

SEE SHEET 2A 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.	R-3833C	1	57

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	18+05.86 - 75+82.64	4-8	12-14
-Y-	13+75.00 - 56+40.00	7,9,10,11	15,16
-Y1-	13+00.00 - 18+84.36	4	17
-Y5-	10+00.00 - 18+22.77	6,11	18

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	21+00.00 - 23+50.00	19,20
-L-	36+00.00	21
-L-	71+00.00 - 72+00.00	22
-L-	74+00.00 - 75+50.00	23
-Y-	19+00.00 - 25+00.00	24-26
-Y5-	15+00.00 - 17+50.00	27,28

APPENDICES

APPENDIX	TITLE	SHEETS
A	PAVEMENT INVESTIGATION	29-50
B	LABORATORY RESULTS	51-54

ROADWAY
SUBSURFACE INVESTIGATION

COUNTY IREDELL
PROJECT DESCRIPTION SR 1100 BRAWLEY SCHOOL
ROAD FROM SR 1116 TALBERT ROAD TO
1000' EAST OF US 21

INVENTORY

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

HPC

LANE, R.W.

INVESTIGATED BY FALCON ENG.

DRAWN BY HILL, M.J.

CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE JULY 2019



DocuSigned by:
W. Scott Hunsberger 7/3/2019

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SIGNATURE DATE

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REFERENCE: R-3833C

PROJECT: 34554

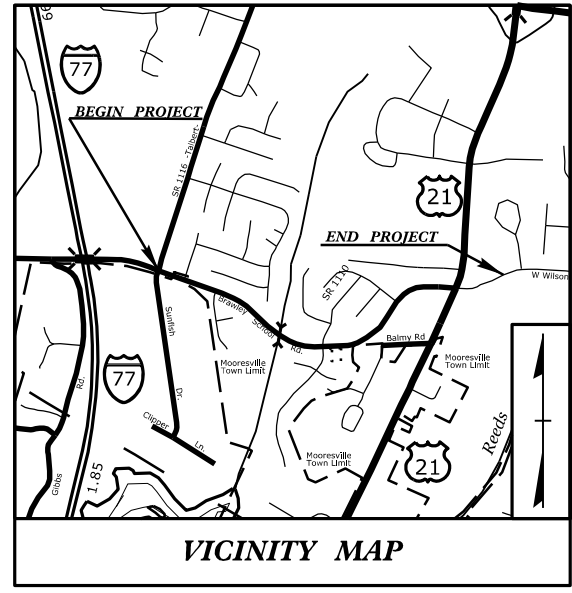
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N.C.	R-3833C	2A	57
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34554.1.FD1		P.E.	
34554.2.4		RW	
34554.2.5		UTIL	

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

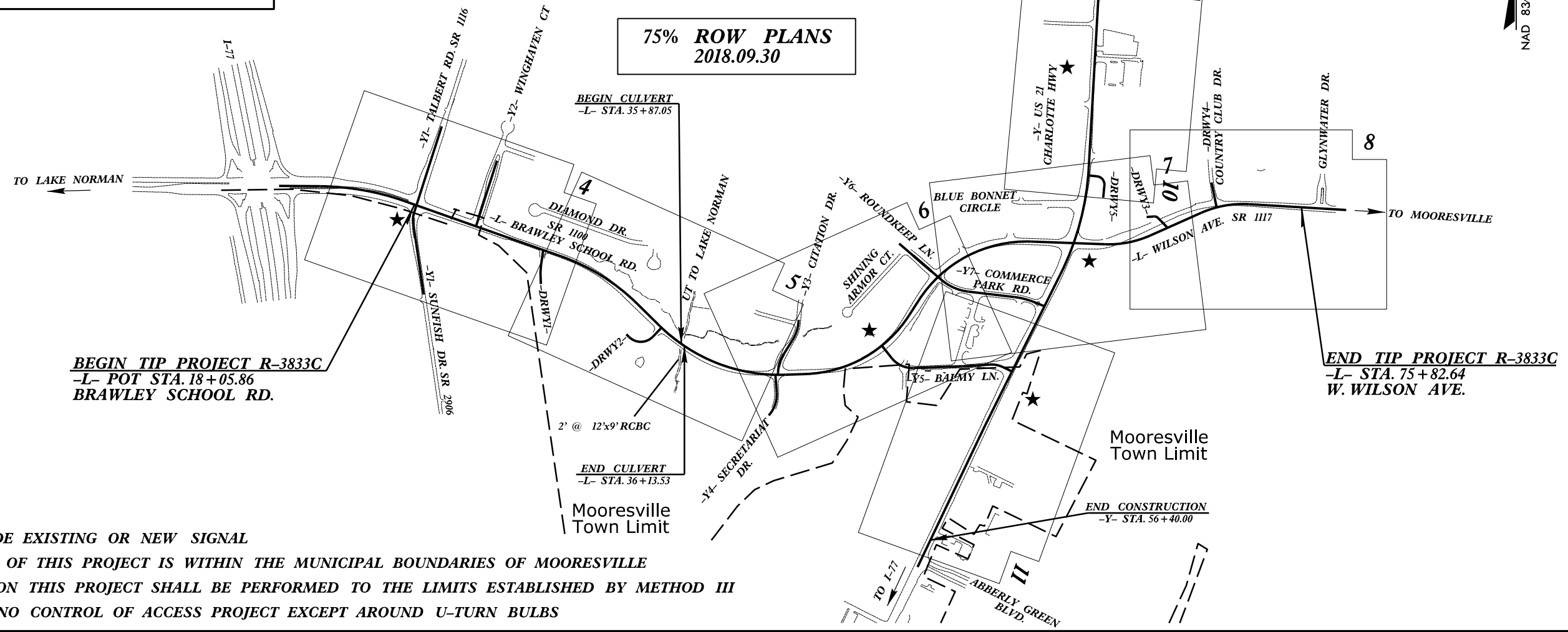
**LOCATION: SR 1100 BRAWLEY SCHOOL ROAD FROM
SR 1116 TALBERT ROAD TO
1000' EAST OF US 21**

**TYPE OF WORK: GRADING, PAVING, DRAINAGE,
CULVERT, WALLS, SIGNALS, PAVEMENT MARKINGS,
PAVEMENT MARKERS**

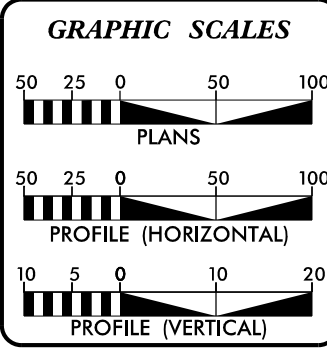


TIP PROJECT: R-3833C

CONTRACT: 34554



★ UPGRADE EXISTING OR NEW SIGNAL
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF MOORESVILLE
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS IS A NO CONTROL OF ACCESS PROJECT EXCEPT AROUND U-TURN BULBS



DESIGN DATA

ADT 2015 =	18500
ADT 2040 =	28200
K =	10 %
D =	55 %
T =	4 % *
V =	45 MPH
* TTST =	1% DUAL = 3%
FUNC CLASS =	MAJOR RURAL COLLECTOR

PROJECT LENGTH

ROADWAY LENGTH TIP PROJECT R-3833C =	1.090 miles
STRUCTURE LENGTH TIP PROJECT R-3833C =	0.005 miles
TOTAL LENGTH TIP PROJECT R-3833C =	1.094 miles

Prepared In The Office of:

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for the North Carolina Department of Transportation

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 30, 2018	STANTEC CONTACT: A. DEAN SARVIS, P.E. PROJECT ENGINEER
LETTING DATE: JUNE 16, 2020	NC DOT DIVISION 12 CONTACT: BRYAN SOWELL, PE PROJECT MANAGER

HYDRAULICS ENGINEER

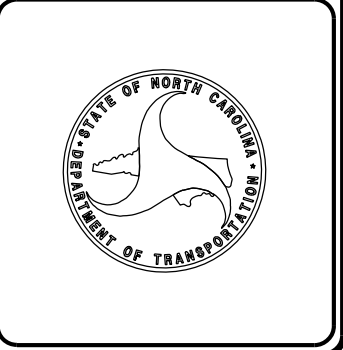
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SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

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SIGNATURE: _____ P.E.



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Roadway Subsurface Investigation Report - Inventory

**Brawley School Road (SR 1100) from
Talbert Road (SR 1116) to 1000' East of US 21
Iredell County, North Carolina
WBS No.: 34554.1.3, TIP: R-3833C
Falcon Project No.: G18063.00**

Prepared for:
STANTEC, Inc.
801 Jones Franklin Road, Suite 300
Raleigh, NC 27606

Submitted by:
Falcon Engineering, Inc.
1210 Trinity Road, Suite 110
Cary, North Carolina 27513
(919) 871-0800
www.falconengineers.com

July 3, 2019

TIP: R-3833C
WBS NO.: 34554.1.3
COUNTY: Iredell
DESCRIPTION: Brawley School Road (SR 1100) from Talbert Road (SR 1116) to 1000' East of US 21
SUBJECT: Roadway Subsurface Investigation – Inventory

PROJECT DESCRIPTION

This project consists of 1.09 miles of proposed widening and intersection improvements on Brawley School Road in Mooresville in Iredell County. Brawley School Road will be widened from Talbert Road to east of US 21. Tie-ins and minor improvements to Y-lines and small drives are also included at various locations. Five retaining walls will be constructed at various locations throughout the project corridor. A dual reinforced concrete box culvert will be constructed at an existing stream crossing across the -L- line. A noise wall will be constructed between Citation Drive and Roundkeep Lane. Investigations for these structures will be provided under separate cover.

The investigation was conducted between January 30th and February 26th, 2019 in general accordance with our Scope and Fee Estimate for Geotechnical Investigation and Engineering Services. The information provided in this report is 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.

A total of forty-eight (48) Standard Penetration Test (SPT) borings were drilled for the proposed roadway alignments. All mechanical borings were drilled using a CME-550 ATV mounted drill rig equipped with 2 1/4-inch inside diameter hollow-stem augers, and SPT testing was performed with an automatic hammer. Representative soil samples, collected with a split-barrel sampler were selected for laboratory testing to verify visual field classifications. In addition, bulk samples were collected for standard Proctor compaction and California Bearing Ratio (CBR) testing. At twenty-five (25) locations along the existing roadway, existing pavements were cored, measured, and Dual Mass Dynamic Cone Penetrometer (DCP) testing completed on the subgrade to depths of up to three feet to correlate in-situ CBR values. The dual mass DCP used is manufactured by Kessler Soils Engineering Products, Inc. CBR values were estimated using software provided by the manufacturer which utilizes correlations established by the Army Corps of Engineers Waterways Experiment Station.





Portions of the following alignment, totaling approximately 2.17 miles were investigated. Other minor Y-lines and driveways are included on the project but improvements are not anticipated to be significant enough to warrant investigation.

<u>Alignment</u>	<u>Station (ft)</u>
-L- (Brawley School Road)	18+05.86 to 75+82.64
-Y- (US 21)	13+75 to 56+40
-Y1- (Talbert Road)	13+00 to 18+84.36
-Y5- (Balmy Lane)	10+00 to 18+22.77

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- I. Alluvial soils were encountered near the following locations. The potential for shallow groundwater and wet, soft or organic soils should be anticipated at these locations:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	35+91
-L-	35+94

- II. The following locations contain very soft to soft/very loose soils with an N-value less than 4 near the ground surface:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	35+91
-L-	35+94
-L-	42+61
-Y-	43+97
-Y-	48+25

- III. The following locations contain highly plastic soils with plasticity indices (PI) greater than 35, or marginal soils with moisture content greater than the plastic limit:

<u>Alignment</u>	<u>Station (ft)</u>
-L-	22+35
-L-	65+00
-L-	71+04
-Y-	20+01
-Y5-	15+84

PHYSIOGRAPHY AND GEOLOGY

According to the *Geologic Map of North Carolina* (1985), the site is in the Charlotte Belt Physiographic Province of North Carolina. Specifically, rocks at the site are noted as Granitic Rock (**Ppg**) – megacrystic to equigranular. Castilia, Lillington, Medoc Mountain, Sims, Contentnea Creek and Elm City intrusives.

Existing site topography is rolling terrain typical of North Carolina's Piedmont Physiographic Province. The site lies approximately 2,000 feet north an arm of Lake Norman – the largest man-made freshwater body in the State of North Carolina. One stream crosses the -L- alignment flowing north to south toward Lake Norman. An existing culvert will be replaced at this location.

The existing corridor is heavily populated with residential (multi-family as well as single family), commercial, and municipal properties. Residential properties are generally located to the west of the project corridor with more commercial properties to the east.





SOIL PROPERTIES

A variety of soils were encountered along the project, including existing Roadway Embankment fill, Alluvial soils and Residual soils.

Roadway Embankment soils were encountered at the ground surface adjacent to existing roadways. Where encountered, these soils consist of up to 5.5 feet of dry to wet, soft to stiff, sandy silt and sandy and silty clay (A-4, A-6, A-7) and very loose to loose, silty sand (A-2-4, A-2-5).

Alluvial soils were encountered at the ground surface or beneath roadway embankment fills. Where encountered, these soils consist of up to 22 feet of moist to saturated, very soft to soft, sandy silt and silty sandy clay (A-4, A-6, A-7) and very loose to loose silty sand and clayey sand (A-2-4, A-2-6).

Residual soils were encountered at ground surface or beneath the roadway embankment fills or alluvial soils. These soils consist of dry to wet, medium stiff to very stiff, sandy silt and sandy and silty clay (A-4, A-6, A-7) and very loose to very dense, silty and clayey sand (A-2-4, A-2-6).

GROUNDWATER PROPERTIES

Groundwater levels were measured at the time of boring completion, and in many cases after a waiting period of at least 24 hours. Borings drilled within and in close proximity to existing roadways, and within residential or commercial areas were backfilled immediately after completion due to safety considerations. Groundwater measurements were generally dry, with some groundwater measured greater than 6 feet below proposed grade.

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.

ADDITIONAL LABORATORY TESTING

The following bulk samples were obtained:

<u>Sample</u>	<u>Location</u>	<u>Depth (ft)</u>	<u>Test</u>
BS-1	30+04, 56' RT, -L-	3.0 – 10.0	California Bearing Ratio, Standard Proctor
BS-2	25+50, 63' RT, -L-	3.0 – 10.0	California Bearing Ratio, Standard Proctor
BS-3	50+04, 47' RT, -Y-	3.5 – 8.5	California Bearing Ratio, Standard Proctor

Classification test results for bulk samples are included in the subsurface profiles and cross sections and Standard Proctor and California Bearing Ratio (CBR) data is attached in the Appendix.

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

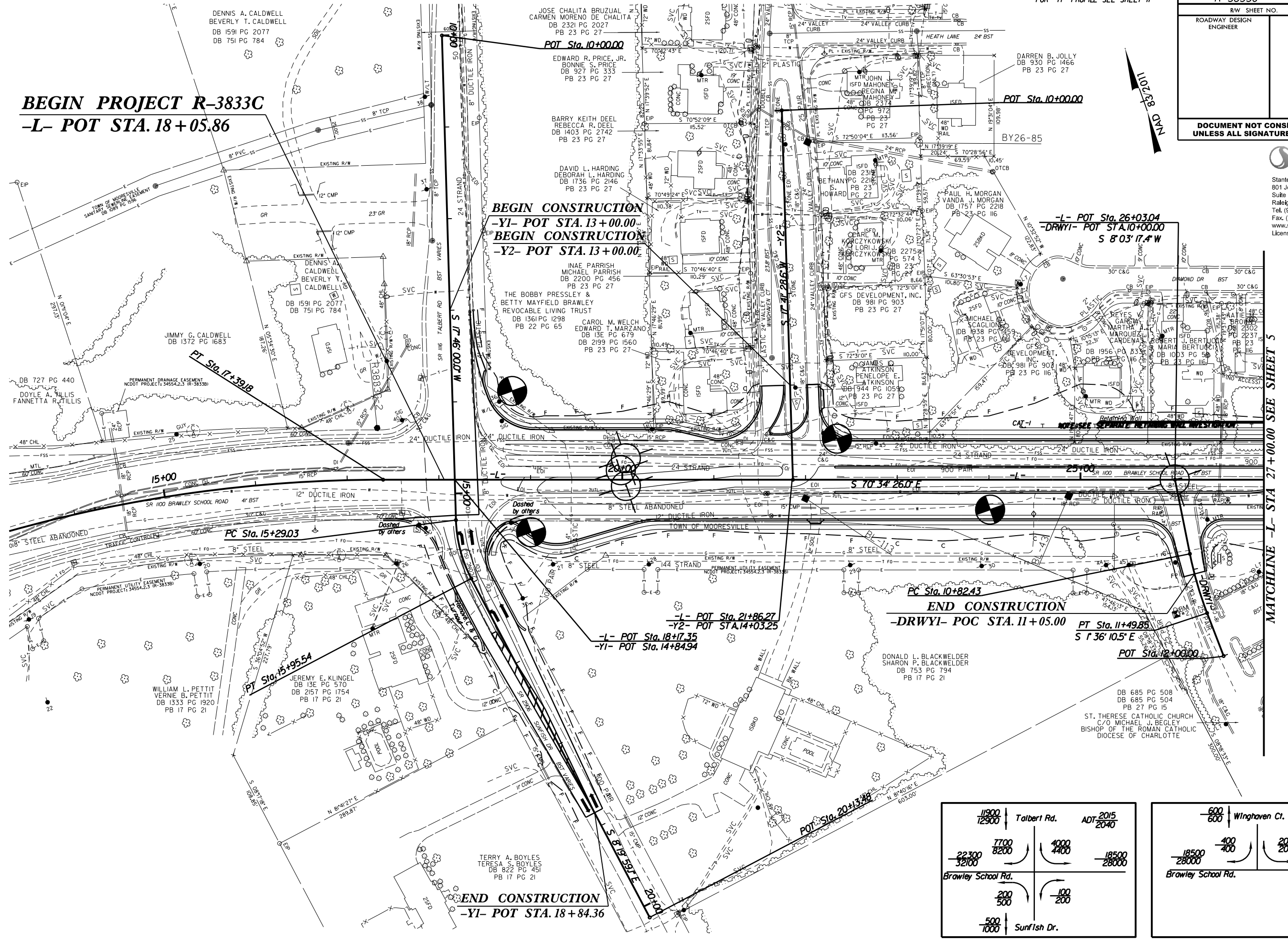


FOR -L- PROFILE SEE SHEET 12
FOR -Y1- PROFILE SEE SHEET 17

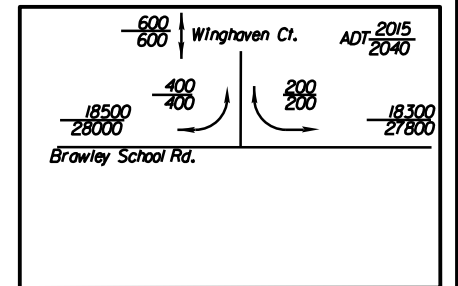
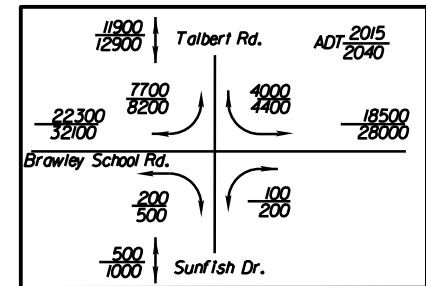
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DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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BEGIN PROJECT R-3833C
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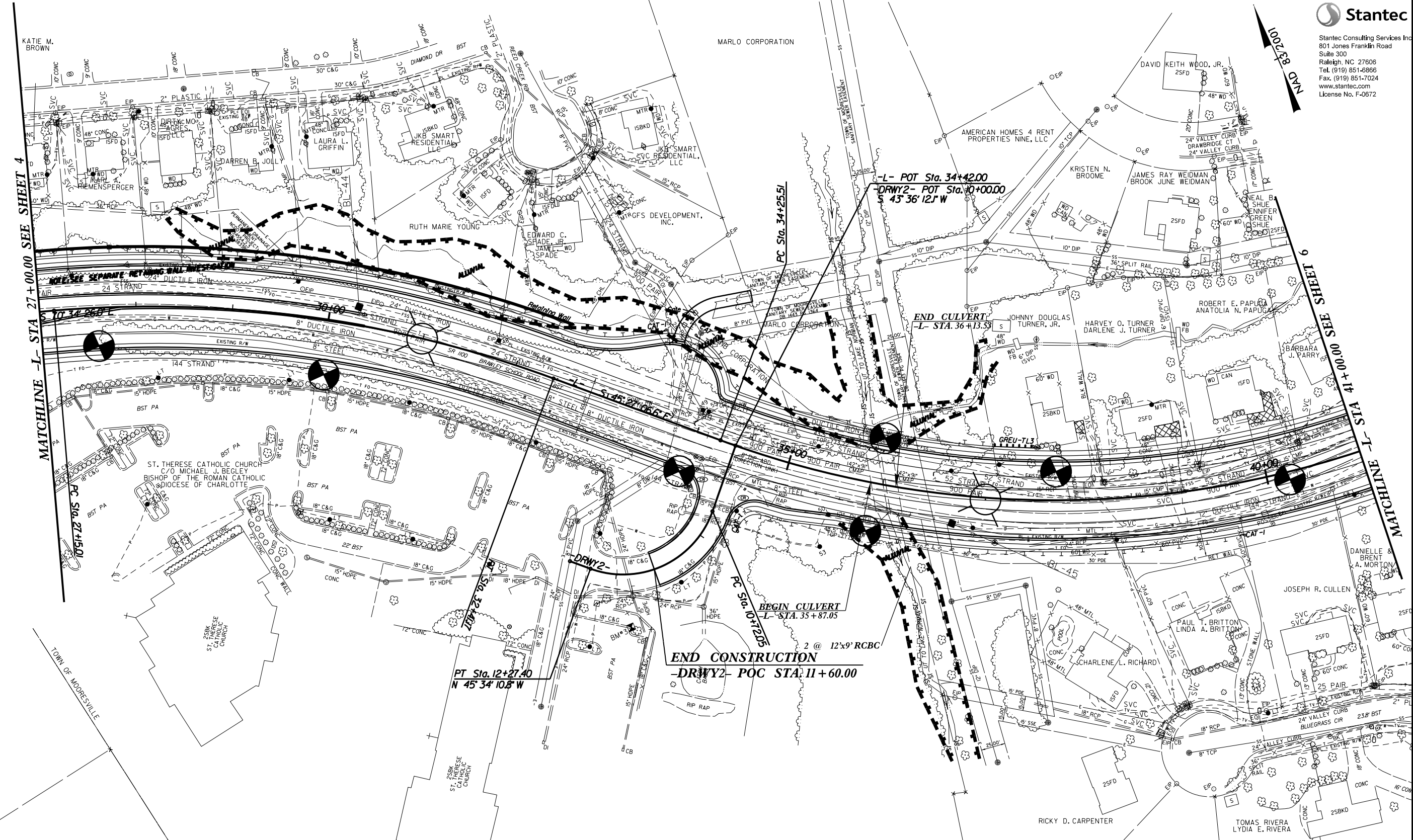


MATCHLINE -L- STA 27+00.00 SEE SHEET 5



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MATCHLINE -L- STA 41+00.00 SEE SHEET 6

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PT Sta. 12+27.40
N 45° 34' 10.8" W

-L- POT Sta. 34+42.00
-DRWY2- POT Sta. 10+00.00
S 43° 36' 12.1" W

PC Sta. 34+25.51

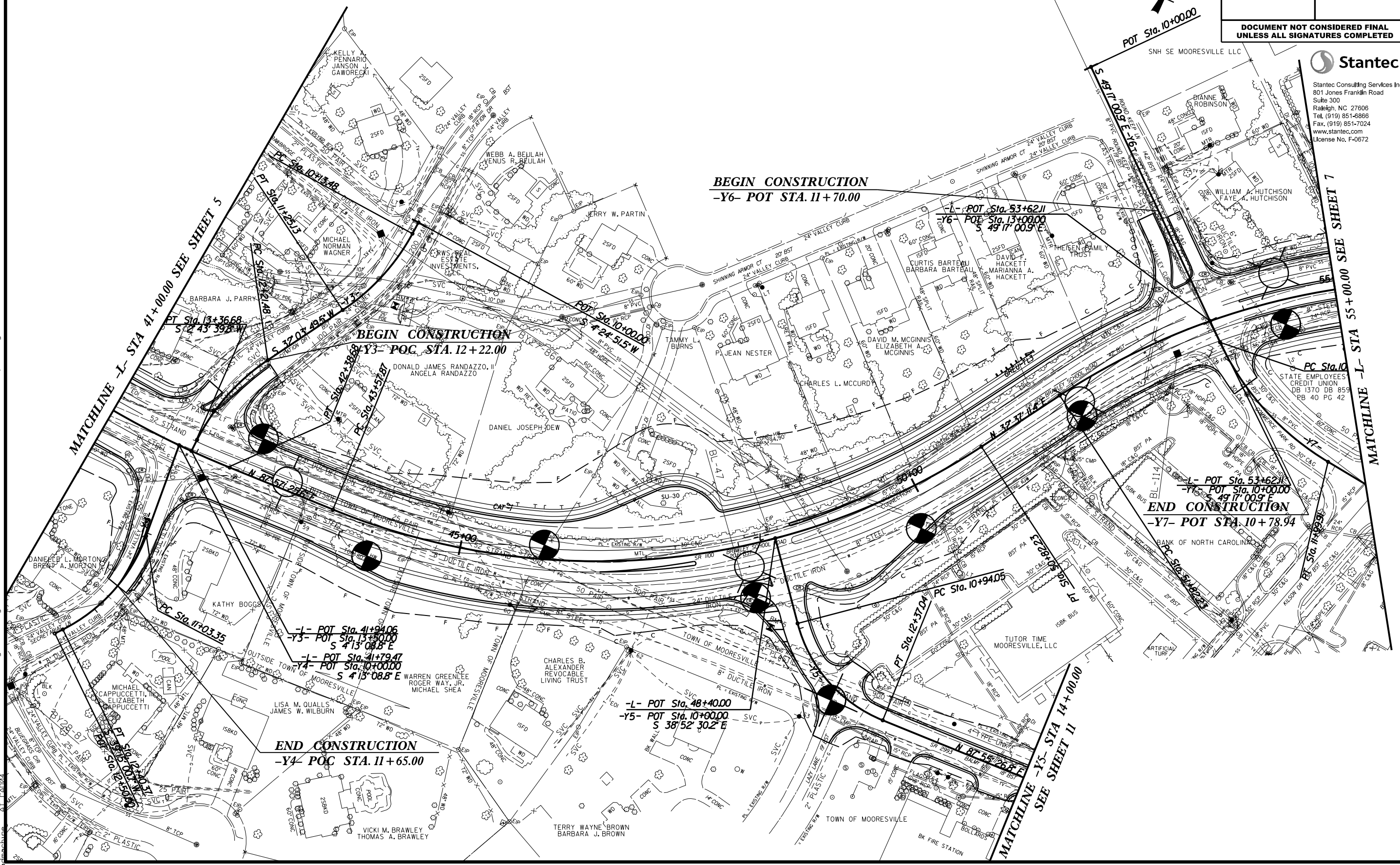
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FOR -L- PROFILE SEE SHEET 13
FOR -Y5- PROFILE SEE SHEET 18

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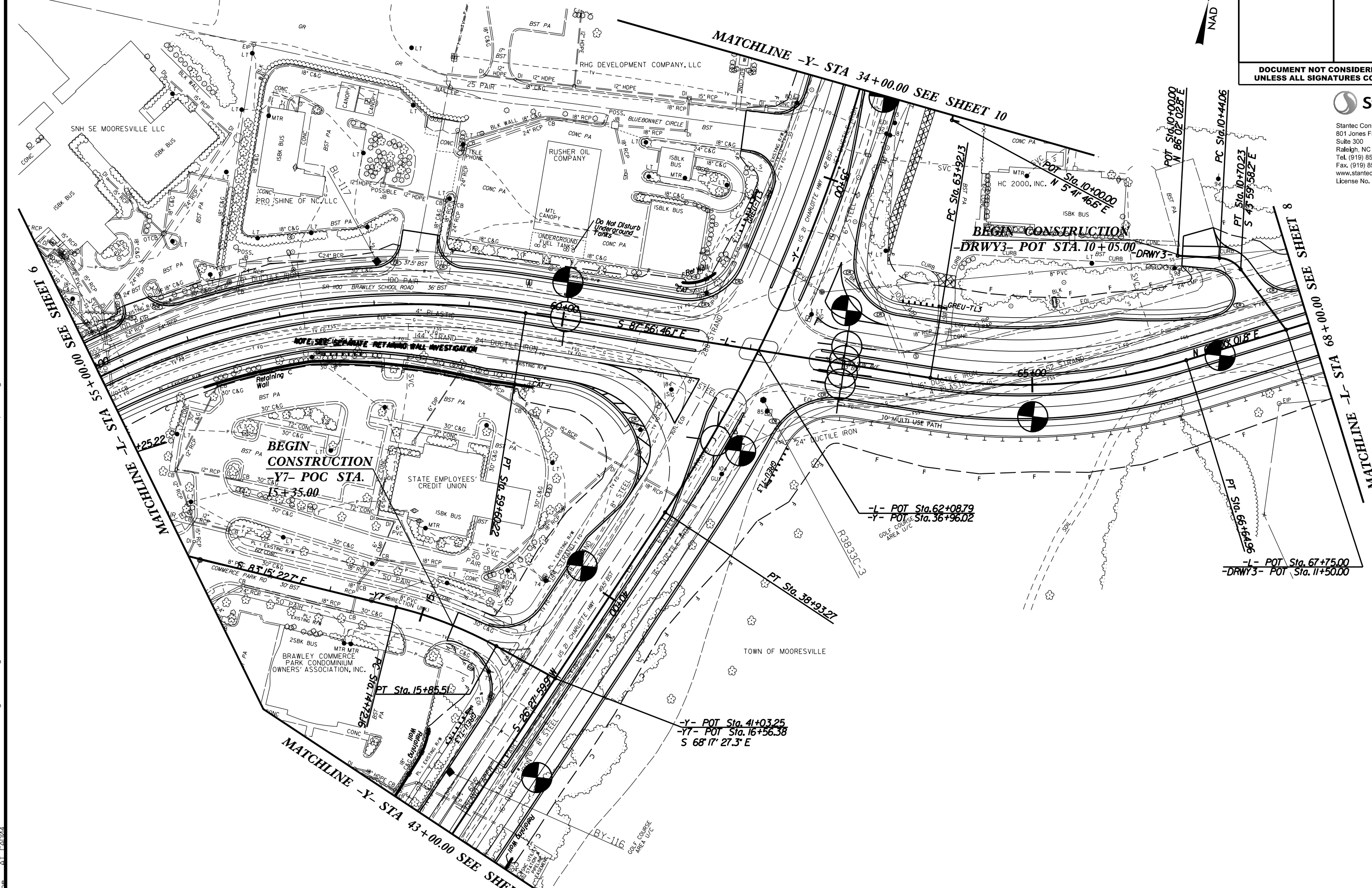
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FOR -L- PROFILE SEE SHEET 13 AND 14
FOR -Y- PROFILE SEE SHEET 15 AND 16

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RW SHEET NO.	
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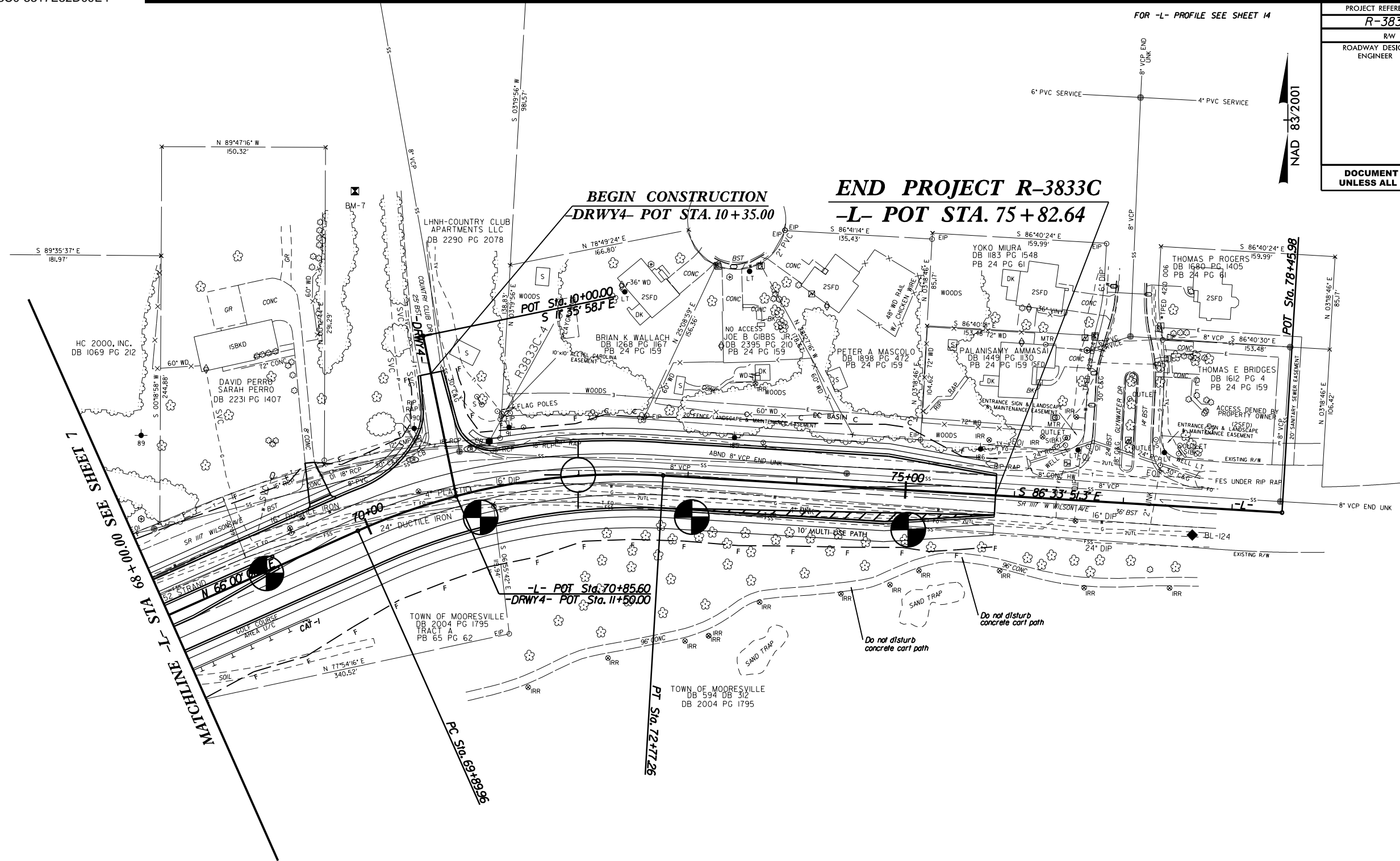
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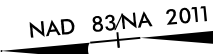
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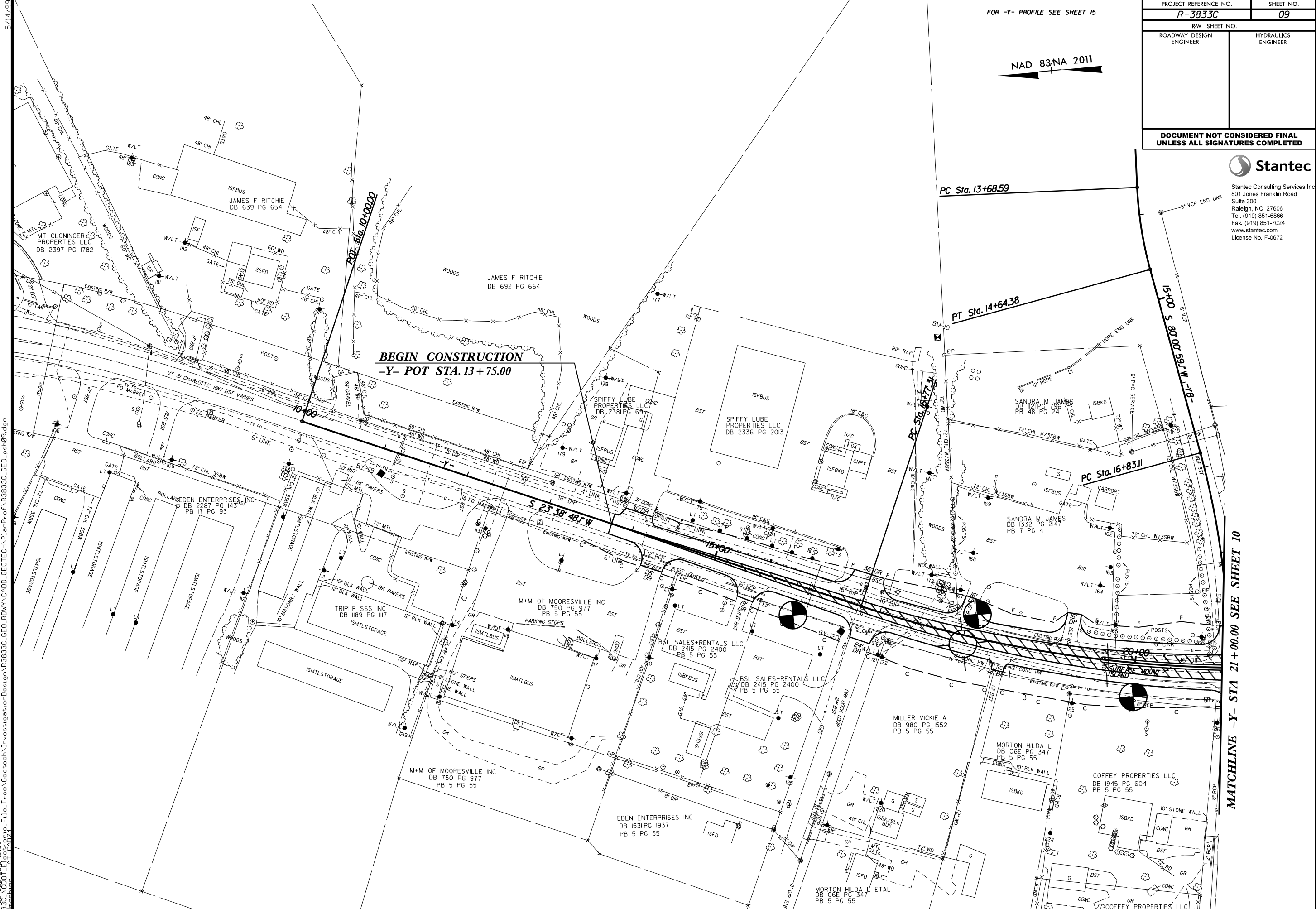
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FOR -Y- PROFILE SEE SHEET 15

