

7.30.13

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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

Table with columns: STATE, STATE PROJECT REFERENCE NO., SHEET NO., TOTAL SHEETS, STATE PROJ. NO., P.A. PROJ. NO., DESCRIPTION

CONTENTS

Table with columns: LINE, STATION, PLAN, PROFILE, XSECT

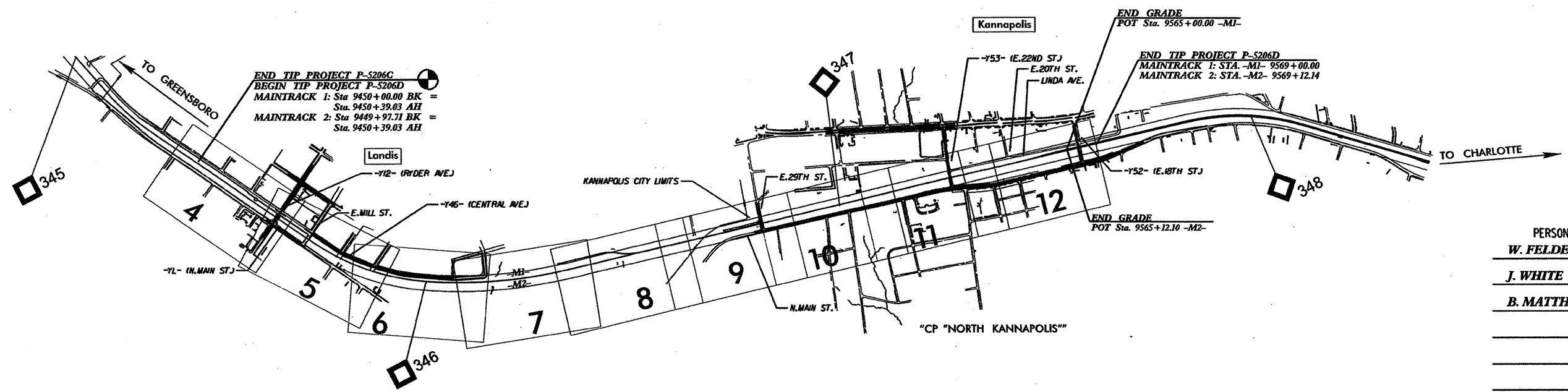
ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 52000.1.STR09TIB (P-5206D) F.A. PROJ. N/A COUNTY ROWAN COUNTY PROJECT DESCRIPTION REID TO NORTH KANNAPOLIS ON THE THE NCRRNS MAINLINE: ROADBED CURVE WIDENING

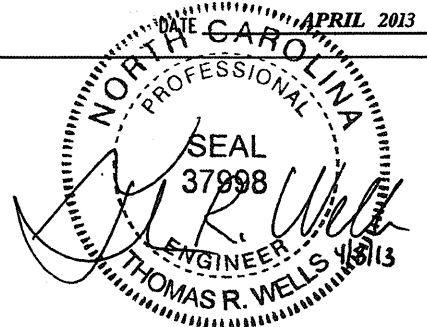
INVENTORY

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.

CONTRACT: 52000.1.STR09TIB ID: P-5206D



PERSONNEL W. FELDER J. WHITE B. MATTHEWS INVESTIGATED BY T. WELLS CHECKED BY T. WELLS SUBMITTED BY KLEINFELDER



DRAWN BY: W. FELDER

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - 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.

0160DEL P10b2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 52000.I.STRO9TIB (P-5206D)
SHEET NO. 2

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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

0160DEL P10b2

CONTRACT: 52000.1.STR09TIB TIP PROJECT: P-5206D

STATE OF NORTH CAROLINA  
NCDOT RAIL DIVISION

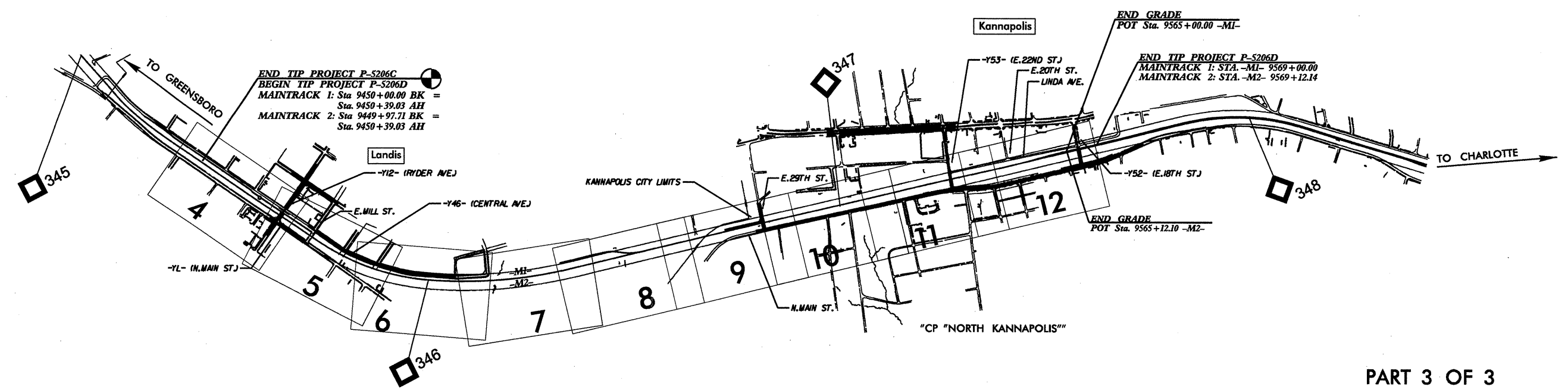
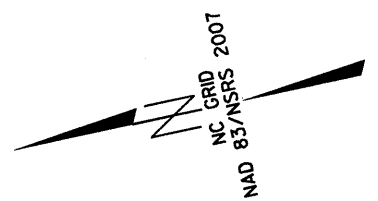
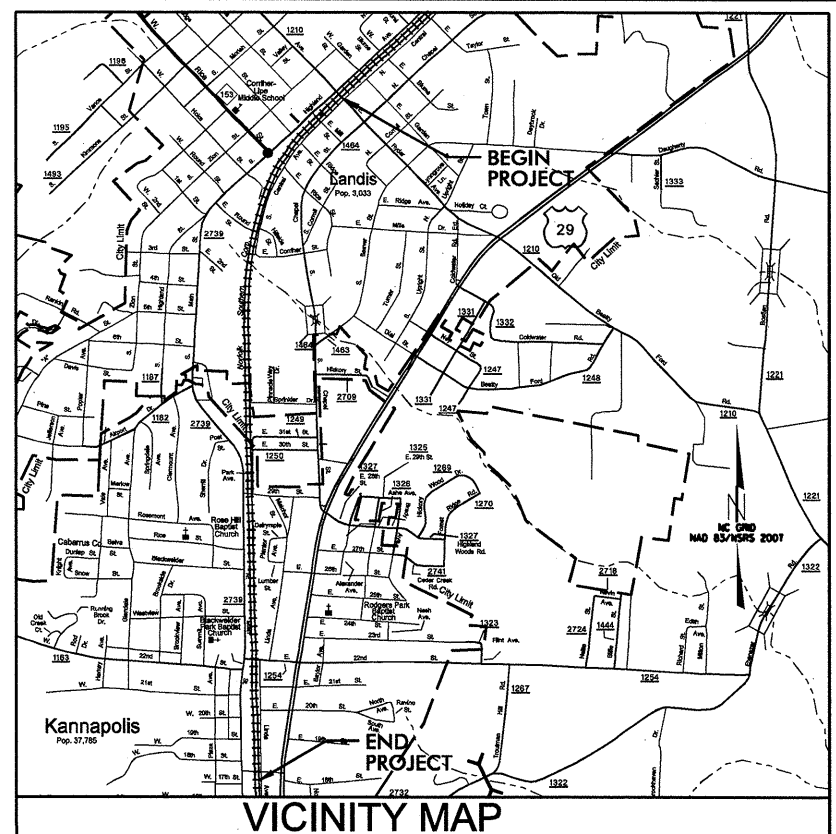


STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5206D	2A	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
52000.1.STR09TIB		PE, UTL, PE	
52000.1.STR10T3		PE, UTL, PE	
43219.2.STR08P5206		ROW	
52000.3.STR02T4D	FRA-FR-HSR-0006-10-01-00	UTL CONST., CONST.	

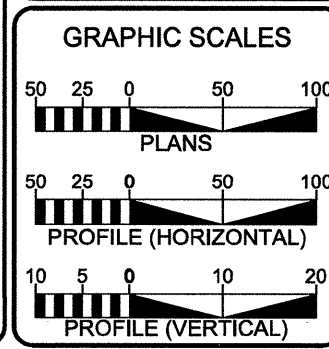
# ROWAN COUNTY

**LOCATION:** NCRANS MAINLINE RAILROAD ROADBED FROM NORTH OF RYDER AVE (SR 1210, MP 345.4) TO CP "NORTH KANAPOLIS" (MP 348.3)

**TYPE OF WORK:** GRADING, DRAINAGE, PAVING, CURB AND GUTTER, RETAINING WALL, SIGNALS



PART 3 OF 3  
**SUBMITTAL: 90%**  
**DATE: JANUARY 28, 2012**



PROJECT LENGTH	
LENGTH OF RAIL TIP PROJECT	= 2.246 Miles
LENGTH OF STRUCTURE TIP PROJECT	= 0.000 Miles
TOTAL LENGTH OF TIP PROJECT	= 2.246 Miles

Prepared In the Office of:  
**CDM Smith** SUNGATE DESIGN GROUP, P.A.  
421 Fayetteville Street, Suite 1303, Raleigh, NC 27604 | Tel: (919) 756-0583 | NC CDR No. F-0412

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 2012

LETTING DATE: JULY 16, 2013

**TODD H. BUCKNER, PE**  
PROJECT ENGINEER

**TODD H. BUCKNER, PE**  
RAIL DESIGN ENGINEER

**BENJAMIN R. CRAWFORD, PE**  
ROADWAY DESIGN ENGINEER

**W. HENRY WELLS, PE**  
HYDRAULICS ENGINEER

**MATTHEW B. SIMMONS**  
NCDOT PROJECT MANAGER

RAIL ENGINEER

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

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

HYDRAULICS ENGINEER

**PRELIMINARY PLANS**  
DO NOT USE FOR CONSTRUCTION

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

ENGINEERING AND SAFETY BRANCH  
 CAPITAL YARD  
 100 RAIL SERVICE CENTER  
 RALEIGH, NC 27601-1000



0160DELP10b2

April 3, 2013  
124366 | GSO13R0156

STATE PROJECT: 52000.1.STR09T1B (P-5206D)  
FEDERAL PROJECT: N/A  
COUNTY: Rowan  
DESCRIPTION: Reid to North Kannapolis on the NCRR/NS Mainline: Roadbed Curve Widening

**SUBJECT: Geotechnical Report - Inventory**

**PROJECT DESCRIPTION**

The project is located in Landis in southern Rowan County, North Carolina. This project consists of a proposed 1,500 feet, roadbed curve widening along -M2D- between E. Mill Street and Hillside Street.

