DGN 0164DEL P10b2

TIP PROJECT: P-5206D

CONTRACT: C203207

STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION

ROWAN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	P-5206D	1	

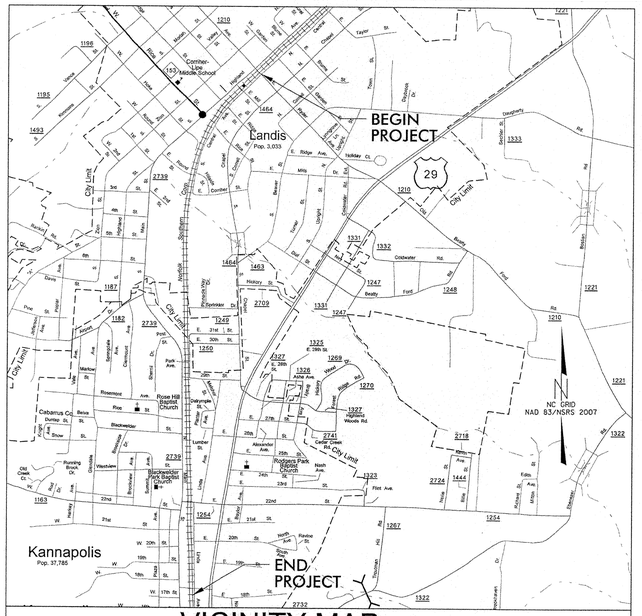
WBS Element	F.A. PROJ. NO.	DESCRIPTION
52000.1.STR09T1B		PE, UTL, PE
52000.1.STR10T3		PE, UTL, PE
43219.2.STR08P5206		ROW
52000.3.STR02T4D	FRA-FR-HSR-0006-10-01-00	UTL CONST., CONST.

PART 3 OF 3

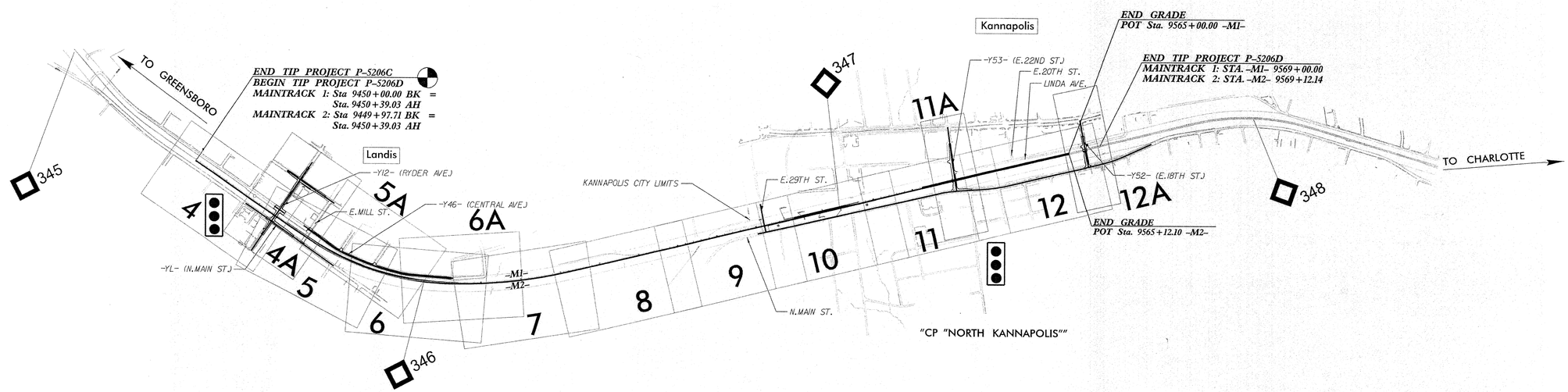
LOCATION: NCRR/NS MAINLINE RAILROAD ROADBED FROM NORTH OF RYDER AVE (SR 1210, MP 345.4) TO CP "NORTH KANNAPOLIS" (MP 348.3)

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

NC GRID NAD 83/NSRS 2007



VICINITY MAP



GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

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

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612 | Tel: (919) 755-0583
NC COA No. F-0412

Prepared In the Office of:
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 2012

LETTING DATE:
OCTOBER 15, 2013

DOUGLAS B. SAUNDERS, PE
PROJECT ENGINEER
DOUGLAS B. SAUNDERS, PE
RAIL DESIGN ENGINEER
BENJAMIN R. CRAWFORD, PE
ROADWAY DESIGN ENGINEER
JOSHUA G. DALTON, PE
HYDRAULICS ENGINEER
MATTHEW B. SIMMONS, PE
NCDOT PROJECT MANAGER

RAIL ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SAUNDERS 7/19/13
SIGNATURE: Douglas B. Saunders P.E.

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13
SIGNATURE: P.E.

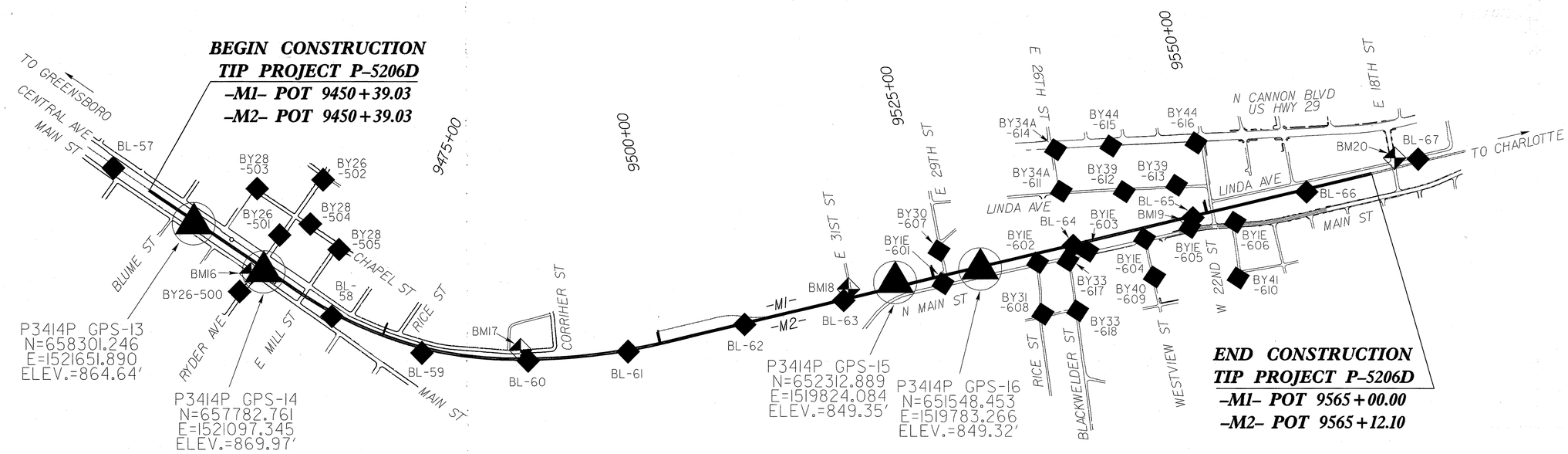
ROADWAY ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD 7/19/2013
SIGNATURE: Benjamin R. Crawford P.E.

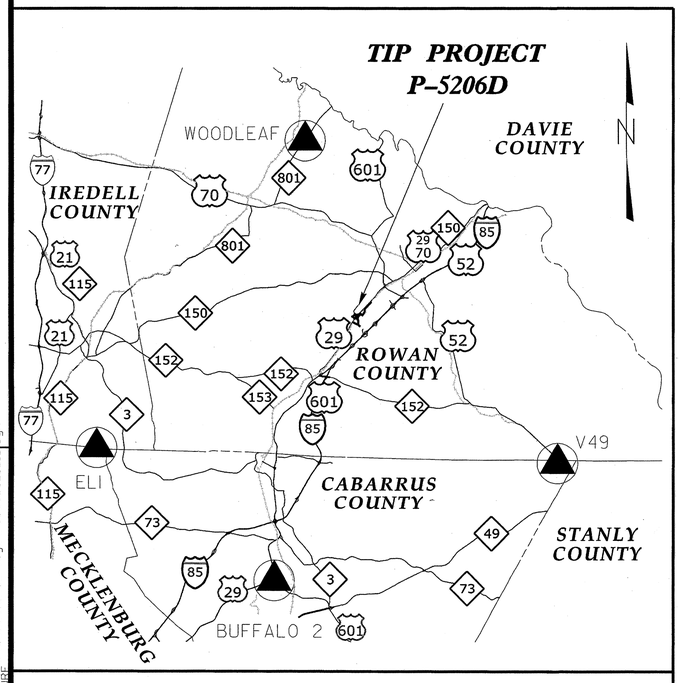
NC DEPARTMENT OF TRANSPORTATION
RAIL DIVISION
PLANNING & DEVELOPMENT BRANCH
CAPITAL YARD
1556 MAIL SERVICE CENTER
RALEIGH, NC 27699-1556

7/30/2013 11:06:01 AM
R:\ncdot\P5206D\Roadway\Proj\P5206D_RR_TSH_01.dgn
USER: STATONRE

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	1-A
Location and Surveys	

SURVEY CONTROL SHEET P-5206D





VICINITY MAP

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P3414P-10"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 666744.654(ft) EASTING: 1531939.796(ft)
ELEVATION: 821.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985378
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P3414P-10" TO -M1- STATION 9450+39.03 IS
S 50°39'15.7" W 12811.28'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/NSRS 2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
P5206D-P3414P_LS_GPSCALIB.HTML
P5206D-P3414P_LS_WGS84.TXT
P5206D-P3414P_LS_LOCAL.TXT
P5206D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DGN 0164DEL P10b2

REVISIONS

7/18/2013 2:24:30 PM
Project:C:\P5206D\LocationSurveys\P5206D_Ls_1ed.dgn
Date:

SURVEY CONTROL SHEET P-5206D

GPS Calibration Report

Project : P3414PZ

TIP Number P3414P
User name tbovender Date & Time 6:15:58 AM 3/30/2009
Coordinate System US State Plane 1983(at ground) Zone North Carolina 3200
Horizontal Datum NAD 1983 (Conus)
Vertical Datum NAVD 88 Geoid Model G03NC
Coordinate Units US survey feet
Distance Units US survey feet
Height Units US survey feet

LOCAL SITE INFORMATION
Localized around
Latitude 35^34'18.46142"N
Longitude 80^34'26.64222"W
Site Scale Factor 1.0001462406
Height 719.931sft

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived. Please take care in utilizing these coordinates to eliminate confusion of the two systems. This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

Northing coordinate of rotation center 667263.504sft
Easting coordinate of rotation center 1532682.097sft
Rotation about the center point 0^00'00"
Translation north 0.075sft
Translation east 0.003sft
Scale factor 0.99999875

Vertical Adjustment Parameters

Northing coordinate of origin point 691593.681sft
Easting coordinate of origin point 1551534.529sft
Vertical separation at origin 0.061sft
Slope north -0.708ppm
Slope east 0.902ppm

Geoid Model Definition

G03NC

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.003sft	0.001	1_GPS
Vertical	0.001sft	0.000	9_GPS
Three-dimensional	0.003sft	0.001	1_GPS

Datum Transformation Parameters

Datum Transformation computation not requested

Point P3414P GPS-13 Latitude 35^32'53.33976"N Longitude 80^36'29.49916"W Height 762.930sft	Northing 658301.245sft Easting 1521651.890sft Elevation 864.638sft Horz error 0.001sft Vert error 0.000sft 3D error 0.001sft	Point 13 Northing 658301.246sft Easting 1521651.890sft Elevation 864.638sft Utilized Horz and Vert Quality Adjusted quality
Point P3414P GPS-14 Latitude 35^32'48.12398"N Longitude 80^36'36.10699"W Height 768.268sft	Northing 657782.760sft Easting 1521097.345sft Elevation 869.971sft Horz error 0.001sft Vert error 0.000sft 3D error 0.001sft	Point 14 Northing 657782.761sft Easting 1521097.345sft Elevation 869.971sft Utilized Horz and Vert Quality Adjusted quality
Point P3414P GPS-15 Latitude 35^31'53.83213"N Longitude 80^36'50.43616"W Height 747.718sft	Northing 652312.889sft Easting 1519824.084sft Elevation 849.313sft Horz error 0.001sft Vert error 0.000sft 3D error 0.001sft	Point 15 Northing 652312.889sft Easting 1519824.084sft Elevation 849.313sft Utilized Horz and Vert Quality Adjusted quality
Point P3414P GPS-16 Latitude 35^31'46.26663"N Longitude 80^36'50.77957"W Height 747.744sft	Northing 651548.452sft Easting 1519783.264sft Elevation 849.323sft Horz error 0.002sft Vert error 0.000sft 3D error 0.002sft	Point 16 Northing 651548.453sft Easting 1519783.266sft Elevation 849.323sft Utilized Horz and Vert Quality Adjusted quality

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P3414P-10"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 666744.654(ft) EASTING: 1531939.796(ft)
ELEVATION: 821.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985378
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"P3414P-10" TO -M1- STATION 9450+39.03 IS
S 50°39'15.7" W 12811.28'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/NSRS 2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
P5206D-P3414P_LS_GPSCALIB.HTML
P5206D-P3414P_LS_WGS84.TXT
P5206D-P3414P_LS_LOCAL.TXT
P5206D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DGN 0164DEL P10b2
REVISIONS
7/18/2013 2:24:35 PM
R:\pcdot\P5206D\LocationSurveys\P5206D_Ls_1b.dgn
USER: STATEWIDE

SURVEY CONTROL SHEET P-5206D

BL

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
LIMITS						
57	BL-57	658893.7470	1522284.3790	857.58	OUTSIDE PROJECT LIMITS	
13	GPS P3414P-13	658301.2460	1521651.8900	864.64	9455+36.08	28.59 RT
14	GPS P3414P-14	657782.7610	1521097.3450	869.97	9462+95.23	33.61 RT
58	BL-58	657270.9250	1520576.9150	863.36	9470+21.37	41.77 RT
59	BL-59	656555.8770	1520093.2960	856.64	9478+74.72	53.72 RT
60	BL-60	655647.3600	1519827.6200	845.78	9488+13.57	22.09 RT
61	BL-61	654763.1220	1519719.2410	839.38	9497+01.84	22.66 RT
62	BL-62	653700.2440	1519734.6760	840.99	9507+63.53	19.16 RT
63	BL-63	652793.3370	1519760.3620	846.60	9516+70.79	15.92 RT
15	GPS P3414P-15	652312.8890	1519824.0840	849.35	9521+52.67	35.90 LT
16	GPS P3414P-16	651548.4530	1519783.2660	849.32	9529+15.86	23.81 RT
64	BL-64	650695.8320	1519812.8080	850.56	9537+68.95	15.37 RT
65	BL-65	649602.5510	1519832.1460	850.96	9548+62.38	23.05 RT
66	BL-66	648566.8920	1519848.4910	849.00	9558+98.13	32.21 RT
67	BL-67	647535.6920	1519925.5670	842.65	9569+30.91	19.45 LT

BY26

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
502	BY26-502	657092.8390	1521792.8200	875.73	9462+64.87	945.55 LT
501	BY26-501	657574.3875	1521388.4381	868.73	9462+27.23	317.86 LT
500	BY26-500	658028.4880	1520966.4900	864.23	9462+21.22	301.99 RT

BY28

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
503	BY28-503	657680.8390	1521838.8060	873.55	9458+27.08	550.33 LT
504	BY28-504	657286.3696	1521428.3972	857.83	9463+96.31	554.43 LT
505	BY28-505	657083.9850	1521149.9130	867.38	9467+54.67	506.36 LT

BY30

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
607	BY30-607	651871.6925	1520018.0525	852.07	9525+98.53	218.90 LT

BY31

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
608	BY31-608	651088.2658	1519269.8474	834.52	9533+63.21	548.46 RT

BY33

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
617	BY33-617	650771.3629	1519688.1925	842.34	9536+90.36	138.08 RT
618	BY33-618	650779.7052	1519233.1123	830.61	9536+70.77	592.81 RT

BY34A

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
611	BY34A-611	650697.9205	1520314.2811	854.66	9537+79.27	486.00 LT
614	BY34A-614	650669.4830	1520684.3241	843.63	9538+16.85	855.23 LT

BY39

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
612	BY39-612	650151.9806	1520191.7705	857.58	9543+22.01	350.03 LT
613	BY39-613	649684.9806	1520149.9727	863.06	9547+87.80	296.71 LT

BY40

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
609	BY40-609	650048.7442	1519384.7237	853.77	9544+05.26	459.33 RT

BY41

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
610	BY41-610	649322.4513	1519219.8504	841.13	9551+27.32	642.06 RT

BY44

POINT	DESC.	NORTH	EAST	ELEVATION	M1D STATION	OFFSET
615	BY44-615	650182.5146	1520611.3266	835.91	9543+01.87	770.21 LT
616	BY44-616	649434.7933	1520479.6870	846.31	9550+46.03	620.16 LT

BENCHMARKS (NAVD88)

****

BM*16 ELEVATION = 870.52'
N 657897 E 1521104
M1D STATION 9462+11 112' RIGHT
CHISELED SQUARE IN CONCRETE CURB AT
INTERSECTION OF MAIN ST AND RYDER ST.
NE QUADRANT IN FRONT OF SHELL STATION

****
****

BM*17 ELEVATION = 845.97'
N 655694 E 1519934
M1D STATION 9487+46 72' LEFT
CHISELED SQUARE IN CONCRETE CURB ON
FRONT OF 1SFD 603 SOUTH CENTRAL AVE

****
****

BM*18 ELEVATION = 851.50'
N 652731 E 1519851
M1D STATION 9517+36 73' LEFT
RR SPIKE IN WESTERN ROOT OF 30" WILLOW
OAK ON N SIDE OF 31ST ST

****
****

BM*19 ELEVATION = 850.98'
N 649622 E 1519819
M1D STATION 9548+42 36' RIGHT
CHISELED SQUARE IN CONCRETE PAD AT 2206
MAIN ST. NEAR CROSSING OF EAST 22ND ST

****
****

BM*20 ELEVATION = 844.19'
N 647737 E 1519980
M1D STATION 9567+31 78' LEFT
RR SPIKE IN SEAM BEHIND BST CURB ON E
18TH ST & LINDA AVE

****

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "P3414P-10"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 666744.654(ft) EASTING: 1531939.796(ft)
ELEVATION: 821.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99985378
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"P3414P-10" TO -M1- STATION 9450+39.03 IS
S 50°39'15.7" W 12811.28'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/NSRS 2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:
P5206D-P3414P_LS_GPSCALIB.HTML
P5206D-P3414P_LS_WGS84.TXT
P5206D-P3414P_LS_LOCAL.TXT
P5206D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DGN 0164DEL P10b2
REVISIONS
7/18/2013 2:24:39 PM
R:\ncdot\P5206D\LocationSurveys\P5206D_Ls_lc.dgn
USER:STATINDE

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	1D
Location and Surveys	

SURVEY CONTROL SHEET P-5206D
FINAL

YL

TYPE	STATION	NORTH	EAST
POT	13+00.00	657928.7069	1521164.1237
POT	19+00.00	657521.5184	1520723.4451

YL2

TYPE	STATION	NORTH	EAST
POT	20+00.00	651962.8247	1519703.5928
PC	43+03.08	649659.8790	1519728.7998
PT	45+54.92	649408.8158	1519712.4225
PC	48+53.53	649113.1780	1519670.3916
PT	52+04.00	648763.7461	1519648.8489
PC	63+35.14	647632.7926	1519669.2973
PT	66+28.44	647341.9211	1519703.1451
POT	70+42.46	646937.3129	1519790.9137

Y12

TYPE	STATION	NORTH	EAST
POT	5+00.00	657209.6567	1521708.1305
POT	10+91.68	657638.8989	1521300.8951
POT	16+05.64	658012.0416	1520947.4657

Y45

TYPE	STATION	NORTH	EAST
POT	15+00.00	657787.8287	1521270.0215
POT	16+63.07	657676.1912	1521151.1589

Y46

TYPE	STATION	NORTH	EAST
POT	9+00.00	657478.6264	1520956.4591
PC	13+39.61	657179.1222	1520634.6653
PT	15+45.74	657024.1808	1520499.2658
PC	16+76.74	656917.1951	1520423.6720
PT	17+77.06	656834.1179	1520367.4361
PC	18+29.11	656790.4385	1520339.1301
PT	21+20.65	656537.1061	1520195.1931
PC	22+47.74	656423.1329	1520138.9546
PT	24+00.31	656281.2554	1520083.3338
POT	29+15.79	655787.1336	1519936.4963

Y51

TYPE	STATION	NORTH	EAST
POT	11+90.00	657541.9597	1521668.5496
POT	19+06.91	657046.4092	1521150.4876

Y52

TYPE	STATION	NORTH	EAST
POT	10+60.00	647748.7954	1520206.6241
POT	16+00.00	647765.8122	1519666.8923

Y53

TYPE	STATION	NORTH	EAST
POT	10+13.30	649375.7894	1520519.9925
PC	14+79.53	649410.5425	1520055.0546
PT	15+54.93	649415.1847	1519979.8014
POT	18+20.00	649428.0646	1519715.0440

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P3414P-10"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 666744.654(ft) EASTING: 1531939.796(ft)
ELEVATION: 821.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985378
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P3414P-10" TO -M1D- STATION 9450+39.03 IS
S 50°39'15.7" W 12811.28'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/NSRS 2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP://CONNECT.NCDOT.GOV/RESOURCES/LOCATION

THE FILES TO BE FOUND ARE AS FOLLOWS:
P5206D-P3414P_LS_GPSCALIB.HTML
P5206D-P3414P_LS_WGS84.TXT
P5206D-P3414P_LS_LOCAL.TXT
P5206D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DGN 0164DEL P10b2
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	1E
Location and Surveys	

SURVEY CONTROL SHEET P-5206D
FINAL

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
YL	14+28.86	25.19	657859.7597	1521052.3846
YL	14+29.06	36.26	657867.7523	1521044.7260

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
YL2	45+74.34	-36.00	649384.5299	1519745.3318
YL2	46+50.00	-36.00	649309.6185	1519734.6816
YL2	47+00.00	-29.00	649261.1016	1519720.7136
YL2	61+50.00	-29.31	647818.4303	1519695.2532

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y12	6+15.18	24.73	657310.2345	1521646.7934
Y12	6+85.00	30.17	657364.6293	1521602.6861
Y12	7+25.00	-25.75	657355.1592	1521534.5871
Y12	7+25.00	30.17	657393.6500	1521575.1579
Y12	7+25.00	50.17	657407.4153	1521589.6671
Y12	8+17.70	30.17	657460.8972	1521511.3537
Y12	8+21.00	-25.54	657424.9490	1521468.6672
Y12	8+83.00	30.17	657508.2702	1521466.4095
Y12	9+54.89	24.92	657556.8115	1521413.1260
Y12	14+22.11	43.45	657908.6758	1521105.2170
Y12	14+38.00	-22.15	657875.1000	1521046.6614
Y12	14+40.62	43.68	657922.2734	1521092.6557
Y12	14+41.90	28.00	657912.4228	1521080.3878
Y12	14+99.93	28.00	657954.5533	1521040.4830
Y12	16+00.01	22.85	658023.6683	1520967.9232

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y12	6+53.00	27.67	657339.6986	1521622.9018
Y12	6+53.00	52.72	657356.9367	1521641.0714
Y12	6+73.00	29.23	657355.2803	1521610.2670
Y12	6+73.00	52.72	657371.4458	1521627.3061

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y51	12+00.00	22.30	657551.1630	1521645.9079
Y51	13+00.00	30.80	657488.1813	1521567.7700
Y51	13+40.00	-27.36	657418.5042	1521579.0663
Y51	13+40.00	30.80	657460.5320	1521538.8647
Y51	13+40.00	50.00	657474.4065	1521525.5930
Y51	14+35.00	-26.42	657353.5175	1521509.7653
Y51	14+35.00	32.00	657395.7321	1521469.3851
Y51	17+00.00	32.00	657212.5556	1521277.8874
Y51	17+25.00	24.95	657190.1833	1521264.6918

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y51	15+39.56	32.00	657323.4582	1521393.8280
Y51	15+39.56	45.00	657332.8524	1521384.8420
Y51	15+59.56	32.00	657309.6335	1521379.3753
Y51	15+59.56	45.00	657319.0278	1521370.3893

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y52	14+83.03	35.00	647797.1087	1519784.9092
Y52	15+50.00	35.00	647799.2191	1519717.9704
Y52	15+58.54	-19.69	647744.8254	1519707.7112
Y52	15+68.27	-44.83	647720.0045	1519697.1938

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y53	13+48.26	-19.00	649381.8104	1520184.5442
Y53	13+70.00	-23.00	649379.4421	1520162.5666
Y53	14+00.00	25.86	649430.4060	1520136.2923
Y53	14+25.48	54.49	649460.8509	1520113.0147
Y53	14+52.58	57.00	649465.3750	1520086.1795
Y53	14+61.43	51.00	649460.0514	1520076.9069
Y53	14+79.53	-22.00	649388.6036	1520053.4158
Y53	14+82.53	33.00	649443.6752	1520054.4897
Y53	15+51.70	-23.00	649392.0544	1519981.8838
Y53	15+73.16	-44.00	649372.1225	1519959.4544
Y53	15+91.28	33.00	649449.9120	1519945.0973

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "P3414P-10"
WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF
NORTHING: 666744.654(ft) EASTING: 1531939.796(ft)
ELEVATION: 821.60(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99985378
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"P3414P-10" TO -M1D- STATION 9450+39.03 IS
S 50°39'15.7" W 12811.28'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/NSRS 2007 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*

2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
HTTP:/CONNECT.NCDOT.GOV/RESOURCES/LOCATION

THE FILES TO BE FOUND ARE AS FOLLOWS:
P5206D–P3414P_LS_GPSCALIB.HTML
P5206D–P3414P_LS_WGS84.TXT
P5206D–P3414P_LS_LOCAL.TXT
P5206D_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

▲ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2
R/W SHEET NO.	

RAIL DESIGN ENGINEER

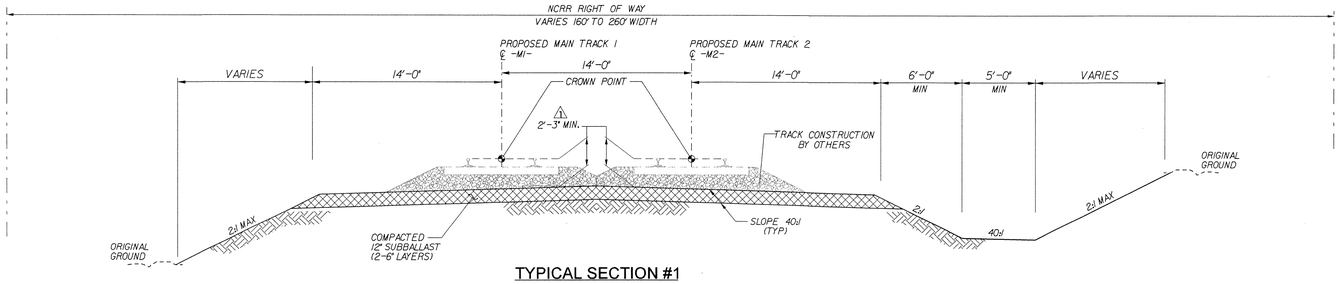
NORTH CAROLINA PROFESSIONAL SEAL 14160 DOUGLAS B. FUNDERBURK

9/28/13

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612
NC COA No. F-0412

NOTES:

1. TOP OF SUBGRADE IS TO BE CROWNED.
2. BALLAST AND RAIL SHOWN FOR INFORMATION PURPOSES ONLY. TRACK CONSTRUCTION, INCLUDING BALLAST, TIE, AND RAIL INSTALLATION IS BY NORFOLK SOUTHERN CONTRACTOR.
3. ACTUAL LOCATION OF EXCAVATION IS TO BE BASED ON FIELD CONDITIONS AS DETERMINED BY THE NORFOLK SOUTHERN REPRESENTATIVE.
4. ⚠1 IN SUPERELEVATED SECTIONS, TO TOP OF 12" COMPACTED SUBBALLAST SHALL BE 2'-5" MIN FROM PGL (CROWN PT).
5. GRADING UNDERNEATH THE EXISTING TRACK CANNOT BE COMPLETED UNTIL AFTER THE TRACK IS MOVED.



