STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34408.1.1 (R-2246B)	1	29

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34408.1.1 (R-2246B) F.A. PROJ. STP-(0005)46

COUNTY CABARRUS

PROJECT DESCRIPTION GEORGE LILES PARKWAY FROM SOUTH OF SR 1304 (ROBERTA ROAD) TO SR 1431 (WEDDINGTON ROAD)

SITE DESCRIPTION NOISE WALL
STA. 110+98.44 -L- to 140+99.70 -L-
RIGHT

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SHEET	DESCRIPTION
1	TITLE SHEET
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21	SOIL 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) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

PERSONNEL
J.E. ESTEP
M.R. MOORE

INVESTIGATED BY C.C. MURRAY
CHECKED BY C.B. LITTLE
SUBMITTED BY C.B. LITTLE
DATE JUNE 2011

NORTH CAROLINA LICENSED SEAL 11046 GEOLOGIST CLINTON B. LITTLE
6-29-11

DRAWN BY: J.K. McCLURE

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

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

PROJECT: 34408.1.1 ID: R-2246B

PROJECT REFERENCE NO.	SHEET NO.
34408.1.1 (R-2246B)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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

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

SOIL LEGEND AND AASHTO CLASSIFICATION

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

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT^2)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE 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

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

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

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

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

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. 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 (REC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

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

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

BENCH MARK:

ELEVATION: FT.

NOTES:

PROFILE STRATIGRAPHY THRU BORINGS.

REVISED 09/23/09

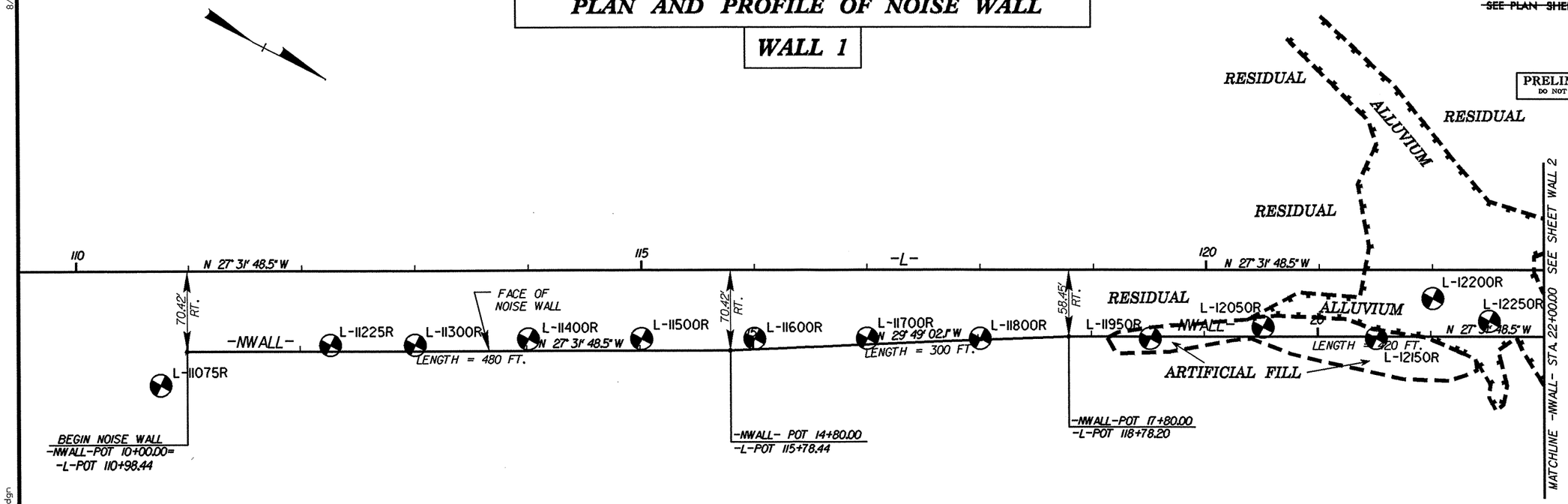
PROJECT REFERENCE NO.	SHEET NO.
R-2246B	3

~~SEE PLAN SHEETS 12 & 13~~

PLAN AND PROFILE OF NOISE WALL

WALL 1

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NOISE WALL DESIGN DATA																										
PANEL NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
TOP ELEVATION	626.0	626.0	628.0	628.0	630.0	630.0	632.0	632.0	634.0	634.0	636.0	636.0	638.0	638.0	640.0	640.0	642.0	642.0	643.0	643.0	644.0	644.0	645.0	645.0		
PANEL LENGTH	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50		

BORING DESCRIPTIONS

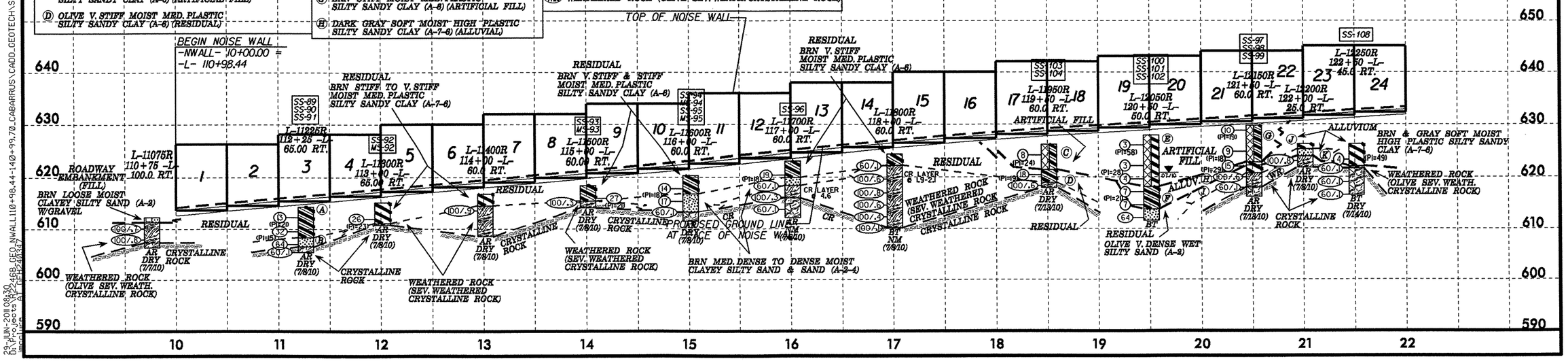
- (A) BRN STIFF TO HARD MOIST MED. TO LOW PLASTIC SILTY SANDY CLAY (A-6) (RESIDUAL)
- (B) BRN V. DENSE MOIST SILTY SAND (A-2-4) (RESIDUAL)
- (C) BRN MED. STIFF TO STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (ARTIFICIAL FILL)
- (D) OLIVE V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (RESIDUAL)

BORING DESCRIPTIONS

- (E) BRN SOFT MOIST TO WET HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (ARTIFICIAL FILL)
- (F) GRAY MED. STIFF WET MED. PLASTIC SILTY SANDY CLAY (A-6) (ALLUVIAL)
- (G) BRN STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-6) (ARTIFICIAL FILL)
- (H) DARK GRAY SOFT MOIST HIGH PLASTIC SILTY SANDY CLAY (A-7-6) (ALLUVIAL)

BORING DESCRIPTIONS

- (I) OLIVE STIFF MOIST SILTY SANDY CLAY (A-7-6) (RESIDUAL)
- (J) BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7) (ALLUVIAL)
- (K) OLIVE LOOSE MOIST CLAYEY SILTY SAND (A-2) (ALLUVIAL)
- (WR) WEATHERED ROCK (OLIVE, SEV. WEATH. CRYSTALLINE ROCK)



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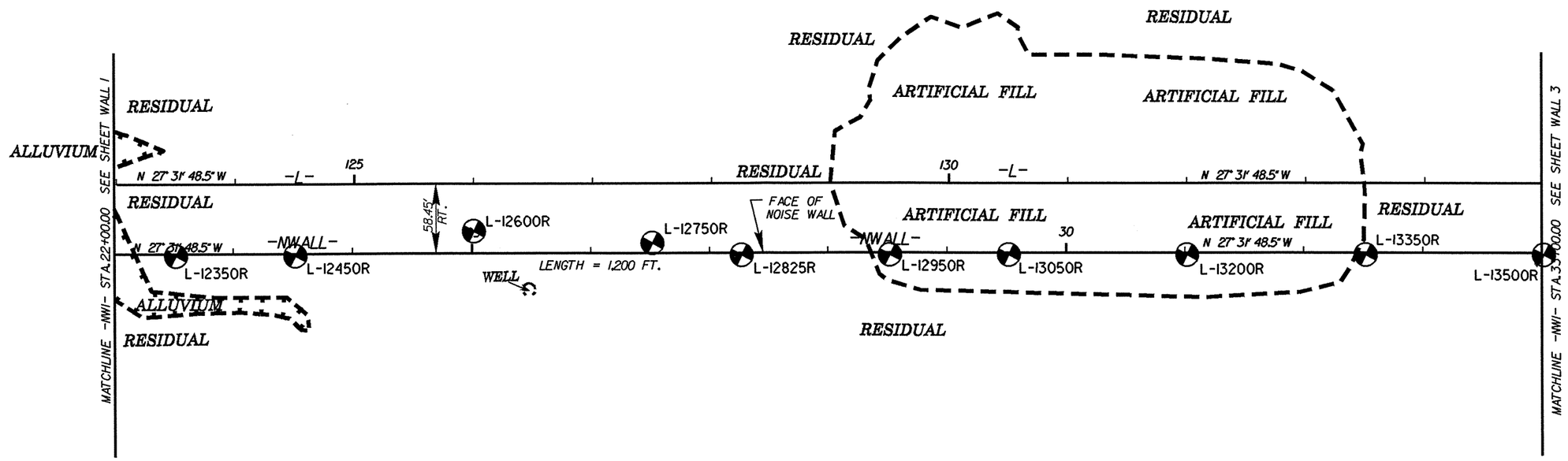
PROJECT REFERENCE NO.	SHEET NO.
R-2246B	4

~~SEE PLAN SHEETS 13 & 14~~

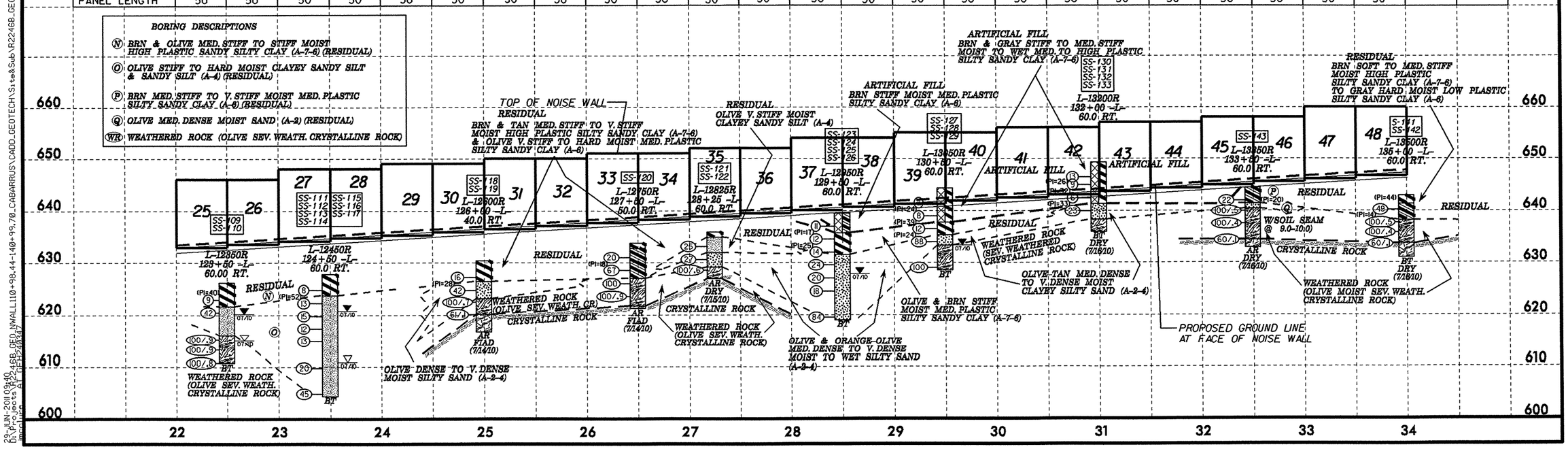
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLAN AND PROFILE OF NOISE WALL

WALL 2



NOISE WALL DESIGN DATA																								
PANEL NUMBER	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
TOP ELEVATION	646.0	646.0	648.0	6480	649.0	649.0	650.0	650.0	651.0	651.0	652.0	652.0	654.0	654.0	655.0	655.0	656.0	656.0	657.0	657.0	658.0	658.0	660.0	660.0
PANEL LENGTH	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50



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mcruice AT GEH24847

8/17/99

8/17/99

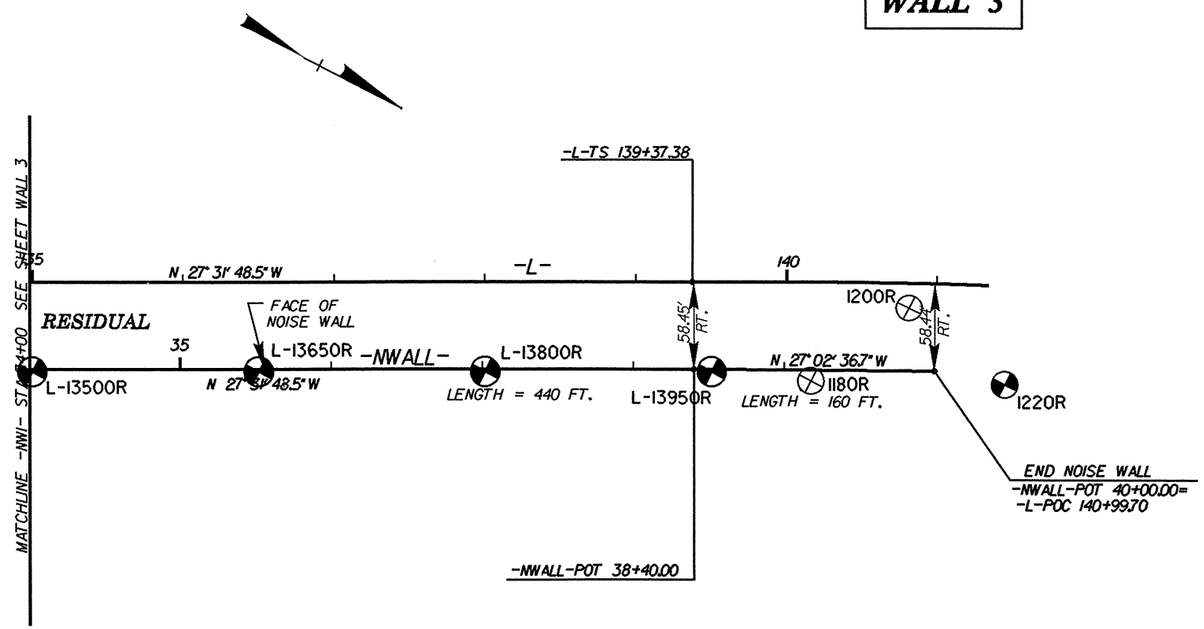
PROJECT REFERENCE NO.	SHEET NO.
R-2246B	5

~~SEE PLAN SHEET 14~~

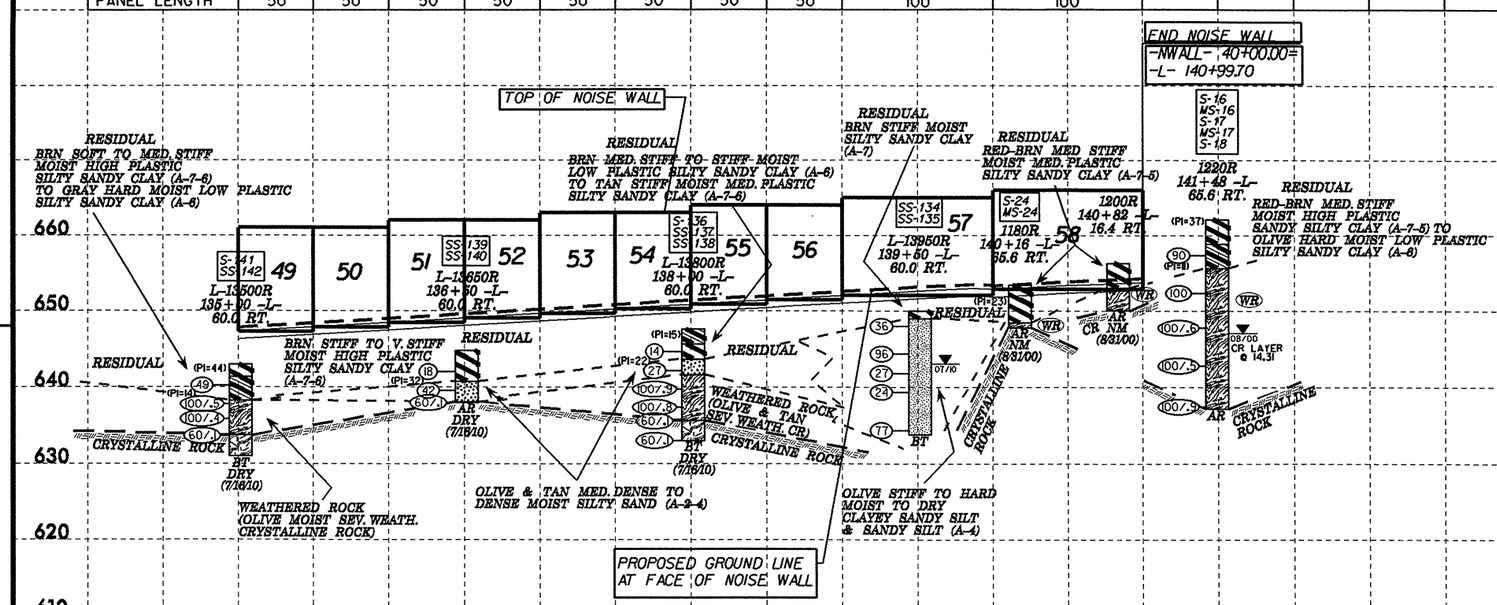
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PLAN AND PROFILE OF NOISE WALL

