

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4753	1	47

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY JACKSON
PROJECT DESCRIPTION NC 107 FROM EAST OF SR 1002
TO NC 281

SITE DESCRIPTION RETAINING WALLS 1A, 1EXT, 1, AND
7

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3&4	SITE PLAN
5	PROFILE(S)
6-17	CROSS SECTION(S)
18-26	BORE LOGS
27-46	SOIL LABORATORY TEST DATA

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

D. NANCE

R. TOOTHMAN

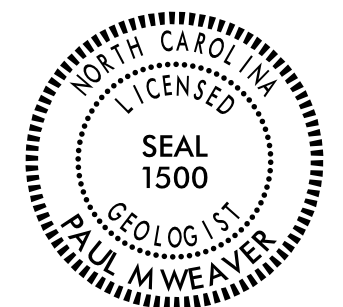
INVESTIGATED BY ESP ASSOCIATES, PA

DRAWN BY T.T. WALKER

CHECKED BY P. WEAVER

SUBMITTED BY ESP ASSOCIATES, PA

DATE OCTOBER 2016



DocuSigned by:
Paul Weaver 10/3/2016
01847D37381549URE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

REFERENCE: R-4753

PROJECT: 39999

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Walker AT 66A161068

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 LEGEND AND AASHTO CLASSIFICATION
Table with columns for GENERAL CLASS., GRANULAR MATERIALS (<= 35% PASSING #200), SILT-CLAY MATERIALS (> 35% PASSING #200), and ORGANIC MATERIALS. Includes symbols and material descriptions.

CONSISTENCY OR DENSENESS
Table with columns for PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), and RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²).

TEXTURE OR GRAIN SIZE
Table with columns for U.S. STD. SIEVE SIZE OPENING (MM) and soil types: BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.).

SOIL MOISTURE - CORRELATION OF TERMS
Table with columns for SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, and GUIDE FOR FIELD MOISTURE DESCRIPTION. Includes Liquid Limit (LL), Plastic Limit (PL), and Optimum Moisture Shrinkage Limit (OM SL).

PLASTICITY
Table with columns for PLASTICITY INDEX (PI) and DRY STRENGTH. Includes categories like NON PLASTIC, SLIGHTLY PLASTIC, MODERATELY PLASTIC, and HIGHLY PLASTIC.

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

GROUND WATER
WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
STATIC WATER LEVEL AFTER 24 HOURS
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
DIP & DIP DIRECTION OF ROCK STRUCTURES
TEST BORING
AUGER BORING
CORE BORING
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
UNIT WEIGHT
DRY UNIT WEIGHT
SAMPLE ABBREVIATIONS
S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT
DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST
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
HAMMER TYPE: 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)
CRYSTALLINE ROCK (ICR)
NON-CRYSTALLINE ROCK (ICR)
COASTAL PLAIN SEDIMENTARY ROCK (CP)

WEATHERING
FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SL.): ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SL.): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.
SEVERE (SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, 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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT: CAN BE GROOVED 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 and BEDDING
Table with columns for TERM, SPACING, and THICKNESS. Includes categories like VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE and VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED.

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 DISLOGGED 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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.
STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-4= N: 589920.6050, E: 761398.2520, STATION 22+20.45
ELEVATION: 2135.64 FEET

NOTES:
F.I.A.D. = FILLED IN AFTER DRILLING

09/06/99

TIP PROJECT: R-4753

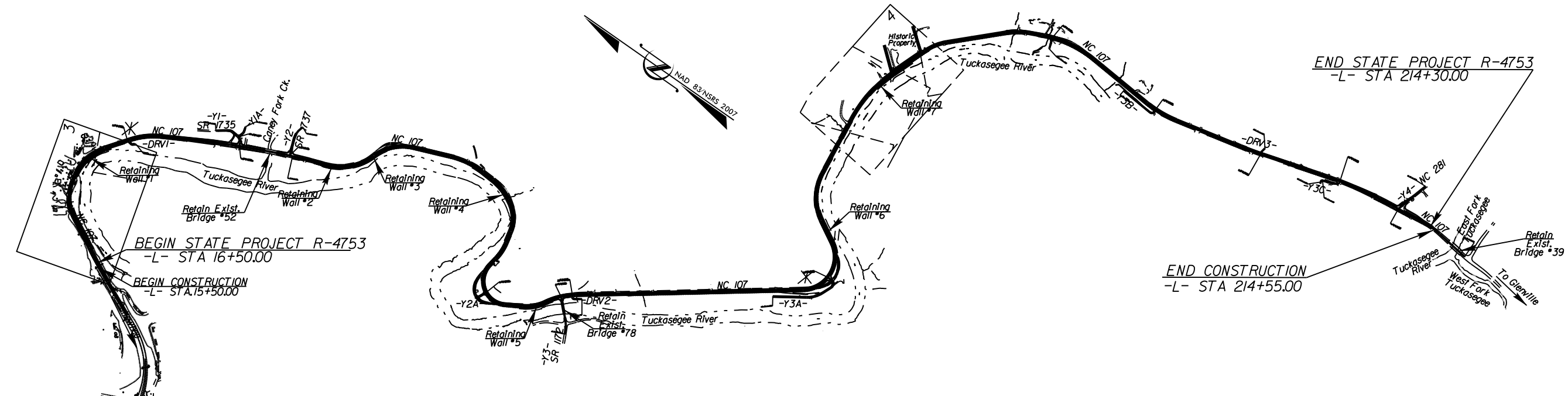
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JACKSON COUNTY

LOCATION: NC 107 FROM NORTH OF SR 1002 TO NC 281

TYPE OF WORK: GRADING, DRAINAGE, PAVING, RESURFACING,
& RETAINING WALLS

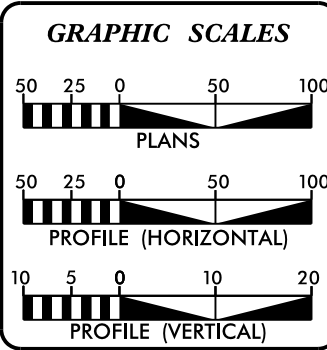
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4753	2A	47
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
39999.1.1	STP-107(10)	P.E.	



* DESIGN EXCEPTION REQUIRED FOR: Horizontal Curve Radius and Vertical Curve Crest K Factors
 THIS PROJECT IS NOT WITHIN THE LIMITS OF ANY MUNICIPALITY.
 CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

INCOMPLETE PLANS
 DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

CONTRACT:



DESIGN DATA

ADT 2015 =	9440 vpd
ADT 2035 =	17000 vpd
DHV =	13 %
D =	55 %
T =	10 % *
V =	40 MPH
* TTST =	2% DUAL 8%
FUNC CLASS =	RURAL COLLECTOR
REGIONAL TIER	

PROJECT LENGTH

Length Roadway TIP Project R-4753 = 3.746 Miles

Prepared in the Office of:
DIVISION OF HIGHWAYS
 1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: May 16, 2014

LETTING DATE: February 16, 2016

James Speer, PE
PROJECT ENGINEER

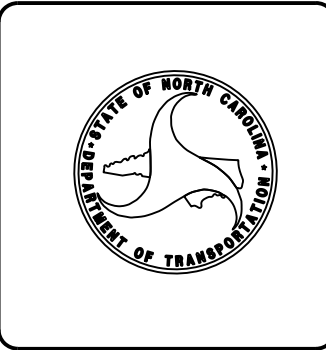
John Lansford, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

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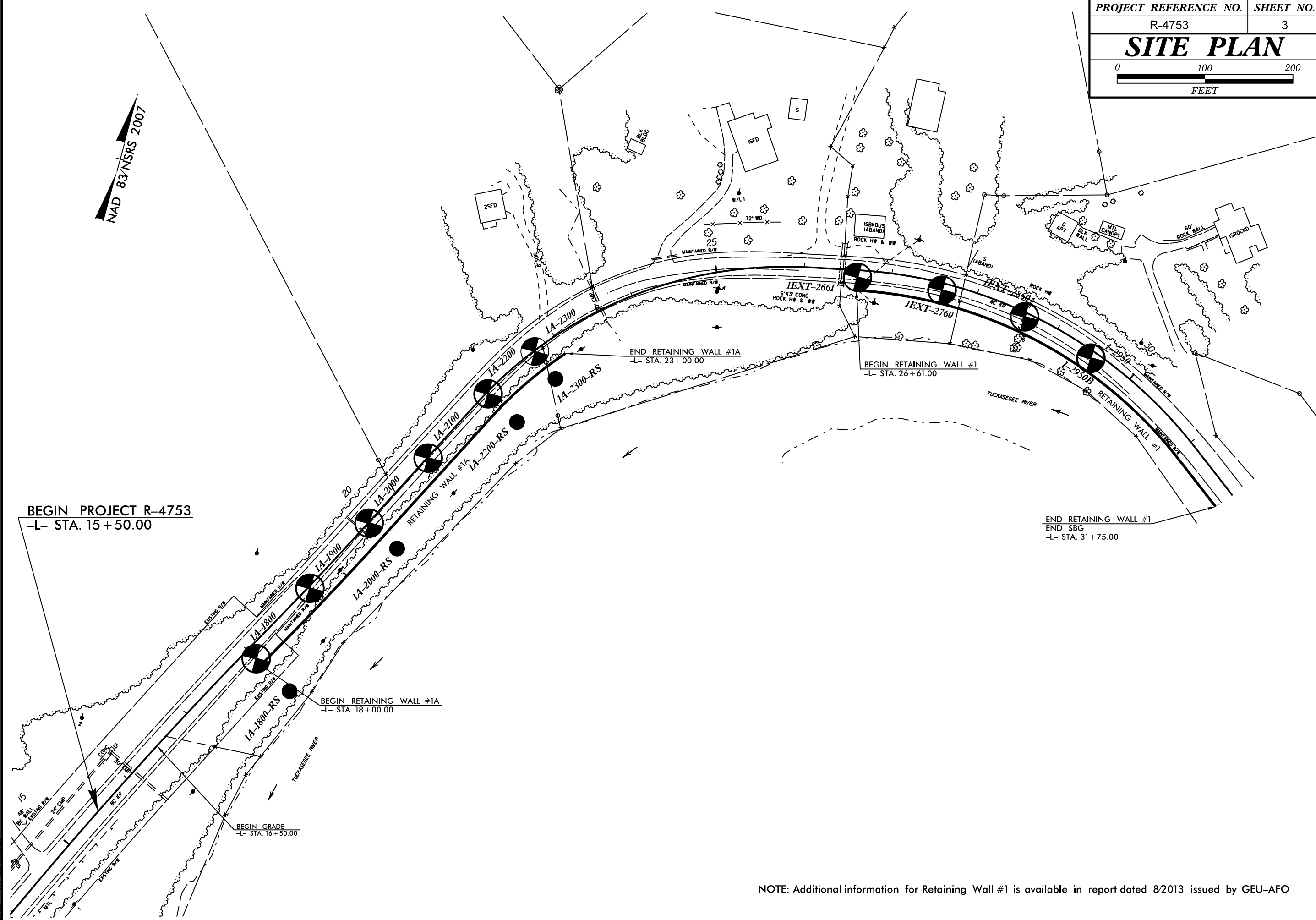


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PROJECT REFERENCE NO.	SHEET NO.
R-4753	3
SITE PLAN	
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NAD 83/NSRS 2007



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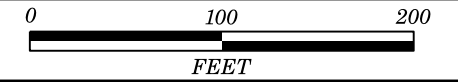
NOTE: Additional information for Retaining Wall #1 is available in report dated 8/2013 issued by GEU-AFO

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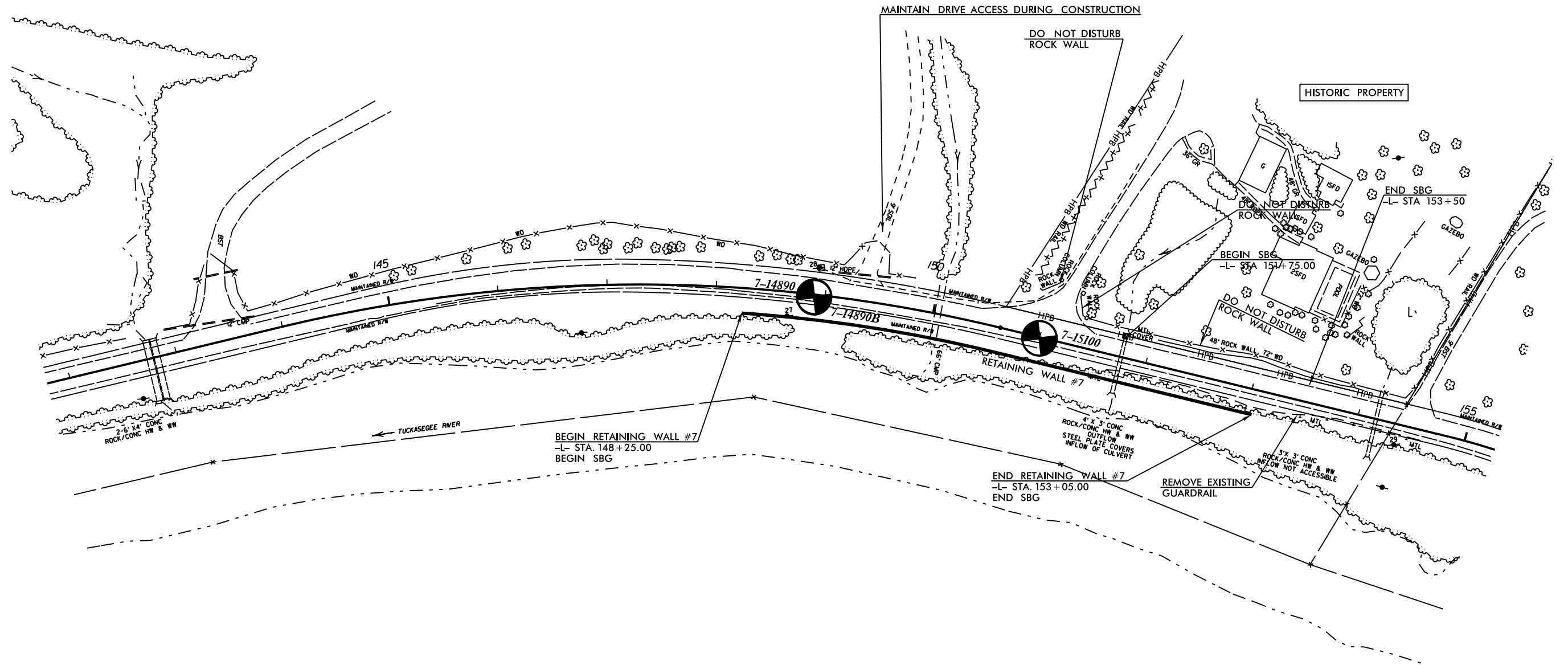
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SITE PLAN



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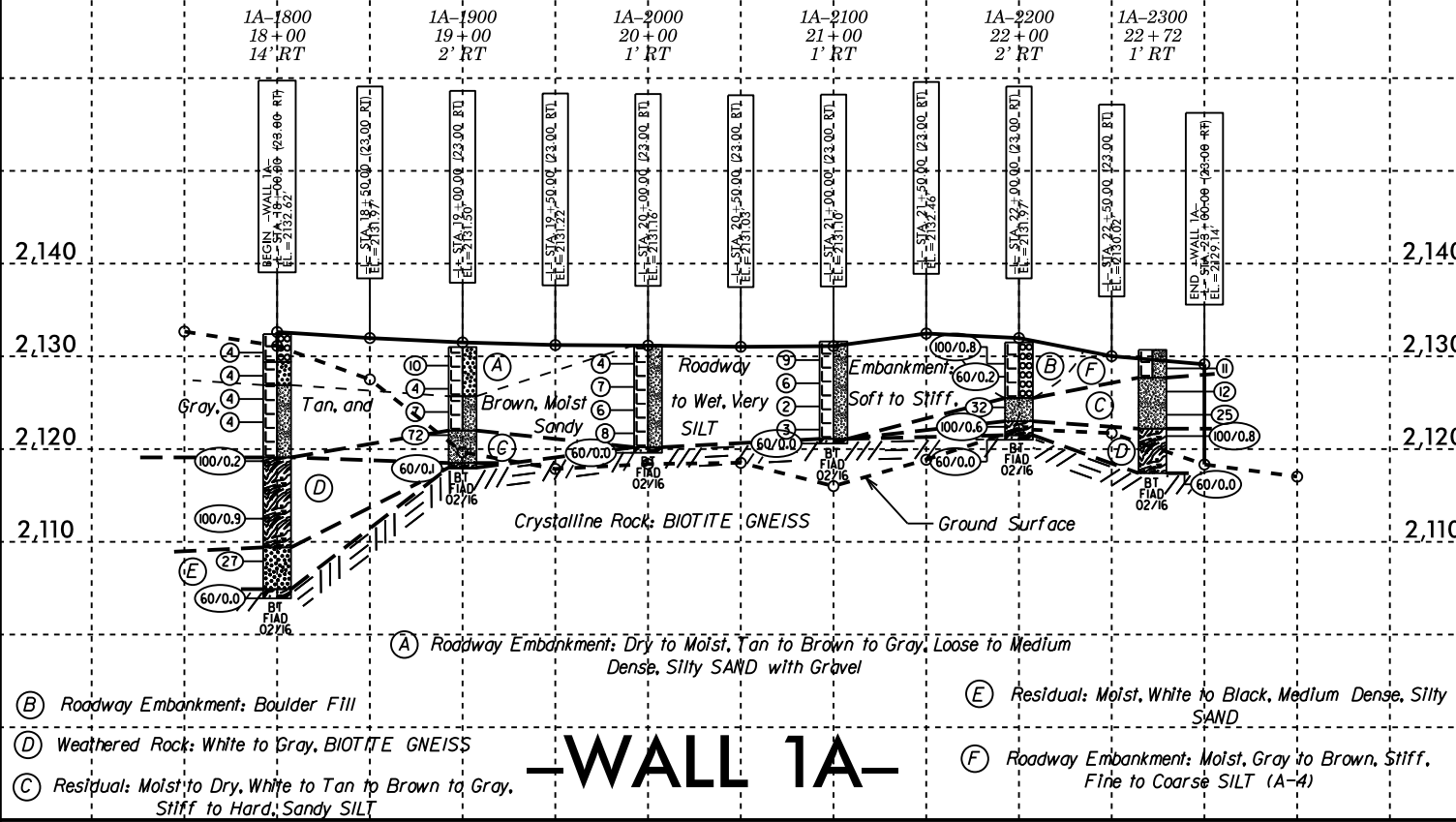
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NOTE: Additional information for Retaining Wall #7 is available in report dated 8/2013 issued by GEU-AFO

5/28/99

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

NOTE: Rock Line is Not Indicative of Rock Line at Wall Profile. Refer to Cross Sections for Rock Lines.



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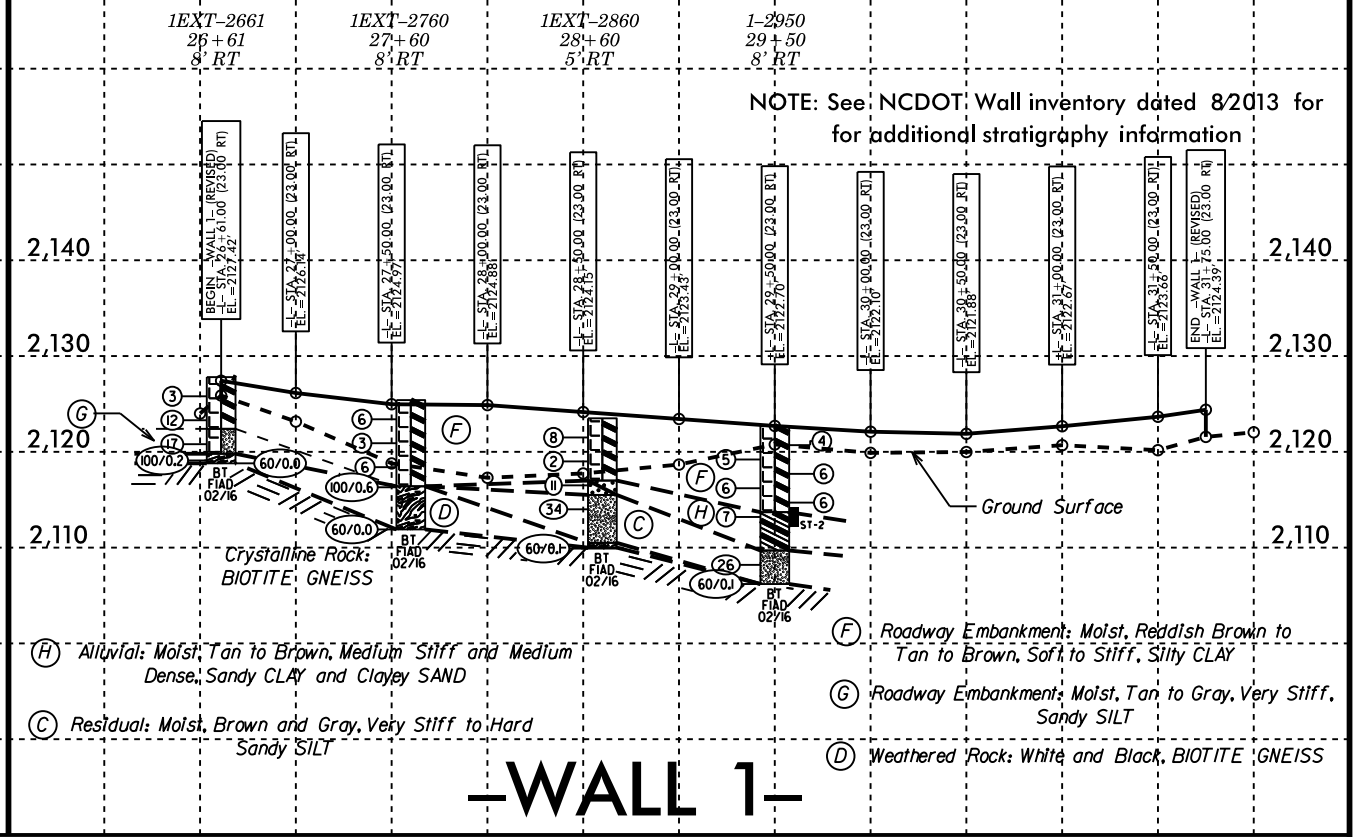
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NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE WALL PROFILE

NOTE: Rock Line is Not Indicative of Rock Line at Wall Profile. Refer to Cross Sections for Rock Lines.



