STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
BEVERLY EAVES PURDUE
GOVERNOR
P.O. BOX 25201, RALEIGH, NC 27611-5201
EUGENE A. CONTI, JR.
SECRETARY

June 11, 2009

U.S. Army Corps of Engineers
Washington Regulatory Field Office
Post Office Box 1000
Washington, NC 27889-1000

Attn: Mr. William Wescott
NCDOT Coordinator

Subject: Modification Request for the Individual Section 404 Permit, Individual Water Quality Certification, and Tar-Pamilico Buffer Authorization for the Rocky Mount Northern Connector, from SR 1604 (Hunter Hill Road) to US 301, Nash County, TIP No. R-2823, Debit $570 from WBS 34509.1.1.

References: May 6, 2009 Individual Section 404 Permit, Action ID #200411199, Permit #SAW2007-00157-164
February 23, 2009 Section 401 Water Quality Certification 3781 and Buffer Authorization

Dear Sir:

In an application dated December 17, 2008, the North Carolina Department of Transportation (NCDOT) submitted an Individual Permit application for the Subject project. This application requested authorization for impacts to jurisdictional features based upon a final design prior to an additional public meeting presenting the final design, held on October 28, 2008. Based upon comments from the meeting and subsequent inquiries from the public concerning the traffic flow from Station -L- 27+45 to Station 65+55, the roadway was re-designed to include directional crossovers and four bulb U-turns to provide additional left-turn traffic flow along Woodruff Road. The redesign will result in unavoidable impacts to Waters of the U.S. Revised permit drawings, buffer drawings and roadway plans are included with this modification request.

Due to a necessary pipe clearance profile change, the roadway profile at Station -L- 189+80 has also been slightly modified resulting in increased jurisdictional impacts.

In another recent development, the City of Rocky Mount, who is responsible for the transmission and distribution utility line relocations associated with this project, requested that NCDOT include these impacts in the Individual Permit for this project. As such, NCDOT has included this information.

This information is being presented as supplemental information to be reviewed as a modification to the 404 Individual Permit issued May 6, 2009. Each modification is discussed in detail below.

Site 1. Unnamed Tributary to Goose Branch - Perennial Stream, Riparian Buffer, and Non-Riparian Wetland (Permit Drawing Sheets 7 and 8 of 68 and Buffer Drawing Sheets 7 and 8 of 56 in December 17, 2008 Application)

The revised drawings (Permit Sheets 7 and 8 of 68 and Buffer Sheets 7 and 8 of 56) indicate that impacts at Site 1 will change due to a new left-turn bulb added to the project as well as a pipe clearance profile change. Aerial utility lines in this area have resulted in hand clearing in wetlands and buffers (Zone 2). The bulb will allow vehicles from businesses near the Hunter Hill Road intersection and the residences on Goose Branch Drive to maintain enough distance between the cross streets for maneuvering across all lanes of traffic. A summary of the original and revised impacts is provided in the following table.

Summary of Site 1 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Fill in Wetlands	0.06 Ac	0.07 Ac	+0.01 Ac
Mech. Clearing in Wetlands	0.05 Ac	0.07 Ac	+0.02 Ac
Hand Clearing in Wetlands	0	0.08 Ac	+0.08 Ac
Perm. Surface Water Impacts	0.01 Ac (95 LF)	0.01 Ac (95 LF)	None
Temp. Surface Water Impacts	0.00 Ac (10 LF)	0.00 Ac (10 LF)	None
Wetlands in Buffer Zone 1	3,268 sq ft	3,279 sq ft	+11 sq ft
Wetlands in Buffer Zone 2	687 sq ft	2,585 sq ft	+1,898 sq ft
Allowable Buffer Zone 1	7,865 sq ft	7,922 sq ft	+57 sq ft
Allowable Buffer Zone 2	3,903 sq ft	6,271 sq ft	+2,368 sq ft

Revised cross section permit sheets 9 and 10 of 68 (buffer sheets 9 and 10 of 56) are enclosed.

Site 2. Unnamed Tributary to Goose Branch - Riparian Buffer (Permit Drawing Sheets 11 and 12 of 68 and Buffer Drawing Sheets 11 and 12 of 56 in December 17, 2008 Application)

The revised drawings (Sheets 11 and 12 of 68) indicate that impacts at Site 2 will change due to a new left-turn bulb added to the project as well as a pipe clearance profile change. A summary of the original and revised impacts is provided in the following table.

Summary of Site 2 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Mitigable Buffer Zone 1	87 sq ft	444 sq ft	+357 sq ft
Mitigable Buffer Zone 2	1,830 sq ft	3,934 sq ft	+2,104 sq ft

Revised cross section buffer drawing sheets 11 and 12 of 56 are enclosed.

Site 3. Unnamed Tributary to Goose Branch - Riparian Wetland (Permit Drawing Sheets 11 and 12 of 68 in December 17, 2008 Application)

The revised drawings (Sheets 11 and 12 of 68) show that the impacts at Site 3 will change due to a new left-turn bulb. Aerial utility lines in this area have resulted in hand clearing in wetlands. Since the location of the bulb is near the Goose Branch Drive intersection, the right turn taper was changed to a right turn lane that extends from Goose Branch Drive to the bulb. A summary of the original and revised impacts is provided in the following table.

Summary of Site 3 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Fill in Wetlands	0.07 Ac	0.09 Ac	+0.02 Ac
Mech. Clearing in Wetlands	0.02 Ac	0.02 Ac	None
Hand Clearing in Wetlands	0	0.04 Ac	+0.04 Ac

Revised cross section permit drawing sheet 13 of 68 is enclosed.

Site 4. Goose Branch - Perennial Stream and Riparian Buffer (Permit Drawing Sheets 14 and 15 of 68 and Buffer Drawing Sheets 15 and 16 of 56 in December 17, 2008 Application)

The revised drawings (Permit Sheets 14 and 15 of 68 and Buffer Sheets 15 and 16 of 56) indicate that impacts at Site 4 will change due to aerial utility lines. The sheets have also been revised due to a new bulb which does not have an impact on the environmental features. A summary of the original and revised impacts is provided in the following table.

The riparian zones on the west side of Site 4 are maintained lawn. They will be kept in a similar condition, so there will be no change to the existing use. In addition, the existing building will be razed and the area revegetated, resulting in a net increase in buffer.

Summary of Site 4 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Perm. Surface Water Impacts	0.04 Ac (158 LF)	0.04 Ac (158 LF)	None
Temp. Surface Water Impacts	0.01 Ac (54 LF)	0.01 Ac (54 LF)	None
Wetlands in Buffer Zone 1	41 sq ft	168 sq ft	+127 sq ft
Wetlands in Buffer Zone 2	574 sq ft	1,712 sq ft	+1,138 sq ft
Mitigable Buffer Zone 1	10,527 sq ft	11,823 sq ft	+1,296 sq ft
Mitigable Buffer Zone 2	6,437 sq ft	7,647 sq ft	+1,210 sq ft

Revised profile and cross section permit sheets 16-18 of 68 (buffer sheets 17-19 of 56) are enclosed.

Site 5. Unnamed Tributary to Goose Branch - Intermittent Stream and Riparian Wetland (Permit Drawing Sheets 14 and 15 of 68 and Buffer Drawing Sheets 15 and 16 of 56 in December 17, 2008 Application)

The revised drawings (Permit Sheets 14 and 15 of 68 and Buffer Sheets 15 and 16 of 56) indicate that impacts at Site 5 will change due to aerial utility lines. The sheets have also been revised due to a new bulb which does not have an impact on the environmental features. A summary of the original and revised impacts at Site 5 is provided in the following table.

Summary of Site 5 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Fill in Wetlands	0.08 Ac	0.08 Ac	None
Mech. Clearing in Wetlands	0.03 Ac	0.03 Ac	None
Hand Clearing in Wetlands	0	0.11 Ac	+0.11 Ac
Perm. Surface Water Impacts	0.02 Ac (210 LF)	0.02 Ac (210 LF)	None

Revised cross section permit sheets 16-18 of 68 (buffer sheets 17-19 of 56) are enclosed.

Site 13. Unnamed Tributary to Compass Creek - Perennial Stream, Riparian Wetland, and Riparian Buffer (Permit Drawing Sheets 43 and 44 of 68 and Buffer Drawing Sheets 34 - 37 of 56 in December 17, 2008 Application)

The revised drawings (Permit Sheets 43 and 44 of 68 and Buffer Sheets 34 - 37 of 56) indicate that impacts at Site 13 will change due to a pipe clearance profile change. The profile was modified slightly at 189+90 to increase the amount of fill on top of the pipe to reduce possible maintence issues for the pipe and road in the future. A summary of the original and revised impacts is provided in the following table.

Summary of Site 13 Impact Changes

Impact Description	Dec. 17, 2008 Impact	Revised Impact	Impact Change
Fill in Wetlands	0.21 Ac	0.26 Ac	+0.05 Ac
Excavation in Wetlands	0.02 Ac	0.02 Ac	None
Mech. Clearing in Wetlands	0.06 Ac	0.05 Ac	-0.01 Ac
Perm. Surface Water Impacts	0.01 Ac (205 LF)	0.02 Ac (218 LF)	+13 LF
Temp. Surface Water Impacts	0.00 Ac (43 LF)	0.01 Ac (75 LF)	+32 LF
Wetlands in Buffer Zone 1	9,708 sq ft	10,132 sq ft	+424 sq ft
Wetlands in Buffer Zone 2	2,521 sq ft	2,661 sq ft	+140 sq ft
Mitigable Buffer Zone 1	15,653 sq ft	16,082 sq ft	+429 sq ft
Mitigable Buffer Zone 2	10,114 sq ft	10,345 sq ft	+231 sq ft

Revised profile and cross section permit sheets 45, 50 and 51 of 68 (buffer sheets 38, 43 and 44 of 56) are enclosed.

The following sheets are also included in this permit modification since they have been slightly revised. There are no jurisdictional impact changes on these sheets and they are included for informational purposes only.

- Permit Drawing Sheets 19 and 20 of 68 show visual changes due to the addition of a bulb.
- Permit Drawing Sheets 62 and 63 of 68 have visual changes due to a couple new ditches required due to pipe clearance issues. (-L- Sta. 261+22 - 263+01 RT and -Y8- Sta. 17+00 - 17+39 and 19+04 - 20+00 RT)

Summary of Project Changes

The NCDOT has modified the project design to incorporate left-turn bulbs along Woodruff Road as a result from public input. In addition, the roadway has been slightly modified to allow for the necessary pipe clearance. Proposed impact changes are summarized in the following table.

Net Impact Revisions to Jurisdictional Features

Site	Wetland Impacts (ac)			Stream Impacts (LF)		Wetlands in Buffer (sq ft)		Buffer Impacts (sq ft)	
	Perm. Fill	Mech. Clearing	Hand Clearing	Perm.	Temp.	Zone 1	Zone 2	Zone 1	Zone 2
1*	+0.01	+0.02	+0.08	0	0	+11	+1,898	+57	+2,368
2	--	--	--	--	--	--	--	+357	+2,104
3	+0.02	0	+0.04	--	--	--	--	--	--
4	--	--	--	0	0	+127	+1,138	+1,296	+1,210
5	0	0	+0.11	0	--	--	--	--	--
13	+0.05	-0.01	--	+13	+32	+424	+140	+429	+231
TOTAL	**+0.08**	**+0.01**	**+0.23**	**+13**	**+32**	**+562**	**+3,176**	**+2,139**	**+5,913**

*Buffer impacts are allowable at Site 1. Buffer impacts at all other sites are mitigable.

Summary of Impacts to Waters of the U.S. and Riparian Buffers

In summary, the final modified permanent impacts to jurisdictional areas of R-2823 will total 6.4 acres of wetlands, 1,952 linear feet of streams, and 201,792 square feet of riparian buffers as itemized in the following table.

Summary of Proposed Permanent Jurisdictional Impacts

Permit Site	Station	Riparian Wetlands (ac)	Non-Riparian Wetlands (ac)	Perennial Streams (LF)	Intermittent Streams (LF)	Riparian Buffer Zone 1 (sq ft)	Riparian Buffer Zone 2 (sq ft)
1*	-L- 30+28	0	0.14	95	0	7,922	6,271
2*	-L- 32+50 RT	0	0	0	0	444	3,934
3*	-L- 36+50 LT	0.11	0	0	0	0	0
4*	-L- 49+02	0	0	158	0	11,823	7,647
5*	-L- 50+65	0.11	0	0	210	0	0
6	-L- 68+00	0	1.11	0	0	0	0
7	-L- 111+50	1.02	0	0	0	8,967	7,421
8	-L- 113+26	0.02**	0	0	24	0	0

Permit Site	Station	Riparian Wetlands (ac)	Non-Riparian Wetlands (ac)	Perennial Streams (LF)	Intermittent Streams (LF)	Riparian Buffer Zone 1 (sq ft)	Riparian Buffer Zone 2 (sq ft)
9	-L- 135+34	0	0.21	210	0	14,535	9,434
10	-L- 169+16	0	0.21	407	0	24,431	15,186
11	-L- 175+00	0.73	0	0	0	0	0
12	-L- 182+00	1.15	0	197	0	11,213	7,394
13*	-L- 189+80	0.33	0	218	0	16,082	10,345
14	-Y5- 11+50	0	0.12	0	0	0	0
15	-L- 231+00	0	0.02	0	0	180	1530
16	-L- 231+57	0	0.14**	0	74	6,616	5,773
17	-L- 239+81	0.98	0	211	0	14,429	8,028
18	-L- 260+50	0	0	0	130	0	0
19	-Y8- 23+50	0	0	18	0	1,776	411
TOTAL IMPACTS:		4.45	1.95	1,514	438	118,418	83,374

* Sites modified from May 06, 2009 permit

** Sites originally including an impact of less than 0.01 acre that were rounded.

There are no temporary wetland impacts. Temporary stream impacts include 428 LF. No impacts will occur to open water ponds.

As with the original permit application, the additional impacts will be mitigated through in-lieu payments to the NC Ecosystem Enhancement Program (EEP). A copy of the EEP in-lieu fee request form is attached. The EEP acceptance letter will be forwarded to all appropriate parties upon receipt.

By copy of this correspondence, we request NCDWQ to authorize these activities through a modification of WQC 3781 and Buffer Authorization. Authorization to debit the $570 Permit Modification Fee from WBS Element 34509.1.1 is hereby given. All environmental commitments and special conditions will continue to be followed throughout project construction. If you have any questions or need any additional information, please do not hesitate to contact Mr. Tyler Stanton, Environmental Specialist at tstanton@ncdot.gov or (919) 715-1439.

Sincerely,

Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA

cc:

W/attachment

Mr. Brian Wrenn, NCDWQ **(5 Copies)**
Ms. Kathy Matthews, USEPA
Mr. Khaled Al-Akhdar, NCDOT
Mr. Tommy Peacock, P.E., RK&K
Mr. Michael Wood, Catena Group

W/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Mark Staley, Roadside Environmental
Mr. Richard E. Greene , P.E. Div. 4 Engineer
Mr. Chad Coggins, Div. 4 Environmental Officer
Mr. Scott McLendon, USACE, Wilmington
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Mr. Ron Sechler, NMFS
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch
Ms. Jameelah El-Amin, PDEA
Mr. Drew Joyner, PE, Human Environment Unit Head
Mr. Clarence W. Coleman, P.E., FHWA

MITIGATION REQUEST FORM
TRI-PARTY MOA (NCDOT)

Revised 3/24/2008

Fill in requested information, print out the form, sign and date, and either mail to EEP, 1652 Mail Service Center, Raleigh, NC 27699-1652, or fax to 919-715-2219. Attachments are acceptable for clarification purposes.

Electronic submissions are permissable; however, an acceptance letter cannot be sent until the original signed form has been received.

NCDOT CONTACT INFORMATION		REGULATORY CONTACT INFORMATION	
Agency/Division	NCDOT-Highways	**USACE Office**	Regulatory Field Office
Branch	PDEA-NEU	**USACE Contact**	Mr. William Wescott
Mailing Address	1598 Mail Service Center	**Mailing Address**	Post Office Box 1000
City, State, Zip	Raleigh, NC 27699-1598	**City, State, Zip**	Washington, NC 27889-1000
Project Manager	Tyler Stanton	**USACE Fax Number**	(252) 975-1399
Telephone Number	(919) 431-2000	**NCDWQ Contact**	Brian Wrenn
E-Mail Address	tstanton@dot.state.nc.us	**Mailing Address**	1650 Mail Service Center
Supervisor	Chris Rivenbark	**City, State, Zip**	Raleigh, NC 27699-1650
Telephone Number	(919) 431-2000	**NCDWQ Fax Number**	(919) 733-6893

PROJECT LOCATION INFORMATION AND IMPACTS

TIP Number(s)		R-2823		
TIP Description		ROCKY MOUNT NORTHERN OUTER LOOP FROM SR 1604 (HUNTER HILL RD)		
Current Let Date		5/20/08		
NCDOT Highway Division		Division 4		
County(ies)		Nash		
EEP Ecoregion(s)		Northern Inner Coastal Plain		
River Basin(s)		Tar-Pamlico		
Cataloging Unit(s) (8-digit)		03020101		
Total **Stream (feet)**	**Warm**	1,952		
	Cool			
	Cold			
	TOTAL	1,952		
Total **Riparian Wetland Impact (acres)**		4.45		
Total **Non-Riparian Wetland Impact (acres)**		1.95		
Total **Coastal Marsh Impact (acres)**				
Total **Buffer Impact**	**Zone 1 (square feet)**	58,668		
	Zone 2 (square feet)	44,862		

OTHER INFORMATION

USACE Action ID Number (if known)	200411199
NCDWQ Project Number (if known)	3781
NCDCM Project Number (if known)	

Comments:

Revised on 6/11/09

IMPORTANT

Check below if this request is a:

☐ **New Mitigation Request**

☒ **Revision to a current acceptance**

Signature of Applicant or Agent:

Date: 6/11/2009

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	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	-L- 30+28	2 - 48" RCP	0.07			0.07	0.08	0.01	0.00 *	95	10	
3	-L- 36+50 LT	N/A	0.09			0.02	0.04					
4	-L- 49+02	9' X 9' RCBC						0.04	0.01	158	54	
5	-L- 50+65	N/A	0.08			0.03	0.11	0.02		210		
6	-L- 68+00	N/A	0.97			0.14						
7	-L- 111+50	BRIDGE	0.85			0.17	0.06					
8	-L- 113+26	N/A			0.00 *	0.02		0.00 *	0.00 *	24	24	
9	-L- 135+34	72" RCP	0.17			0.04		0.02	0.00 *	210	48	
10	-L- 169+16	78" RCP	0.19			0.02		0.05	0.01	407	53	
11	-L- 175+00	18" RCP	0.64			0.09						
12	-L- 182+00	BRIDGE	1.00			0.15		0.29	0.10	197	19	
13	-L- 189+80	78" RCP	0.26		0.02	0.05		0.02	0.01	218	75	
14	-Y5- 11+50	18" RCP	0.11			0.01						
15	-L- 231+00	N/A	0.01			0.01						
16	-L- 231+57	60" RCP	0.13		0.00 *	0.01		0.00 *	0.00 *	74	10	
17	-L- 239+81	8' X 9' RCBC	0.86		0.01	0.11		0.02	0.01	211	85	
18	-L- 260+50	60" RCP						0.01	0.00 *	130	39	
19	-Y8- 23+50	66" RCP						0.00 *	0.00 *	18	11	
TOTALS:			5.43		0.04	0.94	0.29	0.49	0.15	1952	428	

*: < 0.01ac
Permanent Surface Water Impacts for Piers on Site 12: 7sqft
Temporary Surface Water Impacts for Piers on Site 12 outside of roadway construction: 80sqft

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

NASH COUNTY
PROJECT: C201917 (R-2823)
REVISED 06/11/09
PERMIT DRAWING SHEET 3 OF 68

ATN Revised 3/31/05
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BUFFER IMPACTS SUMMARY

		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	-L- 30+28	3279	2585
4 / 5	-L- 49+02	168	1712
7	-L- 111+50	8967	7217
9	-L- 135+34	0	96
10	-L- 169+16	1174	1626
12	-L- 182+00	7628	4324
13	-L- 189+80	10132	2661
15	-L- 231+00	25	507
16	-L- 231+57	2114	1300
17	-L- 239+81	14199	6891
		47686	28919

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NASH COUNTY
PROJECT: C201917 (R-2823)

PERMIT DRAWING SHEET 4 OF 68
REVISED 06/11/09

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8/17/99

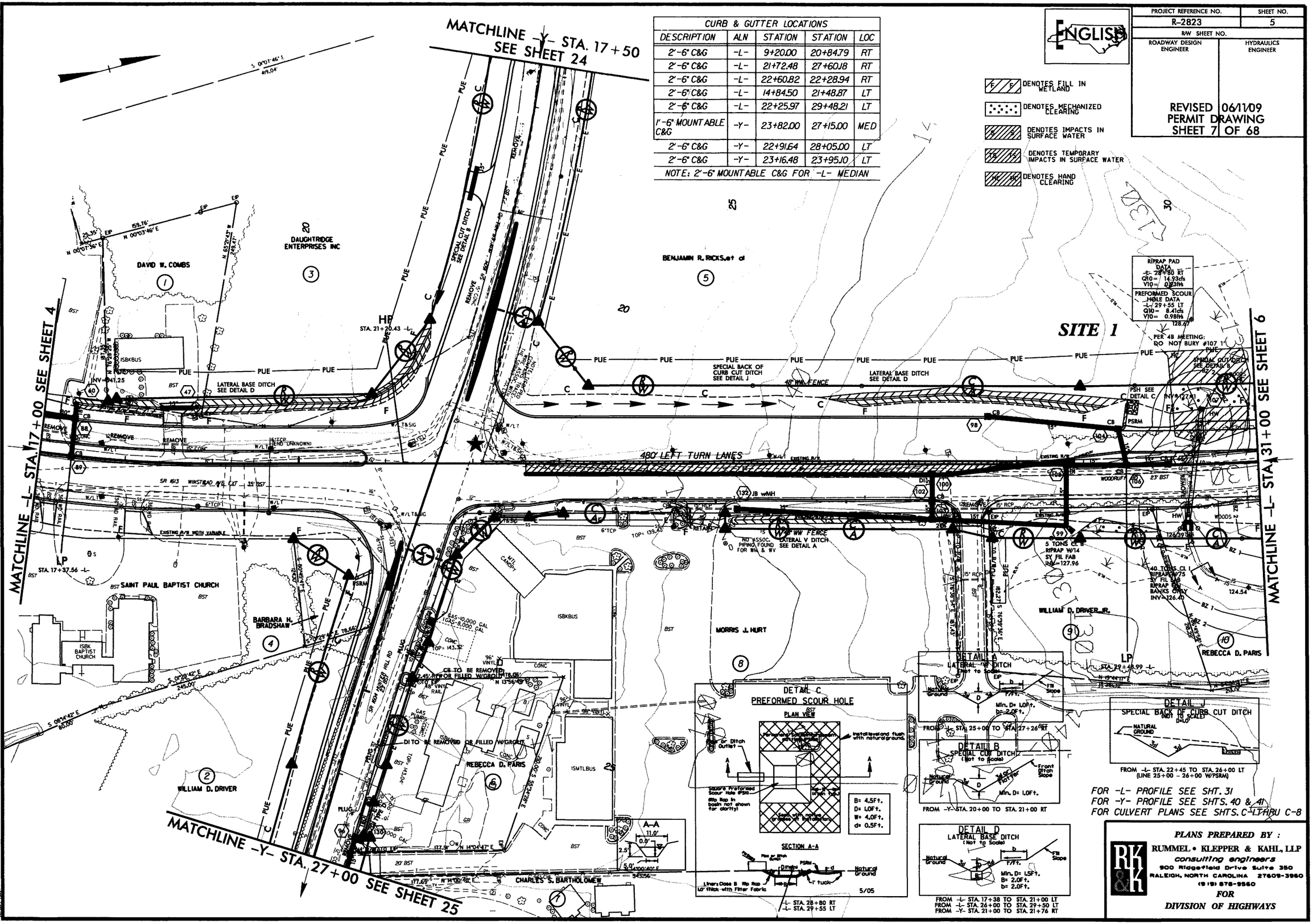
PROJECT REFERENCE NO.	SHEET NO.
R-2823	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
PERMIT DRAWING
SHEET 7 OF 68

ENGLISH

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	9+20.00	20+84.79	RT
2'-6" C&G	-L-	21+72.48	27+60.18	RT
2'-6" C&G	-L-	22+60.82	22+28.94	RT
2'-6" C&G	-L-	14+84.50	21+48.87	LT
2'-6" C&G	-L-	22+25.97	29+48.21	LT
1'-6" MOUNTABLE C&G	-Y-	23+82.00	27+15.00	MED
2'-6" C&G	-Y-	22+91.64	28+05.00	LT
2'-6" C&G	-Y-	23+16.48	23+95.10	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

F/F DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
S/S DENOTES IMPACTS IN SURFACE WATER
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
HC/HC DENOTES HAND CLEARING



FOR -L- PROFILE SEE SHT. 31
FOR -Y- PROFILE SEE SHTS. 40 & 41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-8

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

6/12/2009
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8/17/99

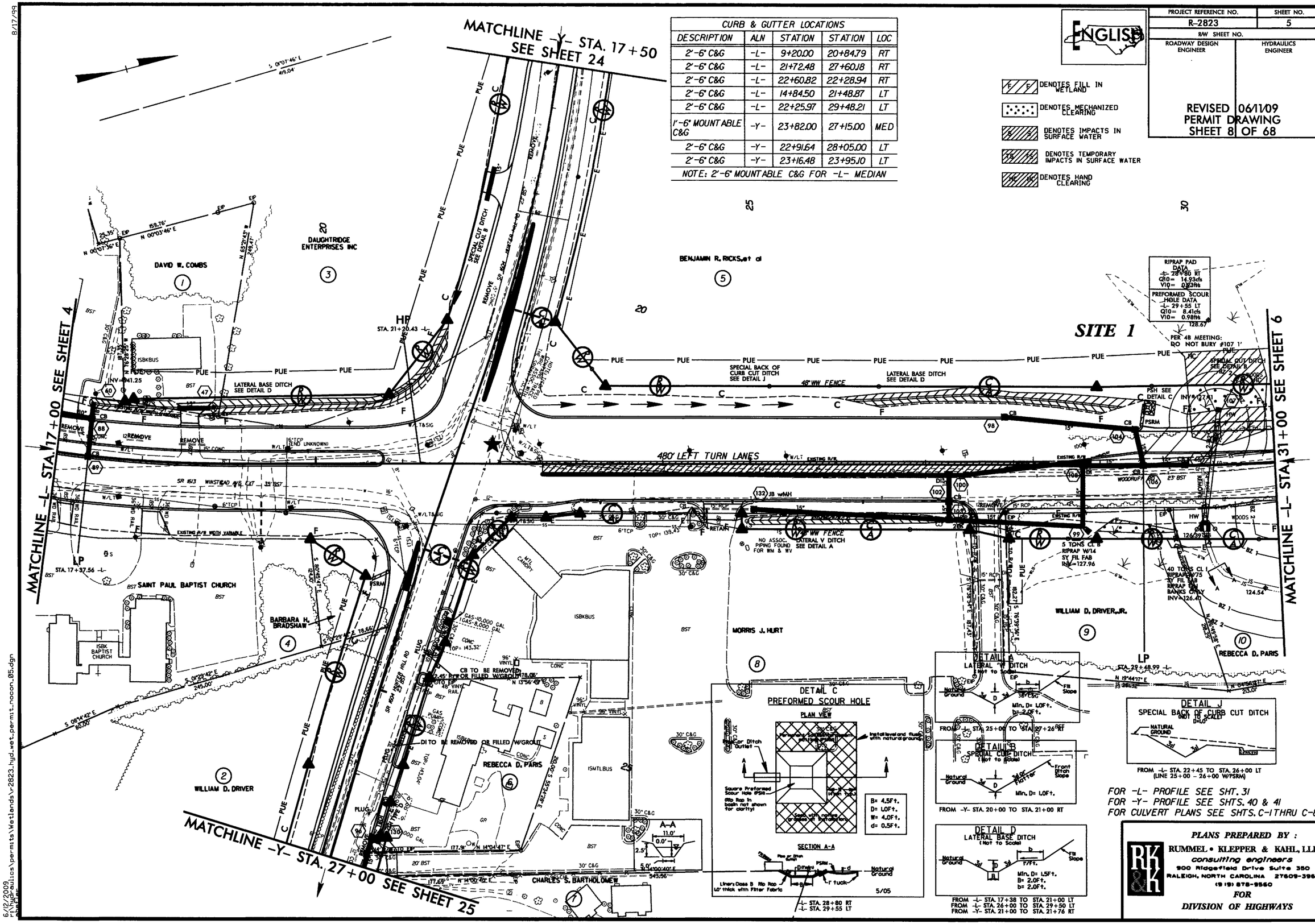
PROJECT REFERENCE NO.	SHEET NO.
R-2823	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
PERMIT DRAWING
SHEET 8 OF 68

ENGLISH

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	9+20.00	20+84.79	RT
2'-6" C&G	-L-	21+72.48	27+60.18	RT
2'-6" C&G	-L-	22+60.82	22+28.94	RT
2'-6" C&G	-L-	14+84.50	21+48.87	LT
2'-6" C&G	-L-	22+25.97	29+48.21	LT
1'-6" MOUNTABLE C&G	-Y-	23+82.00	27+15.00	MED
2'-6" C&G	-Y-	22+91.64	28+05.00	LT
2'-6" C&G	-Y-	23+16.48	23+95.10	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

F/F DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES HAND CLEARING



FOR -L- PROFILE SEE SHT. 31
FOR -Y- PROFILE SEE SHTS. 40 & 41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-8

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

6/12/2009
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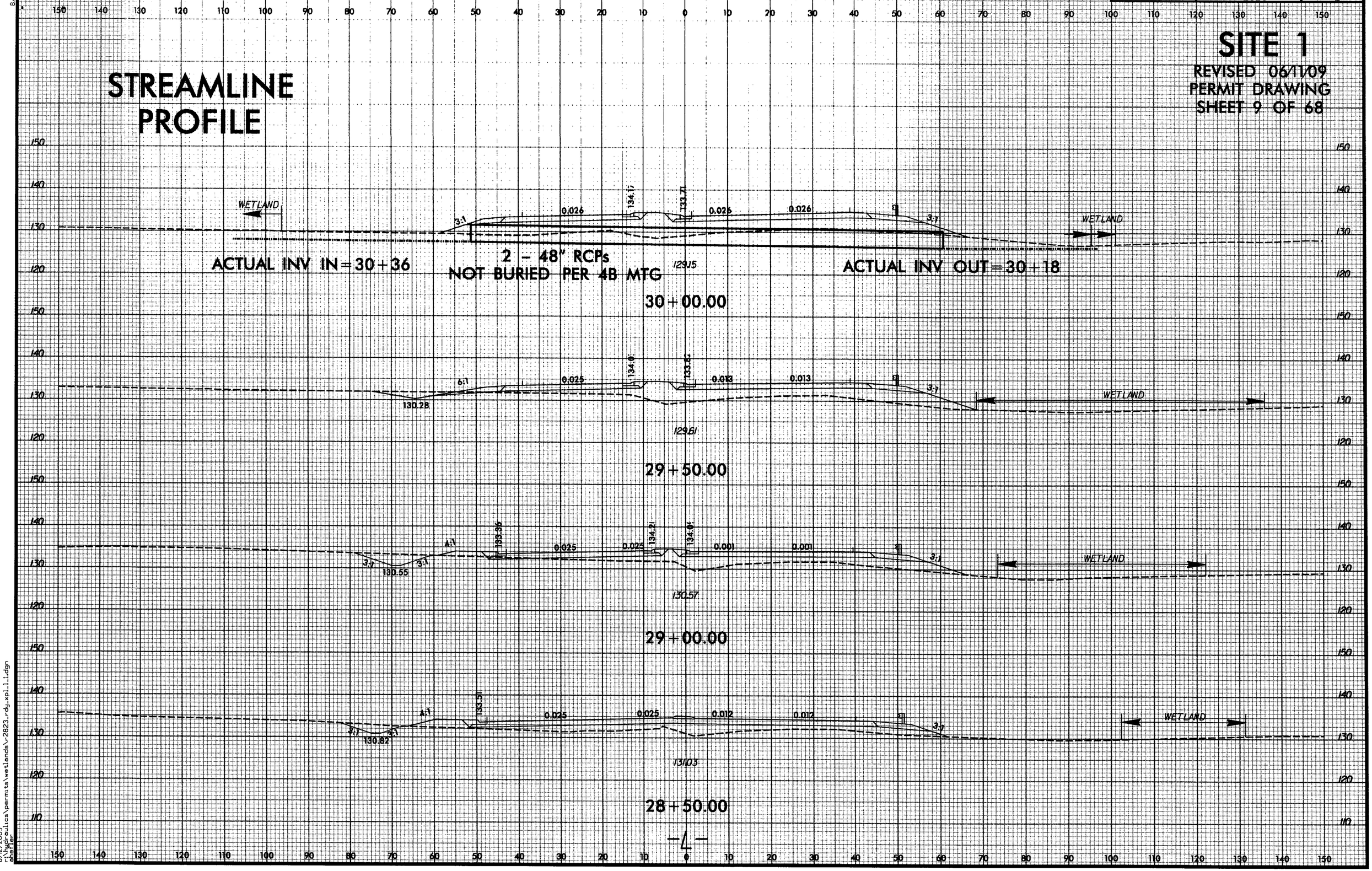
PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-12

SITE 1

REVISED 06/11/09
PERMIT DRAWING
SHEET 9 OF 68

STREAMLINE PROFILE



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6/12/2009
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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2823	X-13

SITE 1

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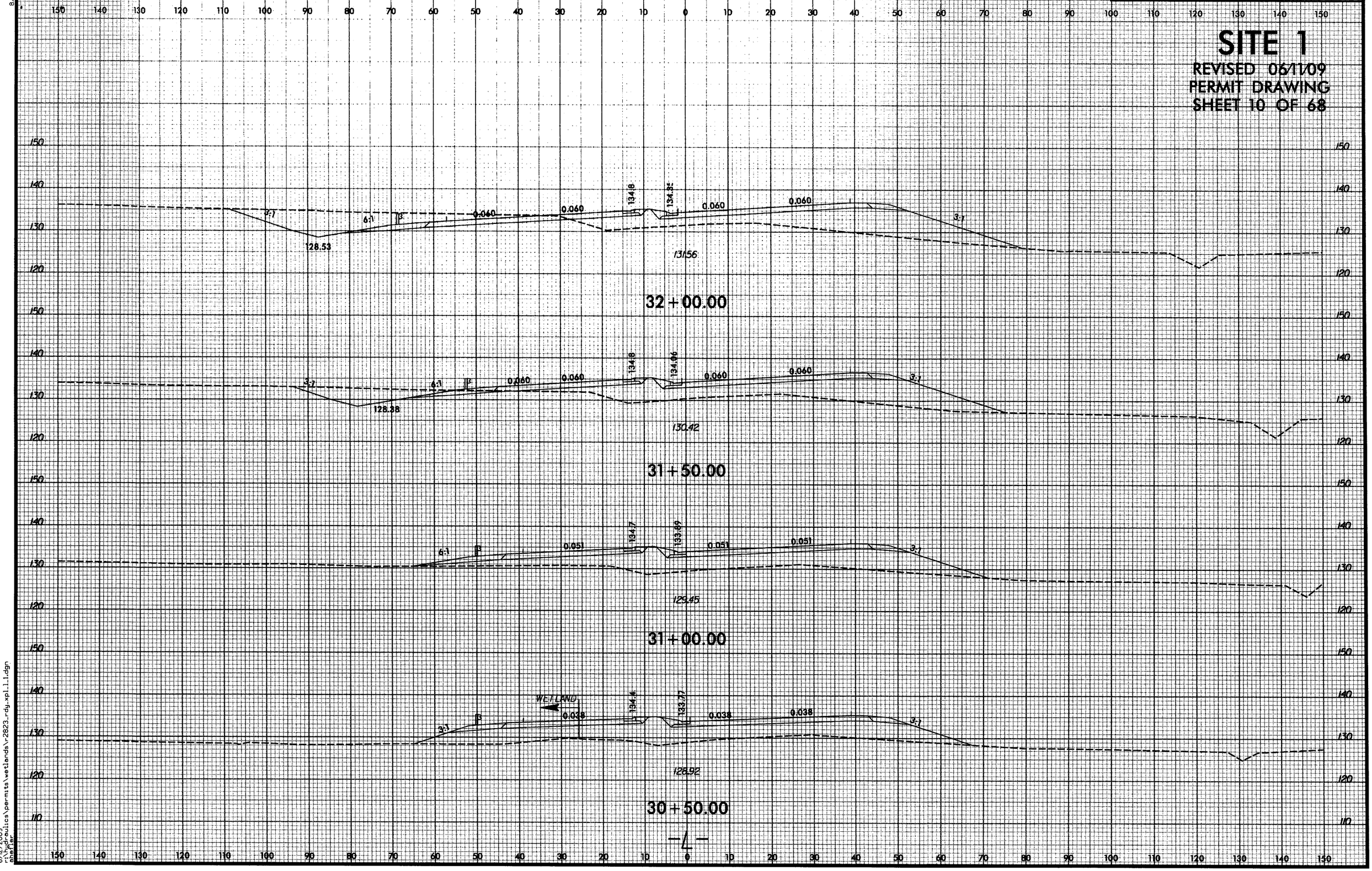
PERMIT DRAWING
SHEET 10 OF 68



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ehefner

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2823	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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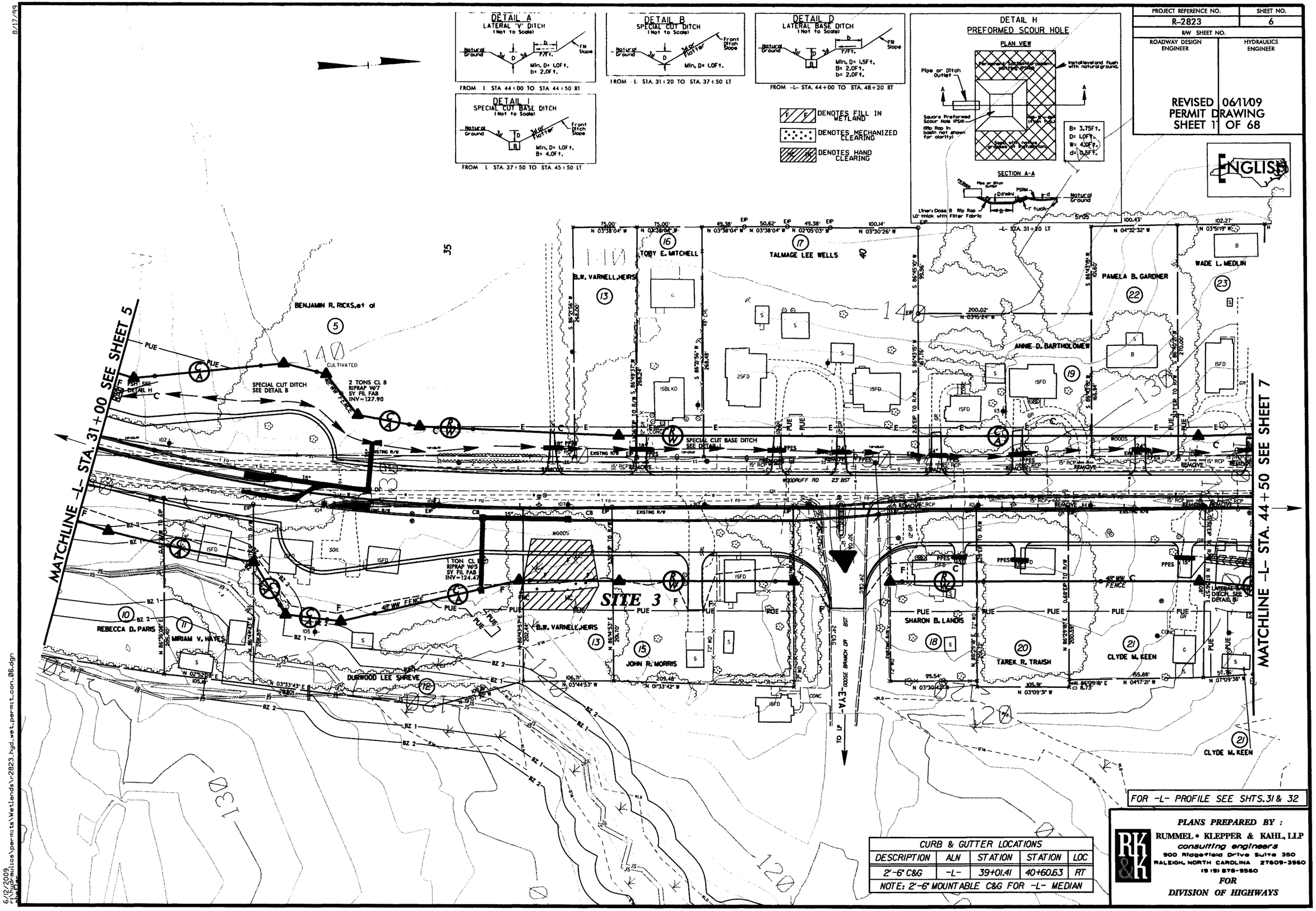
SHEET 11 OF 68



CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	39+01.41	40+60.63	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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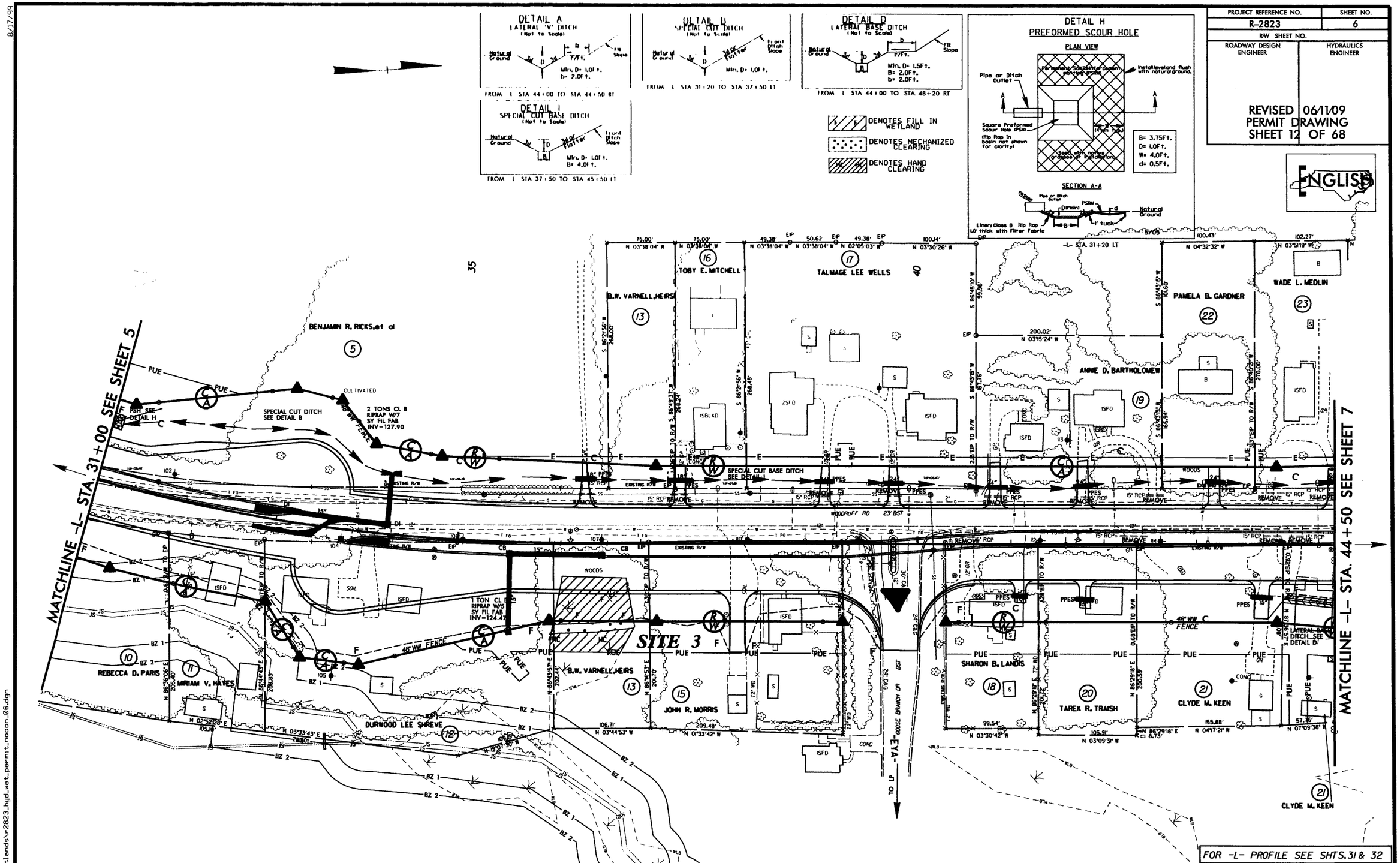
PERMIT DRAWING
SHEET 12 OF 68

ENGLISH



CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	39+01.41	40+60.63	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-15

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SITE 3

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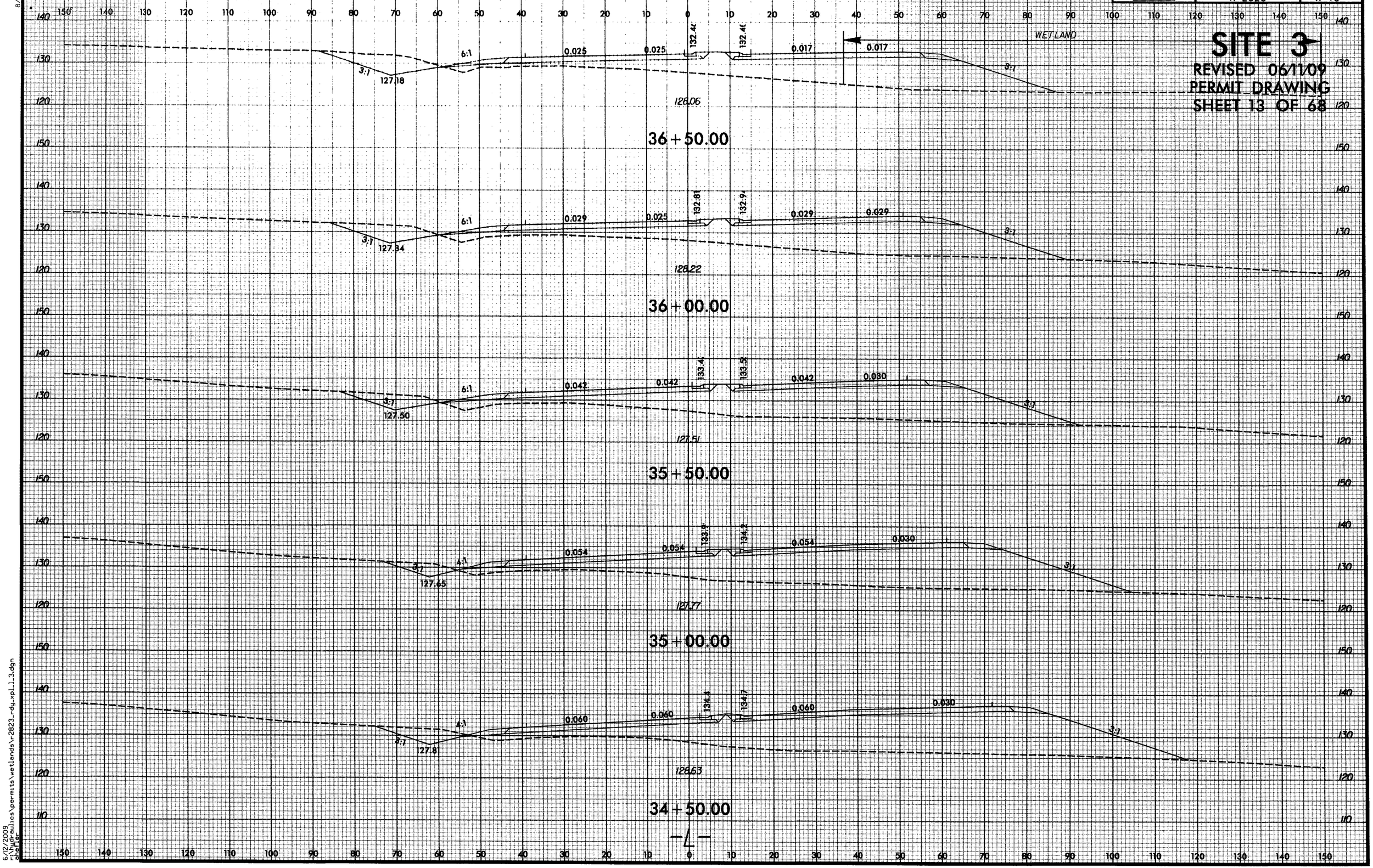
SHEET 13 OF 68



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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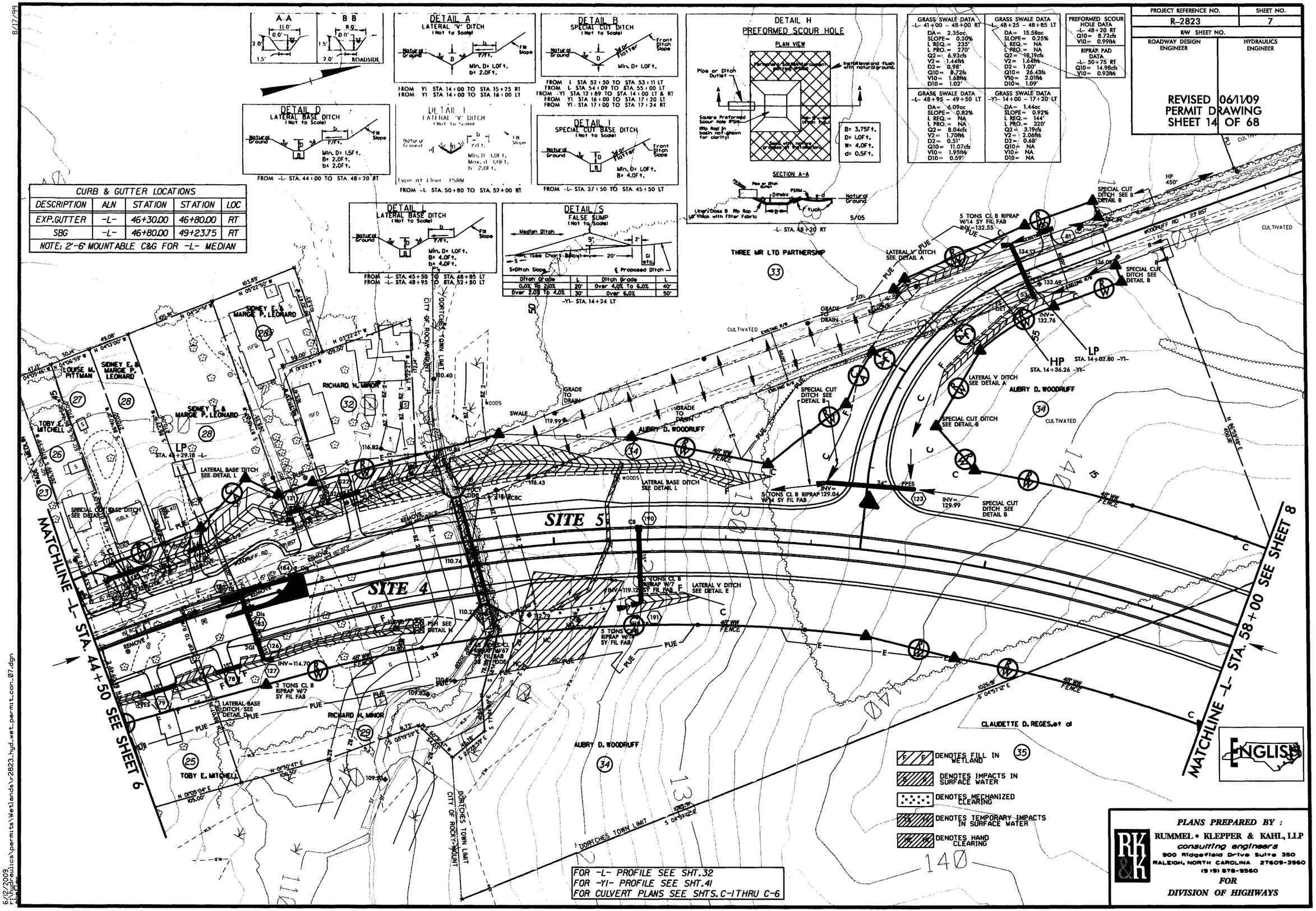
SHEET 14 OF 68



FOR -L- PROFILE SEE SHT.32
FOR -Y1- PROFILE SEE SHT.41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-6

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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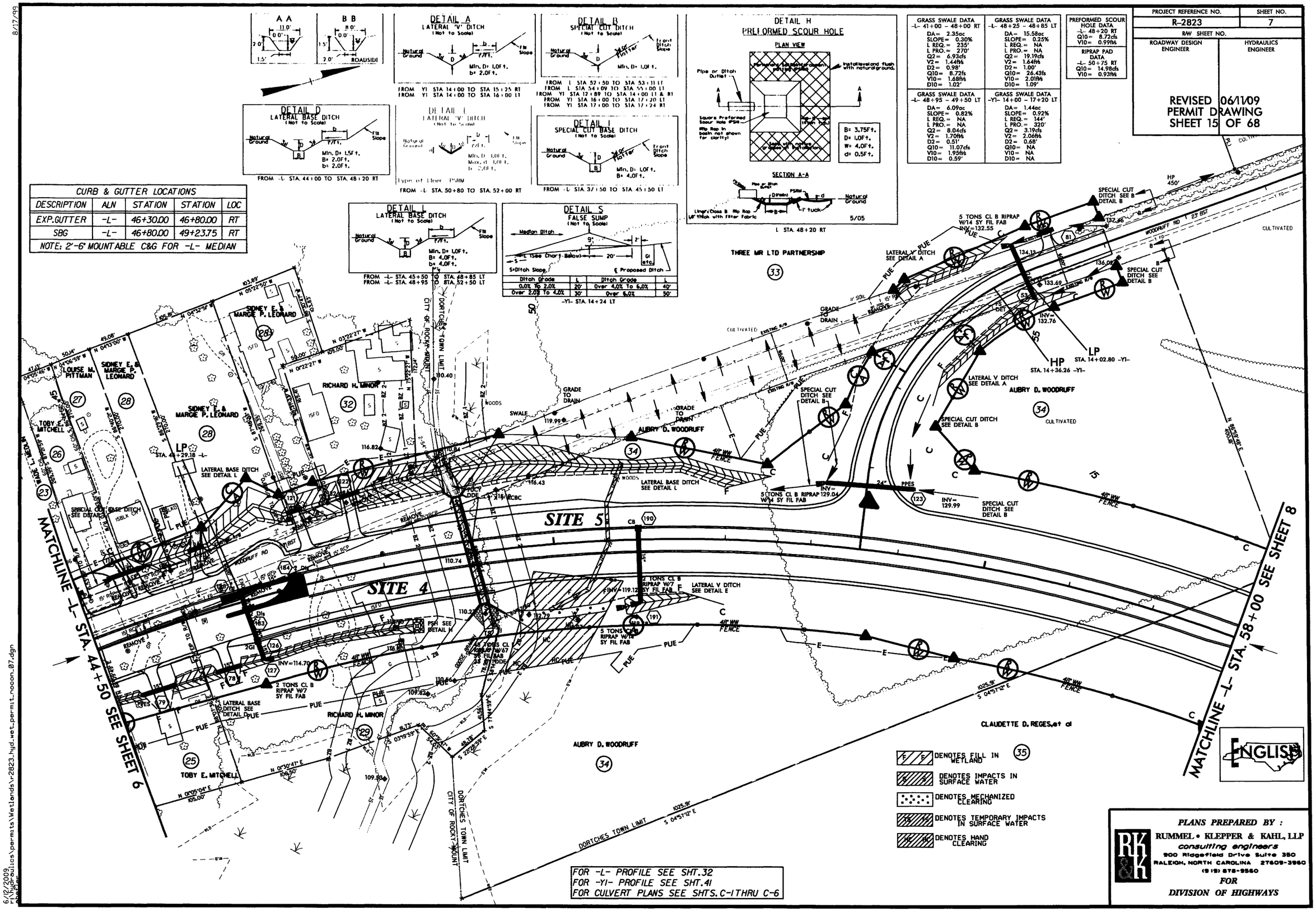
PERMIT DRAWING
SHEET 15 OF 68



