STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY PERDUE
GOVERNOR

Eugene Conti
SECRETARY

July 31, 2009

U.S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Mr. David Baker
NCDOT Coordinator

Subject: **Request for Modification to Individual Section 404 Permit and to Individual Section 401 Certification for Section R-2519A**
US 19/US 19E Improvements
From SR 1336 (Jacks Creek Road) to SR 1186 (US 19) west of Micaville
Yancey County
NCDOT Division 13
State Project Numbers 6.869005T and 6.909001T
T.I.P. Project Number R-2519A
Debit $570.00 from WBS Element 35609.1.1

Reference: Application for Individual Section 404 and 401 permits for TIP R-2518A, R-2518B, and R-2519A, submitted June 26, 2007
Revisions to the permit application, October 1, 2007
Individual 401 Water Quality Certification No. 3706 issued October 16, 2007 for R-2518A.
Individual 404 Permit SAW-2007-2197-357/300 issued April 1, 2008.
Amended Application for Individual Section 404 and Modification to Individual 401 Certification for Section R-2518B, submitted January 22, 2008.

Dear Mr. Baker:

This letter addresses Section R-2519A of the US 19E widening project that extends from SR 1336 (Jack's Creek Road) to SR 1186 (US 19) west of Micaville. The North Carolina Department of Transportation (NCDOT) proposes to widen US 19/US 19E from future I-26 (existing US 19-23) in Madison County to SR 1186 (US 19) near Micaville in Yancey

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

TELEPHONE: 919-733-3141
FAX: 919-715-1501

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

County. The total length of the project (R-2518A, R-2518B & R-2519A) is approximately 21 miles. The length of the R-2519A section is 7.4 miles. The project will upgrade the existing two and three-lane principal arterial to a multi-lane facility with partial access control.

The original permit application dated June 26, 2007 presented the impacts for Section R-2519A, based on preliminary design, as **5,309 linear feet** of permanent impacts to surface waters and **0.29 acre** of permanent impacts to wetlands. This modification for Section R-2519A, based on final design, presents **4,509 linear feet** of permanent impacts to surface waters and **0.30 acre** of permanent impacts to wetlands. Also, this project will utilize 1,019 linear feet of bank stabilization. Attached are the Ecosystem Enhancement Program (EEP) confirmation letter, NCWRC Letter, a revised Stormwater Management Plan for R-2519A, 4B Permit Drawing Review Meeting minutes and Final Minutes for Hydraulic Design Review Meeting with Actions Taken since the Meeting, property owner labels, permit drawings, roadway plan sheets, and Natural Stream Design Plans.

This project calls for a letting date of May 17, 2011 and a review date of March 29, 2011; however, the let date may advance as additional funding becomes available.

IMPACTS TO WATERS OF THE U.S. – R-2519A

Wetlands

Permanent impacts: Wetland impacts total 0.30 acre, with 0.26 acre of impact to riverine wetlands, and the remaining 0.04 acre of impact to non-riverine wetlands.

Temporary impacts: There will be no temporary fill in any of the wetland areas.

Surface Waters

Permanent impacts: Impacts to surface waters total 4,509 linear feet.

Temporary impacts: Impacts will be necessary for construction of the various box culverts and pipe installations. Temporary impacts associated with this project include 573 linear feet (0.09 acre) of temporary fill in surface waters.

The following table depicts all of the jurisdictional streams and wetlands impacted by the final project design for Section R-2519A.

Table 1 - R-2519A Impacts to Waters of the U.S.

