

REFERENCE: B-5981

PROJECT: 47747

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

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

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY Duplin
PROJECT DESCRIPTION Replace Bridge 16 over CSX
Railroad on US 117 Northbound Lane and Bridge
Preservation of Bridge 17 over CSX Railroad

INVENTORY – REVISED

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>
-L-	13+20 to 33+55	4-5
-YI-	10+00 to 14+25	5
-SRI-	10+75 to 24+60	4-5

CROSS SECTIONS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>
-L-	11+00 to 33+50	6-24
-YI-	10+00 to 14+00	25-27
-SRI-	10+91.83 to 20+66.54	6-16
-SRI-	21+00 to 24+50	28-30

APPENDICES

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
A	LABORATORY TEST RESULTS	31-42

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5981	1	

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 1919 T07-6850. 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:

- 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.
- 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

P.M. WEAVER

C.R. PASTRANA

C.P. TURNER

F&R

INVESTIGATED BY ESP Associates, INC.

DRAWN BY C.R. PASTRANA

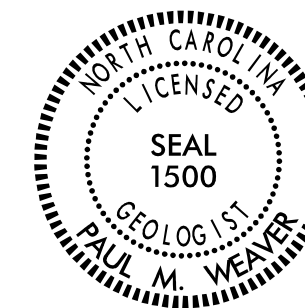
CHECKED BY P.M. WEAVER

SUBMITTED BY ESP Associates, INC.

DATE January 2023



ESP ASSOCIATES, INC.
7011 ALBERT PICK RD
SUITE E
GREENSBORO, NC 27409
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DocuSigned by:
Paul M. Weaver 02/28/2023
01847D3738AD49C SIGNATURE DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
 SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

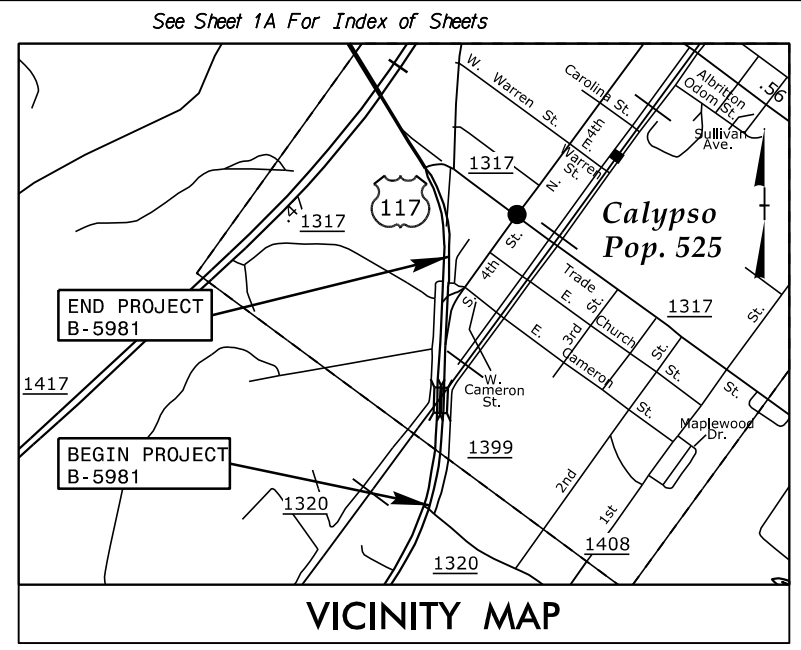
SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																										
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, 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</p>										<p>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.</p>										<p>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:</p>										<p>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. SLICKENISE - 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 (SROD) - 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.</p>																																										
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CALCAREOUS (CALC.)																																										
<p>GENERAL CLASS.</p> <table border="1"> <tr> <td colspan="4">GRANULAR MATERIALS (<= 35% PASSING #200)</td> <td colspan="4">SILT-CLAY MATERIALS (> 35% PASSING #200)</td> <td colspan="2">ORGANIC MATERIALS</td> </tr> <tr> <td>A-1</td><td>A-3</td><td>A-2</td><td>A-2</td><td>A-4</td><td>A-5</td><td>A-6</td><td>A-7</td> <td>A-1, A-2</td><td>A-4, A-5</td> </tr> <tr> <td>A-1-a</td><td>A-1-b</td><td>A-2-4</td><td>A-2-5</td><td>A-2-6</td><td>A-2-7</td><td></td><td>A-7-5</td><td>A-3</td><td>A-6, A-7</td> </tr> </table>										GRANULAR MATERIALS (<= 35% PASSING #200)				SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		A-1	A-3	A-2	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-1-a	A-1-b	A-2-4	A-2-5	A-2-6	A-2-7		A-7-5	A-3	A-6, A-7	<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p>												
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<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>										<p>ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p>																																										
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<p>WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p>STATIC WATER LEVEL AFTER 24 HOURS</p> <p>PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p>SPRING OR SEEP</p>										<p>FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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</p> <p>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</p> <p>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</p> <p>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.</p>										<p>DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p>DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p>DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p>FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p>FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p>FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.</p> <p>FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p>FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p>JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p>LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p>LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p>MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p>PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p>RESIDUAL (RES.) 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SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.</p> <p>STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p>STRATA ROCK QUALITY DESIGNATION (SROD) - 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.</p> <p>TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																				
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										ROCK HARDNESS										BENCH MARK: FILE 'b5981_is_tin_190827.tin' WAS USED TO DETERMINE GROUND ELEVATION AT BORINGS																																										
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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5981	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
47747.1.1	BRZ-0117 (048)	PE	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
DUPLIN COUNTY

**LOCATION: BRIDGE NO.16 OVER CSX RAILROAD ON
US-117 NORTH BOUND LANES AND
PRESERVATION OF BRIDGE NO.17 OVER CSX RAILROAD**

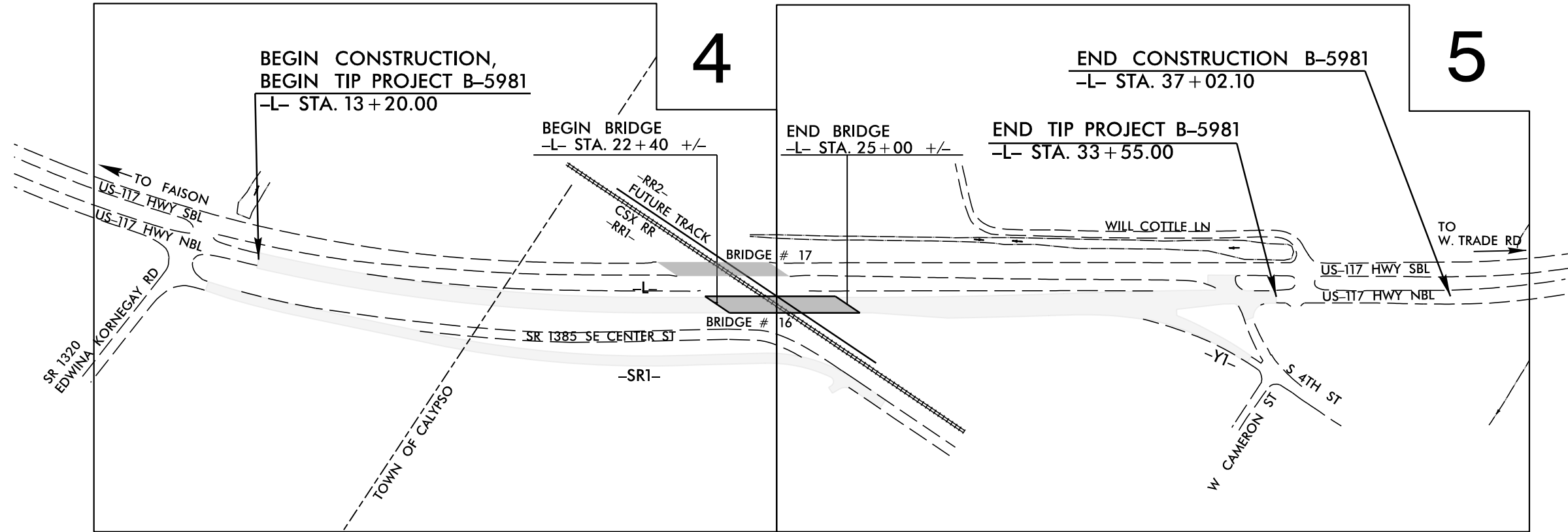
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURE,
AND STRUCTURE PRESERVATION**



25% PLANS

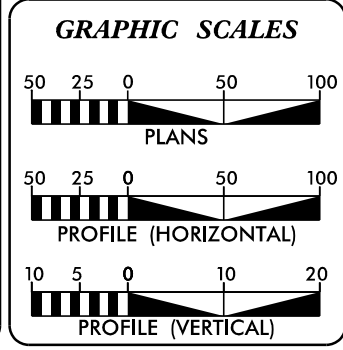
TIP PROJECT: B-5981

CONTRACT: 47747



THE PROJECT IS WITHIN MUNICIPAL BOUNDARIES OF CALYPSO.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD ____.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT 2020 =	2,027
ADT 2040 =	2,300
K =	9% %
D =	100 %
T =	6 % *
V =	60 MPH
* (TTST = 3% + DUAL = 3%)	
FUNC. CLASS =	MAJOR COLLECTOR
REGIONAL TIER	

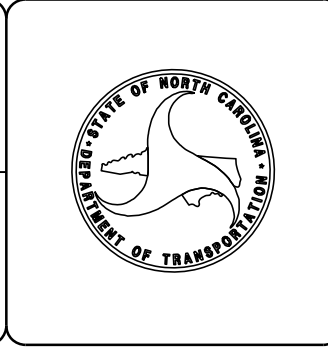
PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT B-5981 =	0.406 MI
LENGTH OF STRUCTURE TIP PROJECT B-5981 =	0.049 MI
TOTAL LENGTH OF TIP PROJECT B-5981 =	0.357 MI

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

2018 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: DECEMBER 2, 2019	TATIA L. WHITE, PE, PLS PROJECT ENGINEER
LETTING DATE: OCTOBER 20, 2020	SHERRI E. CALHOUN, PE PROJECT TEAM LEAD

HYDRAULICS ENGINEER	_____ P.E.
ROADWAY DESIGN ENGINEER	_____ P.E.



I:\19\2023\2-5\05 PM W:\Projects\2020\01\15\4.300 (NC DOT 2020-2022 On-Call Contract)\15\4.334 (B-5981 Revisions)\B5981.GEO_RDWY_REV\CADD_GEO\TECH\Plan\Prof\B5981.rdy.tsh_la_lb.dgn 09/08/19

January 30, 2023

STATE PROJECT: 47747.1.1
 TIP: B-5981
 COUNTY: Duplin
 DESCRIPTION: Replace Bridge 16 over CSX Railroad on US 117 Northbound Lane and Bridge Preservation of Bridge 17 over CSX Railroad
 SUBJECT: Revised Geotechnical Report-Roadway Inventory

Project Description

This proposed project is located in Calypso, North Carolina. It begins at -L- Station 13+20, which is approximately 920 feet south of the beginning of Bridge 16, and continues to -L- Station 33+55, which is approximately 855 feet north of the end of Bridge 16. The total project length of TIP Project B-5981 is approximately 0.4 miles. The project area is primarily woodlands and farmland with isolated single-family homes and a business.

Proposed is the widening of US 117 (-L-) on the east side of the northbound lane, the realignment of SR 1385-SE Center Street (-SR1-) and the widening of the south side of the ramp from northbound US 117 to South 4th Street/ALT US 117 (-Y1). The proposed maximum embankment heights are approximately 20 feet, while the proposed maximum cut depths are approximately 2 feet. Intersections along the project include the CSX Railroad (-RR1- and -RR2-) and the ramp from northbound US 117 to South 4th Street/ALT US 117 (-Y1-).

This geotechnical investigation was confined to the areas of proposed construction.

Initial site scoping was performed on October 31, 2019. The field roadway investigation was performed from November 13 to November 15, 2019. Standard Penetration Test borings were advanced with a CME 55 drill machine equipped with an automatic hammer. A hand auger was utilized to evaluate subsurface conditions in areas inaccessible to the drilling rig. Representative soil samples were collected for visual classification in the field and for laboratory analyses.

The following alignments were investigated. Subsurface cross sections of these alignments are included in this report.

Alignment	Station (±)
-L-	13+20 to 33+55
-Y1-	10+00 to 14+25
-SR1-	10+75 to 24+60

Physiography and Geography

The project corridor is located in the Coastal Plain Physiographic Province. It is composed of sediments deposited during transgressive-regressive cycles caused by eustatic sea level fluctuations. Progressively younger sequences lie nearer the modern coast. The Geologic Map of North Carolina (1985) shows the subsurface materials within the project corridor area to consist of the Black Creek Formation which is Cretaceous in age. The Black Creek Formation is described as “clay, gray to black, lignitic; contains thin beds and laminae of fine-

grained micaceous sand and thick lenses of cross-bedded sand; glauconitic, fossiliferous clayey sand lenses in upper part.”

The roadway along US 117 (-L-) generally slopes up from the south end of the project to Bridge 16, then down from Bridge 16 to the north end of the project with elevations ranging from approximately 191 feet to approximately 162 feet. The roadway along SE Center Street (-SR1-) generally slopes down from the south end of the project to the north end of the project with elevations ranging from approximately 166 feet to approximately 158 feet. The roadway along the ramp to South 4th Street (-Y1-) slopes down from US 117 (-L-) with elevations ranging from approximately 172 feet to approximately 161 feet.

Soil Properties

Soils encountered within this project area have been divided into three categories: artificial fill, roadway embankment, and coastal plain deposits.

The artificial fill was only encountered in one boring (L_2000). It extended to a depth of approximately 1 foot below the existing ground surface and sampled as loose, silty sand (A-2-4). This artificial fill was placed over an old road consisting of asphalt over concrete totaling 1.6 feet in thickness.

The roadway embankment ranged in thickness from approximately 1 foot to approximately 26 feet, and was composed of loose, silty sand (A-2-4) and clayey sand (A-2-6), and of soft to stiff, sandy silt (A-4), sandy clay (A-6), and silty clay (A-7). Plasticities within the roadway embankment range from non-plastic to highly plastic with laboratory plasticity index tests results ranging from non-plastic to 49.

Soils identified as coastal plain deposits were encountered either beginning at the existing ground surface or underlying the embankment fill material. The coastal plain materials consisted of very loose to medium dense, silty sand (A-2-4) and clayey sand (A-2-6), and of very soft to stiff, sandy silt (A-4), sandy clay (A-6), and silty clay (A-7). Plasticities within the coastal plain materials ranged from non-plastic to highly plastic with laboratory plasticity index results ranging from non-plastic to 27.

Groundwater Properties

Ground water data was collected in November, 2019. Ground water depths ranged from 5.3 to 8.7 feet below the existing ground surface, and groundwater elevations ranged from 153.6 to 149.6 feet above sea level.

Areas of Special Geotechnical Interest

- 1) The following sections contain cohesive soils which have the potential to cause embankment/subgrade and/or slope stability problems during construction:

Alignment	Station (±)	Offset
-L-	28+75 to 33+75	Within existing embankment
-Y1-	10+00 to 14+25	Within existing embankment
-SR1-	12+25 to 19+91	Across extent of construction

2) The following area contains artificial fill material.

Alignment	Station to Station (±)	Offset (±)	Notes
-L-	19+85 to 20+15	50' RT to 60' RT	Fill over old roadway

Ponds

There are no ponds are located within the project corridor:

Water Wells

No water wells are identified on the project plans within the project corridor.

APPENDIX A – UNDISTURBED AND BULK SAMPLES

SAMPLE NO.	ALIGNMENT	STATION	OFFSET	SAMPLE DEPTH (FT)	TESTS PERFORMED
ST-1	-L-	19+95	53' RT	6.0-8.0	Consolidation, Atterberg, grain-size with hydrometer, moisture content

PROJECT REFERENCE NO. B-5981	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

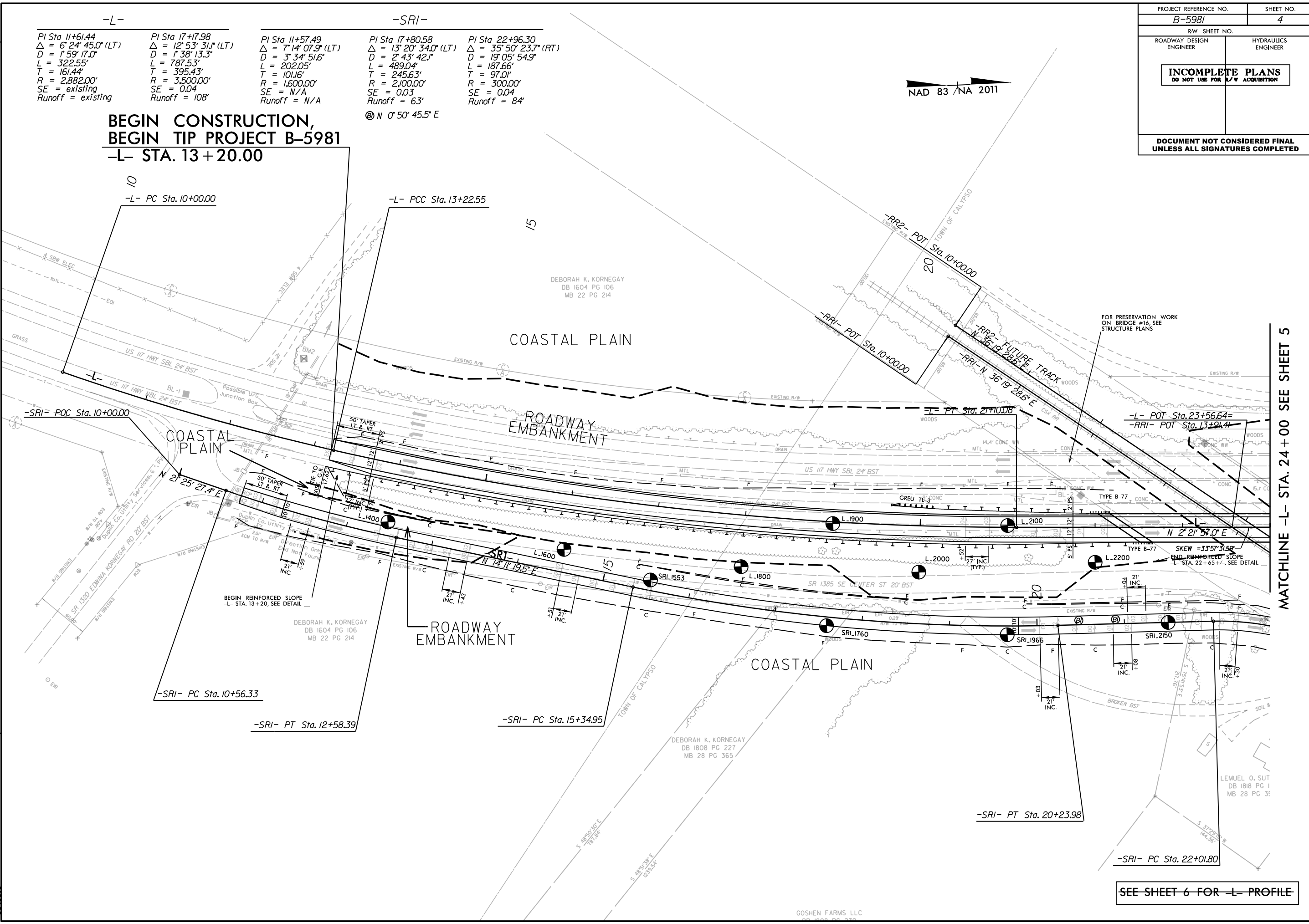
-L-	-SRI-	-SRI-	-SRI-	-SRI-
PI Sta 11+61.44 Δ = 6° 24' 45.0" (LT) D = 1' 59' 17.0" L = 322.55' T = 161.44' R = 2,882.00' SE = existing Runoff = existing	PI Sta 17+17.98 Δ = 12° 53' 31.1" (LT) D = 1' 38' 13.3" L = 787.53' T = 395.43' R = 3,500.00' SE = 0.04 Runoff = 108'	PI Sta 11+57.49 Δ = 7° 14' 07.9" (LT) D = 3' 34' 51.5" L = 202.05' T = 101.16' R = 1,600.00' SE = N/A Runoff = N/A	PI Sta 17+80.58 Δ = 13° 20' 34.0" (LT) D = 2' 43' 42.1" L = 489.04' T = 245.63' R = 2,100.00' SE = 0.03 Runoff = 63'	PI Sta 22+96.30 Δ = 35° 50' 23.7" (RT) D = 19' 05' 54.9" L = 187.66' T = 97.01' R = 300.00' SE = 0.04 Runoff = 84'

NAD 83 / NA 2011

**BEGIN CONSTRUCTION,
BEGIN TIP PROJECT B-5981**
-L- STA. 13+20.00

⊙ N 0° 50' 45.5" E

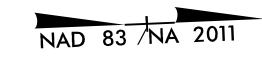
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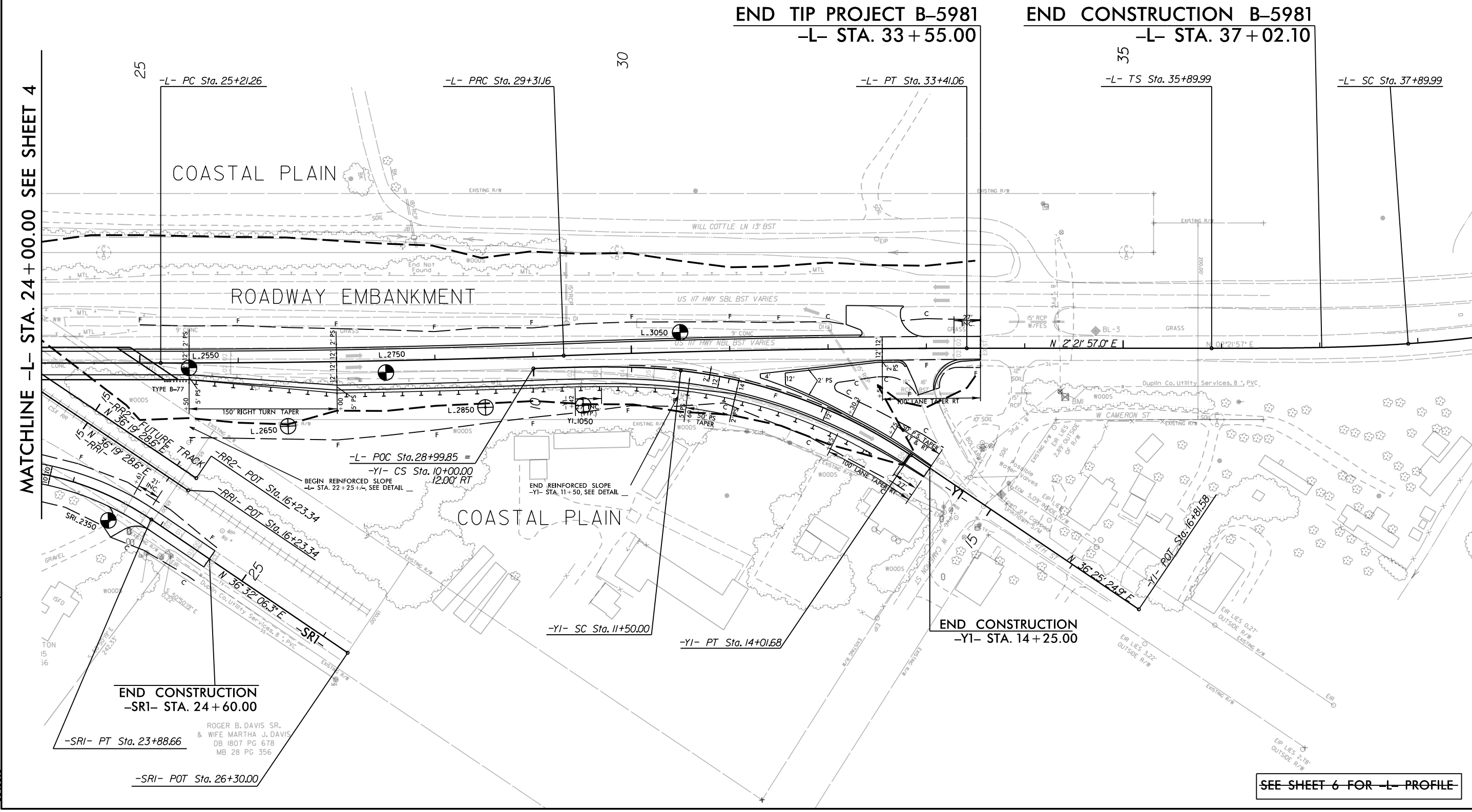
SEE SHEET 6 FOR -L- PROFILE

GOSHEN FARMS LLC
DB 1808 PG 227
MB 28 PG 365

PROJECT REFERENCE NO. B-5981	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-L-			
PI Sta 27+26.23 Δ = 2° 05' 48.9" (LT) D = 0' 30' 41.7" L = 409.90' T = 204.97' R = 11,200.00' SE = NC Runoff = N/A	PI Sta 31+36.13 Δ = 2° 05' 48.9" (RT) D = 0' 30' 41.7" L = 409.90' T = 204.97' R = 11,200.00' SE = NC Runoff = N/A	PIs Sta 37+23.35 θs = 4° 00' 24.1" Ls = 200.00' LT = 133.37' ST = 66.70'	PI Sta 41+18.94 Δ = 25° 54' 34.6" (LT) D = 4° 00' 24.1" L = 646.66' T = 328.95' R = 1,430.00' SE = EXIST.
-YI-		-SRI-	
PIs Sta 11+00.11 θs = 8° 15' 49.7" Ls = 150.00' LT = 100.11' ST = 50.10'	PI Sta 12+78.35 Δ = 27° 43' 50.5" (RT) D = 1' 01' 06.3" L = 251.68' T = 128.35' R = 520.00' SE = 0.06	PI Sta 22+96.30 Δ = 35° 50' 23.7" (RT) D = 19° 05' 54.9" L = 187.66' T = 97.01' R = 300.00' SE = 0.04 Runoff = 84'	⊙ N 0° 50' 45.5" E