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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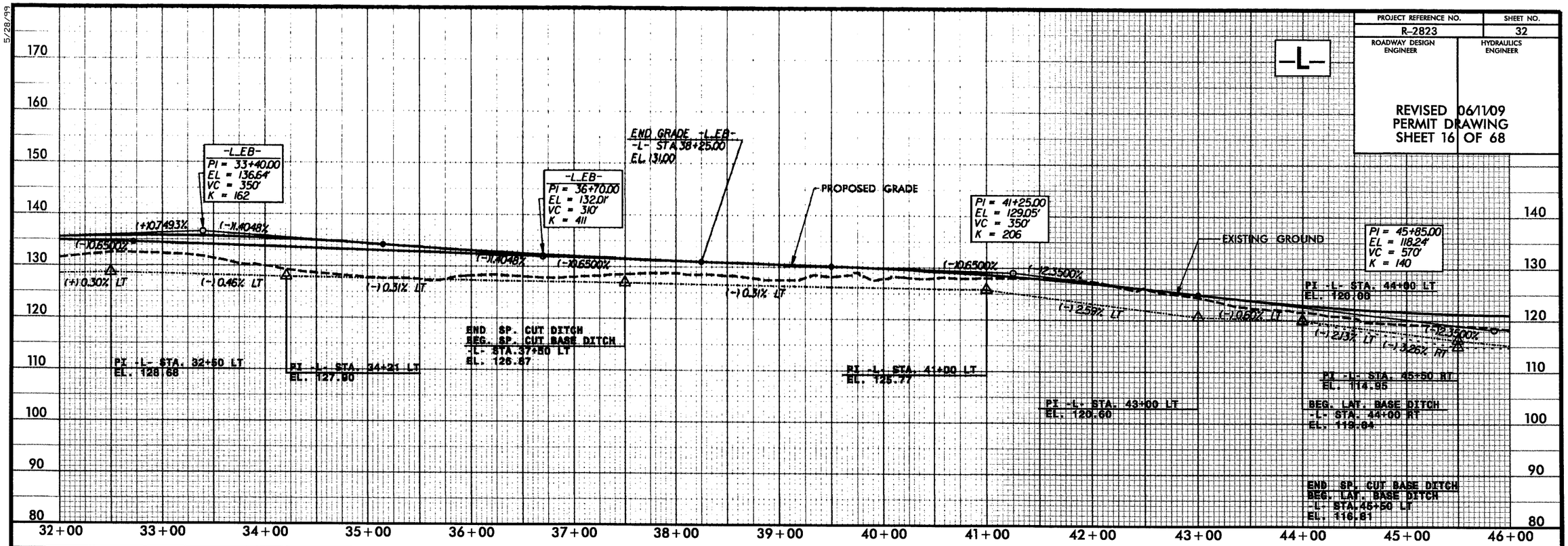
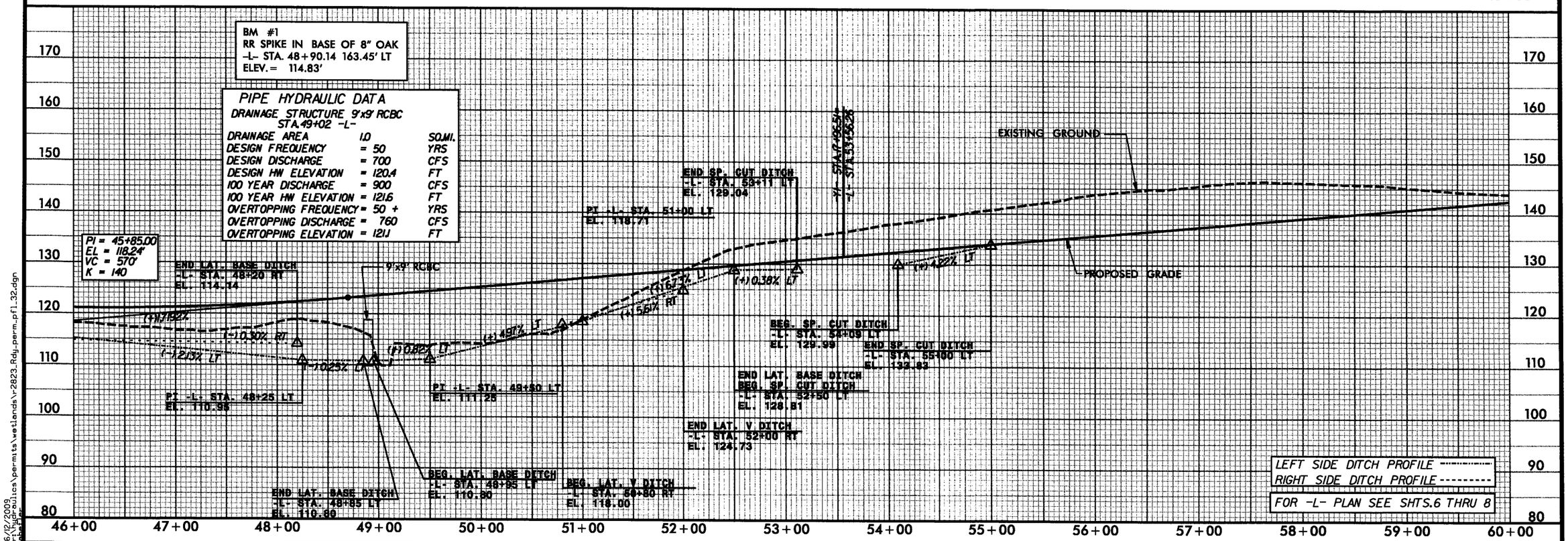
PERMIT DRAWING
SHEET 16 OF 68





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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-21

SITES 4 & 5

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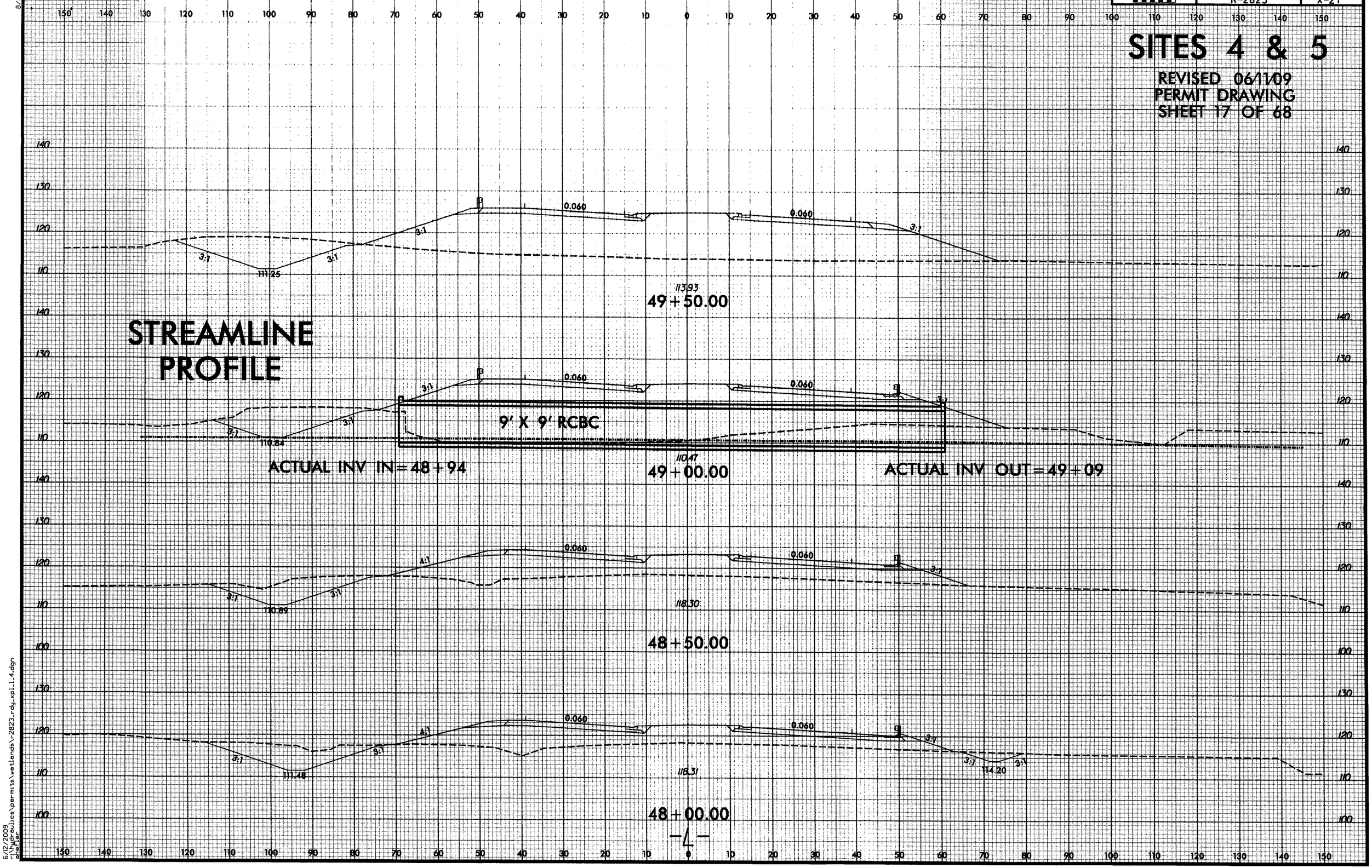
SHEET 17 OF 68



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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2823	X-22

SITES 4 & 5

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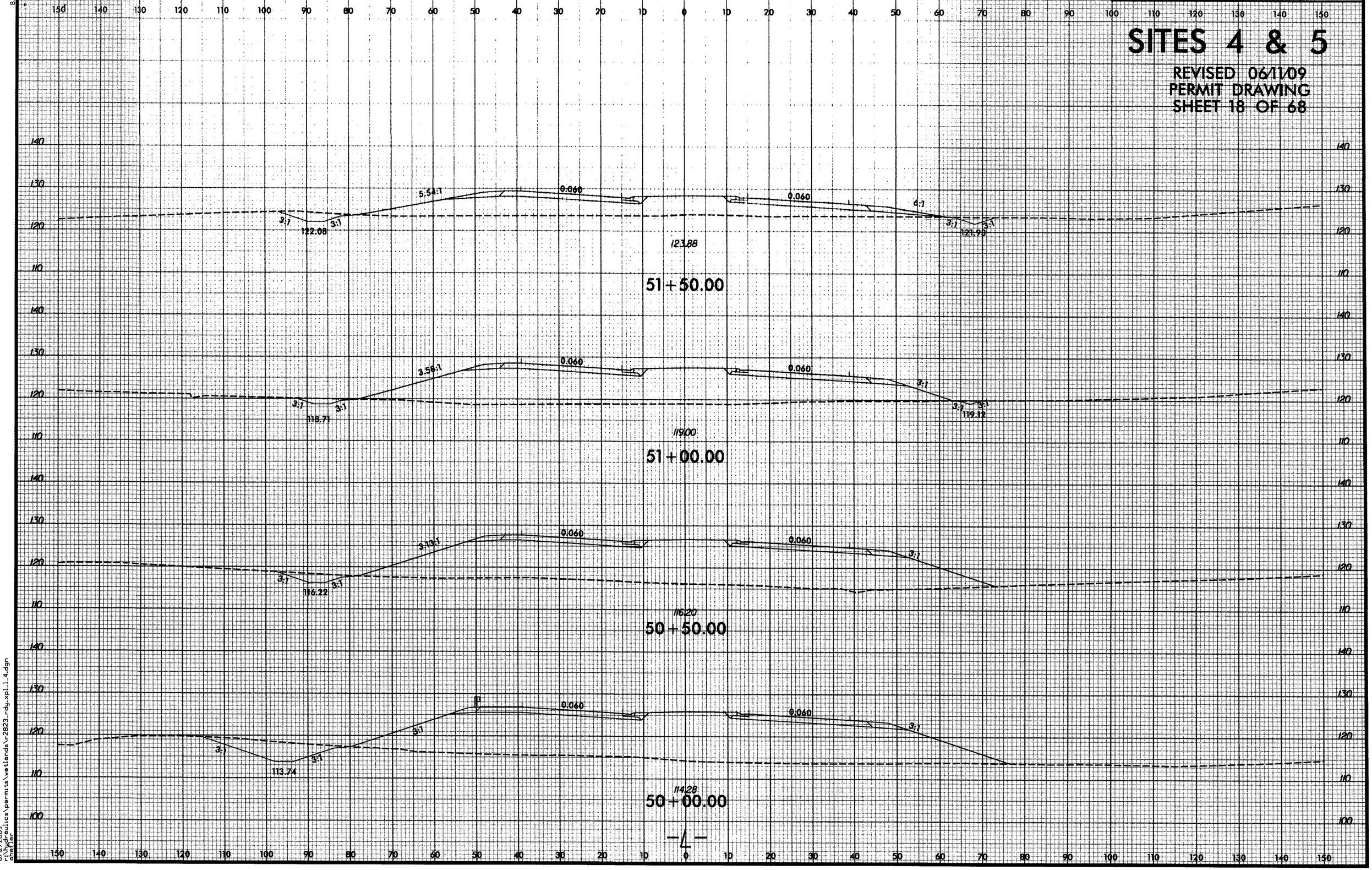
PERMIT DRAWING
SHEET 18 OF 68



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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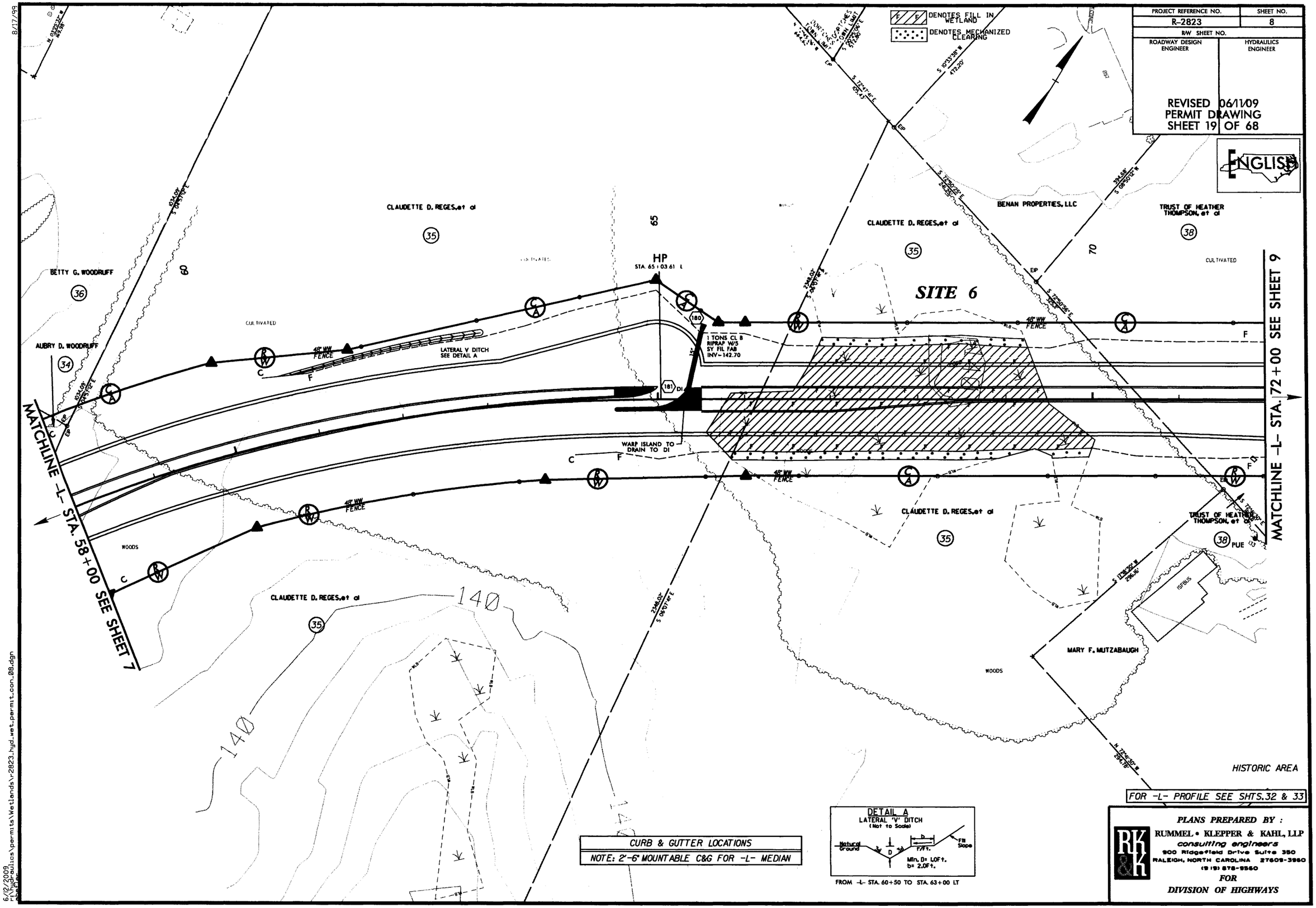
SHEET 19 OF 68

ENGLISH



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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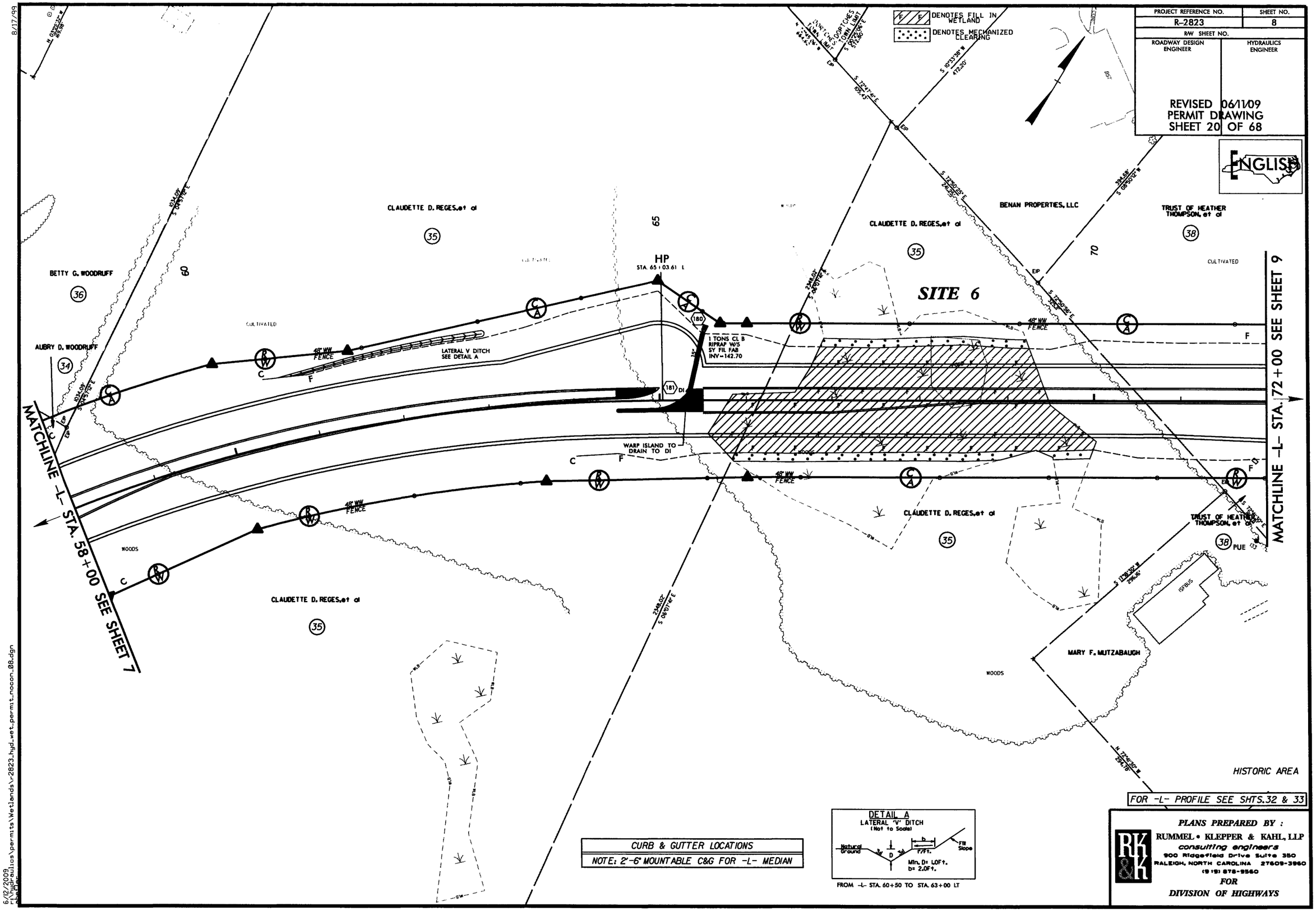
PERMIT DRAWING
SHEET 20 OF 68

ENGLISH

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



CURB & GUTTER LOCATIONS
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

DETAIL A
LATERAL "V" DITCH
(Not to Scale)

FROM -L- STA. 60+50 TO STA. 63+00 LT

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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-30

SITE 6

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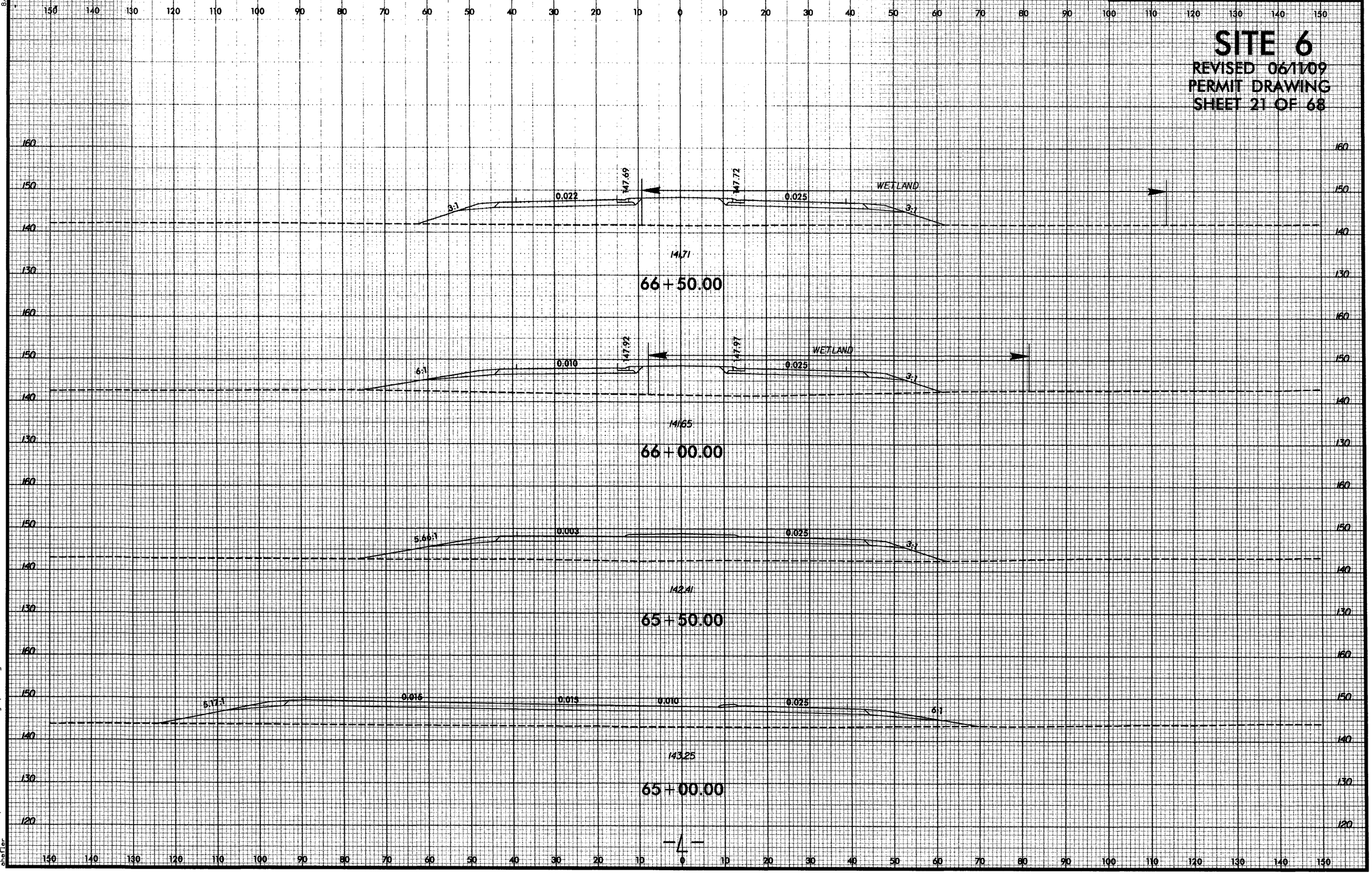
PERMIT DRAWING
SHEET 21 OF 68



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-31

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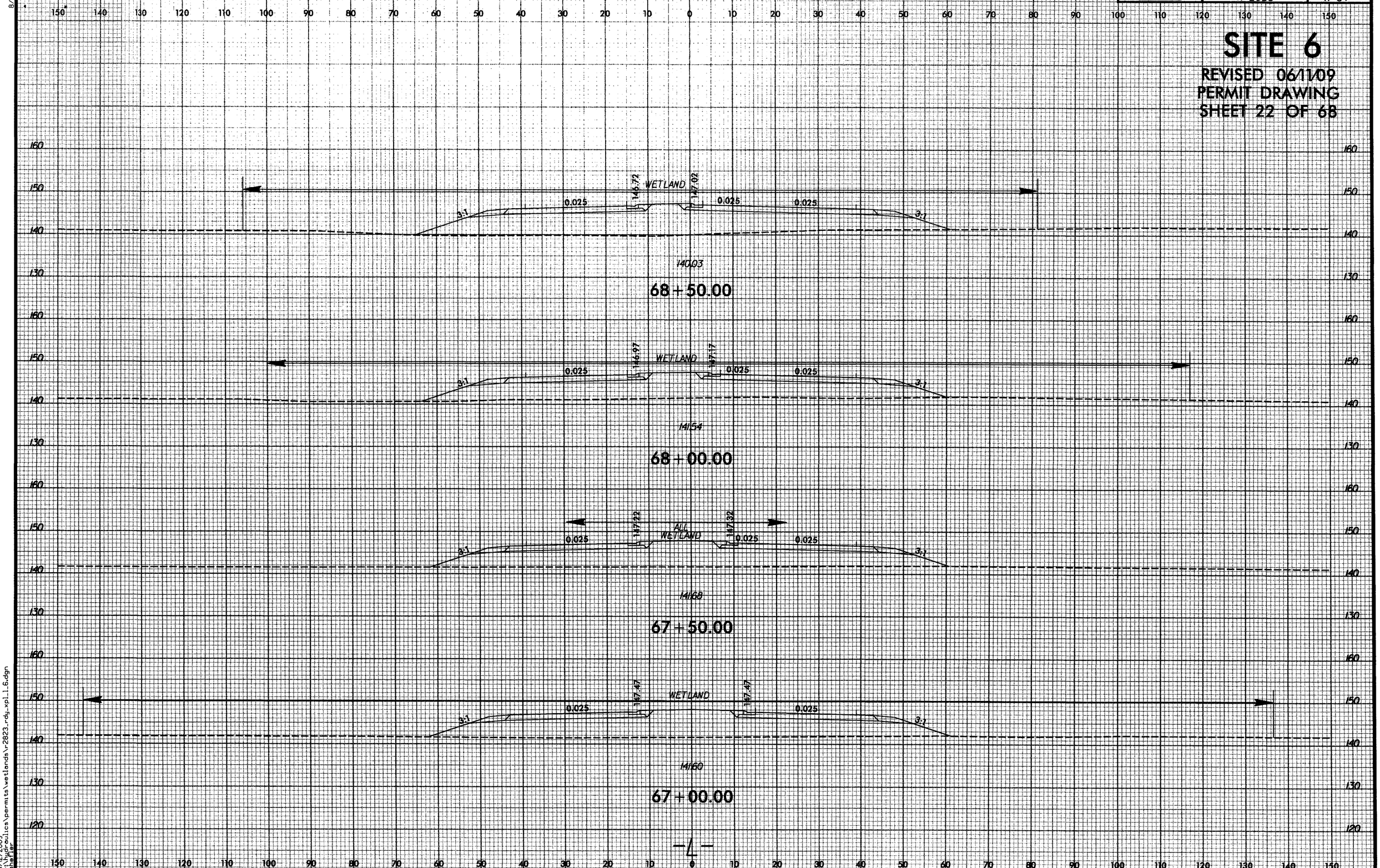
SITE 6

REVISED 06/11/09
PERMIT DRAWING
SHEET 22 OF 68



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-32

SITE 6

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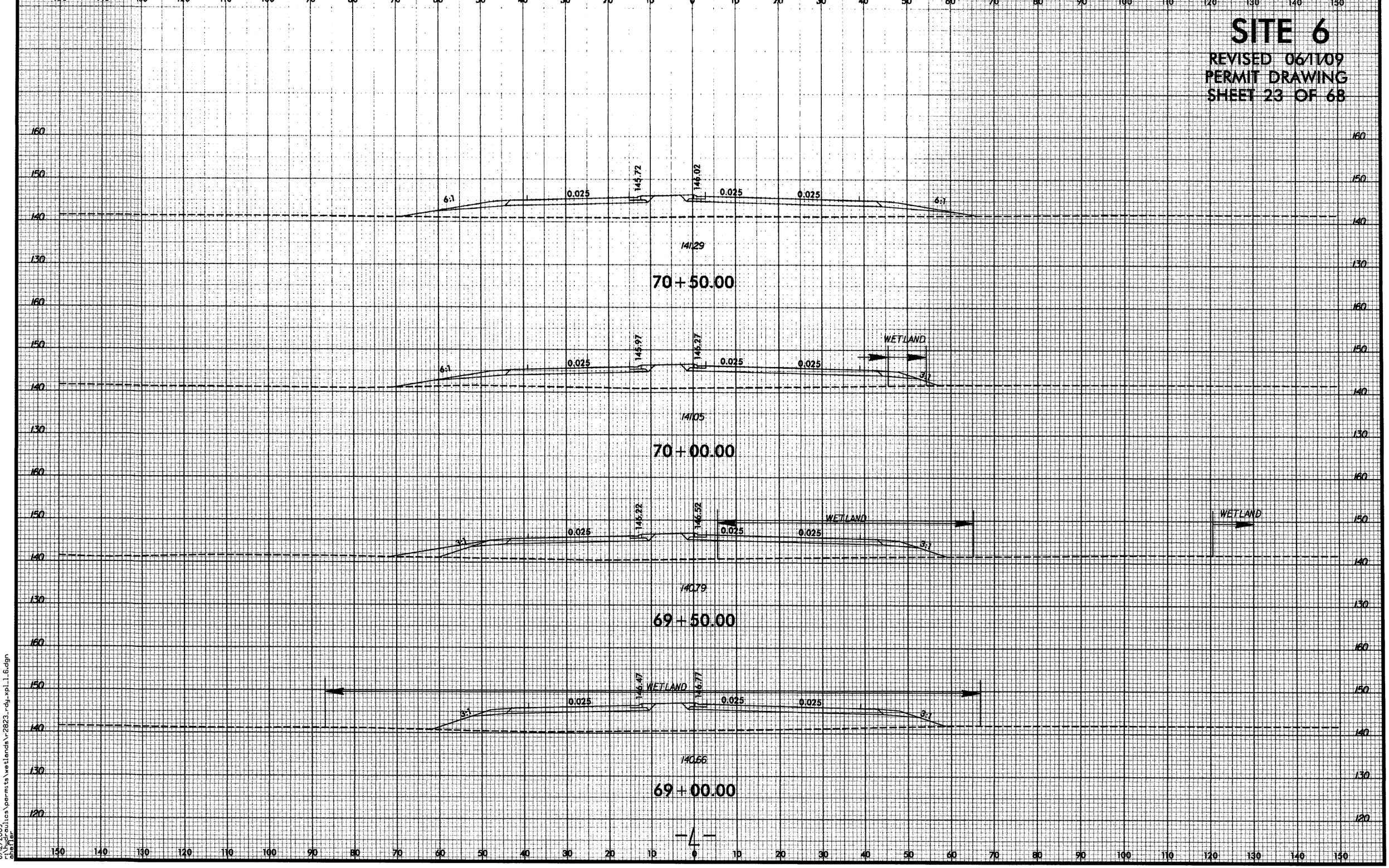
PERMIT DRAWING
SHEET 23 OF 68



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CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	178+50.00	180+47.00	RT
SBG	-L-	184+28.00	184+44.50	RT
EXP.GUTTER	-L-	178+50.00	179+49.00	LT
SBG	-L-	179+49.00	180+47.00	LT
SBG	-L-	184+28.00	185+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND

PROJECT REFERENCE NO.	SHEET NO.
R-2823	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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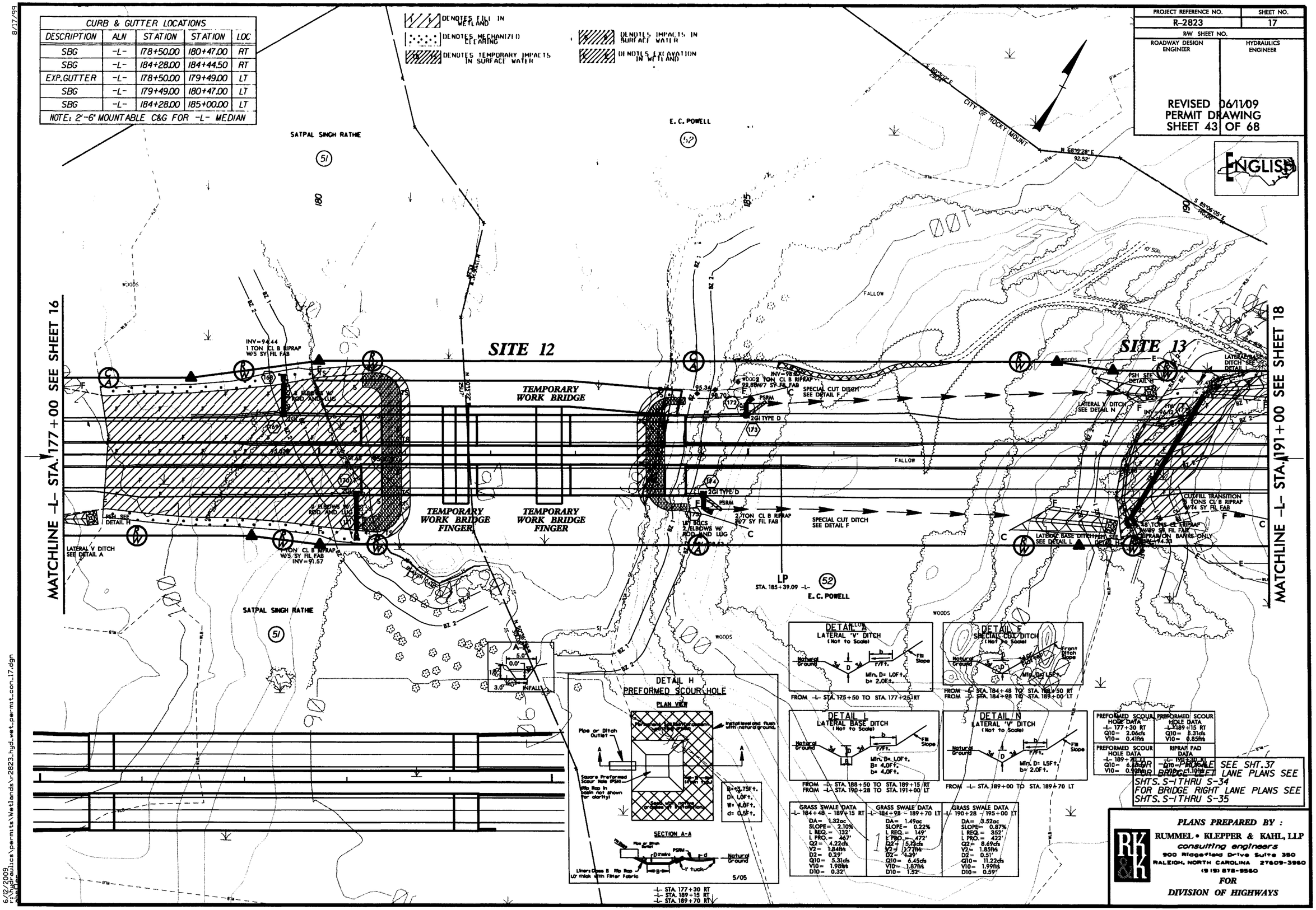
SHEET 43 OF 68

ENGLISH



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8/17/99

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	178+50.00	180+47.00	RT
SBG	-L-	184+28.00	184+44.50	RT
EXP.GUTTER	-L-	178+50.00	179+49.00	LT
SBG	-L-	179+49.00	180+47.00	LT
SBG	-L-	184+28.00	185+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

PROJECT REFERENCE NO.	SHEET NO.
R-2823	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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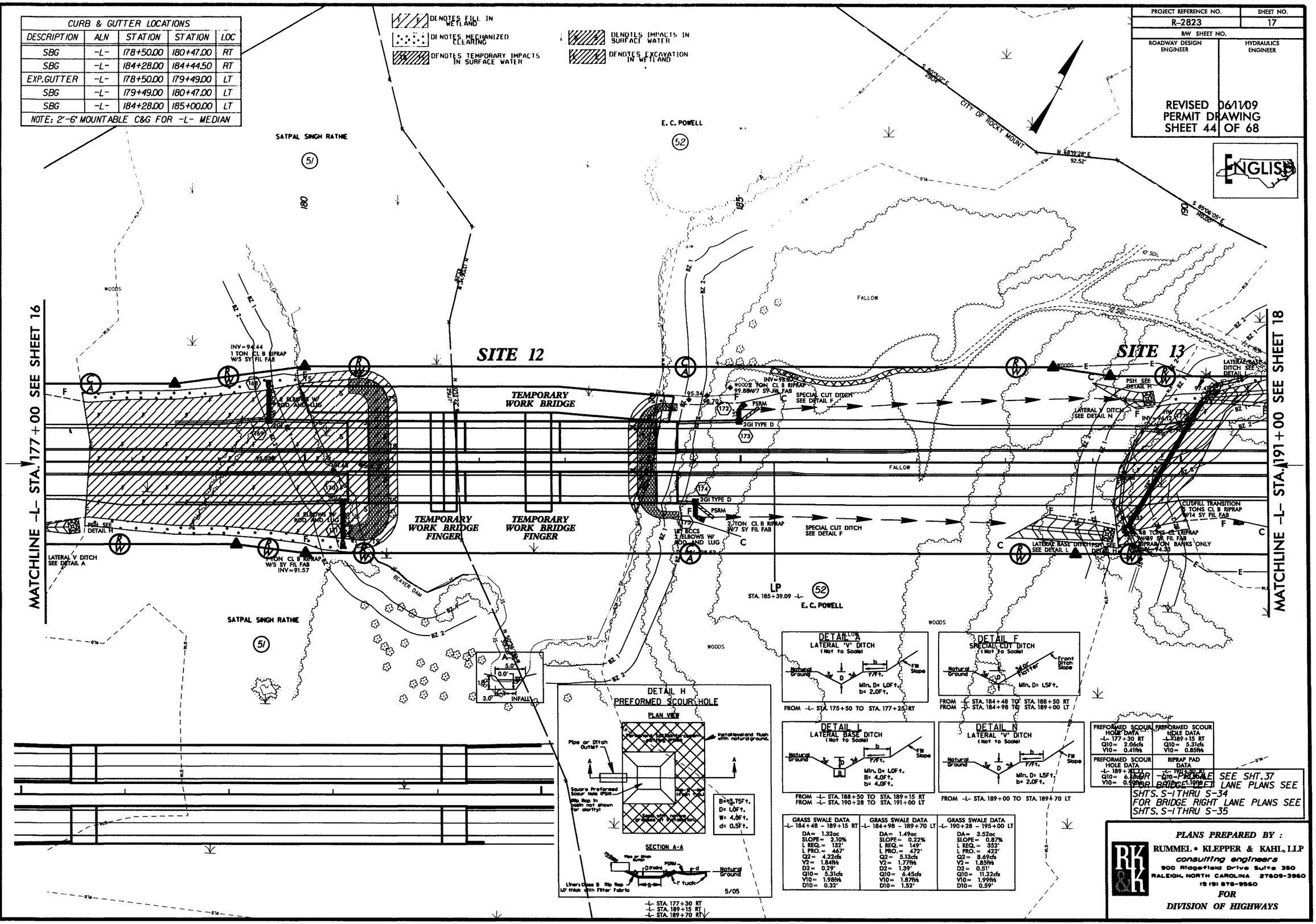
PERMIT DRAWING
SHEET 44 OF 68



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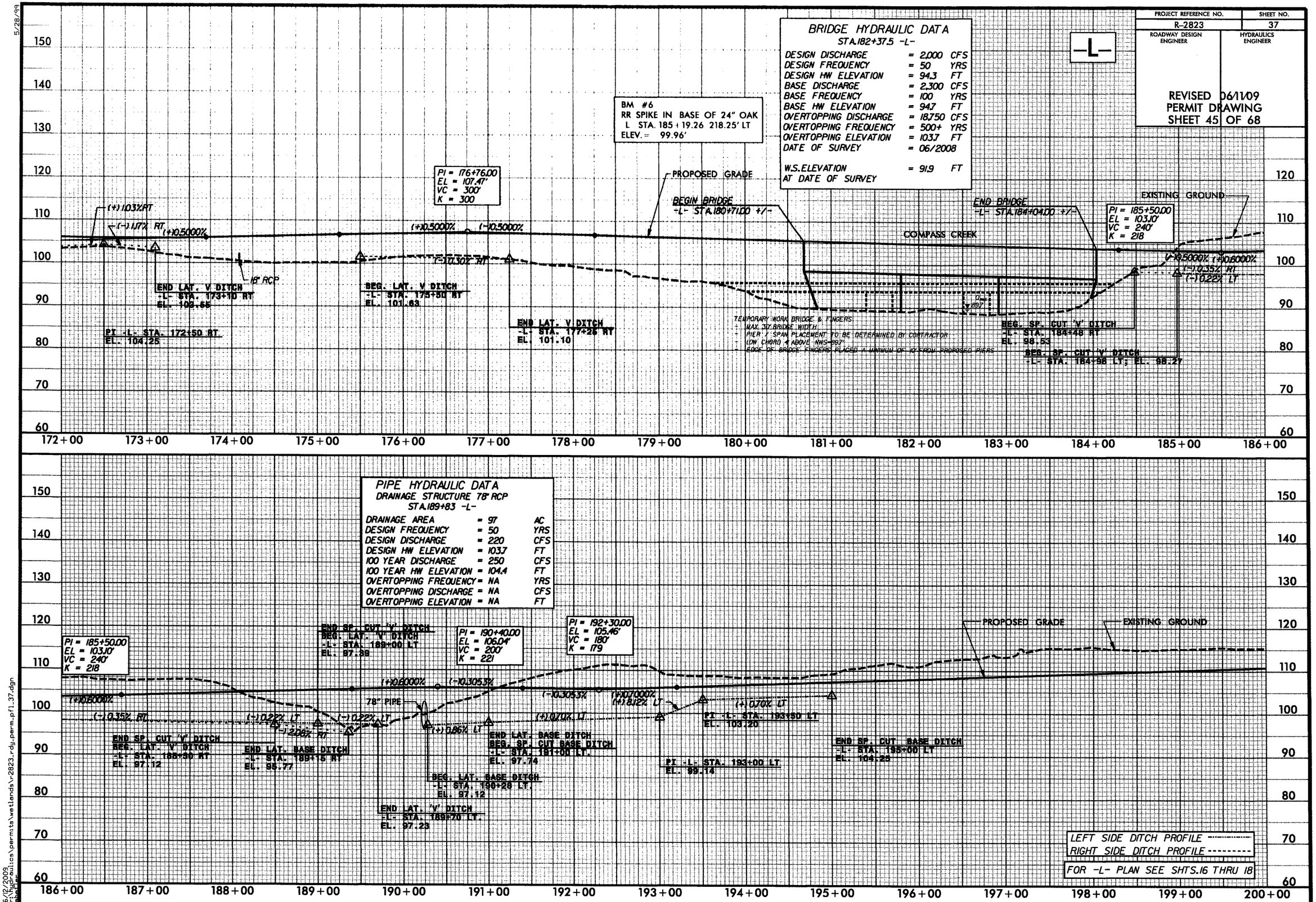
PROJECT REFERENCE NO.	SHEET NO.
R-2823	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
PERMIT DRAWING
SHEET 45 OF 68

-L-

BRIDGE HYDRAULIC DATA
STA.182+37.5 -L-

DESIGN DISCHARGE	= 2,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 94.3	FT
BASE DISCHARGE	= 2,300	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 94.7	FT
OVERTOPPING DISCHARGE	= 18,750	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 103.7	FT
DATE OF SURVEY	= 06/2008	
W.S.ELEVATION AT DATE OF SURVEY	= 91.9	FT



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-90

SITE 13

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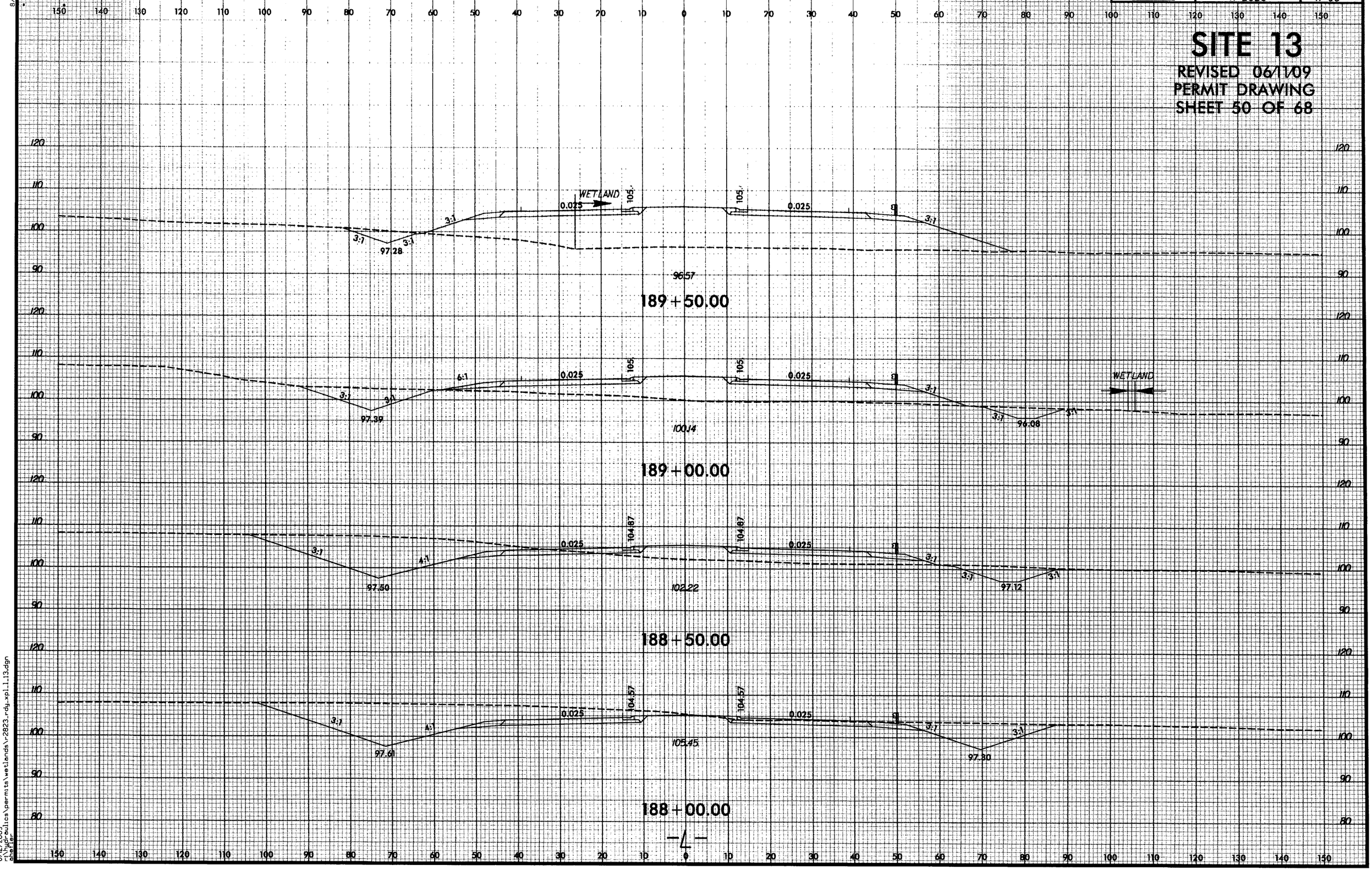
PERMIT DRAWING
SHEET 50 OF 68



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-91

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SITE 13

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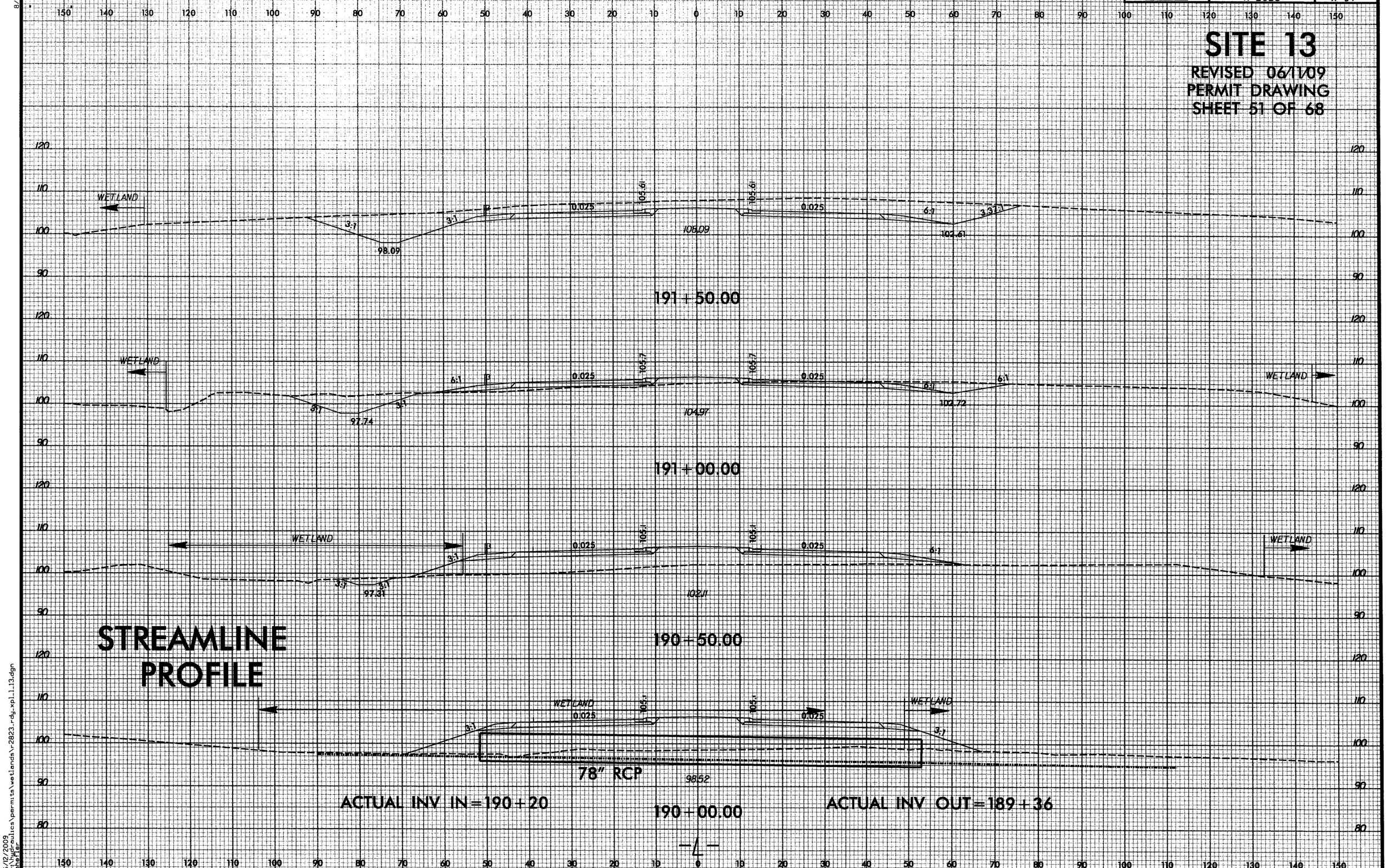
PERMIT DRAWING
SHEET 51 OF 68



