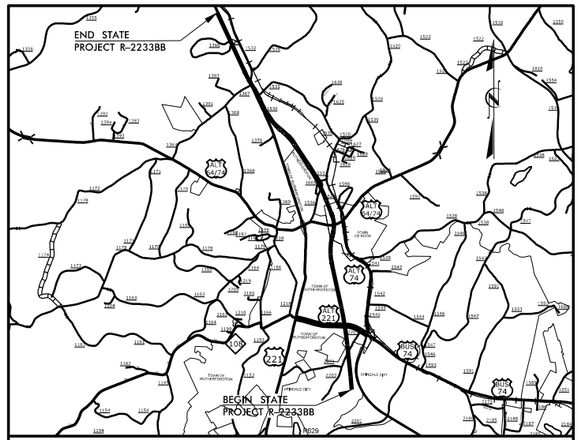
09/08/99

TIP PROJECT: R-2233BB

See Sheet 1A For Index of Sheets



VICINITY MAP

FINAL R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 37

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BB	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.S5		R/W & UTIL

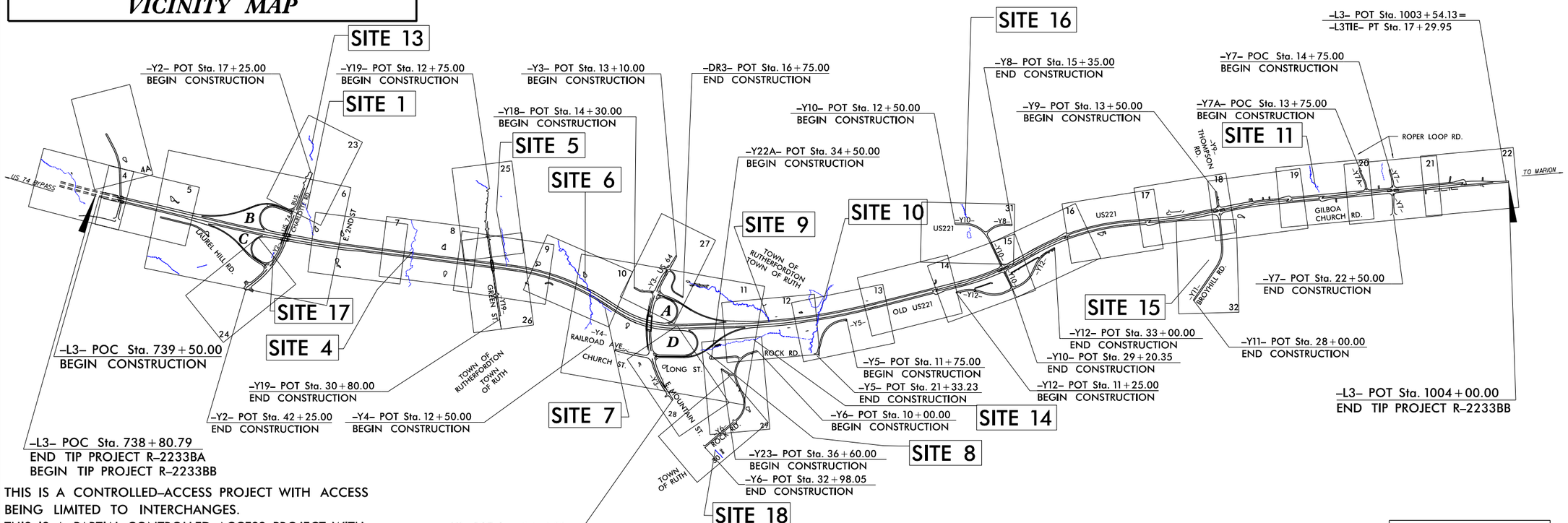
RUTHERFORD COUNTY

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

WETLAND AND SURFACE WATER IMPACTS PERMIT

NAD 83/NA 2011



THIS IS A CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWNS OF RUTHERFORDTON, RUTH, AND SPINDALE CITY

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NCDOT CONTACT: DERRICK WEAVER, P.E.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2020 = 13300
ADT 2040 = 14500
K = 9 %
D = 60 %
T = 9 % *
V = 70 MPH
* TTST 5% DUAL 4%
FUNC CLASS =
ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2233BB = 4.991 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BB = 0.019 MILES
TOTAL LENGTH TIP PROJECT R-2233BB = 5.010 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 28, 2017

LETTING DATE:
JANUARY 21, 2020

DENNIS J. MORY, P.E.
PROJECT ENGINEER

WILLIAM E. TILLITT, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919 881-9939
NC CO.A No. F-0929

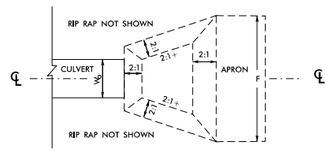
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 2 OF 37

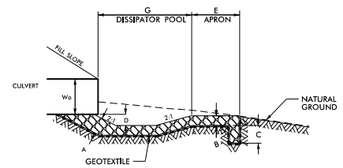
DETAIL 1
RIP-RAP ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN TYPE A	B	C	D	E	
A	2.0	2.0	2.5	2.5	2.0	
B	1.5	1.5	2.0	2.5	1.5	
C	2.0	2.0	2.0	3.0	2.0	
D	1.5	3.0	2.0	1.5	1.0	
E	7.5	10	10	7.5	5.0	
F	20	25	25	20	15	
G	15	25	20	15	10	
DDE (CY)	370	105	244	50	15	
GEOTEXTILE (SY)	370	70	185	40	20	
CL B RIP RAP (TONS)	125	45	55	45	N/A	
CL I RIP RAP (TONS)	105	N/A	N/A	N/A	15	
CL II RIP RAP (TONS)	25	50	115	N/A	N/A	

ALL DIMENSIONS APPROXIMATE



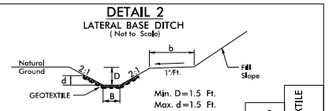
PLAN



℄ SECTION

BASIN #	LOCATION (AT OUTLET)	TYPE	SHEET
1	L3 STA 739+50 LT (CL I)	A	4
2	LPB STA. 17+50 RT (CL B)	B	6
3	L3 STA 778+91 LT (CL II)	A	6
4	L3 STA. 786+61 LT (CL B)	A	7
5	L3 STA. 808+38 LT (CL I)	A	9
6	L3 STA. 824+15 LT (CL B)	A	10
7	RPD STA. 20+15 RT (CL B)	A	11
8	L3 STA. 866+75 RT (CL I)	E	12
9	L3 STA. 867+10 RT (CL I)	A	12
10	L3 STA. 947+50 RT (CL B)	A	18
11	Y11 STA. 13+50 RT (CL B)	A	18
12	L3 STA. 965+10 LT (CL II)	C	20
13	L3 STA. 990+58 LT (CL B)	C	22
14	Y3 STA. 41+55 RT (CL B)	D	28
15	Y10 STA. 14+70 LT (CL II)	B	31
16	Y10 STA. 16+25 RT (CL II)	C	31
17	Y11 STA. 22+00 LT (CL I)	A	32

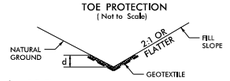
DETAIL 2
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 745+00 TO STA. 747+80 LT	5	1429	157	430
FROM Y25REV STA. 26+30 TO STA. 28+31 LT	5,33	70	113	305

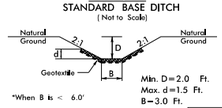
DETAIL 3
TOE PROTECTION
(Not to Scale)



d= 1.5 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM LPD STA. 16+22 TO 18+08 RT	11	86	250
FROM LPD STA. 18+70 TO 20+41 RT	11	79	230
FROM RPD STA. 16+71 TO 19+00 RT	11	105	300
FROM RPD STA. 19+92 TO 20+50 RT	11	27	80
FROM L STA. 814+50 TO 814+68 RT	9	5	12

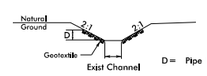
DETAIL 4
STANDARD BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
*When B is < 6.0'
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM RPD STA. 19+04 TO 19+86 RT	11	225	59	140
FROM Y5 STA. 11+75 TO 11+77 RT	13	256	1	10

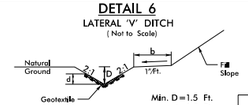
DETAIL 5
RIRPAP PAD AT JURISDICTIONAL STREAM
(Not to Scale)



D= Pipe Dia.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 814+83 LT	9	15	100
FROM RPD STA. 18+09 LT	11	29	100
FROM L3 STA. 995+71 LT	22	15	100
FROM L3 STA. 981+50 LT	21	27	100
FROM L3 STA. 968+80 LT	20	23	100
FROM Y6 STA. 10+25 RT	29	29	100
FROM Y11 STA. 22+33 LT	32	15	100
FROM Y6 STA. 32+05 LT	30	15	100

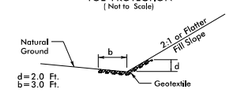
DETAIL 6
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 798+16 TO 799+00 LT	8	49	103	160
FROM L3 STA. 801+00 TO 802+01 LT	8	51	124	190
FROM L3 STA. 798+42 TO 800+00 RT	8	110	193	300
FROM RPD STA. 18+11 TO 26+22 LT	11	970	993	1500
FROM L3 STA. 831+47 TO 838+00 LT	10, 11	2048	799	1210
FROM Y18 STA. 16+00 TO 17+51 LT	11	104	185	280
FROM Y11 STA. 11+00 TO 13+50 LT	18	529	245	470
FROM L3 STA. 963+56 TO 966+53 RT	19, 20	206	360	550
FROM L3 STA. 961+50 TO 965+05 LT	19, 20	317	435	660
FROM L3 STA. 966+54 TO 968+52 RT	20	121	186	290
FROM L3 STA. 968+55 TO 971+50 RT	20	408	361	550
FROM L3 STA. 989+50 TO 989+87 RT	21	14	45	70
FROM L3 STA. 995+00 TO 996+62 RT	22	113	207	320
FROM Y6 STA. 20+74 TO 21+41 RT	30	24	82	130
FROM Y11 STA. 20+56 TO 24+13 RT	32	160	106	660

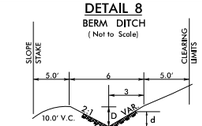
DETAIL 7
TOE PROTECTION
(Not to Scale)



d=2.0 Ft.
b=3.0 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y12 STA. 16+50 TO 18+00 LT	15	53	130
FROM Y11 STA. 12+42 TO 12+73 RT	18	11	30
FROM Y11 STA. 13+50 TO 14+50 LT	18, 32	36	90
FROM L3 STA. 981+57 TO 982+00 LT	21	15	40
FROM L3 STA. 980+25 TO 980+62 RT	21	13	40
FROM Y10 STA. 12+50 TO 13+50 RT	31	36	90
FROM L3 STA. 888+00 TO 894+50 RT	14	228	685
FROM Y25REV STA. 25+00 TO 25+85 LT	33	65	167

DETAIL 8
BERM DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
Type of Liner= CL B RIPRAP

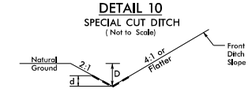
LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 31+00 TO 33+00 LT	6	178	92	260
FROM L3 STA. 782+00 TO 782+50 RT	7	44	23	70
FROM L3 STA. 811+45 TO 812+20 RT	9	67	35	100
FROM L3 STA. 815+87 TO 824+15 RT	9, 10	264	381	1080
FROM L3 STA. 824+15 TO 826+00 RT	10	65	85	240
FROM Y2 STA. 19+08 TO 21+00 LT	23	171	88	250

DETAIL 9
SPECIAL CUT DITCH
(Not to Scale)

Min. D=1.5 Ft.
Max. d=1.5 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 26+21 TO 27+67 RT	6	67	190
FROM L3 STA. 814+71 TO 816+50 RT	9	82	240
FROM Y19 STA. 22+20 TO 27+00 RT	9, 26	358	1010
FROM LPD STA. 18+08 TO 18+70 RT	11	29	90
FROM L3 STA. 883+96 TO 885+50 LT	13	71	200
FROM L3 STA. 890+50 TO 892+00 LT	14	69	200
FROM Y6 STA. 10+00 TO 10+90 LT	29	41	120
FROM Y6 STA. 11+40 TO 13+56 LT	29	99	280
FROM Y22A STA. 35+60 TO 37+00 RT	11, 29	64	190
FROM Y10 STA. 20+00 TO 22+00 LT	31	92	260
FROM Y10 STA. 31+00 TO 33+02 LT	33	92	260

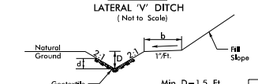
DETAIL 10
SPECIAL CUT DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max d=1.5 Ft.
Type of Liner= PSRM

LOCATION	SHEET	PSRM SY
FROM L3 STA. 807+64 TO 809+50 RT	8, 9	70
FROM Y7 STA. 14+75 TO 17+75 LT	21	330
FROM L3 STA. 776+50 TO 779+50 RT	6	200

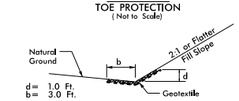
DETAIL 11
LATERAL 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 765+00 TO 767+15 RT	6	2276	99	170
FROM Y5 STA. 17+50 TO 20+50 LT	13	134	138	230
FROM L3 STA. 885+50 TO 890+50 LT	13, 14	176	230	380
FROM Y22A STA. 37+50 TO 40+00 RT	29	199	115	190
FROM Y10 STA. 13+50 TO 14+25 LT	31	96	35	60
FROM Y25REV STA. 26+00 TO 28+00 RT	5	130	92	259

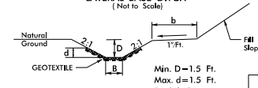
DETAIL 12
TOE PROTECTION
(Not to Scale)



d= 1.0 Ft.
b= 3.0 Ft.
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 794+00 TO 796+00 RT	7, 8	225	320
FROM L3 STA. 795+98 TO 797+57 LT	8	179	260
FROM L3 STA. 798+00 TO 798+33 RT	8	37	60
FROM L3 STA. 799+00 TO 801+00 LT	8	225	320
FROM L3 STA. 800+00 TO 801+00 RT	8	112	160
FROM L3 STA. 828+72 TO 830+50 LT	10	200	290
FROM Y18 STA. 15+27 TO 15+76 LT	11	55	80
FROM L3 STA. 963+00 TO 963+54 RT	19	61	90
FROM L3 STA. 980+75 TO 981+50 LT	21	84	120
FROM L3 STA. 989+50 TO 990+50 LT	21	113	160
FROM Y6 STA. 26+25 TO 28+50 LT	30	275	360
FROM Y6 STA. 29+00 TO 30+45 RT	30	177	240

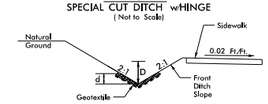
DETAIL 13
LATERAL BASE DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 832+55 TO 838+00 RT	10, 11	1954	332	1190
FROM Y10 STA. 17+80 TO 18+04 LT	31	21	15	60
FROM Y10 STA. 15+50 TO 15+70 RT	31	18	13	50

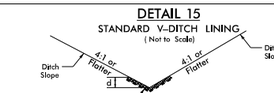
DETAIL 14
SPECIAL CUT DITCH wHINGE
(Not to Scale)



Min. D=1.5Ft.
Max. d=1.0Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y2 STA. 33+50 TO 40+00 LT	6	299	850

DETAIL 15
STANDARD V-DITCH LINING
(Not to Scale)



Max. d= 1.5 Ft.
Type of Liner= CL B Rip-Rap

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM RPD STA. 14+14 TO 16+71 RT	11	118	340
FROM RPD STA. 20+50 TO 23+40 RT	11	133	380
FROM L3 STA. 927+50 LT	17	15	50
FROM L3 STA. 944+50 LT	18	15	50
FROM L3 STA. 871+00 TO 872+00 LT	12	32	70

5/14/99

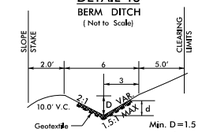
10/25/2017
DWilkins
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919 881-9939
NC CO.A No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING SHEET 3 OF 37

DETAIL 16
BERM DITCH
(Not to Scale)

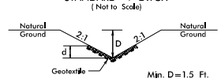


Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL B RIPRAP

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 951+32 TO 954+20 RT	18, 19	160	120	320

DETAIL 17
STANDARD 'V' DITCH
(Not to Scale)

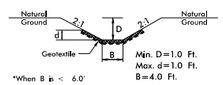


Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y3 STA. 31+05 TO 31+67 RT	11	24	29	90
FROM Y12 STA. 28+72 TO 29+20 LT	16	20	25	44
FROM Y12 STA. 10+43 TO 11+25 RT	15	40	38	110
FROM Y11 STA. 19+90 TO 20+25 RT	32	33	16	50

DETAIL 18
STANDARD BASE DITCH
(Not to Scale)



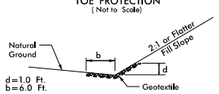
Min. D=1.0 Ft.
Max. d=1.0 Ft.
B=4.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
Y6 STA. 10+31 RT	29	16	30	90

DETAIL 19
TOE PROTECTION
(Not to Scale)

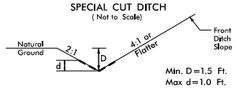


d=1.0 Ft.
b=6.0 Ft.

Type of Liner= CLASS II Rip-Rap

LOCATION	SHEET	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 921+00 TO 922+50 RT	16	148	240
FROM L3 STA. 996+00 TO 998+58 LT	22	292	475
FROM L3 STA. 997+00 TO 998+50 RT	22	195	315

DETAIL 20
SPECIAL CUT DITCH
(Not to Scale)

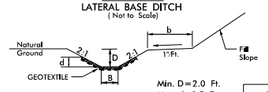


Min. D=1.5 Ft.
Max d=1.0 Ft.

Type of Liner= PSRM

LOCATION	SHEET	PSRM SY
FROM Y12 STA. 20+60 TO 22+50 RT	15	210
FROM Y12 STA. 24+00 TO 26+00 RT	15, 16	225
FROM Y12 STA. 28+50 TO 29+20 RT	16	80
FROM Y12 STA. 29+20 TO 31+00 RT	16	200
FROM Y11 STA. 26+00 TO 27+00 RT	32	110

DETAIL 21
LATERAL BASE DITCH
(Not to Scale)



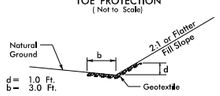
Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.
b=5.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y8 STA. 10+66 TO 12+90 RT	31	176	120	320
FROM L3 STA. 739+50 TO 742+66 LT	4, 5	784	245	655

DETAIL 22
TOE PROTECTION
(Not to Scale)

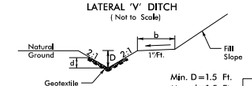


d= 1.0 Ft.
b= 3.0 Ft.

Type of Liner= CL 1 Rip-Rap

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 865+00 TO 866+49 LT	12	112	200
FROM L3 STA. 969+00 TO 971+00 LT	20	151	270

DETAIL 23
LATERAL 'V' DITCH
(Not to Scale)

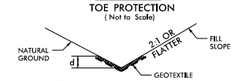


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL I Rip-Rap

LOCATION	SHEET	DDE CY	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 828+00 TO 831+80 RT	10	692	175	600
FROM Y11 STA. 12+42 TO 12+73 RT	18	62	14	50
FROM Y10 STA. 19+19 TO 20+00 LT	31	128	37	130
FROM Y11 STA. 15+50 TO 17+09 LT	32	137	73	250
FROM Y11 STA. 17+09 TO 18+00 LT	32	81	42	150
FROM Y11 STA. 18+00 TO 18+64 LT	32	15	29	110
FROM Y11 STA. 18+64 TO 19+45 LT	32	25	37	130
FROM Y11 STA. 19+45 TO 21+51 LT	32	186	95	330
FROM Y11 STA. 21+51 TO 22+03 LT	32	15	24	90

DETAIL 24
TOE PROTECTION
(Not to Scale)

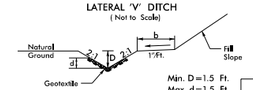


d= 1.5 Ft.

Type of Liner= CL 1 Rip-Rap

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 743+84 TO 745+00 LT	5	133	160
FROM DR3 STA. 12+00 TO 14+50 RT	11, 27	287	340
FROM Y10 STA. 16+50 TO 17+76 LT	31	145	170
FROM Y8 STA. 10+61 TO 11+73 LT	31	129	150
FROM L STA. 744+15 TO 747+50 RT	31	129	150

DETAIL 25
LATERAL 'V' DITCH
(Not to Scale)

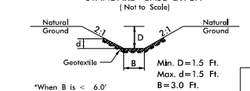


Min. D=1.5 Ft.
Max. d=1.5 Ft.
b=5.0 Ft.

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y3 STA. 18+85 TO 20+44 RT	11, 27	38	73	210

DETAIL 26
STANDARD BASE DITCH
(Not to Scale)



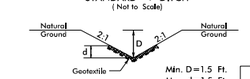
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=3.0 Ft.

*When B is < 6.0'

Type of Liner= CL B Rip-Rap

LOCATION	SHEET	DDE CY	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 767+26 TO 768+28 LT	6	596	71	190

DETAIL 27
STANDARD 'V' DITCH
(Not to Scale)



Min. D=1.5 Ft.
Max. d=1.5 Ft.

Type of Liner= CL II Rip-Rap

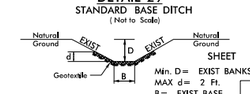
LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 797+67 TO 798+00 RT	8	18	15	70

DETAIL 28
SPECIAL CUT DITCH
(Not to Scale)

Min. D=1.5 Ft.

LOCATION	SHEET
FROM L3 STA. 779+47 TO 799+60 LT (-CUL16-)	6

DETAIL 29
STANDARD BASE DITCH
(Not to Scale)



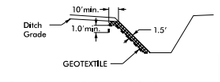
SHEET
Min. D= EXIST BANKS
MAX d= 2 Ft.
B= EXIST BASE

*When B is < 6.0'

Type of RIPRAP = SEE BELOW

LOCATION	SHEET	CL I RIP-RAP TON	GEOTEXTILE FABRIC SY
L3 STA. 867+12 RT (CL I)	12	20	110

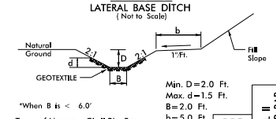
DETAIL 30
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 5 TONS,CL B Rip-Rap
Geotextile= 6 sy

LOCATION	SHEET	CL B RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM L3 STA. 797+65 RT	8	35	70
FROM L3 STA. 864+92 LT	12	35	70
FROM L3 STA. 882+80 RT	13	35	70
FROM Y11 STA. 22+27 LT	32	35	70

DETAIL 31
LATERAL BASE DITCH
(Not to Scale)



Min. D=2.0 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.

*When B is < 6.0'

Type of Liner= CL II Rip-Rap

LOCATION	SHEET	DDE CY	CL II RIP-RAP TON	GEOTEXTILE FABRIC SY
FROM Y10 STA. 26+25 TO 28+00 LT	15	55	107	390
FROM L3 STA. 910+00 TO 910+50 RT	15	25	83	115

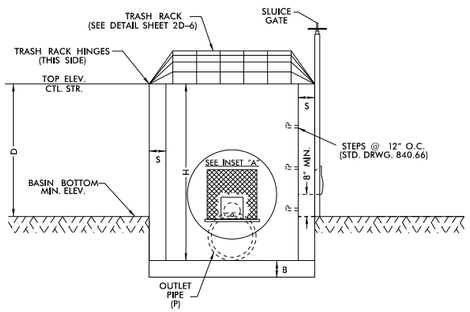
Dewberry
7610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

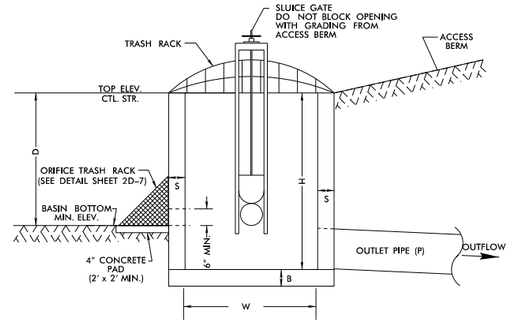
DETAIL K

DRY DETENTION BASIN DRAWDOWN STRUCTURE

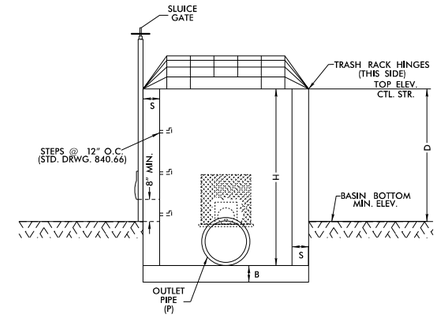
NOT TO SCALE



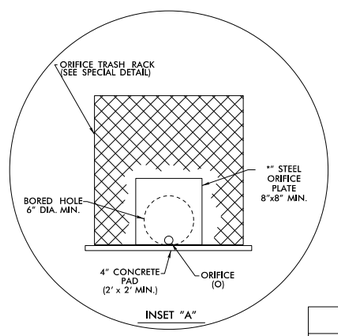
SIDE 1



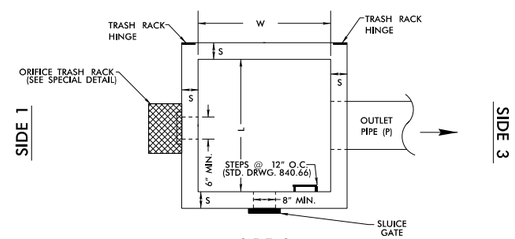
SIDE 2



SIDE 3



INSET "A"



SIDE 2

PLAN VIEW

TRASH RACK NOT SHOWN FOR CLARITY

NOTES:

1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE WQv ELEVATION.
2. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
3. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
4. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
5. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
6. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
7. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
8. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

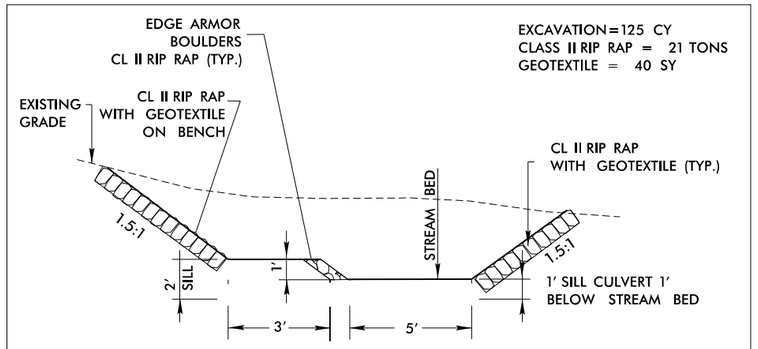
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
LPB 17+50 RT	655	8	12	957.50	960.50	3.0	956.00	4 X 4 X 4.5	2	957.50	30
L 907+00 RT	1514	8	12	1036.50	1039.00	2.5	1034.00	4 X 4 X 5	2	1036.50	30

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0029

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	2D-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

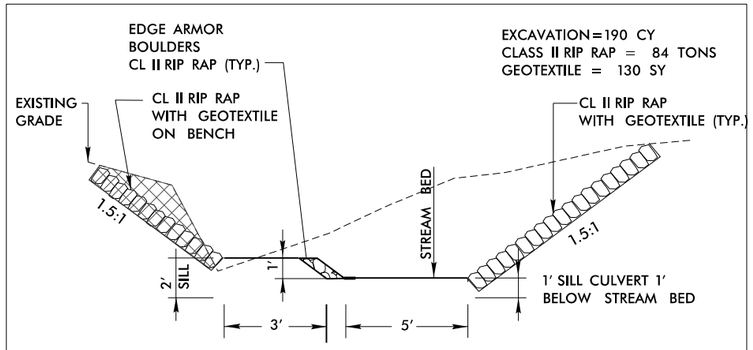
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 5 OF 37



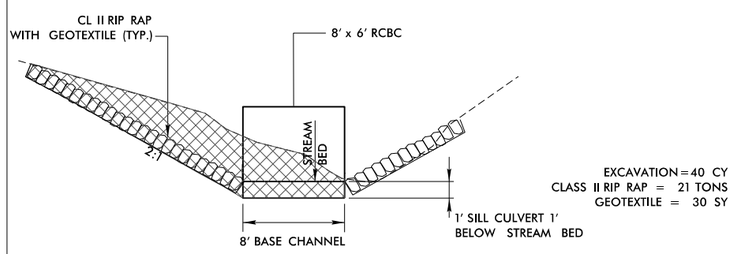
DETAIL G1 – FLOODPLAIN BENCH INLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G1
CULVERT 797+66



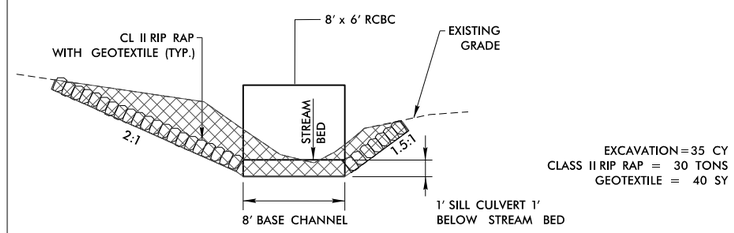
DETAIL G2 – FLOODPLAIN BENCH OUTLET CHANNEL DETAIL
STA 797+66 (LOOKING DOWNSTREAM)

DETAIL G2
CULVERT 797+66



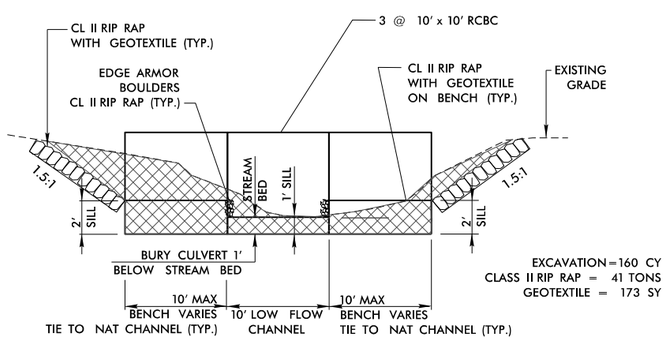
INLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

DETAIL H1
CULVERT 830+02



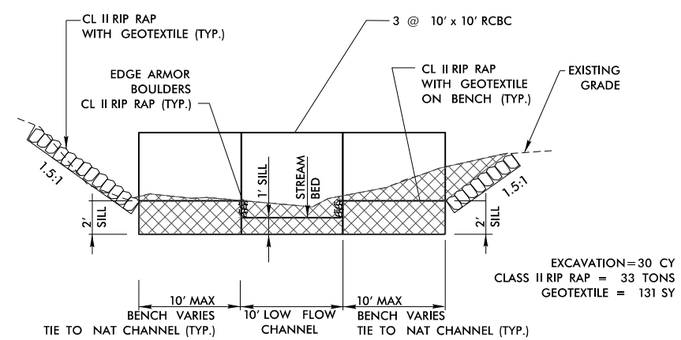
OUTLET CHANNEL DETAIL
STA 830+03 (LOOKING DOWNSTREAM)

DETAIL H2
CULVERT 830+02



FLOODPLAIN BENCH INLET CHANNEL DETAIL
STA 874+45 (LOOKING DOWNSTREAM)

DETAIL J1
CULVERT 874+45



FLOODPLAIN BENCH OUTLET CHANNEL DETAIL
STA 874+45 (LOOKING DOWNSTREAM)

DETAIL J2
CULVERT 874+45

5/14/99
10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1 SN

SITE 17 SO

SITE 17

MATCH TO SHEET 23 -Y2- STA. 23+00.00

MATCH TO SHEET 5 -L3- STA. 756+00.00

MATCH TO SHEET 7 -L3- STA. 782+00.00

MATCH TO SHEET 24 -Y25- STA. 32+00.00

MATCH TO SHEET 24 -Y2- STA. 37+50.00

Dewberry

PERMIT DRAWING SHEET 6 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRAFFIC DATA

B 87/114 A 12/15
10/15 128/145
65/88 US 221 BYPASS
C 71/97 D 94/112
192/255 206/260 *VPD IN 100s

PROPOSED SIGNAL

GRAPHIC SCALE
50 25 0 50 100
PLANS

SEE SHEETS 33 & 36 FOR -L3- PROFILE
SEE SHEETS 34 & 35 FOR -Y2- PROFILE
SEE SHEETS 18&19 FOR -RPB- PROFILE
SEE SHEETS 14&15 FOR -RPC- PROFILE
SEE SHEET 20 FOR -LPB- PROFILE
SEE SHEET 20 FOR -LPC- PROFILE
SEE SHEET 26-A FOR INTERSECTION DETAILS
SEE SHEETS 26-B, 26-C FOR SIGNING DETAILS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.:	COUNTY:
R-2233BB	RUTHERFORD
DESIGNED BY: RES	DATE: 6/1/2018
CHECKED BY: DJM	DATE: 6/1/2018

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 1 SN

SITE 1 SN

SITE 17 SO

SITE 17

B

C

MATCH TO SHEET 23 -Y2- STA. 23+00.00

MATCH TO SHEET 5 -L3- STA. 756+00.00

MATCH TO SHEET 7 -L3- STA. 782+00.00

MATCH TO SHEET 24 -Y25- STA. 32+00.00

MATCH TO SHEET 24 -Y2- STA. 37+50.00

Dewberry

PERMIT DRAWING SHEET 7 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

TRAFFIC DATA

B 87/114 A 12/15 CHARLOTTE RD. US 74 BUSINESS 10/13 65/88 US 221 BYPASS 128/145 C 71/97 D 94/112 192/255 206/300 *VPD IN 100s

PROPOSED SIGNAL

GRAPHIC SCALE 50 25 0 50 100 PLANS

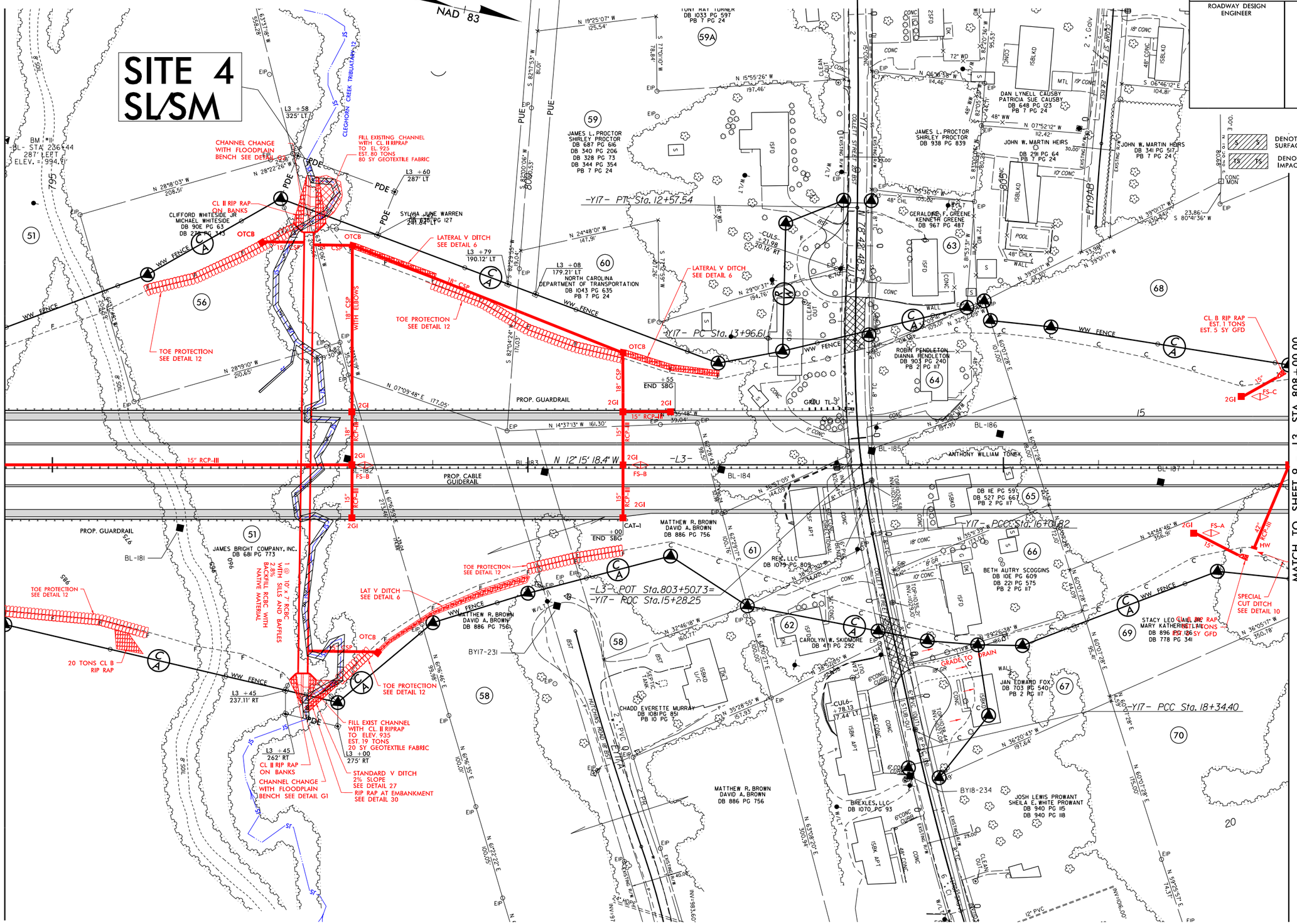
SEE SHEETS 35 & 36 FOR -L3- PROFILE
SEE SHEETS 44 & 45 FOR -Y25- PROFILE
SEE SHEETS 58 & 61 FOR -RPC- PROFILE
SEE SHEETS 59 & 61 FOR -RPB- PROFILE
SEE SHEET 59 FOR -ARPB- PROFILE
SEE SHEET 59 FOR -ARPC- PROFILE
SEE SHEET 36-A FOR INTERCHANGE DETAILS
SEE SHEET 36-B FOR INTERCHANGE DETAILS
SEE SHEETS 20-1 THRU 20-7 FOR DRAINAGE DETAILS

LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.	COUNTY:
R-2233BB	RUTHERFORD
DESIGNED BY: RES	6/1/2018
CHECKED BY: DJM	DATE: 6/1/2018

PERMIT DRAWING
SHEET 8 OF 37

PROJECT REFERENCE NO.	SHEET NO.
	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



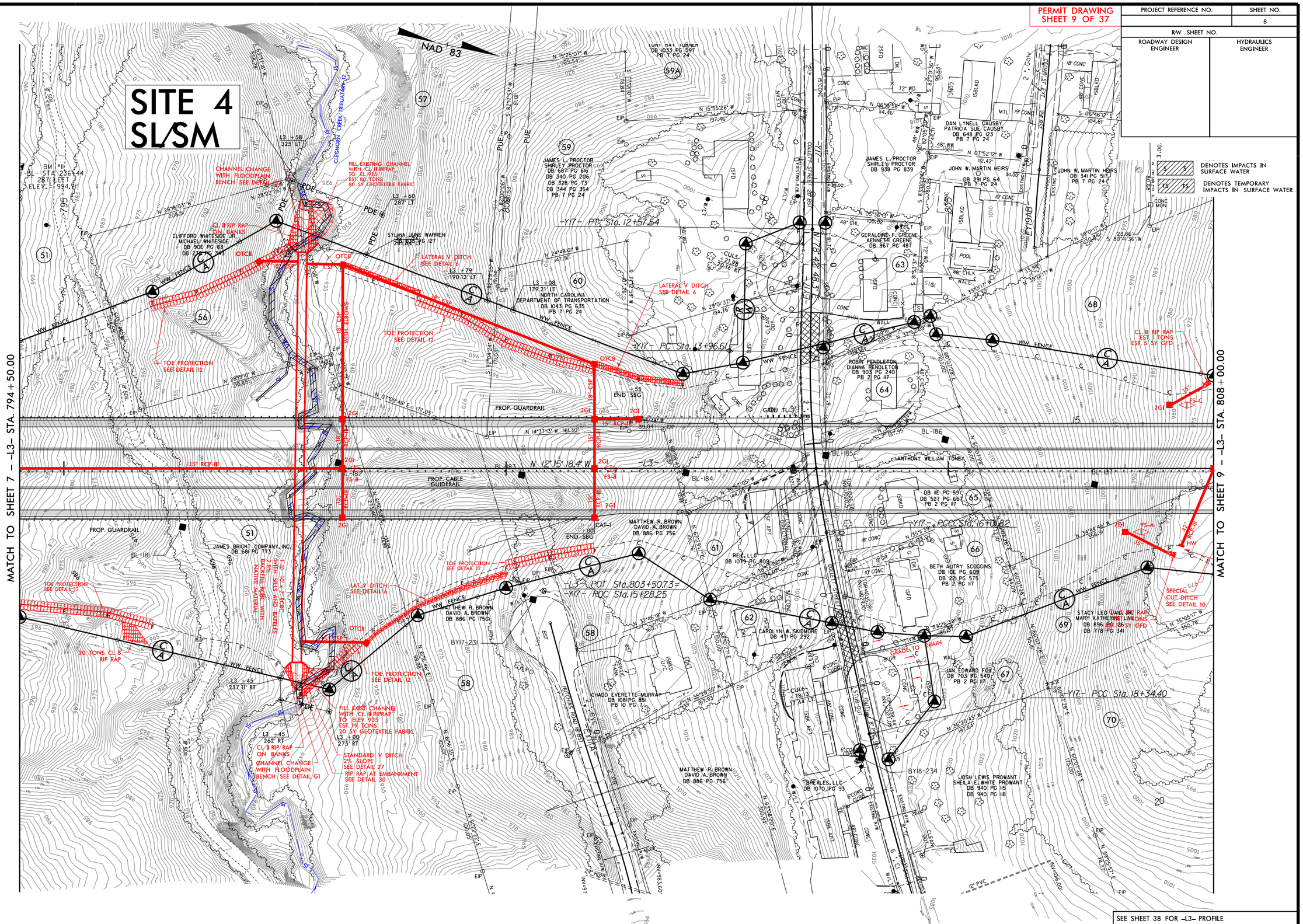
5/14/99

10252017
DSWEBKRY
R2223198_Permit Drawings_20171025.pdf

5/14/99

PERMIT DRAWING
SHEET 9 OF 37

PROJECT REFERENCE NO.	SHEET NO.
	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

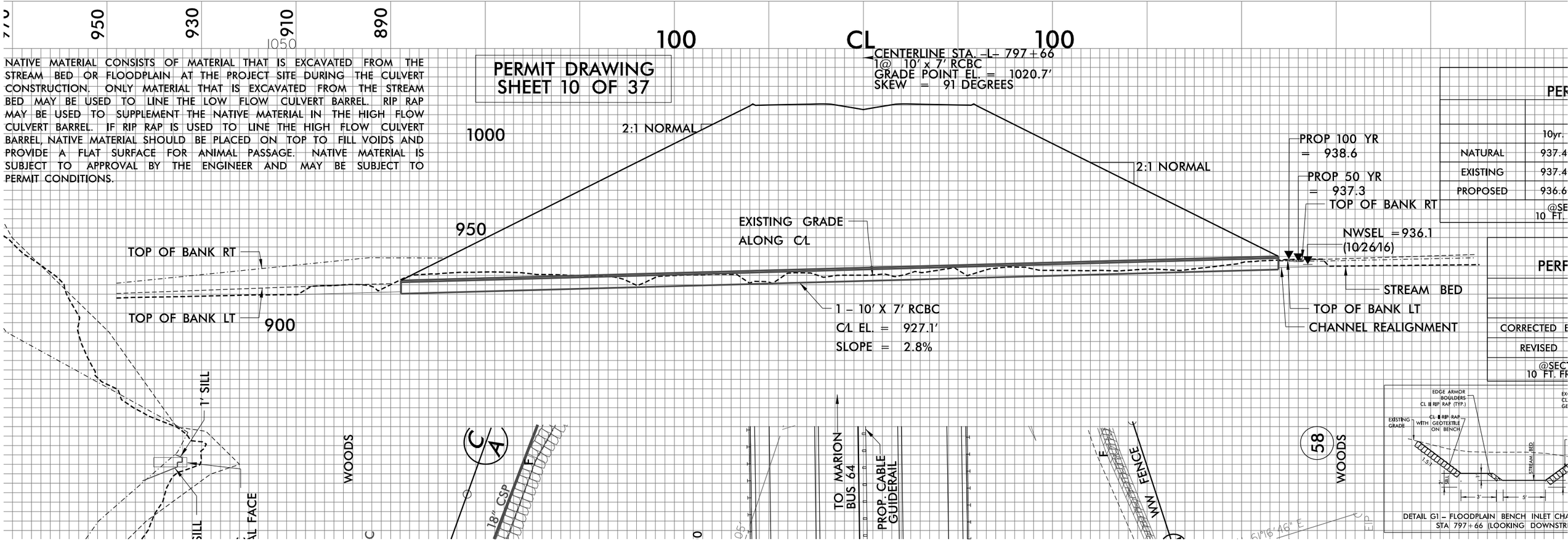


SEE SHEET 38 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

10/25/2017
DEWBERRY
R2123-38_Permit Drawings_20171025.pdf

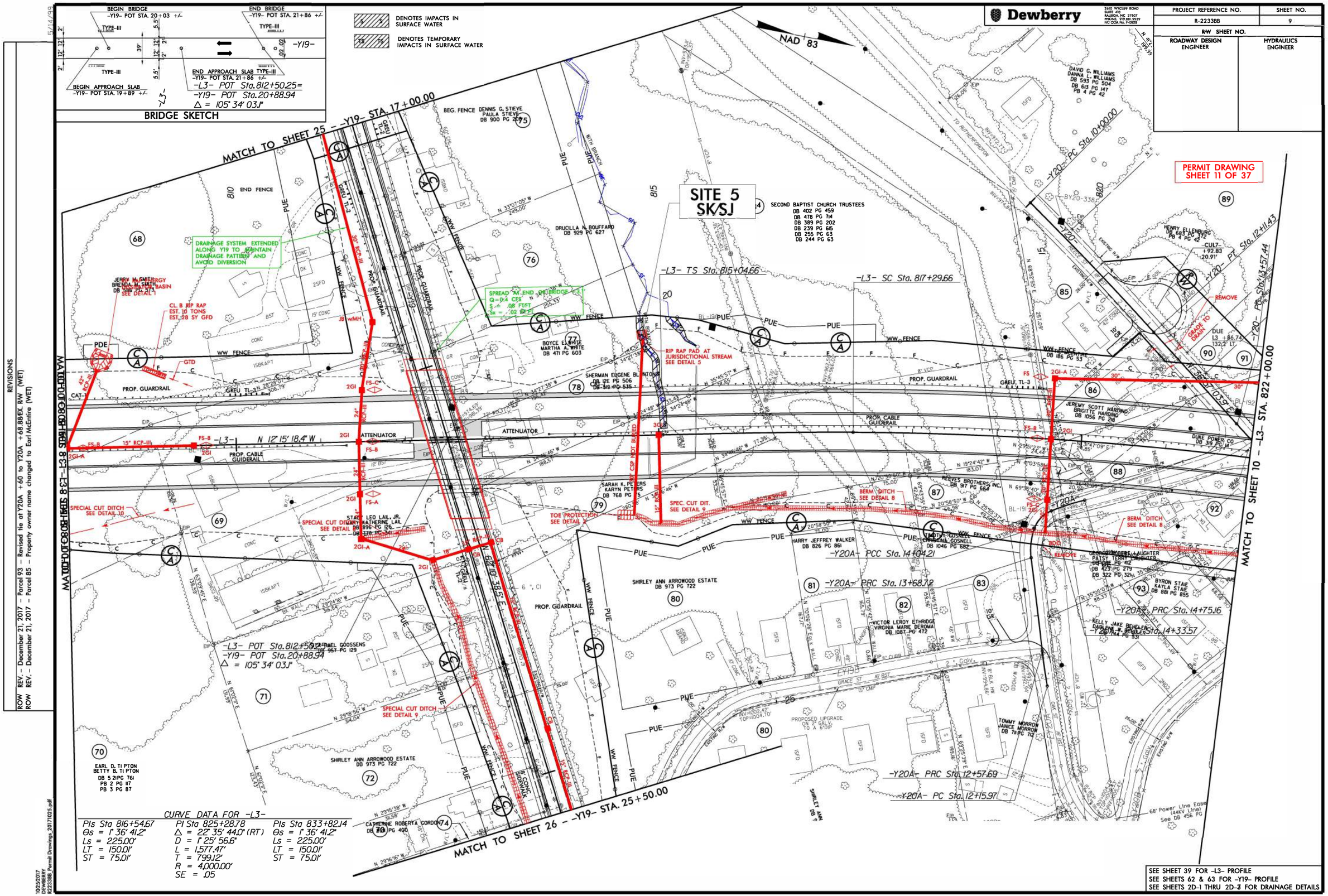
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING THE CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

PERMIT DRAWING
SHEET 10 OF 37

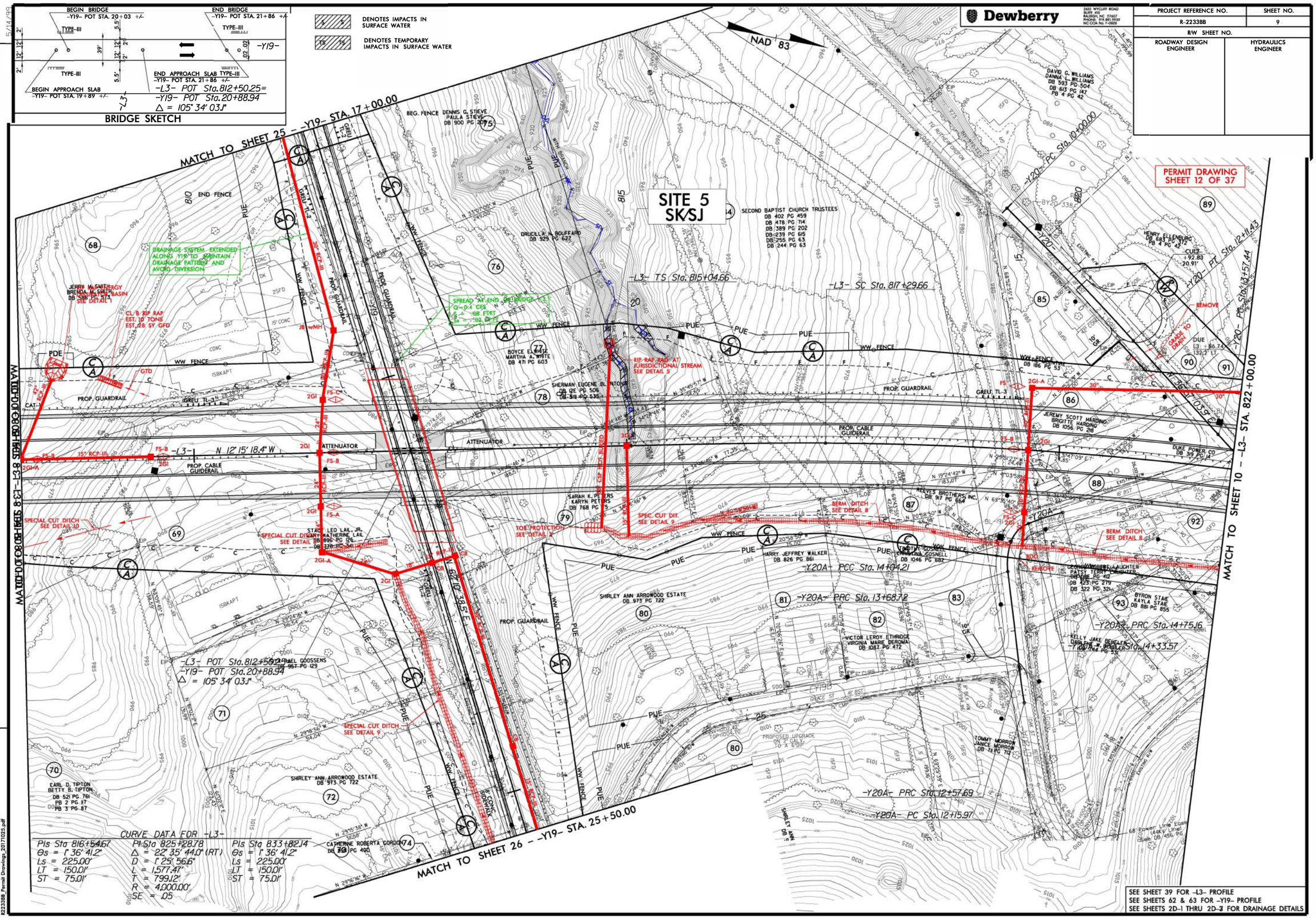


	PER	
	10yr	
NATURAL	937.4	
EXISTING	937.4	
PROPOSED	936.6	
	@SE 10 FT.	

