STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1(U-2525B)	1	21

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1(U-2525B) F.A. PROJ. N/A

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y3- (US 70) AT -L- STA. 26+21

INVENTORY

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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SUBMITTED BY J.L. PEDRO

DATE SEPTEMBER 2011

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Love Pedro 9-16-11

PROJECT: 34821.1.1 ID: U-2525B

DRAWN BY: J.L. PEDRO, T.T. WALKER

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

PROJECT REFERENCE NO.	SHEET NO.
3482I.1.1 (U-2525B)	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, SETY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] MOBILE B- 57
- [ ] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [X] CME-55
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE 2 7/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [X] -N XWL
- [ ] -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: BM# 24 - -Y3- Sta. 14+33.5, Offset - 100.5' Lt

ELEVATION: 755.59 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

SITE PLAN

0 50 100 FEET

NAD 83/95

BM #24
-BY3- STA 9+14.09
43.24' LEFT
ELEV. 755.59'

-Y3RPA-

20+00

15+00

-Y3-

TO GREENSBORO

30" C&G

CB

B2-A

EB2-A

B1-A

EB1-A

B1-C

EB1-C

B2-C

EB2-C

25+00

-L-

EB1-B

B1-B

B2-B

EB2-B

CONC

3' CMB

30+00

BST

INT 840 12' BST

ICB

MTL

12" CMP

30" C&G

TO MCLEANSVILLE

US 70 BST

15" CONC

-L- POC STA. 26+21.65=
-Y3- POT STA. 17+06.65

SKEW ANGLE = varies from 99° to 96°

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	4
PROFILE BORINGS PROJECTED ALONG -L-	

0 20 40
FEET
VE = 2:1

EB1-B
25+26
29' RT

EB1-C
25+50
25' LT

B1-C
25+79
17' LT

-Y3-
(US 70)

B2-C
26+78
17' LT

EB2-C
27+00
10' LT

EB2-B
27+21
30' RT

ROADWAY EMBANKMENT, HIGHLY PLASTIC, RESIDUAL, MEDIUM STIFF CLAYEY

TAN, GRAY, AND BROWN, SILTY TO SANDY

MED. STIFF TO HARD, DRY TO WET, CLAY WITH SOME MED. DENSE, TAN, HARD, AND

GRAY, BROWN, BLACK, GREEN, MOIST, SAPROLITIC, SILTY AND SILT AND SOME MED. TO VERY DENSE,

SANDY SILT AND CLAY AND SILTY SAND

ORANGE, AND WHITE, SANDY CLAY, AND SILTY SAND

WEATHERED ROCK (GRANITE)

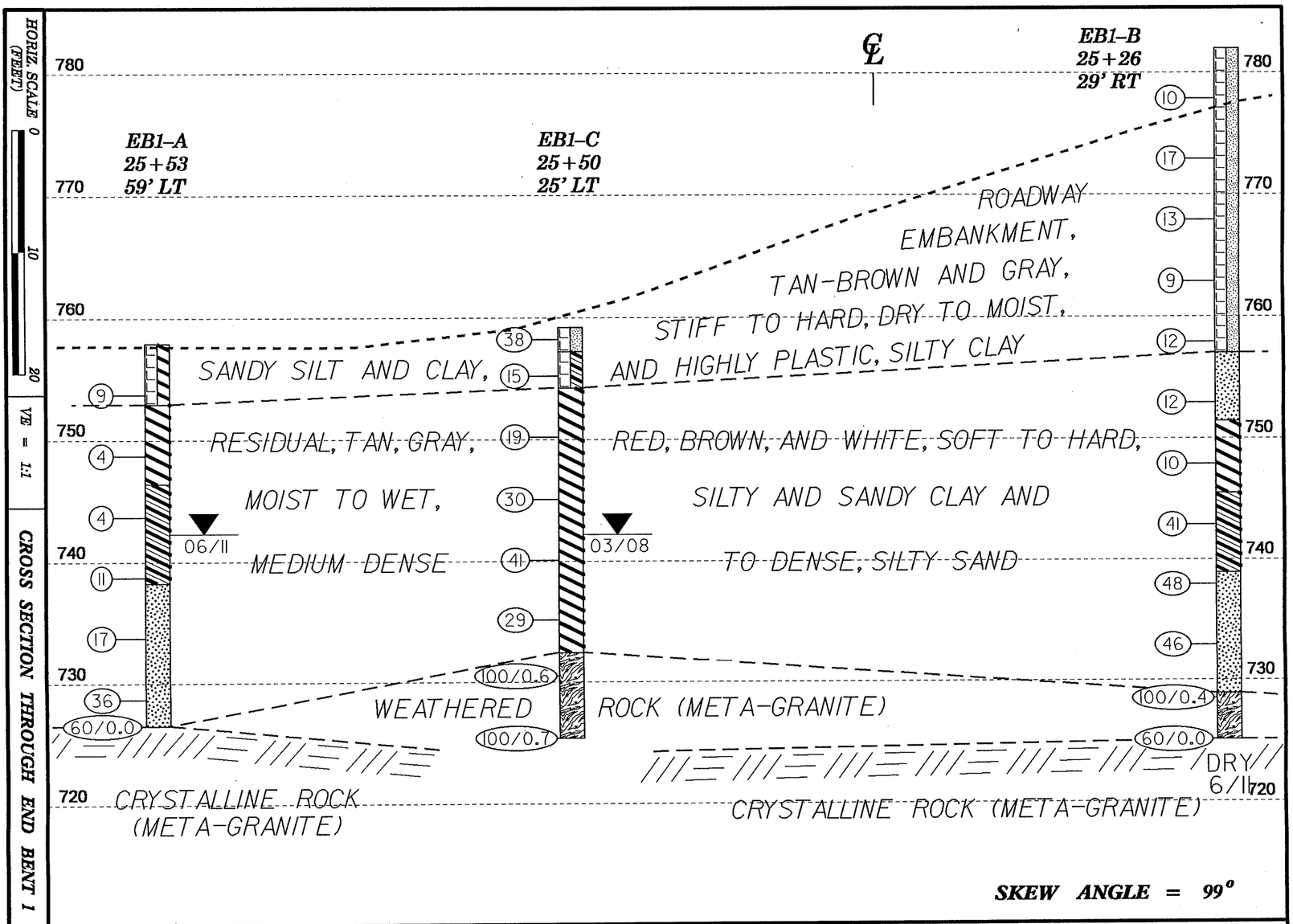
CRYSTALLINE ROCK (GRANITE)

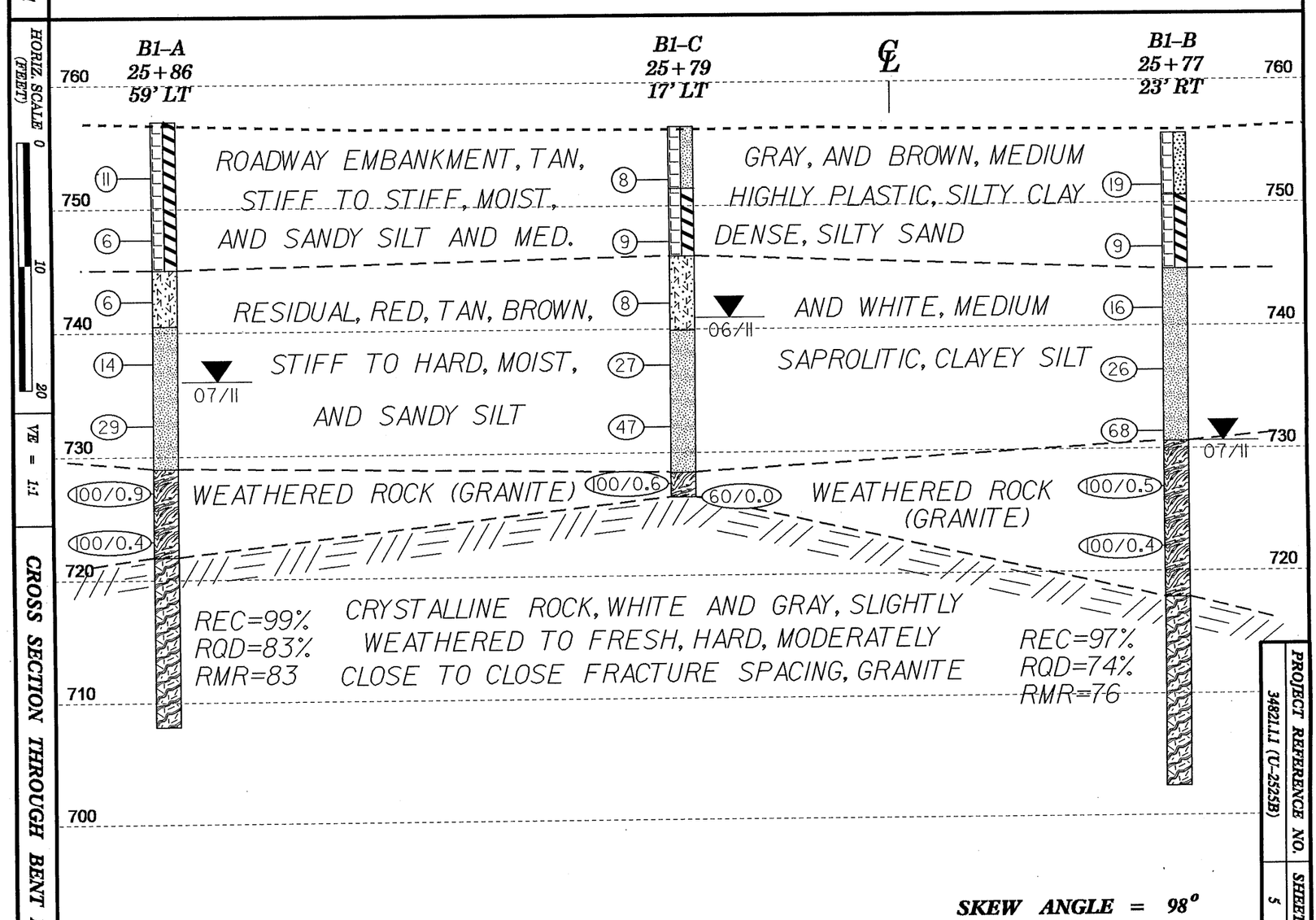
CRYSTALLINE ROCK, GRAY, SLIGHTLY WEATHERED TO FRESH, VERY HARD, MOD. CLOSE FRACTURE SPACING, META-GABBRO

REC=100%
RQD=100%
RMR=84

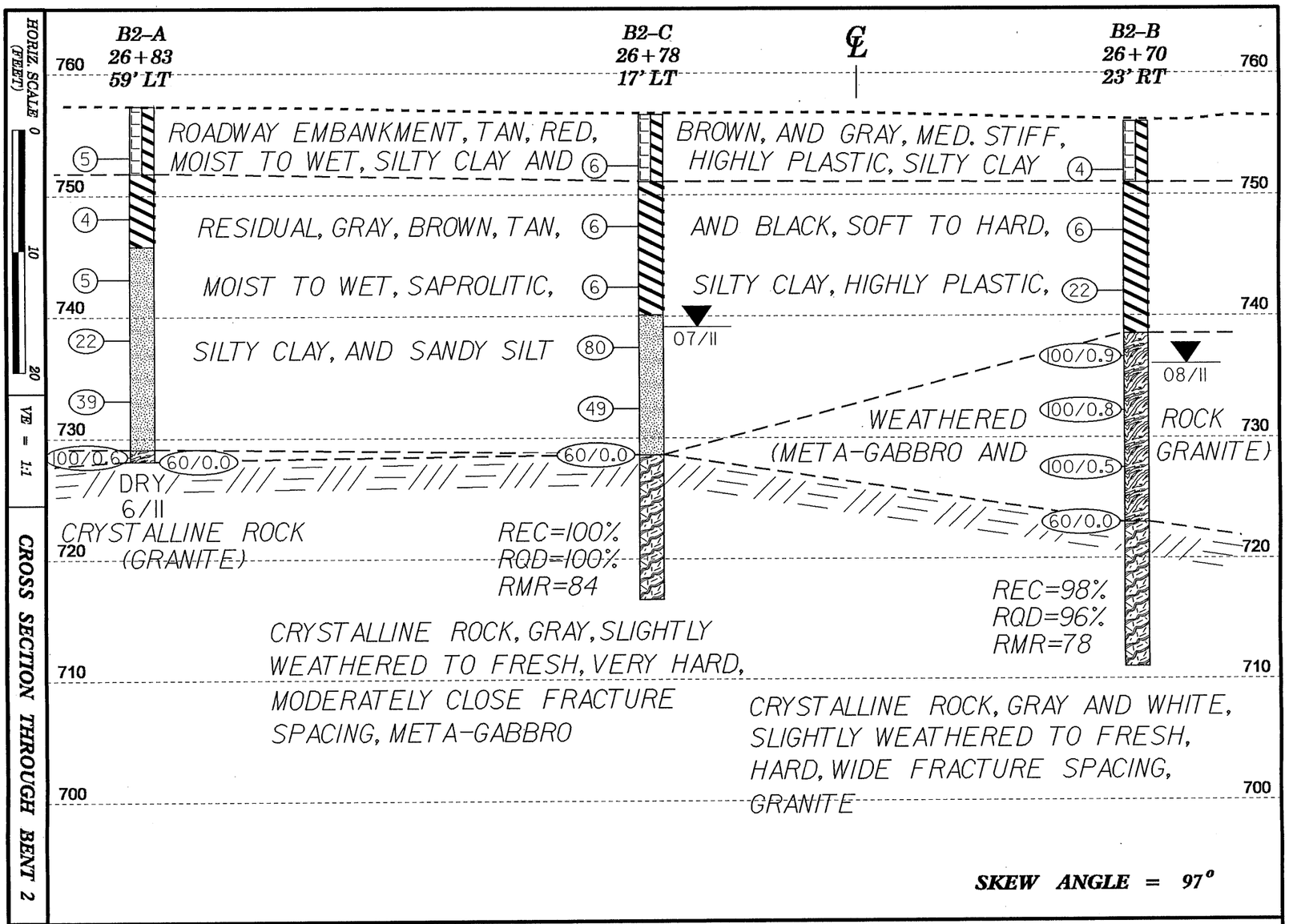
07/11
03/08
06/11
DRY 6/11

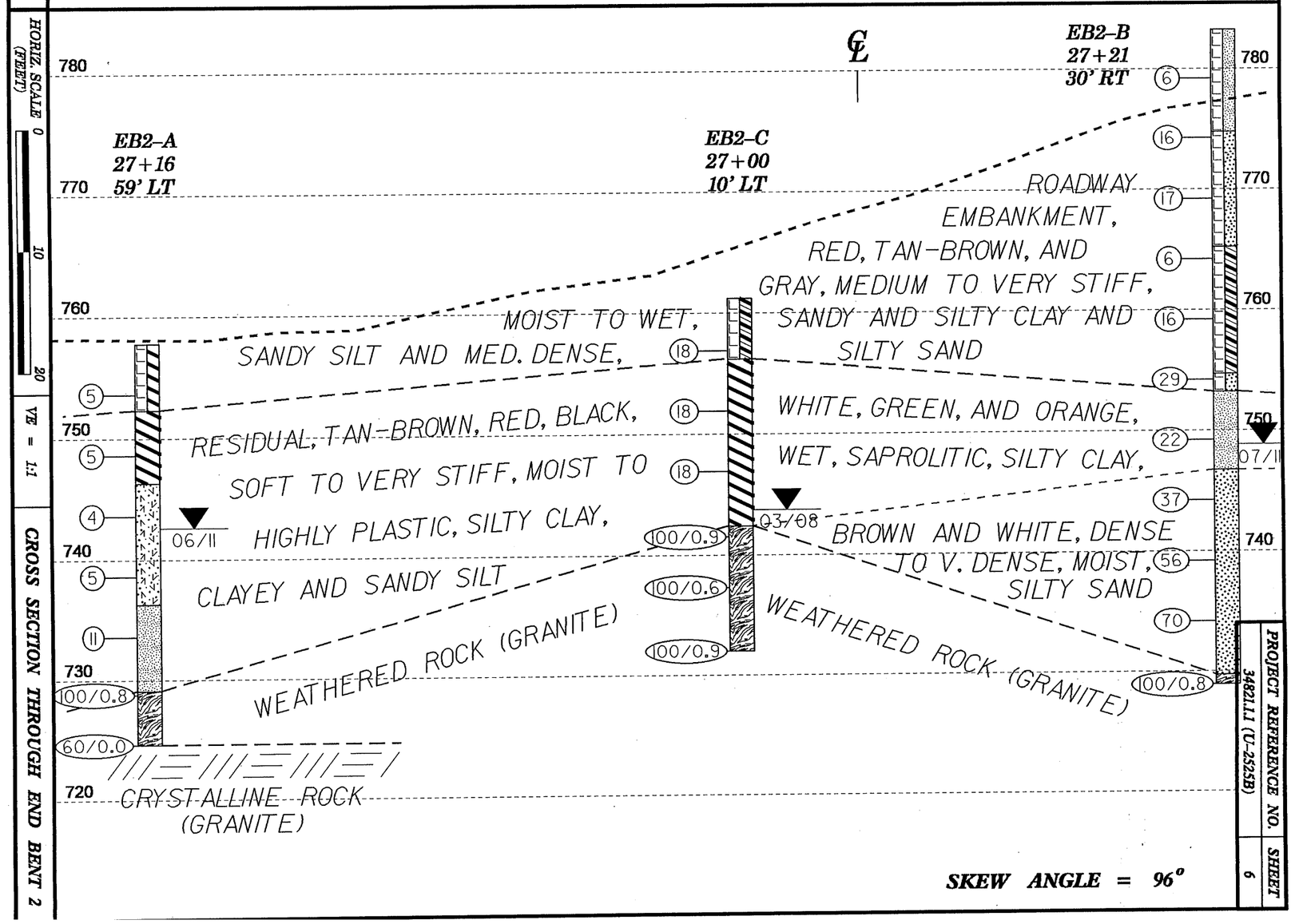
PROFILE TAKEN FROM TIN FILE DATED 5/7/2009





PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	5


HORIZ. SCALE (FEET)
0
10
20
VE = 1:1
CROSS SECTION THROUGH BENT 2
B2-A
26+83
59' LT
B2-C
26+78
17' LT
℄
B2-B
26+70
23' RT
760
750
740
730
720
710
700
ROADWAY EMBANKMENT, TAN, RED, MOIST TO WET, SILTY CLAY AND
RESIDUAL, GRAY, BROWN, TAN, MOIST TO WET, SAPROLITIC, SILTY CLAY, AND SANDY SILT
BROWN, AND GRAY, MED. STIFF, HIGHLY PLASTIC, SILTY CLAY
AND BLACK, SOFT TO HARD, SILTY CLAY, HIGHLY PLASTIC,
07/11
08/11
WEATHERED ROCK (META-GABBRO AND GRANITE)
DRY
6/11
CRYSTALLINE ROCK (GRANITE)
REC=100%
RQD=100%
RMR=84
REC=98%
RQD=96%
RMR=78
CRYSTALLINE ROCK, GRAY, SLIGHTLY WEATHERED TO FRESH, VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-GABBRO
CRYSTALLINE ROCK, GRAY AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, GRANITE
SKEW ANGLE = 97°


HORIZ. SCALE (FEET)
0
10
20
VE = 1:1
CROSS SECTION THROUGH END BENT 2
℄
EB2-B
27+21
30' RT
EB2-A
27+16
59' LT
EB2-C
27+00
10' LT
780
770
760
750
740
730
720
ROADWAY EMBANKMENT, RED, TAN-BROWN, AND GRAY, MEDIUM TO VERY STIFF, SANDY AND SILTY CLAY AND SILTY SAND
MOIST TO WET, SANDY SILT AND MED. DENSE,
RESIDUAL, TAN-BROWN, RED, BLACK, SOFT TO VERY STIFF, MOIST TO HIGHLY PLASTIC, SILTY CLAY, CLAYEY AND SANDY SILT
WHITE, GREEN, AND ORANGE, WET, SAPROLITIC, SILTY CLAY,
BROWN AND WHITE, DENSE TO V. DENSE, MOIST, SILTY SAND
06/11
03/08
07/11
WEATHERED ROCK (GRANITE)
CRYST-ALLINE ROCK (GRANITE)
SKEW ANGLE = 96°
PROJECT REFERENCE NO.
34821.1.1 (U-2525B)
SHEET
6

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 25+53	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** 16.4
COLLAR ELEV. 757.9 ft	**TOTAL DEPTH** 31.4 ft	**NORTHING** 852,267	**EASTING** 1,793,792	**24 HR.** 15.6
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/15/11	**COMP. DATE** 06/15/11	**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										757.9 GROUND SURFACE	0.0
755	754.7	3.2	3	3	6	9	SS-21B	M		ROADWAY EMBANKMENT TAN-BROWN, HIGHLY PLASTIC, SILTY CLAY	
750	749.7	8.2	2	2	2	4	SS-22B	W		752.9 RESIDUAL RED-BROWN-GRAY, SILTY CLAY	5.0
745	744.7	13.2	2	2	2	4	SS-23B	W		746.4 TAN, SANDY CLAY	11.5
740	739.7	18.2	2	5	6	11		M		738.2 TAN-BROWN-WHITE, SILTY SAND	19.7
735	734.7	23.2	4	6	11	17	SS-24B	M			
730	729.7	28.2	6	12	24	36		M			
	726.5	31.4	60/0.0			60/0.0				726.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 726.5 ft ON CRYSTALLINE ROCK (GRANITE)	31.4

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 25+50	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 29.9
COLLAR ELEV. 759.2 ft	**TOTAL DEPTH** 33.8 ft	**NORTHING** 852,270	**EASTING** 1,793,826	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE SME B-57 0% 00/00/0000		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/27/08	**COMP. DATE** 03/27/08	**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	
760	759.2	0.0	4	16	22	38	SS-128	D		759.2 GROUND SURFACE	0.0
755	756.2	3.0	8	8	7	15	SS-129	M		757.2 ROADWAY EMBANKMENT TAN AND BROWN, SANDY SILT WITH SOME GRAVEL	2.0
750	751.2	8.0	8	8	11	19	SS-130	M		754.2 GRAY AND BROWN, SANDY CLAY	5.0
745	746.1	13.1	7	12	18	30		M		RESIDUAL ORANGE-BROWN TO GREEN, SAPROLITIC, SILTY CLAY	
740	741.1	18.1	6	14	27	41		M			
735	736.1	23.1	5	7	22	29		M			
730	731.1	28.1	78	22/0.1		100/0.6				732.4 WEATHERED ROCK (GRANITE)	26.8
	726.1	33.1	11	89/0.2		100/0.7				725.4 Boring Terminated at Elevation 725.4 ft IN WEATHERED ROCK (GRANITE)	33.8

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 25+26	**OFFSET** 29 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 782.0 ft	**TOTAL DEPTH** 56.9 ft	**NORTHING** 852,257	**EASTING** 1,793,884 / **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 06/15/11	**COMP. DATE** 06/15/11	**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
785										782.0 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT TAN-BROWN, SANDY SILT WITH SOME GRAVEL
780	778.9	3.1	5	5	5	10	SS-14B	M		
775	773.9	8.1	6	7	10	17		M		
770	768.9	13.1	3	4	9	13	SS-15B	M		
765	763.9	18.1	2	4	5	9	SS-16B	M		
760	758.9	23.1	8	7	5	12		M		757.0 25.0
755	753.9	28.1	8	7	5	12	SS-17B	M		**RESIDUAL** GRAY-BLACK, SILTY SAND
750	748.9	33.1	3	4	6	10	SS-18B	M		751.4 30.6 TAN-BROWN AND GRAY, SILTY CLAY
745	743.9	38.1	14	18	23	41	SS-19B	M		745.5 36.5 GRAY-BROWN, SANDY CLAY
740	738.9	43.1	17	22	26	48	SS-20B	M		738.9 43.1 TAN-WHITE, SILTY SAND WITH WEATHERED ROCK FRAGMENTS
735	733.9	48.1	8	21	25	46		M		
730	728.9	53.1	100/0.4			100/0.4				728.9 53.1 **WEATHERED ROCK** (GRANITE)
	725.1	56.9	60/0.0			60/0.0				725.1 56.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 725.1 ft ON CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 25+86	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 757.0 ft	**TOTAL DEPTH** 49.0 ft	**NORTHING** 852,300	**EASTING** 1,793,786	**24 HR.** 21.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/26/11	**COMP. DATE** 07/26/11	**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										757.0 GROUND SURFACE	0.0
755	753.5	3.5	2	4	7	11	SS-47B	M		ROADWAY EMBANKMENT TAN-BROWN, HIGHLY PLASTIC, SILTY CLAY	
750	748.5	8.5	2	3	3	6		M		745.0	12.0
745	743.5	13.5	3	3	3	6		M		RESIDUAL TAN-BROWN, SAPROLITIC, CLAYEY SILT	
740	738.5	18.5	3	5	9	14		M		740.5	16.5
735	733.5	23.5	5	9	20	29		M		TAN-WHITE AND BROWN, SAPROLITIC, SANDY SILT	
730	728.5	28.5	29	41	59/0.4	100/0.9				729.0	28.0
725	723.5	33.5	100/0.4			100/0.4				WEATHERED ROCK (GRANITE)	
720							RS-1			721.8 CRYSTALLINE ROCK WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, GRANITE REC=99% RQD=83% RMR=83	35.2
715										708.0	49.0
710										Boring Terminated at Elevation 708.0 ft IN CRYSTALLINE ROCK (GRANITE)	

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/16/11

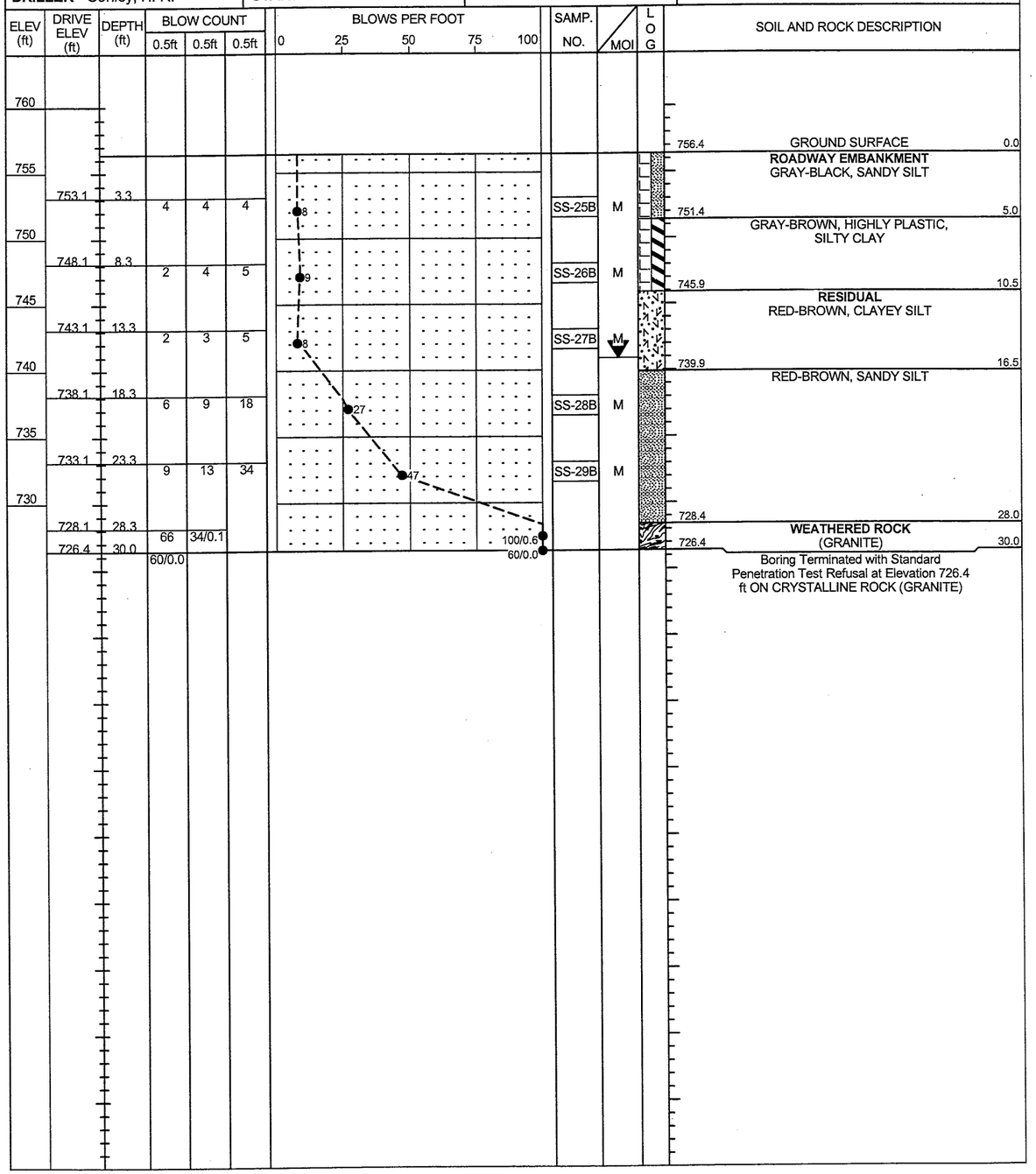
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 25+86	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 757.0 ft	**TOTAL DEPTH** 49.0 ft	**NORTHING** 852,300	**EASTING** 1,793,786	**24 HR.** 21.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/26/11	**COMP. DATE** 07/26/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 13.8 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
721.8											Begin Coring @ 35.2 ft	
720	721.8	35.2	5.0	2:11/1.0 2:21/1.0 2:32/1.0 2:23/1.0 5:43/1.0	(4.8) 96%	(2.7) 54%	RS-1	(13.6) 99%	(11.5) 83%		721.8 CRYSTALLINE ROCK WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, GRANITE	35.2
	716.8	40.2	5.0	10:11/1.0 7:15/1.0 8:12/1.0 8:07/1.0 7:13/1.0	(5.0) 100%	(5.0) 100%						
715	711.8	45.2	3.8	3:16/1.0 5:21/1.0 16:17/1.0 30:37/0.8	(3.8) 100%	(3.8) 100%						
710	708.0	49.0									708.0 Boring Terminated at Elevation 708.0 ft IN CRYSTALLINE ROCK (GRANITE)	49.0

NCDOT CORE SINGLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)			**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 25+79	**OFFSET** 17 ft LT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 756.4 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 852,300	**EASTING** 1,793,829 / **24 HR.** 15.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 06/16/11	**COMP. DATE** 06/16/11	**SURFACE WATER DEPTH** N/A



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 25+77	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 755.6 ft	**TOTAL DEPTH** 53.2 ft	**NORTHING** 852,306	**EASTING** 1,793,868	**24 HR.** 25.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/26/11	**COMP. DATE** 07/26/11	**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										
755										755.6 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT
	752.4	3.2	9	11	8	19	SS-48B	M		TAN-GRAY, SILTY SAND
750										750.6 5.0
	747.4	8.2	3	3	6	9		M		GRAY-BROWN, HIGHLY PLASTIC, SILTY CLAY
745										744.6 11.0
	742.4	13.2	4	7	9	16	SS-49B	M		RESIDUAL
740										TAN-BROWN, SAPROLITIC, SANDY SILT
	737.4	18.2	11	11	15	26		M		
735										
	732.4	23.2	18	33	35	68		M		730.6 25.0
730										WEATHERED ROCK (GRANITE)
	727.4	28.2	100/0.5			100/0.5				
725										
	722.4	33.2	100/0.4			100/0.4				
720										
715										717.9 37.7
										CRYSTALLINE ROCK
710							RS-2			WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, GRANITE
										REC=97% RQD=74%
705										RMR=76
										702.4 53.2
										Boring Terminated at Elevation 702.4 ft IN CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 10/6/11

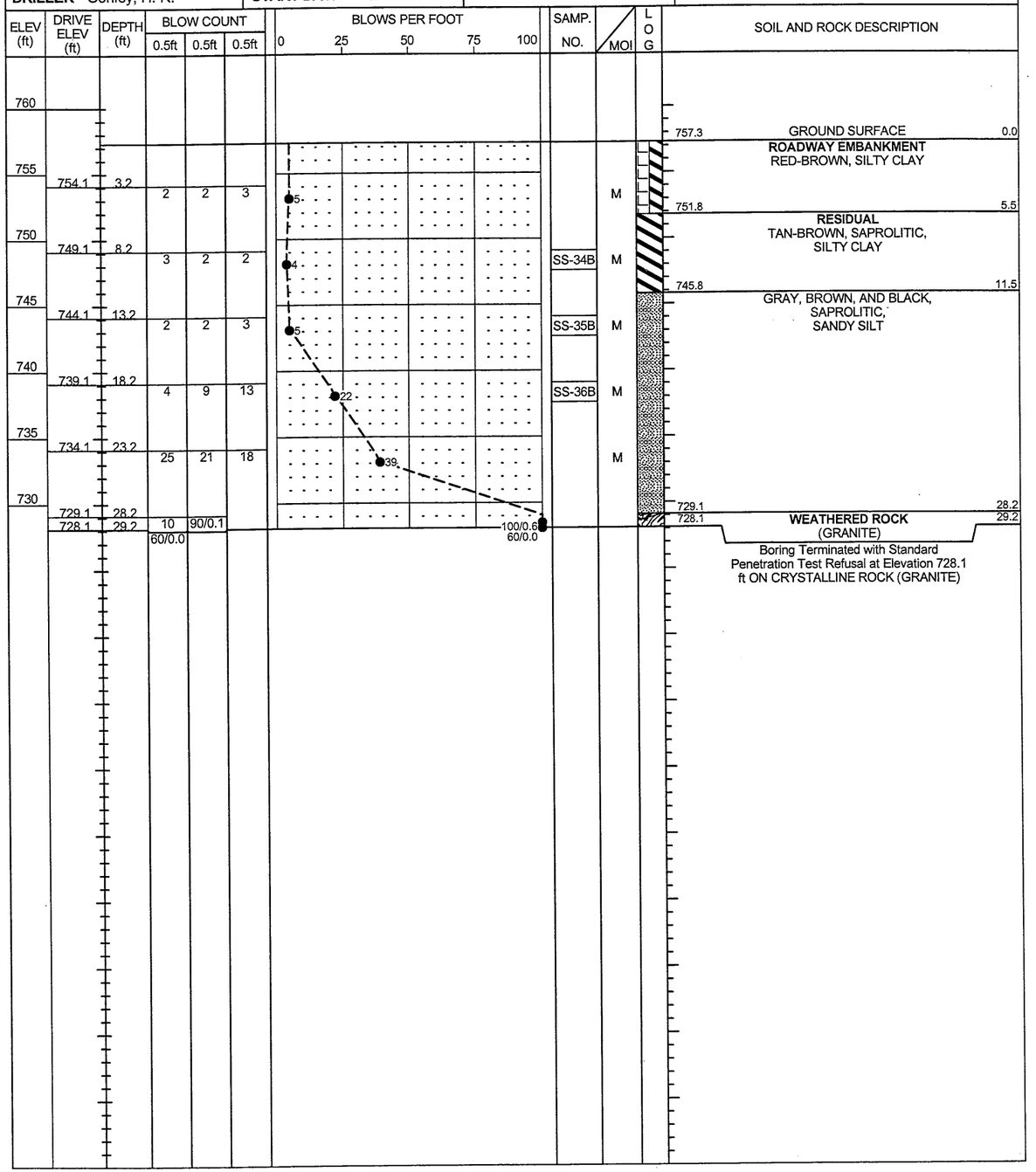
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 25+77	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 755.6 ft	**TOTAL DEPTH** 53.2 ft	**NORTHING** 852,306	**EASTING** 1,793,868	**24 HR.** 25.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/26/11	**COMP. DATE** 07/26/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 15.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
717.9											Begin Coring @ 37.7 ft
	717.9	37.7	0.5	N/A/0.5	(0.5)	(0.4)		(15.1)	(11.4)		717.9 CRYSTALLINE ROCK 37.7
	717.4	38.2	5.0	2:10/1.0	100%	80%		97%	74%		WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD,
715				2:15/1.0							MODERATELY CLOSE TO CLOSE FRACTURE SPACING, GRANITE
				2:00/1.0	(4.6)	(1.4)					
				1:52/1.0	92%	28%					
	712.4	43.2		2:16/1.0							
710			5.0	N/A/1.0	(5.0)	(4.7)	RS-2				
				N/A/1.0	100%	94%					
				N/A/1.0							
				N/A/1.0							
	707.4	48.2		N/A/1.0							
705			5.0	N/A/1.0	(5.0)	(4.9)					
				N/A/1.0	100%	98%					
				N/A/1.0							
				N/A/1.0							
	702.4	53.2		N/A/1.0							702.4 53.2
											Boring Terminated at Elevation 702.4 ft IN CRYSTALLINE ROCK (GRANITE)

NCDOT CORE SINGLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 26+83	**OFFSET** 59 ft LT	**ALIGNMENT** -L- **0 HR.** 17.2
COLLAR ELEV. 757.3 ft	**TOTAL DEPTH** 29.2 ft	**NORTHING** 852,397	**EASTING** 1,793,770 **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 06/17/11	**COMP. DATE** 06/17/11	**SURFACE WATER DEPTH** N/A



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 26+78	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.6 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 852,399	**EASTING** 1,793,812	**24 HR.** 17.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 07/20/11	**COMP. DATE** 07/20/11	**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										756.6 GROUND SURFACE	0.0
755	753.4	3.2	2	3	3	6	SS-43B	M		**ROADWAY EMBANKMENT** BROWN AND GRAY, HIGHLY PLASTIC, SILTY CLAY	
750	748.4	8.2	2	3	3	6	SS-44B	M		751.1 **RESIDUAL** BROWN-GRAY, SAPROLITIC, SILTY CLAY AND HIGHLY PLASTIC, SILTY CLAY	5.5
745	743.4	13.2	2	2	4	6	SS-45B	M		740.1 GRAY-BROWN, SAPROLITIC, SANDY SILT	16.5
740	738.4	18.2	15	32	48	80	SS-46B	M			
735	733.4	23.2	25	27	22	49		M			
730	728.6	28.0	60/0.0			60/0.0				728.6 **CRYSTALLINE ROCK** GRAY, SLIGHTLY WEATHERED TO FRESH, VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-GABBRO REC=100% · RQD=100% RMR=84	28.0
725							RS-3				
720										716.6 Boring Terminated at Elevation 716.6 ft IN CRYSTALLINE ROCK (META-GABBRO)	40.0

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/16/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B2-C	**STATION** 26+78	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.6 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 852,399	**EASTING** 1,793,812	**24 HR.** 17.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 07/20/11	**COMP. DATE** 07/20/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 12.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS / ELEV. (ft)	DEPTH (ft)
728.6											Begin Coring @ 28.0 ft	
	728.6	28.0	2.0	N=60/0.0 1:02/1.0 0:44/1.0	(2.0) 100%	(2.0) 100%		(12.0) 100%	(12.0) 100%		728.6 **CRYSTALLINE ROCK** GRAY, SLIGHTLY WEATHERED TO FRESH, VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-GABBRO	28.0
725	726.6	30.0	5.0	0:50/1.0 0:48/1.0 0:51/1.0 0:50/1.0 0:49/1.0	(5.0) 100%	(5.0) 100%						
	721.6	35.0					RS-3					
720			5.0	0:57/1.0 0:52/1.0 0:55/1.0 0:55/1.0 0:54/1.0	(5.0) 100%	(5.0) 100%						
	716.6	40.0									716.6 Boring Terminated at Elevation 716.6 ft IN CRYSTALLINE ROCK (META-GABBRO)	40.0

NCDOT CORE SINGLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 26+70	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.0 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 852,397	**EASTING** 1,793,853	**24 HR.** 20.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/02/11	**COMP. DATE** 08/02/11	**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											
										756.0 GROUND SURFACE	0.0
755										ROADWAY EMBANKMENT TAN-BROWN, HIGHLY PLASTIC, SILTY CLAY	
	753.0	3.0	4	3	4	7		M			
750										751.0 RESIDUAL TAN-BROWN, SAPROLITIC, SILTY CLAY	5.0
	748.0	8.0	3	5	6						
745						11		M			
	743.0	13.0	9	14	22						
740						36		M			
	738.0	18.0	22	49	51/0.4					738.5 WEATHERED ROCK (GRANITE)	17.5
735						100/0.9					
	733.0	23.0	50	50/0.3							
730						100/0.8					
	728.0	28.0	100/0.5								
725						100/0.5					
	723.0	33.0	60/0.0							723.0 CRYSTALLINE ROCK WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, GRANITE WITH A 70-DEGREE FRACTURE (35.7-36.0)	33.0
720						60/0.0	RS-4			REC=98% RQD=96%	
715										RMR=78	
										711.0 Boring Terminated at Elevation 711.0 ft IN CRYSTALLINE ROCK (GRANITE)	45.0

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/16/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 26+70	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.0 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 852,397	**EASTING** 1,793,853	**24 HR.** 20.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/02/11	**COMP. DATE** 08/02/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 12.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
723											Begin Coring @ 33.0 ft	
	723.0	33.0	2.0	N=60/0.0 2:11/1.0 3:06/1.0	(1.8) 90%	(1.8) 90%		(11.8) 98%	(11.5) 96%		723.0 CRYSTALLINE ROCK WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, GRANITE WITH A 70-DEGREE FRACTURE (35.7-36.0)	33.0
720	721.0	35.0	5.0	4:08/1.0 5:35/1.0 10:30/1.0 2:10/1.0 2:30/1.0	(5.0) 100%	(4.7) 94%	RS-4					
715	716.0	40.0	5.0	1:52/1.0 1:45/1.0 3:03/1.0 2:10/1.0 5:16/1.0	(5.0) 100%	(5.0) 100%					711.0 Boring Terminated at Elevation 711.0 ft IN CRYSTALLINE ROCK (GRANITE)	45.0
	711.0	45.0										

NCDOT CORE SINGLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 27+16	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** 16.6
COLLAR ELEV. 757.8 ft	**TOTAL DEPTH** 33.2 ft	**NORTHING** 852,430	**EASTING** 1,793,765	**24 HR.** 15.2
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/16/11	**COMP. DATE** 06/16/11	**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										757.8 GROUND SURFACE	0.0
755	754.6	3.2	2	2	3	5	SS-30B	M		ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY	
750	749.6	8.2	2	2	3	5	SS-31B	M		752.3 RESIDUAL TAN-BROWN, SAPROLITIC, SILTY CLAY	5.5
745	744.6	13.2	2	2	2	4	SS-32B	M		746.3 BROWN-RED-TAN, SAPROLITIC, CLAYEY SILT	11.5
740	739.6	18.2	2	2	3	5		M			
735	734.6	23.2	2	5	6	11	SS-33B	M		736.3 BROWN-BLACK, SAPROLITIC, SANDY SILT	21.5
730	729.6	28.2	23	54	46/0.3	100/0.8				729.1 WEATHERED ROCK (GRANITE)	28.7
725	724.6	33.2	60/0.0			60/0.0				724.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 724.6 ft ON CRYSTALLINE ROCK (GRANITE)	33.2

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)				**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 27+00	**OFFSET** 10 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 761.2 ft	**TOTAL DEPTH** 29.2 ft	**NORTHING** 852,421	**EASTING** 1,793,816	**24 HR.** 17.5
DRILL RIG/HAMMER EFF./DATE SME B-57 0% 00/00/0000		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/26/08	**COMP. DATE** 03/26/08	**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
765										761.2 GROUND SURFACE 0.0
760	757.9	3.3	7	9	9	18	SS-126	M		ROADWAY EMBANKMENT GRAY AND BROWN, SANDY CLAY 756.2 5.0
755	752.9	8.3	4	7	11	18	SS-127	M		RESIDUAL GREEN, ORANGE, AND BROWN, HIGHLY PLASTIC, SILTY CLAY WITH SOME MICA
750	747.9	13.3	6	9	9	18		M		
745	742.9	18.3	21	40	60/0.4	100/0.9				742.4 WEATHERED ROCK (GRANITE) 18.8
740	737.9	23.3	75	25/0.1		100/0.6				
735	732.9	28.3	16	84/0.4		100/0.9				732.0 Boring Terminated at Elevation 732.0 ft IN WEATHERED ROCK (GRANITE) 29.2

NCDOT BORE DOUBLE U2525B_GEO_BH_Y3.GPJ NC_DOT.GDT 9/13/11

WBS 34821.1.1	**TIP** U-2552B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y3- (US 70)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 27+21	**OFFSET** 30 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 783.2 ft	**TOTAL DEPTH** 54.3 ft	**NORTHING** 852,448	**EASTING** 1,793,853 / **24 HR.** 34.4
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 07/19/11	**COMP. DATE** 07/19/11	**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
785										783.2 GROUND SURFACE 0.0
780	780.2	3.0						M		**ROADWAY EMBANKMENT** TAN-BROWN, SANDY SILT WITH SOME GRAVEL
775	775.2	8.0	3	3	3	6				774.7 8.5
770	770.2	13.0	4	10	6	16	SS-37B	M		TAN-BROWN, SILTY SAND
765	765.2	18.0	8	9	8	17		M		765.2 18.0
760	760.2	23.0	3	3	3	6	SS-38B	M		TAN-BROWN, SANDY CLAY WITH SOME GRAVEL
755	755.2	28.0	3	8	8	16	SS-39B	M		754.7 28.5
750	750.2	33.0	9	17	12	29	SS-40B	M		GRAY, SILTY SAND 753.2 30.0
745	745.2	38.0	11	11	11	22	SS-41B	M		**RESIDUAL** TAN-BROWN-WHITE, SAPROLITIC, SANDY SILT
740	740.2	43.0	10	17	20	37	SS-42B	M		746.7 36.5
735	735.2	48.0	19	28	28	56		M		BROWN AND WHITE, SAPROLITIC, SILTY SAND
730	730.2	53.0	17	28	42	70		M		729.7 53.5
			34	54	46/0.3	100/0.8				728.9 54.3 **WEATHERED ROCK** (GRANITE) Boring Terminated at Elevation 728.9 ft IN WEATHERED ROCK (GRANITE)

EB1-A

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-21B	59 LT	25+53	3.2-4.7	A-7-6(24)	58	35	26.4	14.2	13.3	46.0	99	83	71	-	-
SS-22B	59 LT	25+53	8.2-9.7	A-7-6(14)	50	22	19.2	19.0	29.7	32.0	100	88	67	-	-
SS-23B	59 LT	25+53	13.2-14.7	A-6(4)	40	12	23.4	30.6	27.9	18.0	100	89	53	-	-
SS-24B	59 LT	25+53	23.2-24.7	A-2-4(0)	29	NP	42.0	33.2	18.7	6.0	99	78	30	-	-

EB1-C

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-128	25 LT	25+50	0.0-1.5	A-4(0)	27	6	32.2	27.3	20.0	20.4	94	76	43	-	-
SS-129	25 LT	25+50	3.1-4.6	A-6(6)	35	20	33.7	17.6	16.1	32.7	97	77	50	-	-
SS-130	25 LT	25+50	8.1-9.6	A-7-6(20)	47	21	1.4	17.3	42.4	38.8	100	100	88	-	-

EB1-B

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-14B	29 RT	25+26	3.1-4.6	A-4(3)	35	7	20.6	27.8	33.5	18.0	96	84	57	-	-
SS-15B	29 RT	25+26	13.1-14.6	A-4(0)	31	6	32.4	31.8	23.7	12.0	95	77	41	-	-
SS-16B	29 RT	25+26	18.1-19.6	A-4(5)	37	9	18.0	25.6	38.3	18.0	99	88	63	-	-
SS-17B	29 RT	25+26	28.1-29.6	A-2-4(0)	25	5	48.1	23.0	17.8	11.0	86	55	29	-	-
SS-18B	29 RT	25+26	33.1-34.6	A-7-6(12)	45	20	18.4	20.6	26.9	34.0	100	89	67	-	-
SS-19B	29 RT	25+26	38.1-39.6	A-6(8)	39	20	28.4	20.2	21.3	30.0	97	79	54	-	-
SS-20B	29 RT	25+26	43.1-44.6	A-2-4(0)	27	4	43.6	26.2	18.1	12.0	88	62	31	-	-

B1-A

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-47B	59 LT	25+86	0.0-3.5	A-7-5(21)	63	32	24.2	11.3	18.1	46.4	99	83	66	-	-

B1-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	59 LT	25+86	35.5-36.0	GRANITE	166.6	15.7	6.37

B1-C

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-25B	17 LT	25+79	3.3-4.8	A-4(1)	23	10	36.2	23.8	17.9	22.0	95	75	41	-	-
SS-26B	17 LT	25+79	8.3-9.8	A-7-6(39)	62	33	0.4	5.4	46.1	48.0	100	100	98	-	-
SS-27B	17 LT	25+79	13.3-14.8	A-5(9)	43	9	2.8	27.0	52.2	18.0	100	100	79	-	-
SS-28B	17 LT	25+79	18.3-19.8	A-4(5)	36	8	9.2	35.4	45.3	10.0	100	98	66	-	-
SS-29B	17 LT	25+79	23.3-24.8	A-4(1)	30	4	11.4	39.6	40.9	8.0	100	97	59	-	-

B1-B

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-48B	23 RT	25+77	3.2-4.7	A-2-4(0)	13	1	40.2	29.7	16.0	14.1	97	76	34	-	-
SS-49B	23 RT	25+77	13.2-14.7	A-4(0)	36	6	34.5	23.8	25.5	16.1	93	71	44	-	-

B1-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-2	23 RT	25+77	43.7-44.1	GRANITE	166.5	17.47	8.32

B2-A

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-34B	59 LT	26+83	8.2-9.7	A-7-5(14)	47	13	2.2	22.6	59.2	16.0	100	99	84	-	-
SS-35B	59 LT	26+83	13.2-14.7	A-4(4)	40	3	2.2	35.8	54.0	8.0	100	100	74	-	-
SS-36B	59 LT	26+83	18.2-19.7	A-4(0)	28	NP	6.0	45.4	44.5	4.0	100	99	61	-	-

B2-C

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-43B	17 LT	26+78	3.2-4.7	A-7-6(38)	69	44	11.2	12.0	22.1	54.8	100	93	80	-	-
SS-44B	17 LT	26+78	8.2-9.7	A-7-6(24)	55	28	4.1	23.1	44.4	28.4	100	98	80	-	-
SS-45B	17 LT	26+78	13.2-14.7	A-7-5(11)	44	14	2.0	33.5	46.2	18.3	100	100	76	-	-
SS-46B	17 LT	26+78	18.2-19.7	A-4(0)	25	NP	13.8	41.2	36.9	8.1	100	99	56	-	-

B2-C

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	17 LT	26+78	34.1-34.6	META-GABBRO	181.4	5.74	7.65

B2-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-4	23 RT	26+70	36.4-37.0	GRANITE	167.3	14.25	7.34

EB2-A

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-30B	59 LT	27+16	3.2-4.7	A-7-5(24)	55	24	3.8	14.8	39.3	42.0	100	98	87	-	-
SS-31B	59 LT	27+16	8.2-9.7	A-7-6(23)	50	25	2.6	21.6	41.7	34.0	100	99	84	-	-
SS-32B	59 LT	27+16	13.2-14.7	A-5(8)	41	10	5.2	28.8	45.9	20.0	100	98	75	-	-
SS-33B	59 LT	27+16	23.2-24.7	A-4(1)	33	3	10.6	41.0	42.3	6.0	100	98	58	-	-

EB2-C

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-126	10 LT	27+00	3.3-4.8	A-6(8)	38	25	32.9	19.2	13.3	34.7	97	77	49	-	-
SS-127	10 LT	27+00	8.3-9.8	A-7-5(22)	61	27	5.7	28.6	41.2	24.5	100	97	74	-	-

EB2-B

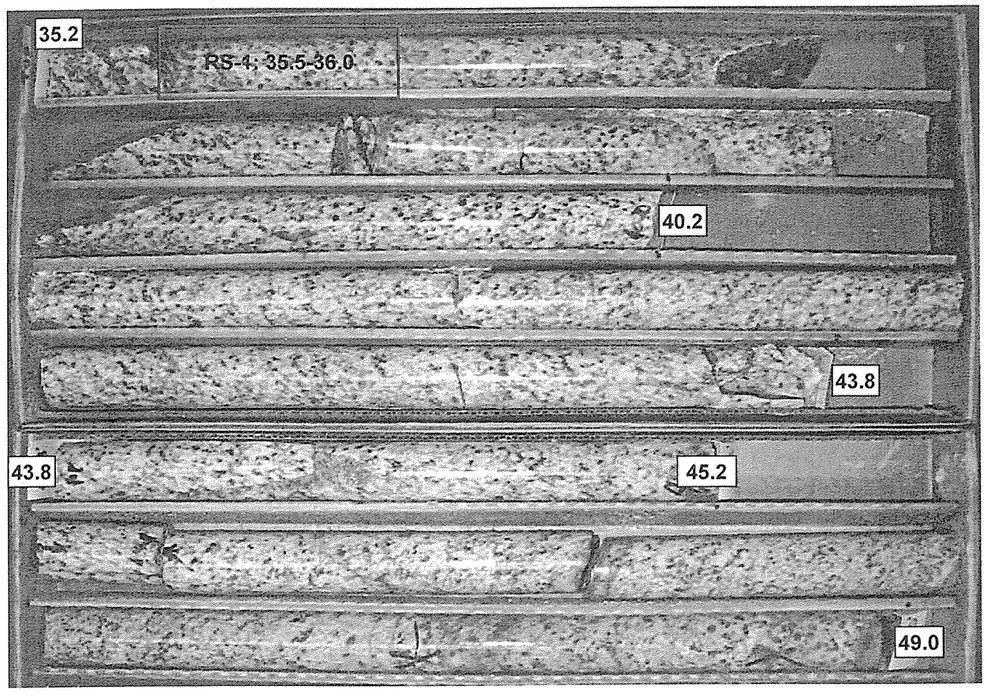
SOIL TEST RESULTS

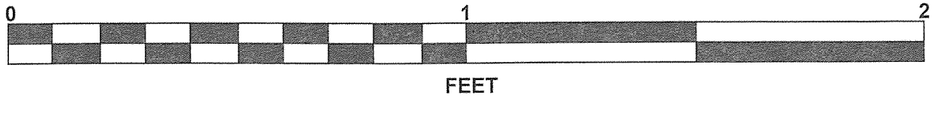
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-37B	30 RT	27+21	8.5-9.5	A-2-4(0)	26	5	39.7	27.3	18.9	14.2	85	63	33	-	-
SS-38B	30 RT	27+21	18.0-19.5	A-6(6)	36	13	20.1	23.5	30.0	26.4	96	85	60	-	-
SS-39B	30 RT	27+21	23.0-24.5	A-6(8)	39	18	22.9	21.9	20.7	34.5	96	83	57	-	-
SS-40B	30 RT	27+21	28.5-29.5	A-2-4(0)	13	1	45.2	27.4	15.2	12.2	96	67	30	-	-
SS-41B	30 RT	27+21	33.0-34.5	A-4(1)	34	9	37.2	26.5	20.1	16.2	96	76	41	-	-
SS-42B	30 RT	27+21	38.0-39.5	A-2-4(0)	33	7	49.5	25.6	13.8	11.2	80	52	24	-	-

CORE PHOTOGRAPHS

B1-A

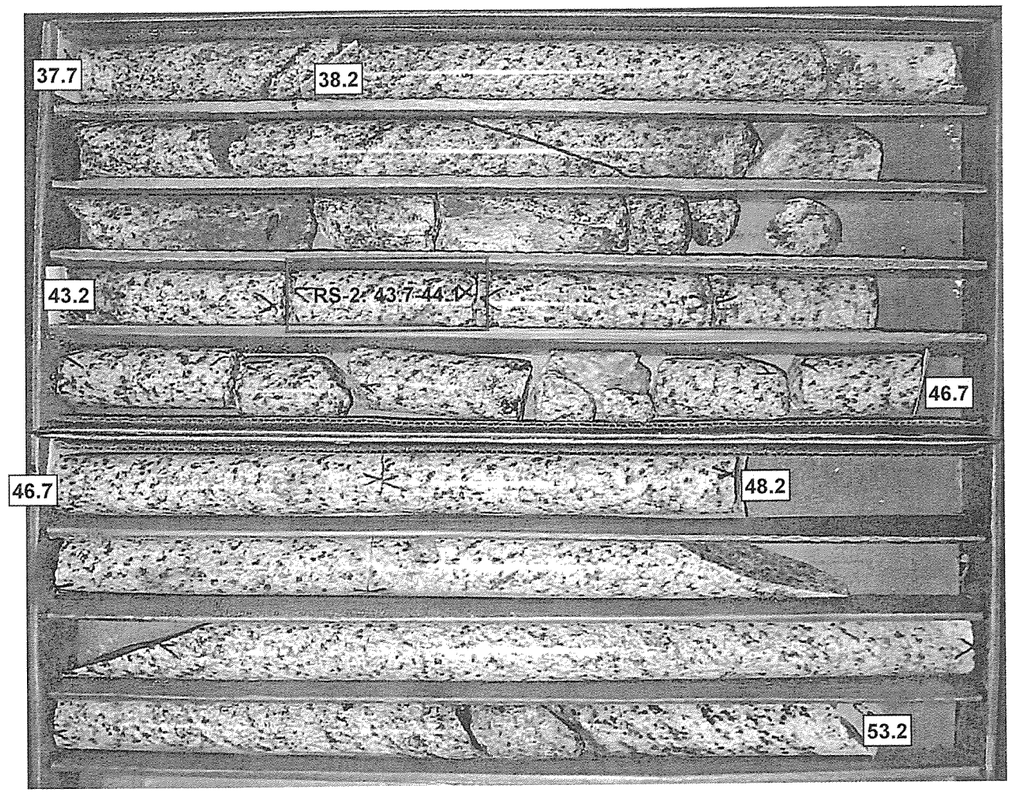
BOXES 1 & 2: 35.2 - 49.0 FEET

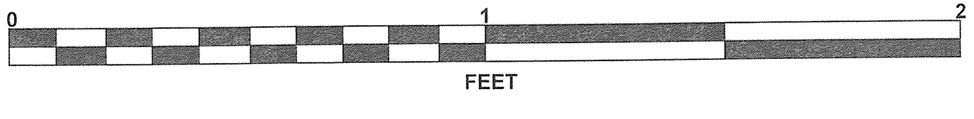




B1-B

BOXES 1 & 2: 37.7 - 53.2 FEET

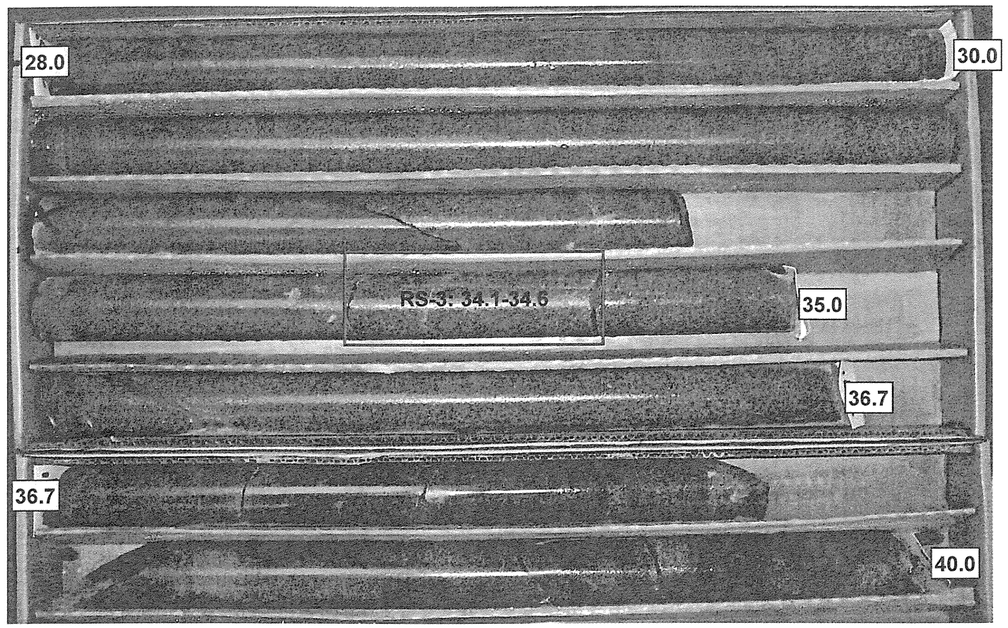


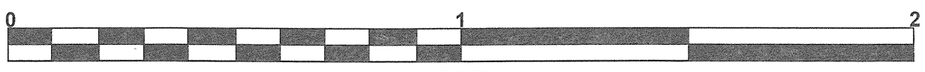


CORE PHOTOGRAPHS

B2-C

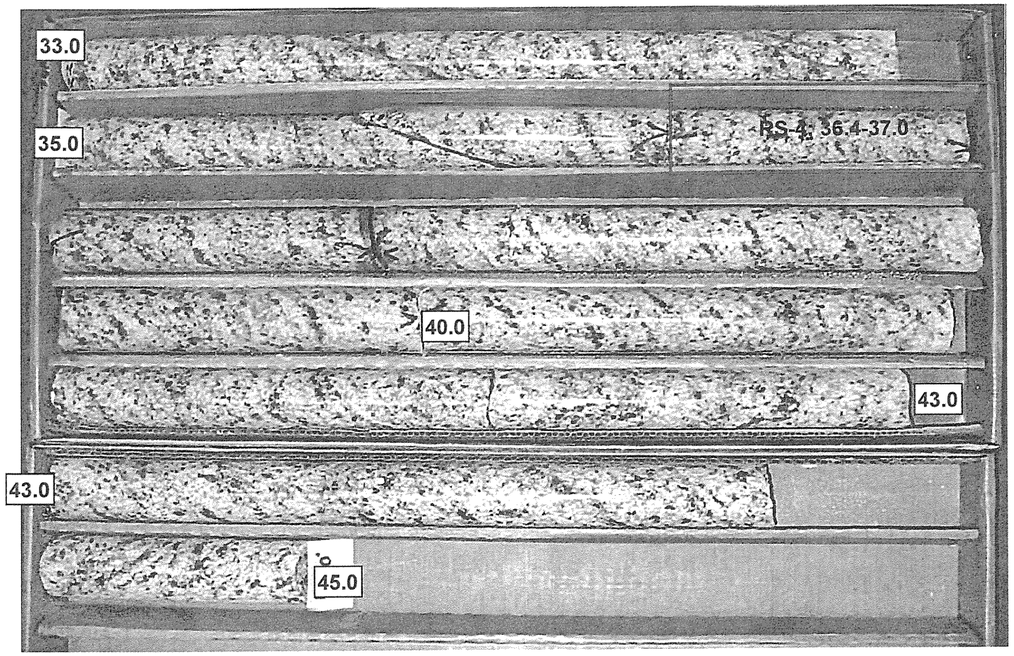
BOXES 1 & 2: 28.0 - 40.0 FEET

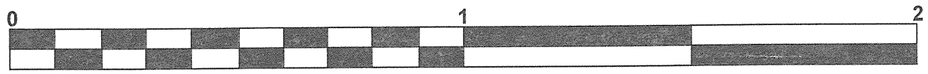




B2-B

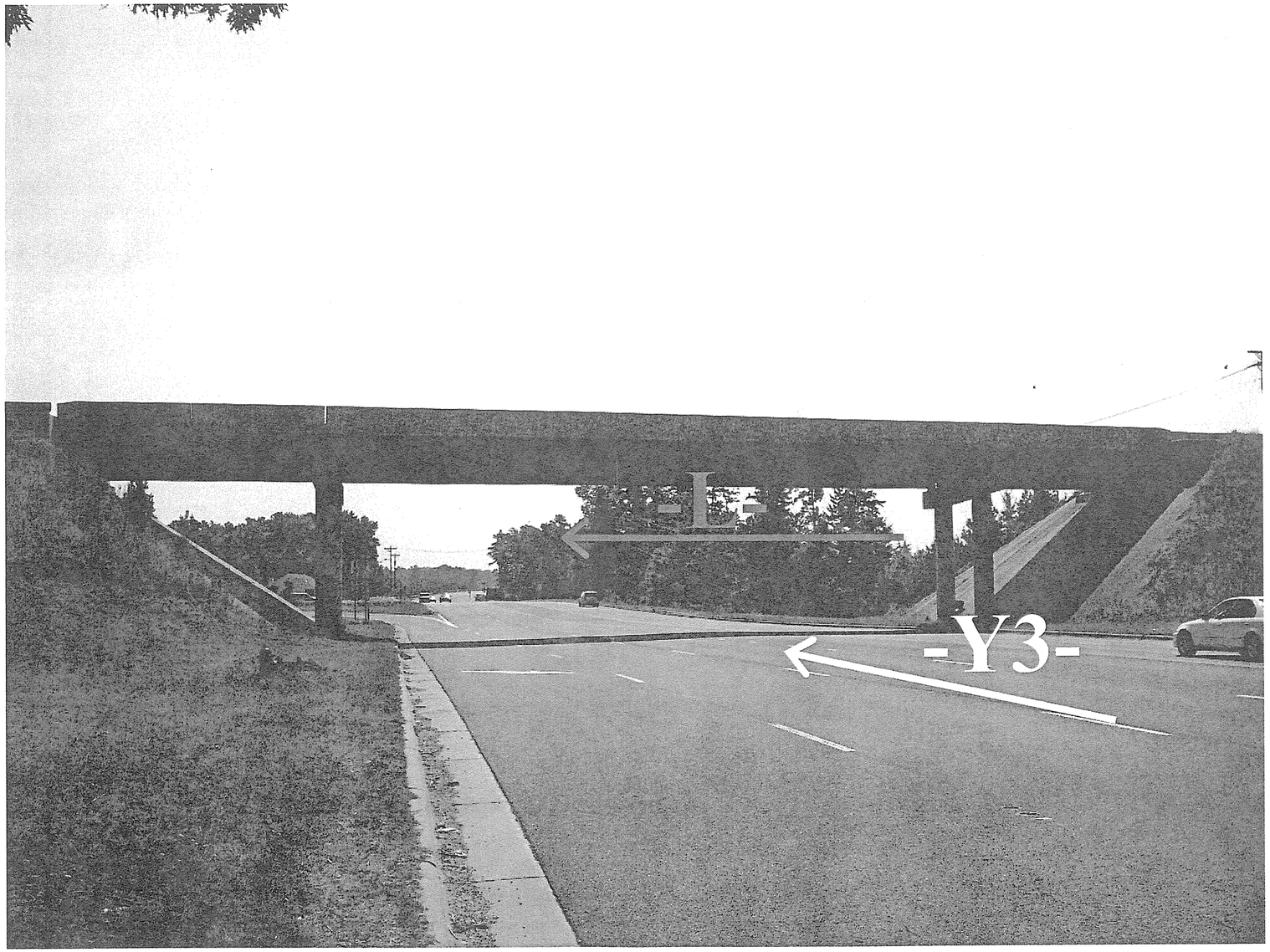
BOXES 1 & 2: 33.0 - 45.0 FEET





SITE PHOTOGRAPH

Proposed Bridges on -L- (I-840) over -Y3- (US 70)



Looking East Towards Existing Bridge

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	21

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1 (U-2525B) F.A. PROJ. N/A

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AT -L- STATION 14+99 AND -Y2- (SOUTHERN RAILROAD) AT -L- STATION 17+34

ID: U-2525B

PROJECT: 34821.1.1

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2	LEGEND
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21	SITE PHOTOGRAPH(S)

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PERSONNEL

O. B. OTI

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CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE SEPTEMBER 2011

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Pedro 9-1-11

DRAWN BY: J. L. PEDRO

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PROJECT REFERENCE NO.	SHEET NO.
34821.1.1 (U-2525B)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

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

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	OTHER MATERIAL
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE 1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE 10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME 20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY 35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

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

ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [X] CME-55
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE 2 7/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N XWL
- [ ] -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.