STREAMLINE PROFILE

-L-

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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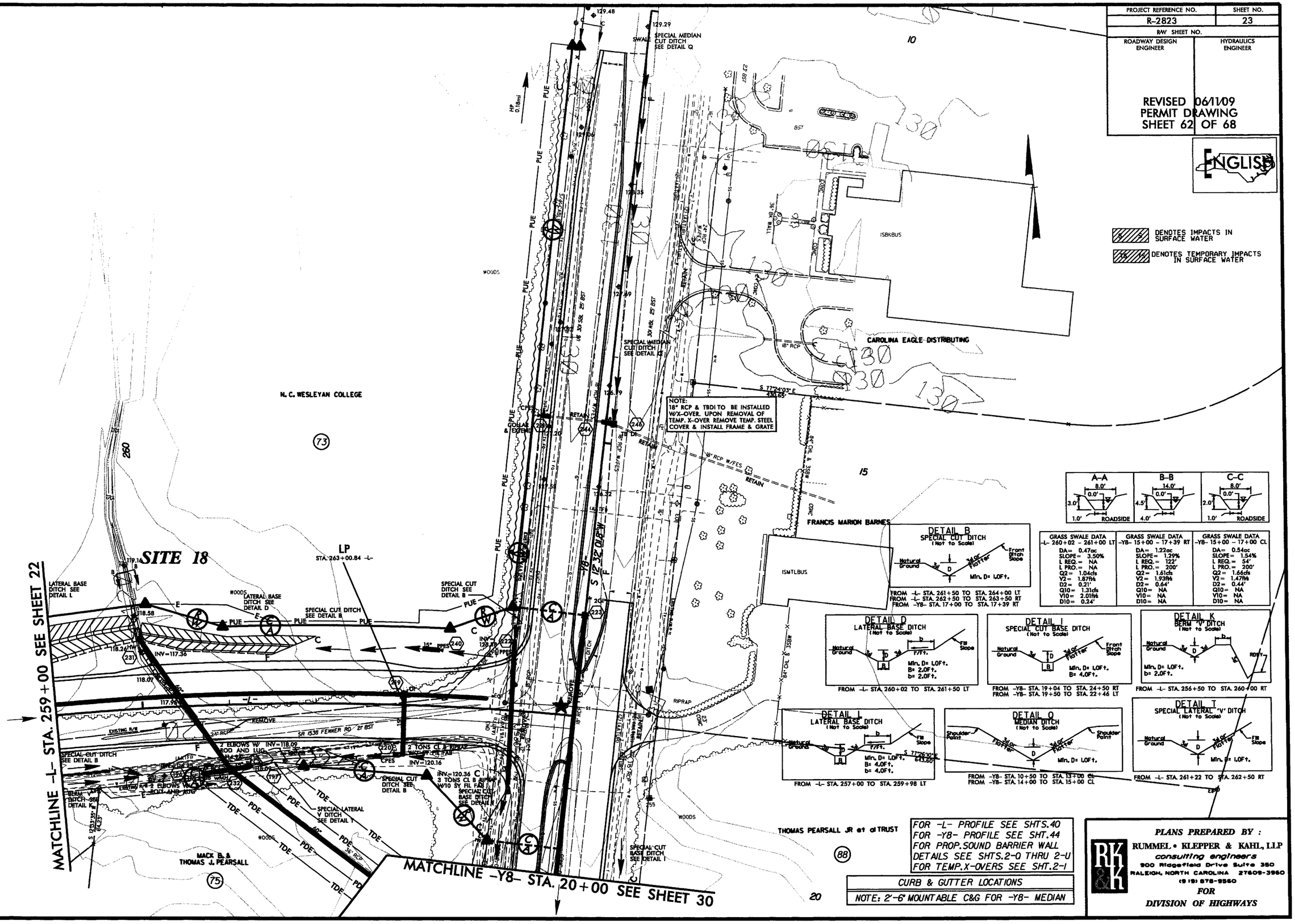
PERMIT DRAWING
SHEET 62 OF 68

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



GRASS SWALE DATA -L- 260+02 - 261+00 LT	GRASS SWALE DATA -Y8- 15+00 - 17+39 RT	GRASS SWALE DATA -Y8- 15+00 - 17+00 CL
DA= 0.47ac	DA= 1.22ac	DA= 0.54ac
SLOPE= 3.50%	SLOPE= 1.29%	SLOPE= 1.54%
L REQ.= NA	L REQ.= 122'	L REQ.= 54'
L PRO.= NA	L PRO.= 200'	L PRO.= 200'
Q2= 1.04cfs	Q2= 1.61cfs	Q2= 1.66cfs
V2= 1.87ft/s	V2= 1.93ft/s	V2= 1.47ft/s
D2= 0.21'	D2= 0.64'	D2= 0.44'
Q10= 1.31cfs	Q10= NA	Q10= NA
V10= 2.01ft/s	V10= NA	V10= NA
D10= 0.24'	D10= NA	D10= NA

FROM -L- STA. 261+50 TO STA. 264+00 LT
FROM -L- STA. 262+50 TO STA. 263+50 RT
FROM -Y8- STA. 17+00 TO STA. 17+39 RT

FROM -L- STA. 260+02 TO STA. 261+50 LT

FROM -Y8- STA. 19+04 TO STA. 24+50 RT
FROM -Y8- STA. 19+50 TO STA. 22+46 LT

FROM -L- STA. 256+50 TO STA. 260+00 RT

FROM -L- STA. 257+00 TO STA. 259+98 LT

FROM -Y8- STA. 10+50 TO STA. 13+00 CL
FROM -Y8- STA. 14+00 TO STA. 15+00 CL

FROM -L- STA. 261+22 TO STA. 262+50 RT

FOR -L- PROFILE SEE SHTS.40
FOR -Y8- PROFILE SEE SHT.44
FOR PROP.SOUND BARRIER WALL DETAILS SEE SHTS.2-O THRU 2-U
FOR TEMP.X-OVERS SEE SHT.2-I

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -Y8- MEDIAN

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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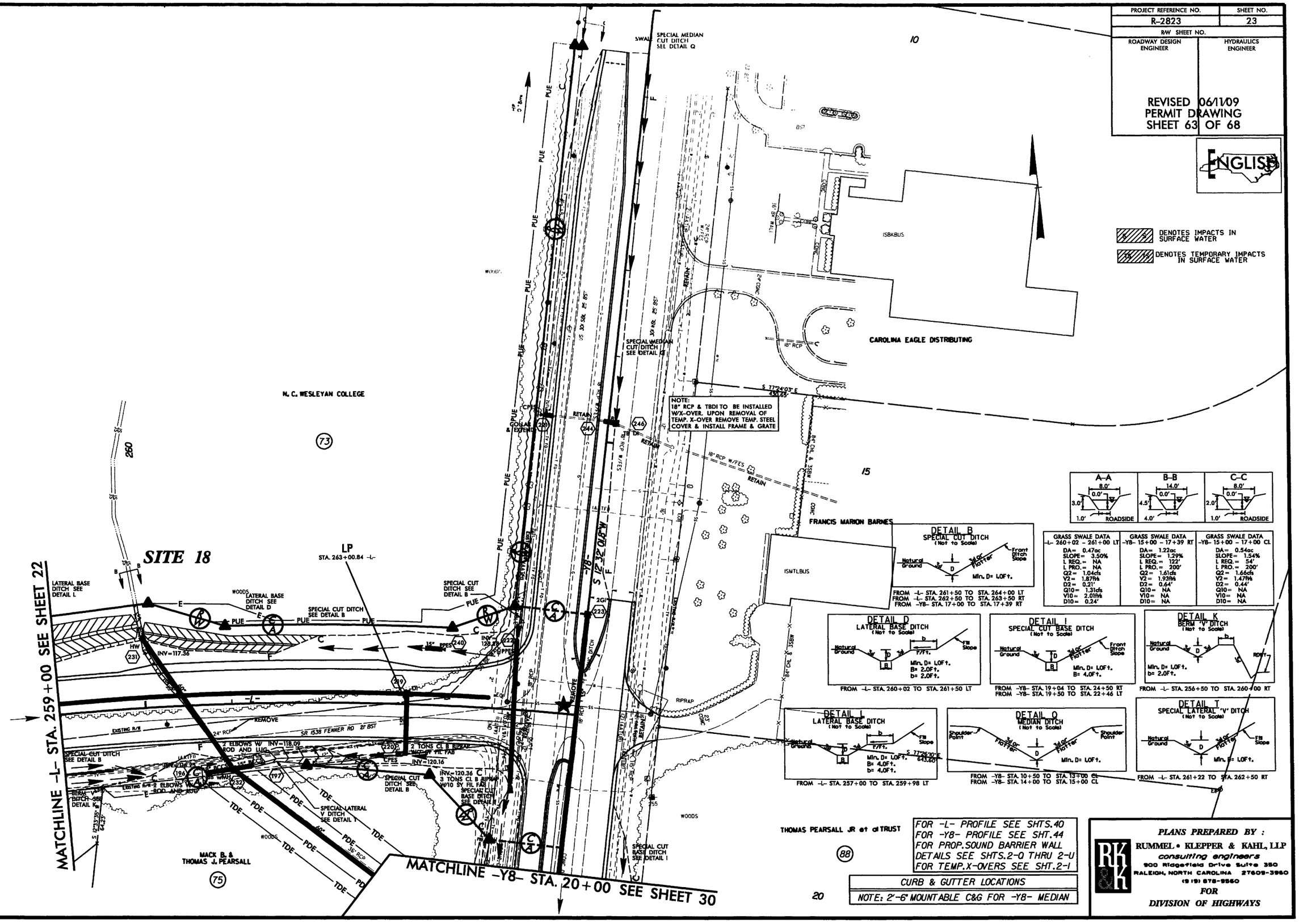
SHEET 63 OF 68

ENGLISH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



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BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	2 - 48" RCP	-L- 30+28	X			7922	6271	14193					
2	ROADWAY	-L- 32+50 RT			X				444	3934	4378		
4	9' X 9' RCBC	-L- 49+02	X						11823	7647	19470		
7	BRIDGE	-L- 111+50	X						0	5186	5186		
				X		8967	2235	11202					
9	72" RCP	-L- 135+34	X						14535	9434	23969		
10	78" RCP	-L- 169+16	X						24431	15186	39617		
12	BRIDGE	-L- 182+00	X						8584	7394	15978		
				X		2629	0	2629					
13	78" RCP	-L- 189+80	X						16082	10345	26427		
15	ROADWAY	-L- 231+00	X			180	1530	1710					
16	60" RCP	-L- 231+57	X			6616	5773	12389					
17	8' X 9' RCBC	-L- 239+81	X						14429	8028	22457		
19	66" RCP	-Y8- 23+50 RT	X			1776	411	2187					
TOTAL:						28090	16220	44310	90328	67154	157482		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NASH COUNTY
PROJECT: C201917 (R-2823)

BUFFER DRAWING SHEET 3 OF 56
REVISED 06/11/09

BUFFER IMPACTS SUMMARY

		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	-L- 30+28	3279	2585
4 / 5	-L- 49+02	168	1712
7	-L- 111+50	8967	7217
9	-L- 135+34	0	96
10	-L- 169+16	1174	1626
12	-L- 182+00	7628	4324
13	-L- 189+80	10132	2661
15	-L- 231+00	25	507
16	-L- 231+57	2114	1300
17	-L- 239+81	14199	6891
		47686	28919

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

NASH COUNTY
PROJECT: C201917 (R-2823)

BUFFER DRAWING SHEET 4 OF 56
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PROJECT REFERENCE NO.	SHEET NO.
R-2823	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

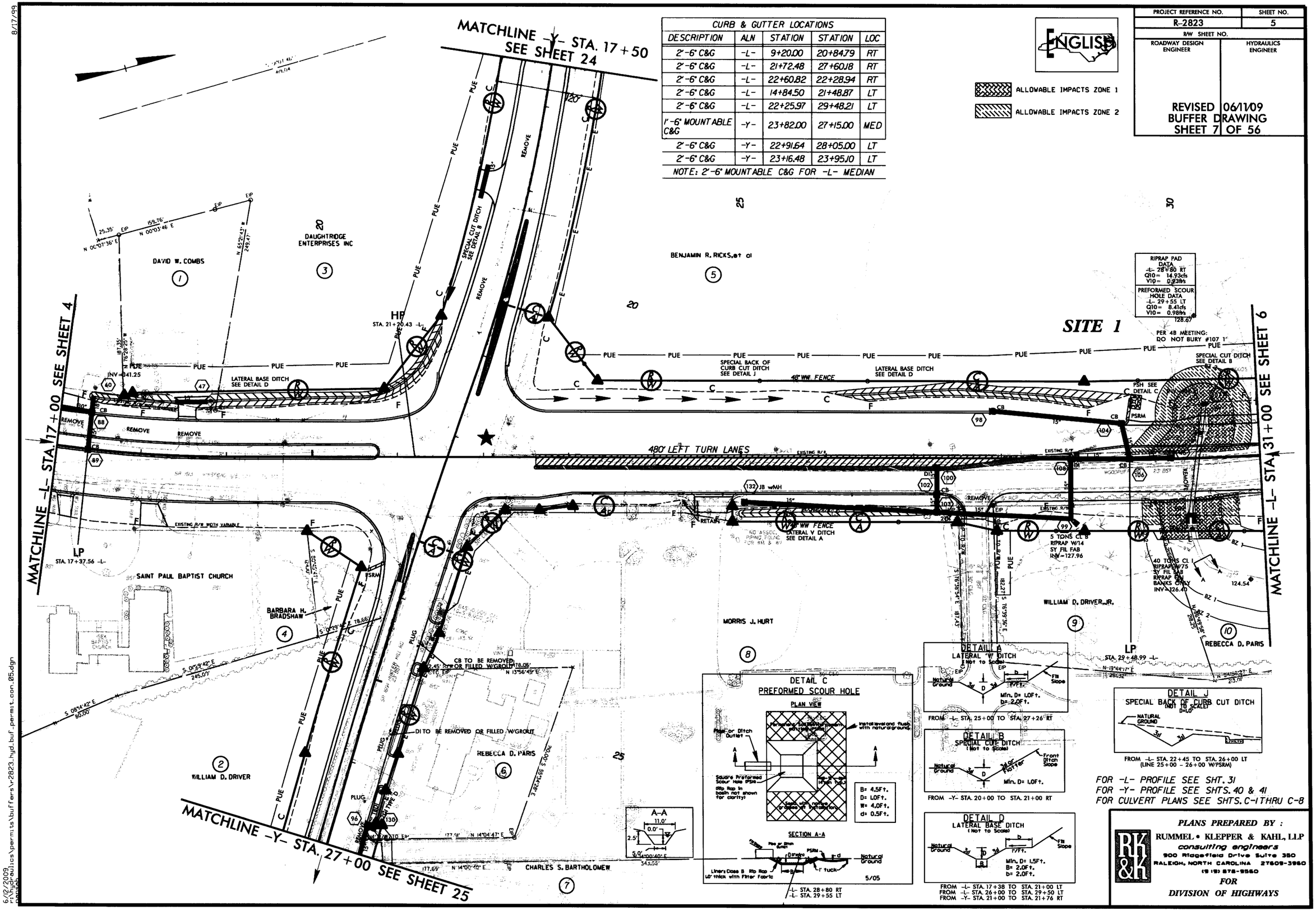
REVISED 06/11/09
BUFFER DRAWING
SHEET 7 OF 56

ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	9+20.00	20+84.79	RT
2'-6" C&G	-L-	21+72.48	27+60.18	RT
2'-6" C&G	-L-	22+60.82	22+28.94	RT
2'-6" C&G	-L-	14+84.50	21+48.87	LT
2'-6" C&G	-L-	22+25.97	29+48.21	LT
1'-6" MOUNTABLE C&G	-Y-	23+82.00	27+15.00	MED
2'-6" C&G	-Y-	22+91.64	28+05.00	LT
2'-6" C&G	-Y-	23+16.48	23+95.10	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				



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FOR
DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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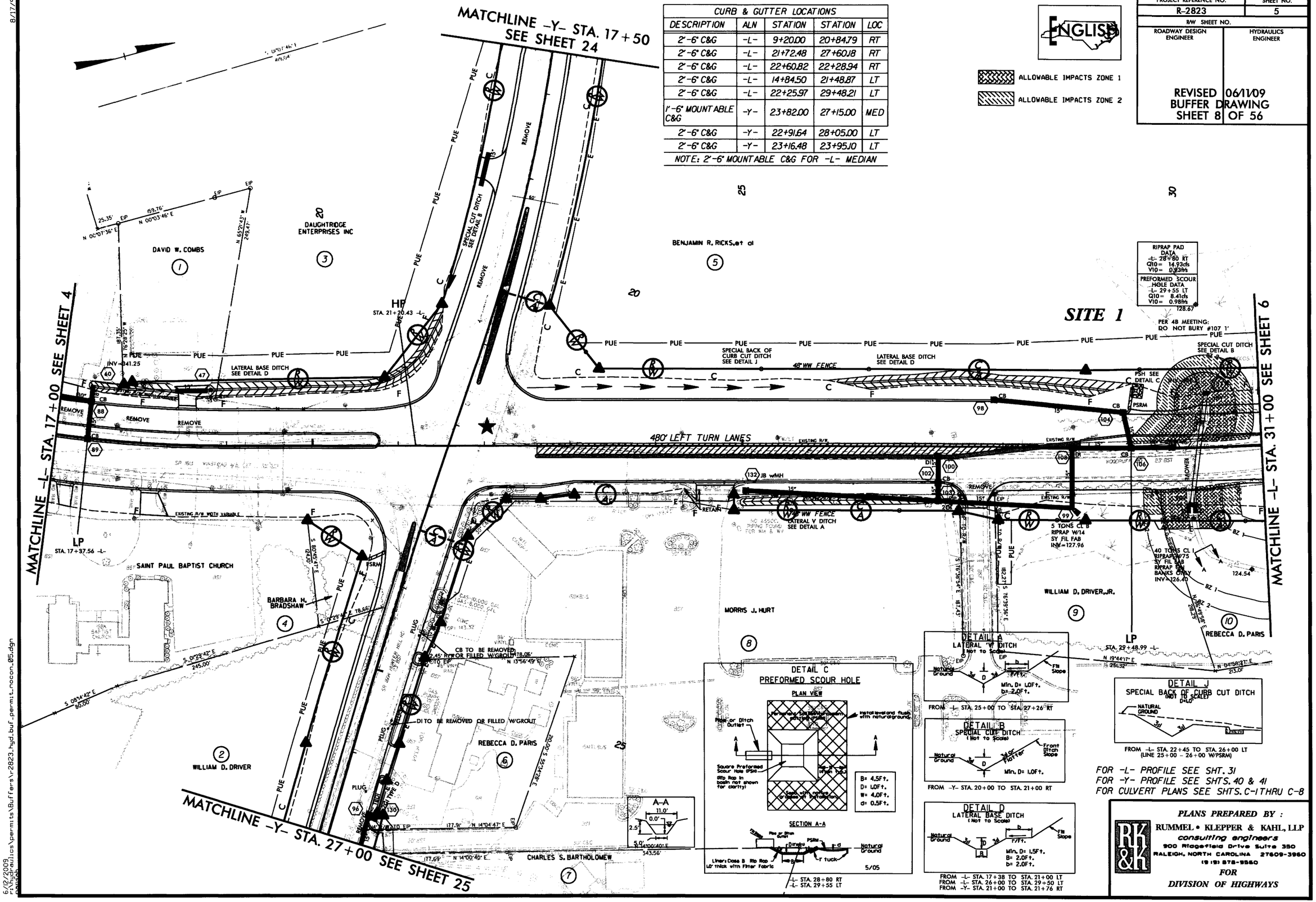
BUFFER DRAWING
SHEET 8 OF 56

ENGLISH

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	9+20.00	20+84.79	RT
2'-6" C&G	-L-	21+72.48	27+60.18	RT
2'-6" C&G	-L-	22+60.82	22+28.94	RT
2'-6" C&G	-L-	14+84.50	21+48.87	LT
2'-6" C&G	-L-	22+25.97	29+48.21	LT
1'-6" MOUNTABLE C&G	-Y-	23+82.00	27+15.00	MED
2'-6" C&G	-Y-	22+91.64	28+05.00	LT
2'-6" C&G	-Y-	23+16.48	23+95.10	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				



FOR -L- PROFILE SEE SHT. 31
FOR -Y- PROFILE SEE SHTS. 40 & 41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-8

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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-12

SITE 1

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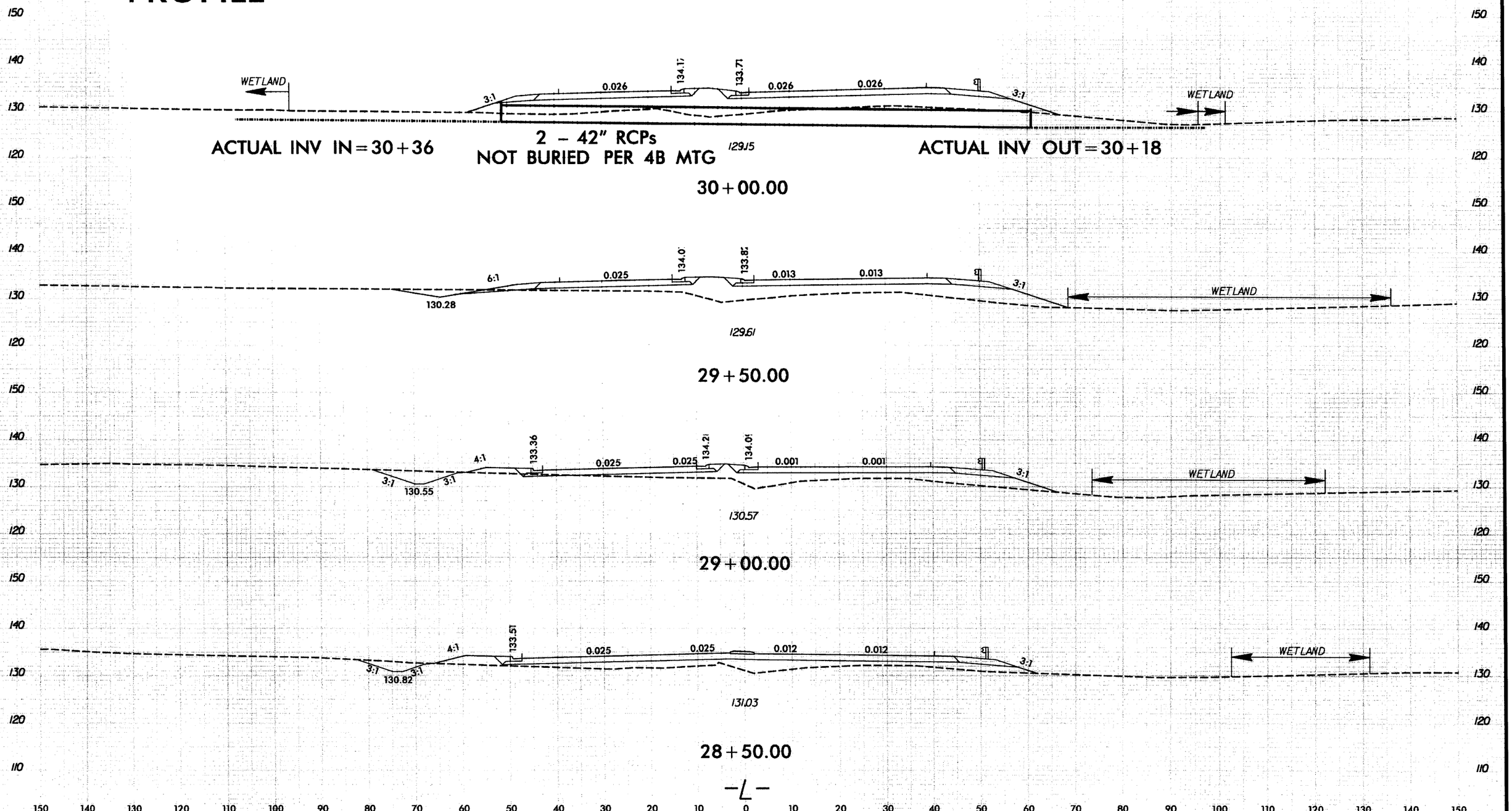
BUFFER DRAWING
SHEET 9 OF 56

STREAMLINE PROFILE



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-13

SITE 1

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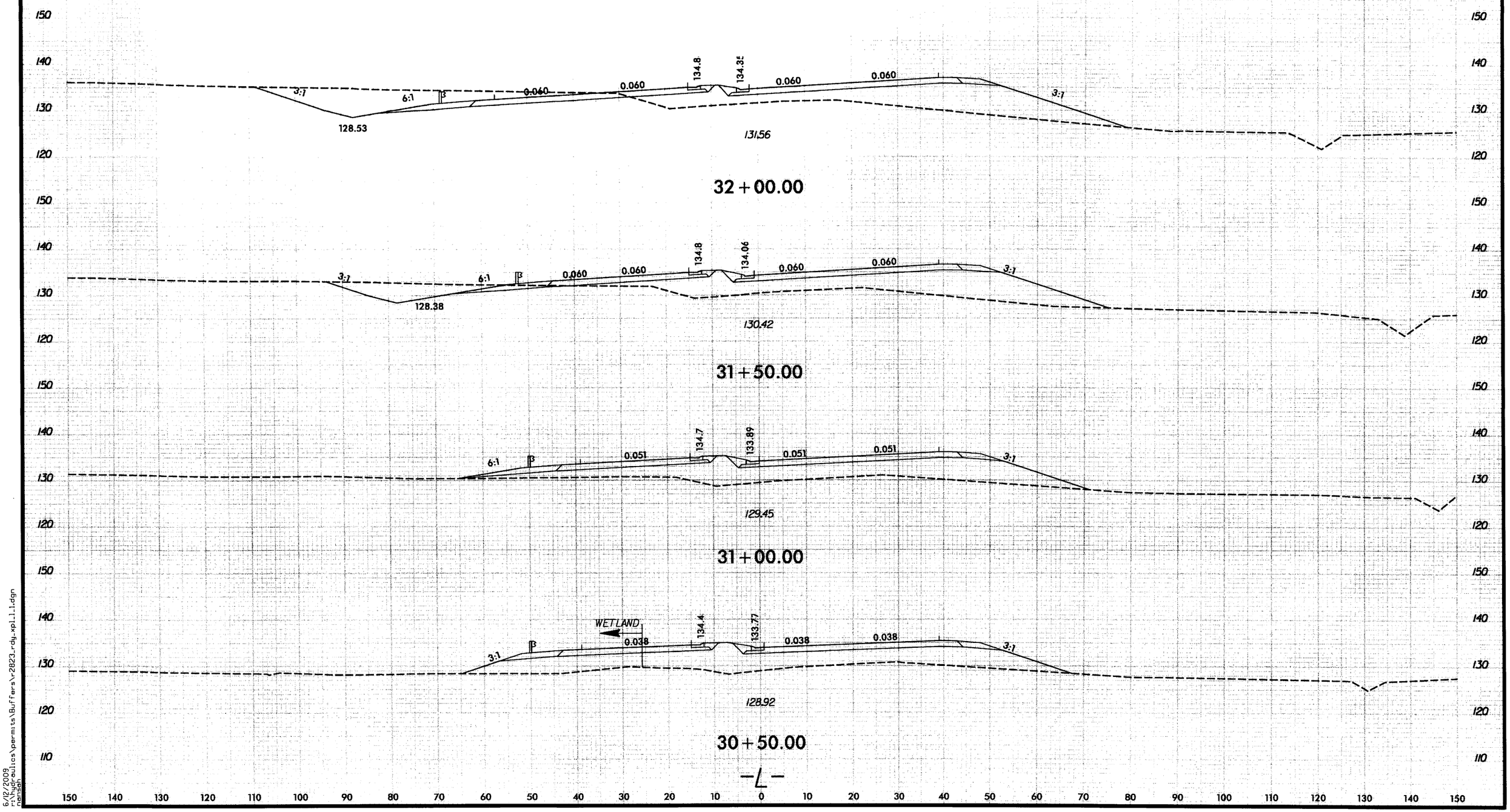
BUFFER DRAWING
SHEET 10 OF 56



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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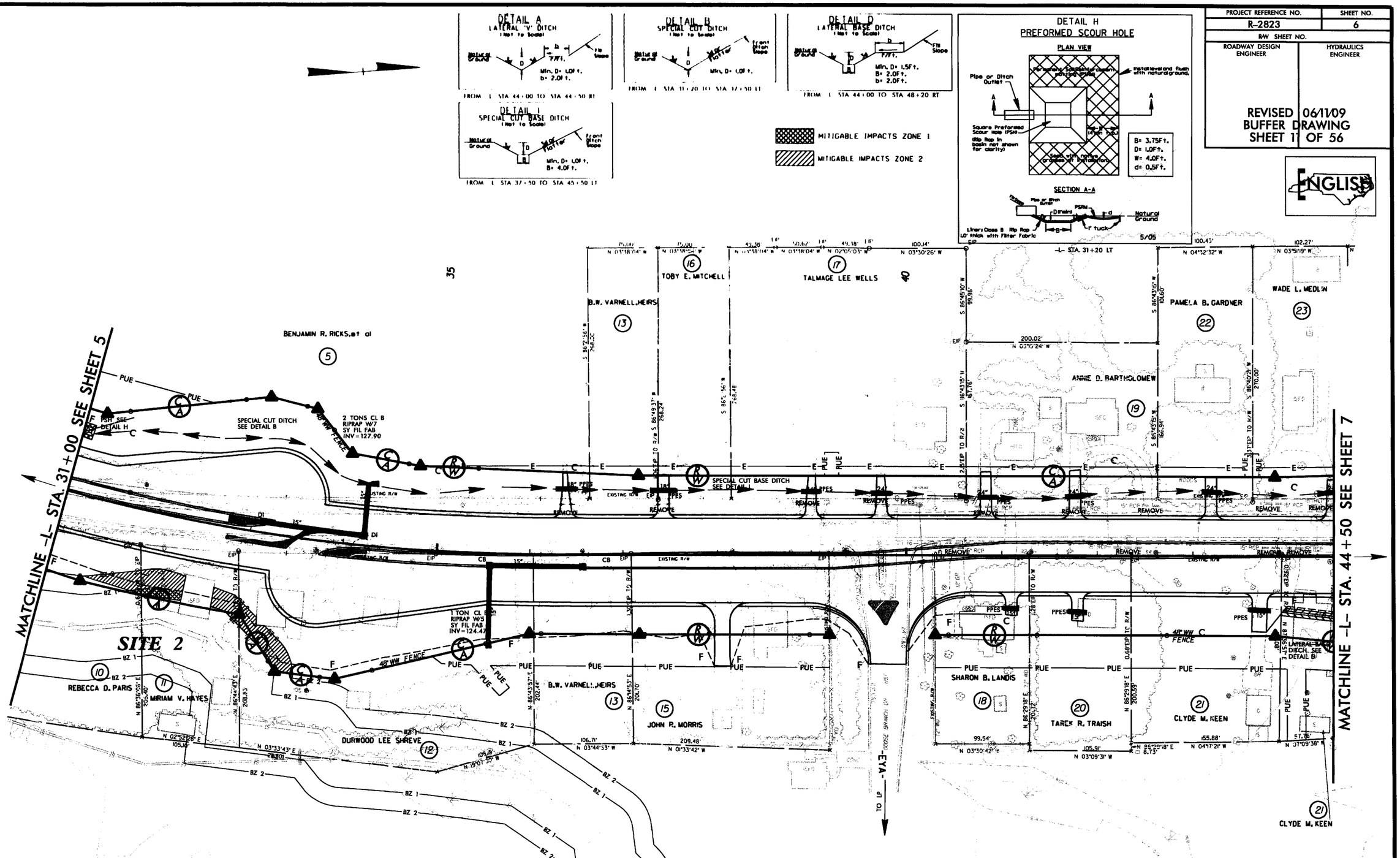
BUFFER DRAWING
SHEET 11 OF 56

ENGLISH



FOR -L- PROFILE SEE SHTS. 31 & 32

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	39+01.41	40+60.63	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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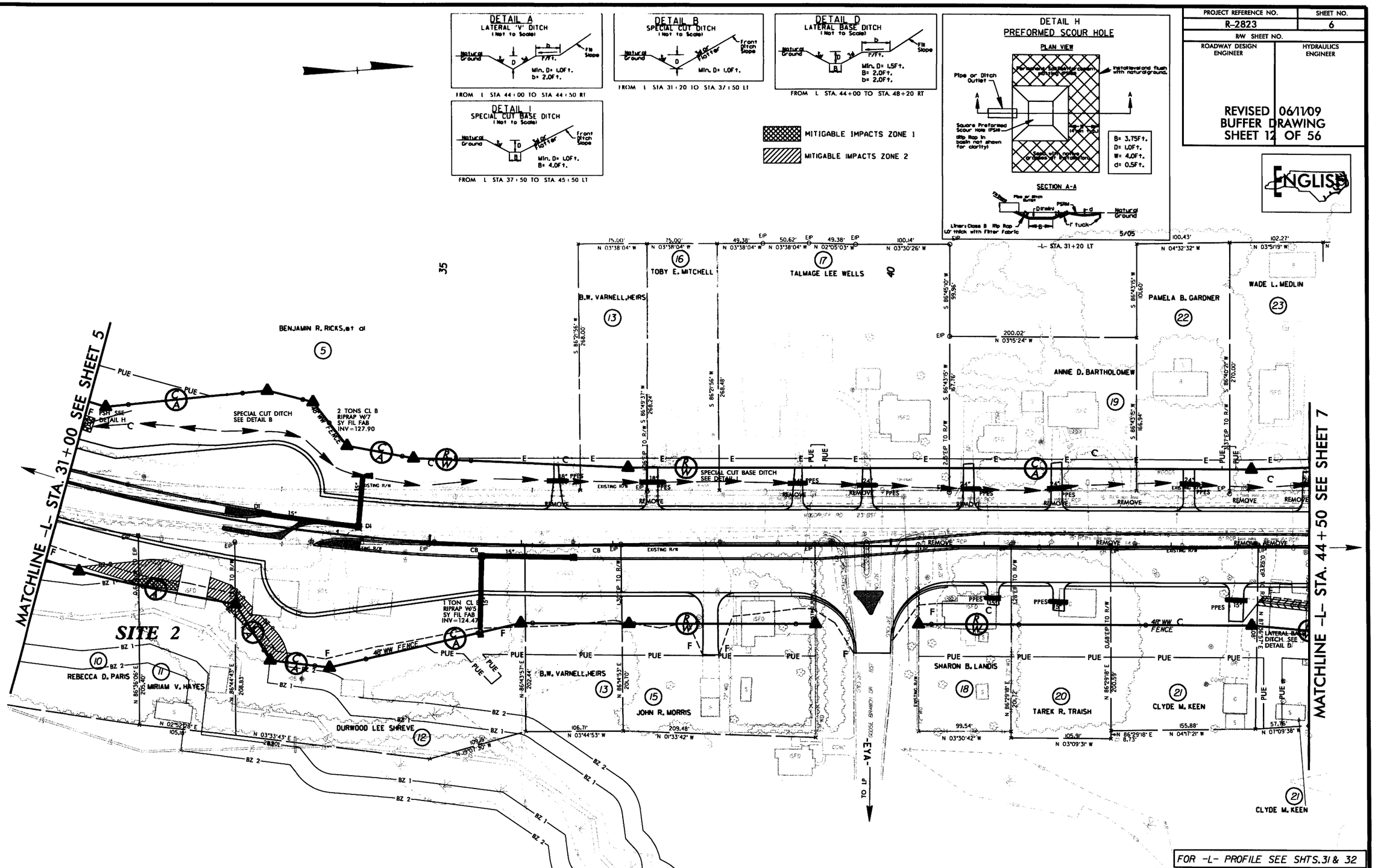
BUFFER DRAWING
SHEET 12 OF 56

ENGLISH



FOR -L- PROFILE SEE SHTS. 31 & 32

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	39+01.41	40+60.63	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2823	X-13

SITE 2

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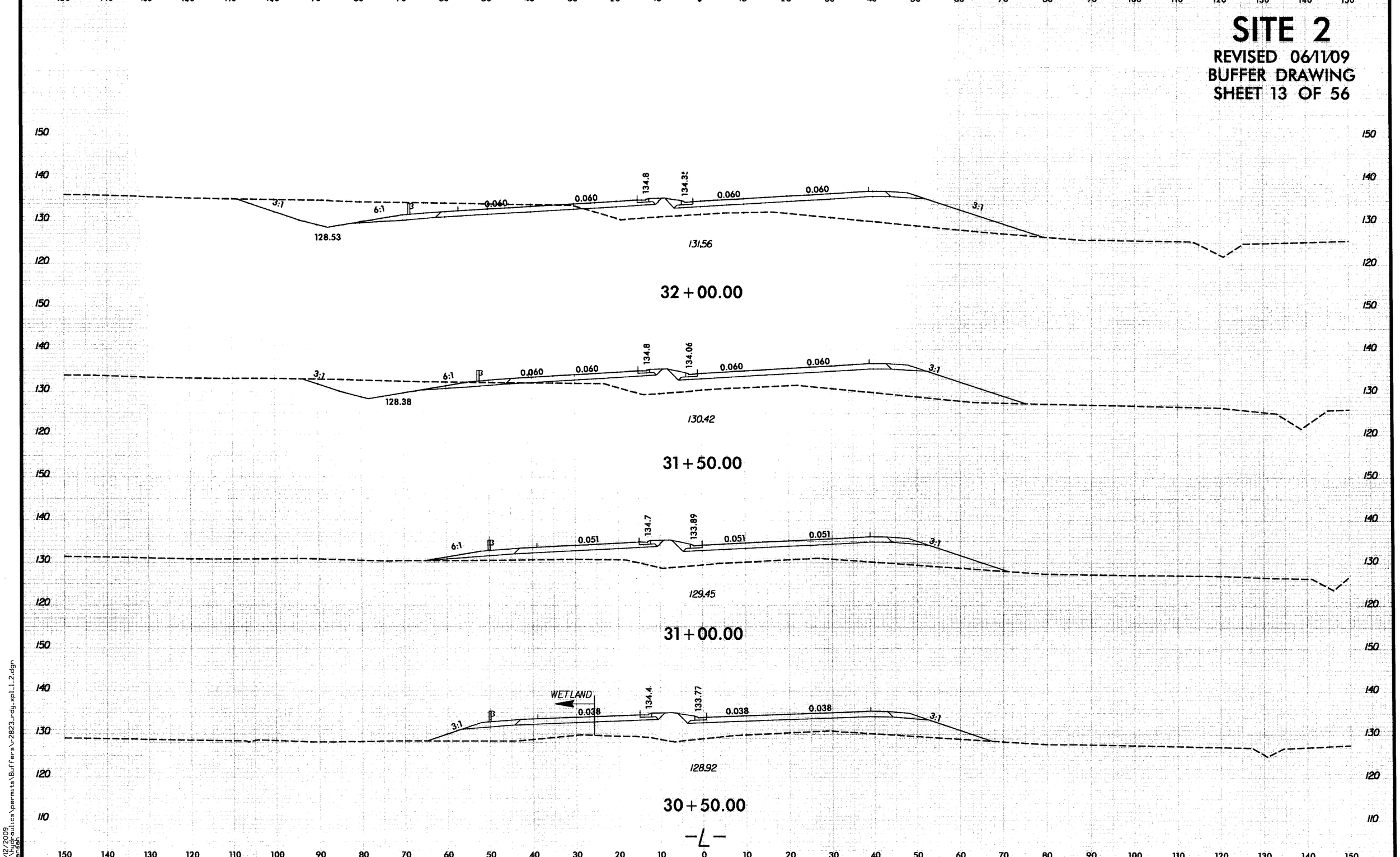
BUFFER DRAWING
SHEET 13 OF 56



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-14

SITE 2

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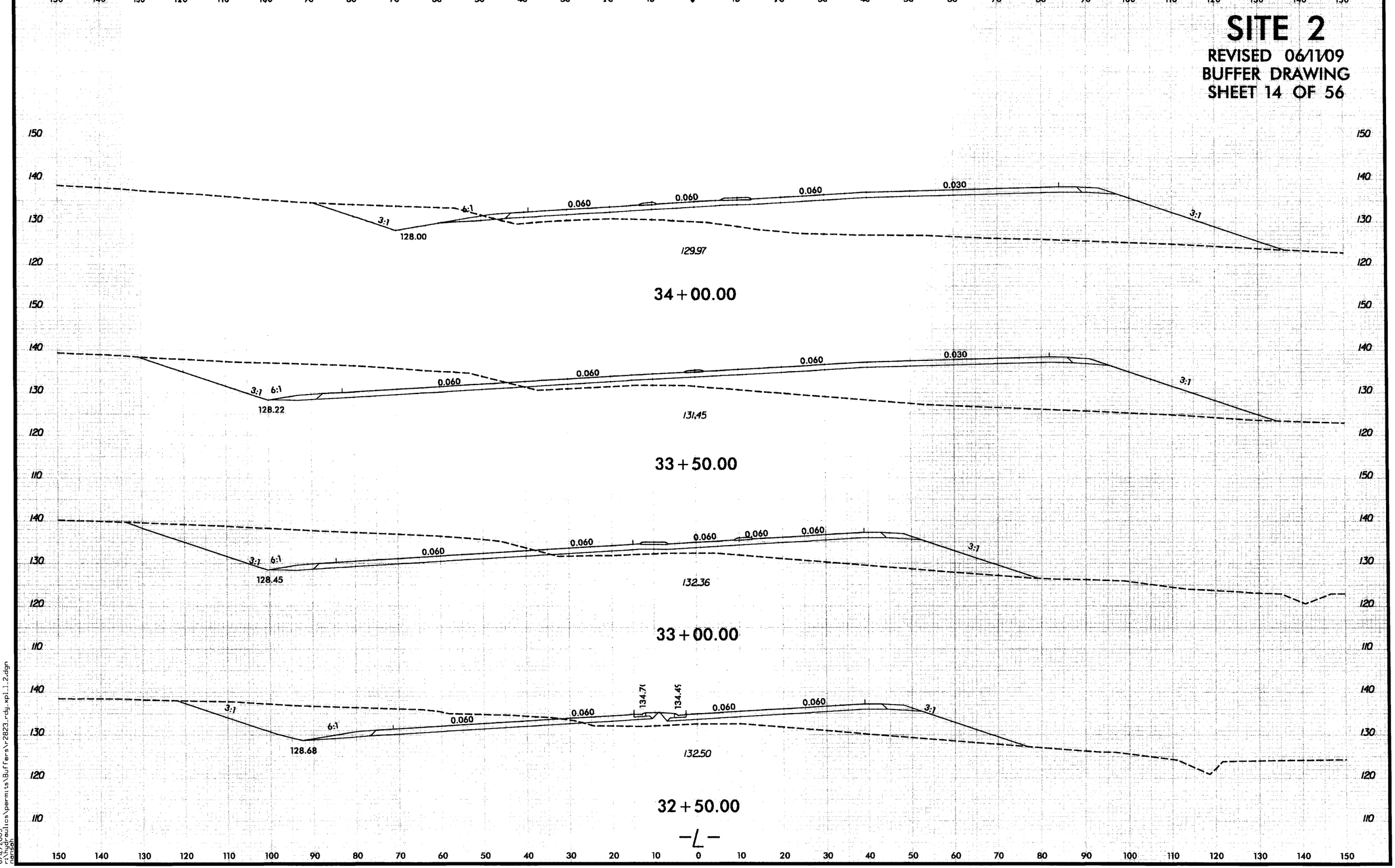
BUFFER DRAWING
SHEET 14 OF 56



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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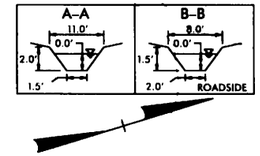
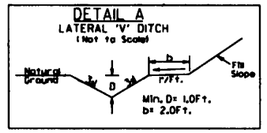
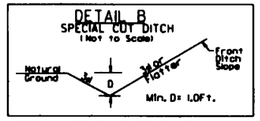
BUFFER DRAWING
SHEET 15 OF 56

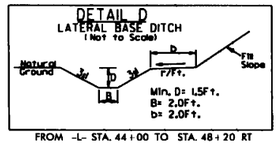




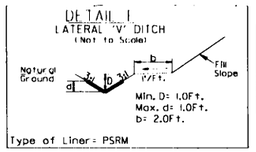
FROM Y1 STA. 14+00 TO STA. 15+25 RT
FROM Y1 STA. 14+00 TO STA. 16+00 LT



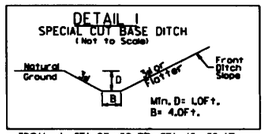
FROM L STA. 52+50 TO STA. 53+11 LT
FROM L STA. 54+09 TO STA. 55+00 LT
FROM Y1 STA. 12+89 TO STA. 14+00 LT & RT
FROM Y1 STA. 16+00 TO STA. 17+20 LT
FROM Y1 STA. 17+00 TO STA. 17+24 RT



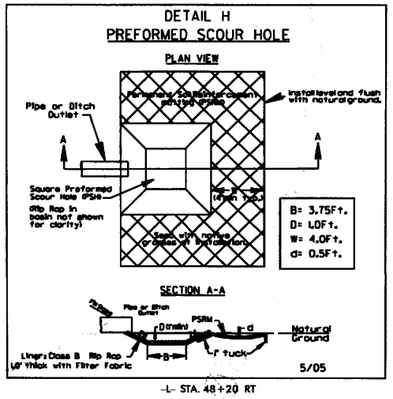
FROM -L- STA. 44+00 TO STA. 48+20 RT



FROM -L- STA. 50+80 TO STA. 52+00 RT



FROM -L- STA. 37+50 TO STA. 45+50 LT



-L- STA. 48+20 RT

GRASS SWALE DATA -L- 41+00 - 48+00 RT	GRASS SWALE DATA -L- 48+25 - 48+85 LT
DA= 2.35ac	DA= 15.58ac
SLOPE= 0.30%	SLOPE= 0.25%
L REQ.= 235'	L REQ.= NA
L PRO.= 270'	L PRO.= NA
Q2 = 6.93cfs	Q2 = 19.19cfs
V2 = 1.44ft/s	V2 = 1.64ft/s
D2 = 0.98'	D2 = 1.00'
Q10= 8.72cfs	Q10= 26.43cfs
V10= 1.68ft/s	V10= 2.01ft/s
D10= 1.02'	D10= 1.09'
GRASS SWALE DATA -L- 48+95 - 49+50 LT	**GRASS SWALE DATA -Y1- 14+00 - 17+20 LT**
DA= 6.09ac	DA= 1.44ac
SLOPE= 0.82%	SLOPE= 0.92%
L REQ.= NA	L REQ.= 144'
L PRO.= NA	L PRO.= 320'
Q2= 8.04cfs	Q2= 3.19cfs
V2 = 1.70ft/s	V2 = 2.06ft/s
D2 = 0.51'	D2 = 0.68'
Q10= 11.07cfs	Q10= NA
V10= 1.95ft/s	V10= NA
D10= 0.59'	D10= NA

PREFORMED SCOUR HOLE DATA
-L- 48+20 RT
Q10= 8.72cfs
V10= 0.99ft/s

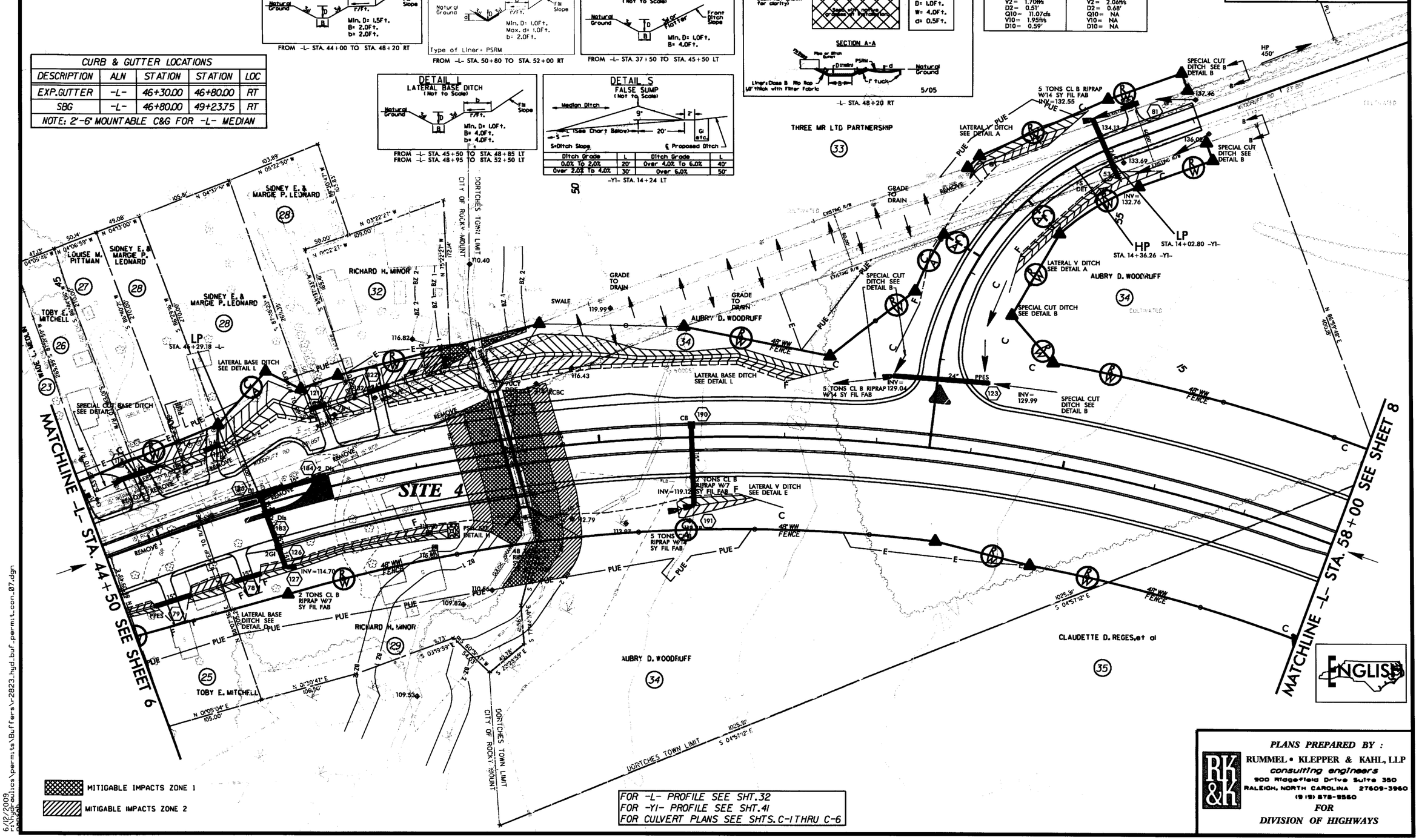
RIPRAP PAD DATA
-L- 50+75 RT
Q10= 14.98cfs
V10= 0.93ft/s

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
EXP.GUTTER	-L-	46+30.00	46+80.00	RT
SBG	-L-	46+80.00	49+23.75	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

FROM -L- STA. 45+50 TO STA. 48+85 LT
FROM -L- STA. 48+95 TO STA. 52+50 LT

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

-Y1- STA. 14+24 LT



MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

FOR -L- PROFILE SEE SHT.32
FOR -Y1- PROFILE SEE SHT.41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-6

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PROJECT REFERENCE NO.	SHEET NO.
R-2823	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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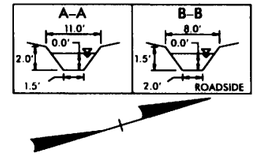
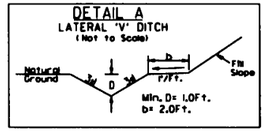
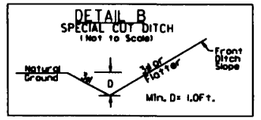
BUFFER DRAWING
SHEET 16 OF 56

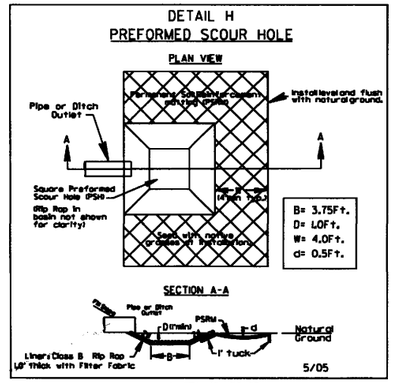




FROM Y1 STA. 14+00 TO STA. 15+25 RT
FROM Y1 STA. 14+00 TO STA. 16+00 LT



FROM L STA. 52+50 TO STA. 53+11 LT
FROM L STA. 54+09 TO STA. 55+00 LT
FROM Y1 STA. 12+89 TO STA. 14+00 LT & RT
FROM Y1 STA. 16+00 TO STA. 17+20 LT
FROM Y1 STA. 17+00 TO STA. 17+24 RT

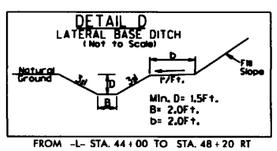


-L- STA. 48+20 RT

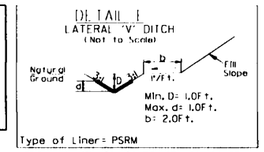
GRASS SWALE DATA -L- 41+00 - 48+00 RT	GRASS SWALE DATA -L- 48+25 - 48+85 LT
DA= 2.35ac	DA= 15.58ac
SLOPE= 0.30%	SLOPE= 0.25%
L REQ.= 235'	L REQ.= NA
L PRO.= 270'	L PRO.= NA
Q2= 6.93cfs	Q2= 19.19cfs
V2= 1.44ft/s	V2= 1.64ft/s
D2= 0.98'	D2= 1.00'
Q10= 8.72cfs	Q10= 26.43cfs
V10= 1.68ft/s	V10= 2.01ft/s
D10= 1.02'	D10= 1.09'
GRASS SWALE DATA -L- 48+95 - 49+50 LT	**GRASS SWALE DATA -Y1- 14+00 - 17+20 LT**
DA= 6.09ac	DA= 1.44ac
SLOPE= 0.82%	SLOPE= 0.92%
L REQ.= NA	L REQ.= 144'
L PRO.= NA	L PRO.= 320'
Q2= 8.04cfs	Q2= 3.19cfs
V2= 1.70ft/s	V2= 2.06ft/s
D2= 0.51'	D2= 0.68'
Q10= 11.07cfs	Q10= NA
V10= 1.95ft/s	V10= NA
D10= 0.59'	D10= NA

PREFORMED SCOUR HOLE DATA -L- 48+20 RT
Q10= 8.72cfs
V10= 0.99ft/s

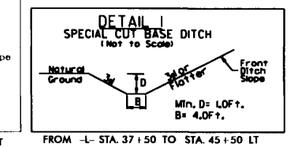
RIPRAP PAD DATA -L- 50+75 RT
Q10= 14.98cfs
V10= 0.93ft/s



