

REFERENCE: B-5301

PROJECT: 46015

SEE SHEET 3 FOR PLAN SHEET LAYOUT  
AT TIME OF INVESTIGATION

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5301	1	29

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<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>	<u>PROFILE</u>
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-DR1-	10+00 - 11+10	4	8
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**CROSS SECTIONS**

<u>LINE</u>	<u>STATION</u>	<u>SHEETS</u>
-L-	18+50	9
-L-	20+50	10
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-L-	30+50 - 32+50	14-18

**APPENDICES**

<u>APPENDIX</u>	<u>TITLE</u>	<u>SHEETS</u>
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**ROADWAY**  
**SUBSURFACE INVESTIGATION**

COUNTY PITT  
PROJECT DESCRIPTION REPLACE BRIDGE NO. 87 OVER  
NORFOLK SOUTHERN RAILROAD ON NC 33

**INVENTORY - REVISED**

**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.

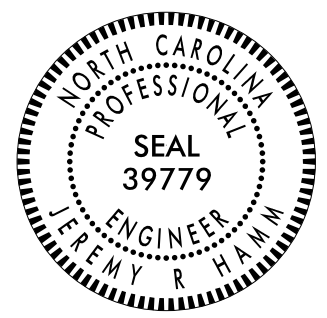
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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

MID-ATLANTIC DRILLING  
SUMMIT  
EVANS, T. E.  
HUNSBERGER, W. S.

INVESTIGATED BY TEEWSH  
DRAWN BY WSH  
CHECKED BY HAMM, J. R.  
SUBMITTED BY FALCON ENG.  
DATE SEPTEMBER 2017



DocuSigned by:  
Jeremy R Hamm 10/11/2017  
ED7938089E22487  
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

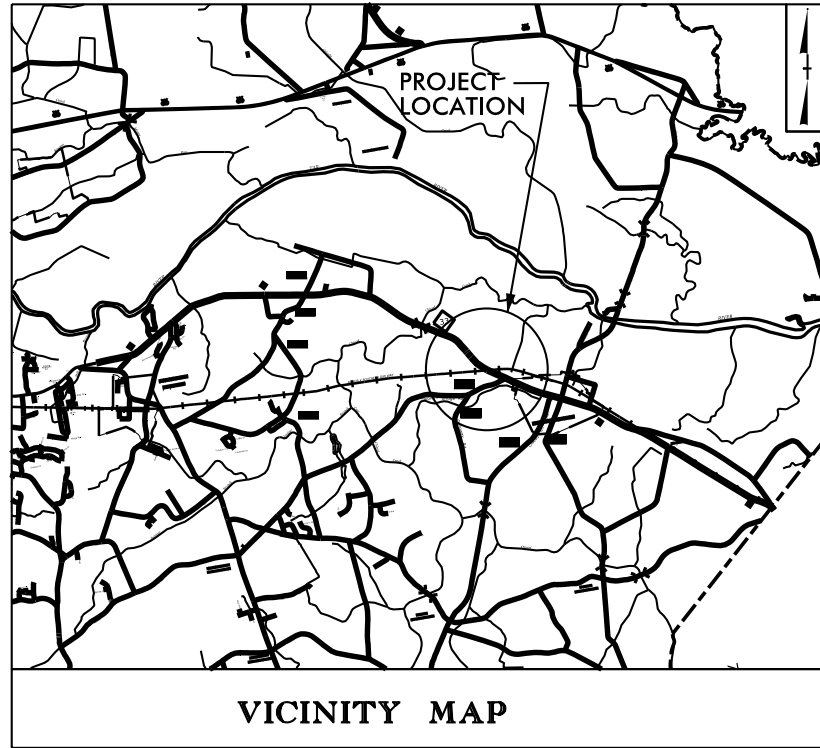
Table with multiple columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, TERMS AND DEFINITIONS, SOIL LEGEND AND AASHTO CLASSIFICATION, MINERALOGICAL COMPOSITION, COMPRESSION, PERCENTAGE OF MATERIAL, GROUND WATER, MISCELLANEOUS SYMBOLS, RECOMMENDATION SYMBOLS, ABBREVIATIONS, EQUIPMENT USED ON SUBJECT PROJECT, FRACTURE SPACING, BEDDING, INDURATION, PLASTICITY, COLOR.

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**TIP PROJECT: B-5301**

**CONTRACT:**

See Sheet 1A For Index of Sheets  
See Sheet 1B For Conventional symbols  
See Sheet 1C For Survey Control Sheet

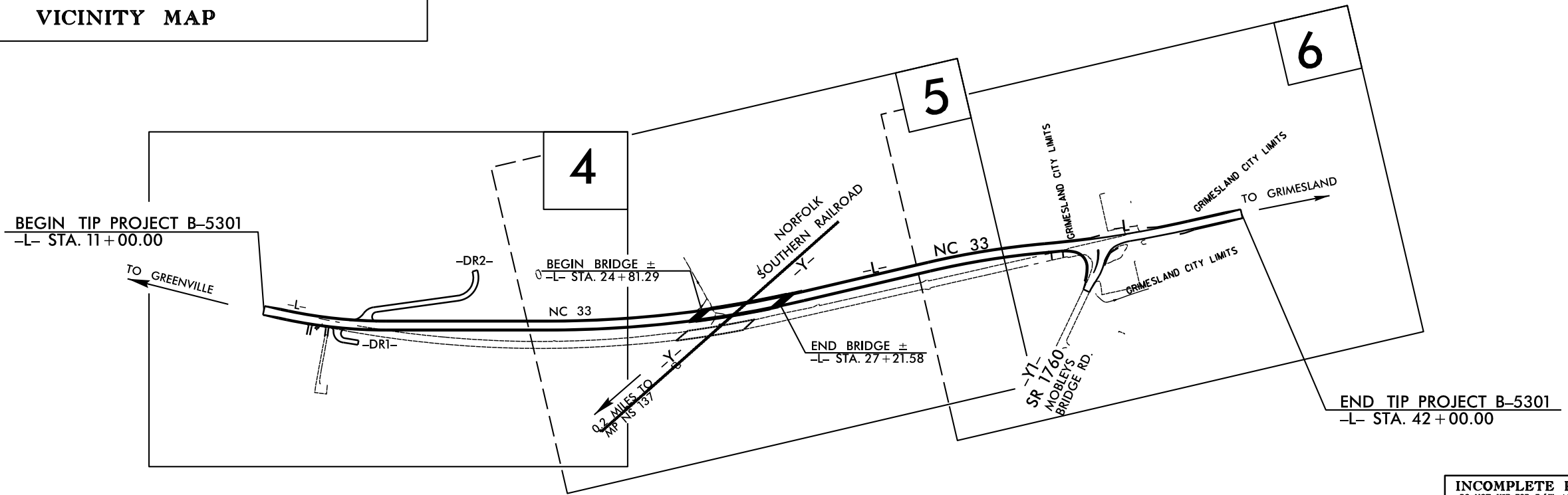
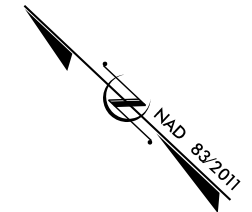


STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS  
**PITT COUNTY**

**LOCATION: BRIDGE NO. 87 OVER NORFOLK SOUTHERN RAILROAD  
ON NC 33**

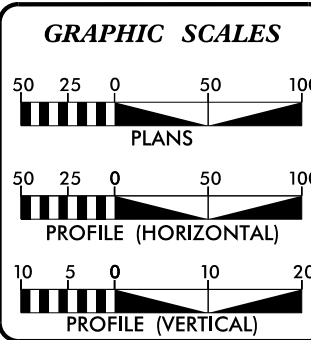
**TYPE OF WORK: GRADING, DRAINAGE, STRUCTURE & PAVING**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5301	3	29
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
46015.1.1	BRSTP-033(13)	PE	



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

PORTION OF THIS PROJECT IS WITHIN MUNICIPAL BOUNDARIES OF GRIMESLAND  
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD XXX



**DESIGN DATA**  
 ADT 2020 = 9,300  
 ADT 2040 = 13,200  
 K = 11%  
 D = 60%  
 T = 8% \*  
 \* (TTST 3% + DUAL 5%)  
 V = 60 MPH  
 CLASS = MAJOR COLLECTOR  
 REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT B-5301	= 0.541 mi.
LENGTH STRUCTURE TIP PROJECT B-5301	= 0.046 mi.
<b>TOTAL LENGTH TIP PROJECT B-5301</b>	<b>= 0.587 mi.</b>

Prepared In the Office of:  
**SEPI**  
 ENGINEERING & CONSTRUCTION  
 1025 Wade Avenue  
 Raleigh, NC 27605  
 Tel: 919-789-9977  
 Fax: 919-789-9591  
 License: C-2197

2012 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
FEBRUARY 16, 2018

**LETTING DATE:**  
FEBRUARY 18, 2020

**BEN CRAWFORD, PE**  
PROJECT ENGINEER

**I. T. YOUNIS**  
PROJECT DESIGN ENGINEER

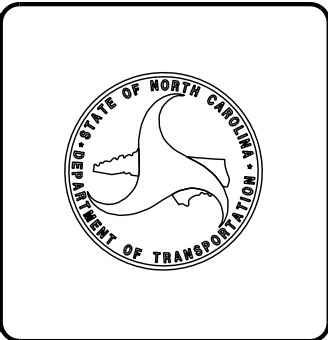
**GARY LOVERING, PE**  
NCDOT CONTACT

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.





**WBS:** 46015.1.1  
**TIP:** B-5301  
**PROJECT ID:** 25009  
**COUNTY:** Pitt  
**DESCRIPTION:** Replace Bridge 87 over the Norfolk Southern Railroad on NC 33  
**SUBJECT:** Roadway Subsurface Investigation – Inventory - Revised

## Roadway Subsurface Investigation Report – Inventory - Revised

**Replace Bridge 87 over the Norfolk Southern Railroad on NC 33**  
**Pitt County, North Carolina**  
**WBS: 46015.1.1 TIP: B-5301**  
**Falcon Project No.: G17015.00**

**Prepared for:**  
NCDOT Geotechnical Engineering Unit  
1589 Mail Service Center  
Raleigh, NC 27699-1589

Submitted by:  
Falcon Engineering, Inc.  
1210 Trinity Road, Suite 110  
Raleigh, North Carolina 27607  
(919) 871-0800  
www.falconengineers.com

September 15, 2017

### PROJECT DESCRIPTION

This project consists of roadway modifications associated with the replacement of Bridge 87 over the Norfolk Southern Railroad on NC 33. The project extends approximately 0.54 miles from the intersection with Overpass Lane (-DR1-) to the intersection with SR 1760 (Mobley's Bridge Road). Roadway modifications include the realignment of NC 33 to the north of the existing bridge and significant vertical grade increase. The project also includes two (2) other driveway realignments (-DR1- and -DR2-) due to proposed embankment slopes encroaching on the existing drives.

A structure subsurface investigation for the bridge over the Norfolk Southern Railroad (NSRR) will be completed separately. No retaining walls or other structures were included in the project at the time of this report and have not been investigated by Falcon.

The initial investigation was conducted between June 9<sup>th</sup> and July 2<sup>nd</sup>, 2015 in general accordance with our Proposal to Provide Geotechnical Engineering Services, dated June 17, 2015. Some additional investigation was conducted between July 7<sup>th</sup> and 17<sup>th</sup>, 2017 in general accordance with our Proposal to Provide Geotechnical Engineering Services, dated June 13, 2017. The recommendations provided in this report are based solely on our site reconnaissance, soil test borings and laboratory test data, engineering evaluation of these data, and generally accepted soil and foundation engineering practices and principles.

For the initial investigation, a total of thirty (30) borings (combination of Standard Penetration Test (SPT), Cone Penetrometer Test (CPT) and Hand Auger borings) were drilled for the proposed roadway alignments. Nineteen (19) SPT borings were drilled using a CME-45C track-mounted or CME-450 ATV drill rig equipped with mud rotary equipment and an automatic hammer. Seven (7) CPT borings were performed using a Morooka track-mounted carrier with Hogentogler CPT sounding equipment. Eleven (11) hand auger borings were performed along the drives. Representative soil samples were selected for laboratory testing to verify visual field classifications. In addition, undisturbed samples were collected using a thin-walled (Shelby) tube sampler for additional laboratory testing.



The following alignments, totaling approximately 3,650 feet (0.69 miles) were explicitly investigated.

<u>Alignment</u>	<u>Station (ft)</u>
-L-	11+00 – 42+00
-DR1-	10+00 – 11+10
-DR2-	10+26 – 14+65

### AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. The following section contains highly plastic soils with plasticity indices (PI) greater than 15 which may cause difficulty during construction:

<u>Station (ft)</u>	<u>Alignment</u>
20+00 to 26+50	-L-

- II. The following section contains soft/very loose soils (n-value less than 4) and may impact subgrade or embankment construction:

<u>Station (ft)</u>	<u>Alignment</u>
15+00 to 32+50	-L-

- III. The following sections were found to contain organic soils:

<u>Station (ft)</u>	<u>Alignment</u>	<u>Offset</u>
28+66 to 29+15	-L-	LT
31+25 to 31+95	-L-	LT

- IV. The entire project contained seasonal high ground water measured within 6 feet of natural ground and may cause groundwater related stability problems during construction.

Note: Shallow groundwater is only present on either side of the existing bridge approaches and roadway NC 33 embankment. Groundwater related issues are not anticipated for construction on existing embankments generally exceeding 5 feet in height.

- V. Two reinforced concrete pipes facilitate drainage along the NSRR beneath the existing bridge approaches at the locations listed below. These pipes were not

investigated, but will require replacement and/or extension beneath the new embankment:

<u>Station (ft)</u>	<u>Alignment</u>
25+00	-L-
26+40	-L-

- VI. A poorly draining storm drainage feature permanently holding water was observed or encountered in the following area:

<u>Station (ft)</u>	<u>Alignment</u>	<u>Offset</u>
21+50 to 24+75	-L-	LT

- VII. Artificial fills were encountered within utility trenches at the location below:

<u>Station (ft)</u>	<u>Alignment</u>	<u>Offset</u>
18+35	-L-	LT

## PHYSIOGRAPHY AND GEOLOGY

The project site is in the Coastal Plain Physiographic Province of North Carolina. According to the *Geologic Map of North Carolina* (1985), the site is within the Yorktown Formation (**Tpy**) of the Tertiary Period. This formation is noted as bluish gray fossiliferous clay with varying amounts of fine-grained sand, with shell material commonly concentrated in lenses. The surficial soils onsite, described as either undivided coastal plain (UCP) or roadway embankment soils range from clean sands to silty clays. The underlying coastal plain (CP) soils encountered onsite indicate a geologic setting consistent with this published data.