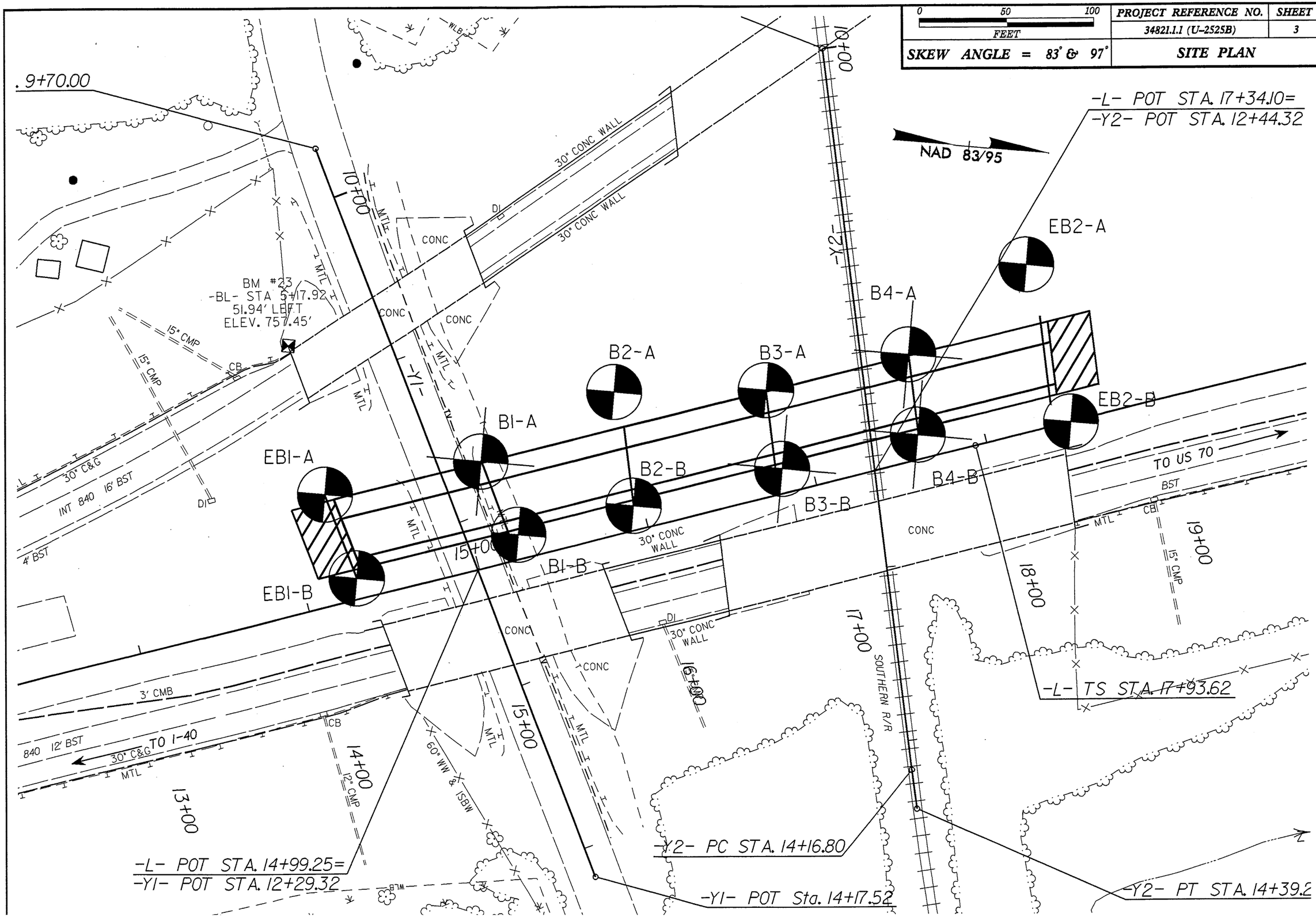
BENCH MARK: BM# 23, -L- Sta. 14+25.33, Offset - 151' LT

ELEVATION: 757.45 FT.

NOTES:

REVISED 02/23/06

0 50 100 FEET	PROJECT REFERENCE NO.	SHEET
	34821.1.1 (U-2525B)	3
SKEW ANGLE = 83° & 97°	SITE PLAN	



PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	4
FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L-	

0 20 40
FEET
VE = 2:1

EB1-B
14+31
12' LT

B1-B
15+27
14' LT

B2-B
15+95
14' LT

-Y1-
(OLD BURLINGTON RD.)

MATCHLINE

ROADWAY EMBANKMENT

CLAY SAND, GRAY-BROWN, AND SILT AND COARSE SAND, AND SILTY SAND

STIFF TO V. STIFF, LOOSE TO DENSE, MOIST,

TAN-BROWN AND CLAYEY SANDY SILT

07/11 MOIST, SANDY

STIFF TO HARD, MOIST,

RESIDUAL, TAN-BROWN AND GRAY,

WEATHERED ROCK (GRANITE)

WEATHERED ROCK (GRANITE)

07/11

DRY 7/11

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

770 760 750 740 730 720 710 700 690 680

6 6 15 20 23 14 25 10 154 100/0.4

12 21 41 100/0.6 60/0.0

13 23 15 16 37 17 10 30 61 60/0.

+20 +40 +60 +80 15+00 +20 +40 +60 +80 16+00 +20 +40 +60 +80

0	20	40

FEET
VE = 2:1

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	5

FENCE DIAGRAM OF BORINGS PROJECTED ALONG -L-

780
770
760
750
740
730
720
710
700
690

MATCHLINE

B3-B
16+79
14' LT

B4-B
17+63
14' LT

EB2-B
18+50
CL

-Y2-
(NORFOLK SOUTHERN RAILROAD)

ROADWAY EMBANKMENT, TAN-BROWN, STIFF, MOIST, SANDY SILT AND MEDIUM DENSE TO DENSE, SILTY AND COARSE SAND

ROADWAY EMBANKMENT, TAN-BROWN AND WHITE, STIFF TO VERY STIFF, MOIST, SANDY SILT AND CLAY AND SOME DENSE, COARSE SAND WITH SOME MICA

RESIDUAL, TAN-BROWN, WHITE, AND GREEN-GRAY, STIFF TO HARD, MOIST, SANDY CLAY AND SANDY SILT WITH SOME MEDIUM DENSE TO DENSE, SILTY AND COARSE SAND AND METAVOLCANIC ROCK)

WEATHERED ROCK (GRANITE

CRYSTALLINE ROCK, GRAY-GREEN, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MOD. CLOSE FRACTURE SPACING, METAVOLCANIC ROCK

CRYSTALLINE ROCK, WHITE AND GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GRANITE

23 16 23 18 54 48 100/0.4

REC=89%
RQD=73%
RMR=75

DRY
7/11

15 49 20 36 40 46 60/0.1

REC=98%
RQD=74%
RMR=63

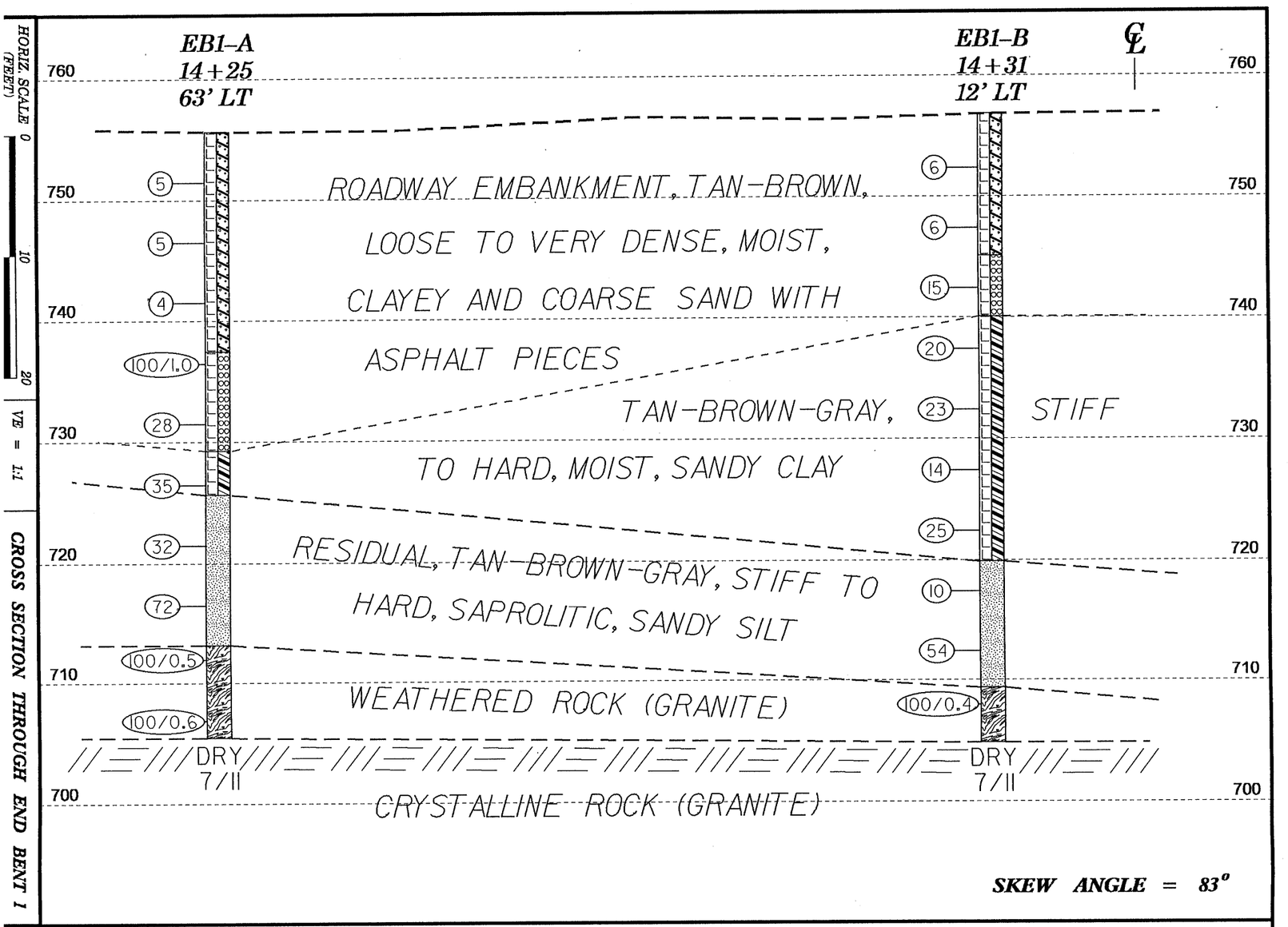
DRY
7/11

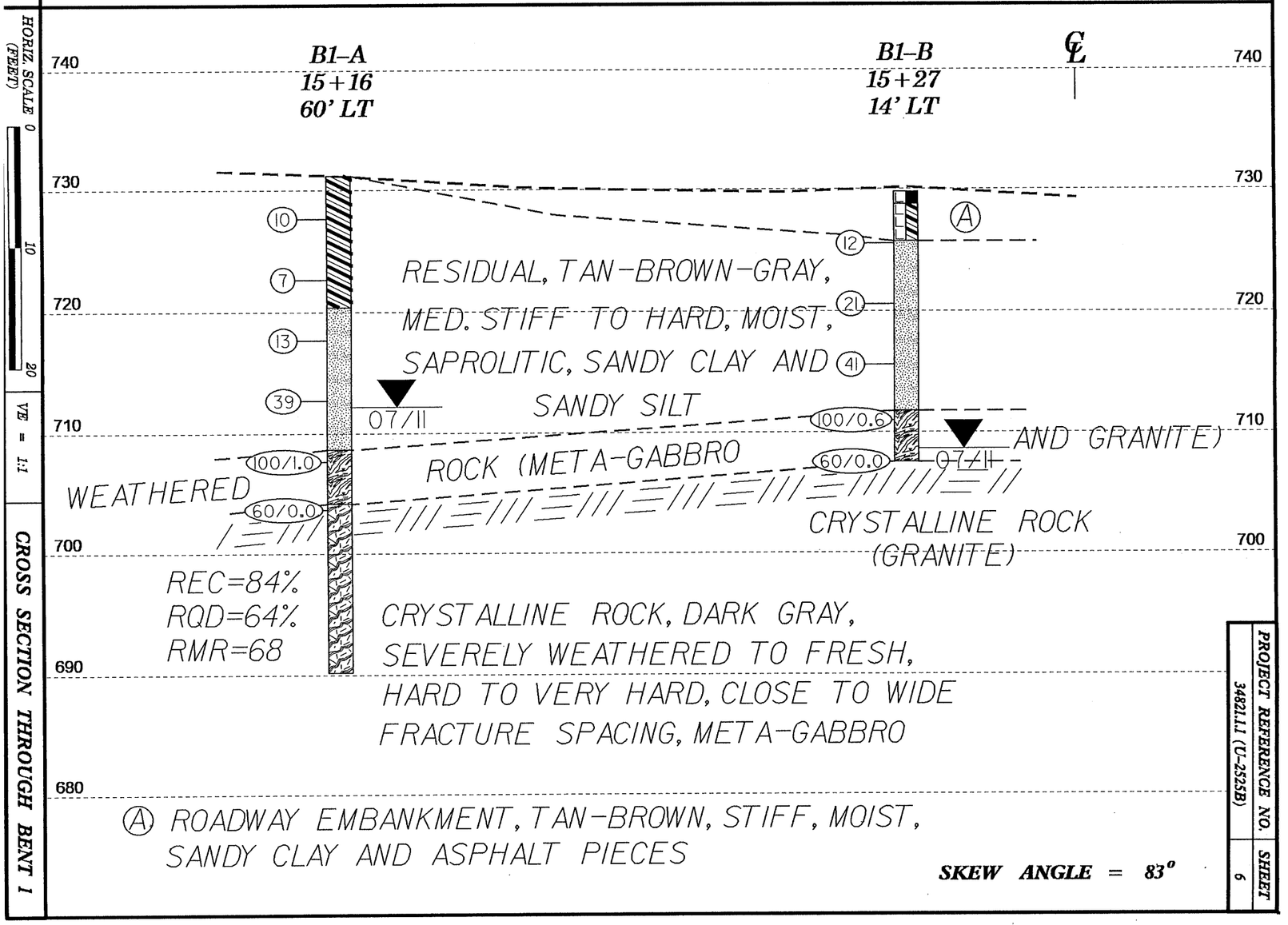
15 18 16 38 31 13 34 61

DRY
3/08

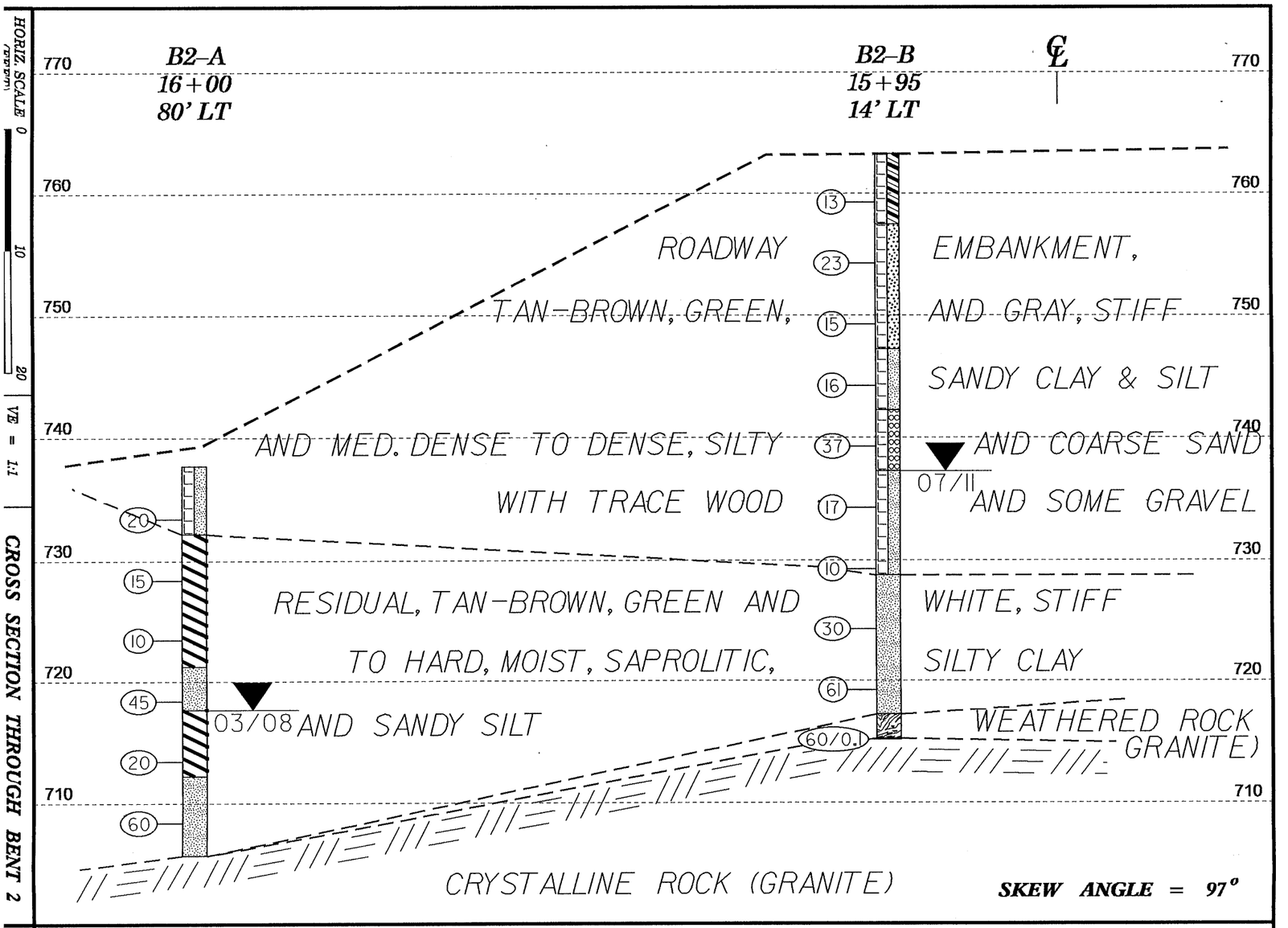
PROFILE TAKEN FROM TIN FILE DATED 5/7/2009

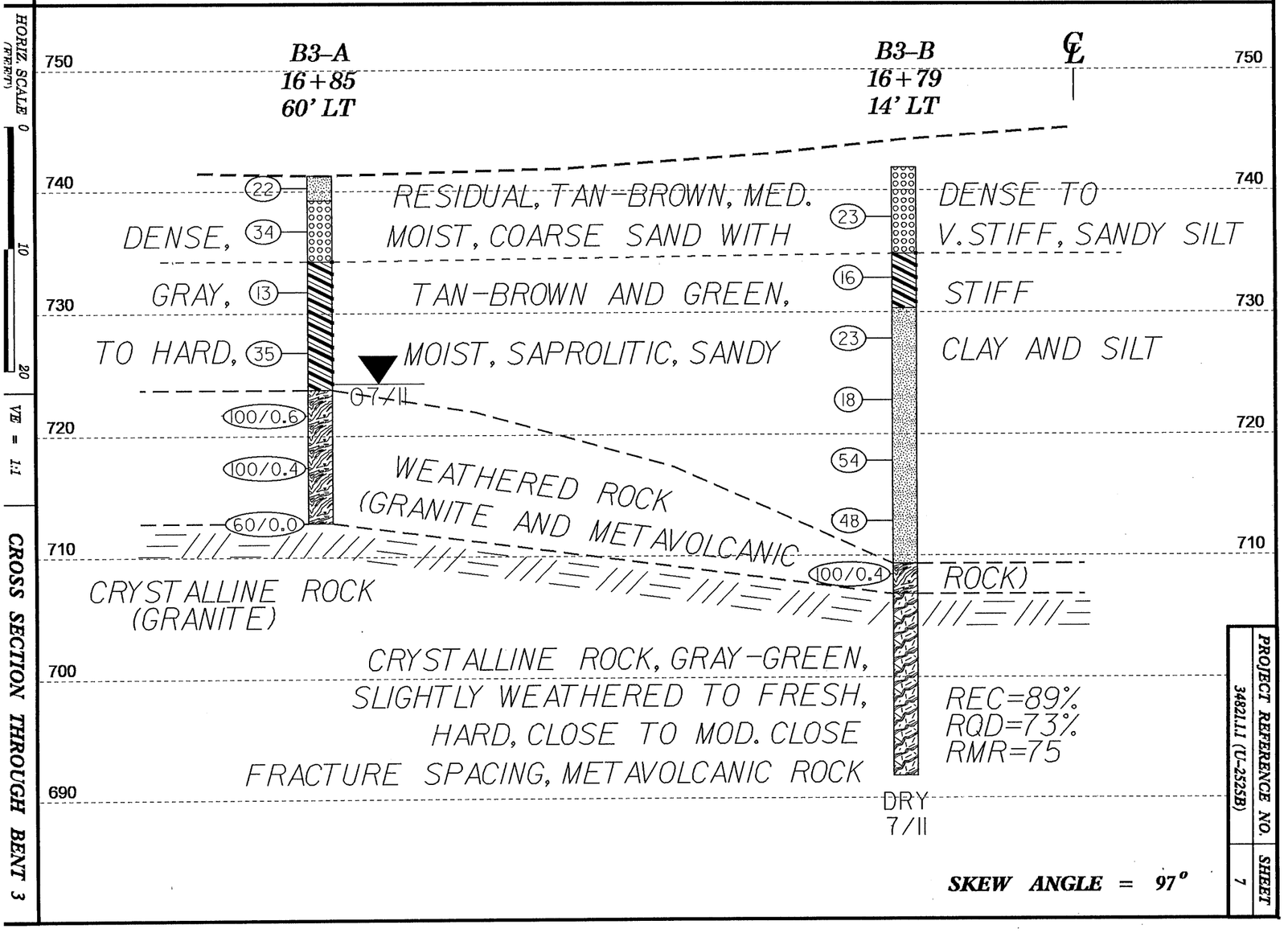
17+00 +20 +40 +60 +80 18+00 +20 +40 +60 +80 19+00 +20

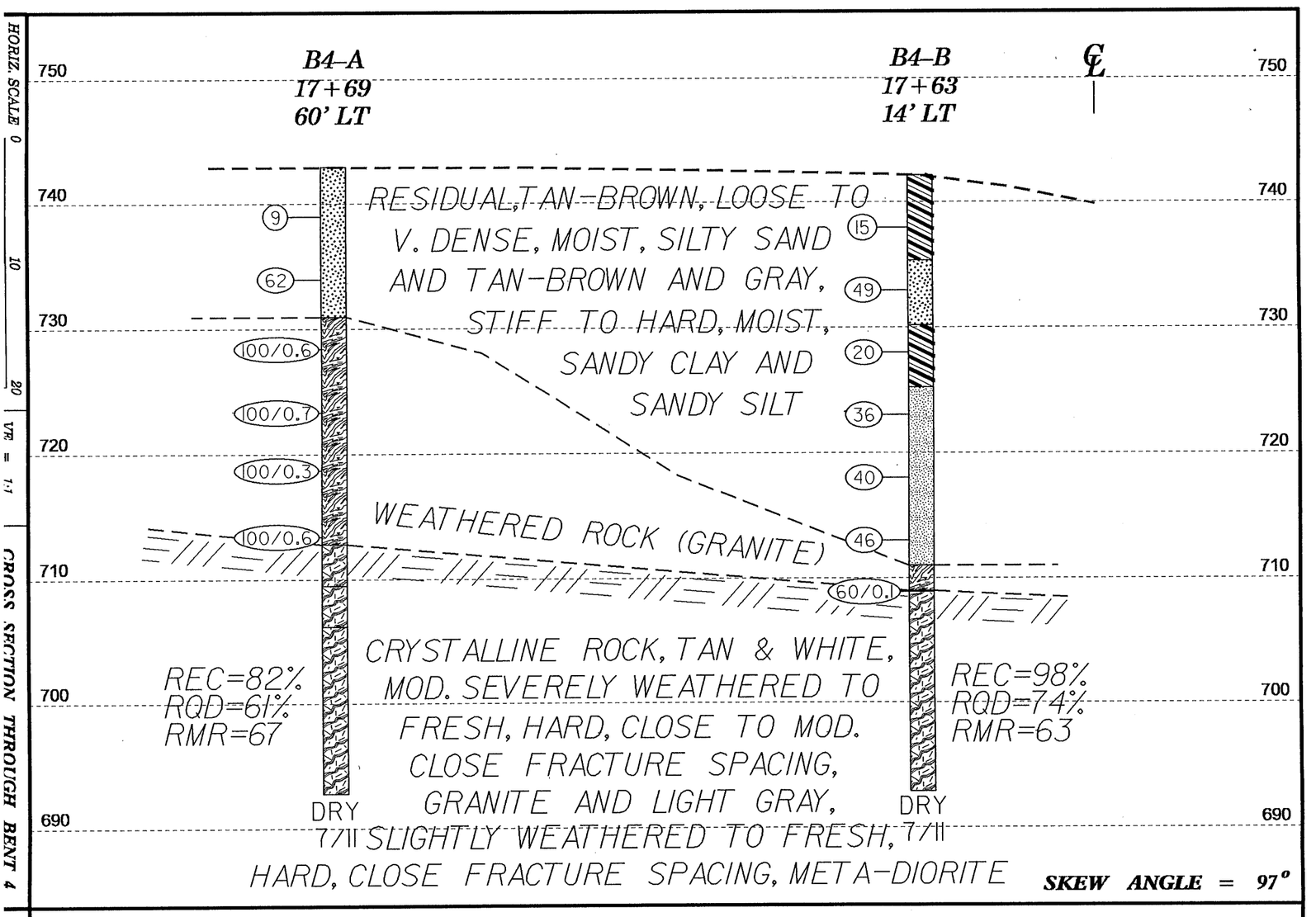


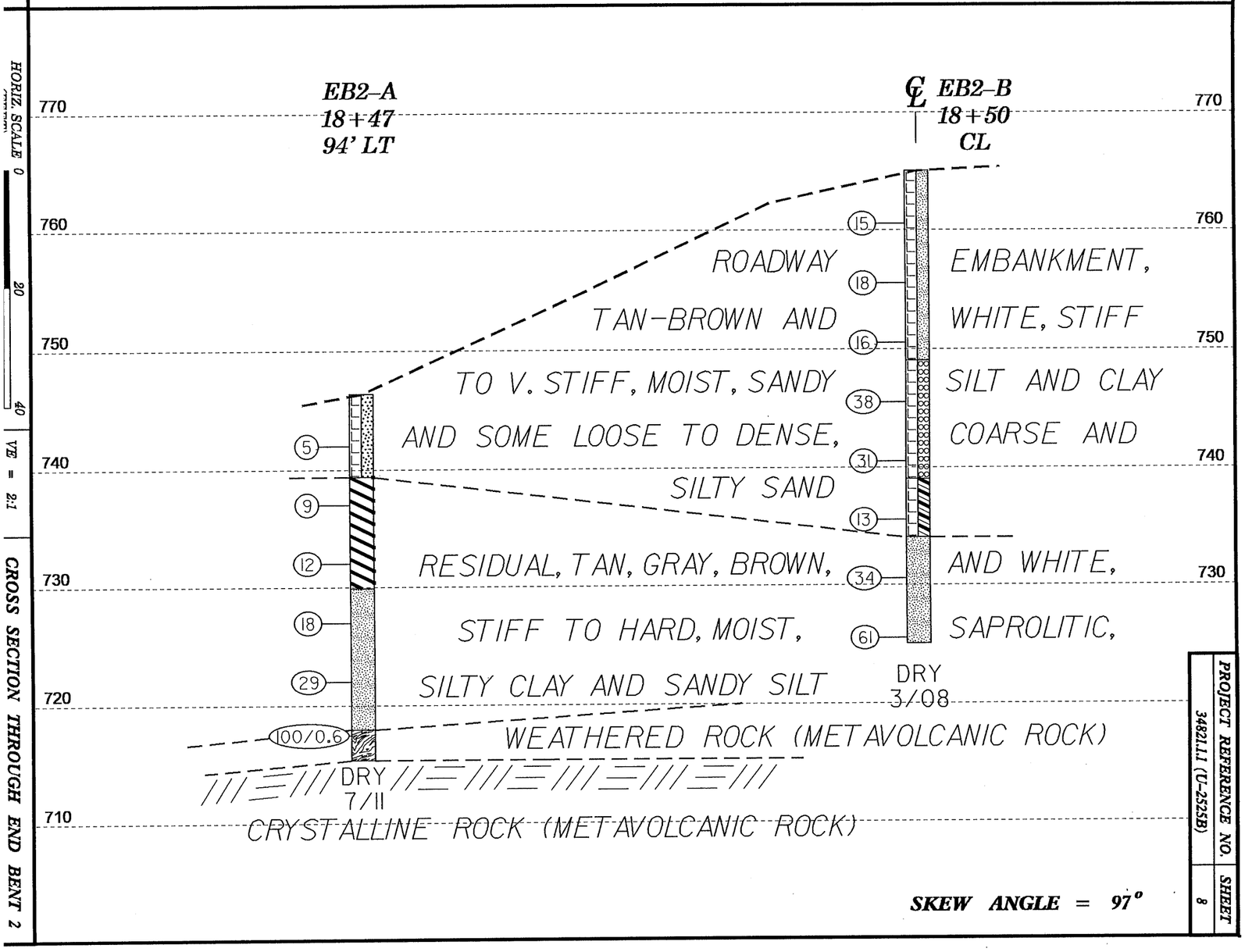


PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	6


HORIZ. SCALE (FEET) 0 10 20
VE = 1:1
CROSS SECTION THROUGH BENT 2
B2-A
16+00
80' LT
B2-B
15+95
14' LT
℄
770
760
750
740
730
720
710
ROADWAY EMBANKMENT,
TAN-BROWN, GREEN, AND GRAY, STIFF
SANDY CLAY & SILT
AND MED. DENSE TO DENSE, SILTY AND COARSE SAND
WITH TRACE WOOD AND SOME GRAVEL
07/11
RESIDUAL, TAN-BROWN, GREEN AND WHITE, STIFF
TO HARD, MOIST, SAPROLITIC, SILTY CLAY
03/08 AND SANDY SILT
WEATHERED ROCK
(GRANITE)
CRYSTALLINE ROCK (GRANITE)
SKEW ANGLE = 97°


HORIZ. SCALE (FEET) 0 10 20
VE = 1:1
CROSS SECTION THROUGH BENT 3
B3-A
16+85
60' LT
B3-B
16+79
14' LT
℄
750
740
730
720
710
700
690
RESIDUAL, TAN-BROWN, MED. DENSE TO
DENSE, MOIST, COARSE SAND WITH V. STIFF, SANDY SILT
GRAY, TAN-BROWN AND GREEN, STIFF
TO HARD, MOIST, SAPROLITIC, SANDY CLAY AND SILT
07/11
WEATHERED ROCK
(GRANITE AND METAVOLCANIC ROCK)
CRYSTALLINE ROCK
(GRANITE)
CRYSTALLINE ROCK, GRAY-GREEN,
SLIGHTLY WEATHERED TO FRESH,
HARD, CLOSE TO MOD. CLOSE
FRACTURE SPACING, METAVOLCANIC ROCK
REC=89%
RQD=73%
RMR=75
DRY
7/11
SKEW ANGLE = 97°
PROJECT REFERENCE NO.
3482.1.1 (U-2525B)
SHEET
7


HORIZ. SCALE 0 10 20
VE = 1:1
CROSS SECTION THROUGH BENT 4
B4-A
17+69
60' LT
B4-B
17+63
14' LT
℄
750
740
730
720
710
700
690
9
62
100/0.6
100/0.7
100/0.3
100/0.6
15
49
20
36
40
46
60/0.1
RESIDUAL, TAN-BROWN, LOOSE TO V. DENSE, MOIST, SILTY SAND AND TAN-BROWN AND GRAY, STIFF TO HARD, MOIST, SANDY CLAY AND SANDY SILT
WEATHERED ROCK (GRANITE)
CRYSTALLINE ROCK, TAN & WHITE, MOD. SEVERELY WEATHERED TO FRESH, HARD, CLOSE TO MOD. CLOSE FRACTURE SPACING, GRANITE AND LIGHT GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE FRACTURE SPACING, META-DIORITE
REC=82%
RQD=61%
RMR=67
REC=98%
RQD=74%
RMR=63
DRY
7/11
DRY
7/11
SKEW ANGLE = 97°


HORIZ. SCALE 0 20 40
VE = 2:1
CROSS SECTION THROUGH END BENT 2
EB2-A
18+47
94' LT
℄ EB2-B
18+50
CL
770
760
750
740
730
720
710
5
9
12
18
29
100/0.6
15
18
16
38
31
13
34
61
ROADWAY EMBANKMENT, TAN-BROWN AND WHITE, STIFF TO V. STIFF, MOIST, SANDY SILT AND CLAY AND SOME LOOSE TO DENSE, COARSE AND SILTY SAND
RESIDUAL, TAN, GRAY, BROWN, AND WHITE, STIFF TO HARD, MOIST, SAPROLITIC, SILTY CLAY AND SANDY SILT
WEATHERED ROCK (METAVOLCANIC ROCK)
CRYSTALLINE ROCK (METAVOLCANIC ROCK)
DRY
7/11
DRY
3/08
SKEW ANGLE = 97°
PROJECT REFERENCE NO.
3482.1.1 (U-2525B)
SHEET
8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 14+25	**OFFSET** 63 ft LT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 755.7 ft	**TOTAL DEPTH** 50.2 ft	**NORTHING** 851,179	**EASTING** 1,794,116 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 07/21/11	**COMP. DATE** 07/21/11	**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)
										755.7 GROUND SURFACE	0.0
	752.5	3.2	2	2	3	5		M		**ROADWAY EMBANKMENT** TAN-BROWN, CLAYEY SAND	
	747.5	8.2	2	2	3	5		M			
	742.5	13.2	2	2	2	4		M			
	737.5	18.2	28	72/0.5		100/1.0		M		737.5 TAN-BROWN, COARSE SAND WITH ASPHALT PIECES	18.2
	732.5	23.2	5	15	13	28		M			
	729.3	26.4								TAN-BROWN-GRAY, SANDY CLAY	
	727.5	28.2	8	15	20	35		M		725.7 **RESIDUAL** TAN-BROWN, SAPROLITIC, SANDY SILT	30.0
	722.5	33.2	6	12	20	32		M			
	717.5	38.2	14	40	32	72		M			
	713.2	42.5	100/0.5			100/0.5				713.2 **WEATHERED ROCK** (GRANITE)	42.5
	707.5	48.2	67	33/0.1		100/0.6				705.5 Boring Terminated by Auger Refusal at Elevation 705.5 ft ON CRYSTALLINE ROCK (GRANITE)	50.2

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 14+31	**OFFSET** 12 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 756.9 ft	**TOTAL DEPTH** 52.0 ft	**NORTHING** 851,201	**EASTING** 1,794,162 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 07/06/11	**COMP. DATE** 07/07/11	**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)
										756.9 GROUND SURFACE	0.0
	753.4	3.5	2	3	3	6	SS-1E	M		**ROADWAY EMBANKMENT** TAN-BROWN, CLAYEY SAND	
	748.4	8.5	3	3	3	6		M			
	743.4	13.5	12	8	7	15	SS-2E	M		745.1 TAN-BROWN, COARSE SAND	11.8
	738.4	18.5	4	9	11	20	SS-3E	M		740.1 TAN-BROWN, SANDY CLAY	16.8
	733.4	23.5	5	7	16	23		M			
	728.4	28.5	8	8	6	14		M			
	723.4	33.5	7	13	12	25	SS-4E	M		719.9 **RESIDUAL** TAN-BROWN-GRAY, SAPROLITIC, SANDY SILT	37.0
	718.4	38.5	3	5	5	10	SS-5E	M			
	713.4	43.5	8	24	30	54	SS-6E	M		709.4 **WEATHERED ROCK** (GRANITE)	47.5
	708.4	48.5	100/0.4			100/0.4				704.9 Boring Terminated with Casing Advancer Refusal at Elevation 704.9 ft ON CRYSTALLINE ROCK (GRANITE)	52.0

NCDOT BORE DOUBLE U2525B_GEO_BH_Y1Y2.GPJ NC_DOT.GDT 8/20/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 15+16	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 731.2 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 851,266	**EASTING** 1,794,089	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/19/11	**COMP. DATE** 07/19/11	**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)
735										731.2 GROUND SURFACE 0.0
730	728.7	2.5	8	4	6	10	SS-20E	M		RESIDUAL TAN-BROWN-GRAY, SAPROLITIC, SANDY CLAY
725	723.7	7.5	2	3	4	7		M		
720	718.7	12.5	4	5	8	13	SS-21E	M		720.4 10.8 TAN-BROWN-GRAY, SAPROLITIC, SANDY SILT
715	713.7	17.5	4	10	29	39		M		
710	708.7	22.5	46	54/0.5		100/1.0				708.7 22.5 WEATHERED ROCK (GRANITE)
705	703.7	27.5	60/0.0			60/0.0				704.2 27.0 CRYSTALLINE ROCK DARK GRAY, FRESH, HARD TO VERY HARD, CLOSE TO WIDE FRACTURE SPACING, META-GABBRO WITH FRACTURES FROM 20 TO 45 DEGREES (28.6-30.6) SEVERELY WEATHERED ROCK REC=84% RQD=64% RMR=68
700							RS-1			
695										690.2 41.0 Boring Terminated at Elevation 690.2 ft IN CRYSTALLINE ROCK (META-GABBRO)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 15+16	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 731.2 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 851,266	**EASTING** 1,794,089	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/19/11	**COMP. DATE** 07/19/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 14.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
704.2											Begin Coring @ 27.0 ft
	704.2	27.0	4.0	0:41/1.0 *N=60/0.0* 0:51/1.0 2:45/1.0 3:50/1.0	(2.1) 53%	(1.2) 30%		(11.7) 84%	(9.0) 64%		704.2 27.0 CRYSTALLINE ROCK DARK GRAY, FRESH, HARD TO VERY HARD, CLOSE TO WIDE FRACTURE SPACING, META-GABBRO WITH FRACTURES FROM 20 TO 45 DEGREES (28.6-30.6) SEVERELY WEATHERED ROCK
700	700.2	31.0	5.0	2:22/1.0 3:11/1.0 3:21/1.0 3:57/1.0 2:16/1.0	(5.0) 100%	(3.9) 78%	RS-1				
695	695.2	36.0	5.0	2:09/1.0 2:08/1.0 1:46/1.0 2:13/1.0 3:02/1.0	(4.6) 92%	(3.9) 78%					
	690.2	41.0									690.2 41.0 Boring Terminated at Elevation 690.2 ft IN CRYSTALLINE ROCK (META-GABBRO)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 15+27	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 729.6 ft	**TOTAL DEPTH** 22.2 ft	**NORTHING** 851,291	**EASTING** 1,794,129	**24 HR.** 21.1
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/20/11	**COMP. DATE** 07/20/11	**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)
730										GROUND SURFACE	729.6	0.0
										ROADWAY EMBANKMENT ASPHALT	728.6	1.0
										TAN-BROWN, SANDY CLAY	725.6	4.0
725	726.4	3.2	3	5	7	12	SS-22E	M		RESIDUAL TAN-BROWN, SAPROLITIC, SANDY SILT		
720	721.4	8.2	10	10	11	21	SS-23E	M				
715	716.4	13.2	5	11	30	41		M				
710	711.4	18.2	65	35/0.1		100/0.6				WEATHERED ROCK (GRANITE)	711.6	18.0
	707.4	22.2	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 707.4 ft ON CRYSTALLINE ROCK (GRANITE)	707.4	22.2

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 16+00	**OFFSET** 80 ft LT	**ALIGNMENT** -L-	**0 HR.** 28.4
COLLAR ELEV. 737.7 ft	**TOTAL DEPTH** 32.0 ft	**NORTHING** 851,339	**EASTING** 1,794,043	**24 HR.** 20.0
DRILL RIG/HAMMER EFF./DATE TRI0117 MOBILE B-57 96% 10/5/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/27/08	**COMP. DATE** 03/27/08	**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)
740										GROUND SURFACE	737.7	0.0
										ROADWAY EMBANKMENT GREEN-BROWN, SANDY SILT WITH TRACE WOOD DEBRIS	732.2	5.5
735	734.4	3.3	8	9	11	20	SS-141	M		RESIDUAL GREEN AND WHITE, SAPROLITIC, SILTY CLAY		
730	729.4	8.3	4	5	10	15	SS-142	M				
725	724.4	13.3	4	4	6	10		M			721.2	16.5
720	719.4	18.3	11	20	25	45	SS-143	M		GREEN AND WHITE, SAPROLITIC, SANDY SILT	717.7	20.0
715	714.4	23.3	9	9	11	20				GREEN AND WHITE, SAPROLITIC, SILTY CLAY	712.2	25.5
710	709.4	28.3	17	13	47	60		M		GREEN AND WHITE, SAPROLITIC, SANDY SILT	705.7	32.0
										Boring Terminated by Auger Refusal at Elevation 705.7 ft ON CRYSTALLINE ROCK (GRANITE)		

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WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 15+95	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 763.4 ft	**TOTAL DEPTH** 48.1 ft	**NORTHING** 851,355	**EASTING** 1,794,107	**24 HR.** 26.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 07/21/11	**COMP. DATE** 07/21/11	**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										763.4 GROUND SURFACE	0.0
760	760.4	3.0	5	5	8	13		M		ROADWAY EMBANKMENT TAN-BROWN, SANDY CLAY WITH SOME GRAVEL	
755	755.4	8.0	5	13	10	23	SS-24E	M		757.6 TAN-BROWN, SILTY SAND	5.8
750	750.4	13.0	7	6	9	15		M		747.4 BROWN-GRAY, SANDY SILT	16.0
745	745.4	18.0	9	9	7	16	SS-25E	M		742.4 TAN-BROWN, COARSE SAND	21.0
740	740.4	23.0	13	24	13	37	SS-26E	M		737.4 GRAY-BROWN, SANDY SILT	26.0
735	735.4	28.0	6	6	11	17	SS-27E	M		728.9 RESIDUAL TAN-BROWN, SANDY SILT	34.5
730	730.4	33.0	2	3	7	10		M			
725	725.4	38.0	7	12	18	30	SS-28E	M			
720	720.4	43.0	13	27	34	61		M		717.4 WEATHERED ROCK (GRANITE)	46.0
	715.4	48.0	60/0.1			60/0.1				715.4 CRYSTALLINE ROCK (GRANITE)	48.0
										715.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 715.3 ft IN CRYSTALLINE ROCK (GRANITE)	48.1

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 16+85	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.3 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 851,426	**EASTING** 1,794,034	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/15/11	**COMP. DATE** 07/15/11	**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
745										741.3 GROUND SURFACE 0.0
740	741.3	0.0	14	10	12	22	SS-17E	M		RESIDUAL 739.3 TAN-BROWN, SANDY SILT 2.0
735	737.8	3.5	10	11	23	34	SS-18E	M		TAN-BROWN, COARSE SAND
730	732.8	8.5	3	5	8	13	SS-19E	M		734.3 TAN-BROWN, SAPROLITIC, SANDY CLAY 7.0
725	727.8	13.5	10	14	21	35		M		
720	722.8	18.5	21	30	70/0.1	100/0.6				723.8 WEATHERED ROCK (METAVOLCANIC AND GRANITE) 17.5
715	717.8	23.5	100/0.4			100/0.4				
	712.8	28.5	60/0.0			60/0.0				712.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 712.8 ft ON CRYSTALLINE ROCK (GRANITE) 28.5

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WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 16+83	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.8 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 851,439	**EASTING** 1,794,078	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/14/11	**COMP. DATE** 07/14/11	**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)
745										
	741.8	0.0								741.8 GROUND SURFACE 0.0
740										RESIDUAL
	738.8	3.0	10	12	11	23	SS-16E	M		TAN-BROWN, COARSE SAND
735										734.8 7.0
	733.8	8.0	4	8	8	16		M		TAN-BROWN-GRAY, SANDY CLAY
730										730.3 11.5
	728.8	13.0	8	9	14	23		M		TAN-GREEN AND BROWN, SAPROLITIC, SANDY SILT
725										
	723.8	18.0	3	6	12	18		M		
720										
	718.8	23.0	11	23	31	54		M		
715										
	713.8	28.0	11	18	30	48		M		
710										
	708.8	33.0	100/0.4			100/0.4				709.3 32.5
705							RS-2			WEATHERED ROCK (METAVOLCANIC ROCK)
										706.8 35.0
700										CRYSTALLINE ROCK GRAY-GREEN, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC ROCK WITH SOME THIN QUARTZ SEAMS
695										REC=89% RQD=73%
										RMR=75
										691.8 50.0
										Boring Terminated at Elevation 691.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC ROCK)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 16+83	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 741.8 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 851,439	**EASTING** 1,794,078	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/14/11	**COMP. DATE** 07/14/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 15.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
706.8											Begin Coring @ 35.0 ft
705	706.8	35.0	5.0	1:35/1.0 1:45/1.0 1:50/1.0 1:38/1.0 1:51/1.0	(4.4) 88%	(4.2) 84%	RS-2	(13.4) 89%	(11.0) 73%		706.8 CRYSTALLINE ROCK 35.0 GRAY-GREEN, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAVOLCANIC ROCK WITH SONE THIN QUARTZ SEAMS
	701.8	40.0									
700			5.0	1:59/1.0 1:59/1.0 1:53/1.0 2:02/1.0 1:48/1.0	(5.0) 100%	(4.0) 80%					
	696.8	45.0									
695			5.0	2:15/1.0 2:20/1.0 1:45/1.0 1:25/1.0 1:07/1.0	(4.0) 80%	(2.8) 56%					
	691.8	50.0									691.8 50.0 Boring Terminated at Elevation 691.8 ft IN CRYSTALLINE ROCK (METAVOLCANIC ROCK)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 17+69	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.0 ft	**TOTAL DEPTH** 50.2 ft	**NORTHING** 851,505	**EASTING** 1,794,007	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/11/11	**COMP. DATE** 07/12/11	**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)
745										743.0 GROUND SURFACE 0.0
	740.0	3.0	3	4	5	9		M		**RESIDUAL** TAN-BROWN AND WHITE, SAPROLITIC, SILTY SAND
740										
	735.0	8.0	20	23	39	62	SS-10E	M		
735										731.0 12.0
	729.0	14.0	45	55/0.1						**WEATHERED ROCK** (GRANITE)
730						100/0.6				
	724.0	19.0	45	55/0.2						
725						100/0.7				
	719.0	24.0	100/0.3							
720						100/0.3				
	714.0	29.0	45	55/0.1						
715						100/0.6				
710										
705										
700							RS-3			
695										

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
712.8											Begin Coring @ 30.2 ft
	712.8	30.2	5.0	3:53/1.0 5:58/1.0 2:50/1.0 0:46/1.0 1:13/1.0	(4.0) 80%	(3.2) 64%		(2.4) 73%	(1.8) 55%		712.8 **CRYSTALLINE ROCK** 30.2 TAN AND WHITE, MODERATELY SEVERELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, GRANITE WITH SOME SEVERELY WEATHERED SEAMS
710											709.5 33.5
	707.8	35.2						(3.3) 100%	(2.4) 73%		GRAY, SLIGHTLY WEATHERED TO FRESH, HARD, CLOSE FRACTURE SPACING, META-DIORITE
			5.0	0:49/1.0 0:46/1.0 0:48/1.0 0:54/1.0 1:23/1.0	(4.0) 80%	(2.7) 54%					706.2 36.8
705											TAN AND WHITE, MODERATELY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE FRACTURE SPACING, GRANITE WITH SOME SEVERELY WEATHERED SEAMS
	702.8	40.2						(10.8) 81%	(7.7) 57%		
			5.0	1:00/1.0 1:25/1.0 1:25/1.0 1:36/1.0 1:40/1.0	(5.0) 100%	(3.5) 70%	RS-3				
700											
	697.8	45.2									
			5.0	1:02/1.0 1:00/1.0 2:19/1.0 1:28/1.0 1:47/1.0	(3.5) 70%	(2.5) 50%					
695											
	692.8	50.2									692.8 50.2 Boring Terminated at Elevation 692.8 ft IN CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 17+69	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 743.0 ft	**TOTAL DEPTH** 50.2 ft	**NORTHING** 851,505	**EASTING** 1,794,007	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/11/11	**COMP. DATE** 07/12/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 20.0 ft			

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BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 17+63	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 742.2 ft	**TOTAL DEPTH** 49.3 ft	**NORTHING** 851,514	**EASTING** 1,794,052	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/14/11	**COMP. DATE** 07/14/11	**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)
745										742.2 GROUND SURFACE	0.0
										RESIDUAL TAN-BROWN, SANDY CLAY	
740	739.0	3.2	5	5	10	15	SS-11E	M			
735	734.0	8.2	13	24	25	49	SS-12E	M		735.4 TAN-BROWN, SAPROLITIC, SILTY SAND	6.8
730	729.0	13.2	4	6	14	20	SS-13E	M		730.2 TAN-BROWN, SAPROLITIC, SANDY CLAY	12.0
725	724.0	18.2	14	16	20	36	SS-14E	M		725.2 GREEN-GRAY AND BROWN, SAPROLITIC, SANDY SILT	17.0
720	719.0	23.2	8	15	25	40		M			
715	714.0	28.2	12	19	27	46	SS-15E	M			
710	709.0	33.2	60/0.1			60/0.1	RS-4			711.0 **WEATHERED ROCK** (GRANITE)	31.2
705										709.0 **CRYSTALLINE ROCK** (GRANITE) 708.9	33.2 33.3
700										WHITE WITH BLACK AND BROWN, SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GRANITE	
695										REC=98% RQD=74%	
										RMR=63	
										692.9 Boring Terminated at Elevation 692.9 ft IN CRYSTALLINE ROCK (GRANITE)	49.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 17+63	**OFFSET** 14 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 742.2 ft	**TOTAL DEPTH** 49.3 ft	**NORTHING** 851,514	**EASTING** 1,794,052	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/14/11	**COMP. DATE** 07/14/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 16.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
708.9											Begin Coring @ 33.3 ft	
	708.9	33.3	2.0	1:09/1.0 1:25/1.0	(1.7) 85%	(1.0) 50%		(15.6) 98%	(11.8) 74%		708.9 WHITE WITH BLACK AND BROWN, SLIGHTLY WEATHERED TO FRESH, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GRANITE	33.3
	706.9	35.3					RS-4					
705			5.0	1:05/1.0 1:00/1.0 1:00/1.0 1:07/1.0 1:51/1.0	(4.9) 98%	(4.0) 80%						
	701.9	40.3										
700			5.0	2:10/1.0 3:01/1.0 4:54/1.0 7:40/1.0 15:10/1.0	(5.0) 100%	(3.5) 70%						
	696.9	45.3										
695			4.0	7:07/1.0 3:29/1.0 2:58/1.0 7:13/1.0	(4.0) 100%	(3.3) 83%						
	692.9	49.3									692.9 Boring Terminated at Elevation 692.9 ft IN CRYSTALLINE ROCK (GRANITE)	49.3

NCDOT BORE DOUBLE U2525B_GEO_BH_Y1Y2.GPJ NC_DOT.GDT 9/1/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 18+47	**OFFSET** 94 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 746.4 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 851,568	**EASTING** 1,793,949	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 07/07/11	**COMP. DATE** 07/08/11	**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))
750										746.4 GROUND SURFACE 0.0
745	743.0	3.4	2	3	2	5	SS-7E	M		ROADWAY EMBANKMENT TAN-BROWN, SILTY SAND
740	738.0	8.4	3	4	5	9	SS-8E	M		739.4 7.0 RESIDUAL TAN-GRAY-BROWN, SILTY CLAY
735	733.0	13.4	3	5	7	12		M		
730	728.0	18.4	5	6	12	18	SS-9E	M		729.9 16.5 TAN-GRAY-BROWN, SAPROLITIC, SANDY SILT
725	723.0	23.4	14	14	15	29		M		
720	718.0	28.4	6	94/0.0		100/0.6		M		718.0 28.4 WEATHERED ROCK (METAVOLCANIC ROCK)
										715.4 31.0 Boring Terminated with Casing Advancer Refusal at Elevation 715.4 ft ON CRYSTALLINE ROCK (METAVOLCANIC ROCK)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y1- (OLD BURLINGTON RD.) AND -Y2- (NSRR)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 18+50	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 768.9 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 851,601	**EASTING** 1,794,037	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI0117 MOBILE B-57 96% 10/5/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/27/08	**COMP. DATE** 03/27/08	**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))
770										768.9 GROUND SURFACE 0.0
765	765.4	3.5	7	8	7	15	SS-135	M		ROADWAY EMBANKMENT TAN-BROWN, SANDY SILT
760	760.4	8.5	4	9	9	18		M		
755	755.4	13.5	7	6	10	16		M		752.9 16.0 BROWN AND WHITE, COARSE SAND WITH SOME MICA
750	750.4	18.5	17	20	18	38	SS-136	M		
745	745.4	23.5	15	16	15	31		M		742.9 26.0 TAN, SANDY CLAY
740	740.4	28.5	5	5	8	13	SS-137	M		737.9 31.0 RESIDUAL BROWN AND WHITE, SAPROLITIC, SANDY SILT
735	735.4	33.5	12	14	20	34		M		
730	730.4	38.5	15	16	45	61		M		728.9 40.0 Boring Terminated at Elevation 728.9 ft IN RESIDUAL (SANDY SILT)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y1Y2.GPJ NC_DOT.GDT 9/1/11

-Y1- (OLD BURLINGTON RD.) AND -Y2- (NORFOLK SOUTHERN RAILROAD)

EB1-B

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-1E	12 LT	14+31	3.5-5.0	A-2-6(0)	32	11	39.2	22.5	20.0	18.3	81	59	35	-	-
SS-2E	12 LT	14+31	13.5-15.0	A-1-b(0)	25	5	50.4	22.1	17.4	10.2	66	40	21	-	-
SS-3E	12 LT	14+31	18.5-20.0	A-6(2)	31	11	31.7	23.1	22.8	22.3	89	71	44	-	-
SS-4E	12 LT	14+31	33.5-35.0	A-6(3)	30	11	26.8	23.1	21.6	28.4	91	75	50	-	-
SS-5E	12 LT	14+31	38.5-40.0	A-4(0)	28	3	35.7	30.5	23.7	10.2	100	81	40	-	-

B1-A

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-20E	60 LT	15+16	2.5-4.0	A-6(11)	38	18	10.6	25.2	41.9	22.3	98	95	69	-	-
SS-21E	60 LT	15+16	12.5-14.0	A-4(3)	31	7	13.0	33.5	41.3	12.2	98	91	62	-	-

B1-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	60 LT	15+16	31.6-32.1	META-GABBRO	183.9	15.08	13.41

B1-B

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-22E	14 LT	15+27	3.2-4.0	A-6(2)	33	14	36.3	21.3	20.0	22.3	93	69	43	-	-
SS-23E	14 LT	15+27	8.2-9.7	A-4(0)	30	7	36.3	33.1	22.4	8.1	98	73	36	-	-

B2-A

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-141	80 LT	16+00	3.3-4.8	A-4(0)	29	6	33.3	27.8	26.7	12.2	87	68	39	-	-
SS-142	80 LT	16+00	8.3-9.8	A-7-6(10)	42	18	16.1	25.7	31.6	26.5	97	86	64	-	-
SS-143	80 LT	16+00	18.3-19.8	A-4(0)	27	4	35.1	28.4	26.3	10.2	95	71	40	-	-

B2-B

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-24E	14 LT	15+95	8.0-9.5	A-2-4(0)	26	5	40.3	23.4	26.3	10.1	77	55	32	-	-
SS-25E	14 LT	15+95	18.0-19.5	A-4(0)	30	6	30.6	26.8	32.5	10.1	81	65	39	-	-
SS-26E	14 LT	15+95	23.0-24.5	A-1-b(0)	26	4	46.1	22.6	23.3	8.1	70	46	25	-	-
SS-27E	14 LT	15+95	28.0-29.5	A-4(0)	24	3	36.1	26.0	27.9	10.1	91	69	39	-	-
SS-28E	14 LT	15+95	38.0-39.5	A-4(0)	27	4	36.5	30.8	24.7	8.1	100	78	39	-	-

B3-A

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-17E	60 LT	16+85	0.0-1.5	A-4(1)	31	10	34.3	22.3	29.1	14.2	84	63	41	-	-
SS-18E	60 LT	16+85	3.5-5.0	A-1-b(0)	22	4	42.4	23.8	21.6	12.2	60	42	23	-	-
SS-19E	60 LT	16+85	8.5-10.0	A-6(8)	38	11	4.1	26.0	51.7	18.3	94	93	74	-	-

B3-B

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-16E	14 LT	16+83	3.0-4.5	A-1-b(0)	26	5	54.2	18.3	19.4	8.1	65	37	20	-	-

B3-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-2	14 LT	16+83	37.0-37.5	METAVOLCANIC	185.5	24.2	13.33

B4-A

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-10E	60 LT	17+69	8.0-9.5	A-2-4(0)	25	4	53.7	23.4	12.8	10.2	85	52	22	-	-

B4-A

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	60 LT	17+69	41.4-41.8	GRANITE	165.6	8.61	4.5

B4-B

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-11E	14 LT	17+63	3.2-4.7	A-6(2)	38	18	41.6	19.9	18.2	20.3	86	59	36	-	-
SS-12E	14 LT	17+63	8.2-9.7	A-2-4(0)	27	8	57.3	19.5	10.1	13.2	71	39	19	-	-
SS-13E	14 LT	17+63	13.2-14.7	A-6(5)	39	12	13.8	35.5	40.5	10.2	98	92	58	-	-
SS-14E	14 LT	17+63	18.2-19.7	A-4(1)	32	5	16.0	34.3	43.6	6.1	99	92	57	-	-
SS-15E	14 LT	17+63	28.2-29.7	A-4(2)	40	6	12.8	48.3	30.8	8.1	100	95	50	-	-

B4-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-4	14 LT	17+63	34.7-35.3	GRANITE	166.1	4.18	-

EB2-A

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-7E	94 LT	18+47	3.4-4.9	A-2-4(0)	15	NP	42.8	7.1	37.9	12.2	89	65	30	-	-
SS-8E	94 LT	18+47	8.4-9.9	A-7-6(18)	47	21	3.9	21.5	42.1	32.5	100	99	80	-	-
SS-9E	94 LT	18+47	18.4-19.9	A-4(2)	31	6	20.5	51.4	18.0	10.2	100	94	55	-	-

EB2-B

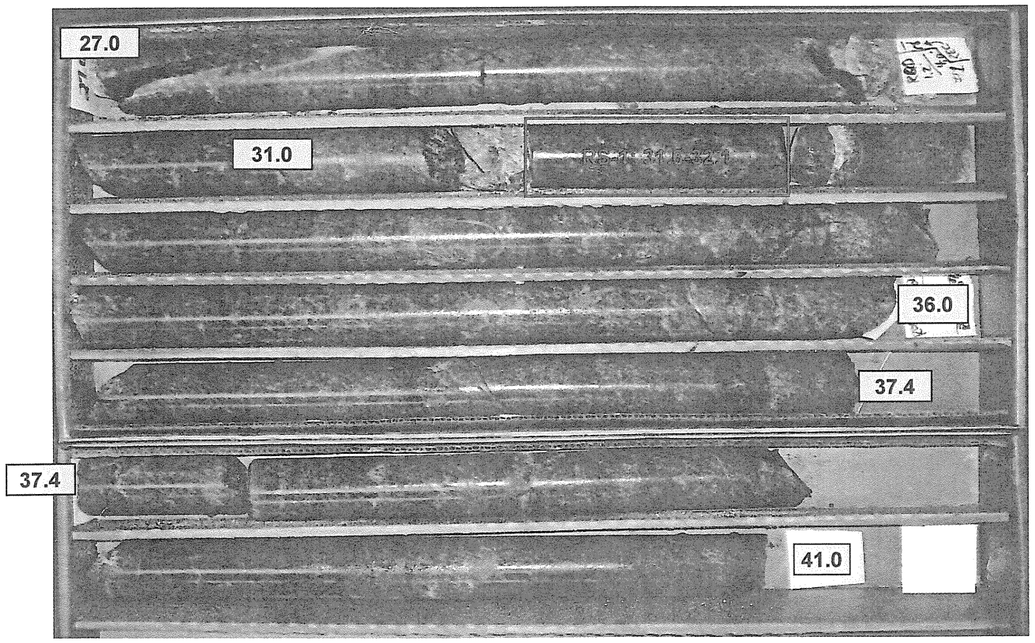
SOIL TEST RESULTS

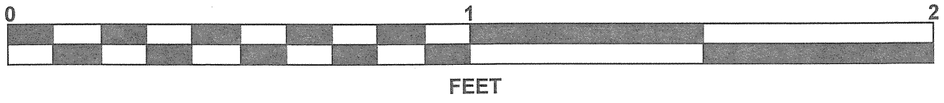
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-135	CL	18+50	3.5-5.0	A-4(0)	29	6	30.4	25.5	15.5	28.6	97	79	47	-	-
SS-136	CL	18+50	18.5-20.0	A-1-b(0)	24	NP	53.3	27.8	12.9	6.1	79	48	19	-	-
SS-137	CL	18+50	28.5-30.0	A-6(6)	37	15	29.8	16.7	18.8	34.7	97	76	55	-	-

CORE PHOTOGRAPHS

B1-A

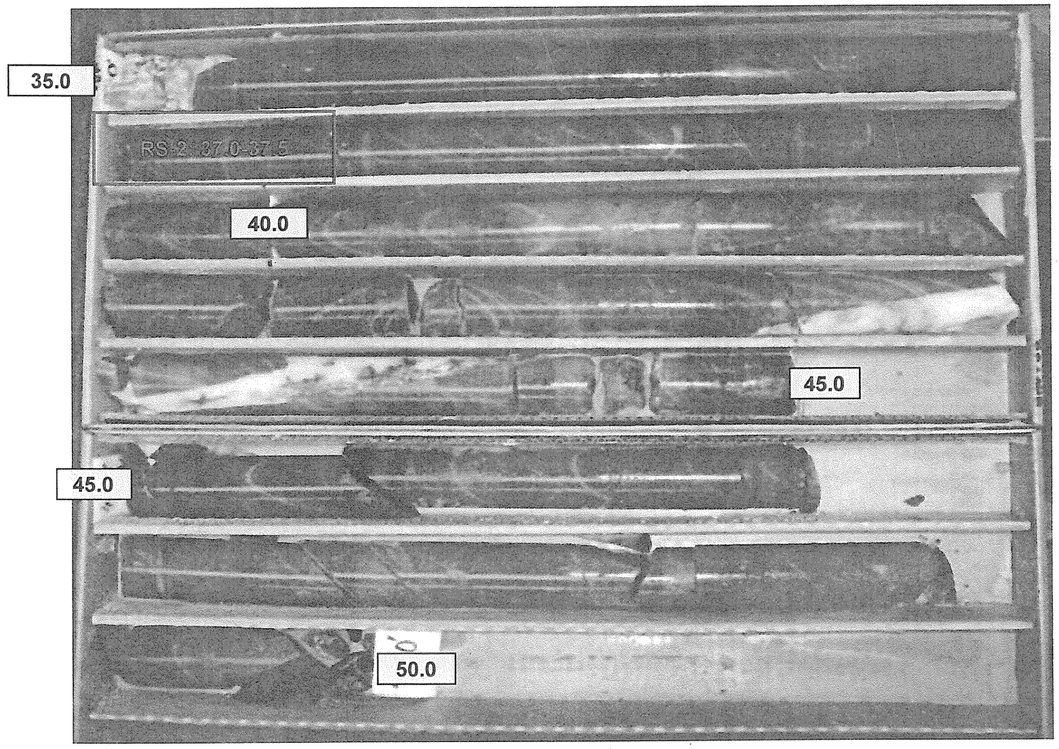
BOXES 1 & 2: 27.0 - 41.0 FEET

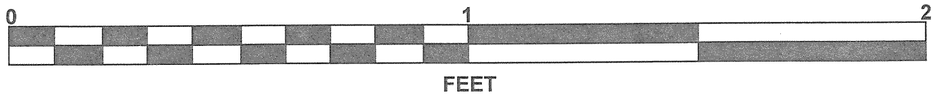




B3-B

BOXES 1 & 2: 35.0 - 50.0 FEET

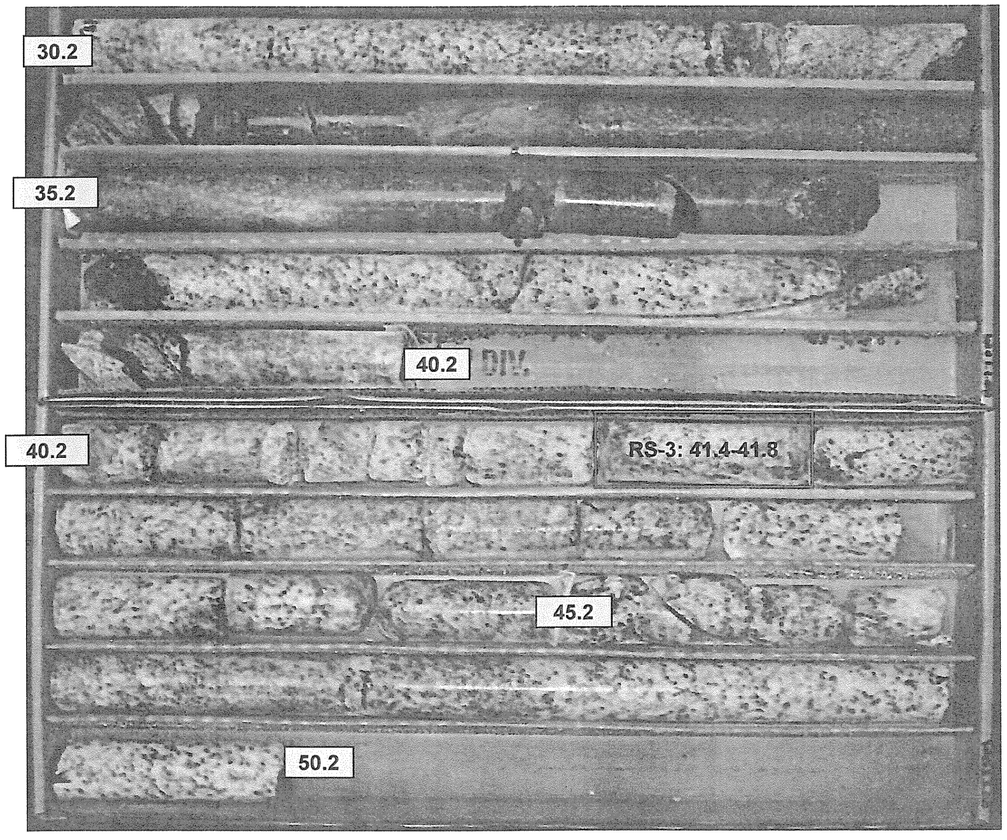


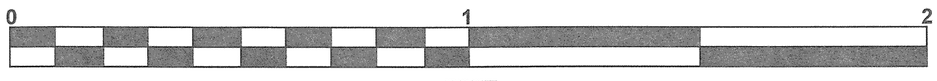


CORE PHOTOGRAPHS

B4-A

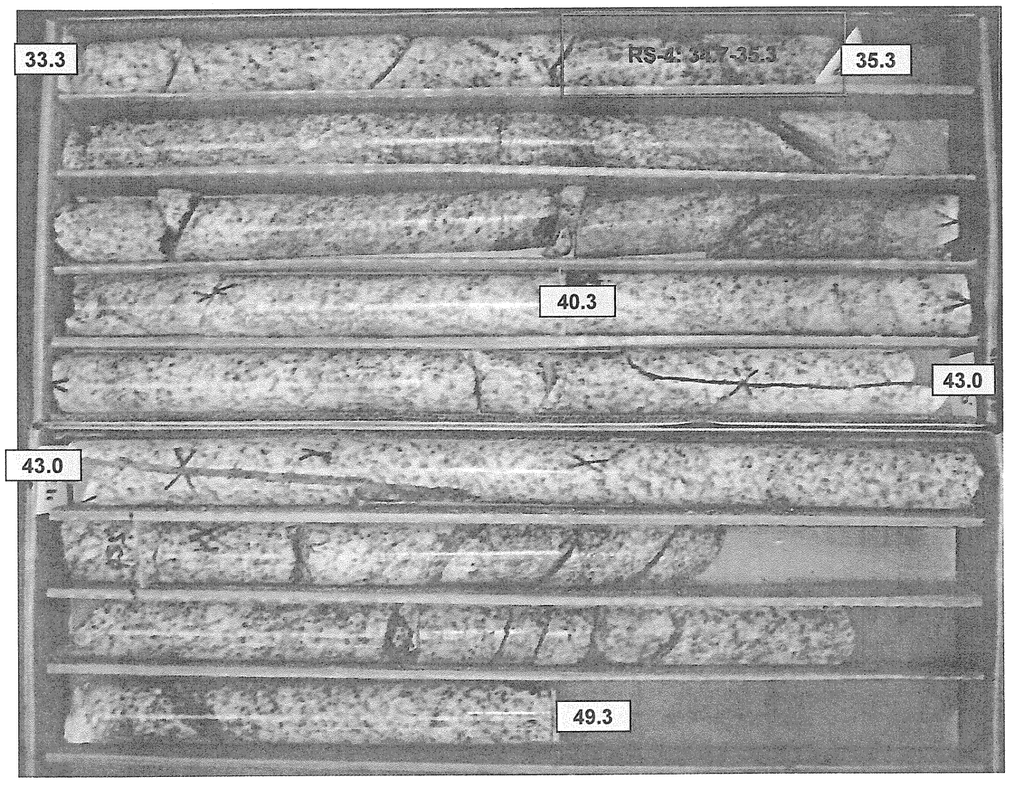
BOXES 1 & 2: 30.2 - 50.2 FEET

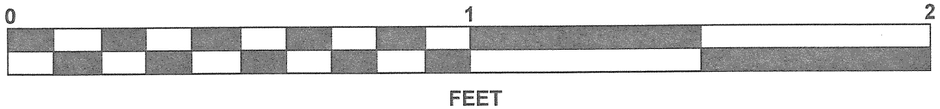




B4-B

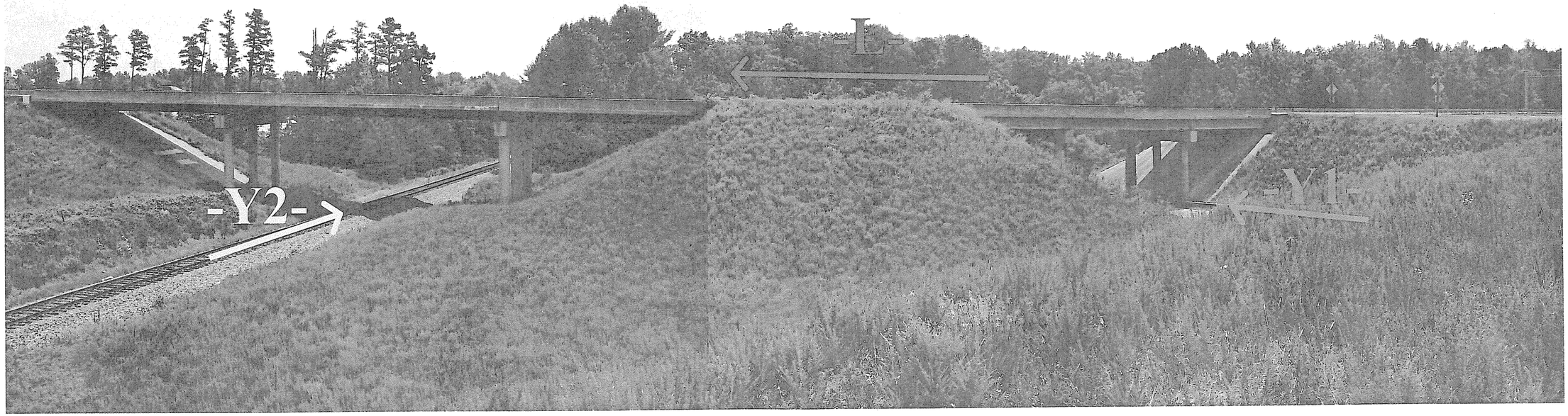
BOXES 1 & 2: 33.3 - 49.3 FEET





SITE PHOTOGRAPH

Proposed Bridge on -L- (I-840) over -Y1- (Old Burlington Rd.) and -Y2- (US 70)



Looking East Towards Existing Structures

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	24

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34821.1.1 (U-2525B)* F.A. PROJ. *N/A*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO*

SITE DESCRIPTION *BRIDGE ON -L- (I-840) OVER -Y7- (SR 2825, CAMP BURTON RD.) AT -L- STATION 129+38*

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DATE *JULY 2011*

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Love Pedro 7-20-2011

DRAWN BY: *T. T. WALKER, J. L. PEDRO*

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ID: U-2525B

PROJECT: 34821.1.1

PROJECT REFERENCE NO.	SHEET NO.
3482I.1.1 (U-2525B)	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	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
- 25/026 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

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

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B____
- [X] -N XWL
- [ ] -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: BM# 30, -L- Sta. 129+30, Offset - 206' Lt

ELEVATION: 707.62 FT.