The geotechnical investigation was conducted during January 2013. Soil test borings were utilized to investigate the subsurface conditions. Representative soil samples were collected in the field for laboratory analysis by Kleinfelder Southeast, Inc.

The following alignment, totaling 0.3 mile, was investigated. Profiles and cross sections of this alignment are included in this report.

LINE	STATIONS
-M2D-	9468+00 to 9483+00

**PHYSIOGRAPHY AND GEOLOGY**

The project is located in the Piedmont Physiographic Province. The project corridor is comprised primarily of commercial and residential properties. The general topography of the site consists of rolling hills with flat to moderate slopes along the existing railway.

Geologically, the project is located within the Charlotte Belt, based on the 1985 Geologic Map of North Carolina. Soils are derived from the underlying bedrock which consists of Permian/Pennsylvanian age igneous rocks. The overlying residual soils are the product of the physical and chemical weathering of the underlying Crystalline granitic rock.

**SOIL PROPERTIES**

The origin of the soils encountered during this investigation is residual soils.


The majority of these soils consist of reddish brown, moist, fine sandy, silty clay (A-7-6), light gray, brown, light red, and reddish brown, moist, micaceous, slightly clayey, coarse to fine sandy silt (A-4, A-5), and light gray and brown to light brown, micaceous, silty coarse to fine sand (A-2-4).


**GROUNDWATER**

Groundwater was not encountered during the investigation.

Prepared by,

**KLEINFELER SOUTHEAST, INC.**

  
Thomas R. Wells, P.E.  
Senior Professional

  
Xavier C. Barrett, P.E.  
Principal Professional

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**BALANCE CARD**

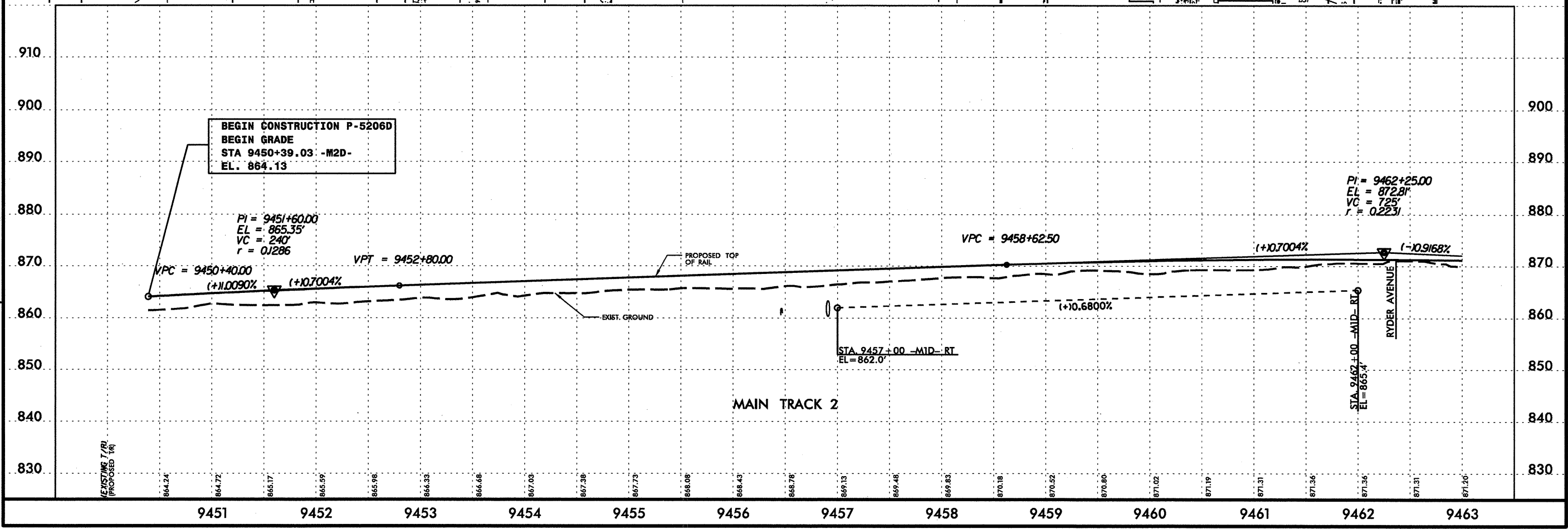
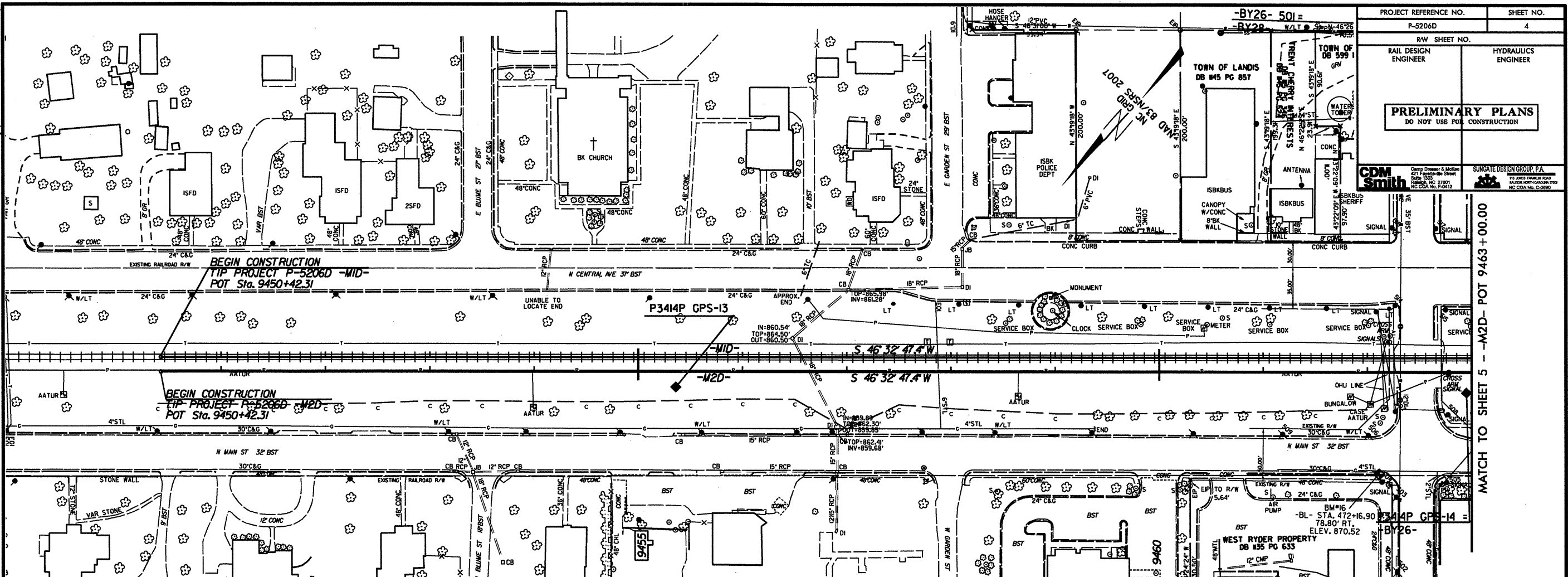
SHEET 1