NOTE: See NCDOT Wall inventory dated 8/2013 for additional stratigraphy information

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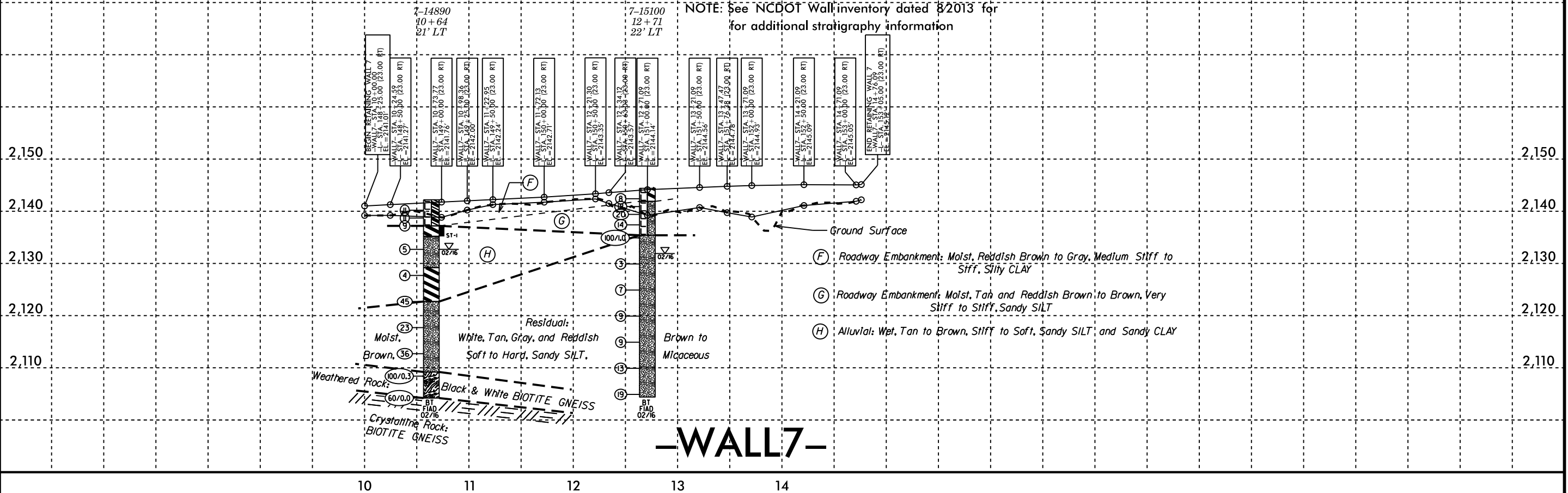
31

32

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

NOTE: Rock Line is Not Indicative of Rock Line at Wall Profile. Refer to Cross Sections for Rock Lines.

NOTE: See NCDOT Wall inventory dated 8/2013 for additional stratigraphy information



10

11

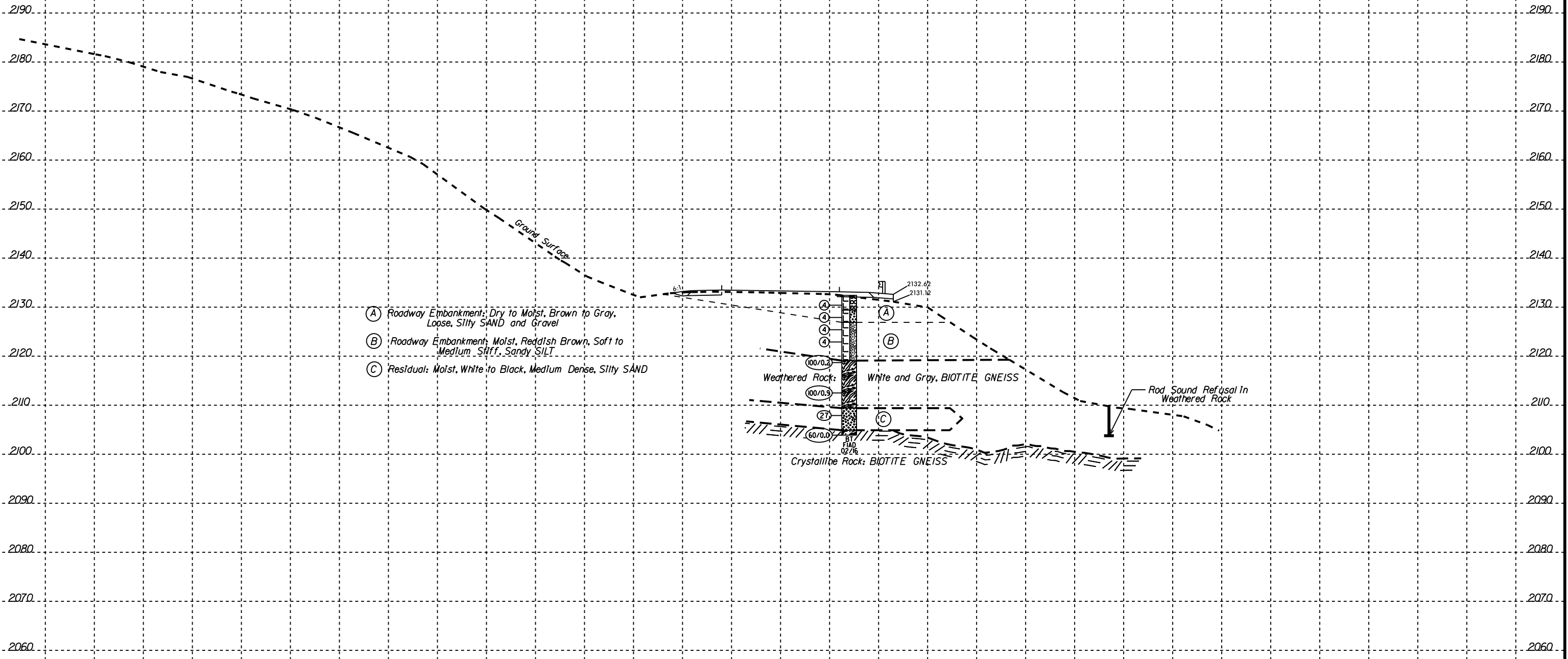
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13

14

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NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION
NOTE: LINE REPRESENTING TOP OF ROCK DOWNSLOPE FROM THE BORING IS BASED ON THE GEOPHYSICAL INVESTIGATION



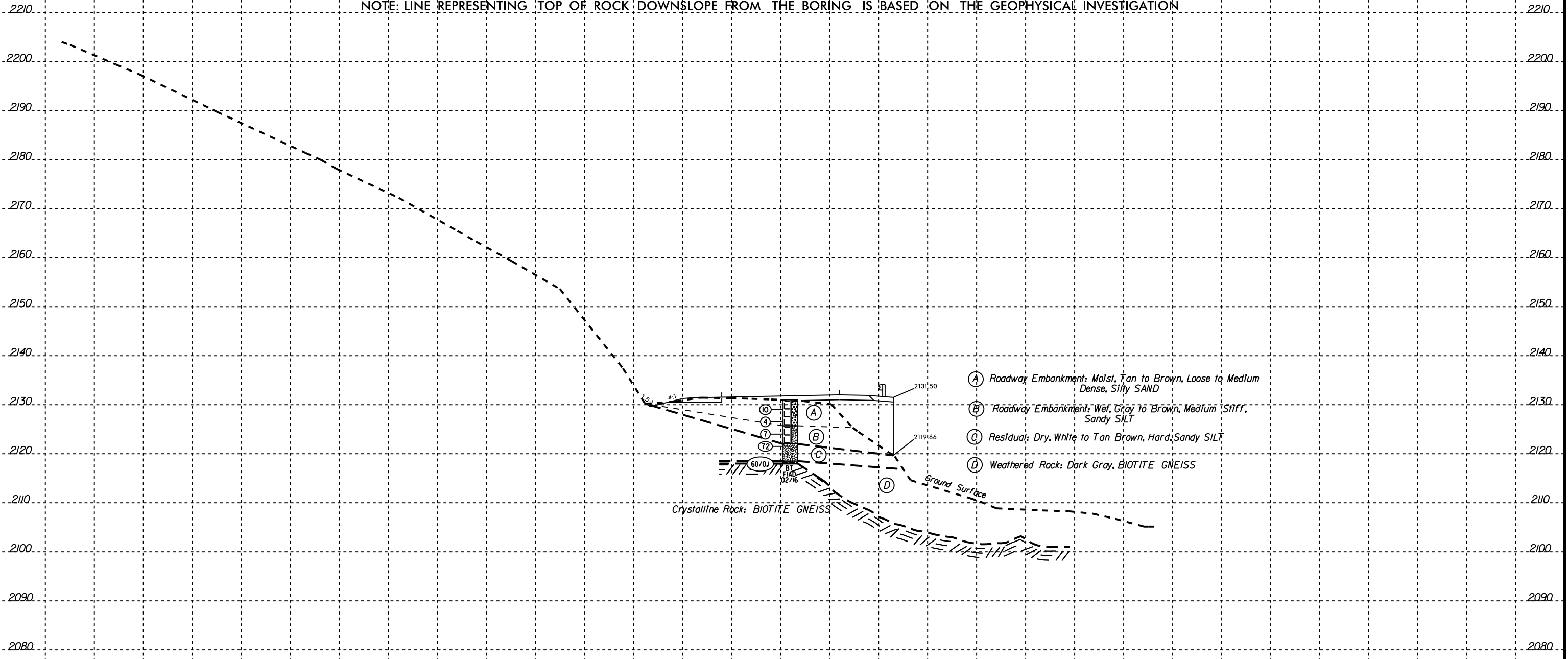
- (A) Roadway Embankment; Dry to Moist, Brown to Gray, Loose, Silty SAND and Gravel
- (B) Roadway Embankment; Moist, Reddish Brown, Soft to Medium Stiff, Sandy SILT
- (C) Residual; Moist, White to Black, Medium Dense, Silty SAND

18 + 00.00
-WALL 1A-

3-MAR-2016 16:20
F:\Projects\AT\66181068
T\Walker

3-MAR-2016 16:20
F:\Projects\AT\66181068
T\Walker

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION
NOTE: LINE REPRESENTING TOP OF ROCK DOWNSLOPE FROM THE BORING IS BASED ON THE GEOPHYSICAL INVESTIGATION



19 + 00.00
-WALL 1A-

8/23/99

140

120

100

80

60

40

20

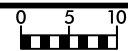
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20

40

60

80

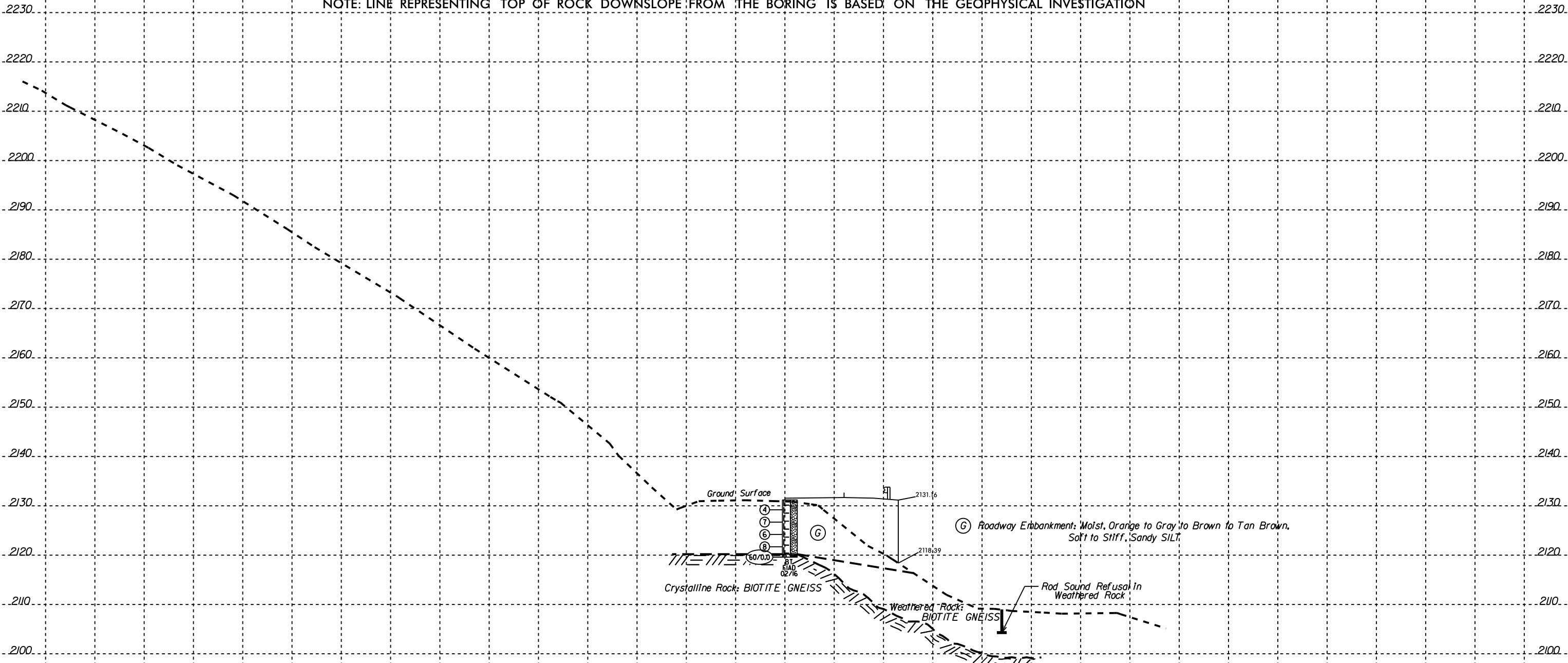


PROJ. REFERENCE NO.
R-4753

SHEET NO.
8

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

NOTE: LINE REPRESENTING TOP OF ROCK DOWNSLOPE FROM THE BORING IS BASED ON THE GEOPHYSICAL INVESTIGATION



20 + 00.00

-WALL 1A-

3-MAR-2016 15:17
F:\Projects\661\661-0314 IESP-R-4753 CADD Only\CADD.GEOTECH\asc\R4753-geo-XSC.L-retain-wall-x.sxdgn
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140

120

100

80

60

40

20

0

20

40

60

80

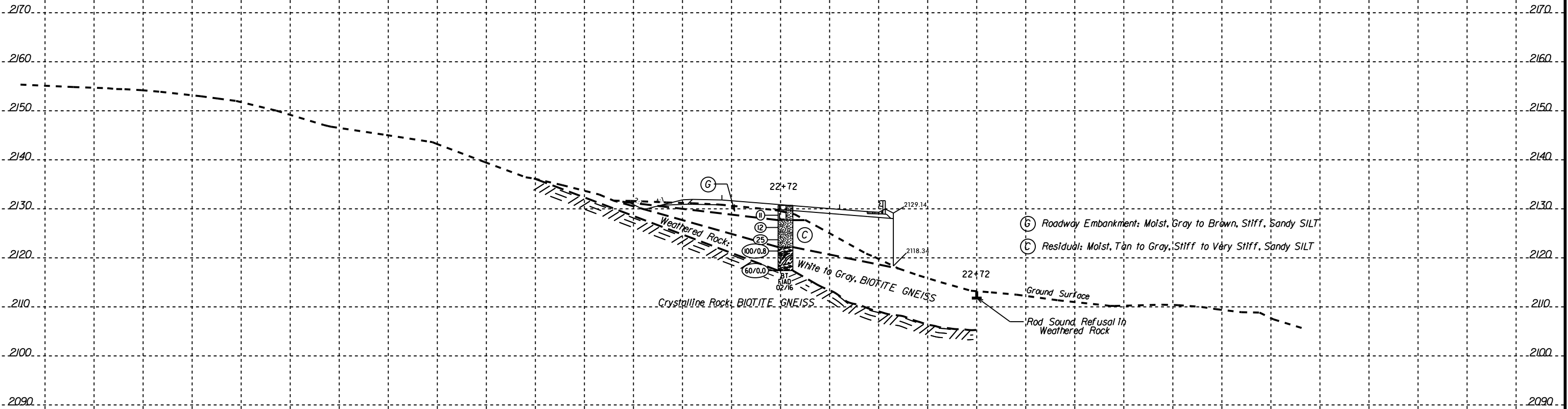


PROJ. REFERENCE NO.	SHEET NO.
R-4753	11

PROJ. REFERENCE NO.	SHEET NO.
R-4753	11

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

NOTE: LINE REPRESENTING TOP OF ROCK DOWNSLOPE FROM THE BORING IS BASED ON THE GEOPHYSICAL INVESTIGATION



23 + 00.00
 -WALL 1A-

140

120

100

80

60

40

20

0

20

40

60

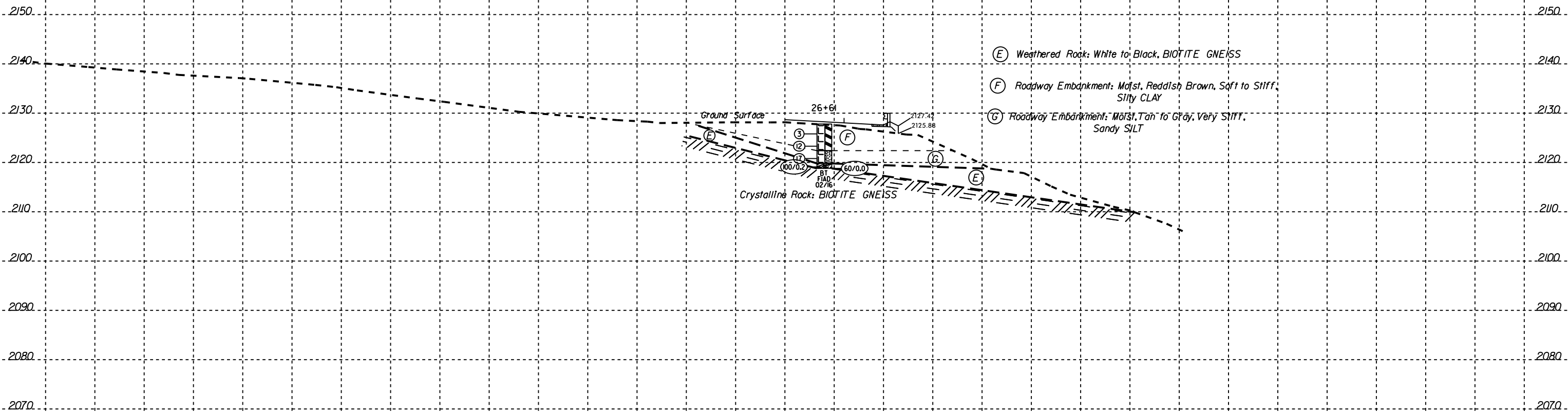
80

100

120

140

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

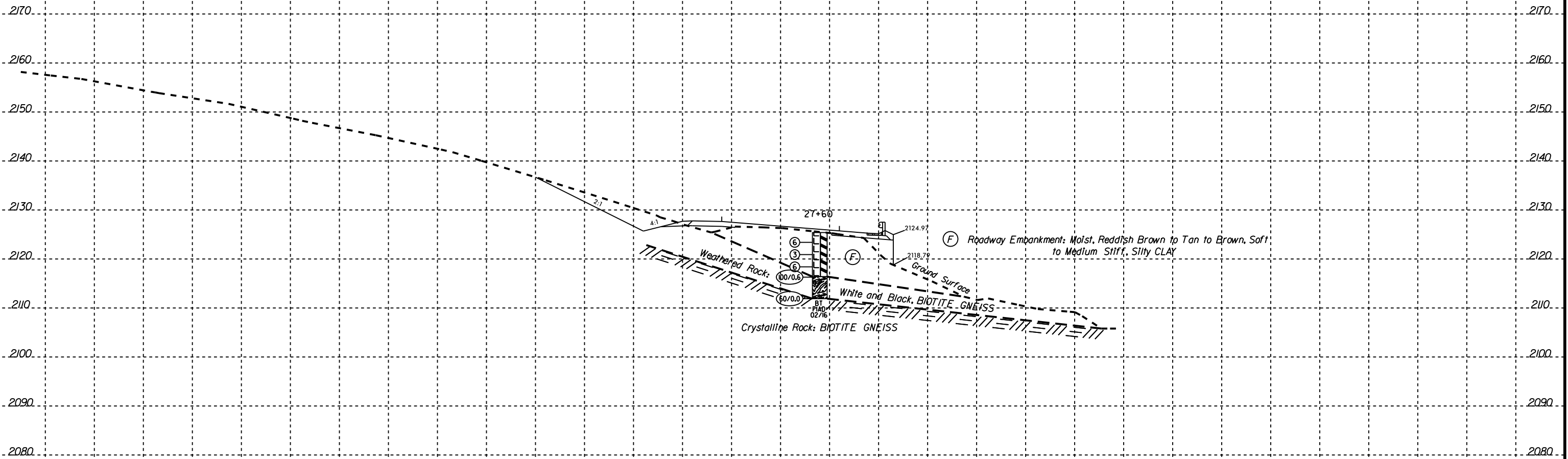


- (E) Weathered Rock: White to Black, BIOTITE GNEISS
- (F) Roadway Embankment: Moist, Reddish Brown, Soft to Stiff, SILTY CLAY
- (G) Roadway Embankment: Moist, Tan to Gray, Very Stiff, Sandy SILT