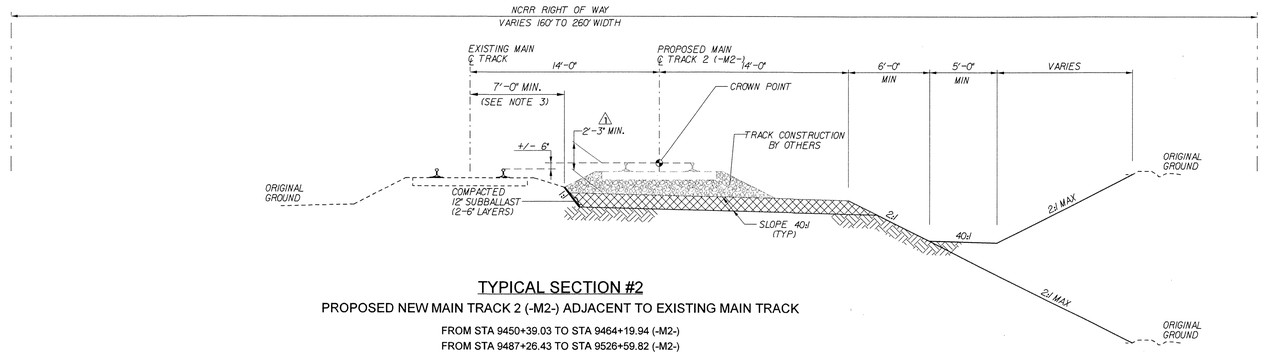
TYPICAL SECTION #1

PROPOSED NEW MAIN TRACK 1 (-M1-) AND MAIN TRACK 2 (-M2-)

FROM STA 9464+19.94 TO STA 9487+17.74 (-M1-)
FROM STA 9464+19.94 TO STA 9487+26.43 (-M2-) *

FROM STA 9540+33.42 TO STA 9565+00.00 (-M1-)
FROM STA 9546+29.04 TO STA 9565+12.10 (-M2-)

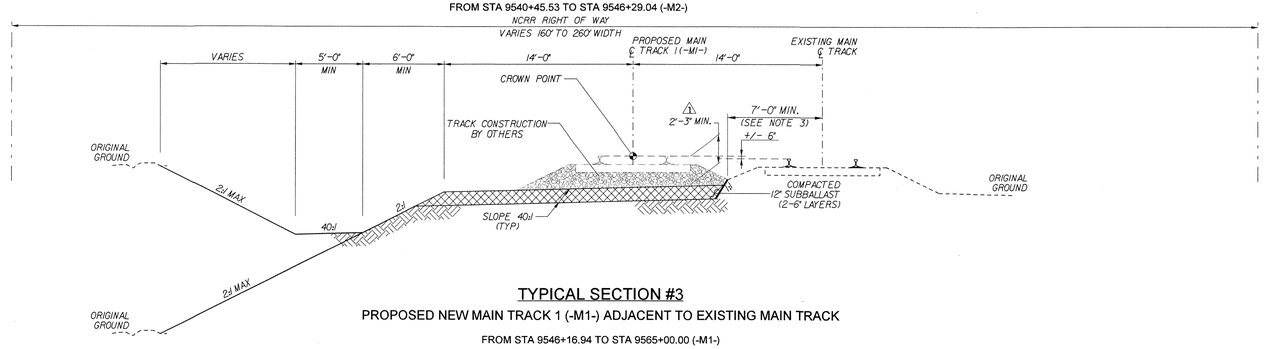
*SPECIAL DITCH GRADE STA. 9474+50 TO 9477+00 -M1- LT & RT. SEE CROSS SECTIONS.



TYPICAL SECTION #2

PROPOSED NEW MAIN TRACK 2 (-M2-) ADJACENT TO EXISTING MAIN TRACK

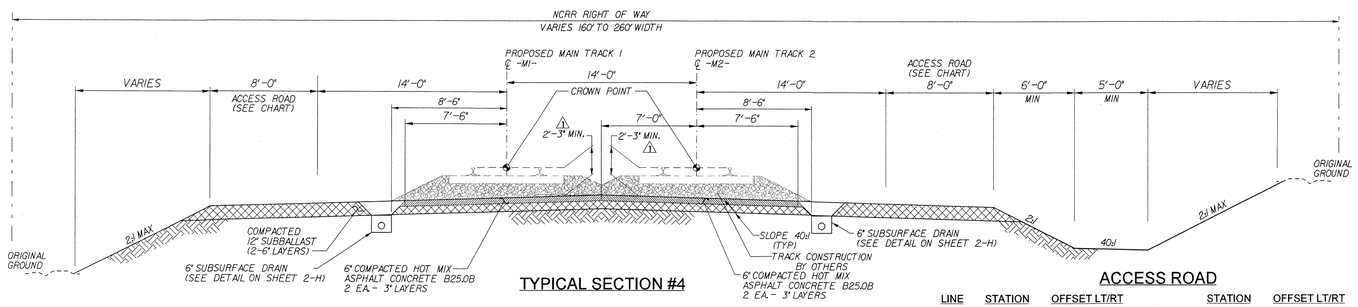
FROM STA 9450+39.03 TO STA 9464+19.94 (-M2-)
FROM STA 9487+26.43 TO STA 9526+59.82 (-M2-)
FROM STA 9540+45.53 TO STA 9546+29.04 (-M2-)



TYPICAL SECTION #3

PROPOSED NEW MAIN TRACK 1 (-M1-) ADJACENT TO EXISTING MAIN TRACK

FROM STA 9546+16.94 TO STA 9565+00.00 (-M1-)

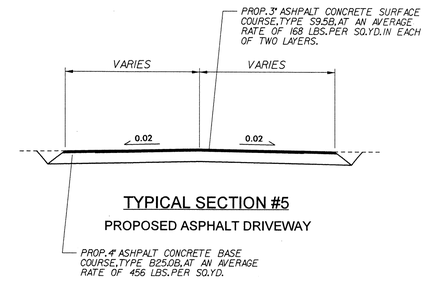


TYPICAL SECTION #4

FROM STA 9526+47.71 TO STA 9540+33.42 (-M1-)
FROM STA 9526+59.82 TO STA 9540+45.53 (-M2-)

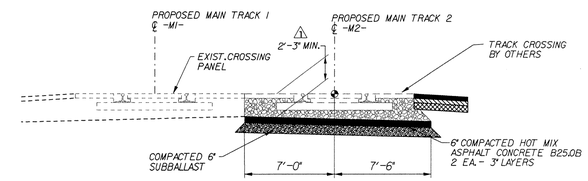
ACCESS ROAD

LINE	STATION	OFFSET LT/RT		STATION	OFFSET LT/RT
-M1-	9526+15	14' LT	TO	9531+50	14' LT
-M2-	9527+10	14' RT	TO	9540+00	14' RT

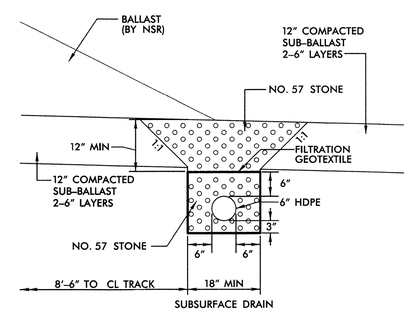


TYPICAL SECTION #5

PROPOSED ASPHALT DRIVEWAY



ASPHALT UNDERLAYMENT DETAIL @ -Y12- CROSSING



*PROVIDE SUBDRAIN OUTLETS AT LOCATIONS SHOWN IN PLANS OR AS DIRECTED BY ENGINEER.

SUBSURFACE DRAIN DETAIL

SUBSURFACE DRAIN SHOWN IS ON RIGHT SIDE, MIRROR IMAGE FOR SUBSURFACE DRAIN ON LEFT SIDE

DCN 0164DEL_P10b2 0001ADD_P10b2

REVISIONS

⚠1 09-30-13 - REVISED DISTANCE FROM TOP OF RAIL TO TOP OF 12" COMPACTED SUBBALLAST

8/30/2013 8:28:06 AM
P:\Proj\P5206D_Roadway\Proj\P5206D_RR_TYP_02.dgn
IS-FS-SS-1 TYPICAL

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
Tel. 919.835.2200
www.stewartinc.com

NCDOT
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH NC 27699-1593

0164DEL_P10b2

DGN

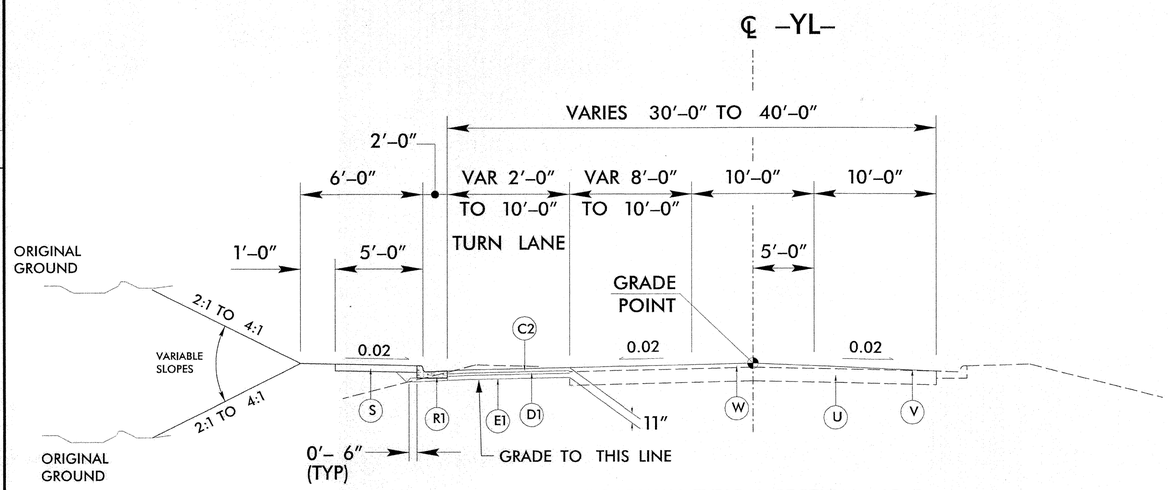
REVISIONS

NOTES:

EXISTING PAVEMENT SHALL BE MILLED AT EXISTING CURB & GUTTER PRIOR TO RESURFACING SO THAT NEW OVERLAY IS FLUSH.

SEE PLANS FOR SIDEWALK LOCATION

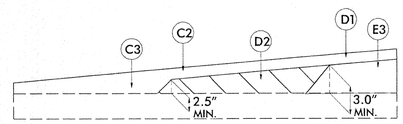
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



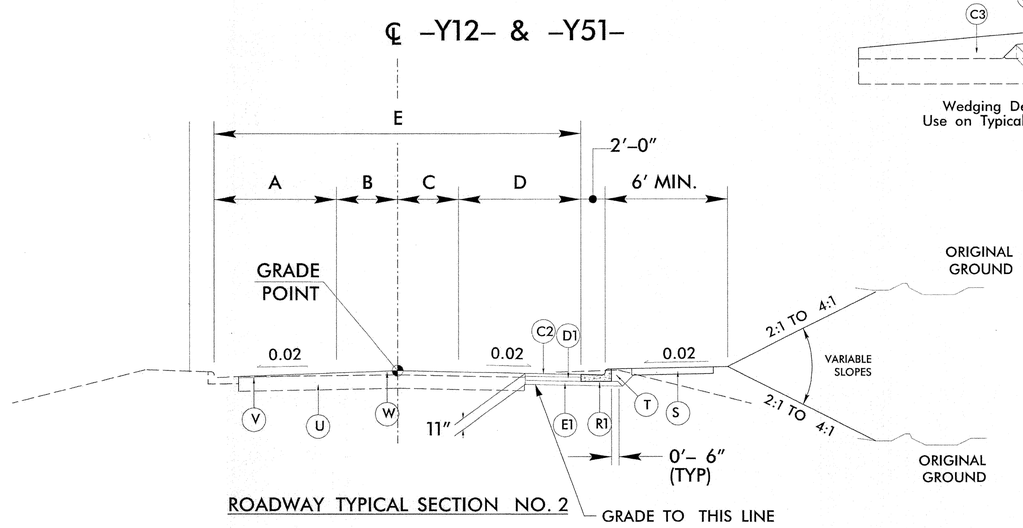
ROADWAY TYPICAL SECTION NO. 1

USE ROADWAY TYPICAL SECTION NO. 1

–YL– STA. 13+20.00 TO –YL– STA. 17+30.00 (MAIN STREET)
–YL– STA. 45+50.00 TO –YL– STA. 47+24.34 (MAIN STREET)



Wedging Detail For Resurfacing
Use on Typical Section No.s 1 and 2



ROADWAY TYPICAL SECTION NO. 2

USE ROADWAY TYPICAL SECTION NO. 2

STATION RANGE	STREET NAME	DIMENSION A	B	C	D	E
–Y12– STA. 5+85.00 TO –Y12– STA. 6+85.00	RYDER AVE.	VARIES 16' TO 14'	VARIES 0' TO 2.33'	VARIES 0' TO 9.67'	VARIES 16' TO 12'	VARIES 32' TO 38'
–Y12– STA. 6+85.00 TO –Y12– STA. 8+83.00	RYDER AVE.	14'	2.33'	9.67'	12'	38'
–Y12– STA. 8+83.00 TO –Y12– STA. 9+83.00	RYDER AVE.	VARIES 14' TO 16'	VARIES 2.33' TO 0'	VARIES 9.67' TO 0'	VARIES 12' TO 16'	VARIES 38' TO 32'
–Y12– STA. 9+83.00 TO –Y12– STA. 11+45.00	RYDER AVE.	RETAIN EXISTING CURB AND GUTTER. MILL TO A DEPTH OF 1.5" AND REPLACE WITH C1				
–Y12– STA. 14+00.00 TO –Y12– STA. 15+00.00	RYDER AVE.	12'	4.5'	7.5'	12'	36'
–Y12– STA. 15+00.00 TO –Y12– STA. 16+00.00	RYDER AVE.	VARIES 12' TO 16'	VARIES 4.5' TO 0'	VARIES 7.5' TO 0'	VARIES 12' TO 14'	VARIES 36' TO 30'
–Y51– STA. 12+00.00 TO –Y12– STA. 13+00.00	CHAPEL ST.	VARIES 14' TO 12'	VARIES 0' TO 1.7'	VARIES 0' TO 10.3'	VARIES 14' TO 12'	VARIES 28' TO 36'
–Y51– STA. 13+00.00 TO –Y51– STA. 15+55.00	CHAPEL ST.	12'	1.7'	10.3'	12'	36'
–Y51– STA. 15+55.00 TO –Y51– STA. 16+55.00	CHAPEL ST.	VARIES 12' TO 15.25'	1.7'	10.3'	12'	VARIES 36' TO 39.25'
–Y51– STA. 16+55.00 TO –Y51– STA. 18+37.00	CHAPEL ST.	VARIES 15.25' TO 14.7'	1.7'	10.3'	12'	VARIES 39.25' TO 38.7'

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1½" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
R1	2'-6" CONCRETE CURB & GUTTER
R2	1'-6" CONCRETE CURB & GUTTER
R3	6" MONOLITHIC CONCRETE ISLAND (KEYED IN)
S	4" CONCRETE SIDEWALK.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING TO DEPTH OF 1.5"
W	WEDGING

7/30/2013
P-5206D_RDY_PSH_02-A.dgn

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-B
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD 7/17/2013

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22888 ENGINEER CLARK S. MORRISON 8/7/13

STEWART

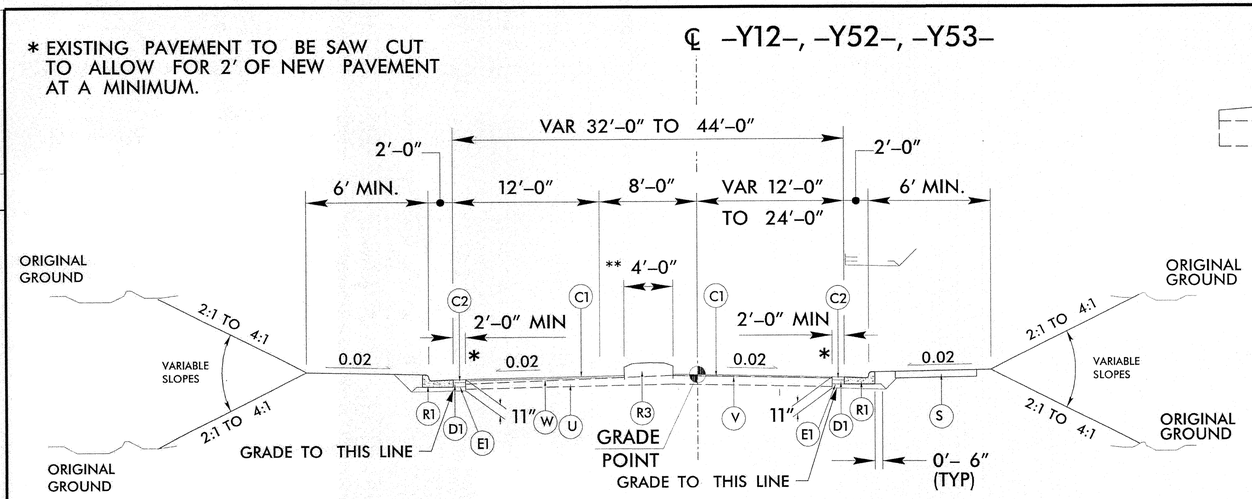
Firm License No. C-1816
423 Fayetteville St.
Suite 400
Raleigh, NC 27601
919.382.8792
www.stewartinc.com

NCDOT
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH NC 27699-1593

DGN 0164DEL_P10b2

REVISIONS

* EXISTING PAVEMENT TO BE SAW CUT TO ALLOW FOR 2′ OF NEW PAVEMENT AT A MINIMUM.

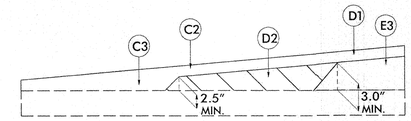


ROADWAY TYPICAL SECTION NO. 3

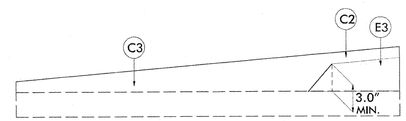
USE ROADWAY TYPICAL SECTION NO. 3

–Y12– STA. 11+45.00 TO –Y12– STA. 13+70.00 (RYDER AVE.)
–Y52– STA. 10+00.00 TO –Y52– STA. 13+00.00 (18TH ST.)
–Y53– STA. 10+00.00 TO –Y53– STA. 13+00.00 (22ND ST.)

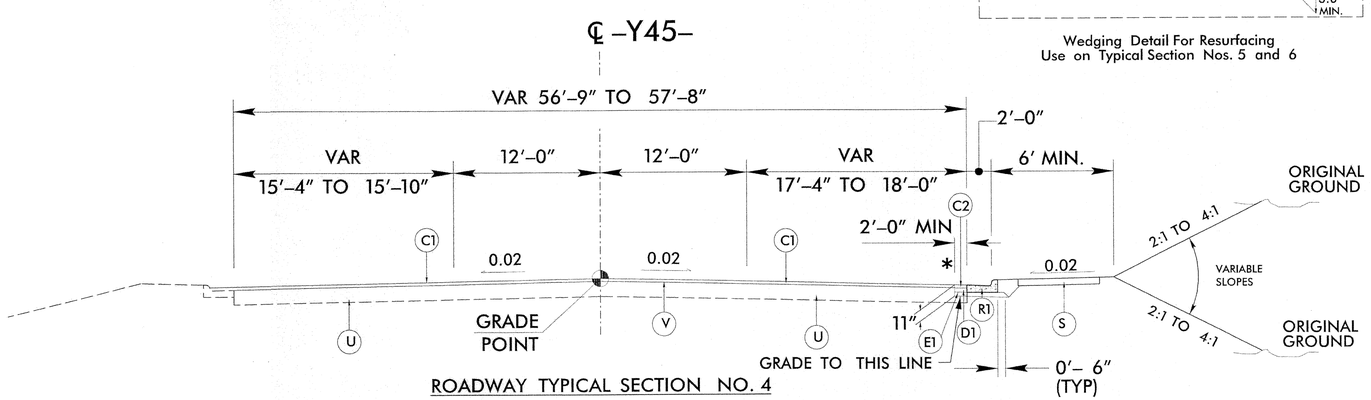
** 4′–0″ CONC ISLAND SHIFTS, SEE PLANS



Wedging Detail For Resurfacing
Use on Typical Section No.s 3 and 4



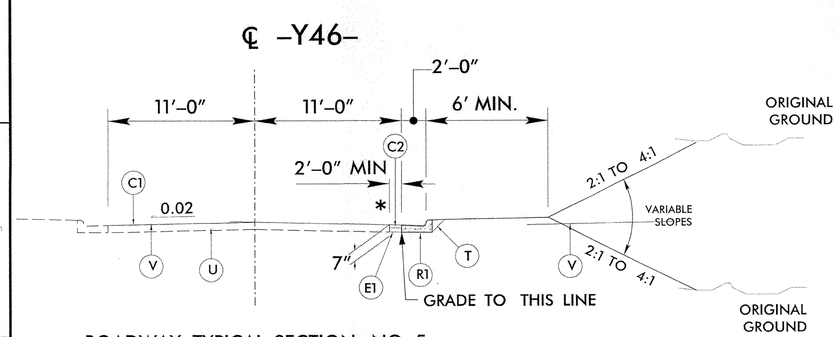
Wedging Detail For Resurfacing
Use on Typical Section Nos. 5 and 6



ROADWAY TYPICAL SECTION NO. 4

USE ROADWAY TYPICAL SECTION NO. 4

–Y45– STA. 15+10.00 TO –Y45– STA. 16+60.00 (CENTRAL AVE.)

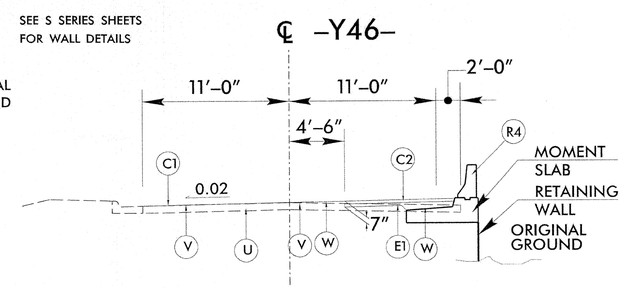


ROADWAY TYPICAL SECTION NO. 5

USE ROADWAY TYPICAL SECTION NO. 6

–Y46– STA. 9+68.00 TO –Y46– STA. 13+00.00 (CENTRAL AVE.)
–Y46– STA. 27+50.00 TO –Y46– STA. 28+89.59 (CENTRAL AVE.)

SEE S SERIES SHEETS FOR WALL DETAILS



ROADWAY TYPICAL SECTION NO. 6

USE ROADWAY TYPICAL SECTION NO. 6

–Y46– STA. 13+00.00 TO –Y46– STA. 27+50.00 (CENTRAL AVE.)

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2″ IN DEPTH.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 4.5″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5½″ IN DEPTH.
R1	2′-6″ CONCRETE CURB & GUTTER
R3	6″ MONOLITHIC CONCRETE ISLAND (KEYED IN)
R4	SINGLE FACED BARRIER
S	4″ CONCRETE SIDEWALK, 5′ WIDE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING TO DEPTH OF 1.5″
W	WEDGING

7/30/2013
mcrae
P:\P5206D_RDY_PSH_02-B.dgn
Stylesheet: pwl.pscript

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-C
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN CRAWFORD 7/17/2013

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22893 ENGINEER CLARK & MORRISON 8/2/13

STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

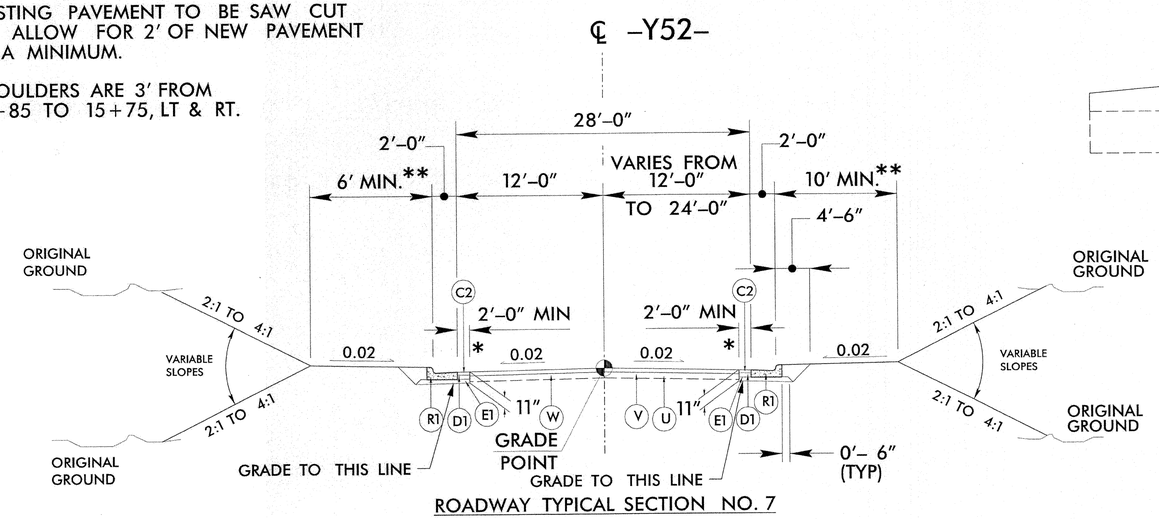
NCDOT
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH NC 27699-1593

DGN 0164DEL_P10b2

REVISIONS

* EXISTING PAVEMENT TO BE SAW CUT TO ALLOW FOR 2′ OF NEW PAVEMENT AT A MINIMUM.

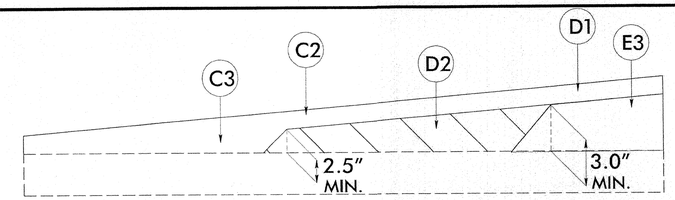
** SHOULDERS ARE 3′ FROM 13+85 TO 15+75, LT & RT.



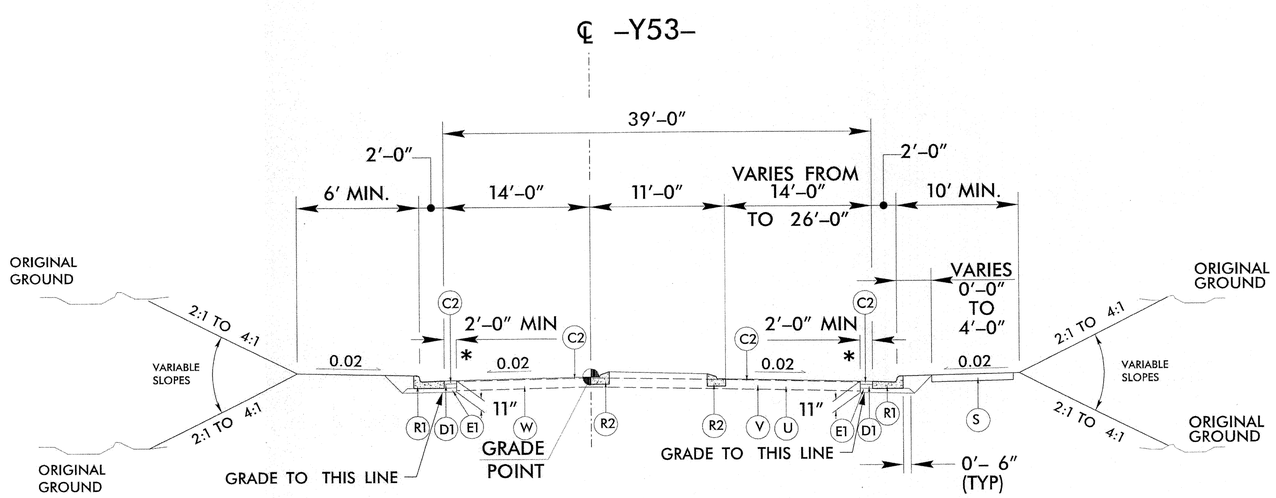
ROADWAY TYPICAL SECTION NO. 7

USE ROADWAY TYPICAL SECTION NO. 7

–Y52– STA. 12+00.00 TO –Y52– STA. 15+75.00 (18TH ST.)



Wedging Detail For Resurfacing
Use on Typical Section No.s 7 and 8



ROADWAY TYPICAL SECTION NO. 8

USE ROADWAY TYPICAL SECTION NO. 8

–Y53– STA. 12+20.00 TO –Y53– STA. 18+02.73 (22ND ST.)