WALL 3



NOISE WALL DESIGN DATA										
PANEL NUMBER	49	50	51	52	53	54	55	56	57	58
TOP ELEVATION	661.0	661.0	662.0	662.0	663.0	663.0	664.0	664.0	665.0	666.0
PANEL LENGTH	50	50	50	50	50	50	50	50	100	100



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11075R	**STATION** 110+75	**OFFSET** 100 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 612.3 ft	**TOTAL DEPTH** 6.0 ft	**NORTHING** 600,626	**EASTING** 1,507,323	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/06/10	**COMP. DATE** 07/06/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
615											
										612.3 GROUND SURFACE	0.0
	610.8	1.5								611.3 **ROADWAY EMBANKMENT**	1.0
610			75	25/.2		100/.7				BRN LOOSE MOIST CLAYEY SILTY SAND (A-2) W/ GRAVEL	
	608.7	3.6	63	37/.3		100/.8				**WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK)	5.0
605										607.3 / 606.3 **CRYSTALLINE ROCK**	6.0
										Boring Terminated BY AUGER REFUSAL at Elevation 606.3 ft IN CRYSTALLINE ROCK	
600										(WALL BORING)	
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											
540											
535											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11225R	**STATION** 112+25	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 614.3 ft	**TOTAL DEPTH** 8.9 ft	**NORTHING** 600,742	**EASTING** 1,507,222	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
615										
										614.3 GROUND SURFACE 0.0
	613.3	1.0								**RESIDUAL**
			5	6	7	13	SS-89	M		BRN STIFF TO HARD MOIST MED. (PI=21) TO LOW (PI=15) PLASTIC SILTY SANDY CLAY (A-6)
610	610.5	3.8								
			5	19	13	32	SS-90	M		
	608.0	6.3								608.3 6.0
			21	29	35	64	SS-91	M		**RESIDUAL**
										606.5 BRN V. DENSE MOIST SILTY SAND (A-2-4) 7.8
605	605.5	8.8								605.4 **CRYSTALLINE ROCK** 8.9
			60/.1			60/.1				Boring Terminated BY AUGER REFUSAL at Elevation 605.4 ft IN CRYSTALLINE ROCK
600										(WALL BORING)
595										
590										
585										
580										
575										
570										
565										
560										
555										
550										
545										
540										
535										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11300R	**STATION** 113+00	**OFFSET** 65 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 615.1 ft	**TOTAL DEPTH** 4.3 ft	**NORTHING** 600,809	**EASTING** 1,507,188	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
620											
615										615.1 GROUND SURFACE	0.0
	613.0	2.1	4	7	19	26	SS-92	24% M		**RESIDUAL** BRN STIFF TO V. STIFF MOIST MED. (PI=23) PLASTIC SILTY SANDY CLAY (A-7-6) 611.1	4.0
610										610.8 **WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK)	4.3
605										Boring Terminated BY AUGER REFUSAL at Elevation 610.8 ft ON CRYSTALLINE ROCK (WALL BORING)	
600										Other Samples: M-92 (2.1 - 3.6)	
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											
540											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11400R	**STATION** 114+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 616.8 ft	**TOTAL DEPTH** 8.3 ft	**NORTHING** 600,895	**EASTING** 1,507,137	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
620											
								M		616.8 GROUND SURFACE	0.0
615	615.0	1.8	5	36	64/.4	100/.9		D		**RESIDUAL** BRN STIFF TO V. STIFF MOIST MED. PLASTIC SILTY SANDY CLAY (A-7) 614.5	2.3
610										**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK) 608.5	8.3
605										Boring Terminated BY AUGER REFUSAL at Elevation 608.5 ft ON CRYSTALLINE ROCK (WALL BORING)	
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											
540											

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-11500R	**STATION** 115+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 618.4 ft	**TOTAL DEPTH** 4.3 ft	**NORTHING** 600,984	**EASTING** 1,507,091
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. Dry; 24 HR. Dry

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
620										618.4 GROUND SURFACE	0.0
	616.9	1.5								**RESIDUAL** BRN V. STIFF MOIST MED. (PI=21) PLASTIC SILTY SANDY CLAY (A-6)	
615	615.4	3.0	9	10	17	27	SS-93	18% M		615.4	3.0
			100/.3			100/.3				**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK)	
										614.1	4.3
610										Boring Terminated BY AUGER REFUSAL at Elevation 614.1 ft ON CRYSTALLINE ROCK	
										(WALL BORING)	
605										Other Samples: M-93 (1.5 - 3.0)	
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											
540											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-11600R	**STATION** 116+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-
COLLAR ELEV. 620.3 ft	**TOTAL DEPTH** 8.8 ft	**NORTHING** 601,073	**EASTING** 1,507,045
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft): 0 HR. Dry; 24 HR. Dry

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
625											
620										620.3 GROUND SURFACE	0.0
	618.8	1.5								**RESIDUAL** BRN STIFF MOIST MED. (PI=18) PLASTIC SILTY SANDY CLAY (A-6)	
			5	5	9	14	SS-94	23% M		616.8	3.5
	616.3	4.0								**RESIDUAL** BRN MED. DENSE TO DENSE MOIST CLAYEY SILTY SAND (A-2-4)	
615			5	7	10	17	SS-95	20% M		613.3	7.0
	613.8	6.5								**CRYSTALLINE ROCK**	
			50	60/.1		60/.1				611.5	8.8
610										Boring Terminated BY AUGER REFUSAL at Elevation 611.5 ft IN CRYSTALLINE ROCK	
										(WALL BORING)	
605										Other Samples: M-94 (1.5 - 3.0) M-95 (4.0 - 5.5)	
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											

NCDOT BORE DOUBLE R2246B_GEO_BH_RDWY_CABARRUS.GPJ NC_DOT.GDT 10/07/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11700R	**STATION** 117+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 623.0 ft	**TOTAL DEPTH** 10.8 ft	**NORTHING** 601,161	**EASTING** 1,506,998	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
625											
										623.0 GROUND SURFACE	0.0
	621.4	1.6								**RESIDUAL** BRN V. STIFF MOIST MED. (PI=18) PLASTIC SILTY SANDY CLAY (A-6)	
620			3	6	13	19	SS-96	M		619.9	3.1
	618.9	4.1								**RESIDUAL** BRN MED. DENSE TO DENSE MOIST SAND (A-2)	
			49	60/.1		60/.1				618.4	4.6
	616.4	6.6									
615			100/.3			100/.3				616.0	7.0
	613.9	9.1								**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK W/ CRYSTALLINE ROCK LAYER @ 4.6)	
			60/.1			60/.1					
										612.2 **CRYSTALLINE ROCK**	10.8
610										Boring Terminated BY AUGER REFUSAL at Elevation 612.2 ft IN CRYSTALLINE ROCK	
										(WALL BORING)	
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											
545											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11800R	**STATION** 118+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 624.1 ft	**TOTAL DEPTH** 14.0 ft	**NORTHING** 601,250	**EASTING** 1,506,952	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
625										
										624.1 GROUND SURFACE 0.0
	622.7	1.4								**RESIDUAL**
			25	60/.1		60/.1		M		622.2 BRN V. STIFF MOIST SILTY SANDY CLAY (A-6) 1.9
620	620.2	3.9								**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK W/ CRYSTALLINE ROCK LAYER @ 1.9-2.1)
			80	20/.1		100/.6				
	617.7	6.4								
			45	55/.3		100/.8				
615	615.2	8.9								
			45	55/.1		100/.6				
	612.7	11.4								
			100/.4			100/.4				
610	610.2	13.9								610.2 13.9
			100/.1			100/.1				610.1 **CRYSTALLINE ROCK** 14.0
										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 610.1 ft IN CRYSTALLINE ROCK
										(WALL BORING)
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										
555										
550										
545										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-11950R	**STATION** 119+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 625.9 ft	**TOTAL DEPTH** 8.0 ft	**NORTHING** 601,383	**EASTING** 1,506,883	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/09/10	**COMP. DATE** 07/09/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
630											
625	624.9	1.0	2	4	4	8	SS-103	M		625.9 GROUND SURFACE	0.0
										ARTIFICIAL FILL BRN MED. STIFF TO STIFF MOIST MED. (PI=24) PLASTIC SILTY SANDY CLAY (A-6)	
	621.4	4.5	2	4	14	18	SS-104	M		621.4	4.5
620	618.9	7.0	85	15/.1		100/.6				**RESIDUAL** OLIVE V. STIFF MOIST MED. (PI=19) PLASTIC SILTY SANDY CLAY (A-6) 618.9	7.0
										617.9 **WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK)	8.0
615										Boring Terminated BY AUGER REFUSAL at Elevation 617.9 ft ON CRYSTALLINE ROCK	
										(WALL BORING)	
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12050R	**STATION** 120+50	**OFFSET** 50 ft RT	**ALIGNMENT** -L-	**0 HR.** 7.0
COLLAR ELEV. 627.8 ft	**TOTAL DEPTH** 16.2 ft	**NORTHING** 601,467	**EASTING** 1,506,828	**24 HR.** 7.0
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/09/10	**COMP. DATE** 07/09/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
630										627.8 GROUND SURFACE 0.0
625	626.8	1.0	2	1	2	3	SS-100	M		**ARTIFICIAL FILL** BRN SOFT MOIST TO WET HIGH (PI=58, 28) PLASTIC SILTY SANDY CLAY (A-7-6)
	623.1	4.7	2	1	2	3	SS-101	W		
620	620.6	7.2	2	2	2	4				618.1 9.7
	618.1	9.7	2	3	4	7	SS-102	W		**ALLUVIAL** GRAY MED. STIFF WET MED. (PI=21) PLASTIC SILTY SANDY CLAY (A-6)
615	615.6	12.2	2	3	4	7		W		613.8 14.0
	613.1	14.7	18	25	39	64		W		611.6 **RESIDUAL** OLIVE V. DENSE WET SILTY SAND (A-2) 16.2
610										Boring Terminated at Elevation 611.6 ft IN V. DENSE WET SILTY SAND (A-2)
										(WALL BORING)
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										
555										
550										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET
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PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12150R	**STATION** 121+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 629.7 ft	**TOTAL DEPTH** 13.5 ft	**NORTHING** 601,560	**EASTING** 1,506,790	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/09/10	**COMP. DATE** 07/09/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
630											
	629.7	0.0	5	5	5	10	SS-97	M		629.7 GROUND SURFACE	0.0
										ARTIFICIAL FILL BRN STIFF MOIST MED. (PI=19, 18) PLASTIC SILTY SANDY CLAY (A-6)	
625	625.5	4.2									
			5	5	4	9	SS-98	M			
	623.0	6.7								622.7	7.0
			1	4	11	15	SS-99	M		622.2 **ALLUVIAL** DARK GRAY SOFT MOIST HIGH (PI=29) PLASTIC SILTY SANDY CLAY (A-7-6)	7.5
620	620.5	9.2								620.7	9.0
			80	20/.1		100/.6				**RESIDUAL** OLIVE STIFF MOIST SILTY SANDY CLAY (A-7-6)	
	618.0	11.7								618.0	11.7
			60/.1			60/.1				616.2	13.5
615										**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK)	
										CRYSTALLINE ROCK	
610										Boring Terminated BY AUGER REFUSAL at Elevation 616.2 ft IN CRYSTALLINE ROCK	
										(WALL BORING)	
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12200R	**STATION** 122+00	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 626.0 ft	**TOTAL DEPTH** 4.2 ft	**NORTHING** 601,589	**EASTING** 1,506,736	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/07/10	**COMP. DATE** 07/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
630										
								M		626.0 GROUND SURFACE 0.0
625										625.0 **ALLUVIAL** BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7) 1.0
	624.2	1.8								623.7 2.3
			9	55	45/.3	100/.8				621.8 **ALLUVIAL** OLIVE LOOSE MOIST CLAYEY SILTY SAND (A-2) 4.2
620										**WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
615										Boring Terminated BY AUGER REFUSAL at Elevation 621.8 ft ON CRYSTALLINE ROCK
610										
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										
555										
550										

NCDOT BORE DOUBLE R2246B_GEO_BH_RDWY_CABARRUS.GPJ NC_DOT.GDT 10/07/10

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BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-12250R	**STATION** 122+50	**OFFSET** 45 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 626.0 ft	**TOTAL DEPTH** 9.5 ft	**NORTHING** 601,642	**EASTING** 1,506,731 / **24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/13/10	**COMP. DATE** 07/13/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
630											
625										626.0 GROUND SURFACE	0.0
	624.1	1.9								**ALLUVIAL** BRN & GRAY SOFT MOIST HIGH (PI=49) PLASTIC SILTY SANDY CLAY (A-7-6)	
			2	2	2	4	SS-108	M			
	621.6	4.4								622.0	4.0
			60/.1			60/.1				621.6 **WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK)	4.4
620	619.1	6.9								**CRYSTALLINE ROCK**	
			60/.1			60/.1					
	616.6	9.4								616.5	9.5
615			60/.1			60/.1				Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 616.5 ft IN CRYSTALLINE ROCK (WALL BORING)	
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-12350R	**STATION** 123+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** 11.3
COLLAR ELEV. 626.2 ft	**TOTAL DEPTH** 15.5 ft	**NORTHING** 601,738	**EASTING** 1,506,698 / **24 HR.** 6.0
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
630										
625										626.2 GROUND SURFACE 0.0
	624.0	2.2								**RESIDUAL** BRN STIFF MOIST HIGH (PI=40) PLASTIC SILTY SANDY CLAY (A-7-6)
			3	4	5	9	SS-109	M		
	621.5	4.7								621.7 4.5
			12	14	28	42	SS-110			**RESIDUAL** OLIVE HARD MOIST SANDY SILT (A-4)
620										
	616.5	9.7								616.0 10.2
			18	40	60/.4					
615	614.0	12.2				100/.9				**WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK)
			25	75/.4		100/.9				
	611.5	14.7								610.7 15.5
610			37	63/.3		100/.8				Boring Terminated at Elevation 610.7 ft IN SEV. WEATH. CRYSTALLINE ROCK (WALL BORING)
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										
555										
550										

