STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	12

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34820.1.2(U-2524C)* F.A. PROJ. *NHF-0708(52)*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 BATTLEGROUND AVENUE*

SITE DESCRIPTION *STRUCTURE NO.1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)*

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CAUTION NOTICE

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PERSONNEL

SCHNABEL

TERRACON

N.D. MOHS

INVESTIGATED BY *N.D. MOHS*

CHECKED BY *N.T. ROBERSON*

SUBMITTED BY *N.D. MOHS*

DATE *OCTOBER 2012*

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST JONATHAN DANIEL MOHS 10/3/12

DRAWN BY: *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: 34820.1.2

ID: U-2524C

PROJECT REFERENCE NO.	SHEET NO.
34820.1.2 (U-2524C)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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

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

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

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

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-75
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N 0-2
- [ ] -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: BY-502, N: 865294.1790, E: 1734054.8640

ELEVATION: 885.33 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

SITE PLAN

0 50 100

FEET

RUINS

PINE/HARDWOOD WOODS

22+00

S

W/LT 13

W/LT 14

275+00

DEBRIS

25+00

DEBRIS

GRASS

CONC

W

W/TEL 16

17

CEDAR/PINE

12" GR

4"

EB1-A

W/TEL 15

B1-A

EB2-A -Y-

SR 2136 FLEMING RD 25' BST

EB1-B

B1-B

EB2-B

PINE/HARDWOOD HEDGEROW

12" SOIL

272+00

12" SOIL

NAD 83

NOTE: GROUNDLINE PROFILE AT CENTERLINE OF -Y- TAKEN FROM ROADWAY PFL FILE DATED 06/26/2012

0 20 40
FEET
VE = 2:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	4

PROFILE BORINGS PROJECTED ALONG -Y-

910 900 890 880 870 860 850 840 830 820

EB1-A
23+76
21' LT

B1-A
24+88
24' LT

EB2-A
26+08
18' LT

Ⓐ CRYSTALLINE ROCK (GRANITE BOULDER)

ROADWAY EMBANKMENT, RED-BROWN, DRY TO WET, STIFF, SANDY SILT, SANDY CLAY, AND VERY DENSE, SILTY SAND WITH GRAVEL

PROPOSED GRADE OF -L-

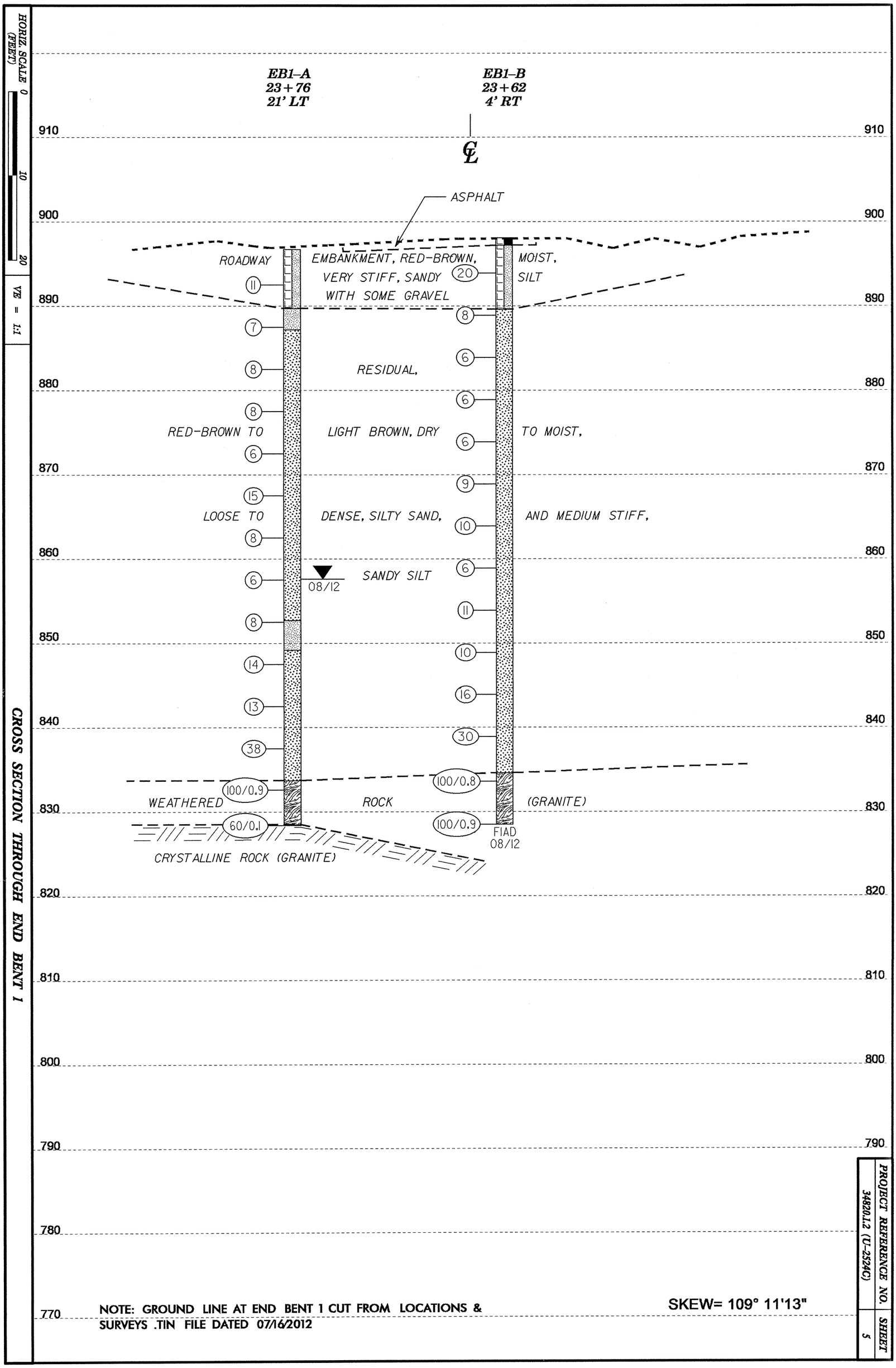
RESIDUAL, BROWN, BLACK, AND ORANGE, DRY TO WET, MEDIUM STIFF, SAPROLITIC, SANDY SILT, AND LOOSE TO VERY DENSE, SILTY SAND

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

Ⓐ CRYSTALLINE ROCK, LIGHT BROWN, VERY SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSE FRACTURE SPACING. (GRANITE BOULDER)
REC=92%
RQD=92%
RMR=64

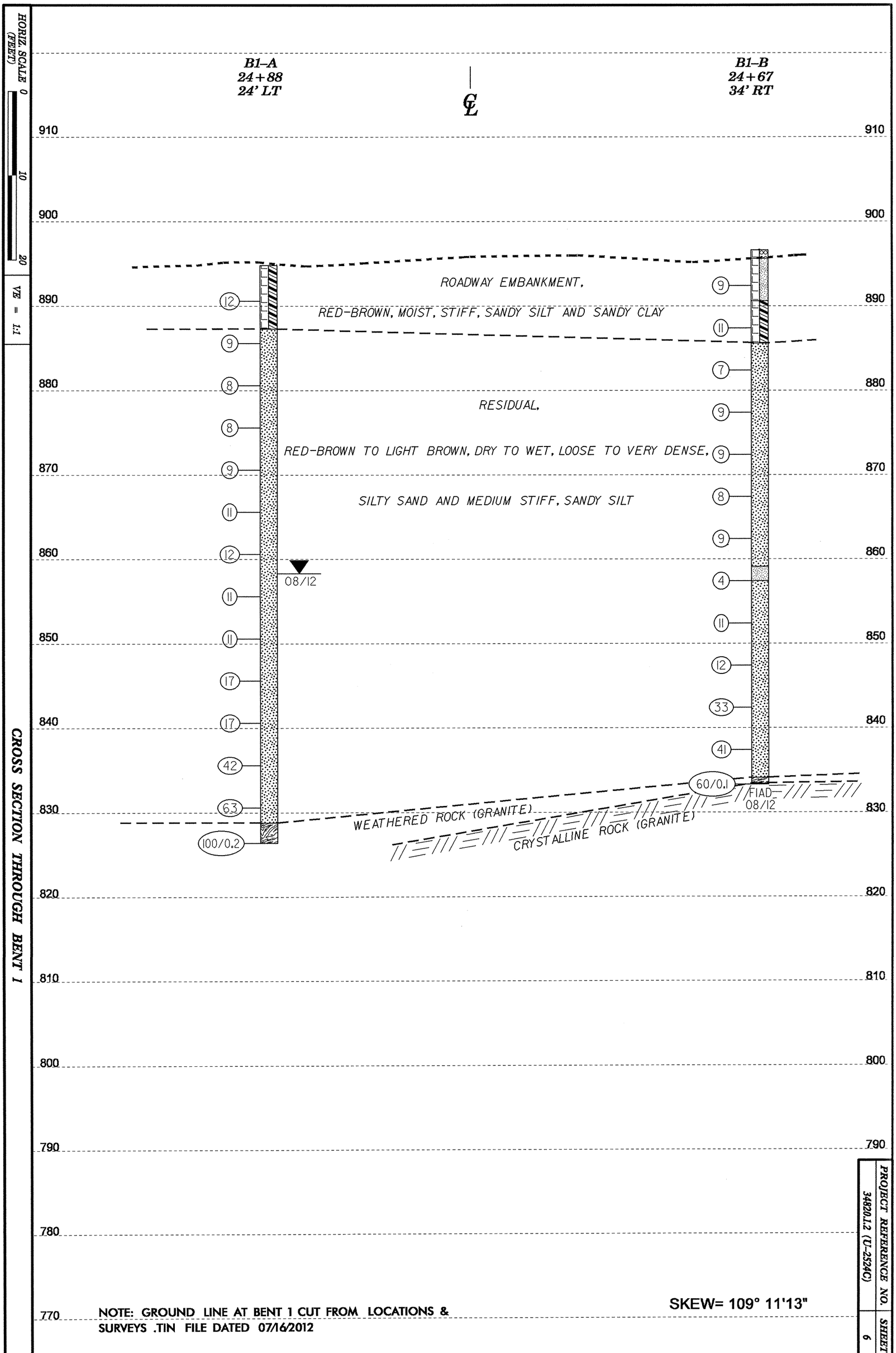
24+00 25+00 26+00



NOTE: GROUND LINE AT END BENT 1 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

SKEW= 109° 11'13"

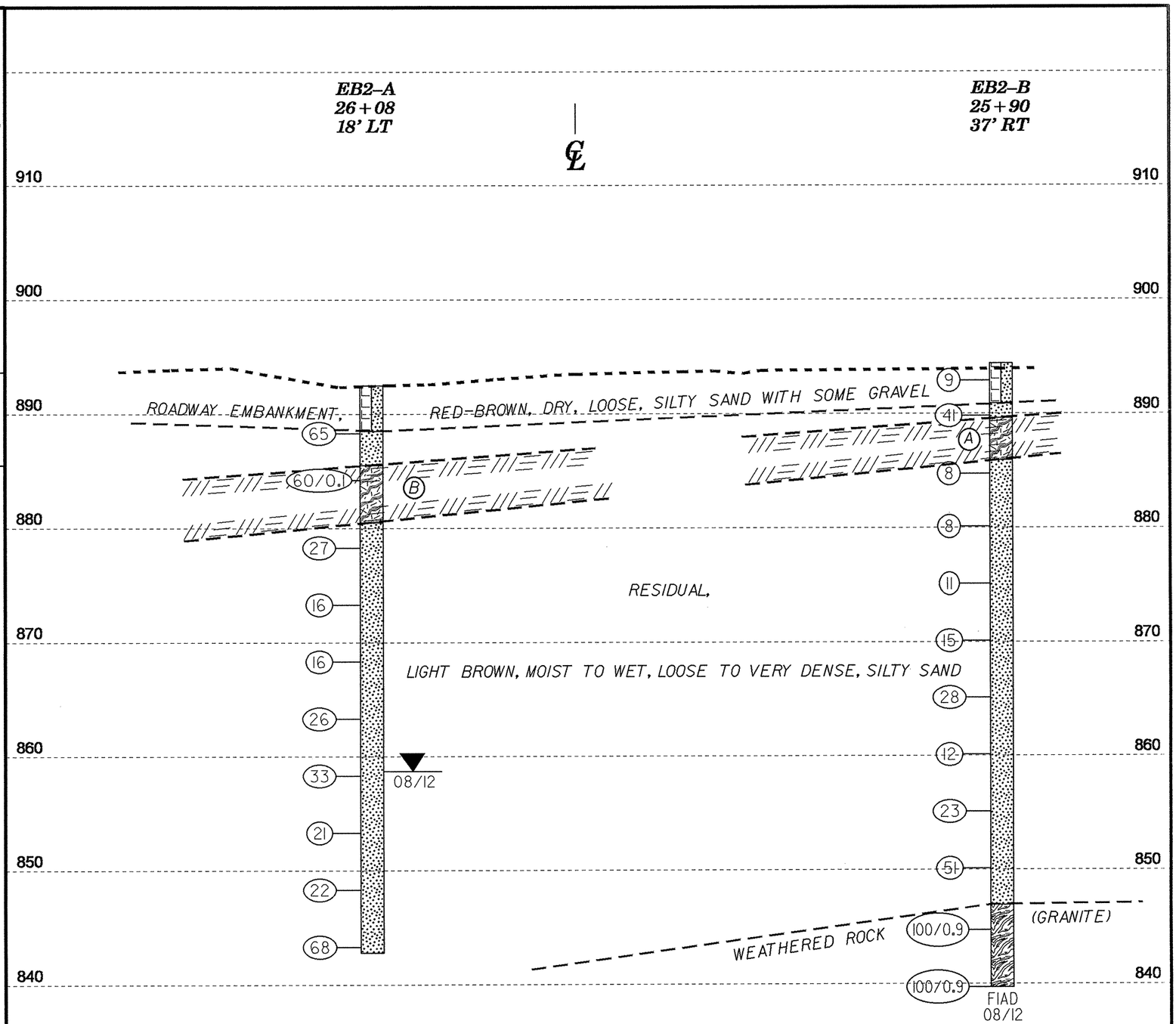
PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5


HORIZ. SCALE (FEET)
0
10
20
VE = 1:1
CROSS SECTION THROUGH BENT 1
B1-A
24+88
24' LT
℄
B1-B
24+67
34' RT
910
900
890
880
870
860
850
840
830
820
810
800
790
780
770
ROADWAY EMBANKMENT,
RED-BROWN, MOIST, STIFF, SANDY SILT AND SANDY CLAY
RESIDUAL,
RED-BROWN TO LIGHT BROWN, DRY TO WET, LOOSE TO VERY DENSE,
SILTY SAND AND MEDIUM STIFF, SANDY SILT
12
9
8
8
9
11
12
11
11
17
17
42
63
100/0.2
08/12
9
11
7
9
9
8
9
4
11
12
33
41
60/0.1
FIAD
08/12
WEATHERED ROCK (GRANITE)
CRYSTALLINE ROCK (GRANITE)
NOTE: GROUND LINE AT BENT 1 CUT FROM LOCATIONS &
SURVEYS .TIN FILE DATED 07/16/2012
SKEW= 109° 11'13"
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
6

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH END BENT 2



(A) CRYSTALLINE ROCK, LIGHT BROWN, VERY SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSELY FRACTURED, (GRANITE BOULDER)
REC=92%
RQD=92%
RMR=64

(B) CRYSTALLINE ROCK (GRANITE BOULDER)

SKEW= 109° 11'13"

NOTE: GROUND LINE AT END BENT 2 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	7

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 23+76	**OFFSET** 21 ft LT	**ALIGNMENT** -Y-	**0 HR.** 25.9
COLLAR ELEV. 896.7 ft	**TOTAL DEPTH** 68.3 ft	**NORTHING** 865,617	**EASTING** 1,733,455	**24 HR.** 39.1
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
900										896.7 GROUND SURFACE 0.0
895	893.5	3.2	2	4	7	11		M		**ROADWAY EMBANKMENT** RED-BROWN, SANDY SILT
890	888.5	8.2	2	3	4	7		M		889.7 7.0 **RESIDUAL** 887.2 ORANGE-BROWN, SANDY SILT 9.5 LIGHT BROWN TO BLACK, SILTY SAND
885	883.5	13.2	4	4	4	8		M		
880	878.5	18.2	2	4	4	8		M		
875	873.5	23.2	2	3	3	6		M		
870	868.5	28.2	4	6	9	15		M		
865	863.5	33.2	3	4	4	8		W		
860	858.5	38.2	2	2	4	6		W		
855	853.5	43.2	2	3	5	8		W		852.7 44.0 ORANGE-BROWN AND BLACK, SANDY SILT 849.2 47.5 LIGHT BROWN, SILTY SAND
850	848.5	48.2	4	6	8	14		W		
845	843.5	53.2	3	5	8	13		W		
840	838.5	58.2	11	18	20	38		W		
835	833.5	63.2	56	44/0.4		100/0.9		W		833.7 63.0 **WEATHERED ROCK** (GRANITE)
830	828.5	68.2	60/0.1			60/0.1		W		828.5 68.2 828.4 68.3 **CRYSTALLINE ROCK** (GRANITE) Boring Terminated at Elevation 828.4 ft in CRYSTALLINE ROCK (GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 23+62	**OFFSET** 4 ft RT	**ALIGNMENT** -Y-	**0 HR.** 6.0
COLLAR ELEV. 898.1 ft	**TOTAL DEPTH** 69.6 ft	**NORTHING** 865,597	**EASTING** 1,733,429	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
900										898.1 GROUND SURFACE 0.0
895	894.9	3.2	4	8	12	20		D		897.2 ASPHALT 0.9 **ROADWAY EMBANKMENT** RED-BROWN, SANDY SILT
890	889.9	8.2	3	3	5	8		D		889.6 8.5 **RESIDUAL** LIGHT BROWN, BLACK, AND GRAY-BROWN, SILTY SAND WITH TRACE GRAVEL
885	884.9	13.2	2	3	3	6		D		
880	879.9	18.2	3	3	3	6		M		
875	874.9	23.2	3	3	3	6		W		
870	869.9	28.2	2	4	5	9		W		
865	864.9	33.2	2	4	6	10		W		
860	859.9	38.2	2	3	3	6		W		
855	854.9	43.2	3	4	7	11		W		
850	849.9	48.2	2	3	7	10		W		
845	844.9	53.2	3	6	10	16		W		
840	839.9	58.2	7	10	20	30		W		
835	834.9	63.2	7	20	80/0.3	100/0.8		W		834.6 63.5 **WEATHERED ROCK** (GRANITE)
830	829.9	68.2	33	60	40/0.4	100/0.9		W		828.5 69.6 Boring Terminated at Elevation 828.5 ft in WEATHERED ROCK (GRANITE)

NCDOT BORE DOUBLE U2425C_GEO_BH_Y.GPJ NC_DOT.GDT 10/1/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 24+88	**OFFSET** 24 ft LT	**ALIGNMENT** -Y- **0 HR.** 36.2
COLLAR ELEV. 894.8 ft	**TOTAL DEPTH** 68.4 ft	**NORTHING** 865,569	**EASTING** 1,733,556 **24 HR.** 36.5
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/27/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
895										894.8 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT RED-BROWN, SANDY CLAY
	891.6	3.2	2	5	7	12		M		
890										
	886.6	8.2	2	4	5	9		D		887.3 7.5
885										**RESIDUAL** RED-BROWN, LIGHT BROWN, AND BLACK, SILTY SAND WITH TRACE OF GRAVEL
	881.6	13.2	3	3	5	8		D		
880										
	876.6	18.2	3	4	4	8		M		
875										
	871.6	23.2	4	4	5	9		M		
870										
	866.6	28.2	5	5	6	11		M		
865										
	861.6	33.2	5	7	5	12		M		
860										
	856.6	38.2	4	5	6	11		M		
855										
	851.6	43.2	3	4	7	11		W		
850										
	846.6	48.2	4	6	11	17		W		
845										
	841.6	53.2	4	7	10	17		W		
840										
	836.6	58.2	12	18	24	42		W		
835										
	831.6	63.2	18	27	36	63		W		828.8 66.0
830										**WEATHERED ROCK** (GRANITE)
	826.6	68.2	100/0.2			100/0.2				826.4 68.4
										Boring Terminated at Elevation 826.4 ft in WEATHERED ROCK (GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+67	**OFFSET** 34 ft RT	**ALIGNMENT** -Y- **0 HR.** 10.0
COLLAR ELEV. 896.6 ft	**TOTAL DEPTH** 63.3 ft	**NORTHING** 865,528	**EASTING** 1,733,511 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/30/12	**COMP. DATE** 08/30/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
900										896.6 GROUND SURFACE 0.0
										895.6 GRAVEL AGGREGATE 1.0
895										**ROADWAY EMBANKMENT** RED-BROWN, SANDY SILT
	893.4	3.2	3	4	5	9		M		890.6 6.0
890										RED-BROWN, SANDY CLAY
	888.4	8.2	3	4	7	11		M		
885										885.6 11.0
	883.4	13.2	3	3	4	7		M		**RESIDUAL** LIGHT BROWN AND BLACK, SILTY SAND WITH TRACE OF GRAVEL
880										
	878.4	18.2	3	4	5	9		M		
875										
	873.4	23.2	3	4	5	9		W		
870										
	868.4	28.2	4	4	4	8		W		
865										
	863.4	33.2	4	4	5	9		W		
860										
	858.4	38.2	WOH	1	3	4		W		859.1 37.5
855										ORANGE-BROWN, SANDY SILT
	853.4	43.2	3	4	7	11		W		857.4 39.2
850										LIGHT BROWN AND BLACK, SILTY SAND WITH TRACE OF GRAVEL
	848.4	48.2	3	5	7	12		W		
845										
	843.4	53.2	7	15	18	33		W		
840										
	838.4	58.2	9	19	22	41		M		
835										
	833.4	63.2	60/0.1			60/0.1				834.1 62.5
										833.4 63.2
										WEATHERED ROCK (GRANITE)
										833.3 63.3
										CRYSTALLINE ROCK (GRANITE)
										Boring Terminated at Elevation 833.3 ft in CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE U2425C_GEO_BH_Y.GPJ NC_DOT.GDT 10/1/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 26+08	**OFFSET** 18 ft LT	**ALIGNMENT** -Y-	**0 HR.** 28.9
COLLAR ELEV. 892.5 ft	**TOTAL DEPTH** 49.7 ft	**NORTHING** 865,511	**EASTING** 1,733,660	**24 HR.** 33.8
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
895										
										892.5 GROUND SURFACE 0.0
890	889.3	3.2	8	21	44	65		D		**ROADWAY EMBANKMENT** RED-BROWN, SILTY SAND WITH TRACE OF GRAVEL
										888.5 4.0
885	884.3	8.2	60/0.1			60/0.1				**RESIDUAL** LIGHT BROWN AND BLACK, SILTY SAND WITH TRACE OF GRAVEL 885.5 7.0
880	879.3	13.2	8	14	13	27		M		**CRYSTALLINE ROCK** (GRANITE BOULDER) 880.5 12.0
875	874.3	18.2	5	7	9	16		M		**RESIDUAL** LIGHT BROWN, BLACK, AND GRAY-BROWN, SILTY SAND WITH TRACE OF GRAVEL
870	869.3	23.2	5	7	9	16		M		
865	864.3	28.2	7	11	15	26		M		
860	859.3	33.2	13	15	18	33		M		
855	854.3	38.2	12	12	9	21		W		
850	849.3	43.2	6	9	13	22		W		
845	844.3	48.2	5	30	38	68		W		842.8 49.7 Boring Terminated at Elevation 842.8 ft in SILTY SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 25+90	**OFFSET** 37 ft RT	**ALIGNMENT** -Y-	**0 HR.** 32.6
COLLAR ELEV. 894.4 ft	**TOTAL DEPTH** 54.7 ft	**NORTHING** 865,469	**EASTING** 1,733,620	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/30/12	**COMP. DATE** 08/30/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
895										
	894.4	0.0								**894.4 GROUND SURFACE 0.0**
	893.9	0.5	3	5	4	9		D		**ROADWAY EMBANKMENT** RED-BROWN, SILTY SAND
890	891.1	3.3	11	15	26	41		M		**890.9 3.5** **RESIDUAL** LIGHT BROWN, SILTY SAND **889.6 4.8**
							RS-1			**CRYSTALLINE ROCK** LIGHT BROWN, VERY SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSELY FRACTURED, (GRANITE BOULDER) REC=92% RQD=92% RMR=64 **885.9 8.5**
885	885.7	8.7	3	4	4	8		M		**RESIDUAL** LIGHT RED, BROWN, AND GRAY-BROWN, SILTY SAND WITH TRACE OF GRAVEL
880	881.1	13.3	3	4	4	8		M		
875	876.1	18.3	4	4	7	11		M		
870	871.1	23.3	6	7	8	15		M		
865	866.1	28.3	6	10	18	28		M		
860	861.1	33.3	10	6	6	12		M		
855	856.1	38.3	7	9	14	23		W		
850	851.1	43.3	15	23	28	51		W		
	846.1	48.3	18	48	52/0.4	100/0.9				**846.9 47.5** **WEATHERED ROCK** (GRANITE)
845										
	841.1	53.3	35	53	47/0.4	100/0.9				**839.7 54.7** Boring Terminated at Elevation 839.7 ft in WEATHERED ROCK (GRANITE) DRIVE AT DEPTH 3.3' STOPPED EARLY DUE TO SPOON SLIDING ON TOP OF ROCK. CORE TERMINATED AT 8.5'.
840										

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 1 ON -Y- (FLEMING ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 25+90	**OFFSET** 37 ft RT	**ALIGNMENT** -Y-	**0 HR.** 32.6
COLLAR ELEV. 894.4 ft	**TOTAL DEPTH** 54.7 ft	**NORTHING** 865,469	**EASTING** 1,733,620	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TER6847 CME-75 91% 02/02/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/30/12	**COMP. DATE** 08/30/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 3.7 ft			

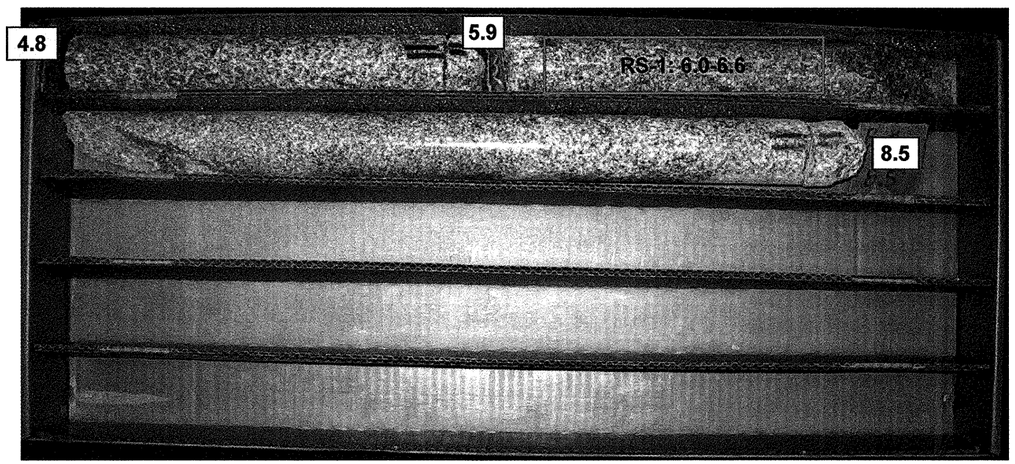
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
											ELEV. (ft) DEPTH (ft)
889.6											Begin Coring @ 4.8 ft
	889.6	4.8	1.1	2:06/0.8	(0.9)	(0.9)		(3.4)	(3.4)		**889.6 4.8** **CRYSTALLINE ROCK** LIGHT BROWN, VERY SLIGHTLY WEATHERED TO FRESH, HARD, MODERATELY CLOSELY FRACTURED, (GRANITE BOULDER) REC=92% RQD=92% RMR=64 **885.9 8.5** **RESIDUAL** LIGHT RED, BROWN, AND GRAY-BROWN, SILTY SAND WITH TRACE OF GRAVEL
	888.5	5.9	2.6	0:34/0.3	82%	82%		92%	92%		
	885.9	8.5		2:01/1.0 2:02/1.0 1:09/0.6	(2.5) 96%	(2.5) 96%	RS-1				
885				N=8							
880				N=8							
875				N=11							
870				N=15							
865				N=28							
860				N=12							
855				N=23							
850				N=51							
845				N=100/0.9							**846.9 47.5** **WEATHERED ROCK** (GRANITE)
840				N=100/0.9							**839.7 54.7** Boring Terminated at Elevation 839.7 ft in WEATHERED ROCK (GRANITE) DRIVE AT DEPTH 3.3' STOPPED EARLY DUE TO SPOON SLIDING ON TOP OF ROCK. CORE TERMINATED AT 8.5'.

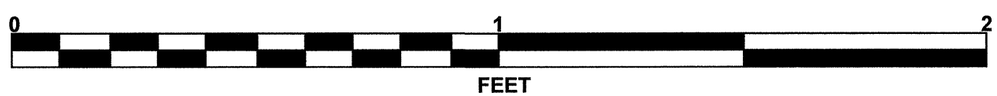
NCDOT BORE DOUBLE U2425C_GEO_BH_Y.GPJ NC_DOT.GDT 10/3/12

CORE PHOTOGRAPH

EB2-B

BOX 1: 4.8 - 8.5 FEET





STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	14

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34820.1.2(U-2524C)* F.A. PROJ. *NHF-0708(52)*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 BATTLEGROUND AVENUE*

SITE DESCRIPTION *STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)*

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PERSONNEL

KLEINFELDER

TRIGON

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INVESTIGATED BY *N.D. MOHS*

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SUBMITTED BY *N.D. MOHS*

DATE *NOVEMBER 2012*

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS 11/20/12

PROJECT: 34820.1.2

ID: U-2524C

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

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PROJECT REFERENCE NO.	SHEET NO.
34820.1.2 (U-2524C)	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 MN	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
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [ ] 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
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [X] -N QWL
- [ ] -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 (SL.)	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: BY2-507, -Y2- STATION 15+25.88, 25.95' RT

ELEVATION: 869.23 FT.

NOTES:

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

0 50 100
FEET

BRIDGE ON -Y2- OVER -L- SITE PLAN

NAD 83

335+00

20+00

25+00

EB1-A

B1-A

B1-C

EB2-A

B1-B

EB1-B

B1-B_OFFSET

EB2-B

-Y2-

-L-

SR 2182 HORSEPEN CREEK RD.

BY2-507
474'

W/TEL 54

W/TEL 53

W/TEL 52

W/TEL 51

5' CHL

40' GR

48" CHL

3SBW - 48" WD POST

330+00

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	4

PROFILE OF BORINGS ALONG -Y2-

0 20 40
FEET
VE = 2:1

EB1-A
21+06
48' LT

B1-A
22+52
48' LT

EB2-A
23+84
48' LT

RESIDUAL, RED, BROWN, AND GRAY, AND LOOSE TO VERY DENSE, STIFF TO HARD, SAPROLITIC, WEATHERED ROCK (GRANITE)

MOIST TO WET, SILTY CLAY, SANDY TO CLAYEY SILT, SILTY SAND WEATHERED ROCK (GRANITE)

PROPOSED GRADE OF -L-

08/12

11/12

08/12

CRYSTALLINE ROCK (GRANITE)

NOTE: GROUNDLINE AT CENTERLINE OF -Y2- TAKEN FROM ROADWAY PFL FILE DATED 6/26/2012.

870 860 850 840 830 820 810 800 790 780 770

21+00 22+00 23+00 24+00

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5
CROSS SECTION THROUGH END BENT 1	

0 10 20
FEET
VE = 1:1

SKEW= 52° 46' 05"

EB1-A
21+06
48' LT

℄

EB1-B
21+80
48' RT

870
860
850
840
830
820
810
800
790

14 22 11 11 10 12 13 15 13 18 41 62 100/0.8 100/0.4

08/12

13 56 22 18 16 11 9 20 12 15 100/0.8 24 45 100/0.8 100/1.0

08/12

RESIDUAL, RED, BROWN, AND GRAY, MOIST TO WET,

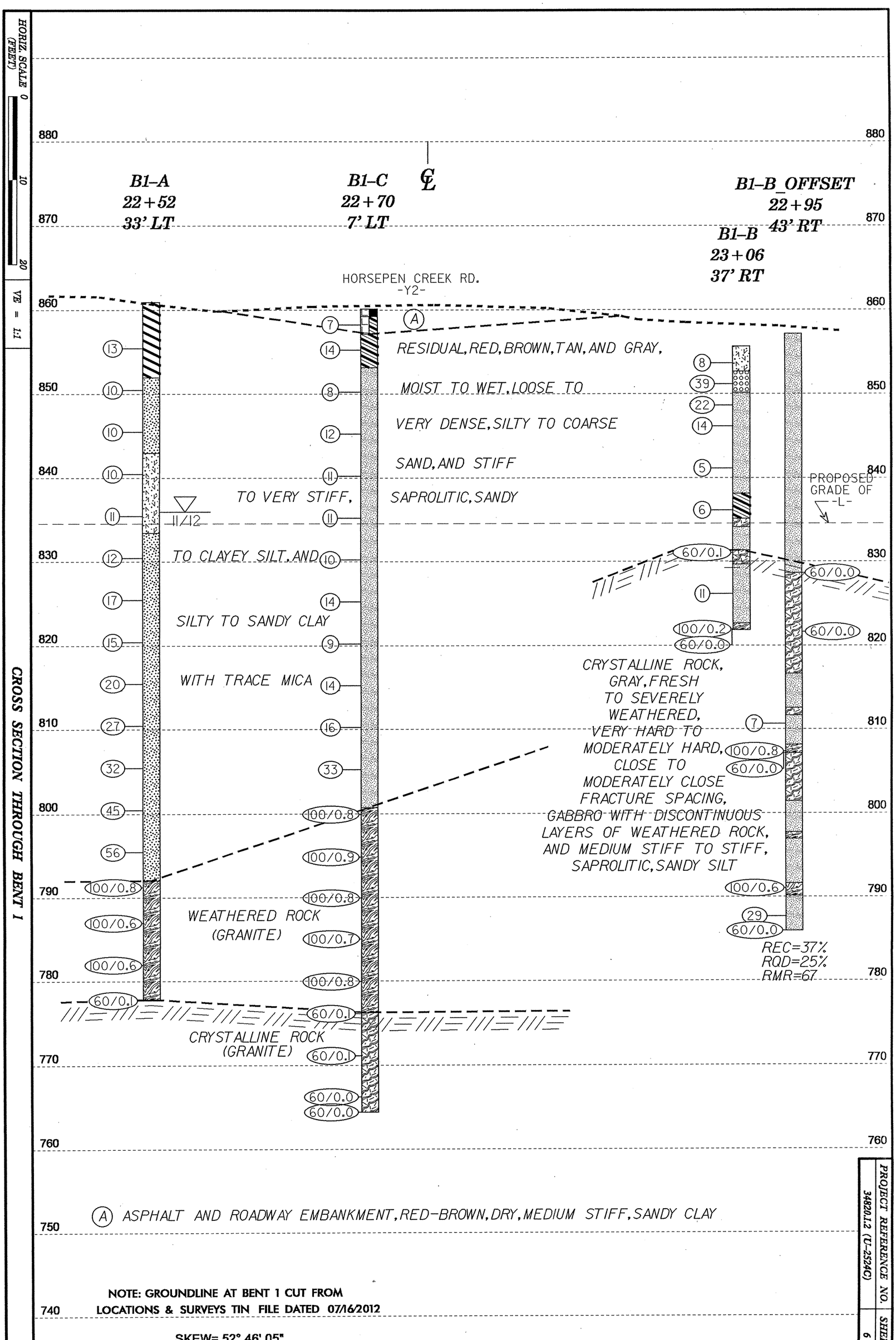
STIFF TO HARD, SANDY SILT, CLAYEY SILT,

AND LOOSE TO VERY DENSE, SILTY SAND

WEATHERED ROCK (GRANITE)

(A) WEATHERED ROCK (GRANITE)

NOTE: GROUNDLINE AT END BENT 1 CUT FROM LOCATIONS & SURVEYS TIN FILE DATED 07/16/2012



NOTE: GROUNDLINE AT BENT 1 CUT FROM LOCATIONS & SURVEYS TIN FILE DATED 07/16/2012

SKEW= 52° 46' 05"

PROJECT REFERENCE NO. 34820.1.2 (U-2524C)

SHEET 6

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	7
CROSS SECTION THROUGH END BENT 2	

SKEW= 52° 46' 05"

℄

EB2-A
23+84
48' LT

EB2-B
24+57
48' RT

870
860
850
840
830
820
810
800
790

RESIDUAL, RED, BROWN, AND GRAY, MOIST TO WET,

STIFF, MICACEOUS, SANDY SILT, AND LOOSE TO DENSE,

SILTY SAND

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

EB2-A: 11, 12, 12, 12, 7, 11, 10, 15, 12, 13, 23, 49, 39, 100/0.6, 100/0.8

08/12

EB2-B: 5, 13, 9, 10, 12, 9, 13, 11, 15, 17, 23, 100/1.0, 100/0.4, 60/0.1

NOTE: GROUNDLINE AT END BENT 2 CUT FROM LOCATIONS & SURVEYS TIN FILE DATED 07/16/2012

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 21+06	**OFFSET** 48 ft LT	**ALIGNMENT** -Y2- **0 HR.** 37.5
COLLAR ELEV. 863.6 ft	**TOTAL DEPTH** 58.9 ft	**NORTHING** 869,310	**EASTING** 1,738,198 **24 HR.** 35.5
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/27/12	**COMP. DATE** 08/27/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
865										863.6 GROUND SURFACE 0.0
	862.6	1.0	3	6	8	14		M		**RESIDUAL** BROWN, CLAYEY SILT
860	860.1	3.5	7	10	12	22		M		860.6 3.0 RED-BROWN, MICACEOUS, SANDY SILT
	857.6	6.0	6	6	5	11		M		856.6 7.0 LIGHT BROWN AND GRAY, SILTY SAND
855	855.1	8.5	6	6	5	11		M		
850	850.1	13.5	5	5	5	10		M		
845	845.1	18.5	7	5	7	12		M		
840	840.1	23.5	10	6	7	13		M		
835	835.1	28.5	8	7	8	15		M		
830	830.1	33.5	5	6	7	13		W		
825	825.1	38.5	9	7	11	18		W		
820	820.1	43.5	17	15	26	41		W		
815	815.1	48.5	16	27	35	62		W		
810	810.1	53.5	50	50/0.3		100/0.8				811.6 52.0 WEATHERED ROCK (GRANITE)
805	805.1	58.5	100/0.4			100/0.4				804.7 58.9 Boring Terminated at Elevation 804.7 ft in WEATHERED ROCK (GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 21+80	**OFFSET** 48 ft RT	**ALIGNMENT** -Y2- **0 HR.** Dry
COLLAR ELEV. 862.4 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 869,243	**EASTING** 1,738,097 **24 HR.** 36.0
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
865										862.4 GROUND SURFACE 0.0
	861.4	1.0	3	5	8	13		M		**RESIDUAL** RED-BROWN, MICACEOUS, SANDY SILT, WITH GRAVEL SIZED ROCK FRAGMENTS
860	858.9	3.5	6	9	47	56		M		
	856.4	6.0	9	10	12	22		M		
855	853.9	8.5	7	8	10	18		M		
850	848.9	13.5	6	7	9	16		M		
845	843.9	18.5	3	5	6	11		M		
840	838.9	23.5	3	4	5	9		M		
835	833.9	28.5	6	9	11	20		M		
830	828.9	33.5	3	5	7	12		W		
825	823.9	38.5	7	7	8	15		W		
820	818.9	43.5	19	24	76/0.3	100/0.8				818.4 44.0 WEATHERED ROCK (GRANITE) 816.9 45.5 **RESIDUAL** GRAY AND BROWN, MICACEOUS, SANDY SILT
815	813.9	48.5	3	11	13	24		W		809.9 52.5 BROWN, CLAYEY SILT
810	808.9	53.5	11	17	28	45		W		
805	803.9	58.5	17	32	68/0.3	100/0.8				803.4 59.0 WEATHERED ROCK (GRANITE)
800	798.9	63.5	9	26	74	100/1.0				797.4 65.0 Boring Terminated at Elevation 797.4 ft in WEATHERED ROCK (GRANITE)

NCDOT BORE DOUBLE U-2524C_GEO_BH_Y2.GPJ NC_DOT.GDT 11/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 22+52	**OFFSET** 33 ft LT	**ALIGNMENT** -Y2-	**0 HR.** 48.0
COLLAR ELEV. 860.9 ft	**TOTAL DEPTH** 83.2 ft	**NORTHING** 869,166	**EASTING** 1,738,173	**24 HR.** WET
DRILL RIG/HAMMER EFF./DATE RFO0046 CME-550 63% 12/12/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 02/10/04	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) — DEPTH (ft)
865										
860										860.9 — GROUND SURFACE — 0.0 **RESIDUAL** RED-BROWN, SILTY CLAY
855	856.4	4.5	3	5	8	13		M		
850	851.4	9.5	3	4	6	10		M		851.9 — 9.0 TAN-BROWN, SILTY SAND
845	846.4	14.5	3	4	6	10		M		
840	841.4	19.5	3	5	5	10		M		842.9 — 18.0 TAN-BROWN, CLAYEY SILT
835	836.4	24.5	4	5	6	11		M		
830	831.4	29.5	4	6	6	12		M		833.4 — 27.5 TAN TO GRAY-BROWN, SAPROLITIC, SILTY SAND, WITH TRACE MICA
825	826.4	34.5	6	8	9	17		M		
820	821.4	39.5	4	6	9	15		M		
815	816.4	44.5	7	9	11	20		W		
810	811.4	49.5	9	12	15	27		W		
805	806.4	54.5	7	11	21	32		W		
800	801.4	59.5	10	15	30	45		W		
795	796.4	64.5	12	20	36	56		W		
790	792.5	68.4	21	62	38/0.3	100/0.8				792.0 — 68.9 **WEATHERED ROCK** (GRANITE)
785	787.5	73.4	80	20/0.1		100/0.6				

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Oti, O. B.	
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 22+52	**OFFSET** 33 ft LT	**ALIGNMENT** -Y2-	**0 HR.** 48.0
COLLAR ELEV. 860.9 ft	**TOTAL DEPTH** 83.2 ft	**NORTHING** 869,166	**EASTING** 1,738,173	**24 HR.** WET
DRILL RIG/HAMMER EFF./DATE RFO0046 CME-550 63% 12/12/2005		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Conley, H. R.	**START DATE** 02/10/04	**COMP. DATE** 11/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
785						Match Line				
780	782.5	78.4	70	30/0.1		100/0.6				**WEATHERED ROCK** (GRANITE) *(continued)*
	777.8	83.1	60/0.1			60/0.1				777.8 — 83.1 777.7 — 83.2 **CRYSTALLINE ROCK** (GRANITE) Boring Terminated at Elevation 777.7 ft in SILTY SAND

ELEVATION DETERMINED BY LOCATIONS & SURVEYS .TIN FILE DATED 7/16/2012.
BORING ADVANCED TO 83.2 FEET 11/15/12 BY CONTRACT GEOLOGIST.

NCDOT BORE DOUBLE U-2524C_GEO_BH_Y2.GPJ NC_DOT.GDT 11/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1C	**STATION** 22+70	**OFFSET** 7 ft LT	**ALIGNMENT** -Y2-	**0 HR.** N/A
COLLAR ELEV. 860.1 ft	**TOTAL DEPTH** 95.7 ft	**NORTHING** 869,150	**EASTING** 1,738,146	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/14/12	**SURFACE WATER DEPTH** N/A	

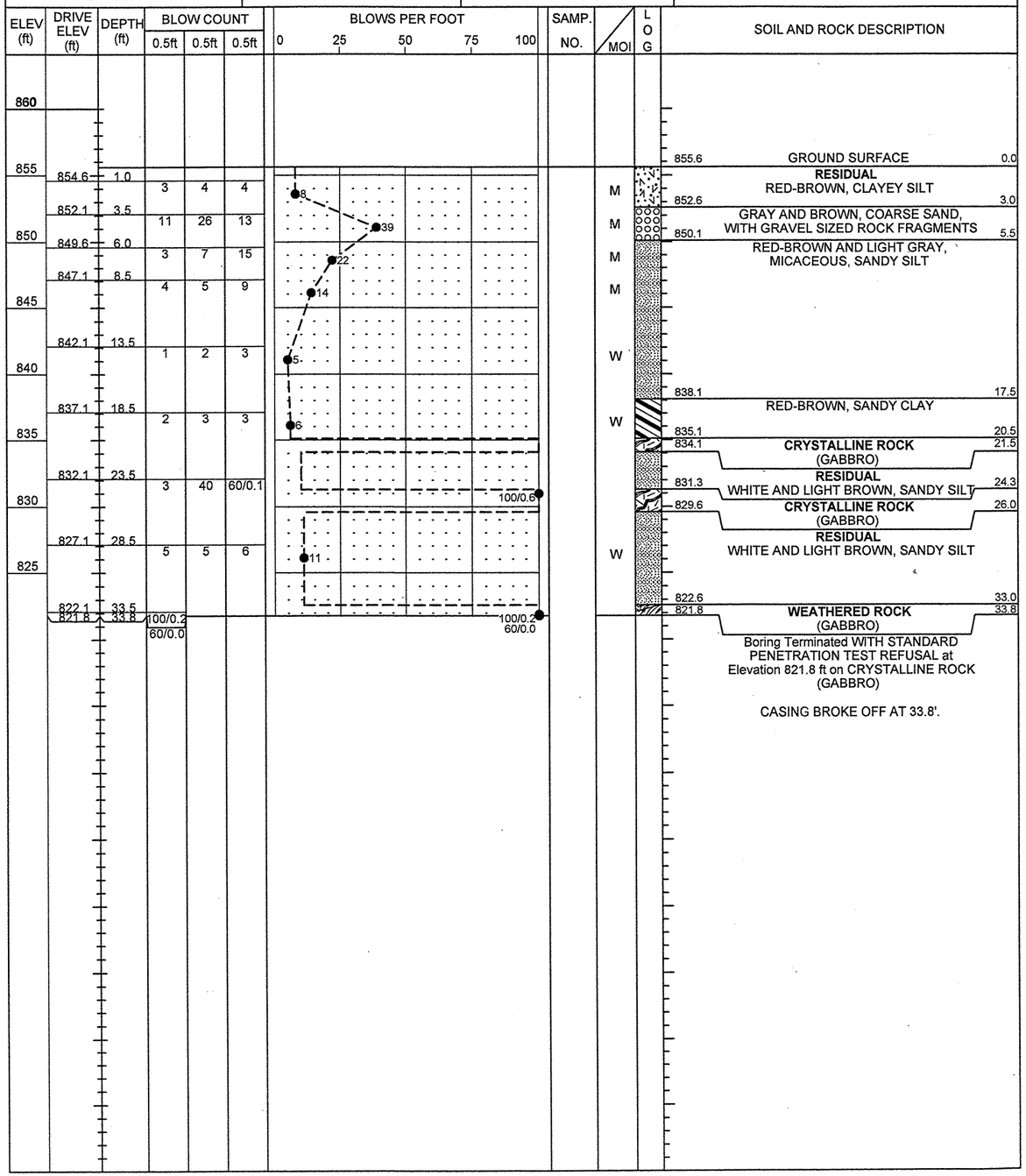
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
865										
860										860.1 GROUND SURFACE 0.0
	859.2	0.9								859.2 **ROADWAY EMBANKMENT** 0.9
			3	4	3	7		D		ASPHALT & ABC
	856.2	3.9								857.1 RED-BROWN, SANDY CLAY 3.0
855			3	6	8	14		D		**RESIDUAL**
										RED-BROWN, SANDY CLAY
	851.2	8.9								853.1 7.0
850			3	3	5	8		D		TAN, RED, AND BROWN, SANDY SILT
	846.2	13.9								
845			3	4	8	12		D		
	841.2	18.9								
840			3	4	7	11		D		
	836.2	23.9								
835			3	5	6	11		D		
	831.2	28.9								
830			3	5	5	10		D		
	826.2	33.9								
825			3	6	8	14		D		
	821.2	38.9								
820			2	3	6	9		M		
	816.2	43.9								
815			5	6	8	14		M		
	811.2	48.9								
810			4	6	10	16		M		
	806.2	53.9								
805			10	12	21	33		M		
	801.2	58.9								
800			24	50	50/0.3	100/0.8				800.7 WEATHERED ROCK 59.4
	796.2	63.9								(GRANITE)
795			26	47	53/0.4	100/0.9				
	791.2	68.9								
790			30	49	51/0.3	100/0.8				
	786.2	73.9								
785			17	60	40/0.2	100/0.7				

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1C	**STATION** 22+70	**OFFSET** 7 ft LT	**ALIGNMENT** -Y2-	**0 HR.** N/A
COLLAR ELEV. 860.1 ft	**TOTAL DEPTH** 95.7 ft	**NORTHING** 869,150	**EASTING** 1,738,146	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/14/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
785						Match Line				
	781.2	78.9								**WEATHERED ROCK**
780			21	38	62/0.3	100/0.5				(GRANITE) *(continued)*
	776.2	83.9								776.2 83.9
775			60/0.1			60/0.1				**CRYSTALLINE ROCK**
	771.2	88.9								(GRANITE)
770			60/0.1			60/0.1				
	766.2	93.9								
765			60/0.0			60/0.0				
	764.4	95.7	60/0.0			60/0.0				764.4 95.7
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 764.4 ft in CRYSTALLINE ROCK (GRANITE)
										ELEVATION DETERMINED BY LOCATIONS & SURVEYS .TIN FILE DATED 7/16/2012.

NCDOT BORE DOUBLE U-2524C_GEO_BH_Y2.GPJ NC_DOT.GDT 11/20/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 23+06	**OFFSET** 37 ft RT	**ALIGNMENT** -Y2-	**0 HR.** N/A
COLLAR ELEV. 855.6 ft	**TOTAL DEPTH** 33.8 ft	**NORTHING** 869,117	**EASTING** 1,738,099	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-B_OFFSET	**STATION** 22+95	**OFFSET** 43 ft RT	**ALIGNMENT** -Y2- — **0 HR.** N/A
COLLAR ELEV. 857.1 ft	**TOTAL DEPTH** 71.2 ft	**NORTHING** 869,128	**EASTING** 1,738,094 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
860										857.1 GROUND SURFACE	0.0
855										RESIDUAL RED-BROWN, SANDY SILT	
850											
845											
840											
835											
830	828.6	28.5	60/0.0			60/0.0	RS-1			828.6	28.5
825										CRYSTALLINE ROCK 28.5'-71.2' GRAY, FRESH TO SEVERELY WEATHERED, VERY HARD TO MODERATELY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GABBRO WITH DISCONTINUOUS LAYERS OF WEATHERED ROCK, AND STIFF, SAPROLITIC, SANDY SILT REC=37% RQD=25% RMR=67	
820	821.6	35.5	60/0.0			60/0.0				816.6	40.5
815	811.6	45.5	5	3	4	7		W		812.5	44.6
810	808.6	48.5								811.6	45.5
805	807.1	50.0	3 60/0.0	4	96/0.3	100/0.8 60/0.0	RS-2			808.1	49.0
800										807.1	50.0
795											
790	792.1	65.0	7	60	40/0.1	100/0.6				801.4	55.7
	788.6	68.5	10	11	18	29		W		797.7	59.4
	785.9	71.2	60/0.0			60/0.0				796.9	60.2
										791.6	65.5
										790.1	67.0
										785.9	71.2
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 785.9 ft in CRYSTALLINE ROCK (GABBRO)	

NCDOT BORE DOUBLE U-2524C_GEO_BH_Y2.GPJ NC_DOT.GDT 11/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-B_OFFSET	**STATION** 22+95	**OFFSET** 43 ft RT	**ALIGNMENT** -Y2- — **0 HR.** N/A
COLLAR ELEV. 857.1 ft	**TOTAL DEPTH** 71.2 ft	**NORTHING** 869,128	**EASTING** 1,738,094 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQWL	**TOTAL RUN** 32.0 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)
828.6											Begin Coring @ 28.5 ft	
825	828.6	28.5	2.0	N=60/0.0 2:45/1.0 2:05/1.0	(1.8) 90%	(1.1) 55%	RS-1	(13.6) 37%	(9.2) 25%		828.6 CRYSTALLINE ROCK	28.5
	826.6	30.5	5.0	0:35/1.0 2:59/1.0 2:31/1.0 1:33/1.0 0:25/1.0	(1.8) 36%	(0.0) 0%					28.5'-71.2' GRAY, FRESH TO SEVERELY WEATHERED, VERY HARD TO MODERATELY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, GABBRO WITH DISCONTINUOUS LAYERS OF WEATHERED ROCK, AND STIFF, SAPROLITIC, SANDY SILT REC=37% RQD=25% RMR=67	
820	821.6	35.5	5.0	N=60/0.0 2:00/1.0 2:27/1.0 2:05/1.0 0:15/1.0 2:00/1.0	(4.0) 80%	(3.4) 68%					816.6	40.5
815	816.6	40.5	5.0	0:50/1.0 1:30/1.0 0:12/1.0 1:03/1.0 0:56/1.0	(0.9) 18%	(0.3) 6%					812.5	44.6
810	811.6	45.5		N=7							811.6	45.5
	807.1	50.0		N=100/0.8							808.1	49.0
805	806.1	51.0	1.0	N=60/0.0	(0.3)	(0.0)					807.1	50.0
	802.1	55.0	4.0	1:38/1.0 2:38/1.0 N/A/1.0 N/A/1.0 N/A/1.0	30% (3.3) 83%	0% (3.1) 78%	RS-2				801.4	55.7
800			5.0	2:20/1.0 0:48/1.0 1:57/1.0 0:43/1.0 1:53/1.0	(1.3) 26%	(1.3) 26%					797.7	59.4
795	797.1	60.0	5.0	0:36/1.0 0:42/1.0 1:18/1.0 1:34/1.0 0:41/1.0	(0.2) 4%	(0.0) 0%					796.9	60.2
790	792.1	65.0		N=100/0.6 N=29 N=60/0.0							791.6	65.5
											790.1	67.0
											785.9	71.2
											Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 785.9 ft in CRYSTALLINE ROCK (GABBRO) ELEVATION DETERMINED BY LOCATIONS & SURVEYS .TIN FILE DATED 7/16/2012. CORE TERMINATED AT 65.0'.	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 23+84	**OFFSET** 48 ft LT	**ALIGNMENT** -Y2- — **0 HR.** 33.0
COLLAR ELEV. 859.7 ft	**TOTAL DEPTH** 64.8 ft	**NORTHING** 869,033	**EASTING** 1,738,178 — **24 HR.** 32.0
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/27/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
860										859.7 GROUND SURFACE 0.0
	858.7	1.0						M		**RESIDUAL** RED-BROWN, MICACEOUS, SANDY SILT
	856.2	3.5	3	4	7	11		M		
855			6	6	6	12		M		
	853.7	6.0	3	6	6	12		M		
	851.2	8.5								854.2 5.5
850			3	6	6	12		M		BROWN TO LIGHT GRAY, MICACEOUS, SILTY SAND
	846.2	13.5								
845			3	3	4	7		M		
	841.2	18.5	4	6	5	11		M		
840										
	836.2	23.5	2	5	5	10		M		
835										
	831.2	28.5	4	7	8	15		M		
830										
	826.2	33.5	3	5	7	12		W		
825										
	821.2	38.5	3	5	8	13		W		
820										
	816.2	43.5	6	10	13	23		W		
815										
	811.2	48.5	16	27	22	49		W		
810										
	806.2	53.5	13	20	19	39		W		
805										
	801.2	58.5	72	28/0.1		100/0.6				802.7 57.0
800										**WEATHERED ROCK** (GRANITE)
	796.2	63.5	28	37	63/0.3	100/0.8				794.9 64.8
795										Boring Terminated at Elevation 794.9 ft in WEATHERED ROCK (GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 2 ON -Y2- (HORSEPEN CREEK ROAD) OVER -L- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 24+57	**OFFSET** 48 ft RT	**ALIGNMENT** -Y2- — **0 HR.** Dry
COLLAR ELEV. 851.7 ft	**TOTAL DEPTH** 58.6 ft	**NORTHING** 868,967	**EASTING** 1,738,077 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/05/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A

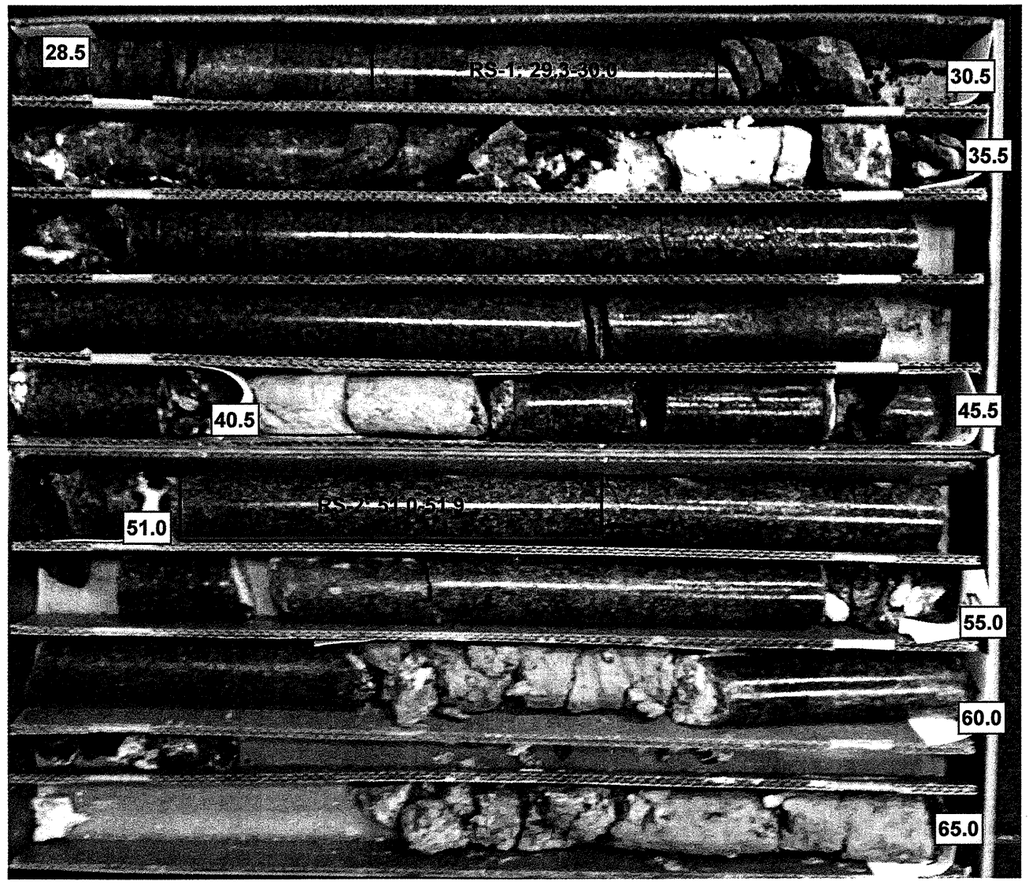
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
855										851.7 GROUND SURFACE 0.0
	850.7	1.0						M		**RESIDUAL** LIGHT BROWN, MICACEOUS, SANDY SILT
850			2	2	3	5		M		
	848.2	3.5	4	6	7	13		M		
845	845.7	6.0	3	4	5	9		M		846.2 5.5
	843.2	8.5	3	5	5	10		M		LIGHT BROWN AND GRAY, MICACEOUS, SILTY SAND
840										
	838.2	13.5	5	5	7	12		M		
835										
	833.2	18.5	3	4	5	9		M		
830										
	828.2	23.5	5	6	7	13		M		
825										
	823.2	28.5	3	5	6	11		M		
820										
	818.2	33.5	2	5	10	15		W		
815										
	813.2	38.5	5	7	10	17		W		
810										
	808.2	43.5	9	10	13	23		W		
805										
					41	59				100/1.0
800	798.2	53.5	100/0.4			100/0.4				804.7 47.0
										WEATHERED ROCK (GRANITE)
795	793.2	58.5	60/0.1			60/0.1				793.2 58.5
										793.1 58.6 **CRYSTALLINE ROCK** (GRANITE)
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 793.1 ft in CRYSTALLINE ROCK (GRANITE)

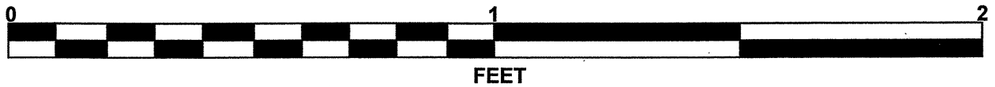
NCDOT BORE DOUBLE U-2524C_GEO_BH_Y2.GPJ NC_DOT.GDT 11/20/12

CORE PHOTOGRAPH

B1-B_OFFSET

BOXES 1 & 2: 28.5-65.0 FEET





STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	14

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34820.1.2(U-2524C)* F.A. PROJ. *NHF-0708(52)*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 BATTLEGROUND AVENUE*

SITE DESCRIPTION *STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)*

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4	PROFILE
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13, 14	CORE PHOTOGRAPHS

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.

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

KLEINFELDER

TRIGON

N.D. MOHS

INVESTIGATED BY *N.D. MOHS*

CHECKED BY *N.T. ROBERSON*

SUBMITTED BY *N.D. MOHS*

DATE *OCTOBER 2012*

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

10/8/12

PROJECT: 34820.1.2

ID: U-2524C

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

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.
34820.1.2 (U-2524C)	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	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
- ☐ _____
- ☐ _____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☐ 6" CONTINUOUS FLIGHT AUGER
- ☐ 8" HOLLOW AUGERS
- ☐ HARD FACED FINGER BITS
- ☐ TUNG.-CARBIDE INSERTS
- ☐ CASING ☐ W/ ADVANCER
- ☐ TRICONE 2 15/16 " STEEL TEETH
- ☐ TRICONE _____ " TUNG.-CARB.
- ☐ CORE BIT
- ☐ _____

HAMMER TYPE:
- ☐ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ☐ -N Q2WL
- ☐ -H_____

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BL-34: -BL- STATION 154+84.47

ELEVATION: 748.80 FT.

NOTES:

REVISED 09/23/09

0	50	100
FEET		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

-RPBY4- SITE PLAN

NAD 83

B1-A

B2-A

B3-A

EB2-A

B1-B

B2-B

B3-B

EB2-B

5+00

RPBY4

10+00

400+00

-L-

-BL- 34

405+00

RPCY4

0	30	60
FEET		
VE = 3:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	4
PROFILE BORINGS PROJECTED ALONG -RPBY4-	

B1-A
4+35
17' LT

B2-A
5+55
17' LT

B3-A
6+73
17' LT

EB2-A
7+68
27' LT

760 750 740 730 720 710 700 690 680 670

09/12

13 28 11 WOH 35 32 100/0.3 60/0.2 60/0.0

ALLUVIAL, GRAY, TAN, AND ORANGE, GRAY AND TAN, RESIDUAL, BROWN, ORANGE, AND GRAY, SANDY SILT, AND DENSE, WEATHERED

CRYSTALLINE ROCK, GRAY TO BROWN, FRESH TO MODERATELY SEVERELY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE

REC=97%
RQD=65%
RMR=50

09/12

WOH 7 9 WOH 37 36 100/0.8 100/0.8 60/0.1

WET, VERY SOFT TO VERY STIFF, SATURATED, VERY LOOSE MOIST, HARD, SAPROLITIC, SILTY SAND ROCK

09/12

5 12 5 WOH 18 100/0.5 100/0.3 60/0.0

SILTY CLAY TO MEDIUM DENSE, SILTY (METAMORPHOSED

CRYSTALLINE ROCK, TAN TO DARK GRAY, FRESH TO MODERATELY WEATHERED, MODERATELY HARD TO VERY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE

REC=100%
RQD=40%
RMR=30

09/12

7 11 5 WOH 11 100/0.3 100/0.3 60/0.1

AND COARSE SAND GRANITE)

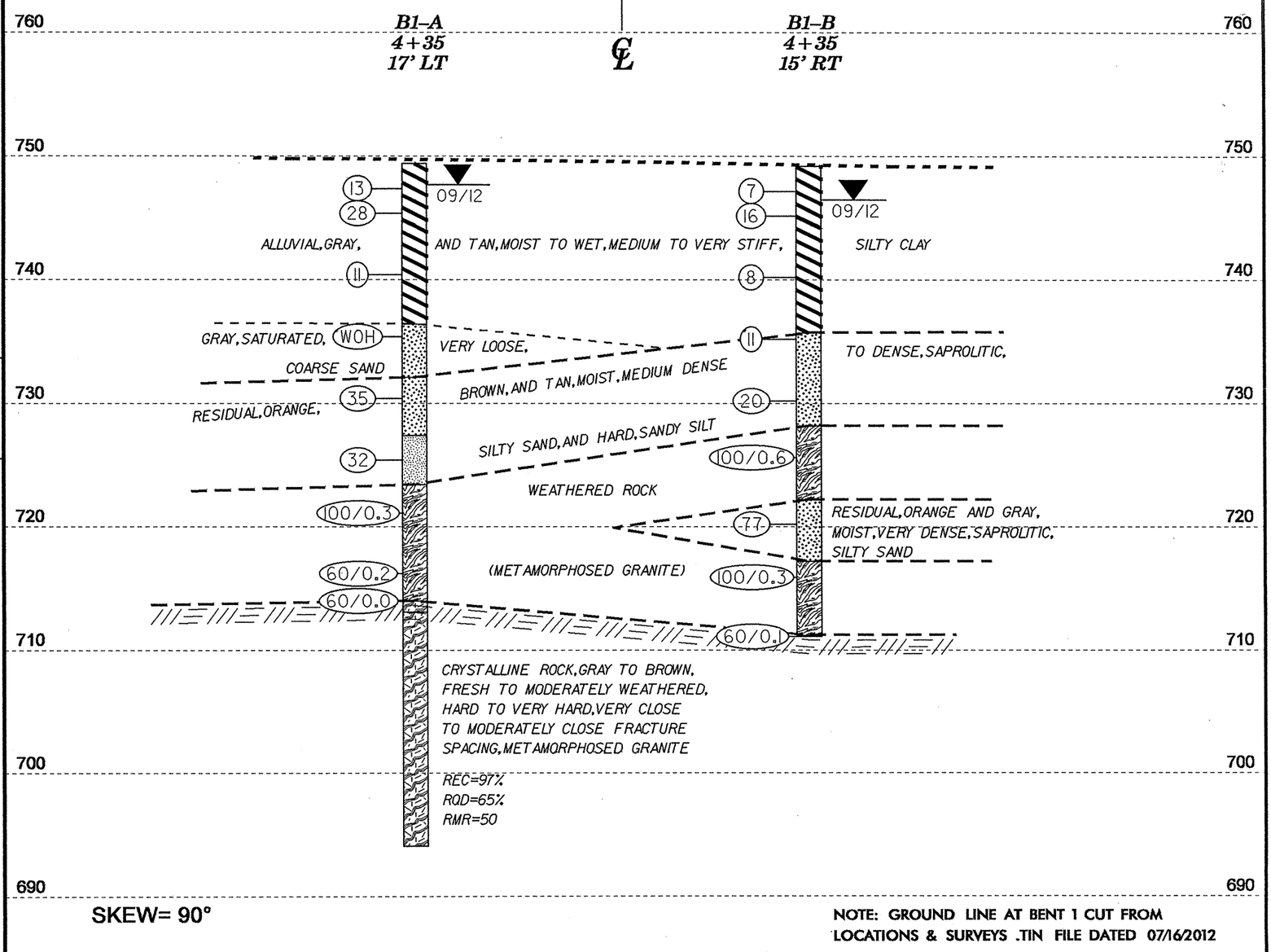
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE DATED 09/18/2012

4+00 5+50 7+00

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPBY4- BENT 1



SKEW= 90°

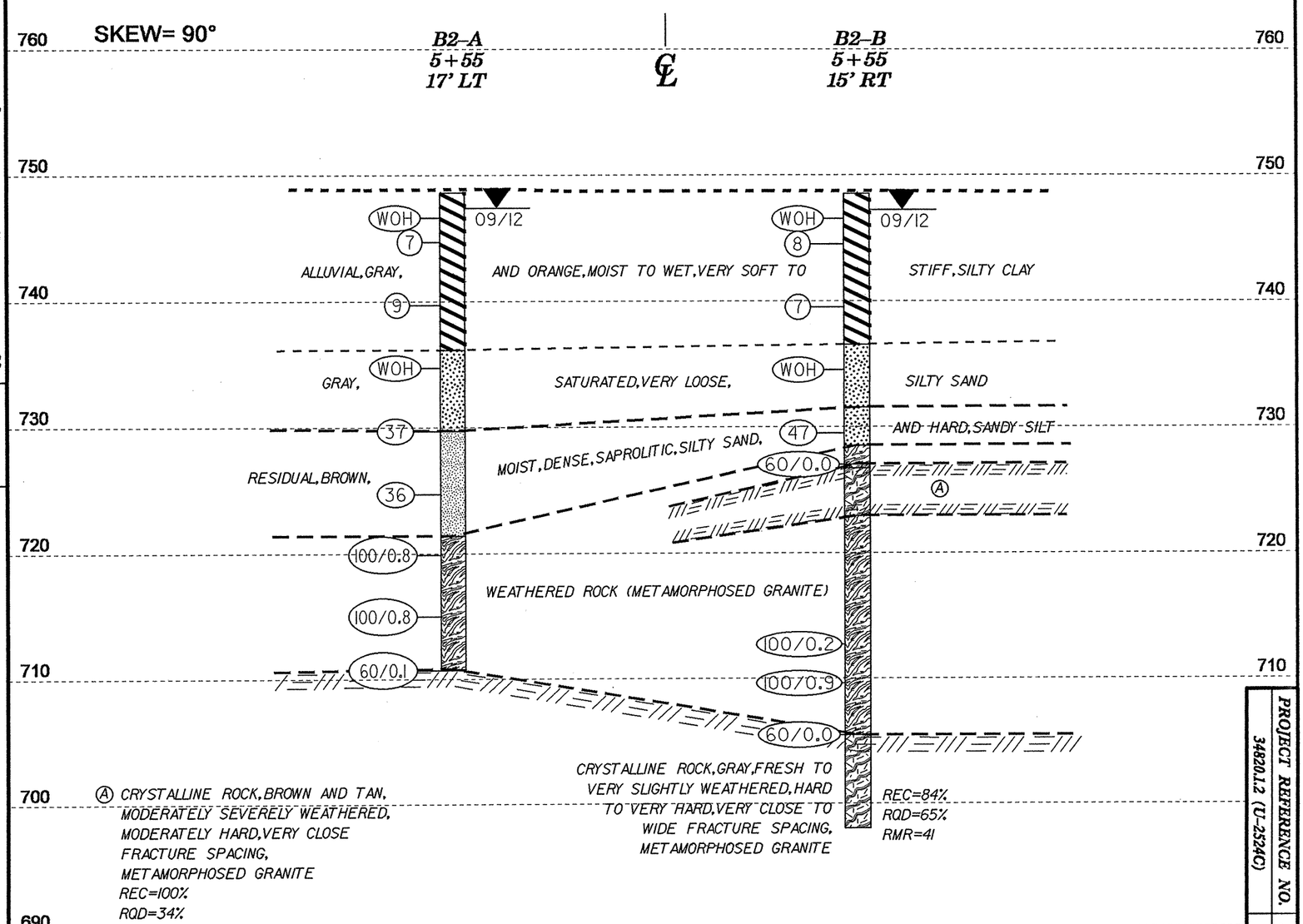
NOTE: GROUND LINE AT BENT 1 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPBY4- BENT 2

SKEW= 90°



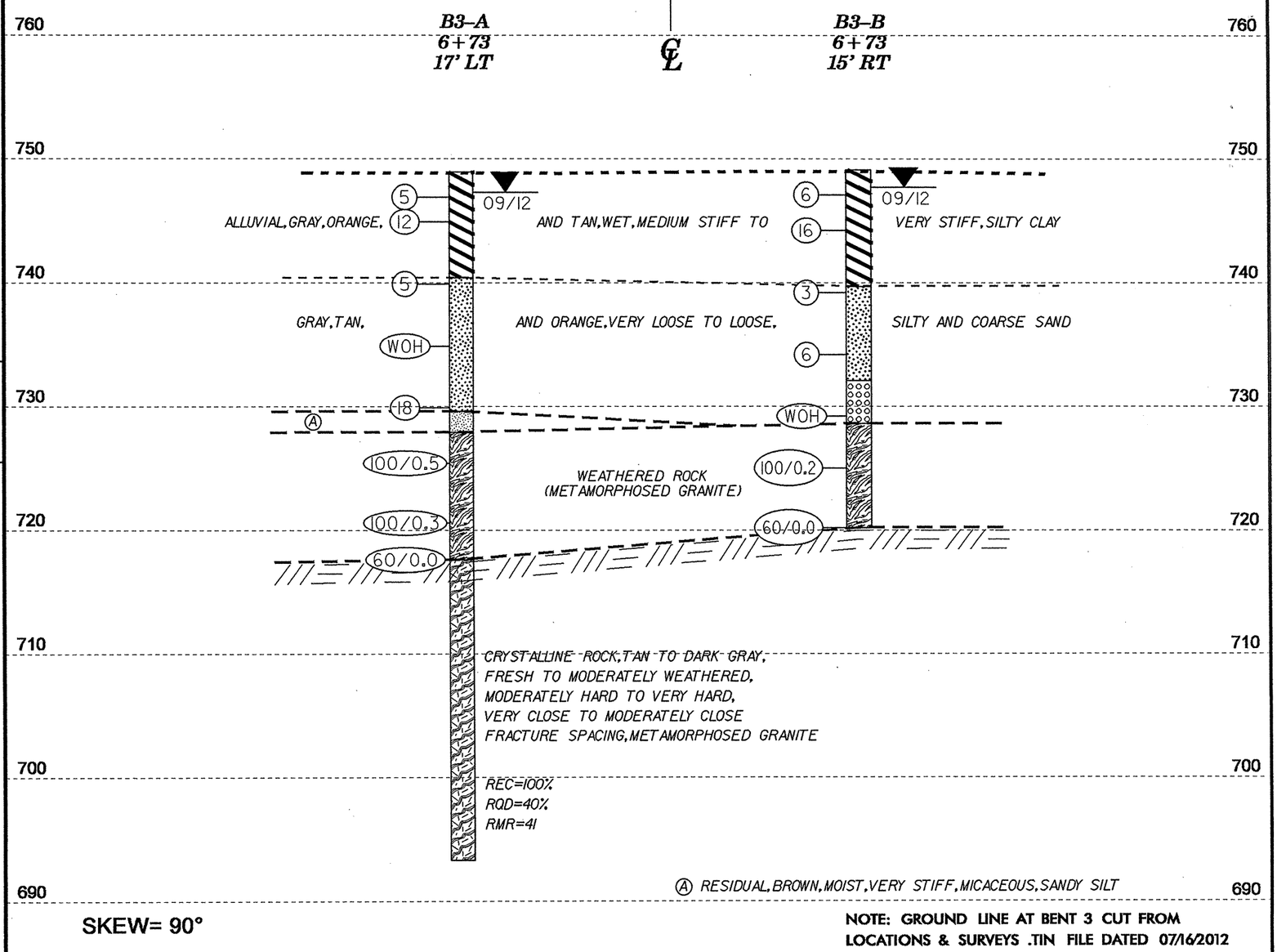
NOTE: GROUND LINE AT BENT 2 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPBY4- BENT 3



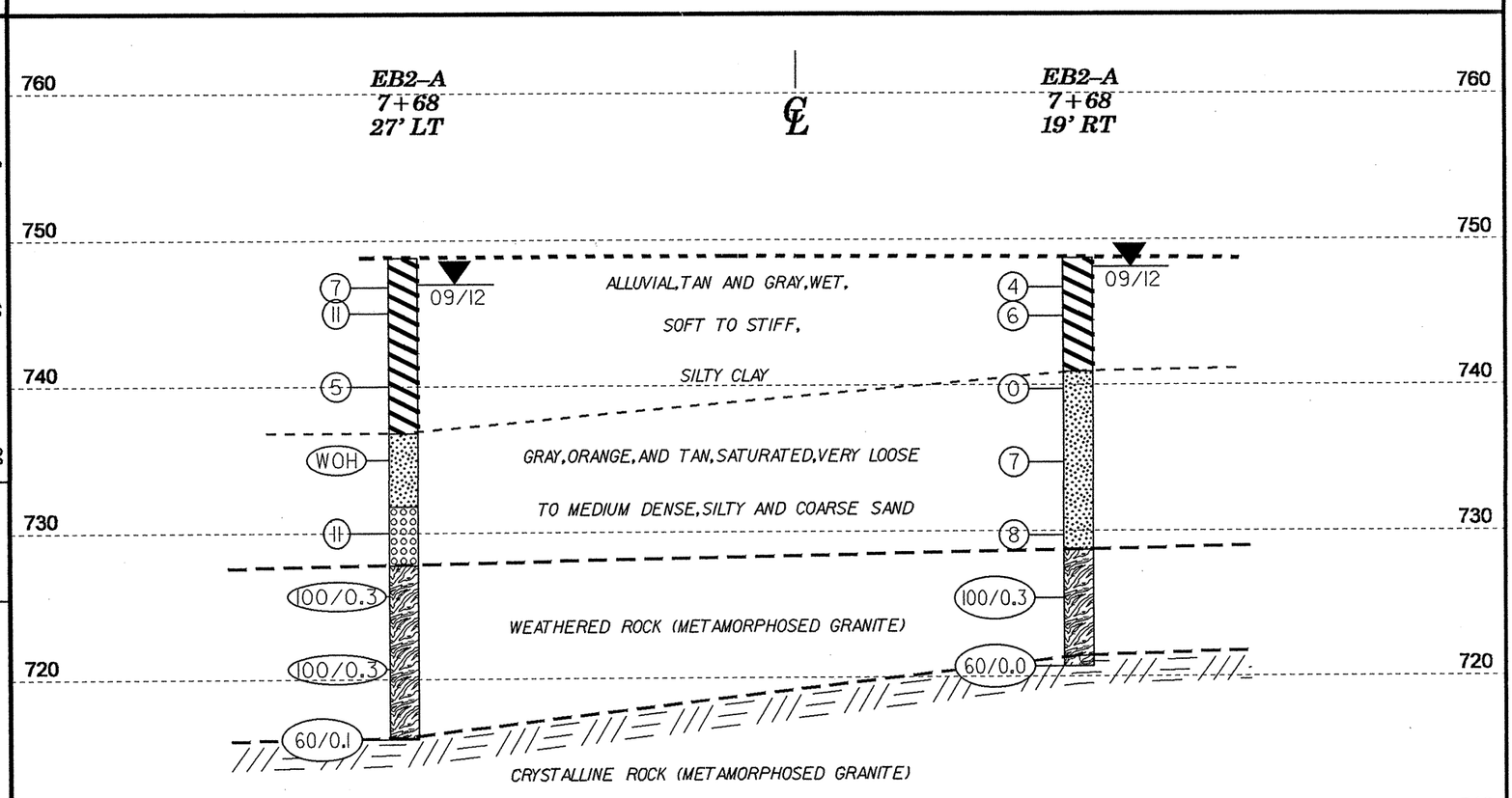
SKEW= 90°

NOTE: GROUND LINE AT BENT 3 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPBY4- END BENT 2



SKEW= 90°

NOTE: GROUND LINE AT END BENT 2 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2425C)	6

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 4+35	**OFFSET** 17 ft LT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 55.3 ft	**NORTHING** 870,096	**EASTING** 1,744,576	**24 HR.** 1.7
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/05/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.4 GROUND SURFACE	0.0
	748.4	1.0	4	6	7	13		W		**ALLUVIAL** GRAY AND TAN, SILTY CLAY	
745	746.4	3.0	5	11	17	28		M			
	741.4	8.0	4	4	7	11		W			
740	736.4	13.0	WOH	WOH	WOH	0		Sat.		736.4 GRAY, SILTY SAND WITH TRACE CLAY	13.0
735	731.4	18.0	10	14	21	35		M		732.1 **RESIDUAL** ORANGE AND TAN, SAPROLITIC, SILTY SAND	17.3
730	726.4	23.0	14	15	17	32		M		727.4 GRAY, MICACEOUS, SANDY SILT	22.0
725	721.4	28.0	100/0.3			100/0.3				723.4 **WEATHERED ROCK** (METAMORPHOSED GRANITE)	26.0
720	716.4	33.0	60/0.2			60/0.2					
715	714.0	35.4	60/0.0			60/0.0	RS-1			714.0 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITE) 713.1 GRAY TO BROWN,FRESH TO MODERATELY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=97% RQD=65% RMR=50	35.4 36.3
710											
705											
700											
695										694.1 Boring Terminated at Elevation 694.1 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	55.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 4+35	**OFFSET** 17 ft LT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 55.3 ft	**NORTHING** 870,096	**EASTING** 1,744,576	**24 HR.** 1.7
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/05/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
713.1											Begin Coring @ 36.3 ft	
	713.1	36.3	4.0	4:20/1.0 3:04/1.0 3:51/1.0 3:06/1.0	(3.6) 90%	(1.9) 48%		(18.5) 97%	(12.3) 65%		713.1 GRAY TO BROWN,FRESH TO MODERATELY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=97% RQD=65% RMR=50	36.3
710	709.1	40.3	5.0	3:21/1.0 3:02/1.0 3:16/1.0 3:56/1.0 2:56/1.0	(5.0) 100%	(2.6) 52%	RS-1					
705	704.1	45.3	5.0	4:57/1.0 2:58/1.0 3:25/1.0 3:54/1.0 3:00/1.0	(4.9) 98%	(3.4) 68%						
700	699.1	50.3	5.0	4:00/1.0 3:53/1.0 3:23/1.0 4:00/1.0 3:40/1.0	(5.0) 100%	(4.4) 88%						
695	694.1	55.3									694.1 Boring Terminated at Elevation 694.1 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	55.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 4+35	**OFFSET** 15 ft RT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 749.2 ft	**TOTAL DEPTH** 38.1 ft	**NORTHING** 870,069	**EASTING** 1,744,593	**24 HR.** 2.7
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/05/12	**COMP. DATE** 09/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. ft)	(DEPTH ft)
750										749.2 GROUND SURFACE	0.0
	748.2	1.0						W		**ALLUVIAL** GRAY, TAN, AND ORANGE, SILTY CLAY	
	746.2	3.0	WOH	3	4	7					
745			5	8	8	16		M			
	741.2	8.0	4	4	4	8					
740								W			
	736.2	13.0	WOH	4	7	11				735.7	13.5
735								W		**RESIDUAL** BROWN, SILTY SAND	
	731.2	18.0	6	9	11	20					
730								M			
	726.2	23.0	65	35/0.1		100/0.6				728.2	21.0
725										**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
	721.2	28.0	30	30	47	77				722.2	27.0
720										**RESIDUAL** ORANGE AND GRAY, SAPROLITIC, SILTY SAND	
	716.2	33.0	100/0.3			100/0.3				717.2	32.0
715										**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
	711.2	38.0	60/0.1			60/0.1				711.2 / 711.1	38.0 / 38.1
										CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	
										Boring Terminated with Standard Penetration Test Refusal at Elevation 711.1 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 5+55	**OFFSET** 17 ft LT	**ALIGNMENT** -RPBY4-	**0 HR.** 0.2
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 37.9 ft	**NORTHING** 870,160	**EASTING** 1,744,678	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/05/12	**COMP. DATE** 09/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. ft)	(DEPTH ft)
750										748.6 GROUND SURFACE	0.0
	747.6	1.0						W		**ALLUVIAL** GRAY AND ORANGE, SILTY CLAY	
	745.7	2.9	WOH	WOH	WOH	0					
745			2	3	4	7		W			
	740.7	7.9	3	4	5	9					
740								W			
	735.7	12.9	WOH	WOH	WOH	0				736.1	12.5
735								Sat.		GRAY, SILTY SAND	
	730.7	17.9	1	1	36	37				729.7	18.9
730								Sat.		**RESIDUAL** BROWN, SANDY SILT	
	725.7	22.9	15	15	21	36				721.4	27.2
725								M		**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
	720.7	27.9	66	34/0.3		100/0.8				710.8 / 710.7	37.8 / 37.9
720										**CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	
	715.8	32.8	58	42/0.3		100/0.8				Boring Terminated with Standard Penetration Test Refusal at Elevation 710.7 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	
715											
	710.8	37.8	60/0.1			60/0.1					

NCDOT BORE DOUBLE U2524C_GEO_BH_RPBY4.GPJ NC_DOT.GDT 10/4/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 5+55	**OFFSET** 15 ft RT	**ALIGNMENT** -RPBY4-	**0 HR.** 0.2
COLLAR ELEV. 748.5 ft	**TOTAL DEPTH** 50.5 ft	**NORTHING** 870,132	**EASTING** 1,744,695	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/06/12	**COMP. DATE** 09/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.5 GROUND SURFACE	0.0
	747.5	1.0	WOH	WOH	WOH	0		W		**ALLUVIAL** GRAY AND ORANGE, SILTY CLAY	
745	745.5	3.0	3	3	5	8		W			
740	740.5	8.0	WOH	3	4	7		W			
735	735.5	13.0	WOH	WOH	WOH	0		Sat.		736.5 GRAY, SILTY SAND	12.0
730	730.5	18.0	17	18	29	47		M		731.5 **RESIDUAL** BROWN AND TAN, SAPROLITIC, SILTY SAND WITH TRACE MICA	17.0
	727.0	21.5	60/0.0			60/0.0	RS-1			728.5 **WEATHERED ROCK** (METAMORPHOSED GRANITE)	20.0
725										727.0 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	21.5
										726.7 BROWN AND TAN, MODERATELY HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=100% RQD=34% RMR=34	21.8
720										722.9 **WEATHERED ROCK** (METAMORPHOSED GRANITE)	25.6
715	712.9	35.6	100/0.2			100/0.2					
710	710.5	38.0	14	86/0.4		100/0.9					
705	705.5	43.0	60/0.0			60/0.0	RS-3			705.5 **CRYSTALLINE ROCK** GRAY, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO WIDE FRACTURE SPACING, METAMORPHOSED GRANITE REC=84% RQD=65% RMR=41	43.0
700										698.0 Boring Terminated at Elevation 698.0 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	50.5

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 5+55	**OFFSET** 15 ft RT	**ALIGNMENT** -RPBY4-	**0 HR.** 0.2
COLLAR ELEV. 748.5 ft	**TOTAL DEPTH** 50.5 ft	**NORTHING** 870,132	**EASTING** 1,744,695	**24 HR.** 1.3
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/06/12	**COMP. DATE** 09/06/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 21.3 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)
726.7											Begin Coring @ 21.8 ft	
725	726.7	21.8	3.8	4:03/1.0 3:02/1.0 3:43/1.0 2:55/0.8	(3.8) 100%	(1.3) 34%	RS-1	(3.8) 100%	(1.3) 34%		726.7 BROWN AND TAN, MODERATELY HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=100% RQD=34% RMR=34	21.8
	722.9	25.6	5.0	3:50/1.0 3:10/1.0 1:35/1.0 2:52/1.0 1:53/1.0	(4.0) 80%	N/A					722.9 **WEATHERED ROCK** (METAMORPHOSED GRANITE)	25.6
720	717.9	30.6	5.0	2:49/1.0 1:14/1.0 2:11/1.0 1:37/1.0 3:42/1.0	(0.4) 8%	N/A						
715	712.9	35.6		*N=100/0.2*								
710				*N=100/0.9*								
705	705.5	43.0	2.5	*N=60/0.0* 2:58/1.0 3:04/1.0 2:08/0.5	(2.1) 84%	(1.0) 40%	RS-3	(6.3) 84%	(4.9) 65%		705.5 **CRYSTALLINE ROCK** GRAY, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, VERY CLOSE TO WIDE FRACTURE SPACING, METAMORPHOSED GRANITE REC=84% RQD=65% RMR=41	43.0
	703.0	45.5	5.0	2:11/1.0 6:24/1.0 6:22/1.0 9:40/1.0 6:50/1.0	(4.2) 84%	(3.9) 78%						
700	698.0	50.5									698.0 Boring Terminated at Elevation 698.0 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	50.5

DOT BORE DOUBLE U2524C_GEO_BH_RPBY4.GPJ NC_DOT.GDT 10/8/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 6+73	**OFFSET** 17 ft LT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 55.6 ft	**NORTHING** 870,222	**EASTING** 1,744,778	**24 HR.** 1.6
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/06/12	**COMP. DATE** 09/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
750										
	747.9	1.0	WOH	2	3	5		W		748.9 GROUND SURFACE 0.0
745	745.9	3.0	3	4	8	12		W		**ALLUVIAL** GRAY AND ORANGE, SILTY CLAY
	740.9	8.0	2	3	2	5		Sat.		740.4 8.5 GRAY, SILTY SAND WITH TRACE CLAY
740										
735	735.9	13.0	WOH	WOH	WOH	0		Sat.		
730	730.9	18.0	5	7	11	18		Sat.		729.6 19.3
										727.9 21.0 **RESIDUAL** BROWN, MICACEOUS, SANDY SILT
725	725.9	23.0	100/0.5			100/0.5				**WEATHERED ROCK** (METAMORPHOSED GRANITE)
720	720.9	28.0	100/0.3			100/0.3				
715	717.6	31.3	60/0.0			60/0.0	RS-4			717.6 31.3 **CRYSTALLINE ROCK** TAN TO DARK GRAY,FRESH TO MODERATELY WEATHERED, VERY HARD TO MODERATELY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=100% RQD=40% RMR=30
710										
705										
700										
695										693.3 55.6 Boring Terminated at Elevation 693.3 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 6+73	**OFFSET** 17 ft LT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 55.6 ft	**NORTHING** 870,222	**EASTING** 1,744,778	**24 HR.** 1.6
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/06/12	**COMP. DATE** 09/06/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 24.3 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)
717.6											Begin Coring @ 31.3 ft
	717.6	31.3	4.3	N=60/0.0 4:14/1.0 4:12/1.0 3:27/1.0 3:10/1.0 1:01/0.3	(4.3) 100%	(2.8) 65%		(24.2) 100%	(9.8) 40%		717.6 **CRYSTALLINE ROCK** 31.3
715	713.3	35.6	5.0	3:35/1.0 3:24/1.0 4:07/1.0 3:14/1.0 3:17/1.0	(5.0) 100%	(1.2) 24%	RS-4				TAN TO DARK GRAY,FRESH TO MODERATELY WEATHERED, VERY HARD TO MODERATELY HARD, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=100% RQD=40% RMR=30
710	708.3	40.6	5.0	3:34/1.0 3:30/1.0 3:24/1.0 3:33/1.0 3:36/1.0	(5.0) 100%	(3.0) 60%					
705	703.3	45.6	5.0	3:03/1.0 3:05/1.0 3:02/1.0 3:19/1.0 3:24/1.0	(4.9) 98%	(1.3) 26%					
700	698.3	50.6	5.0	3:35/1.0 3:28/1.0 3:00/1.0 2:35/1.0 3:41/1.0	(5.0) 100%	(1.5) 30%					
695	693.3	55.6									693.3 55.6 Boring Terminated at Elevation 693.3 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)

C:\DOT BORE DOUBLE_U2524C_GEO_BH_RPBY4.GPJ NC_DOT.GDT 10/4/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 6+73	**OFFSET** 15 ft RT	**ALIGNMENT** -RPBY4-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 28.9 ft	**NORTHING** 870,195	**EASTING** 1,744,795	**24 HR.** 1.4
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/07/12	**COMP. DATE** 09/07/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										749.1 GROUND SURFACE 0.0
	748.1	1.0	2	3	3	6		W		**ALLUVIAL** TAN, SILTY CLAY
745	745.2	3.9	4	8	8	16		M		
740	740.2	8.9	2	1	2	3		Sat.		739.7 9.4 TAN AND ORANGE, SILTY SAND
735	735.2	13.9	4	4	2	6		Sat.		732.1 17.0 TAN, COARSE SAND
730	730.2	18.9	2	2	WOH	2		Sat.		728.6 20.5 **WEATHERED ROCK** (METAMORPHOSED GRANITE)
725	725.2	23.9	100/0.2			100/0.2				
	720.2	28.9	60/0.0			60/0.0				720.2 28.9 Boring Terminated at Elevation 720.2 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 7+68	**OFFSET** 27 ft LT	**ALIGNMENT** -RPBY4- — **0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 32.9 ft	**NORTHING** 870,276	**EASTING** 1,744,857 — **24 HR.** 1.8
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/07/12	**COMP. DATE** 09/07/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
750											
										748.8 GROUND SURFACE	0.0
	747.8	1.0	2	3	4	7 11		W		**ALLUVIAL** TAN, SILTY CLAY	
745	746.0	2.8	2	2	9			W			
740	741.0	7.8	3	3	2	5		W		736.8	12.0
735	736.0	12.8	WOH	WOH	WOH	0		Sat.		GRAY AND ORANGE, SILTY SAND WITH TRACE CLAY	
730	731.0	17.8	2	1	10	11		Sat.		731.8	17.0
725	726.0	22.8	100/0.3			100/0.3				TAN, COARSE SAND	
720	721.0	27.8	100/0.3			100/0.3				727.8	21.0
	716.0	32.8	60/0.1			60/0.1				**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
										716.0	32.8
										715.9 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	32.9
										Boring Terminated with Standard Penetration Test Refusal at Elevation 715.9 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 5 ON -RPBY4- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 7+68	**OFFSET** 19 ft RT	**ALIGNMENT** -RPBY4- — **0 HR.** N/A
COLLAR ELEV. 748.7 ft	**TOTAL DEPTH** 28.0 ft	**NORTHING** 870,241	**EASTING** 1,744,878 — **24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/07/12	**COMP. DATE** 09/07/12	**SURFACE WATER DEPTH** N/A

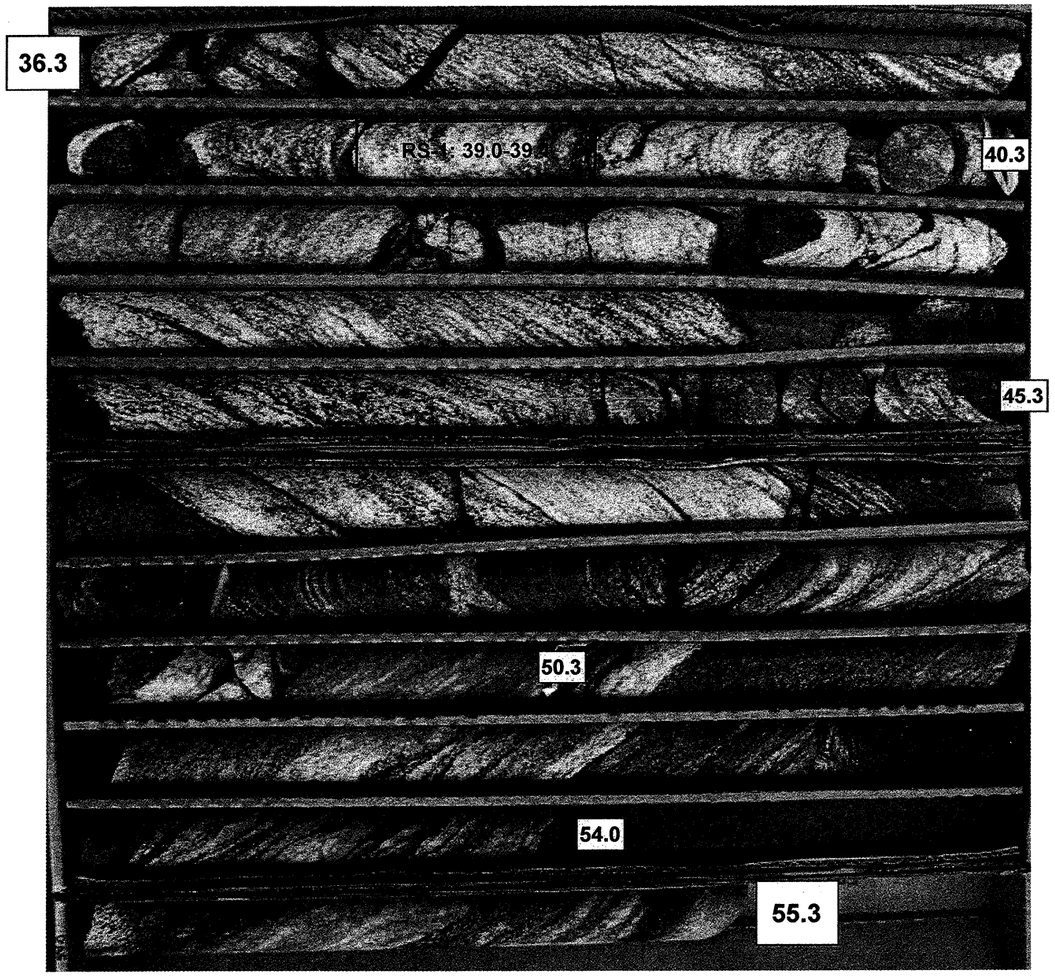
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
										748.7 GROUND SURFACE 0.0
	747.7	1.0	WOH	2	2	4		W		**ALLUVIAL** TAN AND GRAY, SILTY CLAY
745	745.7	3.0	WOH	3	3	6		W		
740	740.7	8.0	1	0	0	0		Sat.		740.9 7.8 TAN, SILTY SAND
735	735.7	13.0	3	5	2			Sat.		
730	730.7	18.0	4	3	5	8		Sat.		728.7 20.0 **WEATHERED ROCK** (METAMORPHOSED GRANITE)
725	725.7	23.0	100/0.3			100/0.3				721.4 27.3
720	720.7	28.0	60/0.0			60/0.0				720.7 28.0 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 720.7 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)

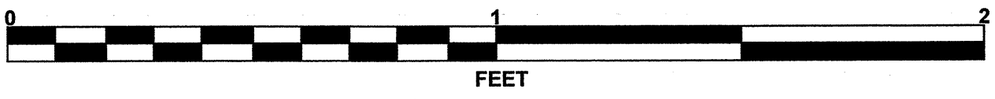
NCDOT BORE DOUBLE U2524C_GEO_BH_RPBY4.GPJ NC_DOT.GDT 10/8/12

CORE PHOTOGRAPHS

B1-A

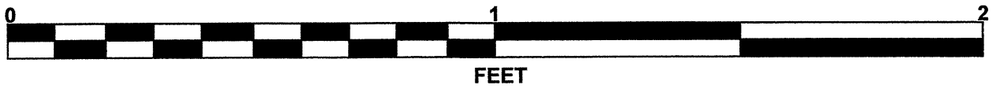
BOXES 1, 2 & 3: 36.3 - 55.3 FEET





B2-B

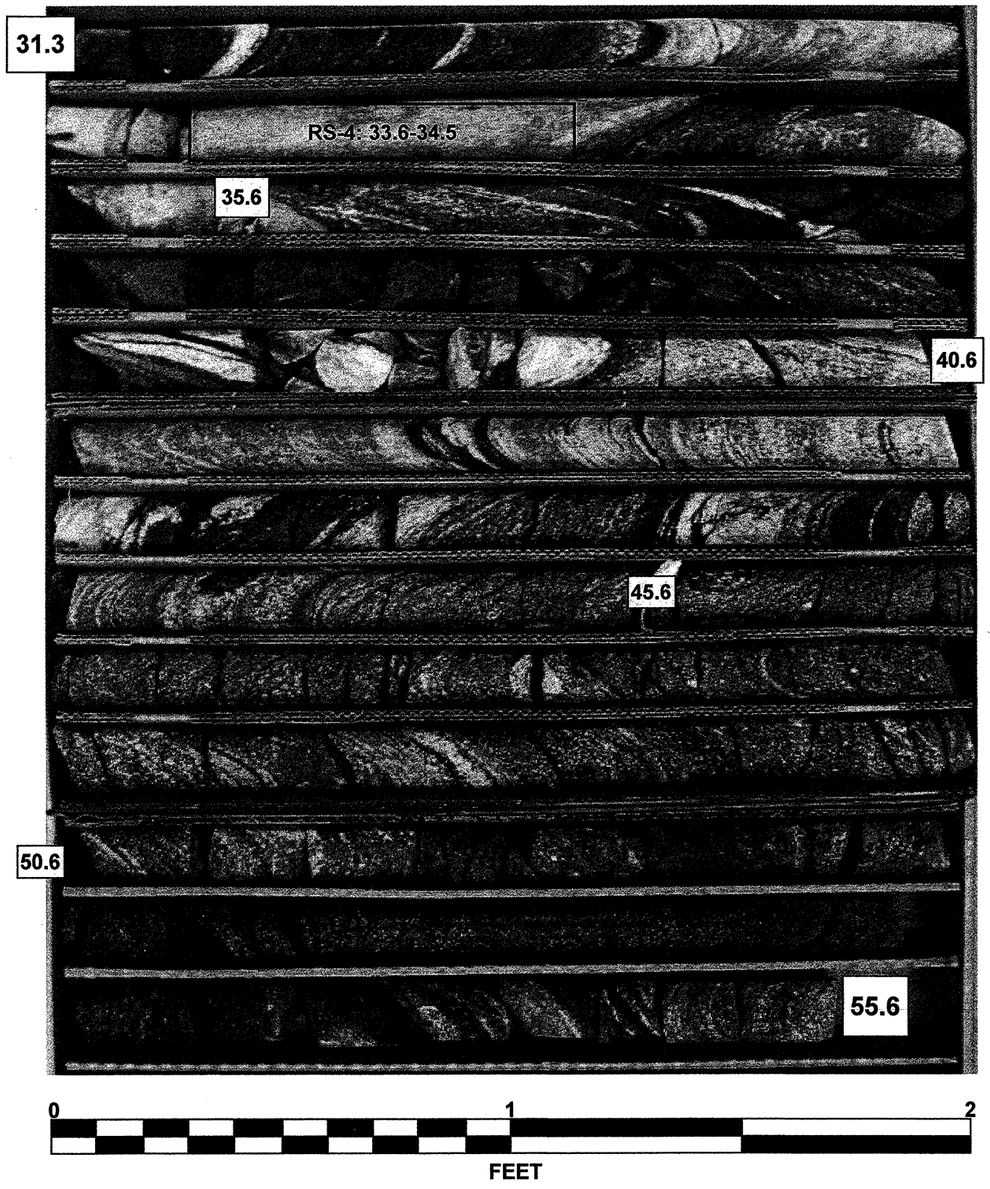
BOXES 1 & 2: 21.8 - 50.5 FEET



CORE PHOTOGRAPHS

B3-A

BOXES 1, 2 & 3: 31.3 - 55.6 FEET



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U2524C)	1	29

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34820.1.2 (U-2524C) F.A. PROJ. NHF-0708(52)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 (BATTLEGROUND AVENUE)

SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK

ID: U-2524C

PROJECT: 34820.1.2

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4, 5	PROFILE
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26-29	CORE 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) 707-6850. 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
TRIGON

INVESTIGATED BY N.D. MOHS
CHECKED BY N.T. ROBERSON
SUBMITTED BY N.T. ROBERSON
DATE OCTOBER 2012

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS 10/31/12

DRAWN BY: 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.
34820.1.2(U-2524C)	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 (CDB.)	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
PLASTIC RANGE (PI): LL — LIQUID LIMIT		
	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
OM — 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, CPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING 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- 57
- [ ] BK-51
- [ ] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [■] CME-850
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [■] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [■] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____ " TUNG.-CARB.
- [■] CORE BIT
- [ ] _____

HAMMER TYPE:
- [■] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [■] -N NO2WL
- [ ] -H_____

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BL-34: -BL- STATION 154+84.47

ELEVATION: 748.80 FT.