Project: P-5206D

County: ROWAN

STATION	UNCLASSIFIED EXCAVATION				UNDERCUT EXCAV.	EMBANKMENT			TOTAL EMB. + 20%	BORROW	WASTE			TOTAL WASTE
	TOTAL	SUITABLE EARTH	ROCK	UNSUITABLE		TOTAL	EARTH	ROCK			SUITABLE EARTH	ROCK	UNSUIT.	
MAINLINE CONSTRUCTION														
SUMMARY #1														
-M1- Sta. 9450+00.00 to Sta. 9480+00.00	19,040	19,040				38	38		46		18,994			18,994
-YL- Sta. 13+20.00 to Sta. 17+30.00	224	224				15	15		18		206			206
-Y12- Sta. 5+85.00 to Sta. 9+83.00	141	141				68	68		82		59			59
-Y12- Sta. 11+45.00 to Sta. 16+00.00	73	73				51	51		61		12			12
-Y45- Sta. 15+10.00 to Sta. 16+60.00	12	12				21	21		25	13				
-Y51- Sta. 12+11.42 to Sta. 16+50.00	214	214				41	41		49		165			165
SUBTOTAL: SUMMARY #1	19,704	19,704				234	234		281	13	19,436			19,436
SUMMARY #2														
-M1- Sta. 9480+00.00 to Sta. 9510+00.00	14,909	14,909				4,943	4,943		5,932		8,977			8,977
-Y46- Sta. 11+00 to Sta. 29+00	0	0				23	23		28	28				
SUBTOTAL: SUMMARY #2	14,909	14,909				4,966	4,966		5,960	28	8,977			8,977
SUMMARY #3														
-M1- Sta. 9510+00.00 to Sta. 9540+00.00	11,188	11,188				2,906	2,906		3,487		7,701			7,701
SUBTOTAL: SUMMARY #3	11,188	11,188				2,906	2,906		3,487		7,701			7,701
SUMMARY #4														
-M1- Sta. 9540+00.00 to Sta. 9569+00.00	16,766	16,766				571	571		685		16,081			16,081
-Y52- Sta. 12+00.00 to Sta. 15+50.00	74	74				189	189		227	153				
-Y53- Sta. 12+20.00 to Sta. 17+50.00	1,734	1,734				97	97		116		1,618			1,618
-YL- Sta. 45+50.00 to Sta. 47+24.34	62	62				23	23		28		34			34
SUBTOTAL: SUMMARY #4	18,636	18,636				880	880		1,056	153	17,733			17,733
SUBTOTAL (SUMMARIES 1-4)	64,437	64,437				8,986	8,986		10,784	194	53,847			53,847
WASTE IN LIEU OF BORROW										-194	-194			-194
PROJECT TOTAL	64,437	64,437				8,986	8,986		10,784		53,653			53,653
GRAND TOTAL	64,437	64,437				8,986	8,986		10,784		53,653			53,653
SAY	64,500													
DRAINAGE DITCH EXCAVATION: EST. 350 CY														
UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT: 200 CY														
SELECT GRANULAR MATERIAL PER GEOTECH REPORT: 200 CY														

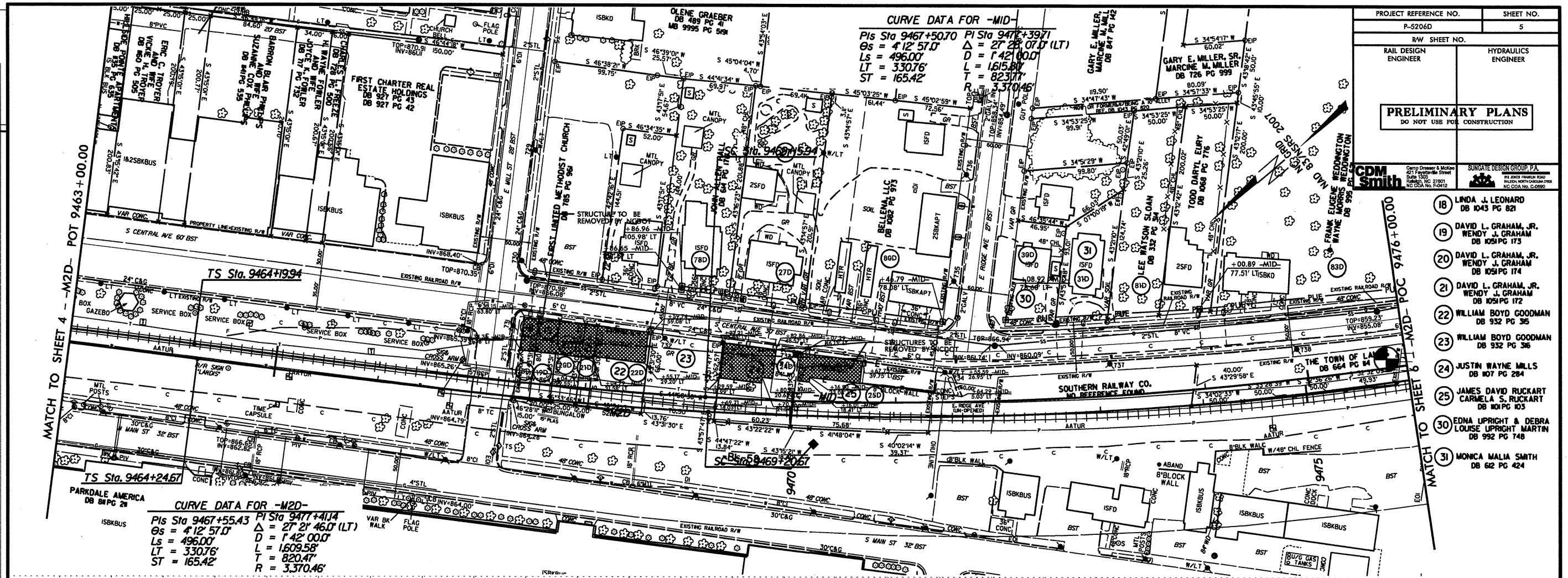
PROJECT REFERENCE NO. P-5206D	SHEET NO. 4
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



REVISIONS

MATCH TO SHEET 5 -M2D- POT 9463+00.00

REVISIONS  
 Δ 12893 - CLAIM ON PARCEL 23D REMOVED DUE TO NO IMPROVEMENTS ON THE PARCEL. CLAIMS ADDED TO PARCELS 78D, 27D, 80D, 30D, 31D, 81D AND 83D FOR PUE.

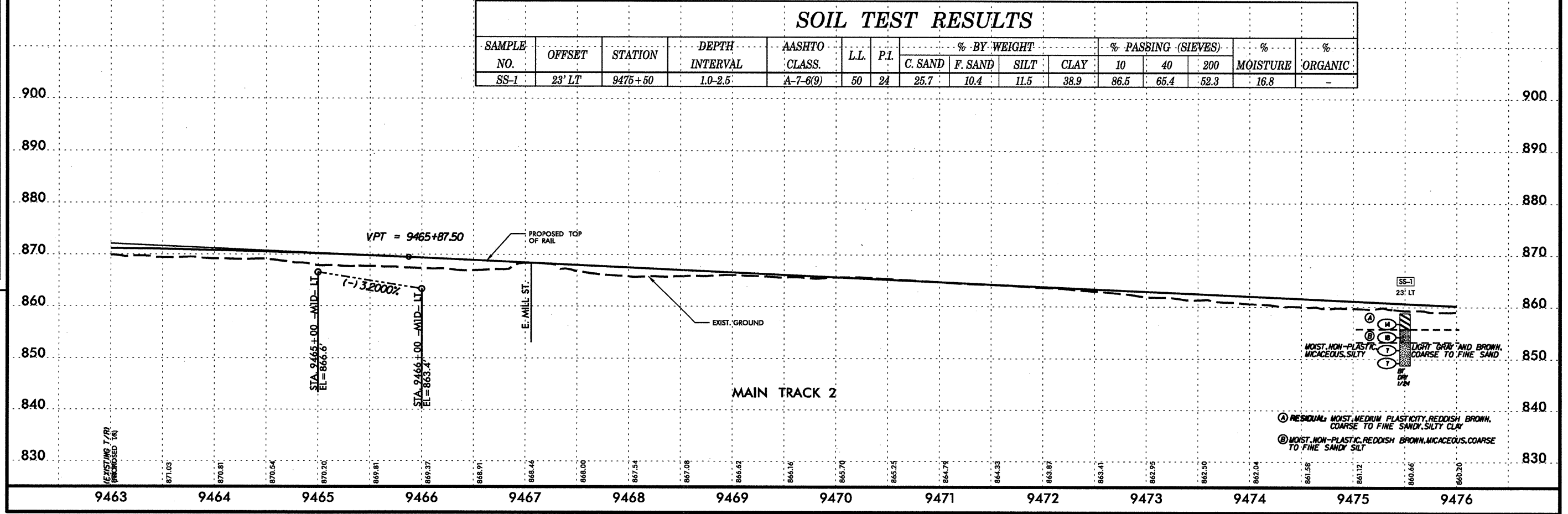


PROJECT REFERENCE NO. P-5206D	SHEET NO. 5
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
CDM Smith Camp Dresser & McKee 421 Fayetteville Street Suite 1500 Charlotte, NC 27601 NC COA No. F04112	SUNGATE DESIGN GROUP, P.A. 100 ZION POWER ROAD WALTON, NORTH CAROLINA 27157 NC COA No. C-0892

- 18 LINDA J. LEONARD DB 1043 PG 821
- 19 DAVID L. GRAHAM, JR. WENDY J. GRAHAM DB 1051 PG 173
- 20 DAVID L. GRAHAM, JR. WENDY J. GRAHAM DB 1051 PG 174
- 21 DAVID L. GRAHAM, JR. WENDY J. GRAHAM DB 1051 PG 172
- 22 WILLIAM BOYD GOODMAN DB 932 PG 35
- 23 WILLIAM BOYD GOODMAN DB 932 PG 36
- 24 JUSTIN WAYNE MILLS DB 107 PG 284
- 25 JAMES DAVID RUCKART CARMELA S. RUCKART DB 104 PG 103
- 30 EDNA UPRIGHT & DEBRA LOUISE UPRIGHT MARTIN DB 992 PG 148
- 31 MONICA MALIA SMITH DB 62 PG 424

**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	23' LT	9475+50	1.0-2.5	A-7-6(9)	50	24	25.7	10.4	11.5	38.9	86.5	65.4	52.3	16.8	-



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33 MATTHEW W. CROSBY  
NATALIE E. FAGGART  
DB 1036 PG 74

34 KELLIE B. WALKER  
DB 1036 PG 989

CURVE DATA FOR -M2D-

PI Sta 9477+39.71  
 $\Delta = 27^{\circ} 28' 07.0"$  (LT)  
 $D = 1^{\circ} 42' 00.0"$   
 $L = 1615.80'$   
 $T = 823.77'$   
 $R = 3,370.46'$

PIs Sta 9486+16.72  
 $\Theta_s = 0^{\circ} 55' 47.9"$   
 $\Theta_s = 1^{\circ} 34' 51.4"$   
 $L_s = 186.00'$   
 $LT = 101.05'$   
 $ST = 84.98'$