NCDOT BORE DOUBLE R2246B_GEO_BH_RDWY_CABARRUS.GPJ NC_DOT.GDT 10/07/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
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PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12450R	**STATION** 124+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** 17.0
COLLAR ELEV. 627.8 ft	**TOTAL DEPTH** 23.5 ft	**NORTHING** 601,826	**EASTING** 1,506,652	**24 HR.** 7.0
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
630											
										627.8 GROUND SURFACE	0.0
625	625.8	2.0	2	3	5	8	SS-111	M		**RESIDUAL** BRN & OLIVE MED. STIFF TO STIFF MOIST HIGH (PI=52) PLASTIC SANDY SILTY CLAY (A-7-6)	
	623.3	4.5	4	5	8	13	SS-112	M		623.8	4.0
620	620.8	7.0	4	6	9	15	SS-113			**RESIDUAL** OLIVE STIFF TO HARD MOIST CLAYEY SANDY SILT & SANDY SILT (A-4)	
	618.3	9.5	4	5	7	12	SS-114				
615	615.8	12.0	3	5	8	13	SS-115				
610	610.8	17.0	8	10	10	20	SS-116				
605	605.8	22.0	15	18	27	45	SS-117			604.3	23.5
										Boring Terminated at Elevation 604.3 ft IN HARD MOIST SANDY SILT (A-4) (WALL BORING)	
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											
550											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12600R	**STATION** 126+00	**OFFSET** 40 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 630.4 ft	**TOTAL DEPTH** 13.7 ft	**NORTHING** 601,950	**EASTING** 1,506,565	**24 HR.** FIAD
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
635										
630										630.4 GROUND SURFACE 0.0
	628.2	2.2	2	5	11	16	SS-118	M		**RESIDUAL** BRN & TAN MED. STIFF TO V. STIFF MOIST HIGH (PI=28) PLASTIC SILTY SANDY CLAY (A-7-6)
625	625.7	4.7	9	19	23	42	SS-119	M		626.4 4.0
	623.2	7.2	65	35/.2		100/.7				**RESIDUAL** OLIVE DENSE TO V. DENSE MOIST SILTY SAND (A-2-4) 623.2 7.2
620	620.7	9.7	69	61/.1		61/.1				**WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK) 620.2 10.2
										CRYSTALLINE ROCK 616.7 13.7
615										Boring Terminated BY AUGER REFUSAL at Elevation 616.7 ft IN CRYSTALLINE ROCK (WALL BORING)
610										
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										
555										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12750R	**STATION** 127+50	**OFFSET** 50 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 633.8 ft	**TOTAL DEPTH** 12.5 ft	**NORTHING** 602,088	**EASTING** 1,506,504	**24 HR.** FIAD
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
635										633.8 GROUND SURFACE	0.0
	632.0	1.8								632.8 **RESIDUAL** BRN MED. STIFF TO STIFF MOIST SILTY SANDY CLAY (A-7)	1.0
630	629.5	4.3	4	7	13	20	SS-120	M		**RESIDUAL** OLIVE V. STIFF TO HARD MOIST MED. (PI=18) PLASTIC SILTY SANDY CLAY (A-6)	
	627.0	6.8	16	28	39	67		M		627.0 **WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK)	6.8
625	624.5	9.3	45	55/.5		100					
			65	45/.4		100/.9				621.8 **CRYSTALLINE ROCK**	12.0
620										621.3 Boring Terminated BY AUGER REFUSAL at Elevation 621.3 ft IN CRYSTALLINE ROCK (WALL BORING)	12.5
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											
555											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12825R	**STATION** 128+25	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 635.9 ft	**TOTAL DEPTH** 9.0 ft	**NORTHING** 602,159	**EASTING** 1,506,478	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
640										
635										635.9 GROUND SURFACE 0.0
	634.1	1.8								634.9 **RESIDUAL** BRN MED. STIFF MOIST SILTY SANDY CLAY (A-7) 1.0
			5	11	14	25	SS-121	M		
630	631.6	4.3								631.9 **RESIDUAL** OLIVE V. STIFF MOIST CLAYEY SANDY SILT (A-4) 4.0
			7	12	15	27	SS-122	M		
	629.1	6.8						M		629.1 6.8
			74	26/.1		100/.6				**RESIDUAL** OLIVE MED. DENSE MOIST SILTY SAND (A-2-4) 9.0
625										626.9 **WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK) Boring Terminated BY AUGER REFUSAL at Elevation 626.9 ft ON CRYSTALLINE ROCK (WALL BORING)
620										
615										
610										
605										
600										
595										
590										
585										
580										
575										
570										
565										
560										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-12950R	**STATION** 129+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 639.5 ft	**TOTAL DEPTH** 20.5 ft	**NORTHING** 602,270	**EASTING** 1,506,421	**24 HR.** 11.7
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/14/10	**COMP. DATE** 07/14/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
640										639.5 GROUND SURFACE	0.0
	638.0	1.5								**ARTIFICIAL FILL** BRN STIFF MOIST MED. (PI=17) PLASTIC SILTY SANDY CLAY (A-6)	
635	635.5	4.0	9	6	5	11	SS-123	M		635.7	3.8
	633.0	6.5	2	4	8	12	SS-124	M		**RESIDUAL** OLIVE STIFF MOIST MED. (PI=25) PLASTIC SILTY SANDY CLAY (A-7-6)	
630	630.5	9.0	4	6	8	14		M		631.5	8.0
	628.0	11.5	5	10	14	24	SS-125	M		**RESIDUAL** ORANGE-OLIVE MED. DENSE TO V. DENSE MOIST TO WET SILTY SAND (A-2-4)	
625	625.5	14.0	5	9	11	20					
620	620.5	19.0	5	9	9	18	SS-126				
			22	39	45	84				619.0	20.5
615										Boring Terminated at Elevation 619.0 ft IN V. DENSE WET SILTY SAND (A-2-4) (WALL BORING)	
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											
560											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-13050R	**STATION** 130+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 644.3 ft	**TOTAL DEPTH** 15.8 ft	**NORTHING** 602,358	**EASTING** 1,506,374	**24 HR.** 11.0
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
645										644.3 GROUND SURFACE 0.0
	642.5	1.8								**ARTIFICIAL FILL** BRN STIFF MOIST MED. (PI=24) TO HIGH (PI=39) PLASTIC SILTY SANDY CLAY (A-7-6)
640	640.0	4.3	4	6	5	11	SS-127	M		
	637.5	6.8	3	3	5	8	SS-128	M		637.8 6.5
635	635.0	9.3	5	5	7	12	SS-129	M		**RESIDUAL** BRN STIFF MOIST MED. (PI=24) PLASTIC SILTY SANDY CLAY (A-7-6) 635.3 9.0
			13	35	53	88				**RESIDUAL** OLIVE-TAN MED. DENSE TO V. DENSE MOIST CLAYEY SILTY SAND (A-2) 633.3 11.0
630	630.0	14.3	35	49	51/.5	100				**WEATHERED ROCK** (SEV. WEATH. CRYSTALLINE ROCK) 628.5 15.8
625										Boring Terminated at Elevation 628.5 ft IN SEV. WEATH. CRYSTALLINE ROCK (WALL BORING)
620										
615										
610										
605										
600										
595										
590										
585										
580										
575										
570										
565										

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BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-13200R	**STATION** 132+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 649.3 ft	**TOTAL DEPTH** 13.4 ft	**NORTHING** 602,492	**EASTING** 1,506,305	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
650										649.3 GROUND SURFACE	0.0
	647.4	1.9								**ARTIFICIAL FILL** BRN & GRAY STIFF TO MED. STIFF MOIST TO WET HIGH (PI=26, 32, 33) PLASTIC SILTY SANDY CLAY (A-7-6)	
	645.9	3.4	5	6	7	13	SS-130	M			
645			3	4	5	9	SS-131	M			
	643.4	5.9	2	3	3	6	SS-132	W			
	640.9	8.4	4	10	13	23	SS-133			641.3	8.0
640										**RESIDUAL** OLIVE-TAN MED. DENSE MOIST CLAYEY SILTY SAND (A-2-4)	
										638.3	11.0
										WEATHERED ROCK (SEV. WEATH. CRYSTALLINE ROCK)	
635										635.9	13.4
										Boring Terminated at Elevation 635.9 ft IN SEV. WEATH. CRYSTALLINE ROCK (WALL BORING)	
630											
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.	
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)				**GROUND WTR (ft)**
BORING NO. L-13350R	**STATION** 133+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** Dry
COLLAR ELEV. 644.4 ft	**TOTAL DEPTH** 11.5 ft	**NORTHING** 602,625	**EASTING** 1,506,236	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
645										644.4 GROUND SURFACE	0.0
	642.9	1.5								**RESIDUAL** BRN MED. STIFF TO V. STIFF MOIST MED. (PI=20) PLASTIC SILTY SANDY CLAY (A-6)	
			7	8	14	22	SS-143	M			
640	640.4	4.0								641.4	3.0
			100/.5			100/.5				640.4	4.0
	637.9	6.5								**RESIDUAL** OLIVE MED. DENSE MOIST SAND (A-2)	
			100/.4			100/.4				**WEATHERED ROCK** (OLIVE SEV. WEATH. CRYSTALLINE ROCK W/ SOIL SEAM @ 9.0-10.0)	
635	635.4	9.0								634.4	10.0
			23	16	60/.1	60/.1				**CRYSTALLINE ROCK**	
										632.9	11.5
										Boring Terminated BY AUGER REFUSAL at Elevation 632.9 ft IN CRYSTALLINE ROCK (WALL BORING)	
630											
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-13500R	**STATION** 135+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 642.9 ft	**TOTAL DEPTH** 11.9 ft	**NORTHING** 602,758	**EASTING** 1,506,166 / **24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
645											
										642.9 GROUND SURFACE	0.0
	641.2	1.7					S-141	M		641.3 **RESIDUAL** BRN SOFT TO MED. STIFF MOIST HIGH (PI=44) PLASTIC SILTY SANDY CLAY (A-7-6)	1.6
640			4	20	29	49	SS-142	M			
	638.7	4.2								638.2 **RESIDUAL** GRAY HARD MOIST LOW (PI=14) PLASTIC SILTY SANDY CLAY (A-6)	4.7
			36	100/.5		100/.5		M			
	636.2	6.7									
635			100/.4			100/.4		D			
	633.7	9.2								633.7 **WEATHERED ROCK** (OLIVE MOIST SEV. WEATH. CRYSTALLINE ROCK)	9.2
			60/.1			60/.1		D			
										631.0 **CRYSTALLINE ROCK**	11.9
630										Boring Terminated BY AUGER REFUSAL at Elevation 631.0 ft IN CRYSTALLINE ROCK	
										(WALL BORING)	
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											
565											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-13650R	**STATION** 136+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** Dry
COLLAR ELEV. 644.7 ft	**TOTAL DEPTH** 6.8 ft	**NORTHING** 602,891	**EASTING** 1,506,097 / **24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
645								M		644.7 GROUND SURFACE 0.0
	643.0	1.7								**RESIDUAL** BRN STIFF TO V. STIFF MOIST HIGH (PI=32) PLASTIC SILTY SANDY CLAY (A-7-6) 4.0
			5	7	11	18	SS-139	M		
640	640.5	4.2								640.7 **RESIDUAL** OLIVE MED. DENSE TO DENSE MOIST SILTY SAND (A-2-4) 6.7
			13	17	25	42	SS-140	M		
	638.0	6.7								638.0 637.9 **CRYSTALLINE ROCK** 6.8
			60/.1			60/.1				Boring Terminated BY AUGER REFUSAL at Elevation 637.9 ft IN CRYSTALLINE ROCK
635										(WALL BORING)
630										(COBBLES & BOULDERS IN AREA)
625										
620										
615										
610										
605										
600										
595										
590										
585										
580										
575										
570										
565										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-13800R	**STATION** 138+00	**OFFSET** 60 ft RT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 647.6 ft	**TOTAL DEPTH** 14.6 ft	**NORTHING** 603,024	**EASTING** 1,506,028 — **24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	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)
650											
										647.6 GROUND SURFACE	0.0
							S-136	M		**RESIDUAL**	
645	645.6	2.0	3	6	8	14	SS-137	M		645.6 BRN MED. STIFF TO STIFF MOIST LOW (PI=15) PLASTIC SILTY SANDY CLAY (A-6)	2.0
	643.1	4.5	9	12	15	27	SS-138	M		643.6 **RESIDUAL** TAN STIFF MOIST MED. (PI=22) PLASTIC SILTY SANDY CLAY (A-7-6)	4.0
640	640.6	7.0	26	74/.4		100/.9				641.6 **RESIDUAL** OLIVE & TAN MED. DENSE MOIST SILTY SAND (A-2-4)	6.0
	638.1	9.5	75	25/.3		100/.8				**WEATHERED ROCK**	
635	635.6	12.0	60/.1			60/.1				635.6 (OLIVE & TAN SEV. WEATH. CRYSTALLINE ROCK)	12.0
	633.1	14.5	60/.1			60/.1				633.0 **CRYSTALLINE ROCK**	14.6
630										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 633.0 ft IN CRYSTALLINE ROCK (WALL BORING)	
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											

PROJECT NO. 34408.1.1	**ID.** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 (ROBERTA RD) TO SR 1431 (WEDDINGTON RD)			**GROUND WTR (ft)**
BORING NO. L-13950R	**STATION** 139+50	**OFFSET** 60 ft RT	**ALIGNMENT** -L- — **0 HR.** Dry
COLLAR ELEV. 650.0 ft	**TOTAL DEPTH** 16.2 ft	**NORTHING** 603,157	**EASTING** 1,505,958 — **24 HR.** 7.0
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/15/10	**COMP. DATE** 07/15/10	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	
650											
								M		650.0 GROUND SURFACE	0.0
	649.0	1.0						M		649.0 **RESIDUAL** BRN STIFF MOIST SILTY SANDY CLAY (A-7)	1.0
			12	15	21	36	SS-134	M			
645	645.3	4.7	26	39	57	96		D		**RESIDUAL** OLIVE STIFF TO HARD MOIST TO DRY CLAYEY SANDY SILT & SANDY SILT (A-4)	
	642.8	7.2	9	15	12	27		D			
640	640.3	9.7	10	9	15	24	SS-135	D			
635	635.3	14.7	14	28	49	77		D		633.8	16.2
										Boring Terminated at Elevation 633.8 ft IN HARD DRY SANDY SILT (A-4)	
630											
625											
620											
615											
610											
605											
600											
595											
590											
585											
580											
575											
570											

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34408.1.1	**ID** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** C. C. MURRAY
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 TO SR 1431			**GND WATER**
BORING NO 1180R	**NORTHING** 603218.00	**EASTING** 1505933.00	**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 140+16.000	**OFFSET** 65.60ft RT	**24 HR** N/A
COLLAR ELEV 653.39ft	**TOTAL DEPTH** 5.58ft	**START DATE** 8/30/00	**COMPLETION DATE** 08/30/00
DRILL MACHINE CME-550	**DRILL METHOD** SOLID AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 5.58ft		**Log 1180R, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
653.39						Ground Surface				
650.00							S-24	27.3		RED-BRN MED STIFF MOIST MED. (PI=23) PLASTIC SILTY SANDY CLAY (A-7-5)
647.81						AUGER REFUSAL				WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK) NOTE: BORING TAKEN FROM PROJECT 8.2661601 R-2246C.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34408.1.1	**ID** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** C. C. MURRAY
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 TO SR 1431			**GND WATER**
BORING NO 1200R	**NORTHING** 603254.00	**EASTING** 1505860.00	**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 140+82.000	**OFFSET** 16.40ft RT	**24 HR** N/A
COLLAR ELEV 656.26ft	**TOTAL DEPTH** 6.23ft	**START DATE** 8/30/00	**COMPLETION DATE** 08/30/00
DRILL MACHINE CME-550	**DRILL METHOD** SOLID AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 6.23ft		**Log 1200R, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
656.26						Ground Surface				
650.03										RED-BROWN MED. STIFF MOIST SANDY SILTY CLAY (A-7)
						AUGER REFUSAL				WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK) NOTE: BORING TAKEN FROM PROJECT 8.2661601 R-2246C.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 34408.1.1	**ID** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** C. C. MURRAY
SITE DESCRIPTION GEORGE LILES PKWY-FROM SR 1304 TO SR 1431			**GND WATER**
BORING NO 1220R	**NORTHING** 603333.00	**EASTING** 1505876.00	**0 HR** N/A
ALIGNMENT L	**BORING LOCATION** 141+48.000	**OFFSET** 65.62ft RT	**24 HR** 15.09ft
COLLAR ELEV 662.13ft	**TOTAL DEPTH** 25.00ft	**START DATE** 8/29/00	**COMPLETION DATE** 08/29/00
DRILL MACHINE MOBILE B-57	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 25.00ft		**Log 1220R, Page 1 of 1**

ELEV	DEPTH	BLOW CT 6in	BLOW CT 6in	BLOW CT 6in	PEN (ft)	BLOWS PER FOOT (0 25 50 75 100)	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
662.13						Ground Surface				
660.00							S-16	33.1		(RESIDIUAL) RED-BRN MED.STIFF MOIST HIGH (PI=37) PLASTIC SANDY SILTY CLAY (A-7-5)
	3.81	14	44	46	1.0	90	S-17	16		
	8.81	5	100		1.0	100	S-18	D		OLIVE HARD MOIST LOW (PI=11) PLSATIC SILTY SANDY CLAY (A-6)
650.00	13.81	75	25		0.6	100		▼		WEATHERED ROCK (OLIVE SEV. WEATH. CRYSTALLINE ROCK) NOTE: BORING TAKEN FROM PROJECT 8.2661601 R-2246C.
	18.81	79	21		0.5	100				
640.00	23.81	20	80		0.9	100				
637.13						AUGER REFUSAL				

