STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	12.101811	1	19

REFERENCE: NO TIP

PROJECT: 12.101811

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *CATAWBA*

PROJECT DESCRIPTION *HICKORY SINKHOLE SHORING DESIGN FOR CULVERT EXTENSION AND DRAINAGE PIPE CONNECTION*

SITE DESCRIPTION *SOUTHEAST CORNER OF INTERSECTION OF US 70 AND 7TH STREET SE*

CONTENTS

CAUTION NOTICE

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PERSONNEL

M. Snyder

D. Tignor

W. Shenberger

INVESTIGATED BY *M. Snyder*

DRAWN BY *J. Beauchaine*

CHECKED BY *G. Taylor*

SUBMITTED BY *RK&K, LLP*

DATE *July 2016*

NORTH CAROLINA PROFESSIONAL SEAL 018580 ENGINEER GARY R. TAYLOR

DocuSigned by:
Gary R. Taylor 7/27/2016
194B327A85270A... SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
12.101811	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40														
LL	—		—	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
PI	6 MX		NP	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 SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

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

TEXTURE OR GRAIN SIZE

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

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

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

SOIL MOISTURE - CORRELATION OF TERMS

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

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	HIGH

COLOR

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

GRADATION

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

ANGULARITY OF GRAINS

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

MINERALOGICAL COMPOSITION

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

COMPRESSIBILITY

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

PERCENTAGE OF MATERIAL

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

GROUND WATER

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

MISCELLANEOUS SYMBOLS

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

RECOMMENDATION SYMBOLS

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

ABBREVIATIONS

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

SAMPLE ABBREVIATIONS

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

EQUIPMENT USED ON SUBJECT PROJECT

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

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [X] 2-¼" AND 3-¼" HSA

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

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

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

ROCK DESCRIPTION

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

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

WEATHERING

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

ROCK HARDNESS

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

FRACTURE SPACING

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

BEDDING

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

INDURATION

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

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

TERMS AND DEFINITIONS

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

AQUIFER - A WATER BEARING FORMATION OR STRATA.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

BENCH MARK: COLLAR ELEVATIONS DETERMINED FROM PROVIDED TOP ELEVATION OF EXISTING MANHOLE LOCATED AT N 721571, E 1311773
ELEVATION: 1025.3 FEET

NOTES:

F.I.A.D. - FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14

PROJECT REFERENCE NO.	SHEET NO.
12.101811	3

SITE PLAN

0 60 120

FEET

NAD 83

CONOVER BLVD. SW (US HWY 70)

BENCH MARK

7TH ST. SE

TEMPORARY SHORING – NORTH

TEMPORARY SHORING – WEST

TEMPORARY SHORING – WEST

TEMP. EXCAVATION FOR CONSTRUCTION

B-1

B-2

B-3

B-4

B-5

B-6

B-7

B-8

B-9

A

A′

B

B′

C

C′

D

D′

7'x8' RCBC

-CULV-

5+50

5+93

INV. EL. = 975.07' (+/–)

5+00

4+56

4+00

3+50

JB w/MH

INV. EL. = 971.09' (+/–)

3+00

96" CMP

2+50

2+00

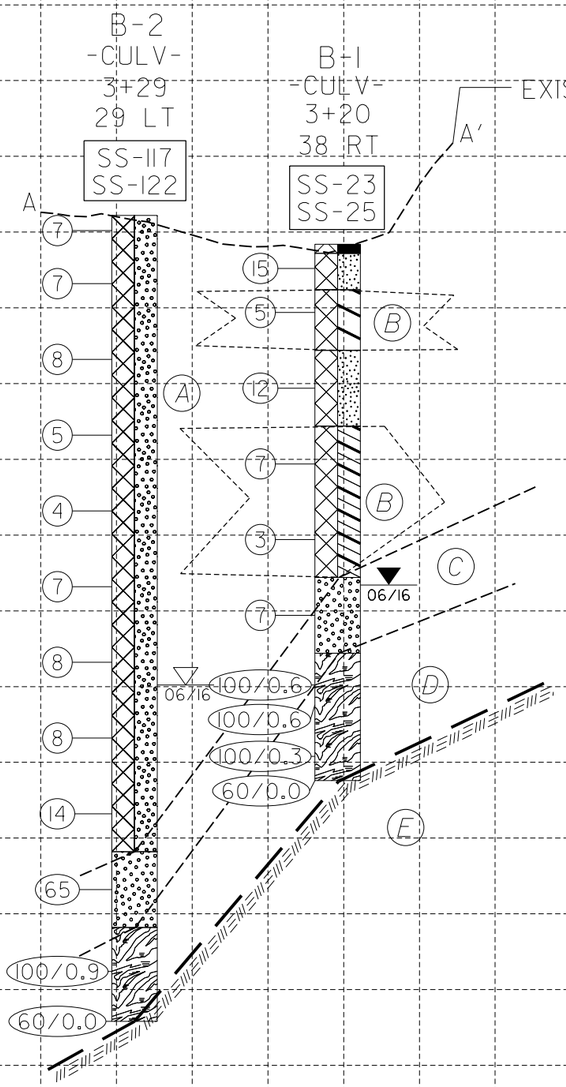
1+50

1+00

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
12.101811	4

BORING PROFILE (A-A')



(A) ARTIFICIAL FILL: VERY LOOSE TO MEDIUM DENSE, DRY TO MOIST, RED-BROWN, ORANGE-BROWN, TAN, GRAY, CLAYEY, SILTY, FINE TO COARSE SAND, TRACE FINE GRAVEL, TRACE MICA AND STIFF, MOIST, BROWN, GRAY, CLAYEY, FINE TO COARSE SANDY SILT

(B) ARTIFICIAL FILL: SOFT TO MEDIUM STIFF, MOIST, RED-BROWN, GRAY-BROWN, WHITE, FINE TO COARSE SANDY, SLIGHTLY PLASTIC SILTY CLAY

(C) RESIDUAL: LOOSE TO VERY DENSE, MOIST, BROWN, GRAY, ORANGE, CLAYEY, SILTY, FINE TO COARSE SAND, TRACE FINE ROCK FRAGMENTS

