This electronic collection of documents is provided for the convenience of the user and is Not a Certified Document –

The documents contained herein were originally issued and sealed by the individuals whose names and license numbers appear on each page, on the dates appearing with their signature on that page.
This file or an individual page shall not be considered a certified document.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	39010.1.R2 (U-3440)	1	18

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 39010.1.R2 (U-3440) F.A. PROJ. _____

COUNTY CABARRUS

PROJECT DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP ROAD) IN KANNAPOLIS

SITE DESCRIPTION DUAL BRIDGES ON NC 3 OVER IRISH BUFFALO CREEK REPLACING BRIDGE NO. 36

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.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.C. MURRAY

J.E. ESTEP

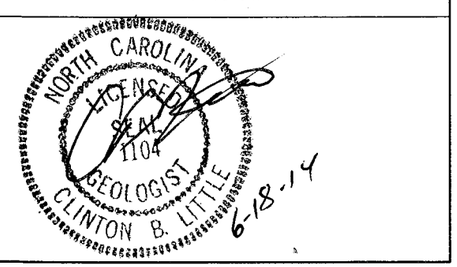
M.R. MOORE

INVESTIGATED BY J.P. ROGERS

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE JUNE 2014



PROJECT: 39010.1.R2

ID: U-3440

DRAWN BY: J.K. McCLURE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PROJECT REFERENCE NO.	SHEET NO.
39010.1.R2 (U-3440)	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 ($TONS/FT^2$)
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 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
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
- SPT / DPT DMT / VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE 2 15/16 " 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: BL-14
STA 63+24.64
N 636547.1510 E 1507771.2200 ELEVATION: 667.34 FT.

NOTES:
SOIL STRATIGRAPHY IS THROUGH THE BORINGS FOR PROFILE AND CROSS SECTIONS.

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
39010.1.R2 (U-3440)	3

SITE PLAN

0 50 100
FEET

SKEW=110°0'00"

OVERCASH TRUSTEE, EDWARD C.
DB 1768 PG 86

65

NORTH

N 07°59'46" E
492.43'

-L- POT Sta. 67+61 +/-
BEGIN BRIDGE

-L- POT Sta. 67+36 +/-
BEGIN APPROACH SLAB

CAROLINAS CASTLE & COOKE REALITY LLC
DB 7200 PG 55
PB 49 PG 95

W.P. #2
STA. 67+90.60 -L-

W.P. #1
STA. 67+60.60 -L-

N 13°33'20" E
114.42'

N 18°25'09" E
140.07'

SANITARY SEWER R/W

70

60.00'

SANITARY SEWER R/W

-L- PC Sta. 70+76.71

42" RCP

WILKINSON, LESTER L.
DB 5012 PG 119

EB1-A(LL)
B2-A(LL)
EB2-A(LL)
B1-A(LL)
B2-C(LL)
EB2-C(LL)
EB1-B(LL)
B1-B(LL)
LEFT LANE

N 43°20'18" E
24.60'

N 43°24'29" E
19.22'

-L- S 84° 11' 58.7" E

30' EXISTING R/W

INV=656.05

48" RCP

INV=655.95

TO SR 1639
MARION AVE

NC 3 MOORESVILLE RD 24' BST

TO SR 1643
RAINBOW DR

CONC
RIGHT LANE

EB1-A(RL)
EB2-A(RL)

S 81° 04' 45.4" E

INV=662.30'

-BL-14

TEL WITNESS POST

EB1-B(RL)
B1-B(RL)
B2-B(RL)
EB2-B(RL)

8" STEEL

BM #8

GAS TEST STATION

S 53°23'30" E
100.40'

POWER METER

6" STEEL GR

12" CMP
w/ 3SBW

48" WW

N 80°27'40" E
67.81'

CONC

GAS REGULATOR TEST STATION

50' EXISTING R/W

W.P. #3
STA. 68+50.60 -L-

W.P. #4
STA. 68+90.60 -L-

-L- POT Sta. 69+16 +/-
END APPROACH SLAB

-L- POT Sta. 68+91 +/-
END BRIDGE

IRISH BUFFALO CREEK

42" RCP

SANITARY SEWER R/W

60.00'

SANITARY SEWER R/W

PUBLIC SERVICE CO. OF NC INC
DB 309 PG 158

S 53°12'21" E
224.97'

WILKINSON, LESTER L.
DB 163 PG 129

BAKER, JERRY H.
DB 6261 PG 261

PROJECT REFERENCE NO.	SHEET
39010.1.R2 (U-3440)	4

Profile -L-
Bridge 036 (Left & Right Lane) on NC 3 over Irish Buffalo Creek

0 50 100
FEET
V.E. = 5:1

-L-

PI = 68+60.00
EL = 573.95'
VC = 200'
K = 109

SS-26
EB1-B(LL)
67+63 -L-
9.0 LT.
ELEV. 661.8

SS-1
SS-2
SS-3
SS-4
SS-5
EB2-C(LL)
69+00 -L-
26.0 LT.
ELEV. 659.5

(+)1.1441%
(-)0.6869%

SS-24
SS-25
B1-B(LL)
67+91 -L-
9.0 LT.
ELEV. 660.7

SS-14
B2-C(LL)
68+67 -L-
25.0 LT.
ELEV. 660.7

IRISH BUFFALO CREEK

ROADWAY EMBANKMENT (FILL)
TAN MED. STIFF MOIST SILTY SANDY CLAY (A-6)

RESIDUAL

ALLUVIUM
GRAY V. LOOSE TO LOOSE MOIST CLAYEY SILTY SAND (A-2-4)

ROADWAY EMBANKMENT (FILL)

ALLUVIUM
GRAY & TAN TO GRAY-TAN SOFT MOIST SILTY SANDY CLAY (A-6)

GRAY-WHITE LOOSE WET SAND (A-1-B)

ALLUVIUM
GRAY LOOSE WET SAND (A-1)

GRAY-WHITE V. LOOSE WET CLAYEY SILTY SAND (A-2-4) W/TRACE MICA

GRAY V. SOFT WET MED. PLASTIC SANDY SILTY CLAY (A-7-6) W/TRACE MICA

RESIDUAL
WHITE & TAN MED. DENSE WET SILTY SAND (A-1-B) W/TRACE MICA

WEATHERED ROCK
SEV. WEATHERED CRYSTALLINE ROCK

WEATHERED ROCK
WHITE & TAN & PINK WET SEV. WEATH. CRYSTALLINE ROCK W/TRACE MICA

WEATHERED ROCK
WHITE & TAN WET SEV. WEATHERED CRYSTALLINE ROCK

CRYSTALLINE ROCK

WEATHERED ROCK
TAN WET SEV. WEATHERED CRYSTALLINE ROCK W/CRYSTALLINE ROCK SEAM @ 28.5

CRYSTALLINE ROCK
WHITE & TAN GRANITIC

BT
FIAD
(4/24/14)

BT
FIAD
(4/22/14)

BORING DESCRIPTIONS

Ⓐ GRAY-TAN TO RED-BRN MED. DENSE MOIST LOW PLASTIC SILTY CLAYEY SAND (A-2-6) W/RIP-RAP 0.0-2.4 +/- (ROADWAY EMBANKMENT FILL)

Ⓑ WHITE & TAN LOOSE MOIST SAND (A-1-B) W/TRACE MICA (ALLUVIUM)

Ⓒ WHITE & TAN MED. DENSE MOIST SAND (A-1-B) W/TRACE MICA (RESIDUAL)

Ⓓ GRAY V. SOFT WET SANDY SILTY CLAY (A-7) (ALLUVIUM)

Ⓔ TAN DENSE WET SILTY SAND (A-2) W/TRACE MICA (RESIDUAL)

Ⓕ TAN LOOSE WET CLAYEY SAND (A-1) W/PEA SIZE GRAVEL @ 21.3 (ALLUVIUM)

690 680 670 660 650 640 630 620 610 600

65 66 67 68 69 70 71 72

PROJECT REFERENCE NO.	SHEET
39010.1.1 (U-3440)	5

Section Through End Bent One (LL&RL)
Sta. 67+60.60 -L- (W.P. #1)
Skew = 110°00'00"

0 20 40
FEET

NC 3 MOORESVILLE RD

690
680
670
660
650
640
630
620
610
600

ROADWAY EMBANKMENT (FILL)
TAN MED. STIFF MOIST
SILTY SANDY CLAY (A-6)

SS-19
SS-20
SS-21
EB1-A(LL)
67+78 -L-
58.0 LT.
ELEV. 659.5

SS-26
EB1-B(LL)
67+63 -L-
9.0 LT.
ELEV. 661.8

SS-38
SS-39
EB1-A(RL)
67+46 -L-
20.0 RT.
ELEV. 668.0

ROADWAY EMBANKMENT (FILL)
BRN-TAN SOFT MOIST LOW PLASTIC
SANDY CLAYEY SILT (A-4)
W/BLACK TOP & BASE 0.0-2.0

SS-27
EB1-B(RL)
67+37 -L-
60.0 RT.
ELEV. 660.7

ROADWAY EMBANKMENT (FILL)
RED-BRN MED. STIFF
MOIST MED. PLASTIC
SILTY SANDY CLAY (A-7-6)

GROUND SURFACE

ALLUVIUM
TAN & GRAY SOFT MOIST TO WET
LOW PLASTIC SILTY SANDY CLAY (A-6)
(PI=12)

ORANGE & WHITE LOOSE WET
SAND (A-1-B) W/TRACE MICA
RESIDUAL

WHITE & TAN MED. DENSE WET
SILTY SAND (A-1-B) W/TRACE MICA
WEATHERED ROCK
WHITE & TAN WET SEV. WEATH.
CRYSTALLINE ROCK

CRYSTALLINE ROCK
WHITE & TAN

ALLUVIUM

WEATHERED ROCK
SEV. WEATHERED
CRYSTALLINE ROCK

ROADWAY EMBANKMENT (FILL)
(PI=10)

GRAY V. LOOSE WET
CLAYEY SILTY SAND (A-2-4)
W/LAYERS OF SANDY CLAY

WEATHERED ROCK
PINK-OLIVE & WHITE WET
SEV. WEATH. CRYSTALLINE ROCK

CRYSTALLINE ROCK
PINK-WHITE & OLIVE

ALLUVIUM
GRAY V. LOOSE MOIST TO WET
CLAYEY SAND (A-2)
(PI=6)

RESIDUAL GRAY MED. DENSE WET CLAYEY SAND (A-2)
WEATHERED ROCK
WHITE & OLIVE SEV. WEATH. CRYSTALLINE ROCK

CRYSTALLINE ROCK

BT
FIAD
(5/8/14)

BORING DESCRIPTIONS
(A) GRAY V. LOOSE TO LOOSE MOIST
CLAYEY SILTY SAND (A-2-4) (ALLUVIUM)

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

PROJECT REFERENCE NO.	SHEET
39010.1.1 (U-3440)	6

Section Through Bent One (LL&RL)
Sta. 67+90.60 -L- (W.P. #2)
Skew = 110°00'00"

0 20 40
FEET

NC 3 MOORESVILLE RD

SS-22 SS-23
B1-A(LL)
68+05 -L-
38.0 LT.
ELEV. 660.1

SS-24 SS-25
B1-B(LL)
67+91 -L-
9.0 LT.
ELEV. 660.7

SS-28 SS-29 SS-30
B1-B(RL)
67+69 -L-
59.0 RT.
ELEV. 662.0

ROADWAY EMBANKMENT (FILL)
GRAY-TAN TO RED-BRN MED DENSE MOIST LOW PLASTIC SILTY CLAYEY SAND (A-2-6) W/RIP-RAP 0.0-2.4 +/-

BRIDGE DECK

ROADWAY EMBANKMENT (FILL)
RED-BRN MED STIFF MOIST LOW PLASTIC CLAYEY SANDY SILT (A-4)

GROUND SURFACE

ALLUVIUM
GRAY-TAN TO GRAY V LOOSE TO LOOSE MOIST TO WET SAND (A-1-B)

RESIDUAL
TAN & WHITE LOOSE TO MED DENSE WET SAND (A-1-B) W/TRACE MICA

WEATHERED ROCK
TAN & WHITE, SEV. WEATH. CRYSTALLINE ROCK

CRYSTALLINE ROCK

ROADWAY EMBANKMENT (FILL)
WHITE & TAN LOOSE MOIST SAND (A-1-B) W/TRACE MICA

WEATHERED ROCK
WHITE & TAN & PINK WET SEV. WEATH. CRYSTALLINE ROCK W/TRACE MICA

CRYSTALLINE ROCK

ALLUVIUM
TAN & GRAY V LOOSE WET NON PLASTIC CLAYEY SILTY SAND (A-2-4)
OLIVE & WHITE LOOSE WET SILTY SAND (A-1-B)