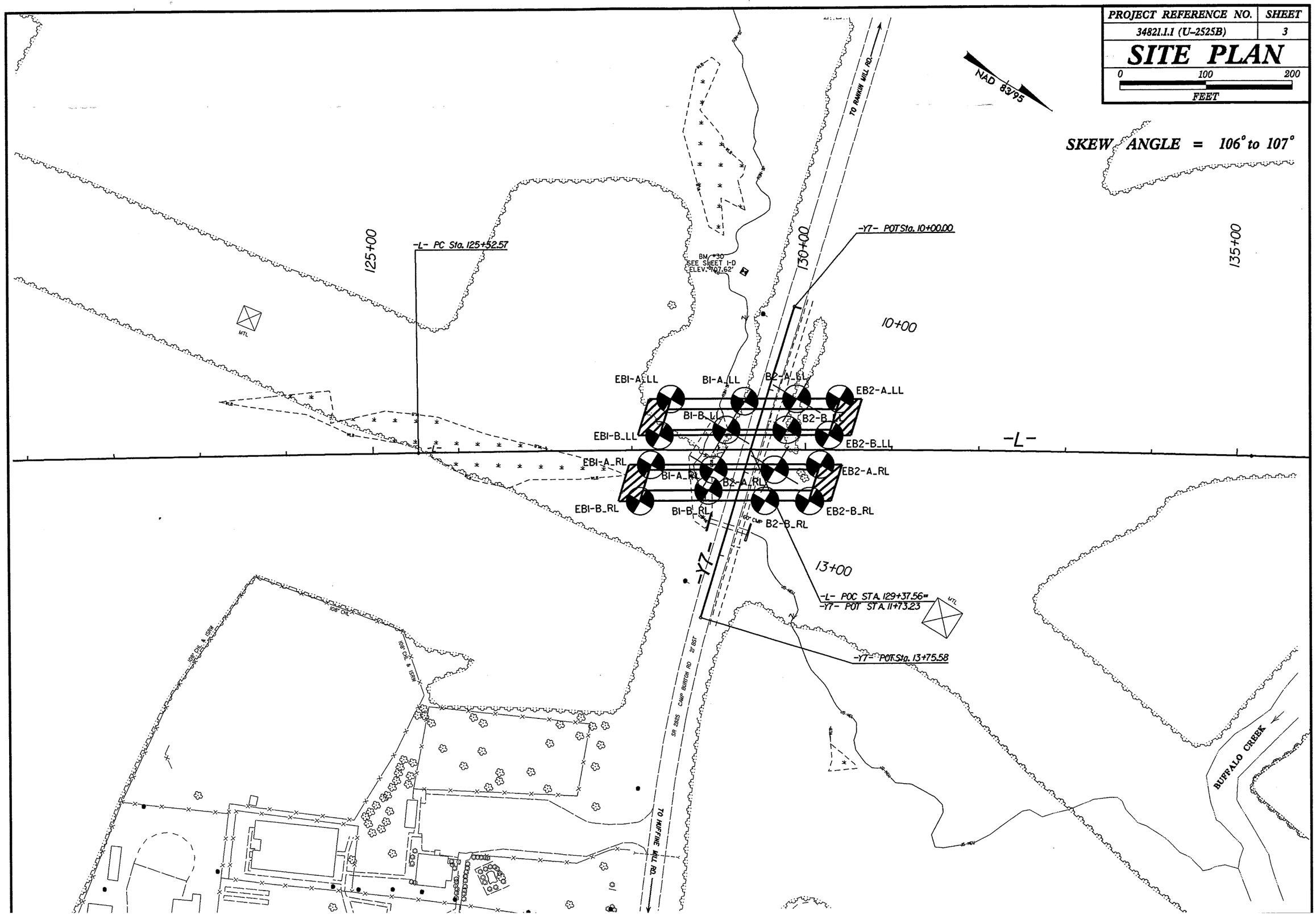
NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

SITE PLAN

0 100 200
FEET



PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	4
FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-	

0 20 40
FEET
VE = 2:1

EB1-B_LL
128+32
17' LT

B1-B_LL
129+09
23' LT

B2-B_LL
129+79
23' LT

EB2-B_LL
130+27
17' LT

-Y7-
(CAMP BURTON RD.)

730
720
710
700
690
680
670
660
650

Ⓐ 23 DRY 6/II

Ⓐ 6 60/0.0 6/II

Ⓐ 44 DRY 6/II

Ⓐ 23 30 100/0.4 DRY 6/II

Ⓑ

CRYSTALLINE ROCK, DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK AND WHITE AND GRAY, FRESH, HARD, WIDE FRACTURE SPACING, GRANITE

REC=94% RQD=89% RMR=84

Ⓐ RESIDUAL, TAN-BROWN, VERY STIFF, MOIST, SANDY SILT AND CLAY AND LOOSE TO DENSE, MOIST, SILTY SAND

Ⓑ WEATHERED ROCK (GRANITE)

129+00 +20 +40 +60 +80 130+00 +20 +40 +60

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	5

CROSS SECTION THROUGH END BENT 1

SKEW ANGLE = 107.0°

℄

EB1-A_LL
128+45
59' LT

EB1-B_LL
128+32
17' LT

EB1-A_RL
128+22
17' RT

EB1-B_RL
128+09
59' RT

730 720 710 700 690 680 670 660 650 640

23 — 60/0.1 — DRY — 6/11

RESIDUAL, TAN-BROWN, STIFF TO V.STIFF, MOIST, SANDY SILT

23 — DRY — 6/11

10 — DRY — 6/11

26 — DRY — 6/11

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

WEATHERED ROCK (GRANITE)

70 60 50 40 30 20 10 CL 10 20 30 40 50 60 70

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	6

0 10 20
FEET
VE = 1:1

CROSS SECTION THROUGH BENT 1

SKEW ANGLE = 106.8°

℄

720
710
700
690
680
670
660
650
640
630

B1-A_LL
129+30
56' LT

B1-B_LL
129+09
23' LT

B1-A_RL
128+94
23' RT

B1-B_RL
128+88
47' RT

④ 6/11

⑥ 60/0.0

Ⓐ

⑧ DRY 6/11

⑤ 6/11

CRYSTALLINE ROCK, DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK AND WHITE AND GRAY, FRESH, HARD, WIDE FRACTURE SPACING, GRANITE

REC=94% RQD=89% RMR=84

6/11

CRYSTALLINE ROCK, WHITE AND GRAY, VERY SLIGHTLY WEATHERED TO FRESH, HARD, GRANITE

REC=100% RQD=100% RMR=92

Ⓐ RESIDUAL, TAN-BROWN, LOOSE, MOIST, SILTY SAND

70 60 50 40 30 20 10 0 10 20 30 40 50 60 70

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	7
CROSS SECTION THROUGH BENT 2	

SKEW ANGLE = 106.7°

℄

B2-A_LL
129+90
59' LT

B2-B_LL
129+79
23' LT

B2-A_RL
129+65
23' RT

B2-B_RL
129+54
59' RT

730
720
710
700
690
680
670
660
650
640

(8) 100/0.5

RESIDUAL, AND TAN-BROWN, STIFF, MOIST, (44) DENSE TO V.DENSE, SILTY

DRY
6/11

(15) (15) SILTY & SANDY CLAY (20)

6/11

6/11

Ⓑ

CRYSTALLINE ROCK, DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK AND WHITE AND GRAY, FRESH, HARD, GRANITE

REC=95% RQD=82% RMR=79

CRYSTALLINE ROCK, WHITE AND GRAY, V. SLIGHTLY WEATHERED TO FRESH, HARD, VERY WIDE FRACTURE SPCING, GRANITE AND GREEN-GRAY, FRESH, HARD, MAFIC, METAVOLCANIC ROCK

REC=100% RQD=100% RMR=87

Ⓑ WEATHERED ROCK (GRANITE)

70 60 50 40 30 20 10 ℄ 10 20 30 40 50 60 70

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	8
CROSS SECTION THROUGH END BENT 2	

0 10 20
FEET
VE = 1:1

SKEW ANGLE = 106.5°

℄

EB2-A_LL
130+39
59' LT

EB2-B_LL
130+27
17' LT

EB2-A_RL
130+17
17' RT

EB2-B_RL
130+05
59' RT

730
720
710
700
690
680
670
660
650
640

24
20
100/0.7
DRY
6/11

23
30
100/0.4
DRY
6/11

7
32
100/0.4
DRY
6/11

10
100/0.8
DRY
6/11

RESIDUAL, TAN-BROWN, SANDY SILT,

MED. STIFF TO SILTY CLAY, AND WEATHERED

HARD, MOIST, SANDY CLAY

ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

70 60 50 40 30 20 10 ℄ 10 20 30 40 50 60 70

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB1-A_LL	**STATION** 128+45	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 710.2 ft	**TOTAL DEPTH** 5.1 ft	**NORTHING** 861,895	**EASTING** 1,792,038	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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)
715											
710	710.2	0.0	5	9	14	23		M		710.2 GROUND SURFACE	0.0
										RESIDUAL TAN-BROWN, SANDY SILT	
	705.2	5.0	60/0.1			60/0.1				705.2	5.0
										705.1 CRYSTALLINE ROCK (GRANITE)	5.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 705.1 ft in CRYSTALLINE ROCK (GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB1-B_LL	**STATION** 128+32	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 708.4 ft	**TOTAL DEPTH** 3.0 ft	**NORTHING** 861,905	**EASTING** 1,792,080	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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
710										
	708.4	0.0	10	11	12	23		M		708.4 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN, SANDY SILT
										705.4 3.0
										Boring Terminated by Auger Refusal at Elevation 705.4 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 7/20/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)			**GROUND WTR (ft)**
BORING NO. B1-A_LL	**STATION** 129+30	**OFFSET** 56 ft LT	**ALIGNMENT** -L- **0 HR.** 2.5
COLLAR ELEV. 703.3 ft	**TOTAL DEPTH** 3.0 ft	**NORTHING** 861,969	**EASTING** 1,791,996 **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/21/11	**COMP. DATE** 06/21/11	**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
705										
	703.3	0.0								703.3 GROUND SURFACE 0.0
			1	2	2	4		M		**RESIDUAL** TAN-BROWN, SILTY SAND
										700.3 3.0
										Boring Terminated by Auger Refusal at Elevation 700.3 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B1-B_LL	**STATION** 129+09	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 702.4 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 861,968	**EASTING** 1,792,035	**24 HR.** 12.9
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/17/11	**COMP. DATE** 06/17/11	**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)
705											
	702.4	0.0	2	3	3					702.4 GROUND SURFACE	0.0
700	699.4	3.0	60/0.0			60/0.0				**RESIDUAL** TAN-BROWN, SILTY SAND 699.4	3.0
695							RS-1			**CRYSTALLINE ROCK** DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, MAFIC METAVOLCANIC ROCK REC=89% RQD=79% RMR=84 690.4	12.0
690										WHITE AND GRAY, FRESH, HARD, WIDE FRACTURE SPACING, GRANITE REC=100% RQD=100% RMR=84 686.4	16.0
685										683.7	18.7
										DARK GREEN, FRESH, HARD, MAFIC METAVOLCANIC ROCK REC=100% RQD=100% RMR=84 682.4	20.0
										WHITE AND GRAY, FRESH, HARD, GRANITE REC=100% RQD=100% RMR=84	
										Boring Terminated at Elevation 682.4 ft in CRYSTALLINE ROCK (GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B1-B_LL	**STATION** 129+09	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 702.4 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 861,968	**EASTING** 1,792,035	**24 HR.** 12.9
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/17/11	**COMP. DATE** 06/17/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 17.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
699.4											Begin Coring @ 3.0 ft	
	699.4	3.0	2.0	*N=60/0.0* 2:11/1.0 1:52/1.0	(1.0) 50%	(0.6) 30%		(8.0) 89%	(7.1) 79%		699.4 **CRYSTALLINE ROCK** DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK	3.0
	697.4	5.0	5.0	2:00/1.0 2:00/1.0 2:10/1.0 1:52/1.0	(5.0) 100%	(4.0) 80%						
695				1:42/1.0								
	692.4	10.0	5.0	2:12/1.0 2:15/1.0 2:21/1.0 2:41/1.0	(5.0) 100%	(5.0) 100%	RS-1				690.4	12.0
690				2:31/1.0				(4.0) 100%	(4.0) 100%		WHITE AND GRAY, FRESH, HARD, WIDE FRACTURE SPACING, GRANITE	
	687.4	15.0	5.0	1:13/1.0 1:42/1.0 1:45/1.0 1:50/1.0	(5.0) 100%	(5.0) 100%					686.4	16.0
685				1:44/1.0				(2.7) 100%	(2.7) 100%		DARK GREEN, FRESH, HARD, MAFIC, METAVOLCANIC ROCK	
	682.4	20.0						(1.3) 100%	(1.3) 100%		683.7	18.7
											WHITE AND GRAY, FRESH, HARD, GRANITE 682.4	20.0
											Boring Terminated at Elevation 682.4 ft in CRYSTALLINE ROCK (GRANITE)	

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 8/8/11

NCDOT CORE SINGLE U2525B_GEO_BR_Y7.GPJ NC_DOT.GDT 8/8/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B2-A_LL	**STATION** 129+90	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 709.1 ft	**TOTAL DEPTH** 18.0 ft	**NORTHING** 862,019	**EASTING** 1,791,962	**24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/15/11	**COMP. DATE** 06/15/11	**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)
710											
	709.1	0.0								709.1 GROUND SURFACE	0.0
			3	4	4	8	SS-10C	M		**RESIDUAL** TAN-BROWN, SILTY CLAY	
	706.6	2.5	100/0.5			100/0.5				706.6	2.5
705										706.1 **WEATHERED ROCK** (METAVOLCANIC ROCK)	3.0
										CRYSTALLINE ROCK DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK	
700							RS-2			REC=93% RQD=79%	
										RMR=79	
695										691.6	17.5
										691.1 WHITE AND GRAY, FRESH, HARD, GRANITE	18.0
										REC=100% RQD=100%	
										RMR=79	
										Boring Terminated at Elevation 691.1 ft in CRYSTALLINE ROCK (GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B2-A_LL	**STATION** 129+90	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 709.1 ft	**TOTAL DEPTH** 18.0 ft	**NORTHING** 862,019	**EASTING** 1,791,962	**24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/15/11	**COMP. DATE** 06/15/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 15.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
706.1											Begin Coring @ 3.0 ft	
705	706.1	3.0	5.0	0:52/1.0 1:00/1.0 1:10/1.0 1:20/1.0 1:22/1.0	(4.5) 90%	(5.0) 100%			(13.9) 96% 11.9		706.1 **CRYSTALLINE ROCK** DARK GREEN, MODERATELY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK	3.0
	701.1	8.0	5.0	2:00/1.0 1:50/1.0 1:17/1.0 1:42/1.0 1:47/1.0	(5.0) 100%	(5.0) 100%	RS-2					
700												
	696.1	13.0	5.0	1:22/1.0 1:18/1.0 1:00/1.0 1:02/1.0 1:12/1.0	(4.8) 96%	(4.6) 92%						
695											691.6	17.5
	691.1	18.0							(0.4) 80% 0.4		691.1 WHITE AND GRAY, FRESH, HARD, GRANITE	18.0
											Boring Terminated at Elevation 691.1 ft in CRYSTALLINE ROCK (GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B2-B_LL	**STATION** 129+79	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 709.4 ft	**TOTAL DEPTH** 8.1 ft	**NORTHING** 862,028	**EASTING** 1,791,999	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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
710										709.4 GROUND SURFACE 0.0
705	705.8	3.6	6	14	30	44	SS-7C	M		**RESIDUAL** TAN-BROWN, SILTY SAND
										701.3 8.1
										Boring Terminated by Auger Refusal at Elevation 701.3 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB2-A_LL	**STATION** 130+39	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 717.4 ft	**TOTAL DEPTH** 15.6 ft	**NORTHING** 862,061	**EASTING** 1,791,937	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**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)
720										717.4 GROUND SURFACE	0.0
715	713.7	3.7	6	9	15	24	SS-1C	M		RESIDUAL TAN-BROWN, SANDY CLAY	
710	708.7	8.7	4	7	13	20	SS-2C	M		710.4 TAN-BROWN, SANDY SILT	7.0
705	703.7	13.7	12	31	69/0.2	100/0.7		D		703.2 WEATHERED ROCK (GRANITE)	14.2
										701.8 Boring Terminated by Auger Refusal at Elevation 701.8 ft on CRYSTALLINE ROCK (GRANITE)	15.6

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB2-B_LL	**STATION** 130+27	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 716.6 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 862,072	**EASTING** 1,791,979	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**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
720										716.6 GROUND SURFACE 0.0
715	713.0	3.6	6	9	14	23	SS-3C	M		RESIDUAL TAN-BROWN, SANDY CLAY
710	708.0	8.6	12	14	16	30		M		704.1 WEATHERED ROCK (GRANITE) 12.5
705	703.0	13.6	100/0.4			100/0.4				699.9 Boring Terminated by Auger Refusal at Elevation 699.9 ft on CRYSTALLINE ROCK (GRANITE) 16.7

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 7/20/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB1-A_RL	**STATION** 128+22	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 705.4 ft	**TOTAL DEPTH** 4.0 ft	**NORTHING** 861,915	**EASTING** 1,792,115	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/07/11	**COMP. DATE** 06/07/11	**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)
710											
705	705.4	0.0	3	5	5	10		M		705.4 GROUND SURFACE	0.0
										RESIDUAL TAN-BROWN, SANDY SILT	
										701.4	4.0
										Boring Terminated by Auger Refusal at Elevation 701.4 ft on CRYSTALLINE ROCK (GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. EB1-B_RL	**STATION** 128+09	**OFFSET** 59 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 706.9 ft	**TOTAL DEPTH** 8.6 ft	**NORTHING** 861,926	**EASTING** 1,792,157	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**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
710										
										706.9 GROUND SURFACE 0.0
705	703.4	3.5	5	12	14	26	SS-5C	M		**RESIDUAL** TAN-BROWN, SANDY SILT
										700.9 6.0
700										**WEATHERED ROCK** (GRANITE)
										698.3 8.6
										Boring Terminated by Auger Refusal at Elevation 698.3 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 7/20/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B1-A_RL	**STATION** 128+94	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 701.5 ft	**TOTAL DEPTH** 13.0 ft	**NORTHING** 861,979	**EASTING** 1,792,082	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/16/11	**COMP. DATE** 06/16/11	**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)
705										
	701.5	0.0								701.5 GROUND SURFACE 0.0
700			1	2	6	8	SS-11C	M		**RESIDUAL**
										699.5 TAN-BROWN, SILTY SAND 2.0
							RS-3			**CRYSTALLINE ROCK**
695										WHITE AND GRAY, VERY SLIGHTLY WEATHERED TO FRESH, HARD, GRANITE
										REC=100% RQD=100%
										RMR=92
690										688.5 13.0
										Boring Terminated at Elevation 688.5 ft in CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B1-A_RL	**STATION** 128+94	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 701.5 ft	**TOTAL DEPTH** 13.0 ft	**NORTHING** 861,979	**EASTING** 1,792,082	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/16/11	**COMP. DATE** 06/16/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 11.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
699.5											Begin Coring @ 2.0 ft
	699.5	2.0	2.0	2:11/1.0	(2.0)	(2.0)		(11.0)	(11.0)		699.5 **CRYSTALLINE ROCK** 2.0
	697.5	4.0		2:05/1.0	100%	100%	RS-3	100%	100%		WHITE AND GRAY, VERY SLIGHTLY WEATHERED TO FRESH, HARD, GRANITE
695			5.0	2:00/1.0	(5.0)	(5.0)					
				1:52/1.0	100%	100%					
				1:40/1.0							
				2:00/1.0							
	692.5	9.0		2:11/1.0							
690			4.0	2:22/1.0	(4.0)	(4.0)					
				3:11/1.0	100%	100%					
				3:16/1.0							
	688.5	13.0		3:20/1.0							688.5 13.0
											Boring Terminated at Elevation 688.5 ft in CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 8/8/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)			**GROUND WTR (ft)**
BORING NO. B1-B_RL	**STATION** 128+88	**OFFSET** 47 ft RT	**ALIGNMENT** -L- **0 HR.** 2.0
COLLAR ELEV. 701.2 ft	**TOTAL DEPTH** 2.5 ft	**NORTHING** 861,987	**EASTING** 1,792,106 **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/21/11	**COMP. DATE** 06/21/11	**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
705										
	701.2	0.0	1	3	2	5		M		701.2 GROUND SURFACE 0.0
700										**RESIDUAL** TAN-BROWN, SILTY SAND 698.7 2.5
										Boring Terminated by Auger Refusal at Elevation 698.7 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B2-A_RL	**STATION** 129+65	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 708.6 ft	**TOTAL DEPTH** 29.8 ft	**NORTHING** 862,040	**EASTING** 1,792,045	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**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)
	708.6	0.0								GROUND SURFACE	0.0
			6	7	8	15	SS-8C	M		RESIDUAL TAN-BROWN, SILTY CLAY	
705	705.6	3.0								706.1	2.5
			4	6	9	15	SS-9C	M		TAN-BROWN, SANDY CLAY	
700	700.6	8.0	60/0.0			60/0.0				700.6 CRYSTALLINE ROCK (GRANITE)	8.0
695	695.6	13.0	60/0.0			60/0.0				695.6 WHITE AND GRAY, VERY SLIGHTLY WEATHERED TO FRESH, HARD, GRANITE REC=100% RQD=100% RMR=87	13.0
690							RS-4				
685										686.0	22.6
										684.8 GREEN-GRAY, FRESH, HARD, MAFIC, METAVOLCANIC ROCK REC=100% RQD=100% RMR=87	23.8
680										678.8 WHITE AND GRAY, FRESH, HARD, GRANITE REC=100% RQD=100% RMR=87	29.8
										Boring Terminated at Elevation 678.8 ft in CRYSTALLINE ROCK (GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)				**GROUND WTR (ft)**
BORING NO. B2-A_RL	**STATION** 129+65	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 708.6 ft	**TOTAL DEPTH** 29.8 ft	**NORTHING** 862,040	**EASTING** 1,792,045	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 16.8 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
695.6											Begin Coring @ 13.0 ft	
695	695.6	13.0	1.8	N=60/0.0	(1.8) 100%	(1.8) 100%		(9.6) 100%	(9.6) 100%		695.6 WHITE AND GRAY, VERY SLIGHTLY WEATHERED TO FRESH, HARD, GRANITE	13.0
	693.8	14.8	5.0	1:00/1.0 0:30/0.8 1:20/1.0 1:11/1.0 1:05/1.0 1:21/1.0 ??/1.0	(5.0) 100%	(5.0) 100%						
690	688.8	19.8	5.0	1:15/1.0 1:00/1.0 1:11/1.0 1:13/1.0 1:12/1.0	(5.0) 100%	(5.0) 100%	RS-4				686.0	22.6
685	683.8	24.8	5.0	0:50/1.0 1:00/1.0 1:13/1.0 1:12/1.0 1:09/1.0	(5.0) 100%	(5.0) 100%		(1.2) 100% (6.0) 100%	(1.2) 100% (6.0) 100%		684.8 GREEN-GRAY, FRESH, HARD, MAFIC, METAVOLCANIC ROCK WHITE AND GRAY, FRESH, HARD, GRANITE	23.8
680	678.8	29.8									678.8 Boring Terminated at Elevation 678.8 ft in CRYSTALLINE ROCK (GRANITE)	29.8

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 8/8/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)			**GROUND WTR (ft)**
BORING NO. B2-B_RL	**STATION** 129+54	**OFFSET** 59 ft RT	**ALIGNMENT** -L- **0 HR.** 3.0
COLLAR ELEV. 708.6 ft	**TOTAL DEPTH** 3.2 ft	**NORTHING** 862,049	**EASTING** 1,792,082 **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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
710										
	708.6	0.0								708.6 GROUND SURFACE 0.0
			5	9	11	20		M		RESIDUAL TAN-BROWN, SILTY SAND
										705.4 3.2
										Boring Terminated at Elevation 705.4 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)			**GROUND WTR (ft)**
BORING NO. EB2-A_RL	**STATION** 130+17	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 715.4 ft	**TOTAL DEPTH** 14.5 ft	**NORTHING** 862,081	**EASTING** 1,792,013	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**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))
720										
715										715.4 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN, SILTY CLAY
710	711.9	3.5	3	3	4	7	SS-4C	M		
	706.9	8.5	7	10	22	32		M		
705	701.9	13.5	100/0.4			100/0.4				702.4 13.0 **WEATHERED ROCK** (GRANITE) 700.9 14.5
										Boring Terminated by Auger Refusal at Elevation 700.9 ft on CRYSTALLINE ROCK (GRANITE)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y7- (CAMP BURTON RD.)			**GROUND WTR (ft)**
BORING NO. EB2-B_RL	**STATION** 130+05	**OFFSET** 59 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 714.4 ft	**TOTAL DEPTH** 13.1 ft	**NORTHING** 862,093	**EASTING** 1,792,056	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/02/11	**COMP. DATE** 06/02/11	**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
715										714.4 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN, SILTY CLAY
710	710.6	3.8	3	5	5	10		M		
705	705.6	8.8	19	32	68/0.3	100/0.8				705.1 9.3 **WEATHERED ROCK** (GRANITE) 701.3 13.1
										Boring Terminated by Auger Refusal at Elevation 701.3 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y7.GPJ NC_DOT.GDT 7/20/11

B1-B LL

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	23 LT	129+09	9.6-10.0	METAVOLCANIC	187.2	20.8	12.34

B2-A LL

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-10 C	59 LT	129+90	0.0-1.5	A-7-6(15)	48	22	19.4	11.9	26.2	42.5	97	83	70	-	-

B2-A LL

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-2	59 LT	129+90	9.1-9.6	METAVOLCANIC	188.7	28.6	14.23

B2-B LL

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-7 C	23 LT	129+79	3.6-5.1	A-2-4(0)	29	9	46.9	23.3	13.7	16.2	74	49	25	-	-

EB2-A LL

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-1 C	59 LT	130+39	3.7-5.2	A-6(7)	35	11	4.4	32.0	39.3	24.3	100	99	72	-	-
SS-2 C	59 LT	130+39	8.7-10.2	A-4(6)	33	7	1.8	25.9	46.0	26.3	100	100	81	-	-

EB2-B LL

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-3 C	17 LT	130+37	3.6-5.1	A-6(1)	30	11	40.2	23.7	16.9	19.2	94	67	38	-	-

EB1-B RL

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-5 C	59 RT	128+09	3.5-5.0	A-4(0)	31	7	40.6	19.3	23.9	16.2	89	62	39	-	-

B1-A RL

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-11 C	23 RT	128+94	0.0-1.5	A-2-4(0)	22	NP	43.5	34.4	16.1	6.1	81	60	21	-	-

B1-B RL

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-3	23 RT	128+94	3.6-4.0	GRANITE	168.4	19.0	5.17

B2-A RL

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-8 C	23 RT	129+65	0.0-1.5	A-7-6(8)	43	19	25.3	19.4	27.0	28.3	90	73	54	-	-
SS-9 C	23 RT	129+65	3.0-4.5	A-6(4)	40	15	30.9	25.3	23.6	20.2	91	72	45	-	-

B2-A RL

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-4	23 RT	129+65	19.8-20.3	GRANITE	166.9	17.7	7.62

EB2-A RL

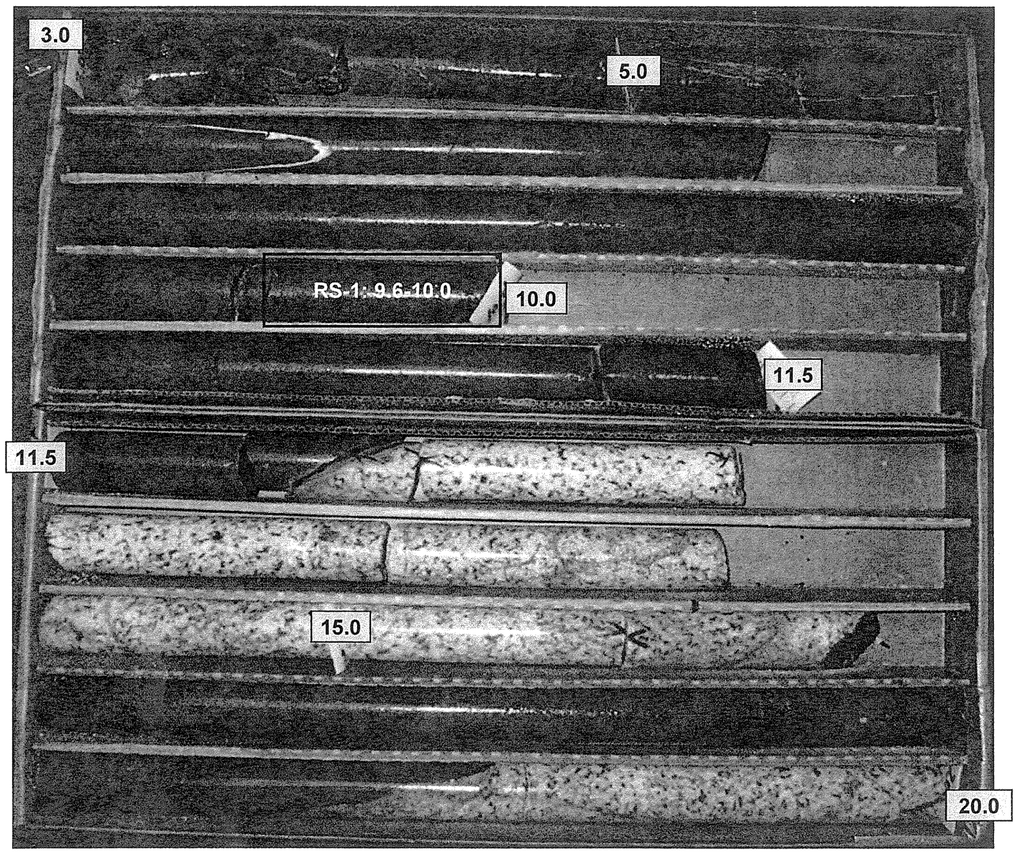
SOIL TEST RESULTS

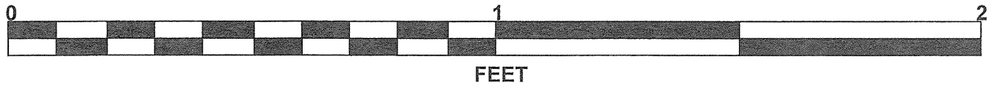
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-4 C	17 RT	130+17	3.5-5.0	A-7-5(27)	60	25	2.6	14.6	42.4	40.4	100	99	89	-	-

CORE PHOTOGRAPHS

B1-B_LL

BOXES 1 & 2: 3.0 - 20.0 FEET





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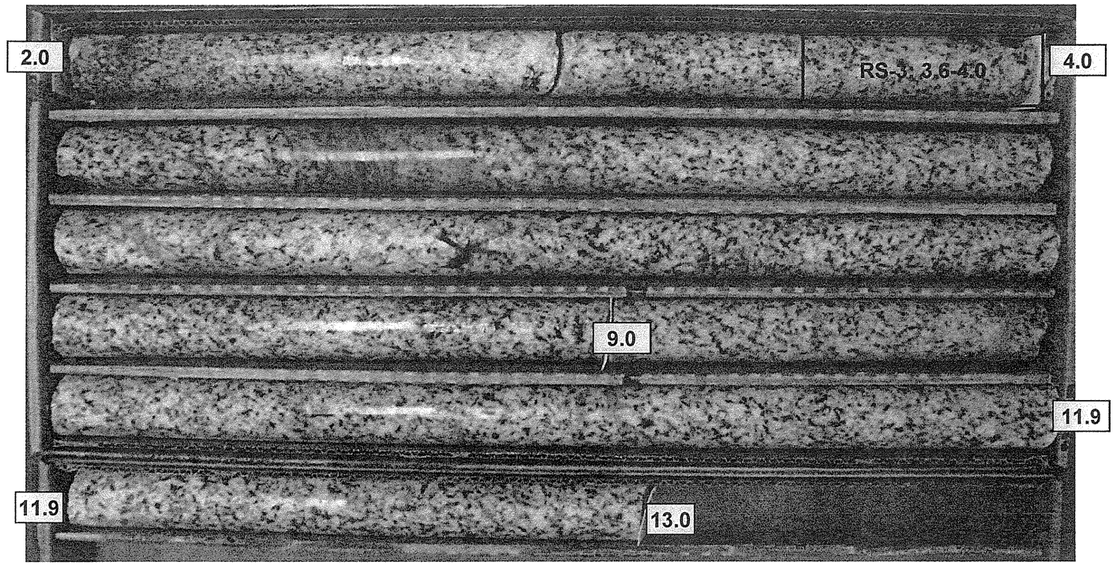

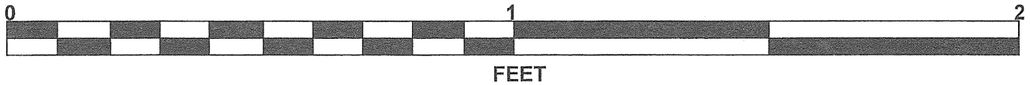

CORE PHOTOGRAPHS

B2-A_LL

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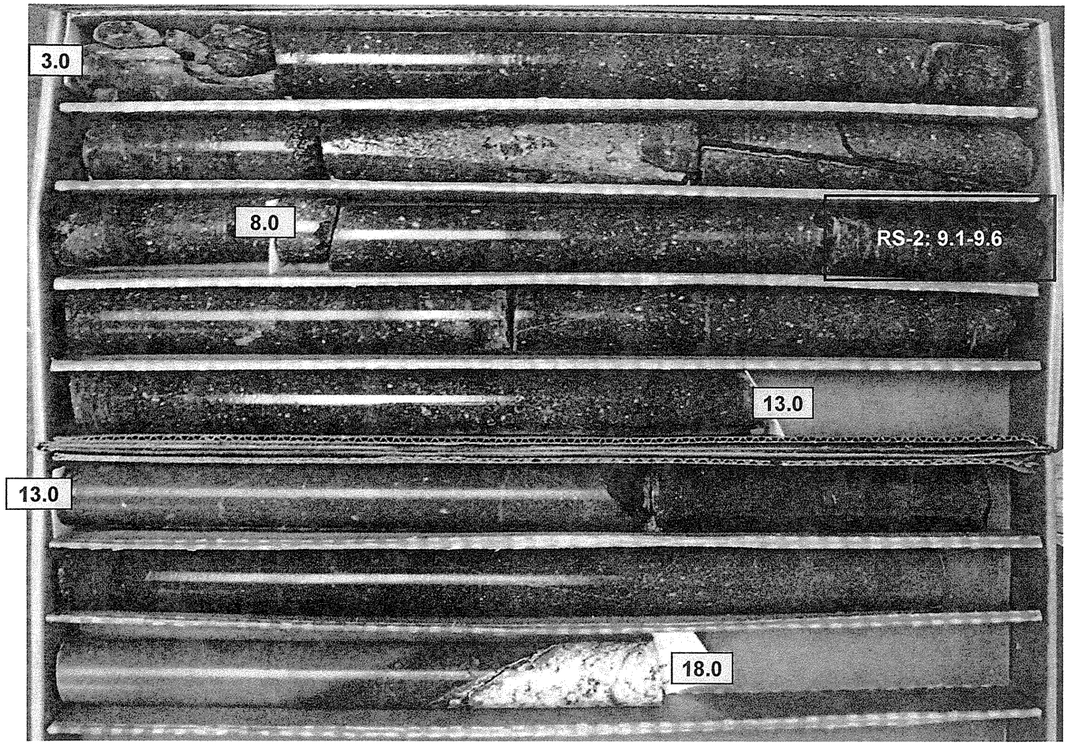

0 1 2
FEET

B2-A_RL

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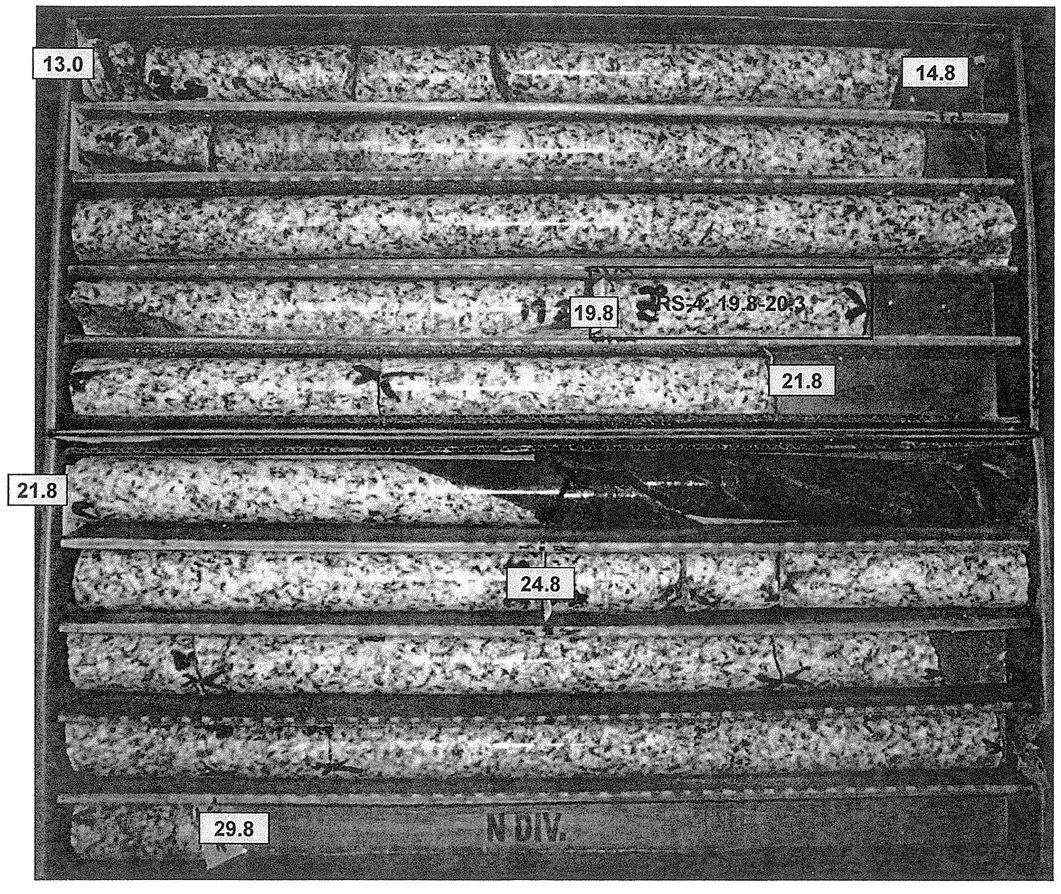

0 1 2
FEET

SITE PHOTOGRAPH

Proposed Bridge on –L– (I-840) over -Y7- (Camp Burton Rd.)

Looking West along Camp Burton Rd.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	59

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1 (U-2525B) F.A. PROJ. _____

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.) AT -L- STATION 144+92

ID: U-2525B

PROJECT: 34821.1.1

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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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

O. B. OTI

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J. R. MATULA

D. G. PINTER

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE SEPTEMBER 2013

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Pedro 9-23-13

DRAWN BY: J. L. PEDRO

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

PROJECT REFERENCE NO.	SHEET NO.
34821.1.1 (U-2525B)	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	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER			HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN				
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX				
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS					
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR		UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-55
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

ELEVATION: FT.

NOTES:
SOME OF THE BORINGS INCLUDED IN THIS REPORT ARE FROM THE ORIGINAL INVENTORY REPORT DONE BY KLEINFELDER DATED 10/01/09.

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

0 50 100
FEET

SITE PLAN

SKEW ANGLE = 90°

NAD 83/95

TO CAMP BURTON RD.

EBI-B_LL
BI-C_LL
BI-B_LL
140+00
-L-
B2-C_LL
B2-B_LL
B3-C_LL
B3-B_LL
145+0

13733RT
13919RT
14159RT
14399RT

BI-C_RL
B2-C_RL
B3-C_RL
EBI-B_RL

SF

BUFFALO CREEK

POND
WE= 691.8

MATCHLINE -L- 145+10 SEE SHEET 4

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	4

0 50 100 FEET

SITE PLAN

SKEW ANGLE = 90°

NAD 83/95

MATCHLINE -L- 145+10 SEE SHEET 3

BUFFALO CREEK

15" RCP

-Y8-

-L-

150+00

B5-A_LL

B4-C_LL

B6-A_LL

B6-C_LL

14647LT

14749LT

14955LT

15082LT

EB2-B_LL

B4-B_LL

B5-B_LL

SR 1559 (RANKIN MILL RD)

ISBKD

W/LT

GR

TO US 29

14585RT

B5-A_RL

15118RT

15238RT

14653RT

B5-C_RL

14807RT

14878RT

14998RT

B7-C_RL

B4-C_RL

B6-C_RL

B5-B_RL

B6-B_RL

EB2-B_RL

20+00

445

444

-L- POT STA. 151+35.60 =
-Y8- POC STA. 18+91.83

ISFD (ABAND)

-Y8- PT Sta. 22+46.94

5/28/99

-L- LEFT LANE

0 50 100 200
FEET
VE = 5:1

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	5
FENCE DIAGRAM OF BORINGS PROJECTED ON -L- PROFILE	

EB1-B_LL
137+95
18' LT

B1-B_LL
139+81
18' LT

B2-B_LL
142+21
18' LT

B3-B_LL
144+63
18' LT

B4-B_LL
146+83
18' LT

146+47
18' LT

147+49
18' LT

B5-B_LL
148+51
18' LT

149+55
25' LT

RESIDUAL, ORANGE, TAN, GRAY, BROWN, AND RED, MOIST TO WET, WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

MEDIUM STIFF TO HARD, SANDY SILT AND SILTY CLAY

BUFFALO CREEK

RESIDUAL, WHITE, RED, AND BROWN, MED. TO V. DENSE, WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, WHITE AND GRAY, WITH BROWN, MODERATELY TO VERY SLIGHTLY WEATHERED, MODERATELY TO VERY HARD, VERY CLOSE TO WIDE FRACTURE SPACING, META-GRANITE

REC=93%
RQD=54%
RMR=61

REC=94%
RQD=94%
RMR=67

REC=100%
RQD=72%
RMR=67

RESIDUAL, STIFF TO HARD, CLAYEY AND SANDY MOIST, SILTY SAND

WEATHERED ROCK

CRYSTALLINE ROCK, GRAY-GREEN, BROWN, AND WHITE, MOD. TO VERY HARD, MOD. CLOSE TO CLOSE FRACTURE

REC=84%
RQD=62%
RMR=67

RED, BROWN, AND GRAY, MOIST TO WET, SILTY SAND AND CLAY

WEATHERED ROCK (META-DIORITE)

REC=98%
RQD=98%
RMR=84

REC=97%
RQD=96%
RMR=87

REC=100%
RQD=87%
RMR=74

WEATHERED TO FRESH, MOD. HARD TO HARD, CLOSE TO MOD. CLOSE FRACTURE SPACING, META-DIORITE AND GABBRO

Ⓐ ALLUVIAL, BROWN, SOFT TO MEDIUM STIFF, MOIST TO WET, SANDY SILT WITH CRYSTALLINE BOULDER

720 710 700 690 680 670 660 650 640 630

136+00 137+00 138+00 139+00 140+00 141+00 142+00 143+00 144+00 145+00 146+00 147+00 148+00 149+00 150+00

-Y8-
(RANKIN MILL RD.)

EB2-B_LL
152+02
18' LT

150+82
18' LT

AND GRAY, VERY STIFF, MOIST, SILTY CLAY AND SANDY SILT

RED, TAN, AND GRAY, MED. DENSE TO DENSE, MOIST, SILTY SAND

RESIDUAL

RED, TAN,

DRY
6/09

WEATHERED ROCK (META-DIORITE)

CRYSTALLINE ROCK (META-DIORITE)

NOTE: GROUNDLINE TAKEN FROM ROADWAY TIN FILE DATED 7/6/2011

750 740 730 720 710 700 690 680 670 660

150+00 151+00 152+00 153+00 154+00 155+00 156+00 157+00 158+00 159+00 160+00 161+00 162+00 163+00 164+00

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i:\raleigh projects\geotech\TIP\U2525B_GEO_BRDG_Buffalo&Rankin\CADD_GEOTECH\Sr1e&Sub\U2525B_geo_pf1_LL.dgn

5/28/99

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	6

FENCE DIAGRAM OF BORINGS PROJECTED ON -L- PROFILE

0 50 100 200
FEET
VE = 5:1

-L- RIGHT LANE

137+33 18' RT
139+19 18' RT
141+59 18' RT
143+99 18' RT
145+85 18' RT
146+53 18' RT
B5-A_RL 147+20 18' RT
148+07 18' RT
148+78 18' RT

RESIDUAL. TAN, RED, WHITE, AND GRAY, STIFF SILTY CLAY AND (META-GRANITE) WEATHERED ROCK

BLACK, TO HARD, MOIST SANDY SILT

DRY 7/09

CRYSTALLINE ROCK (META-GRANITE)

WEATHERED ROCK

BUFFALO CREEK

3/12/08

(META-GRANITE)

DRY 6/09

CRYSTALLINE ROCK, BROWN, WHITE, TAN, MODERATELY TO VERY HARD, VERY WITH SEVERELY WEATHERED ZONE

REC=65%
ROD=36%
RMR=51

GRAY, MODERATELY WEATHERED TO FRESH, CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE

REC=97%
ROD=91%
RMR=82

REC=95%
ROD=94%
RMR=87

REC=96%
ROD=92%
RMR=82

REC=100%
ROD=91%
RMR=82

REC=100%
ROD=97%
RMR=82

720 710 700 690 680 670 660 650 640 630

136+00 137+00 138+00 139+00 140+00 141+00 142+00 143+00 144+00 145+00 146+00 147+00 148+00 149+00

-Y8- (RANKIN MILL RD.)

149+98 18' RT
151+18 18' RT
EB2-A_RL 152+38 18' RT

RESIDUAL. MOIST. RED, TAN, GRAY SANDY SILT DENSE.

AND BLACK, STIFF TO HARD, AND SILTY CLAY WITH SILTY SAND

WEATHERED ROCK (META-DIORITE)

CRYSTALLINE ROCK, GRAY AND WHITE, MODERATELY WEATHERED TO FRESH, HARD TO VERY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-DIORITE

REC=92%
ROD=65%
RMR=65

REC=98%
ROD=96%
RMR=82

750 740 730 720 710 700 690 680 670 660

150+00 151+00 152+00 153+00 154+00 155+00 156+00 157+00 158+00 159+00 160+00 161+00 162+00 163+00

Ⓐ ALLUVIAL, BROWN, SOFT TO MEDIUM STIFF, MOIST TO WET, SANDY SILT

Ⓑ RESIDUAL, BROWN, RED, TAN, AND WHITE, V. STIFF TO HARD, MOIST TO WET, SILTY CLAY AND MEDIUM DENSE, SILTY SAND

Ⓒ RESIDUAL, TAN, BROWN, GRAY, BLACK, AND RED, STIFF TO HARD, MOIST TO WET, SANDY SILT, CLAYEY SILT, AND SILTY CLAY WITH SOME MED. TO V. DENSE, SILTY SAND

Ⓓ WEATHERED ROCK (META-GRANITE AND META-DIORITE) WITH CRYSTALLINE LENSE

Ⓔ CRYSTALLINE ROCK, GRAY AND WHITE WITH BROWN, MODERATELY WEATHERED TO FRESH, MODERATELY TO VERY HARD, CLOSE TO WIDE FRACTURE SPACING, META-DIORITE

Ⓕ ROADWAY EMBANKMENT, RED, STIFF, MOIST, SANDY SILT

NOTE: GROUNDLINE TAKEN FROM ROADWAY TIN FILE DATED 7/6/2011

23-SEP-2013 09:21
X:\Design Construction\TIP\U2525B_GEO_BRDG_Buffalo&Rankin\CADD_GEOTECH\Stte&Sub\U2525B_geo_pfl_RL.dgn
jmedlin
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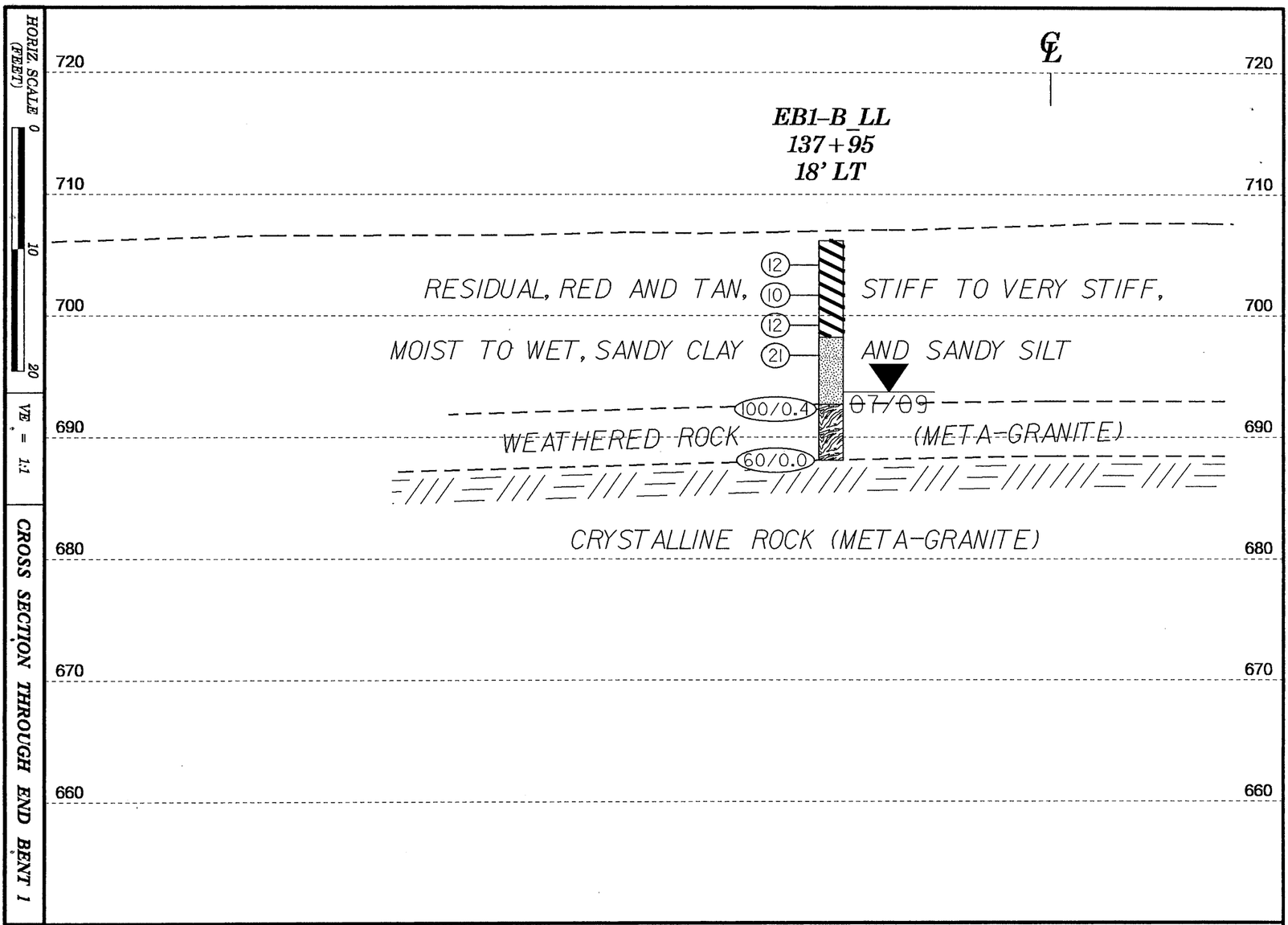
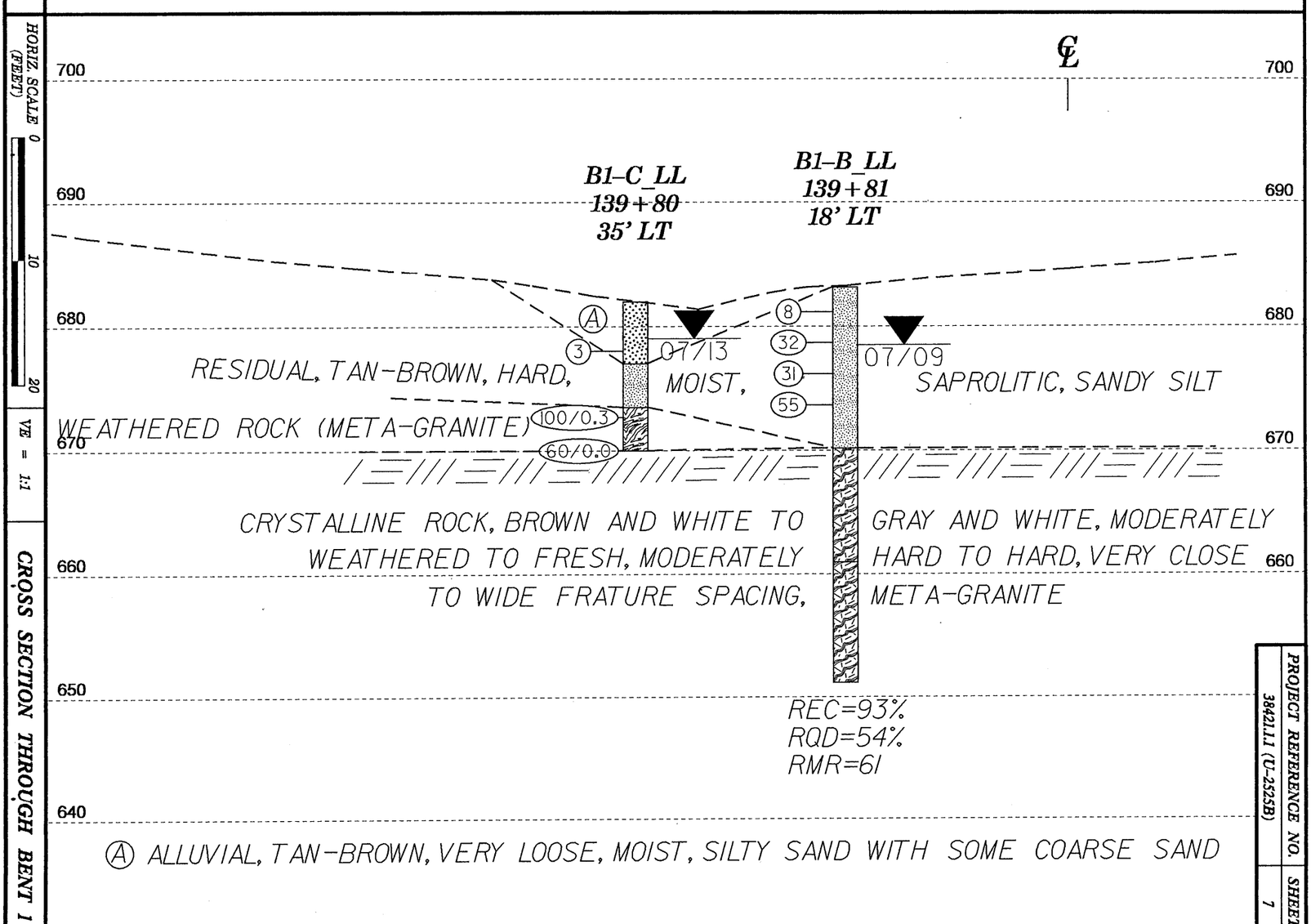
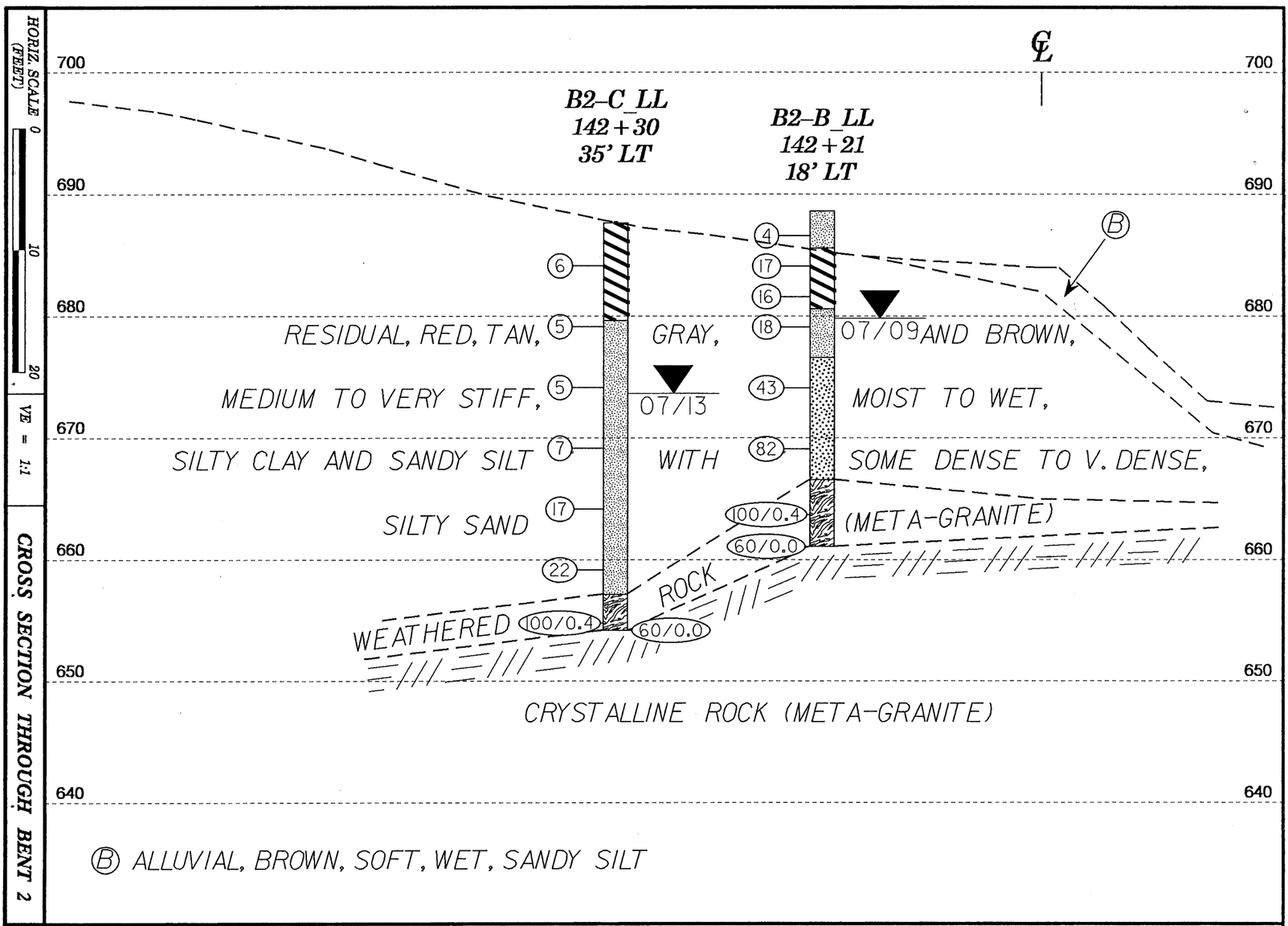
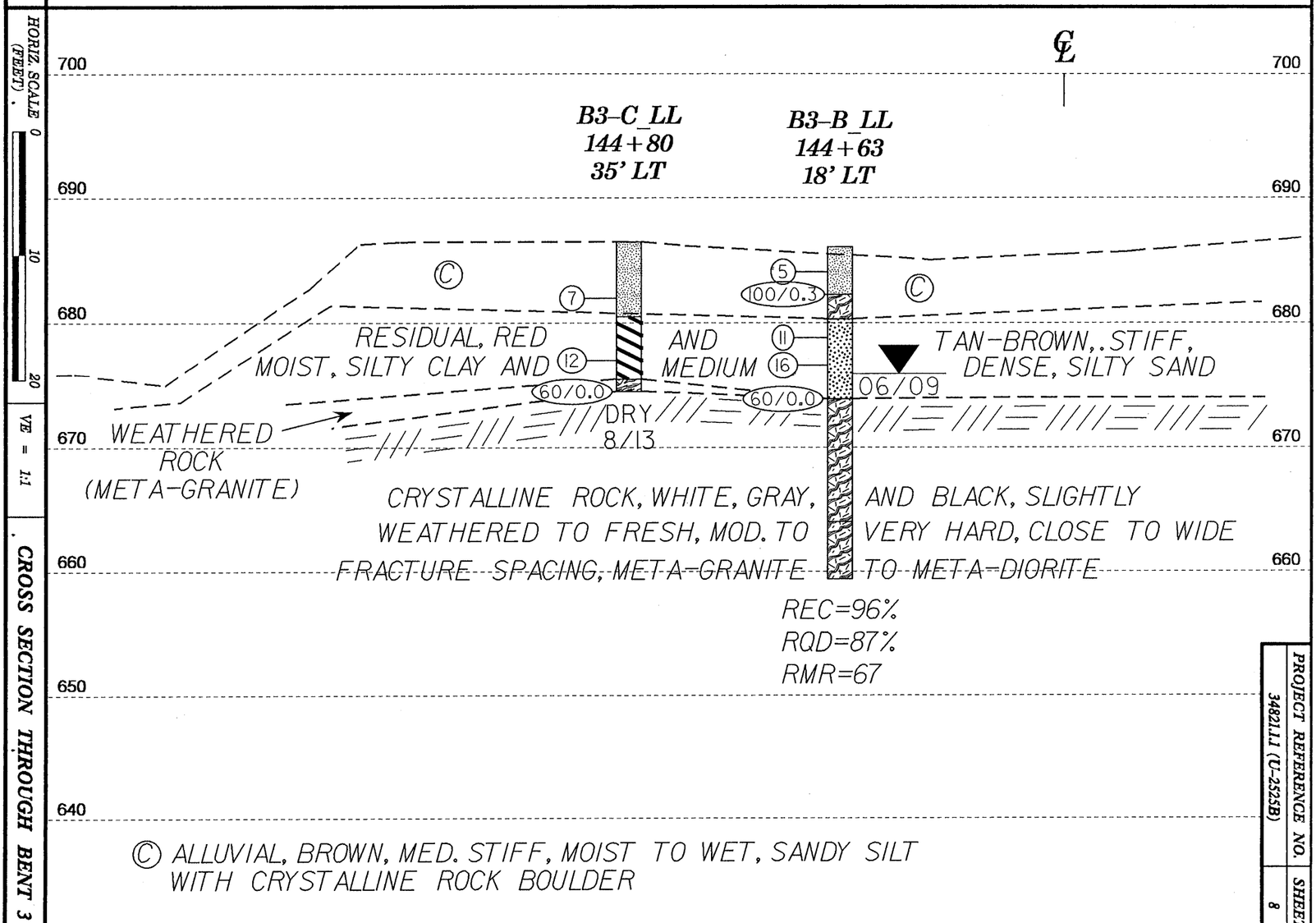