	PERF
CORRECTED E	
REVISED	
	@SECT 10 FT. FR



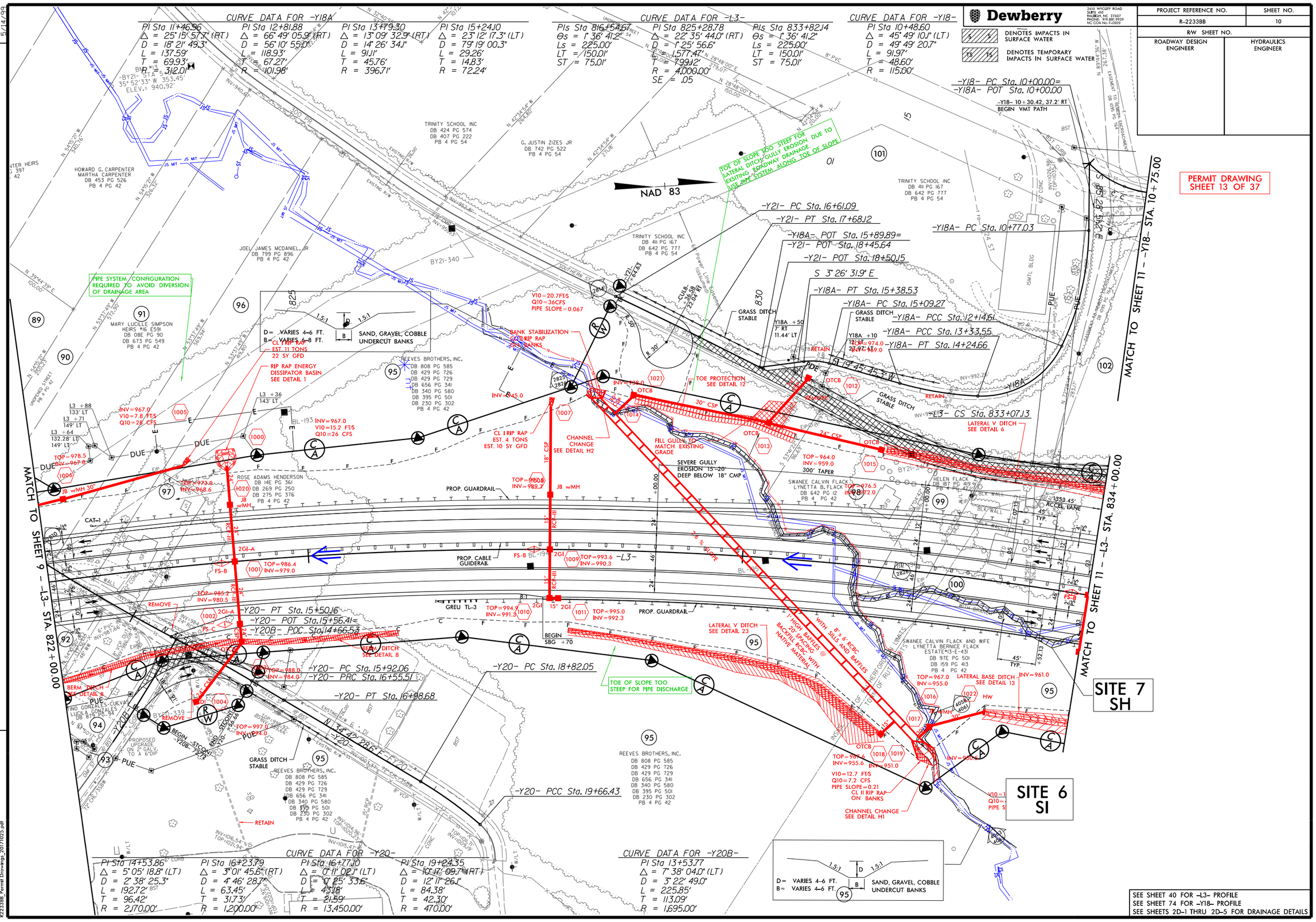
SEE SHEET 39 FOR -L3- PROFILE
SEE SHEETS 62 & 63 FOR -Y19- PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS



REVISIONS

ROW REV. - December 21, 2017 - Parcel 93 - Revised tie at Y20A +60 to Y20A +68.88/EX. R/W (WET)
ROW REV. - December 21, 2017 - Parcel 85 - Property owner name changed to Earl McEntire (WET)

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf


Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO.
R-2233BB
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PERMIT DRAWING
SHEET 13 OF 37
CURVE DATA FOR -Y18A
PI Sta 11+46.96
△ = 25° 15' 57.7" (RT)
D = 18° 21' 49.3"
L = 137.59'
T = 69.93'
R = 312.01'
PI Sta 12+81.88
△ = 66° 49' 05.9" (RT)
D = 56° 10' 55.0"
L = 118.93'
T = 67.27'
R = 101.98'
PI Sta 13+79.30
△ = 13° 09' 32.9" (RT)
D = 14° 26' 34.1"
L = 91.11'
T = 45.76'
R = 396.71'
PI Sta 15+24.10
△ = 23° 12' 17.3" (LT)
D = 79° 19' 00.3"
L = 29.26'
T = 14.83'
R = 72.24'
CURVE DATA FOR -L3-
PIs Sta 816+54.67
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
PI Sta 825+28.78
△ = 22° 35' 44.0" (RT)
D = 1° 25' 56.6"
L = 1,577.47'
T = 799.12'
R = 4,000.00'
SE = .05
PIs Sta 833+82.14
Θs = 1° 36' 41.2"
Ls = 225.00'
LT = 150.01'
ST = 75.01'
CURVE DATA FOR -Y18-
PI Sta 10+48.60
△ = 45° 49' 10.1" (LT)
D = 49° 49' 20.7"
L = 91.97'
T = 48.60'
R = 115.00'
-Y18- PC Sta. 10+00.00=
-Y18A- POT Sta. 10+00.00
-Y18- 10+30.42, 37.2' RT
BEGIN VMT PATH
NAD 83
TOE OF SLOPE TOO STEEP FOR LATERAL DITCH/GULLY EROSION DUE TO EXISTING ROADWAY DRAINAGE. USE PIPE SYSTEM ALONG TOE OF SLOPE
PIPE SYSTEM CONFIGURATION REQUIRED TO AVOID DIVERSION OF DRAINAGE AREA
-Y21- PC Sta. 16+61.09
-Y21- PT Sta. 17+68.12
-Y18A- POT Sta. 15+89.89=
-Y21- POT Sta. 18+45.64
-Y21- POT Sta. 18+50.15
S 3° 26' 31.9" E
-Y18A- PT Sta. 15+38.53
-Y18A- PC Sta. 15+09.27
-Y18A- PC Sta. 10+77.03
-Y18A- PCC Sta. 12+14.61
-Y18A- PCC Sta. 13+33.55
-Y18A- PT Sta. 14+24.66
-L3- CS Sta. 833+07.13
MATCH TO SHEET 11 - -Y18- STA. 10+75.00
MATCH TO SHEET 11 - -L3- STA. 834+00.00
MATCH TO SHEET 9 - -L3- STA. 822+00.00
SITE 7
SH
SITE 6
SI
D = VARIES 4-6 FT.
B = VARIES 4-6 FT.
SAND, GRAVEL, COBBLE UNDERCUT BANKS
BANK STABILIZATION CL II RIP RAP ON BANKS
CL I RIP RAP EST. 11 TONS 22 SY GFD
RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1
V10=20.7FTS Q10=36CFS PIPE SLOPE=0.067
TOE PROTECTION SEE DETAIL 12
CHANNEL CHANGE SEE DETAIL H2
CL I RIP RAP EST. 4 TONS EST. 10 SY GFD
FILL GULLY TO MATCH EXISTING GRADE
SEVERE GULLY EROSION 15-20' DEEP BELOW 18" CMP
LATERAL V DITCH SEE DETAIL 6
LATERAL V DITCH SEE DETAIL 23
LATERAL BASE DITCH SEE DETAIL 13
BERM DITCH SEE DETAIL 8
TOE OF SLOPE TOO STEEP FOR PIPE DISCHARGE
CHANNEL CHANGE SEE DETAIL H1
-Y20- PT Sta. 15+50.16
-Y20- POT Sta. 15+56.41=
-Y20B- POC Sta. 14+66.53
-Y20- PC Sta. 15+92.06
-Y20- PRC Sta. 16+55.51
-Y20- PC Sta. 18+82.05
-Y20- PT Sta. 16+98.68
-Y20- PCC Sta. 19+66.43
CURVE DATA FOR -Y20-
PI Sta 14+53.86
△ = 5° 05' 18.8" (LT)
D = 2° 38' 25.3"
L = 192.72'
T = 96.42'
R = 2,170.00'
PI Sta 16+23.79
△ = 3° 01' 45.6" (RT)
D = 4° 46' 28.7"
L = 63.45'
T = 31.73'
R = 1,200.00'
PI Sta 16+77.10
△ = 0° 11' 02.1" (LT)
D = 0° 25' 33.6"
L = 43.18'
T = 21.59'
R = 13,450.00'
PI Sta 19+24.35
△ = 10° 17' 09.7" (RT)
D = 12° 11' 26.1"
L = 84.38'
T = 42.30'
R = 470.00'
CURVE DATA FOR -Y20B-
PI Sta 13+53.77
△ = 7° 38' 04.0" (LT)
D = 3° 22' 49.0"
L = 225.85'
T = 113.09'
R = 1,695.00'
SEE SHEET 40 FOR -L3- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS
REVISIONS
5/14/99
J0252017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

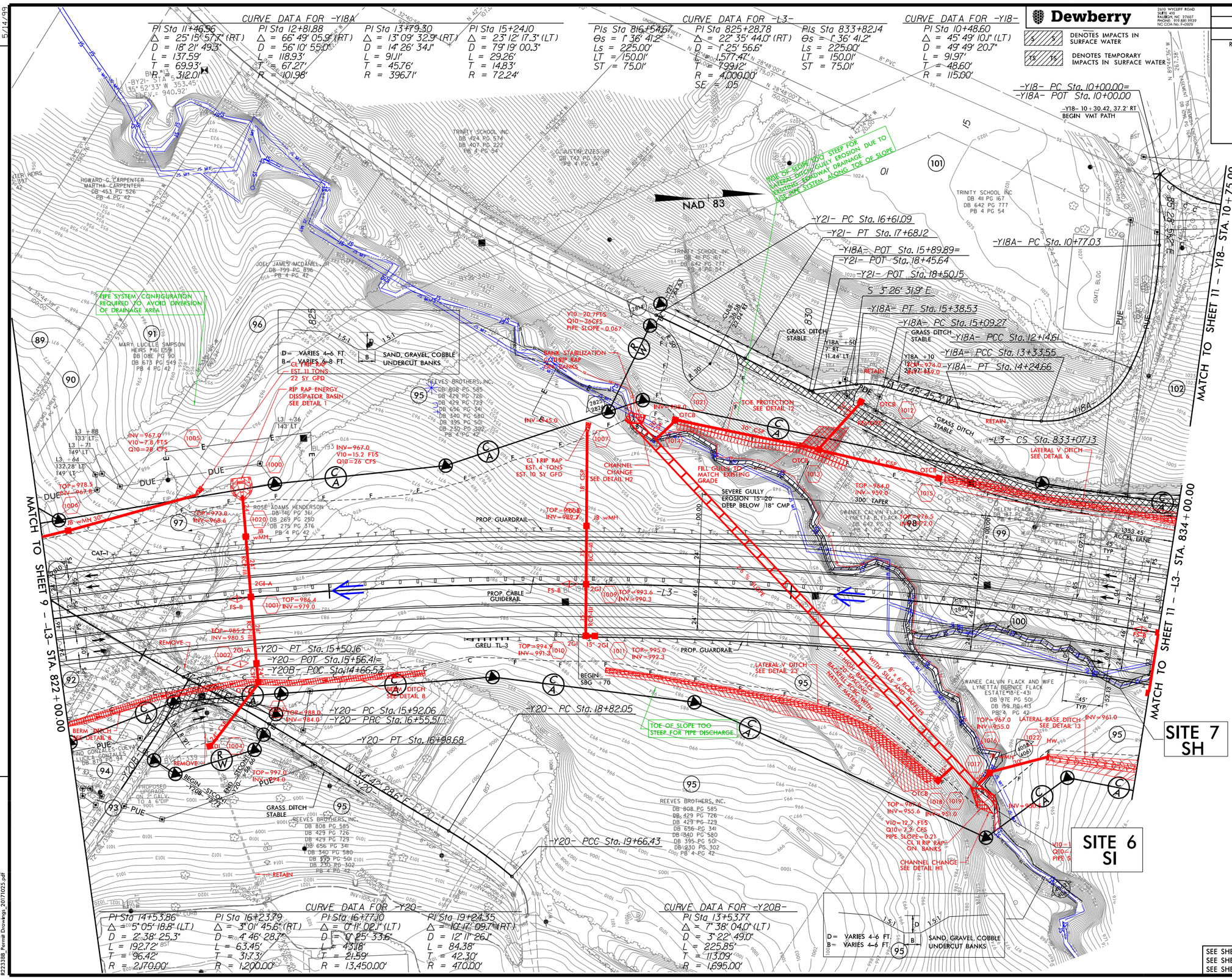
PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 14 OF 37



CURVE DATA FOR -Y18A-

PI Sta 11+46.96	PI Sta 12+81.88	PI Sta 13+79.30	PI Sta 15+24.10
Δ = 25° 15' 57.7" (RT)	Δ = 66° 49' 05.9" (RT)	Δ = 13° 09' 32.9" (RT)	Δ = 23° 12' 17.3" (LT)
D = 18° 21' 49.3"	D = 56° 10' 55.0"	D = 14° 26' 34.1"	D = 79° 19' 00.3"
L = 137.59'	L = 118.93'	L = 91.11'	L = 29.26'
T = 69.93'	T = 67.27'	T = 45.76'	T = 14.83'
R = 312.01'	R = 101.98'	R = 396.71'	R = 72.24'

CURVE DATA FOR -L3-

PIs Sta 816+54.67	PI Sta 825+28.78	PIs Sta 833+82.14
Θs = 1° 36' 41.2"	Δ = 22° 35' 44.0" (RT)	Θs = 1° 36' 41.2"
Ls = 225.00'	D = 1° 25' 56.6"	Ls = 225.00'
LT = 150.01'	L = 1,577.47'	LT = 150.01'
ST = 75.01'	T = 799.12'	ST = 75.01'
	R = 4,000.00'	
	SE = .05'	

CURVE DATA FOR -Y18-

PI Sta 10+48.60
Δ = 45° 49' 10.1" (LT)
D = 49° 49' 20.7"
L = 91.97'
T = 48.60'
R = 115.00'

CURVE DATA FOR -Y20-

PI Sta 14+53.86	PI Sta 16+23.79	PI Sta 16+77.10	PI Sta 19+24.35
Δ = 5° 05' 18.8" (LT)	Δ = 3° 01' 45.6" (RT)	Δ = 0° 11' 02.1" (LT)	Δ = 10° 17' 09.7" (RT)
D = 2° 38' 25.3"	D = 4° 46' 28.7"	D = 0° 25' 33.6"	D = 12° 11' 26.1"
L = 192.72'	L = 63.45'	L = 43.18'	L = 84.38'
T = 96.42'	T = 31.73'	T = 21.59'	T = 42.30'
R = 2,170.00'	R = 1,200.00'	R = 13,450.00'	R = 470.00'

CURVE DATA FOR -Y20B-

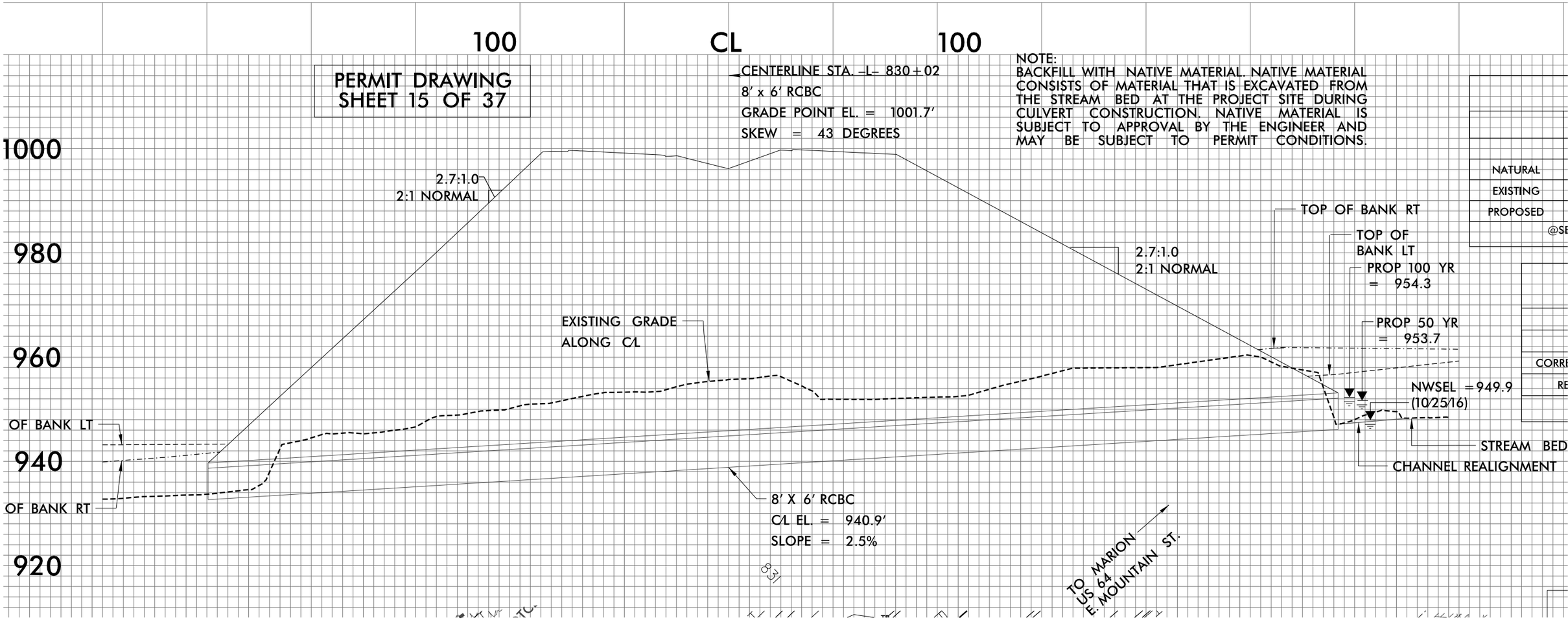
PI Sta 13+53.77
Δ = 7° 38' 04.0" (LT)
D = 3° 22' 49.0"
L = 225.85'
T = 113.09'
R = 1,695.00'

SEE SHEET 40 FOR -L3- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

J0252017
©DEWBERRY
R2233BB_Permit Drawings_20171025.pdf


100
CL
100
PERMIT DRAWING
SHEET 15 OF 37
CENTERLINE STA. –L– 830+02
8' x 6' RCBC
GRADE POINT EL. = 1001.7'
SKEW = 43 DEGREES
NOTE:
BACKFILL WITH NATIVE MATERIAL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
1000
980
960
940
920
2.7:1.0
2:1 NORMAL
EXISTING GRADE
ALONG C/L
TOP OF BANK RT
TOP OF
BANK LT
PROP 100 YR
= 954.3
2.7:1.0
2:1 NORMAL
PROP 50 YR
= 953.7
NWSEL = 949.9
(10/25/16)
STREAM BED
CHANNEL REALIGNMENT
OF BANK LT
OF BANK RT
8' X 6' RCBC
C/L EL. = 940.9'
SLOPE = 2.5%
TO MARION
US 64
E. MOUNTAIN ST.
NATURAL
EXISTING
PROPOSED

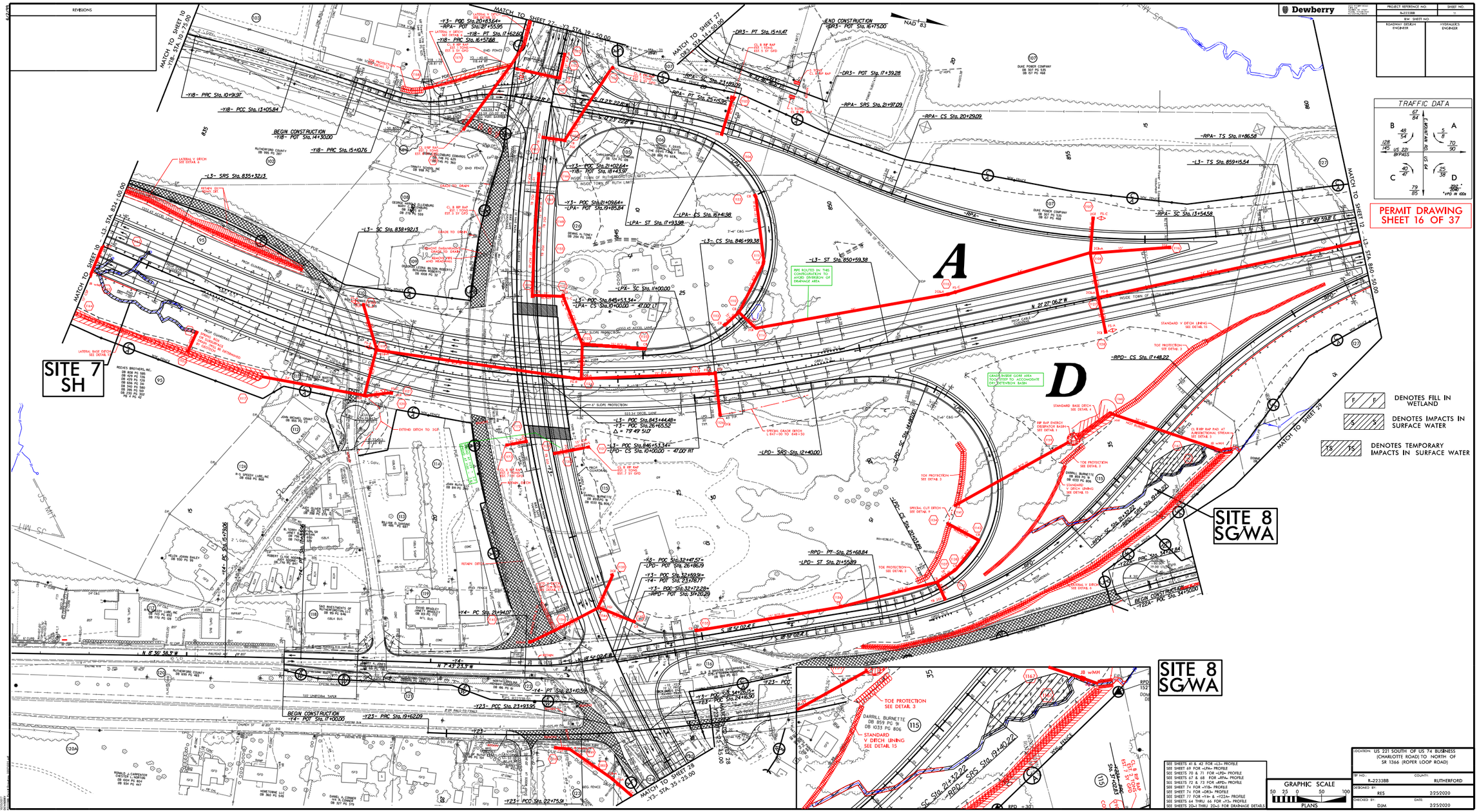
REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TRAFFIC DATA

PERMIT DRAWING
SHEET 16 OF 37



SEE SHEETS 41 & 42 FOR -L3- PROFILE
SEE SHEET 69 FOR -LPA- PROFILE
SEE SHEETS 70 & 71 FOR -LPD- PROFILE
SEE SHEETS 67 & 68 FOR -RPA- PROFILE
SEE SHEETS 72 & 73 FOR -RPD- PROFILE
SEE SHEET 74 FOR -Y18- PROFILE
SEE SHEET 74 FOR -DR3- PROFILE
SEE SHEET 77 FOR -Y4- & -Y22A- PROFILE
SEE SHEETS 64 THRU 66 FOR -Y3- PROFILE
SEE SHEETS 20-1 THRU 20-5 FOR DRAINAGE DETAILS

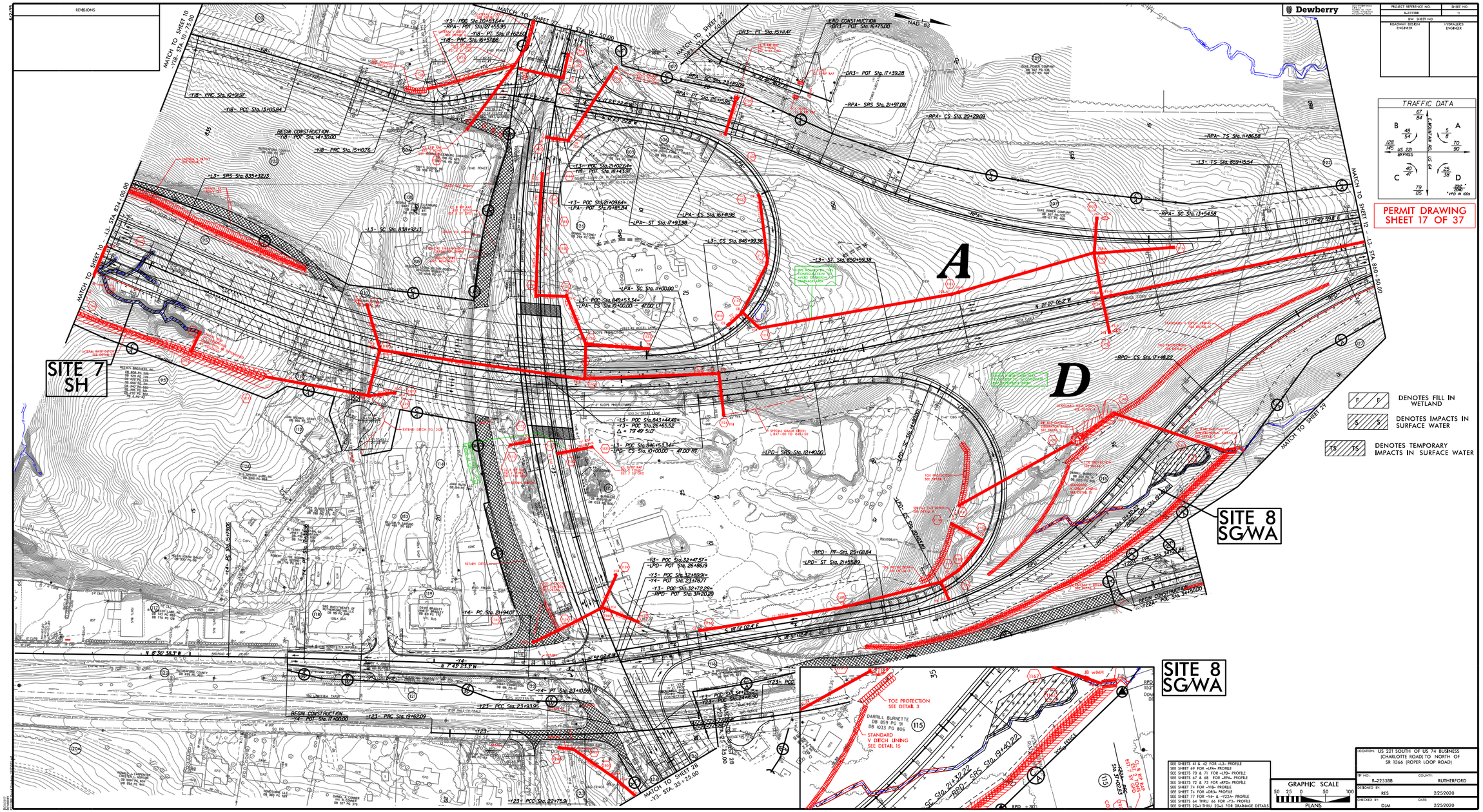
LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO. R-2233BB	COUNTY: RUTHERFORD
DESIGNED BY: RES	2/25/2020
CHECKED BY: DJM	DATE: 2/25/2020

REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

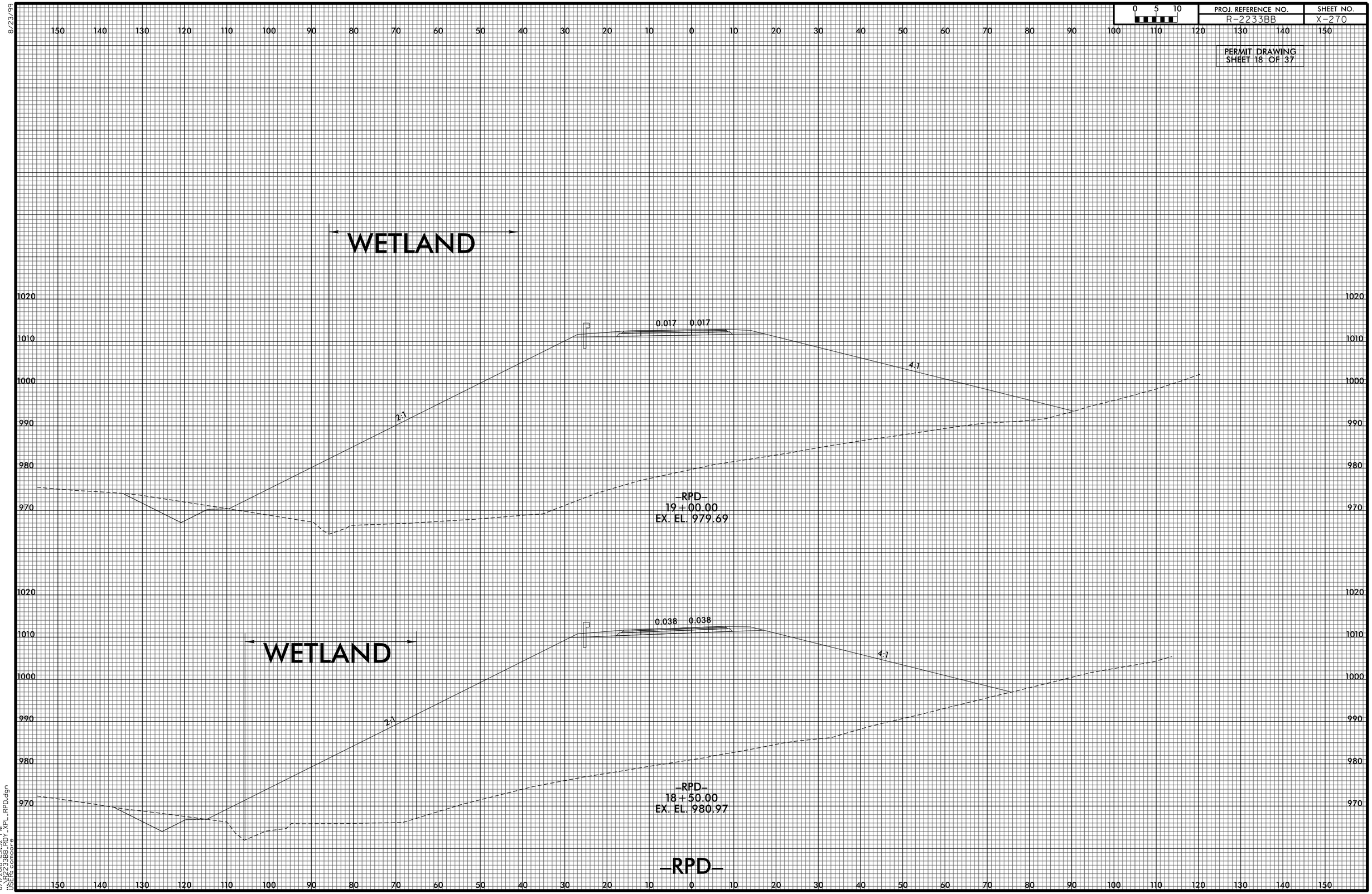


LOCATION: US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD) TO NORTH OF SR 1366 (ROPER LOOP ROAD)

TIP NO.: R-2233BB	COUNTY: RUTHERFORD
DESIGNED BY: RES	2/25/2020
CHECKED BY: DJM	DATE: 2/25/2020

PROJ. REFERENCE NO.	SHEET NO.
R-2233BB	X-270

PERMIT DRAWING
SHEET 18 OF 37



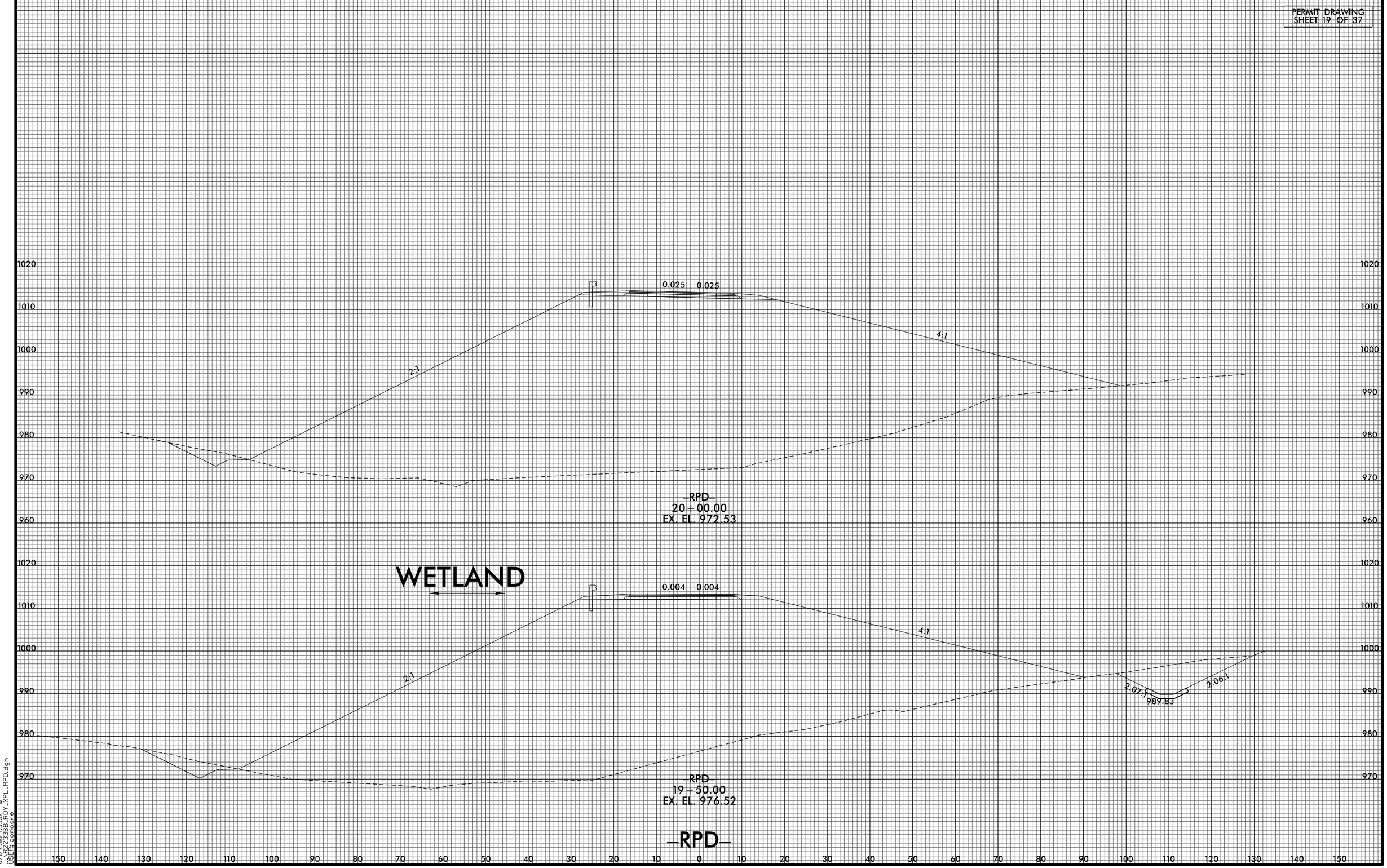
8/23/99

6/1/2018 1:51:52 PM
R-2233BB_RDY_XPL_RPD.dgn
USER: comoore

PROJ. REFERENCE NO.	SHEET NO.
R-2233BB	X-271

0 5 10

PERMIT DRAWING
SHEET 19 OF 37



8/23/99

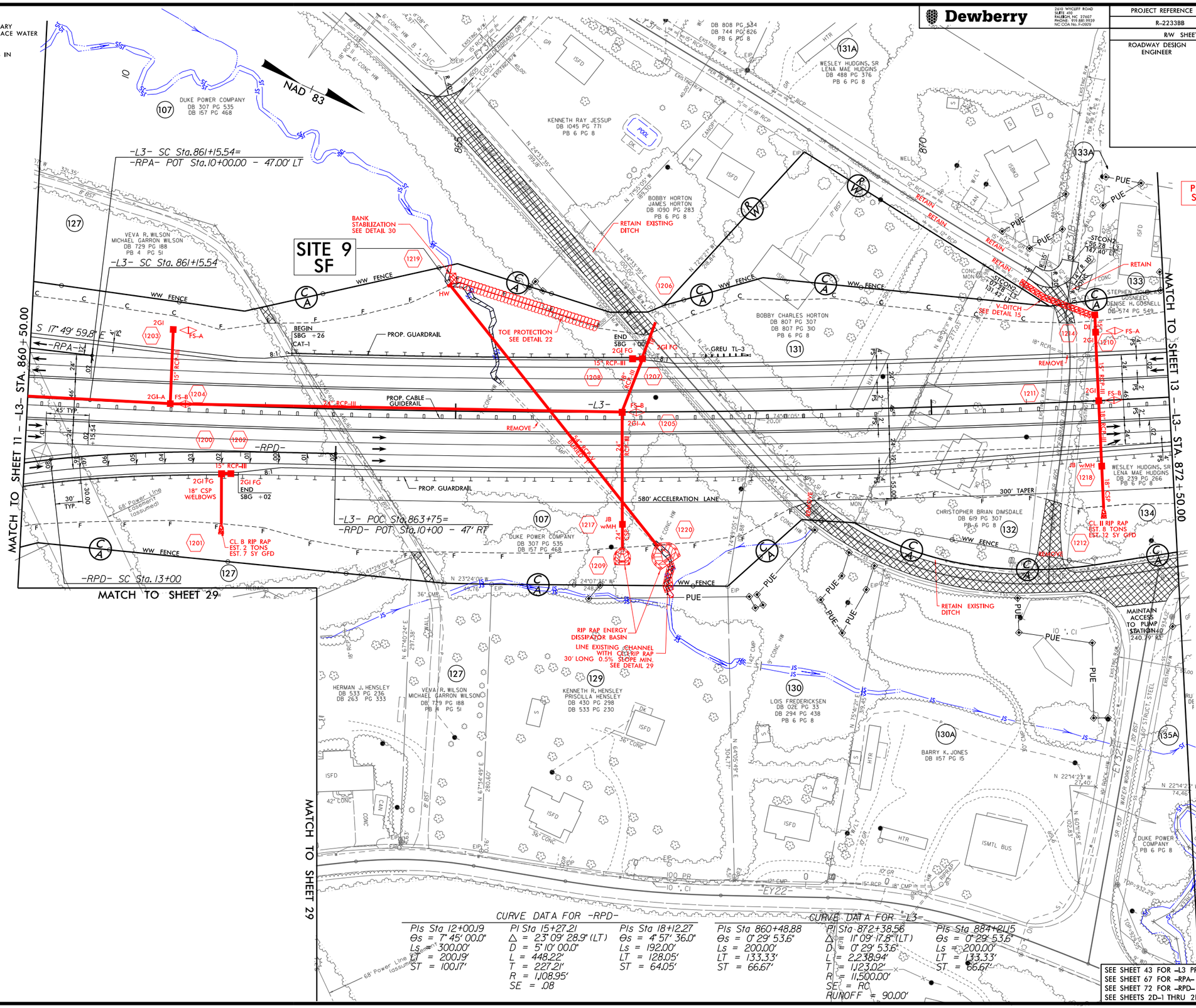
6/1/2018 1:53:12 PM
R2233BB_HDY_XPL_RPD.dgn
USER: rcamoore

5/14/99

REVISIONS

TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S / S DENOTES IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 20 OF 37

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CURVE DATA FOR -RPD-

PIs Sta 12+00.19	PI Sta 15+27.21	PIs Sta 18+12.27	PIs Sta 860+48.88
Θs = 7° 45' 00.0"	Δ = 23° 09' 28.9" (LT)	Θs = 4° 57' 36.0"	Θs = 0° 29' 53.6"
Ls = 300.00'	D = 5° 10' 00.0"	Ls = 192.00'	Ls = 200.00'
LT = 200.19'	L = 448.22'	LT = 128.05'	LT = 133.33'
ST = 100.17'	T = 227.21'	ST = 64.05'	ST = 66.67'
	R = 1,108.95'		
	SE = .08		

CURVE DATA FOR -L3-

PI Sta 872+38.56	PIs Sta 884+21.15
Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
D = 0° 29' 53.6"	Ls = 200.00'
L = 2,238.94'	LT = 133.33'
T = 1,123.02'	ST = 66.67'
R = 11,500.00'	
SE = RC	
RUNOFF = 90.00'	

SEE SHEET 43 FOR -L3 PROFILE
SEE SHEET 67 FOR -RPA- PROFILE
SEE SHEET 72 FOR -RPD- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

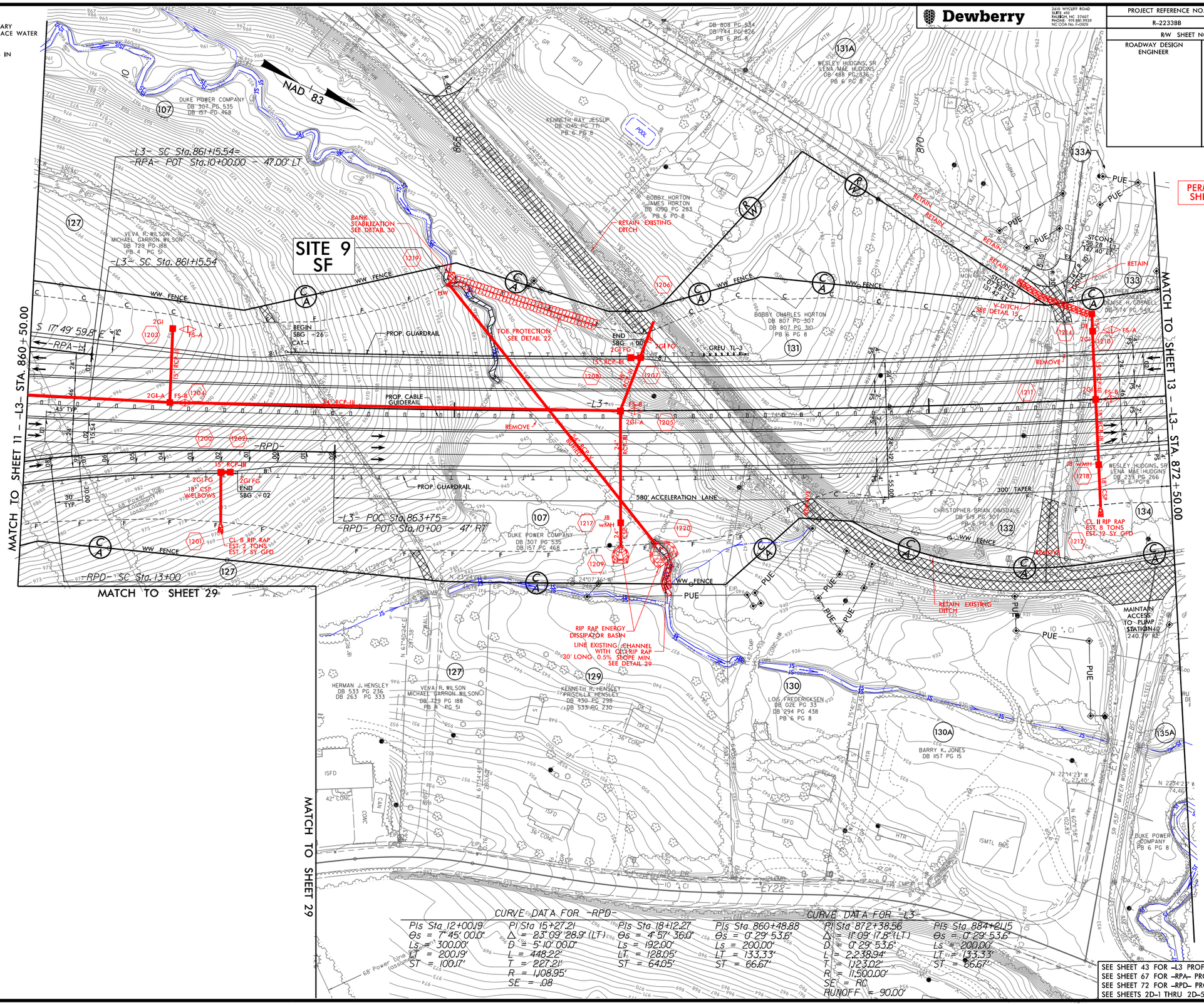
10/25/2017
DEVBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

REVISIONS

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S DENOTES IMPACTS IN SURFACE WATER



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CURVE DATA FOR -RPD-

PIs Sta 12+00.19	PI Sta 15+27.21	PIs Sta 18+12.27
Θs = 7° 45' 00.0"	Δ = 23° 09' 28.9" (LT)	Θs = 4° 57' 36.0"
Ls = 300.00'	D = 5° 10' 00.0"	Ls = 192.00'
LT = 200.19'	L = 448.22'	LT = 128.05'
ST = 100.17'	T = 227.21'	ST = 64.05'
	R = 1,108.95'	
	SE = .08	