RESIDUAL
WEATHERED ROCK
OLIVE & WHITE WET SEV. WEATH. CRYSTALLINE ROCK

CRYSTALLINE ROCK
OLIVE & WHITE

BT
TCR

BORING DESCRIPTIONS
(A) WHITE & TAN MED DENSE MOIST SAND (A-1-B) W/TRACE MICA (RESIDUAL)

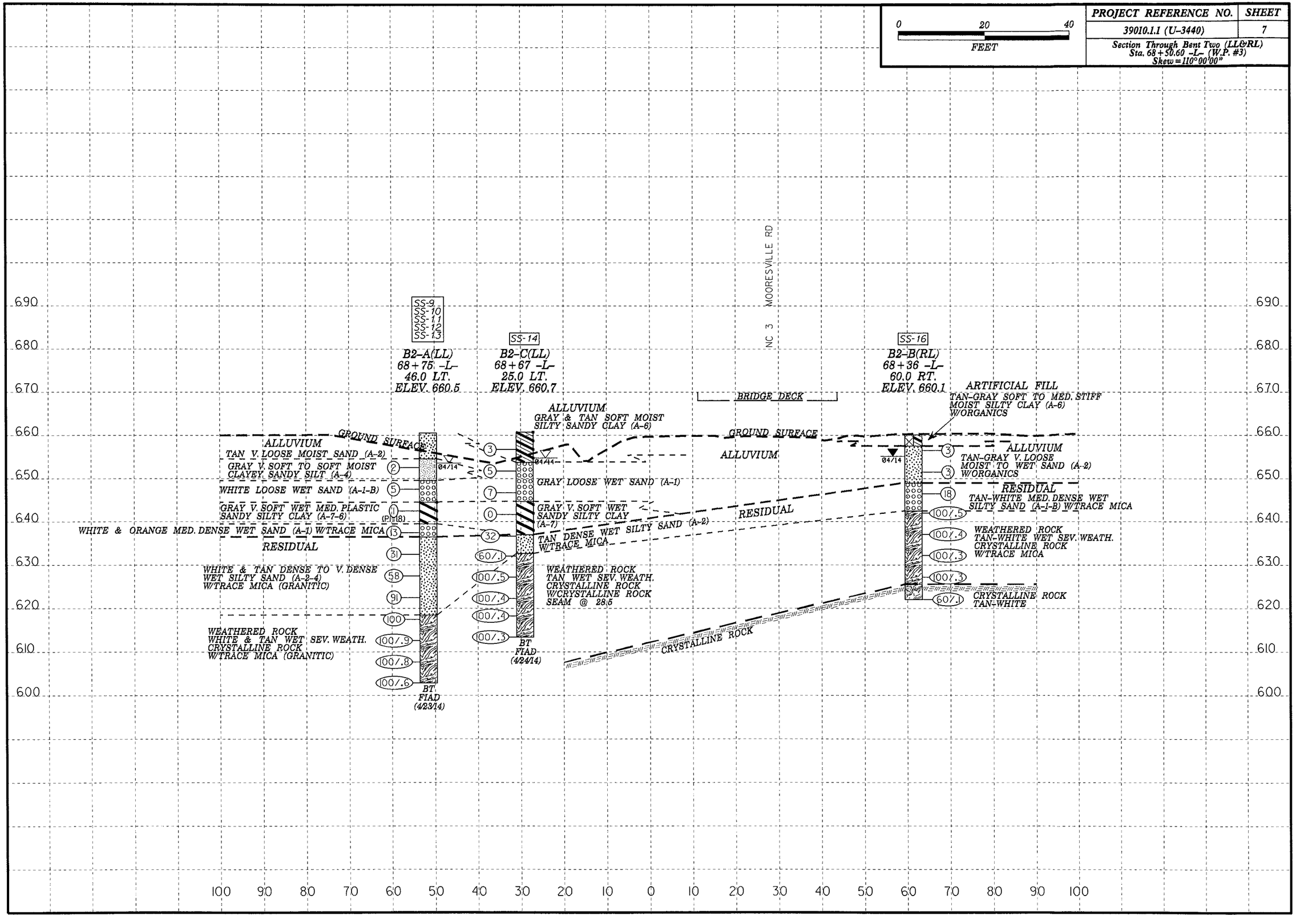
690 680 670 660 650 640 630 620 610 600

100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100

PROJECT REFERENCE NO.	SHEET
39010.1.1 (U-3440)	7

Section Through Bent Two (LL&RL)
Sta. 68+50.60 -L- (W.P. #3)
Skew = 110° 00' 00"

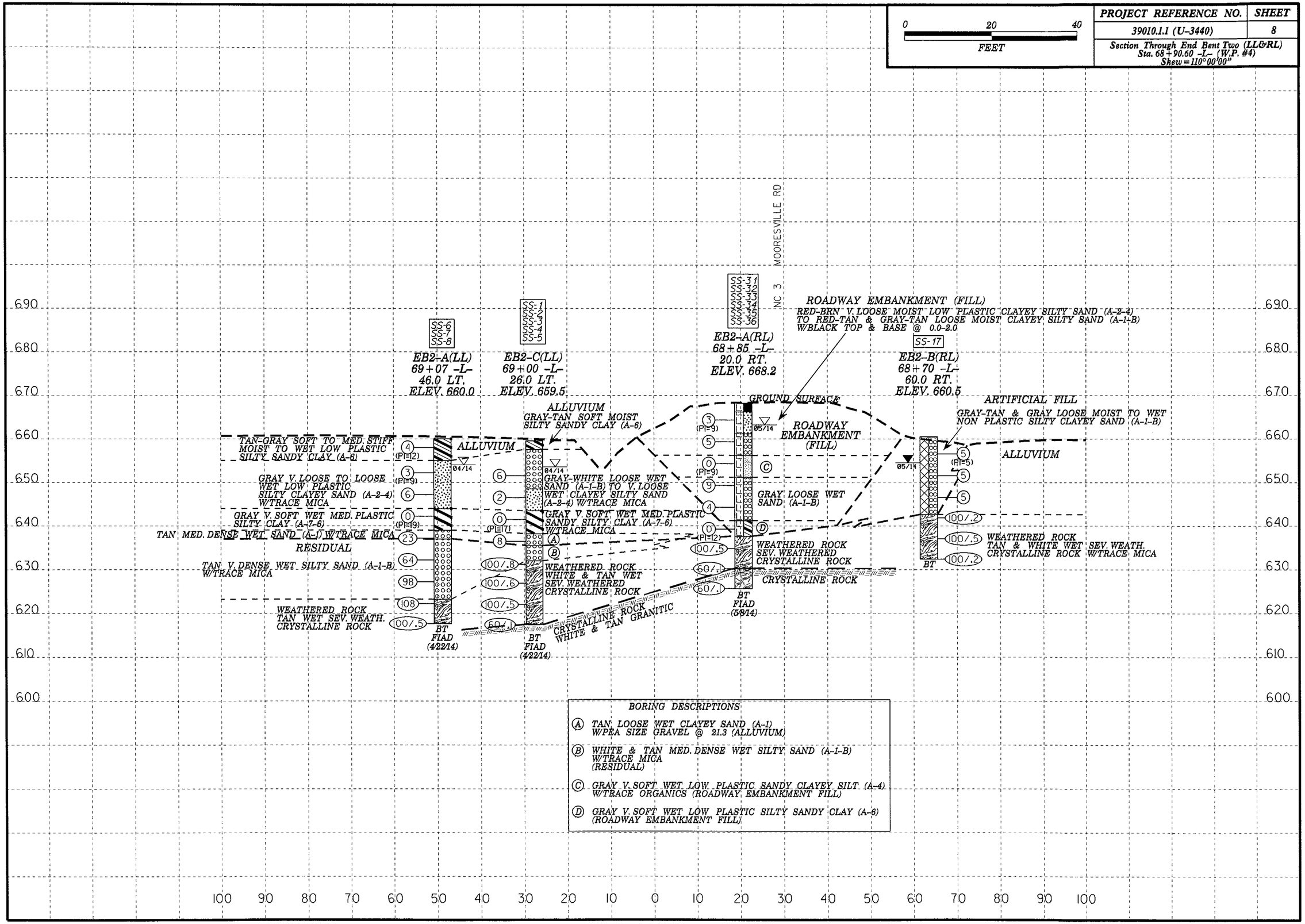
0 20 40
FEET



PROJECT REFERENCE NO.	SHEET
39010.1.1 (U-3440)	8

Section Through End Bent Two (LL&RL)
Sta. 68+90.60 -L- (W.P. #4)
Skew = 110° 00' 00"

0 20 40
FEET



BORING DESCRIPTIONS

(A) TAN LOOSE WET CLAYEY SAND (A-1) W/PEA SIZE GRAVEL @ 21.3 (ALLUVIUM)

(B) WHITE & TAN MED. DENSE WET SILTY SAND (A-1-B) W/TRACE MICA (RESIDUAL)

(C) GRAY V. SOFT WET LOW PLASTIC SANDY CLAYEY SILT (A-4) W/TRACE ORGANICS (ROADWAY EMBANKMENT FILL)

(D) GRAY V. SOFT WET LOW PLASTIC SILTY SANDY CLAY (A-6) (ROADWAY EMBANKMENT FILL)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A(LL)	**STATION** 67+78	**OFFSET** 58 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 659.5 ft	**TOTAL DEPTH** 28.0 ft	**NORTHING** 636,638	**EASTING** 1,507,906	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/02/14	**COMP. DATE** 05/02/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
660										GROUND SURFACE	659.5	0.0
	656.6	2.9	2	1	1	2	SS-19	W		**ALLUVIAL** TAN & GRAY SOFT MOIST TO WET LOW (PI=12) PLASTIC SILTY SANDY CLAY (A-6)		
655	651.6	7.9	2	3	4	7	SS-20	W		**ALLUVIAL** ORANGE & WHITE LOOSE WET SAND (A-1-B) W/ TRACE MICA	652.5	7.0
650	646.6	12.9	4	11	12	23	SS-21	W		**RESIDUAL** WHITE & TAN MED. DENSE WET SILTY SAND (A-1-B) W/ TRACE MICA	648.0	11.5
645	641.6	17.9	52	48/0.4		100/.9		W		**WEATHERED ROCK** WHITE & TAN WET SEV. WEATH. CRYSTALLINE ROCK	644.5	15.0
640	636.6	22.9	60	60/0.1		60/.1		W		**CRYSTALLINE ROCK** WHITE & TAN	636.1	23.4
635	631.6	27.9	60/0.1			60/.1		W		Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 631.5 ft IN CRYSTALLINE ROCK	631.5	28.0

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B(LL)	**STATION** 67+63	**OFFSET** 9 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.0
COLLAR ELEV. 661.8 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 636,591	**EASTING** 1,507,887	**24 HR.** 7.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/06/14	**COMP. DATE** 05/06/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
665										GROUND SURFACE	661.8	0.0
660	658.7	3.1	3	2	3	5		M		**ROADWAY EMBANKMENT** TAN MED. STIFF MOIST SILTY SANDY CLAY (A-6)	658.3	3.5
655	653.7	8.1	0	1	4	5	SS-26	M		**ALLUVIAL** GRAY V. LOOSE TO LOOSE MOIST CLAYEY SILTY SAND (A-2-4)	651.3	10.5
650	648.7	13.1	21	69	31/0.1	100/.6				**WEATHERED ROCK** SEV. WEATH. CRYSTALLINE ROCK		
645	643.7	18.1	100/0.4			100/.4						
640	638.7	23.1	100/0.4			100/.4				Boring Terminated at Elevation 638.3 ft IN SEV. WEATH. CRYSTALLINE ROCK	638.3	23.5