END TIP PROJECT B-5981
-L- STA. 33 + 55.00

END CONSTRUCTION B-5981
-L- STA. 37 + 02.10

MATCHLINE -L- STA. 24 + 00.00 SEE SHEET 4

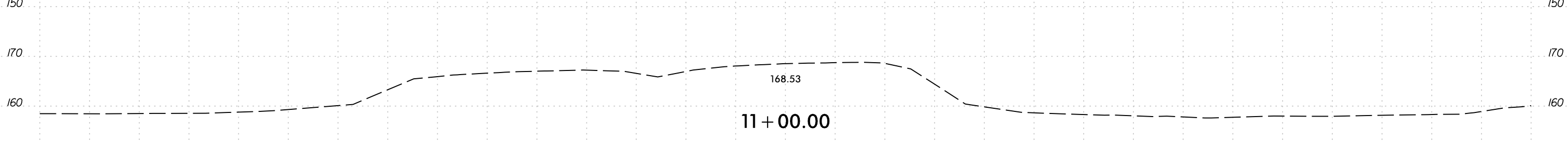
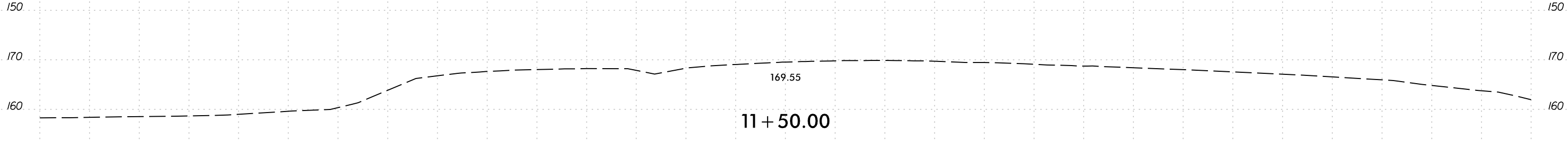
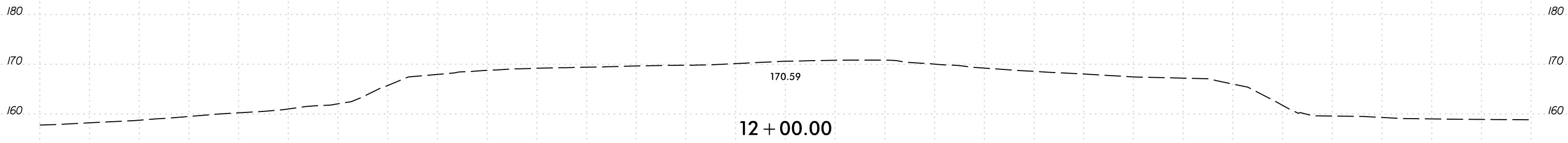
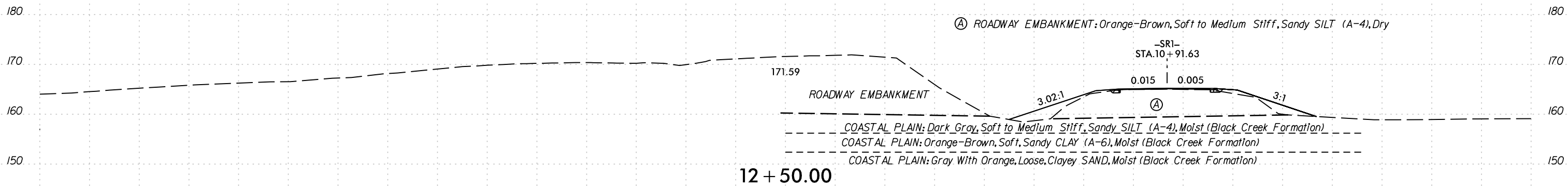
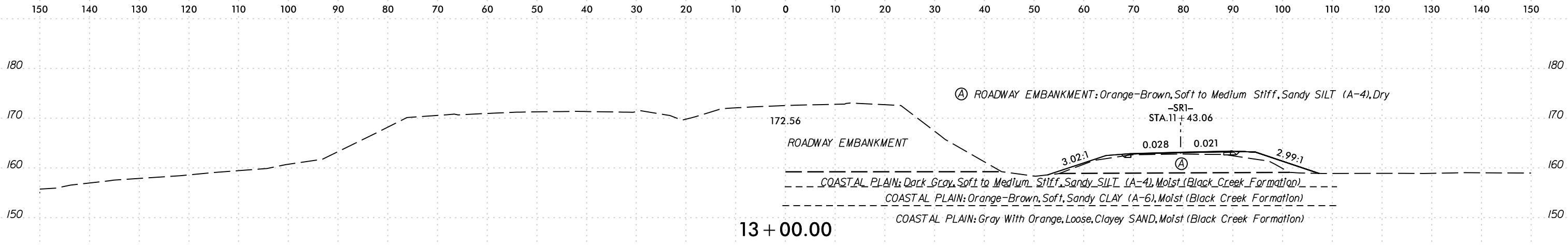
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-SRI- STA. 24 + 60.00

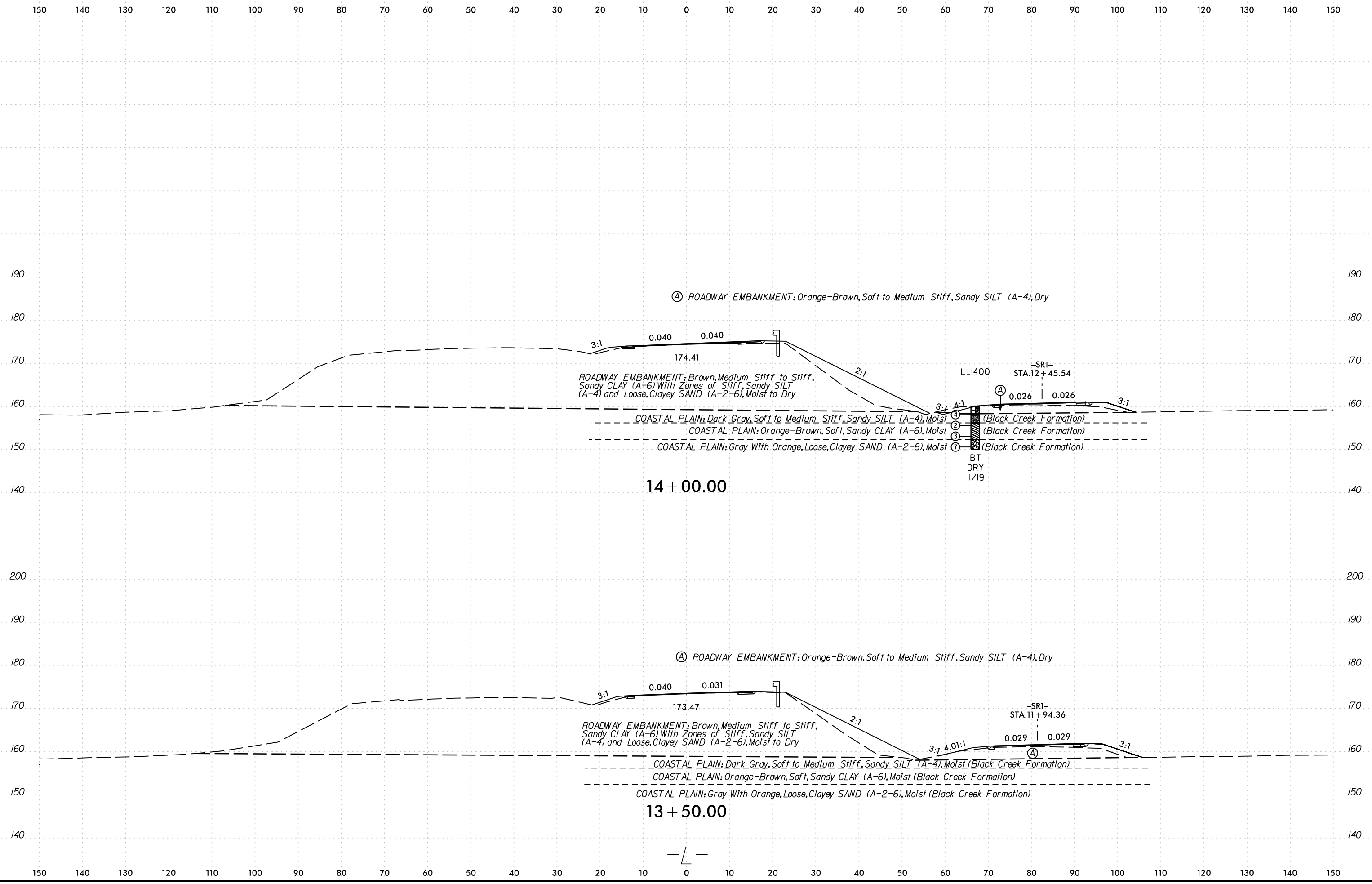
SEE SHEET 6 FOR -L- PROFILE

ROGER B. DAVIS SR.
& WIFE MARTHA J. DAVIS
DB 1807 PG 678
MB 28 PG 356

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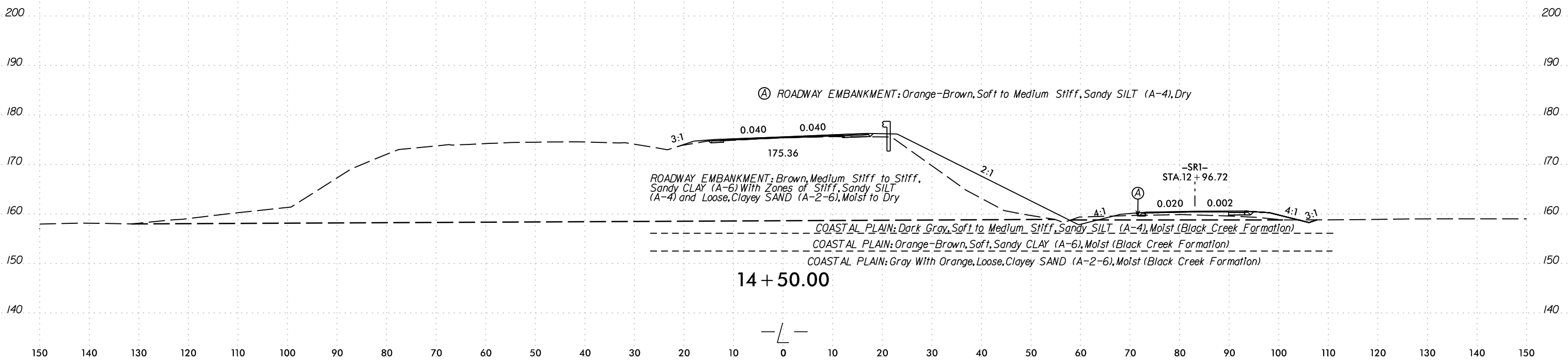
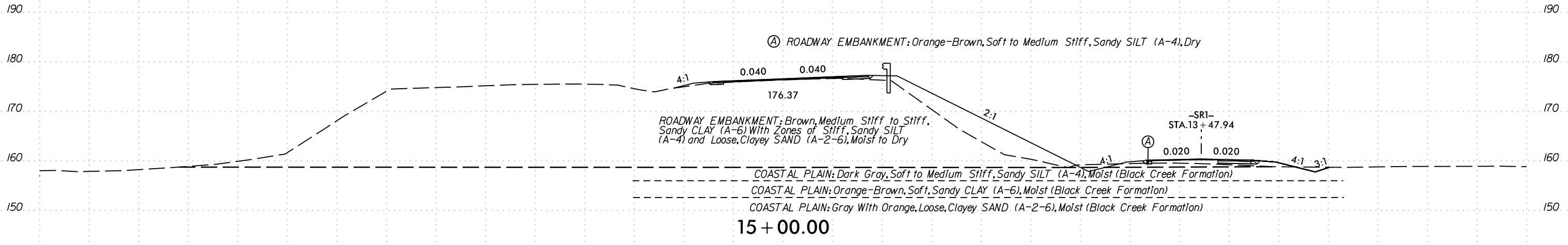
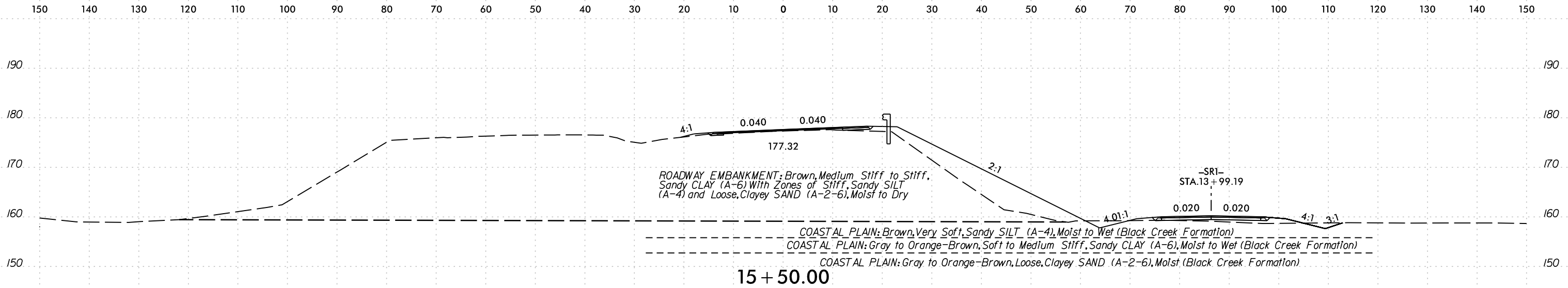


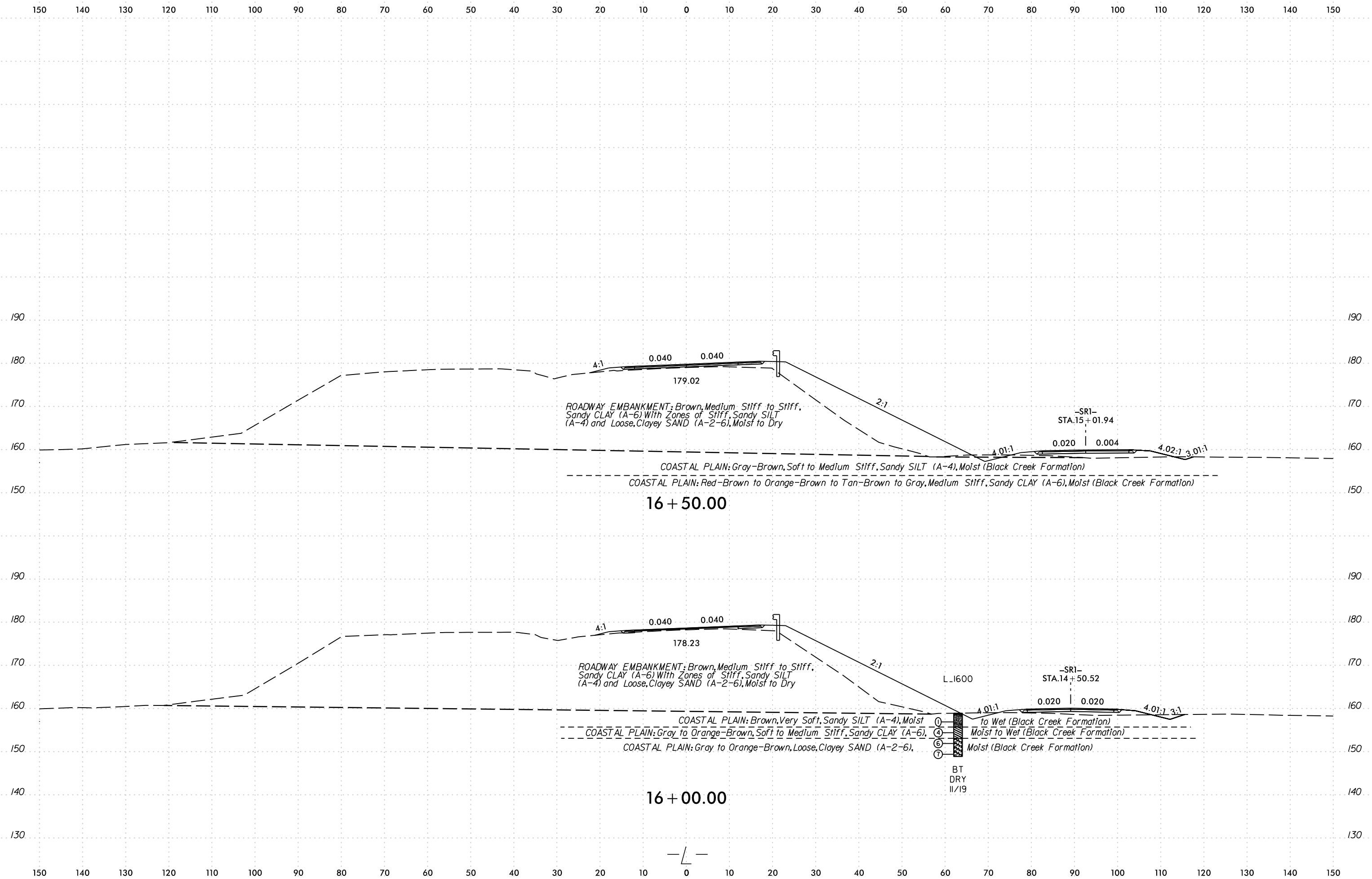
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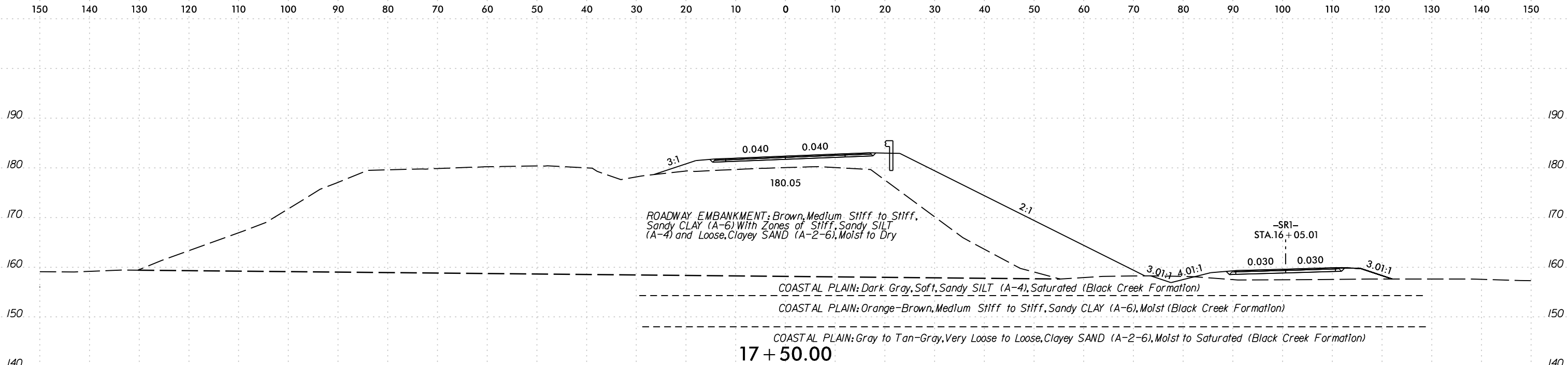
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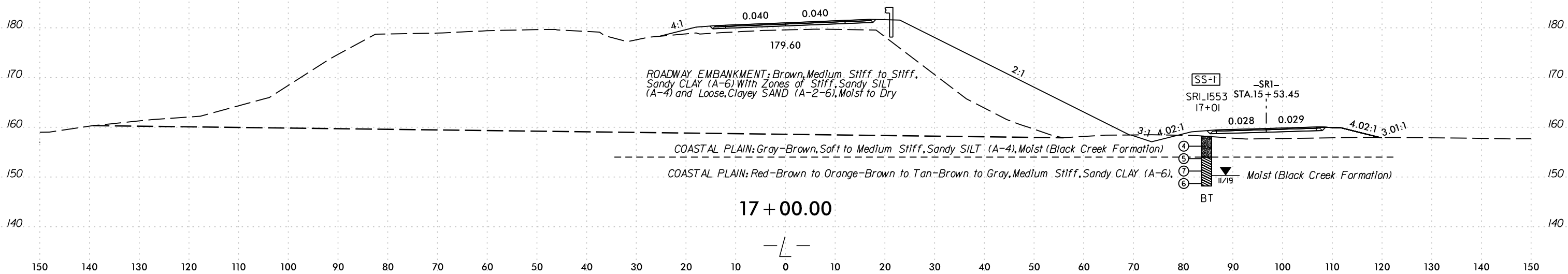


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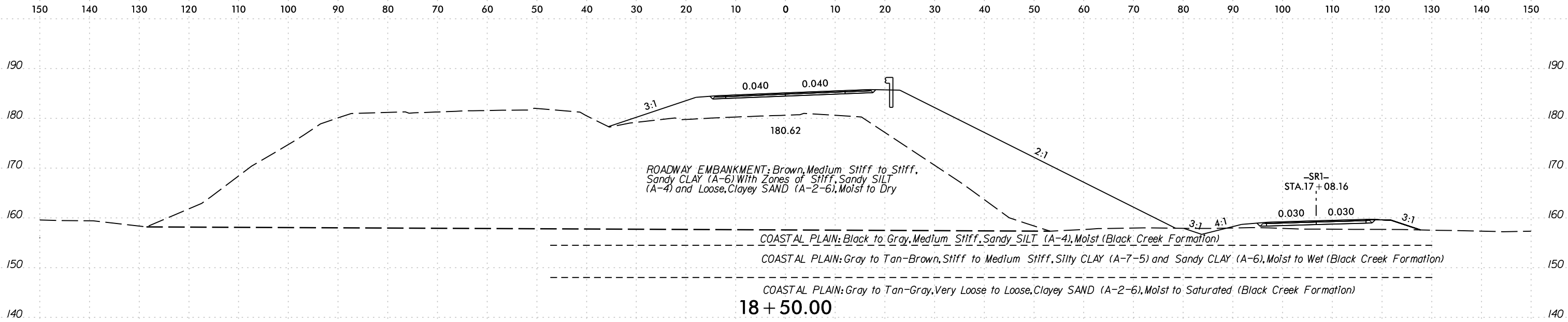
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	12' LT	15+53	1.0-2.5	A-4(0)	20.5		22	40	21	17	99	87	54	14.0	-

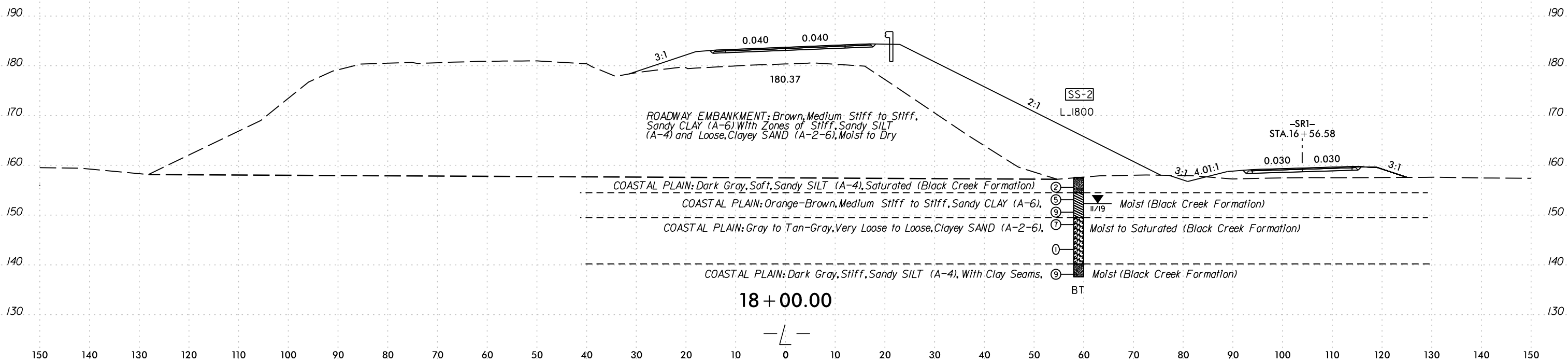
* NOTE: STATION AND OFFSET REFERS TO -SR1- ALIGNMENT