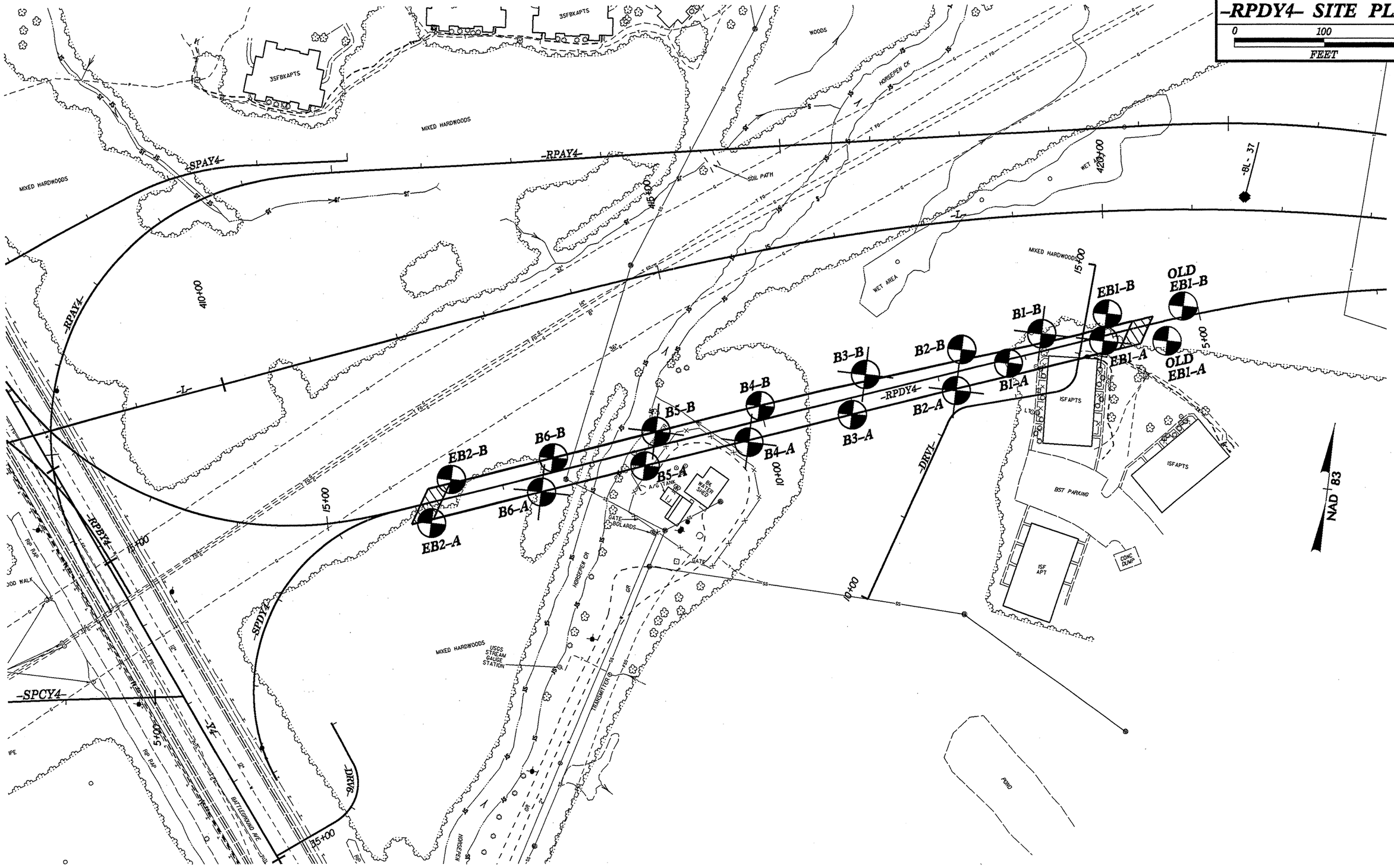
NOTES:

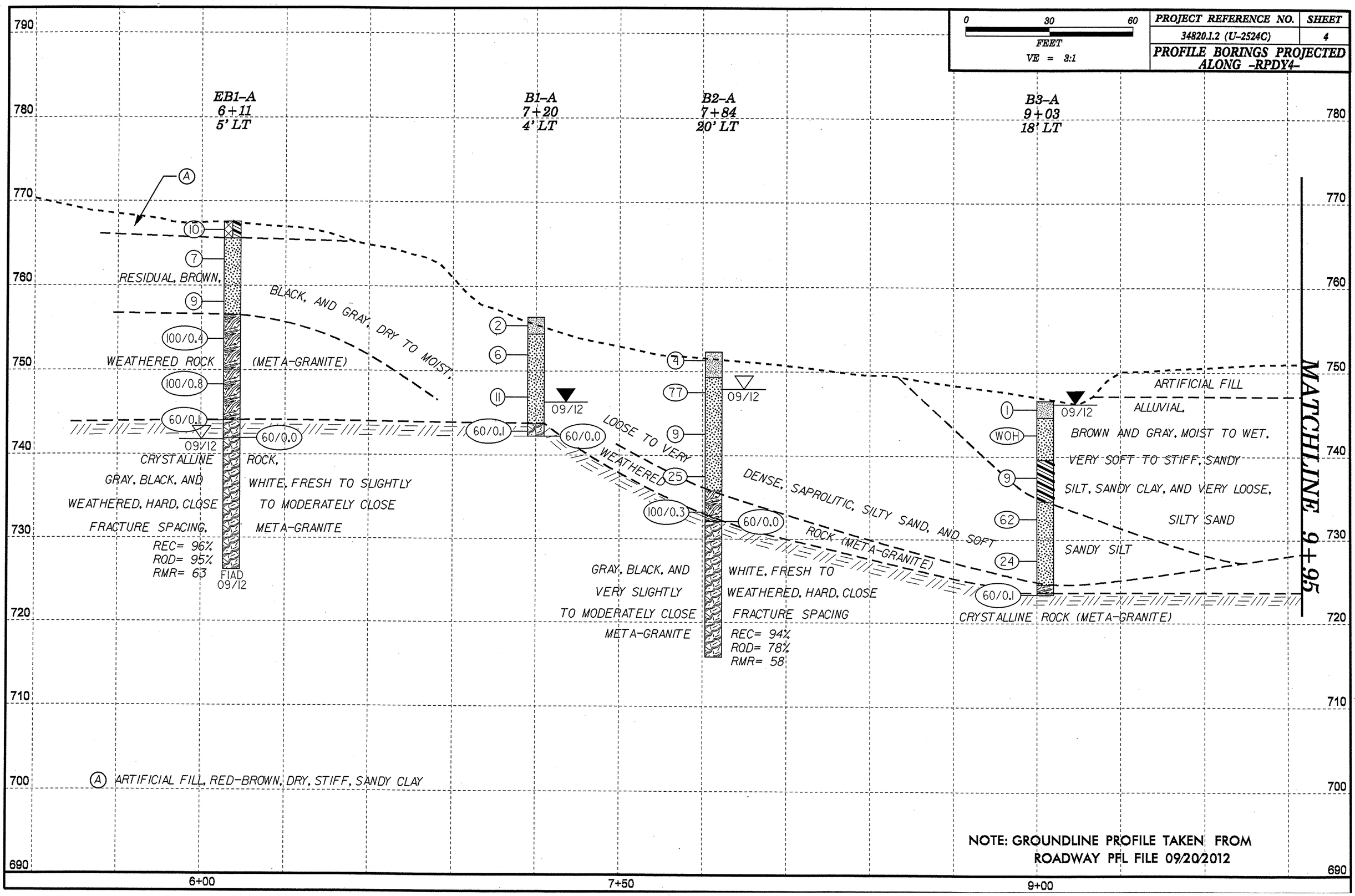
REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34820.1.2(U-2524C)	3

-RPDY4- SITE PLAN

0 100 200
FEET





0 30 60
FEET
VE = 3:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
4
PROFILE BORINGS PROJECTED ALONG -RPDY4-
EB1-A
6+11
5' LT
B1-A
7+20
4' LT
B2-A
7+84
20' LT
B3-A
9+03
18' LT
MATCHLINE 9+95
RESIDUAL, BROWN,
BLACK, AND GRAY, DRY TO MOIST,
WEATHERED ROCK
(META-GRANITE)
CRYSTALLINE ROCK,
GRAY, BLACK, AND WHITE, FRESH TO SLIGHTLY
WEATHERED, HARD, CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC= 96%
RQD= 95%
RMR= 63
FIAD
09/12
LOOSE TO VERY WEATHERED
DENSE, SAPROLITIC, SILTY SAND, AND SOFT ROCK (META-GRANITE)
GRAY, BLACK, AND WHITE, FRESH TO
VERY SLIGHTLY WEATHERED, HARD, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING
META-GRANITE
REC= 94%
RQD= 78%
RMR= 58
ARTIFICIAL FILL
ALLUVIAL,
BROWN AND GRAY, MOIST TO WET,
VERY SOFT TO STIFF, SANDY
SILT, SANDY CLAY, AND VERY LOOSE,
SILTY SAND
SANDY SILT
CRYSTALLINE ROCK (META-GRANITE)
A ARTIFICIAL FILL, RED-BROWN, DRY, STIFF, SANDY CLAY
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE 09/20/2012
790
780
770
760
750
740
730
720
710
700
690
6+00
7+50
9+00

0	30	60
FEET		
VE = 3:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5
PROFILE BORINGS PROJECTED ALONG -RPDY4-	

MATCHLINE 9+95

B4-A
10+22
20' LT

B5-A
11+41
18' LT

B6-A
12+60
18' LT

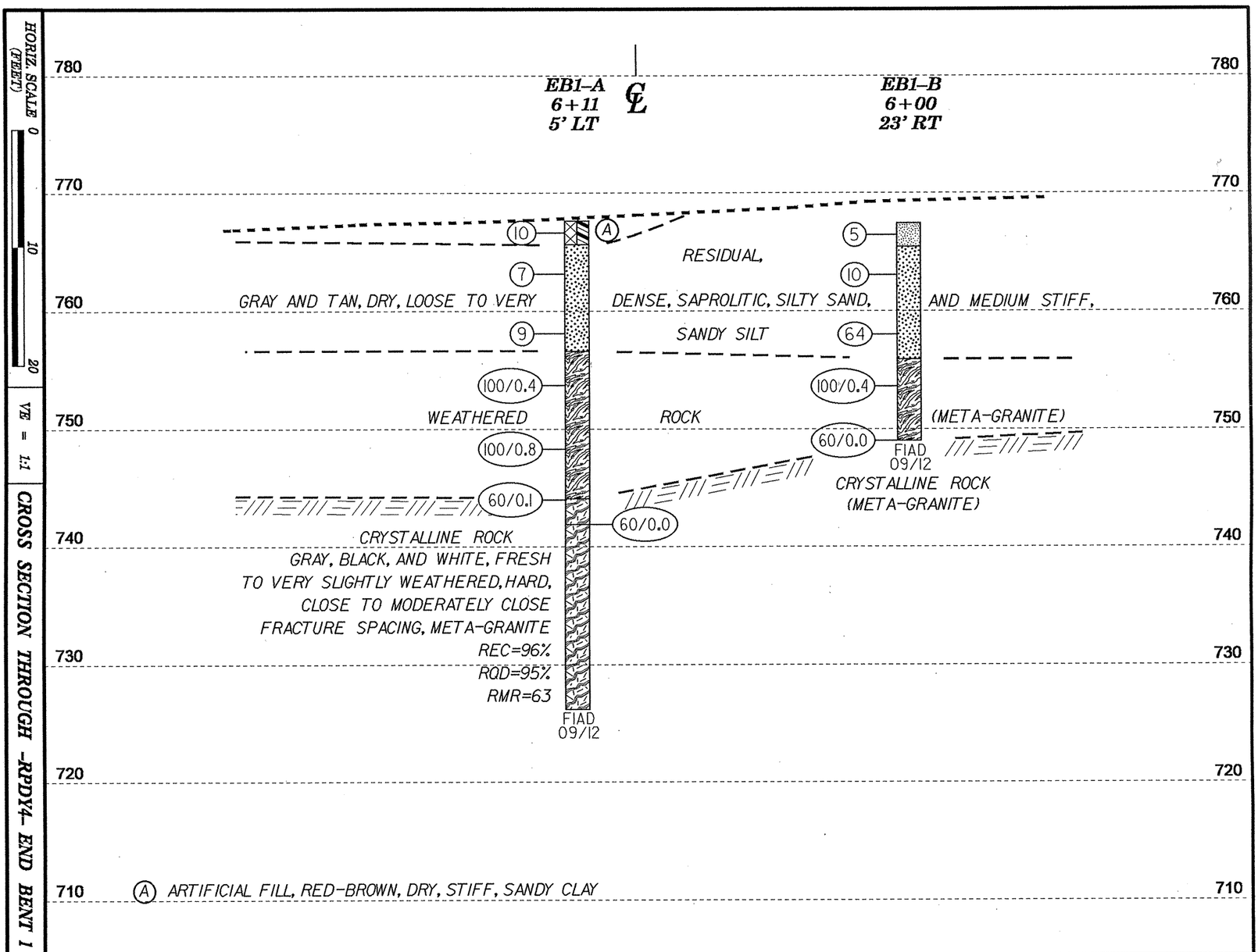
EB2-A
13+87
22' LT

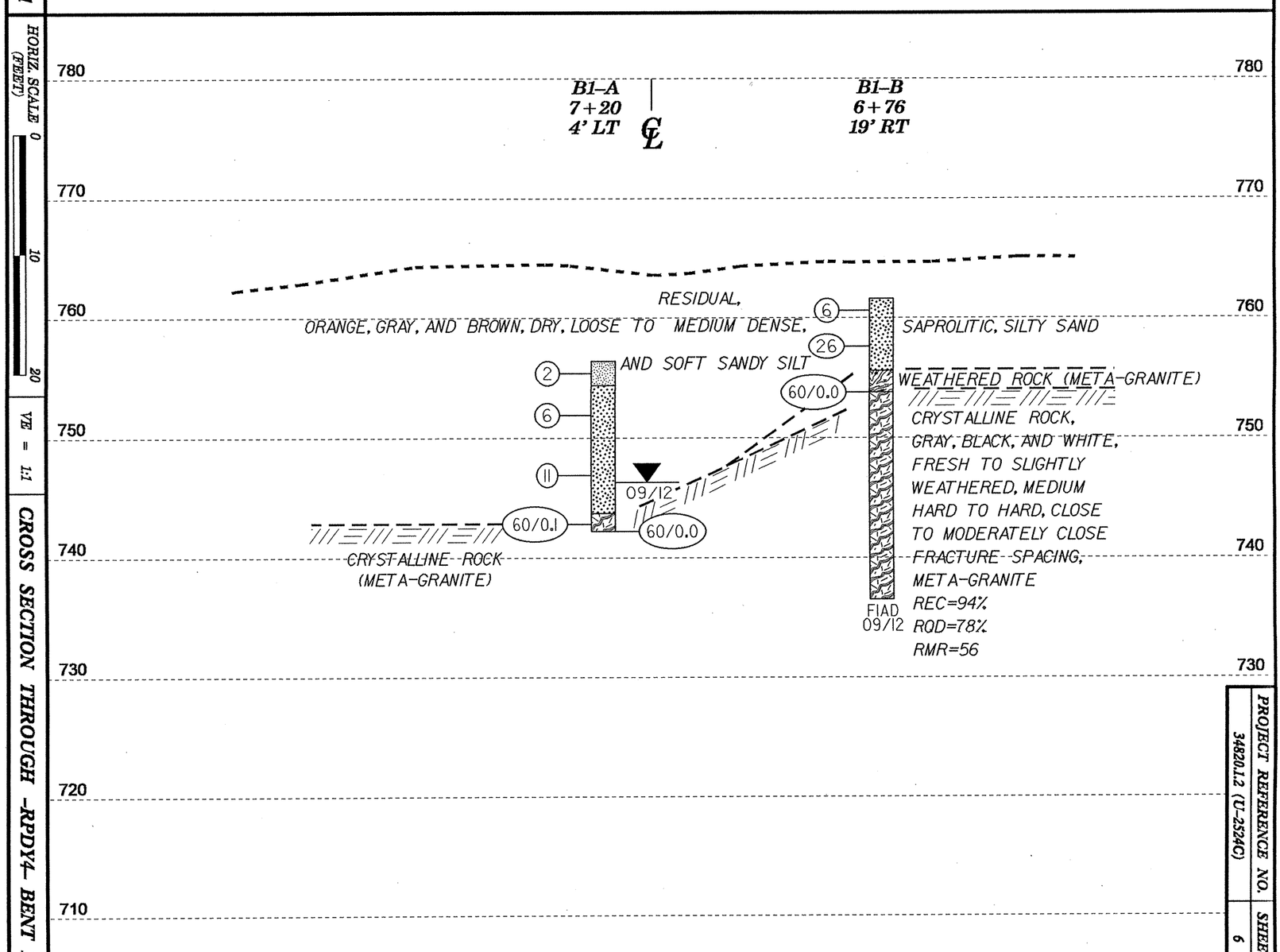
770
760
750
740
730
720
710
700
690
680
670

SOFT
09/12
ARTIFICIAL FILL, RED-BROWN AND GRAY, DRY TO MOIST, TO MEDIUM STIFF, SANDY SILT AND SANDY CLAY
ALLUVIAL, BROWN AND GRAY, MOIST TO SATURATED, VERY SOFT TO STIFF, SANDY SILT, SANDY CLAY, SILTY CLAY, AND VERY LOOSE TO LOOSE, SILTY TO COARSE SAND
RESIDUAL, BROWN, BLACK, WEATHERED ROCK (META-GRANITE) AND GRAY, MOIST TO WET, MEDIUM DENSE TO VERY DENSE, SAPROLITIC, SILTY SAND, AND MEDIUM STIFF TO STIFF, SANDY SILT
CRYSTALLINE ROCK, BLACK, TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING
MET-GRANITE
REC= 85%
ROD= 72%
RMR= 53
FIAD 09/12
WHITE, AND TAN, FRESH SLIGHTLY WEATHERED, FRACTURE SPACING
CRYSTALLINE ROCK (META-GRANITE)
ROCK (META-GRANITE)
GRAY AND WHITE, SLIGHTLY WEATHERED, MODERATELY CLOSE META-GRANITE
FRESH TO VERY HARD, CLOSE TO FRACTURE SPACING,
REC= 100%
ROD= 83%
RMR= 61

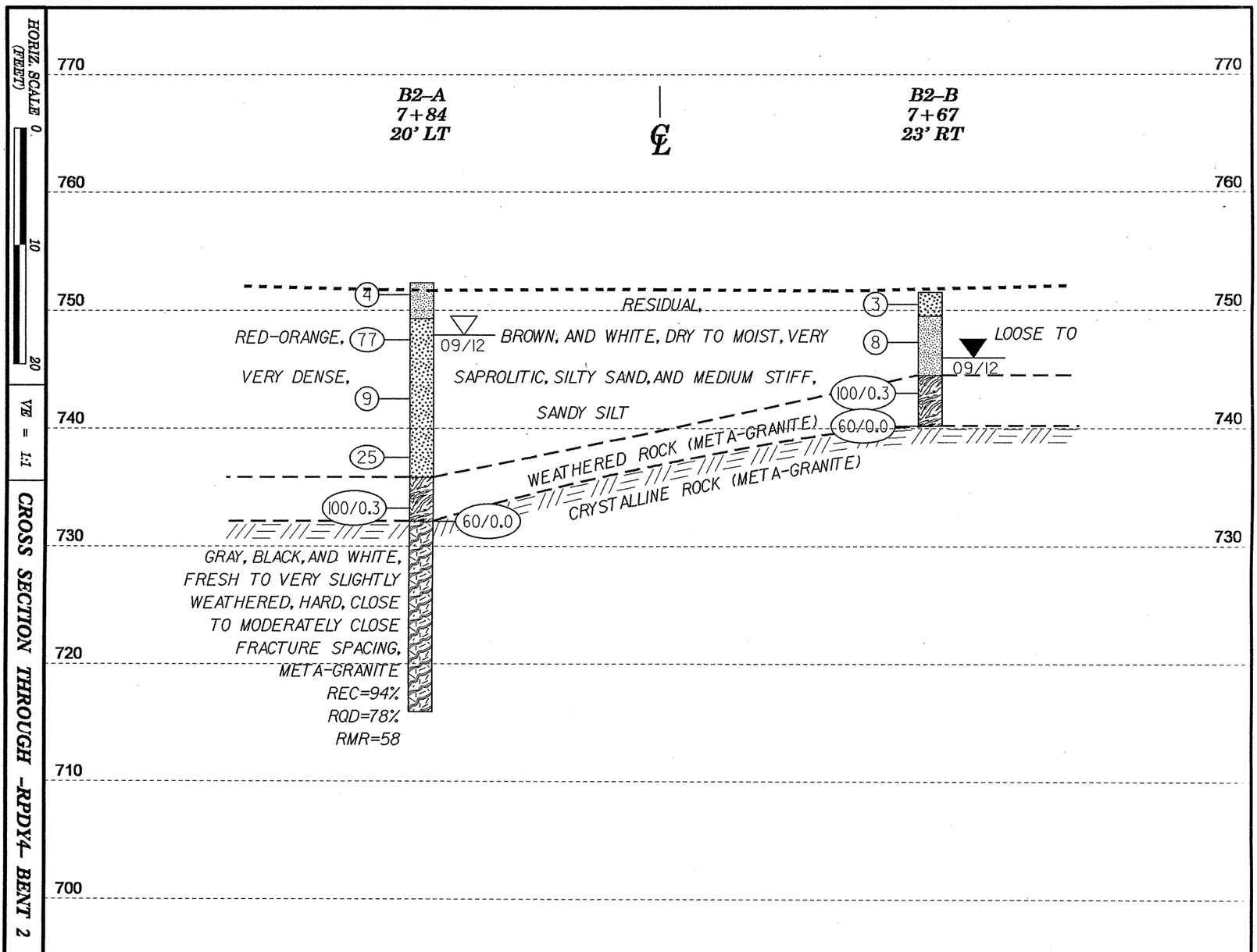
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE 09/20/2012

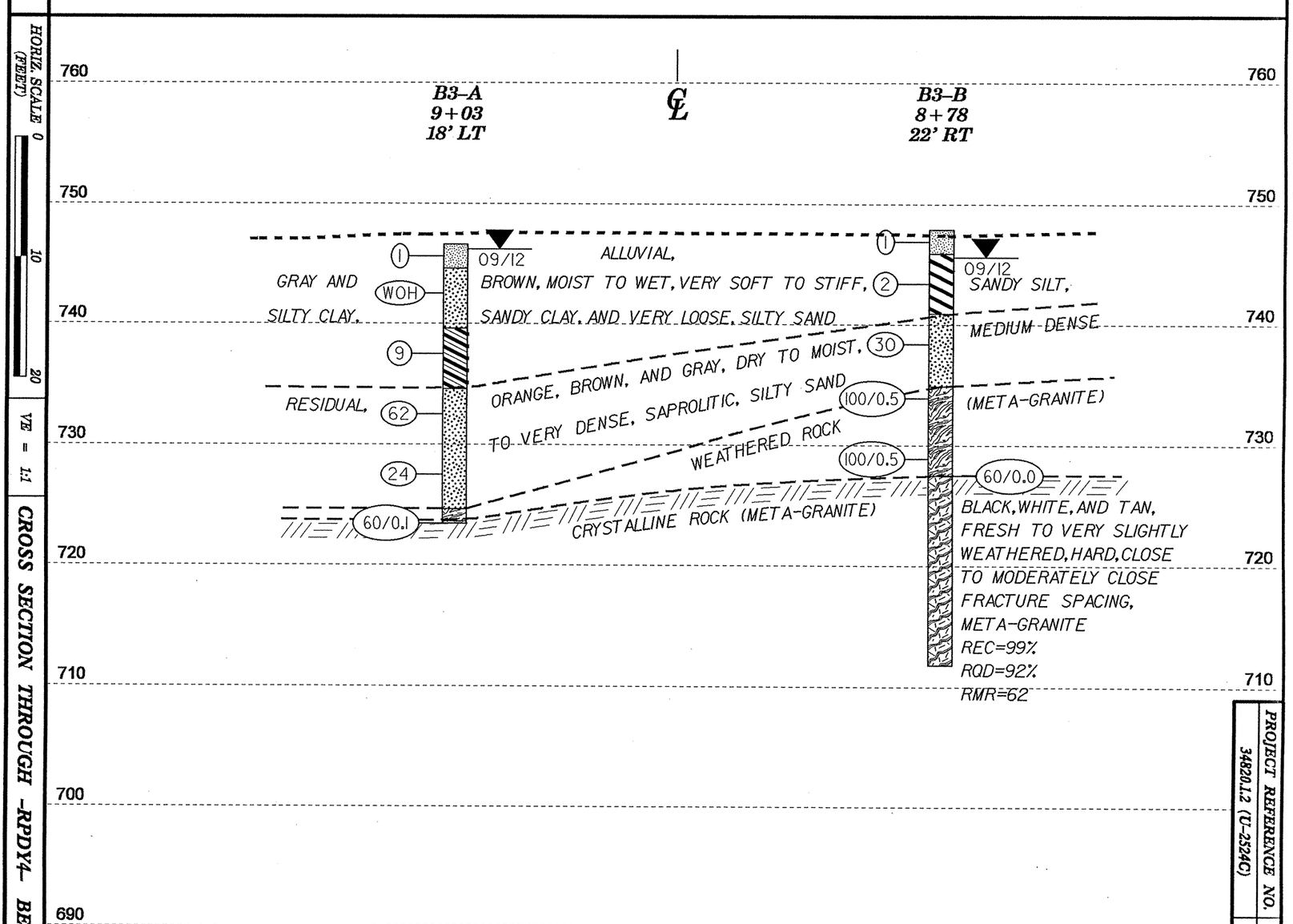
10+00
11+50
13+00
14+50



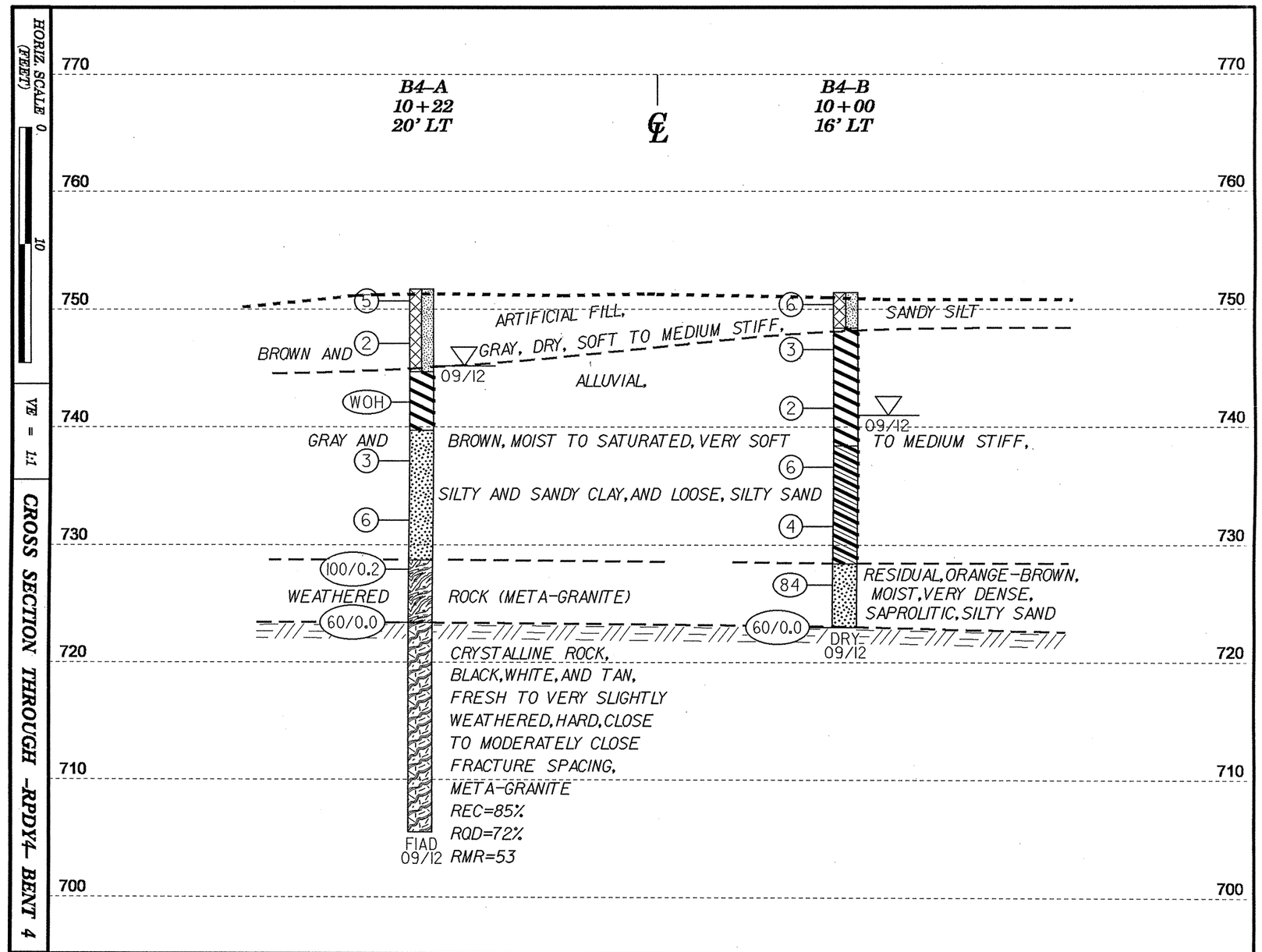


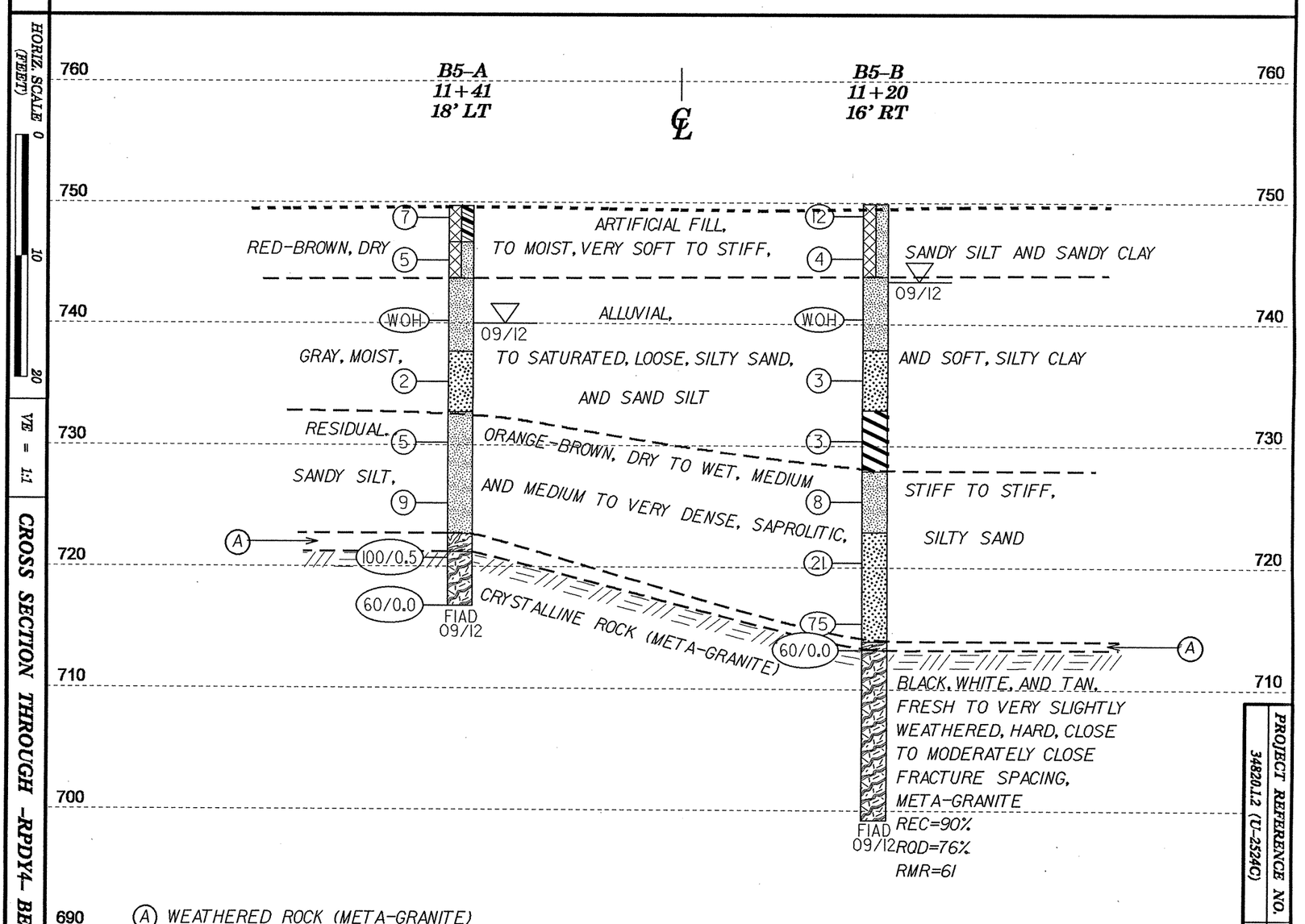
PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	6



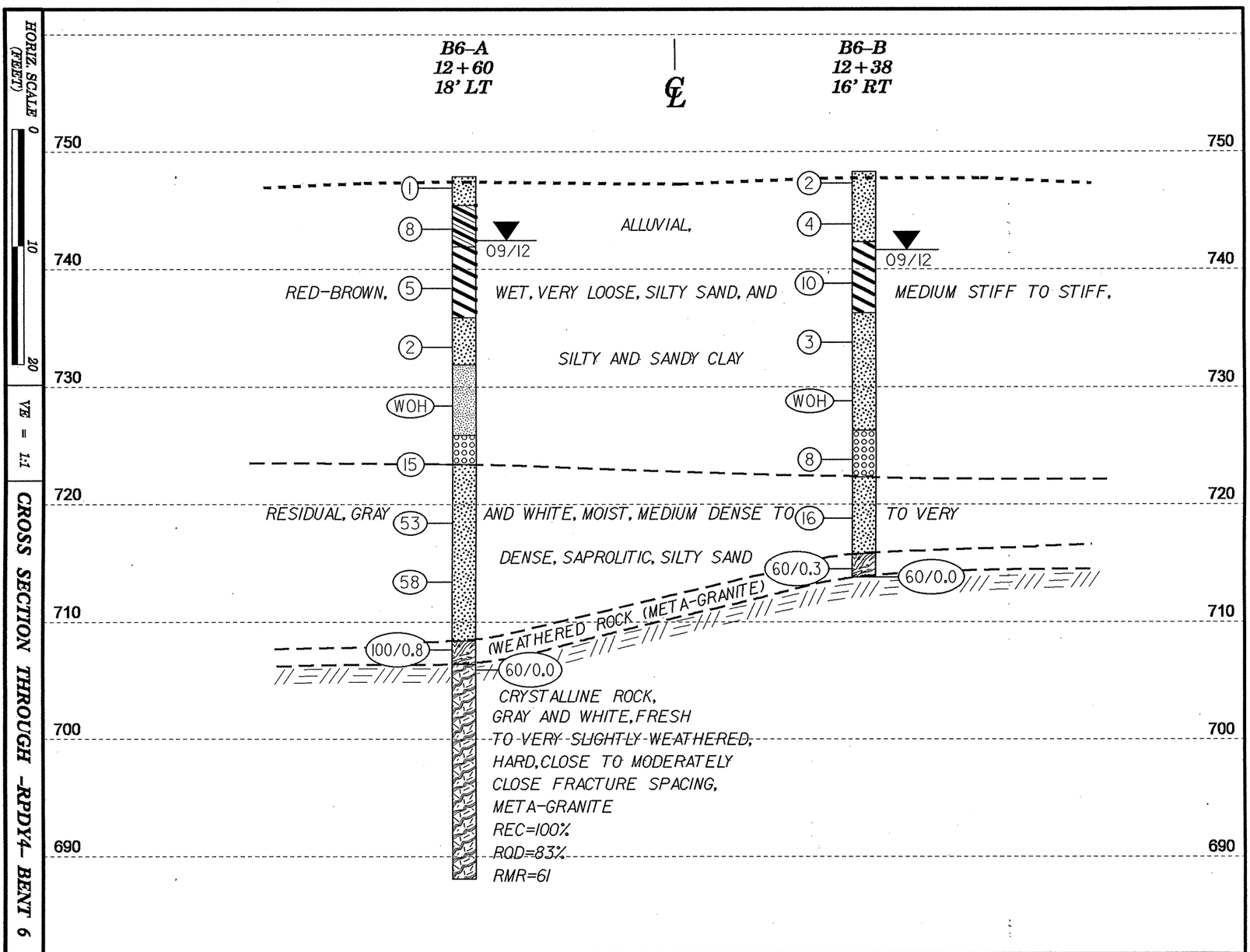


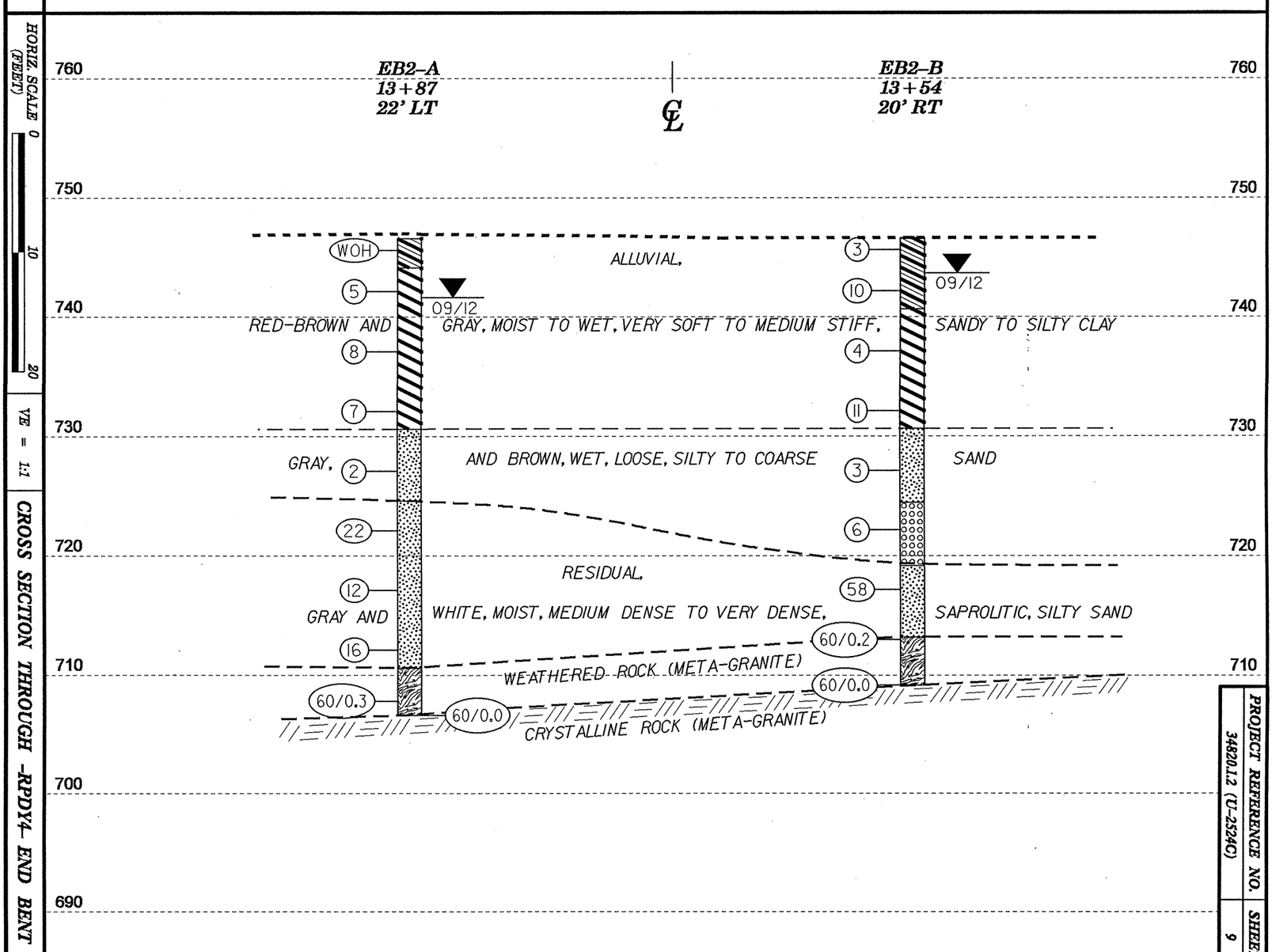
PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	7





PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
8





PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	9

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 6+11	**OFFSET** 5 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 19.4
COLLAR ELEV. 767.6 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 870,553	**EASTING** 1,746,587	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
770											
	767.6	0.0								767.6 GROUND SURFACE	0.0
			3	5	5	10		D		ARTIFICIAL FILL	
765										765.6 RED-BROWN, SANDY CLAY WITH TRACE ORGANICS	2.0
	764.1	3.5	4	3	4	7		D		RESIDUAL	
										GRAY, TAN, AND WHITE, SAPROLITIC, SILTY SAND	
760											
	759.1	8.5	3	4	5	9		D			
755											
	754.1	13.5	100/0.4			100/0.4				756.6 WEATHERED ROCK (META-GRANITE)	11.0
750											
	749.1	18.5	24	76/0.3		100/0.6					
745											
	744.1	23.5	60/0.1			60/0.1				744.1 CRYSTALLINE ROCK (META-GRANITE)	23.5
	741.9	25.7	60/0.0			60/0.0				741.9 GRAY, BLACK, AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=95% RMR=63	25.7
740							RS-1				
735											
730										726.2 Boring Terminated at Elevation 726.2 ft in CRYSTALLINE ROCK (META-GRANITE)	41.4

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 6+11	**OFFSET** 5 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 19.4
COLLAR ELEV. 767.6 ft	**TOTAL DEPTH** 41.4 ft	**NORTHING** 870,553	**EASTING** 1,746,587	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 15.7 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)
741.9											Begin Coring @ 25.7 ft	
	741.9	25.7	0.7	2:00/0.7	(0.7)	(0.6)		(15.1)	(14.4)		741.9 GRAY, BLACK, AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED,	25.7
740	741.2	26.4	5.0	2:00/1.0 1:15/1.0 2:15/1.0 2:45/1.0 1:30/1.0	100% (4.4) 88%	86% (4.0) 80%	RS-1	96%	92%		HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=95% RMR=63	
	736.2	31.4										
735			5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:15/1.0 2:30/1.0	(5.0) 100%	(4.8) 96%						
	731.2	36.4										
730			5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(5.0) 100%	(5.0) 100%						
	726.2	41.4									726.2 Boring Terminated at Elevation 726.2 ft in CRYSTALLINE ROCK (META-GRANITE)	41.4

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 10/31/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 6+00	**OFFSET** 23 ft RT	**ALIGNMENT** -RPDY4- — **0 HR.** Dry
COLLAR ELEV. 767.4 ft	**TOTAL DEPTH** 18.4 ft	**NORTHING** 870,583	**EASTING** 1,746,588 — **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/21/12	**COMP. DATE** 09/21/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
770										
	767.4	0.0								767.4 GROUND SURFACE 0.0
765			1	1	4	5		D		**RESIDUAL**
	764.0	3.4								765.4 TAN, SANDY SILT WITH TRACE ORGANICS 2.0
			3	4	6	10		D		TAN, LIGHT GRAY, BLACK, AND WHITE, SAPROLITIC, SILTY SAND
760										
	759.0	8.4								
			3	6	58	64		D		
755										755.9 11.5
	754.0	13.4								**WEATHERED ROCK** (META-GRANITE)
			100/0.4			100/0.4				
750										749.0 18.4
	749.0	18.4								Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 749.0 ft on CRYSTALLINE ROCK (META-GRANITE)
			60/0.0			60/0.0				

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 7+20	**OFFSET** 4 ft LT	**ALIGNMENT** -RPDY4- — **0 HR.** Dry
COLLAR ELEV. 756.4 ft	**TOTAL DEPTH** 14.2 ft	**NORTHING** 870,516	**EASTING** 1,746,485 — **24 HR.** 10.1
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										
	756.4	0.0								756.4 GROUND SURFACE 0.0
755			1	1	1	2		D		754.4 **RESIDUAL** ORANGE AND RED, SANDY SILT WITH TRACE ORGANICS 2.0
	752.9	3.5	1	3	3	6		D		RED AND ORANGE, SAPROLITIC, SILTY SAND
750										
	747.9	8.5	5	7	4	11		D		
745										743.7 12.7
	742.9	13.5	60/0.1			60/0.1				742.2 **CRYSTALLINE ROCK** (META-GRANITE) 14.2
	742.2	14.2	60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 742.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 6+76	**OFFSET** 19 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 8.2
COLLAR ELEV. 761.6 ft	**TOTAL DEPTH** 25.1 ft	**NORTHING** 870,553	**EASTING** 1,746,518	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/21/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT .5ft	BLOW COUNT .5ft	BLOW COUNT .5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
765										
	761.6	0.0	1	3	3	6		D		761.6 GROUND SURFACE 0.0
760	758.6	3.0	8	8	18	26		D		**RESIDUAL** TAN-BROWN, SILTY SAND WITH TRACE ORGANICS
755	753.8	7.8	60/0.0			60/0.0				755.6 6.0 **WEATHERED ROCK** (META-GRANITE) 753.8 7.8
750										**CRYSTALLINE ROCK** GRAY, BLACK, AND WHITE, FRESH TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=78% RMR=56
745							RS-2			
740										736.5 25.1 Boring Terminated at Elevation 736.5 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 6+76	**OFFSET** 19 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 8.2
COLLAR ELEV. 761.6 ft	**TOTAL DEPTH** 25.1 ft	**NORTHING** 870,553	**EASTING** 1,746,518	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/21/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.3 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)
753.8											Begin Coring @ 7.8 ft
	753.8	7.8	2.3	2:45/1.0 3:00/1.0 0:30/0.3	(1.9) 83%	(1.3) 57%		(16.3) 94%	(13.5) 78%		753.8 **CRYSTALLINE ROCK** GRAY, BLACK, AND WHITE, FRESH TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=78% RMR=56
750	751.5	10.1	5.0	2:00/1.0 2:25/1.0 2:00/1.0 3:00/1.0 3:00/1.0	(4.6) 92%	(3.5) 70%					
745	746.5	15.1	5.0	2:30/1.0 2:30/1.0 2:30/1.0 2:30/1.0 2:30/1.0	(4.8) 96%	(4.8) 96%	RS-2				
740	741.5	20.1	5.0	2:00/1.0 2:15/1.0 2:45/1.0 2:15/1.0 2:15/1.0	(5.0) 100%	(3.9) 78%					
	736.5	25.1									736.5 25.1 Boring Terminated at Elevation 736.5 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 10/31/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 7+84	**OFFSET** 20 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 4.4
COLLAR ELEV. 752.3 ft	**TOTAL DEPTH** 36.4 ft	**NORTHING** 870,478	**EASTING** 1,746,431	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	752.3	0.0	1	2	2	4 77		M		752.3 GROUND SURFACE	0.0
750										**RESIDUAL** RED-ORANGE, SANDY SILT WITH TRACE ORGANICS	
	748.5	3.8	12	29	48			D		749.3	3.0
745										BLACK, WHITE, GRAY, AND BROWN, SAPROLITIC, SILTY SAND	
	743.5	8.8	6	5	4	9		D			
740											
	738.5	13.8	5	8	17	25		D			
735											
	733.5	18.8	100/0.3			100/0.3				735.8	16.5
	732.1	20.2	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
730										732.1	20.2
										CRYSTALLINE ROCK GRAY, BLACK, AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=78% RMR=58	
725							RS-3				
720										715.9	36.4
										Boring Terminated at Elevation 715.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 7+84	**OFFSET** 20 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 4.4
COLLAR ELEV. 752.3 ft	**TOTAL DEPTH** 36.4 ft	**NORTHING** 870,478	**EASTING** 1,746,431	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 16.2 ft			

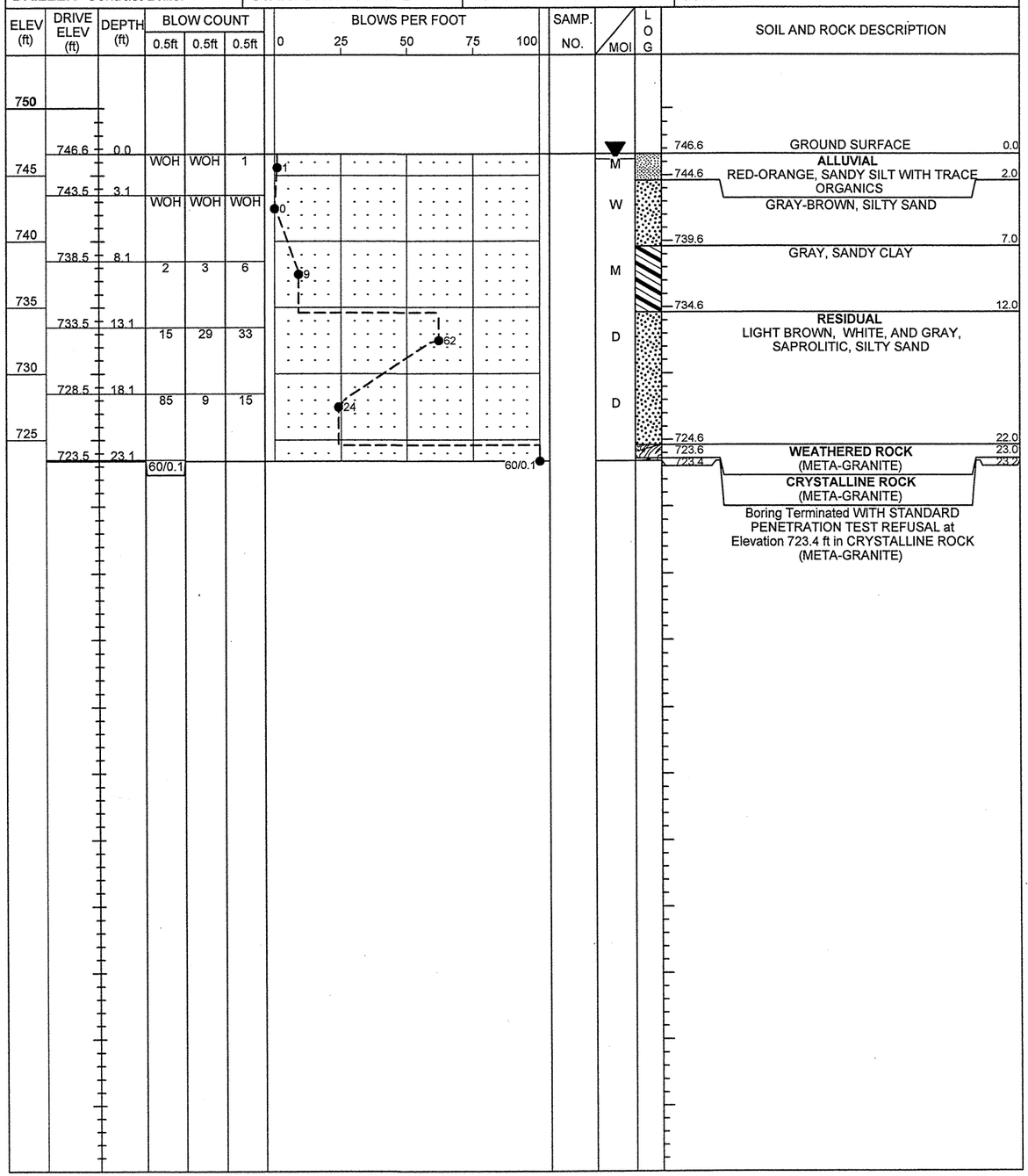
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
732.1											Begin Coring @ 20.2 ft	
	732.1	20.2	1.2	3:30/1.2	(1.0) 83%	(0.0) 0%		(15.3) 94%	(12.7) 78%		732.1 **CRYSTALLINE ROCK**	20.2
730	730.9	21.4	5.0	3:00/1.0 3:00/1.0 2:15/1.0 2:45/1.0 3:15/1.0	(5.0) 100%	(4.2) 84%					GRAY, BLACK, AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=78% RMR=58	
	725.9	26.4	5.0	3:45/1.0 3:00/1.0 3:15/1.0 3:00/1.0 4:15/1.0	(4.9) 98%	(4.4) 88%	RS-3					
725												
720	720.9	31.4	5.0	4:45/1.0 3:30/1.0 3:00/1.0 2:45/1.0 3:45/1.0	(4.4) 88%	(4.1) 82%						
	715.9	36.4									715.9	36.4
											Boring Terminated at Elevation 715.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 10/31/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 7+67	**OFFSET** 23 ft RT	**ALIGNMENT** -RPDY4- **0 HR.** 5.5
COLLAR ELEV. 751.5 ft	**TOTAL DEPTH** 11.3 ft	**NORTHING** 870,525	**EASTING** 1,746,432 **24 HR.** 5.5
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	751.5	0.0	1	1	2	3		M		751.5 GROUND SURFACE 0.0
750										749.5 **RESIDUAL** BROWN, SILTY SAND WITH TRACE ORGANICS 2.0
	748.3	3.2	1	2	6	8		M		BROWN, SANDY SILT
745										744.5 7.0
	743.3	8.2	100/0.3			100/0.3				**WEATHERED ROCK** (META-GRANITE)
	740.2	11.3	60/0.0			60/0.0				740.2 11.3 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 740.2 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 9+03	**OFFSET** 18 ft LT	**ALIGNMENT** -RPDY4- **0 HR.** 0.5
COLLAR ELEV. 746.6 ft	**TOTAL DEPTH** 23.2 ft	**NORTHING** 870,439	**EASTING** 1,746,319 **24 HR.** 0.4
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 8+78	**OFFSET** 22 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 1.8
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 36.1 ft	**NORTHING** 870,485	**EASTING** 1,746,328	**24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/17/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	747.9	0.0	4	WOH	1	1		M		747.9 GROUND SURFACE	0.0
745										**ALLUVIAL**	
	744.4	3.5	1	1	1	2				745.9 ORANGE-BROWN, SANDY SILT WITH TRACE ORGANICS	2.0
740								M		RED-ORANGE, SILTY CLAY	
	739.4	8.5	10	14	16	30				740.9	7.0
735								M		**RESIDUAL** ORANGE, TAN, AND BROWN, SAPROLITIC, SILTY SAND	
	734.4	13.5	100/0.5			100/0.5				734.9	13.0
730										**WEATHERED ROCK** (META-GRANITE)	
	729.4	18.5	100/0.5			100/0.5					
	727.5	20.4	60/0.0			60/0.0				727.5	20.4
725										**CRYSTALLINE ROCK** BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=99% RQD=92% RMR=62	
720							RS-4				
715										711.8	36.1
										Boring Terminated at Elevation 711.8 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 8+78	**OFFSET** 22 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 1.8
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 36.1 ft	**NORTHING** 870,485	**EASTING** 1,746,328	**24 HR.** 2.3
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/17/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 15.7 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)
727.5											Begin Coring @ 20.4 ft	
	727.5	20.4	0.7	N=60/0.0	(0.7)	(0.7)		(15.6)	(14.4)		727.5 **CRYSTALLINE ROCK**	20.4
	726.8	21.1		2:30/0.7	100%	100%		99%	92%		BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED,	
725			5.0	3:00/1.0 2:45/1.0 2:45/1.0 3:00/1.0 2:45/1.0	(4.9) 98%	(3.9) 78%	RS-4				HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=99% RQD=92% RMR=62	
	721.8	26.1										
720			5.0	3:30/1.0 2:45/1.0 3:30/1.0 4:15/1.0 4:15/1.0	(5.0) 100%	(4.8) 96%						
	716.8	31.1										
715			5.0	4:00/1.0 3:30/1.0 3:15/1.0 4:00/1.0 4:45/1.0	(5.0) 100%	(5.0) 100%						
	711.8	36.1									711.8	36.1
											Boring Terminated at Elevation 711.8 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 11/2/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 10+22	**OFFSET** 20 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 6.5
COLLAR ELEV. 751.7 ft	**TOTAL DEPTH** 46.2 ft	**NORTHING** 870,395	**EASTING** 1,746,208	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/14/12	**COMP. DATE** 09/14/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	751.7	0.0								751.7 GROUND SURFACE	0.0
750			1	3	2	5		D		**ARTIFICIAL FILL** BROWN AND GRAY, SANDY SILT WITH TRACE ORGANICS	
	748.1	3.6									
745			1	1	1	2		M			
	743.1	8.6								744.7	7.0
			WOH	WOH	WOH	WOH		M		**ALLUVIAL** GRAY, SANDY CLAY	
740											
	738.1	13.6								739.7	12.0
			WOH	1	2	3		Sat.		GRAY, SILTY SAND WITH TRACE ORGANICS AND WOOD	
735											
	733.1	18.6									
			2	4	2	6		Sat.			
730											
	728.1	23.6	100/0.2			100/0.2				728.7	23.0
725										**WEATHERED ROCK** (META-GRANITE)	
	723.4	28.3	60/0.0			60/0.0				723.4	28.3
720							RS-5			**CRYSTALLINE ROCK** BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=85% RQD=72% RMR=53	
715											
710											
										705.5	46.2
										Boring Terminated at Elevation 705.5 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 11/2/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

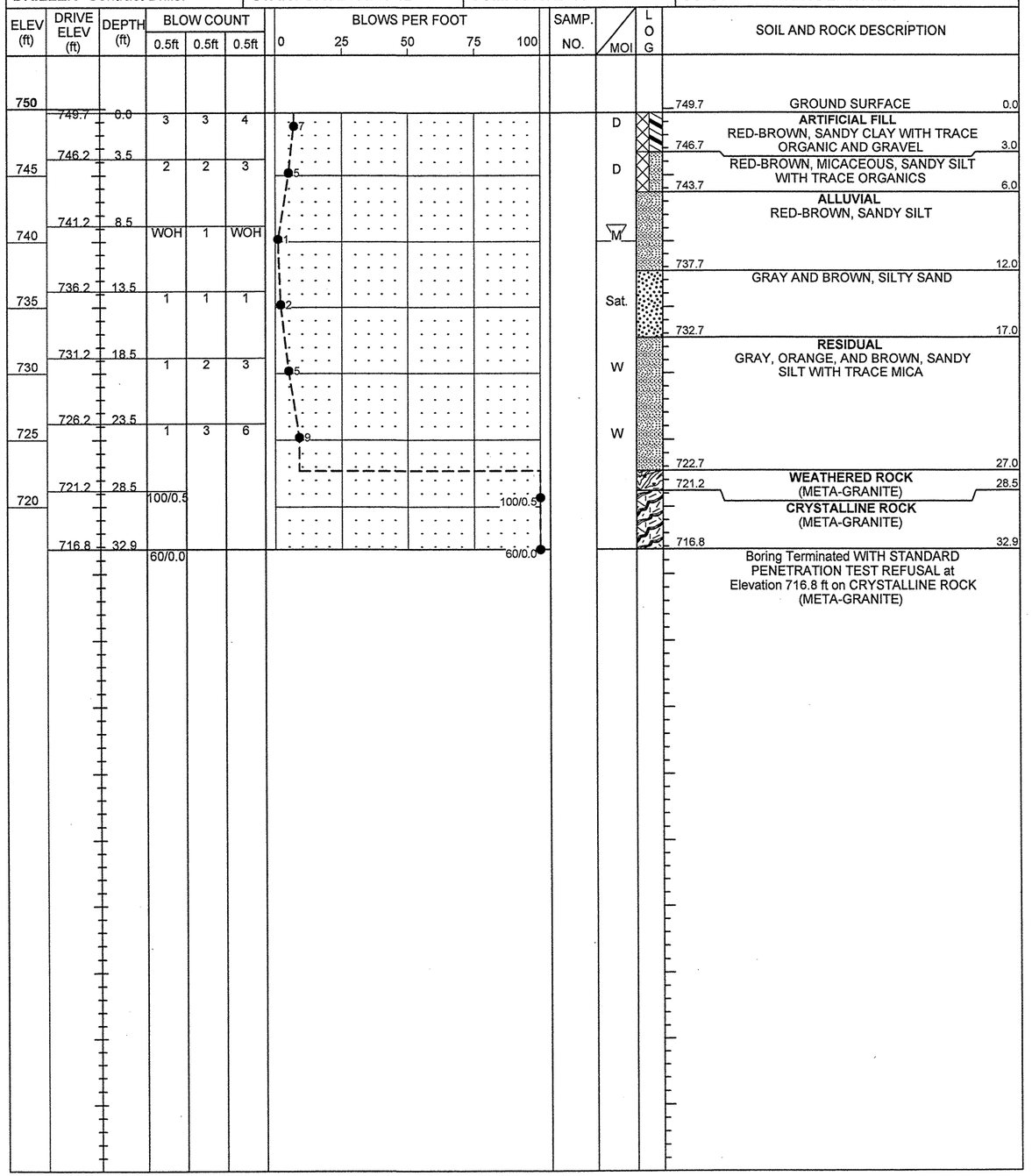
WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 10+22	**OFFSET** 20 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** 6.5
COLLAR ELEV. 751.7 ft	**TOTAL DEPTH** 46.2 ft	**NORTHING** 870,395	**EASTING** 1,746,208	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/14/12	**COMP. DATE** 09/14/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 17.9 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)
723.4											Begin Coring @ 28.3 ft	
	723.4	28.3	2.9	4:15/1.0 4:15/1.0 4:00/0.9	(2.9) 100%	(2.6) 90%		(17.0) 95%	(14.7) 82%		723.4 **CRYSTALLINE ROCK**	28.3
720	720.5	31.2									BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=85% RQD=72% RMR=53	
			5.0	2:45/1.0 3:00/1.0 3:15/1.0 2:30/1.0 3:00/1.0	(4.5) 90%	(4.3) 86%	RS-5					
715	715.5	36.2										
			5.0	3:00/1.0 4:00/1.0 2:00/1.0 3:00/1.0 3:00/1.0	(4.6) 92%	(3.6) 72%						
710	710.5	41.2										
			5.0	3:00/1.0 3:15/1.0 3:45/1.0 5:00/1.0 4:00/1.0	(5.0) 100%	(4.2) 84%						
	705.5	46.2									705.5 Boring Terminated at Elevation 705.5 ft in CRYSTALLINE ROCK (META-GRANITE)	46.2

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 10+00	**OFFSET** 16 ft RT	**ALIGNMENT** -RPDY4- **0 HR.** 10.4
COLLAR ELEV. 751.4 ft	**TOTAL DEPTH** 28.4 ft	**NORTHING** 870,436	**EASTING** 1,746,216 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/17/12	**COMP. DATE** 09/17/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	751.4	0.0								751.4 GROUND SURFACE 0.0
750			1	3	3	6		D		**ARTIFICIAL FILL** BROWN AND GRAY, SANDY SILT WITH TRACE ORGANICS AND FINE GRAVEL
	747.6	3.8								748.4 3.0
			WOH	1	2	3		M		**ALLUVIAL** GRAY AND BROWN, SILTY CLAY WITH TRACE ORGANICS AND MICA
745										
	742.6	8.8								
			WOH	1	1	2		M		
740										
	737.6	13.8								738.4 13.0
			2	3	3	6		M		GRAY AND BLUE-GRAY, SANDY CLAY WITH TRACE WOOD
735										
	732.6	18.8								
			1	1	3	4		M		
730										
	727.6	23.8								728.4 23.0
			7	29	55	84		–		**RESIDUAL** ORANGE, BROWN, AND GRAY, SAPROLITIC, SILTY SAND
725										
	723.0	28.4	60/0.0			60/0.0				723.0 28.4 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 723.0 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B5-A	**STATION** 11+41	**OFFSET** 18 ft LT	**ALIGNMENT** -RPDY4- **0 HR.** 9.7
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 32.9 ft	**NORTHING** 870,355	**EASTING** 1,746,096 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/13/12	**COMP. DATE** 09/13/12	**SURFACE WATER DEPTH** N/A



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 11+20	**OFFSET** 16 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 6.4
COLLAR ELEV. 749.9 ft	**TOTAL DEPTH** 50.7 ft	**NORTHING** 870,394	**EASTING** 1,746,103	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/13/12	**COMP. DATE** 09/13/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
750										
	749.9	0.0	1	3	9	12		D		749.9 / 0.0 GROUND SURFACE
	746.4	3.5								**ARTIFICIAL FILL** RED-BROWN, SANDY SILT WITH TRACE ORGANICS
745			2	2	2	4		M		
	741.4	8.5								743.9 / 6.0 **ALLUVIAL** RED-BROWN, SANDY SILT
740			WOH	WOH	WOH	0		M		
	736.4	13.5								737.9 / 12.0 GRAY, SILTY SAND
735			1	1	2	3		Sat.		
	731.4	18.5								732.9 / 17.0 GRAY, SILTY CLAY
730			1	1	2	3		M		
	726.4	23.5								727.9 / 22.0 **RESIDUAL** GRAY TO ORANGE, SANDY SILT WITH TRACE MICA
725			WOH	1	7	8		M		
	721.4	28.5								722.9 / 27.0 ORANGE AND BROWN, SAPROLITIC, SILTY SAND WITH TRACE MICA
720			8	12	9	21		D		
	716.4	33.5								
715			10	18	57	75		D		
	713.2	36.7	60/0.0			60/0.0	RS-6			713.9 / 36.0 **WEATHERED ROCK** (META-GRANITE) 713.2 / 36.7 **CRYSTALLINE ROCK** BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=90% RQD=76% RMR=61
710										
705										
700										699.2 / 50.7 Boring Terminated at Elevation 699.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 11+20	**OFFSET** 16 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** 6.4
COLLAR ELEV. 749.9 ft	**TOTAL DEPTH** 50.7 ft	**NORTHING** 870,394	**EASTING** 1,746,103	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/13/12	**COMP. DATE** 09/13/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**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))
713.2											Begin Coring @ 36.7 ft
	713.2	36.7	4.0	*N=60/0.0* 2:00/1.0 2:15/1.0 1:45/1.0 3:00/1.0	(3.3) 83%	(2.7) 68%		(12.6) 90%	(10.7) 76%		713.2 / 36.7 **CRYSTALLINE ROCK** BLACK, WHITE, AND TAN, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=90% RQD=76% RMR=61
710	709.2	40.7	5.0	2:30/1.0 2:30/1.0 2:45/1.0 2:45/1.0 3:00/1.0	(4.4) 88%	(4.1) 82%					
705	704.2	45.7	5.0	2:45/1.0 4:15/1.0 2:00/1.0 4:15/1.0 4:15/1.0	(4.9) 98%	(3.9) 78%	RS-6				
700	699.2	50.7									699.2 / 50.7 Boring Terminated at Elevation 699.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 12+60	**OFFSET** 18 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** N/A
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 59.8 ft	**NORTHING** 870,313	**EASTING** 1,745,984	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	747.9	0.0	1	WOH	1	2		W		747.9 GROUND SURFACE	0.0
745										**ALLUVIAL** RED-BROWN, SILTY SAND	
	744.4	3.5	2	3	5	8		W		745.4	2.5
740										RED-BROWN, SANDY CLAY	
	739.4	8.5	WOH	2	3	5		W		741.9	6.0
735										GRAY AND BROWN, SILTY CLAY	
	734.4	13.5	WOH	WOH	2	2		W		735.9	12.0
730										GRAY, SILTY SAND	
	729.4	18.5	WOH	WOH	WOH	0		W		731.9	16.0
725										GRAY, SANDY SILT	
	724.4	23.5	3	5	10	15		W		725.9	22.0
720										BROWN, COARSE SAND	
	719.4	28.5	15	25	28	53		M		723.4	24.5
715										**RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH LITTLE MICA	
	714.4	33.5	22	31	27	58		M			
710											
	709.4	38.5	6	18	100/0.3	100/0.3				708.4	39.5
	706.4	41.5	60/0.0			60/0.0	RS-7			**WEATHERED ROCK** (META-GRANITE) 706.4	41.5
705										**CRYSTALLINE ROCK** GRAY AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=83% RMR=61	
700											
695											
690										688.1	59.8
										Boring Terminated at Elevation 688.1 ft in CRYSTALLINE ROCK (META-GRANITE) ELEVATION DETERMINED BY NCDOT LOCATIONS & SURVEYS .TIN FILE.	

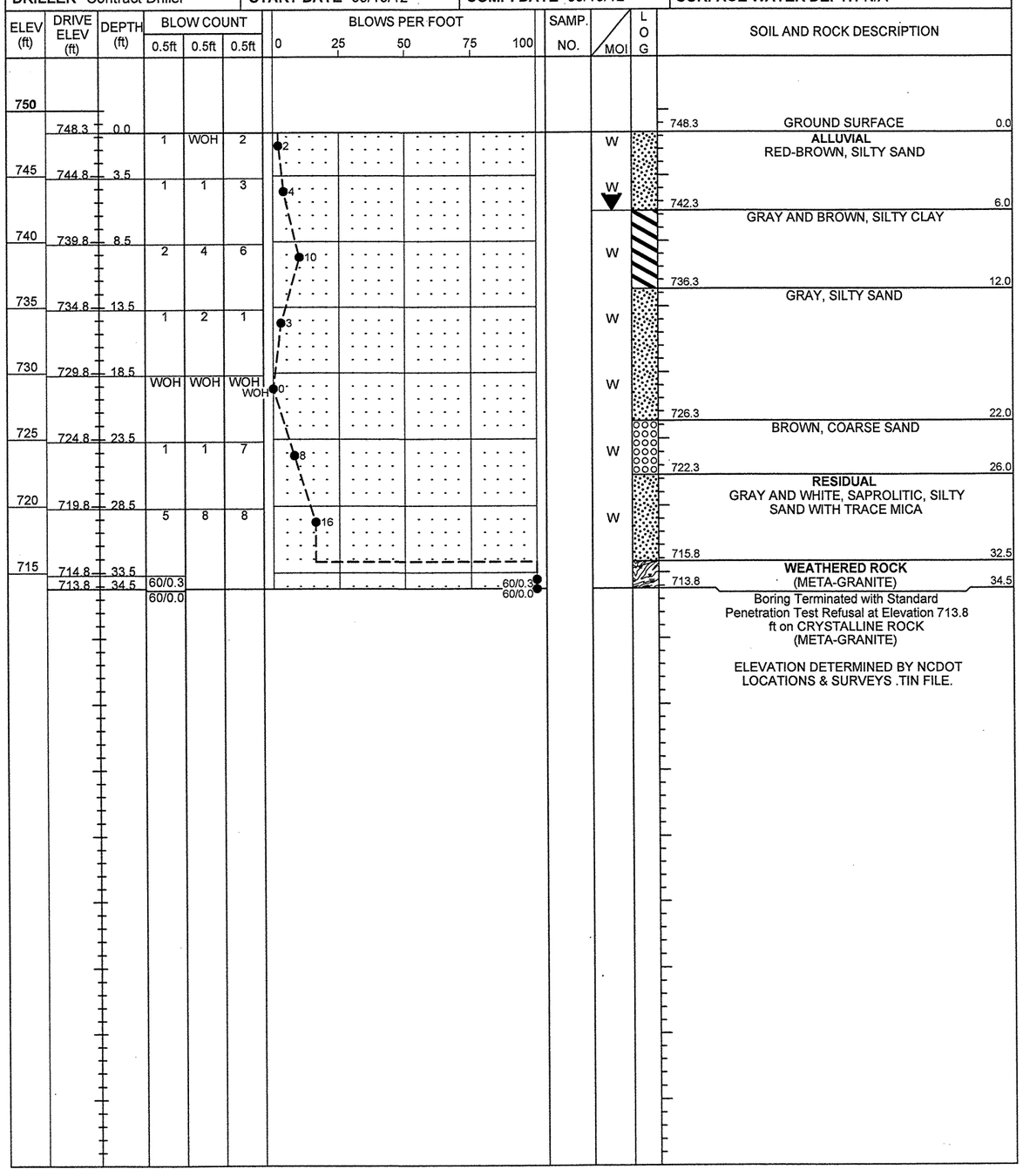
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 12+60	**OFFSET** 18 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** N/A
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 59.8 ft	**NORTHING** 870,313	**EASTING** 1,745,984	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 18.3 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)
706.4											Begin Coring @ 41.5 ft	
705	706.4	41.5	3.3	2:47/1.0 2:43/1.0 3:18/1.0	(3.3) 100%	(2.4) 73%			(18.3) 100% 15.1		706.4 **CRYSTALLINE ROCK** GRAY AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=83% RMR=61	41.5
	703.1	44.8	5.0	1:44/0.3 2:55/1.0 3:05/1.0 3:30/1.0 2:45/1.0 3:01/1.0	(5.0) 100%	(4.0) 80%	RS-7					
700	698.1	49.8	5.0	3:22/1.0 3:20/1.0 3:42/1.0 4:40/1.0 5:07/1.0	(5.0) 100%	(4.1) 82%						
695	693.1	54.8	5.0	3:45/1.0 3:41/1.0 4:29/1.0 4:12/1.0 4:15/1.0	(5.0) 100%	(4.6) 92%						
690	688.1	59.8									688.1	59.8
											Boring Terminated at Elevation 688.1 ft in CRYSTALLINE ROCK (META-GRANITE) ELEVATION DETERMINED BY NCDOT LOCATIONS & SURVEYS .TIN FILE.	

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 11/19/12

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 12+38	**OFFSET** 16 ft RT	**ALIGNMENT** -RPDY4- — **0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 34.5 ft	**NORTHING** 870,353	**EASTING** 1,745,993 — **24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A



NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 13+87	**OFFSET** 22 ft LT	**ALIGNMENT** -RPDY4-
COLLAR ELEV. 746.6 ft	**TOTAL DEPTH** 40.0 ft	**NORTHING** 870,265	**EASTING** 1,745,867
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/18/12	**COMP. DATE** 09/18/12	**SURFACE WATER DEPTH** N/A

0 HR. N/A
24 HR. 5.0

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										
	746.6	0.0	WOH	WOH	WOH	0		W		746.6 GROUND SURFACE 0.0
745	743.1	3.5	2	3	2	5		W		744.1 **ALLUVIAL** RED-BROWN, SILTY CLAY WITH LITTLE ORGANICS 2.5
740	738.1	8.5	2	3	5	8		W		BROWN TO GRAY, SILTY CLAY WITH TRACE ORGANICS
735	733.1	13.5	1	3	4	7		W		730.6 16.0 GRAY AND BROWN, SILTY SAND WITH LITTLE MICA
730	728.1	18.5	1	1	1	2		W		724.6 22.0 **RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
725	723.1	23.5	6	7	15	22		M		
720	718.1	28.5	5	5	7	12		M		
715	713.1	33.5	16	10	6	16		M		710.6 36.0 **WEATHERED ROCK** (META-GRANITE)
710	708.1	38.5	60/0.3			60/0.3		M		
	706.6	40.0	60/0.0			60/0.0		M		706.6 40.0 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 706.6 ft on CRYSTALLINE ROCK (META-GRANITE)

ELEVATION DETERMINED BY NCDOT LOCATIONS & SURVEYS .TIN FILE.

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 13+54	**OFFSET** 20 ft RT	**ALIGNMENT** -RPDY4-
COLLAR ELEV. 746.7 ft	**TOTAL DEPTH** 37.5 ft	**NORTHING** 870,316	**EASTING** 1,745,883
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/17/12	**COMP. DATE** 09/17/12	**SURFACE WATER DEPTH** N/A

0 HR. 7.0
24 HR. 3.0

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										
	746.7	0.0	1	WOH	3	3		W		746.7 GROUND SURFACE 0.0
745	743.2	3.5	4	5	5	10		M		**ALLUVIAL** RED-BROWN, SANDY CLAY
740	738.2	8.5	2	2	2	4		M		740.7 6.0 GRAY AND BROWN, SILTY CLAY
735	733.2	13.5	4	5	6	11		M		
730	728.2	18.5	1	1	2	3		W		730.7 16.0 GRAY, SILTY SAND WITH TRACE MICA
725	723.2	23.5	2	3	3	6		W		724.5 22.2 GRAY, COARSE SAND
720	718.2	28.5	18	25	33	58		M		719.2 27.5 **RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
715	713.2	33.5	60/0.2			60/0.2		M		713.2 33.5 **WEATHERED ROCK** (META-GRANITE)
710	709.2	37.5	60/0.0			60/0.0		M		710.2 36.5 709.2 **CRYSTALLINE ROCK** (META-GRANITE) 37.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 709.2 ft in CRYSTALLINE ROCK (META-GRANITE)

ELEVATION DETERMINED BY NCDOT LOCATIONS & SURVEYS .TIN FILE.