PAVEMENT SCHEDULE

(FINAL PAVEMENT DESIGN)

C1	PROP. APPROX. 1½″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2″ IN DEPTH.
D1	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 4.5″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E3	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3″ IN DEPTH OR GREATER THAN 5½″ IN DEPTH.
R1	2′-6″ CONCRETE CURB & GUTTER
R2	1′-6″ CONCRETE CURB & GUTTER
R3	6″ MONOLITHIC CONCRETE ISLAND (KEYED IN)
S	4″ CONCRETE SIDEWALK.
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING TO DEPTH OF 1.5″
W	WEDGING

7/30/2013
P-5206D_RDY_PSH_02-C.dgn
USER:BrianWood

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-D
R/W SHEET NO.	

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/19/13

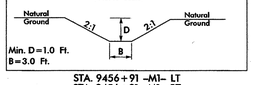
SUNGATE DESIGN GROUP, P.A.
119 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

DKW

0164DEL P10b2

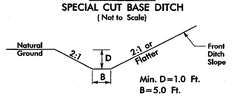
REVISIONS

DETAIL #1
STANDARD BASE DITCH
(Not to Scale)



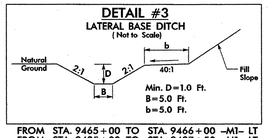
STA. 9456+91 –M1– LT
STA. 9456+91 –M1– RT
STA. 9508+05 –M1– RT

DETAIL #2
SPECIAL CUT BASE DITCH
(Not to Scale)



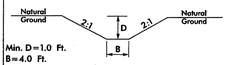
FROM STA. 9457+00 TO STA. 9462+00 –M1– RT
FROM STA. 9495+00 TO STA. 9500+00 –M1– RT
FROM STA. 9503+50 TO STA. 9506+00 –M1– RT
FROM STA. 9511+50 TO STA. 9514+00 –M1– RT
FROM STA. 9531+50 TO STA. 9537+00 –M1– LT
FROM STA. 9532+00 TO STA. 9536+50 –M1– RT
FROM STA. 9544+00 TO STA. 9550+00 –M1– RT
FROM STA. 9546+50 TO STA. 9550+00 –M1– LT
FROM STA. 9550+80 TO STA. 9551+50 –M1– RT
FROM STA. 9551+50 TO STA. 9566+70 –M1– LT
FROM STA. 9567+40 TO STA. 9569+00 –M1– LT

DETAIL #3
LATERAL BASE DITCH
(Not to Scale)



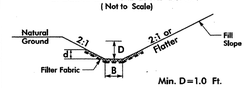
FROM STA. 9465+00 TO STA. 9466+00 –M1– LT
FROM STA. 9485+00 TO STA. 9487+50 –M1– LT
FROM STA. 9541+00 TO STA. 9546+50 –M1– LT

DETAIL #4
STANDARD BASE DITCH
(Not to Scale)



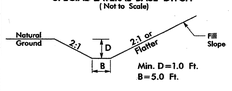
STA. 9491+20 –M1– RT

DETAIL #5
SPECIAL LATERAL BASE DITCH
(Not to Scale)



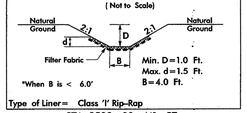
FROM STA. 9487+00 TO STA. 9491+00 –M1– RT
FROM STA. 9491+40 TO STA. 9495+00 –M1– RT
FROM STA. 9508+10 TO STA. 9511+50 –M1– RT

DETAIL #6
SPECIAL LATERAL BASE DITCH
(Not to Scale)



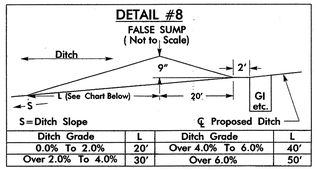
FROM STA. 9526+50 TO STA. 9530+50 –M1– LT
FROM STA. 9530+75 TO STA. 9532+00 –M1– RT
FROM STA. 9536+50 TO STA. 9544+00 –M1– RT

DETAIL #7
STANDARD BASE DITCH
(Not to Scale)



STA. 9539+00 –M1– RT

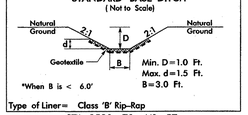
DETAIL #8
FALSE SUMP
(Not to Scale)



Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

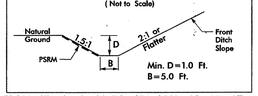
STA. 9480+75 –M1– LT

DETAIL #9
STANDARD BASE DITCH
(Not to Scale)



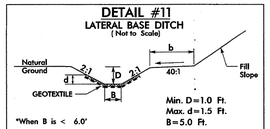
STA. 9530+70 –M1– RT

DETAIL #10
SPECIAL CUT BASE DITCH
(Not to Scale)



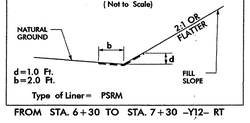
FROM STA. 9550+80 TO STA. 9551+50 –M1– LT

DETAIL #11
LATERAL BASE DITCH
(Not to Scale)



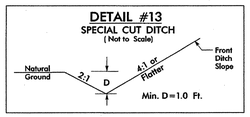
FROM STA. 9537+00 TO STA. 9541+00 –M1– LT

DETAIL #12
TOE PROTECTION
(Not to Scale)



FROM STA. 6+30 TO STA. 7+30 –Y12– RT

DETAIL #13
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 12+20 TO STA. 14+00 –Y53– RT
FROM STA. 8+10 TO STA. 8+70 –Y12– RT

7/22/2013 12:48:50 PM
R:\Roads\P5206D\Roadway\Proj\P5206D_RR_PSH_02D.dgn
USER: STONEMF

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-E
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS W. BUNTERS

7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

HORIZONTAL CURVE GEOMETRY

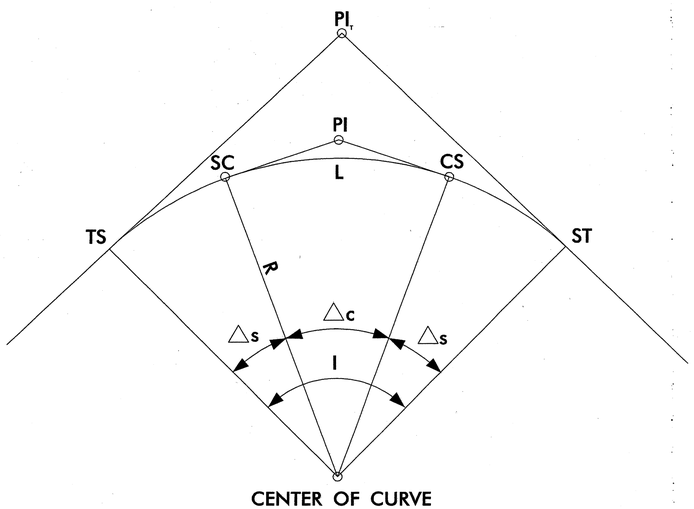


FIGURE A

CIRCULAR CURVE WITH SPIRAL TRANSITION CURVES

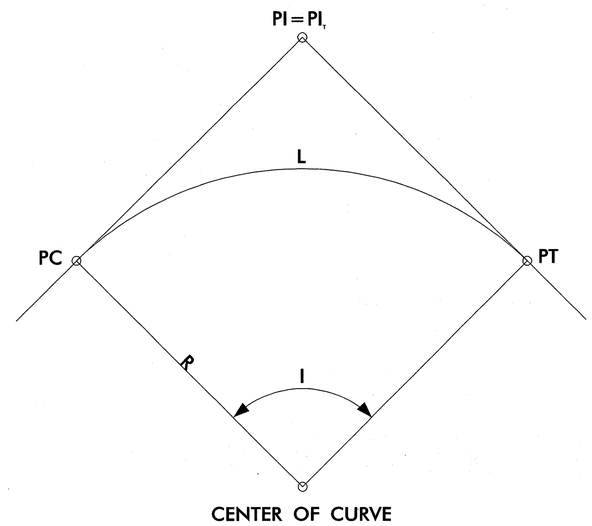


FIGURE B

SIMPLE CIRCULAR CURVE

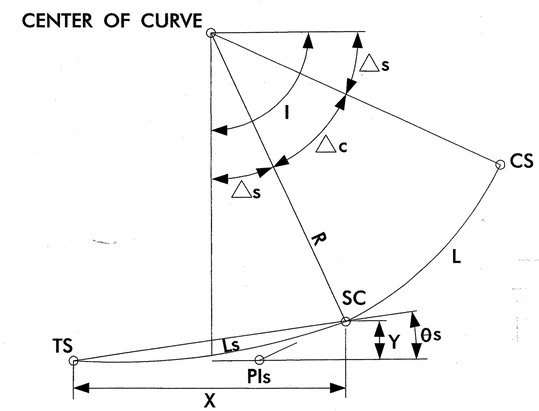


FIGURE C

SPIRAL TRANSITION CURVE

FIGURE D

DEFLECTION BETWEEN TANGENTS

R	RADIUS OF CURVATURE	PI	POINT OF INTERSECTION (CIRCULAR CURVE)
Dc	DEGREE OF CURVATURE (CHORD DEFINED)	PI_T	POINT OF INTERSECTION (TANGENT)
L	LENGTH OF CURVE (CHORD DEFINED)	PIs	POINT OF INTERSECTION (SPIRAL)
I	TOTAL INTERSECTION ANGLE	PC	TANGENT TO CIRCULAR CURVE
△c	CURVE ANGLE	PT	CIRCULAR CURVE TO TANGENT
△s	SPIRAL ANGLE	TS	TANGENT TO SPIRAL
θs	SPIRAL DEFLECTION	SC	SPIRAL TO CIRCULAR CURVE
Ls	LENGTH OF SPIRAL	CS	CIRCULAR CURVE TO SPIRAL
X	SPIRAL TANGENT LENGTH TO OFFSET	ST	SPIRAL TO TANGENT
Y	SPIRAL TANGENT OFFSET	PINC	POINT OF INTERSECTION NO CURVE

0164DEL P10b2

REVISIONS

USER: $$USER$$
DATE: $$DATE$$
TIME: $$TIME$$
DGN: $$DGN$$

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-F

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. BROOKS

7/19/13

CDM Smith — Camp Dresser & McKee, 421 Fayetteville Street, Suite 1303, Raleigh, NC 27601, (919) 706-0928, NC CDM No. P-0412

TRACK GEOMETRY DATA

PROPOSED MAIN TRACK #1 (-M1-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE	R (ft)	Dc	L (ft)	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (ft)	X (ft)	Y (ft)	Ea.(in)	V (MPH) FREIGHT PLAN 7-2	V (MPH) INTERMODAL PLAN 7-2	V (MPH) PASSENGER PLAN 7-2	V (MPH) PASSENGER FUTURE 4" CD	V (MPH) PASSENGER FUTURE 5" CD
	POT	9450+39.03	658,622.3372	1,522,032.3762			*** EQUATION: 9450+00.00 (BK) = 9450+39.03 (AH) *** *** EXISTING ALIGNMENT ***															
					S 46° 32' 47.39" W	1,380.9064																
	TS	9464+19.94	657,672.5971	1,521,029.9310			*** BEGIN TRACK CONSTRUCTION ***															
												4° 12' 57.04" (LT)	1° 24' 18.78"	496.0000	495.7315	12.1606						
M1C3456	SC	9469+15.94	657,322.8222	1,520,678.4268																		
	PI	9477+39.71	656,713.8336	1,520,123.6940			3,370.4636	1° 42' 00.00"	1615.8014		27° 28' 07.04" (LT)						4"	50	60	75 Eu = 2.69"	80 Eu = 3.62"	85 Eu = 4.60"
	CS	9485+31.74	655,917.6227	1,519,912.4036																		
										47° 57' 49.72" (LT)		2° 30' 39.35" (LT)	1° 08' 49.09"	186.0000								
	SC	9487+17.74	655,736.7749	1,519,868.9923																		
	PI	9493+23.16	655,145.3697	1,519,739.4925			5,729.6507	1° 00' 00.00"	1206.3434		12° 03' 48.36" (LT)											
M1C3460	CS	9499+24.08	654,539.9598	1,519,736.4529													2"	50	60	80 Eu = 2.48"	90 Eu = 3.67"	90 Eu = 3.67"
												1° 42' 17.92" (LT)	0° 34' 05.96"	341.0000	340.9698	3.3822						
	ST	9502+65.08	654,199.0107	1,519,741.5054			*** END TRACK CONSTRUCTION ***															
					S 1° 25' 02.33" E	2,934.4822																
11	PI/TO	9531+99.57	651,265.4262	1,519,814.0876																		
					S 1° 25' 02.33" E	91.0000																
NO. 24 LH	PS	9532+90.57	651,174.4541	1,519,816.3384																		
					S 1° 25' 02.33" E	100.0000																
12	PS	9533+90.57	651,074.4847	1,519,818.8119																		
					S 1° 25' 02.33" E	91.0000																
NO. 24 RH	PI/TO	9534+81.57	650,983.5125	1,519,821.0627																		
					S 1° 25' 02.33" E	1,135.3732																
5	PINC	9546+16.94	649,848.4867	1,519,849.1453			*** BEGIN TRACK CONSTRUCTION ***			0° 00' 23.30" (RT)												
					S 1° 24' 39.03" E	1,883.0605																
	POT	9565+00.00	647,965.9970	1,519,895.5088			*** END TRACK CONSTRUCTION *** *** TIE TO EXISTING ALIGNMENT ***															
					S 1° 24' 39.03" E	1,075.6454																
	POT	9575+75.65	647,890.6776	1,519,921.9927			*** EXISTING ALIGNMENT ***															

*SPIRAL LENGTHS ARE BASED ON NCDOT DESIGN CRITERIA (MIN Ls = 1.22*Eu*V) FOR RIDE COMFORT AT MAXIMUM PROPOSED SPEED ROUNDED UP TO 31 FT. INCREMENTS, WHERE GREATER THAN NS STANDARDS.

DGN 0164DEL P10b2

REVISIONS

7/18/2013 2:25:51 PM
R:\ncdot\P5206D\Roadway\Proj\P5206D_RR_PSH_02F.dgn
USER: STATINRE

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-G

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SAUNDERS

7/19/13

CDM Smith — Camp Dresser & McKee, 601 Fairview Road, Suite 1305, Raleigh, NC 27609, Tel (919) 790-0883, NC CDA No. P-0412

DGN 0164DEL P10b2

REVISIONS

TRACK GEOMETRY DATA

PROPOSED MAIN TRACK #2 (-M2-)

FEATURE NO.	DESC.	STATION	NORTHING	EASTING	BEARING	DISTANCE	R (ft)	Dc	L (ft)	I	DELTA (CURVE)	DELTA (SPIRAL)	THETA	Ls* (ft)	X (ft)	Y (ft)	Ea.(in)	V (MPH) FREIGHT PLAN 7-2	INTERMODAL PLAN 7-2	PASSENGER PLAN 7-2	PASSENGER FUTURE 4" CD	PASSENGER FUTURE 5" CD
	POT	9450+39.03	658,632.5002	1,522,022.7475			*** EQUATION: 9449+97.71(BK) = 9450+39.03 (AH) *** *** TIE TO PROJECT P-5206C ***															
					S 46° 32' 47.39" W	1,385.6405																
	TS	9464+24.67	657,679.5042	1,521,016.8656													4"	50	60	75 Eu = 2.69"	80 Eu = 3.62"	85 Eu = 4.60"
												4° 12' 57.04" (LT)	1° 24' 18.78"	496.0000	495.7315	12.1606						
M2C3456	SC	9469+20.67	657,329.7293	1,520,665.3615																		
	PI	9477+41.14	656,723.1789	1,520,112.8496			3,370.4636	1° 42' 00.00"	1609.5759		27° 21' 46.05" (LT)											
	CS	9485+30.25	655,930.5457	1,519,900.9406																		
										47° 57' 49.72" (LT)		2° 30' 39.35" (LT)	1° 08' 49.09"	186.0000								
	SC	9487+16.25	655,749.7785	1,519,857.1954																		
	PI	9493+27.02	655,153.3881	1,519,725.4491			5,729.6507	1° 00' 00.00"	1216.9267		12° 10' 09.36" (LT)						2"	50	60	80 Eu = 2.48"	90 Eu = 3.67"	90 Eu = 3.67"
M2C3460	CS	9499+33.18	654,542.6270	1,519,722.3826																		
												1° 42' 17.92" (LT)	0° 34' 05.96"	341.0000	340.9698	3.3822						
	ST	9502+74.18	654,201.6779	1,519,727.4351																		
					S 1° 25' 02.33" E	2,510.6424																
10	PS	9527+84.82	651,691.8035	1,519,789.5340																		
					S 1° 25' 02.33" E	91.0000																
NO. 24 LH	PI/TO	9528+75.82	651,600.8314	1,519,791.7848																		
					S 1° 25' 02.33" E	953.7083																
13	PI/TO	9538+29.53	650,647.4148	1,519,815.3741																		
					S 1° 25' 02.33" E	91.0000																
NO. 24 RH	PS	9539+20.53	650,556.4426	1,519,817.6249																		
					S 1° 25' 02.33" E	708.5190																
6	PINC	9546+29.05	649,848.1404	1,519,835.1496						0° 01' 12.15" (LT)												
					S 1° 26' 14.48" E	1,098.3980																
7	PINC	9557+27.44	648,750.0880	1,519,862.7018						0° 01' 11.86" (RT)												
					S 1° 25' 02.62" E	784.6562																
	POT	9565+12.10	647,965.6719	1,519,882.1108			*** END TRACK CONSTRUCTION *** *** TIE TO EXISTING ALIGNMENT ***															
					S 1° 25' 02.62" E	1,075.6518																
	POT	9575+87.75	646,890.3492	1,519,908.7178			*** EXISTING ALIGNMENT ***															

*SPIRAL LENGTHS ARE BASED ON NCDOT DESIGN CRITERIA (MIN Ls = 1.22*Eu*V) FOR RIDE COMFORT AT MAXIMUM PROPOSED SPEED ROUNDED UP TO 31 FT. INCREMENTS, WHERE GREATER THAN NS STANDARDS.

7/18/2013 3:25:55 PM
P:\Proj\P5206D_RR_PSH_M2G.dgn
INSERT STATIONS

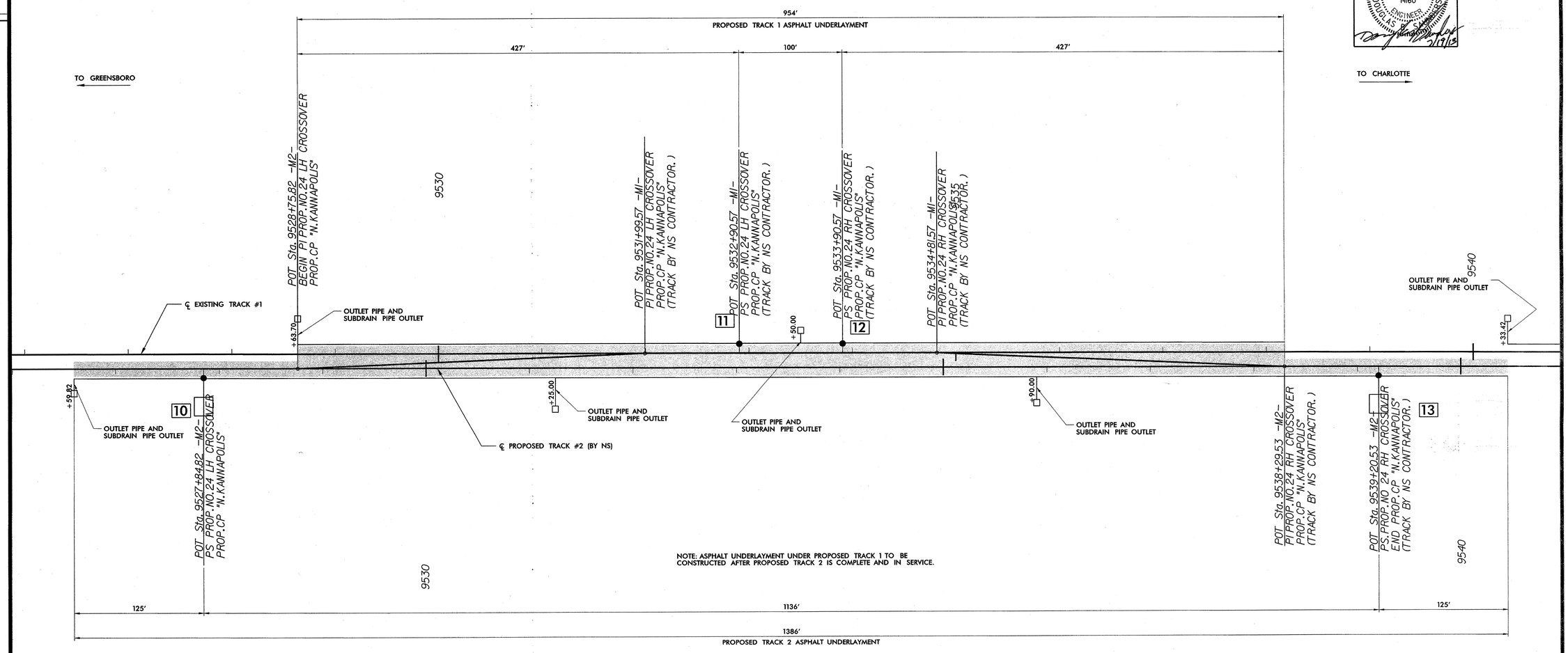
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-H
R/W SHEET NO.	

RAIL DESIGN ENGINEER

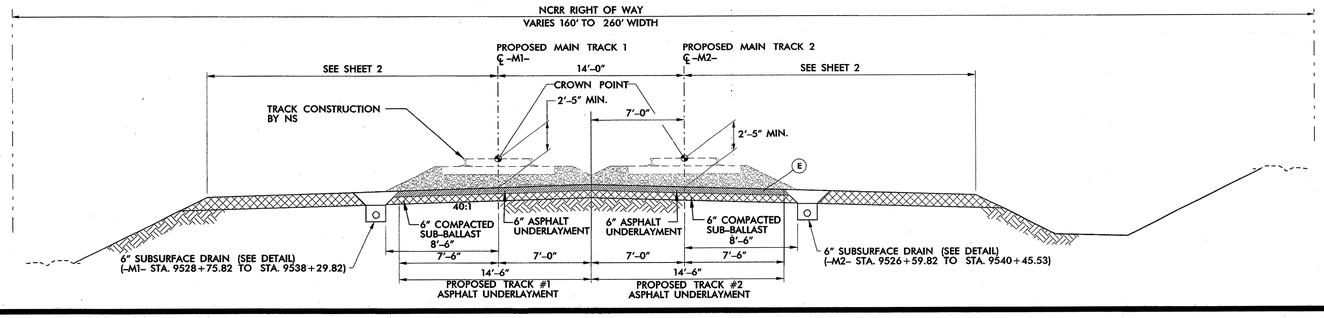
NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS A. SCHMIDT

3/19/13

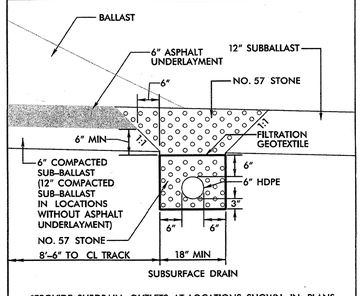
ASPHALT UNDERLAYMENT DETAIL



PAVEMENT SCHEDULE	
E	PROP. 6" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD. IN TWO LAYERS



SUBSURFACE DRAIN DETAIL



*PROVIDE SUBDRAIN OUTLETS AT LOCATIONS SHOWN IN PLANS OR AS DIRECTED BY ENGINEER.

DGN 0164DEL P10b2

REVISIONS

7/19/2013 2:25:58 PM
R:\Projects\P5206D_Roadway\Proj\P5206D_RR_PSH_02H.dgn
USER: STOTINGER

SEE SHEET 4A FOR ROADWAY PLAN SHEET

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-1
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER MATTHEW R. CRAWFORD 7/19/13

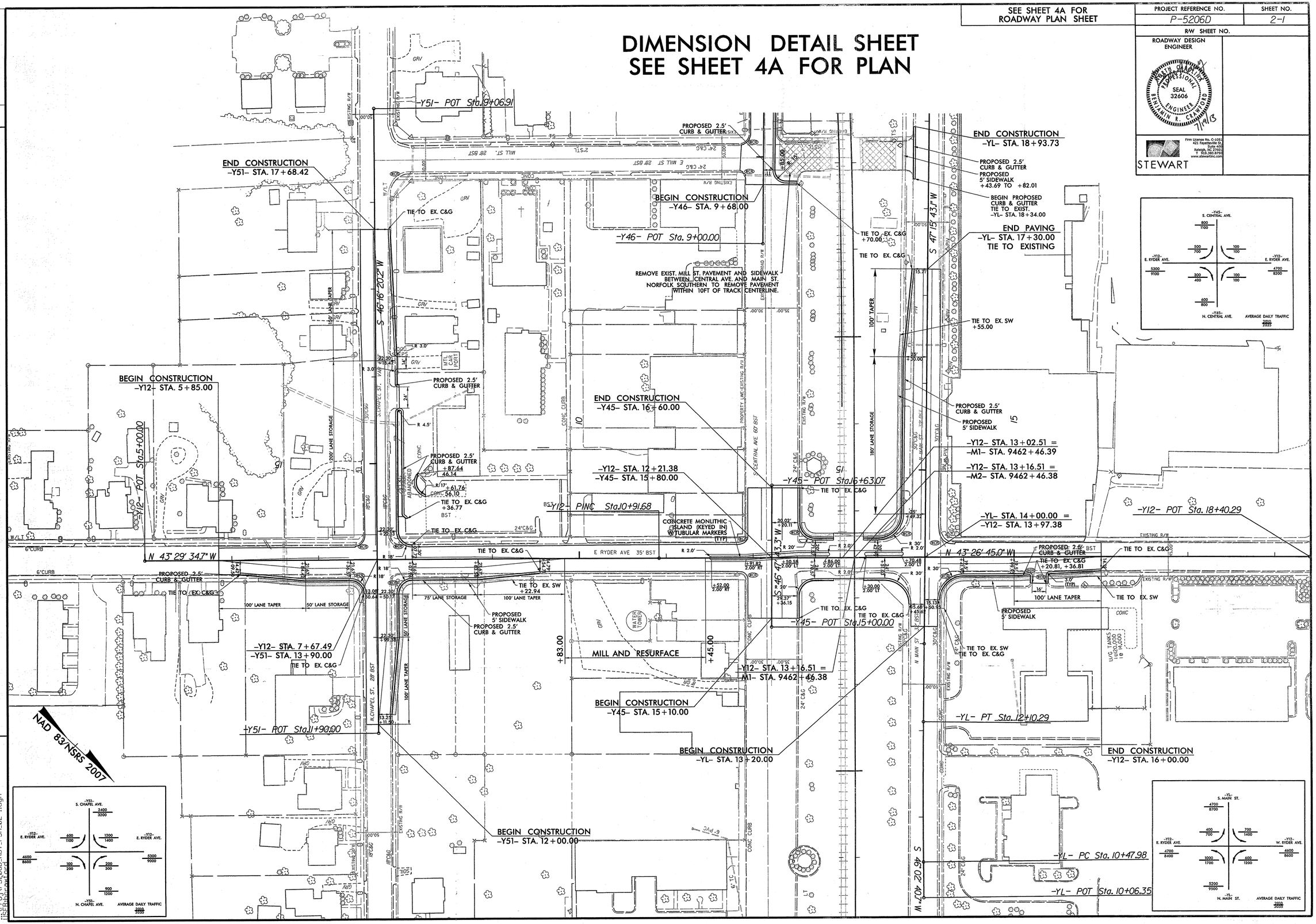
STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
F 919.380.8760
www.stewartinc.com

DGN 0164DEL_P10b2

REVISIONS

DIMENSION DETAIL SHEET
SEE SHEET 4A FOR PLAN



7/22/2013
P-5206D_RDY_PSH_02-1.dgn
USER:brcrawford

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-J
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SUNDERS — 7/17/13

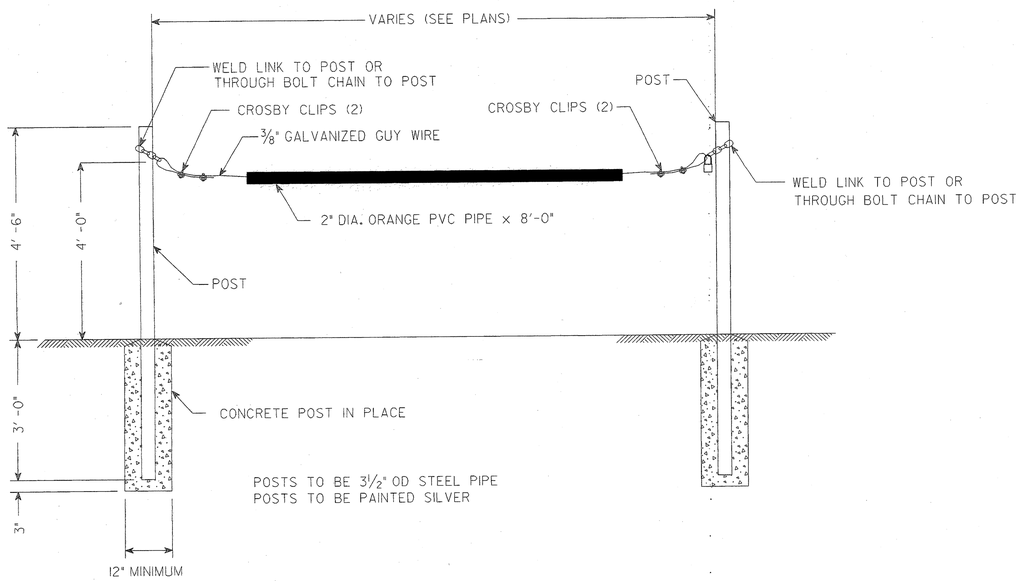
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD — 7/17/13

CDM Smith — Cazos Dresser & McKee, 2905 Westwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

STEWART — Firm License No. C-1511, 421 Fayetteville St., Suite 400, Raleigh, NC 27601, T 919.380.8200, www.stewartinc.com

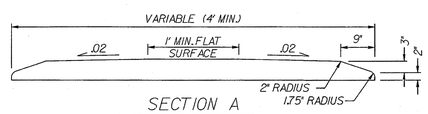
DSCN 0164DEL P10b2

REVISIONS



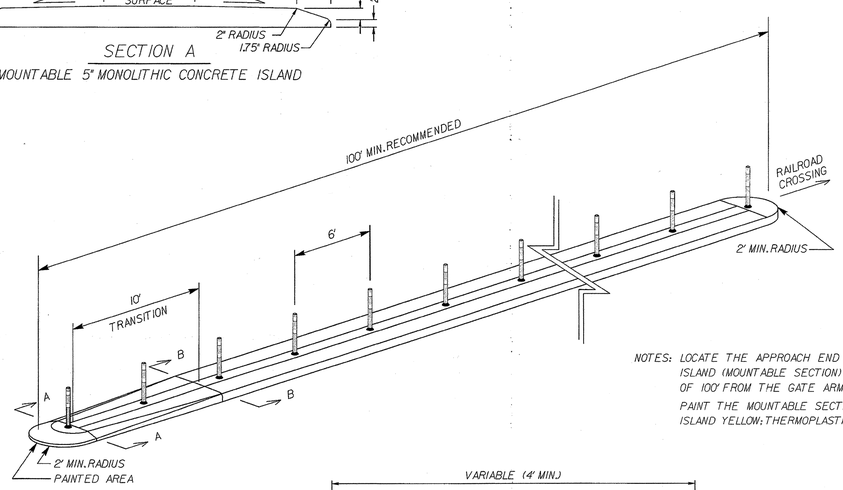
RIGHT OF WAY GATE DETAIL

PROJECT REFERENCE NO.	SHEET NO.