(D) WEATHERED ROCK: MICA SCHIST

(E) CRYSTALLINE ROCK: MICA SCHIST

GROUND LINE PROFILE DRAWN FROM PROVIDED TIN FILE ALONG LINE A-A' AS SHOWN ON SHEET 3

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

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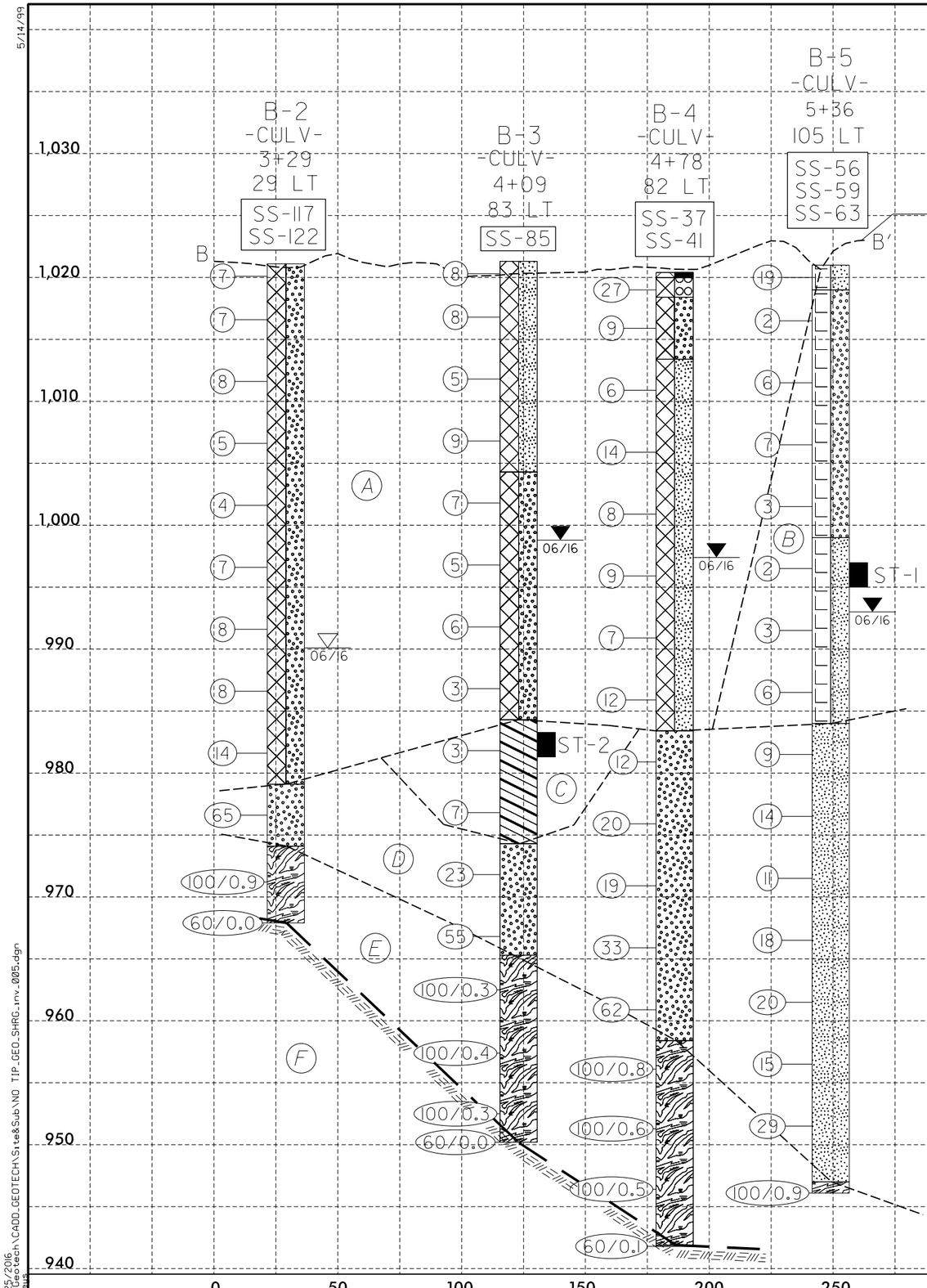
PROJECT REFERENCE NO.	SHEET NO.
12.101811	5

BORING PROFILE (B-B')



(A) *ARTIFICIAL FILL: VERY LOOSE TO MEDIUM DENSE, DRY TO MOIST, RED-BROWN, ORANGE-BROWN, TAN, GRAY, SILTY, CLAYEY, FINE TO COARSE SAND, TRACE FINE COARSE GRAVEL, TRACE MICA AND MEDIUM STIFF TO STIFF, MOIST, BROWN, GRAY, FINE TO COARSE SANDY SILT, TRACE ORGANICS*

(B) *ROADWAY EMBANKMENT: VERY LOOSE TO MEDIUM DENSE, MOIST, RED, ORANGE, BROWN, BLACK, GRAY, CLAYEY, SILTY, FINE TO COARSE SAND, AND VERY SOFT TO VERY STIFF, BROWN, GRAY, ORANGE, CLAYEY, FINE TO COARSE SANDY SILT; TRACE MICA, TRACE WOOD FRAGMENTS*

(C) *ALLUVIAL; SOFT TO MEDIUM STIFF, MOIST, BROWN-GRAY, ORANGE-BROWN, FINE TO COARSE SANDY, SLIGHTLY PLASTIC SILTY CLAY*

(D) *RESIDUAL: LOOSE TO VERY DENSE, MOIST, DARK BROWN, GRAY, ORANGE, WHITE, CLAYEY, SILTY, FINE TO COARSE SAND, AND STIFF TO VERY STIFF, TAN, BROWN, ORANGE, WHITE, CLAYEY, FINE TO COARSE SANDY SILT; TRACE FINE QUARTZ ROCK FRAGMENTS, MICACEOUS TO VERY MICACEOUS, SAPROLITIC*

(E) *WEATHERED ROCK: MICA SCHIST*

(F) *CRYSTALLINE ROCK: MICA SCHIST*

GROUND LINE PROFILE DRAWN FROM PROVIDED TIN FILES ALONG LINE B-B' AS SHOWN ON SHEET 3

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

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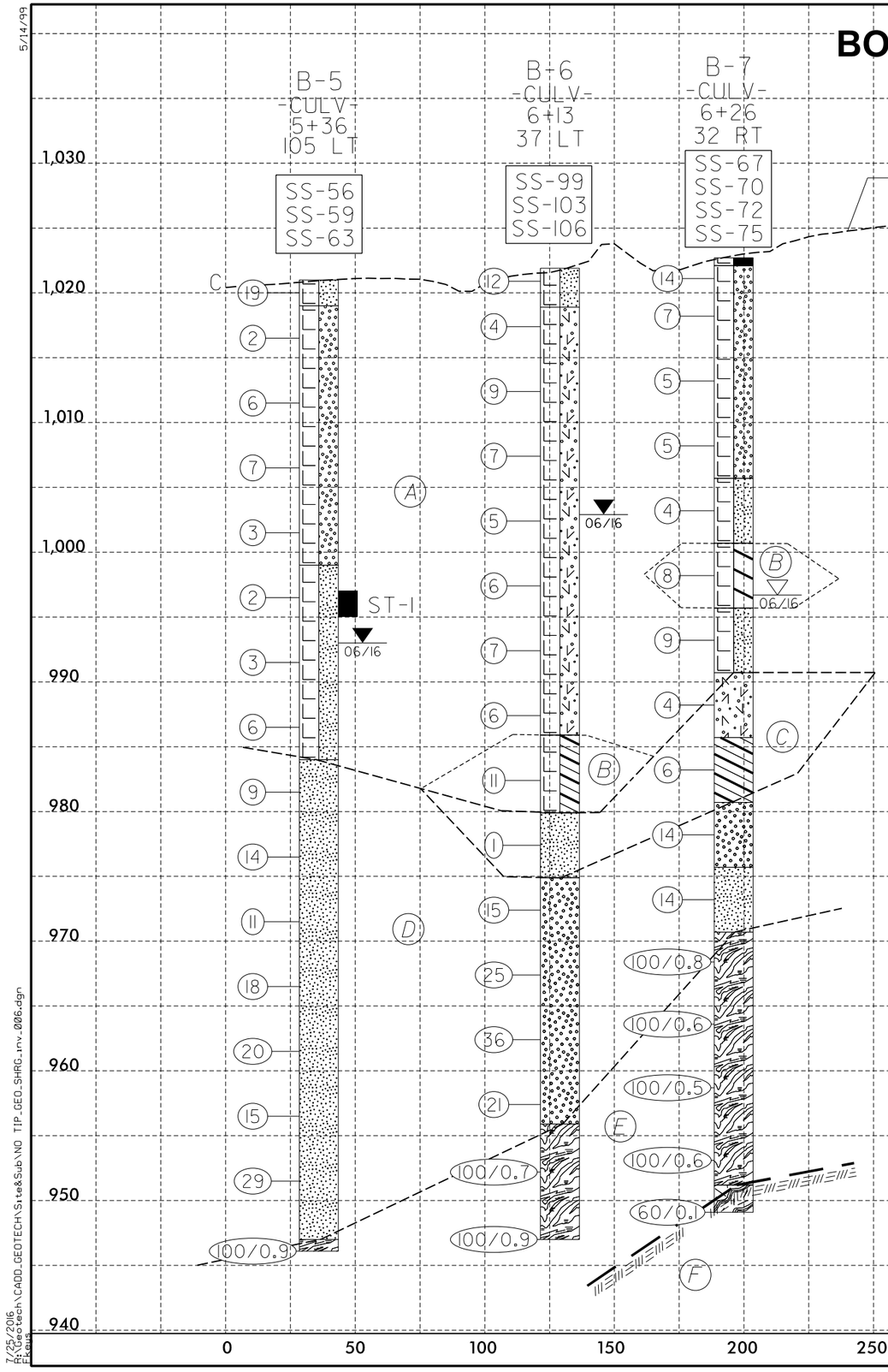
PROJECT REFERENCE NO.	SHEET NO.
12.101811	6