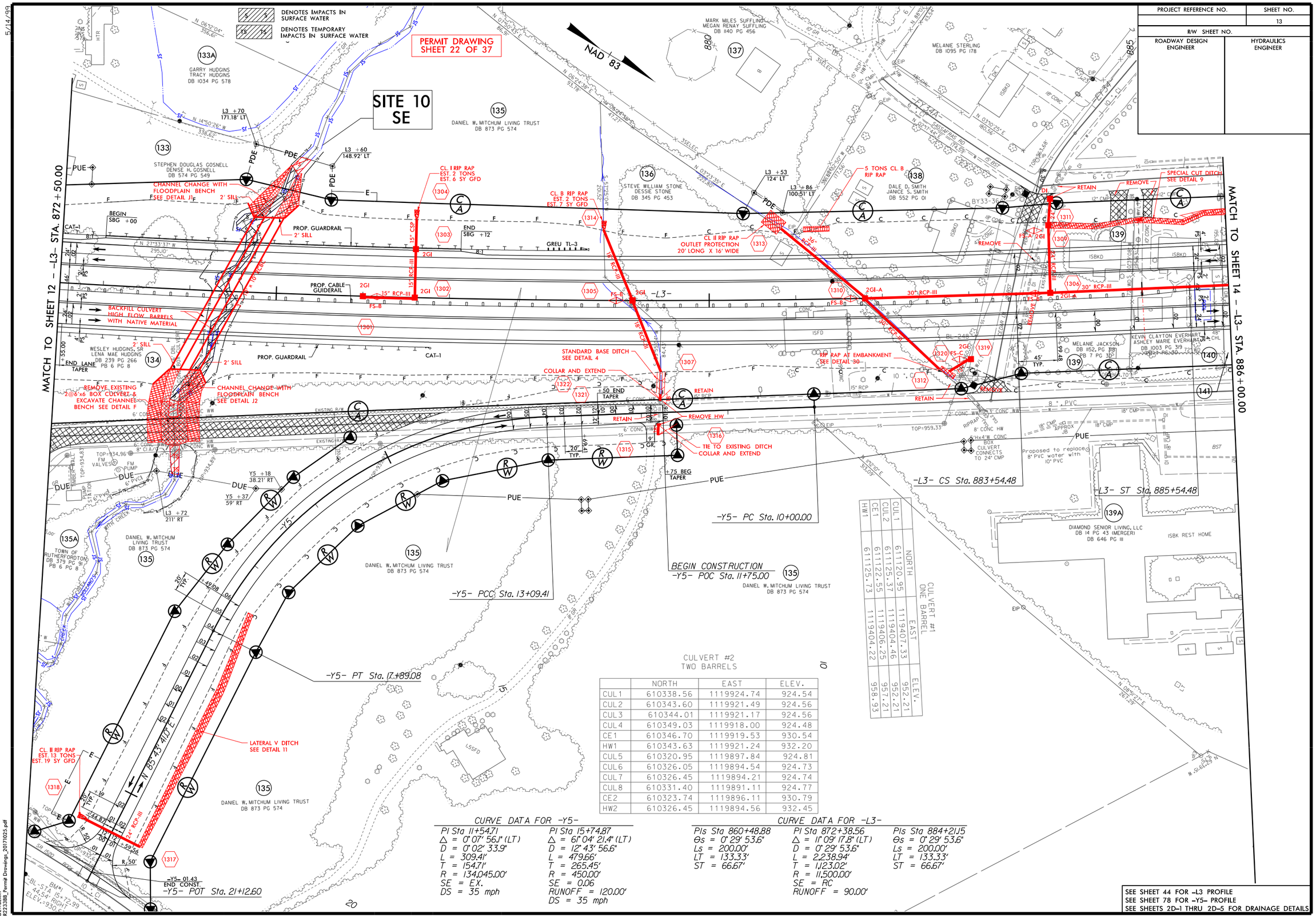
CURVE DATA FOR -L3-

PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 43 FOR -L3 PROFILE
SEE SHEET 67 FOR -RPA- PROFILE
SEE SHEET 72 FOR -RPD- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

10/25/2017
DEVBERRY
R2233BB_Permit Drawings_20171025.pdf

PROJECT REFERENCE NO.	SHEET NO.
	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



	NORTH	EAST	ELEV.
CUL1	611120.95	1119407.33	952.21
CUL2	611125.37	1119404.46	952.21
CE1	611122.55	1119406.25	957.21
HW1	611125.73	1119404.22	958.93

	NORTH	EAST	ELEV.
CUL1	610338.56	1119924.74	924.54
CUL2	610343.60	1119921.49	924.56
CUL3	610344.01	1119921.17	924.56
CUL4	610349.03	1119918.00	924.48
CE1	610346.70	1119919.53	930.54
HW1	610343.63	1119921.24	932.20
CUL5	610320.95	1119897.84	924.81
CUL6	610326.05	1119894.54	924.73
CUL7	610326.45	1119894.21	924.74
CUL8	610331.40	1119891.11	924.77
CE2	610323.74	1119896.11	930.79
HW2	610326.45	1119894.56	932.45

CURVE DATA FOR -Y5-

PI Sta 11+54.71
Δ = 0° 07' 56.1" (LT)
D = 0° 02' 33.9"
L = 309.41'
T = 154.71'
R = 134,045.00'
SE = EX.
DS = 35 mph

PI Sta 15+74.87
Δ = 61° 04' 21.4" (LT)
D = 12° 43' 56.6"
L = 479.66'
T = 265.45'
R = 450.00'
SE = 0.06
RUNOFF = 120.00'
DS = 35 mph

CURVE DATA FOR -L3-

PIs Sta 860+48.88
θs = 0° 29' 53.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 872+38.56
Δ = 11° 09' 17.8" (LT)
D = 0° 29' 53.6"
L = 2,238.94'
T = 1,123.02'
R = 11,500.00'
SE = RC
RUNOFF = 90.00'

PIs Sta 884+21.15
θs = 0° 29' 53.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

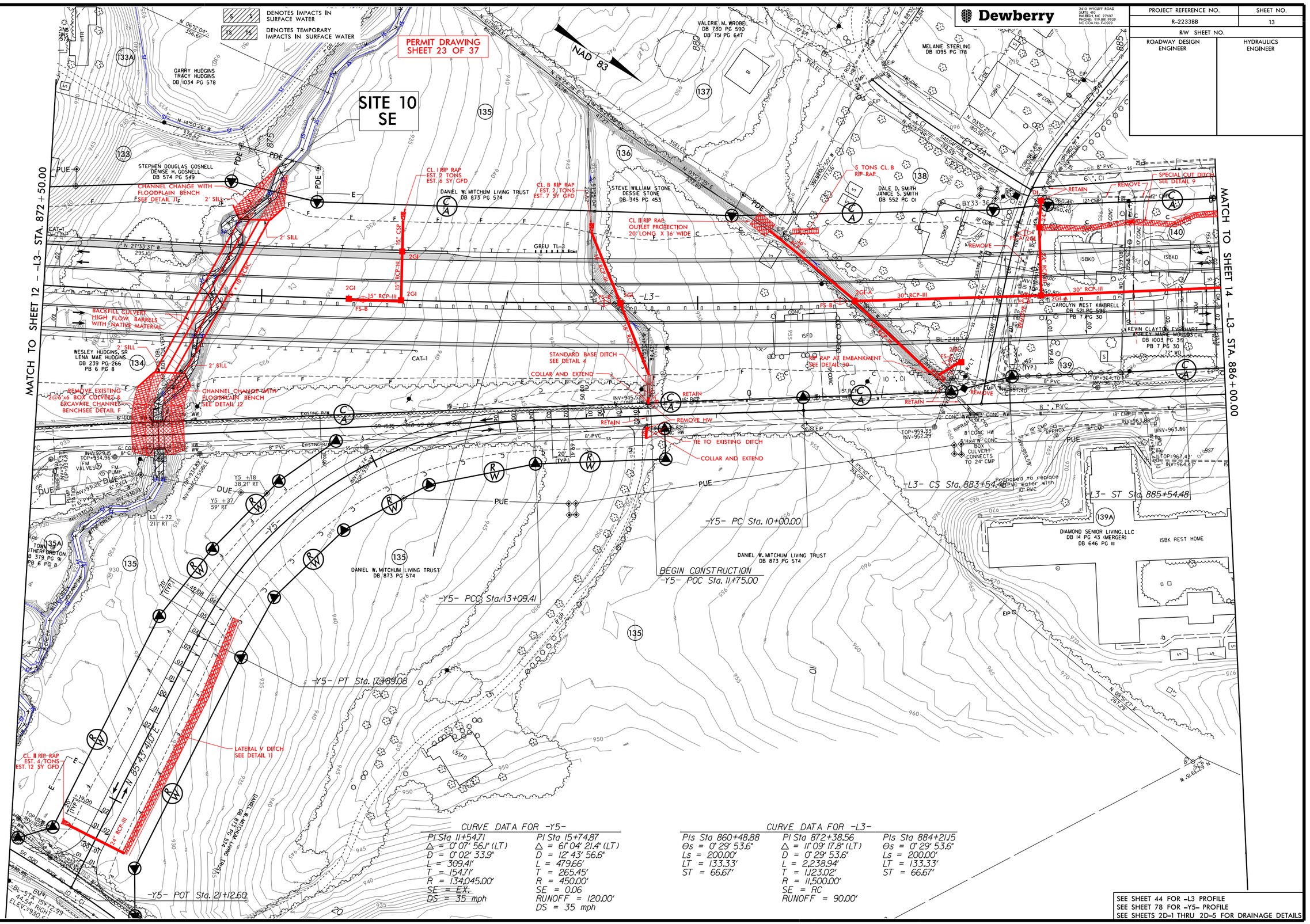
SEE SHEET 44 FOR -L3 PROFILE
SEE SHEET 78 FOR -Y5- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

5/14/99

10/25/2017
DEWBERRY
R223398_Permit Drawings_20171025.pdf

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929



CURVE DATA FOR -Y5-

PI Sta 11+54.71	PI Sta 15+74.87
Δ = 0° 07' 56.1" (LT)	Δ = 61° 04' 21.4" (LT)
D = 0° 02' 33.9"	D = 12° 43' 56.6"
L = 309.41'	L = 479.66'
T = 154.71'	T = 265.45'
R = 134,045.00'	R = 450.00'
SE = EX.	SE = 0.06
DS = 35 mph	RUNOFF = 120.00'
	DS = 35 mph

CURVE DATA FOR -L3-

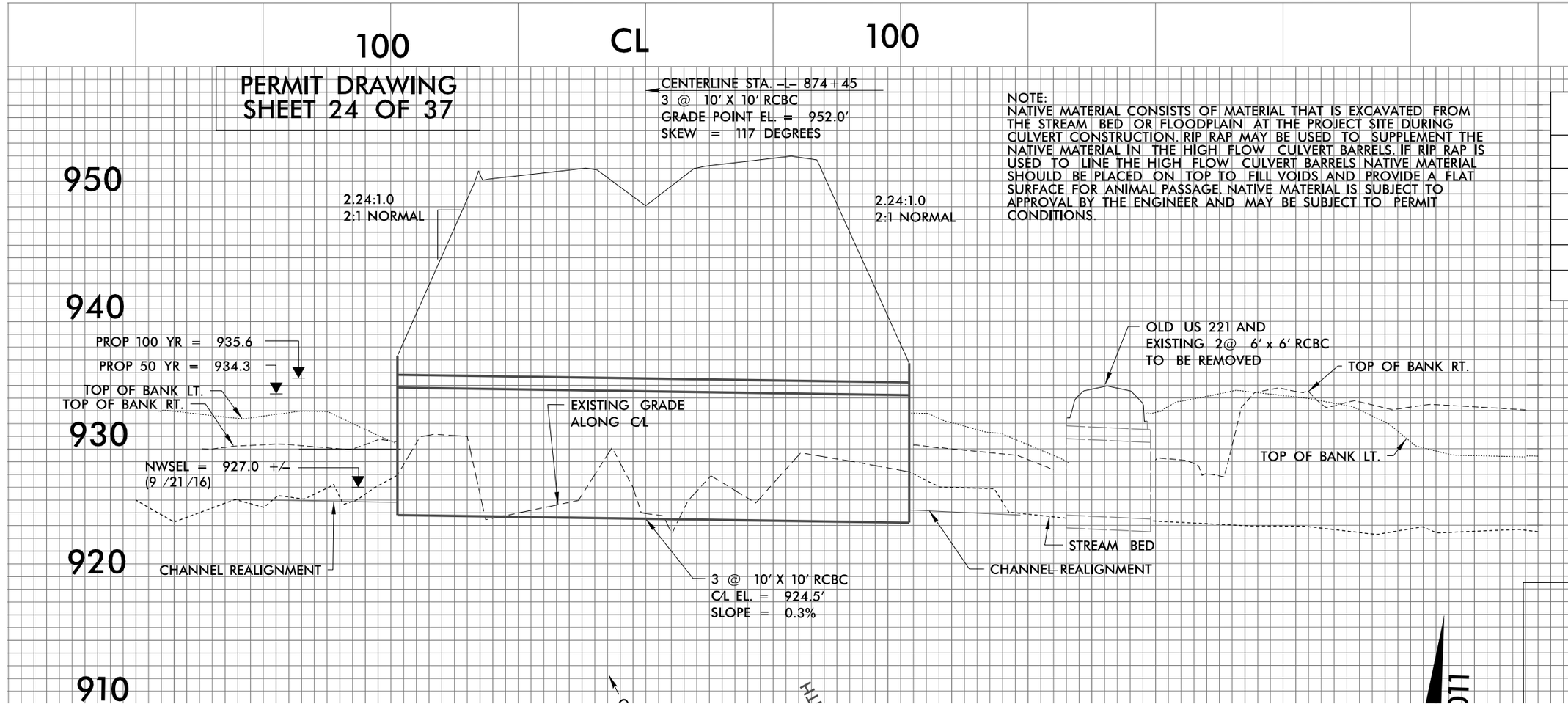
PIs Sta 860+48.88	PI Sta 872+38.56	PIs Sta 884+21.15
Θs = 0° 29' 53.6"	Δ = 11° 09' 17.8" (LT)	Θs = 0° 29' 53.6"
Ls = 200.00'	D = 0° 29' 53.6"	Ls = 200.00'
LT = 133.33'	L = 2,238.94'	LT = 133.33'
ST = 66.67'	T = 1,123.02'	ST = 66.67'
	R = 11,500.00'	
	SE = RC	
	RUNOFF = 90.00'	

SEE SHEET 44 FOR -L3 PROFILE
SEE SHEET 78 FOR -Y5- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf


100
CL
100
PERMIT DRAWING
SHEET 24 OF 37
CENTERLINE STA. –L– 874+45
3 @ 10' X 10' RCBC
GRADE POINT EL. = 952.0'
SKEW = 117 DEGREES
NOTE:
NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARRELS. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARRELS NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
950
940
930
920
910
2.24:1.0
2:1 NORMAL
2.24:1.0
2:1 NORMAL
PROP 100 YR = 935.6
PROP 50 YR = 934.3
TOP OF BANK LT.
TOP OF BANK RT.
NWSEL = 927.0 +/–
(9 /21 /16)
EXISTING GRADE
ALONG C/L
OLD US 221 AND
EXISTING 2@ 6' x 6' RCBC
TO BE REMOVED
TOP OF BANK RT.
TOP OF BANK LT.
STREAM BED
CHANNEL REALIGNMENT
CHANNEL REALIGNMENT
3 @ 10' X 10' RCBC
C/L EL. = 924.5'
SLOPE = 0.3%

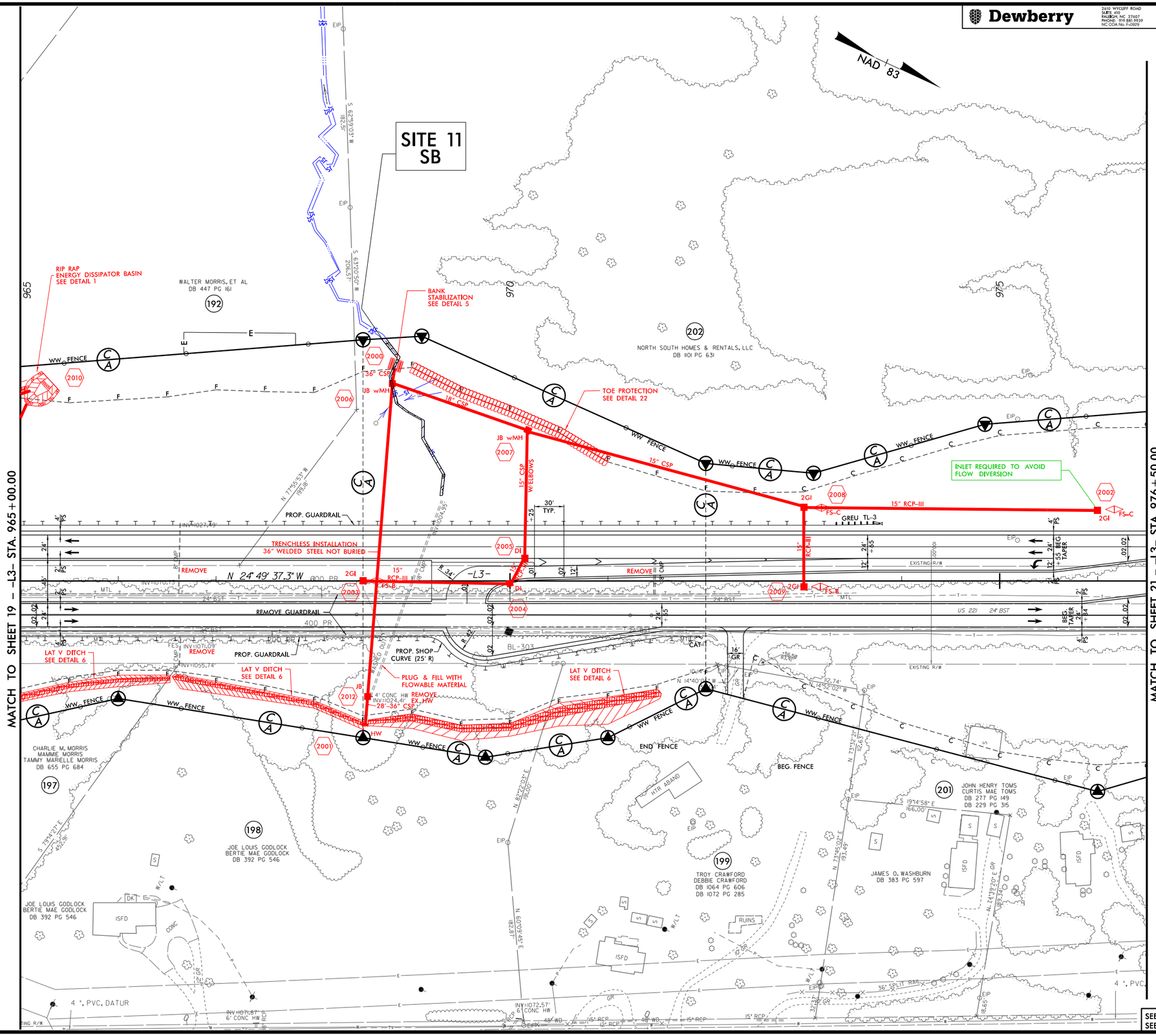
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 51 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS

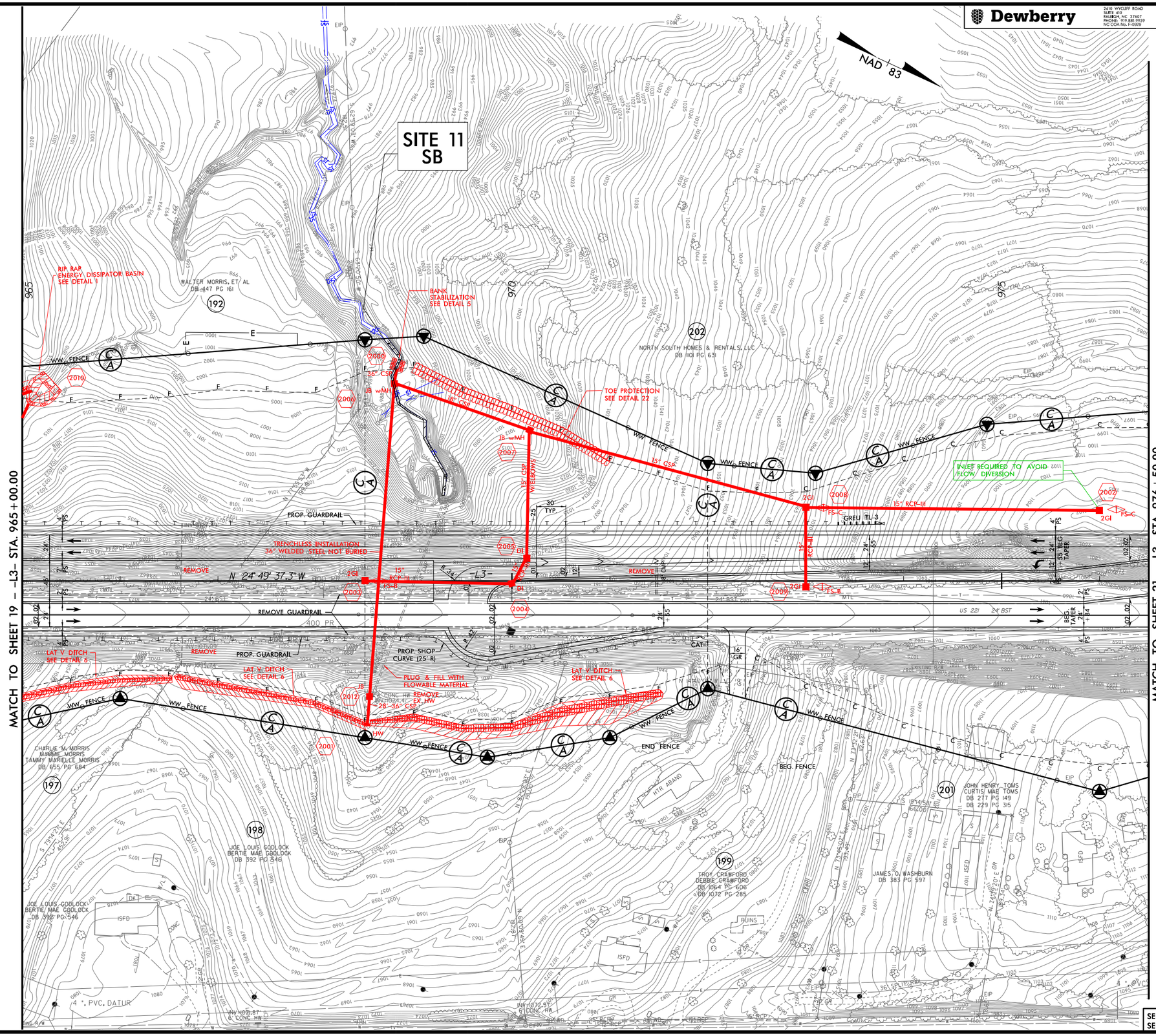
REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

REVISIONS



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 26 OF 37

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 51 FOR –L3– PROFILE
SEE SHEETS 2D-1 THRU 2D-3 FOR DRAINAGE DETAILS

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

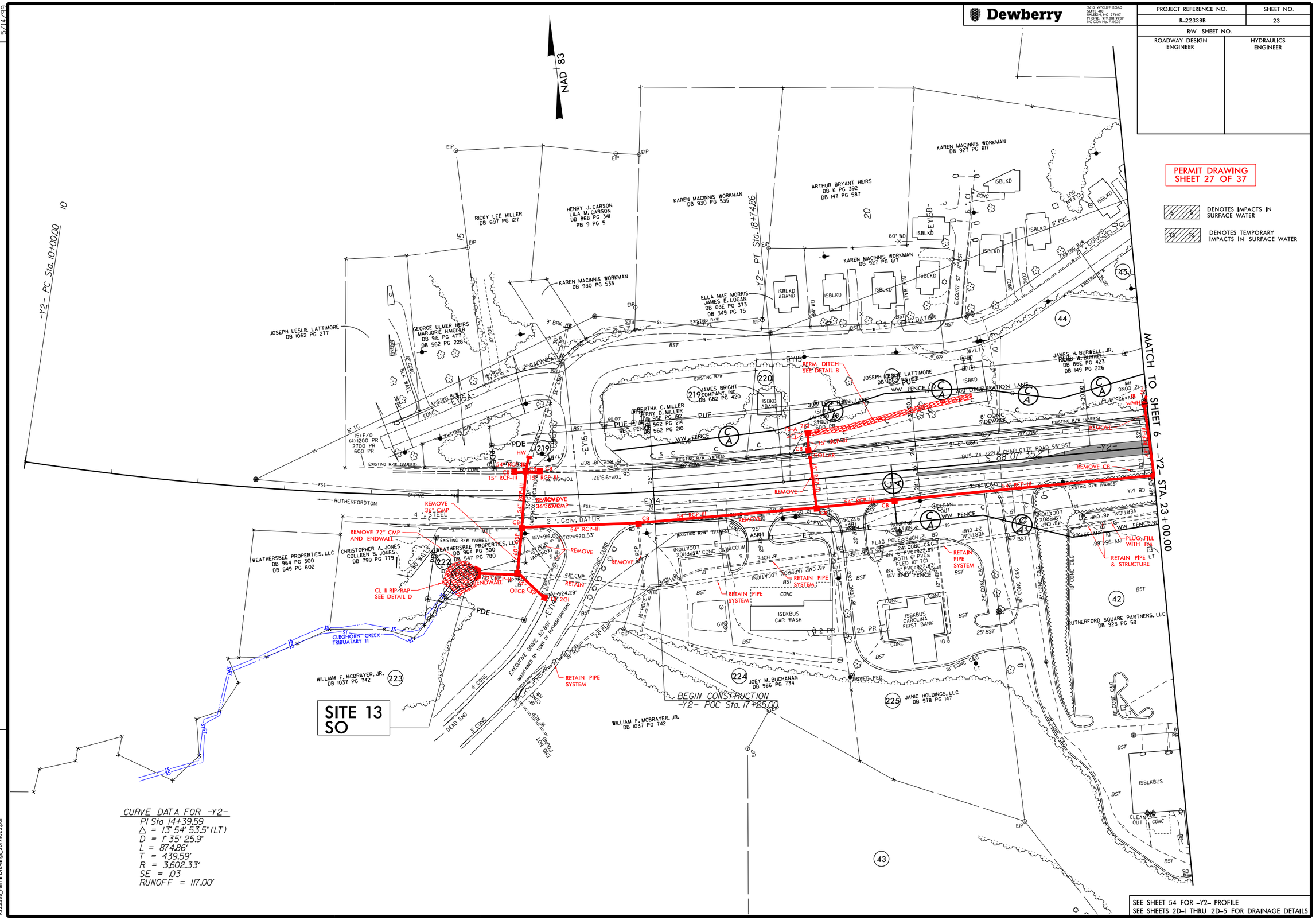
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 27 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y2-
PI Sta 14+39.59
Δ = 13° 54' 53.5" (LT)
D = 1° 35' 25.9"
L = 874.86'
T = 439.59'
R = 3,602.33'
SE = .03
RUNOFF = 117.00'

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

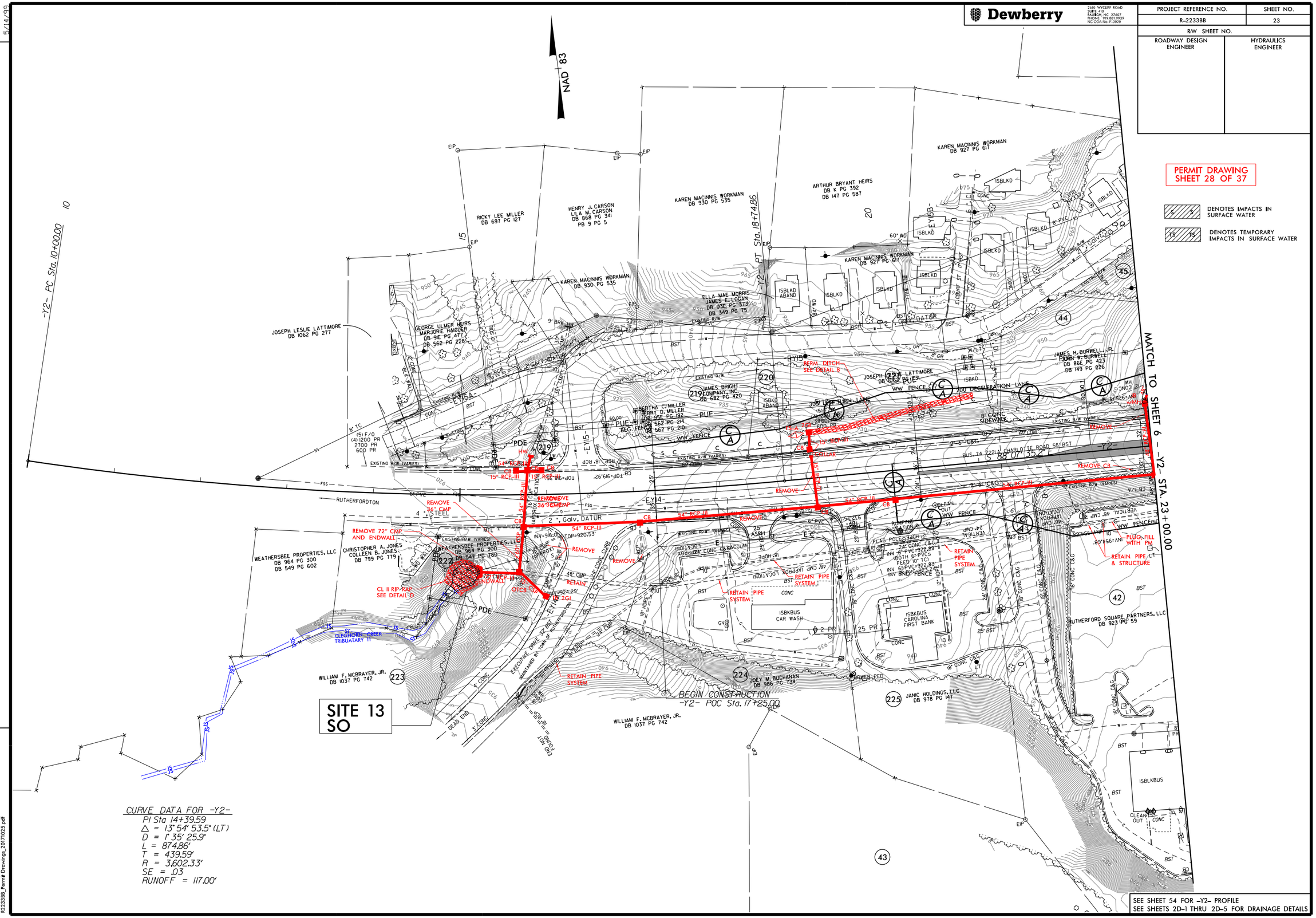
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 28 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y2-
PI Sta 14+39.59
△ = 13° 54' 53.5" (LT)
D = 1° 35' 25.9"
L = 874.86'
T = 439.59'
R = 3,602.33'
SE = .03
RUNOFF = 117.00'

SEE SHEET 54 FOR -Y2- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

REVISIONS

ROW REV. - October 22, 2018 - Parcel 153 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 158 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 265 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 266 - Revised R/W take for roundabout (WET)

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 29 OF 37

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

SITE 16
SD

CURVE DATA FOR -Y8-

PI Sta 16+37.55	PI Sta 22+89.77	PI Sta 24+86.43	PI Sta 28+64.40
Δ = 5° 49' 31.0" (RT)	Δ = 18° 14' 44.9" (RT)	Δ = 0° 26' 26.8" (LT)	Δ = 3° 01' 15.1" (LT)
D = 2° 17' 30.6"	D = 11° 27' 33.0"	D = 0° 11' 14.0"	D = 0° 34' 49.8"
L = 254.18'	L = 159.22'	L = 235.44'	L = 520.39'
T = 127.20'	T = 80.29'	T = 117.72'	T = 260.25'
R = 2,500.00'	R = 500.00'	R = 30,605.00'	R = 9,870.00'

BEGIN CONSTRUCTION
-Y8- POT Sta. 15+00

-Y8- PC Sta. 15+10.35

-Y8- PT Sta. 17+68.71

-Y8- PRC Sta. 23+68.71

-Y8- PI Sta. 21+32.13=
-Y10- POC Sta. 17+55.52
-Y8- PI Sta. 21+89.13 =
-RAB- POC Sta. 1+40.93
-Y8- PC Sta. 22+09.48

-RAB- PC 0+00.00=
-RAB- PT 3+58.14

-Y8- POT Sta. 20+75.13 =
-RAB- POC 3+44.39

-Y10- POC Sta. 18+12.55 =
-RAB- POC Sta. 2+45.81

-Y10- PT Sta. 19+90.43

LINE EXISTING CHANNEL WITH CL B RIP RAP 20' LONG. SEE DETAIL 29

RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1

CL B RIP RAP 3 TONS 10 SY GEOTEXTILE

REMOVE 60" PIPE THAT INTERFERES WITH INSTALLTION OF 60"

REMOVE

TRENCHLESS INSTALLATION AND OBLITERATE HARDPAN

18" CSP WELDBOWS

15" CSP WELDBOWS

36" RCP-III

TOE PROTECTION SEE DETAIL 7

PLUG AND ABANDON 60" THAT DOES NOT INTERFER WITH INSTALLATION OF 60"

REMOVE HEADWALL

JB w/MH

LATERAL BASE DITCH SEE DETAIL 21

LATERAL 'V' DITCH SEE DETAIL 23

SPECIAL CUT DITCH SEE DETAIL 9

CL B RIP RAP 1 TON 5 SY GEOTEXTILE

H. GREGORY HODGE
H. STEPHEN HODGE
DB 06E PG 129
DB 343 PG 200

LEE ANNA EDGERTON
DB 834 PG 691

EVELYN FRANCES MOORE HEFFIN
DB 07E PG 49
DB 473 PG 260

DARRELL AND JANE WHITESIDE
FAMILY LIVING TRUST
DB 1100 PG 546
PB 35 PG 106

DAVID EDGERTON
CAROLYN EDGERTON
DB 1090 PG 396
PB 35 PG 106

MATCH TO SHEET 31A -Y8- STA. 14+00.00

MATCH TO SHEET 15 -Y10- STA. 22+00.00

CURVE DATA FOR -Y10-

PI Sta 18+75.18
Δ = 26° 55' 04.1" (LT)
D = 11° 27' 32.9"
L = 234.90'
T = 119.66'
R = 500.00'

CURVE DATA FOR -RAB-

PI Sta 1+63.96	PI Sta 3+04.88
Δ = 141° 39' 34.3" (RT)	Δ = 218° 20' 25.7" (RT)
D = 100° 31' 08.1"	D = 100° 31' 08.1"
L = 140.93'	L = 217.21'
T = 163.96'	T = 163.96'
R = 57.00'	R = 57.00'

SEE SHEET 78 FOR -Y8- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 79 FOR -RAB- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 30 OF 37

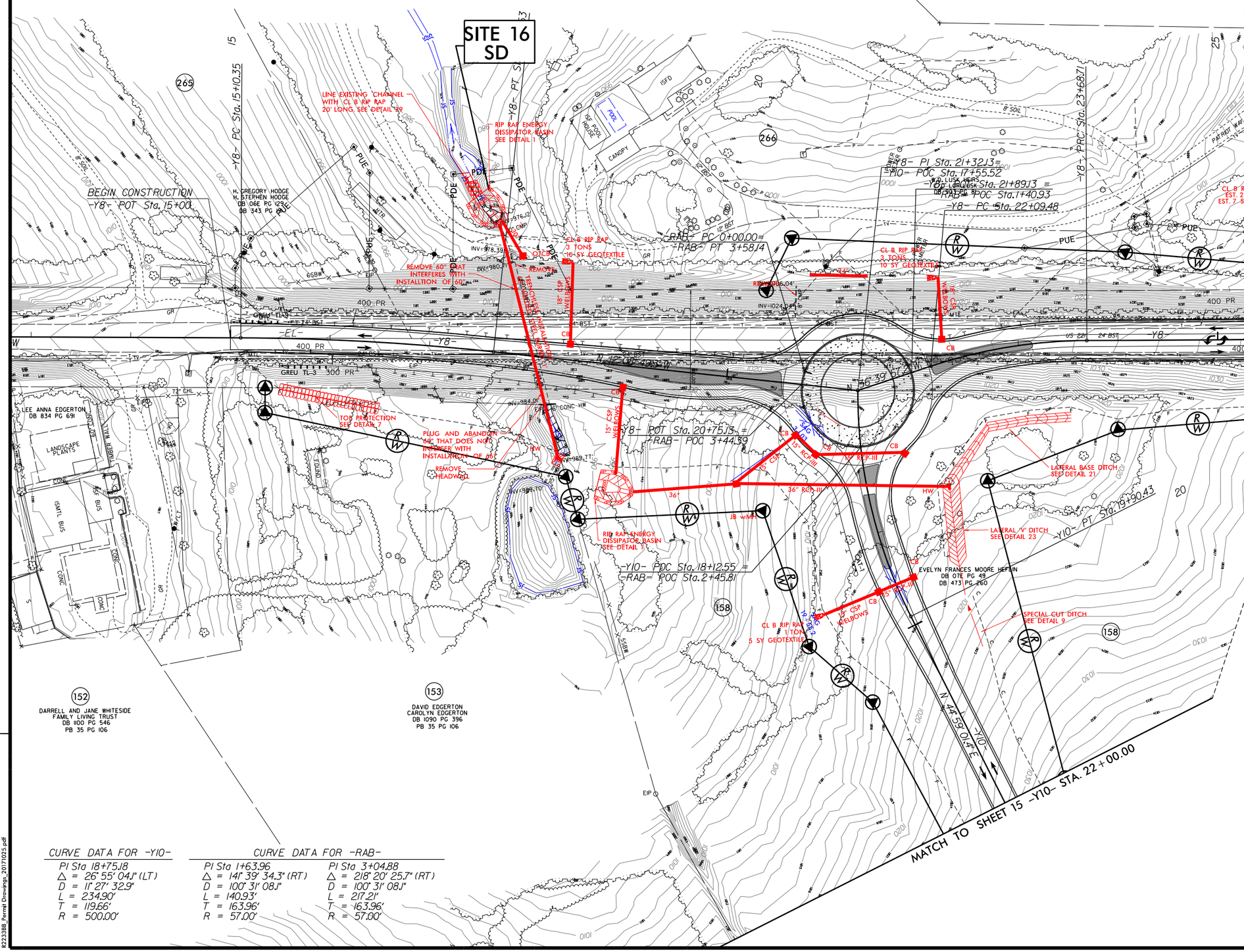
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -Y8-

PI Sta 16+37.55	PI Sta 22+89.77	PI Sta 24+86.43	PI Sta 28+64.40
Δ = 5° 49' 31.0" (RT)	Δ = 18° 14' 44.9" (RT)	Δ = 0° 26' 26.8" (LT)	Δ = 3° 01' 15.1" (LT)
D = 2° 17' 30.6"	D = 11° 27' 33.0"	D = 0° 11' 14.0"	D = 0° 34' 49.8"
L = 254.18'	L = 159.22'	L = 235.44'	L = 520.39'
T = 127.20'	T = 80.29'	T = 117.72'	T = 260.25'
R = 2,500.00'	R = 500.00'	R = 30,605.00'	R = 9,870.00'



CURVE DATA FOR -Y10-

PI Sta 18+75.18
Δ = 26° 55' 04.1" (LT)
D = 11° 27' 32.9"
L = 234.90'
T = 119.66'
R = 500.00'

CURVE DATA FOR -RAB-

PI Sta 1+63.96	PI Sta 3+04.88
Δ = 141° 39' 34.3" (RT)	Δ = 218° 20' 25.7" (RT)
D = 100° 31' 08.1"	D = 100° 31' 08.1"
L = 140.93'	L = 217.21'
T = 163.96'	T = 163.96'
R = 57.00'	R = 57.00'

SEE SHEET 78 FOR -Y8- PROFILE
SEE SHEET 79 FOR -Y10- PROFILE
SEE SHEET 79 FOR -RAB- PROFILE
SEE SHEETS 2D-1 THRU 2D-7 FOR DRAINAGE DETAILS

REVISIONS

ROW REV. - October 22, 2018 - Parcel 153 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 158 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 265 - Revised R/W take for roundabout (WET)
ROW REV. - October 22, 2018 - Parcel 266 - Revised R/W take for roundabout (WET)

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

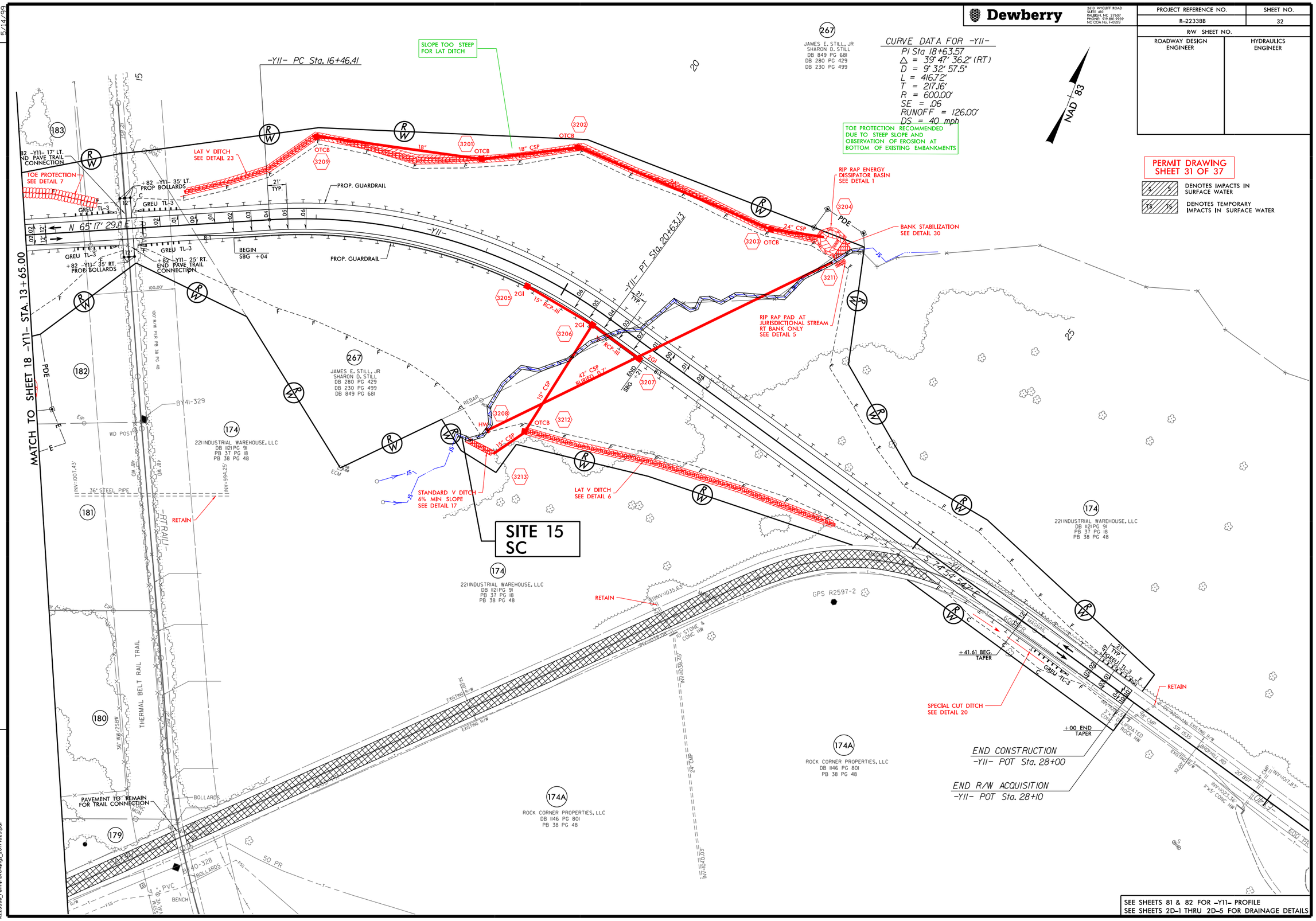
PERMIT DRAWING
SHEET 31 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -Y11-
PI Sta 18+63.57
Δ = 39° 47' 36.2" (RT)
D = 9° 32' 57.5"
L = 416.72'
T = 217.16'
R = 600.00'
SE = .06
RUNOFF = 126.00'
DS = 40 mph

NAD 83



REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 32 OF 37

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -Y11-
PI Sta 18+63.57
Δ = 39° 47' 36.2" (RT)
D = 9° 32' 57.5"
L = 416.72'
T = 217.16'
R = 600.00'
SE = .06
RUNOFF = 126.00'
DS = 40 mph

SLOPE TOO STEEP FOR LAT DITCH

TOE PROTECTION RECOMMENDED DUE TO STEEP SLOPE AND OBSERVATION OF EROSION AT BOTTOM OF EXISTING EMBANKMENTS

RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL 1

BANK STABILIZATION SEE DETAIL 30

RIP RAP PAD AT JURISDICTIONAL STREAM RT BANK ONLY SEE DETAIL 3

LAT V DITCH SEE DETAIL 23

TOE PROTECTION SEE DETAIL 23

STANDARD V DITCH 6% MIN SLOPE SEE DETAIL 17

LAT V DITCH SEE DETAIL 6

SPECIAL CUT DITCH SEE DETAIL 20

SITE 15 SC

MATCH TO SHEET 18 -Y11- STA. 13+65.00

-Y11- PC Sta. 16+46.41

-Y11- PT Sta. 20+63.57

END CONSTRUCTION -Y11- POT Sta. 28+00

END R/W ACQUISITION -Y11- POT Sta. 28+10

+41.61 BEG TAPER

+00 END TAPER

JAMES E. STILL, JR
SHARON D. STILL
DB 849 PG 681
DB 280 PG 429
DB 230 PG 499

220 INDUSTRIAL WAREHOUSE, LLC
DB 1121 PG 91
PB 37 PG 18
PB 38 PG 48

ROCK CORNER PROPERTIES, LLC
DB 1146 PG 801
PB 38 PG 48

SEE SHEETS 81 & 82 FOR -Y11- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/25/2017
DEWBERRY
R2233BB_Permit Drawings_20171025.pdf

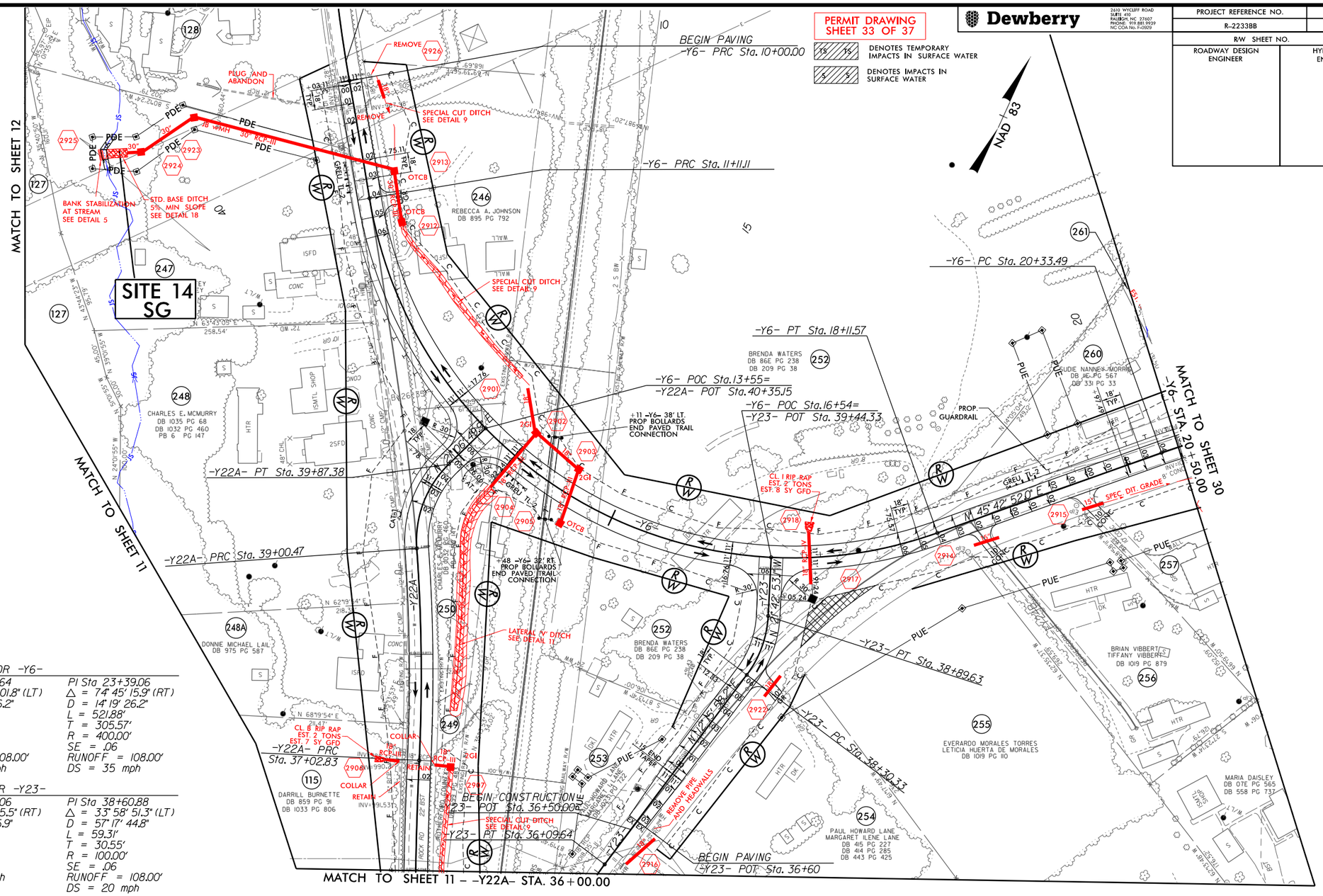
PERMIT DRAWING
SHEET 33 OF 37

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



CURVE DATA FOR –Y6–

PI Sta 10+55.56	PI Sta 15+90.64	PI Sta 23+39.06
Δ = 0° 45' 51.3" (RT)	Δ = 100° 20' 01.8" (LT)	Δ = 74° 45' 15.9" (RT)
D = 0° 41' 16.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 111.11'	L = 700.46'	L = 521.88'
T = 55.56'	T = 479.53'	T = 305.57'
R = 8,330.00'	R = 400.00'	R = 400.00'
SE = EX.	SE = .06	SE = .06
DS = 35 mph	RUNOFF = 108.00'	RUNOFF = 108.00'
	DS = 35 mph	DS = 35 mph

CURVE DATA FOR –Y23–

PI Sta 32+45.69	PI Sta 35+18.06	PI Sta 38+60.88
Δ = 4° 29' 38.6" (RT)	Δ = 30° 01' 05.5" (RT)	Δ = 33° 58' 51.3" (LT)
D = 1° 16' 23.7"	D = 16° 00' 15.9"	D = 57° 17' 44.8"
L = 352.96'	L = 187.56'	L = 59.31'
T = 176.57'	T = 95.99'	T = 30.55'
R = 4,500.00'	R = 358.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .06
DS = 35 mph	DS = 20 mph	RUNOFF = 108.00'
		DS = 20 mph