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 11/19/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. OLD EB1-A	**STATION** 5+42	**OFFSET** 22 ft LT	**ALIGNMENT** -RPDY4-	**0 HR.** Dry
COLLAR ELEV. 764.6 ft	**TOTAL DEPTH** 37.3 ft	**NORTHING** 870,561	**EASTING** 1,746,658	**24 HR.** 26.1
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
765	764.6	0.0	2	7	6	13 16		D		764.6 0.0 GROUND SURFACE
	761.6	3.0								**RESIDUAL** RED-ORANGE, SANDY SILT WITH TRACE ORGANICS
760			5	7	9			D		
	756.6	8.0								757.6 7.0 WHITE AND TAN, SILTY SAND
755			4	4	4	8		D		
	751.6	13.0								
750			7	7	12	19		D		
	746.6	18.0								
745			20	24	31	55		D		
	741.6	23.0								742.6 22.0 **WEATHERED ROCK** (META-GRANITE)
740			77	23/0.1		100/0.6		▼		
	736.6	28.0								
735			20	60	40/0.2	100/0.7				
	731.6	33.0	100/0.3			100/0.3				
730										
	727.3	37.3	60/0.0			60/0.0				727.3 37.3 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 727.3 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 8 ON -RPDY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. OLD EB1-B	**STATION** 5+16	**OFFSET** 12 ft RT	**ALIGNMENT** -RPDY4-	**0 HR.** Dry
COLLAR ELEV. 759.7 ft	**TOTAL DEPTH** 30.5 ft	**NORTHING** 870,602	**EASTING** 1,746,671	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A	

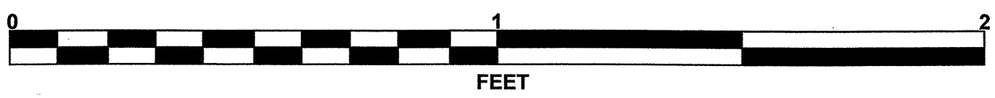
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
760	759.7	0.0	2	4	6	10		D		759.7 0.0 GROUND SURFACE
	756.4	3.3								**RESIDUAL** RED-ORANGE, SANDY CLAY WITH TRACE ORGANIC
755			4	5	8	13		D		
	751.4	8.3								752.7 7.0 TAN AND WHITE, SAPROLITIC, SILTY SAND
750			3	3	5	8		D		
	746.4	13.3								
745			6	9	28	37		D		
	741.4	18.3								
740			10	27	32	59		D		737.7 22.0 **WEATHERED ROCK** (META-GRANITE)
	736.4	23.3	100/0.3			100/0.3				
735										
	731.4	28.3	100/0.4			100/0.4				
730										
	729.2	30.5	60/0.0			60/0.0				729.2 30.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 729.2 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPDY4.GPJ NC_DOT.GDT 11/2/12

CORE PHOTOGRAPHS

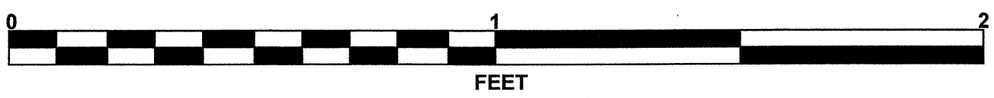
EB1-A

BOXES 1 & 2: 25.7-41.4 FEET



B1-B

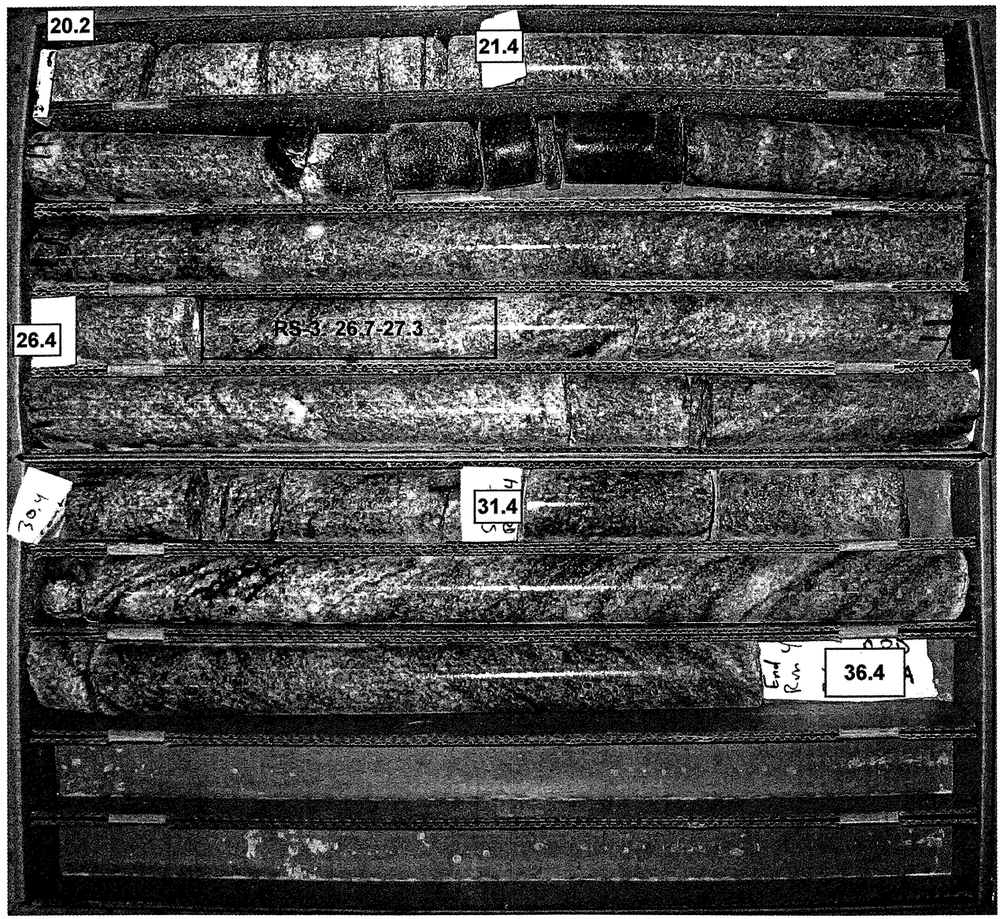
BOXES 1 & 2: 7.8 - 25.1 FEET



CORE PHOTOGRAPHS

B2-A

BOXES 1 & 2: 20.2 - 36.4 FEET



0 1 2
FEET

B3-B

BOXES 1 & 2: 20.4-36.1 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

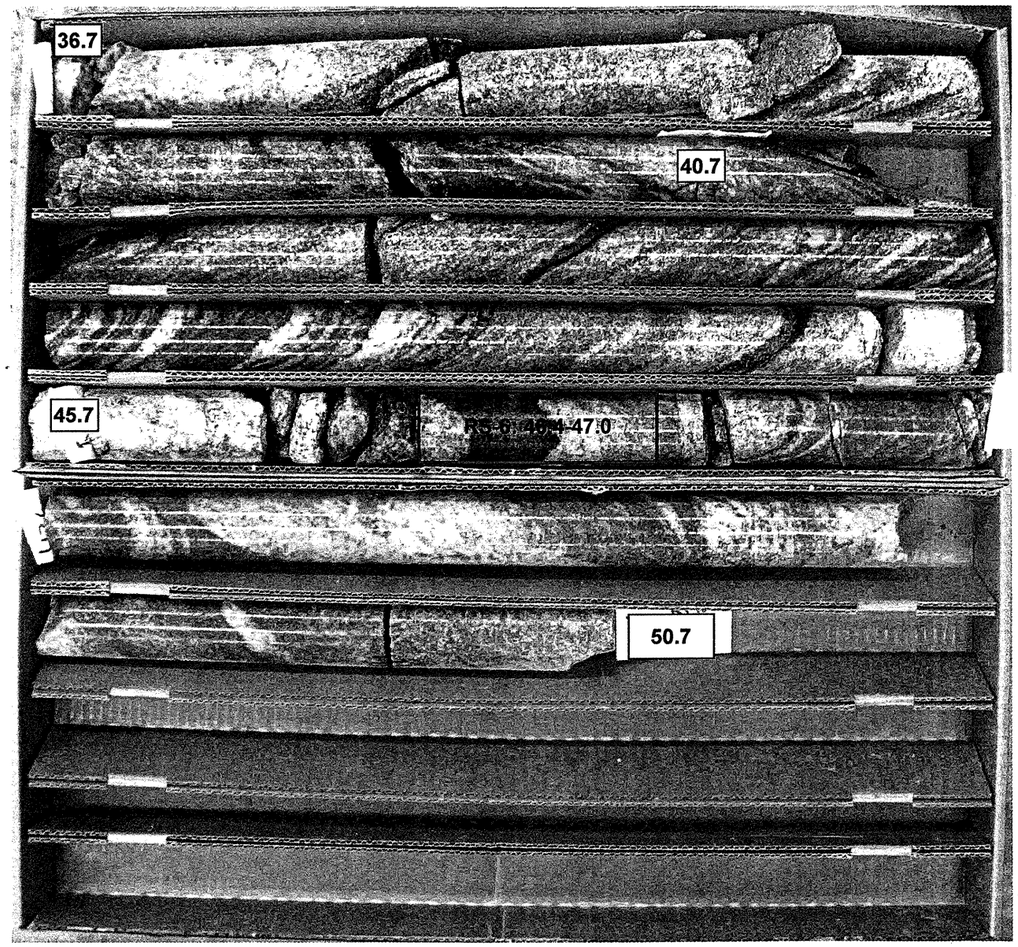
B4-A

BOXES 1 & 2: 28.3-46.2 FEET

0 1 2
FEET

B5-B

BOXES 1 & 2: 36.7-50.7 FEET



0 1 2
FEET

CORE PHOTOGRAPHS

B6-A

BOXES 1 & 2: 41.5-59.8 FEET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	22

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34820.1.2 (U-2524C) F.A. PROJ. NHF-0708(52)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 (BATTLEGROUND AVENUE)

SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK

ID: U-2524C

PROJECT: 34820.1.2

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SHEET	DESCRIPTION
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2	LEGEND
3	SITE PLAN
4, 5	PROFILE
5-10	CROSS SECTIONS
11-20	BORE LOGS & CORE REPORTS
21, 22	CORE PHOTOGRAPHS

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.

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

TRIGON

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE FEBRUARY 2013

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

2/8/13

DRAWN BY: 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.
34820.1.2(U-2524C)	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-4, A-5	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6	A-3	A-6, A-7	
SYMBOL													
% PASSING #10	50 MX												
#40	30 MX	50 MX	51 MN										
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
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
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-850
- [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 [ ] W/ ADVANCER
- [X] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [X] -N 02
- [ ] -H_____

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BL-37: -BL- STATION 175+03.22

ELEVATION: 769.28 FT.

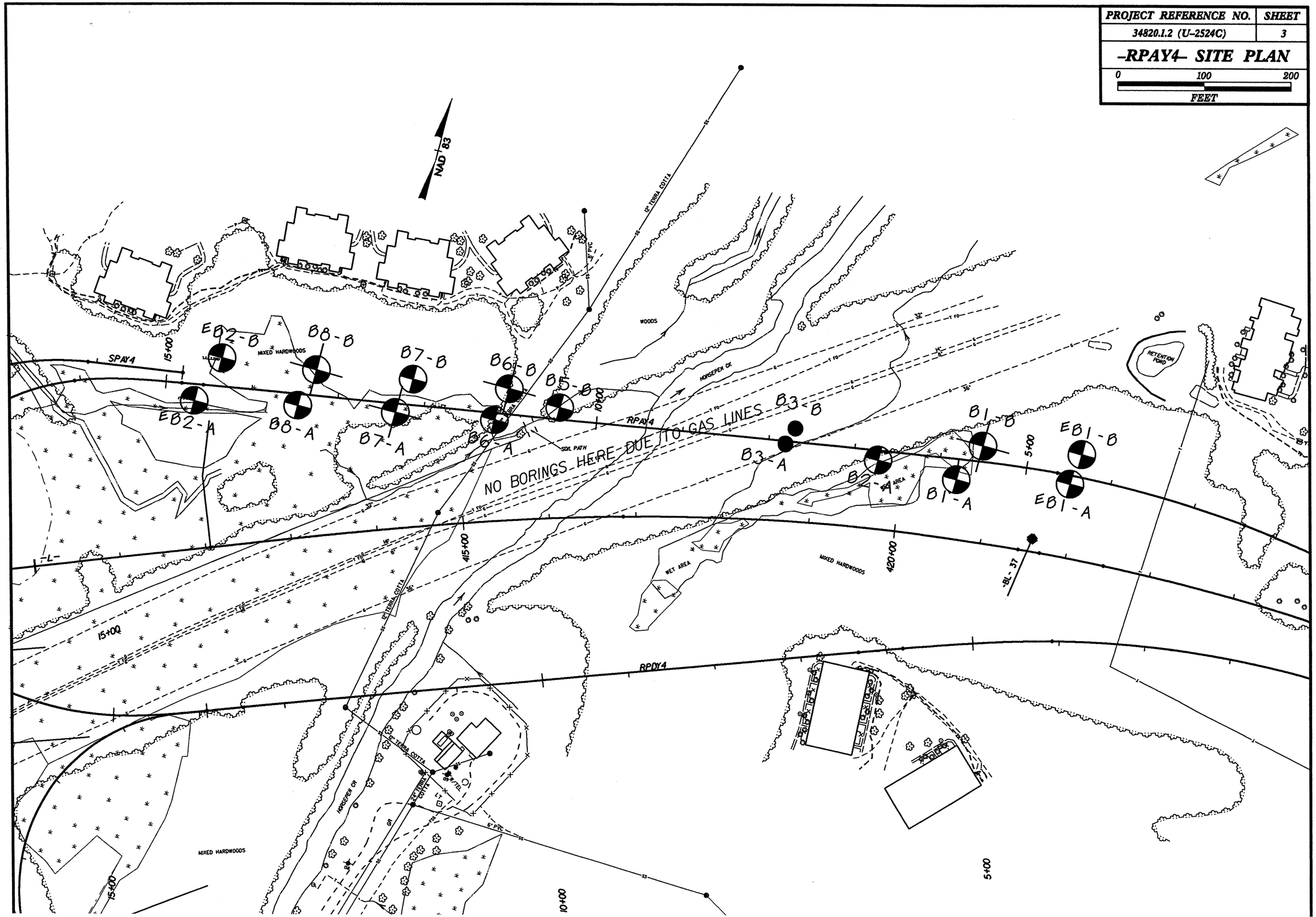
NOTES:
GROUNDLINES AT BENT CROSS SECTIONS CUT BY GEU FROM LOCATIONS & SURVEYS .TIN FILE DATED 7/16/2012

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

-RPAY4- SITE PLAN

0 100 200
FEET



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	4

PROFILE OF BORINGS PROJECTED ALONG -RPAY4-

0 40 80
FEET
VE = 4:1

EB1-B
4+40
26' RT

B1-B
5+53
18' RT

B2-A
6+72
11' LT

B3-A
7+81
3' LT

760
750
740
730
720
710
700
690
680

2
13
100/0.2
60/0.1
60/0.1
100/0.5
100/0.8
DRY 09/12

Ⓐ WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

WEATHERED ROCK (META-GRANITE)

BLACK AND WHITE, FRESH SEVERELY WEATHERED, MEDIUM TO MODERATELY CLOSE FRACTURE

10/12
2
7
10
100/0.9
100/0.9
60/0.0

TO MODERATELY HARD TO HARD, CLOSE SPACING, META-GRANITE

REC=96%
ROD=82%
RMR=53

09/12
WOH
4
2
6
33
100/0.3
60/0.0

ALLUVIAL, GRAY AND BROWN, MOIST TO MEDIUM DENSE, SILTY

SATURATED, VERY SOFT TO STIFF, SILTY AND SANDY CLAY, AND VERY LOOSE TO TO COARSE SAND WITH GRAVEL

RESIDUAL, BROWN, MOIST TO WET, LOOSE TO DENSE, SAPROLITIC, SILTY SAND (META-GRANITE)

WEATHERED ROCK

CRYSTALLINE ROCK (META-GRANITE)

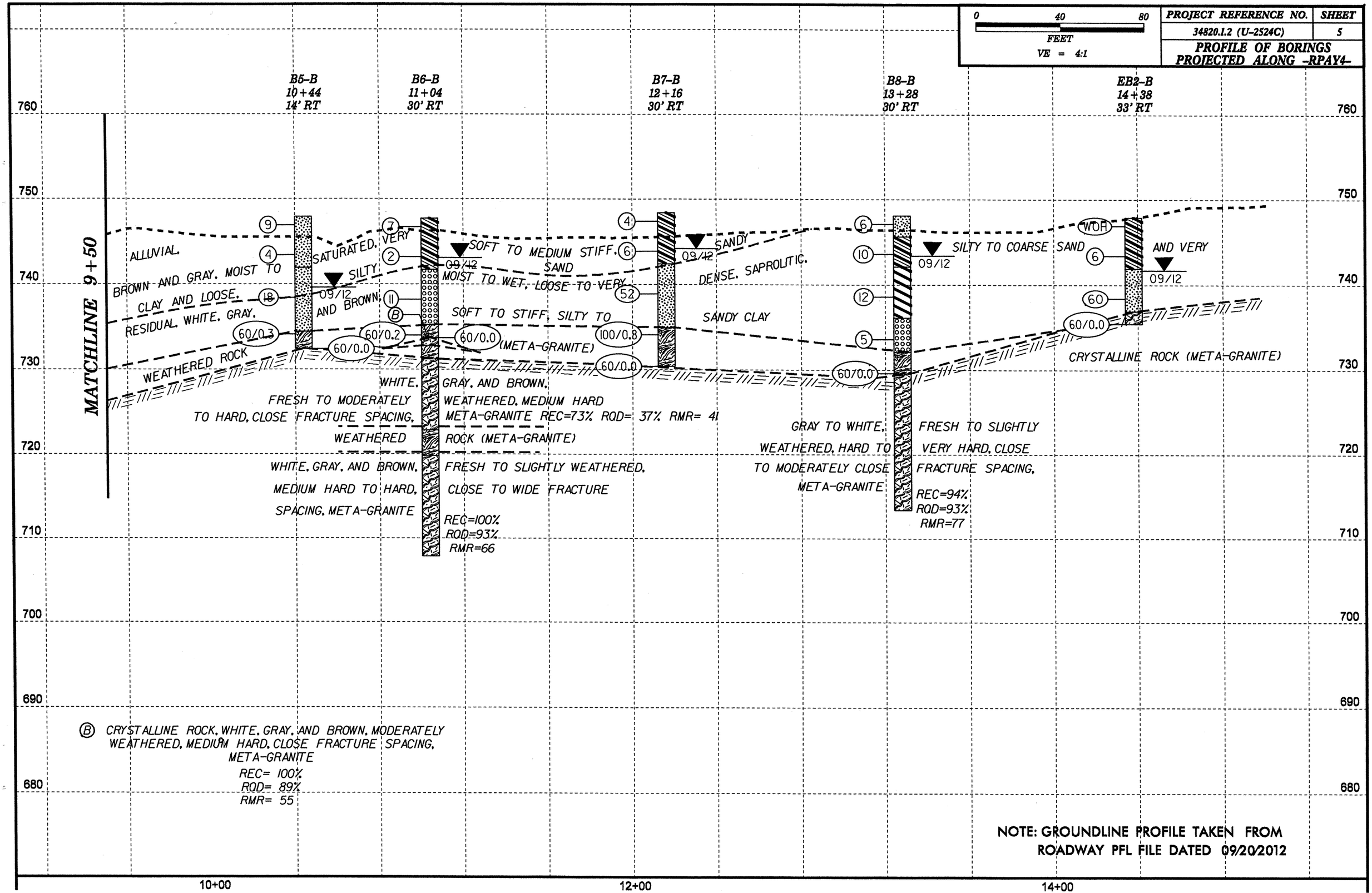
HORSEPEN CREEK

MATCHLINE 9+50

Ⓐ RESIDUAL, RED-ORANGE, BROWN, AND GRAY, DRY TO MOIST, LOOSE TO DENSE, SAPROLITIC, SILTY SAND, AND VERY SOFT TO HARD, SANDY SILT

NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE DATED 09/20/2012

4+00
6+00
8+00

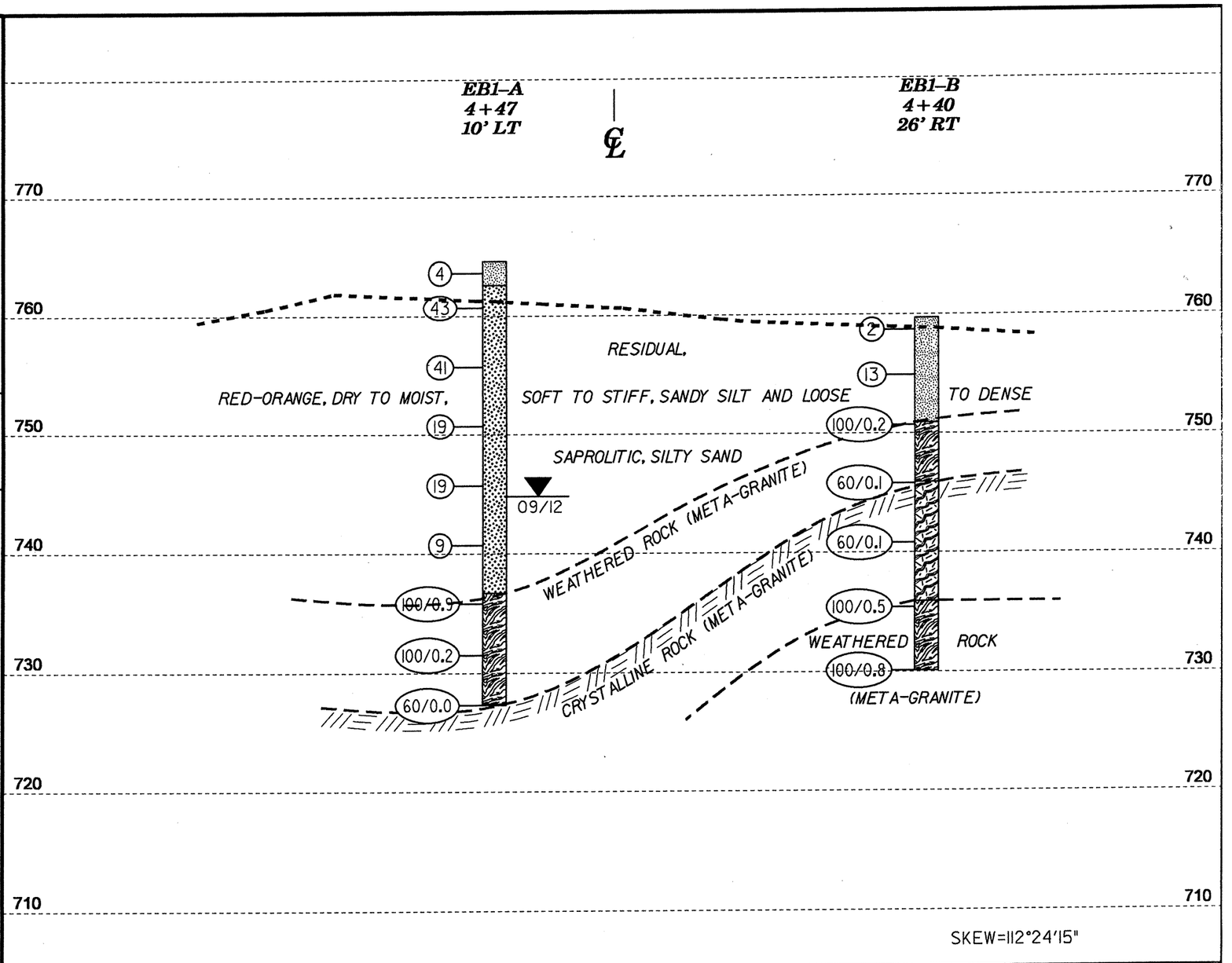


0 40 80
FEET
VE = 4:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
5
PROFILE OF BORINGS PROJECTED ALONG -RPAY4-
B5-B 10+44 14' RT
B6-B 11+04 30' RT
B7-B 12+16 30' RT
B8-B 13+28 30' RT
EB2-B 14+38 33' RT
MATCHLINE 9+50
ALLUVIAL, BROWN AND GRAY, MOIST TO SATURATED, VERY CLAY AND LOOSE, SILTY AND BROWN, RESIDUAL, WHITE, GRAY,
WEATHERED ROCK
SOFT TO MEDIUM STIFF, SAND MOIST TO WET, LOOSE TO VERY SANDY DENSE, SAPROLITIC, SOFT TO STIFF, SILTY TO SANDY CLAY
(META-GRANITE)
SILTY TO COARSE SAND AND VERY
CRYSTALLINE ROCK (META-GRANITE)
WHITE, GRAY, AND BROWN, FRESH TO MODERATELY WEATHERED, MEDIUM HARD TO HARD, CLOSE FRACTURE SPACING, META-GRANITE REC=73% RQD= 37% RMR= 41
WEATHERED ROCK (META-GRANITE)
WHITE, GRAY, AND BROWN, FRESH TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO WIDE FRACTURE SPACING, META-GRANITE
REC=100% RQD=93% RMR=66
GRAY TO WHITE, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=94% RQD=93% RMR=77
Ⓑ CRYSTALLINE ROCK, WHITE, GRAY, AND BROWN, MODERATELY WEATHERED, MEDIUM HARD, CLOSE FRACTURE SPACING, META-GRANITE
REC= 100% RQD= 89% RMR= 55
NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE DATED 09/20/2012
760
750
740
730
720
710
700
690
680
10+00
12+00
14+00

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

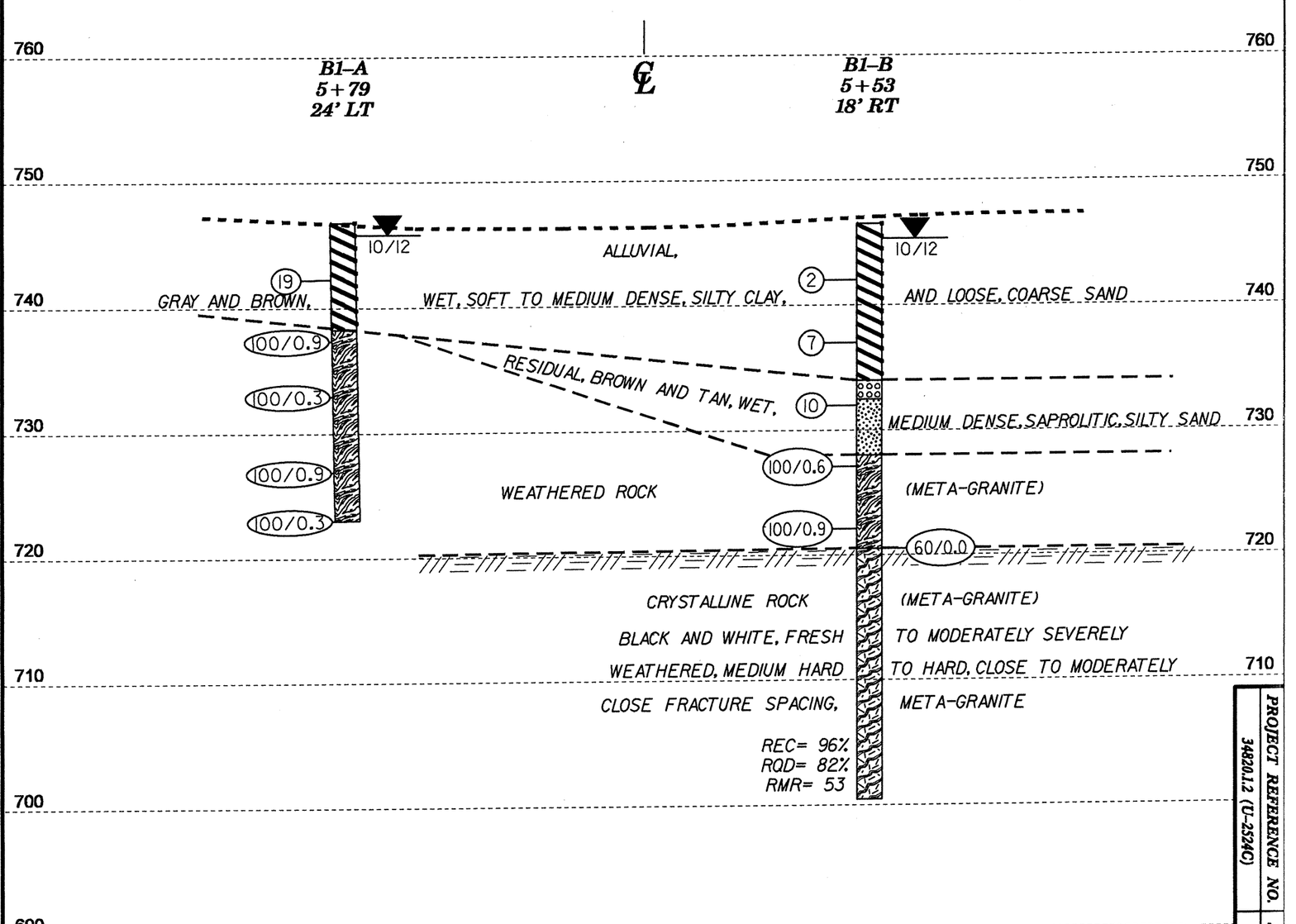
CROSS SECTION THROUGH -RPAY4- END BENT 1



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- BENT 1

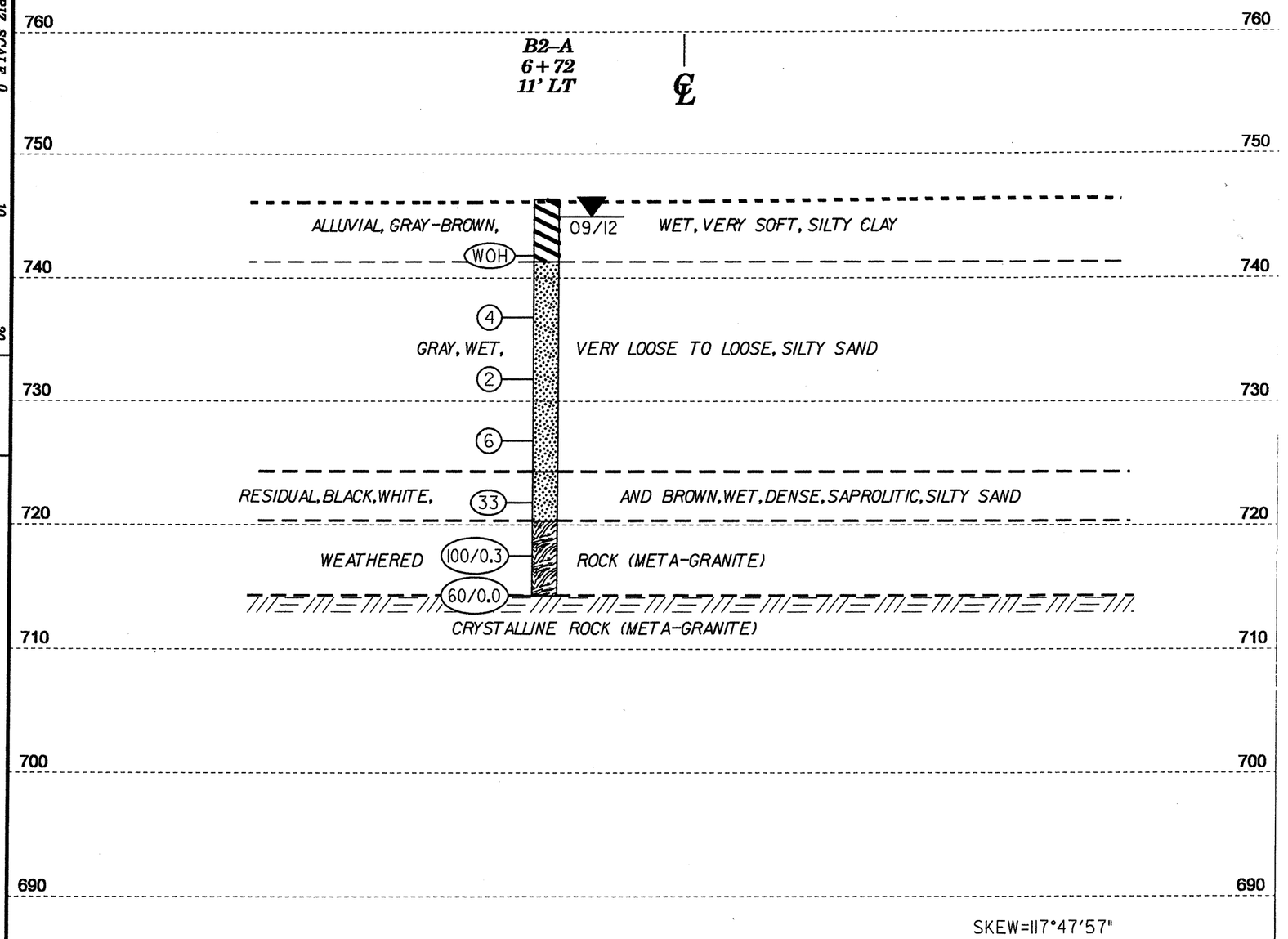


PROJECT REFERENCE NO.	SHEET
34820.12 (U-2524C)	6

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

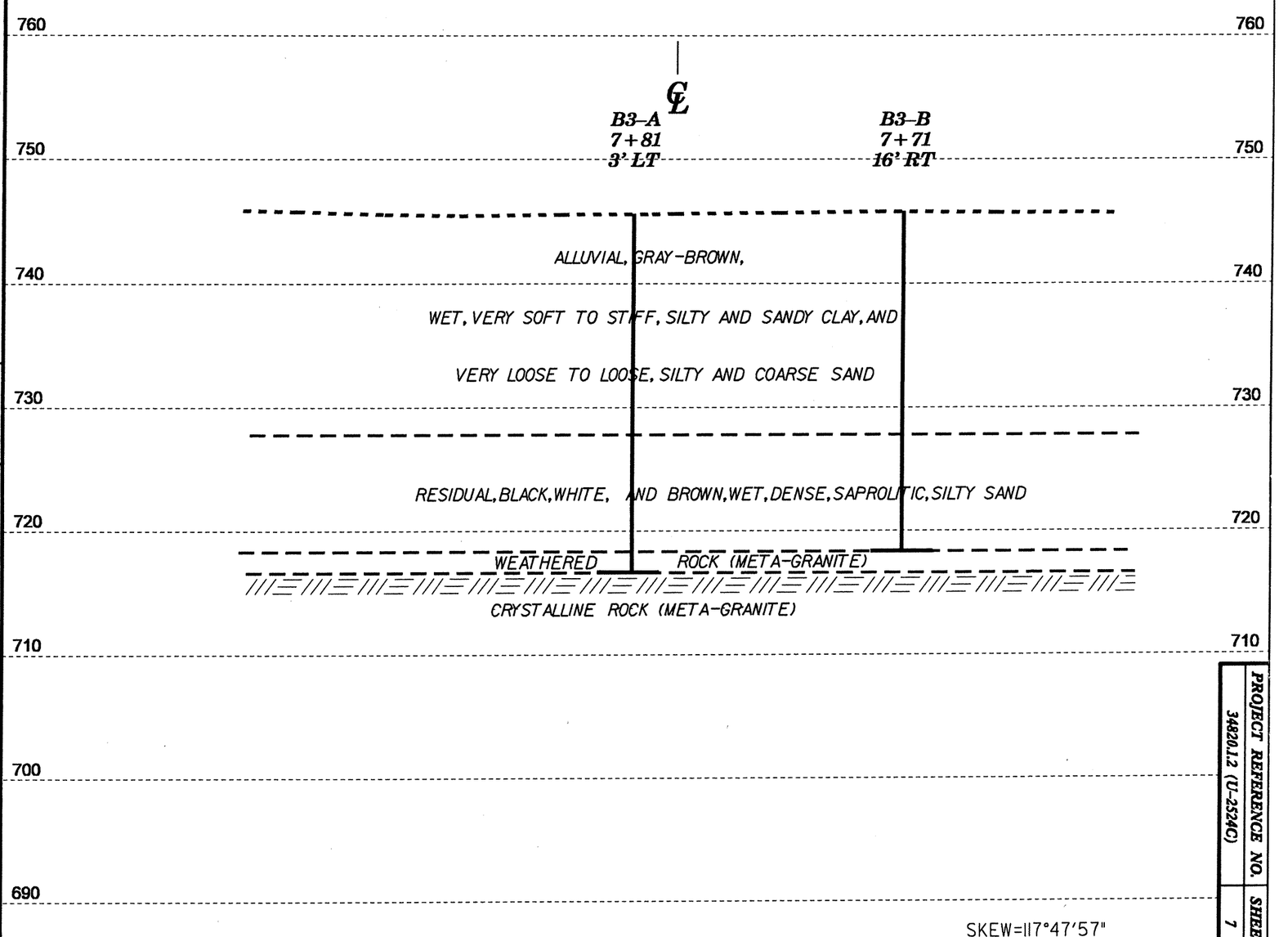
CROSS SECTION THROUGH -RPAY4- BENT 2



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- BENT 3



PROJECT REFERENCE NO.	SHEET
34820.12 (U-3324C)	7

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- BENT 4

760
750
740
730
720
710
700
690

NO BORINGS DUE TO GAS LINES

ALLUVIAL, GRAY-BROWN,
WET, VERY SOFT TO STIFF, SILTY AND SANDY CLAY, AND
VERY LOOSE TO LOOSE, SILTY AND COARSE SAND

RESIDUAL, BLACK, WHITE, AND BROWN, WET, DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

SKEW=117°47'57"

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- BENT 5

B5-B
10+44
14' RT

760
750
740
730
720
710
700

ALLUVIAL,
BROWN, MOIST, LOOSE, SILTY SAND
9
4
09/12

RESIDUAL,
BROWN, MOIST, MEDIUM DENSE, SAPROLITIC, SILTY SAND
18

WEATHERED ROCK (META-GRANITE)
60/0.3
60/0.0

CRYSTALLINE ROCK (META-GRANITE)

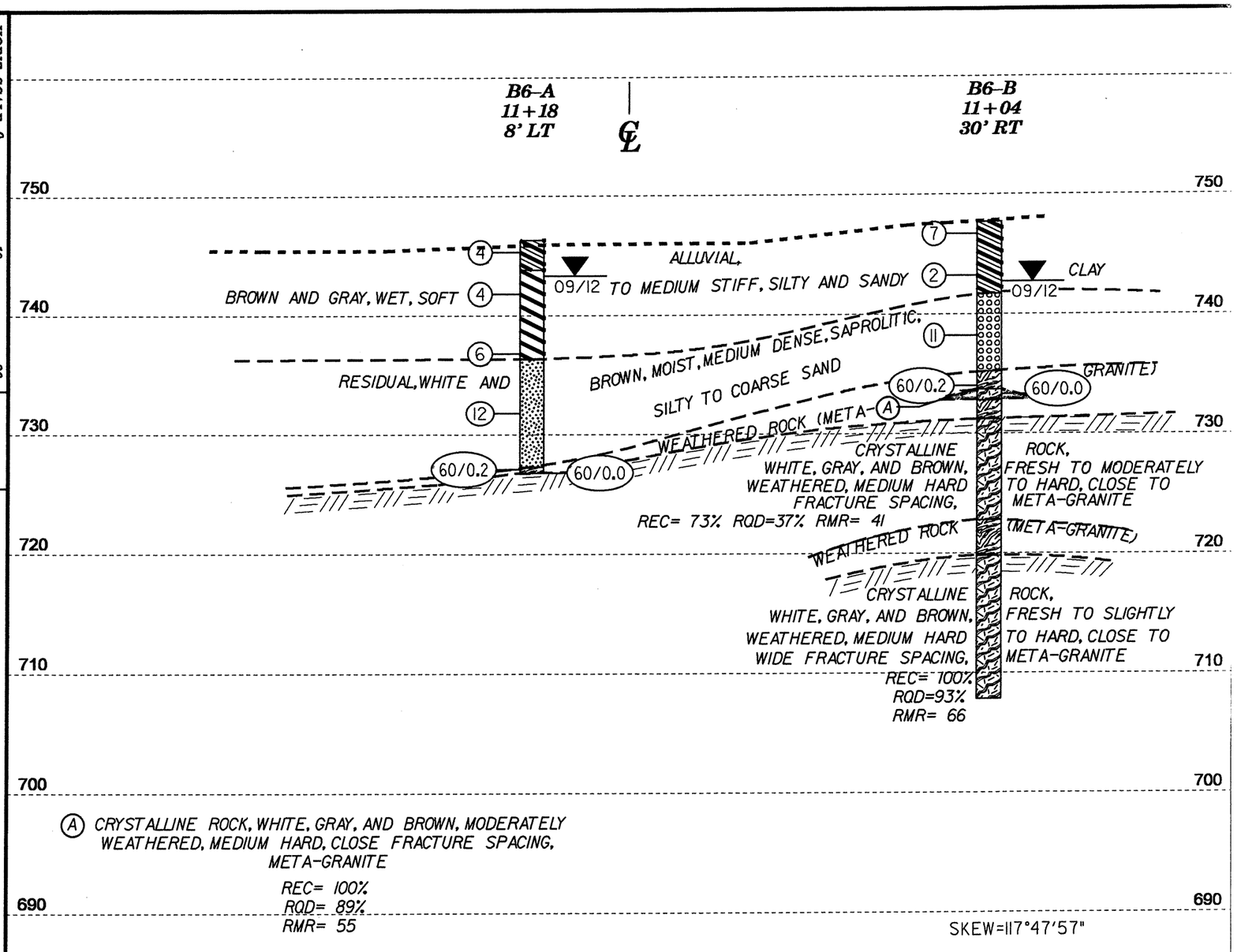
SKEW=117°47'57"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	8

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

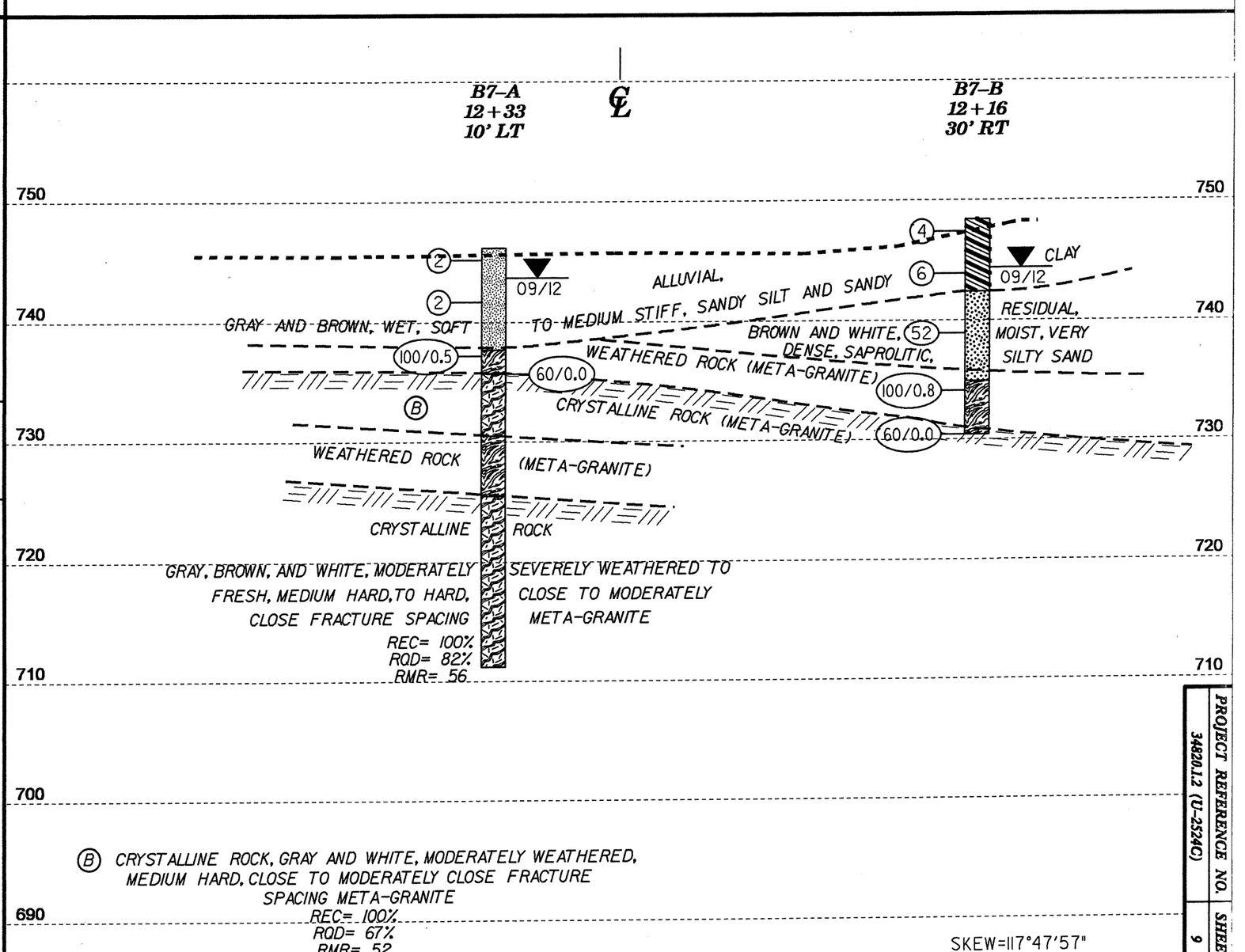
CROSS SECTION THROUGH -RPAY4- BENT 6



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- BENT 7

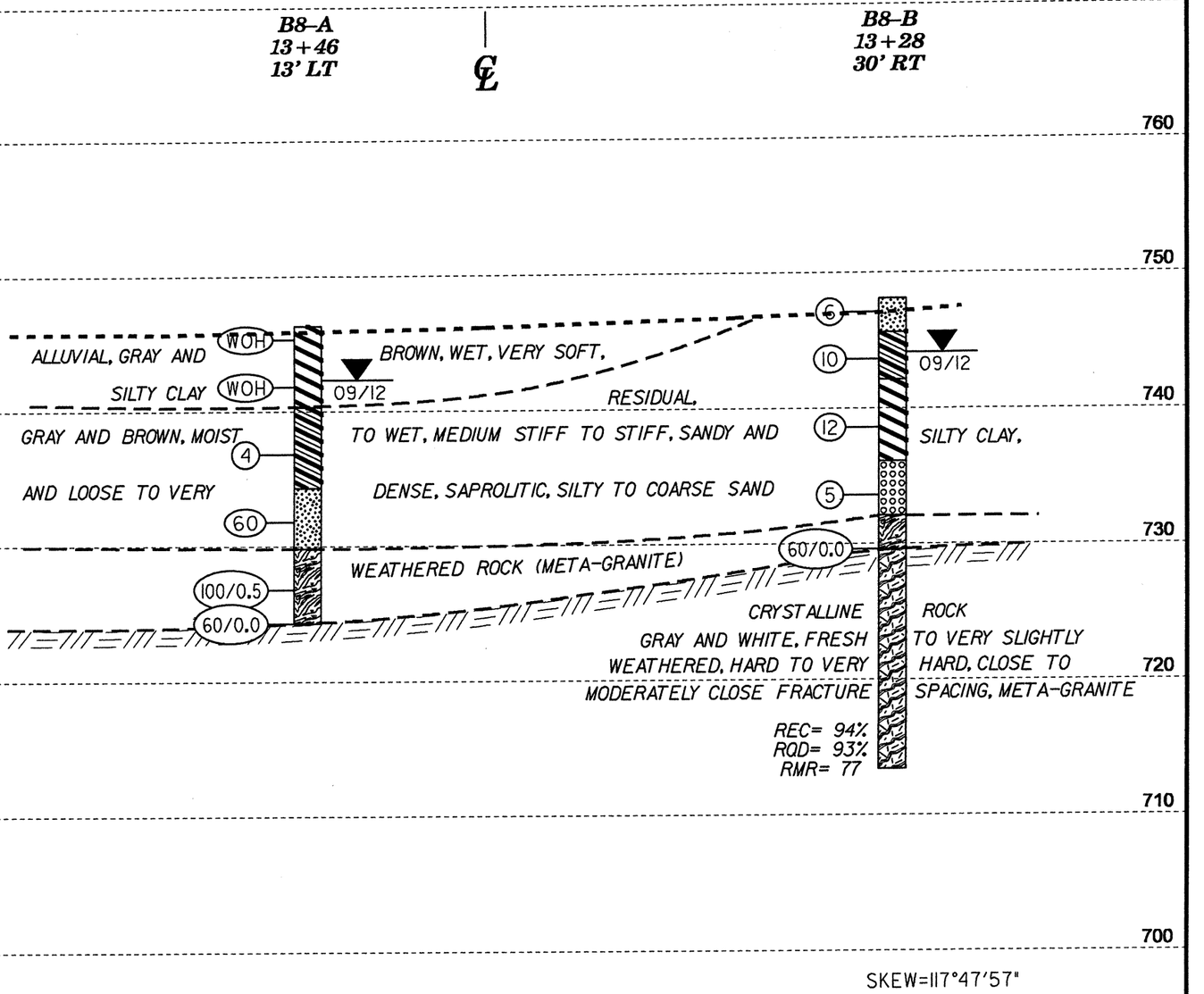


PROJECT REFERENCE NO.	SHEET
34820.1.2 (TU-2524C)	9

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

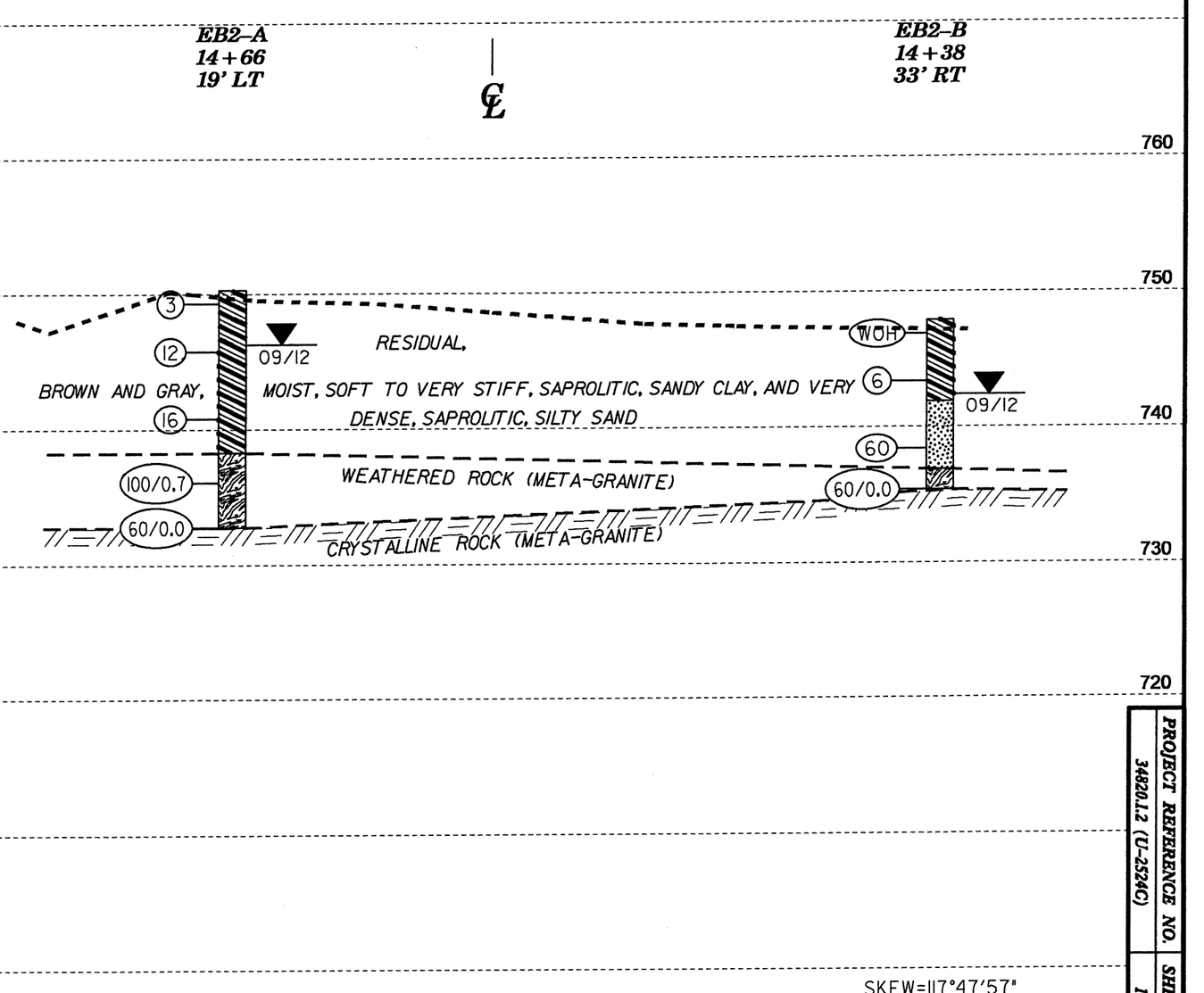
CROSS SECTION THROUGH -RPAY4- BENT 8



HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPAY4- END BENT 2



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 4+47	**OFFSET** 10 ft LT	**ALIGNMENT** -RPAY4-	**0 HR.** 19.7
COLLAR ELEV. 764.6 ft	**TOTAL DEPTH** 37.3 ft	**NORTHING** 870,803	**EASTING** 1,746,751	**24 HR.** 19.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765											
	764.6	0.0	1	1	3	4 43		D		764.6 GROUND SURFACE	0.0
	761.7	2.9								**RESIDUAL**	
760			8	20	23			D		762.6 RED-ORANGE, SANDY SILT WITH TRACE ORGANICS	2.0
	756.7	7.9								TAN, ORANGE, WHITE, AND GRAY, SAPROLITIC, SILTY SAND	
755			15	24	17	41		D			
	751.7	12.9									
750			8	9	10	19		D			
	746.7	17.9									
745			5	8	11	19		D			
	741.7	22.9									
740			4	4	5	9		D			
	736.7	27.9								736.7 **WEATHERED ROCK** (META-GRANITE)	27.9
			18	82/0.4		100/0.9					
735											
	731.7	32.9	100/0.2			100/0.2					
730											
	727.4	37.2	60/0.1			60/0.1				727.4 **CRYSTALLINE ROCK** (META-GRANITE)	37.2
										727.3 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 727.3 ft IN CRYSTALLINE ROCK (META-GRANITE)	37.3

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 4+40	**OFFSET** 26 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** Dry
COLLAR ELEV. 759.7 ft	**TOTAL DEPTH** 29.6 ft	**NORTHING** 870,840	**EASTING** 1,746,755	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
760											
	759.7	0.0	1	1	1	2		M		759.7 GROUND SURFACE	0.0
	755.9	3.8								**RESIDUAL**	
755			4	6	7	13		D		RED-ORANGE, SANDY SILT WITH TRACE ORGANICS	
	750.9	8.8	100/0.2			100/0.2				750.9	8.8
750										**WEATHERED ROCK** (META-GRANITE)	
	745.9	13.8	60/0.1			60/0.1				745.9	13.8
745										**CRYSTALLINE ROCK** (META-GRANITE)	
	740.9	18.8	60/0.1			60/0.1					
740											
	735.9	23.8	100/0.5			100/0.5				735.9 **WEATHERED ROCK** (META-GRANITE)	23.8
735											
	730.9	28.8	30	70/0.3		100/0.8				730.1 Boring Terminated at Elevation 730.1 ft IN WEATHERED ROCK (META-GRANITE)	29.6

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 5+79	**OFFSET** 24 ft LT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.8 ft	**TOTAL DEPTH** 23.8 ft	**NORTHING** 870,773	**EASTING** 1,746,623	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
										746.8 GROUND SURFACE 0.0
745										**ALLUVIAL** GRAY-BROWN, SILTY CLAY WITH ROOTS
	743.3	3.5	3	7	12	19		W		
740										738.3 8.5
	738.3	8.5	8	92/0.4		100/0.9				**WEATHERED ROCK** (META-GRANITE)
735										
	733.3	13.5	100/0.3			100/0.3				
730										
	728.3	18.5	44	53	47/0.4	100/0.9				
725										
	723.3	23.5	100/0.3			100/0.3				723.0 23.8
										Boring Terminated at Elevation 723.0 ft IN WEATHERED ROCK (META-GRANITE)
										ELEVATION DETERMINED BY NCDOT LOCATIONS & SURVEYS .TIN FILE

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 5+53	**OFFSET** 18 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.5 ft	**TOTAL DEPTH** 46.0 ft	**NORTHING** 870,819	**EASTING** 1,746,642	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										746.5	0.0
										GROUND SURFACE	
745										**ALLUVIAL**	
	743.0	3.5	1	1	1	2		W		GRAY-BROWN, SILTY CLAY	
740											
	738.0	8.5	1	3	4	7		W			
735											
	733.0	13.5	3	4	6	10		W		734.0	12.5
730										732.5	14.0
	728.0	18.5	18	82/0.4		100/0.9				SAND AND GRAVEL	
725										**RESIDUAL** BROWN-WHITE, SAPROLITIC, SILTY SAND	
	723.0	23.5	85	15/0.1		100/0.6				728.0	18.5
720	720.5	26.0	60/0.0			60/0.0	RS-1			**WEATHERED ROCK** (META-GRANITE)	
715							RS-2			720.5	26.0
710										**CRYSTALLINE ROCK** BLACK AND WHITE, FRESH TO MODERATELY SEVERELY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=82% RMR=53	
705										700.5	46.0
										Boring Terminated at Elevation 700.5 ft IN CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 5+53	**OFFSET** 18 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.5 ft	**TOTAL DEPTH** 46.0 ft	**NORTHING** 870,819	**EASTING** 1,746,642	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/05/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 20.0 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)
720.5											Begin Coring @ 26.0 ft	
720	720.5	26.0	5.0	N=60/0.0 1:42/1.0 1:29/1.0 1:11/1.0 1:15/1.0 1:41/1.0	(5.0) 100%	(3.7) 74%	RS-1	(19.2) 96%	(16.3) 82%		720.5 **CRYSTALLINE ROCK** BLACK AND WHITE, FRESH TO MODERATELY SEVERELY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=82% RMR=53	26.0
	715.5	31.0	5.0	1:35/1.0 1:46/1.0 2:01/1.0 1:42/1.0 1:52/1.0	(5.0) 100%	(4.2) 84%	RS-2					
715												
	710.5	36.0	5.0	1:18/1.0 1:51/1.0 1:51/1.0 1:50/1.0 1:55/1.0	(4.2) 84%	(4.1) 82%						
710												
	705.5	41.0	5.0	2:24/1.0 2:11/1.0 2:23/1.0 2:14/1.0 3:05/1.0	(5.0) 100%	(4.3) 86%						
705												
	700.5	46.0									700.5 Boring Terminated at Elevation 700.5 ft IN CRYSTALLINE ROCK (META-GRANITE)	46.0

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 6+72	**OFFSET** 11 ft LT	**ALIGNMENT** -RPAY4- / **0 HR.** N/A
COLLAR ELEV. 746.3 ft	**TOTAL DEPTH** 32.0 ft	**NORTHING** 870,771	**EASTING** 1,746,529 / **24 HR.** 1.4
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/27/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
745										746.3 GROUND SURFACE 0.0
	742.8	3.5	WOH	WOH	WOH	0		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY WITH ROOTS
740										741.3 5.0
	737.8	8.5	2	2	2	4		W		GRAY, AND WHITE-TAN, SILTY SAND WITH SOME GRAVEL
735										
	732.8	13.5	1	1	1	2		W		
730										
	727.8	18.5	4	3	3	6		W		
725										
	722.8	23.5	15	19	14	33		M		724.3 22.0 **RESIDUAL** BLACK-WHITE-BROWN, SAPROLITIC, SILTY SAND 720.3 26.0
720										**WEATHERED ROCK** (META-GRANITE)
	717.8	28.5	100/0.3			100/0.3				
715										714.3 32.0
	714.3	32.0	60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 714.3 ft ON CRYSTALLINE ROCK (META-GRANITE)

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 10+44	**OFFSET** 14 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 15.5 ft	**NORTHING** 870,731	**EASTING** 1,746,159	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750	747.9	0.0	2	4	5	9		M		747.9 GROUND SURFACE 0.0
745	744.4	3.5	2	2	2	4		M		**ALLUVIAL** BROWN, SILTY SAND WITH TRACE GRAVEL
740	739.4	8.5	8	10	8	18		M		741.9 6.0 **RESIDUAL** BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA
735	734.4	13.5	60/0.3			60/0.3				734.4 13.5
	732.4	15.5	60/0.0			60/0.0				732.4 15.5 **WEATHERED ROCK** (META-GRANITE) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 732.4 ft ON CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B6-A	**STATION** 11+18	**OFFSET** 8 ft LT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.3 ft	**TOTAL DEPTH** 19.5 ft	**NORTHING** 870,697	**EASTING** 1,746,089	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750	746.3	0.0	2	2	2	4		W		746.3 GROUND SURFACE 0.0
745	742.8	3.5	2	2	2	4		W		743.8 **ALLUVIAL** BROWN, SANDY CLAY WITH SOME ORGANICS AND TRACE GRAVEL 2.5 GRAY, SILTY CLAY
740	737.8	8.5	1	2	4	6		W		736.3 10.0 **RESIDUAL** WHITE AND BROWN, SAPROLITIC, SILTY SAND WITH TRACE MICA
735	732.8	13.5	8	7	5	12		W		
730	727.8	18.5	15	60/0.2		60/0.2				727.3 19.0
	726.8	19.5	60/0.0			60/0.0				726.8 19.5 **WEATHERED ROCK** (META-GRANITE) Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 726.8 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPAY4.GPJ NC_DOT.GDT 2/6/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 11+04	**OFFSET** 30 ft RT	**ALIGNMENT** -RPAY4- — **0 HR.** N/A
COLLAR ELEV. 747.7 ft	**TOTAL DEPTH** 39.9 ft	**NORTHING** 870,737	**EASTING** 1,746,097 — **24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
										747.7	0.0
										GROUND SURFACE	
	747.7	0.0	1	3	4	7		W		**ALLUVIAL** BROWN AND RED-BROWN, SILTY CLAY WITH SOME ORGANICS	
	744.2	3.5	1	1	1	2		W		741.7	6.0
										RESIDUAL LIGHT BROWN, COARSE SAND	
	739.2	8.5	8	8	3	11		M		735.2	12.5
	734.2	13.5	60/0.2			60/0.2				**WEATHERED ROCK** (META-GRANITE)	
	733.7	14.0	60/0.0			60/0.0				733.7	14.0
										732.8	14.9
										CRYSTALLINE ROCK WHITE, GRAY, AND BROWN, MODERATELY WEATHERED, MEDIUM HARD, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=89% RMR=55	
										731.2	16.5
										WEATHERED ROCK (META-GRANITE)	
							RS-3			722.8	24.9
										CRYSTALLINE ROCK WHITE, GRAY, AND BROWN, FRESH TO MODERATELY WEATHERED, MEDIUM HARD TO HARD, CLOSE FRACTURE SPACING, META-GRANITE REC=73% RQD=37% RMR=41	
							RS-4			719.8	27.9
										WEATHERED ROCK (META-GRANITE)	
										CRYSTALLINE ROCK WHITE, GRAY, AND BROWN, FRESH TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO WIDE FRACTURE SPACING, META-GRANITE REC=100% RQD=93% RMR=66	
										707.8	39.9
										Boring Terminated at Elevation 707.8 ft IN CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 11+04	**OFFSET** 30 ft RT	**ALIGNMENT** -RPAY4- — **0 HR.** N/A
COLLAR ELEV. 747.7 ft	**TOTAL DEPTH** 39.9 ft	**NORTHING** 870,737	**EASTING** 1,746,097 — **24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ-3	**TOTAL RUN** 25.9 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)
733.7											Begin Coring @ 14.0 ft	
	733.7	14.0	0.9	*N=60/0.0*	(0.9)	(0.8)		(0.9)	(0.8)		733.7	14.0
	732.8	14.9	5.0	3:45/0.9	100%	89%		100%	89%		**CRYSTALLINE ROCK** WHITE, GRAY, AND BROWN, MODERATELY WEATHERED, MEDIUM HARD, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=89% RMR=55	
730				1:33/1.0							732.8	14.9
				3:16/1.0	(1.6)	(0.5)		(0.0)	(3.1)		731.2	16.5
				2:40/1.0	32%	10%		0%	37%		**WEATHERED ROCK** (META-GRANITE)	
				1:54/1.0							**CRYSTALLINE ROCK** WHITE, GRAY, AND BROWN, FRESH TO MODERATELY WEATHERED, MEDIUM HARD TO HARD, CLOSE FRACTURE SPACING, META-GRANITE REC=73% RQD=37% RMR=41	
	727.8	19.9		2:55/1.0				(6.1)			722.8	24.9
725			5.0	3:44/1.0	(4.5)	(2.6)		73%			719.8	27.9
				2:37/1.0	90%	52%					**WEATHERED ROCK** (META-GRANITE)	
				3:05/1.0							**CRYSTALLINE ROCK** WHITE, GRAY, AND BROWN, FRESH TO SLIGHTLY WEATHERED, MEDIUM HARD TO HARD, CLOSE TO WIDE FRACTURE SPACING, META-GRANITE REC=100% RQD=93% RMR=66	
				2:15/1.0							707.8	39.9
	722.8	24.9		2:36/1.0			RS-3				Boring Terminated at Elevation 707.8 ft IN CRYSTALLINE ROCK (META-GRANITE)	
720			5.0	2:00/1.0	(2.0)	(1.8)		(0.0)				
				2:03/1.0	40%	36%		0%				
				2:10/1.0								
				2:02/1.0			RS-4	(12.0)	(11.2)			
	717.8	29.9		3:20/1.0				100%	93%			
			5.0	2:44/1.0	(5.0)	(4.4)						
715				2:37/1.0	100%	88%						
				2:58/1.0								
				3:30/1.0								
	712.8	34.9		3:49/1.0								
			5.0	3:52/1.0	(5.0)	(5.0)						
710				4:04/1.0	100%	100%						
				3:30/1.0								
				4:32/1.0								
	707.8	39.9		3:46/1.0								

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 12+33	**OFFSET** 10 ft LT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 870,675	**EASTING** 1,745,976	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/21/12	**COMP. DATE** 09/21/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	746.2	0.0	1	1	1	2 2		W		746.2 GROUND SURFACE	0.0
745										**ALLUVIAL** GRAY-BROWN, SANDY SILT WITH SOME ORGANICS	
	742.7	3.5	WOH	WOH	2			W			
740											
	737.7	8.5	100/0.5			100/0.5				737.7 **WEATHERED ROCK** (META-GRANITE)	8.5
	735.7	10.5	60/0.0			60/0.0				735.7 **CRYSTALLINE ROCK** GRAY AND WHITE, MODERATELY WEATHERED, MEDIUM HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=67% RMR=52	10.5
735											
730										730.5	15.7
725							RS-5			725.5 **WEATHERED ROCK** (META-GRANITE)	20.7
							RS-6			**CRYSTALLINE ROCK** GRAY, BROWN, AND WHITE, MODERATELY SEVERELY WEATHERED TO FRESH, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=82% RMR=56	
720											
715										711.2	35.0
										Boring Terminated at Elevation 711.2 ft IN CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B7-A	**STATION** 12+33	**OFFSET** 10 ft LT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 870,675	**EASTING** 1,745,976	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/21/12	**COMP. DATE** 09/21/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 24.5 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)
735.7											Begin Coring @ 10.5 ft	
735	735.7	10.5	4.5	*N=60/0.0* 3:05/1.0 3:21/1.0 2:45/1.0 2:37/1.0 1:41/0.5	(4.5) 100%	(3.5) 78%		(5.2) 100%	(3.5) 67%		735.7 **CRYSTALLINE ROCK** GRAY AND WHITE, MODERATELY WEATHERED, MEDIUM HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=67% RMR=52	10.5
	731.2	15.0									730.5 **WEATHERED ROCK** (META-GRANITE)	15.7
730			5.0	1:44/1.0 1:01/1.0 1:14/1.0 0:56/1.0 1:02/1.0	(0.7) 14%	(0.0) 0%		(0.0) 0%			725.5 **CRYSTALLINE ROCK** GRAY, BROWN, AND WHITE, MODERATELY SEVERELY WEATHERED TO FRESH, MEDIUM HARD TO HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=82% RMR=56	20.7
	726.2	20.0										
725			5.0	2:06/1.0 2:02/1.0 2:35/1.0 2:38/1.0 3:10/1.0	(4.3) 86%	(3.0) 60%	RS-5	(14.3) 100%	(11.7) 82%			
	721.2	25.0					RS-6					
720			5.0	3:12/1.0 3:33/1.0 2:47/1.0 3:46/1.0 3:17/1.0	(5.0) 100%	(5.0) 100%						
	716.2	30.0										
715			5.0	4:40/1.0 3:07/1.0 3:30/1.0 3:28/1.0 3:10/1.0	(5.0) 100%	(3.7) 74%						
	711.2	35.0									711.2 Boring Terminated at Elevation 711.2 ft IN CRYSTALLINE ROCK (META-GRANITE)	35.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 12+16	**OFFSET** 30 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 748.4 ft	**TOTAL DEPTH** 18.0 ft	**NORTHING** 870,717	**EASTING** 1,745,986	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/20/12	**COMP. DATE** 09/20/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750										
	748.4	0.0	1	2	2	4		W		748.4 GROUND SURFACE 0.0
745	744.9	3.5	1	2	4	6		M		**ALLUVIAL** BROWN AND RED-BROWN, SILTY CLAY 742.4 6.0
740	739.9	8.5	12	28	24	52		M		**RESIDUAL** BROWN AND WHITE, SAPROLITC, SILTY SAND WITH LITTLE MICA 734.9 13.5
735	734.9	13.5	34	66/0.3		100/0.8				**WEATHERED ROCK** (META-GRANITE) 730.4 18.0
	730.4	18.0	60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 730.4 ft ON CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 13+46	**OFFSET** 13 ft LT	**ALIGNMENT** -RPAY4- **0 HR.** N/A
COLLAR ELEV. 746.3 ft	**TOTAL DEPTH** 22.0 ft	**NORTHING** 870,653	**EASTING** 1,745,866 **24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750										
	746.3	0.0	WOH	WOH	WOH	0		W		746.3 GROUND SURFACE 0.0
745	742.8	3.5	WOH	WOH	WOH	0		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY WITH SOME ORGANICS 740.3 6.0
740	737.8	8.5	2	2	2	4		W		**RESIDUAL** GRAY AND BROWN, SANDY CLAY 734.3 12.0
735	732.8	13.5	5	30	30	60		W		BROWN AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA 729.8 16.5
730	727.8	18.5	38	43	57	100/1.0		M		**WEATHERED ROCK** (META-GRANITE) 724.3 22.0
725	724.3	22.0	60/0.0			60/0.0				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 724.3 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPAY4.GPJ NC_DOT.GDT 2/6/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B8-B	**STATION** 13+28	**OFFSET** 30 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 748.1 ft	**TOTAL DEPTH** 34.7 ft	**NORTHING** 870,698	**EASTING** 1,745,876	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	748.1	0.0	2	3	3	6		M		748.1 GROUND SURFACE	0.0
745										**RESIDUAL** BROWN, SILTY SAND WITH ORGANICS	
	744.6	3.5	3	4	6	10		M		745.6 RED-BROWN, SANDY CLAY	2.5
740										742.1 GRAY, SILTY CLAY	6.0
	739.6	8.5	6	6	6	12		M			
735										736.1 ORANGE AND GRAY, COARSE SAND	12.0
	734.6	13.5	1	1	4	5		M			
730										732.1 **WEATHERED ROCK** (META-GRANITE)	16.0
	729.6	18.5	60/0.0			60/0.0	RS-7			729.6 **CRYSTALLINE ROCK** GRAY AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=93% RMR=77	18.5
725							RS-8				
720											
715										713.4 Boring Terminated at Elevation 713.4 ft IN CRYSTALLINE ROCK (META-GRANITE)	34.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK				**GROUND WTR (ft)**
BORING NO. B8-B	**STATION** 13+28	**OFFSET** 30 ft RT	**ALIGNMENT** -RPAY4-	**0 HR.** N/A
COLLAR ELEV. 748.1 ft	**TOTAL DEPTH** 34.7 ft	**NORTHING** 870,698	**EASTING** 1,745,876	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** NW Casing w/ Core	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**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)
729.6											Begin Coring @ 18.5 ft	
	729.6	18.5	1.2	*N=60/0.0* 2:57/1.2	(1.2) 100%	(1.2) 100%		(15.3) 94%	(15.1) 93%		729.6 **CRYSTALLINE ROCK**	18.5
	728.4	19.7	5.0	3:28/1.0 2:41/1.0 2:51/1.0	(4.6) 92%	(4.6) 92%	RS-7				GRAY AND WHITE, FRESH TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=94% RQD=93% RMR=77	
725				2:54/1.0								
	723.4	24.7		2:32/1.0								
			5.0	3:09/1.0 2:42/1.0 3:13/1.0 2:40/1.0 2:43/1.0	(4.5) 90%	(4.4) 88%	RS-8					
720												
	718.4	29.7	5.0	2:51/1.0 2:19/1.0 3:02/1.0 3:14/1.0 2:45/1.0	(5.0) 100%	(4.9) 98%						
715												
	713.4	34.7									713.4 Boring Terminated at Elevation 713.4 ft IN CRYSTALLINE ROCK (META-GRANITE)	34.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 14+66	**OFFSET** 19 ft LT	**ALIGNMENT** -RPAY4-
COLLAR ELEV. 750.3 ft	**TOTAL DEPTH** 17.5 ft	**NORTHING** 870,626	**EASTING** 1,745,748
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 4.0

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										
750	750.3	0.0	1	1	2	3		M		750.3 GROUND SURFACE 0.0
										RESIDUAL
	746.8	3.5	4	5	7	12		M		RED TO BROWN, SANDY CLAY
745										
	741.8	8.5	3	6	10	16		M		
740										
	738.3	12.0								**WEATHERED ROCK**
	736.8	13.5	56	44/0.2		100/0.7				(META-GRANITE)
735										
	732.8	17.5	60/0.0			60/0.0				732.8 17.5
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 732.8 ft ON CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 7 ON -RPAY4- OVER HORSEPEN CREEK			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 14+38	**OFFSET** 33 ft RT	**ALIGNMENT** -RPAY4-
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 12.5 ft	**NORTHING** 870,682	**EASTING** 1,745,767
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. N/A; 24 HR. 5.5

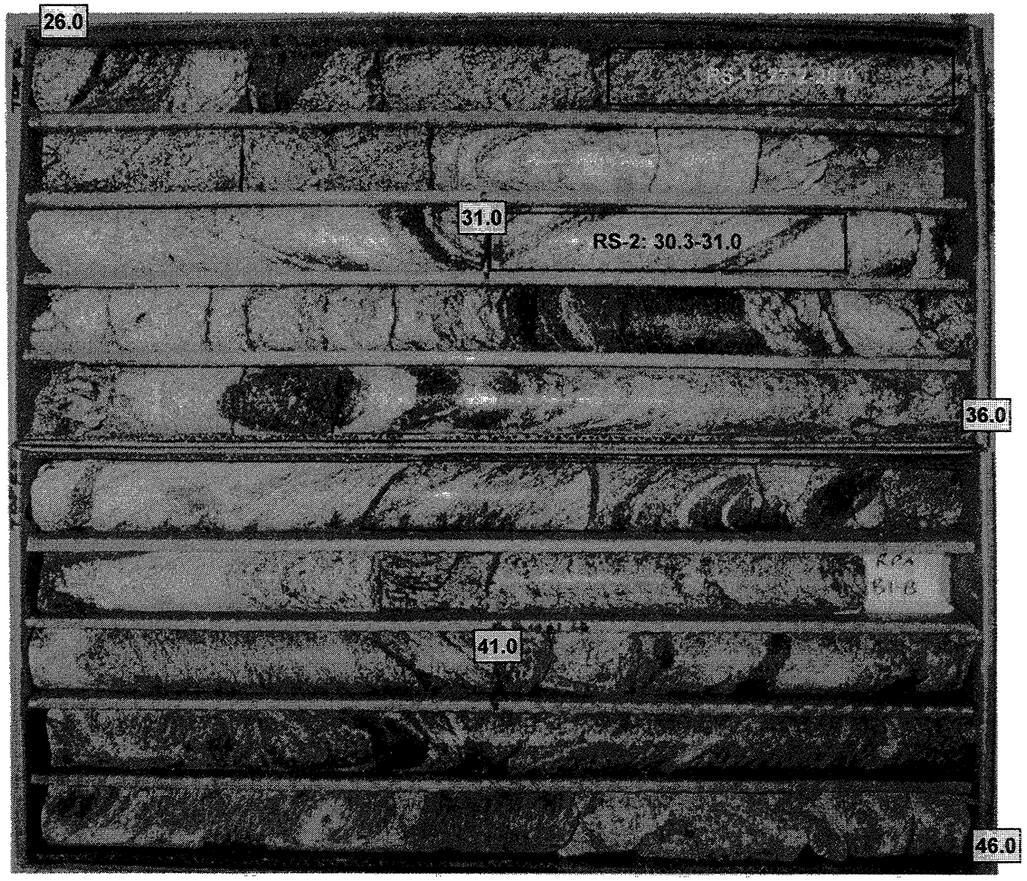
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	747.9	0.0	WOH	WOH	WOH	0		W		747.9 GROUND SURFACE 0.0
										RESIDUAL
745	744.4	3.5	3	3	3	6		W		GRAY AND BROWN, SANDY CLAY
										741.9 6.0
740	739.4	8.5	32	35	25	60		M		GRAY-BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA
										736.9 11.0
	735.4	12.5	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE) 735.4 12.5
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 735.4 ft ON CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPAY4.GPJ NC_DOT.GDT 2/6/13

CORE PHOTOGRAPHS

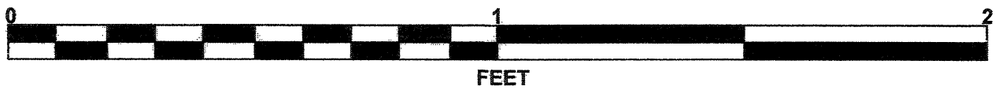
B1-B

BOXES 1 & 2: 26.0 - 46.0 FEET



B6-B

BOXES 1 & 2: 14.0-39.9 FEET



CORE PHOTOGRAPHS

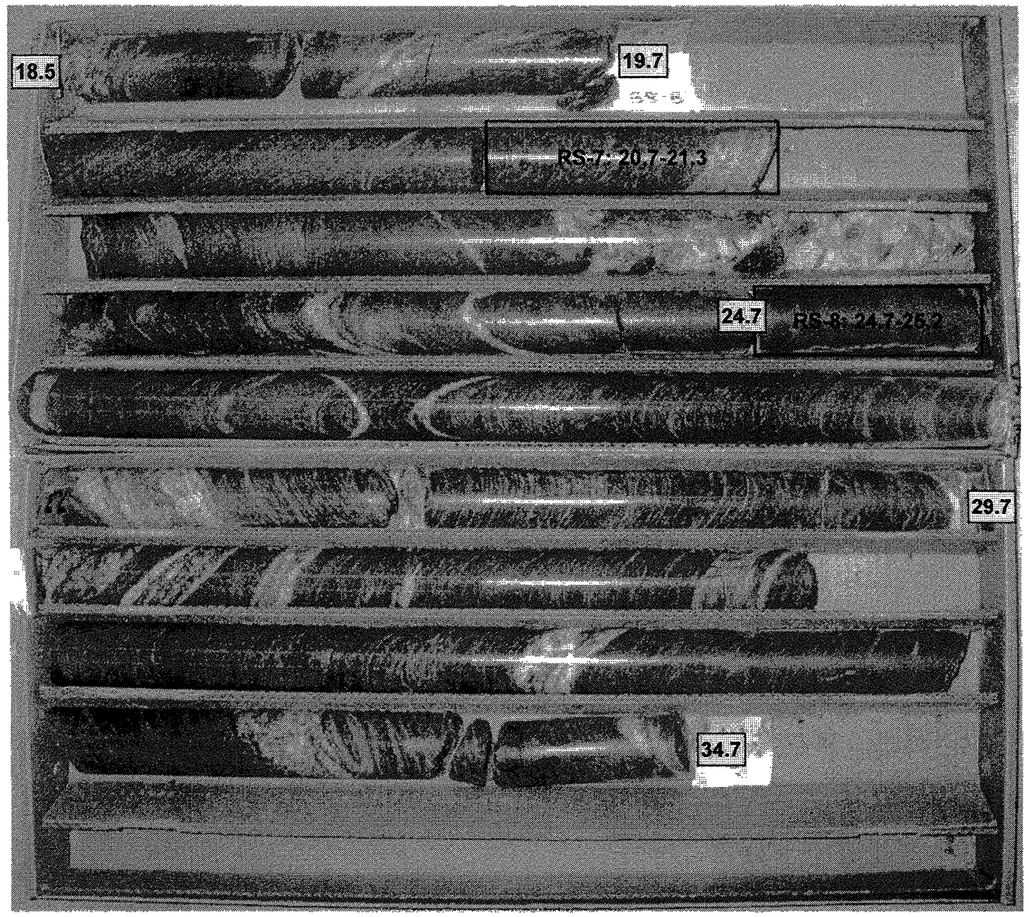
B7-A

BOXES 1 & 2: 10.5-35.0 FEET

0 1 2
FEET

B8-B

BOXES 1 & 2: 18.5 - 34.7 FEET



0 1 2
FEET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	16

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34820.1.2 (U-2524C) F.A. PROJ. NHF-0708(52)

COUNTY GUILFORD

PROJECT DESCRIPTION GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 (BATTLEGROUND AVENUE)

SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)

ID: U-2524C

PROJECT: 34820.1.2

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15, 16	CORE PHOTOGRAPHS

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.

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

TERRACON

INVESTIGATED BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.D. MOHS

DATE OCTOBER 2012

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

10/10/12

DRAWN BY: 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.
34820.1.2 (U-2524C)	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 thru A-3	A-4, A-5 thru 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	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/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	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
GRAIN SIZE 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	: - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

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

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT / CPT / PMT / VST — 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
- [■] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [■] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [■] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [■] -N G2WL
- [ ] -H_____

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: BL-34: -BL- STATION 154+84.47

ELEVATION: 748.80 FT.