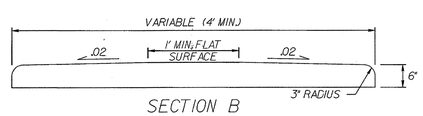
SECTION A

MOUNTABLE 5" MONOLITHIC CONCRETE ISLAND



NOTES: LOCATE THE APPROACH END OF THE ISLAND (MOUNTABLE SECTION) A MINIMUM OF 100' FROM THE GATE ARM.

PAINT THE MOUNTABLE SECTION OF THE ISLAND YELLOW; THERMOPLASTIC PREFERRED.



SECTION B

NON-MOUNTABLE 6" MONOLITHIC CONCRETE ISLAND

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

CONCRETE ISLAND DETAIL

ORIGINAL BY: KKNIGHT DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC: /eng/eng/std/stdcadd/dgn/3001/0300001.dgn

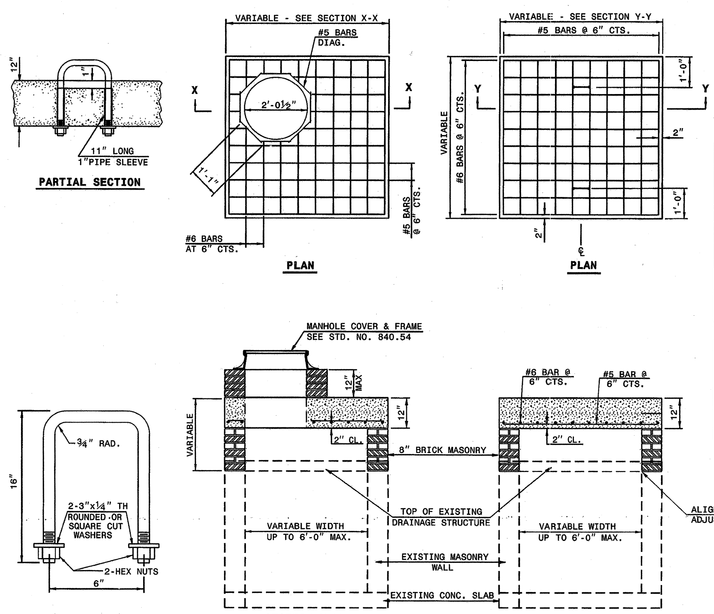
7/18/2013 2:26:44 PM
R:\pcdot\P5206D\Roadway\Proj\P5206D_RR_PSH_02J.dgn
USER: STATHOMPSON

7/18/2013 2:27:14 PM
...\P-0\P52060_RR_PSH_02K.dgn
USER: STATONRE

REVISIONS

DCN
0164DEL P10b2

PROJECT REFERENCE NO.	SHEET NO.



GENERAL NOTES:

CONSTRUCT IN ACCORDANCE WITH SECTION 859 OF THE STANDARD SPECIFICATIONS.

FIELD VERIFY THE DIMENSIONS FOR THE EXISTING BOXES.

BILL OF MATERIALS

MASONRY	
TOP SLAB CONCRETE CLASS "A"	.037YDS³ PER FT²
BRICK MASONRY	.025YDS³ PER FT²
REINFORCING STEEL	7.64LBS PER FT²

MANHOLE OPTION QUANTITIES

SIZE	QTY.	LENGTH	REINF. STEEL LBS.
#5 DIAG.	8	1'-1"	9.04

NOTE:
CONCRETE AND REINFORCING STEEL QUANTITIES BASED ON SQUARE FOOT AREA OF THE PROPOSED TOP SLAB FOR THE EXISTING DRAINAGE STRUCTURE.

BRICK MASONRY QUANTITY IS BASED ON THE TOTAL SQUARE FOOTAGE OF EXTERIOR WALL SURFACE AREA TO BE CONSTRUCTED.

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

DETAIL TO CONVERT EXISTING DROP INLET OR CATCH BASIN TO TRAFFIC BEARING JUNCTION BOX (MANHOLE OPTIONAL)

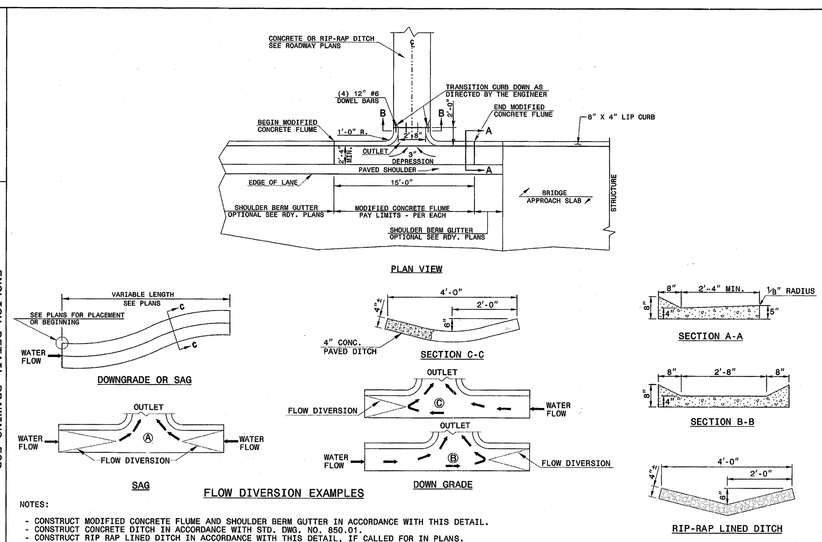
ORIGINAL BY: T.A.S. DATE: APR. 2000
MODIFIED BY: T.A.S. DATE: MAY 2003
CHECKED BY: DATE:
FILE SPEC.: mydetailsstandardmodifiedcurbinlet.dgn

PROJECT REFERENCE NO.	SHEET NO.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1
MODFLMDTCH



NOTES:

- CONSTRUCT MODIFIED CONCRETE FLUME AND SHOULDER BERM GUTTER IN ACCORDANCE WITH THIS DETAIL.
- CONSTRUCT CONCRETE DITCH IN ACCORDANCE WITH STD. DWG. NO. 850.01.
- CONSTRUCT RIP RAP LINED DITCH IN ACCORDANCE WITH THIS DETAIL, IF CALLED FOR IN PLANS.
- CONCRETE OR RIP RAP LINED DITCH SHALL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. THE DITCH SHALL TERMINATE AS SHOWN ON THE PLANS. IF NO TERMINATION IS INDICATED PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE. TRANSITIONS FROM THE DITCH TO TERMINATION SHALL BE AS DIRECTED BY THE ENGINEER.
- MODIFICATIONS SHALL BE AS DICTATED BY SITE CONDITIONS AND DIRECTED BY THE ENGINEER.

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
MODIFIED CONCRETE FLUME
WITH CONCRETE OR RIP-RAP DITCH

SHEET 1 OF 1
MODFLMDTCH

CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: C.C. Ward DATE: APR. 2002
MODIFIED BY: J.F. Ward DATE: JULY 2004
CHECKED BY: DATE:
FILE SPEC.: mydetailsstandardmodifiedflume.dgn

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
7/18/13

PROJECT REFERENCE NO.	SHEET NO.
P-5204D	2-K
R/W SHEET NO.	

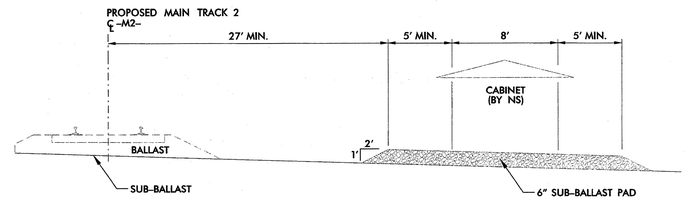
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	2-L
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. ROBERTS

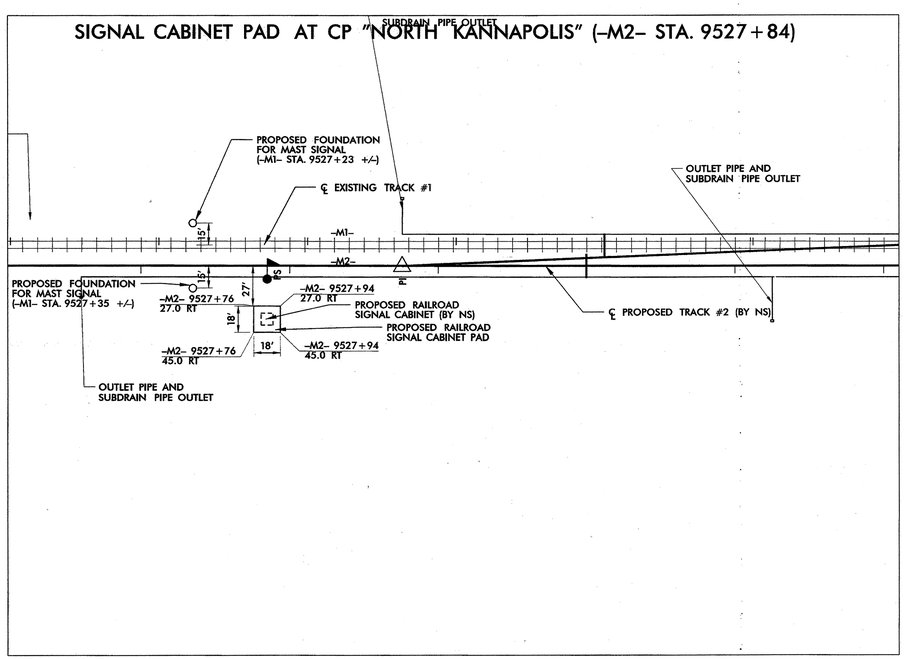
7/19/13

RAILROAD SIGNAL CABINET PAD DETAILS

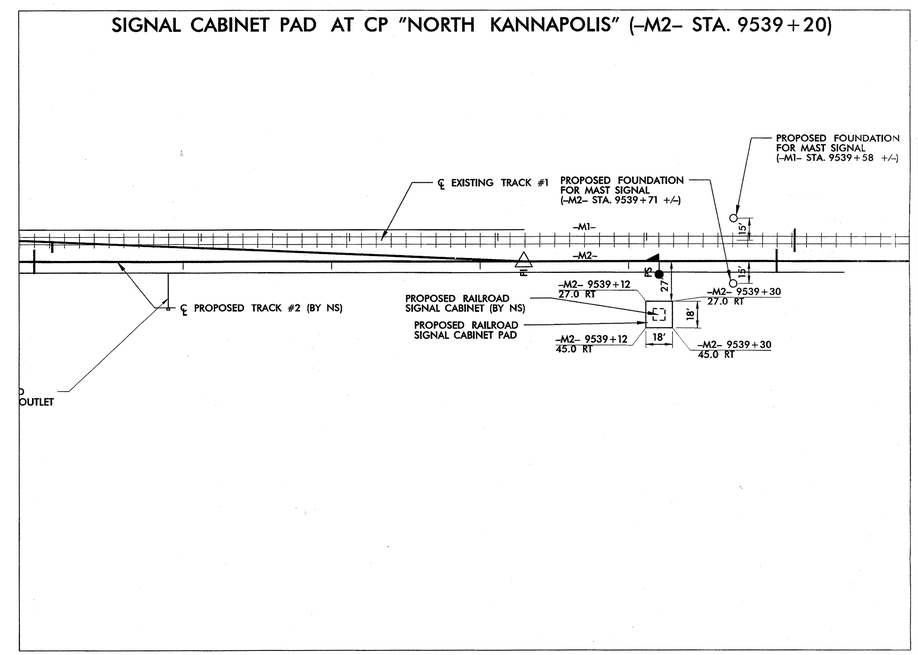


RAILROAD SIGNAL CABINET PAD SECTION

SIGNAL CABINET PAD AT CP "NORTH KANNAPOLIS" (-M2- STA. 9527+84)



SIGNAL CABINET PAD AT CP "NORTH KANNAPOLIS" (-M2- STA. 9539+20)



REVISIONS

0164DEL P10b2

7/18/2013 2:29:00 PM
Project:P5206D_RR_PSH_02L.dgn
User:SCOTTMINE

0164DEL_P1062

PROJECT REFERENCE NO.	SHEET
P-5206D	2-M

TRAFFIC CONTROL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 11725 ENGINEER DAVID R. RUGGLES

David Ruggles 8-12-13
SIGNATURE DATE

STEWART
Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

GEOTECHNICAL ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15741 ENGINEER XAVIER C. BARRETT

8/9/13
SIGNATURE DATE

KLEINFELDER
Bright People. Right Solutions.
Firm License No. F-1143
313 Gallimore Dairy Rd.
Greensboro, NC 27409
T 336.668.0093
www.kleinfelder.com

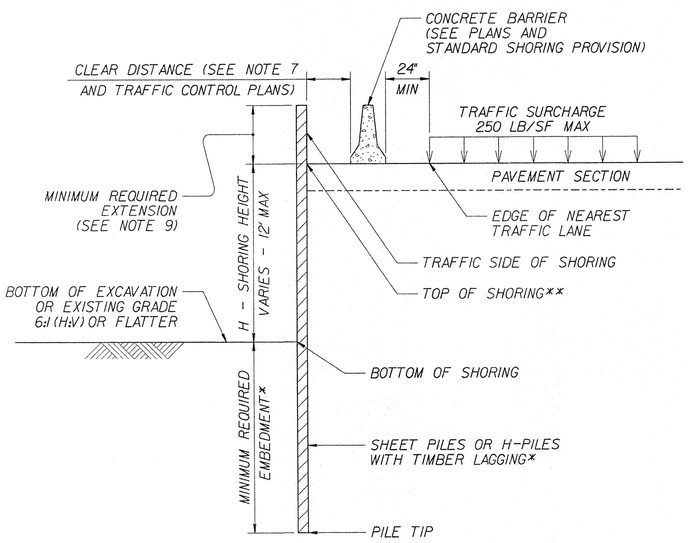
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN^3/FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BEWTEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
	12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
	12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5

MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS

*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

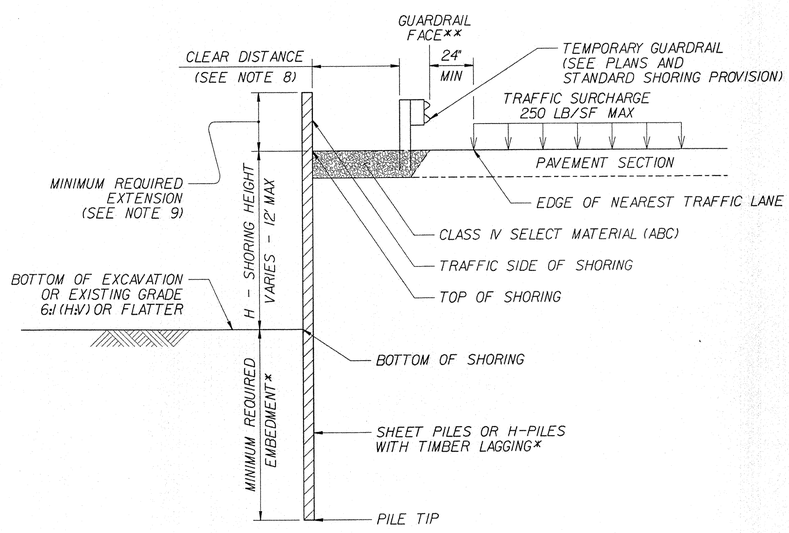
NOTES:

1. AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
2. FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
3. STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
   UNIT WEIGHT, γ = 120 LB/CF
   FRICTION ANGLE, ϕ = 30 DEGREES
   COHESION, c = 0 LB/SF
4. DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
5. DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
6. USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
7. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
8. AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
9. MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
10. MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
11. SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM.
12. CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



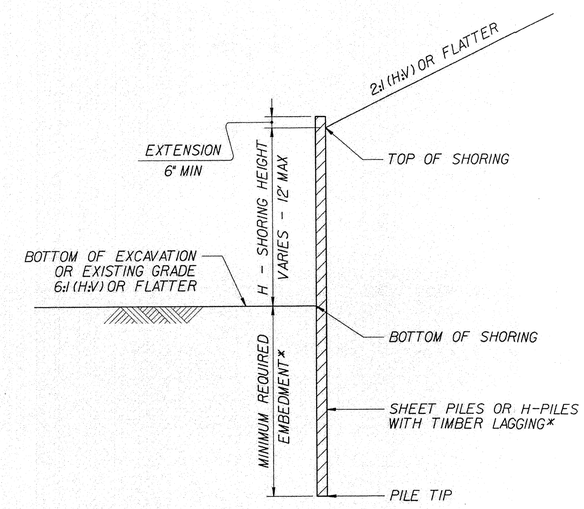
CONCRETE BARRIER

**TOP OF SHORING = EDGE OF PAVEMENT



TEMPORARY GUARDRAIL

**GUARDRAIL FACE = EDGE OF PAVEMENT



STANDARD TEMPORARY SHORING

(SLOPE CASE)
*SEE TABLE ABOVE.

STANDARD TEMPORARY SHORING

(SURCHARGE CASE)
*SEE TABLE ABOVE.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH

STANDARD DRAWING NO. 1801.01

STANDARD TEMPORARY SHORING

DATE: 11-20-12

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	3-A
R/W SHEET NO.	

STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION
PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
7D	11A	BLACKWELDER PARK BAPTIST CHURCH INC.
18D	5	LINDA J. LEONARD
19D	5	DAVID L. GRAHAM, JR. & WENDY J. GRAHAM
20D	5	DAVID L. GRAHAM, JR. & WENDY J. GRAHAM
21D	5	DAVID L. GRAHAM, JR. & WENDY J. GRAHAM
22D	5	WILLIAM BOYD GOODMAN
24D	5	JUSTIN WAYNE MILLS
25D	5	JAMES DAVID RUCKART & CARMELA S. RUCKART
27D	5	TERRY N. BURRIS & CAROLINE H. BURRIS
30D	5	DEBRA UPRIGHT MARTIN
31D	5	MONICA MALIA SMITH
33D	6	MATTHEW W. CROSBY & NATALIE E. FAGGART
34D	6	KELLI B. WALKER
44D	4A	SUSAN C. PRICE
45D	4A	EUGENE QUINCY BLACK & WIFE BETTY B. BLACK
50D	4A	FOUNDATION FOR THE CAROLINAS
54D	4A	WEST RYDER PROPERTY
64D	4A	BROADWAY ASSOCIATES
65D	4A	FERRELL A. JAMES & WIFE BETTY A. JAMES
77D	6,7	ALLIANCE REAL ESTATE III INC
79D	6	ESTATE OF GENE F. DAVIS
80D	5	BELLENA, LLC
81D	5	LEE WATSON SLOAN
82D	10	ROGER DALE LOVE
83D	5	FRANK EUGENE & WAYNE MORRIS WEDDINGTON
84D	11	DAVID ESPY LAMBERT
85D	11	DAVID MOORE
86D	6	DERRICK LEE VAN PELT
87D	6	GREG STAMEY
88D	6	CORRINA DENYSE DIETZ
89D	6	CLINTON D. HELMS
90D	6	CLINTON D. HELMS
91D	6	RICHARD D. EFIRD & TERESA P. EFIRD
92D	9	HOWARD A. & LUCILLE BUTLER
93D	9	QUENTIN T. WILLIAMSON ETAL
94D	11	RALPH & ROSEMARY PAVERO
95D	11	JAMES F. & BETTY J. DAVIS
96D	6	DAVID LEONARD & LINDA LEONARD
97D	6	DAYSTAR RESIDENTIAL SERVICES, INC.
98D	6	THOMAS BILLY COWARD, SR.
99D	6	THOMAS BILLY COWARD, SR.
100D	6	HOWARD C. DURHAM
101D	10	JANETTE HEGLAR BAME
102D	11A	PRINCE OF PIZZA INC.
103D	11A	MERCHANTS DISTRIBUTORS INC.
104D	11A	CAROLINA COMFORT HEATING & AIR CONDITIONING INC
105D	11A	LEEBRICK THOMAS RAY & WF LEEBRICK VIRGIE B
106D	11A	TROUTMAN DIANE REID
107D	11A	RODNEY G. & CHRISTINA M. HOLBROOKS
108D	12A	IRON MASTERS LLC C/O LISA KAWYN
109D	12A	BENNETT GEORGE & SABRINA C
110D	12A	ALDO PRODUCTS CO INC
111D	10	HARTSOE GWYN DAVID & WF HARTSOE RACHEL
112D	4A	DEUTSCHE BANK
113D	4A	PARKDALE AMERICA
114D	12A	KANNAPOLIS SERVICE CO INC
120D	5	JOHN ALLEN HALL
121D	11	EDDIE B. DURHAM (GIS)

DGN 0164DEL P10b2

REVISIONS

7/22/2013 12:48:54 PM
R:\Project\P5206D\Roadway\Proj\P5206D_RR_SUM_03A.dgn
USER:STATTINGER

COMPUTED BY: BNE DATE:
CHECKED BY: THB DATE:

STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION
LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	3-B

0164DEL P10b2

REVISIONS

| STATION | LOCATION (LT, RT, OR CL) | STRUCTURE NO. FROM | STRUCTURE NO. TO | TOP ELEVATION | INVERT ELEVATION | INVERT ELEVATION | SLOPE CRITICAL | DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, or PVC) SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | DO NOT USE RCP | DO NOT USE CSP | DO NOT USE CAAP | DO NOT USE HDPE | C.S. PIPE SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | THICKNESS OR GAUGE .064 | .064 | .064 | .064 | .079 | .079 | .109 | .109 | R.C. PIPE CLASS III SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | R.C. PIPE CLASS IV SIZE 12" | 15" | 18" | 24" | 30" | 36" | 42" | 48" | 36" WELDED STEEL PIPE 0.50" THICK GRADE B IN SOIL | 36" WELDED STEEL PIPE 0.50" THICK GRADE B NOT IN SOIL | 36" WELDED STEEL PIPE 0.50" THICK GRADE B (OPEN CUT) | 42" WELDED STEEL PIPE 0.625" THICK GRADE B IN SOIL | 42" WELDED STEEL PIPE 0.625" THICK GRADE B NOT IN SOIL | 42" WELDED STEEL PIPE 0.625" THICK GRADE B (OPEN CUT) | 48" WELDED STEEL PIPE 0.625" THICK GRADE B IN SOIL | 48" WELDED STEEL PIPE 0.625" THICK GRADE B NOT IN SOIL | 48" WELDED STEEL PIPE 0.625" THICK GRADE B (OPEN CUT) | ENDWALLS STD. 838.01 838.11 OR STD. 838.80 (UNLESS NOTED OTHERWISE) CU. YARDS | QUANTITIES FOR DRAINAGE STRUCTURES "TOTAL" LINE PAY QUANTITY SHALL BE COL. "A" + (1.3 X COL. "B") LIN. FT. A: PER EACH (0' THRU 5.0') | LIN. FT. A: 5.0' THRU 10.0' | LIN. FT. B: 10.0' AND ABOVE | FRAME, GRATES, AND HOOD STANDARD 840.03 C.B. STD. 840.01 OR STD. 840.02 | TYPE OF GRATE E | TYPE OF GRATE F | TYPE OF GRATE G | CONCRETE TRANSITIONAL SECTION DROP INLET | CATCH BASIN | D.I. STD. 840.14 OR 840.15 | D.I. FRAME AND GRATES STD. 840.16 | G.D.I. TYPE "A" STD. 840.17 OR 840.28 | G.D.I. TYPE "D" STD. 840.19 OR 840.28 | G.D.I. (N.S.) FRAME WITH GRATES STD. 840.24 | G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24 | T.B.J.B. STD. 840.34 | FRAME WITH COVER STD. 840.54 | CONVERT C.B. TO T.B.J.B. | CONVERT D.I. TO C.B. | CONVERT C.B. TO J.B WITH MANHOLE | J.B. STD. 840.31 OR 840.32 | OPEN THROAT CB STD. 840.04 OR 840.05 | FLOWABLE FILL, C.Y. | DRAINAGE PIPE ELBOWS NO. & SIZE | CONC. & BRICK PIPE PLUG, C.Y. STD. 840.71 | MODIFIED CONC. FLUME | CONC. COLLARS CL. "B" C.Y. STD. 840.72 | PIPE CLEAN-OUT | PIPE REMOVAL LIN. FT. | REMARKS |
|---|---|---

COMPUTED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	3-C

STATE OF NORTH CAROLINA
NCDOT RAIL DIVISION

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS									IMPACT ATTENUATOR TYPE 350			SINGLE FACED CONCRETE BARRIERS			REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU 350	CAT-1	AT-1	B-77	TYPE III	TERM. END				EA	G	NG				
-Y46-	11+81.50	13+00.00	RT	118.75											1			1												
-Y46-	27+50	28+18.75	RT	68.75											1			1												
-M1D-	9525+82	9526+90	LT	112.50																2										
SUBTOTAL				300.00											2			2		2										
	LESS ANCHOR	DEDUCTIONS		-137.50																										
	GRAU 350	2 @ 50.00 =	-100.00																											
	III	2 @ 18.75 =	-37.50																											
TOTAL				162.50											2			2		2										
			SAY	162.50		5	ADDITIONAL GR POST								2			2		2										
REMOVE EXISTING GUARDRAIL: 0 LF																														

REMOVAL OF EXISTING ASPHALT PAVEMENT SUMMARY

LINE	STATION TO STATION	LOCATION	SQUARE YARDS
MILL STREET		EAST	246
MILL STREET		WEST	304
29TH STREET		WEST	245
-Y46-	10+34 TO 28+90	RT	1,930
MILL STREET	9481+00 TO 9486+79	RT	854
29TH STREET	9548+85 TO 9550+15	LT	206
		TOTAL	3,783
		SAY	3,800

EARTHWORK SUMMARY
IN CUBIC YARDS

LOCATION	UNCLASSIFIED EXCAVATION	EMBANKMENT +%	BORROW	WASTE
SUMMARY #1				
-M1- Sta. 9450+00.00 to Sta. 9480+00.00	19,040	46		18,994
-YL- Sta. 13+20.00 to Sta. 17+30.00	224	18		206
-Y12- Sta. 5+85.00 to Sta. 9+83.00	141	82		59
-Y12- Sta. 11+45.00 to Sta. 16+00.00	73	61		12
-Y45- Sta.15+10.00 to Sta. 16+60.00	12	25	13	
-Y51- Sta. 12+11.42 to Sta. 16+50.00	214	49		165
SUBTOTAL: SUMMARY #1	19,704	281	13	19,436
SUMMARY #2				
-M1- Sta. 9480+00.00 to Sta. 9510+00.00	14,909	5,932		8,977
-Y46- Sta. 11+00 to Sta. 29+00	0	28	28	
SUBTOTAL: SUMMARY #2	14,909	5,960	28	8,977
SUMMARY #3				
-M1- Sta. 9510+00.00 to Sta. 9540+00.00	11,188	3,487		7,701
SUBTOTAL: SUMMARY #3	11,188	3,487		7,701
SUMMARY #4				
-M1- Sta. 9540+00.00 to Sta. 9569+00.00	16,766	685		16,081
-Y52- Sta. 12+00.00 to Sta. 15+50.00	74	227	153	
-Y53- Sta. 12+20.00 to Sta. 17+50.00	1,734	116		1,618
-YL- Sta. 45+50.00 to Sta. 47+24.34	62	28		34
SUBTOTAL: SUMMARY #4	18,636	1,056	153	17,733
SUBTOTAL (SUMMARIES 1-4)	64,437	10,784	194	53,847
WASTE IN LIEU OF BORROW			-194	-194
PROJECT TOTAL	64,437	10,784		53,653
GRAND TOTAL	64,437	10,784		53,653
SAY	64,500			
UNDERCUT EXCAVATION CONTINGENCY PER GEOTECH REPORT: 200 CY				

NOTE: APPROXIMATE QUANTITES ONLY. UNCLASSIFIED EXCAVATION, FINE GRADING, CLEARING AND GRUBBING, AND REMOVAL OF EXISTING PAVEMENT WILL BE PAID FOR AT THE CONTRACT LUMP SUM PRICE FOR "GRADING."