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. B1-A(LL)	**STATION** 68+05	**OFFSET** 38 ft LT	**ALIGNMENT** -L-	**0 HR.** 5.0
COLLAR ELEV. 660.1 ft	**TOTAL DEPTH** 37.1 ft	**NORTHING** 636,615	**EASTING** 1,507,931	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/05/14	**COMP. DATE** 05/05/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
665										
660										660.1 GROUND SURFACE 0.0
	658.1	2.0	1	2	1	3		M		**ALLUVIAL** GRAY-TAN TO GRAY V. LOOSE TO LOOSE MOIST TO WET SAND (A-1-B)
655	653.1	7.0	1	2	2	4	SS-22	W		
650	648.1	12.0	2	3	3	6		W		648.6 11.5 **RESIDUAL** TAN & WHITE LOOSE TO MED. DENSE WET SAND (A-1-B) W/ TRACE MICA
645	643.1	17.0	25	61	39/0.2	100/.7	SS-23			642.6 17.5 **WEATHERED ROCK** TAN & WHITE SEV. WEATH. CRYSTALLINE ROCK
640	638.1	22.0	58	60/0.1		60/.1				637.6 22.5 **CRYSTALLINE ROCK**
635	633.1	27.0	60/0.1			60/.1				
630	628.1	32.0	60/0.1			60/.1				
625	623.1	37.0	60/0.1			60/.1				623.0 37.1 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 623.0 ft IN CRYSTALLINE ROCK

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. B1-B(LL)	**STATION** 67+91	**OFFSET** 9 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 660.7 ft	**TOTAL DEPTH** 26.2 ft	**NORTHING** 636,588	**EASTING** 1,507,914	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Tri-Cone & SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/05/14	**COMP. DATE** 05/05/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
665										
660										660.7 GROUND SURFACE 0.0
	658.3	2.4	6	6	5	11	SS-24	M		**ROADWAY EMBANKMENT** GRAY-TAN TO RED-BRN MED. DENSE MOIST LOW (PI=14) PLASTIC SILTY CLAYEY SAND (A-2-6) W/ RIP-RAP 0.0-2.4+/-
655	653.3	7.4	3	2	4	6	SS-25	M		654.2 6.5 **ALLUVIAL** WHITE & TAN LOOSE MOIST SAND (A-1-B) W/ TRACE MICA
650	648.3	12.4	14	70	30/0.1	100/.6		W		648.7 12.0 647.8 12.9 **RESIDUAL** WHITE & TAN MED. DENSE MOIST SAND (A-1-B) W/ TRACE MICA
645	643.3	17.4	100/0.3			100/.3				**WEATHERED ROCK** WHITE & TAN & PINK WET SEV. WEATH. CRYSTALLINE ROCK W/ TRACE MICA
640	638.3	22.4	100/0.3			100/.3		W		
635	634.5	26.2	60/0.0			60/0				634.5 26.2 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 634.5 ft ON CRYSTALLINE ROCK

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK			**GROUND WTR (ft)**
BORING NO. B2-A(LL)	**STATION** 68+75	**OFFSET** 46 ft LT	**ALIGNMENT** -L- **0 HR.** 7.0
COLLAR ELEV. 660.5 ft	**TOTAL DEPTH** 57.6 ft	**NORTHING** 636,616	**EASTING** 1,508,002 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 04/23/14	**COMP. DATE** 04/23/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	660.5	0.0
										ALLUVIAL TAN V. LOOSE MOIST SAND (A-2)	654.5	6.0
	653.5	7.0	1	1	1	2	SS-9	M		**ALLUVIAL** GRAY V. SOFT TO SOFT MOIST CLAYEY SANDY SILT (A-4)	649.5	11.0
	648.5	12.0	1	2	3	5	SS-10	W		**ALLUVIAL** WHITE LOOSE WET SAND (A-1-B)	644.5	16.0
	643.5	17.0	0	0	1	1	SS-11	W		**ALLUVIAL** GRAY V. SOFT WET MED. (PI=18) PLASTIC SANDY SILTY CLAY (A-7-6)	639.5	21.0
	638.5	22.0	7	7	6	13	SS-12	W		**ALLUVIAL** WHITE & ORANGE MED. DENSE WET SAND (A-1) W/ TRACE MICA	636.5	24.0
	633.5	27.0	7	14	17	31	SS-13	W		**RESIDUAL** WHITE & TAN DENSE TO V. DENSE WET SILTY SAND (A-2-4) W/ TRACE MICA (GRANITIC)		
	628.5	32.0	11	23	35	58		W				
	623.5	37.0	29	39	52	91		W				
	618.5	42.0	35	65/0.5		100		W		**WEATHERED ROCK** WHITE & TAN WET SEV. WEATH. CRYSTALLINE ROCK W/ TRACE MICA (GRANITIC)	618.5	42.0
	613.5	47.0	43	57/0.4		100/.9						
	608.5	52.0	55	45/0.3		100/.8						
	603.5	57.0	74	26/0.1		100/.6				Boring Terminated at Elevation 602.9 ft IN SEV. WEATH. CRYSTALLINE ROCK	602.9	57.6

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK			**GROUND WTR (ft)**
BORING NO. B2-C(LL)	**STATION** 68+67	**OFFSET** 25 ft LT	**ALIGNMENT** -L- **0 HR.** 6.0
COLLAR ELEV. 660.7 ft	**TOTAL DEPTH** 47.3 ft	**NORTHING** 636,596	**EASTING** 1,507,992 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 04/24/14	**COMP. DATE** 04/24/14	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	660.7	0.0
	657.7	3.0	1	1	2	3		M		**ALLUVIAL** GRAY & TAN SOFT MOIST SILTY SANDY CLAY (A-6)	653.7	7.0
	652.7	8.0	1	2	3	5		W		**ALLUVIAL** GRAY LOOSE WET SAND (A-1)	644.7	16.0
	647.7	13.0	2	3	4	7		W		**ALLUVIAL** GRAY V. SOFT WET SANDY SILTY CLAY (A-7)	637.0	23.7
	642.7	18.0	0	0	0 WOH	0	SS-14	W		**RESIDUAL** TAN DENSE WET SILTY SAND (A-2) W/ TRACE MICA	632.7	28.0
	637.7	23.0	5	13	19	32		W		**WEATHERED ROCK** TAN WET SEV. WEATH. CRYSTALLINE ROCK W/ CRYSTALLINE ROCK SEAM @ 28.5		
	632.7	28.0	97	60/0.1		60/.1		W				
	627.7	33.0	100/0.5			100/.5		W				
	622.7	38.0	100/0.4			100/.4		W				
	618.7	42.0	100/0.4			100/.4		W				
	613.7	47.0	100/0.3			100/.3		W		Boring Terminated at Elevation 613.4 ft IN SEV. WEATH. CRYSTALLINE ROCK	613.4	47.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A(LL)	**STATION** 69+07	**OFFSET** 46 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 660.0 ft	**TOTAL DEPTH** 42.3 ft	**NORTHING** 636,613	**EASTING** 1,508,034	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 04/22/14	**COMP. DATE** 04/22/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
660										660.0 GROUND SURFACE 0.0
	659.0	1.0	2	2	2	4	SS-6	W		**ALLUVIAL** TAN-GRAY SOFT TO MED. STIFF MOIST TO WET LOW (PI=12) PLASTIC SILTY SANDY CLAY (A-6)
655										655.0 5.0
	653.2	6.8	2	1	2	3	SS-7	W		**ALLUVIAL** GRAY V. LOOSE TO LOOSE WET LOW (PI=9) PLASTIC SILTY CLAYEY SAND (A-2-4) W/ TRACE MICA
650										
	648.2	11.8	1	2	4	6		W		
645										644.0 16.0
	643.2	16.8	0	0	0	WOH 0	SS-8	W		**ALLUVIAL** GRAY V. SOFT WET MED. (PI=19) PLASTIC SILTY CLAY (A-7-6)
640										639.0 21.0
	638.2	21.8	3	11	12	23		W		**ALLUVIAL** TAN MED. DENSE WET SAND (A-1) W/ TRACE MICA
635										637.0 23.0
	633.2	26.8	27	32	32	64		W		**RESIDUAL** TAN V. DENSE WET SILTY SAND (A-1-B) W/ TRACE MICA
630										
	628.2	31.8	24	41	57	98		W		
625										
	623.2	36.8	41	67/0.5		108		W		623.2 36.8 **WEATHERED ROCK** TAN WET SEV. WEATH. CRYSTALLINE ROCK
620										
	618.2	41.8	100/0.5			100/.5				617.7 42.3 Boring Terminated at Elevation 617.7 ft IN SEV. WEATH. CRYSTALLINE ROCK

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (LEFT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-C(LL)	**STATION** 69+00	**OFFSET** 26 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 659.5 ft	**TOTAL DEPTH** 42.1 ft	**NORTHING** 636,594	**EASTING** 1,508,025	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 04/22/14	**COMP. DATE** 04/22/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
660										659.5 GROUND SURFACE 0.0
	657.5	2.0								**ALLUVIAL** GRAY-TAN SOFT MOIST SILTY SANDY CLAY (A-6)
655										**ALLUVIAL** GRAY-WHITE LOOSE WET SAND (A-1-B)
	652.5	7.0	3	3	3	6	SS-1	W		
650										
	647.5	12.0	1	1	1	2	SS-2	W		648.5 11.0 **ALLUVIAL** GRAY-WHITE V. LOOSE WET CLAYEY SILTY SAND (A-2-4) W/ TRACE MICA
645										643.5 16.0
	642.5	17.0	0	0	0	WOH 0	SS-3	W		**ALLUVIAL** GRAY V. SOFT WET MED. (PI=17) PLASTIC SANDY SILTY CLAY (A-7-6) W/ TRACE MICA
640										638.2 21.3
	637.5	22.0	3	5	3	8	SS-4	W		**ALLUVIAL** TAN LOOSE WET CLAYEY SAND (A-1) W/ PEA SIZE GRAVEL @ 21.3
635										635.5 24.0 **RESIDUAL** WHITE & TAN MED. DENSE WET SILTY SAND (A-1-B) W/ TRACE MICA
	632.5	27.0	27	56	44/0.3	100/.8	SS-5	W		632.0 27.5 **WEATHERED ROCK** WHITE & TAN WET SEV. WEATH. CRYSTALLINE ROCK
630										
	627.5	32.0	73	27/0.1		100/.6				
625										
	622.5	37.0	100/0.5			100/.5				
620										
	617.5	42.0	60/0.1			60/.1				617.5 42.0 617.4 42.1 **CRYSTALLINE ROCK** WHITE & TAN GRANITIC Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 617.4 ft IN CRYSTALLINE ROCK

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A(RL)	**STATION** 67+46	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.0
COLLAR ELEV. 668.0 ft	**TOTAL DEPTH** 28.1 ft	**NORTHING** 636,564	**EASTING** 1,507,867	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/08/14	**COMP. DATE** 05/08/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
670												
										GROUND SURFACE	668.0	0.0
										ROADWAY EMBANKMENT BLACK TOP & BASE	666.0	2.0
665	665.0	3.0	1	1	1	2	SS-38			**ROADWAY EMBANKMENT** BRN-TAN SOFT MOIST LOW (PI=10) PLASTIC SANDY CLAYEY SILT (A-4)	661.0	7.0
660	660.0	8.0	0	1	1	2		M		**ALLUVIAL** GRAY V. LOOSE WET CLAYEY SILTY SAND (A-2-4) W/ LAYERS OF SANDY CLAY		
655	655.0	13.0	1	0	1	1	SS-39	W			651.5	16.5
650	650.0	18.0	39	61/0.5		100		W		**WEATHERED ROCK** PINK-OLIVE & WHITE WET SEV. WEATH. CRYSTALLINE ROCK		
645	645.0	23.0	60/0.1			60/.1				**CRYSTALLINE ROCK** PINK-WHITE & OLIVE	645.0	23.0
640	640.0	28.0	60/0.1			60/.1				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 639.9 ft IN CRYSTALLINE ROCK	639.9	28.1

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B(RL)	**STATION** 67+37	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 660.7 ft	**TOTAL DEPTH** 23.3 ft	**NORTHING** 636,525	**EASTING** 1,507,854	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Tri-Cone & SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/06/14	**COMP. DATE** 05/06/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
665												
										GROUND SURFACE	660.7	0.0
660	657.8	2.9	4	3	4	7	SS-27	M		**ROADWAY EMBANKMENT** RED-BRN MED. STIFF MOIST MED. (PI=16) PLASTIC SILTY SANDY CLAY (A-7-6)	657.3	3.4
655	652.8	7.9	2	9	16	25		M/W		**ALLUVIAL** GRAY V. LOOSE MOIST TO WET CLAYEY SAND (A-2)	652.7	8.0
650	647.8	12.9	53	47/0.3		100/.8				**RESIDUAL** GRAY MED. DENSE WET CLAYEY SAND (A-2)	650.7	10.0
645	642.5	18.2	60/0.1			60/.1				**WEATHERED ROCK** WHITE & OLIVE SEV. WEATH. CRYSTALLINE ROCK	646.7	14.0
640	637.5	23.2	60/0.1			60/.1				**CRYSTALLINE ROCK**	637.4	23.3
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 637.4 ft IN CRYSTALLINE ROCK		