FROM -L- STA. 44+00 TO STA. 48+20 RT



FROM -L- STA. 50+80 TO STA. 52+00 RT



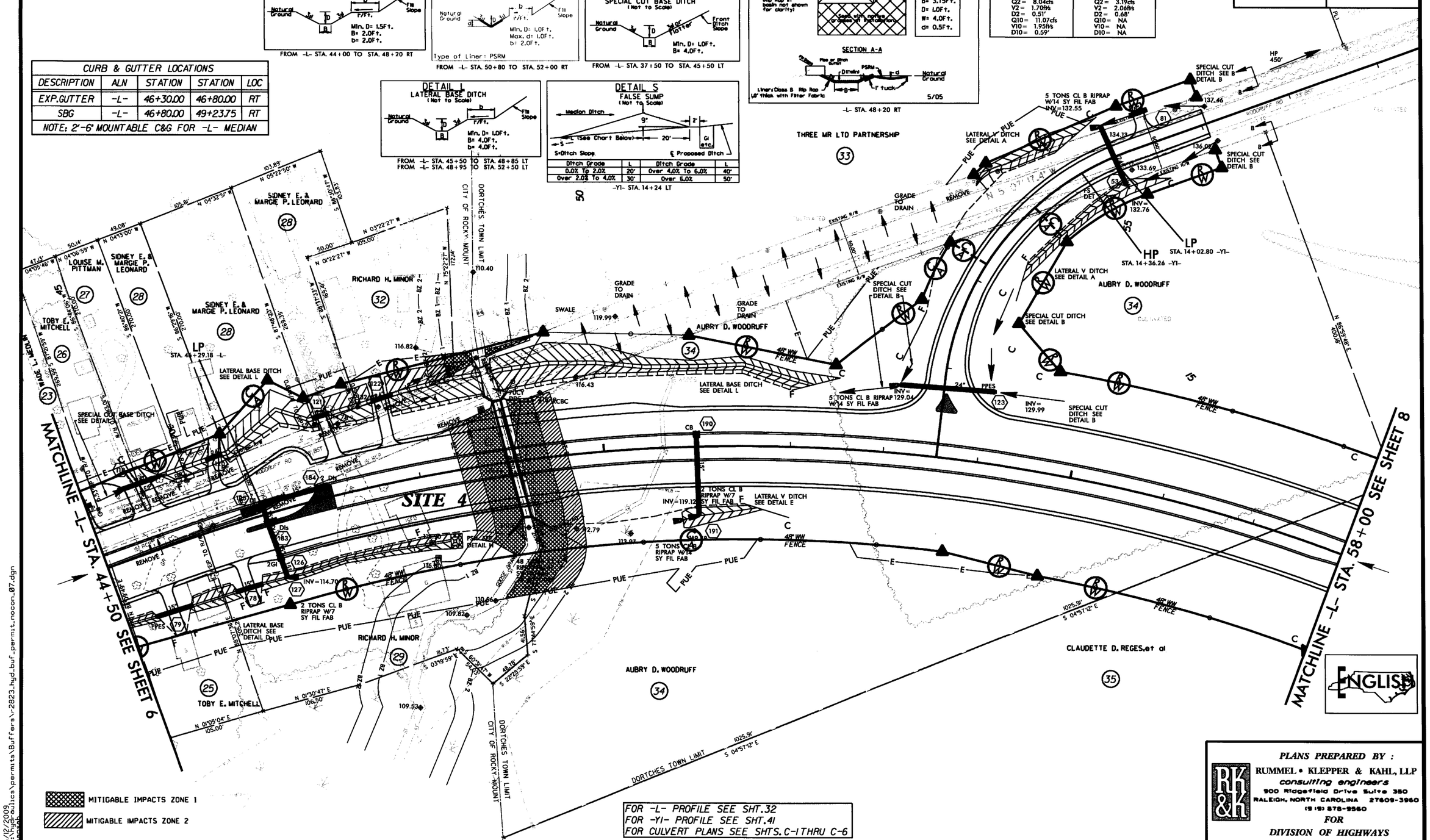
FROM -L- STA. 37+50 TO STA. 45+50 LT

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
EXP.GUTTER	-L-	46+30.00	46+80.00	RT
SBG	-L-	46+80.00	49+23.75	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

FROM -L- STA. 45+50 TO STA. 48+85 LT
FROM -L- STA. 48+95 TO STA. 52+50 LT

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

-Y1- STA. 14+24 LT



FOR -L- PROFILE SEE SHT.32
FOR -Y1- PROFILE SEE SHT.41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-6

PLANS PREPARED BY :
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PROJECT REFERENCE NO.	SHEET NO.
R-2823	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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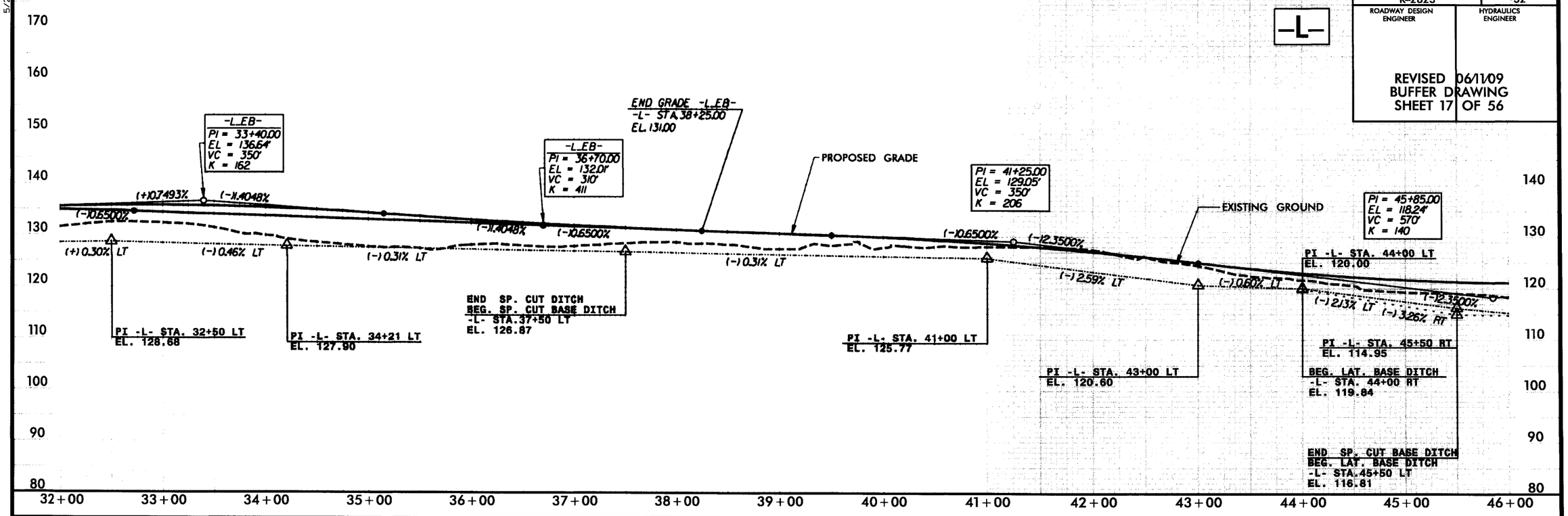
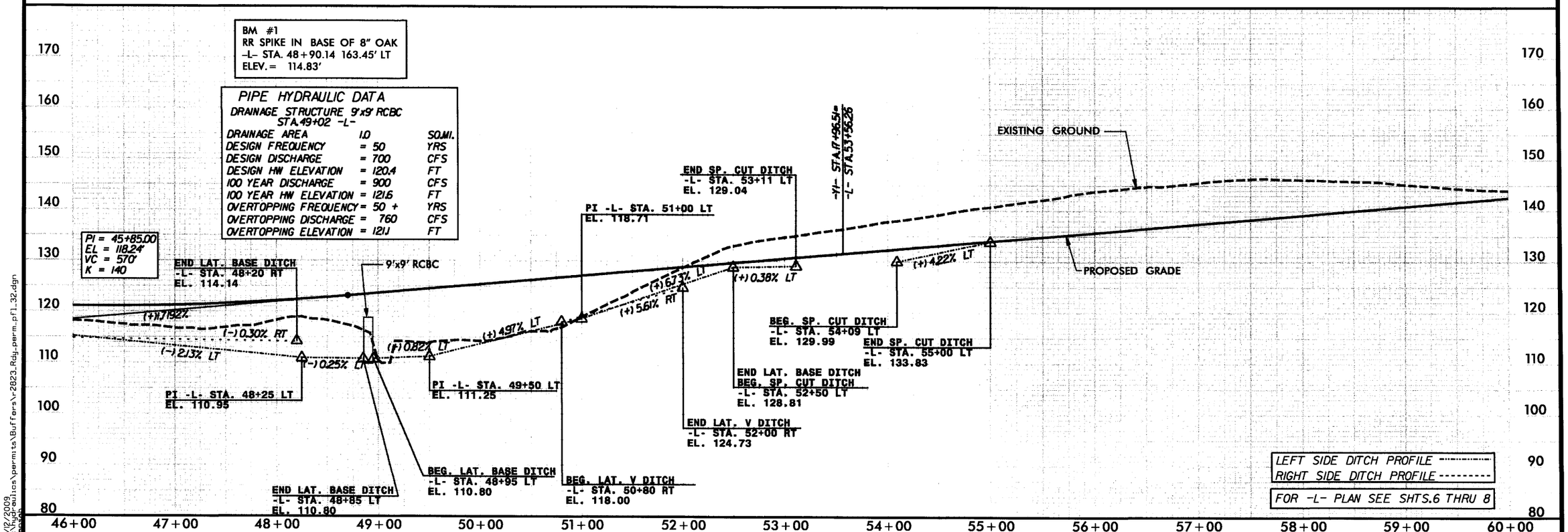
BUFFER DRAWING
SHEET 17 OF 56





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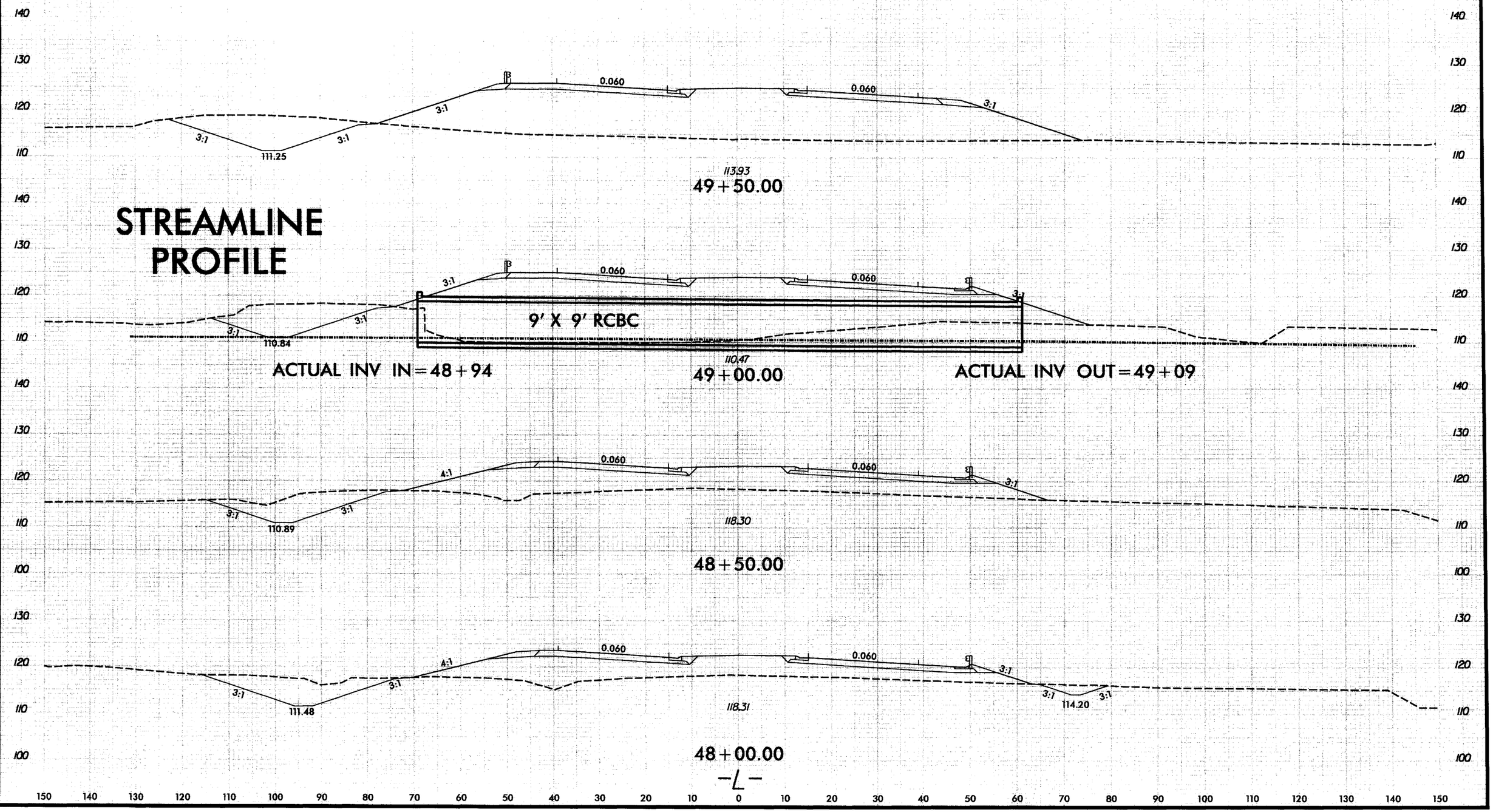
PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-21

SITES 4 & 5

REVISED 06/11/09
BUFFER DRAWING
SHEET 18 OF 56



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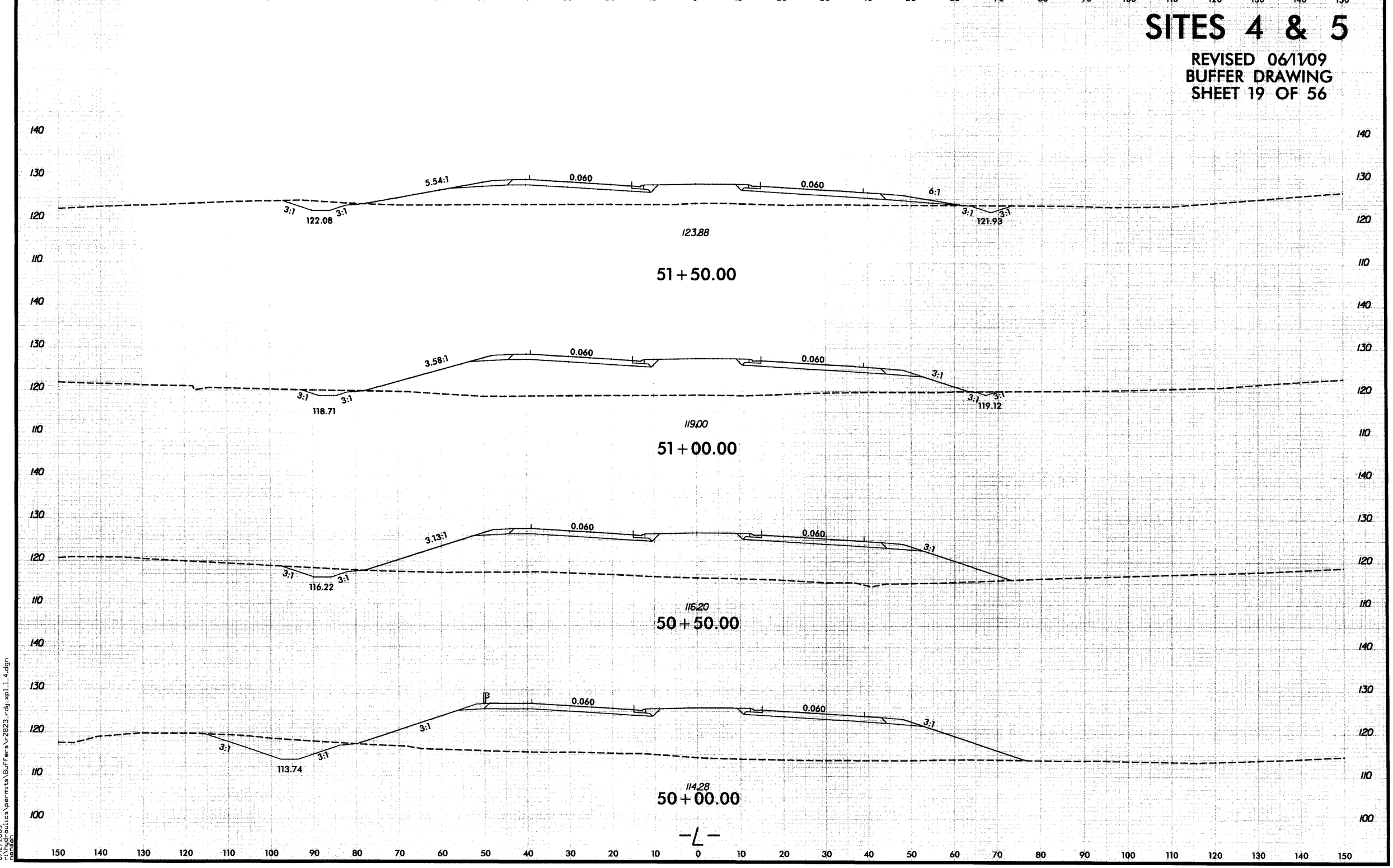
PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-22

SITES 4 & 5

REVISED 06/11/09
BUFFER DRAWING
SHEET 19 OF 56



8/23/99

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8/17/99

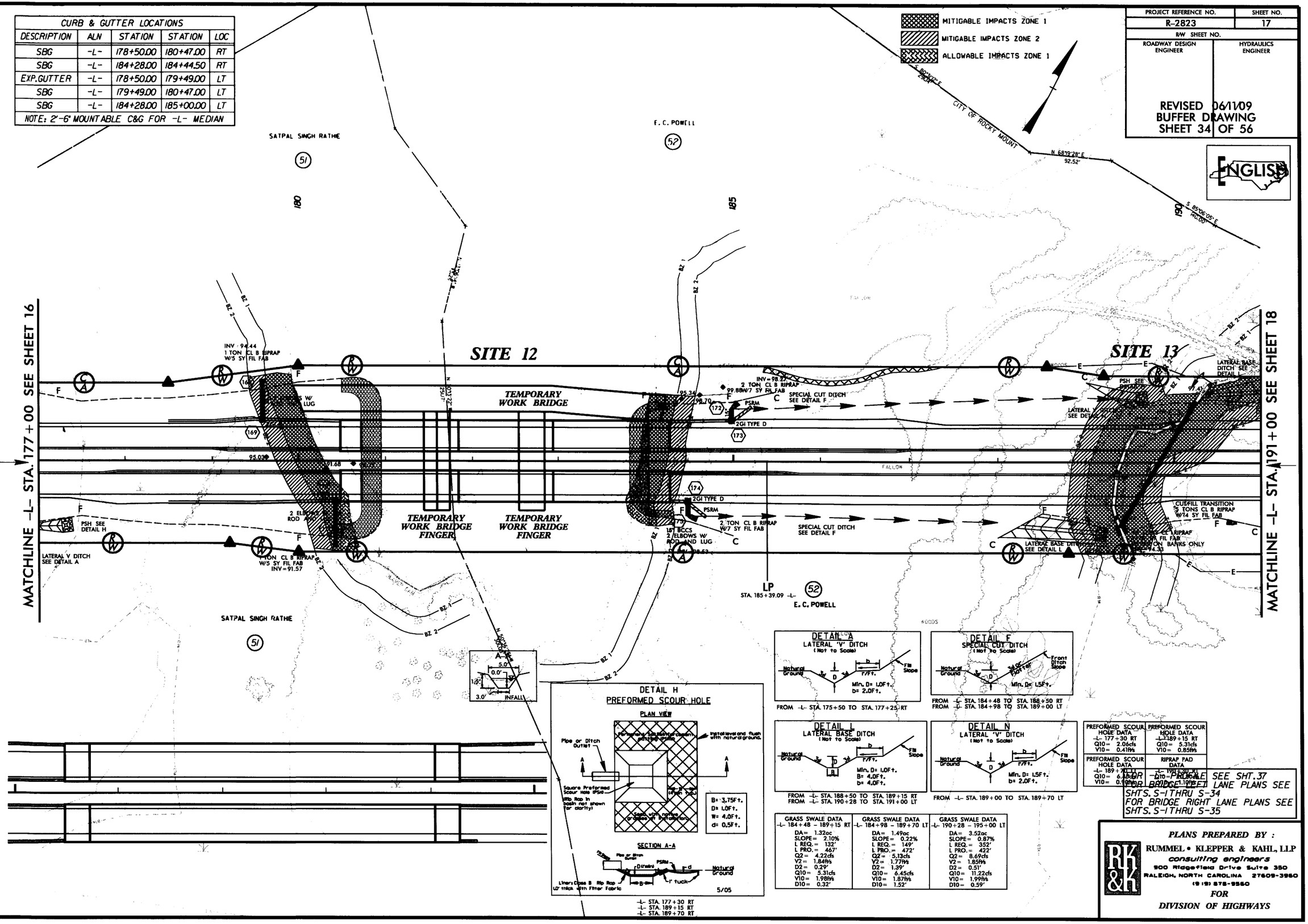
CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	178+50.00	180+47.00	RT
SBG	-L-	184+28.00	184+44.50	RT
EXP.GUTTER	-L-	178+50.00	179+49.00	LT
SBG	-L-	179+49.00	180+47.00	LT
SBG	-L-	184+28.00	185+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
ALLOWABLE IMPACTS ZONE 1

PROJECT REFERENCE NO.	SHEET NO.
R-2823	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
BUFFER DRAWING
SHEET 34 OF 56

ENGLISH



-L- STA. 177+30 RT
-L- STA. 189+15 RT
-L- STA. 189+70 RT

FROM -L- STA. 175+50 TO STA. 177+25 RT

FROM -L- STA. 184+48 TO STA. 188+50 RT
FROM -L- STA. 184+98 TO STA. 189+00 LT

FROM -L- STA. 188+50 TO STA. 189+15 RT
FROM -L- STA. 190+28 TO STA. 191+00 LT

FROM -L- STA. 189+00 TO STA. 189+70 LT

PREFORMED SCOUR HOLE DATA	PREFORMED SCOUR HOLE DATA
-L- 177+30 RT	-L- 189+15 RT
Q10= 2.06cfs	Q10= 5.31cfs
V10= 0.41ft/s	V10= 0.85ft/s
PREFORMED SCOUR HOLE DATA	RIPRAP PAD DATA
-L- 189+70 LT	-L- 190+30 RT
Q10= 6.45cfs	Q10= 11.22cfs
V10= 1.87ft/s	V10= 1.99ft/s

GRASS SWALE DATA	GRASS SWALE DATA	GRASS SWALE DATA
-L- 184+48 - 189+15 RT	-L- 184+98 - 189+70 LT	-L- 190+28 - 195+00 LT
DA= 1.32ac	DA= 1.49ac	DA= 3.52ac
SLOPE= 2.10%	SLOPE= 0.22%	SLOPE= 0.87%
L REQ.= 132'	L REQ.= 149'	L REQ.= 352'
L PRO.= 467'	L PRO.= 472'	L PRO.= 422'
Q2= 4.22cfs	Q2= 5.13cfs	Q2= 8.69cfs
V2= 1.84ft/s	V2= 1.77ft/s	V2= 1.85ft/s
D2= 0.29'	D2= 1.39'	D2= 0.51'
Q10= 5.31cfs	Q10= 6.45cfs	Q10= 11.22cfs
V10= 1.98ft/s	V10= 1.87ft/s	V10= 1.99ft/s
D10= 0.32'	D10= 1.52'	D10= 0.59'

FOR PROFILE SEE SHT. 37
FOR BRIDGE LEFT LANE PLANS SEE SHTS. S-1 THRU S-34
FOR BRIDGE RIGHT LANE PLANS SEE SHTS. S-1 THRU S-35

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

6/12/2009
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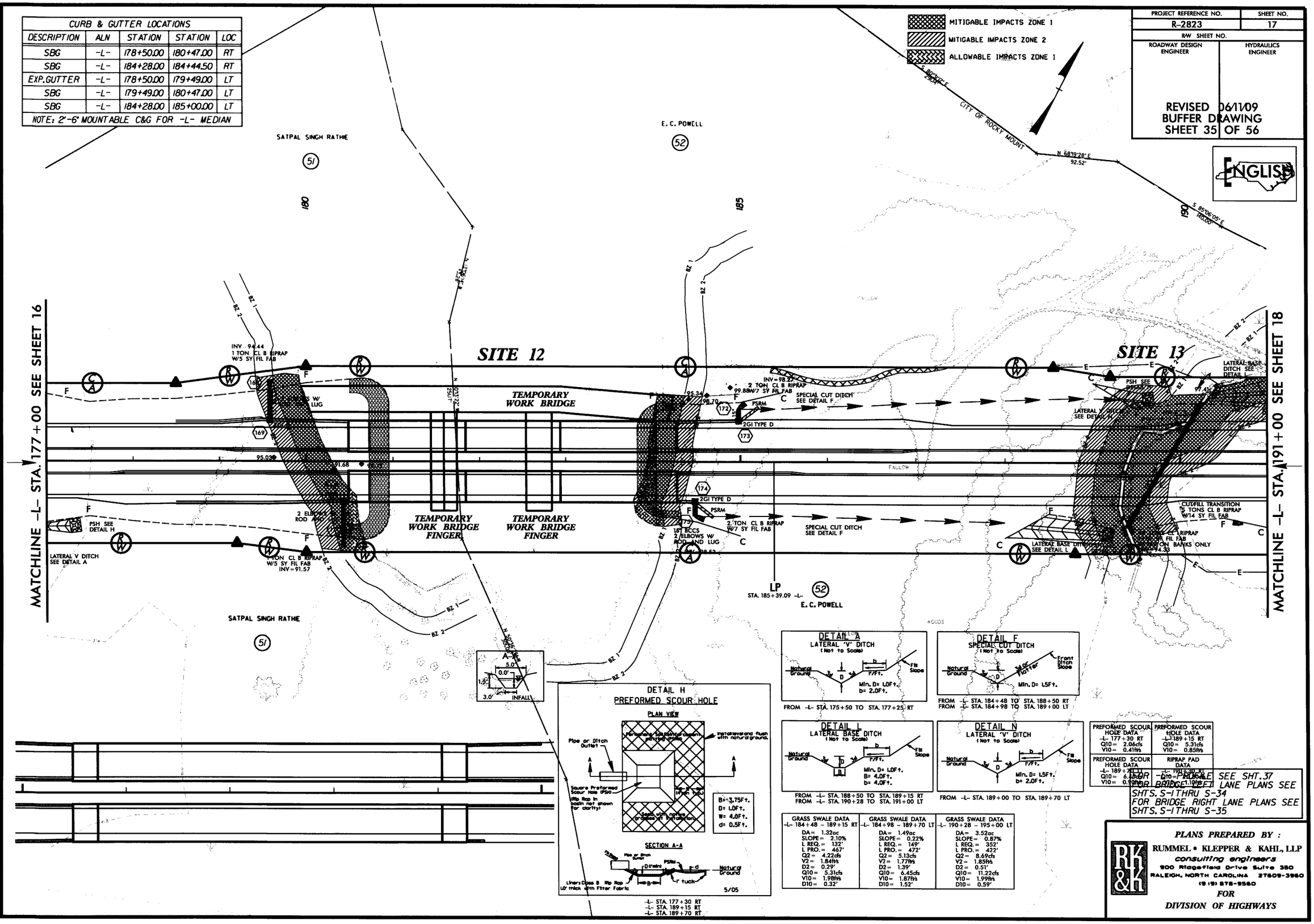
CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	178+50.00	180+47.00	RT
SBG	-L-	184+28.00	184+44.50	RT
EXP.GUTTER	-L-	178+50.00	179+49.00	LT
SBG	-L-	179+49.00	180+47.00	LT
SBG	-L-	184+28.00	185+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
ALLOWABLE IMPACTS ZONE 1

PROJECT REFERENCE NO.	SHEET NO.
R-2823	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
BUFFER DRAWING
SHEET 35 OF 56

ENGLISH



-L- STA. 177+30 RT
-L- STA. 189+15 RT
-L- STA. 189+70 RT

FROM -L- STA. 175+50 TO STA. 177+25 RT

FROM -L- STA. 184+48 TO STA. 188+50 RT
FROM -L- STA. 184+98 TO STA. 189+00 LT

FROM -L- STA. 188+50 TO STA. 189+15 RT
FROM -L- STA. 190+28 TO STA. 191+00 LT

FROM -L- STA. 189+00 TO STA. 189+70 LT

PREFORMED SCOUR HOLE DATA	PREFORMED SCOUR HOLE DATA
-L- 177+30 RT	-L- 189+15 RT
Q10= 2.06cfs	Q10= 5.31cfs
V10= 0.41ft/s	V10= 0.85ft/s
PREFORMED SCOUR HOLE DATA	RIPRAP PAD DATA
-L- 189+70 LT	-L- 190+00 RT
Q10= 6.45cfs	D10= 1.00ft
V10= 0.90ft/s	D50= 1.10ft

GRASS SWALE DATA	GRASS SWALE DATA	GRASS SWALE DATA
-L- 184+48 - 189+15 RT	-L- 184+98 - 189+70 LT	-L- 190+28 - 195+00 LT
DA= 1.32ac	DA= 1.49ac	DA= 3.52ac
SLOPE= 2.10%	SLOPE= 0.22%	SLOPE= 0.87%
L REQ.= 132'	L REQ.= 149'	L REQ.= 352'
L PRO.= 467'	L PRO.= 472'	L PRO.= 422'
Q2= 4.22cfs	Q2= 5.13cfs	Q2= 8.69cfs
V2= 1.84ft/s	V2= 1.77ft/s	V2= 1.85ft/s
D2= 0.29'	D2= 1.39'	D2= 0.51'
Q10= 5.31cfs	Q10= 6.45cfs	Q10= 11.22cfs
V10= 1.98ft/s	V10= 1.87ft/s	V10= 1.99ft/s
D10= 0.32'	D10= 1.52'	D10= 0.59'

FOR BRIDGE LEFT LANE PLANS SEE SHT. 37
FOR BRIDGE RIGHT LANE PLANS SEE SHTS. S-1 THRU S-34
FOR BRIDGE RIGHT LANE PLANS SEE SHTS. S-1 THRU S-35

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FOR
DIVISION OF HIGHWAYS

8/17/99

6/12/2009
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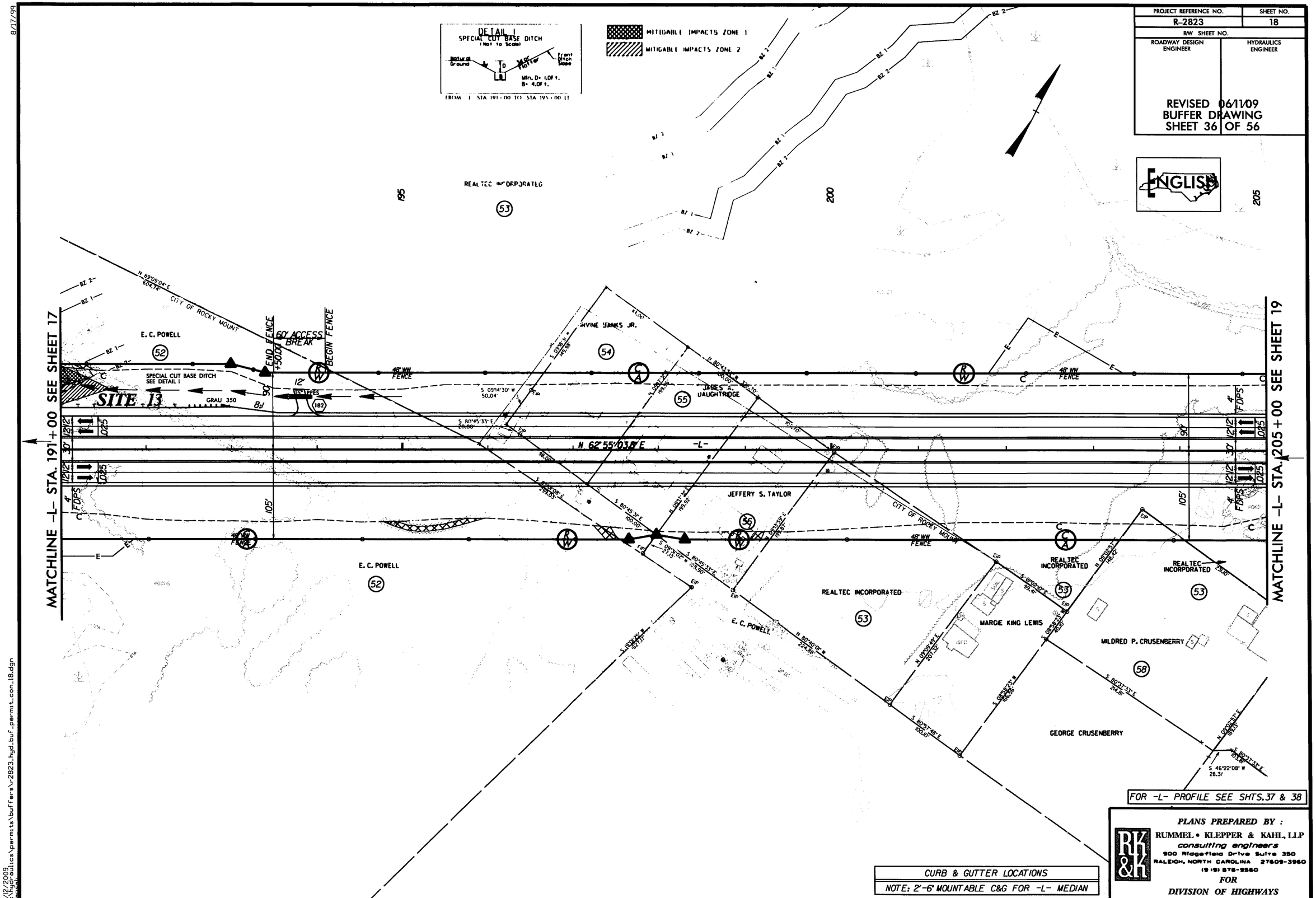
PROJECT REFERENCE NO.	SHEET NO.
R-2823	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
BUFFER DRAWING
SHEET 36 OF 56

ENGLISH



CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

PLANS PREPARED BY :
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900 Ridgefield Drive Suite 350
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8/17/99

6/12/2009
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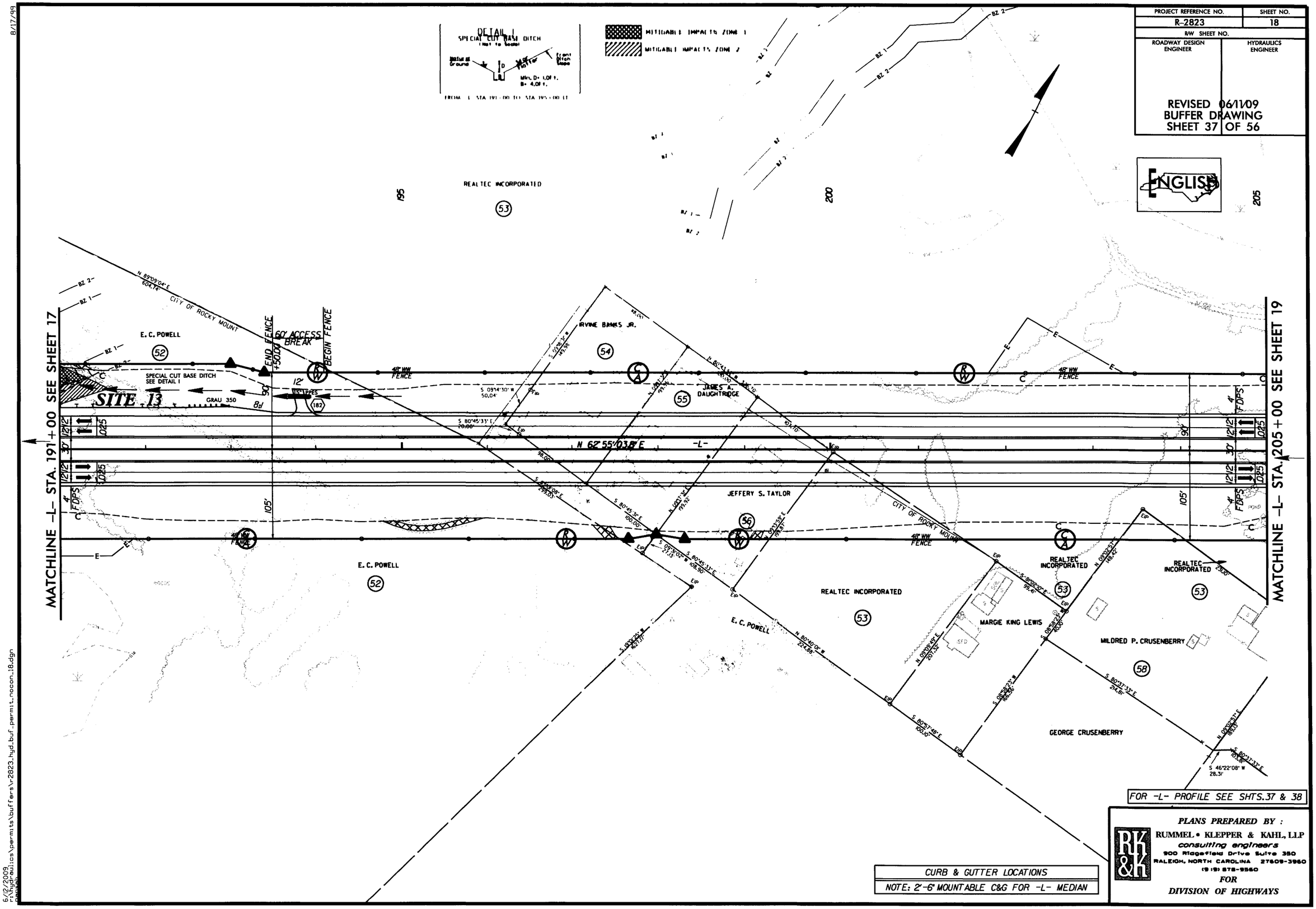
PROJECT REFERENCE NO.	SHEET NO.
R-2823	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
BUFFER DRAWING
SHEET 37 OF 56

ENGLISH



PLANS PREPARED BY :
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900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

8/17/99

6/12/2009
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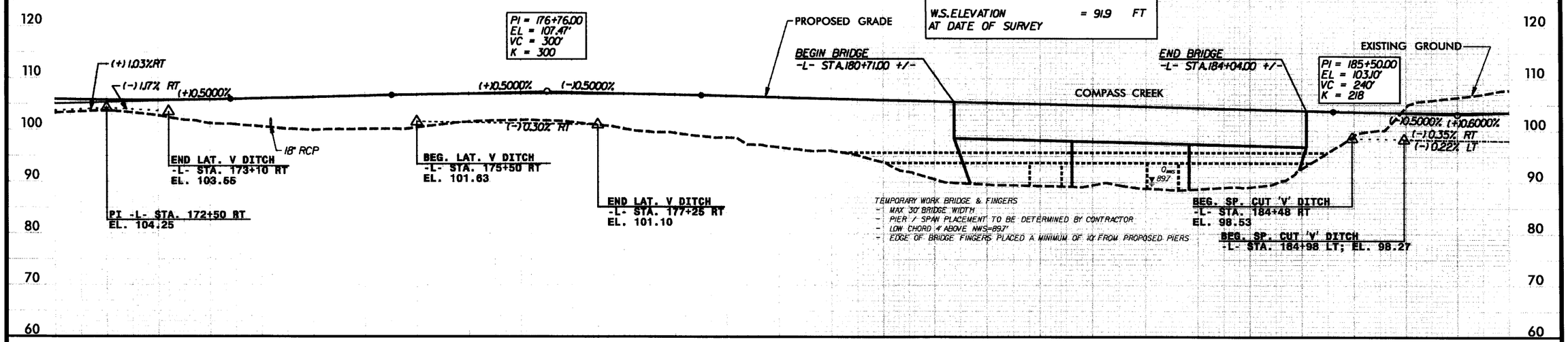
PROJECT REFERENCE NO.	SHEET NO.
R-2823	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISED 06/11/09
BUFFER DRAWING
SHEET 38 OF 56

-L-

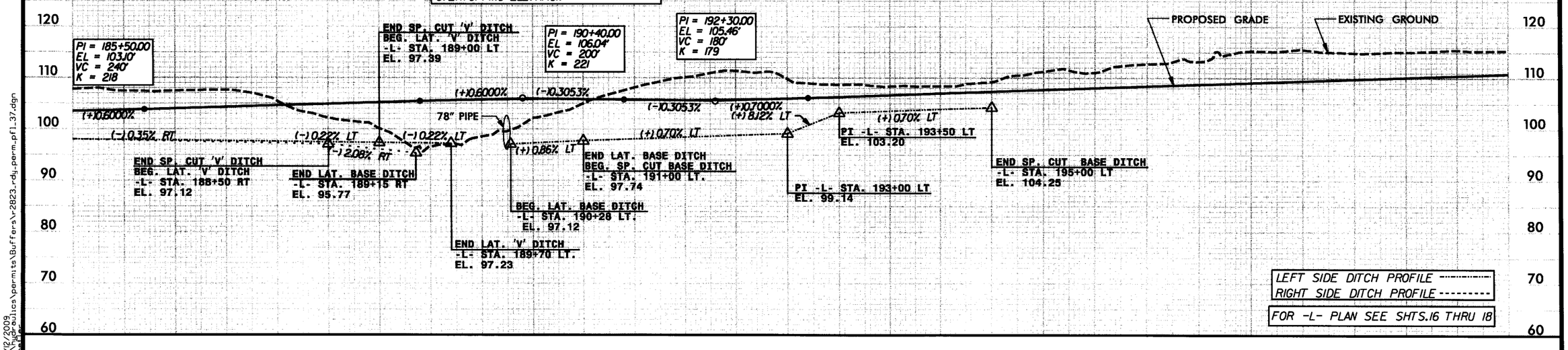
BRIDGE HYDRAULIC DATA
STA.182+37.5 -L-

DESIGN DISCHARGE	= 2,000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 94.3	FT
BASE DISCHARGE	= 2,300	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 94.7	FT
OVERTOPPING DISCHARGE	= 18,750	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 103.7	FT
DATE OF SURVEY	= 06/2008	
W.S. ELEVATION AT DATE OF SURVEY	= 91.9	FT



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE 78" RCP
STA.189+83 -L-

DRAINAGE AREA	= 97	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 220	CFS
DESIGN HW ELEVATION	= 103.7	FT
100 YEAR DISCHARGE	= 250	CFS
100 YEAR HW ELEVATION	= 104.4	FT
OVERTOPPING FREQUENCY	= NA	YRS
OVERTOPPING DISCHARGE	= NA	CFS
OVERTOPPING ELEVATION	= NA	FT



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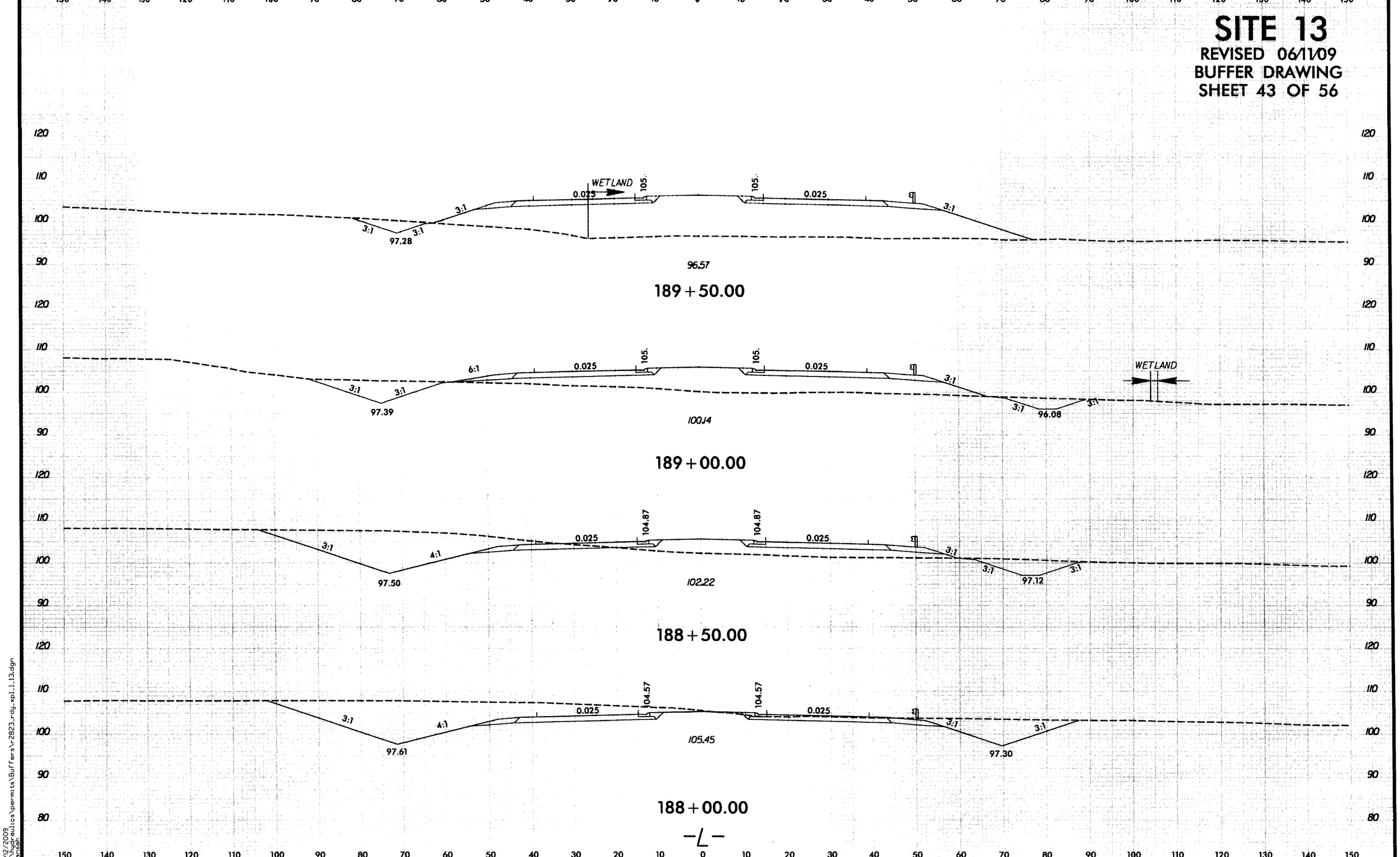
PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-90

SITE 13

REVISED 06/11/09
BUFFER DRAWING
SHEET 43 OF 56



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PROJ. REFERENCE NO.	SHEET NO.
R-2823	X-91

SITE 13

REVISED 06/11/09
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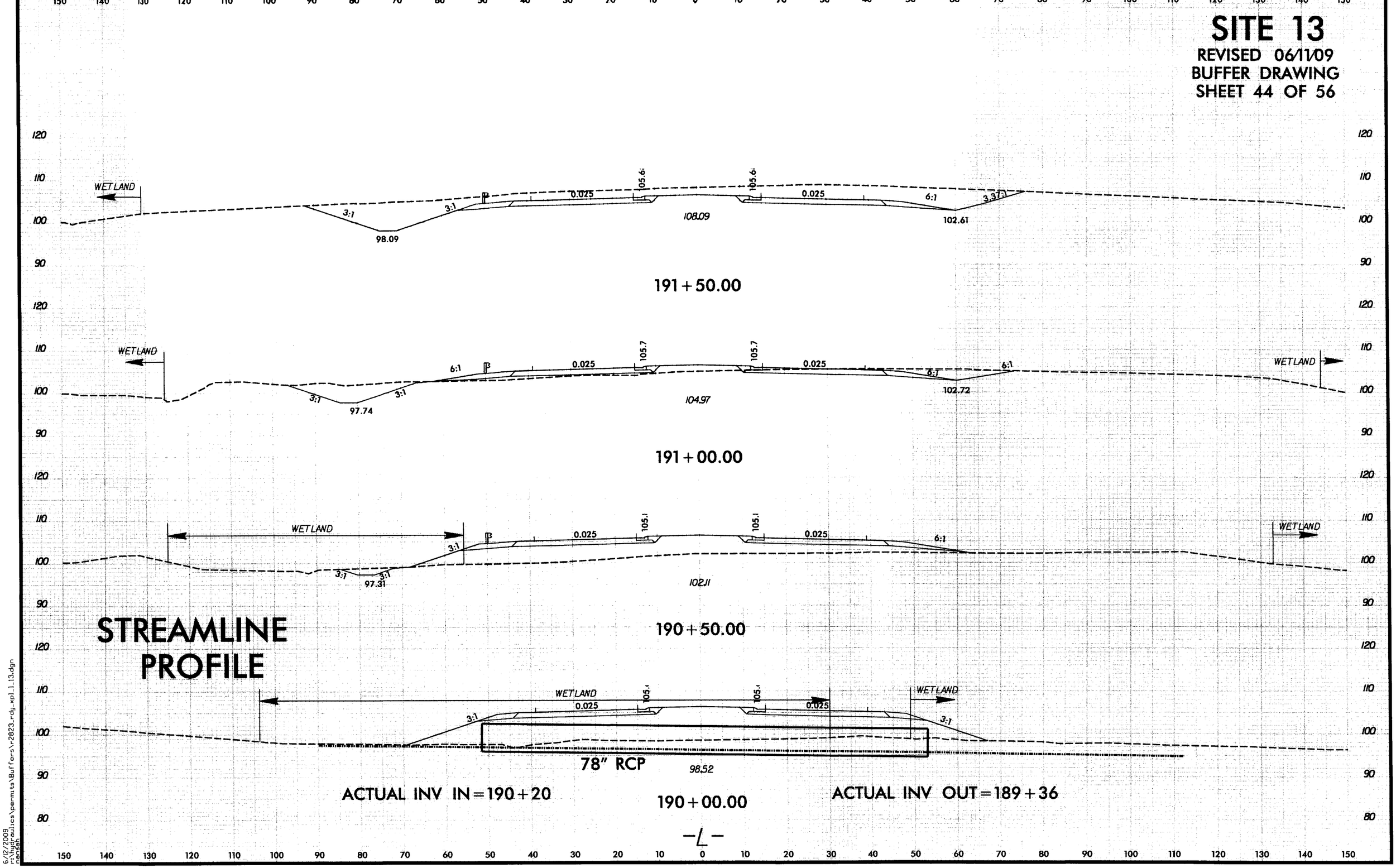
SHEET 44 OF 56



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nanash

T.I.P. PROJECT: R-2823

CONTRACT: C201917

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2823	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34509.2.GV1	STP-0431(24)	CONST.

NASH COUNTY

LOCATION: ROCKY MOUNT NORTHERN CONNECTOR FROM SR 1604 (HUNTER HILL RD.) TO US 301

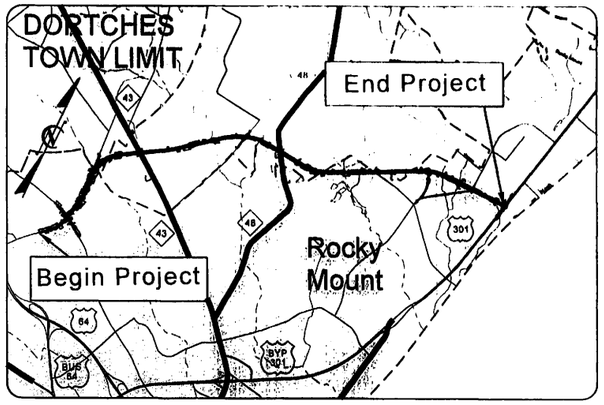
TYPE OF WORK: PAVING, GRADING, DRAINAGE, UTILITIES, STRUCTURES, CULVERTS, SOUND BARRIER WALLS, SIGNING, & SIGNALS

RFC

RELEASED FOR CONSTRUCTION

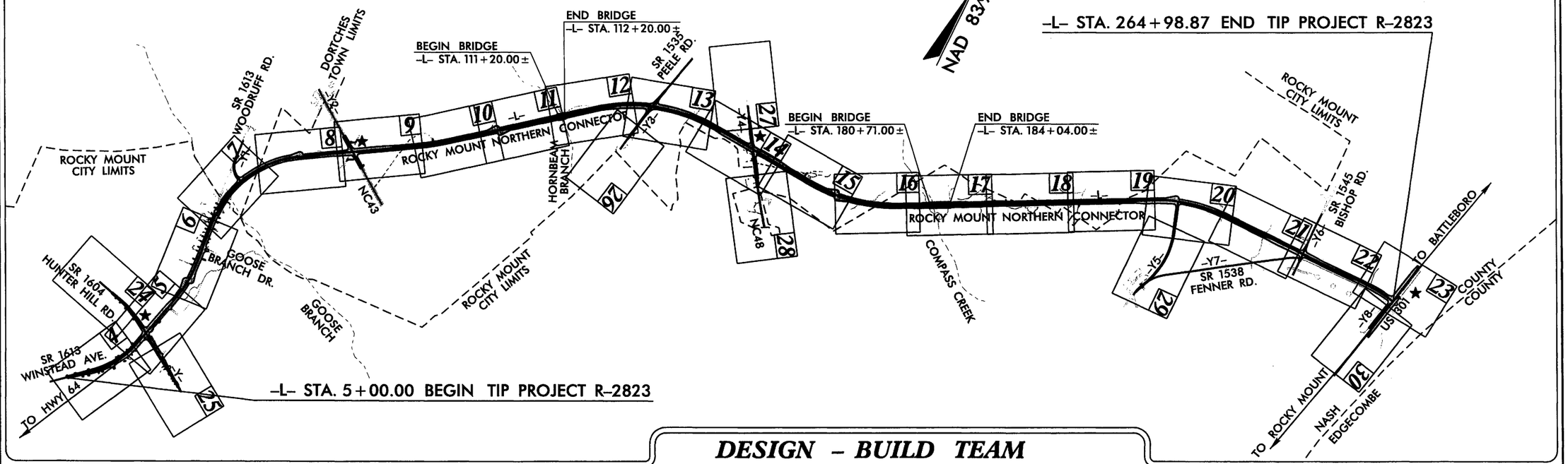
SUBMITTAL NO.: N-055
DATE: 4-17-09

SEE SHEET 1B FOR CONVENTIONAL PLAN SHEET SYMBOLS



VICINITY MAP

NOTES:
1. THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.



DESIGN - BUILD TEAM

GRAPHIC SCALES

50 0 50 100
PLANS

50 0 50 100
PROFILE (HORIZONTAL)

10 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2009	=	12,500
ADT 2030	=	24,000
DHV	=	10%
D	=	60%
T	=	7%*
V	=	60 mph

*(TTST = 3%,DUAL= 4%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2823.....	4.842 mi
LENGTH STRUCTURE TIP PROJECT R-2823.....	0.082 mi
TOTAL LENGTH TIP PROJECT R-2823.....	4.924 mi

PLANS PREPARED BY :

RK&H
RUMMEL, KLEPPER & KAHL, LLP
consulting engineers
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
FOR
DIVISION OF HIGHWAYS

2006 STANDARD SPECIFICATIONS

LETTING DATE:
MAY 20, 2008

J. T. Peacock, Jr., P.E.
PROJECT ENGINEER

Brandon J. McInnis, P.E.
PROJECT DESIGN ENGINEER

CONTRACTOR :

PLT CONSTRUCTION CO., INC.