PROJECT REFERENCE NO.	SHEET
38421.1.1 (U-2525B)	7





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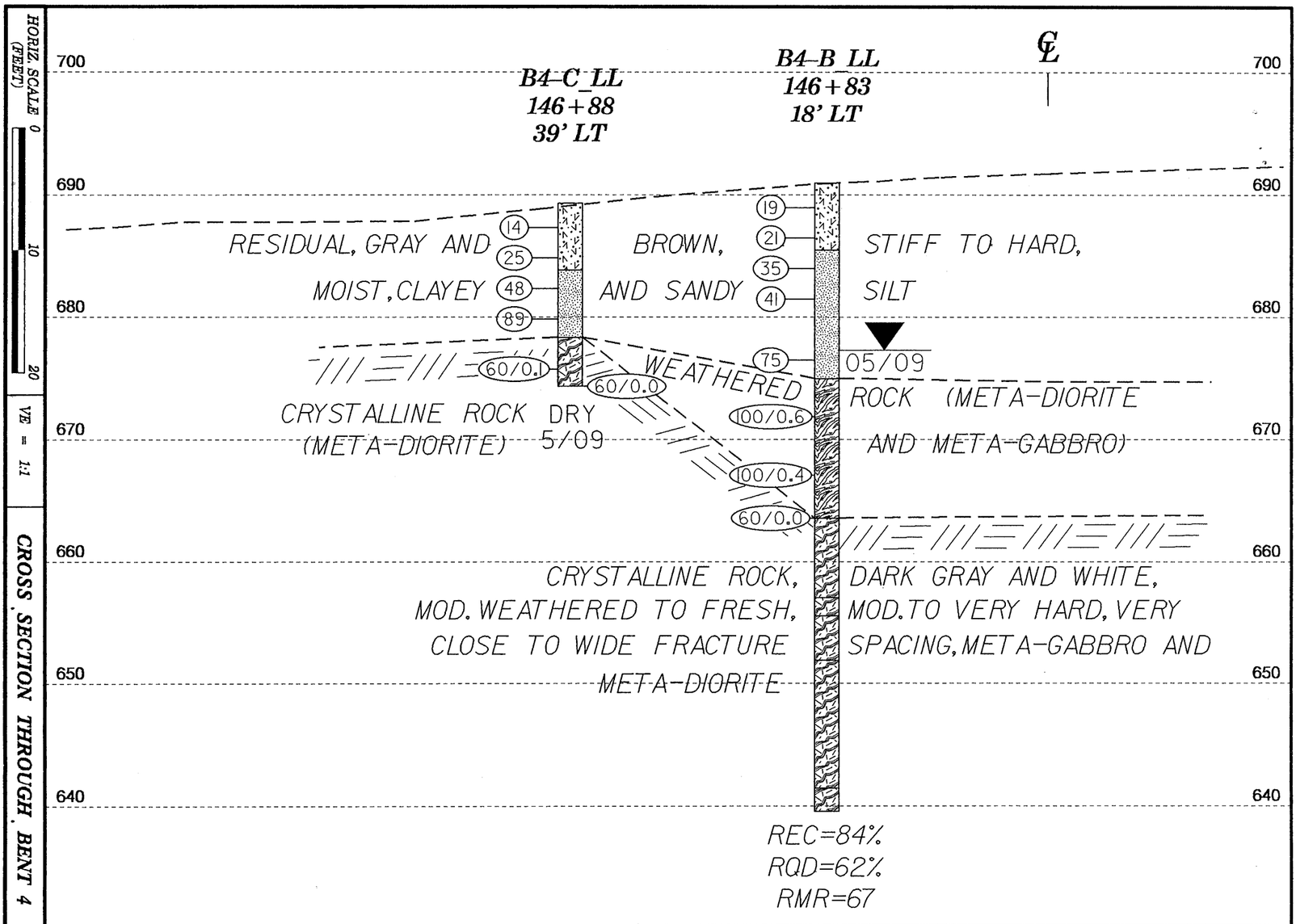
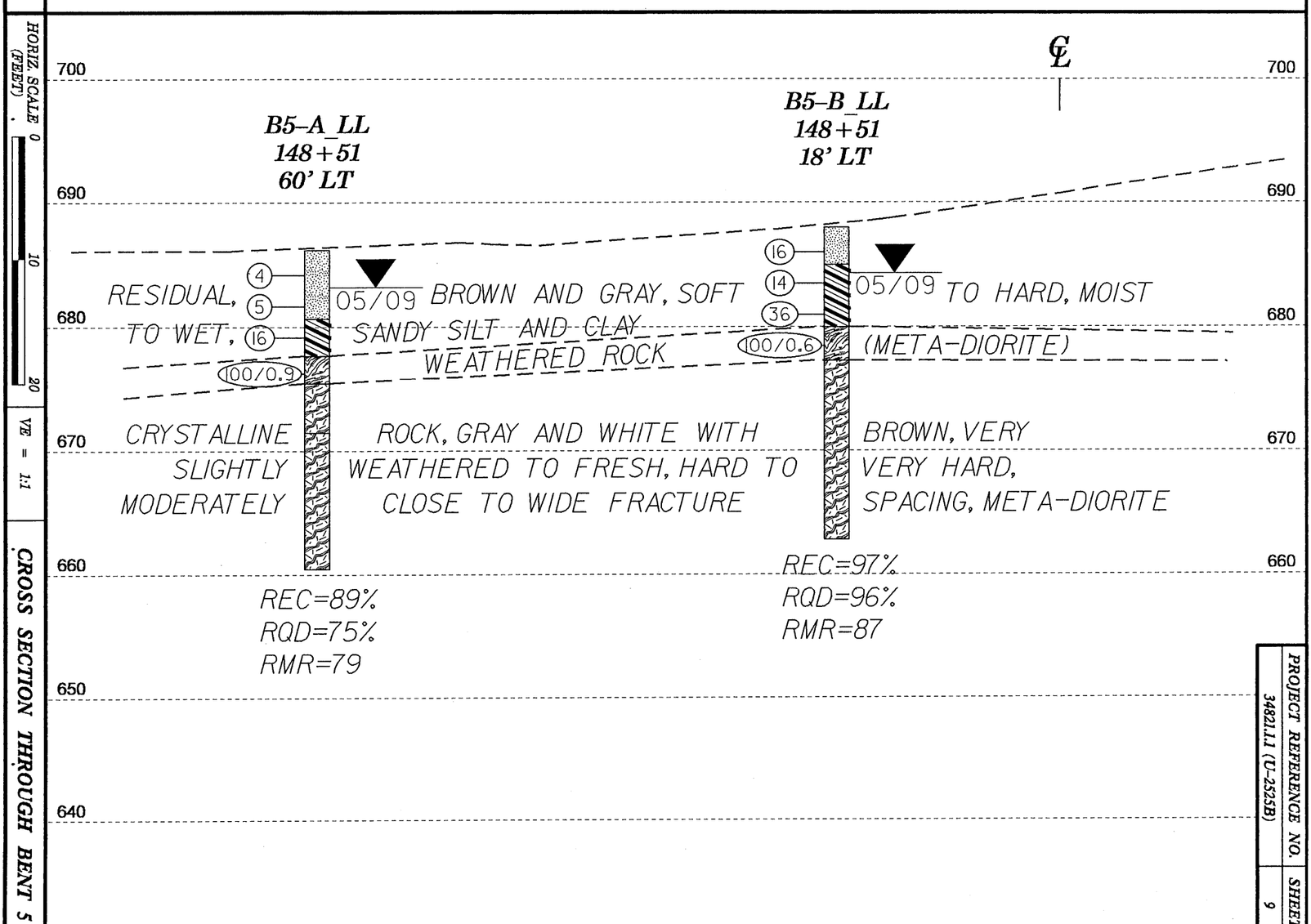
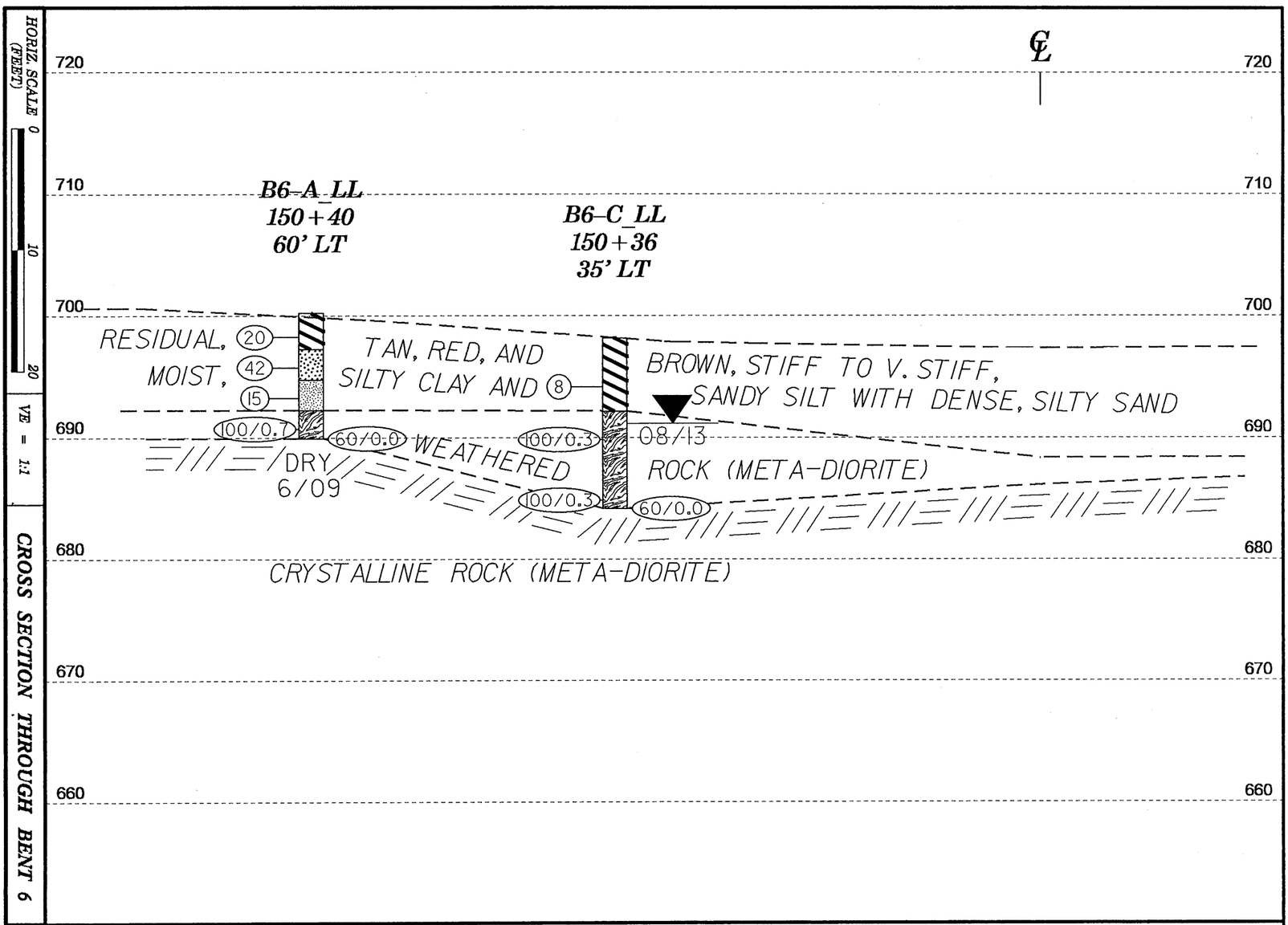
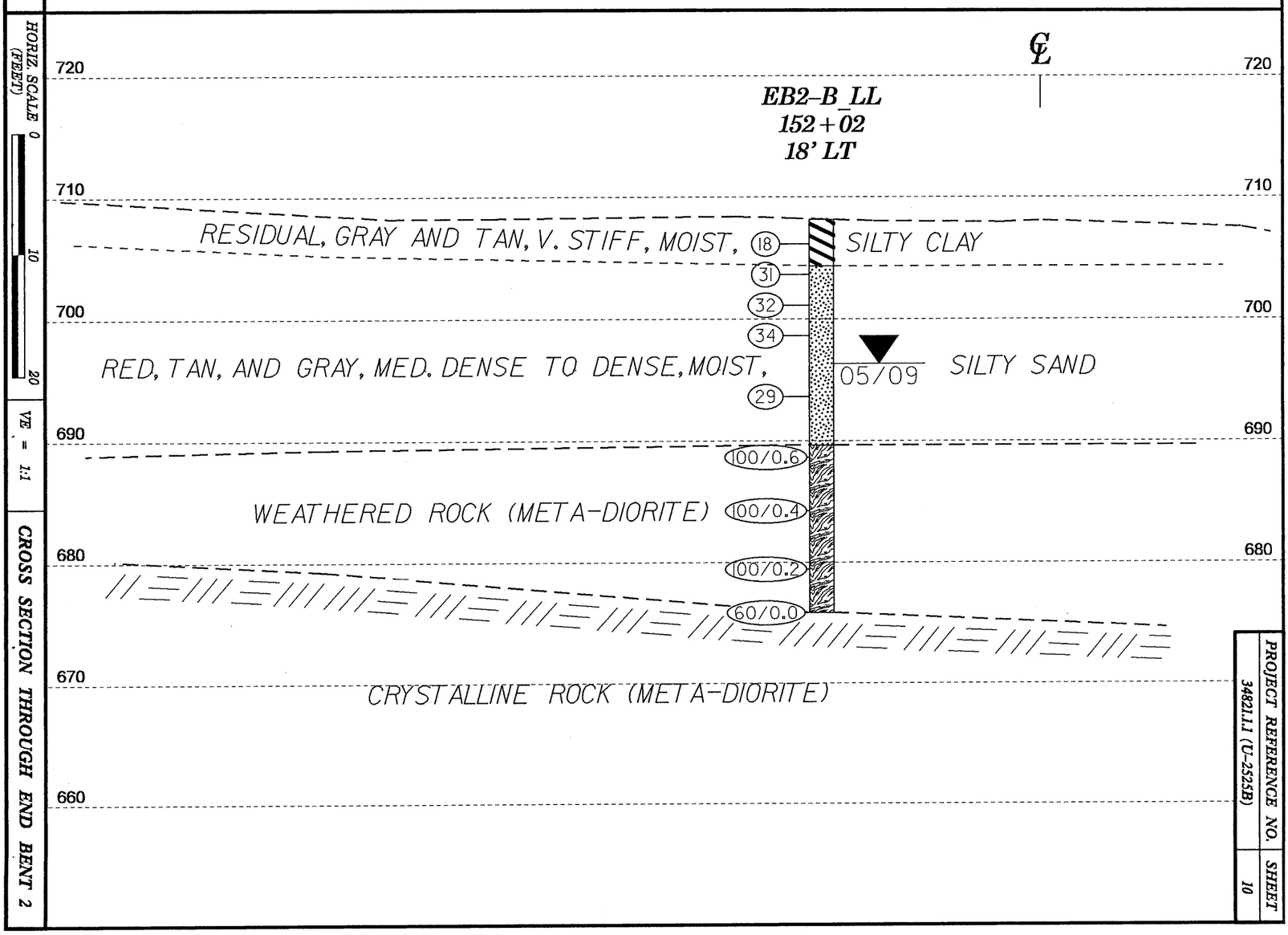
34821.1.1 (U-2525B)	8





PROJECT REFERENCE NO.	SHEET
34921.1.1 (U-2525B)	9





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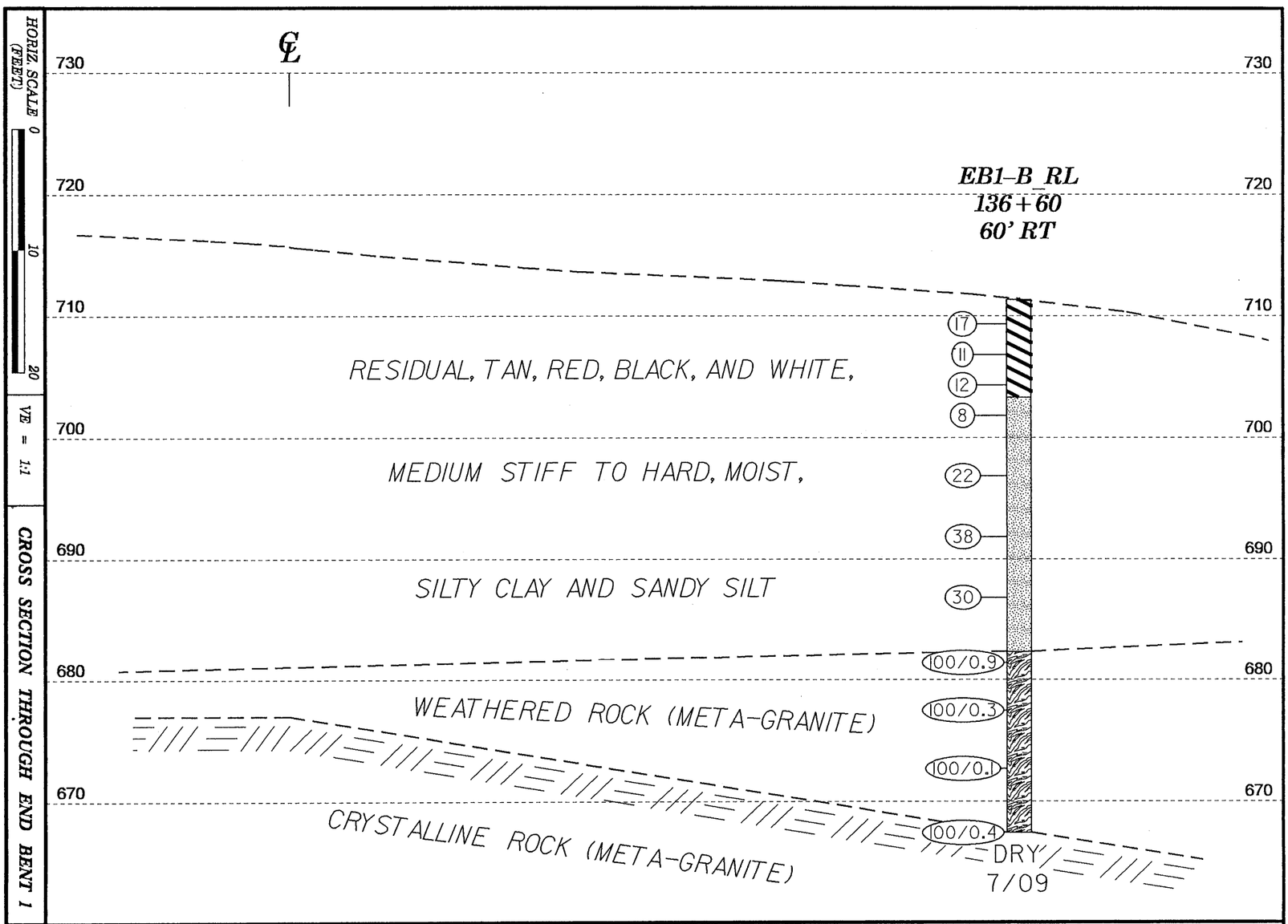

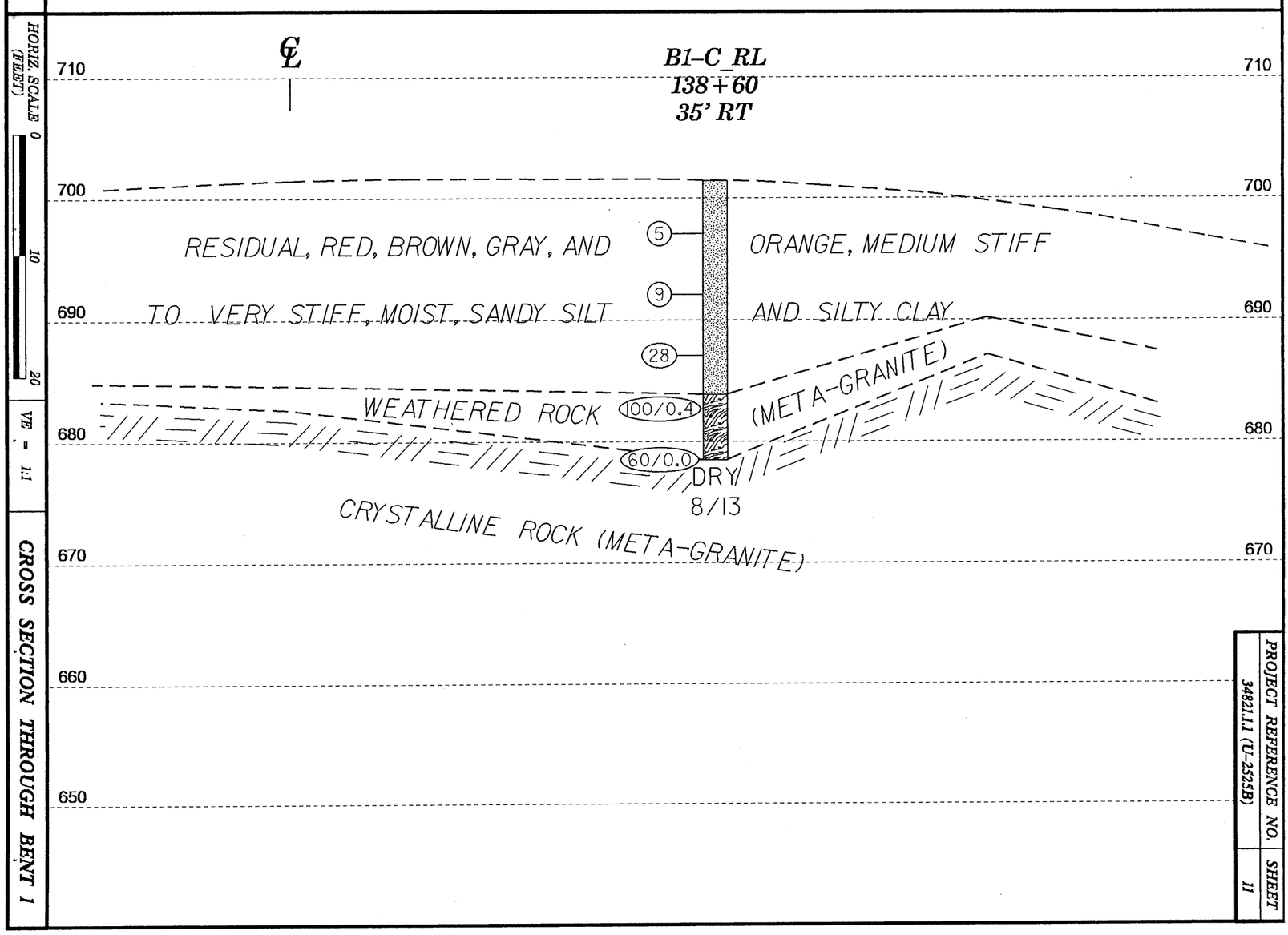

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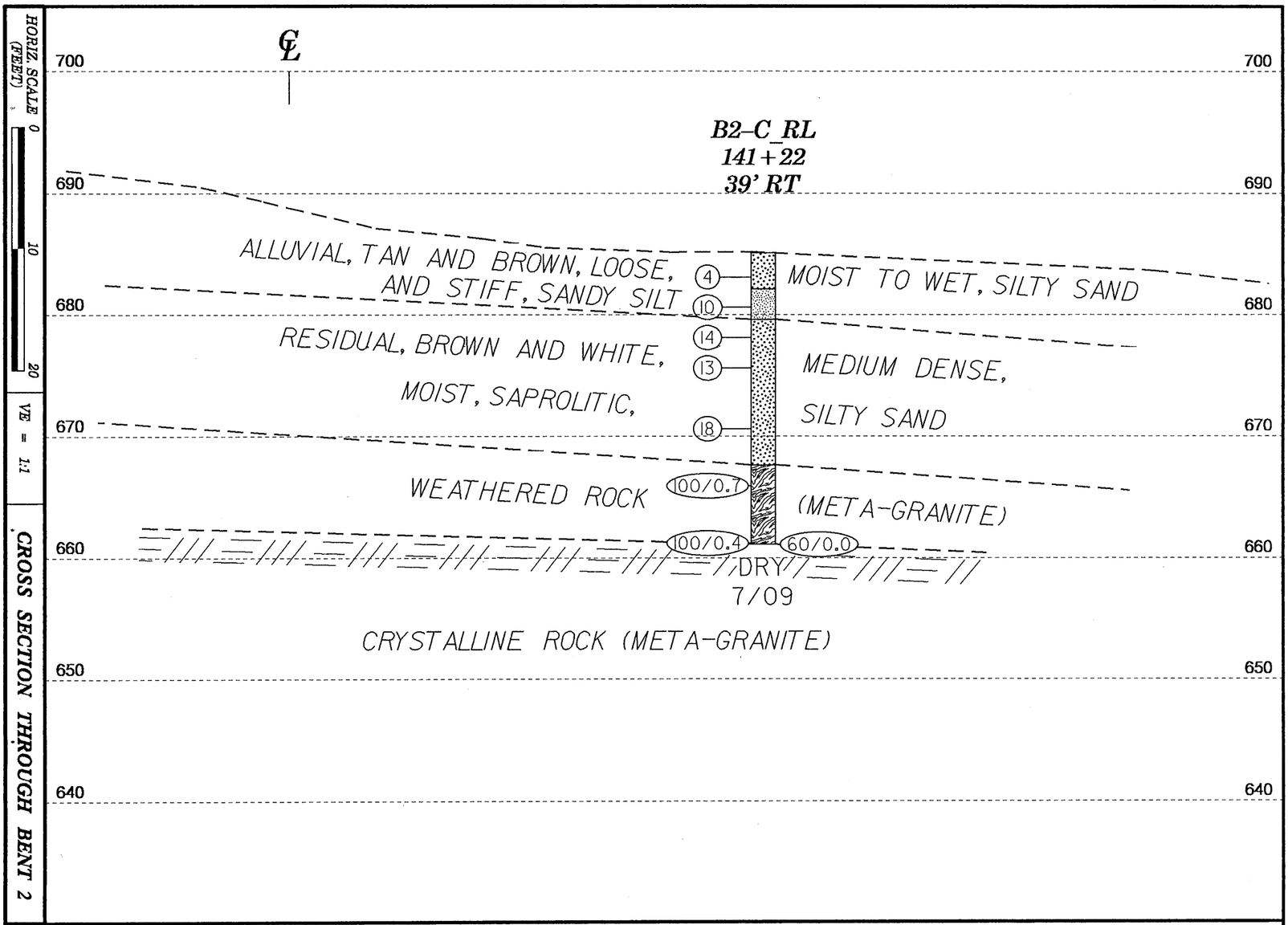

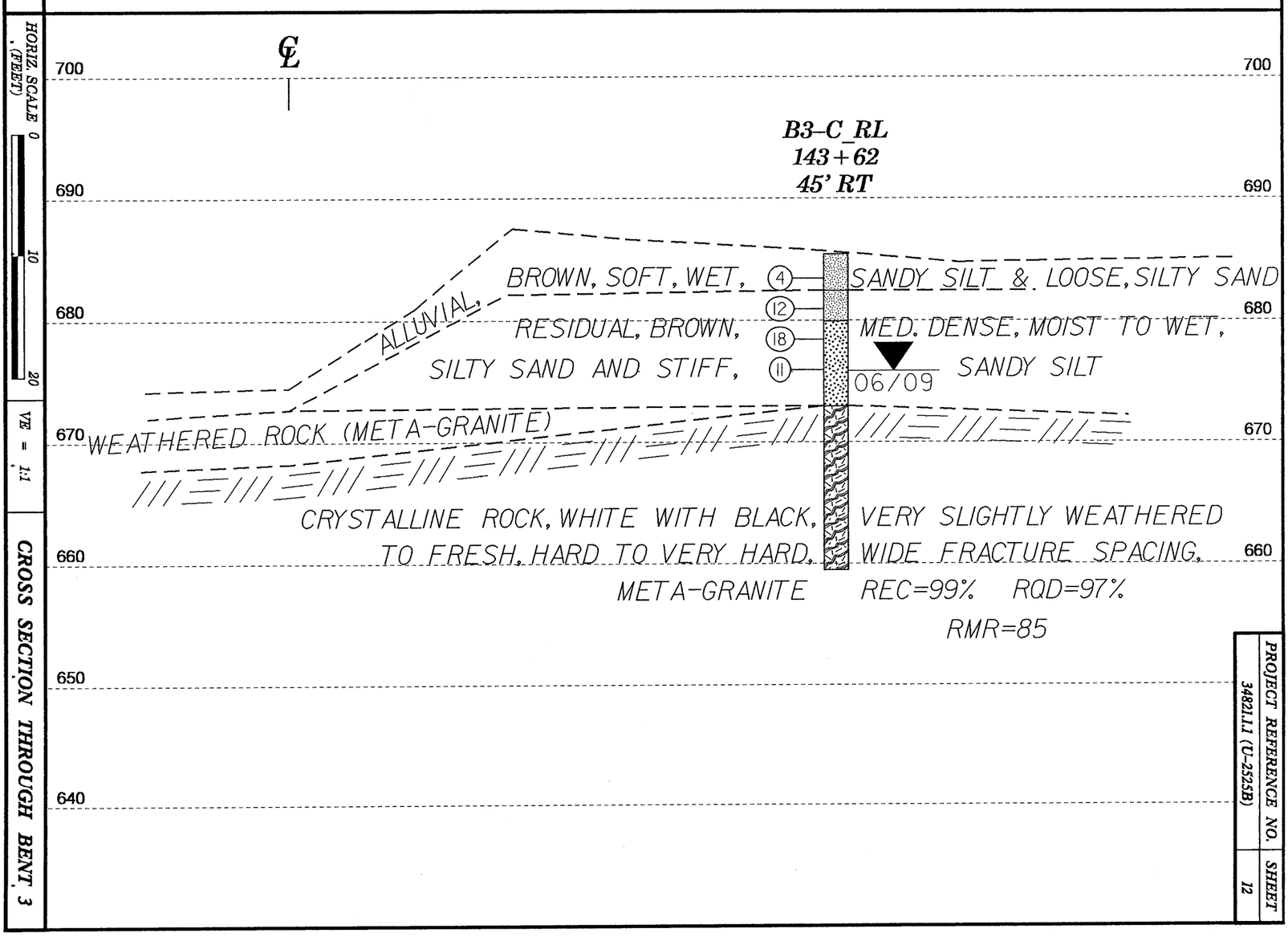

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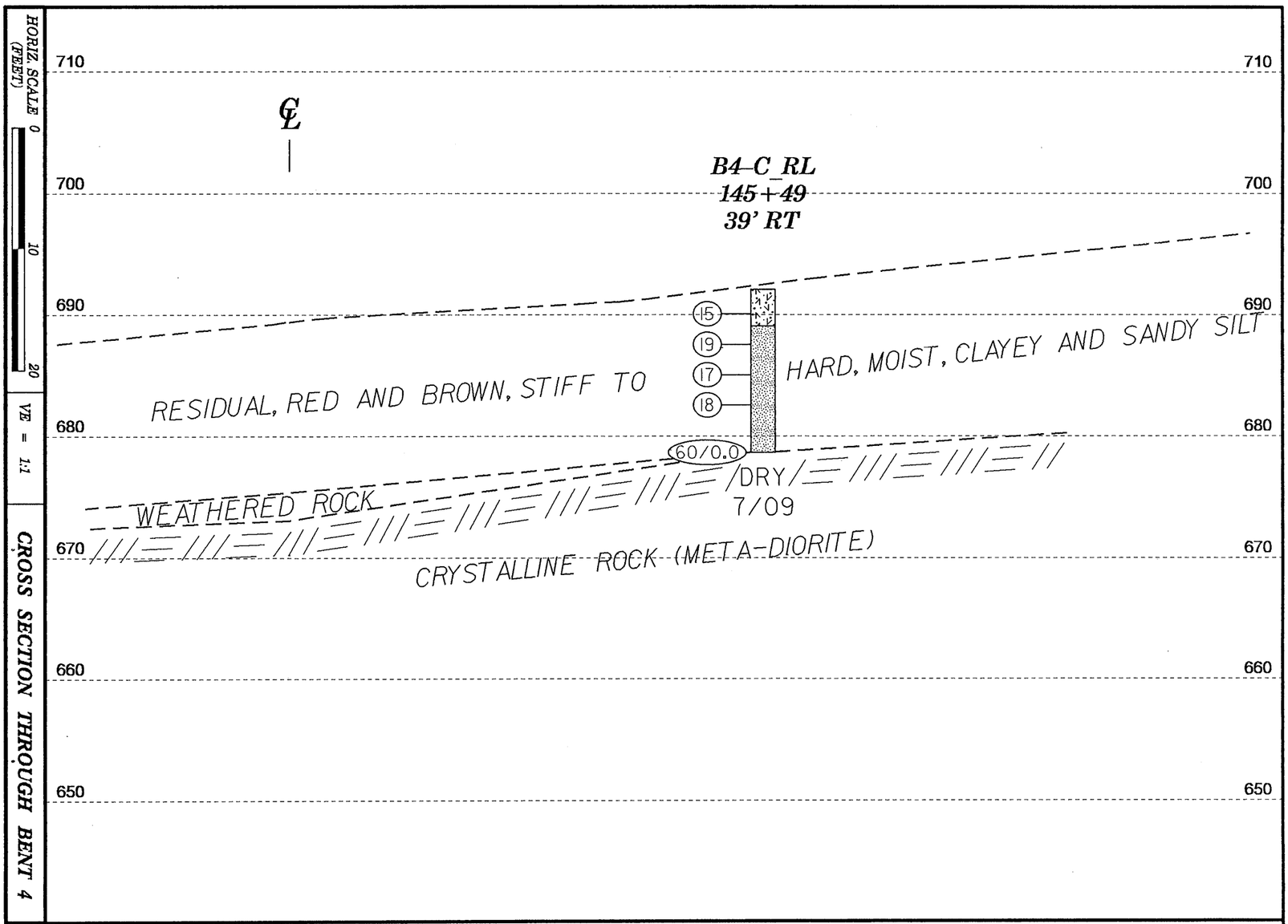
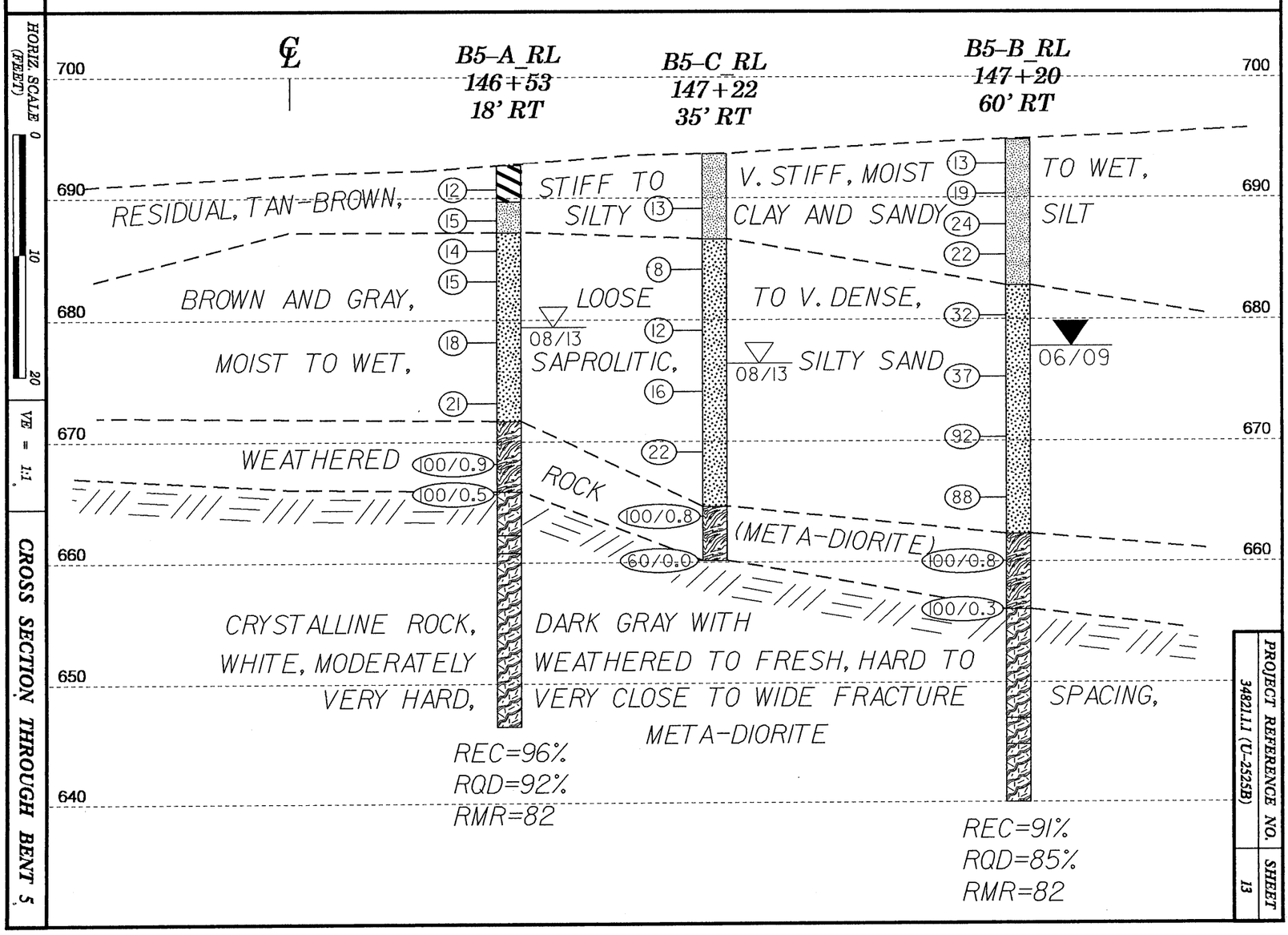
34821.1.1 (U-2525B)	12





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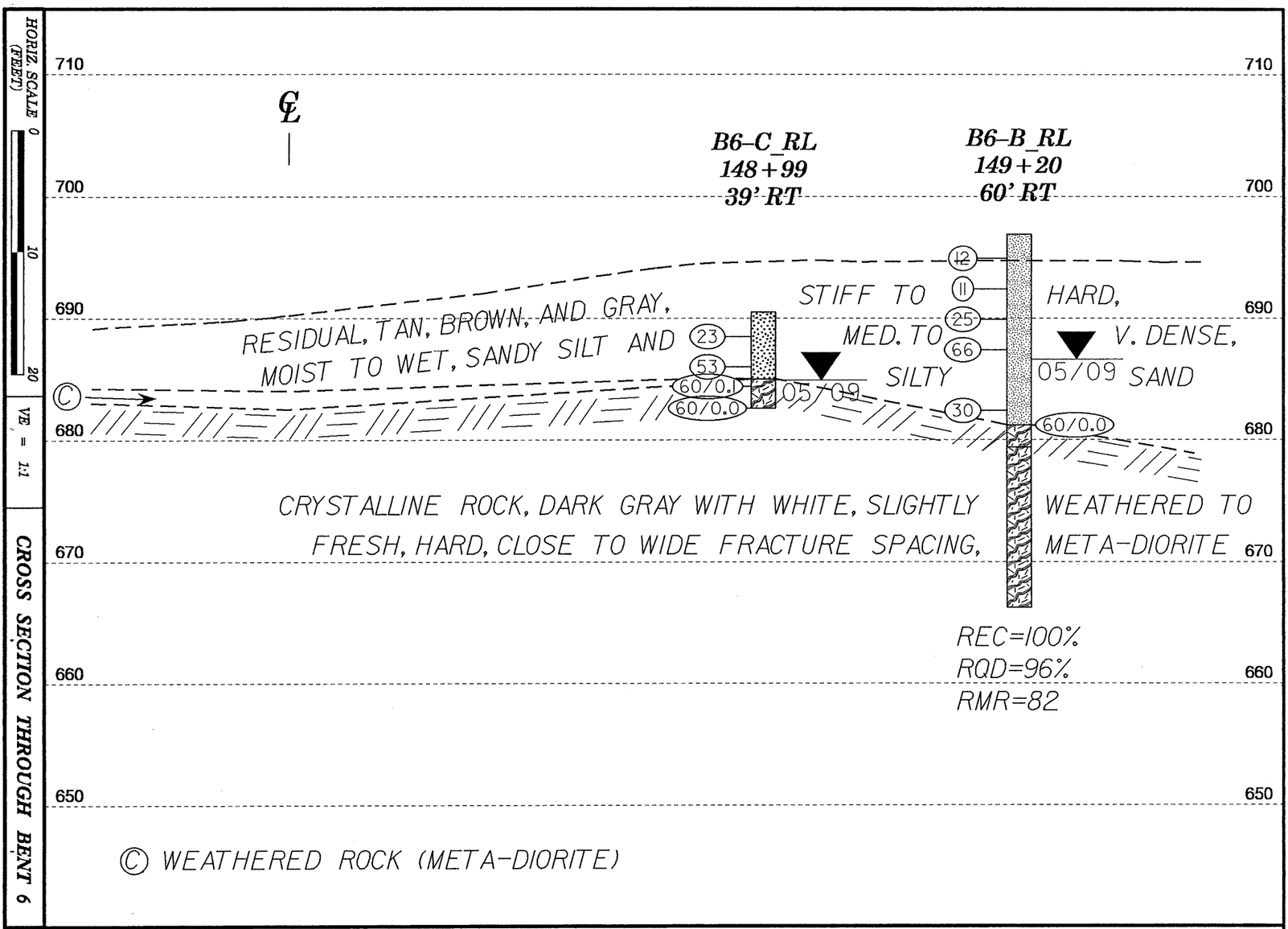
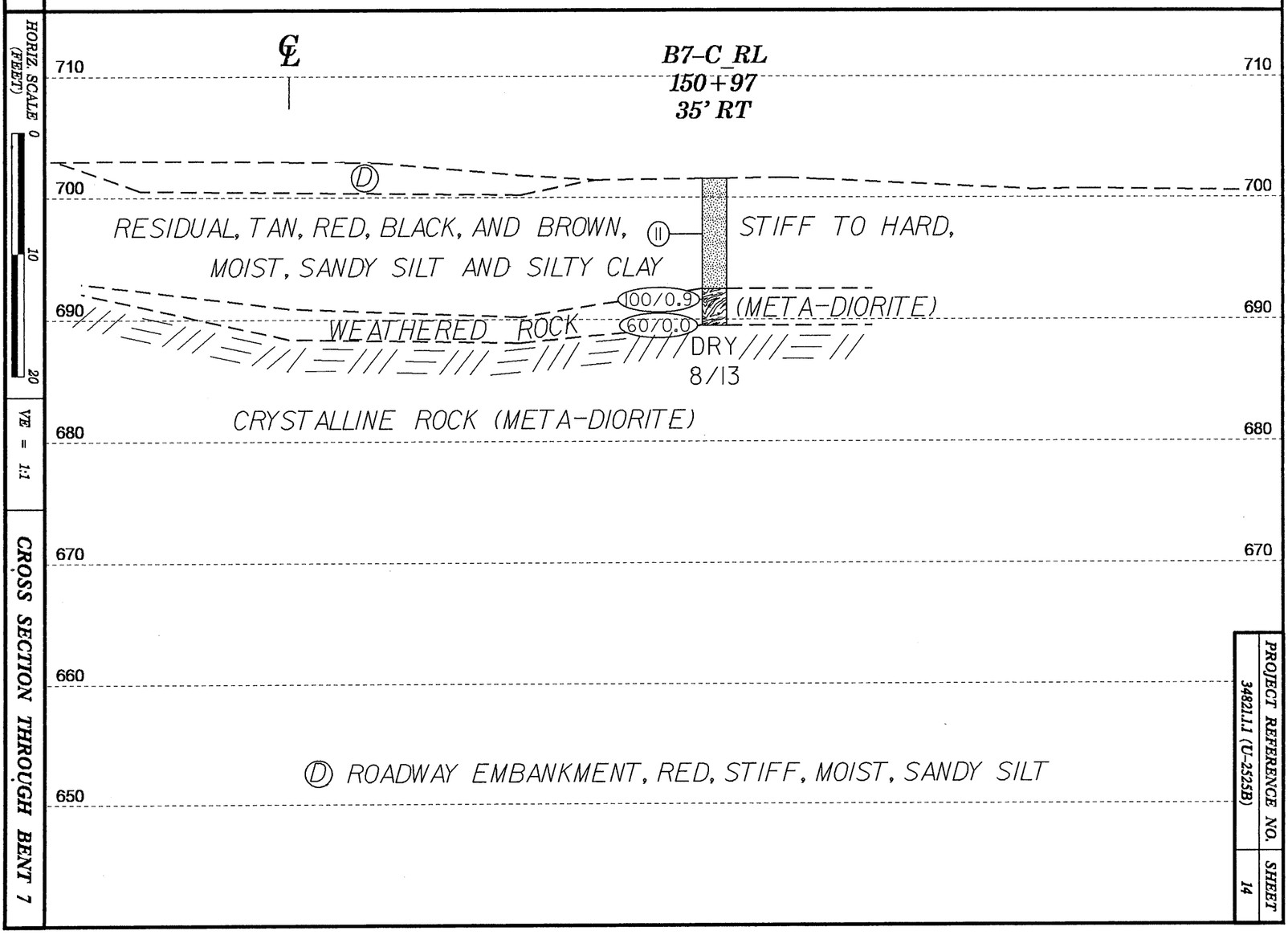


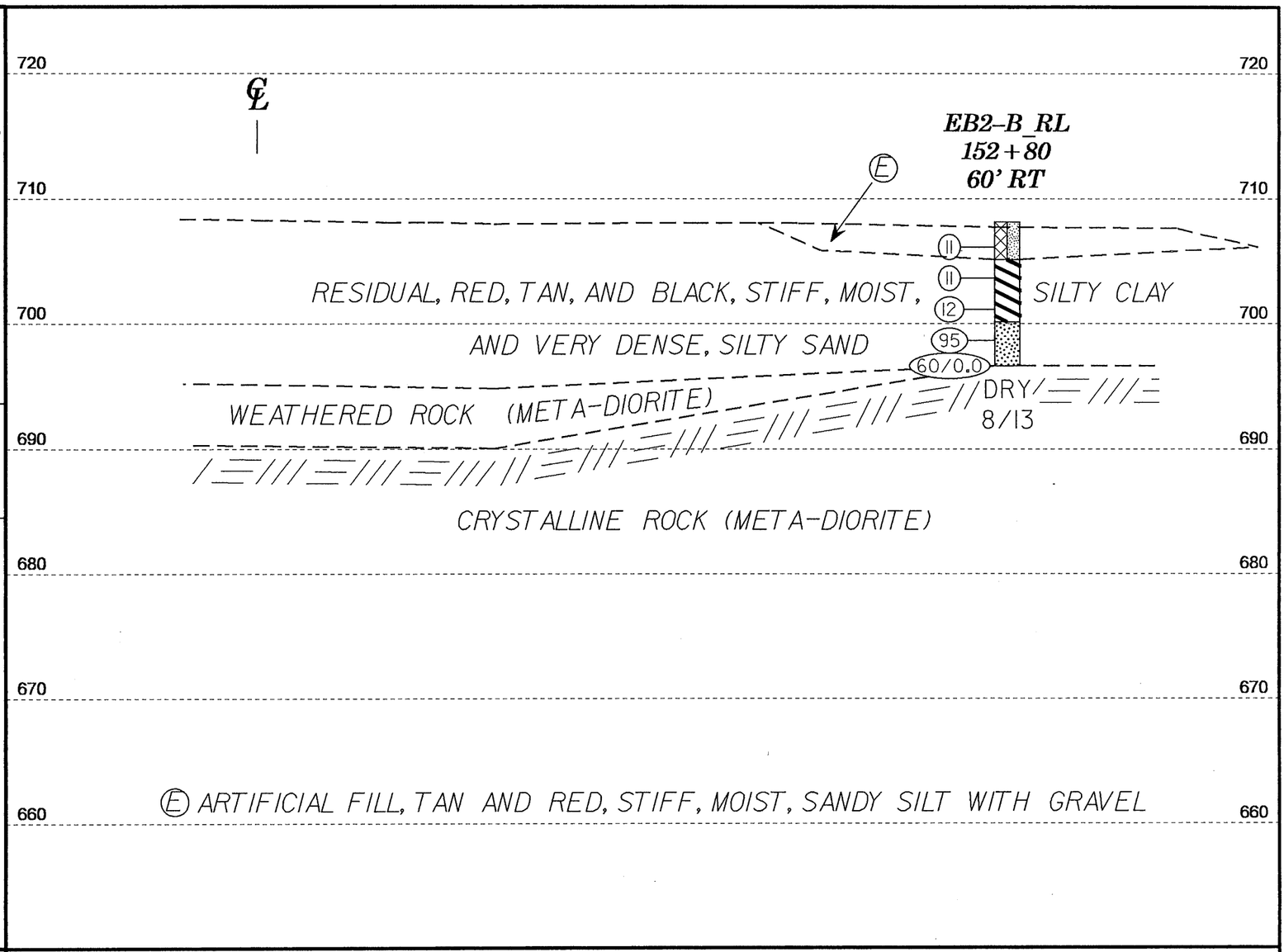


PROJECT REFERENCE NO.	SHEET
34921.1.1 (U-2525B)	14

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH END BENT 2



PROJECT REFERENCE NO.	SHEET
34921.1.1 (U-2525B)	15

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. EB1-B_LL	**STATION** 137+95	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 706.7 ft	**TOTAL DEPTH** 18.1 ft	**NORTHING** 862,736	**EASTING** 1,791,592	**24 HR.** 12.5
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/30/09	**COMP. DATE** 06/30/09	**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)
710												
											706.7	0.0
										GROUND SURFACE		
705	705.7	1.0	6	6	6	12		M		**RESIDUAL** RED, SILTY CLAY		
	703.2	3.5	4	5	5	10		M				
700	700.7	6.0	4	5	7	12		M			698.7	8.0
	698.2	8.5	10	9	12	21		W		RED AND TAN, SANDY SILT		
695											693.2	13.5
	693.2	13.5	100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)		
690	688.6	18.1	60/0.0			60/0.0					688.6	18.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 688.6 ft ON CRYSTALLINE ROCK (META-GRANITE)		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B1-C_LL	**STATION** 139+80	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.2
COLLAR ELEV. 682.0 ft	**TOTAL DEPTH** 12.0 ft	**NORTHING** 862,888	**EASTING** 1,791,485	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 07/30/13	**COMP. DATE** 07/30/13	**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)
685												
											682.0	0.0
										GROUND SURFACE		
680								M		**ALLUVIAL** TAN-BROWN, SILTY SAND WITH SOME COARSE SAND		
	679.0	3.0	1	1	2	3					677.0	5.0
675										**RESIDUAL** TAN-BROWN, SAPROLITIC, SANDY SILT	673.5	8.5
	674.0	8.0	12	40	60/0.3	100/0.3				**WEATHERED ROCK** (META-GRANITE)		
670	670.0	12.0	60/0.0			60/0.0					670.0	12.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 670.0 ft ON CRYSTALLINE ROCK (META-GRANITE)		

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B1-B_LL	**STATION** 139+81	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.5
COLLAR ELEV. 683.6 ft	**TOTAL DEPTH** 32.0 ft	**NORTHING** 862,897	**EASTING** 1,791,500	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 07/07/09	**COMP. DATE** 07/14/09	**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)
685										
	682.6	1.0	3	3	5	8		M		683.6 GROUND SURFACE 0.0
680	680.1	3.5	7	14	18	32				**RESIDUAL** BROWN, SANDY SILT
	677.6	6.0	9	13	18	31	SS-26	15%		
675	675.1	8.5	17	24	31	55		M		
670	670.6	13.0	60/0.0			60/0.0				670.6 13.0
										CRYSTALLINE ROCK WHITE AND BROWN WITH GRAY, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE FRACTURE SPACING, META-GRANITE
665										661.4 22.2
660										WHITE AND GRAY WITH TRACE BROWN, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-GRANITE
655										REC= 93% RQD=54%
										RMR=61
										651.6 32.0
										Boring Terminated at Elevation 651.6 ft IN CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B1-B_LL	**STATION** 139+81	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.5
COLLAR ELEV. 683.6 ft	**TOTAL DEPTH** 32.0 ft	**NORTHING** 862,897	**EASTING** 1,791,500	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 07/07/09	**COMP. DATE** 07/14/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 19.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
670.6											
670	670.6	13.0	2.5	N=60/0.0	(2.5)	(0.0)		(9.2)	(1.7)		Begin Coring @ 13.0 ft
	668.1	15.5		2:30/1.0 2:00/1.0	100%	0%		100%	18%		670.6 13.0
			5.0	1:45/0.5	(5.0)	(1.3)					**CRYSTALLINE ROCK** WHITE AND BROWN WITH GRAY, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-GRANITE WITH VERY CLOSE FRACTURE SPACING
665				2:20/1.0 2:30/1.0 2:10/1.0 2:25/1.0 2:35/1.0	100%	26%					MAJORITY OF JOINTS AND SOME FABRIC HEAVILY IRON STAINED NEAR VERTICAL FRACTURES FROM 13.0' TO 16.1', MAJORITY OF FRACTURES AT 35° TO 45° AND SOME AT 10° TO 20°
	663.1	20.5									661.4 22.2
			2.3	2:30/1.0 4:35/1.0	(2.3)	(1.0)					WHITE AND GRAY WITH TRACE BROWN, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-GRANITE WITH WIDE FRACTURE SPACING
660	660.8	22.8		6:25/0.3	100%	43%		(8.5)	(8.5)		
			2.7	6:40/0.7	(2.4)	(2.4)		87%	87%		
	658.1	25.5		8:35/1.0 4:45/1.0	89%	89%					
			5.0	8:45/1.0 9:35/1.0 11:00/1.0 29:45/1.0 1:00/1.0	(4.2) 84%	(4.2) 84%					
655	653.1	30.5									
	651.6	32.0	1.5	20:40/1.0 21:15/0.5	(1.3) 87%	(1.3) 87%					651.6 32.0
											Boring Terminated at Elevation 651.6 ft IN CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B2-C_LL	**STATION** 142+30	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** 26.0
COLLAR ELEV. 687.6 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 863,105	**EASTING** 1,791,361	**24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 07/30/13	**COMP. DATE** 07/30/13	**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)
690										687.6	0.0
										GROUND SURFACE	
										RESIDUAL	
685	685.1	2.5								RED-BROWN, SILTY CLAY	
			2	3	3	6		M			
680	680.1	7.5								679.6	8.0
			2	2	3	5		M		TAN-BROWN AND GRAY, SAPROLITIC, SANDY SILT	
675	675.1	12.5									
			1	2	3	5		M			
670	670.1	17.5									
			2	3	4	7		M			
665	665.1	22.5									
			4	8	9	17		M			
660	660.1	27.5									
			5	9	13	22		M			
655	655.1	32.5								657.1	30.5
	654.1	33.5	100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)	
			60/0.0			60/0.0				654.1	33.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 654.1 ft ON CRYSTALLINE ROCK (META-GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B2-B_LL	**STATION** 142+21	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 688.6 ft	**TOTAL DEPTH** 27.5 ft	**NORTHING** 863,106	**EASTING** 1,791,380	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER T. Bowles	**START DATE** 07/17/09	**COMP. DATE** 07/17/09	**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	
690										688.6	0.0
	687.6	1.0								GROUND SURFACE	
			2	2	2	4				**ALLUVIAL**	
685	685.1	3.5					SS-24	22%		BROWN, SANDY SILT	
			7	7	10	17		W		685.6	3.0
	682.6	6.0								**RESIDUAL**	
			5	6	10	16	SS-23	25%		BROWN, SILTY CLAY	
680	680.1	8.5								680.6	8.0
			8	9	9	18		W		BROWN, COARSE TO FINE SANDY SILT	
										676.6	12.0
675	675.1	13.5								WHITE AND BROWN, SILTY, COARSE TO FINE SAND	
			10	18	25	43		M			
670	670.1	18.5									
			20	34	48	82		M			
665	665.1	23.5								666.6	22.0
			16	34	66/0.4	100/0.4				**WEATHERED ROCK** (META-GRANITE)	
	661.1	27.5	60/0.0			60/0.0				661.1	27.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 661.1 ft ON CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B3-C_LL	**STATION** 144+80	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 686.5 ft	**TOTAL DEPTH** 12.0 ft	**NORTHING** 863,322	**EASTING** 1,791,237	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/06/13	**COMP. DATE** 08/06/13	**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
690										
685										686.5 GROUND SURFACE 0.0
	683.0	3.5	2	3	4	7		M		**ALLUVIAL** TAN-BROWN, SANDY SILT
680										680.5 6.0
	678.0	8.5	3	3	9	12		M		**RESIDUAL** TAN-BROWN, SILTY CLAY
675										675.5 11.0
	674.5	12.0	60/0.0			60/0.0				674.5 **WEATHERED ROCK** (META-GRANITE) 12.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 674.5 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B3-B_LL	**STATION** 144+63	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 685.8 ft	**TOTAL DEPTH** 26.7 ft	**NORTHING** 863,316	**EASTING** 1,791,260	**24 HR.** 10.2
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/15/09	**COMP. DATE** 06/17/09	**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)
690											
685	684.8	1.0	2	2	3	5	SS-20	M to W		685.8 GROUND SURFACE **ALLUVIAL** BROWN, SANDY SILT WITH TRACE CLAY	0.0
	682.3	3.5	100/0.3			100/0.3				682.0	3.8
680	679.5	6.3	16	6	5	11 16		M		680.0 **CRYSTALLINE ROCK** BOULDER: WHITE WITH GRAY AND BLACK, SLIGHTLY WEATHERED, HARD TO VERY HARD, META-GRANITE REC=94% RQD=94% RMR=67	5.8
675	677.3	8.5	5	9	7					673.6 **RESIDUAL** RED, SILTY, COARSE TO FINE SAND	12.2
	673.6	12.2	60/0.0			60/0.0				**CRYSTALLINE ROCK** WHITE WITH GRAY AND BLACK, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE	
670										663.7	22.1
665										GRAYISH GREEN WITH WHITE AND PINK, SLIGHTLY TO VERY SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-DIORITE WITH SCHISTOSE TEXTURE	
660										659.1 REC=100% RQD=72% RMR=67 Boring Terminated at Elevation 659.1 ft IN CRYSTALLINE ROCK (META-DIORITE)	26.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B3-B_LL	**STATION** 144+63	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 9.0
COLLAR ELEV. 685.8 ft	**TOTAL DEPTH** 26.7 ft	**NORTHING** 863,316	**EASTING** 1,791,260	**24 HR.** 10.2
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/15/09	**COMP. DATE** 06/17/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
682											Begin Coring @ 3.8 ft	
680	682.0	3.8	2.5	5:10/0.5 2:17/1.0 3:00/1.0	(1.4) 56%	(0.9) 36%		(1.4) 70%	(0.9) 45%		682.0 **CRYSTALLINE ROCK**	3.8
	679.5	6.3		*N=11*				(0.0) 0%	N/A		680.0 BOULDER: WHITE WITH GRAY AND BLACK, SLIGHTLY WEATHERED, HARD TO VERY HARD, META-GRANITE **RESIDUAL** RED, SILTY, COARSE TO FINE SAND	5.8
675	673.6	12.2	4.5	*N=16* *N=60/0.0* 2:25/0.5 3:40/1.0 3:30/1.0 4:10/1.0 4:25/1.0	(4.5) 100%	(4.5) 100%		(9.3) 94%	(9.3) 94%		673.6 **CRYSTALLINE ROCK** WHITE WITH GRAY AND BLACK, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-GRANITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING 6 JOINTS AT 0° TO 10° 1 JOINT AT 25° 0.6 CORE LOSS 19.8' TO 20.4'	12.2
670	669.1	16.7	5.0	4:35/1.0 4:40/1.0 4:20/1.0 3:00/1.0 4:45/1.0	(4.4) 88%	(4.4) 88%						
665	664.1	21.7	5.0	5:40/1.0 4:00/1.0 2:20/1.0 2:05/1.0 2:30/1.0	(5.0) 100%	(3.7) 74%		(4.6) 100%	(3.3) 72%		663.7 GRAYISH GREEN WITH WHITE AND PINK, SLIGHTLY TO VERY SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-DIORITE WIH CLOSE TO MODERATELY CLOSE FRACTURE SPACING AND WITH SCHISTOSE TEXTURE	22.1
660	659.1	26.7									659.1 * NOTE: MAJORITY, IF NOT ALL, FRACTURES CAUSED BY EXTRACTING CORE FROM CORE BARREL Boring Terminated at Elevation 659.1 ft IN CRYSTALLINE ROCK (META-DIORITE)	26.7

NCDOT BORE:DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14647LT	**STATION** 146+47	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 18.9
COLLAR ELEV. 689.9 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 863,475	**EASTING** 1,791,169	**24 HR.** 18.5
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/19/09	**COMP. DATE** 06/19/09	**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
690										ELEV. (ft) 689.9 GROUND SURFACE DEPTH (ft) 0.0
	688.9	1.0	3	4	6	10		M		**RESIDUAL** BROWN, CLAYEY SILT
	686.4	3.5								
685			3	4	5	9		W		
	683.9	6.0								
			5	6	14	20		M		
	681.4	8.5								681.9 8.0
680			16	26	35	61		M		LIGHT BROWN, SANDY SILT
	676.4	13.5								
675			37	40	27	67		M		
	671.4	18.5						▼		671.9 18.0
670			20	34	66	100/0.5				**WEATHERED ROCK** (META-GABBRO)
	666.4	23.5								
665			100/0.3			100/0.3				
	661.4	28.5	60/0.0			60/0.0				661.4 28.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 661.4 ft ON CRYSTALLINE ROCK (META-GABBRO)

Note: Incorrect coordinates were used to locate Boring B4-B LL, and the error was not discovered until after the boring had been completed ((Boring B4-B LL (1)). The boring was redrilled at the correct location ((B4-B LL (Plan)) and taken to the top of crystalline rock.

Boring named B4-B_LL(PLAN) for the original investigation.

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B4-C_LL	**STATION** 146+88	**OFFSET** 39 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 690.4 ft	**TOTAL DEPTH** 15.0 ft	**NORTHING** 863,500	**EASTING** 1,791,130	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/26/09	**COMP. DATE** 05/26/09	**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
695										
690										690.4 GROUND SURFACE 0.0
	689.4	1.0	3	6	8	14	SS-16	27%		**RESIDUAL** GRAY AND BROWN, CLAYEY SILT
	686.9	3.5								
685			6	11	14	25		M		
	684.4	6.0								684.9 5.5
			16	18	30	48		M		GRAY, SANDY SILT
	681.9	8.5								
680			12	61	28	89		M		
	676.9	13.5								679.4 11.0
			60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-DIORITE)
	675.4	15.0	60/0.0			60/0.0				675.4 15.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 675.4 ft IN CRYSTALLINE ROCK (META-GABBRO)

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B4-B_LL	**STATION** 146+83	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.1
COLLAR ELEV. 690.2 ft	**TOTAL DEPTH** 51.4 ft	**NORTHING** 863,507	**EASTING** 1,791,151	**24 HR.** 13.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/26/09	**COMP. DATE** 05/27/09	**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)
695											
690										690.2 GROUND SURFACE	0.0
	689.2	1.0	6	8	11	19		M		**RESIDUAL** BROWN, CLAYEY SILT	
	686.7	3.5	10	9	12	21		M		684.7	5.5
685	684.2	6.0	4	10	25	35		M		BROWN AND GRAY, SANDY SILT	
	681.7	8.5	15	18	23	41		W			
680											
	676.7	13.5	20	34	41	75		W		674.2	16.0
675										**WEATHERED ROCK** (META-GABBRO)	
	671.7	18.5	82	18/0.1		100/0.6					
670											
	666.7	23.5	100/0.4			100/0.4					
665											
	662.8	27.4	60/0.0			60/0.0				662.8	27.4
660										**CRYSTALLINE ROCK** DARK GRAY WITH WHITE AND BROWN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GABBRO	
										656.3	33.9
655										DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED, VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-GABBRO	
										654.8	35.4
650										CORE LOSS IN MODERATELY SEVERELY WEATHERED, META-GABBRO	
										651.1	39.1
645										DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, META-DIORITE	
										640.7	49.5
640										GREEN TO GRAY WITH BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GABBRO	
										638.8	51.4
										REC=84% RQD=62%	
										RMR=67	
										Boring Terminated at Elevation 638.8 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B4-B_LL	**STATION** 146+83	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.1
COLLAR ELEV. 690.2 ft	**TOTAL DEPTH** 51.4 ft	**NORTHING** 863,507	**EASTING** 1,791,151	**24 HR.** 13.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/26/09	**COMP. DATE** 05/27/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 24.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
662.8											Begin Coring @ 27.4 ft	
	662.8	27.4	4.0	*N=60/0.0* 3:35/1.0 2:45/1.0 3:25/1.0 3:10/1.0	(4.0) 100%	(1.3) 33%		(6.3) 97%	(3.2) 49%		662.8 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE AND BROWN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-GABBRO WITH VERY CLOSE TO CLOSE FRACTURE SPACING	27.4
660	658.8	31.4	5.0	3:05/1.0 2:55/1.0 2:10/1.0 2:15/1.0 1:05/1.0	(3.8) 76%	(3.2) 64%					656.3 1 JOINT AT 45°, 3 JOINTS AT 70° TO 80° MAJORITY OF JOINTS AT 10° TO 30°	33.9
655	653.8	36.4	5.0	1:30/1.0 1:10/1.0 1:55/1.0 4:15/1.0 3:45/1.0	(2.3) 46%	(1.9) 38%		(1.5) 100%	(1.3) 87%		654.8 ALL JOINTS AND SOME OF FABRIC IRON STAINED VERY BROKEN 27.8' TO 28.2', 29.3' TO 30.3' AND 31.3' TO 31.4'	35.4
650	648.8	41.4	5.0	3:25/1.0 3:25/1.0 3:15/1.0 3:10/1.0 3:15/1.0	(5.0) 100%	(5.0) 100%		(0.0) 0%	(0.0) 0%		651.1 DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED, VERY HARD, META-GABBRO WITH MODERATELY CLOSE FRACTURE SPACING	39.1
645	643.8	46.4	5.0	3:20/1.0 3:35/1.0 2:50/1.0 3:55/1.0 5:25/1.0	(5.0) 100%	(3.5) 70%		(10.4) 100%	(10.0) 96%		2 JOINTS AT 45° WITH IRON STAINING CORE LOSS IN MODERATELY SEVERELY WEATHERED, META-GABBRO DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH MODERATELY CLOSE TO WIDE FRACTURE SPACING	
640	638.8	51.4						(1.9) 100%	(0.4) 21%		640.7 2 JOINTS AT 47.9' AT 20° TO 30° WITH IRON STAINING	49.5
											638.8 GREEN TO GRAY WITH BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-GABBRO WITH VERY CLOSE TO CLOSE FRACTURE SPACING	51.4
											3 JOINTS AT 45° WITH IRON STAINING REST OF JOINTS AT 10° TO 20° WITH SOME IRON STAINING MODERATELY SEVERELY WEATHERED 49.8' TO 50.4'	
											Boring Terminated at Elevation 638.8 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14749LT	**STATION** 147+49	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.2
COLLAR ELEV. 690.1 ft	**TOTAL DEPTH** 41.3 ft	**NORTHING** 863,564	**EASTING** 1,791,118	**24 HR.** 12.1
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/19/09	**COMP. DATE** 05/20/09	**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)
695										
690										690.1 GROUND SURFACE 0.0
	689.1	1.0	3	4	7	11		W		**RESIDUAL** BROWN AND GRAY, FINE SANDY SILT WITH SOME ROCK FRAGMENTS AT 6.0 FT.
685	686.6	3.5	5	8	12	20		M		
	684.1	6.0	20	13	9	22		W		
680	681.6	8.5	10	11	14	25				
	676.6	13.5	10	10	11	21		M		
675										
670	671.6	18.5	14	17	28	45	SS-12	16%		
	666.6	23.5	18	12	12	24		W		664.1 26.0 **WEATHERED ROCK** (META-DIORITE)
665										661.3 28.8 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, VERY WIDE FRACTURE SPACING, META-DIORITE
	661.6	28.5	60/0.1			60/0.1				REC=98% RQD=98%
660	661.3	28.8	60/0.0			60/0.0				RMR=84
655										648.8 41.3 Boring Terminated at Elevation 648.8 ft IN CRYSTALLINE ROCK (META-DIORITE)
650										Boring named B5-B_LL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14749LT	**STATION** 147+49	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.2
COLLAR ELEV. 690.1 ft	**TOTAL DEPTH** 41.3 ft	**NORTHING** 863,564	**EASTING** 1,791,118	**24 HR.** 12.1
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/19/09	**COMP. DATE** 05/20/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 12.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
661.3											Begin Coring @ 28.8 ft
660	661.3	28.8	2.5	N=60/0.0 2:05/0.5 3:55/1.0	(2.3) 92%	(2.3) 92%		(12.3) 98%	(12.3) 98%		661.3 **CRYSTALLINE ROCK** 28.8 DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH VERY WIDE FRACTURE SPACING NO NATURAL FRACTURES
	658.8	31.3	5.0	3:40/1.0	(5.0) 100%	(5.0) 100%					
655				3:45/1.0 4:40/1.0 5:00/1.0 4:25/1.0 4:40/1.0							
	653.8	36.3	5.0	4:20/1.0 4:05/1.0 2:50/1.0 3:30/1.0	(5.0) 100%	(5.0) 100%					
650	648.8	41.3		3:20/1.0							648.8 41.3 Boring Terminated at Elevation 648.8 ft IN CRYSTALLINE ROCK (META-DIORITE) Boring named B5-B_LL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-A_LL	**STATION** 148+51	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.2
COLLAR ELEV. 685.9 ft	**TOTAL DEPTH** 25.7 ft	**NORTHING** 863,631	**EASTING** 1,791,031	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/14/09	**COMP. DATE** 05/14/09	**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)
690										
685	684.9	1.0	3	2	2	4				685.9 GROUND SURFACE 0.0
	682.4	3.5								**RESIDUAL** BROWN AND GRAY, SANDY SILT
680	679.9	6.0	1	2	3	5	SS-10	23%		680.4 5.5
	677.4	8.5	5	8	8	16		W		BROWN, SANDY CLAY
675	675.2	10.7	14	34	66/0.4	100/0.9		W		677.4 8.5
			60/0.0			60/0.0				**WEATHERED ROCK** (META-DIORITE) 675.2 10.7
670										**CRYSTALLINE ROCK** DARK GRAY WITH BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-DIORITE 671.2 14.7
665										DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, META-DIORITE
										660.2 25.7
										Boring Terminated at Elevation 660.2 ft IN CRYSTALLINE ROCK (META-DIORITE)
										Boring named B6-A_LL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-A_LL	**STATION** 148+51	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.2
COLLAR ELEV. 685.9 ft	**TOTAL DEPTH** 25.7 ft	**NORTHING** 863,631	**EASTING** 1,791,031	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/14/09	**COMP. DATE** 05/14/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 15.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
675.2											Begin Coring @ 10.7 ft
	675.2	10.7	4.0	*N=60/0.0* 4:15/1.0 2:35/1.0 2:20/1.0 2:35/1.0	(2.3) 58%	(0.3) 8%		(2.3) 58%	(0.3) 8%		675.2 **CRYSTALLINE ROCK** 10.7 DARK GRAY WITH BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-DIORITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING
	671.2	14.7									671.2 14.7 ABUNDANT LOW ANGLE FRACTURES WITH IRON STAINING VERTICAL FRACTURE THROUGHOUT WITH IRON STAINING
670	670.2	15.7	1.0	6:00/1.0	(1.0) 100%	(1.0) 100%		(11.0) 100%	(11.0) 100%		DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH MODERATELY CLOSE TO WIDE FRACTURE SPACING
			5.0	3:45/1.0 3:15/1.0 3:35/1.0 3:40/1.0 3:50/1.0	(5.0) 100%	(5.0) 100%					2 JOINTS AT 10 TO 20 1 JOINT AT 70
665	665.2	20.7	5.0	3:35/1.0 3:10/1.0 3:20/1.0 3:10/1.0 4:15/1.0	(5.0) 100%	(5.0) 100%					
	660.2	25.7									660.2 25.7 Boring Terminated at Elevation 660.2 ft IN CRYSTALLINE ROCK (META-DIORITE)
											Boring named B6-A_LL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-B_LL	**STATION** 148+51	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.2
COLLAR ELEV. 687.0 ft	**TOTAL DEPTH** 25.2 ft	**NORTHING** 863,652	**EASTING** 1,791,067	**24 HR.** 3.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/15/09	**COMP. DATE** 05/15/09	**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)
690											
										687.0 GROUND SURFACE	0.0
	686.0	1.0								**RESIDUAL**	
685			4	6	10	16		M		BROWN, SANDY SILT	
	683.5	3.5								684.0	3.0
			4	6	8	14	SS-9	26%		BROWN, SANDY CLAY	
	681.0	6.0									
680			8	15	21	36		W			
	678.5	8.5								679.0	8.0
			35	65/0.1		100/0.6				**WEATHERED ROCK** (META-DIORITE)	
	676.3	10.7								676.3	10.7
675			60/0.0			60/0.0				**CRYSTALLINE ROCK** DARK GRAY WHITE AND TRACE GREEN, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, META-DIORITE	
										REC=97% RQD=96%	
670										RMR=87	
665										661.8	25.2
										Boring Terminated at Elevation 661.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	
										Boring named B6-B_LL for the original investigation.	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-B_LL	**STATION** 148+51	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.2
COLLAR ELEV. 687.0 ft	**TOTAL DEPTH** 25.2 ft	**NORTHING** 863,652	**EASTING** 1,791,067	**24 HR.** 3.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/15/09	**COMP. DATE** 05/15/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 14.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
676.3											Begin Coring @ 10.7 ft	
675	676.3	10.7	0.9	2:15/0.5	(0.9)	(0.7)		(14.1)	(13.9)		676.3 **CRYSTALLINE ROCK**	10.7
	675.4	11.6	3.6	N=60/0.0	100%	78%		97%	96%		DARK GRAY WITH WHITE AND TRACE GREEN, VERY SLIGHTLY	
				2:15/0.5							WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH	
				1:23/0.4	(3.3)	(3.3)					MODERATELY CLOSE TO WIDE FRACTURE SPACING	
	671.8	15.2		2:05/0.6	92%	92%						
670			5.0	3:25/1.0								
				2:30/1.0	(5.0)	(5.0)						
				2:30/1.0	100%	100%						
				3:30/1.0								
	666.8	20.2		2:50/1.0								
				2:50/1.0								
			5.0	2:30/1.0								
665				2:40/1.0	(4.9)	(4.9)						
				2:45/1.0	98%	98%						
				2:35/1.0								
				3:25/1.0								
	661.8	25.2		3:00/1.0							661.8	25.2
				2:35/1.0							Boring Terminated at Elevation 661.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	
											Boring named B6-B_LL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT BORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14955LT	**STATION** 149+55	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.8
COLLAR ELEV. 690.7 ft	**TOTAL DEPTH** 29.9 ft	**NORTHING** 863,739	**EASTING** 1,791,010	**24 HR.** 1.4
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/26/09	**COMP. DATE** 05/28/09	**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)
695											
690										690.7 GROUND SURFACE	0.0
	689.7	1.0	6	26	13	39		M		**RESIDUAL** BLACK, TAN AND RED, SANDY SILT WITH TRACE ROCK FRAGMENTS	
	687.2	3.5	10	9	8	17		M			
685	684.7	6.0	19	29	27	56		M			
	682.2	8.5	30	56	44/0.3	100/0.8				681.7	9.0
680										**WEATHERED ROCK** (META-DIORITE)	
	677.5	13.2	60/0.0			60/0.0				677.5	13.2
675										**CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE	
										672.8	17.9
670										DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE FRACTURE SPACING, META-DIORITE	
										670.8	19.9
665										DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE TO VERY WIDE FRACTURE SPACING, META-DIORITE	
										REC=100% RQD=87%	
										660.8	29.9
										RMR=74	
										Boring Terminated at Elevation 660.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	
										Boring named B7-B_LL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14955LT	**STATION** 149+55	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.8
COLLAR ELEV. 690.7 ft	**TOTAL DEPTH** 29.9 ft	**NORTHING** 863,739	**EASTING** 1,791,010	**24 HR.** 1.4
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/26/09	**COMP. DATE** 05/28/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 16.7 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
677.5											Begin Coring @ 13.2 ft	
	677.5	13.2	3.0	3:26/1.0 N=60/0.0 3:26/1.0 3:57/1.0	(3.0) 100%	(2.9) 97%		(4.7) 100%	(4.6) 98%		677.5 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING	13.2
675	674.5	16.2	3.7	3:43/1.0	(3.7) 100%	(1.7) 46%					672.8	17.9
	670.8	19.9	5.0	3:22/1.0 3:08/1.0 2:55/0.7 1:43/1.0	(5.0) 100%	(5.0) 100%		(2.0) 100%	(0.0) 0%		2 JOINTS AT 10° TO 20° IN FIRST 0.5'	
670				3:33/1.0 2:57/1.0 3:15/1.0 3:59/1.0 4:31/1.0				(10.0) 100%	(10.0) 100%		670.8 DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH VERY CLOSE FRACTURE SPACING	19.9
	665.8	24.9	5.0	3:07/1.0 3:11/1.0 3:09/1.0 3:52/1.0 3:45/1.0	(5.0) 100%	(5.0) 100%					VERY BROKEN BUT MAJORITY OF BREAKS ARE MOST LIKELY MECHANICAL DUE TO DIFFICULT EXTRACTION FROM CORE BARREL	
665											DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH WIDE TO VERY WIDE FRACTURE SPACING	
	660.8	29.9									660.8 NO NATURAL FRACTURES	29.9
											Boring Terminated at Elevation 660.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	
											Boring named B7-B_LL for the original investigation.	