Existing site topography is characterized as relatively flat with occasional gentle slopes. Much of the site is surrounded by flat agricultural and rural residential areas. The roadway embankment on NC 33 is comprised of almost 30 feet of placed fill. The embankment slopes are covered in vegetation ranging from vines and small bushes to moderately tall trees. Many of the drainage features that are parallel to NC 33 show signs of poor drainage indicated by standing water and/or shallow ground water.

At the time of our investigation, the fill slopes were covered with vegetation but no failures were observed along the alignment. The fill slopes along the project corridor are observed at roughly 1.75:1 (HV) or flatter and appeared to be stable.

An existing 8 to 12 foot wide channel exists on the north side of NC 33 and west of the NSRR that contained water at the time of our investigation. This channel is noted on the plans to empty into the small drainage feature near the railroad.

## SOIL PROPERTIES

A variety of soils were encountered along the project, including existing roadway embankments, artificial fills not associated with roadway construction, undivided coastal plain deposits and coastal plain formation.

Roadway Embankment soils were encountered at the ground surface or beneath existing pavements in and adjacent to existing roadways. These consist of up to 26 feet of dry to wet, loose to dense, silty and slightly silty sand (A-3 and A-2-4) with clay pieces, wood pieces and gravel.

Artificial Fill soils were encountered at the ground surface or beneath existing pavements in and adjacent to utility trenches, and may exist in the vicinity of private driveways, and parking lots or otherwise graded private properties. These consist of approximately 1 to 2 feet of dry, medium dense, silty fine sand (A-2-4) with gravel.

Undivided coastal plain soils were encountered at the ground surface, or beneath fill soils and roadway embankment. These soils consist of dry to saturated, very loose to medium dense, clean to clayey and silty fine to coarse sand (A-1-b, A-2-6, A-2-4, A-3) and soft to medium stiff, fine sandy clay and silt (A-4, A-6) with trace amounts of mica, and trace to little amounts of organics in surficial samples.

Yorktown Formation soils were encountered beneath undivided coastal plain materials in one location. These soils were found at a depth of 8 feet and consist of wet to saturated, very loose, silty and slightly silty sand (A-1-b, A-2-4, A-3) and medium stiff, fine sandy silt and clay (A-4, A-6) with trace amounts of shell fragments.

## GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in some cases after a waiting period of at least 24 hours. Some borings drilled within and in close proximity to existing roadways, and within residential areas were backfilled immediately after completion due to safety considerations.

The project crosses small streams and drainage ditches. Groundwater was observed at shallow depths near these streams and in low lying areas, in addition to standing water within the streams and ditches. Detailed groundwater measurements are included in the attached subsurface profiles and cross sections, and noted areas of shallow groundwater are included in the Areas of Special Geotechnical Interest earlier in this report.



## UNDISTURBED SAMPLES

The following thin walled (Shelby) Tube samples were collected and tested as indicated in order to determine additional engineering properties of the soil.

<u>Sample</u>	<u>Location</u>	<u>Depth (ft)</u>	<u>Test</u>
ST-1	22+68, 148' RT, -L-	4.4-6.4	In-Situ Bulk Density, CU Triaxial
ST-2	20+31, 131' RT, -L-	2.7-4.8	In-Situ Bulk Density, Consolidation
ST-3	28+70, 144' RT, -L-	2.6-4.7	In-Situ Bulk Density
ST-4	33+08, 68' LT, -L-	15.0-17.0	In-Situ Bulk Density, Consolidation

Moisture content and classification test results for undisturbed samples are included in the subsurface profiles and cross sections.

## CLOSING

Falcon appreciates the opportunity to have provided our geotechnical engineering services for the above referenced project. If you have any questions concerning the contents of this report or need additional information, please do not hesitate to contact our office.

### **FALCON ENGINEERING, INC.**

Report Prepared By:

Report Reviewed By:

W. Scott Hunsberger, PE  
*Geotechnical Engineer*

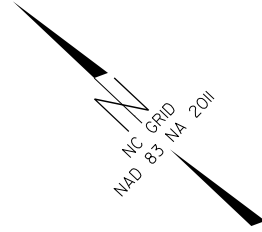
Jeremy R. Hamm, PE  
*Geotechnical Engineering Manager*



PROJECT REFERENCE NO.	SHEET NO.
B-5301	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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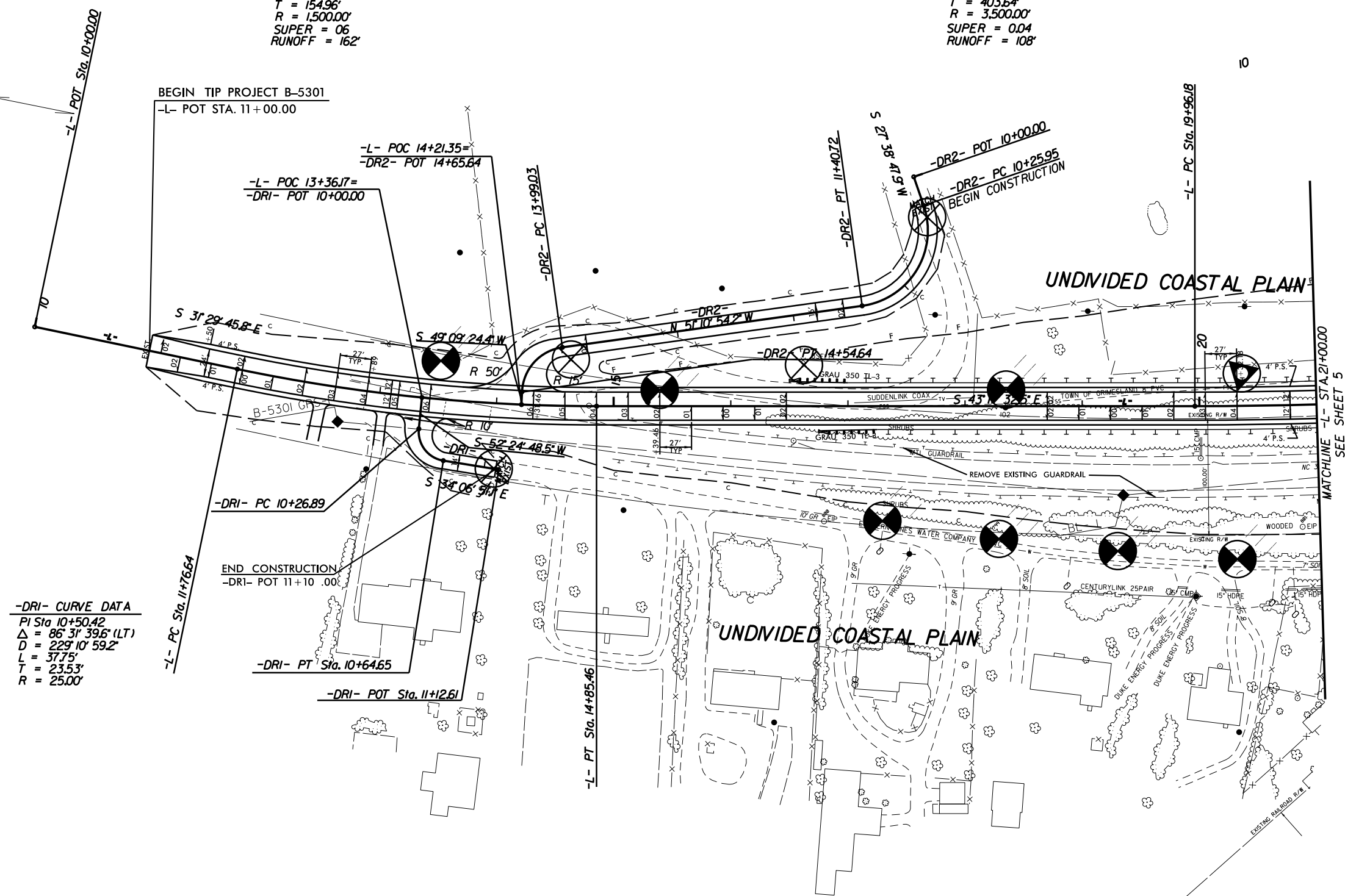
SEE PLAN SHEETS 7 & 8 FOR PROFILES



**-L- CURVE DATA**  
 PI Sta 13+31.60  
 $\Delta = 11^{\circ} 47' 46.6"$  (LT)  
 D = 3' 49' 11.0"  
 L = 308.83'  
 T = 154.96'  
 R = 1,500.00'  
 SUPER = 06  
 RUNOFF = 162'

**-DR2- CURVE DATA**  
 PI Sta 14+32.39  $\Delta = 79^{\circ} 39' 41.4"$  (LT) D = 143' 14' 22.0" L = 55.61' T = 33.36' R = 40.00'  
 PI Sta 11+05.04  $\Delta = 101^{\circ} 10' 17.9"$  (RT) D = 88' 08' 50.5" L = 114.78' T = 79.09' R = 65.00'

**-L- CURVE DATA**  
 PI Sta 23+99.82  
 $\Delta = 13^{\circ} 09' 26.0"$  (LT)  
 D = 1' 38' 13.3"  
 L = 803.73'  
 T = 403.64'  
 R = 3,500.00'  
 SUPER = 0.04  
 RUNOFF = 108'



**-DRI- CURVE DATA**  
 PI Sta 10+50.42  
 $\Delta = 86^{\circ} 31' 39.6"$  (LT)  
 D = 229' 10' 59.2"  
 L = 37.75'  
 T = 23.53'  
 R = 25.00'

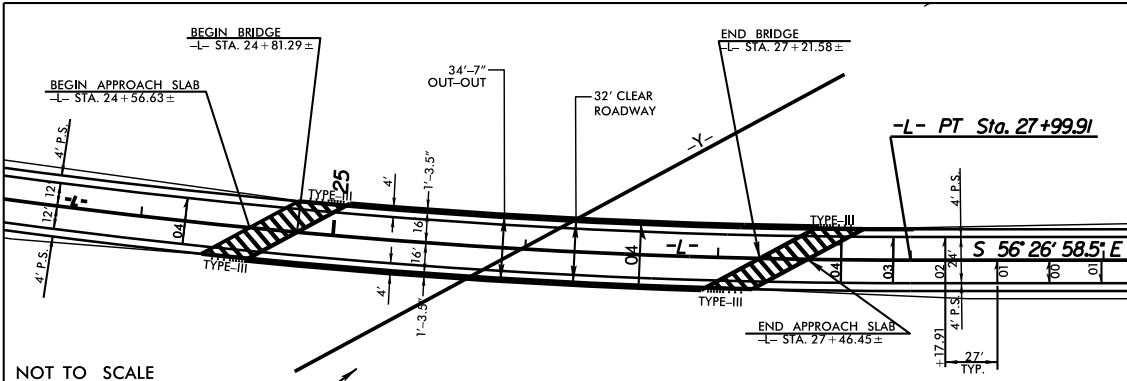
END CONSTRUCTION  
 -DRI- POT 11+10.00  
 -DRI- PT Sta. 10+64.65  
 -DRI- POT Sta. 11+12.61

MATCHLINE -L- STA. 21+00.00 SEE SHEET 5

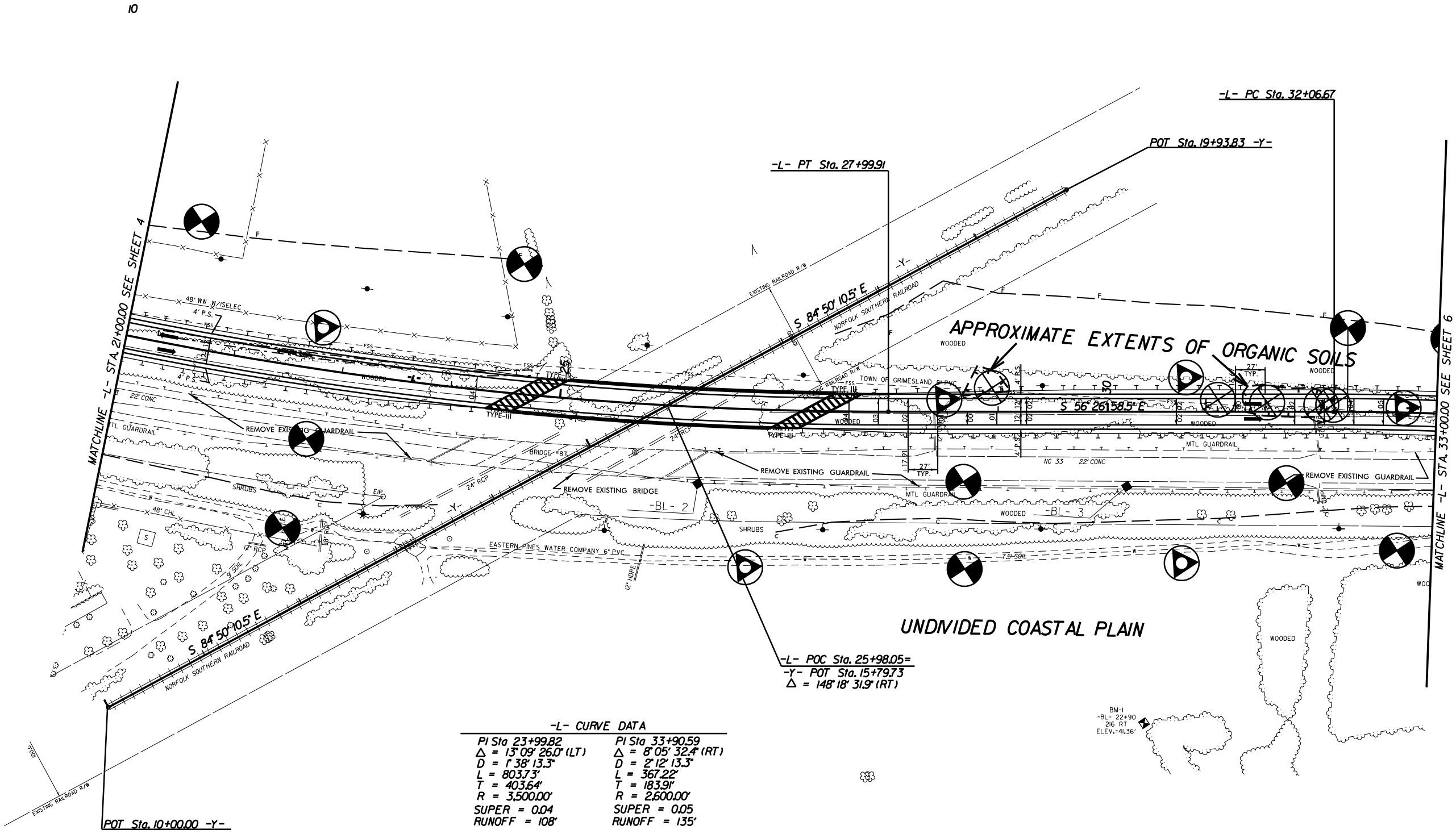
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Sketch showing Dimensions of Pavement and Shoulder in Relation to Proposed Bridge Width