NOTES:

REVISED 09/23/09

0	50	100
FEET		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

-RPCY4- SITE PLAN

RPBY4

-BL- 34

-L-

400+00

NAD 83

B1-A

B2-A

B3-A

B4-A

EB2-A

RPCY4

SPCY4

B1-B

B2-B

B3-B

B4-B

EB2-B

5+00

8+00

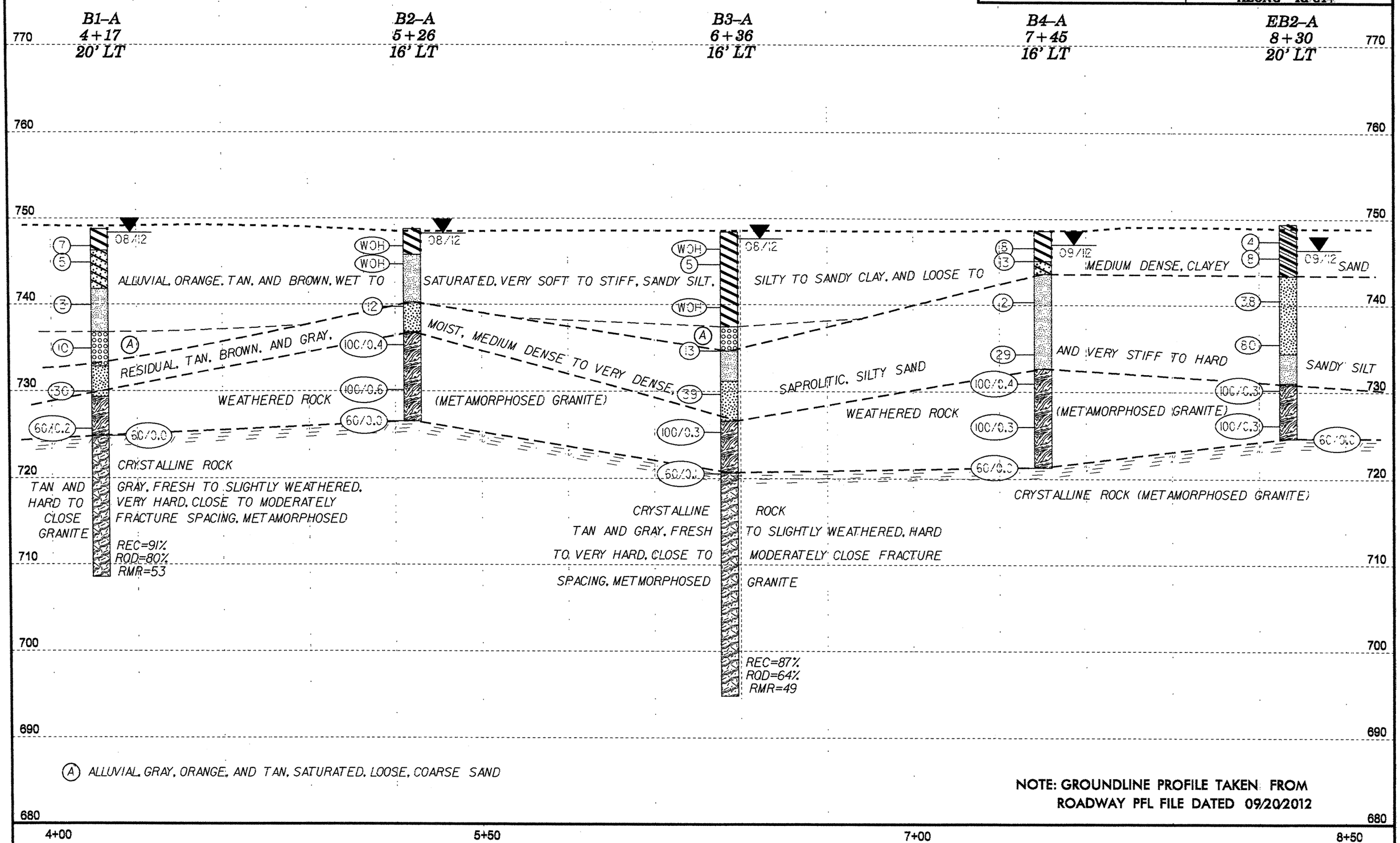
HORSEPEN CR

0	30	60

FEET

VE = 3:1

PROJECT REFERENCE NO.	SHEET
34820.1.2(U-2524C)	4
PROFILE BORINGS PROJECTED ALONG -RPCY4-	



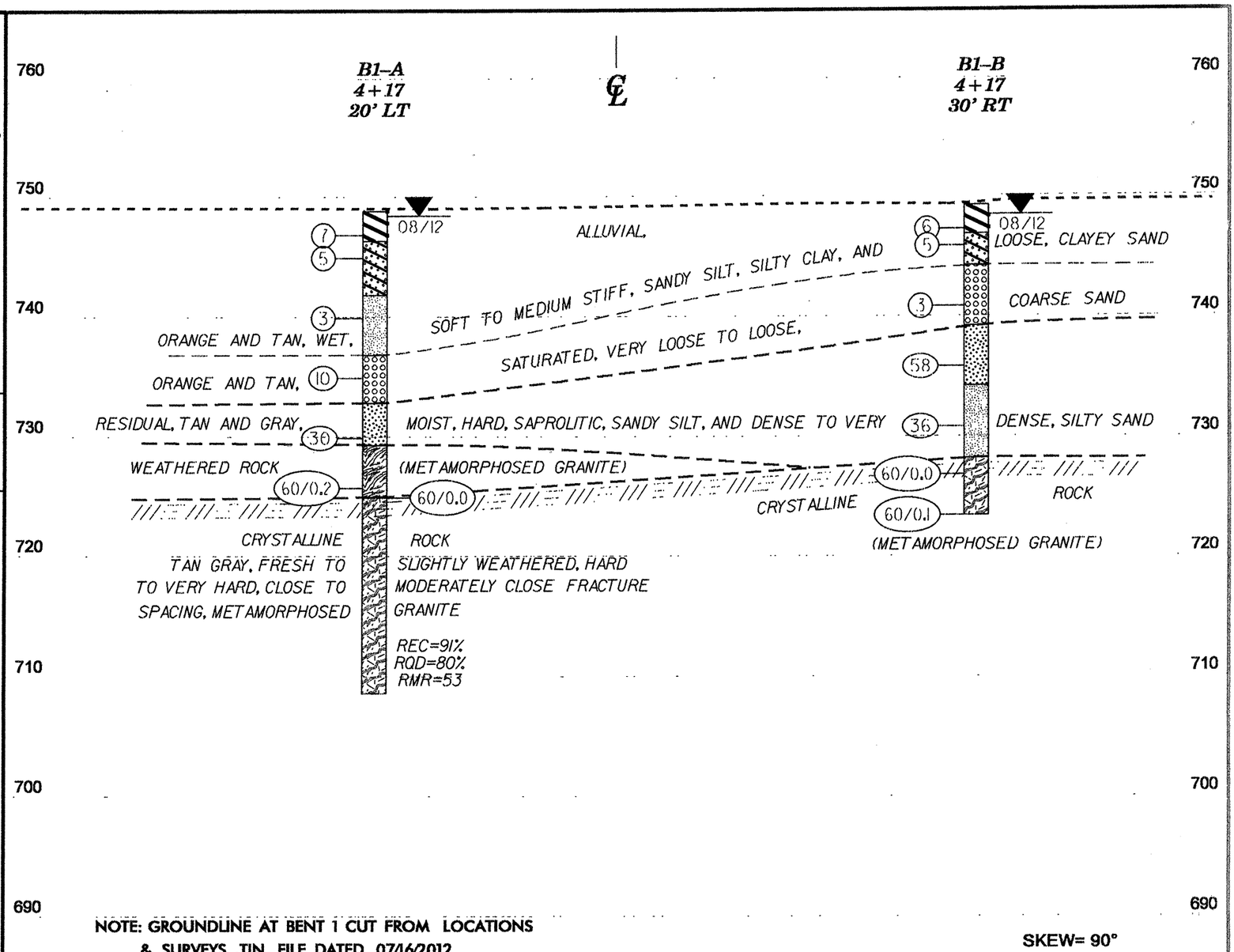
(A) ALLUVIAL, GRAY, ORANGE, AND TAN, SATURATED, LOOSE, COARSE SAND

NOTE: GROUNDLINE PROFILE TAKEN FROM ROADWAY PFL FILE DATED 09/20/2012

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPCY4- BENT 1



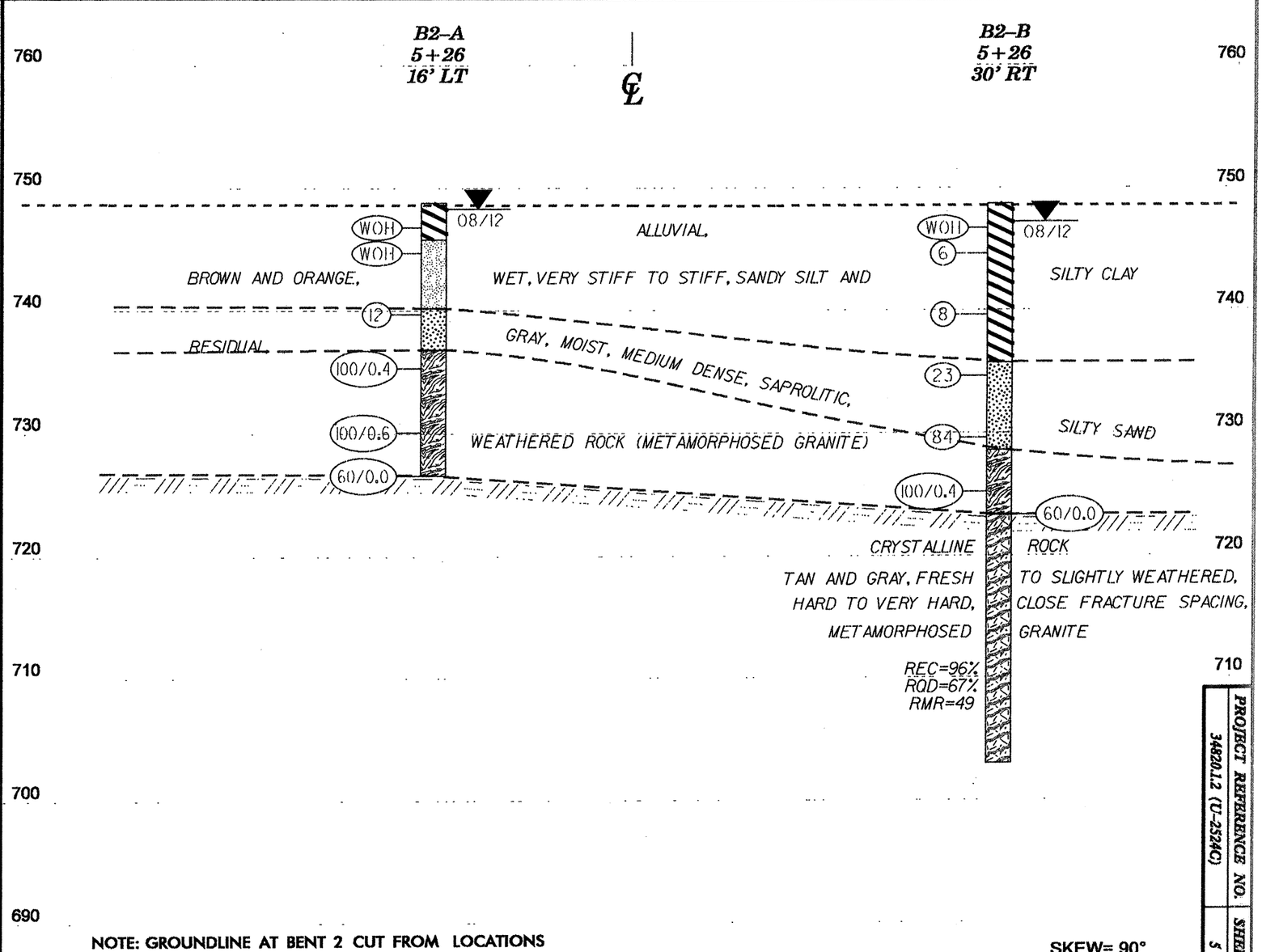
NOTE: GROUNDLINE AT BENT 1 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

SKEW= 90°

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPCY4- BENT 2



NOTE: GROUNDLINE AT BENT 2 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

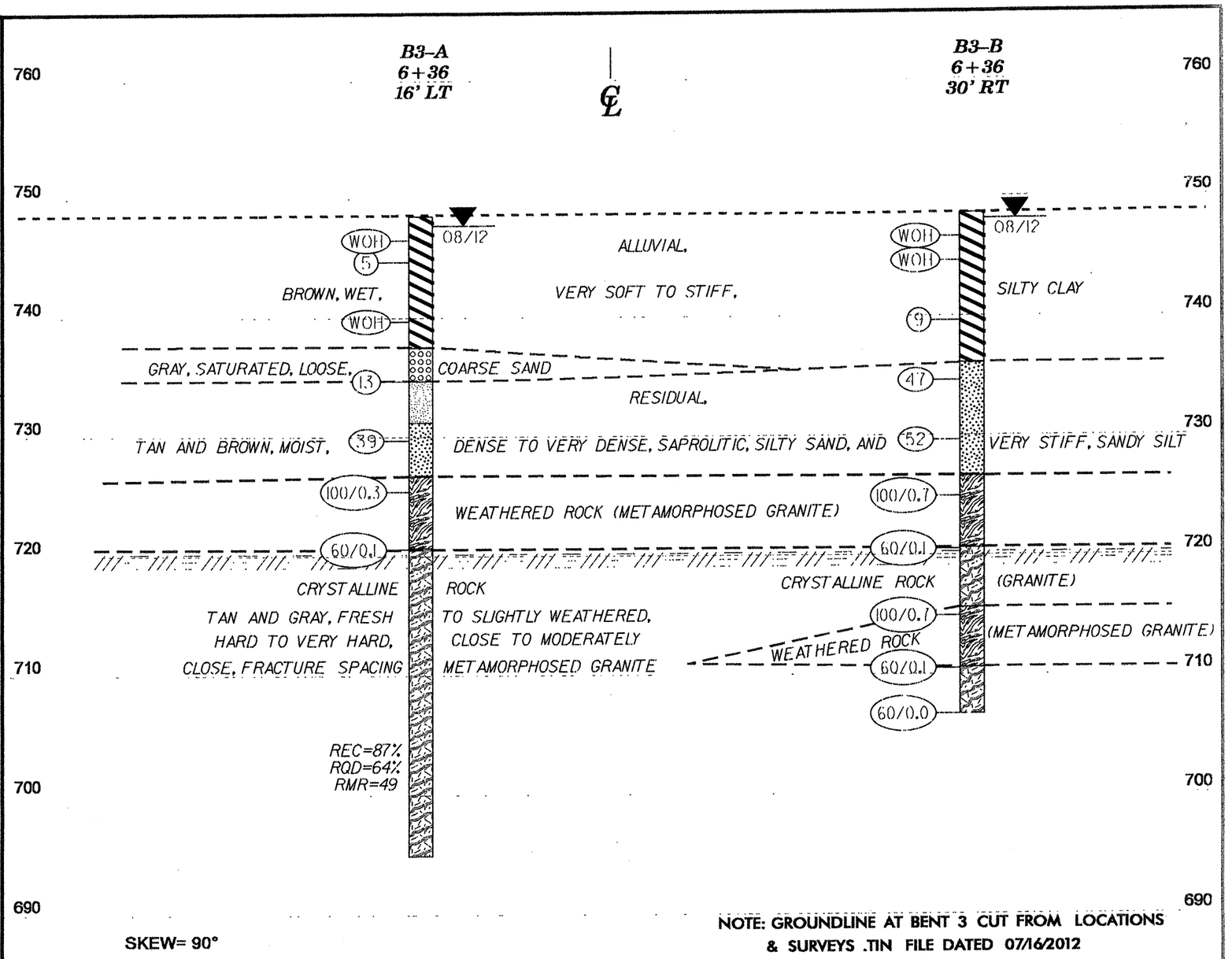
SKEW= 90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPCY4- BENT 3



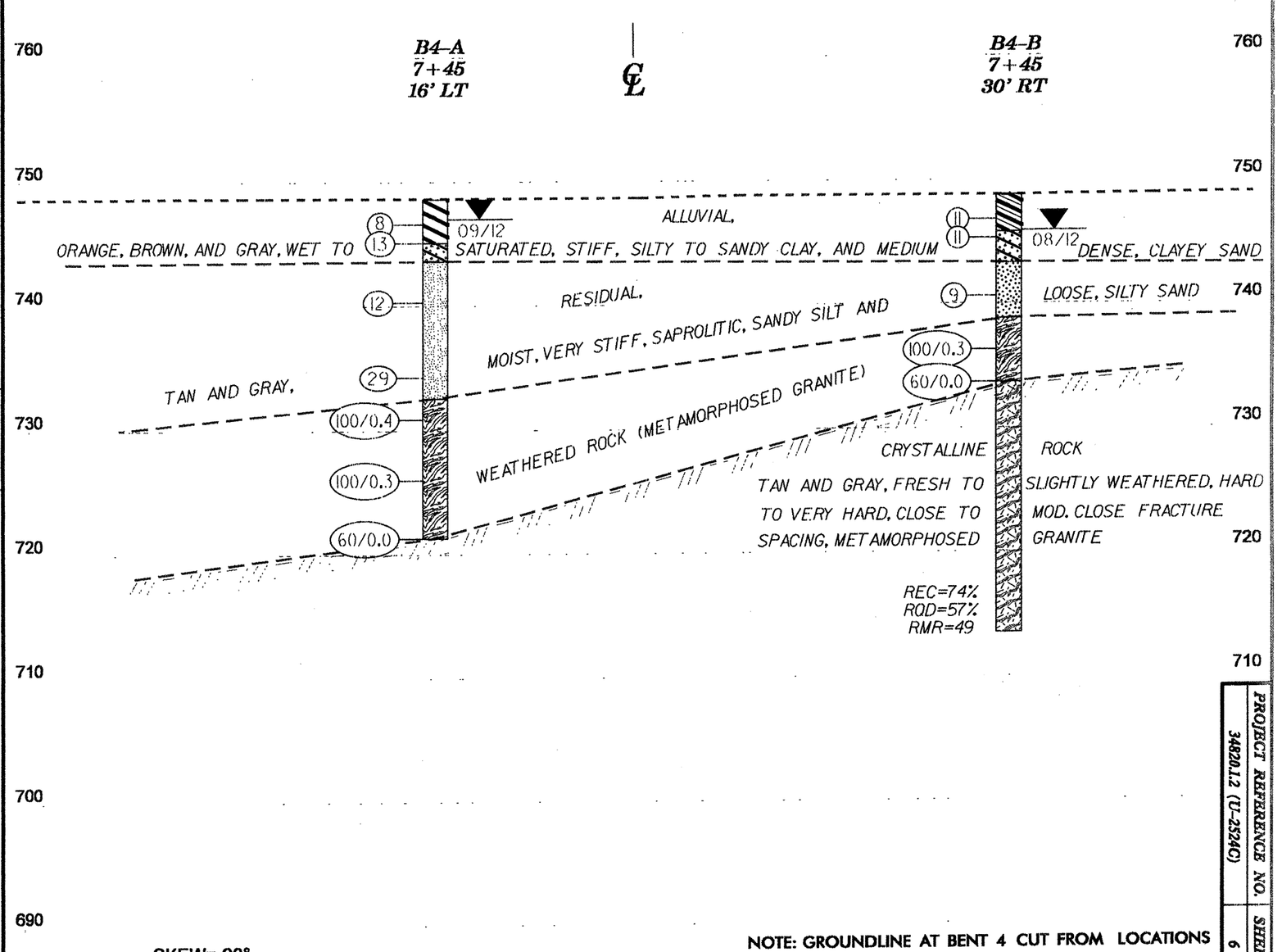
SKEW= 90°

NOTE: GROUNDLINE AT BENT 3 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPCY4- BENT 4



SKEW= 90°

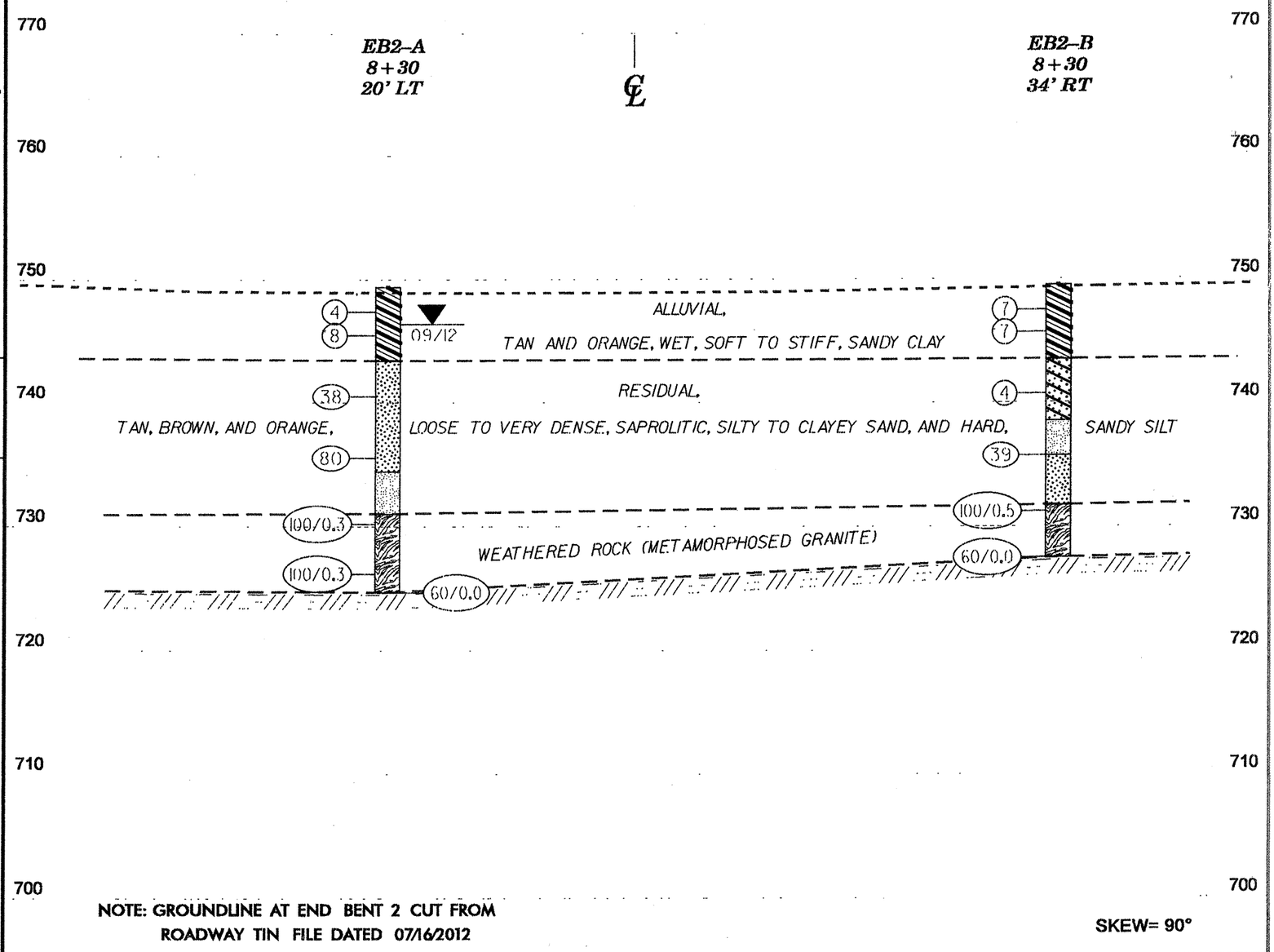
NOTE: GROUNDLINE AT BENT 4 CUT FROM LOCATIONS & SURVEYS .TIN FILE DATED 07/16/2012

PROJECT REFERENCE NO.	SHEET
34820.12 (U-2524C)	6

HORIZ. SCALE (FEET) 0 10 20

VE = 1:1

CROSS SECTION THROUGH -RPCY4- END BENT 2



NOTE: GROUNDLINE AT END BENT 2 CUT FROM ROADWAY TIN FILE DATED 07/16/2012

SKEW= 90°

PROJECT REFERENCE NO.	SHEET
34820.1.2(U-2524C)	7

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 4+17	**OFFSET** 20 ft LT	**ALIGNMENT** -RPCY4- — **0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 40.2 ft	**NORTHING** 869,924	**EASTING** 1,744,651 — **24 HR.** 0.4
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
750										748.8 GROUND SURFACE	0.0
	747.8	1.0								**ALLUVIAL** ORANGE AND TAN, SILTY CLAY	
			2	3	4	7		W		746.3	2.5
745	745.9	2.9								TAN, CLAYEY SAND	
			1	3	2	5		Sat.		741.8	7.0
	740.9	7.9								ORANGE AND TAN, SANDY SILT WITH TRACE MICA	
740			1	0	3	3		W		736.8	12.0
	735.9	12.9								ORANGE AND TAN, COARSE SAND	
735			4	4	6	10		Sat.		732.8	16.0
	730.9	17.9								**RESIDUAL** TAN AND GRAY, SAPROLITIC, SILTY SAND	
730			29	15	15	30		M		729.3	19.5
	725.9	22.9								**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
725	724.9	23.9	60/0.2			60/0.2				724.9	23.9
			60/0.0			60/0.0				**CRYSTALLINE ROCK** TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING. METAMORPHOSED GRANITE REC=91% RQD=80% RMR=53	
720							RS-1				
715							RS-2				
710										708.6 Boring Terminated at Elevation 708.6 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	40.2

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 4+17	**OFFSET** 20 ft LT	**ALIGNMENT** -RPCY4- — **0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 40.2 ft	**NORTHING** 869,924	**EASTING** 1,744,651 — **24 HR.** 0.4
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ2	**TOTAL RUN** 16.3 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)
724.9											Begin Coring @ 23.9 ft	
	724.9	23.9	1.3	3:42/1.0	(1.0)	(0.6)		(14.8)	(13.1)		724.9 **CRYSTALLINE ROCK**	23.9
	723.6	25.2	5.0	1:15/0.3	77%	46%		91%	80%		TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING. METAMORPHOSED GRANITE	
720				4:04/1.0 3:35/1.0 2:51/1.0 2:03/1.0 3:10/1.0	(4.7) 94%	(4.1) 82%	RS-1				REC=94% RQD=80% RMR=53	
	718.6	30.2	5.0	3:44/1.0 4:20/1.0 2:06/1.0 2:57/1.0 2:10/1.0	(4.2) 84%	(3.7) 74%						
715	713.6	35.2					RS-2					
			5.0	3:23/1.0 3:27/1.0 3:40/1.0 3:38/1.0 5:06/1.0	(4.9) 98%	(4.7) 94%						
710	708.6	40.2									708.6 Boring Terminated at Elevation 708.6 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	40.2

C:\DOT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/9/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 4+17	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 749.2 ft	**TOTAL DEPTH** 25.8 ft	**NORTHING** 869,875	**EASTING** 1,744,660	**24 HR.** 0.8
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/28/12	**COMP. DATE** 08/28/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
750										GROUND SURFACE	749.2	0.0
	748.2	1.0	3	3	3	6		W		**ALLUVIAL** ORANGE AND TAN, SILTY CLAY	746.8	2.4
745	746.8	2.4	3	2	3	5		W		TAN, CLAYEY SAND	744.2	5.0
	741.8	7.4	3	1	2	3		Sat.		TAN, COARSE SAND	739.2	10.0
740	736.8	12.4	26	35	23	58		M		**RESIDUAL** TAN AND GRAY, SAPROLITIC, SILTY SAND WITH TRACE MICA	734.2	15.0
735	731.8	17.4	14	18	18	36		M		TAN AND BROWN, SAPROLITIC, SANDY SILT WITH TRACE MICA	728.2	21.0
730	726.8	22.4	60/0.0			60/0.0				**CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	723.4	25.8
725	723.5	25.7	60/0.1			60/0.1				Boring Terminated with Standard Penetration Test Refusal at Elevation 723.4 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)		

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 5+26	**OFFSET** 16 ft LT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 22.2 ft	**NORTHING** 869,938	**EASTING** 1,744,760	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
750										GROUND SURFACE	748.8	0.0
	747.8	1.0	WOH	WOH	WOH	0		W		**ALLUVIAL** ORANGE, SILTY CLAY	745.8	3.0
745	745.7	3.1	WOH	WOH	WOH	0		W		TAN AND ORANGE, SANDY SILT	740.2	8.6
	740.7	8.1	3	6	6	12		M		**RESIDUAL** GRAY, SAPROLITIC, SILTY SAND	736.8	12.0
740	735.7	13.1	100/0.4			100/0.4				**WEATHERED ROCK** (METAMORPHOSED GRANITE)	726.6	22.2
735	730.7	18.1	82	18/0.1		100/0.6				Boring Terminated with Standard Penetration Test Refusal at Elevation 726.6 ft on CRYSTALLINE ROCK (METAMORPHOSED GRANITE)		
730	726.6	22.2	60/0.0			60/0.0						

NCDOT BORE DOUBLE_U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/4/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 5+26	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.7 ft	**TOTAL DEPTH** 45.7 ft	**NORTHING** 869,892	**EASTING** 1,744,767	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 10 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										748.7 GROUND SURFACE	0.0
	747.7	1.0	WOH	WOH	WOH	0		W		ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	745.6	3.1	WOH	3	3	6		W			
740	740.6	8.1	3	3	5	8		W			
735	735.6	13.1	3	10	13	23		M		735.7 RESIDUAL GRAY, SAPROLITIC, SILTY SAND	13.0
730	730.6	18.1	19	19	65	84		M		728.6 WEATHERED ROCK (METAMORPHOSED GRANITE)	20.1
725	725.6	23.1	100/0.4			100/0.4					
	723.3	25.4	60/0.0			60/0.0				723.3 CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	25.4
720										723.0 TAN AND GRAY FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD. CLOSE FRACTURE SPACING. METAMORPHOSED GRANITE REC=96% RQD=67% RMR=49	25.7
							RS-3				
715							RS-4				
710											
705										703.0 Boring Terminated at Elevation 703.0 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	45.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 5+26	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.7 ft	**TOTAL DEPTH** 45.7 ft	**NORTHING** 869,892	**EASTING** 1,744,767	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 20.0 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 @ 25.7 ft	
	723.0	25.7	5.0	3:24/1.0 3:41/1.0 3:23/1.0 2:57/1.0 2:12/1.0	(4.2) 84%	(2.2) 44%		(19.1) 96%	(13.4) 67%		723.0 TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=96% RQD=67% RMR=49	25.7
720	718.0	30.7	5.0	3:15/1.0 3:08/1.0 3:21/1.0 2:56/1.0 3:00/1.0	(5.0) 100%	(4.0) 80%	RS-3					
715	713.0	35.7	5.0	3:21/1.0 2:54/1.0 3:13/1.0 3:12/1.0 3:51/1.0	(5.0) 100%	(3.9) 78%	RS-4					
710	708.0	40.7	5.0	5:43/1.0 3:52/1.0 3:34/1.0 4:03/1.0 4:10/1.0	(4.9) 98%	(3.3) 66%						
705	703.0	45.7									703.0 Boring Terminated at Elevation 703.0 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	45.7

NCDOT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/9/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 6+36	**OFFSET** 16 ft LT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.5 ft	**TOTAL DEPTH** 53.6 ft	**NORTHING** 869.956	**EASTING** 1,744,868	**24 HR.** 0.8
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.5 GROUND SURFACE	0.0
	747.5	1.0	WOH	WOH	WOH	0		W		ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	745.7	2.8	WOH	2	3	5		W			
740	740.7	7.8	WOH	WOH	WOH	0		W		737.5	11.0
										GRAY, COARSE SAND	
735	735.7	12.8	9	9	4	13		Sat.		734.7	13.8
										RESIDUAL BROWN, MICACEOUS, SANDY SILT	
730	730.7	17.8	4	13	26	39		M		731.2	17.3
										TAN AND ORANGE, SAPROLITIC, SILTY SAND	
725	725.7	22.8	100/0.3			100/0.3				726.7	21.8
										WEATHERED ROCK (METAMORPHOSED GRANITE)	
720	720.7	27.8	60/0.1			60/0.1	RS-5			720.7	27.8
715										CRYSTALLINE ROCK TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=87% RQD=64% RMR=49	
							RS-6				
710											
705											
700											
695										694.9	53.6
										Boring Terminated at Elevation 694.9 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 6+36	**OFFSET** 16 ft LT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.5 ft	**TOTAL DEPTH** 53.6 ft	**NORTHING** 869.956	**EASTING** 1,744,868	**24 HR.** 0.8
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 25.8 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)
720.7											Begin Coring @ 27.8 ft	
720	720.7	27.8	1.8	2:49/1.0 2:05/0.8	(1.2) 67%	(0.9) 50%	RS-5	(22.5) 87%	(16.5) 64%		720.7 CRYSTALLINE ROCK	27.8
	718.9	29.6	5.0	2:22/1.0 2:09/1.0 2:31/1.0 3:40/1.0 3:27/1.0	(4.4) 88%	(2.7) 54%					TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=87% RQD=64% RMR=49	
715	713.9	34.6	5.0	3:50/1.0 3:34/1.0 3:26/1.0 3:06/1.0 2:28/1.0	(4.7) 94%	(3.5) 70%	RS-6					
710	708.9	39.6	5.0	3:18/1.0 3:03/1.0 2:22/1.0 2:04/1.0 3:24/1.0	(3.2) 64%	(1.5) 30%						
705	703.9	44.6	5.0	3:46/1.0 4:03/1.0 3:58/1.0 3:48/1.0 4:13/1.0	(5.0) 100%	(4.1) 82%						
700	698.9	49.6	4.0	3:45/1.0 3:50/1.0 3:31/1.0 3:39/1.0	(4.0) 100%	(3.8) 95%						
695	694.9	53.6									694.9	53.6
											Boring Terminated at Elevation 694.9 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

IT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/9/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 6+36	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 41.9 ft	**NORTHING** 869,910	**EASTING** 1,744,876	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	747.6	1.0	WOH	WOH	WOH	0		W		748.6 GROUND SURFACE	0.0
745	745.6	3.0	WOH	WOH	WOH	0		W		**ALLUVIAL** BROWN AND GRAY SILTY CLAY	
740	740.6	8.0	3	3	6	9		W		736.1	12.5
735	735.6	13.0	11	10	37	47		M		**RESIDUAL** LIGHT TAN, SAPROLITIC, SILTY SAND	
730	730.6	18.0	28	23	29	52		M		726.6	22.0
725	725.6	23.0	53	47/0.2		100/0.7				**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
720	720.6	28.0	60/0.1			60/0.1				715.6	33.0
715	715.6	33.0	57	43/0.2		100/0.7				**WEATHERED ROCK** (METAMORPHOSED GRANITE)	
710	710.6	38.0	60/0.1			60/0.1				710.6	38.0
	706.7	41.9	60/0.0			60/0.0				**CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	
										706.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 706.7 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	41.9

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 7+45	**OFFSET** 16 ft LT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 27.3 ft	**NORTHING** 869,974	**EASTING** 1,744,976	**24 HR.** 1.6
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/31/12	**COMP. DATE** 09/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	747.6	1.0								748.6 GROUND SURFACE 0.0
	746.1	2.5	3	3	5	8		W		**ALLUVIAL** BROWN AND GRAY, SILTY CLAY
745			4	5	8	13		W		745.1 3.5
	741.3	7.3								743.6 BROWN AND GRAY, CLAYEY SAND 5.0
740			3	4	8	12		M		**RESIDUAL** GRAY AND BROWN, SAPROLITIC, SANDY SILT
735	735.3	13.3	6	12	17	29		M		
	731.3	17.3	100/0.4			100/0.4				732.6 16.0
730										**WEATHERED ROCK** (METAMORPHOSED GRANITE)
	726.3	22.3	100/0.3			100/0.3				
725										
	721.3	27.3	60/0.0			60/0.0				721.3 27.3
										Boring Terminated at Elevation 721.3 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/4/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 7+45	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 35.3 ft	**NORTHING** 869,928	**EASTING** 1,744.983	**24 HR.** 2.9
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	747.8	1.0	3	4	7	11		W		748.8 GROUND SURFACE	0.0
	746.3	2.5				11		Sat.		**ALLUVIAL** ORANGE, HIGHLY PLASTIC, SILTY CLAY	
745			3	6	5					745.8 ORANGE AND TAN, CLAYEY SAND	3.0
										743.3 **RESIDUAL** LIGHT TAN, SAPROLITIC, SILTY SAND	5.5
	741.6	7.2	6	4	5	9		M			
740										738.8 **WEATHERED ROCK** (METAMORPHOSED GRANITE)	10.0
	736.6	12.2	100/0.3			100/0.3					
735											
	733.7	15.1	60/0.0			60/0.0				733.7 **CRYSTALLINE ROCK** (METAMORPHOSED GRANITE)	15.1
730										733.0 TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD. CLOSE TO MODERATELY CLOSE FRACTURE SPACING, METAMORPHOSED GRANITE REC=74% RQD=57% RMR=49	15.8
							RS-7				
725							RS-8				
720											
715										713.5	35.3
										Boring Terminated at Elevation 713.5 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 7+45	**OFFSET** 30 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 35.3 ft	**NORTHING** 869,928	**EASTING** 1,744.983	**24 HR.** 2.9
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 08/29/12	**COMP. DATE** 08/29/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
733											Begin Coring @ 15.8 ft	
	733.0	15.8	4.5	2:41/1.0 3:21/1.0 2:07/1.0 0:41/1.0 1:14/0.5	(2.7) 60%	(2.6) 58%		(14.5) 74%	(11.2) 57%		733.0 TAN AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD. CLOSE TO MODERATELY CLOSE FRACTURE SPACING. METAMORPHOSED GRANITE REC=74% RQD=57% RMR=49	15.8
730												
	728.5	20.3	5.0	2:28/1.0 1:57/1.0 1:10/1.0 2:28/1.0 3:58/1.0	(2.1) 42%	(0.9) 18%	RS-7					
725							RS-8					
	723.5	25.3	5.0	4:10/1.0 3:50/1.0 3:28/1.0 3:02/1.0 3:58/1.0	(4.7) 94%	(3.4) 68%						
720												
	718.5	30.3	5.0	4:12/1.0 3:52/1.0 3:17/1.0 4:38/1.0 4:30/1.0	(5.0) 100%	(4.3) 86%						
715												
	713.5	35.3									713.5	35.3
											Boring Terminated at Elevation 713.5 ft in CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	

C:\DOT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/9/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 8+30	**OFFSET** 20 ft LT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 24.7 ft	**NORTHING** 869,991	**EASTING** 1,745.059	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/04/12	**COMP. DATE** 09/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 10 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
750										GROUND SURFACE	749.4	0.0
	748.4	1.0	2	2	2	4		W		ALLUVIAL TAN AND ORANGE. SANDY CLAY		
	746.5	2.9				8					743.4	6.0
745			2	3	5			W		RESIDUAL LIGHT TAN. SAPROLITIC. SILTY SAND		
	741.5	7.9										
740			10	14	24	38		M				
	736.5	12.9									734.4	15.0
735			29	44	36	80				BROWN AND ORANGE. MICACEOUS. SANDY SILT		
	731.5	17.9						M			731.0	18.4
730			10	30	70/0.3	100/0.3				WEATHERED ROCK (GRANITE)		
	726.5	22.9	100/0.3			100/0.3						
725	724.7	24.7	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 724.7 ft on CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	724.7	24.7

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NO. 6 ON -RPCY4- (GREENSBORO WESTERN LOOP)				**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 8+30	**OFFSET** 34 ft RT	**ALIGNMENT** -RPCY4-	**0 HR.** N/A
COLLAR ELEV. 749.5 ft	**TOTAL DEPTH** 22.0 ft	**NORTHING** 869,938	**EASTING** 1,745.068	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		**DRILL METHOD** Wash Boring		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/04/12	**COMP. DATE** 09/04/12	**SURFACE WATER DEPTH** N/A	

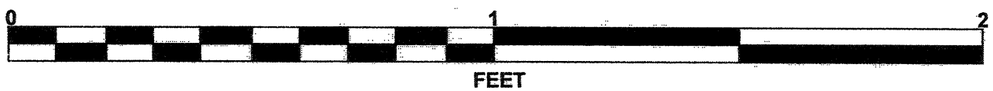
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 10 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
750										GROUND SURFACE	749.5	0.0
	748.5	1.0	3	3	4	7		W		ALLUVIAL TAN AND ORANGE. SANDY CLAY		
	746.7	2.8				7					743.5	6.0
745			3	3	4			W		RESIDUAL TAN. CLAYEY SAND		
	741.7	7.8									738.5	11.0
740			2	2	2	4		W		ORANGE-BROWN. MICACEOUS. SANDY SILT		
	736.7	12.8									735.7	13.8
735			7	14	25	39		M		TAN. SAPROLITIC. SILTY SAND		
	731.7	17.8									731.7	17.8
730			100/0.5			100/0.5				WEATHERED ROCK (GRANITE)		
	727.5	22.0	60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 727.5 ft on CRYSTALLINE ROCK (METAMORPHOSED GRANITE)	727.5	22.0

NCDOT BORE DOUBLE U2524C_GEO_BH_RPCY4.GPJ NC_DOT.GDT 10/4/12

CORE PHOTOGRAPHS

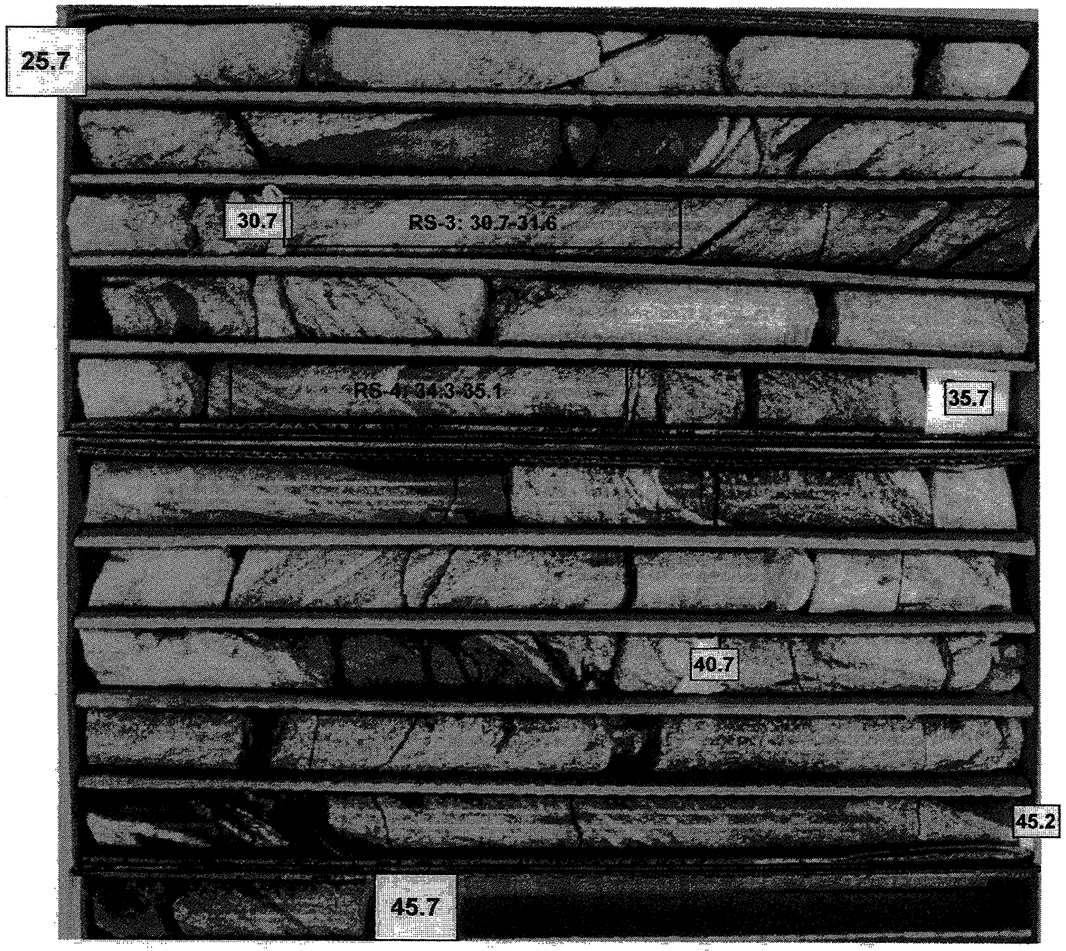
B1-A

BOXES 1 & 2: 23.9 - 40.2 FEET



B2-B

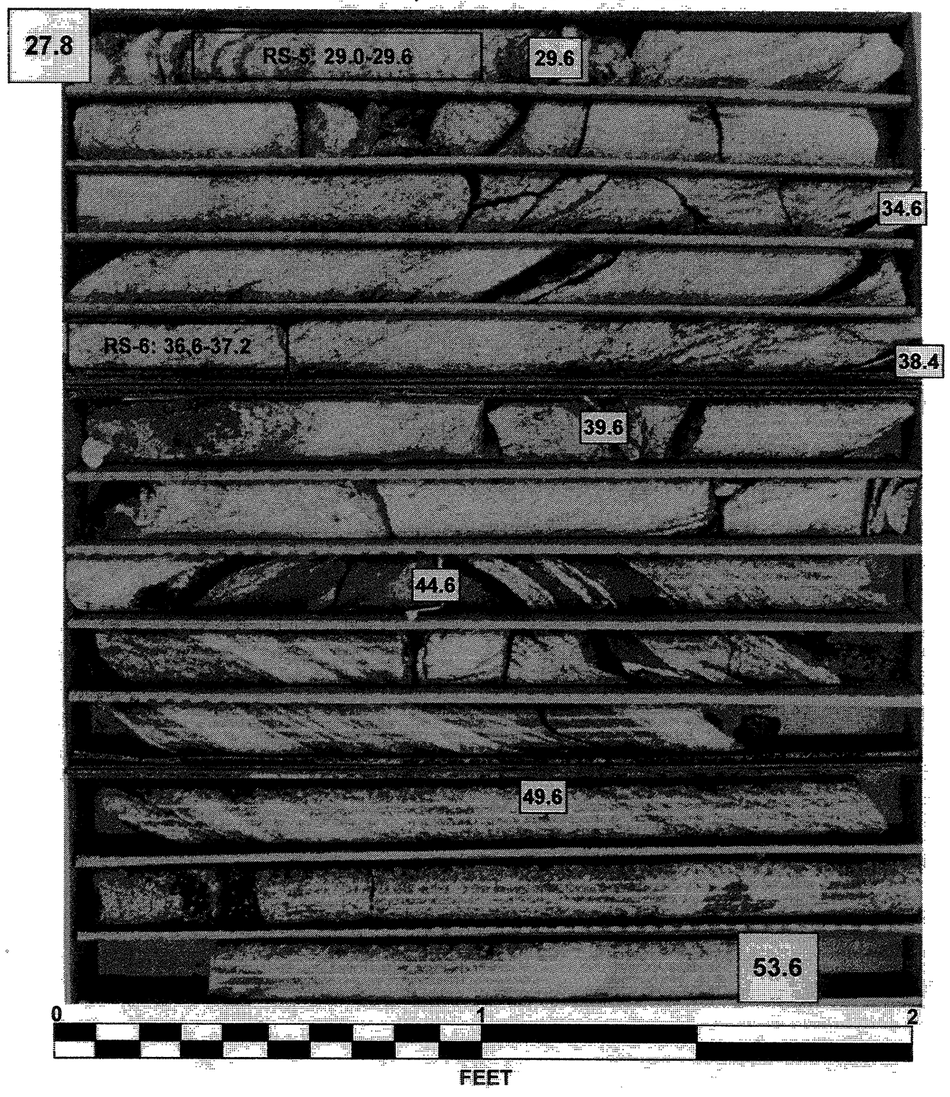
BOXES 1, 2 & 3: 25.7 - 45.7 FEET



CORE PHOTOGRAPHS

B3-A

BOXES 1, 2 & 3: 27.8 - 53.6 FEET



CORE PHOTOGRAPHS

B4-B

BOXES 1 & 2: 15.8 - 35.3 FEET

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34820.1.2 (U-2524C)	1	193

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *34820.1.2 (U-2524C)* F.A. PROJ. *NHF-0708(52)*

COUNTY *GUILFORD*

PROJECT DESCRIPTION *GREENSBORO WESTERN LOOP FROM NORTH OF SR 2176 (BRYAN BOULEVARD) TO US 220 (BATTLEGROUND AVENUE)*

SITE DESCRIPTION *STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER -Y4- (US 220) AND HORSEPEN CREEK*

ID: U-2524C

PROJECT: 34820.1.2

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3-6	SITE PLAN SHEETS
7-10	LEFT LANE PROFILE
11-41	LEFT LANE CROSS SECTIONS
42-86	LEFT LANE BORE & CORE LOGS
87-99	LEFT LANE CORE PHOTOGRAPHS
100-103	RIGHT LANE PROFILE
104-135	RIGHT LANE CROSS SECTIONS
136-179	RIGHT LANE BORE & CORE LOGS
180-191	RIGHT LANE CORE PHOTOGRAPHS
192, 193	ROCK CORE TEST RESULTS

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.

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

AMEC

TRIGON

CONETEC

INVESTIGATED BY *N.D. MOHS*

CHECKED BY *N.T. ROBERSON*

SUBMITTED BY *N.T. ROBERSON*

DATE *FEBRUARY 2013*

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

2/18/13

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

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.
34820.1.2 (U-2524C)	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	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	
CLASS.	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	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
- [X] CME-45C
- [ ] CME-550
- [ ] PORTABLE HOIST
- [X] CME-850
- [ ] _____

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
- [X] TRICONE _____" TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

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

CORE SIZE:
- [ ] -B_____
- [X] -N Q-3
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [X] 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: SEE BELOW

ELEVATION: FT.

NOTES:
BY3-512: -BY3- STA. 13+62.19, ELEV=762.82'
BM-12: -BL- STA. 174+63, 122' LT, ELEV=748.99'
BL-30: -BL- STA. 133+54+.19, ELEV=767.90'
BL-32: -BL- STA. 143+08.17, ELEV=750.44'
BL-33: -BL- STA. 150+32.01, ELEV=749.23'
BL-34: -BL- STA. 154+84.47, ELEV=748.80'
BL-37: -BL- STA. 175+03.22, ELEV=769.28

REVISED 09/23/09

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	3

SITE PLAN

BEGIN BRIDGE
STA 379+45.00 -L-

NAD 83

380+00

385+00

390+00

20+00

RETENTION POND

CONC SPILLWAY

2SFAPTS

WD STAIRS

WD SIGN

-Y3-

-L-

EB1A_LL
EB1B_LL
B1A_LL
B1B_LL
B2A_LL
B2-B_LL
B3A_LL
B3C_LL
B3B_LL
B4A_LL
B4B_LL
B5A_LL
B5C_LL
B6A_LL
B6B_LL
B7A_LL
B7B_LL
B8A_LL
B8B_LL
B9A_LL
B9B_LL

EB1A_RL
EB1B_RL
B1A_RL
B1B_RL
B2A_RL
B2B_RL
B3A_RL
B3B_RL
B4A_RL
B4B_RL
B5A-A_RL
B5A-B_RL
B5B-A_RL
B5B-B_RL
B6A_RL
B6B_RL
B7A_RL
B7B_RL
B8A_RL
B8B_RL
B9A_RL
B9B_RL

MATCHLINE AT -L- STATION 391+35

SR 2459 DAWBRIDGE PARKWAY

ISBKAPTS

TRILLIUM LN

BK SIGN

BK RETAINING WALL

HORSEPEN CR

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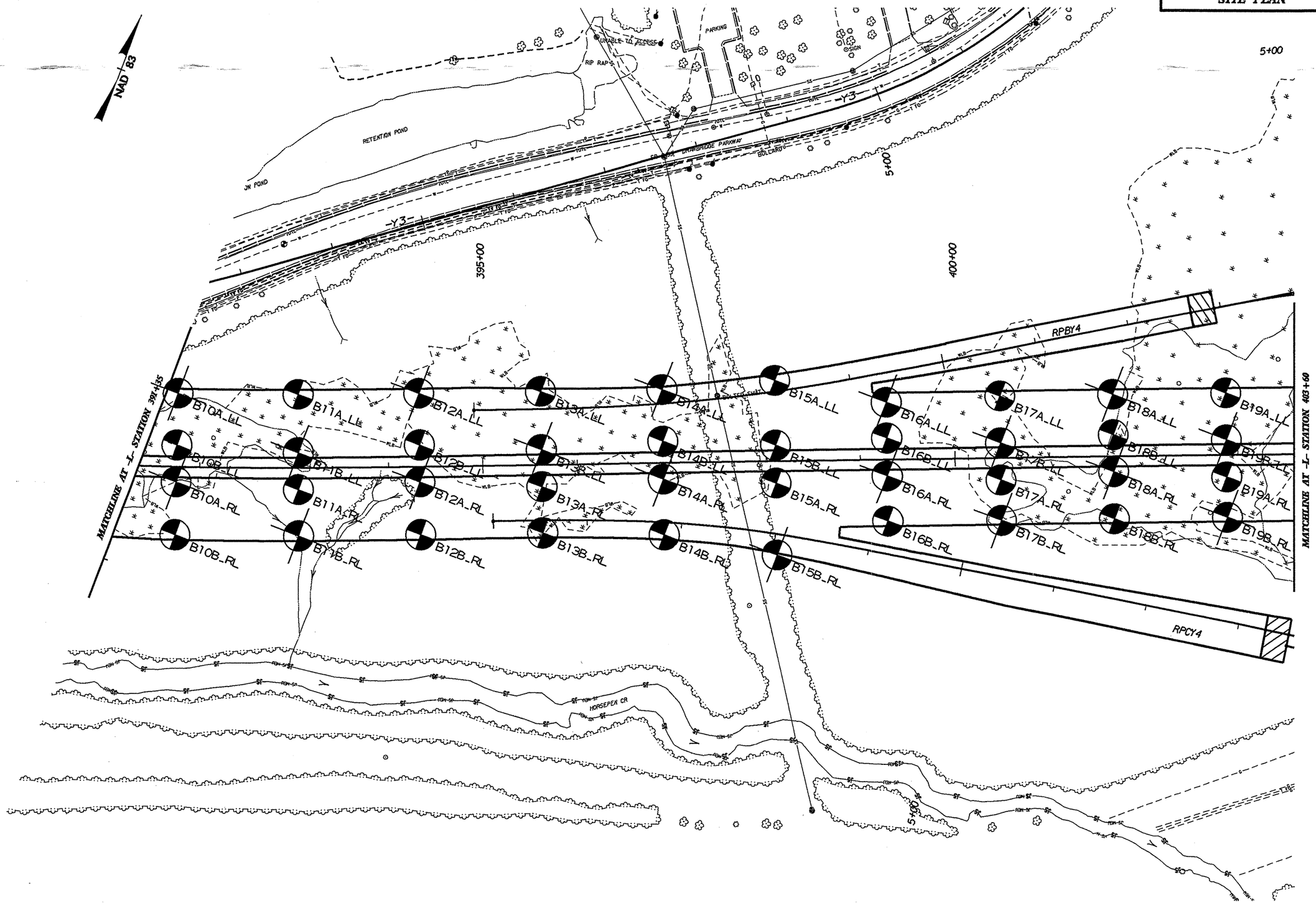
PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	4

SITE PLAN



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PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	5

SITE PLAN

MATCHLINE AT -L- STATION 403+60

MATCHLINE AT -L- STATION 471+61

NAD 83

10+00

405+00

20+00

15+00

40+00

45+00

15+00

10+00

35+00

35+00

10+00

-Y4-

-Y4-

-L-

RPDY4

RPAY4

B20A_LL

B20B_LL

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B22B_RL

B23A_LL

B23B_LL

B23A_RL

B23B_RL

B24A_LL

B25A_LT

B25B_RT

B26C_LT

B26A_LT

B26A_RT

B26B_RT

3SFBKAPTS

3SFBKAPTS

3SFBKAPTS

MIXED HARDWOODS

MIXED HARDWOODS

MIXED HARDWOODS

WOODS

BRICK

WOOD WALK

GAS VENT PIPE

GAS VENT PIPE

RIP RAP

RIP RAP

SOIL PATH

WET AREA

PLASTIC CONTAINER

A/G TANK

WELL

GATE BOULARDS

GATE

HORSEPEN CR

USGS STREAM GAUGE STATION

TRANSMITTER

BATTLEGROU

8/17/99

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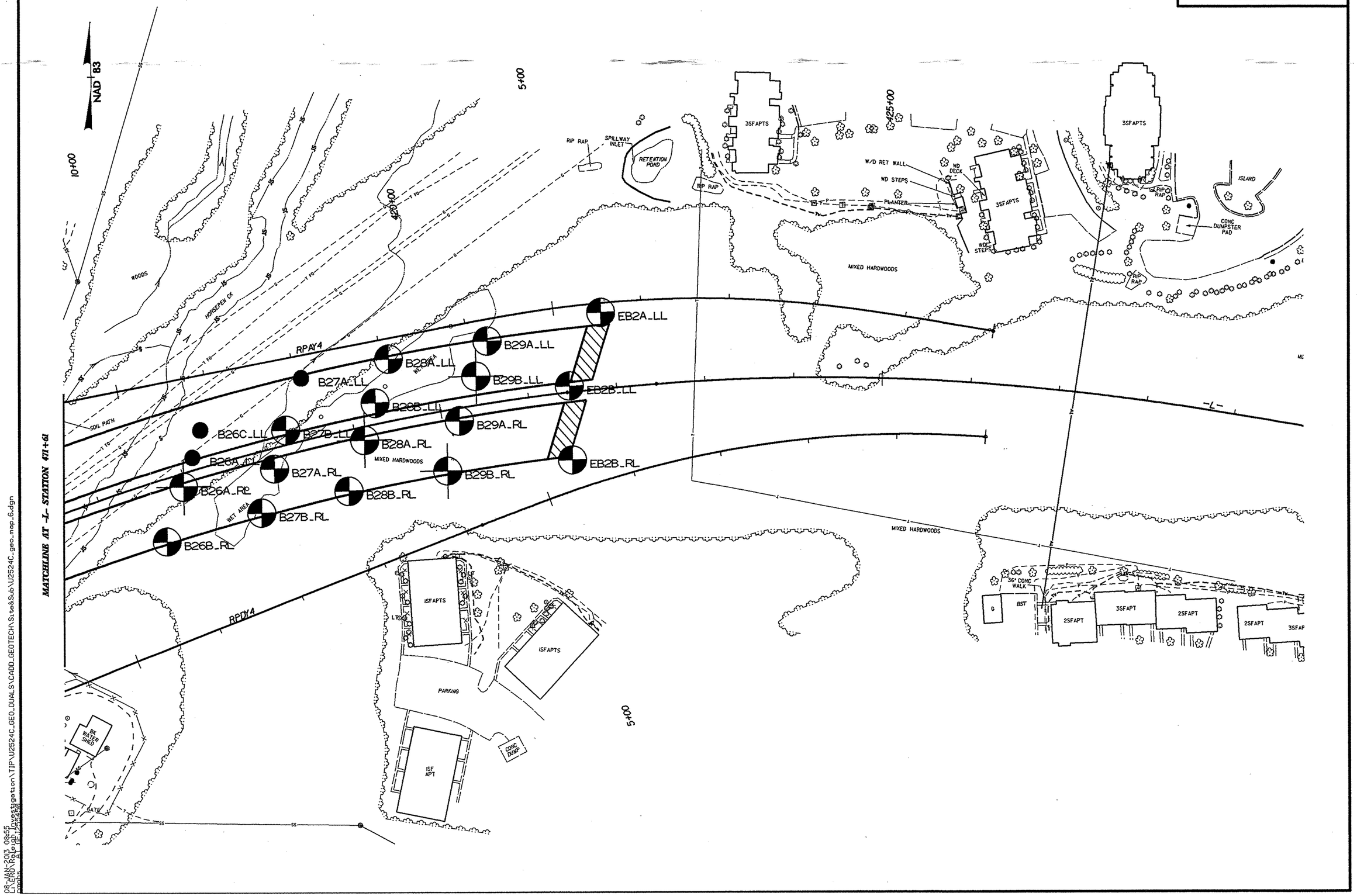
SITE PLAN



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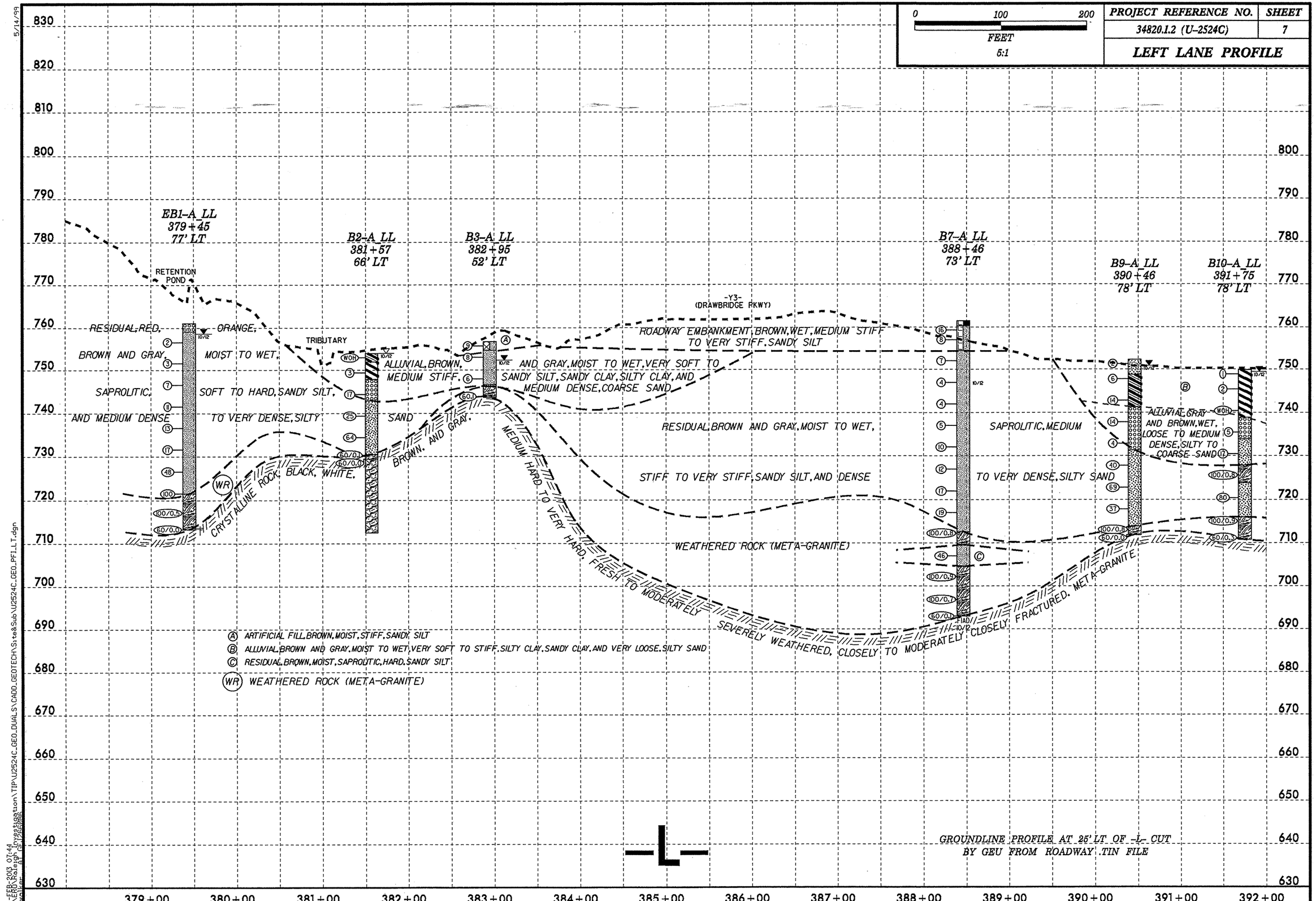

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FEET
5:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
7
LEFT LANE PROFILE
EB1-A_LL
379+45
77' LT
B2-A_LL
381+57
66' LT
B3-A_LL
382+95
52' LT
B7-A_LL
388+46
73' LT
B9-A_LL
390+46
78' LT
B10-A_LL
391+75
78' LT
RETENTION POND
TRIBUTARY
-Y3-
(DRAWBRIDGE PKWY)
RESIDUAL, RED, ORANGE, BROWN AND GRAY, MOIST TO WET, SAPROLITIC, SOFT TO HARD, SANDY SILT, AND MEDIUM DENSE TO VERY DENSE, SILTY SAND
ALLUVIAL, BROWN, MEDIUM STIFF, AND GRAY, MOIST TO WET, VERY SOFT TO SANDY SILT, SANDY CLAY, SILTY CLAY, AND MEDIUM DENSE, COARSE SAND
ROADWAY EMBANKMENT, BROWN, WET, MEDIUM STIFF TO VERY STIFF, SANDY SILT
RESIDUAL, BROWN AND GRAY, MOIST TO WET, STIFF TO VERY STIFF, SANDY SILT, AND DENSE
SAPROLITIC, MEDIUM TO VERY DENSE, SILTY SAND
ALLUVIAL, GRAY AND BROWN, WET, LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND
CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE
WEATHERED ROCK (META-GRANITE)
Ⓐ ARTIFICIAL FILL, BROWN, MOIST, STIFF, SANDY SILT
Ⓑ ALLUVIAL, BROWN AND GRAY, MOIST TO WET, VERY SOFT TO STIFF, SILTY CLAY, SANDY CLAY, AND VERY LOOSE, SILTY SAND
Ⓒ RESIDUAL, BROWN, MOIST, SAPROLITIC, HARD, SANDY SILT
(WR) WEATHERED ROCK (META-GRANITE)
-L-
GROUNDLINE PROFILE AT 25' LT OF -L- CUT
BY GEU FROM ROADWAY .TIN FILE
830
820
810
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
379+00
380+00
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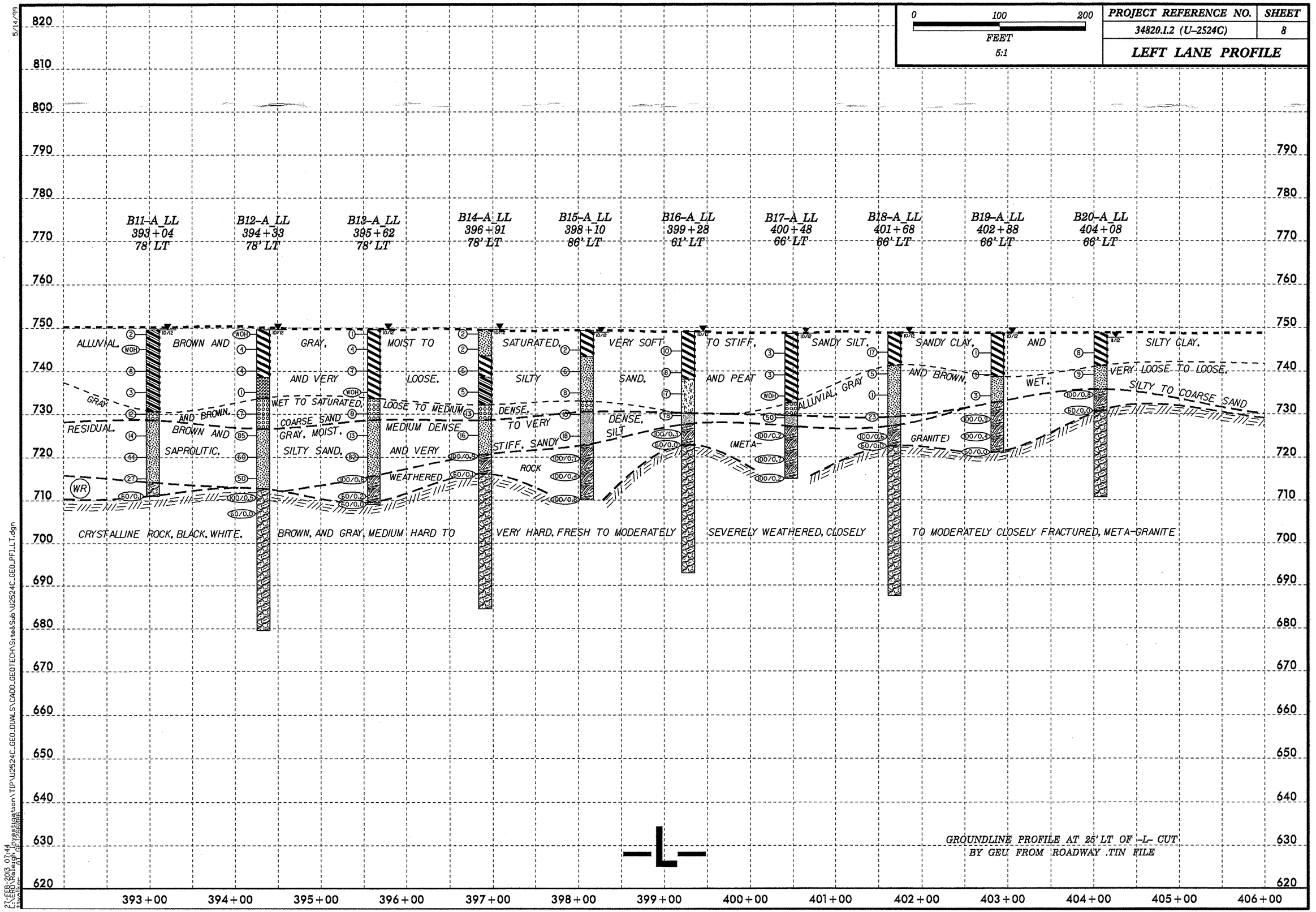
389+00
390+00
391+00
392+00



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FEET
5:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
8
LEFT LANE PROFILE
B11-A_LL 393+04 78' LT
B12-A_LL 394+33 78' LT
B13-A_LL 395+62 78' LT
B14-A_LL 396+91 78' LT
B15-A_LL 398+10 86' LT
B16-A_LL 399+28 61' LT
B17-A_LL 400+48 66' LT
B18-A_LL 401+68 66' LT
B19-A_LL 402+88 66' LT
B20-A_LL 404+08 66' LT
ALLUVIAL, BROWN AND GRAY, MOIST TO SATURATED, VERY SOFT TO STIFF, SANDY SILT, SANDY CLAY, AND SILTY CLAY.
AND VERY LOOSE, SILTY SAND, AND PEAT AND BROWN, WET, VERY LOOSE TO LOOSE, SILTY TO COARSE SAND
GRAY AND BROWN, WET TO SATURATED, LOOSE TO MEDIUM DENSE, ALLUVIAL, GRAY
RESIDUAL, BROWN AND COARSE SAND GRAY, MOIST, MEDIUM DENSE TO VERY DENSE, (META-GRANITE)
SAPROLITIC, SILTY SAND, AND VERY STIFF, SANDY SILT
WEATHERED ROCK
WR
CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE
-L-
GROUNDLINE PROFILE AT 25' LT OF -L- CUT
BY GEU FROM ROADWAY .TIN FILE
820 810 800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630 620
393+00 394+00 395+00 396+00 397+00 398+00 399+00 400+00 401+00 402+00 403+00 404+00 405+00 406+00
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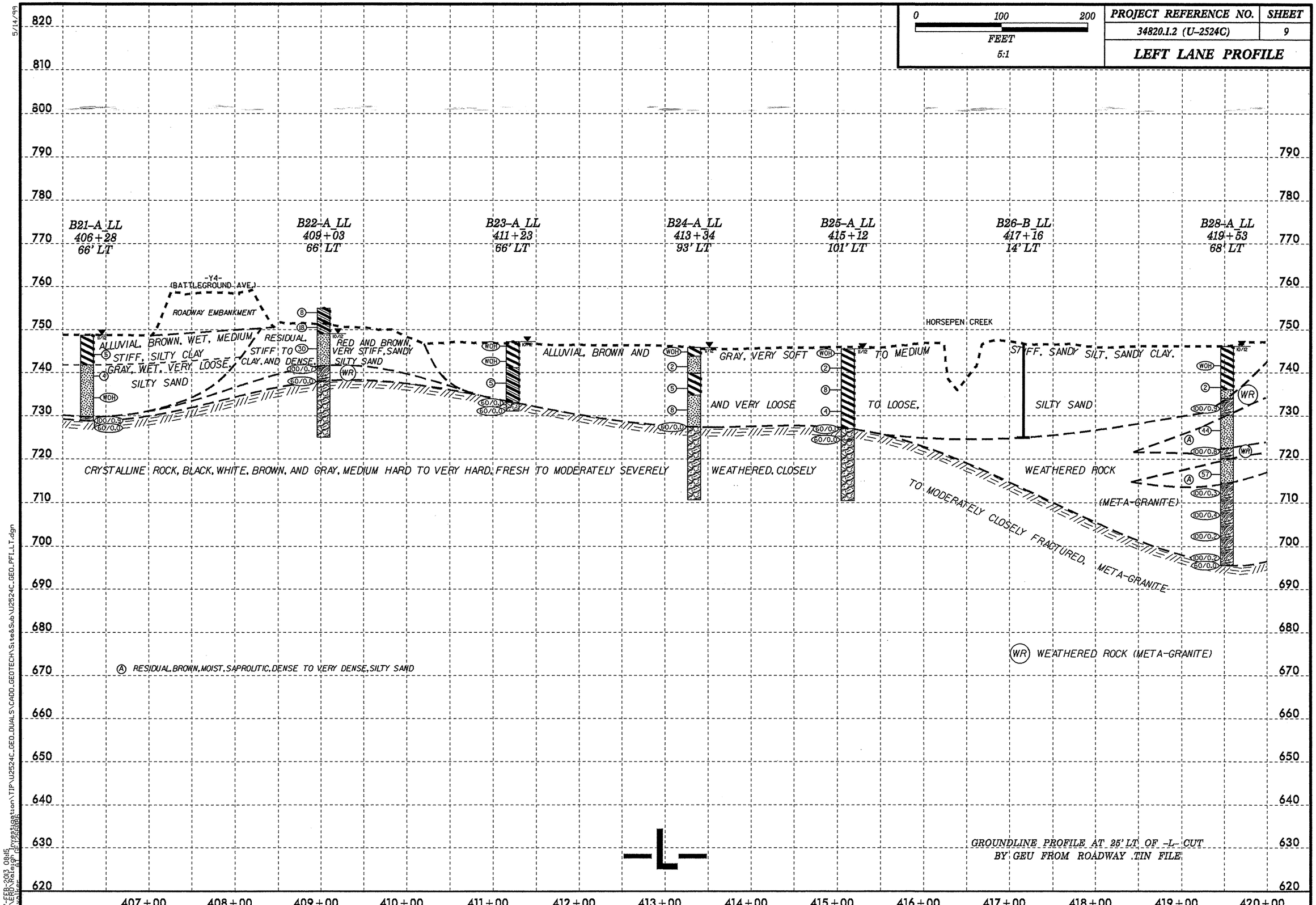

PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
9
LEFT LANE PROFILE
0 100 200
FEET
5:1
B21-A_LL
406+28
66' LT
B22-A_LL
409+03
66' LT
B23-A_LL
411+23
66' LT
B24-A_LL
413+34
93' LT
B25-A_LL
415+12
101' LT
B26-B_LL
417+16
14' LT
B28-A_LL
419+53
68' LT
-Y4-
(BATTLEGROUND AVE.)
ROADWAY EMBANKMENT
HORSEPEN CREEK
ALLUVIAL, BROWN, WET, MEDIUM STIFF, SILTY CLAY
GRAY, WET, VERY LOOSE, SILTY SAND
RESIDUAL, STIFF TO CLAY, AND DENSE
RED AND BROWN, VERY STIFF, SANDY SILTY SAND
ALLUVIAL, BROWN AND GRAY, VERY SOFT TO MEDIUM STIFF, SANDY SILT, SANDY CLAY,
AND VERY LOOSE TO LOOSE, SILTY SAND
CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY
WEATHERED ROCK (META-GRANITE)
TO MODERATELY CLOSELY FRACTURED, META-GRANITE
(A) RESIDUAL, BROWN, MOIST, SAPROLITIC, DENSE TO VERY DENSE, SILTY SAND
(WR) WEATHERED ROCK (META-GRANITE)
-L-
GROUNDLINE PROFILE AT 25' LT OF -L- CUT
BY GEU FROM ROADWAY .TIN FILE
820
810
800
790
780
770
760
750
740
730
720
710
700
690
680
670
660
650
640
630
620
407+00
408+00
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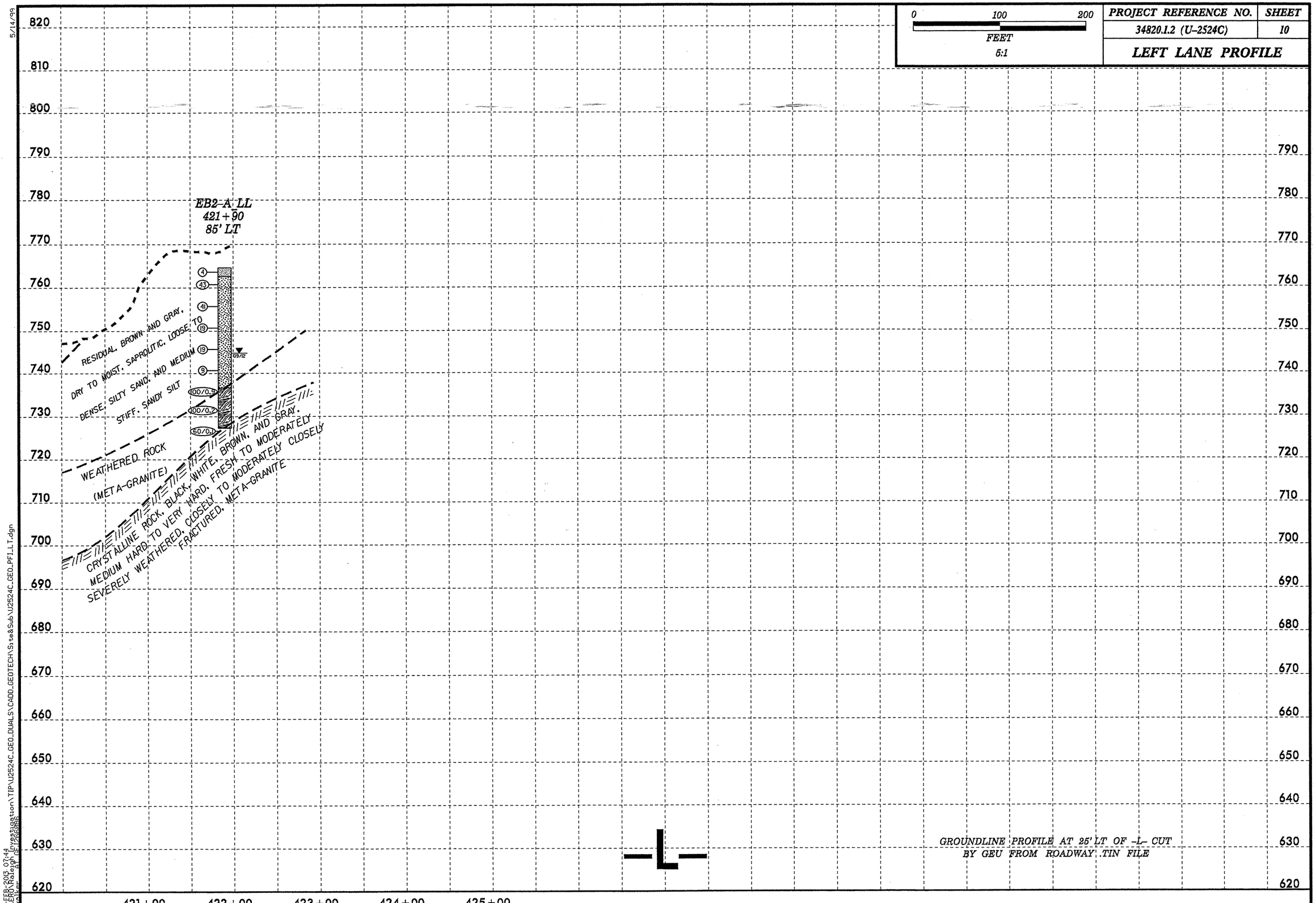
417+00
418+00
419+00
420+00



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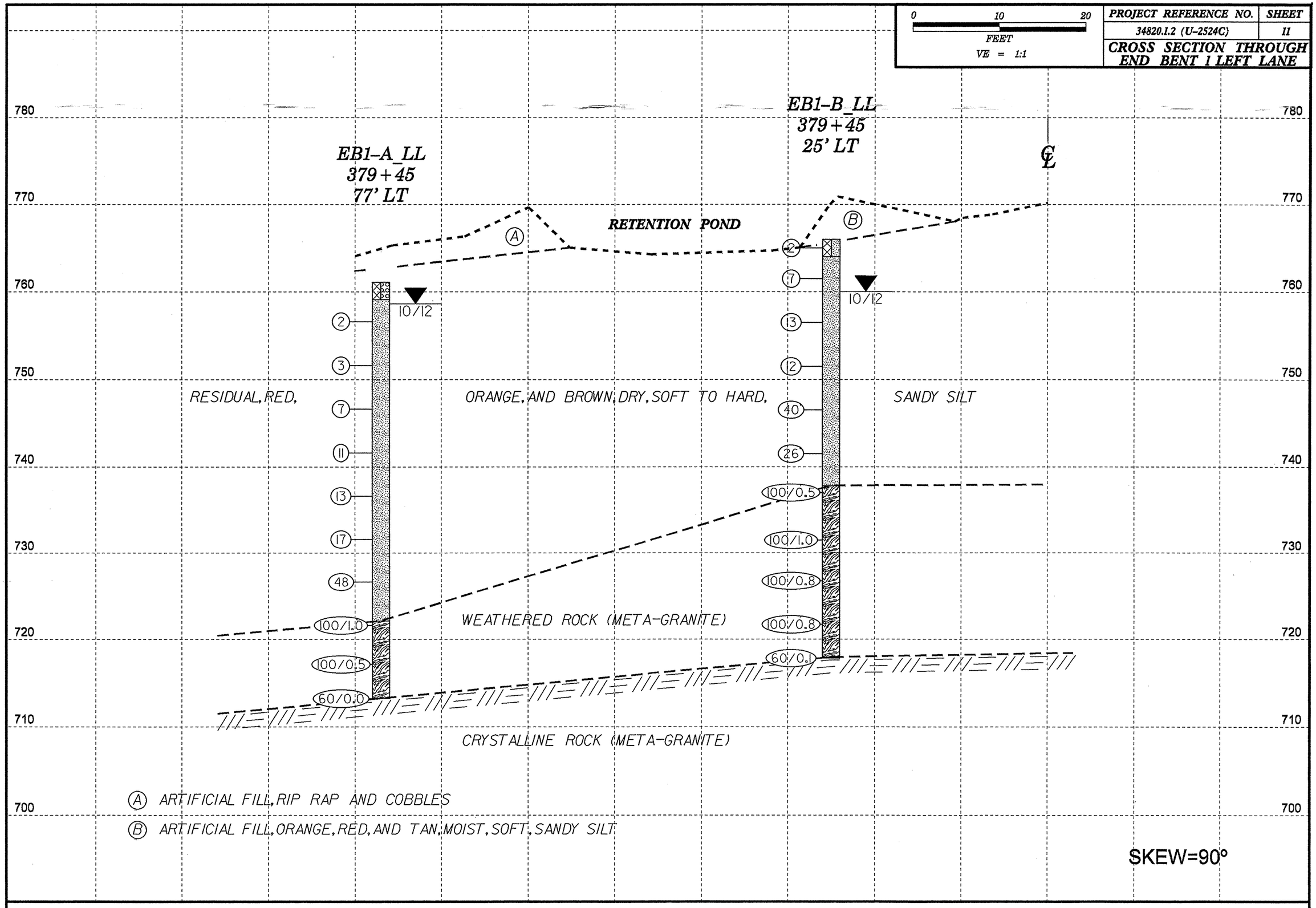
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	11

CROSS SECTION THROUGH END BENT 1 LEFT LANE



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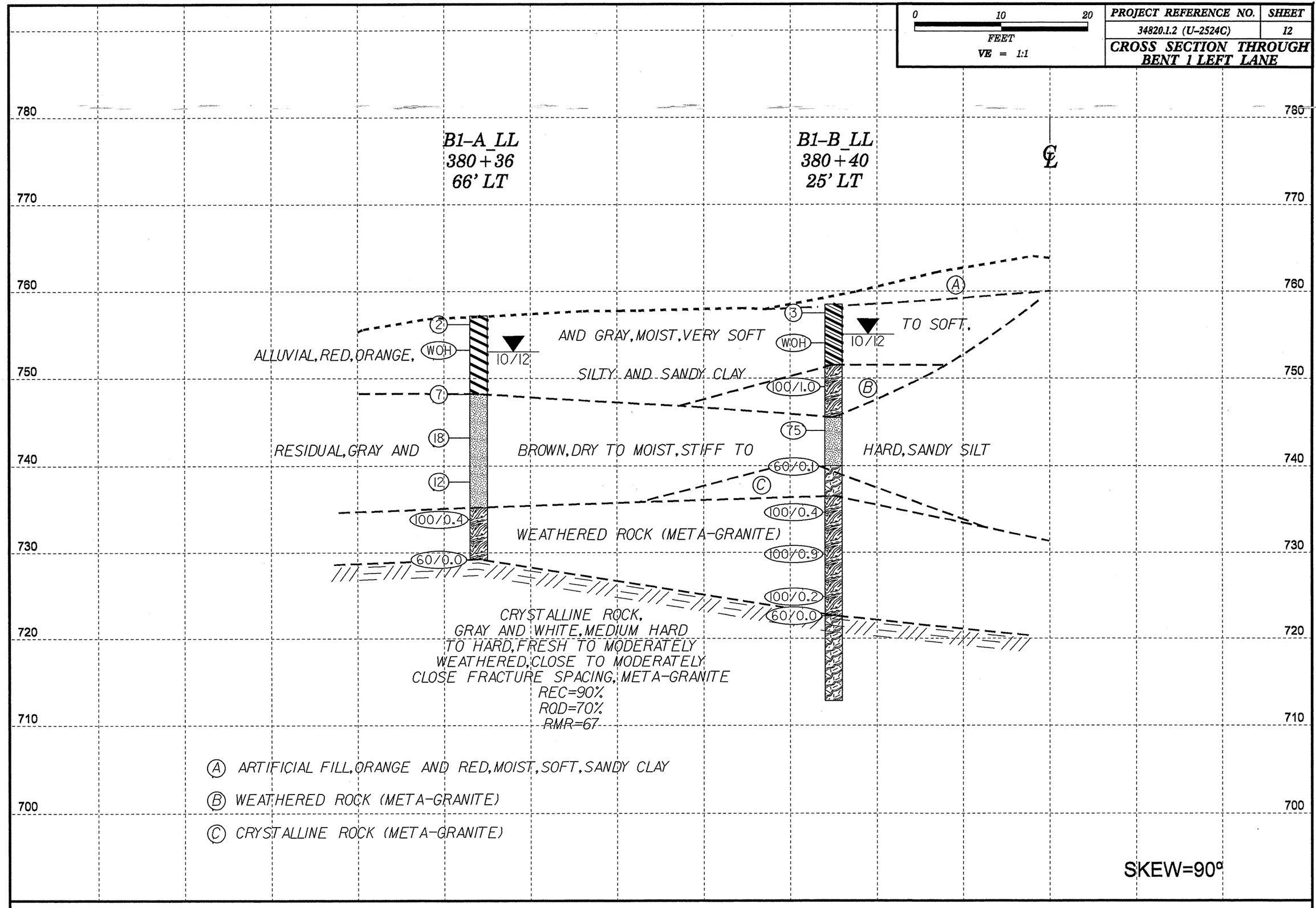
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	12
CROSS SECTION THROUGH BENT 1 LEFT LANE	



(A) ARTIFICIAL FILL, ORANGE AND RED, MOIST, SOFT, SANDY CLAY

(B) WEATHERED ROCK (META-GRANITE)

(C) CRYSTALLINE ROCK (META-GRANITE)

SKEW=90°

0 10 20 FEET	PROJECT REFERENCE NO.	SHEET
	34820.1.2 (U-2524C)	13
	CROSS SECTION THROUGH BENT 2 LEFT LANE	

780
770
760
750
740
730
720
710
700
690

B2-A_LL
381+57
66' LT

B2-B_LL
381+57
16' LT

℄

ALLUVIAL, WET, VERY SOFT, (WOH) (3)
ALLUVIAL, BROWN, (17)
RESIDUAL, ORANGE AND (25) (64)
11/12
BROWN AND GRAY, SANDY AND SILTY CLAY
WET, LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND
BROWN, DRY TO MOIST, MEDIUM DENSE TO DENSE, SAPROLITIC, SILTY SAND
(4) (4) (7) (6) (21)
11/12
(60/0.1) (60/0.0)
(60/0.3) (60/0.0)
WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD
TO HARD, SLIGHTLY TO MODERATELY
WEATHERED, CLOSE TO MODERATELY
CLOSE FRACTURE SPACING, META-GRANITE
REC=82%
RQD=51%
RMR=57

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	14

CROSS SECTION THROUGH BENT 3 LEFT LANE

780
770
760
750
740
730
720
710
700
690

B3-A_LL
382+95
52' LT

B3-C_LL
382+86
34' LT

B3-B_LL
382+77
16' LT

℄

9
8
ARTIFICIAL FILL, RED AND ORANGE,
10/12
6
ALLUVIAL, BROWN AND GRAY, DRY TO WET,
WEATHERED ROCK (META-GRANITE)
60/0.1
CRYSTALLINE ROCK (META-GRANITE)

5
15
DRY, STIFF, SANDY SILT AND CLAY
10/12
2
10/12
SOFT, SANDY SILT AND LOOSE, COARSE SAND
4
RESIDUAL, RED AND BROWN,
14
MEDIUM STIFF TO HARD,
22
81
100/0.4
100/0.3
100/0.8
60/0.0
FIAD
10/12

11
12
5
13
24
DRY TO MOIST,
SAPROLITIC, SANDY SILT
14
100/0.9
Ⓐ
79
(META-
100/0.5
GRANITE)
100/0.4
60/0.0
FIAD
10/12

CRYSTALLINE ROCK,
BLUE-GRAY, VERY HARD, FRESH,
CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC=100%
RQD=97%
RMR=86

Ⓐ WEATHERED ROCK (META-GRANITE)

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	15

CROSS SECTION THROUGH BENT 4 LEFT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

B4-A_LL
383+97
77' LT

B4-B_LL
383+61
29' LT

℄

RETENTION POND

ARTIFICIAL FILL, RED AND TAN, MOIST, MEDIUM TO VERY STIFF, SANDY CLAY

5
5
15
10/12

ALLUVIAL, GRAY AND TAN, MOIST TO WET, MEDIUM STIFF, SANDY CLAY,

6
8

RESIDUAL, GRAY AND BROWN, DRY, STIFF TO HARD,

9
77

WEATHERED ROCK (META-GRANITE)

100/0.3

CRYSTALLINE ROCK (META-GRANITE)

60/0.0

Ⓐ

RESIDUAL, TAN AND BROWN, DRY, HARD, SANDY SILT, AND DENSE,

84

Ⓑ

Ⓐ

14
13
10/12

AND LOOSE, SILTY SAND

4
12

SANDY SILT

60/0.1

SILTY SAND

48

100/0.9

WEATHERED ROCK (META-GRANITE)

100/0.5
60/0.0

CRYSTALLINE ROCK,
BROWN, WHITE, AND BLUE-GRAY,
HARD, FRESH TO SLIGHTLY WEATHERED,
CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC=98%
RQD=86%
RMR=75

Ⓐ CRYSTALLINE ROCK, BLUE-GRAY, HARD,
SLIGHTLY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE
REC=100%
RQD=59%
RMR=66

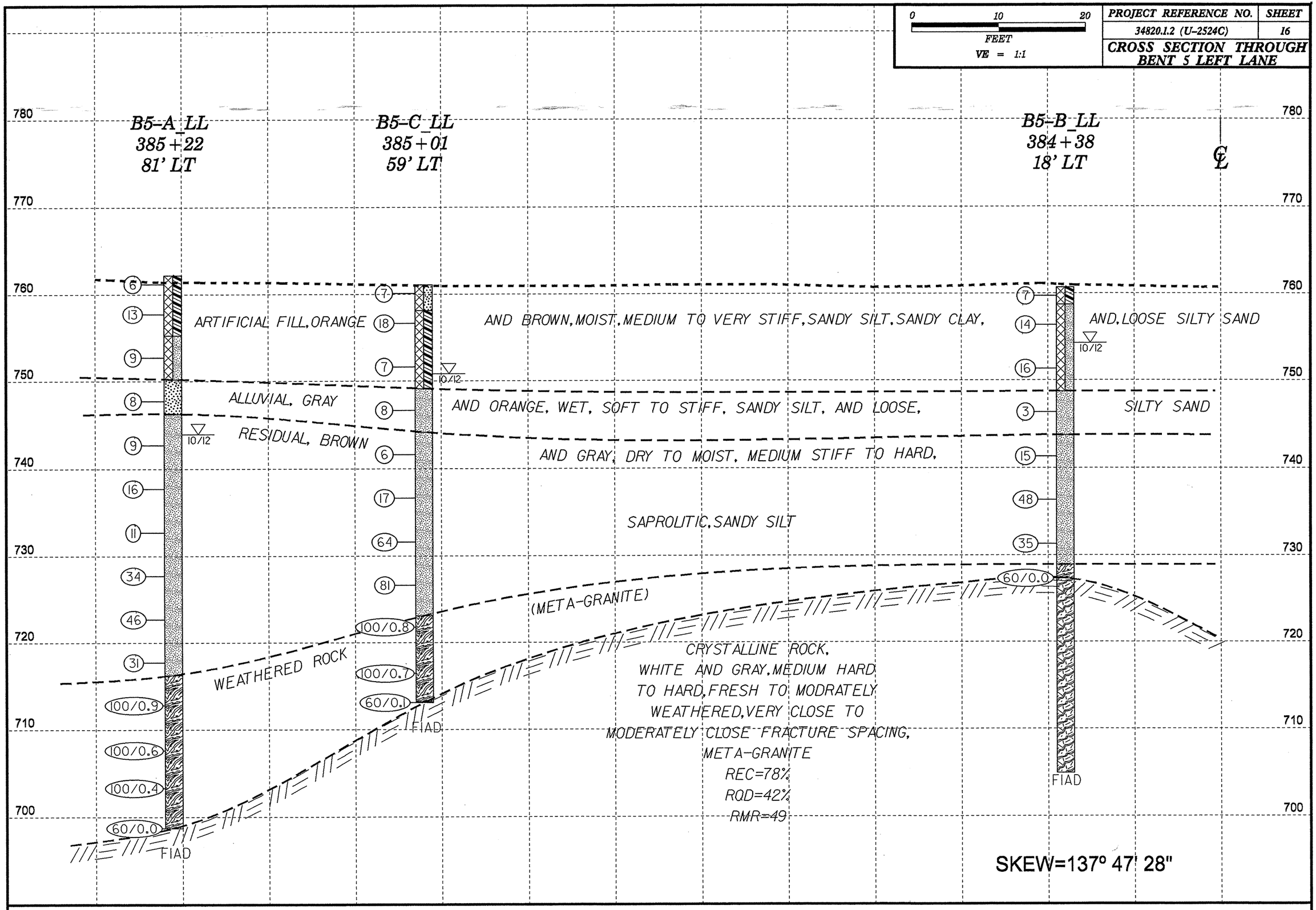
Ⓑ RESIDUAL, BROWN-GRAY, SAPROLITIC, SANDY SILT WITH INTERMITTENT WEATHERD ROCK

SKEW=119° 05' 46"

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	16

CROSS SECTION THROUGH BENT 5 LEFT LANE



0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	17

CROSS SECTION THROUGH BENT 6 LEFT LANE

780
770
760
750
740
730
720
710
700
690

B6-A_LL
387+78
79' LT

B6-C_LL
387+38
47' LT

B6-B_LL
386+98
15' LT

℄

13 13 10 4 5 8 9 25 26 100/0.2 100/0.5 100/0.8 100/0.2 100/0.3 100/0.3 60/0.0

▽ 10/12

FIAD

14 11 10 8 5 8 14 23 100/0.4 100/0.6 A 90 60/0.0

▽ 10/12

FIAD

12 24 14 5 5 8 21 15 43 60/0.3 60/0.0

▽ 10/12

RESIDUAL, GRAY AND BROWN, DRY TO MOIST, MEDIUM STIFF TO HARD, SANDY CLAY, SANDY SILT, AND MEDIUM DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

Ⓐ RESIDUAL, DARK GRAY AND BROWN, SANDY SILT

SKEW=139° 54' 31"

0	10	20
FEET		

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	18

CROSS SECTION THROUGH BENT 7 LEFT LANE

B7-A_LL
388+46
73' LT

B7-B_LL
387+95
11' LT

℄

770
760
750
740
730
720
710
700
690
680

ROADWAY EMBANKMENT, BROWN AND GRAY, STIFF TO VERY STIFF, SANDY SILT

DRY TO MOIST,

RESIDUAL, ORANGE, RED, AND

TAN, DRY TO MOIST, MEDIUM STIFF TO VERY STIFF,

SANDY SILT, SANDY CLAY,

AND VERY LOOSE TO VERY DENSE, SAPROLITIC, SILTY SAND

16, 8, 7, 4, 4, 5, 10, 12, 17, 19

10/12

100/0.8, 46, 100/0.9, 100/0.7, 60/0.1

F1AD

5, 17, 2, 3, 3, 13, 15, 43, 64, 100/0.8, 60/0.1, 60/0.0

10/12

WEATHERED ROCK (META-GRANITE)

Ⓐ RESIDUAL, BROWN AND GRAY, DRY, HARD, SANDY SILT

CRYSTALLINE ROCK,
BLACK, BROWN, WHITE AND GRAY,
MEDIUM HARD TO VERY HARD,
VERY SLIGHTLY TO MODRATELY
SEVERELY WEATHERED, CLOSE
FRACTURE SPACING, META-GRANITE
REC=71%
RQD=53%
RMR=56

SKEW=126° 19' 07"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	19

CROSS SECTION THROUGH BENT 8 LEFT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

B8-A_LL
389+17
78' LT

B8-B_LL
389+17
16' LT

℄

ROADWAY EMBANKMENT, DRY, STIFF, SANDY SILT

BROWN AND GRAY, AND SANDY CLAY

RESIDUAL, BROWN, WHITE, AND GRAY, DRY TO MOIST, MEDIUM STIFF TO HARD, SAPROLITIC, SANDY SILT AND LOOSE TO MEDIUM DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

B8-A_LL: 12, 11, 11, 15, 7, 15, 20, 16, 55, 9, 83, 60/0.1, 100/0.4, 60/0.1, 60/0.0, 60/0.0 FIAD; 10/12

B8-B_LL: 5, 10, 5, 5, 5, 12, 15, 9, 40, 12, 100/0.9, 60/0.0; 10/12

Ⓐ ALLUVIAL, BROWN, MOIST, LOOSE, SILTY SAND
Ⓑ CRYSTALLINE ROCK (META-GRANITE)

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	20

CROSS SECTION THROUGH BENT 9 LEFT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

B9-A_LL
390+46
78' LT

B9-B_LL
390+46
16' LT

℄

Ⓐ

2
6
14
14
4
40
69
37
100/0.8
60/0.0

10/12

ALLUVIAL, BROWN AND GRAY, MOIST TO WET, VERY LOOSE, SILTY SAND, AND MEDIUM STIFF TO STIFF, SILTY TO SANDY CLAY

RESIDUAL, GRAY AND WHITE, MOIST, DRY TO VERY DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, BLACK, WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE

Ⓐ ROADWAY EMBANKMENT, MEDIUM STIFF, SANDY SILT

2
3
6
4
14
60/0.2
75
60/0.3
100/0.7
60/0.0

10/12

BROWN AND GRAY, WET, LOOSE TO MEDIUM DENSE COARSE SAND,

WEATHERED ROCK (META-GRANITE)

REC=100%
RQD=79%
RMR=68

WEATHERED ROCK (META-GRANITE)

REC=85%
RQD=48%
RMR=58

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	21

CROSS SECTION THROUGH BENT 10 LEFT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

B10-A_LL
391+75
78' LT

B10-B_LL
391+75
23' LT

℄

10/12

(1) (2) ALLUVIAL, RED AND BROWN, WET, VERY SOFT TO STIFF, SILTY CLAY

(WOH)

(5) GRAY AND BROWN, LOOSE TO MEDIUM DENSE, SILTY SAND

(17)

WEATHERED ROCK (100/0.8) (META-GRANITE)

RESIDUAL, BROWN (80) AND WHITE, MOIST, MEDIUM TO VERY DENSE, (62) SAPROLITIC, SILTY SAND

(51)

(100/0.9)

WEATHERED ROCK (META-GRANITE)

(60/0.3)

REC=100%
RQD=81%
RMR=66

CRYSTALLINE ROCK,
WHITE, GRAY, AND BLACK, HARD,
SLIGHTLY TO MODERATELY WEATHERED,
CLOSE FRACTURE SPACING,
META-GRANITE

(100/1.0)

(60/0.0)

(A)

REC=100%
RQD=37%
RMR=34

(A) WEATHERED ROCK (META-GRANITE)

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	22

CROSS SECTION THROUGH BENT 11 LEFT LANE

770
760
750
740
730
720
710
700
690
680

B11-A_LL
393+04
78' LT

B11-B_LL
393+04
16' LT

℄

WATER AT GROUND SURFACE

ALLUVIAL, RED, BROWN, AND GRAY, WET TO SATURATED, VERY SOFT TO STIFF, SANDY CLAY, SILTY CLAY, AND PEAT

BROWN, WET, LOOSE TO MEDIUM DENSE, COARSE SAND

RESIDUAL, WHITE AND GRAY, MOIST, MEDIUM DENSE TO VERY DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=86%
RQD=57%
RMR=53