26 + 61.00

-WALL I-

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

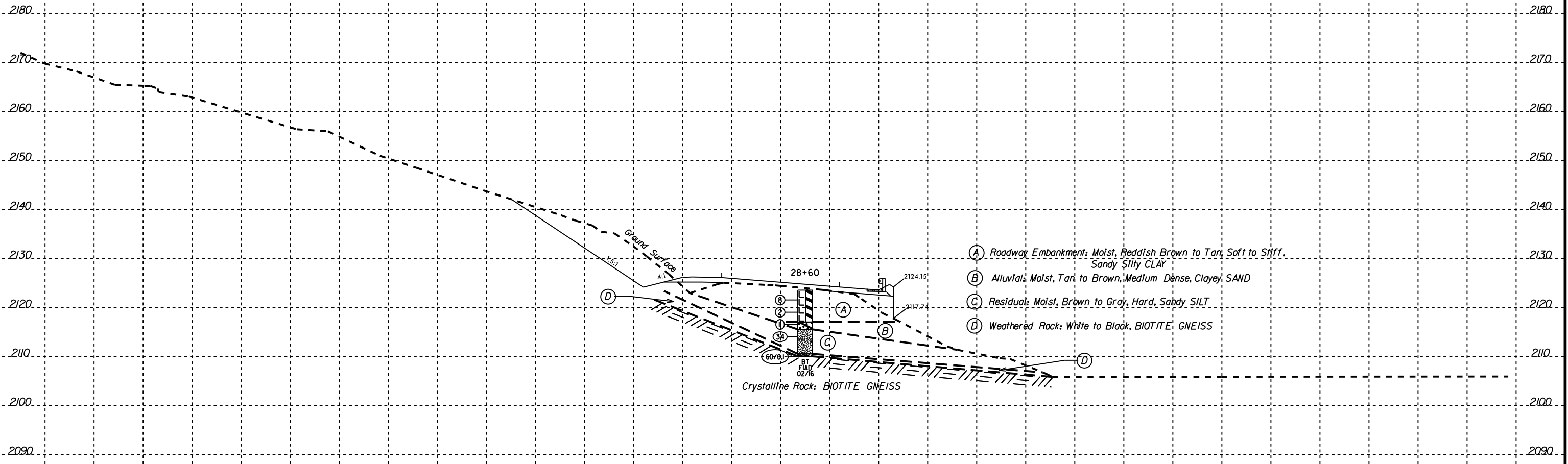


27 + 50.00
-WALL 1-

22-MAR-2006 14:49
F:\Projects\9906\9906-0314 IESP-R-4753 CADD Only\CADD.GEOTECH\asc\RA4753-geo-XSC.L-retain-wall-x.sxdgn
T:\w\k\er



NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



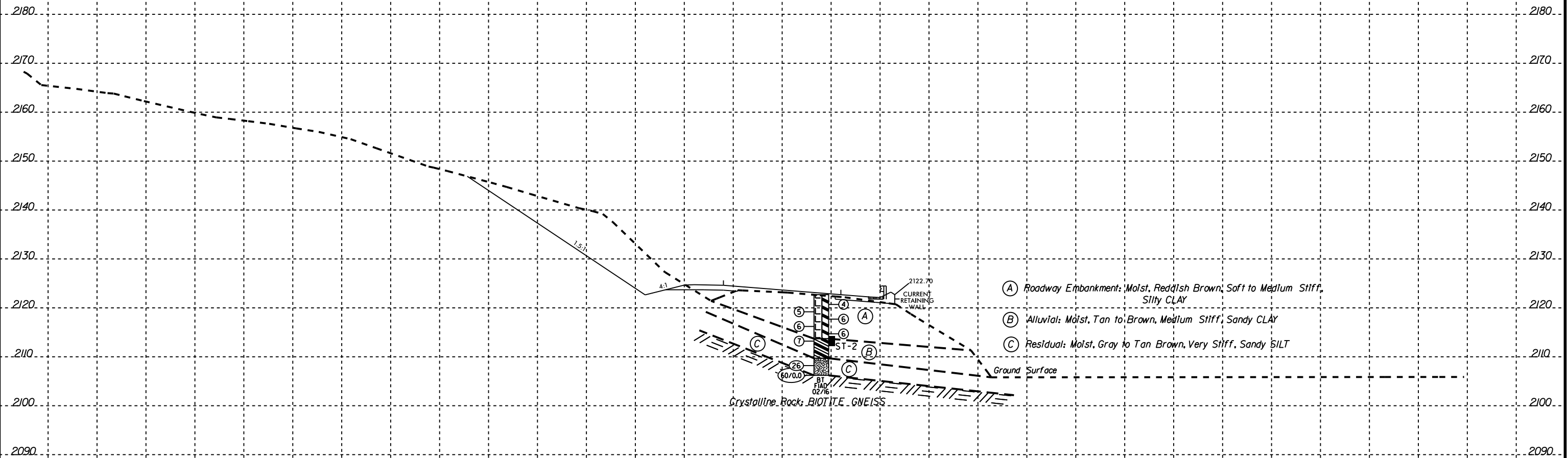
- (A) Roadway Embankment: Moist, Reddish Brown to Tan, Soft to Stiff, Sandy Silty CLAY
- (B) Alluvial: Moist, Tan to Brown, Medium Dense, Clayey SAND
- (C) Residual: Moist, Brown to Gray, Hard, Sandy SILT
- (D) Weathered Rock: White to Black, BIOTITE GNEISS

28 + 50.00
-WALL I-

8/23/99



NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



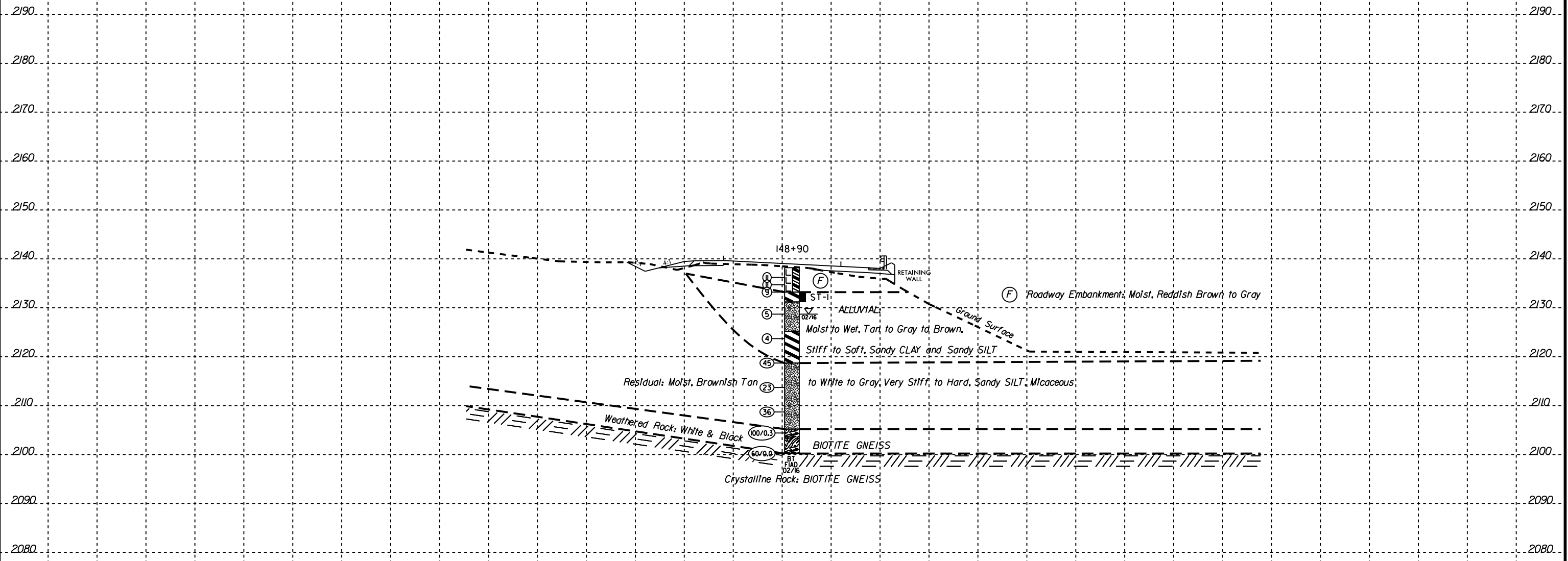
29 + 50.00
-WALL I-

03-OCT-2016 09:21
I:\Projects\66666666\EST_0814 IESP-R-4753 CADD Only\ACADD_GEO\TECH\ssc\R4753-geo_XSC.L-retain-wall-ssi.dgn
Author: A. G. S. B. J. O. B.

8/23/99



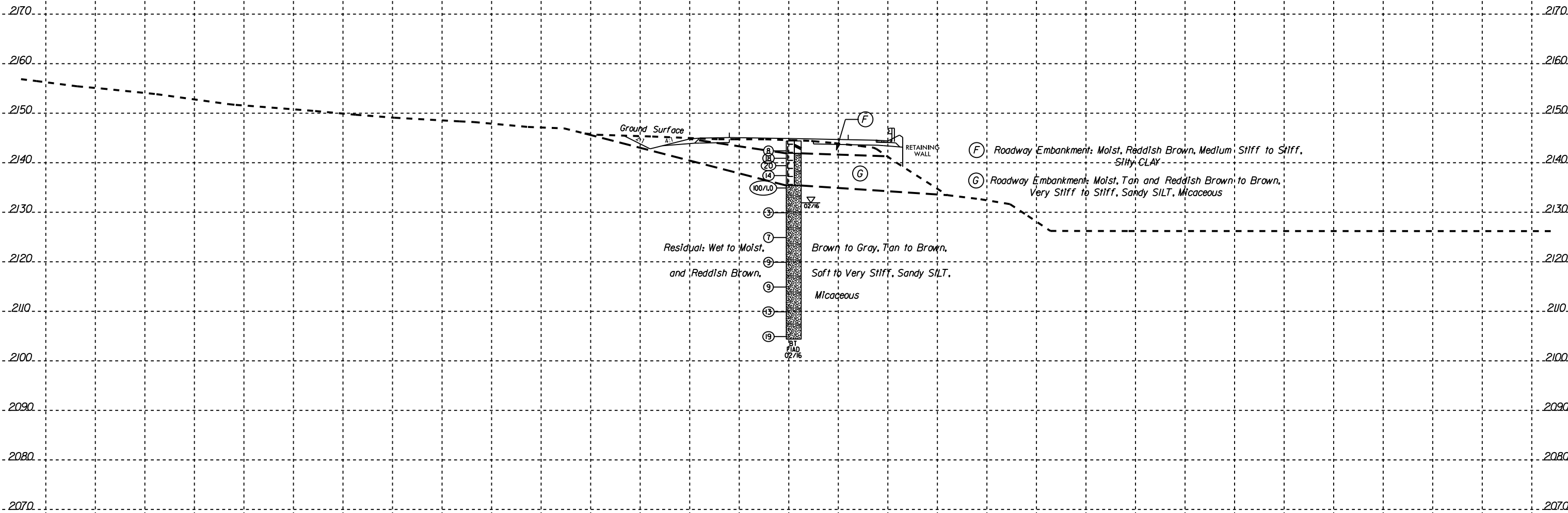
NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



149 + 00.00
-WALL 7-

03-OCT-2016 09:16
I:\Projects\6661033
Wall 7.dgn

NOTE: THE INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION



151 + 00.00
-WALL 7-

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.	
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)
BORING NO. 1A-1800		STATION 18+00		OFFSET 14 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,132.4 ft		TOTAL DEPTH 28.5 ft		NORTHING 589,998		EASTING 761,477	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER Toothman, R.		START DATE 02/17/16		COMP. DATE 02/17/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2135															
2130	2,131.4	1.0		5	2	2									
	2,128.9	3.5		WOH	2	2									
2125	2,126.4	6.0			1	1	3								
	2,123.9	8.5			4	2	2								
2120	2,118.9	13.5													
					100/0.2										
2115	2,113.9	18.5			10	19	81/0.4								
2110	2,108.9	23.5			29	14	13								
2105	2,103.9	28.5			60/0.0										

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.	
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)
BORING NO. 1A-1800-RS		STATION 18+00		OFFSET 67 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,109.7 ft		TOTAL DEPTH 6.0 ft		NORTHING 589,972		EASTING 761,524	
DRILL RIG/HAMMER EFF./DATE N/A			DRILL METHOD N/A		HAMMER TYPE N/A		
DRILLER N/A		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2110															
2105															

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT_GDT 4/1/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)									
BORING NO. 1A-1900		STATION 19+00		OFFSET 2 ft RT		ALIGNMENT -L-	0 HR. C.I. @ 9.5'									
COLLAR ELEV. 2,131.0 ft		TOTAL DEPTH 13.1 ft		NORTHING 590,091		EASTING 761,515	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 02/17/16		COMP. DATE 02/17/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2135																
2130	2,130.0	1.0	10	6	4									2,131.0	0.0	GROUND SURFACE
	2,127.5	3.5	2	2	2											ROADWAY EMBANKMENT Tan to Brown, Loose to Medium Dense, Silty, Fine to Coarse SAND (A-2-4), Trace Clay
2125	2,125.0	6.0	11	6	1									2,125.7	5.3	Gray to Brown, Medium Stiff, Fine to Coarse Sandy SILT (A-4), Some Gravel
	2,122.5	8.5	2	20	52									2,122.0	9.0	RESIDUAL White to Tan Brown, Hard, Fine to Coarse Sandy SILT (A-4), Some Rock Fragments
2120	2,118.0	13.0												2,118.5	12.5	WEATHERED ROCK Dark Gray BIOTITE GNEISS
			60/0.1											2,117.9	13.1	CRYSTALLINE ROCK BIOTITE GNEISS Boring Terminated with Standard Penetration Test Refusal at Elevation 2,117.9 ft In Crystalline Rock: BIOTITE GNEISS

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT_GDT 4/1/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.									
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)								
BORING NO. 1A-2000		STATION 20+00		OFFSET 1 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,131.2 ft		TOTAL DEPTH 11.6 ft		NORTHING 590,180		EASTING 761,561									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER Toothman, R.		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2135															
2130	2,130.2	1.0	4	2	2									2,131.2	GROUND SURFACE
	2,127.7	3.5	3	4	3										ROADWAY EMBANKMENT
	2,125.2	6.0	3	3	3										Orange to Gray to Brown to Tan Brown, Soft to Stiff, Fine to Coarse, Sandy SILT (A-4), Little Rock Fragments, Trace Clay
2125	2,122.7	8.5	17	4	4										
2120	2,119.6	11.6	60/0.0											2,120.2	CRYSTALLINE ROCK
														2,119.6	BIOTITE GNEISS
															Boring Terminated with Standard Penetration Test Refusal at Elevation 2,119.6 ft In Crystalline Rock: BIOTITE GNEISS

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.									
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)								
BORING NO. 1A-2000-RS		STATION 20+00		OFFSET 44 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,109.0 ft		TOTAL DEPTH 4.7 ft		NORTHING 590,160		EASTING 761,599									
DRILL RIG/HAMMER EFF./DATE N/A				DRILL METHOD N/A		HAMMER TYPE N/A									
DRILLER N/A		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2110															
														2,109.0	GROUND SURFACE
															Rod Sounding
2105														2,104.3	Boring Terminated at Elevation 2,104.3 ft In Weathered Rock: BIOTITE GNEISS
															Note: Rod Sounding Performed Only to Confirm Refusal

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)									
BORING NO. 1A-2100		STATION 21+00		OFFSET 1 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,131.6 ft		TOTAL DEPTH 11.0 ft		NORTHING 590,269		EASTING 761,607										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2135																
														2,131.6		GROUND SURFACE
2130	2,130.6	1.0	5	4	5							M				ROADWAY EMBANKMENT
	2,128.1	3.5	6	3	3							M				Gray to Brown to Tan Brown, Very Soft to Stiff, Fine to Coarse Sandy SILT (A-4), Little Clay, Little Rock Fragments
2125	2,125.6	6.0	WOH	1	1							M				
	2,123.1	8.5										M				
	2,120.6	11.0												2,121.1	10.5	CRYSTALLINE ROCK
			60/0.0											2,120.6	11.0	BIOTITE GNEISS
																Boring Terminated with Standard Penetration Test Refusal at Elevation 2,120.6 ft In Crystalline Rock: BIOTITE GNEISS

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT_GDT 4/1/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.	
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)
BORING NO. 1A-2200		STATION 22+00		OFFSET 2 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,131.5 ft		TOTAL DEPTH 10.5 ft		NORTHING 590,358		EASTING 761,653	
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER Toothman, R.		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2135															
2130	2,130.5	1.0	4	42	58/0.3									2,131.5	GROUND SURFACE
	2,128.0	3.5	100/0.2												ROADWAY EMBANKMENT Boulder Fill
2125	2,125.5	6.0	78	19	13									2,125.5	RESIDUAL
	2,123.0	8.5	50	50/0.1										2,123.0	Tan to Gray, Hard, Fine to Coarse Sandy SILT (A-4), Trace Rock Fragments
	2,121.0	10.5	60/0.0											2,121.0	WEATHERED ROCK White to Gray BIOTITE GNEISS
															CRYSTALLINE ROCK BIOTITE GNEISS

Boring Terminated with Standard Penetration Test Refusal at Elevation 2,121.0 ft In Crystalline Rock: BIOTITE GNEISS

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.	
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)
BORING NO. 1A-2200-RS		STATION 22+00		OFFSET 48 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 2,110.0 ft		TOTAL DEPTH 2.9 ft		NORTHING 590,335		EASTING 761,693	
DRILL RIG/HAMMER EFF./DATE N/A			DRILL METHOD N/A		HAMMER TYPE N/A		
DRILLER N/A		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2110														2,110.0	GROUND SURFACE
															Rod Sounding
														2,107.1	Boring Terminated at Elevation 2,107.1 ft On Crystalline Rock: BIOTITE GNEISS

Note: Rod Sounding Performed Only to Confirm Refusal

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.									
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)								
BORING NO. 1A-2300		STATION 22+72		OFFSET 1 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,130.7 ft		TOTAL DEPTH 13.3 ft		NORTHING 590,418		EASTING 761,692									
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER Toothman, R.		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2135															
2130	2,129.7	1.0	5	3	8									2,130.7	0.0
	2,127.2	3.5	12	5	7									2,127.7	3.0
2125	2,124.7	6.0	9	11	14										
	2,122.2	8.5	23	77/0.3										2,122.2	8.5
2120	2,117.4	13.3	60/0.0											2,117.4	13.3

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.									
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1A)							GROUND WTR (ft)								
BORING NO. 1A-2300-RS		STATION 22+72		OFFSET 40 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 2,113.2 ft		TOTAL DEPTH 1.4 ft		NORTHING 590,394		EASTING 761,723									
DRILL RIG/HAMMER EFF./DATE N/A			DRILL METHOD N/A		HAMMER TYPE N/A										
DRILLER N/A		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2115															
														2,113.2	0.0
														2,111.8	1.4

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT_GDT 4/1/16

Boring Terminated at Elevation 2,111.8 ft In Weathered Rock: BIOTITE GNEISS
 Note: Rod Sounding Performed Only to Confirm Refusal

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1EXT and Wall 1)							GROUND WTR (ft)									
BORING NO. 1EXT-2661		STATION 26+61		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,127.8 ft		TOTAL DEPTH 9.0 ft		NORTHING 590,595		EASTING 762,024										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 02/18/16		COMP. DATE 02/18/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2130														2,127.8	0.0	GROUND SURFACE
2125	2,126.8	1.0	3	2	1								M	2,122.4	5.4	ROADWAY EMBANKMENT Reddish Brown, Soft to Stiff, Silty CLAY (A-7-5)
	2,124.3	3.5	WOH										M	2,119.8	8.0	Tan to Gray, Very Stiff, Fine to Coarse Sandy SILT (A-4), Trace Clay
	2,121.8	6.0	7	8	9								M	2,118.8	9.0	WEATHERED ROCK White and Black BIOTITE GNEISS
2120	2,119.3	8.5	100/0.2													Boring Terminated with Standard Penetration Test Refusal at Elevation 2,118.8 ft On Crystalline Rock: BIOTITE GNEISS
	2,118.8	9.0	60/0.0													

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1EXT and Wall 1)							GROUND WTR (ft)									
BORING NO. 1EXT-2760		STATION 27+60		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,125.4 ft		TOTAL DEPTH 13.5 ft		NORTHING 590,606		EASTING 762,121										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 02/19/16		COMP. DATE 02/19/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2130														2,125.4	0.0	GROUND SURFACE
2125	2,124.4	1.0	3	2	4								M	2,119.4	6.0	ROADWAY EMBANKMENT Reddish Brown to Tan to Brown, Soft to Medium Stiff, Fine to Coarse Sandy, Silty CLAY (A-7-6), Trace Gravel
	2,121.9	3.5	4	1	2								M	2,116.9	8.5	WEATHERED ROCK White and Black BIOTITE GNEISS
2120	2,119.4	6.0	2	3	3								M	2,111.9	13.5	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,111.9 ft On Crystalline Rock: BIOTITE GNEISS
	2,116.9	8.5	20	80/0.1												
2115	2,111.9	13.5	60/0.0													