Permit Drawing Site #	Feature Type	Feature Name	Station No.	Type of Stream/ Wetland	DWQ Stream Classification	Mitigation Required?
1	Stream	UT to Cane River	228+50 –L-	Perennial	C;Tr	Yes
2	Stream	UT to Cane River	10+40 –D1-	Perennial	C;Tr	Yes
3	Stream	UT to Cane River	230+85 –L-	Perennial	C;Tr	No
4	Stream	UT to Cane River	231+50 –L-	Perennial	C;Tr	Yes
5	Stream	UT to Cane River	232+90 –L-	Perennial	C;Tr	Yes
6	Stream	UT to Cane River	236+10 –L	Perennial	C;Tr	Yes
7	Stream	Bailey Branch	243+30 –L-	Perennial	C;Tr	Yes
8	Stream	UT to Pine Swamp Branch	249+65 –L-	Perennial	C;Tr	Yes
9	Stream	Pine Swamp Branch	D4 – 10+30	Perennial	C;Tr	Yes
9A	Stream	Pine Swamp Branch	255+40 –L	Perennial	C;Tr	Yes
10	Stream	McIntosh Branch/ Pine Swamp Branch	257+35 –L/ Y10 – 11+00	Perennial	C/C;Tr	Yes
11	Stream	Little Crabtree Creek	270+55 –L	Perennial	C;Tr	Yes
12	Stream	Little Crabtree Creek	Y17-11+30	Perennial	C;Tr	Yes
13	Stream	UT to Little Crabtree Creek	279+93 -L	Perennial	C;Tr	Yes
14	Stream	Little Crabtree Creek	284+30 -L	Perennial	C;Tr	Yes
15	Stream	Little Crabtree Creek	285+00 -L	Perennial	C;Tr	Yes
16	Stream	UT to Little Crabtree Creek	Y19 -11+60	Perennial	C;Tr	Yes
17	Wetland		287+60 -L	Non-Riverine		Yes
18	Stream	Ray Creek	289+80 -L	Perennial	C;Tr	Yes
19	Wetland		292+10 -L	Riverine		Yes
20	Wetland		293+40 -L	Riverine		Yes
21	Stream	Sugar Hollow Creek	297+60 -L	Perennial	C;Tr	Yes
22	Stream	Little Crabtree Creek	300+90 -L	Perennial	C;Tr	Yes
23	Stream	Allen Branch	301+40 -L	Perennial	C;Tr	Yes
24	Stream	UT to Little Crabtree Creek	Y26 -9+44	Perennial	C;Tr	Yes
25	Stream	George's Fork	312+60 -L	Perennial	C;Tr	Yes
26	Stream	George's Fork	314+05 -L	Perennial	C;Tr	Yes
27	Stream	UT to George's Fork	314+40 -L	Perennial	C;Tr	Yes
28	Stream	Little Crabtree Creek	316+60 -L	Perennial	C;Tr	Yes
29	Stream	Shoal Creek	318+15 -L	Perennial	C;Tr	Yes
30	Stream	UT to Little Crabtree Creek	320+10 -L	Perennial	C;Tr	Yes
31	Stream	UT to Little Crabtree Creek	324+50 -L	Perennial	C;Tr	Yes
32	Stream	UT to Plum Branch	Y33 -9+90	Perennial	C;Tr	Yes
33	Stream	Plum Branch	327+90 -L	Perennial	C;Tr	Yes
34	Stream	UT to Little Crabtree Creek	333+15 -L	Perennial	C;Tr	Yes
35	Stream	Little Crabtree Creek	Y34 -10+51	Perennial	C;Tr	Yes
36	Stream	UT to Little Crabtree Creek	337+25 -L	Perennial	C;Tr	Yes
37	Stream	UT to Little Crabtree Creek	340+50 -L	Perennial	C;Tr	Yes

Permit Site 1 : A perennial unnamed tributary (UT) to the Cane River will be impacted by the extension of the existing 1000mm corrugated metal pipe (CMP) on the inlet with a new 1000mm corrugated steel pipe (CSP) with headwall and a new 1200mm reinforced concrete pipe (RCP), a junction box and bank stabilization on the outlet.
Permanent Impacts, Stream: 68 lf
Temporary Impact, Stream: <0.01ac

Permit Site 2: A perennial UT to the Cane River will be impacted by replacement of the existing 1200mm CMP with a 2.23m x 1.6m corrugated steel pipe arch (CSPA) with a headwall at the inlet and bank stabilization at the outlet.
Permanent Impacts, Stream: 85 lf
Temporary Impact, Stream: <0.01 ac

Permit Site 3: A perennial UT to the Cane River will be impacted by the extension of an existing 900mm CMP with a new 900mm CSP and bank stabilization at the outlet.
Permanent Impacts, Stream: 54 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 4: A perennial UT to the Cane River will be impacted by the extension of an existing 1800mm CMP with a new 1800mm CSP and bank stabilization at the outlet.
Permanent Impacts, Stream: 46 lf
Temporary Impacts, Stream: 0.02 ac