DGN 0164DEL P10b2

REVISIONS

8/8/2013 3:44:07 PM
R:\Traffic\Projects\P5206D\Roadway\Proj\P5206D_RR_SUM_P3C.dgn

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	4
R/W SHEET NO.	

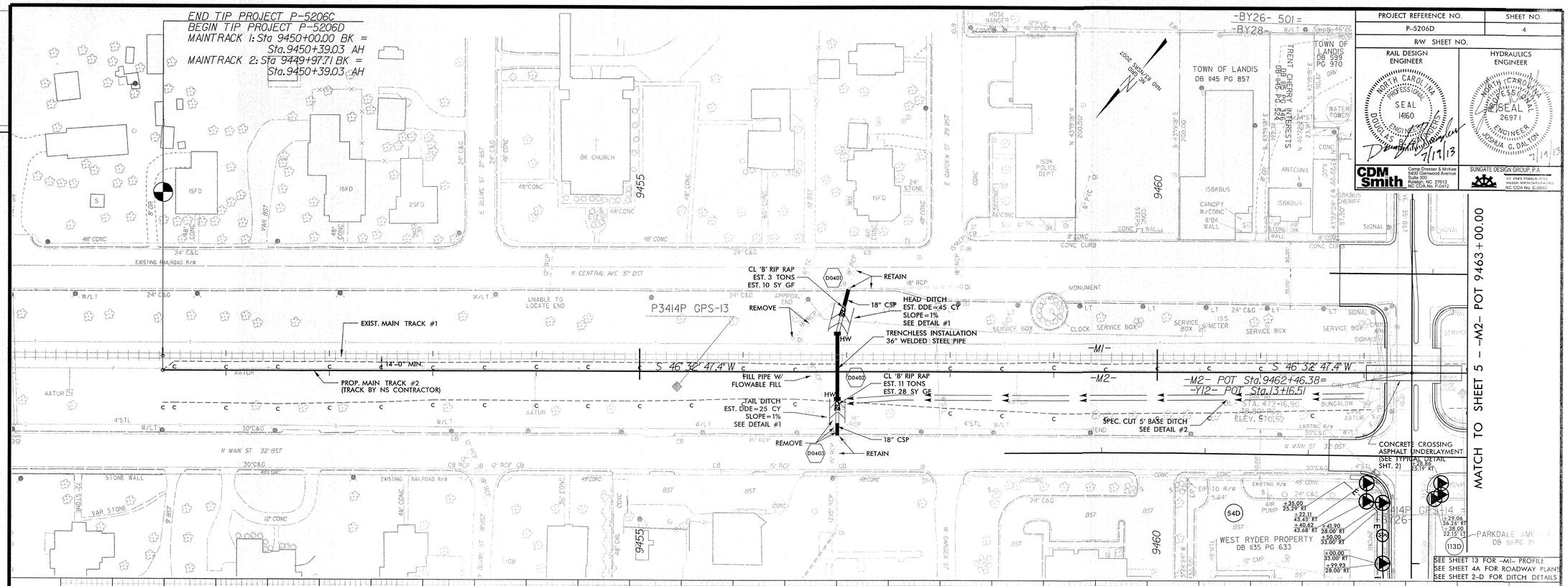
RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER — 7/17/13

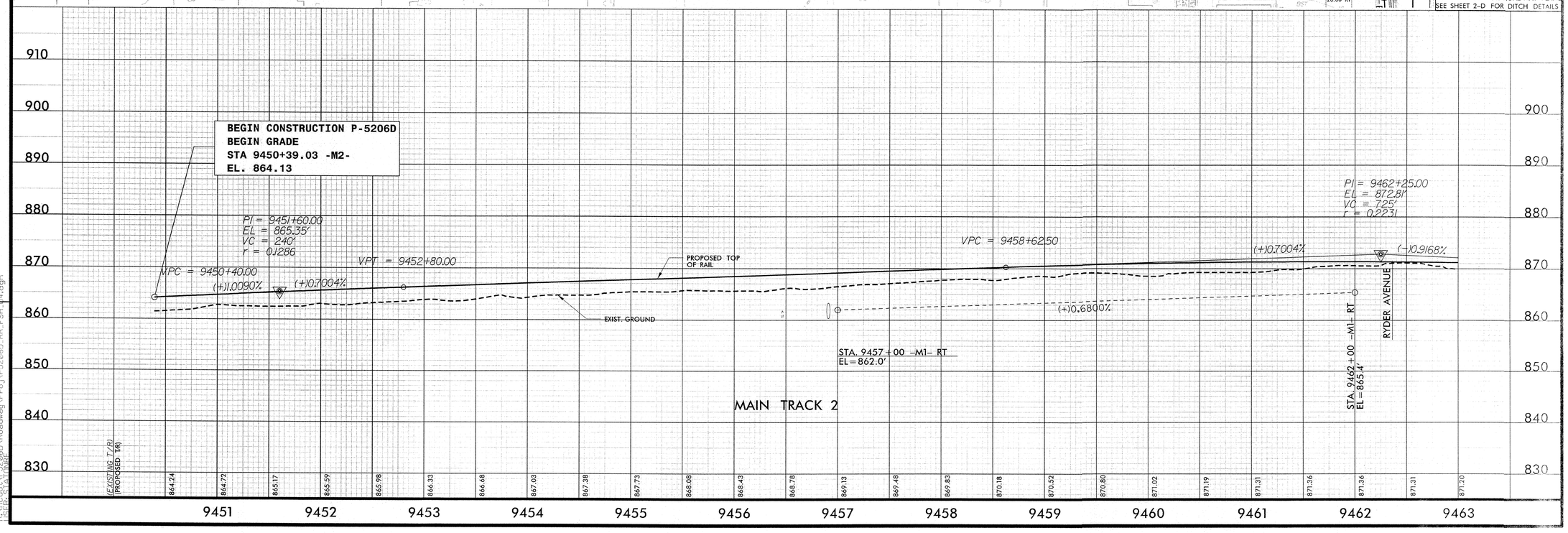
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER — 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 310 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850

END TIP PROJECT P-5206C
BEGIN TIP PROJECT P-5206D
MAINTRACK 1: Sta 9450+00.00 BK = Sta.9450+39.03 AH
MAINTRACK 2: Sta 9449+97.71 BK = Sta.9450+39.03 AH





JACK 0164DEL P10b2

REVISIONS

7/31/2013 8:42:42 AM
R:\Projects\0164DEL P10b2\Roadway\Proj\P5206D_RR_PSH_04.dgn
USER: SCOTTWHEE

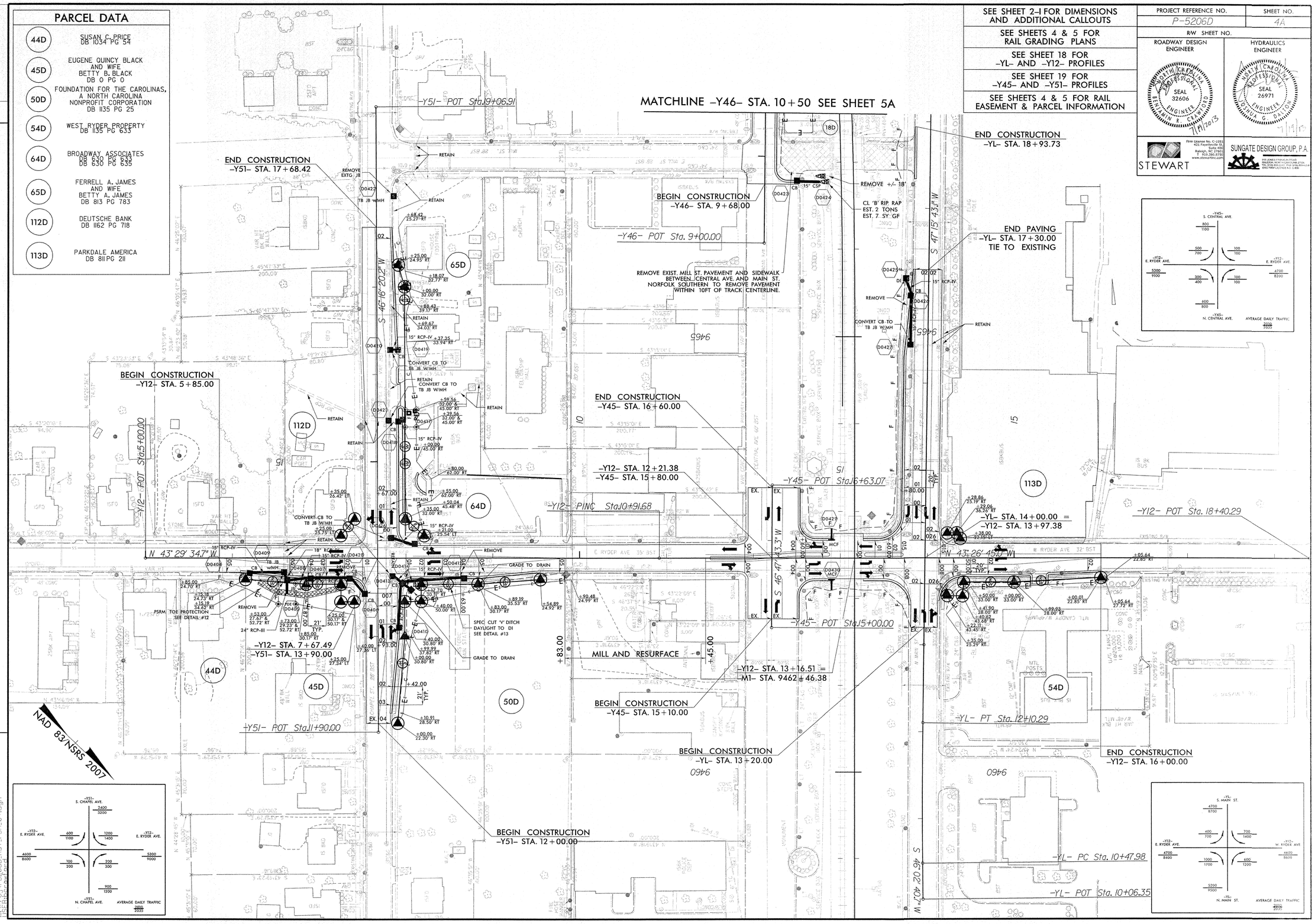
0164DEL_P10b2

DGN

REVISIONS

PARCEL DATA

44D	SUSAN C. PRICE DB 1034 PG 54
45D	EUGENE QUINCY BLACK AND WIFE BETTY B. BLACK DB 0 PG 0
50D	FOUNDATION FOR THE CAROLINAS, A NORTH CAROLINA NONPROFIT CORPORATION DB 1135 PG 25
54D	WEST RYDER PROPERTY DB 1135 PG 633
64D	BROADWAY ASSOCIATES DB 630 PG 633 DB 630 PG 635
65D	FERRELL A. JAMES AND WIFE BETTY A. JAMES DB 813 PG 783
112D	DEUTSCHE BANK DB 1162 PG 718
113D	PARKDALE AMERICA DB 811 PG 211



SEE SHEET 2-I FOR DIMENSIONS AND ADDITIONAL CALLOUTS	
SEE SHEETS 4 & 5 FOR RAIL GRADING PLANS	
SEE SHEET 18 FOR -YL- AND -Y12- PROFILES	
SEE SHEET 19 FOR -Y45- AND -Y51- PROFILES	
SEE SHEETS 4 & 5 FOR RAIL EASEMENT & PARCEL INFORMATION	

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	4A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN E. CRAWFORD 7/11/2013

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/11/13

STEWART

Firm License No. C-1051
421 Fayetteville Street
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.
919 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2201 FAX (919) 859-2216
EMAIL FIRM LICENSE NO. C-890

7/30/2013
11:29:01 AM
P5206D_RDY_PSH_04.dgn
STEWART-BRAND

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	5
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS P. SAUNDERS 7/19/13

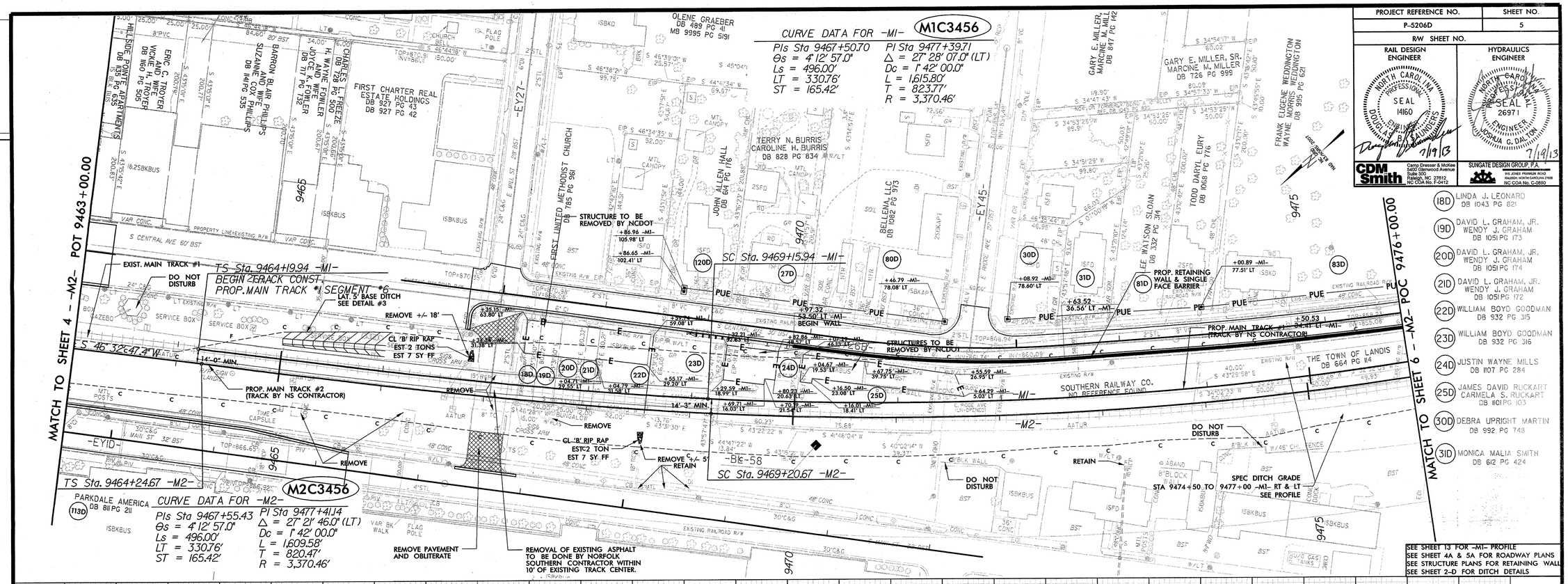
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13

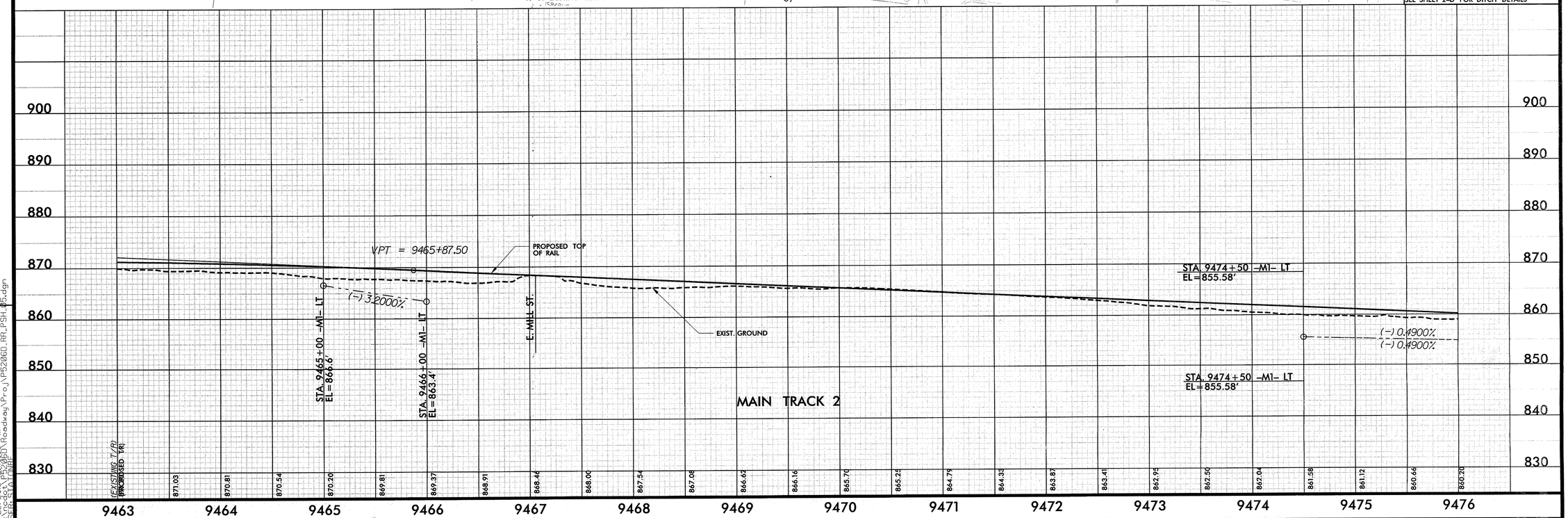
CPM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

DRN 0164DEL P10b2

REVISIONS





7/22/2013 12:41:05 PM
R:\Roadway\Proj\P5206D_RR_PSH_05.dgn
USER: SAYLOR

DGN 0164DEL_P10b2

REVISIONS

SEE SHEET S SERIES FOR RETAINING WALL
SEE SHEETS 5 & 6 FOR RAIL GRADING PLAN
SEE SHEETS 19 & 20 FOR PROFILE
SEE SHEETS 5 & 6 FOR RAIL EASEMENT & PARCEL INFORMATION

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	5A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD — 7/19/13

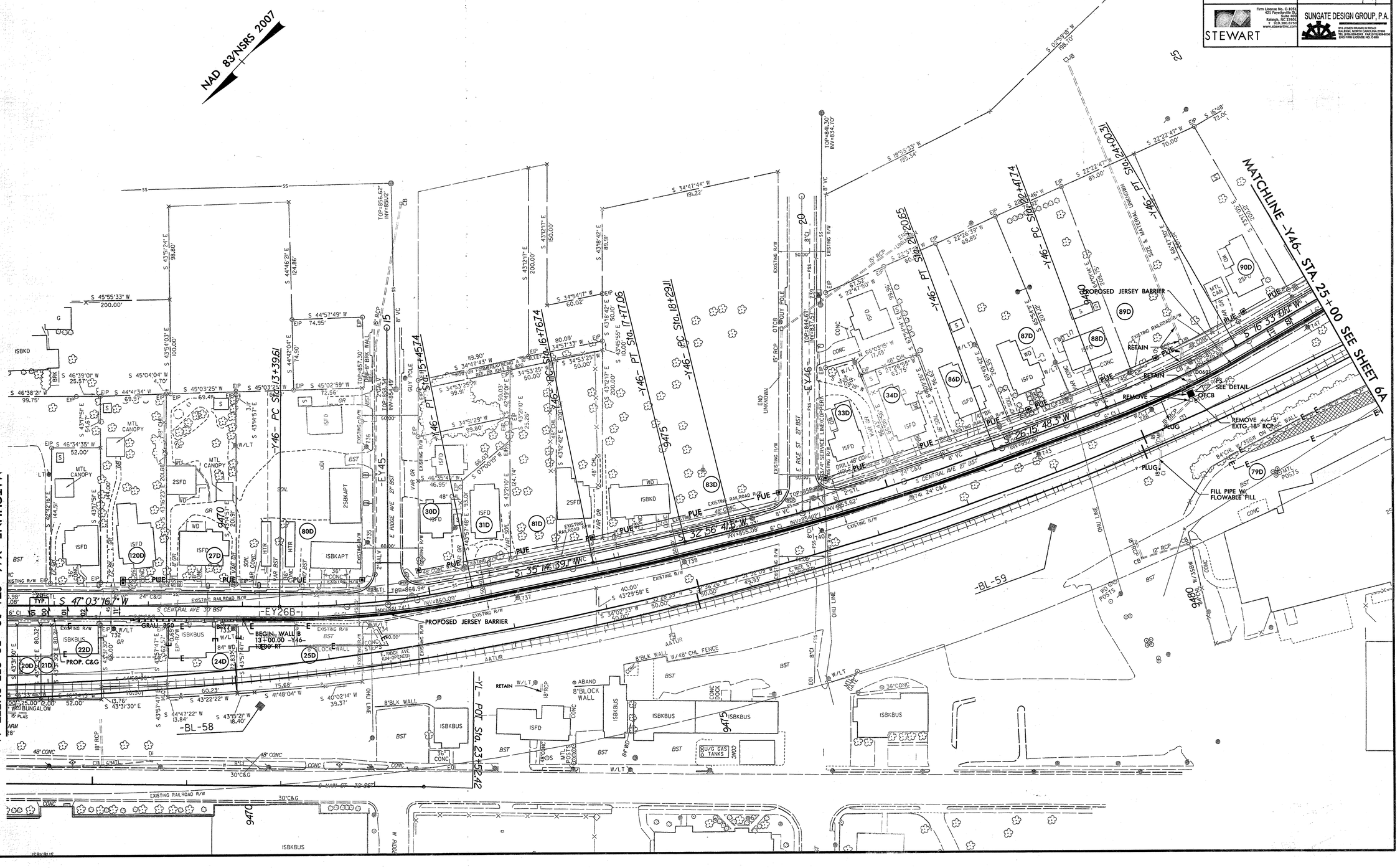
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 7/19/13

STEWART — Firm License No. C-1051, 421 Fayetteville St., Suite 1100, Raleigh, NC 27601, T 919.380.8750, www.stewartinc.com

SUNGATE DESIGN GROUP, P.A. — 916 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, TEL (919) 859-2243 FAX (919) 859-4106, SDG FIRM LICENSE NO. C-850

-Y46- CURVE DATA

PI Sta 14+43.04	PI Sta 17+26.91	PI Sta 19+75.04	PI Sta 23+24.21
Δ = 11° 48' 37.6" (LT)	Δ = 2° 17' 57.6" (LT)	Δ = 6° 40' 53.2" (LT)	Δ = 9° 42' 47.2" (LT)
D = 5° 43' 46.5"	D = 2° 17' 30.6"	D = 2° 17' 30.6"	D = 6° 21' 58.3"
L = 206.13'	L = 100.33'	L = 291.53'	L = 152.57'
T = 103.43'	T = 50.17'	T = 145.93'	T = 76.47'
R = 1,000.00'	R = 2,500.00'	R = 2,500.00'	R = 900.00'
e = 0.02	e = 0.02	e = 0.02	e = 0.02
RUNOFF = 40'	RUNOFF = 40'	RUNOFF = 40'	RUNOFF = 40'


NAD 83/NSRS 2007
MATCHLINE -Y46- STA. 10+50 SEE SHEET 4A
MATCHLINE -Y46- STA. 25+00 SEE SHEET 6A
-Y46- PC Sta. 13+39.61
-Y46- PT Sta. 15+45.74
-Y46- PC Sta. 16+76.74
-Y46- PT Sta. 17+77.06
-Y46- PC Sta. 18+29.11
-Y46- PT Sta. 20+20.65
-Y46- PC Sta. 22+47.74
-Y46- PT Sta. 24+00.31
-Y46- PT Sta. 23+52.42
-EY45-
-EY26B-
-BL-58
-BL-59
PROPOSED JERSEY BARRIER
BEGIN WALL B 13+00.00 -Y46- 13.00' RT
PROP. C&G
RETAIN
REMOVE
SEE DETAIL
PLUG
FILL PIPE W/ FLOWABLE FILL
REMOVE EXTG. 18" RCP
EXISTING RAILROAD R/W
S CENTRAL AVE 30' BST
E RIDGE AVE 27' BST
S 47°03'16" W
S 32°56'41" W
S 16°33'00" W
S 26°15'48" W
S 35°14'39" W
S 45°55'33" W 200.00'
S 43°54'03" E 100.00'
S 44°46'21" E 124.86'
S 43°12'17" E 200.00'
S 43°12'17" E 150.00'
S 34°47'44" W 191.22'
S 19°53'33" W 85.34'
S 02°59'18" W 58.10'
S 22°22'47" W 85.00'
S 22°22'47" W 70.00'
S 16°28' 72.0'
S 22°26'39" W 69.85'
S 22°44'50" W 67.82'
S 22°41'50" W 60.00'
S 66°03'18" W 17.46'
S 27°29'55" W 63.13'
S 43°45'55" E 80.09'
S 34°57'33" W 80.09'
S 34°47'43" W 119.90'
S 34°51'29" W 99.80'
S 34°53'25" W 50.00'
S 34°54'17" W 60.02'
S 43°18'42" E 89.29'
S 43°18'42" E 50.00'
S 43°12'42" E 200.00'
S 43°12'42" E 200.00'
S 43°10'42" E 124.74'
S 43°10'42" E 20.26'
S 43°14'57" E 200.00'
S 43°16'23" E 200.00'
S 43°42'16" E 144.51'
S 43°43'51" E 54.67'
S 43°17'51" E 54.67'
S 43°54'03" E 100.00'
S 45°04'04" W 4.70'
S 45°03'25" W 72.56'
S 45°02'59" W 72.56'
S 44°42'04" E 74.90'
S 44°57'49" W 74.95'
S 46°39'01" W 25.57'
S 46°38'21" W 99.75'
S 44°41'34" W 69.97'
S 46°34'35" W 52.00'
S 43°43'30" E 66.00'
S 43°31'30" E 52.00'
S 43°31'30" E 13.76'
S 43°57'47" E 13.84'
S 44°47'22" W 13.84'
S 43°22'22" W 60.23'
S 41°48'04" W 75.68'
S 43°15'21" W 16.40'
S 40°02'14" W 39.37'
S 34°02'33" W 50.00'
S 43°29'58" E 40.00'
S 43°26'39" W 49.93'
S 43°26'39" W 50.00'
S 43°26'39" W 50.00'
S 43°26'39" W 50.00

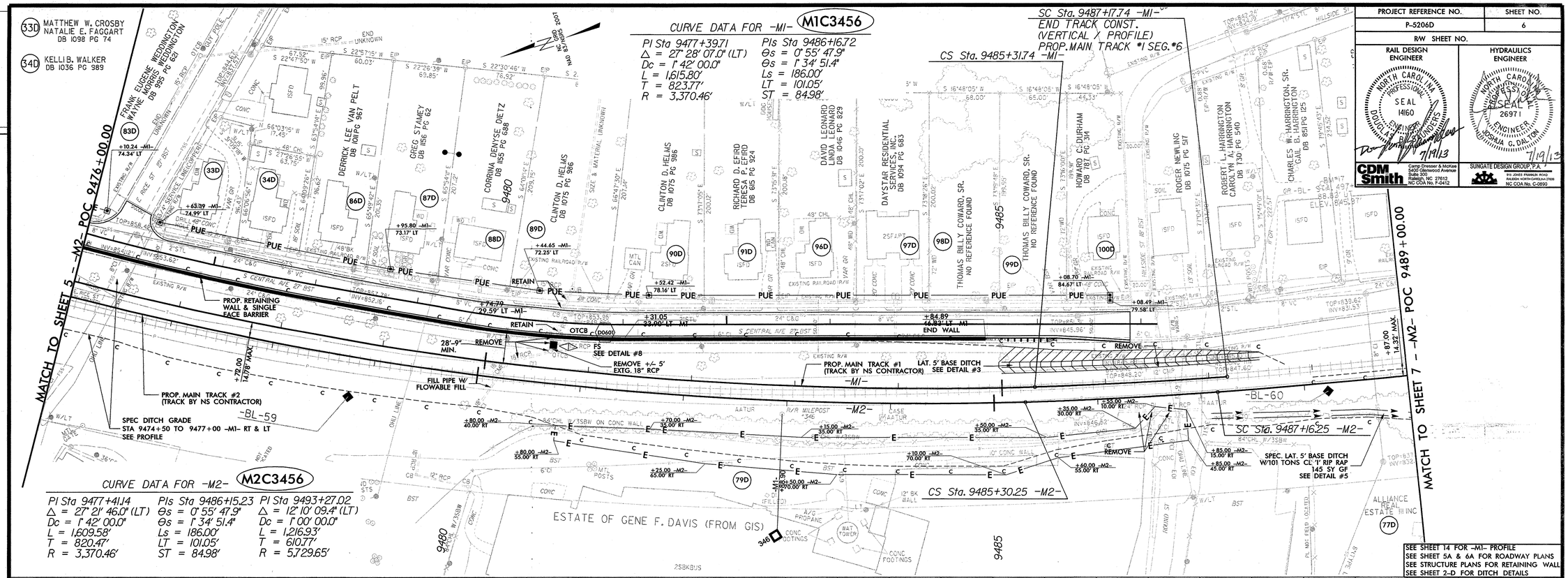
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	6
R/W SHEET NO.	