CURVE DATA FOR –Y22A–

PI Sta 32+70.82	PI Sta 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
Δ = 0° 56' 34.2" (LT)	Δ = 4° 35' 36.2" (RT)	Δ = 6° 44' 25.9" (LT)	Δ = 49° 47' 48.1" (RT)
D = 0° 18' 00.8"	D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 314.05'	L = 274.98'	L = 197.64'	L = 86.91'
T = 157.03'	T = 137.56'	T = 98.94'	T = 46.41'
R = 19,085.00'	R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = EX.	SE = .04
DS = 35 mph	DS = 35 mph	DS = 35 mph	RUNOFF = 72.00'
			DS = 15 mph

CURVE DATA FOR –Y23A–

PI Sta 44+55.25	PI Sta 45+75.10	PI Sta 46+84.50	PI Sta 48+15.42
Δ = 1° 32' 38.7" (RT)	Δ = 6° 33' 34.4" (RT)	Δ = 19° 55' 51.0" (RT)	Δ = 35° 04' 00.6" (RT)
D = 1° 09' 35.4"	D = 6° 09' 39.0"	D = 17° 54' 17.8"	D = 23° 52' 23.7"
L = 133.13'	L = 106.47'	L = 111.31'	L = 146.89'
T = 66.57'	T = 53.29'	T = 56.23'	T = 75.83'
R = 4,940.00'	R = 930.00'	R = 320.00'	R = 240.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR –Y6– PROFILE
SEE SHEET 77 FOR –Y22A– PROFILE
SEE SHEET 77 FOR –Y23– PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

10/23/2017
DEWBERRY
R2233BB_Permit Drawings_20171023.pdf

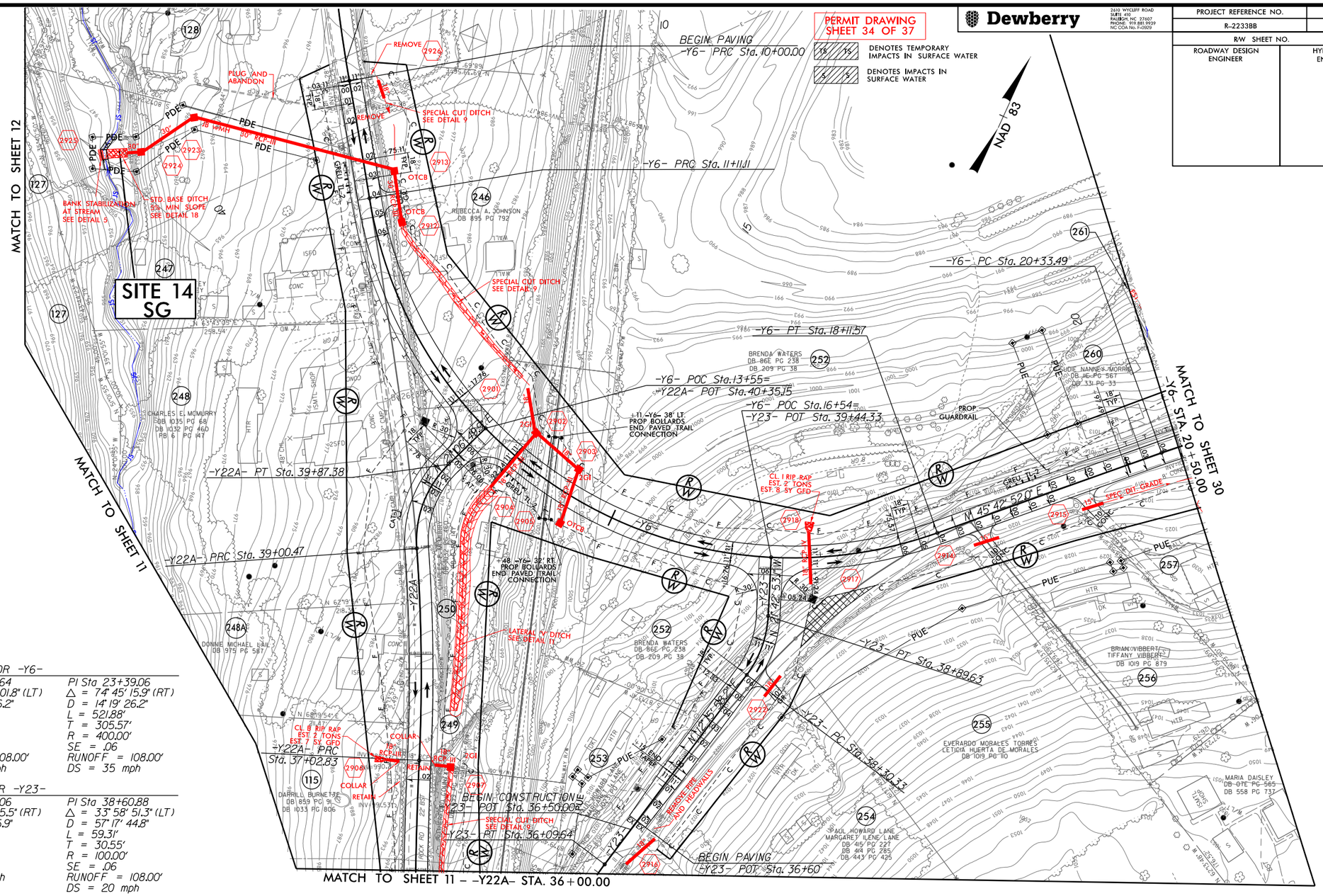
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 34 OF 37

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y6-

PI Sta 10+55.56	PI Sta 15+90.64	PI Sta 23+39.06
Δ = 0° 45' 51.3" (RT)	Δ = 100° 20' 01.8" (LT)	Δ = 74° 45' 15.9" (RT)
D = 0° 41' 16.2"	D = 14° 19' 26.2"	D = 14° 19' 26.2"
L = 111.11'	L = 700.46'	L = 521.88'
T = 55.56'	T = 479.53'	T = 305.57'
R = 8,330.00'	R = 400.00'	R = 400.00'
SE = EX.	SE = .06	SE = .06
DS = 35 mph	RUNOFF = 108.00'	RUNOFF = 108.00'
	DS = 35 mph	DS = 35 mph

CURVE DATA FOR -Y23-

PI Sta 32+45.69	PI Sta 35+18.06	PI Sta 38+60.88
Δ = 4° 29' 38.6" (RT)	Δ = 30° 01' 05.5" (RT)	Δ = 33° 58' 51.3" (LT)
D = 1° 16' 23.7"	D = 16° 00' 15.9"	D = 57° 17' 44.8"
L = 352.96'	L = 187.56'	L = 59.31'
T = 176.57'	T = 95.99'	T = 30.55'
R = 4,500.00'	R = 358.00'	R = 100.00'
SE = EX.	SE = EX.	SE = .06
DS = 35 mph	DS = 20 mph	RUNOFF = 108.00'
		DS = 20 mph

CURVE DATA FOR -Y22A-

PI Sta 32+70.82	PI Sta 35+65.41	PI Sta 38+01.76	PI Sta 39+46.88
Δ = 0° 56' 34.2" (LT)	Δ = 4° 35' 36.2" (RT)	Δ = 6° 44' 25.9" (LT)	Δ = 49° 47' 48.1" (RT)
D = 0° 18' 00.8"	D = 1° 40' 13.6"	D = 3° 24' 37.7"	D = 57° 17' 44.8"
L = 314.05'	L = 274.98'	L = 197.64'	L = 86.91'
T = 157.03'	T = 137.56'	T = 98.94'	T = 46.41'
R = 19,085.00'	R = 3,430.00'	R = 1,680.00'	R = 100.00'
SE = EX.	SE = EX.	SE = EX.	SE = .04
DS = 35 mph	DS = 35 mph	DS = 35 mph	RUNOFF = 72.00'
			DS = 15 mph

CURVE DATA FOR -Y23A-

PI Sta 44+55.25	PI Sta 45+75.10	PI Sta 46+84.50	PI Sta 48+15.42
Δ = 1° 32' 38.7" (RT)	Δ = 6° 33' 34.4" (RT)	Δ = 19° 55' 51.0" (RT)	Δ = 35° 04' 00.6" (RT)
D = 1° 09' 35.4"	D = 6° 09' 39.0"	D = 17° 54' 17.8"	D = 23° 52' 23.7"
L = 133.13'	L = 106.47'	L = 111.31'	L = 146.89'
T = 66.57'	T = 53.29'	T = 56.23'	T = 75.83'
R = 4,940.00'	R = 930.00'	R = 320.00'	R = 240.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEET 77 FOR -Y22A- PROFILE
SEE SHEET 77 FOR -Y23- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS 5/14/99

10/23/2017
DEWBERRY
R2233BB_Permit Drawings_20171023.pdf

SITE 18

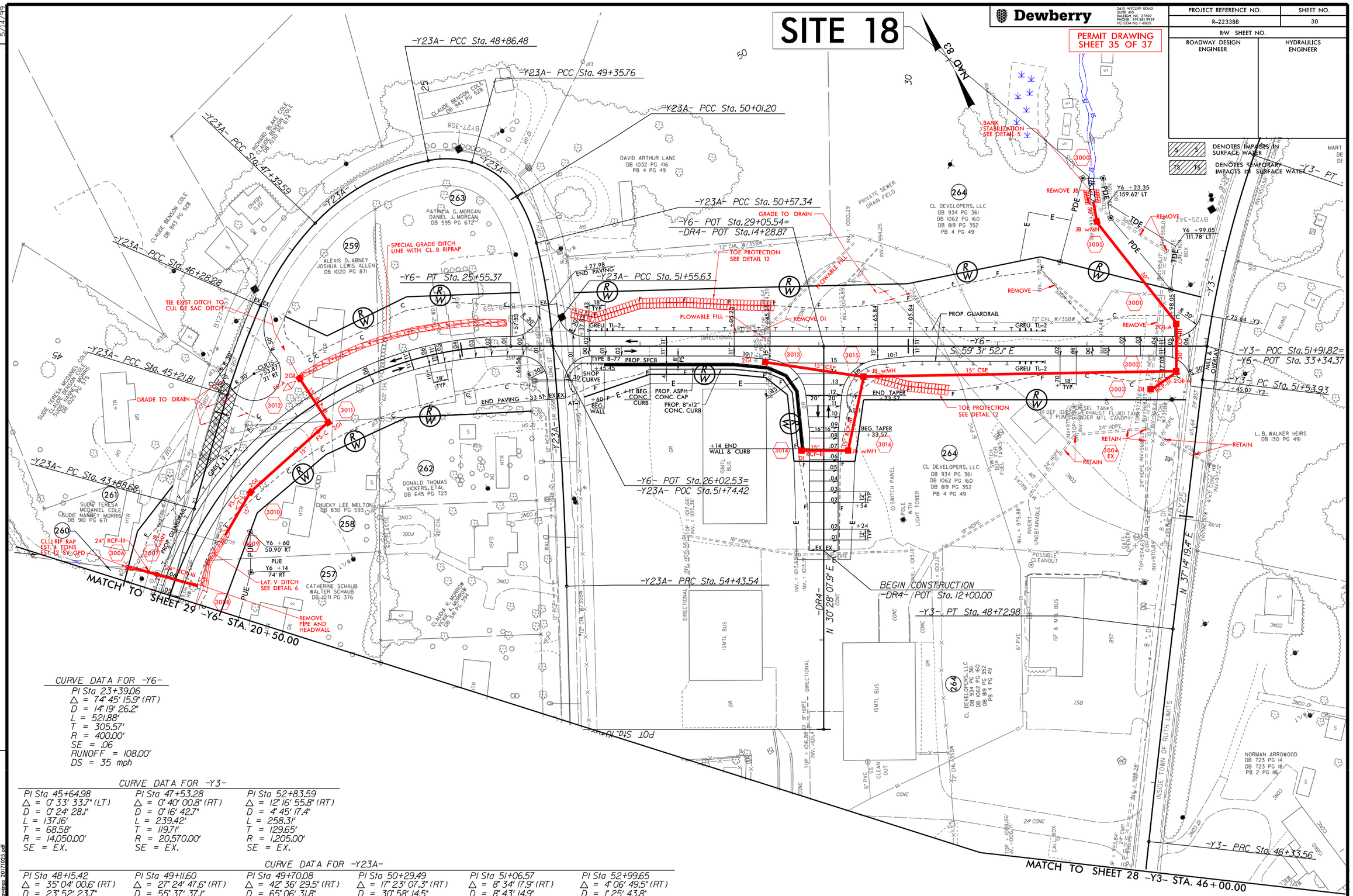
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 35 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS
5/14/99



CURVE DATA FOR -Y6-

PI Sta 23+39.06
Δ = 74° 45' 15.9" (RT)
D = 14° 19' 26.2"
L = 521.88'
T = 305.57'
R = 400.00'
SE = .06
RUNOFF = 108.00'
DS = 35 mph

CURVE DATA FOR -Y3-

PI Sta 45+64.98	PI Sta 47+53.28	PI Sta 52+83.59
Δ = 0° 33' 33.7" (LT)	Δ = 0° 40' 00.8" (RT)	Δ = 12° 16' 55.8" (RT)
D = 0° 24' 28.1"	D = 0° 16' 42.7"	D = 4° 45' 17.4"
L = 137.16'	L = 239.42'	L = 258.31'
T = 68.58'	T = 119.71'	T = 129.65'
R = 14,050.00'	R = 20,570.00'	R = 1,205.00'
SE = EX.	SE = EX.	SE = EX.

CURVE DATA FOR -Y23A-

PI Sta 48+15.42	PI Sta 49+11.60	PI Sta 49+70.08	PI Sta 50+29.49	PI Sta 51+06.57	PI Sta 52+99.65
Δ = 35° 04' 00.6" (RT)	Δ = 27° 24' 47.6" (RT)	Δ = 42° 36' 29.5" (RT)	Δ = 17° 23' 07.3" (RT)	Δ = 8° 34' 17.9" (RT)	Δ = 4° 06' 49.5" (RT)
D = 23° 52' 23.7"	D = 55° 37' 37.1"	D = 65° 06' 31.8"	D = 30° 58' 14.5"	D = 8° 43' 14.9"	D = 1° 25' 43.8"
L = 146.89'	L = 49.28'	L = 65.44'	L = 56.13'	L = 98.29'	L = 287.91'
T = 75.83'	T = 25.12'	T = 34.32'	T = 28.28'	T = 49.24'	T = 144.02'
R = 240.00'	R = 103.00'	R = 88.00'	R = 185.00'	R = 657.00'	R = 4,010.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

11/8/2017
3:09:00 PM EST
R2233BB Permit Drawings 20171025.pdf

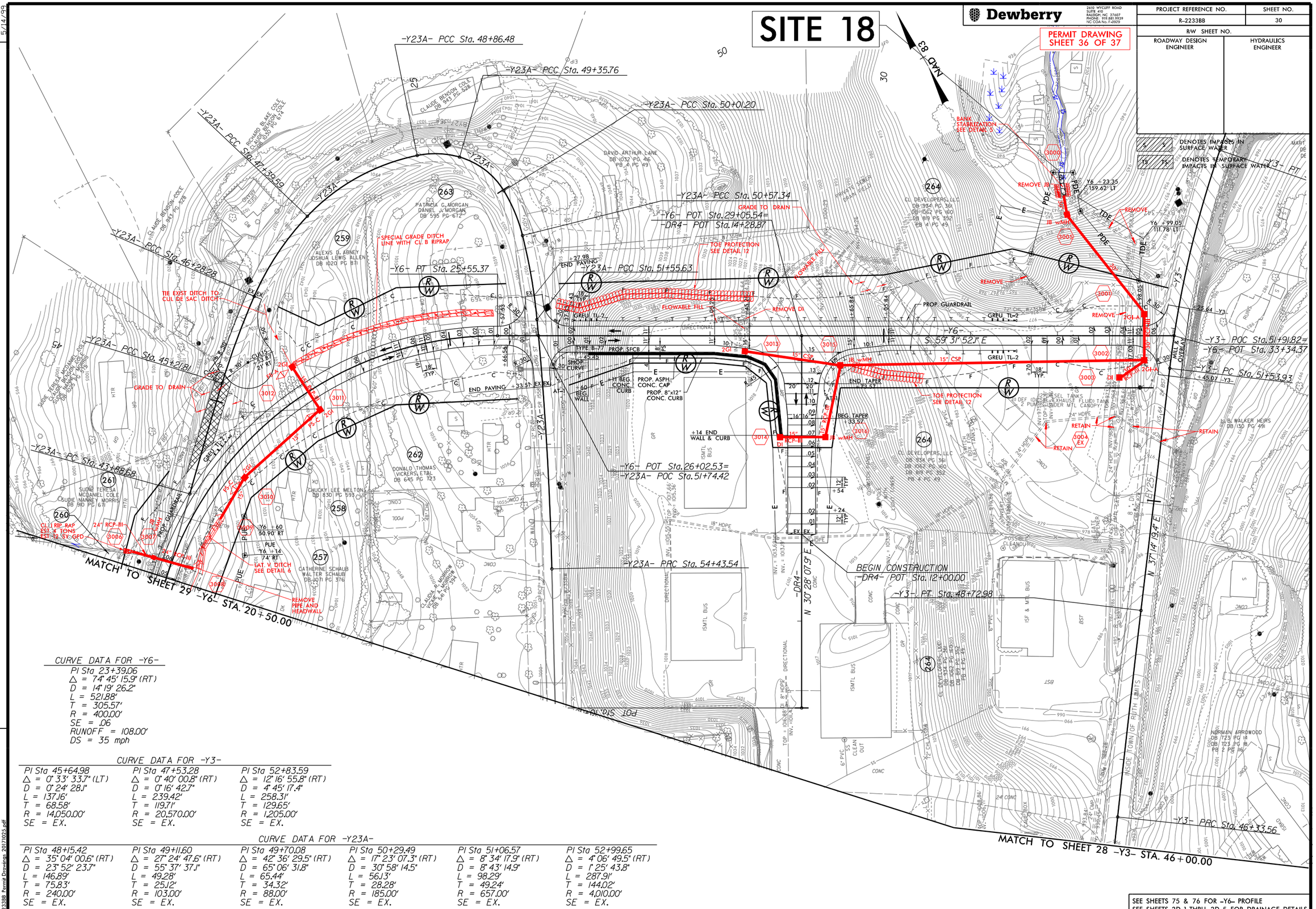
SITE 18

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PERMIT DRAWING
SHEET 36 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-2233BB	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



CURVE DATA FOR -Y6-

PI Sta 23+39.06
△ = 74° 45' 15.9" (RT)
D = 14° 19' 26.2"
L = 521.88'
T = 305.57'
R = 400.00'
SE = .06
RUNOFF = 108.00'
DS = 35 mph

CURVE DATA FOR -Y3-

PI Sta 45+64.98	PI Sta 47+53.28	PI Sta 52+83.59
△ = 0° 33' 33.7" (LT)	△ = 0° 40' 00.8" (RT)	△ = 12° 16' 55.8" (RT)
D = 0° 24' 28.1"	D = 0° 16' 42.7"	D = 4° 45' 17.4"
L = 137.16'	L = 239.42'	L = 258.31'
T = 68.58'	T = 119.71'	T = 129.65'
R = 14,050.00'	R = 20,570.00'	R = 1,205.00'
SE = EX.	SE = EX.	SE = EX.

CURVE DATA FOR -Y23A-

PI Sta 48+15.42	PI Sta 49+11.60	PI Sta 49+70.08	PI Sta 50+29.49	PI Sta 51+06.57	PI Sta 52+99.65
△ = 35° 04' 00.6" (RT)	△ = 27° 24' 47.6" (RT)	△ = 42° 36' 29.5" (RT)	△ = 17° 23' 07.3" (RT)	△ = 8° 34' 17.9" (RT)	△ = 4° 06' 49.5" (RT)
D = 23° 52' 23.7"	D = 55° 37' 37.1"	D = 65° 06' 31.8"	D = 30° 58' 14.5"	D = 8° 43' 14.9"	D = 1° 25' 43.8"
L = 146.89'	L = 49.28'	L = 65.44'	L = 56.13'	L = 98.29'	L = 287.91'
T = 75.83'	T = 25.12'	T = 34.32'	T = 28.28'	T = 49.24'	T = 144.02'
R = 240.00'	R = 103.00'	R = 88.00'	R = 185.00'	R = 657.00'	R = 4,010.00'
SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.	SE = EX.

SEE SHEETS 75 & 76 FOR -Y6- PROFILE
SEE SHEETS 2D-1 THRU 2D-5 FOR DRAINAGE DETAILS

REVISIONS

5/14/99

1/18/2017
DEWBERRY
R2233BB Permit Drawings 20171025.pdf

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	JD ID	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	SN	L3 778+97 TO 779+40 LT	ROADWAY FILL						< 0.01	< 0.01	43	34	
1	SN	Y2 22+05 LT	48" Pipe						< 0.01	< 0.01	24	14	
4	SL	L3 797+64 TO 798+03 LT	CHANNEL REALIGNMENT						0.01	< 0.01	96	18	
4	SL/SM	L3 797+66	10' X 7' RCBC						0.09		766		
4	SL	L 797+63 TO 798+0 RT	CHANNEL REALIGNMENT						< 0.01		43		
4	SL	L3 797+63 TO 797+70 RT	V DITCH						< 0.01	< 0.01	10	7	
5	SK	L3 814+76 LT TO 814+87 LT	BANK STABILIZATION						< 0.01	< 0.01	10	17	
5	SK	L3 814+76 LT TO 815+43 RT	ROADWAY FILL/30" CSP						0.02		112		
5	SJ	L3 815+11 TO 815+46LT	ROADWAY FILL						< 0.01	< 0.01	28	21	
6	SI	L3 828+19 TO 828+28 LT	BANK STABILIZATION						< 0.01	< 0.01	11	9	
6	SI	L3 830+00	8' X 6' RCBC						0.06		670		
6	SI	L3 832+25 TO 832+56 RT	CL. II RIPRAP ON BANKS						< 0.01	< 0.01	34	18	
7	SH	L3 831+35 TO 836+42 RT	ROADWAY FILL						0.11		832		
8	SG	RPD 22+04 RT TO 18+22 LT	ROADWAY FILL						0.05		445		
8	WA	RPD 17+38 TO 22+04 LT	ROADWAY FILL	0.11									
8	SG	RPD 18+26 TO 18+08 LT	36" PIPE						< 0.01		32		
8	SG	RPD 18+08 TO 17+76 LT	CL. II RIPRAP ON BANKS						< 0.01	< 0.01	25	20	
9	SF	L3 864+92 LT	BANK STABILIZATION						< 0.01	< 0.01	14	9	
9	SF	L3 866+00	54" RCP-V						0.01		140		
9	SF	L3 867+00 TO 867+28 RT	RIIP RAP ENERGY DISSIPATOR BASIN/CL. I RIP RAP IN CHANNEL						< 0.01	< 0.01	55	7	
10	SE	L3 875+24 LT	FLOODPLAIN BENCH						0.01	< 0.01	72	19	
10	SE	L3 874+42	3 - 10' X 10' RCBC						0.05		217		
10	SE	L3 874+16 RT	FLOODPLAIN BENCH						0.01		45		
10	SE	L3 873+90 RT	REMOVAL OF EXISTING CULVERT							0.01		51	
11	SB	L3 968+69 TO 968+88 LT	BANK STABILIZATION						< 0.01	< 0.01	10	27	
11	SB	L3 968+64	36" STEEL PIPE						< 0.01		151		
13	SO	Y2 15+24 RT	CL. II RIPRAP						0.02	< 0.01	35	19	
14	SG	Y6 10+23 RT	BANK STABILIZATION						< 0.01	< 0.01	10	24	
15	SC	Y11 22+50 LT	BANK STABILIZATION						< 0.01	< 0.01	22	14	
15	SC	Y11 22+80	42" CSP						0.05		506		
15	SC	Y11 19+88 RT	LATERAL V DITCH						< 0.01	< 0.01	14	19	
16	SD	Y8 17+18 LT	RIP RAP ENEGY DISSIPATOR/CL. B RIPRAP LINING CHANNEL						< 0.01	< 0.01	52	10	
16	SD	Y8 18+04	60" PIPE						< 0.01		38		
16	SD	Y10 15+63 RT	LATERAL V DITCH						< 0.01	< 0.01	18	12	
17	SO	Y2 33+41 TO 34+50 RT	ROADWAY FILL						0.01		143		
18	N/A	Y6 32+02 TO 32+09 LT	BANK STABILIZATION						< 0.01	< 0.01	13	13	
TOTALS*:				0.11					0.58	0.05	4736	382	0

*Rounded totals are sum of actual impacts

NOTES:
Site 4 SL/SM is comprised of both the main jurisdictional stream and a trib to the left of the main stem.
Site 7 begin on sheet 16 of 37. The stream is completely covered by roadway. The drainage that would have gone to the stream is being picked up in the proposed lateral V ditch to the right of L3.
Site 17 is a small area between piped streams that has been covered up by the roadway.
Site 2,3, and 12 have been removed due to those sites not being jurisdictional.
Site 18 was not in the original JD file, therefore it never received a JD ID. During the 4C meeting, it was agreed upon to keep the impact site.

Revised 2016 09 09

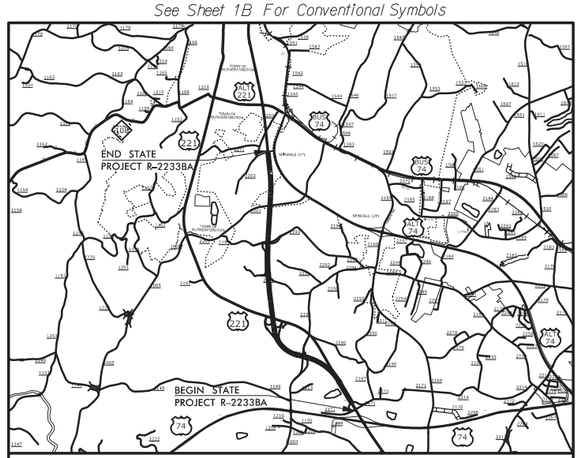
NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
3/4/2019
RUTHERFORD
R-2233BB
ENTER WBS # HERE

09/08/99

TIP PROJECT: R-2233BA

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols



VICINITY MAP

FDFI PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PERMIT DRAWING
SHEET 1 OF 50

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2233BA	1	

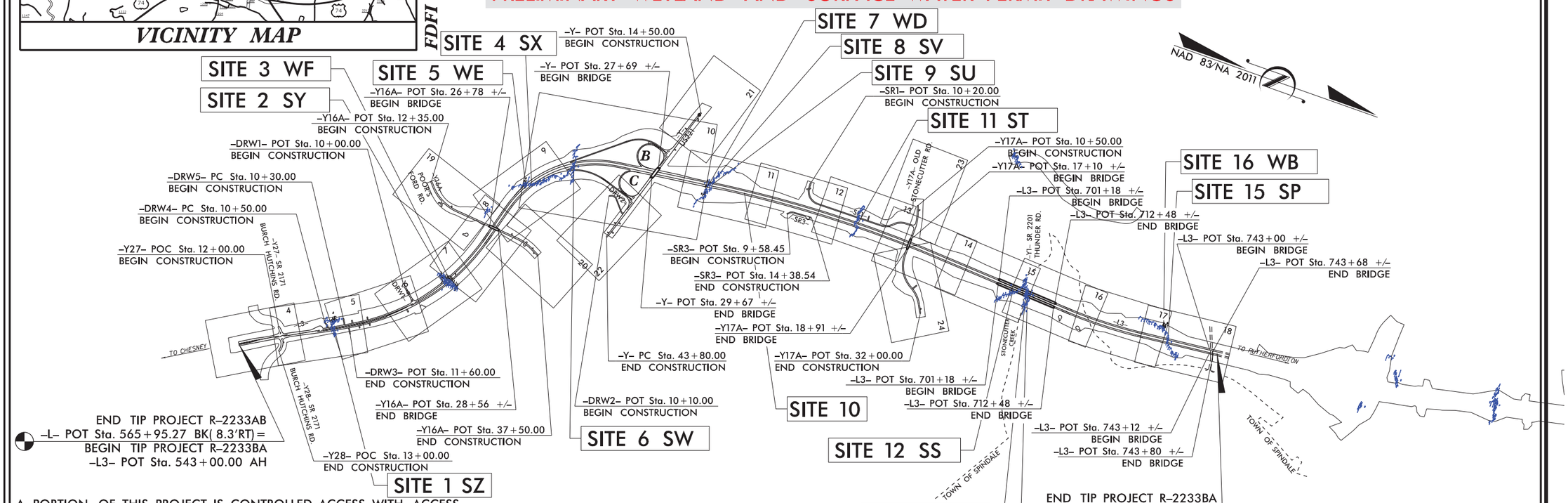
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34400.1.S5		PE
34400.2.S5		R/W & UTIL

RUTHERFORD COUNTY

LOCATION: RUTHERFORDTON BYPASS FROM US 74 BYPASS TO US 221 SOUTH OF US 74 BUSINESS (CHARLOTTE ROAD)

TYPE OF WORK: GRADING, DRAINAGE, PAVING AND STRUCTURES

PRELIMINARY WETLAND AND SURFACE WATER PERMIT DRAWINGS



A PORTION OF THIS PROJECT IS CONTROLLED–ACCESS WITH ACCESS BEING LIMITED TO INTERCHANGES.
A PORTION OF THIS PROJECT IS PARTIAL CONTROLLED–ACCESS WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD XX.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF SPINDALE.

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

NCDOT CONTACT: NATHAN ADIMA, P.E.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 10400
ADT 2040 = 12900
K = 8 %
D = 55 %
T = 7 % *
V = 70 MPH
* TTST 2% DUAL 5%
FUNC CLASS =
ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2233BA = 3.589 MILES
LENGTH STRUCTURE TIP PROJECT R-2233BA = 0.227 MILES
TOTAL LENGTH TIP PROJECT R-2233BA = 3.816 MILES

STRUCTURE LENGTH BASED ON –L3– NB STATIONING.

PLANS PREPARED FOR NCDOT BY:

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 19, 2020

LETTING DATE:
JUNE 20, 2023

DENNIS J. MORY, P.E.
PROJECT ENGINEER

BRYAN LAMBETH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 2 OF 50

NAD 83

5 5 DENOTES IMPACTS IN SURFACE WATER

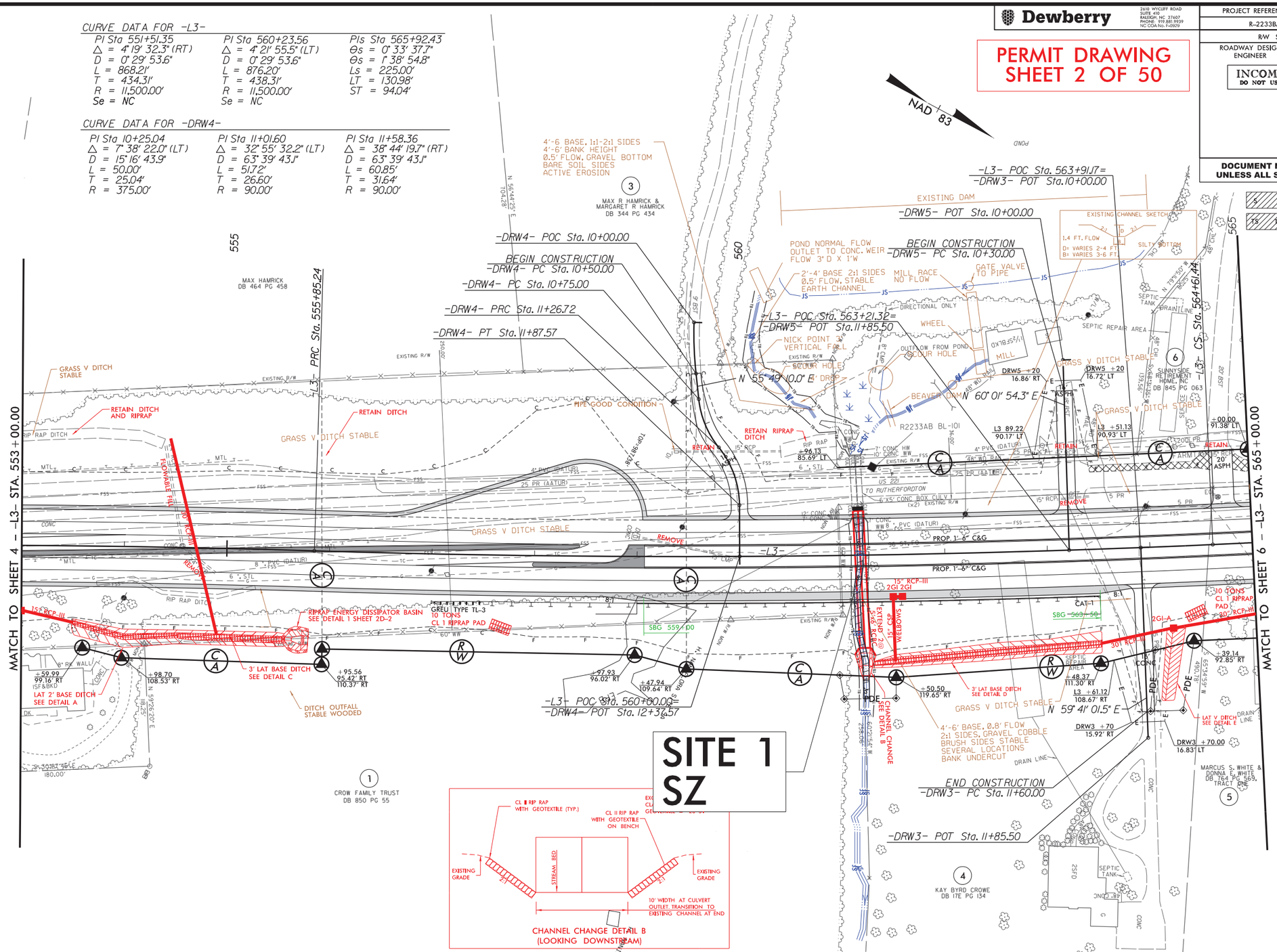
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-

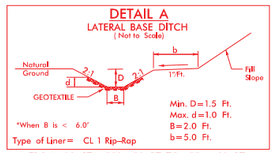
PI Sta 551+51.35	PI Sta 560+23.56	PIs Sta 565+92.43
Δ = 4° 19' 32.3" (RT)	Δ = 4° 21' 55.5" (LT)	Θs = 0° 33' 37.7"
D = 0° 29' 53.6"	D = 0° 29' 53.6"	Θs = 1° 38' 54.8"
L = 868.21'	L = 876.20'	Ls = 225.00'
T = 434.31'	T = 438.31'	LT = 130.98'
R = 11,500.00'	R = 11,500.00'	ST = 94.04'
Se = NC	Se = NC	

CURVE DATA FOR -DRW4-

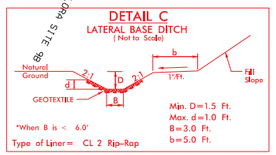
PI Sta 10+25.04	PI Sta 11+01.60	PI Sta 11+58.36
Δ = 7° 38' 22.0" (LT)	Δ = 32° 55' 32.2" (LT)	Δ = 38° 44' 19.7" (RT)
D = 15° 16' 43.9"	D = 63° 39' 43.1"	D = 63° 39' 43.1"
L = 50.00'	L = 51.72'	L = 60.85'
T = 25.04'	T = 26.60'	T = 31.64'
R = 375.00'	R = 90.00'	R = 90.00'



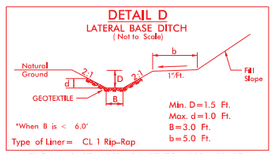
CHANNEL CHANGE DETAIL B
(LOOKING DOWNSTREAM)



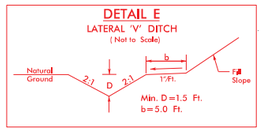
DETAIL A
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 553+50 RT TO 554+60 RT



DETAIL C
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 554+60 RT TO 555+60 RT



DETAIL D
LATERAL BASE DITCH
(Not to Scale)
FROM L3 STA. 561+30 RT TO 563+50 RT



DETAIL E
LATERAL 'V' DITCH
(Not to Scale)
FROM DRW3 STA. 10+80 LT TO 11+50 LT

SEE SHEET 26 FOR -L3- PROFILE
SEE SHEET 51 FOR -DRW3- PROFILE
SEE SHEET 52 FOR -DRW4- PROFILE
SEE SHEET 52 FOR -DRW5- PROFILE
SEE SHEET 2B-2 FOR INTERSECTION DETAILS

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 3 OF 50

NAD 83

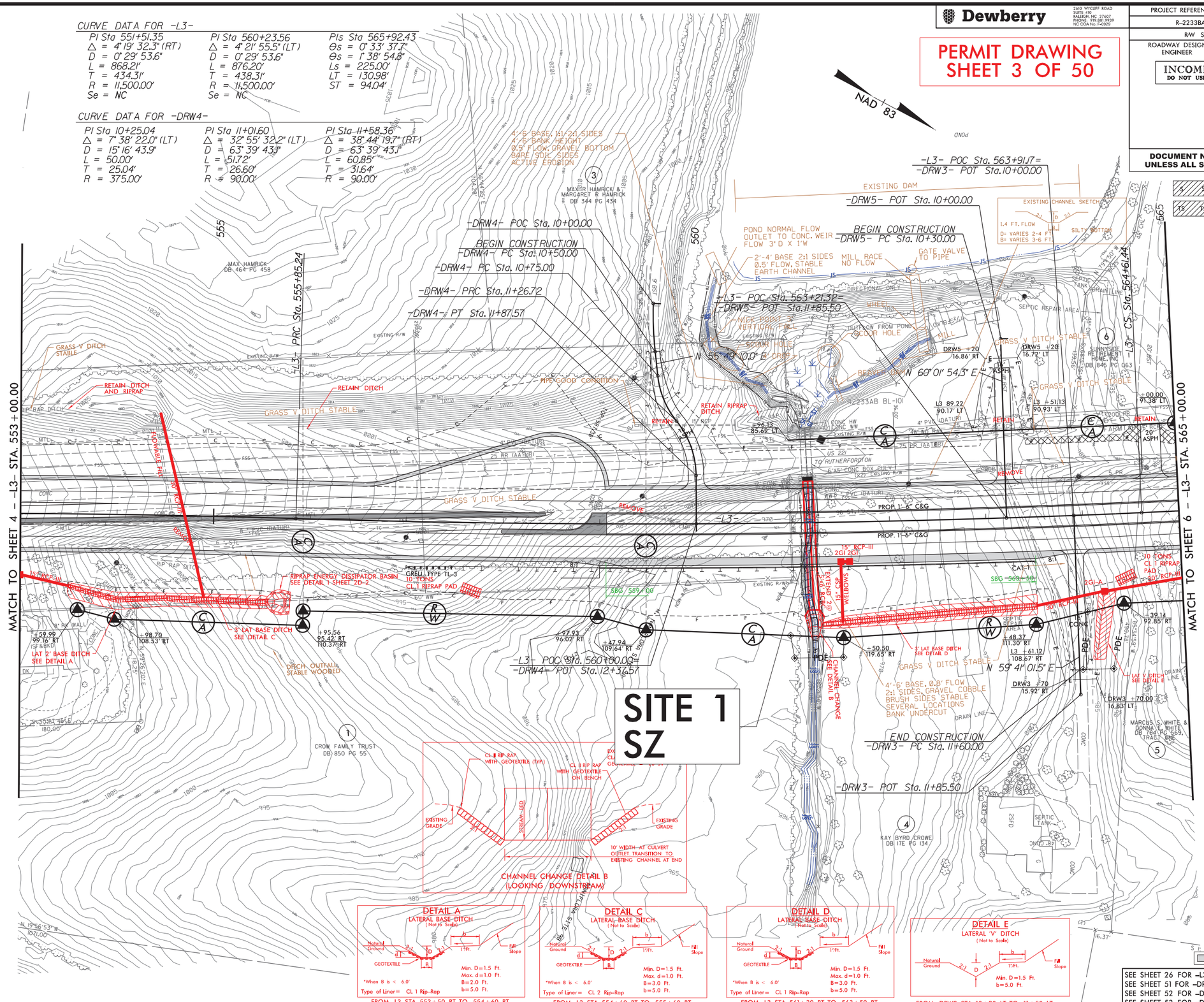
5 / 5 — DENOTES IMPACTS IN SURFACE WATER
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-

PI Sta 551+51.35	PI Sta 560+23.56	PIs Sta 565+92.43
Δ = 4° 19' 32.3" (RT)	Δ = 4° 21' 55.5" (LT)	Θs = 0° 33' 37.7"
D = 0° 29' 53.6"	D = 0° 29' 53.6"	Θs = 1° 38' 54.8"
L = 868.21'	L = 876.20'	Ls = 225.00'
T = 434.31'	T = 438.31'	LT = 130.98'
R = 11,500.00'	R = 11,500.00'	ST = 94.04'
Se = NC	Se = NC	

CURVE DATA FOR -DRW4-

PI Sta 10+25.04	PI Sta 11+01.60	PI Sta 11+58.36
Δ = 7° 38' 22.0" (LT)	Δ = 32° 55' 32.2" (LT)	Δ = 38° 44' 19.7" (RT)
D = 15° 16' 43.9"	D = 63° 39' 43.3"	D = 63° 39' 43.3"
L = 50.00'	L = 51.72'	L = 60.85'
T = 25.04'	T = 26.60'	T = 31.64'
R = 375.00'	R = 90.00'	R = 90.00'



SEE SHEET 26 FOR –L3– PROFILE
SEE SHEET 51 FOR –DRW3– PROFILE
SEE SHEET 52 FOR –DRW4– PROFILE
SEE SHEET 52 FOR –DRW5– PROFILE
SEE SHEET 2B-2 FOR INTERSECTION DETAILS

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

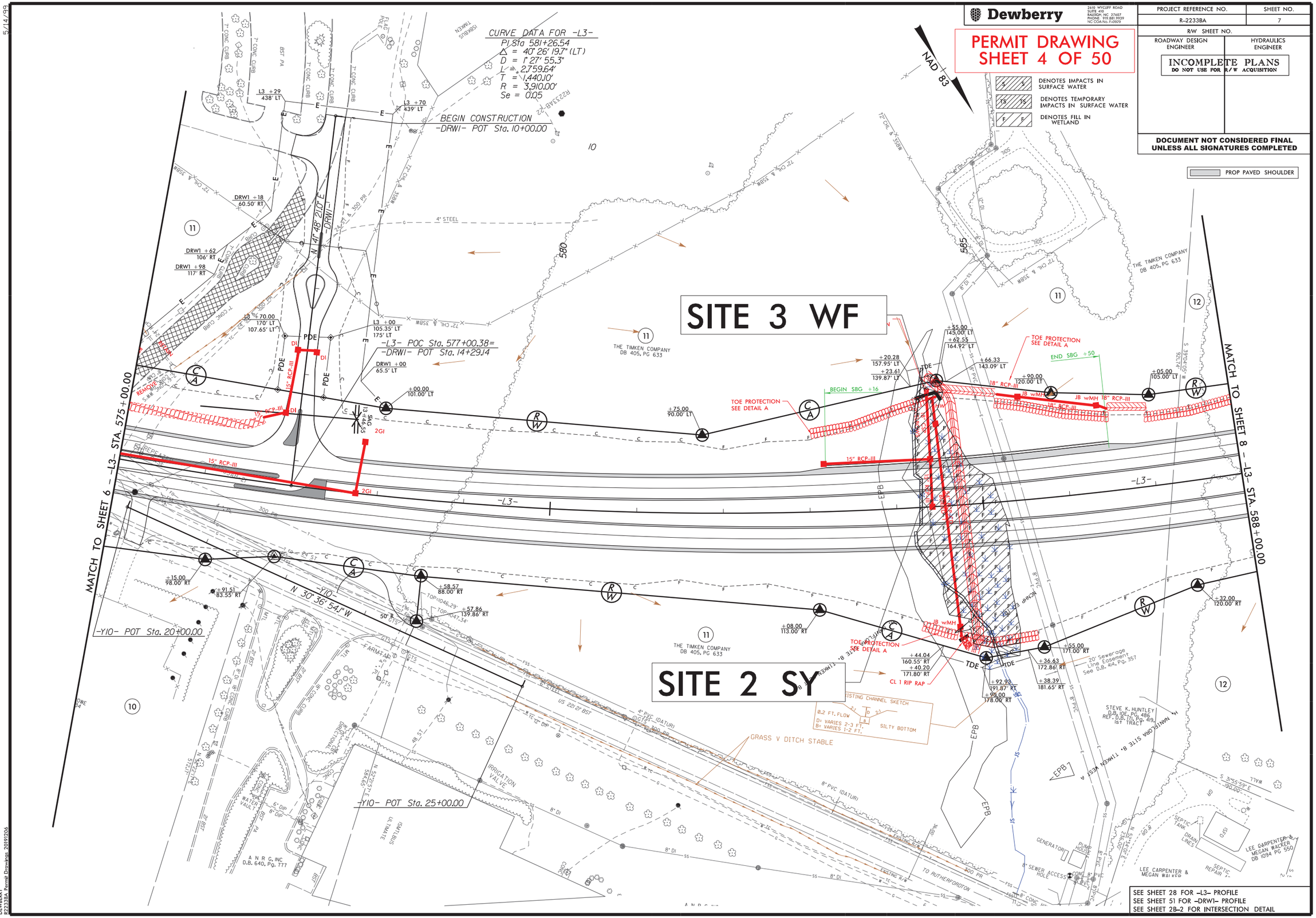
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 4 OF 50

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROP PAVED SHOULDER



SEE SHEET 28 FOR -L3- PROFILE
SEE SHEET 51 FOR -DRW1- PROFILE
SEE SHEET 28-2 FOR INTERSECTION DETAIL

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

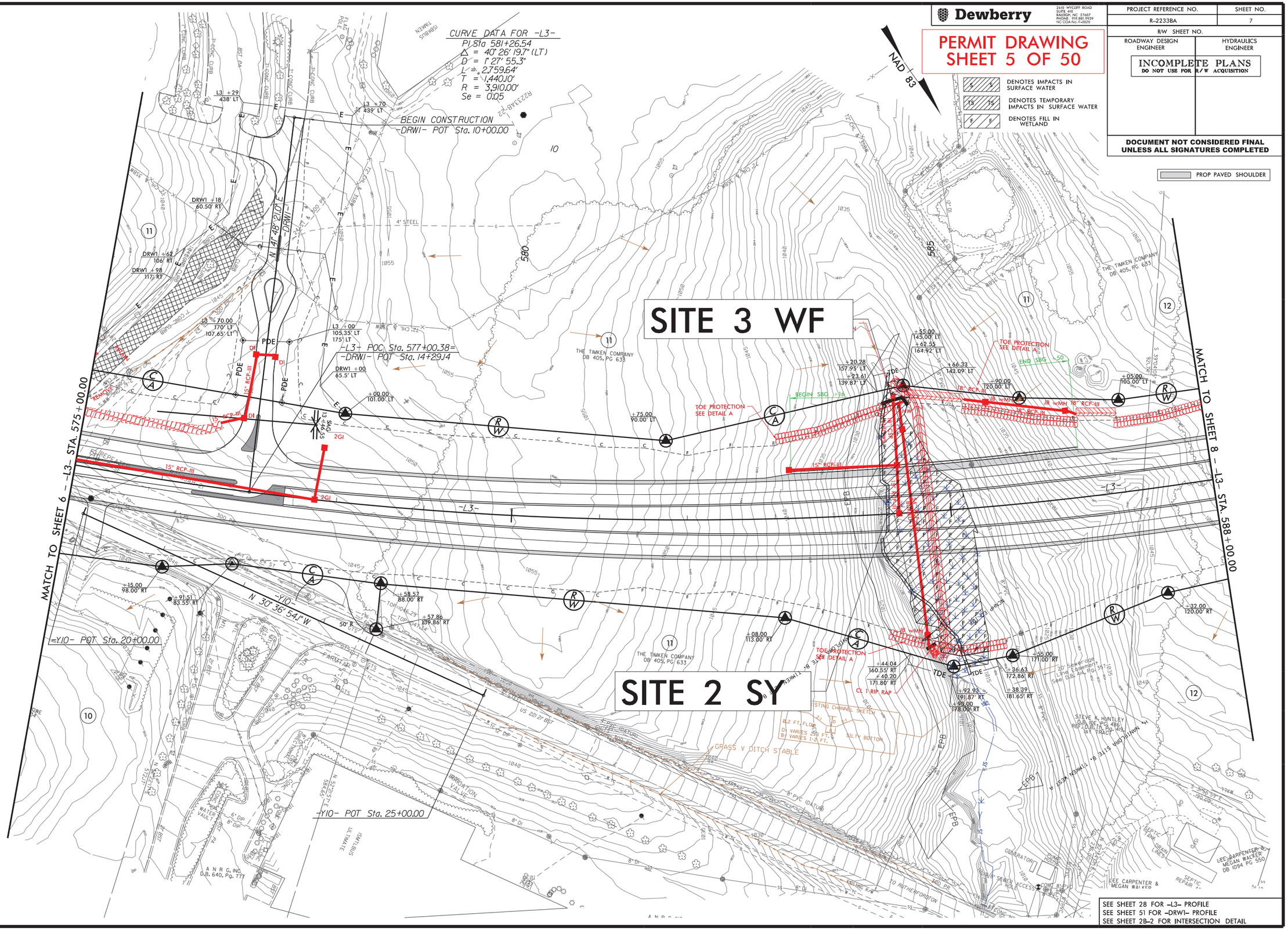
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 5 OF 50