17 + 00.00

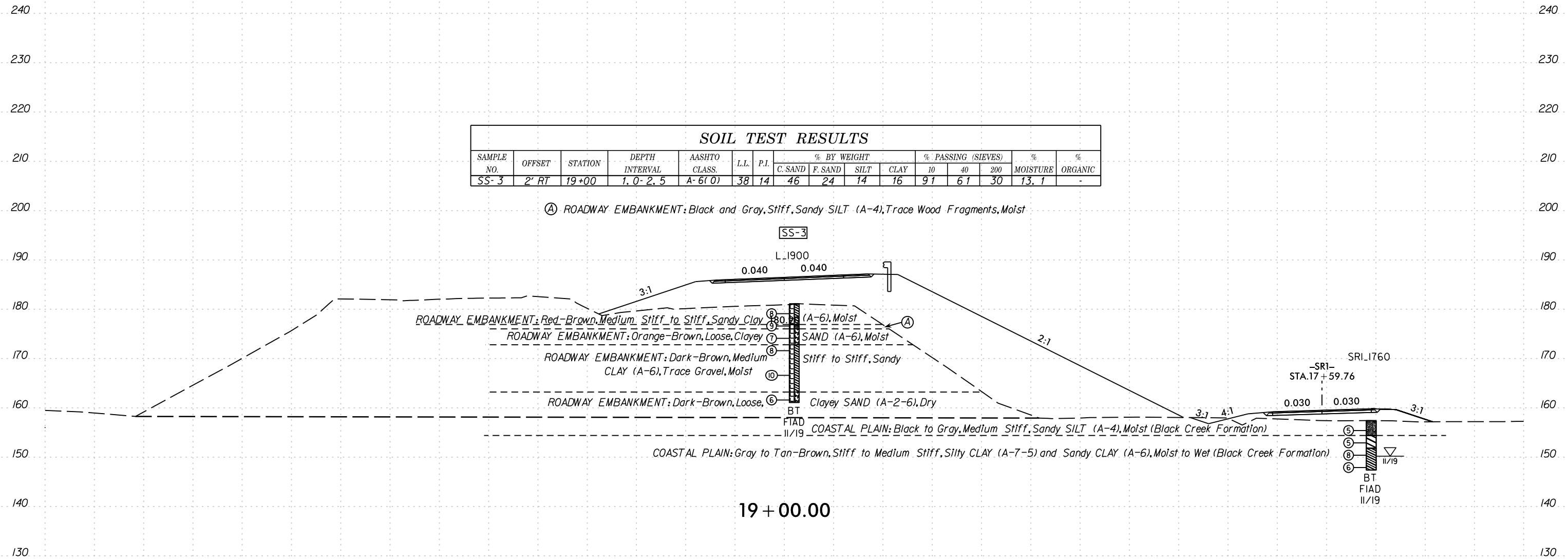


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-2	59' RT	18+00	8.5- 10.0	A-2-6(O)	31	12	45	29	3	23	94	69	27	15.2	-



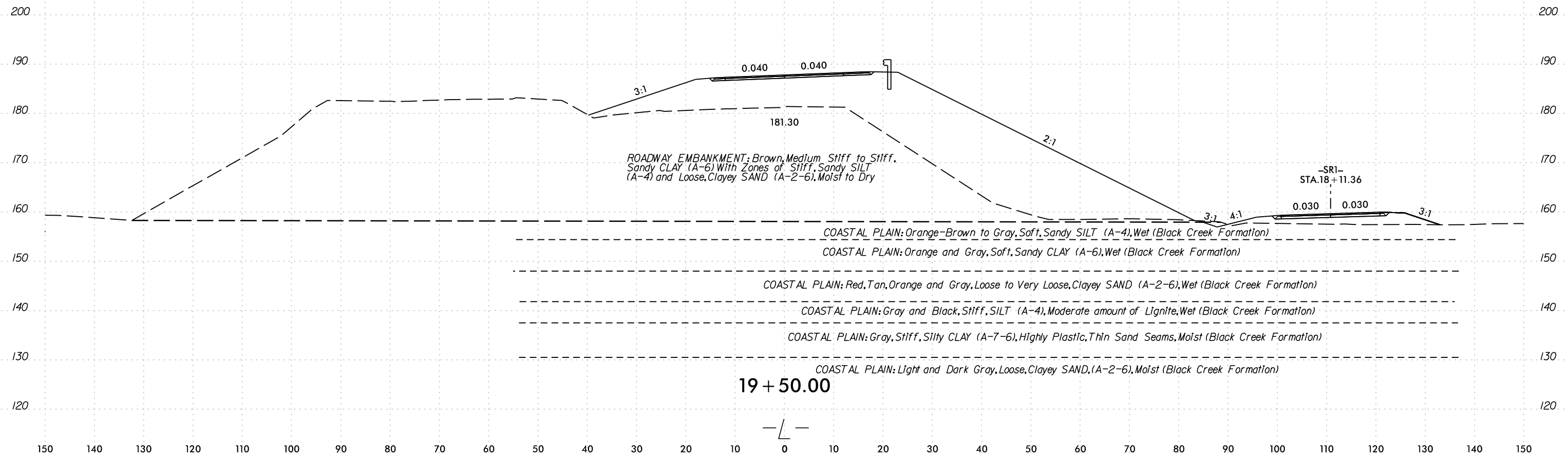
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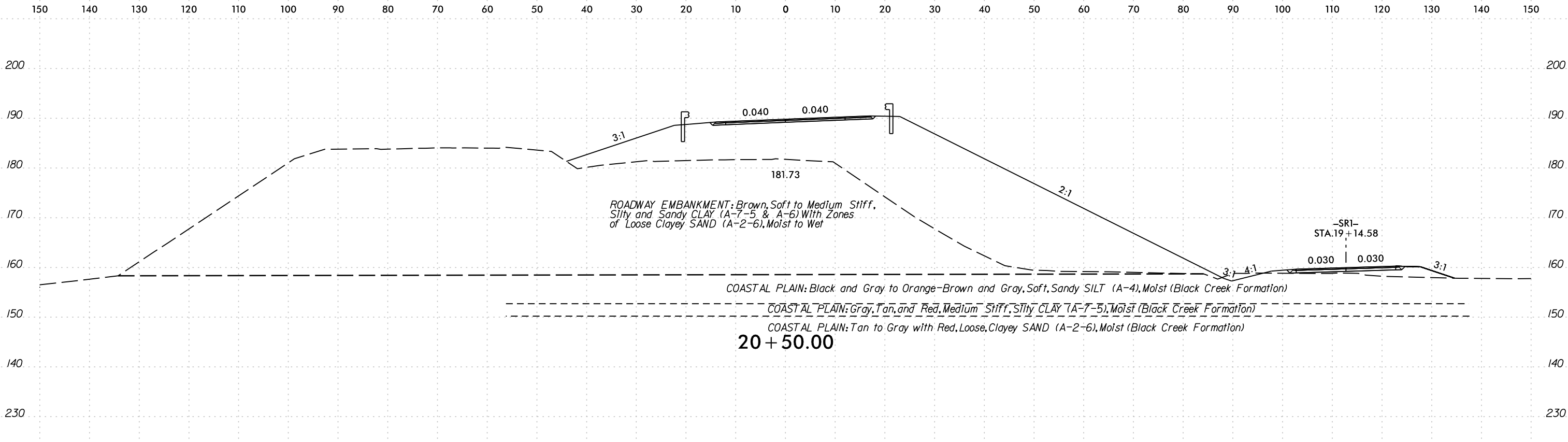
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150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

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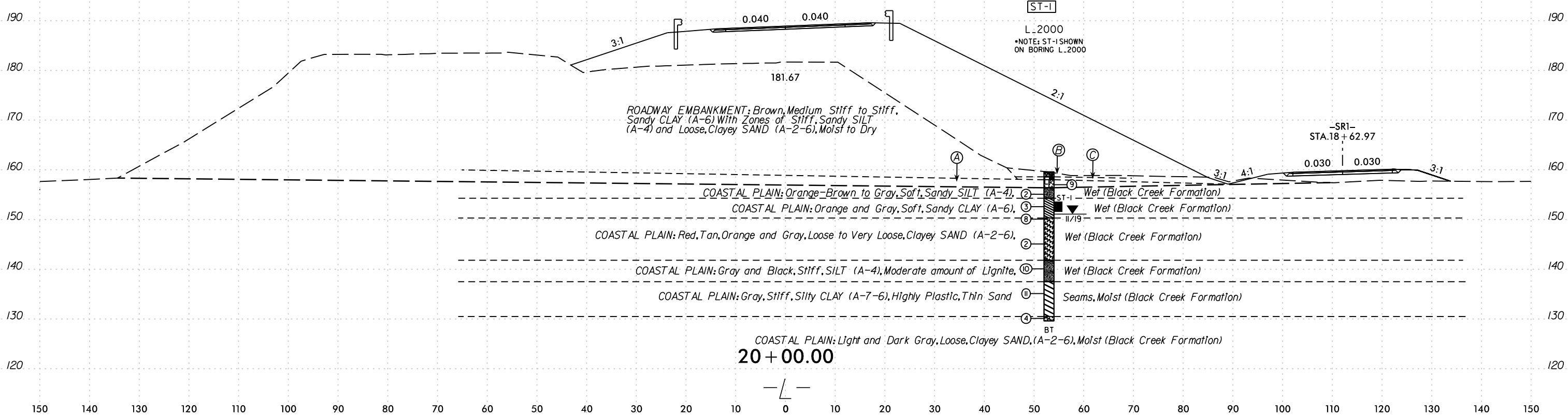




SOIL TEST RESULTS

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
ST-1	53' RT	19+95	6.0-8.0	A-6(3)	29	15	24	39	12	25	99	88	47	18.6	-

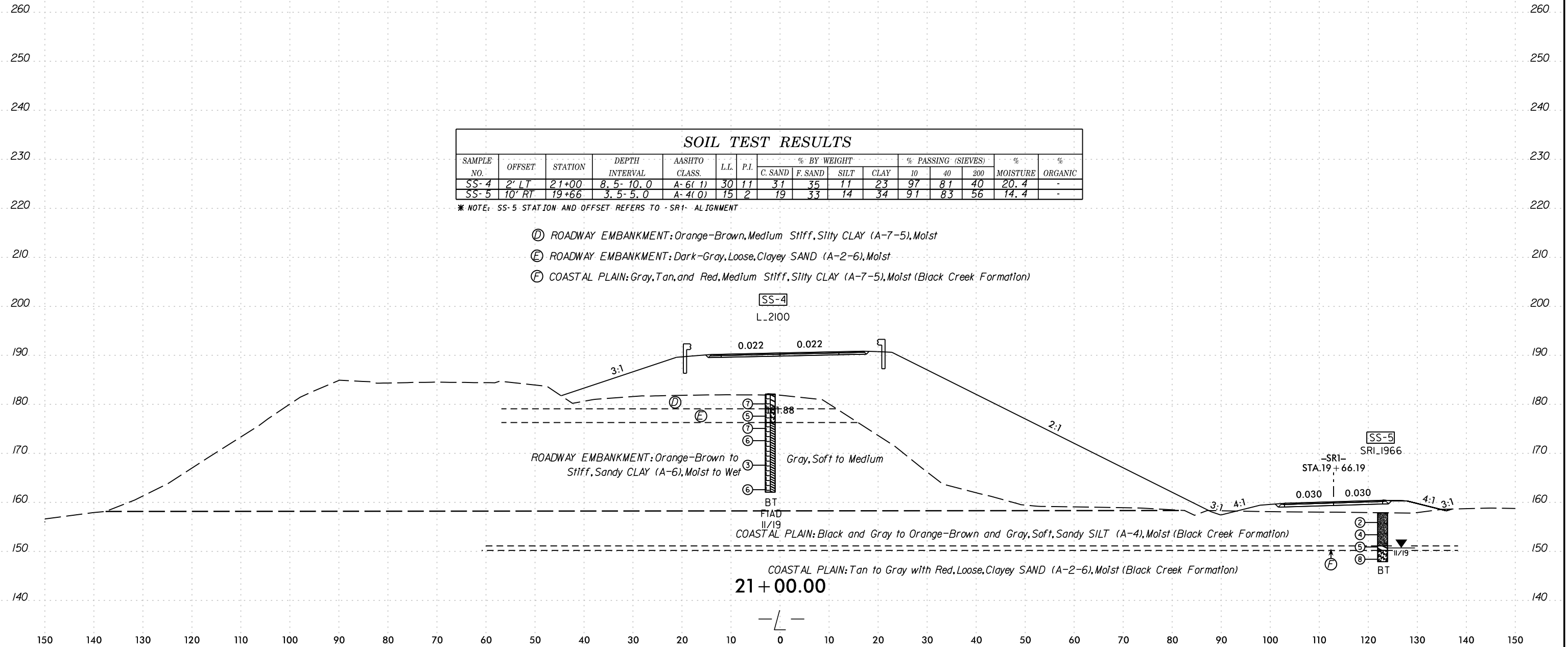
- Ⓐ ROADWAY EMBANKMENT: Orange-Brown and Dark-Gray, Stiff, Clayey SILT (A-5), Moist (Old Roadway Subgrade)
- Ⓑ ARTIFICIAL FILL: Orange-Brown, Loose, Silty SAND (A-2-4), Moist,
- Ⓒ ROADWAY EMBANKMENT: ASPHALT Over CONCRETE (Old Road)



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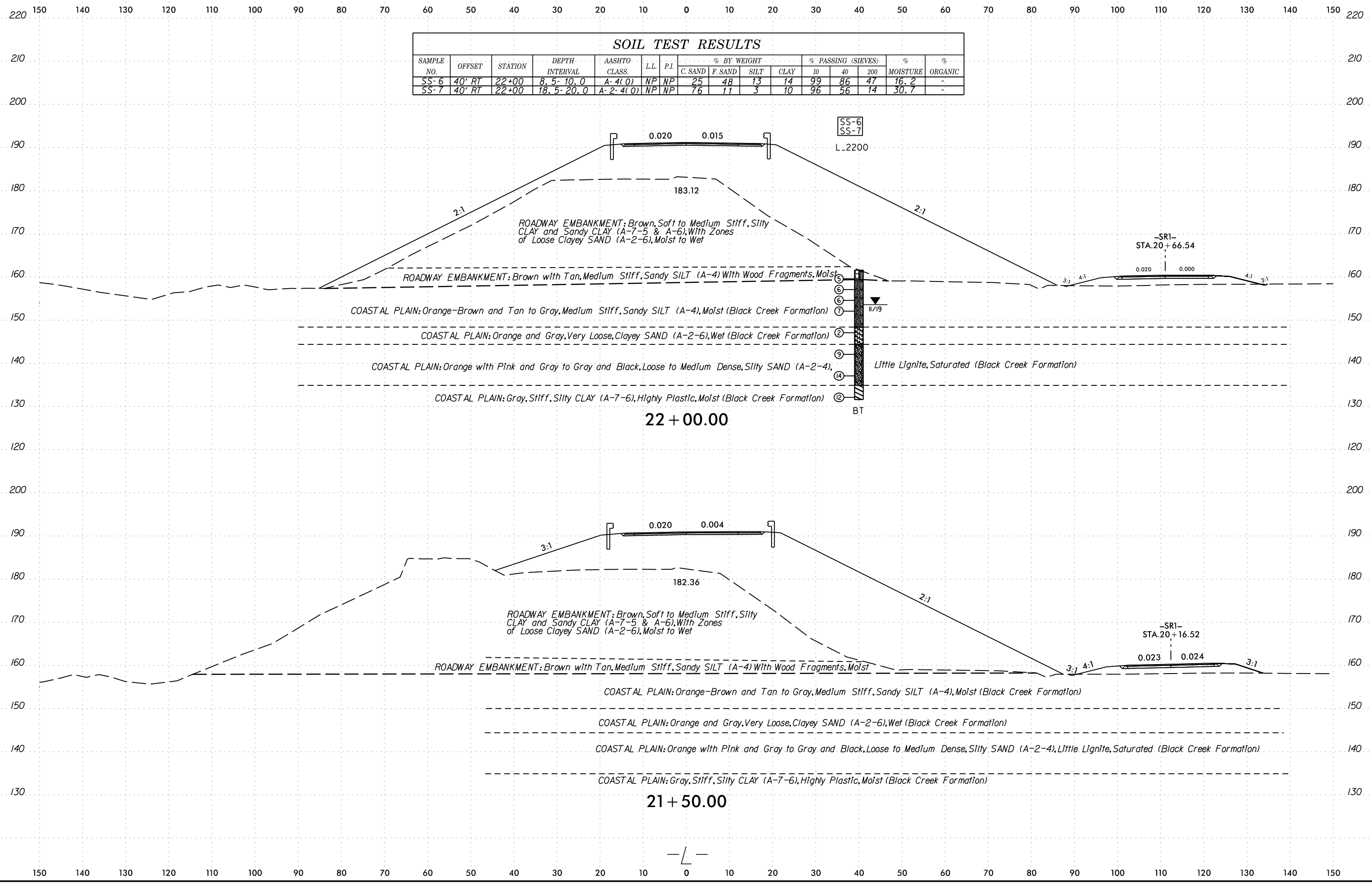
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-4	2' LT	21+00	8.5-10.0	A-6(1)	30	11	31	35	11	23	97	81	40	20.4	-
SS-5	10' RT	19+66	3.5-5.0	A-4(0)	15	2	19	33	14	34	91	83	56	14.4	-

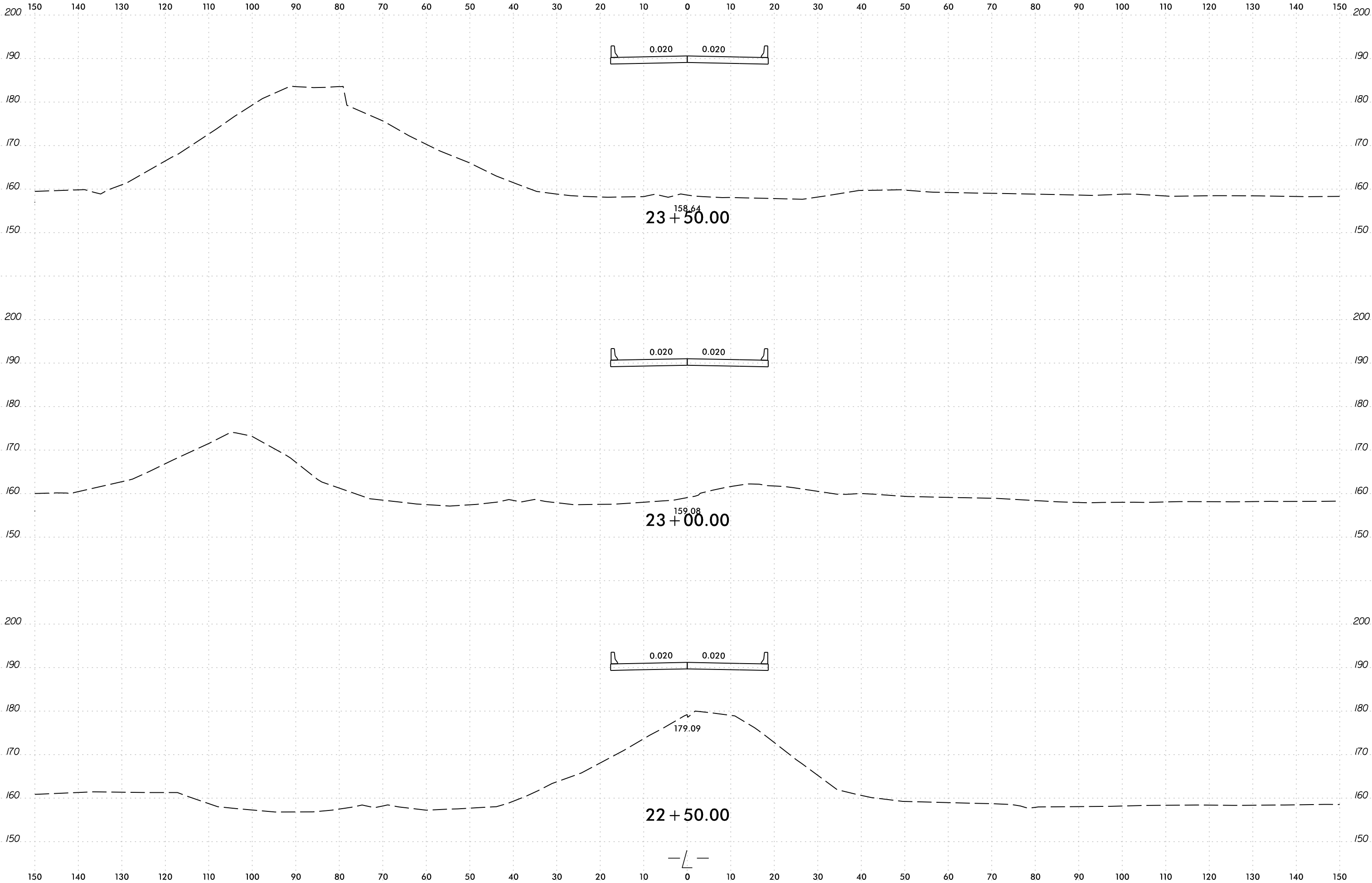
* NOTE: SS-5 STATION AND OFFSET REFERS TO SRI- ALIGNMENT

- Ⓓ ROADWAY EMBANKMENT: Orange-Brown, Medium Stiff, Silty CLAY (A-7-5), Moist
- Ⓔ ROADWAY EMBANKMENT: Dark-Gray, Loose, Clayey SAND (A-2-6), Moist
- Ⓕ COASTAL PLAIN: Gray, Tan, and Red, Medium Stiff, Silty CLAY (A-7-5), Moist (Black Creek Formation)

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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-6	40' RT	22+00	8.5-10.0	A-4(0)	NP	NP	25	48	13	14	99	86	47	16.2	-
SS-7	40' RT	22+00	18.5-20.0	A-2-4(0)	NP	NP	76	11	3	10	96	56	14	30.7	-





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

200 200

190 190

180 180

170 170

160 160

150 150

200 200

190 190

180 180

170 170

160 160

150 150

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190 190

180 180

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160 160

150 150

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Ⓢ ROADWAY EMBANKMENT: Tan-Brown to Orange-Brown, Loose, Silty SAND (A-2-4), Moist

0.020 0.020

3:1

Ⓢ 181.57

ROADWAY EMBANKMENT: Gray to Orange-Brown, Soft to Medium Stiff, Silty CLAY and SANDY CLAY (A-7-5 & A-6), Moist

2:1

COASTAL PLAIN: Black and Gray, Medium Stiff, Sandy SILT (A-4), Moist (Black Creek Formation)

COASTAL PLAIN: Gray and Orange-Brown, Medium Stiff, Silty CLAY (A-7-5), Moist (Black Creek Formation)

25 + 00.00

0.020 0.020

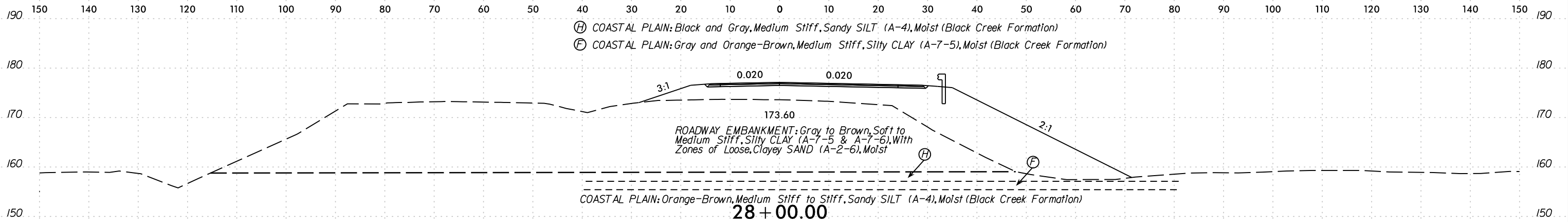
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24 + 50.00

0.020 0.020

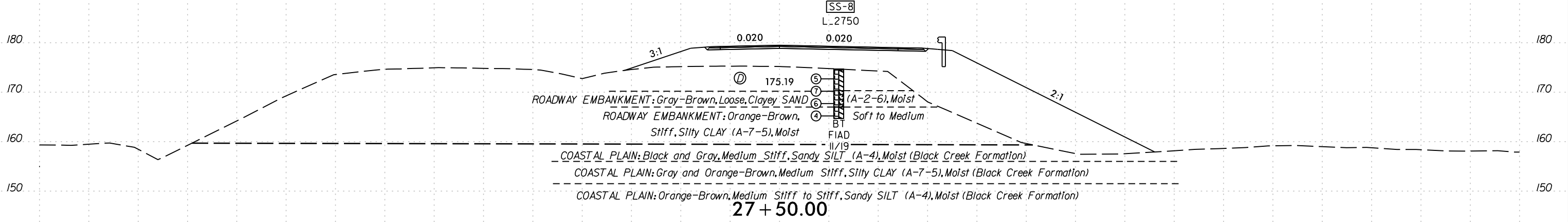
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24 + 00.00



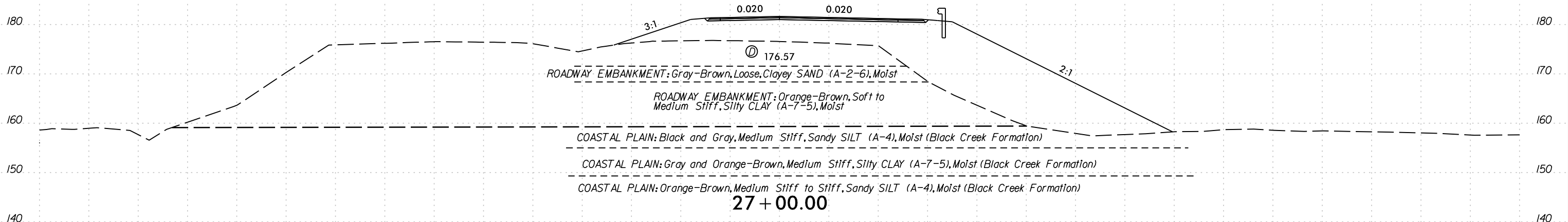


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-8	12' RT	27+50	1.0-2.5	A-7-6(1)	76	49	28	32	2	38	94	78	43	42.2	-