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.											
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1EXT and Wall 1)							GROUND WTR (ft)										
BORING NO. 1EXT-2860		STATION 28+60		OFFSET 5 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 2,123.5 ft		TOTAL DEPTH 13.6 ft		NORTHING 590,602		EASTING 762,219											
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Toothman, R.		START DATE 02/19/16		COMP. DATE 02/19/16		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2125															2,123.5	GROUND SURFACE	0.0
	2,122.5	1.0	3	3	5								M	ROADWAY EMBANKMENT			
2120	2,120.0	3.5	WOH 1 1										M	Reddish Brown to Tan, Soft to Stiff, Fine to Coarse Sandy, Silty CLAY (A-7-6)			
	2,117.5	6.0	2	6	5								M				
2115	2,115.0	8.5	3	4	30								M	ALLUVIAL			
													M	Tan to Brown, Medium Dense, Clayey, Fine to Coarse SAND (A-2-6), Little Gravel			
													M	RESIDUAL			
													M	Brown to Gray, Hard, Fine to Coarse Sandy SILT (A-4)			
2110	2,110.0	13.5	60/0.1											WEATHERED ROCK			
														White and Black BIOTITE GNEISS			
														CRYSTALLINE ROCK			
														BIOTITE GNEISS			
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,109.9 ft In Crystalline Rock: BIOTITE GNEISS			

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.											
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 1EXT and Wall 1)							GROUND WTR (ft)										
BORING NO. 1-2950		STATION 29+50		OFFSET 8 ft RT		ALIGNMENT -L-											
COLLAR ELEV. 2,122.7 ft		TOTAL DEPTH 16.5 ft		NORTHING 590,576		EASTING 762,304											
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER Toothman, R.		START DATE 02/19/16		COMP. DATE 02/19/16		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2125															2,122.7	GROUND SURFACE	0.0
	2,121.7	1.0	2	2	2								M	ROADWAY EMBANKMENT			
2120	2,120.2	2.5	2	2	3								M	Reddish Brown, Soft to Medium Stiff, Silty CLAY (A-7-5)			
	2,118.7	4.0	2	3	3								M				
	2,117.2	5.5	2	3	3								M				
2115	2,115.7	7.0	2	3	3								M				
	2,115.7	7.0	2	3	3								M				
	2,114.2	8.5	1	3	3								M	ALLUVIAL			
													M	Tan to Brown, Medium Stiff, Silty, Coarse to Fine Sandy, CLAY (A-6)			
													M	RESIDUAL			
													M	Gray to Tan Brown, Very Stiff, Fine to Coarse Sandy SILT (A-4), Some Rock Fragments			
2110	2,109.2	13.5	48	6	20									WEATHERED ROCK			
														White and Black BIOTITE GNEISS			
														CRYSTALLINE ROCK			
														BIOTITE GNEISS			
														Boring Terminated with Standard Penetration Test Refusal at Elevation 2,106.2 ft On Crystalline Rock: BIOTITE GNEISS			
														Other Samples: ST-2 (8.5 - 10.5)			

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT.GDT 10/3/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 7)							GROUND WTR (ft)									
BORING NO. 7-14890		STATION 148+90		OFFSET 2 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,142.2 ft		TOTAL DEPTH 38.0 ft		NORTHING 584,119		EASTING 767,744										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 02/26/16		COMP. DATE 02/26/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2145																
2140	2,141.2	1.0	5	6	5									2,142.2	0.0	GROUND SURFACE
	2,139.7	2.5	3	3	8									2,137.2	5.0	ROADWAY EMBANKMENT Reddish Brown to Gray, Stiff, Silty, Fine to Coarse Sandy CLAY (A-6)
	2,138.2	4.0	11	5	4									2,135.2	7.0	ALLUVIAL Tan to Brown, Stiff, Silty, Coarse to Fine Sandy CLAY (A-7-5) Tan to Brown, Medium Stiff, Fine to Coarse Sandy SILT (A-4), Trace Clay
2135	2,133.7	8.5	2	2	3									2,129.2	13.0	Tan to Gray, Soft to Medium Stiff, Silty CLAY (A-7-6)
2130	2,128.7	13.5	WOH	3	1									2,122.7	19.5	RESIDUAL Brownish Tan to White to Gray, Very Stiff to Hard, Fine to Coarse Sandy SILT (A-4), Micaceous
2125	2,123.7	18.5	12	16	29									2,109.2	33.0	WEATHERED ROCK White and Black BIOTITE GNEISS
2120	2,118.7	23.5	3	8	15									2,104.2	38.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,104.2 ft On Crystalline Rock: BIOTITE GNEISS
2115	2,113.7	28.5	11	16	20											Other Samples: ST-1 (5.0 - 7.0)
2110	2,108.7	33.5	100/0.3													
2105	2,104.2	38.0	60/0.0													

WBS 39999.1.1		TIP R-4753		COUNTY JACKSON		GEOLOGIST Nance, D.										
SITE DESCRIPTION NC 107 from East of SR 1002 to NC 281 (Retaining Wall 7)							GROUND WTR (ft)									
BORING NO. 7-15100		STATION 151+00		OFFSET 1 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 2,144.4 ft		TOTAL DEPTH 40.0 ft		NORTHING 584,057		EASTING 767,944										
DRILL RIG/HAMMER EFF./DATE TRI9435 CME-55 84% 02/20/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Toothman, R.		START DATE 02/26/16		COMP. DATE 02/26/16		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2145																
	2,143.4	1.0	2	4	4									2,144.4	0.0	GROUND SURFACE
	2,141.9	2.5	6	10	8									2,141.9	2.5	ROADWAY EMBANKMENT Reddish Brown, Medium Stiff to Stiff, Silty CLAY (A-7-5)
2140	2,140.4	4.0	5	8	12											Tan and Reddish Brown to Brown, Very Stiff to Stiff, Fine to Coarse Sandy SILT (A-4), Micaceous
	2,138.4	6.0	5	6	8											
2135	2,135.9	8.5	15	83	22									2,135.4	9.0	RESIDUAL Brown to Gray, Tan to Brown, and Reddish Brown, Soft to Very Stiff, Fine to Coarse Sandy SILT (A-4), Micaceous Note: Abundant Rock Fragments from 9.0' to 10.0'
	2,130.9	13.5	3	1	2											Blow Count Influenced By Rock Fragments
2130	2,125.9	18.5	2	3	4											
2125	2,120.9	23.5	3	4	5											
2120	2,115.9	28.5	3	4	5											
2115	2,110.9	33.5	4	4	9											
2110	2,105.9	38.5	5	8	11											
2105																

NCDOT BORE DOUBLE R4753_GINT_LOGS.GPJ NC_DOT.GDT 4/20/16

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. **R-4753**

REPORT ON SAMPLES OF **SOILS FOR QUALITY**

Project **39999.1.1** County **JACKSON** Owner _____
 Date: Sampled **2/26/16** Received **4/7/16** Reported **4/13/16**
 Sampled from **EMBANKMENT** By **C.M BRUINSMA**
 Submitted by **SURIYATI B.S** **2012** Standard Specifications

799862 TO 799862
 4/14/16

TEST RESULTS

Proj. Sample No.	ST-1				
Lab. Sample No.	799862				
Retained #4 Sieve	%	-			
Passing #10 Sieve	%	100			
Passing #40 Sieve	%	91			
Passing #200 Sieve	%	62			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					
Coarse Sand Ret - #60	%	18.9			
Fine Sand Ret - #270	%	23.3			
Silt 0.05 - 0.005 mm	%	17.6			
Clay < 0.005 mm	%	40.2			
T-#		6060			
Sample		CU#3, #4			

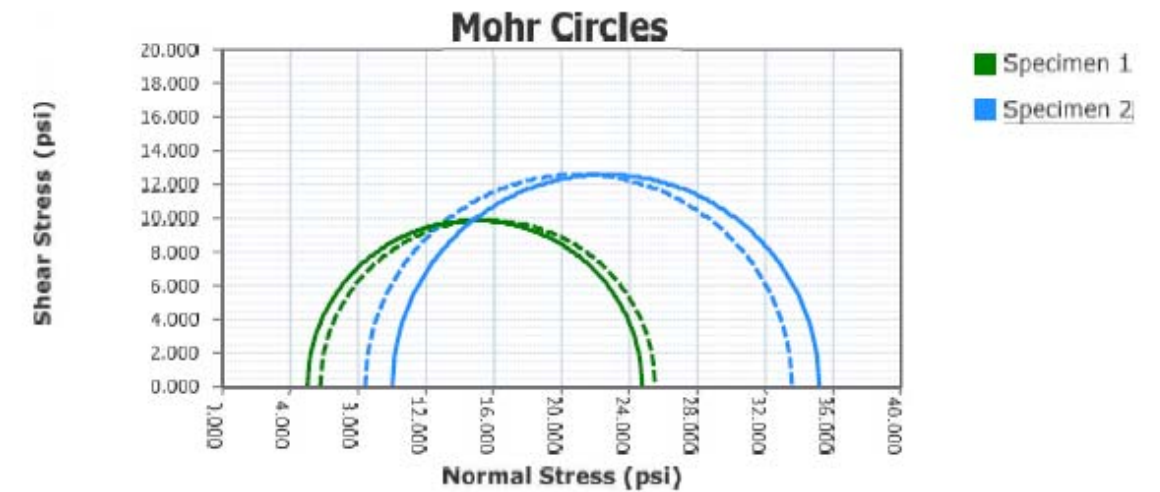
L. L.	54				
P. I.	21				
AASHTO Classification	A-7-5(12)				
Station	148+90				
Offset	3'RT				
Alignment	-L-				
Location					
Depth (Ft)	5.00				
	to	7.00			

cc: C.M BRUINSMA

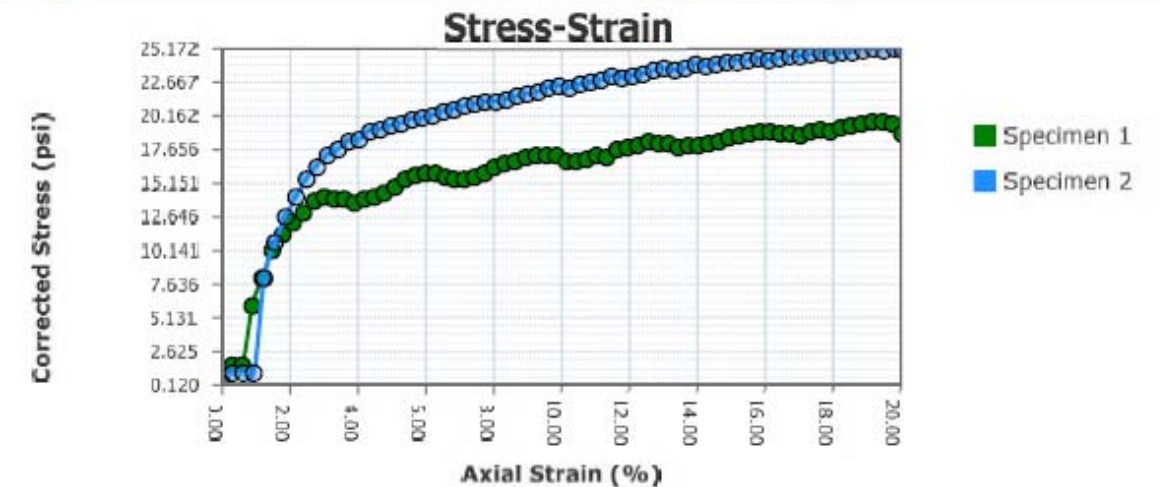
Soils Engineer

Consolidated Undrained Test

ASTM D4767



Total Strength Intercept (psi):	NA	Effective Strength Intercept (psi):	NA
Total Friction Angle (°):	NA	Effective Friction Angle (°):	NA



After Shear	Specimen Number							
	1	2	3	4	5	6	7	8
$\sigma'1$ at Failure (psi)	5.000	10.000						
$\sigma'3$ at Failure (psi)	25.497	33.571						
Project:	R-4753							
Project Number:	39999.1.1							
Sampling Date:								
Sample Number:	ST-1							
Sample Depth:	5.0' - 7.0'							
Location:	Jackson County							
Client Name:								
Remarks:								

Consolidated Undrained Test

ASTM D4767

Initial Parameters	Specimen Number							
	1	2	3	4	5	6	7	8
Moisture Content (%)	30.53	33.84						
Dry Density (pcf)	87.04	86.23						
Saturation (%)	86.83	94.44						
Void Ratio	0.962	0.980						
Height (in)	5.9868	5.9265						
Diameter (in)	2.8425	2.8470						
Test Temperature (°F)	75.0	75.0						
Membrane Thickness (in)	0.0120	0.0120						
Filter Paper Strips	Used	Used						
Saturation Parameters	1	2	3	4	5	6	7	8
Height (in)	5.7038	5.5265						
Area (in ²)	5.716	5.444						
Volume (in ³)	32.6040	30.0888						
B-Value	0.000	0.000						
Consolidation Parameters	1	2	3	4	5	6	7	8
Cell Pressure (psi)	76.167	80.143						
Back Pressure (psi)	71.167	70.143						
Effective Pressusre (psi)	5.000	10.000						
Height (in)	5.7007	5.5253						
Area (in ²)	5.715	5.397						
Dry Density (in ³)	32.5783	29.8193						
Dry Density (pcf)	101.50	109.10						
Saturation (%)	122.41	163.83						
Void Ratio	0.682	0.565						
Final Parameters	1	2	3	4	5	6	7	8
Moisture Content (%)	33.87	35.25						
Dry Density (pcf)	101.50	109.10						
Void Ratio	0.682	0.565						
Failure Angle (°):								
Test Data	1	2	3	4	5	6	7	8
Comp. Strength at Failure (psi)	6.065	8.060						
σ ₁ at Failure (psi)	9.103	13.698						
σ ₃ at Failure (psi)	3.038	5.638						
Rate of Strain (in/min)	0.009	0.009						
Axial Strain at Failure (%)	0.883	1.232						

Project Name: R-4753 Project Number: 39999.1.1

Report Created: 4/27/2016 8:09:14 AM

Checked By: _____ Date: _____

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Consolidated Undrained Test

ASTM D4767

Specimen 1	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	
Test Time:	
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-1#3	Specimen Lab #: T-6060
Specimen Description:	
Specific Gravity: 2.735	
Plastic Limit: 0	Liquid Limit: 0
Filter Paper Correction: YES	Membrane Correction: YES
Failure Criteria: 20% Strain	
Large Particle:	
Moisture Material: Entire Specimen	
Moist Weight (g): 1133.0	
Test Remarks: 32° shear plane. Tannish colored clay.	
Specimen 2	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	
Test Time:	
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-1#4	Specimen Lab #: T-6060
Specimen Description:	
Specific Gravity: 2.735	
Plastic Limit: 0	Liquid Limit: 0
Filter Paper Correction: YES	Membrane Correction: YES
Failure Criteria: 20% Strain	
Large Particle:	
Moisture Material: Entire Specimen	
Moist Weight (g): 1143.0	
Test Remarks: 40° shear plane. Tannish colored clay.	

Project Name: R-4753 Project Number: 39999.1.1

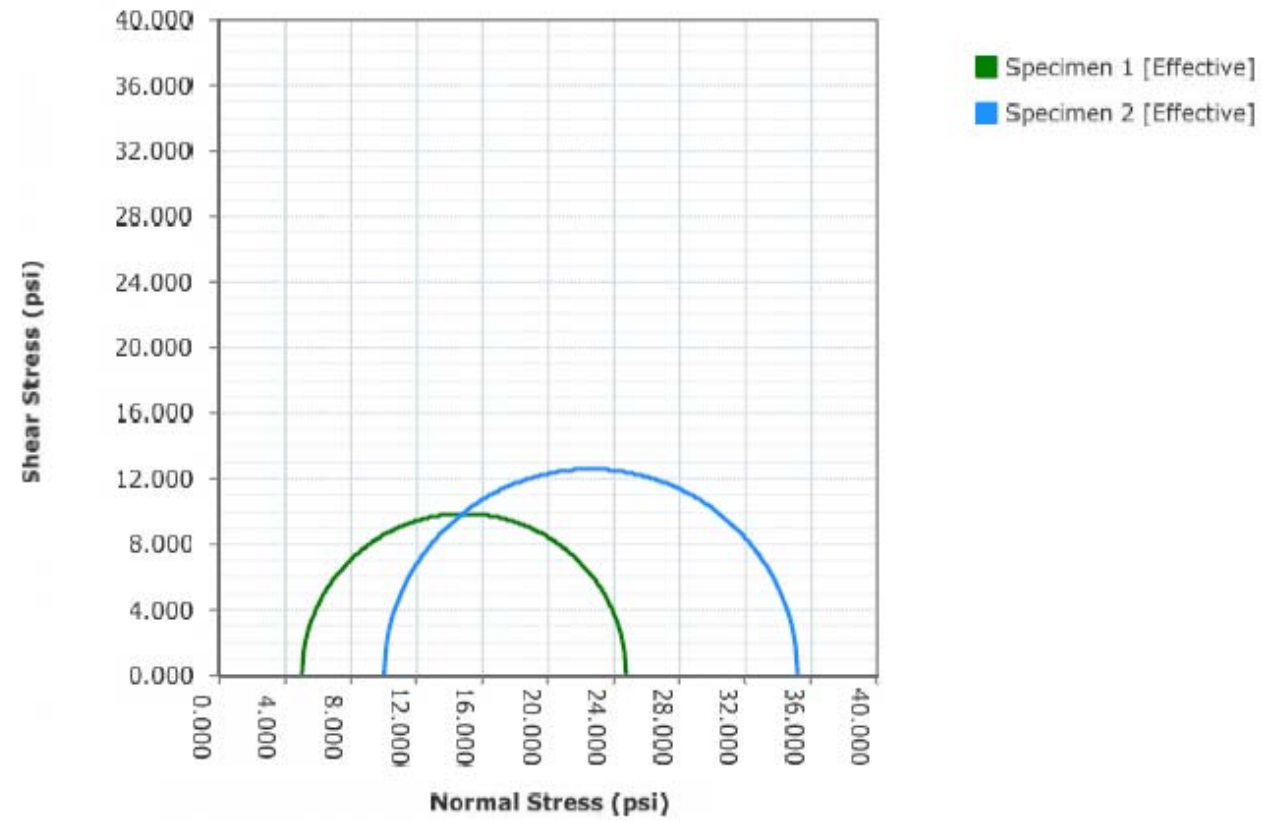
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Checked By: _____ Date: _____

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Graph - Mohr Circle (Effective)

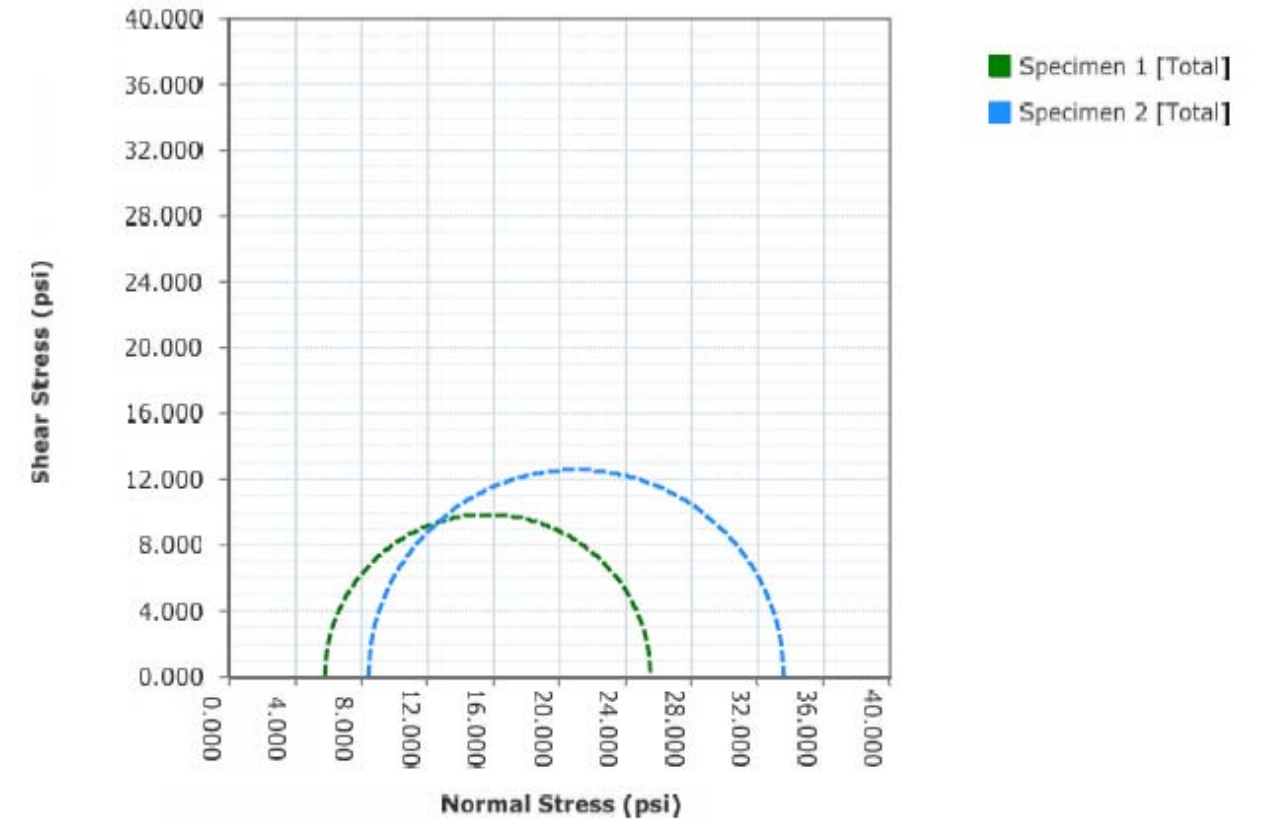
ASTMD4767



Tangent Results	
Strength Intercept (psi)	NA
Friction Angle (°)	NA

Graph - Mohr Circle (Total)