B11-A_LL	B11-B_LL
2	1
WOH	5
8	8
3	WOH
12	9
14	76
44	100/0.7
27	60/0.2
60/0.1	60/0.0

SKEW=90°

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	23

CROSS SECTION THROUGH BENT 12 LEFT LANE

770
760
750
740
730
720
710
700
690
680

B12-A_LL
394+33
78' LT

B12-B_LL
394+33
23' LT

℄

WOH
4
4
1
7
85
60
50
100/0.5
60/0.0

1
4
7
3
3
24
60/0.4
75
60/0.0

10/12

ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY AND PEAT

BROWN, WET, VERY LOOSE TO MEDIUM DENSE, COARSE SAND

RESIDUAL, GRAY AND WHITE, MOIST, VERY DENSE, SAPROLITIC, SILTY SAND

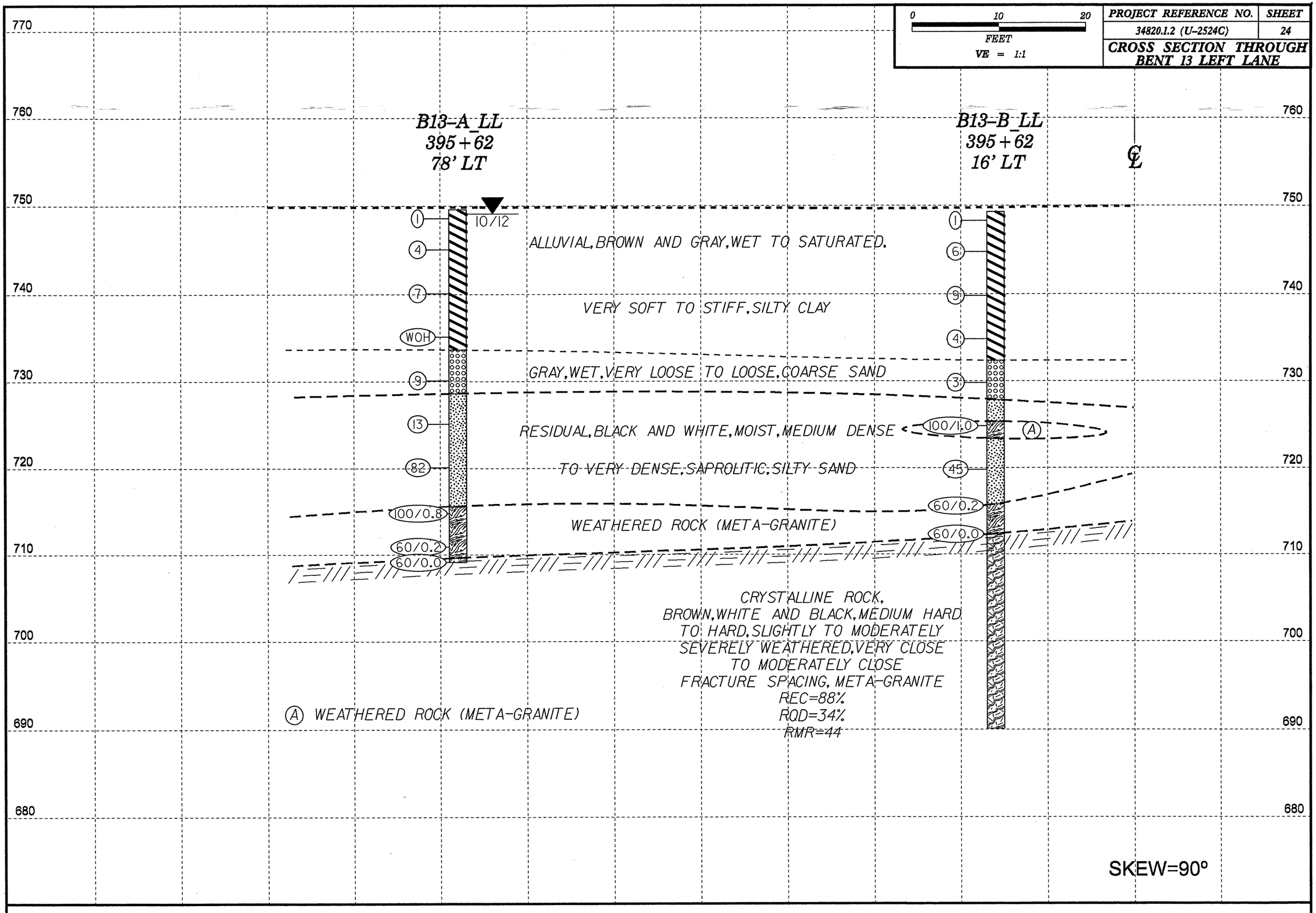
WEATHERED ROCK (META-GRANITE)

RESIDUAL, GRAY AND WHITE, MOIST, VERY DENSE, SAPROLITIC, SILTY SAND

CRYSTALLINE ROCK, BROWN, WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=68%
RQD=41%
RMR=56

SKEW=90°

0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34820.1.2 (U-2524C)	24
	CROSS SECTION THROUGH BENT 13 LEFT LANE	



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	25

CROSS SECTION THROUGH BENT 14 LEFT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

B14-A_LL
396+91
78' LT

B14-B_LL
396+91
23' LT

℄

(2) (2) (6) (5) (A) (13) (16) (100/0.9) (60/0.1)

(2) (4) (9) (4) (38) (100/0.8) (97) (B) (60/0.3) (60/0.2)

ALLUVIAL, GRAY AND BROWN, WET TO SATURATED, VERY SOFT TO STIFF, SILTY CLAY, SANDY CLAY, AND VERY LOOSE, SILTY SAND

SAPROLITIC, SILTY SAND

RESIDUAL, WHITE AND GRAY, MOIST, MEDIUM DENSE TO DENSE,

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
BROWN, WHITE AND BLACK,
MEDIUM HARD TO HARD,
SLIGHTLY TO MODERATELY
SEVERELY WEATHERED, VERY CLOSE
TO MODERATELY CLOSE FRACTURE SPACING,
META-GRANITE
REC=95%
RQD=28%
RMR=43

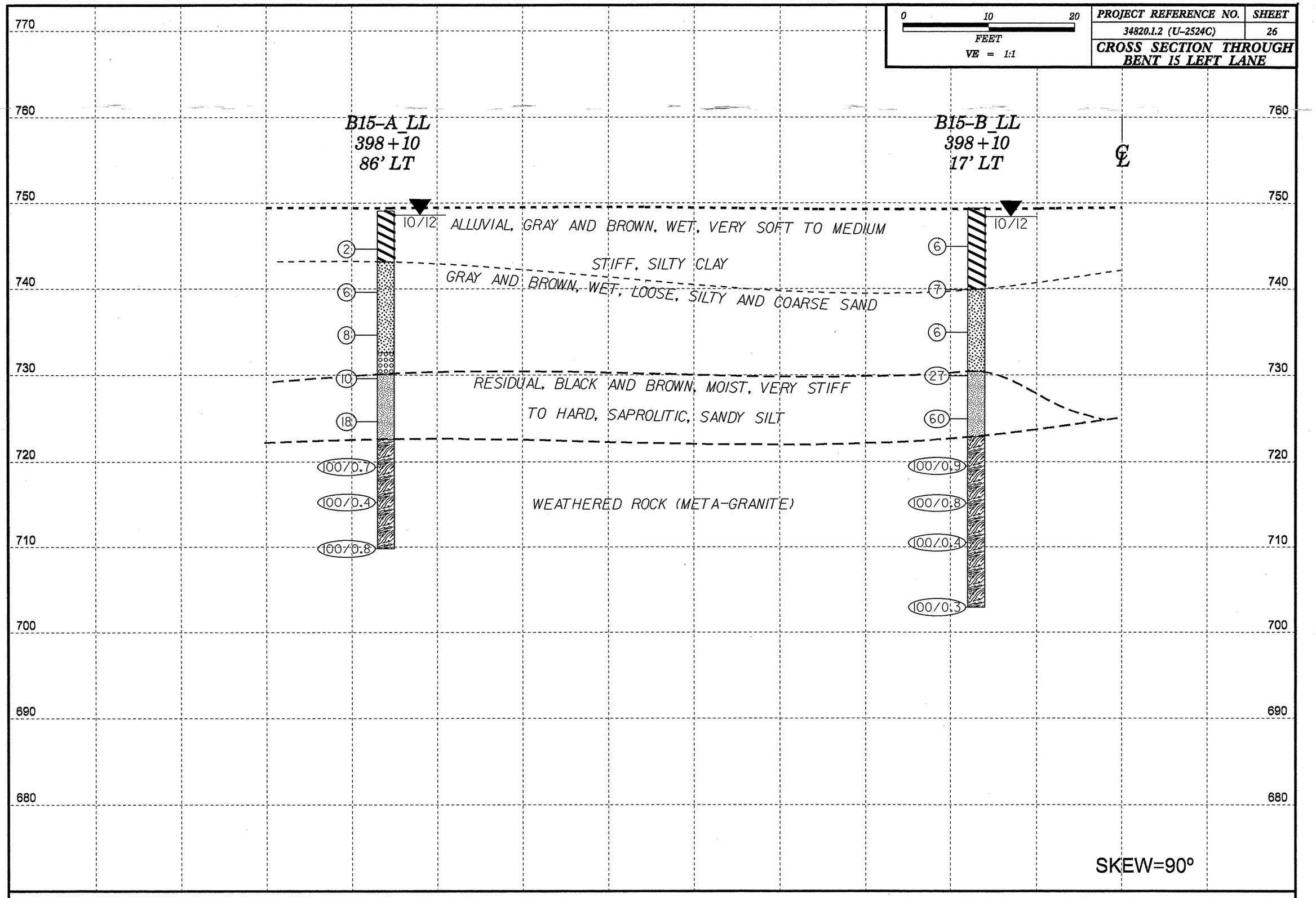
(A) ALLUVIAL, BROWN, WET, MEDIUM DENSE, COARSE SAND

(B) RESIDUAL, BLACK AND WHITE, MOIST, VERY DENSE, SILTY SAND

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	26
CROSS SECTION THROUGH BENT 15 LEFT LANE	



0	10	20
FEET		

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	27

CROSS SECTION THROUGH BENT 16 LEFT LANE

770
760
750
740
730
720
710
700
690
680

B16-A_LL
399+28
61' LT

B16-B_LL
399+28
23' LT

℄

ALUVIAL, BROWN AND GRAY, WET, SOFT TO STIFF, SILTY CLAY AND CLAYEY SILT

10
8
7
78
100/0.3
60/0.0

6
3
WOH
100/0.6
47
100/0.2
100/0.6

RESIDUAL, BLACK AND WHITE, WEATHERED ROCK

MOIST, HARD, SAPROLITIC, SANDY SILT (META-GRANITE)

WEATHERED ROCK (META-GRANITE)

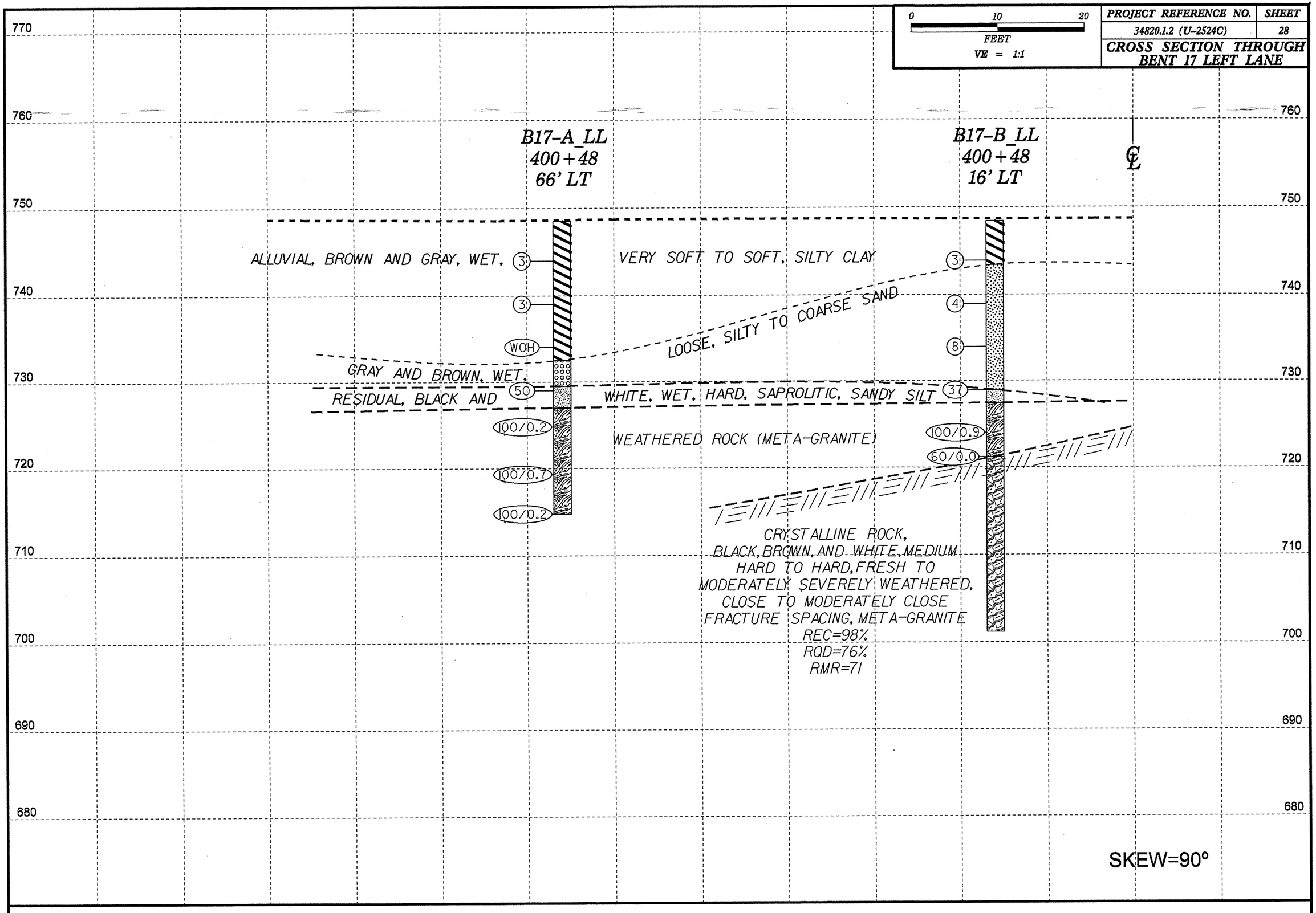
CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD,
FRESH TO MODERATELY SEVERELY WEATHERED,
CLOSE TO MODERATELY CLOSE FRACTURE
SPACING, META-GRANITE
REC=99%
RQD=57%
RMR=55-69

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	28

CROSS SECTION THROUGH BENT 17 LEFT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	29

CROSS SECTION THROUGH BENT 18 LEFT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

B18-A_LL
401+68
66' LT

B18-B_LL
401+68
23' LT

℄

ALLUVIAL, BROWN AND GRAY, WET, STIFF TO VERY STIFF, SILTY CLAY

17
5
1
23
A
100/0.6
60/0.0

10/12
13
1
3
100/0.4
60/0.0

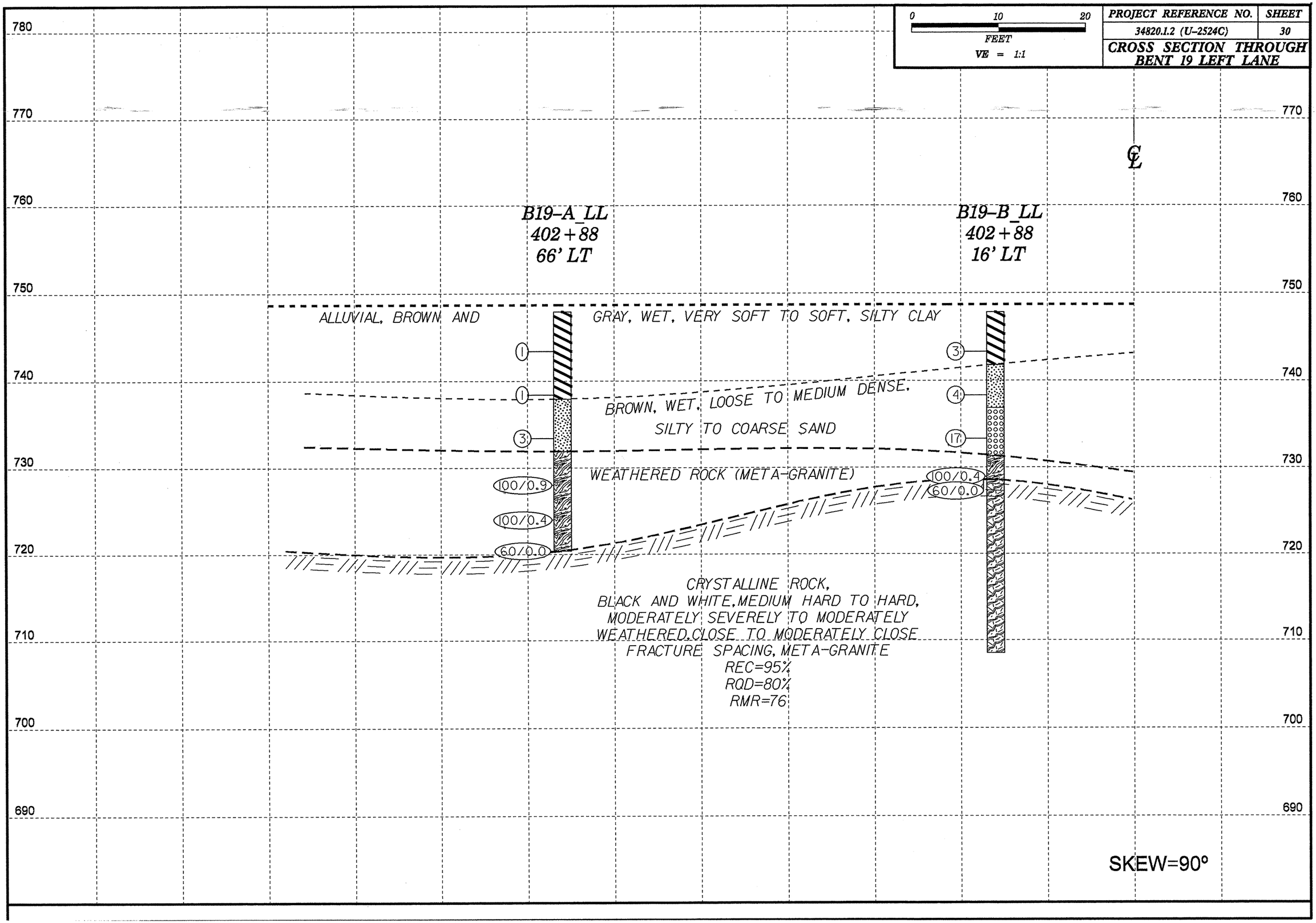
BROWN, WET, LOOSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=93%
RQD=66%
RMR=69

(A) RESIDUAL, BLACK AND WHITE, WET, VERY STIFF, SAPROLITIC, SANDY SILT

SKEW=90°



0 10 20
FEET
VE = 1:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
30
CROSS SECTION THROUGH BENT 19 LEFT LANE
780
770
760
750
740
730
720
710
700
690
B19-A_LL
402+88
66' LT
B19-B_LL
402+88
16' LT
ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO SOFT, SILTY CLAY
BROWN, WET, LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND
WEATHERED ROCK (META-GRANITE)
1
1
3
100/0.9
100/0.4
60/0.0
3
4
17
100/0.4
60/0.0
CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD,
MODERATELY SEVERELY TO MODERATELY
WEATHERED, CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC=95%
RQD=80%
RMR=76
SKEW=90°

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	31

CROSS SECTION THROUGH BENT 20 LEFT LANE

780
770
760
750
740
730
720
710
700
690

℄

B20-A LL
404+08
66' LT

B20-B LL
404+08
23' LT

ALLUVIAL, BROWN AND GRAY, WET, STIFF, SILTY CLAY

11/12

11/12

8

12

BROWN, WET, LOOSE, SILTY SAND

9

3

A

100/0.8

100/0.7

WEATHERED ROCK (META-GRANITE)

60/0.0

60/0.0

CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD,
SLIGHTLY TO MODERATELY WEATHERED, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=96%
RQD=70%
RMR=65

(A) RESIDUAL, BLACK AND WHITE, WET, STIFF, SAPROLITIC, SANDY SILT

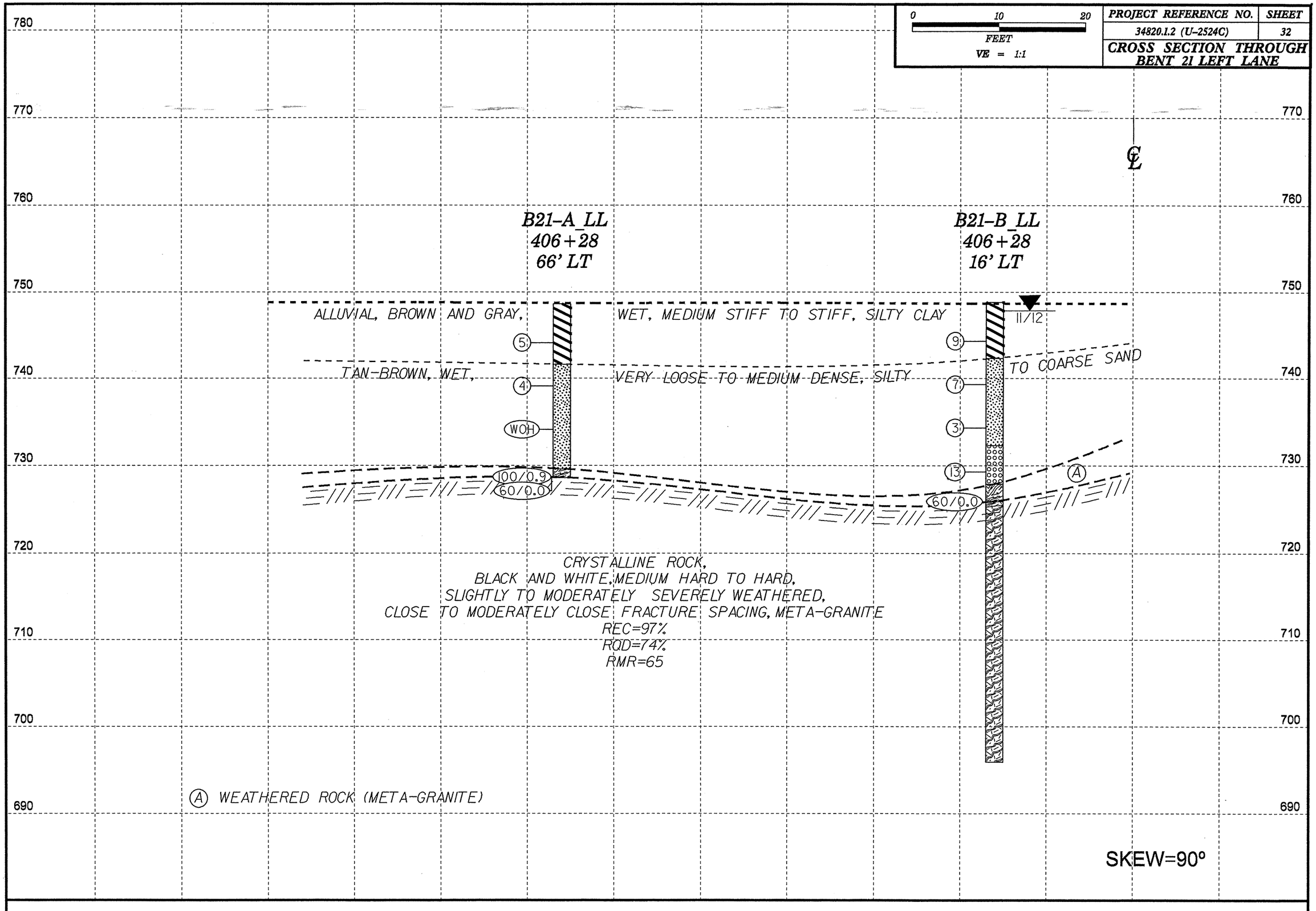
SKEW=90°

0	10	20
FEET		

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	32

CROSS SECTION THROUGH BENT 21 LEFT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	33

CROSS SECTION THROUGH BENT 22 LEFT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

B22-A_LL
409+03
66' LT

B22-B_LL
409+03
27' LT

℄

RESIDUAL, RED AND BROWN, MOIST, STIFF TO VERY STIFF, SANDY CLAY, AND MEDIUM DENSE TO DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

8
18
30
100/0.7
60/0.0
10/12
11
23
25
09/12
60/0.0

Ⓐ

CRYSTALLINE ROCK,
BLACK, GRAY, AND WHITE, VERY HARD,
FRESH TO SLIGHTLY WEATHERED, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=96%
RQD=93%
RMR=80

Ⓐ ALLUVIAL, BROWN AND GRAY, WET, LOOSE, SILTY SAND

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	34

CROSS SECTION THROUGH BENT 23 LEFT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B23-A_LL
411+23
66' LT

B23-B_LL
411+23
16' LT

ALLUVIAL, GRAY AND BROWN, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY AND SANDY CLAY

WOH
WOH
5
60/0.1
60/0.0
10/12

ALLUVIAL, GRAY AND BROWN, WET, VERY LOOSE TO LOOSE, SILTY TO COARSE SAND

WOH
WOH
5
60/0.3
60/0.0
10/12

Ⓐ

CRYSTALLINE ROCK,
GRAY AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=100%
ROD=94%
RMR=84

Ⓐ WEATHERED ROCK (META-GRANITE)

SKEW=90°

0	10	20

FEET

VE = 1:1

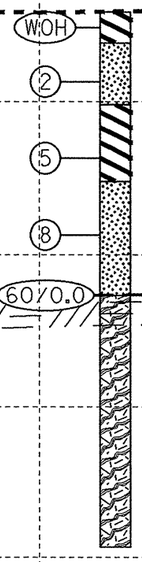
PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	35

CROSS SECTION THROUGH BENT 24 LEFT LANE

780
770
760
750
740
730
720
710
700
690

℄

B24-A_LL
413+34
93' LT



ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY, AND LOOSE, SILTY SAND

CRYSTALLINE ROCK,
BLACK, GRAY AND WHITE, HARD, FRESH
TO MODERATELY WEATHERED, CLOSE TO
MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=90%
RQD=66%
RMR=58

SKEW=129° 19' 40"

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	36

CROSS SECTION THROUGH BENT 25 LEFT LANE

770
760
750
740
730
720
710
700
690
680

B25-A_LL
415+12
101' LT

℄

WOH
2
8
4
60/0.1
60/0.0

ALLUVIAL, BROWN AND GRAY, WET, SOFT TO STIFF, SILTY CLAY

CRYSTALLINE ROCK,
BROWN, GRAY, AND WHITE, MEDIUM HARD
TO VERY HARD, FRESH TO MODERATELY
WEATHERED, CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC=97%
RQD=69%
RMR=62

SKEW=127° 24' 56"

0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	37

CROSS SECTION THROUGH BENT 26 LEFT LANE

780
770
760
750
740
730
720
710
700
690

℄

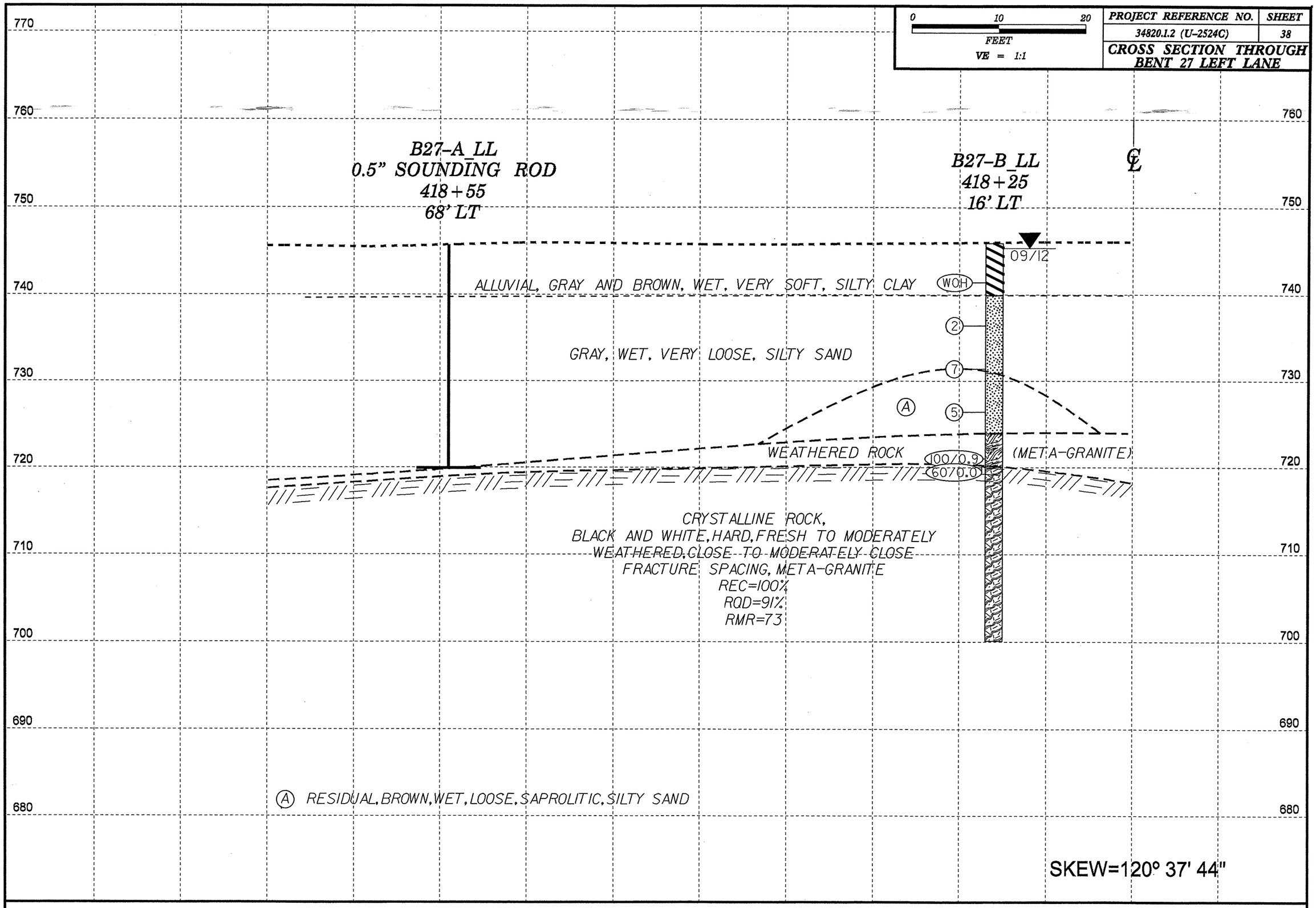
B26-B LL
0.5" SOUNDING ROD
417+16
14' LT

ALLUVIAL, BROWN AND GRAY, WET TO SATURATED, SOFT, SILTY CLAY, AND LOOSE, SILTY SAND

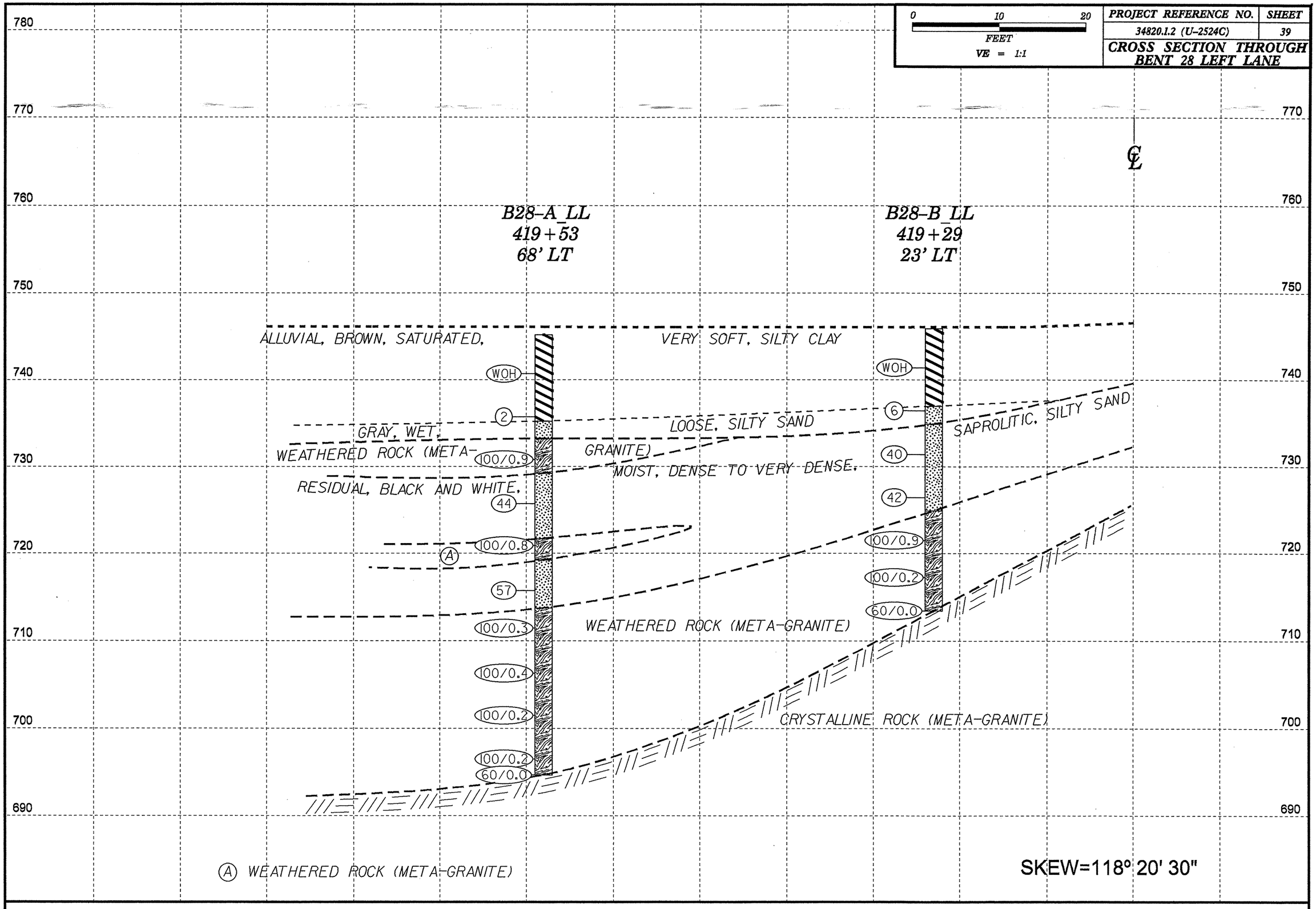
WEATHERED ROCK (META-GRANITE)

SKEW=123° 06' 11"

0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34820.1.2 (U-2524C)	38
	CROSS SECTION THROUGH BENT 27 LEFT LANE	



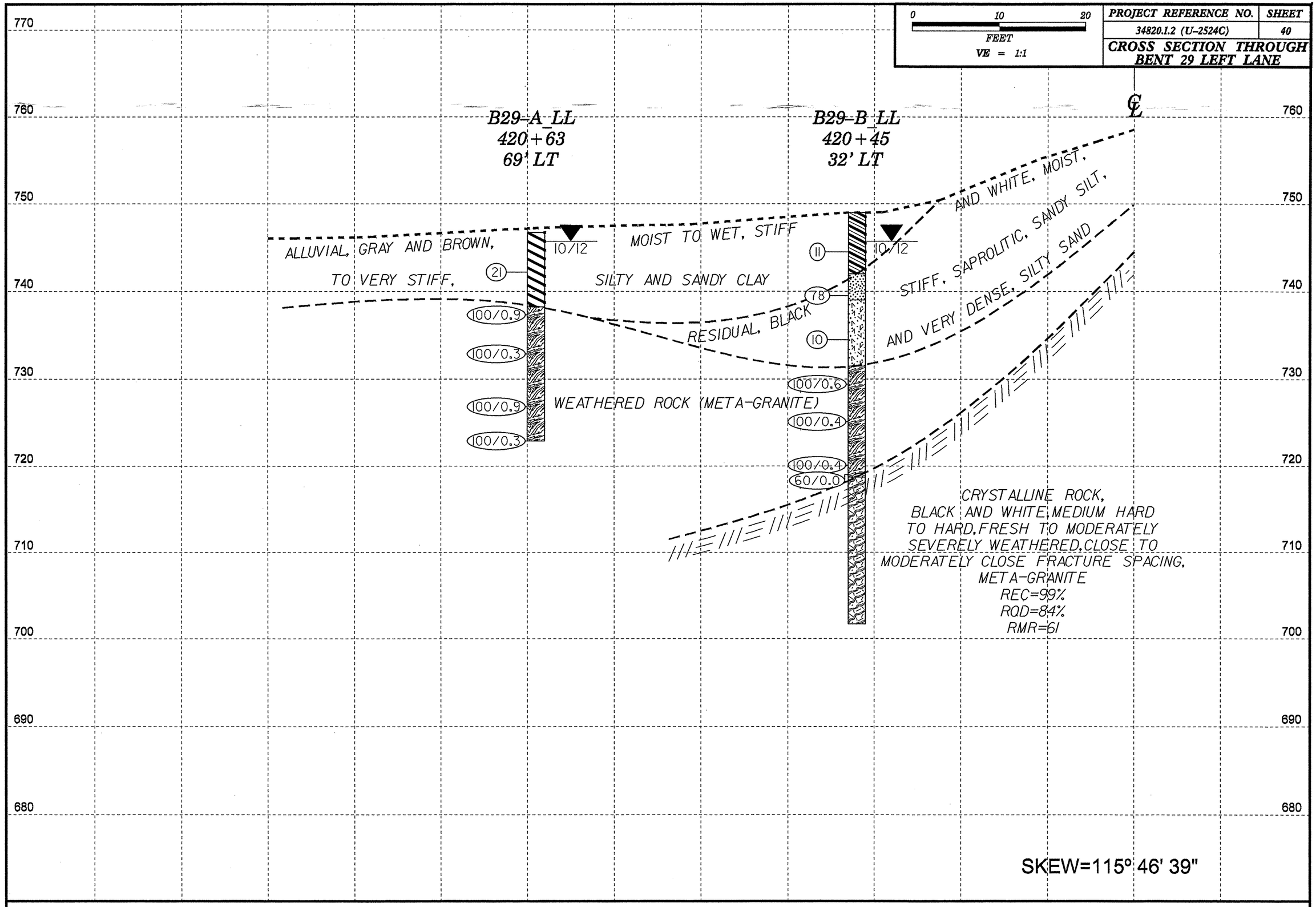
0 10 20 FEET	PROJECT REFERENCE NO.	SHEET
VE = 1:1	34820.1.2 (U-2524C)	39
	CROSS SECTION THROUGH BENT 28 LEFT LANE	



0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	40

CROSS SECTION THROUGH BENT 29 LEFT LANE



0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	41

CROSS SECTION THROUGH END BENT 2 LEFT LANE

790
780
770
760
750
740
730
720
710

℄

EB2-A_LL
421+90
85' LT

EB2-B_LL
421+47
7' LT

4
43
41
19
19
09/12
9
100/0.9
100/0.2
60/0.1

10
100/0.8
100/0.4
72
37
37
09/12
100/0.9
100/1.0
100/0.5

WEATHERED ROCK
(META-GRANITE)

RESIDUAL, TAN AND BROWN, DRY, LOOSE TO VERY DENSE, SILTY SAND AND MEDIUM STIFF, SANDY SILT

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK (META-GRANITE)

SKEW=113° 11' 29"

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. EB1A_LL	**STATION** 379+45	**OFFSET** 77 ft LT	**ALIGNMENT** -L-	**0 HR.** 2.7
COLLAR ELEV. 761.1 ft	**TOTAL DEPTH** 47.9 ft	**NORTHING** 869,675	**EASTING** 1,742,720	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/02/12	**COMP. DATE** 10/02/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765										761.1 GROUND SURFACE	0.0
760										759.1 **ARTIFICIAL FILL** RIP RAP/COBBLES	2.0
	757.6	3.5	1	1	1	2		M		**RESIDUAL** RED-ORANGE, TAN-BROWN, AND GRAY, SANDY SILT	
755											
	752.6	8.5	1	2	1	3		D			
750											
	747.6	13.5	3	3	4	7		D			
745											
	742.6	18.5	3	4	7	11		D			
740											
	737.6	23.5	2	6	7	13		D			
735											
	732.6	28.5	3	7	10	17		D			
730											
	727.6	33.5	16	16	32	48		D			
725											
	722.6	38.5	10	16	84	100/1.0		D		722.1 **WEATHERED ROCK** (META-GRANITE)	39.0
720											
	717.6	43.5	100/0.5			100/0.5					
715											
	713.2	47.9	60/0.0			60/0.0				713.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 713.2 ft on CRYSTALLINE ROCK (META-GRANITE)	47.9

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. EB1B_LL	**STATION** 379+45	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 9.1
COLLAR ELEV. 766.0 ft	**TOTAL DEPTH** 48.2 ft	**NORTHING** 869,623	**EASTING** 1,742,713	**24 HR.** 6.3
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/01/12	**COMP. DATE** 10/01/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
770										766.0 GROUND SURFACE	0.0
	766.0	0.0	WOH	1	1	2		M		764.0 **ARTIFICIAL FILL** ORANGE-RED AND TAN, SANDY SILT WITH TRACE ORGANICS	2.0
765										**RESIDUAL** TAN, BROWN, GRAY, AND ORANGE, SAPROLITIC, SANDY SILT	
	762.5	3.5	2	2	5	7		D			
760											
	757.5	8.5	9	6	7	13		D			
755											
	752.5	13.5	3	5	7	12		D			
750											
	747.5	18.5	15	16	24	40		D			
745											
	742.5	23.5	5	7	19	26		D			
740											
	737.5	28.5	100/0.5			100/0.5				737.8 **WEATHERED ROCK** (META-GRANITE)	28.2
735											
	732.5	33.5	60	40/0.5		100/1.0					
730											
	727.5	38.5	20	80/0.3		100/0.8					
725											
	722.5	43.5	30	70/0.3		100/0.8					
720											
	717.9	48.1	60/0.1			60/0.1				717.8 **CRYSTALLINE ROCK** (META-GRANITE)	48.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 717.8 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B1A_LL	**STATION** 380+36	**OFFSET** 66 ft LT	**ALIGNMENT** -L- **0 HR.** 3.4
COLLAR ELEV. 757.2 ft	**TOTAL DEPTH** 28.0 ft	**NORTHING** 869,653	**EASTING** 1,742,806 **24 HR.** 4.2
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/02/12	**COMP. DATE** 10/02/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										
	757.2	0.0								757.2 GROUND SURFACE 0.0
755			1	1	1	2		M		**ALLUVIAL** RED-ORANGE AND GRAY, SILTY CLAY WITH TRACE ORGANICS
	754.2	3.0								
			1	1	0	1		M		
750										
	749.2	8.0								
			1	2	5	7		M		748.2 9.0
745										**RESIDUAL** GRAY, BROWN, AND ORANGE, SANDY SILT
	744.2	13.0								
			4	8	10	18		D		
740										
	739.2	18.0								
			3	6	6	12		D		
735										735.2 22.0
	734.2	23.0								**WEATHERED ROCK** (META-GRANITE)
			100/0.4			100/0.4				
730										
	729.2	28.0								729.2 28.0
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 729.2 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B1B_LL	**STATION** 380+40	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.3
COLLAR ELEV. 758.5 ft	**TOTAL DEPTH** 45.7 ft	**NORTHING** 869,612	**EASTING** 1,742,806	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
760											
	758.5	0.0								758.5 GROUND SURFACE	0.0
			1	1	2	3		M		**ALLUVIAL** RED-ORANGE, SANDY CLAY WITH TRACE ORGANICS	
755	755.0	3.5									
			1	WOH	WOH	0		M			
750	750.0	8.5								751.5	7.0
			22	78/0.5		100/1.0				**WEATHERED ROCK** (META-GRANITE)	
745	745.0	13.5								745.5	13.0
			13	30	45	75		D		**RESIDUAL** BROWN-ORANGE, SAPROLITIC, SANDY SILT WITH ROCK FRAGMENTS	
740	740.0	18.5								740.0	18.5
			60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-GRANITE)	
735	735.0	23.5								736.5	22.0
			100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)	
730	730.7	27.8									
			33	67/0.4		100/0.9					
725	725.0	33.5									
			100/0.2			100/0.2					
	722.6	35.9	60/0.0			60/0.0	RS-71			722.6 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=90% RQD=70% RMR=67	35.9
720											
715							RS-72			712.8 Boring Terminated at Elevation 712.8 ft in CRYSTALLINE ROCK (META-GRANITE)	45.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B1B_LL	**STATION** 380+40	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** 3.3
COLLAR ELEV. 758.5 ft	**TOTAL DEPTH** 45.7 ft	**NORTHING** 869,612	**EASTING** 1,742,806	**24 HR.** 3.5
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 9.8 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)
722.6											Begin Coring @ 35.9 ft	
	722.6	35.9	4.8	*N=60/0.0* 2:45/1.0 2:45/1.0 2:45/1.0 2:00/1.0 1:30/0.8	(4.0) 83%	(2.5) 52%	RS-71	(8.7) 89%	(7.2) 73%		722.6 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=90% RQD=70% RMR=67	35.9
720												
	717.8	40.7	5.0	2:45/1.0 2:30/1.0 2:00/1.0 2:45/1.0 2:30/1.0	(4.7) 94%	(4.7) 94%						
715												
	712.8	45.7					RS-72				712.8 Boring Terminated at Elevation 712.8 ft in CRYSTALLINE ROCK (META-GRANITE)	45.7

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B2A_LL	**STATION** 381+57	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 753.6 ft	**TOTAL DEPTH** 41.5 ft	**NORTHING** 869,644	**EASTING** 1,742,924	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** 0.0ft	

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											
	753.6	0.0	WOH	WOH	WOH	0		W		753.6 WATER SURFACE (11/01/12)	0.0
										ALLUVIAL	
750	750.1	3.5	WOH	1	2	3		W		751.6 BROWN, SANDY CLAY	2.0
										GRAY, SILTY CLAY	
										747.6	6.0
745	745.1	8.5	1	5	12	17		W		BROWN, COARSE SAND	
										742.6	11.0
740	740.1	13.5	5	9	16	25		M		**RESIDUAL** GRAY, WHITE, AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA	
735	735.1	18.5	20	29	35	64		M			
730	730.1	23.5								730.1	23.5
	729.1	24.5	60/0.1			60/0.1				729.1 **CRYSTALLINE ROCK** (META-GRANITE)	24.5
			60/0.0			60/0.0				GRAY AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=82% RQD=51% RMR=57	
725							RS-19				
720							RS-20				
715										712.1	41.5
										Boring Terminated at Elevation 712.1 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B2A_LL	**STATION** 381+57	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 753.6 ft	**TOTAL DEPTH** 41.5 ft	**NORTHING** 869,644	**EASTING** 1,742,924	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** 0.0ft	
CORE SIZE NQ-3	**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)
729.1											Begin Coring @ 24.5 ft	
	729.1	24.5	2.0	2:57/1.0 3:20/1.0	(2.0) 100%	(1.1) 55%		(14.0) 82%	(8.6) 51%		729.1 GRAY AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=82% RQD=51% RMR=57	24.5
	727.1	26.5										
725			5.0	3:03/1.0 2:41/1.0 3:10/1.0 3:02/1.0 2:50/1.0	(3.3) 66%	(1.3) 26%	RS-19					
	722.1	31.5										
720			5.0	3:07/1.0 3:15/1.0 3:01/1.0 2:40/1.0 2:55/1.0	(4.3) 86%	(3.5) 70%	RS-20					
	717.1	36.5										
715			5.0	2:51/1.0 3:07/1.0 3:21/1.0 3:16/1.0 3:08/1.0	(4.4) 88%	(2.7) 54%						
	712.1	41.5									712.1 Boring Terminated at Elevation 712.1 ft in CRYSTALLINE ROCK (META-GRANITE)	41.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B2B_LL	**STATION** 381+57	**OFFSET** 16 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 755.3 ft	**TOTAL DEPTH** 28.5 ft	**NORTHING** 869,594	**EASTING** 1,742,921 / **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/31/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										
755	755.3	0.0	1	1	3	4		M		755.3 GROUND SURFACE 0.0 **ALLUVIAL** RED-BROWN, GRAY, AND BROWN, SILTY SAND WITH TRACE ORGANICS
750	751.8	3.5	3	2	2	4		W		749.3 6.0 BROWN, COARSE SAND
745	746.8	8.5	2	3	4	7		W		
740	741.8	13.5	4	2	4	6		W		738.8 16.5 **RESIDUAL** DARK BROWN AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
735	736.8	18.5	7	8	13	21		M		732.8 22.5 **WEATHERED ROCK** (META-GRANITE)
730	731.8	23.5	60/0.3			60/0.3				726.8 28.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 726.8 ft on CRYSTALLINE ROCK (META-GRANITE)
	726.8	28.5	60/0.0			60/0.0				

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B3A_LL	**STATION** 382+95	**OFFSET** 52 ft LT	**ALIGNMENT** -L-	**0 HR.** 4.8
COLLAR ELEV. 756.7 ft	**TOTAL DEPTH** 13.0 ft	**NORTHING** 869,623	**EASTING** 1,743,058	**24 HR.** 4.4
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										756.7 GROUND SURFACE	0.0
	756.7	0.0								**ARTIFICIAL FILL**	
755	754.0	2.7	2	4	5	9		D		754.7 RED-ORANGE, SANDY SILT WITH TRACE ORGANICS	2.0
			2	3	5	8		D		**ALLUVIAL** TAN-BROWN, SANDY SILT	
750	749.0	7.7	2	3	3	6		W			
										746.7	10.0
745	744.0	12.7								746.2 GRAY, FINE TO COARSE SAND AND GRAVEL	10.5
			60/0.1			60/0.1				744.0 **WEATHERED ROCK** (META-GRANITE)	12.7
										743.7 **CRYSTALLINE ROCK** (META-GRANITE)	13.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 743.7 ft in CRYSTALLINE ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B3C_LL	**STATION** 382+86	**OFFSET** 34 ft LT	**ALIGNMENT** -L-	**0 HR.** 7.8
COLLAR ELEV. 756.4 ft	**TOTAL DEPTH** 44.2 ft	**NORTHING** 869,608	**EASTING** 1,743,049	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/19/12	**COMP. DATE** 10/19/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
										756.4 GROUND SURFACE	0.0
	756.4	0.0								**ARTIFICIAL FILL**	
755	754.2	2.2	WOH	2	3	5		M		ORANGE-RED AND BROWN-ORANGE, SANDY CLAY WITH TRACE ORGANICS AND COARSE GRAVEL	
			9	11	4	15		M		750.4	6.0
750	749.2	7.2	1	1	1	2		W		**ALLUVIAL** LIGHT GRAY, SANDY SILT	
										745.4	11.0
745	744.2	12.2	3	3	1	4		M		**RESIDUAL** TAN, ORANGE, GRAY, AND BROWN, SANDY SILT	
740	739.2	17.2	3	4	10	14		D			
735	734.2	22.2	8	10	12	22		D			
730	729.2	27.2	22	24	57	81		D			
725	724.2	32.2	100/0.4			100/0.4				725.4	31.0
720	719.2	37.2	100/0.3			100/0.3				**WEATHERED ROCK** (META-GRANITE)	
715	714.2	42.2	16	84/0.3		100/0.8					
	712.2	44.2	60/0.0			60/0.0				712.2	44.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 712.2 ft on CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B3B_LL	**STATION** 382+77	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.3 ft	**TOTAL DEPTH** 55.1 ft	**NORTHING** 869,590	**EASTING** 1,743,040	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
760										
	756.3	0.0								756.3 GROUND SURFACE 0.0
755			4	5	6	11		D		**ARTIFICIAL FILL** RED-ORANGE AND BROWN, SANDY CLAY WITH LITTLE ORGANICS
	753.5	2.8								
			5	7	5	12		M		
750										749.3 7.0
	748.5	7.8								**ALLUVIAL** BROWN-GRAY, COARSE SAND
			WOH	2	3	5		Sat.		
745										744.3 12.0
	743.5	12.8								**RESIDUAL** RED-BROWN AND GRAY-BROWN, SAPROLITIC, SANDY SILT
			3	5	8	13		D		
740										
	738.5	17.8								
			9	11	13	24		D		
735										
	733.5	22.8								
			3	5	9	14		D		
730										
	728.5	27.8								728.0 28.8
			24	41	59/0.4	100/0.9				**WEATHERED ROCK** (META-GRANITE)
725										724.3 32.0
	723.5	32.8								**RESIDUAL** BLUE-GRAY, BROWN, AND TAN, SANDY SILT
			10	30	49	79		D		
720										719.3 37.0
	718.5	37.8								**WEATHERED ROCK** (META-GRANITE)
			100/0.5			100/0.5				
715										
	713.5	42.8								
			100/0.4			100/0.4				
710										
	709.3	47.0								709.3 47.0
			60/0.0			60/0.0				**CRYSTALLINE ROCK** BLUE-GRAY, VERY HARD, FRESH, CLOSE TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=97% RMR=86
705							RS-1			
							RS-2			701.2 55.1
										Boring Terminated at Elevation 701.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B3B_LL	**STATION** 382+77	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 756.3 ft	**TOTAL DEPTH** 55.1 ft	**NORTHING** 869,590	**EASTING** 1,743,040	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 8.1 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)
709.3											Begin Coring @ 47.0 ft
	709.3	47.0	3.1	2:45/1.0 2:00/1.0 2:00/1.1	(3.1) 100%	(2.9) 94%		(8.1) 100%	(7.9) 98%		709.3 **CRYSTALLINE ROCK** 47.0
	706.3	50.0									BLUE-GRAY, VERY HARD, FRESH, CLOSE TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=97% RMR=86
705	706.2	50.1	5.0	2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(5.0) 100%	(5.0) 100%	RS-1				
	701.3	55.0					RS-2				701.2 55.1
											Boring Terminated at Elevation 701.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B4A_LL	**STATION** 383+97	**OFFSET** 77 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.9
COLLAR ELEV. 763.0 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,653	**EASTING** 1,743,157	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765											
	763.0	0.0	2	2	3	5		M		763.0 GROUND SURFACE	0.0
760	759.7	3.3	1	2	3	5		M		**ARTIFICIAL FILL** RED-ORANGE AND TAN-ORANGE, SANDY CLAY	
755	754.7	8.3	6	7	8	15		M			
750	749.7	13.3	2	3	3	6		M		751.0 **ALLUVIAL** TAN, GRAY, SANDY SILT	12.0
745	744.7	18.3	2	1	7	8		W			
740	739.7	23.3	3	4	5	9		D		741.0 **RESIDUAL** GRAY-BROWN, SANDY SILT	22.0
735	734.7	28.3	14	31	46	77		D			
730	729.7	33.3	100/0.3			100/0.3				730.0 **WEATHERED ROCK** (META-GRANITE)	33.0
725	725.5	37.5	60/0.0			60/0.0				725.5 **CRYSTALLINE ROCK** BLUE-GRAY, HARD, SLIGHTLY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=100% RQD=59% RMR=66	37.5
720										723.8	39.2
	717.3	45.7	22	21	63	84				**RESIDUAL** BROWN-GRAY, SAPROLITIC, SANDY SILT WITH INTERMITTENT WEATHERED ROCK	
715										714.3	48.7
710										**CRYSTALLINE ROCK** BROWN AND GRAY, SOFT TO MEDIUM HARD, MODERATELY TO MODERATELY SEVERELY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=100% RQD=40% RMR=66	
705										712.3	50.7
700										709.6	53.4
										RESIDUAL BROWN-GRAY, SAPROLITIC, SANDY SILT WITH INTERMITTENT WEATHERED ROCK	
										CRYSTALLINE ROCK BROWN AND BLUE-GRAY, HARD, FRESH TO MODERATELY WEATHERED, VERY CLOSE TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=94% RMR=66	
										697.3	65.7
										Boring Terminated at Elevation 697.3 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B4A_LL	**STATION** 383+97	**OFFSET** 77 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.9
COLLAR ELEV. 763.0 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,653	**EASTING** 1,743,157	**24 HR.** 11.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 26.7 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)
725.5											Begin Coring @ 37.5 ft	
725	725.5	37.5	3.2	1:30/1.0 2:15/1.0 2:30/1.2	(2.0) 63%	(1.0) 31%		(1.7) 100%	(1.0) 59%		725.5 **CRYSTALLINE ROCK** BLUE-GRAY, HARD, SLIGHTLY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=100% RQD=59% RMR=66	37.5
	722.3	40.7	5.0	1:45/1.0 0:45/1.0 1:30/1.0 1:15/1.0 1:30/1.0	(1.3) 26%	(0.0) 0%		(0.0) 0%			723.8	39.2
720	717.3	45.7		*N=84*							**RESIDUAL** BROWN-GRAY, SAPROLITIC, SANDY SILT WITH INTERMITTENT WEATHERED ROCK	
	715.8	47.2	3.5	0:45/0.5 1:15/1.0 1:45/1.0	(2.7) 77%	(0.8) 23%					714.3	48.7
715	712.3	50.7	5.0	2:00/1.0 2:45/1.0 3:30/1.0 3:15/1.0 2:15/1.0	(2.3) 46%	(2.0) 40%		(2.0) 100%	(0.8) 40%		**CRYSTALLINE ROCK** BROWN AND GRAY, SOFT TO MEDIUM HARD, MODERATELY TO MODERATELY SEVERELY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=100% RQD=40% RMR=66	
710	707.3	55.7	5.0	2:45/1.0 2:30/1.0 2:00/1.0 1:45/1.0 2:00/1.0	(5.0) 100%	(4.6) 92%		(0.0) 0%			712.3	50.7
705	702.3	60.7	5.0	2:00/1.0 2:00/1.0 2:15/1.0 2:00/1.0 2:15/1.0	(5.0) 100%	(5.0) 100%		(12.3) 100%	(11.6) 94%		709.6	53.4
700	697.3	65.7									**RESIDUAL** BROWN-GRAY, SAPROLITIC, SANDY SILT WITH INTERMITTENT WEATHERED ROCK **CRYSTALLINE ROCK** BROWN AND BLUE-GRAY, HARD, FRESH TO MODERATELY WEATHERED, VERY CLOSE TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=94% RMR=66	
											697.3	65.7
											Boring Terminated at Elevation 697.3 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B4B_LL	**STATION** 383+61	**OFFSET** 29 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 756.6 ft	**TOTAL DEPTH** 54.9 ft	**NORTHING** 869,603	**EASTING** 1,743,123	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										ELEV. (ft) DEPTH (ft)
	756.6	0.0								756.6 GROUND SURFACE 0.0
755			2	7	7	14		M		**ARTIFICIAL FILL** TAN, ORANGE, SANDY CLAY WITH TRACE ORGANICS
	753.5	3.1								
			3	7	6	13		M		
750										749.6 7.0
	748.5	8.1								**ALLUVIAL** GRAY AND TAN-ORANGE, SILTY SAND WITH TRACE WOOD FRAGMENTS
			4	2	2	4		W		
745										
	743.5	13.1								744.6 12.0
			2	5	7	12		D		**RESIDUAL** GRAY-BROWN, SANDY SILT
740										
	738.5	18.1								738.9 17.7
			60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-GRANITE)
735										
	733.5	23.1								
			60/0.1			60/0.1				
730										
	728.5	28.1	20	28	20	48		D		
725										
	723.5	33.1	15	37	63/0.4	100/0.9				729.6 27.0
720										**RESIDUAL** TAN, BROWN, AND WHITE, SILTY SAND
	718.5	38.1	100/0.5			100/0.5				
	716.7	39.9	60/0.0			60/0.0				722.3 34.3
715										**WEATHERED ROCK** (META-GRANITE)
710							RS-57			716.7 39.9
										CRYSTALLINE ROCK BROWN, WHITE, AND BLUE-GRAY, HARD, FRESH TO SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=98% RQD=86% RMR=75
705							RS-58			
										701.7 54.9
										Boring Terminated at Elevation 701.7 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B4B_LL	**STATION** 383+61	**OFFSET** 29 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.0
COLLAR ELEV. 756.6 ft	**TOTAL DEPTH** 54.9 ft	**NORTHING** 869,603	**EASTING** 1,743,123	**24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/17/12	**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
716.7											ELEV. (ft) DEPTH (ft)
715	716.7	39.9	5.0	2:45/1.0 2:00/1.0 1:30/1.0 2:00/1.0 3:15/1.0	(4.8) 96%	(4.0) 80%		(14.7) 98%	(12.9) 86%		Begin Coring @ 39.9 ft
	711.7	44.9									716.7 **CRYSTALLINE ROCK** 39.9
710			5.0	2:45/1.0 2:30/1.0 1:45/1.0 2:15/1.0 2:30/1.0	(4.9) 98%	(4.9) 98%	RS-57				BROWN, WHITE, AND BLUE-GRAY, HARD, FRESH TO SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=98% RQD=86% RMR=75
	706.7	49.9									
705			5.0	2:30/1.0 2:30/1.0 2:30/1.0 2:45/1.0 2:30/1.0	(5.0) 100%	(4.0) 80%	RS-58				
	701.7	54.9									701.7 54.9
											Boring Terminated at Elevation 701.7 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B5A_LL	**STATION** 385+22	**OFFSET** 81 ft LT	**ALIGNMENT** -L-	**0 HR.** 18.3
COLLAR ELEV. 762.2 ft	**TOTAL DEPTH** 63.5 ft	**NORTHING** 869,664	**EASTING** 1,743,278	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/15/12	**COMP. DATE** 10/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
765										
	762.2	0.0								762.2 GROUND SURFACE 0.0
760	758.7	3.5	1	2	4	6		M		**ARTIFICIAL FILL** ORANGE-BROWN AND GRAY-BROWN, SANDY CLAY WITH TRACE ORGANICS AND SOME GRAVEL
			3	6	7	13		M		
755	753.7	8.5								755.2 7.0
			2	3	6	9		M		BLUE-GRAY AND BROWN, SANDY CLAY WITH TRACE ORGANICS
750	748.7	13.5								750.2 12.0
			4	6	2	8		W		**ALLUVIAL** GRAY AND ORANGE, SILTY SAND
745	743.7	18.5								746.2 16.0
			2	4	5	9		M		**RESIDUAL** BROWN, GRAY AND WHITE, SANDY SILT
740	738.7	23.5								
			4	7	9	16		D		
735	733.7	28.5								
			4	6	5	11		D		
730	728.7	33.5								
			9	13	21	34		D		
725	723.7	38.5								
			12	19	27	46		D		
720	718.7	43.5								
			6	13	18	31		D		
715	713.7	48.5								716.2 46.0 **WEATHERED ROCK** (META-GRANITE)
			21	79/0.4						
710	708.7	53.5				100/0.9				
			26	36	64/0.1	100/0.6				
705	703.7	58.5								
			100/0.4			100/0.4				
700	698.7	63.5								698.7 63.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 698.7 ft on CRYSTALLINE ROCK (META-GRANITE)
			60/0.0			60/0.0				

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B5C_LL	**STATION** 385+01	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** 10.3
COLLAR ELEV. 761.1 ft	**TOTAL DEPTH** 48.0 ft	**NORTHING** 869,641	**EASTING** 1,743,259	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
765										
	761.1	0.0								761.1 GROUND SURFACE 0.0
760	757.6	3.5	2	3	4	7		M		**ARTIFICIAL FILL** RED-ORANGE, SILTY SAND WITH TRACE ORGANICS 3.0
			4	6	12	18		M		758.1 GRAY, RED, AND ORANGE, SANDY CLAY WITH TRACE GRAVEL
755	752.6	8.5								
			3	4	3	7		M		
750	747.6	13.5								749.1 12.0
			3	3	5	8		M		**ALLUVIAL** GRAY, SANDY SILT WITH TRACE ORGANICS
745	742.6	18.5								744.1 17.0
			2	2	4	6		D		**RESIDUAL** GRAY, BROWN, AND WHITE, SANDY SILT
740	737.6	23.5								
			3	6	11	17		D		
735	732.6	28.5								
			15	23	41	64		D		
730	727.6	33.5								
			8	24	57	81		D		
725	722.6	38.5								723.1 38.0 **WEATHERED ROCK** (META-GRANITE)
			52	48/0.3		100/0.8				
720	717.6	43.5								
			17	78	22/0.2	100/0.7				
715	713.2	47.9								713.2 47.9 713.1 48.0 **CRYSTALLINE ROCK** (META-GRANITE) Boring Terminated with Standard Penetration Test Refusal at Elevation 713.1 ft in CRYSTALLINE ROCK (META-GRANITE)
			60/0.1			60/0.1				

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B5B_LL	**STATION** 384+38	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.5
COLLAR ELEV. 760.7 ft	**TOTAL DEPTH** 55.8 ft	**NORTHING** 869,596	**EASTING** 1,743,200	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/12/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765											
760	760.7	0.0								760.7 GROUND SURFACE	0.0
			1	5	2	7		M		**ARTIFICIAL FILL**	
	757.3	3.4								758.7 RED-ORANGE, SANDY CLAY WITH TRACE ORGANICS	2.0
755			5	7	7	14		D		RED-BROWN AND ORANGE, SANDY SILT	
	752.3	8.4									
750			5	8	8	16		M			
	747.3	13.4								748.7 **ALLUVIAL**	12.0
			2	1	2	3		M		TAN-BROWN, SANDY SILT	
745											
	742.3	18.4								743.7 **RESIDUAL**	17.0
			4	8	7	15		D		BROWN, GRAY, AND WHITE, SAPROLITIC, SANDY SILT	
740											
	737.3	23.4									
			9	20	28	48		D			
735											
	732.3	28.4									
			6	11	24	35		D			
730											
	727.3	33.4								728.9	31.8
			60/0.0			60/0.0				727.3 **WEATHERED ROCK** (META-GRANITE)	33.4
725										**CRYSTALLINE ROCK**	
										WHITE AND GRAY, MEDIUM HARD TO HARD, FRESH TO MODRATELY WEATHERED, VERY CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE	
720										REC=78%	
										RQD=42%	
715										RMR=49	
710											
705										704.9	55.8
										Boring Terminated at Elevation 704.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B5B_LL	**STATION** 384+38	**OFFSET** 18 ft LT	**ALIGNMENT** -L-	**0 HR.** 6.5
COLLAR ELEV. 760.7 ft	**TOTAL DEPTH** 55.8 ft	**NORTHING** 869,596	**EASTING** 1,743,200	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/12/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 22.4 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)
727.3											Begin Coring @ 33.4 ft	
	727.3	33.4	2.4	2:00/1.0 2:30/1.0	(1.9) 79%	(0.7) 29%		(17.4) 78%	(9.4) 42%		727.3 **CRYSTALLINE ROCK**	33.4
725	724.9	35.8		0:45/0.4							WHITE AND GRAY, MEDIUM HARD TO HARD, FRESH TO MODRATELY WEATHERED, VERY CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE	
			5.0	2:00/1.0 1:30/1.0 2:45/1.0 2:00/1.0 2:45/1.0	(3.1) 62%	(0.6) 12%					REC=78% RQD=42% RMR=49	
720	719.9	40.8										
			5.0	1:45/1.0 2:15/1.0 1:30/1.0 1:30/1.0 1:30/1.0	(4.9) 98%	(2.5) 50%						
715	714.9	45.8										
			5.0	1:00/1.0 1:30/1.0 2:00/1.0 2:00/1.0 3:00/1.0	(2.7) 54%	(1.6) 32%						
710	709.9	50.8										
			5.0	2:00/1.0 1:30/1.0 1:45/1.0 2:00/1.0 1:45/1.0	(4.8) 96%	(4.0) 80%						
705	704.9	55.8									704.9	55.8
											Boring Terminated at Elevation 704.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B6A_LL	**STATION** 387+78	**OFFSET** 79 ft LT	**ALIGNMENT** -L-	**0 HR.** 14.8
COLLAR ELEV. 762.2 ft	**TOTAL DEPTH** 72.7 ft	**NORTHING** 869,697	**EASTING** 1,743,523	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
										762.2 GROUND SURFACE 0.0
	760.8	1.4								760.8 ASPHALT & ABC 1.4
			4	5	8	13		D		**ROADWAY EMBANKMENT** RED, SANDY CLAY
	758.7	3.5	3	5	8	13		D		
	753.7	8.5	3	5	5	10		D		755.2 7.0 **RESIDUAL** ORANGE, BROWN, GRAY, SANDY SILT
	748.7	13.5	1	2	2	4		M		
	743.7	18.5	1	2	3	5		M		
	738.7	23.5	2	2	6	8		D		
	733.7	28.5	2	3	6	9		D		
	728.7	33.5	10	12	13	25		D		
	723.7	38.5	8	12	14	26		D		
	717.7	44.5	100/0.2			100/0.2				
	713.7	48.5	100/0.5			100/0.5				
	708.7	53.5	39	61/0.3		100/0.8				
	703.7	58.5	100/0.2			100/0.2				
	699.1	63.1	100/0.3			100/0.3				
	693.7	68.5	100/0.3			100/0.3				
	689.5	72.7	60/0.0			60/0.0				719.2 43.0 **WEATHERED ROCK** (META-GRANITE)
										689.5 72.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 689.5 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B6B_LL	**STATION** 386+98	**OFFSET** 15 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 759.4 ft	**TOTAL DEPTH** 47.5 ft	**NORTHING** 869,620	**EASTING** 1,743,457	**24 HR.** 5.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
	759.4	0.0								759.4 GROUND SURFACE 0.0
			2	1	1	2		M		**RESIDUAL** RED-BROWN, SANDY CLAY WITH LITTLE ORGANICS
	755.9	3.5	10	11	13	24		M		753.4 6.0
	750.9	8.5	1	2	2	4		M		RED-BROWN, GRAY, AND WHITE, SAPROLITIC, SANDY SILT WITH SOME MICA
	745.9	13.5	1	2	3	5		M		
	740.9	18.5	3	2	3	5		M		
	735.9	23.5	1	3	5	8		M		733.4 26.0 GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
	730.9	28.5	3	8	13	21		M		
	725.9	33.5	4	6	9	15		M		723.4 36.0 GRAY AND WHITE, SAPROLITIC, SANDY SILT WITH SOME MICA
	720.9	38.5	10	18	25	43		M		
	715.9	43.5	60/0.3			60/0.3				715.9 43.5 **WEATHERED ROCK** (META-GRANITE)
	711.9	47.5	60/0.0			60/0.0				711.9 47.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 711.9 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B6C_LL	**STATION** 387+38	**OFFSET** 47 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.7
COLLAR ELEV. 763.3 ft	**TOTAL DEPTH** 53.5 ft	**NORTHING** 869,659	**EASTING** 1,743,491	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/22/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765										763.3 GROUND SURFACE	0.0
	762.0	1.3	4	6	8	14		D		762.1 ASPHALT & ABC	1.2
760	759.8	3.5								760.3 **ARTIFICIAL FILL** BROWN-GRAY, SANDY SILT	3.0
			5	5	6	11		M		**RESIDUAL** ORANGE-RED, SANDY CLAY WITH TRACE GRAVEL	
755	754.8	8.5									
			3	4	6	10		M			
750	749.8	13.5								751.3 ORANGE, BROWN-GRAY, AND WHITE, SANDY SILT	12.0
			2	4	4	8		D			
745	744.8	18.5									
			1	2	3	5		M			
740	739.8	23.5									
			2	4	4	8		D			
735	734.8	28.5									
			2	6	8	14		D			
730	729.8	33.5									
			6	9	14	23		D		727.3 **WEATHERED ROCK** (META-GRANITE)	36.0
725	724.8	38.5	100/0.4			100/0.4					
720	719.8	43.5	80	20/0.1		100/0.6					
										716.3 **RESIDUAL** DARK GRAY AND BROWN, SANDY SILT	47.0
715	714.8	48.5	35	45	45	90		D			
										712.3 **WEATHERED ROCK** (META-GRANITE)	51.0
710	709.8	53.5	60/0.0			60/0.0				709.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 709.8 ft on CRYSTALLINE ROCK (META-GRANITE)	53.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B7A_LL	**STATION** 388+46	**OFFSET** 73 ft LT	**ALIGNMENT** -L-	**0 HR.** 14.1
COLLAR ELEV. 761.5 ft	**TOTAL DEPTH** 68.6 ft	**NORTHING** 869,705	**EASTING** 1,743,589	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765										761.5 GROUND SURFACE	0.0
	760.3	1.2	4	9	7	16		D		760.3 ASPHALT & ABC	1.2
760	758.0	3.5								**ROADWAY EMBANKMENT** BROWN-GRAY AND RED, SANDY SILT WITH GRAVEL	
			4	4	4	8		M			
755	753.0	8.5								754.5 **RESIDUAL** ORANGE-RED, TAN, AND GRAY-BROWN, SANDY SILT	7.0
			2	3	4	7		D			
750	748.0	13.5									
			1	2	2	4		D			
745	743.0	18.5									
			1	2	2	4		M			
740	738.0	23.5									
			1	2	3	5		D			
735	733.0	28.5									
			1	3	7	10		D			
730	728.0	33.5									
			2	5	7	12		D			
725	723.0	38.5									
			5	8	9	17		D			
720	718.0	43.5									
			3	8	11	19		D			
715	713.0	48.5									
			28	41	59/0.3	100/0.8		D		712.5 **WEATHERED ROCK** (META-GRANITE)	49.0
710	708.0	53.5								709.5 **RESIDUAL** BROWN-GRAY, SANDY SILT	52.0
			26	22	24	46		D			
705	703.0	58.5								704.5 **WEATHERED ROCK** (META-GRANITE)	57.0
			45	55/0.4		100/0.9					
700	698.0	63.5									
			19	65	35/0.2	100/0.7					
695	693.0	68.5	60/0.1			60/0.1				693.0 692.9 **CRYSTALLINE ROCK** (META-GRANITE) 68.5 68.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 692.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B7B_LL	**STATION** 387+95	**OFFSET** 11 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 754.8 ft	**TOTAL DEPTH** 74.9 ft	**NORTHING** 869,634	**EASTING** 1,743,553	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	754.8	0.0	2	1	4	5		M		754.8 GROUND SURFACE	0.0
	751.3	3.5								**RESIDUAL** RED-BROWN, SANDY CLAY	
750			8	8	9	17		M		748.8	6.0
	746.3	8.5								BROWN AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	
745			1	1	1	2		W			
	741.3	13.5									
740			2	1	2	3		W			
	736.3	18.5									
735			1	1	2	3		W			
	731.3	23.5									
730			4	6	7	13		W			
	726.3	28.5									
725			3	5	10	15		W		724.8	30.0
	721.3	33.5								BROWN, GRAY, AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
720			9	18	25	43		W			
	716.3	38.5									
715			14	28	36	64		W			
	711.3	43.5								711.3	43.5
710			21	79/0.3		100/0.8				**WEATHERED ROCK** (META-GRANITE)	
	706.3	48.5	60/0.1			60/0.1				706.3	48.5
705										**CRYSTALLINE ROCK** (META-GRANITE)	
	701.9	52.9	60/0.0			60/0.0				701.9	52.9
700										BLACK, BROWN, WHITE AND GRAY, MEDIUM HARD TO VERY HARD, VERY SLIGHTLY TO MODRATELY SEVERELY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=71% RQD=53% RMR=56	
695							RS-43				
690											
685							RS-44				
680										679.9	74.9
										Boring Terminated at Elevation 679.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B7B_LL	**STATION** 387+95	**OFFSET** 11 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 754.8 ft	**TOTAL DEPTH** 74.9 ft	**NORTHING** 869,634	**EASTING** 1,743,553	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 22.0 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)
701.9											Begin Coring @ 52.9 ft	
	701.9	52.9	2.0	3:20/1.0 2:15/1.0	(0.9) 45%	(0.7) 35%		(15.6) 71%	(11.6) 53%		701.9 BLACK, BROWN, WHITE AND GRAY, MEDIUM HARD TO VERY HARD, VERY SLIGHTLY TO MODRATELY SEVERELY WEATHERED, CLOSELY FRACTURED, META-GRANITE REC=71% RQD=53% RMR=56	52.9
700	699.9	54.9	5.0	2:10/1.0 2:37/1.0 2:21/1.0 2:29/1.0 2:32/1.0	(2.0) 40%	(0.8) 16%						
695	694.9	59.9	5.0	2:41/1.0 3:10/1.0 3:03/1.0 2:47/1.0 2:31/1.0	(3.0) 60%	(2.4) 48%	RS-43					
690	689.9	64.9	5.0	2:50/1.0 3:10/1.0 3:37/1.0 3:21/1.0 3:35/1.0	(4.8) 96%	(3.5) 70%						
685	684.9	69.9	5.0	3:41/1.0 3:30/1.0 3:39/1.0 3:27/1.0 3:34/1.0	(4.9) 98%	(4.2) 84%	RS-44					
680	679.9	74.9									679.9 Boring Terminated at Elevation 679.9 ft in CRYSTALLINE ROCK (META-GRANITE)	74.9

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B8A_LL	**STATION** 389+17	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** 13.2
COLLAR ELEV. 760.9 ft	**TOTAL DEPTH** 69.3 ft	**NORTHING** 869,725	**EASTING** 1,743,655	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/24/12	**COMP. DATE** 10/24/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										760.9	0.0
										GROUND SURFACE	
	759.7	1.2								759.7	1.2
										ASPHALT & ABC	
			4	4	8	12		D		**ROADWAY EMBANKMENT**	
	757.4	3.5								BROWN-GRAY, SANDY SILT	
			4	5	6	11		D		753.9	7.0
	752.4	8.5								ORANGE-RED, SANDY CLAY	
			3	4	7	11		D		748.9	12.0
	747.4	13.5								**RESIDUAL**	
			5	7	8	15		D		BROWN, GRAY, BLACK, TAN, AND WHITE, SAPROLITIC, SANDY SILT	
	742.4	18.5									
			2	3	4	7		D			
	737.4	23.5									
			9	8	7	15		D			
	732.4	28.5									
			12	11	9	20		D			
	727.4	33.5									
			8	8	8	16		D			
	722.4	38.5									
			20	25	30	55		D			
	717.4	43.5									
			7	5	4	9		D			
	712.4	48.5									
			21	28	55	83		D			
	707.4	53.5								707.4	53.5
			60/0.1			60/0.1		D		**CRYSTALLINE ROCK** (META-GRANITE)	
	705.4	55.5								705.4	55.5
										WEATHERED ROCK (META-GRANITE)	
	702.4	58.5	100/0.4			100/0.4		D			
	697.4	63.5								697.4	63.5
			60/0.1			60/0.1		D		**CRYSTALLINE ROCK** (META-GRANITE)	
	692.4	68.5									
	691.6	69.3	60/0.0			60/0.0		D		691.6	69.3
			60/0.0			60/0.0		D		Boring Terminated with Standard Penetration Test Refusal at Elevation 691.6 ft in CRYSTALLINE ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B8B_LL	**STATION** 389+17	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 752.5 ft	**TOTAL DEPTH** 47.0 ft	**NORTHING** 869,665	**EASTING** 1,743,670	**24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
	752.5	0.0	1	2	3	5		M		752.5	0.0
										GROUND SURFACE	
	749.0	3.5	5	5	5	10		M		**ALLUVIAL** BROWN, SILTY SAND WITH SOME ORGANICS	
										746.5	6.0
	744.0	8.5	2	2	3	5		M		**RESIDUAL** BROWN, WHITE, GRAY, AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA	
	739.0	13.5	1	2	3	5		M			
	734.0	18.5	3	5	7	12		M			
	729.0	23.5	7	5	10	15		M			
	724.0	28.5	8	4	5	9		M			
	719.0	33.5	9	13	27	40		M			
	714.0	38.5	2	4	8	12		M			
	709.0	43.5	40	60/0.4		100/0.9		M		709.0	43.5
	705.5	47.0	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
										705.5	47.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 705.5 ft on CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B9A_LL	**STATION** 390+46	**OFFSET** 78 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 752.3 ft	**TOTAL DEPTH** 40.5 ft	**NORTHING** 869,759	**EASTING** 1,743,775 — **24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/15/12	**COMP. DATE** 10/15/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	752.3	0.0								752.3 GROUND SURFACE 0.0
750			WOH	1	1	2		M		**ALLUVIAL** RED-BROWN, SILTY SAND
	748.8	3.5								748.8 3.5
			3	3	3	6		M		RED-BROWN AND GRAY, SANDY CLAY
745										
	743.8	8.5								
			5	6	8	14		M		
740										
	738.8	13.5								741.3 11.0
			5	8	6	14		M		BROWN, COARSE SAND
735										
	733.8	18.5								
			2	2	2	4		W		
730										731.3 21.0
	728.8	23.5								**RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
			13	20	20	40		M		
725										
	723.8	28.5								
			10	35	34	69		M		
720										
	718.8	33.5								
			10	12	25	37		M		
715										
	713.8	38.5								713.8 38.5
			59	41/0.3		100/0.8				**WEATHERED ROCK** (META-GRANITE)
	711.8	40.5	60/0.0			60/0.0				711.8 40.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 711.8 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B9B_LL	**STATION** 390+46	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.7 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,700	**EASTING** 1,743,793	**24 HR.** 2.7
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.7	0.0	WOH	WOH	2	2		M		750.7 GROUND SURFACE	0.0
	747.2	3.5								**ALLUVIAL** RED-BROWN, SILTY SAND WITH TRACE GRAVEL AND ORGANICS	
745			2	1	2	3		M		744.7	6.0
	742.2	8.5								GRAY AND BROWN, SILTY CLAY	
740			1	3	3	6		M		739.7	11.0
	737.2	13.5								BROWN, COARSE SAND	
735			2	2	2	4		W			
	732.2	18.5									
730			6	7	7	14		W			
	727.2	23.5	60/0.2			60/0.2				727.2 **WEATHERED ROCK** (META-GRANITE)	23.5
725											
	723.7	27.0								GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
	722.2	28.5	9	24	51	75		M			
720											
	717.2	33.5	60/0.3			60/0.3				717.2 **WEATHERED ROCK** (META-GRANITE)	33.5
715											
	712.2	38.5	25	65	35/0.2	100/0.7					
710											
	708.2	42.5	60/0.0			60/0.0				708.2 **CRYSTALLINE ROCK** WHITE AND GRAY, HARD, SLIGHTLY TO MODRATELY WEATHERED, MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=79% RMR=68	42.5
705							RS-47			701.9	48.8
										WEATHERED ROCK (META-GRANITE)	
700										698.8	51.9
										CRYSTALLINE ROCK BLACK, WHITE AND GRAY, HARD, SLIGHTLY TO MODRATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=85% RQD=48% RMR=58	
695											
690											
685							RS-48			685.0	65.7
										Boring Terminated at Elevation 685.0 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B9B_LL	**STATION** 390+46	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.7 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,700	**EASTING** 1,743,793	**24 HR.** 2.7
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 23.2 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)
708.2											Begin Coring @ 42.5 ft	
	708.2	42.5	3.2	2:49/1.0 2:15/1.0 2:09/1.2	(3.2) 100%	(2.7) 84%		(6.3) 100%	(5.0) 79%		708.2 **CRYSTALLINE ROCK** WHITE AND GRAY, HARD, SLIGHTLY TO MODRATELY WEATHERED, MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=79% RMR=68	42.5
705	705.0	45.7					RS-47				701.9	48.8
			5.0	2:27/1.0 2:34/1.0 2:45/1.0 2:15/1.0 2:10/1.0	(3.1) 62%	(2.3) 46%		(0.0) 0%			698.8 **WEATHERED ROCK** (META-GRANITE)	51.9
700	700.0	50.7										
			5.0	2:13/1.0 2:40/1.0 2:19/1.0 2:21/1.0 2:35/1.0	(3.8) 76%	(1.7) 34%		(12.8) 93%	(7.2) 52%		**CRYSTALLINE ROCK** BLACK, WHITE AND GRAY, HARD, SLIGHTLY TO MODRATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=85% RQD=48% RMR=58	
695	695.0	55.7										
			5.0	2:41/1.0 2:50/1.0 2:39/1.0 2:47/1.0 2:29/1.0	(4.0) 80%	(2.2) 44%						
690	690.0	60.7										
			5.0	2:31/1.0 2:45/1.0 2:25/1.0 2:40/1.0 2:37/1.0	(5.0) 100%	(3.3) 66%						
685	685.0	65.7					RS-48				685.0	65.7
											Boring Terminated at Elevation 685.0 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B10A_LL	**STATION** 391+75	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.9 ft	**TOTAL DEPTH** 58.0 ft	**NORTHING** 869,799	**EASTING** 1,743,895	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										749.9	0.0
										GROUND SURFACE	
750	749.9	0.0	WOH	WOH	1	1		W		**ALLUVIAL** RED-BROWN, BROWN, AND GRAY, SILTY CLAY WITH ORGANICS	
	746.4	3.5									
745			WOH	WOH	2	2		W			
	741.4	8.5									
740			WOH	WOH	WOH	0		W			
										738.9	11.0
	736.4	13.5								RED-BROWN, COARSE SAND	
735			4	3	2	5		W			
										733.9	16.0
	731.4	18.5								BROWN, SILTY SAND	
730			3	7	10	17		W			
										727.9	22.0
	726.4	23.5								**WEATHERED ROCK** (META-GRANITE)	
725			48	52/0.3		100/0.8					
										723.9	26.0
	721.4	28.5								GRAY, WHITE, AND BROWN, SILTY SAND WITH SOME MICA	
720			19	33	47	80		W			
										715.9	34.0
	716.4	33.5								**WEATHERED ROCK** (META-GRANITE)	
715			11	52	48/0.4	100/0.9					
										710.7	39.2
	711.4	38.5	60/0.3			60/0.3				**CRYSTALLINE ROCK** BROWN, WHITE, GRAY, AND BLACK, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=81% RMR=66	
710											
705							RS-45				
700							RS-46				
										698.2	51.7
										WEATHERED ROCK (META-GRANITE)	
695										694.9	55.0
										CRYSTALLINE ROCK WHITE, GRAY, AND BLACK, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=37% RMR=34	
										691.9	58.0
										Boring Terminated at Elevation 691.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B10A_LL	**STATION** 391+75	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.9 ft	**TOTAL DEPTH** 58.0 ft	**NORTHING** 869,799	**EASTING** 1,743,895	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/15/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 18.8 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)
710.7											Begin Coring @ 39.2 ft	
710	710.7	39.2	0.8	2:41/0.8	(0.8)	(0.6)		(12.1)	(10.1)		710.7	39.2
	709.9	40.0	5.0	2:37/1.0 2:10/1.0 2:15/1.0 2:29/1.0 2:35/1.0	100% (5.0) 100%	75% (4.6) 92%		97%	81%		**CRYSTALLINE ROCK** BROWN, WHITE, GRAY, AND BLACK, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=81% RMR=66	
705	704.9	45.0	5.0	2:49/1.0 2:53/1.0 2:47/1.0 2:41/1.0 2:30/1.0	(4.6) 92%	(3.7) 74%	RS-45					
700	699.9	50.0	5.0	2:39/1.0 2:14/1.0 1:33/1.0 1:12/1.0 1:19/1.0	(1.7) 34%	(1.2) 24%	RS-46	(0.0) 0%			698.2	51.7
											WEATHERED ROCK (META-GRANITE)	
695	694.9	55.0	3.0	2:18/1.0 2:34/1.0 2:15/1.0	(3.0) 100%	(1.1) 37%		(3.0) 100%	(1.1) 37%		694.9	55.0
	691.9	58.0									**CRYSTALLINE ROCK** WHITE, GRAY, AND BLACK, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=37% RMR=34	58.0
											Boring Terminated at Elevation 691.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B10B_LL	**STATION** 391+75	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.0 ft	**TOTAL DEPTH** 40.5 ft	**NORTHING** 869,747	**EASTING** 1,743,913	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	750.0	0.0	WOH	WOH	1	1				750.0 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY WITH ORGANICS	
745	746.5	3.5	WOH	WOH	1	1					
	741.5	8.5	4	4	5	9				739.0 BROWN AND RED-BROWN, SILTY SAND	11.0
740											
	736.5	13.5	1	0	1	1				734.0 BROWN, COARSE SAND	16.0
735											
	731.5	18.5	8	9	12	21				729.0 **RESIDUAL** BROWN AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	21.0
730											
	726.5	23.5	3	4	6	10				724.0 GRAY AND WHITE, SAPROLTICI, SILTY SAND WITH MICA	26.0
725											
	721.5	28.5	23	27	35	62					
720											
	716.5	33.5	18	19	32	51					
715											
	711.5	38.5	16	20	80	100/1.0				711.0 **WEATHERED ROCK** (GRANITE)	39.0
710	709.5	40.5	60/0.0			60/0.0				709.5	40.5

Boring Terminated with Standard Penetration Test Refusal at Elevation 709.5 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B11A_LL	**STATION** 393+04	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 38.6 ft	**NORTHING** 869,842	**EASTING** 1,744,014	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/10/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	749.6	0.0	1	1	1	2		Sat.		749.6 GROUND SURFACE 0.0
										ALLUVIAL RED-BROWN AND GRAY, SANDY CLAY WITH SOME TRACE ORGANICS
745	746.1	3.5	WOH	WOH	WOH	0		Sat.		
	741.1	8.5	3	3	5	8		W		
740										
	736.1	13.5	WOH	1	2	3		W		
735										
	731.1	18.5	WOH	3	9	12		W		730.6 19.0
730										728.6 BROWN, COARSE SAND WITH TRACE GRAVEL 21.0
	726.1	23.5	6	7	7	14		M		**RESIDUAL** WHITE AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA
725										
	721.1	28.5	10	12	32	44		M		
720										
	716.1	33.5	36	16	11	27				714.1 35.5
715										**WEATHERED ROCK** (META-GRANITE)
	711.1	38.5	60/0.1			60/0.1				711.1 38.5
										711.0 **CRYSTALLINE ROCK** (META-GRANITE) 38.6