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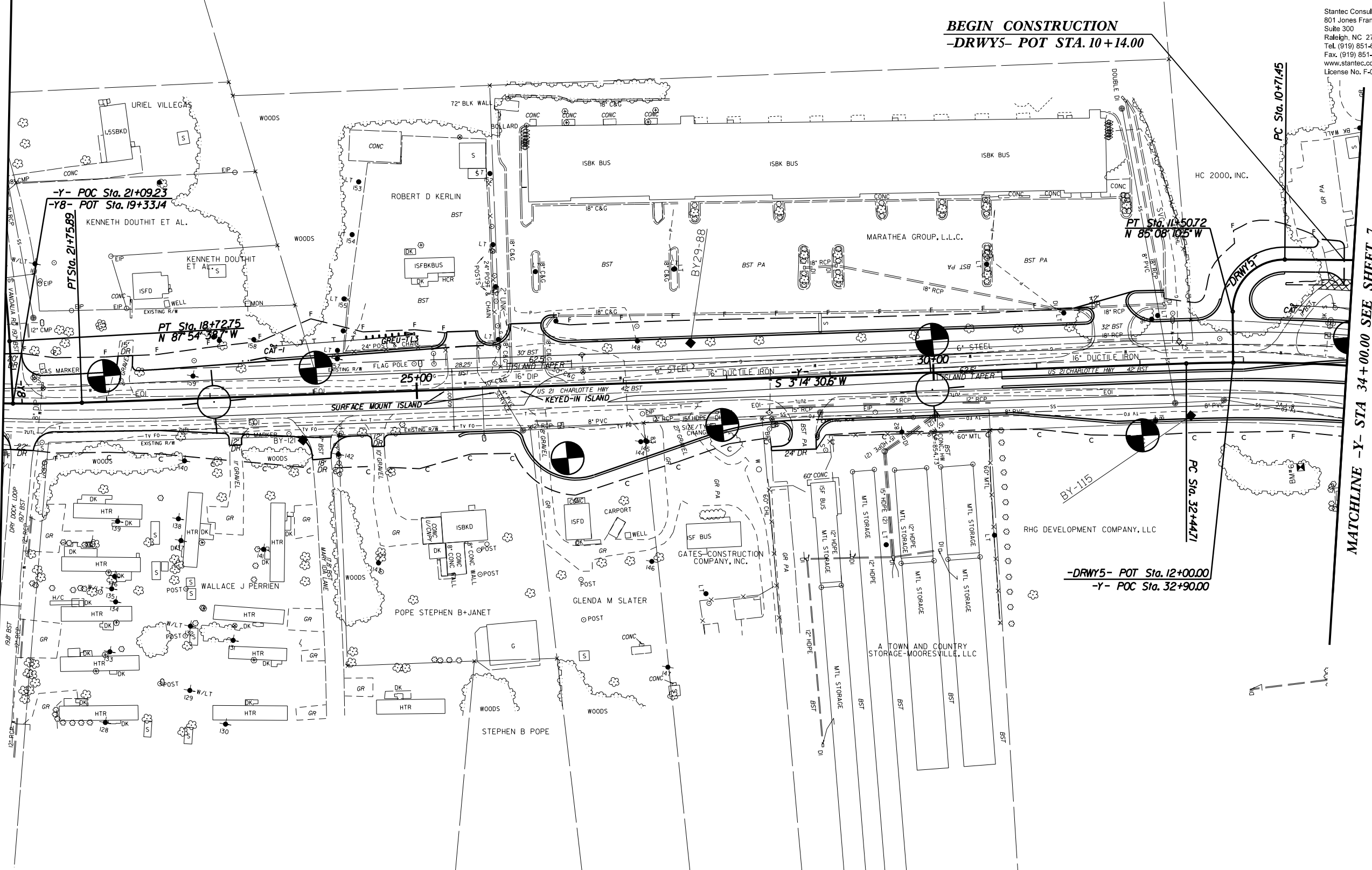
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MATCHLINE -Y- STA 21+00.00 SEE SHEET 9

MATCHLINE -Y- STA 34+00.00 SEE SHEET 7

BEGIN CONSTRUCTION
-DRWY5- POT STA. 10+14.00

-DRWY5- POT Sta. 12+00.00
-Y- POC Sta. 32+90.00




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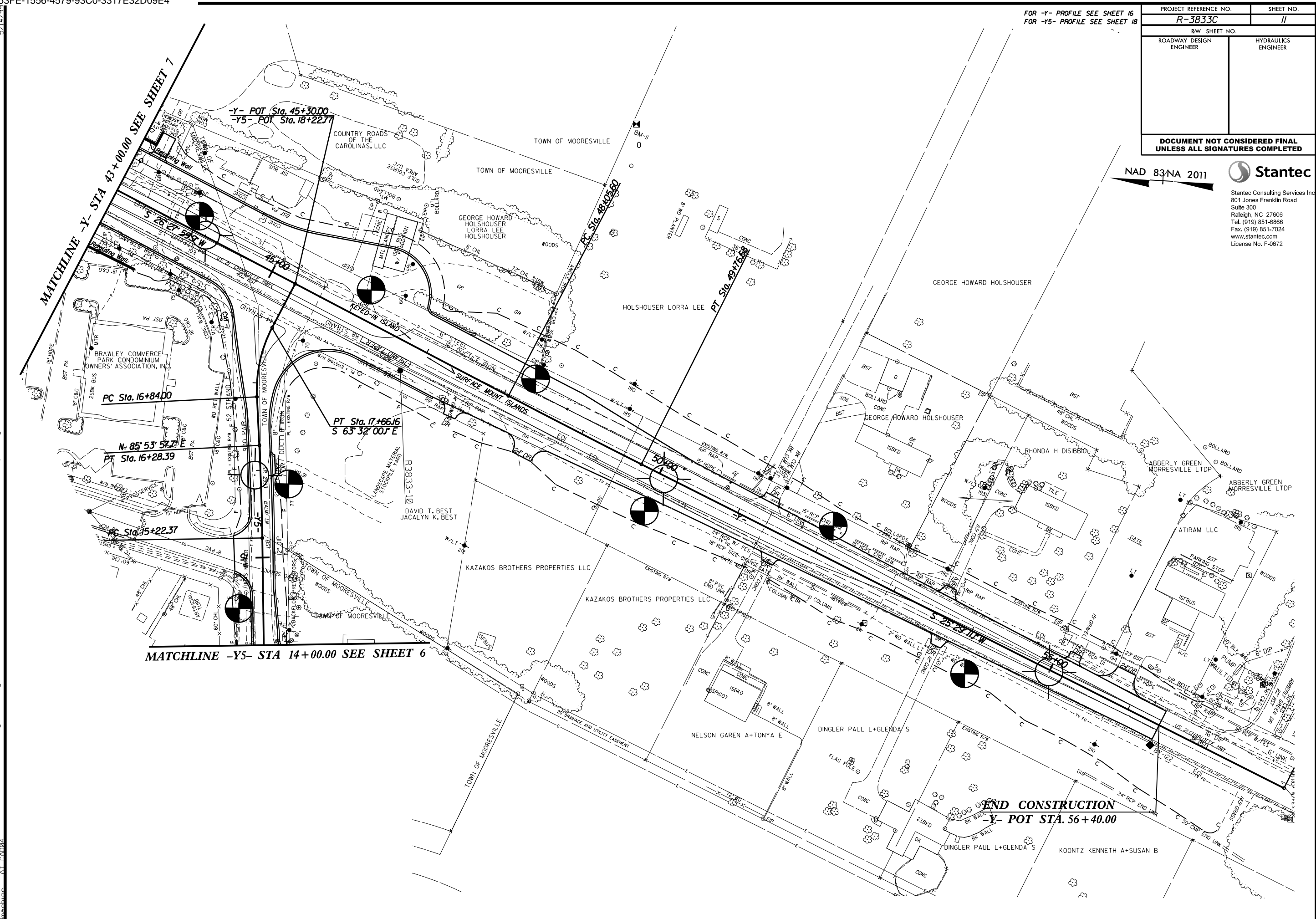
FOR -Y- PROFILE SEE SHEET 16
FOR -Y5- PROFILE SEE SHEET 18

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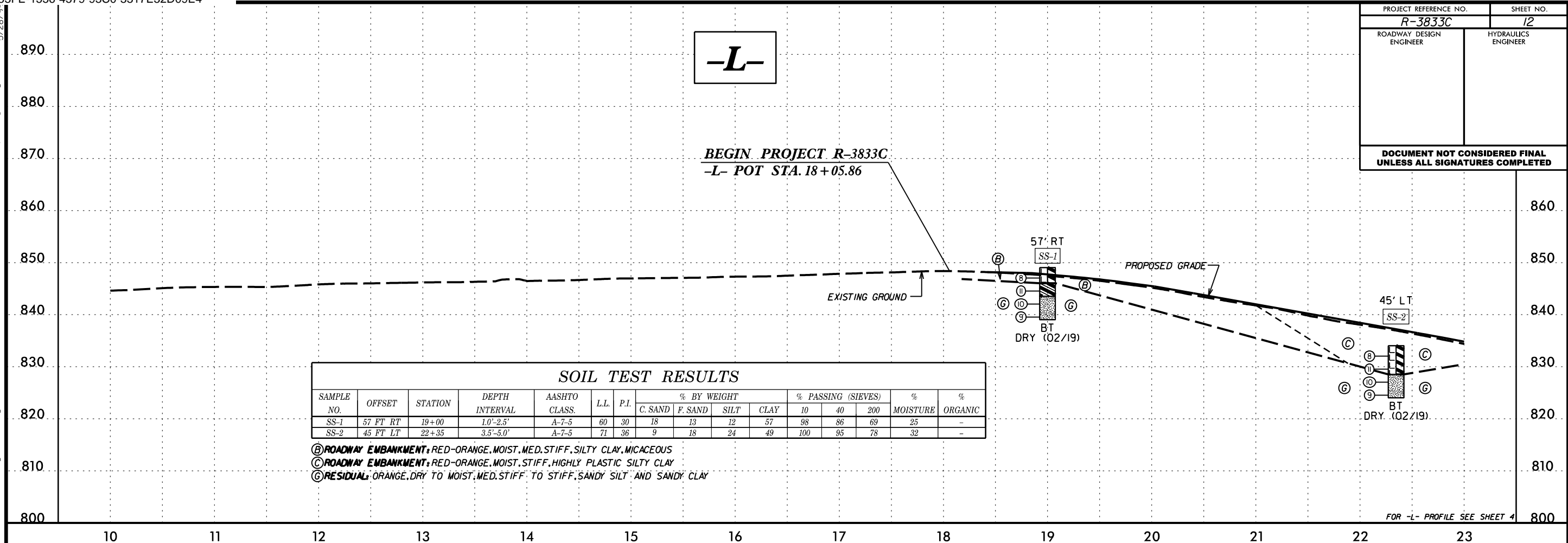
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MATCHLINE -Y5- STA 14+00.00 SEE SHEET 6

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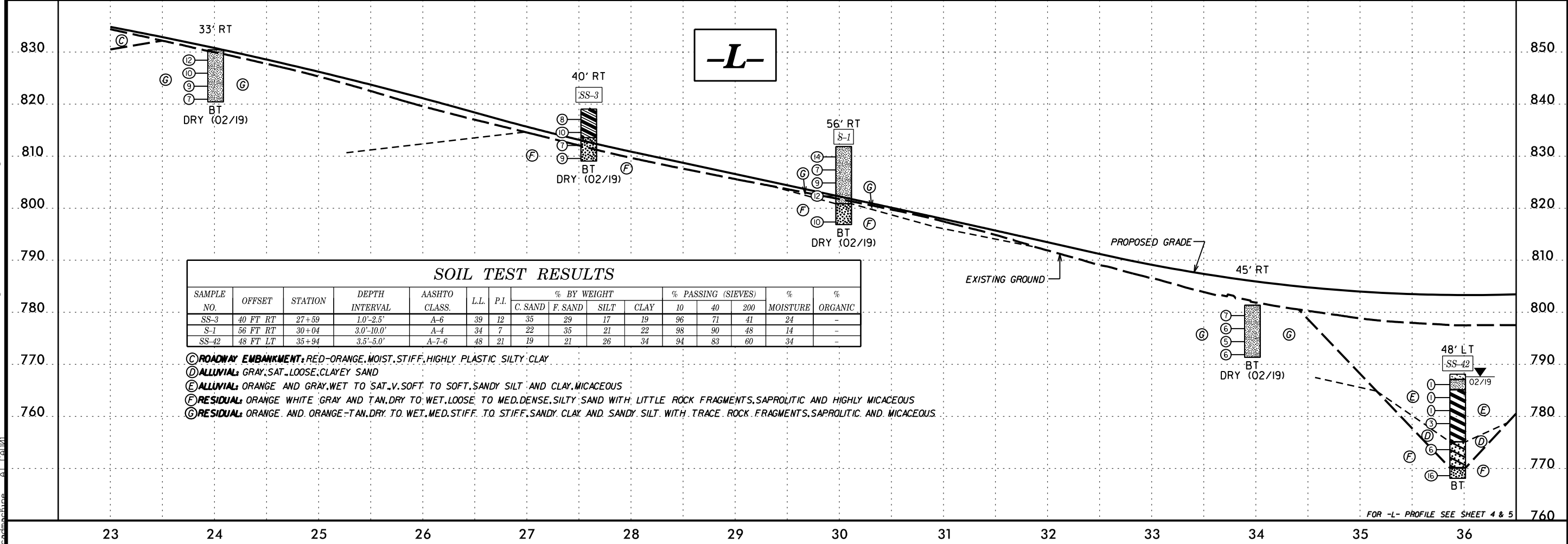
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	-
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	-

- ⓑ ROADWAY EMBANKMENT: RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS
- ⓒ ROADWAY EMBANKMENT: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
- ⓓ RESIDUAL: ORANGE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SANDY CLAY

FOR -L- PROFILE SEE SHEET 4



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-3	40 FT RT	27+59	1.0'-2.5'	A-6	39	12	35	29	17	19	96	71	41	24	-
S-1	56 FT RT	30+04	3.0'-10.0'	A-4	34	7	22	35	21	22	98	90	48	14	-
SS-42	48 FT LT	35+94	3.5'-5.0'	A-7-6	48	21	19	21	26	34	94	83	60	34	-

- ⓒ ROADWAY EMBANKMENT: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
- ⓓ ALLUVIAL: GRAY, SAT, LOOSE, CLAYEY SAND
- ⓔ ALLUVIAL: ORANGE AND GRAY, WET TO SAT, V. SOFT TO SOFT, SANDY SILT AND CLAY, MICACEOUS
- ⓕ RESIDUAL: ORANGE WHITE GRAY AND TAN, DRY TO WET, LOOSE TO MED. DENSE, SILTY SAND WITH LITTLE ROCK FRAGMENTS, SAPROLITIC AND HIGHLY MICACEOUS
- ⓖ RESIDUAL: ORANGE AND ORANGE-TAN, DRY TO WET, MED. STIFF TO STIFF, SANDY CLAY AND SANDY SILT WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS

FOR -L- PROFILE SEE SHEET 4 & 5

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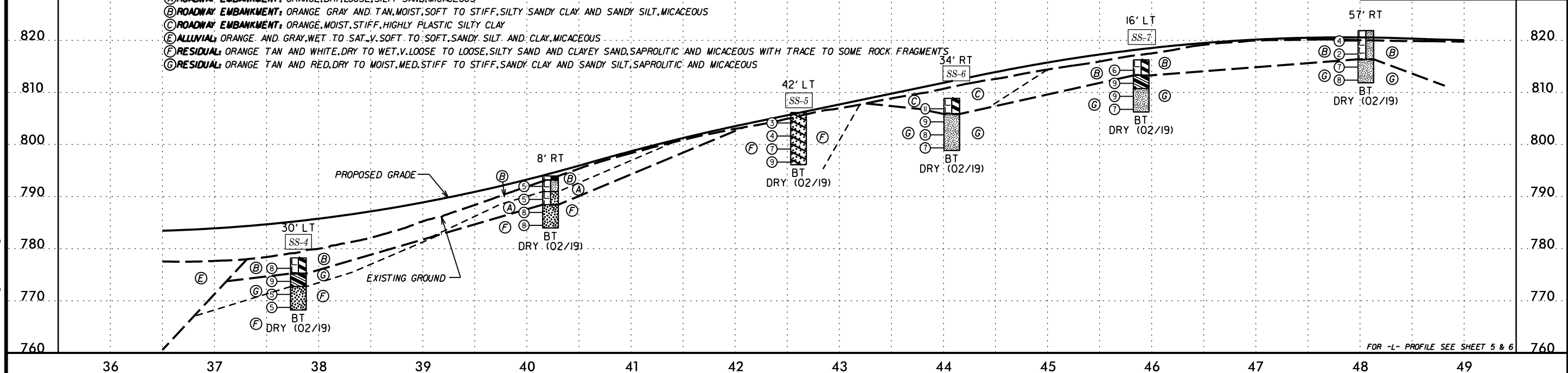
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PROJECT REFERENCE NO.	SHEET NO.
R-3833C	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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-4	30 FT LT	37+81	1.0'-2.5'	A-7-6	47	25	37	23	10	30	84	63	37	19	-
SS-5	42 FT LT	42+61	1.0'-2.5'	A-2-7	43	16	54	16	12	18	65	40	21	19	-
SS-6	34 FT RT	44+08	1.0'-2.5'	A-7-5	63	29	25	17	17	41	90	73	54	27	-
SS-7	16 FT LT	45+90	1.0'-2.5'	A-7-6	43	14	26	31	15	28	78	62	37	24	-

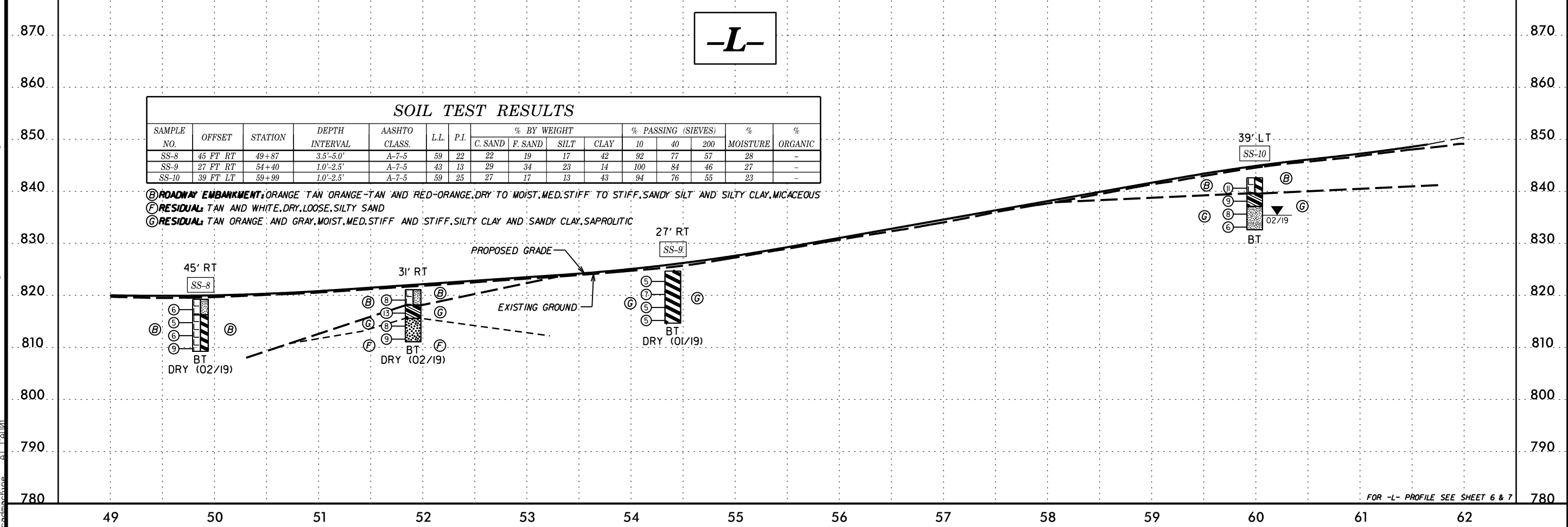
- (A) ROADWAY EMBANKMENT: ORANGE, DRY, LOOSE, SILTY SAND, MICACEOUS
- (B) ROADWAY EMBANKMENT: ORANGE GRAY AND TAN, MOIST, SOFT TO STIFF, SILTY SANDY CLAY AND SANDY SILT, MICACEOUS
- (C) ROADWAY EMBANKMENT: ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
- (E) ALLUVIAL: ORANGE AND GRAY, WET TO SAT, V. SOFT TO SOFT, SANDY SILT AND CLAY, MICACEOUS
- (F) RESIDUAL: ORANGE TAN AND WHITE, DRY TO WET, V. LOOSE TO LOOSE, SILTY SAND AND CLAYEY SAND, SAPROLITIC AND MICACEOUS WITH TRACE TO SOME ROCK FRAGMENTS
- (G) RESIDUAL: ORANGE TAN AND RED, DRY TO MOIST, MED. STIFF TO STIFF, SANDY CLAY AND SANDY SILT, SAPROLITIC AND MICACEOUS



FOR -L- PROFILE SEE SHEET 5 & 6

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	45 FT RT	49+87	3.5'-5.0'	A-7-5	59	22	22	19	17	42	92	77	57	28	-
SS-9	27 FT RT	54+40	1.0'-2.5'	A-7-5	43	13	29	34	23	14	100	84	46	27	-
SS-10	39 FT LT	59+99	1.0'-2.5'	A-7-5	59	25	27	17	13	43	94	76	55	23	-

- (B) ROADWAY EMBANKMENT: ORANGE TAN ORANGE-TAN AND RED-ORANGE, DRY TO MOIST, MED. STIFF TO STIFF, SANDY SILT AND SILTY CLAY, MICACEOUS
- (F) RESIDUAL: TAN AND WHITE, DRY, LOOSE, SILTY SAND
- (G) RESIDUAL: TAN ORANGE AND GRAY, MOIST, MED. STIFF AND STIFF, SILTY CLAY AND SANDY CLAY, SAPROLITIC

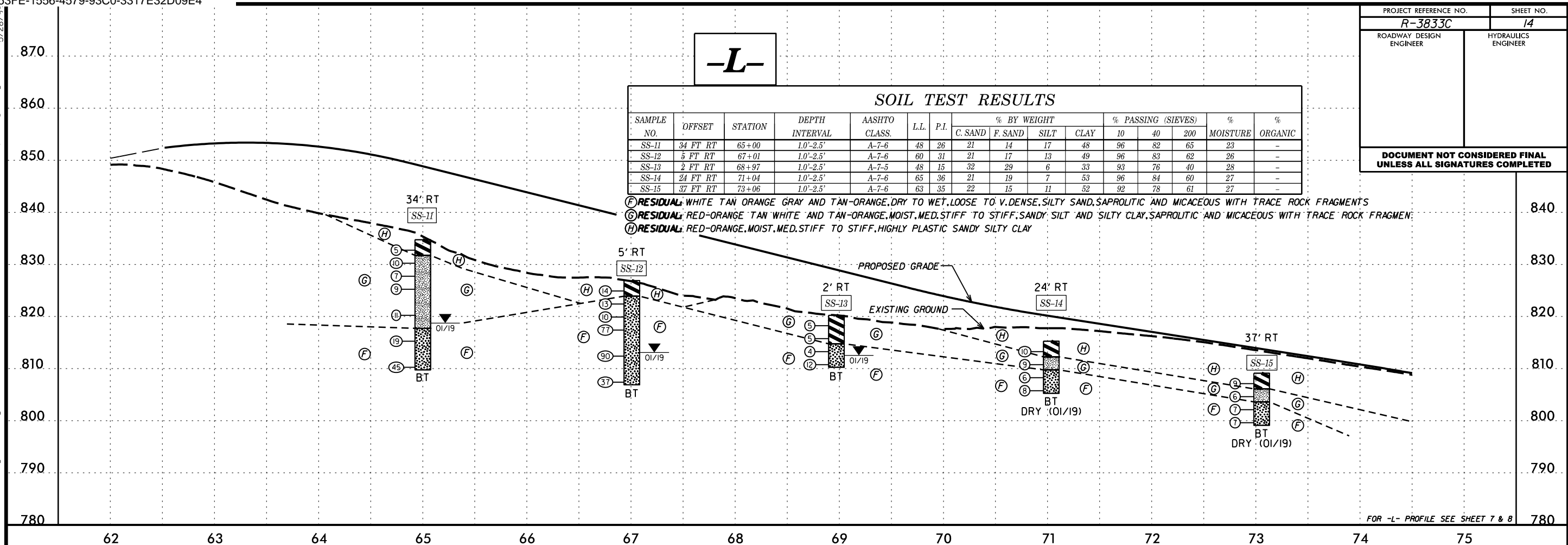


FOR -L- PROFILE SEE SHEET 6 & 7

PROJECT REFERENCE NO. R-3833C	SHEET NO. 14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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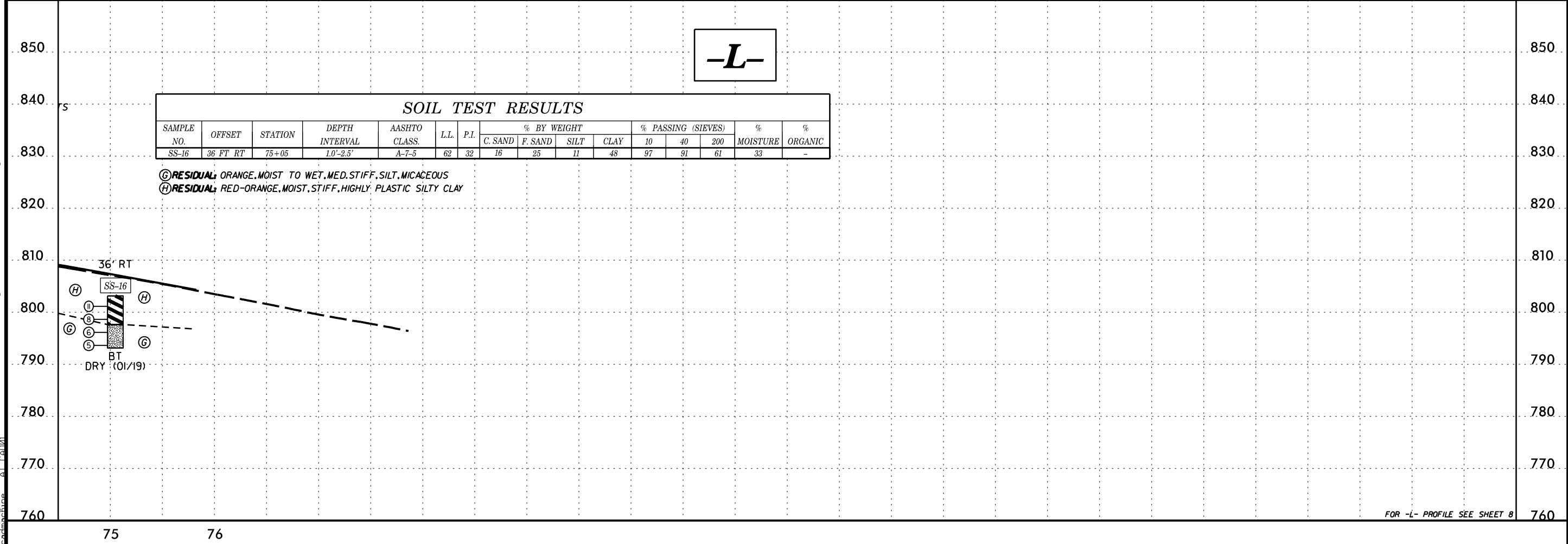
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
							SS-11	34 FT RT	65+00	1.0'-2.5'	A-7-6	48	26		
SS-12	5 FT RT	67+01	1.0'-2.5'	A-7-6	60	31	21	17	13	49	96	83	62	26	-
SS-13	2 FT RT	68+97	1.0'-2.5'	A-7-5	48	15	32	29	6	33	93	76	40	28	-
SS-14	24 FT RT	71+04	1.0'-2.5'	A-7-6	65	36	21	19	7	53	96	84	60	27	-
SS-15	37 FT RT	73+06	1.0'-2.5'	A-7-6	63	35	22	15	11	52	92	78	61	27	-



-L-

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-16	36 FT RT	75+05	1.0'-2.5'	A-7-5	62	32		

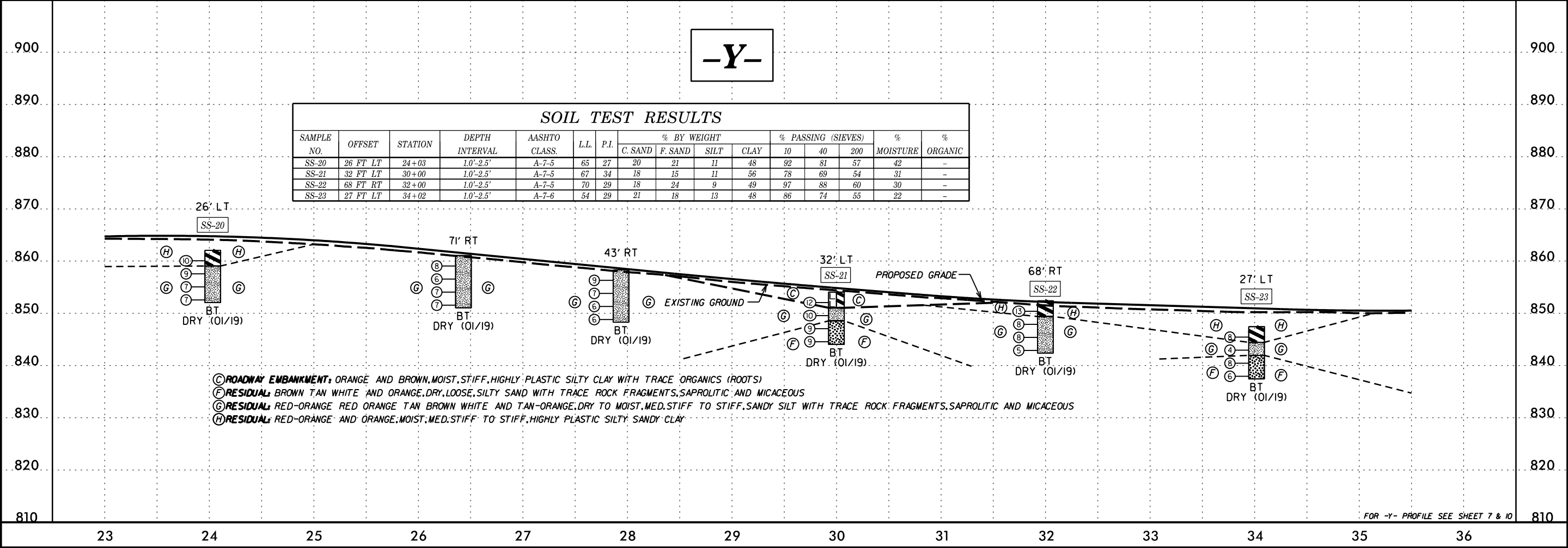
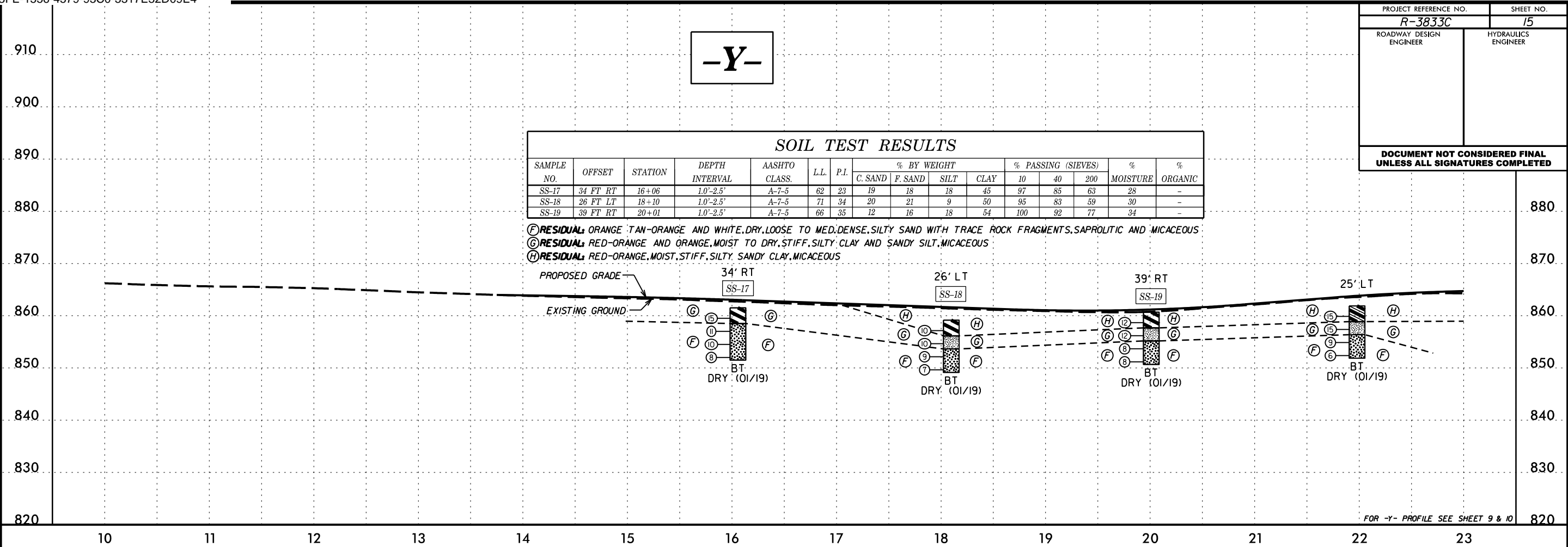
G RESIDUAL: ORANGE, MOIST TO WET, MED. STIFF, SILT, MICACEOUS
H RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY



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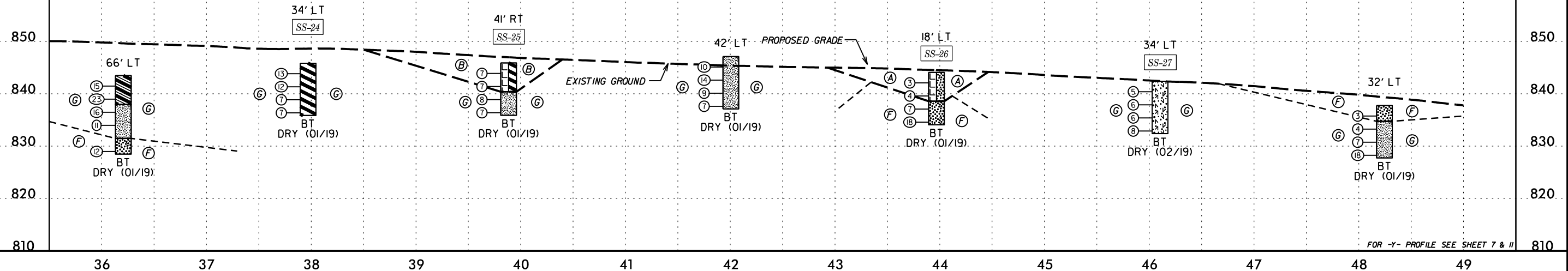
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

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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-24	34 FT LT	37+97	3.5'-5.0'	A-7-5	55	12	30	32	13	25	97	80	42	28	-
SS-25	41 FT RT	39+89	1.0'-2.5'	A-7-6	48	21	24	26	15	35	100	89	54	25	-
SS-26	18 FT LT	43+97	1.0'-2.5'	A-2-5	45	6	28	43	16	13	98	88	34	19	-
SS-27	34 FT LT	46+10	1.0'-2.5'	A-5	42	7	37	32	14	17	100	80	36	20	-

- Ⓐ **ROADWAY EMBANKMENT**: ORANGE, DRY TO MOIST, V. LOOSE, SILTY SAND, MICACEOUS
- Ⓑ **ROADWAY EMBANKMENT**: RED-ORANGE, MOIST, MED. STIFF, SILTY CLAY, MICACEOUS
- Ⓕ **RESIDUAL**: ORANGE TAN AND WHITE, DRY TO MOIST, V. LOOSE TO MED. DENSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS
- Ⓖ **RESIDUAL**: RED-ORANGE ORANGE TAN AND WHITE, DRY TO MOIST, MED. STIFF TO V. STIFF, SANDY CLAYEY SILT AND SILTY CLAY, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS



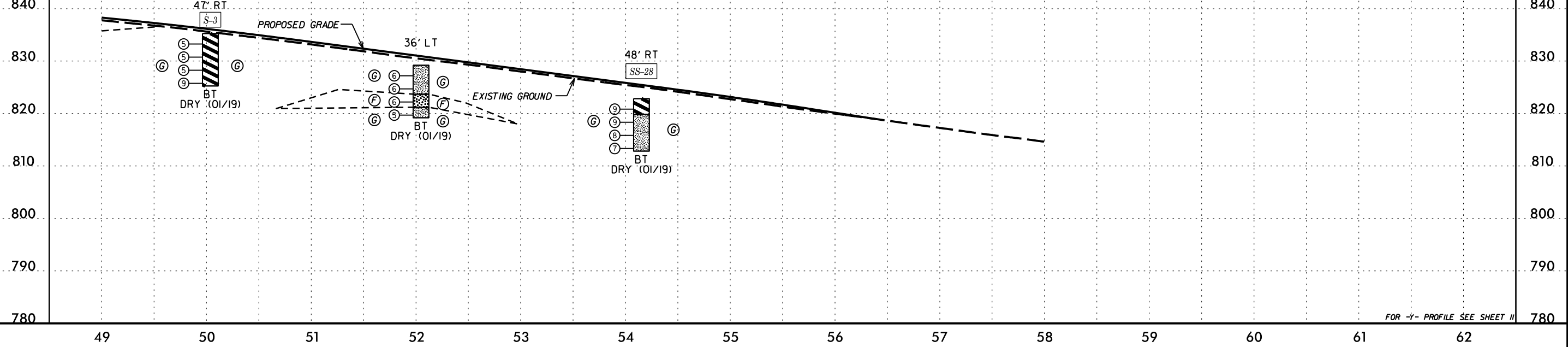
FOR -Y- PROFILE SEE SHEET 7 & 11

-Y-

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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-3	47 FT RT	50+04	3.5'-8.5'	A-7-5	46	14	32	29	14	25	90	74	40	25	-
SS-28	48 FT RT	54+15	1.0'-2.5'	A-7-5	56	22	16	32	12	40	100	95	57	30	-

- Ⓕ **RESIDUAL**: TAN AND WHITE, DRY, LOOSE, SILTY SAND WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS
- Ⓖ **RESIDUAL**: TAN-ORANGE TAN AND RED, DRY TO MOIST, MED. STIFF TO STIFF, SILTY CLAY AND SANDY SILT WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS

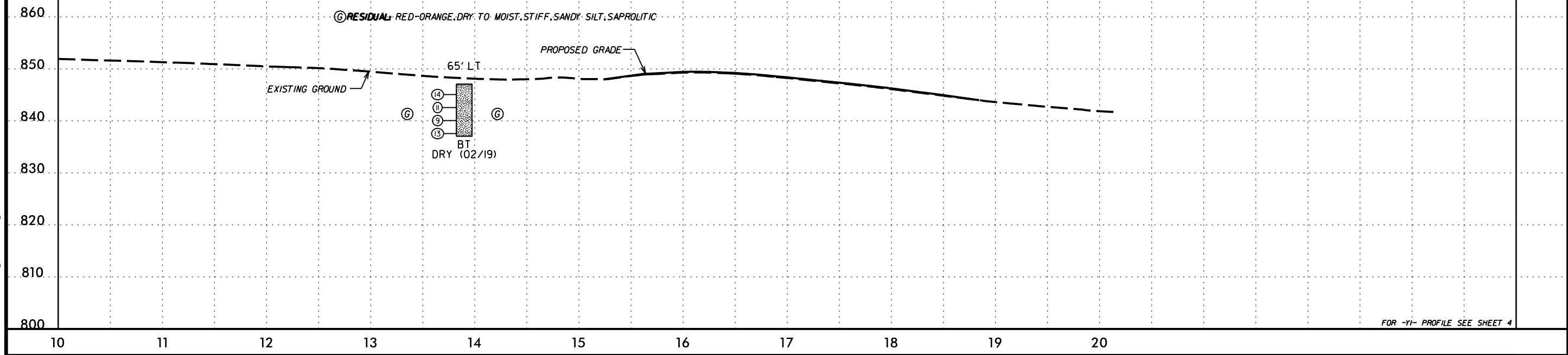


FOR -Y- PROFILE SEE SHEET 11

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5/28/18

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PROJECT REFERENCE NO. R-3833C	SHEET NO. 17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



FOR -Y1- PROFILE SEE SHEET 4

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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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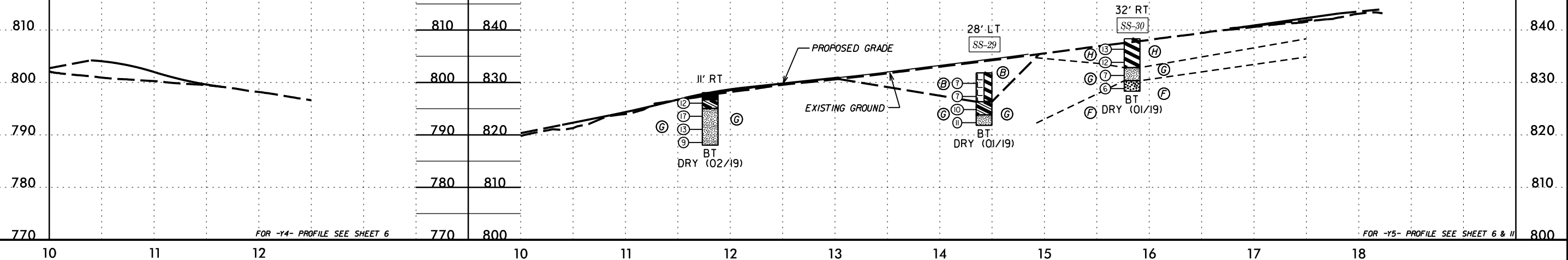
-Y4-

-Y5-

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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-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	-
SS-30	32 FT RT	15+84	1.0'-2.5'	A-7-5	75	42	16	12	9	63	100	90	74	30	-

- (B) **ROADWAY EMBANKMENT:** BROWN, MOIST, MED. STIFF, SILTY CLAY WITH TRACE ORGANICS, MICACEOUS
- (E) **RESIDUAL:** TAN AND WHITE, MOIST, LOOSE, SILTY SAND WITH TRACE ROCK FRAGMENTS, SAPROLITIC AND MICACEOUS
- (G) **RESIDUAL:** ORANGE TAN AND TAN-ORANGE, DRY TO MOIST, MED. STIFF TO V. STIFF, SANDY CLAY AND SANDY SILT, SAPROLITIC AND MICACEOUS
- (H) **RESIDUAL:** ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY, MICACEOUS



FOR -Y4- PROFILE SEE SHEET 6

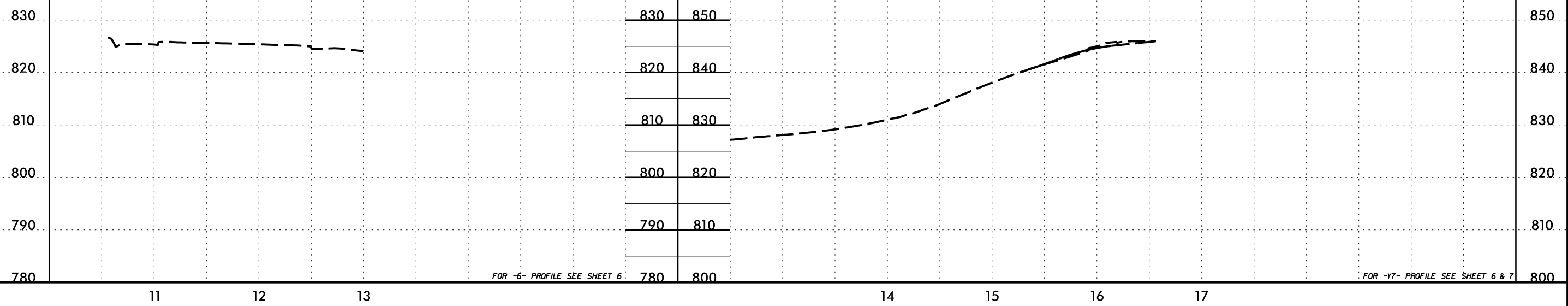
FOR -Y5- PROFILE SEE SHEET 6 & 11

-Y6-

-Y7-

NO BORINGS ON THIS ALIGNMENT

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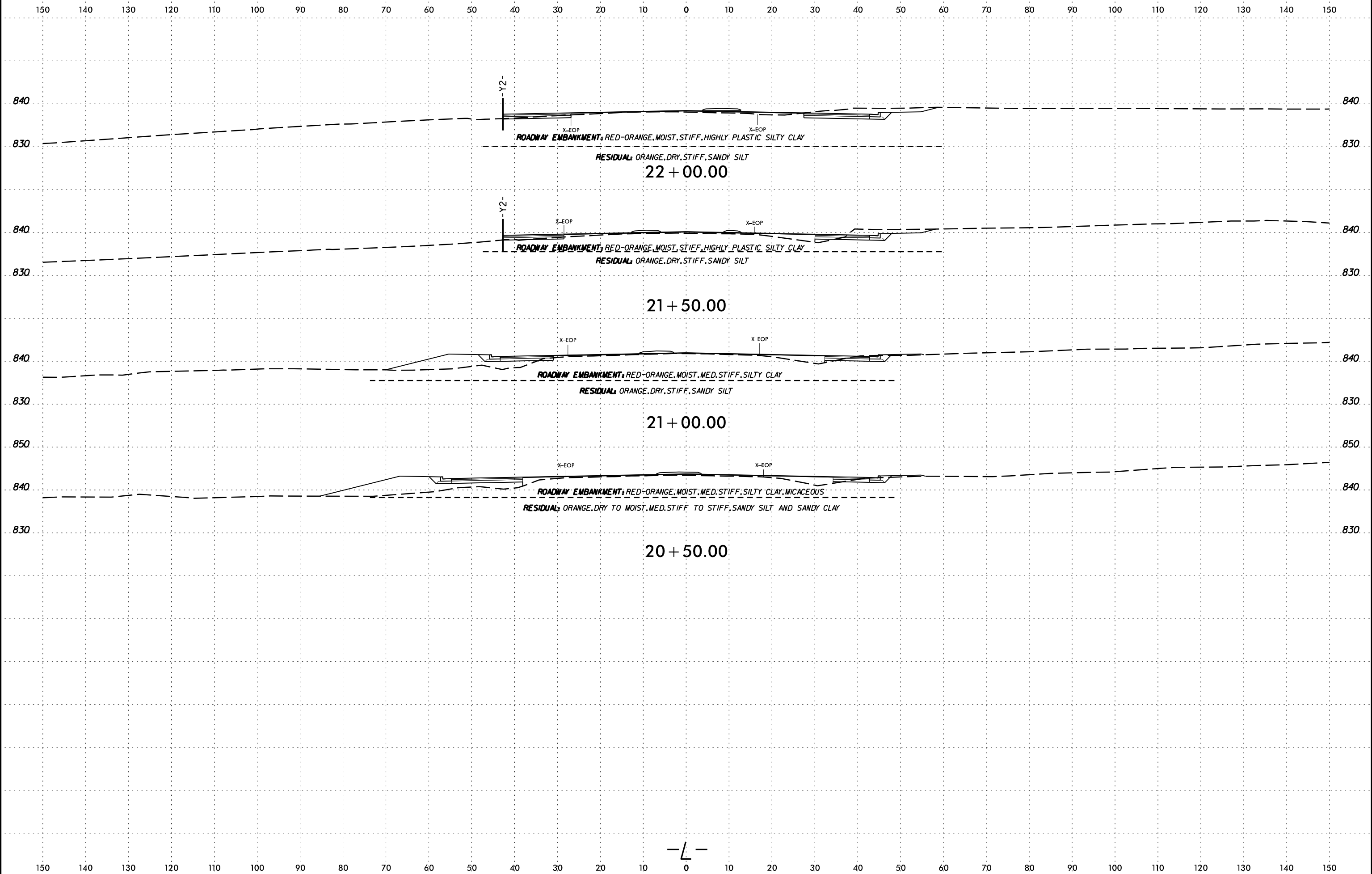


FOR -Y6- PROFILE SEE SHEET 6

FOR -Y7- PROFILE SEE SHEET 6 & 7



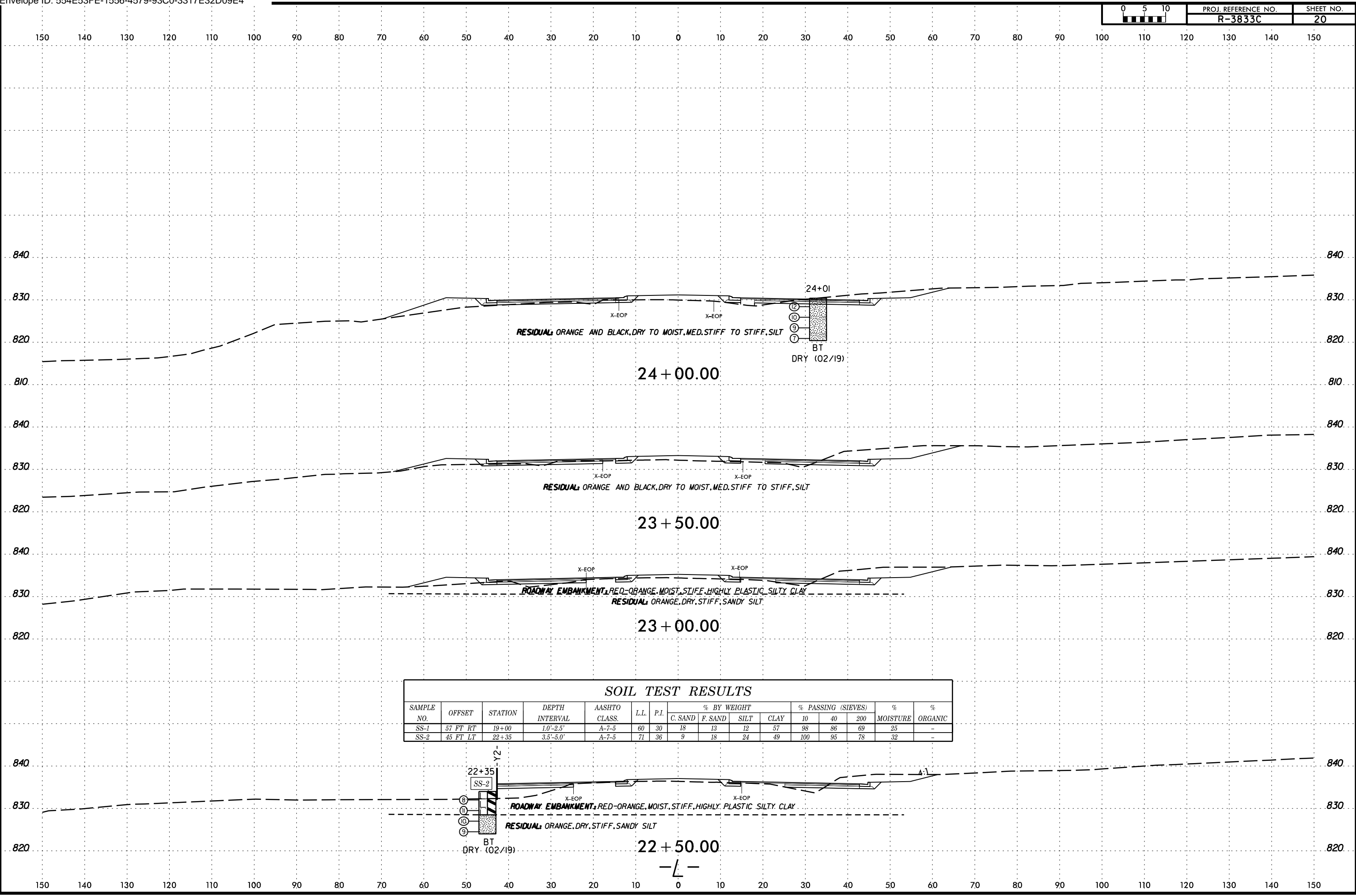
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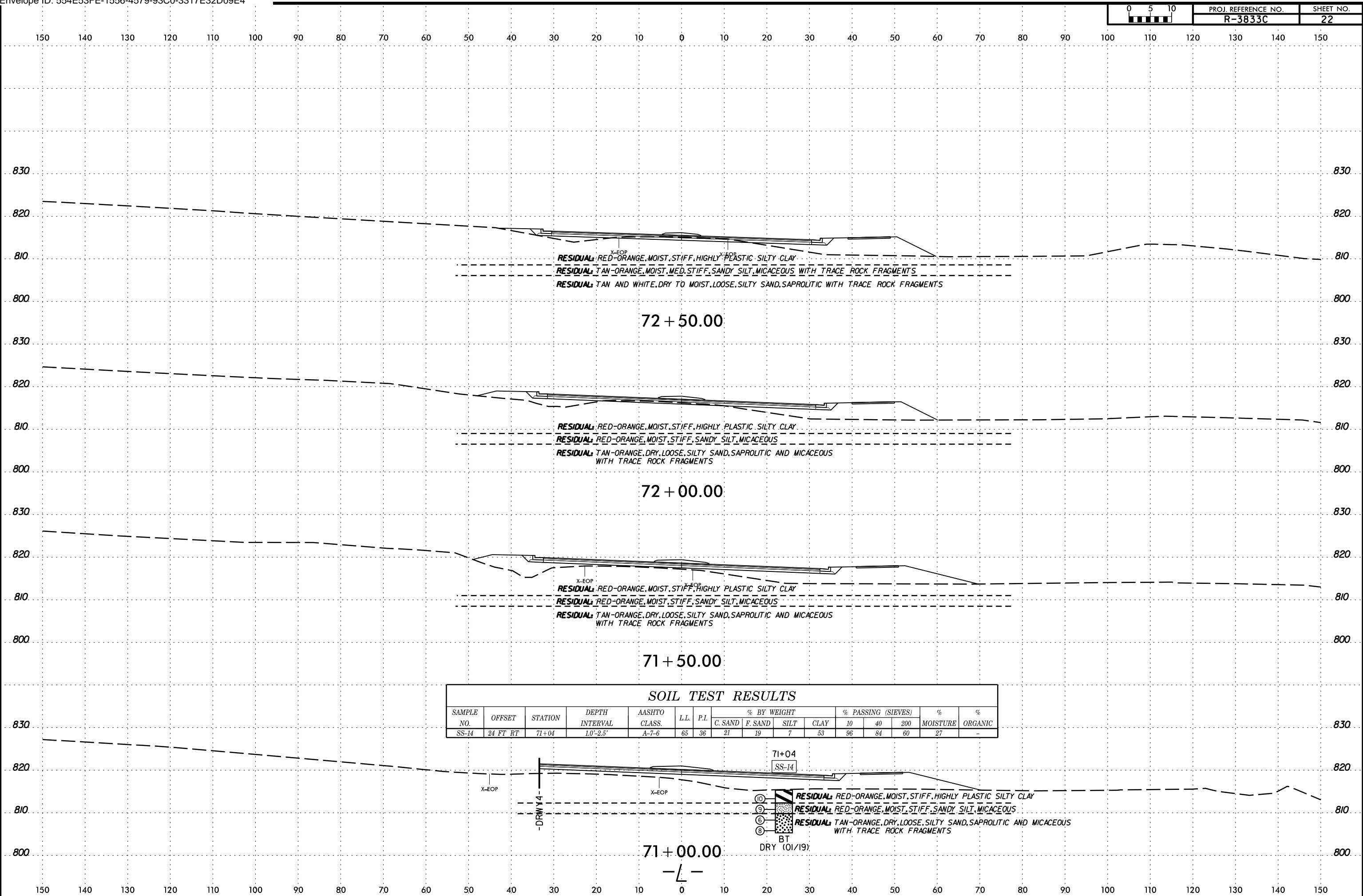


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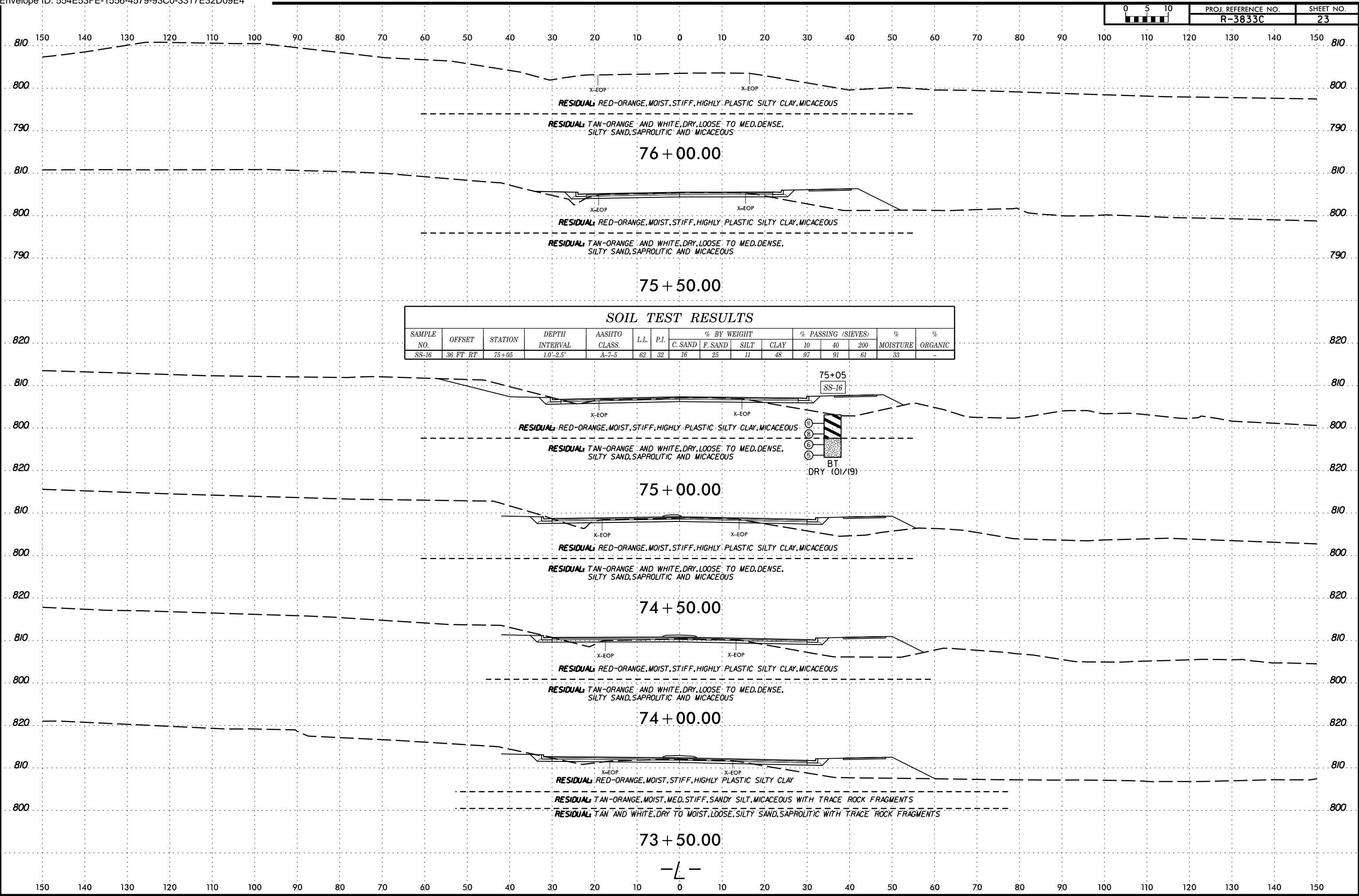
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-1	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	-	
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	-	

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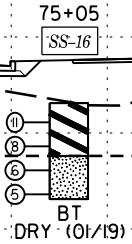


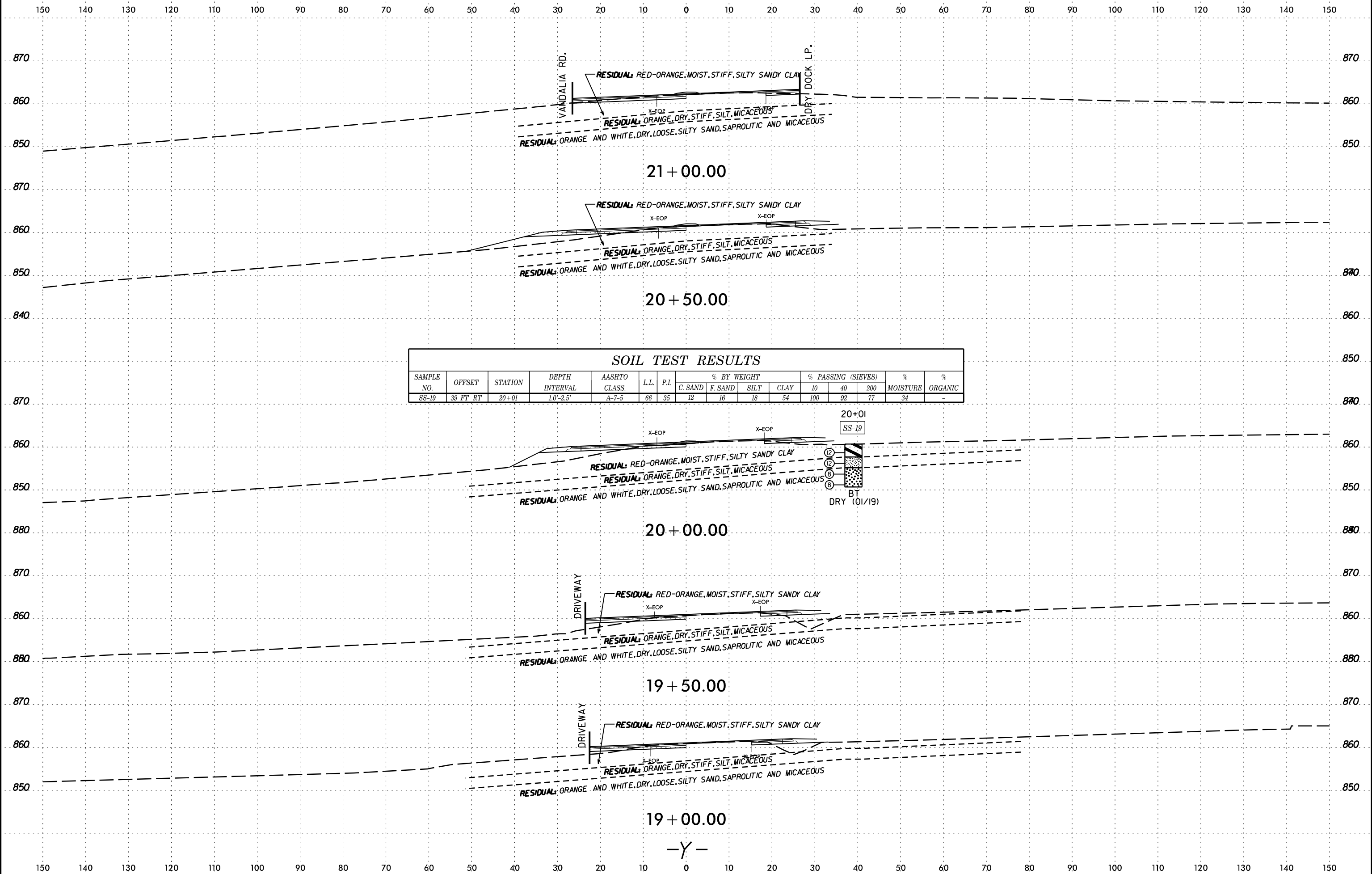
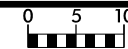


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 cadmachine



SOIL TEST RESULTS																
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							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-16	36 FT RT	75+05	1.0'-2.5'	A-7-5	62	32	16	25	11	48	97	91	61	33	-	





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-19	39 FT RT	20+01	10'-2.5'	A-7-5	66	35	12	16	18	54	100	92	77	34	-

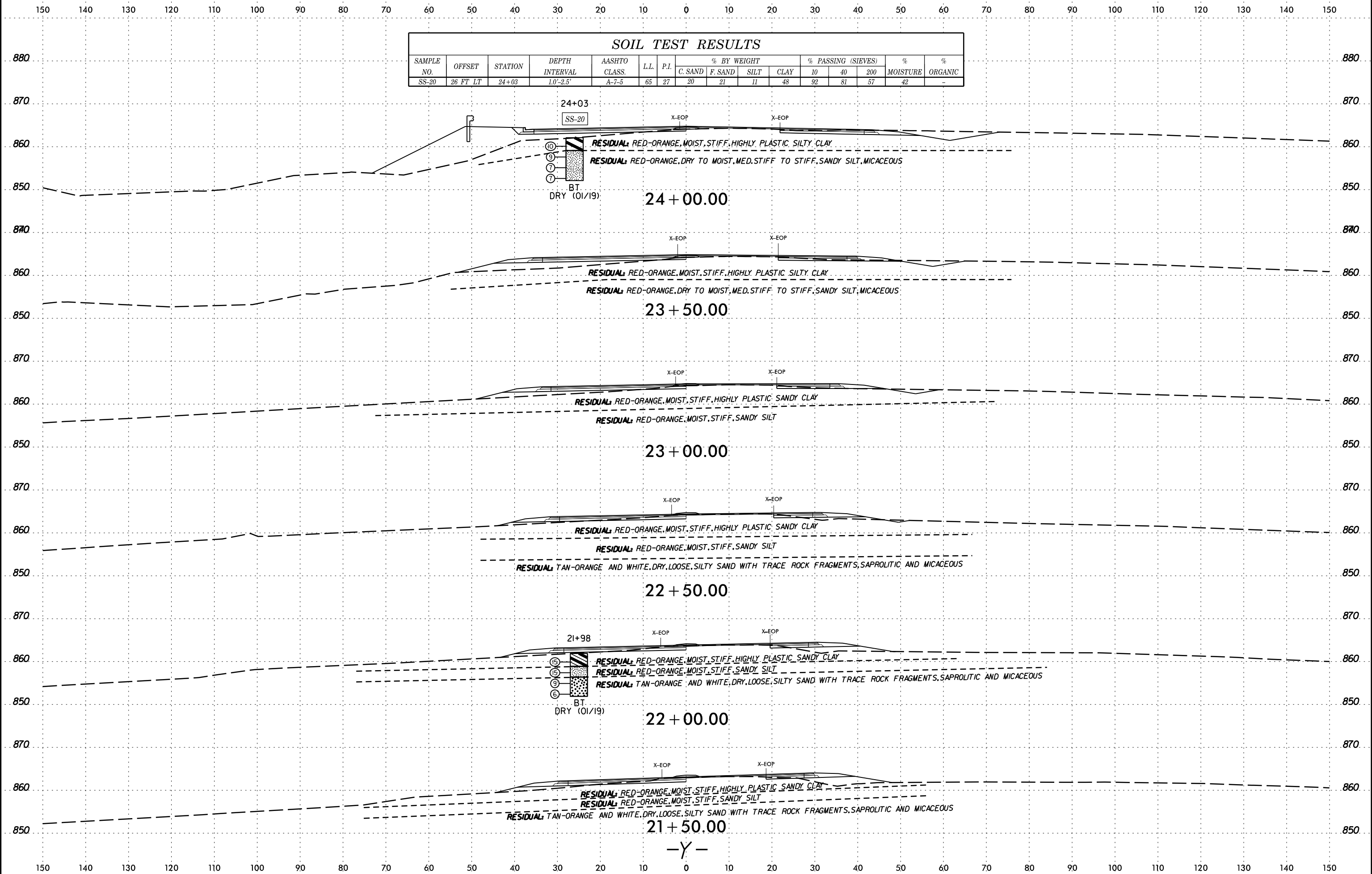
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6/23/16