BORING PROFILE (C-C')



(A) *ROADWAY EMBANKMENT: VERY LOOSE TO MEDIUM DENSE, MOIST, BROWN, RED, BROWN, BLACK, GRAY, CLAYEY, SILTY, FINE TO COARSE SAND, AND SOFT TO STIFF, MOIST, GRAY, RED, BROWN, FINE TO COARSE SANDY, CLAYEY SILT; TRACE FINE TO COARSE GRAVEL, TRACE MICA*

(B) *ROADWAY EMBANKMENT: MEDIUM STIFF TO STIFF, MOIST, GRAY, BROWN, RED, SILTY, FINE TO COARSE SANDY, SLIGHTLY PLASTIC CLAY, TRACE ORGANICS*

(C) *ALLUVIAL: VERY SOFT TO MEDIUM STIFF, MOIST, RED-BROWN, GRAY, FINE TO COARSE SANDY, CLAYEY SILT AND SLIGHTLY PLASTIC CLAY, TRACE FINE TO COARSE GRAVEL, TRACE ORGANICS*

(D) *RESIDUAL: STIFF TO VERY STIFF, MOIST, TAN, BROWN, ORANGE, WHITE, CLAYEY, FINE TO COARSE SANDY SILT, AND MEDIUM DENSE TO DENSE, MOIST, ORANGE, BROWN, WHITE, CLAYEY, SILTY FINE TO COARSE SAND; TRACE FINE ROCK FRAGMENTS, MICACEOUS TO VERY MICACEOUS, SAPROLITIC*

(E) *WEATHERED ROCK: MICA SCHIST*

(F) *CRYSTALLINE ROCK: MICA SCHIST*

GROUND LINE PROFILE DRAWN FROM PROVIDED TIN FILES ALONG LINE C-C' AS SHOWN ON SHEET 3

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
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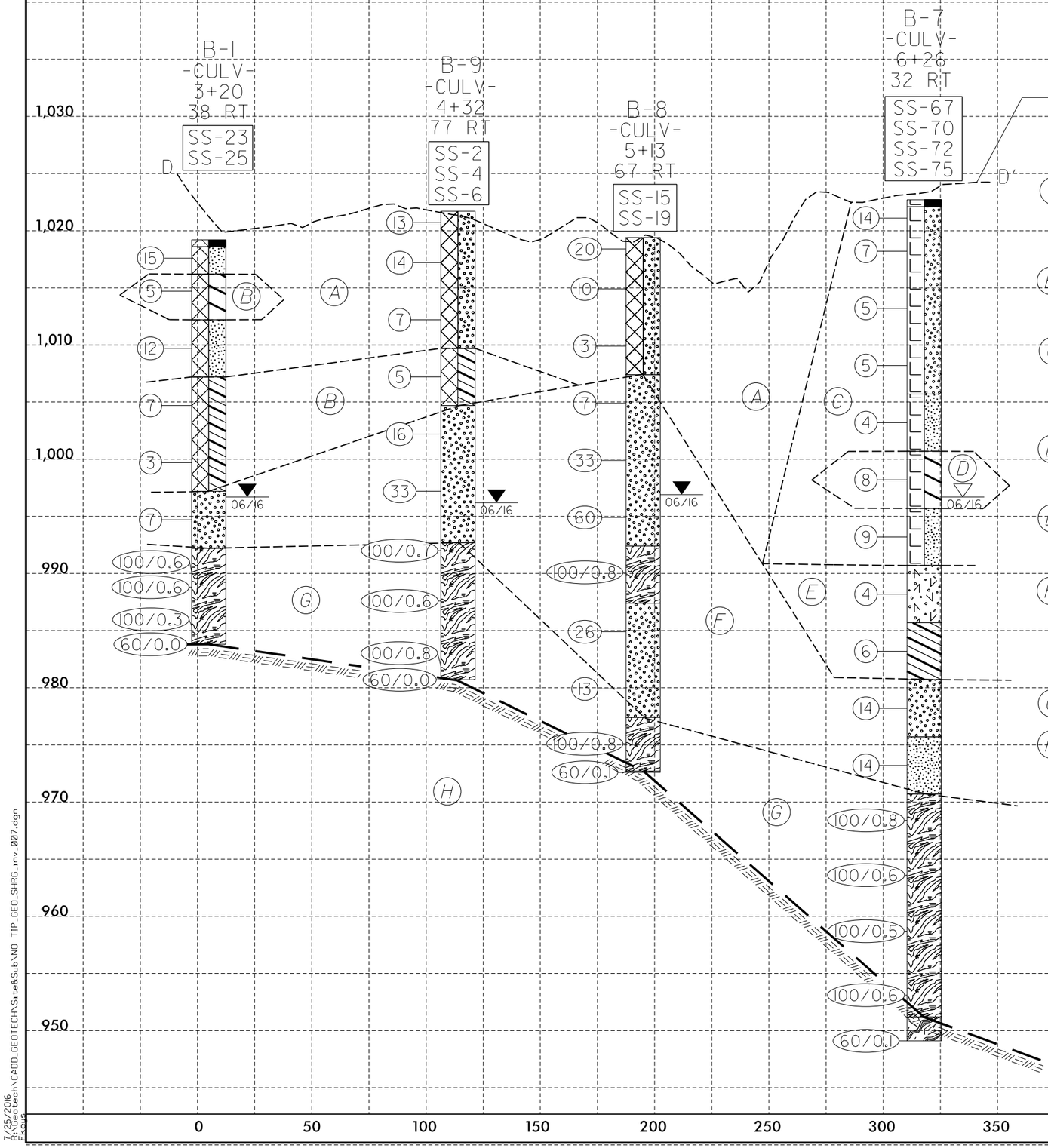
BORING PROFILE (D-D')



(A) *ARTIFICIAL FILL: VERY LOOSE TO MEDIUM DENSE, MOIST, BROWN, GRAY, RED, ORANGE, CLAYEY, SILTY, FINE TO COARSE SAND, TRACE FINE GRAVEL, AND STIFF, MOIST, BROWN, GRAY, CLAYEY, FINE TO COARSE SANDY SILT; TRACE MICA*

(B) *ARTIFICIAL FILL: SOFT TO MEDIUM STIFF, MOIST, GRAY, BROWN, RED, FINE TO COARSE SANDY, SLIGHTLY PLASTIC SILTY CLAY, TRACE FINE GRAVEL*