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND

PROP PAVED SHOULDER



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

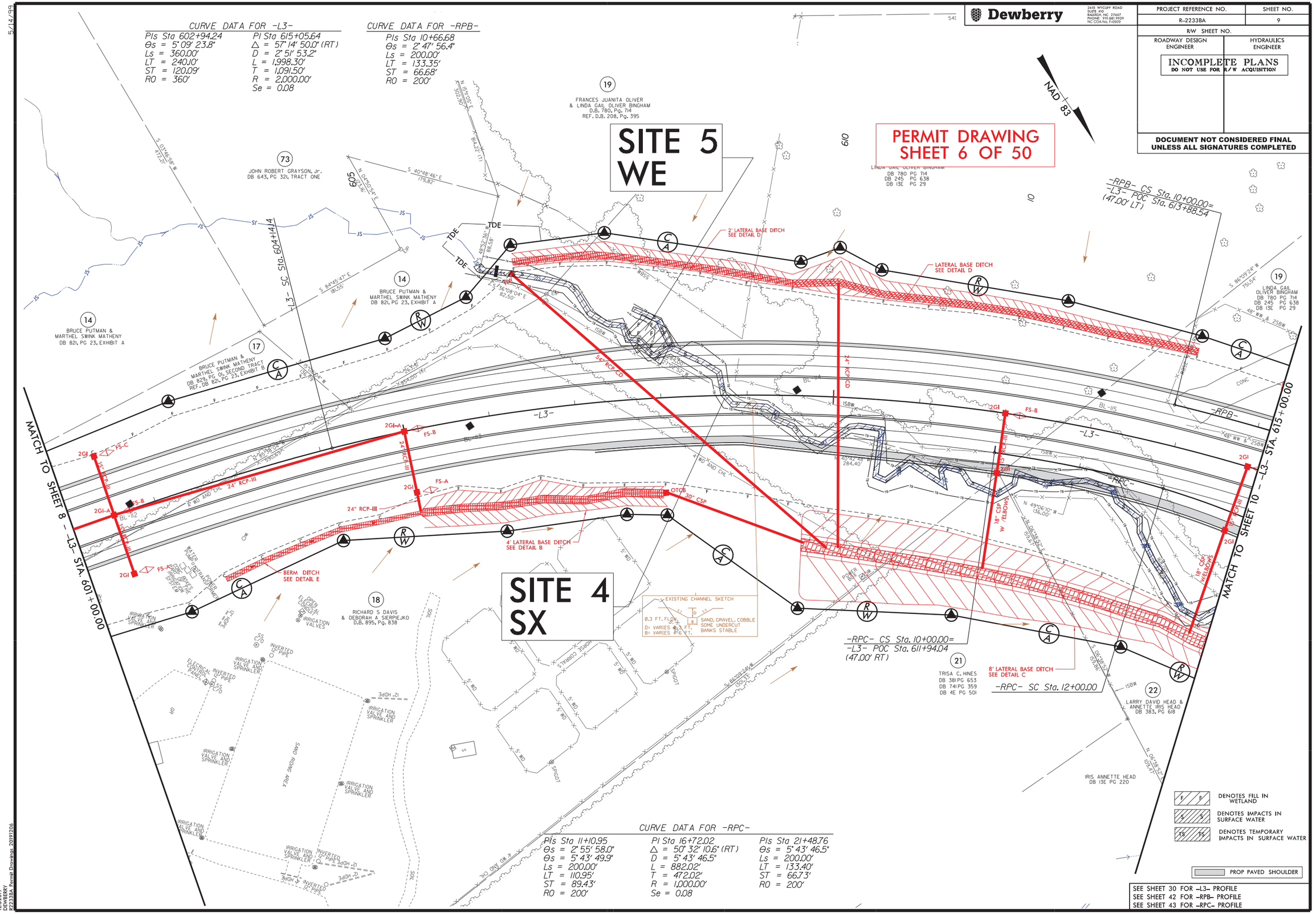
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 6 OF 50



CURVE DATA FOR -L3-

PIs Sta 602+94.24	PI Sta 615+05.64
Θs = 5° 09' 23.8"	Δ = 57° 14' 50.0" (RT)
Ls = 360.00'	D = 2° 51' 53.2"
LT = 240.10'	L = 1,998.30'
ST = 120.09'	T = 1,091.50'
RO = 360'	R = 2,000.00'
	Se = 0.08

CURVE DATA FOR -RPB-

PIs Sta 10+66.68
Θs = 2° 47' 56.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'
RO = 200'

CURVE DATA FOR -RPC-

PIs Sta 11+10.95	PI Sta 16+72.02	PIs Sta 21+48.76
Θs = 2° 55' 58.0"	Δ = 50° 32' 10.6" (RT)	Θs = 5° 43' 46.5"
Θs = 5° 43' 49.9"	D = 5° 43' 46.5"	Ls = 200.00'
Ls = 200.00'	L = 882.02'	LT = 133.40'
LT = 110.95'	T = 472.02'	ST = 66.73'
ST = 89.43'	R = 1,000.00'	RO = 200'
RO = 200'	Se = 0.08	

SEE SHEET 30 FOR -L3- PROFILE
SEE SHEET 42 FOR -RPB- PROFILE
SEE SHEET 43 FOR -RPC- PROFILE

5/14/99

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 7 OF 50

NAD 83

SITE 5
WE

SITE 4
SX

CURVE DATA FOR -L3-

PIs Sta 602+94.24
Θs = 5° 09' 23.8"
Ls = 360.00'
LT = 240.10'
ST = 120.09'
RO = 360'

PI Sta 615+05.64
Δ = 57° 14' 50.0" (RT)
D = 2° 51' 53.2"
L = 1,998.30'
T = 1,091.50'
R = 2,000.00'
Se = 0.08

CURVE DATA FOR -RPB-

PIs Sta 10+66.68
Θs = 2° 47' 56.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'
RO = 200'

CURVE DATA FOR -RPC-

PIs Sta 11+10.95
Θs = 2° 55' 58.0"
Θs = 5° 43' 49.9"
Ls = 200.00'
LT = 110.95'
ST = 89.43'
RO = 200'

PI Sta 16+72.02
Δ = 50° 32' 10.6" (RT)
D = 5° 43' 46.5"
L = 882.02'
T = 472.02'
R = 1,000.00'
Se = 0.08

PIs Sta 21+48.76
Θs = 5° 43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'
RO = 200'

-RPB- CS Sta. 10+00.00=
-L3- POC Sta. 613+88.54
(47.00' LT)

-RPC- CS Sta. 10+00.00=
-L3- POC Sta. 611+94.04
(47.00' RT)

-RPC- SC Sta. 12+00.00

MATCH TO SHEET 8 – -L3- STA. 601+00.00

MATCH TO SHEET 10 – -L3- STA. 615+00.00

19 FRANCES JUANITA OLIVER & LINDA GAIL OLIVER BINGHAM D.B. 780, PG. 714 REF. D.B. 208, PG. 395

73 JOHN ROBERT CRAYSON, JR. DB 643, PG 321, TRACT ONE

14 BRUCE PUTMAN & MARTHEL SWINK MATHENY DB 821, PG 23, EXHIBIT A

17 BRUCE PUTMAN & MARTHEL SWINK MATHENY DB 821, PG 23, SECOND TRACT REF. DB 821, PG 23, EXHIBIT A

18 RICHARD S. DAVIS & DEBORAH A. SIERPIEJKO D.B. 895, PG. 838

21 TRISA C. HINES DB 381 PG 653 DB 741 PG 359 DB 1E PG 501

22 LARRY DAVID HEAD & ANNETTE IRIS HEAD DB 383, PG 618

IRIS ANNETTE HEAD DB 1E PG 220

LINDA GAIL OLIVER BINGHAM DB 780 PG 714 DB 245 PG 638 DB 13E PG 29

2' LATERAL BASE DITCH SEE DETAIL D

LATERAL BASE DITCH SEE DETAIL D

4' LATERAL BASE DITCH SEE DETAIL B

BERM DITCH SEE DETAIL E

8' LATERAL BASE DITCH SEE DETAIL C

24" RCP-III

30" CSP

18" CSP W/ FLOW DIVERTER

EXISTING CHANNEL SKETCH
0.3 FT. FLOW
D= VARIES 4.5 FT.
B= VARIES 4.5 FT.
SAND, GRAVEL, COBBLE
SOME UNDERCUT
BANKS STABLE

F/F DENOTES FILL IN WETLAND

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROP PAVED SHOULDER

SEE SHEET 30 FOR -L3- PROFILE
SEE SHEET 42 FOR -RPB- PROFILE
SEE SHEET 43 FOR -RPC- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings 20191206

REVISIONS

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	70
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PERMIT DRAWING
SHEET 8 OF 50

NAD 83

PROP PAVED SHOULDER

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 4 SX

SITE 6 SW

MATCH TO SHEET 21 - Y STA. 21+00.00

MATCH TO SHEET 11 - L3- STA. 641+50.00

MATCH TO SHEET 22 - Y STA. 35+50.00

MATCH TO SHEET 9 - L3- STA. 615+50.00

-RPB- SC Sta. 25+92.92

-RPB- TS Sta. 23+92.92

-RPB- ST Sta. 21+00.00

-RPB- POT Sta. 33+41.77=
-Y- POT Sta. 24+33.05

-LPB- POT Sta. 21+86.27=
-Y- POT Sta. 24+15.05

-LPB- ST Sta. 10+00.00=
-L3- POT Sta. 632+39.40
(47.00 LT)

-LPB- SC Sta. 11+80.00

-L3- POT Sta. 633+19.66=
-Y- POT Sta. 28+68.37

-L3- ST Sta. 627+72.44

-L3- ST Sta. 624+62.24

-RPB- ST Sta. 12+00.00

-LPC- SC Sta. 11+80.00

-LPC- ST Sta. 10+00.00=
-L3- POT Sta. 630+12.87
(47.00 RT)

-LPC- CS Sta. 16+15.74

-LPC- ST Sta. 17+17.74

-RPC- CS Sta. 20+82.03

-RPC- ST Sta. 22+82.03

-RPC- POT Sta. 28+39.46=
-Y- POT Sta. 35+42.43

-LPC- POT Sta. 19+15.74=
-Y- POT Sta. 35+24.43

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 17° 29' 50.0" W

N 7° 24' 08.3" W

B

C

CURVE DATA FOR -RPB-

PIs Sta 10+66.68	PI Sta 25+26.45	PI Sta 28+54.49
Gs = 2° 47' 56.4"	Gs = 9° 32' 57.5"	Δ = 41° 06' 36.1" (RT)
Ls = 200.00'	Ls = 200.00'	D = 9° 52' 57.5"
LT = 133.35'	LT = 133.53'	L = 493.33'
ST = 66.68'	ST = 66.84'	T = 261.57'
RO = 200'	RO = 200'	R = 580.00'
		Se = 0.08

CURVE DATA FOR -L3-

PI Sta 615+05.64	PI Sta 625+32.53
Δ = 53° 14' 50.0" (RT)	Gs = 9° 09' 23.8"
D = 2° 54' 53.2"	Ls = 360.00'
L = 1,998.50'	LT = 240.00'
T = 1,129.50'	ST = 120.19'
R = 2,000.00'	RO = 360'
Se = 0.08	

CURVE DATA FOR -LPB-

PIs Sta 11+20.98	PI Sta 17+97.59	PIs Sta 18+93.06
Gs = 22° 25' 12.3"	Δ = 167° 36' 08.4" (RT)	Gs = 14° 56' 48.2"
Ls = 180.00'	D = 24° 54' 40.4"	Ls = 120.00'
LT = 120.98'	L = 672.87'	LT = 80.29'
ST = 60.89'	T = 2,117.59'	ST = 40.26'
RO = 180'	R = 230.00'	RO = 120'
	Se = 0.08	

CURVE DATA FOR -RPC-

PIs Sta 11+20.95	PI Sta 16+72.00	PIs Sta 21+48.76
Gs = 2° 55' 58.0"	Δ = 50° 32' 10.2" (RT)	Gs = 5° 43' 46.5"
Gs = 5° 43' 49.9"	D = 5° 43' 46.5"	Ls = 200.00'
Ls = 200.00'	L = 882.12'	LT = 133.40'
LT = 110.95'	T = 472.22'	ST = 66.73'
ST = 89.43'	R = 1,000.00'	RO = 200'
RO = 200'	Se = 0.08	

CURVE DATA FOR -LPC-

PIs Sta 11+20.98	PI Sta 15+61.01	PIs Sta 16+93.00
Gs = 22° 25' 12.3"	Δ = 107° 49' 55.0" (LT)	Gs = 14° 56' 48.2"
Ls = 180.00'	D = 24° 54' 40.4"	Ls = 120.00'
LT = 120.98'	L = 412.74'	LT = 80.29'
ST = 60.89'	T = 318.01'	ST = 40.26'
RO = 180'	R = 230.00'	RO = 120'
	Se = 0.08	

TRAFFIC DATA

US 221 BYPASS

	AADT	DHV	%DHV	%D	%T	TTST	K	D	V
A	44/55	7/9	16	55	2	1	9	60	55
B	33/41	7.3/8.8	16	55	2	1	9	60	55
C	102/124	6/7	6	55	2	1	9	60	55
D	12/15	2/3	16	55	2	1	9	60	55

2020 / 2040
*VPD IN 100s

SEE SHEETS 31 & 32 FOR -L3- PROFILE
SEE SHEET 41 FOR -LPB- PROFILE
SEE SHEET 41 FOR -LPC- PROFILE
SEE SHEET 42 & 43 FOR -RPB- PROFILE
SEE SHEET 44 & 45 FOR -RPC- PROFILE
SEE SHEETS 45 & 46 FOR -X- PROFILE
SEE SHEET 28-1 FOR INTERSECTION DETAILS
SEE SHEET 1 FOR CONC. BLAND DETAILS

LOCATION:
RUTHERFORDTON BYPASS FROM US 74 BYPASS TO NORTH OF RELOCATED LAUREL HILL ROAD

TIP NO.: R-2233BA	COUNTY:	RUTHERFORD
DESIGNED BY:	AMP	3/5/2020
CHECKED BY:	DJM	3/5/2020

GRAPHIC SCALE
50 25 0 50 100
PLANS

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

REVISIONS

CURVE DATA FOR -RPB-

PIs Sta 10+66.68	PI Sta 25+26.45	PI Sta 28+54.49
Gs = 2° 47' 56.4"	Gs = 9° 32' 57.5"	Δ = 41° 06' 36.1" (RT)
Ls = 200.00'	Ls = 200.00'	D = 9° 32' 57.5"
LT = 133.35'	LT = 133.33'	L = 493.33'
ST = 66.68'	ST = 66.84'	T = 261.57'
RO = 200'	RO = 200'	R = 600.00'
		Se = 0.08

CURVE DATA FOR -LS-

PI Sta 6+50+50.64	PIs Sta 6+25+32.53
Δ = 53° 14' 50.0" (RT)	Gs = 5° 09' 23.8"
D = 2° 54' 53.2"	Ls = 560.00'
L = 1,998.50'	LT = 240.00'
T = 1,129.50'	ST = 120.19'
R = 2,000.00'	RO = 360'
Se = 0.08	

CURVE DATA FOR -LPB-

PIs Sta 11+20.98	PIs Sta 18+93.06
Gs = 22° 25' 12.3"	Gs = 14° 56' 48.2"
Ls = 180.00'	Ls = 120.00'
LT = 120.98'	LT = 80.25'
ST = 60.89'	ST = 40.26'
RO = 180'	RO = 120'

Dewberry

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

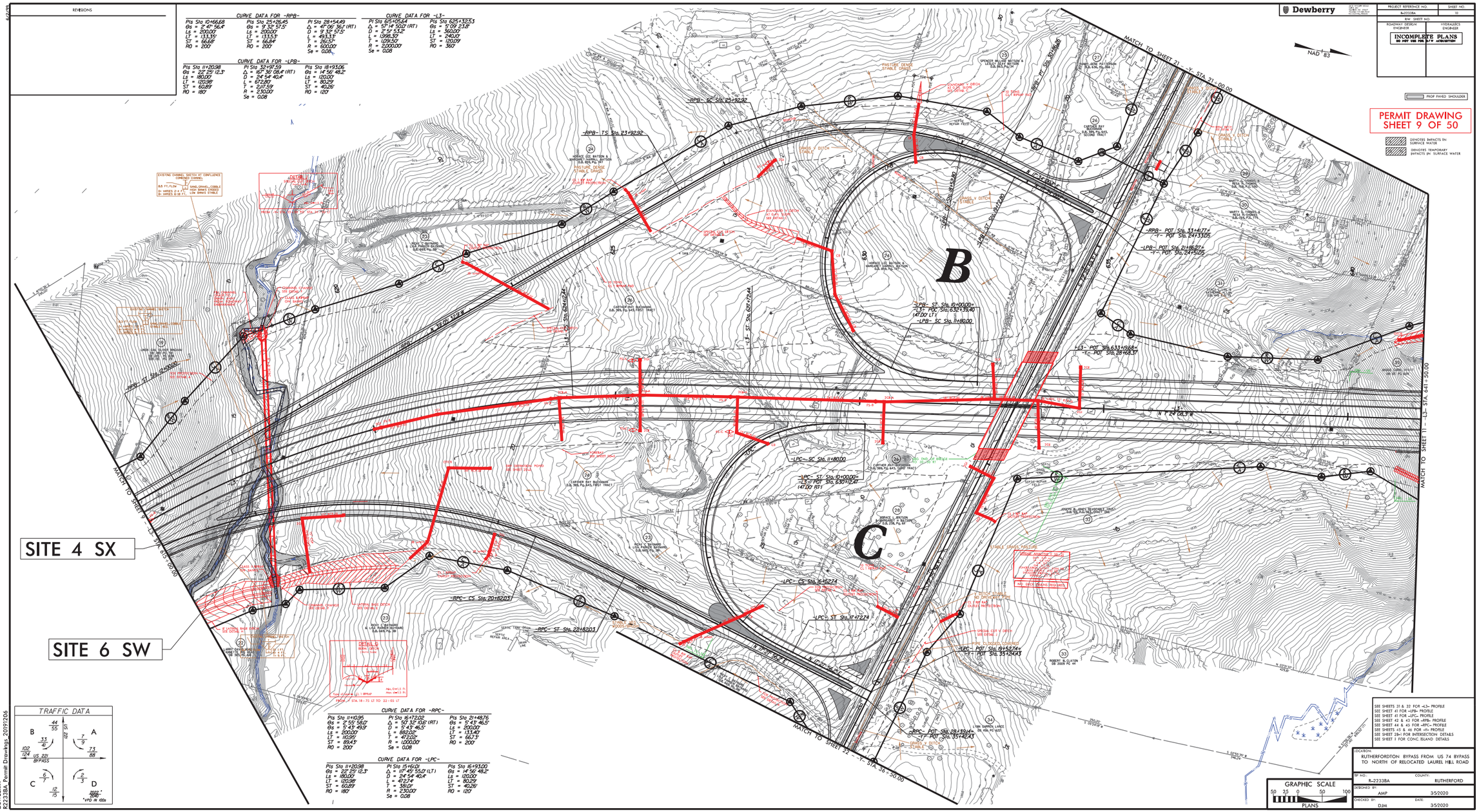
NAD 83

PROP PAVED SHOULDER

PERMIT DRAWING
SHEET 9 OF 50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER


MATCH TO SHEET 21 - Y- STA. 21+00.00
MATCH TO SHEET 11 - L3- STA. 641+50.00
MATCH TO SHEET 9 - L3- STA. 615+00.00
MATCH TO SHEET 22 - Y- STA. 36+50.00
SITE 4 SX
SITE 6 SW
B
C
-RPB- SC Sta. 25+92.92
-RPB- TS Sta. 23+92.92
-RPB- POT Sta. 33+67.77=
-Y- POT Sta. 24+33.05
-LPB- POT Sta. 21+86.87=
-Y- POT Sta. 24+53.05
-LPB- ST Sta. 8+00.00=
-L3- POT Sta. 632+39.40
(47.00' LT)
-LPB- SC Sta. 11+80.00
-L3- POT Sta. 633+09.64=
-Y- POT Sta. 28+68.37
-LPC- SC Sta. 11+80.00
-LPC- ST Sta. 10+00.00=
-L3- POT Sta. 630+12.47
(47.00' RT)
-LPC- CS Sta. 16+52.74
-LPC- ST Sta. 17+72.74
-RPC- CS Sta. 20+82.03
-RPC- ST Sta. 22+82.03
-RPC- POT Sta. 19+52.74=
-Y- POT Sta. 35+42.43
-RPC- POT Sta. 28+89.46=
-Y- POT Sta. 35+42.43
N 17°24'00.3"W
N 17°24'00.3"E
N 17°24'00.3"W
N 17°24'00.3"E
EXISTING CHANNEL SKETCH AT CONFLUENCE COMBINED CHANNEL
DETAIL G
NTS
DETAIL H
NTS
PROP. 1" DTA. 18+75 LT TO 22+85 LT
Vert. Clr = 2 ft.
Horz. Clr = 5 ft.
Top of Pipe = 2 ft. BRAP
PROP. 1" DTA. 18+75 LT TO 22+85 LT
PROP. 1" DTA. 18+75 LT TO 22+85 LT
PROP. 1" DTA. 18+75 LT TO 22+85 LT

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

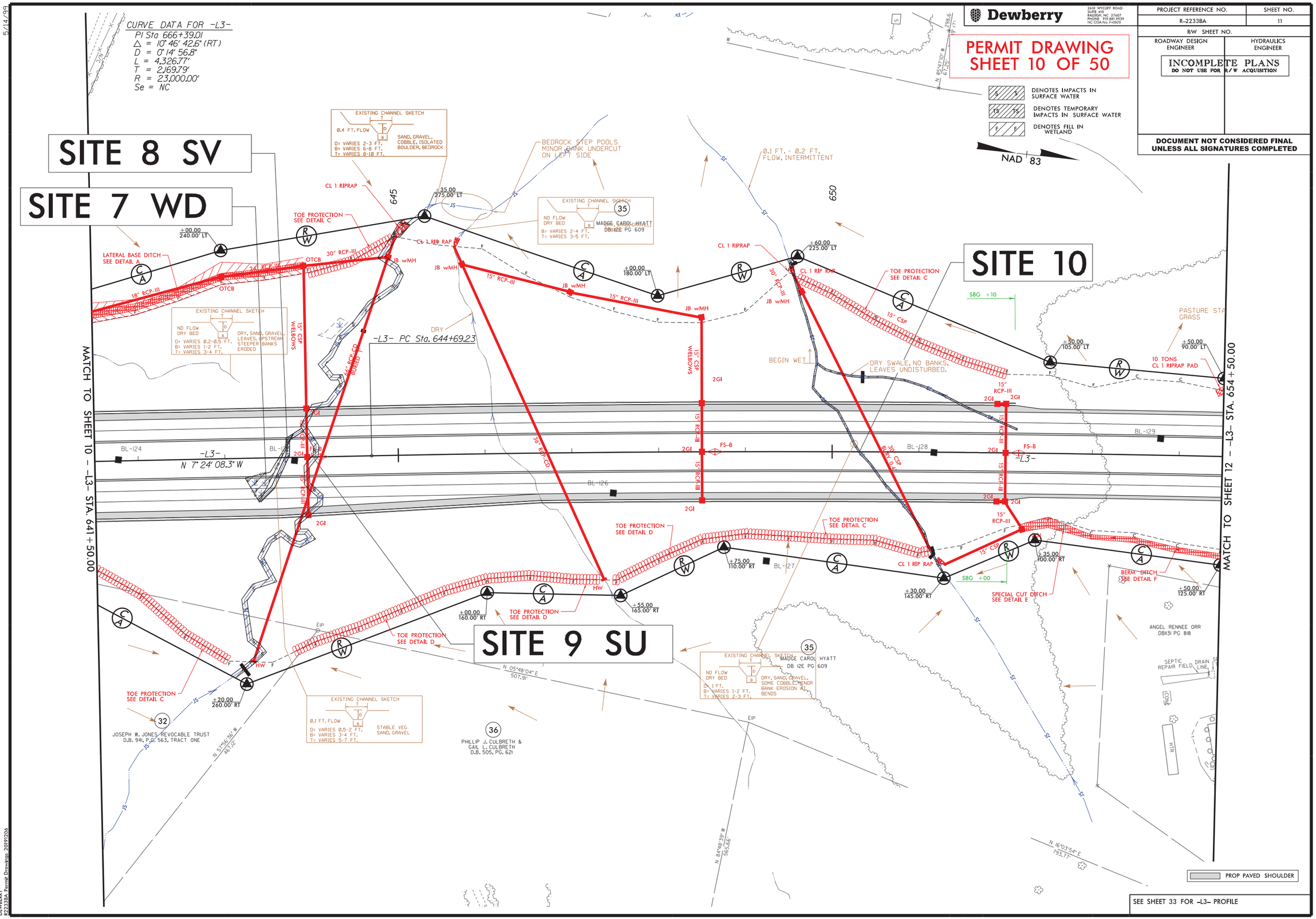
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 10 OF 50

S/S DENOTES IMPACTS IN SURFACE WATER
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F/F DENOTES FILL IN WETLAND

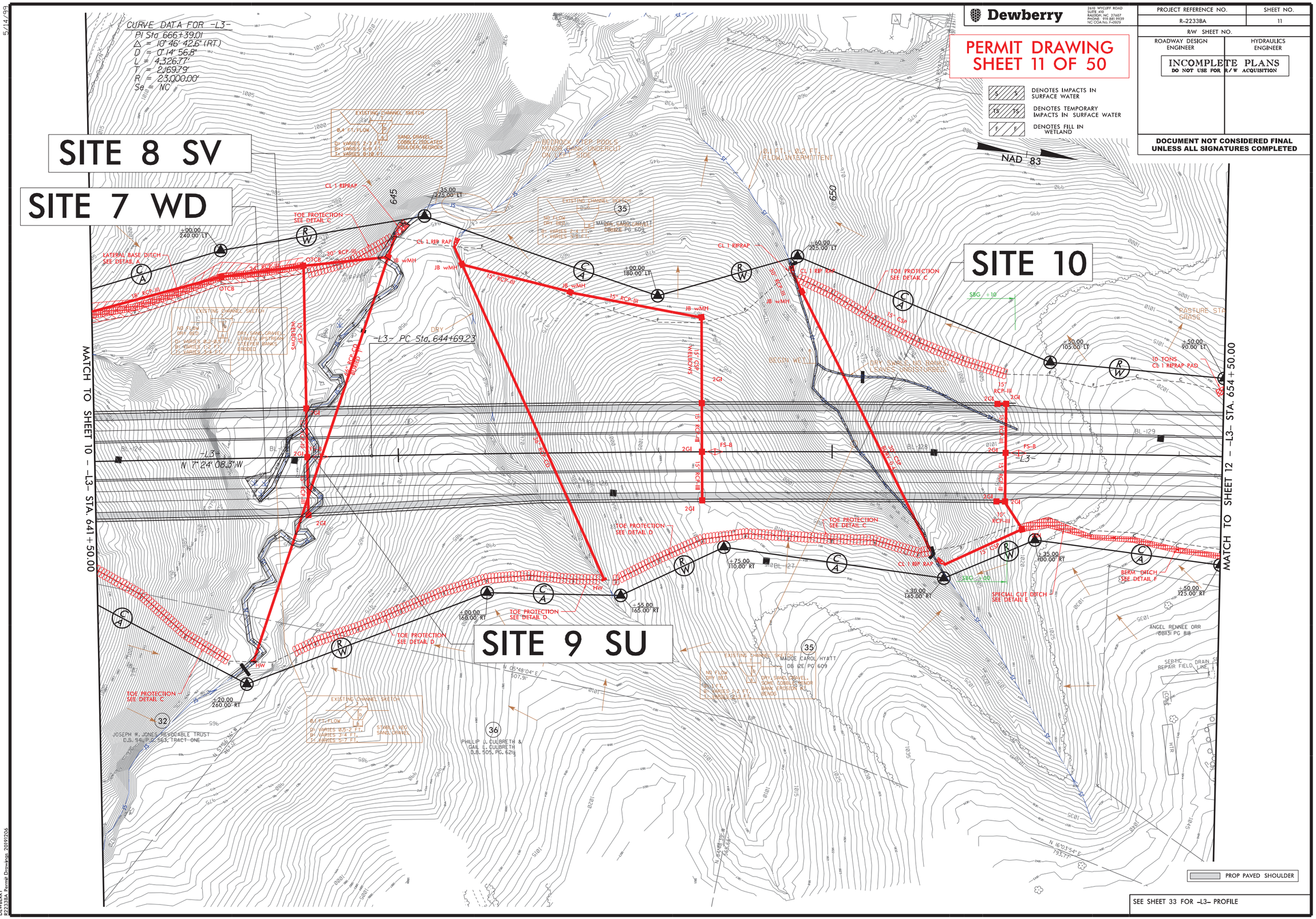
NAD 83



SEE SHEET 33 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

PERMIT DRAWING
SHEET 12 OF 50

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROP PAVED SHOULDER
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CURVE DATA FOR -L3-
PI Sta 666+39.01
△ = 10° 46' 42.6" (RT)
D = 0° 14' 56.8"
L = 4,326.77'
T = 2,169.79'
R = 23,000.00'
Se = NC

CURVE DATA FOR -SR1-
PI Sta 28+77.65
△ = 46° 17' 48.5" (LT)
D = 19° 05' 54.9"
L = 242.41'
T = 128.26'
R = 300.00'
Se = 0.06
RO = 108'

PI Sta 31+17.50
△ = 45° 28' 11.4" (RT)
D = 19° 05' 54.9"
L = 238.08'
T = 125.71'
R = 300.00'
Se = 0.06
RO = 108'

NAD 83

MATCH TO SHEET 12 - -L3- STA. 667+50.00

MATCH TO SHEET 14 - -L3- STA. 680+50.00

MATCH TO SHEET 23 -SR1- STA. 32+00.00

-SR1- PC Sta. 27+49.39

-SR1- PRC Sta. 29+91.79

EXISTING CHANNEL SKETCH
43 KATHY PATE MORGAN
Ø.8 FT. FLOW
D= VARIES 2 VIEW PATE
B= VARIES 0.6-1.5 FT. COBBLE, GRAVEL, SOME
T= VARIES 8-10 FT. COBBLE, STABLE VEG ON BANKS

39 DOUGLAS W. ARROWOOD
D.B. 866, PG. 358
PORTION OF P.B. 6, PG. 152

44 LOYD C. PATE
D.B. 1067, PG. 785
D.B. 1067, PG. 884

46 LOYD C. PATE
PASTURE STABLE GRASS

45 KEVIN MARTIN PATE
D.B. 697, PG. 371

47 ROGER MCCLUNEY & ALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

43 KATHY PATE MORGAN
LYNN PATE
DB 1167 PG 785

CHANNEL CHANGE SEE DETAIL E

CL B RIP RAP OUTLET PROTECTION

PASTURE STABLE GRASS

TOE PROTECTION SEE DETAIL D

BERM DITCH SEE DETAIL C

TOE PROTECTION SEE DETAIL A

TOE PROTECTION SEE DETAIL B

FILL EXISTING CHANNEL TO EL 945

24" RCP-III
18" RCP-III
15" RCP-III
2GI
FS-A
FS-B
FS-C
JB w/MH
SBG +75
SBG +00
SBG +50
-L3-
-SR-
N 0°42'07.1" W

SITE 11 ST

SEE SHEET 35 FOR -L3- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99

PERMIT DRAWING
SHEET 13 OF 50

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROP PAVED SHOULDER

S S — DENOTES IMPACTS IN SURFACE WATER

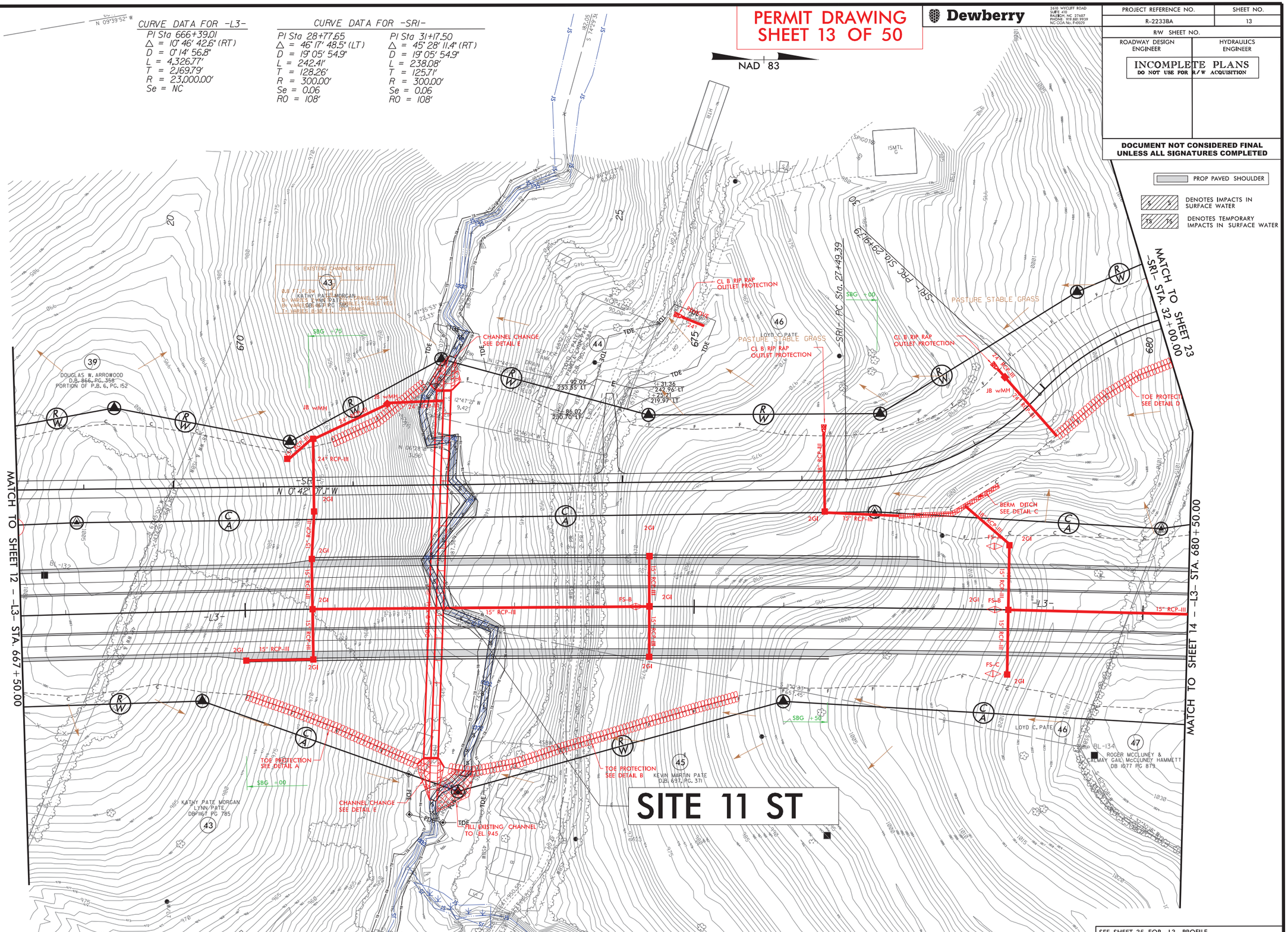
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

CURVE DATA FOR -L3-
PI Sta 666+39.01
△ = 10° 46' 42.6" (RT)
D = 0° 14' 56.8"
L = 4,326.77'
T = 2,169.79'
R = 23,000.00'
Se = NC

CURVE DATA FOR -SR1-
PI Sta 28+77.65
△ = 46° 17' 48.5" (LT)
D = 19° 05' 54.9"
L = 242.41'
T = 128.26'
R = 300.00'
Se = 0.06
RO = 108'

PI Sta 31+17.50
△ = 45° 28' 11.4" (RT)
D = 19° 05' 54.9"
L = 238.08'
T = 125.71'
R = 300.00'
Se = 0.06
RO = 108'



SEE SHEET 35 FOR -L3- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings 20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC CGA No. F-0259

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 14 OF 50

NAD 83

SITE 12 SS

SPREAD ANALYSIS L3 700+80LT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.3 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT.
SPREAD= 12.6 FT.

NO DECK DRAINS REQUIRED

SBG +60 TO END OF BRIDGE LT AND RT

47
ROGER MCCLUNEY &
CALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

48
A. L. COSTNER HEIRS
D.B. 156, P.G. 468

STONECUTTER CREEK

MATCH TO SHEET 14 – –L3– STA. 693+50.00

MATCH TO SHEET 16 – –L3– STA. 706+50.00

695 700 705

+65.00 184.00' LT
+00.00 140.00' LT
+45.00 100.00' LT
+75.00 100.00' RT
+58.00 146.00' RT
+87.00 100.00' RT 142.00' RT
+88.08 100.00' RT 142.00' RT
+18.02 100.00' RT 122.04' RT
+78.02 100.00' RT 120.00' RT
+55.60 134.95' RT

BM #6

BL-137
BL-138
BL-139
BL-140
BL-141

2GI FS-C 15" RCP-III
2GI FS-B 18" RCP-III
2GI FS-A 15" RCP-III
2GI 15" RCP-III
2GI 15" RCP-III
2GI 15" RCP-III
2GI 18" RCP-III
2GI 24" RCP-III
2GI-A 30" RCP-III JB w/MH
30" RCP-III
JB w/MH 30" RCP-III JB w/MH
30" RCP-III PDE

–L3–
N 3° 22' 34.3" E

CL II RIPRAP
845 TONS

RIPRAP ENERGY DISSIPATOR BASIN
SEE DETAIL 1 SHEET 2D-2

PIPE REQUIRED DOWN SLOPE TO AVOID EROSION OF STEEP SLOPES

47
ROGER MCCLUNEY &
CALMAY GAIL McCLUNEY HAMMETT
DB 1077 PG 879

SPREAD ANALYSIS L3 700+80RT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.3 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT.
SPREAD= 12.6 FT.

NO DECK DRAINS REQUIRED

S 13°49'30" E
619.12'

STEVEN HOWARD ROSS &
ALLISON B. ROSS
D.B. 982, PG. 698

EXISTING CHANNEL SKETCH
D= VARIES 1-3 FT.
B= VARIES 3-5 FT.
T= VARIES 5-7 FT.
SAND, GRAVEL, COBBLE, STABLE VEG

EIP

1225.63'
N 14°22'04" W

1210.43'
S 56°28' E

PROP PAVED SHOULDER

SEE SHEET 37 FOR –L3– PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC CGA No. F-0260

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 15 OF 50

NAD 83

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 12 SS

MATCH TO SHEET 14 – -L3- STA. 693+50.00

MATCH TO SHEET 16 – -L3- STA. 706+50.00

SPREAD ANALYSIS L3 700 +80LT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.8 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT
SPREAD= 12.6 FT

NO DECK DRAINS REQUIRED

SBG - MOVTO END OF BRIDGE LT AND RT

ROGER MCCLUNEY & CALMAY GAIL MCCLUNEY HAMMETT DB 1077 PG 879

+65.00 184.00' LT

+00.00 140.00' LT

+45.00 100.00' LT

15" RCP-III

18" RCP-III

2GI

FS-C

FS-B

FS-A

18" RCP-III

N 5° 22' 34.3" E

30" RCP-III

JB w/MH

50" RCP-III

+75.00 100.00' RT

+58.00 146.00' RT

+87.00 100.00' RT 142.00' RT

+88.09 100.00' RT 142.00' RT

+18.02 100.00' RT 122.04' RT

+78.02 100.00' RT 120.00' RT

+55.60 134.95' RT

PDE

CL II RIPRAP 843 TONS

RIPRAP ENERGY DISSIPATOR BASIN SEE DETAIL 1 SHEET 25-2

RIP REQUIRED DOWN SLOPE TO AVOID EROSION OF STEEP SLOPES

STONECUTTER CREEK

A.L. COSTNER HEIRS D.B. 861, P.G. 488

ROGER MCCLUNEY & CALMAY GAIL McCLUNEY HAMMETT DB 1077 PG 879

SPREAD ANALYSIS L3 700 +80RT
DA= 1.19 ac
I= 4.0 in/hr
C= 0.9
Q= 4.8 cfs
LONGITUDINAL SLOPE= 0.004 ft/ft
CROSS SLOPE= .025 ft/ft
SHOULDER WIDTH= 12.0 FT
SPREAD= 12.6 FT

NO DECK DRAINS REQUIRED

EXISTING CHANNEL SKETCH

D= VARIES 1-3 FT
B= VARIES 3-5 FT
Z= VARIES 2-3 FT

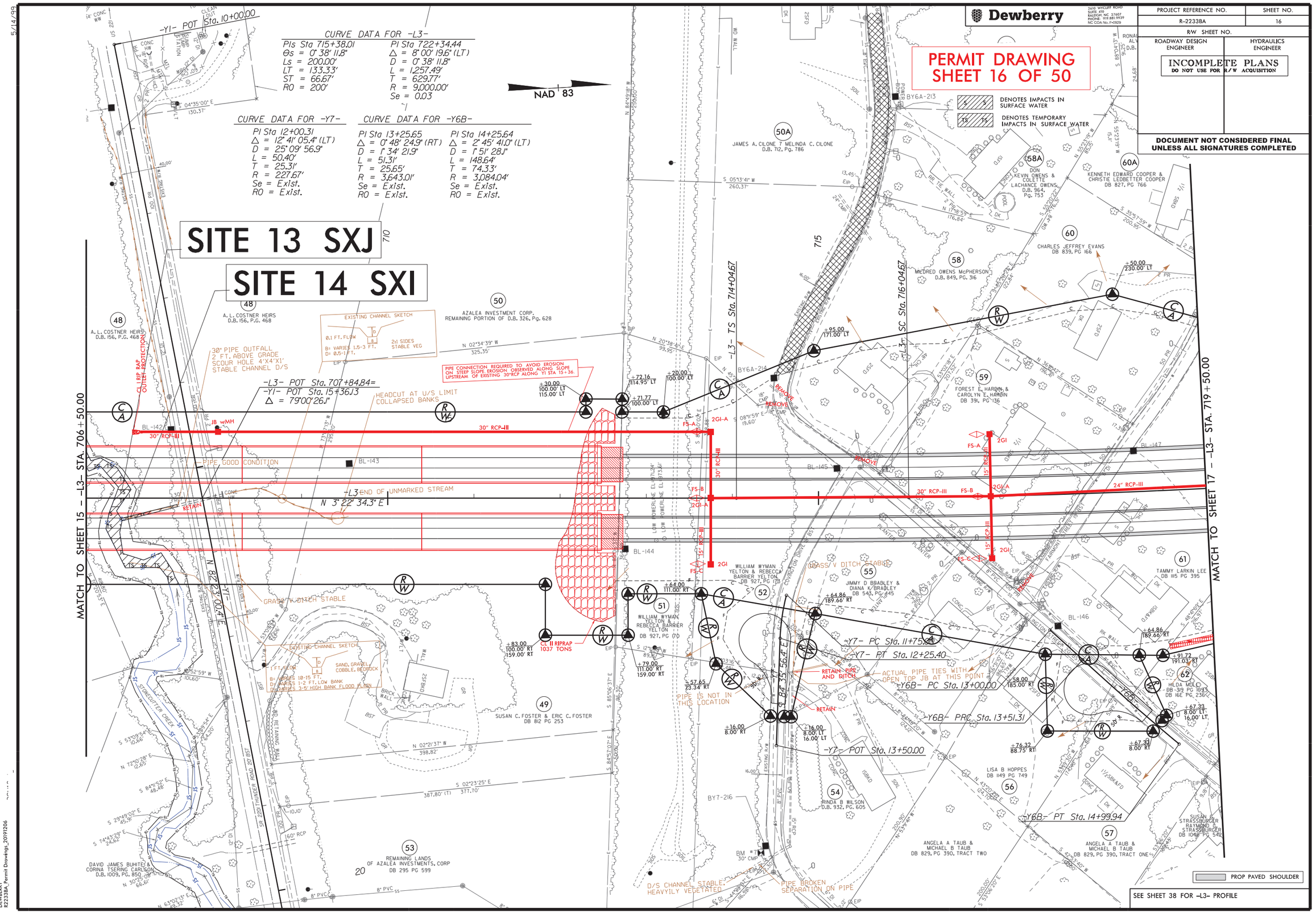
SAND, GRAVEL, COBBLE, STABLE VEG

STEVEN HOWARD ROSS & ALLISON B. ROSS D.B. 987, PG. 888

PROP PAVED SHOULDER

SEE SHEET 37 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA Permit Drawings_20191206


Dewberry
2610 WYCLIFF ROAD SUITE 410 RALEIGH, NC 27607 PHONE: 919.881.9939 NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BA
SHEET NO.
16
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 16 OF 50
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83
CURVE DATA FOR -L3-
PIs Sta 715+38.01
Θs = 0° 38' 11.8"
Ls = 200.00'
LT = 133.33'
ST = 66.67'
RO = 200'
PI Sta 722+34.44
Δ = 8° 00' 19.6" (LT)
D = 0° 38' 11.8"
L = 1,257.49'
T = 629.77'
R = 9,000.00'
Se = 0.03
CURVE DATA FOR -Y7-
PI Sta 12+00.31
Δ = 12° 41' 05.4" (LT)
D = 25° 09' 56.9"
L = 50.40'
T = 25.31'
R = 227.67'
Se = Exist.
RO = Exist.
CURVE DATA FOR -Y6B-
PI Sta 13+25.65
Δ = 0° 48' 24.9" (RT)
D = 1° 34' 21.9"
L = 51.31'
T = 25.65'
R = 3,643.01'
Se = Exist.
RO = Exist.
PI Sta 14+25.64
Δ = 2° 45' 41.0" (LT)
D = 1° 51' 28.1"
L = 148.64'
T = 74.33'
R = 3,084.04'
Se = Exist.
RO = Exist.
SITE 13 SXJ
SITE 14 SXI
MATCH TO SHEET 15 – -L3- STA. 706+50.00
MATCH TO SHEET 17 – -L3- STA. 719+50.00
-L3- TS Sta. 714+04.67
SC Sta. 716+04.67
-L3- POT Sta. 707+84.84=
-Y1- POT Sta. 15+36.13
Δ = 79°00'26.1"
-Y1- POT Sta. 10+00.00
-L3- END OF UNMARKED STREAM
N 3° 22' 34.3" E
N 82° 33' 00.4" E
30" RCP-III
24" RCP-III
15" RCP-III
PIPE GOOD CONDITION
HEADCUT AT U/S LIMIT COLLAPSED BANKS
30" PIPE OUTFALL 2 FT. ABOVE GRADE SCOUR HOLE 4'X4'X1' STABLE CHANNEL D/S
PIPE CONNECTION REQUIRED TO AVOID EROSION ON STEEP SLOPE. EROSION OBSERVED ALONG SLOPE UPSTREAM OF EXISTING 30"RCP ALONG Y1 STA 15+36.
EXISTING CHANNEL SKETCH
CL II RIPRAP 1037 TONS
PIPE IS NOT IN THIS LOCATION
-Y7- PC Sta. 11+75.41
-Y7- PT Sta. 12+25.40
-Y6B- PC Sta. 13+00.00
-Y6B- PRC Sta. 13+51.31
-Y7- POT Sta. 13+50.00
-Y6B- PT Sta. 14+99.94
ACTUAL PIPE TIES WITH OPEN TOP JB AT THIS POINT
RETAIN PIPE AND BITCH
RETAIN
REMOVE
GRASS/ V DITCH STABLE
D/S CHANNEL STABLE, HEAVYILY VEGETATED
PIPE BROKEN SEPARATION ON PIPE
JAMES A. CILONE & MELINDA C. CILONE D.B. 712, Pg. 786
KENNETH EDWARD COOPER & CHRISTIE LEDBETTER COOPER DB 827, PG 766
CHARLES JEFFREY EVANS DB 839, PG 166
MILDRED OWENS McPHERSON D.B. 849, PG. 316
FOREST E. HARDIN & CAROLYN E. HARDIN DB 391, PG 136
A. L. COSTNER HEIRS D.B. 156, P.G. 468
AZALEA INVESTMENT CORP. REMAINING PORTION OF D.B. 326, Pg. 628
WILLIAM WYMAN YELTON & REBECCA BARRIER YELTON DB 927, PG 170
JIMMY D BRADLEY & DIANA K BRADLEY DB 540, PG 445
TAMMY LARKIN LEE DB 1115 PG 395
HILDA MULL DB-319 PG 1033 DB 16E PG 236
SUSAN C. FOSTER & ERIC C. FOSTER DB 812 PG 253
REMAINING LANDS OF AZALEA INVESTMENTS, CORP DB 295 PG 599
DAVID JAMES BUHITE & CORINA TSERING CARLSON D.B. 1009, PG. 850
RINDA B WILSON D.B. 932, PG. 605
LISA B HOPPES DB 1149 PG 749
ANGELA A TAUB & MICHAEL B TAUB DB 829, PG 390, TRACT TWO
ANGELA A TAUB & MICHAEL B TAUB DB 829, PG 390, TRACT ONE
SUSAN & STRASSBURGER RAYMOND A. STRASSBURGER DB 1048 PG 542
PROP PAVED SHOULDER
SEE SHEET 38 FOR -L3- PROFILE
12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