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC	Line or Boring ID
SS-89	65 RT	112+25	1.5-2.5	A-6(7)	38	21	23.0	29.9	18.8	28.3	99	83	52	-	-	L
SS-90	65 RT	112+25	4.3-5.3	A-6(3)	32	15	14.9	47.1	17.8	20.2	100	96	45	-	-	L
SS-91	65 RT	112+25	6.8-7.8	A-2-4(0)	22	NP	37.6	41.8	12.5	8.1	98	79	27	-	-	L
MS-92	65 RT	113+00	2.6-3.6											23.6	-	L
SS-92	65 RT	113+00	2.6-3.6	A-7-6(9)	41	23	18.8	33.7	17.2	30.3	99	90	53	-	-	L
MS-93	60 RT	115+00	2.0-3.0											17.7	-	L
SS-93	60 RT	115+00	2.0-3.0	A-6(10)	39	21	17.2	26.1	18.4	38.4	99	89	61	-	-	L
MS-94	60 RT	116+00	2.0-3.0											22.7	-	L
SS-94	60 RT	116+00	2.0-3.0	A-6(7)	36	18	18.4	30.3	19.0	32.3	98	87	56	-	-	L
MS-95	60 RT	116+00	4.5-5.5											20.3	-	L
SS-95	60 RT	116+00	4.5-5.5	A-2-4(0)	26	5	27.1	44.0	16.8	12.1	99	87	35	-	-	L
SS-96	60 RT	117+00	2.1-3.1	A-6(6)	35	18	14.1	38.8	18.8	28.3	100	95	53	-	-	L
SS-97	60 RT	121+50	0.5-1.5	A-6(4)	36	19	27.1	35.2	15.6	22.2	97	83	42	-	-	L
SS-98	60 RT	121+50	4.7-5.7	A-6(4)	34	18	20.8	37.2	17.8	24.2	97	88	46	-	-	L
SS-99	60 RT	121+50	7.0-8.2	A-7-6(15)	52	29	17.2	29.3	15.2	38.4	100	92	59	-	-	L
SS-100	50 RT	120+50	1.5-2.5	A-7-6(45)	80	56	10.1	15.6	15.8	58.6	99	93	77	-	-	L
SS-101	50 RT	120+50	5.2-6.2	A-7-6(9)	43	28	23.6	33.1	12.9	30.3	100	89	48	-	-	L
SS-102	50 RT	120+50	10.2-11.2	A-6(5)	36	21	26.9	35.4	15.6	22.2	98	85	43	-	-	L
SS-103	60 RT	119+50	1.5-2.5	A-6(9)	40	24	20.6	29.9	15.2	34.3	99	89	54	-	-	L
SS-104	60 RT	119+50	5.0-6.0	A-6(5)	36	19	21.8	39.0	19.0	20.2	99	89	46	-	-	L
SS-108	45 RT	122+50	1.9-3.4	A-7-6(40)	77	49	9.4	17.2	9.7	63.7	100	94	77	-	-	L
SS-109	60 RT	123+50	2.2-3.7	A-7-6(31)	60	40	6.6	23.4	20.7	49.3	100	97	77	-	-	L
SS-110	60 RT	123+50	4.7-6.2	A-4(0)	26	NP	25.7	48.3	22.0	4.1	100	91	37	-	-	L
SS-111	60 RT	124+50	2.0-3.5	A-7-6(47)	81	52	7.8	14.8	22.0	55.4	100	96	82	-	-	L
SS-112	60 RT	124+50	4.5-6.0	A-4(4)	39	7	9.7	39.0	34.9	16.4	100	97	62	-	-	L
SS-113	60 RT	124+50	7.0-8.5	A-4(0)	33	3	17.0	48.0	26.7	8.2	100	94	46	-	-	L
SS-114	60 RT	124+50	9.5-11.0	A-4(0)	33	NP	19.3	51.5	23.0	6.2	100	92	40	-	-	L
SS-115	60 RT	124+50	12.0-13.5	A-4(0)	33	NP	16.8	44.4	30.6	8.2	100	93	49	-	-	L
SS-116	60 RT	124+50	17.0-18.5	A-4(0)	27	2	20.7	42.3	28.7	8.2	100	90	47	-	-	L
SS-117	60 RT	124+50	22.0-23.5	A-4(0)	30	NP	32.2	35.3	26.3	6.2	95	77	38	-	-	L
SS-118	40 RT	126+00	2.2-3.7	A-7-6(8)	45	28	23.4	36.8	13.1	26.7	100	89	45	-	-	L
SS-119	40 RT	126+00	4.7-6.2	A-2-4(0)	26	NP	39.2	44.1	10.6	6.1	99	78	23	-	-	L
SS-120	50 RT	127+50	1.8-3.3	A-6(2)	34	18	33.9	34.9	14.9	16.3	96	77	36	-	-	L
SS-121	60 RT	128+25	1.8-3.5	A-4(0)	31	5	26.9	43.9	19.0	10.2	100	89	37	-	-	L
SS-122	60 RT	128+25	4.3-5.8	A-2-4(0)	28	NP	36.7	45.5	15.7	2.0	99	80	24	-	-	L
SS-123	60 RT	129+50	1.5-3.0	A-6(4)	37	17	31.4	21.0	23.1	24.5	85	64	44	-	-	L
SS-124	60 RT	129+50	4.0-5.5	A-7-6(14)	54	25	10.6	37.6	29.4	22.4	100	95	62	-	-	L
SS-125	60 RT	129+50	9.0-10.5	A-2-4(0)	40	NP	38.6	40.2	19.2	2.0	98	76	27	-	-	L
SS-126	60 RT	129+50	14.0-15.5	A-2-4(0)	31	NP	33.5	48.2	16.3	2.0	94	78	25	-	-	L
SS-127	60 RT	130+50	1.8-3.3	A-7-6(10)	45	24	18.4	25.9	21.0	34.7	92	81	56	-	-	L
SS-128	60 RT	130+50	4.3-5.8	A-7-6(23)	58	39	12.9	27.3	16.9	42.9	99	93	65	-	-	L
SS-129	60 RT	130+50	6.8-8.3	A-7-6(14)	46	24	17.1	22.7	19.4	40.8	99	87	64	-	-	L
SS-130	60 RT	132+00	1.9-3.4	A-7-6(11)	45	26	19.8	26.3	19.2	34.7	95	83	56	-	-	L
SS-131	60 RT	132+00	3.4-4.9	A-7-6(19)	56	32	16.4	24.8	15.6	43.1	100	91	64	-	-	L
SS-132	60 RT	132+00	5.9-7.4	A-7-6(21)	54	33	14.2	22.4	16.2	47.2	100	92	68	-	-	L
SS-133	60 RT	132+00	8.4-9.9	A-2-4(0)	26	5	23.4	51.3	12.9	12.3	100	92	33	-	-	L
SS-134	60 RT	139+50	1.0-2.5	A-4(0)	30	7	21.4	48.0	20.3	10.3	100	94	40	-	-	L
SS-135	60 RT	139+50	9.7-11.2	A-4(0)	29	4	23.4	48.3	22.2	6.2	100	92	37	-	-	L
S-136	60 RT	138+00	0.0-1.5	A-6(4)	33	15	31.0	21.4	18.9	28.7	95	71	50	-	-	L
SS-137	60 RT	138+00	2.0-3.5	A-7-6(12)	47	22	16.6	25.5	16.8	41.1	98	88	61	-	-	L
SS-138	60 RT	138+00	4.5-6.0	A-2-4(0)	24	NP	34.9	46.4	10.5	8.2	100	86	25	-	-	L
SS-139	60 RT	136+50	1.7-3.2	A-7-6(17)	54	32	18.5	23.6	16.8	41.1	98	86	61	-	-	L
SS-140	60 RT	136+50	4.2-5.7	A-2-4(0)	27	3	34.1	42.5	15.2	8.2	100	84	29	-	-	L
S-141	60 RT	135+00	0.0-1.5	A-7-6(32)	65	44	14.4	15.2	17.0	53.4	99	88	73	-	-	L
SS-142	60 RT	135+00	1.7-3.2	A-6(1)	31	14	29.0	40.5	10.1	20.5	99	85	37	-	-	L
SS-143	60 RT	133+50	1.5-3.0	A-6(6)	38	20	22.2	34.9	14.2	28.7	98	84	49	-	-	L

THE FOLLOWING SAMPLES WERE TAKEN FROM PROJECT R-2246C (METRIC).
THE BORINGS WERE PLACED IN THE ENGLISH PROJECT R-2246B, WHERE THE STATION & OFFSET WAS OBTAINED.
THE STATION AND OFFSET ARE ROUNDED TO THE NEAREST FOOT.
THE SAMPLE DEPTHS ARE A DIRECT METRIC TO ENGLISH CONVERSION ROUNDED TO THE NEAREST TENTH OF A FOOT.

S-24	66 RT	140+16	0.0-4.3	A-7-5(18)	53	23	10	16	21.8	52.2	97	90	75	27.3	-	L
S-16	66 RT	141+48	0.0-3.3	A-7-5(30)	67	37	9.6	14.4	17.8	58.2	97	91	76	33.1	-	L
SS-17	66 RT	141+48	3.8-5.3	A-6(2)	28	11	27.9	33.1	21	18.1	98	83	44	16.0	-	L
SS-18	66 RT	141+48	8.8-10.3	A-2-4(0)	22	6	33.1	38.9	18	10	100	83	32	-	-	L

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	34408.1.1 (R-2246B)	1	34

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34408.1.1 (R-2246B) F.A. PROJ. _____

COUNTY CABARRUS

PROJECT DESCRIPTION GEORGE LILES PARKWAY FROM SR 1304 (ROBERTA RD.) TO SR 1431 (WEDDINGTON RD.)

SITE DESCRIPTION BRIDGES ON SR 1430 (GEORGE LILES PARKWAY) OVER US 29 (RETAINING WALLS 1 & 2)

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CAUTION NOTICE

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

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PERSONNEL

C. C. MURRAY

J. E. ESTEP

M. R. MOORE

INVESTIGATED BY R. Q. CALLAWAY

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE JANUARY 2013

NORTH CAROLINA LICENSED SEAL 1098 GEOLOGIST ROGER Q CALLAWAY 01/07/13

DRAWN BY: J.K. McCLURE

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

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

PROJECT: 34408.1.1

ID: R-2246B

PROJECT REFERENCE NO.	SHEET NO.
34408.1.1 (R-2246B)	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 / PLASTIC INDEX	6 MX		NP	40 MX / 10 MX	41 MN / 10 MX	40 MX / 11 MN	41 MN / 11 MN	40 MX / 10 MX	41 MN / 10 MX	40 MX / 11 MN	41 MN / 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

GRAIN SIZE MM: 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005
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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
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
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

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

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

CORE SIZE:
- [ ] -B_____
- [X] -N 0/NQ
- [ ] -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: R2246B-4: (GPS-4) 1998
STA. 79+97.17 -L- 6.1 LT.
N 598378.1800 E 1509329.3080 ELEVATION: 627.67 FT.

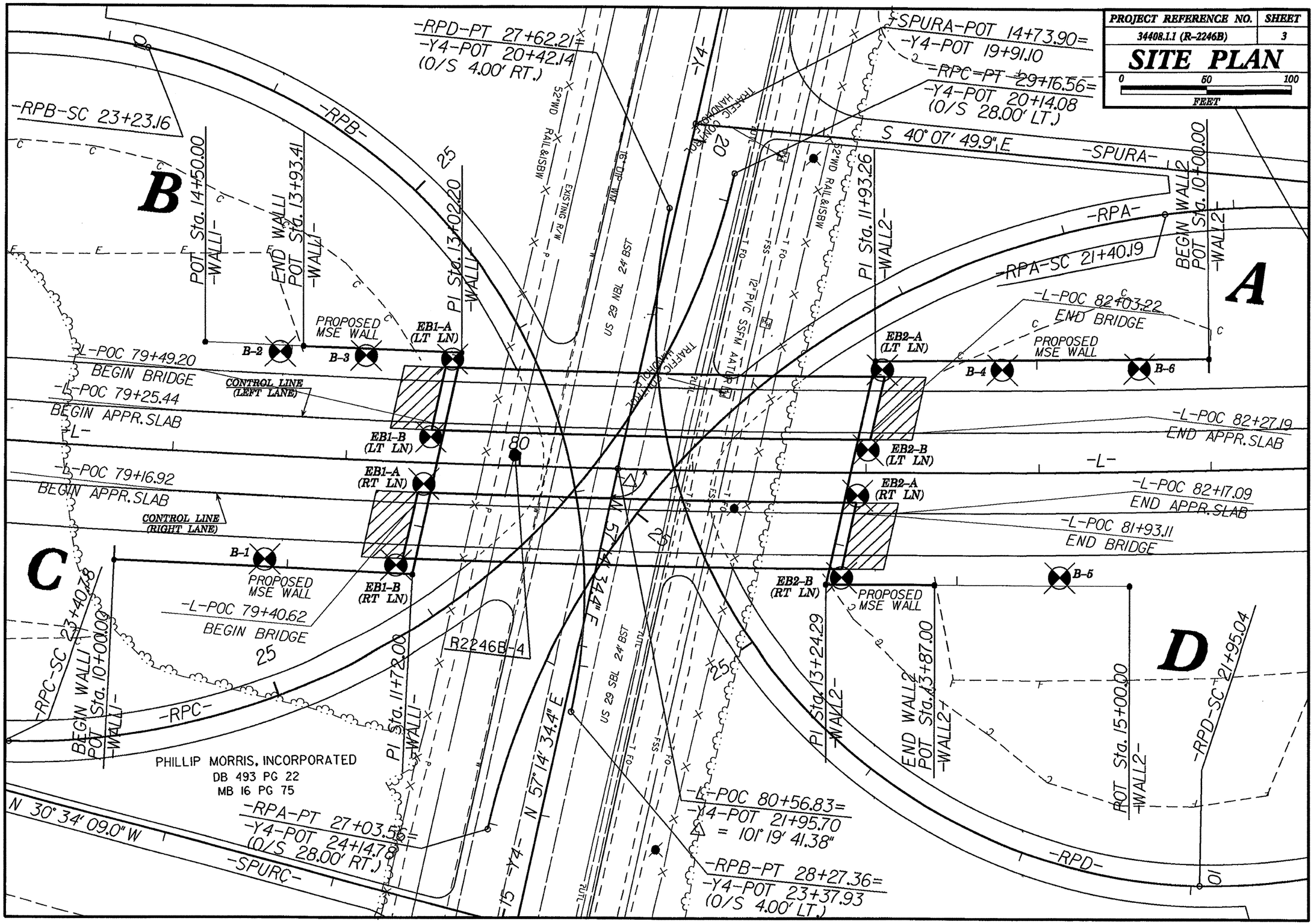
NOTES:
SOIL STRATIGRAPHY IS THROUGH THE BORINGS FOR PROFILES.

ALIGNMENTS USED FOR RETAINING WALLS 1 & 2 IN THIS REPORT WERE CREATED BY THE GEOTECHNICAL ENGINEERING UNIT AND ARE LOCATED IN THE Jobgeo.gpk FILE.

PROJECT REFERENCE NO.	SHEET
34408.1.1 (R-2246B)	3

SITE PLAN

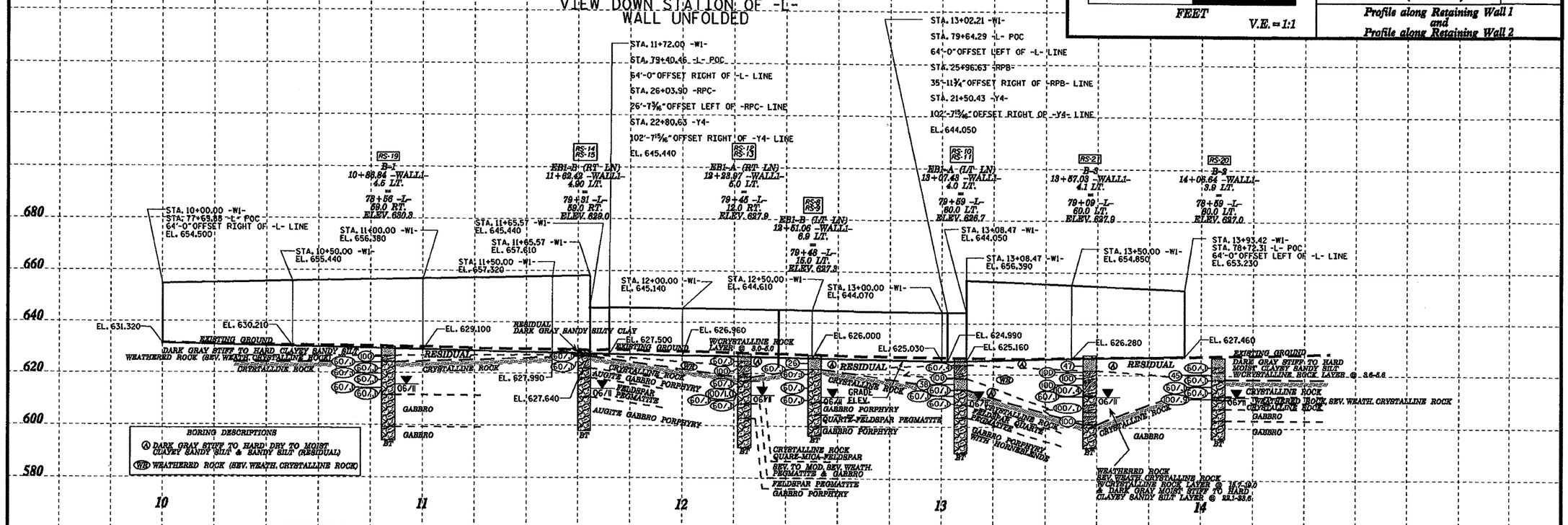
0 50 100
FEET



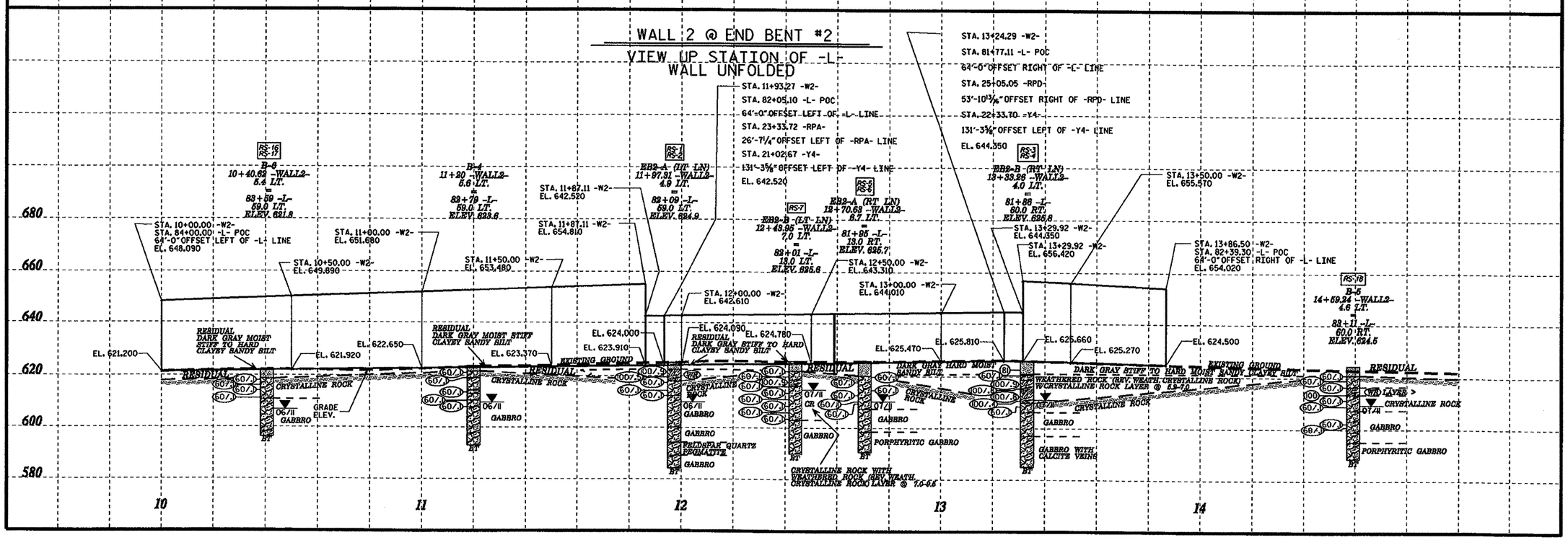
PROJECT REFERENCE NO.	SHEET
34408.1.1 (R-2246B)	4
Profile along Retaining Wall 1 and Profile along Retaining Wall 2	