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. B1-B(RL)	**STATION** 67+69	**OFFSET** 59 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.0
COLLAR ELEV. 662.0 ft	**TOTAL DEPTH** 30.6 ft	**NORTHING** 636,522	**EASTING** 1,507,886	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Tri-Cone & SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/07/14	**COMP. DATE** 05/07/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
										GROUND SURFACE	662.0	0.0
										ROADWAY EMBANKMENT RED-BRN MED. STIFF MOIST LOW (PI=10) PLASTIC CLAYEY SANDY SILT (A-4)		
	658.7	3.3	3	2	3	5	SS-28	M			656.0	6.0
										ALLUVIAL TAN & GRAY V. LOOSE WET NON (PI=5) PLASTIC CLAYEY SILTY SAND (A-2-4)		
	653.7	8.3	1	1	2	3	SS-29	W			650.7	11.3
										RESIDUAL OLIVE & WHITE LOOSE WET SILTY SAND (A-1-B)	648.2	13.8
	648.7	13.3	5	18	82/0.4	100/.9	SS-30	W		**WEATHERED ROCK** OLIVE & WHITE WET SEV. WEATH. CRYSTALLINE ROCK	643.7	18.3
	643.7	18.3	60/0.1			60/.1		W		**CRYSTALLINE ROCK** OLIVE & WHITE		
	638.4	23.6	60/0.1			60/.1		W				
	633.4	28.6	60/0.1			60/.1		W			631.4	30.6
										Boring Terminated BY TRI-CONE REFUSAL at Elevation 631.4 ft IN CRYSTALLINE ROCK		

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. B2-B(RL)	**STATION** 68+36	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 660.1 ft	**TOTAL DEPTH** 38.0 ft	**NORTHING** 636,515	**EASTING** 1,507,952	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ Tri-Cone & SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 04/25/14	**COMP. DATE** 04/25/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
								M		GROUND SURFACE	660.1	0.0
	657.5	2.6	0	1	2	3		M		**ARTIFICIAL FILL** TAN-GRAY SOFT TO MED. STIFF MOIST SILTY CLAY (A-6) W/ ORGANICS	657.5	2.6
										ALLUVIAL TAN-GRAY V. LOOSE MOIST TO WET SAND (A-2) W/ ORGANICS		
	652.5	7.6	1	2	1	3		W			649.0	11.1
	647.5	12.6	3	6	12	18	SS-16	W		**RESIDUAL** TAN-WHITE MED. DENSE WET SILTY SAND (A-1-B) W/ TRACE MICA		
	642.5	17.6	100/0.5			100/.5		W		**WEATHERED ROCK** TAN-WHITE WET SEV. WEATH. CRYSTALLINE ROCK W/ TRACE MICA	642.5	17.6
	637.5	22.6	100/0.4			100/.4		W				
	632.5	27.6	100/0.3			100/.3		W				
	627.5	32.6	100/0.3			100/.3		W			625.6	34.5
										CRYSTALLINE ROCK TAN-WHITE		
	622.2	37.9	60/0.1			60/.1					622.1	38.0
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 622.1 ft IN CRYSTALLINE ROCK		

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-A(RL)	**STATION** 68+85	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** 5.0
COLLAR ELEV. 668.2 ft	**TOTAL DEPTH** 42.5 ft	**NORTHING** 636,550	**EASTING** 1,508,005	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/08/14	**COMP. DATE** 05/08/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
670										
										668.2 GROUND SURFACE 0.0
665	665.3	2.9	2	1	2	3	SS-31	M		**ROADWAY EMBANKMENT** BLACK TOP & BASE 666.2 2.0
										ROADWAY EMBANKMENT RED-BRN V. LOOSE MOIST LOW (PI=9) PLASTIC CLAYEY SILTY SAND (A-2-4) 661.2 7.0
660	660.3	7.9	2	2	3	5	SS-32	M		**ROADWAY EMBANKMENT** RED-TAN & GRAY-TAN LOOSE MOIST CLAYEY SILTY SAND (A-1-B) 656.2 12.0
655	655.3	12.9	0	0	0 WOH	0	SS-33	W		**ROADWAY EMBANKMENT** GRAY V. SOFT WET LOW (PI=9) PLASTIC SANDY CLAYEY SILT (A-4) W/ TRACE ORGANICS 651.2 17.0
650	650.3	17.9	3	5	4	9	SS-34	W		**ROADWAY EMBANKMENT** GRAY LOOSE WET SAND (A-1-B)
645	645.3	22.9	2	3	1	4	SS-35	W		641.2 27.0
640	640.3	27.9	0	0	0 WOH	0	SS-36	W		**ROADWAY EMBANKMENT** GRAY V. SOFT WET LOW (PI=12) PLASTIC SILTY SANDY CLAY (A-6) 637.6 30.6
635	635.3	32.9	100/0.5			100/.5		W		**WEATHERED ROCK** SEV. WEATH. CRYSTALLINE ROCK
630	630.3	37.9	60/0.1			60/.1		W		630.3 37.9 **CRYSTALLINE ROCK**
	625.8	42.4	60/0.1			60/.1				625.7 42.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 625.7 ft IN CRYSTALLINE ROCK

WBS 39010.1.R2	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION BRIDGE 36 (RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK				**GROUND WTR (ft)**
BORING NO. EB2-B(RL)	**STATION** 68+70	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 660.5 ft	**TOTAL DEPTH** 28.1 ft	**NORTHING** 636,511	**EASTING** 1,507,986	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 03/19/2014		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 05/02/14	**COMP. DATE** 05/02/14	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
665										
										660.5 GROUND SURFACE 0.0
660	657.6	2.9	1	2	3	5	SS-17	M		**ARTIFICIAL FILL** GRAY-TAN & GRAY LOOSE MOIST TO WET NON (PI=5) PLASTIC SILTY CLAYEY SAND (A-1-B)
655	652.6	7.9	1	2	3	5		W		
650	647.6	12.9	2	3	2	5		W		
645	642.6	17.9	60	40/0.2		100/.2		W		642.6 17.9 **WEATHERED ROCK** TAN & WHITE WET SEV. WEATH. CRYSTALLINE ROCK W/ TRACE MICA
640	637.6	22.9	100/0.5			100/.5				
635	632.6	27.9	100/0.2			100/.2				632.4 28.1 Boring Terminated at Elevation 632.4 ft IN SEV. WEATH. CRYSTALLINE ROCK

TEST RESULTS

PROJECT: 39010.1.R2 (U-3440)
COUNTY: CABARRUS
SITE DESCRIPTION: BRIDGE NO. 036 (LEFT LANE & RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK

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(LL)																
SS-19	58 LT.	67+78	2.9-4.4	A-6(6)	2	36	12	16.3	21.1	28.4	34.2	97	89	64				
SS-20	58 LT.	67+78	7.9-9.4	A-1-b(0)	7	23	NP	82.7	13.3	4.0	0.0	87	30	5				
SS-21	58 LT.	67+78	12.9-14.4	A-1-b(0)	23	33	NP	55.7	27.0	13.3	4.0	77	46	16				
		EB1-B(LL)																
SS-26	9 LT.	67+63	8.1-9.6	A-2-4(0)	5	28	NP	22.9	46.5	20.5	10.1	93	82	34				
		B1-A(LL)																
SS-22	38 LT.	68+05	7.0-8.5	A-1-b(0)	4	29	NP	71.2	22.5	2.2	4.0	83	41	6				
SS-23	38 LT.	68+05	17.0-18.5	A-1-b(0)	100+	30	NP	59.2	25.4	9.5	6.0	67	37	13				
		B1-B(LL)																
SS-24	9 LT.	67+91	2.4-3.9	A-2-6(1)	11	37	14	40.6	18.5	18.7	22.1	79	54	35				
SS-25	9 LT.	67+91	7.4-8.9	A-1-b(0)	6	26	NP	67.6	22.9	5.4	4.0	77	37	9				
		B2-A(LL)																
SS-9	46 LT.	68+75	7.0-8.5	A-4(0)	2	21	NP	11.3	44.8	25.8	18.1	100	98	51				
SS-10	46 LT.	68+75	12.0-13.5	A-1-b(0)	5	20	NP	78.6	15.1	4.3	2.0	66	21	5				
SS-11	46 LT.	68+75	17.0-18.5	A-7-6(19)	1	43	18	1.2	9.0	32.9	57.0	100	99	94				
SS-12	46 LT.	68+75	22.0-23.5	****	13													
SS-13	46 LT.	68+75	27.0-28.5	A-2-4(0)	31	33	NP	45.2	32.3	16.4	6.1	74	51	20				
		B2-C(LL)																
SS-14	25 LT.	68+67	18.0-19.5	****	0													
		EB2-A(LL)																
SS-6	46 LT.	69+07	1.0-2.5	A-6(5)	4	37	12	21.9	20.5	33.5	24.1	96	83	59				
SS-7	46 LT.	69+07	6.8-8.3	A-2-4(0)	3	27	9	34.0	31.2	16.8	18.1	88	69	34				
SS-8	46 LT.	69+07	16.8-18.3	A-7-6(20)	0	44	19	1.6	8.2	39.9	50.3	100	99	93				
		EB2-C(LL)																
SS-1	26 LT.	69+00	7.0-8.5	A-1-b(0)	6	22	NP	85.2	9.4	3.3	2.0	75	21	4				
SS-2	26 LT.	69+00	13.0-14.5	A-2-4(0)	2	26	NP	44.0	34.2	11.8	10.1	77	55	20				
SS-3	26 LT.	69+00	17.0-18.5	A-7-6(16)	0	41	17	1.4	13.9	36.5	48.2	100	99	89				
SS-4	26 LT.	69+00	22.0-23.5	***	8	-	-	88.6	7.2	4.1	0.0	52	10	3				
SS-5	26 LT.	69+00	27.0-28.5	A-1-b(0)	100+	28	NP	56.9	26.3	12.8	4.0	71	41	15				
		EB1-A(RL)																
SS-38	20 RT.	67+46	8.0-9.5	A-4(7)	2	35	10	10.9	15.7	41.2	32.2	96	88	75				
SS-39	20 RT.	67+46	13.0-14.5	A-2-4(0)	1	23	NP	32.2	37.6	20.1	10.1	76	59	28				
		EB1-B(RL)																
SS-27	60 RT.	67+37	2.9-4.4	A-7-6(9)	7	41	16	20.5	14.5	28.8	36.2	96	82	65				
		B1-B(RL)																
SS-28	59 RT.	67+69	3.3-4.8	A-4(1)	5	34	10	41.2	14.9	21.7	22.1	85	57	40				
SS-29	59 RT.	67+69	8.3-9.8	A-2-4(0)	3	30	5	45.7	22.7	19.5	12.1	90	62	32				
SS-30	59 RT.	67+69	13.3-14.8	A-1-b(0)	100+	34	NP	52.7	31.6	13.7	2.0	71	45	14				
		B2-B(RL)																
SS-16	60 RT.	68+36	12.6-13.1	A-1-b(0)	18	31	NP	57.5	25.6	10.9	6.0	71	40	15				
		EB2-A(RL)																
SS-31	20 RT.	68+85	2.9-4.5	A-2-4(0)	3	39	9	41.0	22.5	18.3	18.1	79	56	32				
SS-32	20 RT.	68+85	7.9-9.4	A-1-b(0)	5	43	NP	44.5	27.2	16.3	12.1	69	47	23				
SS-33	20 RT.	68+85	12.9-14.4	A-4(6)	0	34	9	3.6	26.8	39.4	30.2	100	98	76				
SS-34	20 RT.	68+85	12.9-14.4	A-1-b(0)	9	24	NP	82.9	11.9	3.2	2.0	76	22	5				
SS-35	20 RT.	68+85	22.9-24.4	A-1-b(0)	4	21	NP	80.3	16.3	1.4	2.0	78	29	4				
SS-36	20 RT.	68+85	27.9-29.4	A-6(6)	0	33	12	7.4	32.8	27.6	32.2	99	95	65				

ROCK SAMPLE RESULTS

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

TEST RESULTS

PROJECT: 39010.1.R2 (U-3440)
COUNTY: CABARRUS
SITE DESCRIPTION: BRIDGE NO. 036 (LEFT LANE & RIGHT LANE) ON NC 3 OVER IRISH BUFFALO CREEK