PLT CONSTRUCTION CO., INC.
5676 THOMPSON CHAPEL CHURCH ROAD
WILSON, NORTH CAROLINA 27896

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER
M. Matthew Cook P.E.
SIGNATURE: 4/17/09

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER
Brandon J. McInnis P.E.
SIGNATURE: 4-17-09

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

04/16/09 17:48:40
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bepichande

PROJECT REFERENCE NO.	SHEET NO.
R-2823	1-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-07

EFF. 07-18-06
REV. 01-02-07

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1-A	INDEX OF SHEETS, GENERAL NOTES, AND LIST OF STANDARD DRAWINGS
1-B	CONVENTIONAL SYMBOLS
1-C	CENTERLINE COORDINATE LIST
2 THRU 2-F	PAVEMENT SCHEDULE, TYPICAL SECTIONS, AND WEDGING DETAILS
2-G THRU 2-H	INTERSECTION DETAILS
2-I	TEMPORARY DETOUR ON -L-
2-J	TEMPORARY CROSS-OVERS ON -Y8-
2-K	2'-6" CURB & GUTTER DETAIL
2-L THRU 2-U	SOUND BARRIER WALL DETAILS
2-V	GRATED DROP INLET DETAIL
3-A	ROW AREA DATA SHEET
3-B	PARCEL INDEX SHEET
4 THRU 30	PLAN SHEET
31 THRU 44	PROFILE SHEET
TCP-1 THRU TCP-42	TRAFFIC CONTROL PLANS
SIG 1 -SIG 23	SIGNAL PLANS
TMS1-TMS21	SIGNAL CABLE ROUTING
PM-1 THRU PM-5	PAVEMENT MARKING PLANS
EC-1 THRU EC-56	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-	SIGNING PLANS
U-1 THRU U-14	UTILITIES PLANS (WATER)
U-1 THRU U-11	UTILITIES PLANS (SANITARY SEWER)
X-0 THRU X-167	CROSS-SECTIONS
C-1 - C-8	CULVERT PLANS FOR GOOSE BRANCH
C-1 - C-6	CULVERT PLANS FOR UNAMED TRIBUTARY TO COMPASS CREEK
S-1 - S-26	STRUCTURE PLANS FOR HORNBEAM BRANCH LEFT LANE
S-1 - S-27	STRUCTURE PLANS FOR HORNBEAM BRANCH RIGHT LANE
S-1 - S-34	STRUCTURE PLANS FOR COMPASS CREEK LEFT LANE
S-1 - S-35	STRUCTURE PLANS FOR COMPASS CREEK RIGHT LANE

GENERAL NOTES:

2006 SPECIFICATIONS
EFFECTIVE: 07-18-06
REVISED: 07-30-08

GRADING AND SURFACING OR RESURFACING AND WIDENING:
THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

CLEARING:
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

SUPERELEVATION:
ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 AND 225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:
ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.01 AND 560.02.

SIDE ROADS:
THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

BERM DITCHES:
BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

UNDERDRAINS:
UNDERDRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.03 AT LOCATIONS DIRECTED BY THE ENGINEER.

DRIVEWAYS:
DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

STREET TURNOUT:
STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

GUARDRAIL:
THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

END BENTS:
THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:
UTILITY OWNERS ON THIS PROJECT ARE CITY OF ROCKY MOUNT, DOMINION POWER, PROGRESS ENERGY, EMBARQ, SUDDEN LINK, AND TIME WARNER CABLE.

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:
ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY CONTRACT.

WHEELCHAIR RAMPS:
WHEELCHAIR RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. THE CONSTRUCTION OF ALL WHEELCHAIR RAMPS SHALL BE IN ACCORDANCE WITH STD. NO. 848.05

2006 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated July 18, 2006 are applicable to this project and by reference hereby are considered a part of these plans:

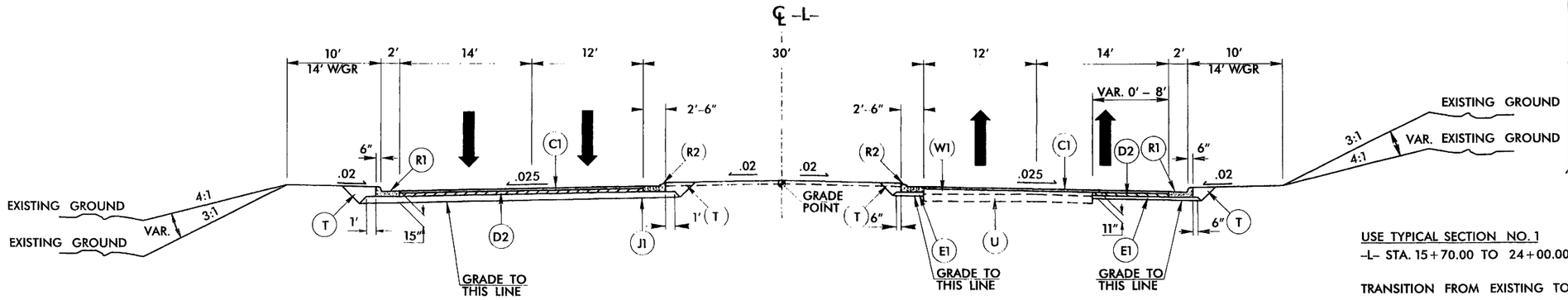
STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Super elevation - Two Lane Pavement
225.05	Method of Obtaining Super elevation - Divided Highways
240.01	Guide for Berm Ditch Construction
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation - Method 'A'
310.02	Parallel Pipe End Section - Precast Concrete Section for 15" to 24" Pipe
310.03	Cross Pipe End Section - Precast Concrete Section for 18" to 30" Pipe
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Super elevated Curve - Method I
560.02	Method of Shoulder Construction - High Side of Super elevated Curve - Method II
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.03	Pipe Under drain and Blind Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.33	Reinforced Concrete Endwall - for Single 66" Pipe 90 Skew
838.39	Reinforced Concrete Endwall - for Single 72" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.63	Reinforced Brick Endwall - for Single 66" Pipe 90 Skew
838.69	Reinforced Brick Endwall - for Single 72" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
840.35	Traffic Bearing Grated Drop Inlet - for Cust Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
852.04	Method for Placement of Drop Inlets in Grassed Median-Using 1'-6" Curb and Gutter
852.05	Median Curb for Catch Basin - for Use with 1"-6" Curb and Gutter
846.02	Drop Inlet Installation in Expressway Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.02	Driveway Turnout - Radius Type
848.05	Wheelchair Ramp - Curb Cut
850.10	Guide for Berm Drainage Outlet - 15" and 18" Pipe
850.11	Guide for Berm Drainage Outlet - 24" and 30" Pipe
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
852.10	Median Construction - with Curb and Gutter
862.01	Guardrail Placement
862.02	Guardrail Installation
862.03	Structure Anchor Units
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.02	Woven Wire Fence - with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

PROJECT REFERENCE NO.	SHEET NO.
R-2823	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-7-09

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 4/14/09

NOTE: SEE PLANS FOR LOCATION OF CONCRETE ISLANDS, AUXILLARY LANES, AND TAPERS.

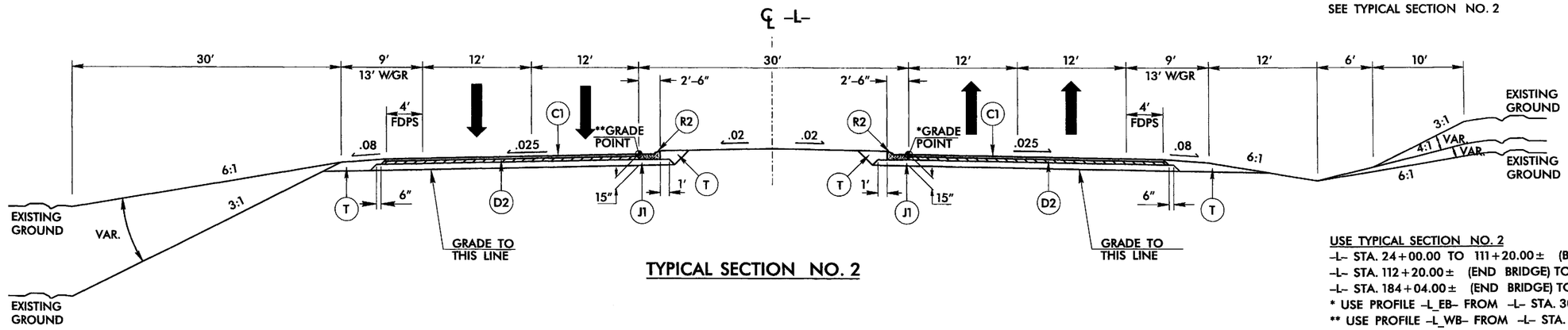


TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 15+70.00 TO 24+00.00

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 1 FROM
-L- STA. 5+20.00 TO 15+70.00

FOR SHOULDER & DITCH WIDTHS WITHIN TRANSITION AREA, SEE TYPICAL SECTION NO. 2

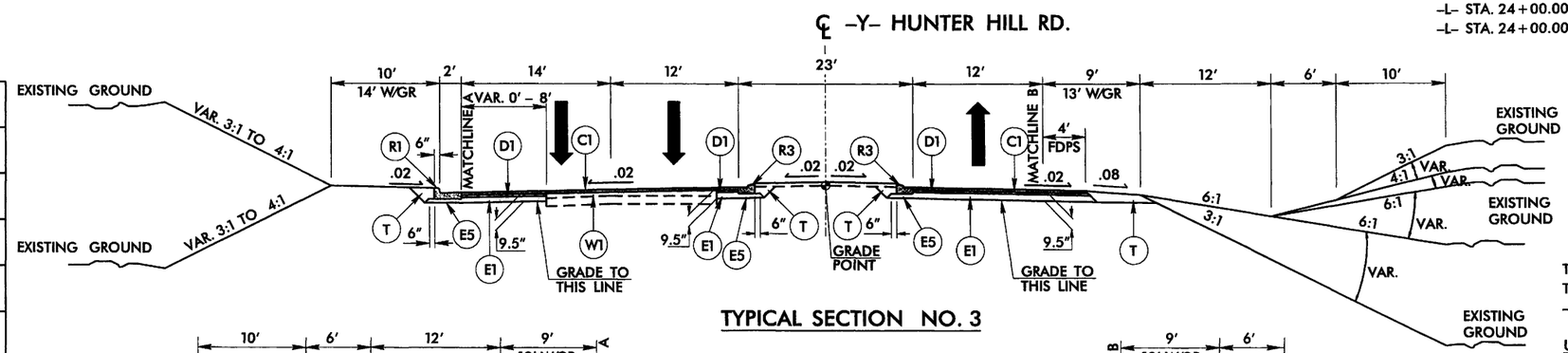


TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2
-L- STA. 24+00.00 TO 111+20.00± (BEGIN BRIDGE)
-L- STA. 112+20.00± (END BRIDGE) TO 180+71.00± (BEGIN BRIDGE)
-L- STA. 184+04.00± (END BRIDGE) TO 264+49.56
* USE PROFILE -L_EB- FROM -L- STA. 30+52.00 TO 38+25.00
** USE PROFILE -L_WB- FROM -L- STA. 218+75.00 TO 227+25.00

NOTE: USE 2'-6" CURB & GUTTER IN LIEU OF OUTSIDE SHOULDERS
-L- STA. 24+00.00 TO 29+48 +/- LT.
-L- STA. 24+00.00 TO 27+60 +/- RT.

PAVEMENT SCHEDULE	
C1	3" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
E1	4" B25.0B
J1	8" ABC
R1	2'-6" CURB & GUTTER
R2	2'-6" MOUNTABLE CURB & GUTTER
R3	1'-6" MOUNTABLE CURB & GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING

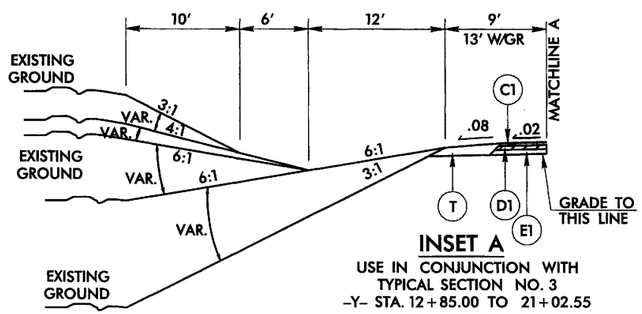


TYPICAL SECTION NO. 3

TRANSITION FROM EXISTING TO TYPICAL SECTION NO. 3 FROM
-Y- STA. 12+85.00 TO 21+45.00

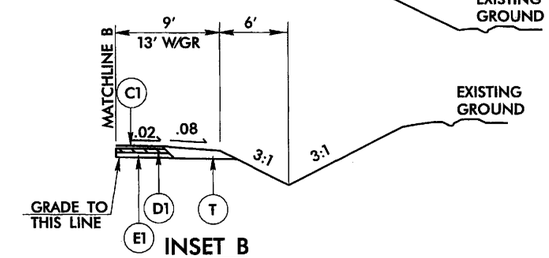
USE TYPICAL SECTION NO. 3
-Y- STA. 21+45.00 TO 28+05.00

TRANSITION FROM TYPICAL SECTION NO. 3 TO EXISTING FROM
-Y- STA. 28+05.00 TO 33+80.00



INSET A

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 3
-Y- STA. 12+85.00 TO 21+02.55



INSET B

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 3
-Y- STA. 30+00.00 TO 33+00.00 RT

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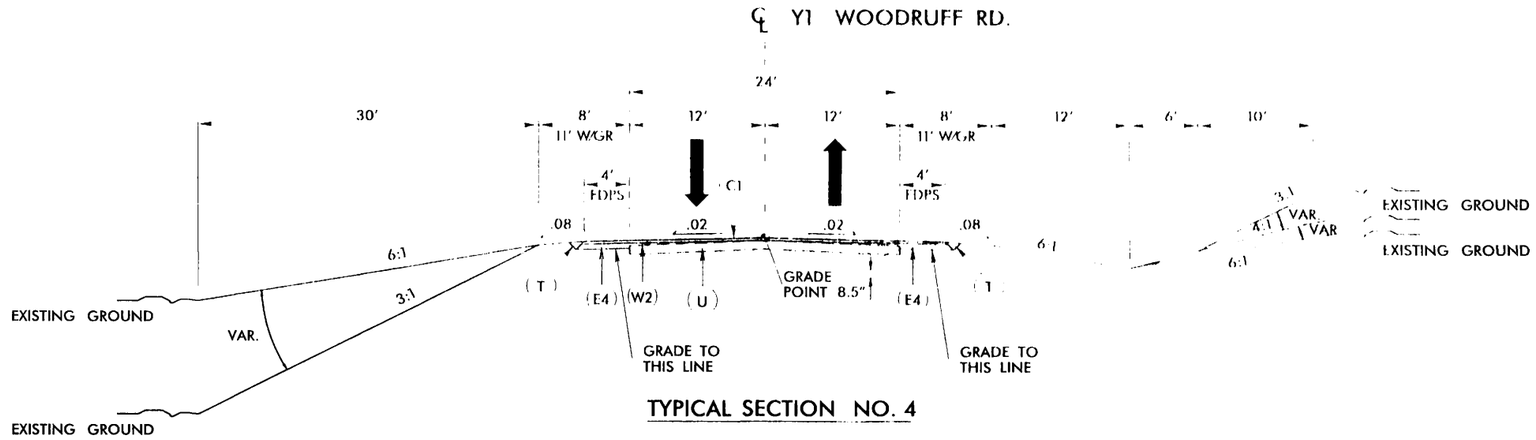
PROJECT REFERENCE NO.	SHEET NO.
R-2823	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McMINN 4-9-09

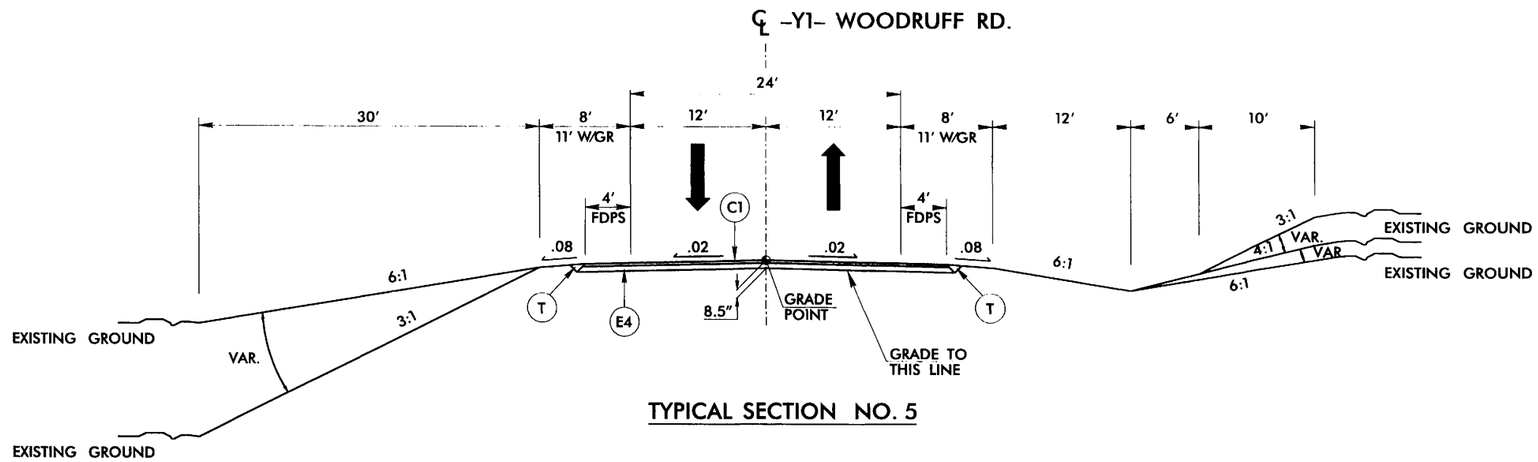
NORTH CAROLINA PROFESSIONAL SEAL 22886 ENGINEER CLARK S. MORRISON 4/16/09

NOTE: SEE PLANS FOR LOCATION OF CONCRETE ISLANDS, AUXILLARY LANES, AND TAPERS.



TYPICAL SECTION NO. 4

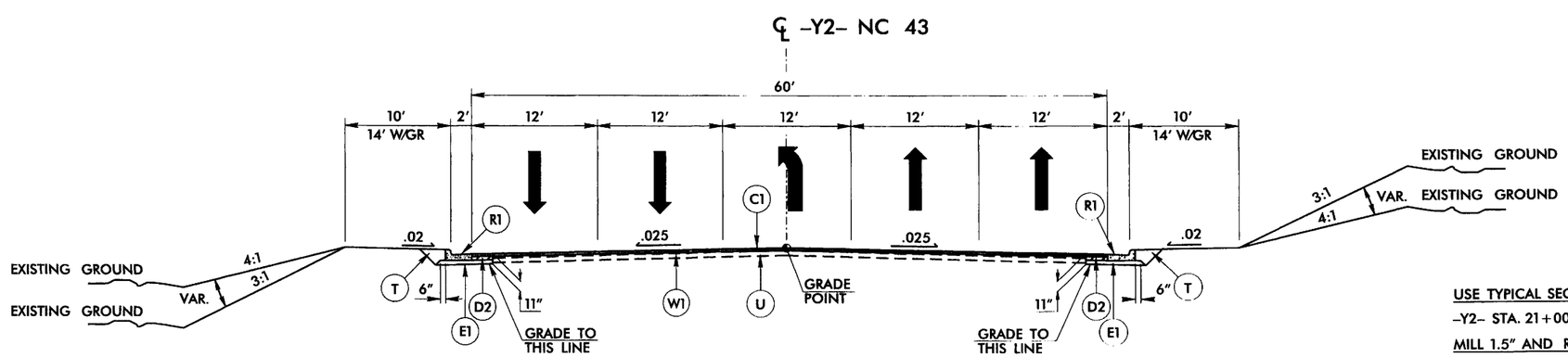
USE TYPICAL SECTION NO. 4
-Y1- STA. 12+95.00 TO 14+95 +/-



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
-Y1- STA. 14+95 +/- TO 17+57.51

PAVEMENT SCHEDULE	
C1	3" S9.5B
D2	4" I19.0B
E1	4" B25.0B
E4	5½" B25.0B
R1	2'-6" CURB & GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING
W2	WEDGING



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6
-Y2- STA. 21+00.00 TO 24+00.00
MILL 1.5" AND REPLACE W/1.5" S9.5B
-Y2- STA. 19+30.00 TO 21+00.00
-Y2- STA. 24+00.00 TO 25+75.00

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bcpowell

PROJECT REFERENCE NO.	SHEET NO.
R-2823	2C
R/W SHEET NO.	

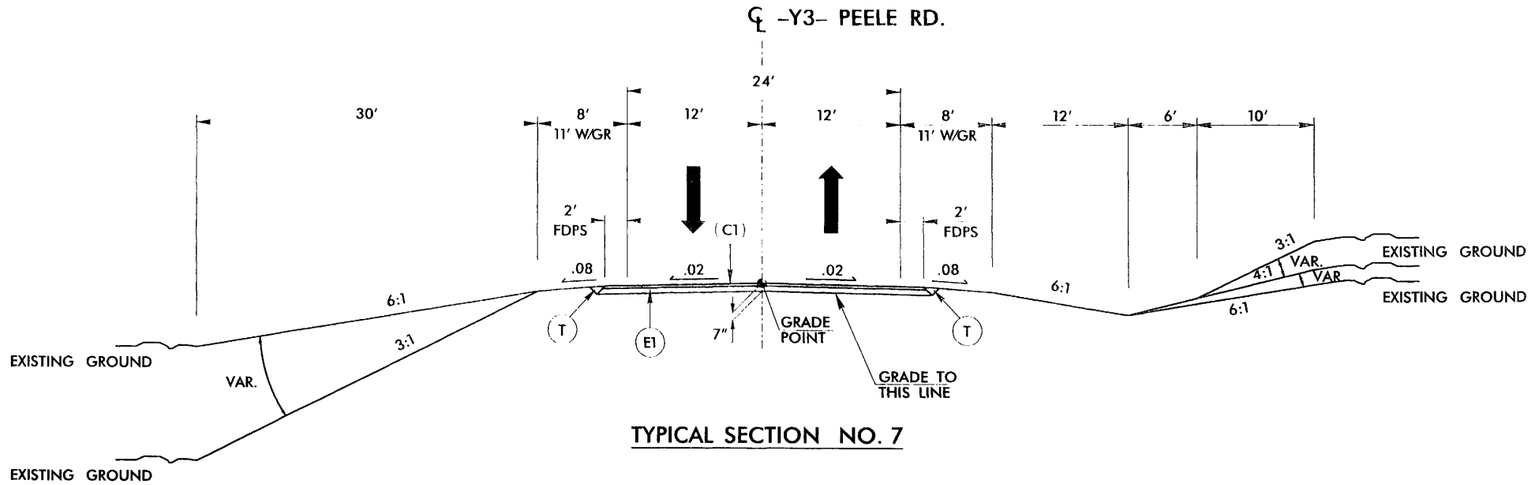
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McDANIEL 4-7-09

PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 4-7-09

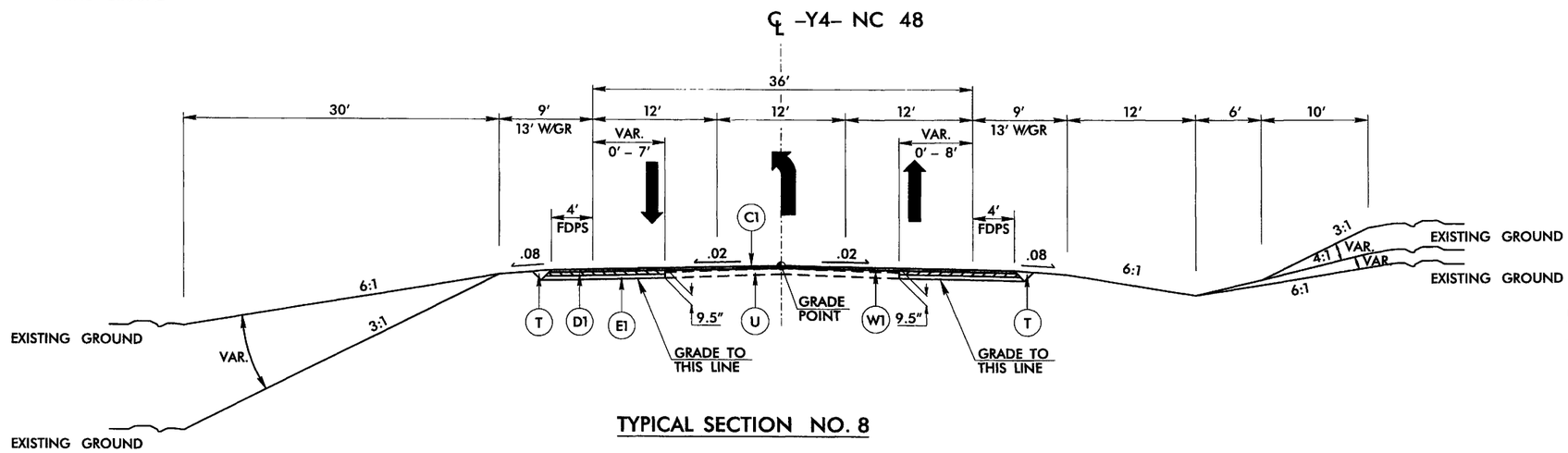
NOTE: SEE PLANS FOR LOCATION OF AUXILLARY LANES AND TAPERS.



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

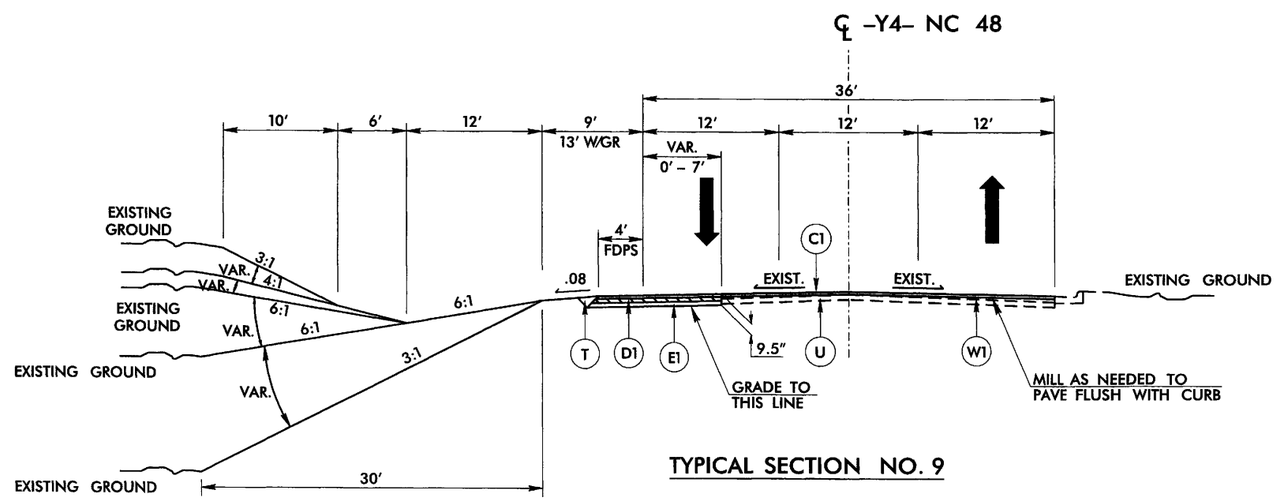
-Y3- STA. 17+33.00 TO 28+40.00



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8

-Y4- STA. 11+90.00 TO 22+00.00



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

-Y4- STA. 22+00.00 TO 24+50.00

PAVEMENT SCHEDULE	
C1	3" S9.5B
D1	2½" I19.0B
E1	4" B25.0B
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING

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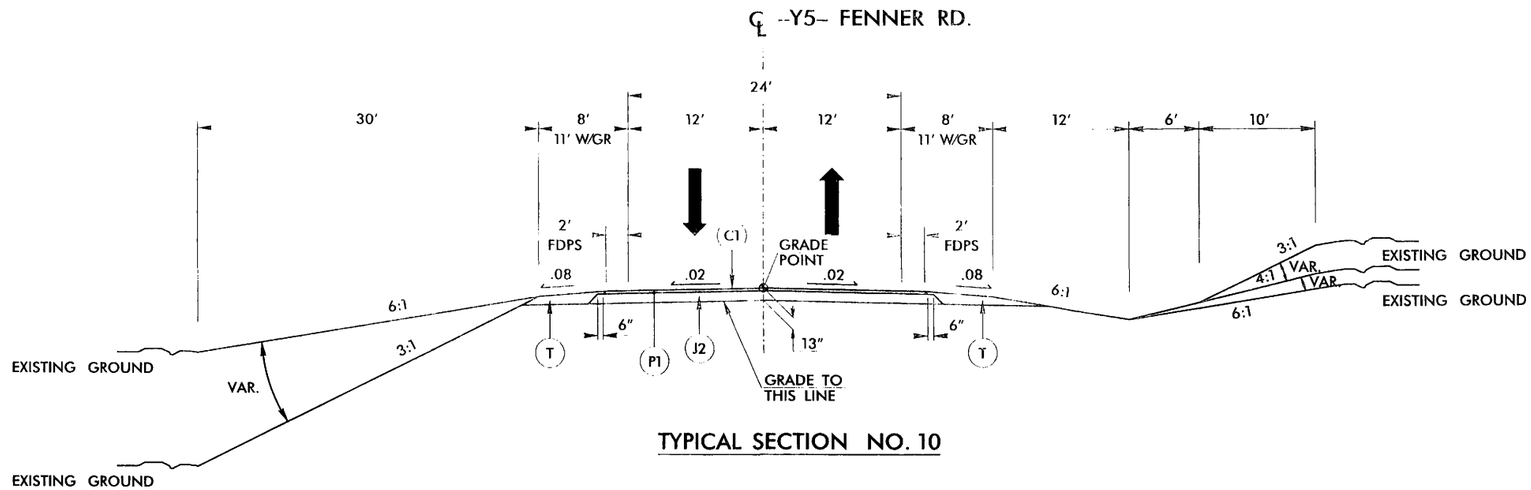
bcampbell

PROJECT REFERENCE NO.	SHEET NO.
R-2823	2D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT ENGINEER

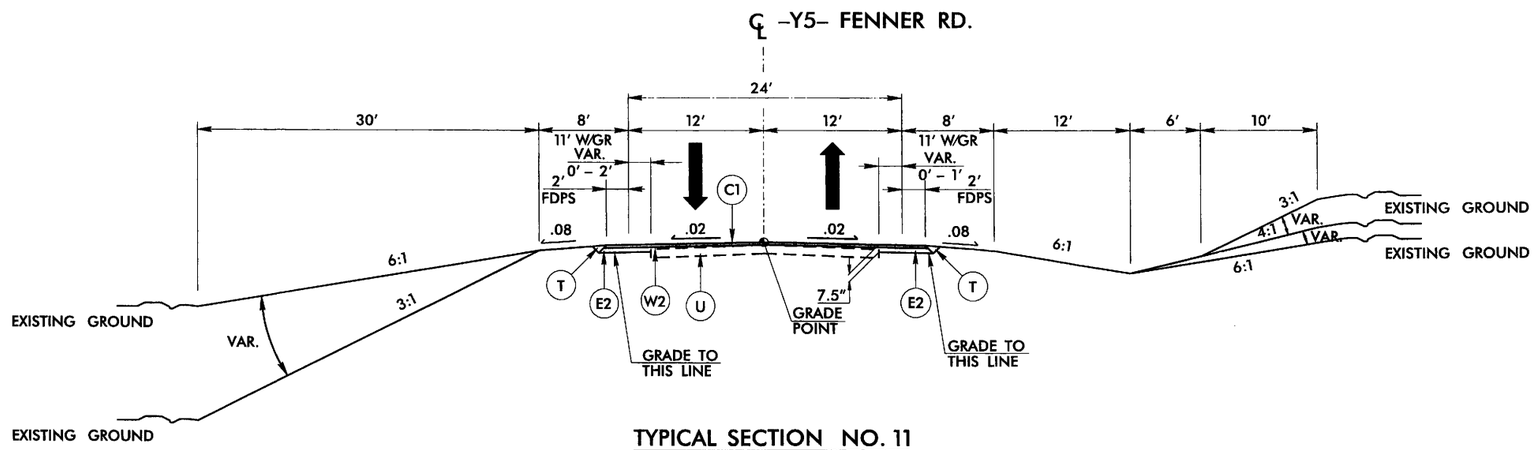
NOTE: SEE PLANS FOR LOCATION OF AUXILLARY LANES AND TAPERS.



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

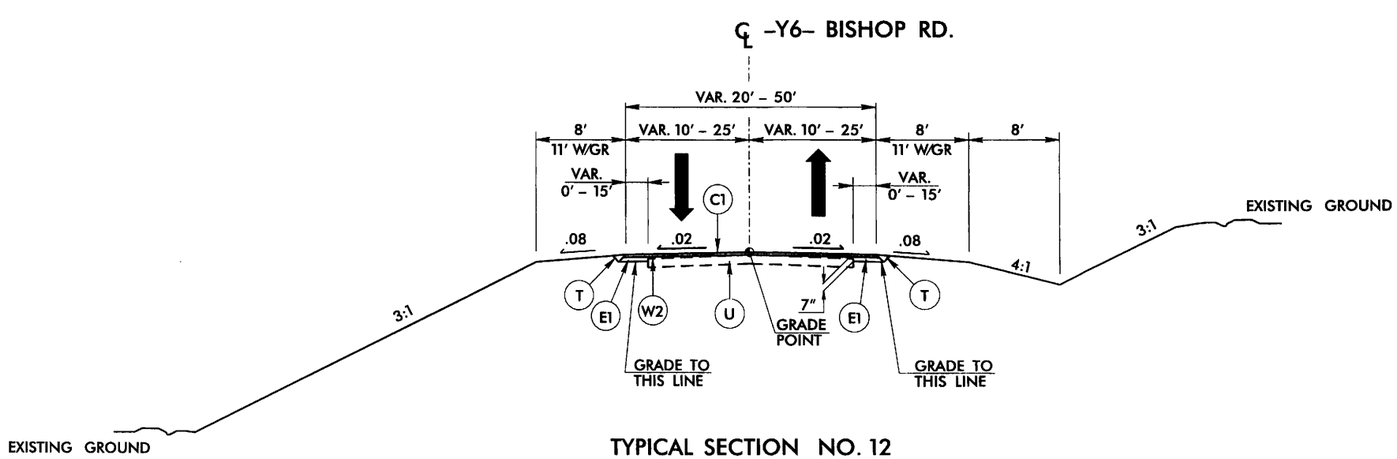
-Y5- STA. 10+39.00 TO 24+65 +/-



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11

-Y5- STA. 24+65 +/- TO 28+15.00



TYPICAL SECTION NO. 12

USE TYPICAL SECTION NO. 12

-Y6- STA. 16+00.00 TO 19+25.00

PAVEMENT SCHEDULE	
C1	3" S9.5B
E1	4" B25.0B
E2	4½" B25.0B
J2	10" ABC
P1	PRIME COAT
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W2	WEDGING

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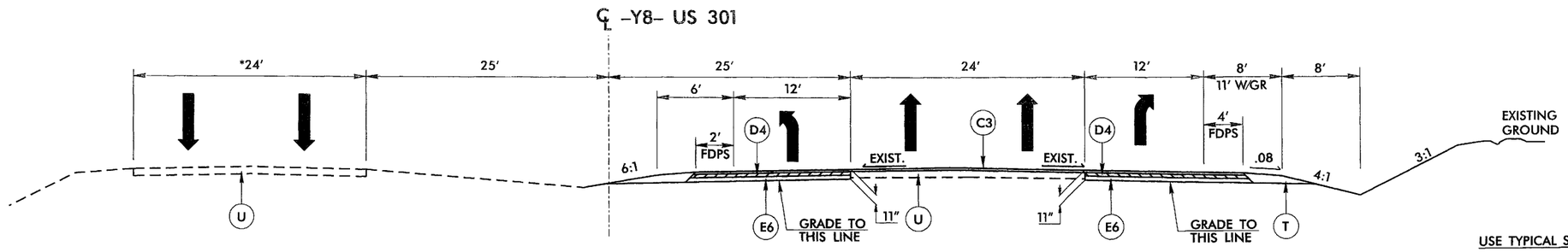
PROJECT REFERENCE NO.	SHEET NO.
R-2823	2E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McDANIEL 4-7-09

NORTH CAROLINA PROFESSIONAL SEAL 22896 ENGINEER CLARK S. MORRISON 4/14/09

NOTE: SEE PLANS FOR LOCATION OF AUXILLARY LANES AND TAPERS.

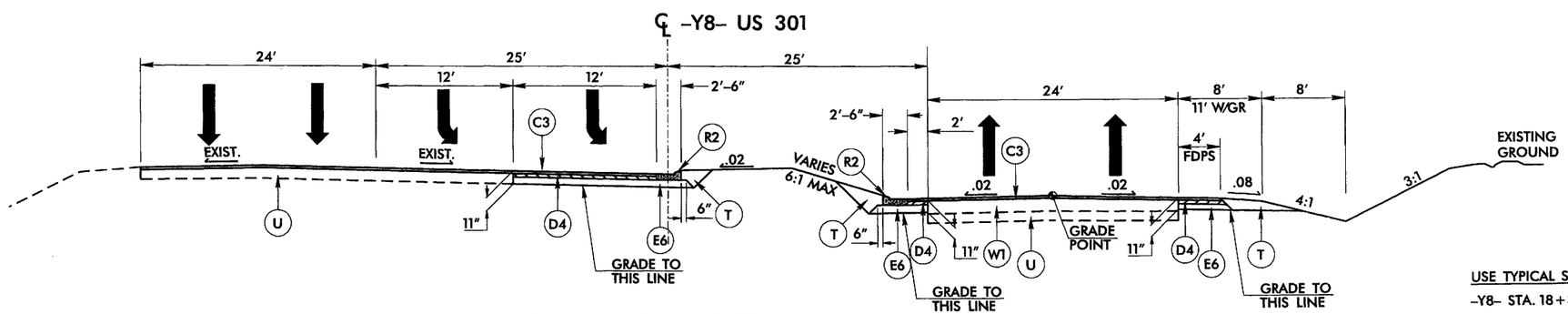


TYPICAL SECTION NO. 13

USE TYPICAL SECTION NO. 13

-Y8- STA. 10+51.50 TO 18+30.00

* RESURFACE NB LANES WITH 3" S9.5C FROM -Y8- STA. 16+79.96 TO 18+30.00



TYPICAL SECTION NO. 14

USE TYPICAL SECTION NO. 14

-Y8- STA. 18+30.00 TO 25+75.57

PAVEMENT SCHEDULE	
C3	3" S9.5C
D4	4" I19.0C
E6	4" B25.0C
R2	2'-6" MOUNTABLE CURB & GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W1	WEDGING

8/17/99

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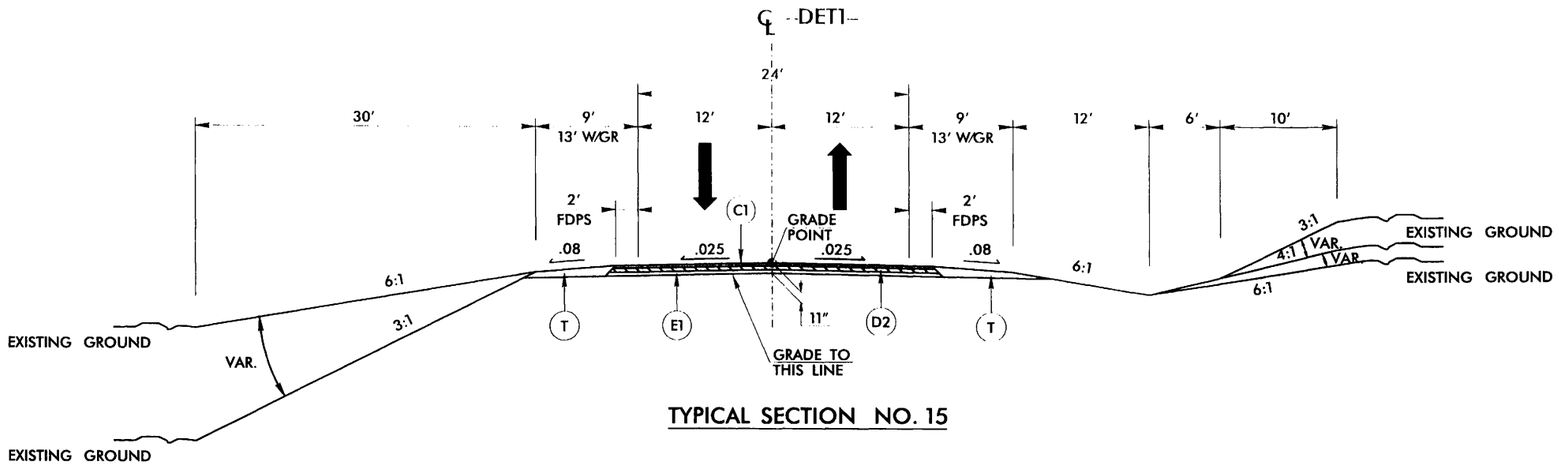
bcarlsons

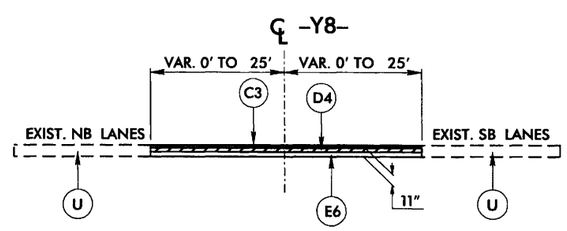
PROJECT REFERENCE NO.	SHEET NO.
R-2823	2F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 15

USE TYPICAL SECTION NO. 15
-DET1- STA. 10+00.00 TO 12+23.03



TYPICAL SECTION NO. 16

PROPOSED PAVEMENT FOR MEDIAN CROSS-OVERS
-CR1-, -CR2-, -CR3-, & -CR4-

USE TYPICAL SECTION NO. 16
-Y8- STA. 12+75.96 TO 17+10.34
-Y8- STA. 29+28.74 TO 33+29.84

PAVEMENT SCHEDULE	
C1	3" S9.5B
C3	3" S9.5C
D2	4" I19.0B
D4	4" I19.0C
E1	4" B25.0B
E6	4" B25.0C
T	EARTH MATERIAL
U	EXIST. PAVEMENT

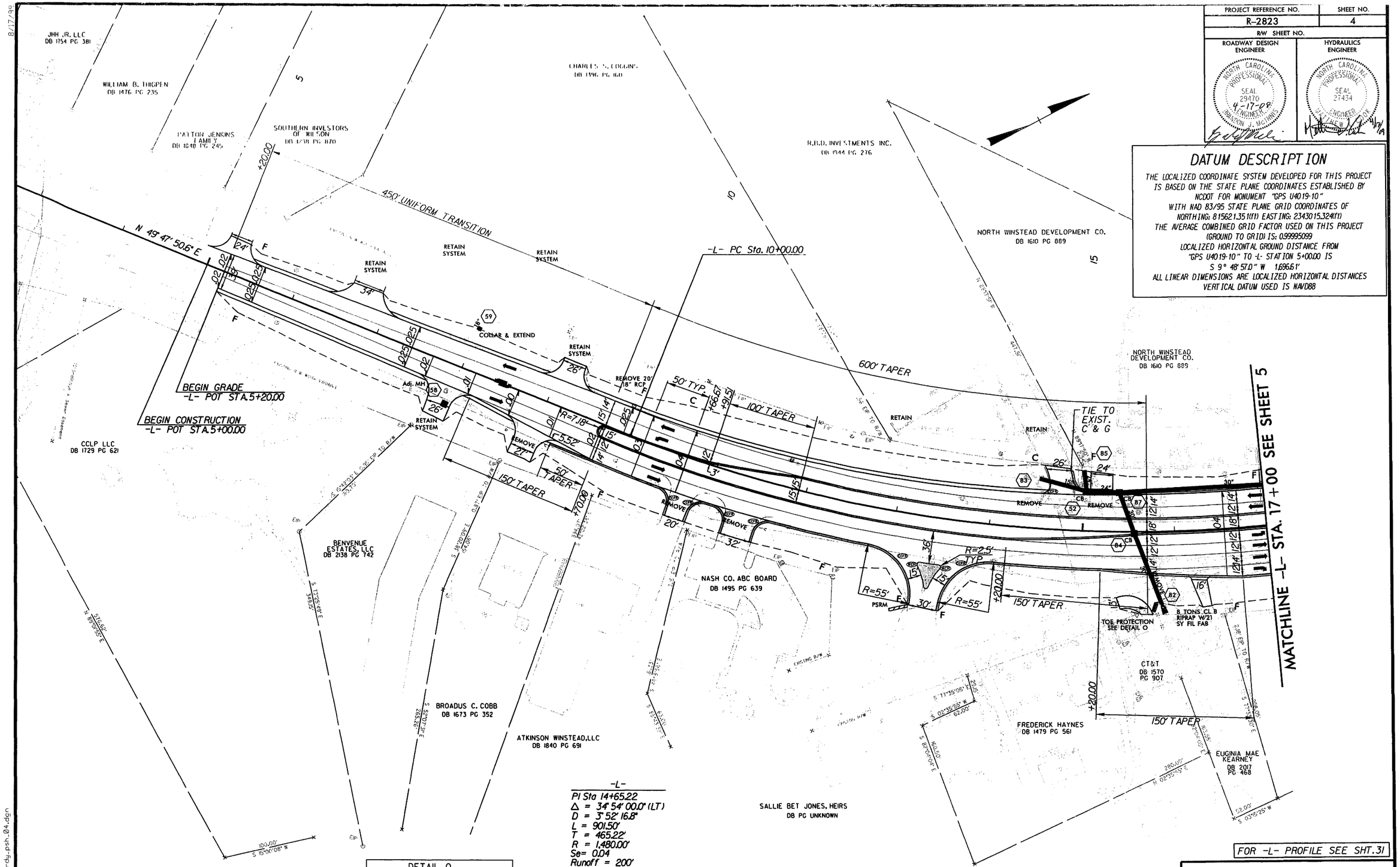
PROJECT REFERENCE NO.	SHEET NO.
R-2823	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McDONALD 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW D. LEWIS 4/17/09

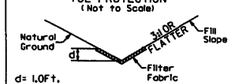
DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS U4019-10"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 815621.351(ft) EASTING: 2343015.324(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995099
LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS U4019-10" TO -L- STATION 5+00.00 IS
S 9° 48' 57.0" W 1,696.61'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD88



-L-
PI Sta 14+65.22
Δ = 34° 54' 00.0" (LT)
D = 3° 52' 16.8"
L = 901.50'
T = 465.22'
R = 1,480.00'
Se= 0.04
Runoff = 200'

DETAIL O
TOE PROTECTION
(Not to Scale)



d= 1.0Ft.
Type of Liner= Class B Rip-Rap
FROM -L- STA. 15+75, L=14'

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	9+20.00	20+84.79	RT
2'-6" C&G	-L-	14+84.50	21+48.87	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

FOR -L- PROFILE SEE SHT.31

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

8/17/99

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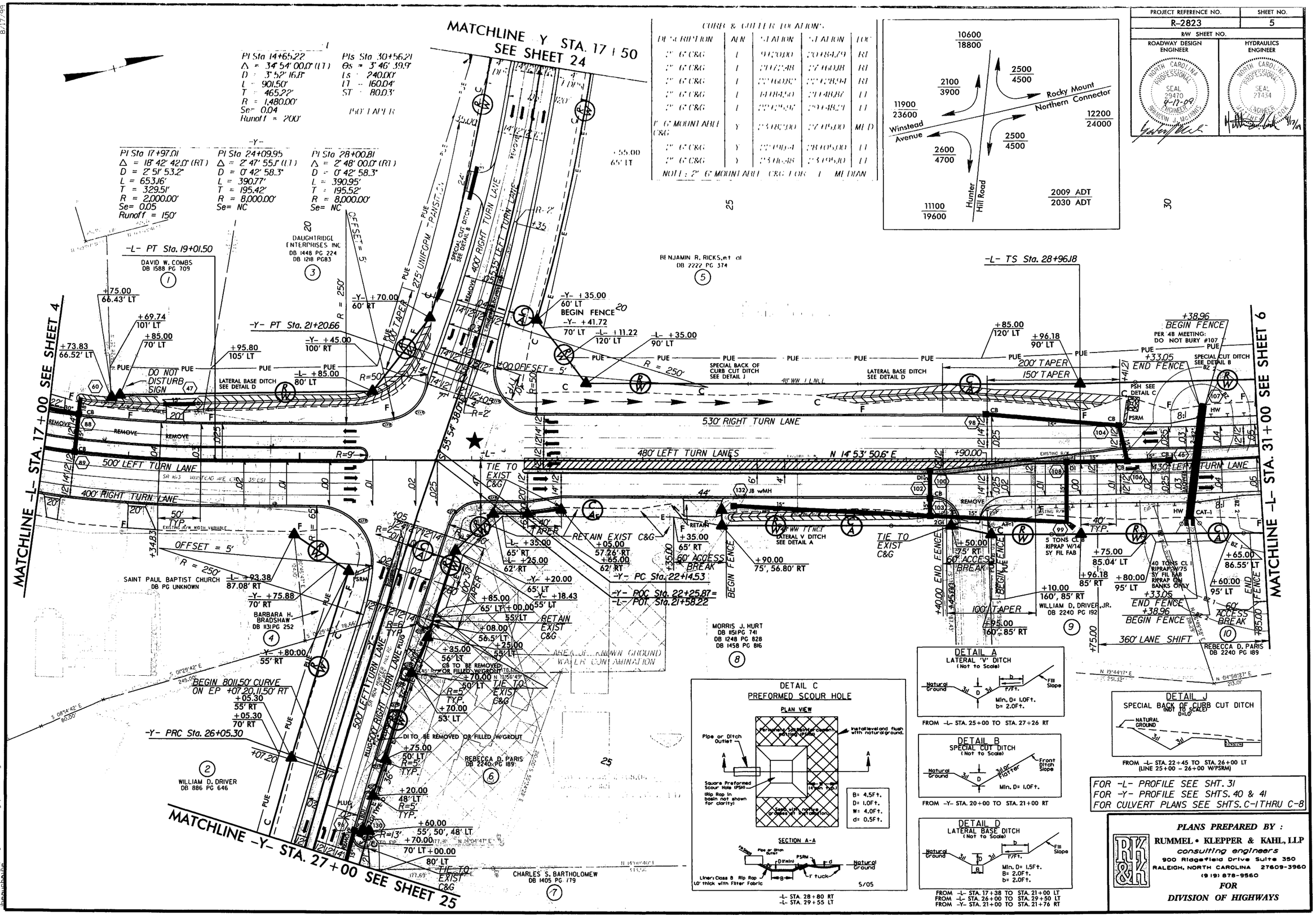
jbergchaine

PROJECT REFERENCE NO.	SHEET NO.
R-2823	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CURB & GUTTER LOCATIONS

DESCRIPTION	ALIN	STATION	STATION	LOC
2" 6" C&G	L	9+73.00	20+84.79	RT
2" 6" C&G	L	21+77.48	22+60.18	RT
2" 6" C&G	L	22+60.82	22+78.94	RT
2" 6" C&G	L	14+84.50	21+48.87	LT
2" 6" C&G	L	22+29.97	29+48.21	LT
2" 6" MOUNTABLE C&G	Y	23+88.00	27+05.00	MED
2" 6" C&G	Y	27+99.14	28+05.00	LT
2" 6" C&G	Y	23+06.38	23+95.30	LT

NOTE: 2" 6" MOUNTABLE C&G FOR L MEDIAN

25

30

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

FROM -L- STA. 25+00 TO STA. 27+26 RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)

FROM -Y- STA. 20+00 TO STA. 21+00 RT

DETAIL D
LATERAL BASE DITCH
(Not to Scale)

FROM -L- STA. 17+38 TO STA. 21+00 LT
FROM -L- STA. 26+00 TO STA. 29+50 LT
FROM -Y- STA. 21+00 TO STA. 21+76 RT

DETAIL C
PREFORMED SCOUR HOLE

-L- STA. 28+80 RT
-L- STA. 29+55 LT

DETAIL J
SPECIAL BACK OF CURB CUT DITCH
(NOT TO SCALE)

FROM -L- STA. 22+45 TO STA. 26+00 LT
(LINE 25+00 - 26+00 W/PSRM)

FOR -L- PROFILE SEE SHT. 31
FOR -Y- PROFILE SEE SHTS. 40 & 41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-8

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

8/17/99

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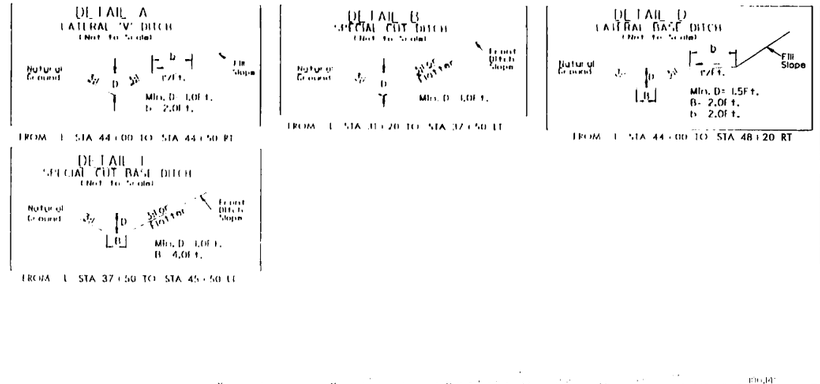
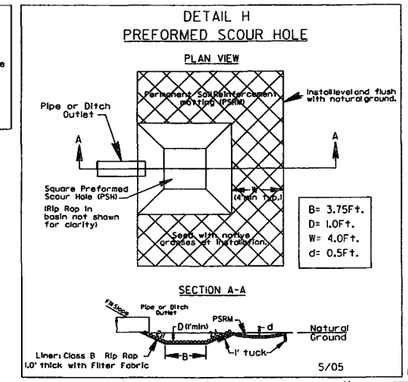
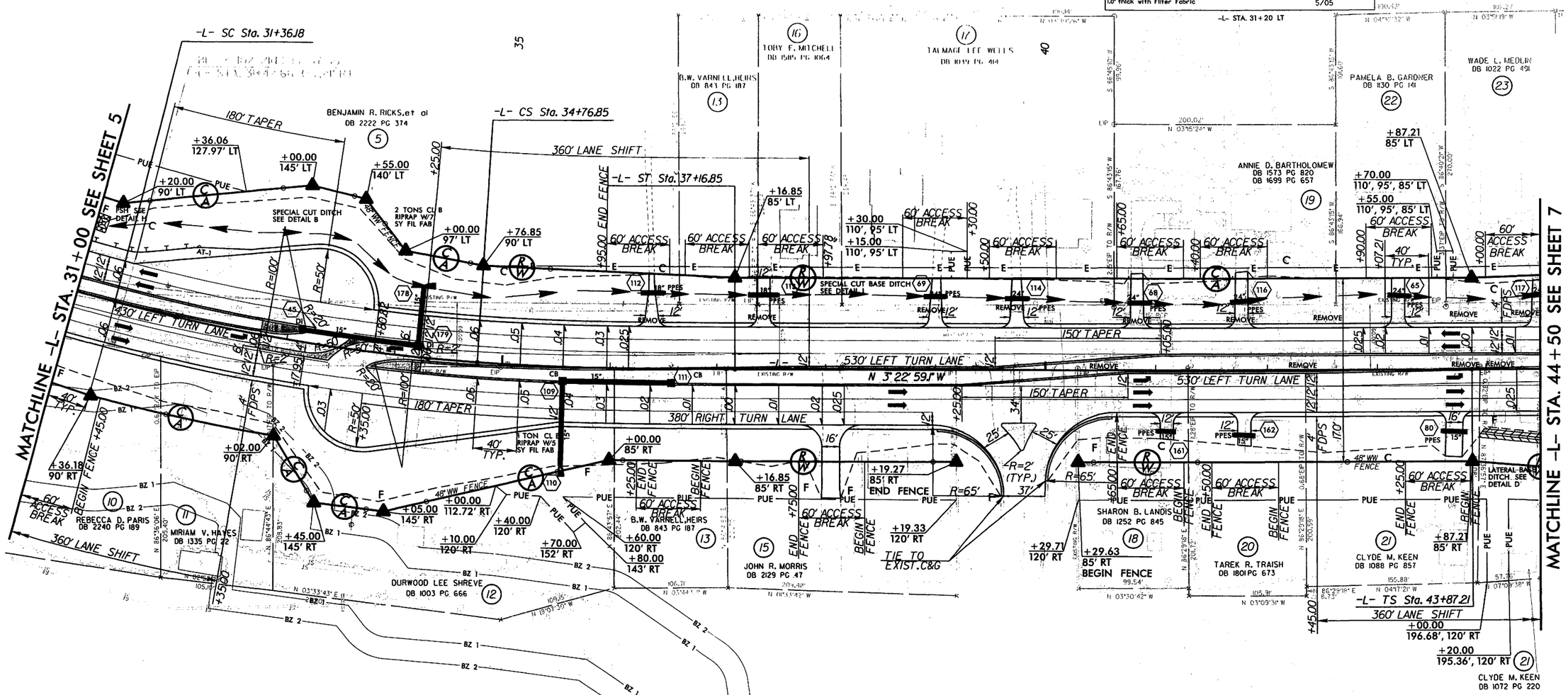
luzwinshape