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B6-A_LL	**STATION** 150+40	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 700.4 ft	**TOTAL DEPTH** 10.3 ft	**NORTHING** 863,795	**EASTING** 1,790,937	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/25/09	**COMP. DATE** 06/29/09	**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)
705											
700										700.4	0.0
	699.4	1.0	7	9	11	20		M		GROUND SURFACE **RESIDUAL** RED-BROWN, SILTY CLAY	
	696.9	3.5	18	14	28	42		M		697.4	3.0
695	694.4	6.0	7	7	8	15		M		BROWN, SILTY, COARSE TO FINE SAND 694.9	5.5
	691.9	8.5	81	19/0.2		100/0.7				BROWN, SANDY SILT 692.4	8.0
	690.1	10.3	60/0.0			60/0.0				**WEATHERED ROCK** (META-DIORITE) 690.1	10.3
										Boring Terminated with Standard Penetration Test Refusal at Elevation 690.1 ft ON CRYSTALLINE ROCK (META-DIORITE) Boring named B8-A_LL for the original investigation.	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B6-C_LL	**STATION** 150+36	**OFFSET** 35 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 698.1 ft	**TOTAL DEPTH** 14.0 ft	**NORTHING** 863,804	**EASTING** 1,790,961	**24 HR.** 7.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/02/13	**COMP. DATE** 08/02/13	**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
700										
										698.1 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN, SILTY CLAY
695	695.1	3.0	3	3	5	8		M		692.1 6.0
690	690.1	8.0	100/0.3			100/0.3				**WEATHERED ROCK** (META-DIORITE)
685	685.1	13.0	100/0.3			100/0.3				
	684.1	14.0	60/0.0			60/0.0				684.1 14.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 684.1 ft ON CRYSTALLINE ROCK (META-DIORITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 15082LT	**STATION** 150+82	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 701.6 ft	**TOTAL DEPTH** 9.8 ft	**NORTHING** 863,853	**EASTING** 1,790,953	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/19/09	**COMP. DATE** 06/29/09	**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
705										ELEV. (ft) DEPTH (ft)
										701.6 GROUND SURFACE 0.0
700	700.6	1.0	5	9	11	20		M		**RESIDUAL** TAN AND RED, SILTY CLAY
	698.1	3.5	6	7	12	19		M		
	695.6	6.0	11	12	15	27		M		695.6 6.0 RED AND TAN, SANDY SILT
695	693.1	8.5	16	84/0.2		100/0.7				692.6 9.0
	691.8	9.8	60/0.0			60/0.0				691.8 9.8 **WEATHERED ROCK** (META-DIORITE)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 691.8 ft ON CRYSTALLINE ROCK (META-DIORITE)
										Boring named B8-B_LL for the original investigation.

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. EB2-B_LL	**STATION** 152+02	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 708.6 ft	**TOTAL DEPTH** 32.3 ft	**NORTHING** 863,957	**EASTING** 1,790,893	**24 HR.** 11.8
DRILL RIG/HAMMER EFF./DATE B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/13/09	**COMP. DATE** 05/13/09	**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
710										
	707.6	1.0	5	7	11	18		M		708.6 GROUND SURFACE 0.0 **RESIDUAL** GRAY AND TAN, SILTY CLAY
705	705.1	3.5	10	13	18	31		M		704.8 3.8 RED, TAN, AND GRAY, SILTY SAND
	702.6	6.0	10	13	19	32		M		
700	700.1	8.5	17	16	18	34	SS-2	M		
695	695.1	13.5	13	14	15	29		M		
690	690.1	18.5	55	45/0.1		100/0.6				690.1 18.5 **WEATHERED ROCK** (META-DIORITE)
685	685.1	23.5	100/0.4			100/0.4				
680	680.1	28.5	100/0.2			100/0.2				
	676.3	32.3	60/0.0			60/0.0				676.3 32.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 676.3 ft ON CRYSTALLINE ROCK (META-DIORITE)

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)			**GROUND WTR (ft)**
BORING NO. 13733RT	**STATION** 137+33	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 710.2 ft	**TOTAL DEPTH** 31.7 ft	**NORTHING** 862,700	**EASTING** 1,791,654	**24 HR.** 19.9
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/30/09	**COMP. DATE** 06/30/09	**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)
715										
710										710.2 GROUND SURFACE 0.0
	709.2	1.0	4	5	6	11		M		**RESIDUAL** WHITE, BLACK AND RED, SILTY CLAY
	706.7	3.5	4	5	6	11		M		
705	704.2	6.0	4	4	5	9		M		
	701.7	8.5	4	6	8	14		M		
700	696.7	13.5	5	8	8	16		M		
695	691.7	18.5	11	14	23	37		M		692.2 18.0 RED, TAN AND GRAY, SANDY SILT
690	686.7	23.5	17	30	29	59		W		
685	681.7	28.5	100/0.2			100/0.2				682.2 28.0 **WEATHERED ROCK** (META-GRANITE)
680	678.5	31.7	60/0.0			60/0.0				678.5 31.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 678.5 ft ON CRYSTALLINE ROCK (META-GRANITE)
675										Boring named EB1-A_RL for the original investigation.
670										

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)			**GROUND WTR (ft)**
BORING NO. EB1-B_RL	**STATION** 136+60	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 711.8 ft	**TOTAL DEPTH** 43.9 ft	**NORTHING** 862,657	**EASTING** 1,791,727	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/30/09	**COMP. DATE** 07/01/09	**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
715										
710										711.8 GROUND SURFACE 0.0
	710.8	1.0	7	8	9	17		M		**RESIDUAL** TAN AND RED, SILTY CLAY
	708.3	3.5	5	5	6	11	SS-28	37%		
705	705.8	6.0	4	5	7	12		M		
	703.3	8.5	4	4	4	8		M		703.8 8.0 RED, WHITE AND TAN, SANDY SILT
700	698.3	13.5	9	9	13	22	SS-27	14%		
695	693.3	18.5	15	20	18	38		M		
690	688.3	23.5	9	12	18	30		M		
685	683.3	28.5	31	35	65/0.4	100/0.9				682.8 29.0 **WEATHERED ROCK** (META-GRANITE)
680	678.3	33.5	100/0.3			100/0.3				
675	673.3	38.5	100/0.1			100/0.1				
670	668.3	43.5	100/0.4			100/0.4				667.9 43.9 Boring Terminated at Elevation 667.9 ft IN WEATHERED ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B1-C_RL	**STATION** 138+60	**OFFSET** 35 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 701.4 ft	**TOTAL DEPTH** 22.9 ft	**NORTHING** 862,819	**EASTING** 1,791,606	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/01/13	**COMP. DATE** 08/01/13	**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)
705											
										701.4	0.0
										GROUND SURFACE	
700										**RESIDUAL** RED-BROWN, SAPROLITIC, SANDY SILT	
	698.1	3.3	2	2	3	5		M			
695	693.1	8.3	2	3	6	9		M			
690	688.1	13.3	5	11	17	28		M			
	683.1	18.3	100/0.4			100/0.4				683.9	17.5
685										**WEATHERED ROCK** (META-GRANITE)	
680	678.5	22.9	60/0.0			60/0.0				678.5	22.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 678.5 ft ON CRYSTALLINE ROCK (META-GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 13919RT	**STATION** 139+19	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 696.3 ft	**TOTAL DEPTH** 9.8 ft	**NORTHING** 862,861	**EASTING** 1,791,562	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 07/02/09	**COMP. DATE** 07/02/09	**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
700										
										696.3 GROUND SURFACE 0.0
695	695.3	1.0	6	7	7	14		M		**RESIDUAL** TAN AND RED, SILTY CLAY
	692.8	3.5	5	4	7	11		M		690.8 5.5
690	690.3	6.0	17	26	41	67		M		WHITE AND TAN, SANDY SILT
	687.8	8.5	19	81/0.3		100/0.8				687.3 9.0
	686.5	9.8	60/0.0			60/0.0				686.5 **WEATHERED ROCK** (META-GRANITE) 9.8
										Boring Terminated with Standard Penetration Test Refusal at Elevation 686.5 ft ON CRYSTALLINE ROCK (META-GRANITE)
										Boring named B1-A_RL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B2-C_RL	**STATION** 141+22	**OFFSET** 39 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 686.5 ft	**TOTAL DEPTH** 24.0 ft	**NORTHING** 863,048	**EASTING** 1,791,479	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Manual
DRILLER T. Bowles	**START DATE** 07/16/09	**COMP. DATE** 07/17/09		**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
690										
										686.5 GROUND SURFACE 0.0
685	685.5	1.0	1	2	2	4	SS-22	D		**ALLUVIAL** LIGHT BROWN, SILTY, COARSE TO FINE SAND WITH TRACE CLAY 683.5 3.0
	683.0	3.5	3	5	5	10		M		BROWN, COARSE TO FINE SANDY SILT 681.0 5.5
680	680.5	6.0	5	6	8	14		M		**RESIDUAL** BROWN, SILTY, COARSE TO FINE SAND
	678.0	8.5	5	7	6	13		M		
675										
	673.0	13.5	5	11	7	18		M		
670										669.0 17.5
	668.0	18.5	61	39/0.2		100/0.7				**WEATHERED ROCK** (META-GRANITE)
665										
	663.0	23.5								
	662.5	24.0	100/0.4			100/0.4				662.5 24.0
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 662.5 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** P. Weaver/G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14159RT	**STATION** 141+59	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 17.0
COLLAR ELEV. 685.0 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 863,070	**EASTING** 1,791,442	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE CME-45 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER T. Bowles	**START DATE** 08/11/09	**COMP. DATE** 08/13/09	**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)
685										685.0 GROUND SURFACE	0.0
	684.0	1.0	4	3	3	6		D		**ALLUVIAL** BROWN, SANDY SILT	
680	681.5	3.5	6	6	7	13		D		679.5	5.5
	679.0	6.0	7	7	10	17		W		**RESIDUAL** BROWN TO TAN AND RED, SILTY CLAY	
675	676.5	8.5	6	11	22	33		W			
670	671.5	13.5	5	12	16	28		M		672.0	13.0
665	666.5	18.5	8	35	65/0.4	100/0.9				WHITE AND BROWN, SILTY, COARSE TO FINE SAND	
660	661.5	23.5	40	60/0.3		100/0.8				666.0	19.0
655	656.5	28.5	60/0.1			60/0.1				**WEATHERED ROCK** (META-GRANITE)	
650										656.5	28.5
645	644.0	41.0	69	31/0.3		100/0.8				**CRYSTALLINE ROCK** BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE	
640										647.2	37.8
635										**WEATHERED ROCK** (META-GRANITE)	
										643.2	41.8
										CRYSTALLINE ROCK WHITE AND GRAY WITH BROWN, MODERATELY TO SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE	
										REC=65% RQD=36%	
										634.0 RMR=51	51.0
										Boring Terminated at Elevation 634.0 ft IN CRYSTALLINE ROCK (META-GRANITE)	
										Boring named B2-A_RL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** P. Weaver/G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14159RT	**STATION** 141+59	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 17.0
COLLAR ELEV. 685.0 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 863,070	**EASTING** 1,791,442	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE CME-45 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER T. Bowles	**START DATE** 08/11/09	**COMP. DATE** 08/13/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 21.7 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
656.5											Begin Coring @ 28.5 ft	
655	656.5	28.5	2.5	*N=60/0.1* 2:30/1.0 4:40/1.0	(2.0) 80%	(0.0) 0%		(7.5) 81%	(3.5) 38%		656.5 **CRYSTALLINE ROCK** BROWN AND WHITE, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-GRANITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING	28.5
	654.0	31.0	5.0	*3:40/0.5* 3:35/1.0 5:15/1.0	(3.9) 78%	(1.7) 34%					IRON STAINING OF JOINTS VERTICAL FRACTURE TO 30.8 FT. JOINTS AT EITHER 10° TO 20° OR AT 35° TO 45°	
650	649.0	36.0	5.0	4:35/1.0 6:10/1.0 5:20/1.0 3:35/1.0 3:10/1.0 :30/1.0	(1.6) 32%	(1.8) 36%		(0.0) 0%			647.2 **WEATHERED ROCK** TAN, GRAY AND WHITE, META-GRANITE	37.8
645	644.0	41.0		:20/1.0 :20/1.0							643.2 **CRYSTALLINE ROCK** WHITE AND GRAY WITH BROWN, MODERATELY TO SLIGHTLY WEATHERED, HARD TO VERY HARD, META-GRANITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING	41.8
	643.2	41.8		*N=100/0.8*							MAJORITY OF JOINTS AT 10° TO 20°	
640	639.0	46.0	4.2	:14/0.2 3:02/1.0 4:08/1.0 5:46/1.0 10:08/1.0	(4.2) 100%	(2.4) 57%		(7.2) 78%	(4.7) 51%		*NOTE: APPROXIMATELY 2 FT. OF LAST RUN COULD NOT BE BROKEN OFF BY LIFTERS	
635	634.0	51.0	5.0	5:02/1.0 4:26/1.0 7:26/1.0 8:25/1.0 16:45/1.0	(3.0) 60%	(2.3) 46%					634.0 Boring Terminated at Elevation 634.0 ft IN CRYSTALLINE ROCK (META-GRANITE)	51.0
											Boring named B2-A_RL for the original investigation.	

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B3-C_RL	**STATION** 143+62	**OFFSET** 45 ft RT	**ALIGNMENT** -L-	**0 HR.** 7.5
COLLAR ELEV. 686.0 ft	**TOTAL DEPTH** 26.0 ft	**NORTHING** 863,259	**EASTING** 1,791,365	**24 HR.** 9.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER E. Estep	**START DATE** 06/10/09	**COMP. DATE** 06/11/09	**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)
690										
										686.0 GROUND SURFACE 0.0
685	685.0	1.0								**ALLUVIAL**
	682.5	3.5	1	2	2	4		W		BROWN, SANDY SILT
			4	6	6	12				683.0 3.0
680	680.0	6.0					SS-19	23%		**RESIDUAL**
			10	9	9	18				BROWN, SILTY, COARSE TO FINE SAND
	677.5	8.5								680.5 5.5
675			4	5	6	11				
	673.5	12.5	60/0.0			60/0.0				**CRYSTALLINE ROCK**
670										WHITE WITH GRAY AND BLACK, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, META-GRANITE
665										
660										660.0 26.0
										Boring Terminated at Elevation 660.0 ft IN CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B3-C_RL	**STATION** 143+62	**OFFSET** 45 ft RT	**ALIGNMENT** -L-	**0 HR.** 7.5
COLLAR ELEV. 686.0 ft	**TOTAL DEPTH** 26.0 ft	**NORTHING** 863,259	**EASTING** 1,791,365	**24 HR.** 9.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER E. Estep	**START DATE** 06/10/09	**COMP. DATE** 06/11/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 13.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
673.5											Begin Coring @ 12.5 ft
	673.5	12.5	4.5	4:30/1.0	(4.3)	(4.1)		(13.3)	(13.1)		673.5 **CRYSTALLINE ROCK** 12.5
670				*N=60/0.0*	96%	91%		99%	97%		WHITE WITH GRAY AND BLACK, VERY SLIGHTLY WEATHERED TO
				4:30/1.0							FRESH, HARD TO VERY HARD, META-GRANITE WITH MODERATELY
				6:45/1.0							CLOSE TO WIDE FRACTURE SPACING
				11:00/1.0							
	669.0	17.0		3:00/0.5							0.2 CORE LOSS FROM 15.7' TO 15.9'
			5.0	4:00/1.0	(5.0)	(5.0)					2 JOINTS AT 10°
665				5:00/1.0	100%	100%					
				5:40/1.0							
				5:50/1.0							
	664.0	22.0		7:30/1.0							
			4.0	9:55/1.0	(4.0)	(4.0)					
660	660.0	26.0		8:30/1.0	100%	100%					660.0 26.0
				10:05/1.0							Boring Terminated at Elevation 660.0 ft IN CRYSTALLINE ROCK
				12:15/1.0							(META-GRANITE)
				17:00/1.0							

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14399RT	**STATION** 143+99	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 687.2 ft	**TOTAL DEPTH** 16.1 ft	**NORTHING** 863,278	**EASTING** 1,791,323	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER E. Estep	**START DATE** 06/09/09	**COMP. DATE** 06/09/09	**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)
690												
										GROUND SURFACE	687.2	0.0
	686.2	1.0	1	1	1	2		M		**ALLUVIAL** BROWN, SANDY SILT WITH TRACE ORGANICS		
685	683.7	3.5	2	2	1	3		W			682.2	5.0
	681.2	6.0	7	7	8	15		W		**RESIDUAL** TAN AND RED, SANDY SILT		
680	678.7	8.5	3	5	6	11		W				
						1					674.7	12.5
675	673.7	13.5	100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)		
	671.1	16.1	60/0.0			60/0.0					671.1	16.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 671.1 ft ON CRYSTALLINE ROCK (META-GRANITE) Boring named B3-A_RL for the original investigation.		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B4-C_RL	**STATION** 145+49	**OFFSET** 39 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 692.4 ft	**TOTAL DEPTH** 13.4 ft	**NORTHING** 863,419	**EASTING** 1,791,267	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/03/09	**COMP. DATE** 06/03/09	**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)
695												
										GROUND SURFACE	692.4	0.0
	691.4	1.0	5	7	8	15		M		**RESIDUAL** RED AND BROWN, CLAYEY SILT	689.4	3.0
690	688.9	3.5	8	9	10	19		M		BROWN, SANDY SILT		
	686.4	6.0	6	7	10	17		M				
685	683.9	8.5	5	8	10	18		M				
											679.0	13.4
680	679.0	13.4	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 679.0 ft ON CRYSTALLINE ROCK (META-DIORITE)		

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14585RT	**STATION** 145+85	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 8.4
COLLAR ELEV. 690.1 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 863,439	**EASTING** 1,791,231	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/02/09	**COMP. DATE** 06/03/09	**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)
695											
690										690.1 GROUND SURFACE	0.0
	689.1	1.0	3	4	7	11 29	SS-15	26%		**RESIDUAL** BROWN, CLAYEY SILT	
	686.6	3.5	10	12	17			M		687.1 BROWN, COARSE TO FINE SANDY SILT	3.0
685	684.1	6.0	8	9	11	20		M			
	681.6	8.5	6	6	9	15		W		678.6 BROWN, SILTY, COARSE TO FINE SAND	11.5
680											
	676.6	13.5	8	10	14	24		M		674.1	16.0
675										**WEATHERED ROCK**	
	671.9	18.2	60/0.0			60/0.0				671.9 RED, TAN AND GRAY, SEVERELY WEATHERED, META-DIORITE	18.2
670										670.4 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE AND BROWN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-DIORITE	19.7
665										DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE	
660										REC=97% RQD=91%	
655										RMR=82	
										653.9	36.2
										Boring Terminated at Elevation 653.9 ft IN CRYSTALLINE ROCK (META-DIORITE)	
										Boring named B4-A_RL for the original investigation.	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14585RT	**STATION** 145+85	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 8.4
COLLAR ELEV. 690.1 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 863,439	**EASTING** 1,791,231	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 06/02/09	**COMP. DATE** 06/03/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 18.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
671.9											Begin Coring @ 18.2 ft	
670	671.9	18.2	3.0	*N=60/0.0* 3:25/1.0 3:15/1.0 3:30/1.0	(2.4) 80%	(1.5) 50%		(0.9) 60%	(0.0) 0%		671.9 **CRYSTALLINE ROCK**	18.2
	668.9	21.2	5.0	3:30/1.0 3:20/1.0 3:30/1.0 3:40/1.0 3:45/1.0	(5.0) 100%	(4.9) 98%		(16.5) 100%	(16.4) 99%		670.4 DARK GRAY WITH WHITE AND BROWN, MODERATELY TO SLIGHTLY WEATHERED, MODERATELY HARD TO HARD, META-DIORITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING	19.7
665	663.9	26.2	5.0	4:05/1.0 3:45/1.0 4:15/1.0 3:35/1.0 4:55/1.0	(5.0) 100%	(5.0) 100%					MOSTLY BROKEN WITH IRON STAINING OF JOINT FACES DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING	
660	658.9	31.2	5.0	4:47/1.0 4:55/1.0 4:40/1.0 2:45/1.0 3:00/1.0	(5.0) 100%	(5.0) 100%					2 JOINTS AT 10° CONTAINS GRANITIC ZONES	
655	653.9	36.2									653.9	36.2
											Boring Terminated at Elevation 653.9 ft IN CRYSTALLINE ROCK (META-DIORITE)	
											Boring named B4-A_RL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14653RT	**STATION** 146+53	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 15.5
COLLAR ELEV. 691.4 ft	**TOTAL DEPTH** 50.5 ft	**NORTHING** 863,498	**EASTING** 1,791,197	**24 HR.** 14.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/29/09	**COMP. DATE** 06/01/09	**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)
695										
	690.4	1.0	3	3	6	9		M		691.4 GROUND SURFACE 0.0
690	687.9	3.5	3	6	9	15		M		**RESIDUAL** GRAY AND BROWN, SILTY CLAY
685	685.4	6.0	5	9	11	20		M		
	682.9	8.5	6	6	12	18		M		
680	677.9	13.5	17	22	25	47				679.4 12.0 GRAY AND BROWN, COARSE TO FINE SANDY SILT
675	672.9	18.5	13	20	30	50		W		670.4 21.0 **WEATHERED ROCK** (META-DIORITE)
670	667.9	23.5	83	17/0.1		100/0.6				
665	662.9	28.5	100/0.3			100/0.3				
660	657.9	33.5	100/0.3			100/0.3				
655	655.9	35.5	60/0.0			60/0.0				655.9 35.5 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE REC=95% RQD=94% RMR=87
650										640.9 50.5 Boring Terminated at Elevation 640.9 ft IN CRYSTALLINE ROCK (META-DIORITE) Boring named B5-A_RL for the original investigation.
645										

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14653RT	**STATION** 146+53	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 15.5
COLLAR ELEV. 691.4 ft	**TOTAL DEPTH** 50.5 ft	**NORTHING** 863,498	**EASTING** 1,791,197	**24 HR.** 14.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/29/09	**COMP. DATE** 06/01/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 15.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
655.9											Begin Coring @ 35.5 ft
655	655.9	35.5	5.0	*N=60/0.0* 3:40/1.0 3:30/1.0 3:25/1.0 2:30/1.0 2:45/1.0	(4.4) 88%	(4.3) 86%		(14.3) 95%	(14.1) 94%		655.9 **CRYSTALLINE ROCK** 35.5 DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING MODERATE SEVERELY TO MODERATELY WEATHERED ZONE 27.4' TO 28.1' WITH 0.6' CORE LOSS; JOINTS EACH END OF ZONE AT 10° ZONE 42.6' TO 42.7' WITH VERY CLOSE FRACTURE SPACING; JOINTS AT EACH END OF ZONE AT 0° TO 10° WITH IRON STAINING
650	650.9	40.5	5.0	2:50/1.0 2:20/1.0 2:25/1.0 2:00/1.0 2:30/1.0	(5.0) 100%	(4.9) 98%					
645	645.9	45.5	5.0	2:40/1.0 2:10/1.0 2:45/1.0 2:20/1.0 2:05/1.0	(4.9) 98%	(4.9) 98%					
	640.9	50.5									640.9 50.5 Boring Terminated at Elevation 640.9 ft IN CRYSTALLINE ROCK (META-DIORITE) Boring named B5-A_RL for the original investigation.

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-A_RL	**STATION** 147+20	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 13.3
COLLAR ELEV. 692.4 ft	**TOTAL DEPTH** 46.3 ft	**NORTHING** 863,557	**EASTING** 1,791,164	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/28/09	**COMP. DATE** 05/28/09	**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)
										692.4	0.0
										GROUND SURFACE	
	691.4	1.0	4	5	7	12		M		**RESIDUAL** BROWN, SILTY CLAY	
	688.9	3.5	4	6	9	15		M		689.4	3.0
	686.4	6.0	4	6	8	14		M		BROWN, COARSE TO FINE SANDY SILT	
	683.9	8.5	4	6	9	15		W		686.9	5.5
	678.9	13.5	6	6	12	18		W		GRAY AND BROWN, SILTY, COARSE TO FINE SAND WITH TRACE ROCK FRAGMENTS	
	673.9	18.5	6	8	13	21		W		671.4	21.0
	668.9	23.5	21	79/0.4						**WEATHERED ROCK** (META-DIORITE)	
	666.4	26.0	100/0.5			100/0.9				665.6	26.8
	665.6	26.8	60/0.0			100/0.5 60/0.0				**CRYSTALLINE ROCK** DARK GRAY, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-DIORITE	
										662.0	30.4
										660.5	31.9
										DARK GRAY, SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE FRACTURE SPACING, META-DIORITE	
										DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE	
										REC=96% RQD=92%	
										RMR=82	
										646.1	46.3
										Boring Terminated at Elevation 646.1 ft IN CRYSTALLINE ROCK (META-DIORITE)	
										Boring named B6-A_RL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-A_RL	**STATION** 147+20	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 13.3
COLLAR ELEV. 692.4 ft	**TOTAL DEPTH** 46.3 ft	**NORTHING** 863,557	**EASTING** 1,791,164	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/28/09	**COMP. DATE** 05/28/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 19.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
665.6											Begin Coring @ 26.8 ft	
665	665.6	26.8	5.0	4:00/1.0 *N=60/0.0* 4:00/1.0 2:50/1.0 2:55/1.0 2:00/1.0	(4.4) 88%	(3.6) 72%		(3.6) 100%	(3.6) 100%		665.6	26.8
											CRYSTALLINE ROCK DARK GRAY, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH MODERATELY CLOSE FRACTURE SPACING	
											662.0	30.4
660	660.6	31.8	4.5	4:30/1.0 3:10/1.0 2:30/1.0 2:45/1.0 3:07/0.5 1:20/1.0	(4.4) 98%	(4.4) 98%		(0.8) 53% (14.4) 100%	(0.0) 0% (14.4) 100%		660.5	31.9
											1 JOINT AT 45° PARTIALLY HEALED JOINT AT 80° TO 90° FIRST 1.2 FT.	
	656.1	36.3									DARK GRAY, SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH VERY CLOSE FRACTURE SPACING	
655			5.0	4:45/1.0 3:20/1.0 3:15/1.0 4:50/1.0 5:05/1.0	(5.0) 100%	(5.0) 100%					DARK GRAY WITH WHITE, VERY SLIGHTLY WEATHERED TO FRESH, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING	
	651.1	41.3									3 JOINTS AT 10° TO 20°	
650			5.0	4:30/1.0 4:30/1.0 4:00/1.0 4:40/1.0 4:20/1.0	(5.0) 100%	(5.0) 100%						
	646.1	46.3									646.1	46.3
											Boring Terminated at Elevation 646.1 ft IN CRYSTALLINE ROCK (META-DIORITE)	
											Boring named B6-A_RL for the original investigation.	

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD		**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-C_RL	**STATION** 147+22	**OFFSET** 35 ft RT	**ALIGNMENT** -L-	**0 HR.** 17.2
COLLAR ELEV. 693.6 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 863,567	**EASTING** 1,791,177	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 08/05/13	**COMP. DATE** 08/05/13		**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
695										
										693.6 GROUND SURFACE 0.0
										RESIDUAL GRAY AND BROWN, SANDY SILT
690	690.1	3.5	3	6	7	13		M		
										686.6 7.0
685	685.1	8.5	2	3	5	8		M		TAN-BROWN, SAPROLITIC, SILTY SAND
680	680.1	13.5	3	5	7	12		M		
675	675.1	18.5	2	6	10	16		M		
670	670.1	23.5	6	7	15	22		M		
665	665.1	28.5	6	40	60/0.3	100/0.8				664.6 29.0
										WEATHERED ROCK (META-DIORITE)
	660.1	33.5	60/0.0			60/0.0				660.1 33.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 660.1 ft ON CRYSTALLINE ROCK (META-DIORITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-B_RL	**STATION** 147+20	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 695.2 ft	**TOTAL DEPTH** 54.8 ft	**NORTHING** 863,577	**EASTING** 1,791,200	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/22/09	**COMP. DATE** 06/23/09	**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)
700											
695										695.2 GROUND SURFACE	0.0
	694.2	1.0	7	6	7	13		W		**RESIDUAL** BROWN, SANDY SILT	
690	691.7	3.5	5	7	12	19		W			
	689.2	6.0	8	10	14	24		W			
685	686.7	8.5	6	11	11	22		W		683.2	12.0
	681.7	13.5	8	17	15	32		W		BROWN AND GRAY, SILTY, COARSE TO FINE SAND	
680	676.7	18.5	10	16	21	37		W			
675	671.7	23.5	17	37	55	92		W			
670	666.7	28.5	20	33	55	88		W			
665	661.7	33.5	37	60	40/0.3	100/0.8		W		662.7	32.5
660	656.7	38.5	100/0.3			100/0.3				**WEATHERED ROCK** (META-DIORITE)	
655	656.4	38.8	60/0.0			60/0.0				656.4	38.8
650										**CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD; CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-DIORITE	
645										647.4	47.8
										DARK GRAY, SLIGHTLY WEATHERED, HARD, VERY CLOSE FRACTURE SPACING, META-DIORITE	
										645.2	50.0
										DARK GRAY, VERY SLIGHTLY WEATHERED, HARD, MODERATELY CLOSE FRACTURE SPACING, META-DIORITE	
										640.4	54.8
										Boring Terminated at Elevation 640.4 ft IN CRYSTALLINE ROCK (META-DIORITE)	

Boring named B6-B_RL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B5-B_RL	**STATION** 147+20	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 695.2 ft	**TOTAL DEPTH** 54.8 ft	**NORTHING** 863,577	**EASTING** 1,791,200	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/22/09	**COMP. DATE** 06/23/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 16.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
656.4											Begin Coring @ 38.8 ft	
655	656.4	38.8	1.0	N=60/0.0	(1.0) 100%	(1.0) 100%		(9.0) 100%	(8.8) 98%		656.4 **CRYSTALLINE ROCK**	38.8
	655.4	39.8	5.0	5:00/1.0							DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING	
				4:05/1.0	(5.0) 100%	(5.0) 100%					5 JOINTS AT 0° TO 10°	
				4:30/1.0								
				4:35/1.0								
				3:10/1.0								
650	650.4	44.8		3:00/1.0							647.4	47.8
			5.0	3:45/1.0	(3.8) 76%	(2.8) 56%					DARK GRAY, SLIGHTLY WEATHERED, HARD, META-DIORITE WITH	
				3:15/1.0							VERY CLOSE FRACTURE SPACING	
				3:10/1.0								
				3:55/1.0				(0.8) 36%	(0.0) 0%		645.2	50.0
645	645.4	49.8		3:45/1.0							DARK GRAY, VERY SLIGHTLY WEATHERED, HARD, META-DIORITE	
			5.0	2:30/1.0	(4.8) 96%	(4.8) 96%		(4.8) 100%	(4.8) 100%		WITH MODERATELY CLOSE FRACTURE SPACING	
				1:55/1.0								
				2:00/1.0							1 JOINT AT 10°	
				1:55/1.0								
	640.4	54.8		2:00/1.0							640.4	54.8
											Boring Terminated at Elevation 640.4 ft IN CRYSTALLINE ROCK (META-DIORITE)	

Boring named B6-B_RL for the original investigation.

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/25/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14807RT	**STATION** 148+07	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 8.7
COLLAR ELEV. 692.8 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 863,632	**EASTING** 1,791,120	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/03/09	**COMP. DATE** 06/10/09	**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)
										692.8 GROUND SURFACE	0.0
	691.8	1.0	5	7	9	16		M		**RESIDUAL** BLACK, TAN AND RED, SANDY SILT WITH TRACE ORGANICS	
	689.3	3.5	35	43	38	81		M		689.8 RED, TAN AND BLACK, SILTY, FINE TO COARSE SAND	3.0
	686.8	6.0	26	26	27	53		M			
	684.3	8.5	15	27	40	67		M		683.8 TAN AND GRAY, SANDY SILT	9.0
	679.3	13.5	24	32	68/0.3	100/0.8				678.3 **WEATHERED ROCK** (META-DIORITE)	14.5
	674.3	18.5	60/0.0			60/0.0				674.3 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, MODERATELY SEVERELY TO MODERATELY WEATHERED, MEDIUM HARD TO MODERATELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-DIORITE	18.5
	671.5	21.3	100/0.4			100/0.4				672.8 **WEATHERED ROCK** RED, TAN AND GRAY, SEVERELY WEATHERED, META-DIORITE	20.0
	666.5	26.3	100/0.3			100/0.3				661.8 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE	31.0
	661.8	31.0	60/0.0			60/0.0				REC=100% RQD=91%	
										RMR=82	
										647.8 Boring Terminated at Elevation 647.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	45.0
										Boring named B7-A_RL for the original investigation.	

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14807RT	**STATION** 148+07	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 8.7
COLLAR ELEV. 692.8 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 863,632	**EASTING** 1,791,120	**24 HR.** 8.8
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/03/09	**COMP. DATE** 06/10/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 16.8 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
674.3											Begin Coring @ 18.5 ft	
	674.3	18.5	2.8	*N=60/0.0* 1:22/1.0 3:06/1.0 2:32/0.7	(0.8) 29%	(0.0) 0%		(0.8) 53%	(0.0) 0%		674.3 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, MODERATELY SEVERELY TO MODERATELY WEATHERED, MEDIUM HARD TO MODERATELY HARD, META-DIORITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING	18.5
670	671.5	21.3		*N=100/0.4*				(0.0) 0%	N/A		672.8 HEAVY IRON STAINING ON JOINT FACES **WEATHERED ROCK** RED, TAN AND GRAY, SEVERELY WEATHERED, META-DIORITE	20.0
665				*N=100/0.3*								
	661.8	31.0	5.0	*N=60/0.0* 3:46/1.0 3:58/1.0 2:50/1.0 3:43/1.0 3:59/1.0	(5.0) 100%	(4.1) 82%		(14.0) 100%	(12.8) 91%		661.8 **CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING	31.0
660											CLOSE FRACTURE SPACING 31.0' TO 31.8' 5 JOINTS AT 0° TO 10°	
	656.8	36.0										
655			5.0	3:43/1.0 4:07/1.0 4:14/1.0 4:16/1.0 3:38/1.0	(5.0) 100%	(4.7) 94%						
	651.8	41.0										
650			4.0	4:09/1.0 4:17/1.0 4:06/1.0 4:24/1.0	(4.0) 100%	(4.0) 100%						
	647.8	45.0									647.8 Boring Terminated at Elevation 647.8 ft IN CRYSTALLINE ROCK (META-DIORITE)	45.0
											Boring named B7-A_RL for the original investigation.	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14878RT	**STATION** 148+78	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 10.4
COLLAR ELEV. 689.2 ft	**TOTAL DEPTH** 20.7 ft	**NORTHING** 863,694	**EASTING** 1,791,085	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/13/09	**COMP. DATE** 05/13/09	**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)
690										689.2 GROUND SURFACE 0.0
	688.2	1.0	3	2	5	7		M		**RESIDUAL** BROWN, SILTY, COARSE TO FINE SAND WITH TRACE MICA
685	685.7	3.5	6	11	17	28				
	683.2	6.0	12	34	28	62		W		681.2 8.0
680	680.7	8.5	70	30/0.1		100/0.6				680.0 **WEATHERED ROCK** (META-DIORITE) 9.2
	680.0	9.2	60/0.0			60/0.0				**CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, META-DIORITE
675										REC=100% RQD=97%
670										668.5 RMR=82 20.7
										Boring Terminated at Elevation 668.5 ft IN CRYSTALLINE ROCK (META-DIORITE)
										Boring named B8-A_RL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14878RT	**STATION** 148+78	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 10.4
COLLAR ELEV. 689.2 ft	**TOTAL DEPTH** 20.7 ft	**NORTHING** 863,694	**EASTING** 1,791,085	**24 HR.** 4.7
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/13/09	**COMP. DATE** 05/13/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 11.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
680											Begin Coring @ 9.2 ft
	680.0	9.2	1.5	*N=60/0.0*	(1.5)	(1.5)		(11.5)	(11.1)		680.0 **CRYSTALLINE ROCK** 9.2
	678.5	10.7	5.0	1:40/0.5 3:00/1.0	100%	100%		100%	97%		DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH MODERATELY CLOSE TO WIDE FRACTURE SPACING
675				3:20/1.0 3:05/1.0 3:10/1.0	(5.0) 100%	(4.6) 92%					ZONE FROM 11.9' TO 12.3' WITH VERY CLOSE FRACTURE SPACING 4 JOINTS AT 10° TO 20°, WITH IRON STAINING, AND 1 JOINT AT 80 WITH IRON STAINING
	673.5	15.7	5.0	3:15/0.8 3:40/1.0	(5.0) 100%	(5.0) 100%					OTHER THAN ABOVE DESCRIBED ZONE, 2 JOINTS AT 10°, SOME HIGH ANGLE HEALED FRACTURES
670				3:55/1.0 3:05/1.0 3:20/1.0 3:10/1.0							
	668.5	20.7		3:15/1.0							668.5 20.7
											Boring Terminated at Elevation 668.5 ft IN CRYSTALLINE ROCK (META-DIORITE)
											Boring named B8-A_RL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)			**GROUND WTR (ft)**
BORING NO. B6-C_RL	**STATION** 148+99	**OFFSET** 39 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 690.5 ft	**TOTAL DEPTH** 7.9 ft	**NORTHING** 863,722	**EASTING** 1,791,093	**24 HR.** 5.6
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/13/09	**COMP. DATE** 05/13/09	**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
695										
690										690.5 GROUND SURFACE 0.0
	689.5	1.0	7	9	14	23	SS-7	M		**RESIDUAL** LIGHT BROWN, SILTY SAND
	687.0	3.5	11	18	35	53				685.0 5.5
685	684.5	6.0	60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-DIORITE)
	682.6	7.9	60/0.0			60/0.0				682.6 7.9

Boring Terminated with Standard Penetration Test Refusal at Elevation 682.6 ft IN CRYSTALLINE ROCK (META-DIORITE)

Boring named B8-C_RL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B6-B_RL	**STATION** 149+20	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** 10.6
COLLAR ELEV. 697.4 ft	**TOTAL DEPTH** 30.7 ft	**NORTHING** 863,751	**EASTING** 1,791,101	**24 HR.** 10.3
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/12/09	**COMP. DATE** 05/12/09	**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)
700										
										697.4 GROUND SURFACE 0.0
	696.4	1.0	4	6	6	12		M		**RESIDUAL** LIGHT BROWN TO BROWN AND GRAY, SANDY SILT WITH TRACE ROCK FRAGMENTS AT 13.5 FT.
695	693.9	3.5	4	5	6	11		M		
	691.4	6.0	6	8	17	25		M		
690	688.9	8.5	24	23	43	66		M		
	683.9	13.5	17	16	14	30		W		
685	681.7	15.7	60/0.0			60/0.0				681.7 15.7
										CRYSTALLINE ROCK DARK GRAY WITH WHITE, SLIGHTLY WEATHERED, HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-DIORITE
680										679.9 17.5
										DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD, WIDE FRACTURE SPACING, META-DIORITE
675										
										666.7 30.7
670										Boring Terminated at Elevation 666.7 ft IN CRYSTALLINE ROCK (META-DIORITE)
										Boring named B8-B_RL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** T. Wells/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. B6-B_RL	**STATION** 149+20	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** 10.6
COLLAR ELEV. 697.4 ft	**TOTAL DEPTH** 30.7 ft	**NORTHING** 863,751	**EASTING** 1,791,101	**24 HR.** 10.3
DRILL RIG/HAMMER EFF./DATE CME-55		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Manual	
DRILLER W. Whichard	**START DATE** 05/12/09	**COMP. DATE** 05/12/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 15.0 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
681.7											Begin Coring @ 15.7 ft
680	681.7	15.7	5.0	N=60/0.0 3:15/1.0 2:30/1.0 2:15/1.0 1:50/1.0 2:15/1.0	(5.0) 100%	(4.4) 88%		(1.8) 100%	(1.2) 67%		681.7 **CRYSTALLINE ROCK** 15.7
	676.7	20.7	5.0	2:15/1.0 1:45/1.0 2:10/1.0 2:05/1.0 2:10/1.0	(5.0) 100%	(5.0) 100%		(13.2) 100%	(13.2) 100%		679.9 17.5 DARK GRAY WITH WHITE, SLIGHTLY WEATHERED, HARD, META-DIORITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING 5 JOINTS AT 0° TO 10° WITH IRON STAINING OPEN TO PARTIALLY HEALED VERTICAL JOINT THROUGHOUT
675											DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD, META-DIORITE WITH WIDE FRACTURE SPACING 1 JOINT AT 10°
	671.7	25.7	5.0	2:05/1.0 1:50/1.0 2:10/1.0 2:15/1.0 2:45/1.0	(5.0) 100%	(5.0) 100%					
670	666.7	30.7									666.7 30.7
											Boring Terminated at Elevation 666.7 ft IN CRYSTALLINE ROCK (META-DIORITE)
											Boring named B8-B_RL for the original investigation.

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14998RT	**STATION** 149+98	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.0
COLLAR ELEV. 694.4 ft	**TOTAL DEPTH** 25.7 ft	**NORTHING** 863,798	**EASTING** 1,791,026	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER Toothman/Hicks	**START DATE** 05/15/09	**COMP. DATE** 05/18/09	**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)
695										694.4 GROUND SURFACE	0.0
	693.4	1.0	2	3	5	8		M		**RESIDUAL** RED, TAN AND GRAY, COARSE TO FINE SANDY SILT	
690	690.9	3.5	18	28	72/0.3	100/0.8				689.9	4.5
	688.4	6.0	100/0.4			100/0.4				**WEATHERED ROCK** (META-DIORITE) 688.0	6.4
685	688.0	6.4	60/0.0			60/0.0				**CRYSTALLINE ROCK** DARK GRAY, MODERATELY TO SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE FRACTURE SPACING, META-DIORITE 682.9	11.5
										DARK GRAY, VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE 678.7	15.7
680										DARK GRAY WITH WHITE, SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, META-DIORITE 676.3	18.1
675										DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, META-DIORITE 668.7	25.7
670										REC=92% RQD=65% RMR=65 Boring Terminated at Elevation 668.7 ft IN CRYSTALLINE ROCK (META-DIORITE)	

Boring named B9-A_RL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 14998RT	**STATION** 149+98	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.0
COLLAR ELEV. 694.4 ft	**TOTAL DEPTH** 25.7 ft	**NORTHING** 863,798	**EASTING** 1,791,026	**24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Manual	
DRILLER Toothman/Hicks	**START DATE** 05/15/09	**COMP. DATE** 05/18/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 19.3 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
688											Begin Coring @ 6.4 ft	
	688.0	6.4	2.5	*N=60/0.0*	(1.8)	(0.0)		(4.1)	(0.0)		**CRYSTALLINE ROCK** 688.0	6.4
	685.5	8.9		7:10 6:11	72%	0%		80%	0%		DARK GRAY, MODERATELY TO SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH VERY CLOSE FRACTURE SPACING ABUNDANT LOW ANGLE AND HIGH ANGLE FRACTURES	
685			1.8	1:33/0.5	(1.6)	(0.0)					682.9	11.5
	683.7	10.7		1:52/0.5	89%	0%					DARK GRAY, VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING NEAR VERTICAL FRACTURE THROUGHOUT	
			5.0	4:11 1:24/0.3	(4.7)	(4.2)		(4.2)	(4.2)		678.7	15.7
680				10:06 2:37	94%	84%		100%	100%		DARK GRAY WITH WHITE, SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH VERY CLOSE TO CLOSE FRACTURE SPACING	
	678.7	15.7		2:36							4 JOINTS AT 10° TO 20° WITH LIGHT IRON STAINING	
	677.7	16.7	1.0	2:16	(0.7)	(0.7)		(1.8)	(0.8)		676.3	18.1
	676.7	17.7	1.0	1:55	70%	70%		75%	33%		DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH WIDE FRACTURE SPACING NO NATURAL FRACTURES	
675			1.0	1:33							668.7	25.7
			3.0	3:29	(0.7)	(0.0)		(7.6)	(7.6)		Boring Terminated at Elevation 668.7 ft IN CRYSTALLINE ROCK (META-DIORITE)	
	673.7	20.7		2:13 2:27	70%	0%		100%	100%		Boring named B9-A_RL for the original investigation.	
				2:39	(3.0)	(2.7)						
			5.0	1:42 2:12	100%	90%						
670				2:15	(5.0)	(5.0)						
	668.7	25.7		2:27 2:04	100%	100%						

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)			**GROUND WTR (ft)**
BORING NO. B7-C_RL	**STATION** 150+97	**OFFSET** 35 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 701.5 ft	**TOTAL DEPTH** 12.0 ft	**NORTHING** 863,892	**EASTING** 1,790,991	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 91% 12/18/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/02/13	**COMP. DATE** 08/02/13	**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
705										
										701.5 GROUND SURFACE 0.0
700										**RESIDUAL** TAN-BROWN, SANDY SILT
	698.0	3.5	3	4	7	11		M		
695	693.0	8.5	5	5	95/0.4	100/0.9				692.5 9.0 **WEATHERED ROCK** (META-DIORITE)
690	689.5	12.0	60/0.0			60/0.0				689.5 12.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 689.5 ft ON CRYSTALLINE ROCK (META-DIORITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 15118RT	**STATION** 151+18	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 703.5 ft	**TOTAL DEPTH** 34.3 ft	**NORTHING** 863,902	**EASTING** 1,790,966	**24 HR.** 7.4
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/28/09	**COMP. DATE** 05/29/09	**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)
705										
	702.5	1.0								703.5 — GROUND SURFACE — 0.0
			10	9	9	18				**ROADWAY EMBANKMENT** RED, SANDY SILT WITH TRACE CLAY
700	700.0	3.5					SS-4	14%		700.5 — 3.0
			15	16	33	49		M		**RESIDUAL** RED, BLACK AND TAN, SANDY SILT
	697.5	6.0				57				
			23	26	31			M		
695	695.0	8.5								
			48	29	37	66				
690	690.0	13.5								690.5 — 13.0
	688.4	15.1	100/0.5			100/0.5				**WEATHERED ROCK** (META-DIORITE) — 688.4 — 15.1
			60/0.0			60/0.0				**CRYSTALLINE ROCK** DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-DIORITE
685										
680										
675										676.6 — 26.9 675.1 — WHITE WITH DARK GRAY, SLIGHTLY TO VERY SLIGHTLY WEATHERED, VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-GRANITE — 28.4
670										669.2 — DARK GREENISH GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, MODERATELY CLOSE FRACTURE SPACING, META-DIORITE WITH SCHISTOSE TEXTURE — 34.3 REC=98% RQD=96% RMR=82 Boring Terminated at Elevation 669.2 ft IN CRYSTALLINE ROCK (META-DIORITE) Boring named B10-A_RL for the original investigation.

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan/ P. Weaver	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 15118RT	**STATION** 151+18	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 703.5 ft	**TOTAL DEPTH** 34.3 ft	**NORTHING** 863,902	**EASTING** 1,790,966	**24 HR.** 7.4
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** Wash Rotary/NQ Core	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/28/09	**COMP. DATE** 05/29/09	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 19.2 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft) — DEPTH (ft)
688.4											Begin Coring @ 15.1 ft
	688.4	15.1	5.0	*N=60/0.0* 2:53/1.0 2:52/1.0 4:51/1.0 4:01/1.0 3:45/1.0	(4.8) 96%	(4.7) 94%		(11.6) 98%	(11.2) 95%		688.4 — **CRYSTALLINE ROCK** — 15.1 DARK GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING 3 JOINTS AT 10° TO 20° 4 JOINTS AT 60° TO 70° ISOLATED THIN QUARTZ ZONES
685											
	683.4	20.1									
			4.9	2:55/1.0 2:43/1.0 2:57/1.0 3:44/0.9 3:51/1.0	(4.9) 100%	(4.6) 94%					
680	678.5	25.0									
			4.2	4:54/1.0 5:09/1.0 7:41/1.0 7:42/0.2	(4.2) 100%	(4.2) 100%					
675	674.3	29.2									676.6 — 26.9
	673.5	30.0	0.8	1:09/0.8 3:26/1.0	(0.7) 88%	(0.7) 88%		(1.5) 100%	(1.5) 100%		675.1 — WHITE WITH DARK GRAY, SLIGHTLY TO VERY SLIGHTLY WEATHERED, VERY HARD, META-GRANITE WITH MODERATELY CLOSE FRACTURE SPACING — 28.4
			4.3	5:18/1.0 4:46/1.0 5:27/1.0 4:57/1.0 3:02/0.3	(4.3) 100%	(4.3) 100%		(5.8) 98%	(5.8) 98%		NO NATURAL FRACTURES BUT SEVERAL HEALED TO PARTIALLY HEALED FRACTURES
670	669.2	34.3									669.2 — DARK GREENISH GRAY WITH WHITE, SLIGHTLY TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, META-DIORITE WITH MODERATELY CLOSE FRACTURE SPACING AND WITH SCHISTOSE TEXTURE — 34.3 2 JOINTS AT 10° GRANITIC INTRUSION 29.4' TO 30.7' CORE BLOCK AT 30.0 FT. Boring Terminated at Elevation 669.2 ft IN CRYSTALLINE ROCK (META-DIORITE) Boring named B10-A_RL for the original investigation.

NCDOT BORE DOUBLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT CORE SINGLE U2525B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. 15238RT	**STATION** 152+38	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 707.4 ft	**TOTAL DEPTH** 17.8 ft	**NORTHING** 864,006	**EASTING** 1,790,906	**24 HR.** 9.1
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 06/02/09	**COMP. DATE** 06/02/09	**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)
710										707.4 GROUND SURFACE	0.0
	706.4	1.0	6	6	7	13		M		**RESIDUAL** BLACK, TAN AND RED, SILTY CLAY	
705	703.9	3.5	4	7	8	15		M			
	701.4	6.0	5	6	7	13		M			
700	698.9	8.5	5	9	28	37		M		697.9 RED, TAN AND BLACK, SILTY SAND	9.5
695	693.9	13.5	58	42/0.2		100/0.7				694.4 **WEATHERED ROCK** (META-DIORITE)	13.0
690	689.6	17.8	60/0.0			60/0.0				689.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 689.6 ft ON CRYSTALLINE ROCK (META-DIORITE)	17.8

Boring named EB2-A_RL for the original investigation.

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** G. Licayan	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER NORTH BUFFALO CREEK AND -Y8- (RANKIN MILL RD.)				**GROUND WTR (ft)**
BORING NO. EB2-B_RL	**STATION** 152+80	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 707.8 ft	**TOTAL DEPTH** 11.5 ft	**NORTHING** 864,063	**EASTING** 1,790,922	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE Mobile B-57 ATV		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER K. Hicks	**START DATE** 05/14/09	**COMP. DATE** 05/14/09	**SURFACE WATER DEPTH** N/A	

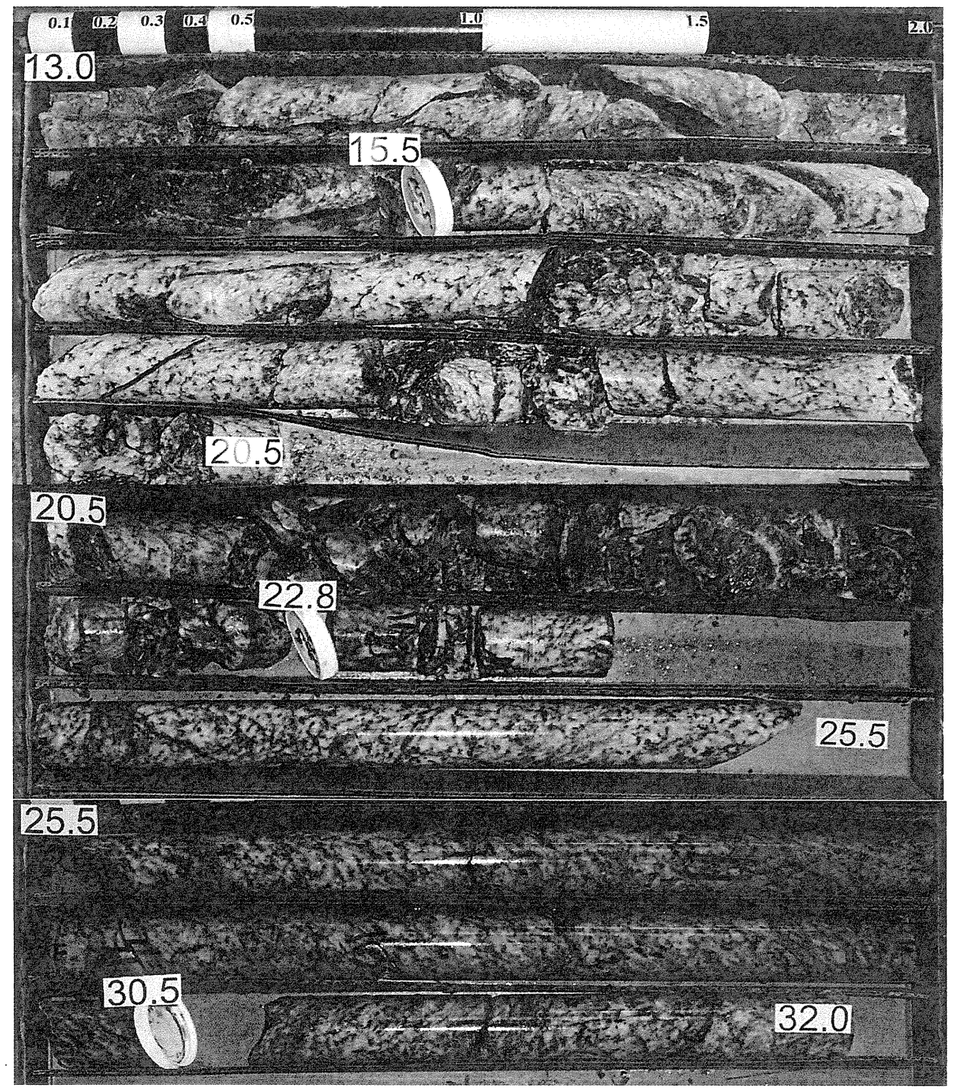
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
710										707.8 GROUND SURFACE	0.0
	706.8	1.0	3	6	5	11		M		**ARTIFICIAL FILL** TAN AND RED, SANDY SILT WITH TRACE OF ORGANIC MATTER AND LAYER OF GRAVEL BETWEEN FILL AND RESIDUAL	3.0
705	704.3	3.5	4	5	6	11	SS-1	37%			
	701.8	6.0	4	5	7	12		M		699.8 **RESIDUAL** TAN, BLACK AND RED, SILTY CLAY	8.0
700	699.3	8.5	14	30	65	95		M		BLACK AND TAN, SILTY SAND	
	696.3	11.5	60/0.0			60/0.0				696.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 696.3 ft ON CRYSTALLINE ROCK (META-DIORITE)	11.5