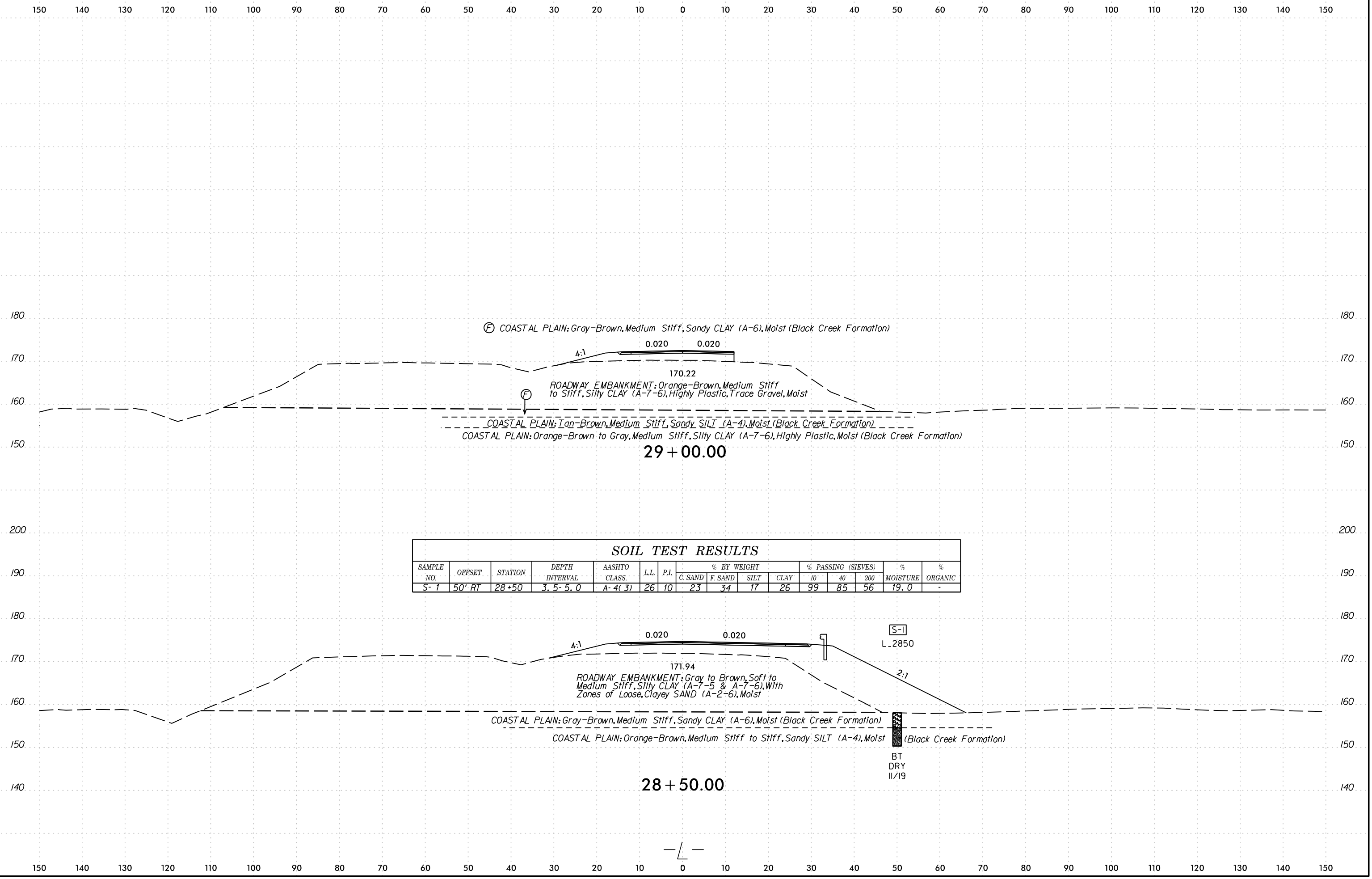
Ⓞ ROADWAY EMBANKMENT: Orange-Brown, Medium Stiff, Silty CLAY (A-7-6), Highly Plastic, Trace Gravel, Moist



Ⓞ ROADWAY EMBANKMENT: Orange-Brown, Medium Stiff, Silty CLAY (A-7-6), Highly Plastic, Trace Gravel, Moist

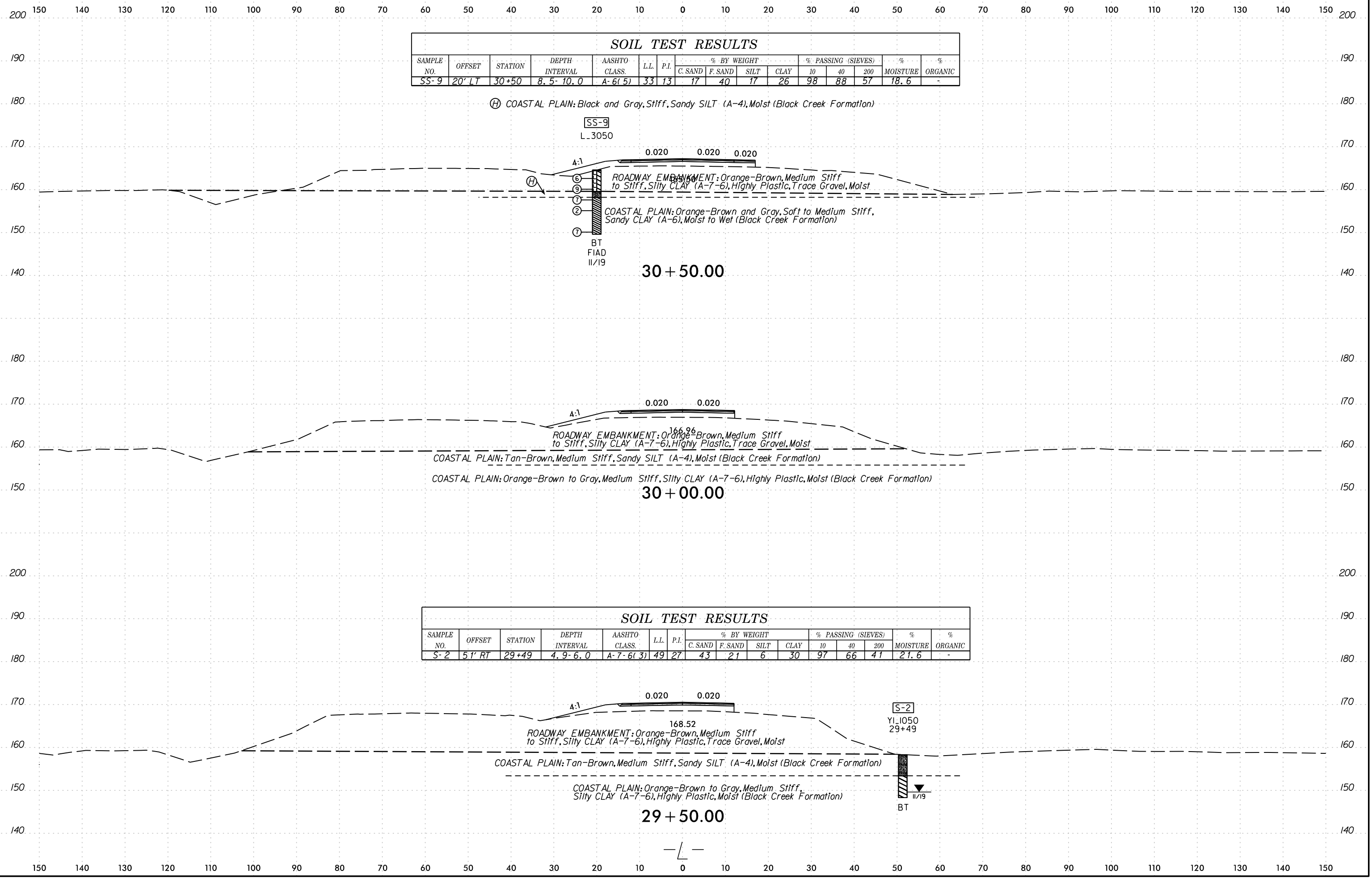


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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	50' RT	28+50	3.5-5.0	A-4(3)	26	10	23	34	17	26	99	85	56	19.0	-

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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-9	20' LT	30+50	8.5-10.0	A-6(5)	33	13	17	40	17	26	98	88	57	18.6	-

Ⓜ COASTAL PLAIN: Black and Gray, Stiff, Sandy SILT (A-4), Moist (Black Creek Formation)

SS-9
L_3050

ROADWAY EMBANKMENT: Orange-Brown, Medium Stiff to Stiff, Silty CLAY (A-7-6), Highly Plastic, Trace Gravel, Moist

COASTAL PLAIN: Orange-Brown and Gray, Soft to Medium Stiff, Sandy CLAY (A-6), Moist to Wet (Black Creek Formation)

BT
FIAD
11/19

30 + 50.00

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-2	51' RT	29+49	4.9-6.0	A-7-6(3)	49	27	43	21	6	30	97	66	41	21.6	-

4:1

ROADWAY EMBANKMENT: Orange-Brown, Medium Stiff to Stiff, Silty CLAY (A-7-6), Highly Plastic, Trace Gravel, Moist

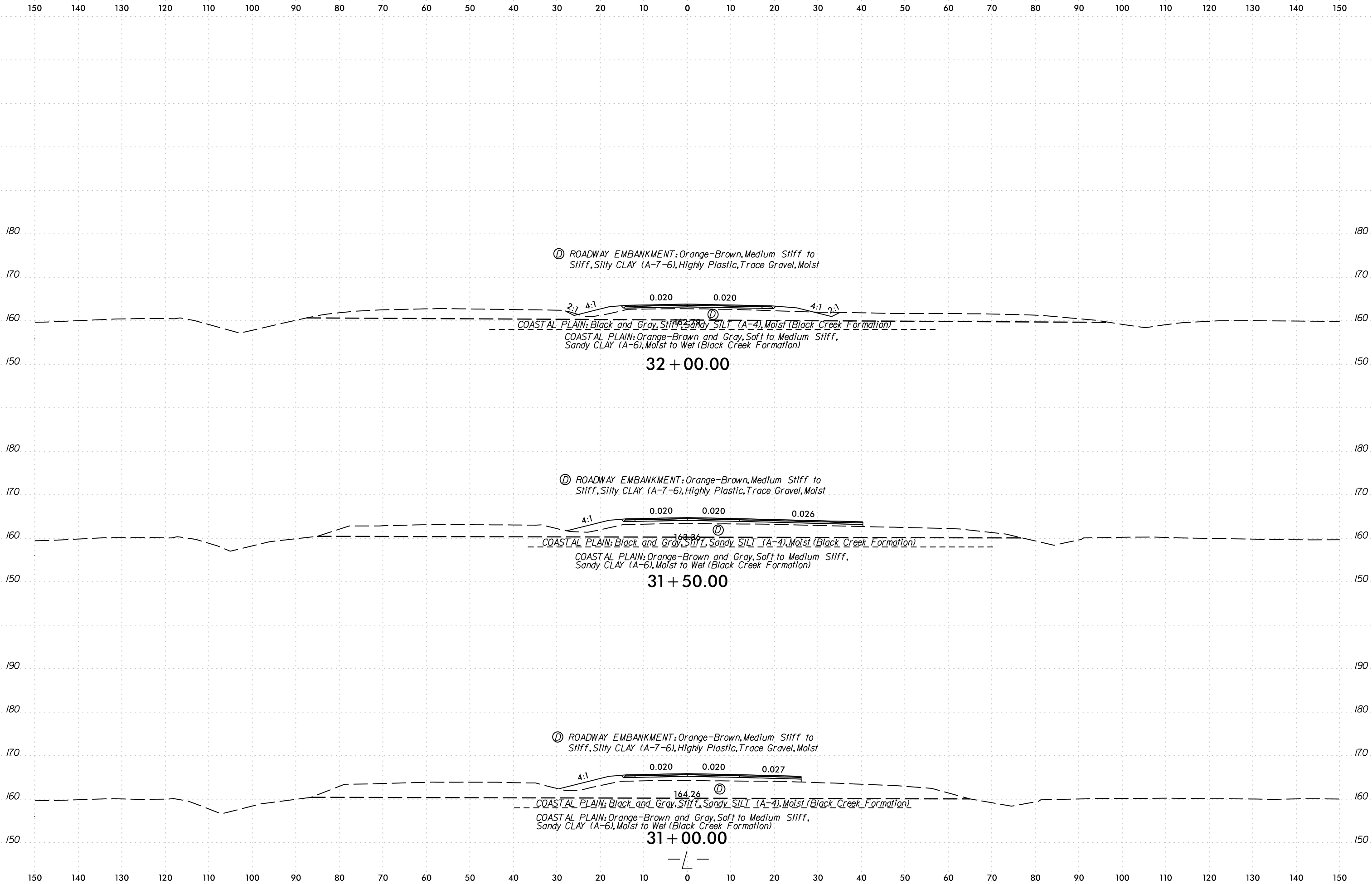
COASTAL PLAIN: Tan-Brown, Medium Stiff, Sandy SILT (A-4), Moist (Black Creek Formation)

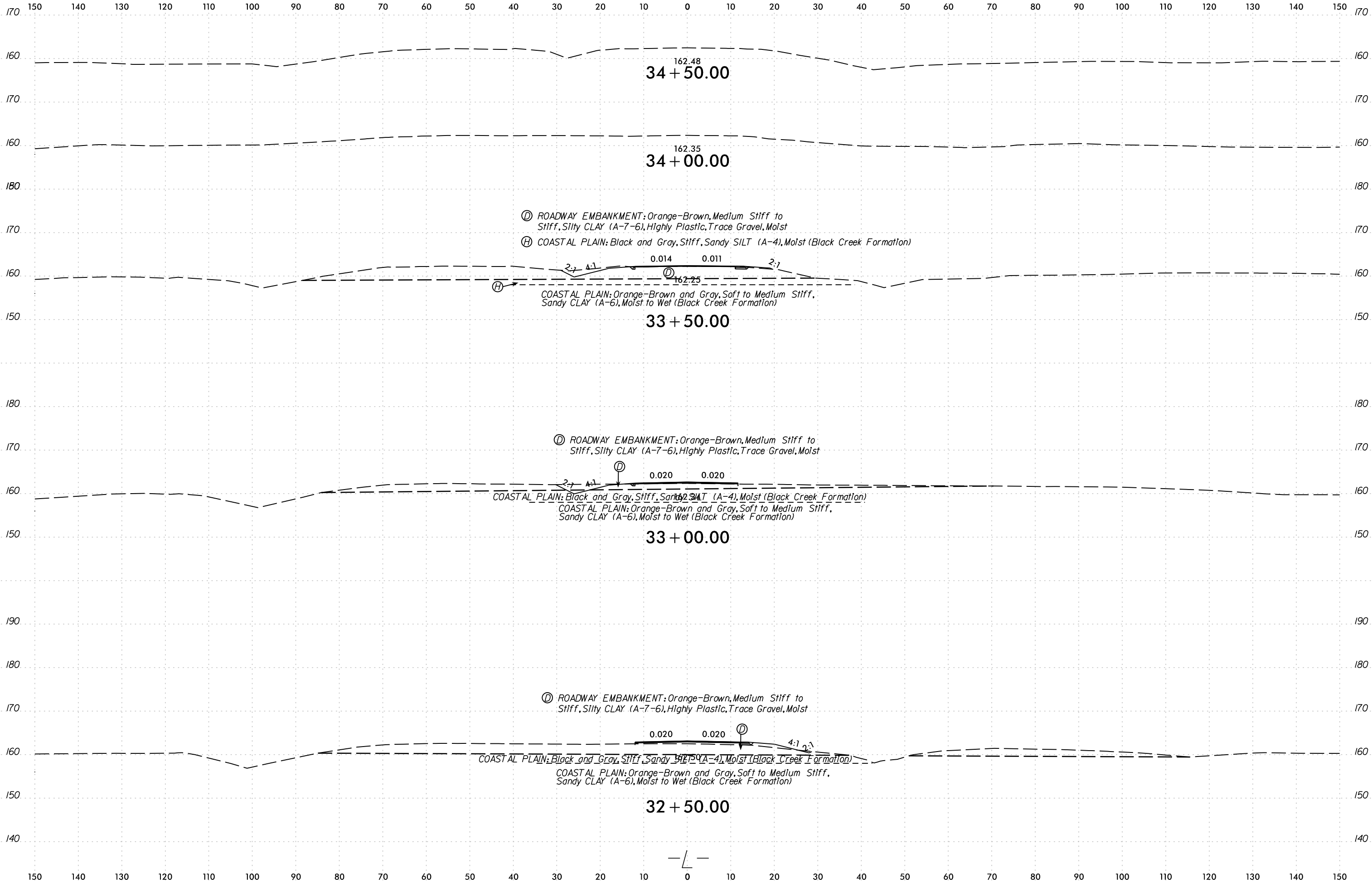
COASTAL PLAIN: Orange-Brown to Gray, Medium Stiff, Silty CLAY (A-7-6), Highly Plastic, Moist (Black Creek Formation)

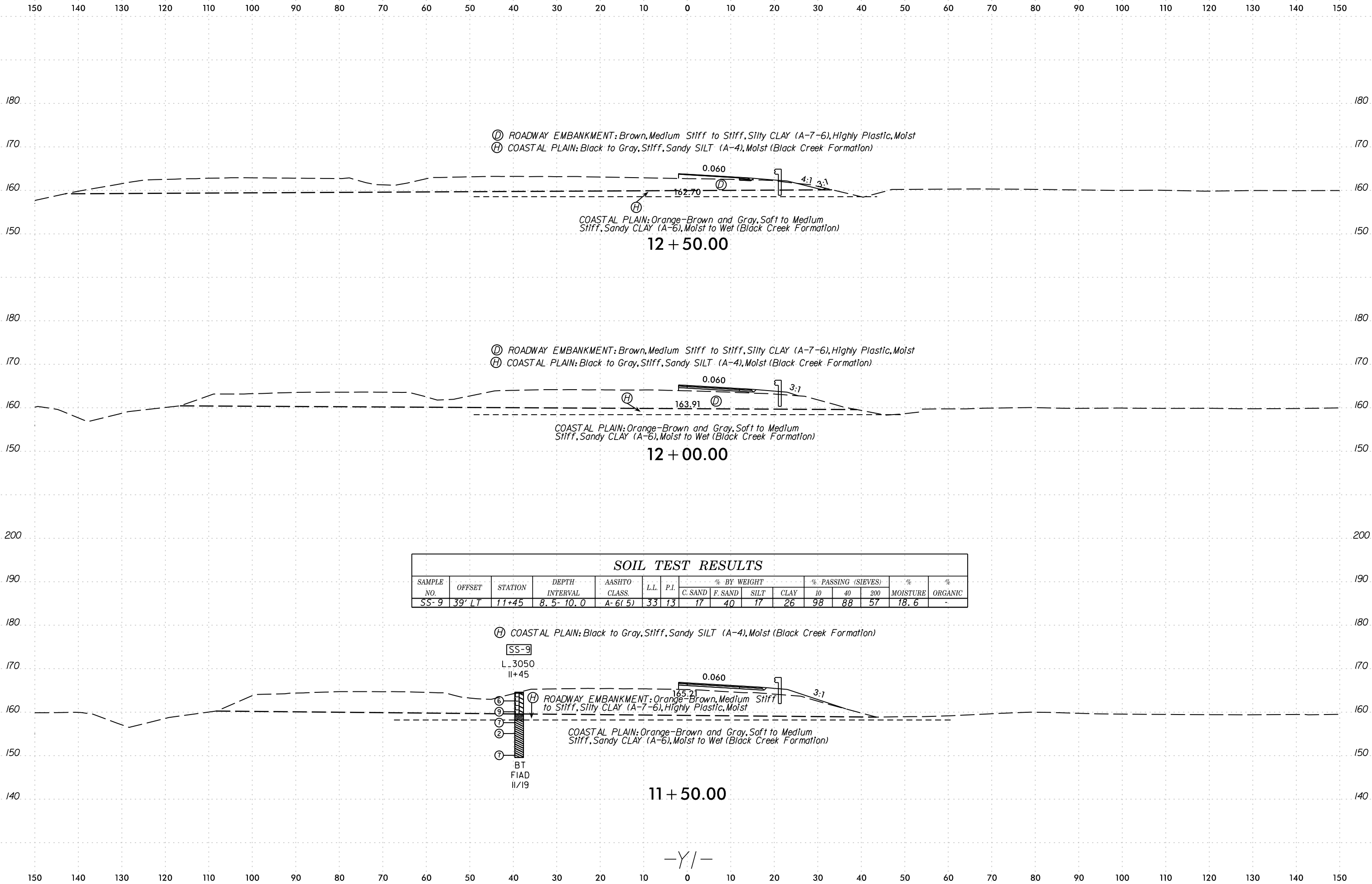
S-2
Y1_1050
29+49

BT
11/19

29 + 50.00



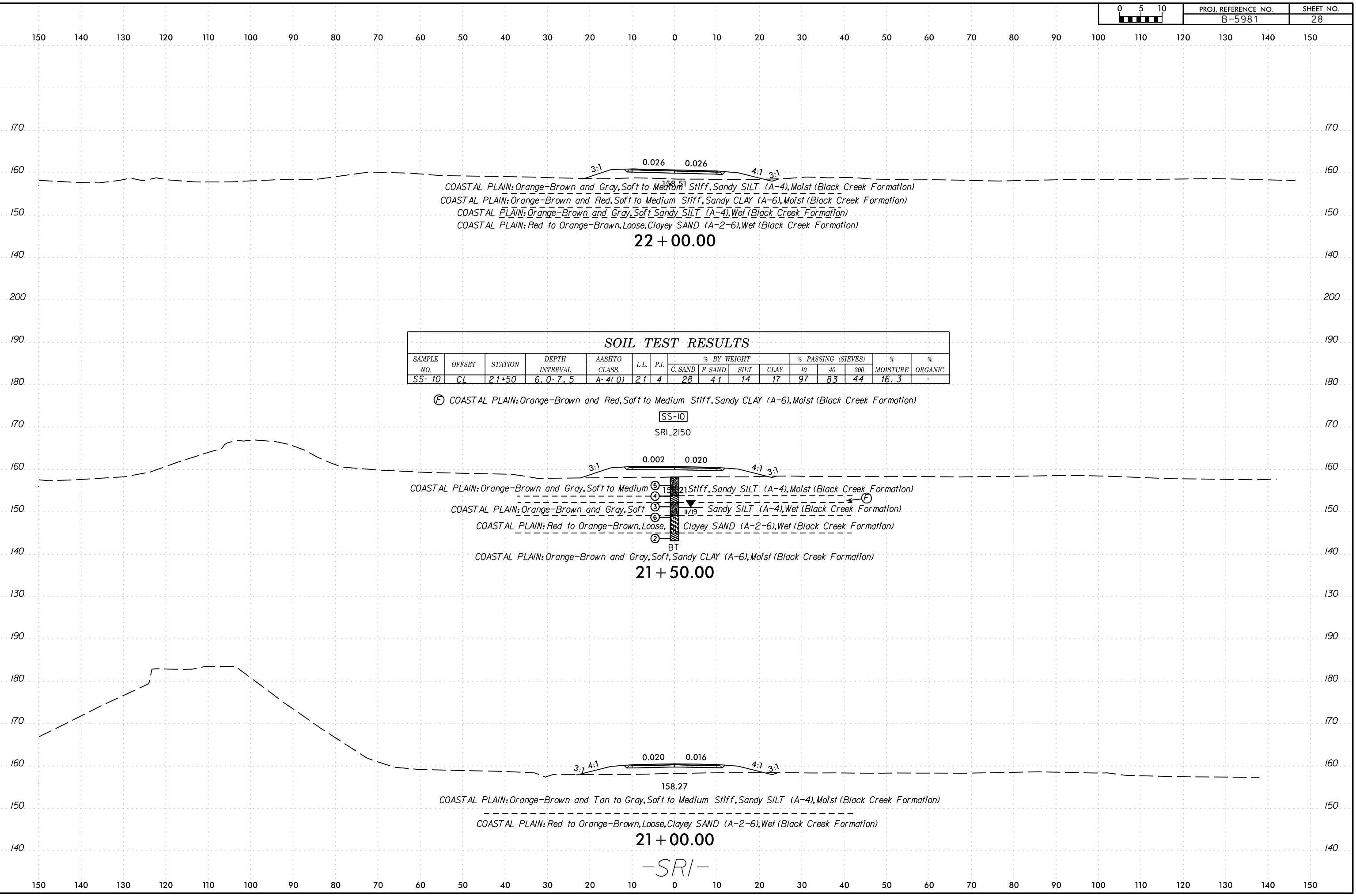




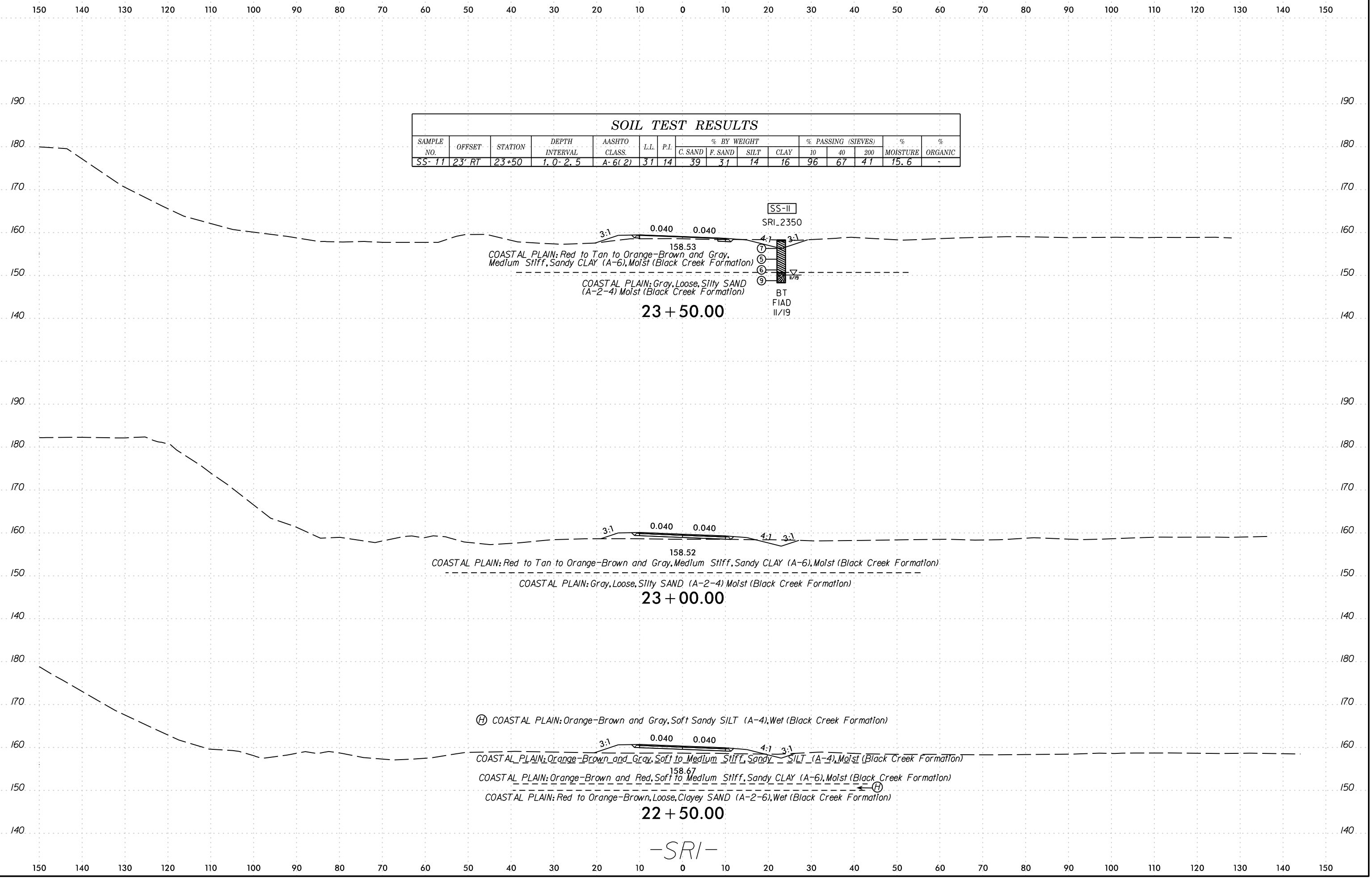
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-9	39' LT	11+45	8.5-10.0	A-6(5)	33	13	17	40	17	26	98	88	57	18.6	-