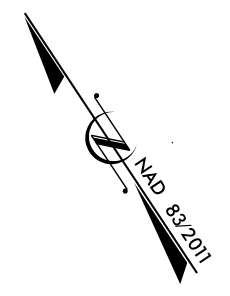


-L- CURVE DATA

PI Sta 23+99.82	PI Sta 33+90.59
$\Delta = 13^{\circ} 09' 26.0''$ (LT)	$\Delta = 8^{\circ} 05' 32.4''$ (RT)
D = 138' 13.3"	D = 212' 13.3"
L = 803.73'	L = 367.22'
T = 403.64'	T = 183.91'
R = 3,500.00'	R = 2,600.00'
SUPER = 0.04	SUPER = 0.05
RUNOFF = 108'	RUNOFF = 135'

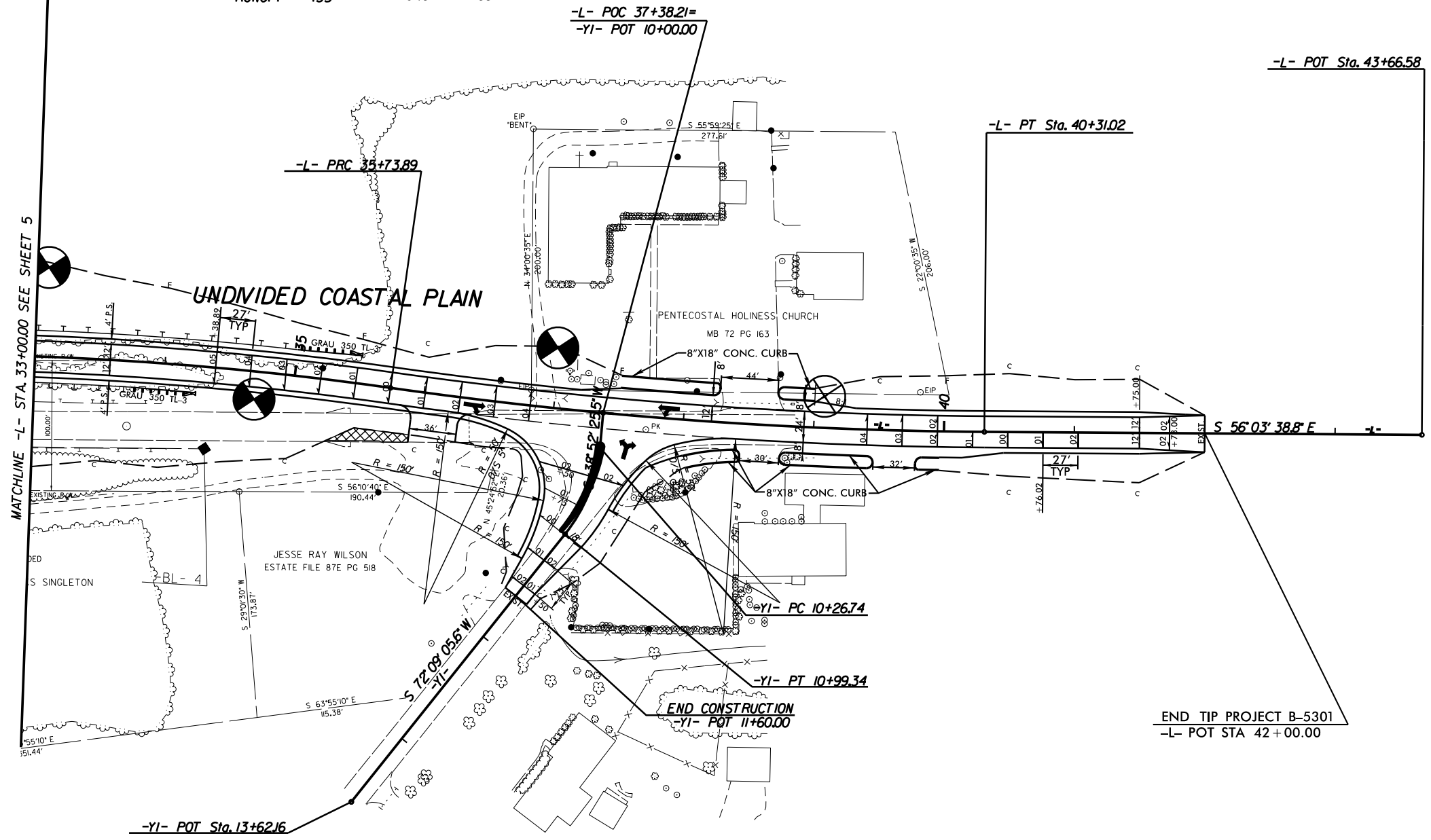
BM-1  
-BL- 22+90  
216 RT  
ELEV.=41.36'

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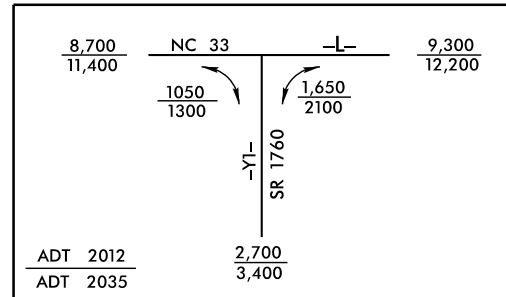
**-L- CURVE DATA**

PI Sta 33+90.59	PI Sta 38+02.80
$\Delta = 8^{\circ}05'32.4"$ (RT)	$\Delta = 7^{\circ}42'12.7"$ (LT)
D = 2'12'13.3"	D = 1'41'06.6"
L = 367.22'	L = 457.14'
T = 183.91'	T = 228.91'
R = 2,600.00'	R = 3,400.00'
SUPER = 0.05	SUPER = 0.04
RUNOFF = 135'	RUNOFF = 108'



**-YI- CURVE DATA**

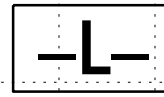
PI Sta 10+64.10
$\Delta = 33^{\circ}16'40.2"$ (RT)
D = 45'50'11.8"
L = 72.60'
T = 37.36'
R = 125.00'



REVISIONS  
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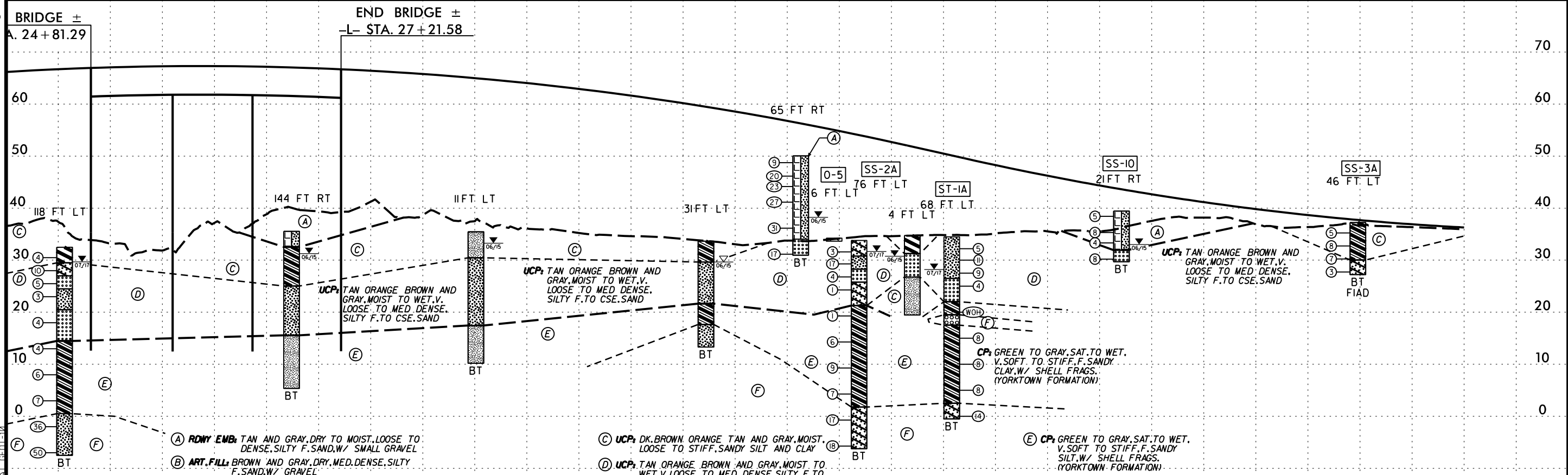
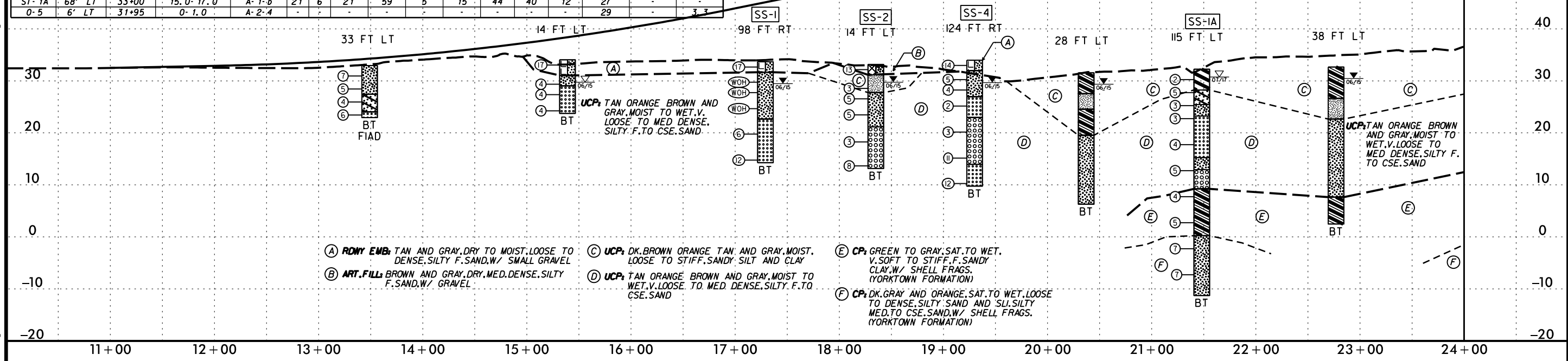
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BEGIN GRADE  
 -L- STA. 11+00.00  
 ELEV. 32.50'

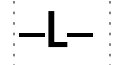


PROJECT REFERENCE NO.	SHEET NO.
B-5301	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-1	98' RT	17+29	2.9-4.4	A-2-4(0)	25	4	3	66	5	26	100	99	34	24	-	-
SS-1A	115' LT	21+48	23.5-25.0	A-6(6)	32	16	12	36	21	31	100	95	57	31	-	-
SS-2	14' LT	18+35	3.6-5.1	A-4(0)	26	3	1	68	7	24	100	100	41	28	-	-
SS-2A	76' LT	32+19	13.5-15.0	A-6(13)	37	19	1	33	23	43	100	89	51	17	-	-
SS-3A	46' LT	36+98	1.0-2.5	A-6(3)	28	13	25	29	21	25	100	89	51	17	-	-
SS-4	124' RT	19+30	0-1.5	A-2-4(0)	18	NP	10	62	13	15	95	90	33	12	-	-
SS-10	21' RT	34+71	3.1-4.6	A-2-4(0)	15	NP	24	58	5	13	100	91	22	13	-	-
ST-1A	68' LT	33+00	15.0-17.0	A-1-b	21	6	21	59	5	15	44	40	12	27	-	-
O-5	6' LT	31+95	0-1.0	A-2-4	-	-	-	-	-	-	-	-	-	29	-	3.3



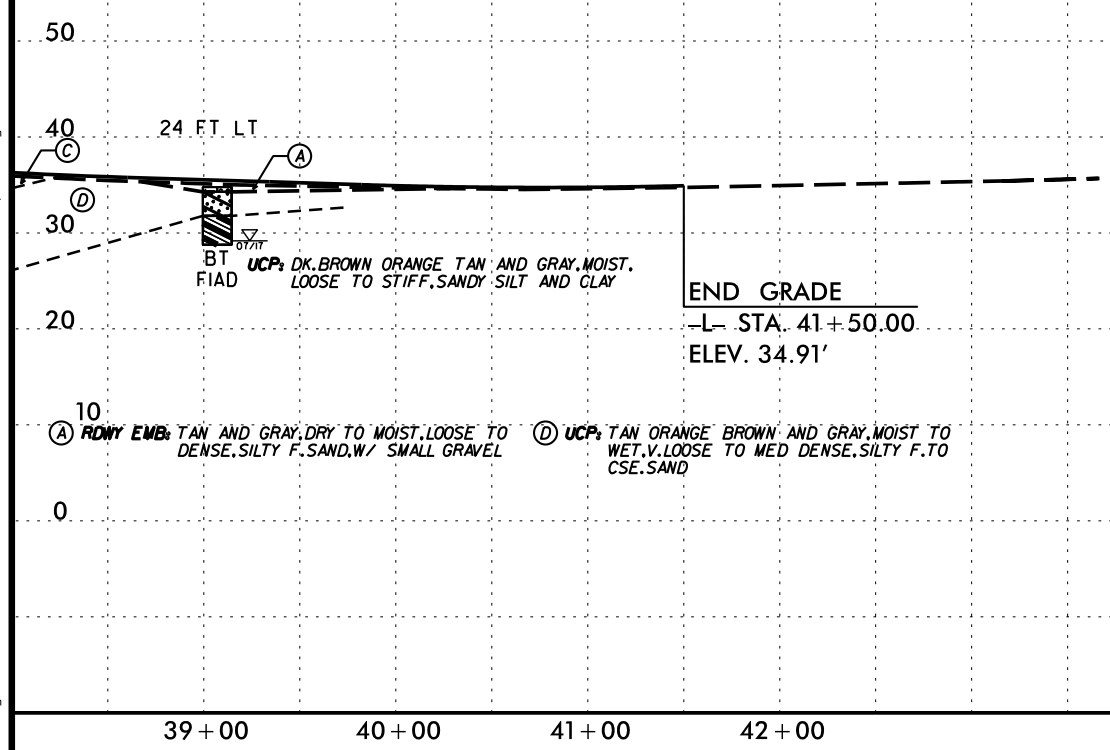
NOTE: INFERRED STRATIGRAPHY IS SHOWN THROUGH SELECTED BORINGS PROJECTED ONTO THE CENTERLINE -L- PROFILE.