NCDOT BORE DOUBLE_U2526B_GEO_BUFFALORANKIN_BH.GPJ NC_DOT.GDT 9/23/13

CORE PHOTOGRAPHS

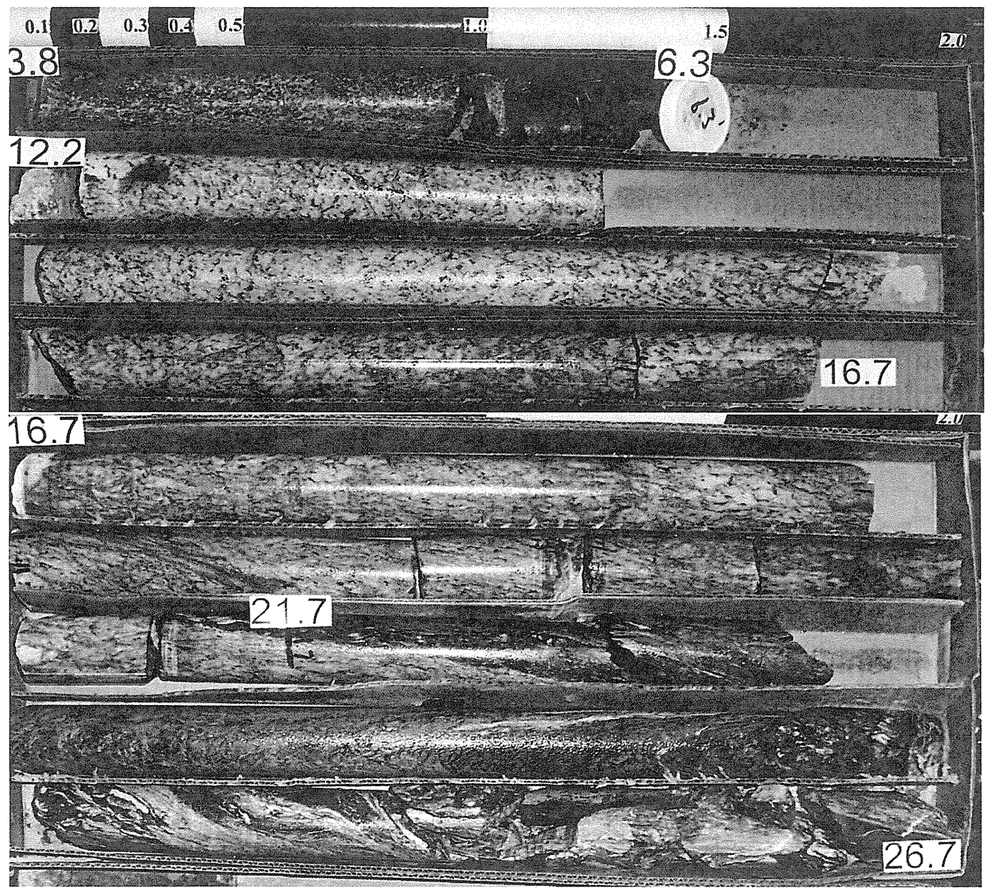
B1-B LL

BOXES 1 - 3: 13.0 - 32.0 FEET



B3-B LL

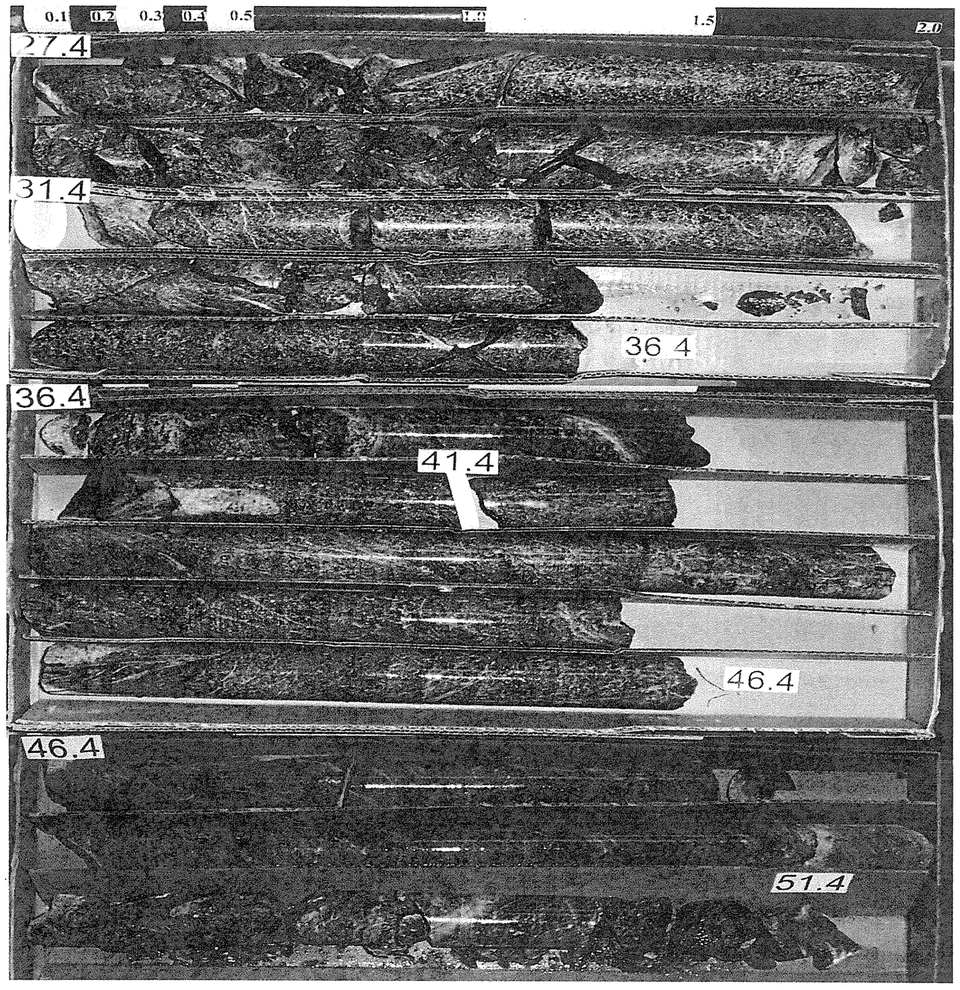
BOXES 1 & 2: 3.8 - 26.7 FEET



CORE PHOTOGRAPHS

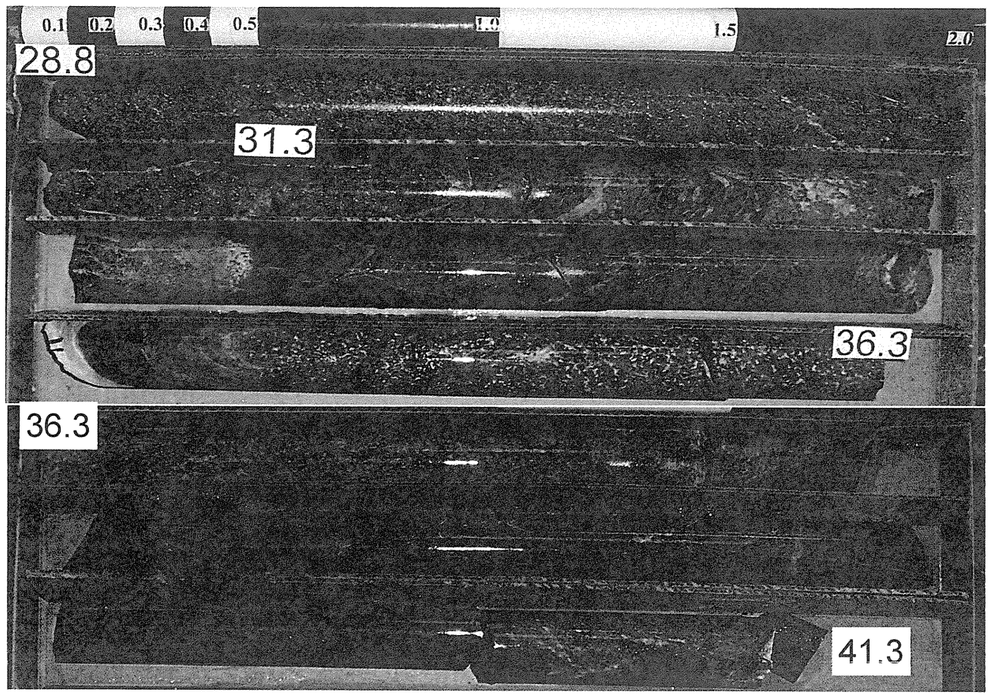
B4-B LL

BOXES 1 - 3: 27.4 - 51.4 FEET



14749 LT

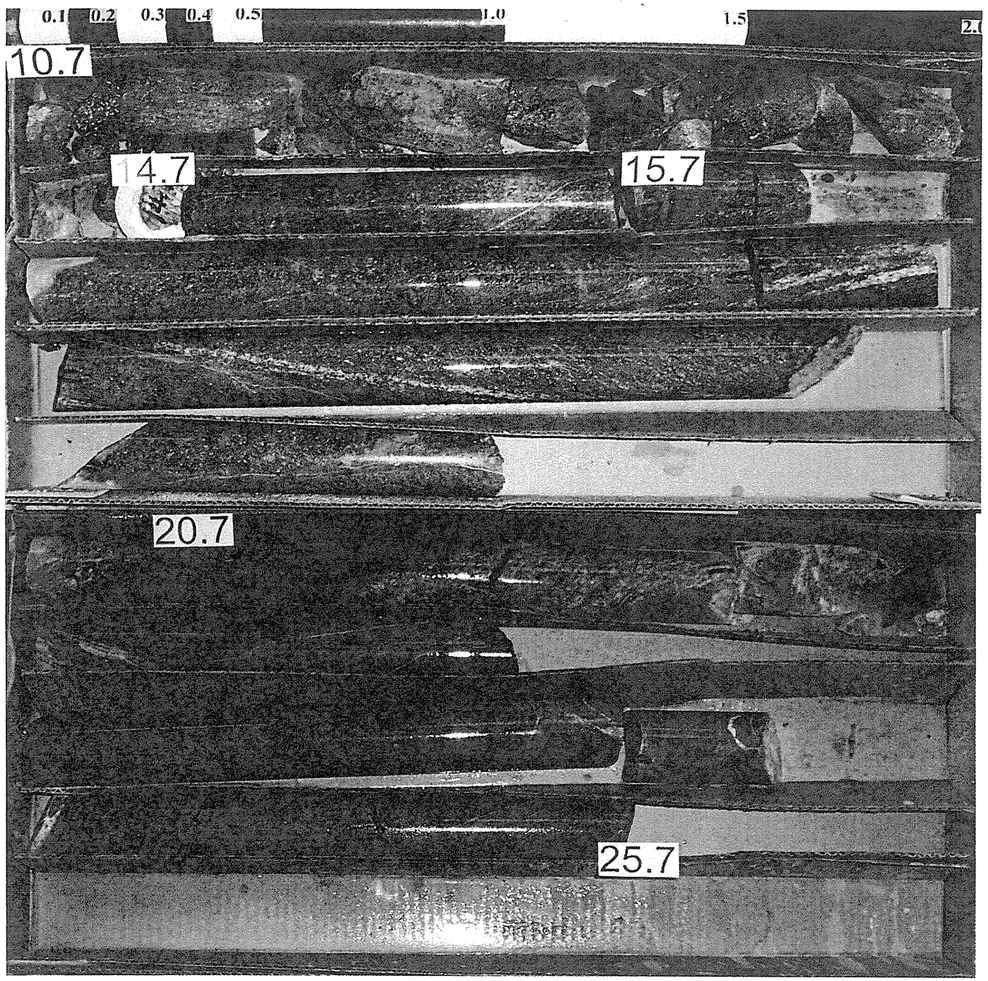
BOXES 1 & 2: 28.8 - 41.3 FEET



CORE PHOTOGRAPHS

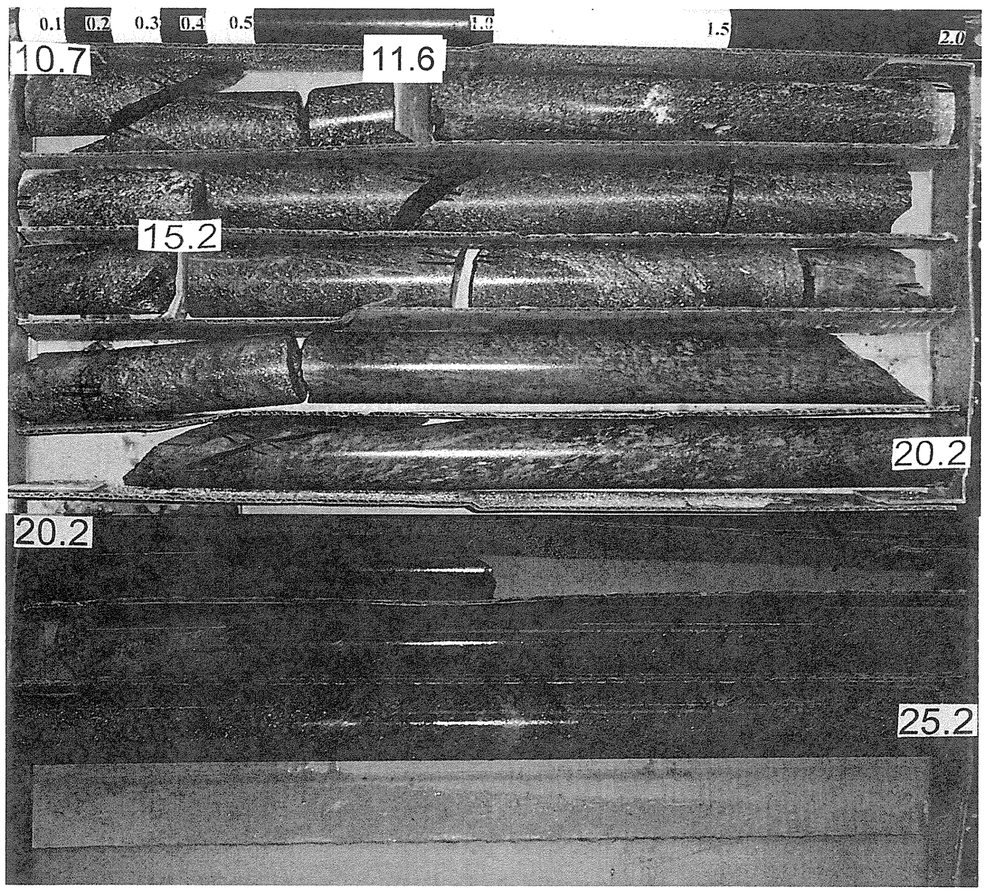
B5-A LL

BOXES 1 & 2: 10.7 - 25.7 FEET



B5-B LL

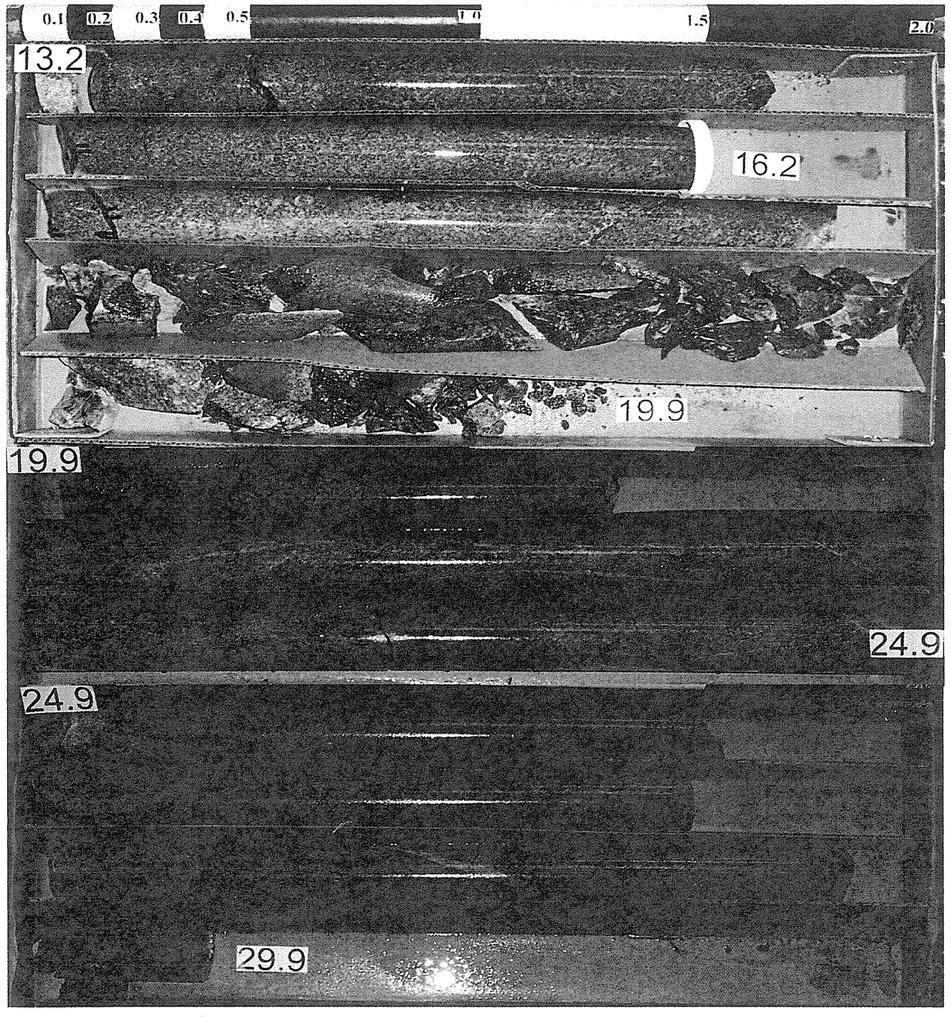
BOXES 1 & 2: 10.7 - 25.2 FEET



CORE PHOTOGRAPHS

14955 LT

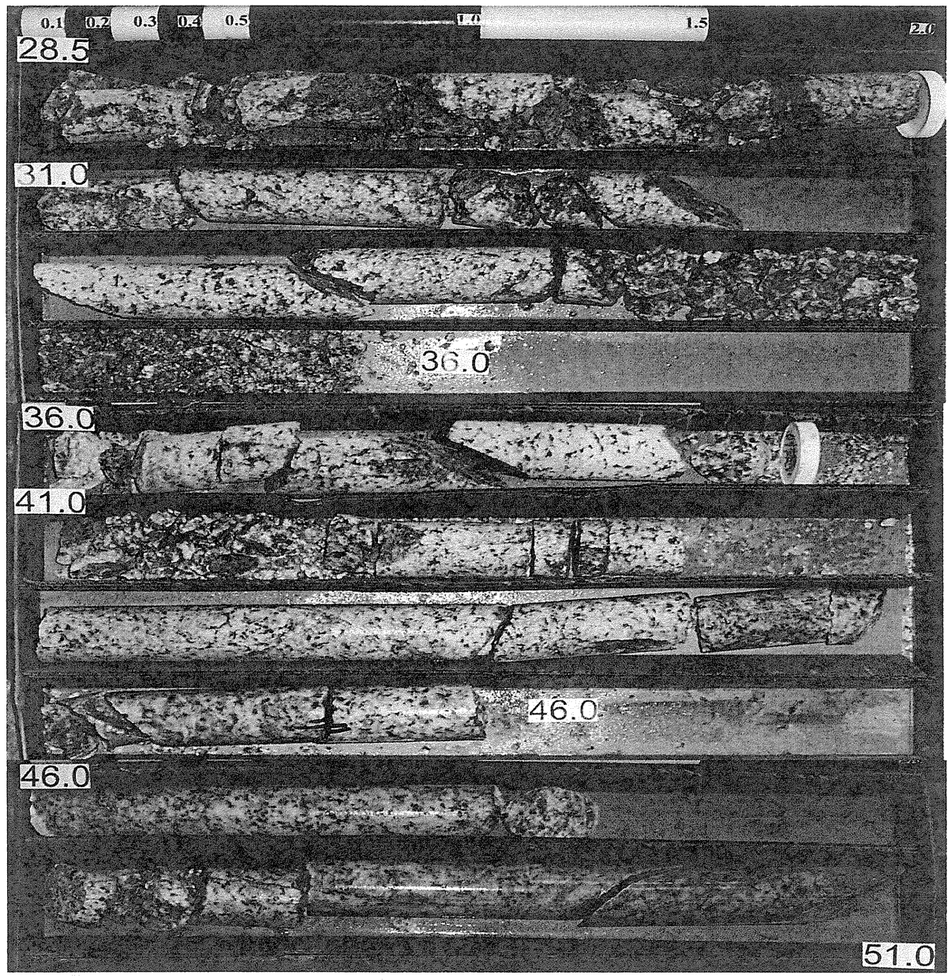
BOXES 1 - 3: 13.2 - 29.9 FEET



CORE PHOTOGRAPHS

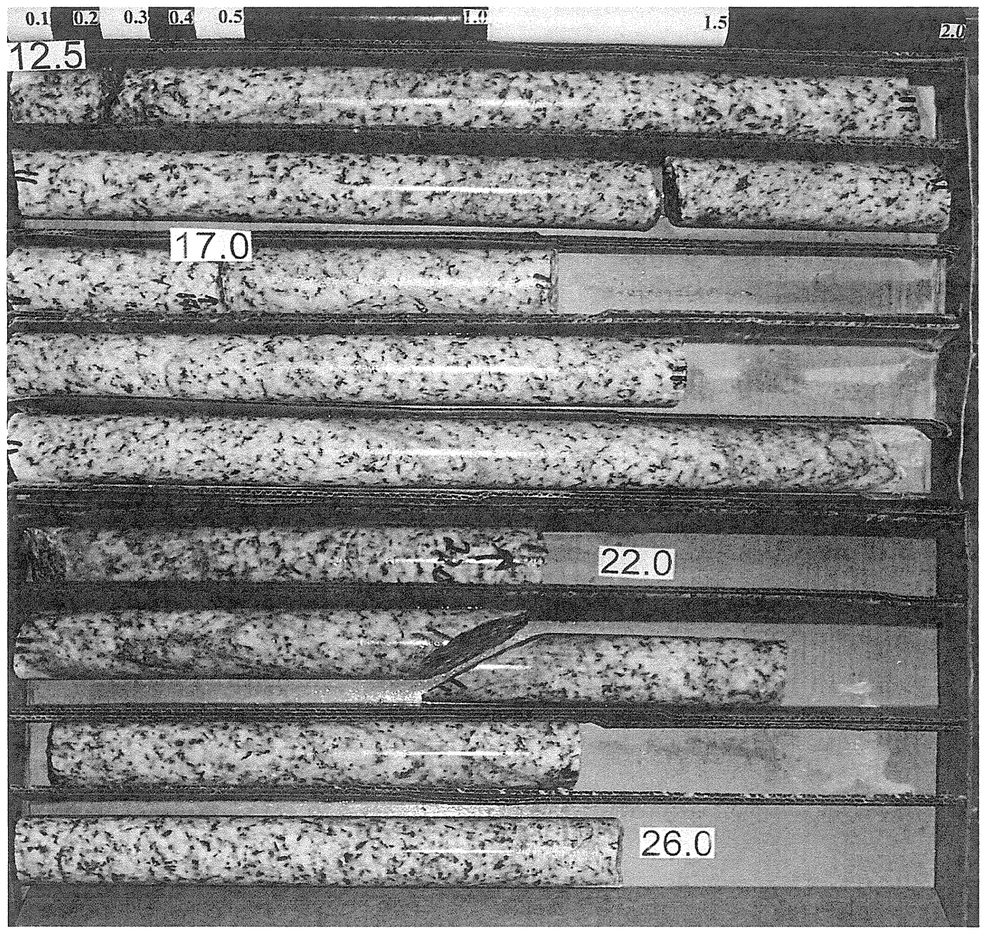
14159 RT

BOXES 1 - 3: 28.5 - 51.0 FEET



B3-C RL

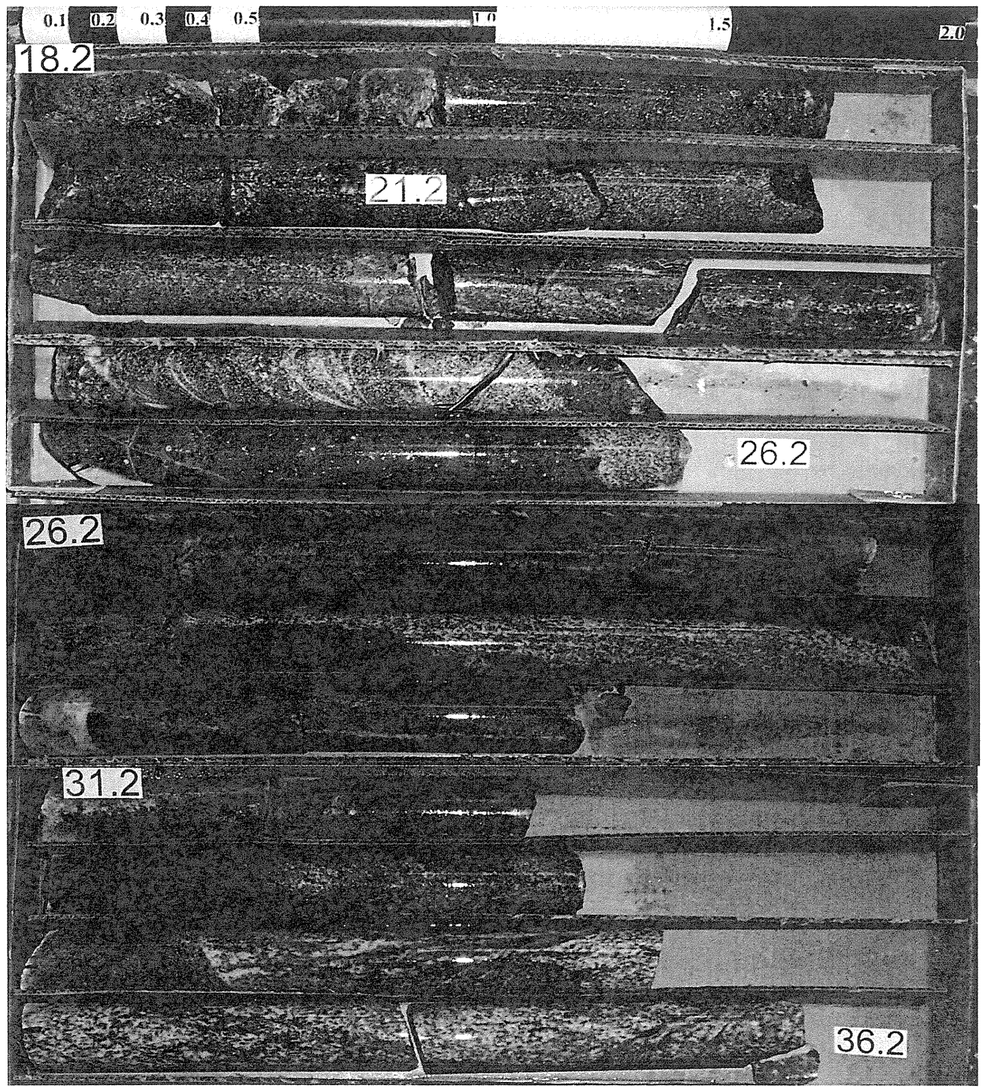
BOXES 1 & 2: 12.5 - 26.0 FEET



CORE PHOTOGRAPHS

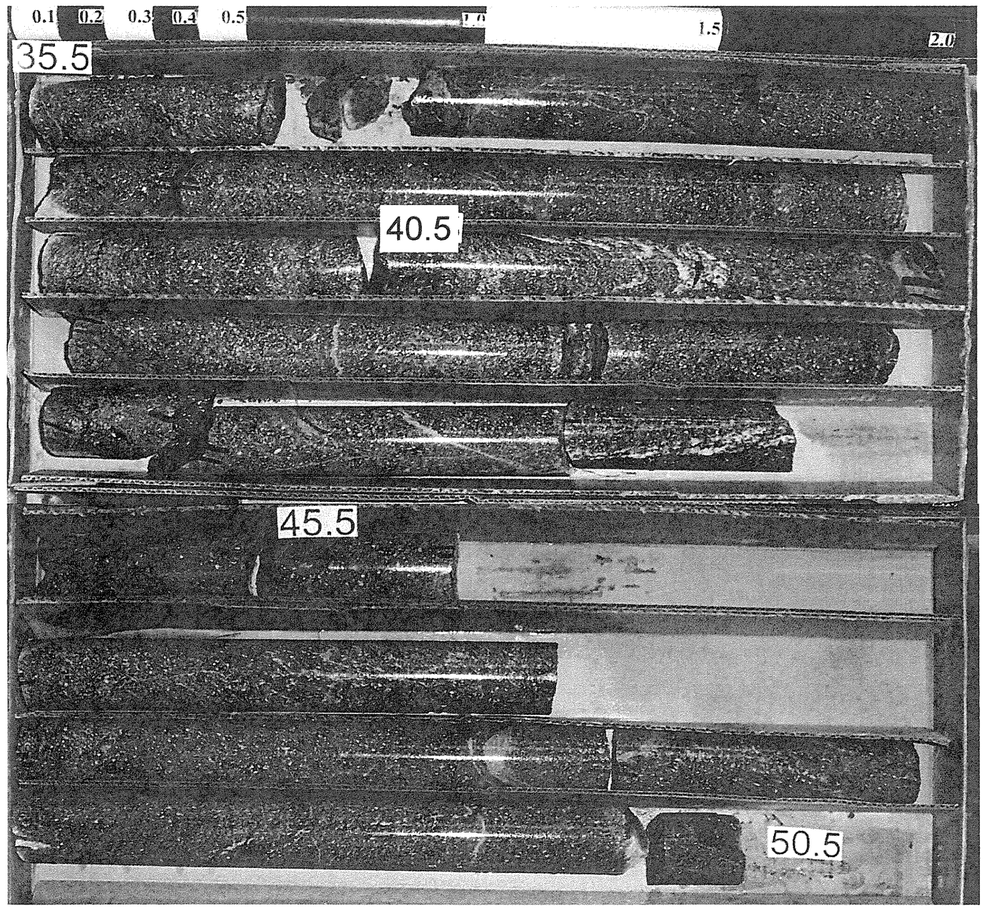
14585 RT

BOXES 1 - 3: 18.2 - 36.2 FEET



14653 RT

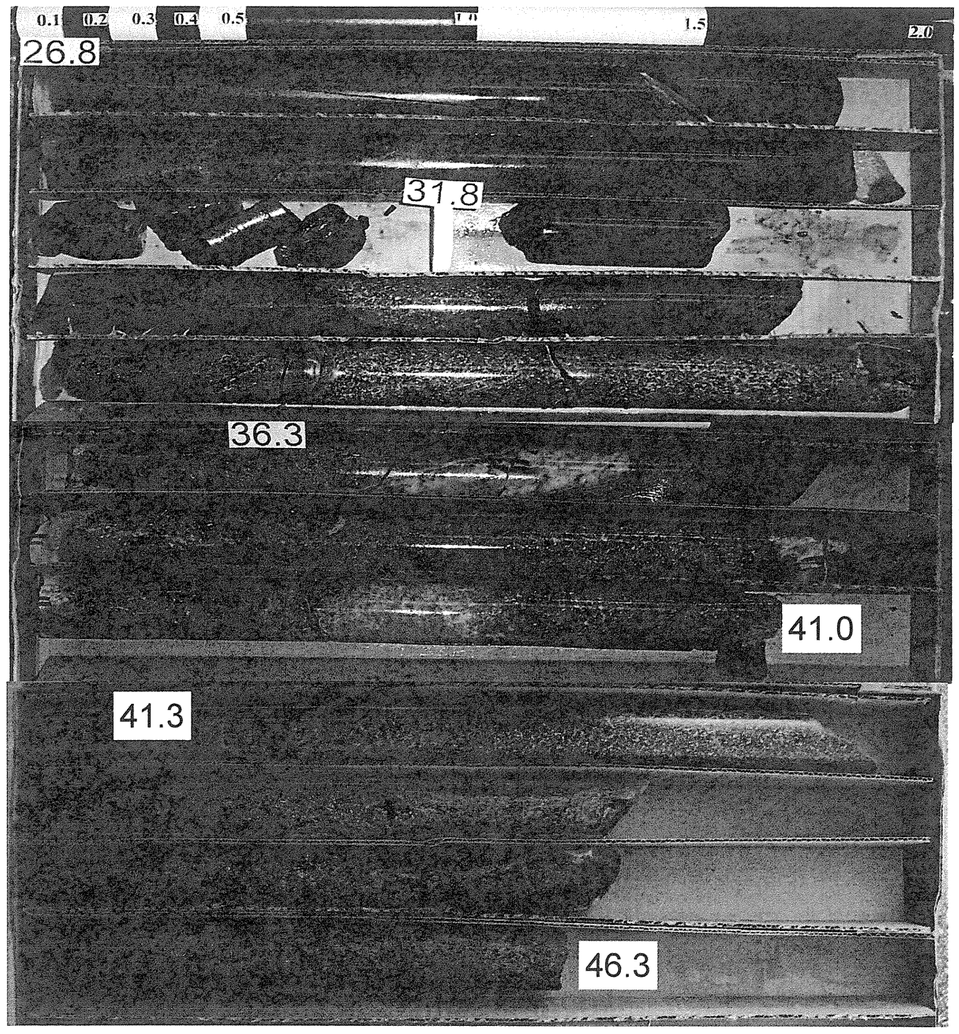
BOXES 1 & 2: 35.5 - 50.5 FEET



CORE PHOTOGRAPHS

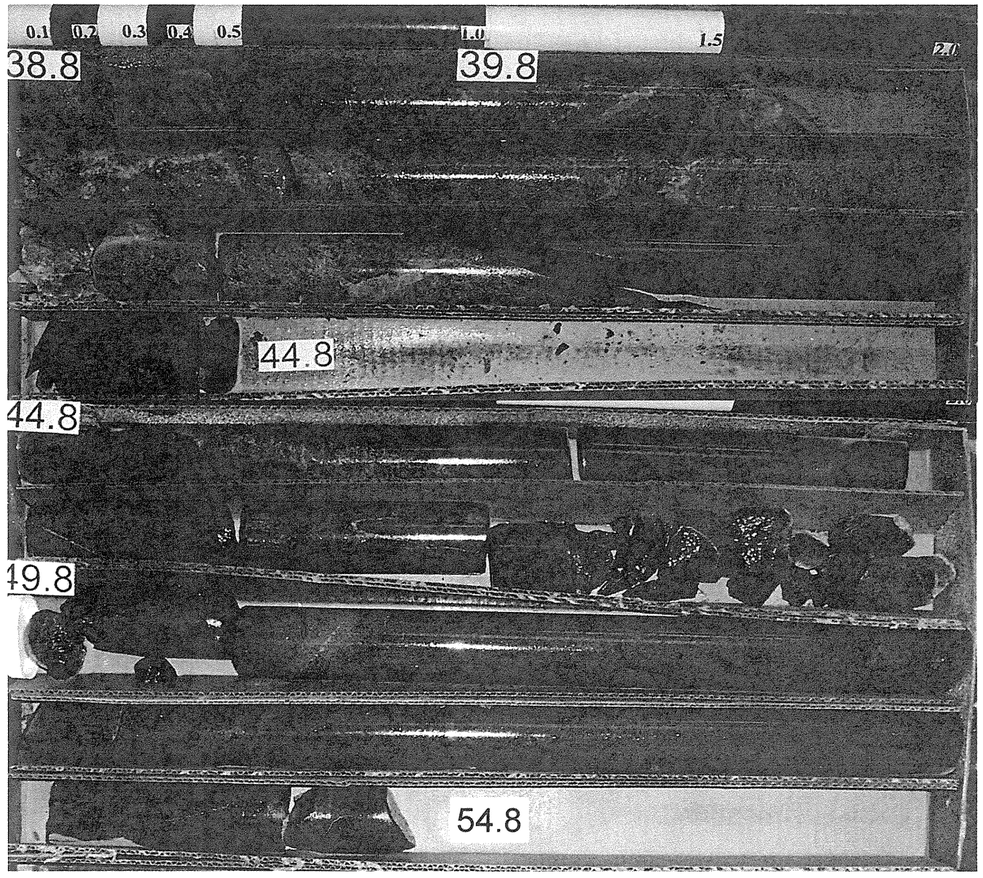
B5-A RL

BOXES 1 - 3: 26.8 - 46.3 FEET



B5-B RL

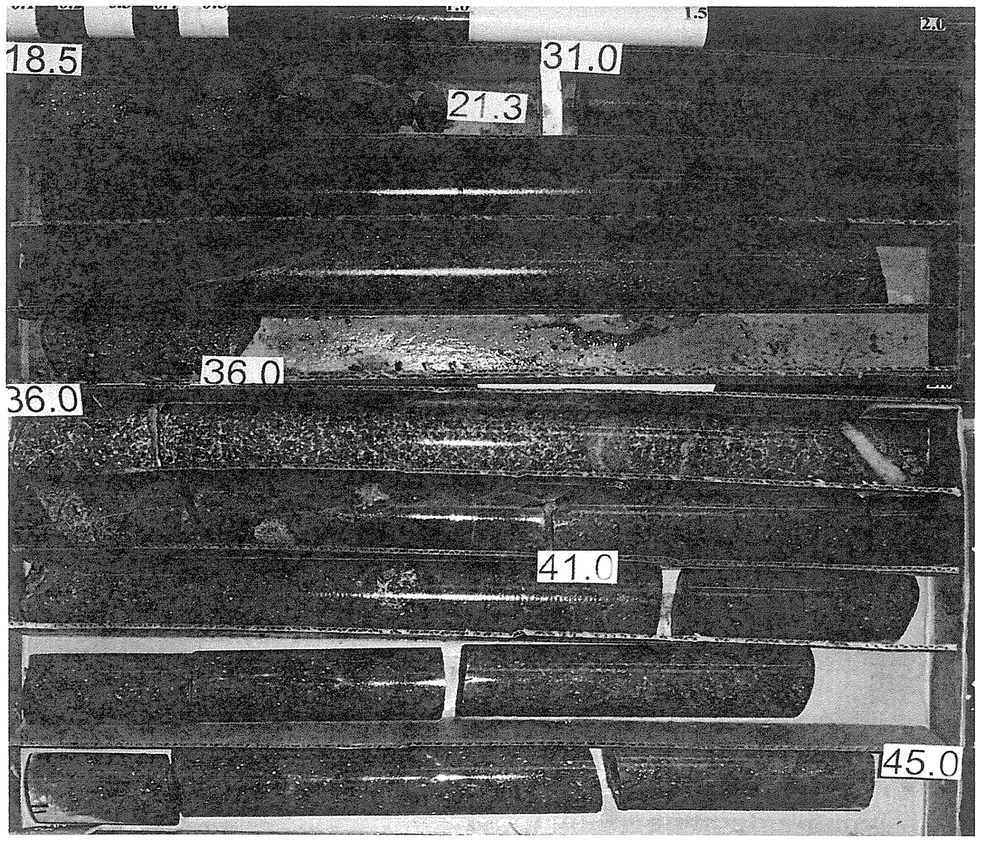
BOXES 1 & 2: 38.8 - 54.8 FEET



CORE PHOTOGRAPHS

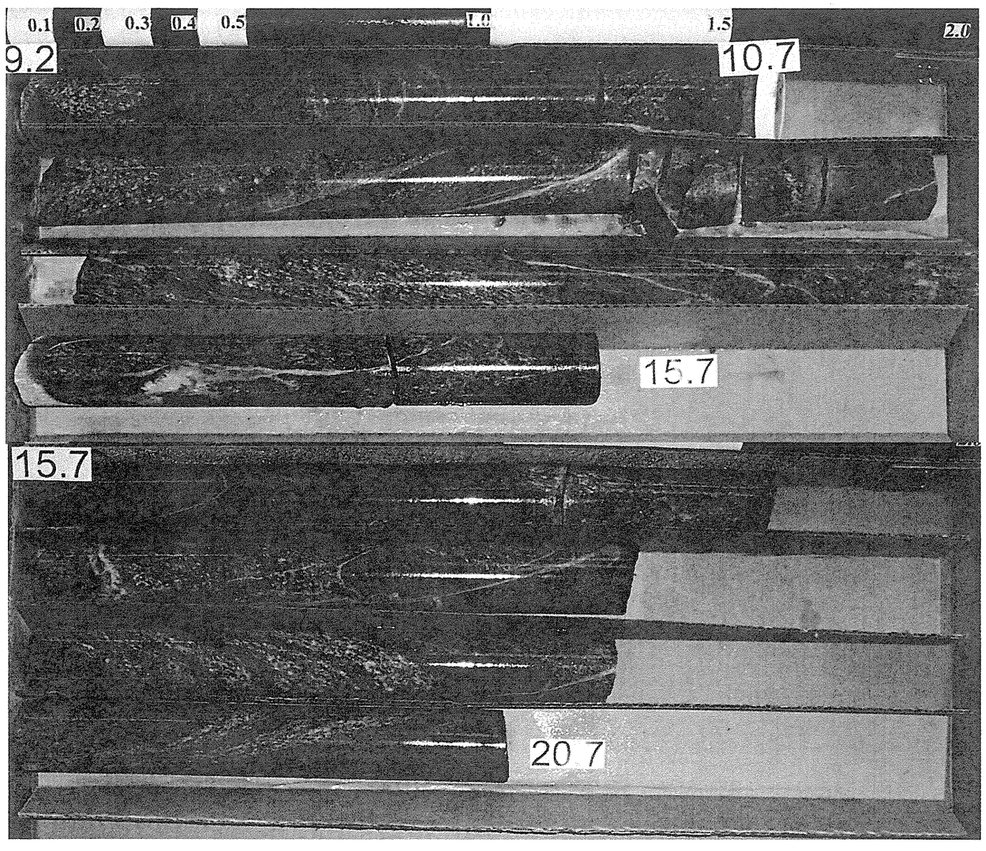
14807 RT

BOXES 1 & 2: 18.5 - 45.0 FEET



14878 RT

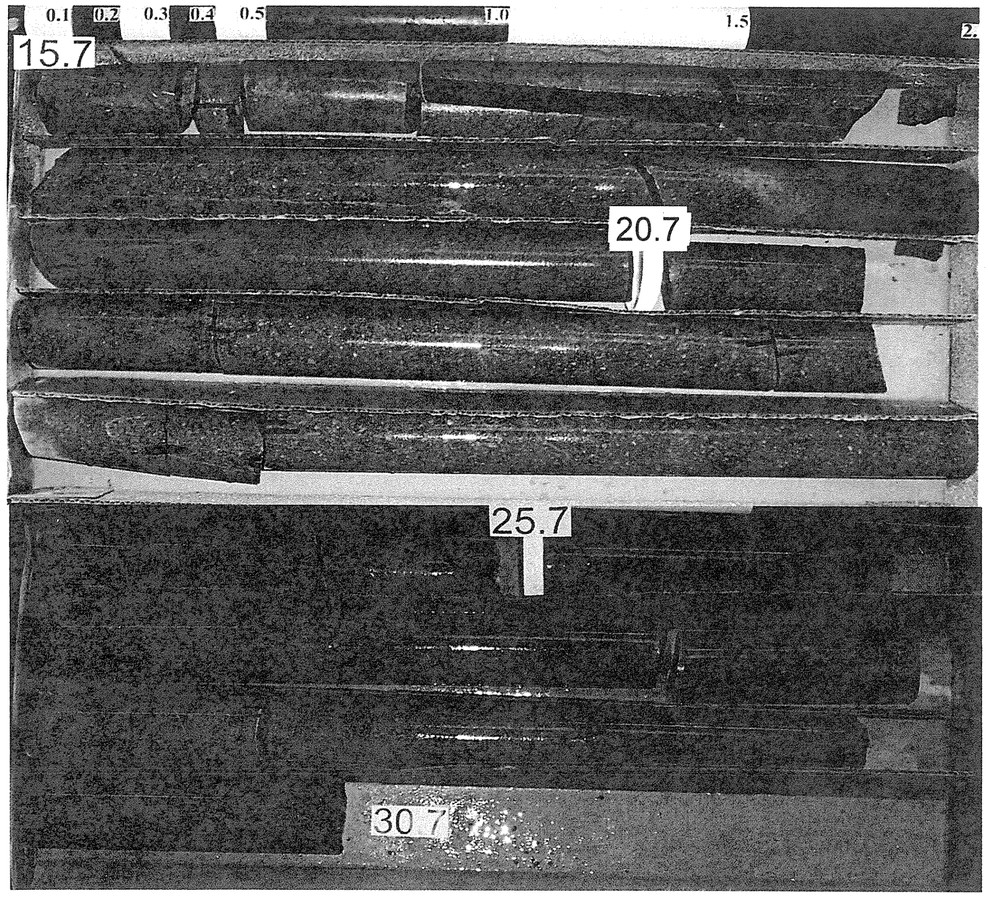
BOXES 1 & 2: 9.2 - 20.7 FEET



CORE PHOTOGRAPHS

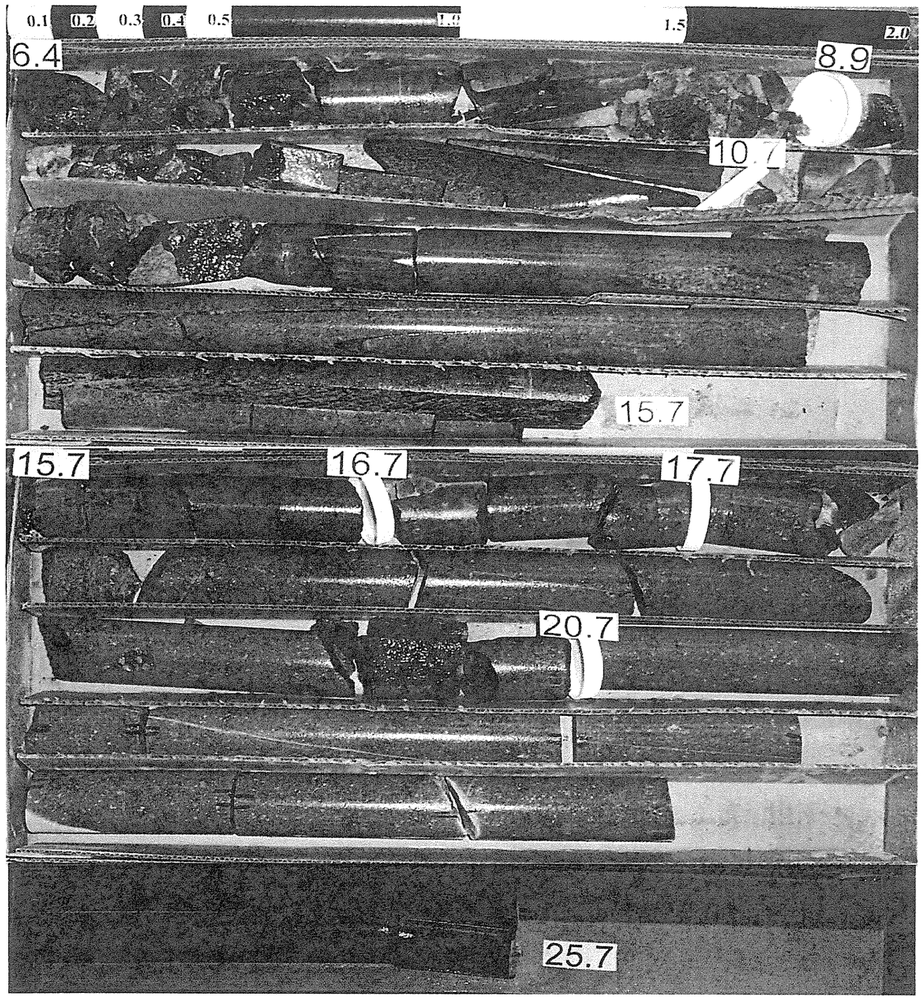
B6-B RL

BOXES 1 & 2: 15.7 - 30.7 FEET



14998 RT

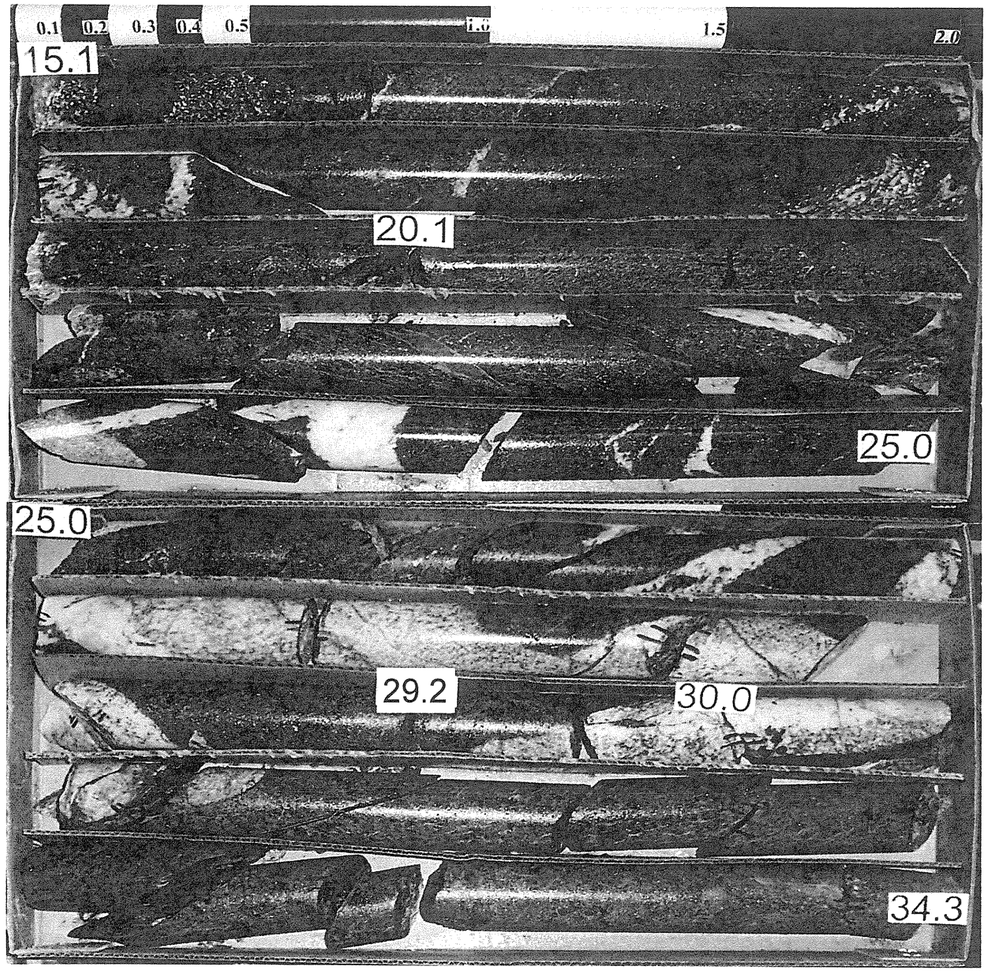
BOXES 1 - 3: 6.4 - 25.7 FEET



CORE PHOTOGRAPHS

15118 RT

BOXES 1 & 2: 15.1 - 34.3 FEET



PROJ. NO. - 34821.1.1
ID NO. - U-2525B
COUNTY - GUILFORD

B1-B LL

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-26	18' LT	139+81	6.0-7.5	A-4(0)	22	NP	35	26	26	13	95	71	39	15.1	-

B2-B LL

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-24	18' LT	142+21	1.0-2.5	A-4(0)	27	NP	14	27	34	25	99	90	62	22.1	-
SS-25	18' LT	142+21	6.0-7.5	A-7-6(16)	47	21	3	26	32	39	100	99	74	24.5	-

B3-B LL

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-20	18' LT	144+63	1.0-2.5	A-4(1)	27	5	7	39	45	9	100	100	57	-	-

B4-C LL

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-16	39' LT	146+88	1.0-2.5	A-5(7)	46	8	9	32	49	10	100	96	68	26.7	-

14749LT

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-12	18' LT	147+49	18.5-20.0	A-4(0)	31	NP	23	40	35	2	100	88	38	16.0	-

B5-A LL

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-10	60' LT	148+51	3.5-5.0	A-4(3)	27	10	15	30	39	16	100	93	58	23.4	-

B5-B LL

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-9	18' LT	148+51	3.5-5.0	A-6(7)	40	13	8	33	49	10	100	97	62	26.1	-

EB2-B LL

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-2	18' LT	152+02	8.5-10.0	A-2-4(0)	39	NP	16	58	26	0	100	95	29	-	-

PROJ. NO. - 34821.1.1
ID NO. - U-2525B
COUNTY - GUILFORD

EB1-B RL

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-28	60' RT	136+60	3.5-5.0	A-7-5(14)	59	24	23	14	31	32	95	76	61	36.6	-
SS-27	60' RT	136+60	13.5-15.0	A-4(0)	35	NP	30	32	27	11	96	73	40	13.5	-

B2-C RL

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-22	39' RT	141+22	1.0-2.5	A-2-4(0)	18	NP	27	55	10	8	100	97	19	-	-

B3-C RL

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-19	45' RT	143+62	3.5-5.0	A-4(0)	37	8	0	29	53	18	100	100	75	23.4	-

14585RT

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-15	18' RT	145+85	1.0-2.5	A-5(10)	53	8	7	19	53	21	100	97	77	26.1	-

B6-C RL

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-7	39' RT	148+99	1.0-2.5	A-2-4(0)	29	2	18	53	24	5	100	98	35	-	-

15118RT

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-4	18' RT	151+18	1.0-2.5	A-4(3)	29	10	12	38	41	9	100	99	57	14.0	-

EB2-B RL

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-1	60' RT	152+80	3.5-5.0	A-7-6(7)	44	15	7	38	25	30	100	98	58	36.8	-

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	12

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1 (U-2525B) F.A. PROJ. N/A

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION PROPOSED BRIDGE ON -L- (I-840) OVER -Y9- (HINES CHAPEL RD.) AT -L- STA. 174+72

ID: U-2525B

PROJECT: 34821.1.1

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE(S)
5-6	CROSS SECTION(S)
7-10	BORE LOG(S)
11	SOIL TEST RESULTS
12	SITE PHOTOGRAPH(S)

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.

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PERSONNEL

J. I. MILKOVITS

H. R. CONLEY

J. R. MATULA

CONSULTANT: S&ME

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE JULY 2011

NORTH CAROLINA LICENSED GEOLOGIST JAIME LOVE PEDRO SEAL 2157

7-11-11

DRAWN BY: T. T. WALKER, J. L. PEDRO

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.
34821.1.1 (U-2525B)	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	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
- 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-___
- [X] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

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

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BM# 33, -BY9- Sta. 3+52.38, Offset - 106.83' Rt

ELEVATION: 720.83 FT.

NOTES:

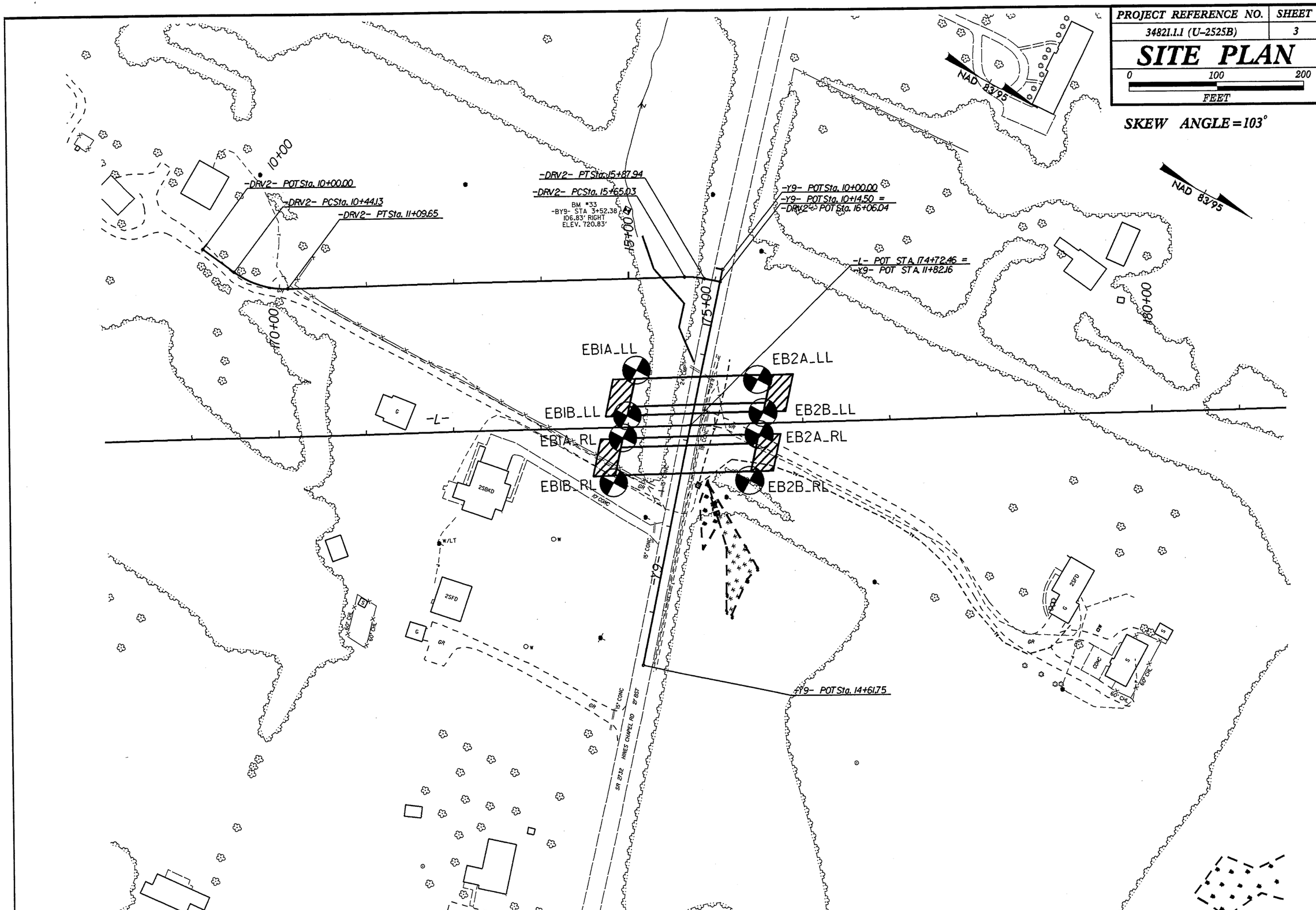
REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

SITE PLAN

0 100 200
FEET

SKEW ANGLE = 103°



PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	4

FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -L-

0 10 20
FEET
VE = 2:1

EB1A_RL
173+93
12' RT

EB2B_LL
175+55
12' LT

750
740
730
720
710
700
690
680
670

RESIDUAL, RED-GRAY, AND BROWN, MED. TO V. STIFF, MOIST, SAPROLITIC, SANDY CLAY AND HIGHLY PLASTIC, SILTY CLAY

BROWN AND BLACK, HARD, MOIST, SAPROLITIC, SANDY SILT

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

EB1A_RL: (16) (47) 06/11 (41) 100/0.6 100/0.3 60/0.0

EB2B_LL: (6) 06/11 (27) (51) 100/0.9 100/0.4 60/0.0

PROFILE TAKEN FROM RDWY TIN FILE DATED 5/7/2009

174+00 +20 +40 +60 +80 175+00 +20 +40 +60 +80 176+00

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	5

CROSS SECTION THROUGH END BENT 1

EB1A_LL
174+11
65' LT

EB1B_LL
173+99
13' LT

℄

EB1A_RL
173+93
12' RT

EB1B_RL
173+81
63' LT

750
740
730
720
710
700
690
680
670

RESIDUAL, TAN-GRAY, ORANGE, BLACK, AND BROWN, GRAY, BLACK, AND BROWN, HARD, MOIST, WEATHERED ROCK (META-GRANITE)

STIFF TO V. STIFF, MOIST, SAPROLITIC, SANDY CLAY

SAPROLITIC, SANDY SILT

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

	EB1A_LL	EB1B_LL	EB1A_RL	EB1B_RL
	12	14	16	17
	06/11	47	47	32
	46	06/11	06/11	35
	100/0.9	100/0.9	41	06/11
		100/0.8	100/0.6	100/0.4
		60/0.0	100/0.3	100/0.6
			60/0.0	100/0.9

SKEW ANGLE = 103°

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	6

CROSS SECTION THROUGH END BENT 2

0 10 20
FEET
VE = 1:1

EB2A_LL
175+50
50' LT

EB2B_LL
175+55
12' LT

EB2A_RL
175+50
13' RT

EB2B_RL
175+38
65' RT

RESIDUAL, TAN AND RED-GRAY, AND RED-GRAY AND BROWN, MED. STIFF HIGHLY WEATHERED ROCK

V. STIFF TO HARD, MOIST, SAPROLITIC, SANDY SILT WITH SOME WEATHERED ROCK FRAGMENTS

TO VERY STIFF, MOIST, SILTY CLAY TO PLASTIC, SILTY CLAY

CRYSTALLINE ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

	EB2A_LL	EB2B_LL	EB2A_RL	EB2B_RL
750				
740				
730	04/08	06/11	06/11	06/11
720	100/0.6 60/0.1 60/0.0	6 27 51 100/0.9 100/0.4 60/0.0	10 13 20 37 60/0.1	11 47 16 63 100/0.9
710				
700				
690				
680				
670				
660				

SKEW ANGLE = 103°

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB1A_LL	**STATION** 174+11	**OFFSET** 65 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 726.8 ft	**TOTAL DEPTH** 18.9 ft	**NORTHING** 865,851	**EASTING** 1,789,755	**24 HR.** 5.3
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**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
730										ELEV. (ft) DEPTH (ft)
										726.8 GROUND SURFACE 0.0
725	723.9	2.9	3	5	7	12	SS-11B	M		**RESIDUAL** TAN-GRAY, SANDY CLAY
720	718.9	7.9	16	17	29	46		M		718.4 8.4 GRAY-BLACK, SAPROLITIC, SANDY SILT
715	713.9	12.9	39	61/0.4		100/0.9				714.3 12.5 **WEATHERED ROCK** (META-GRANITE)
710										707.9 18.9 Boring Terminated by Auger Refusal at Elevation 707.9 ft ON CRYSTALLINE ROCK (META-GRANITE)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB1B_LL	**STATION** 173+99	**OFFSET** 13 ft LT	**ALIGNMENT** -L-	**0 HR.** 15.0
COLLAR ELEV. 731.7 ft	**TOTAL DEPTH** 22.6 ft	**NORTHING** 865,866	**EASTING** 1,789,806	**24 HR.** 9.3
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**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
735										
										731.7 GROUND SURFACE 0.0
730	728.1	3.6	4	5	9	14	SS-9B	M		**RESIDUAL** ORANGE AND BLACK, SANDY CLAY
725	723.1	8.6	10	24	23	47	SS-10B	M		723.1 8.6 GRAY-BLACK, SAPROLITIC, SANDY SILT
720	718.1	13.6	21	39	61/0.4	100/0.9				717.6 14.1 **WEATHERED ROCK** (META-GRANITE)
715	713.1	18.6	9	55	45/0.3	100/0.8				
710	709.1	22.6	60/0.0			60/0.0				709.1 22.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 709.1 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_Y9_BH.GPJ NC_DOT.GDT 6/28/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB2A_LL	**STATION** 175+50	**OFFSET** 50 ft LT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 732.3 ft	**TOTAL DEPTH** 13.7 ft	**NORTHING** 865,979	**EASTING** 1,789,699	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE SME R-5 BK-51 78% 00/00/0000		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 04/03/08	**COMP. DATE** 04/03/08	**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)
735										732.3 GROUND SURFACE	0.0
							S-713	M		RESIDUAL TAN, SILTY CLAY	
730	728.6	3.7	70	30/0.1		100/0.6				729.3 WEATHERED ROCK (META-GRANITE)	3.0
725	723.6	8.7	60/0.1			60/0.1				723.6 CRYSTALLINE ROCK (META-GRANITE)	8.7
720	718.6	13.7	60/0.0			60/0.0				718.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 718.6 ft IN CRYSTALLINE ROCK (META-GRANITE)	13.7

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB2B_LL	**STATION** 175+55	**OFFSET** 12 ft LT	**ALIGNMENT** -L-	**0 HR.** 9.3
COLLAR ELEV. 732.1 ft	**TOTAL DEPTH** 26.5 ft	**NORTHING** 866,002	**EASTING** 1,789,729	**24 HR.** 5.6
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/07/11	**COMP. DATE** 06/07/11	**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	
735										732.1 GROUND SURFACE	0.0
730	729.1	3.0	3	3	3	6	SS-1B	M		RESIDUAL RED-BROWN, HIGHLY PLASTIC, SILTY CLAY	
725	724.1	8.0	6	12	15	27		M		722.1 BROWN, SAPROLITIC, SANDY SILT WITH SOME WEATHERED ROCK FRAGMENTS	10.0
720	719.1	13.0	10	22	29	51	SS-2B	M			
715	714.1	18.0	20	80/0.4		100/0.9				714.1 WEATHERED ROCK (META-GRANITE)	18.0
710	709.1	23.0	100/0.4			100/0.4					
	705.6	26.5	60/0.0			60/0.0				705.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 705.6 ft ON CRYSTALLINE ROCK (META-GRANITE)	26.5

C:\CDOT BORE DOUBLE U2525B_GEO_Y9_BH.GPJ NC_DOT.GDT 6/28/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB1A_RL	**STATION** 173+93	**OFFSET** 12 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 733.7 ft	**TOTAL DEPTH** 25.3 ft	**NORTHING** 865,873	**EASTING** 1,789,830	**24 HR.** 10.4
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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)
735										733.7 GROUND SURFACE	0.0
730	730.0	3.7	4	5	11	16	SS-7B	M		RESIDUAL BROWN, SAPROLITIC, SANDY CLAY	
725	725.0	8.7	12	18	29	47	SS-8B	M		725.2 BROWN-BLACK, SAPROLITIC, SANDY SILT	8.5
720	720.0	13.7	9	19	22	41		M		716.7 WEATHERED ROCK (META-GRANITE)	17.0
715	715.0	18.7	90	10/0.1		100/0.6					
710	710.0	23.7	100/0.3			100/0.3				708.4 Boring Terminated with Standard Penetration Test Refusal at Elevation 708.4 ft ON CRYSTALLINE ROCK (META-GRANITE)	25.3
	708.4	25.3	60/0.0			60/0.0					

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB1B_RL	**STATION** 173+81	**OFFSET** 63 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 738.9 ft	**TOTAL DEPTH** 29.6 ft	**NORTHING** 865,888	**EASTING** 1,789,881	**24 HR.** 15.8
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/09/11	**COMP. DATE** 06/09/11	**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)
740										738.9 GROUND SURFACE	0.0
735	735.2	3.7	7	8	9	17		M		RESIDUAL BROWN, SAPROLITIC, SANDY CLAY	
730	730.2	8.7	6	11	21	32	SS-12B	M		730.9 BROWN, BLACK, AND GRAY, SANDY SILT	8.0
725	725.2	13.7	11	16	19	35	SS-13B	M		720.2 WEATHERED ROCK (META-GRANITE)	18.7
720	720.2	18.7	100/0.4			100/0.4					
715	715.2	23.7	86	14/0.1		100/0.6					
710	710.2	28.7	20	80/0.4		100/0.9				709.3 Boring Terminated at Elevation 709.3 ft IN WEATHERED ROCK (META-GRANITE)	29.6

C:\DOT BORE DOUBLE U2525B_GEO_Y9_BH.GPJ NC_DOT.GDT 6/28/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB2A_RL	**STATION** 175+50	**OFFSET** 13 ft RT	**ALIGNMENT** -L-	**0 HR.** 13.4
COLLAR ELEV. 732.8 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 866,010	**EASTING** 1,789,753	**24 HR.** 5.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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)
735										732.8 GROUND SURFACE	0.0
	729.4	3.4	3	5	5	10	SS-3B	M		RESIDUAL RED-GRAY, HIGHLY PLASTIC, SILTY CLAY	
730											
	724.4	8.4	6	6	7	13		M		722.8 BROWN, SAPROLITIC, SANDY SILT	10.0
725											
	719.4	13.4	7	10	10	20	SS-4B	M			
720											
	714.4	18.4	9	20	17	37		M		712.4 WEATHERED ROCK (META-GRANITE)	20.4
715											
	709.4	23.4	60/0.1			60/0.1				709.4 CRYSTALLINE ROCK (META-GRANITE)	23.4
710										709.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 709.3 ft IN CRYSTALLINE ROCK (META-GRANITE)	23.5

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION PROPOSED BRIDGE ON -L- (NC 68) OVER -Y9- (Hines Chapel Rd.)				**GROUND WTR (ft)**
BORING NO. EB2B_RL	**STATION** 175+38	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** 15.7
COLLAR ELEV. 732.9 ft	**TOTAL DEPTH** 24.3 ft	**NORTHING** 866,025	**EASTING** 1,789,804	**24 HR.** 5.4
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 00% 00/00/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 06/08/11	**COMP. DATE** 06/08/11	**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)
735										732.9 GROUND SURFACE	0.0
	729.7	3.2	3	4	7	11		M		RESIDUAL RED-GRAY, HIGHLY PLASTIC, SILTY CLAY	
730											
	724.7	8.2	5	22	25	47	SS-5B	M		724.2 RED-GRAY AND BROWN, SAPROLITIC, SANDY SILT	8.7
725											
	719.7	13.2	3	8	8	16		M			
720											
	714.7	18.2	19	29	34	63	SS-6B	M			
715											
	709.7	23.2	9	91/0.4		100/0.9				709.7 WEATHERED ROCK (META-GRANITE)	23.2
710										708.6 Boring Terminated by Auger Refusal at Elevation 708.6 ft ON CRYSTALLINE ROCK (META-GRANITE)	24.3

NCDOT BORE DOUBLE U2525B_GEO_Y9_BH.GPJ NC_DOT.GDT 6/28/11

EB1-A_LL

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-11B	65 LT	174+11	2.9-4.4	A-6(13)	39	23	10.3	24.8	32.7	32.3	95	91	68	-	-

EB1-B_LL

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-9B	13 LT	173+99	3.6-5.1	A-6(14)	39	20	8.1	19.2	38.5	34.3	97	93	76	-	-
SS-10B	13 LT	173+99	8.6-10.1	A-4(0)	26	3	24.8	45.6	23.6	6.0	94	84	36	-	-

EB2-A_LL

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-713	50 LT	175+50	0.0-1.5	A-7-6(13)	46	24	15.9	24.7	18.6	40.8	100	95	63	-	-

EB2-B_LL

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-1B	12 LT	175+55	3.0-4.5	A-7-6(15)	50	26	13.1	26.6	22.0	38.3	97	90	63	-	-
SS-2B	12 LT	175+55	13.0-14.5	A-4(3)	32	7	12.1	40.7	41.1	6.0	100	96	59	-	-

EB1-A_RL

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-7B	12 RT	173+93	3.7-5.2	A-6(6)	36	14	13.7	35.9	32.3	18.1	95	89	57	-	-
SS-8B	12 RT	173+93	8.7-10.2	A-4(0)	26	2	23.6	43.3	27.0	6.0	95	87	40	-	-

EB1-B_RL

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-12B	63 RT	173+81	8.7-10.2	A-4(0)	36	3	24.0	32.5	35.5	8.1	86	74	43	-	-
SS-13B	63 RT	173+81	13.7-15.2	A-4(2)	35	6	16.3	33.7	41.9	8.1	95	88	56	-	-

EB2-A_RL

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-3B	13 RT	175+50	3.4-4.9	A-7-6(26)	61	39	10.5	22.8	20.4	46.4	96	91	69	-	-
SS-4B	13 RT	175+50	13.4-14.9	A-4(0)	30	4	21.8	45.2	29.0	4.0	93	85	40	-	-

EB2-B_RL

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-5B	65 RT	175+38	8.7-9.7	A-4(5)	37	6	4.4	37.3	52.2	6.0	100	98	73	-	-
SS-6B	65 RT	175+38	18.2-19.7	A-4(2)	35	3	8.7	38.1	49.2	4.0	100	97	67	-	-

SITE PHOTOGRAPH

Proposed Bridge on -L- (I-840) over -Y9- (Hines Chapel Rd.)

Looking West along Hines Chapel Rd.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	18

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1 (U-2525B) F.A. PROJ. N/A

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION PROPOSED BRIDGES ON -L- (I-840) OVER -Y13- (US 29) AT -L- STATION 268+23

ID: U-2525B

PROJECT: 34821.1.1

CONTENTS

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CAUTION NOTICE

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PERSONNEL

O. B. OTI

D. W. DIXON

J. R. MATULA

J. R. TURNAGE

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE SEPTEMBER 2011

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Love Pedro 9-26-11

DRAWN BY: J. L. PEDRO

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.
34821.1.1 (U-2525B)	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	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] MOBILE B- 57
- [X] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [X] WATER TRUCK
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [X] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [X] TRICONE 2 7/8 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [X] -N XWL
- [ ] -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 IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

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

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

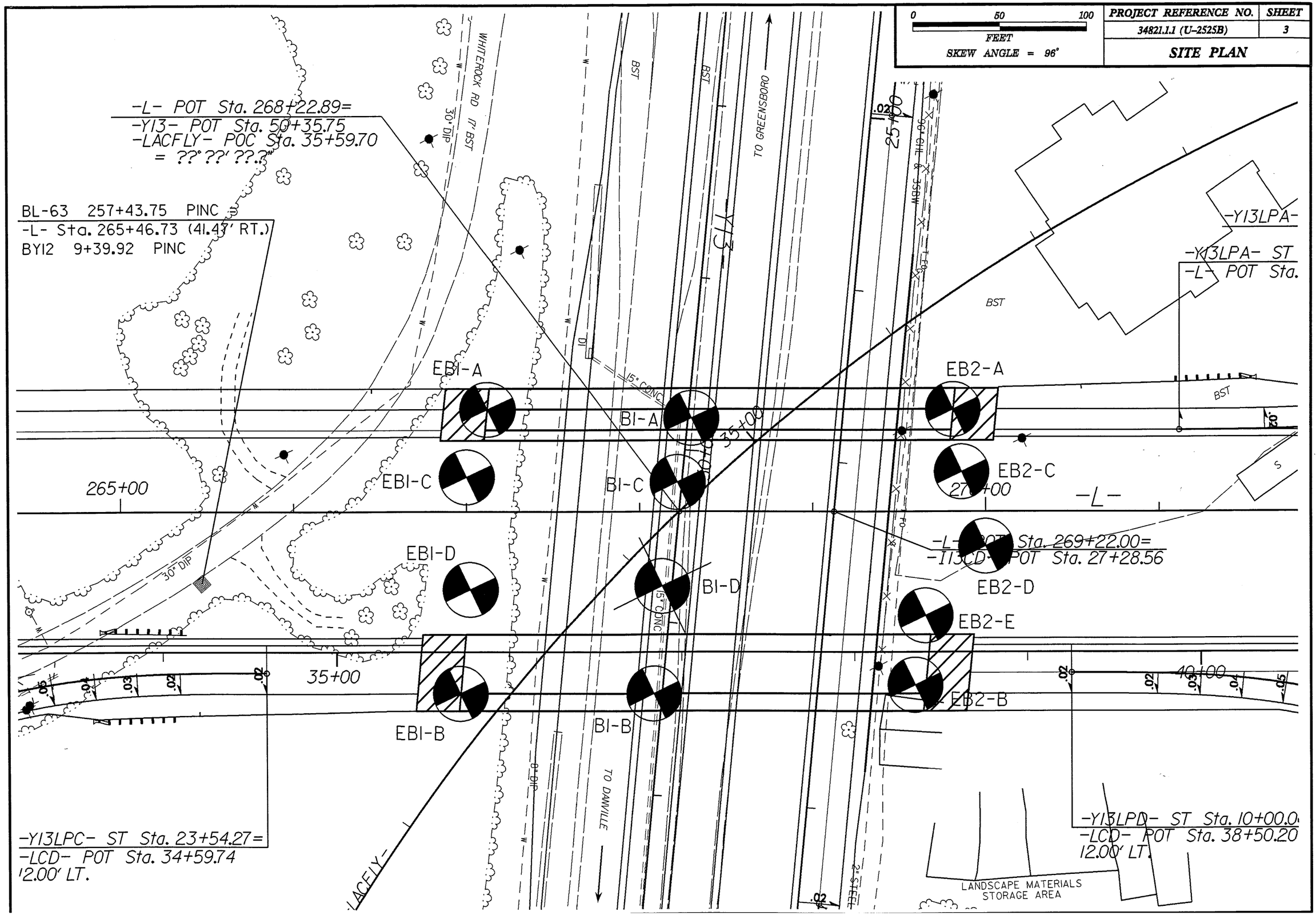
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL# 63, -L- Sta. 265+46.73, Offset - 41.5' RT

ELEVATION: 836.87 FT.