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING SIEVES 10	40	200	% MOISTURE	% ORGANIC	UNIT WT. (d)	VOID RATIO
		EB2-B(RL)																
SS-17	60 RT.	68+70	2.9-4.4	A-1-b(0)	5	27	5	60.4	14.1	11.5	14.1	89	48	25				

ROCK SAMPLE RESULTS

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

*** Insufficient Material to Test Sample
**** Missing Sample or Not Sent to Lab for Testing

PROJECT REFERENCE NO.	SHEET
39010.1.R2 (U-3440)	18

Aerial Photo

0 50 100

FEET

SKEW=110°0'00"

65

70

NORTH

-L- POT Sta. 67+61 +/-
BEGIN BRIDGE

-L- POT Sta. 67+36 +/-
BEGIN APPROACH SLAB

-L- PC Sta. 70+76.71

W.P. #2
STA. 67+90.60 -L-

W.P. #1
STA. 67+60.60 -L-

EB1-A(LL)

B1-A(LL)

B2-A(LL)

EB2-A(LL)

B2-C(LL)

EB2-C(LL)

EB1-B(LL)

B1-B(LL)

-L- S 84° 11' 58.7" E

TO SR 1639
MARION AVE

NC 3 MOORESVILLE RD 24' BST

CONC

TO SR 1643
RAINBOW DR

EB1-A(RL)

EB2-A(RL)

S 81° 04' 45.4" E

-BL-14

TFO WITNESS POST

EB1-B(RL)

B1-B(RL)

B2-B(RL)

EB2-B(RL)

BM #8

GAS TEST STATION

POWER METER

GAS REGULATOR

GAS TEST STATION

W.P. #3
STA. 68+50.60 -L-

W.P. #4
STA. 68+90.60 -L-

IRISH BUFFALO CREEK

-L- POT Sta. 69+16 +/-
END APPROACH SLAB

-L- POT Sta. 68+91 +/-
END BRIDGE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	39010.1.1	1	13

REFERENCE: U-3440

PROJECT: 39010.1.1

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *CABARRUS*

PROJECT DESCRIPTION *NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP ROAD) IN KANNAPOLIS*

SITE DESCRIPTION *RETAINING WALLS 1-5*

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) 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

KLEINFELDER

INVESTIGATED BY *J.P. ROGERS*

DRAWN BY *T.T. WALKER*

CHECKED BY *J.E. BEVERLY* JEB

SUBMITTED BY *E.N. WILLIAMS*

DATE *JULY 2016*

NORTH CAROLINA PROFESSIONAL SEAL 26962 ENGINEER ERIC N. WILLIAMS

DocuSigned by:
Eric N. Williams
A6B874F1197848D...
SIGNATURE

7/13/2016
DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
39010.1.1	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 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 THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR 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
MATERIAL PASSING #40 LL PI	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 SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PLASTIC RANGE (PI)		
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
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	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.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES 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 WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LL < 31
MODERATELY COMPRESSIBLE	LL = 31 - 50
HIGHLY COMPRESSIBLE	LL > 50

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [X] MOBILE B-57
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. 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, WOULD YIELD SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD 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 FOOT
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 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, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

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

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

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

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

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

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

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

BENCH MARK:

ELEVATION: FEET

NOTES:

BORING AND ELEVATION DATA DERIVED FROM NCDOT ROADWAY SUBSURFACE INVENTORY DATED MAY 2014

DATE: 8-15-14

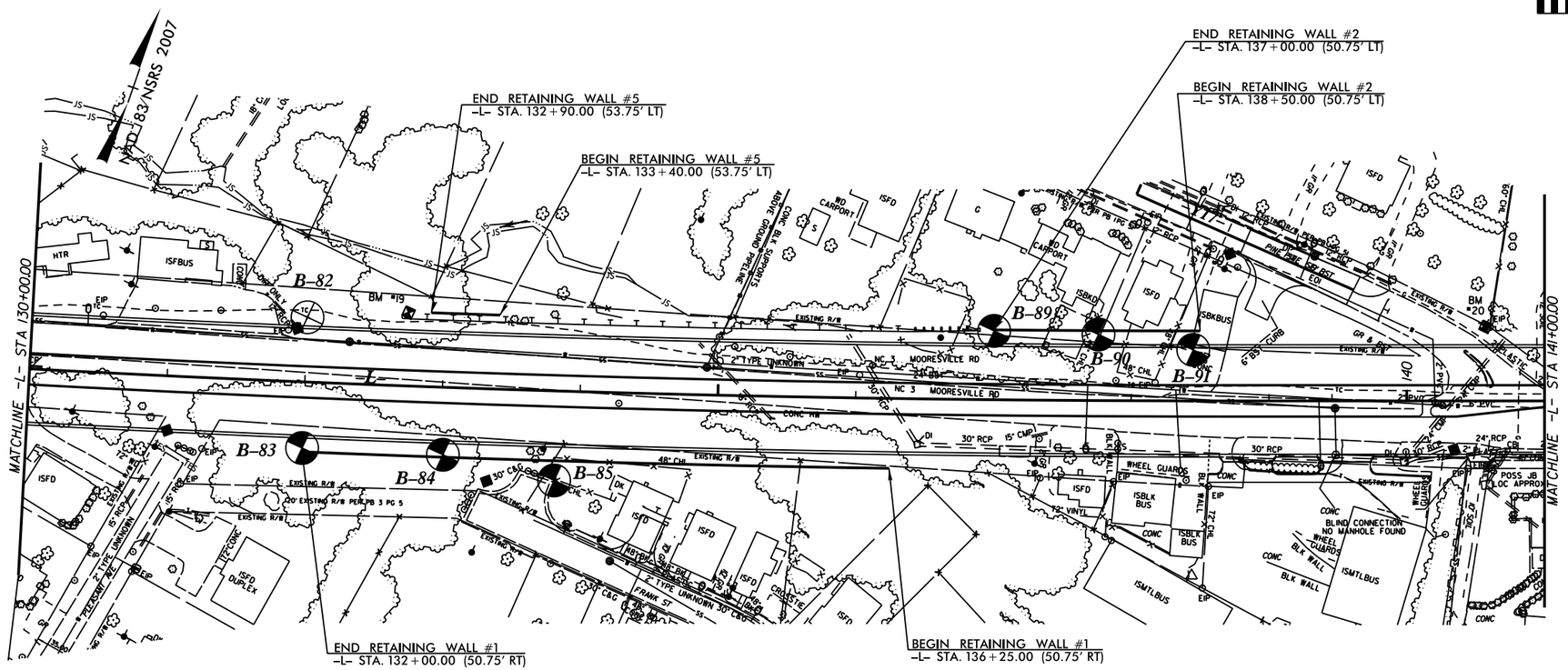
8/17/99

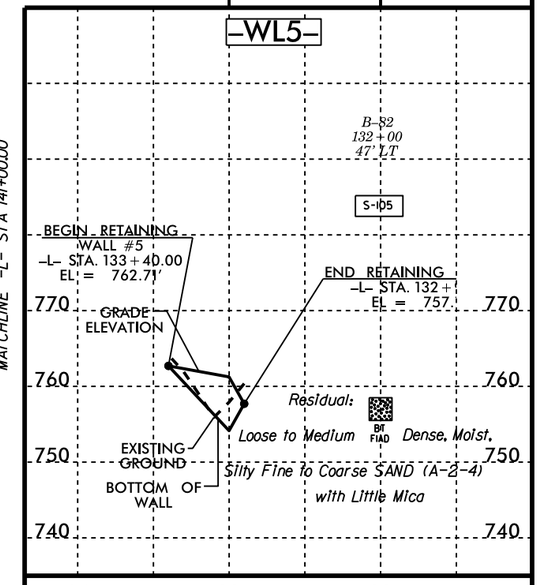
PROJECT REFERENCE NO.	SHEET NO.
U-3440	3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

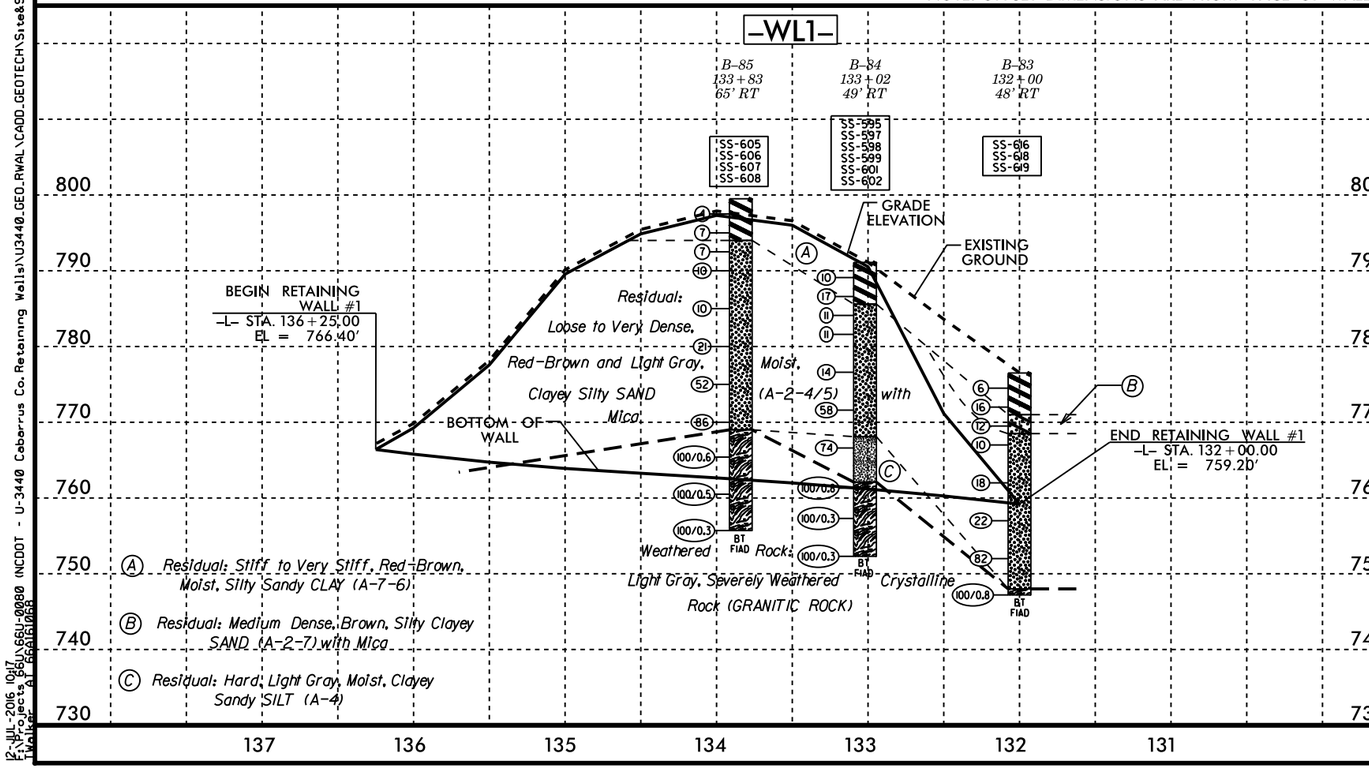
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

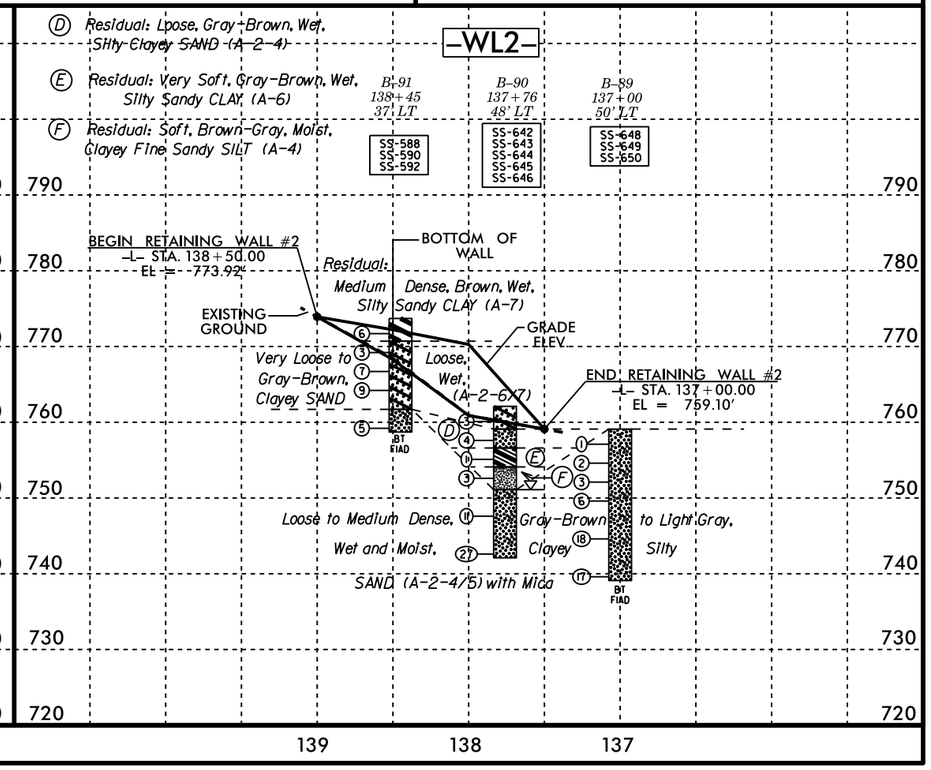
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50 25 0 50 100