5/28/99  
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END PAVEMENT OVERLAY  
 -L- STA. 42+00.00

**L**



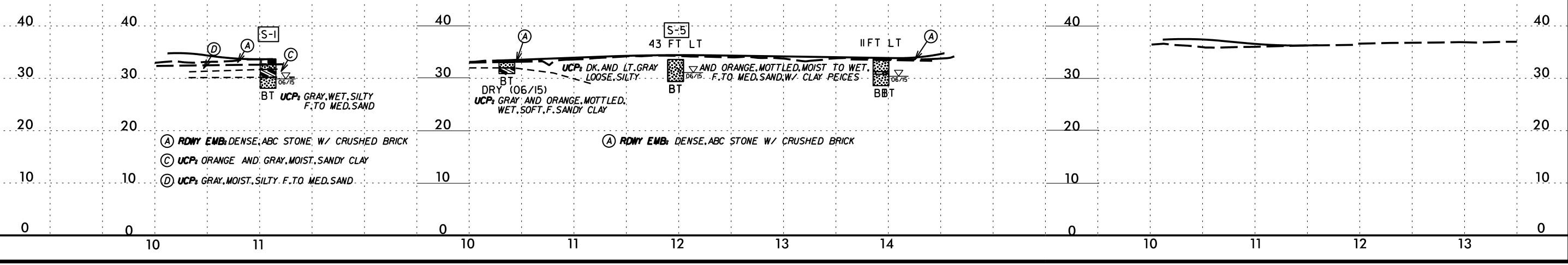
PROJECT REFERENCE NO.		SHEET NO.	
<b>B-5301</b>		<b>8</b>	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION			
<b>DOCUMENT NOT CONSIDERED FINAL</b> UNLESS ALL SIGNATURES COMPLETED			
<b>SEPI</b> ENGINEERING & CONSTRUCTION		1025 Wade Avenue Raleigh, NC 27605 Tel: 919-789-9977 Fax: 919-789-9591 License: C-2197	

**DR1**

**DR2**

**Y1**

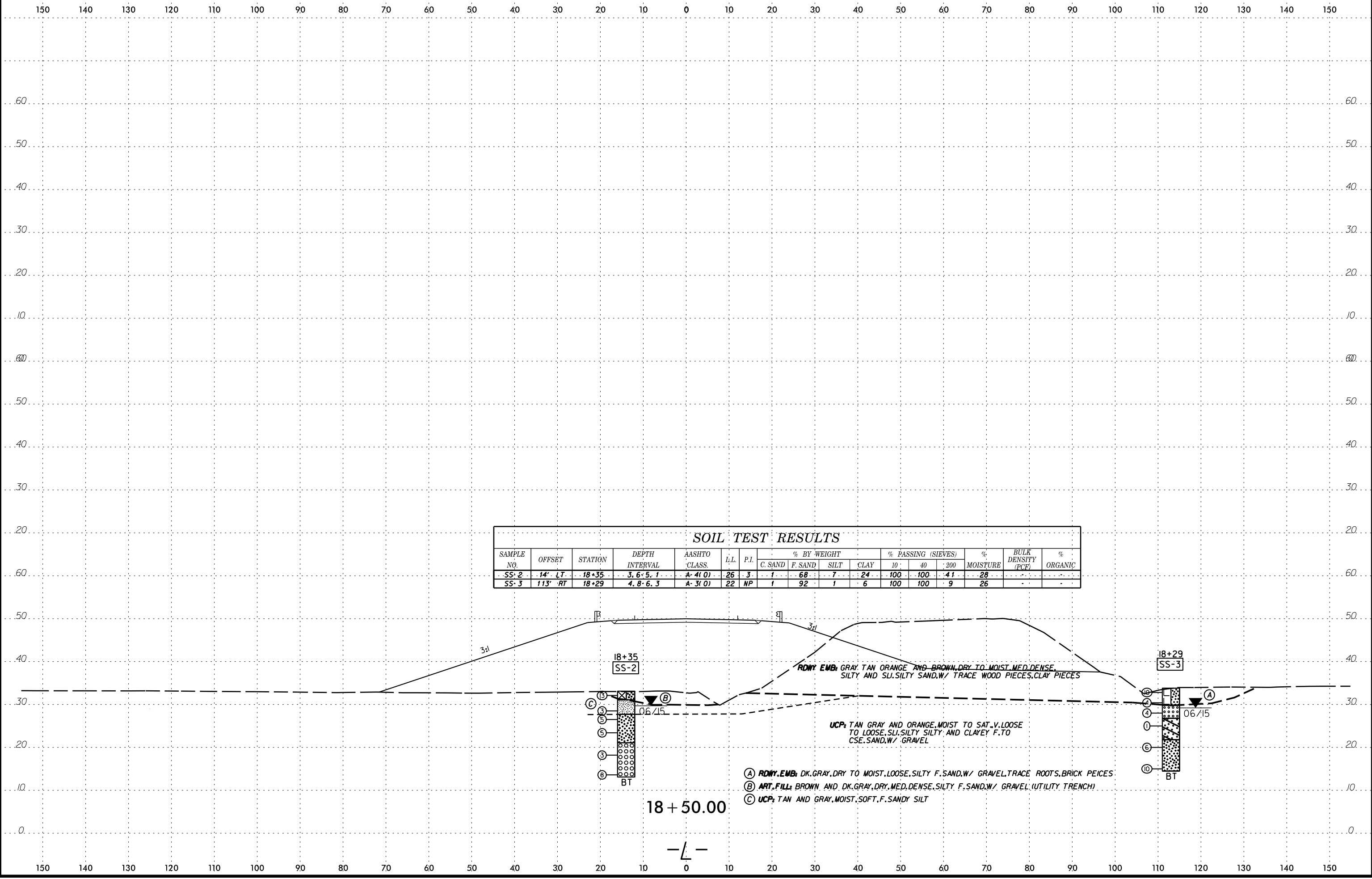
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							C. SAND	F. SAND	SILT	CLAY	10	40	200			
S-1	CL	11+08	1-1-2.0	A-2-4(0)	16	NP	8	71	6	15	97	94	24	12	-	-
S-5	43' LT	11+97	0-1.0	A-2-4(0)	15	NP	8	75	7	10	100	97	21	16	-	-



- (A) RDWY EMB: DENSE, ABC STONE W/ CRUSHED BRICK
- (C) UCP: ORANGE AND GRAY, MOIST, SANDY CLAY
- (D) UCP: GRAY, MOIST, SILTY F. TO MED. SAND

14-SEP-2017 09:29  
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 cadmachine AI GEO 18

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-2	14' LT	18+35	3.6'-5.1'	A-4(0)	26	3	1	68	7	24	100	100	41	28	-	-
SS-3	113' RT	18+29	4.8'-6.3'	A-3(0)	22	NP	1	92	1	6	100	100	9	26	-	-

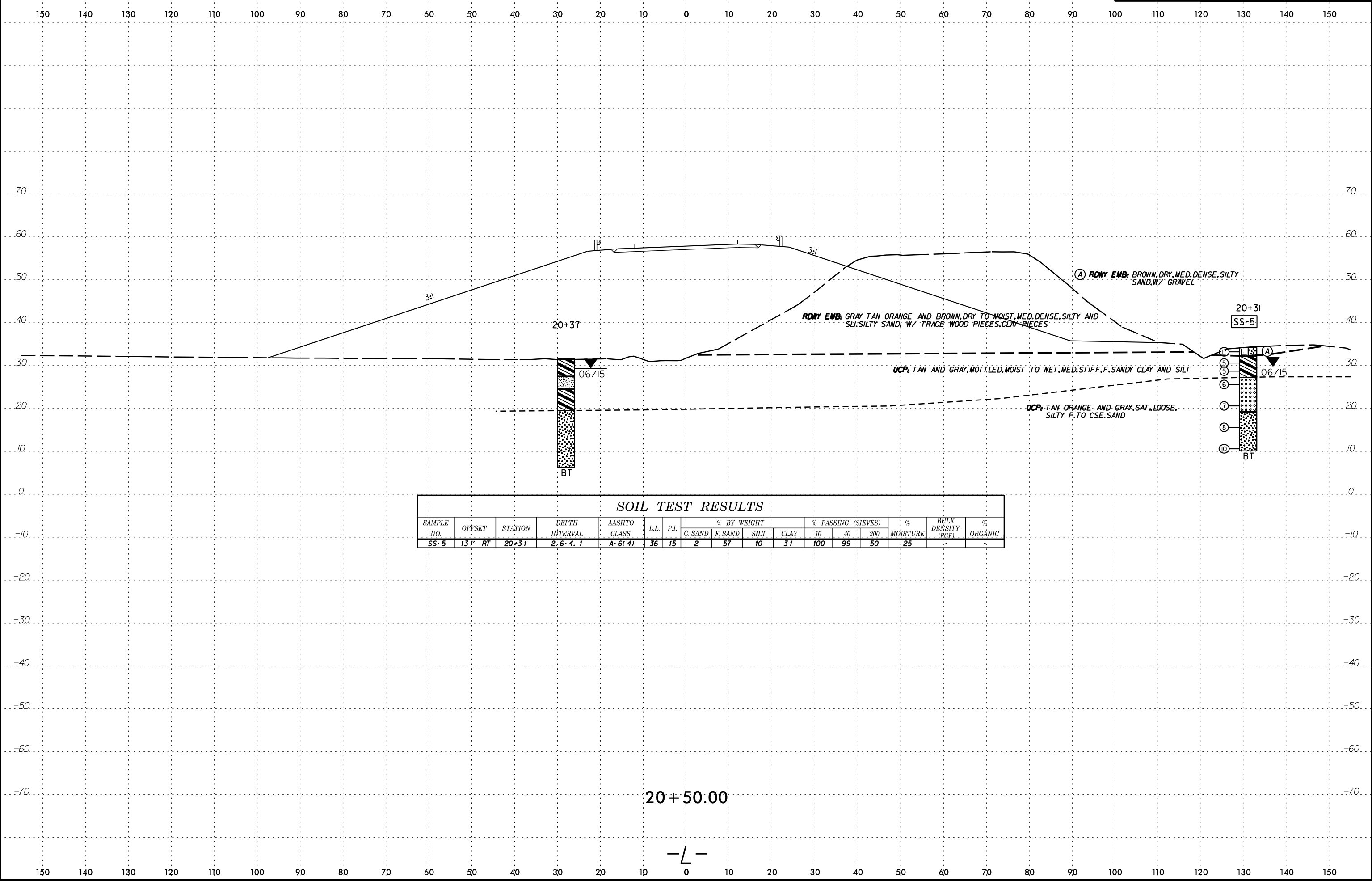


- (A) ROWY.EMB: DK.GRAY, DRY TO MOIST, LOOSE, SILTY F.SAND, W/ GRAVEL, TRACE ROOTS, BRICK PEICES
- (B) ART.FILL: BROWN AND DK.GRAY, DRY, MED.DENSE, SILTY F.SAND, W/ GRAVEL (UTILITY TRENCH)
- (C) UCP: TAN AND GRAY, MOIST, SOFT, F.SANDY SILT

18 + 50.00

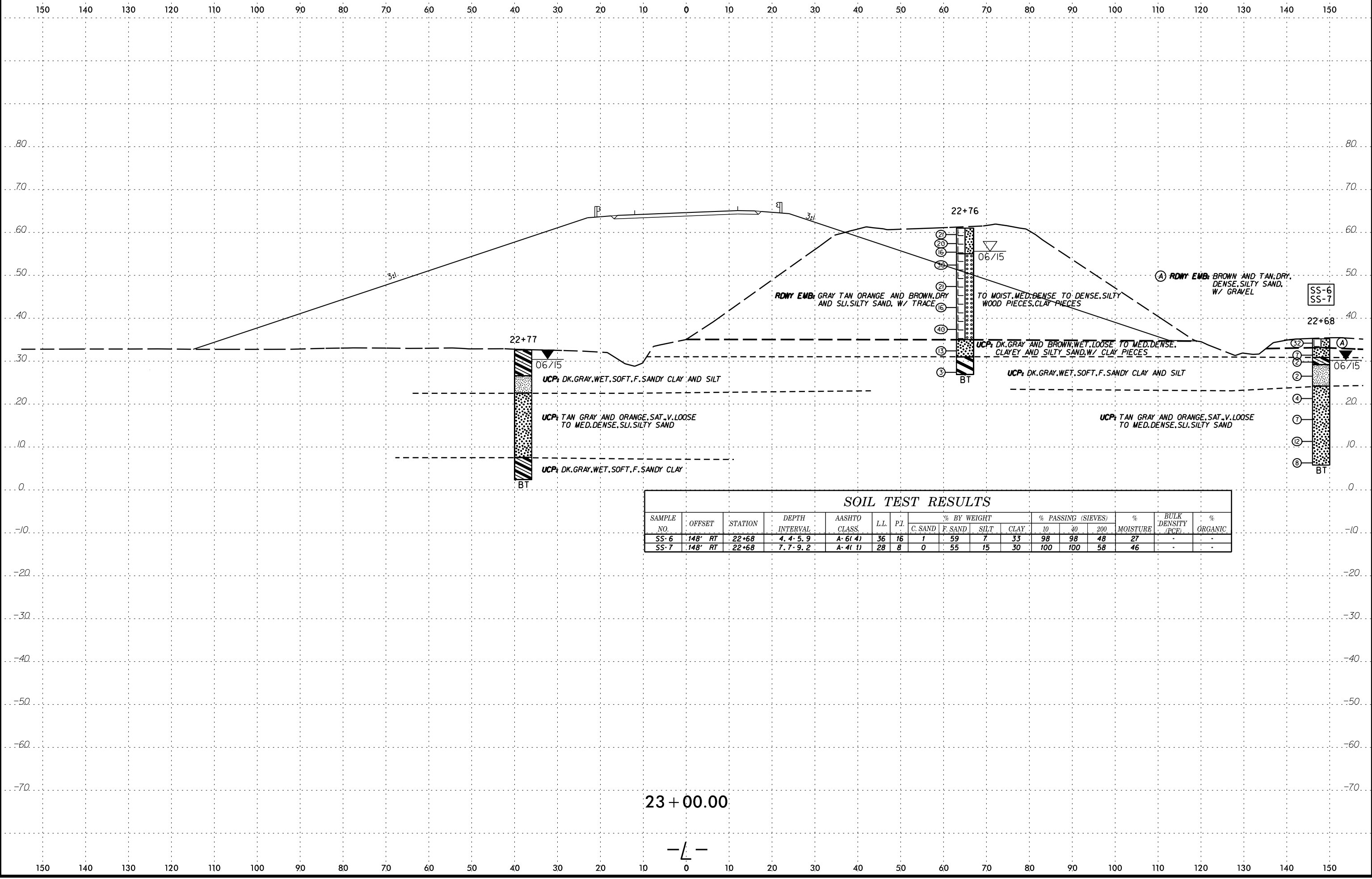
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6/23/16  
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 cadmachine AT GEO-18



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	#10	#40	#200			
SS-5	13' RT	20+31	2.6 - 4.1	A-6(4)	36	15	2	57	10	31	100	99	50	25	-	-