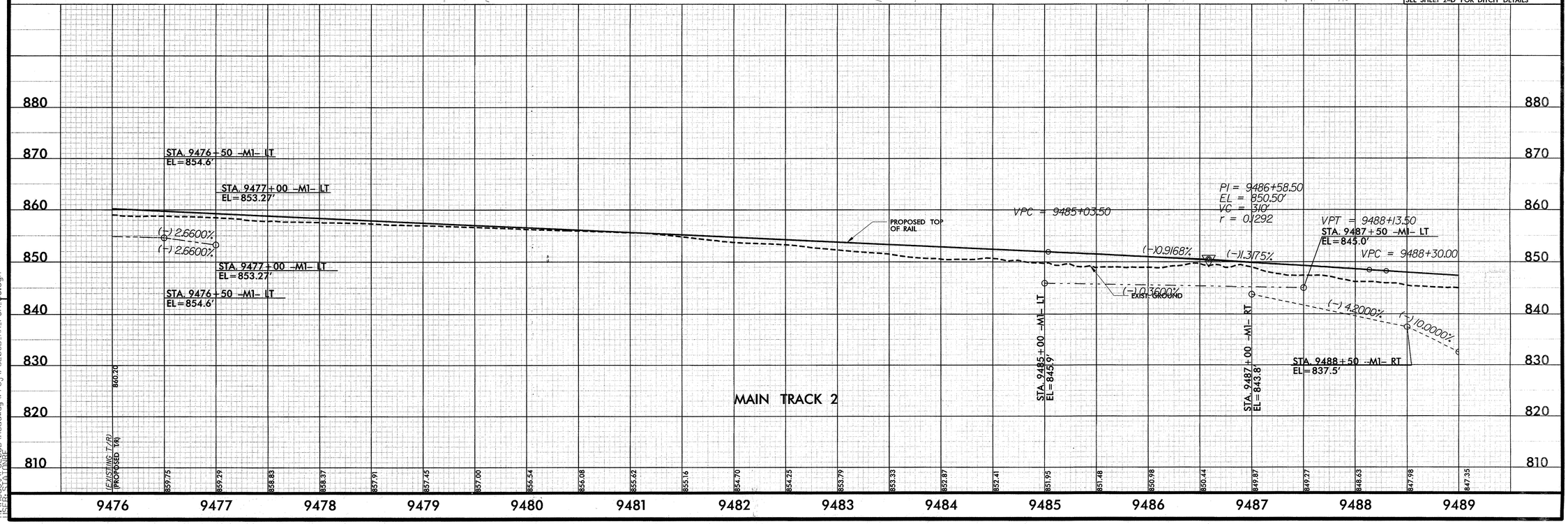
RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. SANDERS — 7/19/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 7/19/13

CDM Smith — Carey Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 905 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890





0164DEL P10b2

REVISIONS

7/22/2013 12:49:10 PM
R:\Project\P5206D\Roadway\Proj\P5206D_RR_PSH_06.dgn
USER: STATINGE

DGN 0164DEL P10b2

REVISIONS

SEE SHEET S SERIES FOR RETAINING WALL	
SEE SHEETS 6 & 7 FOR RAIL GRADING PLAN	
SEE SHEETS 19 & 20 FOR PROFILE	
SEE SHEETS 6 & 7 FOR RAIL EASEMENT AND PARCEL INFORMATION	

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	6A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD 7/19/13

STEWART

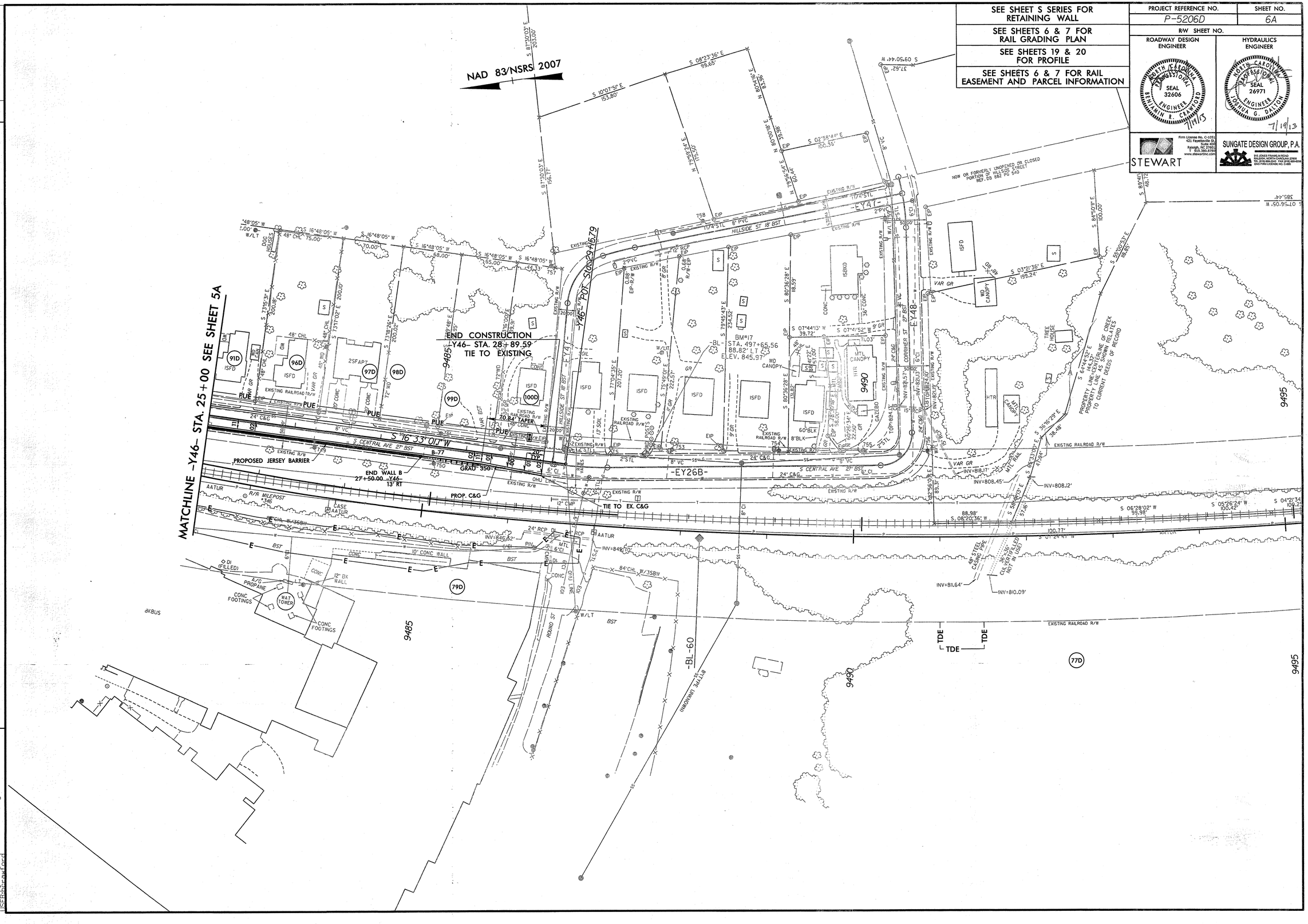
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13

SUNGATE DESIGN GROUP, P.A.

Firm License No. C-1051
421 Fayetteville St.
Suite 1100
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-8208
ENG FIRM LICENSE NO. C-855



7/22/2013
13:14:01
P:\P5206D_RDY_PSH_06.dgn
jsgilmore@stewart.com

DGN 0164DEL P10b2

REVISIONS

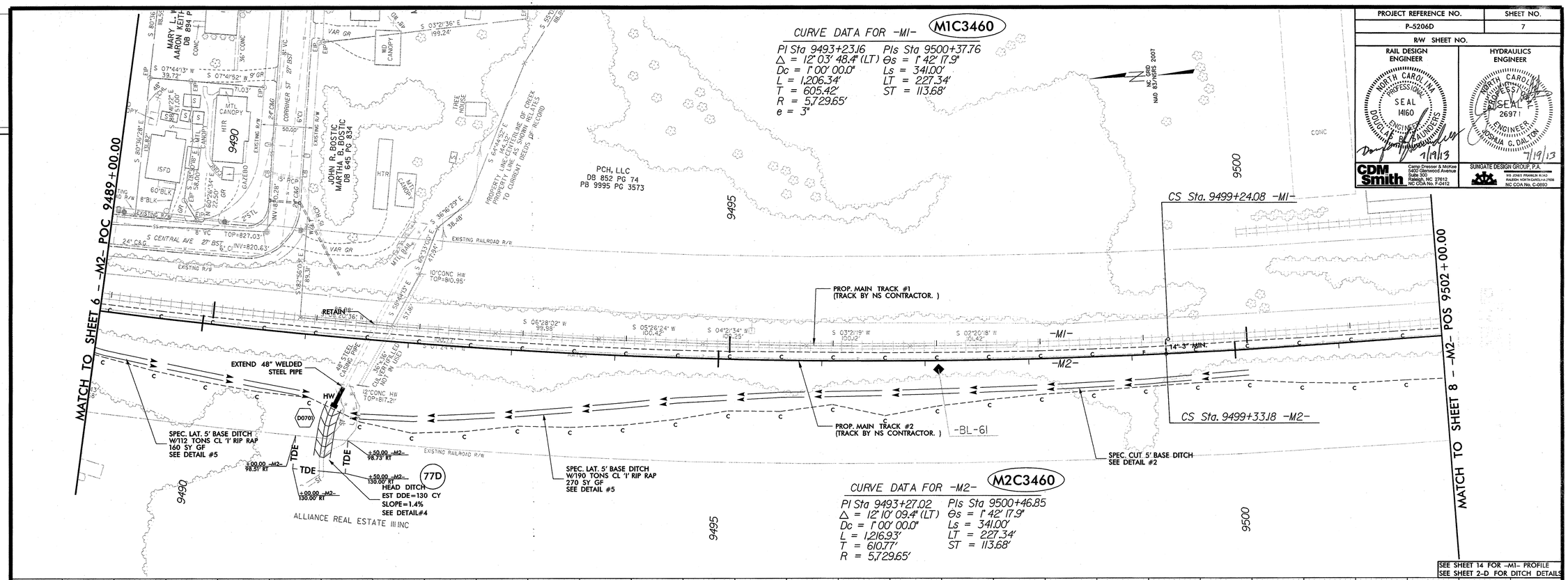
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	7
R/W SHEET NO.	

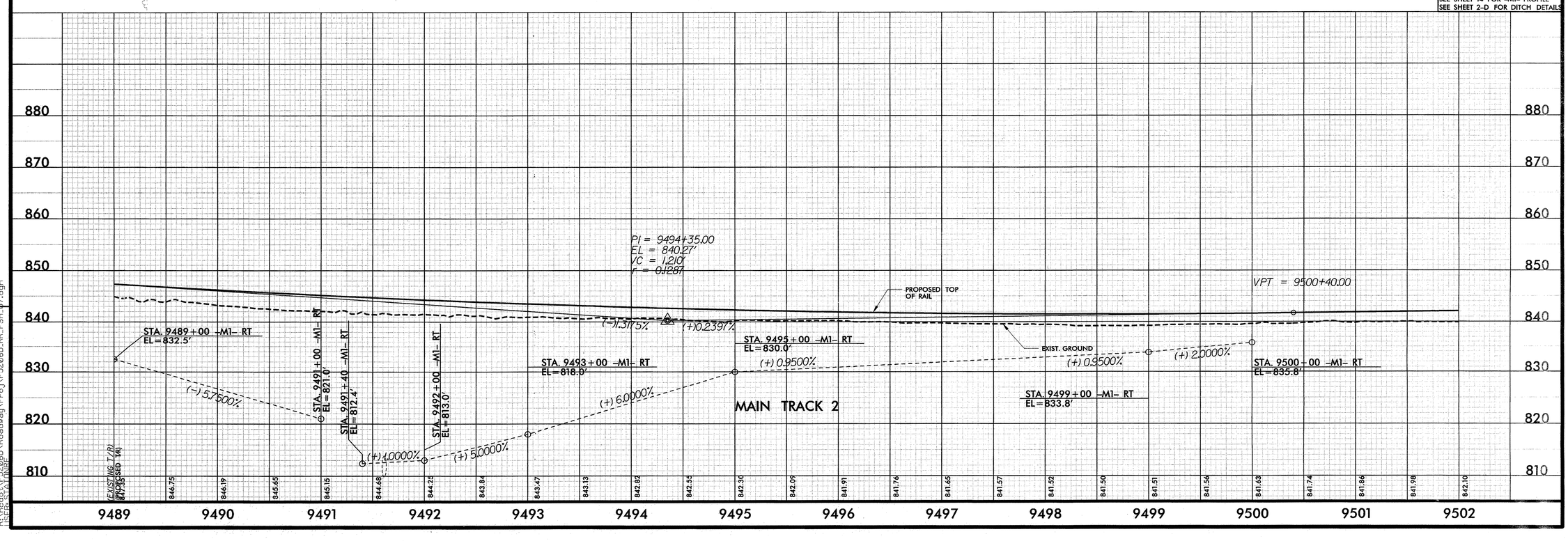
RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS A. SAUNDERS 7/19/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850





7/18/2013 2:29:35 PM
R:\Projects\P5206D\Roadway\Proj\P5206D_RR_PSH_07.dgn
USER: STATINGE

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	8
RW SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS E. GAUDETTE 7/19/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

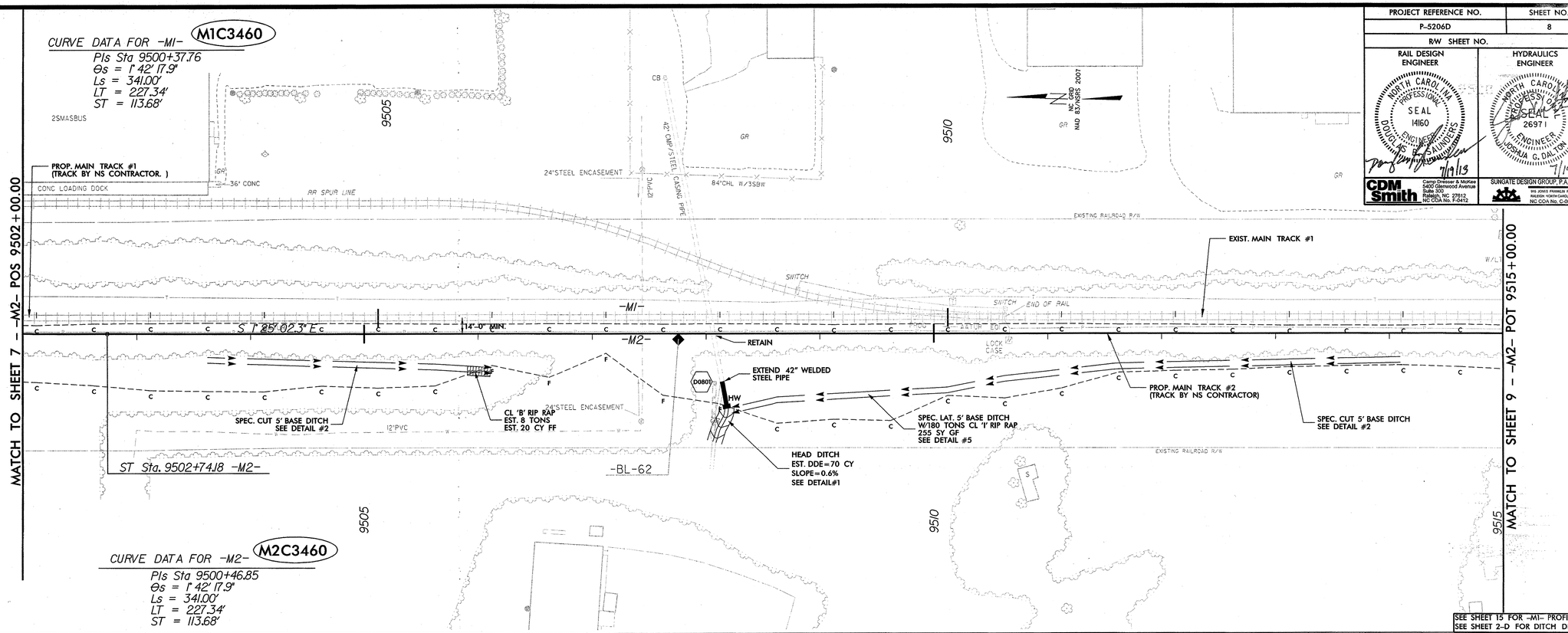
SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27609, NC COA No. C-0860

DGN 0164DEL P10b2

REVISIONS

CURVE DATA FOR -M1- (M1C3460)

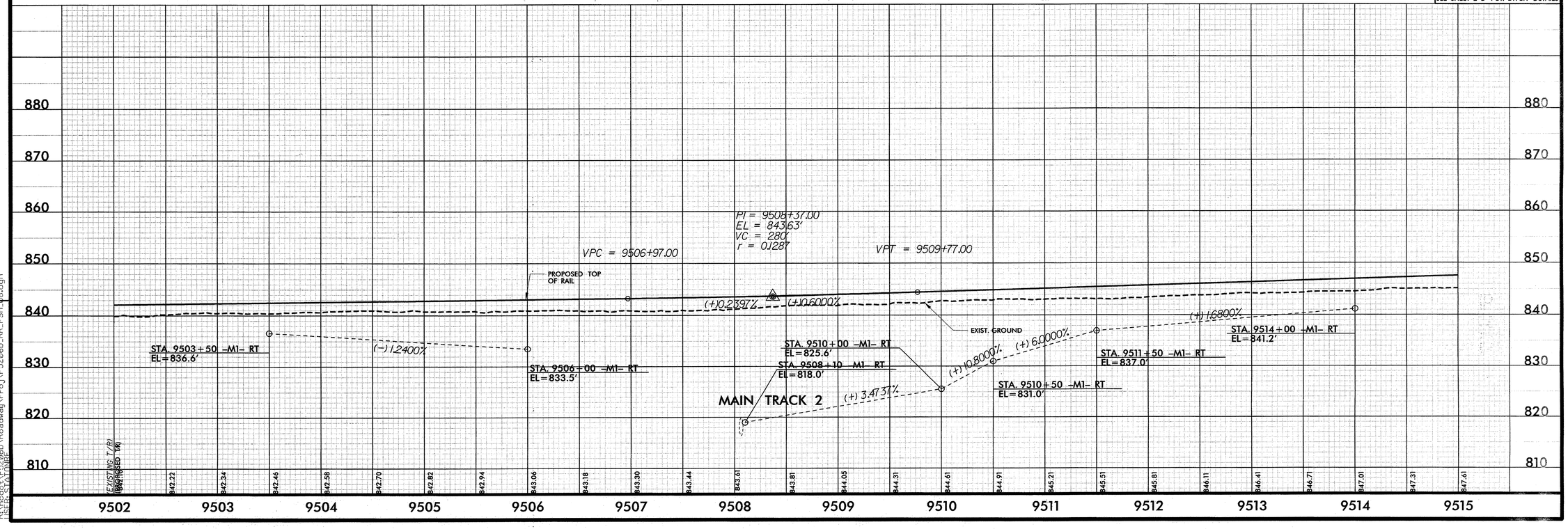
PIs Sta 9500+37.76
Θs = 1° 42' 17.9"
Ls = 341.00'
LT = 227.34'
ST = 113.68'



CURVE DATA FOR -M2- (M2C3460)

PIs Sta 9500+46.85
Θs = 1° 42' 17.9"
Ls = 341.00'
LT = 227.34'
ST = 113.68'

SEE SHEET 15 FOR -M1- PROFILE
SEE SHEET 2-D FOR DITCH DETAILS



7/18/2013 2:23:41 PM
R:\Roadway\Proj\P5206D_RR_PSH_08.dgn
USER: SATUNDE

DGN 0164DEL P10b2

REVISIONS

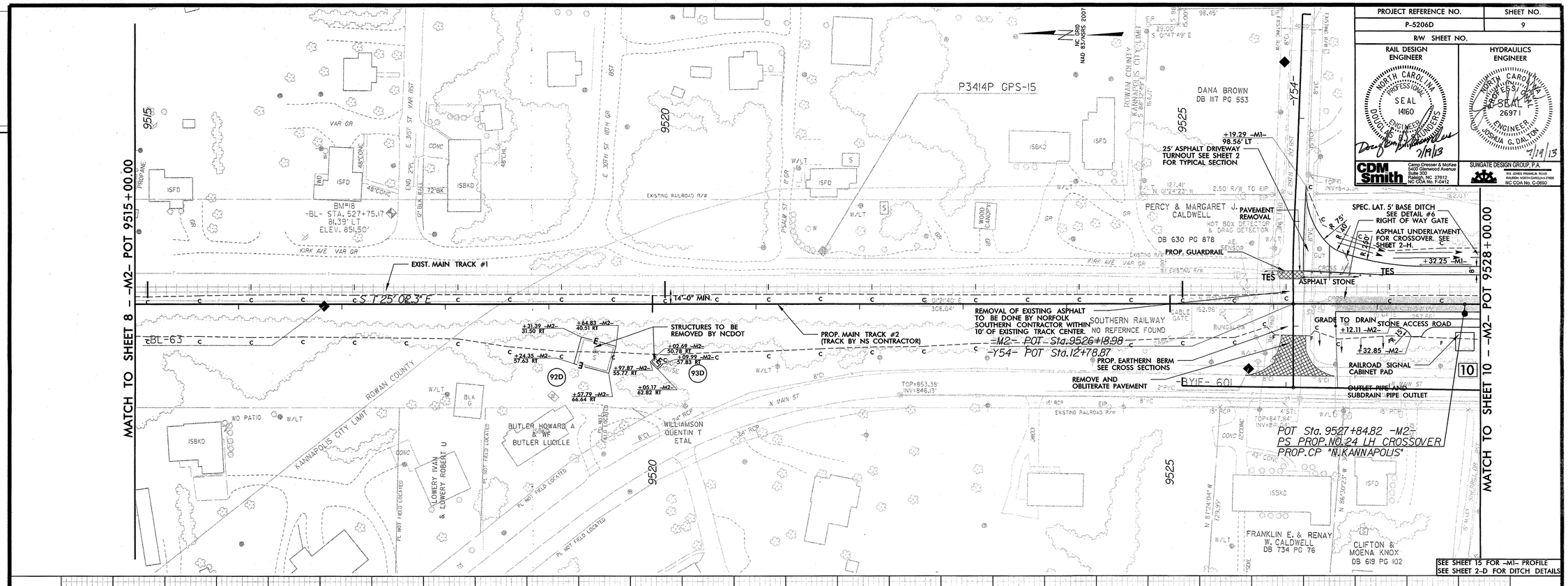
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	9
R/W SHEET NO.	

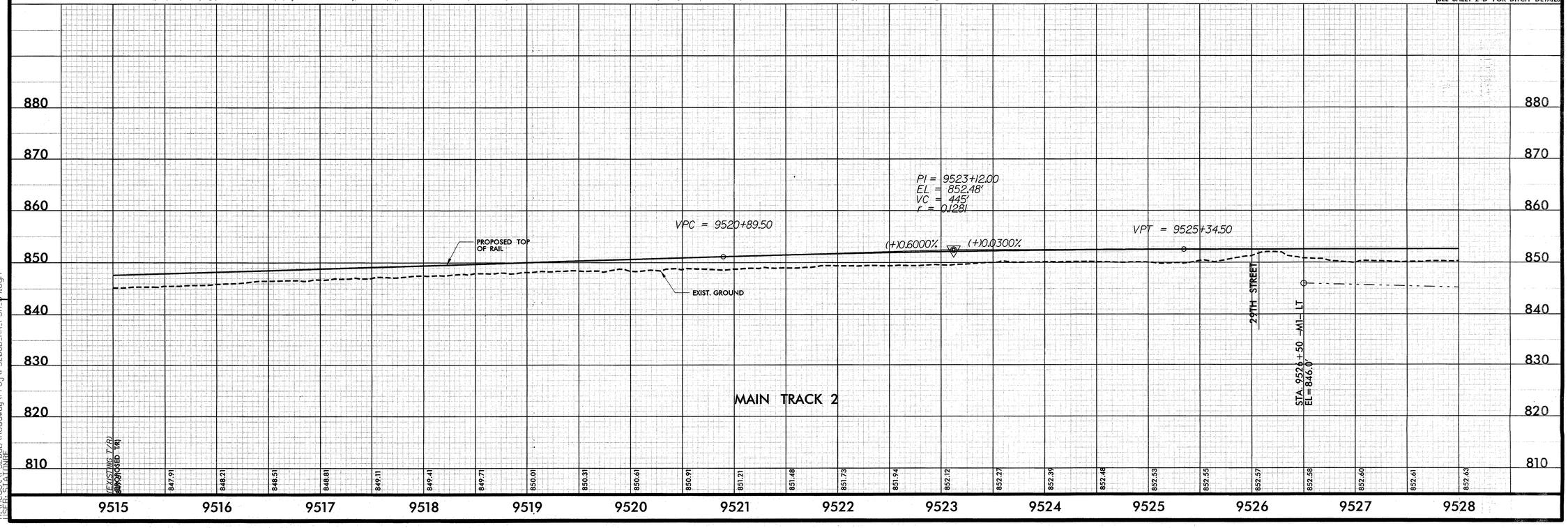
RAIL DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS A. DUNDERS — 7/19/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850





7/22/2013 12:49:15 PM
R:\Project\P5206D\Roadway\Proj\P5206D_RR_PSH_09.dgn
USER: STATINGE

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	10
R/W SHEET NO.	