PROJECT REFERENCE NO.	SHEET NO.
R-2823	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER







-L-			
Pls Sta 30+56.21	Pl Sta 33+07.01	Pls Sta 35+56.89	Pls Sta 45+47.25
Θs = 3°46' 39.9"	Δ = 10°43' 29.9" (LT)	Θs = 3°46' 39.9"	Θs = 3°46' 39.9"
Ls = 240.00'	D = 3°08' 53.2"	Ls = 240.00'	Ls = 240.00'
LT = 160.04'	L = 340.68'	LT = 160.04'	LT = 160.04'
ST = 80.03'	T = 170.84'	ST = 80.03'	ST = 80.03'
	R = 1,820.00'		
	Se= 0.06		
	Runoff = 240'		

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-L-	39+01.41	40+60.63	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

FOR -L- PROFILE SEE SHTS. 31 & 32

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8/17/99

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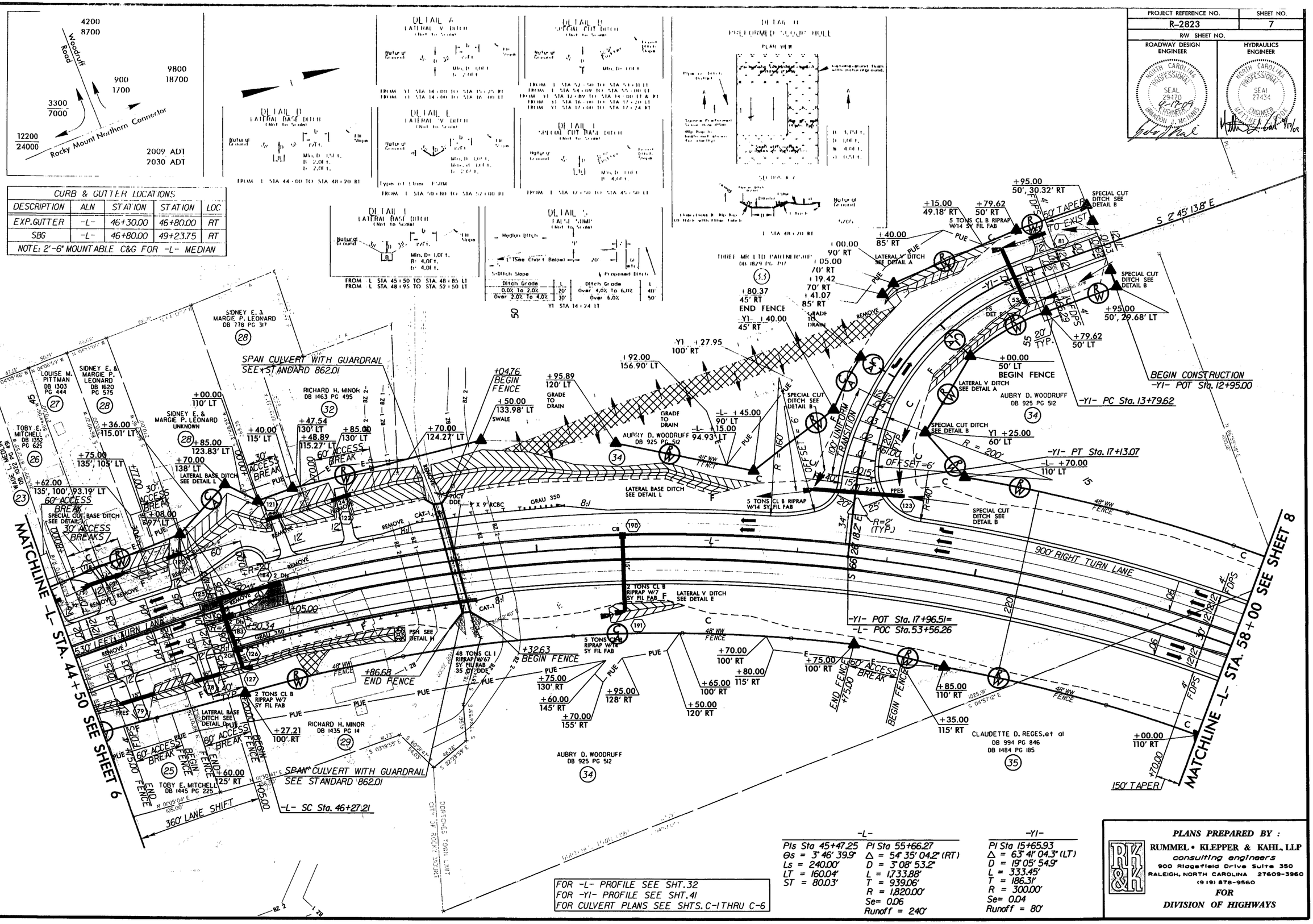
PROJECT REFERENCE NO.	SHEET NO.
R-2823	7
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. MCDANIELS 9-17-09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 9/17/09



CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
EXP.GUTTER	-L-	46+30.00	46+80.00	RT
SBG	-L-	46+80.00	49+23.75	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

FROM -L- STA 44+00 TO STA 48+20 RT

FROM -L- STA 45+50 TO STA 48+85 LT
FROM -L- STA 48+95 TO STA 52+50 LT

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

Y1 STA 14+24 LT

FROM -L- STA 46+80 TO STA 52+00 RT

FROM -L- STA 47+50 TO STA 45+50 LT

FROM -L- STA 48+20 RT

FOR -L- PROFILE SEE SHT.32
FOR -Y1- PROFILE SEE SHT.41
FOR CULVERT PLANS SEE SHTS. C-1 THRU C-6

-L-	
PIs Sta 45+47.25	PI Sta 55+66.27
θs = 3° 46' 39.9"	Δ = 54° 35' 04.2" (RT)
Ls = 240.00'	D = 3° 08' 53.2"
LT = 160.04'	L = 1,733.88'
ST = 80.03'	T = 939.06'
	R = 1,820.00'
	Se= 0.06
	Runoff = 240'

-Y1-
PI Sta 15+65.93
Δ = 63° 41' 04.3" (LT)
D = 19° 05' 54.9"
L = 333.45'
T = 186.31'
R = 300.00'
Se= 0.04
Runoff = 80'

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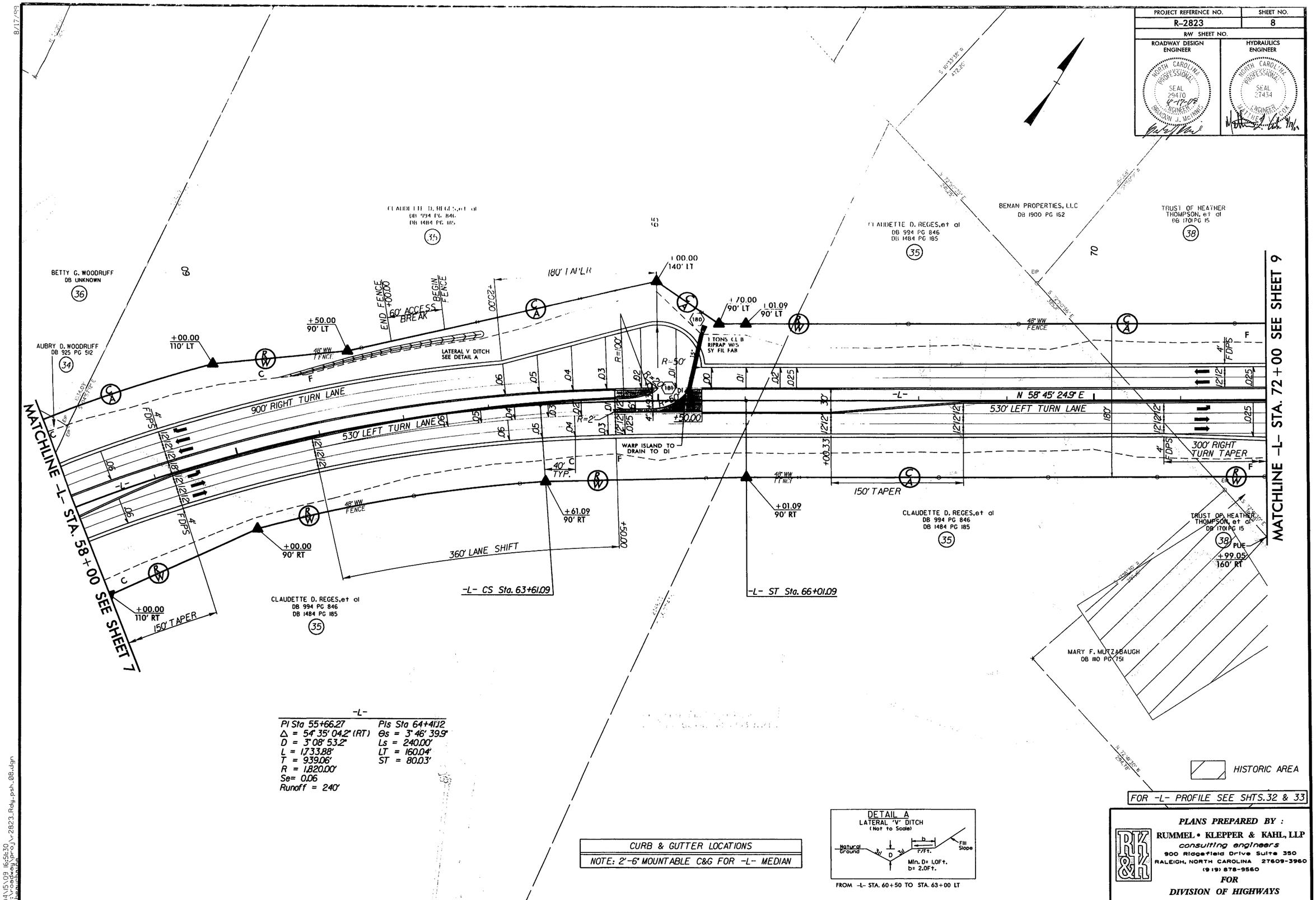
PROJECT REFERENCE NO.	SHEET NO.
R-2823	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. MCINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW D. COX 4/17/09



-L-

PI Sta 55+66.27	PIs Sta 64+41.12
Δ = 54° 35' 04.2" (RT)	Θs = 3° 46' 39.9"
D = 3° 08' 53.2"	Ls = 240.00'
L = 1,733.88'	LT = 160.04'
T = 939.06'	ST = 80.03'
R = 1,820.00'	
Se= 0.06	
Runoff = 240'	

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

DETAIL A
LATERAL "V" DITCH
(Not to Scale)

FROM -L- STA. 60+50 TO STA. 63+00 LT

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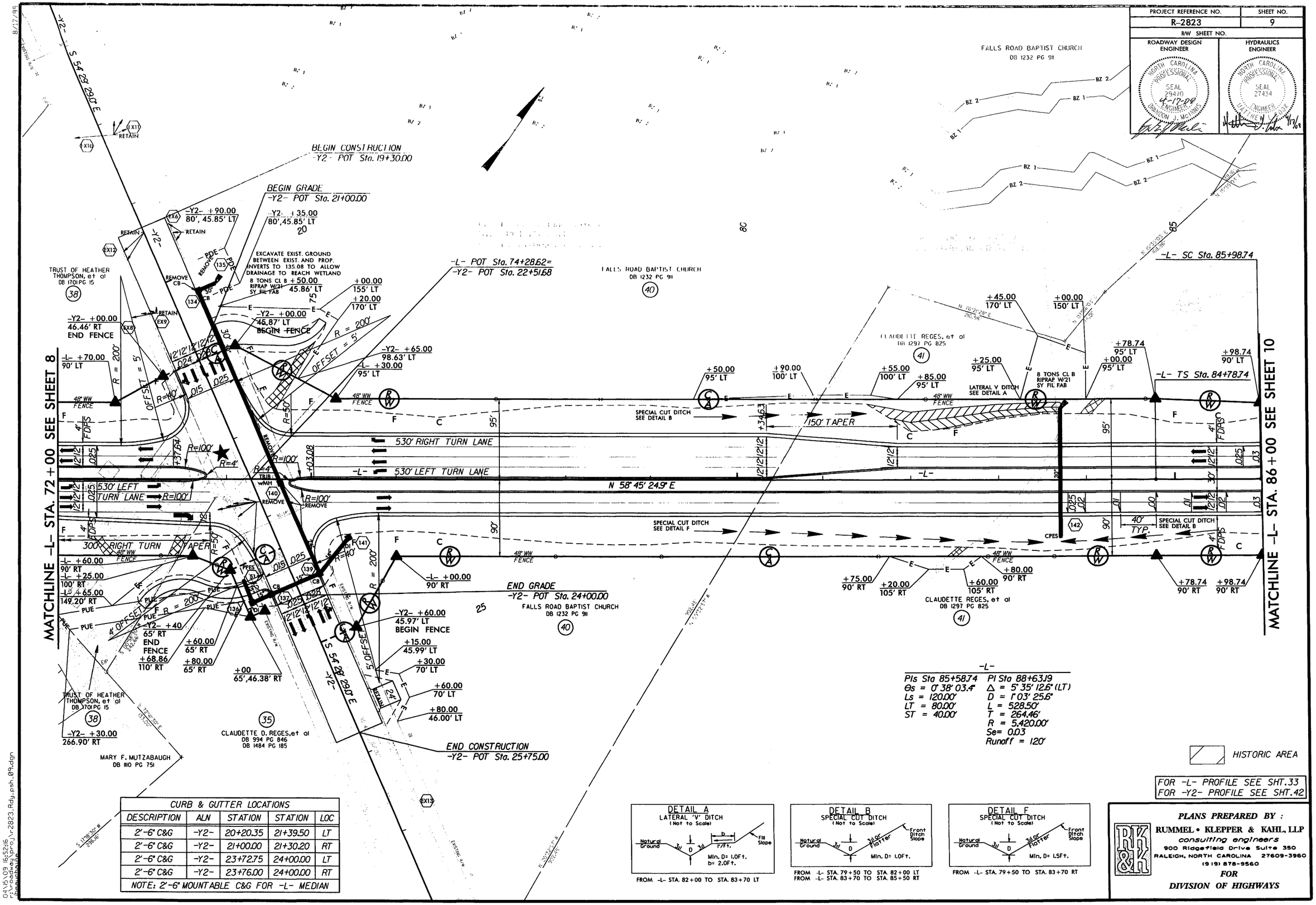
PROJECT REFERENCE NO.	SHEET NO.
R-2823	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-Y2-	20+20.35	21+39.50	LT
2'-6" C&G	-Y2-	21+00.00	21+30.20	RT
2'-6" C&G	-Y2-	23+72.75	24+00.00	LT
2'-6" C&G	-Y2-	23+76.00	24+00.00	RT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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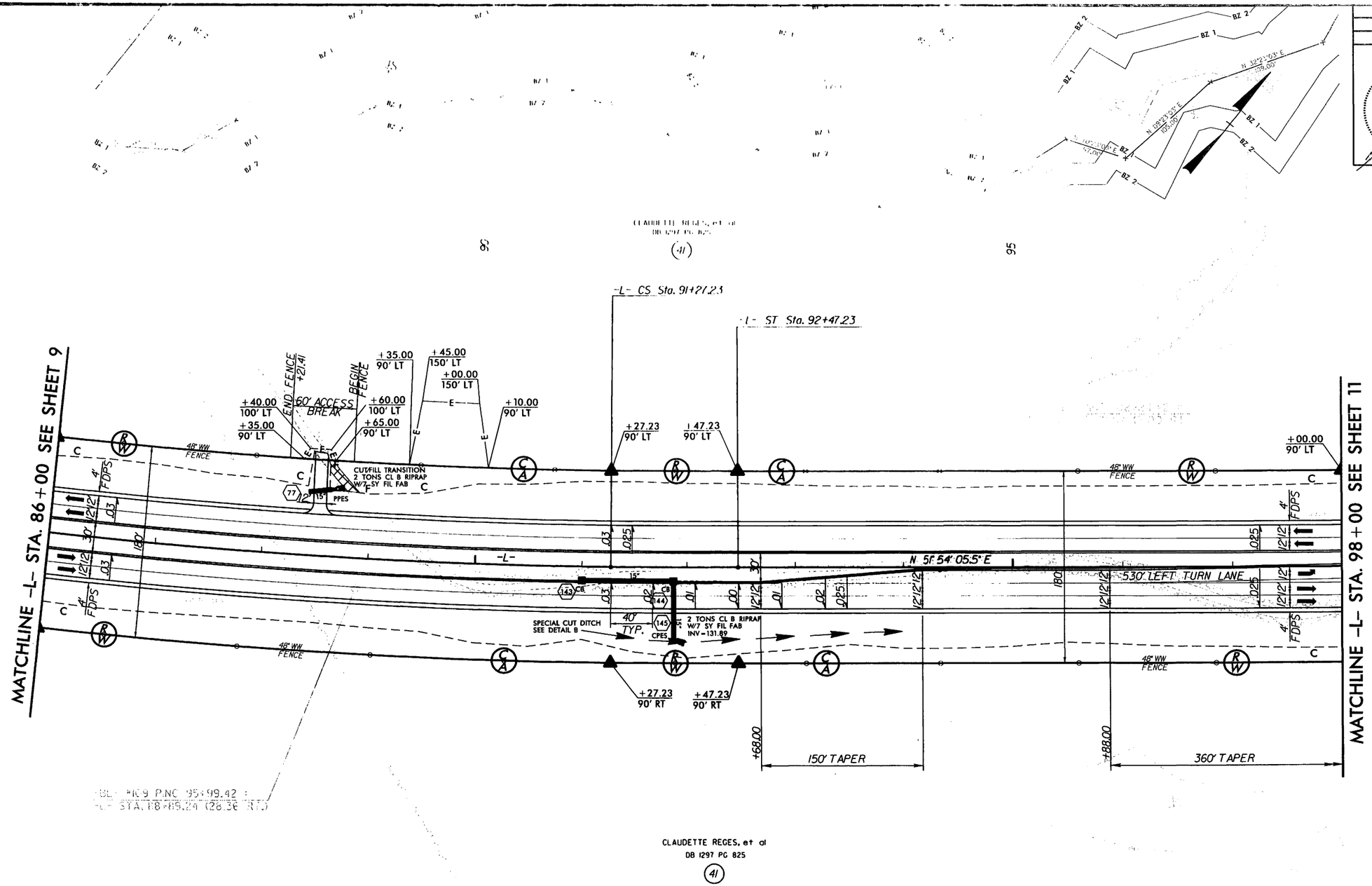
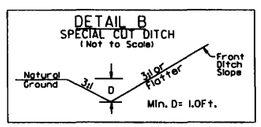
PROJECT REFERENCE NO.	SHEET NO.
R-2823	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CLAUDETTE REGES, et al
DB 1297 PG 825
41

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -L- STA. 91+00 TO STA. 94+00 RT

-L-

PI Sta 88+63.19	PIs Sta 91+67.23
Δ = 5° 35' 12.6" (LT)	θs = 0° 38' 03.4"
D = 1° 03' 25.6"	Ls = 120.00'
L = 528.50'	LT = 80.00'
T = 264.46'	ST = 40.00'
R = 5,420.00'	
Se= 0.03	
Runoff = 120'	

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

FOR -L- PROFILE SEE SHTS.33 & 34

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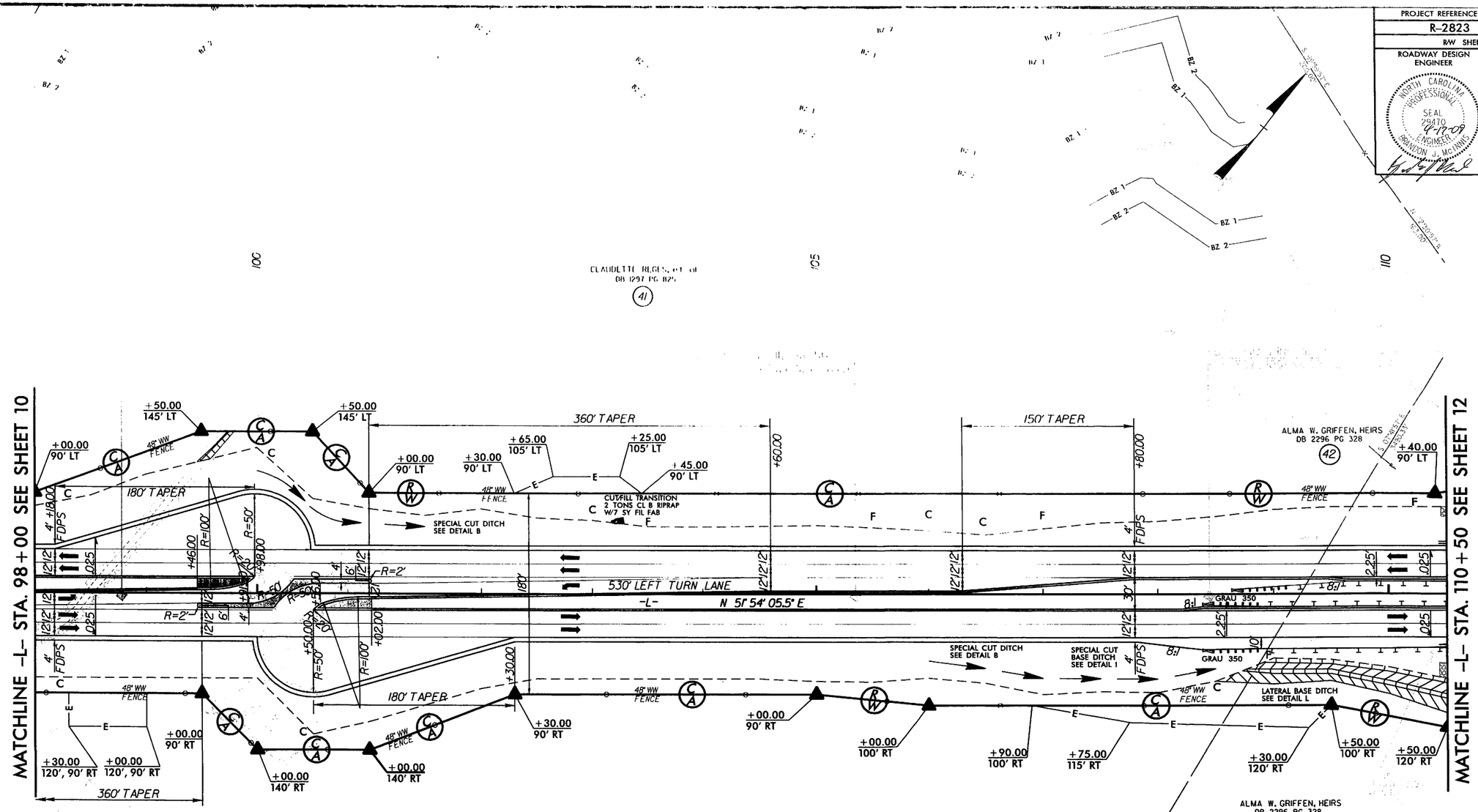
PROJECT REFERENCE NO.	SHEET NO.
R-2823	11
R/W SHEET NO.	

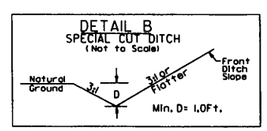
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 22470 ENGINEER BRANDON J. McKINNIS 6-12-09

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW L. ATKINS 6/12/09

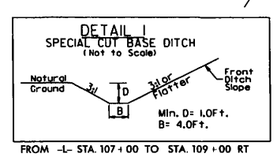


CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	110+43.00	110+96.00	RT
EXP.GUTTER	-L-	110+43.00	110+82.50	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

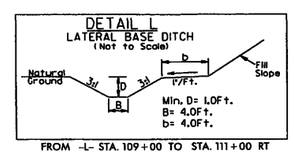
FOR -L- PROFILE SEE SHT.34



FROM -L- STA. 100+00 TO STA. 101+50 LT
FROM -L- STA. 106+00 TO STA. 107+00 RT



FROM -L- STA. 107+00 TO STA. 109+00 RT



FROM -L- STA. 109+00 TO STA. 111+00 RT

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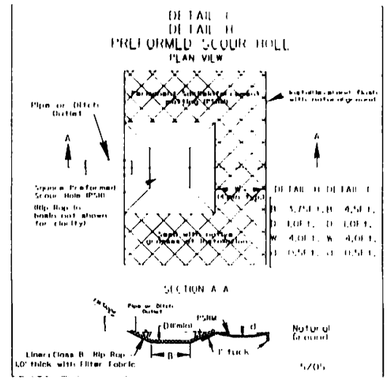
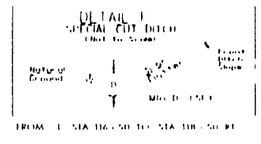
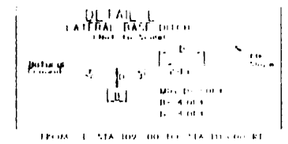
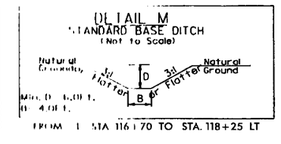
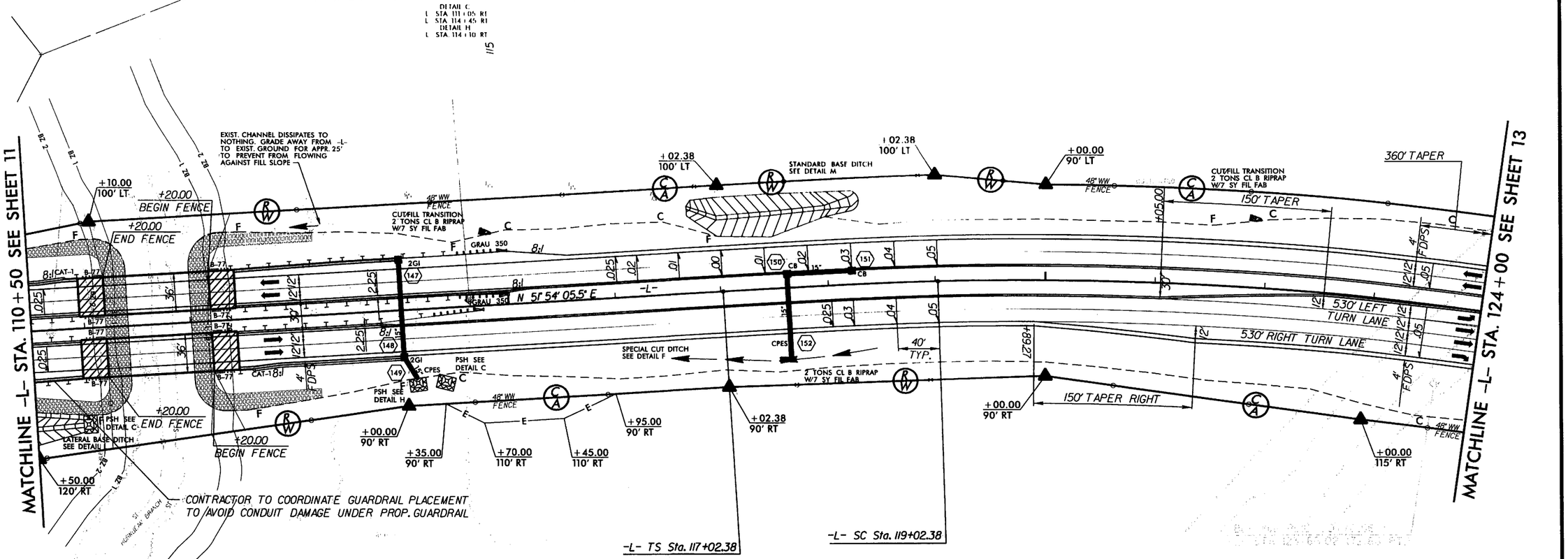
PROJECT REFERENCE NO.	SHEET NO.
R-2823	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER









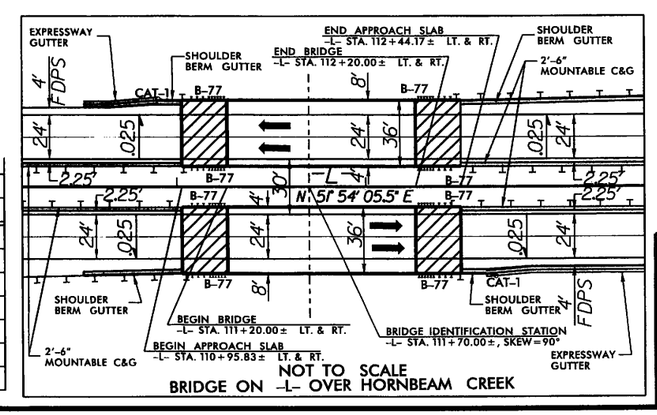


-L-

PIs Sta 118+35.72	PI Sta 129+52.93
Θs = 1° 56' 08.4"	Δ = 39° 04' 51.9" (RT)
Ls = 200.00'	D = 1° 56' 08.4"
LT = 133.34'	L = 2,019.00'
ST = 66.67'	T = 1,050.55'
	R = 2,960.00'
	Se = 0.05
	Runoff = 200'

ALMA W. GRIFFEN, HEIRS
DB 2296 PG 328
(42)

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	110+43.00	110+96.00	RT
SBG	-L-	112+44.00	112+57.61	RT
EXP. GUTTER	-L-	112+57.61	114+00.00	RT
EXP. GUTTER	-L-	110+43.00	110+82.50	LT
SBG	-L-	110+82.50	110+96.00	LT
SBG	-L-	112+44.00	114+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				



FOR -L- PROFILE SEE SHTS. 34 & 35
FOR BRIDGE LEFT LANE PLANS SEE SHTS. S-1 THRU S-26
FOR BRIDGE RIGHT LANE PLANS SEE SHTS. S-1 THRU S-27

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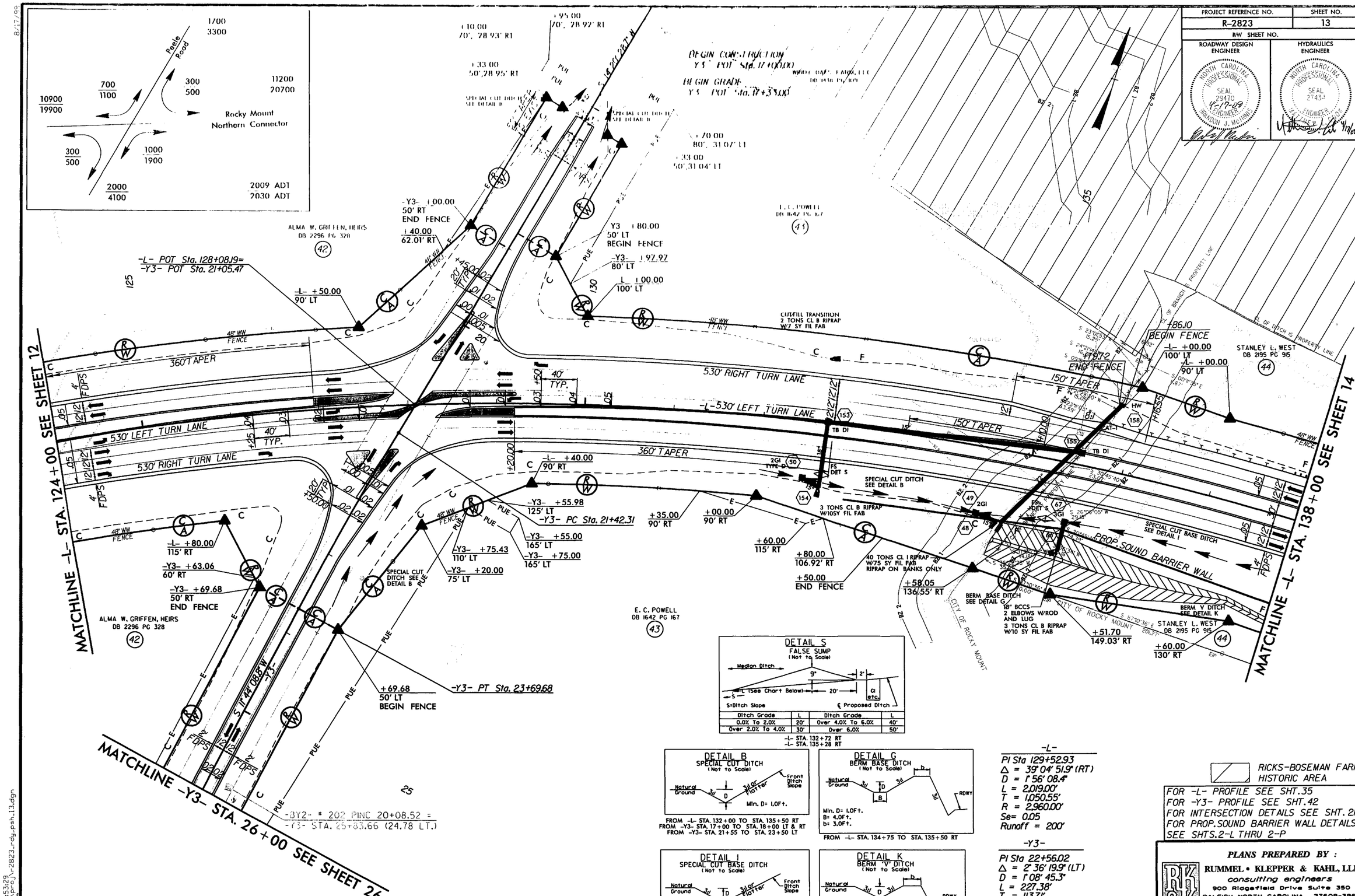
PROJECT REFERENCE NO.	SHEET NO.
R-2823	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



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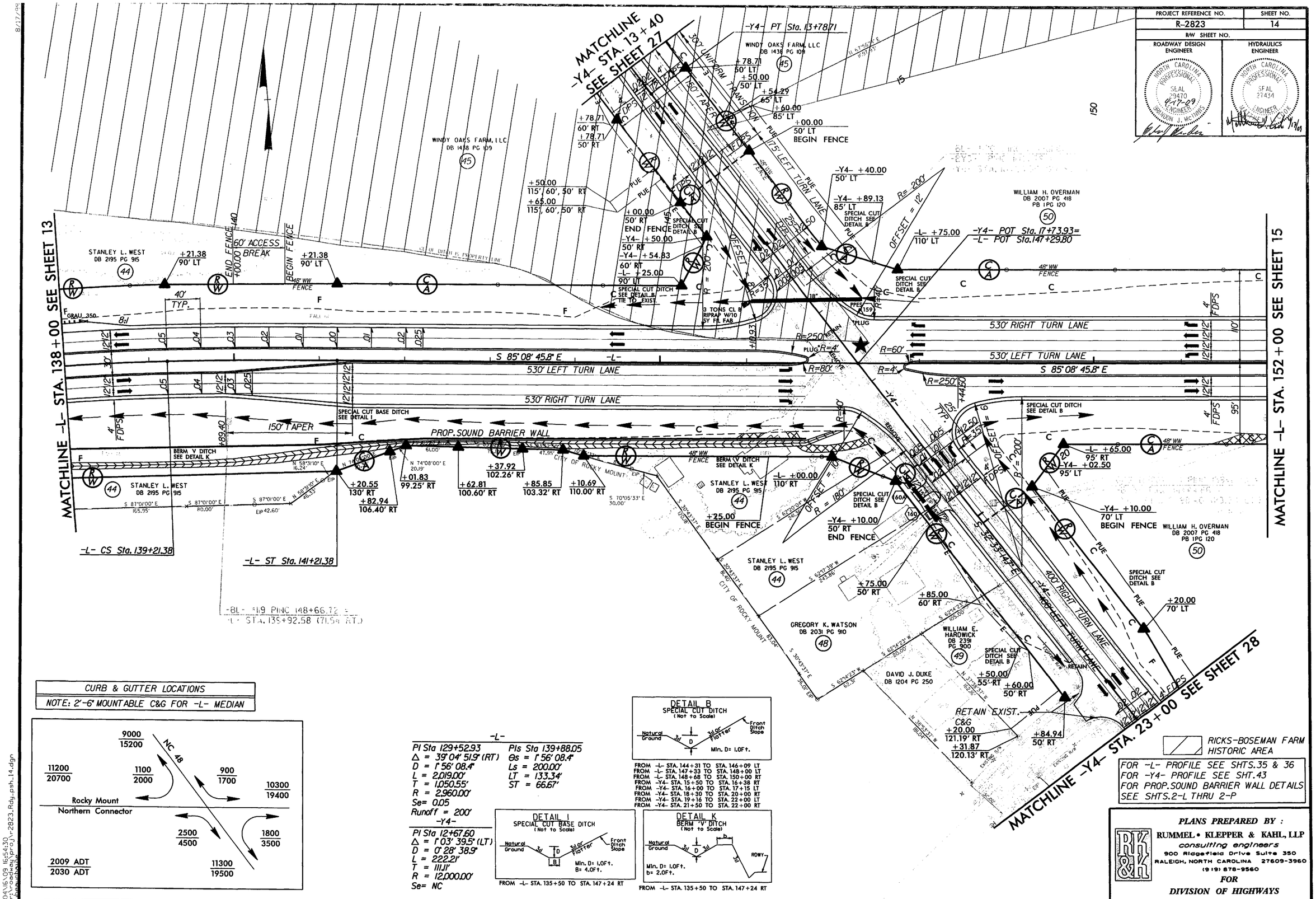
PROJECT REFERENCE NO.	SHEET NO.
R-2823	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CURB & GUTTER LOCATIONS
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

-L-

PI Sta 129+52.93
Δ = 39° 04' 51.9" (RT)
D = 1° 56' 08.4"
L = 2,019.00'
T = 1,050.55'
R = 2,960.00'
Se= 0.05
Runoff = 200'

PIs Sta 139+88.05
θs = 1° 56' 08.4"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-Y4-

PI Sta 12+67.60
Δ = 1° 03' 39.5" (LT)
D = 0° 28' 38.9"
L = 222.21'
T = 111.11'
R = 12,000.00'
Se= NC

DETAIL I
SPECIAL CUT BASE DITCH
(Not to Scale)

FROM -L- STA. 135+50 TO STA. 147+24 RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)

FROM -L- STA. 144+31 TO STA. 146+09 LT
FROM -L- STA. 147+33 TO STA. 148+00 LT
FROM -L- STA. 148+68 TO STA. 150+00 RT
FROM -Y4- STA. 15+50 TO STA. 16+38 RT
FROM -Y4- STA. 16+00 TO STA. 17+15 LT
FROM -Y4- STA. 18+30 TO STA. 20+00 RT
FROM -Y4- STA. 19+16 TO STA. 22+00 LT
FROM -Y4- STA. 21+50 TO STA. 22+00 RT

DETAIL K
BERM 'V' DITCH
(Not to Scale)

FROM -L- STA. 135+50 TO STA. 147+24 RT

FOR -L- PROFILE SEE SHTS.35 & 36
FOR -Y4- PROFILE SEE SHT.43
FOR PROP. SOUND BARRIER WALL DETAILS SEE SHTS.2-L THRU 2-P

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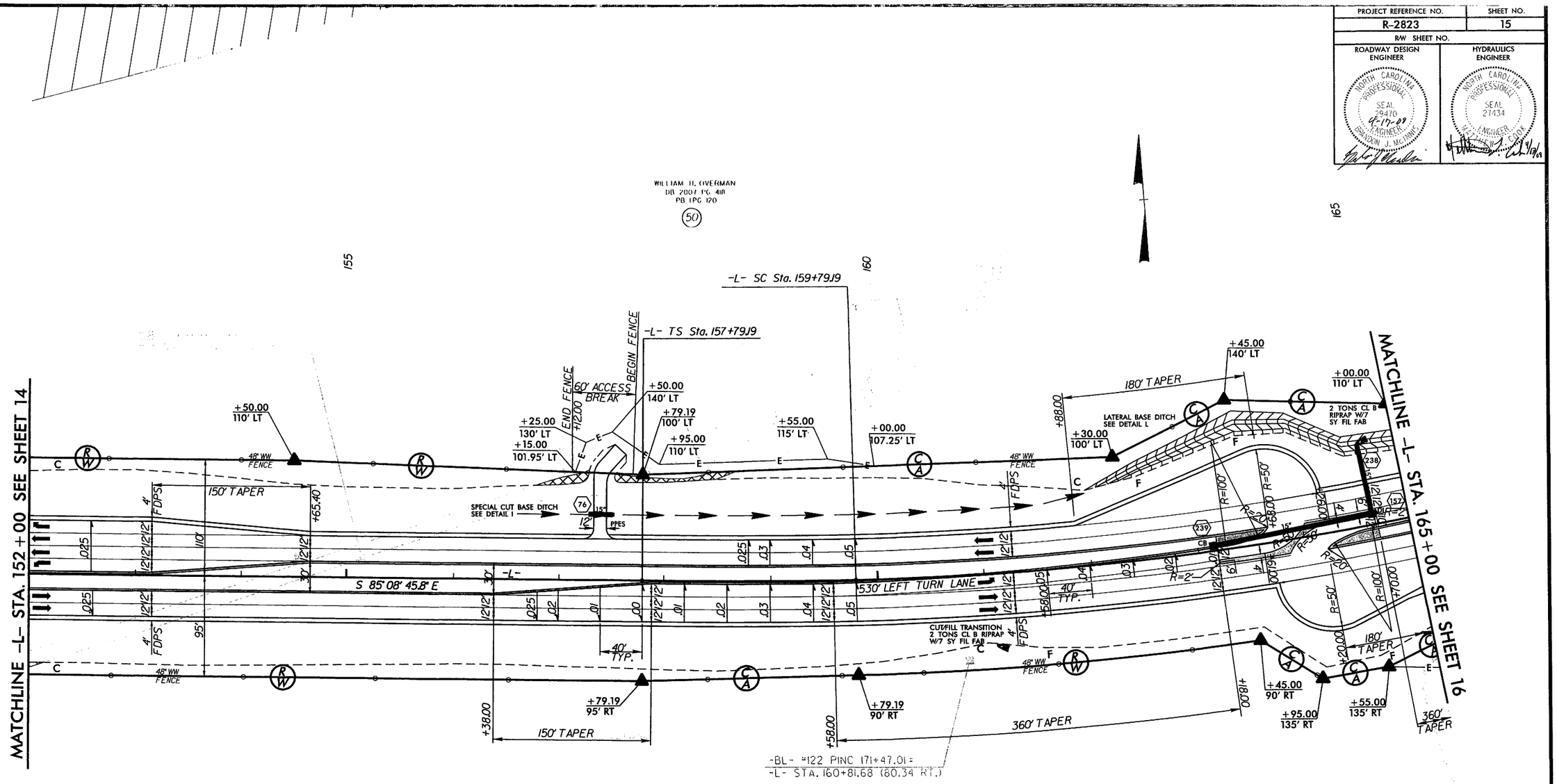
PROJECT REFERENCE NO.	SHEET NO.
R-2823	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

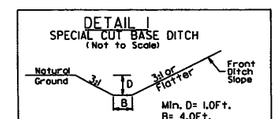


WILLIAM H. OVERMAN
DB 2007 PG 418
PB 1PG 120
50

-L-

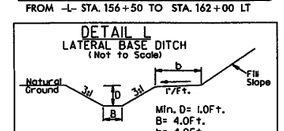
PIs Sta 159+12.54	PI Sta 167+18.99
Θs = 1° 56' 08.4"	Δ = 28° 03' 53.7" (LT)
Ls = 200.00'	D = 1° 56' 08.4"
LT = 133.34'	L = 1,449.88'
ST = 66.67'	T = 739.79'
	R = 2,960.00'
	Se= 0.05
	Runoff = 200'

DETAIL I
SPECIAL CUT BASE DITCH
(Not to Scale)



FROM -L- STA. 156+50 TO STA. 162+00 LT

DETAIL L
LATERAL BASE DITCH
(Not to Scale)



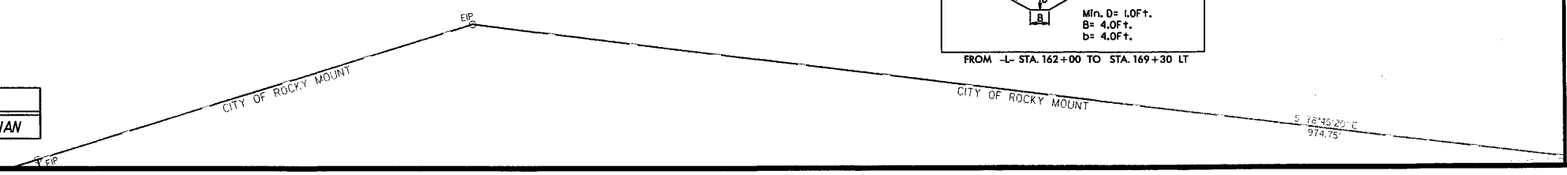
FROM -L- STA. 162+00 TO STA. 169+30 LT

RICKS-BOSEMAN FARM HISTORIC AREA

FOR -L- PROFILE SEE SHT.36

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN



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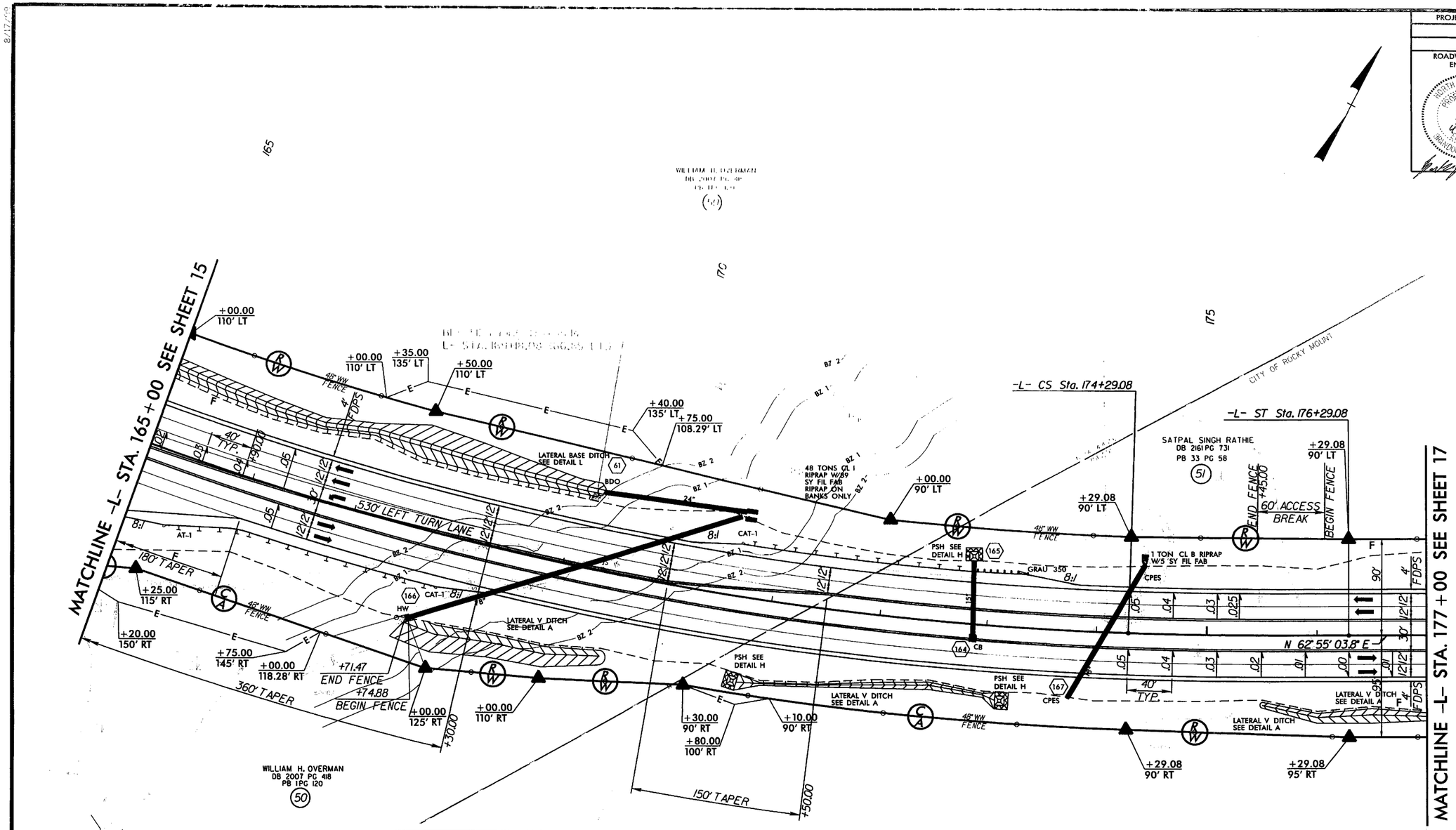
PROJECT REFERENCE NO.	SHEET NO.
R-2823	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

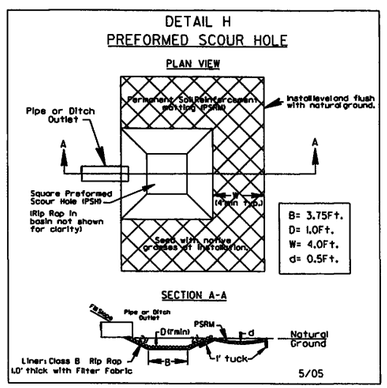
NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. MCINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27437 ENGINEER MATTHEW J. LEE 4/17/09

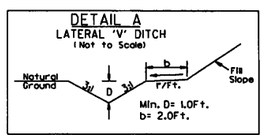


-L-

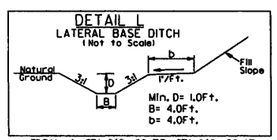
PI Sta 167+18.99	PIs Sta 174+95.75
Δ = 28° 03' 53.7" (LT)	Θs = 1° 56' 08.4"
D = 1° 56' 08.4"	Ls = 200.00'
L = 1,449.88'	LT = 133.34'
T = 739.79'	ST = 66.67'
R = 2,960.00'	
Se= 0.05	
Runoff = 200'	



-L- STA. 170+75 RT
-L- STA. 172+87 LT
-L- STA. 173+15 RT



FROM -L- STA. 167+75 TO STA. 169+50 RT
FROM -L- STA. 170+80 TO STA. 173+10 RT
FROM -L- STA. 175+50 TO STA. 177+25 RT



FROM -L- STA. 162+00 TO STA. 169+30 LT

SATPAL SINGH RATHIE
DB 2161 PG 731
PB 33 PG 58
51

FOR -L- PROFILE SEE SHTS. 36 & 37

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

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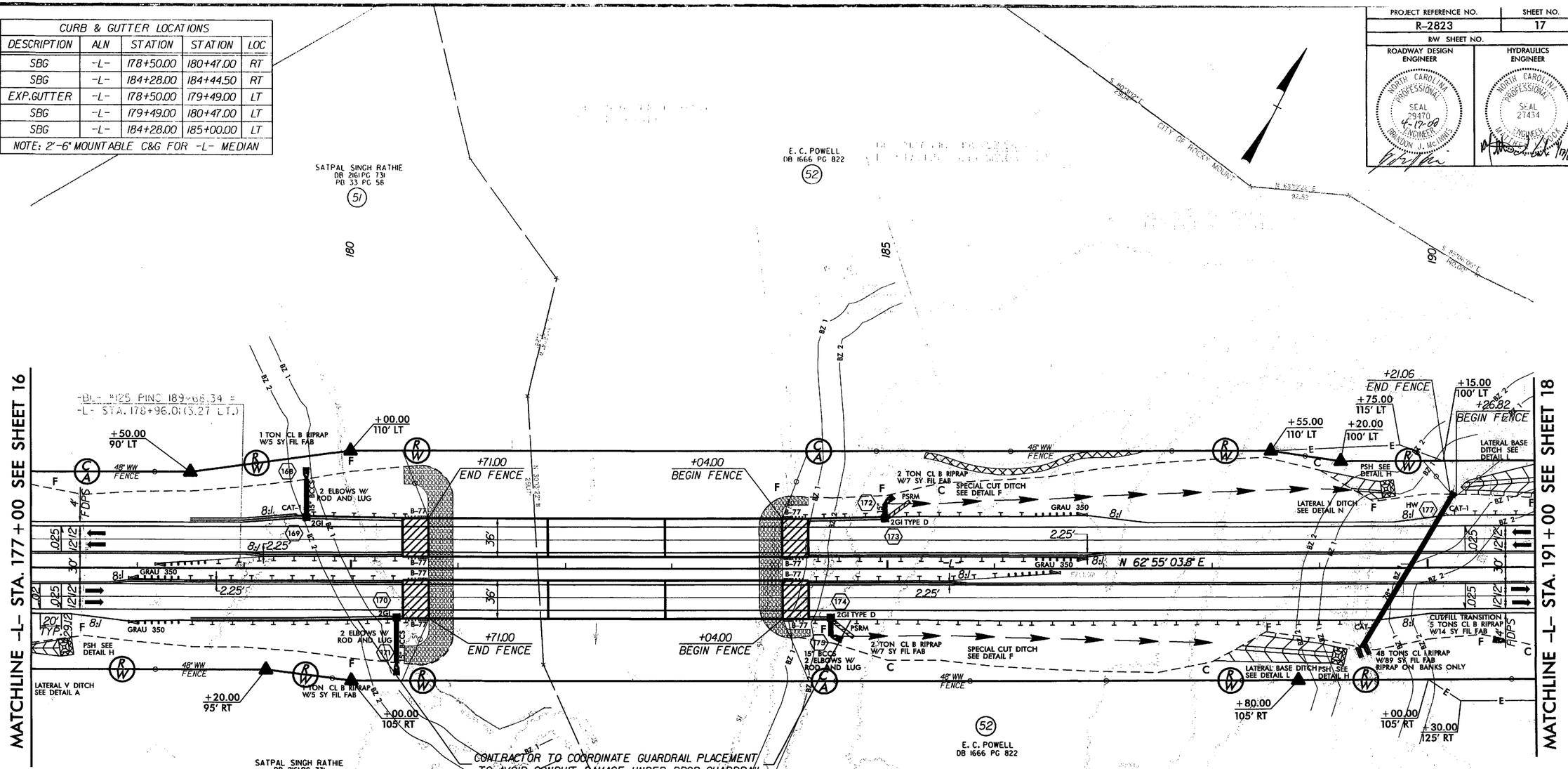
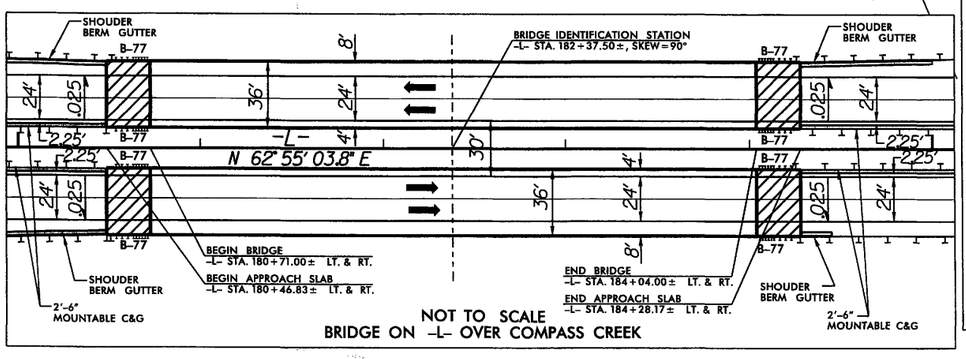
PROJECT REFERENCE NO.	SHEET NO.
R-2823	17
RW SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINTYRE 4-17-08