Boring Terminated with Standard Penetration Test Refusal at Elevation 711.0 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B11B_LL	**STATION** 393+04	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.8 ft	**TOTAL DEPTH** 54.6 ft	**NORTHING** 869,784	**EASTING** 1,744,036	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	749.8	0.0	WOH	WOH	1	1		W		749.8 GROUND SURFACE	0.0
	746.3	3.5								**ALLUVIAL** GRAY AND BROWN, SILTY CLAY WITH SOME ORGANICS	
745			WOH	2	3	5		W			
	741.3	8.5									
740			3	3	5	8		W			
	738.8	11.0								DARK BROWN, FINE SANDY PEAT	
	736.3	13.5	WOH	WOH	WOH	0		W			
735											
	733.8	16.0								LIGHT BROWN, COARSE SAND	
	731.3	18.5	5	5	4	9		W			
730											
	729.3	20.5								**RESIDUAL** GRAY AND WHITE,	
	726.3	23.5	19	11	65	76		W			
725											
	721.3	28.5	64	36/0.2		100/0.7				WEATHERED ROCK (META-GRANITE)	
720											
	716.3	33.5	60/0.2			60/0.2					
715											
	713.8	36.0	60/0.0			60/0.0				CRYSTALLINE ROCK WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=86% RQD=57% RMR=53	
710							RS-33				
705							RS-34				
700											
	695.2	54.6								Boring Terminated at Elevation 695.2 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B11B_LL	**STATION** 393+04	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.8 ft	**TOTAL DEPTH** 54.6 ft	**NORTHING** 869,784	**EASTING** 1,744,036	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 18.6 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)
713.8												
	713.8	36.0	4.1	4:10/1.0 3:37/1.0 3:41/1.0 3:25/1.1	(4.1) 100%	(2.7) 66%		(16.0) 86%	(10.5) 56%		713.8 Begin Coring @ 36.0 ft	36.0
710	709.7	40.1					RS-33				**CRYSTALLINE ROCK** WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=86% RQD=57% RMR=53	
			5.0	3:27/1.0 3:10/1.0 3:34/1.0 3:41/1.0 3:47/1.0	(3.6) 72%	(1.7) 34%						
705	704.7	45.1										
			5.0	3:43/1.0 4:01/1.0 3:37/1.0 3:21/1.0 3:25/1.0	(4.7) 94%	(4.0) 80%	RS-34					
700	699.7	50.1										
			4.5	3:27/1.0 3:33/1.0 3:27/1.0 3:31/1.0 1:49/0.5	(3.6) 80%	(2.1) 47%						
	695.2	54.6									695.2 Boring Terminated at Elevation 695.2 ft in CRYSTALLINE ROCK (META-GRANITE)	54.6

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/11/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B12A_LL	**STATION** 394+33	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 70.0 ft	**NORTHING** 869,889	**EASTING** 1,744,133	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/09/12	**COMP. DATE** 10/10/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										749.6	0.0
	749.6	0.0	WOH	WOH	WOH	0		W		GROUND SURFACE **ALLUVIAL** BROWN AND GRAY, SILTY CLAY WITH SOME ORGANICS	
	746.1	3.5	2	2	2	4		W			
	741.1	8.5	1	2	2	4		W		738.6	11.0
	736.1	13.5	1	WOH	1	1		W		DARK BROWN	
	731.1	18.5	2	4	3	7		W		733.6	16.0
	726.1	23.5	33	39	46	85		M		BROWN, COARSE SAND	
	721.1	28.5	18	26	34	60		M		726.6	23.0
	716.1	33.5	17	26	24	50		M		**RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
	711.1	38.5	75	25/0.0		100/0.5				712.6	37.0
	706.9	42.7	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
										706.9	42.7
										CRYSTALLINE ROCK WHITE AND GRAY, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE REC=87% RQD=0% RMR=56	
										704.6	45.0
										700.4	49.2
										WEATHERED ROCK (META-GRANITE)	
										CRYSTALLINE ROCK BROWN, WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=68% RQD=41% RMR=56	
										679.6	70.0
										Boring Terminated at Elevation 679.6 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B12A_LL	**STATION** 394+33	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 70.0 ft	**NORTHING** 869,889	**EASTING** 1,744,133	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/09/12	**COMP. DATE** 10/10/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 27.3 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)
706.9											Begin Coring @ 42.7 ft	
705	706.9	42.7	2.3	2:57/1.0 3:20/1.3	(2.0) 87%	(0.0) 0%		(2.0) 87%	(0.0) 0%		706.9	42.7
	704.6	45.0	5.0	2:10/1.0 2:21/1.0 2:16/1.0 2:13/1.0 2:20/1.0	(0.8) 16%	(0.4) 8%		(0.0) 0%			**CRYSTALLINE ROCK** WHITE AND GRAY, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE REC=87% RQD=0% RMR=56	704.6 45.0
700	699.6	50.0	5.0	2:25/1.0 2:21/1.0 2:37/1.0 2:29/1.0 2:40/1.0	(1.6) 32%	(0.0) 0%		(14.1) 68%	(8.6) 41%		700.4	49.2
695	694.6	55.0	5.0	2:23/1.0 2:45/1.0 2:16/1.0 2:29/1.0 2:41/1.0	(1.7) 34%	(0.4) 8%					**WEATHERED ROCK** (META-GRANITE)	
690	689.6	60.0	5.0	3:10/1.0 3:21/1.0 3:37/1.0 3:15/1.0 3:49/1.0	(5.0) 100%	(3.0) 60%					**CRYSTALLINE ROCK** BROWN, WHITE AND GRAY, HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=68% RQD=41% RMR=56	
685	684.6	65.0	5.0	3:33/1.0 3:29/1.0 3:43/1.0 3:25/1.0 3:47/1.0	(4.0) 80%	(4.8) 96%					679.6	70.0
680	679.6	70.0									Boring Terminated at Elevation 679.6 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B12B_LL	**STATION** 394+33	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.1 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 869,838	**EASTING** 1,744,153	**24 HR.** 0.3
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/09/12	**COMP. DATE** 10/09/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.1	0.0	WOH	WOH	1	1		W		750.1 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY WITH SOME ORGANICS	
745	746.6	3.5	3	2	2	4		W			
740	741.6	8.5	2	3	4	7		W			
735	736.6	13.5	1	1	2	3		W		734.1	16.0
										BROWN, COARSE SAND WITH SOME GRAVEL	
730	731.6	18.5	3	2	1	3		W			
725	726.6	23.5	7	12	12	24		W		724.1	26.0
										WEATHERED ROCK (META-GRANITE)	
720	721.6	28.5	60/0.4			60/0.4					
715	716.6	33.5	43	47	28	75		M		719.1	31.0
										GRAY, WHITE, AND BROWN, SAPROLITIC, SILTY SAND	
	711.6	38.5	60/0.0			60/0.0				713.1	37.0
										711.6 **CRYSTALLINE ROCK** (META-GRANITE)	38.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 711.6 ft on CRYSTALLINE ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B13A_LL	**STATION** 395+62	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 40.5 ft	**NORTHING** 869,936	**EASTING** 1,744,253	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/05/12	**COMP. DATE** 10/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750	749.6	0.0	WOH	WOH	1	1		W		749.6 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	746.1	3.5	3	1	3	4		W			
740	741.1	8.5	3	3	4	7		W			
735	736.1	13.5	WOH	WOH	WOH	0		W		733.6	16.0
										BROWN, COARSE SAND WITH SOME MICA	
730	731.1	18.5	7	5	4	9		W		728.6	21.0
725	726.1	23.5	5	6	7	13		M		**RESIDUAL** BROWN, GRAY, AND WHITE, SILTY SAND WITH SOME MICA	
720	721.1	28.5	15	26	56	82		M			
715	716.1	33.5	22	65	35/0.3	100/0.8				715.6	34.0
										WEATHERED ROCK (META-GRANITE)	
710	711.1	38.5	60/0.2			60/0.2					
	709.1	40.5	60/0.0			60/0.0				709.6	40.0
										709.1 **CRYSTALLINE ROCK** (META-GRANITE)	40.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 709.1 ft on CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B13B_LL	**STATION** 395+62	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.3 ft	**TOTAL DEPTH** 59.2 ft	**NORTHING** 869,878	**EASTING** 1,744,276	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	749.3	0.0								749.3 GROUND SURFACE	0.0
			WOH	WOH	1	1		Sat.		**ALLUVIAL** BROWN AND GRAY, SILTY CLAY	
745	745.8	3.5	3	3	3	6		Sat.			
740	740.8	8.5	3	4	5	9		Sat.			
735	735.8	13.5	2	2	2	4		W			
730	730.8	18.5	3	2	1	3		W		732.3 GRAY, WHITE, AND BROWN, COARSE SAND WITH SOME GRAVEL	17.0
725	725.8	23.5	22	29	71	100				727.8 **RESIDUAL** 725.3 GRAY AND WHITE, SILTY SAND	21.5 24.0
720	720.8	28.5	11	23	22	45				723.3 **WEATHERED ROCK** (META-GRANITE)	26.0
	715.8	33.5	60/0.2			60/0.2				**RESIDUAL** BLACK AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
715	712.3	37.0	60/0.0			60/0.0				715.8	33.5
710										**WEATHERED ROCK** (META-GRANITE) 712.3	37.0
705										**CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=88% RQD=34% RMR=44	
700											
695							RS-89			690.1 Boring Terminated at Elevation 690.1 ft in CRYSTALLINE ROCK (META-GRANITE)	59.2

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B13B_LL	**STATION** 395+62	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.3 ft	**TOTAL DEPTH** 59.2 ft	**NORTHING** 869,878	**EASTING** 1,744,276	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 22.2 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)
712.3												
	712.3	37.0	2.2	3:03/1.0 3:10/1.2	(2.2) 100%	(0.4) 18%		(19.6) 88%	(7.6) 34%		Begin Coring @ 37.0 ft	
710	710.1	39.2									712.3 **CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=88% RQD=34% RMR=44	37.0
			5.0	2:10/1.0 2:15/1.0 3:27/1.0 3:09/1.0 3:06/1.0	(3.7) 74%	(1.2) 24%						
705	705.1	44.2										
			5.0	3:15/1.0 3:21/1.0 3:07/1.0 3:33/1.0 5:50/1.0	(3.8) 76%	(1.6) 32%						
700	700.1	49.2										
			5.0	3:30/1.0 3:21/1.0	(4.9) 98%	(1.5) 30%						
695	695.1	54.2		2:45/1.0 2:53/1.0 3:33/1.0								
			5.0	3:20/1.0 3:15/1.0 2:56/1.0 2:37/1.0 2:42/1.0	(5.0) 100%	(3.1) 62%	RS-89					
	690.1	59.2									690.1 Boring Terminated at Elevation 690.1 ft in CRYSTALLINE ROCK (META-GRANITE)	59.2

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B14A_LL	**STATION** 396+91	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 869,983	**EASTING** 1,744,373	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/03/12	**COMP. DATE** 10/03/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
										749.6	
	749.6	0.0	WOH	1	1	2		W		GROUND SURFACE **ALLUVIAL** RED-BROWN, CLAYEY SAND	0.0
	746.1	3.5	WOH	WOH	2	2		W		743.6	6.0
										RED-BROWN AND GRAY, SILTY CLAY	
	741.1	8.5	3	2	4	6		W		738.6	11.0
										GRAY, SANDY CLAY	
	736.1	13.5	WOH	2	3	5		W		732.1	17.5
										BROWN, COARSE SAND WITH GRAVEL	
	731.1	18.5	13	10	3	13		W		728.6	21.0
										RESIDUAL WHITE AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	
	726.1	23.5	5	6	10	16		M		720.6	29.0
										WEATHERED ROCK (META-GRANITE)	
	721.1	28.5	43	53	47/0.4	100/0.9				716.1	33.5
	716.1	33.5	60/0.1			60/0.1				**CRYSTALLINE ROCK** (META-GRANITE)	34.0
										712.6 **CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=30% RMR=43	37.0
										710.6	39.0
										708.8	40.8
										705.6 **WEATHERED ROCK** (META-GRANITE)	44.0
										704.4 **CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=50% RMR=43	45.2
										699.6	50.0
										WEATHERED ROCK (META-GRANITE)	
										CRYSTALLINE ROCK BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=0% RMR=43	
										684.6	65.0
										WEATHERED ROCK (META-GRANITE)	
										CRYSTALLINE ROCK BROWN, WHITE AND BLACK, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=95% RQD=28% RMR=43	
										Boring Terminated at Elevation 684.6 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B14A_LL	**STATION** 396+91	**OFFSET** 78 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 869,983	**EASTING** 1,744,373	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/03/12	**COMP. DATE** 10/03/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 31.0 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)
715.6											Begin Coring @ 34.0 ft	
715	715.6	34.0	1.0	2:57/1.0	(1.0) 100%	(0.0) 0%		(3.0) 100%	(0.9) 30%		715.6 **CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=30% RMR=43	34.0
	714.6	35.0	5.0	2:34/1.0 2:20/1.0 2:45/1.0 2:31/1.0 2:18/1.0	(3.0) 60%	(1.3) 26%		(0.0) 0%			712.6	37.0
710	709.6	40.0	5.0	2:47/1.0 2:36/1.0 2:43/1.0 2:29/1.0 2:40/1.0	(1.8) 36%	(0.5) 10%		(1.8) 100%	(0.9) 50%		710.6	39.0
705	704.6	45.0	5.0	2:20/1.0 2:21/1.0 2:37/1.0 2:16/1.0 2:25/1.0	(0.2) 4%	(0.0) 0%		(0.0) 0%			708.8	40.8
700	699.6	50.0	5.0	2:19/1.0 2:27/1.0 2:10/1.0 2:21/1.0 2:15/1.0	(5.0) 100%	(0.9) 18%		(0.0) 0%			705.6 **WEATHERED ROCK** (META-GRANITE)	44.0
695	694.6	55.0	5.0	2:33/1.0 2:27/1.0 2:45/1.0 2:36/1.0 2:29/1.0	(4.6) 92%	(1.6) 32%		(1.2) 100%	(0.0) 0%		704.4 **CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=50% RMR=43	45.2
690	689.6	60.0	5.0	2:34/1.0 2:45/1.0 2:51/1.0 2:43/1.0 2:40/1.0	(4.7) 94%	(1.7) 34%		(14.3) 95%	(4.2) 28%		699.6 **WEATHERED ROCK** (META-GRANITE)	50.0
685	684.6	65.0									**CRYSTALLINE ROCK** BROWN, WHITE AND BLACK, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, VERY CLOSE TO CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=0% RMR=43	
											WEATHERED ROCK (META-GRANITE)	
											CRYSTALLINE ROCK BROWN, WHITE AND BLACK, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=95% RQD=28% RMR=43	
											Boring Terminated at Elevation 684.6 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B14B_LL .	**STATION** 396+91	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.0 ft	**TOTAL DEPTH** 38.7 ft	**NORTHING** 869,932	**EASTING** 1,744,393	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	749.0	0.0								749.0 GROUND SURFACE 0.0
			WOH	WOH	2	2		Sat.		**ALLUVIAL** GRAY-BROWN AND RED-BROWN, SILTY CLAY
745	745.5	3.5								
			1	2	2	4		Sat.		
740	740.5	8.5								
			2	4	5	9		Sat.		
735	735.5	13.5								
			1	2	2	4		W		
730	730.5	18.5								733.0 16.0
			13	16	22	38		M		**RESIDUAL** GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA
725	725.5	23.5								725.0 24.0
			13	38	62/0.3	100/0.8				723.0 **WEATHERED ROCK** (GRANITE) 26.0
720	720.5	28.5	22	41	56	97		M		**RESIDUAL** BLACK AND WHITE, SILTY SAND WITH SOME MICA
										717.0 32.0
715	715.5	33.5	60/0.3			60/0.3				**WEATHERED ROCK** (GRANITE)
	710.5	38.5	60/0.2			60/0.2				710.3 38.7
										Boring Terminated at Elevation 710.3 ft in WEATHERED ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B15A_LL	**STATION** 398+10	**OFFSET** 86 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 39.3 ft	**NORTHING** 870,035	**EASTING** 1,744,481	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/09/12	**COMP. DATE** 10/09/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.1 GROUND SURFACE	0.0
	745.6	3.5	WOH	WOH	2	2		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY	
745										743.1	6.0
	740.6	8.5	4	3	3	6		W		GRAY-BROWN, SLIGHTLY MICACEOUS, SILTY SAND	
740											
	735.6	13.5	4	4	4	8		W		732.6	16.5
735										COARSE SAND AND GRAVEL	
	730.6	18.5	8	5	5	10		M		730.1	19.0
730										**RESIDUAL** BLACK-BROWN-WHITE, SAPROLITIC, SANDY SILT	
	725.6	23.5	4	5	13	18		W		722.6	26.5
725										**WEATHERED ROCK** (META-GRANITE)	
	720.6	28.5	26	63	37/0.2	100/0.7					
720											
	715.6	33.5	100/0.4			100/0.4					
715											
	710.6	38.5	47	53/0.3		100/0.8				709.8	39.3
710										Boring Terminated at Elevation 709.8 ft in WEATHERED ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B15B_LL	**STATION** 398+10	**OFFSET** 17 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 46.5 ft	**NORTHING** 869,970	**EASTING** 1,744,506	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/09/12	**COMP. DATE** 10/09/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.4 GROUND SURFACE	0.0
	745.9	3.5	2	2	4	6		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY	
745											
	740.9	8.5	2	4	3	7		W		739.9	9.5
740										TAN-BROWN, SILTY SAND	
	735.9	13.5	2	2	4	6		W		737.9	11.5
735										YELLOW-BROWN, SILTY SAND WITH GRAVEL	
	730.9	18.5	7	13	14	27		W		730.4	19.0
730										**RESIDUAL** BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT	
	725.9	23.5	27	39	21	60		W		722.9	26.5
725										**WEATHERED ROCK** (META-GRANITE)	
	720.9	28.5	24	42	58/0.4	100/0.9					
720											
	715.9	33.5	59	41/0.3		100/0.8					
715											
	710.9	38.5	100/0.4			100/0.4					
710											
	705.9	43.5	100/0.3			100/0.3					
705											
	702.9	46.5	60/0.0			60/0.0				702.9	46.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 702.9 ft on CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16A_LL	**STATION** 399+28	**OFFSET** 61 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 56.3 ft	**NORTHING** 870,055	**EASTING** 1,744,600	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.1 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.6	3.5	1	4	6	10		W			
740	740.6	8.5	1	4	4	8		W		738.1 TAN-BROWN, SLIGHTLY MICACEOUS, CLAYEY SILT	11.0
735	735.6	13.5	1	3	4	7		W			
730	730.6	18.5	7	15	63	78		M		730.1 **RESIDUAL** BLACK-WHITE-BROWN, MICACEOUS, SAPROLITIC, SANDY SILT	19.0
725	725.6	23.5	100/0.3			100/0.3				727.6 **WEATHERED ROCK** (META-GRANITE)	21.5
720	722.8	26.3	60/0.0			60/0.0				722.8 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=74% RMR=69	26.3
715										718.8	30.3
710										713.7 **WEATHERED ROCK** (META-GRANITE)	35.4
705										712.8	36.3
700										712.5 **CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=18% RQD=0% RMR=69	36.6
695										**WEATHERED ROCK** (META-GRANITE)	
										CRYSTALLINE ROCK BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=99% RQD=57% RMR=55	
										692.8 Boring Terminated at Elevation 692.8 ft in CRYSTALLINE ROCK (META-GRANITE)	56.3

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16A_LL	**STATION** 399+28	**OFFSET** 61 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 56.3 ft	**NORTHING** 870,055	**EASTING** 1,744,600	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/16/12	**COMP. DATE** 10/16/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 30.0 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)
722.8											Begin Coring @ 26.3 ft	
720	722.8	26.3	5.0	1;58/1.0 2:08/1.0 1;32/1.0 1:53/1.0 :47/1.0	(4.0) 80%	(3.7) 74%		(4.0) 100%	(3.7) 93%		722.8 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=74% RMR=69	26.3
	717.8	31.3									718.8	30.3
715	712.8	36.3	5.0	:26/1.0 :56/1.0 :35/1.0 1:01/1.0 1:37/1.0	(0.9) 18%	(0.0) 0%		(0.0) 0%			713.7 **WEATHERED ROCK** (META-GRANITE)	35.4
710	707.8	41.3	5.0	1:19/1.0 1:38/1.0 1:25/1.0 1;21/1.0 1:13/1.0	(4.7) 94%	(1.5) 30%		(0.9) 100% (0.0) 0% (19.5) 99%	(0.0) 0% (11.3) 57%		712.8 712.5 **CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=18% RQD=0% RMR=69	36.3 36.6
705	702.8	46.3	5.0	1:24/1.0 1:27/1.0 1:19/1.0 1:42/1.0 1:51/1.0	(4.8) 96%	(1.7) 34%					**WEATHERED ROCK** (META-GRANITE)	
700	697.8	51.3	5.0	1:38/1.0 1:36/1.0 2:06/1.0 2:06/1.0 2:00/1.0	(5.0) 100%	(4.2) 84%					**CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=99% RQD=57% RMR=55	
695	692.8	56.3	5.0	1:51/1.0 2:20/1.0 2:33/1.0 2:43/1.0 3:10/0.0	(5.0) 100%	(3.9) 78%					692.8 Boring Terminated at Elevation 692.8 ft in CRYSTALLINE ROCK (META-GRANITE)	56.3

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16B_LL	**STATION** 399+28	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.2 ft	**TOTAL DEPTH** 34.1 ft	**NORTHING** 870,019	**EASTING** 1,744,614	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/15/12	**COMP. DATE** 10/15/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.2 GROUND SURFACE	0.0
	745.7	3.5	1	2	4	6		W		**ALLUVIAL** BROWN-GRAY AND GRAY, SILTY CLAY	
740	740.7	8.5	WOH	1	2	3		W			
735	735.7	13.5	WOH	WOH	WOH	0		W			
730	730.7	18.5	2	41	59/0.1	100/0.6				730.2 **WEATHERED ROCK** (META-GRANITE)	19.0
725	725.7	23.5	23	29	18	47		W		727.2 **RESIDUAL** BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT	22.0
720	720.7	28.5	100/0.2			100/0.2				723.2 **WEATHERED ROCK** (META-GRANITE)	26.0
	715.7	33.5	90	10/0.1		100/0.6				715.1 Boring Terminated at Elevation 715.1 ft in WEATHERED ROCK (META-GRANITE)	34.1

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17A_LL	**STATION** 400+48	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.5 ft	**TOTAL DEPTH** 33.7 ft	**NORTHING** 870,103	**EASTING** 1,744,710	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/17/12	**SURFACE WATER DEPTH** 0.5ft	

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	
750										748.5 WATER SURFACE (10/17/12) / GROUND SURFACE	0.0
	745.0	3.5	WOH	1	2	3		W		**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
740	740.0	8.5	3	1	2	3		W			
735	735.0	13.5	WOH	WOH	WOH	0		W			
730	730.0	18.5	5	14	36	50		W		732.5 SAND AND GRAVEL	16.0
725	725.0	23.5	100/0.2			100/0.2				729.5 **RESIDUAL** BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT	19.0
720	720.0	28.5	60	40/0.2		100/0.7				727.0 **WEATHERED ROCK** (META-GRANITE)	21.5
715	715.0	33.5	100/0.2			100/0.2				714.8 Boring Terminated at Elevation 714.8 ft in WEATHERED ROCK (META-GRANITE)	33.7

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17B_LL	**STATION** 400+48	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.4 ft	**TOTAL DEPTH** 47.2 ft	**NORTHING** 870,057	**EASTING** 1,744,728	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/17/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.4 GROUND SURFACE	0.0
745	744.9	3.5	1	1	2	3		W		**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
740	739.9	8.5	WOH	2	2	4		W		743.4 YELLOW-BROWN, SILTY SAND	5.0
735	734.9	13.5	1	4	4	8		W			
730	729.9	18.5	WOH	3	34	37		W		728.9 **RESIDUAL**	19.5
725	724.9	23.5	50	50/0.4		100/0.9				727.4 BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT	21.0
720	721.2	27.2	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
715										721.2 **CRYSTALLINE ROCK** BLACK, BROWN, AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=98% RQD=76% RMR=71	27.2
710											
705										701.2	47.2
										Boring Terminated at Elevation 701.2 ft in CRYSTALLINE ROCK (META-GRANITE)	

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17B_LL	**STATION** 400+48	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.4 ft	**TOTAL DEPTH** 47.2 ft	**NORTHING** 870,057	**EASTING** 1,744,728	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/17/12	**COMP. DATE** 10/17/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 20.0 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)
721.2											Begin Coring @ 27.2 ft	
720	721.2	27.2	5.0	2:40/1.0 1:35/1.0 1:40/1.0 2:15/1.0 2:42/1.0	(4.5) 90%	(3.4) 68%		(19.5) 98%	(15.1) 76%		721.2 **CRYSTALLINE ROCK** BLACK, BROWN, AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=98% RQD=76% RMR=71	27.2
	716.2	32.2										
715			5.0	1:56/1.0 2:00/1.0 2:25/1.0 2:38/1.0 2:35/1.0	(5.0) 100%	(4.2) 84%						
	711.2	37.2										
710			5.0	2:32/1.0 2:14/1.0 2:30/1.0 2:53/1.0 2:32/1.0	(5.0) 100%	(3.8) 76%						
	706.2	42.2										
705			5.0	2:14/1.0 2:32/1.0 2:13/1.0 2:44/1.0 2:35/1.0	(5.0) 100%	(3.7) 74%						
	701.2	47.2									701.2	47.2
											Boring Terminated at Elevation 701.2 ft in CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18A_LL	**STATION** 401+68	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 61.2 ft	**NORTHING** 870,147	**EASTING** 1,744,821	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/24/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.8 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.3	3.5	3	7	10	17		W			
740	740.3	8.5	4	3	2	5		W		741.3 TAN-BROWN, SILTY SAND WITH SOME GRAVEL	7.5
735	735.3	13.5	WOH	WOH	1	1		W			
730	730.3	18.5	2	4	19	23		W		729.3	19.5
725	725.3	23.5	93	7/0.1		100/0.6				727.3 BLACK, WHITE, AND BROWN, SAPROLITIC, SANDY SILT	21.5
	722.6	26.2	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
720										722.6 **CRYSTALLINE ROCK** BLACK AND WHITE, SOFT TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=71% RQD=38% RMR=69	26.2
715										712.6 BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=93% RQD=66% RMR=69	36.2
710											
705											
700											
695											
690										687.6 Boring Terminated at Elevation 687.6 ft in CRYSTALLINE ROCK (META-GRANITE)	61.2

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18A_LL	**STATION** 401+68	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 61.2 ft	**NORTHING** 870,147	**EASTING** 1,744,821	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/24/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 35.0 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)
722.6											Begin Coring @ 26.2 ft	
720	722.6	26.2	5.0	3:24/1.0 1:22/1.0 2:43/1.0 1:52/1.0 1:36/1.0	(3.4) 68%	(1.4) 28%		(7.1) 71%	(3.8) 38%		722.6 **CRYSTALLINE ROCK** BLACK AND WHITE, SOFT TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=71% RQD=38% RMR=69	26.2
715	717.6	31.2	5.0	1:28/1.0 2:22/1.0 3:00/1.0 2:45/1.0 3:12/1.0	(3.7) 74%	(2.4) 48%					712.6 BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=93% RQD=66% RMR=69	36.2
710	712.6	36.2	5.0	2:43/1.0 2:26/1.0 2:33/1.0 2:00/1.0 1:41/1.0	(5.0) 100%	(4.2) 84%		(23.3) 93%	(16.4) 66%			
705	707.6	41.2	5.0	3:05/1.0 2:55/1.0 3:06/1.0 2:02/1.0 2:37/1.0	(4.8) 96%	(3.0) 60%						
700	702.6	46.2	5.0	3:15/1.0 3:02/1.0 3:01/1.0 2:32/1.0 0:00/1.0	(5.0) 100%	(4.1) 82%						
695	697.6	51.2	5.0	1:30/1.0 2:12/1.0 2:32/1.0 2:07/1.0 2:43/1.0	(3.5) 70%	(0.4) 8%						
690	692.6	56.2	5.0	3:13/1.0 3:33/1.0 3:26/1.0 3:47/1.0 5:18/1.0	(5.0) 100%	(4.7) 94%						
	687.6	61.2									687.6 Boring Terminated at Elevation 687.6 ft in CRYSTALLINE ROCK (META-GRANITE)	61.2

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18B_LL	**STATION** 401+68	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 870,107	**EASTING** 1,744,837	**24 HR.** 0.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.9 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.4	3.5	2	5	8	13		W			
										741.4 YELLOW-TAN, SILTY SAND WITH GRAVEL	7.5
740	740.4	8.5	WOH	WOH	1	1		W			
735	735.4	13.5	2	1	2	3		W			
										732.4 **WEATHERED ROCK** (META-GRANITE)	16.5
730	730.4	18.5	100/0.4			100/0.4					
	728.9	20.0	60/0.0			60/0.0				728.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 728.9 ft on CRYSTALLINE ROCK (META-GRANITE)	20.0

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19A_LL	**STATION** 402+88	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.9 ft	**TOTAL DEPTH** 27.5 ft	**NORTHING** 870,191	**EASTING** 1,744,933	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** 0.8ft	

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
750										WATER SURFACE (10/25/12)
										747.9 GROUND SURFACE 0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY
745	744.4	3.5	WOH	WOH	1	1		W		
740	739.4	8.5	WOH	WOH	1	1		W		737.9 10.0 TAN-BROWN, SILTY SAND WITH GRAVEL
735	734.4	13.5	1	2	1	3		W		
730	729.4	18.5	21	22	78/0.4	100/0.9				731.9 16.0 **WEATHERED ROCK** (META-GRANITE)
725	724.4	23.5	100/0.4			100/0.4				
	720.4	27.5	60/0.0			60/0.0				720.4 27.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 720.4 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19B_LL	**STATION** 402+88	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.8 ft	**TOTAL DEPTH** 39.3 ft	**NORTHING** 870,145	**EASTING** 1,744,951	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/30/12	**COMP. DATE** 10/30/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										747.8 GROUND SURFACE	0.0
745										**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
	744.3	3.5									
			1	1	2	3		W			
740										741.8	6.0
	739.3	8.5								TAN-BROWN, SILTY SAND	
			2	2	2	4		W			
735										736.8	11.0
	734.3	13.5								TAN-BROWN, SILTY SAND WITH GRAVEL	
			4	7	10	17		W			
730										731.3	16.5
	729.3	18.5								**WEATHERED ROCK** (META-GRANITE)	
	728.5	19.3	100/0.4			100/0.4				728.5	19.3
725			60/0.0			60/0.0				**CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD TO HARD, MODERATELY SEVERELY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=95% RQD=80% RMR=76	
720											
715											
710										708.5	39.3
										Boring Terminated at Elevation 708.5 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19B_LL	**STATION** 402+88	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.8 ft	**TOTAL DEPTH** 39.3 ft	**NORTHING** 870,145	**EASTING** 1,744,951	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/30/12	**COMP. DATE** 10/30/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 20.0 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)
728.5											Begin Coring @ 19.3 ft	
	728.5	19.3	5.0	2:20/1.0 2:48/1.0 2:45/1.0 2:21/1.0 1:00/1.0	(4.5) 90%	(3.7) 74%		(18.9) 95%	(15.9) 80%		728.5 **CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD TO HARD, MODERATELY SEVERELY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=95% RQD=80% RMR=76	19.3
725												
	723.5	24.3	5.0	2:07/1.0 2:23/1.0 2:33/1.0 2:48/1.0 2:11/1.0	(5.0) 100%	(4.0) 80%						
720												
	718.5	29.3	5.0	2:19/1.0 3:31/1.0 3:51/1.0 3:11/1.0 2:25/1.0	(4.9) 98%	(4.7) 94%						
715												
	713.5	34.3	5.0	2:28/1.0 2:31/1.0 2:38/1.0 2:57/1.0 2:49/1.0	(4.5) 90%	(3.5) 70%						
710												
	708.5	39.3									708.5	39.3
											Boring Terminated at Elevation 708.5 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20A_LL	**STATION** 404+08	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 38.0 ft	**NORTHING** 870,235	**EASTING** 1,745,045	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/31/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.9	0.0
										GROUND SURFACE	
										ALLUVIAL	
										BROWN-GRAY, SILTY CLAY	
745	745.4	3.5	1	2	6	8		W			
										741.4	7.5
740	740.4	8.5	2	5	4	9		W		TAN-BROWN, SILTY SAND WITH SOME GRAVEL	
										735.9	13.0
735	735.4	13.5	32	68/0.3		100/0.8				WEATHERED ROCK	
										(META-GRANITE)	
	730.9	18.0	60/0.0			60/0.0				730.9	18.0
730										CRYSTALLINE ROCK	
										BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE	
725										REC=96%	
										RQD=70%	
720										RMR=65	
715										710.9	38.0
										Boring Terminated at Elevation 710.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20A_LL	**STATION** 404+08	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 38.0 ft	**NORTHING** 870,235	**EASTING** 1,745,045	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/31/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 20.0 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)
730.9											Begin Coring @ 18.0 ft	
730	730.9	18.0	5.0	2:18/1.0	(4.4)	(2.5)		(19.1)	(13.9)		730.9	18.0
				2:31/1.0	88%	50%		96%	70%		CRYSTALLINE ROCK	
				2:13/1.0							BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE	
				1:12/1.0							REC=96%	
				1:34/1.0							RQD=70%	
725	725.9	23.0	5.0	2:34/1.0	(5.0)	(3.5)					RMR=65	
				2:53/1.0	100%	70%						
				2:41/1.0								
				2:41/1.0								
	720.9	28.0		3:00/1.0								
720			5.0	4:50/1.0	(5.0)	(4.4)						
				3:06/1.0	100%	88%						
				3:32/1.0								
				2:52/1.0								
	715.9	33.0		3:17/1.0								
715			5.0	3:07/1.0	(4.7)	(3.5)						
				3:47/1.0	94%	70%						
				3:59/1.0								
				2:49/1.0								
	710.9	38.0		2:58/1.0							710.9	38.0
											Boring Terminated at Elevation 710.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21B_LL	**STATION** 406+28	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 52.9 ft	**NORTHING** 870,270	**EASTING** 1,745,268	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.8 GROUND SURFACE	0.0
	745.3	3.5	3	4	5	9		W		ALLUVIAL BROWN-GRAY, SILTY CLAY	
745										742.3	6.5
	740.3	8.5	4	3	4	7		W		TAN-BROWN, SILTY SAND WITH SOME GRAVEL	
740											
	735.3	13.5	WOH	1	2	3		W		732.3	16.5
735										TAN-BROWN, SAND WITH GRAVEL	
	730.3	18.5	3	6	7	13		W		727.9	20.9
730										WEATHERED ROCK (META-GRANITE)	
	725.9	22.9	60/0.0			60/0.0				725.9	22.9
725										CRYSTALLINE ROCK BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=74% RMR=65	
720											
715											
710											
705											
700										695.9	52.9
										Boring Terminated at Elevation 695.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21B_LL	**STATION** 406+28	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.8 ft	**TOTAL DEPTH** 52.9 ft	**NORTHING** 870,270	**EASTING** 1,745,268	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 30.0 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)
725.9											Begin Coring @ 22.9 ft	
725	725.9	22.9	5.0	2:59/1.0 2:39/1.0 1:47/1.0 2:00/1.0 1:32/1.0	(4.7) 94%	(3.8) 76%		(29.1) 97%	(22.2) 74%		725.9 CRYSTALLINE ROCK BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=74% RMR=65	22.9
720	720.9	27.9	5.0	2:12/1.0 2:06/1.0 2:05/1.0 2:14/1.0 2:17/1.0	(5.0) 100%	(4.1) 82%						
715	715.9	32.9	5.0	1:44/1.0 1:51/1.0 1:25/1.0 2:05/1.0 2:00/1.0	(4.7) 94%	(3.9) 78%						
710	710.9	37.9	5.0	2:21/1.0 1:58/1.0 2:24/1.0 3:24/1.0 3:08/1.0	(4.7) 94%	(3.4) 68%						
705	705.9	42.9	5.0	2:05/1.0 2:17/1.0 2:26/1.0 2:51/1.0 2:22/1.0	(5.0) 100%	(2.8) 56%						
700	700.9	47.9	5.0	2:25/1.0 2:41/1.0 2:44/1.0 3:19/1.0 3:05/1.0	(5.0) 100%	(4.2) 84%						
	695.9	52.9									695.9 Boring Terminated at Elevation 695.9 ft in CRYSTALLINE ROCK (META-GRANITE)	52.9

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20B_LL	**STATION** 404+08	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 18.5 ft	**NORTHING** 870,195	**EASTING** 1,745,060	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										749.1 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.6	3.5	4	4	8	12		M			
										743.1 TAN-BROWN, SILTY SAND	6.0
740	740.6	8.5	3	1	2	3		W			
										738.1 **RESIDUAL** BLACK AND WHITE, SAPROLITIC, SANDY SILT	11.0
735	735.6	13.5	8	24	76/0.2	100/0.7				735.1 **WEATHERED ROCK** (META-GRANITE)	14.0
	730.6	18.5	60/0.0			60/0.0				730.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 730.6 ft on CRYSTALLINE ROCK (META-GRANITE)	18.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21A_LL	**STATION** 406+28	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 20.0 ft	**NORTHING** 870,316	**EASTING** 1,745,249	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/07/12	**COMP. DATE** 11/07/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										748.6 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.1	3.5	1	2	3	5		W			
										741.6 TAN-BROWN, GRAY, AND TAN-BROWN-YELLOW, SILTY SAND	7.0
740	740.1	8.5	4	2	2	4		W			
735	735.1	13.5	WOH	WOH	WOH	0		W			
										729.6	19.0
730	730.1	18.5	1	78	22/0.4					728.6 **WEATHERED ROCK** (META-GRANITE)	20.0
	728.6	20.0	60/0.0			100/0.9 60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 728.6 ft on CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B22A_LL	**STATION** 409+03	**OFFSET** 66 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 755.5 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 870,417	**EASTING** 1,745,505 — **24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/01/12	**COMP. DATE** 10/01/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
760											
755	755.5	0.0	3	3	5	8 18		M		755.5 GROUND SURFACE	0.0
	752.0	3.5						M		**RESIDUAL** RED-BROWN, SANDY CLAY	
750			8	8	10						
	747.0	8.5								749.5	6.0
745			32	21	9	30				GRAY AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA	
	742.0	13.5								742.0	13.5
740			67	33/0.2		100/0.7				**WEATHERED ROCK** (META-GRANITE)	
	738.5	17.0	60/0.0			60/0.0	RS-63			738.5	17.0
735										**CRYSTALLINE ROCK** BLACK, GRAY, AND WHITE, VERY HARD, FRESH TO SLIGHTLY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=93% RMR=80	
730							RS-64			725.5	30.0
										Boring Terminated at Elevation 725.5 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B22A_LL	**STATION** 409+03	**OFFSET** 66 ft LT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 755.5 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 870,417	**EASTING** 1,745,505 — **24 HR.** 6.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/01/12	**COMP. DATE** 10/01/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ-3	**TOTAL RUN** 13.0 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)
738.5											Begin Coring @ 17.0 ft	
	738.5	17.0	3.0	3:47/1.0 3:10/1.0 3:21/1.0	(3.0) 100%	(3.0) 100%	RS-63	(12.5) 96%	(12.1) 93%		738.5 **CRYSTALLINE ROCK** BLACK, GRAY, AND WHITE, VERY HARD, FRESH TO SLIGHTLY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=96% RQD=93% RMR=80	17.0
735	735.5	20.0	5.0	3:20/1.0 3:15/1.0 3:21/1.0 3:17/1.0 3:03/1.0	(4.5) 90%	(4.1) 82%						
730	730.5	25.0	5.0	3:08/1.0 3:21/1.0 3:16/1.0 3:09/1.0 3:30/1.0	(5.0) 100%	(5.0) 100%	RS-64					
	725.5	30.0									725.5 Boring Terminated at Elevation 725.5 ft in CRYSTALLINE ROCK (META-GRANITE)	30.0

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B22B_LL	**STATION** 409+03	**OFFSET** 27 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.8 ft	**TOTAL DEPTH** 13.5 ft	**NORTHING** 870,381	**EASTING** 1,745,519	**24 HR.** 9.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/27/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.8	0.0	4	4	7	11, 23		M		750.8 GROUND SURFACE	0.0
										RESIDUAL RED-BROWN, SILTY CLAY	
	747.3	3.5	8	11	12			M		744.8	6.0
745										WHITE AND BROWN, SAPROLITIC, SILTY SAND WITH TRACE MICA	
	742.3	8.5	11	11	14	25		M		739.3	11.5
740										**CRYSTALLINE ROCK** (META-GRANITE)	
	737.3	13.5	60/0.0			60/0.0				737.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 737.3 ft on CRYSTALLINE ROCK (META-GRANITE)	13.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B23A_LL	**STATION** 411+23	**OFFSET** 66 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.1 ft	**TOTAL DEPTH** 16.0 ft	**NORTHING** 870,498	**EASTING** 1,745,710	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/01/12	**COMP. DATE** 10/01/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	747.1	0.0	WOH	WOH	WOH	0		W		747.1 GROUND SURFACE	0.0
745										**ALLUVIAL** GRAY-BROWN, SILTY CLAY WITH SOME ORGANICS	
	743.6	3.5	WOH	WOH	WOH	0		W		741.1	6.0
740										GRAY, SANDY CLAY	
	738.6	8.5	2	2	3	5		M			
735											
	733.6	13.5	34	60/0.1		60/0.1				733.1	14.0
	731.1	16.0	60/0.0			60/0.0				**CRYSTALLINE ROCK** (META-GRANITE)	
										731.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 731.1 ft in CRYSTALLINE ROCK (META-GRANITE)	16.0

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B23B_LL	**STATION** 411+23	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.0 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 870,451	**EASTING** 1,745,728	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/02/12	**COMP. DATE** 10/02/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750										
	747.0	0.0	WOH	WOH	WOH	0				747.0 GROUND SURFACE 0.0
745										**ALLUVIAL** GRAY-BROWN, COARSE SAND
	743.5	3.5	WOH	WOH	WOH	0				
740										
	738.5	8.5	3	3	2	5				738.5 8.5 **ALLUVIAL** GRAY, CLAYEY SAND
735										
	733.5	13.5								733.5 13.5
	733.0	14.0	60/0.3			60/0.3				733.0 14.0 **WEATHERED ROCK** (META-GRANITE)
730			60/0.0			60/0.0				**CRYSTALLINE ROCK** GRAY AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=94% RMR=84
725										
720										717.0 30.0 Boring Terminated at Elevation 717.0 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B23B_LL	**STATION** 411+23	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.0 ft	**TOTAL DEPTH** 30.0 ft	**NORTHING** 870,451	**EASTING** 1,745,728	**24 HR.** 0.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/02/12	**COMP. DATE** 10/02/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**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)
733											Begin Coring @ 14.0 ft
	733.0	14.0	1.0	3:43/1.0	(1.0)	(1.0)		(16.0)	(15.1)		733.0 14.0 **CRYSTALLINE ROCK**
	732.0	15.0	5.0	3:20/1.0	100%	100%		100%	94%		GRAY AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED,
730				3:32/1.0							CLOSE TO MODERATELY CLOSE FRACTURE SPACING,
				3:56/1.0	(5.0)	(5.0)					META-GRANITE
				3:38/1.0	100%	100%					REC=100%
	727.0	20.0		3:28/1.0							RQD=94%
725			5.0	3:05/1.0	(4.8)	(4.1)					RMR=84
				3:06/1.0	96%	82%					
				2:50/1.0							
	722.0	25.0		3:33/1.0							
720				2:52/1.0							
			5.0	3:23/1.0	(5.0)	(5.0)					
				3:32/1.0	100%	100%					
				2:44/1.0							
				4:20/1.0							
	717.0	30.0		3:18/1.0							717.0 30.0 Boring Terminated at Elevation 717.0 ft in CRYSTALLINE ROCK (META-GRANITE)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B24A_LL	**STATION** 413+34	**OFFSET** 93 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.8 ft	**TOTAL DEPTH** 35.1 ft	**NORTHING** 870,600	**EASTING** 1,745,897	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/07/12	**SURFACE WATER DEPTH** 0.1ft	

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											
	745.8	0.0	WOH	WOH	WOH	0		W		745.8 WATER SURFACE (11/06/12)	0.0
745										743.8 **ALLUVIAL** BROWN, SILTY CLAY	2.0
	742.3	3.5	1	1	1	2		W		GRAY, SILTY SAND	
740										739.8	6.0
	737.3	8.5	2	3	2	5		W		GRAY, SILTY CLAY	
735										734.8	11.0
	732.3	13.5	2	2	6	8		W		GRAY, SILTY SAND	
730											
	727.3	18.5	60/0.0			60/0.0				727.3 **CRYSTALLINE ROCK** BLACK, GRAY AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=90% RQD=66% RMR=58	18.5
725											
720											
715										710.7	35.1
										Boring Terminated at Elevation 710.7 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B24A_LL	**STATION** 413+34	**OFFSET** 93 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.8 ft	**TOTAL DEPTH** 35.1 ft	**NORTHING** 870,600	**EASTING** 1,745,897	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/07/12	**SURFACE WATER DEPTH** 0.1ft	
CORE SIZE NQ3	**TOTAL RUN** 16.6 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)
727.3											Begin Coring @ 18.5 ft	
	727.3	18.5	1.6	3:10/1.0	(1.6)	(1.4)					727.3 **CRYSTALLINE ROCK**	18.5
725	725.7	20.1		2:16/0.6	100%	88%					BLACK, GRAY AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE	
			5.0	2:29/1.0 2:47/1.0 3:03/1.0 2:27/1.0 2:41/1.0	(4.0) 80%	(2.4) 48%					REC=90% RQD=66% RMR=58	
720	720.7	25.1										
			5.0	2:21/1.0 2:39/1.0 2:45/1.0 2:41/1.0 2:35/1.0	(4.3) 86%	(2.6) 52%						
715	715.7	30.1										
			5.0	2:40/1.0 2:29/1.0 2:56/1.0 3:10/1.0 3:17/1.0	(5.0) 100%	(4.5) 90%						
	710.7	35.1									710.7	35.1
											Boring Terminated at Elevation 710.7 ft in CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B25A_LL	**STATION** 415+12	**OFFSET** 101 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.7 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 870,671	**EASTING** 1,746,064	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
745	745.7	0.0	WOH	WOH	WOH	0		W		745.7 GROUND SURFACE	0.0
	742.2	3.5	WOH	1	1	2		W		**ALLUVIAL** GRAY AND BROWN, SILTY CLAY WITH TRACE ORGANICS	
740											
	737.2	8.5	3	3	5	8		W			
735											
	732.2	13.5	2	2	2	4		W			
730											
	727.2	18.5	60/0.1			60/0.1				727.2	18.5
725	724.7	21.0	60/0.0			60/0.0				**CRYSTALLINE ROCK** (META-GRANITE)	21.0
										BROWN, GRAY, AND WHITE, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=69% RMR=62	
720											
715										710.7	35.0
										Boring Terminated at Elevation 710.7 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B25A_LL	**STATION** 415+12	**OFFSET** 101 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.7 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 870,671	**EASTING** 1,746,064	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ3	**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)
724.7											Begin Coring @ 21.0 ft	
	724.7	21.0	4.0	2:49/1.0 3:01/1.0 3:10/1.0 3:12/1.0	(3.6) 90%	(2.1) 53%		(13.6) 97%	(9.6) 69%		724.7 BROWN, GRAY, AND WHITE, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=97% RQD=69% RMR=62	21.0
720	720.7	25.0	5.0	2:27/1.0 3:03/1.0 3:21/1.0 2:54/1.0 2:39/1.0	(5.0) 100%	(3.5) 70%						
715	715.7	30.0	5.0	2:41/1.0 2:36/1.0 3:10/1.0 3:19/1.0 3:07/1.0	(5.0) 100%	(4.0) 80%						
	710.7	35.0									710.7 Boring Terminated at Elevation 710.7 ft in CRYSTALLINE ROCK (META-GRANITE)	35.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B27B_LL	**STATION** 418+25	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.9 ft	**TOTAL DEPTH** 45.8 ft	**NORTHING** 870,679	**EASTING** 1,746,394	**24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
745										745.9 GROUND SURFACE	0.0
	742.4	3.5	WOH	WOH	WOH	0		W		ALLUVIAL GRAY-BROWN, SILTY CLAY WITH ROOTS	
740										739.9	6.0
	737.4	8.5	2	1	1	2		W		GRAY-WHITE, SILTY SAND	
735											
	732.4	13.5	1	4	3	7		W		730.9	15.0
730										RESIDUAL BROWN, SAPROLITIC, SILTY SAND	
	727.4	18.5	1	2	3	5		W		723.9	22.0
725										WEATHERED ROCK (META-GRANITE)	
	722.4	23.5	26	12	88/0.4	100/0.9				720.1	25.8
720	720.1	25.8	60/0.0			60/0.0				CRYSTALLINE ROCK BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=91% RMR=73	
715											
710											
705										700.1	45.8
										Boring Terminated at Elevation 700.1 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B27B_LL	**STATION** 418+25	**OFFSET** 16 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.9 ft	**TOTAL DEPTH** 45.8 ft	**NORTHING** 870,679	**EASTING** 1,746,394	**24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-2	**TOTAL RUN** 20.0 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)
720											Begin Coring @ 25.8 ft	
	720.1	25.8	5.0	1:49/1.0 2:12/1.0 2:13/1.0 2:11/1.0 2:08/1.0	(5.0) 100%	(4.7) 94%		(20.0) 100%	(18.2) 91%		720.1 CRYSTALLINE ROCK BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE REC=100% RQD=91% RMR=73	25.8
715	715.1	30.8	5.0	2:01/1.0 1:53/1.0 2:08/1.0 2:07/1.0 1:54/1.0	(5.0) 100%	(5.0) 100%						
710	710.1	35.8	5.0	1:43/1.0 1:02/1.0 1:34/1.0 2:08/1.0 2:34/1.0	(5.0) 100%	(3.5) 70%						
705	705.1	40.8	5.0	3:01/1.0 2:58/1.0 3:25/1.0 3:17/1.0 2:54/1.0	(5.0) 100%	(5.0) 100%						
	700.1	45.8									700.1	45.8
											Boring Terminated at Elevation 700.1 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B28A_LL	**STATION** 419+53	**OFFSET** 68 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.2 ft	**TOTAL DEPTH** 50.5 ft	**NORTHING** 870,755	**EASTING** 1,746,511	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/28/12	**COMP. DATE** 10/01/12	**SURFACE WATER DEPTH** 2.0ft	

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)
										WATER SURFACE (09/28/12)	
										745.2 GROUND SURFACE	0.0
										ALLUVIAL GRAY-BROWN, SILTY CLAY	
	741.7	3.5	WOH	WOH	WOH	0		Sat.			
	736.7	8.5	WOH	1	1	2		W		735.2	10.0
										GRAY-WHITE, SILTY SAND	
	731.7	13.5	15	85/0.4		100/0.9				733.2	12.0
										WEATHERED ROCK (META-GRANITE)	
	726.7	18.5	44	14	30	44		M		729.2	16.0
										RESIDUAL BLACK-WHITE-BROWN, SAPROLITIC, SILTY SAND	
	721.7	23.5	58	42/0.3		100/0.8				721.7	23.5
										WEATHERED ROCK (META-GRANITE)	
	716.7	28.5	8	19	38	57		M		719.2	26.0
										RESIDUAL BLACK-WHITE-BROWN, SAPROLITIC, SILTY SAND	
	711.7	33.5	100/0.3			100/0.3				713.7	31.5
										WEATHERED ROCK (META-GRANITE)	
	706.7	38.5	100/0.4			100/0.4					
	701.7	43.5	100/0.2			100/0.2					
	696.7	48.5	100/0.2			100/0.2					
	694.7	50.5	60/0.0			60/0.0				694.7	50.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 694.7 ft on CRYSTALLINE ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B28B_LL	**STATION** 419+29	**OFFSET** 23 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.9 ft	**TOTAL DEPTH** 32.5 ft	**NORTHING** 870,707	**EASTING** 1,746,495	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/24/12	**COMP. DATE** 09/24/12	**SURFACE WATER DEPTH** 0.0ft	

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
										745.9 WATER SURFACE (09/24/12) 0.0
										ALLUVIAL BROWN, SILTY CLAY WITH ROOTS
	742.4	3.5	WOH	WOH	WOH	0		Sat.		
	737.4	8.5	WOH	3	3	6		W		736.9 9.0
										ALLUVIAL GRAY-WHITE, SILTY SAND 11.0
	732.4	13.5	11	18	22	40		W		**RESIDUAL** BLACK-WHITE-BROWN, SAPROLITIC, SILTY SAND
	727.4	18.5	9	10	32	42		W		724.9 21.0
										WEATHERED ROCK (META-GRANITE)
	722.4	23.5	32	68/0.4		100/0.9				
	717.4	28.5	100/0.2			100/0.2				
	713.4	32.5	60/0.0			60/0.0				713.4 32.5
										Boring Terminated with Standard Penetration Test Refusal at Elevation 713.4 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/7/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B29A_LL	**STATION** 420+63	**OFFSET** 69 ft LT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 746.7 ft	**TOTAL DEPTH** 23.8 ft	**NORTHING** 870,773	**EASTING** 1,746,623 / **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/04/12	**COMP. DATE** 10/04/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
										746.7 GROUND SURFACE 0.0
745										**ALLUVIAL** GRAY-BROWN, SILTY CLAY WITH TREE ROOTS
	743.2	3.5	3	7	14	21		W		
740										
	738.2	8.5	8	92/0.4		100/0.9				738.2 8.5
735										**WEATHERED ROCK** (META-GRANITE)
	733.2	13.5	100/0.3			100/0.3				
730										
	728.2	18.5	44	53	47/0.4	100/0.9				
725										
	723.2	23.5	100/0.3			100/0.3				722.9 23.8
										Boring Terminated at Elevation 722.9 ft in WEATHERED ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B29B_LL	**STATION** 420+45	**OFFSET** 32 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.0 ft	**TOTAL DEPTH** 47.3 ft	**NORTHING** 870,734	**EASTING** 1,746,609	**24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/03/12	**COMP. DATE** 10/03/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										ELEV. (ft) DEPTH (ft)
										749.0 GROUND SURFACE 0.0
										ALLUVIAL
745	745.5	3.5	WOH	4	7	11		M		TAN-BROWN, SANDY CLAY
										742.0 7.0
740	740.5	8.5	11	34	44	78		W		**RESIDUAL**
										BLACK-WHITE-BROWN, SAPROLITIC, SILTY SAND
										739.0 10.0
735	735.5	13.5	3	5	5	10		W		BLACK-WHITE-BROWN, MICACEOUS, SAPROLITIC, CLAYEY SILT
730	730.5	18.5	12	71	29/0.1					731.5 17.5
						100/0.6				**WEATHERED ROCK**
725	725.5	23.5	100/0.4							(META-GRANITE)
						100/0.4				
720	720.5	28.5	100/0.4							
	719.0	30.0	60/0.0			100/0.4 60/0.0				718.7 30.3
715										**CRYSTALLINE ROCK**
										BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
710										REC=99%
										RQD=84%
705										RMR=61
										701.7 47.3
										Boring Terminated at Elevation 701.7 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B29B_LL	**STATION** 420+45	**OFFSET** 32 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.0 ft	**TOTAL DEPTH** 47.3 ft	**NORTHING** 870,734	**EASTING** 1,746,609	**24 HR.** 3.3
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/03/12	**COMP. DATE** 10/03/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-2	**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
718.7											ELEV. (ft) DEPTH (ft)
											Begin Coring @ 30.3 ft
	718.7	30.3	2.0	1:50/1.0	(1.9)	(0.6)		(16.9)	(14.2)		718.7 **CRYSTALLINE ROCK** 30.3
	716.7	32.3		1:35/1.0	95%	30%		99%	84%		BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO
715			5.0	1:31/1.0	(5.0)	(4.4)					MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY
				1:35/1.0	100%	88%					CLOSE FRACTURE SPACING, META-GRANITE
				1:42/1.0							REC=99%
	711.7	37.3		1:46/1.0							RQD=84%
				1:47/1.0							RMR=61
710			5.0	1:43/1.0	(5.0)	(4.5)					
				1:46/1.0	100%	90%					
				1:53/1.0							
				1:32/1.0							
	706.7	42.3		1:47/1.0							
705			5.0	1:44/1.0	(5.0)	(4.7)					
				1:49/1.0	100%	94%					
				1:55/1.0							
				2:01/1.0							
	701.7	47.3		2:10/1.0							701.7 47.3
											Boring Terminated at Elevation 701.7 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 1/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. EB2A_LL	**STATION** 421+90	**OFFSET** 85 ft LT	**ALIGNMENT** -L- **0 HR.** 19.7
COLLAR ELEV. 764.6 ft	**TOTAL DEPTH** 37.3 ft	**NORTHING** 870,803	**EASTING** 1,746,751 **24 HR.** 19.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
765	764.6	0.0	1	1	3	4 2		D		764.6 0.0 GROUND SURFACE
	761.7	2.9								**RESIDUAL**
760			8	20	23	43		D		762.6 2.0 RED-ORANGE, SANDY SILT WITH TRACE ORGANICS
	756.7	7.9								WHITE, BROWN, AND GRAY, SILTY SAND
755			15	24	17	41		D		
	751.7	12.9								
750			8	9	10	19		D		
	746.7	17.9								
745			5	8	11	19		D▼		
	741.7	22.9								
740			4	4	5	9		D		
	736.7	27.9								736.7 27.9 **WEATHERED ROCK** (META-GRANITE)
735			18	82/0.4		100/0.9				
	731.7	32.9								
730			100/0.2			100/0.2				
	727.4	37.2	60/0.1			60/0.1				727.4 37.2 **CRYSTALLINE ROCK** (META-GRANITE) 727.3 37.3
										Boring Terminated with Standard Penetration Test Refusal at Elevation 727.3 ft in CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. EB2B_LL	**STATION** 421+47	**OFFSET** 7 ft LT	**ALIGNMENT** -L- **0 HR.** 25.8
COLLAR ELEV. 770.8 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 870,721	**EASTING** 1,746,714 **24 HR.** 25.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A

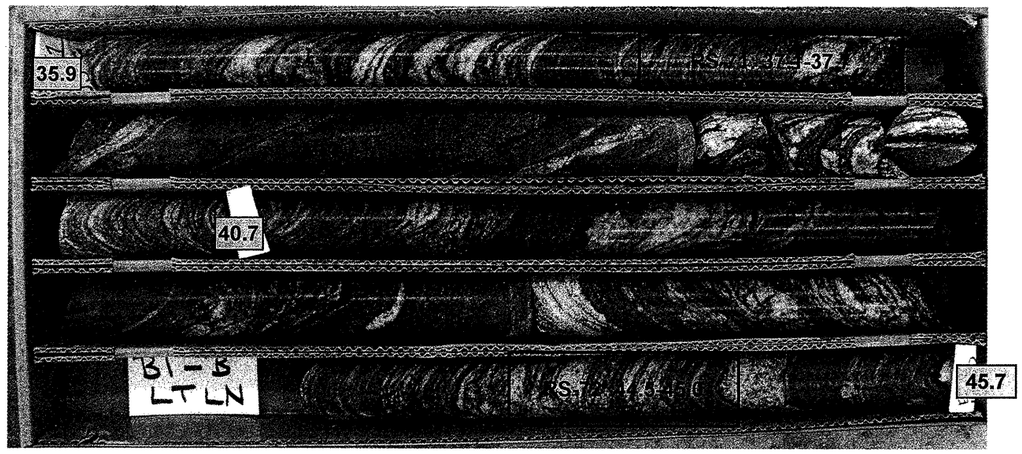
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
775										
	770.8	0.0	2	6	4	10		D		770.8 0.0 GROUND SURFACE
770										**RESIDUAL**
	767.8	3.0	13	25	75/0.3	100/0.8				767.3 3.5 TAN, RED, AND WHITE,SILTY SAND
765										**WEATHERED ROCK**
	762.8	8.0	100/0.4			100/0.4				(META-GRANITE)
760										
	757.8	13.0	3	27	45	72		D		758.8 12.0 **RESIDUAL**
755										TAN-GRAY AND TAN-WHITE, SILTY SAND
	752.8	18.0	8	13	24	37		D		
750										
	747.8	23.0	16	21	16	37		D▼		
745										
	742.8	28.0	26	39	61/0.4	100/0.9				742.3 28.5 **WEATHERED ROCK** (META-GRANITE)
740										
	737.8	33.0	14	32	68/0.5	100/1.0				
735										
	732.8	38.0	100/0.5			100/0.5				732.3 38.5 Boring Terminated at Elevation 732.3 ft in WEATHERED ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_LL.GPJ NC_DOT.GDT 2/8/13

CORE PHOTOGRAPHS

B1-B_LL

BOXES 1 & 2: 35.9 - 45.7 FEET



0 1 2
FEET

B2-A_LL

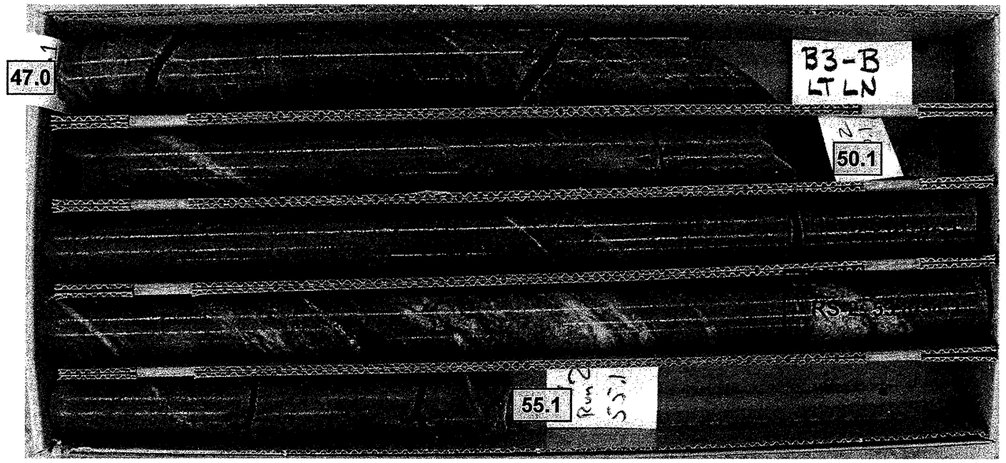
BOXES 1 & 2: 24.5 - 41.5 FEET

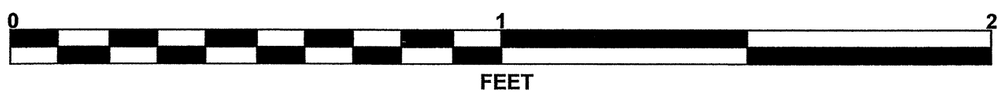
0 1 2
FEET

CORE PHOTOGRAPHS

B3-B_LL

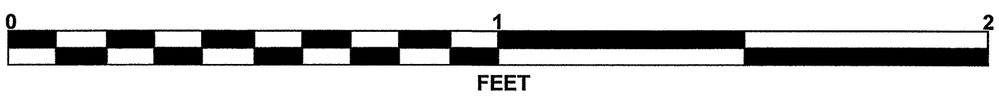
BOXES 1 & 2: 47.0 - 55.1 FEET





B4-A_LL

BOXES 1 & 2: 37.5 - 65.7 FEET



CORE PHOTOGRAPHS

B4-B_LL
BOXES 1 & 2: 39.9- 54.9 FEET

0 1 2
FEET

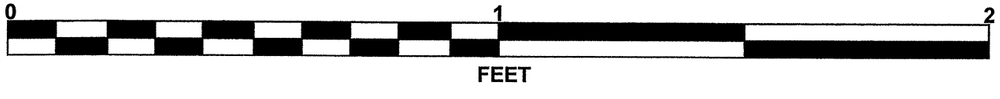
B5-B_LL
BOXES 1 & 2: 33.4 - 55.8 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

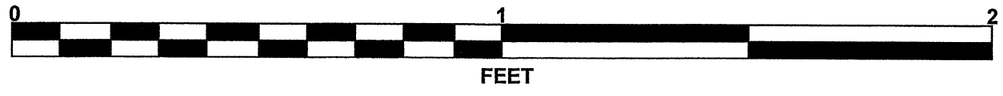
B7-B_LL

BOXES 1 & 2: 52.9- 74.9 FEET



B9-B_LL

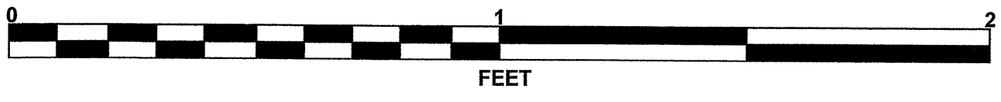
BOXES 1 & 2: 42.5 - 65.7 FEET



CORE PHOTOGRAPHS

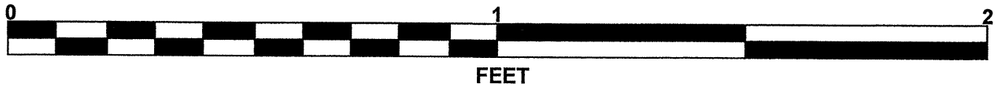
B10-A_LL

BOXES 1 & 2: 39.2- 58.0 FEET



B11-B_LL

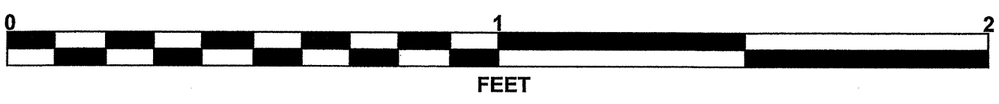
BOXES 1 & 2: 36.0 - 54.6 FEET



CORE PHOTOGRAPHS

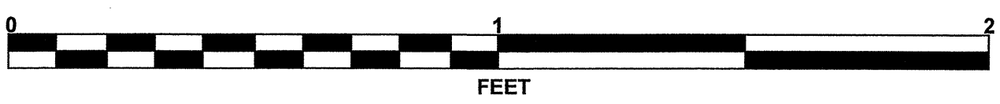
B12-A_LL

BOXES 1 & 2: 42.7- 70.0 FEET



B13-B_LL

BOXES 1 & 2: 37.0 - 59.2 FEET



CORE PHOTOGRAPHS

B14-A_LL

BOXES 1 & 2: 34.0- 65.0 FEET

0 1 2
FEET

B16-A_LL

BOXES 1 - 3: 26.3 - 56.3 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B17-B_LL

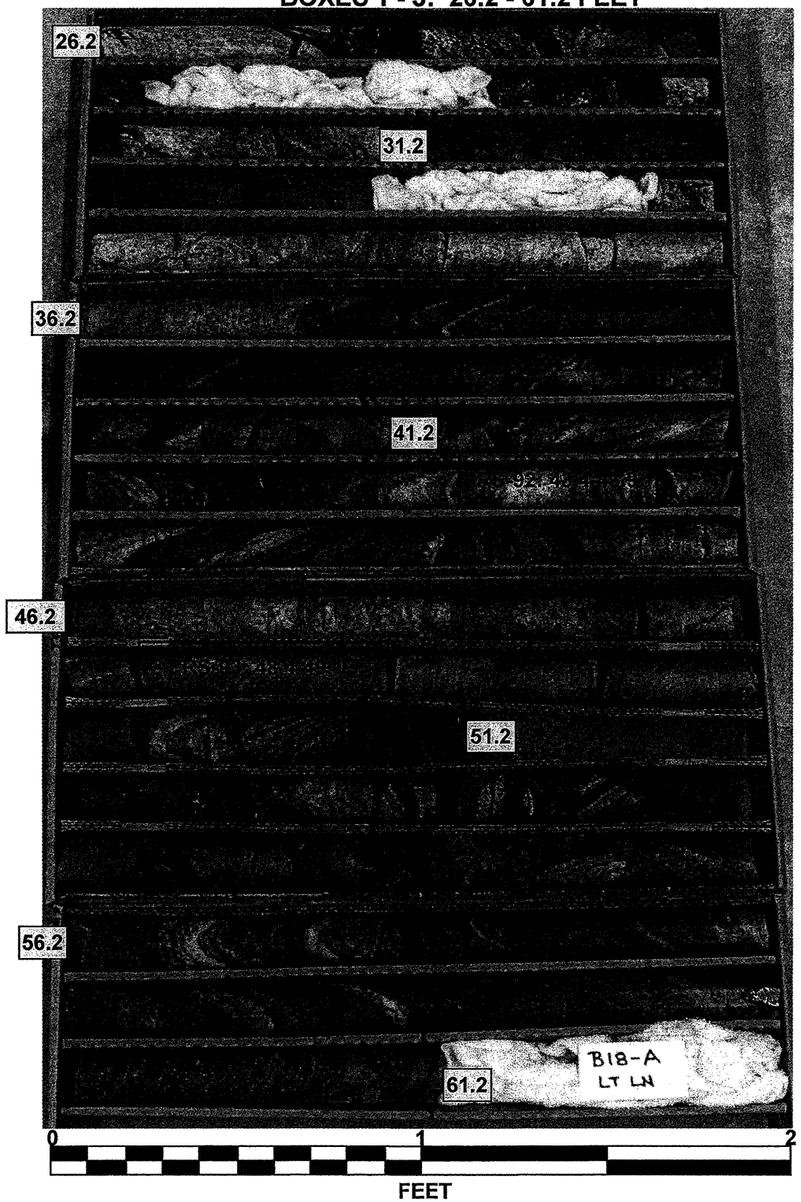
BOXES 1 & 2: 27.2- 47.2 FEET

0 1 2

FEET

B18-A_LL

BOXES 1 - 3: 26.2 - 61.2 FEET



0 1 2

FEET

CORE PHOTOGRAPHS

B19-B_LL

BOXES 1 & 2: 19.3- 39.3 FEET

0 1 2

FEET

B20-A_LL

BOXES 1 & 2: 18.0 - 38.0 FEET

0 1 2

FEET

CORE PHOTOGRAPHS

B21-B_LL

BOXES 1 - 3: 22.9- 52.9 FEET

B22-A_LL

BOXES 1 & 2: 17.0 - 30.0 FEET

CORE PHOTOGRAPHS

B23-B_LL

BOXES 1 & 2: 14.0- 30.0 FEET

0 1 2
FEET

B24-A_LL

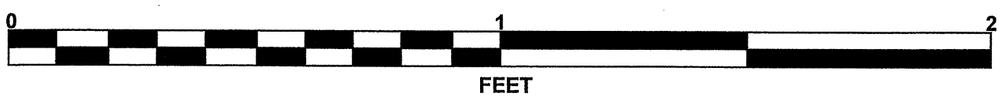
BOXES 1 & 2: 18.5 - 35.1 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

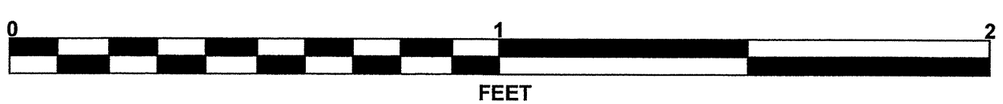
B25-A_LL

BOXES 1 & 2: 21.0- 35.0 FEET



B27-B_LL

BOXES 1 & 2: 25.8 - 45.8 FEET



CORE PHOTOGRAPHS

B29-B_LL

BOXES 1 & 2: 30.3 - 47.3 FEET

0 1 2

FEET

5/14/99

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	100

0 100 200
FEET
5:1

RIGHT LANE PROFILE

EB1-A RL
379+45
25' RT

B1-A RL
380+44
21' RT

B2-A RL
381+25
16' RT

B3-A RL
382+49
16' RT

B5A-A RL
385+25
29' RT

B7-A RL
387+88
16' RT

B8-A RL
389+17
16' RT

B9-A RL
390+46
23' RT

B10-A RL
391+75
16' RT

-Y3-
(DRAWBRIDGE PKWY)

ROADWAY EMBANKMENT, RED-ORANGE, MOIST, MEDIUM STIFF, SANDY CLAY

TRIBUTARY

RESIDUAL, RED, ORANGE, BROWN, AND GRAY, DRY TO WET, SAPROLITIC, MEDIUM STIFF TO HARD, SANDY SILT, AND WEATHERED ROCK (META-GRANITE)

ALLUVIAL, GRAY, SOFT TO AND LOOSE, SILTY SAND

ORANGE, AND BROWN, MOIST TO SATURATED, MEDIUM STIFF, SANDY SILT, SANDY CLAY.

ALLUVIAL, GRAY, WET, VERY SOFT, SILTY CLAY, AND LOOSE TO VERY DENSE.

AND BROWN, TO STIFF, LOOSE, SILTY SAND

SILTY SAND (META-GRANITE)

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED.

Ⓐ ALLUVIAL, GRAY AND BROWN, MOIST TO WET, LOOSE TO MEDIUM DENSE, COARSE SAND

GROUNDLINE PROFILE AT 25' RT OF -L- CUT BY GEU FROM ROADWAY .TIN FILE

820 810 800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630 620

379+00 380+00 381+00 382+00 383+00 384+00 385+00 386+00 387+00 388+00 389+00 390+00 391+00 392+00

13-FEB-2003 11:30
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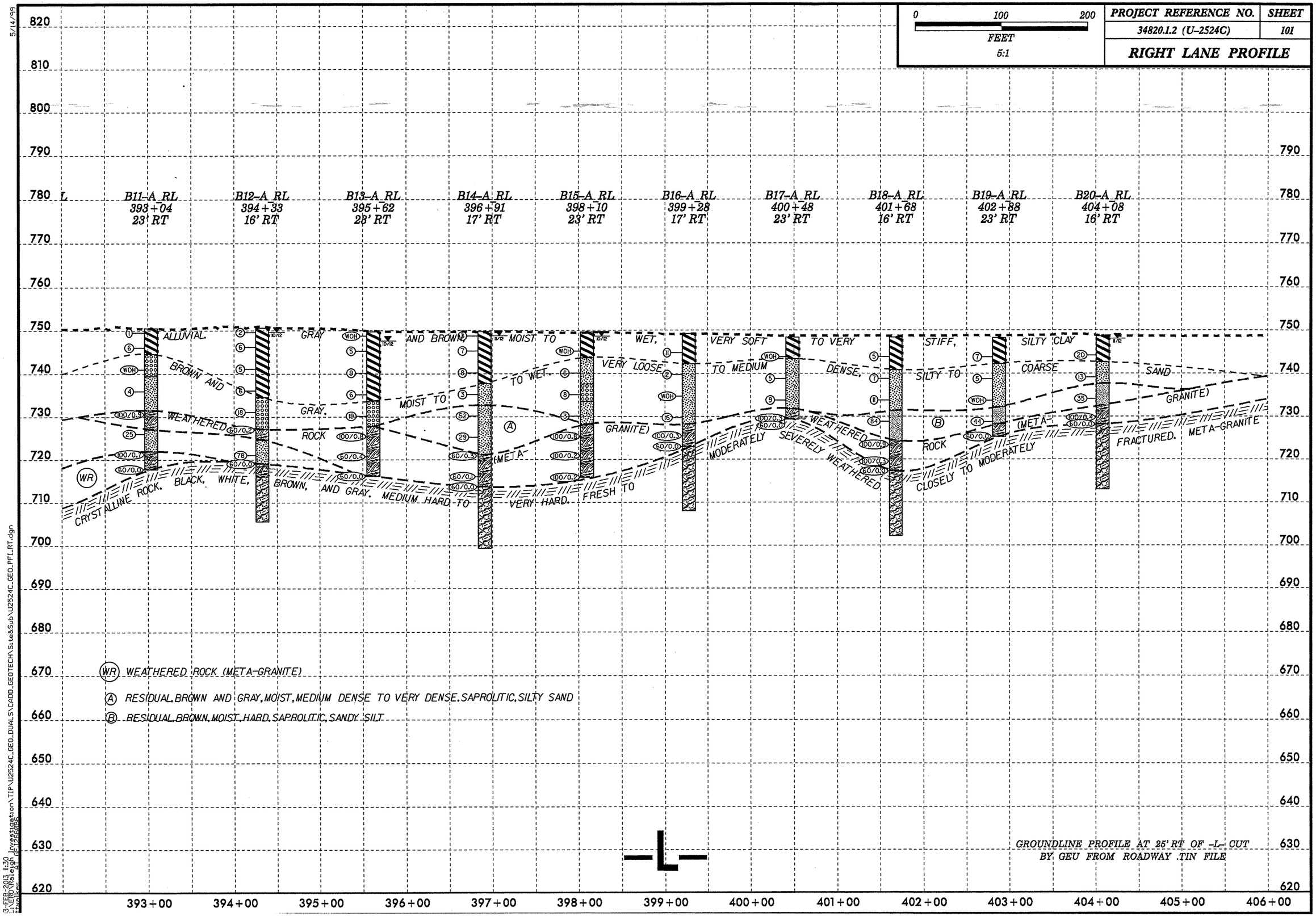
tiwalker



0 100 200
FEET
5:1
PROJECT REFERENCE NO.
34820.1.2 (U-2524C)
SHEET
101
RIGHT LANE PROFILE
B11-A_RL 393+04 23' RT
B12-A_RL 394+33 16' RT
B13-A_RL 395+62 23' RT
B14-A_RL 396+91 17' RT
B15-A_RL 398+10 23' RT
B16-A_RL 399+28 17' RT
B17-A_RL 400+48 23' RT
B18-A_RL 401+68 16' RT
B19-A_RL 402+88 23' RT
B20-A_RL 404+08 16' RT
ALLUVIAL, GRAY AND BROWN, MOIST TO WET, VERY SOFT TO VERY STIFF, SILTY CLAY
BROWN AND GRAY, MOIST TO WET, VERY LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND
WEATHERED ROCK (META-GRANITE)
CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY FRACTURED, META-GRANITE
WR WEATHERED ROCK (META-GRANITE)
A RESIDUAL, BROWN AND GRAY, MOIST, MEDIUM DENSE TO VERY DENSE, SAPROLITIC, SILTY SAND
B RESIDUAL, BROWN, MOIST, HARD, SAPROLITIC, SANDY SILT
GROUNDLINE PROFILE AT 25' RT OF -L- CUT
BY GEU FROM ROADWAY .TIN FILE
-L-
393+00 394+00 395+00 396+00 397+00 398+00 399+00 400+00 401+00 402+00 403+00 404+00 405+00 406+00

5/14/99

0	100	200
FEET		
5:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	102

RIGHT LANE PROFILE

B21-A_RL
406+28
23' RT

B22-A_RL
409+03
16' RT

B23-A_RL
411+23
23' RT

B25-B_RL
413+99
122' RT

B26-A_RL
416+97
15' RT

B27-A_RL
418+02
23' RT

-Y4-
(BATTLEGROUND AVE.)

ROADWAY EMBANKMENT

HORSEPEN CREEK

ALLUVIAL, BROWN, WET, MEDIUM STIFF, SILTY CLAY

ALLUVIAL, BROWN AND GRAY, MOIST TO SATURATED, VERY LOOSE TO LOOSE, SILTY TO COARSE SAND, AND SANDY CLAY

ALLUVIAL, GRAY AND BROWN, MOIST TO WET, VERY SOFT TO STIFF, SILTY CLAY

CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED SPACING, META-GRANITE

MEDIUM STIFF, SILTY CLAY

WEATHERED ROCK (META-GRANITE)

Ⓐ ALLUVIAL, BROWN, WET, MEDIUM STIFF, SILTY CLAY

Ⓑ RESIDUAL, BROWN, MOIST, MEDIUM DENSE, SAPROLITIC, COARSE SAND

Ⓒ RESIDUAL, BROWN, MOIST, MEDIUM DENSE, SAPROLITIC, SILTY SAND

Ⓓ RESIDUAL, BROWN, MOIST, MEDIUM DENSE, SAPROLITIC, SILTY SAND, AND STIFF, SANDY SILT

GROUNDLINE PROFILE AT 25' RT OF -L- CUT
BY GEU FROM ROADWAY .TIN FILE

820 810 800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630 620

407+00 408+00 409+00 410+00 411+00 412+00 413+00 414+00 415+00 416+00 417+00 418+00 419+00 420+00

3-FEB-2003 12:40
User:Design
File:U2524C_GEO_PFL_RT.dgn
\\Mainsa1\Projects\Division\TIP\U2524C_GEO_DUALS\CADD_GEOTECH\Site&Sub\U2524C_GEO_PFL_RT.dgn

5/14/99

0	100	200

FEET

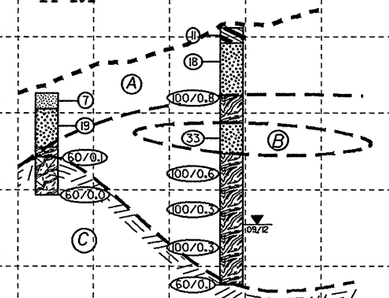
5:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	103

RIGHT LANE PROFILE

B29-A_RL
420+19
14' RT

EB2-B_RL
421+41
75' RT



CRYSTALLINE ROCK (META-GRANITE)

Ⓐ RESIDUAL, BROWN AND GRAY, DRY TO MOIST, SAPROLITIC, MEDIUM DENSE, SILTY SAND, AND STIFF, SANDY SILT AND SANDY CLAY

Ⓑ RESIDUAL, BROWN, MOIST, SAPROLITIC, DENSE, SILTY SAND

Ⓒ CRYSTALLINE ROCK, BLACK, WHITE, BROWN, AND GRAY, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURE, META-GRANITE

-L-

GROUNDLINE PROFILE AT 25' RT OF -L- CUT BY GEU FROM ROADWAY .TIN FILE

830 820 810 800 790 780 770 760 750 740 730 720 710 700 690 680 670 660 650 640 630

421+00 422+00 423+00 424+00 425+00

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L:\VERO\Raleigh Investigation\TIP\U2524C_GEO_DUALS\CADD_GEOTECH\Site&Sub\U2524C_GEO_PFL_RT.dgn
walker

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	104

CROSS SECTION THROUGH END BENT 1 RIGHT LANE

0 10 20
FEET
VE = 1:1

EB1-A_RL
379+45
25' RT

EB1-B_RL
379+45
75' RT

℄

790
780
770
760
750
740
730
720
710

14 13 5 9 16 22 23 16 66 100/0.3 100/0.8 100/0.4 100/0.5

8 9 8 12 7 11 18 100/0.3 76 100/0.7 100/0.8 53 34

09/12

09/12

(A)

RESIDUAL, RED, BROWN, AND GRAY, DRY TO MOIST, MEDIUM STIFF TO HARD, SANDY SILT, AND MEDIUM DENSE TO DENSE, SILTY SAND

(B)

WEATHERED ROCK (META-GRANITE)

RESIDUAL, GRAY AND VERY DENSE, SILTY SAND.

WHITE, MOIST, AND HARD, SANDY SILT

(A) ARTIFICIAL FILL, RED, BROWN, AND ORANGE, DRY, MEDIUM STIFF TO STIFF, SANDY AND SILTY CLAY

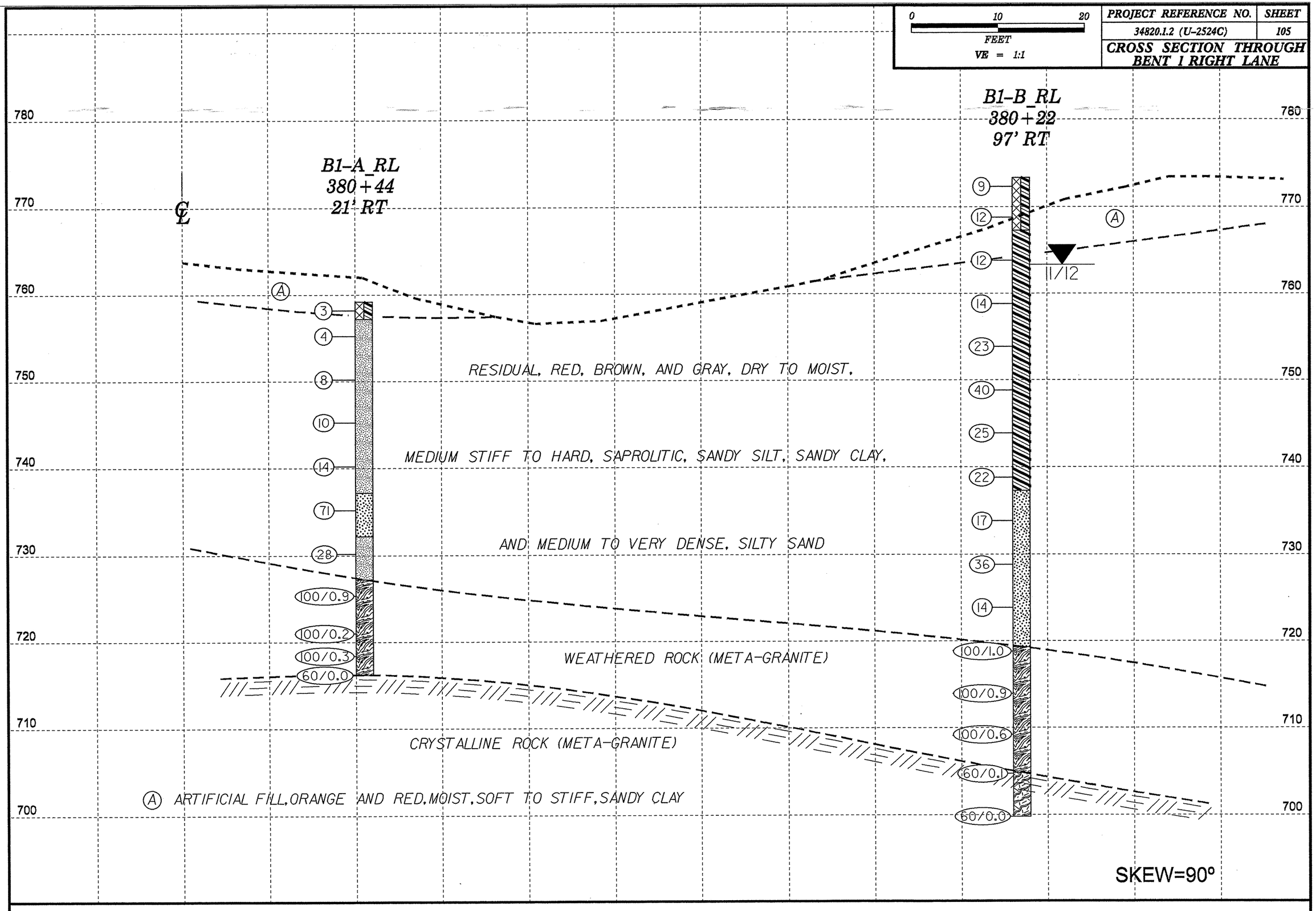
(B) WEATHERED ROCK (META-GRANITE)

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	105

CROSS SECTION THROUGH BENT 1 RIGHT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	106

CROSS SECTION THROUGH BENT 2 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B2-A_RL
381+25
16' RT

B2-B_RL
381+25
66' RT

(2) (4) (3) (6) (22) (100/0.9) (16) (100/0.9) (44) (60/0.) (60/0.0)

(3) (3) (WOH) (6) (14) (37) (37) (67) (100/0.8) (100/0.7) (100/0.3) (60/0.1)

10/12

10/12

ALLUVIAL, GRAY AND BROWN, MOIST TO WET, VERY SOFT TO MEDIUM STIFF, SANDY CLAY AND SANDY SILT

RESIDUAL, BROWN AND GRAY, DRY TO SATURATED, HARD, STIFF TO HARD, SAPROLITIC, SANDY SILT, AND MEDIUM DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, BLUE-GRAY, BLACK, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=97%
RQD=94%
RMR=82

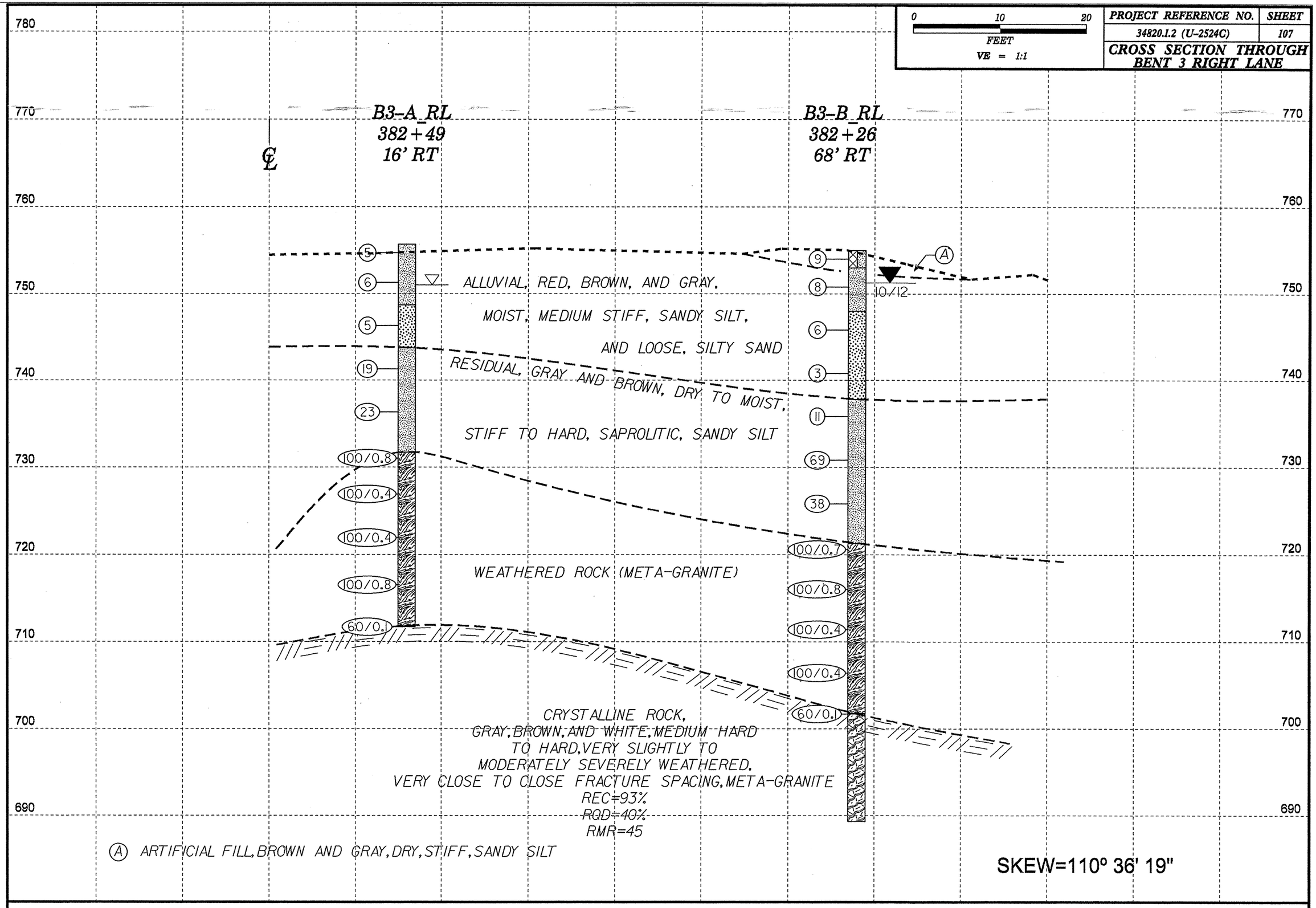
(A) RESIDUAL, BROWN AND GRAY, MOIST, VERY STIFF TO HARD, SANDY SILT

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	107

CROSS SECTION THROUGH BENT 3 RIGHT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	108

CROSS SECTION THROUGH BENT 4 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

B4-A_RL
0.5" SOUNDING ROD
383+31
36' RT

B4-B_RL
383+05
88' RT

℄

17
14
20
5
4
13
100/0.8
100/0.5
38
100/0.6
100/0.4
60/0.1

ROADWAY EMBANKMENT, ORANGE AND RED, DRY, VERY STIFF, SANDY CLAY

ARTIFICIAL FILL, TAN AND BROWN, DRY, MEDIUM DENSE, SILTY SAND

ALLUVIAL, GRAY, MOIST, MEDIUM STIFF, SANDY SILT

RESIDUAL, ORANGE AND BROWN, MOIST TO WET, MEDIUM DENSE, SILTY SAND, AND STIFF, SANDY SILT

(META-GRANITE)

WEATHERED ROCK

RESIDUAL, BROWN, DRY, HARD, SANDY SILT

CRYSTALLINE ROCK (META-GRANITE)

SKEW=137° 39' 39"

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	109

CROSS SECTION THROUGH BENT 5A RIGHT LANE

℄

B5A-A_RL
385+25
29' RT

B5A-B_RL
384+83
68' RT

780
770
760
750
740
730
720
710
700
690

ROADWAY EMBANKMENT, MEDIUM STIFF, SANDY ALLUVIAL, RED, ORANGE, AND SANDY SILT, SANDY CLAY

RED-ORANGE, MOIST, CLAY

BROWN, MOIST TO WET, AND LOOSE, SILTY

MEDIUM STIFF TO STIFF, SAND

RESIDUAL, ORANGE AND BROWN, DRY TO MOIST, MEDIUM STIFF TO VERY STIFF, SANDY SILT

WEATHERED ROCK (META-GRANITE)

Ⓐ WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD TO HARD,
FRESH TO MODERATELY SEVERELY WEATHERED,
VERY CLOSE TO MODERATELY CLOSE
FRACTURE SPACING, META-GRANITE
REC=64%
RQD=27%
RMR=27-85

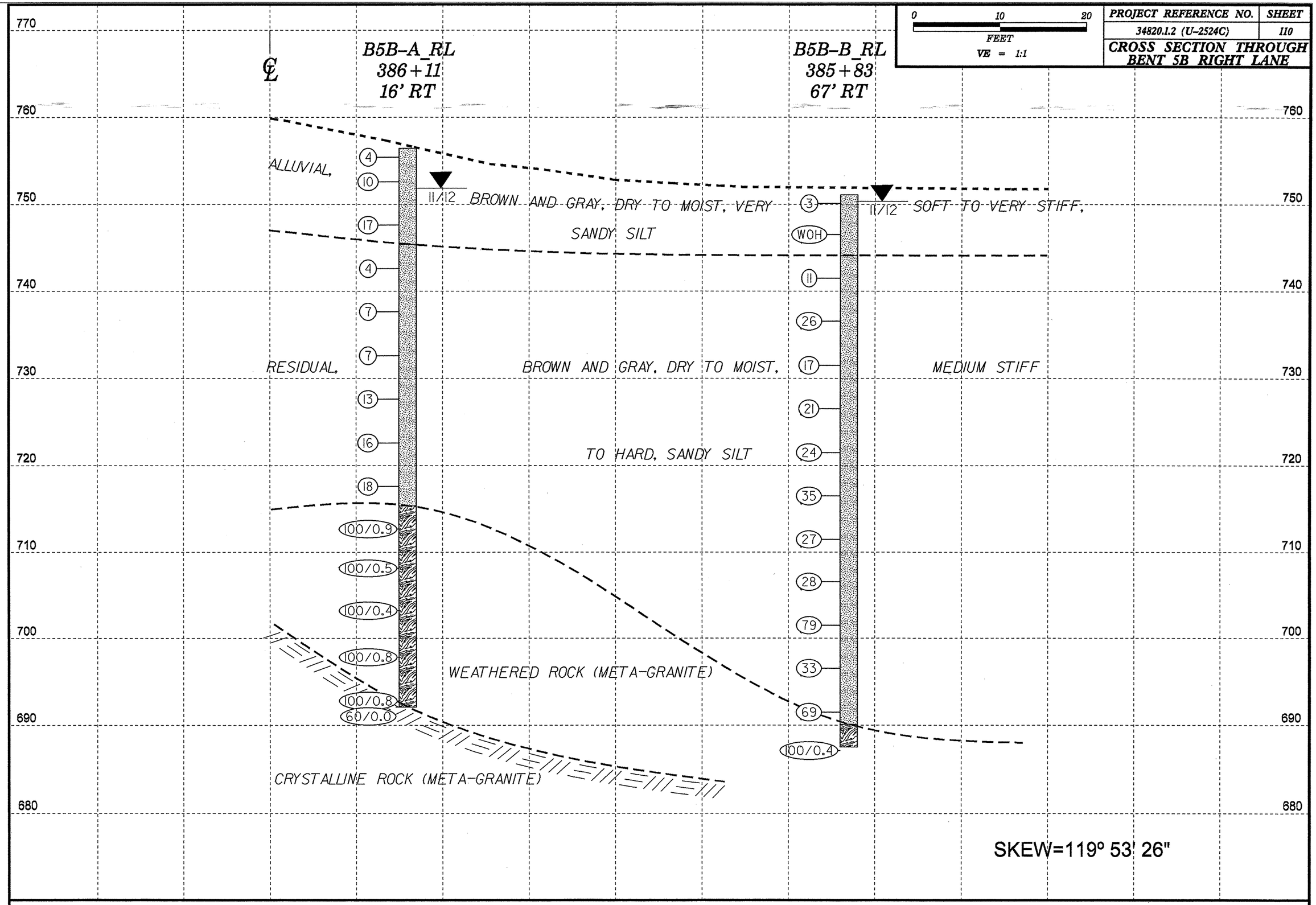
B5A-A_RL		B5A-B_RL	
7		9	
6		7	10/12
4	11/12	6	
7		16	
15		100/0.8	Ⓐ
10		21	
15		100/0.3	
100/0.9		60/0.0	
100/0.6			
100/0.6			
100/0.4			
60/0.1			

SKEW=137° 47' 27"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	110

CROSS SECTION THROUGH BENT 5B RIGHT LANE

0 10 20
FEET
VE = 1:1



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	111

CROSS SECTION THROUGH BENT 6 RIGHT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

℄

B6-A_RL
386+81
16' RT

B6-B_RL
386+81
66' RT

ALLUVIAL, RED AND ORANGE, MOIST, STIFF

SANDY CLAY

11/12

11
11
3
4
5
14
21
48
100/1.0
100/0.6
51 Ⓐ
100/1.0
60/0.0

8
9
8
16
13
29
41
76
100/0.8
100/0.4
60/0.1
100/0.5
60/0.1

RESIDUAL, BROWN AND GRAY, DRY TO MOIST.