0 40 80
FEET
V.E. = 1:1

WALL 1 @ END BENT #1
VIEW DOWN STATION OF -L- WALL UNFOLDED



WALL 2 @ END BENT #2
VIEW UP STATION OF -L- WALL UNFOLDED



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-1	**STATION** 78+56	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 630.3 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 598,319	**EASTING** 1,509,474 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/27/11	**COMP. DATE** 06/27/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
635											
630										630.3 GROUND SURFACE	0.0
	627.2	3.1								**RESIDUAL** 0-3.6 DARK GRAY STIFF TO HARD CLAYEY SANDY SILT	
			21	43	57	100				626.7	3.6
625	624.7	5.6	100	60/.1		60/.1				**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
	622.2	8.1	100	60/.1		60/.1				624.2	6.1
620	619.7	10.6	60/.1			60/.1				**CRYSTALLINE ROCK** SPT REFUSAL ROLLER CONE REFUSAL @ 18.7'	
	617.2	13.1	60/.1			60/.1					
615	614.7	15.6	100	60/.1		60/.1		▼			
	613.2	17.1	60/.1			60/.1				611.6	18.7
610										**CRYSTALLINE ROCK** GABBRO	
605											
600							RS-19			599.1	31.2
										CRYSTALLINE ROCK GABBRO	
595										594.1	36.2
										Boring Terminated at Elevation 594.1 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 78+56 59

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 5

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-1	**STATION** 78+56	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 630.3 ft	**TOTAL DEPTH** 36.2 ft	**NORTHING** 598,319	**EASTING** 1,509,474 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/27/11	**COMP. DATE** 06/27/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 17.5 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)
611.6											Begin Coring @ 18.7 ft	
610	611.6	18.7	2.5		(2.3) 92%	(0.4) 16%		(11.2) 90%	(3.4) 27%		611.6 **CRYSTALLINE ROCK** 18.7 - 31.2 GABBRO WITH WEATHERING PROFILE. MODERATELY SEVERE WEATHERING AT TOP, SLOWLY GRADES TO SLIGHTLY WEATHERED AT BASE. MEDIUM TO MODERATELY HARD AT TOP, HARD AT BASE. ROCK TYPE E, RMR=39	18.7
	609.1	21.2										
			5.0		(4.6) 92%	(0.9) 18%						
605	604.1	26.2										
			5.0		(4.3) 86%	(2.1) 42%						
600	599.1	31.2					RS-19				599.1	31.2
			5.0		(4.3) 86%	(3.3) 66%		(4.3) 86%	(3.3) 66%		**CRYSTALLINE ROCK** 31.2-36.2 GABBRO, FRESH, HARD, ONE VERTICAL FRACTURE SPOILS RQD. ROCK TYPE E, RMR=67	
595	594.1	36.2									594.1	36.2
											Boring Terminated at Elevation 594.1 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 78+56 59

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-B (RT LN)	**STATION** 79+31	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 629.0 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 598,375	**EASTING** 1,509,422 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										629.0 GROUND SURFACE	0.0
	627.2	1.8								**RESIDUAL** DARK GRAY SANDY SILTY CLAY	1.8
			100	60/0.1		60/.1				626.7 **WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	2.3
625	624.5	4.5	60/.1			60/.1					
										621.8 **CRYSTALLINE ROCK** SPT REFUSAL	7.2
620							RS-14			**CRYSTALLINE ROCK** AUGITE GABBRO PORPHYRY	
										618.0	11.0
615										**CRYSTALLINE ROCK** FELDSPAR PEGMATITE	
610							RS-15			611.0	18.0
										CRYSTALLINE ROCK AUGITE GABBRO PORPHYRY	
605											
600										598.0	31.0
										Boring Terminated at Elevation 598.0 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 6

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-B (RT LN)	**STATION** 79+31	**OFFSET** 59 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 629.0 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 598,375	**EASTING** 1,509,422 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 23.8 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)
621.8											Begin Coring @ 7.2 ft	
620	621.8	7.2	3.8		(1.7) 45%	(0.8) 21%	RS-14	(1.7) 45%	(0.8) 21%		621.8 **CRYSTALLINE ROCK** HARD,GRAY GREEN, MODERATELY WEATHERED AUGITE GABBRO PORPHYRY, CLOSELY SPACED JOINTS, ROCK TYPE E, RMR=37	7.2
	618.0	11.0									618.0	11.0
615			5.0		(4.0) 80%	(1.6) 31%		(7.0) 100%	(2.5) 35%		**CRYSTALLINE ROCK** HARD, FELDSPAR PEGMATITE, VERY SLIGHTLY WEATHERED, CLOSELY SPACED JOINTS ROCK TYPE D, RMR=55	
	613.0	16.0										
610			5.0		(5.0) 100%	(3.2) 64%	RS-15	(13.0) 100%	(13.0) 100%		611.0	18.0
	608.0	21.0									**CRYSTALLINE ROCK** HARD, AUGITE PORPHYRY GABBRO DARK GREENISH GRAY,SLIGHTLY WEATHERED, MODERATELY CLOSE FRACTURE SPACING. ROCK TYPE E, RMR=84	
605			5.0		(5.0) 100%	(5.0) 100%						
	603.0	26.0										
600			5.0		(5.0) 100%	(5.0) 100%						
	598.0	31.0									598.0	31.0
											Boring Terminated at Elevation 598.0 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-A (RT LN)	**STATION** 79+45	**OFFSET** 12 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.9 ft	**TOTAL DEPTH** 36.3 ft	**NORTHING** 598,353	**EASTING** 1,509,378 / **24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										627.9 GROUND SURFACE	0.0
										RESIDUAL DARK GRAY, DRY, STIFF, CLAYEY SANDY SILT	
625	624.9	3.0	60/.1			60/.1				624.9	3.0
	622.9	5.0	39	43	57	100				**CRYSTALLINE ROCK** SPT REFUSAL	
620										622.9	5.0
										WEATHERED ROCK DARK GRAY, DRY, HARD SANDY SILT	
										618.5	9.4
										CRYSTALLINE ROCK QUARZ-MICA-FELDSPAR	
615					60/.1	60/.1				616.9	11.0
	613.4	14.5								**CRYSTALLINE ROCK** SEVERELY TO MODERATELY SEVERELY WEATHERED PEGMATITE & GABBRO	
	612.4	15.5	42	65/.5							
			60/.1			100/1.0 60/.1					
610											
	608.4	19.5	60/.1			60/.1				608.6	19.3
										CRYSTALLINE ROCK FELDSPAR PEGMATITE	
605											
										602.7	25.2
										CRYSTALLINE ROCK GABBRO PORPHYRY	
600							RS-12				
							RS-13				
595											
										591.6	36.3
										Boring Terminated at Elevation 591.6 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 7

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-A (RT LN)	**STATION** 79+45	**OFFSET** 12 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.9 ft	**TOTAL DEPTH** 36.3 ft	**NORTHING** 598,353	**EASTING** 1,509,378 / **24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 18.4 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
618.5											Begin Coring @ 9.4 ft	
	618.5 616.9	9.4 11.0	1.6		(0.8) 50%	(0.0) 0%		(0.8) 50%	(0.0) 0%		618.5 **CRYSTALLINE ROCK**	9.4
615				N=60/.1							616.9 HARD, FRESH, OFF WHITE, QUARTZ- MICA-FELDSPAR PEGMATITE WITH VERY CLOSE SPACED FRACTURES ROCK TYPE D, RMR=40	11.0
				N=100/1.0 N=60/.1							**CRYSTALLINE ROCK** SEVERELY TO MODERATELY SEVERELY WEATHERED PEGMATITE & GABBRO. SPT REFUSAL AT 11.8' AND 15.5'.	
610	608.4	19.5									608.6	19.3
	606.6	21.3	1.8	N=60/.1	(0.5) 28%	(0.0) 0%		(3.3) 56%	(1.4) 24%		**CRYSTALLINE ROCK** HARD FELDSPAR PEGMATITE, SLIGHTLY WEATHERED, FRACTURES CLOSELY SPACED ROCK TYPE D, RMR=49	
605			5.0		(4.3) 86%	(1.7) 34%					602.7	25.2
	601.6	26.3						(11.0) 99%	(9.1) 82%		**CRYSTALLINE ROCK** DARK GRAY GREEN GABBRO PORPHYRY, HARD, FRESH, WITH WIDE SPACED FRACTURES ROCK TYPE E, RMR=81	
600			5.0		(5.0) 100%	(3.7) 74%	RS-12					
	596.6	31.3					RS-13					
595			5.0		(5.0) 100%	(4.8) 95%						
	591.6	36.3									591.6	36.3
											Boring Terminated at Elevation 591.6 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-B (LT LN)	**STATION** 79+48	**OFFSET** 15 ft LT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.3 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 598,336	**EASTING** 1,509,357 / **24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										627.3 GROUND SURFACE	0.0
625	625.3	2.0	4	8	18	26				**RESIDUAL** DARK GRAY, MOIST, VERY STIFF TO HARD, SANDY SILT	
	622.8	4.5	26	50	60/.1	60/.1				621.8	5.5
620	620.3	7.0	37	60/.1		60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
615	615.3	12.0	20	60/.1		60/.1					
610	610.3	17.0	60/.1			60/.1	RS-8			609.3	18.0
										CRYSTALLINE ROCK GABBRO PORPHYRY	
605										604.3	23.0
										CRYSTALLINE ROCK QUARTZ-FELDSPAR PEGMATITE	
600							RS-9			599.8	27.5
										CRYSTALLINE ROCK GABBRO PORPHYRY	
										596.3	31.0

Boring Terminated at Elevation 596.3 ft in crystalline rock

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 8

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-B (LT LN)	**STATION** 79+48	**OFFSET** 15 ft LT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.3 ft	**TOTAL DEPTH** 31.0 ft	**NORTHING** 598,336	**EASTING** 1,509,357 / **24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/22/11	**COMP. DATE** 06/22/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**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)
609.3											Begin Coring @ 18.0 ft	
	609.3	18.0	3.0		(2.6) 87%	(1.9) 63%	RS-8	(4.3) 86%	(2.2) 44%		609.3 **CRYSTALLINE ROCK** MEDIUM GRAY SLIGHTLY WEATHERED MEDIUM GRAINED HARD FRESH GABBRO PORPHYRY. FROM 18 - 21, FRACTURE AT 1' SPACING, FROM 21-23 CLOSE SPACED FRACTURES. ROCK TYPE E, RMR=51	18.0
	606.3	21.0									604.3	23.0
605			5.0		(3.8) 76%	(1.0) 20%		(3.7) 82%	(2.7) 60%		**CRYSTALLINE ROCK** PINK TO LIGHT TAN, HARD FRESH QUARTZ - FELDSPAR PEGMATITE WITH FRACTURES AT 1' SPACING OR LESS. ROCK TYPE D, RMR=54	
	601.3	26.0									599.8	27.5
600			5.0		(4.7) 94%	(4.1) 82%	RS-9	(3.2) 91%	(3.2) 91%		**CRYSTALLINE ROCK** MEDIUM GRAY FRESH HARD GABBRO PORPHYRY WITH FRACTURES SPACING FROM 1' TO 3'. MOSTLY MEDIUM GRAINED BUT WITH FINER FRACTION AT TOP. ROCK TYPE E, RMR=74	
	596.3	31.0									596.3	31.0

Boring Terminated at Elevation 596.3 ft in crystalline rock

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-A (LT LN)	**STATION** 79+59	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 626.7 ft	**TOTAL DEPTH** 36.9 ft	**NORTHING** 598,314	**EASTING** 1,509,316	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/23/11	**COMP. DATE** 06/23/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										626.7 GROUND SURFACE	0.0
625										**RESIDUAL** DARK GRAY, STIFF, MOIST, CLAYEY SANDY SILT	
	623.7	3.0	40	60/.4		100/.9				623.7	3.0
										WEATHERED ROCK DARK GRAY, HARD, MOIST CLAYEY SANDY SILT	
620	619.7	7.0	32	40	60	100				618.2	8.5
	617.2	9.5	12	17	21	38				**RESIDUAL** DARK GRAY, HARD, MOIST, CLAYEY SANDY SILT	
615	614.7	12.0	65	60/.1		60/.1				614.2	12.5
	612.2	14.5	60/.1			60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
610	609.2	17.5	60/.1			60/.1				608.5	18.2
										CRYSTALLINE ROCK FELDSPAR QUARTZ PEGMATITE	
605										603.3	23.4
600							RS-10			**CRYSTALLINE ROCK** GABBRO PORPHYRY WITH HORNEBLENDE	
595							RS-11				
590										589.8	36.9
										Boring Terminated at Elevation 589.8 ft in crystalline rock NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ	

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 9

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB1-A (LT LN)	**STATION** 79+59	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 626.7 ft	**TOTAL DEPTH** 36.9 ft	**NORTHING** 598,314	**EASTING** 1,509,316	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/23/11	**COMP. DATE** 06/23/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 18.7 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)
608.5											Begin Coring @ 18.2 ft	
	608.5	18.2	3.7		(3.2) 86%	(1.7) 46%		(4.7) 90%	(2.8) 54%		608.5 **CRYSTALLINE ROCK** PINKISH ORANGE AND WHITE, FELDSPAR QUARTZ PEGMATITE, CLOSE SPACED IRON STAINED FRACTURES, BUT HARD, SLIGHTLY WEATHERED	18.2
605	604.8	21.9	5.0		(3.7) 74%	(1.9) 38%		(11.5) 85%	(9.1) 67%		603.3 ROCK TYPE D, RMR=54	23.4
600	599.8	26.9	5.0		(4.9) 98%	(4.7) 94%	RS-10				**CRYSTALLINE ROCK** MEDIUM GRAY, MEDIUM GRAINED GABBRO PORPHYRY WITH HORNBLENDE. VERY SLIGHTLY WEATHERED, FRESH, HARD, MODERATELY CLOSE FRACTURES. CORE AND RQD LOSS AT 23.4 ROCK TYPE E, RMR=67	
595	594.8	31.9	5.0		(4.5) 90%	(3.5) 70%	RS-11					
590	589.8	36.9									589.8	36.9
											Boring Terminated at Elevation 589.8 ft in crystalline rock NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-3	**STATION** 79+09	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 627.9 ft	**TOTAL DEPTH** 36.0 ft	**NORTHING** 598,277	**EASTING** 1,509,350	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/24/11	**COMP. DATE** 06/24/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										627.9 GROUND SURFACE	0.0
										RESIDUAL DARK GRAY, MOIST STIFF TO HARD CLAYEY SANDY SILT	
625	624.7	3.2	10	21	26	47					
	622.2	5.7	24	43	57	100				621.7	6.2
620	619.7	8.2	17	41	59	100				**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
	617.2	10.7	17	37	63	100					
615	614.7	13.2	100/.4			100/.4					
	612.2	15.7	60/.1			60/.1				612.2	15.7
610										**CRYSTALLINE ROCK** SPT REFUSAL	
	608.3	19.6	61	39/.2		100/.7				608.9	19.0
605										**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
										605.8	22.1
	603.3	24.6	22	36	64	100				604.3 **RESIDUAL** DARK GRAY MOIST STIFF TO HARD CLAYEY SANDY SILT	23.6
600										601.0 **WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK ROLLER CONE REFUSAL @ 26.9'	26.9
										599.9	28.0
595										**CRYSTALLINE ROCK** GABBRO	
							RS-21			**CRYSTALLINE ROCK** GABBRO	
										591.9	36.0

Boring Terminated at Elevation 591.9 ft in crystalline rock

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 79+09 -60

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NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 10

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-3	**STATION** 79+09	**OFFSET** 60 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 627.9 ft	**TOTAL DEPTH** 36.0 ft	**NORTHING** 598,277	**EASTING** 1,509,350	**24 HR.** 16.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/24/11	**COMP. DATE** 06/24/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 9.1 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)
601											Begin Coring @ 26.9 ft	
600	601.0	26.9	4.1		(3.9) 95%	(2.7) 66%		(0.9) 82%	(0.0) 0%		601.0 **CRYSTALLINE ROCK** SLIGHTLY WEATHERED, HARD, MEDIUM GRAINED GABBRO WITH FRACTURES SPACED FROM 2" TO 1' APART. ROCK TYPE E, RMR=28	26.9
	596.9	31.0	5.0		(4.9) 98%	(4.8) 96%		(8.0) 100%	(7.9) 99%		599.9 **CRYSTALLINE ROCK** FRESH, HARD MEDIUM GRAINED GABBRO. CORE DISPLAYS BANDED APPEARANCE BUT INVESTIGATION SHOWED IT TO BE AN ARTIFACT OF DRILLING PROCESSES. ROCK TYPE E, RMR=84	28.0
595	591.9	36.0					RS-21				591.9	36.0