(C) *ROADWAY EMBANKMENT: LOOSE TO MEDIUM DENSE, MOIST, BROWN, GRAY, RED, ORANGE, CLAYEY, SILTY, FINE TO COARSE GRAVELLY, FINE TO COARSE SAND, AND SOFT TO STIFF, MOIST, GRAY, BROWN, RED, FINE TO COARSE SANDY, CLAYEY SILT; TRACE MICA*

(D) *ROADWAY EMBANKMENT: MEDIUM STIFF TO STIFF, MOIST, GRAY, BROWN, RED, SILTY, FINE TO COARSE SANDY, SLIGHTLY PLASTIC CLAY, TRACE ORGANICS*

(E) *ALLUVIAL: SOFT TO MEDIUM STIFF, MOIST, RED-BROWN, GRAY, FINE TO COARSE SANDY, CLAYEY SILT AND SLIGHTLY PLASTIC CLAY, TRACE FINE TO COARSE GRAVEL*

(F) *RESIDUAL: LOOSE TO DENSE, MOIST, BROWN, ORANGE, WHITE, GRAY, CLAYEY, SILTY, FINE TO COARSE SAND, TRACE FINE GRAVEL AND STIFF, MOIST, DARK BROWN, ORANGE, WHITE, FINE TO COARSE SANDY, SILT, TRACE FINE GRAVEL; WITH WEATHERED ROCK LENSES, MICACEOUS TO VERY MICACEOUS, SAPROLITIC*

(G) *WEATHERED ROCK: MICA SCHIST*

(H) *CRYSTALLINE ROCK: MICA SCHIST*

GROUND LINE PROFILE DRAWN FROM PROVIDED TIN FILE ALONG LINE D-D' AS SHOWN ON SHEET 3

INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

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6/23/16

PROJ. REFERENCE NO.	SHEET NO.
12.101811	8

0 5 10

(A) ARTIFICIAL FILL: MEDIUM STIFF, MOIST, RED-BROWN, FINE TO COARSE SANDY, SLIGHTLY PLASTIC CLAY, TRACE FINE GRAVEL

(B) ALLUVIAL: SOFT TO MEDIUM STIFF, MOIST, BROWN-GRAY, ORANGE-BROWN, FINE TO COARSE SANDY SLIGHTLY PLASTIC CLAY

(C) RESIDUAL: MEDIUM DENSE TO VERY DENSE, MOIST, BROWN, ORANGE, WHITE, CLAYEY, SILTY, FINE TO COARSE SAND, TRACE TO LITTLE QUARTZ ROCK FRAGMENTS, MICACEOUS, SAPROLITIC

B-3
4+09
SS-85

B-9
4+32
SS-2
SS-4
SS-6

993.69

ARTIFICIAL FILL: VERY LOOSE TO MEDIUM DENSE, MOIST, GRAY, RED-BROWN, ORANGE, SILTY, CLAYEY, FINE TO COARSE SAND, AND MEDIUM STIFF TO STIFF, MOIST, BROWN, GRAY, FINE TO COARSE SANDY SILT; TRACE FINE GRAVEL, TRACE MICA, TRACE ORGANICS

2:1

2:1

ST-2

WEATHERED ROCK: MICA SCHIST

CRYSTALLINE ROCK: MICA SCHIST

AR

4+20.00

B-2
3+29
SS-117
SS-122

B-1
SS-23
SS-25

1019.38

ARTIFICIAL FILL: VERY LOOSE TO MEDIUM DENSE, DRY TO MOIST, RED, ORANGE, BROWN, TAN, GRAY, SILTY, CLAYEY, FINE TO COARSE SAND AND STIFF, MOIST, BROWN, GRAY, CLAYEY, FINE TO COARSE SANDY SILT; TRACE FINE TO COARSE GRAVEL, TRACE MICA

(A) ARTIFICIAL FILL: SOFT TO MEDIUM STIFF, MOIST, GRAY, BROWN, RED, FINE TO COARSE SANDY, SLIGHTLY PLASTIC SILTY CLAY, TRACE FINE GRAVEL

(B) RESIDUAL: LOOSE TO VERY DENSE, MOIST, BROWN, GRAY, ORANGE, CLAYEY, SILTY FINE TO COARSE SAND, TRACE ROCK FRAGMENTS

WEATHERED ROCK: MICA SCHIST

CRYSTALLINE ROCK: MICA SCHIST

3+20.00

—CULV—

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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	12.101811	9

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

1040
1030
1020
1010
1000
990
980
970
960
950
940
930

Ⓐ ALLUVIAL: SOFT TO MEDIUM STIFF, MOIST, BROWN-GRAY, ORANGE-BROWN, FINE TO COARSE SANDY, SLIGHTLY PLASTIC CLAY

B-4
4+78
SS-37
SS-41

27 9 6 14 8 9 7 12 12 20 19 33 62 100/0.8 100/0.6 100/0.5 50/0.1

06/16

AR

RESIDUAL: LOOSE TO VERY DENSE, MOIST, GRAY, BROWN, TAN, ORANGE, WHITE, CLAYEY, SILTY, FINE TO COARSE SAND WITH WEATHERED ROCK LENSES, TRACE QUARTZ ROCK FRAGMENTS, MICACEOUS TO VERY MICACEOUS, SAPROLITIC

CRYSTALLINE ROCK: MICA SCHIST

2:1

1003.77

ARTIFICAL FILL: VERY LOOSE TO MEDIUM DENSE, GRAY, BROWN, RED-BROWN, SILTY FINE TO COARSE SAND AND GRAVEL, AND MEDIUM STIFF TO STIFF, MOIST, BROWN, GRAY, TAN, WHITE, FINE TO COARSE SANDY SILT, TRACE MICA, TRACE FINE TO COARSE GRAVEL, TRACE WOOD AND CONCRETE FRAGMENTS

Ⓐ

WEATHERED ROCK: MICA SCHIST

B-8
5+13
SS-15
SS-19

20 10 3 7 33 60 100/0.8 26 13 100/0.8 60/0.1

06/16

AR

2:1

RESIDUAL: LOOSE TO VERY DENSE, MOIST, GRAY, BROWN, TAN, ORANGE, WHITE, CLAYEY, SILTY, FINE TO COARSE SAND WITH WEATHERED ROCK LENSES, TRACE QUARTZ ROCK FRAGMENTS, MICACEOUS TO VERY MICACEOUS, SAPROLITIC

CRYSTALLINE ROCK: MICA SCHIST

5+00.00

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	12.101811	10

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

1040
1030
1020
1010
1000
990
980
970
960
950
940
930
920

B-5
5+36
SS-56
SS-59
SS-63
19
2
6
7
3
2
3
6
9
14
11
18
20
15
29
100/0.9

ST-1
06/16

(A) ROADWAY EMBANKMENT: VERY LOOSE TO LOOSE, MOIST, RED, ORANGE, BROWN, BLACK, GRAY, CLAYEY, SILTY, FINE TO COARSE SAND, AND VERY SOFT TO VERY STIFF, MOIST, BROWN, GRAY, ORANGE, FINE TO COARSE SANDY SILT; TRACE FINE TO COARSE GRAVEL, TRACE MICA, TRACE WOOD FRAGMENTS

(B) ALLUVIAL: VERY SOFT TO MEDIUM STIFF, MOIST, DARK GRAY, RED-BROWN, CLAYEY, FINE TO COARSE SANDY, CLAYEY SILT AND SLIGHTLY PLASTIC CLAY, TRACE FINE TO COARSE GRAVEL