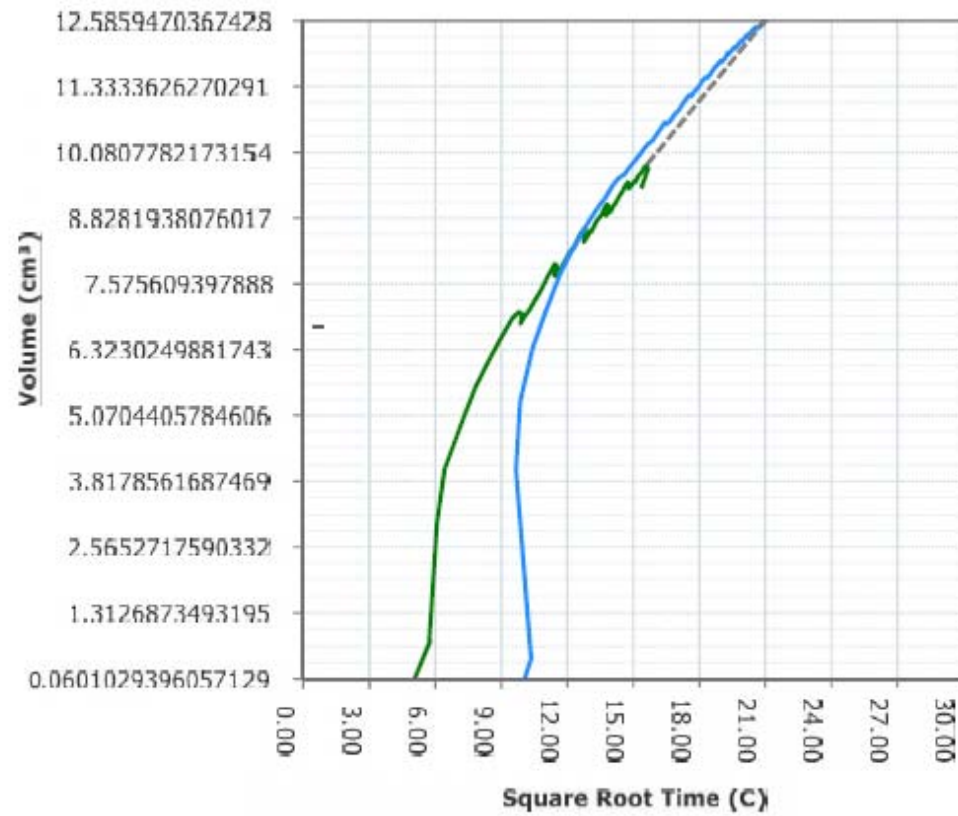
ASTMD4767



Tangent Results	
Strength Intercept (psi)	NA
Friction Angle (°)	NA

Graph - PQ (Effective)

ASTMD4767



- Specimen 1 [Effective]
- Specimen 2 [Effective]
- Tangent Line Effective

Tangent Results	
Strength Intercept (psi)	1.939
Friction Angle (°)	26.900

Project Name: R-4753 Project Number: 39999.1.1

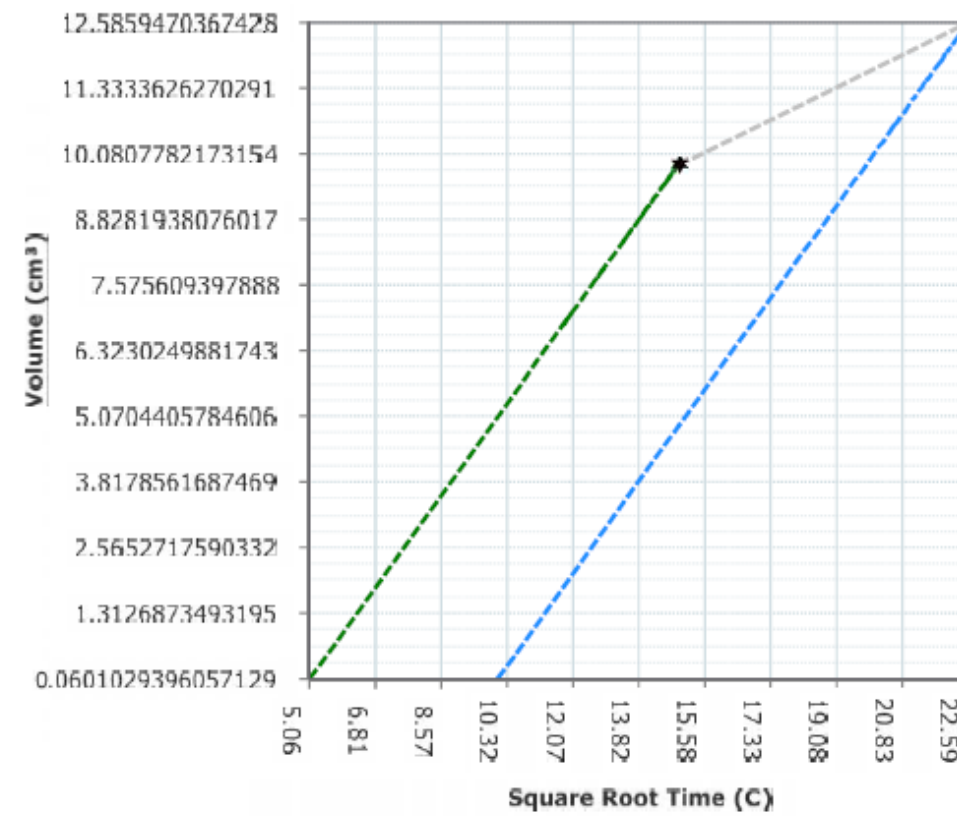
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Graph - PQ (Total)

ASTMD4767



- Specimen 1 [Total]
- Specimen 2 [Total]
- Tangent Line Total

Tangent Results	
Strength Intercept (psi)	4.633
Friction Angle (°)	19.399

Project Name: R-4753 Project Number: 39999.1.1

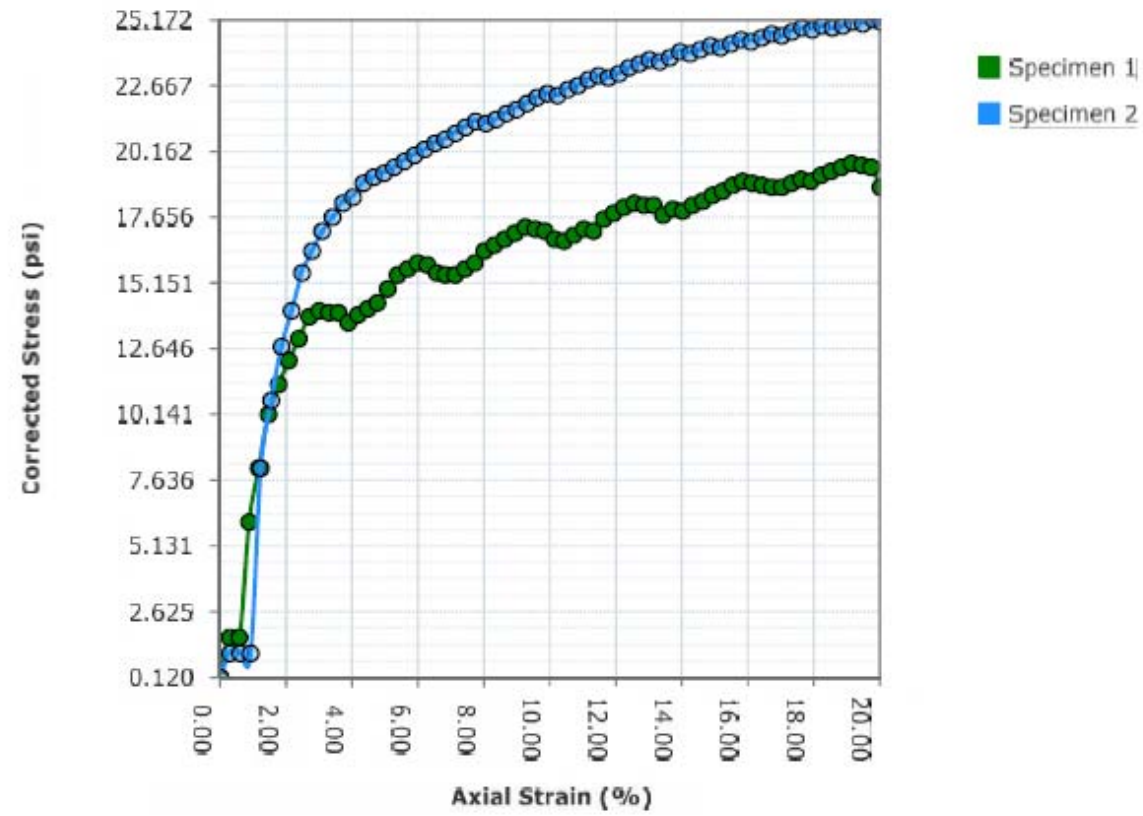
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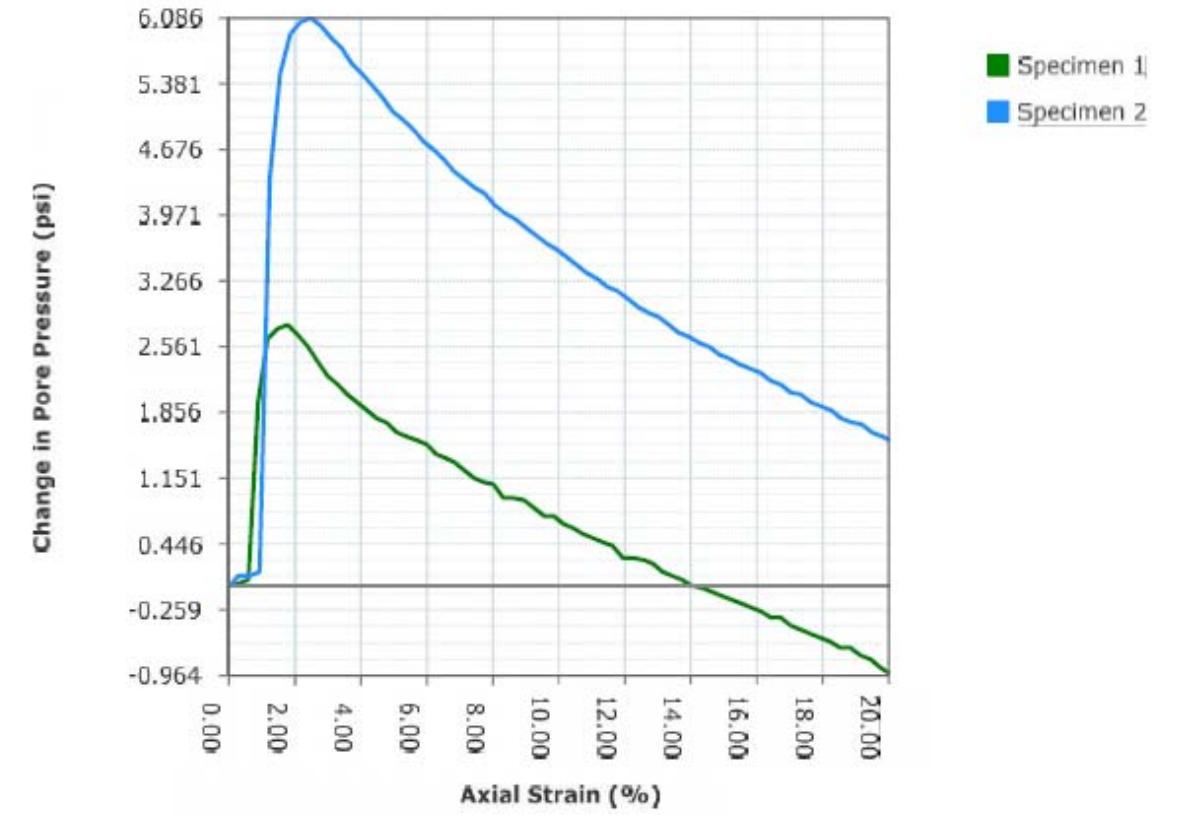
Stress Strain Graph

ASTMD4767



Pore Pressure Graph

ASTMD4767



Project Name: R-4753 Project Number: 39999.1.1

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Report Created: 4/27/2016 8:09:15 AM
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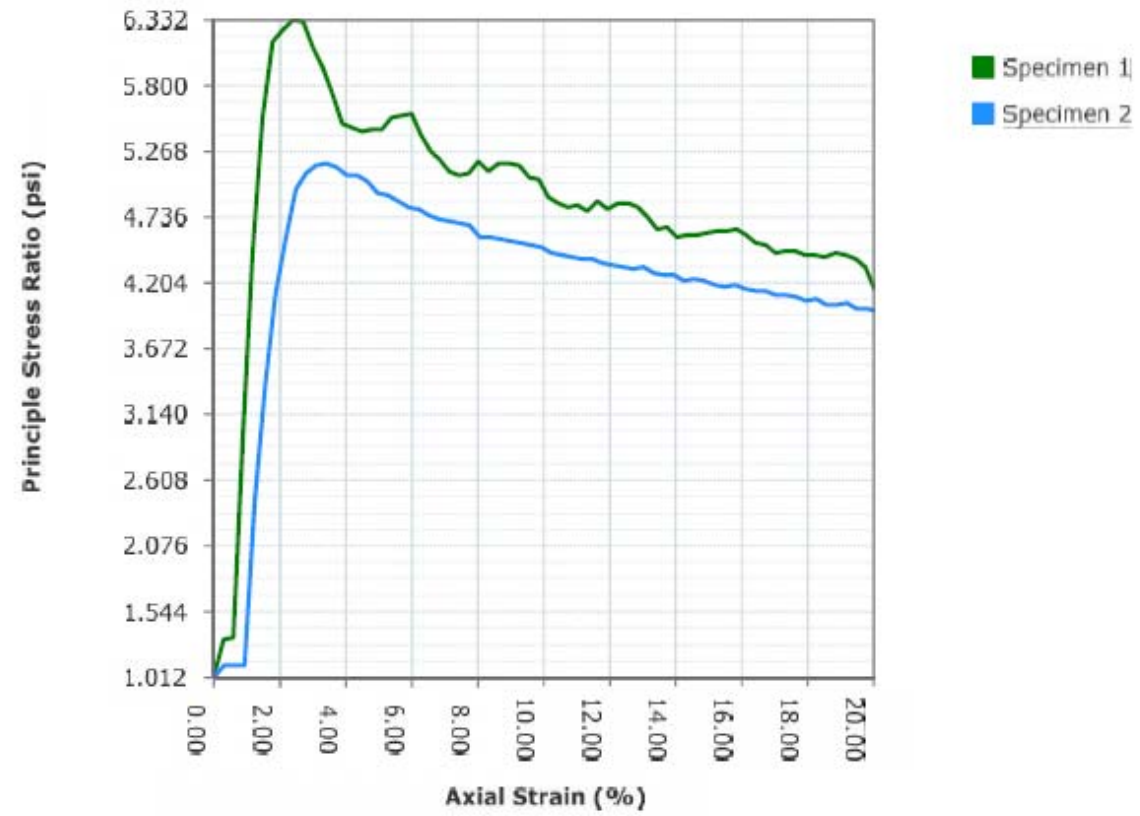
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Stress Ratio Graph

ASTMD4767

Failure Sketches



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. **R-4753**

REPORT ON SAMPLES OF **SOILS FOR QUALITY**

Project **39999.1.1** County **JACKSON** Owner
 Date: Sampled **2/26/16** Received **4/4/16** Reported **4/6/16**
 Sampled from **EMBANKMENT** By **CM. BRUINSMA**
 Submitted by **SURIYATI** **2012** Standard Specifications

799789 TO 799789
 4/11/16

TEST RESULTS

Proj. Sample No.	ST-1				
Lab. Sample No.	799789				
Retained #4 Sieve	%	-			
Passing #10 Sieve	%	99			
Passing #40 Sieve	%	91			
Passing #200 Sieve	%	57			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					
Coarse Sand Ret - #60	%	19.5			
Fine Sand Ret - #270	%	26.6			
Silt 0.05 - 0.005 mm	%	11.6			
Clay < 0.005 mm	%	42.3			
T-#		6060			
Sample		#1, #2			

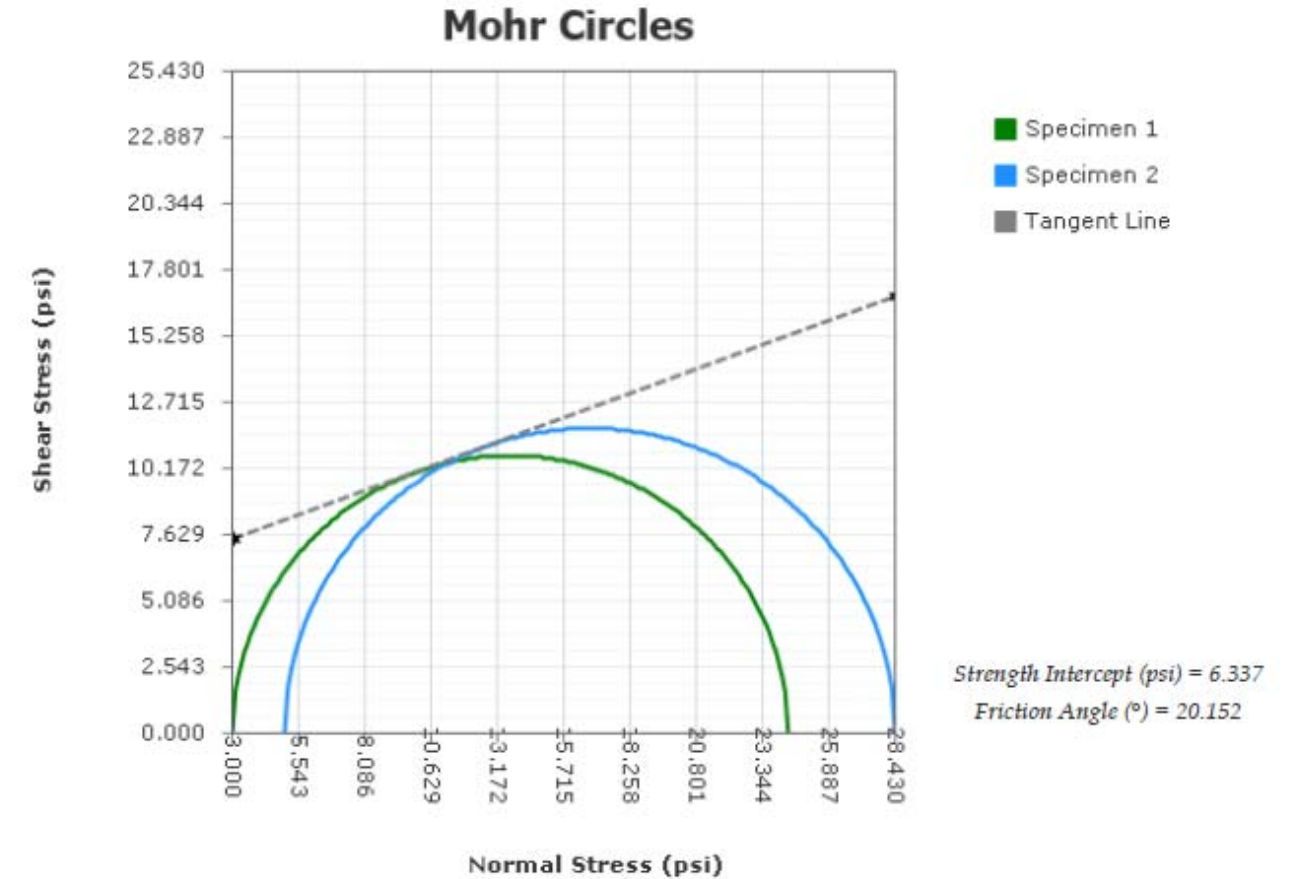
L. L.		51			
P. I.		21			
AASHTO Classification		A-7-5(10)			
Station					
Offset		3'RT			
Alignment		-L-			
Location		148+90			
Depth (Ft)		5.0'			
	to	7.0'			
		UU			

cc: CM. BRUINSMA

Soils Engineer

Unconsolidated Undrained Test

ASTM D2850



Project:	R-4753
Project Number:	39999.1.1
Sampling Date:	
Sample Number:	ST-1
Sample Depth:	5.0 - 7.0 ft
Location:	Jackson County
Client Name:	T-6060_UUsat
Remarks:	Tannish orange colored clay. Specimen 2 data is incorrect due to apparatus error; the strain rate recorded was slower than specified on the triaxial machine.

Project Name: R-4753 Project Number: 39999.1.1



Checked By: _____ Date: _____

Unconsolidated Undrained Test

ASTM D2850

Before Test	Specimen Number							
	1	2	3	4	5	6	7	8
Membrane Thickness (in)	0.0120	0.0120						
Initial Cell Pressure (psi)	3.000	5.000						
Height (in)	6.0338	5.9333						
Diameter (in)	2.8637	2.8440						
Water Content (%)	29.44	28.70						
Wet Density (Units)								
Dry Density (pcf)	88.23	89.45						
Saturation (%)	85.94	86.20						
Degree of Saturation (%)								
Void Ratio	0.939	0.912						
Height To Diameter Ratio	2.107	2.086						
Test Data	1	2	3	4	5	6	7	8
Comp. Strength at Failure (psi)	21.299	23.429						
σ_1 at Failure (psi)	24.299	28.429						
σ_3 at Failure (psi)	3.000	5.000						
Rate of Strain (in/min)	0.02	0.02						
Axial Strain at Failure (%)	15.075	13.485						
After Test	1	2	3	4	5	6	7	8
Final Water Content (%)	32.56	32.77						

Project:	R-4753
Project Number:	39999.1.1
Sampling Date:	
Sample Number:	ST-1
Sample Depth:	5.0 - 7.0 ft
Location:	Jackson County
Client Name:	T-6060_UUsat
Project Remarks:	Tannish orange colored clay. Specimen 2 data is incorrect due to apparatus error; the strain rate recorded was slower than specified on the triaxial machine.

Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Specimen 6	Specimen 7	Specimen 8
Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch
							

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Unconsolidated Undrained Test

ASTM D2850

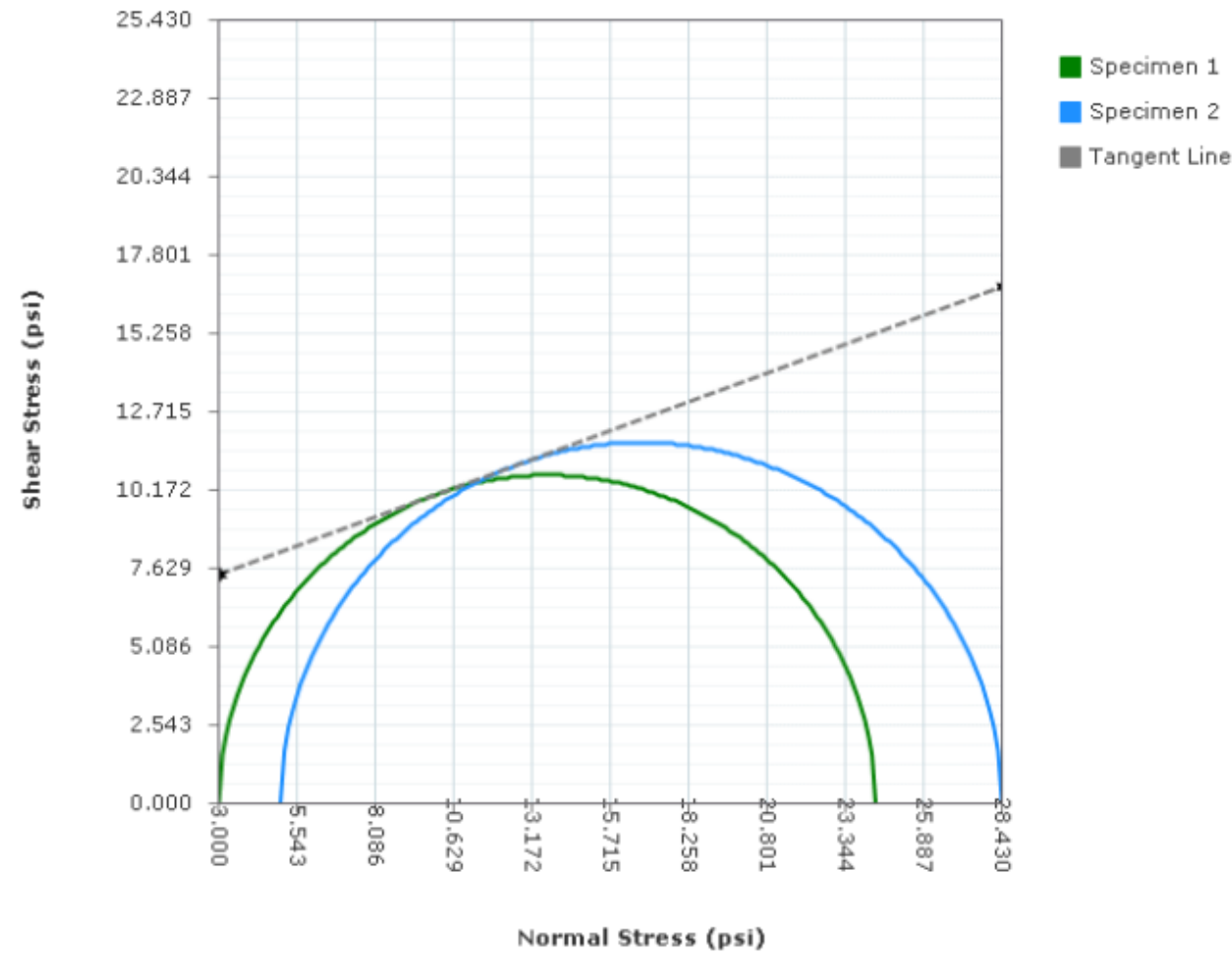
Specimen 1	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	Test Time: 3/29/2016 11:42:22 AM
Technician:	Sampling Method: Undisturbed
Specimen Code:	Specimen Lab #: T-6060 #1
Specimen Description:	
Specific Gravity:	2.74
Plastic Limit:	0
	Liquid Limit: 0
Height (in):	6.0338
Diameter (in):	2.8637
Area (in ²):	6.441
Volume (ft ³):	0.0225
Large Particle:	
Moisture Material:	Entire specimen
Moist Weight (g):	1165.0
Test Remarks:	30° shear plane.
Specimen 2	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	Test Time: 3/29/2016 11:54:25 AM
Technician:	Sampling Method: Undisturbed
Specimen Code:	Specimen Lab #: T-6060 #2
Specimen Description:	
Specific Gravity:	2.74
Plastic Limit:	0
	Liquid Limit: 0
Height (in):	5.9333
Diameter (in):	2.8440
Area (in ²):	6.353
Volume (ft ³):	0.0218
Large Particle:	
Moisture Material:	Entire specimen
Moist Weight (g):	1139.0
Test Remarks:	35° and 38° shear plane

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Mohr Circles (Total Stress) Graph

ASTM D2850



Tangent Results	
Strength Intercept (psi)	6.337
Friction Angle (°)	20.152

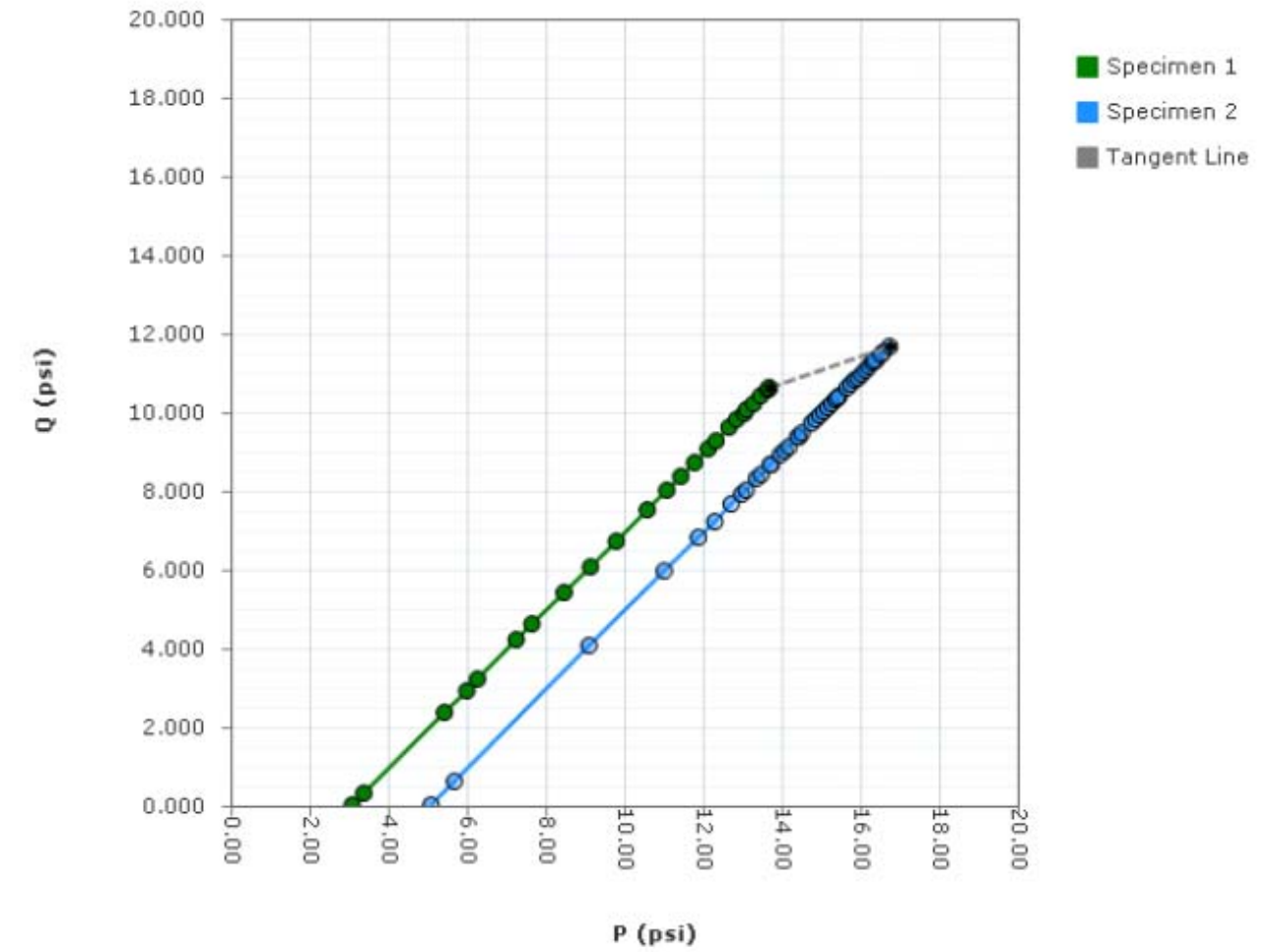
Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____

PQ Graph

ASTM D2850



Tangent Results	
Strength Intercept (psi)	5.953
Friction Angle (°)	19.020

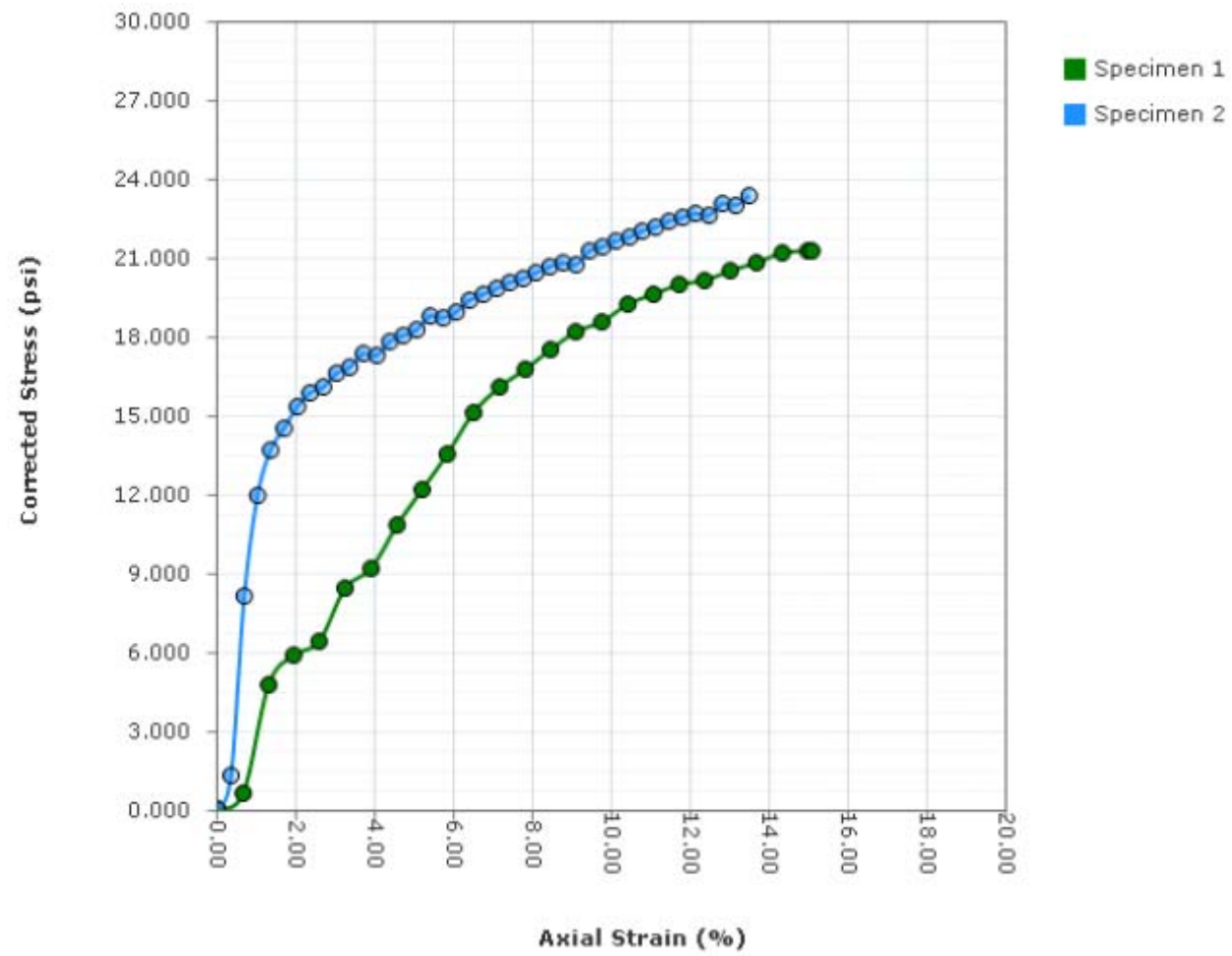
Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____

Stress-Strain Graph

ASTM D2850



Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAY
 MATERIALS & TESTS UNIT
 SOILS LABORATORY

T. I. P. No. **R-4753**

REPORT ON SAMPLES OF **SOILS FOR QUALITY**

Project **39999.1.1** County **JACKSON** Owner _____
 Date: Sampled **2/26/16** Received **4/7/16** Reported **4/13/16**
 Sampled from **EMBANKMENT** By **C.M BRUINSMA**
 Submitted by **SURIYATI B.S** **2012** Standard Specifications

799863 TO 799863
 4/14/16

TEST RESULTS

Proj. Sample No.	ST-2				
Lab. Sample No.	799863				
Retained #4 Sieve	%	-			
Passing #10 Sieve	%	100			
Passing #40 Sieve	%	95			
Passing #200 Sieve	%	58			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					
Coarse Sand Ret - #60	%	13.1			
Fine Sand Ret - #270	%	36.0			
Silt 0.05 - 0.005 mm	%	14.8			
Clay < 0.005 mm	%	36.2			
T-#		6064			
Sample		CU#3, #4			

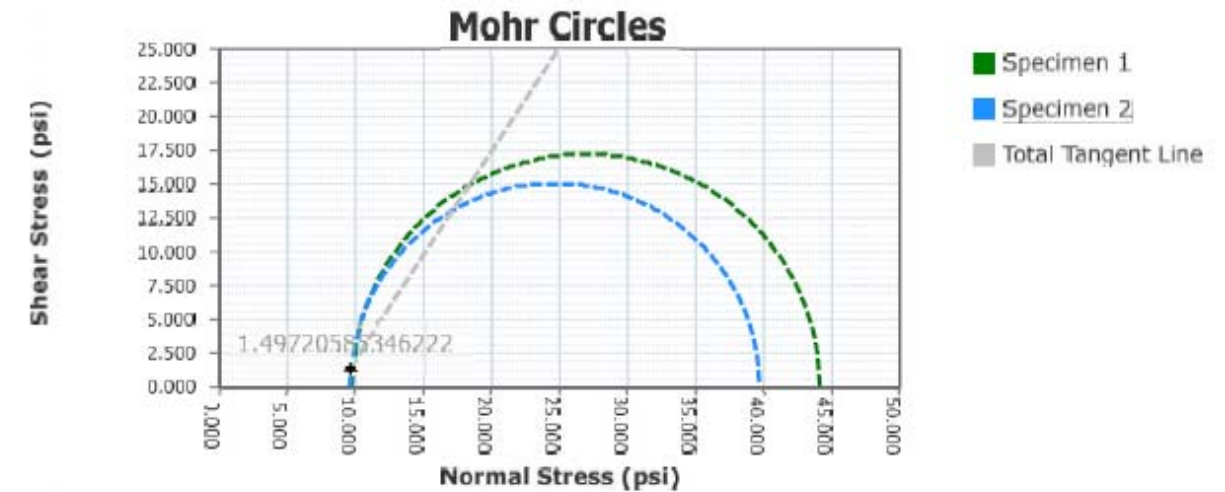
L. L.	41				
P. I.	88				
AASHTO Classification	A-7-6(38)				
Station	29+50				
Offset	3'RT				
Alignment	-L-				
Location					
Depth (Ft)	8.50				
	to 10.50				

cc: C.M BRUINSMA

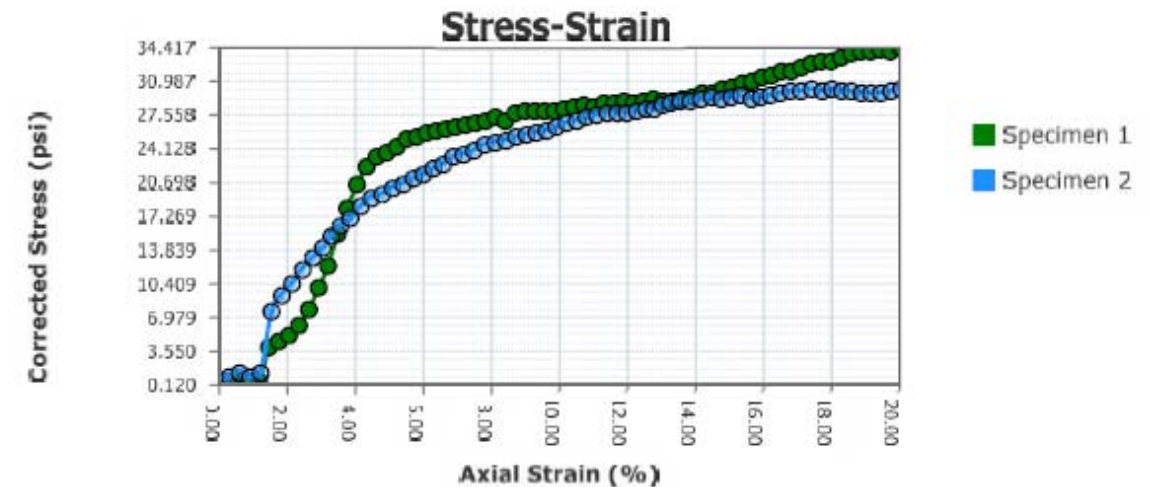
Soils Engineer

Consolidated Undrained Test

ASTM D4767



Total Strength Intercept (psi):	-13.161	Effective Strength Intercept (psi):	NA
Total Friction Angle (°):	56.887	Effective Friction Angle (°):	NA



After Shear	Specimen Number							
	1	2	3	4	5	6	7	8
σ'_1 at Failure (psi)								
σ'_3 at Failure (psi)								
Project:	R-4753							
Project Number:	39999.1.1							
Sampling Date:								
Sample Number:	ST-2							
Sample Depth:	8.5' - 10.5'							
Location:	Jackson County							
Client Name:	T-6064							
Remarks:	Tan colored clay							

Consolidated Undrained Test

ASTM D4767

Initial Parameters	Specimen Number							
	1	2	3	4	5	6	7	8
Moisture Content (%)	25.79	29.11						
Dry Density (pcf)	95.96	94.09						
Saturation (%)	90.64	97.86						
Void Ratio	0.777	0.813						
Height (in)	6.1050	5.9450						
Diameter (in)	2.8500	2.8413						
Test Temperature (°F)	75.0	75.0						
Membrane Thickness (in)	0.0120	0.0120						
Filter Paper Strips	Used	Used						
Saturation Parameters	1	2	3	4	5	6	7	8
Height (in)	6.0980	5.6700						
Area (in ²)	6.365	5.726						
Volume (in ³)	38.8122	32.4642						
B-Value	0.000	0.000						
Consolidation Parameters	1	2	3	4	5	6	7	8
Cell Pressure (psi)	75.924	81.624						
Back Pressure (psi)	70.924	71.624						
Effective Pressure (psi)	5.000	10.000						
Height (in)	6.0941	5.6696						
Area (in ²)	6.362	5.680						
Dry Density (pcf)	96.40	110.14						
Saturation (%)	91.60	144.97						
Void Ratio	0.769	0.549						
Final Parameters	1	2	3	4	5	6	7	8
Moisture Content (%)	27.32	29.32						
Dry Density (pcf)	96.40	110.14						
Void Ratio	0.769	0.549						
Failure Angle (°):								
Test Data	1	2	3	4	5	6	7	8
Comp. Strength at Failure (psi)	3.962	7.507						
σ ₁ at Failure (psi)	5.870	12.946						
σ ₃ at Failure (psi)	1.908	5.439						
Rate of Strain (in/min)	0.009	0.009						
Axial Strain at Failure (%)	1.453	1.527						

Project Name: R-4753 Project Number: 39999.1.1

Report Created: 4/27/2016 9:12:31 AM

Checked By: _____ Date: _____

Page 2

Consolidated Undrained Test

ASTM D4767

Specimen 1	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	
Test Time:	
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-2_#3	Specimen Lab #: T-6064
Specimen Description:	
Specific Gravity: 2.732	Liquid Limit: 0
Plastic Limit: 0	
Filter Paper Correction: YES	Membrane Correction: YES
Failure Criteria: 20% Strain	
Large Particle:	
Moisture Material: Entire Specimen	
Moist Weight (g): 1234.0	
Test Remarks: 30° shear plane.	
Specimen 2	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	
Test Time:	
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-2_#4	Specimen Lab #: T-6064
Specimen Description:	
Specific Gravity: 2.732	Liquid Limit: 0
Plastic Limit: 0	
Filter Paper Correction: YES	Membrane Correction: YES
Failure Criteria: 20% Strain	
Large Particle:	
Moisture Material: Entire Specimen	
Moist Weight (g): 1202.0	
Test Remarks: 35° shear plane.	