Permit Site 5: A perennial UT to the Cane River will be impacted by the extension of an existing 1500mm CMP with a new 1500mm CSP; bank stabilization, and stream relocation at the inlet.
Permanent Impacts, Stream: 83 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 6: A perennial UT to the Cane River will be impacted by the extension of an existing 1400mm CMP with a new 1400mm CSP and bank stabilization at the outlet.
Permanent Impacts, Stream: 81 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 7: The Bailey Branch crossing is listed as a permit site though there are no impacts to the stream. During preliminary design it was determined that the existing pipe would not need to be extended to accommodate the road widening.
Permanent Impacts, Stream: 0 lf
Temporary Impacts, Stream: 0 ac

Permit Site 8: A perennial UT to Pine Swamp Branch will be impacted by the extension of an existing 1500mm CMP with a new 1500mm CSP at the inlet.
Permanent Impacts, Stream: 19 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 9: Pine Swamp Branch will be impacted by the replacement of an existing 1500mm CSP with a 2.41m x 1.70m CSPA with a headwall at the inlet and bank stabilization at the outlet.
Permanent Impacts, Stream: 32 lf
Temporary Impacts, Stream: <0.01 ac.

Permit Site 9A: Pine Swamp Branch will be impacted by bank stabilization from a grass lined roadway drainage ditch.
Permanent Impacts, Stream: 25 lf
Temporary Impacts, Stream: 0 ac.

Permit Site 10: Pine Swamp Branch will be impacted by the extension of the existing (2) 1.83m x 1.83m reinforced concrete box culverts (RCBC) with (2) 1.83m x 2.74m RCBC and bank stabilization at the outlet. Pine Swamp Branch will also be impacted by relocation into a new 1.83m x 2.13m RCBC that transitions to a 2.1m x 2.1m RCBC with sills at the inlet. McIntosh Branch will be impacted by relocation into a new 1.83m x 2.13m RCBC that transitions to a 2.13m x 2.44m at the inlet. A perennial UT to Pine Swamp Branch will be impacted by the installation of an energy dissipator basin.
Permanent Impacts, Stream: 714 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 11: Little Crabtree Creek will be impacted by the extension of an existing 1600 mm CMP with a junction box and a 1400mm CSP with bank stabilization at the outlet.
Permanent Impacts, Stream: 32 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 12: Little Crabtree Creek will be impacted by the replacement of the existing (2) 2.13m x 1.83m RCBC with (2) 3.0m x 2.4m RCBC.
Permanent Impacts, Stream: 132 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 13: A perennial UT to Little Crabtree Creek will be impacted by the extension of an existing 2.13m x 1.52m RCBC with a junction box and 1500mm CMP at the inlet and a 1500mm CMP with bank stabilization at the outlet.
Permanent Impacts, Stream: 82 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 14: Little Crabtree Creek will be impacted by the bank stabilization and low flow diversion sills. Two sets of existing RCBCs will be replaced at their current length but with no new impacts
Permanent Impacts, Stream: 270 lf
Temporary Impacts, Stream: 0 ac

Permit Site 15: Little Crabtree Creek will be impacted by the replacement of the existing (2) 2.4m x 2.1m RCBC with (2) 3.6m x 2.4m RCBC with a low flow diversion sill at the inlet and bank stabilization at the outlet with low flow benches at the inlet and outlet.
Permanent Impacts, Stream: 130 lf
Temporary Impacts, Stream: 0.01 ac

Permit Site 16: A perennial UT to Little Crabtree Creek will be impacted by its relocation into a 1050mm CMP.
Permanent Impacts, Stream: 41 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 17: A Non-Riverine wetland will be impacted by roadway fill and mechanized clearing.
Permanent Impacts, Non-Riverine Wetland: 0.04 ac

Permit Site 18: Ray Creek and will be impacted by the extension of an existing 1.83m x 1.83m RCBC with bank stabilization and a low flow bench at the outlet.
Permanent Impacts, Stream: 109 lf
Temporary Impacts, Stream: 0 ac

Permit Site 19: A Riverine wetland will be impacted by roadway fill and mechanized clearing.
Permanent Impacts, Riverine Wetland: 0.24 ac

Permit Site 20: A small Riverine wetland will be impacted by roadway fill and mechanized clearing.
Permanent Impacts, Riverine Wetland: 0.02 ac

Permit Site 21: Sugar Hollow Creek and will be impacted by the replacement of the existing 1400mm CSP with a 1800mm CSP with bank stabilization at the outlet.
Permanent Impacts, Stream: 66 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 22: Little Crabtree Creek and will be impacted by the extension of the existing (2) 3.05m x 2.74 RCBC with a low flow diversion channel at the inlet and bank stabilization at the outlet.
Permanent Impacts, Stream: 251 lf
Temporary Impacts, Stream: 0.01 ac