1011.06

ARTIFICAL FILL: VERY LOOSE TO MEDIUM DENSE, GRAY, BROWN, RED-BROWN, SILTY, FINE TO COARSE SAND AND GRAVEL, AND MEDIUM STIFF TO STIFF, MOIST, BROWN, GRAY, TAN, WHITE, FINE TO COARSE, SANDY SILT; TRACE MICA, TRACE FINE TO COARSE GRAVEL, TRACE WOOD AND CONCRETE FRAGMENTS

2:1

2:1

RESIDUAL: STIFF TO VERY STIFF, MOIST, TAN, BROWN, ORANGE, WHITE, CLAYEY, FINE TO COARSE SANDY SILT AND LOOSE TO VERY DENSE, MOIST, GRAY, BROWN, TAN, ORANGE, WHITE, CLAYEY, SILTY, FINE TO COARSE SAND; TRACE QUARTZ ROCK FRAGMENTS, MICACEOUS TO VERY MICACEOUS, SAPROLITIC

WEATHERED ROCK: MICA SCHIST

WEATHERED ROCK: MICA SCHIST

CRYSTALLINE ROCK: MICA SCHIST

5+40.00

—CULV—

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	12.101811	11

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

1040 1030 1020 1010 1000 990 980 970 960 950 940 930

B-6
6+13
SS-99
SS-103
SS-106

B-7
6+26
SS-67
SS-70
SS-72
SS-75

Ⓐ ROADWAY EMBANKMENT: MEDIUM STIFF TO STIFF, MOIST, GRAY, RED-BROWN, SILTY, FINE TO COARSE, SANDY, SLIGHTLY PLASTIC CLAY, TRACE ORGANICS

Ⓑ ALLUVIAL: VERY SOFT TO MEDIUM STIFF, MOIST, DARK GRAY, RED-BROWN, CLAYEY, FINE TO COARSE SANDY, CLAYEY SILT AND SLIGHTLY PLASTIC CLAY, TRACE FINE TO COARSE GRAVEL

1021.96

ROADWAY EMBANKMENT: SOFT TO STIFF, MOIST, RED-BROWN, SANDY, CLAYEY SILT, AND LOOSE TO MEDIUM DENSE, MOIST, FINE TO COARSE GRAVELLY SAND; TRACE MICA

ORANGE-BROWN, TAN, GRAY, FINE TO COARSE BROWN, GRAY, RED, ORANGE, CLAYEY, SILTY, SAPROLITIC

06/16

2:1

ORANGE, WHITE, CLAYEY SILTY, ORANGE, WHITE, FINE TO COARSE VERY MICACEOUS, SAPROLITIC

RESIDUAL: MEDIUM DENSE TO DENSE, MOIST, DARK BROWN, FINE TO COARSE SAND, AND STIFF, MOIST, DARK BROWN, SANDY SILT; TRACE ROCK FRAGMENTS, MICACEOUS TO

WEATHERED ROCK: MICA SCHIST

WEATHERED ROCK: MICA SCHIST

CRYSTALLINE ROCK: MICA SCHIST

6+10.00

-CULV-

7/25/2016
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GEOTECHNICAL BORING REPORT
BORE LOG

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-1	**STATION** 3+20	**OFFSET** 38 ft RT	**ALIGNMENT** -CULV-	**0 HR.** 25.0
COLLAR ELEV. 1,019.2 ft	**TOTAL DEPTH** 35.4 ft	**NORTHING** 721,290	**EASTING** 1,311,841	**24 HR.** 22.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/01/16	**COMP. DATE** 06/01/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
1020										1,019.2 GROUND SURFACE	0.0
	1,018.6	0.6	11	7	8	15		M		1,018.6 **ARTIFICIAL FILL** 0.6-ft Asphalt Concrete	0.6
1015	1,015.7	3.5	2	2	3	5	SS-23	29%		1,016.2 **ARTIFICIAL FILL** Stiff, moist, brown, gray, fine to coarse sandy SILT, trace fine gravel (A-4)	3.0
1010	1,010.7	8.5	4	5	7	12		M		1,012.2 **ARTIFICIAL FILL** Medium stiff, moist, red-brown, white, fine to coarse sandy, slightly plastic silty CLAY (A-7-5)	7.0
1005	1,005.7	13.5	4	4	3	7	SS-25	21%		1,007.2 **ARTIFICIAL FILL** Stiff, moist, brown, gray, clayey, fine to coarse sandy SILT (A-4)	12.0
1000	1,000.7	18.5	1	1	2	3		M		**ARTIFICIAL FILL** Soft to medium stiff, moist, gray-brown, red, fine to coarse sandy, slightly plastic silty CLAY (A-6)	
995	995.7	23.5	4	4	3	7		M		997.2 **RESIDUAL** Loose, moist, brown, clayey, silty fine to coarse SAND (A-2-4)	22.0
990	990.7	28.5	88	12/0.1		100/0.6				992.2 **WEATHERED ROCK** Orange, brown, dark gray, white MICA SCHIST	27.0
	989.4	29.8	85	15/0.1		100/0.6					
985	985.7	33.5	100/0.3			100/0.3					
	983.8	35.4	60/0.0			60/0.0				983.8 Boring Terminated by Auger Refusal at Elevation 983.8 ft On Crystalline Rock: MICA SCHIST	35.4

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-2	**STATION** 3+29	**OFFSET** 29 ft LT	**ALIGNMENT** -CULV-	**0 HR.** 31.0
COLLAR ELEV. 1,021.1 ft	**TOTAL DEPTH** 53.2 ft	**NORTHING** 721,348	**EASTING** 1,311,807	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/08/16	**COMP. DATE** 06/08/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
1025										1,021.1 GROUND SURFACE 0.0
	1,021.1	0.0	3	3	4	7		D		**ARTIFICIAL FILL** Very loose to medium dense, dry to moist, red-brown, orange-brown, tan, gray, silty, clayey, fine to coarse SAND, trace fine to coarse gravel, trace mica, trace roots (A-2-4)
1020	1,017.6	3.5	2	3	4	7		M		
1015	1,012.6	8.5	3	3	5	8		M		
1010	1,007.6	13.5	3	2	3	5		M		
1005	1,002.6	18.5	2	2	2	4	SS-117	M		
1000	997.6	23.5	4	4	3	7		M		
995	992.6	28.5	2	3	5	8		M		
990	987.6	33.5	4	4	4	8		M		
985	982.6	38.5	2	4	10	14		M		979.1 **RESIDUAL** Very dense, moist, dark brown, gray, orange, silty, clayey, fine to coarse SAND, trace fine rock fragments (A-2-4) 42.0
980	977.6	43.5	4	30	35	65	SS-122	M		974.1 **WEATHERED ROCK** Dark brown, orange MICA SCHIST 47.0
975	972.6	48.5	21	28	72/0.4	100/0.9				
970	967.9	53.2	60/0.0			60/0.0				967.9 Boring Terminated by Auger Refusal at Elevation 967.9 ft On Crystalline Rock: MICA SCHIST 53.2