Boring Terminated at Elevation 591.9 ft in crystalline rock

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 79+09 -60

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-2	**STATION** 78+59	**OFFSET** 60 ft LT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.0 ft	**TOTAL DEPTH** 31.2 ft	**NORTHING** 598,241	**EASTING** 1,509,384 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/23/11	**COMP. DATE** 06/24/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
										627.0 GROUND SURFACE	0.0
625										**RESIDUAL** DARK GRAY, STIFF TO HARD, MOIST, CLAYEY SANDY SILT	
	623.9	3.1	63	60/.1		60/.1				623.4	3.6
	621.4	5.6	31	22	23	45				**CRYSTALLINE ROCK** SPT REFUSAL	
620										621.4	5.6
	618.9	8.1	62	60/.1		60/.1				**RESIDUAL** DARK GRAY, HARD, MOIST, CLAYEY SANDY SILT	
	616.4	10.6	40	60/.1		60/.1				618.4	8.6
615										**CRYSTALLINE ROCK** SPT REFUSAL	
	613.9	13.1	60/.1			60/.1					
	612.4	14.6	34	66/.4		100/.9				612.4	14.6
610										**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
										611.0	16.0
										CRYSTALLINE ROCK ROLLER CONE REFUSAL AT 19.7'	
										607.3	19.7
605										**CRYSTALLINE ROCK** GABBRO	
							RS-20			602.8	24.2
600										**CRYSTALLINE ROCK** GABBRO	
										595.8	31.2
										Boring Terminated at Elevation 595.8 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 78+59 -60

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 11

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-2	**STATION** 78+59	**OFFSET** 60 ft LT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 627.0 ft	**TOTAL DEPTH** 31.2 ft	**NORTHING** 598,241	**EASTING** 1,509,384 / **24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/23/11	**COMP. DATE** 06/24/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 11.5 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
607.3											Begin Coring @ 19.7 ft	
	607.3	19.7	1.5		(1.4) 93%	(0.5) 33%		(3.7) 82%	(1.5) 33%		607.3 **CRYSTALLINE ROCK** 19.7-24.2 VERY SLIGHTLY WEATHERED, HARD GABBRO, IRON STAINED AT FRACTURES. FRACTURES ARE CLOSE SPACED. ROCK TYPE E, RMR=44	19.7
605	605.8	21.2	5.0		(4.0) 80%	(2.1) 42%					602.8	24.2
	600.8	26.2					RS-20	(7.0) 100%	(5.8) 83%		**CRYSTALLINE ROCK** 24.2 -31.2 FRESH, HARD, GABBRO, FRACTURES ARE MODERATELY CLOSE SPACED ROCK TYPE E, RMR=76	
600			5.0		(5.0) 100%	(4.4) 88%						
	595.8	31.2									595.8	31.2
											Boring Terminated at Elevation 595.8 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 78+59 -60

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-6	**STATION** 83+59	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 621.8 ft	**TOTAL DEPTH** 25.5 ft	**NORTHING** 598,596	**EASTING** 1,509,037	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/27/11	**COMP. DATE** 06/27/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
625											
										621.8 GROUND SURFACE	0.0
620										**RESIDUAL** DARK GRAY, MOIST STIFF TO HARD, CLAYEY SANDY SILT	
	619.1	2.7	6	50	60/.1	60/.1				618.6	3.2
	616.6	5.2	22	60/.1		60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
615	614.1	7.7	60/.1			60/.1					
	611.6	10.2	50	60/.1		60/.1				610.6	11.2
610										**CRYSTALLINE ROCK** GABBRO	
605							RS-16				
600										598.2	23.6
							RS-17			596.3 **CRYSTALLINE ROCK** GABBRO	25.5
										Boring Terminated at Elevation 596.3 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 83+59 -59

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 12

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-6	**STATION** 83+59	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 621.8 ft	**TOTAL DEPTH** 25.5 ft	**NORTHING** 598,596	**EASTING** 1,509,037	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/27/11	**COMP. DATE** 06/27/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**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)
610.6											Begin Coring @ 11.2 ft	
	610.6	11.2	4.3		(3.6) 84%	(0.4) 9%		(10.0) 81%	(0.8) 6%		610.6 **CRYSTALLINE ROCK** 11.2-23.6 SOMEWHAT RUSTY BROWN AND SPOTTED, MODERATELY WEATHERED, MODERATELY HARD GABBRO. CORE LOSS POSSIBLY FROM MORE SEVERELY WEATHERED INTERVALS ROCK TYPE E, RMR=33	11.2
	606.3	15.5										
605			5.0		(4.2) 84%	(0.4) 8%	RS-16					
	601.3	20.5										
600			5.0		(3.6) 72%	(1.4) 28%					598.2	23.6
	596.3	25.5					RS-17	(1.9) 100%	(1.4) 74%		596.3 **CRYSTALLINE ROCK** 23.6 - 25.5 LIGHT GRAY, FRESH HARD GABBRO. ROCK TYPE E, RMR=67	25.5
											Boring Terminated at Elevation 596.3 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 83+59 -59

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-4	**STATION** 82+79	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 623.6 ft	**TOTAL DEPTH** 30.7 ft	**NORTHING** 598,540	**EASTING** 1,509,094
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/28/11	**COMP. DATE** 06/28/11	**SURFACE WATER DEPTH** N/A

GROUND WTR (ft)	
0 HR.	NM
24 HR.	14.0

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)
625											
										623.6 GROUND SURFACE	0.0
	621.6	2.0								RESIDUAL DARK GRAY, MOIST, STIFF CLAYEY SANDY SILT	2.0
620			100	60/.1		60/.1					
	619.1	4.5	60/.1			60/.1				619.0 CRYSTALLINE ROCK SPT REFUSAL	4.6
615										CRYSTALLINE ROCK GABBRO	
	613.5	10.1	60/.1			60/.1				614.2	9.4
										612.9 CRYSTALLINE ROCK SPT REFUSAL (GABBRO)	10.7
610	610.4	13.2	60/.1			60/.1				610.4 CRYSTALLINE ROCK GABBRO	13.2
	608.0	15.6	60/.1			60/.1				607.9 CRYSTALLINE ROCK SPT REFUSAL (GABBRO)	15.7
605										CRYSTALLINE ROCK GABBRO	
600											
										597.9 CRYSTALLINE ROCK GABBRO	25.7
595											
										592.9	30.7

Boring Terminated at Elevation 592.9 ft in crystalline rock

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 82+79 -59

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 13

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-4	**STATION** 82+79	**OFFSET** 59 ft LT	**ALIGNMENT** -L-
COLLAR ELEV. 623.6 ft	**TOTAL DEPTH** 30.7 ft	**NORTHING** 598,540	**EASTING** 1,509,094
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/28/11	**COMP. DATE** 06/28/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 22.3 ft		

GROUND WTR (ft)	
0 HR.	NM
24 HR.	14.0

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)
619												
	619.0	4.6	4.8		(0.6) 13%	(0.0) 0%		(9.7) 46%	(1.6) 8%		Begin Coring @ 4.6 ft	
615											619.0 CRYSTALLINE ROCK 4.6 - 25.7 GRAY, MODERATE, TO MODERATELY SEVERELY WEATHERED, HARD TO SOFT GABBRO. VERY CLOSE- SPACED FRACTURES. SIGNIFICANT ROCK LOSS, ASSUMED TO BE VOIDS OR COMPLETELY WEATHERED INTERVALS. ROCK QUALITY INPROVES WITH DEPTH. ROCK TYPE E, RMR=30	4.6
	614.2	9.4									614.2	9.4
	612.9	10.7		N=60/.1							612.9	10.7
			2.5		(1.3) 52%	(0.0) 0%						
610	610.4	13.2									610.4 CRYSTALLINE ROCK	13.2
				N=60/.1							CRYSTALLINE ROCK	
	607.9	15.7									607.9 CRYSTALLINE ROCK	15.7
			5.0	N=60/.1	(4.3) 86%	(0.7) 14%					CRYSTALLINE ROCK	
605												
	602.9	20.7										
			5.0		(3.5) 70%	(0.9) 18%						
600												
	597.9	25.7									597.9	25.7
			5.0		(4.3) 86%	(3.1) 62%		(4.3) 86%	(3.1) 62%		CRYSTALLINE ROCK 25.7 - 30.7GRAY, HARD FRESH GABBRO, OCCASIONAL IRON STAINED JOINTS, JOINTS ARE MODERATELY CLOSELY SPACED. ROCK TYPE E, RMR=72	
595												
	592.9	30.7									592.9	30.7

Boring Terminated at Elevation 592.9 ft in crystalline rock

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 82+79 -59

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-A (LT LN)	**STATION** 82+09	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 624.9 ft	**TOTAL DEPTH** 40.8 ft	**NORTHING** 598,492	**EASTING** 1,509,144	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/28/11	**COMP. DATE** 06/28/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
625										624.9 GROUND SURFACE	0.0
	622.4	2.5	43	57/.4		100/.9				**RESIDUAL** DARK GRAY STIFF TO HARD, CLAYEY SANDY SILT — 622.4	2.5
620	619.9	5.0	100/.5			100/.5				**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK — 617.9	7.0
	617.4	7.5	60/.1			60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
615	614.9	10.0	24	60/.1		60/.1				612.3	12.6
	612.4	12.5	60/.1			60/.1	RS-1	▼		**CRYSTALLINE ROCK** GABBRO	
610											
605											
600							RS-2			600.1	24.8
										CRYSTALLINE ROCK GABBRO	
595										594.1	30.8
										CRYSTALLINE ROCK FELDSPAR QUARTZ PEGMATITE	
590										589.1	35.8
										CRYSTALLINE ROCK GABBRO	
585										584.1	40.8
										Boring Terminated at Elevation 584.1 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL000180002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 14

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-A (LT LN)	**STATION** 82+09	**OFFSET** 59 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 624.9 ft	**TOTAL DEPTH** 40.8 ft	**NORTHING** 598,492	**EASTING** 1,509,144	**24 HR.** 15.0
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/28/11	**COMP. DATE** 06/28/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 28.2 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)
612.3											Begin Coring @ 12.6 ft	
610	612.3	12.6	3.2		(2.3) 72%	(0.7) 22%	RS-1	(6.4) 52%	(0.7) 6%		612.3 **CRYSTALLINE ROCK** 12.6-24.8 MODERATE TO MODERATELY SEVERELY WEATHERED GABBRO, MODERATELY HARD, OR LESS, SIGNIFICANT CORE LOSS. RECOVERED ROCK HAS SANDY APPEARANCE, SLIGHTLY FRIABLE. ROCK TYPE E, RMR=27	12.6
	609.1	15.8	5.0		(2.7) 54%	(0.0) 0%						
605	604.1	20.8	5.0		(2.7) 54%	(0.6) 12%						
600	599.1	25.8	5.0		(2.7) 54%	(2.7) 54%	RS-2	(4.3) 72%	(4.3) 72%		600.1 **CRYSTALLINE ROCK** 24.8 - 30.8 LIGHT GREY, HARD FRESH GABBRO ROCK TYPE E, RMR=81	24.8
595	594.1	30.8	5.0		(2.4) 48%	(1.4) 28%		(2.9) 58%	(1.4) 28%		594.1 **CRYSTALLINE ROCK** 30.8 - 35.8 HARD FRESH FELDSPAR QUARTZ PEGMATITE. 50% CORE LOSS. ROCK TYPE D, RMR=81	30.8
590	589.1	35.8	5.0		(5.0) 100%	(5.0) 100%		(5.0) 100%	(5.0) 100%		589.1 **CRYSTALLINE ROCK** 35.8 - 40.8 LIGHT GRAY HARD FRESH GABBRO, ALTERATION AT LOWER 2' DOES NOT AFFECT STRENGTH. ROCK TYPE E, RMR=81	35.8
585	584.1	40.8									584.1 Boring Terminated at Elevation 584.1 ft in crystalline rock	40.8

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL000180002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-B (LT LN)	**STATION** 82+01	**OFFSET** 13 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 625.6 ft	**TOTAL DEPTH** 35.8 ft	**NORTHING** 598,519	**EASTING** 1,509,182	**24 HR.** 11.0 Caved
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/30/11	**COMP. DATE** 06/30/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
625										625.6 GROUND SURFACE	0.0
	623.0	2.6	14	50	60/.1	60/.1				**RESIDUAL** DARK GRAY, STIFF TO HARD, DRY, CLAYEY SANDY SILT	
620	620.5	5.1	100	60/.1		60/.1				622.0 **CRYSTALLINE ROCK** SPT REFUSAL	3.6
	618.6	7.0	65	35/.4		100/.9				618.6 **WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	7.0
615	616.1	9.5	60/.1			60/.1				616.1 **CRYSTALLINE ROCK** SPT REFUSAL ROLLER CONE REFUSAL @ 22.5'	9.5
	613.6	12.0	60/.1			60/.1					
610	611.1	14.5	60/.1			60/.1					
	608.6	17.0	60/.1			60/.1					
605	606.1	19.5	60/.1			60/.1					
	603.6	22.0	60/.1			60/.1	RS-7			603.1 **CRYSTALLINE ROCK** GABBRO	22.5
600											
595											
590										589.8 Boring Terminated at Elevation 589.8 ft in crystalline rock	35.8

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL00018&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 15

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-B (LT LN)	**STATION** 82+01	**OFFSET** 13 ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 625.6 ft	**TOTAL DEPTH** 35.8 ft	**NORTHING** 598,519	**EASTING** 1,509,182	**24 HR.** 11.0 Caved
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 06/30/11	**COMP. DATE** 06/30/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 13.3 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)
603.1											Begin Coring @ 22.5 ft	
	603.1	22.5	3.7		(3.4) 92%	(3.4) 92%	RS-7	(12.6) 95%	(10.2) 77%		603.1 **CRYSTALLINE ROCK** GRAY, HARD, FRESH GABBRO WITH FRACTURES AT 1 TO 3' SPACING ROCK TYPE E, RMR=68	22.5
600	599.4	26.2										
			4.7		(4.7) 100%	(3.6) 77%						
595	594.7	30.9										
			4.9		(4.5) 92%	(3.2) 65%						
590	589.8	35.8									589.8 Boring Terminated at Elevation 589.8 ft in crystalline rock	35.8

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL00018&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-A (RT LN)	**STATION** 81+95	**OFFSET** 13 ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 625.7 ft	**TOTAL DEPTH** 35.2 ft	**NORTHING** 598,533	**EASTING** 1,509,205	**24 HR.** 15.4
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/01/11	**COMP. DATE** 07/01/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
630											
625										625.7 GROUND SURFACE	0.0
										RESIDUAL DARK GRAY, HARD, MOIST, SANDY SILT	
620	620.3	5.4								620.3	5.4
			100/.4	60/.1		60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
	617.8	7.9	60/.1			60/.1					
615	615.3	10.4									
			25	60/.1		60/.1					
	612.8	12.9	60/.1			60/.1					
610	610.3	15.4									
	609.5	16.2	60/.1			60/.1					
			60/.1							607.5	18.2
605										**CRYSTALLINE ROCK** GABBRO	
							RS-5				
600										598.5	27.2
							RS-6			**CRYSTALLINE ROCK** PORPHYRITIC GABBRO	
595											
										590.5	35.2
										Boring Terminated at Elevation 590.5 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 16

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-A (RT LN)	**STATION** 81+95	**OFFSET** 13 ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 625.7 ft	**TOTAL DEPTH** 35.2 ft	**NORTHING** 598,533	**EASTING** 1,509,205	**24 HR.** 15.4
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/01/11	**COMP. DATE** 07/01/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 17.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
607.5											Begin Coring @ 18.2 ft	
	607.5	18.2	2.0		(1.4) 70%	(0.5) 25%		(8.0) 89%	(4.2) 47%		607.5 **CRYSTALLINE ROCK**	18.2
605	605.5	20.2									GRAY, MEDIUM GRAINED GABBRO, SLIGHT TO MODERATE WEATHERED, HARD TO MOD HARD, SEVERE WEATHERING ALONG SOME FRACTURES, FRACTURE SPACING CLOSE TO MOD CLOSE, (.16' TO 3') ROCK TYPE E, RMR=49	
			5.0		(4.6) 92%	(3.1) 62%	RS-5					
600	600.5	25.2										
			5.0		(4.5) 90%	(2.9) 57%					598.5	27.2
							RS-6	(7.7) 96%	(7.7) 96%		**CRYSTALLINE ROCK** GRAY, FRESH, VERY HARD, MED GRAINED PORPHYRITIC GABBRO. ROCK TYPE E, RMR=84	
595	595.5	30.2										
			5.0		(5.0) 100%	(5.0) 100%						
	590.5	35.2									590.5	35.2
											Boring Terminated at Elevation 590.5 ft in crystalline rock	

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-B (RT LN)	**STATION** 81+86	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 625.8 ft	**TOTAL DEPTH** 40.9 ft	**NORTHING** 598,560	**EASTING** 1,509,244 / **24 HR.** 14.9
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/06/11	**COMP. DATE** 07/06/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
630										
625										625.8 / 0.0 GROUND SURFACE
	623.6	2.2	7	16	65	81				**RESIDUAL** DARK GRAY STIFF TO HARD, MOIST, SANDY CLAYEY SILT
	621.1	4.7	50	60/.1		60/.1				621.1 / 4.7 **WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK
620	618.6	7.2	20	32	68/.4	100/.9				620.6 / 5.2; 618.8 / 7.0 **CRYSTALLINE ROCK** SPT REFUSAL
	616.1	9.7	37	63/.3		100/.8				**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK
615	613.6	12.2	21	33	67/.3	100/.8				
	611.1	14.7	100/.4			100/.4				609.8 / 16.0 **CRYSTALLINE ROCK** SPT REFUSAL
610	608.6	17.2	60/.1			60/.1				606.2 / 19.6 **CRYSTALLINE ROCK** GABBRO
605							RS-3			
600							RS-4			
										596.9 / 28.9 **CRYSTALLINE ROCK** GABBRO WITH CALCITE VEINS
595										
590										
585										584.9 / 40.9 Boring Terminated at Elevation 584.9 ft in crystalline rock