MEDIUM STIFF TO HARD, SANDY SILT

WEATHERED ROCK (META-GRANITE)

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK
GRAY, TAN, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED,
MODERATELY CLOSELY TO FRACTURED, META-GRANITE
REC=98%
RQD=98%
RMR=88

Ⓐ RESIDUAL, BLUE-GRAY, DRY, HARD, SANDY SILT

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	112

CROSS SECTION THROUGH BENT 7 RIGHT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

℄

B7-A_RL
387+88
16' RT

B7-B_RL
387+88
66' RT

4
5
4
10
5
24
79
60/0.0

11/12

5
3
14
5
67
59
35
60/0.1
60/0.0

11/12

ALLUVIAL, BROWN AND GRAY, MOIST TO WET, SOFT TO STIFF, SANDY SILT AND SANDY CLAY

RESIDUAL, BROWN AND GRAY, DRY TO MOIST, MEDIUM STIFF TO HARD, SAPROLITIC, SANDY SILT

CRYSTALLINE ROCK, GRAY AND BLACK, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=83%
RQD=70%
RMR=64

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	113

CROSS SECTION THROUGH BENT 8 RIGHT LANE

770
760
750
740
730
720
710
700
690
680

B8-A_RL
389+17
16' RT

B8-B_RL
389+17
70' RT

℄

(4) (6) 11/12

(4) (8) 11/12

ALLUVIAL, GRAY AND BROWN, MOIST, MEDIUM STIFF TO STIFF, SILTY CLAY, AND LOOSE, SILTY SAND

(4) (6)

RESIDUAL, GRAY AND BROWN, MOIST, SOFT TO HARD, SAPROLITIC, SANDY SILT, AND LOOSE TO DENSE, SILTY SAND

(17) (40) (3) (9)

(22) (29) (31) (100/1.0) (60/0.0) (100/0.9) (A) (40) (60/0.3) (60/0.2) (60/0.0)

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, GRAY AND WHITE, HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO WIDE FRACTURE SPACING, META-GRANITE
REC=94%
RQD=51%
RMR=70

(A) WEATHERED ROCK (META-GRANITE)

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	114

CROSS SECTION THROUGH BENT 9 RIGHT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

℄

B9-A_RL
390+46
23' RT

B9-B_RL
390+46
72' RT

10/12

ALLUVIAL, RED AND BROWN, WET, VERY SOFT TO STIFF, SILTY CLAY

BROWN, WET, VERY LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND

RESIDUAL, GRAY AND BROWN, MOIST, MEDIUM DENSE TO DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD TO VERY HARD, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=92%
RQD=40%
RMR=48

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	115

CROSS SECTION THROUGH BENT 10 RIGHT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

B10-A_RL
391+75
16' RT

B10-B_RL
391+75
72' RT

℄

ALLUVIAL,

(2) (6) (7) 10/12

BROWN,WET,SOFT TO MEDIUM STIFF, SILTY CLAY

(3) (7) 10/12

BROWN,WET,VERY LOOSE TO MEDIUM DENSE SILTY TO COARSE SAND

(5) (11)

(1) (4) SILTY SAND

RESIDUAL,

(3) (13) BROWN AND GRAY, MOIST, VERY LOOSE TO MEDIUM DENSE.

(10) 100/0.9 60/0.2

60/0.3 60/0.2 60/0.0

WEATHERED ROCK (META-GRANITE)

60/0.1

CRYSTALLINE ROCK,
GRAY AND WHITE,MEDIUM HARD TO HARD,
SLIGHTLY TO MODERATELY SEVERELY WEATHERED,
CLOSE TO MODERATELY CLOSE FRACTURE SPACING,META-GRANITE
REC=83%
RQD=30%
RMR=37

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	116

CROSS SECTION THROUGH BENT 11 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B11-A_RL
393+04
23' RT

B11-B_RL
393+04
72' RT

10/12

ALLUVIAL, RED, BROWN, AND GRAY, WET TO SATURATED, VERY SOFT TO STIFF, SANDY CLAY, SILTY CLAY, AND SILTY SAND

GRAY, WET, VERY LOOSE TO MEDIUM DENSE, SILTY TO COARSE SAND

RESIDUAL, BROWN, WEATHERED ROCK (META-GRANITE) MOIST, MEDIUM DENSE TO VERY DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD TO VERY HARD,
FRESH TO MODERATELY SEVERELY WEATHERED, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=94%
RQD=52%
RMR=60

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	117

CROSS SECTION THROUGH BENT 12 RIGHT LANE

780
770
760
750
740
730
720
710
700
690

℄

B12-A_RL
394+33
16' RT

B12-B_RL
394+33
72' RT

10/12

10/12

ALLUVIAL, RED, BROWN, AND GRAY, WET,
VERY SOFT TO MEDIUM STIFF, SILTY CLAY,
AND VERY LOOSE, SILTY SAND
GRAY AND BROWN, MOIST, MEDIUM DENSE TO DENSE, COARSE SAND

WEATHERED ROCK (META-GRANITE)
RESIDUAL,
BROWN AND GRAY, MOIST, VERY DENSE, SAPROLITIC, SILTY SAND

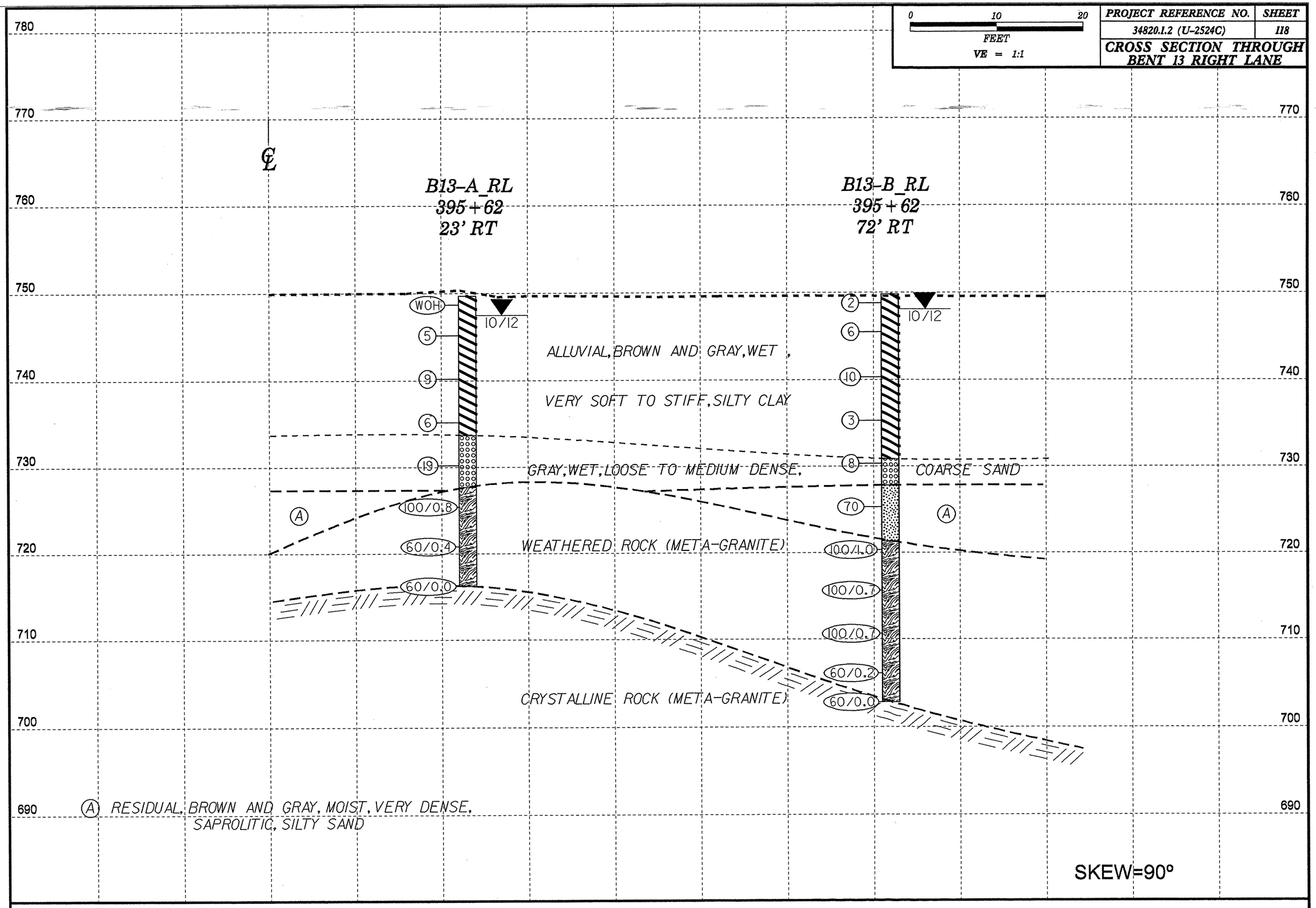
WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD TO VERY HARD,
SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO
MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=93%
RQD=82%
RMR=64

(A) CRYSTALLINE ROCK, GRAY AND WHITE, MEDIUM HARD, MODERATELY
SEVERELY WEATHERED, CLOSELY TO FRACTURED, META-GRANITE
REC=100%
RQD=67%
RMR=64

SKEW=90°

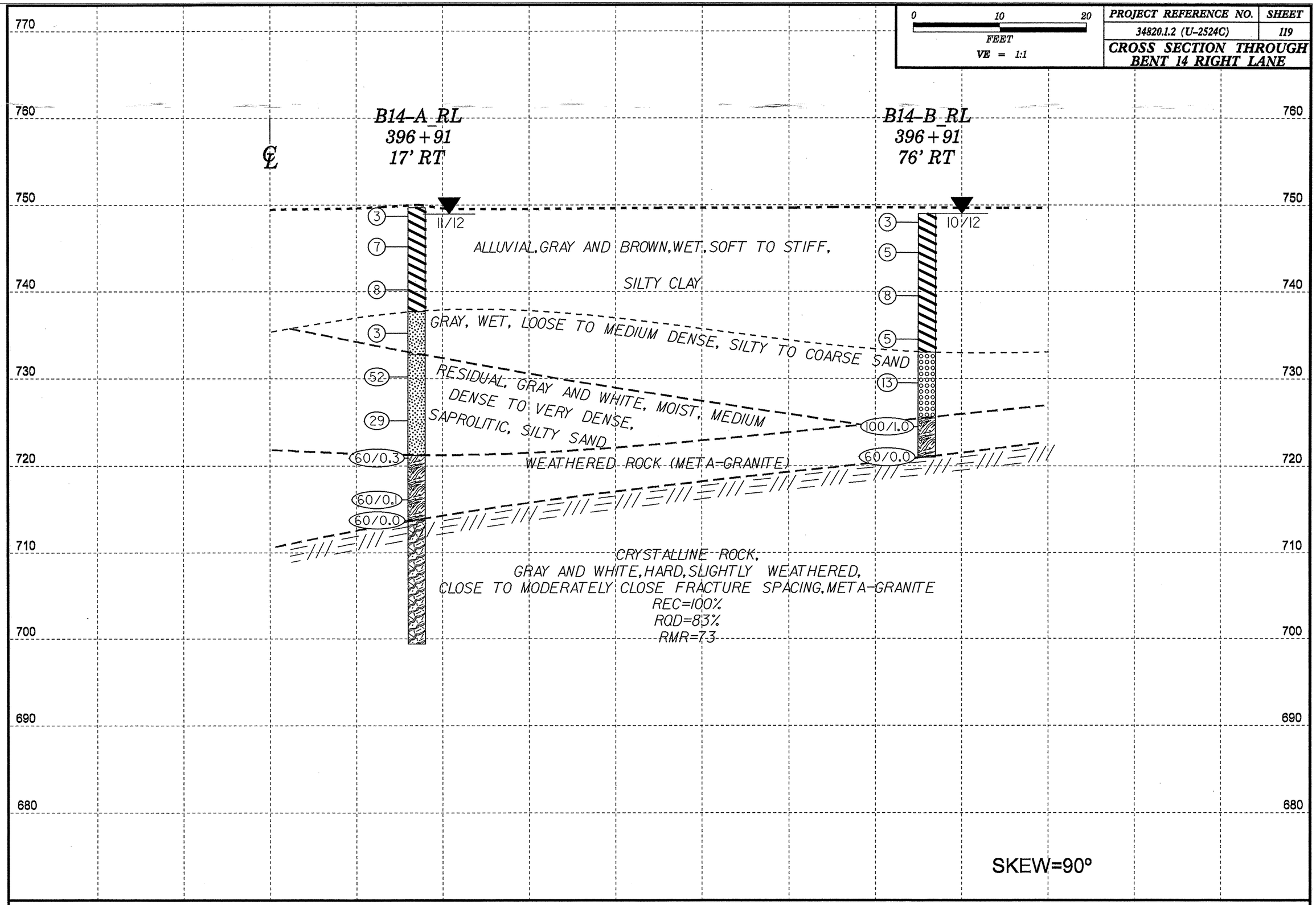
0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34820.1.2 (U-2524C)	118
	CROSS SECTION THROUGH BENT 13 RIGHT LANE	



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	119

0 10 20
FEET
VE = 1:1

CROSS SECTION THROUGH BENT 14 RIGHT LANE



0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	120

CROSS SECTION THROUGH BENT 15 RIGHT LANE

780
770
760
750
740
730
720
710
700
690

℄

B15-A_RL
398+10
23' RT

B15-B_RL
398+10
99' RT

10/12

WOH
6
8
3
100/0.8
100/0.2
100/0.2

10/12

6
4
95
54
100/0.6
100/0.2
60/0.0

ALLUVIAL, GRAY AND BROWN, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY

ALLUVIAL, GRAY AND BROWN, WET, LOOSE, SILTY TO COARSE SAND

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

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK, BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=95%
RQD=84%
RMR=58

SKEW=90°

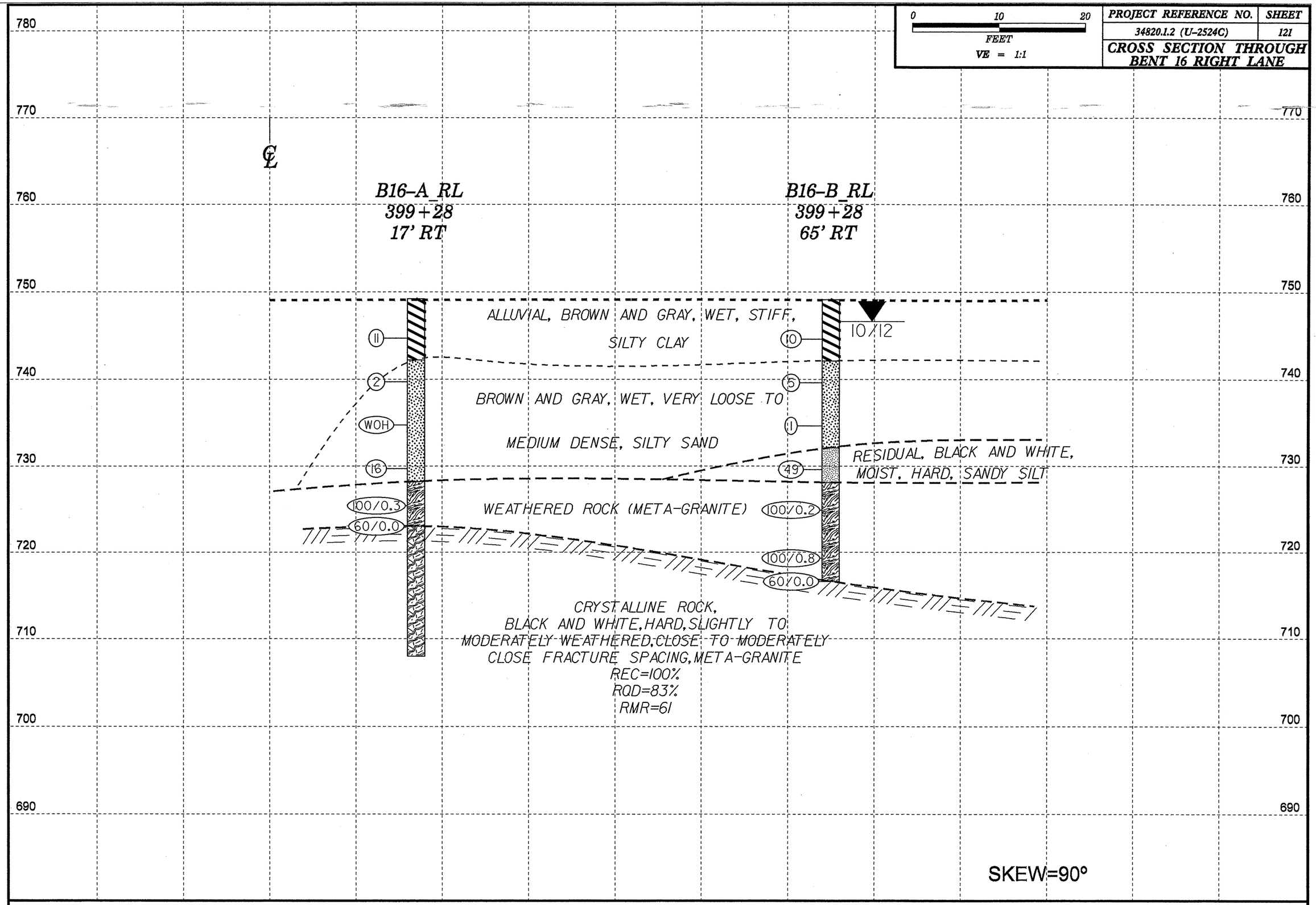
0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	121

CROSS SECTION THROUGH BENT 16 RIGHT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	122

CROSS SECTION THROUGH BENT 17 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B17-A_RL
400+48
23' RT

B17-B_RL
400+48
66' RT

ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO SOFT, SILTY CLAY AND SANDY SILT

BROWN, WET,

LOOSE, SILTY SAND

WOH
5
9
WOH
3
3

WEATHERED ROCK (META-GRANITE)

100/0.3
60/0.0
100/0.3
60/0.0

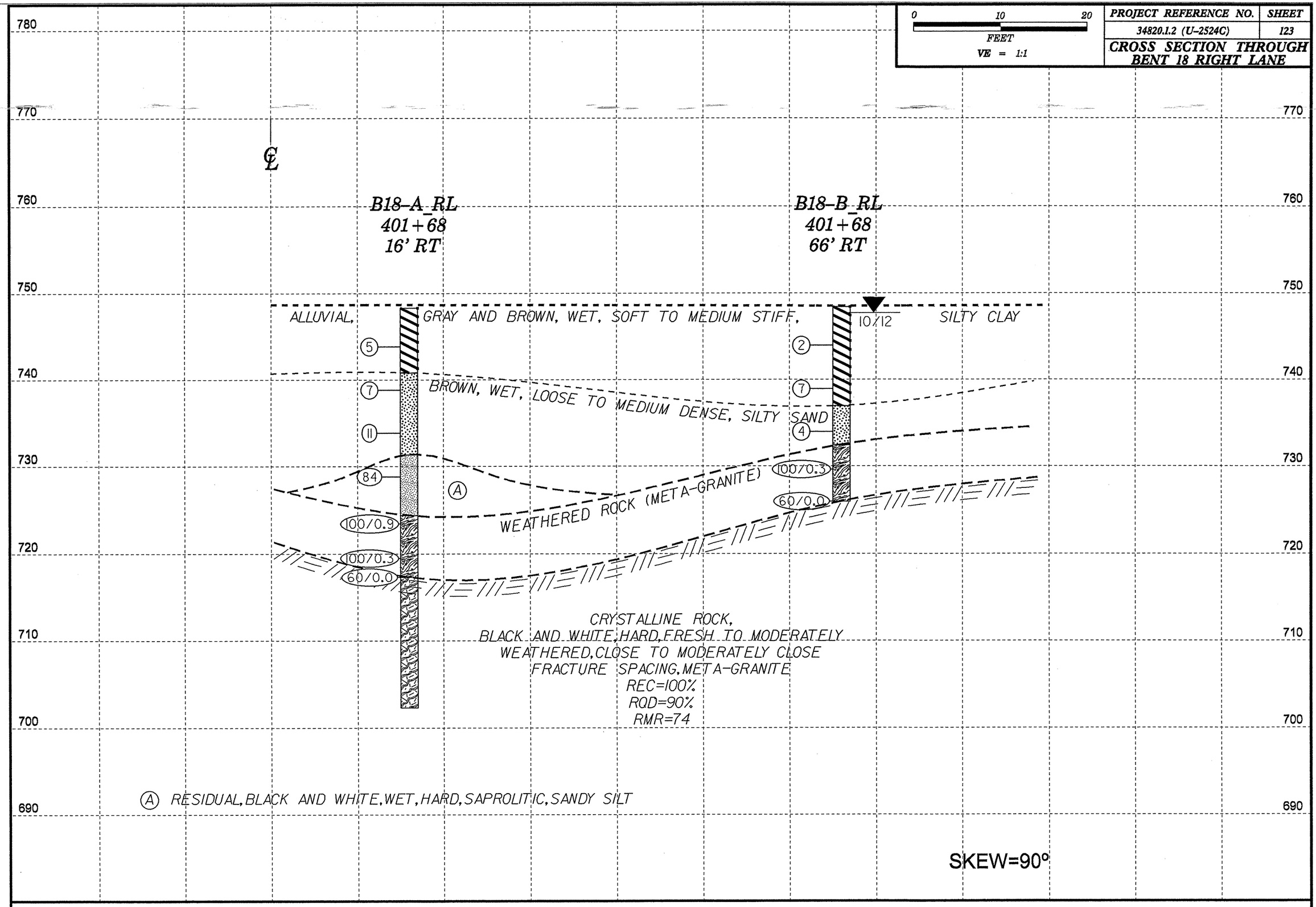
CRYSTALLINE ROCK,
BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=99%
RQD=87%
RMR=70

SKEW=90°

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	123

CROSS SECTION THROUGH BENT 18 RIGHT LANE



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	124

CROSS SECTION THROUGH BENT 19 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B19-A_RL
402+88
23' RT

B19-B_RL
402+88
66' RT

11/12

ALLUVIAL, BROWN AND GRAY, WET, MEDIUM STIFF, SILTY CLAY

GRAY, WET, VERY LOOSE TO LOOSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

(7) (5) WOH (A) 44 60/0.0

FIAD 11/12

(4) 100/0.9 100/0.4 60/0.1

CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD,
SLIGHTLY TO MODERATELY SEVERELY WEATHERED,
CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=90%
RQD=75%
RMR=62

(A) RESIDUAL, BLACK, WHITE, AND BROWN, MOIST, HARD, SANDY SILT

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	125

CROSS SECTION THROUGH BENT 20 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B20-A_RL
404+08
16' RT

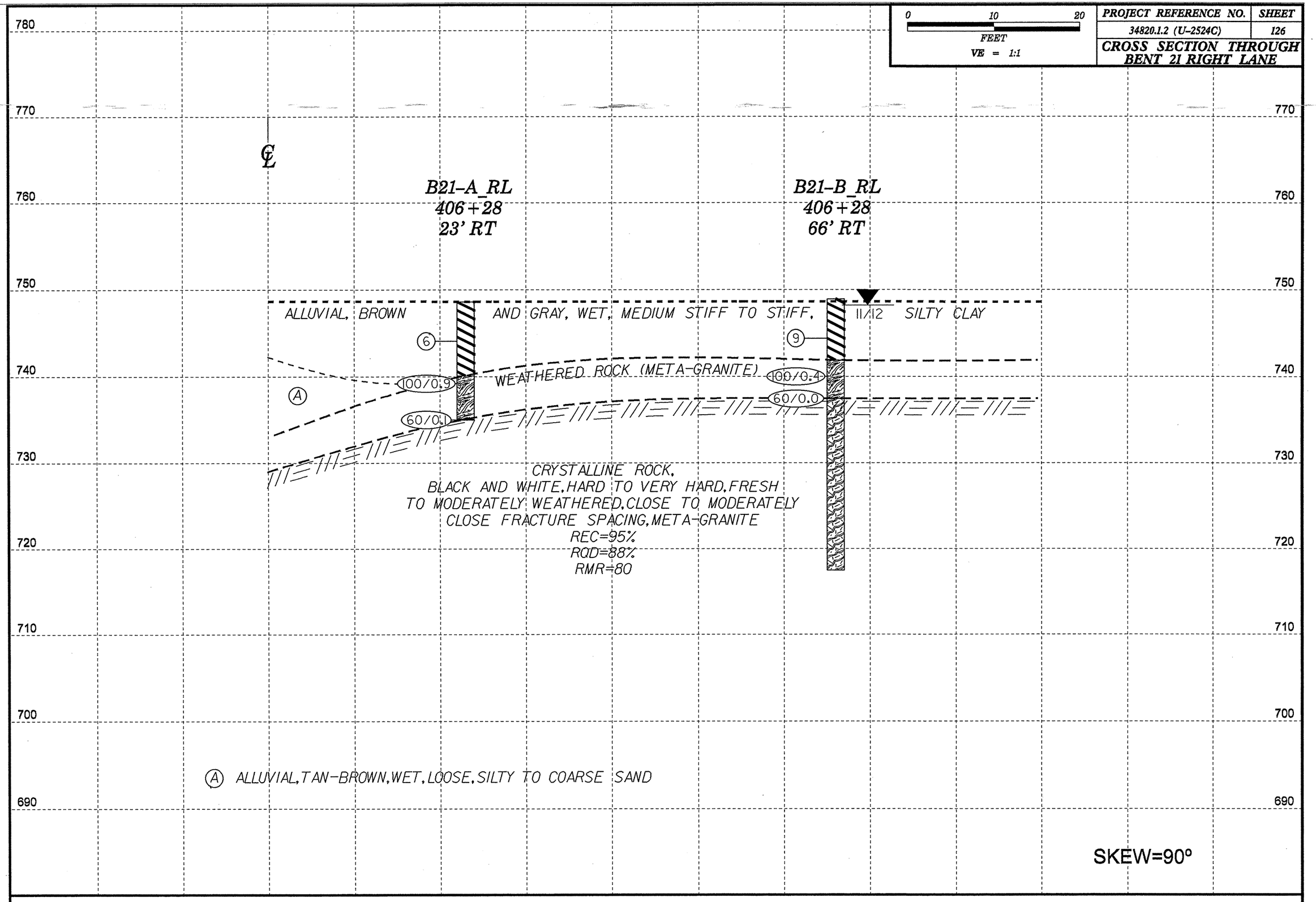
B20-B_RL
404+08
66' RT

ALLUVIAL, BROWN AND GRAY, WET, VERY STIFF, SILTY CLAY
11/12
20
17
BROWN, WET, LOOSE TO MEDIUM DENSE, SILTY SAND
13
3
RESIDUAL, BLACK AND WHITE, WET,
HARD, SANDY SILT
35
100/0.8
60/0.0
WEATHERED ROCK (META-GRANITE)
100/0.4
60/0.0

CRYSTALLINE ROCK,
BLACK AND WHITE, HARD, FRESH TO MODERATELY
WEATHERED, CLOSE FRACTURE SPACING, META-GRANITE
REC=98%
RQD=91%
RMR=76

SKEW=90°

0 10 20 FEET VE = 1:1	PROJECT REFERENCE NO.	SHEET
	34820.1.2 (U-2524C)	126
	CROSS SECTION THROUGH BENT 21 RIGHT LANE	



PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	127

CROSS SECTION THROUGH BENT 22 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B22-A_RL
409+03
16' RT

B22-B_RL
409+03
66' RT

(2) 60/0.3
60/0.0
REC=94%
RQD=75%
RMR=58

REC=100%
RQD=86%
RMR=73

ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY, AND VERY LOOSE, SILTY SAND

(WOH) (2) (6) (6) 60/0.0

09/12

(A)

CRYSTALLINE ROCK,
GRAY AND WHITE, MEDIUM HARD TO HARD,
SLIGHTLY TO MODERATELY WEATHERED,
CLOSE TO MODERATELY CLOSE FRACTURE SPACING,
AND WEATHERED ROCK, META-GRANITE

(A) WEATHERED ROCK (META-GRANITE)

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	128

CROSS SECTION THROUGH BENT 23 RIGHT LANE

0 10 20
FEET
VE = 1:1

770
760
750
740
730
720
710
700
690
680

℄

B23-A_RL
411+23
23' RT

WOH
WOH
6
2
17
100/0.2
60/0.0
A

ALLUVIAL, GRAY, SATURATED, VERY SOFT, SILTY SAND

ALLUVIAL, GRAY, WET TO SATURATED, LOOSE TO MEDIUM DENSE, COARSE SAND

CRYSTALLINE ROCK (META-GRANITE)

(A) WEATHERED ROCK (META-GRANITE)

SKEW=90°

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	I29

CROSS SECTION THROUGH BENT 24 RIGHT LANE

0 10 20
FEET
VE = 1:1

℄

ALLUVIAL, BROWN AND GRAY, WET, VERY SOFT TO MEDIUM STIFF, SILTY CLAY, AND LOOSE, SILTY SAND

CRYSTALLINE ROCK (META-GRANITE)

770 760 750 740 730 720 710 700 690 680

SKEW=128° 24' 36"

0	10	20
FEET		

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	130

CROSS SECTION THROUGH BENT 25 RIGHT LANE

℄

770
760
750
740
730
720
710
700
690
680

B25-B_RL
413+99
122' RT

ALLUVIAL, BROWN AND GRAY, WET, SOFT TO STIFF, SILTY CLAY, SANDY CLAY, AND MEDIUM DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
GRAY AND WHITE, HARD TO VERY HARD,
SLIGHTLY TO MODERATELY WEATHERED, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=97%
RQD=82%
RMR=67

3
12
5
4
2
6
60/0.2
100/0.7
60/0.1
60/0.0

11/12

SKEW=127° 52' 38"

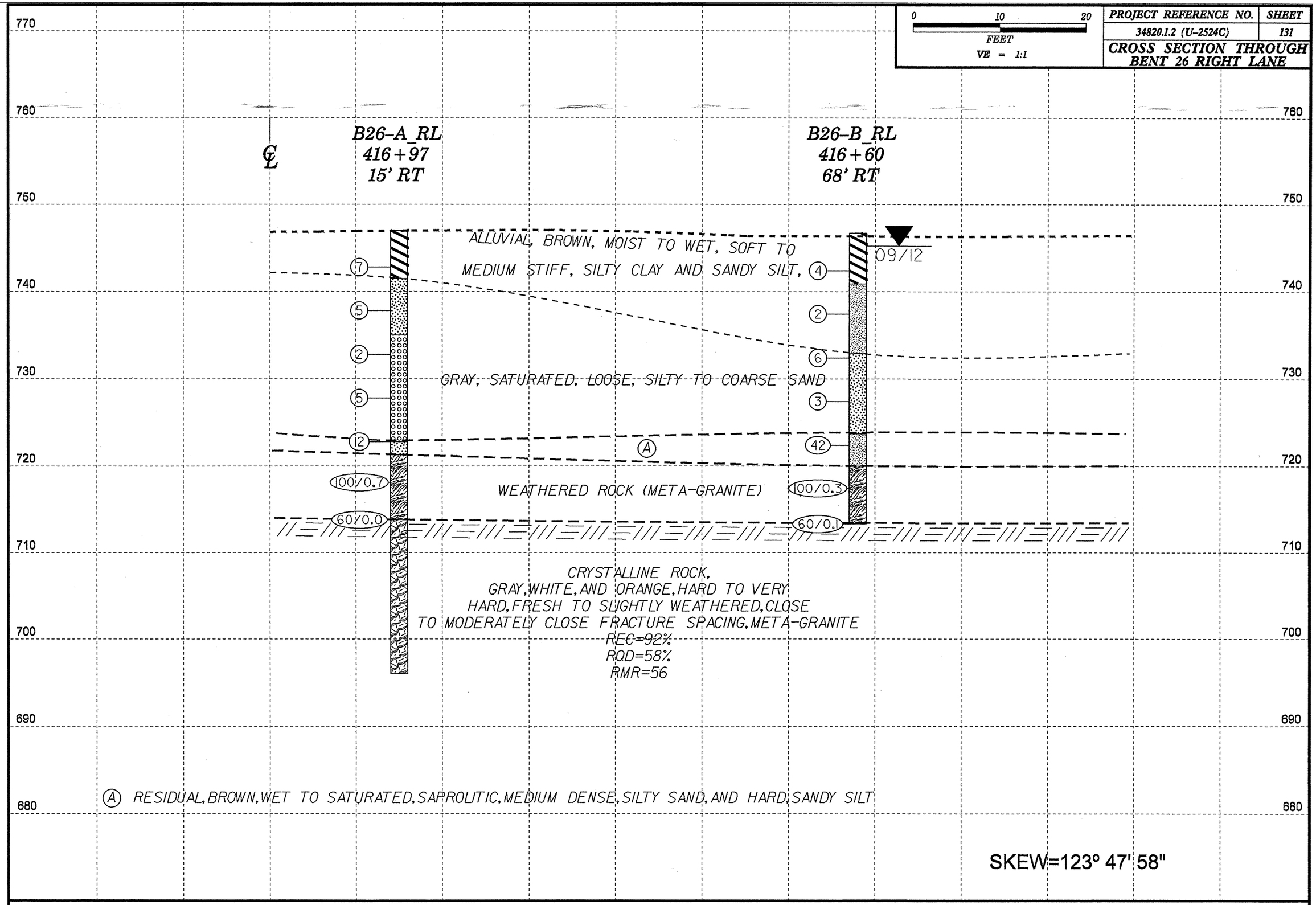
0	10	20

FEET

VE = 1:1

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	131

CROSS SECTION THROUGH BENT 26 RIGHT LANE



SKEW=123° 47' 58"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	132

CROSS SECTION THROUGH BENT 27 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B27-A_RL
418+02
23' RT

B27-B_RL
417+75
67' RT

09/12

ALLUVIAL, GRAY, WET, VERY SOFT TO SOFT, SILTY CLAY

WOH
4
4
100/0.7
100/0.2
60/0.1
2
4
6
100/0.3
60/0.0

GRAY, WET, LOOSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

CRYSTALLINE ROCK,
BLACK AND WHITE, HARD, FRESH TO
MODERATELY WEATHERED, CLOSE TO
MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=100%
RQD=93%
RMR=70

SKEW=121° 15' 39"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	133

CROSS SECTION THROUGH BENT 28 RIGHT LANE

0 10 20
FEET
VE = 1:1

780
770
760
750
740
730
720
710
700
690

℄

B28-A_RL
419+09
15' RT

B28-B_RL
418+79
67' RT

RESIDUAL, BLACK AND BROWN, MOIST TO WET, MEDIUM DENSE TO VERY DENSE, SAPROLITIC, SILTY SAND

WEATHERED ROCK (META-GRANITE)

Ⓐ WOH — 09/12 — 25 — 100/0.4 — 100/0.2 — 60/0.0

50 — 09/12 — 100/0.9 — 60/0.0

CRYSTALLINE ROCK,
BLACK AND WHITE, MEDIUM HARD TO HARD,
FRESH TO MODERATELY WEATHERED, CLOSE
TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=92%
RQD=81%
RMR=58

Ⓐ ALLUVIAL, BROWN, MOIST, VERY SOFT, SANDY SILT

SKEW=118° 55' 01"

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	134

CROSS SECTION THROUGH BENT 29 RIGHT LANE

0 10 20
FEET
VE = 1:1

780 770 760 750 740 730 720 710 700

℄

B29-A_RL
420+19
14' RT

B29-B_RL
419+96
67' RT

RESIDUAL, RED AND ORANGE, DRY, MEDIUM STIFF, SANDY SILT

AND MEDIUM DENSE, SILTY SAND

WEATHERED ROCK (META-GRANITE)

7
19
60/0.1
60/0.0
DRY
9/12

18
100/0.1
100
100/0.5
60/0.0
9/12

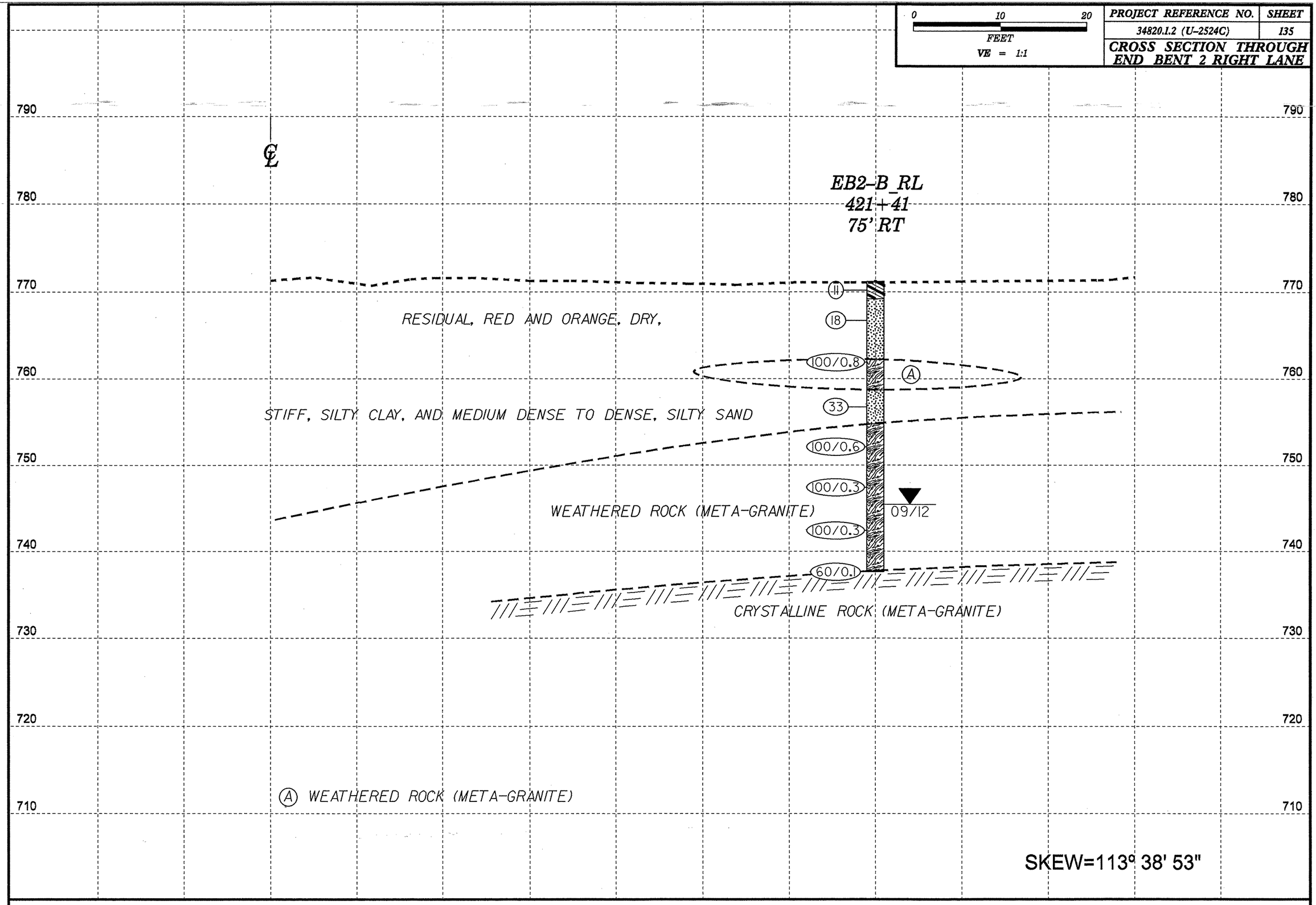
CRYSTALLINE ROCK,
BLACK, GRAY, AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED,
CLOSE TO MODERATELY CLOSE FRACTURE SPACING, META-GRANITE
REC=80%
RQD=46%
RMR=50

SKEW=116° 17' 33"

0	10	20
FEET		
VE = 1:1		

PROJECT REFERENCE NO.	SHEET
34820.1.2 (U-2524C)	135

CROSS SECTION THROUGH END BENT 2 RIGHT LANE



NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. EB1A_RL	**STATION** 379+45	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** 25.8
COLLAR ELEV. 778.4 ft	**TOTAL DEPTH** 59.0 ft	**NORTHING** 869,574	**EASTING** 1,742,706	**24 HR.** 25.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/28/12	**COMP. DATE** 09/28/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
780										
	778.4	0.0								778.4 GROUND SURFACE 0.0
			1	2	2	4		D		**ARTIFICIAL FILL**
775	774.9	3.5								776.4 ORANGE-RED, SANDY SILT WITH TRACE ORGANICS 2.0
			3	6	7	13		D		**RESIDUAL**
770	769.9	8.5								RED-BROWN, WHITE, AND GRAY, SANDY SILT
			1	2	3	5		D		
765	764.9	13.5								
			2	4	5	9		M		
760	759.9	18.5								
			6	8	8	16		M		
755	754.9	23.5								
			4	10	12	22		M		
750	749.9	28.5								
			5	9	14	23		M		
745	744.9	33.5								
			3	6	10	16		D		
740	739.9	38.5								
			7	17	49	66		D		
735	734.9	43.5								736.4 WEATHERED ROCK 42.0
			100/0.3			100/0.3				(META-GRANITE)
730	729.9	48.5								
			42	58/0.3		100/0.8				
725	724.9	53.5								
			100/0.4			100/0.4				
720	719.9	58.5								719.4 59.0
			100/0.5			100/0.5				Boring Terminated at Elevation 719.4 ft in WEATHERED ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. EB1B_RL	**STATION** 379+45	**OFFSET** 75 ft RT	**ALIGNMENT** -L-	**0 HR.** 26.4
COLLAR ELEV. 779.4 ft	**TOTAL DEPTH** 60.5 ft	**NORTHING** 869,524	**EASTING** 1,742,699	**24 HR.** 27.3
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/27/12	**COMP. DATE** 09/28/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
780										
	779.4	0.0								779.4 GROUND SURFACE 0.0
			2	5	3	8		D		**ARTIFICIAL FILL**
775	775.4	4.0								776.4 RED-BROWN, SANDY CLAY WITH TRACE ORGANICS AND BRICK FRAGMENTS 3.0
			3	3	6	9		D		**RESIDUAL**
770	770.4	9.0								RED-BROWN AND GRAY, SAPROLITIC, SANDY SILT
			2	4	4	8		D		
765	765.4	14.0								
			3	4	8	12		D		
760	760.4	19.0								
			3	3	4	7		D		
755	755.4	24.0								756.4 23.0
			4	4	7	11		M		WHITE, BROWN, AND GRAY, SILTY SAND
750	750.4	29.0								
			5	8	10	18		M		
745	745.4	34.0								745.4 34.0
			100/0.3			100/0.3				**WEATHERED ROCK**
740	740.4	39.0								743.4 (META-GRANITE) 36.0
			21	24	52	76				**RESIDUAL**
735	735.4	44.0								WHITE, TAN, AND GRAY, SILTY SAND
			28	72/0.2		100/0.7				736.4 43.0
730	730.4	49.0								**WEATHERED ROCK**
			27	73/0.3		100/0.8				(META-GRANITE)
725	725.4	54.0								726.4 53.0
			8	6	47	53		M		**RESIDUAL**
720	720.4	59.0								GRAY AND WHITE, SILTY SAND
			18	19	15	34		M		721.4 58.0
										DARK GRAY, MICACEOUS, SANDY SILT
										718.9 60.5
										Boring Terminated at Elevation 718.9 ft in SANDY SILT

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B1A_RL	**STATION** 380+44	**OFFSET** 21 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 759.2 ft	**TOTAL DEPTH** 43.0 ft	**NORTHING** 869,566	**EASTING** 1,742,805	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/05/12	**COMP. DATE** 10/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
760											
	759.2	0.0						M		759.2 GROUND SURFACE	0.0
			1	1	2	3 4				**ARTIFICIAL FILL**	
	757.2	2.0								757.2 ORANGE-RED, SANDY CLAY WITH TRACE ORGANICS	2.0
755			2	2	2			D		**RESIDUAL**	
	756.2	3.0								BROWN-GRAY, TAN-GRAY, AND WHITE, SAPROLITIC, SANDY SILT	
						8					
750	751.2	8.0	3	3	5			D			
						10					
745	746.2	13.0	3	5	5			D			
						14					
740	741.2	18.0	4	7	7			D			
										737.2 WHITE, YELLOW, AND ORANGE, SILTY SAND	22.0
735	736.2	23.0	13	32	39	71		D			
										732.2 GRAY AND BROWN, SANDY SILT	27.0
730	731.2	28.0	6	7	21	28		D			
										727.2 **WEATHERED ROCK** (META-GRANITE)	32.0
725	726.2	33.0	27	73/0.4		100/0.9					
720	721.2	38.0	100/0.2			100/0.2					
	718.7	40.5	100/0.3			100/0.3					
	716.2	43.0	60/0.0			60/0.0				716.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 716.2 ft on CRYSTALLINE ROCK (META-GRANITE)	43.0

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B1B_RL	**STATION** 380+22	**OFFSET** 97 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 773.3 ft	**TOTAL DEPTH** 73.5 ft	**NORTHING** 869,492	**EASTING** 1,742,775	**24 HR.** 10.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/02/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
775											
	773.3	0.0						M		773.3 GROUND SURFACE	0.0
			4	5	4	9				**ARTIFICIAL FILL**	
770	769.8	3.5						M		RED-BROWN, SANDY CLAY	
			6	6	6	12				767.3	6.0
765	764.8	8.5								**RESIDUAL**	
			5	5	7	12		M		RED AND BROWN, SANDY CLAY	
760	759.8	13.5									
			5	5	9	14					
755	754.8	18.5						M			
			5	11	12	23					
750	749.8	23.5						M			
			10	19	21	40					
745	744.8	28.5						M			
			10	12	13	25					
740	739.8	33.5						M			
			5	9	13	22					
735	734.8	38.5						M			
			5	8	9	17					
730	729.8	43.5						M			
			13	17	19	36					
725	724.8	48.5						M			
			9	7	7	14					
720	719.8	53.5						M		719.3 **WEATHERED ROCK** (META-GRANITE)	54.0
			26	32	68	100/1.0					
715	714.8	58.5									
			33	67/0.4		100/0.9					
710	709.8	63.5									
			60	40/0.1		100/0.6					
705	704.8	68.5								704.8 **CRYSTALLINE ROCK** (META-GRANITE)	68.5
			60/0.1			60/0.1					
700	699.8	73.5								699.8 Boring Terminated at Elevation 699.8 ft in CRYSTALLINE ROCK (META-GRANITE)	73.5
			60/0.0			60/0.0					

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B2A_RL	**STATION** 381+25	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.4
COLLAR ELEV. 755.1 ft	**TOTAL DEPTH** 56.8 ft	**NORTHING** 869,564	**EASTING** 1,742,887	**24 HR.** 3.7
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/08/12	**COMP. DATE** 10/09/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
760											
755	755.1	0.0	1	1	1	2		M		755.1 GROUND SURFACE	0.0
	751.1	4.0								**ALLUVIAL** ORANGE, GRAY, AND BROWN, SANDY SILT WITH TRACE ORGANICS	
750			1	1	3	4		W			
745	746.1	9.0	2	1	2	3		M			
740	741.1	14.0	WOH	WOH	6	6		M		739.1	16.0
735	736.1	19.0	8	10	12	22		Sat.		**RESIDUAL** BROWN AND GRAY, SILTY SAND WITH TRACE GRAVEL	
730	731.1	24.0	29	47	53/0.4	100/0.9				732.1	23.0
725	726.1	29.0	3	5	11	16		D		730.6 BROWN AND GRAY, SANDY SILT	24.5
720	721.1	34.0	23	46	54/0.4	100/0.9				**WEATHERED ROCK** (META-GRANITE)	
715	716.1	39.0	17	25	19	44				727.1	28.0
	711.1	44.0								**RESIDUAL** BROWN, TAN, AND BLACK, SANDY SILT	
710	710.4	44.7	60/0.1			60/0.1 60/0.0				720.6	34.5
705			60/0.0				RS-5			**WEATHERED ROCK** (META-GRANITE)	
700							RS-6			717.1	38.0
										RESIDUAL BROWN AND GRAY, SANDY SILT	
										712.6	42.5
										CRYSTALLINE ROCK (META-GRANITE)	
										710.3 BLUE-GRAY, BLACK, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=97% RQD=94% RMR=82	44.8
										698.3 Boring Terminated at Elevation 698.3 ft in CRYSTALLINE ROCK (META-GRANITE)	56.8

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B2A_RL	**STATION** 381+25	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.4
COLLAR ELEV. 755.1 ft	**TOTAL DEPTH** 56.8 ft	**NORTHING** 869,564	**EASTING** 1,742,887	**24 HR.** 3.7
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/08/12	**COMP. DATE** 10/09/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**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)
710											Begin Coring @ 44.8 ft	
	710.3	44.8	2.0	4:00/1.0 3:00/1.0	(2.0) 100%	(2.0) 100%		(11.7) 98%	(11.3) 94%		710.3 BLUE-GRAY, BLACK, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=97% RQD=94% RMR=82	44.8
	708.3	46.8	5.0	3:00/1.0 2:45/1.0 2:00/1.0 2:00/1.0 2:00/1.0	(5.0) 100%	(4.7) 94%	RS-5					
705	703.3	51.8	5.0	3:00/1.0 2:45/1.0 2:15/1.0 2:30/1.0 2:30/1.0	(4.7) 94%	(4.6) 92%	RS-6					
700	698.3	56.8									698.3 Boring Terminated at Elevation 698.3 ft in CRYSTALLINE ROCK (META-GRANITE)	56.8

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B2B_RL	**STATION** 381+25	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.1
COLLAR ELEV. 755.2 ft	**TOTAL DEPTH** 47.9 ft	**NORTHING** 869,514	**EASTING** 1,742,884	**24 HR.** 9.1
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/03/12	**COMP. DATE** 10/03/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										755.2	
	755.2	0.0	1	2	1	3 3		M		GROUND SURFACE	0.0
	751.7	3.5	WOH	1	2	3		M		**ALLUVIAL** TAN, ORANGE, AND GRAY, SANDY CLAY WITH TRACE ORGANICS AND WOOD	
	746.7	8.5	WOH	WOH	WOH	0		M		748.2 GRAY, SANDY SILT WITH TRACE ORGANICS	7.0
	741.7	13.5	4	3	3	6		W		738.2 **RESIDUAL** ORANGE-BROWN AND GRAY, SAPROLITIC, SANDY SILT	17.0
	736.7	18.5	4	6	8	14		D			
	731.7	23.5	10	19	18	37		D			
	726.7	28.5	10	16	21	37		D			
	721.7	33.5	24	31	36	67		D			
	716.7	38.5	37	50	50/0.3	100/0.8				716.2 **WEATHERED ROCK** (META-GRANITE)	39.0
	711.7	43.5	7	33	67/0.2	100/0.7				712.7 **RESIDUAL** 710.8 ORANGE-BROWN, SANDY SILT	42.5 44.4
	708.2	47.0	100/0.3			100/0.3				**WEATHERED ROCK** (META-GRANITE) 707.4	47.8
	707.4	47.8	60/0.1			60/0.1				707.3 **CRYSTALLINE ROCK** (META-GRANITE)	47.9

Boring Terminated with Standard Penetration Test Refusal at Elevation 707.3 ft in CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B3A_RL	**STATION** 382+49	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.7
COLLAR ELEV. 755.7 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 869,558	**EASTING** 1,743,012	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										755.7	
	755.7	0.0	1	2	3	5		M		GROUND SURFACE	0.0
	752.3	3.4	1	3	3	6		M		**ALLUVIAL** RED-BROWN AND GRAY, SANDY SILT WITH TRACE ORGANICS	
	747.3	8.4	1	3	2	5		Sat.		748.7 GRAY, SILTY SAND	7.0
	742.3	13.4	9	10	9	19		M		743.7 **RESIDUAL** GRAY-BROWN AND ORANGE, SAPROLITIC, SANDY SILT	12.0
	737.3	18.4	8	12	11	23		D			
	732.3	23.4	20	52	48/0.3	100/0.8				731.7 **WEATHERED ROCK** (META-GRANITE)	24.0
	727.3	28.4	100/0.4			100/0.4					
	722.3	33.4	100/0.4			100/0.4					
	717.3	38.4	21	79/0.3		100/0.8					
	712.3	43.4	25	60/0.1		60/0.1				711.8 **CRYSTALLINE ROCK** (META-GRANITE) 711.7	43.9 44.0

Boring Terminated with Standard Penetration Test Refusal at Elevation 711.7 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B3B_RL	**STATION** 382+26	**OFFSET** 68 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.4
COLLAR ELEV. 755.0 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,507	**EASTING** 1,742,987	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/29/12	**COMP. DATE** 10/29/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755										755.0 GROUND SURFACE	0.0
	755.0	0.0	2	4	5	9				**ARTIFICIAL FILL** TAN AND BROWN-GRAY, SANDY SILT WITH TRACE ORGANICS	
	751.8	3.2	3	5	3	8				753.0	2.0
750										**ALLUVIAL** DARK BROWN, SANDY SILT WITH TRACE ORGANICS	
	746.8	8.2	2	4	2	6				748.0	7.0
745										GRAY, SILTY SAND	
	741.8	13.2	WOH	1	2	3					
740											
	736.8	18.2	3	5	6	11				737.8	17.2
735										**RESIDUAL** GRAY, BROWN, AND TAN-ORANGE, SANDY SILT	
	731.8	23.2	10	18	51	69					
730											
	726.8	28.2	6	11	27	38					
725											
	721.8	33.2	26	60	40/0.2	100/0.7				721.3	33.7
720										**WEATHERED ROCK** (META-GRANITE)	
	716.8	38.2	31	69/0.3		100/0.8					
715											
	711.8	43.2	100/0.4			100/0.4					
710											
	706.8	48.2	100/0.4			100/0.4					
705											
	701.8	53.2	60/0.1			60/0.1				701.8 / 701.7	53.2 / 53.3
700										**CRYSTALLINE ROCK** (META-GRANITE)	
695										**CRYSTALLINE ROCK** GRAY, BROWN, AND WHITE, MEDIUM HARD TO HARD, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSELY TO CLOSELY FRACTURED, META-GRANITE REC=93% RQD=40% RMR=45	
690										689.3	65.7
										Boring Terminated with Standard Penetration Test Refusal at Elevation 689.3 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B3B_RL	**STATION** 382+26	**OFFSET** 68 ft RT	**ALIGNMENT** -L-	**0 HR.** 4.4
COLLAR ELEV. 755.0 ft	**TOTAL DEPTH** 65.7 ft	**NORTHING** 869,507	**EASTING** 1,742,987	**24 HR.** 4.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/29/12	**COMP. DATE** 10/29/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 12.4 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)
701.7											Begin Coring @ 53.3 ft	
700	701.7	53.3	2.4	2:15/1.0 2:15/1.0	(2.1) 88%	(1.0) 42%		(11.5) 93%	(4.9) 40%		701.7 **CRYSTALLINE ROCK** GRAY, BROWN, AND WHITE, MEDIUM HARD TO HARD, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, VERY CLOSELY TO CLOSELY FRACTURED, META-GRANITE REC=93% RQD=40% RMR=45	53.3
	699.3	55.7	5.0	1:00/0.4 2:15/1.0 2:30/1.0 2:15/1.0 2:15/1.0 2:15/1.0	(4.4) 88%	(1.8) 36%						
695	694.3	60.7	5.0	2:30/1.0 2:15/1.0 2:00/1.0 2:15/1.0 2:45/1.0	(5.0) 100%	(2.1) 42%						
690	689.3	65.7									689.3 Boring Terminated with Standard Penetration Test Refusal at Elevation 689.3 ft in CRYSTALLINE ROCK (META-GRANITE)	65.7

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B4B_RL	**STATION** 383+05	**OFFSET** 88 ft RT	**ALIGNMENT** -L- **0 HR.** 13.8
COLLAR ELEV. 762.7 ft	**TOTAL DEPTH** 53.6 ft	**NORTHING** 869,486	**EASTING** 1,743,068 **24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/22/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
765										762.7 GROUND SURFACE	0.0
	761.5	1.2								761.5 ASPHALT/ABC	1.2
760			3	7	10	17		D		**ROADWAY EMBANKMENT** ORANGE-RED, TAN, AND BROWN-GRAY, SANDY CLAY WITH TRACE ORGANICS AND LITTLE GRAVEL	
	759.2	3.5	5	6	8	14		D		757.2	5.5
755										**ARTIFICIAL FILL** TAN, BROWN, AND GRAY, SILTY SAND	
	754.2	8.5	5	10	10	20		D		750.7	12.0
750										**ALLUVIAL** GRAY, SANDY SILT	
	749.2	13.5	3	3	2	5		M			
745											
	744.2	18.5	1	2	2	4		M		740.7	22.0
740										**RESIDUAL** ORANGE-BROWN, SILTY SAND	
	739.2	23.5	2	3	10	13		W		735.7	27.0
735										ORANGE-BROWN, SANDY SILT	
	734.2	28.5	17	18	82/0.3	100/0.8				733.2	29.5
730										**WEATHERED ROCK** (META-GRANITE)	
	729.2	33.5	100/0.5			100/0.5					
725										725.7	37.0
	724.2	38.5	17	14	24	38		D		**RESIDUAL** GRAY-BROWN, SANDY SILT	
720										720.7	42.0
	719.2	43.5	70	30/0.1		100/0.6				**WEATHERED ROCK** (META-GRANITE)	
715											
	714.2	48.5	100/0.4			100/0.4					
710											
	709.2	53.5	60/0.1			60/0.1				709.2	53.5
										709.1 **CRYSTALLINE ROCK** (META-GRANITE)	53.6

Boring Terminated at Elevation 709.1 ft in CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B5A-A_RL	**STATION** 385+25	**OFFSET** 29 ft RT	**ALIGNMENT** -L- **0 HR.** 7.5
COLLAR ELEV. 756.6 ft	**TOTAL DEPTH** 51.4 ft	**NORTHING** 869,555	**EASTING** 1,743,290 **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										756.6 GROUND SURFACE 0.0
	756.6	0.0								**ROADWAY EMBANKMENT** RED-ORANGE AND GRAY-BROWN, SANDY CLAY WITH TRACE ORGANICS
755			2	4	3	7		M		
	754.2	2.4	1	3	3	6		M		750.6 6.0
750										**ALLUVIAL** GRAY, SANDY CLAY
	749.2	7.4	2	1	3	4		W		745.6 11.0
745										**RESIDUAL** ORANGE-BROWN, AND GRAY-BROWN, SAPROLITIC, SANDY SILT
	744.2	12.4	1	3	4	7		D		
740										
	739.2	17.4	3	6	9	15		D		
735										
	734.2	22.4	2	4	6	10		D		
730										
	729.2	27.4	6	7	8	15		D		
725										725.6 31.0
	724.2	32.4	55	45/0.4		100/0.9				**WEATHERED ROCK** (META-GRANITE)
720										
	719.2	37.4	71	29/0.1		100/0.6				
715										
	714.2	42.4	56	44/0.1		100/0.6				
710										
	709.2	47.4	100/0.4			100/0.4				
	705.3	51.3	60/0.1			60/0.1				705.3 51.3
										705.2 **CRYSTALLINE ROCK** (META-GRANITE) 51.4

Boring Terminated with Standard Penetration Test Refusal at Elevation 705.2 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 1/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B5A-B_RL	**STATION** 384+83	**OFFSET** 68 ft RT	**ALIGNMENT** -L-	**0 HR.** 32.5
COLLAR ELEV. 753.7 ft	**TOTAL DEPTH** 60.7 ft	**NORTHING** 869,513	**EASTING** 1,743,251	**24 HR.** 4.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/29/12	**COMP. DATE** 10/30/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755										753.7 GROUND SURFACE	0.0
	753.7	0.0	2	3	6	9		M		**ALLUVIAL**	
750	750.4	3.3	3	3	4	7		M		751.7 BROWN-GRAY, SANDY SILT WITH TRACE ORGANICS	2.0
										YELLOW AND TAN, CLAYEY SAND	
745	745.4	8.3	1	2	4	6		M		746.7 **RESIDUAL** ORANGE AND BROWN-GRAY, SANDY SILT	7.0
740	740.4	13.3	5	6	10	16		D			
735	735.4	18.3	19	51	49/0.3					734.9 **WEATHERED ROCK** (META-GRANITE)	18.8
730	730.4	23.3	8	9	12	21		D		731.7 **RESIDUAL** BROWN-GRAY, SANDY SILT	22.0
725	725.4	28.3	100/0.3			100/0.3				726.7 **WEATHERED ROCK** (META-GRANITE)	27.0
720	721.0	32.7	60/0.0			60/0.0	RS-17			721.0 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, VERY CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=64% RQD=27% RMR=54	32.7
715											
710											
705											
700											
695							RS-18			693.0 Boring Terminated at Elevation 693.0 ft in CRYSTALLINE ROCK (META-GRANITE)	60.7

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B5A-B_RL	**STATION** 384+83	**OFFSET** 68 ft RT	**ALIGNMENT** -L-	**0 HR.** 32.5
COLLAR ELEV. 753.7 ft	**TOTAL DEPTH** 60.7 ft	**NORTHING** 869,513	**EASTING** 1,743,251	**24 HR.** 4.2
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/29/12	**COMP. DATE** 10/30/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 28.0 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)
721											Begin Coring @ 32.7 ft	
720	721.0	32.7	3.0	2:15/1.0 2:15/1.0 1:45/1.0	(2.4) 80%	(2.4) 80%	RS-17	(17.8) 64%	(7.5) 27%		721.0 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, VERY CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=64% RQD=27% RMR=54	32.7
	718.0	35.7	5.0	2:00/1.0 1:45/1.0 1:30/1.0 1:30/1.0 1:15/1.0	(3.0) 60%	(0.4) 8%						
715	713.0	40.7	5.0	2:00/1.0 1:45/1.0 1:00/1.0 1:15/1.0 2:15/1.0	(2.9) 58%	(0.0) 0%						
710	708.0	45.7	5.0	2:45/1.0 2:45/1.0 2:00/1.0 2:00/1.0 2:15/1.0	(1.7) 34%	(0.8) 16%						
705	703.0	50.7	5.0	2:00/1.0 1:30/1.0 1:45/1.0 1:45/1.0 1:30/1.0	(2.9) 58%	(0.4) 8%						
700	698.0	55.7	5.0	2:00/1.0 2:00/1.0 2:15/1.0 2:00/1.0 2:15/1.0	(4.9) 98%	(3.5) 70%	RS-18					
695	693.0	60.7									693.0 Boring Terminated at Elevation 693.0 ft in CRYSTALLINE ROCK (META-GRANITE)	60.7

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B5B-A_RL	**STATION** 386+11	**OFFSET** 16 ft RT	**ALIGNMENT** -L- **0 HR.** 4.8
COLLAR ELEV. 756.4 ft	**TOTAL DEPTH** 64.3 ft	**NORTHING** 869,577	**EASTING** 1,743,375 **24 HR.** 4.8
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/02/12	**COMP. DATE** 11/02/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
760										
	756.4	0.0								756.4 GROUND SURFACE 0.0
755			2	2	2	4		D		**ROADWAY EMBANKMENT**
	753.6	2.8								ORANGE-RED AND ORANGE, BROWN,
			3	4	6	10		D		SANDY SILT WITH TRACE ORGANICS
750										
	748.6	7.8								
			5	10	7	17		M		
745										745.4 11.0
	743.6	12.8								**RESIDUAL**
			1	2	2	4		M		ORANGE-BROWN, BROWN-GRAY, AND
740										GRAY, SANDY SILT
	738.6	17.8								
			1	3	4	7		M		
735										
	733.6	22.8								
			2	3	4	7		D		
730										
	728.6	27.8								
			4	5	8	13		D		
725										
	723.6	32.8								
			4	7	9	16		D		
720										
	718.6	37.8								
			4	8	10	18		D		
715										715.4 41.0
	713.6	42.8								**WEATHERED ROCK**
			48	52/0.4		100/0.9				(META-GRANITE)
710										
	708.6	47.8								
			100/0.5			100/0.5				
705										
	703.6	52.8								
			100/0.4			100/0.4				
700										
	698.6	57.8								
			55	45/0.3		100/0.8				
695										
	693.6	62.8								
			17	83/0.3		100/0.8				
	692.1	64.3	60/0.0			60/0.0				692.1 64.3
										Boring Terminated with Standard Penetration Test Refusal at Elevation 692.1 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B5B-B_RL	**STATION** 385+83	**OFFSET** 67 ft RT	**ALIGNMENT** -L- **0 HR.** 1.5
COLLAR ELEV. 751.1 ft	**TOTAL DEPTH** 64.0 ft	**NORTHING** 869,523	**EASTING** 1,743,353 **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/31/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
755										
	751.1	0.0						W		751.1 GROUND SURFACE 0.0
750			2	1	2	3				**ALLUVIAL**
	747.5	3.6						W		RED-BROWN AND GRAY, SANDY SILT
			WOH	WOH	WOH	0				
745										744.1 7.0
	742.5	8.6								**RESIDUAL**
			2	5	6	11		M		GRAY, WHITE, BROWN, AND ORANGE,
740										SANDY SILT
	737.5	13.6								
			6	11	15	26		D		
735										
	732.5	18.6								
			4	7	10	17		D		
730										
	727.5	23.6								
			5	9	12	21		D		
725										
	722.5	28.6								
			8	11	13	24		D		
720										
	717.5	33.6								
			8	14	21	35		D		
715										
	712.5	38.6								
			8	11	16	27		D		
710										
	707.5	43.6								
			9	11	17	28		D		
705										
	702.5	48.6								
			16	39	40	79		D		
700										
	697.5	53.6								
			10	15	18	33		D		
695										
	692.5	58.6								
			15	31	38	69		D		
690										690.1 61.0
	687.5	63.6	100/0.4			100/0.4				**WEATHERED ROCK**
										(META-GRANITE) 687.5 63.6
										Boring Terminated at Elevation 687.1 ft in WEATHERED ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B6A_RL	**STATION** 386+81	**OFFSET** 16 ft RT	**ALIGNMENT** -L- **0 HR.** 4.4
COLLAR ELEV. 755.6 ft	**TOTAL DEPTH** 55.2 ft	**NORTHING** 869,587	**EASTING** 1,743,445 **24 HR.** 3.6
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/05/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
760										
755	755.6	0.0	3	5	6	11		M		755.6 GROUND SURFACE 0.0
750	752.2	3.4	3	5	6	11		M		**ROADWAY EMBANKMENT** RED-ORANGE, SANDY CLAY WITH TRACE ORGANICS AND TRACE GRAVEL
745	747.2	8.4	1	2	1	3		M		748.6 7.0 **RESIDUAL** ORANGE-BROWN, TAN-GRAY, AND WHITE, SANDY SILT
740	742.2	13.4	1	2	2	4		M		
735	737.2	18.4	2	1	4	5		M		
730	732.2	23.4	2	4	10	14		D		
725	727.2	28.4	6	9	12	21		D		
720	722.2	33.4	20	22	26	48		D		
715	717.2	38.4	22	78/0.5		100/1.0				718.6 37.0 **WEATHERED ROCK** (META-GRANITE)
710	712.2	43.4	87	13/0.1		100/0.6		D		709.1 46.5 **RESIDUAL** BLUE GRAY AND BROWN, SANDY SILT
705	707.2	48.4	9	16	35	51		D		703.6 52.0 **WEATHERED ROCK** (META-GRANITE)
	702.2	53.4	28	72/0.5						700.6 55.0
	700.4	55.2	60/0.0			100/1.0 60/0.0				700.4 55.2 **CRYSTALLINE ROCK** (META-GRANITE) Boring Terminated with Standard Penetration Test Refusal at Elevation 700.4 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B6B_RL	**STATION** 386+81	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** 2.4 N/A
COLLAR ELEV. 751.6 ft	**TOTAL DEPTH** 70.6 ft	**NORTHING** 869,538	**EASTING** 1,743,453	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										751.6	0.0
										GROUND SURFACE	
	751.6	0.0	3	3	5	8		M		**ALLUVIAL** RED-ORANGE, SANDY CLAY WITH TRACE ORGANICS	
	748.4	3.2	3	4	5	9		M			
	743.4	8.2	3	4	4	8		M		744.6	7.0
	738.4	13.2	7	9	7	16		D		**RESIDUAL** WHITE, GRAY, AND BROWN-GRAY, SANDY SILT	
	733.4	18.2	4	5	8	13		D			
	728.4	23.2	9	13	16	29		D			
	723.4	28.2	17	20	21	41		D			
	718.4	33.2	30	23	53	76		D			
	713.4	38.2	54	46/0.3		100/0.8				714.6	37.0
	708.4	43.2	100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)	
	703.4	48.2	60/0.1			60/0.1				703.4	48.2
	698.4	53.2	100/0.5			100/0.5				**CRYSTALLINE ROCK** (META-GRANITE)	
	693.9	57.7	60/0.1			60/0.1				699.6	52.0
										WEATHERED ROCK (META-GRANITE)	
										693.9	57.7
										CRYSTALLINE ROCK GRAY, TAN, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED, MODERATELY CLOSELY TO WIDELY FRACTURED, META-GRANITE REC=98% RQD=98% RMR=88	
										681.0	70.6
										Boring Terminated at Elevation 681.0 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B6B_RL	**STATION** 386+81	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** 2.4 N/A
COLLAR ELEV. 751.6 ft	**TOTAL DEPTH** 70.6 ft	**NORTHING** 869,538	**EASTING** 1,743,453	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 12.9 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)
693.9											Begin Coring @ 57.7 ft	
	693.9	57.7	2.9	2:00/1.0 2:30/1.0 2:15/0.9	(2.7) 93%	(2.7) 93%		(12.7) 98%	(12.7) 98%		693.9 **CRYSTALLINE ROCK** GRAY, TAN, AND WHITE, HARD, FRESH TO VERY SLIGHTLY WEATHERED, MODERATELY CLOSELY TO WIDELY FRACTURED, META-GRANITE REC=98% RQD=98% RMR=88	57.7
690	691.0	60.6	5.0	2:45/1.0 2:45/1.0 2:45/1.0 3:00/1.0 3:00/1.0	(5.0) 100%	(5.0) 100%						
	686.0	65.6	5.0	3:15/1.0 2:45/1.0 2:45/1.0 2:45/1.0 3:00/1.0	(5.0) 100%	(5.0) 100%						
685	681.0	70.6									681.0 Boring Terminated at Elevation 681.0 ft in CRYSTALLINE ROCK (META-GRANITE)	70.6

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B7A_RL	**STATION** 387+88	**OFFSET** 16 ft RT	**ALIGNMENT** -L- **0 HR.** 5.2
COLLAR ELEV. 752.2 ft	**TOTAL DEPTH** 30.3 ft	**NORTHING** 869,606	**EASTING** 1,743,551 **24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/07/12	**COMP. DATE** 11/07/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
	752.2	0.0								752.2 GROUND SURFACE 0.0
750			2	2	2	4		M		**RESIDUAL** BROWN, WHITE, AND GRAY, SAPROLITIC, SANDY SILT
	749.3	2.9								
			3	3	2	5		M		
745										
	744.3	7.9								
			1	2	2	4		W		
740										
	739.3	12.9								
			6	6	4	10		M		
735										
	734.3	17.9								
			2	3	2	5		M		
730										
	729.3	22.9								
			13	10	14	24		D		
725										
	724.3	27.9								
			9	41	38	79		D		
	721.9	30.3								721.9 30.3
			60/0.0			60/0.0				Boring Terminated with Standard Penetration Test Refusal at Elevation 721.9 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B7B_RL	**STATION** 387+88	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** 1.8
COLLAR ELEV. 750.5 ft	**TOTAL DEPTH** 60.4 ft	**NORTHING** 869,557	**EASTING** 1,743,561	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/08/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.5	0.0	2	2	3	5		M		750.5 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SANDY CLAY	
745	747.0	3.5	1	1	2	3		M			
740	742.0	8.5	3	6	8	14		M		738.5 DARK GRAY, SANDY SILT	12.0
735	737.0	13.5	1	2	3	5		M		733.5 **RESIDUAL** BROWN AND GRAY, SAPROLITIC, SANDY SILT	17.0
730	732.0	18.5	17	23	44	67		D			
725	727.0	23.5	17	30	29	59		D			
720	722.0	28.5	7	10	25	35		D			
715	717.0	33.5	60/0.1			60/0.1				717.0 **CRYSTALLINE ROCK** (META-GRANITE)	33.5
710	713.1	37.4	60/0.0			60/0.0				713.1 GRAY AND BLACK, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=83% RQD=70% RMR=64	37.4
705											
700											
695										690.1 Boring Terminated at Elevation 690.1 ft in CRYSTALLINE ROCK (META-GRANITE)	60.4

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B7B_RL	**STATION** 387+88	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** 1.8
COLLAR ELEV. 750.5 ft	**TOTAL DEPTH** 60.4 ft	**NORTHING** 869,557	**EASTING** 1,743,561	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/06/12	**COMP. DATE** 11/08/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 23.0 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)
											Begin Coring @ 37.4 ft	
713.1	713.1	37.4	3.0	1:06/1.0 1:38/1.0 1:55/1.0	(1.5) 50%	(0.7) 23%		(19.0) 83%	(16.1) 70%		713.1 GRAY AND BLACK, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=83% RQD=70% RMR=64	37.4
710	710.1	40.4	5.0	2:02/1.0 2:04/1.0 2:10/1.0 2:25/1.0 2:52/1.0	(5.0) 100%	(4.7) 94%						
705	705.1	45.4	5.0	2:13/1.0 1:45/1.0 2:05/1.0 2:15/1.0 1:20/1.0	(3.0) 60%	(1.9) 38%						
700	700.1	50.4	5.0	1:58/1.0 2:47/1.0 2:03/1.0 3:32/1.0 2:42/1.0	(4.7) 94%	(4.4) 88%						
695	695.1	55.4	5.0	2:35/1.0 3:04/1.0 2:08/1.0 2:16/1.0 2:31/1.0	(4.8) 96%	(4.4) 88%						
	690.1	60.4									690.1 Boring Terminated at Elevation 690.1 ft in CRYSTALLINE ROCK (META-GRANITE)	60.4

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B8A_RL	**STATION** 389+17	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.8 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 869,634	**EASTING** 1,743,678	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/07/12	**COMP. DATE** 11/08/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										750.8 GROUND SURFACE	0.0
	750.8	0.0	2	2	2	4		M		748.8 **ALLUVIAL** BROWN, SILTY SAND	2.0
	747.3	3.5								GRAY AND BROWN, SILTY CLAY	
			2	2	4	6		M		744.8 **RESIDUAL** BROWN, SAPROLITIC, SILTY SAND	6.0
	742.3	8.5	2	1	3	4		M		739.8 GRAY, SAPROLITIC, SANDY SILT	11.0
	737.3	13.5	5	9	8	17		M			
	732.3	18.5	17	16	24	40		M		729.8 GRAY, SAPROLITIC, SILTY SAND	21.0
	727.3	23.5	7	9	13	22		M			
	722.3	28.5	10	16	13	29		M			
	717.3	33.5	10	10	21	31		M			
	712.3	38.5	23	77/0.5		100/1.0				712.3 **WEATHERED ROCK** (META-GRANITE)	38.5
	707.8	43.0	60/0.0			60/0.0				707.8 **CRYSTALLINE ROCK** GRAY AND WHITE, HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO WIDELY FRACTURED, META-GRANITE REC=94% RQD=51% RMR=70	43.0
										690.8 Boring Terminated at Elevation 690.8 ft in CRYSTALLINE ROCK (META-GRANITE)	60.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B8A_RL	**STATION** 389+17	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.8 ft	**TOTAL DEPTH** 60.0 ft	**NORTHING** 869,634	**EASTING** 1,743,678	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/07/12	**COMP. DATE** 11/08/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**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)
707.8											Begin Coring @ 43.0 ft	
	707.8	43.0	2.0	2:35/1.0 2:10/1.0	(1.0) 50%	(0.8) 40%		(15.9) 94%	(8.6) 51%		707.8 **CRYSTALLINE ROCK** GRAY AND WHITE, HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO WIDELY FRACTURED, META-GRANITE REC=94% RQD=51% RMR=70	43.0
705	705.8	45.0	5.0	2:40/1.0 3:20/1.0 3:03/1.0 2:43/1.0 3:01/1.0	(4.9) 98%	(3.6) 72%						
700	700.8	50.0	5.0	3:37/1.0 3:41/1.0 4:10/1.0 4:03/1.0 3:31/1.0	(5.0) 100%	(3.7) 74%						
695	695.8	55.0	5.0	3:41/1.0 4:04/1.0 3:55/1.0 3:47/1.0 3:20/1.0	(5.0) 100%	(3.5) 70%						
	690.8	60.0									690.8 Boring Terminated at Elevation 690.8 ft in CRYSTALLINE ROCK (META-GRANITE)	60.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B8B_RL	**STATION** 389+17	**OFFSET** 70 ft RT	**ALIGNMENT** -L- **0 HR.** N/A
COLLAR ELEV. 750.2 ft	**TOTAL DEPTH** 43.5 ft	**NORTHING** 869,582	**EASTING** 1,743,691 **24 HR.** 2.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/08/12	**COMP. DATE** 11/05/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.2	0.0	1	1	3	4 8		M		750.2 GROUND SURFACE **ALLUVIAL** GRAY AND BROWN, SILTY SAND	0.0
745	746.7	3.5	3	4	4			M			
740	741.7	8.5	3	3	3	6		M		739.2 **RESIDUAL** BROWN, SAPROLITIC, SANDY SILT	11.0
735	736.7	13.5	1	2	1	3		M		734.2 BROWN AND WHITE, SAPROLITIC, SILTY SAND	16.0
730	731.7	18.5	3	4	5	9		M			
725	726.7	23.5	14	33	97/0.4	100/0.9		M		726.2 **WEATHERED ROCK** (META-GRANITE)	24.0
720	721.7	28.5	9	15	25	40		M		724.2 **RESIDUAL** WHITE, GRAY, AND BROWN, SAPROLITIC, SILTY SAND	26.0
715	716.7	33.5	60/0.3			60/0.3		M		716.7 **WEATHERED ROCK** (META-GRANITE)	33.5
710	711.7	38.5	60/0.2			60/0.2		M			
	706.7	43.5	60/0.0			60/0.0		M		706.7 Boring Terminated with Standard Penetration Test Refusal at Elevation 706.7 ft on CRYSTALLINE ROCK (META-GRANITE)	43.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B9A_RL	**STATION** 390+46	**OFFSET** 23 ft RT	**ALIGNMENT** -L- **0 HR.** N/A
COLLAR ELEV. 749.3 ft	**TOTAL DEPTH** 39.5 ft	**NORTHING** 869,663	**EASTING** 1,743,805 **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** 0.5ft

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
750										WATER SURFACE (10/18/12)
	749.3	0.0						W		749.3 GROUND SURFACE 0.0
745	745.8	3.5	1 WOH	0 WOH	1 1	1 1		W		**ALLUVIAL** GRAY, SILTY CLAY WITH TRACE ORGANICS
740	740.8	8.5	3	4	5	9		W		738.3 BROWN, COARSE SAND 11.0
735	735.8	13.5	5	5	5	10		W		
730	730.8	18.5	13	13	7	20		W		730.3 **RESIDUAL** GRAY AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA 19.0
725	725.8	23.5	13	13	11	24		W		
720	720.8	28.5	6	12	14	26		W		
715	715.8	33.5	24	76/0.3		100/0.8		W		715.8 **WEATHERED ROCK** (META-GRANITE) 33.5
710	710.8	38.5	60/0.3			60/0.3		W		
	709.8	39.5	60/0.0			60/0.0		W		709.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 709.8 ft on CRYSTALLINE ROCK (META-GRANITE) 39.5

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B9B_RL	**STATION** 390+46	**OFFSET** 72 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 69.8 ft	**NORTHING** 869,616	**EASTING** 1,743,819	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/19/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** 0.5ft	

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										WATER SURFACE (10/19/12)	
	749.7	0.0	WOH	WOH	1	1		W		749.7 GROUND SURFACE	0.0
										ALLUVIAL RED-BROWN, SILTY CLAY WITH SOME ORGANICS	
	746.2	3.5						W		743.7	6.0
745			2	1	1	2				BROWN, COARSE SAND	
	741.2	8.5						W		738.7	11.0
740			1	1	2	3				**RESIDUAL** BROWN, SILTY SAND	
	736.2	13.5						W			
735			2	3	2	5					
	731.2	18.5						M		730.7	19.0
730			2	8	9	17				GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
	726.2	23.5						M			
725			14	12	14	26					
	721.2	28.5						M			
720			9	17	21	38					
	716.2	33.5								716.2	33.5
715			60	40/0.1		100/0.6				**WEATHERED ROCK** (META-GRANITE)	
	711.2	38.5									
710			70	30/0.2		100/0.7					
	706.2	43.5									
705			35	65/0.2		100/0.7					
	703.2	46.5								703.2	46.5
			60/0.0			60/0.0				**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=92% RQD=40% RMR=48	
700											
695											
690											
685											
680										679.9	69.8
										Boring Terminated at Elevation 679.9 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B9B_RL	**STATION** 390+46	**OFFSET** 72 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 69.8 ft	**NORTHING** 869,616	**EASTING** 1,743,819	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/19/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** 0.5ft	
CORE SIZE NQ-3	**TOTAL RUN** 23.3 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)
703.2											Begin Coring @ 46.5 ft	
	703.2	46.5	3.3	2:45/1.0 3:07/1.0 2:56/1.3	(3.3) 100%	(0.4) 12%		(21.4) 92%	(9.3) 40%		703.2 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, VERY SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=92% RQD=40% RMR=48	46.5
700	699.9	49.8	5.0	2:47/1.0 3:10/1.0 3:15/1.0 3:21/1.0 3:05/1.0	(4.0) 80%	(1.3) 26%						
695	694.9	54.8	5.0	2:45/1.0 2:59/1.0 3:03/1.0 3:13/1.0 2:48/1.0	(4.1) 82%	(0.8) 16%						
690	689.9	59.8	5.0	2:51/1.0 3:03/1.0 3:16/1.0 3:11/1.0 3:10/1.0	(4.8) 96%	(2.7) 54%						
685	684.9	64.8	5.0	0:00/1.0 0:00/1.0 0:00/1.0 0:00/1.0 0:00/1.0	(5.2) 104%	(4.1) 82%						
680	679.9	69.8									679.9 Boring Terminated at Elevation 679.9 ft in CRYSTALLINE ROCK (META-GRANITE)	69.8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B10A_RL	**STATION** 391+75	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 869,710	**EASTING** 1,743,926	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** 0.0ft	

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	749.6	0.0	WOH	WOH	2	2		W		749.6 WATER SURFACE (10/23/12)	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY WITH TRACE ORGANICS	
745	746.1	3.5	WOH	3	3	6		W			
740	741.1	8.5	3	3	4	7		W		738.6 BROWN, COARSE SAND WITH SOME GRAVEL	11.0
735	736.1	13.5	3	2	3	5		W			
730	731.1	18.5	3	5	6	11		W		728.6 **RESIDUAL** BROWN, WHITE, AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	21.0
725	726.1	23.5	2	1	2	3		M			
720	721.1	28.5	5	7	6	13		M			
715	716.1	33.5	60/0.3			60/0.3				716.1 **WEATHERED ROCK** (META-GRANITE)	33.5
710	711.1	38.5	60/0.2			60/0.2					
705	707.6	42.0	60/0.0			60/0.0				707.6 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=83% RQD=30% RMR=37	42.0
700											
695											
690											
685										684.6 Boring Terminated at Elevation 684.6 ft in CRYSTALLINE ROCK (META-GRANITE)	65.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B10A_RL	**STATION** 391+75	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 65.0 ft	**NORTHING** 869,710	**EASTING** 1,743,926	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** 0.0ft	
CORE SIZE NQ-3	**TOTAL RUN** 23.0 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)
707.6											Begin Coring @ 42.0 ft	
705	707.6	42.0	3.0	2:37/1.0 3:10/1.0 2:49/1.0	(3.0) 100%	(0.6) 20%		(19.0) 83%	(6.9) 30%		707.6 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=83% RQD=30% RMR=37	42.0
	704.6	45.0										
700			5.0	3:03/1.0 3:01/1.0 2:49/1.0 2:46/1.0 2:51/1.0	(3.9) 78%	(1.2) 24%						
	699.6	50.0										
695			5.0	2:37/1.0 2:55/1.0 3:03/1.0 2:40/1.0 2:45/1.0	(2.1) 42%	(0.9) 18%						
	694.6	55.0										
690			5.0	2:49/1.0 3:10/1.0 3:07/1.0 3:16/1.0 2:58/1.0	(5.0) 100%	(2.5) 50%						
	689.6	60.0										
685			5.0	3:07/1.0 3:19/1.0 2:56/1.0 3:02/1.0 3:06/1.0	(5.0) 100%	(1.7) 34%						
	684.6	65.0									684.6 Boring Terminated at Elevation 684.6 ft in CRYSTALLINE ROCK (META-GRANITE)	65.0

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 1/7/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B10B_RL	**STATION** 391+75	**OFFSET** 72 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 33.6 ft	**NORTHING** 869,657	**EASTING** 1,743,944 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/22/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** 0.0ft

