	41	9	44.1	25.9	17.9	12.1	89	63	31				
		EB1-B																
SS-7	32 RT	23+40 -L-	5.6-6.6	A-7-6(17)	10	57	29	20.8	21.2	15.5	42.5	100	88	62				
SS-8	32 RT	23+40 -L-	10.6-11.6	A-7-5(14)	6	62	22	16.8	21.6	27.2	34.4	91	80	63				
SS-9	32 RT	23+40 -L-	15.6-16.6	A-7-5(16)	5	62	16	11.9	34.0	29.8	24.3	100	95	74				
SS-10	32 RT	23+40 -L-	25.6-26.6	A-7-5(17)	3	59	21	11.1	25.7	34.9	28.3	100	94	71				
SS-11	32 RT	23+40 -L-	35.6-36.6	A-5(0)	5	44	7	32.2	29.9	23.8	14.2	82	62	37				
SS-12	32 RT	23+40 -L-	50.6-51.6	A-2-4(0)	20	39	8	47.5	29.6	14.8	8.1	98	68	28				
SS-13	32 RT	23+40 -L-	55.6-56.6	A-2-4(0)	38	28	NP	55.7	27.0	12.2	5.1	97	58	21				
		B1-A																
SS-16	37 LT	24+18 -L-	9.7-10.7	A-5(2)	7	46	7	19.4	42.3	26.2	12.1	100	93	46				
SS-17	37 LT	24+18 -L-	14.7-15.7	A-2-4(0)	31	34	NP	37.0	37.2	17.7	8.1	100	79	32				
SS-18	37 LT	24+18 -L-	19.7-20.7	A-5(3)	7	51	7	18.4	36.4	27.0	18.2	100	92	53				
SS-19	37 LT	24+18 -L-	34.7-35.7	A-5(1)	11	41	7	32.0	29.5	24.4	14.2	97	79	43				
		EB2-A																
SS-1	26 LT	25+66 -L-	6.2-7.2	A-7-5(44)	3	89	44	4.7	17.8	18.9	58.6	100	98	83				
SS-2	26 LT	25+66 -L-	16.2-17.2	A-5(0)	5	60	5	22.0	44.7	21.1	12.1	100	93	40				
SS-3	26 LT	25+66 -L-	21.2-22.2	A-7-5(1)	7	45	11	31.1	34.8	19.9	14.2	91	75	37				
SS-4	26 LT	25+66 -L-	41.2-42.2	A-2-4(0)	5	33	2	40.0	32.8	17.1	10.1	92	69	30				
SS-5	26 LT	25+66 -L-	61.2-62.2	A-5(0)	15	41	6	28.1	37.2	22.5	12.1	98	82	42				
SS-6	26 LT	25+66 -L-	86.2-87.2	A-2-4(0)	76	31	NP	31.0	49.3	13.5	6.1	100	87	26				

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT	Q(MPa) (ksf)	E(MPa) (MPsi)