NOTES:

REVISED 09/23/09



0 50 100
FEET
SKEW ANGLE = 96°
PROJECT REFERENCE NO.
34821.1.1 (U-2525B)
SHEET
3
SITE PLAN
-L- POT Sta. 268+22.89=
-Y13- POT Sta. 50+35.75
-LACFLY- POC Sta. 35+59.70
= ??° ??' ??.?"
BL-63 257+43.75 PINC
-L- Sta. 265+46.73 (41.47' RT.)
BY12 9+39.92 PINC
WHITEROCK RD 17' BST
30" DIP
BST
TO GREENSBORO
Y13
25+00
96" CHL & 3SBW
-Y13LPA-
-Y13LPA- ST
-L- POT Sta.
EB1-A
EB2-A
B1-A
35+00
EB1-C
B1-C
EB2-C
265+00
-L-
-L- POT Sta. 269+22.00=
-I13CD- POT Sta. 27+28.56
EB1-D
B1-D
EB2-D
EB2-E
35+00
40+00
EB1-B
B1-B
EB2-B
15" CONC
8" DIP
TO DANVILLE
-Y13LPC- ST Sta. 23+54.27=
-LCD- POT Sta. 34+59.74
12.00' LT.
-Y13LPD- ST Sta. 10+00.0
-LCD- POT Sta. 38+50.20
12.00' LT.
LANDSCAPE MATERIALS
STORAGE AREA

0	20	40
FEET		
VE = 2:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	4
FENCE DIAGRAM PROJECTED THROUGH BORINGS ALONG -L-	

EB1-C
267+00
20' LT

B1-C
268+22
17' LT

-Y13-
(US 29)

EB2-C
269+86
23' LT

ASPHALT & GRAVEL

850
840
830
820
810
800
790
780
770
760

22 17 12 13 15 19 9 16 36 53 100/0.8

3/08

6 6 9 27 53 100/0.6 100/0.3 60/0.1

8/11

A 8 8 9 9 8 21 100/0.6 100/0.2

8/11

RESIDUAL, RED, ORANGE, TAN, GRAY, AND BLACK, SANDY CLAY, SILTY CLAY, HIGHLY PLASTIC, MICA AND SOME MEDIUM DENSE, WEATHERED ROCK (GRANITE AND DIORITE)

MEDIUM STIFF TO HARD, DRY TO MOIST, SAPROLITIC, SILTY CLAY, SANDY SILT, AND CLAYEY SILT WITH SOME SILTY SAND

WEATHERED ROCK (GRANITE AND DIORITE)

CRYSTALLINE ROCK (DIORITE)

Ⓐ ARTIFICIAL FILL, RED-ORANGE, STIFF, MOIST, HIGHLY PLASTIC, SILTY CLAY

PROFILE TAKEN FROM TIN FILE DATED 5/7/2009

+80 267+00 +20 +40 +60 +80 268+00 +20 +40 +60 +80 269+00 +20 +40 +60 +80

0	10	20

FEET

VE = 2:1

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	5

CROSS SECTION THROUGH END BENT 1

EB1-A
267+12
59' LT

EB1-C
267+00
20' LT

EB1-D
267+02
45' RT

EB1-B
266+96
105' RT

850
840
830
820
810
800
790
780
770
760

20 14 11 9 12 12 13 9 16 40 100/0.5 100/0.4 100/0.5 60/0.0

8/11

22 17 12 13 15 19 9 16 36 53 100/0.8

3/08

26 17 13 12 16 17 50 100/0.9 100/0.8

8/11

21 12 17 19 21 34 30 62 79

8/11

RESIDUAL, STIFF TO HIGHLY CLAYEY

RED, TAN, BROWN, HARD, DRY TO MOIST, PLASTIC, SILTY CLAY, AND SANDY SILT

ORANGE, AND GRAY, SILTY CLAY AND SAPROLITIC,

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

+80 +60 +40 +20 CL +20 +40 +60 +80 +100 +120

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	6

CROSS SECTION THROUGH BENT 1

0 10 20
FEET
VE = 2:1

B1-A
268+30
54' LT

B1-C
268+22
17' LT

B1-D
268+13
43' RT

B1-B
268+08
105' RT

820
810
800
790
780
770
760
750
740

9 10 9 7 13 85 60/0.4 100/0.4 60/0.0

6 6 9 27 53 100/0.6 100/0.3 60/0.1

5 5 14 13 16 100/0.8 47 80 60/0.0 Ⓑ

14 26 41 28 52 29 68 100/0.7 100/0.7

RESIDUAL, MED. STIFF SANDY AND SANDY

8/11

TAN, RED, BROWN, TO HARD, DRY TO SILT, CLAYEY CLAY WITH SOME

8/11

ORANGE, AND GRAY, MOIST, SAPROLITIC, SILT, SILTY CLAY, V.DENSE, SILTY SAND

8/11

WEATHERED ROCK (GRANITE, DIORITE AND META-GABBRO)

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE AND DIORITE)

CRYSTALLINE ROCK, DARK GRAY AND GREEN-GRAY, MODERATELY WEATHERED TO FRESH, HARD TO VERY HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, META-GABBRO WITH THIN SEAM OF RESIDUAL, ORANGE-BROWN, STIFF TO HARD, MOIST, SANDY SILT

REC=100%
RQD=83%
RMR=66

Ⓑ RESIDUAL, GREEN AND WHITE, HARD, MOIST, SAPROLITIC, SANDY SILT

+100 +80 +60 +40 +20 CL +20 +40 +60 +80 +100 +120

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	7

CROSS SECTION THROUGH END BENT 2

0 10 20
FEET
VE = 2:1

EB2-A
269+81
59' LT

EB2-C
269+86
23' LT

EB2-D
270+00
20' RT

EB2-E
269+65
60' RT

EB2-B
269+59
100' RT

ASPHALT & GRAVEL

MULCH

ARTIFICIAL FILL, SILTY CLAY

RED-ORANGE AND TAN-WHITE, WITH SOME LOOSE, RESIDUAL, TAN-WHITE, MEDIUM TO DENSE, SILTY SAND WEATHERED ROCK

RESIDUAL, WITH BLACK, DRY TO MOIST, CLAYEY SILT, VERY MOIST, WITH SEAM

STIFF, MOIST, SILTY SAND

RED, TAN, MEDIUM AND

HIGHLY PLASTIC, ORANGE, STIFF TO SAPROLITIC, SANDY SILT

AND BROWN HARD, SILTY CLAY,

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

WEATHERED ROCK (META-GRANITE)

WEATHERED ROCK (GRANITE)

845 835 825 815 805 795 785 775 765

+120 +100 +80 +60 +40 +20 CL +20 +40 +60 +80 +100 +120 +140

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 267+12	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** 47.0
COLLAR ELEV. 839.5 ft	**TOTAL DEPTH** 68.0 ft	**NORTHING** 871,662	**EASTING** 1,782,969	**24 HR.** 43.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/09/11	**COMP. DATE** 08/09/11	**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)
840										839.5 GROUND SURFACE	0.0
	836.5	3.0	7	9	11	20	SS-1P	M		**RESIDUAL** RED-BROWN, HIGHLY PLASTIC, SILTY CLAY	
835										832.0 TAN-BROWN, SILTY CLAY	7.5
	831.5	8.0	6	7	7	14	SS-2P	M			
830											
	826.5	13.0	6	5	6	11	SS-3P	M			
825										823.3 TAN-BROWN, CLAYEY SILT	16.2
	821.5	18.0	4	4	5	9	SS-4P	M			
820											
	816.5	23.0	5	5	7	12		M			
815										813.3 TAN-BROWN, SAPROLITIC, SANDY SILT	26.2
	811.5	28.0	4	6	6	12	SS-5P	M			
810											
	806.5	33.0	3	5	8	13		M			
805											
	801.5	38.0	3	4	5	9	SS-6P	M			
800											
	796.5	43.0	3	5	11	16		M			
795											
	791.5	48.0	5	14	26	40	SS-7P	M			
790											
	786.5	53.0	100/0.5			100/0.5				786.5 WEATHERED ROCK (GRANITE)	53.0
785											
	781.5	58.0	100/0.4			100/0.4					
780											
	776.5	63.0	100/0.5			100/0.5					
775											
	771.5	68.0	60/0.0			60/0.0				771.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 771.5 ft ON CRYSTALLINE ROCK (GRANITE)	68.0

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Kuntakova, K.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 267+00	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** 50.4
COLLAR ELEV. 839.0 ft	**TOTAL DEPTH** 55.8 ft	**NORTHING** 871,692	**EASTING** 1,782,996	**24 HR.** 44.0
DRILL RIG/HAMMER EFF./DATE SME R-5 BK-51 78% 06/01/2006		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/13/08	**COMP. DATE** 03/13/08	**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	
840										839.0 GROUND SURFACE	0.0
	834.0	5.0	6	10	12	22	SS-631	M		**RESIDUAL** RED-ORANGE, HIGHLY PLASTIC, SILTY CLAY	
835										831.0 RED-TAN, SANDY CLAY	8.0
	829.0	10.0	6	8	9	17	SS-632	M			
830											
	824.0	15.0	7	6	6	12		M			
825										821.5 RED-TAN TO GRAY, SANDY SILT	17.5
	819.0	20.0	6	7	6	13	SS-633	M			
820											
	814.0	25.0	6	7	8	15		M			
815											
	809.0	30.0	7	9	10	19	SS-634	M			
810											
	804.0	35.0	4	4	5	9		M			
805											
	799.0	40.0	6	8	8	16	SS-635	M			
800											
	794.0	45.0	8	13	23	36		M			
795											
	789.0	50.0	15	23	30	53		M			
790											
	784.0	55.0	45	55/0.3		100/0.8				785.5 WEATHERED ROCK (GRANITE)	53.5
785										783.2 Boring Terminated at Elevation 783.2 ft IN WEATHERED ROCK (GRANITE)	55.8

NCDOT BORE DOUBLE U2525B_GEO_Y13_BH.GPJ NC_DOT.GDT 9/26/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 268+30	**OFFSET** 54 ft LT	**ALIGNMENT** -L-	**0 HR.** 20.4
COLLAR ELEV. 816.5 ft	**TOTAL DEPTH** 40.6 ft	**NORTHING** 871,717	**EASTING** 1,782,864	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/16/11	**COMP. DATE** 08/16/11	**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)
820										
	816.5	0.0								GROUND SURFACE
815										**RESIDUAL** TAN-BROWN, SANDY SILT
	813.1	3.4	4	5	4	9	SS-12P	M		
810	808.1	8.4	5	5	5	10	SS-13P	M		
805	803.1	13.4	4	4	5	9	SS-14P	M		
800	798.1	18.4	3	3	4	7	SS-15P	M		
795	793.1	23.4	4	6	7	13	SS-16P	M		
	793.5	23.0								RED-BROWN, SAPROLITIC, CLAYEY SILT WITH SOME MICA
790	788.1	28.4	8	15	70	85	SS-17P	M		
	788.0	28.5								TAN-BROWN, SAPROLITIC, SANDY SILT
785	784.0	32.5								
	783.1	33.4	60/0.1			60/0.1				**WEATHERED ROCK** (GRANITE)
	783.0	33.5								**CRYSTALLINE ROCK** (GRANITE)
780	778.1	38.4	100/0.4			100/0.4				**WEATHERED ROCK** (GRANITE)
	775.9	40.6	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 775.9 ft ON CRYSTALLINE ROCK (GRANITE)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 268+22	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 815.5 ft	**TOTAL DEPTH** 42.8 ft	**NORTHING** 871,747	**EASTING** 1,782,887	**24 HR.** 16.3
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing w/ SPT	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/18/11	**COMP. DATE** 08/18/11	**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)
820										
	815.5	0.0								GROUND SURFACE
815										**RESIDUAL** RED, TAN, ORANGE, AND GRAY, SAPROLITIC, SANDY SILT
	812.2	3.3	2	3	3	6	SS-25P	M		
810	807.2	8.3	2	3	3	6		M		
805	802.2	13.3	3	4	5	9	SS-26P	M		
800	797.2	18.3	8	10	17	27		M		
795	792.2	23.3	17	22	31	53		M		
790	790.0	25.5								**WEATHERED ROCK** (DIORITE)
	787.2	28.3	68	32/0.1		100/0.6				
785	782.2	33.3	100/0.3			100/0.3				
780	777.2	38.3	60/0.1			60/0.1				**CRYSTALLINE ROCK** (DIORITE)
775	772.7	42.8								Boring Terminated with Casing Advancer Refusal at Elevation 772.7 ft IN CRYSTALLINE ROCK (DIORITE)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 269+81	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 834.9 ft	**TOTAL DEPTH** 41.6 ft	**NORTHING** 871,777	**EASTING** 1,782,726	**24 HR.** 33.3
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/29/11	**COMP. DATE** 08/29/11	**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)
835										GROUND SURFACE	834.9	0.0
	833.1	1.8	2	6	8	14		M		ARTIFICIAL FILL ASPHALT AND GRAVEL	834.1	0.8
830	828.4	6.5	4	4	4	8		M		ORANGE, HIGHLY PLASTIC, SILTY CLAY WITH SOME QUARTZ FRAGMENTS	828.9	6.0
825	823.4	11.5	4	5	6	11		M		TAN-WHITE, SILTY SAND	826.9	8.0
820	818.4	16.5	5	6	8	14		M		RESIDUAL TAN-WHITE, SAPROLITIC, SILTY SAND		
815	813.4	21.5	5	7	8	15		M			810.4	24.5
810	808.4	26.5	20	48	52/0.3	100/0.8				WEATHERED ROCK (GRANITE)	804.4	30.5
805	803.4	31.5	16	20	41	61		M		RESIDUAL WHITE WITH BROWN, SAPROLITIC, SILTY SAND	797.9	37.0
800	798.4	36.5	50	35	65/0.2	100/0.7				WEATHERED ROCK (GRANITE)	793.4	41.5
795	793.4	41.5	60/0.1			60/0.1				CRYSTALLINE ROCK (GRANITE)	793.3	41.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 793.3 ft IN CRYSTALLINE ROCK (GRANITE)		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 269+86	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 834.7 ft	**TOTAL DEPTH** 41.8 ft	**NORTHING** 871,812	**EASTING** 1,782,737	**24 HR.** 35.2
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/25/11	**COMP. DATE** 08/25/11	**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)
835										GROUND SURFACE	834.7	0.0
	828.1	6.6	3	4	4	8		M		ARTIFICIAL FILL ASPHALT AND GRAVEL	833.9	0.8
830	823.1	11.6	2	3	5	8		M		RED-ORANGE, HIGHLY PLASTIC, SILTY CLAY	826.7	8.0
825	818.1	16.6	2	4	5	9		M		RESIDUAL RED-ORANGE WITH BLACK, SAPROLITIC, SILTY CLAY		
820	813.1	21.6	2	4	5	9	SS-34P	M			814.7	20.0
815	808.1	26.6	2	3	5	8		M		BROWN, SAPROLITIC, CLAYEY SILT WITH SOME MICA	802.0	32.7
810	803.1	31.6	2	3	18	21		M		WHITE, SILTY SAND	799.7	35.0
805	798.1	36.6	88	12/0.1		100/0.6				WEATHERED ROCK (GRANITE)	792.9	41.8
800	793.1	41.6	100/0.2			100/0.2				Boring Terminated at Elevation 792.9 ft IN WEATHERED ROCK (GRANITE)		
795												

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB1-D	**STATION** 267+02	**OFFSET** 45 ft RT	**ALIGNMENT** -L-	**0 HR.** 43.0
COLLAR ELEV. 835.7 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 871,751	**EASTING** 1,783,022	**24 HR.** 41.8
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/10/11	**COMP. DATE** 08/10/11	**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)
										835.7 GROUND SURFACE	0.0
										RESIDUAL RED-BROWN, HIGHLY PLASTIC, SILTY CLAY	
	832.4	3.3	9	12	14	26		M			
	827.4	8.3	8	8	9	17		M		827.7 TAN-BROWN, SILTY CLAY	8.0
	822.4	13.3	5	6	7	13		M			
	817.4	18.3	4	6	6	12		M		819.2 TAN-BROWN, CLAYEY SILT	16.5
	812.4	23.3	6	8	8	16		M			
	807.4	28.3	6	8	9	17		M		809.2 TAN-BROWN, SAPROLITIC, SANDY SILT	26.5
	802.4	33.3	9	15	35	50		M			
	797.4	38.3	20	11	89/0.4	100/0.9				796.9 **WEATHERED ROCK** (GRANITE)	38.8
	792.4	43.3	60	40/0.3		100/0.8				790.7 Boring Terminated by Auger Refusal at Elevation 790.7 ft ON CRYSTALLINE ROCK (GRANITE)	45.0

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 266+96	**OFFSET** 105 ft RT	**ALIGNMENT** -L-	**0 HR.** 43.0
COLLAR ELEV. 831.7 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 871,803	**EASTING** 1,783,054	**24 HR.** 39.3
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/11/11	**COMP. DATE** 08/11/11	**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	
										831.7 GROUND SURFACE	0.0
										RESIDUAL TAN-RED, HIGHLY PLASTIC, SILTY CLAY	
	829.2	2.5	8	9	12	21	SS-8P	M			
	824.2	7.5	5	6	6	12	SS-9P	M		824.7 TAN-BROWN AND GRAY, SAPROLITIC, SANDY SILT	7.0
	819.2	12.5	6	8	9	17		M			
	814.2	17.5	8	9	10	19		M			
	809.2	22.5	6	11	10	21	SS-10P	M			
	804.2	27.5	13	14	20	34		M			
	799.2	32.5	13	16	14	30	SS-11P	M			
	794.2	37.5	17	20	42	62		W			
	789.2	42.5	16	25	54	79		M		786.7 Boring Terminated by Auger Refusal at Elevation 786.7 ft ON CRYSTALLINE ROCK (GRANITE)	45.0

NCDOT BORE DOUBLE U2525B_GEO_Y13_BH.GPJ NC_DOT.GDT 9/26/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. B1-D	**STATION** 268+13	**OFFSET** 43 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 814.1 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 871,797	**EASTING** 1,782,921	**24 HR.** 15.8
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/17/11	**COMP. DATE** 08/17/11	**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										814.1 GROUND SURFACE	0.0
										RESIDUAL RED-ORANGE WITH BLACK, SAPROLITIC, SILTY CLAY	
810	810.3	3.8	2	2	3	5	SS-21P	M			
805	805.3	8.8	1	2	3	5		M		803.1	11.0
										TAN-ORANGE, SAPROLITIC, CLAYEY SILT	
800	800.3	13.8	3	6	8	14	SS-22P	M			
795	795.3	18.8	5	6	7	13		M		792.7	21.4
										TAN-GREEN AND ORANGE, SANDY CLAY	
790	790.3	23.8	6	7	9	16	SS-23P	M			
785	785.3	28.8	21	79/0.3		100/0.8				786.1	28.0
										WEATHERED ROCK (DIORITE)	
780	780.3	33.8	12	22	25	47	SS-24P	M		781.1	33.0
775	775.3	38.8	7	35	45	80		M		**RESIDUAL** GREEN AND WHITE, SAPROLITIC, SANDY SILT	
770	770.3	43.8	60/0.0			60/0.0				771.1	43.0
765										770.3 **WEATHERED ROCK** (META-GABBRO)	43.8
										CRYSTALLINE ROCK DARK GRAY AND GREEN-GRAY, MODERATELY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, META-GABBRO	
760										763.1	51.0
										762.1 REC=89% RQD=47%	52.0
										RMR=66	
755										**RESIDUAL** ORANGE-BROWN, SANDY SILT	
										CRYSTALLINE ROCK DARK GRAY AND GREEN-GRAY, MODERATELY WEATHERED TO FRESH, VERY HARD, CLOSE TO WIDE FRACTURE SPACING, META-GABBRO	
										754.1 REC=100% RQD=83%	60.0
										RMR=66	
										Boring Terminated at Elevation 754.1 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. B1-D	**STATION** 268+13	**OFFSET** 43 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 814.1 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 871,797	**EASTING** 1,782,921	**24 HR.** 15.8
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/17/11	**COMP. DATE** 08/17/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 16.2 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
~~770.3~~											Begin Coring @ 43.8 ft	
	770.3	43.8	1.2	*N=60/0.0*	(1.1)	(1.1)		(6.4)	(3.4)		770.3 **CRYSTALLINE ROCK**	43.8
	769.1	45.0	4.5	0:27/0.2 2:10/1.0	92%	92%		89%	47%		DARK GRAY AND GREEN-GRAY, MODERATELY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO CLOSE FRACTURE SPACING, META-GABBRO	
765				1:35/1.0 0:38/1.0 1:26/1.0 1:17/1.0	(3.8) 84%	(2.3) 51%						
	764.6	49.5	5.5	0:52/0.5	(5.0) 91%	(1.7) 31%		(0.5) 50%			763.1	51.0
				0:47/1.0 0:26/1.0 0:35/1.0 1:25/1.0 1:24/1.5				(8.0) 100%	(6.6) 83%		762.1 **RESIDUAL** ORANGE-BROWN, SANDY SILT	52.0
760	759.1	55.0	5.0	0:59/1.0 0:56/1.0 0:47/1.0 0:58/1.0 1:25/1.0	(5.0) 100%	(4.9) 98%					**CRYSTALLINE ROCK** DARK GRAY AND GREEN-GRAY, MODERATELY WEATHERED TO FRESH, VERY HARD, CLOSE TO WIDE FRACTURE SPACING, META-GABBRO	
755	754.1	60.0									754.1	60.0
											Boring Terminated at Elevation 754.1 ft IN CRYSTALLINE ROCK (META-GABBRO)	

NCDOT BORE DOUBLE U2525B_GEO_Y13_BH.GPJ NC_DOT.GDT 9/26/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 268+08	**OFFSET** 105 ft RT	**ALIGNMENT** -L-	**0 HR.** 17.0
COLLAR ELEV. 812.1 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 871,851	**EASTING** 1,782,952	**24 HR.** 14.0
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/16/11	**COMP. DATE** 08/16/11	**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)
										812.1	0.0
										GROUND SURFACE	
										RESIDUAL	
										TAN-BROWN, SAPROLITIC, CLAYEY SILT	
	808.8	3.3	4	7	7	14		M			
	803.8	8.3	8	13	13	26	SS-18P	M		804.1	8.0
	798.8	13.3	11	19	22	41		M		TAN-BROWN, SAPROLITIC, SANDY SILT	
	793.8	18.3	8	11	17	28	SS-19P	M			
	788.8	23.3	13	23	29	52		M			
	783.8	28.3	10	15	14	29		M			
	778.8	33.3	31	43	25	68	SS-20P	M		780.6	31.5
	773.8	38.3	45	55/0.2		100/0.7				TAN-BROWN, SAPROLITIC, SILTY SAND	
										774.6	37.5
										WEATHERED ROCK (GRANITE)	
	768.8	43.3	48	52/0.2		100/0.7				768.1	44.0
										Boring Terminated at Elevation 768.1 ft IN WEATHERED ROCK (GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Kuntakova, K.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB2-D	**STATION** 270+00	**OFFSET** 20 ft RT	**ALIGNMENT** -L-	**0 HR.** 36.0
COLLAR ELEV. 833.6 ft	**TOTAL DEPTH** 53.7 ft	**NORTHING** 871,857	**EASTING** 1,782,742	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE SME R-5 BK-51 78% 06/01/2006		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Manual	
DRILLER Contract Driller	**START DATE** 03/24/08	**COMP. DATE** 03/24/08	**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	
										833.6	0.0
										GROUND SURFACE	
										832.6	1.0
										ARTIFICIAL FILL ASPHALT AND GRAVEL	
										RED, SILTY CLAY	
	830.1	3.5	4	6	9	15	SS-654	M		826.8	6.8
	825.1	8.5	4	4	5	9	SS-655	M		**RESIDUAL** RED AND TAN, SILTY CLAY	
	820.1	13.5	4	5	6	11		M			
	815.1	18.5	4	5	6	11		M			
	810.1	23.5	5	7	6	13		M			
	805.1	28.5	5	7	9	16	SS-656	M		802.6	31.0
	800.1	33.5	5	5	7	12	SS-657	M		TAN, MICACEOUS, CLAYEY SILT	
	795.1	38.5	5	10	11	21		M		792.6	41.0
	790.1	43.5	32	68/0.4		100/0.9				**WEATHERED ROCK** (GRANITE)	
	785.1	48.5	100/0.3			100/0.3					
	780.1	53.5	100/0.2			100/0.2				779.9	53.7
										Boring Terminated at Elevation 779.9 ft IN WEATHERED ROCK (GRANITE)	

NCDOT BORE DOUBLE U2525B_GEO_Y13_BH.GPJ NC_DOT.GDT 9/26/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)			**GROUND WTR (ft)**
BORING NO. EB2-E	**STATION** 269+65	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 833.7 ft	**TOTAL DEPTH** 74.8 ft	**NORTHING** 871,878	**EASTING** 1,782,791 / **24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 08/24/11	**COMP. DATE** 08/24/11	**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
835										833.7 GROUND SURFACE 0.0
830	829.6	4.1	4	5	6	11		M		830.2 ARTIFICIAL FILL (MULCH) 0.5 RED-ORANGE, HIGHLY PLASTIC, SILTY CLAY
825	824.2	9.5	1	2	3	5		M		826.2 7.5 RESIDUAL RED, ORANGE, AND TAN WITH BLACK, SAPROLITIC, SILTY CLAY
820	819.2	14.5	1	2	4	6		M		
815	814.2	19.5	2	3	4	7		M		
810	809.2	24.5	2	3	4	7		M		
805	804.2	29.5	1	2	3	5		M		
800	799.2	34.5	3	4	5	9		M		801.2 32.5 TAN-GREEN, SAPROLITIC, CLAYEY SILT
795	794.2	39.5	2	4	9	13		M		
790	789.2	44.5	2	4	6	10		M		
785	784.2	49.5	5	6	9	15		M		781.7 52.0 BROWN AND WHITE, SAPROLITIC, SANDY SILT
780	779.2	54.5	2	4	8	12		M		
775	774.2	59.5	7	13	12	25		M		775.2 58.5 BROWN, SAPROLITIC, SILTY CLAY
770	769.2	64.5	60/0.1			60/0.1				771.2 62.5 WEATHERED ROCK (META-GRANITE) 769.2 64.5 CRYSTALLINE ROCK (META-GRANITE)
765	764.2	69.5	60/0.0			60/0.0				761.7 72.0 WEATHERED ROCK (META-GRANITE)
760	759.2	74.5	100/0.3			100/0.3				758.9 74.8 Boring Terminated at Elevation 758.9 ft IN WEATHERED ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 269+59	**OFFSET** 100 ft RT	**ALIGNMENT** -L-	**0 HR.** 36.6
COLLAR ELEV. 831.4 ft	**TOTAL DEPTH** 83.9 ft	**NORTHING** 871,911	**EASTING** 1,782,814	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/23/11	**COMP. DATE** 08/23/11	**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)
835												
										GROUND SURFACE	831.4	0.0
830										ARTIFICIAL FILL RED-ORANGE, HIGHLY PLASTIC, SILTY CLAY		
	828.1	3.3	3	6	9	15						
825							SS-27P	M			826.4	5.0
	823.1	8.3	3	4	6	10				RESIDUAL RED-ORANGE WITH BLACK, SAPROLITIC, SILTY CLAY		
820							SS-28P	M				
	818.1	13.3	2	3	4	7		M				
815												
	813.1	18.3	2	3	5	8		M				
810												
	808.1	23.3	2	3	4	7		M				
805							SS-29P	M				
	803.1	28.3	2	3	4	7		M				
800												
	798.1	33.3	2	2	4	6	SS-30P	M				
795												
	793.1	38.3	1	3	6	9		M				
790												
	788.1	43.3	3	3	4	7		M				
785											785.4	46.0
	783.1	48.3	3	5	7	12	SS-31P	M		TAN-GREEN, SAPROLITIC, SILTY CLAY		
780												
	778.1	53.3	4	7	11	18		M				
775												
	773.1	58.3	9	19	23	42		M			771.9	59.5
770										TAN, ORANGE, AND BROWN, SAPROLITIC, SANDY SILT		
	768.1	63.3	12	24	23	47	SS-32P	M				
765												
	763.1	68.3	15	15	19	34	SS-33P	M				
760												
	758.1	73.3	95	5/0.0		100/0.5					758.4	73.0
755										WEATHERED ROCK (GRANITE)		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Pedro, J. L.	
SITE DESCRIPTION PROPOSED DUAL BRIDGES ON -L- (I-840) OVER -Y13- (US 29)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 269+59	**OFFSET** 100 ft RT	**ALIGNMENT** -L-	**0 HR.** 36.6
COLLAR ELEV. 831.4 ft	**TOTAL DEPTH** 83.9 ft	**NORTHING** 871,911	**EASTING** 1,782,814	**24 HR.** Caved
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 77% 03/15/2010		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 08/23/11	**COMP. DATE** 08/23/11	**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)
755						Match Line						
	753.1	78.3	60/0.0			60/0.0				CRYSTALLINE ROCK (GRANITE)	753.1	78.3
750										WEATHERED ROCK (GRANITE)	751.4	80.0
	748.1	83.3	80	20/0.1		100/0.6					747.5	83.9
										Boring Terminated at Elevation 747.5 ft IN WEATHERED ROCK (GRANITE)		

NCDOT BORE DOUBLE U2525B_GEO_Y13_BH.GPJ NC_DOT.GDT 9/28/11

EB1-A

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-1P	59 LT	267+12	3.0-4.5	A-7-5(39)	71	35	2.8	10.1	32.3	54.8	100	99	92	-	-
SS-2P	59 LT	267+12	8.0-9.5	A-7-5(15)	49	17	7.1	21.7	36.7	34.5	100	99	77	-	-
SS-3P	59 LT	267+12	13.0-14.5	A-7-5(7)	45	11	18.7	21.9	35.1	24.3	100	95	63	-	-
SS-4P	59 LT	267+12	18.0-19.5	A-5(4)	41	8	23.1	22.7	35.9	18.3	100	94	58	-	-
SS-5P	59 LT	267+12	28.0-29.5	A-4(2)	38	6	28.0	20.9	36.9	14.2	100	86	56	-	-
SS-6P	59 LT	267+12	38.0-39.5	A-4(1)	36	3	25.8	22.1	37.9	14.2	100	90	57	-	-
SS-7P	59 LT	267+12	48.0-49.5	A-4(0)	30	3	20.9	35.3	35.7	8.1	100	94	52	-	-

EB1-C

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-631	20 LT	267+00	5.0-6.5	A-7-5(24)	63	31	11.6	17.6	18.1	52.7	100	97	73	-	-
SS-632	20 LT	267+00	10.0-11.5	A-6(7)	39	14	19.9	22.9	28.9	28.4	100	96	61	-	-
SS-633	20 LT	267+00	20.0-21.5	A-4(3)	35	8	18.6	28.4	32.7	20.3	100	96	58	-	-
SS-634	20 LT	267+00	30.0-31.5	A-4(2)	34	6	20.3	26.7	36.8	16.2	100	95	58	-	-
SS-635	20 LT	267+00	40.0-41.5	A-4(1)	34	4	25.8	27.6	38.6	8.0	100	92	53	-	-

EB1-D

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-8P	105 RT	266+96	2.5-4.0	A-7-6(18)	53	27	12.0	23.3	18.1	46.7	100	98	68	-	-
SS-9P	105 RT	266+96	7.5-9.0	A-4(0)	31	4	21.9	35.9	30.0	12.2	100	96	48	-	-
SS-10P	105 RT	266+96	22.5-24.0	A-4(0)	25	2	17.6	39.6	30.6	12.2	100	96	49	-	-
SS-11P	105 RT	266+96	32.5-34.0	A-4(0)	24	1	26.8	39.6	25.6	8.1	100	91	40	-	-

B1-A

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-12P	54 LT	268+30	3.4-4.9	A-4(0)	29	4	20.5	36.5	30.8	12.2	100	93	49	-	-
SS-13P	54 LT	268+30	8.4-9.9	A-4(0)	28	3	21.1	37.7	31.0	10.1	100	92	48	-	-
SS-14P	54 LT	268+30	13.4-14.9	A-4(0)	28	NP	24.5	36.1	31.2	8.1	100	89	46	-	-
SS-15P	54 LT	268+30	18.4-19.9	A-4(1)	33	3	20.3	27.4	40.2	12.2	100	91	58	-	-
SS-16P	54 LT	268+30	23.4-24.9	A-5(4)	43	7	8.7	47.9	37.3	6.1	100	98	60	-	-
SS-17P	54 LT	268+30	28.5-29.9	A-4(0)	27	2	22.7	37.5	33.7	6.1	100	95	48	-	-

B1-C

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-25P	17 LT	268+22	3.3-4.8	A-4(1)	30	5	25.4	23.9	36.5	14.2	100	95	54	-	-
SS-26P	17 LT	268+22	13.3-14.8	A-4(0)	30	2	23.9	32.7	35.3	8.1	100	96	47	-	-

B1-D

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-21P	43 RT	268+13	3.8-5.3	A-7-5(14)	52	15	5.5	25.8	52.5	16.2	100	97	78	-	-
SS-22P	43 RT	268+13	13.8-15.3	A-5(7)	46	10	7.7	39.8	44.4	8.1	100	98	65	-	-
SS-23P	43 RT	268+13	23.8-25.3	A-6(6)	40	11	15.0	33.1	39.8	12.2	100	93	62	-	-
SS-24P	43 RT	268+13	33.8-35.3	A-4(1)	31	6	24.3	35.5	32.0	8.1	100	89	49	-	-

B1-D

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	17 RT	268+15	58.5-58.9	META-GABBRO	183.7	9.81	11.56

B1-B

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-18P	105 RT	268+08	8.3-9.8	A-4(0)	27	NP	27.8	37.7	28.4	6.1	100	87	43	-	-
SS-19P	105 RT	268+08	18.3-19.8	A-4(0)	25	NP	31.0	39.1	23.7	6.1	100	88	36	-	-
SS-20P	105 RT	268+08	33.3-34.8	A-2-4(0)	22	NP	40.8	32.7	22.5	4.1	100	78	30	-	-

EB2-C

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-34P	23 LT	269+86	21.6-23.1	A-5(11)	59	8	7.5	32.3	46.0	14.2	100	98	75	-	-

EB2-D

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	20 RT	270+00	3.5-5.0	A-7-5(28)	60	25	1.8	9.1	20.5	68.6	100	99	91	-	-
SS-655	20 RT	270+00	8.5-10.0	A-7-5(16)	55	16	4.6	21.0	42.1	32.3	100	100	79	-	-
SS-656	20 RT	270+00	28.5-30.0	A-7-5(10)	47	12	9.1	25.0	47.7	18.2	100	96	74	-	-
SS-657	20 RT	270+00	33.5-35.0	A-5(7)	42	7	7.3	32.1	52.6	8.1	100	96	76	-	-

EB2-B

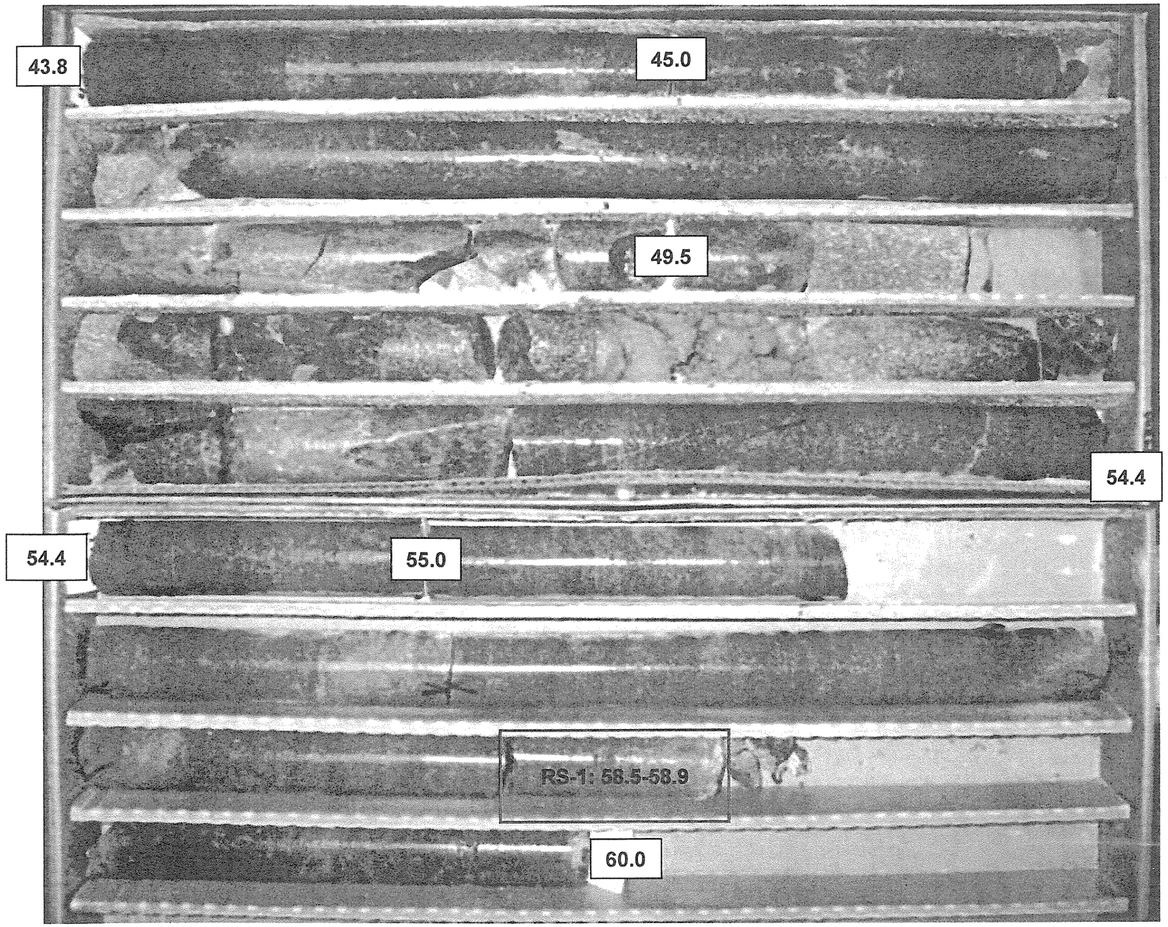
SOIL TEST RESULTS

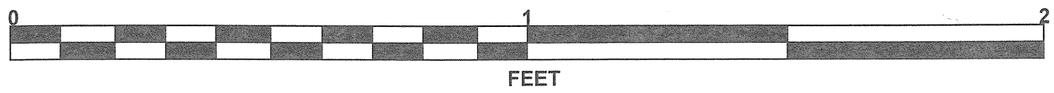
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-27P	100 RT	269+59	3.3-4.8	A-7-5(35)	73	35	7.7	10.8	26.8	54.8	100	95	84	-	-
SS-28P	100 RT	269+59	8.3-9.8	A-7-5(15)	61	16	13.4	20.1	38.1	28.4	100	91	72	-	-
SS-29B	100 RT	269+59	23.3-24.8	A-5(10)	59	8	9.9	28.6	47.3	14.2	100	94	74	-	-
SS-30P	100 RT	269+59	33.3-34.8	A-5(9)	57	10	12.0	29.2	44.6	14.2	100	94	68	-	-
SS-31P	100 RT	269+59	48.3-49.8	A-7-5(8)	43	11	7.5	36.1	48.3	8.1	99	96	68	-	-
SS-32P	100 RT	269+59	63.3-64.8	A-4(1)	31	4	15.2	37.5	39.1	8.1	91	85	53	-	-
SS-33P	100 RT	269+59	68.3-69.8	A-4(4)	36	5	6.5	30.2	55.2	8.1	100	98	74	-	-

CORE PHOTOGRAPHS

B1-D

BOXES 1 & 2: 43.8 - 60.0 FEET





SITE PHOTOGRAPH

Proposed Bridges on –L– (I-840) over -Y13- (US 29)

Looking Northeast along Bent 1 towards -Y22- (Hicone Rd.)

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34821.1.1 (U-2525B)* F.A. PROJ. *N/A*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO*

SITE DESCRIPTION *BRIDGE ON -Y11- (MCKNIGHT MILL ROAD) OVER -L- AT STATION 21+69*

PROJECT: 34821.1.1

ID: U-2525B

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1	TITLE SHEET
2	LEGEND
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14	CORE PHOTOGRAPH
15	SITE PHOTOGRAPH

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

PERSONNEL

J.I. MILKOVITS JR.

H.R. CONLEY

J.R. MATULA

N.D. MOHS

INVESTIGATED BY *N.D. MOHS*

CHECKED BY *N.T. ROBERSON*

SUBMITTED BY *N.T. ROBERSON*

DATE *SEPTEMBER 2011*

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

9/2/11

DRAWN BY: *N.D. MOHS*

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

PROJECT REFERENCE NO.	SHEET NO.
34821.1.1 (U-2525B)	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	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

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

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

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N X
- [ ] -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 KADLINIZED 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-57 AT -Y11- STA. 22+15.81, 155.20' LT

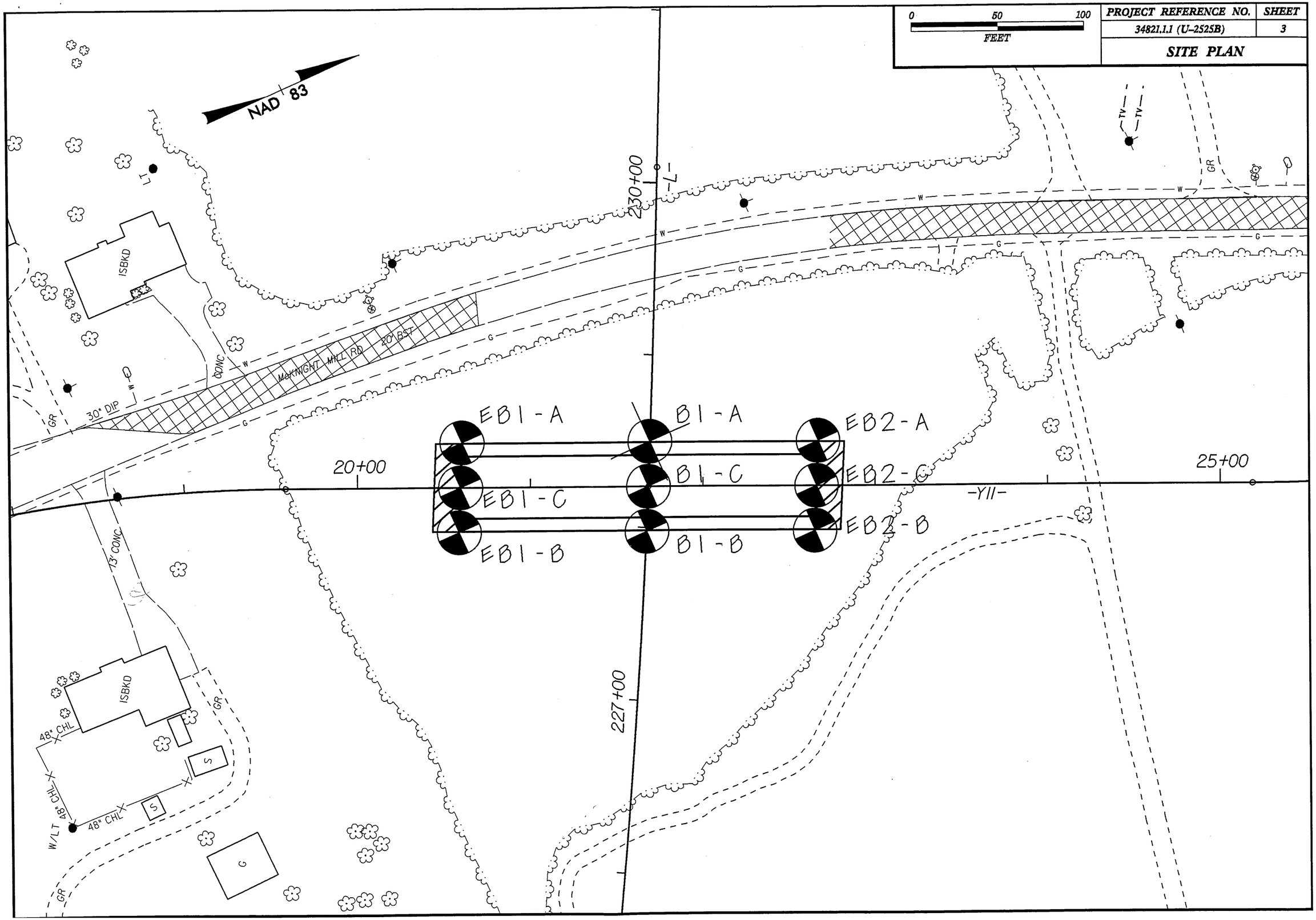
ELEVATION: 764.69 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

SITE PLAN



0 20 40 FEET VE = 2:1	PROJECT REFERENCE NO.	SHEET
	34821.1.1 (U-2525B)	4
	PROFILE BORINGS PROJECTED ALONG -Y11-	

780
770
760
750
740
730
720
710
700

EB1-C
20+60
℄

B1-A
21+70
26' LT

EB2-C
22+66
℄

10
100/0.6
100/0.4
60/0.0
DRY 08/11

6
16
21
97
100/0.2
60/0.0
08/11

15
27
77
100/0.9
49
100/0.7
100/0.3
08/11
Ⓐ

RESIDUAL, RED, TAN, AND BROWN, MOIST, SANDY SILT, MEDIUM STIFF TO HARD, SAPROLITIC, SANDY CLAY AND SILTY CLAY

WEATHERED ROCK

(META-DIORITE)

CRYSTALLINE ROCK, GRAY, FRESH
WITH VERY SLIGHT WEATHERING ON JOINTS,
VERY HARD, CLOSE FRACTURES AT 30°
META-DIORITE
REC=98%
RQD=68%
RMR=70

Ⓐ RESIDUAL, GRAY AND BROWN, MOIST, DENSE, SAPROLITIC, SILTY SAND

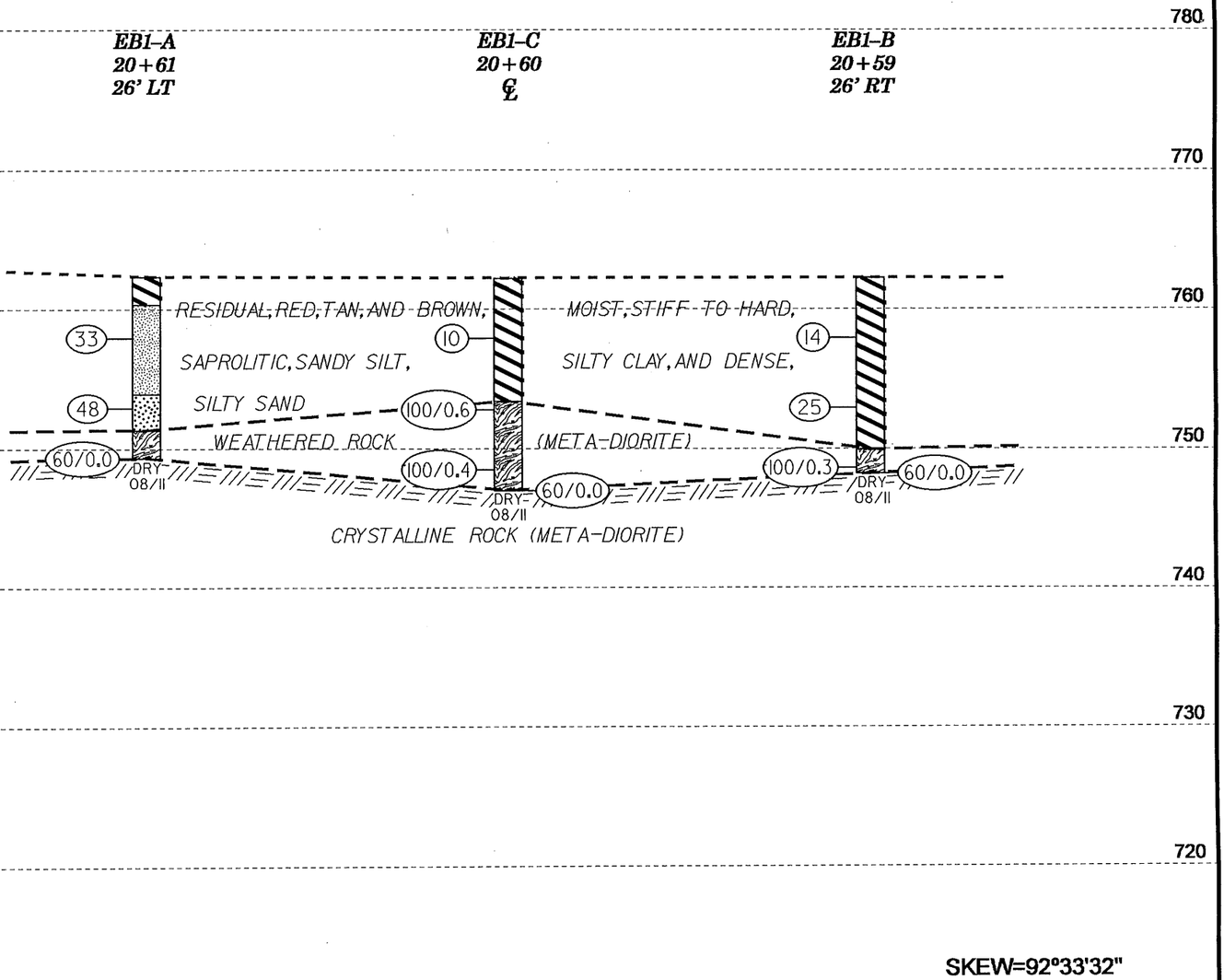
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY TIN DATED 08/12/2011

20+00
21+00
22+00
23+00

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

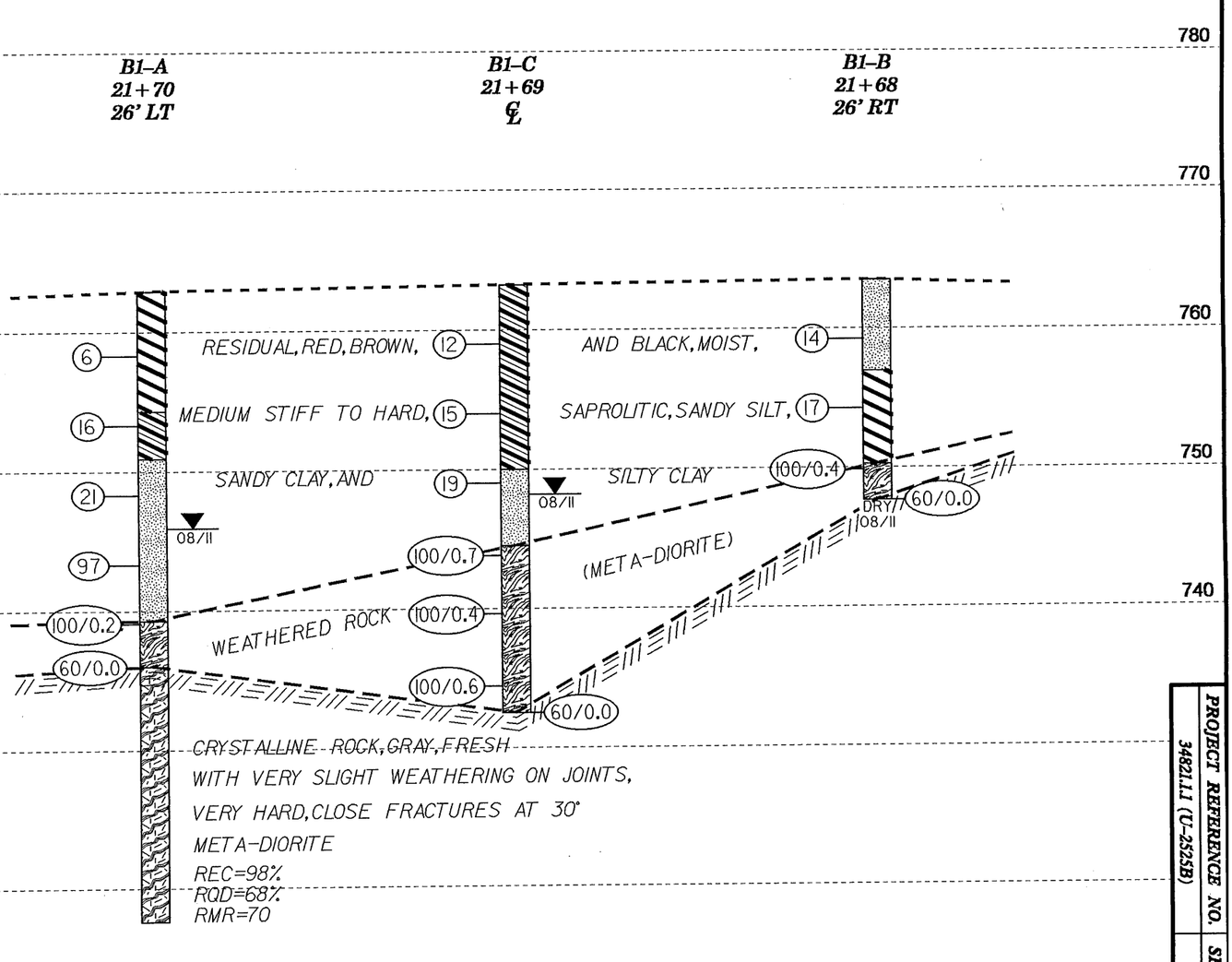
END BENT 1 CROSS SECTION



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

BENT 1 CROSS SECTION

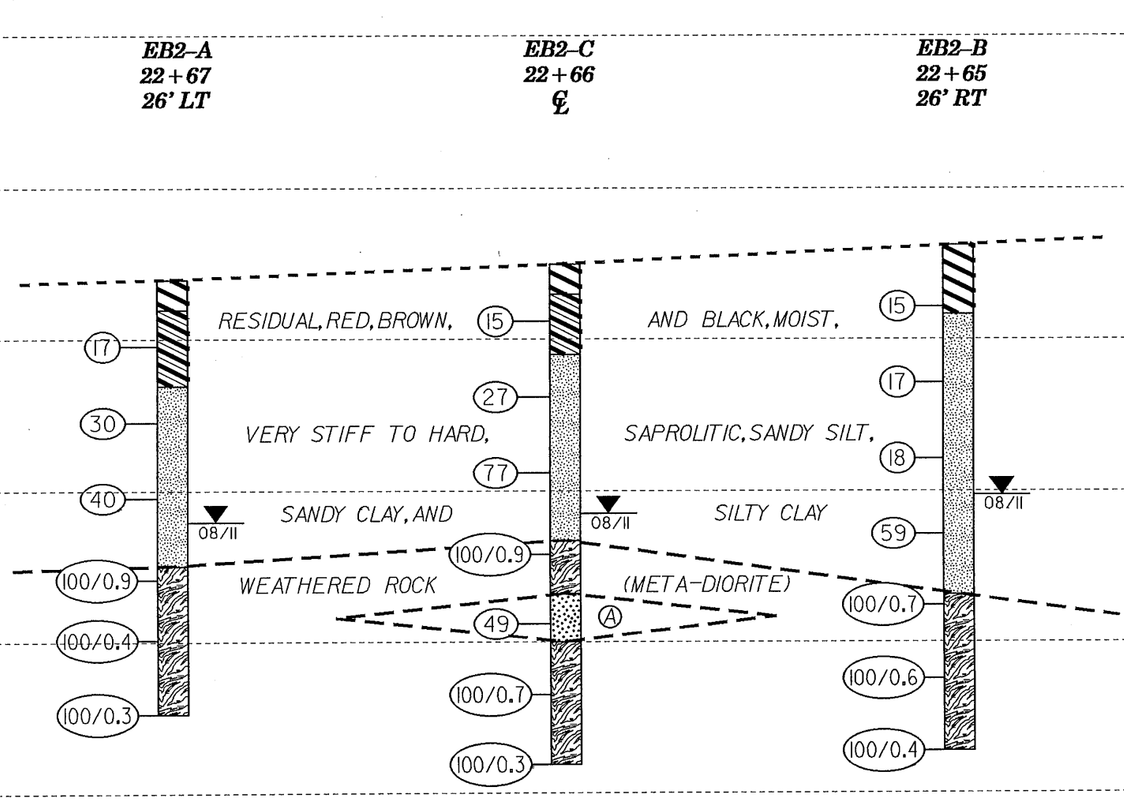


PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	5

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

END BENT 2 CROSS SECTION



SKEW=92°33'32"

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	6

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 20+61	**OFFSET** 26 ft LT	**ALIGNMENT** -Y11-	**0 HR.** Dry
COLLAR ELEV. 762.3 ft	**TOTAL DEPTH** 13.0 ft	**NORTHING** 869,955	**EASTING** 1,786,437	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/12/11	**COMP. DATE** 08/12/11	**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										GROUND SURFACE	762.3	0.0
										RESIDUAL Brown-Black, Saprolitic, Silty Clay	760.3	2.0
760	758.9	3.4	8	13	20	33	SS-10	M		Tan-White, Saprolitic, Sandy Silt	753.9	8.4
755	753.9	8.4	29	24	24	48	SS-11	M		White-Tan, Saprolitic, Silty Sand with some Gravel	751.3	11.0
750	749.3	13.0	60/0.0			60/0.0				**WEATHERED ROCK** (Meta-Diorite)	749.3	13.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 749.3 ft on Crystalline Rock (Meta-Diorite)		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 20+59	**OFFSET** 26 ft RT	**ALIGNMENT** -Y11-	**0 HR.** Dry
COLLAR ELEV. 762.2 ft	**TOTAL DEPTH** 14.0 ft	**NORTHING** 869,932	**EASTING** 1,786,484	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/16/11	**COMP. DATE** 08/16/11	**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										GROUND SURFACE	762.2	0.0
										RESIDUAL Red, Brown, Tan and White, Silty Clay		
760	758.9	3.3	7	6	8	14	SS-13	M				
755	753.9	8.3	7	10	15	25	SS-14	M			749.9	12.3
750	748.9	13.3	100/0.3			100/0.3				**WEATHERED ROCK** (Meta-Diorite)	748.2	14.0
	748.2	14.0	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 748.2 ft on Crystalline Rock (Meta-Diorite)		

NCDOT BORE DOUBLE U2525B_GEO_Y11.GPJ NC_DOT.GDT 9/6/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69			**GROUND WTR (ft)**
BORING NO. EB1-C	**STATION** 20+60	**OFFSET** CL	**ALIGNMENT** -Y11- — **0 HR.** Dry
COLLAR ELEV. 762.2 ft	**TOTAL DEPTH** 15.2 ft	**NORTHING** 869,944	**EASTING** 1,786,460 — **24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 08/16/11	**COMP. DATE** 08/16/11	**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
765										762.2 GROUND SURFACE 0.0
760	758.9	3.3	5	4	6	10	SS-12	M		**RESIDUAL** Tan, Red, and Gray, Silty Clay
755	753.9	8.3	10	83	17/0.1	100/0.6				753.4 8.8 **WEATHERED ROCK** (Meta-Diorite)
750	748.9	13.3	100/0.4			100/0.4				
	747.0	15.2	60/0.0			60/0.0				747.0 15.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 747.0 ft on Crystalline Rock (Meta-Diorite)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 21+70	**OFFSET** 26 ft LT	**ALIGNMENT** -Y11-	**0 HR.** N/A
COLLAR ELEV. 762.9 ft	**TOTAL DEPTH** 45.3 ft	**NORTHING** 870,055	**EASTING** 1,786,481	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/18/11	**COMP. DATE** 08/18/11	**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										762.9 GROUND SURFACE	0.0
										RESIDUAL Red-Brown, Silty Clay	
760	759.3	3.6	3	2	4	6	SS-19	W			
755	754.3	8.6	7	7	9	16	SS-20	W		754.3 Red, Brown, and Tan, Saprolitic, Sandy Clay	8.6
750	749.3	13.6	6	8	13	21	SS-21	W		750.9 Brown-Black, Saprolitic, Sandy Silt	12.0
745	744.3	18.6	42	54	43	97		W			
740	739.3	23.6	100/0.2			100/0.2				739.3 **WEATHERED ROCK** (Meta-Diorite)	23.6
735	736.0	26.9	60/0.0			60/0.0	RS-1			736.0 **CRYSTALLINE ROCK** Meta-Diorite, Gray, Fresh with Very Slight Weathering on Joints, Very Hard, Close Fractures at 30° REC=98% RQD=68% RMR=70	26.9
730							RS-2				
725											
720										717.6 Boring Terminated at Elevation 717.6 ft in Crystalline Rock (Meta-Diorite)	45.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 21+70	**OFFSET** 26 ft LT	**ALIGNMENT** -Y11-	**0 HR.** N/A
COLLAR ELEV. 762.9 ft	**TOTAL DEPTH** 45.3 ft	**NORTHING** 870,055	**EASTING** 1,786,481	**24 HR.** 17.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/18/11	**COMP. DATE** 08/18/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NX	**TOTAL RUN** 18.4 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
736											Begin Coring @ 26.9 ft	
735	736.0	26.9	3.4	*N=60/0.0* 1:00/1.0 1:00/1.0 :50/1.0	(3.1) 91%	(2.3) 68%	RS-1	(18.1) 98%	(12.5) 68%		736.0 **CRYSTALLINE ROCK** Meta-Diorite, Gray, Fresh with Very Slight Weathering on Joints, Very Hard, Close Fractures at 30° REC=98% RQD=68% RMR=70	26.9
	732.6	30.3										
730	727.6	35.3	5.0	1:05/1.0 :20/0.4 1:05/1.0 1:07/1.0 1:05/1.0 1:05/1.0 1:06/1.0	(5.0) 100%	(3.8) 76%	RS-2					
725	722.6	40.3	5.0	:45/1.0 :43/1.0 :52/1.0 :58/1.0 1:07/1.0	(5.0) 100%	(3.0) 60%						
720	717.6	45.3	5.0	:45/1.0 :47/1.0 1:00/1.0 1:30/1.0 1:20/1.0	(5.0) 100%	(3.4) 68%					717.6 Boring Terminated at Elevation 717.6 ft in Crystalline Rock (Meta-Diorite)	45.3

C:\DOT BORE DOUBLE U2525B_GEO_Y11.GPJ NC_DOT.GDT 9/6/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 21+68	**OFFSET** 26 ft RT	**ALIGNMENT** -Y11-	**0 HR.** Dry
COLLAR ELEV. 763.4 ft	**TOTAL DEPTH** 15.8 ft	**NORTHING** 870,032	**EASTING** 1,786,528	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/17/11	**COMP. DATE** 08/17/11	**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										763.4 / 0.0 GROUND SURFACE
										RESIDUAL Tan-Brown, Sandy Silt
760	760.2	3.2	12	9	5	14	SS-15	M		
										756.9 / 6.5 Tan-Brown, Saprolitic, Silty Clay
755	755.2	8.2	6	7	10	17	SS-16	M		
750	750.2	13.2	100/0.4			100/0.4				750.2 / 13.2 **WEATHERED ROCK** (Meta-Diorite)
	747.6	15.8	60/0.0			60/0.0				747.6 / 15.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 747.6 ft on Crystalline Rock (Meta-Diorite)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. B1-C	**STATION** 21+69	**OFFSET** CL	**ALIGNMENT** -Y11-	**0 HR.** 21.5
COLLAR ELEV. 763.2 ft	**TOTAL DEPTH** 30.7 ft	**NORTHING** 870,044	**EASTING** 1,786,505	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/17/11	**COMP. DATE** 08/17/11	**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										763.2 / 0.0 GROUND SURFACE
										RESIDUAL Red, Brown, and Tan, Saprolitic, Sandy Clay
760	760.0	3.2	6	7	5	12	SS-17	M		
755	755.0	8.2	6	7	8	15		M		
750	750.0	13.2	5	7	12	19	SS-18	M		750.0 / 13.2 Brown and Black, Saprolitic, Sandy Silt
745	745.0	18.2	7	57	43/0.2	100/0.7				744.5 / 18.7 **WEATHERED ROCK** (Meta-Diorite)
740	740.0	23.2	100/0.4			100/0.4				
735	735.0	28.2	60	40/0.1		100/0.6				
	732.5	30.7	60/0.0			60/0.0				732.5 / 30.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 732.5 ft on Crystalline Rock (Meta-Diorite)

NCDOT BORE DOUBLE U2525B_GEO_Y11.GPJ NC_DOT.GDT 9/6/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 22+67	**OFFSET** 26 ft LT	**ALIGNMENT** -Y11-	**0 HR.** 17.5
COLLAR ELEV. 763.9 ft	**TOTAL DEPTH** 28.7 ft	**NORTHING** 870,144	**EASTING** 1,786,521	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/11/11	**COMP. DATE** 08/11/11	**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										GROUND SURFACE	763.9	0.0
										RESIDUAL Brown-Black, Saprolitic, Silty Clay	761.9	2.0
760	760.5	3.4	7	8	9	17	SS-8	M		Tan-Brown, Saprolitic, Sandy Clay	756.9	7.0
755	755.5	8.4	9	14	16	30	SS-9	M		Dark Brown, Black, and Tan, Saprolitic, Sandy Silt		
750	750.5	13.4	16	18	22	40		M			745.0	18.9
745	745.5	18.4	20	42	58/0.4	100/0.9				**WEATHERED ROCK** (Meta-Diorite)		
740	740.5	23.4	100/0.4			100/0.4					735.2	28.7
	735.5	28.4	100/0.3			100/0.3				Boring Terminated at Elevation 735.2 ft		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 22+65	**OFFSET** 26 ft RT	**ALIGNMENT** -Y11-	**0 HR.** 16.5
COLLAR ELEV. 766.2 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 870,121	**EASTING** 1,786,567	**24 HR.** 16.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/09/11	**COMP. DATE** 08/09/11	**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)
770										GROUND SURFACE	766.2	0.0
										RESIDUAL Brown-Black, Saprolitic, Silty Clay		
765	763.1	3.1	6	7	8	15	SS-1	M			761.6	4.6
760	758.1	8.1	5	8	9	17	SS-2	M		Dark Brown and Tan, Saprolitic, Sandy Silt		
755	753.1	13.1	3	5	13	18	SS-3	M				
750	748.1	18.1	14	26	33	59	SS-4	M			743.1	23.1
745	743.1	23.1	47	53/0.2		100/0.7				**WEATHERED ROCK** (Meta-Diorite)		
740	738.1	28.1	65	35/0.1		100/0.6						
735	733.1	33.1	100/0.4			100/0.4					732.7	33.5
										Boring Terminated at Elevation 732.7 ft		

NCDOT BORE DOUBLE U2525B_GEO_Y11.GPJ NC_DOT.GDT 9/6/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION Bridge on -Y11- (McKnight Mill Rd.) over -L- at Station 21+69			**GROUND WTR (ft)**
BORING NO. EB2-C	**STATION** 22+66	**OFFSET** CL	**ALIGNMENT** -Y11- — **0 HR.** 21.5
COLLAR ELEV. 765.0 ft	**TOTAL DEPTH** 33.1 ft	**NORTHING** 870,132	**EASTING** 1,786,544 — **24 HR.** 16.5
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Conley, H. R.	**START DATE** 08/10/11	**COMP. DATE** 08/10/11	**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
765										765.0 GROUND SURFACE 0.0
	762.2	2.8	7	7	8	15	SS-5	M		**RESIDUAL** Brown-Black, Saprolitic, Silty Clay 763.0 2.0
760										Tan-Brown, Saprolitic, Sandy Clay 759.0 6.0
	757.2	7.8	9	12	15	27		M		Brown and Tan, Saprolitic, Sandy Silt
755										
	752.2	12.8	17	25	52	77	SS-6	M		
750										
	747.2	17.8	20	42	58/0.4	100/0.9				746.7 18.3 **WEATHERED ROCK** (Meta-Diorite)
745										743.2 21.8
	742.2	22.8	14	23	26	49	SS-7	M		**RESIDUAL** Gray and Brown, Saprolitic, Silty Sand 740.0 25.0
740										**WEATHERED ROCK** (Meta-Diorite)
	737.2	27.8	71	29/0.2		100/0.7				
735										
	732.2	32.8	100/0.3			100/0.3				731.9 33.1 Boring Terminated at Elevation 731.9 ft

EB1-A

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-10	26 LT	20+61	3.4-9.9	A-4(1)	33	7	27.6	30.2	22.1	20.1	100	83	48	-	-
SS-11	26 LT	20+61	8.4-9.9	A-2-4(0)	25	3	41.2	30.8	17.9	10.1	98	70	33	-	-

EB1-B

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-13	26 RT	20+59	3.3-4.8	A-7-6(35)	65	42	11.3	12.5	15.5	60.7	100	95	79	-	-
SS-14	26 RT	20+59	8.3-9.8	A-7-6(35)	61	36	6.9	10.7	46.0	36.4	100	95	87	-	-

EB1-C

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-12	CL	20+60	3.3-4.8	A-7-6(31)	70	42	16.6	14.0	12.8	56.6	98	88	71	-	-

B1-A

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-19	26 LT	21+70	3.6-5.1	A-7-6(36)	66	41	9.3	12.1	19.9	58.6	99	94	81	-	-
SS-20	26 LT	21+70	8.6-10.1	A-6(6)	39	13	11.5	38.2	34.1	16.2	100	95	61	-	-
SS-21	26 LT	21+70	13.6-15.1	A-4(0)	32	2	24.5	39.0	30.4	6.1	92	80	43	-	-

B1-B

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-15	26 RT	21+68	3.2-4.7	A-4(0)	21	5	23.5	22.2	34.1	20.2	96	81	56	-	-
SS-16	26 RT	21+68	8.2-9.7	A-7-6(14)	42	20	7.9	27.1	42.8	22.2	100	97	74	-	-

B1-C

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-17	CL	21+69	3.2-4.7	A-6(10)	38	18	16.6	19.6	35.5	28.3	98	87	67	-	-
SS-18	CL	21+69	13.2-14.7	A-4(0)	33	3	16.0	46.7	31.2	6.1	100	93	48	-	-

EB2-A

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTU	% ORGANI
							C.SAN	F.SAND	SILT	CLAY	10	40	200		
SS-8	26 LT	22+67	3.4-4.9	A-6(8)	37	11	12.1	21.5	48.3	18.1	100	92	73	-	-
SS-9	26 LT	22+67	8.4-9.9	A-4(0)	34	3	8.9	51.7	31.4	8.0	100	95	51	-	-

EB2-B

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTU	% ORGANI
							C.SAN	F.SAND	SILT	CLAY	10	40	200		
SS-1	26 RT	22+65	3.1-4.6	A-7-6(27)	60	33	11.3	15.1	25.4	48.3	100	93	78	-	-
SS-2	26 RT	22+65	8.1-9.6	A-4(1)	37	2	14.7	35.0	38.2	12.1	98	91	60	-	-
SS-3	26 RT	22+65	13.1-14.6	A-4(1)	35	6	26.2	33.8	28.0	12.1	100	84	49	-	-
SS-4	26 RT	22+65	18.1-19.6	A-4(0)	27	1	25.2	41.9	24.9	8.0	100	87	43	-	-

EB2-C

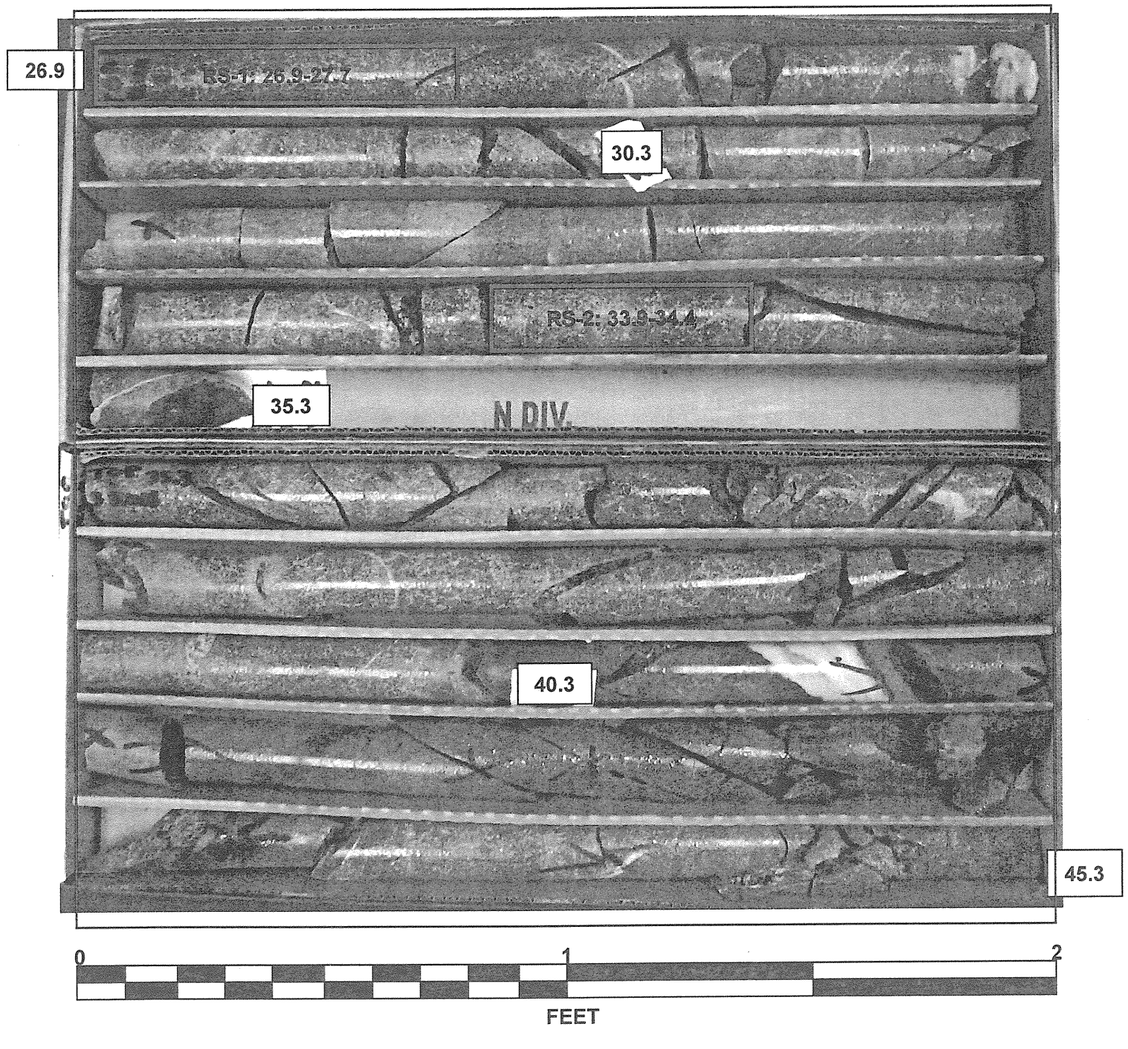
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTU	% ORGANI
							C.SAN	F.SAND	SILT	CLAY	10	40	200		
SS-5	CL	22+66	2.8-4.3	A-6(7)	38	11	11.3	31.2	37.4	20.1	100	95	67	-	-
SS-6	CL	22+66	12.8-14.3	A-4(1)	31	4	20.5	21.7	43.7	14.1	98	85	62	-	-
SS-7	CL	22+66	22.8-24.3	A-2-4(0)	31	5	34.6	30.2	27.2	8.0	81	62	34	-	-

CORE PHOTOGRAPH

B1-A

BOXES 1 & 2: 26.9-45.3 FEET



SITE PHOTOGRAPH

Bridge on -Y11- (McKnight Mill Road) over -L- at Station 21+69

Looking East towards Bent 1

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	13

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34821.1.1 (U-2525B) F.A. PROJ. N/A

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO

SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL RD. - RELOCATION) OVER -L- (I-840) AT -L- STA. 80+74

ID: U-2525B

PROJECT: 34821.1.1

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1	TITLE SHEET
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PERSONNEL

O. B. OTI

D. W. DIXON

J. R. TURNAGE

INVESTIGATED BY J. L. PEDRO

CHECKED BY N. T. ROBERSON

SUBMITTED BY J. L. PEDRO

DATE AUGUST 2011

NORTH CAROLINA LICENSED SEAL 2157 GEOLOGIST JAIME LOVE PEDRO

Jaime Love Pedro 7-27-11

DRAWN BY: T. T. WALKER, J. L. PEDRO

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

PROJECT REFERENCE NO.	SHEET NO.
34821.1.1 (U-2525B)	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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

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

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

CORE SIZE:
- [ ] -B_____
- [X] -N XWL
- [ ] -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 SL.)	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-24, -Y4- Sta. 24+63.04, Offset - 58.75' Rt OR -L- Sta. 80+18.99, Offset - 20.22' Rt

ELEVATION: 770.82 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	3

SITE PLAN

0 60 120
FEET

SKEW ANGLE = 103.6°

NAD 83/95

20+00

-Y4-

-L-

EB1-A

EB1-B

B1-A

B1-B

25+00

80+00

EB2-A

EB2-B

ISFD

CONC

-L-

-Y4-

-Y4RPD-
25+00

-Y4RPC-

BL-24 -Y4- Sta. 24+63.04 -58.75' RT.)
-L- Sta. 80+18.99 (20.22' RT.)