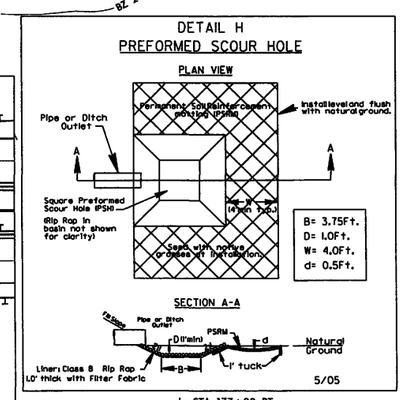
HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	178+50.00	180+47.00	RT
SBG	-L-	184+28.00	184+44.50	RT
EXP.GUTTER	-L-	178+50.00	179+49.00	LT
SBG	-L-	179+49.00	180+47.00	LT
SBG	-L-	184+28.00	185+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

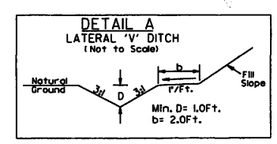




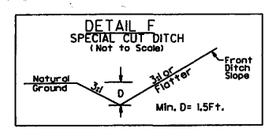
NOT TO SCALE
BRIDGE ON -L- OVER COMPASS CREEK



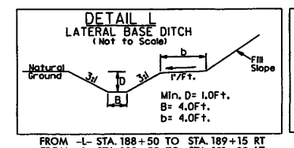
-L- STA. 177+30 RT
-L- STA. 189+15 RT
-L- STA. 189+70 RT



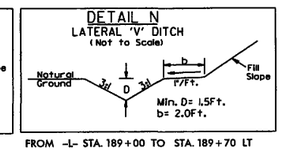
FROM -L- STA. 175+50 TO STA. 177+25 RT



FROM -L- STA. 184+48 TO STA. 188+50 RT
FROM -L- STA. 184+98 TO STA. 189+00 LT



FROM -L- STA. 188+50 TO STA. 189+15 RT
FROM -L- STA. 190+28 TO STA. 191+00 LT



FROM -L- STA. 189+00 TO STA. 189+70 LT

FOR -L- PROFILE SEE SHT. 37
FOR BRIDGE LEFT LANE PLANS SEE SHTS. S-1 THRU S-34
FOR BRIDGE RIGHT LANE PLANS SEE SHTS. S-1 THRU S-35

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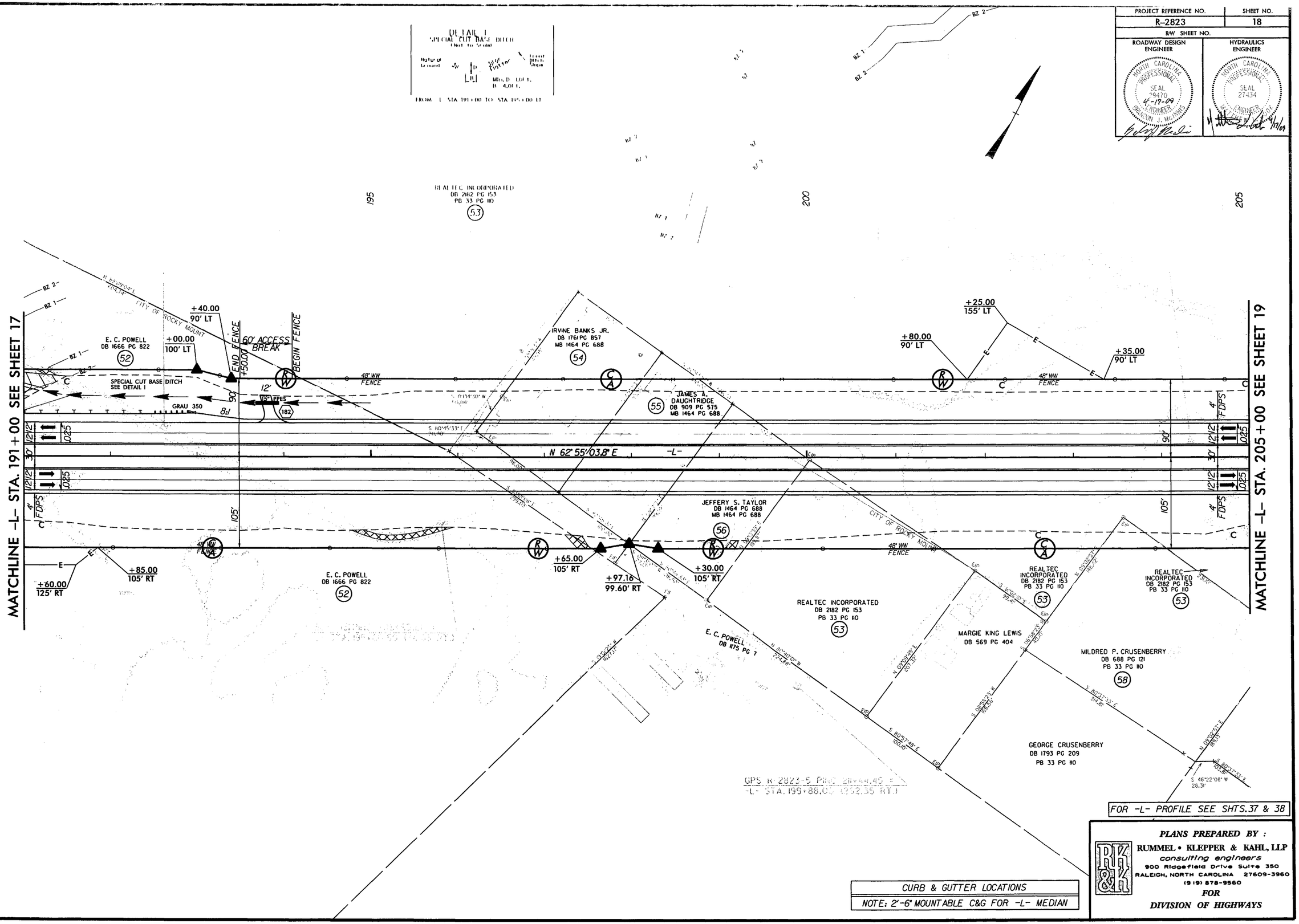
PROJECT REFERENCE NO.	SHEET NO.
R-2823	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



FOR -L- PROFILE SEE SHTS. 37 & 38

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

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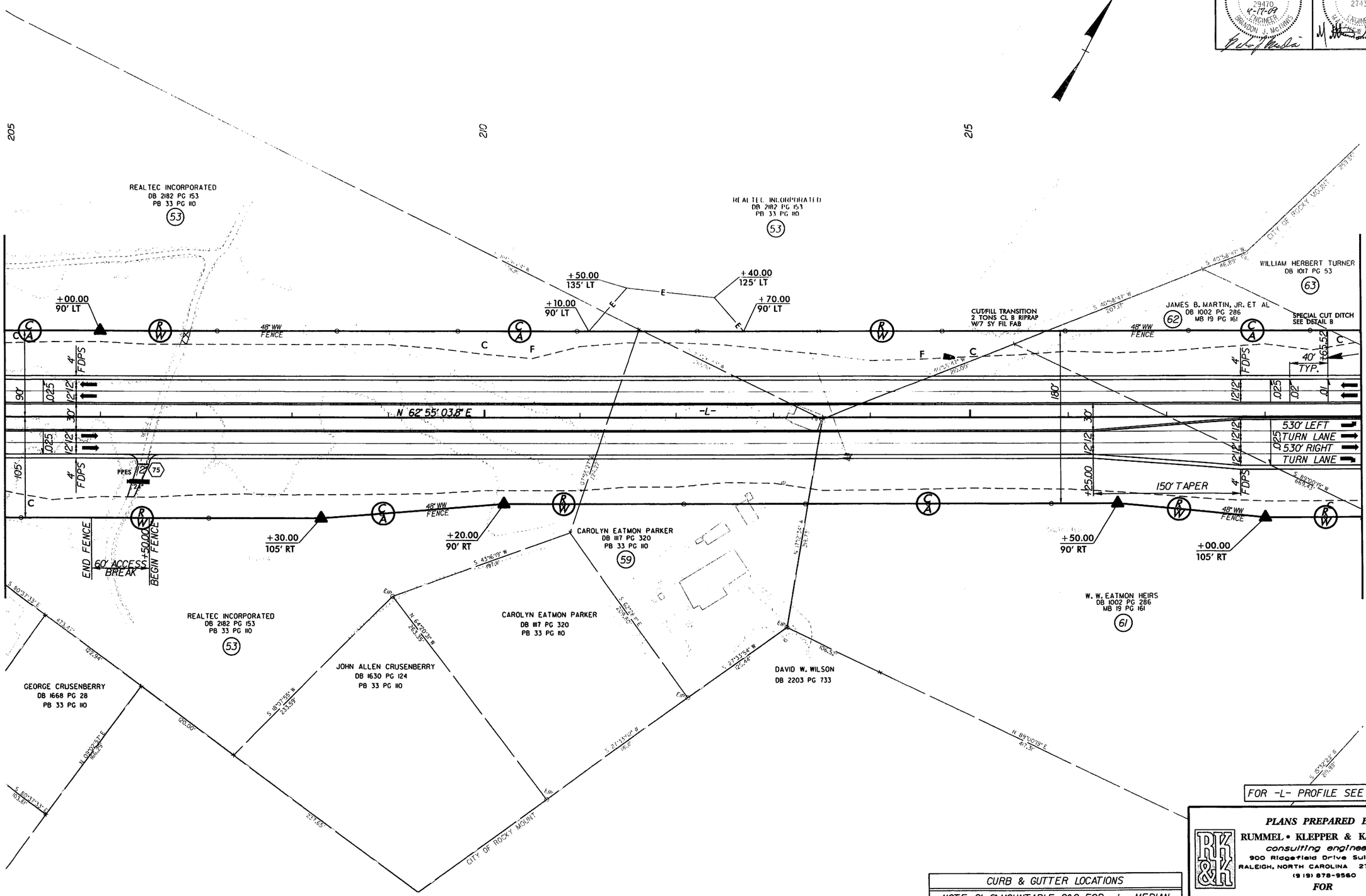
PROJECT REFERENCE NO.	SHEET NO.
R-2823	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN

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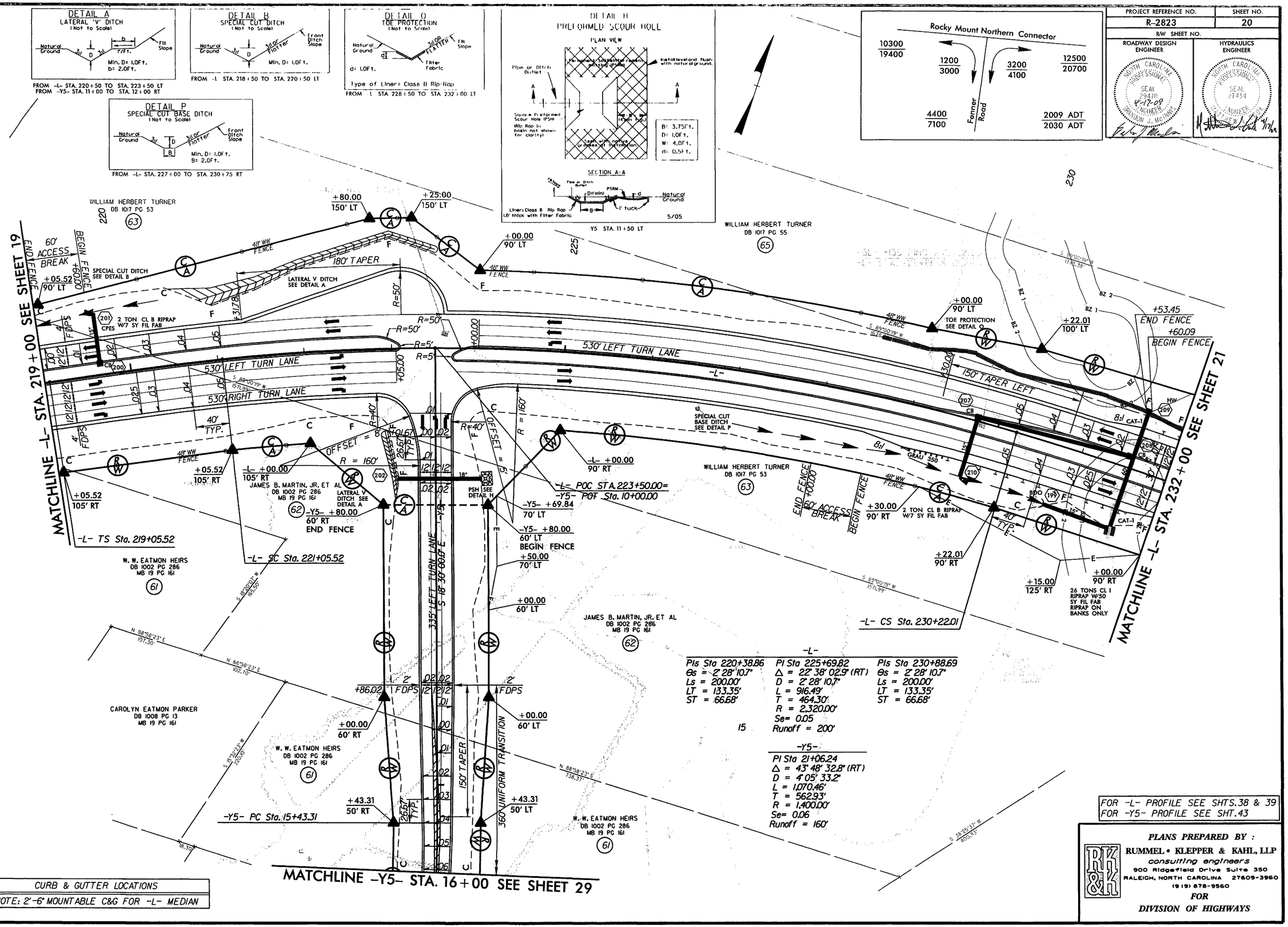
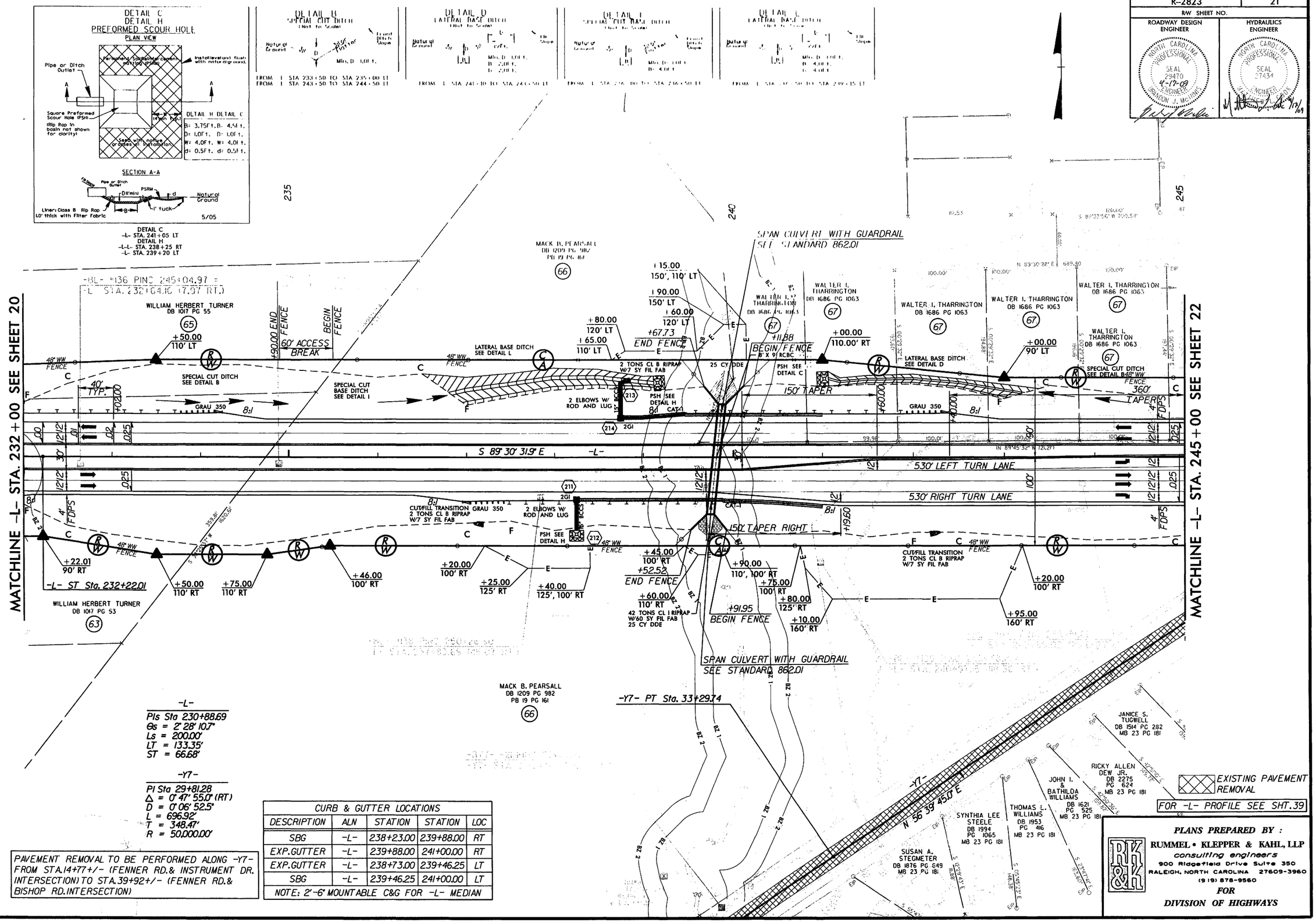
PROJECT REFERENCE NO.	SHEET NO.
R-2823	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



PROJECT REFERENCE NO.	SHEET NO.
R-2823	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



-L-

PIs Sta 230+88.69
Θs = 2° 28' 10.7"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

-Y7-

PI Sta 29+81.28
Δ = 0° 47' 55.0" (RT)
D = 0° 06' 52.5"
L = 696.92'
T = 348.47'
R = 50,000.00'

PAVEMENT REMOVAL TO BE PERFORMED ALONG -Y7- FROM STA.14+77+/- (FENNER RD.& INSTRUMENT DR. INTERSECTION) TO STA.39+92+/- (FENNER RD.& BISHOP RD.INTERSECTION)

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
SBG	-L-	238+23.00	239+88.00	RT
EXP.GUTTER	-L-	239+88.00	241+00.00	RT
EXP.GUTTER	-L-	238+73.00	239+46.25	LT
SBG	-L-	239+46.25	241+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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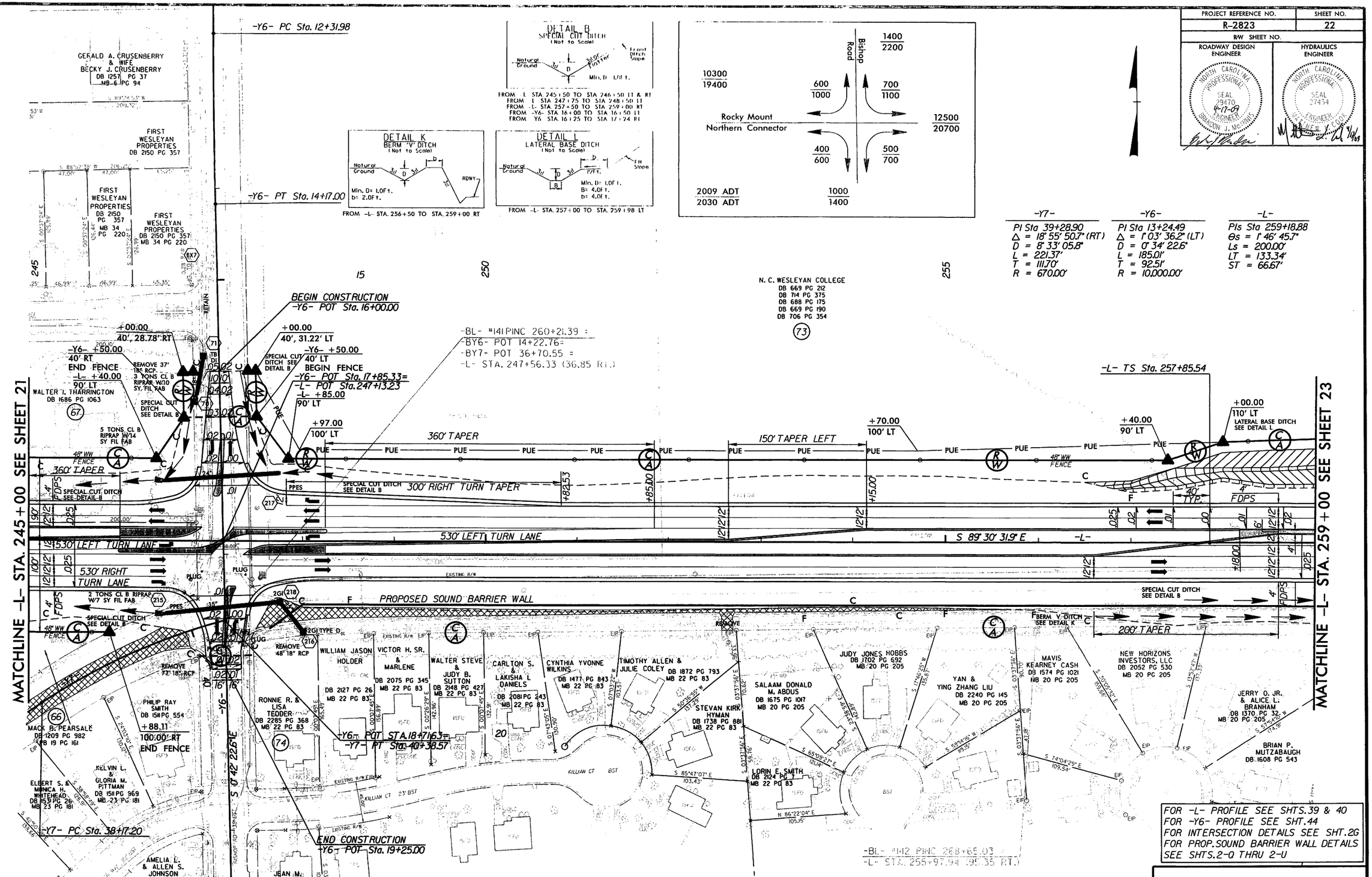
PROJECT REFERENCE NO.	SHEET NO.
R-2823	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



FOR -L- PROFILE SEE SHTS.39 & 40
FOR -Y6- PROFILE SEE SHT.44
FOR INTERSECTION DETAILS SEE SHT.2G
FOR PROP.SOUND BARRIER WALL DETAILS SEE SHTS.2-O THRU 2-U

EXISTING PAVEMENT REMOVAL

PAVEMENT REMOVAL TO BE PERFORMED ALONG -Y7- FROM STA.14+77+/- (FENNER RD.& INSTRUMENT DR. INTERSECTION) TO STA.39+92+/- (FENNER RD.& BISHOP RD.INTERSECTION)

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-Y6-	19+13.83	19+25.00	RT
2'-6" C&G	-Y6-	18+66.67	19+00.00	LT
NOTE: 2'-6" MOUNTABLE C&G FOR -L- MEDIAN				

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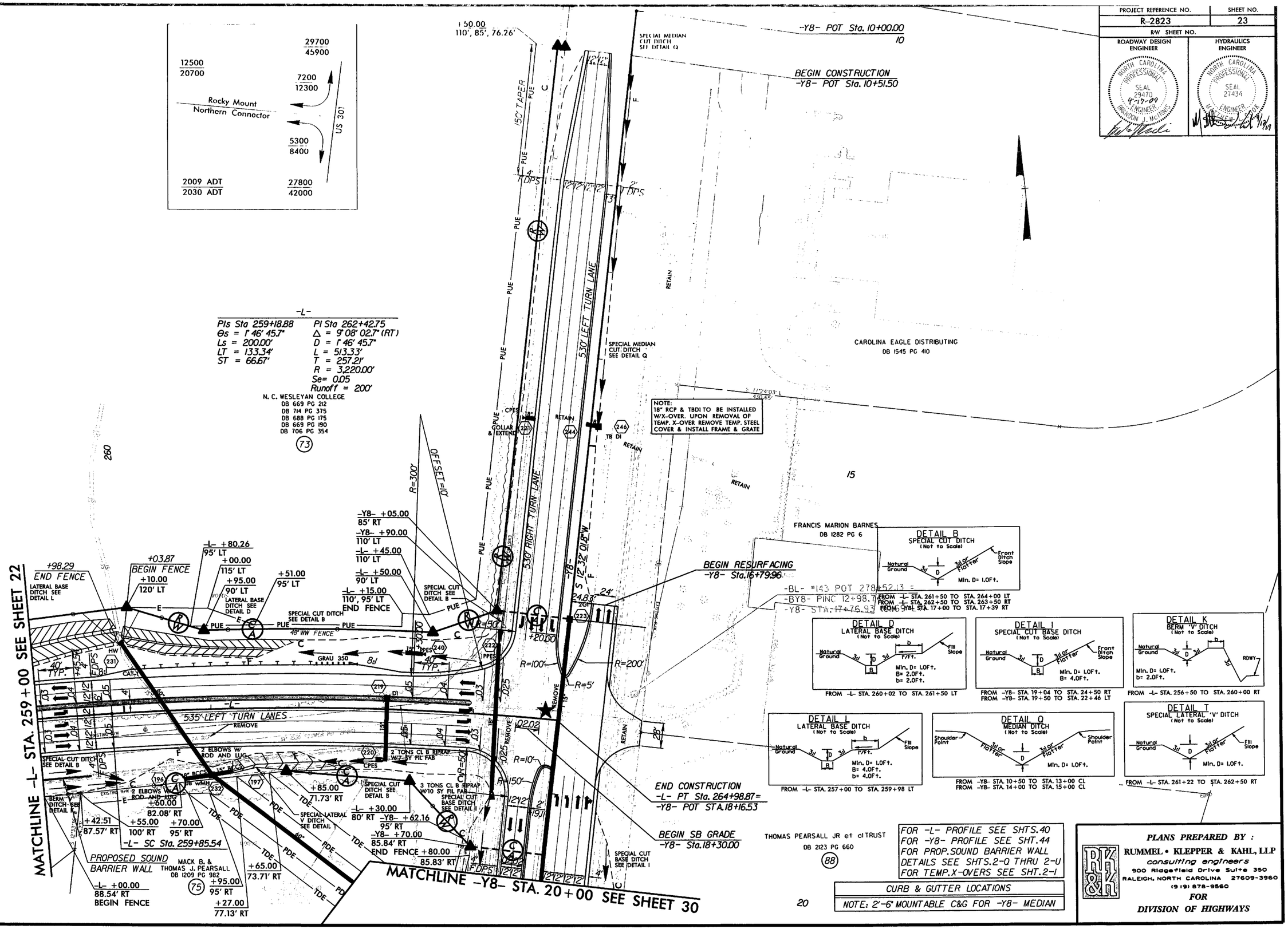
PROJECT REFERENCE NO.	SHEET NO.
R-2823	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29970 ENGINEER BRANDON J. MCINNIS 9-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW D. FOX 9/17/09



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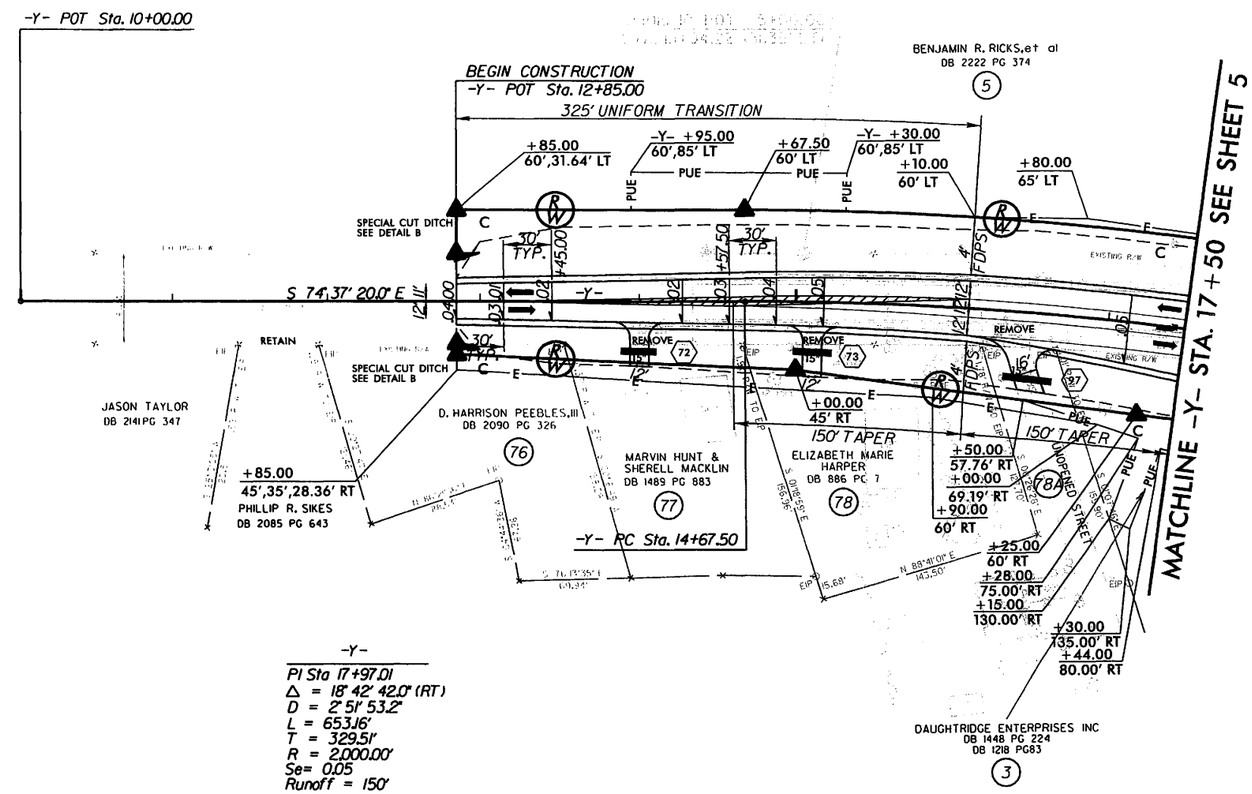
PROJECT REFERENCE NO.	SHEET NO.
R-2823	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 20476 ENGINEER BRANDON J. MCMINN 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 9/17/09

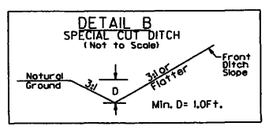


-Y-

PI Sta 17+97.01
Δ = 18° 42' 42.0" (RT)
D = 2° 51' 53.2"
L = 653.16'
T = 329.51'
R = 2,000.00'
Se= 0.05
Runoff = 150'

FOR -Y- PROFILE SEE SHT.40

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y- STA. 12+85 TO STA. 13+00 LT & RT

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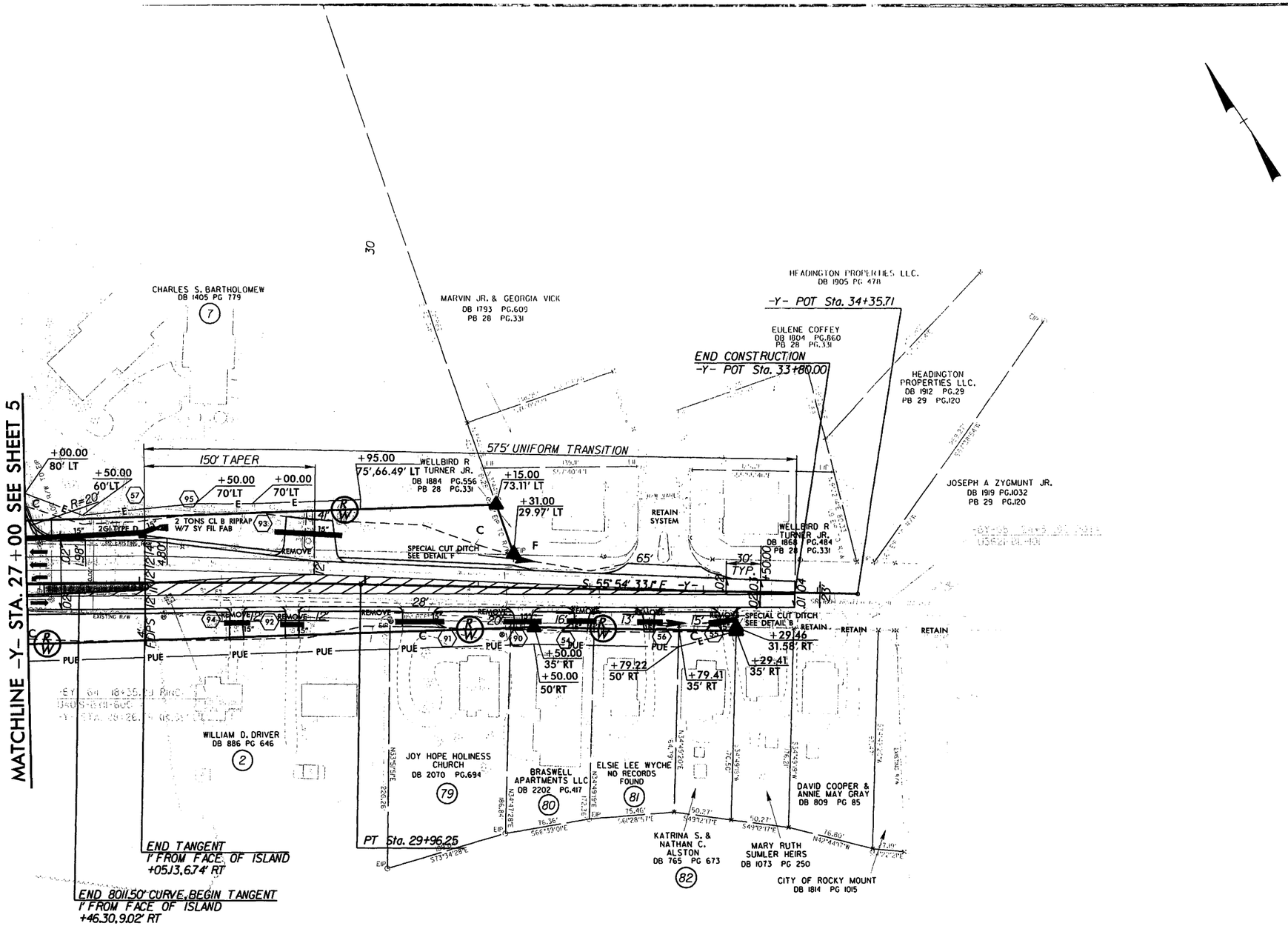
PROJECT REFERENCE NO.	SHEET NO.
R-2823	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McCOMBS — 4-17-09

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW W. LOCK — 4/17/09

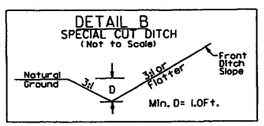


-Y-

PI Sta 28+00.81
Δ = 2° 48' 00.0" (RT)
D = 0° 42' 58.3"
L = 390.95'
T = 195.52'
R = 8,000.00'
Se= NC

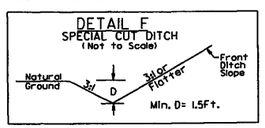
CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
1'-6" MOUNTABLE C&G	-Y-	23+82.00	27+15.00	MED
2'-6" C&G	-Y-	22+91.64	28+05.00	LT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y- STA. 33+00 TO STA. 33+50 RT

DETAIL F
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y- STA. 31+00 TO STA. 31+50 LT

FOR -Y- PROFILE SEE SHT. 41

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bzaunbaugh

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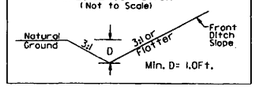
PROJECT REFERENCE NO.	SHEET NO.
R-2823	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER 4-17-09 BRANDON J. MCINTYRE

NORTH CAROLINA PROFESSIONAL SEAL 27431 ENGINEER

4/17/09

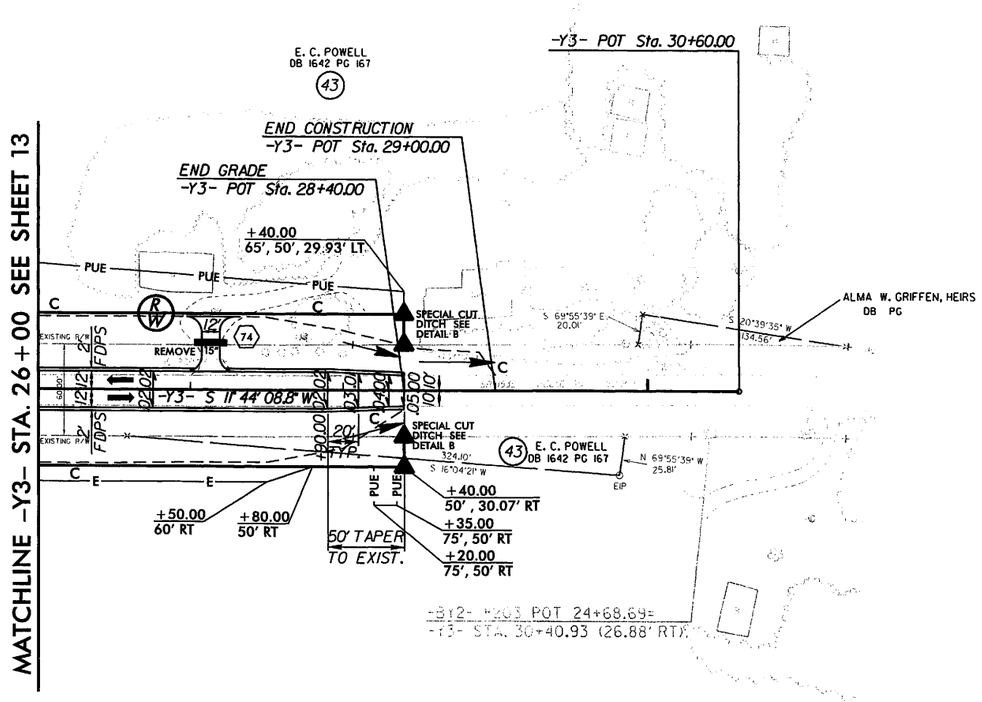
DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y3- STA. 28+00 TO STA. 28+40 RT
FROM -Y3- STA. 28+00 TO STA. 29+00 LT

30

MATCHLINE -Y3- STA. 26+00 SEE SHEET 13



FOR -Y3- PROFILE SEE SHT.42

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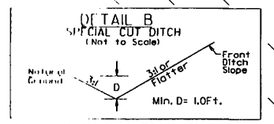
jbeaucham

PROJECT REFERENCE NO.	SHEET NO.
R-2823	27
R/W SHEET NO.	

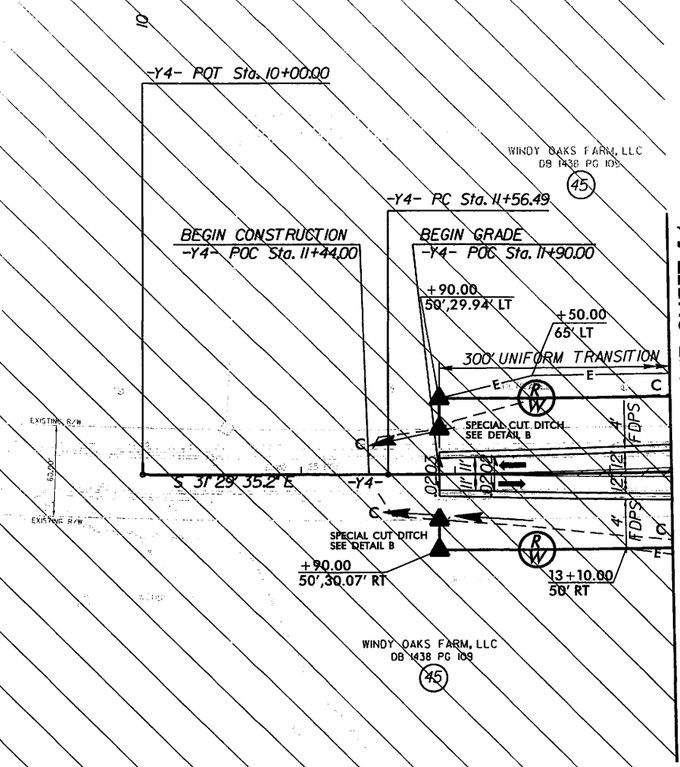
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. MCINNIS 4-17-09

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 9/17/09

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y4- STA. 11+44 TO STA. 12+00 LT
FROM -Y4- STA. 11+50 TO STA. 12+50 RT



-Y4-
PI Sta 12+67.60
Δ = 1°03' 39.5" (LT)
D = 0°28' 38.9"
L = 222.21'
T = 111.11'
R = 12,000.00'
Se = NC

RICKS-BOSEMAN FARM HISTORIC AREA

FOR -Y4- PROFILE SEE SHT. 43

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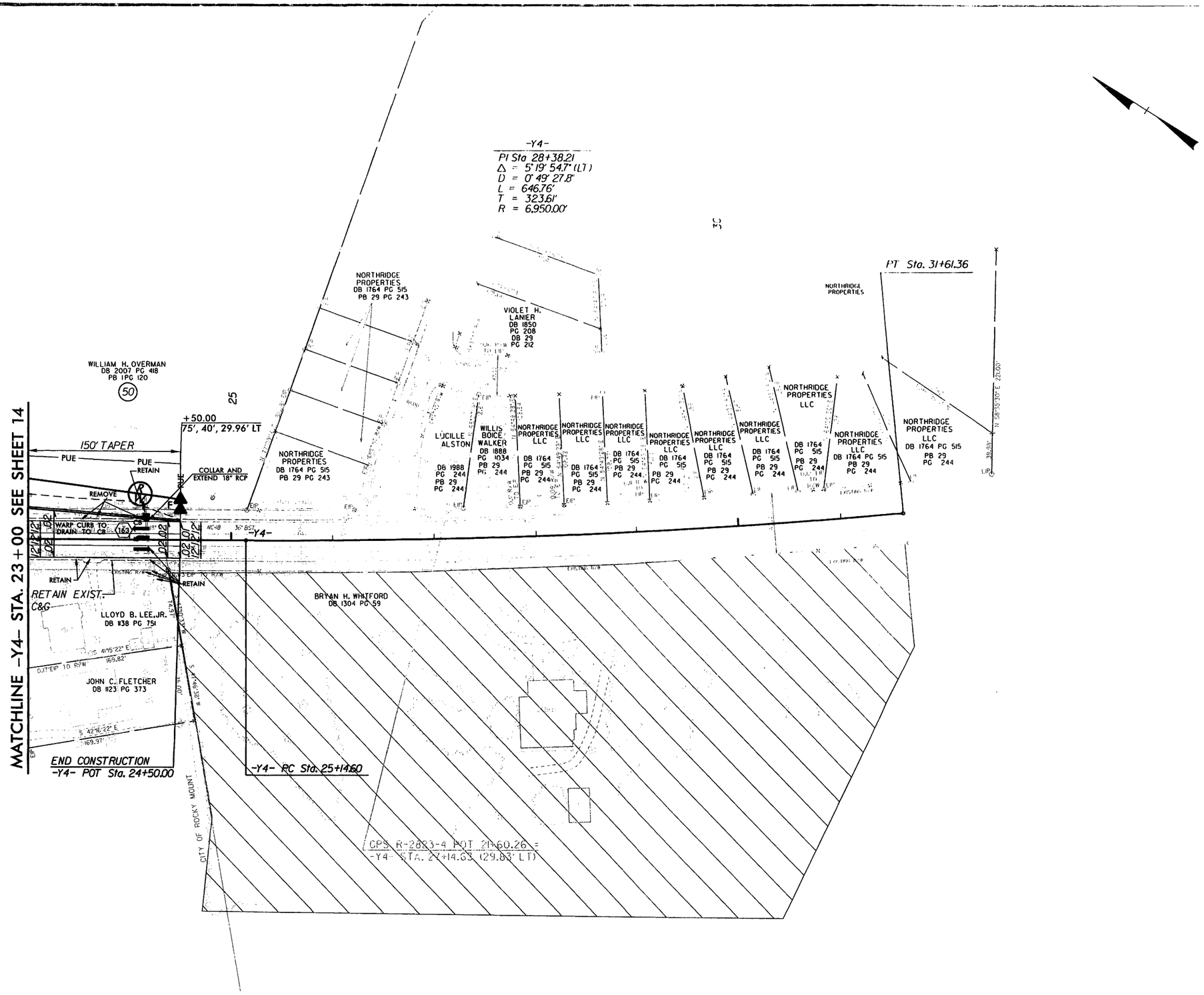
PROJECT REFERENCE NO.	SHEET NO.
R-2823	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McMINN 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 4/17/09



SPRUILL-EASLEY HOUSE HISTORIC AREA

FOR -Y4- PROFILE SEE SHT.43

CURB & GUTTER LOCATIONS				
DESCRIPTION	ALN	STATION	STATION	LOC
2'-6" C&G	-Y4-	23+00.00	24+50.00	LT

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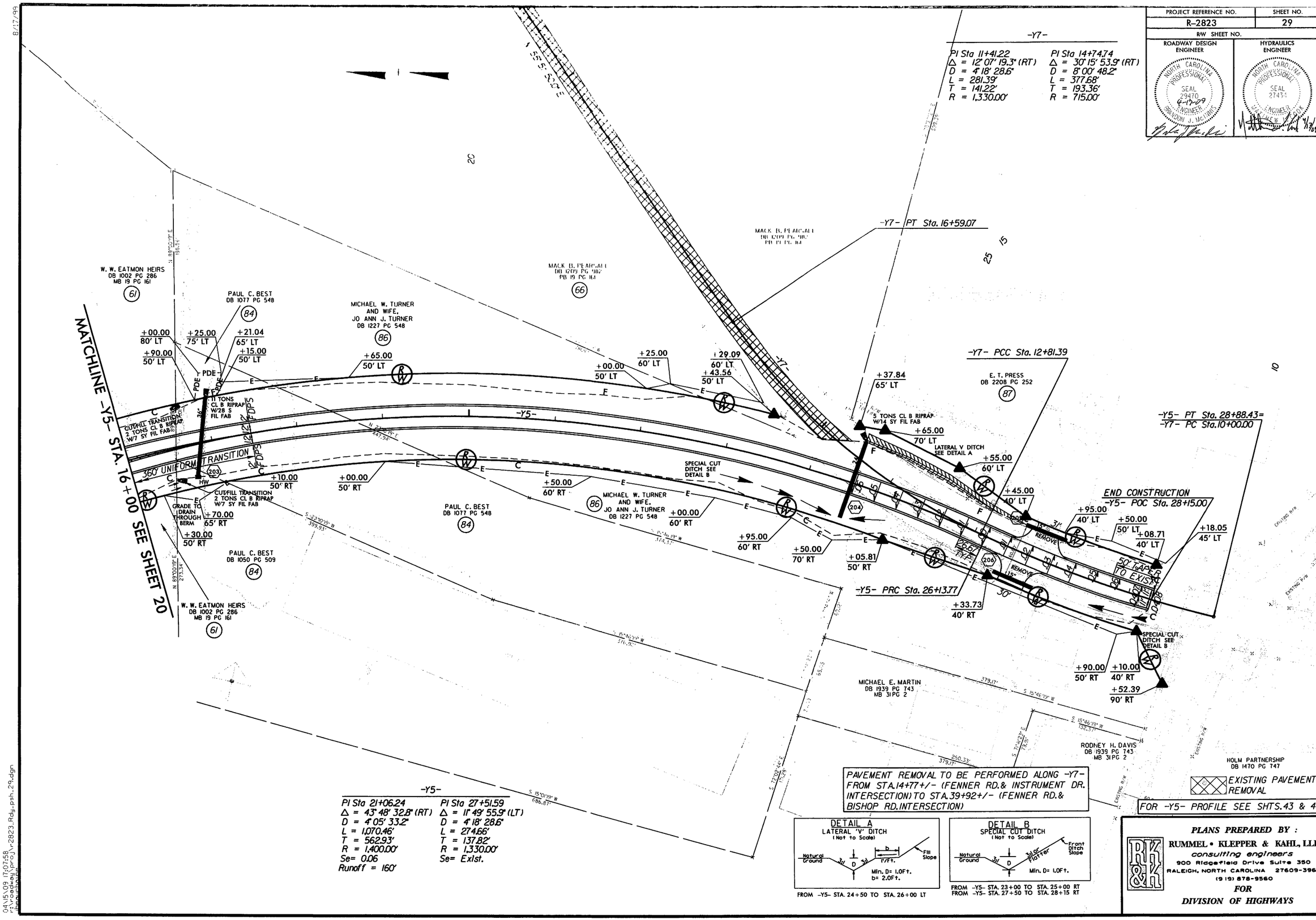
PROJECT REFERENCE NO.	SHEET NO.
R-2823	29
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER — 9-17-09 — BRANDON J. McILWAIN

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER — MARK W. VAN DYK — 9/17/09



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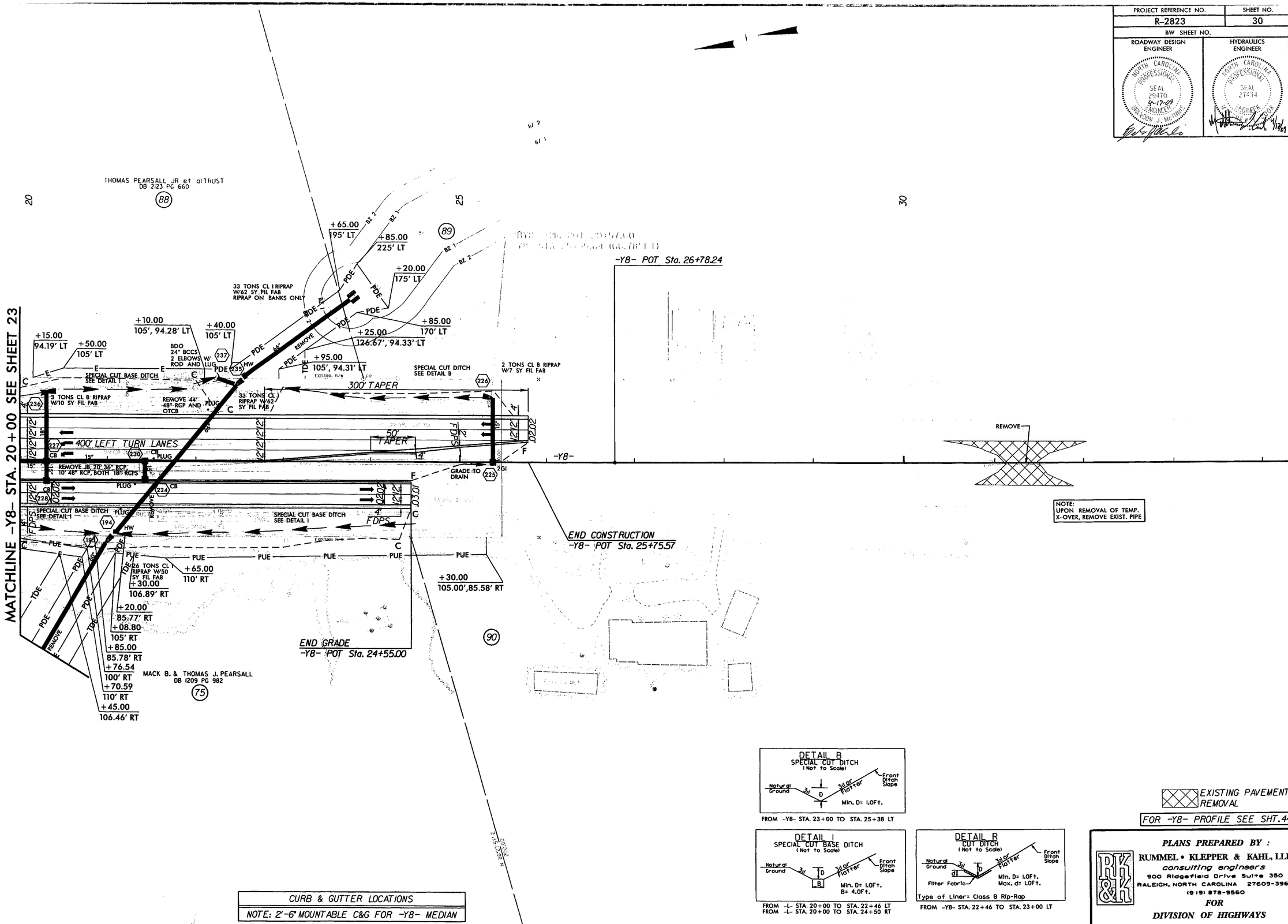
PROJECT REFERENCE NO.	SHEET NO.
R-2823	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



FROM -Y8- STA. 23+00 TO STA. 25+38 LT

FROM -L- STA. 20+00 TO STA. 22+46 LT
FROM -L- STA. 20+00 TO STA. 24+50 RT

Type of Liner= Class B Rip-Rap

FROM -Y8- STA. 22+46 TO STA. 23+00 LT

CURB & GUTTER LOCATIONS

NOTE: 2'-6" MOUNTABLE C&G FOR -Y8- MEDIAN

PLANS PREPARED BY :
RUMMEL • KLEPPER & KAHL, LLP
consulting engineers
900 Ridgefield Drive Suite 350
RALEIGH, NORTH CAROLINA 27609-3960
(919) 878-9560
FOR
DIVISION OF HIGHWAYS