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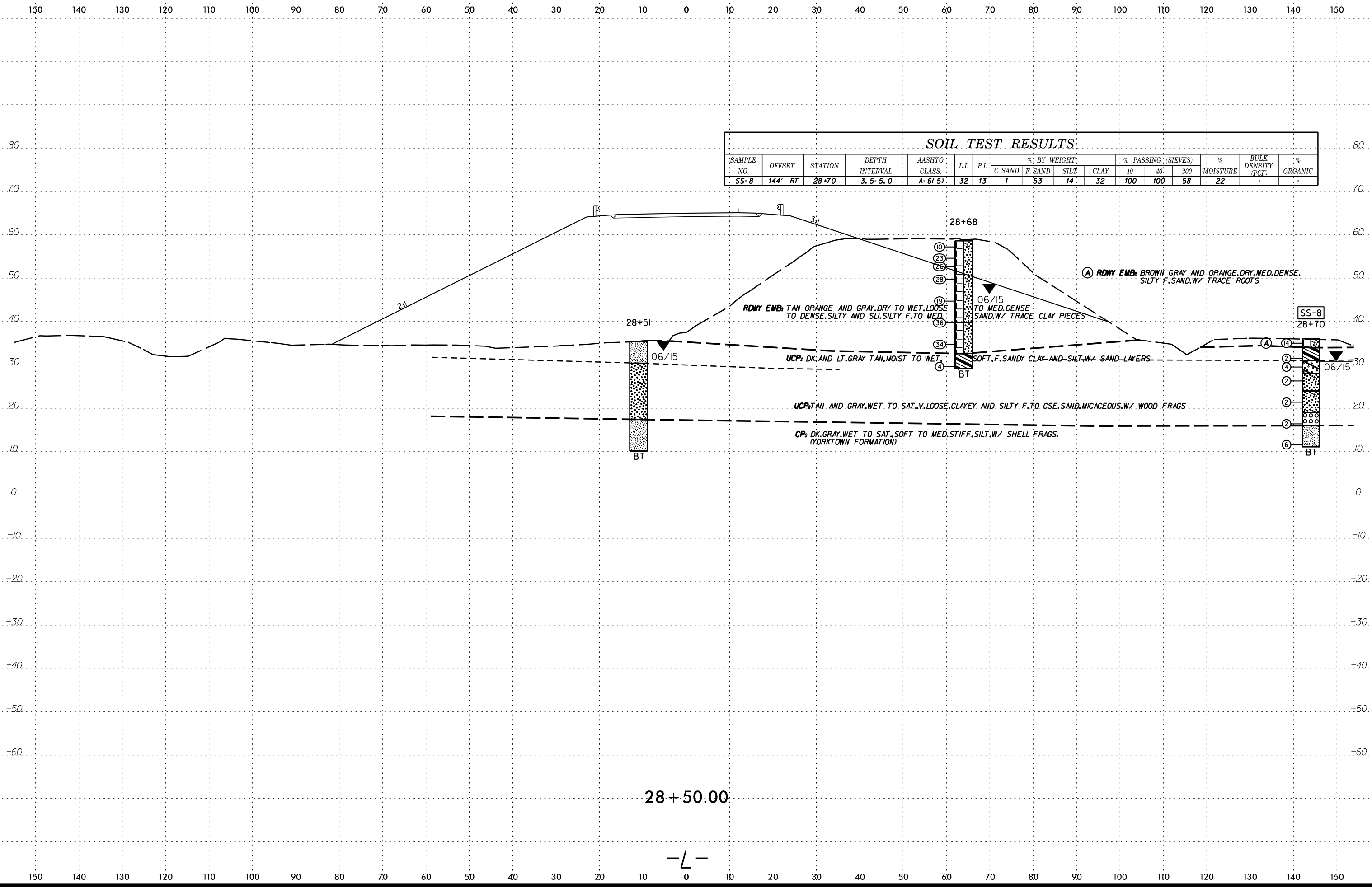


SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	PI	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-6	148' RT	22+68	4.4-5.9	A-6(4)	36	16	1	59	7	33	98	98	48	27	-	-
SS-7	148' RT	22+68	7.7-9.2	A-4(1)	28	8	0	55	15	30	100	100	58	46	-	-

23 + 00.00

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29-SEP-2017 08:38 I:\Projects\2017\GE01500 NCDOT GEU B-5301 Modifications\B5301\_NCDOT\_Electronic\_File\_Tree\Geotech\Investigation\Design\B5301\_GEO\_ROWY\_CADD\_GEO TECH\B5301\_GEO\_xsl\_L.dgn  
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-8	144' RT	28+70	3.5-5.0	A-6(5)	32	13	1	53	14	32	100	100	58	22	-	-

RDWY EMB: TAN ORANGE AND GRAY DRY TO WET, LOOSE TO DENSE, SILTY AND SLT. SILTY F. TO MED. TO MED. DENSE SAND, W/ TRACE CLAY PIECES  
 UCP: DK. AND LT. GRAY TAN, MOIST TO WET, SOFT, F. SANDY CLAY AND SILT, W/ SAND LAYERS  
 CP: DK. GRAY, WET TO SAT., SOFT TO MED. STIFF, SILT, W/ SHELL FRAGS. (YORKTOWN FORMATION)

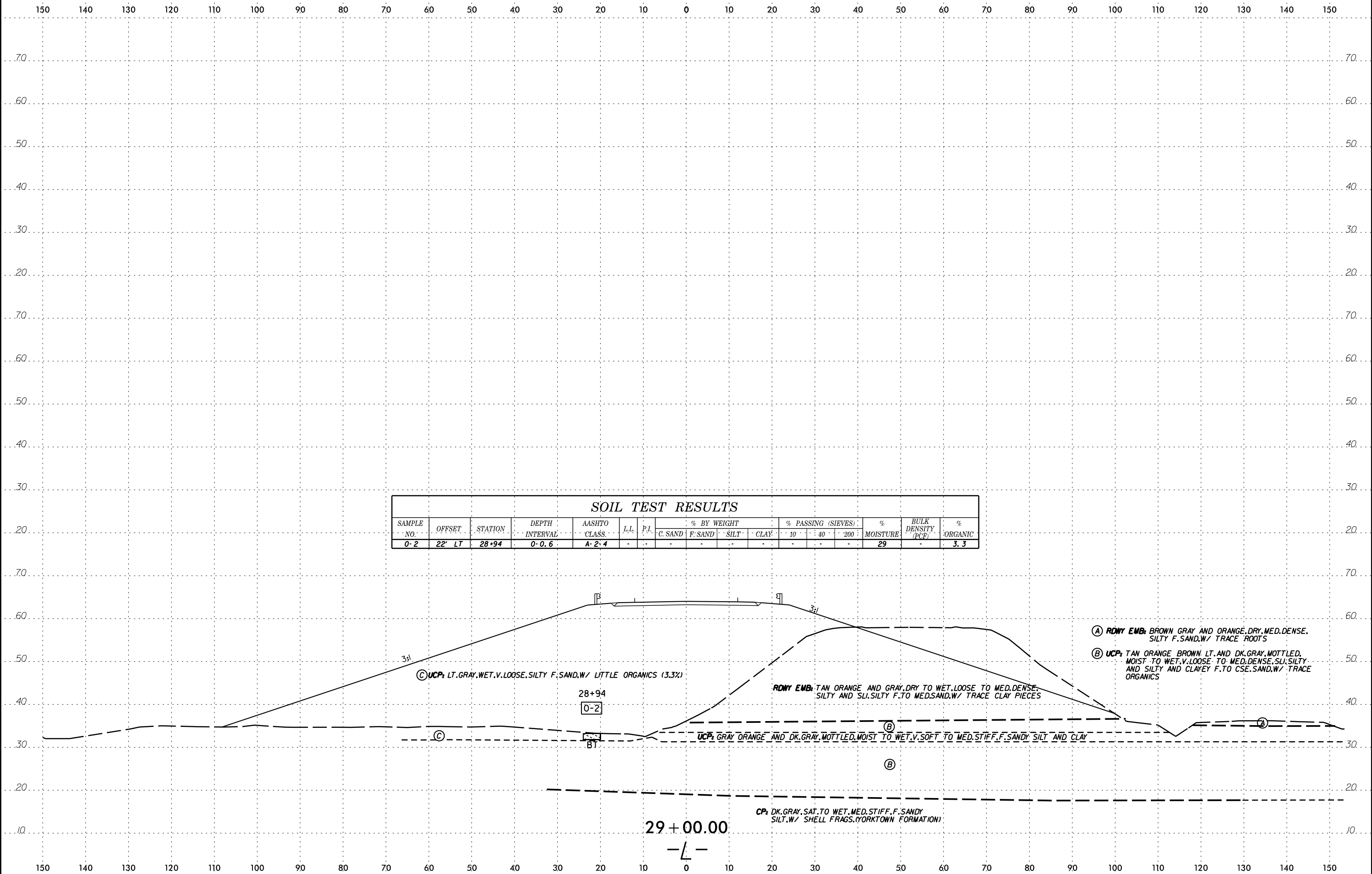
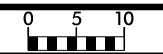
(A) RDWY EMB: BROWN GRAY AND ORANGE, DRY, MED. DENSE, SILTY F. SAND, W/ TRACE ROOTS

28 + 50.00

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 I:\Projects\2017\GEOTECH\1500 NCDOT\GEU B-5301 Modifications\B5301\_NCDOT\_Electronic\_File\_Tree\Geotech\Investigation\Design\B5301\_GEO\_ROWY\CADD\GEO\TECH\B5301\_GEO\_xsi\_L.dgn  
 cadmachine AI GEO 18



SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
0-2	22' LT	28+94	0-0.6	A-2.4	-	-	-	-	-	-	-	-	-	29	-	3.3

③ UCP: LT. GRAY, WET, V. LOOSE, SILTY F. SAND, W/ LITTLE ORGANICS (3.3%)

ROWY EMB: TAN ORANGE AND GRAY, DRY TO WET, LOOSE TO MED. DENSE, SILTY AND SLT. SILTY F. TO MED. SAND, W/ TRACE CLAY PIECES

UCP: GRAY ORANGE AND DK. GRAY, MOTTLED, MOIST TO WET, V. SOFT TO MED. STIFF, F. SANDY SILT AND CLAY

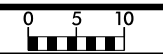
CP: DK. GRAY, SAT. TO WET, MED. STIFF, F. SANDY SILT, W/ SHELL FRAGS. (YORKTOWN FORMATION)

Ⓐ ROWY EMB: BROWN GRAY AND ORANGE, DRY, MED. DENSE, SILTY F. SAND, W/ TRACE ROOTS

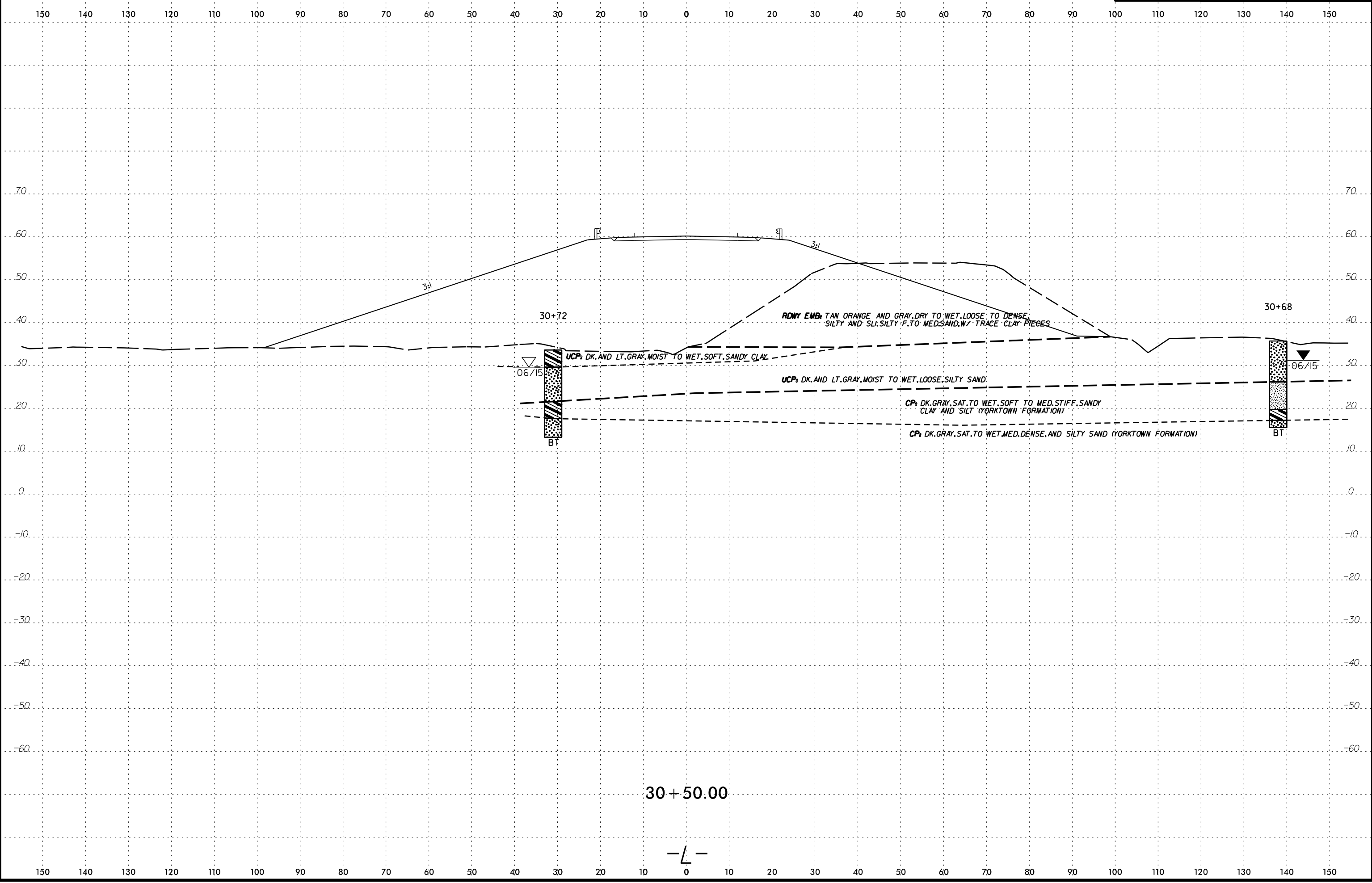
Ⓑ UCP: TAN ORANGE BROWN LT. AND DK. GRAY, MOTTLED, MOIST TO WET, V. LOOSE TO MED. DENSE, SLT. SILTY AND SILTY AND CLAYEY F. TO CSE. SAND, W/ TRACE ORGANICS