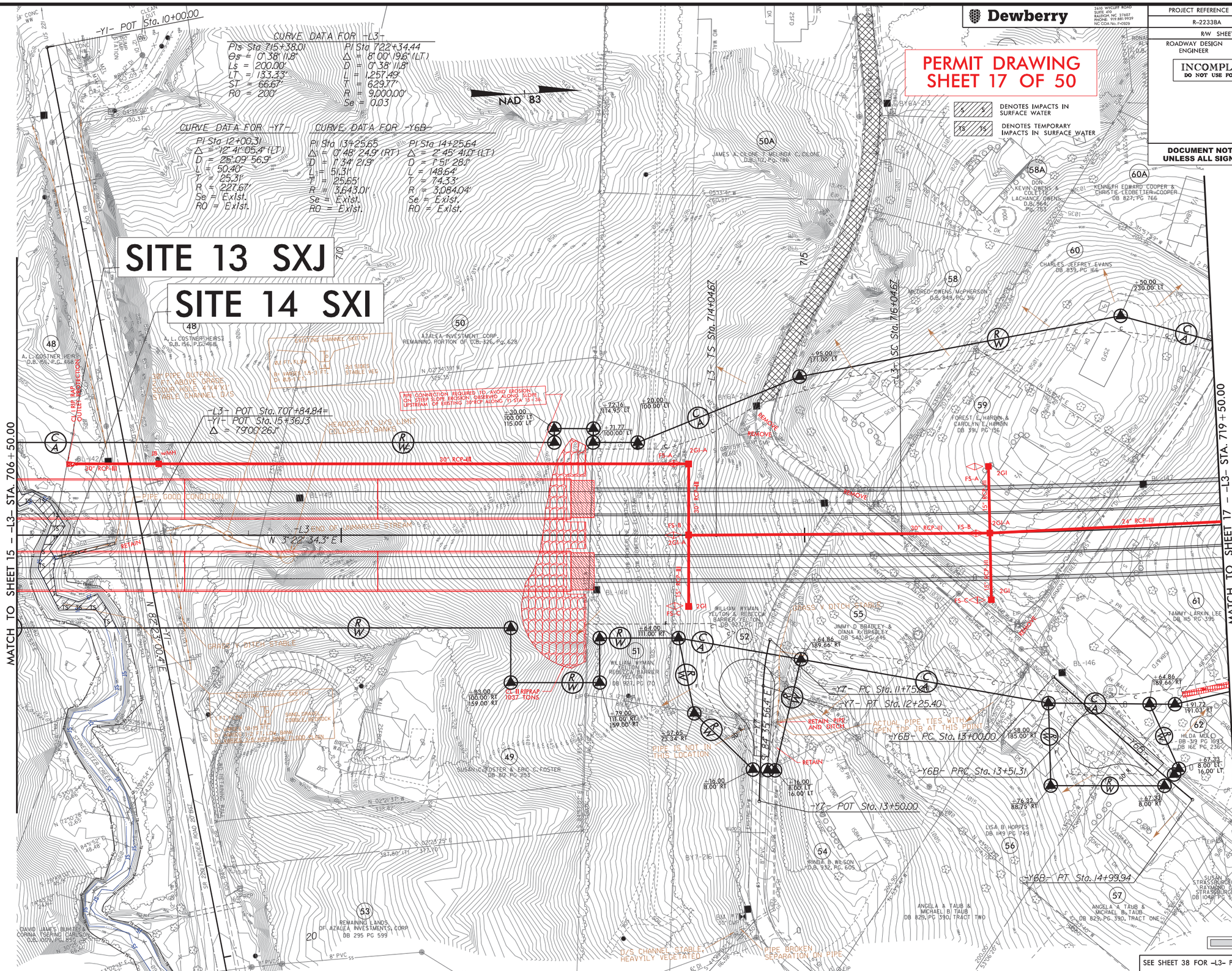
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 17 OF 50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 38 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 18 OF 50

SITE 15 SP

NAD 83

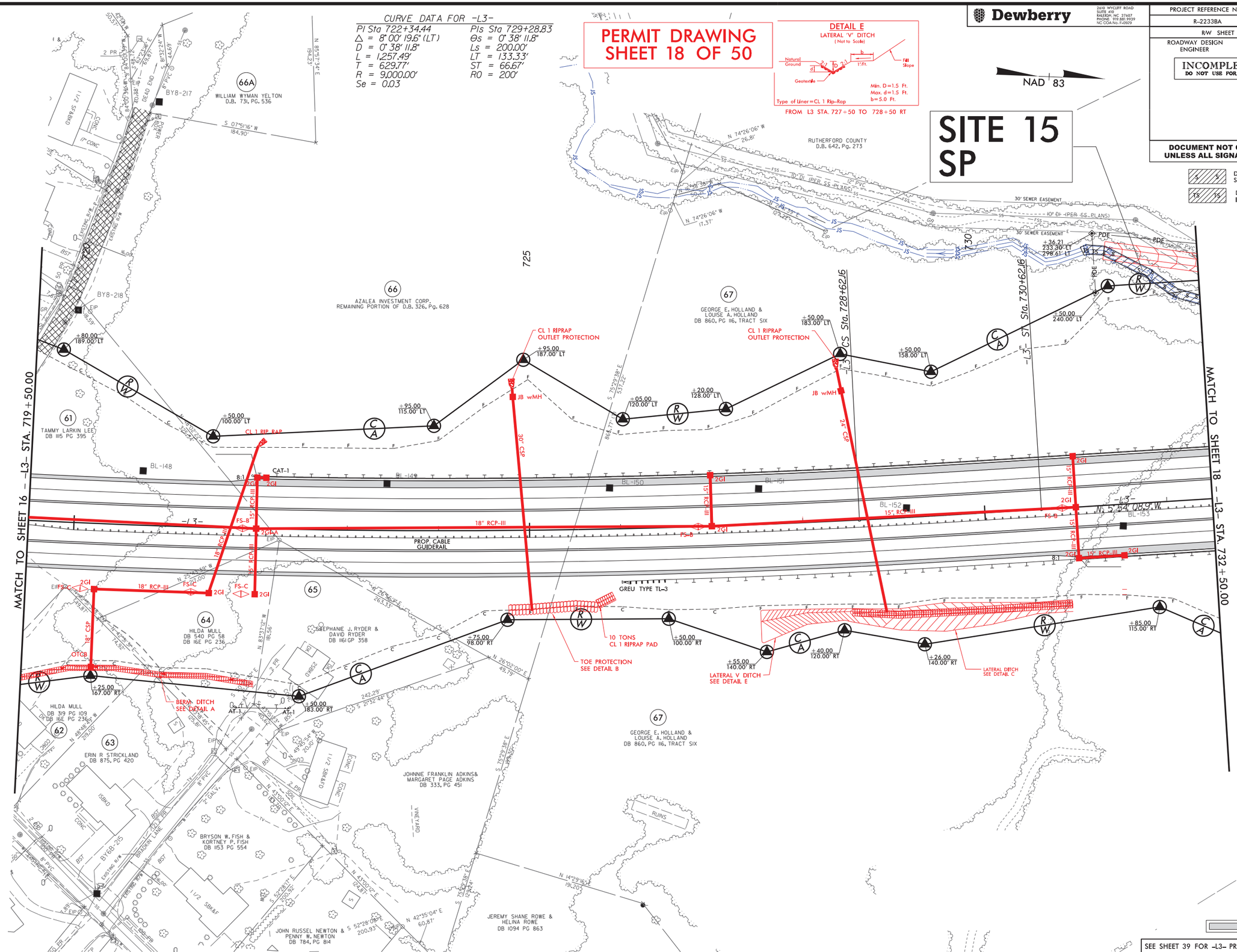
CURVE DATA FOR -L3-

PI Sta 722+34.44
Δ = 8° 00' 19.6" (LT)
D = 0° 38' 11.8"
L = 1,257.49'
T = 629.77'
R = 9,000.00'
Se = 0.03

PIs Sta 729+28.83
Θs = 0° 38' 11.8"
Ls = 200.00'
LT = 133.33'
ST = 66.67'
R0 = 200'

DETAIL E
LATERAL 'V' DITCH
(Not to Scale)

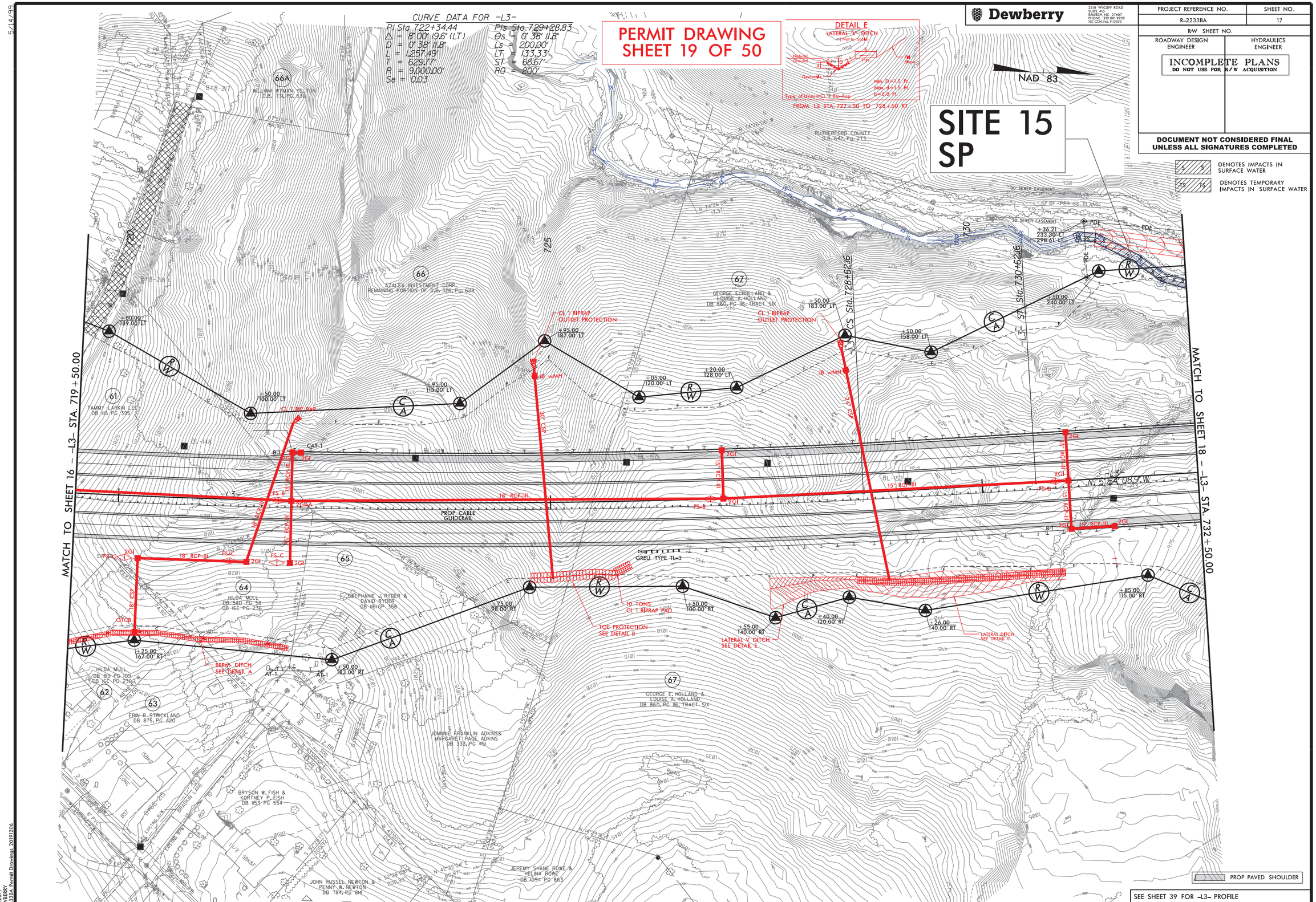
Type of Liner=CL 1 Rip-Rap
FROM L3 STA. 727+50 TO 728+50 RT



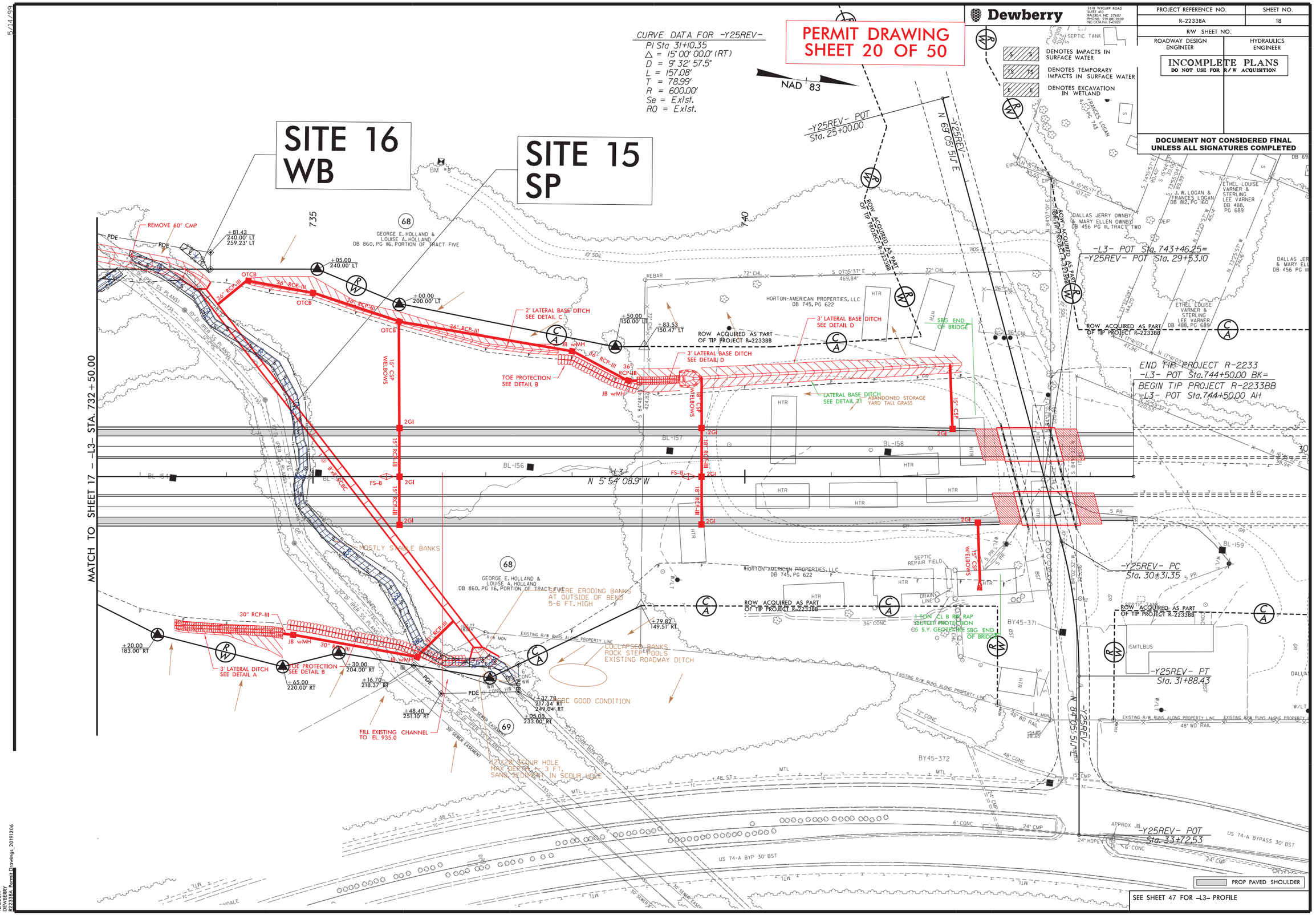
SEE SHEET 39 FOR -L3- PROFILE

12/6/2019
DEWBERRY
R2233BA_Permit Drawings 20191206

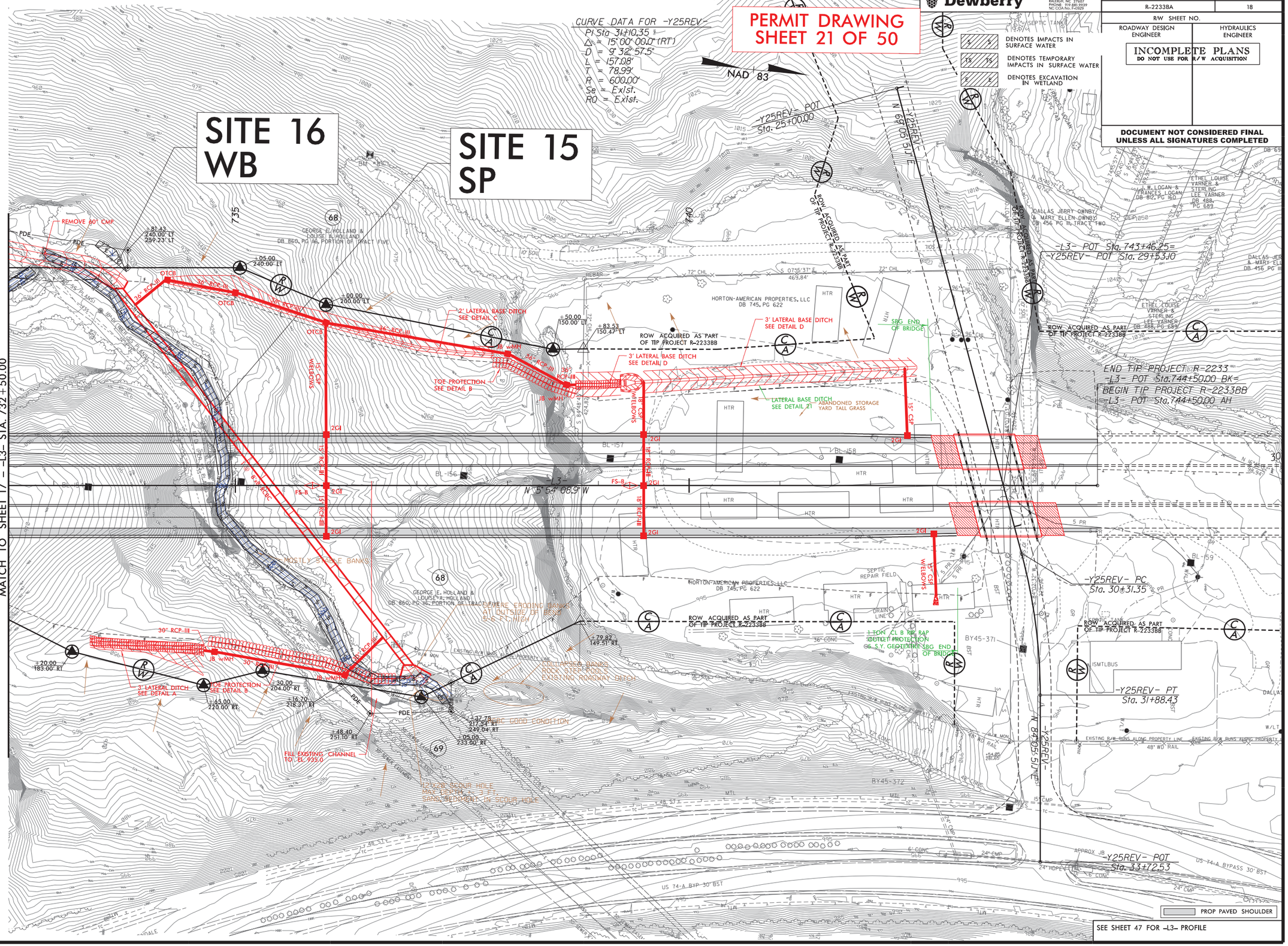
5/14/99



12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206


Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929
PROJECT REFERENCE NO.
R-2233BA
SHEET NO.
18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PERMIT DRAWING
SHEET 20 OF 50
CURVE DATA FOR -Y25REV-
PI Sta 31+10.35
△ = 15° 00' 00.0" (RT)
D = 9° 32' 57.5"
L = 157.08'
T = 78.99'
R = 600.00'
Se = Exist.
RO = Exist.
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
SITE 16
WB
SITE 15
SP
MATCH TO SHEET 17 – -L3- STA. 732+50.00
REMOVE 60" CMP
GEORGE E. HOLLAND & LOUISE A. HOLLAND DB 860, PG 116, PORTION OF TRACT FIVE
HORTON-AMERICAN PROPERTIES, LLC DB 745, PG 622
ROW ACQUIRED AS PART OF TIP PROJECT R-2233BB
2' LATERAL BASE DITCH SEE DETAIL C
3' LATERAL BASE DITCH SEE DETAIL D
TOE PROTECTION SEE DETAIL B
LATERAL BASE DITCH SEE DETAIL 21
ABANDONED STORAGE YARD TALL GRASS
SBG END OF BRIDGE
15" CSP WELDOWS
18" CSP WELDOWS
15" RCP-III
18" RCP-III
36" RCP-III
30" RCP-III
MOSTLY STABLE BANKS
SEVERE ERODING BANKS AT OUTSIDE OF BEND 5-6 FT. HIGH
COLLAPSED BANKS ROCK STEPS POOLS EXISTING ROADWAY DITCH
1 TON CL B RIP RAP SUPPLY PROTECTION 65 S.Y. GEOTEXTILE SBG END OF BRIDGE
3' LATERAL DITCH SEE DETAIL A
FILL EXISTING CHANNEL TO EL. 935.0
CSX GOOD CONDITION
SCOUR HOLE MAX DEPTH = 3 FT. SAND SEDIMENT IN SCOUR HOLE
SEPTIC REPAIR FIELD
DRAIN LINE
ISMTLBUS
-L3- POT Sta. 743+46.25=
-Y25REV- POT Sta. 29+53.10
END TIP PROJECT R-2233
-L3- POT Sta. 744+50.00 BK=
BEGIN TIP PROJECT R-2233BB
-L3- POT Sta. 744+50.00 AH
-Y25REV- POT Sta. 25+00.00
-Y25REV- PC Sta. 30+31.35
-Y25REV- PT Sta. 31+88.43
-Y25REV- POT Sta. 33+72.53
N 69° 05' 51.1" E
N 84° 05' 51.1" E
N 5° 54' 08.9" W
US 74-A BYP 30' BST
US 74-A BYPASS 30' BST
PROP PAVED SHOULDER
SEE SHEET 47 FOR -L3- PROFILE
5/14/99
12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

5/14/99



Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

S / S — DENOTES IMPACTS IN SURFACE WATER
TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
E / E — DENOTES EXCAVATION IN WETLAND

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

12/6/2019
DEWBERRY
R2233BA_Permit Drawings_20191206

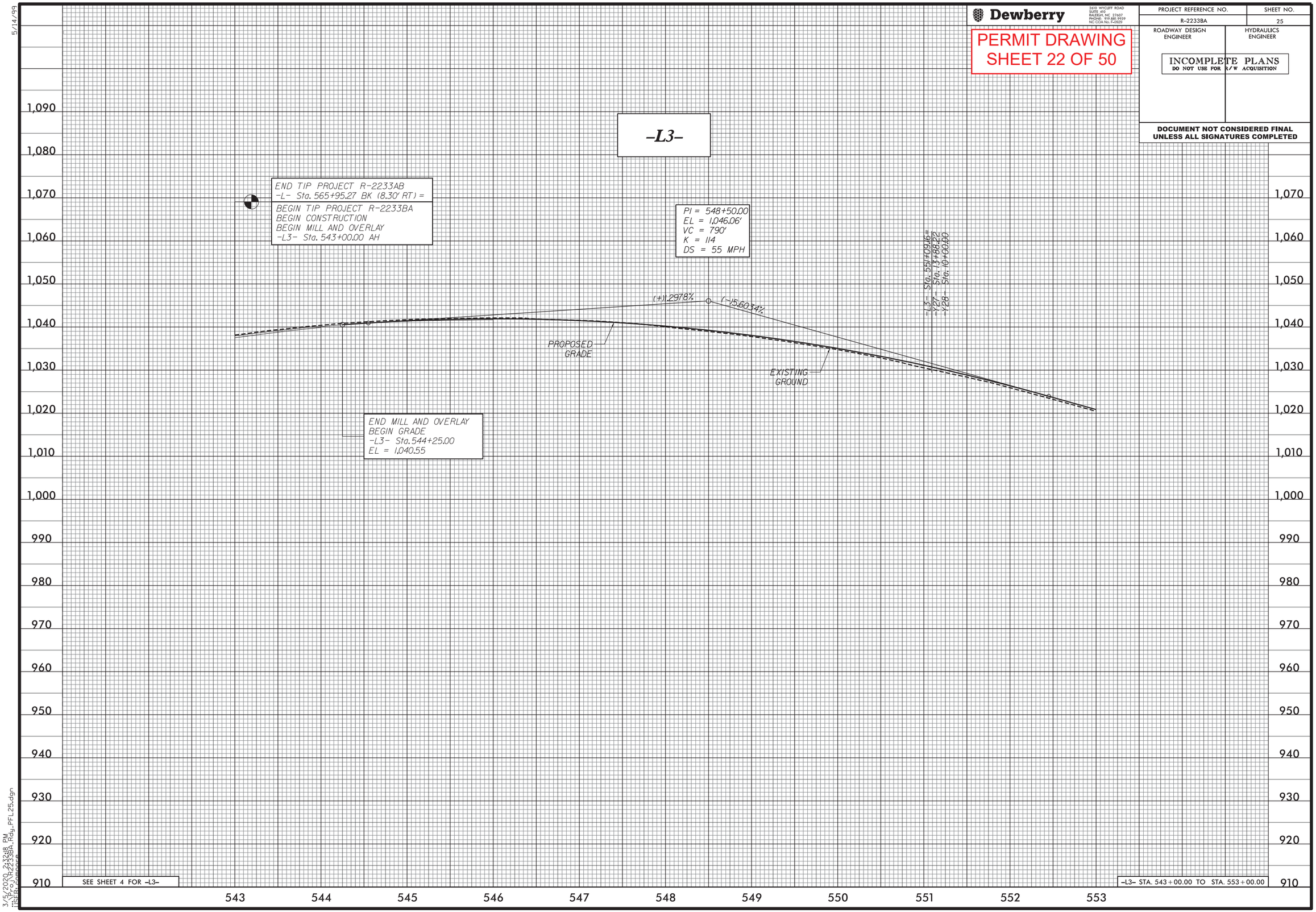
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 22 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



5/14/99

3/5/2020 2:33:18 PM
r:\r2233ba\r2233ba_Rdy_PFL25.dgn
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	26

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

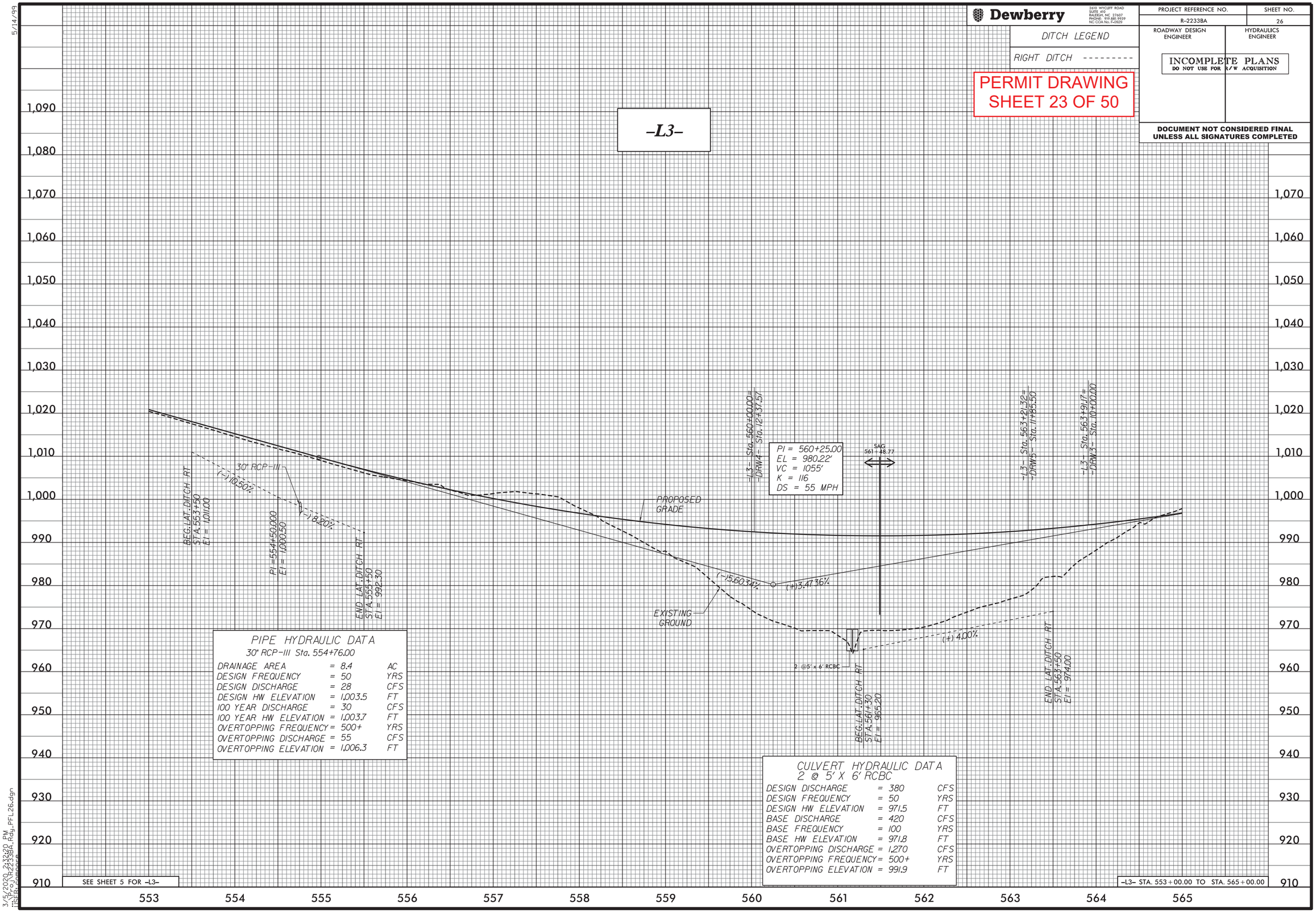
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 23 OF 50



PIPE HYDRAULIC DATA
30" RCP-III Sta. 554+76.00

DRAINAGE AREA	=	8.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	28	CFS
DESIGN HW ELEVATION	=	1,003.5	FT
100 YEAR DISCHARGE	=	30	CFS
100 YEAR HW ELEVATION	=	1,003.7	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	55	CFS
OVERTOPPING ELEVATION	=	1,006.3	FT

CULVERT HYDRAULIC DATA
2 @ 5' X 6' RCBC

DESIGN DISCHARGE	=	380	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	971.5	FT
BASE DISCHARGE	=	420	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	971.8	FT
OVERTOPPING DISCHARGE	=	1,270	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	991.9	FT

3/5/2020 2:33:20 PM
R:\Projects\R2233BA_Rdy_PFL26.dgn
USER: Jamoore

5/14/99

Dewberry

2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 24 OF 50

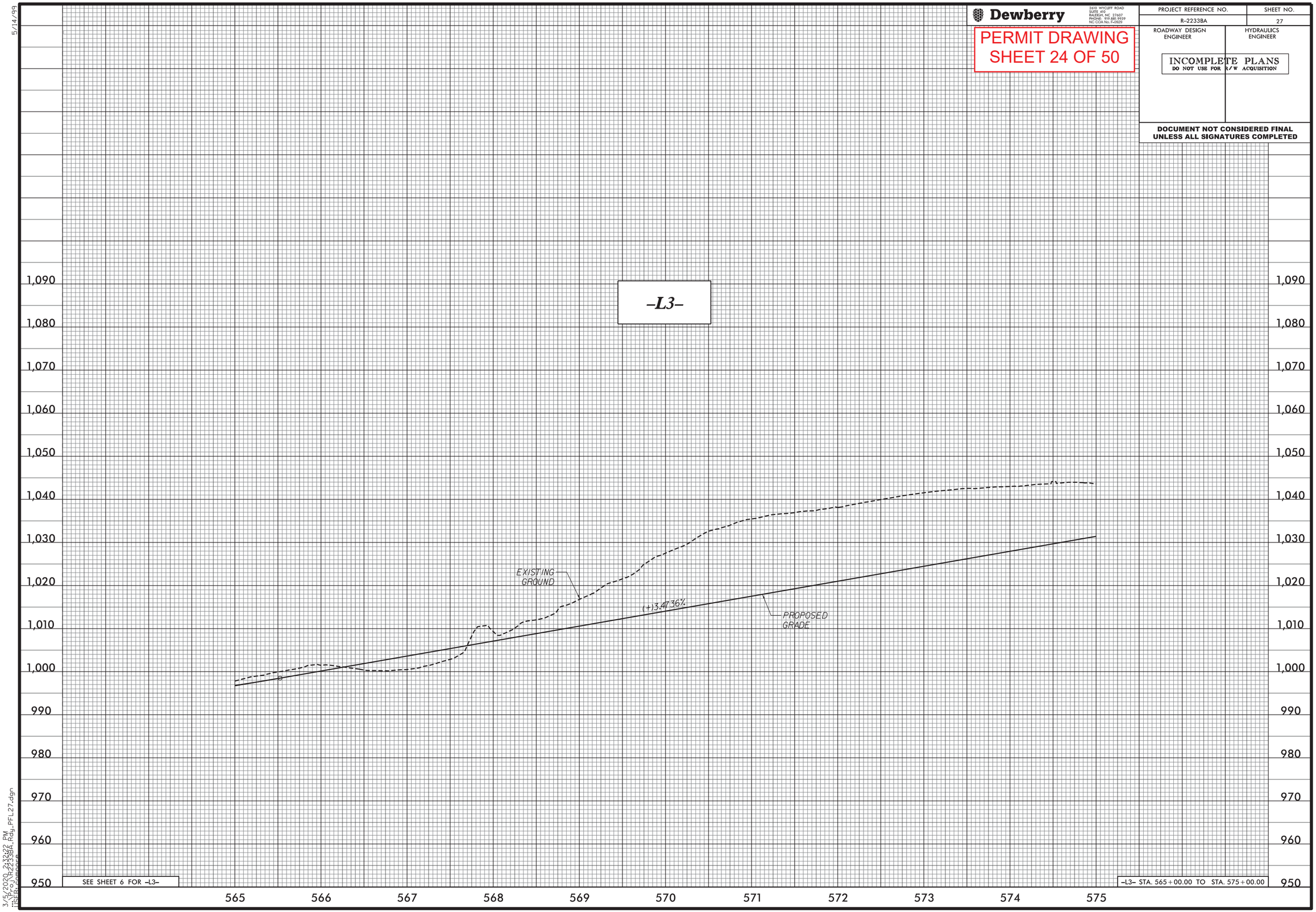
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	27

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



3/5/2020 2:33:22 PM
USER: J.Jamison

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	28

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

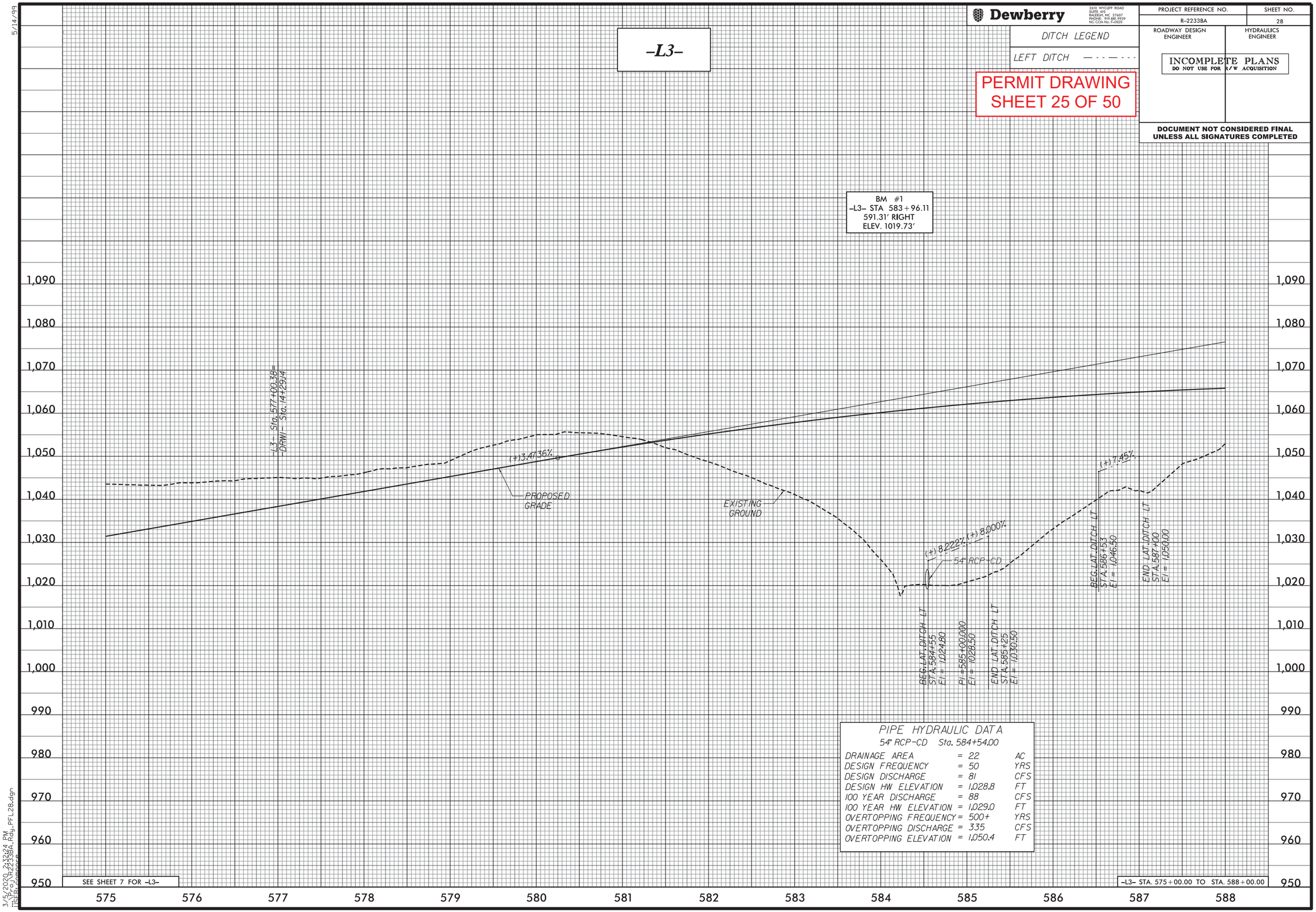
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 25 OF 50

–L3–



PIPE HYDRAULIC DATA
54" RCP-CD Sta. 584+54.00

DRAINAGE AREA	=	22	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	81	CFS
DESIGN HW ELEVATION	=	1,028.8	FT
100 YEAR DISCHARGE	=	88	CFS
100 YEAR HW ELEVATION	=	1,029.0	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	335	CFS
OVERTOPPING ELEVATION	=	1,050.4	FT

SEE SHEET 7 FOR –L3–

–L3– STA. 575+00.00 TO STA. 588+00.00

3/5/2020 2:32:24 PM
R:\2233BA_Hydro\Plans\R2233BA_Hydro_PFL28.dgn
USER: Compaq

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	29

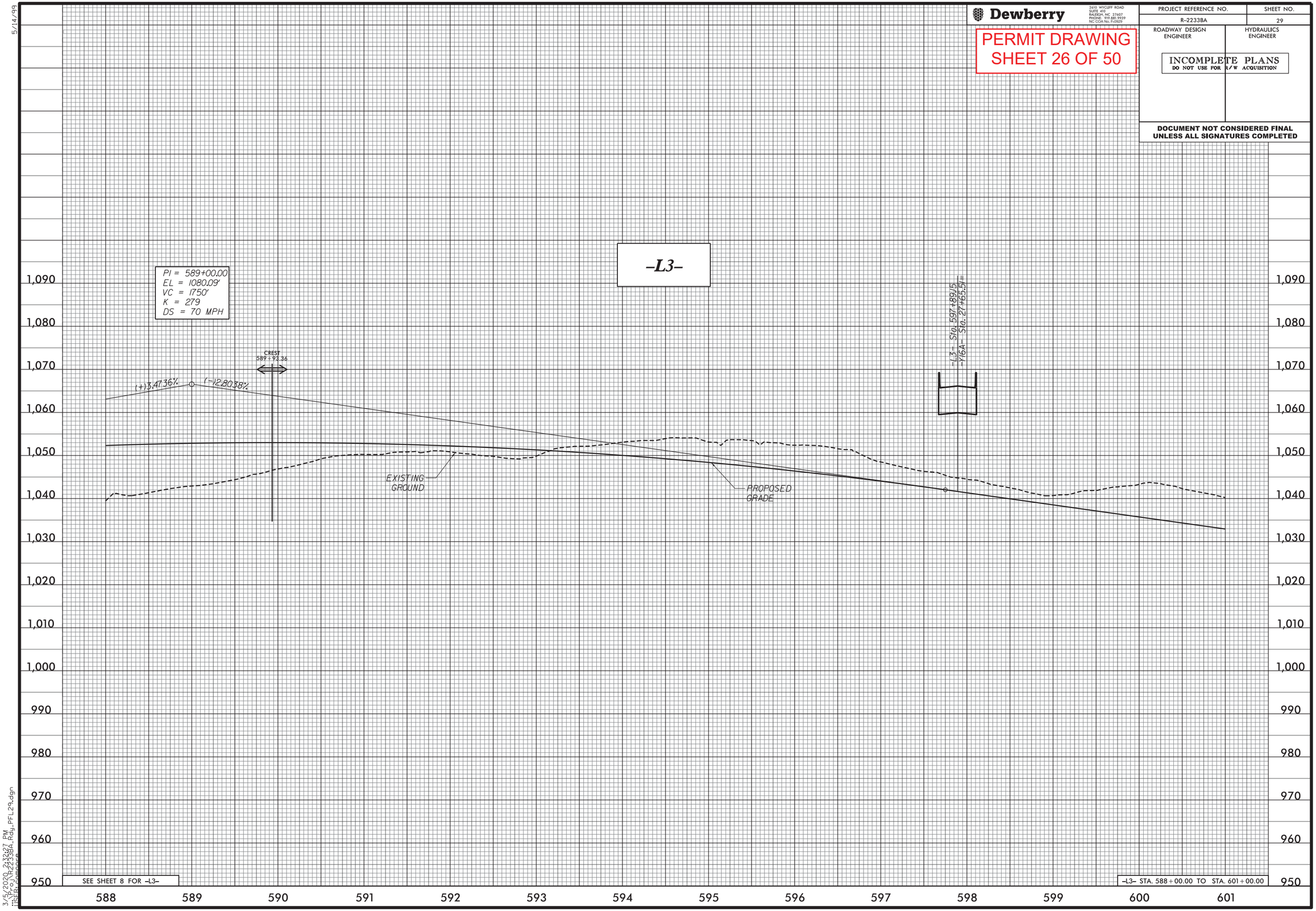
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 26 OF 50



5/14/99

3/5/2020 2:32:27 PM
R:\2233BA\Roadway\PFL29.dgn
USER: Jamaya

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	30

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

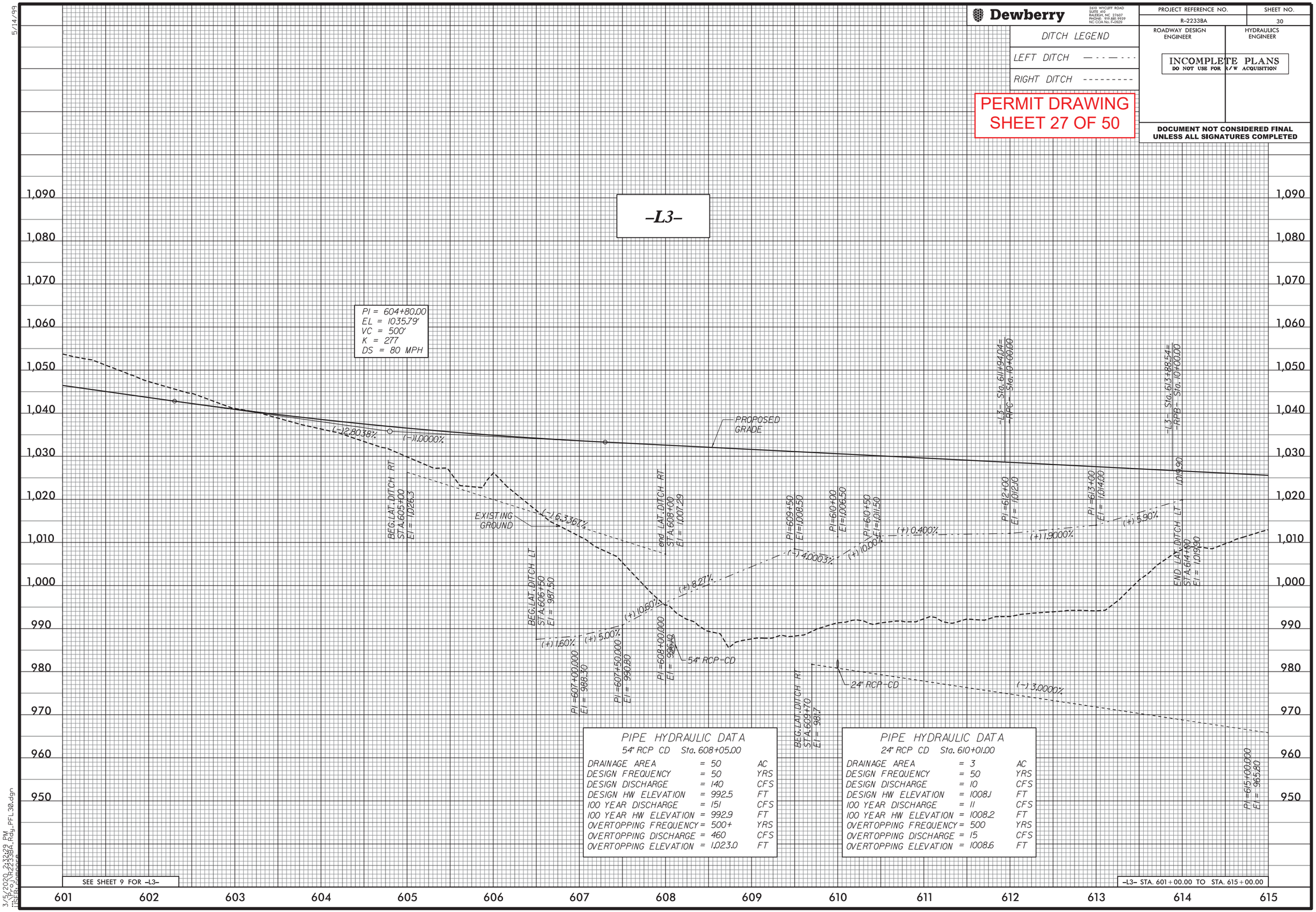
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -

PERMIT DRAWING
SHEET 27 OF 50



PIPE HYDRAULIC DATA
54" RCP CD Sta. 608+05.00

DRAINAGE AREA	= 50	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 992.5	FT
100 YEAR DISCHARGE	= 151	CFS
100 YEAR HW ELEVATION	= 992.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 460	CFS
OVERTOPPING ELEVATION	= 1,023.0	FT

PIPE HYDRAULIC DATA
24" RCP CD Sta. 610+01.00

DRAINAGE AREA	= 3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 10	CFS
DESIGN HW ELEVATION	= 1008.1	FT
100 YEAR DISCHARGE	= 11	CFS
100 YEAR HW ELEVATION	= 1008.2	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 15	CFS
OVERTOPPING ELEVATION	= 1008.6	FT

SEE SHEET 9 FOR -L3-

-L3- STA. 601+00.00 TO STA. 615+00.00

5/14/99
3/5/2020 2:32:23 PM
-L3-PL-R2233BA_Rdy_PFL30.dgn
USER: Jamacre

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	31

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

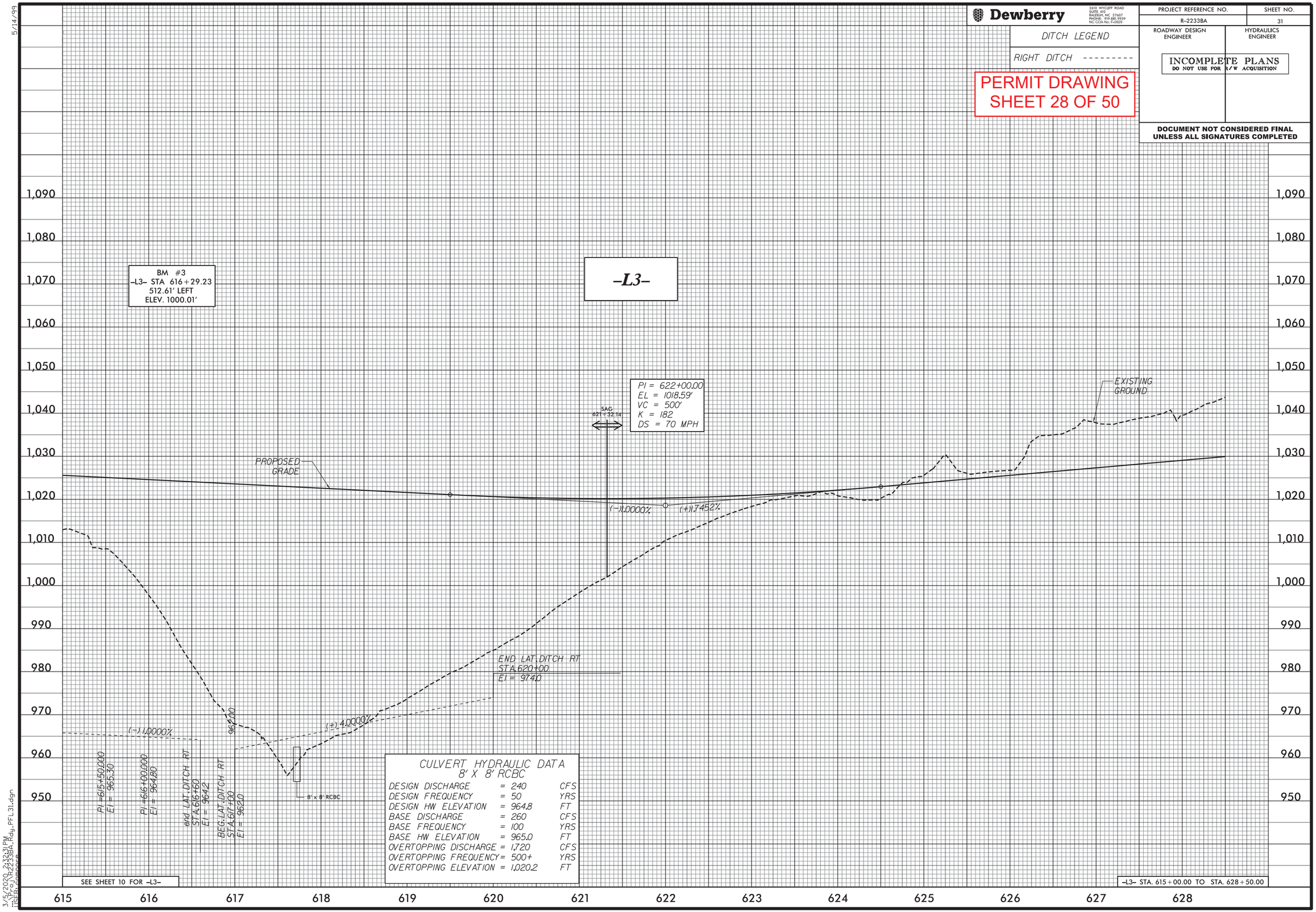
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 28 OF 50