SOIL TEST RESULTS

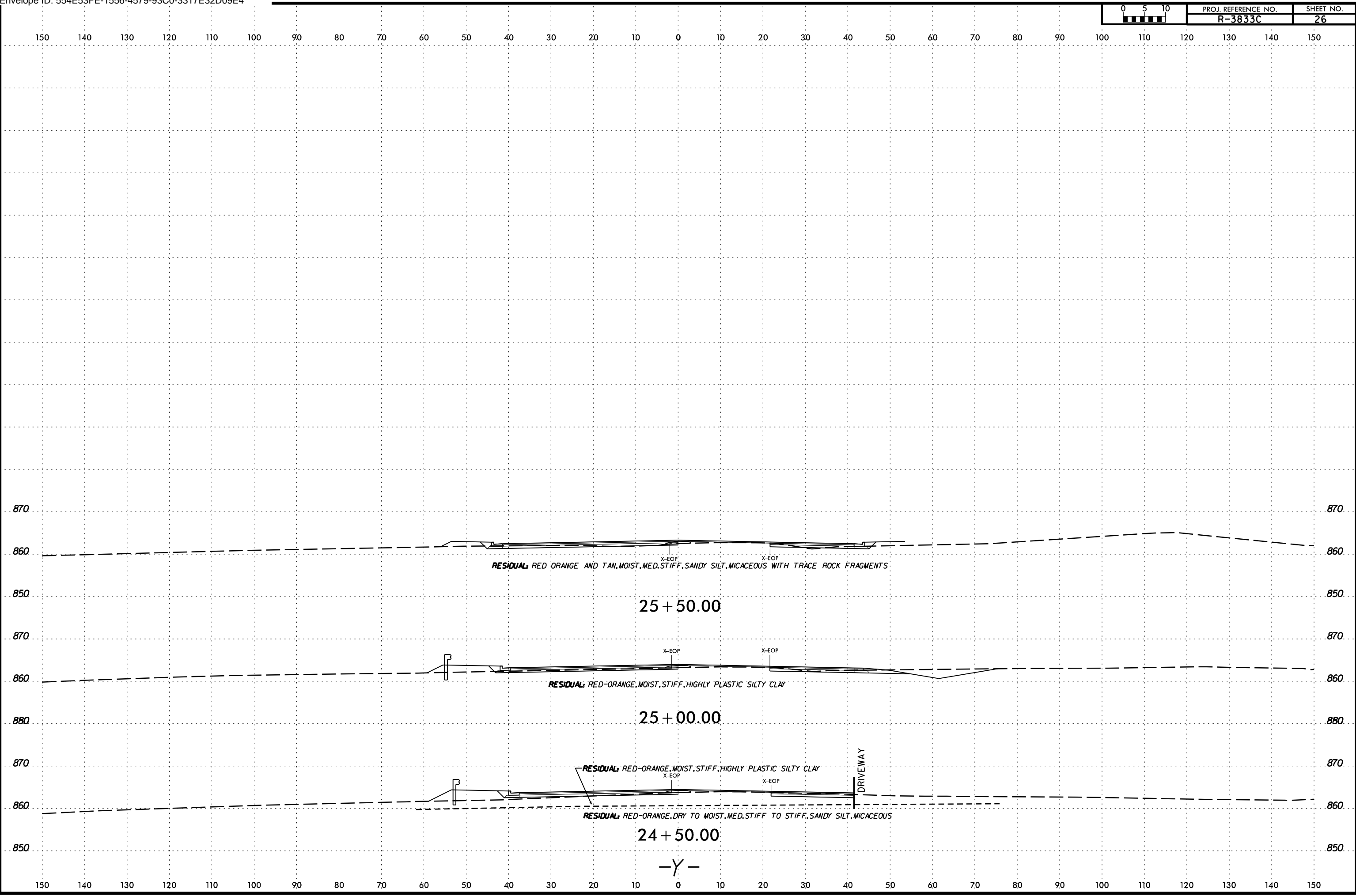
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							C. SAND	F. SAND	SILT	CLAY	10	40			200
SS-20	26 FT LT	24+03	1.0'-2.5'	A-7-5	65	27	20	21	11	48	92	81	57	42	-



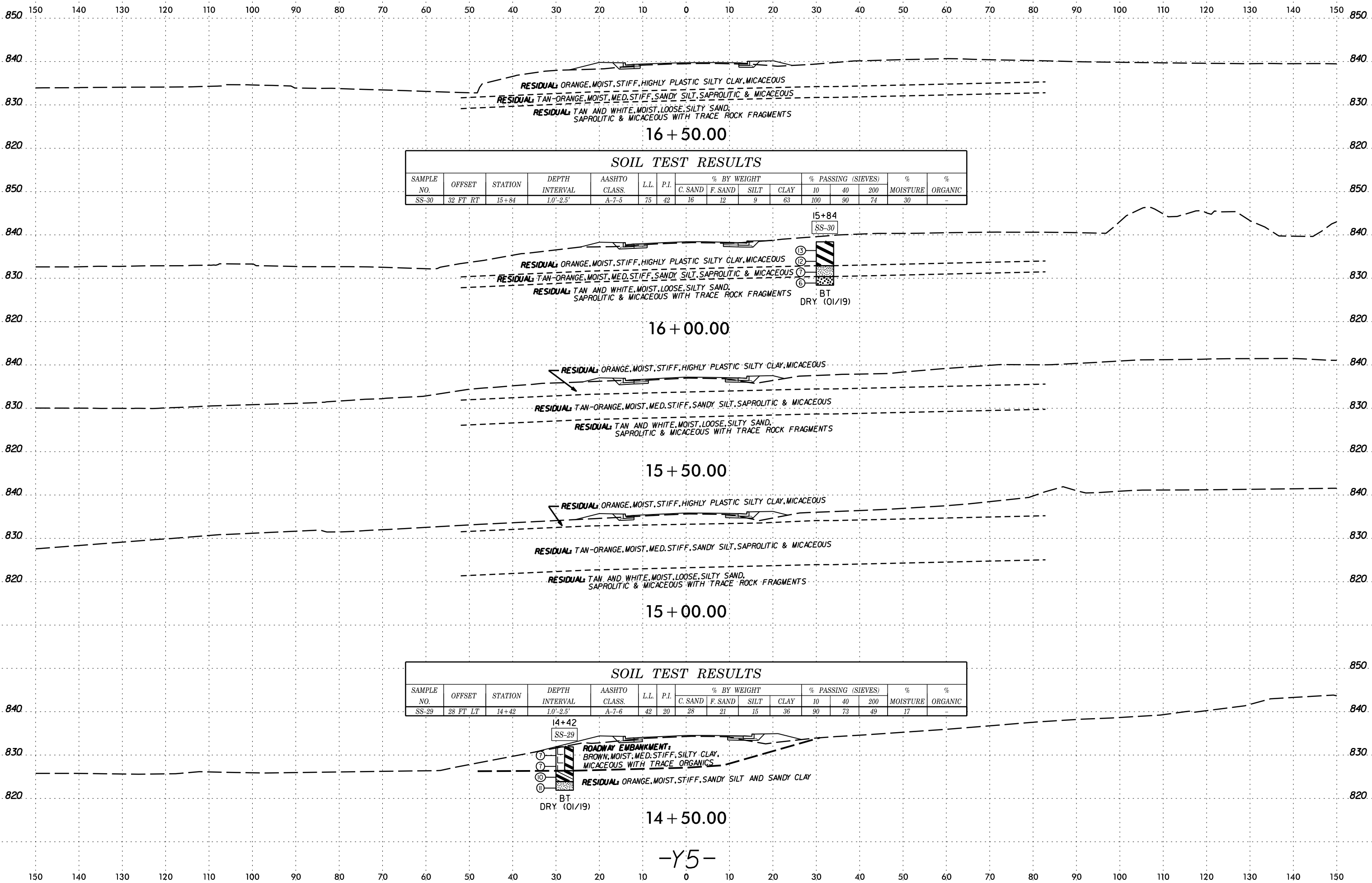
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 6/23/16



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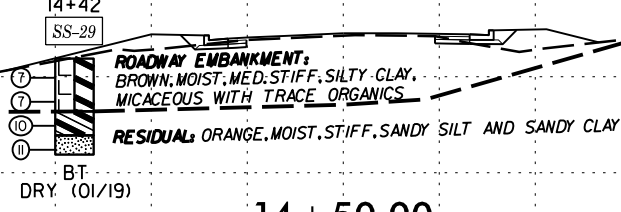


SOIL TEST RESULTS

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-30	32 FT RT	15+84	1.0'-2.5'	A-7-5	75	42	16	12	9	63	100	90	74	30	-

SOIL TEST RESULTS

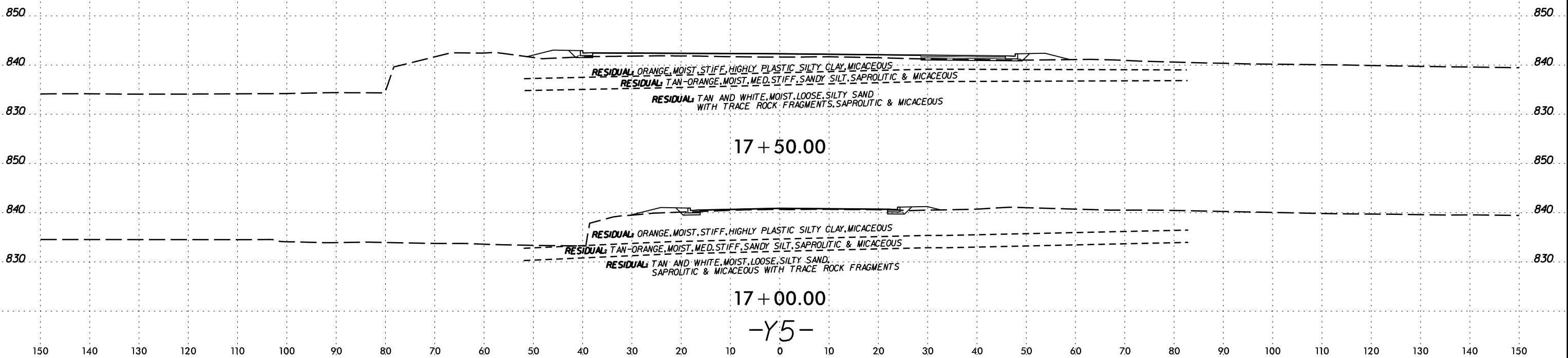
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	-



-Y5-



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



6/23/16
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ceadachine AI CAD01

PROJECT REFERENCE NO.	SHEET NO.
R-3833C	29

REFERENCE: R-3833C

PROJECT: 34554

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

SUBSURFACE INVESTIGATION

***APPENDIX A
PAVEMENT INVESTIGATION***

DS
WSH 7/3/2019
INITIALS DATE

Falcon Engineering, Inc.

1210 Trinity Road, Suite 110 Cary, NC 27513

PAVEMENT SECTION AND SUBGRADE CONDITION SUMMARY

BRAWLEY SCHOOL ROAD (SR 1100) FROM TALBERT ROAD (SR 1116) TO 1000' EAST OF US 21

IREDELL COUNTY, NORTH CAROLINA

WBS: 34554.1.3 ; TIP: R-3833C

Falcon Project No.: G18063.00

ALIGNMENT	TEST LOCATION			PAVEMENT SECTION THICKNESS (INCHES)			SUBGRADE	NOTES
	STATION	OFFSET	LANE	HMA	AGGREGATE BASE	TOTAL	IN-SITU CBR	
-L-	19+99	10' LT	WESTBOUND, TURN LANE	23.00	6.00	29.00	13	Multiple Layers, delaminated at 11 inches
-L-	20+04	23' LT	WESTBOUND, TRAVEL LANE	12.00	0.00	12.00	8	Multiple Layers
-L-	20+04	7' RT	EASTBOUND, TRAVEL LANE	24.00	0.00	24.00	15	Multiple Layers, delamination at 11, 18 and 23 inches, base course crumbling
-L-	26+03	CL	EASTBOUND, TRAVEL LANE	9.00	0.00	9.00	7	Multiple Layers
-L-	30+99	CL	WESTBOUND, TRAVEL LANE	8.00	0.00	8.00	8	Multiple Layers
-L-	37+07	2' RT	EASTBOUND, TRAVEL LANE	6.00	6.00	12.00	9	Multiple Layers
-L-	43+02	9' LT	EASTBOUND, TRAVEL LANE	7.00	0.00	7.00	12	Multiple Layers
-L-	48+07	23' RT	EASTBOUND, TRAVEL LANE	7.00	0.00	7.00	15	Multiple Layers, broken at base
-L-	51+97	17' RT	EASTBOUND, TURN LANE	12.00	0.00	12.00	10	Multiple Layers, delaminated at 6 inches
-L-	54+40	30' LT	WESTBOUND, TRAVEL LANE	6.00	11.00	17.00	9	Multiple Layers, base course broken
-L-	60+04	3' LT	EASTBOUND, TURN LANE	7.00	7.00	14.00	6	Multiple Layers
-L-	62+99	22' RT	WESTBOUND, TRAVEL LANE	24.00	7.00	31.00	5	Multiple Layers, delaminated at 19 inches
-L-	63+00	10' RT	EASTBOUND, INSIDE TURN LANE	25.00	6.00	31.00	5	Multiple Layers, delaminated at 14 and 20 inches
-L-	63+00	4' LT	EASTBOUND, TRAVEL LANE	26.00	0.00	26.00	6	Multiple Layers, delaminated at 14 and 21 inches
-L-	63+01	19' LT	EASTBOUND, OUTSIDE TURN LANE	21.00	0.00	21.00	6	Multiple Layers, delaminated at 14 inches
-L-	71+99	1' LT	EASTBOUND, TRAVEL LANE	6.00	8.00	14.00	7	Multiple Layers
-Y-	18+01	10' RT	SOUTHBOUND, TRAVEL LANE	12.00	8.00	20.00	10	Multiple Layers
-Y-	23+04	4' RT	NORTHBOUND, TRAVEL LANE	12.00	7.00	19.00	8	Multiple Layers, delaminated at 7 inches
-Y-	29+38	16' RT	SOUTHBOUND, TRAVEL LANE	14.00	7.00	21.00	11	Multiple Layers, delaminated at 6 and 11 inches
-Y-	38+01	5' LT	NORTHBOUND, TURN LANE	11.00	0.00	11.00	4	Multiple Layers
-Y-	44+13	1' LT	NORTHBOUND, TRAVEL LANE	12.00	10.00	22.00	10	Multiple Layers
-Y-	50+07	3' RT	CENTRAL TURN LANE	13.00	9.00	22.00	8	Multiple Layers, Delaminated at 7, 9 and 10 inches. Full depth cracking in older layers
-Y-	55+00	2' RT	CENTRAL TURN LANE	12.00	8.00	20.00	4	Multiple Layers, delaminated at 8 inches
-Y5-	11+81	12' RT	EASTBOUND, TRAVEL LANE	11.00	6.00	17.00	10	Multiple Layers
-Y5-	15+95	7' LT	WESTBOUND, TRAVEL LANE	9.00	0.00	9.00	5	Multiple layers
REPRESENTATIVE AVERAGE				13.16	4.24	17.40	N/A	-



PAVEMENT CORE - L_19+99_10'LT




PAVEMENT CORE - L_20+04_23'LT



PAVEMENT CORE - L_20+04_7'RT



PAVEMENT CORE - L_26+03

 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800</p>	<p>PAVEMENT CORE PHOTOGRAPHS</p> <p>SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21 IREDELL / NORTH CAROLINA WBS NO.:34554.1.1 TIP NO.: R-3833C FALCON PROJECT NO.: G18063.00</p>
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PAVEMENT CORE - L_30+99




PAVEMENT CORE - L_37+07_2'RT

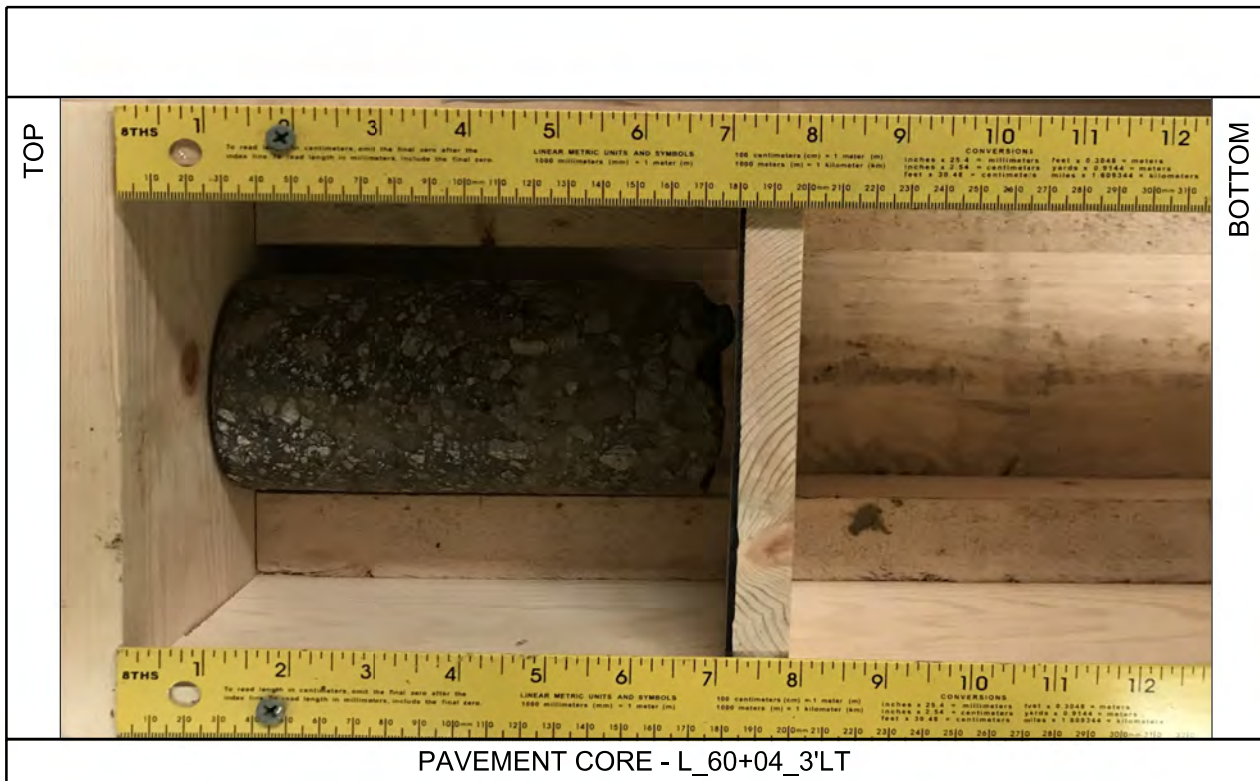


PAVEMENT CORE - L_43+02_9'LT



PAVEMENT CORE - L_48+07_23'RT

 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800</p>	<p>PAVEMENT CORE PHOTOGRAPHS</p> <p>SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21 IREDELL / NORTH CAROLINA WBS NO.:34554.1.1 TIP NO.: R-3833C FALCON PROJECT NO.: G18063.00</p>
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FALCON ENGINEERING, INC.
 1210 TRINITY ROAD, SUITE 110
 CARY, NC 27513
 PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
 SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
 IREDELL / NORTH CAROLINA
 WBS NO.:34554.1.1 | TIP NO.: R-3833C
 FALCON PROJECT NO.: G18063.00



PAVEMENT CORE - L_63+00_10'RT



PAVEMENT CORE - L_63+00_4'LT



PAVEMENT CORE - L_63+00_19'LT



PAVEMENT CORE - L_71+99_1'LT



FALCON ENGINEERING, INC.
 1210 TRINITY ROAD, SUITE 110
 CARY, NC 27513
 PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS

SR 1100 BRAWLEY SCHOOL ROAD FROM
 SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
 IREDELL / NORTH CAROLINA
 WBS NO.:34554.1.1 | TIP NO.: R-3833C
 FALCON PROJECT NO.: G18063.00



PAVEMENT CORE - Y_18+01_10'RT




PAVEMENT CORE - Y_23+04_4'RT



PAVEMENT CORE - Y_29+38_16'RT



PAVEMENT CORE - Y_38+01_5'LT

 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800</p>	<p>PAVEMENT CORE PHOTOGRAPHS</p> <p>SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21 IREDELL / NORTH CAROLINA WBS NO.:34554.1.1 TIP NO.: R-3833C FALCON PROJECT NO.: G18063.00</p>
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PAVEMENT CORE - Y_44+13_1'LT



PAVEMENT CORE - Y_50+07_3'RT



PAVEMENT CORE - Y_55+00_2'RT




PAVEMENT CORE - Y5_11+81_12RT



FALCON ENGINEERING, INC.
 1210 TRINITY ROAD, SUITE 110
 CARY, NC 27513
 PHONE: 919.871.0800

PAVEMENT CORE PHOTOGRAPHS
 SR 1100 BRAWLEY SCHOOL ROAD FROM
 SR 1116 TALBERT ROAD TO 1000' EAST OF US 21
 IREDELL / NORTH CAROLINA
 WBS NO.:34554.1.1 | TIP NO.: R-3833C
 FALCON PROJECT NO.: G18063.00



 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 CARY, NC 27513 PHONE: 919.871.0800</p>	PAVEMENT CORE PHOTOGRAPHS
	SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21 IREDELL / NORTH CAROLINA WBS NO.:34554.1.1 TIP NO.: R-3833C FALCON PROJECT NO.: G18063.00

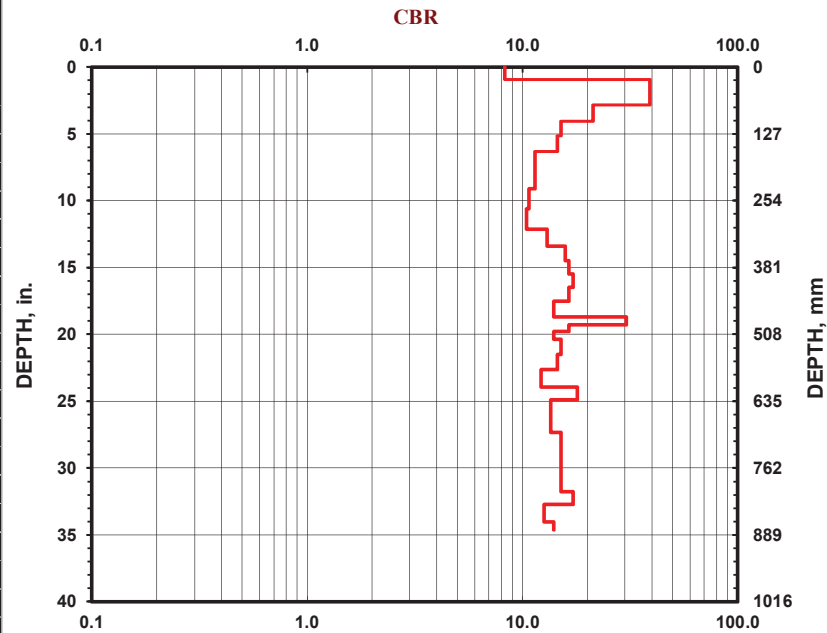
DCP TEST DATA

File Name: L_19+99_10'LT

Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-6

- Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used
- Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	24	1
4	48	1
4	72	1
3	103	1
2	131	1
2	160	1
2	196	1
2	232	1
2	270	1
2	309	1
2	341	1
2	368	1
2	394	1
2	419	1
2	445	1
2	475	1
2	490	1
1	503	1
1	518	1
2	546	1
2	575	1
2	609	1
2	633	1
2	664	1
2	695	1
2	723	1
2	751	1
2	779	1
2	807	1
2	832	1
2	865	1
1	880	1



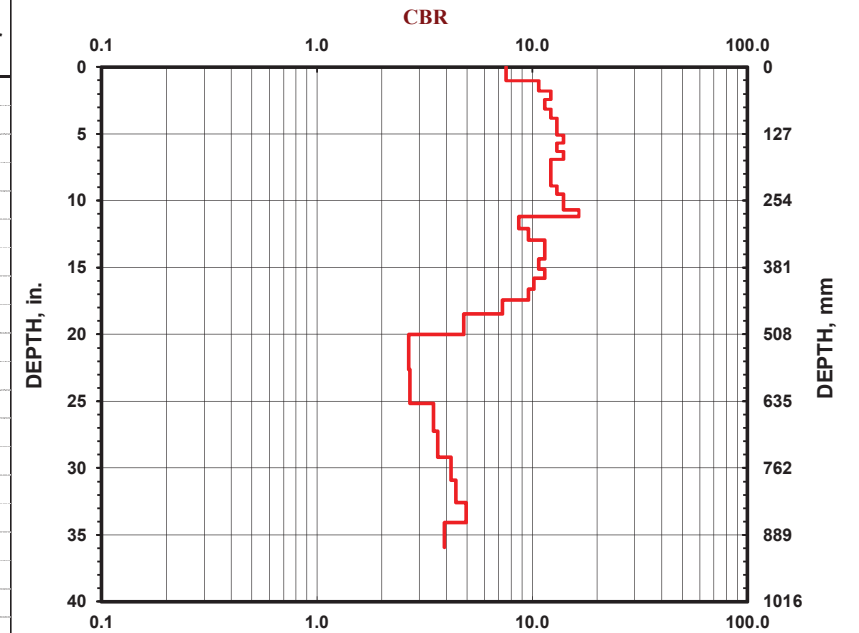
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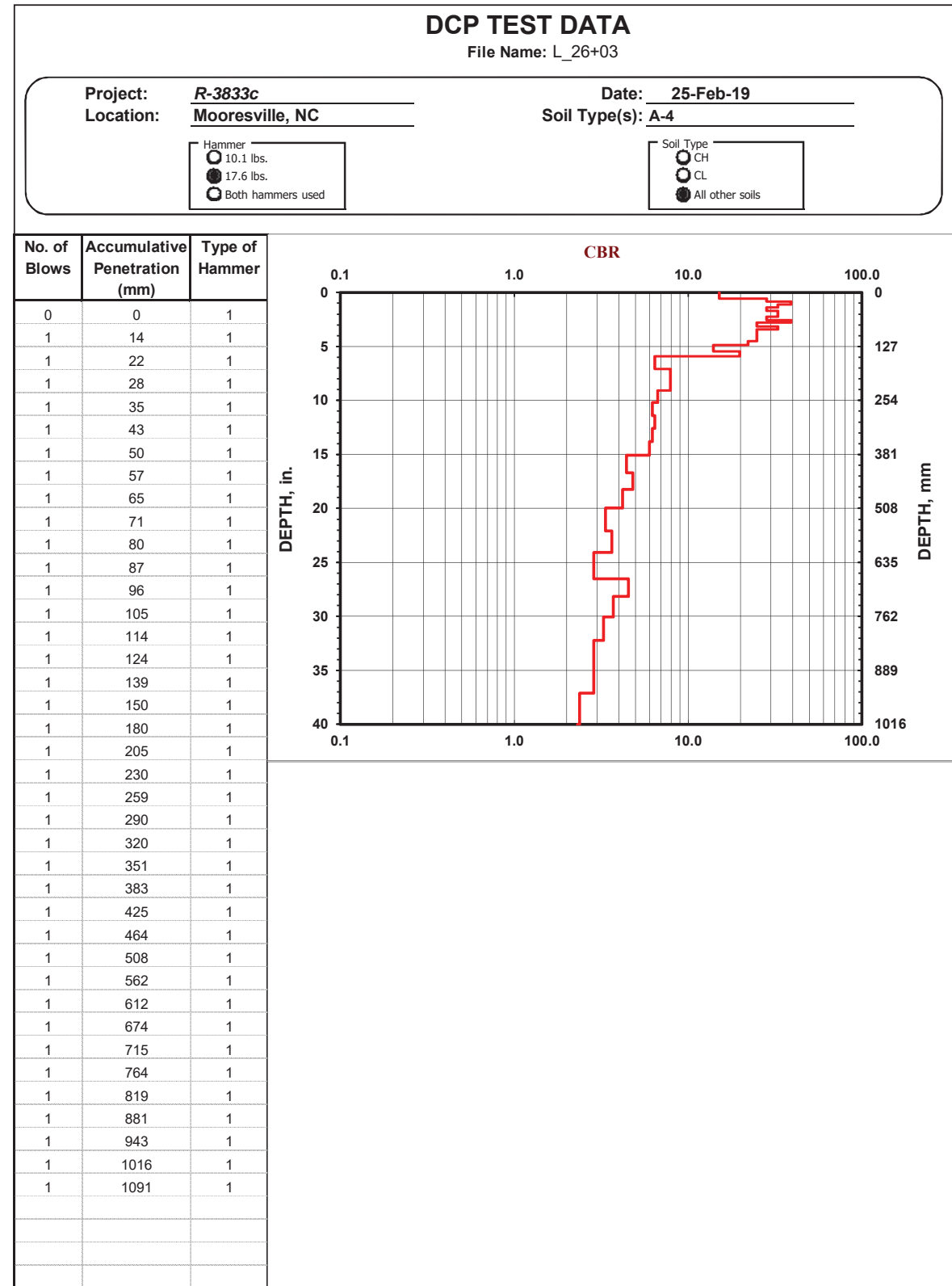
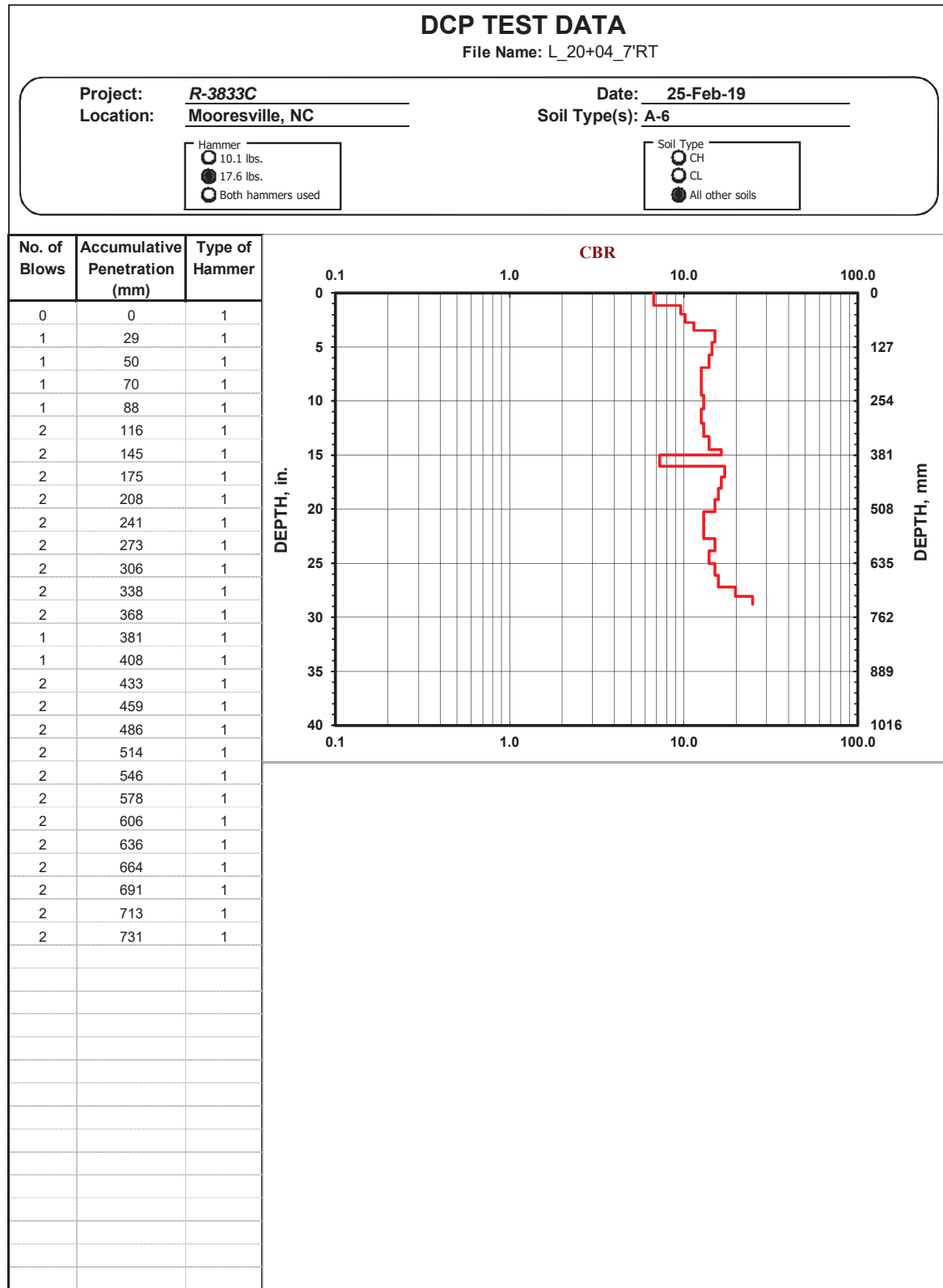
File Name: L_20_04_23'LT

Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-4

- Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used
- Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	26	1
1	45	1
1	62	1
1	80	1
1	97	1
1	113	1
1	129	1
1	144	1
1	160	1
1	175	1
1	192	1
1	209	1
1	226	1
1	242	1
1	257	1
1	272	1
1	285	1
1	308	1
1	329	1
1	347	1
1	365	1
1	384	1
1	402	1
1	422	1
1	443	1
1	470	1
1	509	1
1	575	1
1	640	1
1	692	1
1	742	1
1	786	1
1	828	1
1	866	1
1	913	1