8/17/99

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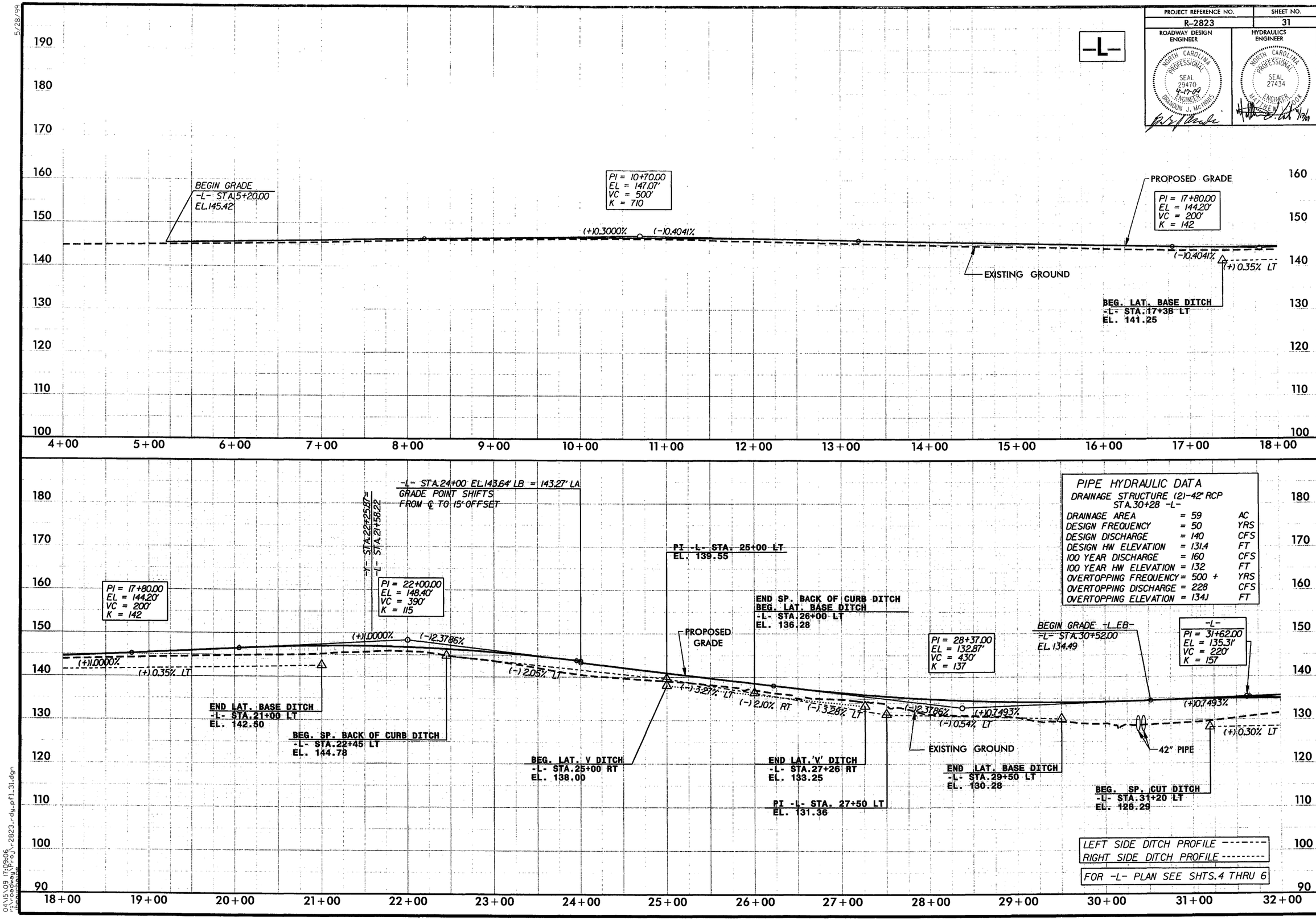
jbouchard

PROJECT REFERENCE NO.	SHEET NO.
R-2823	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW D. COX 4/17/09



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jbrownlee

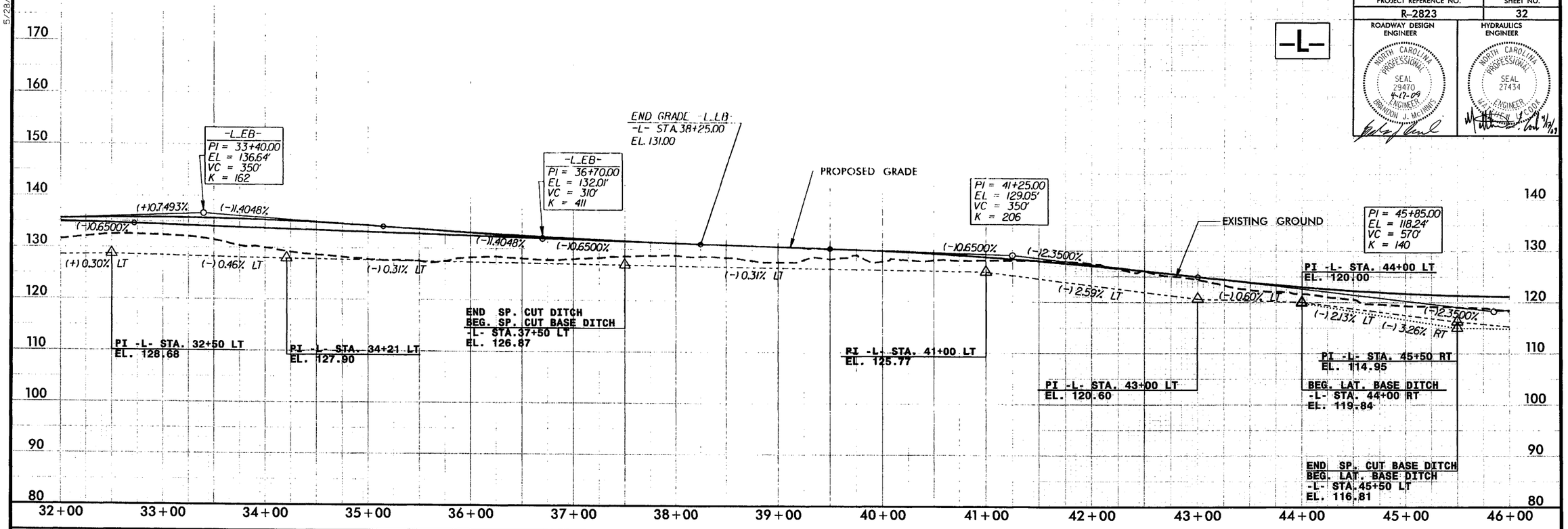
5/28/99

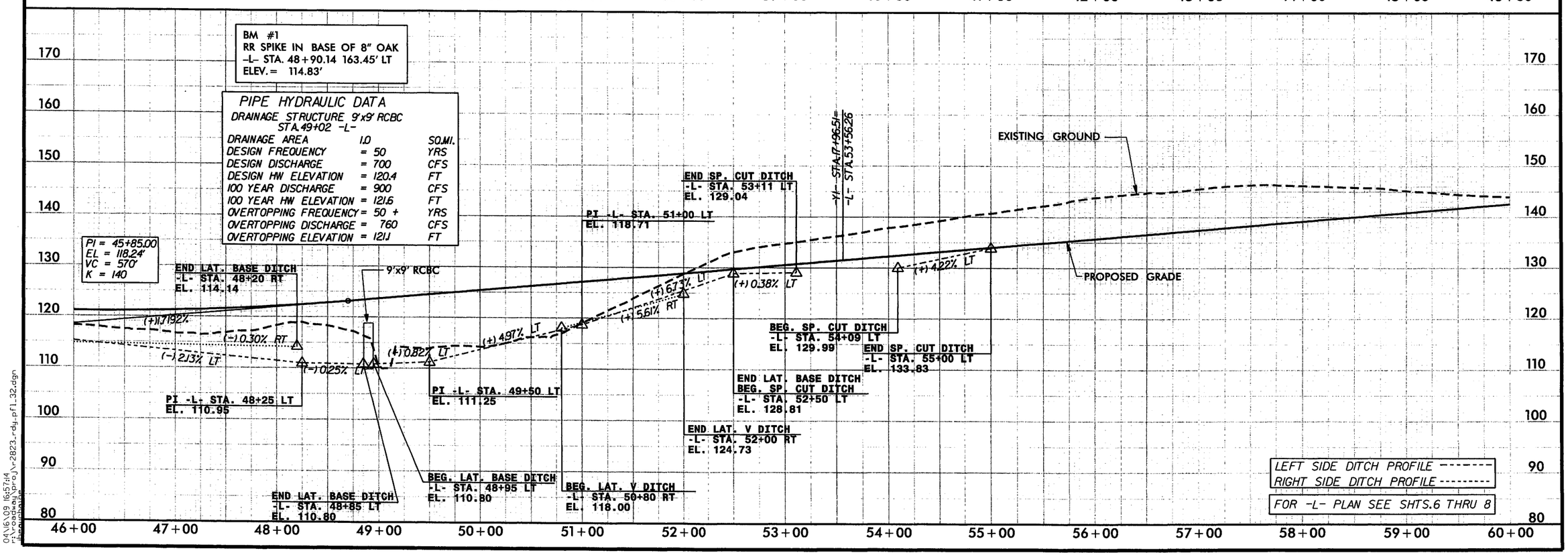
PROJECT REFERENCE NO.	SHEET NO.
R-2823	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER

-L-





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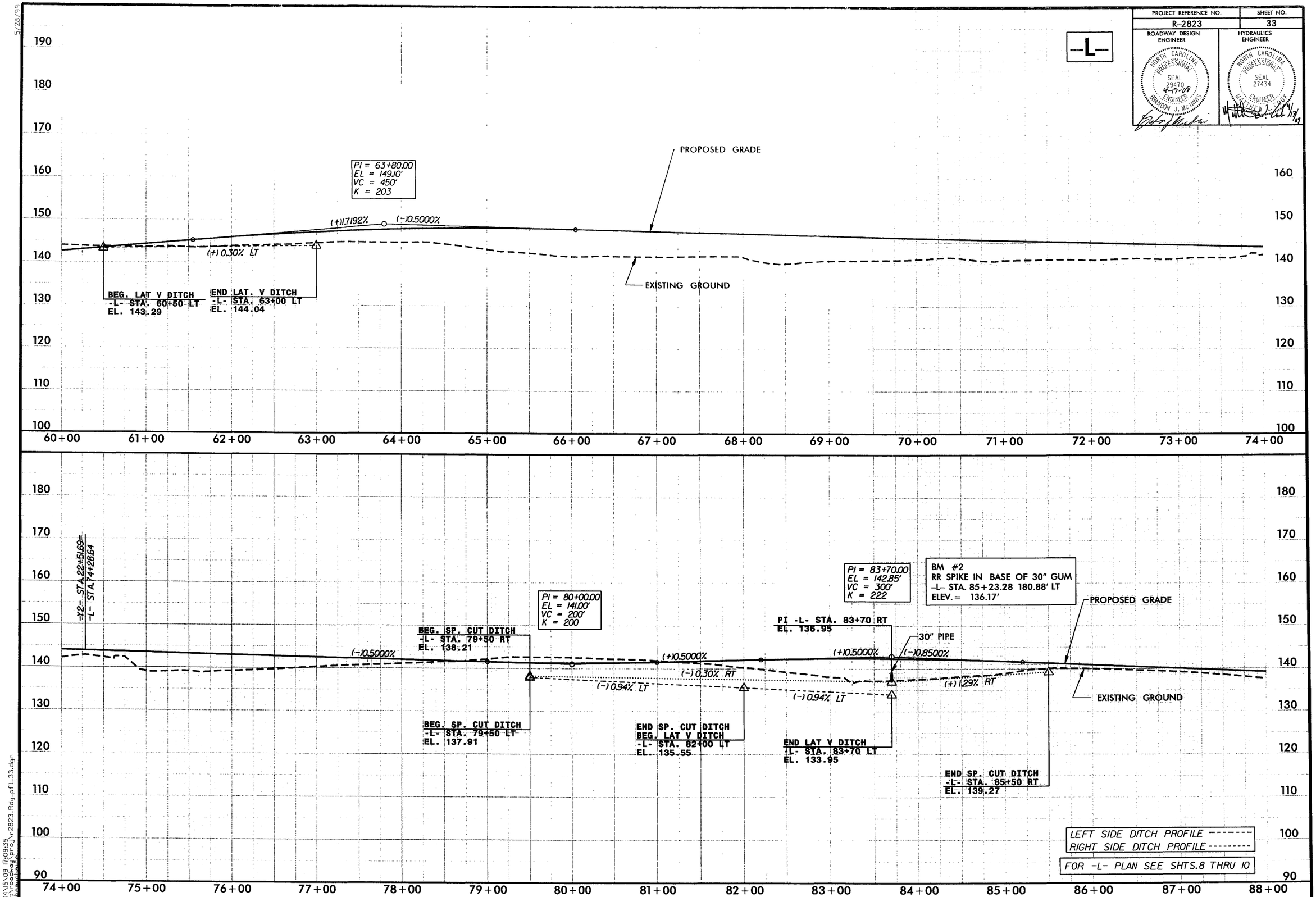
bcarpenter

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2823	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. MCINNIS 4-27-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW J. COOK 4/27/09



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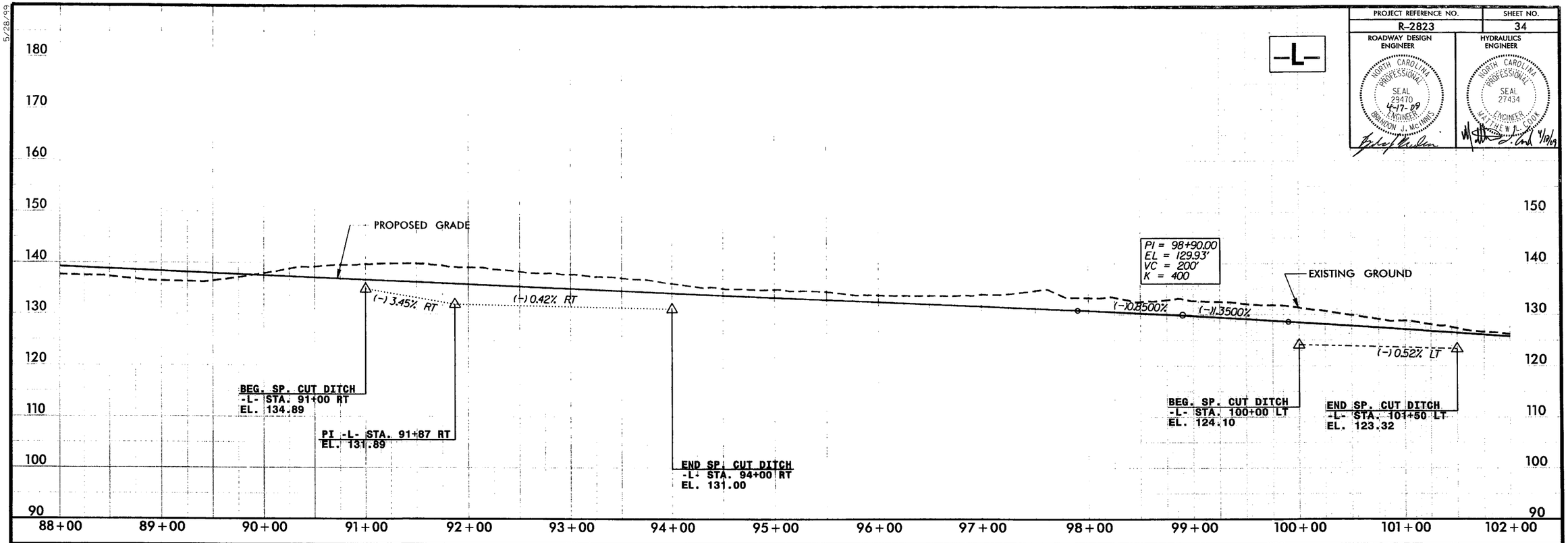
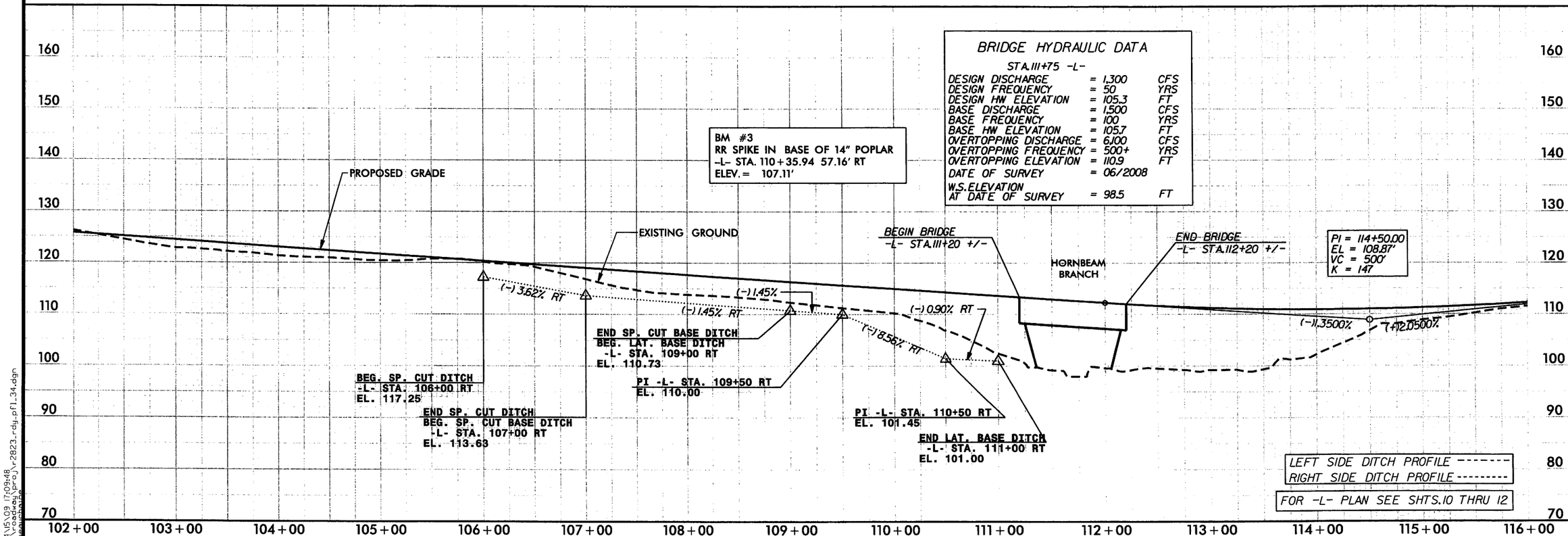
PROJECT REFERENCE NO.	SHEET NO.
R-2823	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW R. COOK 4/10/09





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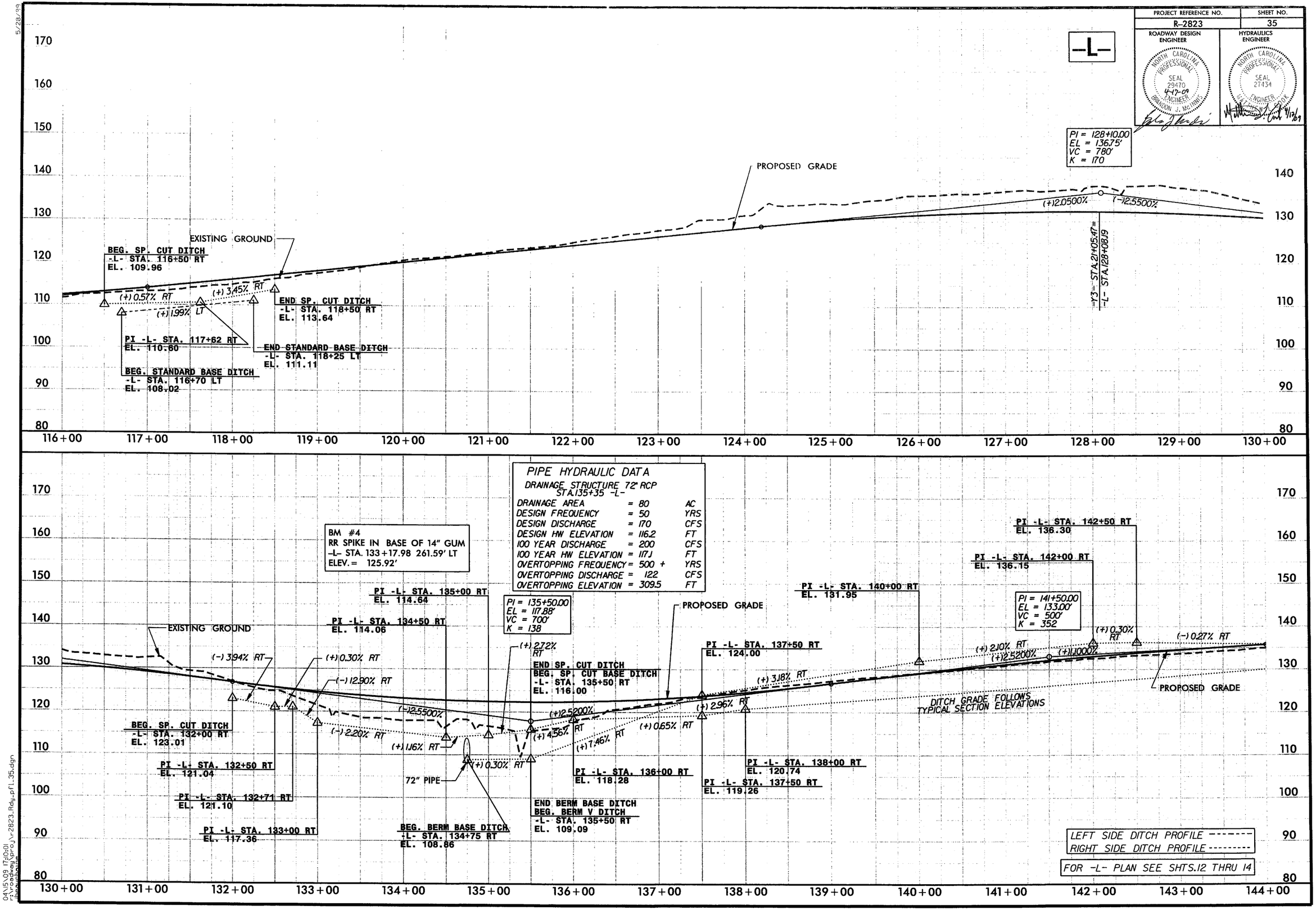
PROJECT REFERENCE NO.	SHEET NO.
R-2823	35

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRENDON J. McINNIS 4-17-09

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 4/17/09



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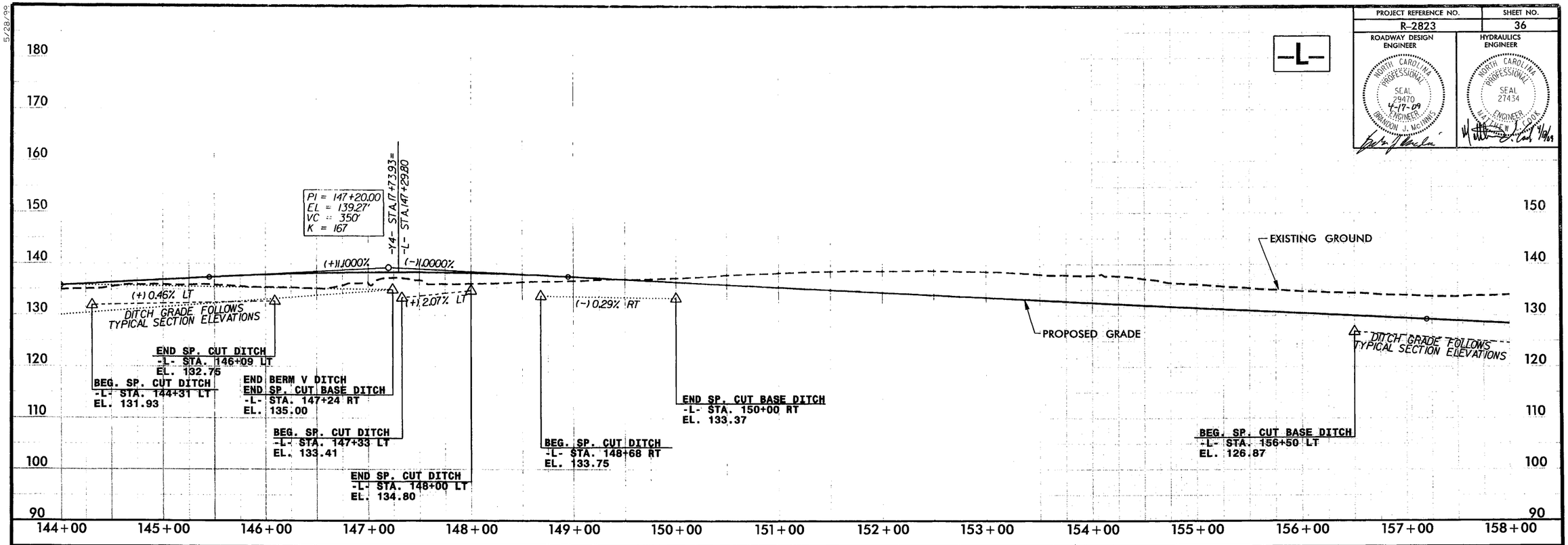
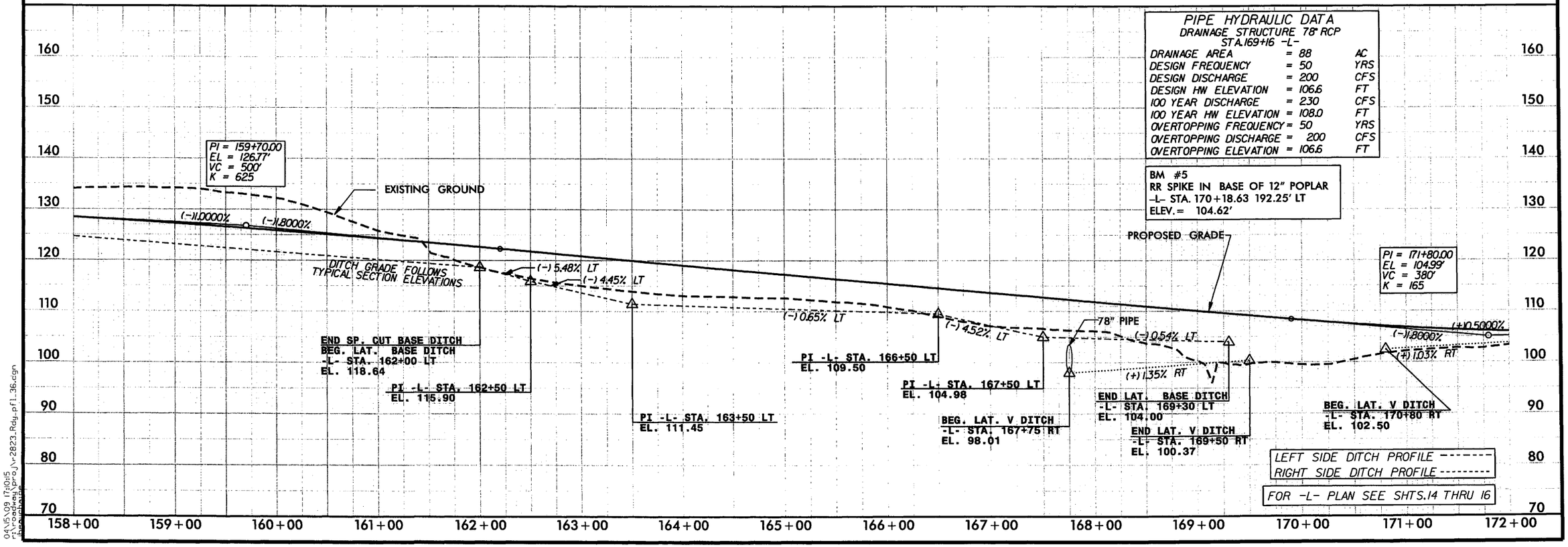
PROJECT REFERENCE NO.	SHEET NO.
R-2823	36

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER 4-17-09 BRANDON J. McINNIS

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW J. COOK 4/16/09





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PROJECT REFERENCE NO.	SHEET NO.
R-2823	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

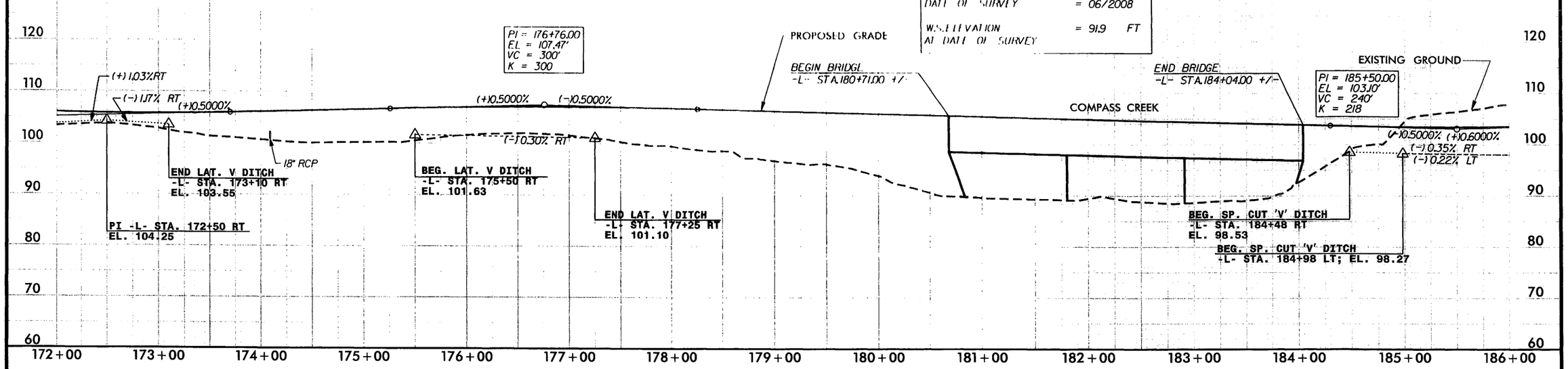
NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW W. BOX 4/17/09

-L-

BRIDGE HYDRAULIC DATA
STA.182+37.5 -L-

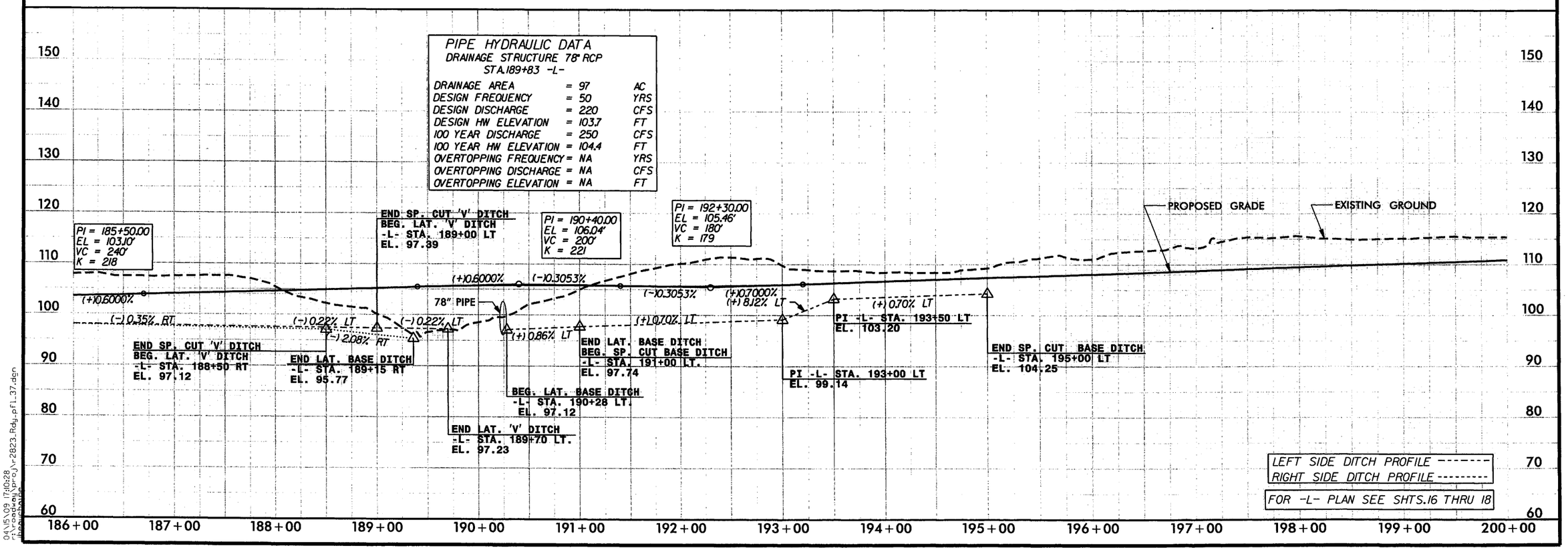
DESIGN DISCHARGE	=	2,000	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	94.3	FT
BASE DISCHARGE	=	2,300	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	94.7	FT
OVERTOPPING DISCHARGE	=	18,750	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	103.7	FT
DATE OF SURVEY	=	06/2008	
W.S. ELEVATION AT DATE OF SURVEY	=	91.9	FT

BM #6
RR SPIKE IN BASE OF 24" OAK
L STA. 185+19.26 218.25' LT
ELEV. 99.96'



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE 78" RCP
STA.189+83 -L-

DRAINAGE AREA	=	97	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	220	CFS
DESIGN HW ELEVATION	=	103.7	FT
100 YEAR DISCHARGE	=	250	CFS
100 YEAR HW ELEVATION	=	104.4	FT
OVERTOPPING FREQUENCY	=	NA	YRS
OVERTOPPING DISCHARGE	=	NA	CFS
OVERTOPPING ELEVATION	=	NA	FT



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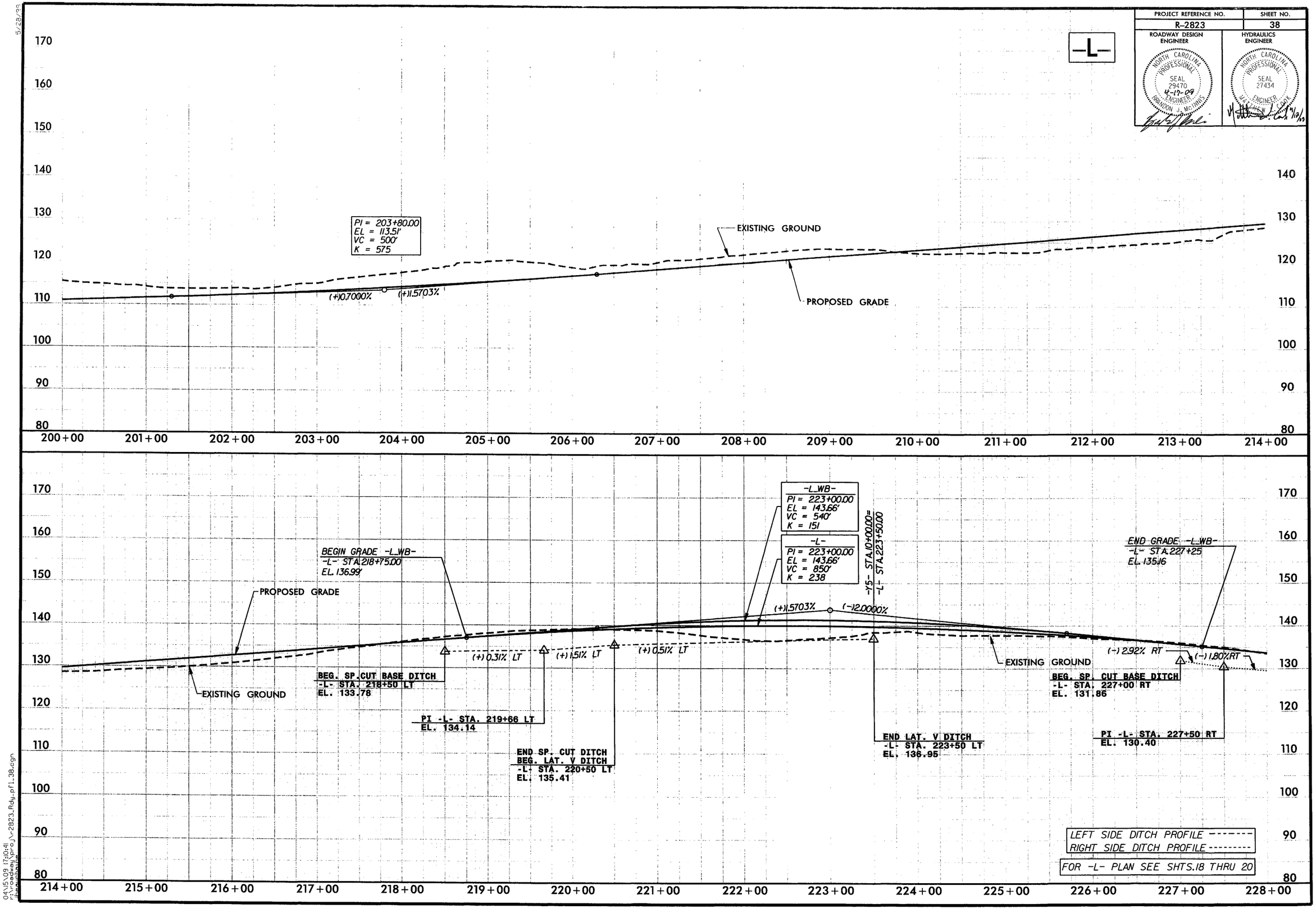
PROJECT REFERENCE NO.	SHEET NO.
R-2823	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW J. COOK 4/17/09



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rbrandon

PROJECT REFERENCE NO.	SHEET NO.
R-2823	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER MATTHEW W. COOK 10/2/09

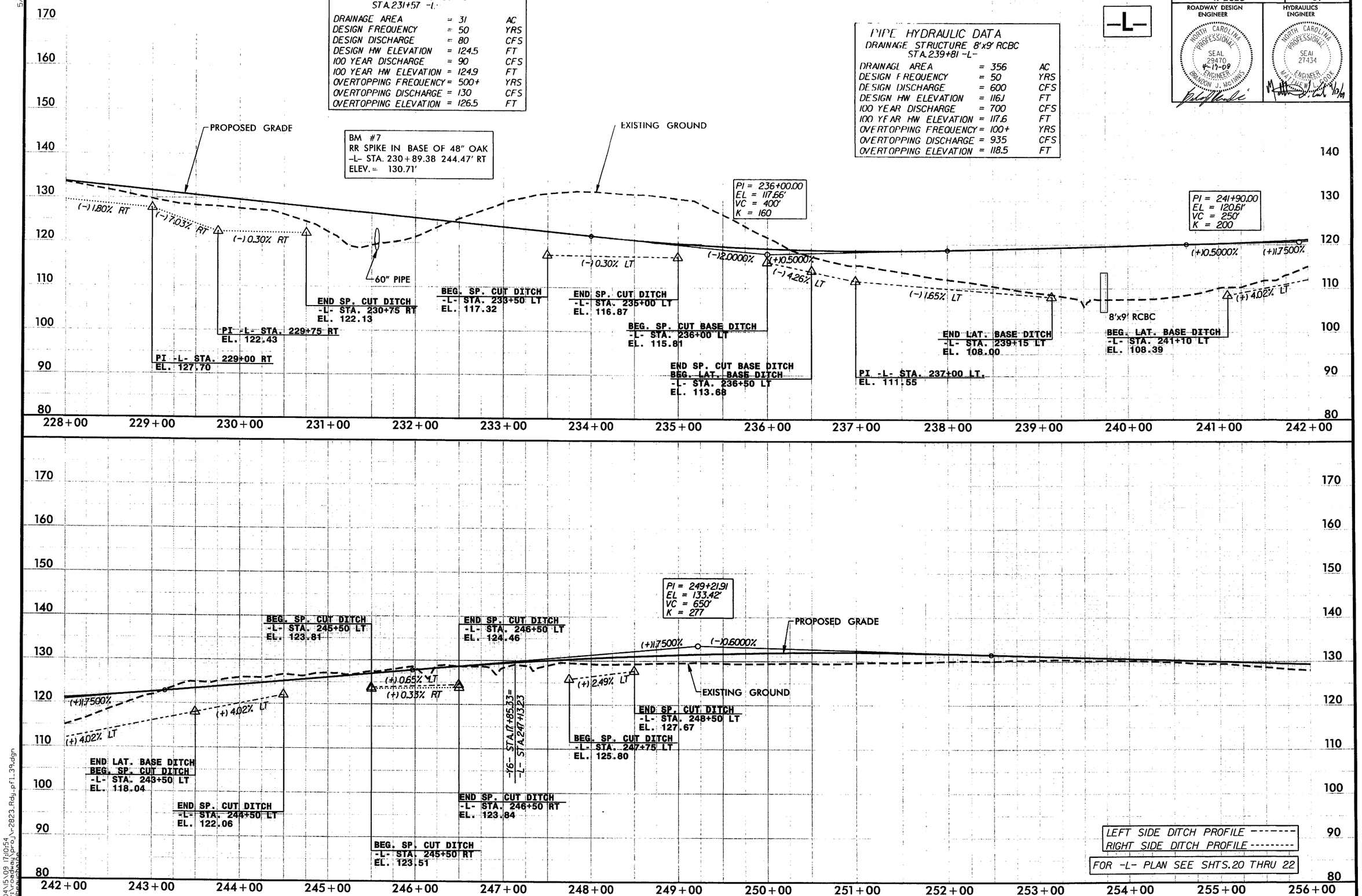
-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE 60" RCP
STA. 231+57 -L-

DRAINAGE AREA	= 31	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 80	CFS
DESIGN HW ELEVATION	= 124.5	FT
100 YEAR DISCHARGE	= 90	CFS
100 YEAR HW ELEVATION	= 124.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 130	CFS
OVERTOPPING ELEVATION	= 126.5	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE 8'x9' RCBC
STA. 239+81 -L-

DRAINAGE AREA	= 356	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 600	CFS
DESIGN HW ELEVATION	= 116.1	FT
100 YEAR DISCHARGE	= 700	CFS
100 YEAR HW ELEVATION	= 117.6	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 935	CFS
OVERTOPPING ELEVATION	= 118.5	FT



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PROJECT REFERENCE NO.	SHEET NO.
R-2823	40

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 4/17/09

-L-

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE 60" RCP
STA.260+50 -L-

DRAINAGE AREA	= 43	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 100	CFS
DESIGN HW ELEVATION	= 123.1	FT
100 YEAR DISCHARGE	= 120	CFS
100 YEAR HW ELEVATION	= 123.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 156	CFS
OVERTOPPING ELEVATION	= 125.8	FT

BM #9
RR SPIKE IN BASE OF 24" PINE
-L- STA. 262+77.10 84.18' RT
ELEV. 125.25'

END GRADE
-L- STA.264+49.56 EL.125.90'=
-Y8- STA.18+17.87 79.29' RT

PI = 262+70.00
EL = 125.33'
VC = 200'
K = 218

BEG. BERM V DITCH
-L- STA. 256+50 RT
EL. 125.76

BEG. SP. CUT DITCH
-L- STA. 257+50 RT
EL. 125.35

PI -L- STA. 259+50 RT
SP. CUT DITCH EL. 122.50
BERM V DITCH EL. 120.37

PI -L- STA. 259+00 RT
EL. 121.66

END SP. CUT DITCH
END BERM V DITCH
-L- STA. 260+00 RT
EL. 118.00

PROPOSED GRADE

END SP. CUT DITCH
-L- STA. 264+00 LT
EL. 124.04

EXISTING GROUND

18" RCP

(-)1.64% RT
(-)1.63% LT
(-)1.55% LT
(-)1.43% RT
(-)2.58% RT
(-)9.00% RT
(-)4.74% RT
(+)0.75 LT
(+)3.60% LT
(+)3.25% RT
(+)0.77% RT
(-)0.6000%
(+)0.75% LT
(+)0.77% RT
(+)0.31% LT
(+)3.61% RT

60" PIPE

PI -L- STA. 257+58 LT
EL. 122.08

BEG. LAT. BASE DITCH
-L- STA. 257+00 LT
EL. 125.75

END LAT. BASE DITCH
-L- STA. 259+98 LT
EL. 118.36

BEG. LAT. BASE DITCH
-L- STA. 260+02 LT
EL. 118.36

PI -L- STA. 261+00 LT
EL. 121.79

BEG. SP. LAT. V DITCH
-L- STA. 261+22 RT
EL. 118.09

PI -L- STA. 261+50 RT
EL. 119.00

END LAT. BASE DITCH
BEG. SP. CUT DITCH
-L- STA. 261+50 LT
EL. 122.17

END SP. LAT. V DITCH
BEG. SP. CUT DITCH
-L- STA. 262+50 RT
EL. 119.77

PI -L- STA. 263+01 RT
EL. 120.16

END SP. CUT DITCH
-L- STA. 263+50 RT
EL. 121.93

FOR -L- PLAN SEE SHTS.22 & 23

170 160 150 140 130 120 110 100 90 80

256+00 257+00 258+00 259+00 260+00 261+00 262+00 263+00 264+00

-Y-

BEGIN GRADE
-Y- STA.12+85.00
EL.156.25'

BEGIN GRADE
-Y- STA.22+69.22 EL.146.10'=
-L- STA.21+44.14 (41.0' RT)

END GRADE
-Y- STA.21+82.46 EL.145.89'=
-L- STA.21+72.49 (41.0' LT)

-Y- STA.22+25.87'=
-L- STA.21+56.22

BEG. SP. CUT DITCH
-Y- STA. 12+85 LT
EL. 154.15

END SP. CUT DITCH
-Y- STA. 13+00 LT
EL. 153.66

(-)1.27% LT

(-)2.60% RT

PI = 16+15.00
EL = 151.96'
VC = 160'
K = 320

PI = 17+75.00
EL = 149.08'
VC = 160'
K = 152

PI = 21+00.00
EL = 146.64'
VC = 160'
K = 949

PI = 23+45.00
EL = 145.33'
VC = 150'
K = 227

EXISTING GROUND

PROPOSED GRADE

(-)1.3000%
(-)1.8000%
(-)1.8000%
(-)0.7500%
(-)0.7500%
(-)0.9186%
.025
.020
(-)1.0117%
(-)0.3500%
(-)0.35% RT
(-)0.35% RT

BEG. SP. CUT DITCH
-Y- STA. 12+85 RT
EL. 153.56

END SP. CUT DITCH
-Y- STA. 13+00 RT
EL. 153.17

BEG. SP. CUT DITCH
-Y- STA. 20+00 RT
EL. 143.11

END SP. CUT DITCH
BEG. LAT. BASE DITCH
-Y- STA. 21+00 RT
EL. 142.76

END LAT. BASE DITCH
-Y- STA. 21+76 RT
EL. 142.50

LEFT SIDE DITCH PROFILE -------
RIGHT SIDE DITCH PROFILE ---------

FOR -Y- PLAN SEE SHTS.5 & 24

160 150 140 130 120 110 100

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00

5/28/2009

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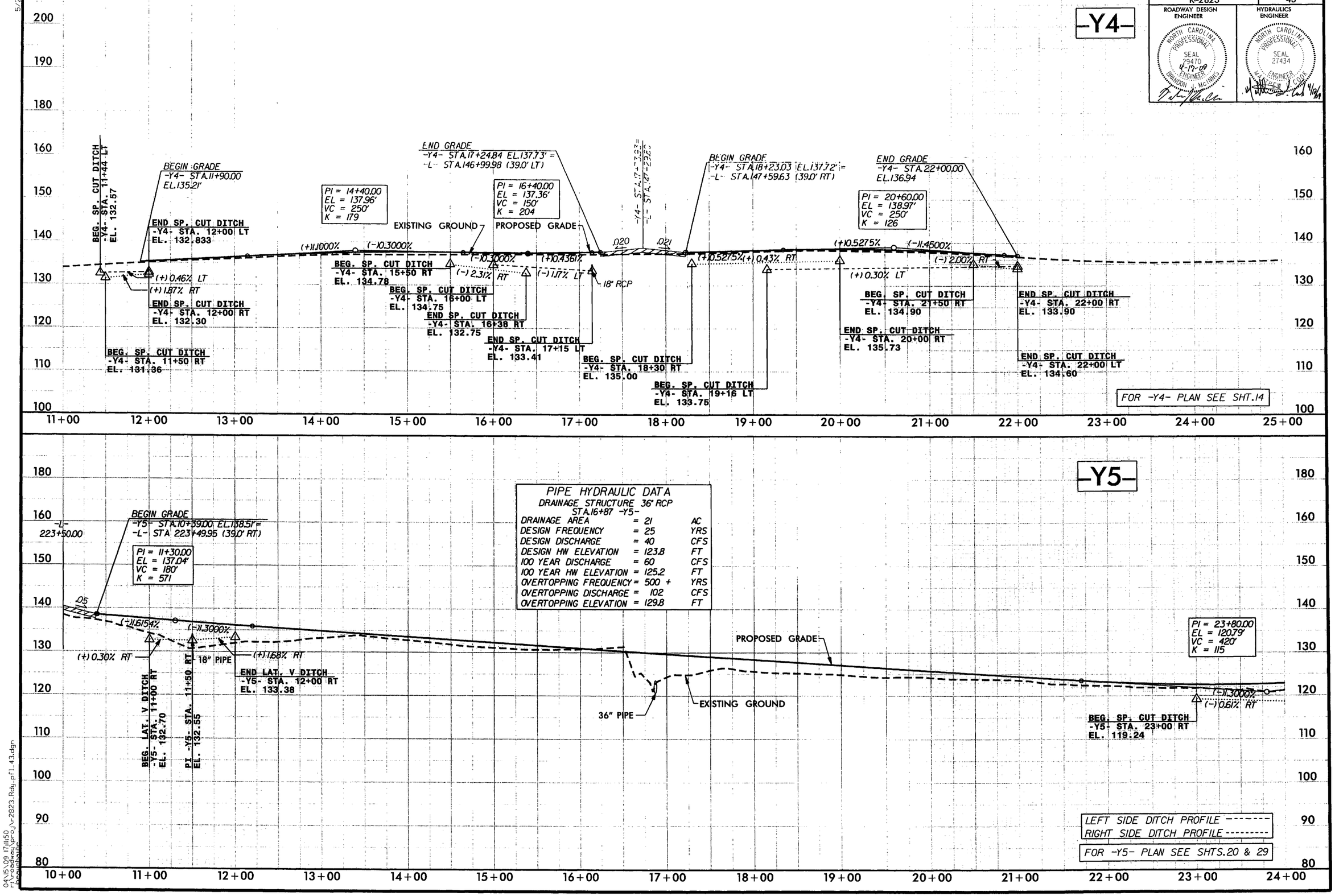
PROJECT REFERENCE NO.	SHEET NO.
R-2823	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 29470 ENGINEER BRANDON J. McINNIS 4-17-09

NORTH CAROLINA PROFESSIONAL SEAL 27434 ENGINEER 4/17/09



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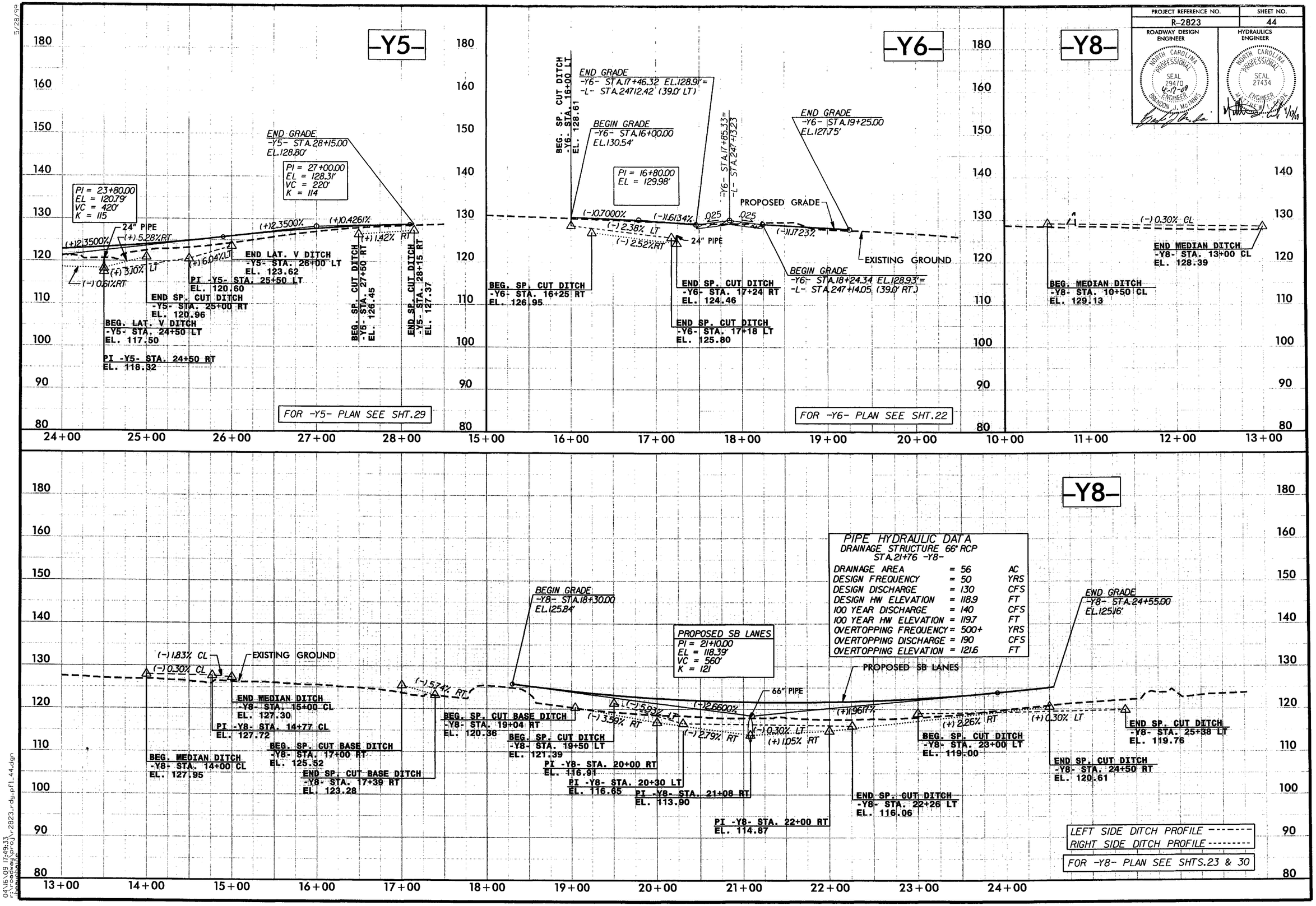
PROJECT REFERENCE NO.	SHEET NO.
R-2823	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



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