CULVERT HYDRAULIC DATA
8' X 8' RCBC

DESIGN DISCHARGE	=	240	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	964.8	FT
BASE DISCHARGE	=	260	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	965.0	FT
OVERTOPPING DISCHARGE	=	1,720	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	1,020.2	FT

SEE SHEET 10 FOR -L3-

-L3- STA. 615+00.00 TO STA. 628+50.00

3/5/2020 2:37:31 PM
R:\2233BA_Hydro\Hydro_Models\Hydro_PFL31.dgn
USER: Jamesca

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	32

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

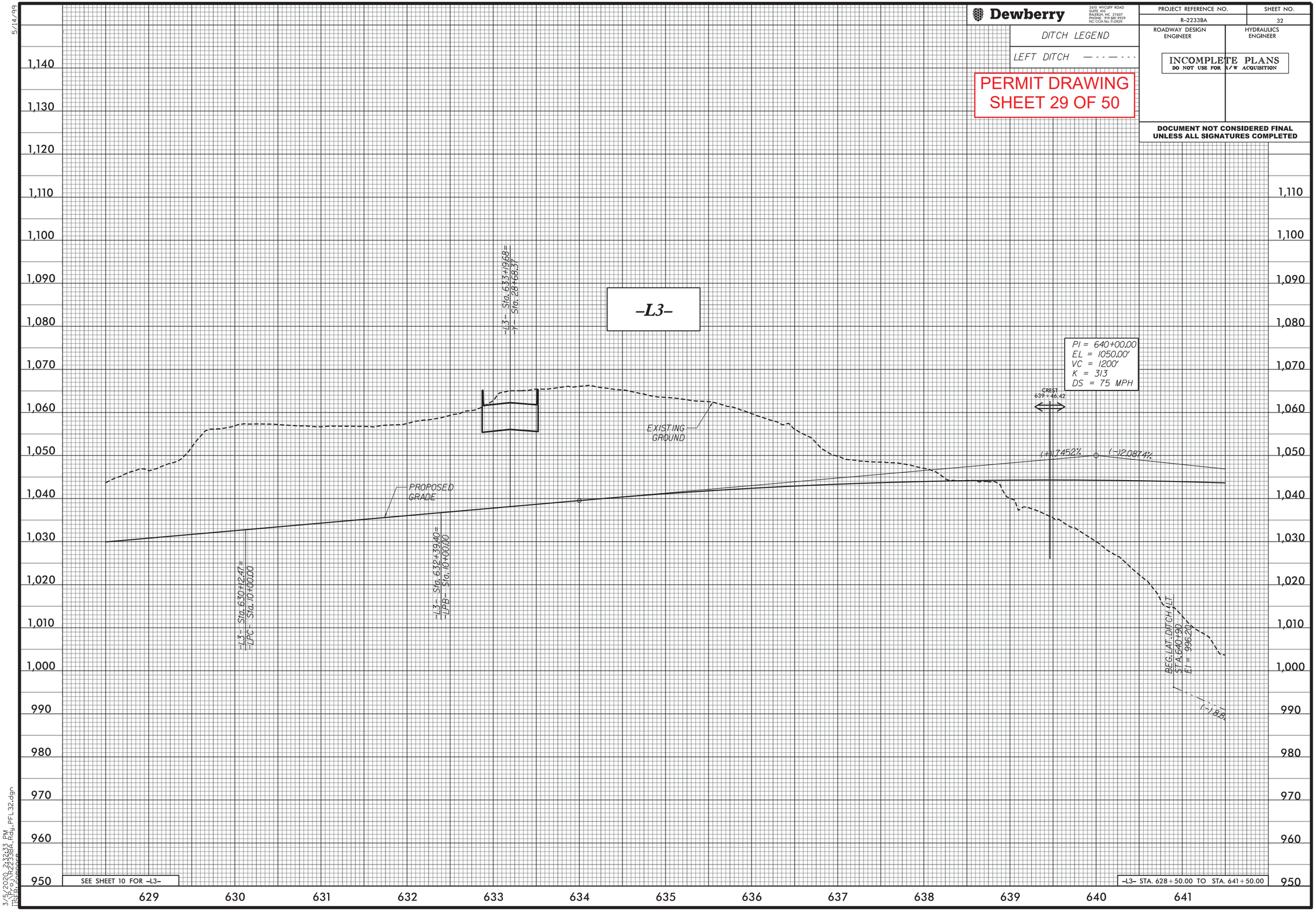
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 29 OF 50



3/5/2020 2:37:33 PM
R:\Roadway\Proj\R2233BA_Rdy_PFL32.dgn
USER: cgonzales

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

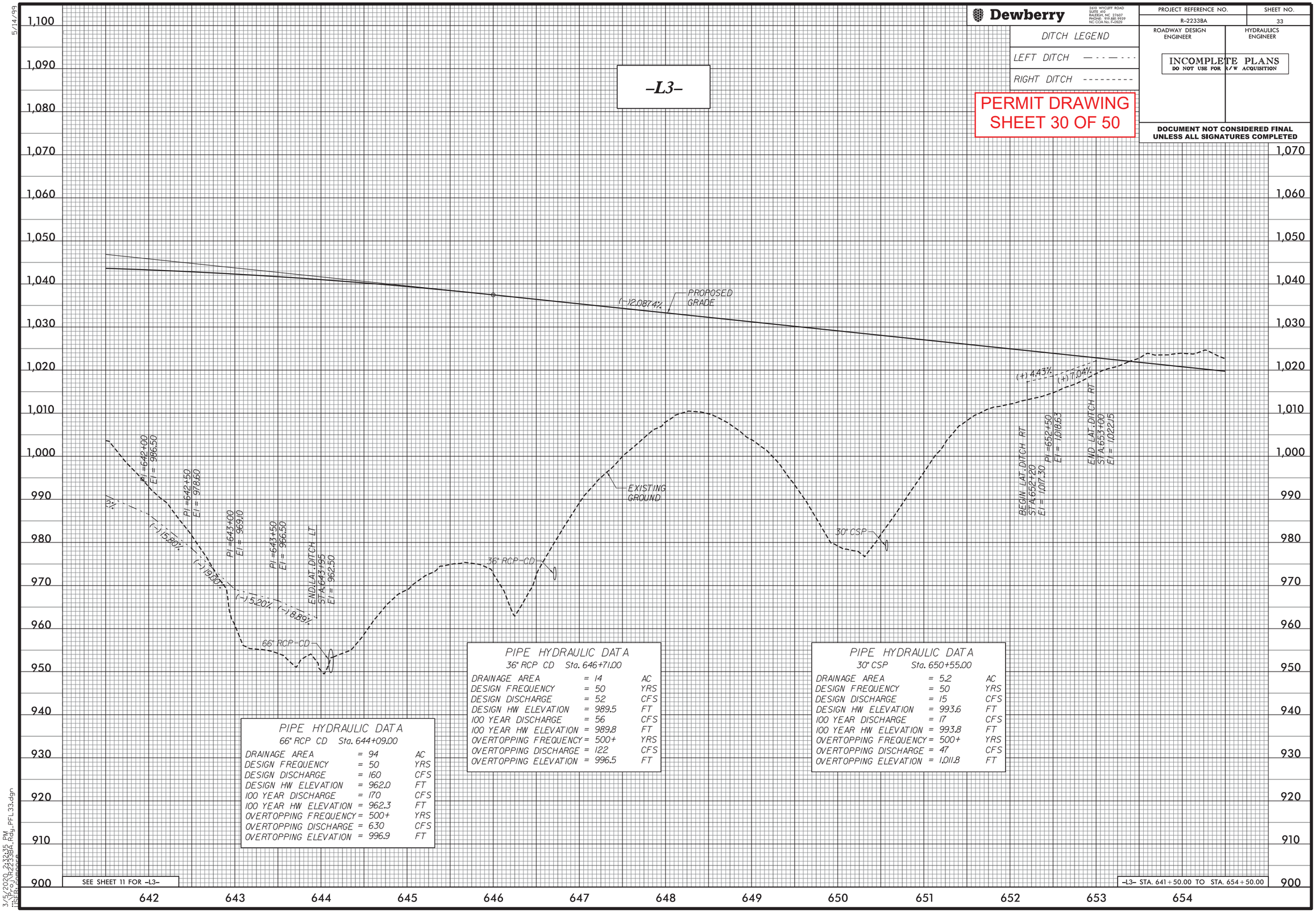
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND
LEFT DITCH — · · — · · —
RIGHT DITCH - - - - - - - - -

PERMIT DRAWING
SHEET 30 OF 50

–L3–



PIPE HYDRAULIC DATA
66" RCP CD Sta. 644+09.00

DRAINAGE AREA	= 94	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 160	CFS
DESIGN HW ELEVATION	= 962.0	FT
100 YEAR DISCHARGE	= 170	CFS
100 YEAR HW ELEVATION	= 962.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 630	CFS
OVERTOPPING ELEVATION	= 996.9	FT

PIPE HYDRAULIC DATA
36" RCP CD Sta. 646+71.00

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 52	CFS
DESIGN HW ELEVATION	= 989.5	FT
100 YEAR DISCHARGE	= 56	CFS
100 YEAR HW ELEVATION	= 989.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 122	CFS
OVERTOPPING ELEVATION	= 996.5	FT

PIPE HYDRAULIC DATA
30" CSP Sta. 650+55.00

DRAINAGE AREA	= 5.2	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 15	CFS
DESIGN HW ELEVATION	= 993.6	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 993.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 47	CFS
OVERTOPPING ELEVATION	= 1,011.8	FT

SEE SHEET 11 FOR –L3–

–L3– STA. 641+50.00 TO STA. 654+50.00

3/5/2020 2:32:35 PM
R-2233BA_Rdy_PFL33.dgn
USER: Jpowell

5/14/99

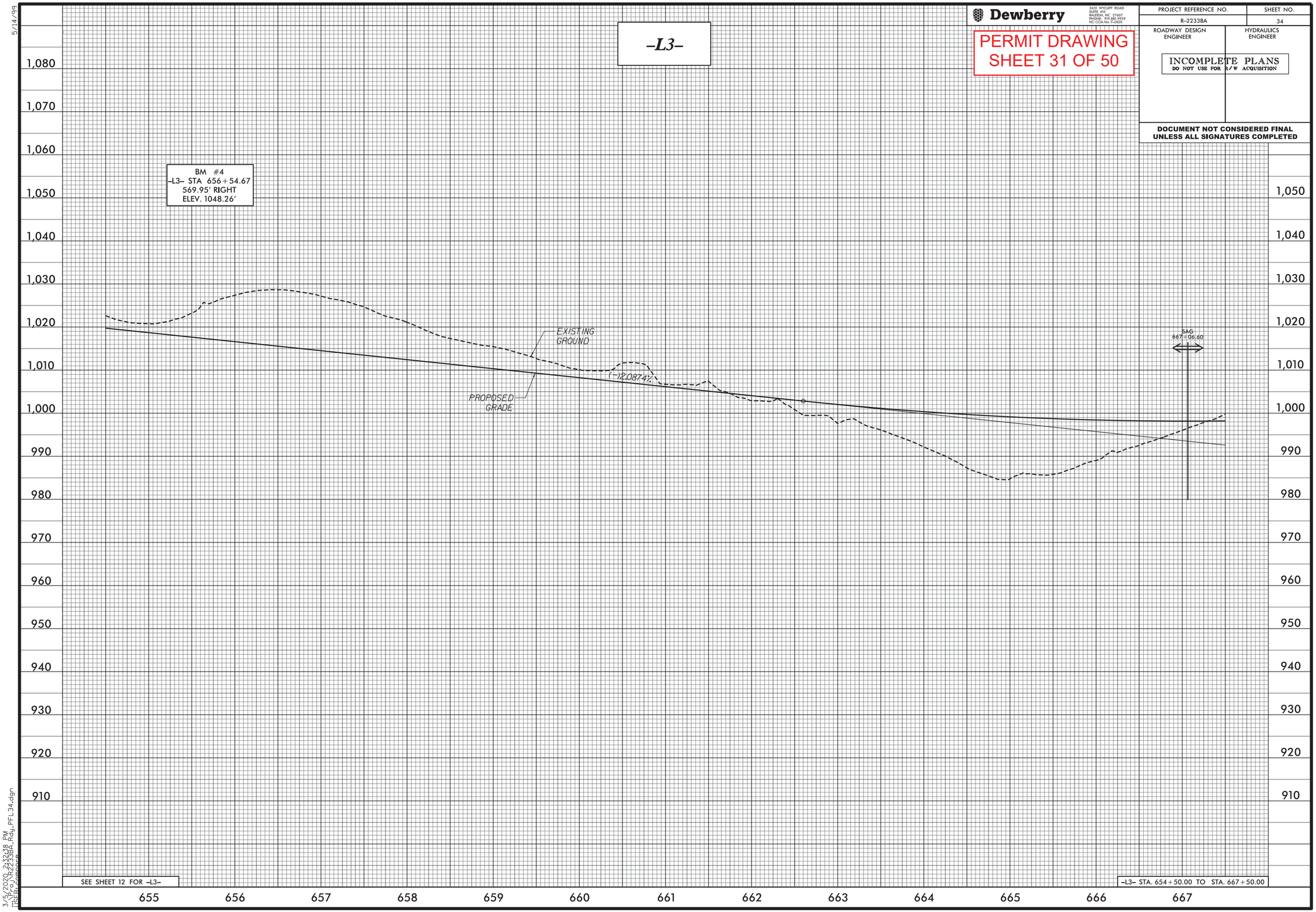
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 31 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



3/5/2020 2:32:38 PM
-L3-PFL34.dgn
R2233BA_Rdy_PFL34.dgn
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

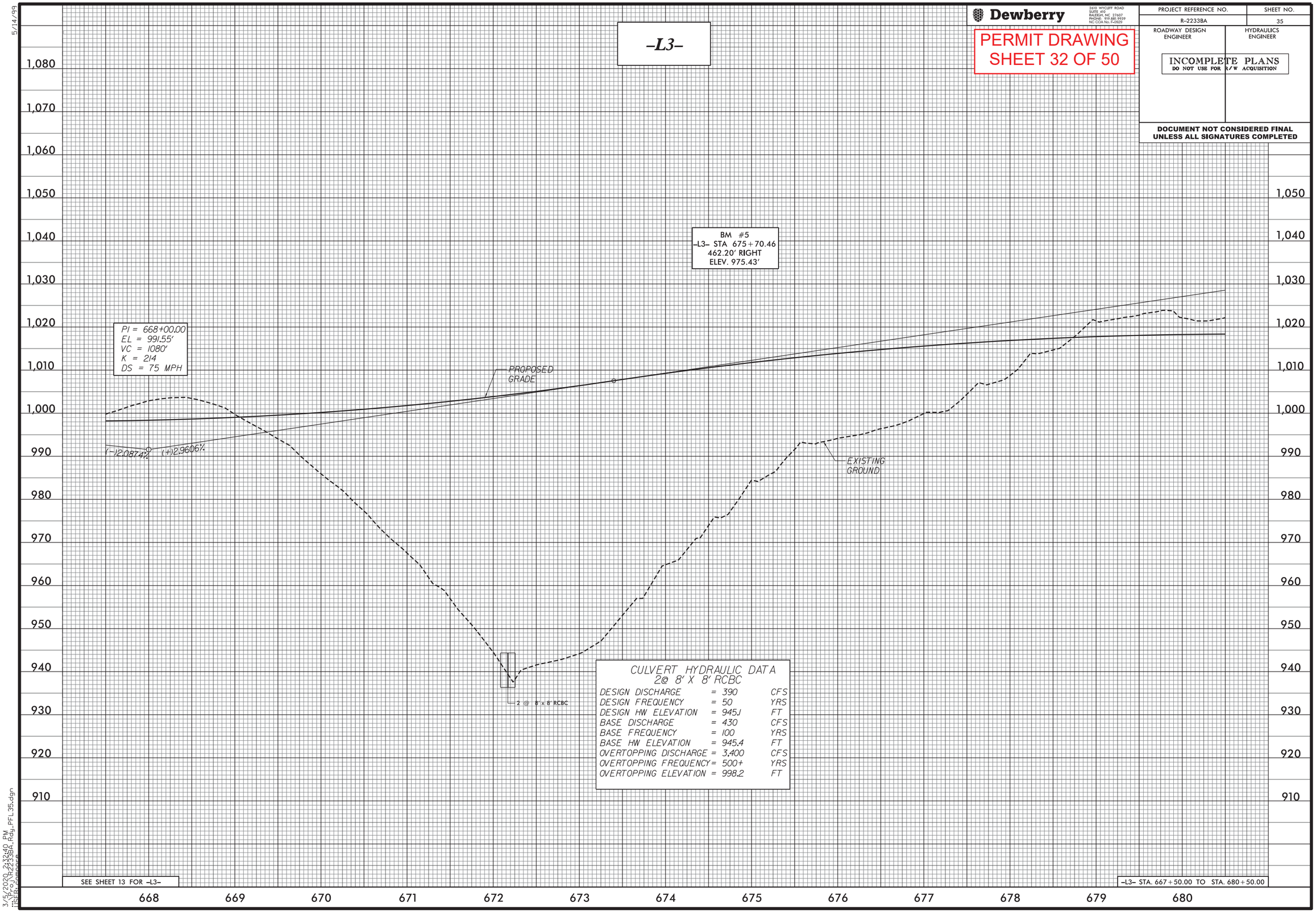
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 32 OF 50

-L3-



3/5/2020 2:32:40 PM
-L3-PL-R2233BA_Rdy_PFL35.dgn
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

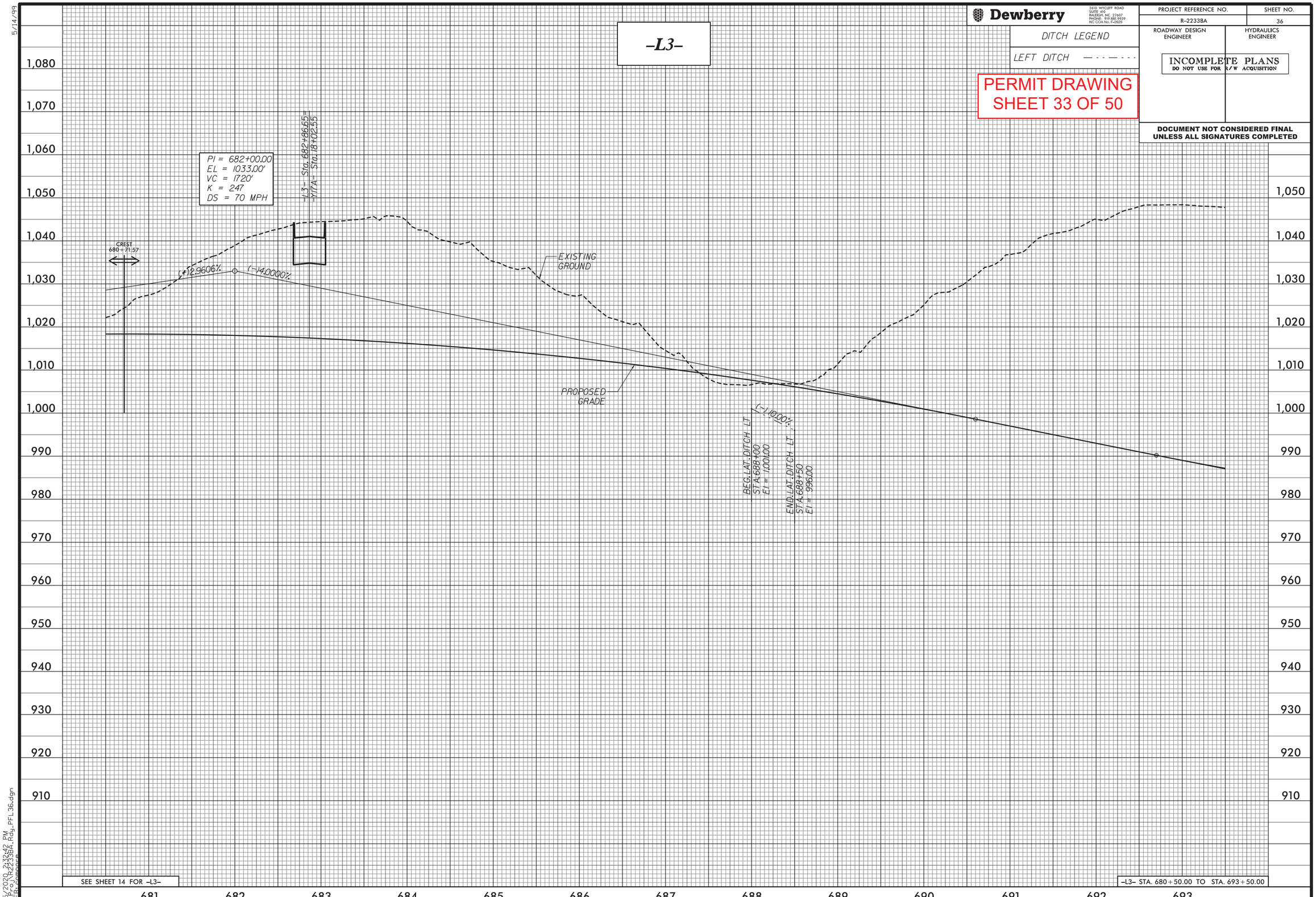
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

LEFT DITCH — - - — - - -

PERMIT DRAWING
SHEET 33 OF 50



SEE SHEET 14 FOR -L3-

-L3- STA. 680+50.00 TO STA. 693+50.00

3/5/2020 2:37:42 PM
R-2233BA_Rdy_PFL36.dgn
USER: Samaras

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

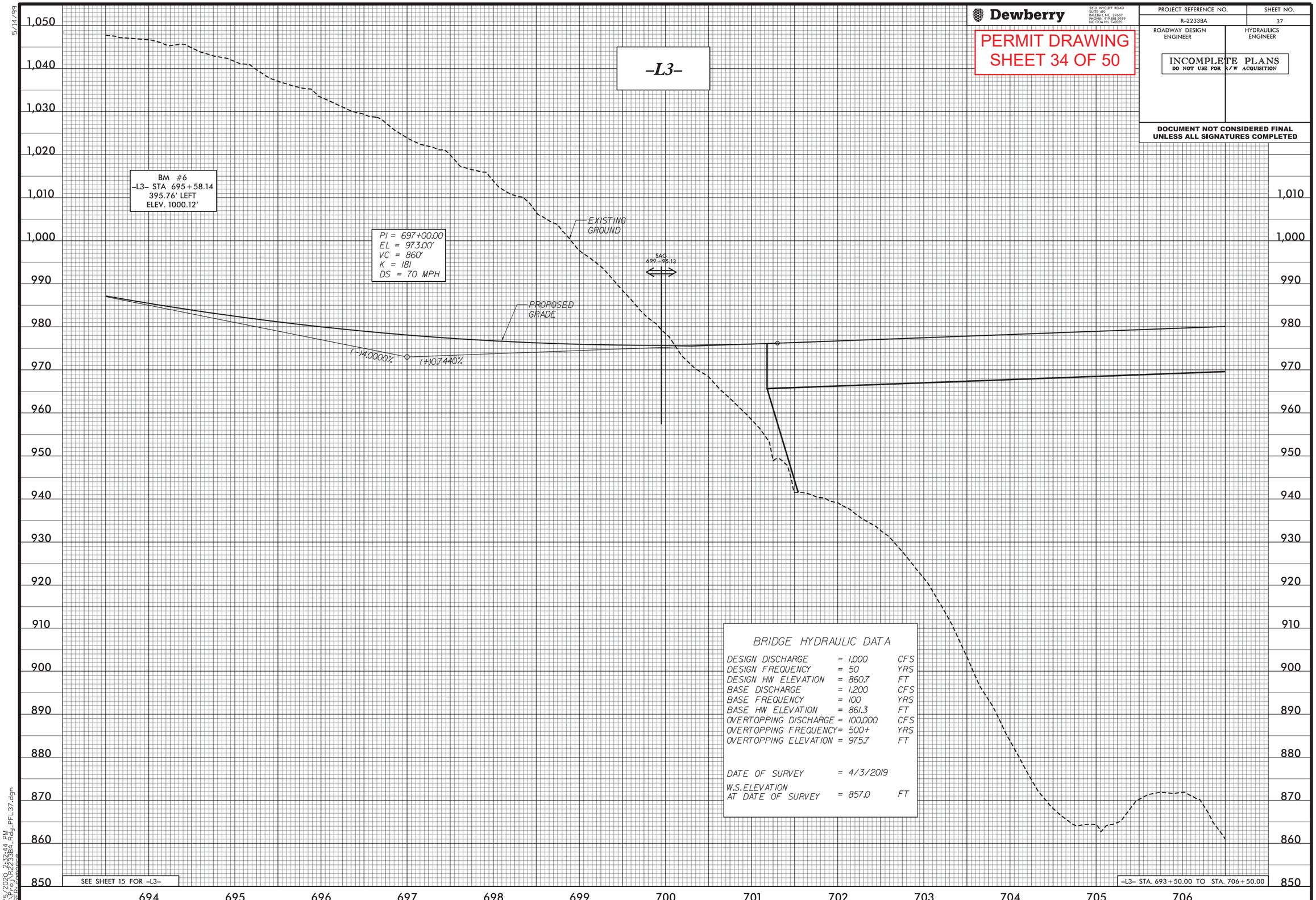
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 34 OF 50

-L3-



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 1,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 860.7	FT
BASE DISCHARGE	= 1,200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 861.3	FT
OVERTOPPING DISCHARGE	= 100,000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 975.7	FT
DATE OF SURVEY	= 4/3/2019	
W.S. ELEVATION AT DATE OF SURVEY	= 857.0	FT

SEE SHEET 15 FOR -L3-

-L3- STA. 693+50.00 TO STA. 706+50.00

3/5/2020 2:32:44 PM
-L3-PFL 37 R-2233BA_Rdy_PFL 37.dgn
USER: Jcamacho

5/14/99

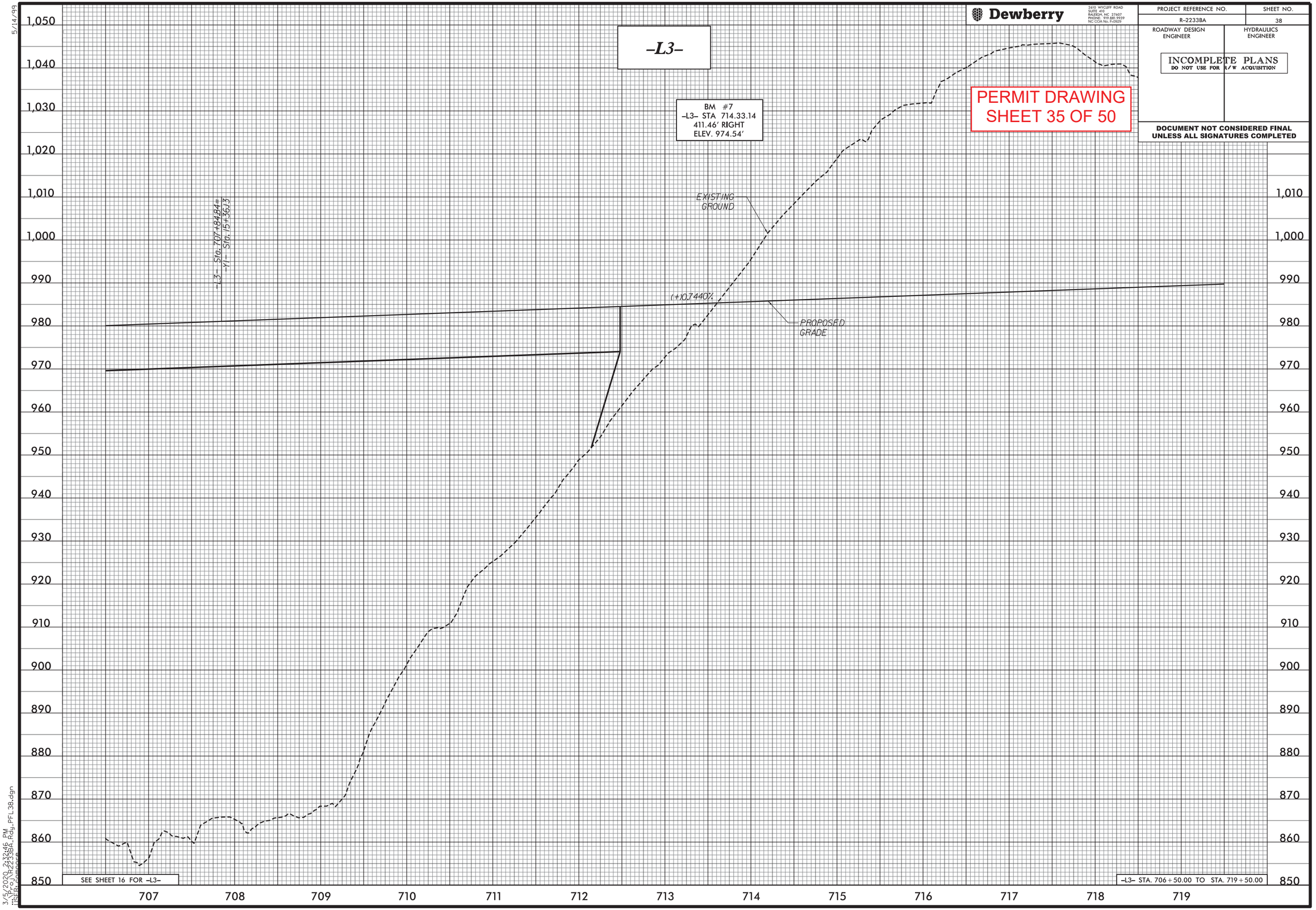
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 35 OF 50



3/5/2020 2:33:46 PM
x:\projects\2233BA_Rdy_PFL38.dgn
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919-881-9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	39

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

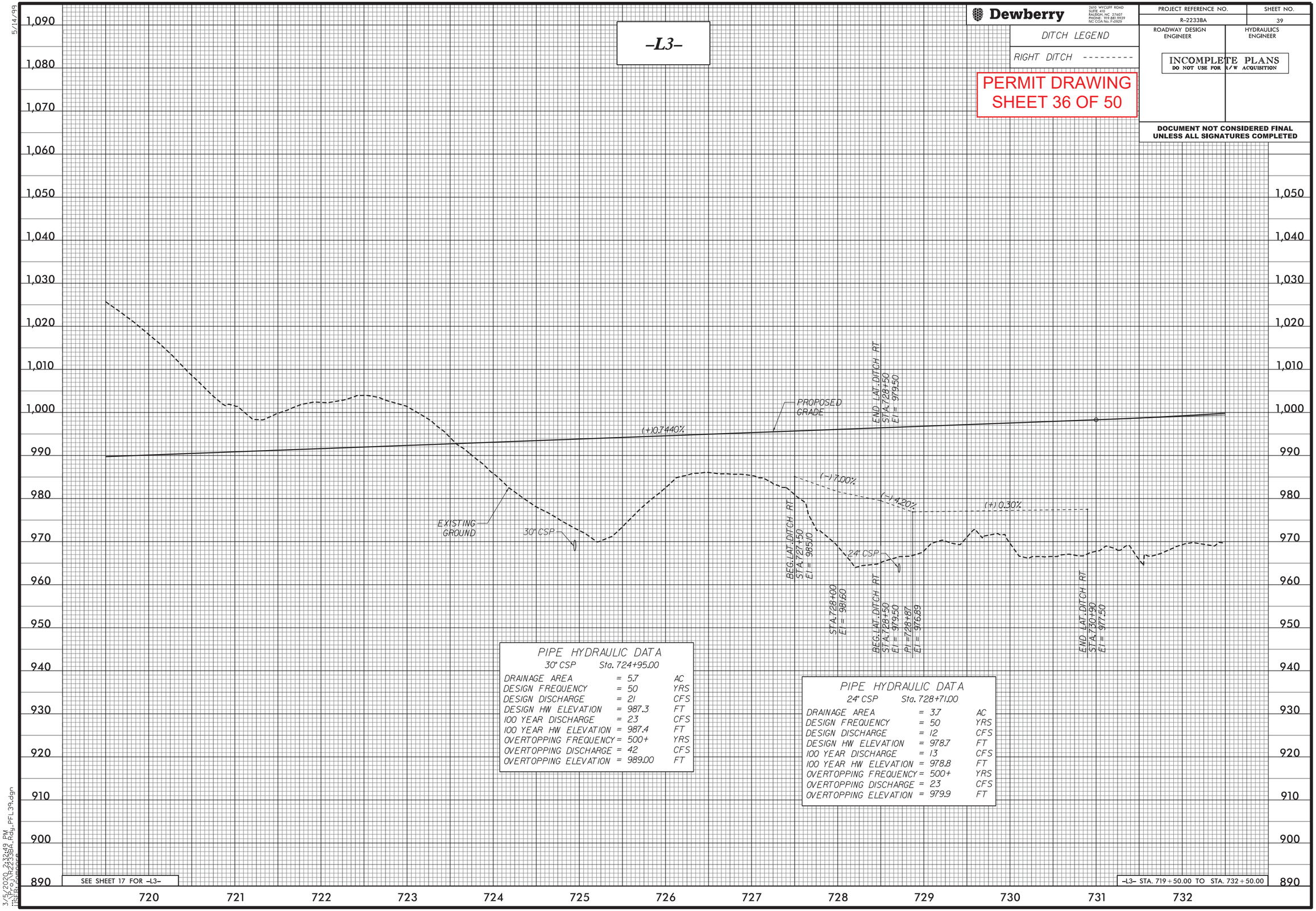
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DITCH LEGEND

RIGHT DITCH ---------

PERMIT DRAWING
SHEET 36 OF 50



PIPE HYDRAULIC DATA
30" CSP Sta. 724+95.00

DRAINAGE AREA	= 5.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 21	CFS
DESIGN HW ELEVATION	= 987.3	FT
100 YEAR DISCHARGE	= 23	CFS
100 YEAR HW ELEVATION	= 987.4	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 42	CFS
OVERTOPPING ELEVATION	= 989.00	FT

PIPE HYDRAULIC DATA
24" CSP Sta. 728+71.00

DRAINAGE AREA	= 3.7	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 12	CFS
DESIGN HW ELEVATION	= 978.7	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 978.8	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 979.9	FT

3/5/2020 2:33:48 PM
USER: Jamoore

5/14/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	40

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

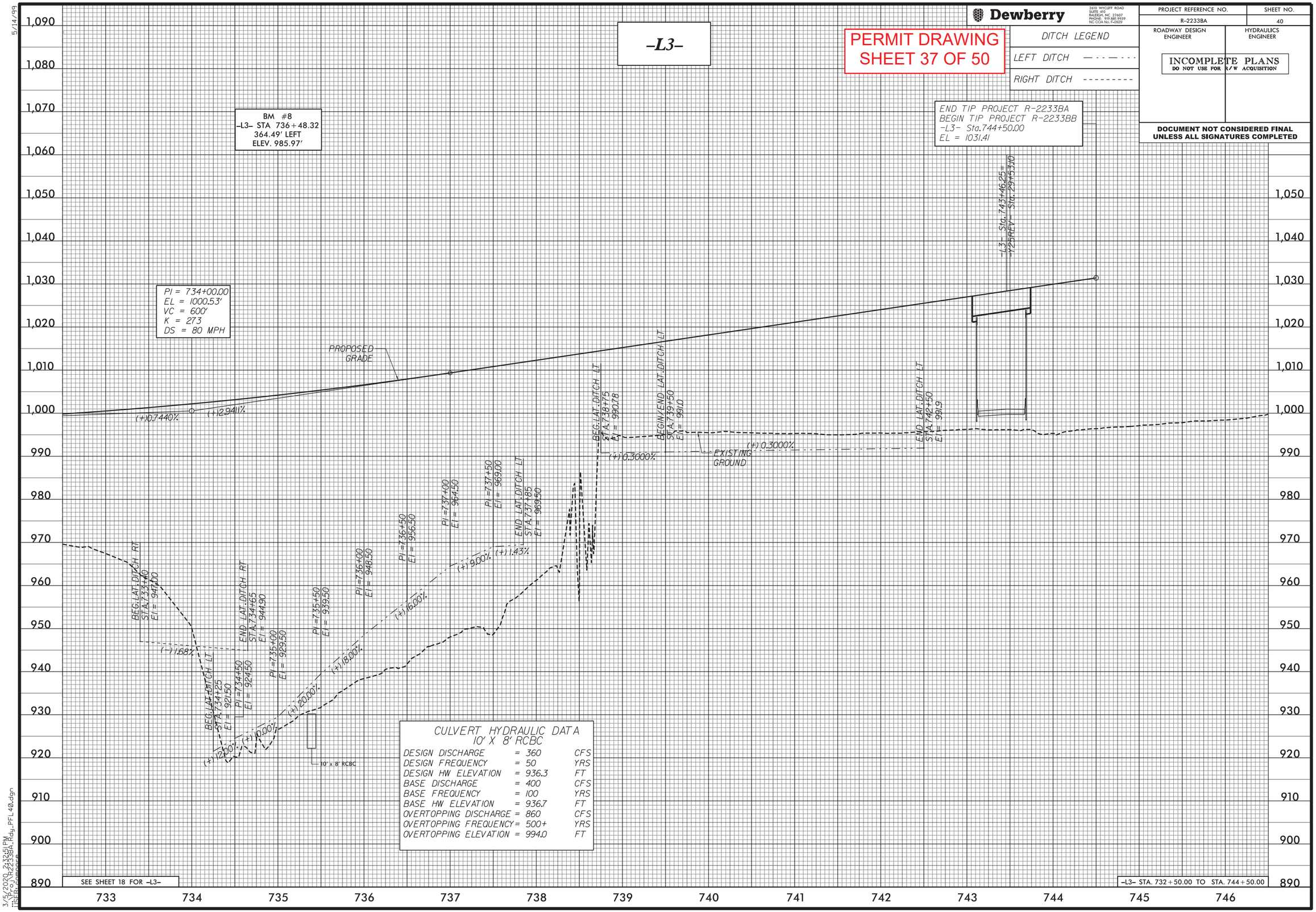
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 37 OF 50

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -



CULVERT HYDRAULIC DATA
10' X 8' RCBC

DESIGN DISCHARGE	=	360	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	936.3	FT
BASE DISCHARGE	=	400	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	936.7	FT
OVERTOPPING DISCHARGE	=	860	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	994.0	FT

3/5/2020 2:32:51 PM
R:\Roadway\R2233BA_Rdy_PFL40.dgn
USER: Jcampos

5/28/99

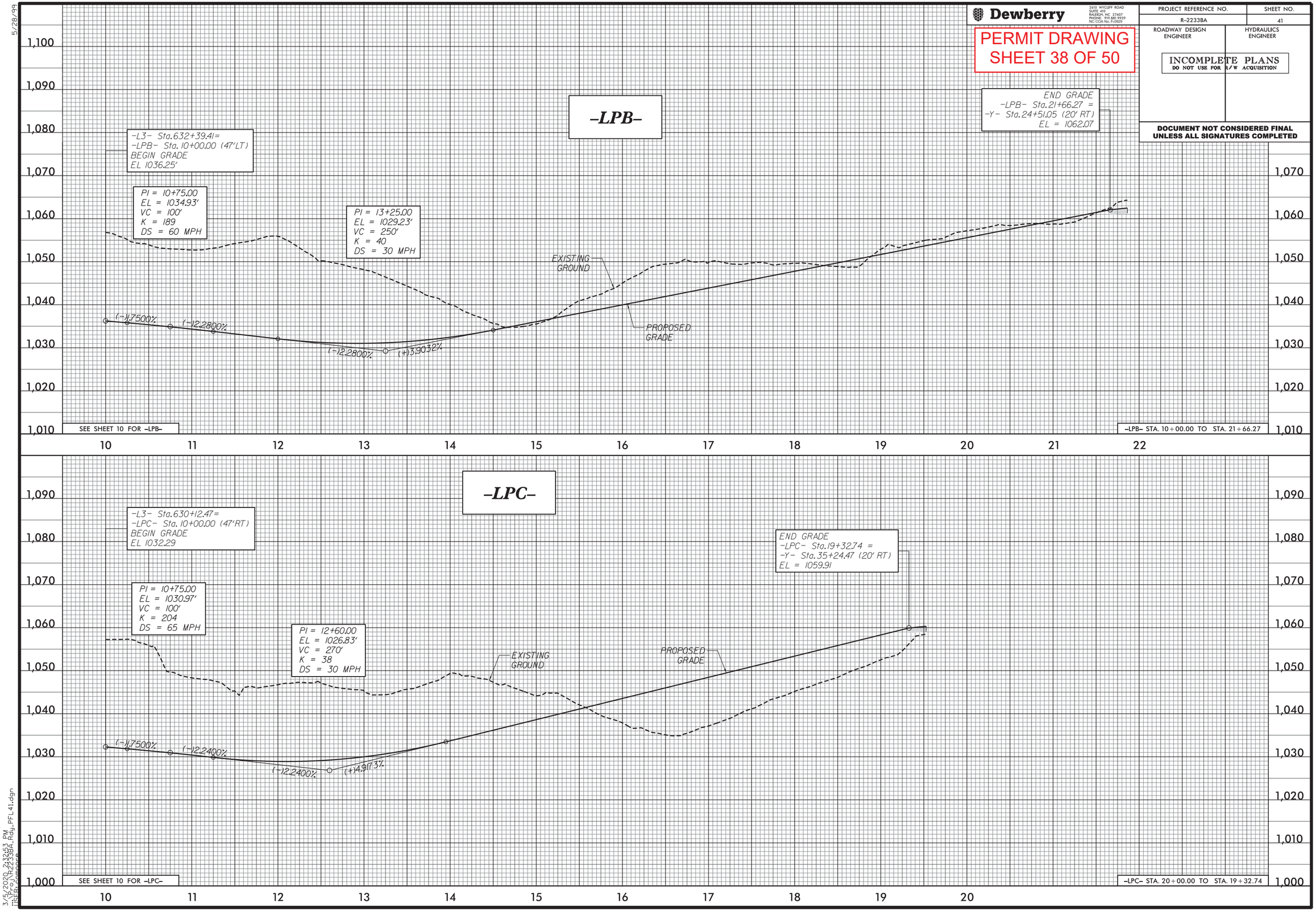
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 38 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



3/5/2020 2:23:53 PM
Y:\2233BA_Rdy_PFL41.dgn
USER: Jongrace

5/14/99

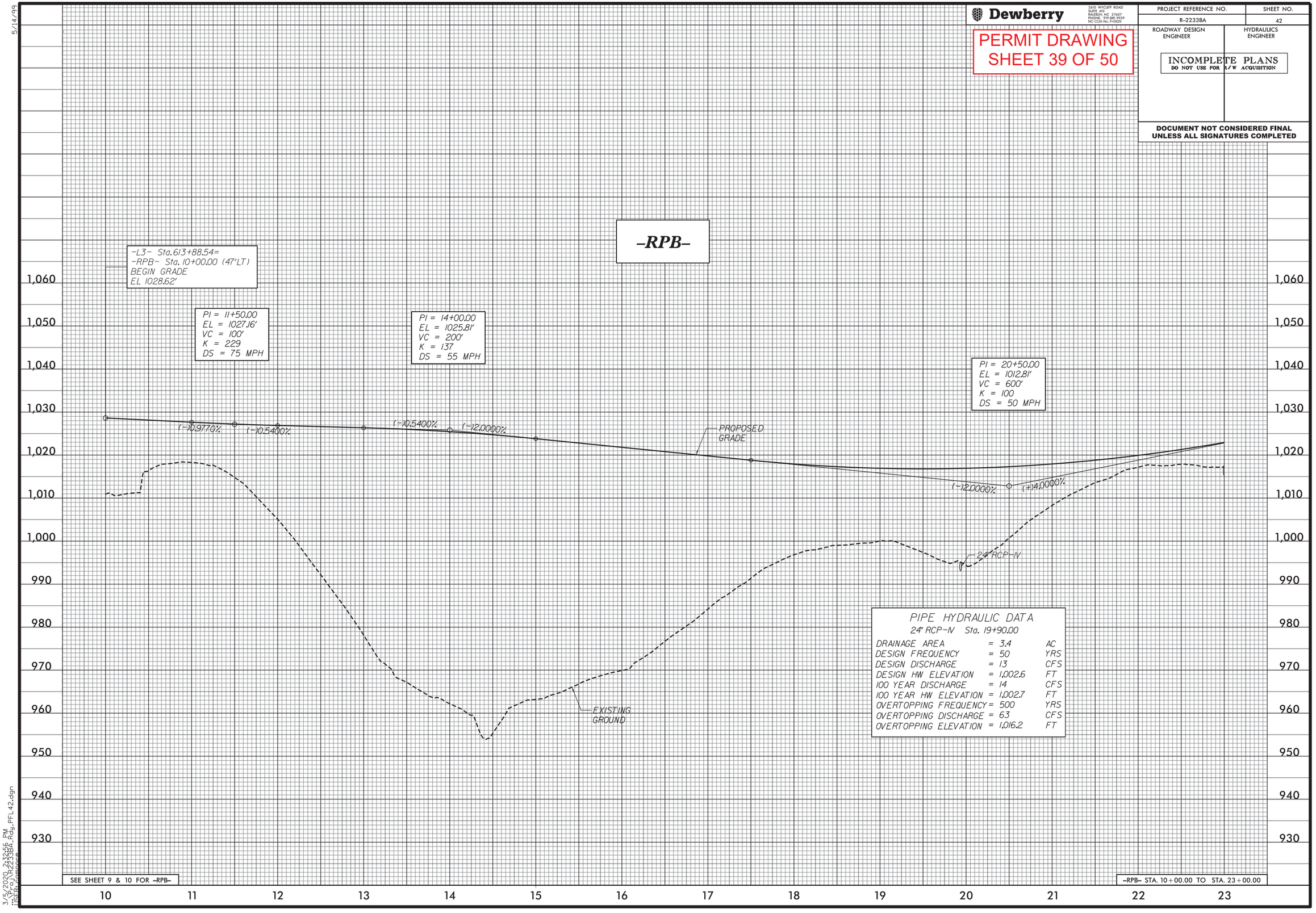
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PERMIT DRAWING
SHEET 39 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PIPE HYDRAULIC DATA
24" RCP-IV Sta. 19+90.00

DRAINAGE AREA	=	3.4	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	13	CFS
DESIGN HW ELEVATION	=	1,002.6	FT
100 YEAR DISCHARGE	=	14	CFS
100 YEAR HW ELEVATION	=	1,002.7	FT
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	63	CFS
OVERTOPPING ELEVATION	=	1,016.2	FT

SEE SHEET 9 & 10 FOR -RPB-

-RPB- STA. 10+00.00 TO STA. 23+00.00

3/5/2020 2:32:55 PM
R:\Roadway\Proj\2233BA_Rdy_PFL42.dgn
USER: jamacce

5/14/99

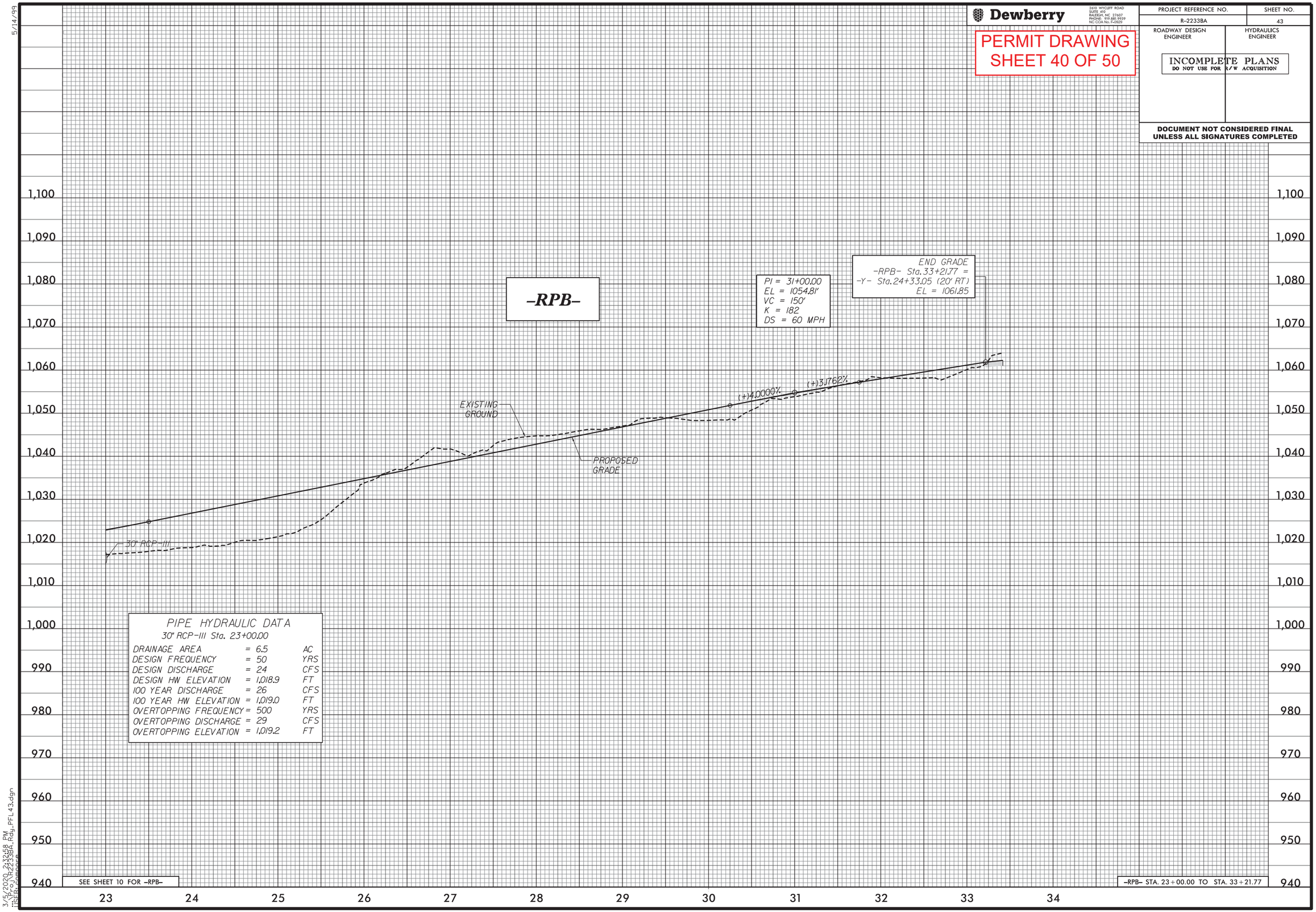
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 40 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