DCP TEST DATA

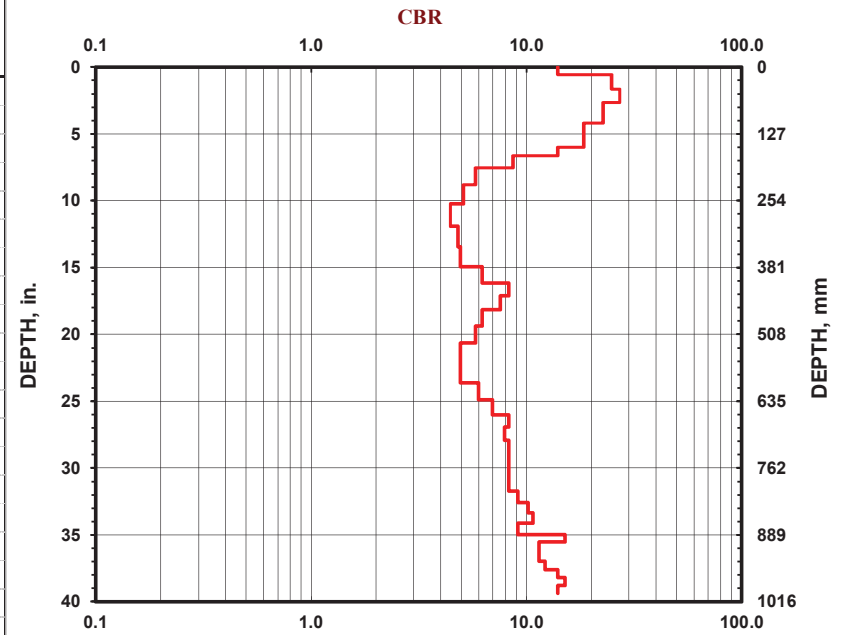
File Name: L_30+99

Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-6

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	15	1
3	42	1
3	67	1
4	106	1
4	153	1
1	168	1
1	191	1
1	224	1
1	261	1
1	303	1
1	342	1
1	380	1
1	411	1
1	435	1
1	461	1
1	492	1
1	525	1
1	563	1
1	601	1
1	633	1
1	661	1
1	685	1
1	710	1
1	734	1
1	758	1
1	782	1
1	806	1
1	828	1
1	848	1
1	867	1
1	889	1
1	903	1
1	921	1
1	939	1
1	956	1
1	971	1
1	985	1
1	1000	1



DCP TEST DATA

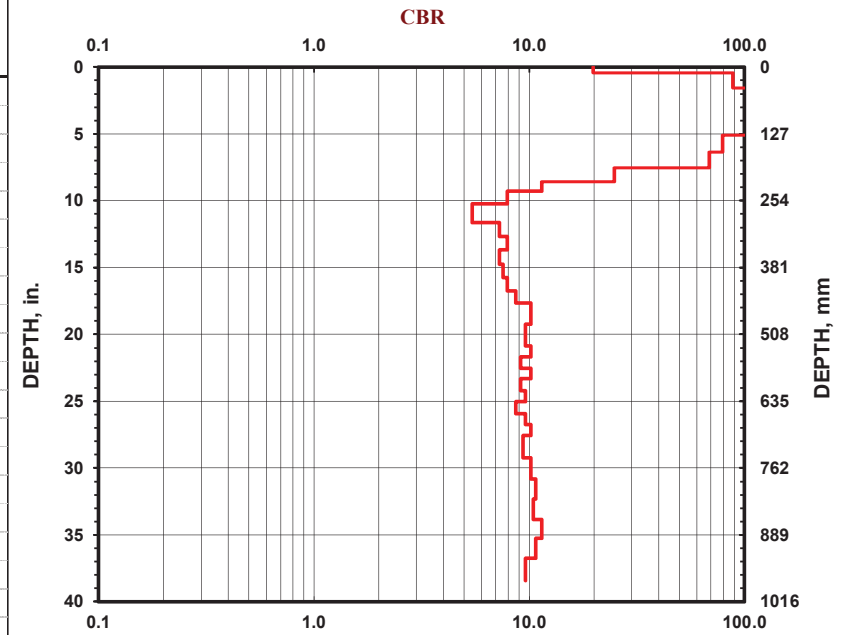
File Name: L_37+07_2'RT

Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-4

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	11	1
10	40	1
15	68	1
15	95	1
15	130	1
10	162	1
8	191	1
3	218	1
1	236	1
1	261	1
1	296	1
1	323	1
1	348	1
1	375	1
1	401	1
1	426	1
1	449	1
2	489	1
1	510	1
1	531	1
1	551	1
1	573	1
1	593	1
1	615	1
1	636	1
1	659	1
1	680	1
1	700	1
2	743	1
2	783	1
2	821	1
2	860	1
2	896	1
2	934	1
2	976	1



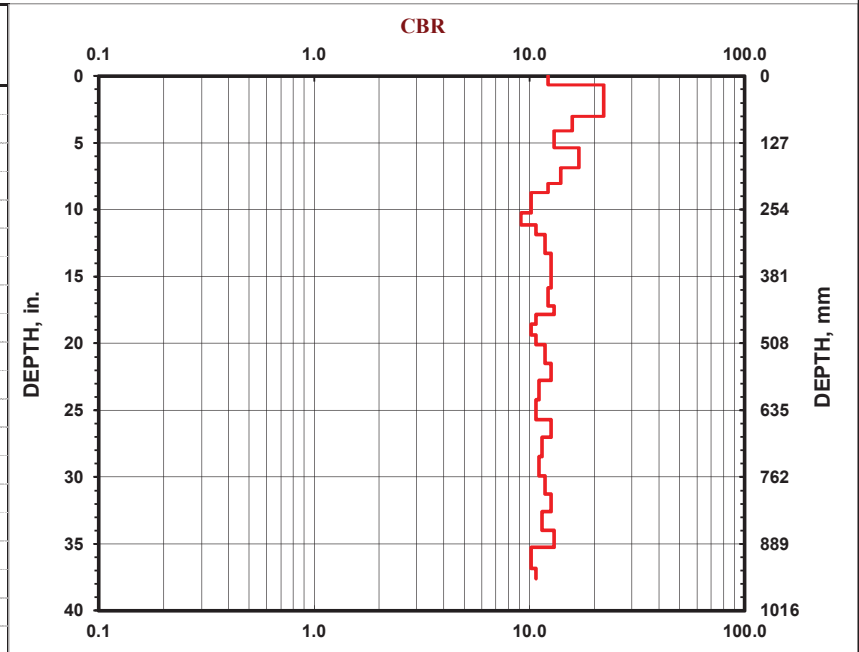
DCP TEST DATA

File Name: L_43+02_9'LT

Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-4

Hammer <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used	Soil Type <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	17	1
3	47	1
3	77	1
2	104	1
2	136	1
3	174	1
2	204	1
1	221	1
1	241	1
1	261	1
1	283	1
1	302	1
2	337	1
2	370	1
2	403	1
2	437	1
1	453	1
1	472	1
1	492	1
1	511	1
2	546	1
2	579	1
2	616	1
1	635	1
1	654	1
2	687	1
1	705	1
1	723	1
2	760	1
2	795	1
2	828	1
2	864	1
2	896	1
2	936	1
1	955	1



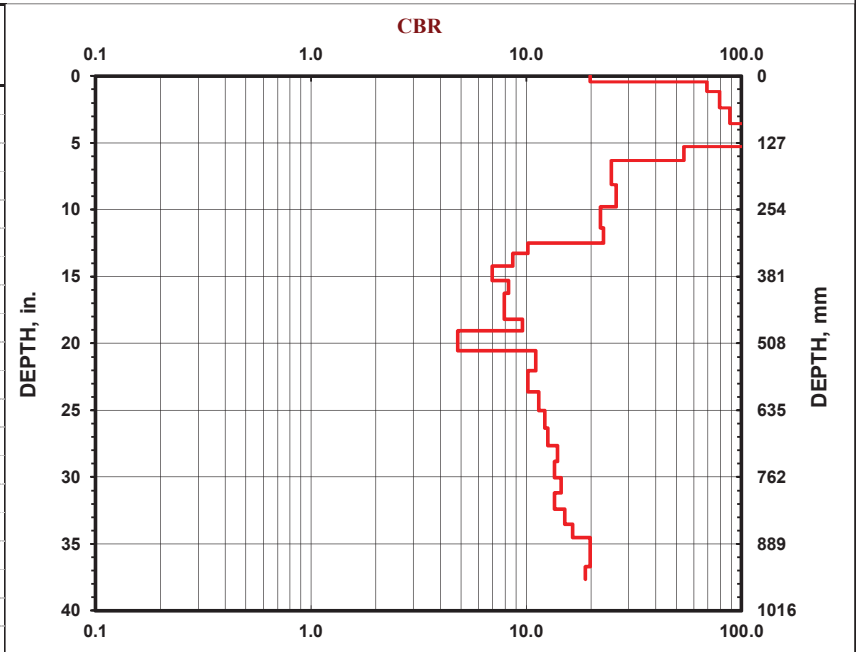
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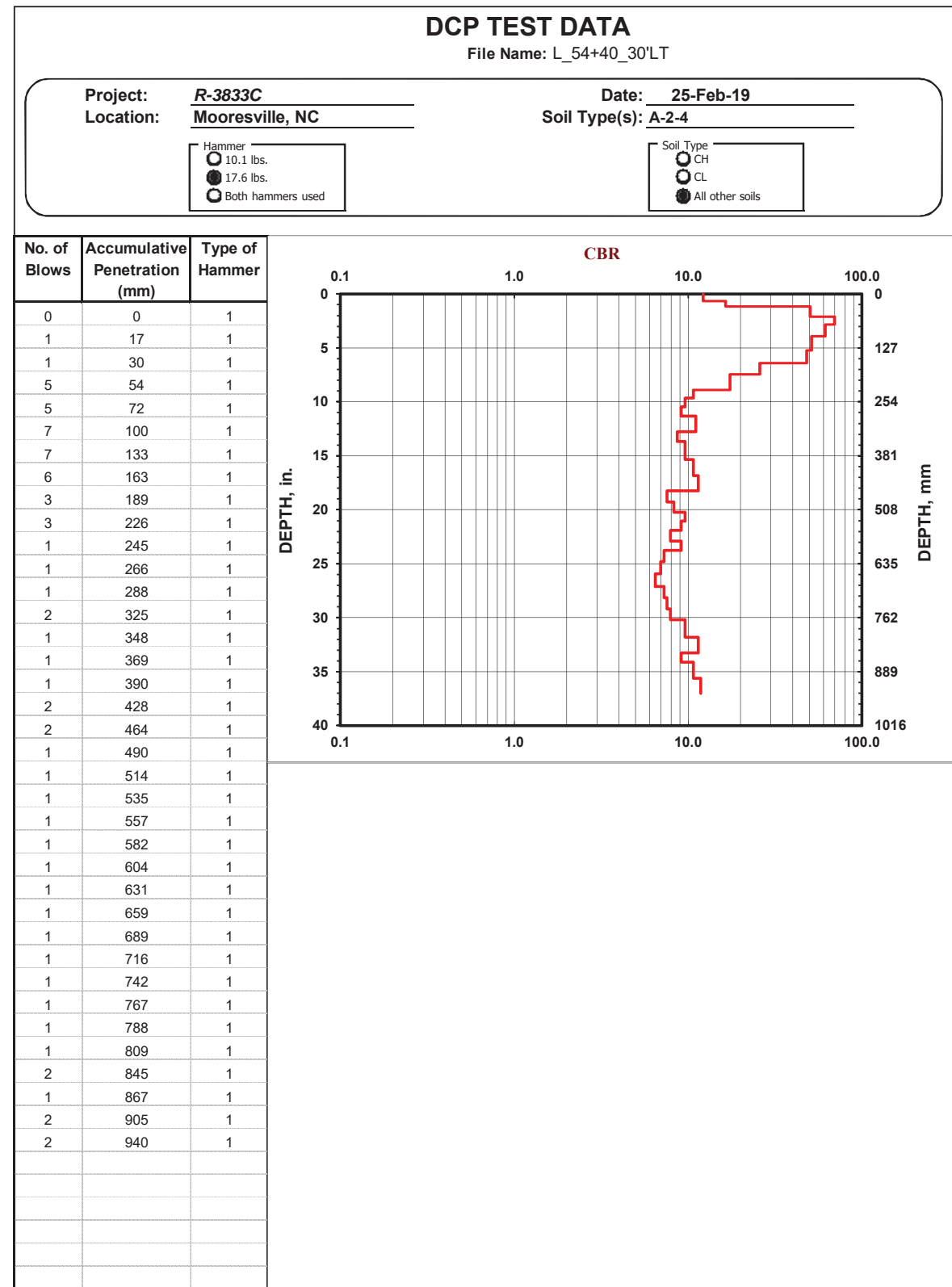
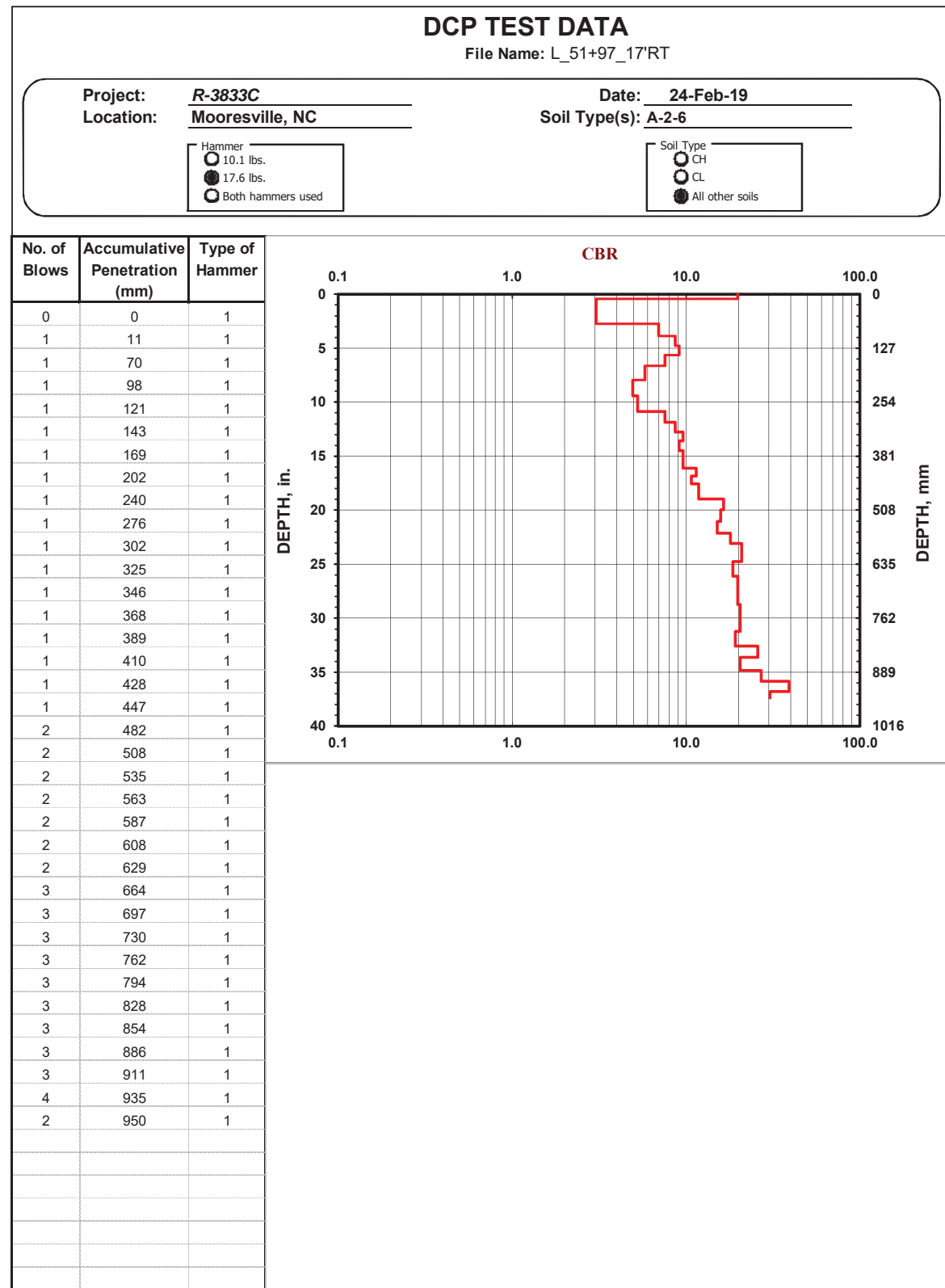
File Name: L_48+07_23'RT

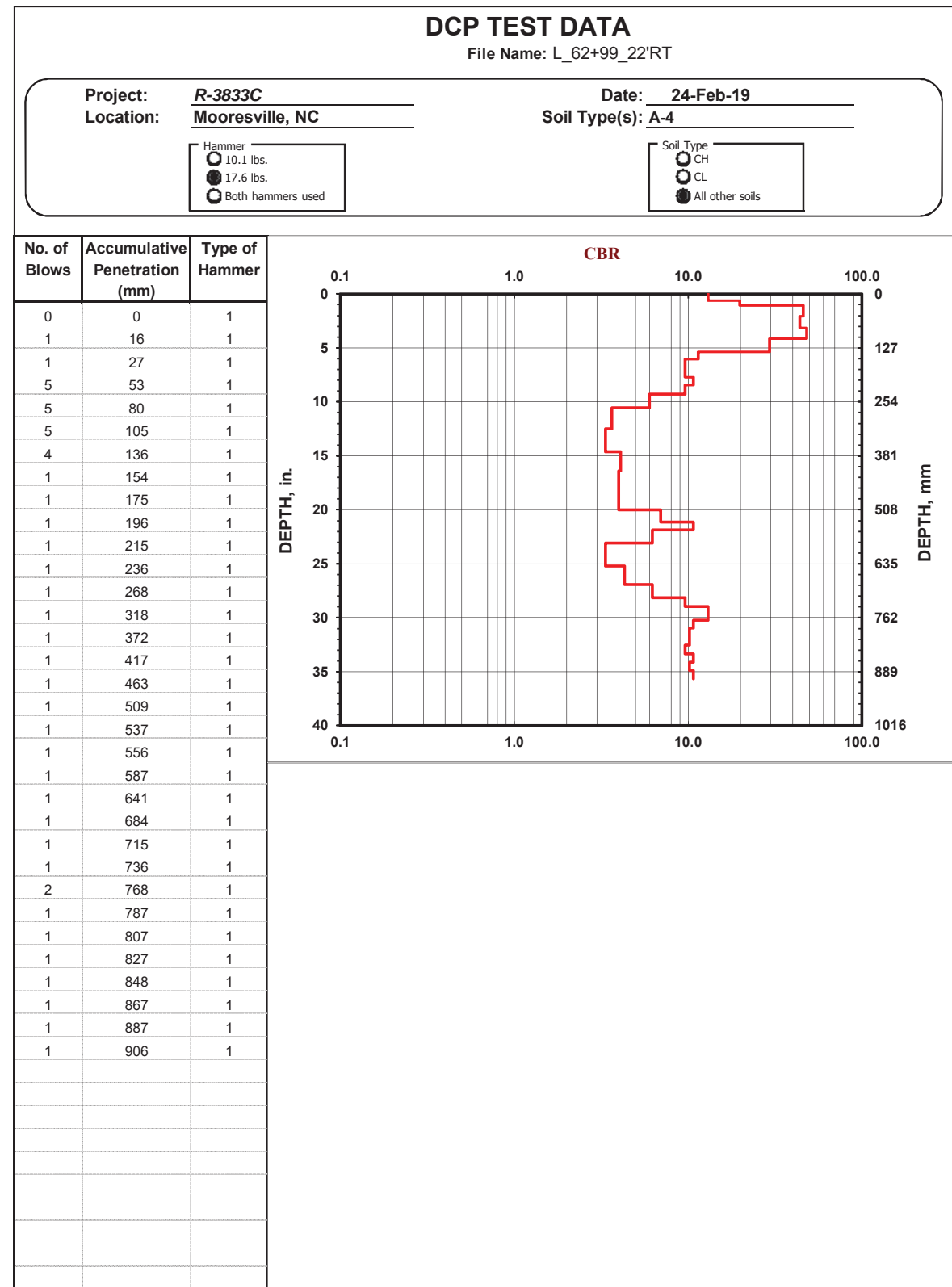
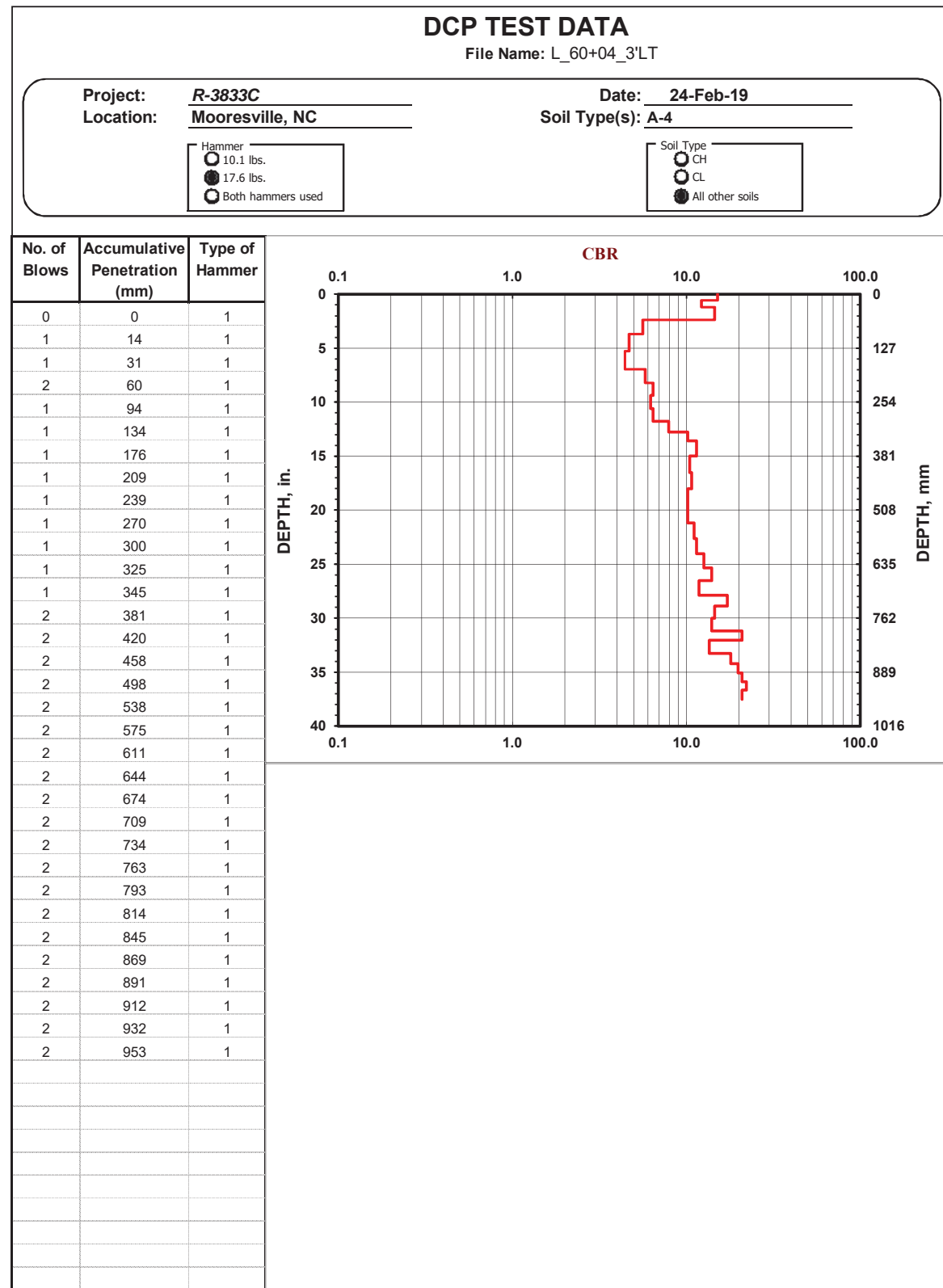
Project: R-3833C Date: 25-Feb-19
 Location: Mooreville, NC Soil Type(s): A-6

Hammer <input type="radio"/> 10.1 lbs. <input checked="" type="radio"/> 17.6 lbs. <input type="radio"/> Both hammers used	Soil Type <input type="radio"/> CH <input type="radio"/> CL <input checked="" type="radio"/> All other soils
--	---

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	11	1
5	29	1
10	61	1
10	90	1
10	110	1
10	134	1
6	161	1
5	206	1
5	249	1
4	289	1
3	318	1
1	338	1
1	361	1
1	389	1
1	413	1
1	438	1
1	463	1
1	484	1
1	523	1
2	560	1
2	600	1
2	636	1
2	670	1
2	703	1
2	733	1
2	764	1
2	793	1
2	824	1
2	852	1
2	878	1
2	900	1
1	911	1
2	933	1
2	956	1





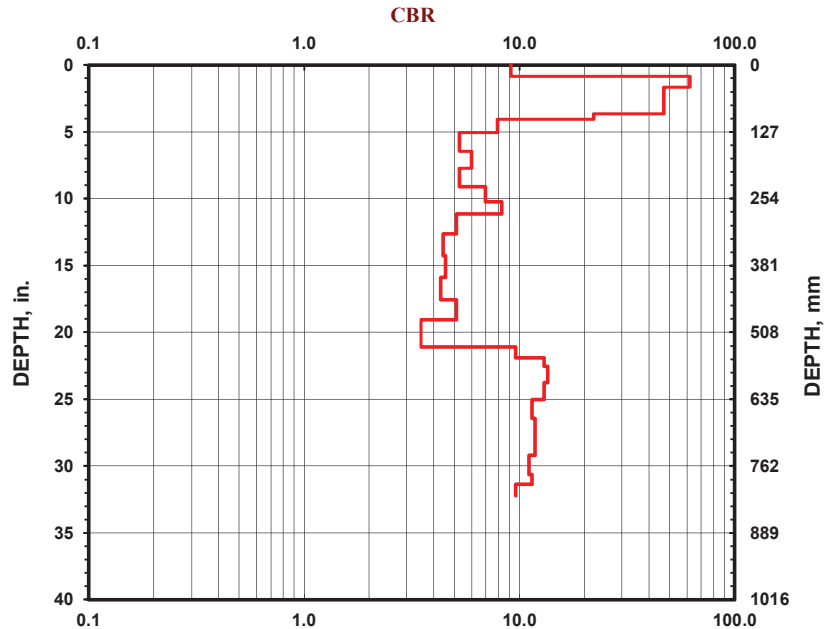


DCP TEST DATA

File Name: L_63+00_10'RT

Project:	<u>R-3833C</u>	Date:	<u>24-Feb-19</u>
Location:	<u>Mooreville, NC</u>	Soil Type(s):	<u>A-4</u>
Hammer		Soil Type	
<input type="radio"/> 10.1 lbs.		<input type="radio"/> CH	
<input checked="checked" type="radio"/> 17.6 lbs.		<input type="radio"/> CL	
<input type="radio"/> Both hammers used		<input type="radio"/> All other soils	

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	22	1
5	42	1
10	93	1
1	103	1
1	128	1
1	164	1
1	196	1
1	232	1
1	260	1
1	284	1
1	321	1
1	363	1
1	404	1
1	447	1
1	484	1
1	536	1
1	557	1
1	573	1
2	604	1
2	636	1
2	672	1
2	707	1
2	742	1
2	779	1
1	797	1
1	818	1

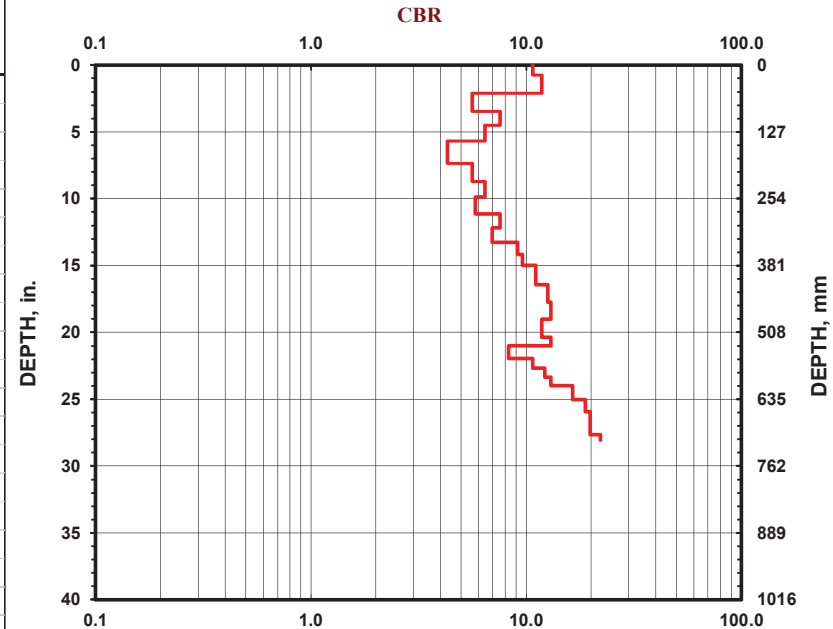


DCP TEST DATA

File Name: L_63+00_4'LT

Project:	<u>R-3833C</u>	Date:	<u>24-Feb-19</u>
Location:	<u>Mooreville, NC</u>	Soil Type(s):	<u>A-4</u>
Hammer		Soil Type	
<input type="radio"/> 10.1 lbs.		<input type="radio"/> CH	
<input checked="checked" type="radio"/> 17.6 lbs.		<input type="radio"/> CL	
<input type="radio"/> Both hammers used		<input type="radio"/> All other soils	

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	19	1
2	54	1
1	88	1
1	114	1
1	144	1
1	187	1
1	221	1
1	251	1
1	284	1
1	310	1
1	338	1
1	360	1
1	381	1
2	418	1
2	451	1
2	483	1
2	518	1
1	534	1
1	558	1
1	577	1
1	594	1
1	610	1
1	623	1
1	636	1
2	659	1
2	681	1
2	703	1
1	713	1



DCP TEST DATA

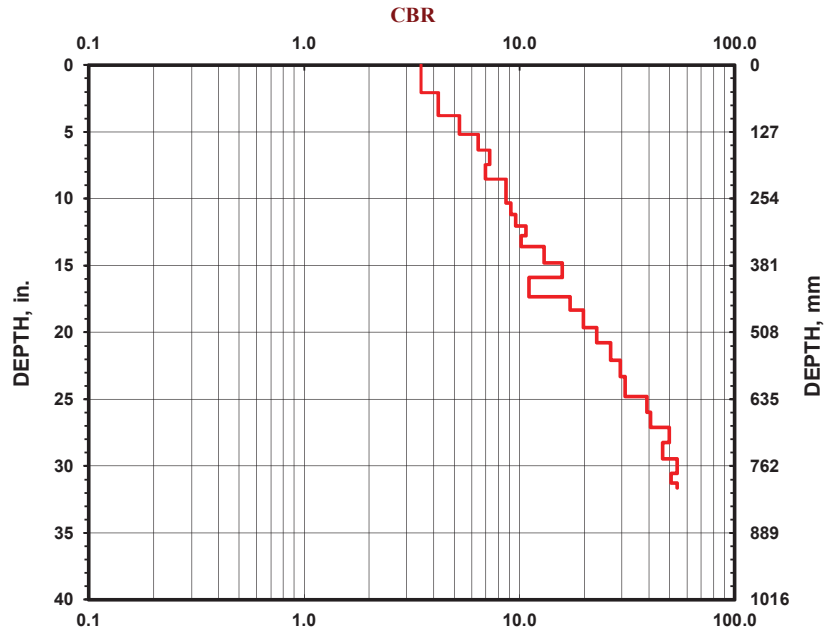
File Name: L_63+00_19'LT

Project: R-3833C Date: 24-Feb-19
 Location: Mooreville, NC Soil Type(s): A-6

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	52	1
1	96	1
1	132	1
1	162	1
1	189	1
1	217	1
1	240	1
1	263	1
1	285	1
1	306	1
1	325	1
1	345	1
2	377	1
2	404	1
2	441	1
2	466	1
3	499	1
3	528	1
4	562	1
4	593	1
5	630	1
5	660	1
5	689	1
6	718	1
6	749	1
6	776	1
4	795	1
2	804	1



DCP TEST DATA

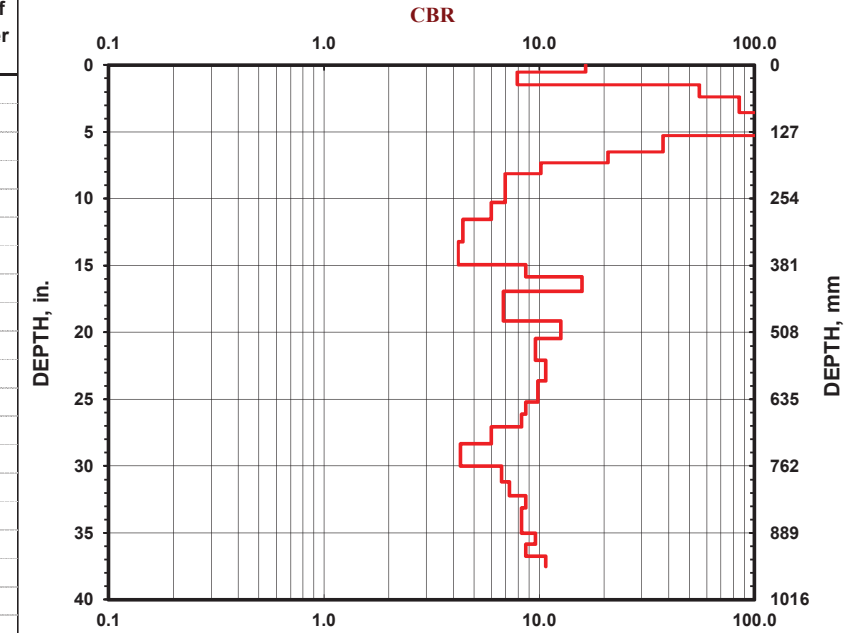
File Name: L_71+99_1'LT

Project: R-3833C Date: 24-Feb-19
 Location: Mooreville, NC Soil Type(s): A-4

- Hammer
- 10.1 lbs.
 - 17.6 lbs.
 - Both hammers used

- Soil Type
- CH
 - CL
 - All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	13	1
1	38	1
5	60	1
10	90	1
10	114	1
10	134	1
5	165	1
2	186	1
1	206	1
1	234	1
1	262	1
1	294	1
1	336	1
1	380	1
1	403	1
2	430	1
2	487	1
2	520	1
2	562	1
2	600	1
2	641	1
1	664	1
1	688	1
1	720	1
1	763	1
1	792	1
1	819	1
1	842	1
1	866	1
1	890	1
1	911	1
1	934	1
1	953	1