Project Name: R-4753 Project Number: 39999.1.1

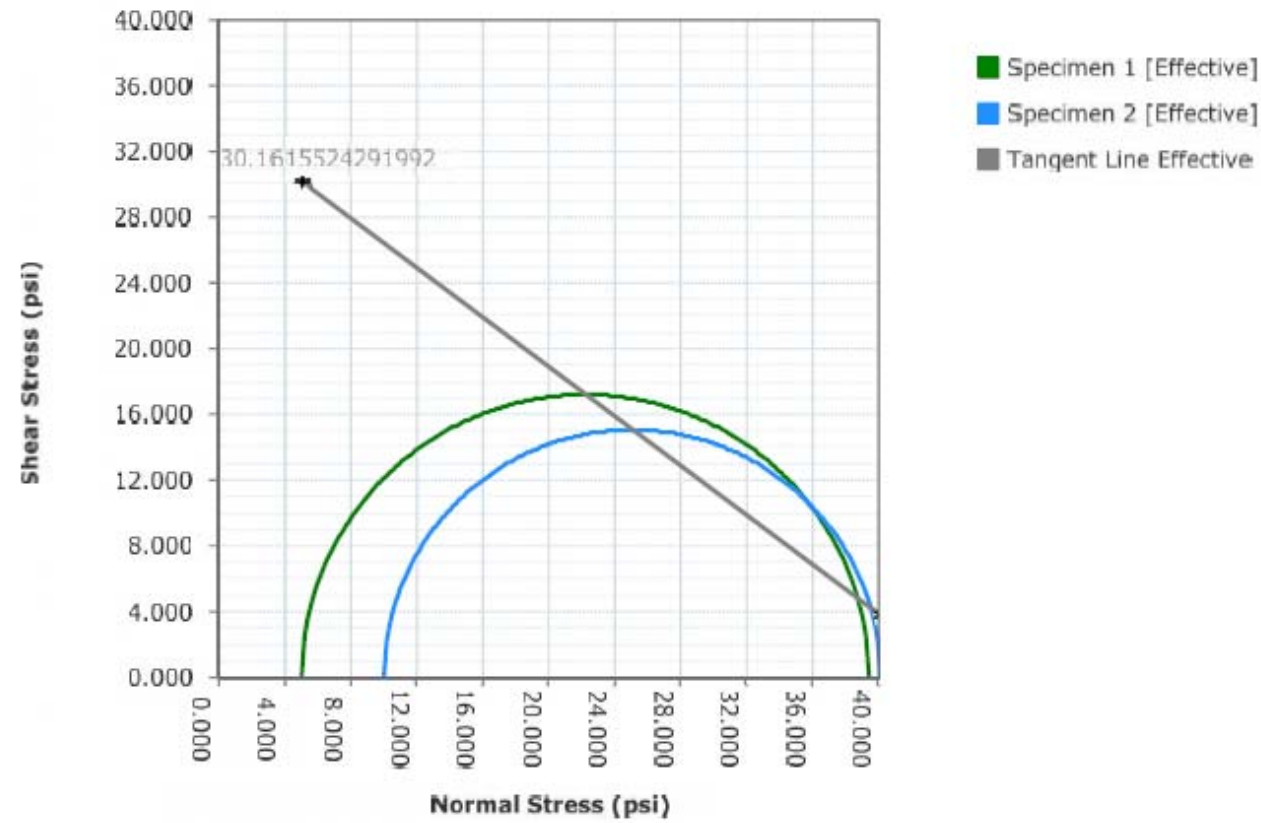
Report Created: 4/27/2016 9:12:31 AM

Checked By: _____ Date: _____

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Graph - Mohr Circle (Effective)

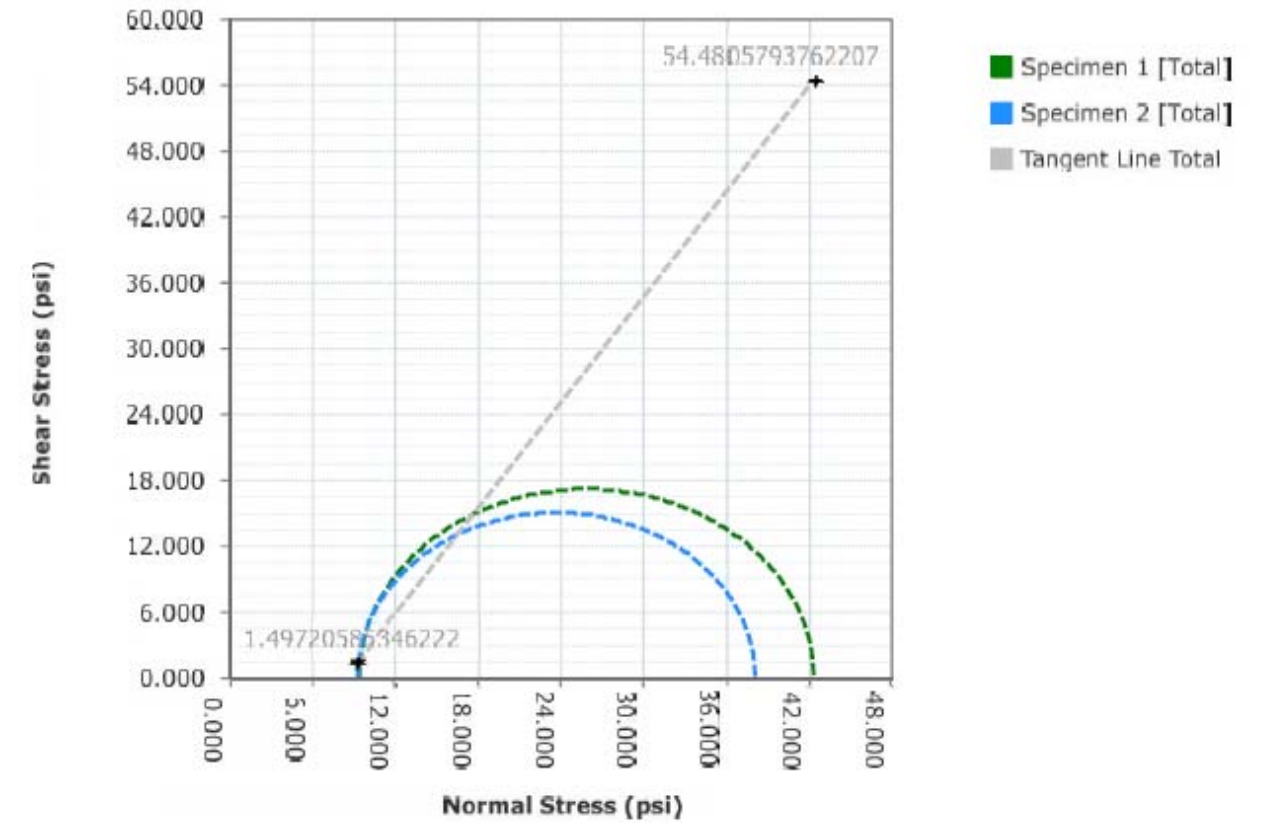
ASTMD4767



Tangent Results	
Strength Intercept (psi)	33.925
Friction Angle (°)	36.969

Graph - Mohr Circle (Total)

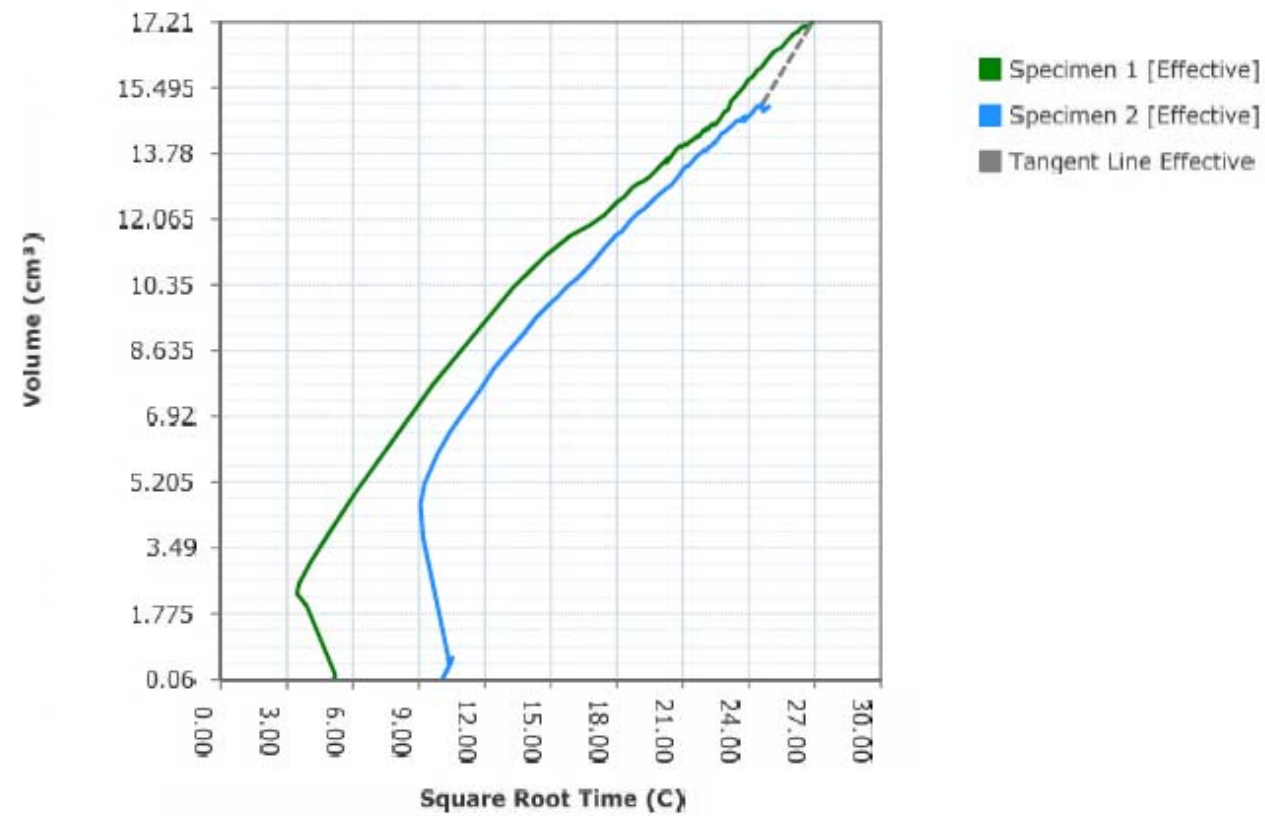
ASTMD4767



Tangent Results	
Strength Intercept (psi)	-13.161
Friction Angle (°)	56.887

Graph - PQ (Effective)

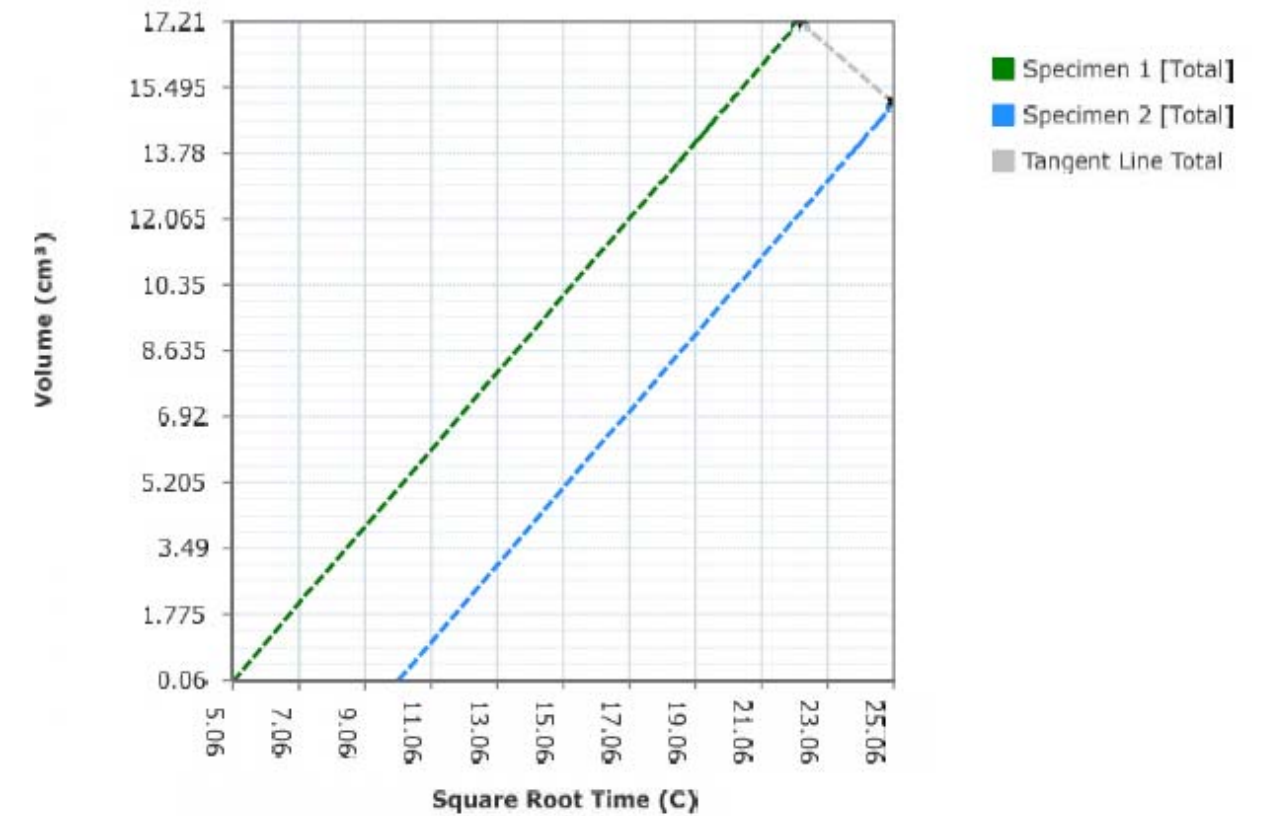
ASTMD4767



Tangent Results	
Strength Intercept (psi)	-8.061
Friction Angle (°)	43.202

Graph - PQ (Total)

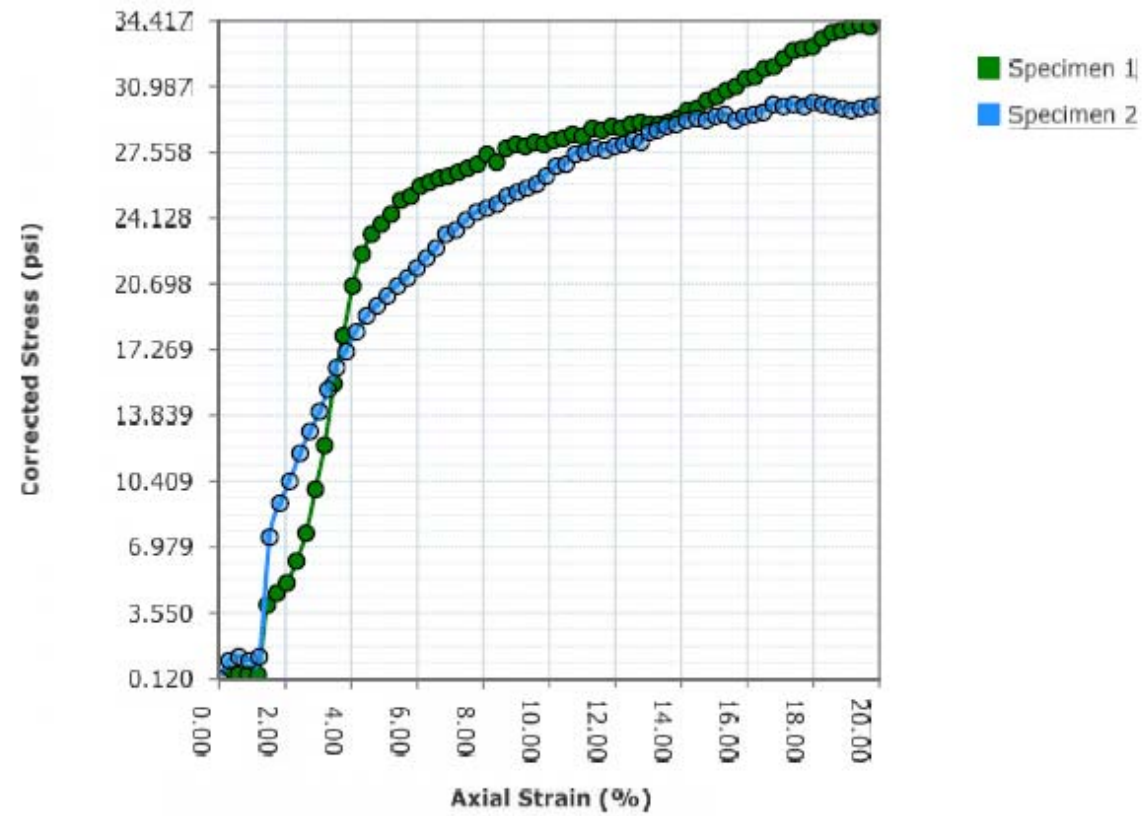
ASTMD4767



Tangent Results	
Strength Intercept (psi)	33.924
Friction Angle (°)	36.967

Stress Strain Graph

ASTMD4767



Project Name: R-4753 Project Number: 39999.1.1

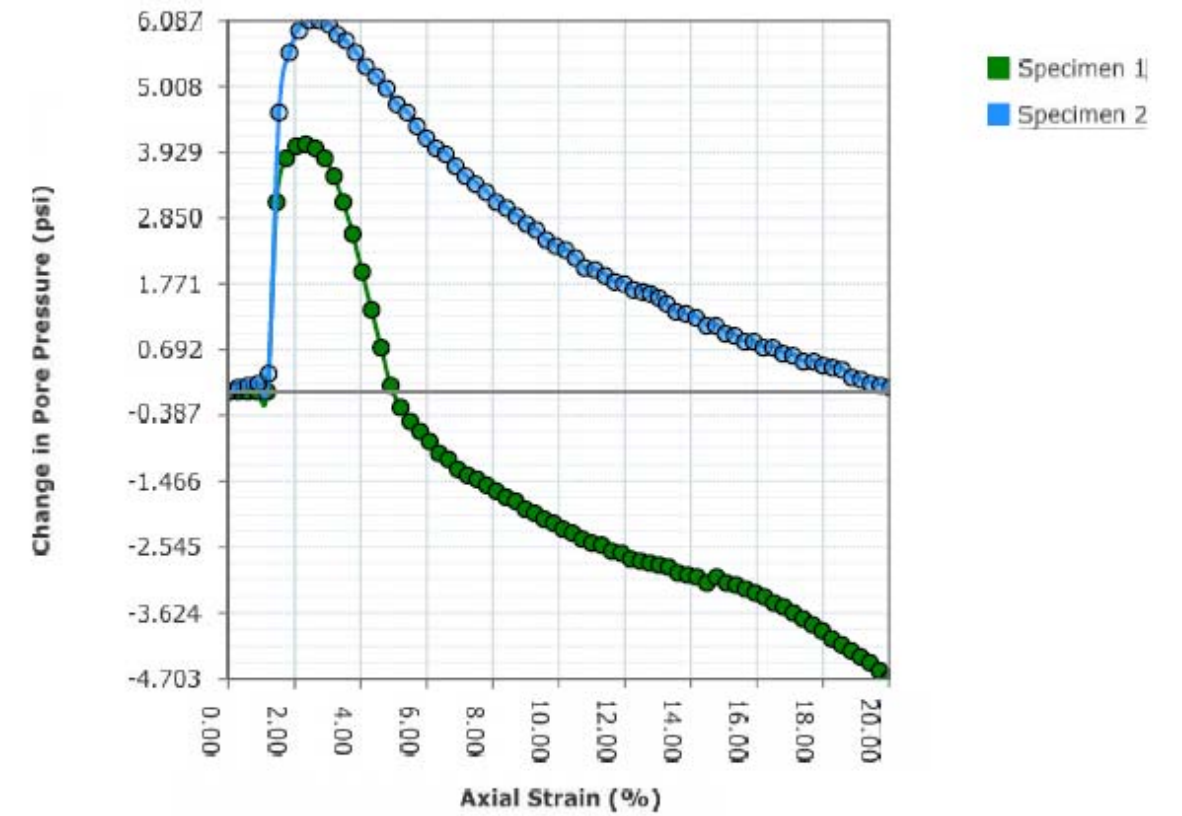
Checked By: _____ Date: _____

Report Created: 4/27/2016 9:12:31 AM

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Pore Pressure Graph

ASTMD4767



Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

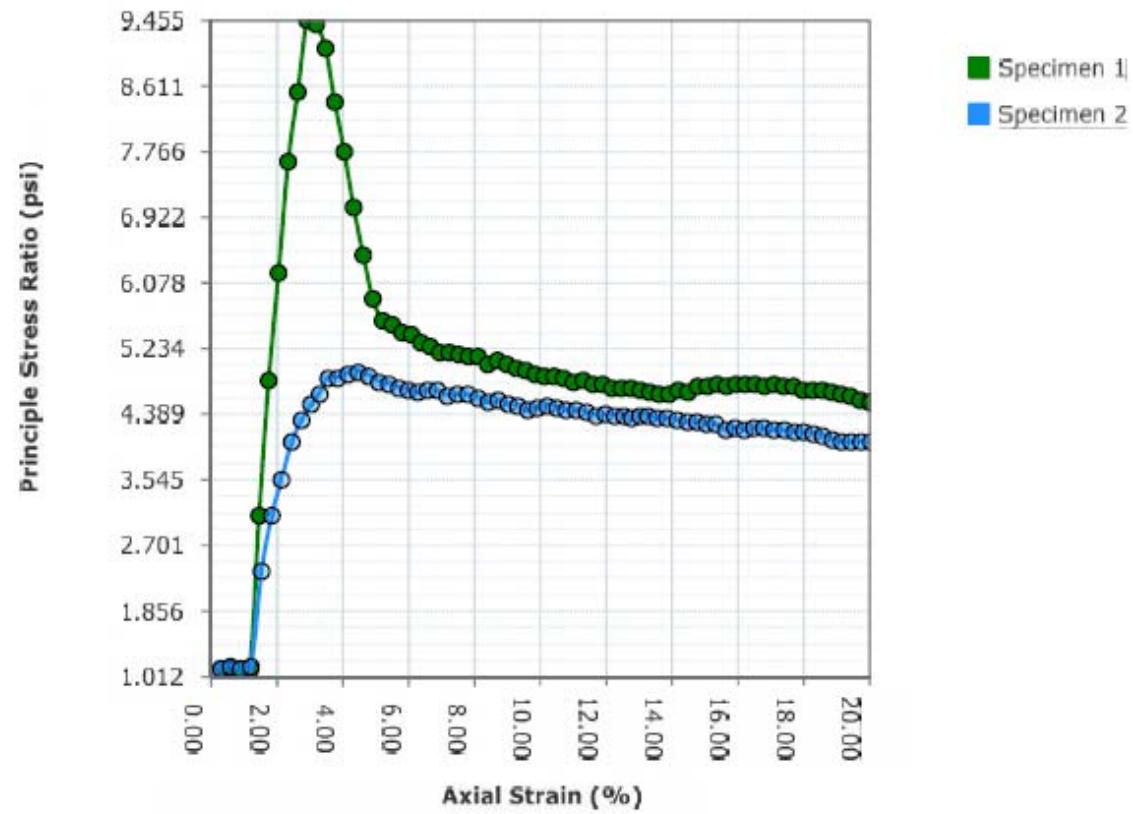
Report Created: 4/27/2016 9:12:31 AM

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Stress Ratio Graph

ASTMD4767

Failure Sketches



CU #3



CU #4

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. **R-4753**

REPORT ON SAMPLES OF **SOILS FOR QUALITY**

Project **39999.1.1** County **JACKSON** Owner
Date: Sampled **2/19/16** Received **4/6/16** Reported **4/8/16**
Sampled from **EMBANKMENT** By **C. BRUINSMA**
Submitted by **SURIYATI B.S** **2012** Standard Specifications