PI Sta 9493+23.16  
 $\Delta = 12^{\circ} 03' 48.4"$  (LT)  
 $D = 1^{\circ} 00' 00.0"$   
 $L = 1206.34'$   
 $T = 605.42'$   
 $R = 5,729.65'$

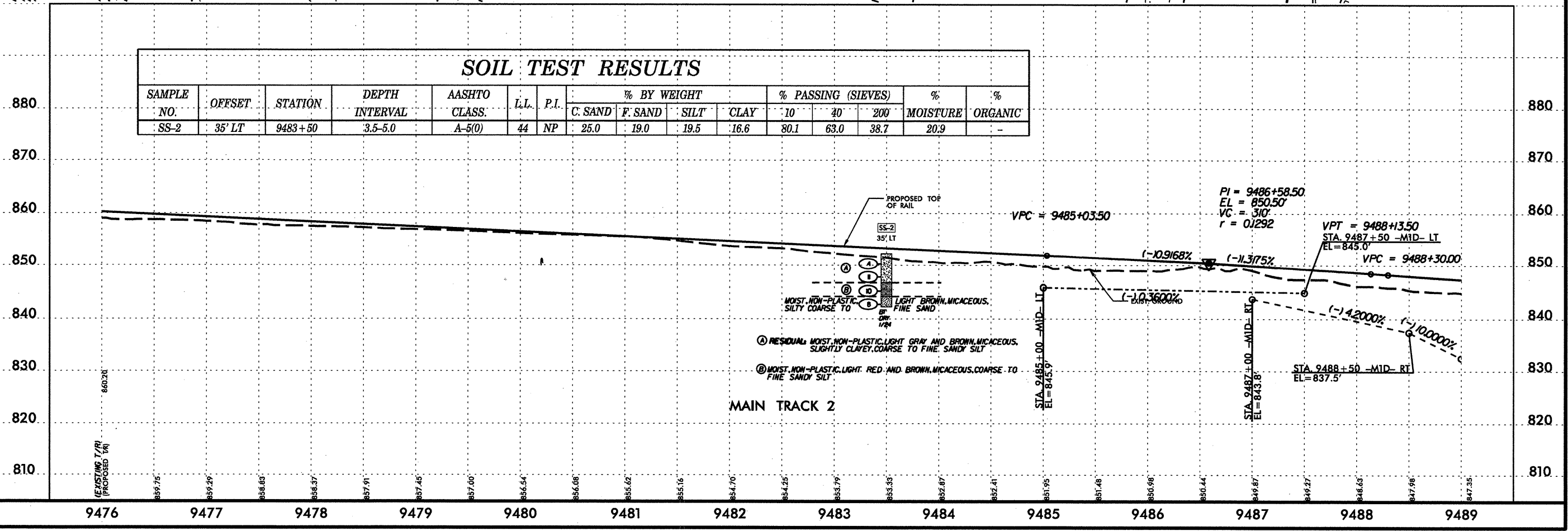
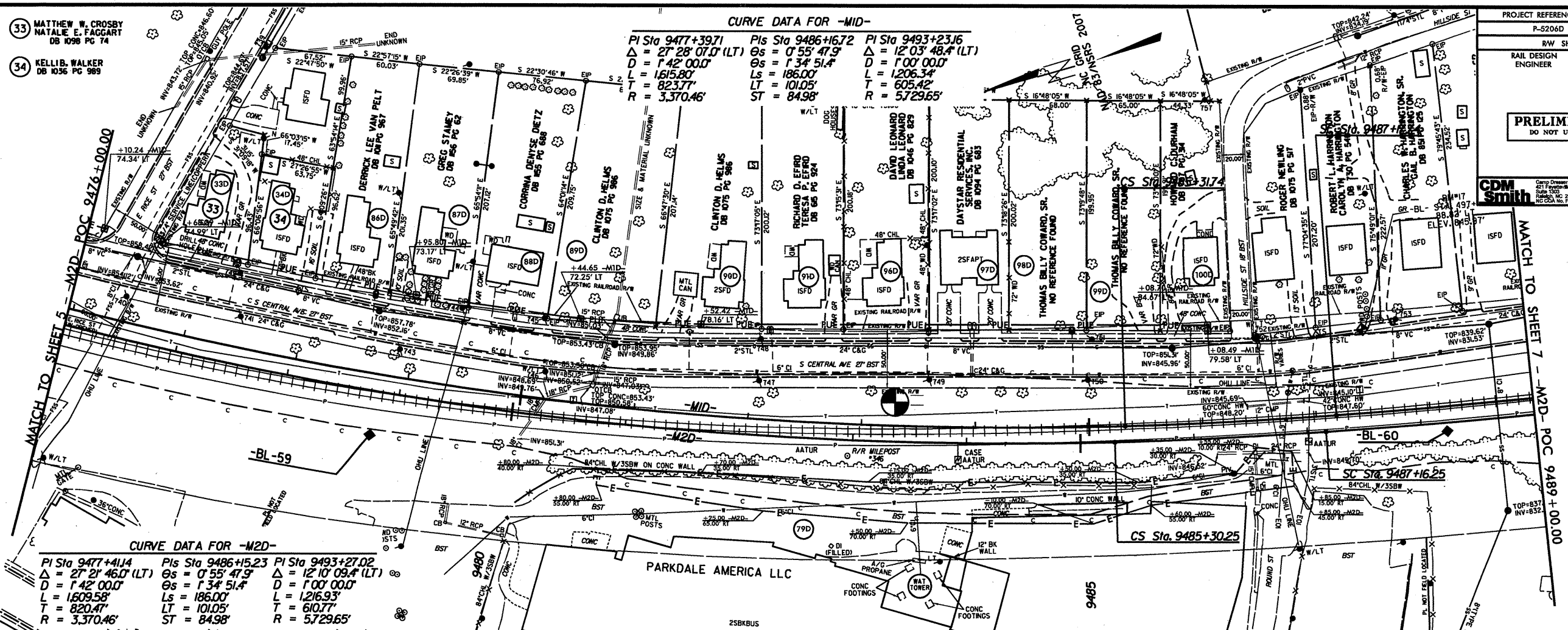
CURVE DATA FOR -M2D-

PI Sta 9477+41.14  
 $\Delta = 27^{\circ} 21' 46.0"$  (LT)  
 $D = 1^{\circ} 42' 00.0"$   
 $L = 1609.58'$   
 $T = 820.47'$   
 $R = 3,370.46'$

PIs Sta 9486+15.23  
 $\Theta_s = 0^{\circ} 55' 47.9"$   
 $\Theta_s = 1^{\circ} 34' 51.4"$   
 $L_s = 186.00'$   
 $LT = 101.05'$   
 $ST = 84.98'$

PI Sta 9493+27.02  
 $\Delta = 12^{\circ} 10' 09.4"$  (LT)  
 $D = 1^{\circ} 00' 00.0"$   
 $L = 1216.93'$   
 $T = 610.77'$   
 $R = 5,729.65'$

PROJECT REFERENCE NO. P-5206D	SHEET NO. 6
RW SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
CDM Smith Camp Dresser & McKee 421 F Street Baltimore, MD 21201 P: 410.528.1000 F: 410.528.1001 M: 410.528.1002	SUNSHINE DESIGN GROUP P.A. 1000 W. Main Street Baltimore, MD 21201 P: 410.528.1000 F: 410.528.1001 M: 410.528.1002

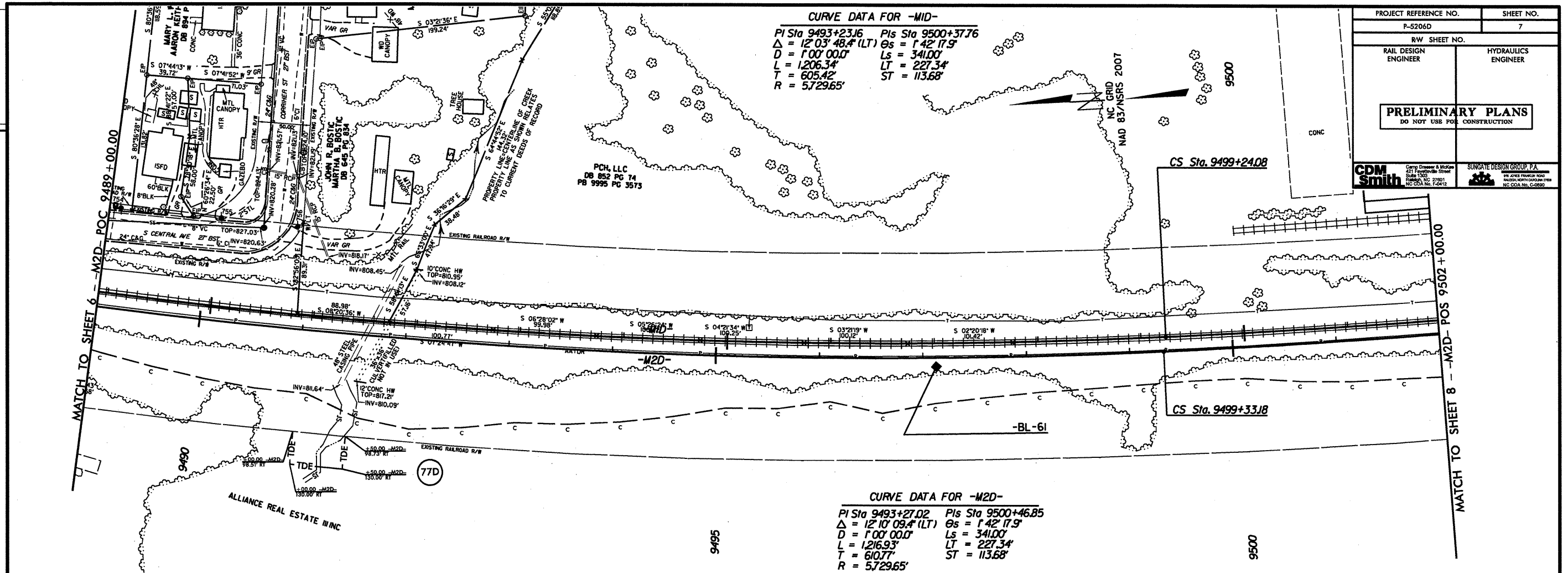


REVISIONS  
 12813 - CLAIMS ADDED TO PARCELS 33D, 34D, 86D, 87D, 88D, 89D, 90D, 91D, 94D, 97D, 98D, 99D AND 100D FOR PUE.