6/23/16
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6/23/16
 I:\8\2023_25\424 PM
 W:\Projects\2020\2020 On-Call Contract\1514.334 (B-5981 Revisions)\B5981.GEO.ROWY_REV\CADD.GEOTECH\sec B5981.GEO.SRI.dgn
 cotocole



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-11	23' RT	23+50	1.0-2.5	A-6(2)	31	14	39	31	14	16	96	67	41	15.6	-

SS-II
 SRI_2350
 158.53
 COASTAL PLAIN: Red to Tan to Orange-Brown and Gray, Medium Stiff, Sandy CLAY (A-6), Moist (Black Creek Formation)
 COASTAL PLAIN: Gray, Loose, Silty SAND (A-2-4) Moist (Black Creek Formation)
23 + 50.00
 BT
 FIAD
 11/19

158.52
 COASTAL PLAIN: Red to Tan to Orange-Brown and Gray, Medium Stiff, Sandy CLAY (A-6), Moist (Black Creek Formation)
 COASTAL PLAIN: Gray, Loose, Silty SAND (A-2-4) Moist (Black Creek Formation)
23 + 00.00

(H) COASTAL PLAIN: Orange-Brown and Gray, Soft Sandy SILT (A-4), Wet (Black Creek Formation)
 COASTAL PLAIN: Orange-Brown and Gray, Soft to Medium Stiff, Sandy SILT (A-4), Moist (Black Creek Formation)
 COASTAL PLAIN: Orange-Brown and Red, Soft to Medium Stiff, Sandy CLAY (A-6), Moist (Black Creek Formation)
 COASTAL PLAIN: Red to Orange-Brown, Loose, Clayey SAND (A-2-6), Wet (Black Creek Formation)
22 + 50.00
 ← (H)

-SRI-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
APPENDIX A
LABORATORY TEST RESULTS

REFERENCE: B-5981

PROJECT: 47747

SOILS LABORATORY TESTS RESULTS

WBS NO.: 47747.1.1

TIP NO.: B-5981

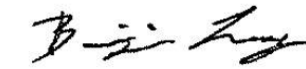
COUNTY: Duplin

SITE DESCRIPTION: Replace Bridge 16 over CSX Railroad on US 117 Northbound Lane and Bridge Preservation of Bridge 17 over CSX Railroad

BORING NO.	SAMPLE NO.	BORING LOCATION	DEPTH INTERVAL (FT)	AASHTO CLASS	N	L.L	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
								CSE. SAND	F. SAND	SILT	CLAY	10	40	200		
L_1800	SS-2	-L- STA. 18+00, 59' RT	8.5-10.0	A-2-6 (0)	7	31	12	45	29	3	23	94	69	27	15.2	-
L_1900	SS-3	-L- STA. 19+00, 2' RT	1.0-2.5	A-6 (0)	8	38	14	46	24	14	16	91	61	30	13.1	-
L_1995	ST-1	-L- STA. 19+95, 53' RT	6.0-8.0	A-6 (3)	N/A	29	15	24	39	12	25	99	88	47	18.6	-
L_2100	SS-4	-L- STA. 21+00, 2' LT	8.5-10.0	A-6 (1)	6	30	11	31	35	11	23	97	81	40	20.4	-
L_2200	SS-6	-L- STA. 22+00, 40' RT	8.5-10.0	A-4 (0)	7	NP	NP	25	48	13	14	99	86	47	16.2	-
L_2200	SS-7	-L- STA. 22+00, 40' RT	18.5-20.0	A-2 4 (0)	9	NP	NP	76	11	3	10	96	56	14	30.7	-
L_2750	SS-8	-L- STA. 27+50, 12' RT	1.0-2.5	A-7-6 (14)	5	76	49	28	32	2	38	94	78	43	42.2	-
L_2850	S-1	-L- STA. 28+50, 50' RT	3.5-5.0	A-4 (3)	N/A	26	10	23	34	17	26	99	85	56	19.0	-
L_3050	SS-9	-L- STA. 30+50, 20' LT	8.5-10.0	A-6 (5)	2	33	13	17	40	17	26	98	88	57	18.6	-
SR1_1553	SS-1	-SR1- STA. 15+53, 12' LT	1.0-2.5	A-4 (0)	4	20	5	22	40	21	17	99	87	54	14.0	-
SR1_1966	SS-5	-SR1- STA. 19+66, 10' RT	3.5-5.0	A-4 (0)	4	15	2	19	33	14	34	91	83	56	14.4	-
SR1_2150	SS-10	-SR1- STA. 21+50, CL	6.0-7.5	A-4 (0)	3	21	4	28	41	14	17	97	83	44	16.3	-
SR1_2350	SS-11	-SR1- STA. 23+50, 23' RT	1.0-2.5	A-6 (2)	7	31	14	39	31	14	16	96	67	41	15.6	-
Y1_1050	S-2	-Y1- STA. 10+50, 39' RT	4.9-6.0	A-7-6 (6)	N/A	49	27	43	21	6	30	97	66	41	21.6	-

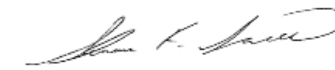
For All Samples But Sample ST-1: Signed

NCDOT Certification No. 144-02-0718



For Sample ST-1: Signed

NCDOT Certification No. 129-04-0411

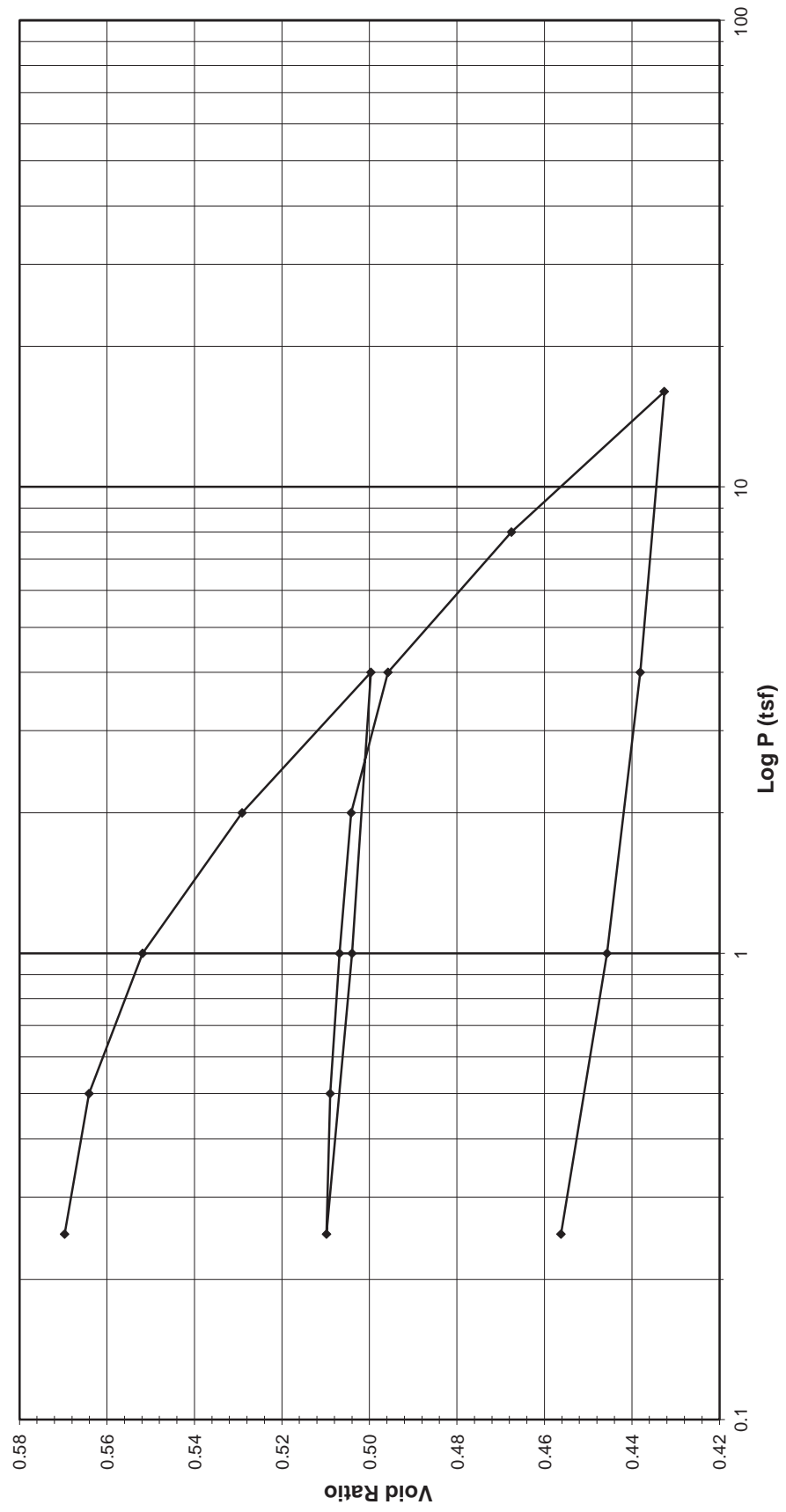


ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc.
 Client Reference B-5981
 Project No. R-2019-327-001
 Lab ID R-2019-327-001-001

Boring No. L_1995
 Depth (ft) 6.0-8.0
 Sample No. ST-1
 Visual Description Gray Sandy Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



page 1 of 4
 DCN: CT-24E Date: 5/3/12 Revision: 6
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 Tested By 129-08-0411 Date 11/20/2019 Approved By MPS Date 12/2/2019

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc.
 Client Reference B-5981
 Project No. R-2019-327-001
 Lab ID R-2019-327-001-001

Boring No. L_1995
 Depth (ft) 6.0-8.0
 Sample No. ST-1
 Visual Description Gray Sandy Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409
1 Division = 0.0001 (in.)

Sample Properties

	Initial	Final
Water Content		
Tare Number	SS-3	SS-6
Wt. Tare & WS (g)	471.93	258.40
Wt. Tare & DS (g)	413.79	236.08
Wt. Water (g)	58.14	22.32
Wt. Tare (g)	100.72	100.96
Wt. DS (g)	313.07	135.12
Water Content (%)	18.57	16.52
Sample Parameters		
Sample Diameter (in)	2.5	2.5
Sample Height (in)	1.0000	0.9183
Sample Volume (cc)	80.44	73.87
Wt. Wet Sample + Ring (g)	375.40	372.61
Wt. of Ring (g)	214.20	214.20
Wt. of Wet Sample (g)	161.20	158.41
Wet Density (pcf)	125.05	133.81
Wet Density (g/cc)	2.00	2.14
Water Content (%)	18.57	16.52
Wt. of Dry Sample (g)	135.95	135.95
Dry Density (pcf)	105.46	114.84
Dry Density (g/cc)	1.69	1.84
Void Ratio	0.5857	0.4562
Saturation (%)	84.98	97.04
Specific Gravity	2.68	Assumed

Test Data Summary

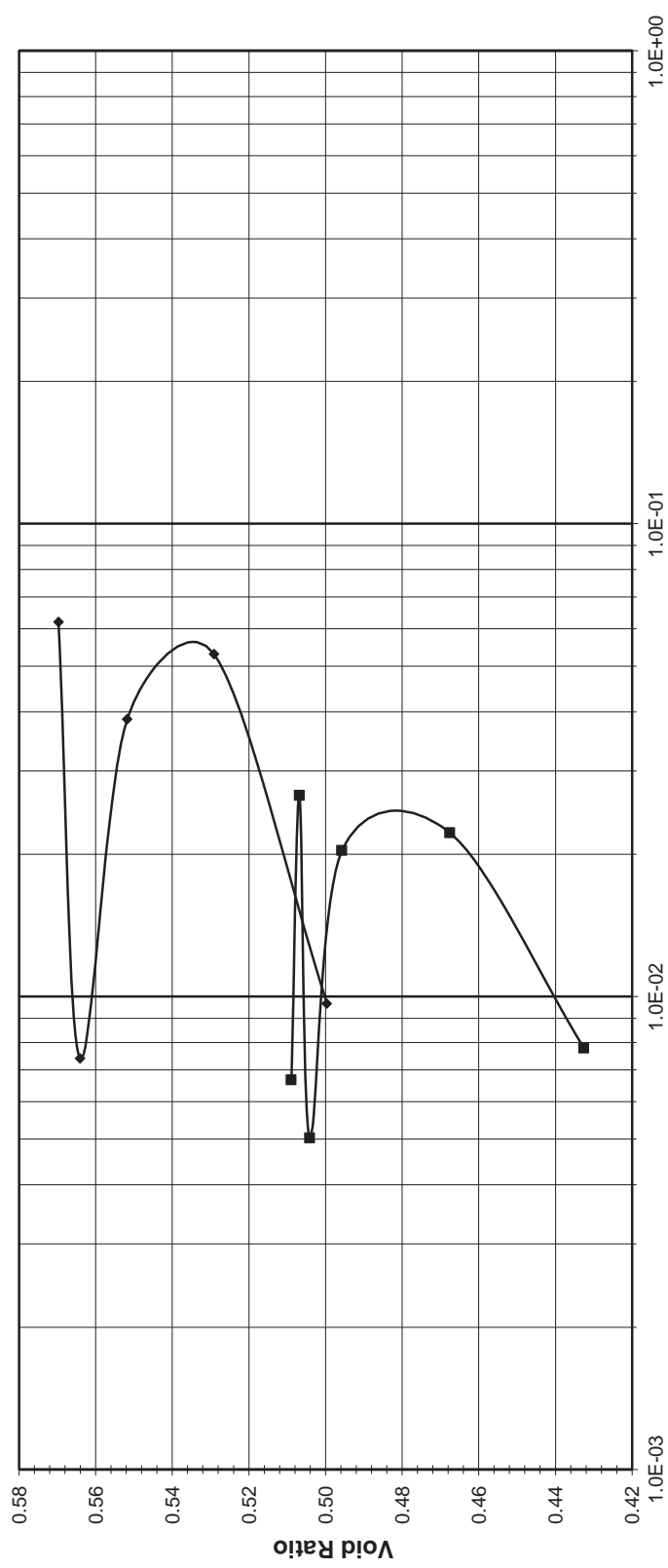
Applied Pressure (tsf)	Final Reading (div)	Machine Deflection (div)	Corrected Reading (div)	Height of Sample (mm)	Volume (cc)	Dry Density (g/cc)	Void Ratio
Seating	0	0	0	25.400	80.440	1.69011	0.58569
0.25	111.5	10.7	100.8	25.144	79.629	1.70733	0.56970
0.5	166.2	30.0	136.2	25.054	79.344	1.71345	0.56410
1	260.7	47.1	213.6	24.857	78.722	1.72700	0.55182
2	431.4	74.4	357.0	24.493	77.568	1.75268	0.52909
4	643.8	101.3	542.5	24.022	76.076	1.78706	0.49967
1	585.2	69.8	515.4	24.091	76.294	1.78196	0.50396
0.25	513.1	34.5	478.5	24.185	76.590	1.77506	0.50981
0.5	524.7	40.8	483.9	24.171	76.547	1.77606	0.50896
1	552.7	55.4	497.3	24.137	76.440	1.77856	0.50684
2	591.6	77.3	514.3	24.094	76.303	1.78175	0.50414
4	669.4	102.2	567.2	23.959	75.877	1.79174	0.49575
8	891.5	146.5	745.0	23.508	74.447	1.82616	0.46756
16	1165.3	199.9	965.4	22.948	72.674	1.87072	0.43261
4	1069.1	138.4	930.6	23.036	72.954	1.86354	0.43812
1	969.5	86.8	882.7	23.158	73.340	1.85374	0.44573
0.25	862.3	45.6	816.7	23.326	73.870	1.84042	0.45619

Tested By 129-08-0411 Date 11/20/2019 Input Checked By GEM Date 12/2/2019
 page 2 of 4
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 Z:\2019 PROJECTS\ESP ASSOCIATES\2019-327 ESP - B-5981\2019-327-001-001 DOT GEOJAC-16TSF1 Cv.xls\m\FINAL PLOT

ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates, Inc.	Boring No.	L_1995
Client Reference	B-5981	Depth (ft)	6.0-8.0
Project No.	R-2019-327-001	Sample No.	ST-1
Lab ID	R-2019-327-001-001	Visual Description	Gray Sandy Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Coefficient of Consolidation (cm²/sec)

◆ First Cycle Up ■ Second Cycle Up

Tested By 129-08-0411 Date 11/20/2019 Input Checked By GEM Date 12/2/2019

page 3 of 4 DCN: CT-24E Date: 5/3/12 Revision: 6 Z:\2019 PROJECTS\ESP ASSOCIATES\2019-327 ESP - B-5981\2019-327-001-001 DOT GEOJAC-16T5F1 Cv.xlsm\FINAL PLOT
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client	ESP Associates, Inc.	Boring No.	L_1995
Client Reference	B-5981	Depth (ft)	6.0-8.0
Project No.	R-2019-327-001	Sample No.	ST-1
Lab ID	R-2019-327-001-001	Visual Description	Gray Sandy Clay

Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED

Consolidometer No. R409

1 Division = 0.0001 (in.)

Sample Properties	Initial		Final		C _v Test Data Summary						
	SS-3	SS-6	SS-3	SS-6	Load Increment (tsf)	Dial Reading @ t ₅₀ (div)	Machine Deflection (div)	Corrected Dial Reading @ t ₅₀ (div)	Sample Height @ t ₅₀ (cm)	Time t ₅₀ (min.)	C _v (cm²/sec)
Water Content											
Tare Number											
Wt. Tare & WS (g)	471.93	258.40									
Wt. Tare & DS (g)	413.79	236.08									
Wt. Water (g)	58.14	22.32									
Wt. Tare (g)	100.72	100.96									
Wt. DS (g)	313.07	135.12									
Water Content (%)	18.57	16.52									
Sample Parameters											
Sample Diameter (in)	2.5	2.5									
Sample Height (in)	1.000	0.918									
Sample Volume (cc)	80.44	73.87									
Wt. of Wet Sample + Ring (g)	375.40	372.61									
Wt. of Ring (g)	214.20	214.20									
Wt. of Wet Sample (g)	161.20	158.41									
Wet Density (pcf)	125.05	133.81									
Wet Density (g/cc)	2.00	2.14									
Water Content (%)	18.57	16.52									
Wt. of Dry Sample (g)	135.95	135.95									
Dry Density (pcf)	105.46	114.84									
Dry Density (g/cc)	1.69	1.84									
Void Ratio	0.5857	0.4562									
Saturation (%)	84.98	97.04									
Specific Gravity	2.68	Assumed									
		Tested By	129-08-0411								
		Date	11/20/2019								
		Input Checked By	GEM								
		Date	12/2/2019								

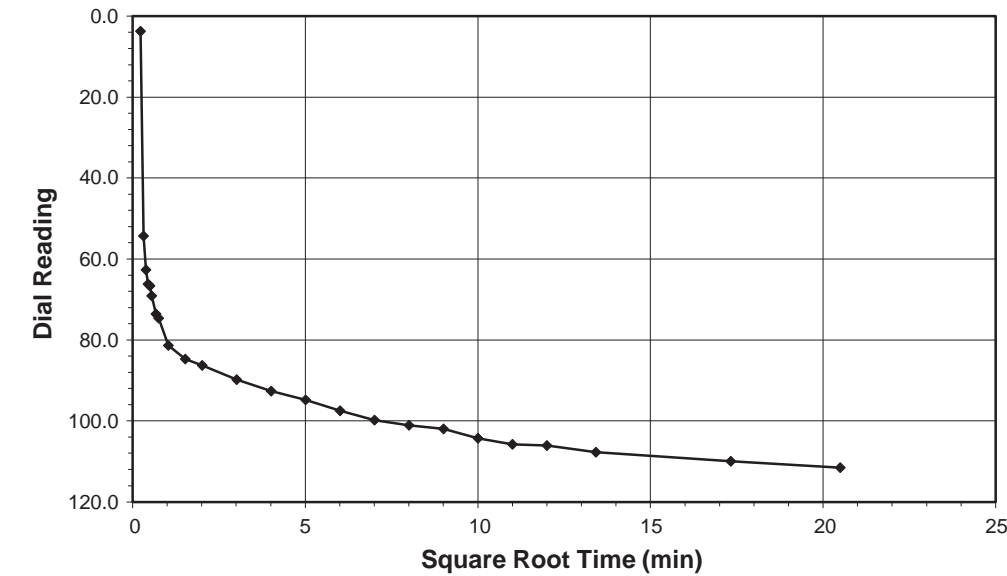
page 4 of 4 DCN: CT-24E Date: 5/3/12 Revision: 6 Z:\2019 PROJECTS\ESP ASSOCIATES\2019-327 ESP - B-5981\2019-327-001-001 DOT GEOJAC-16T5F1 Cv.xlsm\FINAL PLOT



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

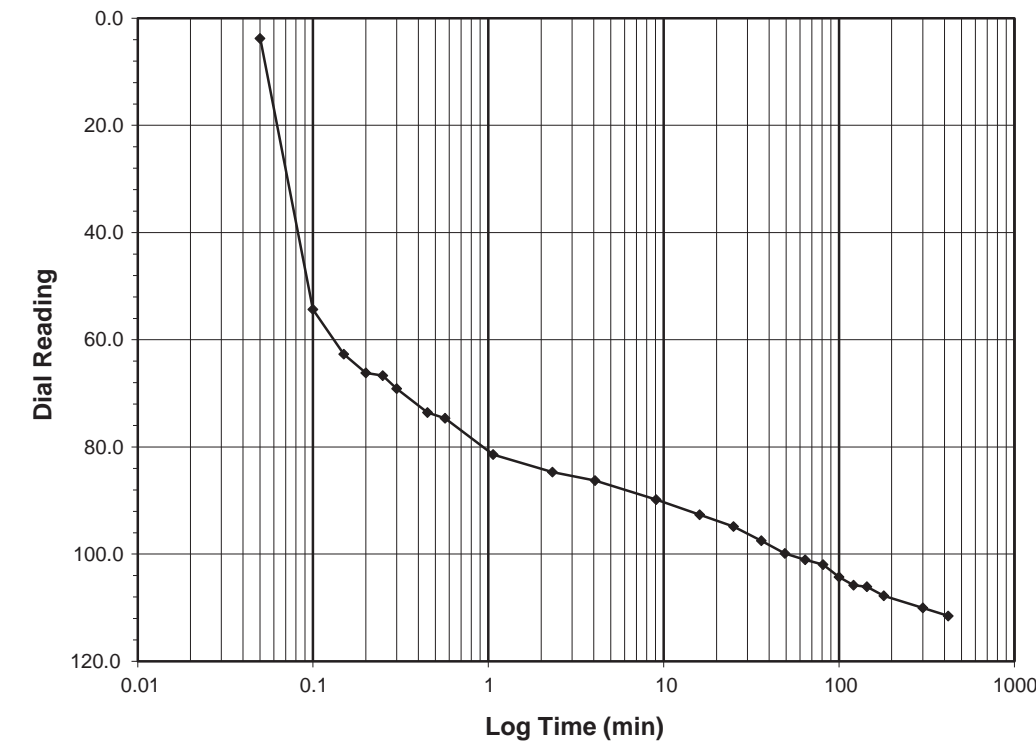
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.0-0.25
 Final Reading (div) 111.5
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/20/2019
 Start Time 9:15:40