DCP TEST DATA

File Name: Y_18+01_10'RT

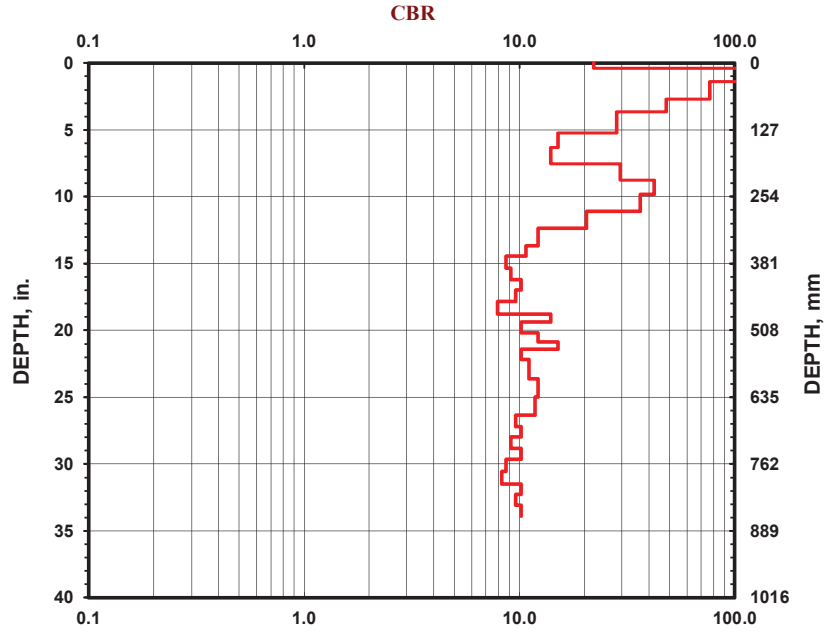
Project: R-3833C
Location: Mooreville, NC

Date: 24-Feb-19
Soil Type(s): A-2-4

- Hammer 10.1 lbs.
- Hammer 17.6 lbs.
- Both hammers used

- Soil Type CH
- Soil Type CL
- All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	10	1
10	35	1
10	68	1
5	93	1
5	133	1
2	161	1
2	191	1
4	222	1
5	250	1
5	282	1
3	314	1
2	348	1
1	367	1
1	390	1
1	412	1
1	432	1
1	453	1
1	478	1
1	493	1
1	513	1
1	530	1
1	544	1
1	564	1
2	601	1
2	635	1
2	670	1
1	691	1
1	711	1
1	733	1
1	753	1
1	776	1
1	800	1
1	820	1
1	841	1
1	861	1



DCP TEST DATA

File Name: Y_23+04_4'RT

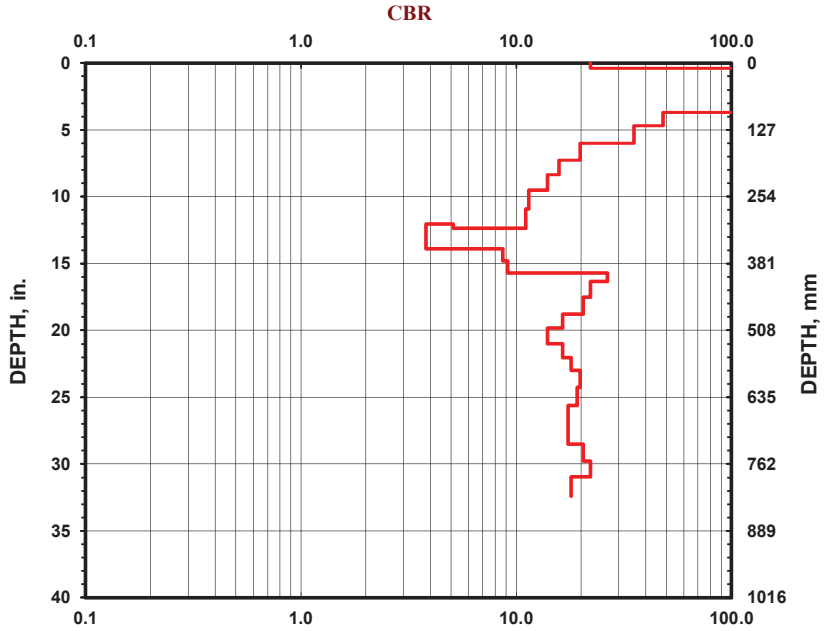
Project: R-3833C
Location: Mooreville, NC

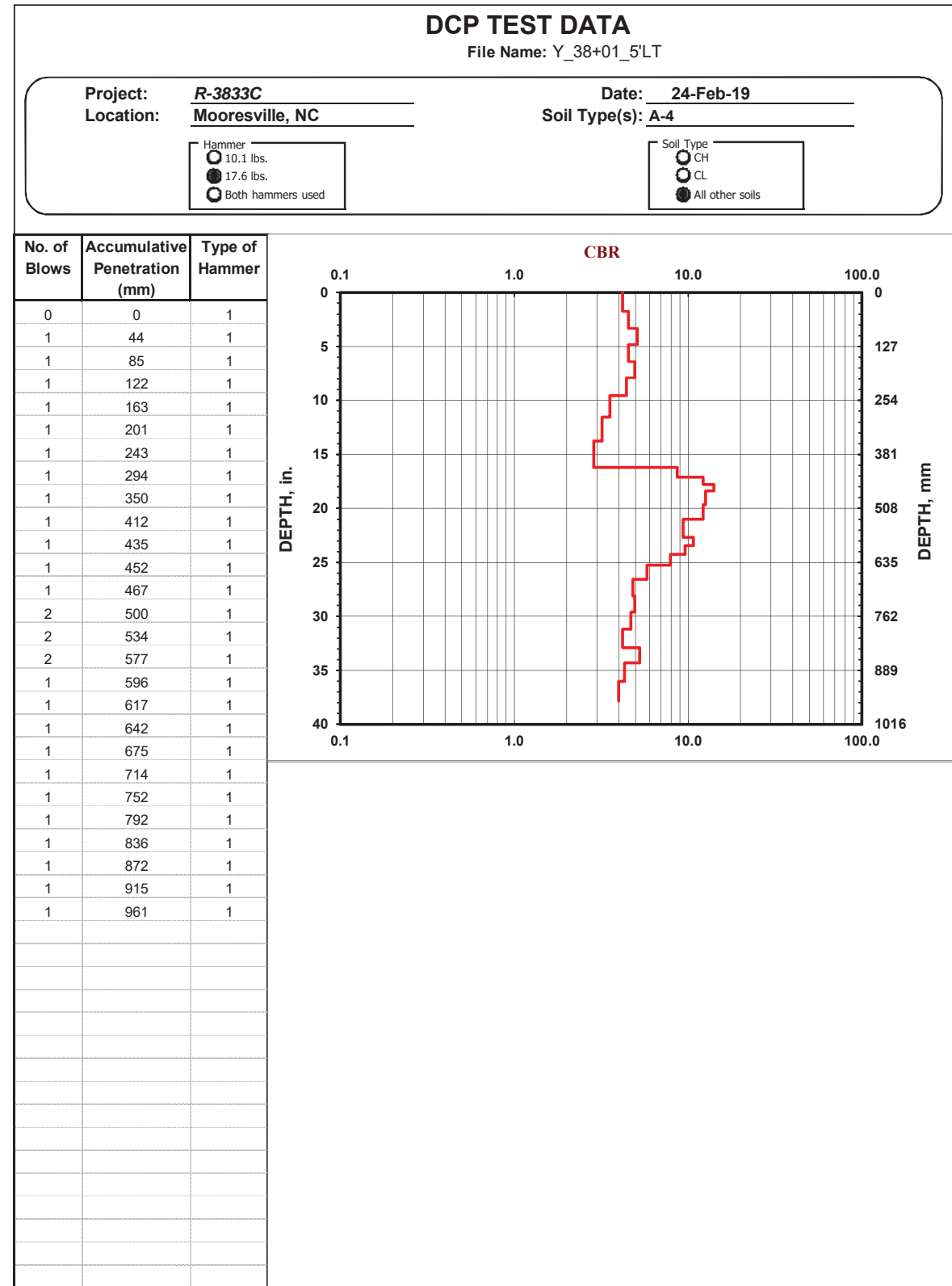
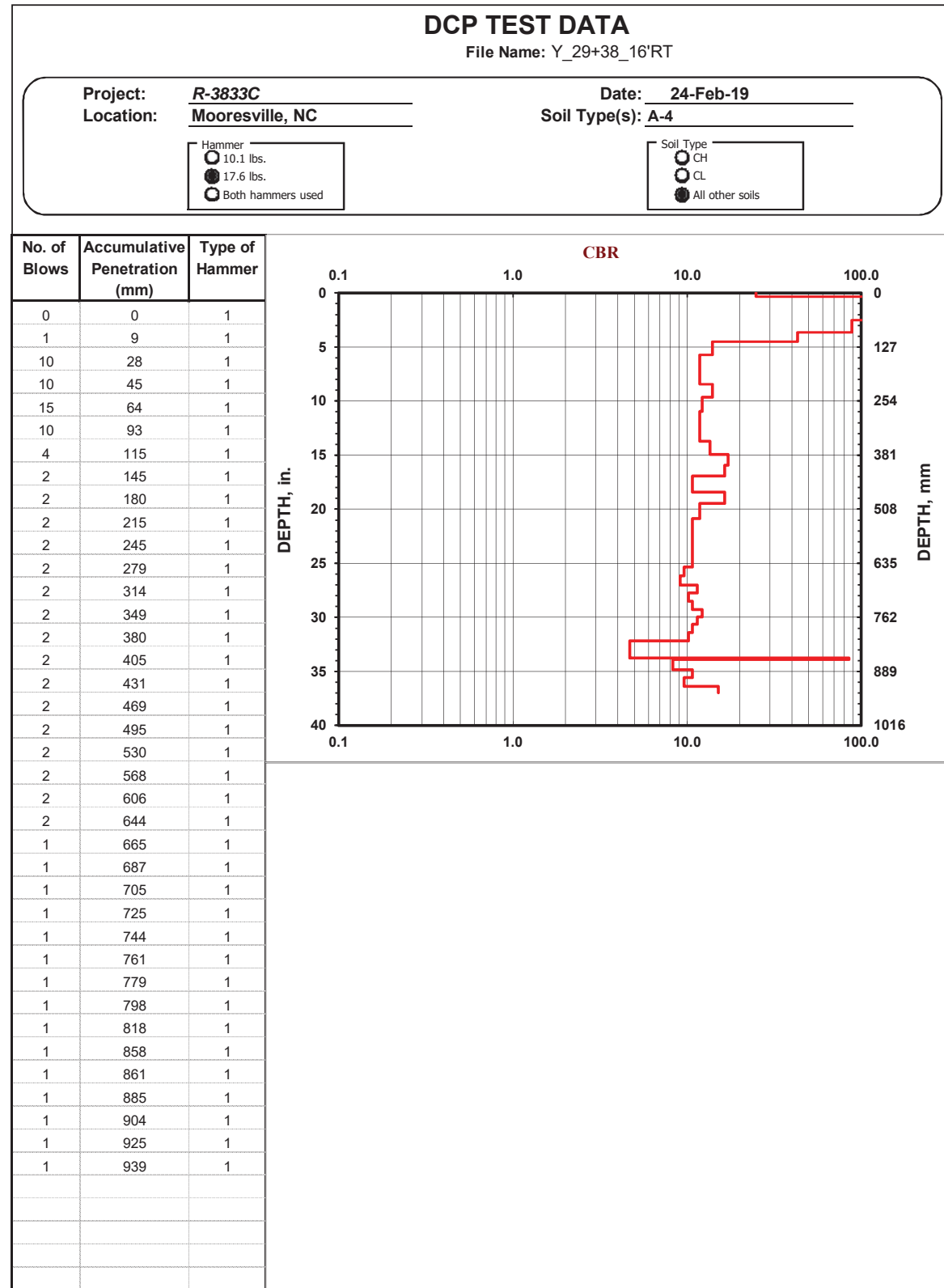
Date: 24-Feb-19
Soil Type(s): A-4

- Hammer 10.1 lbs.
- Hammer 17.6 lbs.
- Both hammers used

- Soil Type CH
- Soil Type CL
- All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	10	1
10	30	1
15	62	1
15	94	1
5	119	1
5	152	1
3	185	1
2	212	1
2	242	1
2	278	1
2	315	1
1	306	1
1	354	1
1	377	1
1	399	1
2	416	1
3	446	1
3	478	1
2	504	1
2	534	1
2	560	1
2	584	1
3	617	1
3	651	1
3	688	1
3	725	1
3	757	1
3	787	1
3	823	1





DCP TEST DATA

File Name: Y_44+13_1'LT

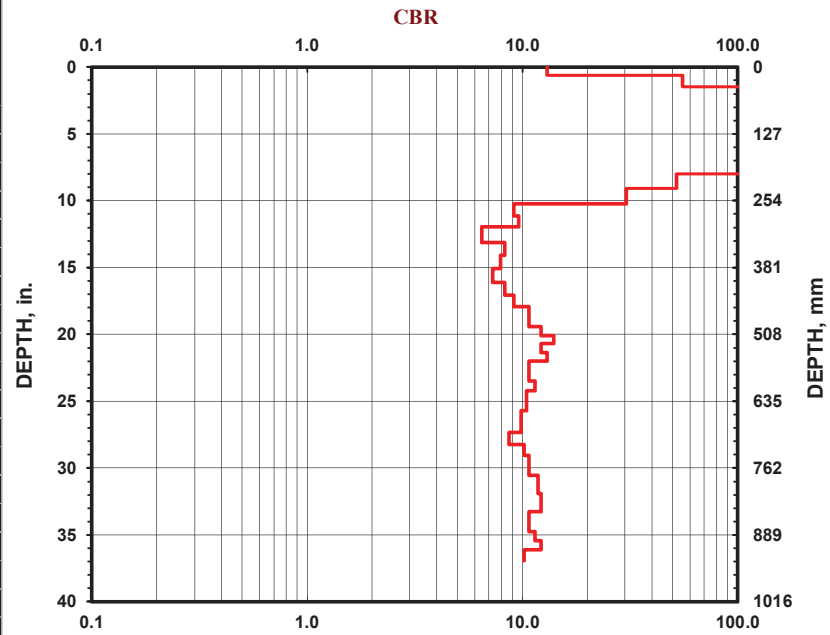
Project: R-3833C
 Location: Mooreville, NC

Date: 24-Feb-19
 Soil Type(s): A-4

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	16	1
5	38	1
10	54	1
15	72	1
15	86	1
15	103	1
15	118	1
15	137	1
15	166	1
15	203	1
6	231	1
4	261	1
1	283	1
1	304	1
1	334	1
1	358	1
1	383	1
1	410	1
1	434	1
1	456	1
1	475	1
1	494	1
1	511	1
1	526	1
1	543	1
1	559	1
1	578	1
1	597	1
1	615	1
2	654	1
2	695	1
1	718	1
1	738	1
2	776	1
2	811	1
2	845	1
2	883	1
1	901	1
1	918	1
1	938	1



DCP TEST DATA

File Name: Y_50+07_3'RT

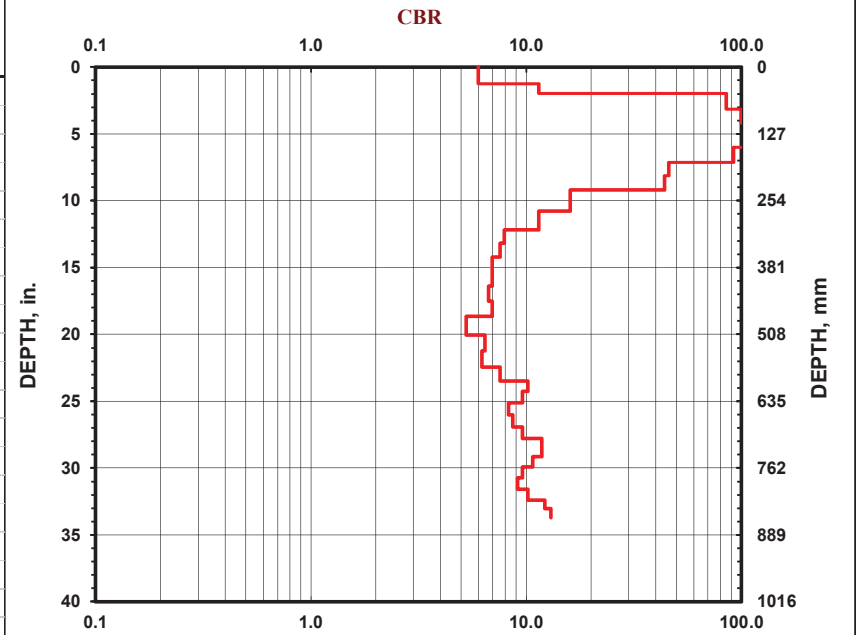
Project: R-3833C
 Location: Mooreville, NC

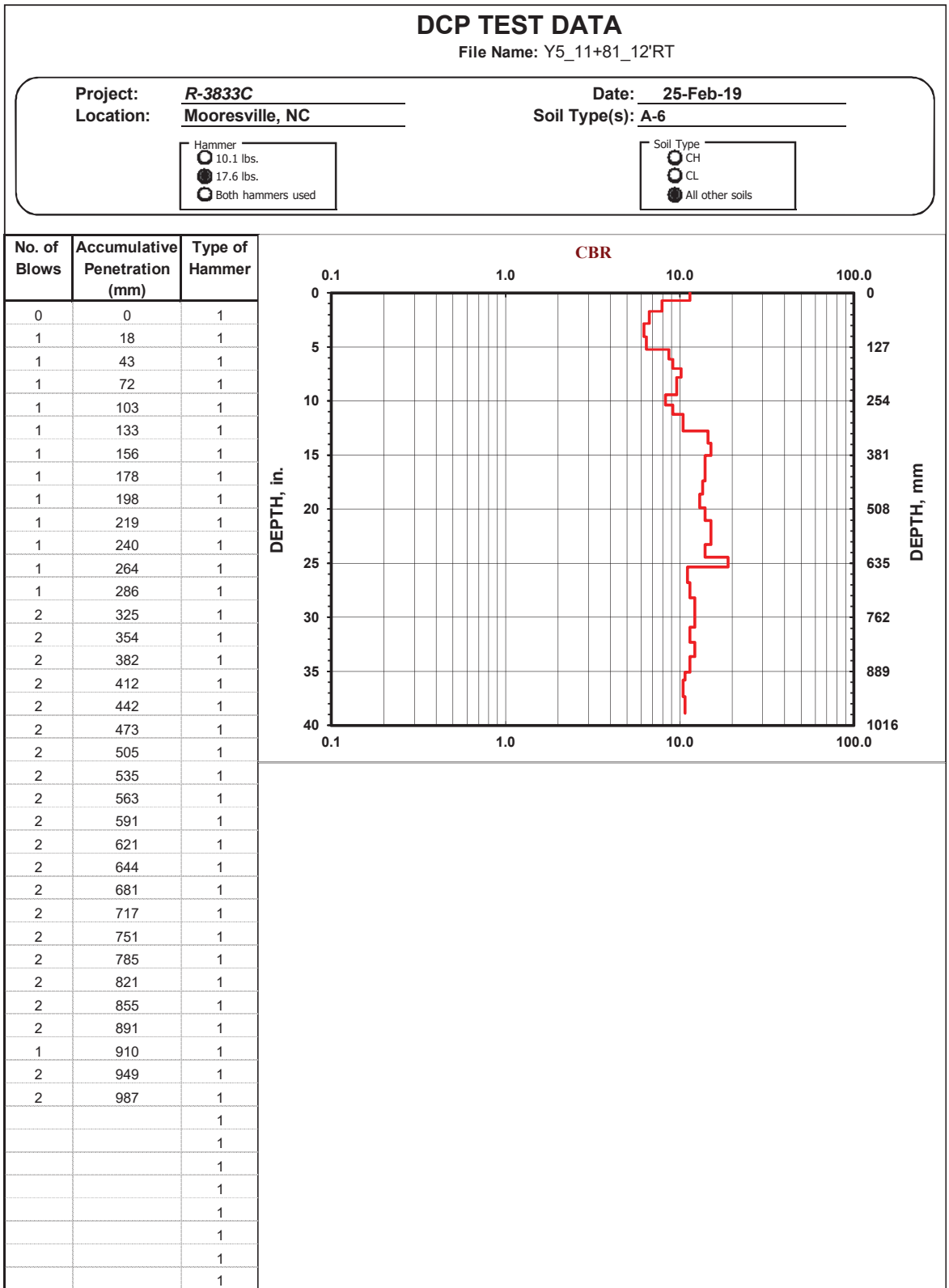
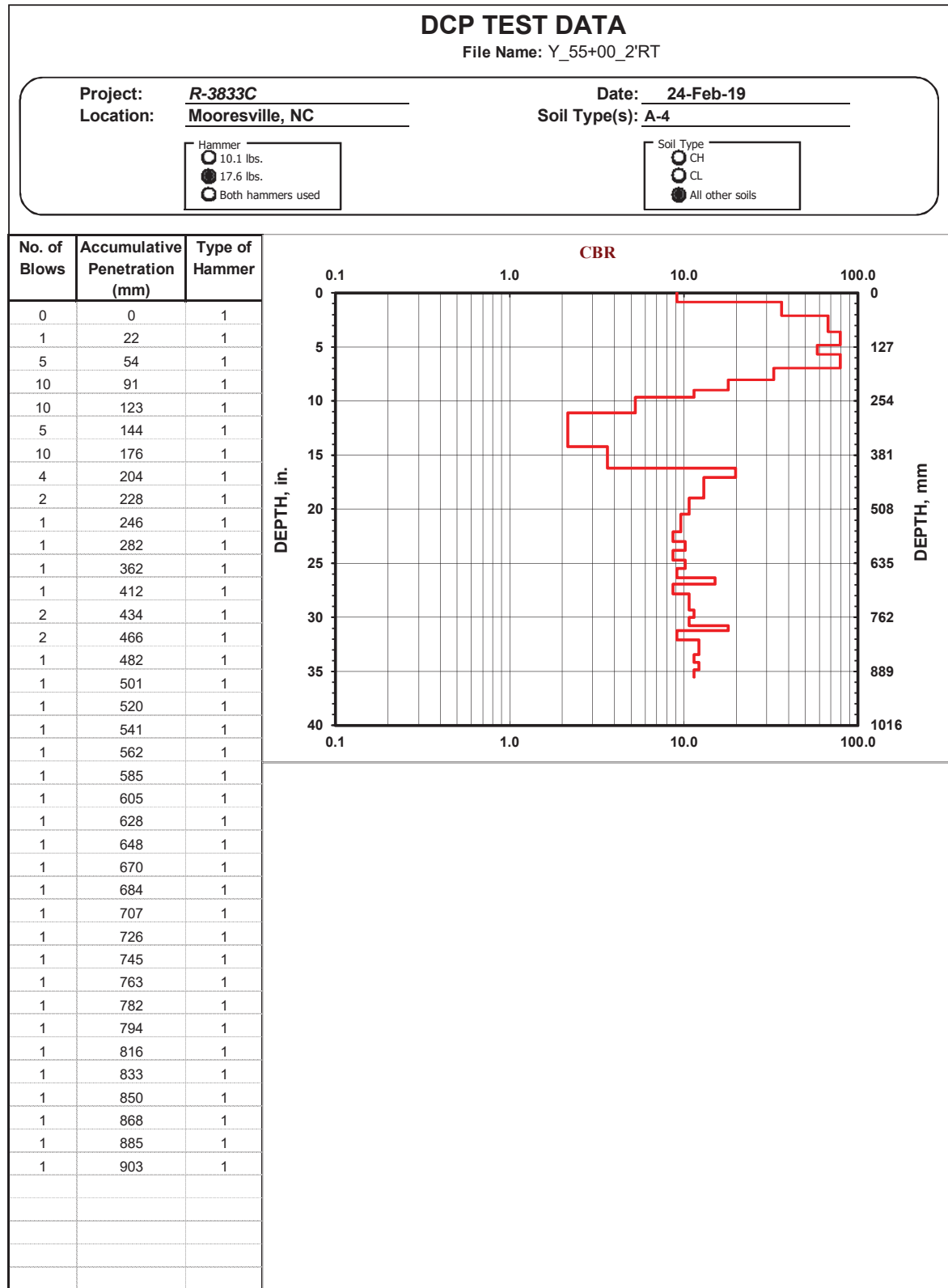
Date: 24-Feb-19
 Soil Type(s): A-4

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	32	1
1	50	1
10	80	1
10	106	1
10	131	1
10	153	1
10	181	1
5	207	1
5	234	1
3	274	1
2	310	1
1	335	1
1	361	1
1	389	1
1	417	1
1	446	1
1	474	1
1	510	1
1	540	1
1	571	1
1	597	1
1	617	1
1	638	1
1	662	1
1	685	1
1	706	1
2	741	1
1	760	1
1	781	1
1	803	1
1	823	1
1	840	1
1	856	1





DCP TEST DATA

File Name: Y5_15+95_7'LT

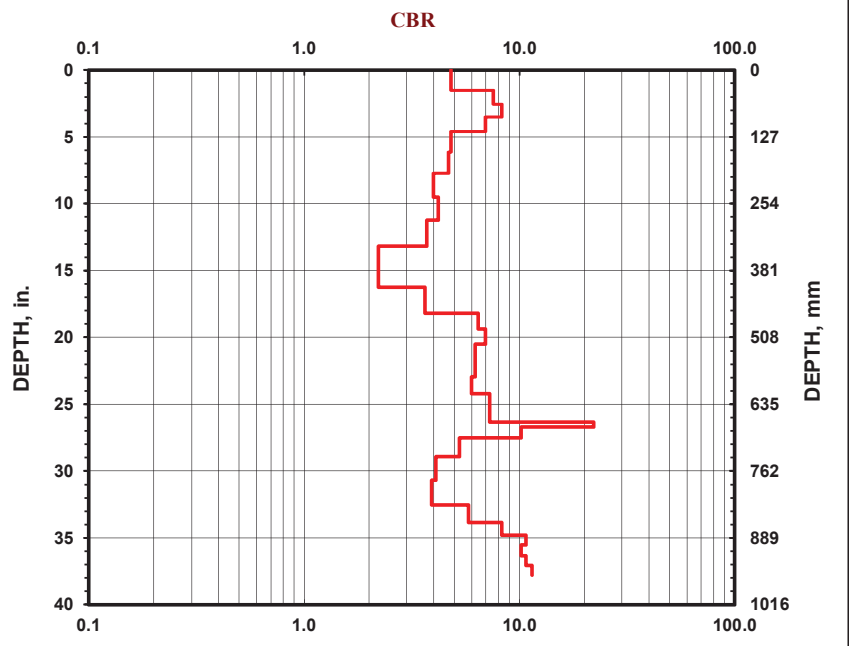
Project: R-3833C
 Location: Mooresville, NC

Date: 24-Feb-19
 Soil Type(s): A-2-6

Hammer
 10.1 lbs.
 17.6 lbs.
 Both hammers used

Soil Type
 CH
 CL
 All other soils

No. of Blows	Accumulative Penetration (mm)	Type of Hammer
0	0	1
1	39	1
1	65	1
1	89	1
1	117	1
1	156	1
1	196	1
1	242	1
1	286	1
1	335	1
1	413	1
1	463	1
1	493	1
1	521	1
1	552	1
1	583	1
1	615	1
1	642	1
1	669	1
1	679	1
1	699	1
1	735	1
1	780	1
1	827	1
1	860	1
1	884	1
1	903	1
1	923	1
1	942	1
1	960	1



PROJECT REFERENCE NO.	SHEET NO.
R-3833C	51

REFERENCE: R-3833C

PROJECT: 34554

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

SUBSURFACE INVESTIGATION

***APPENDIX B
LABORATORY RESULTS***

<small>DS</small> <i>WSH</i>	7/3/2019
<small>INITIALS</small>	<small>DATE</small>



FALCON ENGINEERING, INC.
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FALCON ENGINEERING 1210 TRINITY RD., SUITE 110, Cary, NC 27513

CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

AASHTO T-193 \ ASTM D-1883

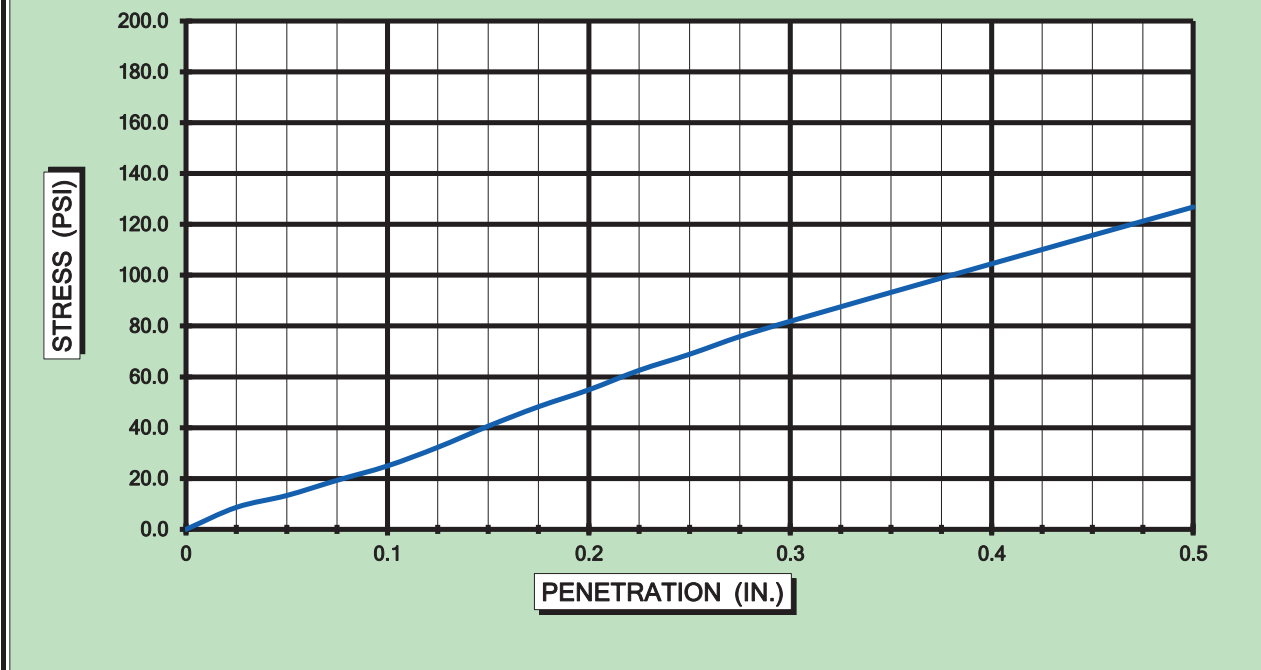
PROJECT #:	G18063.00	DATE:	3/3/2019
PROJECT NAME:	R-3833C Brawley School Road		
BORING:	R-05	SAMPLE:	BS-01
		DEPTH:	3.0 - 10.0

SOIL DESCRIPTION: Tan Very Micaceous Sandy Silt (A-4)

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	102.0 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.2%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	100.3 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	17.9%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.3%	SWELL	6.03%

CBR VALUE AT .1"	2.5	2.5
CBR VALUE AT .2"	3.7	3.7

STRESS-PENETRATION CURVE



LIQUID LIMIT	34	PLASTIC LIMIT	27	PLASTIC INDEX	7
--------------	----	---------------	----	---------------	---

Project No.	G18063.00
Project Name:	R-3833C Brawley School Road
Sample No:	BS-01
Source of Material:	R-05
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SILTY SAND(SM)
AASHTO Classification:	A-4
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

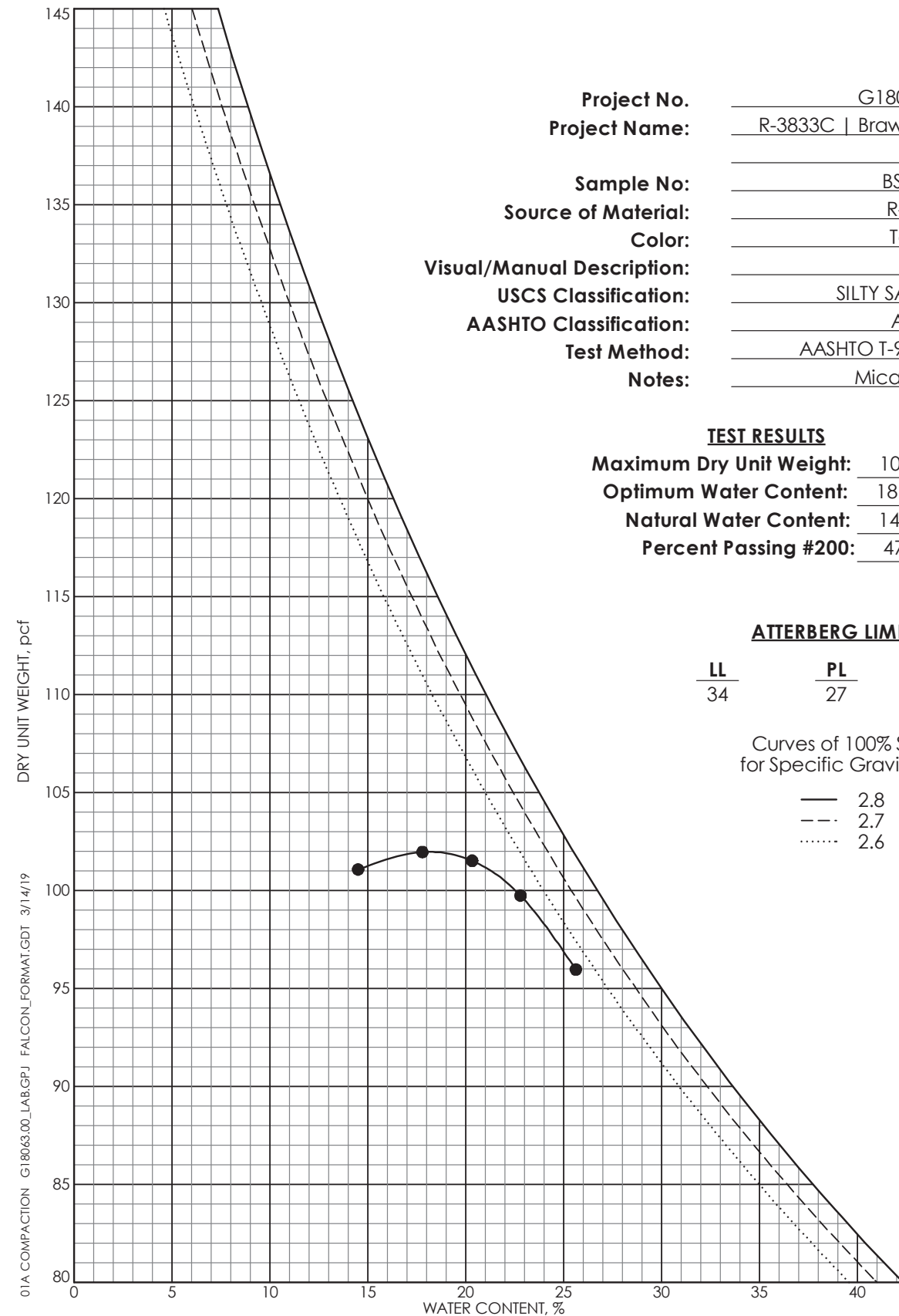
Maximum Dry Unit Weight:	102.0 PCF
Optimum Water Content:	18.2 %
Natural Water Content:	14.1 %
Percent Passing #200:	47.6 %