Permit Site 23: Allen Branch will be impacted by the replacement of the existing (2) 1500mm CMPs with (2) 1.8m x 1.8m RCBC with sills and a low flow channel bank stabilization and a floodplain bench at the outlet.
Permanent Impacts, Stream: 132 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 24: A perennial UT to Little Crabtree Creek will be impacted by its relocation into a 1050mm RCP.
Permanent Impacts, Stream: 535 lf
Temporary Impacts, Stream: 0 ac

Permit Site 25P: A pond will be impacted by roadway fill. These impacts are considered nonmitigable.
Permanent Impacts, Pond: 0.040 ac

Permit Site 25: George's Fork will be impacted by the extension of the existing (2) 2.13m x 1.83m RCBC.
Permanent Impacts, Stream: 186 lf
Temporary Impacts, Stream: 0.01 ac

Permit Site 26: George's Fork will be impacted by relocation into a new channel.
Permanent Impacts, Stream: 583 lf
Temporary Impacts, Stream: <0.01 ac
Natural Stream Design: 580 lf

Permit Site 27: A perennial UT to George's Fork will be impacted by relocation into a 1500mm RCP.
Permanent Impacts, Stream: 143 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 28: Little Crabtree Creek will be impacted by the extension of the existing (3) 3.05m x 2.4m RCBC with the addition of another 3.05 x 2.4m culvert (for a total of 4) with low flow diversion sills at the inlet and a low flow bench with bank stabilization at the outlet
Permanent Impacts, Stream: 175 lf
Temporary Impacts, Stream: 0.02 ac

Permit Site 29: Shoal Creek will be impacted by the extension of the existing (2) 2.44m x 2.13m RCBC and relocation into a new channel.
Permanent Impacts, Stream: 294 lf
Temporary Impacts, Stream: <0.01 ac
Natural Stream Design: 233 lf

Permit Site 30: A perennial UT to Little Crabtree Creek will be impacted by relocation into a 1200mm CMP.
Permanent Impacts, Stream: 200 lf
Temporary Impacts, Stream: <0.01 ac

Permit Site 31: A perennial UT to Little Crabtree Creek will be impacted by the extension of the existing 1500mm CMP with bank stabilization at the outlet.
Permanent Impacts, Stream: 54 lf
Temporary Impacts, Stream <0.01 ac

Permit Site 32: A perennial UT to Plum Branch will be impacted by relocation into a new channel using natural stream design.
Permanent Impacts, Stream: 217 lf
Temporary Impacts, Stream: <0.01 ac
Natural Stream Design: 210 lf

Permit Site 33: Plum Branch will be impacted by relocation into a new channel using natural stream design and the extension of the existing 3.05m x 1.83m RCBC with a new 3.6m x 2.1m RCBC. There will be low flow sills at the RCBC inlet and low flow sills added to the existing culvert. A Rock Cross-vane will be installed at the outlet to bring the stream grade up to culvert outlet elevation.
Permanent Impacts, Stream: 325 lf
Temporary Impacts, Stream: <0.01 ac
Natural Stream Design: 157 lf

Permit Site 34: A perennial UT to Little Crabtree Creek will be impacted by its relocation into a new channel.
Permanent Impacts, Stream: 208 lf
Temporary Impacts, Stream <0.01 ac

Permit Site 35: Little Crabtree Creek will be impacted by the extension of the existing (3) 3.35m x 3.05m RCBC with low flow diversion sills at the inlet and bank stabilization at the outlet
Permanent Impacts, Stream: 73 lf
Temporary Impacts, Stream: 0.01 ac

Permit Site 36: A perennial UT to Little Crabtree Creek will be impacted by the extension of the existing 1350mm RCP at the inlet.
Permanent Impacts, Stream: 24 lf
Temporary Impacts, Stream <0.01 ac

Permit Site 37: A perennial UT to Little Crabtree Creek will be impacted by relocation into a new channel and the extension of the existing 150 0mm RCP at the inlet.
Permanent Impacts, Stream: 59 lf
Temporary Impacts, Stream <0.01 ac

Compensation for R-2519A

Compensatory Mitigation: A March 21, 2007 R-2519A Permit Drawing Review (4C) meeting, resource agency representatives agreed that "leftover" on-site mitigation from the R-2518A section of the US19E Widening project could be used as compensatory mitigation for impacts associated with other sections of the project. An October 22, 2007 letter from EEP reserved compensatory mitigation for wetlands and streams not covered by onsite mitigation. After 2,522 linear feet of excess mitigation from R-2518A and 1,180 linear feet of natural stream design for R-2519A are subtracted from the 4,509 linear feet of permanent surface waters impacts for R-2519A; there are 807 linear feet of permanent impacts to surface waters remaining that will be mitigated by EEP.