Elapsed Time (min)	Dial Reading (div)
Initial	0.0
0.05	3.8
0.10	54.3
0.15	62.7
0.20	66.2
0.25	66.7
0.30	69.1
0.45	73.6
0.57	74.7
1.07	81.4
2.32	84.7
4.07	86.3
9.07	89.8
16.07	92.6
25.07	94.8
36.07	97.5
49.07	99.8
64.07	101.1
81.07	102.0
100.07	104.3
121.08	105.8
144.08	106.1
180.08	107.8
300.08	110.0
420.08	111.5



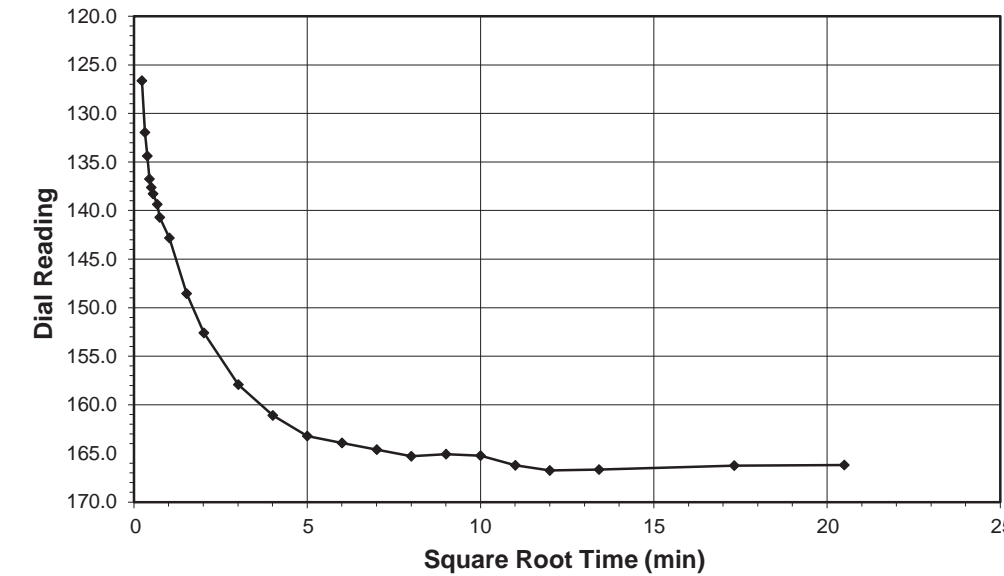
Tested By 129-08-0411 Date 11/20/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

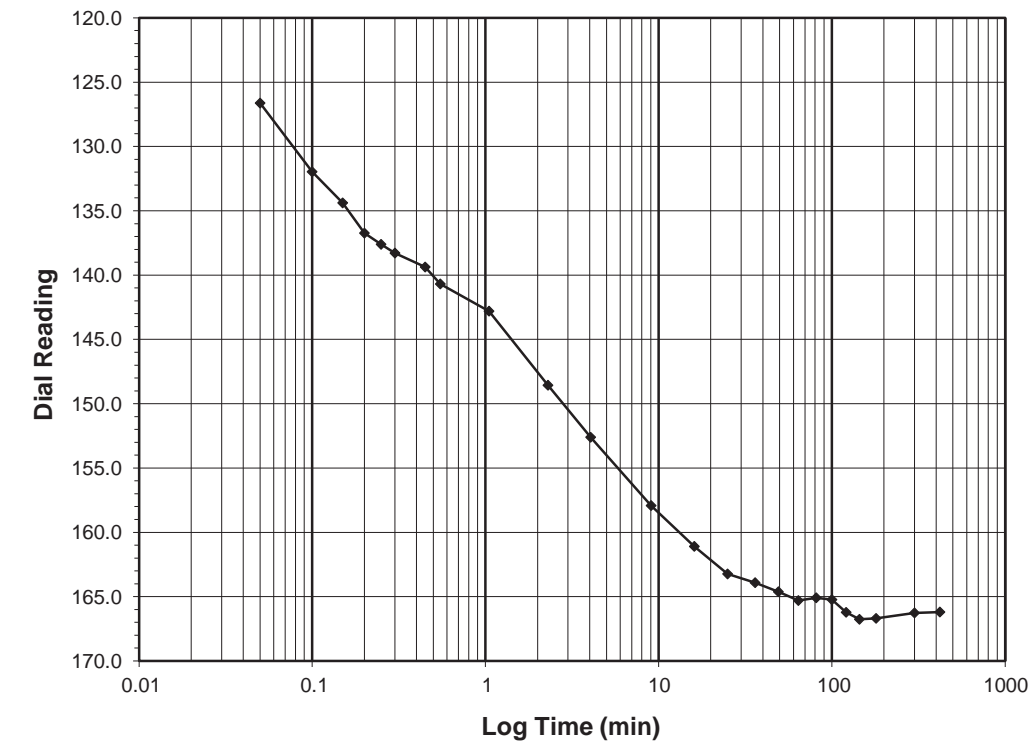
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 166.2
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/20/2019
 Start Time 16:15:45

Elapsed Time (min)	Dial Reading (div)
Initial	111.5
0.05	126.6
0.10	132.0
0.15	134.4
0.20	136.7
0.25	137.6
0.30	138.3
0.45	139.4
0.55	140.7
1.05	142.8
2.30	148.6
4.05	152.6
9.05	157.9
16.05	161.1
25.05	163.2
36.05	163.9
49.07	164.6
64.07	165.3
81.07	165.1
100.07	165.2
121.07	166.2
144.07	166.8
180.07	166.7
300.07	166.3
420.12	166.2



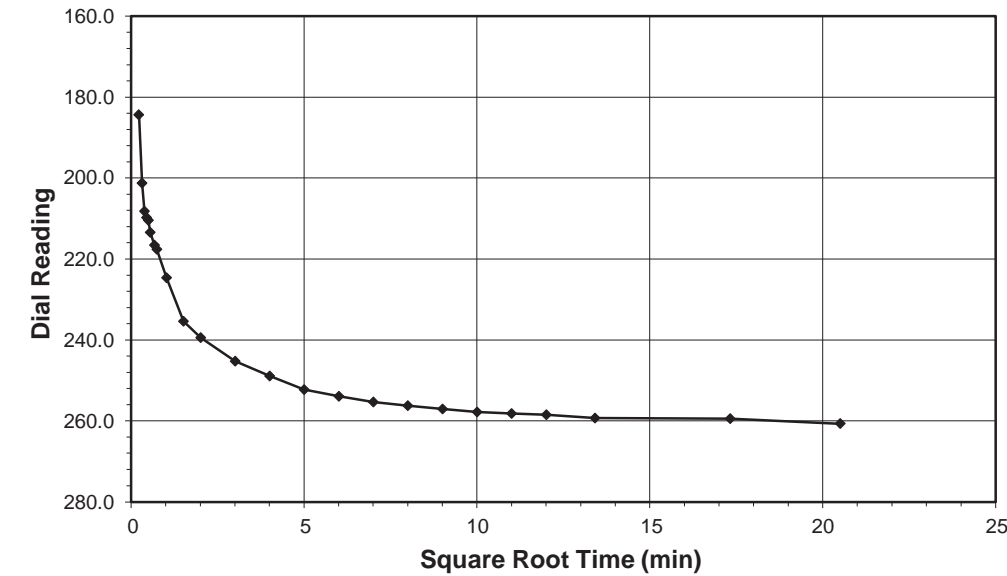
Tested By 129-08-0411 Date 11/20/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

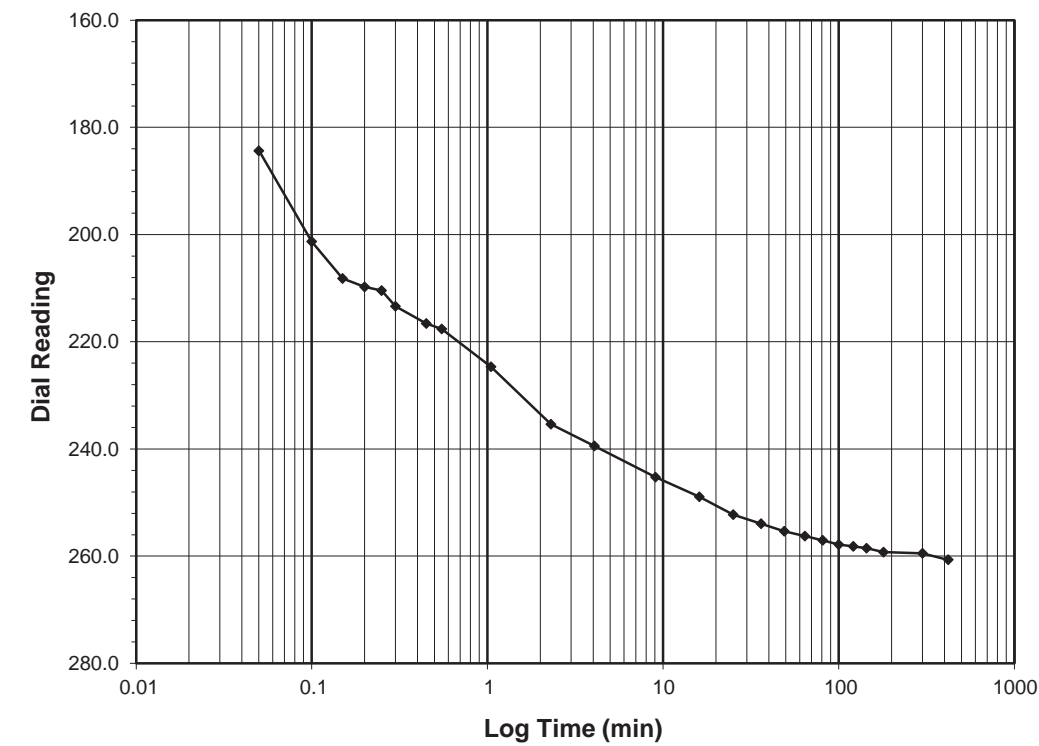
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
 Final Reading (div) 260.7
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/20/2019
 Start Time 23:15:52

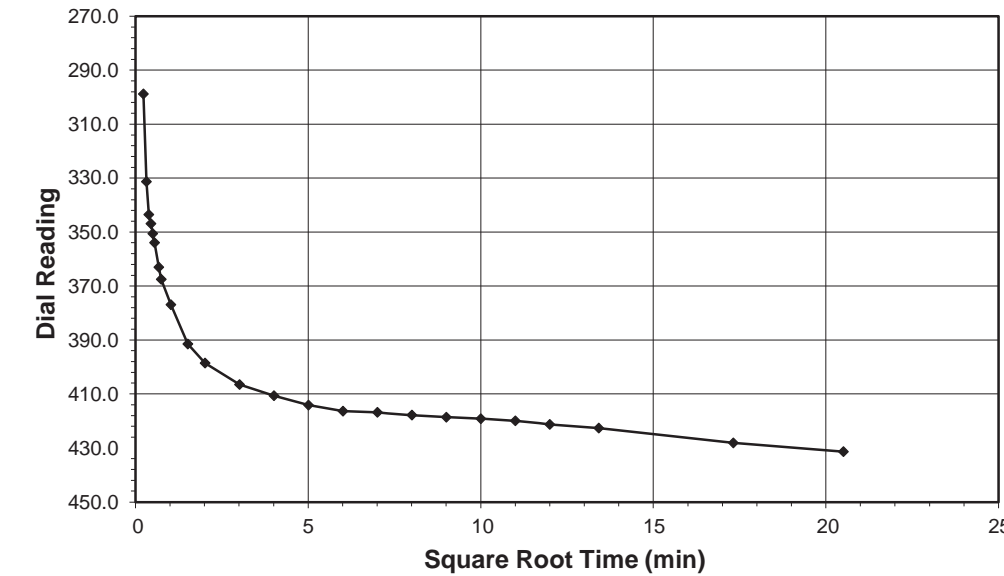
Elapsed Time (min)	Dial Reading (div)
Initial	166.2
0.05	184.4
0.10	201.3
0.15	208.2
0.20	209.8
0.25	210.5
0.30	213.4
0.45	216.6
0.55	217.6
1.05	224.7
2.30	235.4
4.07	239.4
9.07	245.2
16.07	248.9
25.07	252.3
36.07	253.9
49.07	255.4
64.07	256.2
81.07	257.1
100.07	257.8
121.07	258.1
144.07	258.5
180.07	259.3
300.07	259.5
420.50	260.7



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

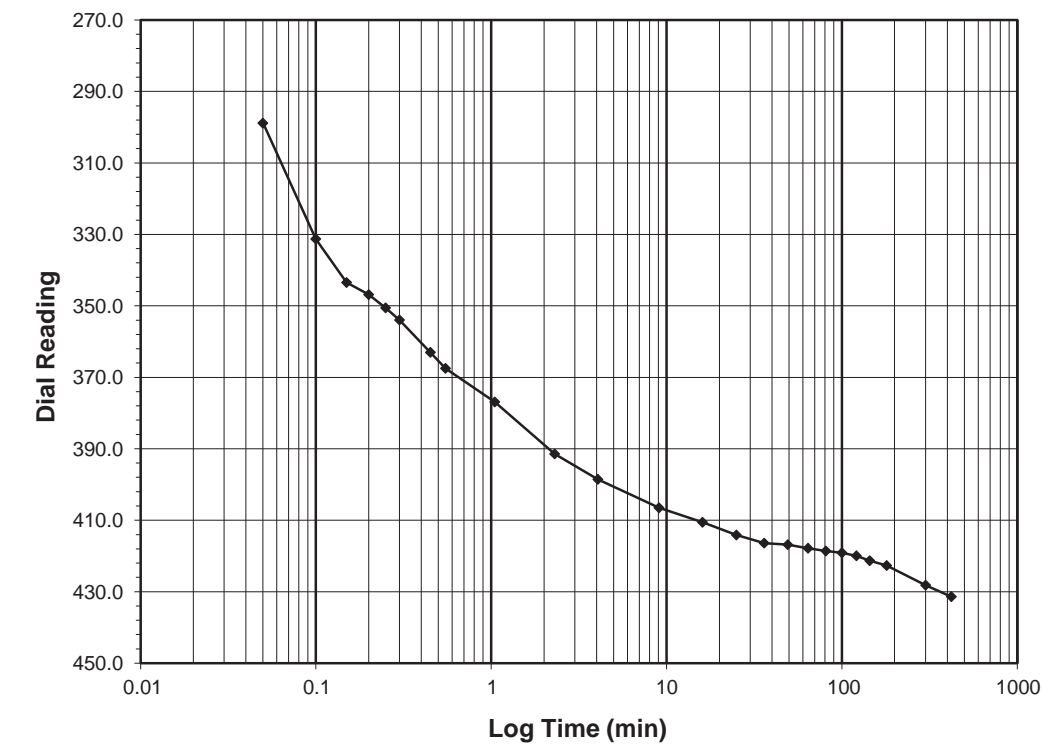
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
 Final Reading (div) 431.4
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/21/2019
 Start Time 6:16:23

Elapsed Time (min)	Dial Reading (div)
Initial	260.7
0.05	298.8
0.10	331.3
0.15	343.5
0.20	346.9
0.25	350.6
0.30	353.9
0.45	363.0
0.55	367.5
1.05	376.9
2.30	391.5
4.07	398.5
9.07	406.5
16.07	410.6
25.07	414.1
36.07	416.4
49.07	416.8
64.07	417.8
81.07	418.6
100.07	419.1
121.07	420.0
144.07	421.4
180.07	422.7
300.07	428.2
420.43	431.4



Tested By 129-08-0411 Date 11/20/2019 Checked By GEM Date 12/2/2019

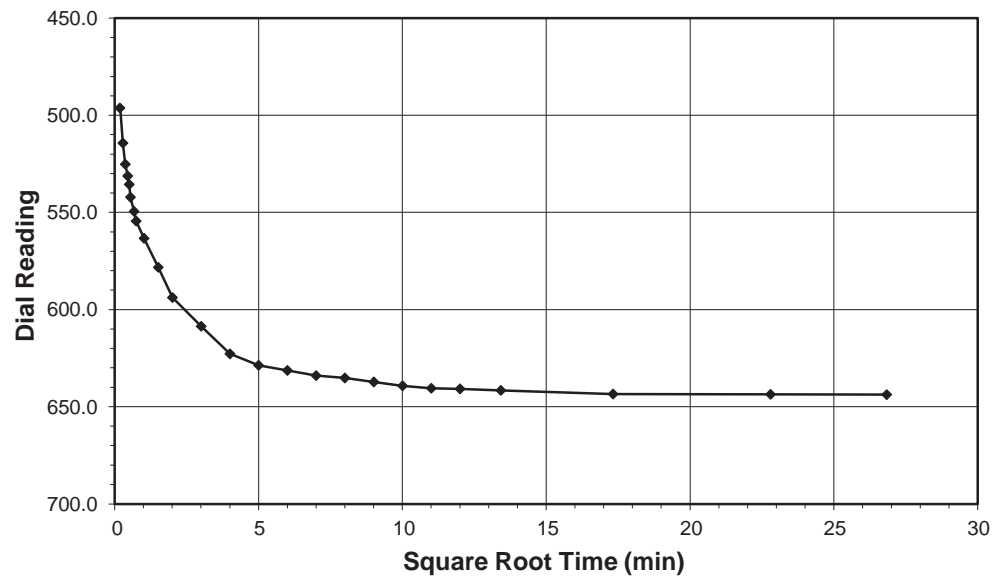
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ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

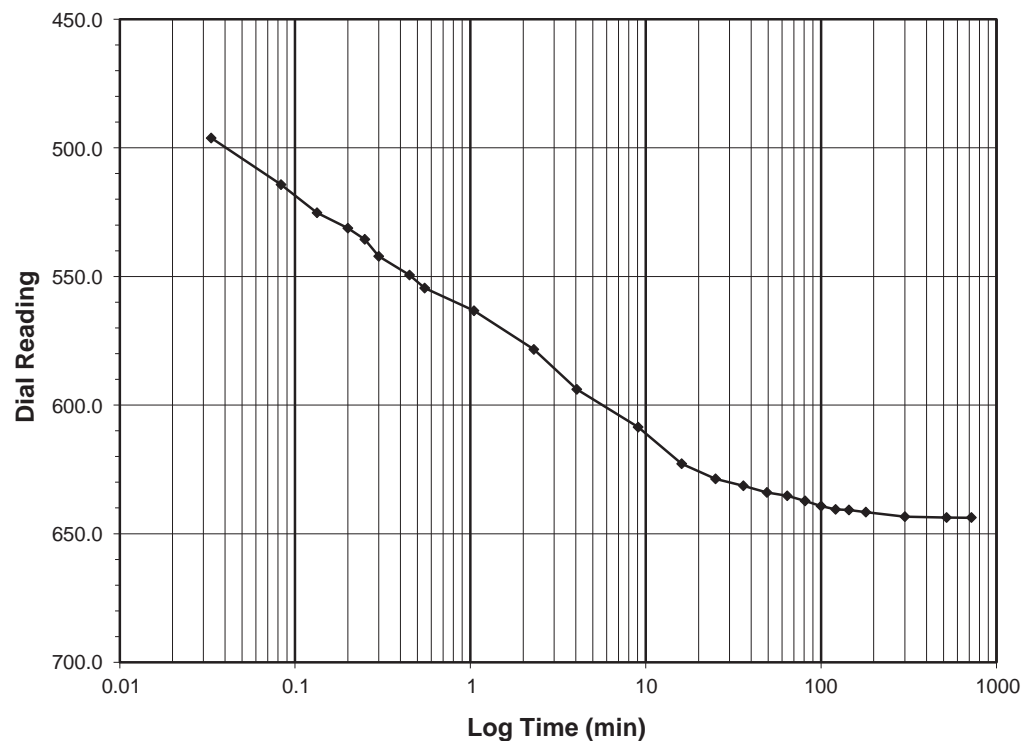
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
 Final Reading (div) 643.8
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/21/2019
 Start Time 13:16:49

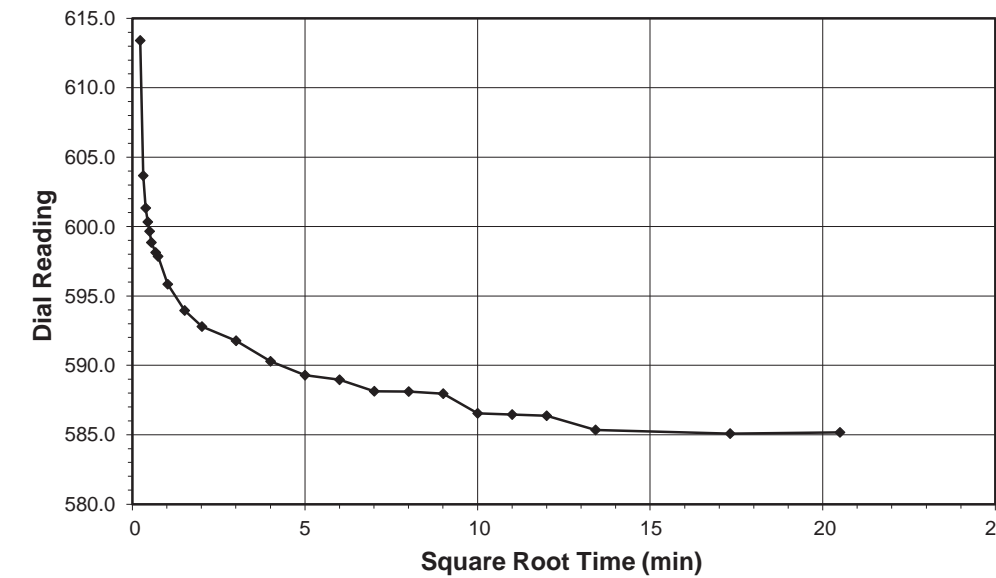
Elapsed Time (min)	Dial Reading (div)
Initial	431.4
0.03	496.2
0.08	514.3
0.13	525.2
0.20	531.2
0.25	535.6
0.30	542.2
0.45	549.5
0.55	554.5
1.05	563.3
2.30	578.3
4.05	593.9
9.05	608.6
16.05	622.8
25.07	628.7
36.07	631.3
49.07	633.9
64.07	635.2
81.07	637.2
100.07	639.3
121.07	640.5
144.07	640.8
180.07	641.6
300.07	643.4
520.07	643.7
720.32	643.8



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

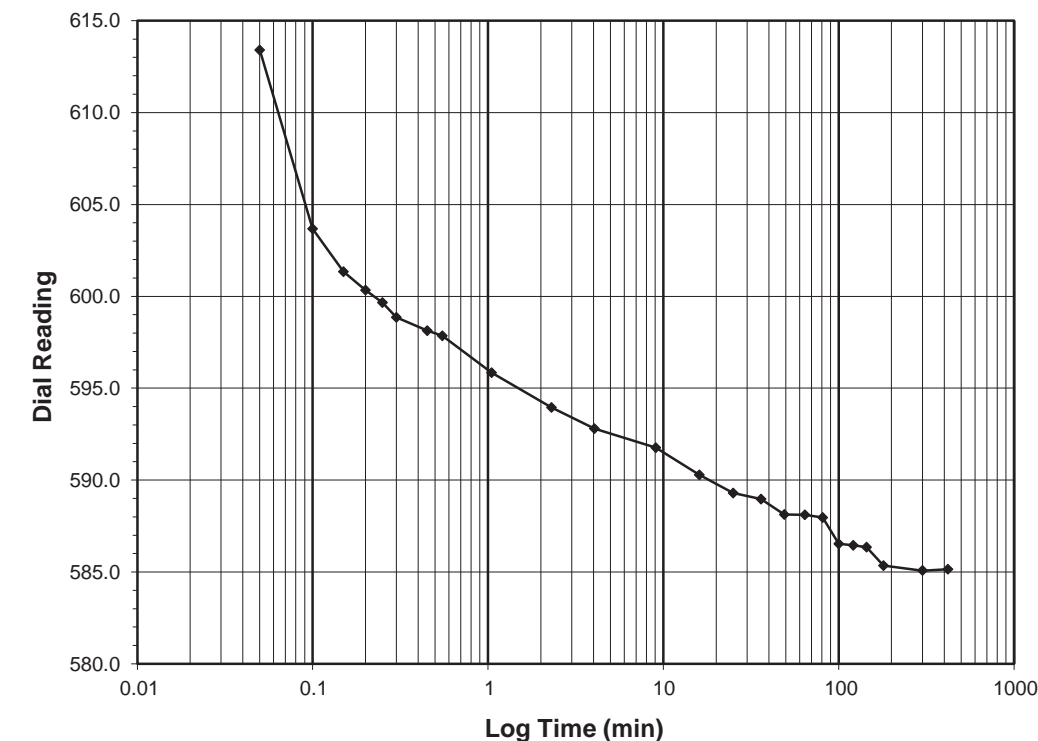
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
 Final Reading (div) 585.2
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/22/2019
 Start Time 1:17:09

Elapsed Time (min)	Dial Reading (div)
Initial	643.8
0.05	613.4
0.10	603.7
0.15	601.3
0.20	600.3
0.25	599.7
0.30	598.8
0.45	598.1
0.55	597.8
1.05	595.8
2.30	594.0
4.05	592.8
9.05	591.8
16.05	590.3
25.05	589.3
36.05	589.0
49.05	588.1
64.05	588.1
81.07	588.0
100.07	586.5
121.07	586.5
144.07	586.4
180.07	585.3
300.07	585.1
420.07	585.2