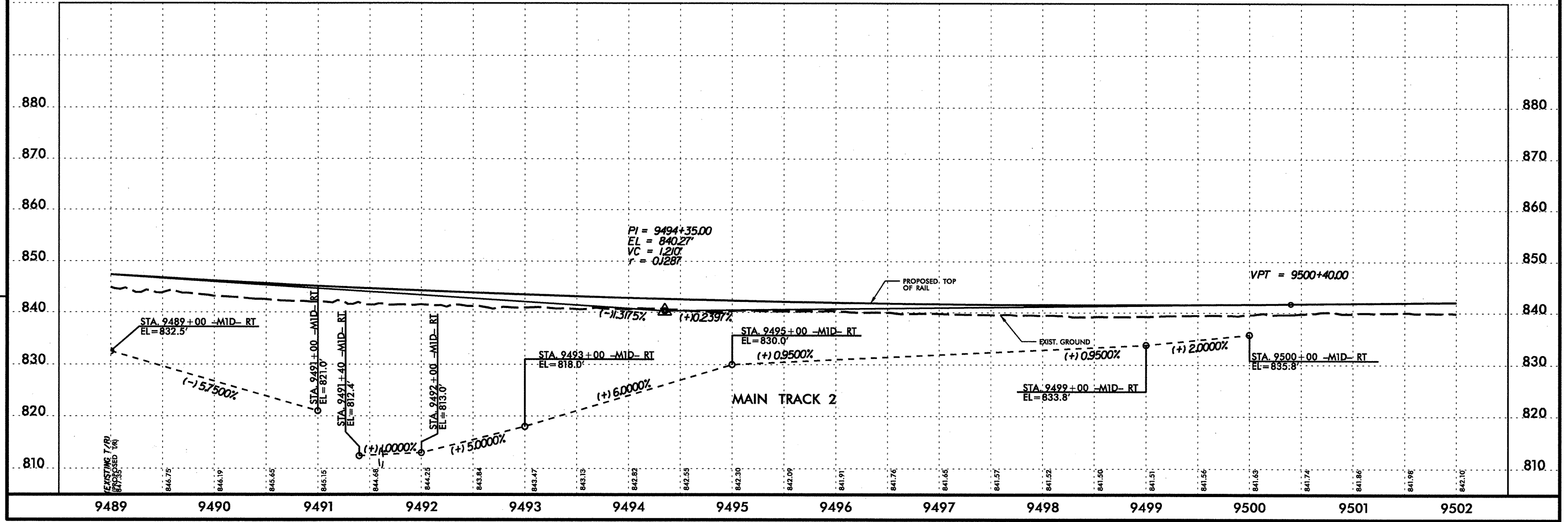


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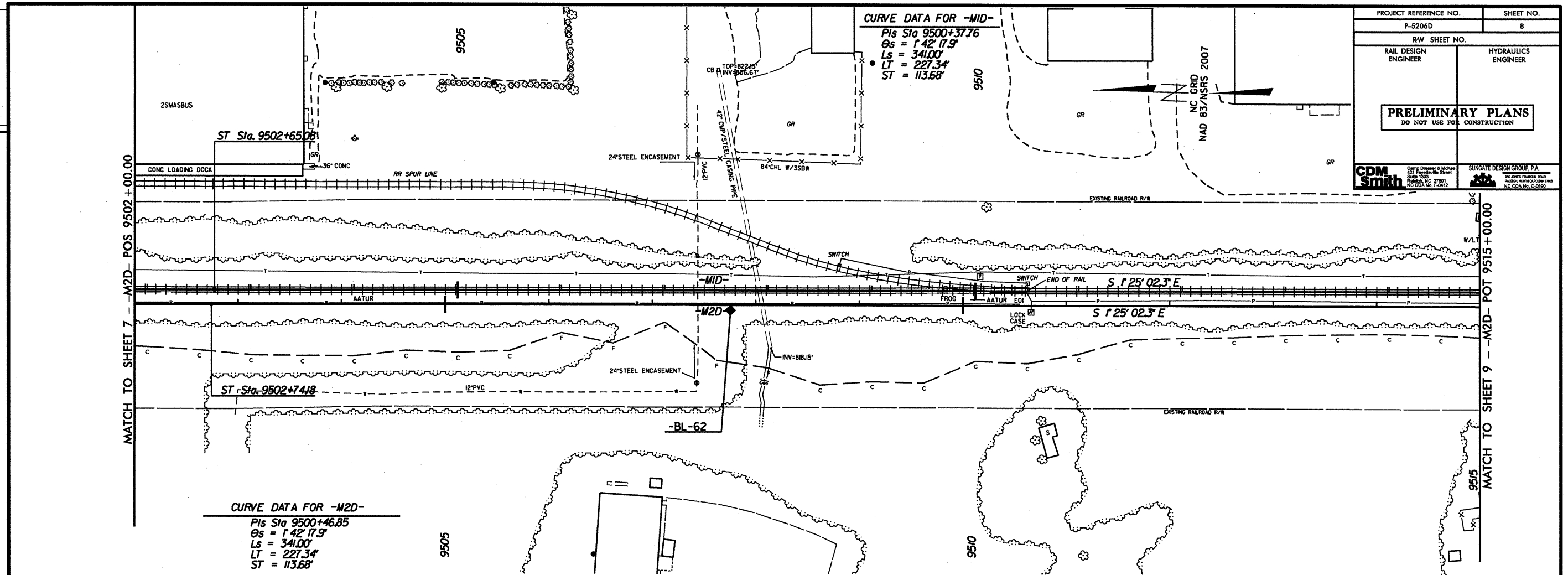
REVISIONS



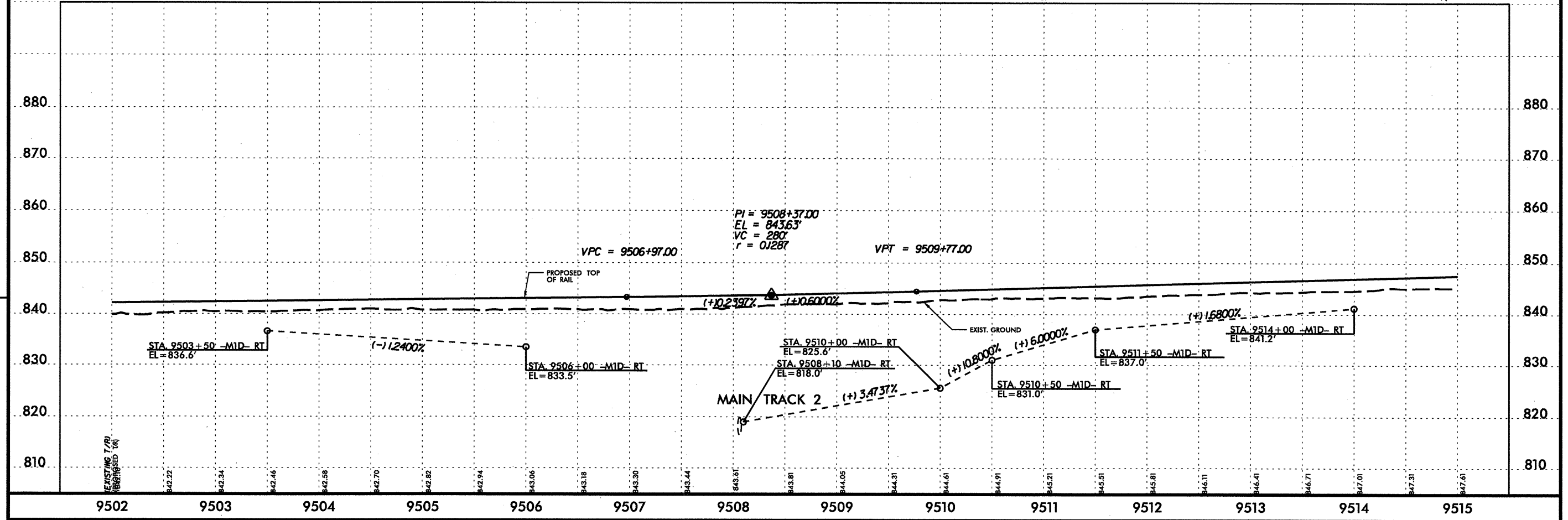
PROJECT REFERENCE NO. P-5206D	SHEET NO. 7
RW SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
CDM Smith Carr, Pinner & Moore 421 Fayetteville Street Suite 1500 Raleigh, NC 27601 NC CEA No. P-0412	SUNGATE DESIGN GROUP, P.A. 101 JONES FARM ROAD WARRINGTON, VA 22090 NC CEA No. C-0892