8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-3440	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

50 25 0 50 100

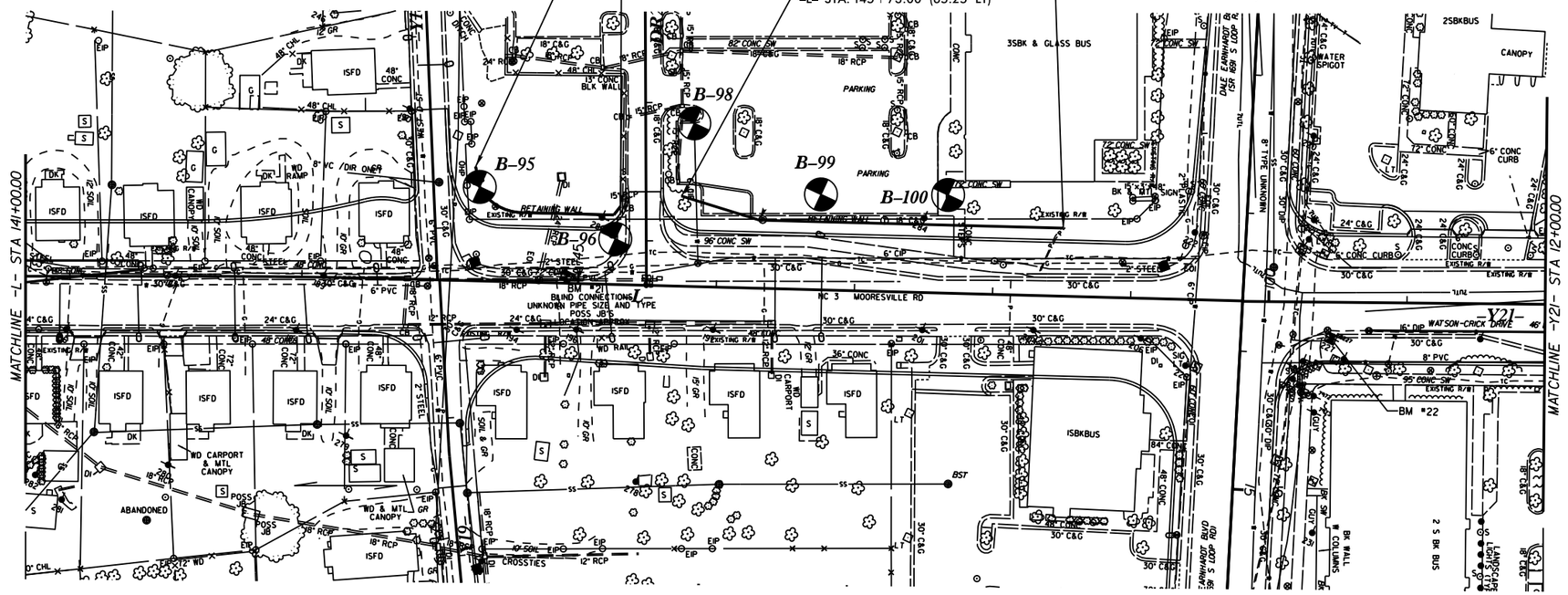
NAD 83/NSRS 2007

BEGIN RETAINING WALL #3
-WL3- STA. 10+00.00=
-Y18- STA. 11+56.70 (30.99' LT)

END RETAINING WALL #3
TIE TO EXISTING WALL
-WL3- STA. 11+26.94=
-DR2- STA. 11+75.00 (18.50' RT)

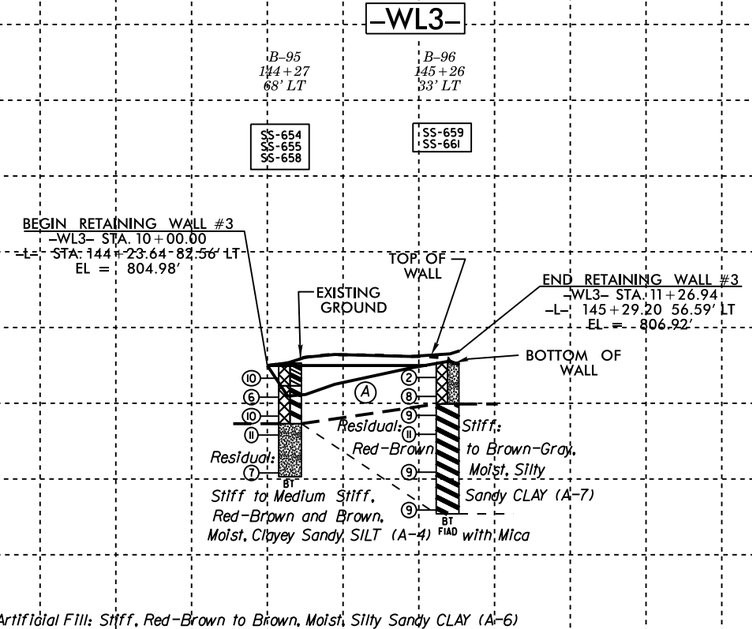
BEGIN RETAINING WALL #4
-WL4- STA. 10+00.00=
-L- STA. 145+73.00 (65.25' LT)

END RETAINING WALL #4
-WL4- STA. 12+79.20=
-L- STA. 148+50.00 (49.25 LT)



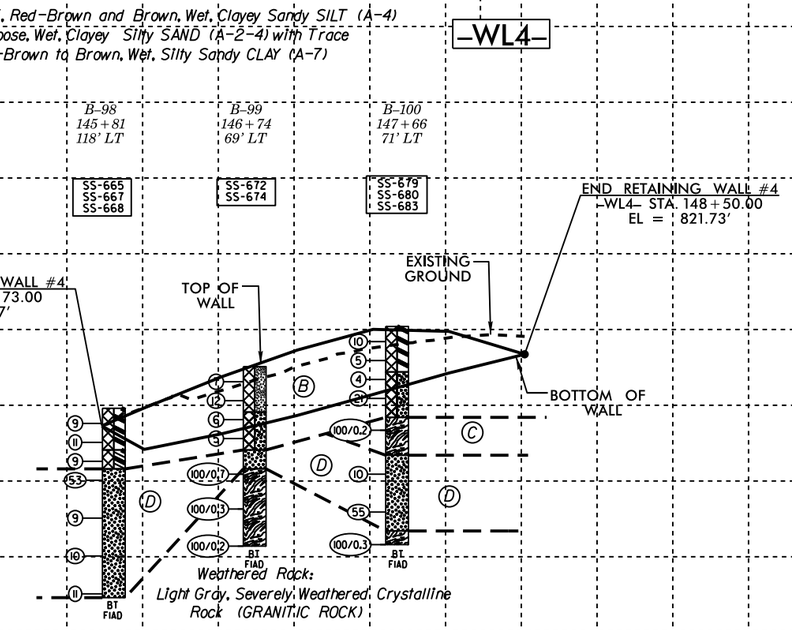
NOTE: OFFSET DIMENSIONS ARE FROM FACE OF WALL

-WL3-



(A) Artificial Fill: Stiff, Red-Brown to Brown, Moist, Silty Sandy CLAY (A-6) with Trace Organics, Red-Brown, Medium Stiff to Stiff, Moist, Silty Sandy CLAY (A-7-6), and Brown, Soft to Medium Stiff, Clayey Sandy SILT (A-4)

-WL4-



(B) Artificial Fill: Medium Stiff, Red-Brown and Brown, Wet, Clayey Sandy SILT (A-4) Brown to Dark Brown, Loose, Wet, Clayey Silty SAND (A-2-4) with Trace Gravel at 8.5' and Red-Brown to Brown, Wet, Silty Sandy CLAY (A-7)

(C) Weathered Rock: Light Gray, Severely Weathered Crystalline rock (GRANITIC ROCK)

(D) Residual: Red-Brown to Light Brown and Gray, Loose to Very Dense, Moist, Clayey Silty SAND (A-2-4) with Mica

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-83	**STATION** 132+00	**OFFSET** 48 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 776.5 ft	**TOTAL DEPTH** 29.3 ft	**NORTHING** 639,753	**EASTING** 1,513,190	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/06/13	**COMP. DATE** 12/06/13	**SURFACE WATER DEPTH** N/A	

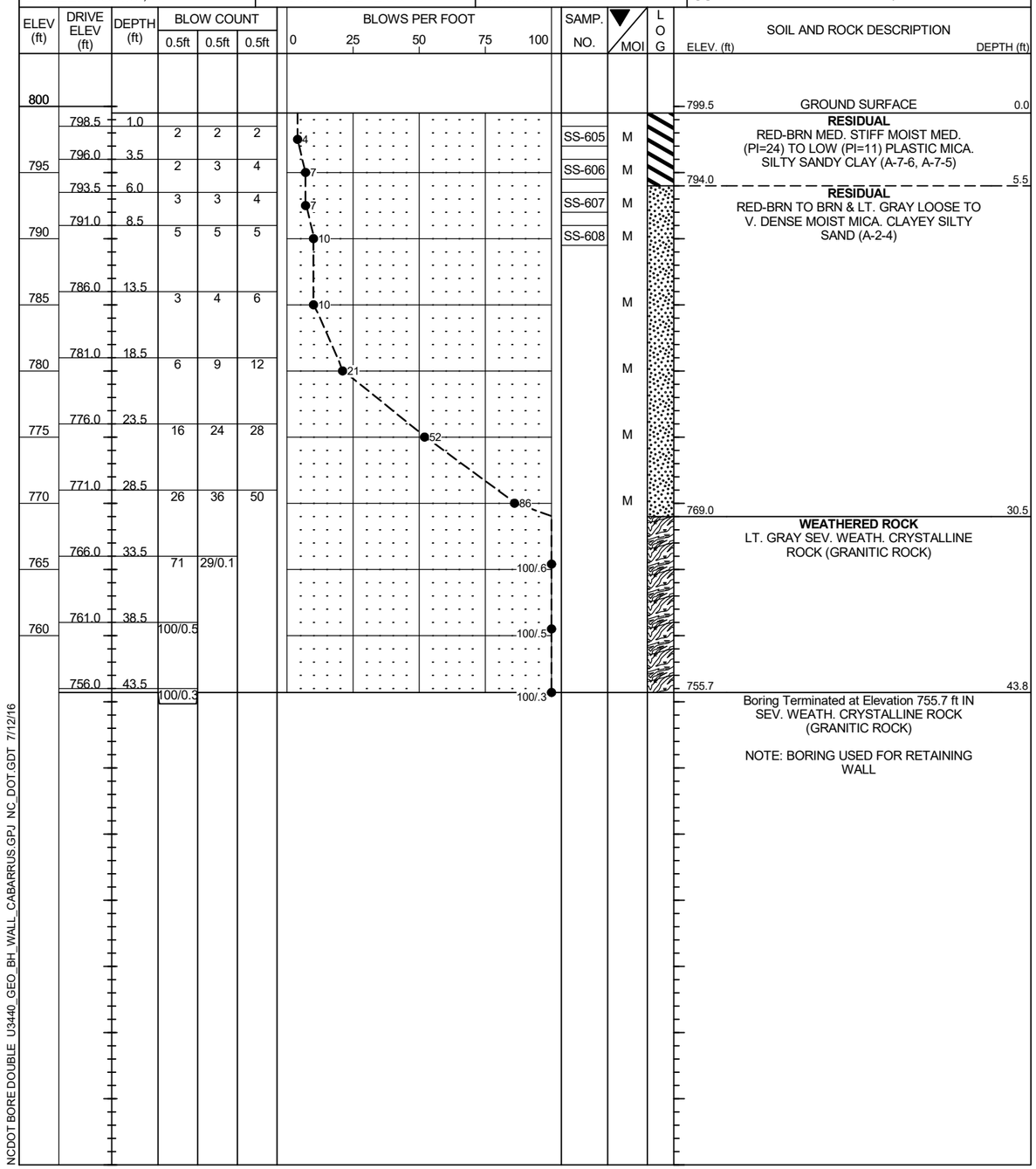
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
780										
	775.5	1.0								776.5 GROUND SURFACE 0.0
775			2	3	3	6 16	SS-616	W		**RESIDUAL** BRN MED. STIFF TO V. STIFF WET TO MOIST MICA. MED. (PI=23) PLASTIC SILTY SANDY CLAY (A-7-6)
	773.0	3.5	4	6	10			M		
770	770.5	6.0	5	6	6	12	SS-618	M		771.0 5.5 **RESIDUAL** BRN MED. DENSE MOIST MICA. LOW (PI=12) PLASTIC SILTY CLAYEY SAND (A-2-7) 768.5 8.0
	768.0	8.5	4	5	5	10	SS-619	M		**RESIDUAL** BRN TO LT. BRN & GRAY LOOSE TO V. DENSE MOIST MICA. CLAYEY SILTY SAND (A-2-5)
765										
	763.0	13.5	6	9	9	18		M		
760										
	758.0	18.5	4	8	14	22		M		
755										
	753.0	23.5	28	31	51	82		M		
750										
	748.0	28.5	57	43/0.3		100/.8				748.0 28.5 747.2 29.3 **WEATHERED ROCK** LT. GRAY SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK) Boring Terminated at Elevation 747.2 ft IN SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK) NOTE: BORING USED FOR RETAINING WALL