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-3	**STATION** 4+09	**OFFSET** 83 ft LT	**ALIGNMENT** -CULV-	**0 HR.** Dry
COLLAR ELEV. 1,021.3 ft	**TOTAL DEPTH** 71.1 ft	**NORTHING** 721,439	**EASTING** 1,311,837	**24 HR.** 22.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/06/16	**COMP. DATE** 06/06/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
	1,021.3	0.0								1,021.3 GROUND SURFACE	0.0
			2	4	4	8		M		**ARTIFICIAL FILL** Medium stiff to stiff, moist, brown, gray, fine to coarse sandy SILT, trace fine gravel, trace mica, trace organics (A-4)	
	1,017.8	3.5	4	4	4	8		M			
	1,012.8	8.5	3	2	3	5		M			
	1,007.8	13.5	4	4	5	9		M			
	1,002.8	18.5	4	4	3	7	SS-85	M		1,004.3 **ARTIFICIAL FILL** Very loose to loose, moist, gray, brown, orange, silty, clayey, fine to coarse SAND, some mica, trace gravel (A-2-4), metal nail in auger cuttings	17.0
	997.8	23.5	3	2	3	5		M			
	992.8	28.5	3	3	3	6		M			
	987.8	33.5	2	2	1	3		M			
	982.8	38.5	1	1	2	3		24% M		984.3 **ALLUVIAL** Soft to medium stiff, moist, brown-gray, orange-brown, fine to coarse sandy, slightly plastic silty CLAY (A-6)	37.0
	977.8	43.5	3	4	3	7		M			
	972.8	48.5	4	8	15	23		M		974.3 **RESIDUAL** Dense to very dense, moist, brown, orange, white, clayey, silty, fine to coarse SAND, trace rock fragments (A-2-4), micaceous, saprolitic	47.0
	967.8	53.5	18	27	28	55		M			
	962.8	58.5	100/0.3			100/0.3				965.3 **WEATHERED ROCK** Gray, brown, white MICA SCHIST	56.0
	957.8	63.5	100/0.4			100/0.4					
	952.8	68.5	100/0.3			100/0.3					
	950.2	71.1	60/0.0			60/0.0				950.2 Boring Terminated by Auger Refusal at Elevation 950.2 ft On Crystalline Rock: MICA SCHIST Offset completed 6-ft north of B-3 to obtain Shelby tube from 38.0 to 40.0-ft Other Samples: ST-2 (38.0 - 40.0)	71.1

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-4	**STATION** 4+78	**OFFSET** 82 ft LT	**ALIGNMENT** -CULV-	**0 HR.** 24.0
COLLAR ELEV. 1,020.4 ft	**TOTAL DEPTH** 78.6 ft	**NORTHING** 721,481	**EASTING** 1,311,892	**24 HR.** 23.0
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/02/16	**COMP. DATE** 06/02/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
	1,020.0	0.4	11	20	7	27		M		1,020.4 GROUND SURFACE	0.0
	1,016.9	3.5	3	5	4	9		M		1,018.4 **ARTIFICIAL FILL** 0.4-ft Asphalt Concrete	0.4 / 2.0
	1,011.9	8.5	3	2	4	6		M		**ARTIFICIAL FILL** Medium dense, moist, gray, white, brown, clayey, fine to coarse sandy, fine to coarse GRAVEL (A-1-b)	
	1,006.9	13.5	6	8	6	14		M		1,013.4 **ARTIFICIAL FILL** Loose, moist, brown, gray, silty fine to coarse SAND, trace fine gravel (A-2-4)	7.0
	1,001.9	18.5	4	4	4	8		M		**ARTIFICIAL FILL** Medium stiff to stiff, moist, brown, gray, tan, white, clayey, fine to coarse sandy SILT, trace fine to coarse gravel, trace mica, trace wood fragments, musty odor (A-4)	
	996.9	23.5	2	3	6	9	SS-37	26% M			
	991.9	28.5	2	3	4	7		M			
	986.9	33.5	5	7	5	12		M			
	981.9	38.5	2	2	10	12		M		983.4 **RESIDUAL** Medium dense to very dense, moist, gray, brown, tan, orange, white, clayey, silty, fine to coarse SAND, trace quartz rock fragments (A-2-4), micaceous to very micaceous, saprolitic	37.0
	976.9	43.5	6	9	11	20	SS-41	M			
	971.9	48.5	4	7	12	19		M			
	966.9	53.5	7	12	21	33		M			
	961.9	58.5	58	30	32	62		M			
	956.9	63.5	26	74/0.3		100/0.8				958.4 **WEATHERED ROCK** Gray, brown, orange, white MICA SCHIST	62.0
	951.9	68.5	74	26/0.1		100/0.6					
	946.9	73.5	100/0.5			100/0.5					
	941.9	78.5	60/0.1			60/0.1				941.9 / 941.8 **CRYSTALLINE ROCK** MICA SCHIST Boring Terminated by Auger Refusal at Elevation 941.8 ft In Crystalline Rock: MICA SCHIST	78.5 / 78.6

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-5	**STATION** 5+36	**OFFSET** 105 ft LT	**ALIGNMENT** -CULV-	**0 HR.** 27.0
COLLAR ELEV. 1,021.0 ft	**TOTAL DEPTH** 74.9 ft	**NORTHING** 721,535	**EASTING** 1,311,924	**24 HR.** 28.0
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/02/16	**COMP. DATE** 06/02/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
1025										
1020	1,021.0	0.0	5	12	7	19		M		1,021.9 / 0.0 GROUND SURFACE
										1,020.7 / 1.2 0.3-ft Topsoil
	1,017.5	3.5	2	1	1	2		M		1,019.0 / 2.0 **ROADWAY EMBANKMENT** Very stiff, moist, brown, fine sandy SILT, trace fine to coarse gravel (A-4)
1015										**ROADWAY EMBANKMENT** Very loose to loose, moist, red, orange, brown, black, gray, clayey, silty, fine to coarse SAND, trace mica (A-2-4)
	1,012.5	8.5	3	2	4	6		M		
1010										
	1,007.5	13.5	2	3	4	7		M		
1005										
	1,002.5	18.5	1	1	2	3		M		
1000										999.0 / 22.0 **ROADWAY EMBANKMENT** Very soft to medium stiff, moist, gray, brown, orange, clayey, fine to coarse sandy SILT, trace wood fragments (A-4)
	997.5	23.5	1	1	1	2		M		
995								31%		
	992.5	28.5	1	2	1	3		M		
990										
	987.5	33.5	2	3	3	6	SS-56	32%		
985										984.0 / 37.0 **RESIDUAL** Stiff to very stiff, moist, tan, brown, orange, white, clayey, fine to coarse sandy SILT, trace fine quartz rock fragments (A-4), micaceous to very micaceous, saprolitic
	982.5	38.5	2	3	6	9		M		
980										
	977.5	43.5	6	6	8	14		M		
975										
	972.5	48.5	2	4	7	11	SS-59	33%		
970										
	967.5	53.5	5	6	12	18		M		
965										
	962.5	58.5	4	7	13	20		M		
960										
	957.5	63.5	5	6	9	15		M		
955										
	952.5	68.5	5	9	20	29	SS-63	29%		
950										
	947.5	73.5	13	25	75/0.4	100/0.9				947.0 / 74.0 / 946.1 / 74.9 **WEATHERED ROCK** Orange-brown, white MICA SCHIST Boring Terminated at Elevation 946.1 ft In Weathered Rock: Orange-brown, white MICA SCHIST

Offset completed 8-ft east of B-5 to obtain Shelby tube from 24.0 to 26.0-ft

Other Samples:
ST-1 (24.0 - 26.0)