ATTERBERG LIMITS

LL	PL	PI
34	27	7

Curves of 100% Saturation for Specific Gravity Equal to:

- 2.8
- - - 2.7
- 2.6



01A COMPACTION G18063.00_LAB.GPJ FALCON_FORMAT.GDT 3/14/19



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CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

AASHTO T-193 \ ASTM D-1883

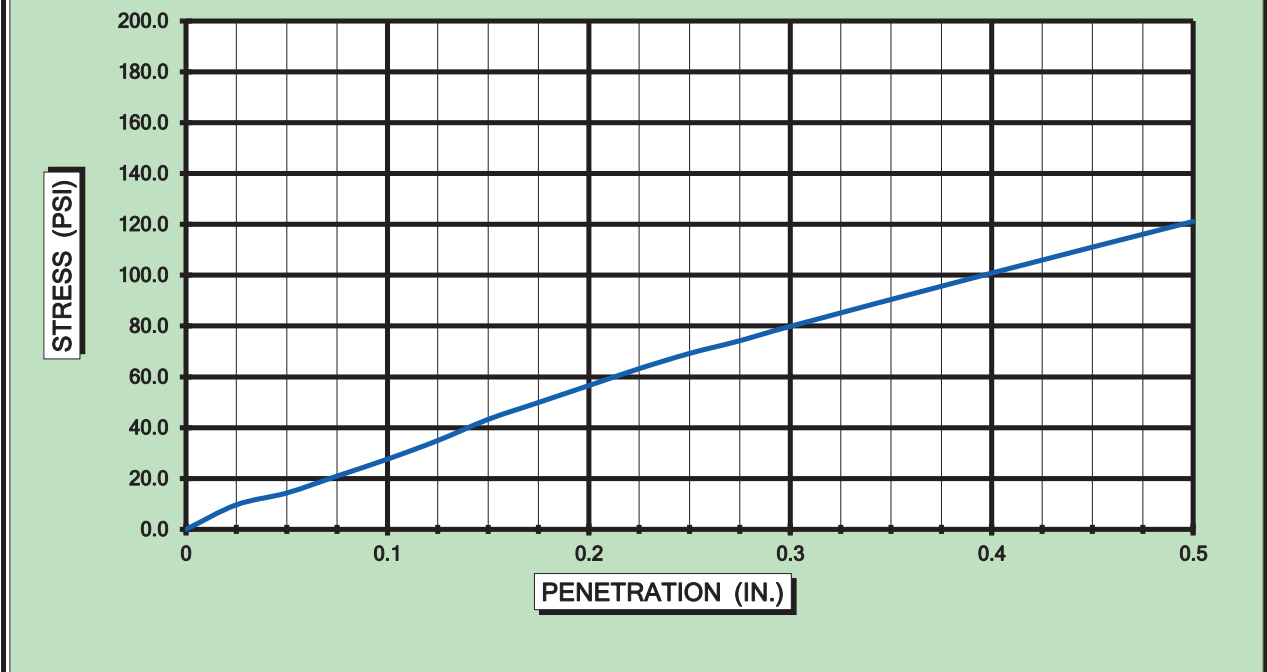
PROJECT #:	G18063.00	DATE:	3/3/2019
PROJECT NAME:	R-3833C Brawley School Road		
BORING:	RW1-1	SAMPLE:	BS-02
		DEPTH:	3.0-10.0

SOIL DESCRIPTION: Tan Very Micaceous Silty Clay (A-7-5)

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	102.4 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.8%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	100.6 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	18.6%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.3%	SWELL	5.60%

CBR VALUE AT .1"	2.8	2.8
CBR VALUE AT .2"	3.8	3.8

STRESS-PENETRATION CURVE



LIQUID LIMIT	57	PLASTIC LIMIT	33	PLASTIC INDEX	24
--------------	----	---------------	----	---------------	----

Project No.	G18063.00
Project Name:	R-3833C Brawley School Road
Sample No:	BS-02
Source of Material:	RW1-1
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SANDY ELASTIC SILT(MH)
AASHTO Classification:	A-7-5
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

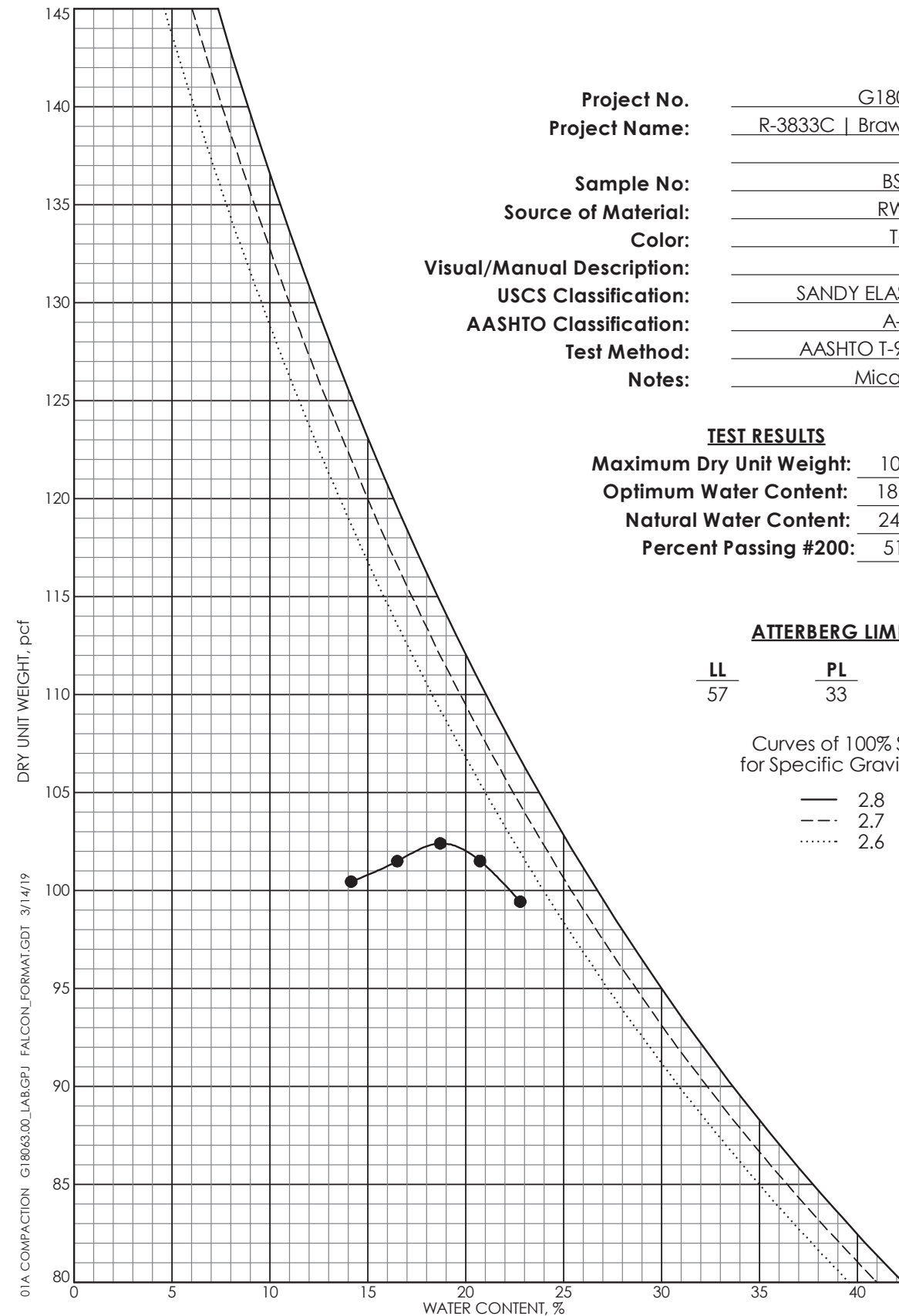
Maximum Dry Unit Weight:	102.4 PCF
Optimum Water Content:	18.8 %
Natural Water Content:	24.4 %
Percent Passing #200:	51.0 %

ATTERBERG LIMITS

LL	PL	PI
57	33	24

Curves of 100% Saturation for Specific Gravity Equal to:

- 2.8
- - - 2.7
- 2.6



01A COMPACTION G18063.00_LAB.GPJ FALCON_FORMAT.GDT 3/14/19



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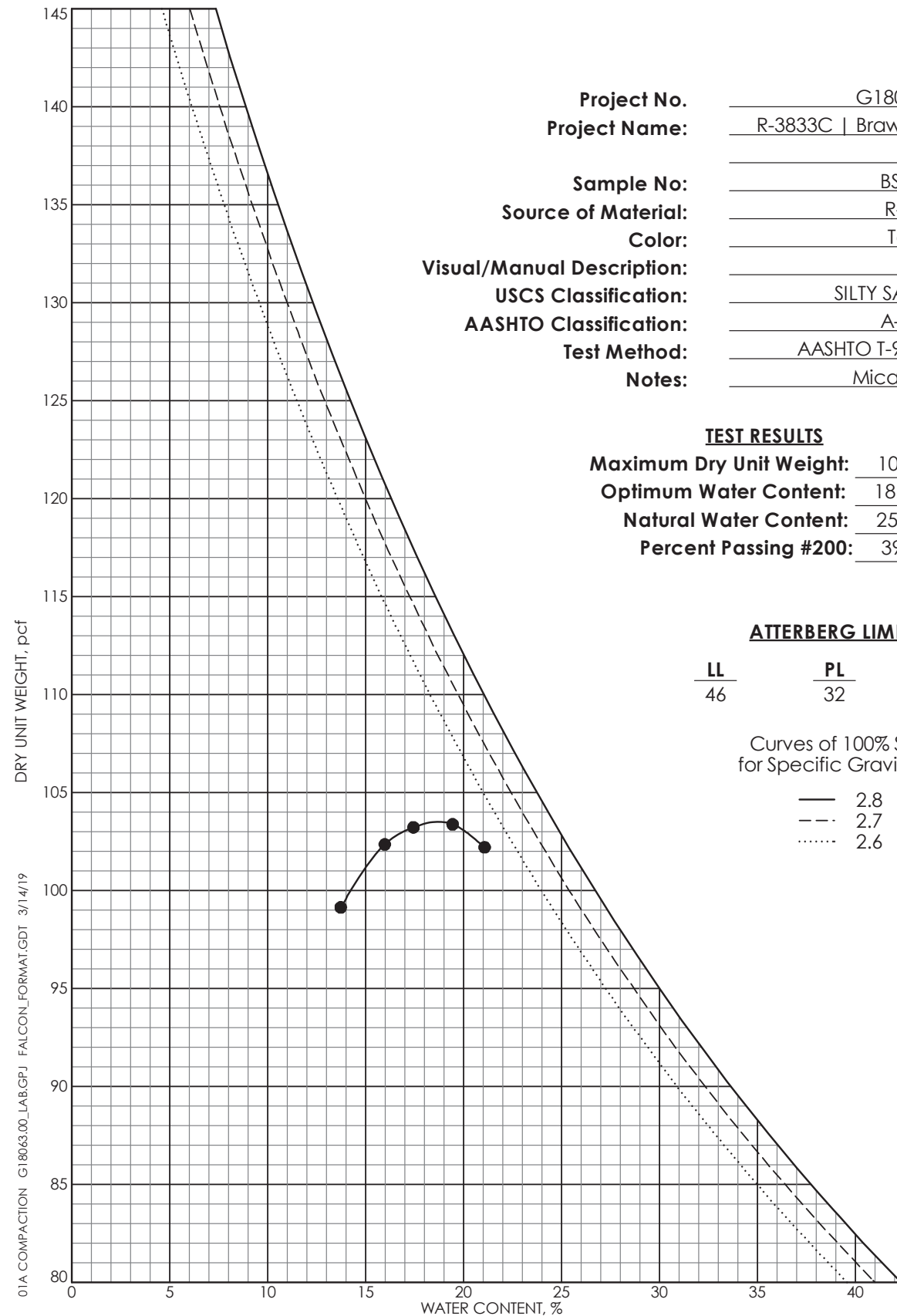
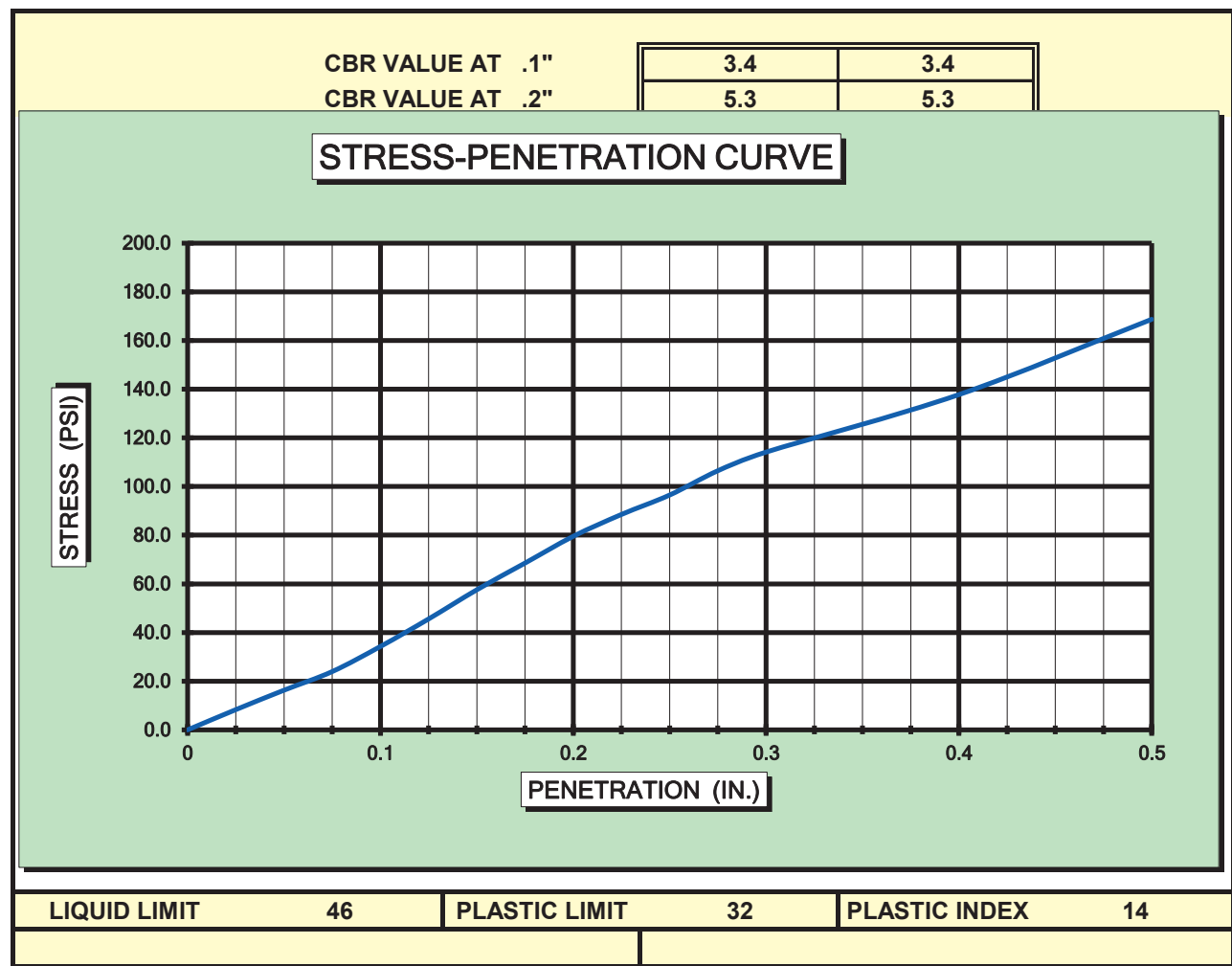
CBR (CALIFORNIA BEARING RATIO) OF LABORATORY COMPACTED SOIL

AASHTO T-193 \ ASTM D-1883

PROJECT #:	G18063.00	DATE:	3/3/2019
PROJECT NAME:	R-3833C Brawley School Road		
BORING:	R-40	SAMPLE:	BS-03
		DEPTH:	3.5-8.5

SOIL DESCRIPTION: Tan Very Micaceous Silty Clay (A-7-5)

COMPACTION METHOD	AASHTO T-99A	SOAK	96 HRS.
MAXIMUM DRY DENSITY	103.5 PCF	STRAIN RATE	.05 IN / MIN.
OPTIMUM MOISTURE CONTENT	18.7%	LOAD CELL	6000
TEST DATA		SURCHARGE WEIGHT	10 lb.
DRY DENSITY	101.6 PCF	SURCHARGE PER SQUARE FOOT	51 lbs/sq.ft.
MOISTURE CONTENT	18.6%	FINAL MOISTURE CONTENT	N/A
PERCENT COMPACTION	98.2%	SWELL	2.31%



Project No.	G18063.00
Project Name:	R-3833C Brawley School Road
Sample No:	BS-03
Source of Material:	R-40
Color:	Tan
Visual/Manual Description:	
USCS Classification:	SILTY SAND(SM)
AASHTO Classification:	A-7-5
Test Method:	AASHTO T-99 Method A
Notes:	Micaceous

TEST RESULTS

Maximum Dry Unit Weight:	103.5 PCF
Optimum Water Content:	18.7 %
Natural Water Content:	25.4 %
Percent Passing #200:	39.7 %

ATTERBERG LIMITS

LL	PL	PI
46	32	14

Curves of 100% Saturation for Specific Gravity Equal to:

- 2.8
- - - 2.7
- 2.6

01A COMPACTION G18063.00_LAB.GPJ FALCON_FORMAT.GDT 3/14/19



July 3, 2019

TIP No.: R-3833C
WBS No.: 34554.1.3
County: Iredell

Project Description: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21

Subject: Roadway Recommendations

As authorized, Falcon Engineering, Inc. (Falcon) has completed the geotechnical subsurface investigation for the proposed roadway widening for Brawley School Road (SR 1100) from Talbert Road (SR 1116) to 1000' East of US 21 in Mooresville in Iredell County, North Carolina. This report includes roadway geotechnical recommendations for the preparation of final design, right of way plans, construction cost estimates, and construction procedures.

Recommendations and evaluations provided by Falcon are based on the information provided by STANTEC and established NCDOT standards. Modifications of our recommendations and evaluations may be required if there are changes to the design. Recommendations in this report are in part based on data obtained from soil borings. The nature and extent of variations between borings may not become evident until construction.

Our professional services for this project have been performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. Falcon appreciates the opportunity to have provided you with geotechnical engineering services for this project. If you have any questions regarding this report, please contact our office.

Respectfully submitted:

FALCON ENGINEERING, INC.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DocuSigned by:
W. Scott Hunsberger
5A469AC80FC746E3
7/3/2019

W. Scott Hunsberger, PE
Geotechnical Engineer

Jeremy R. Hamm, PE
Geotechnical Engineering Manager

TIP No.: R-3833C
WBS No.: 34554.1.3
COUNTY: Iredell
DESCRIPTION: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21
SUBJECT: Roadway Subsurface Investigation – Recommendations

Falcon has completed the subsurface investigation for this project and submits the following recommendations:

I. Slope/Embankment Stability

A. Slope Design

We recommend that all embankment and cut slopes be constructed at a ratio of 2:1 (H:V) or flatter.

B. Undercut for Embankment Stability

Soft surficial soils may be present in portions of the site where new embankments will be placed. These soils may not provide adequate stability for construction of embankments.

To assist in embankment stabilization in such locations, it is recommended that a quantity of **8,300 CY** of undercut be included in the contract as a contingency to be used at the discretion of the engineer.

C. Geotextile for Soil Stabilization

To aid in the placement of fill over unstable soil, it is recommended that a quantity of **8,300 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used in conjunction with the above referenced undercut at the discretion of the engineer.

II. Subgrade Stability

A. Subsurface Drainage – Subsurface Drain

Based on subsurface conditions and the condition of the existing road, we do not anticipate widespread subgrade stability issues due to groundwater. However, it is recommended that a quantity of **500 LF** of 6-inch perforated corrugated plastic pipe be included in the contract as a contingency to be used at the discretion of the Engineer. Construction of underdrains shall follow Standard Specifications, Section 815 “Subsurface Drainage”, and Roadway Standard Drawing 815.02 “Subsurface Drain”.

B. Grade Point Undercut

It is recommended that a quantity of **50 CY** of undercut be included in the contract for undercut at grade points.

C. Undercut for Subgrade Stability

It is recommended a quantity of **1,000 CY** of undercut be included in the contract as a contingency to be used at the discretion of the Engineer. Undercut of unstable soils should be

made to a depth of three feet, or to competent material, whichever is less, and to a width of one foot beyond edge of pavement or back of curb.

D. Geotextile for Soil Stabilization

The use of Geotextile for Soil Stabilization is anticipated in conjunction with Undercut for Subgrade Stabilization as discussed in Section II. B. It is recommended that a quantity of **1,000 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used at the discretion of the Engineer.

E. Aggregate Subgrade

Moderate to high plasticity soils were encountered at proposed pavement subgrade in cut and near-grade construction areas at many locations throughout the project adjacent to existing pavements. We recommend aggregate subgrade be implemented to replace materials with a Plasticity Index (PI) greater than or equal to 36 from within 1.0 feet of pavement subgrade in these areas to avoid undermining existing pavements and allow for staging of construction and/or avoidance of utilities. Based on our subsurface investigation, aggregate subgrade is anticipated at the following locations.

Station	Offset
21+00 to 23+50, -L-	10 ft to 48 ft LT & 10 ft to 47 ft RT
71+25 to 72+25, -L-	17 ft to 28 ft LT & 3 ft to 19 ft RT
74+00 to 75+50, -L-	17 ft to 35 ft LT & 13 ft to 26 ft RT
19+25 to 25+00, -Y-	2 ft to 44 ft LT & 17 ft to 46 ft RT
15+00 to 17+50, -Y5-	9 ft to 42 ft LT & 9 ft to 50 ft RT

These areas are represented on the subsurface cross sections by a solid filled area. It is recommended that **1,550 CY** of Shallow Undercut, **3,450 Tons** of Class IV Subgrade Stabilization and **5,200 SY** of Geotextile for Soil Stabilization be included in the contract for the above listed areas. If highly plastic or otherwise unsuitable subgrades are present in other areas adjacent to existing pavements or above existing utilities, implement aggregate subgrade. To assist in subgrade stabilization in such locations, it is recommended that a quantity of **400 CY** of Shallow Undercut, **800 Tons** of Class IV Subgrade Stabilization and **1,200 SY** of Geotextile for Soil Stabilization be included in the contract as a contingency to be used at the discretion of the Engineer. Aggregate Subgrade shall be performed in accordance with Section 505 of the Standard Specifications, to a depth of one foot and a width of one foot beyond edge of pavement or back of curb, as necessary.

III. Borrow Specifications

A. Disposal of Waste Materials

Waste Materials may be disposed of in non-structural areas, such as outside of the embankment slopes at the discretion of the engineer.

B. Common Borrow

Common borrow for embankment fill shall meet the Statewide Criteria outlined in the Standard Specification, Article 1018-2 (A).

C. Select Granular Material

Select granular material for embankment/backfill, geotextile for soil stabilization, or for fill in standing water shall meet the criteria outlined in the Standard Specifications, Article 1016-3, Class II and/or III. The select granular material should be placed to a height of 3 feet above geotextile for soil stabilization and/or water level.

It is recommended a quantity of **8,300 CY** of Select Granular Material be included in the contract as a contingency item for use in conjunction with Geotextile for Soil Stabilization in Section I, C or at the discretion of the Engineer. It is recommended a quantity of **1,000 CY** of Select Granular Material be included in the contract as a contingency item for use in conjunction with Geotextile for Soil Stabilization in Section II, D or at the discretion of the Engineer.

D. Shrinkage Factor

A shrinkage factor of **15 percent** is recommended to be used in the earthwork computations for this project.

IV. Miscellaneous**A. Reduction of Unclassified Excavation – Loss Due to Clearing and Grubbing**

It is recommended that Unclassified Excavation on the project be reduced by **600 CY** due to clearing and grubbing.

B. Reduction of Unclassified Excavation – Unsuitable Unclassified Excavation

Highly plastic soils are anticipated to be present in cut excavations from the following locations and we recommend unclassified excavation be reduced by the following amounts.

Station	Offset	Quantity (CY)
21+00 to 23+50, -L-	10 ft to 48 ft LT & 10 ft to 67 ft RT	600
71+25 to 72+25, -L-	17 ft to 19 ft LT & 8 ft to 10 ft RT	50
74+00 to 75+50, -L-	17 ft to 57 ft LT & 13 ft to 21 ft RT	200
19+25 to 25+00, -Y-	2 ft to 44 ft LT & 17 ft to 46 ft RT	250
15+00 to 17+50, -Y5-	9 ft to 42 ft LT & 9 ft to 50 ft RT	100

These areas are represented on the subsurface profiles and cross sections by a single hatch pattern.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS Number: 34554.1.3County: IredellProject Engineer: Hunsberger, W. S.TIP Number: R-3833CField Office: ConsultantProject Geologist: Lane, R.W.Description: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	8,300	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. B	Contingency	N/A	N/A	50	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. C	Contingency	N/A	N/A	1,000	CY
Total Quantity of Undercut Excavation =							9,350	CY
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	9,300	CY
Total Quantity of Select Granular Material =							9,300	CY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	8,300	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. D	Contingency	N/A	N/A	1,000	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	21+00.00	23+50.00	1,450	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	71+25.00	72+25.00	200	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-L-	74+00.00	75+50.00	550	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-Y-	19+25.00	25+00.00	2,700	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	-Y5-	15+00.00	17+50.00	300	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. E	Contingency	N/A	N/A	1,200	SY
Total Quantity of Geotextile for Soil Stabilization =							15,700	SY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	21+00.00	23+50.00	450	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	71+25.00	72+25.00	50	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-L-	74+00.00	75+50.00	150	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-Y-	19+25.00	25+00.00	800	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	-Y5-	15+00.00	17+50.00	100	CY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. E	Contingency	N/A	N/A	400	CY
Total Quantity of Shallow Undercut =							1,950	CY
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	21+00.00	23+50.00	1,000	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	71+25.00	72+25.00	100	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-L-	74+00.00	75+50.00	350	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-Y-	19+25.00	25+00.00	1,800	TON
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	-Y5-	15+00.00	17+50.00	200	TON



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS Number: 34554.1.3County: IredellProject Engineer: Hunsberger, W. S.TIP Number: R-3833CField Office: ConsultantProject Geologist: Lane, R.W.Description: Brawley School Road (SR 1100) From Talbert Road (SR 1116) to 1000' East of US 21

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. E	Contingency	N/A	N/A	800	TON
Total Quantity of Class IV Subgrade Stabilization =							4,250	TON
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. A	Contingency	N/A	N/A	500	LF
Total Quantity of 6" Perforated Subdrain Pipe =							500	LF

These Items Only Impact Earthwork Totals								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	600	CY
N/A	Shrinkage Factor	235 - Embankments	III. D	N/A	N/A	N/A	15	%
N/A	Unclassified Excavation - Unsuitable Waste	225 - Roadway Excavation	IV. B	N/A	N/A	N/A	1,200	CY

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.	R-3833C	1	12

CROSS SECTIONS

LINE	STATION	SHEETS
-L-	21+00.00 - 23+50.00	4,5
-L-	71+00.00 - 72+00.00	6
-L-	74+00.00 - 75+50.00	7
-Y-	19+00.00 - 25+00.00	8-10
-Y5-	15+00.00 - 17+50.00	11,12

**ROADWAY
SUBSURFACE INVESTIGATION**

COUNTY IREDELL
PROJECT DESCRIPTION SR 1100 BRAWLEY SCHOOL
ROAD FROM SR 1116 TALBERT ROAD TO
1000' EAST OF US 21

RECOMMENDATIONS

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

HPC

LANE, R.W.

INVESTIGATED BY FALCON ENG.

DRAWN BY HILL, M.J.

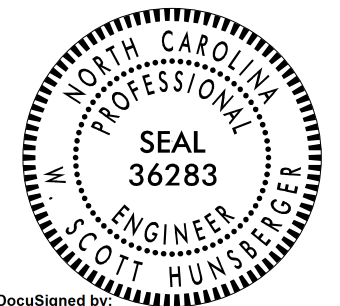
CHECKED BY HUNSBERGER, W.S.

SUBMITTED BY FALCON ENG.

DATE JUNE 2019

REFERENCE: R-3833C

PROJECT: 34554



DocuSigned by:

W. Scott Hunsberger

5A469AC80FCD49E... 7/3/2019

SIGNATURE

DATE

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

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CONTRACT: 34554

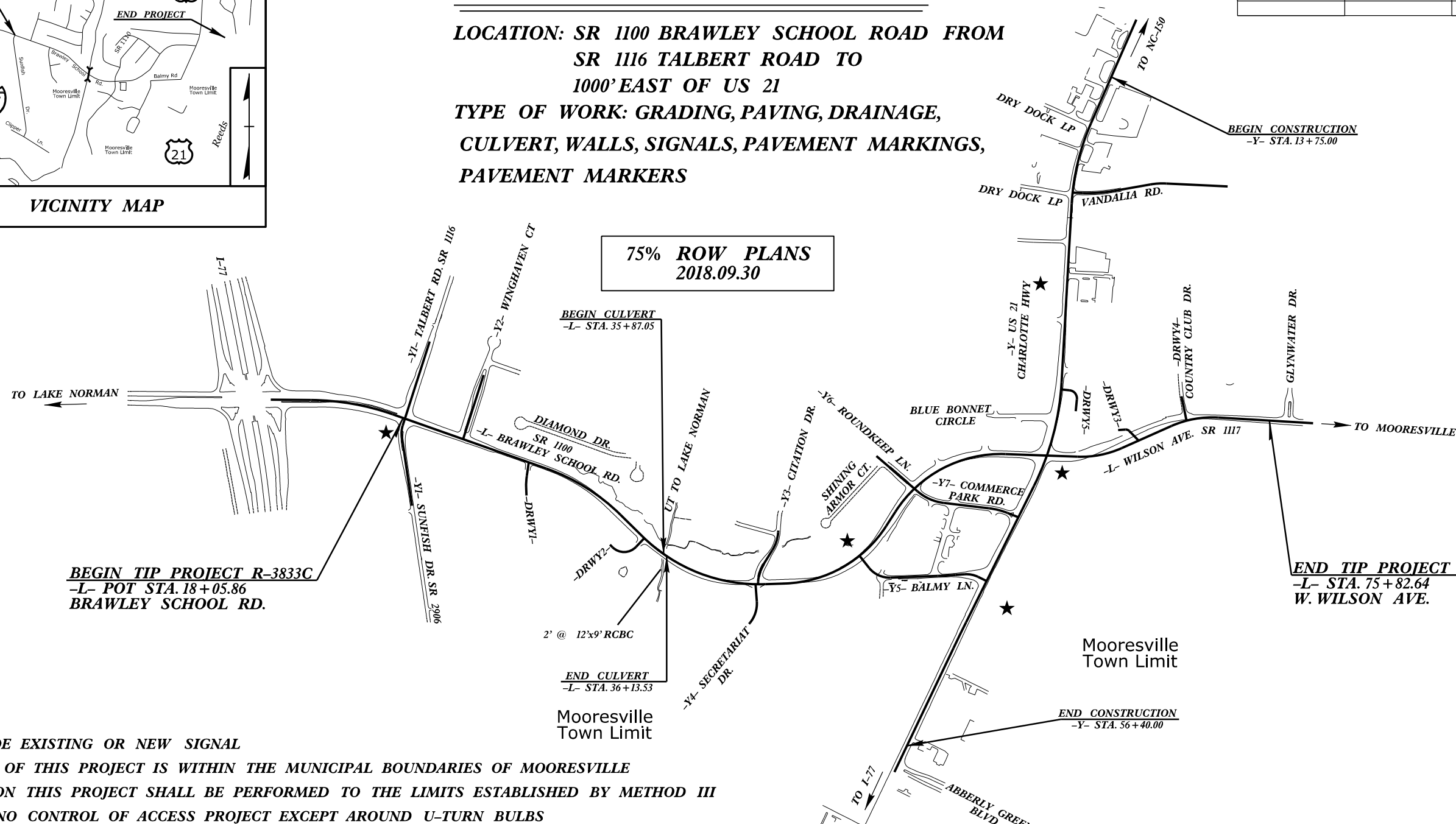
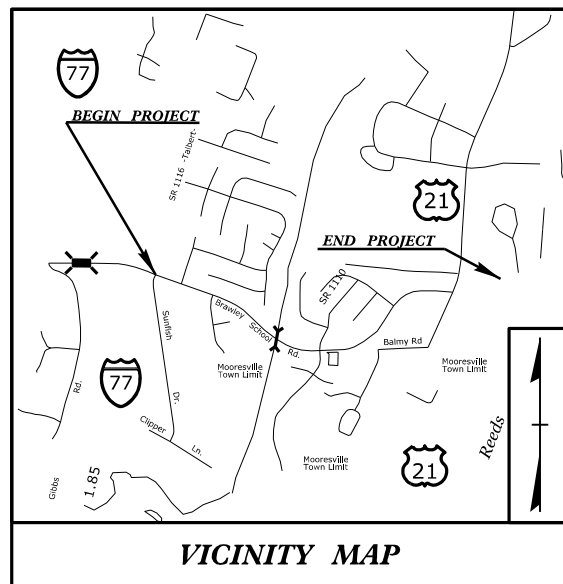
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

IREDELL COUNTY

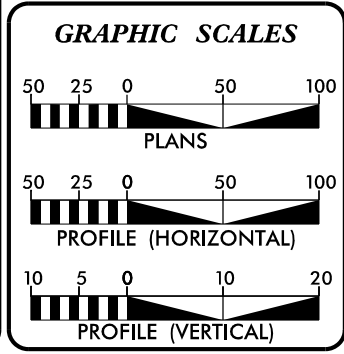
LOCATION: SR 1100 BRAWLEY SCHOOL ROAD FROM SR 1116 TALBERT ROAD TO 1000' EAST OF US 21

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERT, WALLS, SIGNALS, PAVEMENT MARKINGS, PAVEMENT MARKERS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3833C	3	12
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34554.1.FD1		P.E.	
34554.2.4		RW	
34554.2.5		UTIL	



★ UPGRADE EXISTING OR NEW SIGNAL
 A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF MOORESVILLE
 CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
 THIS IS A NO CONTROL OF ACCESS PROJECT EXCEPT AROUND U-TURN BULBS