PINC = 71+53.05

PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	4

FENCE DIAGRAM THROUGH BORINGS PROJECTED ALONG -Y4-

0 20 40
FEET
VE = 2:1

EB1-B
23+58
24' RT

B1-B
24+52
18' RT

EB2-B
25+46
24' RT

780
770
760
750
740
730
720
710
700

11
25
31
100/0.8
100/0.4
06/11

37
37
51
40
57
100/0.9
100/0.6
07/11

21
21
23
52
100/0.8
06/11

RESIDUAL, TAN-BROWN AND GREEN, VERY STIFF TO HARD, MOIST, SANDY SILT

TAN-BROWN, MEDIUM TO VERY DENSE, MOIST, SILTY SAND

WEATHERED ROCK (GRANITE AND METAVOLCANIC ROCK)

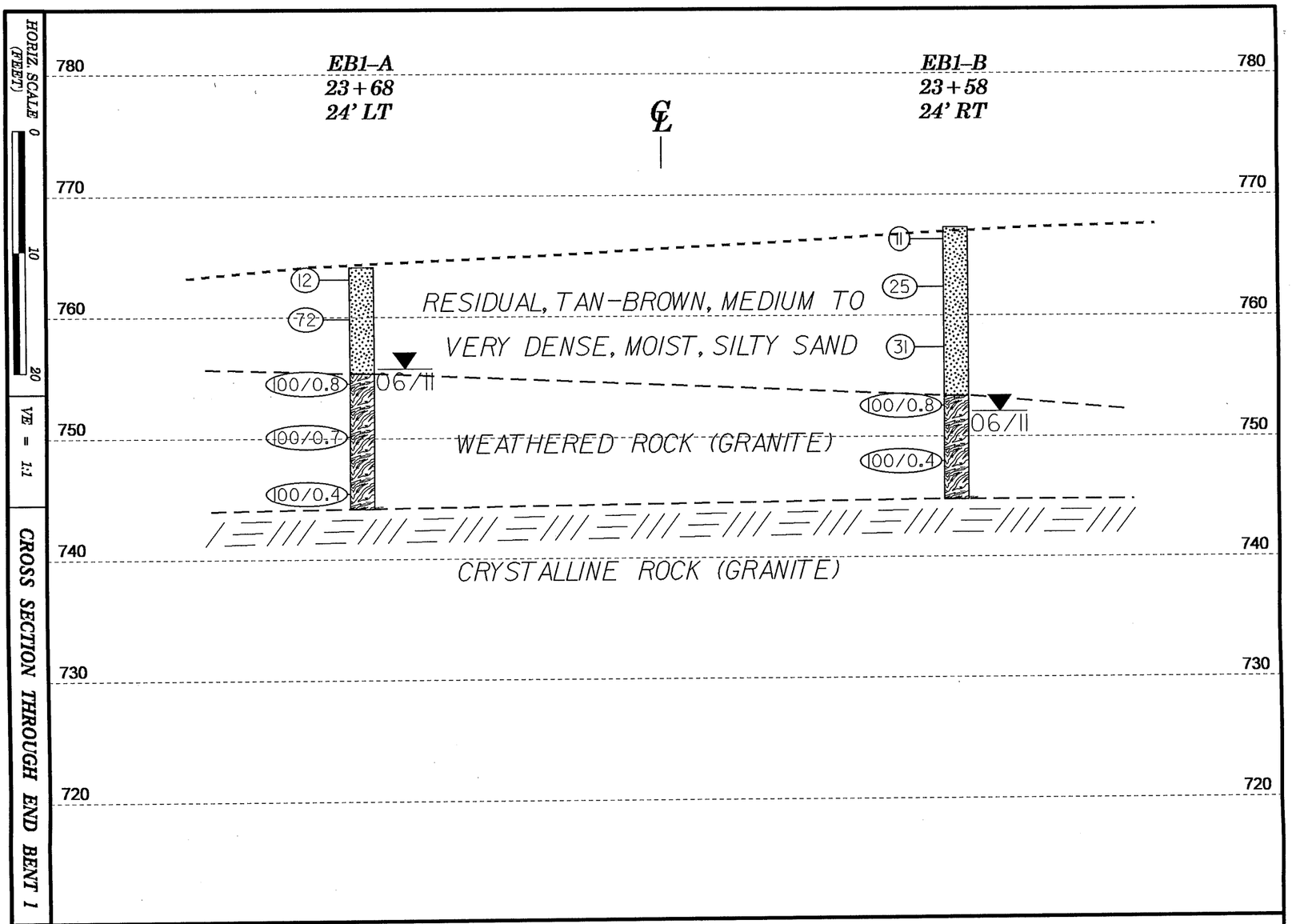
CRYSTALLINE ROCK, GRAY AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, GRANITE

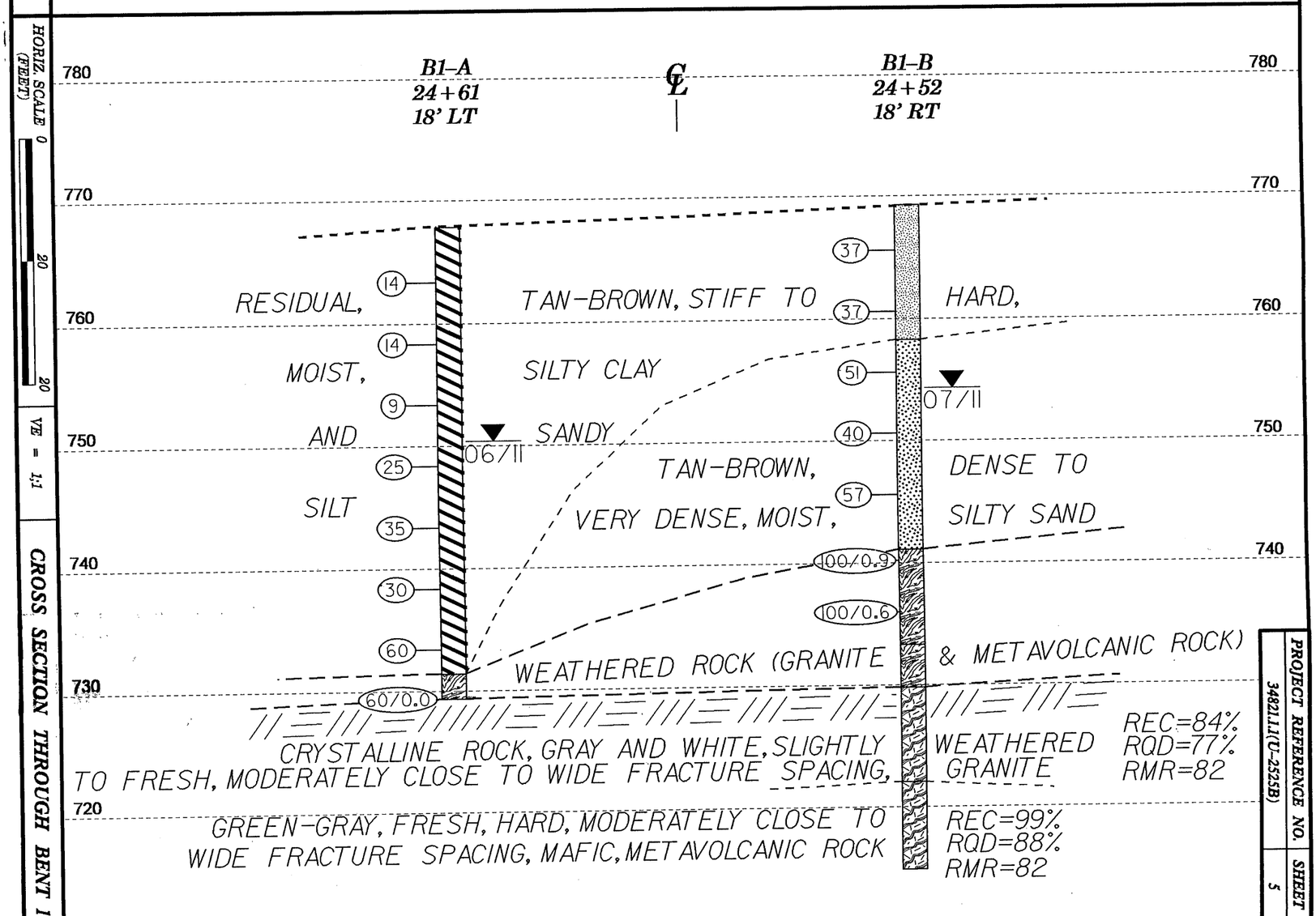
REC=84%
RQD=77%
RMR=82

GREEN-GRAY, FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK

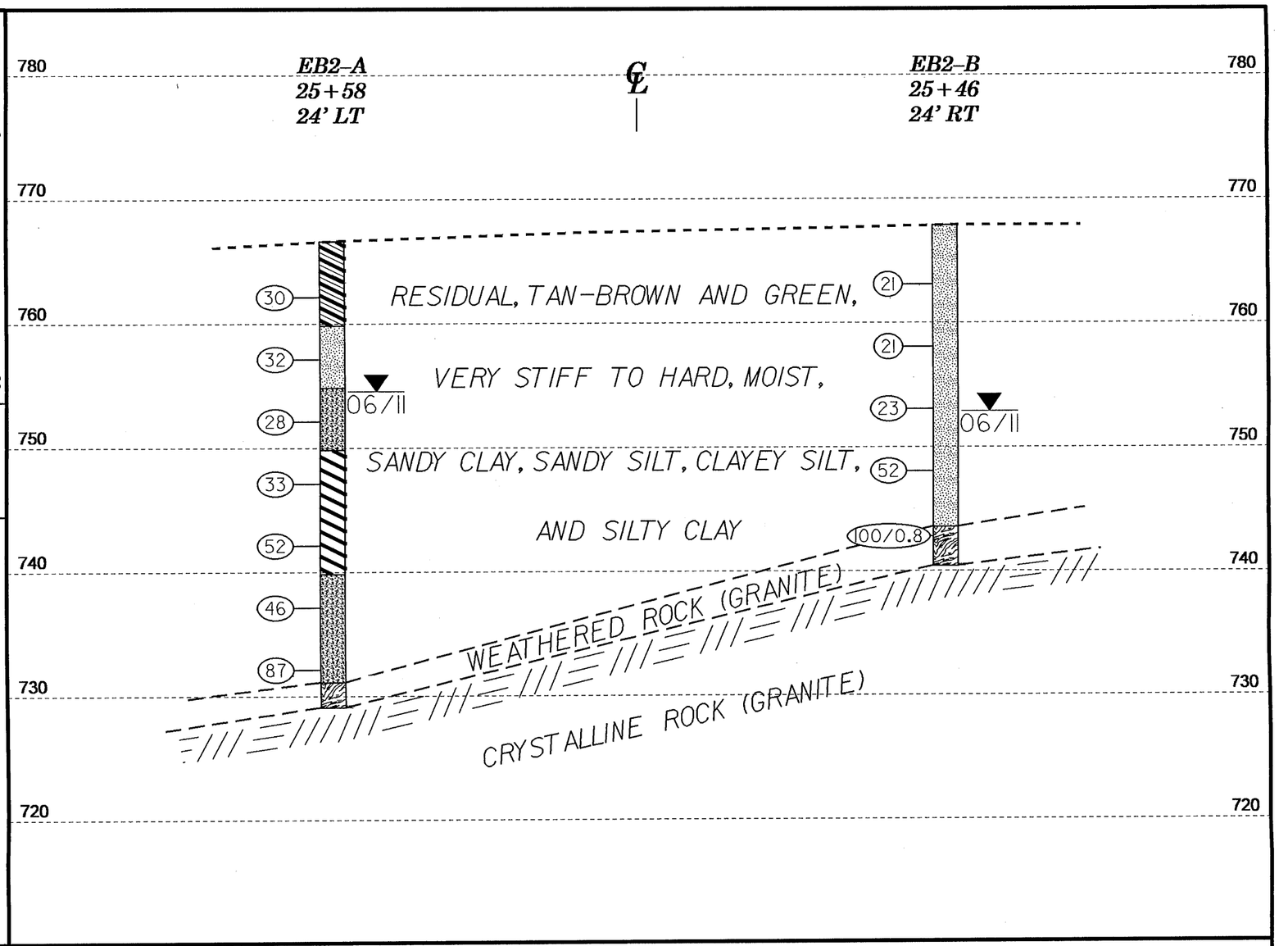
REC=99%
RQD=88%
RMR=82

24+00 +20 +40 +60 +80 25+00 +20 +40 +60 +80 26+00





PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	5



PROJECT REFERENCE NO.	SHEET
34821.1.1(U-2525B)	6

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 23+68	**OFFSET** 24 ft LT	**ALIGNMENT** -Y4-	**0 HR.** Dry
COLLAR ELEV. 764.1 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 857,710	**EASTING** 1,794,194	**24 HR.** 8.4
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**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	764.1	0.0								764.1 GROUND SURFACE	0.0
			3	6	6	12		M		RESIDUAL TAN-BROWN, SILTY SAND	
760	760.8	3.3	4	20	52	72		M			
755	755.8	8.3	11	50	50/0.3	100/0.8				755.3 WEATHERED ROCK (GRANITE)	8.8
750	750.8	13.3	75	25/0.2		100/0.7					
745	745.8	18.3	100/0.4			100/0.4				744.1 Boring Terminated by Auger Refusal at Elevation 744.1 ft on CRYSTALLINE ROCK (GRANITE)	20.0

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 23+58	**OFFSET** 24 ft RT	**ALIGNMENT** -Y4-	**0 HR.** Dry
COLLAR ELEV. 767.4 ft	**TOTAL DEPTH** 22.6 ft	**NORTHING** 857,662	**EASTING** 1,794,205	**24 HR.** 15.3
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**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	
770	767.4	0.0								767.4 GROUND SURFACE	0.0
			3	5	6	11	SS-1D	M		RESIDUAL TAN-BROWN, SILTY SAND	
765	763.4	4.0	5	12	13	25		M			
760	758.4	9.0	10	15	16	31	SS-2D	M			
755	753.4	14.0	21	79/0.3		100/0.8				753.4 WEATHERED ROCK (GRANITE)	14.0
750	748.4	19.0	100/0.4			100/0.4				744.8 Boring Terminated by Auger Refusal at Elevation 744.8 ft on CRYSTALLINE ROCK (GRANITE)	22.6

NCDOT BORE DOUBLE U2525B_GEO_BH.GPJ NC_DOT.GDT 7/26/11

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 24+61	**OFFSET** 18 ft LT	**ALIGNMENT** -Y4- / **0 HR.** 23.0
COLLAR ELEV. 767.9 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 857,743	**EASTING** 1,794,281 / **24 HR.** 17.5
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Dixon, D. W.	**START DATE** 06/23/11	**COMP. DATE** 06/23/11	**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
770										767.9 GROUND SURFACE 0.0
										RESIDUAL
765	764.4	3.5	4	6	8	14	SS-10D	M		TAN-BROWN, SILTY CLAY
760	759.4	8.5	4	5	9	14	SS-11D	M		
755	754.4	13.5	3	4	5	9		M		
750	749.4	18.5	5	10	15	25	SS-12D	M		
745	744.4	23.5	4	15	20	35		M		
740	739.4	28.5	6	13	17	30	SS-13D	M		
735	734.4	33.5	13	25	35	60		M		
										731.4 36.5
730	729.4	38.5	60/0.0			60/0.0				**WEATHERED ROCK** (METAVOLCANIC ROCK) 729.4 38.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 729.4 ft on CRYSTALLINE ROCK (METAVOLCANIC ROCK)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+52	**OFFSET** 18 ft RT	**ALIGNMENT** -Y4-	**0 HR.** N/A
COLLAR ELEV. 769.3 ft	**TOTAL DEPTH** 54.5 ft	**NORTHING** 857,707	**EASTING** 1,794,287	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/28/11	**COMP. DATE** 07/01/11	**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)
770										769.3 GROUND SURFACE	0.0
	766.6	2.7	20	17	20	37	SS-14D	M		**RESIDUAL** TAN-BROWN, SANDY SILT	
765											
	761.6	7.7	16	17	20	37		M			
760										758.3	11.0
	756.6	12.7	26	30	21	51	SS-15D	M		TAN-BROWN, SILTY SAND	
755											
	751.6	17.7	6	9	31	40		M			
750											
	746.6	22.7	47	39	18	57		M			
745											
	741.6	27.7	20	52	48/0.4	100/0.9				741.1 **WEATHERED ROCK** (METAVOLCANIC ROCK)	28.2
740											
	736.6	32.7	60	40/0.1		100/0.6				733.3 (METAVOLCANIC ROCK)	36.0
735										REC=0%	
730										729.8 **CRYSTALLINE ROCK** GRAY AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, GRANITE WITH METAVOLCANIC SEAM AT 39.8'-40.2'	39.5
725							RS-1			722.1 REC=84% RQD=77% RMR=82	47.2
720										GREEN-GRAY, FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SAPCING, MAFIC, METAVOLCANIC ROCK	
715										714.8 REC=99% RQD=88% RMR=82	54.5
										Boring Terminated at Elevation 714.8 ft in CRYSTALLINE ROCK (METAVOLCANIC ROCK)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+52	**OFFSET** 18 ft RT	**ALIGNMENT** -Y4-	**0 HR.** N/A
COLLAR ELEV. 769.3 ft	**TOTAL DEPTH** 54.5 ft	**NORTHING** 857,707	**EASTING** 1,794,287	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/28/11	**COMP. DATE** 07/01/11	**SURFACE WATER DEPTH** N/A	
CORE SIZE NXWL	**TOTAL RUN** 18.5 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
733.3											Begin Coring @ 36.0 ft	
	733.3	36.0	3.5	N/A/0.5 N/A/1.0 N/A/1.0 N/A/1.0	(0.0) 0%	(0.0) 0%		(0.0) 0%			733.3 (METAVOLCANIC ROCK)	36.0
730	729.8	39.5	5.0	2:06/1.0 3:00/1.0 4:08/1.0 3:52/1.0 3:46/1.0	(4.1) 82%	(3.7) 74%		(6.5) 84%	(5.9) 77%		729.8 **CRYSTALLINE ROCK** GRAY AND WHITE, SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, GRANITE WITH METAVOLCANIC SEAM AT 39.8'-40.2'	39.5
725	724.8	44.5	5.0	6:40/1.0 7:31/1.0 10:11/1.0 12:13/1.0 13:07/1.0	(4.6) 92%	(4.5) 90%	RS-1				722.1 GREEN-GRAY, FRESH, HARD, MODERATELY CLOSE TO WIDE FRACTURE SPACING, MAFIC, METAVOLCANIC ROCK	47.2
720	719.8	49.5	5.0	2:11/1.0 3:22/1.0 2:51/1.0 2:47/1.0 2:50/1.0	(5.0) 100%	(4.2) 84%		(7.2) 99%	(6.4) 88%		714.8	54.5
715	714.8	54.5									Boring Terminated at Elevation 714.8 ft in CRYSTALLINE ROCK (METAVOLCANIC ROCK)	

NCDOT BORE DOUBLE U2525B_GEO_BH.GPJ NC_DOT.GDT 8/9/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 25+58	**OFFSET** 24 ft LT	**ALIGNMENT** -Y4-	**0 HR.** 25.0
COLLAR ELEV. 766.6 ft	**TOTAL DEPTH** 37.5 ft	**NORTHING** 857,789	**EASTING** 1,794,366	**24 HR.** 12.1
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**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)
770										766.6 GROUND SURFACE	0.0
										RESIDUAL TAN-BROWN, SANDY CLAY	
765	763.1	3.5	9	13	17	30	SS-3D	M			
										759.8 TAN-BROWN, SANDY SILT	6.8
760	758.1	8.5	10	15	17	32	SS-4D	M			
755	753.1	13.5	7	12	16	28	SS-5D	M		754.8 TAN-BROWN, CLAYEY SILT	11.8
										749.8 TAN-BROWN, SILTY CLAY	16.8
750	748.1	18.5	9	14	19	33	SS-6D	M			
745	743.1	23.5	15	25	27	52		M			
										739.8 TAN-BROWN, SAPROLITIC, CLAYEY SILT	26.8
740	738.1	28.5	10	20	26	46	SS-7D	M			
735	733.1	33.5	22	40	47	87		M		731.1	35.5
730										**WEATHERED ROCK** (GRANITE) 729.1	37.5
										Boring Terminated by Auger Refusal at Elevation 729.1 ft on CRYSTALLINE ROCK (GRANITE)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION PROPOSED BRIDGE ON -Y4- (HUFFINE MILL ROAD) OVER -L- (I-840)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 25+46	**OFFSET** 24 ft RT	**ALIGNMENT** -Y4-	**0 HR.** 18.0
COLLAR ELEV. 767.9 ft	**TOTAL DEPTH** 27.5 ft	**NORTHING** 857,741	**EASTING** 1,794,375	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE RFO0057 CME-550X 73% 12/06/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Dixon, D. W.	**START DATE** 06/23/11	**COMP. DATE** 06/23/11	**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
770										767.9 GROUND SURFACE 0.0
										RESIDUAL TAN-BROWN AND GREEN, SANDY SILT
765	764.1	3.8	5	9	12	21	SS-8D	M		
760	759.1	8.8	7	10	11	21		M		
755	754.1	13.8	7	10	13	23	SS-9D	M		
750	749.1	18.8	11	24	28	52		M		
745	744.1	23.8	18	47	58/0.3	100/0.8				743.6 24.3
										WEATHERED ROCK (GRANITE)
										740.4 27.5
										Boring Terminated by Auger Refusal at Elevation 740.4 ft on CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2525B_GEO_BH.GPJ NC_DOT.GDT 8/9/11

EB1-B

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-1D	24 RT	23+58	0.0-1.5	A-2-4(0)	30	7	45.4	29.0	13.5	12.1	99	71	30	-	-
SS-2D	24 RT	23+58	9.0-10.5	A-2-4(0)	25	3	42.0	30.4	15.5	12.1	99	74	32	-	-

B1-A

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-10D	18 LT	24+61	3.5-5.0	A-7-5(21)	54	21	4.8	15.8	51.1	28.3	100	97	85	-	-
SS-11D	18 LT	24+61	8.5-10.0	A-7-5(26)	56	25	3.2	12.1	46.3	38.4	100	98	89	-	-
SS-12D	18 LT	24+61	18.5-20.0	A-7-5(23)	56	22	2.2	17.0	54.5	26.3	100	99	87	-	-
SS-13D	18 LT	24+61	28.5-30.0	A-7-5(9)	45	11	5.9	36.6	45.5	12.1	100	98	72	-	-

B1-B

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-14D	18 RT	24+52	2.7-4.2	A-4(3)	34	10	26.5	28.1	29.3	16.2	98	83	52	-	-
SS-15D	18 RT	24+52	12.7-14.2	A-2-4(0)	22	NP	50.1	29.1	11.7	9.1	78	51	20	-	-

B1-B

ROCK TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ROCK TYPE	UNIT WT LB/FT^3	UNCONFINED COMP. STRENGTH, KSI	SECTION MOD. @ 40% MPSI
RS-1	18 RT	24+52	43.9-44.5	GRANITE	168.0	18.81	4.11

EB2-A

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-3D	24 LT	25+58	3.5-5.0	A-6(7)	37	11	6.7	31.1	44.0	18.2	100	97	72	-	-
SS-4D	24 LT	25+58	8.5-10.0	A-4(5)	39	10	10.5	37.6	41.8	10.1	99	95	63	-	-
SS-5D	24 LT	25+58	13.5-15.0	A-5(3)	42	5	9.1	44.4	38.4	8.1	99	95	60	-	-
SS-6D	24 LT	25+58	18.5-20.0	A-7-5(7)	42	12	10.3	38.8	38.8	12.1	100	96	63	-	-
SS-7D	24 LT	25+58	28.5-30.0	A-5(7)	45	10	8.7	36.4	42.8	12.1	100	96	67	-	-

EB2-B

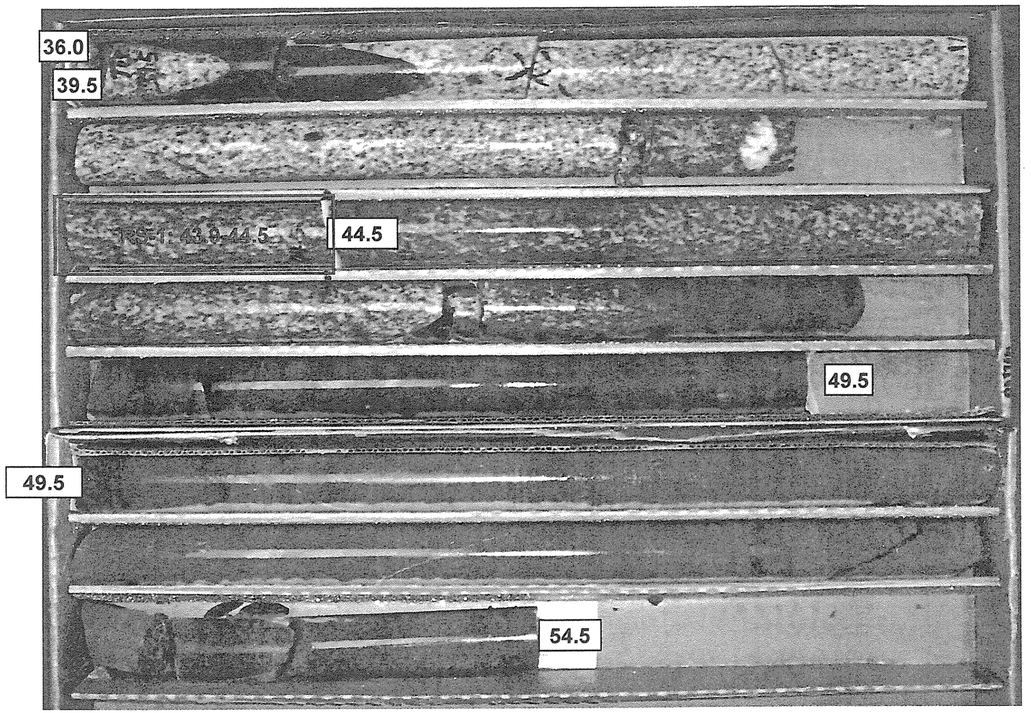
SOIL TEST RESULTS

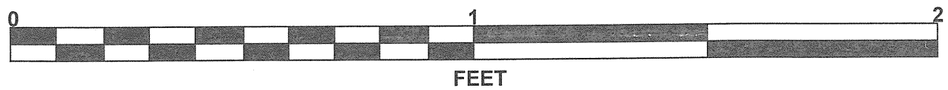
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-8D	24 RT	25+46	3.8-5.3	A-4(0)	29	3	33.3	34.9	17.6	14.1	100	83	38	-	-
SS-9D	24 RT	25+46	13.8-15.3	A-4(1)	32	5	15.6	39.0	35.4	10.1	100	96	54	-	-

CORE PHOTOGRAPHS

B1-B

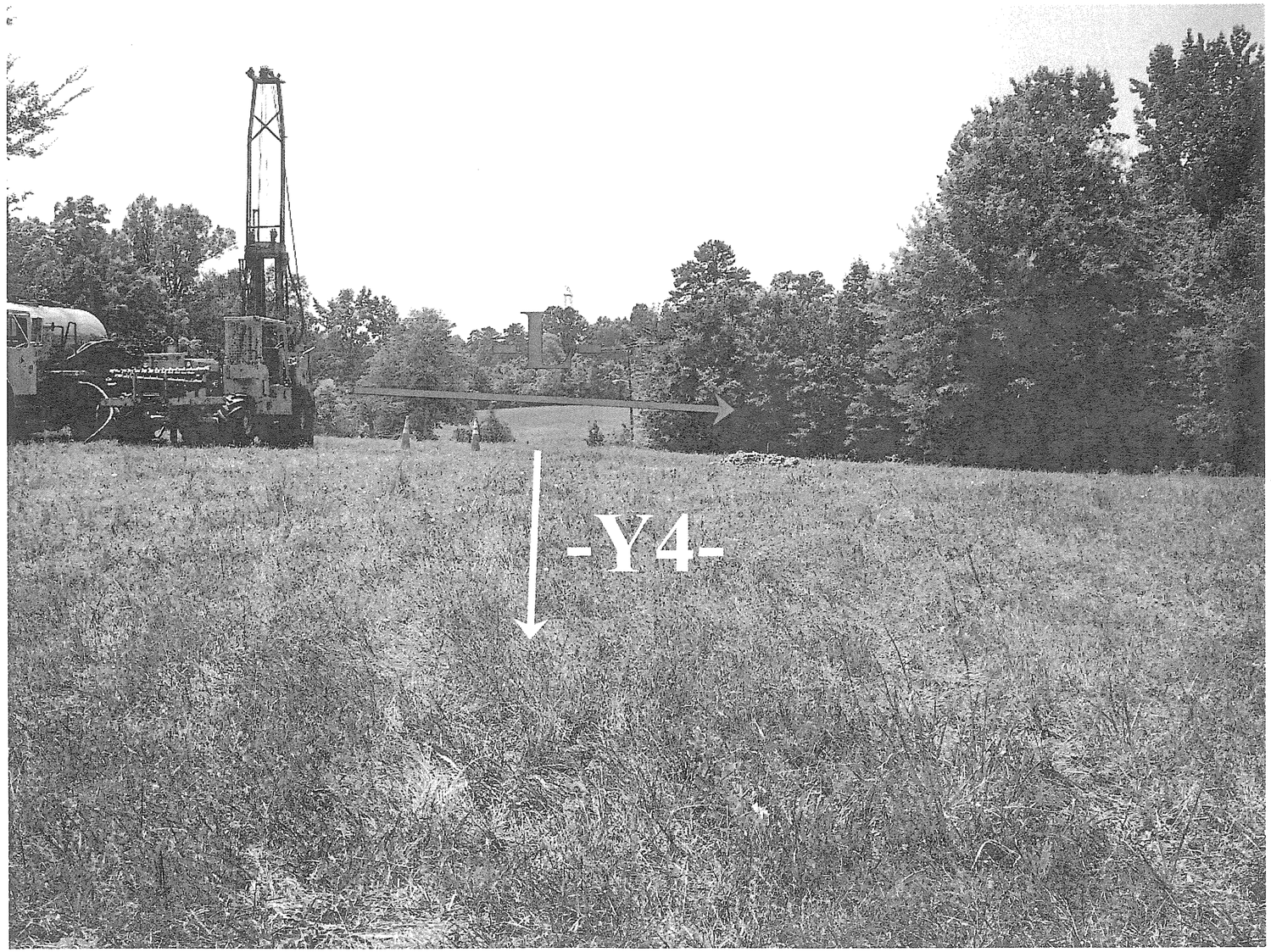
BOXES 1 & 2: 36.0 - 54.5 FEET





SITE PHOTOGRAPH

Proposed Bridge on -Y4- (Huffine Mill Rd.) over -L- (I-840)



Looking West towards End Bent 1

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34821.1.1 (U-2525B)	1	13

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34821.1.1 (U-2525B)* F.A. PROJ. *N/A*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO EASTERN LOOP FROM NORTH OF US 70 RELOCATION TO US 29 NORTH OF GREENSBORO*

SITE DESCRIPTION *BRIDGES ON -Y22- (HICONE ROAD) OVER -Y13- (US 29) AT STATION 26+18*

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-7	CROSS SECTIONS
8-12	BORE LOGS
13	SITE PHOTOGRAPH

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

N.D. MOHS

J.I. MILKOVITS JR.

H.R. CONLEY

J.R. MATULA

INVESTIGATED BY *N.D. MOHS*

CHECKED BY *N.T. ROBERSON*

SUBMITTED BY *N.T. ROBERSON*

DATE *SEPTEMBER 2011*

PROJECT: 34821.1.1

ID: U-2525B

DRAWN BY: *N.D. MOHS, T.T. WALKER*

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.
34821.1.1 (U-2525B)	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	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] 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: BY13-1308, STA. 78+13.11

ELEVATION: 826.89 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	3

SITE PLAN

0 50 100
FEET

NAD 83

88+00

US 29 NORTH

EB1-A LL

B1-A LL

EB2-A LL

B1-B LL

25+00

30+00

HICONE RD.

-Y22-

EB1-A RL

85+00

B1-A RL

EB2-B LL

B1-B RL

EB2-B RL

EB1-B RL

US 29 SOUTH

-Y13-

BY13-1308

TW

FSS

GR

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	4

PROFILE OF BORINGS ALONG -Y22-

0 30 60
FEET
VE = 3:1

EB1-A_RL
24+79
5' RT

B1-B_LL
26+20
23' LT

EB2-B_LL
27+59
9' LT

860
850
840
830
820
810
800
790
780
770

5 5 5 10 8 11 8 3 11 7 100/0.4 100/0.4 60/0.0 DRY 08/11

25 25 25 15 08/11 100/0.8 100/0.2 100/0.9

5 5 6 9 14 18 10 10 15 22 100/0.9 100/0.4 60/0.0 DRY 08/11

ROADWAY EMBANKMENT, RED, MOIST, MEDIUM STIFF, SILTY CLAY AND RESIDUAL, RED, BROWN, TAN, AND WHITE, MOIST, SOFT TO VERY STIFF, SAPROLITIC, SANDY CLAY, CLAYEY SILT AND LOOSE TO MEDIUM DENSE, SILTY SAND

SANDY CLAY

WEATHERED ROCK

(META-GRANITE)

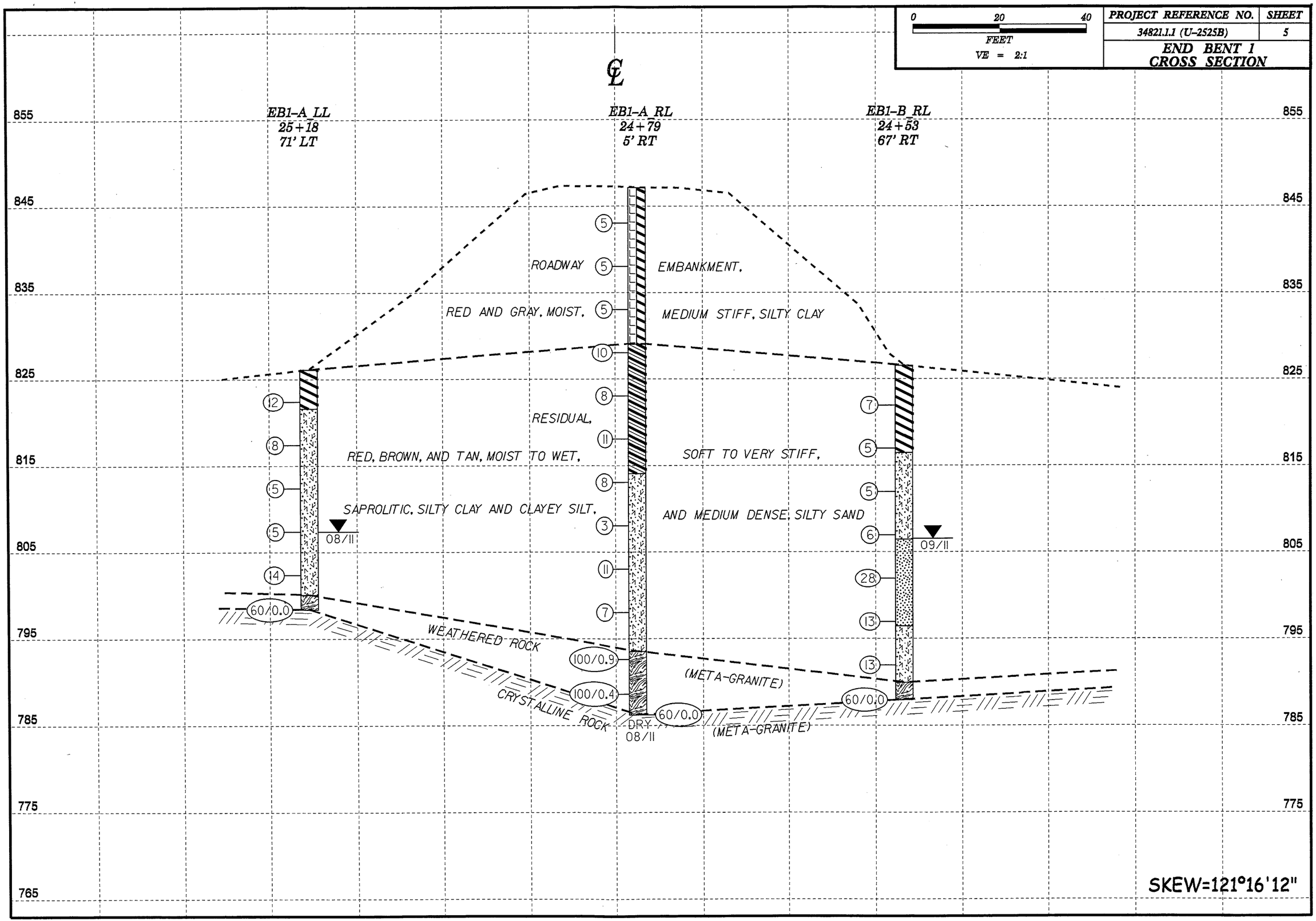
CRYSTALLINE ROCK

(META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

NOTE: PROFILE OF GROUNDLINE TAKEN FROM ROADWAY DESIGN FILE DATED 5/7/2009

24+00 27+00

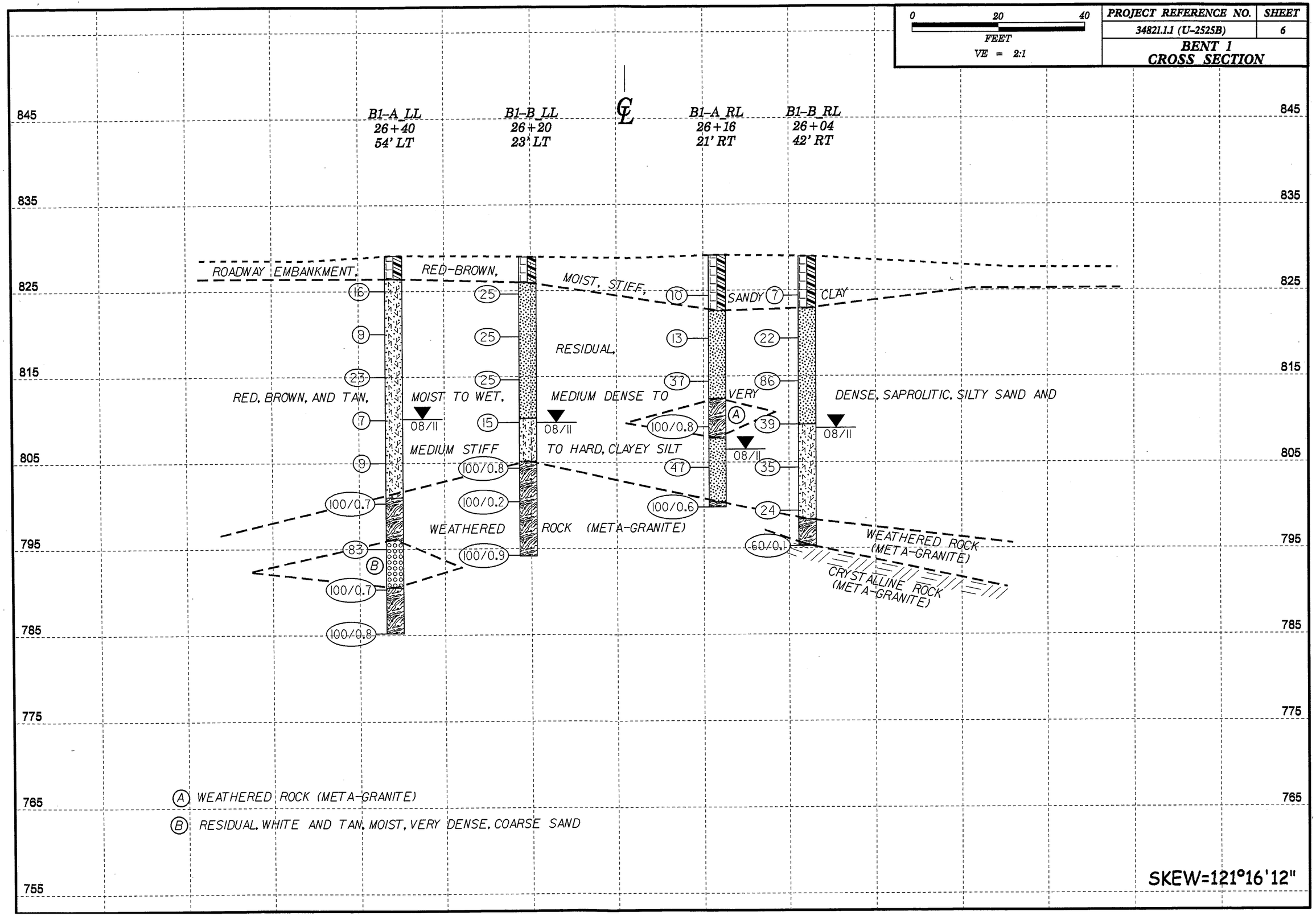


0 20 40
FEET
VE = 2:1
PROJECT REFERENCE NO.
34821.1.1 (U-2525B)
SHEET
5
END BENT 1
CROSS SECTION
EB1-A_LL
25+18
71' LT
EB1-A_RL
24+79
5' RT
EB1-B_RL
24+53
67' RT
855
845
835
825
815
805
795
785
775
765
ROADWAY EMBANKMENT,
RED AND GRAY, MOIST, MEDIUM STIFF, SILTY CLAY
RESIDUAL,
RED, BROWN, AND TAN, MOIST TO WET, SOFT TO VERY STIFF,
SAPROLITIC, SILTY CLAY AND CLAYEY SILT, AND MEDIUM DENSE, SILTY SAND
WEATHERED ROCK
(META-GRANITE)
CRYSTALLINE ROCK
(META-GRANITE)
DRY
08/11
09/11
60/0.0
100/0.9
100/0.4
60/0.0
60/0.0
SKEW=121°16'12"

0	20	40
FEET		
VE = 2:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	6

BENT 1
CROSS SECTION



(A) WEATHERED ROCK (META-GRANITE)

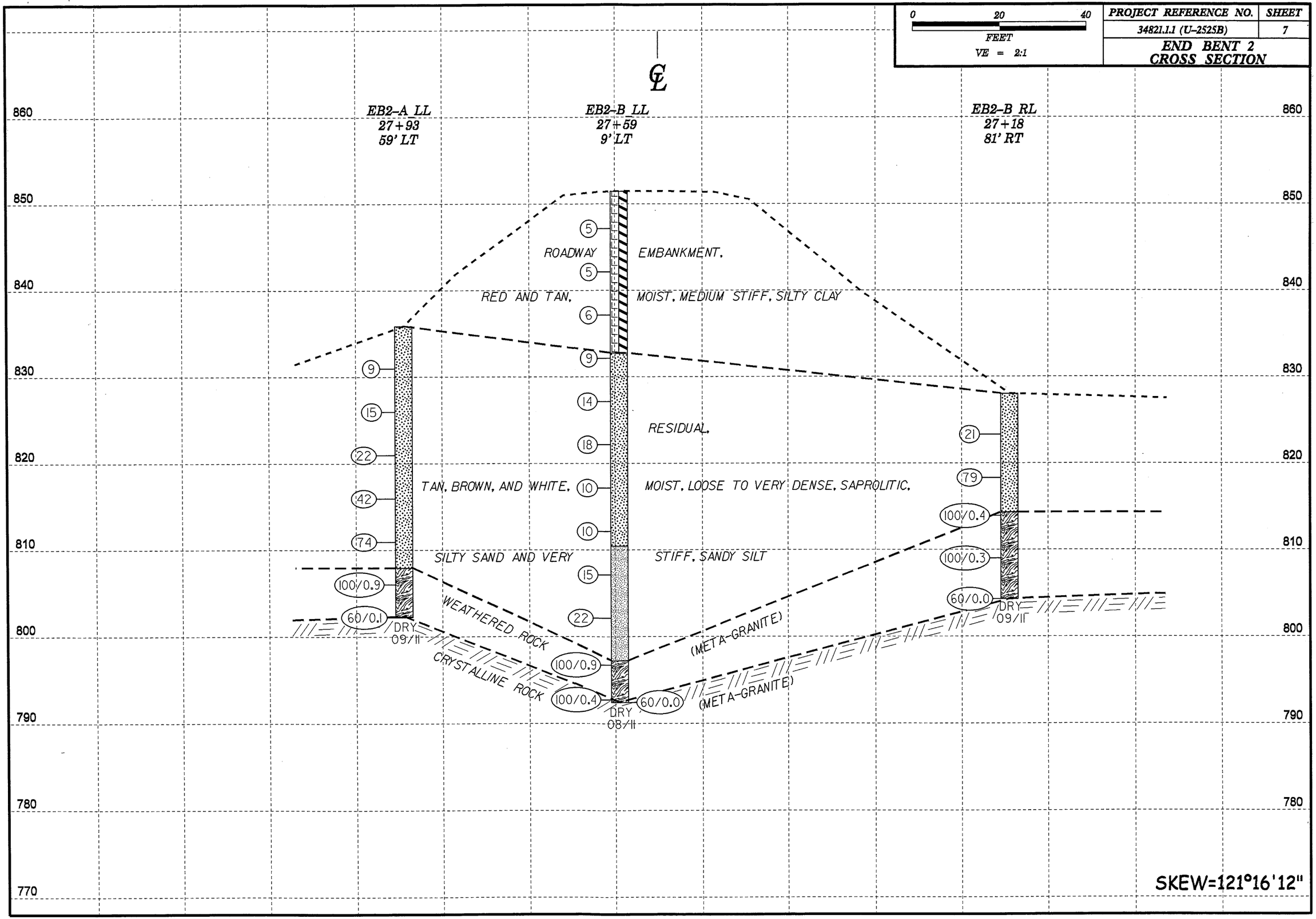
(B) RESIDUAL, WHITE AND TAN, MOIST, VERY DENSE, COARSE SAND

SKEW=121°16'12"

0	20	40
FEET		
VE = 2:1		

PROJECT REFERENCE NO.	SHEET
34821.1.1 (U-2525B)	7

END BENT 2
CROSS SECTION



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB1A_LL	**STATION** 25+18	**OFFSET** 71 ft LT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 826.2 ft	**TOTAL DEPTH** 27.7 ft	**NORTHING** 874,841	**EASTING** 1,784,594	**24 HR.** 18.7
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/29/11	**COMP. DATE** 08/29/11	**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))
826.2										GROUND SURFACE 0.0
										RESIDUAL Red-Brown, Silty Clay
825	823.5	2.7	5	5	7	12		M		
821.7		4.5								Tan-Brown, Saprolitic, Clayey Silt
820	818.5	7.7	3	4	4	8		M		
815	813.5	12.7	3	2	3	5		M		
810	808.5	17.7	3	2	3	5		W		
805	803.5	22.7	5	7	7	14		M		
800.2		26.0								**WEATHERED ROCK** (Meta-Granite)
800	798.5	27.7	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 798.5 ft on Crystalline Rock (Meta-Granite)

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB1A_RL	**STATION** 24+79	**OFFSET** 5 ft RT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 847.4 ft	**TOTAL DEPTH** 60.9 ft	**NORTHING** 874,764	**EASTING** 1,784,555	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/24/11	**COMP. DATE** 08/24/11	**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))
847.4										GROUND SURFACE 0.0
										ROADWAY EMBANKMENT Red and Gray, Silty Clay
845	844.3	3.1	1	3	2	5		M		
840	839.3	8.1	1	2	3	5		M		
835	834.3	13.1	1	2	3	5		M		
829.3		18.1								**RESIDUAL** Brown and Red, Sandy Clay
830	829.3	18.1	3	4	6	10		M		
825	824.3	23.1	4	4	4	8		M		
820	819.3	28.1	3	6	5	11		M		
814.3		33.1								Red, Tan, and Brown, Saprolitic, Clayey Silt
815	814.3	33.1	3	3	5	8		M		
810	809.3	38.1	1	2	1	3		W		
805	804.3	43.1	2	5	6	11		M		
800	799.3	48.1	5	3	4	7		W		
793.8		53.6								**WEATHERED ROCK** (Meta-Granite)
795	794.3	53.1	9	24	76/0.4	100/0.9				
790	789.3	58.1	100/0.4			100/0.4				
786.5		60.9	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 786.5 ft on Crystalline Rock (Meta-Granite)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y22.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB1B_RL	**STATION** 24+53	**OFFSET** 67 ft RT	**ALIGNMENT** -Y22-	**0 HR.** 20.0
COLLAR ELEV. 826.8 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 874,702	**EASTING** 1,784,530	**24 HR.** 20.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/30/11	**COMP. DATE** 09/07/11	**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	826.8	0.0
								M		**RESIDUAL** Red-Brown, Silty Clay		
	823.2	3.6	3	3	4	7						
	818.2	8.6	1	2	3	5		M			816.7	10.1
	813.2	13.6	2	2	3	5		M		Tan, Brown, and White, Saprolitic, Clayey Silt		
	808.2	18.6	2	3	3	6		M			806.7	20.1
	803.2	23.6	6	13	15	28		M		Tan and White, Saprolitic, Silty Sand		
	798.2	28.6	4	5	8	13		M			796.7	30.1
	793.2	33.6	1	2	11	13		M		Brown-Black, Saprolitic, Clayey Silt		
	788.2	38.6	60/0.0			60/0.0		M			790.2	36.6
										WEATHERED ROCK (Meta-Granite)	788.2	38.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 788.2 ft on Crystalline Rock (Meta-Granite)		

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. B1A_LL	**STATION** 26+40	**OFFSET** 54 ft LT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 829.1 ft	**TOTAL DEPTH** 43.9 ft	**NORTHING** 874,825	**EASTING** 1,784,716	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/02/11	**COMP. DATE** 08/02/11	**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	829.1	0.0
										ROADWAY EMBANKMENT Red-Brown, Sandy Clay	826.4	2.7
	826.0	3.1	5	7	9	16		D		**RESIDUAL** Red, Tan, and Brown, Clayey Silt		
	821.0	8.1	3	4	5	9		M				
	816.0	13.1	8	9	14	23		M				
	811.0	18.1	3	4	3	7		W				
	806.0	23.1	3	4	5	9		W				
	801.0	28.1	65	35/0.2		100/0.7		W			801.0	28.1
										WEATHERED ROCK (Meta-Granite)	796.1	33.0
	796.0	33.1	64	18	65	83		M		**RESIDUAL** White and Tan, Coarse Sand with Gravel	790.5	38.6
	791.0	38.1	11	89/0.2		100/0.7				**WEATHERED ROCK** (Meta-Granite)	785.2	43.9
	786.0	43.1	39	61/0.3		100/0.8				Boring Terminated at Elevation 785.2 ft in Weathered Rock (Meta-Granite)		

NCDOT BORE DOUBLE U2525B_GEO_BH_Y22.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. B1B_LL	**STATION** 26+20	**OFFSET** 23 ft LT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 828.9 ft	**TOTAL DEPTH** 34.8 ft	**NORTHING** 874,793	**EASTING** 1,784,696	**24 HR.** 19.3
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/25/11	**COMP. DATE** 08/25/11	**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)
830										828.9 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT Red-Brown, Sandy Clay	
825	825.6	3.3	9	11	14	25		M		825.9	3.0
										RESIDUAL Tan-White, Saprolitic, Silty Sand	
820	820.6	8.3	7	12	13	25		M			
815	815.6	13.3	3	10	15	25		M			
810	810.6	18.3	9	7	8	15		M		810.1	18.8
										Brown, Clayey Silt	
805	805.6	23.3	21	47	53/0.3	100/0.8				805.1	23.8
										WEATHERED ROCK (Meta-Granite)	
800	800.6	28.3	100/0.2			100/0.2					
795	795.6	33.3	8	21	79/0.4	100/0.9				794.1	34.8
										Boring Terminated at Elevation 794.1 ft in Weathered Rock (Meta-Granite)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. B1A_RL	**STATION** 26+16	**OFFSET** 21 ft RT	**ALIGNMENT** -Y22-	**0 HR.** N/A
COLLAR ELEV. 829.1 ft	**TOTAL DEPTH** 29.3 ft	**NORTHING** 874,749	**EASTING** 1,784,693	**24 HR.** 22.6
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/23/11	**COMP. DATE** 08/23/11	**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
830										829.1 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT Red-Brown, Sandy Clay
825	825.4	3.7	5	5	5	10		W		822.6 6.5
										RESIDUAL Tan-White, Saprolitic, Silty Sand
820	820.4	8.7	4	6	7	13		M		
815	815.4	13.7	7	15	22	37		M		812.4 16.7
										WEATHERED ROCK (Meta-Granite)
810	810.4	18.7	26	53	47/0.3	100/0.8				807.8 21.3
										RESIDUAL Tan-White, Saprolitic, Silty Sand
805	805.4	23.7	24	25	22	47		M		
800	800.4	28.7	82	18/0.1		100/0.6				800.4 28.7
										799.8 **WEATHERED ROCK** (Meta-Granite) 29.3
										Boring Terminated at Elevation 799.8 ft in Weathered Rock (Meta-Granite)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y22.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. B1B_RL	**STATION** 26+04	**OFFSET** 42 ft RT	**ALIGNMENT** -Y22-	**0 HR.** N/A
COLLAR ELEV. 829.0 ft	**TOTAL DEPTH** 33.7 ft	**NORTHING** 874,728	**EASTING** 1,784,681	**24 HR.** 20.0
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** NW Casing w/ Advancer	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/23/11	**COMP. DATE** 08/23/11	**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)
830										829.0 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT Red-Brown, Sandy Clay	
825	825.4	3.6	5	4	3	7		W		822.9	6.1
										RESIDUAL Tan-Brown, Saprolitic, Silty Sand	
820	820.4	8.6	7	12	10	22		M			
815	815.4	13.6	29	42	44	86		M			
810	810.4	18.6	21	24	15	39		M		809.4	19.6
										Brown, Saprolitic, Clayey Silt	
805	805.4	23.6	7	18	17	35		M			
800	800.4	28.6	5	10	14	24		M		798.4	30.6
	795.4	33.6	60/0.1			60/0.1		M		**WEATHERED ROCK** (Meta-Granite)	
										795.4 / 795.3 **CRYSTALLINE ROCK** (Meta-Granite)	33.6 / 33.7
										Boring Terminated with Standard Penetration Test Refusal at Elevation 795.3 ft in Weathered Rock (Meta-Granite)	

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB2A_LL	**STATION** 27+93	**OFFSET** 59 ft LT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 835.9 ft	**TOTAL DEPTH** 33.6 ft	**NORTHING** 874,831	**EASTING** 1,784,869	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 09/07/11	**COMP. DATE** 09/07/11	**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)
840										835.9 GROUND SURFACE	0.0
										RESIDUAL Tan, Brown, and White, Saprolitic, Silty Sand	
835											
830	832.0	3.9	4	4	5	9		M			
825	827.0	8.9	4	7	8	15		M			
820	822.0	13.9	6	10	12	22		M			
815	817.0	18.9	11	18	24	42		M			
	812.0	23.9	24	33	41	74		M		808.0	27.9
810	807.0	28.9	84	16/0.4		100/0.9		M		**WEATHERED ROCK** (Meta-Granite)	
805	802.4	33.5	60/0.1			60/0.1		M		802.4 / 802.3 **CRYSTALLINE ROCK** (Meta-Granite)	33.5 / 33.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 802.3 ft on Crystalline Rock (Meta-Granite)	

NCDOT BORE DOUBLE U2525B_GEO_BH_Y22.GPJ NC_DOT.GDT 9/13/11

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB2B_LL	**STATION** 27+59	**OFFSET** 9 ft LT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 851.4 ft	**TOTAL DEPTH** 59.0 ft	**NORTHING** 874,780	**EASTING** 1,784,835	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 08/24/11	**COMP. DATE** 08/24/11	**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))
855										851.4 GROUND SURFACE 0.0
850	848.1	3.3	1	2	3	5		M		**ROADWAY EMBANKMENT** Red and Tan, Silty Clay
845	843.1	8.3	2	2	3	5		M		
840	838.1	13.3	2	3	3	6		M		
835	833.1	18.3	4	4	5	9		M		832.7 18.7 **RESIDUAL** White, Tan, and Brown, Saprolitic, Silty Sand
830	828.1	23.3	5	6	8	14		M		
825	823.1	28.3	7	9	9	18		M		
820	818.1	33.3	5	5	5	10		M		
815	813.1	38.3	5	3	7	10		M		
810	808.1	43.3	5	6	9	15		M		810.4 41.0 Brown, Saprolitic, Sandy Silt
805	803.1	48.3	6	9	13	22		M		
800	798.1	53.3	11	17	83/0.4	100/0.9		M		797.2 54.2 **WEATHERED ROCK** (Meta-Granite)
795	793.1 / 792.4	58.3 / 59.0	100/0.4 / 60/0.0			100/0.4 60/0.0				792.4 59.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 792.4 ft on Crystalline Rock (Meta-Granite)

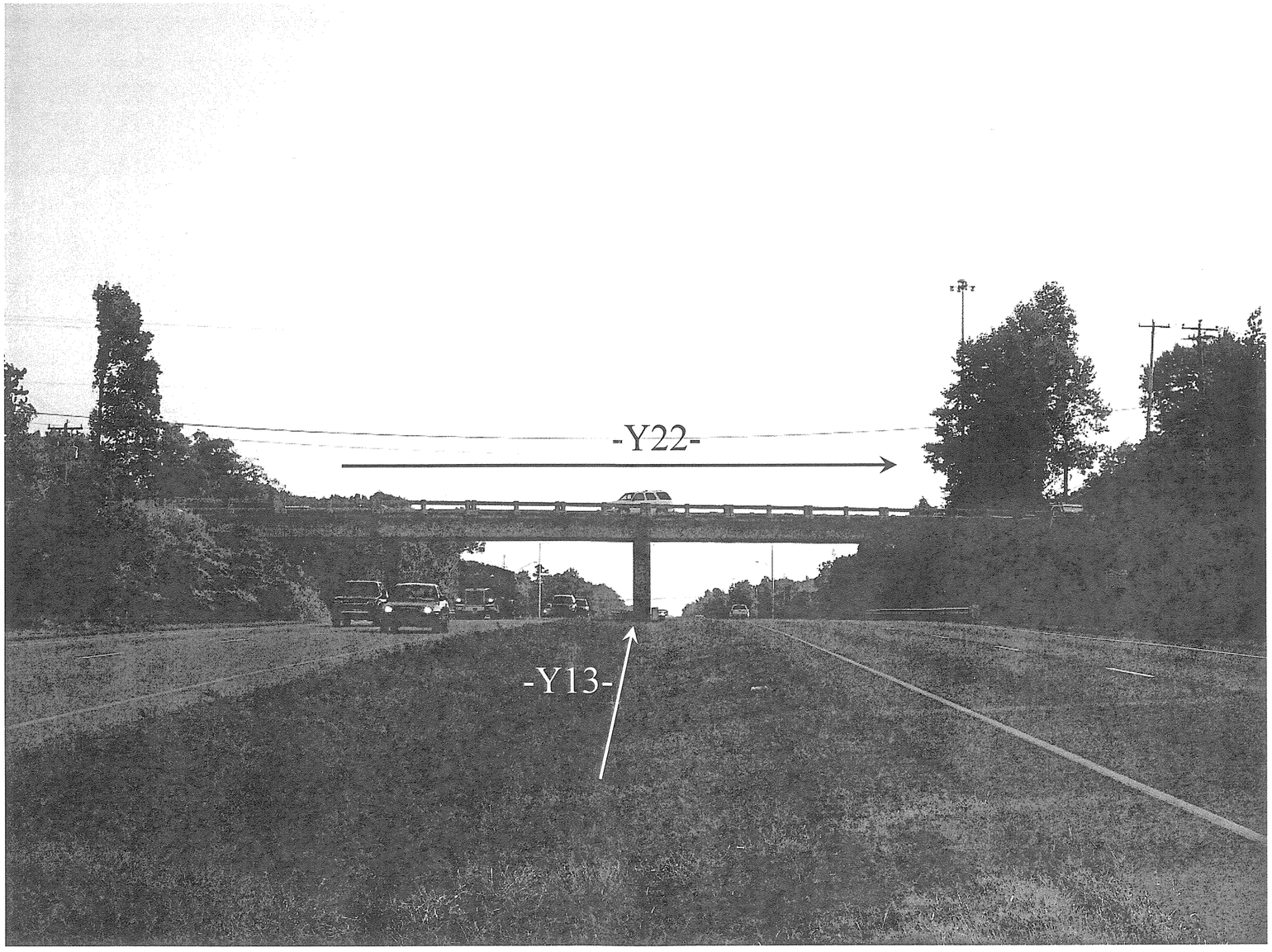
WBS 34821.1.1	**TIP** U-2525B	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION Bridges on -Y22- (Hicone Road) over -Y13- (US 29) at Station 26+18				**GROUND WTR (ft)**
BORING NO. EB2B_RL	**STATION** 27+18	**OFFSET** 81 ft RT	**ALIGNMENT** -Y22-	**0 HR.** Dry
COLLAR ELEV. 828.0 ft	**TOTAL DEPTH** 23.7 ft	**NORTHING** 874,690	**EASTING** 1,784,795	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE RFO0074 CME-55 92% 07/12/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 09/12/11	**COMP. DATE** 09/12/11	**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))
830										828.0 GROUND SURFACE 0.0
825	824.3	3.7	13	11	10	21		M		**RESIDUAL** White-Tan, Saprolitic, Silty Sand
820	819.3	8.7	16	38	41	79		M		
815	814.3	13.7	100/0.4			100/0.4				814.3 13.7 **WEATHERED ROCK** (Meta-Granite)
810	809.3	18.7	100/0.3			100/0.3				
805	804.3	23.7	60/0.0			60/0.0				804.3 23.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 804.3 ft on Crystalline Rock (Meta-Granite)

NCDOT BORE DOUBLE U2525B_GEO_BH_Y22.GPJ NC_DOT.GDT 9/13/11

SITE PHOTOGRAPH

Bridges on -Y22- (Hicone Road) over -Y13- at Station 26+18



Looking North along Bent 1