RAIL DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS M. SAUNDERS

7/19/13

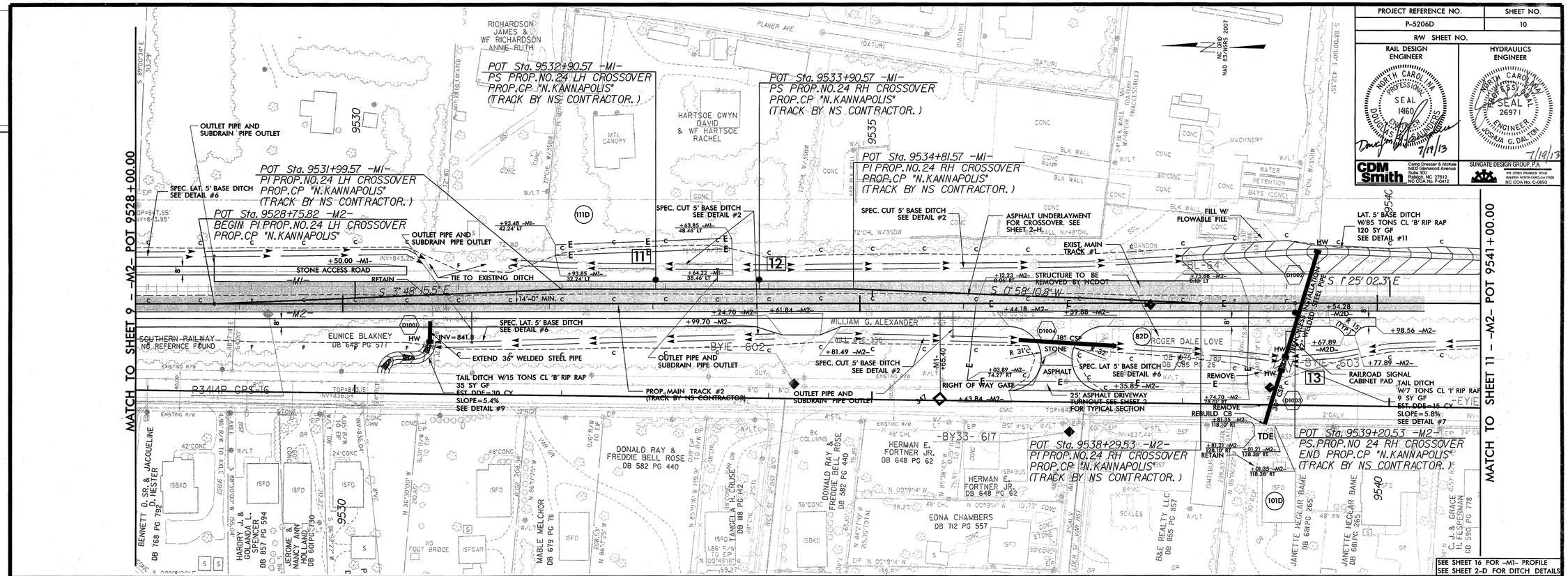
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 905 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850



DGN 0164DEL P10b2

REVISIONS

7/22/2013 12:49:21 PM
R:\Roadway\Proj\P5206D_RR_PSH_10.dgn
USER: STATINE

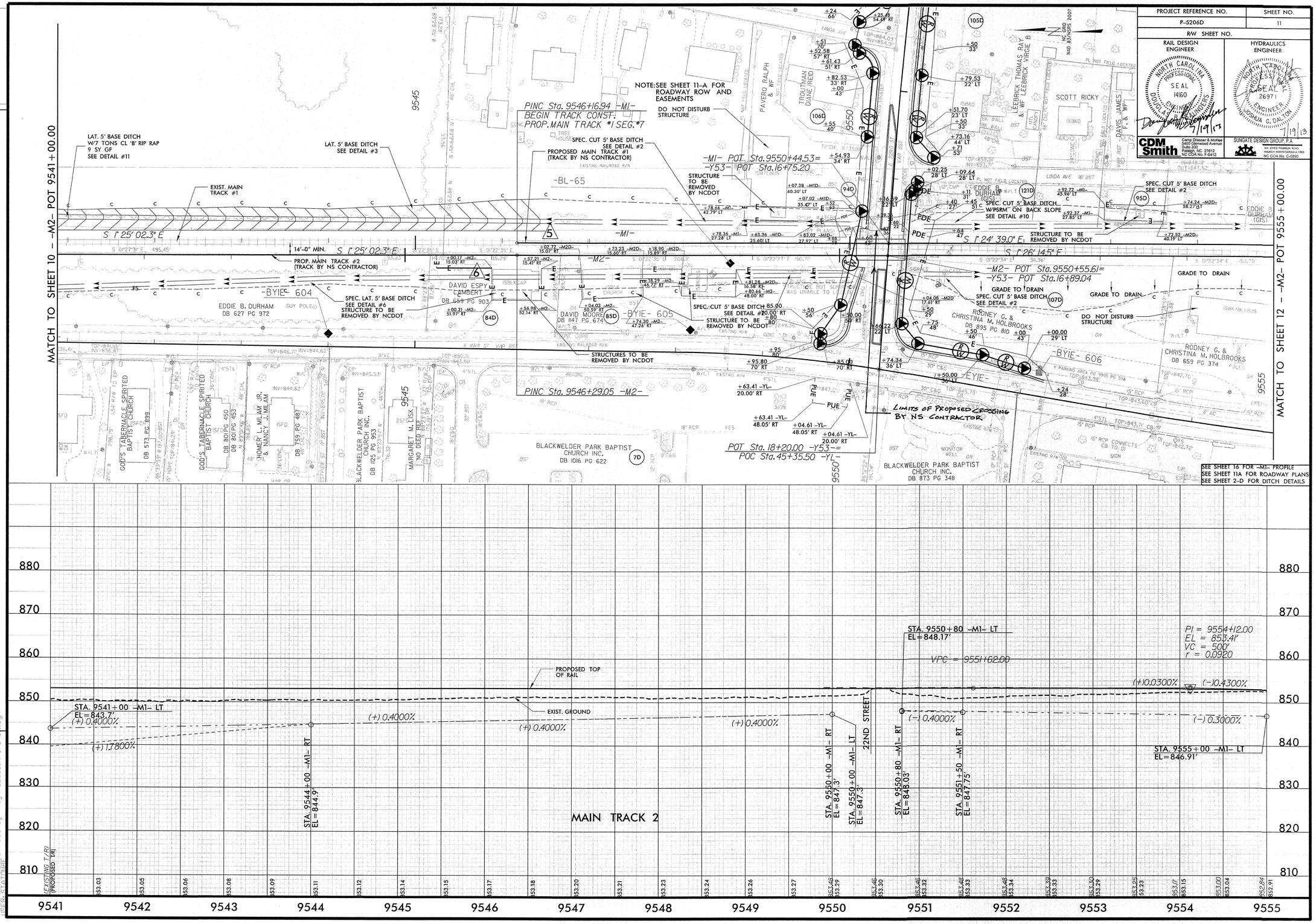
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	11
R/W SHEET NO.	

RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS A. DANIELS — 5/19/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 905 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27609, NC COA No. C-0850



REVISIONS

0164DEL P10b2

DGN

7/31/2013 8:42:47 AM
R:\Projects\P5206D\Roadway\Proj\P5206D_RR_PSH_11.dgn
Bentley Systems

0164DEL P10b2

DGN

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	11A
R/W SHEET NO.	

SEE SHEET 11 FOR RAIL GRADING PLANS

SEE SHEET 11 FOR RAIL EASEMENT AND PARCEL INFORMATION

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN T. CRAWFORD

8/26/13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER MICHAEL G. HALSEY

8/26/13

STEWART

Firm License No. C-1051
421 Fayetteville Street
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.

915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 851-1912 FAX (919) 851-1918
FIRM LICENSE NO. C-1752

8/26/2013
P:\P-5206D_RDY_PSH 07.dgn
USER: Rdoc-Ashford

DGN 0164DEL P10b2

REVISIONS

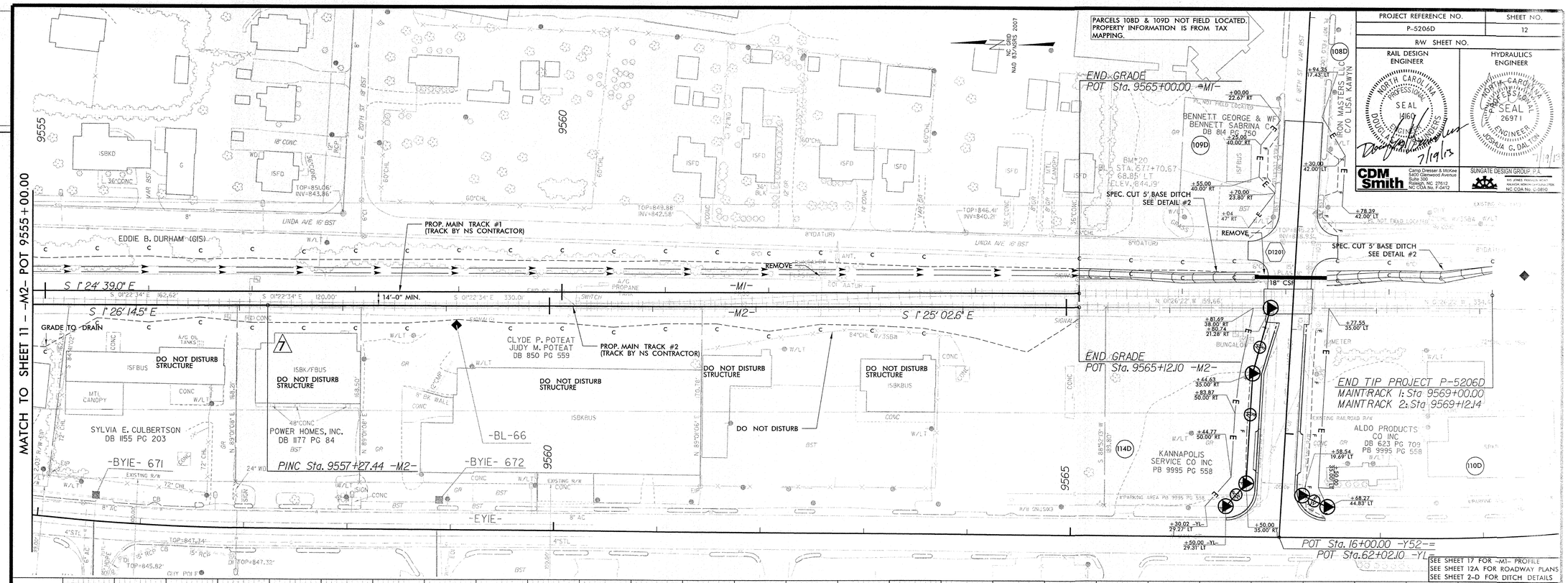
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	12
R/W SHEET NO.	

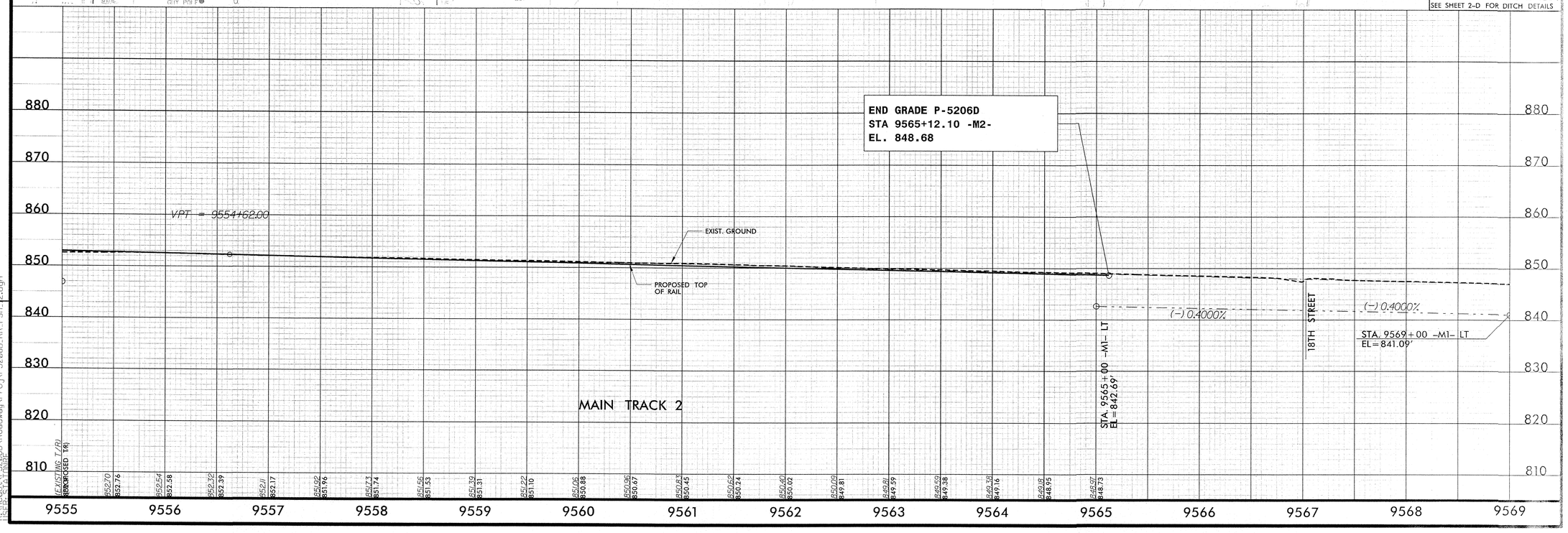
RAIL DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 11160 ENGINEER DOUGLAS G. TAYLOR 7/19/13

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA C. DALTON 7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 400, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP P.A. — 121 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0910





7/31/2013 8:42:53 AM
R:\Proj\P5206D\Roadway\Proj\P5206D_RR_PSH_12.dgn

DGN 0164DEL_P10b2

REVISIONS

SEE SHEET 12 FOR RAIL GRADING PLANS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	12A
R/W SHEET NO.	

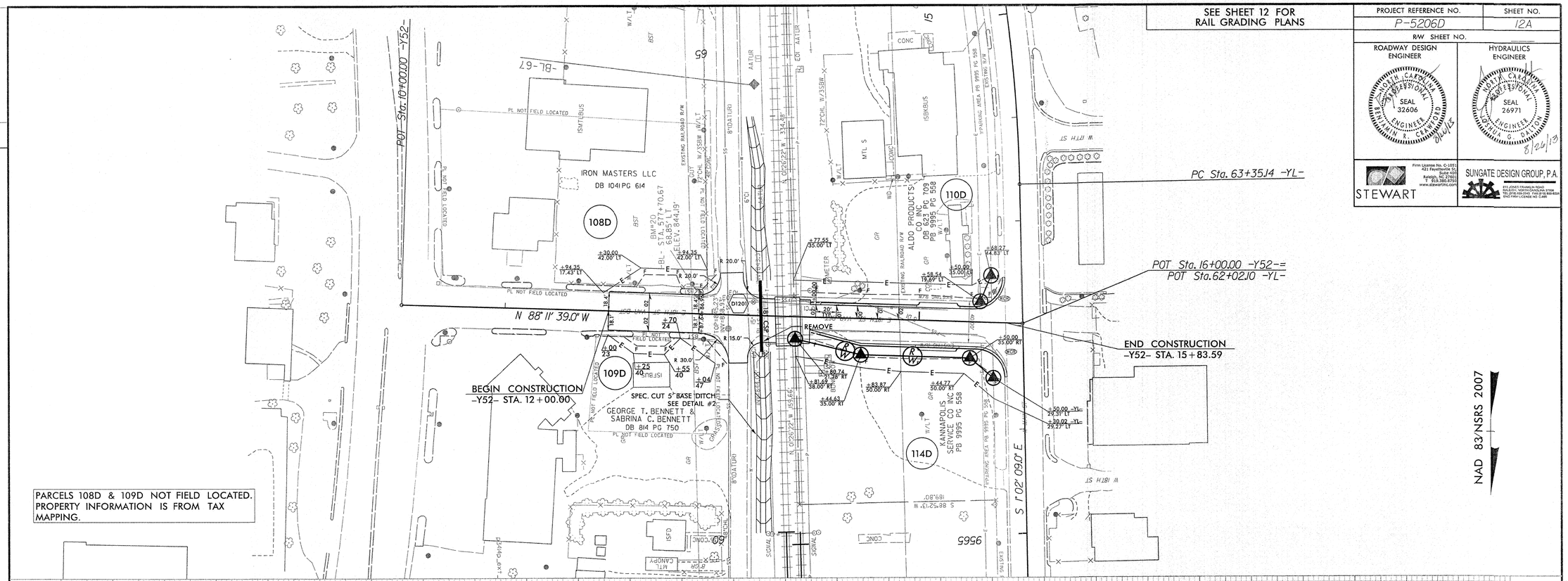
ROADWAY DESIGN ENGINEER — SEAL 32606 — NORTH CAROLINA PROFESSIONAL ENGINEER — BENJAMIN R. CEMENTWOOD — 8/26/13

HYDRAULICS ENGINEER — SEAL 26971 — NORTH CAROLINA PROFESSIONAL ENGINEER — JOSHUA G. DALTON — 8/26/13

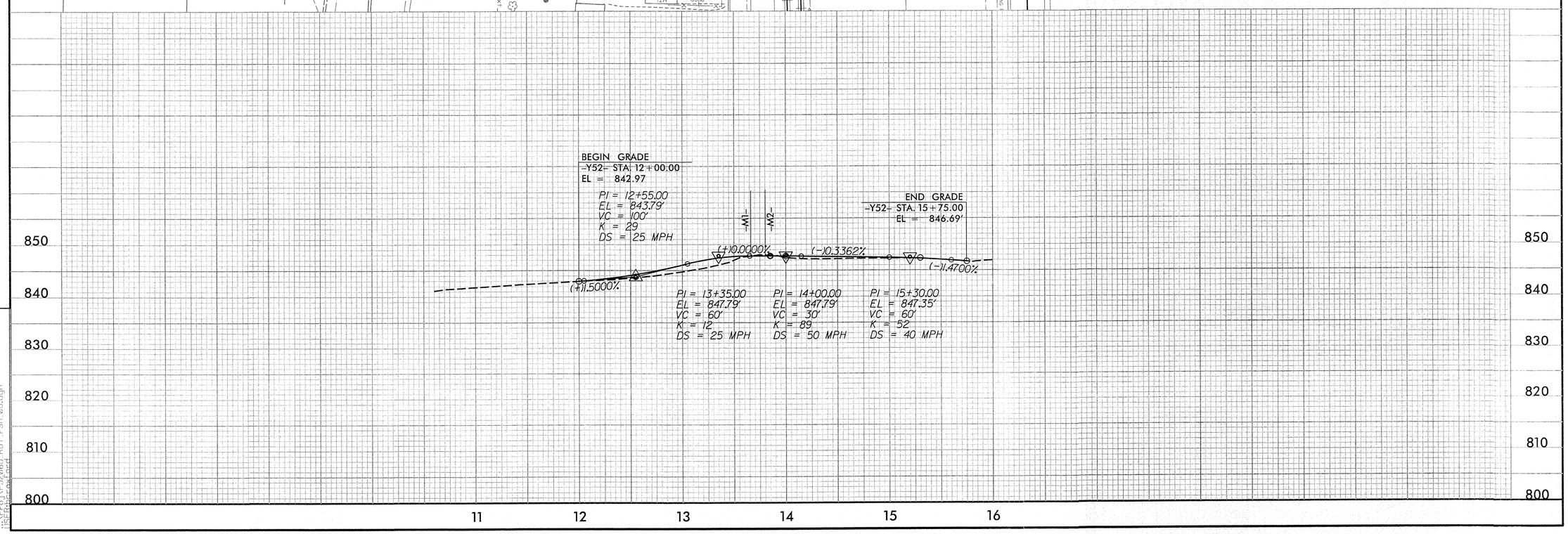
STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.
815 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PHONE: (919) 851-1912 FAX: (919) 851-1918
ENGINEERING LICENSE NO. F-0112



PARCELS 108D & 109D NOT FIELD LOCATED. PROPERTY INFORMATION IS FROM TAX MAPPING.



8/26/2013
(P:\P5206) RDY PSH 03.dgn

0164DEL P10b2

DGN

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	13

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 DIGITAL ENGINEERING SOLUTIONS

7/19/13

HYDRAULICS ENGINEER

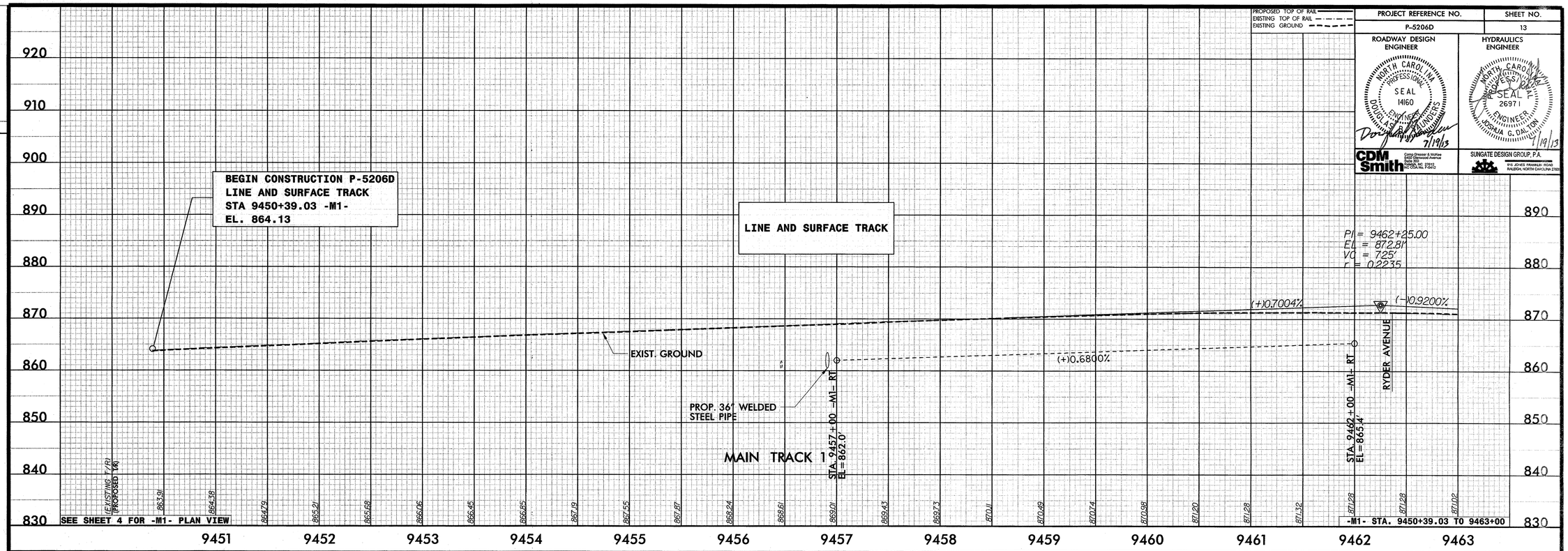
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

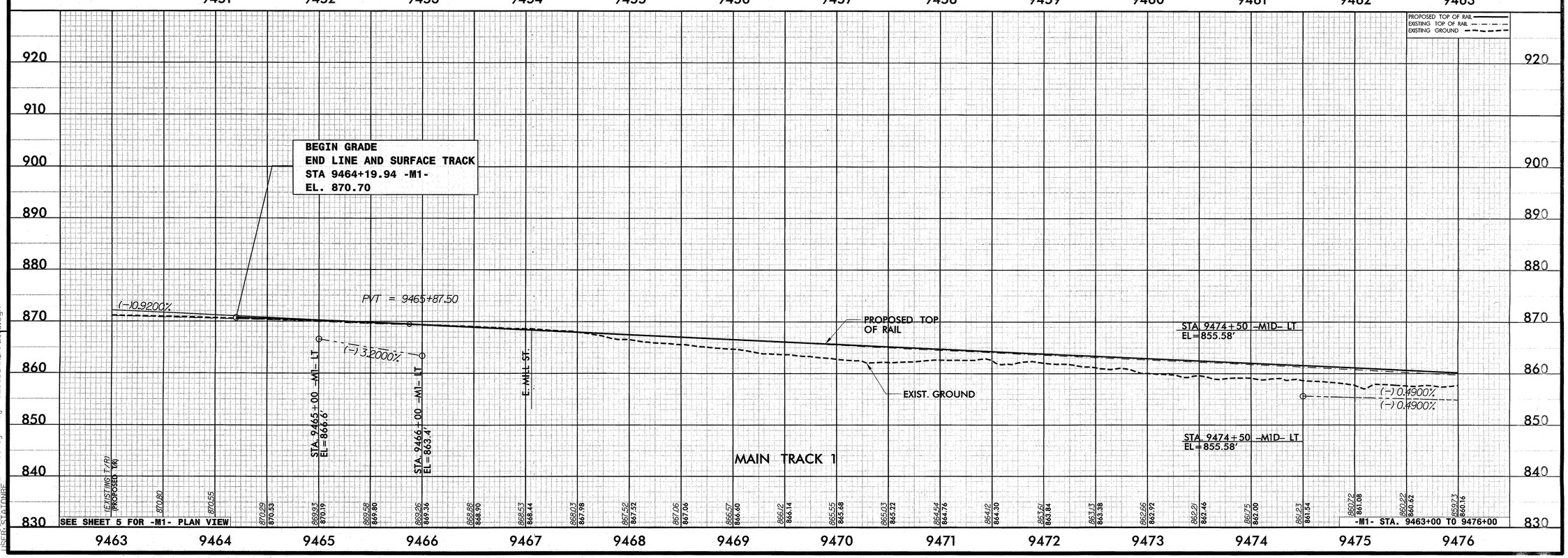
7/19/13

CDM Smith — Camp Dresser & McKee, 8000 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC DBA No. P-0412

SUNGATE DESIGN GROUP, P.A. — 918 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27610

PROPOSED TOP OF RAIL
EXISTING TOP OF RAIL
EXISTING GROUND





7/18/2013 2:30:06 PM
R:\Roadway\Proj\P5206D_RR_PFL_13.dgn
USER: STATINIB

0164DEL P10b2

DSGN

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	14

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS A. PAULSON

7/19/13

HYDRAULICS ENGINEER

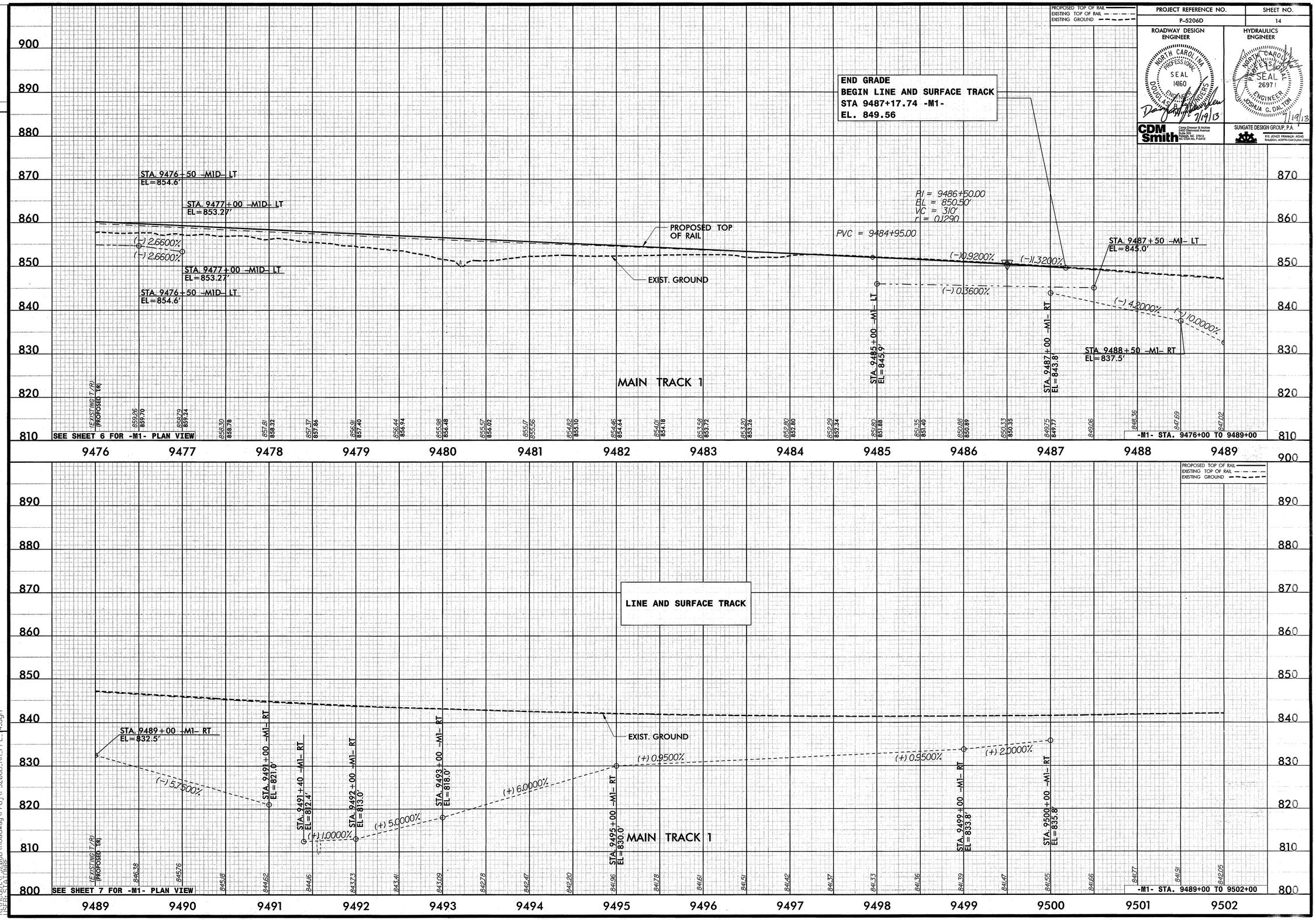
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/19/13