29 + 00.00

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Geotechnical

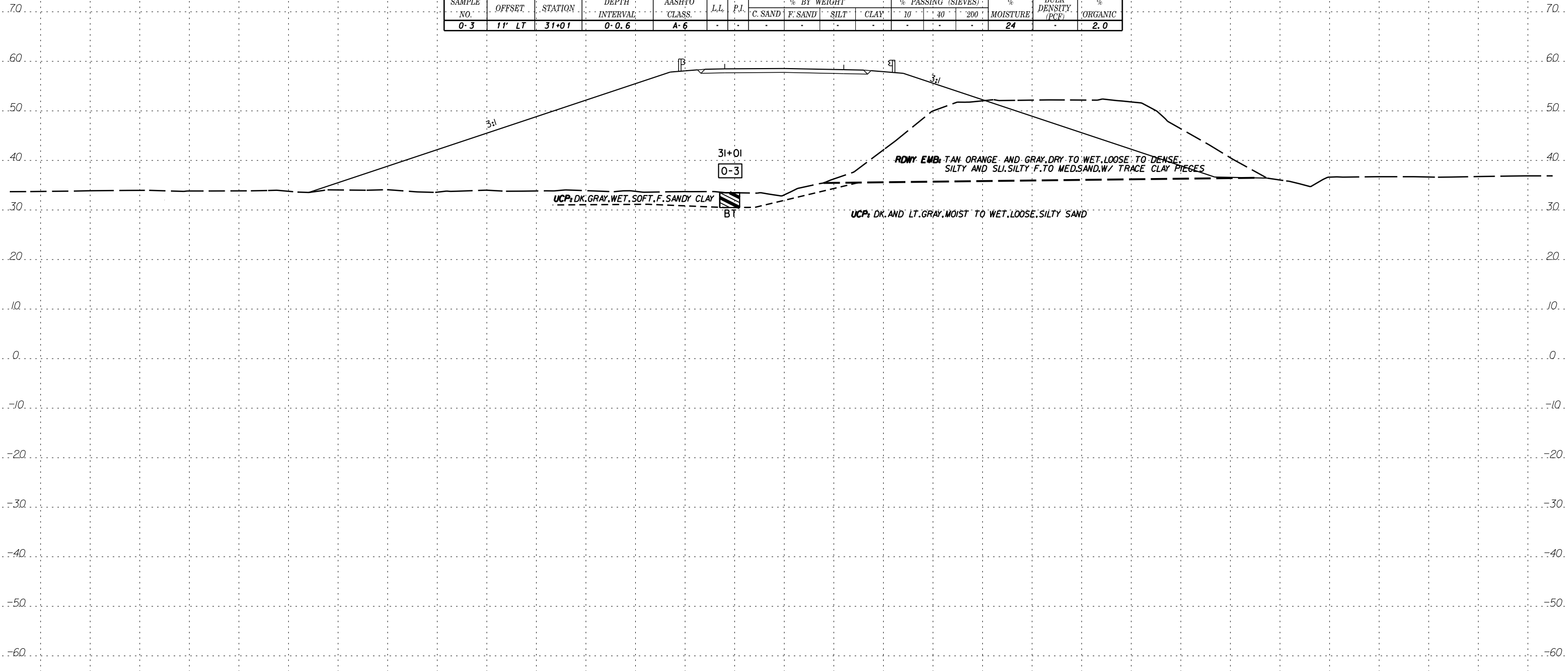


PROJ. REFERENCE NO.	SHEET NO.
B-5301	14



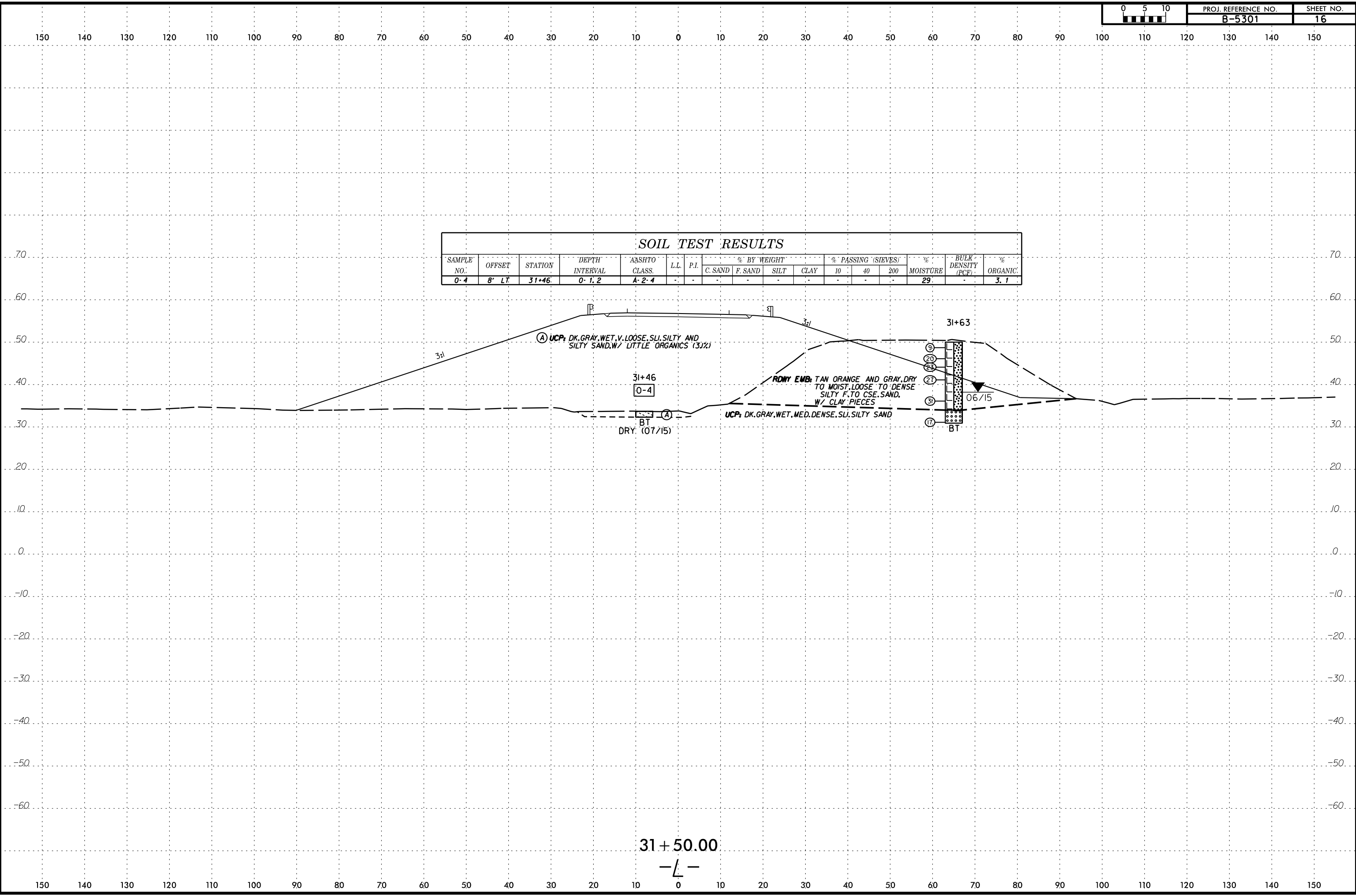
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SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L <sub>60</sub>	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
0-3	11' LT	31+01	0-0.6	A-6	-	-	-	-	-	-	-	-	24	-	2.0	



31+00.00  
-L-

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 cadmachine AI GEO-18

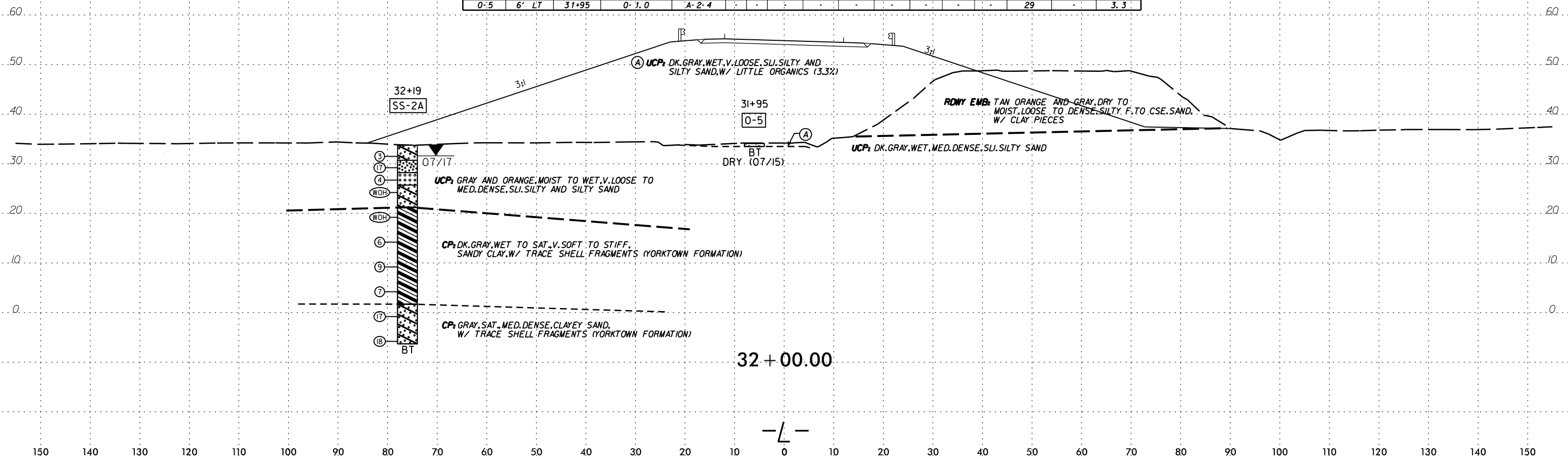


SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
0-4	8' LT	31+46	0-1.2	A-2-4	-	-	-	-	-	-	-	-	-	29	-	3.1

31 + 50.00  
 -L-

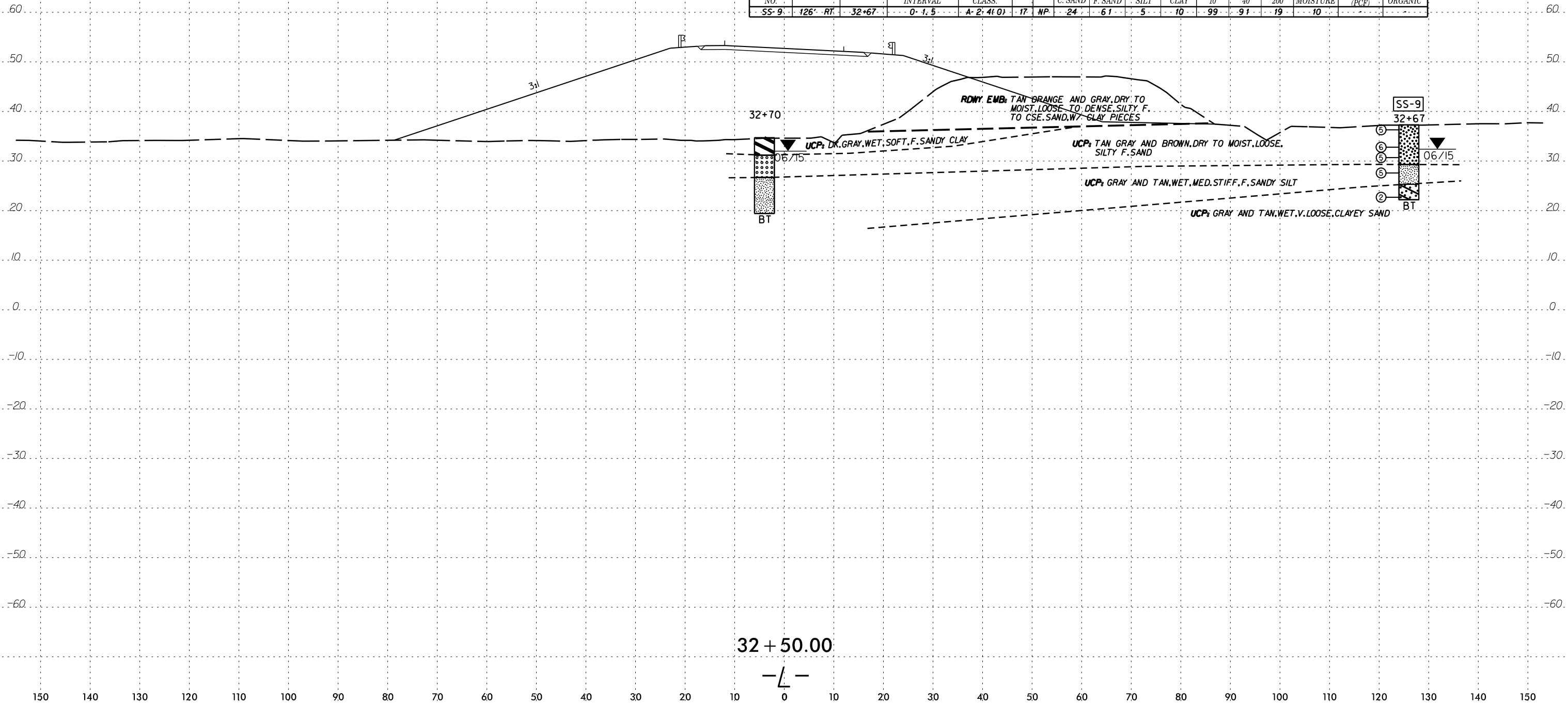
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SOIL TEST RESULTS																
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							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-2A	76' LT	32+19	4.8-6.3	A-3(0)	22	NP	7	92	1	6	100	100	9	26	-	-
0-5	6' LT	31+95	0-1.0	A-2-4	-	-	-	-	-	-	-	-	29	-	3.3	



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

SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	BULK DENSITY (PCF)	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-9	126' RT	32+67	0-1.5	A-2(0)	17	NP	24	61	5	10	99	91	19	10		