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										749.7 WATER SURFACE (10/22/12)	0.0
	749.7	0.0	WOH	1	2	3		W		**ALLUVIAL** BROWN, SILTY CLAY WITH SOME ORGANICS	
745	746.2	3.5	3	3	4	7		W		743.7 GRAY, SILTY SAND WITH SOME ORGANICS AND WOOD FRAGMENTS	6.0
740	741.2	8.5	WOH	WOH	1	1		W		738.7 BROWN, COARSE SAND	11.0
735	736.2	13.5	3	3	1	4		W		733.7 **RESIDUAL** BROWN AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	16.0
730	731.2	18.5	3	4	6	10		M			
725	726.2	23.5	26	74/0.4		100/0.9				726.2 **WEATHERED ROCK** (META-GRANITE)	23.5
720	721.2	28.5	60/0.2			60/0.2					
	716.2	33.5	60/0.1			60/0.1				716.2 **CRYSTALLINE ROCK** (META-GRANITE)	33.5
										716.1 Boring Terminated with Standard Penetration Test Refusal at Elevation 716.1 ft in CRYSTALLINE ROCK (META-GRANITE)	33.6

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B11A_RL	**STATION** 393+04	**OFFSET** 23 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 750.5 ft	**TOTAL DEPTH** 32.7 ft	**NORTHING** 869,748	**EASTING** 1,744,050 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
755											
750	750.5	0.0	WOH	WOH	1	1		W		750.5 GROUND SURFACE	0.0
	747.0	3.5	2	3	3	6		W		**ALLUVIAL** BROWN AND GRAY, SILTY CLAY WITH TRACE ORGANICS	
745	742.0	8.5	WOH	WOH	WOH	0		W		744.5 GRAY, COARSE SAND	6.0
740	737.0	13.5	3	2	2	4		W		739.5 GRAY, SILTY SAND	11.0
735	732.0	18.5	6	35	65/0.4	100/0.9				731.5 **WEATHERED ROCK** (META-GRANITE)	19.0
730	727.0	23.5	35	10	15	25				727.0 **ALLUVIAL** BROWN, GRAY, AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	23.5
725	722.0	28.5	31	69/0.2		100/0.7				722.0 **WEATHERED ROCK** (META-GRANITE)	28.5
720	717.8	32.7	60/0.0			60/0.0				717.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 717.8 ft on CRYSTALLINE ROCK (META-GRANITE)	32.7

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B11B_RL	**STATION** 393+04	**OFFSET** 72 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 751.1 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 869,702	**EASTING** 1,744,067	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/24/12	**COMP. DATE** 10/24/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
	751.1	0.0	WOH	WOH	1	1		M		751.1 GROUND SURFACE	0.0
750										**ALLUVIAL** RED-BROWN, SILTY CLAY	
	747.6	3.5	2	2	1	3		M		745.1	6.0
745										GRAY, SILTY SAND	
	742.6	8.5	WOH	1	1	2		W		740.1	11.0
740										GRAY AND BROWN, SANDY CLAY	
	737.6	13.5	3	4	6	10		M		735.1	16.0
735										BROWN, COARSE SAND WITH GRAVEL	
	732.6	18.5	10	10	8	18		W		727.6	23.5
730										**WEATHERED ROCK** (META-GRANITE)	
	727.6	23.5	60/0.3			60/0.3				723.6	27.5
725										**RESIDUAL** WHITE, GRAY, AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA	
	722.6	28.5	15	16	42	58		M		719.1	32.0
720										**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=94% RQD=52% RMR=60	
	719.1	32.0	60/0.0			60/0.0				701.1	50.0
715										Boring Terminated at Elevation 701.1 ft in CRYSTALLINE ROCK (META-GRANITE)	
710											
705											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B11B_RL	**STATION** 393+04	**OFFSET** 72 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 751.1 ft	**TOTAL DEPTH** 50.0 ft	**NORTHING** 869,702	**EASTING** 1,744,067	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/24/12	**COMP. DATE** 10/24/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**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)
719.1											Begin Coring @ 32.0 ft	
	719.1	32.0	3.0	3:03/1.0 3:10/1.0 2:57/1.0	(3.0) 100%	(2.7) 90%		(17.0) 94%	(9.4) 52%		719.1 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=94% RQD=52% RMR=60	32.0
715	716.1	35.0	5.0	2:45/1.0 2:37/1.0 3:03/1.0 3:19/1.0 2:47/1.0	(5.0) 100%	(1.7) 34%						
	711.1	40.0	5.0	3:20/1.0 2:59/1.0 3:16/1.0 3:07/1.0 3:01/1.0	(4.0) 80%	(1.4) 28%						
710	706.1	45.0	5.0	3:16/1.0 3:09/1.0 3:00/1.0 3:10/1.0 3:15/1.0	(5.0) 100%	(3.6) 72%						
705	701.1	50.0									701.1	50.0
											Boring Terminated at Elevation 701.1 ft in CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B12A_RL	**STATION** 394+33	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.6 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 869,801	**EASTING** 1,744,168	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
750	750.6	0.0	WOH	1	1	2		W		750.6 GROUND SURFACE	0.0
	747.1	3.5	3	3	3	6		W		**ALLUVIAL** RED-BROWN, GRAY, AND BROWN, SILTY CLAY WITH TRACE ORGANICS	
745	742.1	8.5	2	2	3	5		W			
740	737.1	13.5	3	3	3	6		W		734.6 GRAY AND BROWN, COARSE SAND	16.0
735	732.1	18.5	5	9	9	18		M			
730	727.1	23.5	60/0.2			60/0.2				727.1 **WEATHERED ROCK** (META-GRANITE)	23.5
725	724.6	26.0								724.6 **RESIDUAL** BROWN AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	26.0
	722.1	28.5	38	28	50	78		M			
720	719.1	31.5	60/0.0			60/0.0				719.1 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSELY TO FRACTURED, META-GRANITE REC=100% RQD=67% RMR=64	31.5
715										718.5 716.1 **WEATHERED ROCK** (META-GRANITE)	32.1 34.5
710										**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=93% RQD=82% RMR=64	
										705.6 Boring Terminated at Elevation 705.6 ft in CRYSTALLINE ROCK (META-GRANITE)	45.0

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B12A_RL	**STATION** 394+33	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 750.6 ft	**TOTAL DEPTH** 45.0 ft	**NORTHING** 869,801	**EASTING** 1,744,168	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**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)
719.1											Begin Coring @ 31.5 ft	
	719.1	31.5	3.5	3:10/1.0 2:43/1.0 2:51/1.0 1:20/0.5	(1.8) 51%	(0.9) 26%		(0.6) 100%	(0.4) 67%		719.1 **CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSELY TO FRACTURED, META-GRANITE REC=100% RQD=67% RMR=64	31.5
715	715.6	35.0	5.0	3:07/1.0 3:01/1.0 3:17/1.0 3:10/1.0 3:05/1.0	(5.0) 100%	(4.1) 82%		(0.7) 29% (9.7) 92%	(8.6) 82%		718.5 716.1 **WEATHERED ROCK** (META-GRANITE)	32.1 34.5
710	710.6	40.0	5.0	3:19/1.0 2:57/1.0 3:06/1.0 3:12/1.0 3:29/1.0	(4.2) 84%	(3.6) 72%					**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD TO VERY HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=93% RQD=82% RMR=64	
	705.6	45.0									705.6 Boring Terminated at Elevation 705.6 ft in CRYSTALLINE ROCK (META-GRANITE)	45.0

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 1/8/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B12B_RL	**STATION** 394+33	**OFFSET** 72 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 750.5 ft	**TOTAL DEPTH** 35.0 ft	**NORTHING** 869,749	**EASTING** 1,744,188 / **24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/25/12	**COMP. DATE** 10/25/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
755										
750	750.5	0.0	WOH	WOH	1	1		W		750.5 GROUND SURFACE 0.0
	747.0	3.5	2	3	3	6		W		**ALLUVIAL** BROWN, SILTY CLAY
745										744.5 6.0
	742.0	8.5	WOH	WOH	WOH	0		W		GRAY, SILTY SAND
740										739.5 11.0
	737.0	13.5	WOH	WOH	WOH	0		W		GRAY, SILTY CLAY
735										734.5 16.0
	732.0	18.5	10	20	11	31		W		GRAY AND ORANGE, COARSE SAND
730										729.5 21.0
	727.0	23.5	29	45	30	75		M		**RESIDUAL** GRAY AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA
725										
	722.0	28.5	12	40	60	100				721.5 29.0
720										**WEATHERED ROCK** (META-GRANITE)
	717.0	33.5	60/0.2			60/0.2				
	715.5	35.0	60/0.0			60/0.0				715.5 35.0
										Boring Terminated with Standard Penetration Test Refusal at Elevation 715.5 ft on CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B13A_RL	**STATION** 395+62	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 33.5 ft	**NORTHING** 869,842	**EASTING** 1,744,290	**24 HR.** 2.2
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/26/12	**COMP. DATE** 10/29/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	749.7	0.0	WOH	WOH	WOH	0		W		749.7 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	746.2	3.5	2	2	3	5		W			
740	741.2	8.5	4	4	5	9		W			
735	736.2	13.5	3	3	3	6		W		733.7 GRAY, COARSE SAND	16.0
730	731.2	18.5	4	7	12	19		W		727.7 **WEATHERED ROCK** (META-GRANITE)	22.0
725	726.2	23.5	22	78/0.3		100/0.8					
720	721.2	28.5	60/0.4			60/0.4					
	716.2	33.5	60/0.0			60/0.0				716.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 716.2 ft on CRYSTALLINE ROCK (META-GRANITE)	33.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B13B_RL	**STATION** 395+62	**OFFSET** 72 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.8 ft	**TOTAL DEPTH** 47.0 ft	**NORTHING** 869,797	**EASTING** 1,744,308	**24 HR.** 1.7
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/26/12	**COMP. DATE** 10/26/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	749.8	0.0	WOH	1	1	2		W		749.8 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	746.5	3.3	2	3	3	6		W			
740	741.3	8.5	3	4	6	10		W			
735	736.3	13.5	WOH	1	2	3		W			
730	731.3	18.5	2	4	4	8		W		730.8 BROWN, COARSE SAND WITH GRAVEL	19.0
725	726.3	23.5	22	27	43	70		M		727.8 **RESIDUAL** BROWN AND GRAY, SAPROLITIC, SILTY SAND WITH SOME MICA	22.0
720	721.3	28.5	22	78		100/0.7				721.3 **WEATHERED ROCK** (META-GRANITE)	28.5
715	716.3	33.5	50	50/0.2		100/0.7					
710	711.3	38.5	53	47/0.2		100/0.7					
705	706.3	43.5	60/0.2			60/0.2					
	702.8	47.0	60/0.0			60/0.0				702.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 702.8 ft on CRYSTALLINE ROCK (META-GRANITE)	47.0

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B14A_RL	**STATION** 396+91	**OFFSET** 17 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 50.3 ft	**NORTHING** 869,895	**EASTING** 1,744,408 — **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/30/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.7	
	749.7	0.0	WOH	1	2	3		W		GROUND SURFACE	0.0
	746.2	3.5								**ALLUVIAL** BROWN AND GRAY, SILTY CLAY WITH TRACE ORGANICS	
745			4	4	3	7		W			
740	741.2	8.5	3	3	5	8		W			
	736.2	13.5								737.7	12.0
735			WOH	1	2	3		W		GRAY, SILTY SAND	
730	731.2	18.5	11	23	29	52		M		732.7	17.0
										RESIDUAL GRAY AND WHITE, SAPROLITIC, SILTY SAND WITH SOME MICA	
725	726.2	23.5	9	12	17	29		M		726.2	23.5
										GRAY, WHITE, AND BROWN, SAPROLITIC, SILTY SAND WITH SOME MICA	
720	721.2	28.5	60/0.3			60/0.3				721.2	28.5
										WEATHERED ROCK (META-GRANITE)	
715	716.2	33.5	60/0.1			60/0.1					
	713.7	36.0	60/0.0			60/0.0				713.7	36.0
710										**CRYSTALLINE ROCK** GRAY AND WHITE, HARD, SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=83% RMR=73	
705											
700										699.4	50.3
										Boring Terminated at Elevation 699.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B14A_RL	**STATION** 396+91	**OFFSET** 17 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 749.7 ft	**TOTAL DEPTH** 50.3 ft	**NORTHING** 869,895	**EASTING** 1,744,408 — **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/30/12	**COMP. DATE** 10/31/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ-3	**TOTAL RUN** 14.3 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)
713.7											Begin Coring @ 36.0 ft	
	713.7	36.0	4.3	N=60/0.0 3:10/1.0 3:31/1.0 3:27/1.0 3:40/1.3	(4.3) 100%	(4.3) 100%		(14.3) 100%	(11.9) 83%		713.7 **CRYSTALLINE ROCK** GRAY AND WHITE, HARD, SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=83% RMR=73	36.0
710	709.4	40.3	5.0	3:35/1.0 3:43/1.0 3:15/1.0 3:21/1.0 3:19/1.0	(5.0) 100%	(5.0) 100%						
705	704.4	45.3	5.0	3:35/1.0 3:40/1.0 3:26/1.0 3:18/1.0 3:27/1.0	(5.0) 100%	(5.0) 100%						
700	699.4	50.3									699.4 Boring Terminated at Elevation 699.4 ft in CRYSTALLINE ROCK (META-GRANITE)	50.3

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B14B_RL	**STATION** 396+91	**OFFSET** 76 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.0 ft	**TOTAL DEPTH** 28.0 ft	**NORTHING** 869,840	**EASTING** 1,744,430	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/29/12	**COMP. DATE** 10/29/12	**SURFACE WATER DEPTH** 0.0ft	

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											
	749.0	0.0	1	1	2	3		W		749.0 WATER SURFACE (10/29/12)	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY WITH TRACE ORGANICS	
745	745.5	3.5	1	2	3	5		W			
740	740.5	8.5	3	3	5	8		W			
735	735.5	13.5	1	2	3	5		W		733.0	16.0
										GRAY, COARSE SAND WITH TRACE GRAVEL	
730	730.5	18.5	1	2	11	13		W			
725	725.5	23.5	26	74/0.5		100				725.5 **WEATHERED ROCK** (META-GRANITE)	23.5
	721.0	28.0	60/0.0			60/0.0				721.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 721.0 ft on CRYSTALLINE ROCK (META-GRANITE)	28.0

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B15A_RL	**STATION** 398+10	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.6 ft	**TOTAL DEPTH** 33.7 ft	**NORTHING** 869,933	**EASTING** 1,744,521	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/10/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
	749.6	0.0								749.6 GROUND SURFACE 0.0
										ALLUVIAL GRAY-BROWN, SILTY CLAY
745	746.1	3.5	WOH	WOH	WOH	0				743.6 6.0
740	741.1	8.5	2	3	3	6				GRAY, SILTY SAND
735	736.1	13.5	2	3	5	8				737.6 12.0
										YELLOW-BROWN, COARSE SAND WITH GRAVEL
730	731.1	18.5	3	2	1	3				733.6 16.0
725	726.1	23.5	11	54/0.3		100/0.8				YELLOW-BROWN, SILTY SAND WITH GRAVEL
720	721.1	28.5	100/0.2			100/0.2				728.1 21.5
	716.1	33.5	100/0.2			100/0.2				**WEATHERED ROCK** (META-GRANITE)
										715.9 33.7 Boring Terminated at Elevation 715.9 ft in WEATHERED ROCK (META-GRANITE)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B15B_RL	**STATION** 398+10	**OFFSET** 99 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 869,862	**EASTING** 1,744,549	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.4 GROUND SURFACE	0.0
	745.9	3.5	1	2	4	6		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY	
745										743.4 GRAY-BROWN, CLAYEY SAND	6.0
	740.9	8.5	2	2	2	4		W			
740											
	735.9	13.5	3	3	92	95		W		734.9	14.5
735										734.4 RESIDUAL WHITE-BROWN, SILTY SAND (QUARTZ LENSE)	15.0
	730.9	18.5	14	15	39	54		W		BLACK-WHITE-BROWN, MICACEOUS, SAPROLITIC, SANDY SILT	
730										727.4	22.0
	725.9	23.5	14	27	73/0.1	100/0.6				**WEATHERED ROCK** (META-GRANITE)	
725											
	720.9	28.5	100/0.2			100/0.2				720.4	29.0
720	720.4	29.0	60/0.0			60/0.0				**CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=95% RQD=84% RMR=58	
715											
710							RS-55 RS-56				
										705.4	44.0
										Boring Terminated at Elevation 705.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B15B_RL	**STATION** 398+10	**OFFSET** 99 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.4 ft	**TOTAL DEPTH** 44.0 ft	**NORTHING** 869,862	**EASTING** 1,744,549	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/10/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
720.4											Begin Coring @ 29.0 ft	
	720.4	29.0	5.0	2:33/1.0 1:55/1.0 4:32/1.0 1:23/1.0 2:13/1.0	(4.3) 86%	(3.3) 66%		(14.3) 95%	(12.6) 84%		720.4 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=95% RQD=84% RMR=58	29.0
715	715.4	34.0	5.0	2:22/1.0 2:31/1.0 2:34/1.0 2:06/1.0 2:21/1.0	(5.0) 100%	(4.5) 90%						
710	710.4	39.0	5.0	2:03/1.0 2:00/1.0 2:44/1.0 2:48/1.0 2:34/1.0	(5.0) 100%	(4.8) 96%	RS-55 RS-56					
	705.4	44.0									705.4 Boring Terminated at Elevation 705.4 ft in CRYSTALLINE ROCK (META-GRANITE)	44.0

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16A_RL	**STATION** 399+28	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.2 ft	**TOTAL DEPTH** 41.2 ft	**NORTHING** 869,982	**EASTING** 1,744,629	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/12/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.2 GROUND SURFACE	0.0
	745.7	3.5	2	4	7	11		W		**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
745										742.2	7.0
	740.7	8.5	3	1	1	2		W		YELLOW-BROWN AND GRAY, SILTY SAND WITH WOOD	
740											
	735.7	13.5	WOH	1	0	1		W			
735											
	730.7	18.5	5	6	10	16		W		728.2	21.0
730										**WEATHERED ROCK** (META-GRANITE)	
725	725.7	23.5	100/0.3			100/0.3				723.0	26.2
	723.0	26.2	60/0.0			60/0.0				**CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=83% RMR=61	
720							RS-49				
715											
710							RS-50			708.0	41.2
										Boring Terminated at Elevation 708.0 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16A_RL	**STATION** 399+28	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.2 ft	**TOTAL DEPTH** 41.2 ft	**NORTHING** 869,982	**EASTING** 1,744,629	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/12/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
723											Begin Coring @ 26.2 ft	
	723.0	26.2	5.0	3:01/1.0 2:28/1.0 2:17/1.0 2:14/1.0 2:20/1.0	(5.0) 100%	(3.9) 78%		(15.0) 100%	(12.5) 83%		723.0 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=83% RMR=61	26.2
720							RS-49					
	718.0	31.2	5.0	2:04/1.0 1:41/1.0 1:23/1.0 1:52/1.0 1:55/1.0	(5.0) 100%	(4.4) 88%						
715												
	713.0	36.2	5.0	2:14/1.0 1:45/1.0 2:21/1.0 1:59/1.0 2:12/1.0	(5.0) 100%	(4.2) 84%	RS-50					
710												
	708.0	41.2									708.0	41.2
											Boring Terminated at Elevation 708.0 ft in CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B16B_RL	**STATION** 399+28	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.1 ft	**TOTAL DEPTH** 32.5 ft	**NORTHING** 869,937	**EASTING** 1,744,646	**24 HR.** 2.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/11/12	**COMP. DATE** 10/11/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										ELEV. (ft) DEPTH (ft)
										749.1 GROUND SURFACE 0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY
745	745.6	3.5	2	4	6	10		W		
740	740.6	8.5	2	2	3	5		W		742.1 7.0 YELLOW-BROWN, SILTY SAND WITH GRAVEL
735	735.6	13.5	WOH	WOH	1	1		W		
730	730.6	18.5	17	30	19	49		W		732.1 17.0 **RESIDUAL** BLACK AND WHITE, MICACEOUS, SAPROLITIC, SANDY SILT
725	725.6	23.5	70	30/0.2		100/0.2				728.1 21.0 **WEATHERED ROCK** (META-GRANITE)
720	720.6	28.5	57	20	80/0.3	100/0.8				
	716.6	32.5	60/0.0			60/0.0				716.6 32.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 716.6 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17A_RL	**STATION** 400+48	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 19.0 ft	**NORTHING** 870,021	**EASTING** 1,744,742	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/18/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
										748.3 GROUND SURFACE 0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY
745	744.8	3.5	WOH	WOH	WOH	0		W		
740	739.8	8.5	WOH	1	4	5		W		743.3 5.0 YELLOW-BROWN, SILTY SAND WITH GRAVEL
735	734.8	13.5	4	3	6	9		W		
730	729.8	18.5	100/0.3			100/0.3				731.8 16.5 **WEATHERED ROCK** (META-GRANITE)
	729.3	19.0	60/0.0			60/0.0				729.3 19.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 729.3 ft on CRYSTALLINE ROCK (META-GRANITE)

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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17B_RL	**STATION** 400+48	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 37.7 ft	**NORTHING** 869,981	**EASTING** 1,744,758	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/19/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	ELEV. (ft)	DEPTH (ft)
750												
										GROUND SURFACE	748.3	0.0
745	744.8	3.5	WOH	WOH	WOH	0		W		**ALLUVIAL** BROWN-GRAY, SILTY CLAY		
										GRAY, CLAYEY SILT	743.3	5.0
740	739.8	8.5	WOH	1	2	3		W				
										YELLOW-BROWN, SILTY SAND	738.3	10.0
735	734.8	13.5	1	2	1	3		W				
										WEATHERED ROCK (META-GRANITE)	732.0	16.3
730	729.8	18.5	100/0.3			100/0.3						
										CRYSTALLINE ROCK BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=99% RQD=87% RMR=70	725.6	22.7
725	724.8	23.5	60/0.0			60/0.0						
720							RS-85					
715							RS-86					
										Boring Terminated at Elevation 710.6 ft in CRYSTALLINE ROCK (META-GRANITE)	710.6	37.7

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CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B17B_RL	**STATION** 400+48	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 37.7 ft	**NORTHING** 869,981	**EASTING** 1,744,758	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/18/12	**COMP. DATE** 10/19/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
721.1											Begin Coring @ 27.2 ft		
720	721.1 720.6	27.2 27.7	5.0 5.0	1:46/1.0 2:09/1.0 2:17/1.0 2:17/1.0 1:34/1.0	(5.0) 100% (5.0) 100%	(4.0) 80% (4.6) 92%					**CRYSTALLINE ROCK** BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=99% RQD=87% RMR=70 *(continued)*		
715	716.1 715.6	32.2 32.7	5.0	1:55/1.0 2:20/1.0 2:34/1.0 2:41/1.0 2:43/1.0	(4.8) 96%	(4.5) 90%	RS-86					710.6	37.7
	710.6	37.7									Boring Terminated at Elevation 710.6 ft in CRYSTALLINE ROCK (META-GRANITE)		

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18A_RL	**STATION** 401+68	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 46.0 ft	**NORTHING** 870,071	**EASTING** 1,744,851	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.3	0.0
										GROUND SURFACE	
										ALLUVIAL GRAY-BROWN, SILTY CLAY	
745	744.8	3.5	1	2	3	5		W			
740	739.8	8.5	2	2	5	7		W		740.8	7.5
										YELLOW-TAN-BROWN, SILTY SAND WITH GRAVEL	
735	734.8	13.5	5	6	5	11		W			
730	729.8	18.5	13	30	54	84		W		731.3	17.0
										RESIDUAL BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT	
725	724.8	23.5	16	30	70/0.4	100/0.9				724.3	24.0
720	719.8	28.5	100/0.3			100/0.3				**WEATHERED ROCK** (META-GRANITE)	
	717.3	31.0	60/0.0			60/0.0				717.3	31.0
715										**CRYSTALLINE ROCK** BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=90% RMR=74	
710										702.3	46.0
705										Boring Terminated at Elevation 702.3 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18A_RL	**STATION** 401+68	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.3 ft	**TOTAL DEPTH** 46.0 ft	**NORTHING** 870,071	**EASTING** 1,744,851	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/23/12	**COMP. DATE** 10/23/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
717.3											Begin Coring @ 31.0 ft	
715	717.3	31.0	5.0	2:28/1.0 2:45/1.0 2:49/1.0 2:51/1.0 2:29/1.0	(5.0) 100%	(4.6) 92%		(100.0) 667%	(90.0) 600%		717.3 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=90% RMR=74	31.0
710	712.3	36.0	5.0	2:10/1.0 2:26/1.0 2:23/1.0 2:26/1.0 2:26/1.0	(5.0) 100%	(4.5) 90%						
705	707.3	41.0	5.0	2:35/1.0 2:42/1.0 2:38/1.0 2:39/1.0 2:38/1.0	(5.0) 100%	(4.4) 88%						
	702.3	46.0									702.3 Boring Terminated at Elevation 702.3 ft in CRYSTALLINE ROCK (META-GRANITE)	46.0

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B18B_RL	**STATION** 401+68	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.4 ft	**TOTAL DEPTH** 22.5 ft	**NORTHING** 870,025	**EASTING** 1,744,870	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 10/22/12	**COMP. DATE** 10/22/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.4 GROUND SURFACE	0.0
	744.9	3.5	WOH	WOH	2	2		W		**ALLUVIAL** GRAY-BROWN, SILTY CLAY	
745											
	739.9	8.5	2	4	3	7		W		736.9	11.5
740										YELLOW-TAN, SILTY SAND WITH GRAVEL	
	734.9	13.5	2	2	2	4		W		732.4	16.0
735										**WEATHERED ROCK** (META-GRANITE)	
	729.9	18.5	100/0.3			100/0.3					
730											
	725.9	22.5	60/0.0			60/0.0				725.9 Boring Terminated with Standard Penetration Test Refusal at Elevation 725.9 ft on CRYSTALLINE ROCK (META-GRANITE)	22.5

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19A_RL	**STATION** 402+88	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.2 ft	**TOTAL DEPTH** 23.0 ft	**NORTHING** 870,109	**EASTING** 1,744,966	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/14/12	**COMP. DATE** 11/14/12	**SURFACE WATER DEPTH** 0.0ft	

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	
750										748.2 WATER SURFACE (11/14/12)	0.0
	744.7	3.5	WOH	3	4	7		W		**ALLUVIAL** BROWN AND GRAY, SILTY CLAY	
745										742.2	6.0
	739.7	8.5	WOH	2	3	5		W		TAN-BROWN AND GRAY, SILTY SAND WITH SOME GRAVEL	
740											
	734.7	13.5	WOH	WOH	WOH	0		W		732.2	16.0
735										**RESIDUAL** BLACK , WHITE, AND BROWN, SANDY SILT	
	729.7	18.5	10	15	29	44		W		728.2	20.0
730										**WEATHERED ROCK** (META-GRANITE)	
	725.2	23.0	60/0.0			60/0.0				725.2 Boring Terminated with Standard Penetration Test Refusal at Elevation 725.2 ft on CRYSTALLINE ROCK (META-GRANITE)	23.0

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19B_RL	**STATION** 402+88	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 38.1 ft	**NORTHING** 870,069	**EASTING** 1,744,981	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/13/12	**COMP. DATE** 11/13/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										748.6 GROUND SURFACE	0.0
										ALLUVIAL BROWN AND GRAY, SILTY CLAY	
745	745.1	3.5	1	1	3	4		W			
										743.1 TAN-BROWN, SILTY SAND	5.5
740	740.1	8.5	34	76/0.4		100/0.9				741.1 **WEATHERED ROCK** (META-GRANITE)	7.5
735	735.1	13.5	100/0.4			100/0.4					
	733.6	15.0	60/0.1			60/0.1				733.6	15.0
730										733.5 **CRYSTALLINE ROCK** (META-GRANITE)	15.1
										BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=90% RQD=75% RMR=62	
725											
720											
715										710.5	38.1
										Boring Terminated at Elevation 710.5 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B19B_RL	**STATION** 402+88	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 38.1 ft	**NORTHING** 870,069	**EASTING** 1,744,981	**24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/13/12	**COMP. DATE** 11/13/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 23.0 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)
733.5											Begin Coring @ 15.1 ft	
	733.5	15.1	3.0	2:25/1.0 2:43/1.0 1:12/1.0	(2.6) 87%	(2.0) 67%		(20.7) 90%	(17.2) 75%		733.5 BLACK AND WHITE, MEDIUM HARD TO HARD, SLIGHTLY TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=90% RQD=75% RMR=62	15.1
730	730.5	18.1	5.0	1:06/1.0 1:04/1.0 2:29/1.0 2:21/1.0 2:20/1.0	(3.5) 70%	(2.3) 46%						
725	725.5	23.1	5.0	1:42/1.0 2:42/1.0 2:15/1.0 1:46/1.0 3:16/1.0	(4.6) 92%	(3.9) 78%						
720	720.5	28.1	5.0	2:14/1.0 2:49/1.0 2:56/1.0 2:16/1.0 2:31/1.0	(5.0) 100%	(4.4) 88%						
715	715.5	33.1	5.0	2:24/1.0 3:40/1.0 4:14/1.0 3:31/1.0 3:32/1.0	(5.0) 100%	(4.6) 92%						
	710.5	38.1									710.5 Boring Terminated at Elevation 710.5 ft in CRYSTALLINE ROCK (META-GRANITE)	38.1

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20A_RL	**STATION** 404+08	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 35.5 ft	**NORTHING** 870,159	**EASTING** 1,745,075	**24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750										
										748.6 0.0 GROUND SURFACE
										ALLUVIAL
745	745.1	3.5								BROWN-GRAY, SILTY CLAY
			7	10	10	20		M		
										742.6 6.0
740	740.1	8.5								YELLOW-BROWN, SILTY SAND
			3	6	7	13		W		
										737.6 11.0
735	735.1	13.5								RESIDUAL
			9	19	16	35		W		BLACK-WHITE-BROWN, SAPROLITIC, SANDY SILT
										732.6 16.0
730	730.1	18.5								WEATHERED ROCK
			100/0.4			100/0.4				(META-GRANITE)
	728.1	20.5	60/0.0			60/0.0				728.1 20.5
725										CRYSTALLINE ROCK
										BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY FRACTURED, META-GRANITE
										REC=98%
										RQD=91%
										RMR=76
720										
715										713.1 35.5
										Boring Terminated at Elevation 713.1 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20A_RL	**STATION** 404+08	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 35.5 ft	**NORTHING** 870,159	**EASTING** 1,745,075	**24 HR.** 0.6
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/01/12	**COMP. DATE** 11/01/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
728.1											
	728.1	20.5	5.0	2:41/1.0	(5.0)	(4.6)		(14.7)	(13.6)		Begin Coring @ 20.5 ft
725				2:59/1.0	100%	92%		98%	91%		728.1 CRYSTALLINE ROCK 20.5
				4:19/1.0							BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED,
				4:18/1.0							CLOSELY FRACTURED, META-GRANITE
	723.1	25.5	5.0	3:56/1.0							REC=98%
				2:25/1.0	(4.7)	(4.0)					RQD=91%
720				2:34/1.0	94%	80%					RMR=76
	718.1	30.5	5.0	2:35/1.0							
				1:14/1.0							
				2:11/1.0							
				2:23/1.0	(5.0)	(5.0)					
715				2:36/1.0	100%	100%					
				2:54/1.0							
	713.1	35.5	5.0	3:10/1.0							
				2:52/0.0							713.1 35.5
											Boring Terminated at Elevation 713.1 ft in CRYSTALLINE ROCK (META-GRANITE)

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BORELOG REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B20B_RL	**STATION** 404+08	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 749.5 ft	**TOTAL DEPTH** 16.7 ft	**NORTHING** 870,113	**EASTING** 1,745,093	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/02/12	**COMP. DATE** 11/02/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										749.5 GROUND SURFACE	0.0
	746.0	3.5	2	6	11	17		M		**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
745										743.5	6.0
	741.0	8.5	3	2	1	3		W		TAN-BROWN, SILTY SAND WITH SOME GRAVEL	
740										735.5	14.0
	736.0	13.5	3	10	90/0.3	100/0.8				**WEATHERED ROCK** (META-GRANITE)	
735	732.8	16.7	60/0.0			60/0.0				732.8 Boring Terminated with Standard Penetration Test Refusal at Elevation 732.8 ft on CRYSTALLINE ROCK (META-GRANITE)	16.7

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21A_RL	**STATION** 406+28	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.6 ft	**TOTAL DEPTH** 13.6 ft	**NORTHING** 870,233	**EASTING** 1,745,282	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/02/12	**COMP. DATE** 11/02/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.6 GROUND SURFACE	0.0
	745.1	3.5	1	1	5	6		M		**ALLUVIAL** BROWN-GRAY, SILTY CLAY	
745										740.1	8.5
	740.1	8.5	2	98/0.4		100/0.9				**WEATHERED ROCK** (META-GRANITE)	
740										735.1	13.5
	735.1	13.5	60/0.1			60/0.1				735.0 **CRYSTALLINE ROCK** (META-GRANITE) 13.6 Boring Terminated with Standard Penetration Test Refusal at Elevation 735.0 ft in CRYSTALLINE ROCK (META-GRANITE)	
735											

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21B_RL	**STATION** 406+28	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 870,193	**EASTING** 1,745,298	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/05/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										748.9 GROUND SURFACE	0.0
										ALLUVIAL BROWN-GRAY, SILTY CLAY	
745	745.4	3.5	2	4	5	9		M			
										741.9	7.0
740	740.4	8.5	100/0.4			100/0.4				**WEATHERED ROCK** (META-GRANITE)	
	737.4	11.5	60/0.0			60/0.0				737.4	11.5
735										**CRYSTALLINE ROCK** BLACK AND WHITE, HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=95% RQD=88% RMR=80	
730											
725											
720										717.4	31.5
										Boring Terminated at Elevation 717.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B21B_RL	**STATION** 406+28	**OFFSET** 66 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.9 ft	**TOTAL DEPTH** 31.5 ft	**NORTHING** 870,193	**EASTING** 1,745,298	**24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/05/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 20.0 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)
737.4											Begin Coring @ 11.5 ft	
	737.4	11.5	5.0	3:02/1.0 2:46/1.0 2:15/1.0 2:26/1.0 2:44/1.0	(5.0) 100%	(4.6) 92%		(19.0) 95%	(17.5) 88%		737.4 **CRYSTALLINE ROCK** BLACK AND WHITE, HARD TO VERY HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=95% RQD=88% RMR=80	11.5
735												
	732.4	16.5	5.0	2:36/1.0 2:32/1.0 2:54/1.0 3:12/1.0 2:54/1.0	(5.0) 100%	(4.8) 96%						
730												
	727.4	21.5	5.0	2:49/1.0 1:12/1.0 2:42/1.0 1:27/1.0 2:47/1.0	(4.0) 80%	(3.1) 62%						
725												
	722.4	26.5	5.0	2:27/1.0 2:04/1.0 2:26/1.0 2:41/1.0 2:37/1.0	(5.0) 100%	(5.0) 100%						
720												
	717.4	31.5									717.4	31.5
											Boring Terminated at Elevation 717.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

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NCDOT GEOTECHNICAL ENGINEERING UNIT
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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B22A_RL	**STATION** 409+03	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 24.8 ft	**NORTHING** 870,341	**EASTING** 1,745,535	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	746.2	0.0								746.2 GROUND SURFACE	0.0
745			1	1	1	2		W		**ALLUVIAL** RED-BROWN, SILTY SAND	
	742.7	3.5								742.2	4.0
	741.2	5.0	1	60/0.3		60/0.3				741.2 **WEATHERED ROCK** (META-GRANITE)	5.0
740			60/0.0			60/0.0				**CRYSTALLINE ROCK** BROWN, GRAY, AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=94% RQD=75% RMR=58	
735										735.9	10.3
										733.2 **WEATHERED ROCK** (META-GRANITE)	13.0
730										**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=86% RMR=73	
725										721.4	24.8
										Boring Terminated at Elevation 721.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B22A_RL	**STATION** 409+03	**OFFSET** 16 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 24.8 ft	**NORTHING** 870,341	**EASTING** 1,745,535	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-3	**TOTAL RUN** 19.8 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)
741.2											Begin Coring @ 5.0 ft	
740	741.2	5.0	4.8	3:21/1.0 3:10/1.0 1:36/1.0 3:10/1.0 2:31/0.8	(4.5) 94%	(4.0) 83%		(5.0) 94%	(4.0) 75%		741.2 **CRYSTALLINE ROCK** BROWN, GRAY, AND WHITE, MEDIUM HARD, MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=94% RQD=75% RMR=58	5.0
	736.4	9.8									735.9	10.3
735			5.0	3:33/1.0 1:30/1.0 1:00/1.0 1:25/1.0 1:03/1.0	(2.3) 46%	(1.3) 26%		(0.0) 0%			733.2 **WEATHERED ROCK** (META-GRANITE)	13.0
	731.4	14.8									**CRYSTALLINE ROCK** GRAY AND WHITE, MEDIUM HARD HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=86% RMR=73	
730			5.0	2:16/1.0 2:35/1.0 2:21/1.0 2:25/1.0 2:27/1.0	(5.0) 100%	(4.2) 84%		(11.8) 100%	(10.2) 86%		721.4	24.8
	726.4	19.8									Boring Terminated at Elevation 721.4 ft in CRYSTALLINE ROCK (META-GRANITE)	
725			5.0	2:30/1.0 2:46/1.0 2:50/1.0 2:40/1.0 2:50/1.0	(5.0) 100%	(4.7) 94%						
	721.4	24.8										

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B22B_RL	**STATION** 409+03	**OFFSET** 66 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 18.0 ft	**NORTHING** 870,294	**EASTING** 1,745,553 — **24 HR.** 1.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
750										
	746.2	0.0								746.2 GROUND SURFACE 0.0
745			WOH	WOH	WOH	0				**ALLUVIAL** RED-BROWN AND BROWN, SILTY CLAY WITH SOME ORGANICS
	742.7	3.5								
			WOH	1	1	2				
740										740.2 6.0 GRAY, SILTY CLAY
	737.7	8.5	1	2	4	6				
735										
	732.7	13.5	2	2	4	6				
730										
	728.2	18.0	60/0.0			60/0.0				728.7 17.5 / 728.2 18.0 **WEATHERED ROCK** (META-GRANITE) Boring Terminated with Standard Penetration Test Refusal at Elevation 728.2 ft on CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B23A_RL	**STATION** 411+23	**OFFSET** 23 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 746.2 ft	**TOTAL DEPTH** 25.5 ft	**NORTHING** 870,415	**EASTING** 1,745,742 — **24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 10/02/12	**COMP. DATE** 10/02/12	**SURFACE WATER DEPTH** 0.5ft

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
750										
	746.2	0.0								746.2 WATER SURFACE (10/02/12) / GROUND SURFACE 0.0
745			WOH	WOH	WOH	0				**ALLUVIAL** GRAY, SILTY CLAY WITH SOME ORGANICS
	742.7	3.5								
			WOH	WOH	WOH	0				
740										740.2 6.0 GRAY, COARSE SAND
	737.7	8.5	2	3	3	6				
735										
	732.7	13.5	WOH	1	1	2				
730										
	727.7	18.5	7	7	10	17				726.7 19.5 **RESIDUAL** GRAY AND WHITE, SAPROLITIC, COARSE SAND WITH SOME ROCK FRAGMENTS
725										
	722.7	23.5	70	30/0.2		100/0.2				722.7 23.5 **WEATHERED ROCK** (META-GRANITE)
	720.7	25.5	60/0.0			60/0.0				720.7 25.5 Boring Terminated with Standard Penetration Test Refusal at Elevation 720.7 ft on CRYSTALLINE ROCK (META-GRANITE)

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B25B_RL	**STATION** 413+99	**OFFSET** 122 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 748.0 ft	**TOTAL DEPTH** 50.6 ft	**NORTHING** 870,423	**EASTING** 1,746,034 — **24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
	748.0	0.0	1	1	2	3		W		748.0 GROUND SURFACE	0.0
745	744.5	3.5								**ALLUVIAL** RED-BROWN, SANDY CLAY	
			5	6	6	12		W		742.0	6.0
740	739.5	8.5								GRAY AND BROWN, SILTY CLAY	
			2	1	4	5		W			
735	734.5	13.5									
			2	2	2	4		W		732.0	16.0
730	729.5	18.5								GRAY AND BROWN, COARSE SAND	
			1	1	1	2		W		727.0	21.0
725	724.5	23.5								GRAY, SILTY CLAY	
			WOH	2	4	6		W		721.0	27.0
720	719.5	28.5	60/0.2			1 / 60/0.2				**WEATHERED ROCK** (META-GRANITE)	
715	714.5	33.5	29	71/0.2		100/0.7					
710	709.5	38.5								710.0	38.0
	709.0	39.0	60/0.1			60/0.1				**CRYSTALLINE ROCK** GRAY AND WHITE, HARD TO VERY HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=97% RQD=82% RMR=67	
705			60/0.0			60/0.0					
700										697.4	50.6
										Boring Terminated at Elevation 697.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B25B_RL	**STATION** 413+99	**OFFSET** 122 ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 748.0 ft	**TOTAL DEPTH** 50.6 ft	**NORTHING** 870,423	**EASTING** 1,746,034 — **24 HR.** 3.0
DRILL RIG/HAMMER EFF./DATE MAC9354 CME-45C 87% 05/30/2012		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 11/05/12	**COMP. DATE** 11/06/12	**SURFACE WATER DEPTH** N/A
CORE SIZE NQ-3	**TOTAL RUN** 11.6 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)
709											Begin Coring @ 39.0 ft	
	709.0	39.0	1.6	2:51/1.0 1:32/0.6	(1.6) 100%	(1.4) 88%					**CRYSTALLINE ROCK** GRAY AND WHITE, HARD TO VERY HARD, SLIGHTLY TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=97% RQD=82% RMR=67 *(continued)*	
	707.4	40.6	5.0	2:57/1.0 2:39/1.0 3:03/1.0 3:10/1.0 3:15/1.0	(5.0) 100%	(4.0) 80%						
705												
	702.4	45.6	5.0	3:06/1.0 2:41/1.0 3:10/1.0 3:01/1.0 2:47/1.0	(4.7) 94%	(4.1) 82%						
700												
	697.4	50.6									697.4	50.6
											Boring Terminated at Elevation 697.4 ft in CRYSTALLINE ROCK (META-GRANITE)	

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B26A_RL	**STATION** 416+97	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.0 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 870,617	**EASTING** 1,746,278	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/13/12	**COMP. DATE** 09/14/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750										747.0 GROUND SURFACE	0.0
745	743.8	3.2	3	3	4	7		M		**ALLUVIAL** BROWN, SILTY CLAY	
740	738.8	8.2	3	2	3	5		Sat.		741.5 GRAY, SILTY SAND	5.5
735	733.8	13.2	2	1	1	2		Sat.		735.0 GRAY, COARSE SAND WITH GRAVEL	12.0
730	728.8	18.2	3	2	3	5		Sat.			
725	723.8	23.2	1	1	11	12		Sat.		722.8	24.2
720	718.8	28.2	50	50/0.2		100/0.7				721.3 **RESIDUAL** BROWN, SAPROLITIC, SILTY SAND	25.7
715	713.8	33.2	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
710										713.8 **CRYSTALLINE ROCK** GRAY, WHITE, AND ORANGE, HARD TO VERY HARD, FRESH TO SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=92% RQD=58% RMR=56	33.2
705							RS-90				
700							RS-91			696.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 696.0 ft in CRYSTALLINE ROCK (META-GRANITE)	51.0

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Mohs, N. D.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B26A_RL	**STATION** 416+97	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.0 ft	**TOTAL DEPTH** 51.0 ft	**NORTHING** 870,617	**EASTING** 1,746,278	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/13/12	**COMP. DATE** 09/14/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ-2	**TOTAL RUN** 17.8 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)
713.8											Begin Coring @ 33.2 ft	
	713.8	33.2	2.8	2:39/0.8 4:45/1.0 5:16/1.0	(2.6) 93%	(1.4) 50%		(16.2) 91%	(10.2) 57%		713.8 **CRYSTALLINE ROCK** GRAY, WHITE, AND ORANGE, HARD TO VERY HARD, FRESH TO SLIGHTLY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=92% RQD=58% RMR=56	33.2
710	711.0	36.0	5.0	3:28/1.0 3:25/1.0 2:31/1.0 4:00/1.0 3:59/1.0	(3.6) 72%	(0.6) 12%						
705	706.0	41.0	5.0	3:22/1.0 4:20/1.0 4:01/1.0 5:15/1.0 5:35/1.0	(5.0) 100%	(4.1) 82%	RS-90					
700	701.0	46.0	5.0	4:20/1.0 2:53/1.0 5:07/1.0 5:30/1.0 4:57/1.0	(5.0) 100%	(4.1) 82%	RS-91					
	696.0	51.0									696.0 Boring Terminated with Standard Penetration Test Refusal at Elevation 696.0 ft in CRYSTALLINE ROCK (META-GRANITE)	51.0

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. B26B_RL	**STATION** 416+60	**OFFSET** 68 ft RT	**ALIGNMENT** -L- / **0 HR.** N/A
COLLAR ELEV. 746.7 ft	**TOTAL DEPTH** 33.4 ft	**NORTHING** 870,556	**EASTING** 1,746,257 / **24 HR.** 1.5
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/12/12	**COMP. DATE** 09/12/12	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
750										
										746.7 GROUND SURFACE 0.0
745										**ALLUVIAL** TAN-BROWN AND GRAY, SILTY CLAY WITH ROOTS
	743.4	3.3	3	2	2	4		W		740.9 5.8
740										GRAY, SANDY SILT
	738.4	8.3	1	1	1	2		W		732.9 13.8
735										GRAY, COARSE SAND WITH GRAVEL
	733.4	13.3	1	3	3	6		W		
730										
	728.4	18.3	1	2	1	3		W		723.7 23.0
725										**RESIDUAL** TAN-BROWN AND BLACK, MICACEOUS, SAPROLITIC, SANDY SILT
	723.4	23.3	12	22	20	42		W		720.0 26.7
720										**WEATHERED ROCK** (META-GRANITE)
	718.4	28.3	100/0.3			100/0.3				
715										
	713.4	33.3	60/0.1			60/0.1				713.4 33.3 / 713.3 33.4 **CRYSTALLINE ROCK** (META-GRANITE) Boring Terminated with Standard Penetration Test Refusal at Elevation 713.3 ft in CRYSTALLINE ROCK (META-GRANITE)

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B27A_RL	**STATION** 418+02	**OFFSET** 23 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 745.4 ft	**TOTAL DEPTH** 28.6 ft	**NORTHING** 870,636	**EASTING** 1,746,380	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/17/12	**COMP. DATE** 09/17/12		**SURFACE WATER DEPTH** 0.0ft

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
750										
745										745.4 WATER SURFACE (09/17/12) 0.0
										ALLUVIAL GRAY, SILTY CLAY WITH SOME ROOTS
	741.9	3.5	WOH	WOH	WOH	0		W		741.4 4.0
740										GRAY, SILTY SAND WITH PIECES OF WOOD
	736.9	8.5	1	2	2	4		W		
735										
	731.9	13.5	1	1	3	4		W		
730										
	726.9	18.5	6	94/0.2		100/0.7				726.9 18.5
725										**WEATHERED ROCK** (META-GRANITE)
	721.9	23.5	100/0.2			100/0.2				
720										
	716.9	28.5	60/0.1			60/0.1				716.9 28.5 716.8 28.6
										CRYSTALLINE ROCK (META-GRANITE)
										Boring Terminated with Standard Penetration Test Refusal at Elevation 716.8 ft in CRYSTALLINE ROCK (META-GRANITE)

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B27B_RL	**STATION** 417+75	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.2 ft	**TOTAL DEPTH** 37.0 ft	**NORTHING** 870,587	**EASTING** 1,746,365	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
750											
										747.2 GROUND SURFACE	0.0
745										**ALLUVIAL** GRAY, SILTY CLAY	
	743.7	3.5	WOH	1	1	2		W			
740	738.7	8.5	WOH	2	2	4		W			
735	733.7	13.5	1	2	4	6		W		736.2	11.0
										TAN-BROWN, SILTY SAND WITH SOME GRAVEL AND WOOD	
730	728.7	18.5	30	70/0.3		100/0.3				729.7	17.5
725	725.2	22.0	60/0.0			60/0.0				**WEATHERED ROCK** (META-GRANITE)	
										725.2	22.0
720							RS-38			724.2	23.0
										723.2	24.0
715							RS-39			**CRYSTALLINE ROCK** WHITE AND BROWN, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=0% RMR=70	
										WEATHERED ROCK (META-GRANITE)	
										CRYSTALLINE ROCK BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=93% RMR=70	
										710.2	37.0
										Boring Terminated at Elevation 710.2 ft in CRYSTALLINE ROCK (META-GRANITE)	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B27B_RL	**STATION** 417+75	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 747.2 ft	**TOTAL DEPTH** 37.0 ft	**NORTHING** 870,587	**EASTING** 1,746,365	**24 HR.** 1.2
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**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)
~~725.2~~											Begin Coring @ 22.0 ft	
	725.2	22.0	5.0	2:00/1.0 0:52/1.0 2:04/1.0 1:51/1.0 2:14/1.0	(4.0) 80%	(3.0) 60%		(1.0) 100%	(0.0) 0%		725.2	
720	720.2	27.0	5.0	2:14/1.0 2:23/1.0 2:26/1.0 2:32/1.0 2:11/1.0	(5.0) 100%	(4.7) 94%	RS-38	(0.0) 0% (13.0) 100%	(12.1) 93%		**CRYSTALLINE ROCK** WHITE AND BROWN, MEDIUM HARD TO HARD, FRESH TO MODERATELY SEVERELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=0% RMR=70	724.2 22.0 723.2 24.0
715	715.2	32.0	5.0	2:28/1.0 2:01/1.0 2:16/1.0 2:45/1.0 2:55/1.0	(5.0) 100%	(4.4) 88%	RS-39				**WEATHERED ROCK** (META-GRANITE)	
	710.2	37.0									**CRYSTALLINE ROCK** BLACK AND WHITE, HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=100% RQD=93% RMR=70	710.2 37.0
											Boring Terminated at Elevation 710.2 ft in CRYSTALLINE ROCK (META-GRANITE)	

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B28A_RL	**STATION** 419+09	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.0 ft	**TOTAL DEPTH** 42.2 ft	**NORTHING** 870,666	**EASTING** 1,746,482	**24 HR.** 2.4
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
750										
										748.0 GROUND SURFACE 0.0
										ALLUVIAL BROWN, SANDY SILT
745	744.5	3.5	1	0	0	0		M		
740	739.5	8.5	8	11	14	25		W		741.5 6.5
										RESIDUAL BLACK-BROWN-WHITE, SAPROLITIC, SILTY SAND
735	734.5	13.5	100/0.4			100/0.4				736.5 11.5
730	729.5	18.5	100/0.2			100/0.2				**WEATHERED ROCK** (META-GRANITE)
	727.8	20.2	60/0.0			60/0.0				727.8 20.2
725										**CRYSTALLINE ROCK** BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=92% RQD=81% RMR=58
720							RS-96			
715							RS-97			
710										705.8 42.2
										Boring Terminated at Elevation 705.8 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B28A_RL	**STATION** 419+09	**OFFSET** 15 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 748.0 ft	**TOTAL DEPTH** 42.2 ft	**NORTHING** 870,666	**EASTING** 1,746,482	**24 HR.** 2.4
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** Mud Rotary	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ2	**TOTAL RUN** 22.0 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
727.8											ELEV. (ft) DEPTH (ft)
	727.8	20.2	2.0	1:54/1.0	(1.8)	(1.8)		(20.2)	(17.9)		Begin Coring @ 20.2 ft
	725.8	22.2		1:36/1.0	90%	90%		92%	81%		727.8 **CRYSTALLINE ROCK** 20.2
725			5.0	1:44/1.0	(5.0)	(4.5)					BLACK AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE
				1:50/1.0	100%	90%					REC=92%
				2:03/1.0							RQD=81%
				1:46/1.0			RS-96				RMR=58
	720.8	27.2		2:04/1.0							
720			5.0	1:30/1.0	(4.8)	(3.9)					
				1:50/1.0	96%	78%					
				1:25/1.0							
				2:03/1.0							
	715.8	32.2		2:02/1.0							
715			5.0	1:18/1.0	(3.6)	(2.7)	RS-97				
				1:21/1.0	72%	54%					
				1:11/1.0							
				0:50/1.0							
	710.8	37.2		1:36/1.0							
710			5.0	1:50/1.0	(5.0)	(5.0)					
				1:40/1.0	100%	100%					
				2:08/1.0							
				2:05/1.0							
	705.8	42.2		2:03/1.0							705.8 42.2
											Boring Terminated at Elevation 705.8 ft in CRYSTALLINE ROCK (META-GRANITE)

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Milkovits, J. I.	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B28B_RL	**STATION** 418+79	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 752.6 ft	**TOTAL DEPTH** 13.1 ft	**NORTHING** 870,609	**EASTING** 1,746,464	**24 HR.** 7.0
DRILL RIG/HAMMER EFF./DATE TRI0472 CME-850 67% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/19/12	**COMP. DATE** 09/19/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
755											
										752.6 GROUND SURFACE	0.0
										RESIDUAL BROWN-BLACK, SAPROLITIC, SILTY SAND	
750	749.1	3.5	10	19	31	50		M			
										746.1	6.5
745	744.1	8.5	42	58/0.4		100/0.9				**WEATHERED ROCK** (META-GRANITE)	
740	739.5	13.1	60/0.0			60/0.0				739.5	13.1
										Boring Terminated with Standard Penetration Test Refusal at Elevation 739.5 ft on CRYSTALLINE ROCK (META-GRANITE)	

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B29A_RL	**STATION** 420+19	**OFFSET** 14 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 762.5 ft	**TOTAL DEPTH** 13.2 ft	**NORTHING** 870,685	**EASTING** 1,746,590	**24 HR.** Dry
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/26/12	**COMP. DATE** 09/26/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
765										
	762.5	0.0								762.5 GROUND SURFACE 0.0
			1	3	4	7		D		**RESIDUAL**
760	759.3	3.2	6	5	14	19		D		760.5 RED-ORANGE, SANDY SILT WITH TRACE ORGANICS 2.0
										TAN AND WHITE, SILTY SAND
755	754.3	8.2	60/0.1			60/0.1				755.5 7.0
										754.3 **WEATHERED ROCK** (META-GRANITE) 8.2
750	749.3	13.2	60/0.0			60/0.0				**CRYSTALLINE ROCK** (META-GRANITE)
										749.3 13.2
										Boring Terminated with Standard Penetration Test Refusal at Elevation 749.3 ft in CRYSTALLINE ROCK (META-GRANITE)

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WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B29B_RL	**STATION** 419+96	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** 19.6
COLLAR ELEV. 765.2 ft	**TOTAL DEPTH** 35.3 ft	**NORTHING** 870,629	**EASTING** 1,746,576	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/27/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
770										
765	765.2	0.0	2	10	8	18		D		765.2 GROUND SURFACE 0.0
	761.8	3.4								**RESIDUAL** BROWN AND GRAY, SILTY SAND WITH TRACE ORGANICS 761.8 3.4
760			63	37/0.2		100/0.7				**WEATHERED ROCK** (META-GRANITE)
	756.8	8.4								
755			25	56	44	100/1.0				
	751.8	13.4								
750	750.6	14.6	100/0.5			100/0.5				750.6 14.6
			60/0.0			60/0.0				**CRYSTALLINE ROCK** BLACK, GRAY, AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE REC=80% RQD=46% RMR=50
745										
740							RS-53			
735										
730							RS-54			729.9 35.3
										Boring Terminated at Elevation 729.9 ft in CRYSTALLINE ROCK (META-GRANITE)

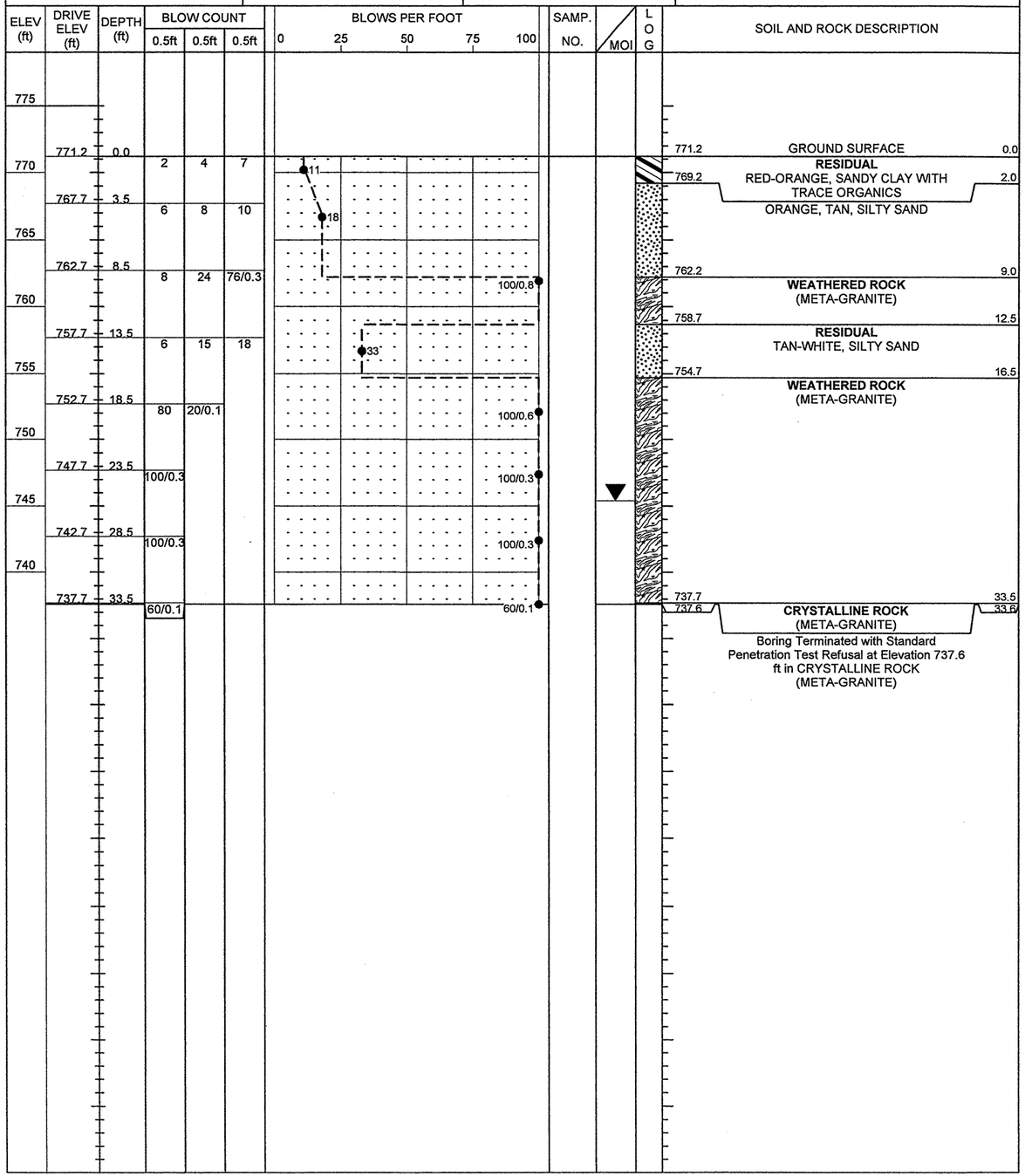
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist	
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)				**GROUND WTR (ft)**
BORING NO. B29B_RL	**STATION** 419+96	**OFFSET** 67 ft RT	**ALIGNMENT** -L-	**0 HR.** 19.6
COLLAR ELEV. 765.2 ft	**TOTAL DEPTH** 35.3 ft	**NORTHING** 870,629	**EASTING** 1,746,576	**24 HR.** N/A
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 09/27/12	**COMP. DATE** 09/27/12	**SURFACE WATER DEPTH** N/A	
CORE SIZE NQ	**TOTAL RUN** 20.7 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)
750.6											Begin Coring @ 14.6 ft
750	750.6	14.6	0.7	1:15/0.7	(0.5)	(0.0)		(16.5)	(9.5)		750.6 **CRYSTALLINE ROCK** 14.6
	749.9	15.3	5.0	1:15/1.0	71%	0%		80%	46%		BLACK, GRAY, AND WHITE, MEDIUM HARD TO HARD, FRESH TO MODERATELY WEATHERED, CLOSELY TO MODERATELY CLOSELY FRACTURED, META-GRANITE
				1:30/1.0							REC=80%
				2:00/1.0	(2.7)	(0.0)					RQD=46%
				1:15/1.0	54%	0%					RMR=50
745	744.9	20.3		1:45/1.0							
			5.0	1:45/1.0	(3.4)	(1.3)					
				1:00/1.0	68%	26%					
				1:30/1.0							
				1:15/1.0							
740	739.9	25.3		2:00/1.0							
			5.0	1:30/1.0	(4.9)	(3.7)					
				1:45/1.0	98%	74%					
				2:00/1.0			RS-53				
				1:45/1.0							
735	734.9	30.3		1:45/1.0							
			5.0	1:45/1.0	(5.0)	(4.5)					
				1:45/1.0	100%	90%					
				2:00/1.0							
				2:00/1.0			RS-54				
730	729.9	35.3		2:00/1.0							729.9 35.3
											Boring Terminated at Elevation 729.9 ft in CRYSTALLINE ROCK (META-GRANITE)

NCDOT BORE DOUBLE U2524C_GEO_BH_RT.GPJ NC_DOT.GDT 2/8/13

WBS 34820.1.2	**TIP** U-2524C	**COUNTY** GUILFORD	**GEOLOGIST** Contract Geologist
SITE DESCRIPTION STRUCTURE NOS. 3 & 4 ON -L- (GREENSBORO LOOP) OVER HORSEPEN CREEK AND -Y4- (US 220)			**GROUND WTR (ft)**
BORING NO. EB2B_RL	**STATION** 421+41	**OFFSET** 75 ft RT	**ALIGNMENT** -L- **0 HR.** 25.2
COLLAR ELEV. 771.2 ft	**TOTAL DEPTH** 33.6 ft	**NORTHING** 870,639	**EASTING** 1,746,716 **24 HR.** 25.8
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic
DRILLER Contract Driller	**START DATE** 09/25/12	**COMP. DATE** 09/25/12	**SURFACE WATER DEPTH** N/A



CORE PHOTOGRAPHS

B2-A_RL

BOXES 1 & 2: 44.8 - 56.8 FEET

0 1 2
FEET

B3-B_RL

BOXES 1 & 2: 53.3 - 65.7 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B5A-B_RL

BOXES 1 & 2: 32.7 - 60.7 FEET

0 1 2
FEET

B6-B_RL

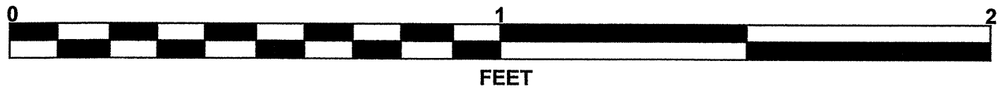
BOXES 1 & 2: 57.7 - 70.6 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

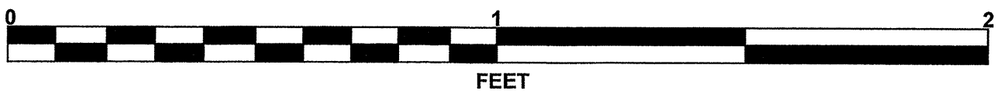
B7-B_RL

BOXES 1 & 2: 37.4- 60.4 FEET



B8-A_RL

BOXES 1 & 2: 43.0 - 60.0 FEET



CORE PHOTOGRAPHS

B9-B_RL

BOXES 1 - 3: 46.5- 69.8 FEET

0 1 2

FEET

B10-A_RL

BOXES 1 & 2: 42.0 - 65.0 FEET

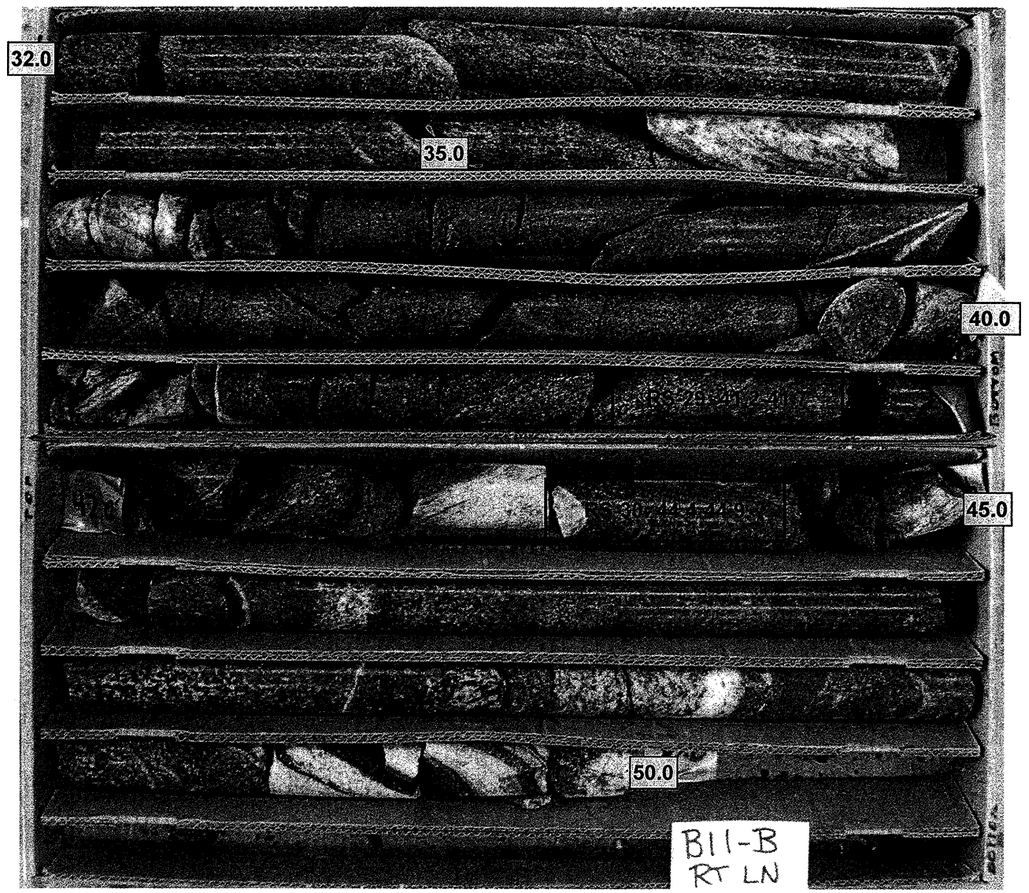
0 1 2

FEET

CORE PHOTOGRAPHS

B11-B_RL

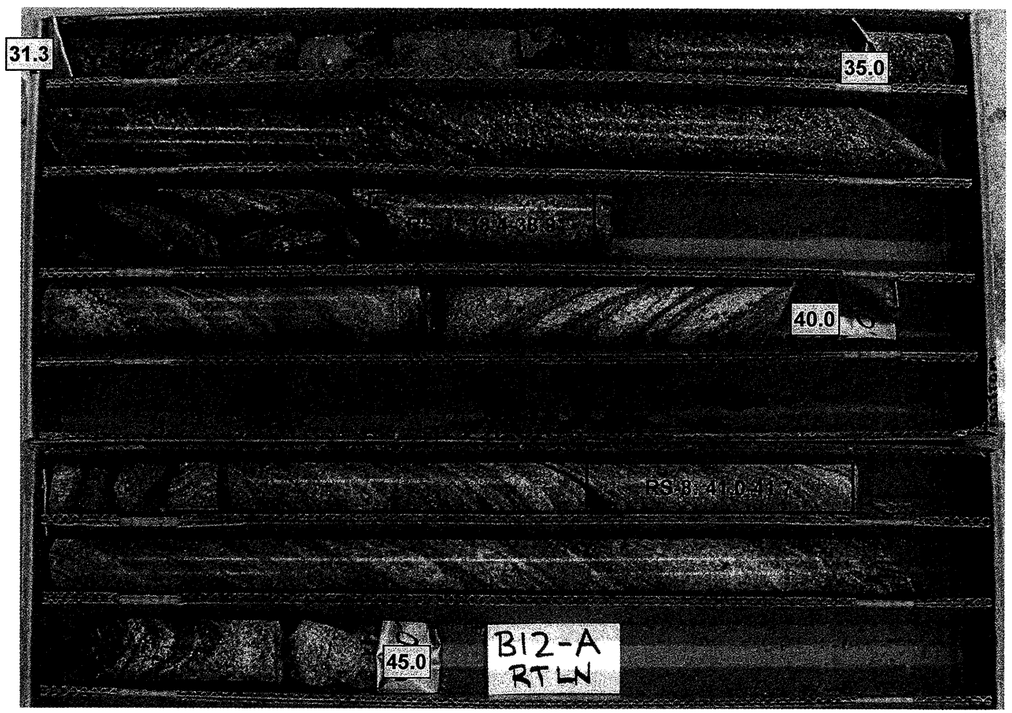
BOXES 1 & 2: 32.0- 50.0 FEET



0 1 2
FEET

B12-A_RL

BOXES 1 & 2: 31.3 - 45.0 FEET



0 1 2
FEET

CORE PHOTOGRAPHS

B14-A_RL

BOXES 1 & 2: 36.0- 50.3 FEET

0 1 2

FEET

B15-B_RL

BOXES 1 & 2: 29.0 - 44.0 FEET

0 1 2

FEET

CORE PHOTOGRAPHS

B16-A_RL

BOXES 1 & 2: 26.2- 41.2 FEET

0 1 2
FEET

B17-B_RL

BOXES 1 & 2: 22.7 - 37.7 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

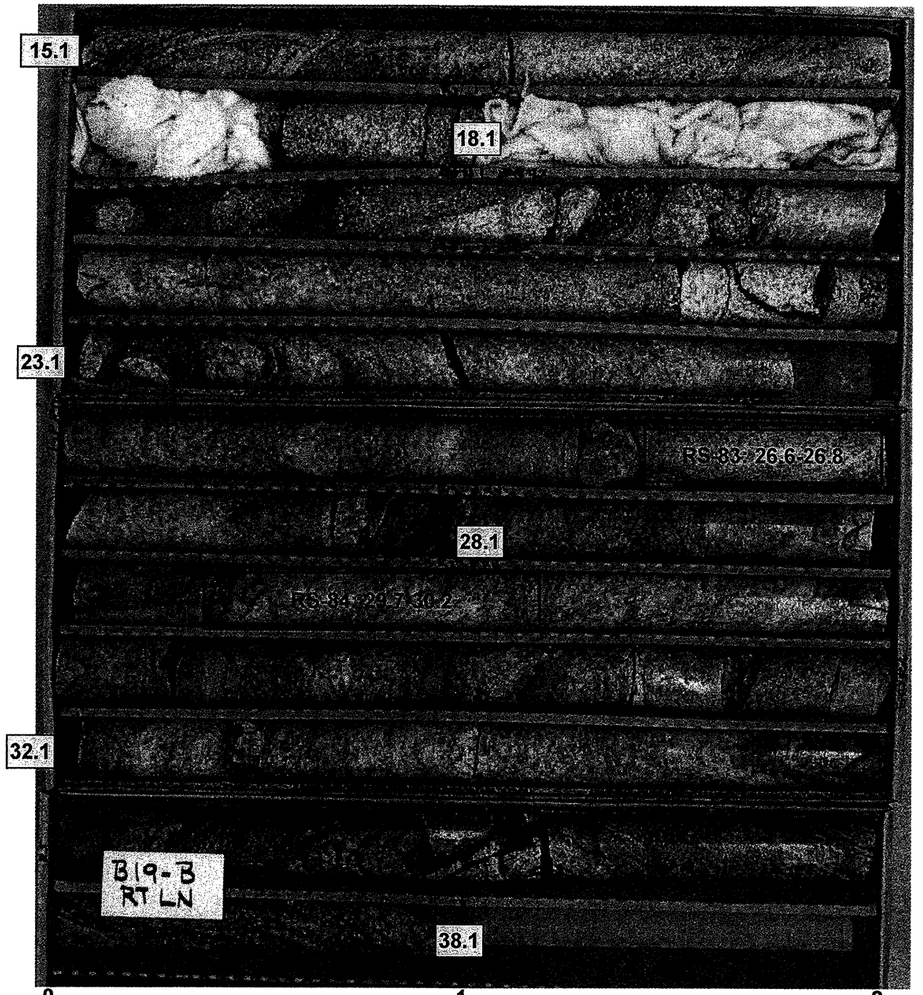
B18-A_RL

BOXES 1 & 2: 31.0- 46.0 FEET

0 1 2
FEET

B19-B_RL

BOXES 1 - 3: 15.1 - 38.1 FEET



0 1 2
FEET

CORE PHOTOGRAPHS

B20-A_RL

BOXES 1 & 2: 20.5- 35.5 FEET

0 1 2
FEET

B21-B_RL

BOXES 1 & 2: 11.5 - 31.5 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B22-A_RL

BOXES 1 & 2: 5.0- 24.8 FEET

0 1 2
FEET

B25-B_RL

BOXES 1 & 2: 39.0 - 50.6 FEET

0 1 2
FEET

CORE PHOTOGRAPHS

B26-A_RL

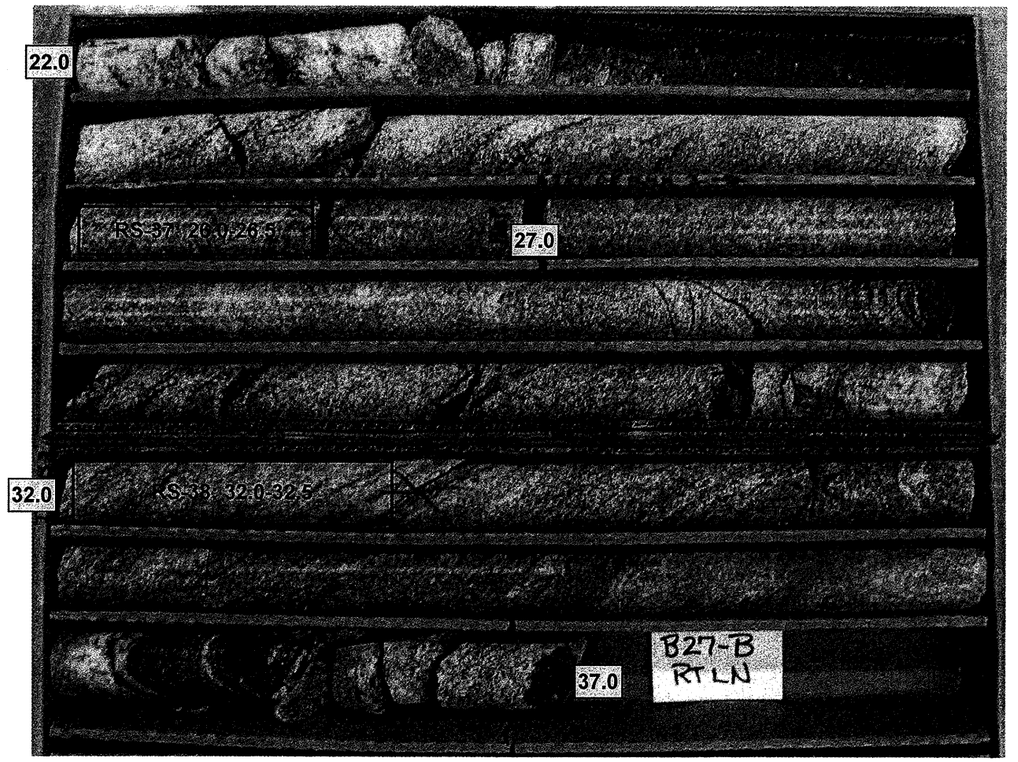
BOXES 1 & 2: 33.2- 51.0 FEET

0 1 2

FEET

B27-B_RL

BOXES 1 & 2: 22.0 - 37.0 FEET



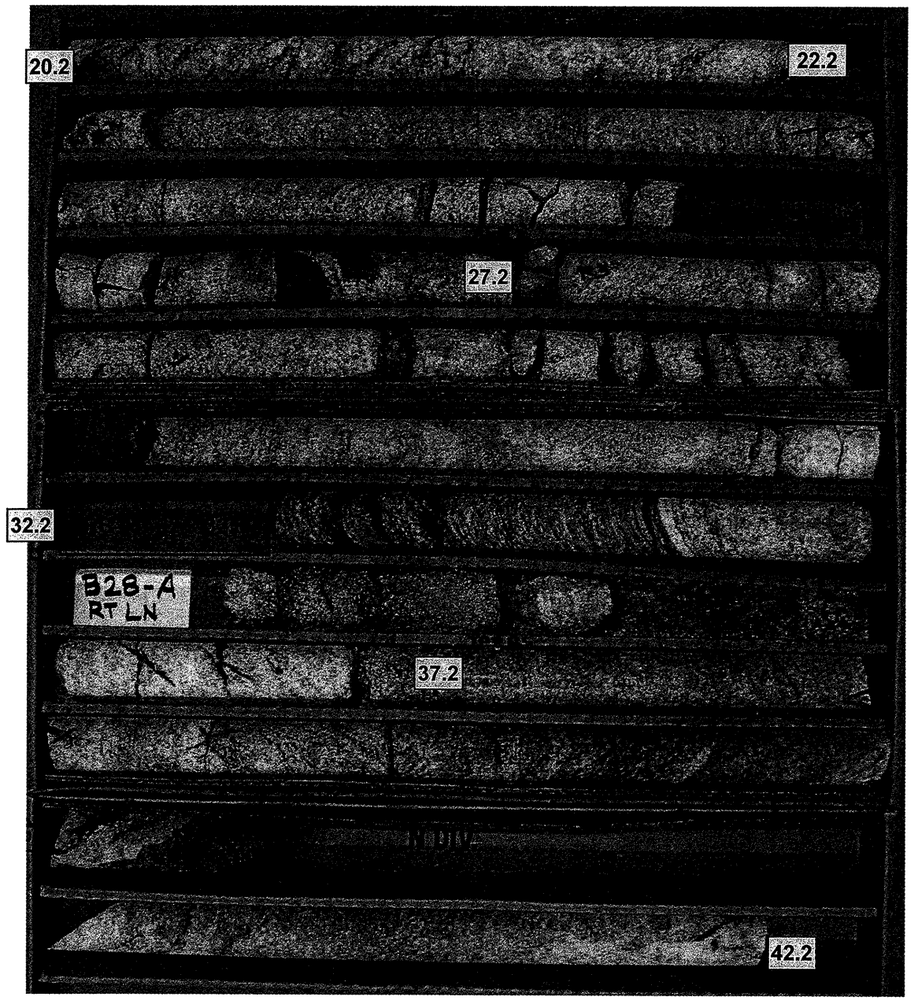
0 1 2

FEET

CORE PHOTOGRAPHS

B28-A_RL

BOXES 1 - 3: 20.2- 42.2 FEET



0 1 2

FEET

B29-B_RL

BOXES 1 & 2: 14.6 - 35.3 FEET

0 1 2

FEET

ROCK CORE TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	H/D RATIO	UNIT WT lbs/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	Sec. Mod. @ 40% Mpsi
RS-1	B3B_LL	382+77	16' LT	51.7-52.1	1.96	175.5	43000	13.853	13.82	5.35
RS-2	B3B_LL	382+77	16' LT	53.8-54.2	1.99	172.6	28600	9.232	9.24	4.82
RS-3	B14A_RL	396+91	17' RT	39.0-39.5	1.98	165.3	57000	20.91	20.9	0.574
RS-4	B14A_RL	396+91	17' RT	41.7-42.3	2	168.9	24900	9.204	9.2	3.77
RS-5	B2A_RL	381+25	16' RT	48.2-48.7	2	171.4	42100	13.590	13.6	6.81
RS-6	B2A_RL	381+25	16' RT	51.8-52.3	2	168.4	42500	13.72	13.72	5.07
RS-7	B12A_RL	394+33	16' RT	38.4-38.9	1.99	163.1	14720	5.412	5.41	1.506
RS-8	B12A_RL	394+33	16' RT	41.0-41.7	2.0	163.6	15080	5.574	5.57	0.82
RS-9	B8A_RL	389+17	16' RT	49.1-49.6	1.99	163.5	23400	8.557	8.54	2.62
RS-10	B8A_RL	389+17	16' RT	52.2-52.9	2	165.9	43300	15.833	15.82	6.65
RS-11	B6B_RL	386+81	66' RT	62.8-63.6	1.99	200.1	29800	9.639	9.63	16.51
RS-12	B6B_RL	386+61	66' RT	65.0-65.6	2	152.6	28100	9.089	9.08	8.46
RS-13	B25B_RL	413+99	122' RT	41.3-41.9	1.97	166.4	29400	10.751	10.73	3.96
RS-14	B25B_RL	413+99	122' RT	45.6-46.0	1.97	164.0	27900	10.224	10.19	4.27
RS-15	B25A_LL	415+12	101' LT	23.5-23.9	1.95	164	36000	1.95	7.82	1.178
RS-16	B25A_LL	415+12	101' LT	27.0-27.5	1.98	163.0	33200	12.166	12.16	3.09
RS-17	B5A-B_RL	384+83	68' RT	33.3-33.8	1.97	161.9	51000	16.53	16.49	3.11
RS-18	B5A-B_RL	384+83	68' RT	57.8-58.2	2	169.3	25000	8.095	8.1	2.6
RS-19	B2A_LL	381+57	66' LT	26.8-27.2	2	151.5	5500	2.018	2.02	0.0669
RS-20	B2A_LL	381+57	66' LT	32.3-32.7	1.96	163.3	45600	16.728	16.74	0.0769
RS-21	B24A_LL	413+34	93' LT	19.8-20.3	2	159.8	24100	8.841	8.83	0.665
RS-22	B24A_LL	413+34	93' LT	32.0-32.4	2	163.4	14330	5.257	5.26	0.459
RS-23	B7B_LL	387+88	66' RT	43.4-43.9	1.99	167.3	35100	11.365	11.35	4.29
RS-24	B7B_LL	387+88	66' RT	56.4-57.0	1.99	173.1	33000	10.685	10.69	3.28
RS-25	B3B_RL	382+26	68' RT	56.7-57.3	1.98	162.0	6410	2.071	2.07	0.716
RS-26	B3B_RL	382+26	68' RT	63.6-64.1	1.98	165	16960	5.491	5.49	2.06
RS-27	B9B_RL	390+46	72' RT	50.4-50.9	1.96	161.6	14800	5.435	5.42	0.856
RS-28	B9B_RL	390+46	72' RT	65.6-66.2	1.99	174.6	15090	5.542	5.54	4.08
RS-29	B11B_RL	393+04	72' RT	41.2-41.7	1.99	175.7	13990	5.16	5.16	0.498
RS-30	B11B_RL	393+04	72' RT	44.4-44.9	1.97	178.0	25900	9.512	9.48	4.44
RS-31	B10A_RL	391+75	16' RT	53.0-53.5	2	158.5	4900	1.813	1.812	0.1907
RS-32	B10A_RL	391+75	16' RT	42.2-42.7	1.97	155.8	8650.0	3.18	3.17	0.1927
RS-33	B11B_LL	393+04	16' LT	38.5-39.0	1.81	156.8	10240	3.826	3.78	0.225
RS-34	B11B_LL	393+04	16' LT	45.1-45.7	1.99	157.0	13570	4.973	4.97	0.297
RS-35	B12A_LL	394+33	78' LT	63.6-64.0	1.98	162.7	24300	8.943	8.91	3.13
RS-36	B12A_LL	394+33	78' LT	65.6-66.1	1.95	162.2	21800	8.049	8.03	3.69
RS-37	B27B_RL	417+75	67' RT	26.0-26.5	1.96	164.9	13470	4.379	4.37	1.6
RS-38	B27B_RL	417+75	67' RT	32.0-32.5	1.99	162.8	25700	8.355	8.36	1.946
RS-39	B5B_LL	384+38	18' LT	46.6-47.0	1.81	165.8	12970	4.204	4.15	1.197
RS-40	B5B_LL	384+38	18' LT	52.3-52.8	1.98	165.7	20000	6.443	6.43	3.53
RS-41	B4A_LL	383+97	77' LT	54.4-54.9	1.97	165.2	26900	8.666	8.66	5.55
RS-42	B4A_LL	383+97	77' LT	57.2-57.7	1.56	208.0	31100	10.019	9.99	5.63
RS-43	B7B_LL	387+95	11' LT	59.9-60.4	1.96	162.2	9310	3.426	3.42	0.322
RS-44	B7B_LL	387+95	11' LT	71.9-72.4	2	1.97	17810.0	6.555	6.55	7.95
RS-45	B10A_LL	391+75	78' LT	45.5-46.0	2	162.4	27100	9.974	9.99	3.38
RS-46	B10A_LL	391+75	78' LT	50.3-50.9	2	169.5	5960.0	2.193	2.19	0.232
RS-47	B9B_LL	390+46	16' LT	44.8-45.3	1.97	163.1	26100	9.606	9.58	2.74
RS-48	B9B_LL	390+46	16' LT	64.4-64.8	2	175.5	22600	8.317	8.3	6.17
RS-49	B16A_RL	399+28	17' RT	28.6-29.2	1.98	164.5	26100	8.434	8.42	1.99
RS-50	B16A_RL	399+28	17' RT	36.8-37.2	1.98	176.0	24400	7.885	7.89	4.04

ROCK CORE TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION	DEPTH INTERVAL	H/D RATIO	UNIT WT lbs/ft3	Ultimate lbf	Ultimate ksi	Ultimate (corrected) ksi	Sec. Mod. @ 40% Mpsi
RS-51	B18A_RL	401+68	16' RT	36.5-37.0	1.97	167.9	38500	12.416	12.4	4.61
RS-51	B18A_RL	401+68	16' RT	40.2-40.7	1.96	175.8	33700	10.923	10.89	3.7
RS-53	B29B_RL	419+96	67' RT	27.3-27.8	1.96	160.2	24100	7.923	7.9	0.838
RS-54	B29B_RL	419+96	67' RT	33.4-33.9	1.97	167.2	12580	4.136	4.13	1.016
RS-55	B15B_RL	398+10	99' RT	37.2-37.7	1.95	172.1	35300	11.407	11.36	3.7
RS-56	B15B_RL	398+10	99' RT	38.1-38.6	2	1.93	28400	9.177	9.14	1.413
RS-57	B4B_LL	383+61	29' RT	45.1-45.8	1.95	164.1	39600	12.796	10.9	5.25
RS-58	B4B_LL	383+61	29' RT	50.9-51.5	2	163.5	33100	10.696	10.19	4.75
RS-59	B17B_LL	400+48	16' LT	35.2-35.8	1.99	171.6	33800	10.90	12.43	5.37
RS-60	B17B_LL	400+48	16' LT	37.2-37.7	1.99	171.5	31600	10.191	11.9	4.67
RS-61	B23B_LL	411+23	16' LT	17.2-17.7	1.99	162.9	33800	12.439	12.43	3.48
RS-62	B23B_LL	411+23	16' LT	22.7-23.2	2.05	177.9	32100	11.852	11.9	3.76
RS-63	B22A_LL	409+03	66' LT	18.0-18.7	2.05	173.9	27900	10.301	10.34	4.92
RS-64	B22A_LL	409+03	66' LT	23.7-24.3	2.05	185.9	27500	10.154	10.2	4.24
RS-65	B19B_RL	402+88	66' RT	21.7-22.3	2	161.2	31500	10.23	10.23	1.69
RS-66	B19B_RL	402+88	66' RT	29.3-29.9	2	163.7	41000	13.316	13.32	3.39
RS-67	B22A_RL	409+03	16' RT	8.0-8.5	2.04	152.9	6880	2.535	2.54	0.1336
RS-68	B22A_RL	409+03	16' RT	20.0-20.8	2.01	166.6	13640	5.025	5.03	2.25
RS-69	B16A_LL	399+28	61' LT	28.2-28.8	2	163.1	17720	5.72	5.72	2.28
RS-70	B16A_LL	399+28	61' LT	47.7-48.2	2.01	176.3	28000	9.039	9.06	4.98
RS-71	B1B_LL	380+40	25' LT	37.1-37.7	2	170.1	20700	6.682	6.69	4.2
RS-72	B1B_LL	380+40	25' LT	44.5-45.0	1.99	169.6	16340	5.275	5.27	1.916
RS-73	B29B_LL	420+45	32' LT	34.7-35.1	1.98	169.2	16470	5.349	5.34	0.985
RS-74	B29B_LL	420+45	32' LT	44.3-44.8	1.98	178.7	33800	10.977	10.97	2.83
RS-75	B20A_LL	404+08	66' LT	27.0-27.4	1.99	173.9	40300	13.088	13.08	2.53
RS-76	B20A_LL	404+08	66' LT	33.3-33.8	1.97	172.3	24700	8.022	8.01	4.5
RS-77	B20A_RL	404+08	16' RT	24.5-25.1	1.98	163.1	57000	18.419	18.38	3.42
RS-78	B20A_RL	404+08	16' RT	31.8-32.5	2	166.3	26100	8.434	8.42	3.55
RS-79	B21B-LL	406+28	16' LT	35.5-36.0	2	166	17340	5.643	5.64	1.32
RS-80	B21B-LL	406+28	16' LT	41.0-41.5	1.98	163.5	45900	14.832	14.81	3.6
RS-81	B21B_RL	406+28	66' RT	20.5-21.1	2.02	163.0	38400	12.409	12.43	2.61
RS-82	B21B_RL	406+28	66' RT	25.5-26.1	2.02	164.4	33100	10.75	10.75	2.83
RS-83	B19B_LL	402+88	16' LT	26.3-26.8	2	171.7	29700	9.646	9.64	3.45
RS-84	B19B_LL	402+88	16' LT	29.7-30.2	2.2	170.1	28300	9.191	9.2	3.15
RS-85	B17B_RL	400+48	66' RT	25.5-26.0	2.19	172.6	8020	2.945	2.98	2.67
RS-86	B17B_RL	400+48	66' RT	34.0-34.5	2.06	161.5	22900	7.445	7.47	1.009
RS-87	B14A_LL	396+91	78' LT	61.9-62.4	2.06	163.8	17270	5.609	5.63	1.019
RS-88	B14A_LL	396+91	78' LT	63.3-63.9	2.06	165.4	25900	8.412	8.44	4.6
RS-89	B13B-LL	395+62	16' LT	56.3-56.8	2.05	165.0	33400	10.880	10.91	6.79
RS-90	B26A_RL	416+97	15' RT	41.7-42.1	2.06	166.3	24100	7.827	7.85	2.66
RS-91	B26A_RL	416+97	15' RT	46.0-46.8	1.56	216.9	17270	5.609	5.63	1.019
RS-92	B18A_LL	401+68	66' LT	43.4-43.9	1.56	218.7	25900	8.412	8.44	4.6
RS-93	B18A_LL	401+68	66' LT	48.4-49.1	1.55	218.2	33400	10.88	10.91	6.79
RS-94	B27B_LL	418+25	16' LT	31.0-31.8	1.56	220.5	24100	7.827	7.85	2.66
RS-95	B27B_LL	418+25	16' LT	37.8-38.4	1.55	216.8	26300	8.576	8.59	1.431
RS-96	B28A_RL	419+09	15' RT	25.7-26.2	1.54	218.0	11250	3.71	3.73	0.445
RS-97	B28A_RL	419+09	15' RT	32.2-32.8	1.55	215.7	9630	3.159	3.18	0.208