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 17

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. EB2-B (RT LN)	**STATION** 81+86	**OFFSET** 60 ft RT	**ALIGNMENT** -L- / **0 HR.** NM
COLLAR ELEV. 625.8 ft	**TOTAL DEPTH** 40.9 ft	**NORTHING** 598,560	**EASTING** 1,509,244 / **24 HR.** 14.9
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/06/11	**COMP. DATE** 07/06/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**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))
606.2											Begin Coring @ 19.6 ft
605	606.2 / 604.9	19.6 / 20.9	1.3		(1.3) 100%	(0.4) 31%	RS-3	(9.0) 97%	(0.8) 9%		606.2 / 19.6 **CRYSTALLINE ROCK** 19.6 - 28.9 LIGHT GRAY, MEDIUM GRAINED GABBRO, VERY SLIGHTLY WEATHERED, HARD, IRON STAIN ON JOINTS. CLOSE SPACED JOINTING. ROCK TYPE E, RMR=33
			5.0		(5.0) 100%	(0.8) 16%					
600	599.9	25.9					RS-4				
			5.0		(5.0) 100%	(0.8) 16%					596.9 / 28.9 **CRYSTALLINE ROCK** 28.9 - 40.9 MEDIUM GRAY, MEDIUM GRAINED GABBRO, VERY SLIGHTLY WEATHERED, HARD TO MODERTELY HARD, EXCEPT AT 30.2, 31.5, 36.9 THERE ARE CALCITE VEINS WITH CHLORITE ON SELVAGE. CHLORITE SHOWS SLIGHT TENDENCY TO SLAKE. ROCK TYPE E, RMR=49
595	594.9	30.9						(12.0) 100%	(4.9) 41%		
			5.0		(5.0) 100%	(0.6) 12%					
590	589.9	35.9									
			5.0		(5.0) 100%	(2.6) 52%					
585	584.9	40.9									584.9 / 40.9 Boring Terminated at Elevation 584.9 ft in crystalline rock

NOTE: ORIGINAL BORING FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-5	**STATION** 83+11	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 624.5 ft	**TOTAL DEPTH** 36.0 ft	**NORTHING** 598,648	**EASTING** 1,509,154	**24 HR.** 15.1
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/05/11	**COMP. DATE** 07/05/11	**SURFACE WATER DEPTH** N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
625											
										624.5 GROUND SURFACE	0.0
	622.1	2.4								**RESIDUAL** DARK GRAY, MOIST, STIFF TO HARD, CLAYEY SANDY SILT	
			19	54	60/.1	60/.1					
620	619.6	4.9								621.1	3.4
			35	60/.1		60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
	617.1	7.4									
			50	60/.1		60/.1				616.5	8.0
615	614.6	9.9								**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
			35	65							
	612.1	12.4								613.5	11.0
			42	60/.1		60/.1				**CRYSTALLINE ROCK** SPT REFUSAL	
610	609.6	14.9									
			33	60/.1		60/.1					
										607.5	17.0
605										**CRYSTALLINE ROCK** GABBRO	
	603.5	21.0								603.5	21.0
			35	51	60/.1	60/.1				**CRYSTALLINE ROCK** SPT REFUSAL (GABBRO)	
	601.0	23.5									
600			60/.1			60/.1				599.1	25.4
										CRYSTALLINE ROCK GABBRO	
595										595.1	29.4
							RS-18			**CRYSTALLINE ROCK** PORPHYRITIC GABBRO	
590										588.5	36.0
										Boring Terminated at Elevation 588.5 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 83+11 60

NCDOT BORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 18

WBS 34408.1.1	**TIP** R-2246B	**COUNTY** CABARRUS	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION Bridges on SR 1430 George Liles Parkway over US 29 (RETAINING WALLS 1 & 2)			**GROUND WTR (ft)**
BORING NO. B-5	**STATION** 83+11	**OFFSET** 60 ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 624.5 ft	**TOTAL DEPTH** 36.0 ft	**NORTHING** 598,648	**EASTING** 1,509,154	**24 HR.** 15.1
DRILL RIG/HAMMER EFF./DATE HFO0066 CME-550 81% 09/02/2009		**DRILL METHOD** NW Casing W/SPT & Core	**HAMMER TYPE** Automatic
DRILLER Estep, J. E.	**START DATE** 07/05/11	**COMP. DATE** 07/05/11	**SURFACE WATER DEPTH** N/A
CORE SIZE NO/NQ	**TOTAL RUN** 14.6 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)
607.5												
	607.5	17.0	4.0		(1.0) 25%	(0.0) 0%		(1.0) 12%	(0.0) 0%		Begin Coring @ 17.0 ft	
605											607.5 **CRYSTALLINE ROCK** 17-25.4 GABBRO, MODERATELY SEVERELY WEATHERED, MEDIUM HARD TO SOFT, FRIABLE. SIGNIFICANT CORE LOSS ROCK TYPE E, RMR=16	17.0
	603.5	21.0									603.5	21.0
				N=60/.1							**CRYSTALLINE ROCK**	
600				N=60/.1								
	599.1	25.4									599.1	25.4
	598.5	26.0	0.6		(0.6) 100%	(0.6) 100%		(4.0) 100%	(1.4) 35%		**CRYSTALLINE ROCK** 25.4-29.4 LIGHT GRAY, HARD VERY SLIGHTLY WEATHERED GABBRO, ROCK TYPE E, RMR=35	
			5.0		(5.0) 100%	(2.3) 46%						
595							RS-18				595.1	29.4
	593.5	31.0						(6.6) 100%	(4.5) 68%		**CRYSTALLINE ROCK** 29.4 - 36 HARD FRESH PORPHYRITIC GABBRO ROCK TYPE E, RMR=67	
			5.0		(5.0) 100%	(3.1) 62%						
590												
	588.5	36.0									588.5	36.0
											Boring Terminated at Elevation 588.5 ft in crystalline rock	

NOTE: ORIGINAL BORING NAME FROM R2246B_GEO_bh_BRDG_CABARRUS.GPJ IS 83+11 60

NCDOT CORE SINGLE R2246B_GEO_BH_RWAL0001&0002_CABARRUS.GPJ NC_DOT.GDT 12/20/12

TEST RESULTS

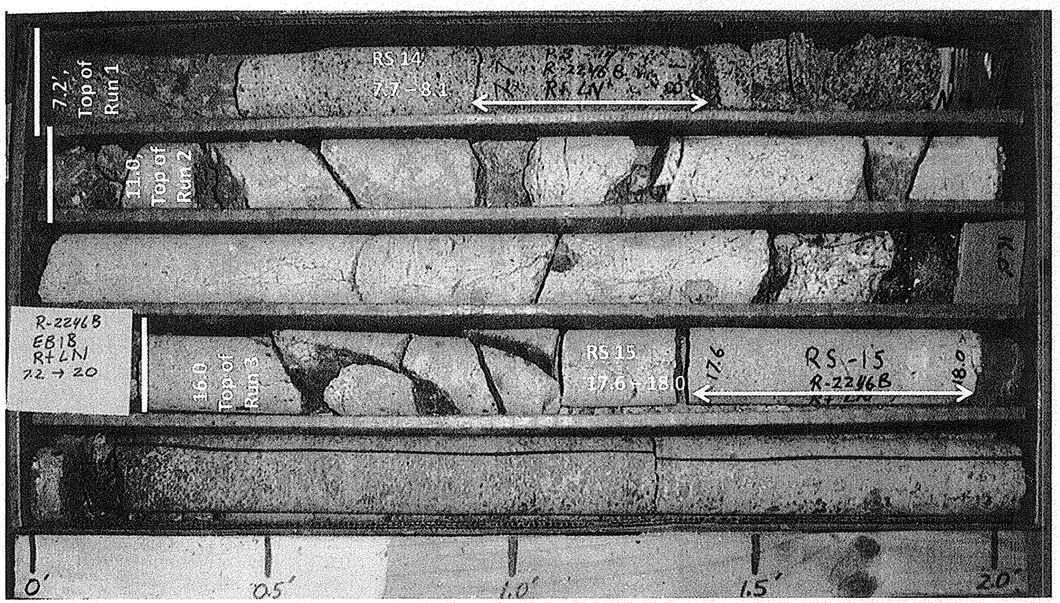
PROJECT: 34408.1.1 (R-2246B)
COUNTY: CABARRUS
SITE DESCRIPTION: BRIDGES ON SR 1430 (GEORGE LILES PARKWAY) OVER US 29 (RETAINING WALLS 1 & 2)

ROCK SAMPLE RESULTS

SAMPLE NO.	*OFFSET*	*STATION*	*DEPTH INTERVAL*	*RQD*	*UNIT WT (pcf)*	Q(ksf)	E(MPsi)
		B-1					
RS-19	59.0 RT.	78+56 -L-	29.0-29.4	27%	176.6	276	0.252
		EB1-B (RT LN)					
RS-14	59.0 RT	79+31 -L-	7.70-8.10	21%	170.9	328.32	0.264
RS-15	59.0 RT	79+31 -L-	17.60-18.00	35%	163.4	1257.12	6.24
		EB1-A (RT LN)					
RS-12	12.0 RT	79+45 -L-	27.80-28.30	82%	182.1	1452.96	8.34
RS-13	12.0 RT	79+45 -L-	29.30-30.30	82%	184.5	1689.12	12.05
		EB1-B (LT LN)					
RS-8	15.0 LT	79+48 -L-	19.00-19.30	44%	182.3	774.72	82.6
RS-9	15.0 LT	79+48 -L-	27.00-27.40	60%	165.3	838.08	0.21
		EB1-A (LT LN)					
RS-10	60.0 LT	79+59 -L-	25.60-26.10	67%	190.6	1778.4	8.51
RS-11	60.0 LT	79+59 -L-	28.90-29.40	67%	184.3	1886.4	10.11
		B-3					
RS-21	60.0 LT.	79+09 -L-	34.4-34.8	99%	189.9	2080.8	11.99
		B-2					
RS-20	60.0 LT.	78+59 -L-	24.2-24.8	83%	188.1	1846.08	16.15
		B-6					
RS-16	59.0 LT.	83+59 -L-	17.1-17.4	6%	179.3	218.016	0.2
RS-17	59.0 LT.	83+59 -L-	24.1-24.6	74%	194.7	1314.72	10.26
		EB2-A (LT LN)					
RS-1	59.0 LT.	82+09 -L-	13.90-14.20	6%	189.0	2089.44	19.72
RS-2	59.0 LT.	82+09 -L-	25.10-25.60	72%	182.8	2017.44	6.32
		EB2-B (LT LN)					
RS-7	13.0 LT	82+01 -L-	22.50-23.00	77%	186.3	1546.56	5.75
		EB2-A (RT LN)					
RS-5	13.0 RT	81+95 -L-	20.60-24.60	47%	181.4	342.72	0.371
RS-6	13.0 RT	81+95 -L-	27.50-27.90	96%	185.5	915.84	1.092
		EB2-B (RT LN)					
RS-3	60.0 RT	81+86 -L-	20.20-20.60	9%	183.9	1323.36	3.83
RS-4	60.0 RT	81+86 -L-	24.00-24.40	9%	185.5	1244.16	3.2
		B-5					
RS-18	60.0 RT	83+11 -L-	29.1-29.5	35%	185.4	1729.44	7.67

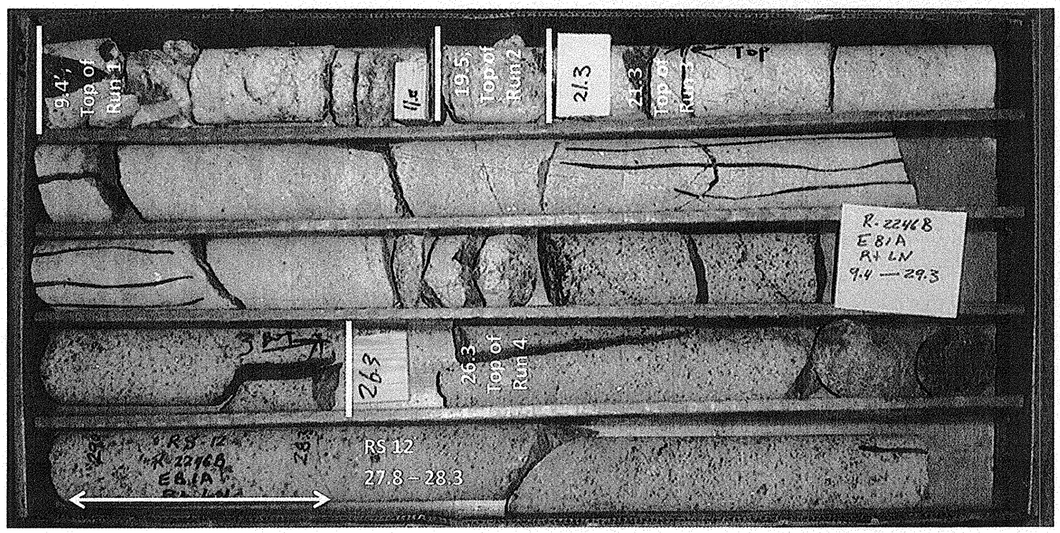
18.7
Top of
Run 1
21.2
Top of
Run 2
R-2246 B
Rel well (-75)
78+56, 59 Rt
EB1B Rt Ln
18.7 - 26.2
0'
0.5'
1.0'
1.5'
2.0'

26.2
Top of
Run 3
RS 19
29.0 - 29.4
31.2
Top of
Run 4
R-2246 B
Rel well (-75)
78+56, 59 Rt
EB 1B Rt Ln
26.2 - 36.2
Bpt
36.2
End of
Boring
0'
0.5'
1.0'
1.5'
2.0'

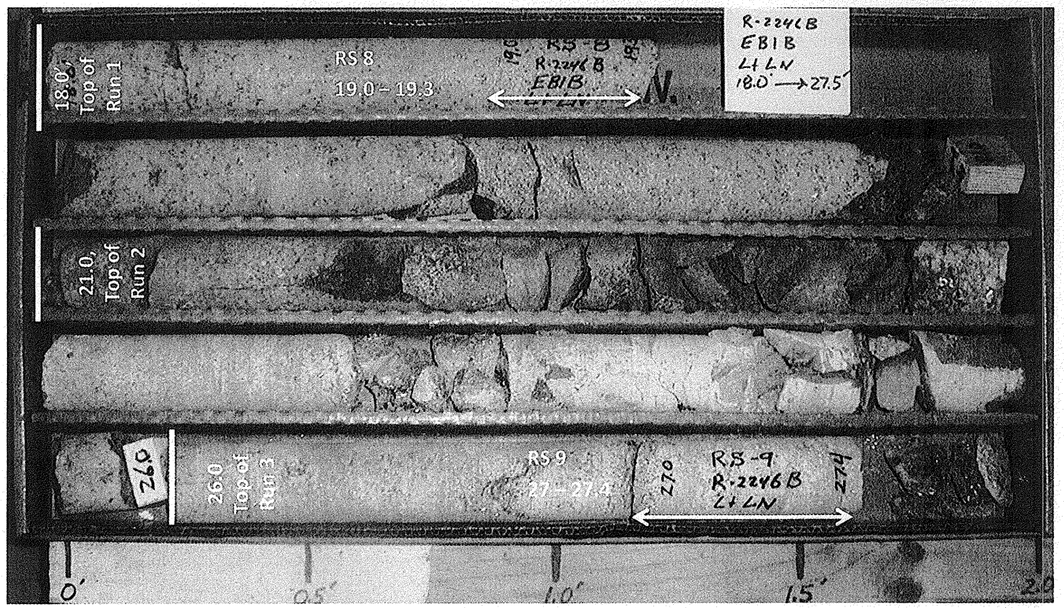

7.2'
Top of
Run 1
RS 14
7.7 - 8.1
11.0
Top of
Run 2
R-2246B
EB1B
Rt LN
7.2 → 20
16.0
Top of
Run 3
RS 15
17.6 - 18.0
17.6
RS-15
R-2246B
18.0
0'
0.5'
1.0'
1.5'
2.0'

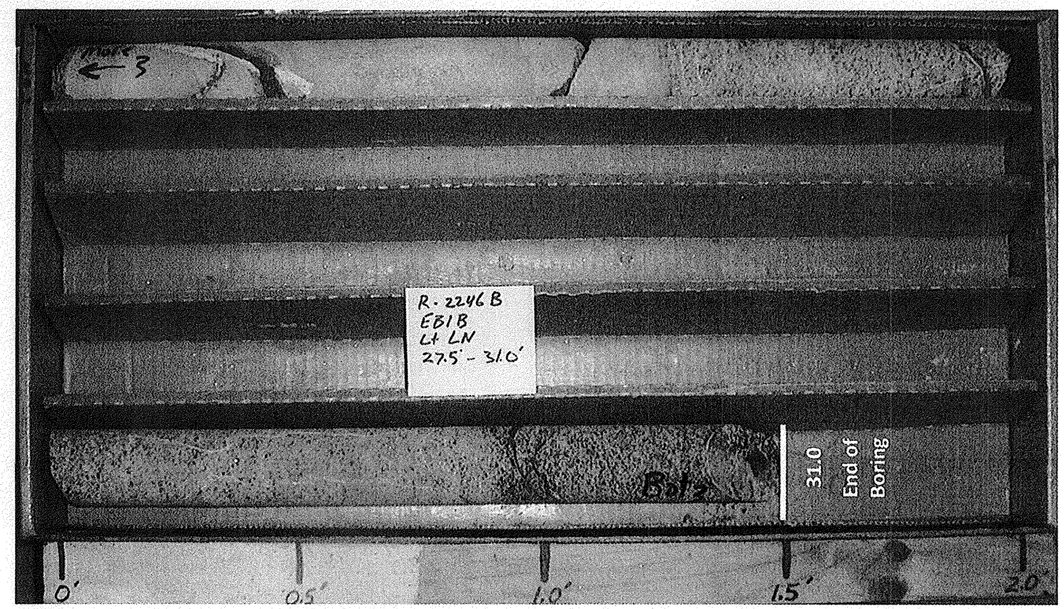
#5
31.0
End of
Boring
R-2246B
EB1B
Rt LN
28.6 - 31
0'
0.5'
1.0'
1.5'