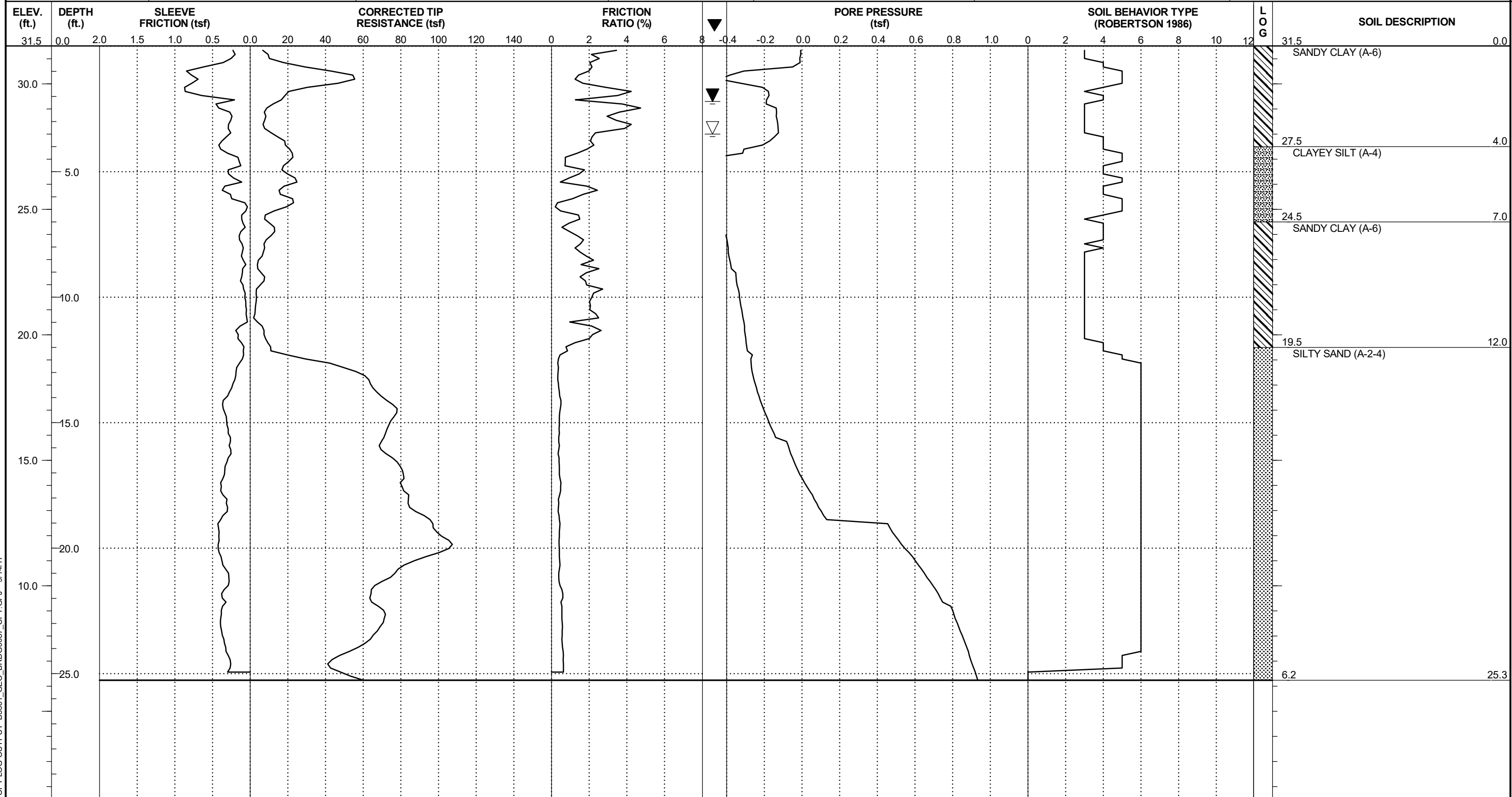


32 + 50.00  
-L-



FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NORTH CAROLINA 27607  
 Phone (919) 871-0800 Fax (919) 871-0803

PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_2037_LT	BORING LOCATION 20+37	OFFSET 28' LT	ALIGNMENT -L-	0 HR. 3.5	TOTAL DEPTH 25.26 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 31.5 ft	NORTHING 667,546	EASTING 2,533,778	24 HR. 2.2	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	

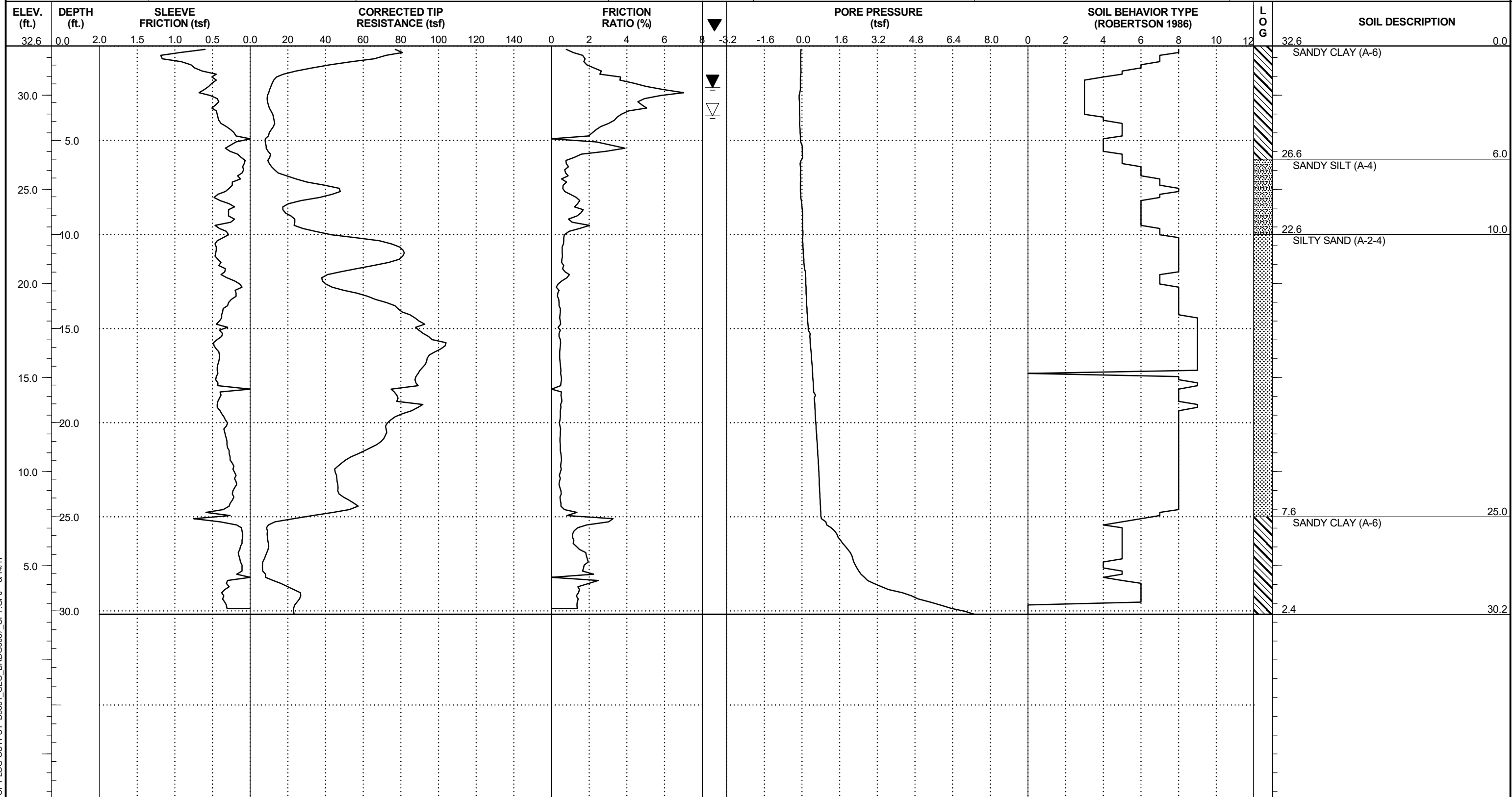


CPT LOG OUTPUT B5301\_GEO\_BRDG0087\_CPT.GPJ 9/14/17



FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NORTH CAROLINA 27607  
 Phone (919) 871-0800 Fax (919) 871-0803

PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_2277_LT	BORING LOCATION 22+77	OFFSET 38' LT	ALIGNMENT -L-	0 HR. 3.7	TOTAL DEPTH 30.19 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 32.6 ft	NORTHING 667,388	EASTING 2,533,956	24 HR. 2.2	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	



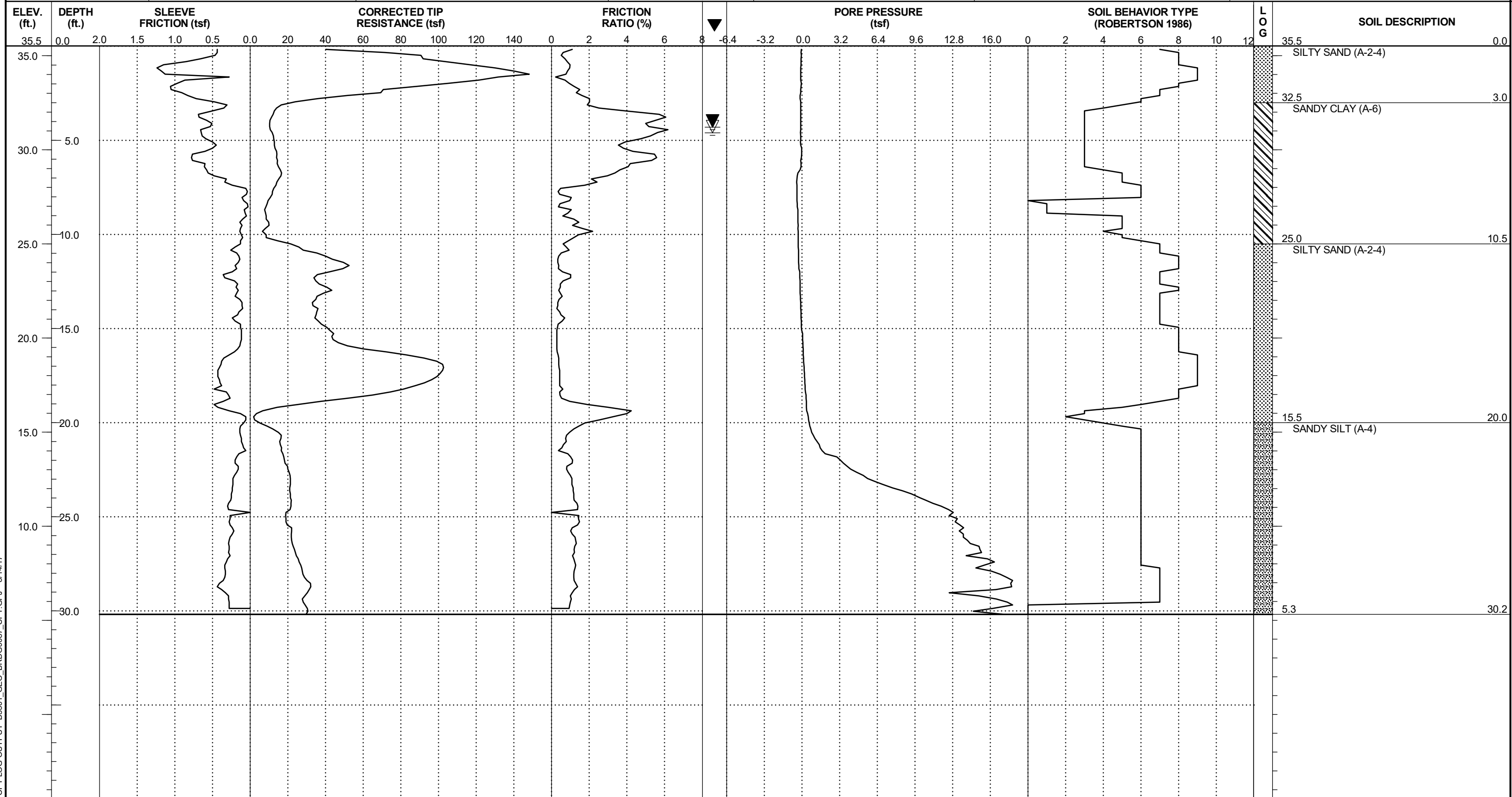
CPT LOG OUTPUT B5301\_GEO\_BRDG0087\_CPT.GPJ 8/14/17





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PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_2674_RT	BORING LOCATION 26+74	OFFSET 144' RT	ALIGNMENT -L-	0 HR. 4.6	TOTAL DEPTH 30.19 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 35.5 ft	NORTHING 666,993	EASTING 2,534,156	24 HR. 4.3	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	

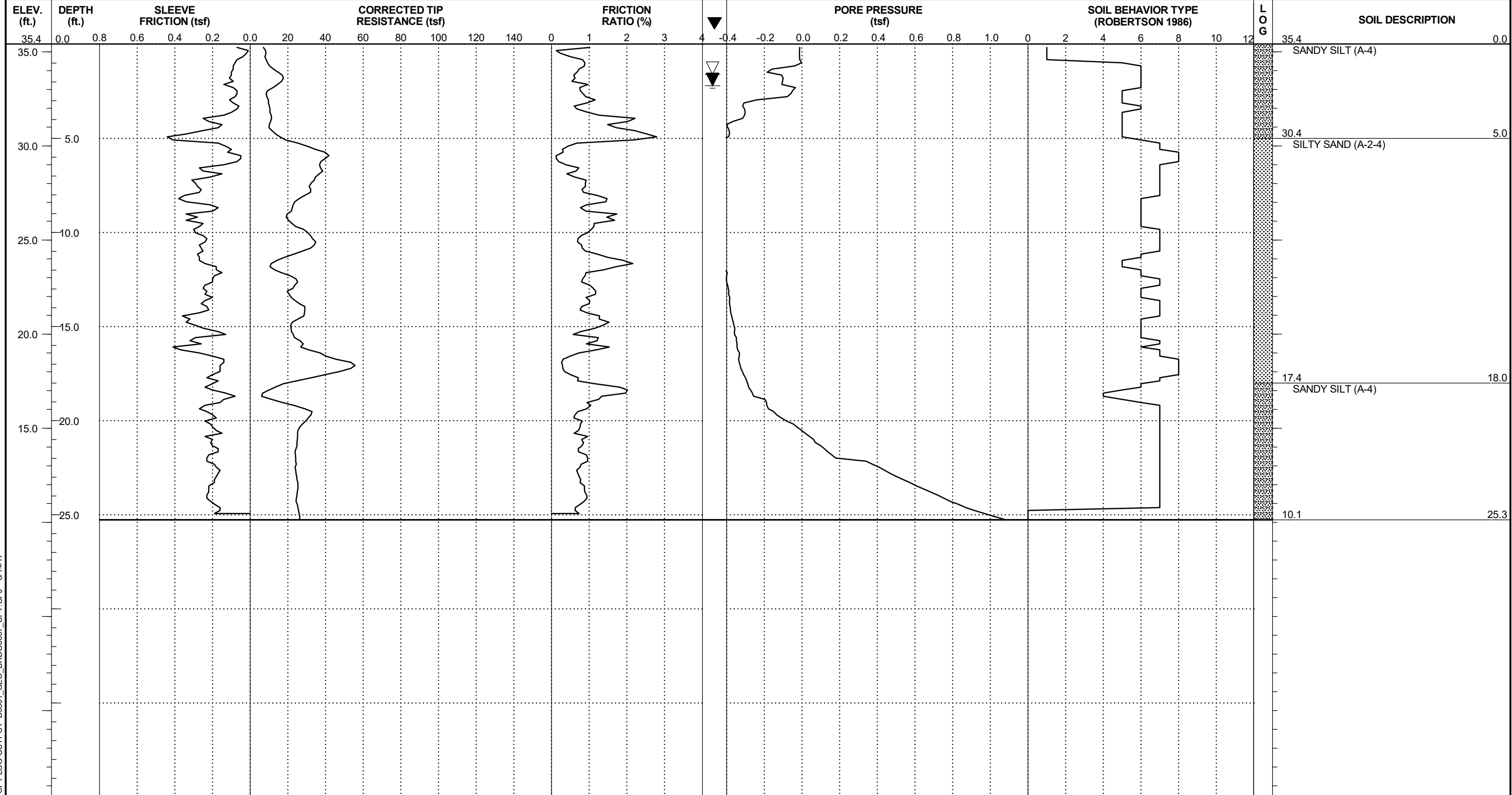


CPT LOG OUTPUT B5301\_GEO\_BRDG0087\_CPT.GPJ 8/14/17



FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NORTH CAROLINA 27607  
 Phone (919) 871-0800 Fax (919) 871-0803

PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_2851_LT	BORING LOCATION 28+51	OFFSET 11' LT	ALIGNMENT -L-	0 HR. 1.6	TOTAL DEPTH 25.26 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 35.4 ft	NORTHING 667,020	EASTING 2,534,392	24 HR. 2.2	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	

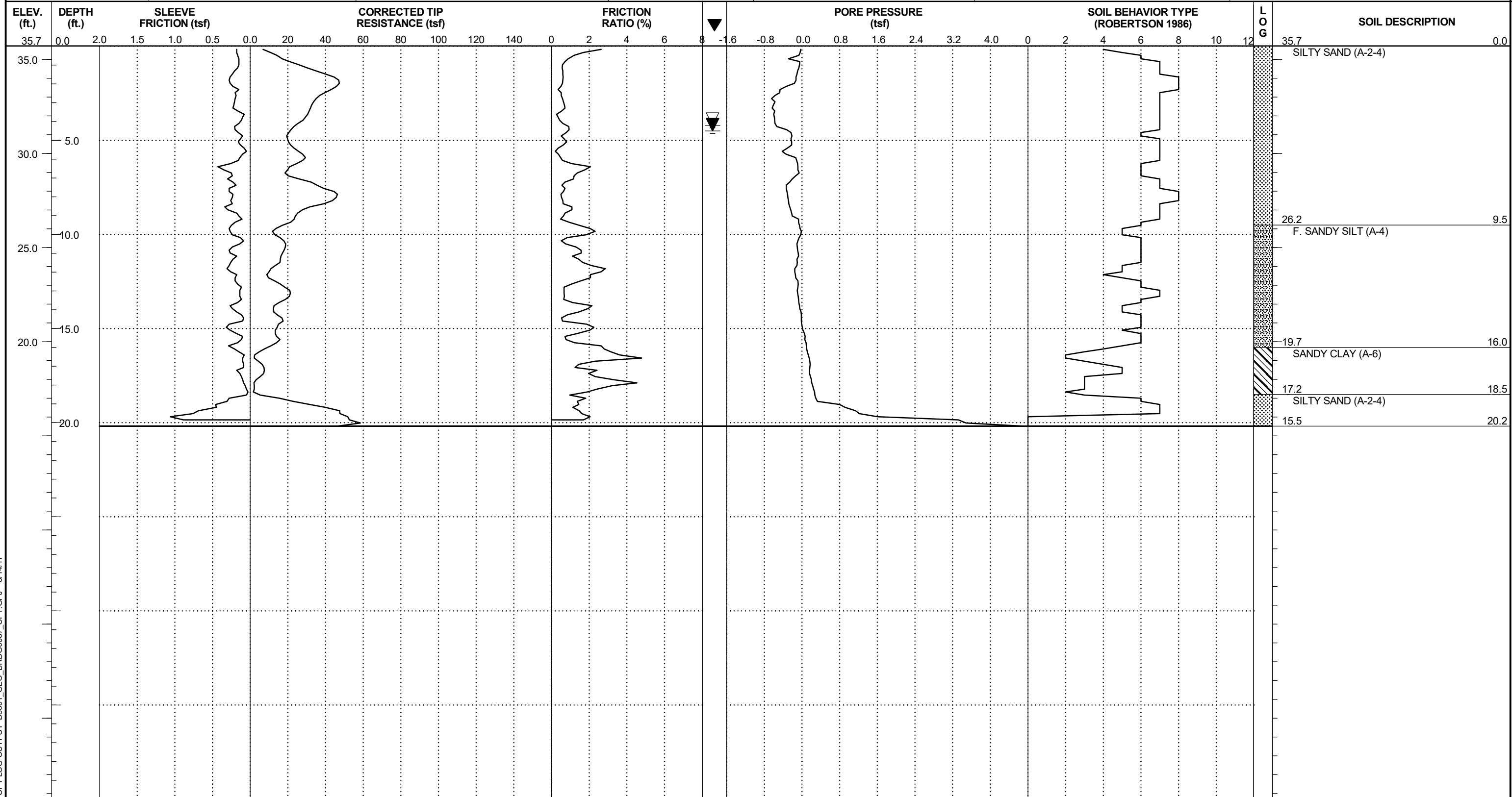


CPT LOG OUTPUT B5301\_GEO\_BRDG0087\_CPT.GPJ 8/14/17



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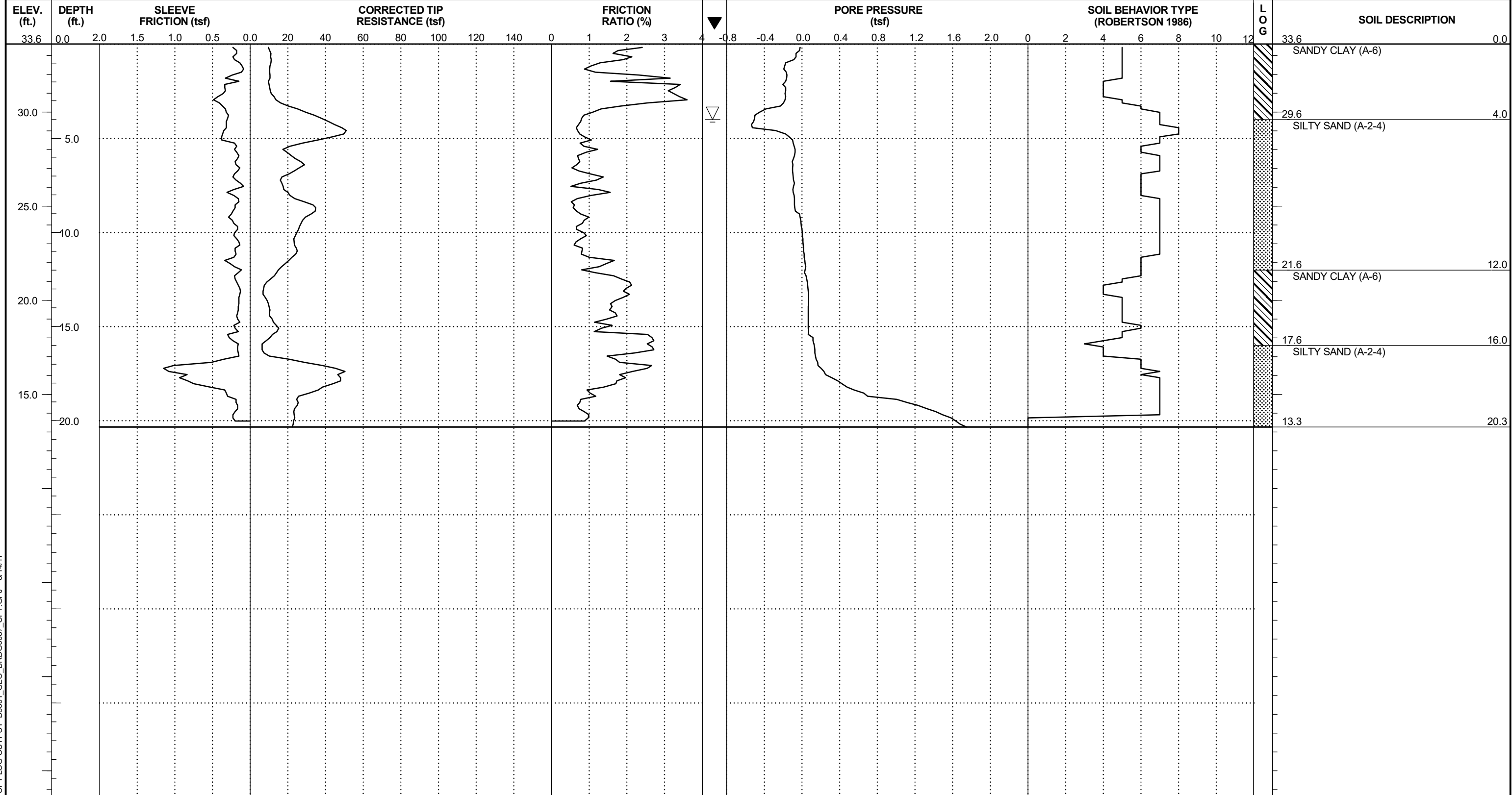
PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_3068_RT	BORING LOCATION 30+68	OFFSET 138' RT	ALIGNMENT -L-	0 HR. 4.2	TOTAL DEPTH 20.18 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 35.7 ft	NORTHING 666,776	EASTING 2,534,490	24 HR. 4.5	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	





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 RALEIGH, NORTH CAROLINA 27607  
 Phone (919) 871-0800 Fax (919) 871-0803

PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_3072_LT	BORING LOCATION 30+72	OFFSET 31' LT	ALIGNMENT -L-	0 HR. 4.0	TOTAL DEPTH 20.34 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 33.6 ft	NORTHING 666,915	EASTING 2,534,587	24 HR. N/A	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	

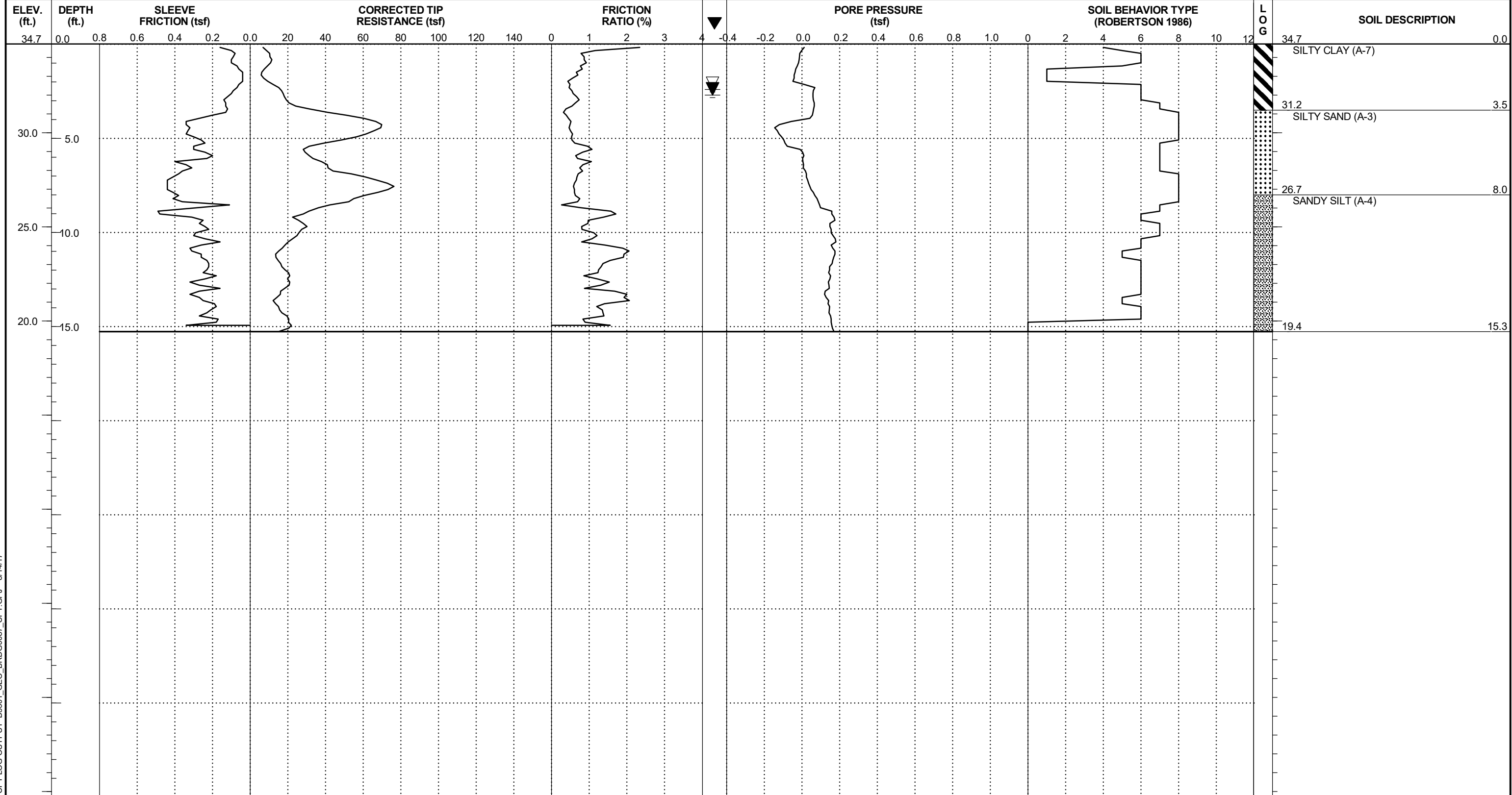


CPT LOG OUTPUT B5301\_GEO\_BRDG0087\_CPT.GPJ 8/14/17



FALCON ENGINEERING, INC.  
 1210 TRINITY ROAD, SUITE 110  
 RALEIGH, NORTH CAROLINA 27607  
 Phone (919) 871-0800 Fax (919) 871-0803

PROJECT NO. 46015.1.1	ID. B-5301	COUNTY PITT	LOGGED BY HUNSBERGER, W. S.	TYPE OF CONE 10 TON CONE	ROD TYPE 1.4" DIA	MAX. DOWN PRESSURE (tsf) 900 TSF
SITE DESCRIPTION REPLACE BRIDGE 87 OVER THE NORFOLK SOUTHERN RAILROAD ON NC 33			GROUND WATER (ft.)	DATE STARTED 06/22/15	COMPLETED 06/22/15	SURFACE WATER DEPTH N/A
BORING NO. L_3270_LT	BORING LOCATION 32+70	OFFSET 4' LT	ALIGNMENT -L-	0 HR. 2.4	TOTAL DEPTH 15.26 ft	DRILL MACHINE CPT TRACK
COLLAR ELEV. 34.7 ft	NORTHING 666,782	EASTING 2,534,737	24 HR. 2.7	DRILLER CONTRACT DRILLER	DRILL METHOD DIRECT PUSH	



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