799803 TO 799803
4/11/16

TEST RESULTS

Proj. Sample No.	ST-2				
Lab. Sample No.	799803				
Retained #4 Sieve	%	-			
Passing #10 Sieve	%	100			
Passing #40 Sieve	%	94			
Passing #200 Sieve	%	63			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%					
Coarse Sand Ret - #60	%	14.0			
Fine Sand Ret - #270	%	28.1			
Silt 0.05 - 0.005 mm	%	23.6			
Clay < 0.005 mm	%	34.4			
T-#		6064			
Sample		UU #1 & 2			

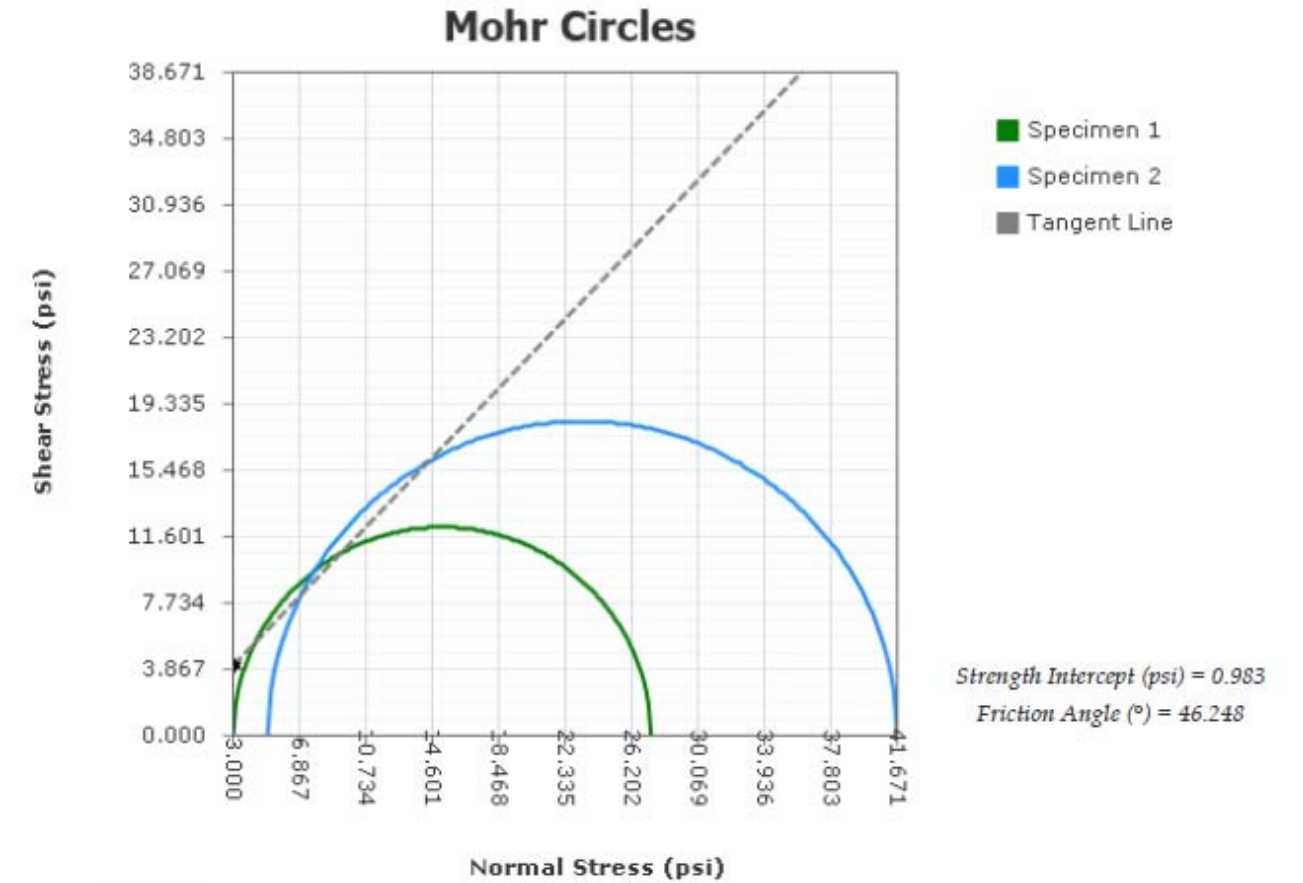
L. L.	40				
P. I.	16				
AASHTO Classification	A-6(8)				
Station	29+50				
Offset					
Alignment	-L-				
Location					
Depth (Ft)	8.5'				
	to	10.5'			

cc: C. BRUINSMA

Soils Engineer

Unconsolidated Undrained Test

ASTM D2850



Project:	R-4753
Project Number:	39999.1.1
Sampling Date:	
Sample Number:	ST-2
Sample Depth:	8.5 - 10.5
Location:	Jackson County
Client Name:	T-6064_UUsat
Remarks:	Tannish red colored silty clay

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Unconsolidated Undrained Test

ASTM D2850

Before Test	Specimen Number							
	1	2	3	4	5	6	7	8
Membrane Thickness (in)	0.0120	0.0120						
Initial Cell Pressure (psi)	3.000	5.000						
Height (in)	5.9790	6.1868						
Diameter (in)	2.8487	2.8510						
Water Content (%)	28.79	24.33						
Wet Density (Units)								
Dry Density (pcf)	90.27	96.74						
Saturation (%)	88.38	87.03						
Degree of Saturation (%)								
Void Ratio	0.891	0.764						
Height To Diameter Ratio	2.099	2.170						
Test Data	1	2	3	4	5	6	7	8
Comp. Strength at Failure (psi)	24.327	36.671						
σ_1 at Failure (psi)	27.327	41.671						
σ_3 at Failure (psi)	3.000	5.000						
Rate of Strain (in/min)	0.02	0.02						
Axial Strain at Failure (%)	15.082	14.808						
After Test	1	2	3	4	5	6	7	8
Final Water Content (%)	31.78	26.02						

Project:	R-4753
Project Number:	39999.1.1
Sampling Date:	
Sample Number:	ST-2
Sample Depth:	8.5 - 10.5
Location:	Jackson County
Client Name:	T-6064_UUsat
Project Remarks:	Tannish red colored silty clay

Specimen 1	Specimen 2	Specimen 3	Specimen 4	Specimen 5	Specimen 6	Specimen 7	Specimen 8
Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch	Failure Sketch

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Unconsolidated Undrained Test

ASTM D2850

Specimen 1	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	Test Time: 4/4/2016 9:42:57 AM
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-2	Specimen Lab #: T-6064_UUsat
Specimen Description:	
Specific Gravity: 2.734	
Plastic Limit: 0	Liquid Limit: 0
Height (in): 5.9790	Diameter (in): 2.8487
Area (in ²): 6.373	Volume (in ³): 38.1067
Large Particle:	
Moisture Material: Entire specimen	
Moist Weight (g): 1163.0	
Test Remarks: 38° shear plane.	

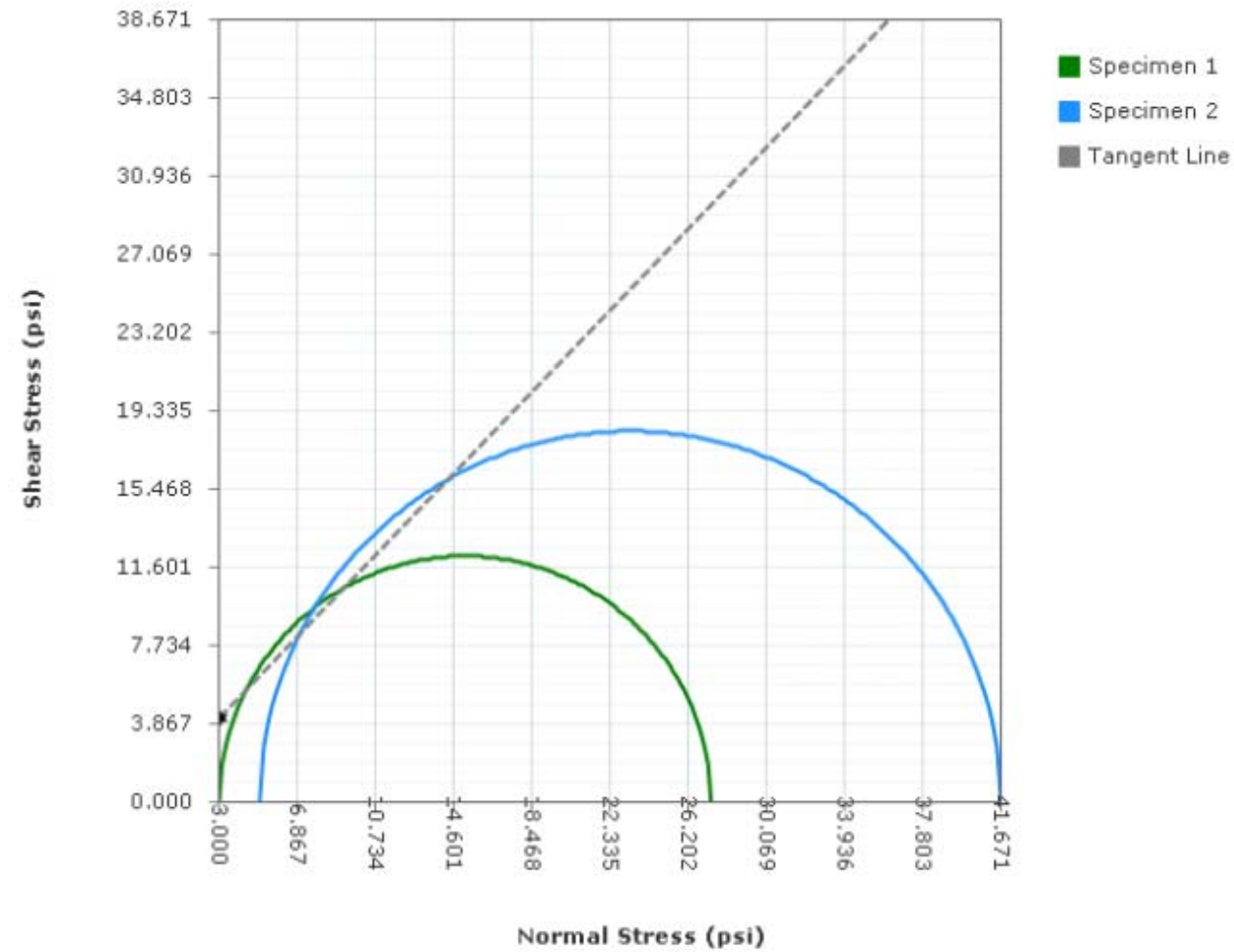
Specimen 2	
Test Description:	
Other Associated Tests:	
Device Details:	
Test Specification:	Test Time: 4/4/2016 10:41:15 AM
Technician:	Sampling Method: Undisturbed
Specimen Code: ST-2	Specimen Lab #: T-6064_UUsat
Specimen Description:	
Specific Gravity: 2.734	
Plastic Limit: 0	Liquid Limit: 0
Height (in): 6.1868	Diameter (in): 2.8510
Area (in ²): 6.384	Volume (in ³): 39.4960
Large Particle:	
Moisture Material: Entire specimen	
Moist Weight (g): 1247.0	
Test Remarks: 30° shear plane	

Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____ Date: _____

Mohr Circles (Total Stress) Graph

ASTM D2850



Tangent Results	
Strength Intercept (psi)	0.983
Friction Angle (°)	46.248

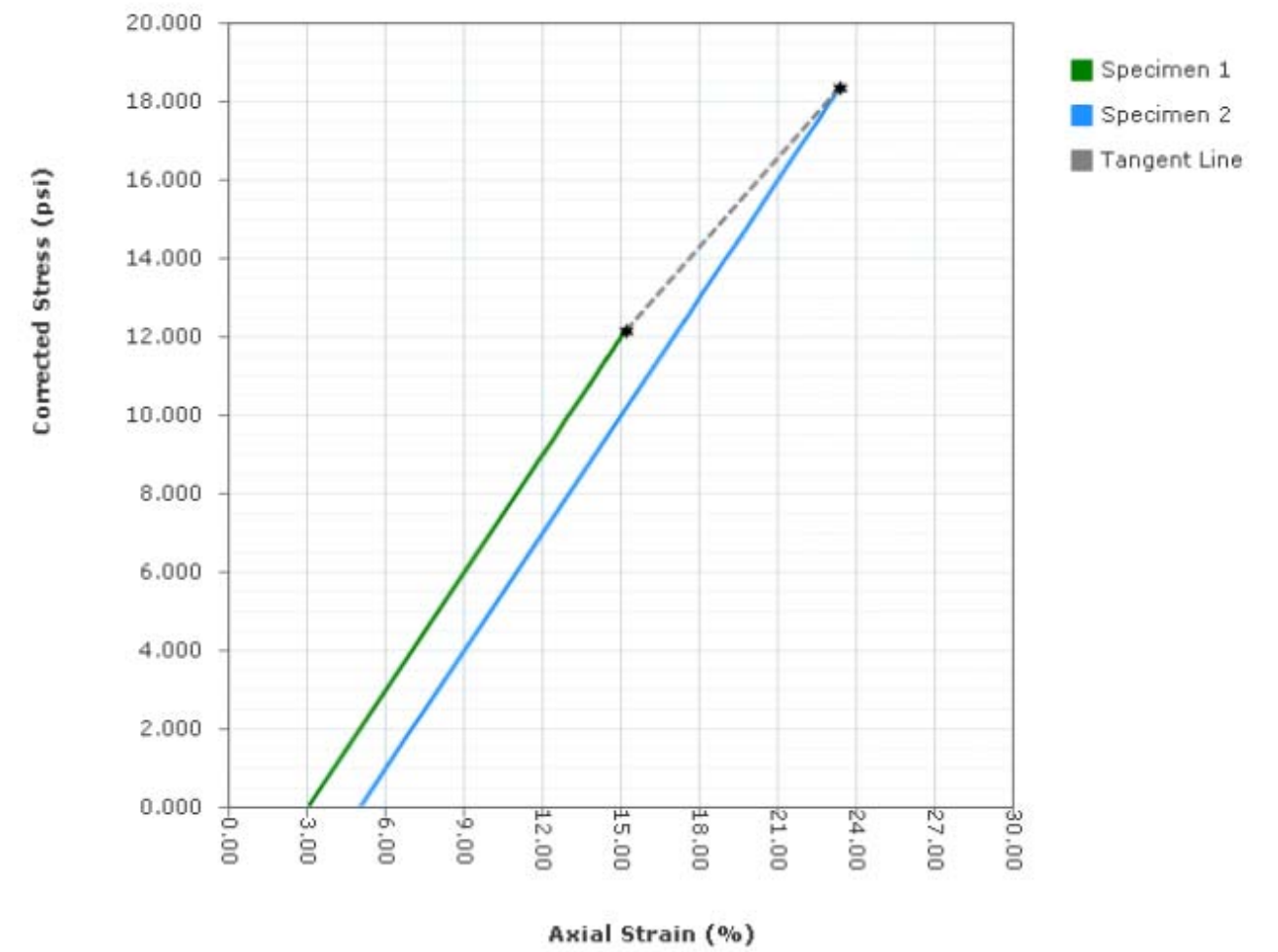
Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____

PQ Graph

ASTM D2850



Tangent Results	
Strength Intercept (psi)	0.711
Friction Angle (°)	37.062

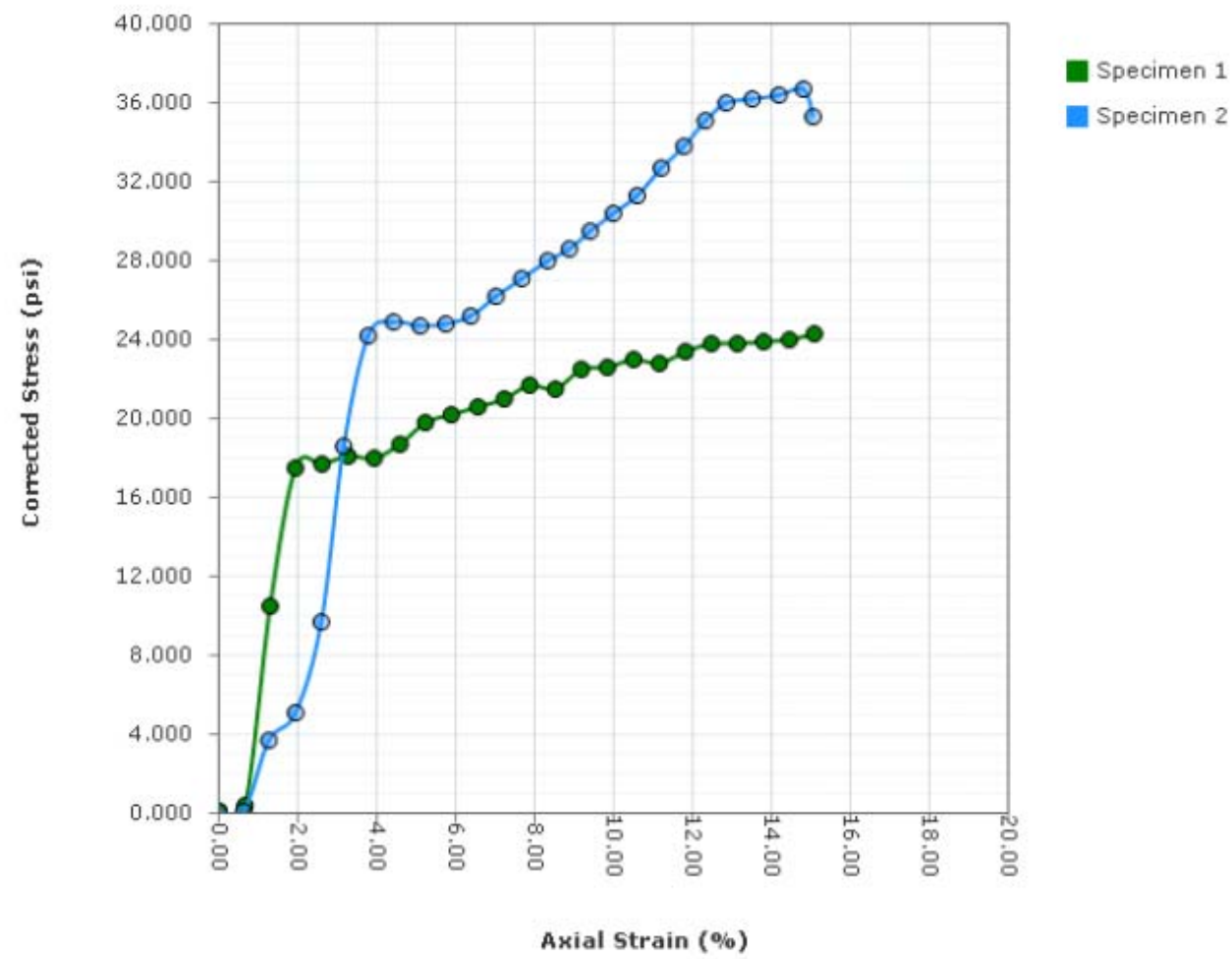
Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____

Stress-Strain Graph

ASTM D2850



Failure Sketches



Project Name: R-4753 Project Number: 39999.1.1

Checked By: _____

Date: _____