21.0
Top of
Run 4
26.0
Top of
Run 5
R-2246B
EB1B
Rt LN
20 - 28.6
0'
0.5'
1.0'
1.5'
2.0'


9.4'
Top of
Run 1
11.5
19.5
Top of
Run 2
21.3
25.3
Top of
Run 3
R-2246B
EB1A
Rt LN
9.4 — 29.3
26.3
26.3
Top of
Run 4
RS 12
27.8 – 28.3

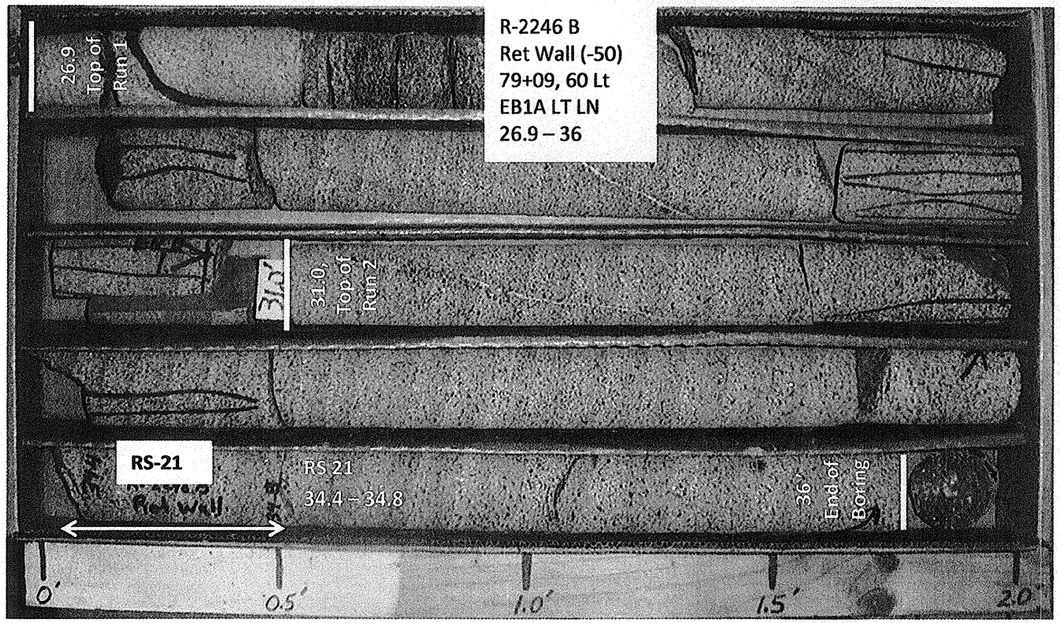
R-2246B
EB1A
Rt LN
29.3 - 36.3
RS 13
27.8 – 28.3
31.3
31.3
Top of
Run 5
36.3
End of
Boring
0'
0.5'
1.0'
1.5'
2.0'


R-2246B
EB1B
Lt LN
18.0' → 27.5'
18.0
Top of
Run 1
RS 8
19.0 - 19.3
RS-8
R-2246B
EB1B
N.
21.0
Top of
Run 2
26.0
26.0
Top of
Run 3
RS 9
27 - 27.4
RS-9
R-2246B
Lt LN
27.0
27.4
0'
0.5'
1.0'
1.5'
2.0'

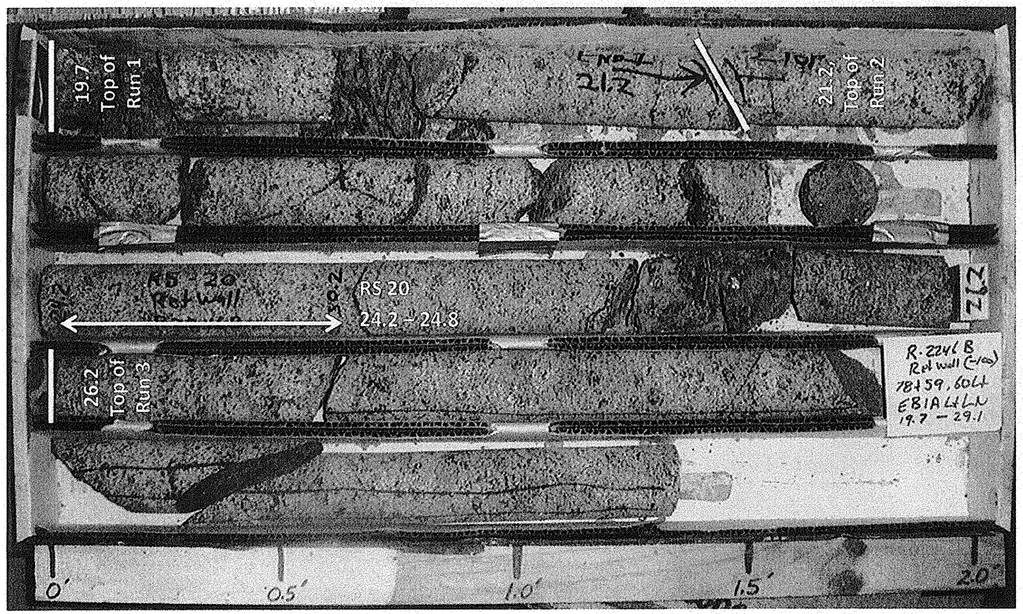

R-2246B
EB1B
Lt LN
27.5' - 31.0'
31.0
End of
Boring
0'
0.5'
1.0'
1.5'
2.0'

R-2246B
EB1-A (LT LN)

R-2246B
79+09_60LT_EB1A_LT
(B-3)



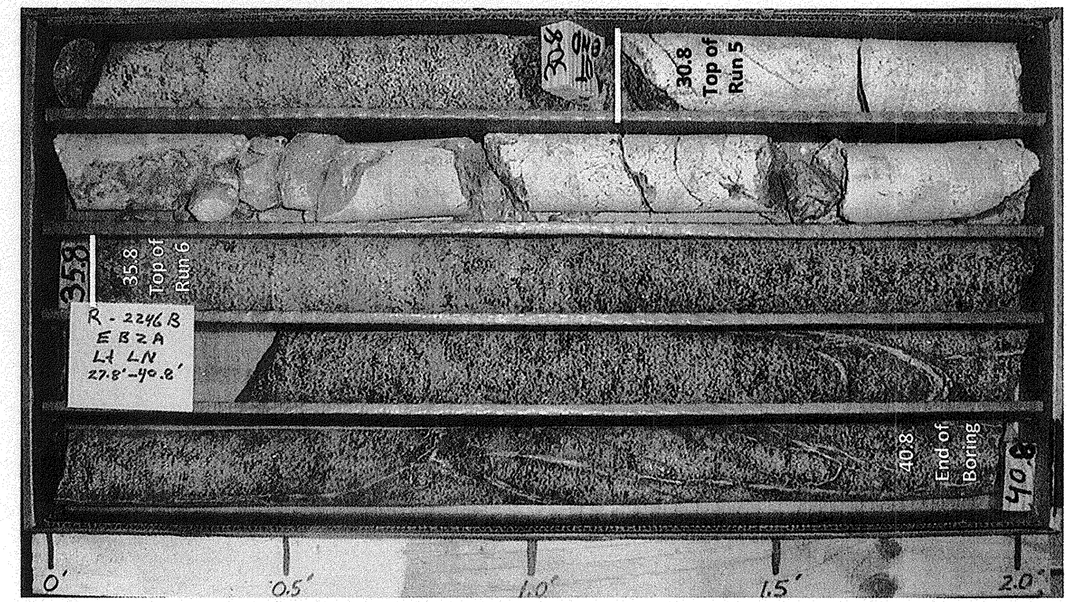
R-2246B
78+59_60LT_EB1A_LT
(B-2)



R-2246B
83+59_59LT_EB2A_LT
(B-6)

R-2246B
82+79_59LT_EB2A_LT
(B-4)

12.6
Top of
Run 1
RS 1
13.9 - 14.2
R-2246B
EB2A
LT LN
R-2246B
EB2A
LT LN
12.6' — 27.8'
15.8
15.8
Top of
Run 2
20.8
Top of
Run 3
RS 2
25.1 - 25.6
25.1
25.6
R-2246B
EB2A
LT LN
25.8
Top of
Run 4
0'
0.5'
1.0'
1.5'
2.0'

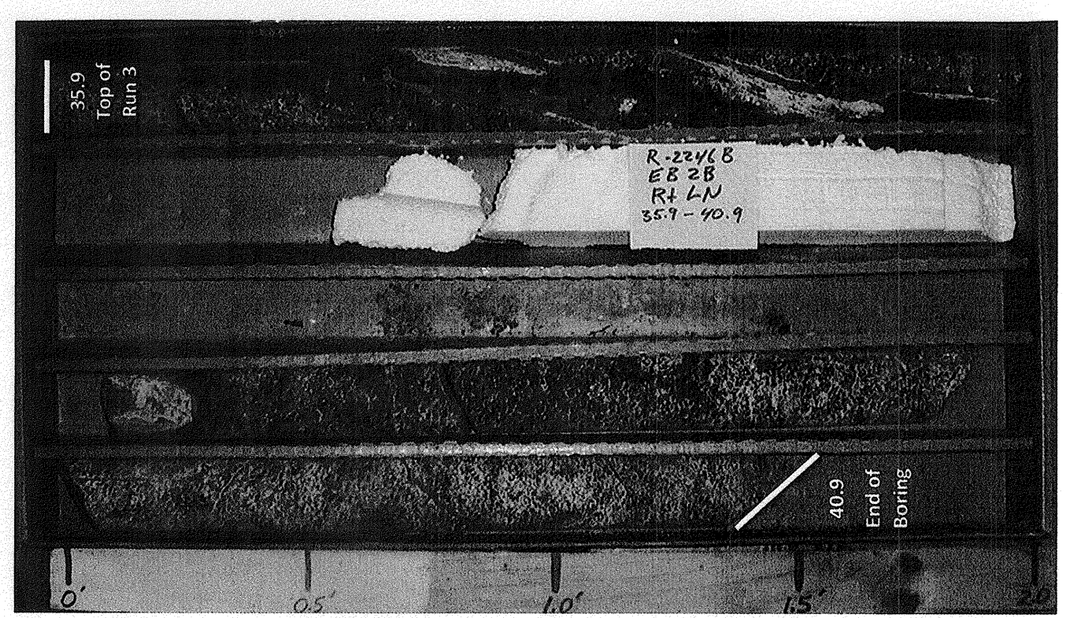

30.8
END
30.8
Top of
Run 5
35.8
35.8
Top of
Run 6
R-2246B
EB2A
LT LN
27.8'-40.8'
40.8
End of
Boring
40.8
0'
0.5'
1.0'
1.5'
2.0'

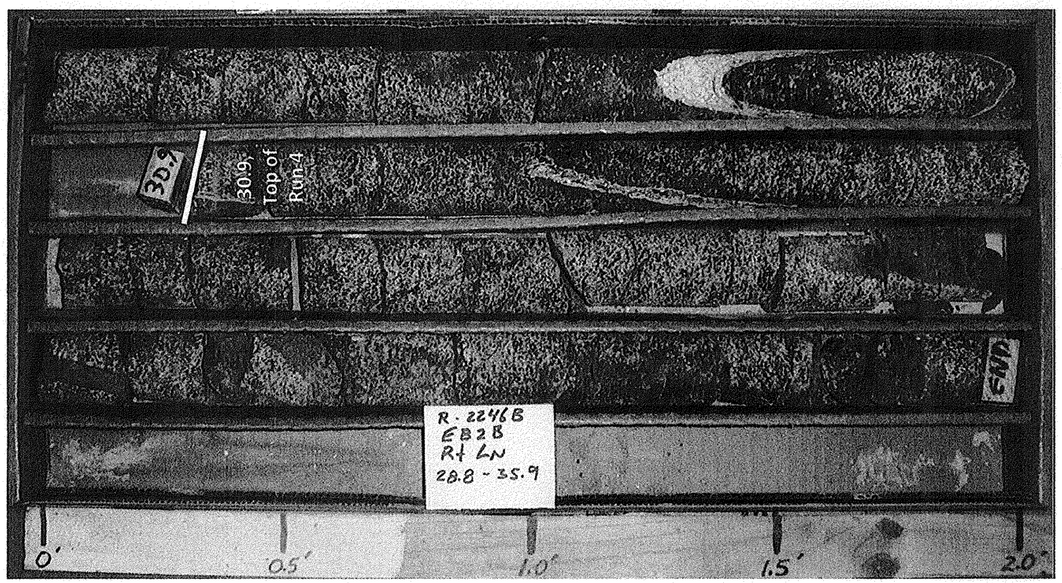
22.5
Top of
Run 1
RS
R-2246B
EB2-B
RS 7
22.5 - 23.0
26.2
26.2
Top of
Run 2
30.9
R-2246B
EB2B
Lt LN
22.5 → 30.9
0'
0.5'
1.0'
1.5'
2.0'

30.9
Top of
Run 3
R-2246B
EB2B
Lt LN
30.9 - 35.8
35.8
End of
Boring
0'
0.5'
1.0'
1.5'
2.0'

R-2246B
EB2-A (RT LN)

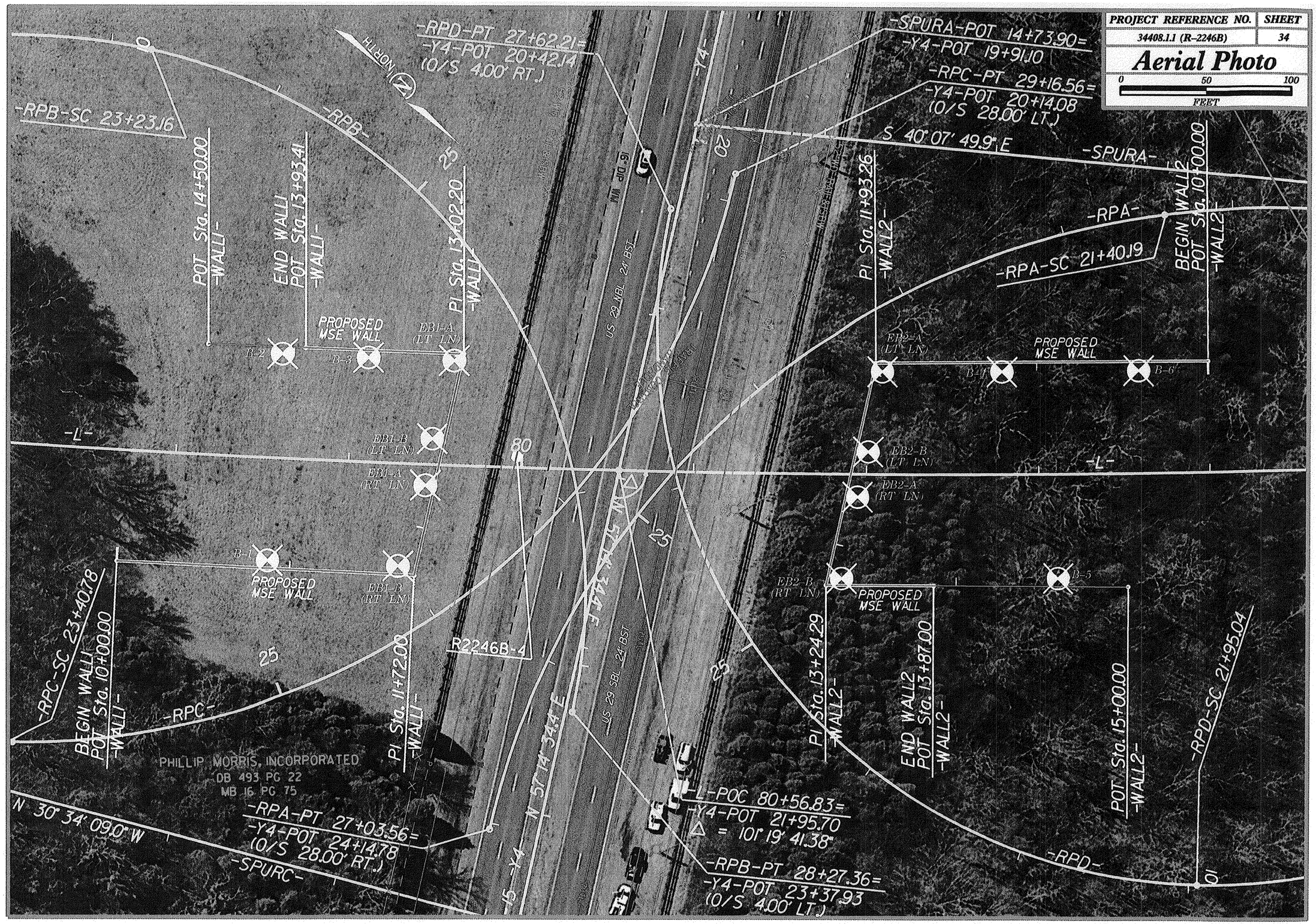
R-2246B
EB2-B (RT LN)





R-2246B
83+11_60RT_EB2B_RT
(B-5)

PROJECT REFERENCE NO.	SHEET
34408.1.1 (R-2246B)	34

Aerial Photo

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