Tested By 129-08-0411 Date 11/21/2019 Checked By GEM Date 12/2/2019

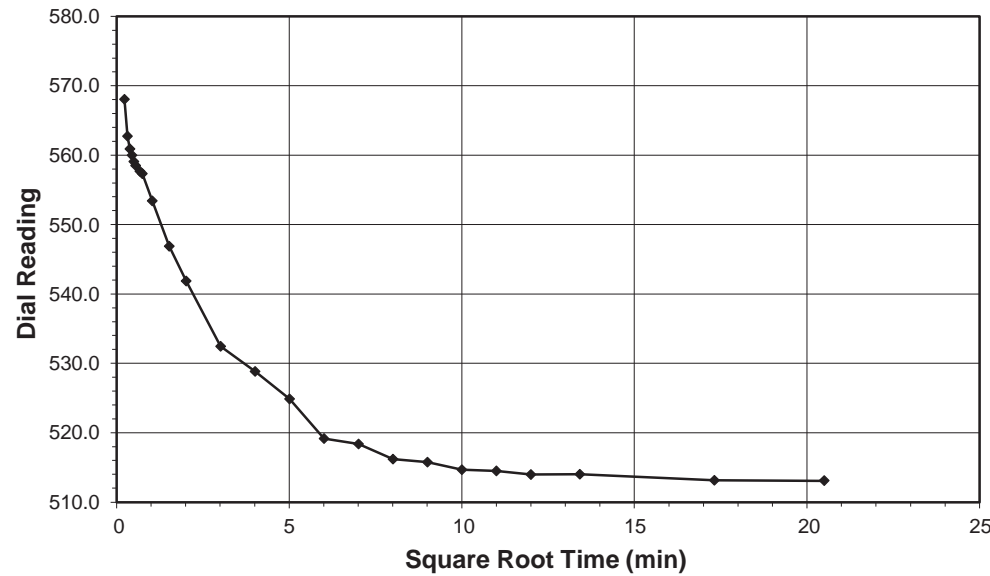
Tested By 129-08-0411 Date 11/22/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

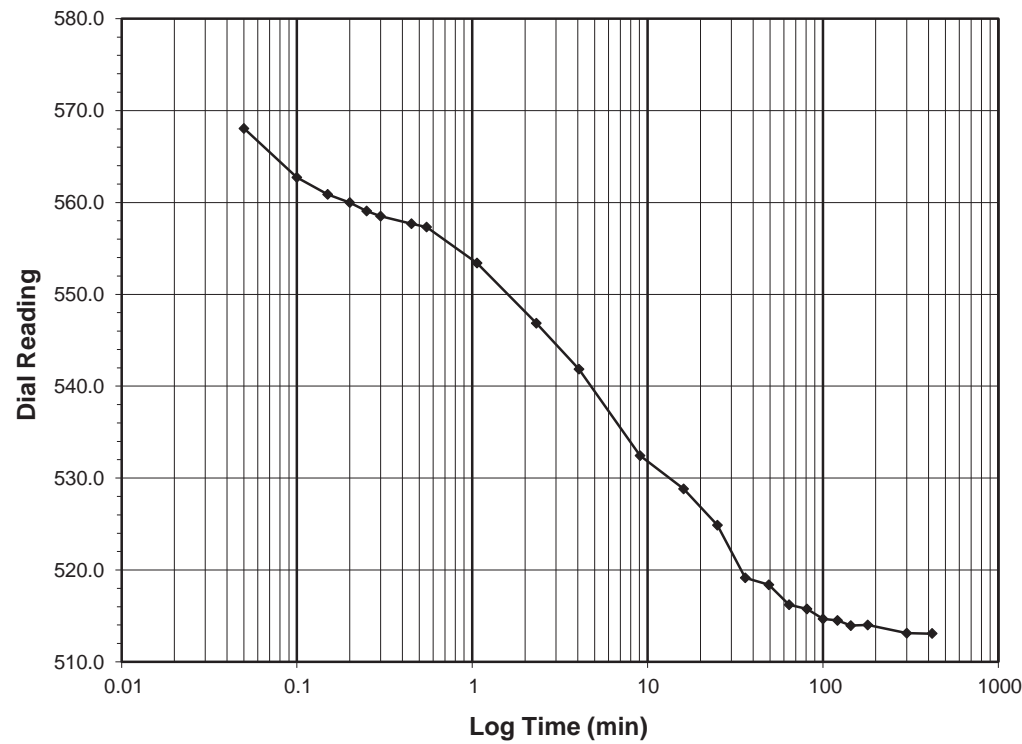
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
 Final Reading (div) 513.1
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/22/2019
 Start Time 8:17:13

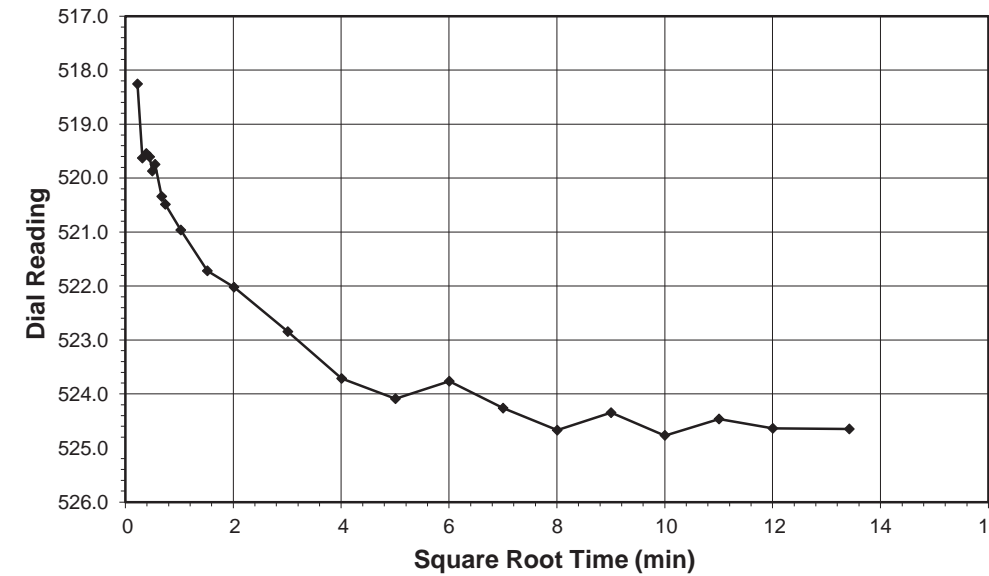
Elapsed Time (min)	Dial Reading (div)
Initial	585.2
0.05	568.1
0.10	562.7
0.15	560.9
0.20	560.0
0.25	559.1
0.30	558.5
0.45	557.7
0.55	557.3
1.07	553.4
2.32	546.9
4.07	541.8
9.07	532.4
16.07	528.8
25.07	524.9
36.07	519.2
49.07	518.4
64.07	516.2
81.07	515.8
100.07	514.7
121.07	514.5
144.07	514.0
180.07	514.0
300.07	513.1
420.00	513.1



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

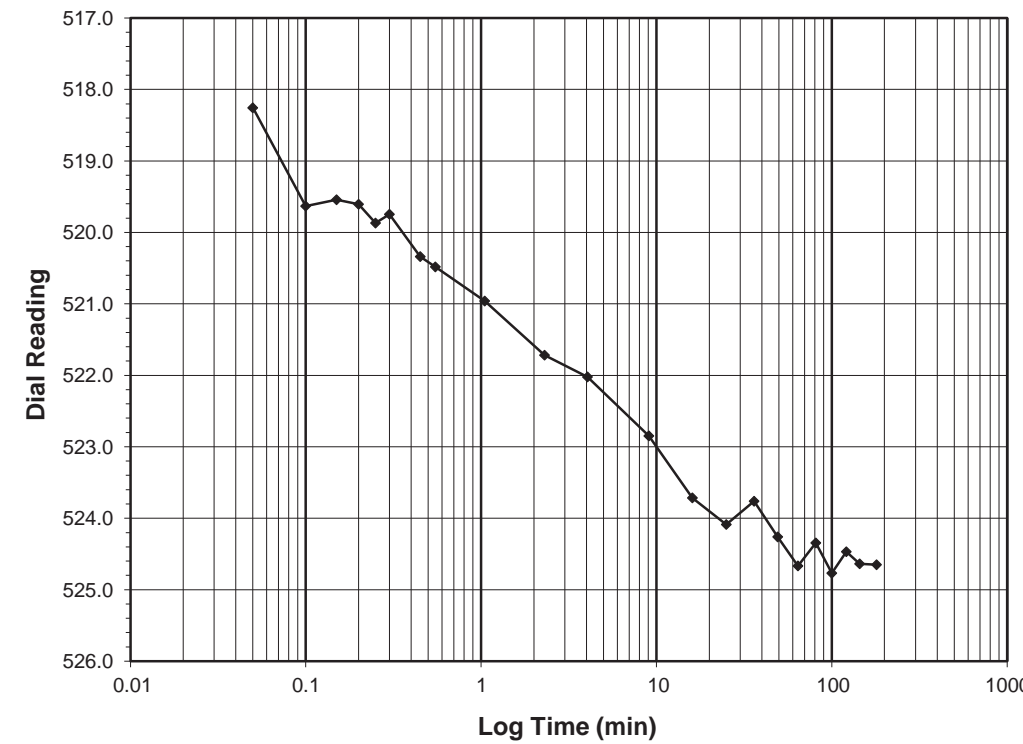
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.25-0.5
 Final Reading (div) 524.7
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/22/2019
 Start Time 15:17:13

Elapsed Time (min)	Dial Reading (div)
Initial	513.1
0.05	518.3
0.10	519.6
0.15	519.5
0.20	519.6
0.25	519.9
0.30	519.7
0.45	520.3
0.55	520.5
1.05	521.0
2.30	521.7
4.05	522.0
9.05	522.8
16.05	523.7
25.05	524.1
36.07	523.8
49.07	524.3
64.07	524.7
81.07	524.3
100.07	524.8
121.07	524.5
144.07	524.6
180.07	524.7



Tested By 129-08-0411 Date 11/22/2019 Checked By GEM Date 12/2/2019

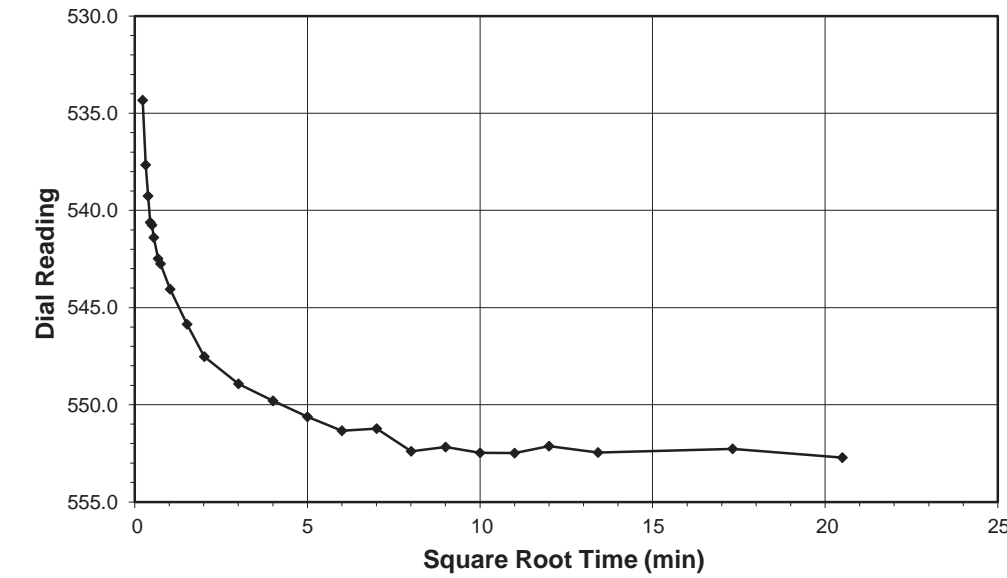
Tested By 129-08-0411 Date 11/22/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

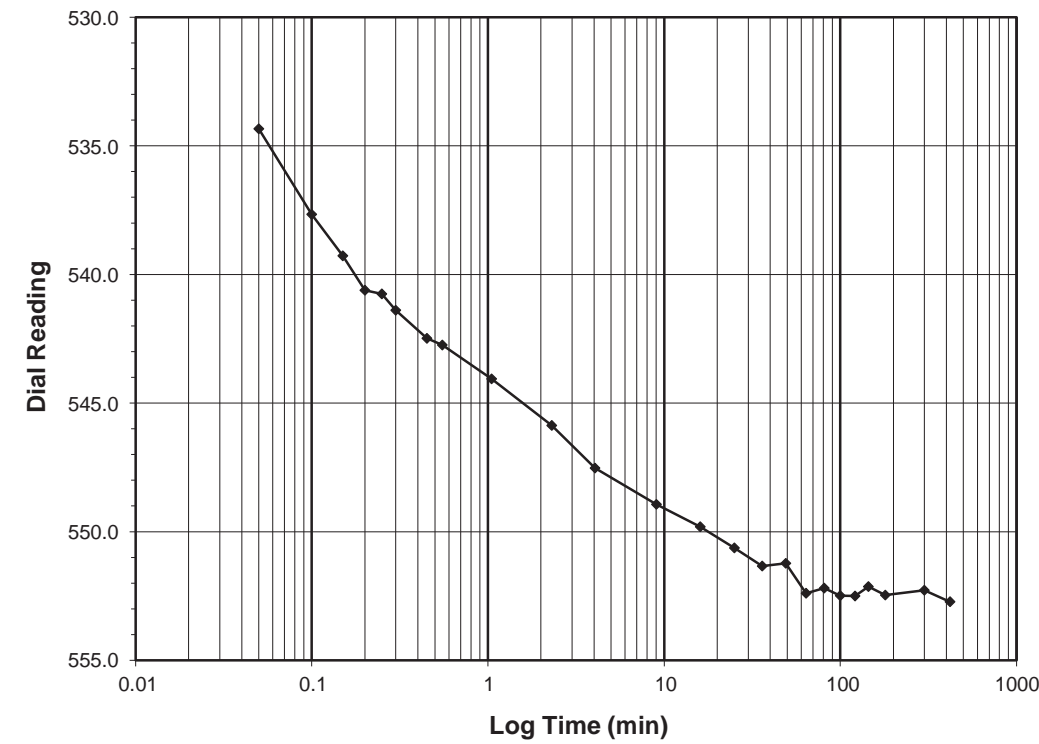
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 0.5-1.0
Final Reading (div) 552.7
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 11/22/2019
 Start Time 22:17:43

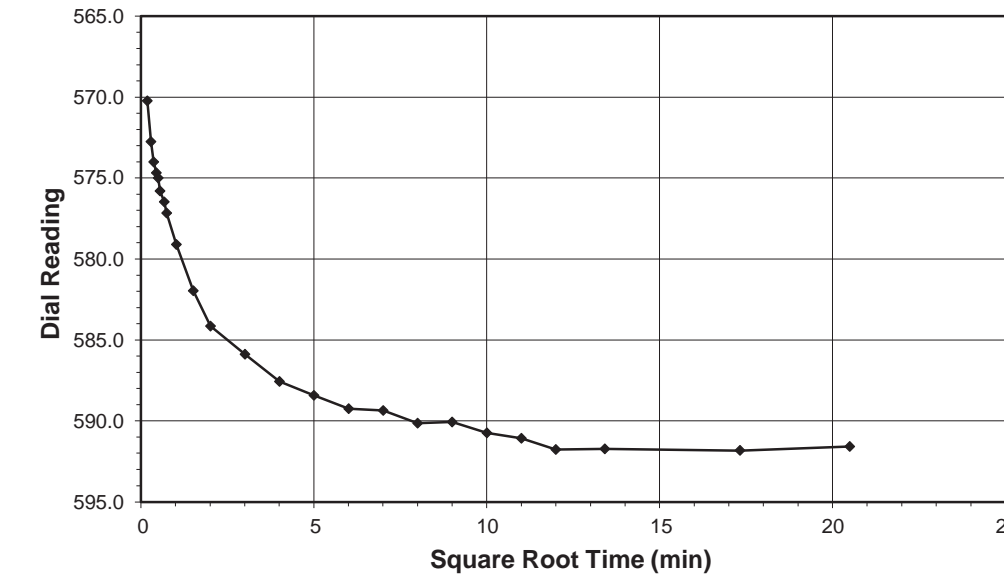
Elapsed Time (min)	Dial Reading (div)
Initial	524.7
0.05	534.3
0.10	537.7
0.15	539.3
0.20	540.6
0.25	540.8
0.30	541.4
0.45	542.5
0.55	542.7
1.05	544.1
2.30	545.9
4.05	547.5
9.05	548.9
16.05	549.8
25.05	550.6
36.05	551.3
49.05	551.2
64.05	552.4
81.07	552.2
100.07	552.5
121.07	552.5
144.07	552.1
180.07	552.5
300.07	552.3
420.03	552.7



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

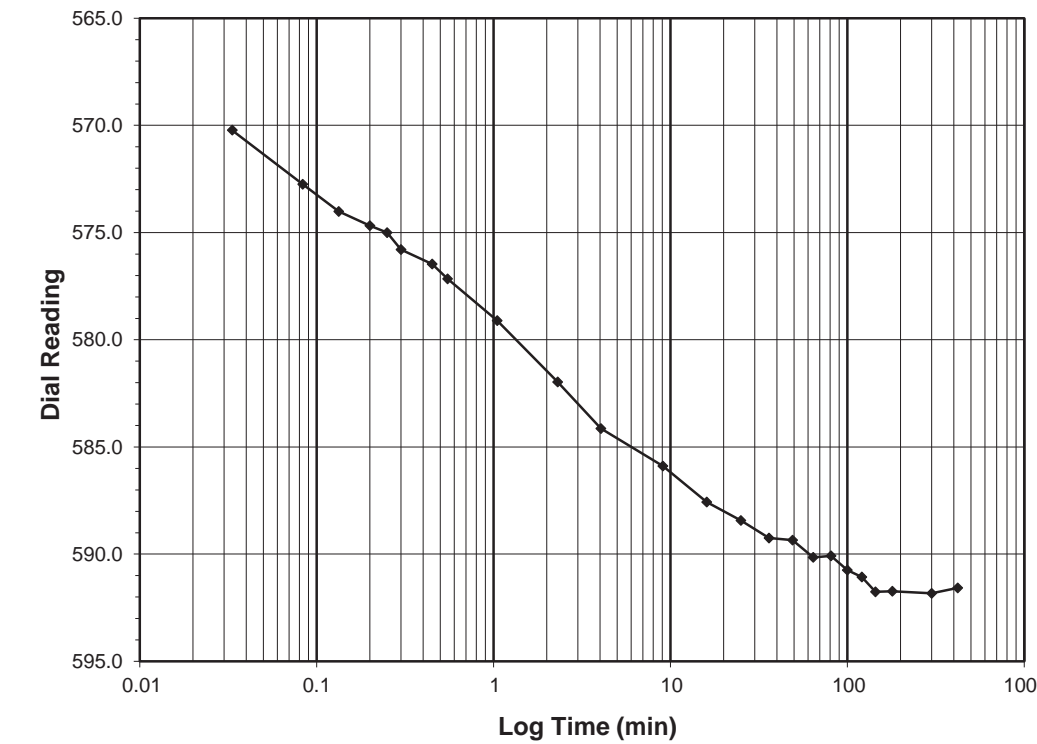
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-2.0
Final Reading (div) 591.6
 Consolidometer No. **R409**
 1 Division (in) 0.0001

Start Date 11/23/2019
 Start Time 5:17:45

Elapsed Time (min)	Dial Reading (div)
Initial	552.7
0.03	570.2
0.08	572.8
0.13	574.0
0.20	574.7
0.25	575.0
0.30	575.8
0.45	576.5
0.55	577.2
1.05	579.1
2.30	582.0
4.05	584.1
9.05	585.9
16.05	587.6
25.05	588.4
36.05	589.2
49.05	589.4
64.05	590.1
81.05	590.1
100.05	590.7
121.05	591.1
144.05	591.8
180.05	591.7
300.05	591.8
420.10	591.6



Tested By 129-08-0411 Date 11/22/2019 Checked By GEM Date 12/2/2019

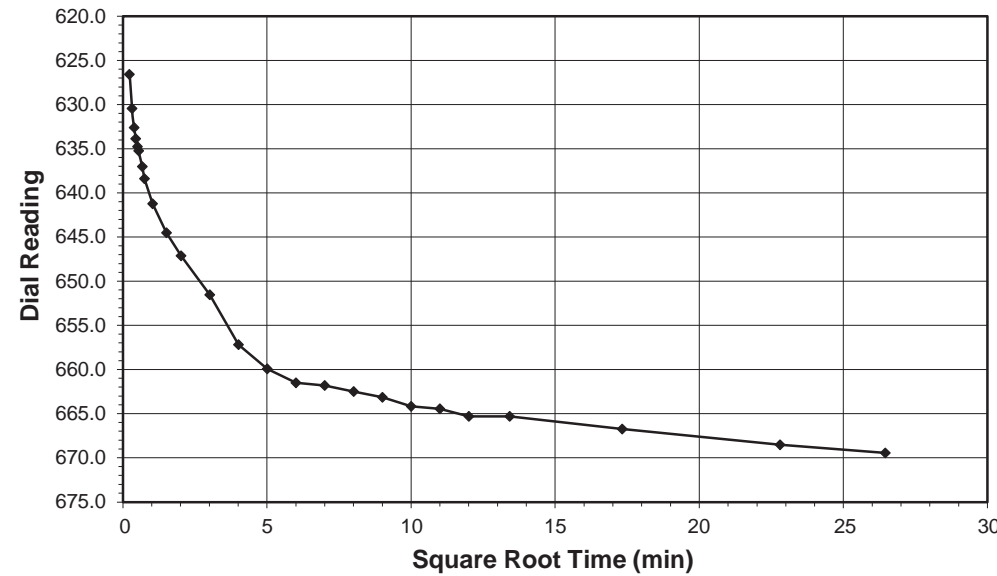
Tested By 129-08-0411 Date 11/23/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

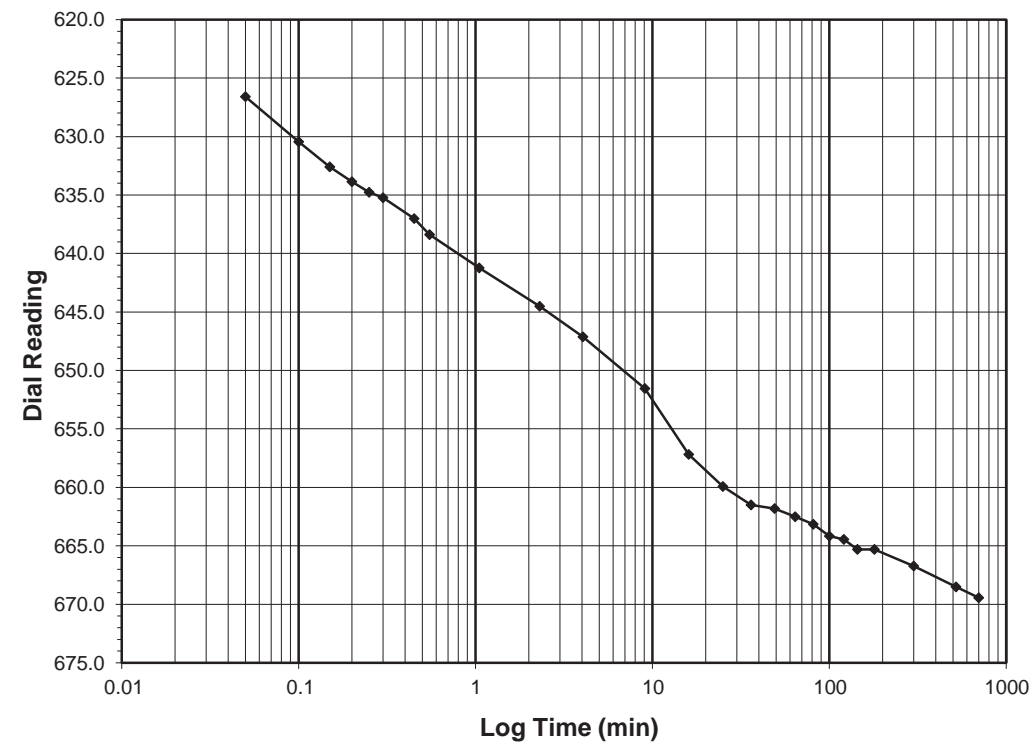
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 2.0-4.0
 Final Reading (div) 669.4
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/23/2019
 Start Time 12:17:52