This project will also utilize 1,019 linear feet of bank stabilization. The NCDOT does not propose mitigation for stream bank stabilization activities. Stabilizing the bank of a stream does not require fill in the stream bed and, therefore, under Section 404 of the Clean Water Act, does not constitute Loss of Waters of the U.S. and is not subject to compensatory mitigation. Furthermore, the proposed bank stabilization activities are necessary to prevent erosion and sedimentation, i.e. preventing bank destabilization and minimizing impacts to the environment.

Table 2 provides information about the on-site mitigation associated with each impact site within R-2519A.

Table 2. On-site Stream Mitigation within R-2519A

R-2519A	Site Name	Station	Mitigation Type	Length (ft.)	Buffer (ft./side)	Mitigation Area (Ac)
	26 (George Fork)	314+04 to 315+67 –L-	restoration	580	30	.81
	29 (Shoal Creek)	10+28 to 10+98 –Y30-	restoration	233	24	.26
	32 (UT Plum Branch)	9+86 to 10+40 –Y33-	restoration	210	20	.20
	33 (Plum Branch)	9+86 to 10+34 –Y32-	restoration	157	25	.17
			Total:	**1,180**	**279**	**2.09**

FEDERALLY PROTECTED SPECIES

Please refer to the original permit application submittal dated June 26, 2007 for project-wide federally threatened and endangered species information. As of July 28, 2009, the federally protected species listed by the United States Fish and Wildlife Service (USFWS) for Yancey County has not changed. A July 15, 2009 survey for Virginia Spiraea found no specimens.

REGULATORY APPROVALS

Clean Water Act Section 404: Application is hereby made for Modification to the Department of the Army Individual Section 404 Permit as required for the above-

described activities. Due to the size and complexity of the project; NCDOT requests a 5 year permit to cover the duration of construction activity.

Clean Water Act Section 401: We are also hereby requesting a modification to the Section 401 Water Quality Certification (WQC. No. 3706) from the Division of Water Quality. A state stormwater permit is not required for this section of the project since there are no HQW or ORW waters on this section.

By copy of this letter and attachments, NCDOT hereby requests NCWRC review. NCDOT requests that NCWRC forward their comments to the Corps of Engineers within 30 days of receipt of this application.

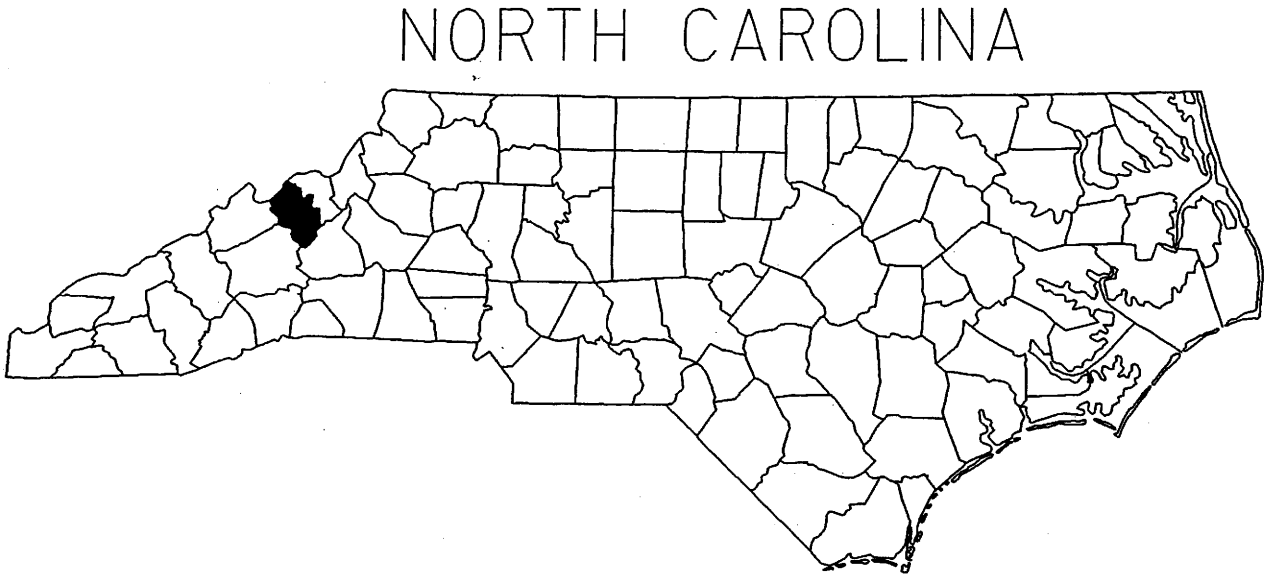
If you have any questions or need additional information please call Mr. Jeff Hemphill, at (919) 431-6674 or at jhemphill@ncdot.gov. A copy of this application will also be posted at www.ncdot.org/doh/preconstruct/pe/neu/permit.html.