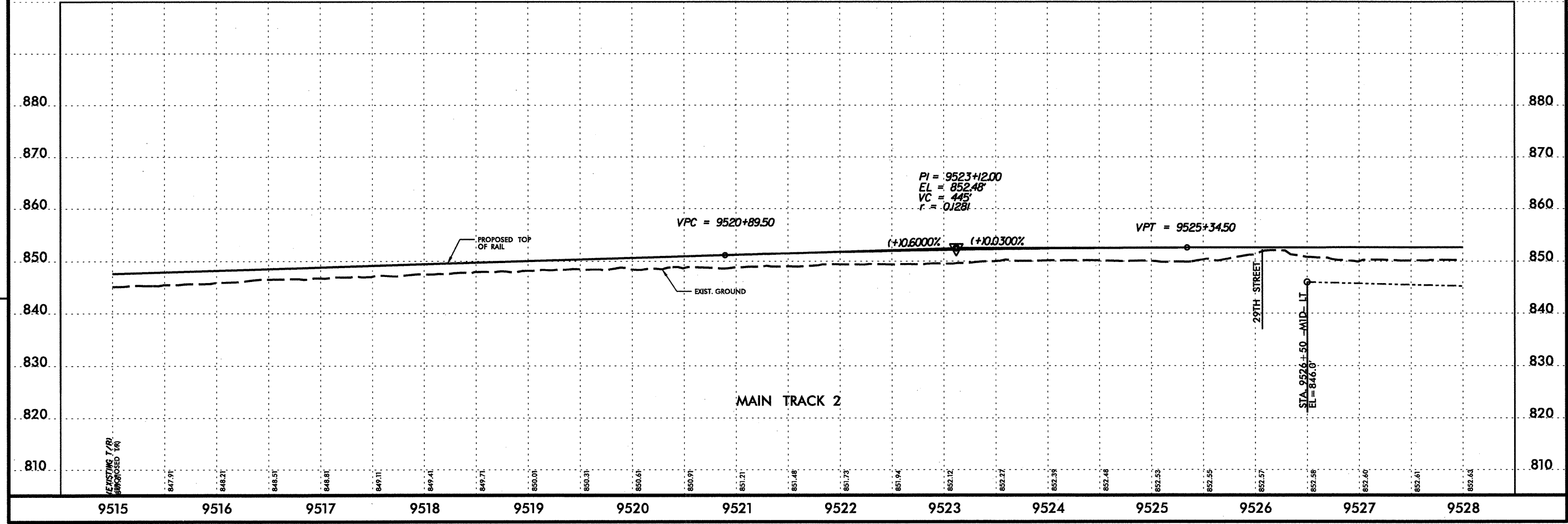
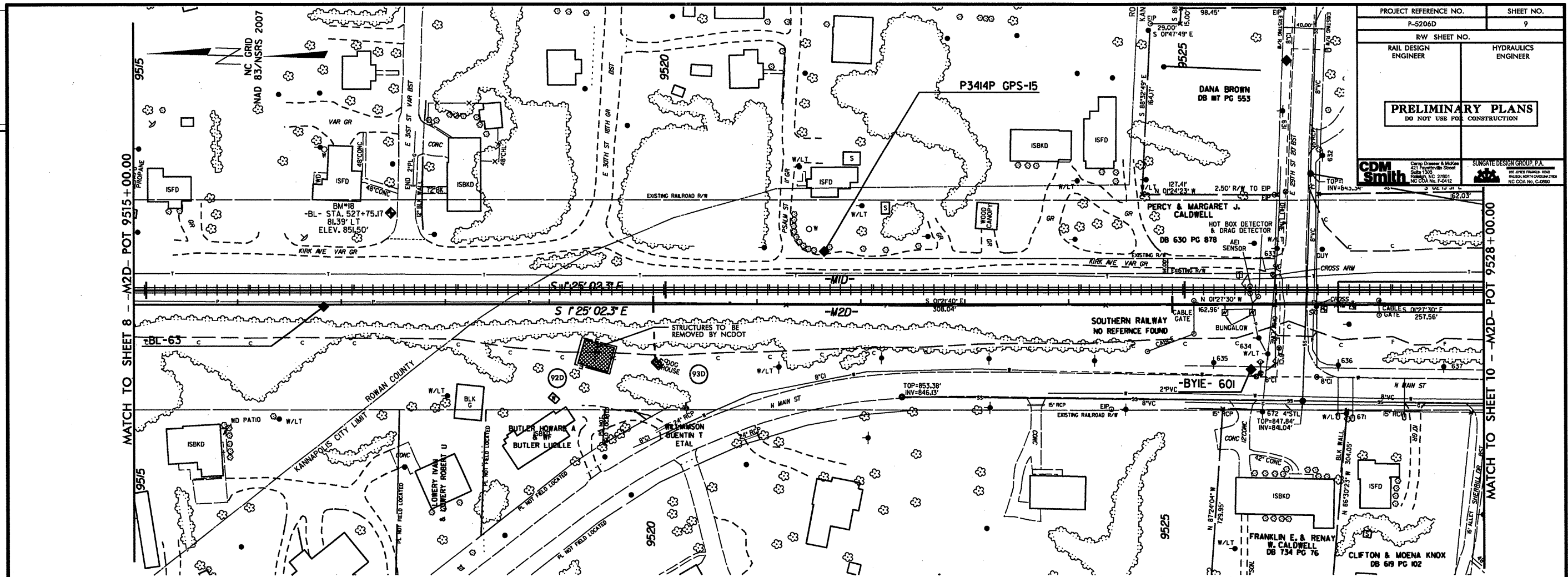
REVISIONS



PROJECT REFERENCE NO. P-5206D	SHEET NO. 8
RW SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
CDM Smith Camp Dresser & McKee 211 Fayetteville Street Suite 1200 Raleigh, NC 27601 NC COA No. F-2412	SUNGATE DESIGN GROUP, P.A. 10000 W. HARRIS ROAD MAYNARD, NC 27653 NC COA No. C-0980



PROJECT REFERENCE NO. P-5206D	SHEET NO. 9
RW SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>CDM Smith</b> Camp Dresser & McKee 451 Fayetteville Street Raleigh, NC 27601 TEL: 919.978.1411 FAX: 919.978.1412	<b>SUNGATE DESIGN GROUP, P.A.</b> 100 JONES FARM ROAD RALEIGH, NORTH CAROLINA 27609 TEL: 919.876.6000 FAX: 919.876.6001

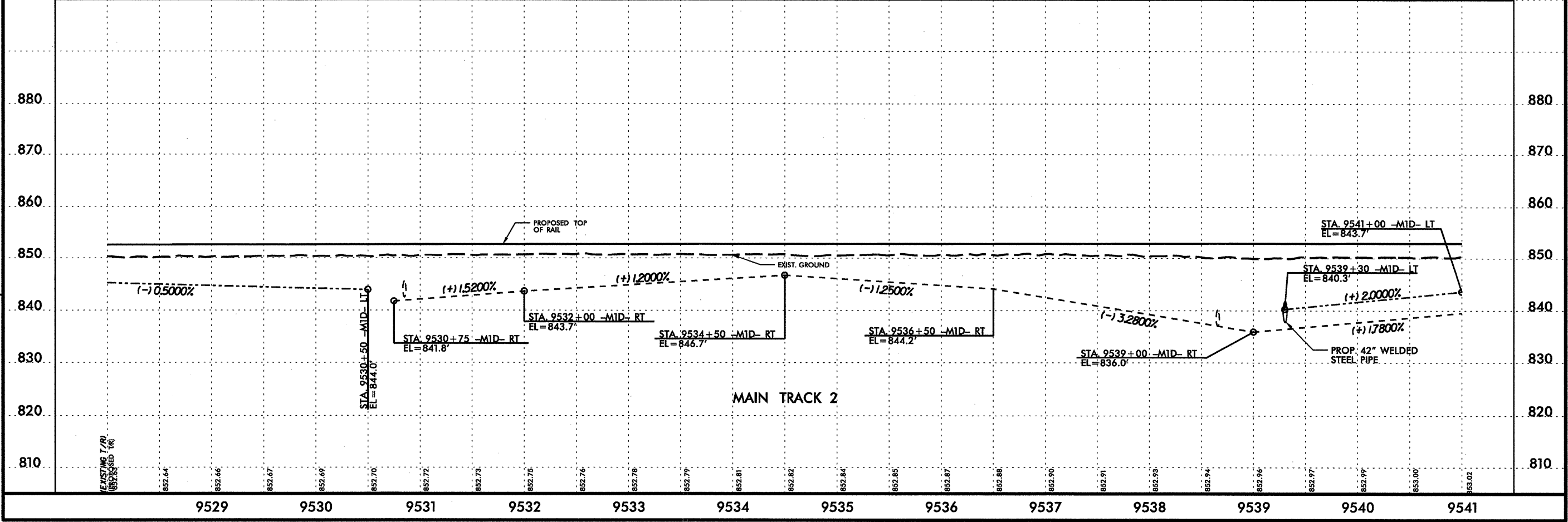
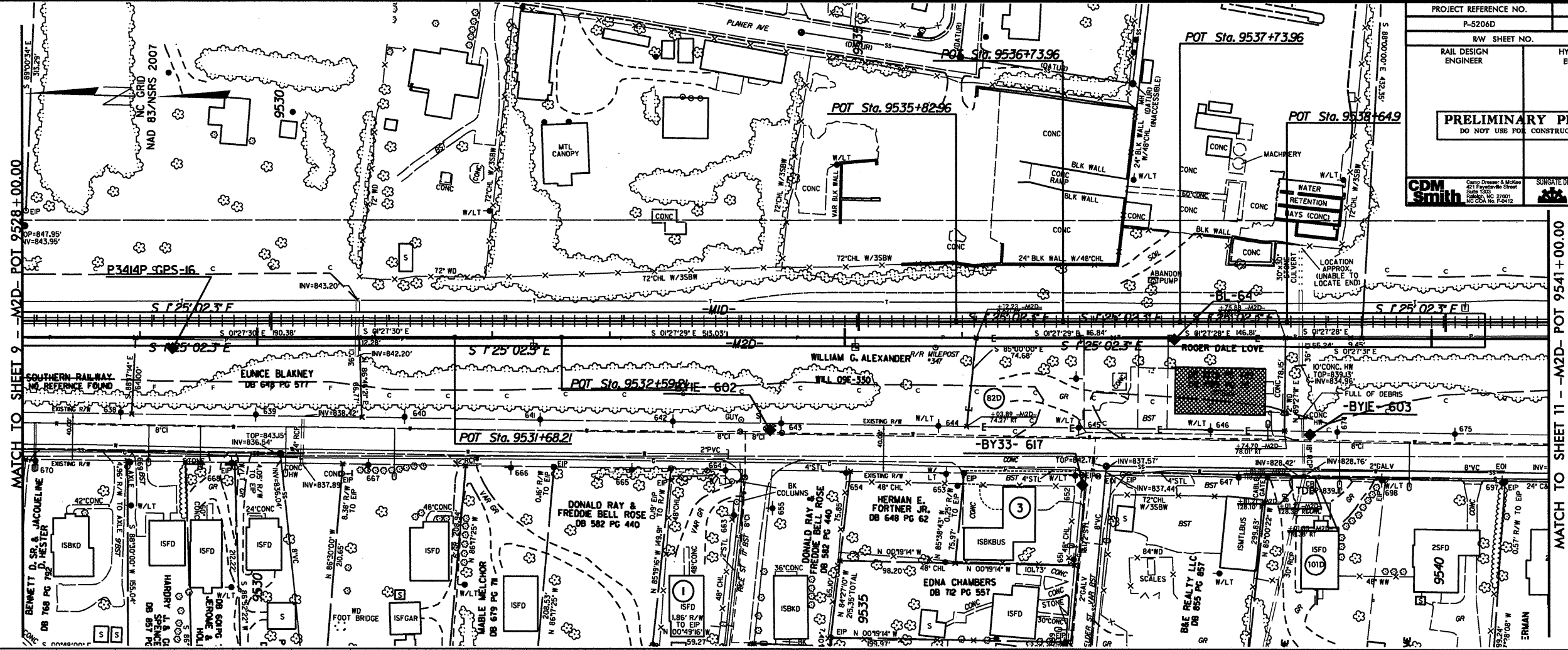