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-84	**STATION** 133+02	**OFFSET** 49 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 791.1 ft	**TOTAL DEPTH** 38.8 ft	**NORTHING** 639,792	**EASTING** 1,513,284	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/05/13	**COMP. DATE** 12/05/13	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
795										
	790.1	1.0								791.1 GROUND SURFACE 0.0
790			3	4	6	10	SS-595	M		**RESIDUAL** RED-BRN STIFF TO V. STIFF MOIST MED. (PI=16) PLASTIC SILTY SANDY CLAY (A-7-5)
	787.6	3.5	6	8	9	17		M		
785	785.1	6.0	5	6	5	11	SS-597	M		785.6 5.5 **RESIDUAL** BRN & LT. BRN MED. DENSE TO V. DENSE MOIST MICA. SILTY SAND & SILTY CLAYEY SAND (A-2-4)
	782.6	8.5	4	5	6	11	SS-598	M		
780										
	777.6	13.5	5	7	7	14	SS-599	M		
775										
	772.6	18.5	21	30	28	58		M		
770										
	767.6	23.5	28	39	35	74	SS-601	M		768.1 23.0 **RESIDUAL** LT. GRAY HARD MOIST CLAYEY SANDY SILT (A-4)
765										
	762.6	28.5	32	52	48/0.3	100/.8	SS-602			762.1 29.0 **WEATHERED ROCK** LT. GRAY SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK)
760										
	757.6	33.5	100/0.3			100/.3				
755										
	752.6	38.5	100/0.3			100/.3				752.3 38.8 Boring Terminated at Elevation 752.3 ft IN SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK) NOTE: BORING USED FOR RETAINING WALL

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-85	**STATION** 133+83	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 799.5 ft	**TOTAL DEPTH** 43.8 ft	**NORTHING** 639,809	**EASTING** 1,513,366	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/05/13	**COMP. DATE** 12/05/13	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE U3440_GEO_BH_WALL_CABARRUS.GPJ NC_DOT.GDT 7/12/16

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1 | **TIP** U-3440 | **COUNTY** CABARRUS | **GEOLOGIST** Wells, T.

SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS | **GROUND WTR (ft)**

BORING NO. B-89 | **STATION** 137+00 | **OFFSET** 50 ft LT | **ALIGNMENT** -L- | **0 HR.** Dry

COLLAR ELEV. 759.1 ft | **TOTAL DEPTH** 20.0 ft | **NORTHING** 640,042 | **EASTING** 1,513,610 | **24 HR.** FIAD

DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011 | **DRILL METHOD** H.S. Augers | **HAMMER TYPE** Automatic

DRILLER Gower, S. | **START DATE** 12/10/13 | **COMP. DATE** 12/10/13 | **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
760											759.1	0.0
	758.1	1.0								GROUND SURFACE **RESIDUAL** GRAY-BRN TO LT. GRAY V. LOOSE TO MED. DENSE WET & MOIST LOW (PI=5, 4) PLASTIC CLAYEY SILTY SAND & NON-PLASTIC SILTY CLAYEY SAND (A-2-4) MICA. 9.5-20.0		
755	755.6	3.5	1	0	1	1	SS-648	W				
	753.1	6.0	1	1	1	2	SS-649	W				
750	750.6	8.5	1	1	2	3	SS-650	W				
			1	2	4	6		M				
745	745.6	13.5	3	7	11	18		M				
740	740.6	18.5	9	7	10	17		W			739.1	20.0
										Boring Terminated at Elevation 739.1 ft IN MED. DENSE WET SILTY CLAYEY SAND (A-2-4)		

WBS 39010.1.1 | **TIP** U-3440 | **COUNTY** CABARRUS | **GEOLOGIST** Wells, T.

SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS | **GROUND WTR (ft)**

BORING NO. B-90 | **STATION** 137+76 | **OFFSET** 48 ft LT | **ALIGNMENT** -L- | **0 HR.** 11.0

COLLAR ELEV. 762.1 ft | **TOTAL DEPTH** 20.0 ft | **NORTHING** 640,071 | **EASTING** 1,513,679 | **24 HR.** FIAD

DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011 | **DRILL METHOD** H.S. Augers | **HAMMER TYPE** Automatic

DRILLER Gower, S. | **START DATE** 12/10/13 | **COMP. DATE** 12/10/13 | **SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
765											762.1	0.0
	761.1	1.0								GROUND SURFACE **RESIDUAL** GRAY-BRN V. LOOSE WET LOW (PI=12) PLASTIC CLAYEY SAND (A-2-6)	759.1	3.0
760	758.6	3.5	1	1	2	3	SS-642	W		**RESIDUAL** GRAY-BRN LOOSE WET LOW (PI=2) PLASTIC SILTY CLAYEY SAND (A-2-4)	756.6	5.5
	756.1	6.0	2	2	2	4	SS-643	W		**RESIDUAL** GRAY-BRN V. SOFT WET LOW (PI=12) PLASTIC SILTY SANDY CLAY (A-6)	754.1	8.0
755	753.6	8.5	0	0	1	1	SS-644	W		**RESIDUAL** BRN-GRAY SOFT MOIST MICA. CLAYEY F. SANDY SILT (A-4)	751.1	11.0
			1	1	2	3	SS-645	M		**RESIDUAL** LT. GRAY MED. DENSE MOIST MICA. SILTY SAND (A-2-5)		
750	748.6	13.5	4	4	7	11	SS-646	M				
745	743.6	18.5	11	13	14	27		M			742.1	20.0
										Boring Terminated at Elevation 742.1 ft IN MED. DENSE MOIST SILTY SAND (A-2-5)		

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-91	**STATION** 138+45	**OFFSET** 37 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 773.7 ft	**TOTAL DEPTH** 15.0 ft	**NORTHING** 640,090	**EASTING** 1,513,746	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Gower, S.	**START DATE** 12/05/13	**COMP. DATE** 12/05/13	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
775										
	773.7	0.0								773.7 GROUND SURFACE 0.0
	772.7	1.0								**RESIDUAL**
			2	2	4	6	SS-588	W		BROWN MED. STIFF WET MED. (PI=24)
770	770.2	3.5								PLASTIC SILTY SANDY CLAY (A-7-6) 770.7 3.0
			1	1	2	3		W		**RESIDUAL**
	767.7	6.0								GRAY & BROWN V. LOOSE TO LOOSE
			2	3	4	7	SS-590	W		WET MED. (PI=22) PLASTIC CLAYEY
765	765.2	8.5								SAND (A-2-6)
			3	4	5	9		W		
										761.7 12.0
760	760.2	13.5								**RESIDUAL**
			2	2	3	5	SS-592	M		LT. BROWN LOOSE MOIST CLAYEY SILTY
										SAND (A-2-4) 758.7 15.0
										Boring Terminated at Elevation 758.7 ft IN
										LOOSE MOIST CLAYEY SILTY SAND
										(A-2-4)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-95	**STATION** 144+27	**OFFSET** 68 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 805.3 ft	**TOTAL DEPTH** 15.0 ft	**NORTHING** 640,361	**EASTING** 1,514,264	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/10/13	**COMP. DATE** 12/10/13	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
810										
805										805.3 GROUND SURFACE 0.0
	804.3	1.0	4	6	4	10 16	SS-654	M		**ARTIFICIAL FILL** RED-BRN STIFF MOIST LOW (PI=14) PLASTIC SILTY SANDY CLAY (A-6) W/ TRACE ORGANICS 802.3 3.0
	801.8	3.5	3	3	3		SS-655	M		**ARTIFICIAL FILL** RED-BRN MED. STIFF TO STIFF MOIST MED. (PI=22) PLASTIC SILTY SANDY CLAY (A-7-6)
800	799.3	6.0	2	3	7	10		M		797.3 8.0
	796.8	8.5	4	5	6	11		M		**RESIDUAL** RED-BRN & BRN STIFF TO MED. STIFF MOIST NON-MICA. TO MICA. CLAYEY SANDY SILT (A-4)
795	791.8	13.5	2	3	4	7	SS-658	M		790.3 15.0
										Boring Terminated at Elevation 790.3 ft IN MED. STIFF MOIST MICA. CLAYEY SANDY SILT (A-4)

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-96	**STATION** 145+26	**OFFSET** 33 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 805.4 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 640,368	**EASTING** 1,514,369	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/11/13	**COMP. DATE** 12/11/13	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
810										
805										805.4 GROUND SURFACE 0.0
	804.4	1.0	1	1	1	2	SS-659	W		**ARTIFICIAL FILL** BRN SOFT TO MED. STIFF WET LOW (PI=7) PLASTIC CLAYEY SANDY SILT (A-4)
	801.9	3.5	3	3	5	8		W		799.9 5.5
800	799.4	6.0	4	4	5	9	SS-661	M		**RESIDUAL** RED-BRN TO BRN-GRAY STIFF MOIST LOW (PI=11) PLASTIC MICA. SILTY SANDY CLAY (A-7-5)
	796.9	8.5	3	5	6	11		M		
795	791.9	13.5	4	4	5	9		M		
790	786.9	18.5	3	4	5	9		M		785.4 20.0
										Boring Terminated at Elevation 785.4 ft IN STIFF MOIST MICA. SILTY SANDY CLAY (A-7-5)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-98	**STATION** 145+81	**OFFSET** 118 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 814.6 ft	**TOTAL DEPTH** 25.0 ft	**NORTHING** 640,468	**EASTING** 1,514,386	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/11/13	**COMP. DATE** 12/11/13	**SURFACE WATER DEPTH** N/A	