CDM Smith — Cazza Dresser & McKee, 5400 Glenwood Avenue Suite 400, Raleigh, NC 27612, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

PROPOSED TOP OF RAIL
EXISTING TOP OF RAIL
EXISTING GROUND



7/18/2013 2:30:10 PM
R:\pcdot\P5206D\Roadway\Proj\P5206D_RR_PFL_14.dgn
ELEV: STATIONS

DGN 0164DEL P10b2

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	15

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS R. SAUNDERS

7/19/13

HYDRAULICS ENGINEER

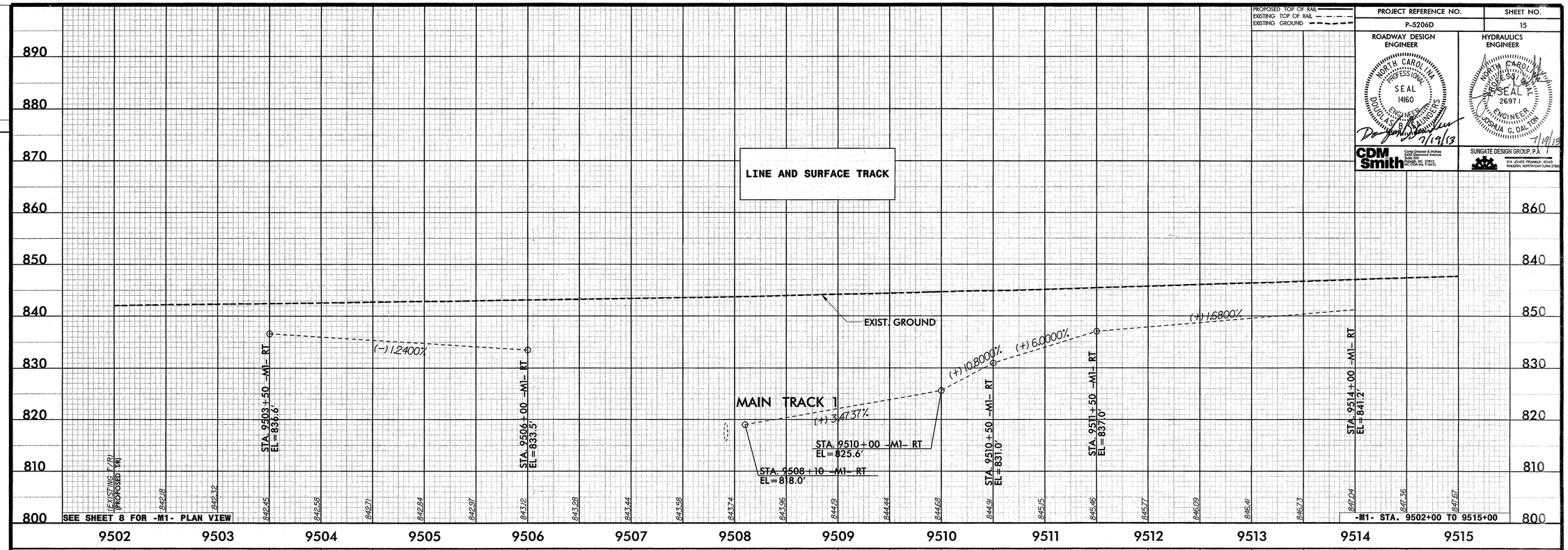
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

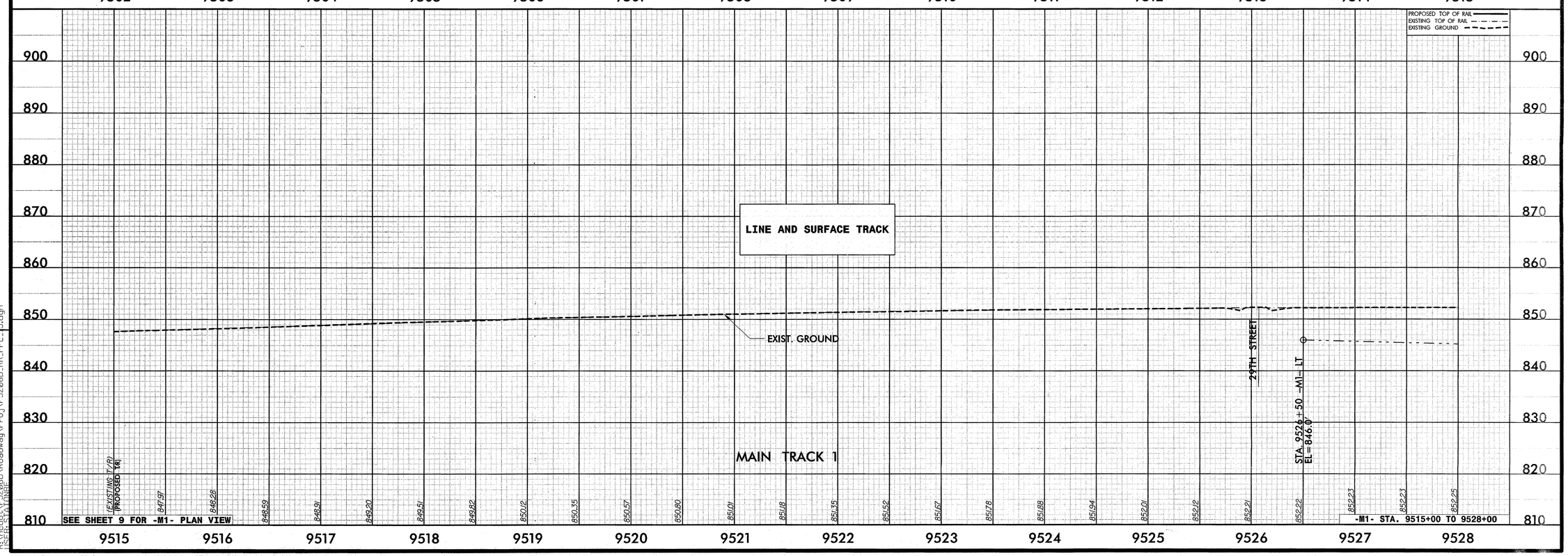
7/19/13

CDM Smith — Camp Dresser & McKee, 8601 Glenwood Avenue, Suite 300, Raleigh, NC 27612, NC License No. F-0272

SUNGATE DESIGN GROUP, P.A. — 919 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

PROPOSED TOP OF RAIL
EXISTING TOP OF RAIL
EXISTING GROUND





7/18/2013 2:30:13 PM
R:\proj\P5206D\Roadway\Proj\P5206D_RR_PFL_15.dgn
USER: STATINGER

DGN 0164DEL P10b2

REVISIONS

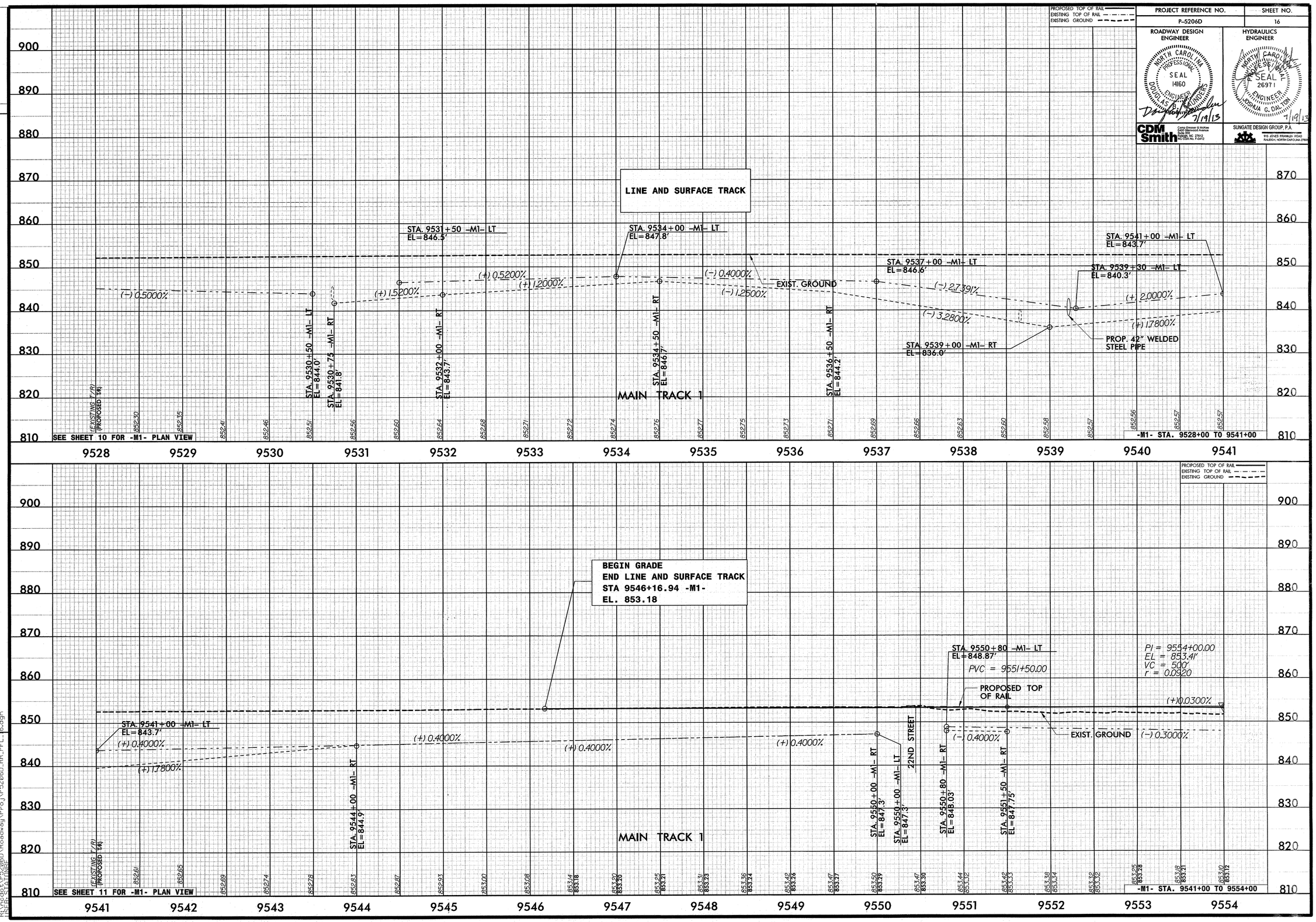
PROJECT REFERENCE NO.	SHEET NO.
P-5206D	16

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS P. SOUNDERS — 7/19/13

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON — 7/19/13

CDM Smith — Cairo Gresser & McKee 8520 Glenwood Avenue Suite 200 Raleigh, NC 27612 NC FIRM No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD RALEIGH, NORTH CAROLINA 27606



7/18/2013 2:30:17 PM
R:\Proj\P5206D\Roadway\Proj\P5206D_RR_PFL_16.dgn
USER: STATINGF

0164DEL P10b2

DGN

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	17

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14160 ENGINEER DOUGLAS B. ROBINSON

7/19/13

HYDRAULICS ENGINEER

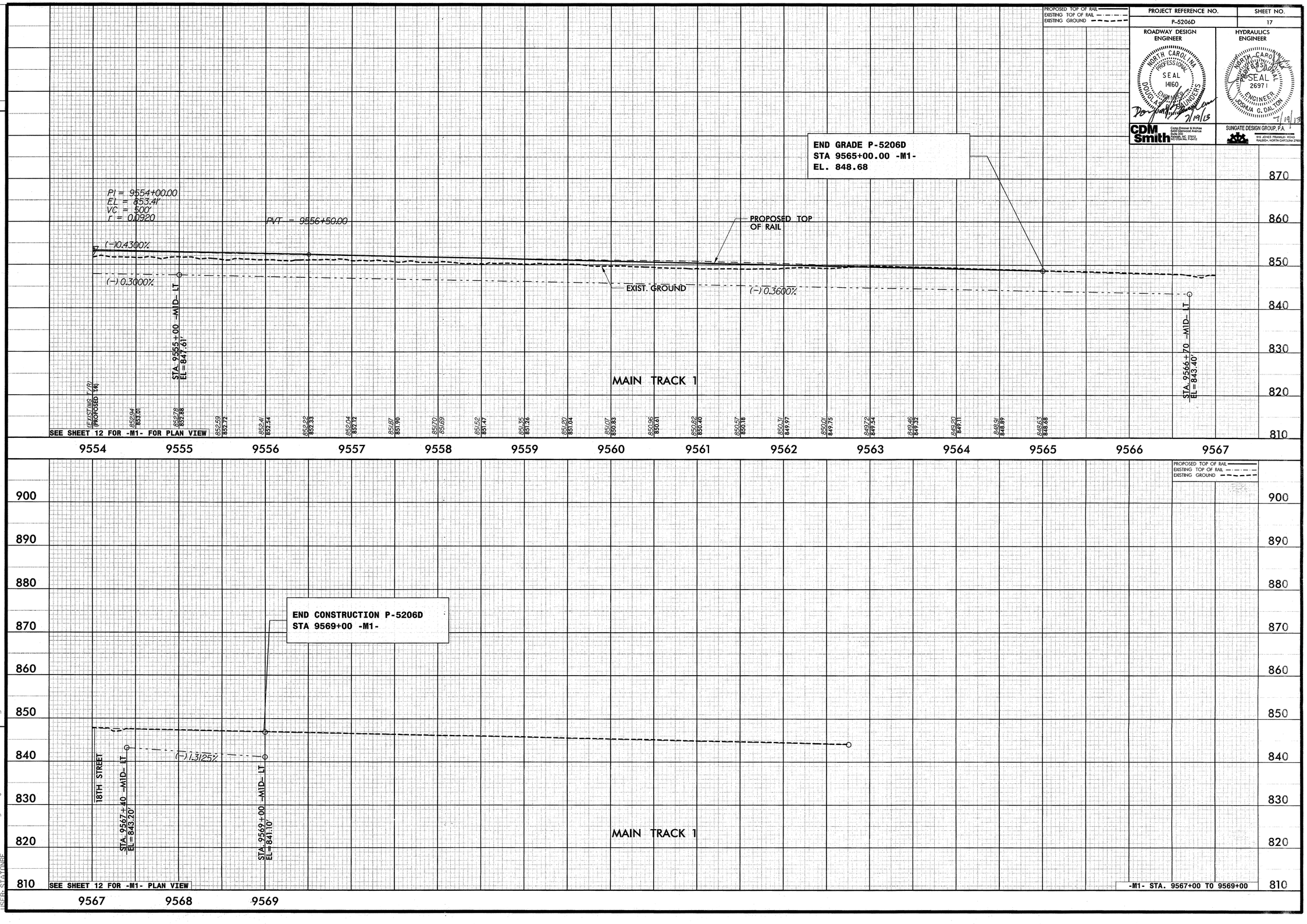
NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

7/19/13

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 301, Raleigh, NC 27612, (919) 781-1830, FL#C-0170

SUNGATE DESIGN GROUP, P.A. — 919 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606

PROPOSED TOP OF RAIL
EXISTING TOP OF RAIL
EXISTING GROUND



7/18/2013 2:30:21 PM
R:\Projects\P5206D\Roadway\Proj\P5206D_RR_PFL_17.dgn
Rhenderson

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	18

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 032606 ENGINEER BENJAMIN R. CRAWFORD

7/19/13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

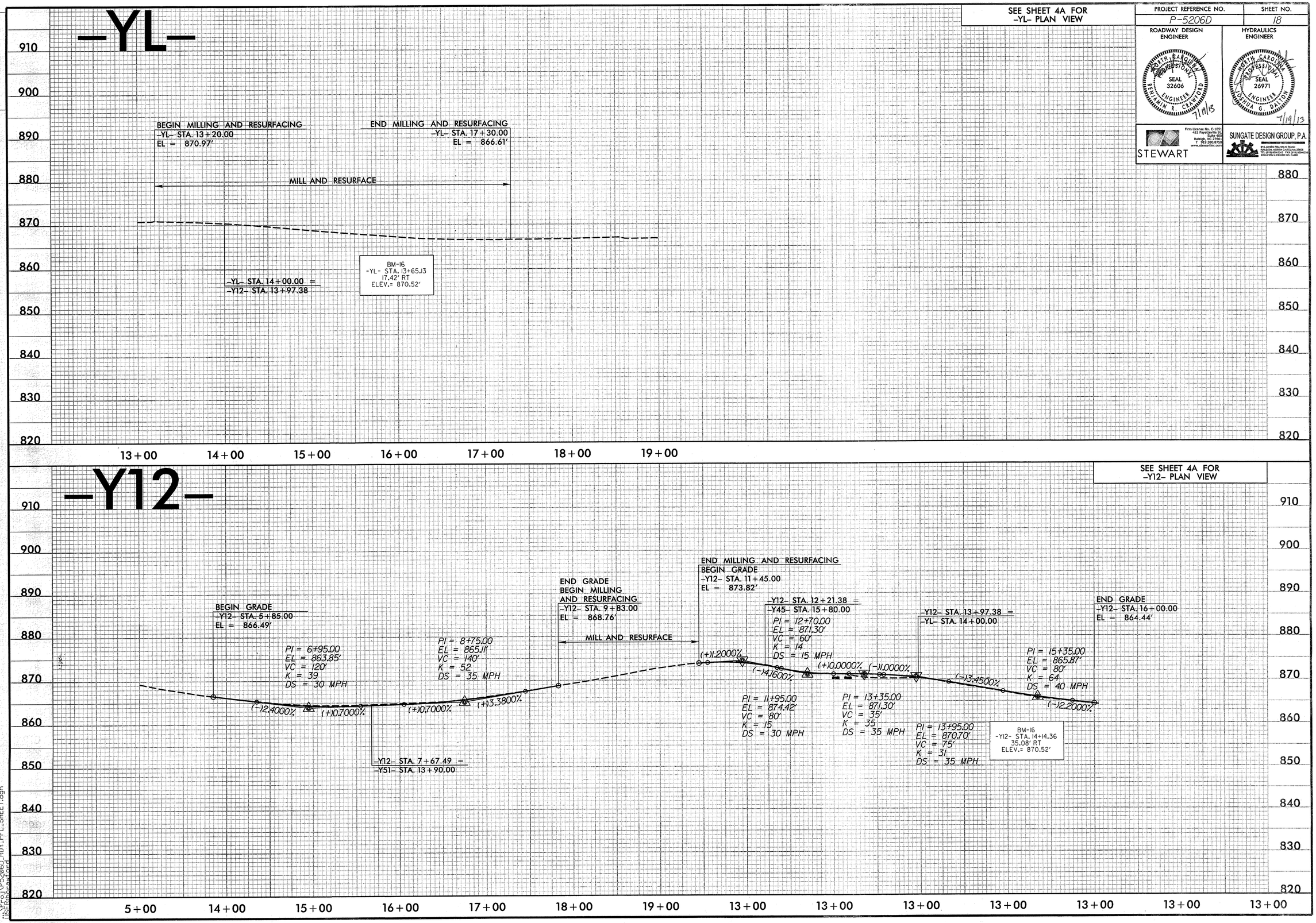
7/19/13

STEWART

Firm License No. C-1051
423 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.

919 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
(919) 851-1912 FAX (919) 851-1918
SNC FIRM LICENSE NO. C-0910



DGN 0164DEL_P10b2

7/22/2013
USER:cbrandford PW:...\Proj\5206D_RDY_PFL_SHEET.dgn

0164DEL_P10b2

DGN

SEE SHEET 4A FOR
-Y45- PLAN VIEW

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	19

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD

7/19/13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON

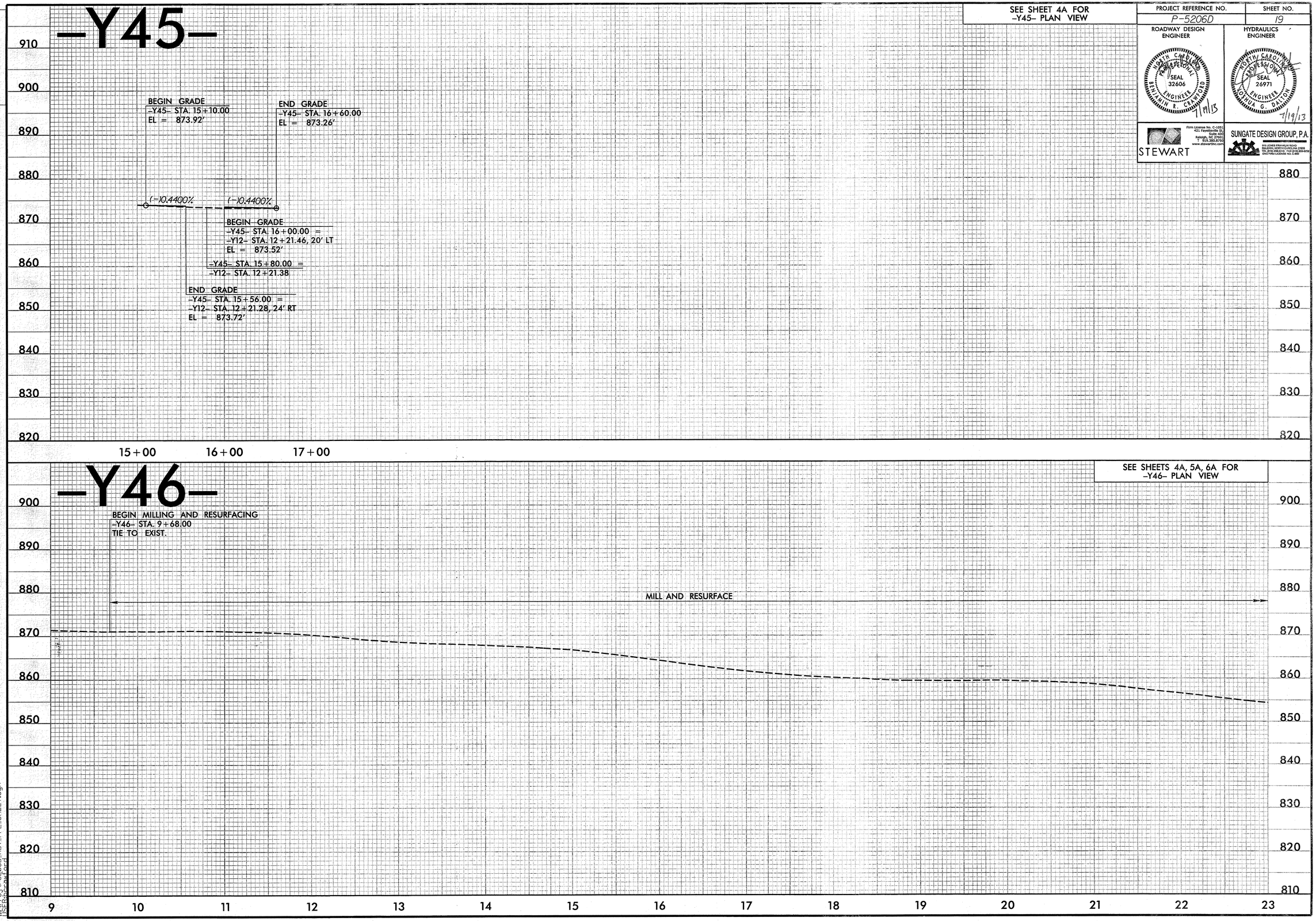
7/19/13

STEWART

Firm License No. C-1051
421 Fayetteville St.
Suite 400
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.

919 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
PHONE (919) 851-1912 FAX (919) 851-1918
ENGINEERING LICENSE NO. C-0910



SEE SHEETS 4A, 5A, 6A FOR
-Y46- PLAN VIEW

7/22/2013
15:17:01
P:\P5206D_RDY_PFL_SHEET.dgn

PROJECT REFERENCE NO.	SHEET NO.
P-5206D	20

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 32606 ENGINEER BENJAMIN R. CRAWFORD 7/19/13

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 26971 ENGINEER JOSHUA G. DALTON 7/19/13

STEWART

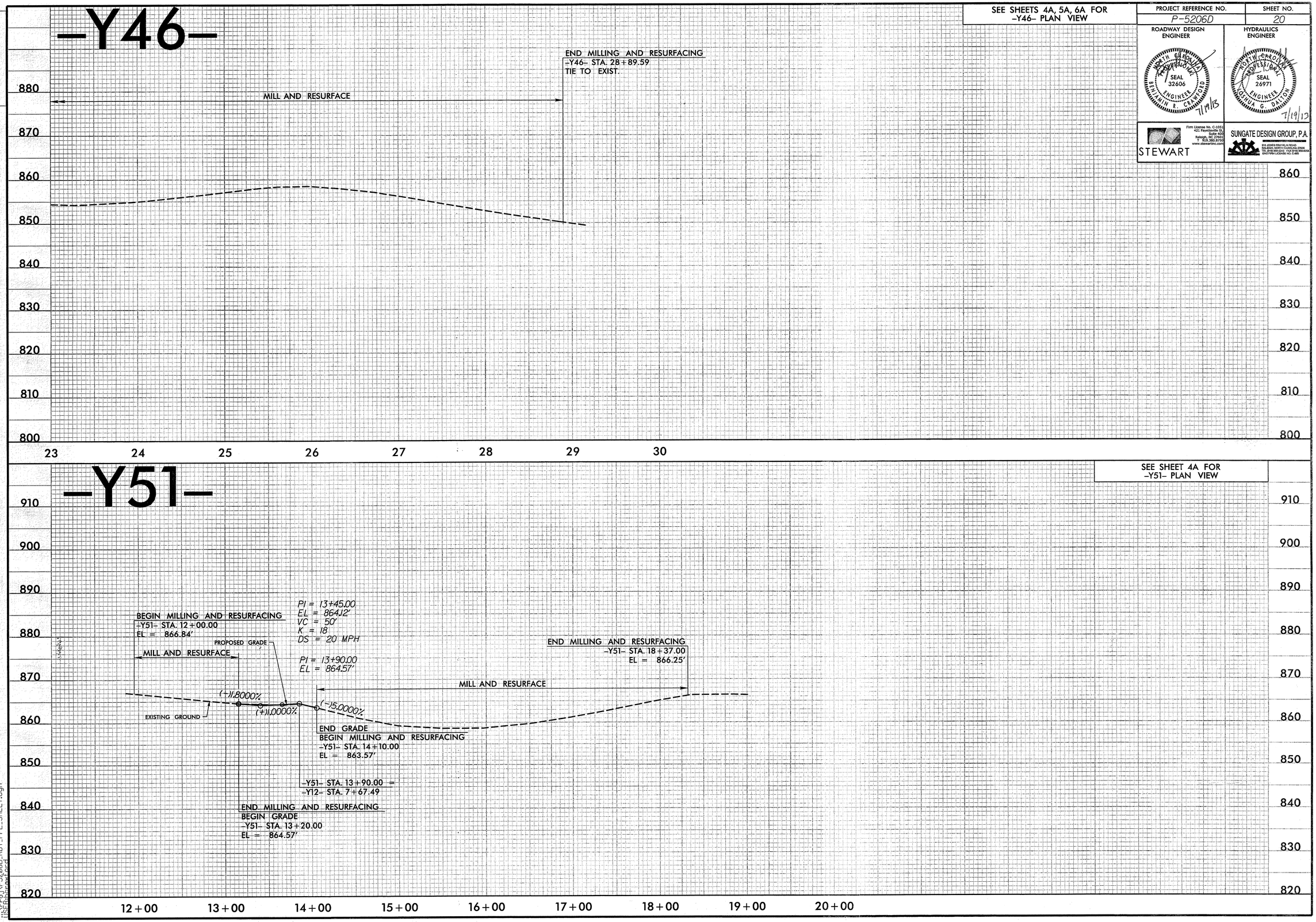
Firm License No. C-1051
421 Fayetteville St.
Suite 1100
Raleigh, NC 27601
T 919.380.8750
www.stewartinc.com

SUNGATE DESIGN GROUP, P.A.

815 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 851-2123 FAX (919) 851-6135
END FIRM LICENSE NO. C-955

DGN 0164DEL_P10b2

SEE SHEETS 4A, 5A, 6A FOR -Y46- PLAN VIEW



7/22/2013
jsteffner
P:\P5206D_RDY_PFL_SHEET.dgn