REVISIONS

MATCH TO SHEET 8 - M2D - POT 9515 + 00.00

MATCH TO SHEET 10 - M2D - POT 9528 + 00.00

PROJECT REFERENCE NO. P-5206D	SHEET NO. 10
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
CDM Smith	SUNGATE DESIGN GROUP, P.A.

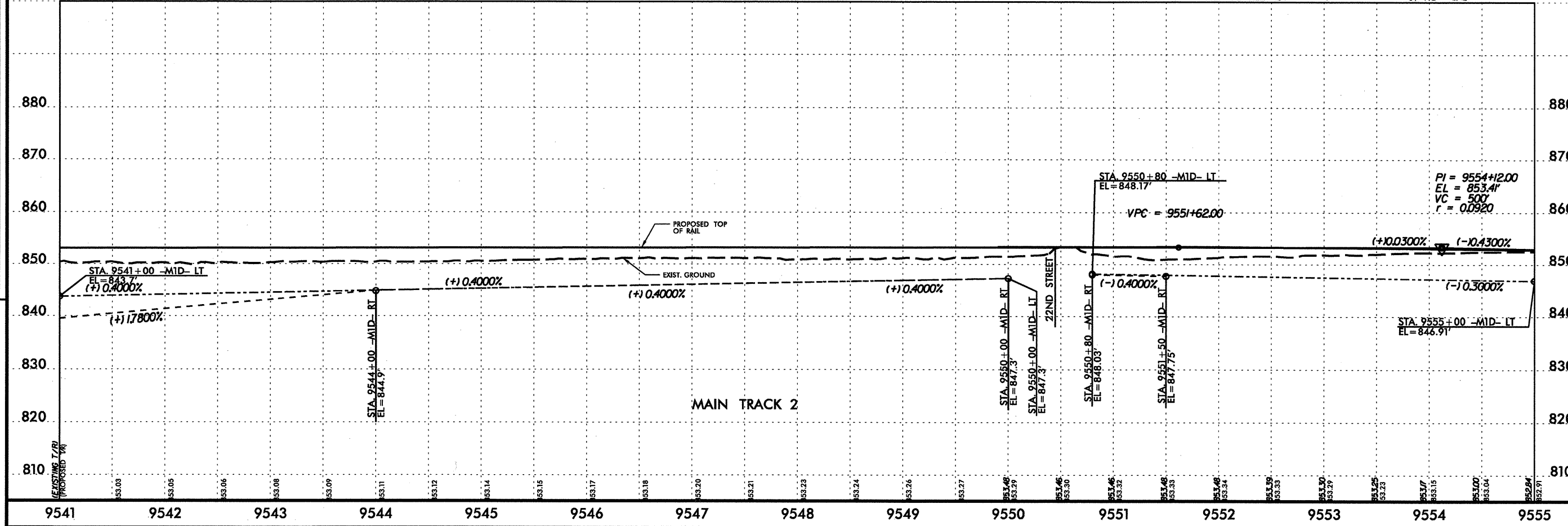
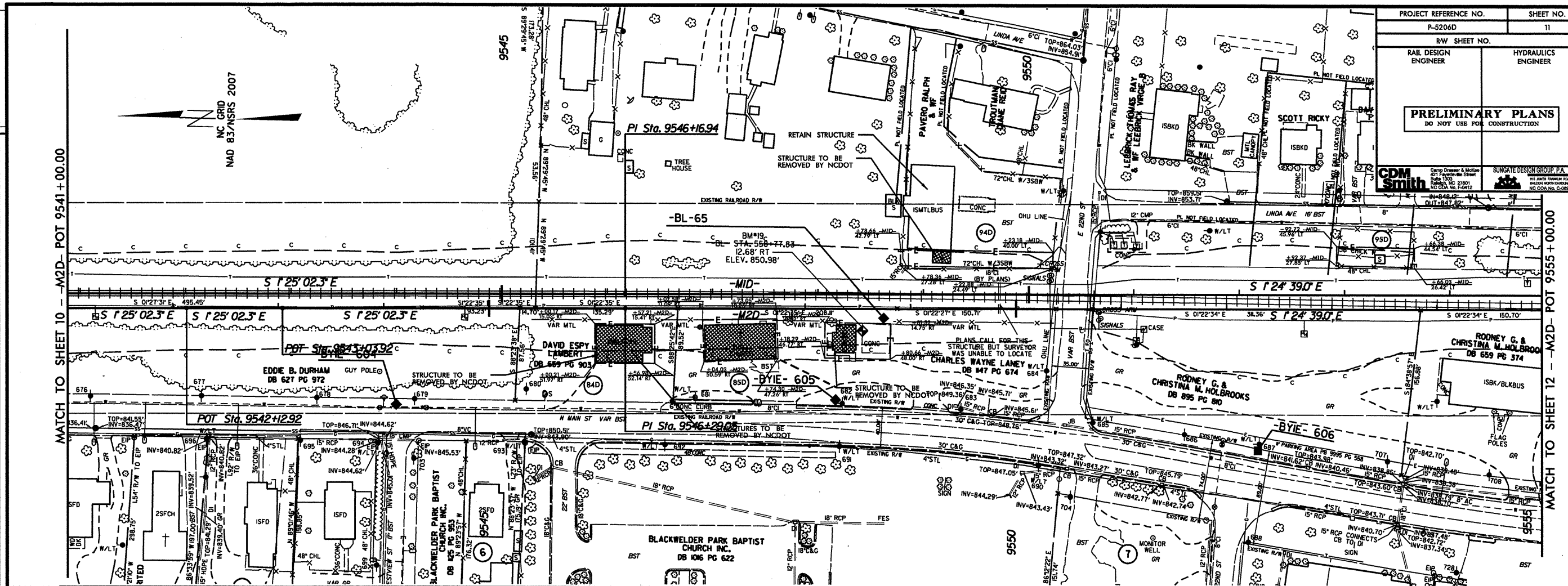


REVISIONS

MATCH TO SHEET 9 - M2D- POT 9528+00.00

MATCH TO SHEET 11 - M2D- POT 9541+00.00

PROJECT REFERENCE NO. P-5206D	SHEET NO. 11
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>CDM Smith</b>	<b>SUNGATE DESIGN GROUP, P.A.</b>