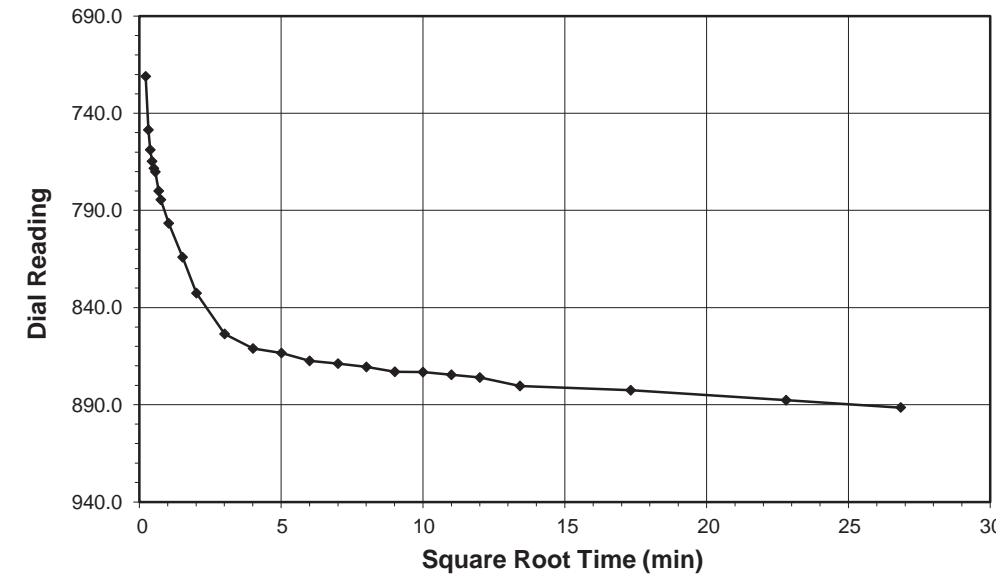
Elapsed Time (min)	Dial Reading (div)
Initial	591.6
0.05	626.6
0.10	630.4
0.15	632.6
0.20	633.9
0.25	634.8
0.30	635.2
0.45	637.0
0.55	638.4
1.05	641.2
2.30	644.5
4.05	647.1
9.05	651.6
16.07	657.2
25.07	659.9
36.07	661.5
49.07	661.8
64.07	662.5
81.07	663.1
100.07	664.2
121.07	664.5
144.07	665.3
180.07	665.3
300.07	666.7
520.07	668.5
700.07	669.4



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

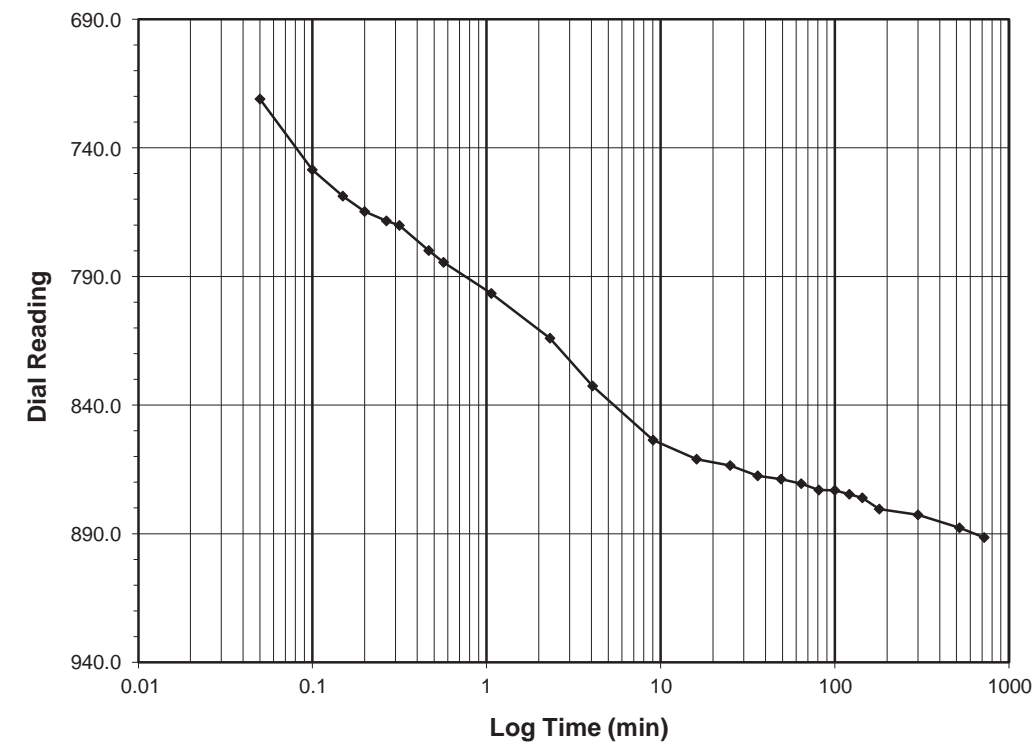
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-8.0
 Final Reading (div) 891.5
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/24/2019
 Start Time 0:18:14

Elapsed Time (min)	Dial Reading (div)
Initial	669.4
0.05	721.0
0.10	748.6
0.15	758.8
0.20	764.7
0.27	768.4
0.32	770.1
0.47	779.9
0.57	784.5
1.07	796.6
2.32	814.1
4.07	832.6
9.07	853.6
16.07	861.0
25.07	863.5
36.07	867.5
49.07	868.8
64.07	870.5
81.07	873.0
100.07	873.2
121.07	874.6
144.07	876.1
180.07	880.4
300.07	882.6
520.08	887.7
720.40	891.5



Tested By 129-08-0411 Date 11/23/2019 Checked By GEM Date 12/2/2019

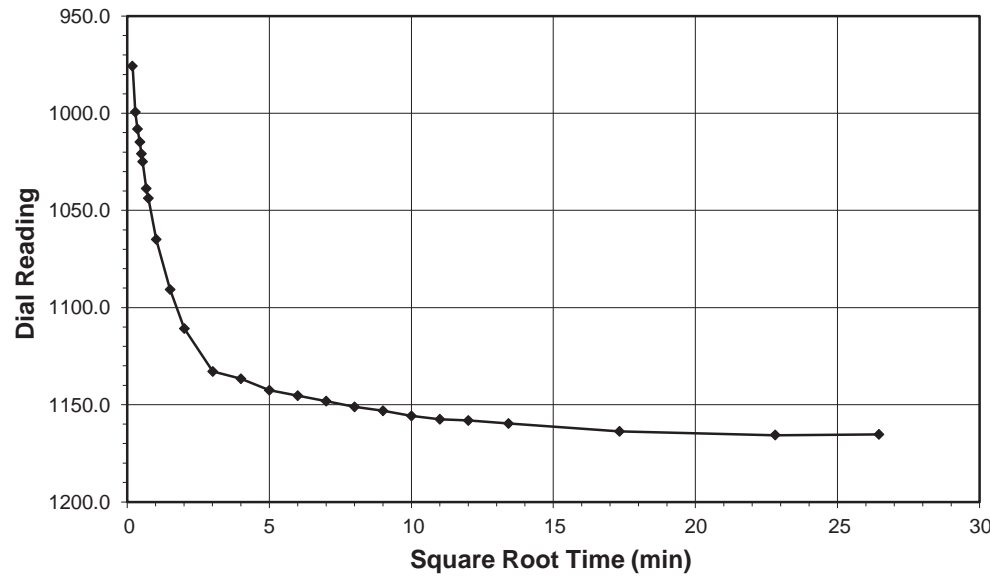
Tested By 129-08-0411 Date 11/24/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

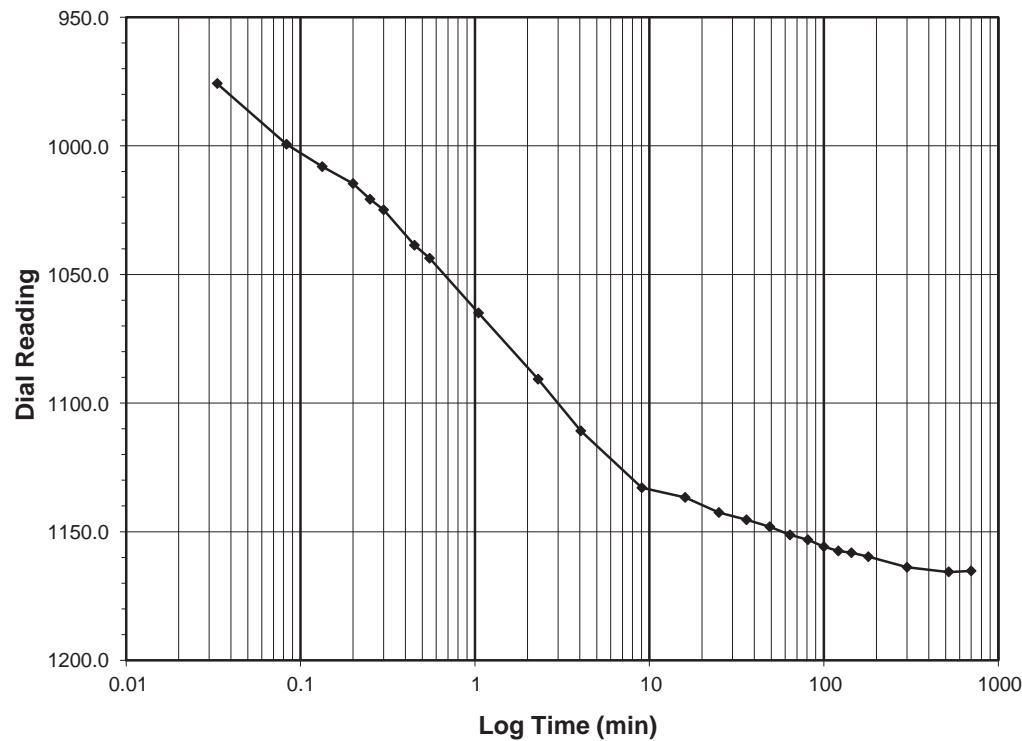
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 8.0-16.0
 Final Reading (div) 1165.3
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/24/2019
 Start Time 12:18:38

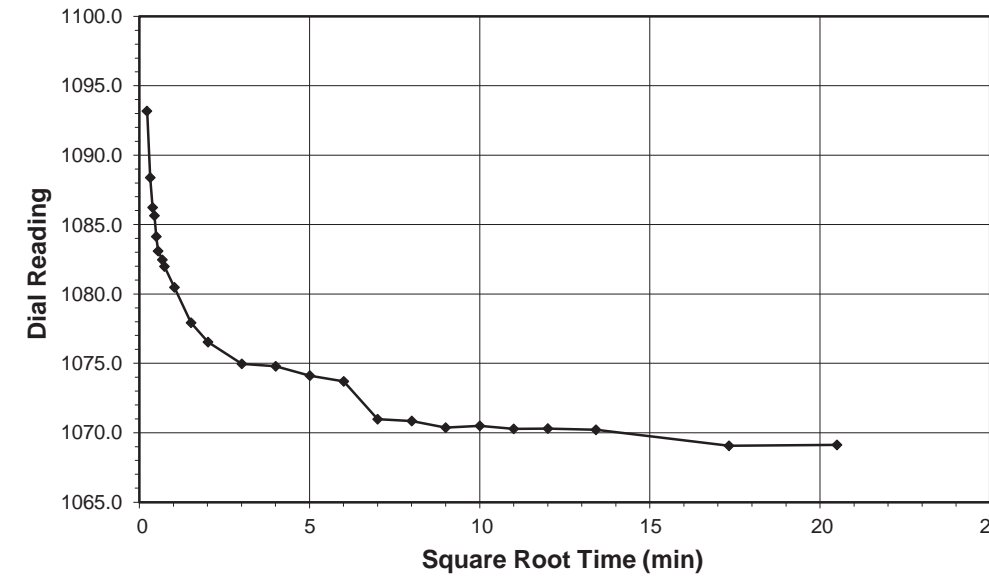
Elapsed Time (min)	Dial Reading (div)
Initial	891.5
0.03	975.8
0.08	999.4
0.13	1008.1
0.20	1014.7
0.25	1020.8
0.30	1024.9
0.45	1038.7
0.55	1043.7
1.05	1064.9
2.30	1090.7
4.05	1110.8
9.05	1132.9
16.05	1136.6
25.05	1142.6
36.05	1145.3
49.05	1148.1
64.05	1151.2
81.05	1153.1
100.05	1155.8
121.05	1157.5
144.05	1158.2
180.05	1159.8
300.05	1163.8
520.05	1165.6
700.05	1165.3



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

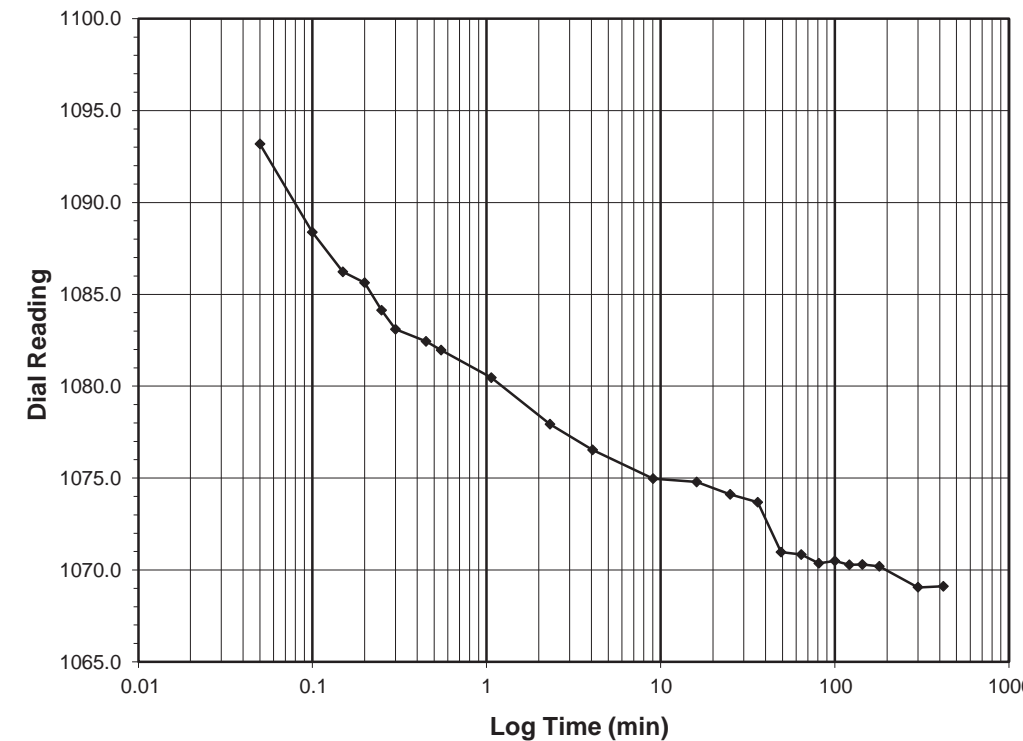
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 16.0-4.0
 Final Reading (div) 1069.1
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/25/2019
 Start Time 0:19:03

Elapsed Time (min)	Dial Reading (div)
Initial	1165.3
0.05	1093.2
0.10	1088.4
0.15	1086.2
0.20	1085.6
0.25	1084.1
0.30	1083.1
0.45	1082.4
0.55	1082.0
1.07	1080.5
2.32	1077.9
4.07	1076.5
9.07	1075.0
16.07	1074.8
25.07	1074.1
36.07	1073.7
49.07	1071.0
64.07	1070.8
81.07	1070.4
100.07	1070.5
121.07	1070.3
144.07	1070.3
180.07	1070.2
300.07	1069.1
420.15	1069.1



Tested By 129-08-0411 Date 11/24/2019 Checked By GEM Date 12/2/2019

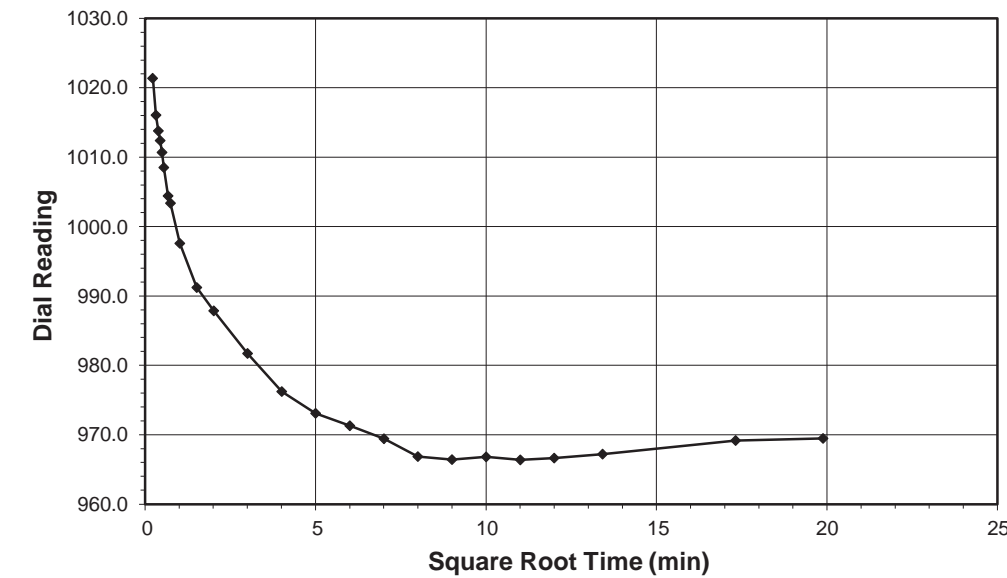
Tested By 129-08-0411 Date 11/25/2019 Checked By GEM Date 12/2/2019



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

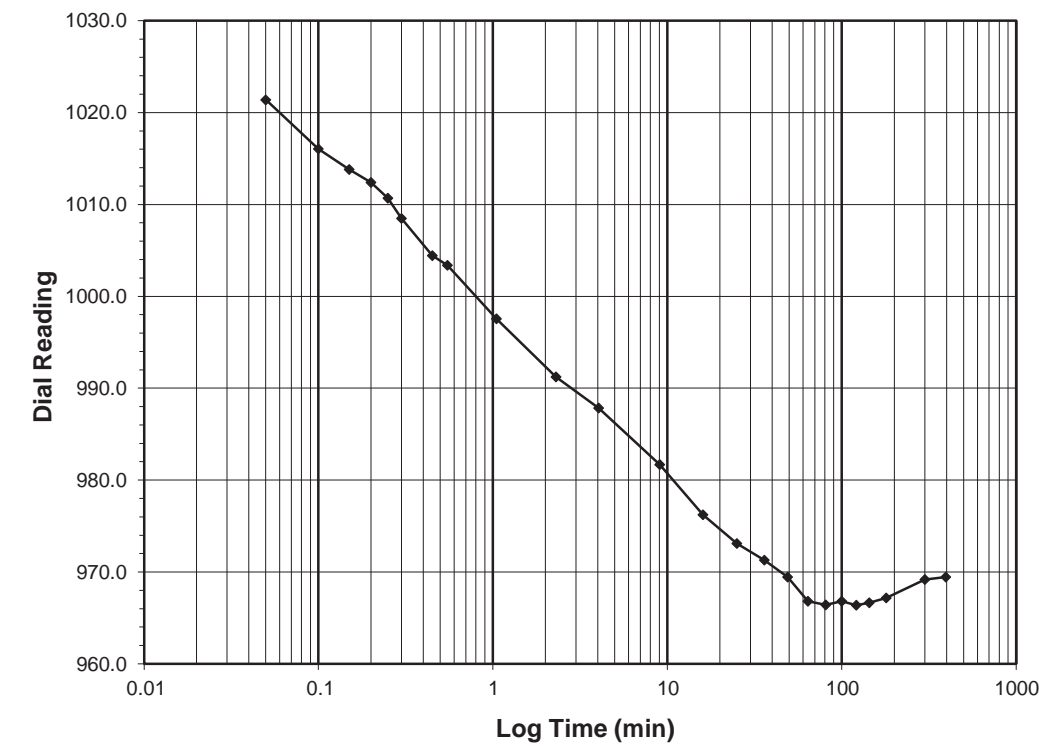
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 4.0-1.0
 Final Reading (div) 969.5
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/25/2019
 Start Time 7:19:12

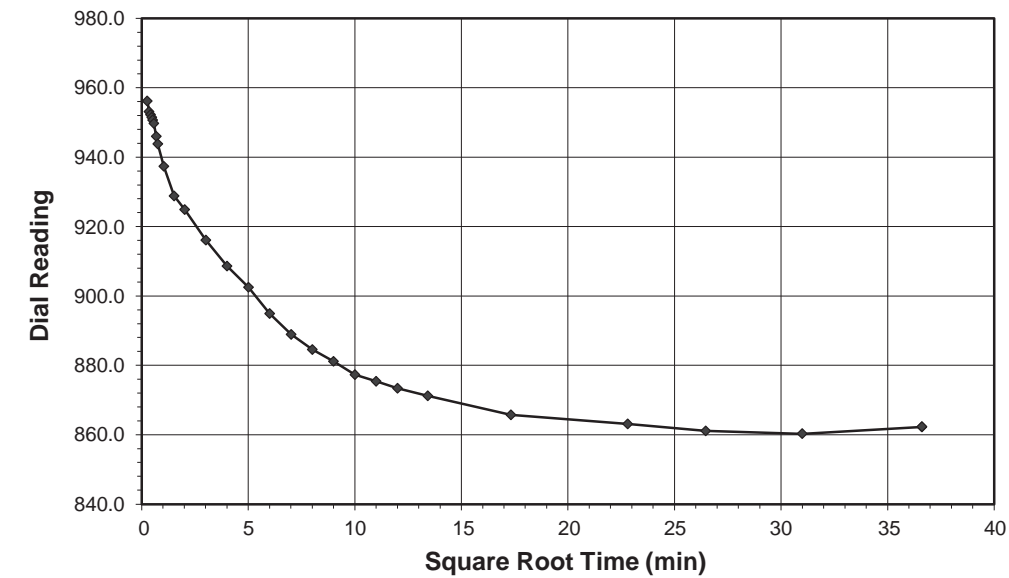
Elapsed Time (min)	Dial Reading (div)
Initial	1069.1
0.05	1021.4
0.10	1016.0
0.15	1013.8
0.20	1012.4
0.25	1010.7
0.30	1008.5
0.45	1004.4
0.55	1003.4
1.05	997.6
2.30	991.2
4.05	987.9
9.05	981.7
16.05	976.2
25.05	973.1
36.05	971.3
49.05	969.4
64.07	966.8
81.07	966.4
100.07	966.8
121.07	966.4
144.07	966.6
180.07	967.2
300.07	969.2
395.33	969.5



ONE DIMENSIONAL CONSOLIDATION
AASHTO T-216

Client ESP Associates, Inc. Boring No. L_1995
 Client Project B-5981 Depth (ft) 6.0-8.0
 Project No. R-2019-327-001 Sample No. ST-1
 Lab ID R-2019-327-001-001 Visual Description Gray Sandy Clay

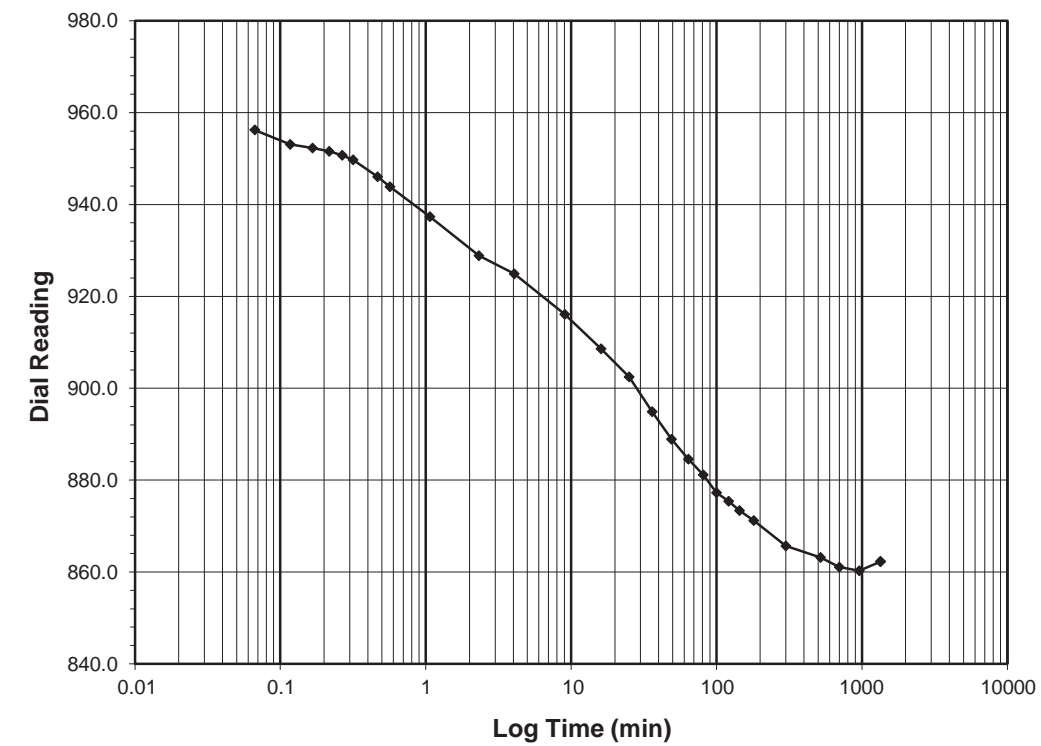
Sample Conditions: UNDISTURBED, INUNDATED AND DOUBLE DRAINED



Test Load (tsf) 1.0-0.25
 Final Reading (div) 862.3
 Consolidometer No. R409
 1 Division (in) 0.0001

Start Date 11/25/2019
 Start Time 13:54:33

Elapsed Time (min)	Dial Reading (div)
Initial	969.5
0.07	956.2
0.12	953.1
0.17	952.3
0.22	951.5
0.27	950.7
0.32	949.7
0.47	946.0
0.57	943.8
1.07	937.3
2.32	928.8
4.07	924.9
9.07	916.1
16.07	908.6
25.07	902.5
36.07	894.9
49.07	888.9
64.07	884.6
81.07	881.2
100.07	877.3
121.07	875.4
144.07	873.4
180.08	871.2
300.08	865.7
520.08	863.1
700.08	861.1
960.08	860.3
1340.50	862.2
1340.63	862.3



Tested By 129-08-0411 Date 11/25/2019 Checked By GEM Date 12/2/2019

Tested By 129-08-0411 Date 11/25/2019 Checked By GEM Date 12/2/2019