PIPE HYDRAULIC DATA
30" RCP-III Sta. 23+00.00

DRAINAGE AREA	=	6.5	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	24	CFS
DESIGN HW ELEVATION	=	1,018.9	FT
100 YEAR DISCHARGE	=	26	CFS
100 YEAR HW ELEVATION	=	1,019.0	FT
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	29	CFS
OVERTOPPING ELEVATION	=	1,019.2	FT

SEE SHEET 10 FOR -RPB-

-RPB- STA. 23+00.00 TO STA. 33+21.77

3/5/2020 2:32:58 PM
R:\Roadway\Proj\2233BA_Hyd_PFL43.dgn
USER: Jamoore

5/14/99

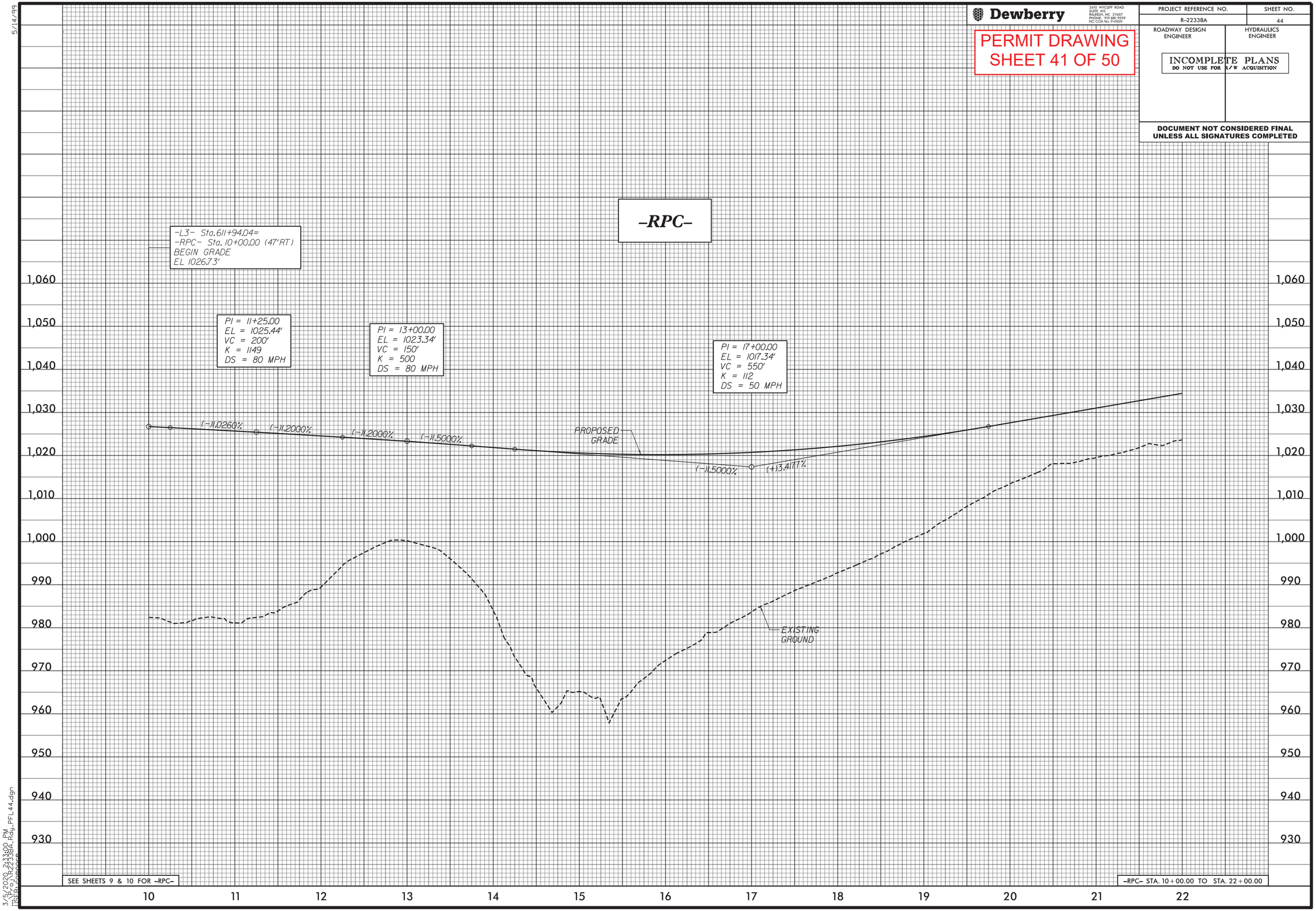
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 41 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



3/5/2020 2:33:00 PM
-Y:\R2233BA_Rdy_PFL44.dgn
USER: Jamoore

5/28/99

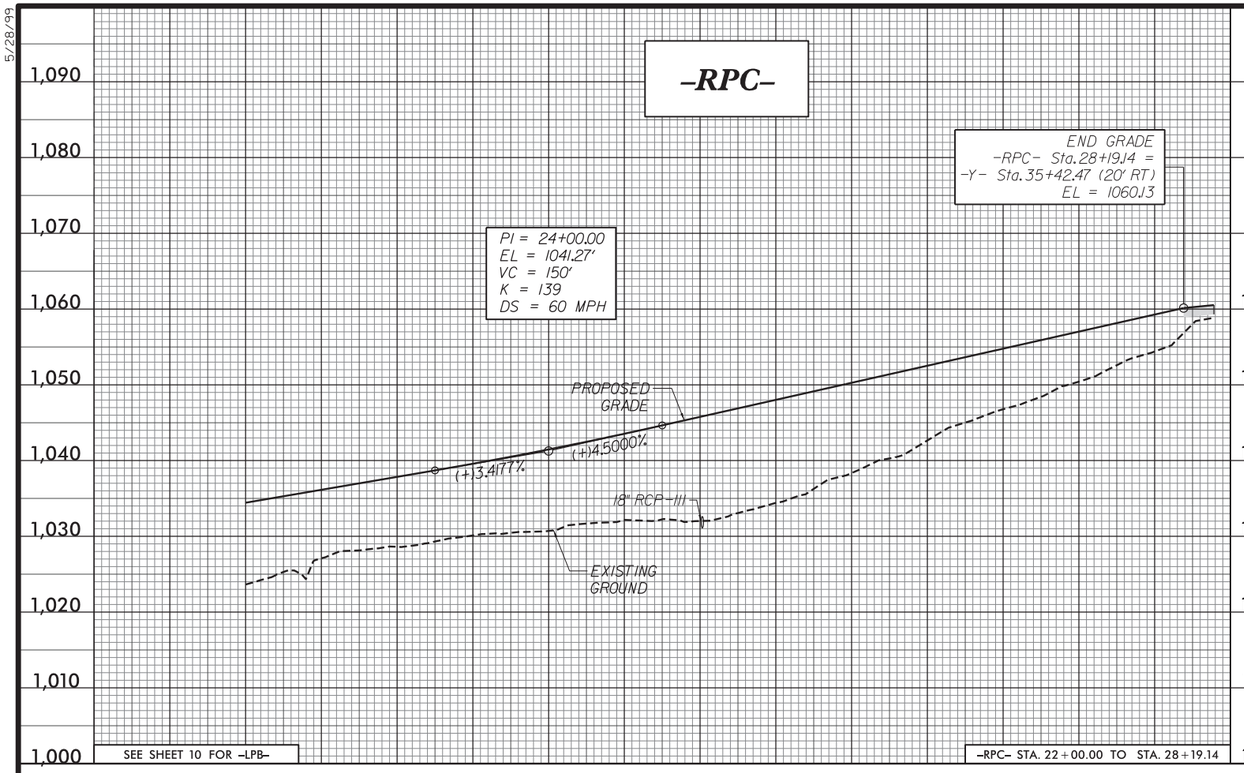
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9929
NC COA No. F-0029

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

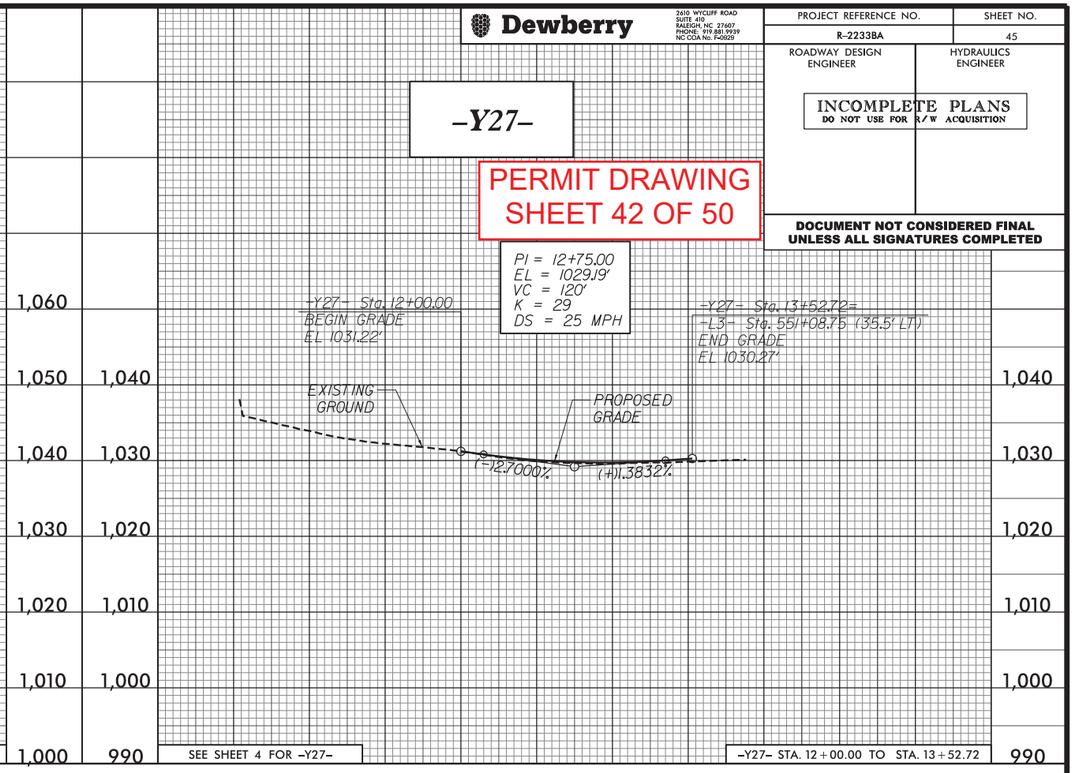
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 42 OF 50



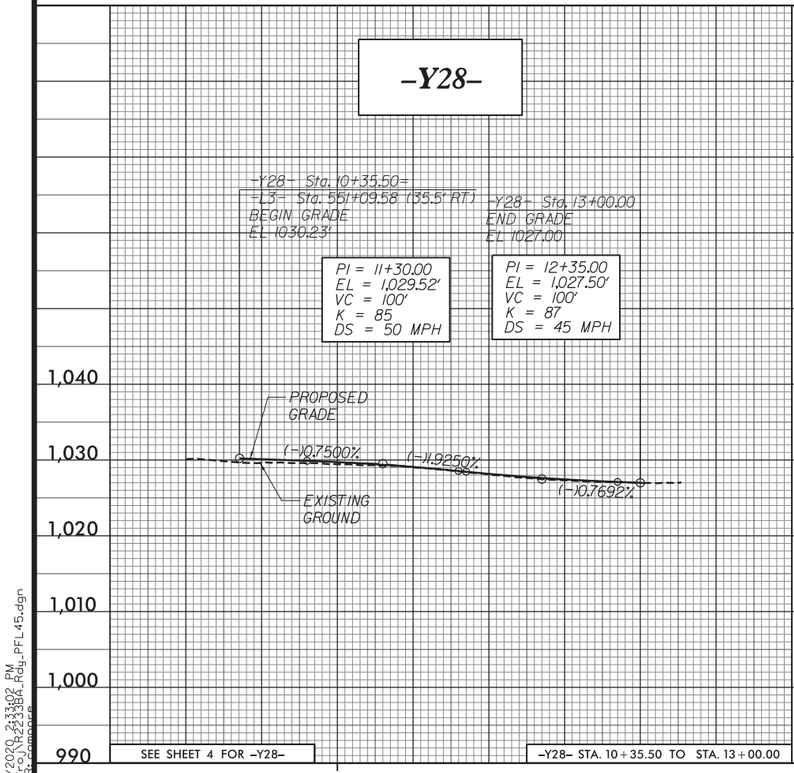
SEE SHEET 10 FOR -LPB-

-RPC- STA. 22+00.00 TO STA. 28+19.14



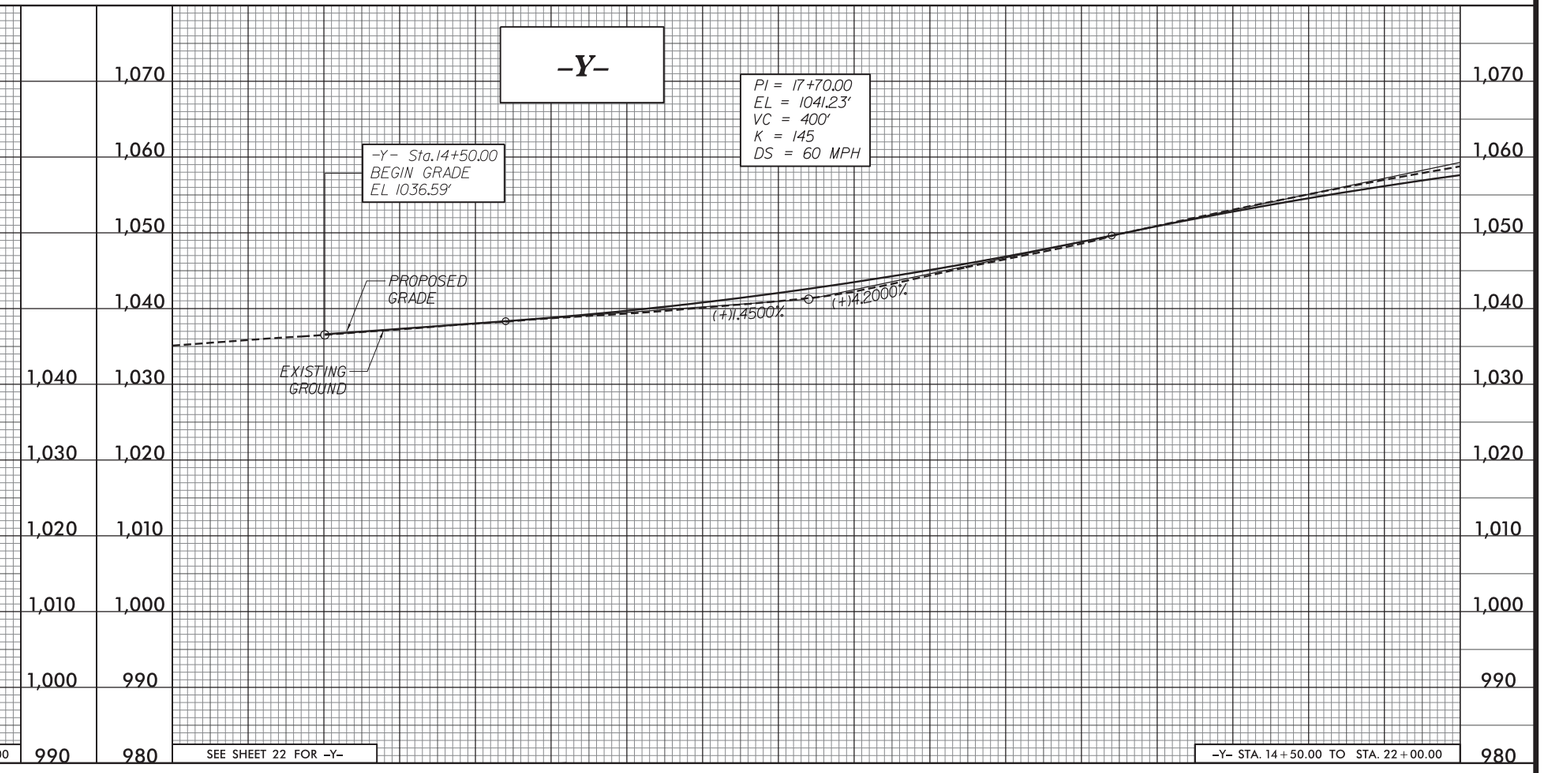
SEE SHEET 4 FOR -Y27-

-Y27- STA. 12+00.00 TO STA. 13+52.72



SEE SHEET 4 FOR -Y28-

-Y28- STA. 10+35.50 TO STA. 13+00.00



SEE SHEET 22 FOR -Y-

-Y- STA. 14+50.00 TO STA. 22+00.00

3/5/2020 2:33:02 PM
R-2233BA_Rdy_PFL45.dgn
USER: jcordero

5/28/99

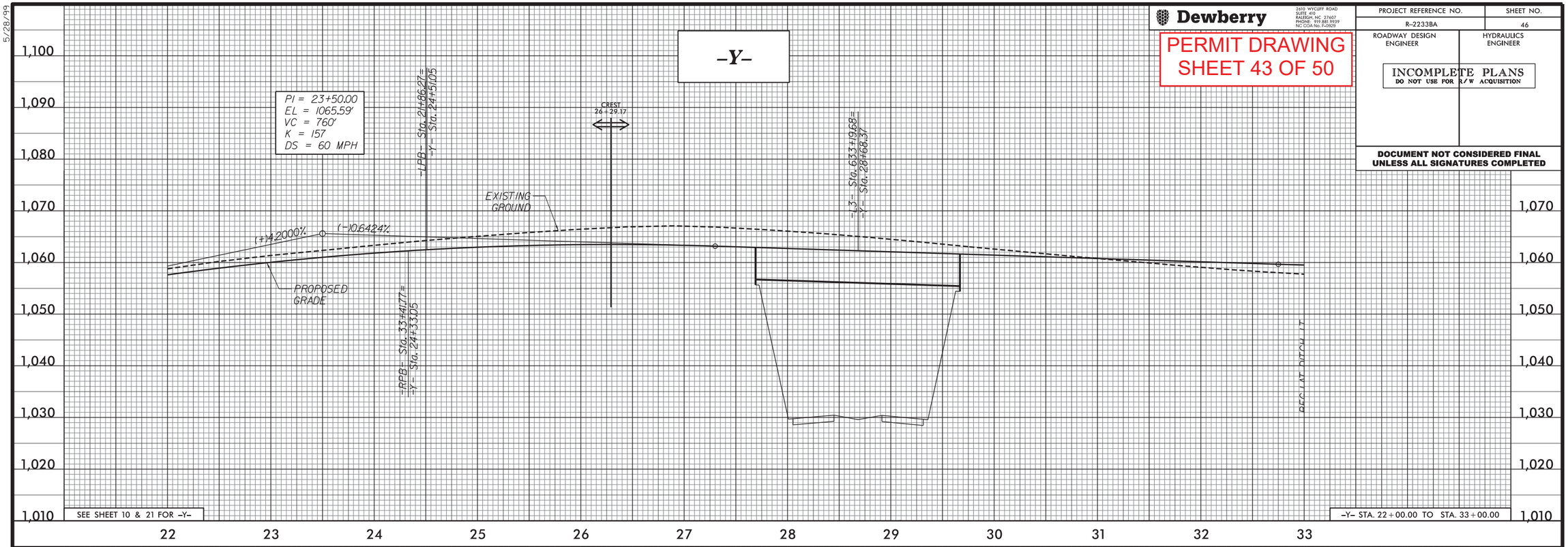
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

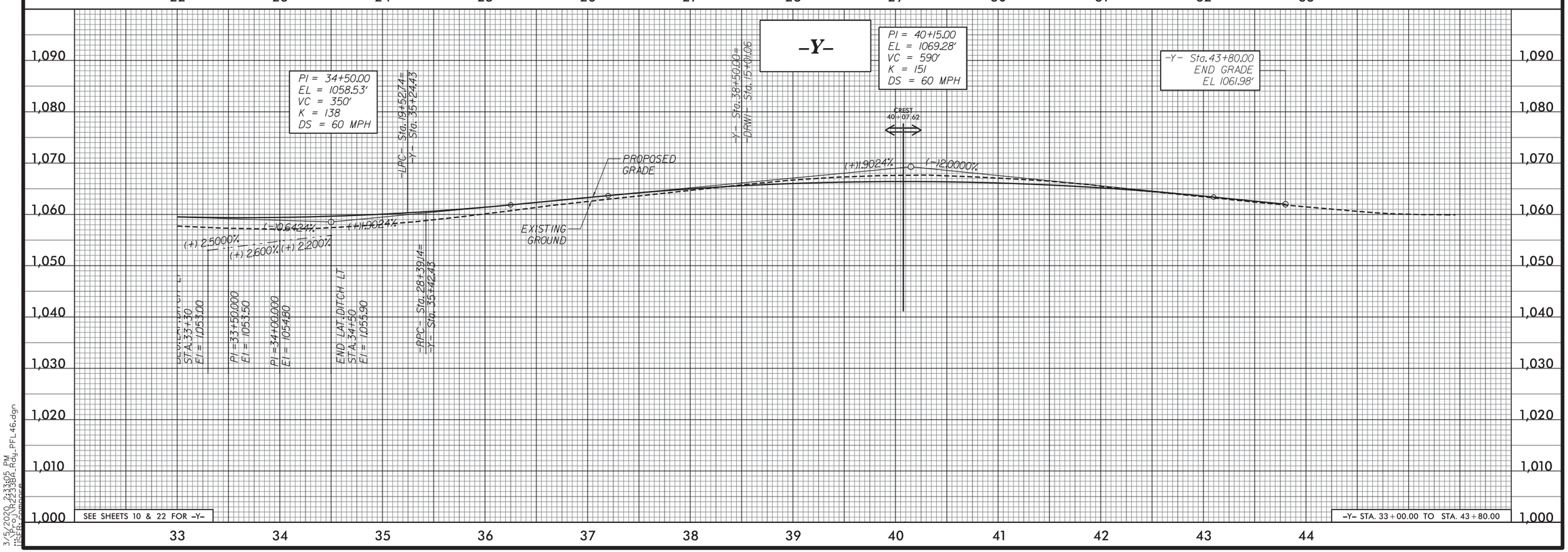
PERMIT DRAWING
SHEET 43 OF 50

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





3/5/2020 2:33:05 PM
USER: Jonnace

5/28/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	47

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 44 OF 50

DITCH LEGEND

LEFT DITCH — · · — · · —

RIGHT DITCH - - - - - - - - -

-Y16A-

PI = 15+40.00
EL = 107.3.28'
VC = 200'
K = 720
DS = 80 MPH

-Y16A- Sta. 12+35.00
BEGIN GRADE
EL 1070.85'

(+)0.7976%

(+)0.5200%

PROPOSED GRADE

EXISTING GROUND

BEG. LAT. DITCH LT
STA. 22+40
EI = 1.05.00

BEG. LAT. DITCH RT
STA. 22+00
EI = 1.038.00

END LAT. DITCH RT
STA. 22+40
EI = 1.034.50

(-) 1.03%

PI = 23+00.000
EI = 1.046.50

END LAT. DITCH LT
STA. 23+50
EI = 1.045.50

(-) 2.00000%

(-) 8.75%

PI = 22+50.000
EI = 1.047.50

(-) 3.33%

(-) 0.35%

PI=STA. 23+00
EI = 1.032.50

SEE SHEETS 19 & 8 FOR -Y16A-

-Y16A- STA. 12+35.00 TO STA. 24+50.00

1,110 1,100 1,090 1,080 1,070 1,060 1,050 1,040 1,030 1,020

11 12 13 14 15 16 17 18 19 20 21 22 23 24

-Y16A-

PI = 33+30.00
EL = 1082.59'
VC = 500'
K = 608
DS = 80 MPH

-Y16A- Sta. 35+75.00
END GRADE
EL 1081.85'

-Y16A- Sta. 37+50.00
END MILL AND OVERLAY
EL 1081.32'

-Y16A- Sta. 27+65.51=
-L3- Sta. 5.97+89.15

PROPOSED GRADE

(+)0.5200%

(-)0.3020%

(+) 0.30%

(+) 2.20%

EXISTING GROUND

BEG. SP. DITCH RT
STA. 30+00
EI = 1.076.30

PI = 30+50
EI = 1.077.40

END SP. DITCH RT
STA. 33+50
EI = 1.078.30

END LAT. DITCH RT
STA. 24+70
EI = 1.031.90

36" RCP-CD

END LAT. DITCH LT
STA. 25+50
EI = 1.021.4

(+) 4.67%

BEGIN LAT. DITCH LT
STA. 25+20
EI = 1.020.0

PIPE HYDRAULIC DATA
36" RCP-CD Sta. 24+97.00

DRAINAGE AREA	=	11	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	41	CFS
DESIGN HW ELEVATION	=	1,033.2	FT
100 YEAR DISCHARGE	=	44	CFS
100 YEAR HW ELEVATION	=	1,033.4	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	155	CFS
OVERTOPPING ELEVATION	=	1,046.9	FT

SEE SHEETS 8 & 20 FOR -Y16A-

-Y16A- STA. 24+50.00 TO STA. 37+50.00

1,100 1,090 1,080 1,070 1,060 1,050 1,040 1,030 1,020 1,010

25 26 27 28 29 30 31 32 33 34 35 36 37 38

3/5/2020 2:33:07 PM
R-2233BA_Rdy_PFL47.dgn
USER: jcondrey

5/28/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

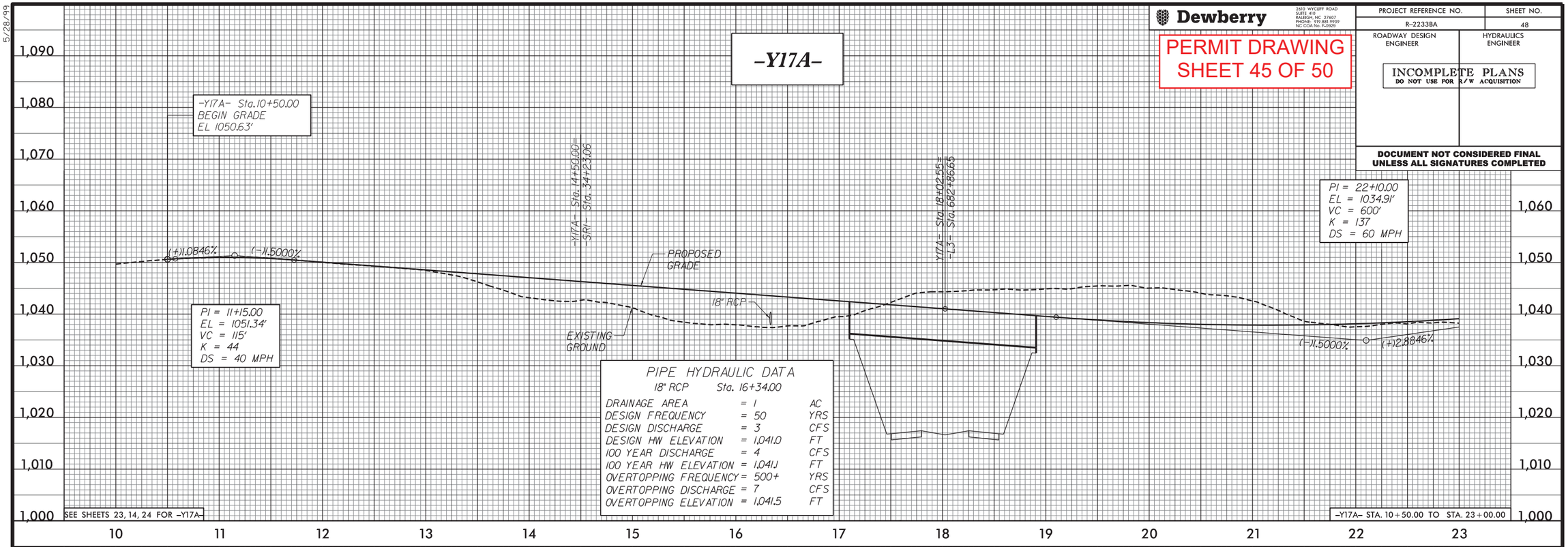
PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 45 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-Y17A-



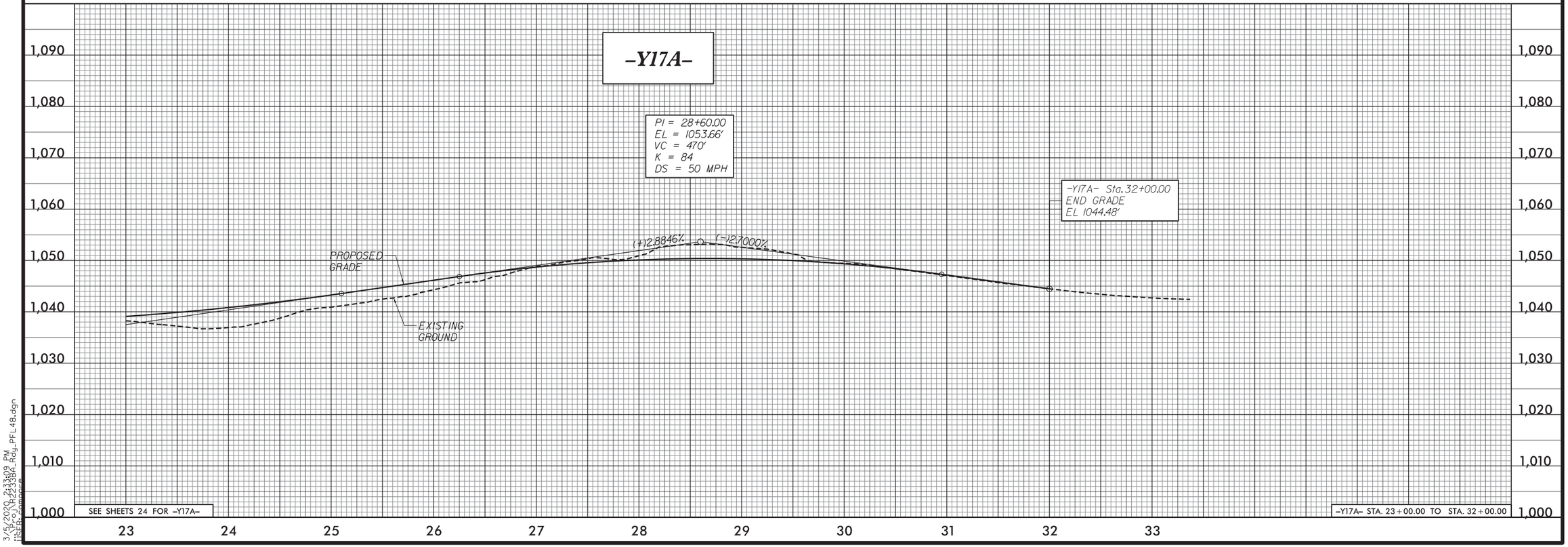
PIPE HYDRAULIC DATA
18" RCP Sta. 16+34.00

DRAINAGE AREA	=	1	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	3	CFS
DESIGN HW ELEVATION	=	1,041.0	FT
100 YEAR DISCHARGE	=	4	CFS
100 YEAR HW ELEVATION	=	1,041.1	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	7	CFS
OVERTOPPING ELEVATION	=	1,041.5	FT

SEE SHEETS 23, 14, 24 FOR -Y17A-

-Y17A- STA. 10+50.00 TO STA. 23+00.00

-Y17A-



SEE SHEETS 24 FOR -Y17A-

-Y17A- STA. 23+00.00 TO STA. 32+00.00

3/5/2020 2:33:09 PM
R:\Roadway\Proj\R-2233BA_Rdy_PFL48.dgn
USER: Jonnace

5/14/99

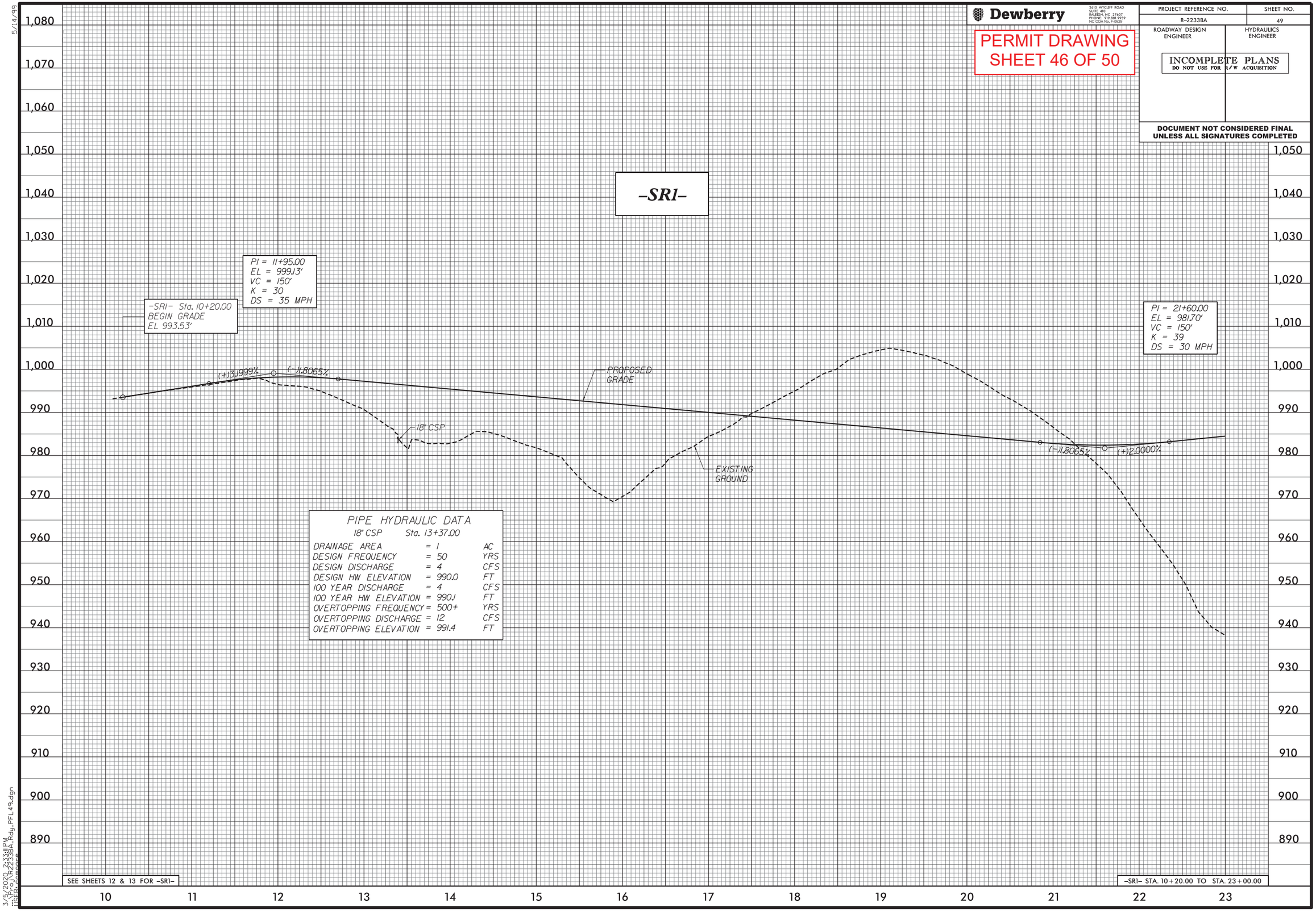
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 46 OF 50

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PIPE HYDRAULIC DATA

18" CSP Sta. 13+37.00

DRAINAGE AREA	= 1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 4	CFS
DESIGN HW ELEVATION	= 990.0	FT
100 YEAR DISCHARGE	= 4	CFS
100 YEAR HW ELEVATION	= 990.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 12	CFS
OVERTOPPING ELEVATION	= 991.4	FT

3/5/2020 2:33:41 PM
R-2233BA_Rdy_PFL49.dgn
USER: Jamacc

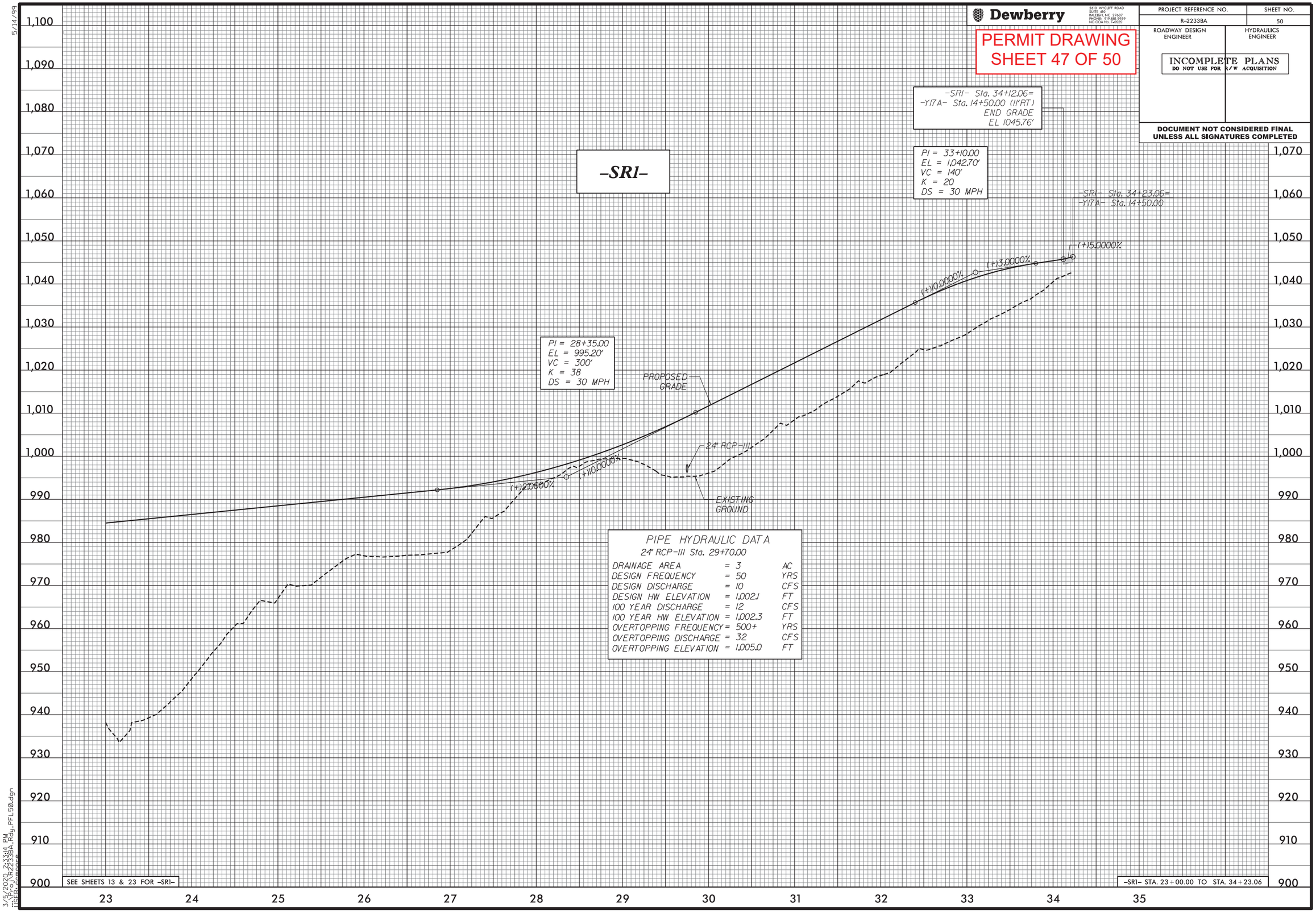
Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 47 OF 50



PIPE HYDRAULIC DATA
24" RCP-111 Sta. 29+70.00

DRAINAGE AREA	=	3	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	10	CFS
DESIGN HW ELEVATION	=	1,002.1	FT
100 YEAR DISCHARGE	=	12	CFS
100 YEAR HW ELEVATION	=	1,002.3	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	32	CFS
OVERTOPPING ELEVATION	=	1,005.0	FT

SEE SHEETS 13 & 23 FOR -SR1-

-SR1- STA. 23+00.00 TO STA. 34+23.06

5/14/99

3/5/2020 2:37:14 PM
R:\Projects\R2233BA_Rdy_PFL50.dgn
USER: Jamaca

5/28/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 48 OF 50

DITCH LEGEND

LEFT DITCH — - - — - - -

-SR3-

-SR3- Sta. 9+58.45
BEGIN GRADE
EL 1026.73'

PI = 13+75.00
EL = 999.45'
VC = 100'
K = 39
DS = 30 MPH

-SR3- Sta. 14+38.54
END GRADE
EL 996.91'

(-)6.5481%

(-)4.0000%

SEE SHEET 12 FOR -SR3-

-SR3- STA. 9+58.45 TO STA. 14+38.54

-DRW1-

-DRW1- Sta. 10+00.00
BEGIN GRADE
EL 1052.24'

PI = 10+90.00
EL = 1049.63'
VC = 100'
K = 32
DS = 35 MPH

PI = 13+10.00
EL = 1,036.43'
VC = 100'
K = 14
DS = 15 MPH

-DRW1- Sta. 13+93.64=
-L3- Sta. 577+00.09 (35.5' LT)
END GRADE
EL = 1037.21'

EXISTING GROUND

PROPOSED GRADE

(-)2.9000%

(-)6.0000%

(-)6.0000%

(+)0.9326%

SEE SHEET 7 FOR -DRW1-

-DRW1- STA. 10+00.00 TO STA. 13+93.64

-DRW2-

-DRW2- Sta. 10+10.00
BEGIN GRADE
EL 1026.79'

PI = 10+80.00
EL = 1030.68'
VC = 100'
K = 24
DS = 20 MPH

PI = 14+00.00
EL = 1061.79'
VC = 100'
K = 18
DS = 25 MPH

-DRW2- Sta. 14+77.06=
-Y- Sta. 38+50.00 (24'RT)
END GRADE
EL 1065.10'

~~-DRW2- Sta. 15+01.06=~~
~~-Y- Sta. 38+50.00~~

(+)5.5500%

(+)7.2225%

(+)7.2225%

(+)4.2992%

(+)2.0000%

SEE SHEET 22 FOR -DRW2-

-DRW2- STA. 10+10.00 TO STA. 14+77.06

-DRW3-

-DRW3- Sta. 10+35.50=
-L3- Sta. 563+91.17 (35.5' RT)
BEGIN GRADE
EL = 993.58'

PI = 10+52.00
EL = 993.25'
VC = 25'
K = 3
DS = 15 MPH

PI = 11+30.00
EL = 984.52'
VC = 50'
K = 5
DS = 15 MPH

-DRW3- Sta. 11+60.00
END GRADE
EL = 984.43'

PROPOSED GRADE

EXISTING GROUND

(-)2.0000%

(-)11.9046%

(-)0.3000%

(+) 0.43%

BEG. LAT. DITCH LT
STA. 10+80
El = 982.10

END. LAT. DITCH LT
STA. 11+50
El = 982.40

SEE SHEET 5 FOR -DRW3-

-DRW3- STA. 10+35.50 TO STA. 11+60.00

3/5/2020 2:33:16 PM
USER: Jonnance
FILE: R-2233BA_Rdy_PFL51.dgn

5/28/99

Dewberry
2610 WYCLIFF ROAD
SUITE 410
RALEIGH, NC 27607
PHONE: 919.881.9939
NC COA No. F-0929

PROJECT REFERENCE NO.	SHEET NO.
R-2233BA	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

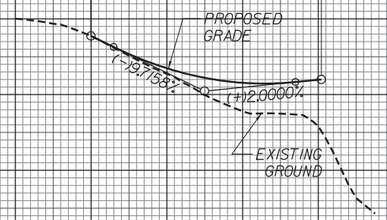
PERMIT DRAWING
SHEET 49 OF 50

-DRW4-

-DRW4- Sta. 10+50.00
BEGIN GRADE
EL = 997.75'

PI = 11+25.00
EL = 990.46'
VC = 120'
K = 10
DS = 15 MPH

-DRW4- Sta. 12+02.07=
-L3- Sta. 560+00.00 (35.5' LT)
END GRADE
EL = 992.00'



SEE SHEET 4 FOR -DRW4-

-DRW4- STA. 10+50.00 TO STA. 12+02.07

-DRW5-

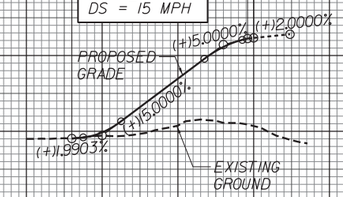
-DRW5- Sta. 10+30.00
BEGIN GRADE
EL = 979.05'

PI = 11+30.00
EL = 991.45'
VC = 25'
K = 3
DS = 15 MPH

PI = 11+46.00
EL = 992.25'

-DRW5- Sta. 11+50.00=
-L3- Sta. 563+21.32 (35.5' LT)
END GRADE
EL = 992.33'

PI = 10+50.00
EL = 979.45'
VC = 25'
K = 2
DS = 15 MPH



SEE SHEET 5 FOR -DRW5-

-DRW5- STA. 10+30.00 TO STA. 11+50.00

3/5/2020 2:38 PM
jsfer: Dewberry
USER: Jonnace
R-2233BA_Rdy_PFL52.dgn

WETLAND AND SURACE WATER IMPACTS SUMMARY

				WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	JD ID	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	SZ	L3 561+11 TO 561+24 RT	2 -5' x 6' RCBC						0.02		136		
1	SZ	L3 561+11 TO 561+24 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	24	18	
2	SY	L3 584+19 TO 585+04	54" RCP	0.03					0.02	< 0.01	323	60	
3	WF	L3 584+16 TO 585+35	ROADWAY FILL	0.47			0.02						
3	WF	L3 584+16 TO 585+35	TEMPORARY BYPASS CHANNEL			0.01							
4	SX	L3 606+50 TO 617+50	54" RCP						0.21	< 0.01	1509	43	
5	WE	L3 607+66 TO 608+22 LT	ROADWAY FILL	0.04									
6	SW	L3 616+76 TO 618+60	8' X 6' RCBC						0.09		583		
6	SW	L3 617+00 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	21	5	
6	SW	L3 618+58 LT	CHANNEL REALIGNMENT						0.01	< 0.01	75	18	
7	WD	L3 643+23 TO 643+80 RT	ROADWAY FILL	0.01									
8	SV	L3 643+38 RT TO 643+91 LT	ROADWAY FILL						< 0.01		102		
9	SU	L3 643+13 RT TO 645+10 LT	66" RCP						0.10	< 0.01	702	29	
9	SU	L3 645+10 LT	CL II RIPRAP ON BANKS						< 0.01	< 0.01	20	10	
10		L3 649+55 LT TO 651+18 RT	30" RCP						0.03	< 0.01	620	29	
10		L3 649+55 LT	CL II RIPRAP ON BANKS						< 0.01	< 0.01	8	10	
11	ST	L3 671+97 LT TO 672+82 RT	9' x 8' RCBC						0.10		582		
11	ST	L3 672+08 RT	CHANNEL REALIGNMENT						< 0.01	< 0.01	44	23	
11	ST	L3 672+34 LT	CHANNEL REALIGNMENT						< 0.01	< 0.01	36	35	
12	SS	L3 705+00 RT TO 705+10 LT	TEMPORARY WORK BRIDGE							0.03		272	
13	SR	L3 706+79 RT TO 707+02 LT	TEMPORARY WORK BRIDGE							0.08		290	
14	SQ	L3 706+90 RT TO 707+54 RT	TEMPORARY STREAM CROSSING							< 0.01		67	
15	SP	L3 733+34 LT TO 736+81 RT	8' X 8' RCBC						0.14		605		
15	SP	L3 731+47 TO 732+16 LT	CHANNEL REALIGNMENT						0.02		92		
15	SP	L3 732+16 TO 732+71 LT	ROADWAY FILL						0.01		60		
15	SP	L3 732+71 TO 733+34 LT	CHANNEL REALIGNMENT						0.02		76		
15	SP	L3 731+22 TO 731+47 LT	CHANNEL REALIGNMENT							< 0.01		24	
15	SP	L3 736+81 TO 737+26 RT	CHANNEL REALIGNMENT						0.01		46		
15	SP	L3 737+26 TO 737+36 RT	CHANNEL REALIGNMENT							< 0.01		18	
16	WB	L3 733+46 LT TO 733+80 LT	CHANNEL REALIGNMENT			< 0.01							
TOTALS*:				0.56		0.02	0.02		0.81	0.15	5664	951	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
2/20/2020
RUTHERFORD
R-2233BA
34400.1.S5

Revised 2016 09 09