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-6	**STATION** 6+13	**OFFSET** 37 ft LT	**ALIGNMENT** -CULV-	**0 HR.** 23.0
COLLAR ELEV. 1,021.9 ft	**TOTAL DEPTH** 74.9 ft	**NORTHING** 721,525	**EASTING** 1,312,017	**24 HR.** 19.0
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/07/16	**COMP. DATE** 06/07/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
1025										
1020	1,021.9	0.0	4	7	5	12		M		1,021.9 / 0.0 GROUND SURFACE
										1,021.7 / 0.2 0.2-ft Topsoil
	1,018.4	3.5	2	2	2	4		M		1,018.9 / 3.0 **ROADWAY EMBANKMENT** Stiff, moist, brown, gray, fine to coarse sandy SILT, trace coarse gravel (A-4)
1015										**ROADWAY EMBANKMENT** Soft to stiff, moist, red-brown, orange-brown, tan, gray, fine to coarse sandy, clayey, SILT, trace mica, trace fine gravel (A-5)
	1,013.4	8.5	3	4	5	9	SS-99	23%		
1010										
	1,008.4	13.5	2	3	4	7		M		
1005										
	1,003.4	18.5	2	2	3	5		M		
1000										
	998.4	23.5	2	2	4	6		M		
995										
	993.4	28.5	2	3	4	7	SS-103	30%		
990										
	988.4	33.5	2	2	4	6		M		
985										985.9 / 36.0 **ROADWAY EMBANKMENT** Stiff, moist, gray, red-brown, fine sandy, slightly plastic silty CLAY (A-6)
	983.4	38.5	3	4	7	11		M		
980										979.9 / 42.0 **ALLUVIAL** Very soft, moist, dark gray, clayey, fine to coarse sandy SILT (A-4)
	978.4	43.5	WOH	WOH	1	1	SS-106	29%		
975										974.9 / 47.0 **RESIDUAL** Medium dense to dense, moist, dark brown, orange, white, clayey, silty, fine to coarse SAND (A-2-4), micaceous, saprolitic
	973.4	48.5	4	6	9	15		M		
970										
	968.4	53.5	5	12	13	25		M		
965										
	963.4	58.5	10	13	23	36		M		
960										
	958.4	63.5	8	9	12	21		M		
955										955.9 / 66.0 **WEATHERED ROCK** Orange, brown, white MICA SCHIST
	953.4	68.5	20	42	58/0.2	100/0.7				
950										
	948.4	73.5	25	35	65/0.4	100/0.9				947.0 / 74.9 Boring Terminated at Elevation 947.0 ft In Weathered Rock: Orange, brown, white MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-7	**STATION** 6+26	**OFFSET** 32 ft RT	**ALIGNMENT** -CULV-	**0 HR.** 26.0
COLLAR ELEV. 1,022.7 ft	**TOTAL DEPTH** 73.6 ft	**NORTHING** 721,493	**EASTING** 1,312,079	**24 HR.** FIAD
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/03/16	**COMP. DATE** 06/03/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
1025											
	1,022.1	0.6	6	7	7	14		M		1,022.7 GROUND SURFACE	0.0
1020										1,022.1 **ROADWAY EMBANKMENT** 0.6-ft Asphalt Concrete	0.6
	1,019.2	3.5	4	3	4	7		M		**ROADWAY EMBANKMENT** Loose to medium dense, moist, brown, gray, red, orange, clayey, silty, fine to coarse gravelly, fine to coarse SAND, trace mica (A-2-4)	
1015											
	1,014.2	8.5	2	3	2	5	SS-67	M			
1010											
	1,009.2	13.5	2	2	3	5		M			
1005										1,005.7 **ROADWAY EMBANKMENT** Soft, moist, gray-brown, red-brown, fine to coarse sandy, clayey SILT, trace mica (A-4)	17.0
	1,004.2	18.5	1	2	2	4		M			
1000										1,000.7 **ROADWAY EMBANKMENT** Medium stiff, moist, gray-brown, silty, fine to coarse sandy, slightly plastic CLAY, trace organics (A-7-5)	22.0
	999.2	23.5	2	3	5	8	SS-70	29%			
995										995.7 **ROADWAY EMBANKMENT** Stiff, moist, gray-brown, red-brown, fine to coarse sandy, clayey SILT, trace mica (A-4)	27.0
	994.2	28.5	2	4	5	9		M			
990										990.7 **ALLUVIAL** Soft, moist, red-brown, gray, fine to coarse sandy, clayey, SILT, trace coarse gravel, trace organics (A-5)	32.0
	989.2	33.5	1	2	2	4	SS-72	31%			
985										985.7 **ALLUVIAL** Medium stiff, moist, red-brown, light gray, fine to coarse sandy, slightly plastic CLAY, trace fine gravel (A-6)	37.0
	984.2	38.5	1	4	2	6		M			
980										980.7 **RESIDUAL** Medium dense, moist, orange, brown, white, silty fine to coarse SAND, trace fine rock fragments (A-2-4), micaceous	42.0
	979.2	43.5	5	7	7	14		M			
975										975.7 **RESIDUAL** Stiff, moist, dark brown, orange, white, fine to coarse sandy, SILT, trace fine rock fragments (A-4), very micaceous	47.0
	974.2	48.5	3	6	8	14	SS-75	30%			
970										970.7 **WEATHERED ROCK** Brown, orange, white MICA SCHIST	52.0
	969.2	53.5	24	76/0.3		100/0.8					
965											
	964.2	58.5	79	21/0.1		100/0.6					
960											
	959.2	63.5	100/0.5			100/0.5					
955											
	954.2	68.5	30	70	30/0.1	100/0.6					
950										951.2	71.5
	949.2	73.5	60/0.1			60/0.1				949.1 **CRYSTALLINE ROCK** MICA SCHIST	73.6
										Boring Terminated with Standard Penetration Test Refusal at Elevation 949.1 ft In Crystalline Rock: MICA SCHIST	

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-8	**STATION** 5+13	**OFFSET** 67 ft RT	**ALIGNMENT** -CULV-	**0 HR.** 23.0
COLLAR ELEV. 1,019.4 ft	**TOTAL DEPTH** 46.8 ft	**NORTHING** 721,385	**EASTING** 1,312,011	**24 HR.** 22.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers	**HAMMER TYPE** Automatic	
DRILLER Tignor, D.	**START DATE** 06/01/16	**COMP. DATE** 06/01/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
1020										
	1,019.4	0.0	11	12	8	20		M		1,019.4 GROUND SURFACE 0.0
1015										**ARTIFICIAL FILL** Very loose to medium dense, gray, brown, red-brown, silty fine to coarse SAND, trace fine to coarse rounded gravel, concrete fragments (A-2-4)
	1,015.9	3.5	2	4	6	10		M		
1010										
	1,010.9	8.5	2	2	1	3		M		
1005										1,007.4 **RESIDUAL** Loose to very dense, orange, brown, gray, white, black, silty fine to coarse SAND, rock fragments (A-2-4), slightly micaceous, saprolitic	12.0
	1,005.9	13.5	2	3	4	7		M		
1000										
	1,000.9	18.5	35	15	18	33	SS-15	M		
995										
	995.9	23.5	15	38	22	60		M		
990										992.4 **WEATHERED ROCK** Brown, orange, white MICA SCHIST	27.0
	990.9	28.5	28	72/0.3		100/0.8				
985										987.4 **RESIDUAL** Medium dense, brown, orange, gray, white, clayey, silty fine to coarse SAND (A-2-4), very micaceous, saprolitic	32.0
	985.9	33.5	7	12	14	26		M		
980										
	980.9	38.5	4	6	7	13	SS-19	M		
975										977.4 **WEATHERED ROCK** Brown, orange, gray MICA SCHIST	42.0
	975.9	43.5	42	58/0.3		100/0.8				
	972.7	46.7	60/0.1			100/0.1				972.7 **CRYSTALLINE ROCK** MICA SCHIST 46.7
										972.6 46.8
										Boring Terminated by Auger Refusal at Elevation 972.6 ft In Crystalline Rock: MICA SCHIST