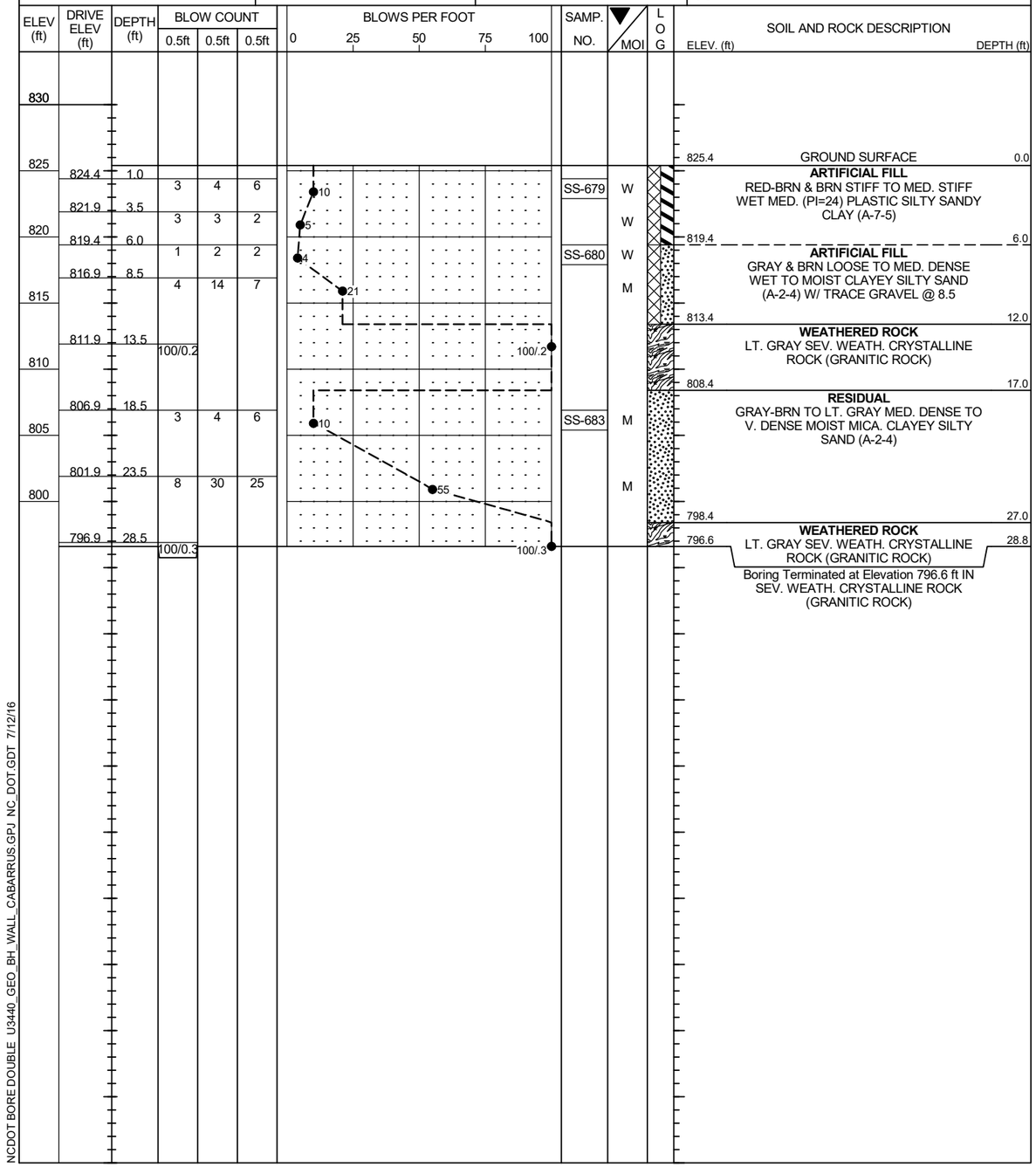
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
815										814.6 GROUND SURFACE 0.0
	813.6	1.0	3	4	5	9	SS-665	W		**ARTIFICIAL FILL** BRN STIFF WET TO MOIST LOW (PI=14) PLASTIC SILTY SANDY CLAY (A-7-6)
810	811.1	3.5	8	6	5	11		M		809.1 5.5
	808.6	6.0	3	4	5	9	SS-667	M		**ARTIFICIAL FILL** RED-BRN STIFF MOIST MED. (PI=17) PLASTIC SILTY SANDY CLAY (A-6)
805	806.1	8.5	15	28	25	53	SS-668	M		806.6 8.0 **RESIDUAL** RED-BRN TO LT. BRN & GRAY V. DENSE TO LOOSE & MED. DENSE MOIST MICA. CLAYEY SILTY SAND (A-2-4)
800	801.1	13.5	3	4	5	9		M		
795	796.1	18.5	4	5	5	10		M		
790	791.1	23.5	3	5	6	11		M		789.6 25.0 Boring Terminated at Elevation 789.6 ft IN MED. DENSE MOIST MICA. CLAYEY SILTY SAND (A-2-4)

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-99	**STATION** 146+74	**OFFSET** 69 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 820.1 ft	**TOTAL DEPTH** 23.7 ft	**NORTHING** 640,460	**EASTING** 1,514,491	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/11/13	**COMP. DATE** 12/11/13	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
825										
820										820.1 GROUND SURFACE 0.0
	819.1	1.0	3	3	4	7	SS-672	W		**ARTIFICIAL FILL** RED-BRN & BRN MED. STIFF TO STIFF WET LOW (PI=9) PLASTIC CLAYEY SANDY SILT (A-4)
815	816.6	3.5	5	6	6	12		W		814.1 6.0
	814.1	6.0	2	3	3	6	SS-674	W		**ARTIFICIAL FILL** BRN TO DARK BRN. LOOSE WET LOW (PI=8) PLASTIC CLAYEY SILTY SAND (A-2-4)
810	811.6	8.5	6	3	2	5		W		809.1 11.0
	806.6	13.5	20	80/0.2		100/.7		M		**RESIDUAL** LT. GRAY MED. DENSE MOIST MICA. SILTY SAND (A-2) 13.5
805	801.6	18.5	100/0.3			100/.3				806.6 **WEATHERED ROCK** LT. GRAY SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK)
800	796.6	23.5	100/0.2			100/.2				796.4 23.7 Boring Terminated at Elevation 796.4 ft IN SEV. WEATH. CRYSTALLINE ROCK (GRANITIC ROCK)

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Wells, T.	
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS				**GROUND WTR (ft)**
BORING NO. B-100	**STATION** 147+66	**OFFSET** 71 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 825.4 ft	**TOTAL DEPTH** 28.8 ft	**NORTHING** 640,498	**EASTING** 1,514,574	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Gower, S.	**START DATE** 12/11/13	**COMP. DATE** 12/11/13	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE U3440_GEO_BH_WALL_CABARRUS.GPJ NC_DOT.GDT 7/12/16

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 39010.1.1	**TIP** U-3440	**COUNTY** CABARRUS	**GEOLOGIST** Goodnight, D.
SITE DESCRIPTION NC 3, PROPOSED WEST SIDE BYPASS (U-2009) TO SR 1691 (LOOP RD.) IN KANNAPOLIS			**GROUND WTR (ft)**
BORING NO. B-82	**STATION** 132+00	**OFFSET** 47 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 758.5 ft	**TOTAL DEPTH** 3.0 ft	**NORTHING** 639,841	**EASTING** 1,513,153	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE N/A		**DRILL METHOD** Hand Auger	**HAMMER TYPE** Automatic
DRILLER Goodnight, D.	**START DATE** 11/20/13	**COMP. DATE** 11/20/13	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
760											
										758.5 GROUND SURFACE	0.0
										RESIDUAL TAN LOOSE TO MED. DENSE MOIST SILTY F. TO CSE. SAND (A-2-4) W/ LITTLE MICA.	
							S-105	14%		755.5	3.0
										Boring Terminated at Elevation 755.5 ft IN LOOSE TO MED. DENSE MOIST SILTY F. TO CSE. SAND (A-2-4)	
										Other Samples: M-105 (2.7 - 3.0)	

PROJ. NO. -39010.1.1
ID NO. - B-5390
COUNTY - CABARRUS

WALL NO. 1

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-605	65' RT	133+83	1.0-2.5	A-7-6(12)	51	24	15.3	28.4	12.1	44.3	98	93	58	-	-
SS-606	65' RT	133+83	3.5-5.0	A-7-5(3)	42	11	18.3	39.0	14.5	28.2	98	93	46	-	-
SS-607	65' RT	133+83	6.0-7.5	A-2-4(0)	36	NP	22.5	48.1	15.3	14.1	97	92	35	-	-
SS-608	65' RT	133+83	0.0-0.0	A-2-4(0)	32	NP	25.6	49.1	15.3	10.1	96	89	30	-	-
SS-595	49' RT	133+02	1.0-2.5	A-7-5(4)	48	16	27.4	31.9	14.5	26.2	98	88	44	-	-
SS-597	49' RT	133+02	6.0-7.5	A-2-4(0)	28	NP	29.6	46.7	15.6	8.1	97	87	29	-	-
SS-598	49' RT	133+02	8.5-10.0	A-2-4(0)	38	NP	34.3	40.5	11.1	14.1	97	85	28	-	-
SS-599	49' RT	133+02	13.5-15.0	A-2-4(0)	36	NP	50.9	27.9	12.1	9.1	93	60	24	-	-
SS-601	49' RT	133+02	23.5-25.0	A-4(0)	35	NP	30.6	36.9	12.3	20.2	98	87	36	-	-
SS-602	49' RT	133+02	0.0-0.0	A-2-4(0)	29	NP	29.3	47.2	15.4	8.1	98	87	29	-	-
SS-616	49' RT	132+00	1.0-2.5	A-7-6(5)	49	23	35.0	19.3	13.5	32.2	85	63	41	-	-
SS-618	49' RT	132+00	6.0-7.5	A-2-7(0)	44	12	41.9	18.1	19.9	20.1	81	55	35	-	-
SS-619	49' RT	132+00	8.5-10.0	A-2-5(0)	43	8	40.8	22.3	22.7	14.1	79	53	33	-	-

WALL NO. 2

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-588	49' LT	138+50	1.0-1.5	A-7-6(9)	45	24	29.1	19.5	13.3	38.1	92	74	51	-	-
SS-590	49' LT	138+50	6.0-7.5	A-2-6(2)	37	22	38.7	24.5	6.7	30.1	86	64	34	-	-
SS-592	49' LT	138+50	13.5-15.0	A-2-4(0)	39	NP	33.1	38.7	14.1	14.0	91	75	31	-	-
SS-642	48' LT	137+75	1.0-2.5	A-2-6(0)	32	12	45.9	22.9	7.0	24.1	76	52	25	-	-
SS-643	48' LT	137+75	3.5-5.0	A-2-4(0)	28	2	31.0	38.2	12.7	18.1	80	66	28	-	-
SS-644	48' LT	137+75	6.0-7.5	A-6(1)	32	12	31.6	27.0	11.3	30.2	90	74	41	-	-
SS-645	48' LT	137+75	8.5-10.0	A-4(0)	38	NP	3.0	65.0	21.9	10.1	100	99	44	-	-
SS-646	48' LT	137+75	13.5-15.0	A-2-5(0)	41	NP	24.3	50.9	16.7	8.0	90	81	28	-	-
SS-648	50' LT	137+00	1.0-2.5	A-2-4(0)	28	5	44.8	26.3	16.8	12.1	85	58	28	-	-
SS-649	50' LT	137+00	3.5-5.0	A-2-4(0)	31	4	40.6	30.7	14.5	14.1	86	63	29	-	-
SS-650	50' LT	137+00	6.0-7.5	A-2-4(0)	26	NP	45.1	33.7	9.1	12.1	88	62	22	-	-

WALL NO. 3

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-654	68' LT	144+27	1.0-2.5	A-6(2)	35	14	33.8	21.1	16.9	28.2	84	63	41	-	-
SS-655	68' LT	144+27	3.5-5.0	A-7-6(10)	46	22	27.2	16.7	13.9	42.3	94	76	56	-	-
SS-658	68' LT	144+27	13.5-15.0	A-4(0)	37	NP	23.9	39.0	22.9	14.1	97	88	40	-	-
SS-659	33' LT	145+26	1.0-2.5	A-4(0)	25	7	40.0	19.3	16.5	24.1	91	66	40	-	-
SS-661	56' LT	145+26	6.0-7.5	A-7-5(5)	44	11	20.1	31.4	20.3	28.2	100	92	54	-	-

WALL NO. 4

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-665	118' LT	145+81	0.0-0.0	A-7-6(3)	42	14	34.4	21.1	20.3	24.1	89	67	44	-	-
SS-667	118' LT	145+81	6.0-7.5	A-6(5)	37	17	31.0	21.3	17.5	30.2	96	78	49	-	-
SS-668	118' LT	145+81	8.5-10.0	A-2-4(0)	31	NP	50.7	25.2	12.1	12.1	83	52	24	-	-
SS-672	69' LT	146+94	1.0-2.5	A-4(2)	40	9	33.4	20.3	22.1	24.1	87	65	44	-	-
SS-674	61' LT	146+94	6.0-7.5	A-2-5(0)	46	8	45.5	21.3	21.1	12.1	85	56	31	-	-
SS-679	71' LT	147+65	1.0-2.5	A-7-5(15)	57	24	17.7	23.7	22.3	36.2	98	86	63	-	-
SS-680	71' LT	147+65	6.0-7.5	A-2-4(0)	38	NP	41.9	24.1	23.9	10.1	80	55	31	-	-
SS-683	71' LT	147+65	18.5-20.0	A-2-4(0)	40	NP	44.5	23.9	17.5	14.1	86	60	31	-	-

WALL NO. 5

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-105	47' LT	132+00	2.7-3.0	A-2-4(0)	30	NP	29.4	49.9	14.6	6.0	99	90	27	-	-