DESIGN DATA

ADT 2015 =	18500
ADT 2040 =	28200
K =	10 %
D =	55 %
T =	4 % *
V =	45 MPH
* TTST =	1% DUAL = 3%
FUNC CLASS =	MAJOR RURAL COLLECTOR

PROJECT LENGTH

ROADWAY LENGTH TIP PROJECT R-3833C =	1.090 miles
STRUCTURE LENGTH TIP PROJECT R-3833C =	0.005 miles
TOTAL LENGTH TIP PROJECT R-3833C =	1.094 miles

Prepared In The Office of:

Stantec
 Stantec Consulting Services Inc.
 801 Jones Franklin Road
 Suite 300
 Raleigh, NC 27606
 Tel. (919) 851-6866 Fax. (919) 851-7024
 www.stantec.com License No. F-0672

for the North Carolina Department of Transportation

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2018

LETTING DATE:
JUNE 16, 2020

STANTEC CONTACT:
A. DEAN SARVIS, P.E.
PROJECT ENGINEER

NC DOT DIVISION 12 CONTACT:
BRYAN SOWELL, PE
PROJECT MANAGER

HYDRAULICS ENGINEER

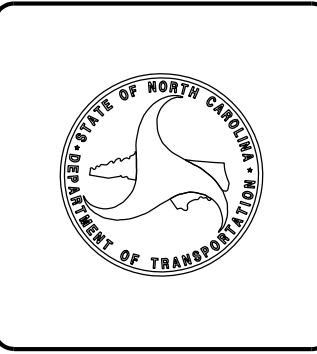
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ROADWAY DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

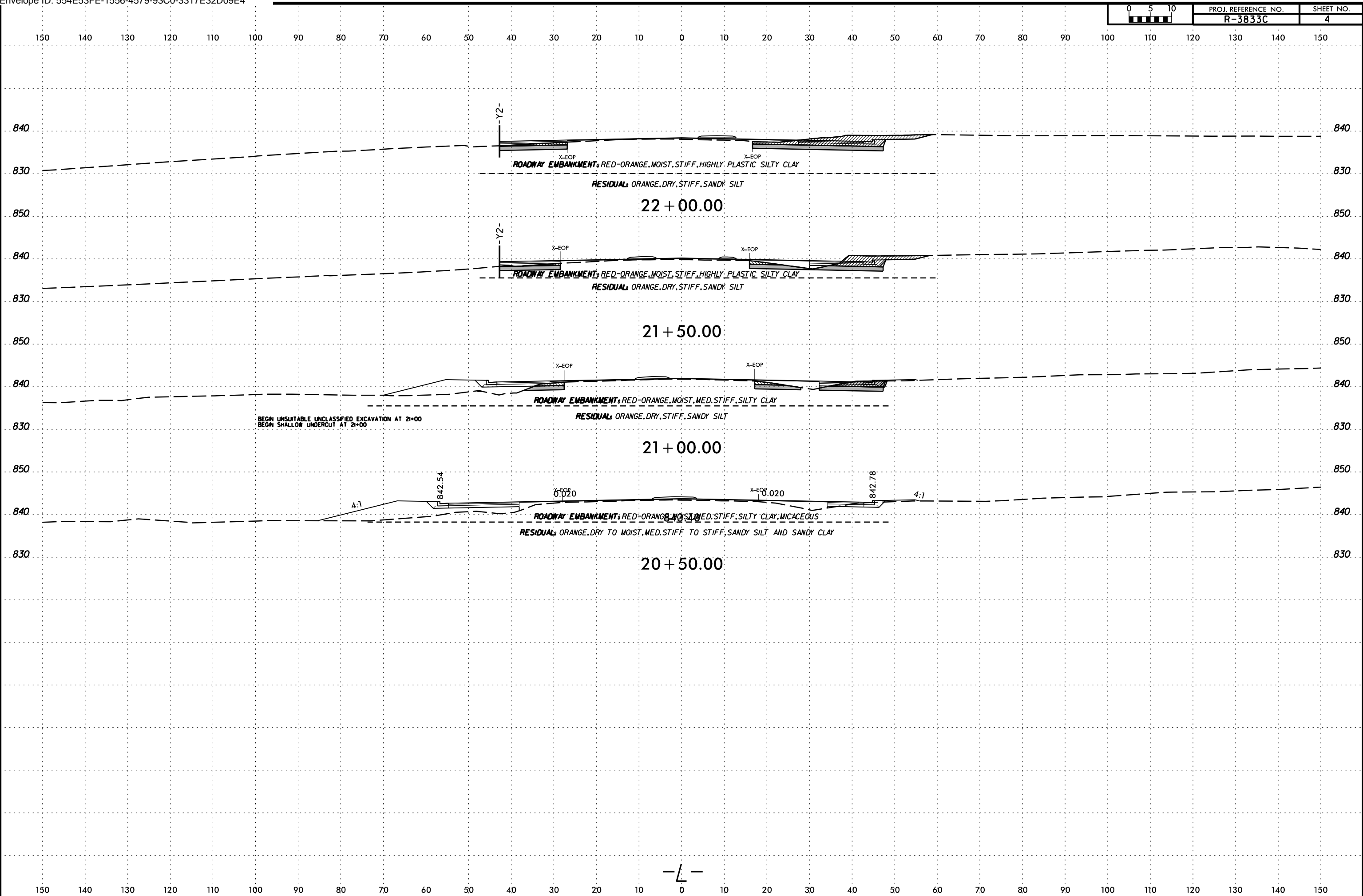
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NAD 83/NA 2011



6/23/16
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BEGN UNSUITABLE UNCLASSIFIED EXCAVATION AT 21+00
BEGN SHALLOW UNDERCUT AT 21+00

22 + 00.00

21 + 50.00

21 + 00.00

20 + 50.00

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842.00

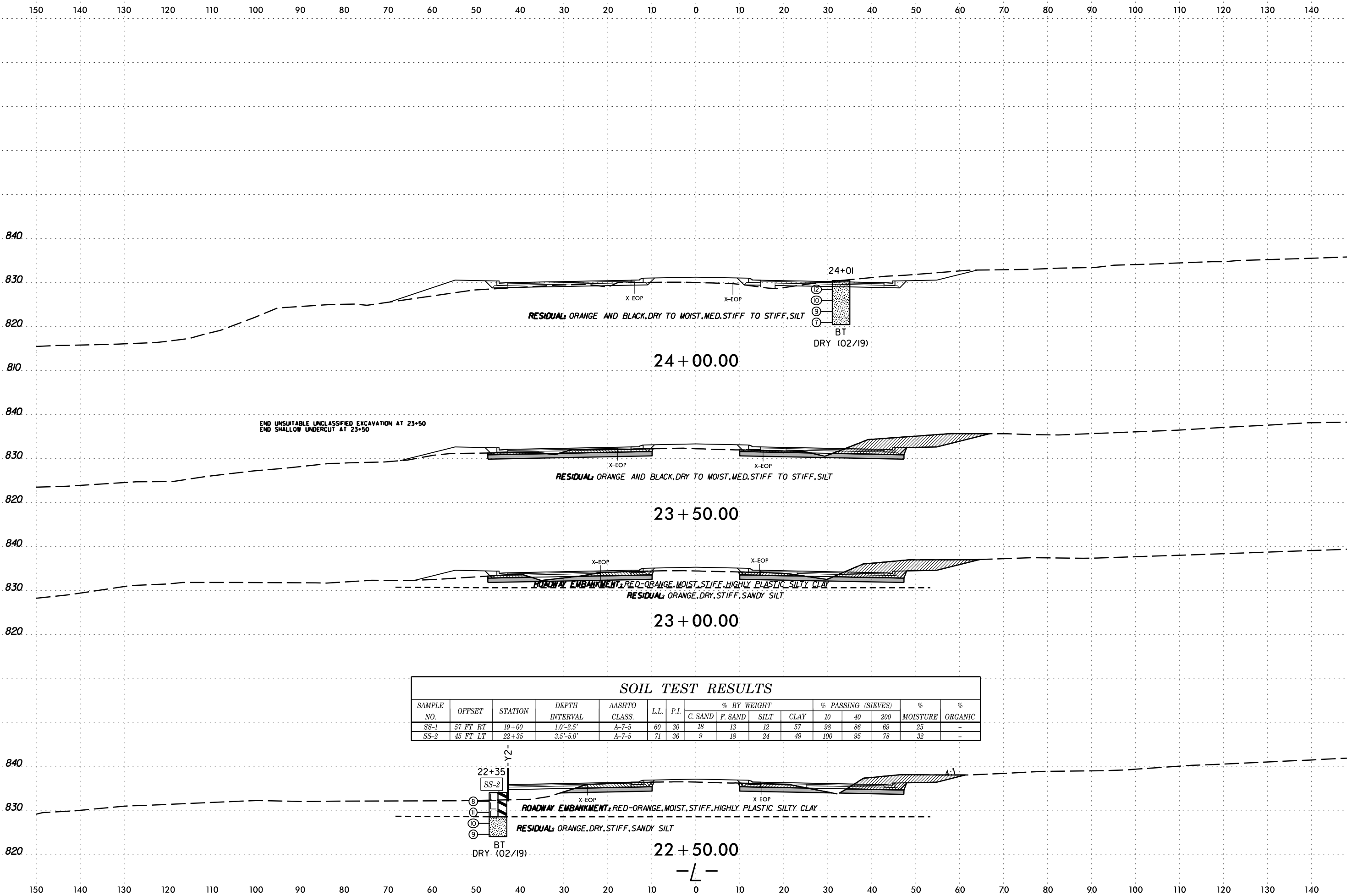
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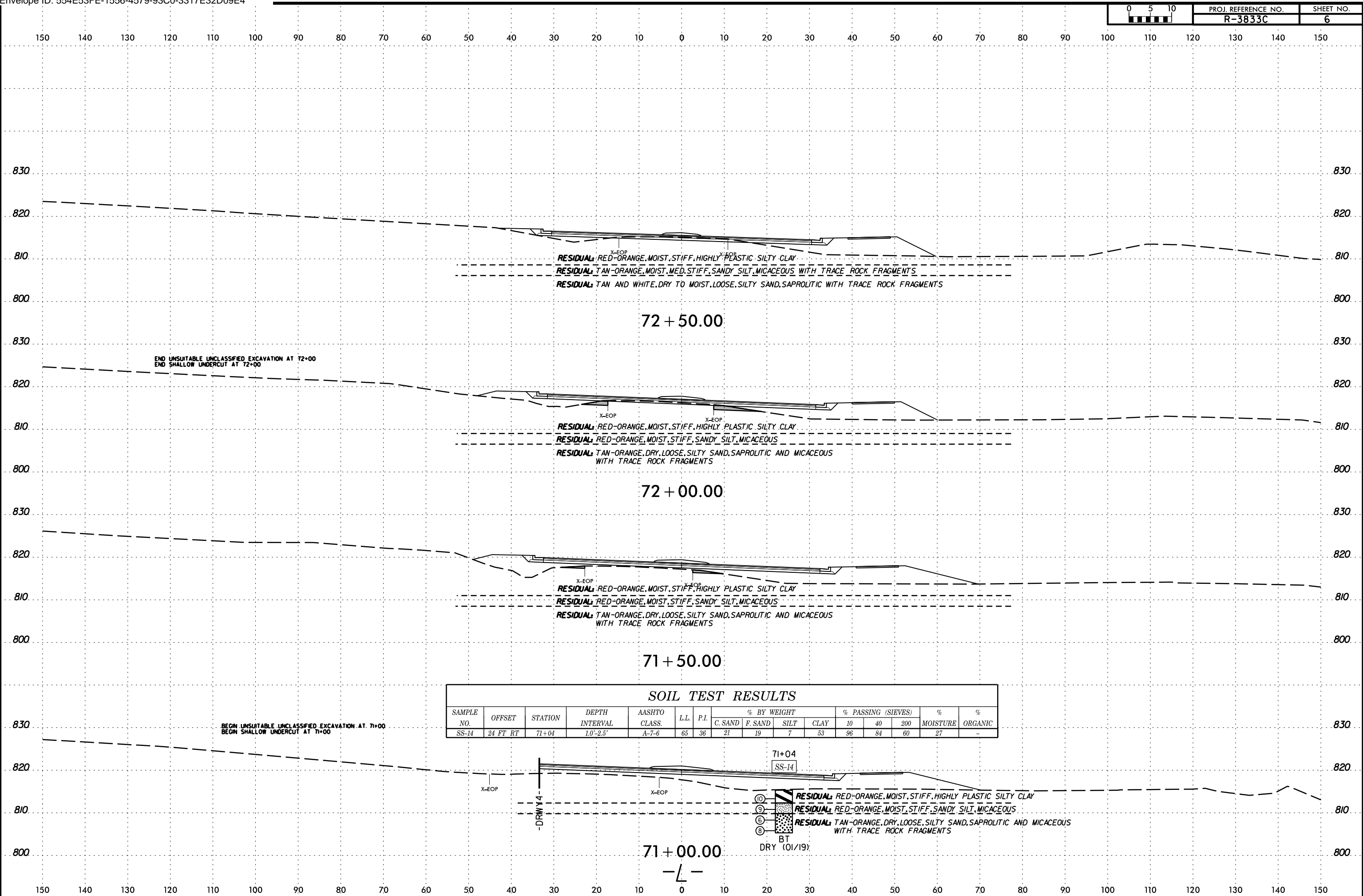
SOIL TEST RESULTS

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	57 FT RT	19+00	1.0'-2.5'	A-7-5	60	30	18	13	12	57	98	86	69	25	-
SS-2	45 FT LT	22+35	3.5'-5.0'	A-7-5	71	36	9	18	24	49	100	95	78	32	-

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 6/23/16



72 + 50.00

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
 RESIDUAL: TAN-ORANGE, MOIST, MED. STIFF, SANDY SILT, MICACEOUS WITH TRACE ROCK FRAGMENTS
 RESIDUAL: TAN AND WHITE, DRY TO MOIST, LOOSE, SILTY SAND, SAPROLITIC WITH TRACE ROCK FRAGMENTS

END UNSUITABLE UNCLASSIFIED EXCAVATION AT 72+00
 END SHALLOW UNDERCUT AT 72+00

72 + 00.00

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
 RESIDUAL: RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
 RESIDUAL: TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

71 + 50.00

RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
 RESIDUAL: RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
 RESIDUAL: TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS

BEGN UNSUITABLE UNCLASSIFIED EXCAVATION AT 71+00
 BEGN SHALLOW UNDERCUT AT 71+00

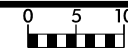
SOIL TEST RESULTS																
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC	
							C. SAND	F. SAND	SILT	CLAY	10	40	200			
SS-14	24 FT RT	71+04	1.0'-2.5'	A-7-6	65	36	21	19	7	53	96	84	60	27	-	

71+04
 SS-14

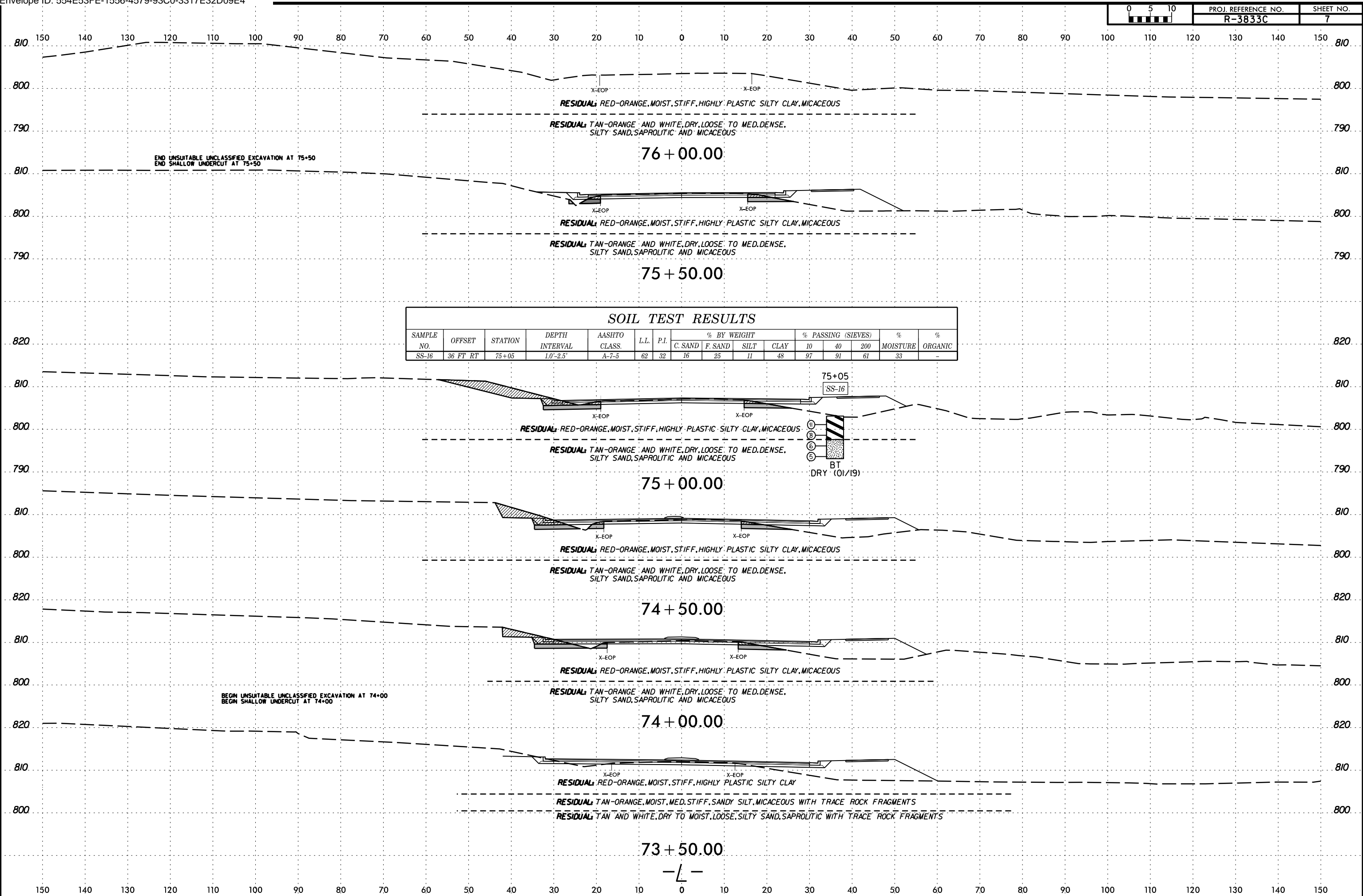
RESIDUAL: RED-ORANGE, MOIST, STIFF, HIGHLY PLASTIC SILTY CLAY
 RESIDUAL: RED-ORANGE, MOIST, STIFF, SANDY SILT, MICACEOUS
 RESIDUAL: TAN-ORANGE, DRY, LOOSE, SILTY SAND, SAPROLITIC AND MICACEOUS WITH TRACE ROCK FRAGMENTS
 BT
 DRY (01/19)

71 + 00.00

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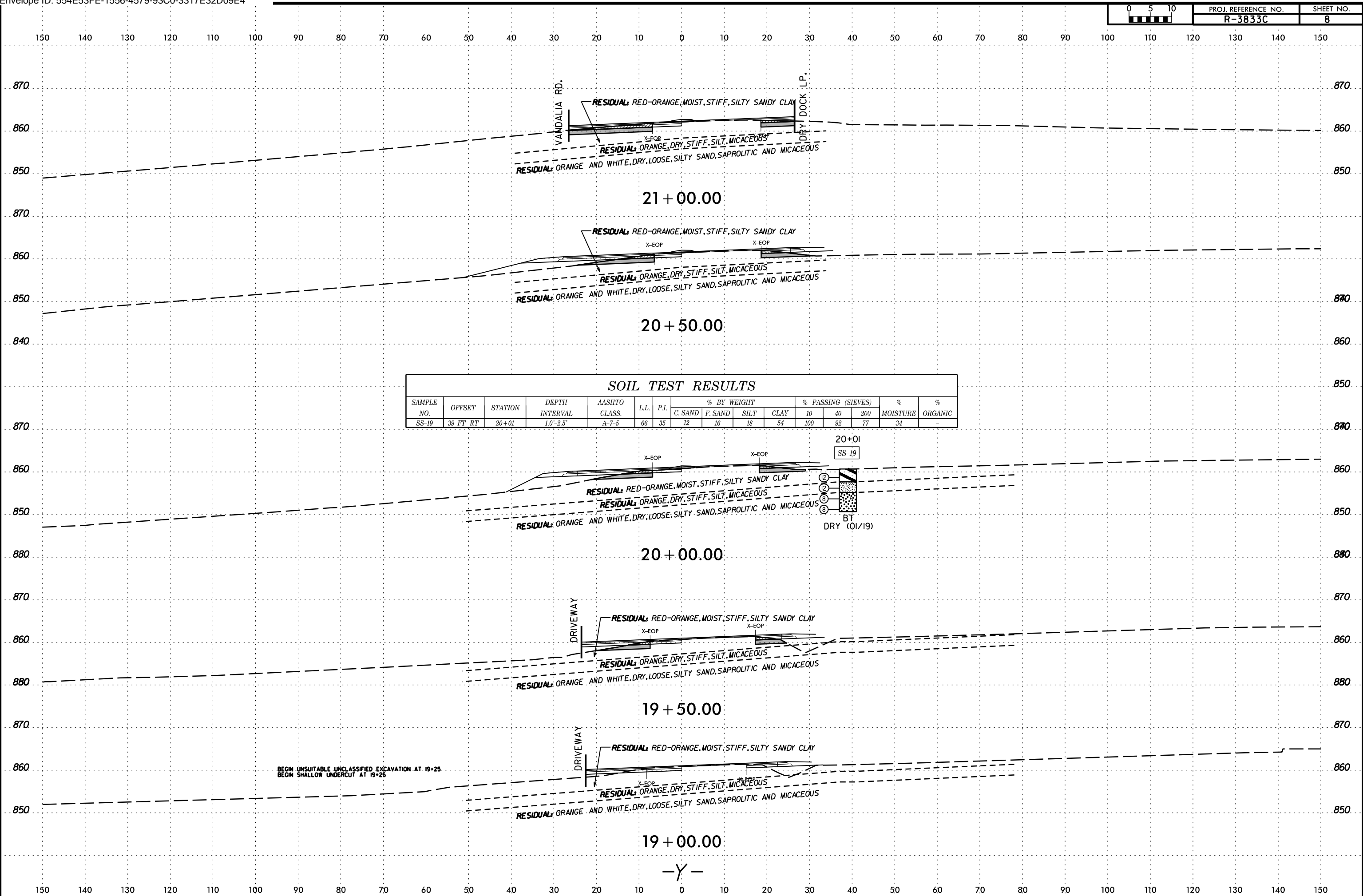
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
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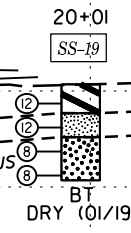


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 6/23/16



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-19	39 FT RT	20+01	10'-2.5'	A-7-5	66	35	12	16	18	54	100	92	77	34	-



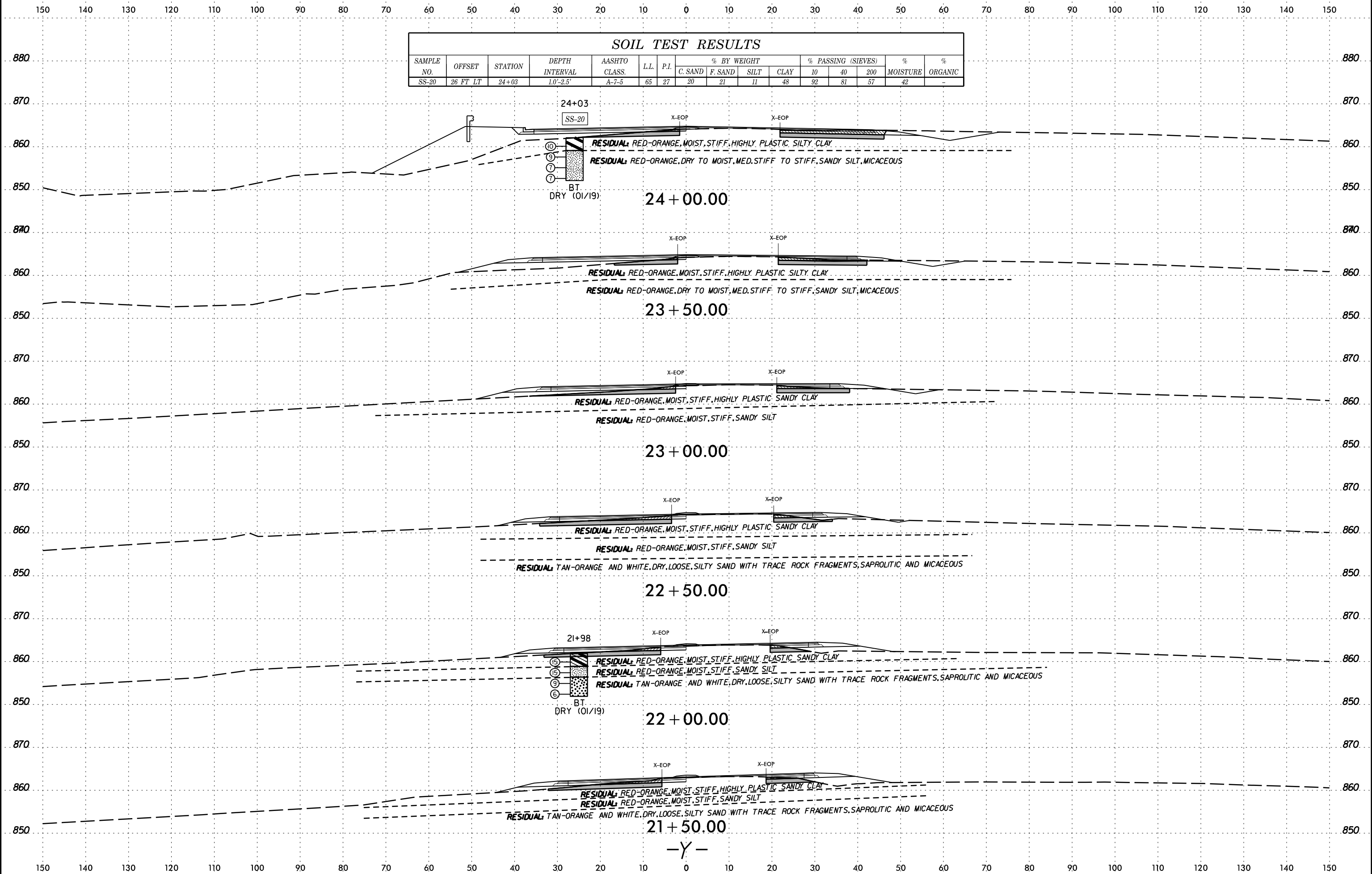
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 BEGIN SHALLOW UNDERCUT AT 19+25

-Y-



SOIL TEST RESULTS

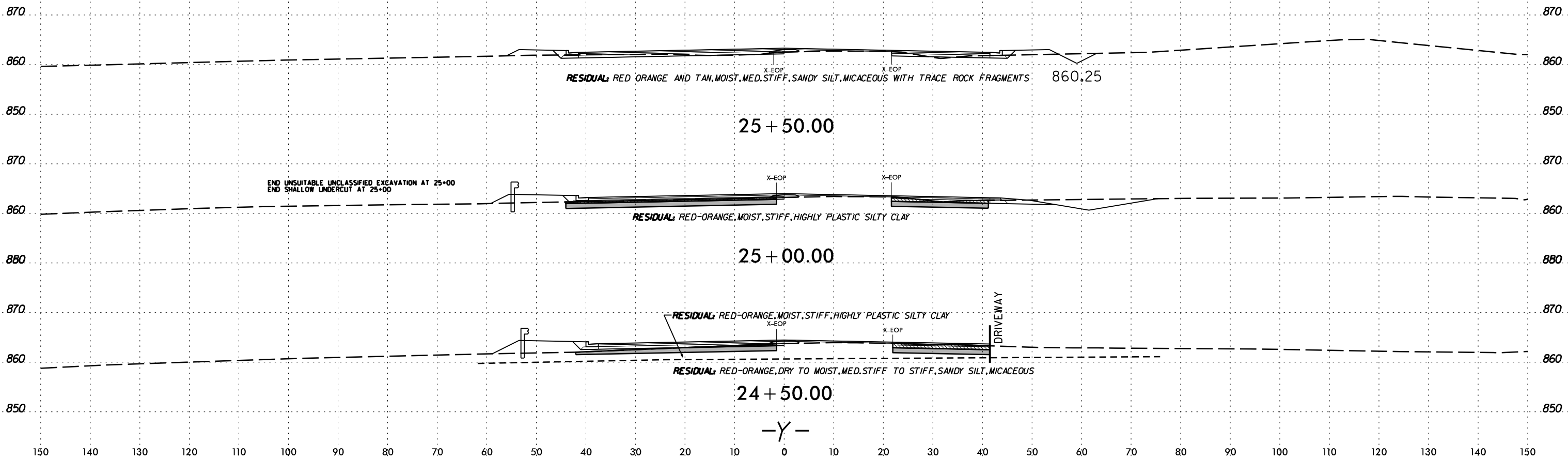
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							C. SAND	F. SAND	SILT	CLAY	10	40			200
SS-20	26 FT LT	24+03	1.0'-2.5'	A-7-5	65	27	20	21	11	48	92	81	57	42	-



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 6/23/16



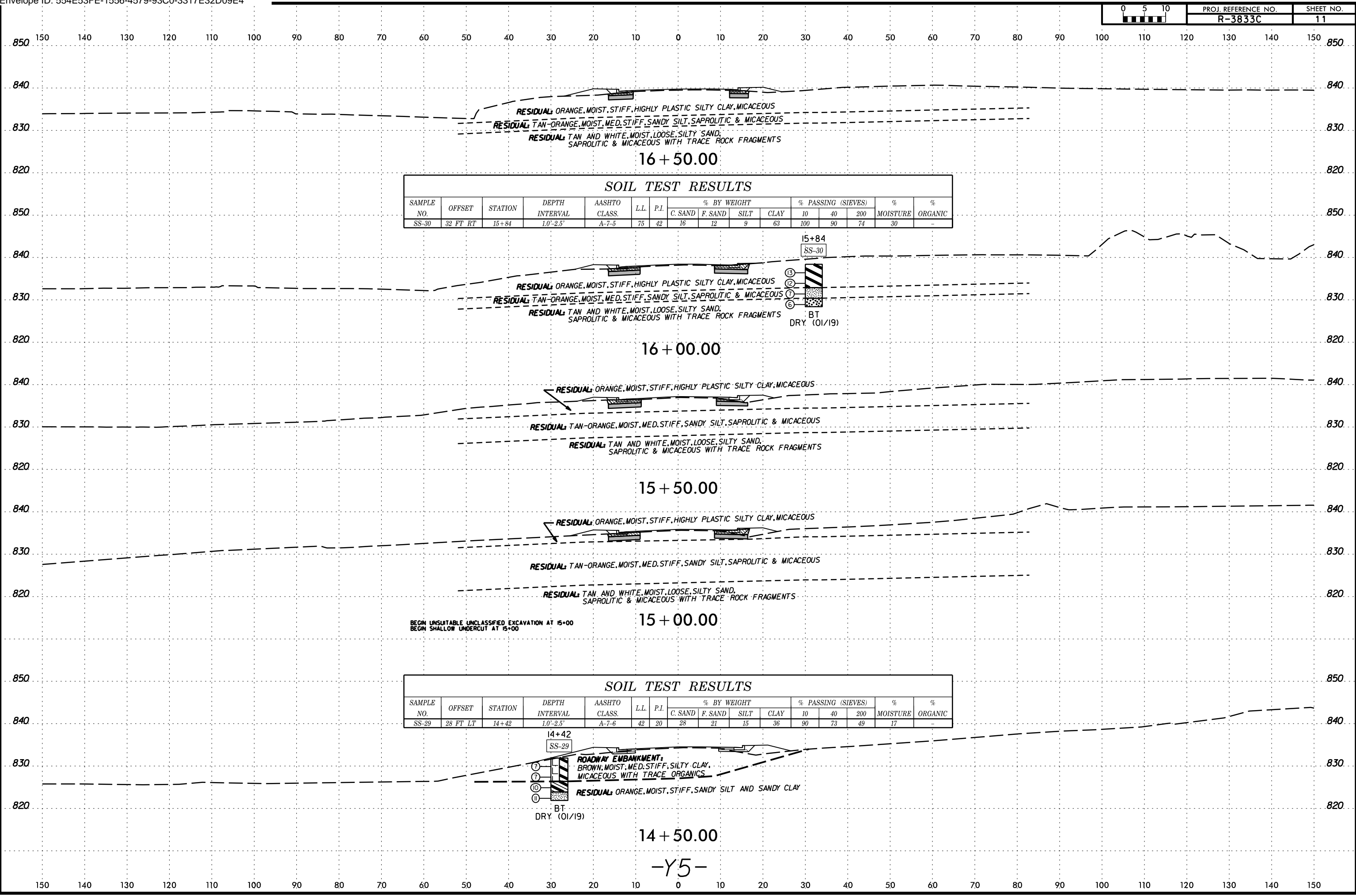
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SOIL TEST RESULTS

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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
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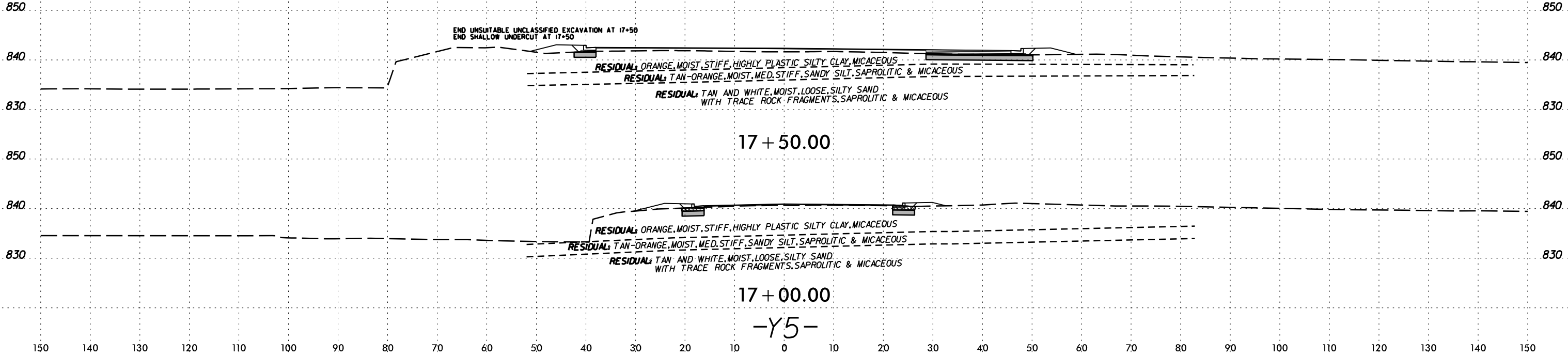
SOIL TEST RESULTS

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-29	28 FT LT	14+42	1.0'-2.5'	A-7-6	42	20	28	21	15	36	90	73	49	17	-

-Y5-



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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