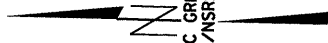


REVISIONS

MATCH TO SHEET 10 - M2D - POT 9541+00.00

MATCH TO SHEET 12 - M2D - POT 9555+00.00

NAD 83/NSRS 2007



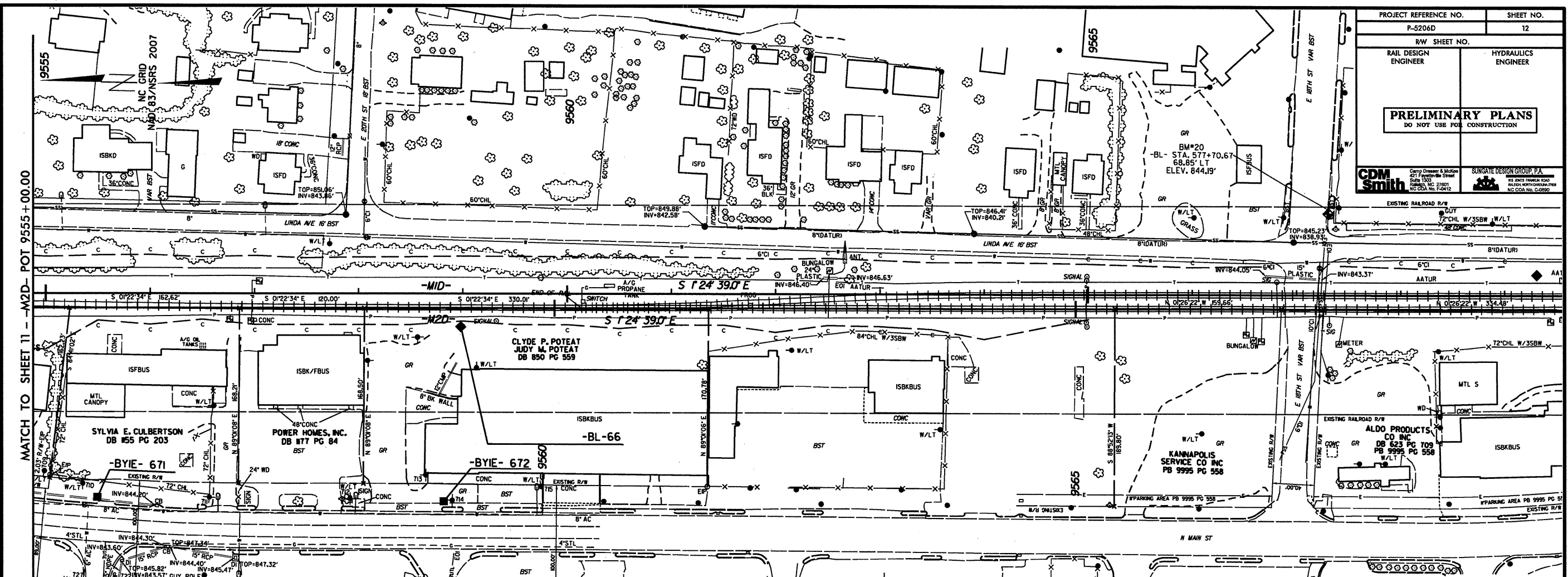
EXISTING T/R  
(PROPOSED - R)

880  
870  
860  
850  
840  
830  
820  
810

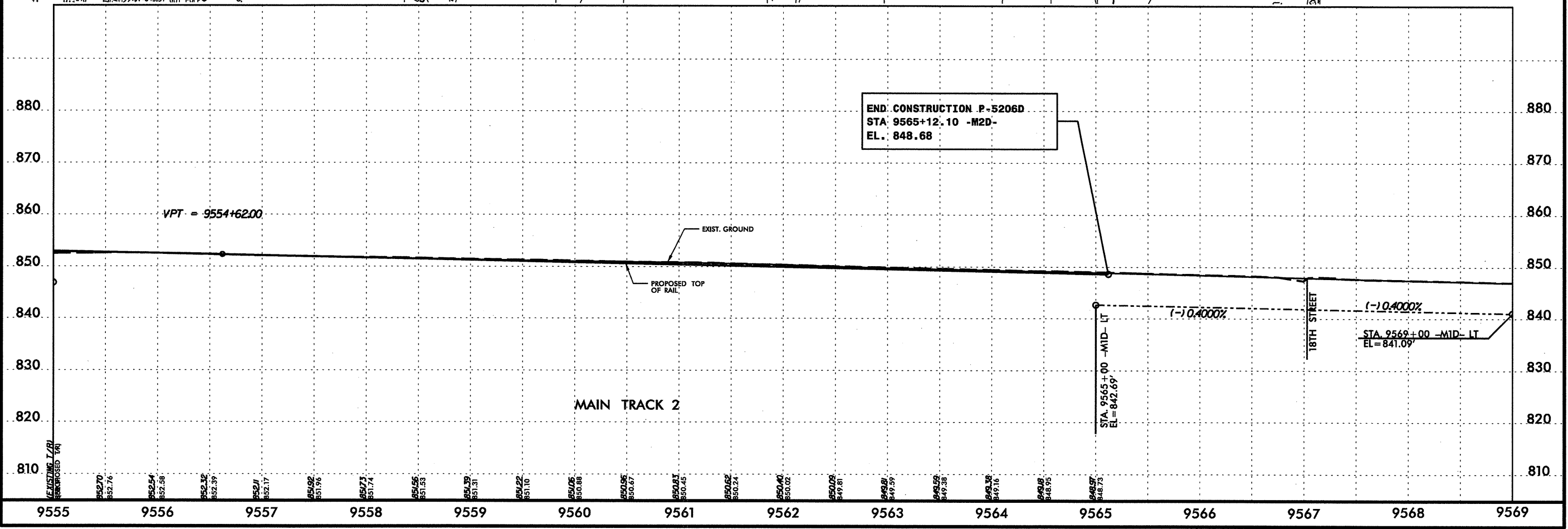
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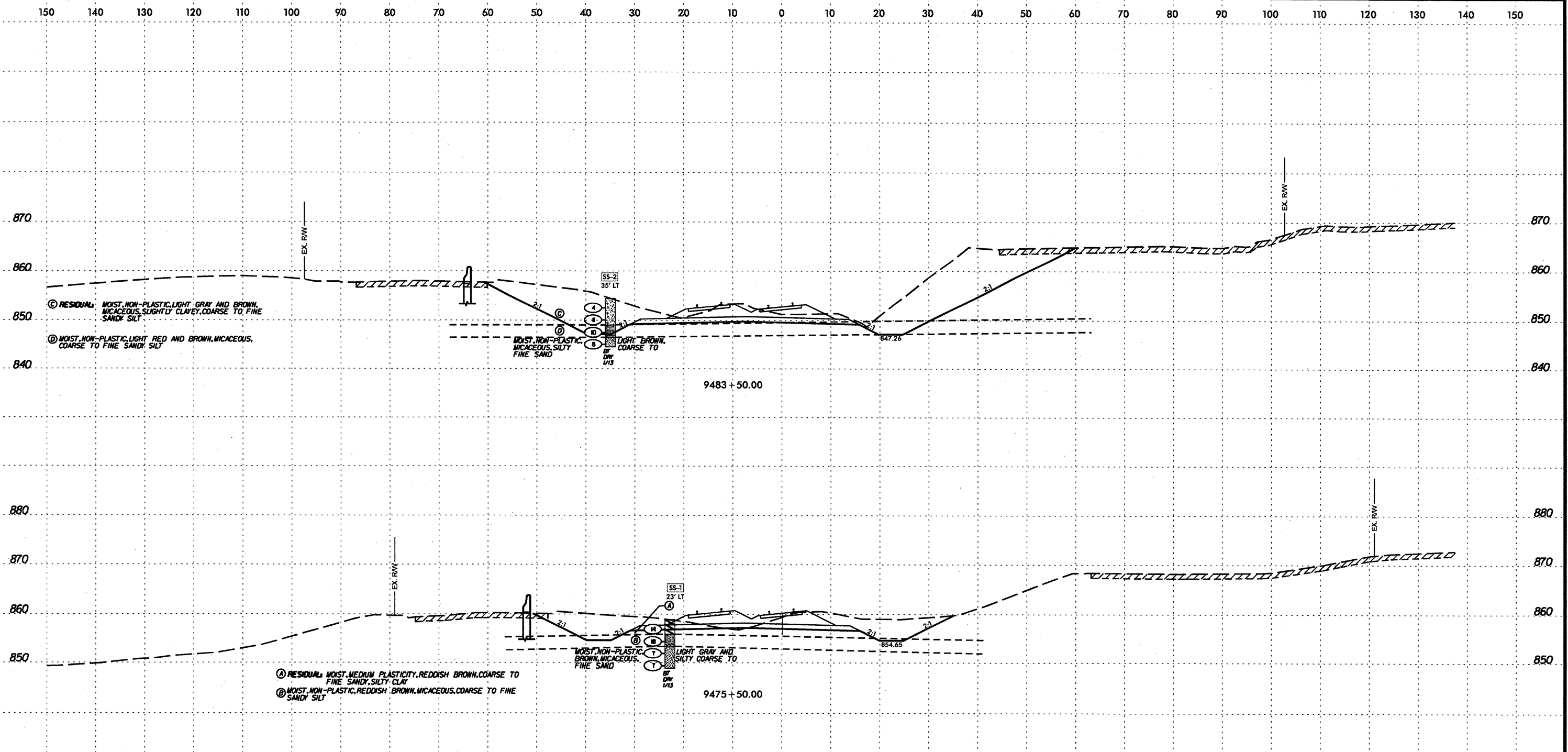
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REVISIONS



PROJECT REFERENCE NO. P-5206D	SHEET NO. 12
R/W SHEET NO.	
RAIL DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	





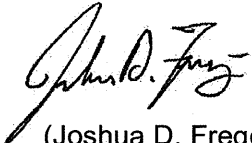
**SOIL TEST RESULTS**

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	23' LT	9475+50	1.0-2.5	A-7-6(9)	50	24	25.7	10.4	11.5	38.9	86.5	65.4	52.3	16.8	-
SS-2	35' LT	9483+50	3.5-5.0	A-5(0)	44	NP	25.0	19.0	19.5	16.6	80.1	63.0	38.7	20.9	-

**NCDOT Project No. 52000.1.STR09T1B TIP No. P-5206D  
Reid to North Kannapolis on the NCRR/NS Mainline  
Rowan County, North Carolina  
SUMMARY OF LABORATORY TEST DATA**

Boring Number	Sample Depth (ft.)	Sample No.*	Natural Moisture Content (%)	AASHTO Class (Group Index)	N-Value (blows/ft.)	Atterberg Limits			Gradation Results							
						L.L.	P.L.	P.I.	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Retained #270 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
B-1	1.0 – 2.5	SS-1	16.8	A-7-6 (9)	14	50	26	24	86.5	65.4	52.3	49.6	25.7	10.4	11.5	38.9
B-2	3.5 – 5.0	SS-2	20.9	A-5 (0)	11	44	NP	NP	80.1	63.0	38.7	63.9	25.0	19.0	19.5	16.6

SS = Split-Barrel Sample (ASTM-D-1586) ST = Shelby Tube (Undisturbed) Sample  
S = Grab Sample  
NP -- Non Plastic                      NA-- Non Applicable

Lab Technician:   
(Joshua D. Fregosi)

NCDOT Certification No.: 111-05-1203