GEOTECHNICAL BORING REPORT
BORE LOG

WBS 12.101811	**TIP** N/A	**COUNTY** CATAWBA	**GEOLOGIST** Snyder, M.	
SITE DESCRIPTION US 70 Hickory Sinkhole				**GROUND WTR (ft)**
BORING NO. B-9	**STATION** 4+32	**OFFSET** 77 ft RT	**ALIGNMENT** -CULV-	**0 HR.** 25.0
COLLAR ELEV. 1,021.7 ft	**TOTAL DEPTH** 41.0 ft	**NORTHING** 721,327	**EASTING** 1,311,953	**24 HR.** 25.5
DRILL RIG/HAMMER EFF./DATE F&R3495 CME-55 80% 02/16/2016		**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic
DRILLER Tignor, D.	**START DATE** 06/01/16	**COMP. DATE** 06/01/16	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
1025											
	1,021.7	0.0								1,021.7 GROUND SURFACE	0.0
1020			3	6	7	13		M		**ARTIFICIAL FILL** Loose to medium dense, moist, red-brown, clayey, silty, fine to coarse SAND, trace fine angular gravel, trace mica (A-2-4)	
	1,018.2	3.5	6	8	6	14	SS-2	M			
1015											
	1,013.2	8.5	7	3	4	7		M			
1010										1,009.7	12.0
	1,008.2	13.5	2	2	3	5	SS-4	17%		**ARTIFICIAL FILL** Medium stiff, moist, red-brown, fine to coarse sandy, slightly plastic silty CLAY, trace fine gravel (A-6)	
1005										1,004.7	17.0
	1,003.2	18.5	4	8	8	16		M		**RESIDUAL** Medium dense to dense, moist, orange-brown, white, silty, clayey, fine to coarse SAND, little fine to coarse quartz rock fragments (A-2-4), micaceous, saprolitic	
1000											
	998.2	23.5	8	18	15	33	SS-6	M			
995											
	993.2	28.5	15	33	67/0.2	100/0.7				992.7	29.0
990										**WEATHERED ROCK** Dark brown, gray, white MICA SCHIST	
	988.2	33.5	84	16/0.1		100/0.6					
985											
	983.2	38.5	18	46	54/0.3	100/0.8					
	980.7	41.0	60/0.0			60/0.0				980.7	41.0
										Boring Terminated by Auger Refusal at Elevation 980.7 ft On Crystalline Rock: MICA SCHIST	

NCDOT BORE DOUBLE 018&000_GEO_BH_SHRG_HICKORY SINKHOLE.GPJ NC_DOT.GDT 7/19/16

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% Moisture	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-2	77 RT	4+32	3.5-5.0	A-2-4(0)	26	NP	37.8	32.5	15.0	14.7	80.9	61.7	26.9	-	-
SS-4	77 RT	4+32	13.5-15.0	-	-	-	-	-	-	-	-	-	-	17.2	-
SS-6	77 RT	4+32	23.5-25.0	A-2-4(0)	24	NP	43.6	36.6	3.0	16.8	83.1	58.9	19.4	-	-
SS-15	67 RT	5+13	18.5-20.0	A-2-4(0)	25	NP	40.6	34.4	14.1	10.9	76.8	57.9	21.8	-	-
SS-19	67 RT	5+13	38.5-40.0	A-2-4(0)	32	NP	32.0	45.4	18.3	4.3	98.1	80.2	26.8	-	-
SS-23	38 RT	3+20	3.5-5.0	A-7-5(6)	51	13	19.0	28.3	20.1	32.6	97.0	85.9	54.4	29.4	-
SS-25	38 RT	3+20	13.5-15.0	-	-	-	-	-	-	-	-	-	-	20.5	-
SS-37	82 LT	4+78	23.5-25.0	A-4(0)	36	NP	22.2	44.6	22.2	11.0	93.9	83.1	36.6	25.8	-
SS-41	82 LT	4+78	43.5-45.0	A-2-4(0)	32	NP	30.9	43.0	19.5	6.6	98.5	80.3	31.4	-	-
SS-56	105 LT	5+36	33.5-35.0	A-4(2)	33	10	23.5	28.0	16.8	31.7	95.9	83.0	49.0	32.2	-
SS-59	105 LT	5+36	48.5-50.0	-	-	-	-	-	-	-	-	-	-	33.2	-
SS-63	105 LT	5+36	68.5-70.0	A-4(0)	40	8	23.6	39.2	26.4	10.8	96.0	83.2	40.1	28.5	-
SS-67	32 RT	6+26	8.5-10.0	A-2-4(0)	32	5	34.4	31.4	17.1	17.1	98.1	83.7	54.1	-	-
SS-70	32 RT	6+26	23.5-25.0	A-7-5(6)	52	14	23.4	24.4	14.7	37.5	98.1	83.7	54.1	28.7	-
SS-72	32 RT	6+26	33.5-35.0	A-5(0)	51	9	30.3	25.1	14.8	29.8	78.0	62.1	37.1	31.4	-
SS-75	32 RT	6+26	48.5-50.0	-	-	-	-	-	-	-	-	-	-	29.6	-
SS-85	83 LT	4+09	18.5-20.0	A-2-4(0)	22	5	24.6	31.6	18.3	25.5	72.4	61.9	34.0	-	-
SS-99	37 LT	6+13	8.5-10.0	A-5(0)	46	5	32.6	31.9	17.0	18.5	92.4	72.2	36.0	23.4	-
SS-103	37 LT	6+13	28.5-30.0	-	-	-	-	-	-	-	-	-	-	29.6	-
SS-106	37 LT	6+13	43.5-45.0	A-4(1)	28	8	22.8	36.4	13.0	27.8	98.2	87.5	42.9	29.1	-
SS-117	29 LT	3+29	18.5-20.0	A-2-4(0)	28	NP	33.5	30.6	15.7	20.2	83.9	66.4	32.9	-	-
SS-122	29 LT	3+29	43.5-45.0	A-2-4(0)	33	8	32.7	27.2	13.1	27.0	75.3	59.7	32.0	-	-
ST-1	105 LT	5+36	24.0-26.0	A-4(0)	32	NP	26.5	41.4	19.5	12.6	97.6	83.2	36.1	31.2	-
ST-2	83 LT	4+09	38.0-40.0	A-6(8)	39	15	18.3	18.3	21.3	42.1	99.8	88.4	65.0	24.2	-

CONSOLIDATED UNDRAINED TRIAXIAL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	UNIT WT. (d)	VOID RATIO	COHESION (PSF)		FRICTION	
						EFF.	TOT.	EFF.	TOT.
ST-1	105 LT	5+36	24.0-26.0	88	0.88	432	331	33.6	19.2
ST-2	83 LT	4+09	38.0-40.0	104	0.61	115	230	34.2	21.1

***Detailed consolidated undrained triaxial test data available upon request**

SITE PHOTOGRAPHS

View Looking Upstation From Approx. -CULV- 3+00

View Looking East From Approx. -CULV- 4+00

SITE PHOTOGRAPHS

View Looking Downstation From 7th Street During Flooding Event

View Looking East Along Conceptual Temporary Shoring - North