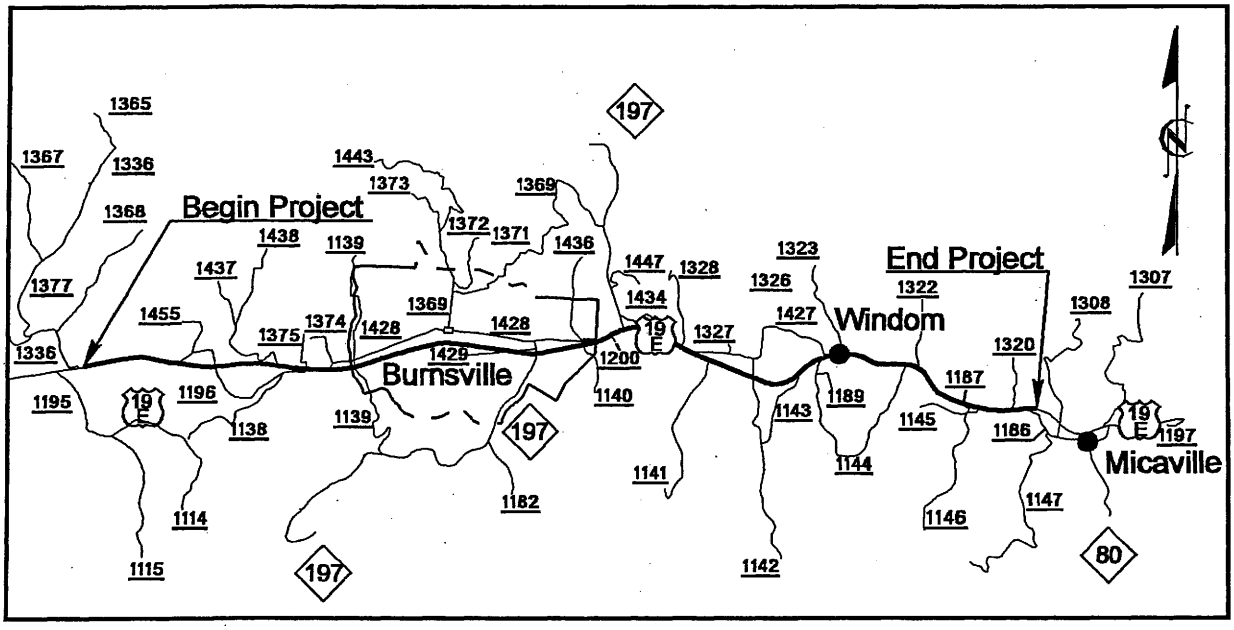
Sincerely,

for Gregory J. Thorpe, Ph.D., Environmental Management Director
Project Development and Environmental Analysis Branch

w/attachment
Mr. Brian Wrenn, NCDWQ **(5 Copies)**
Ms. Marella Buncick, USFWS
Ms. Marla Chambers, NCWRC
Ms. Kathy Matthews, USEPA-Whitter, NC
Dr. Charles Nicholson, TVA

W/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Victor Barbour, Project Services Unit
Mr. Greg Perfetti, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. J.J. Swain, P.E., Division Engineer
Mr. Roger Bryan, DEO
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P.E., Prog. and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE, Wilmington
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT Ext. Audit Branch
Mr. Steve Brown, P.E., PDEA Pl. Engineer
Mr. Drew Joyner, PE, HEU
Ms. LeiLani Paugh, NEU
Mr. Randy Griffin, NEU





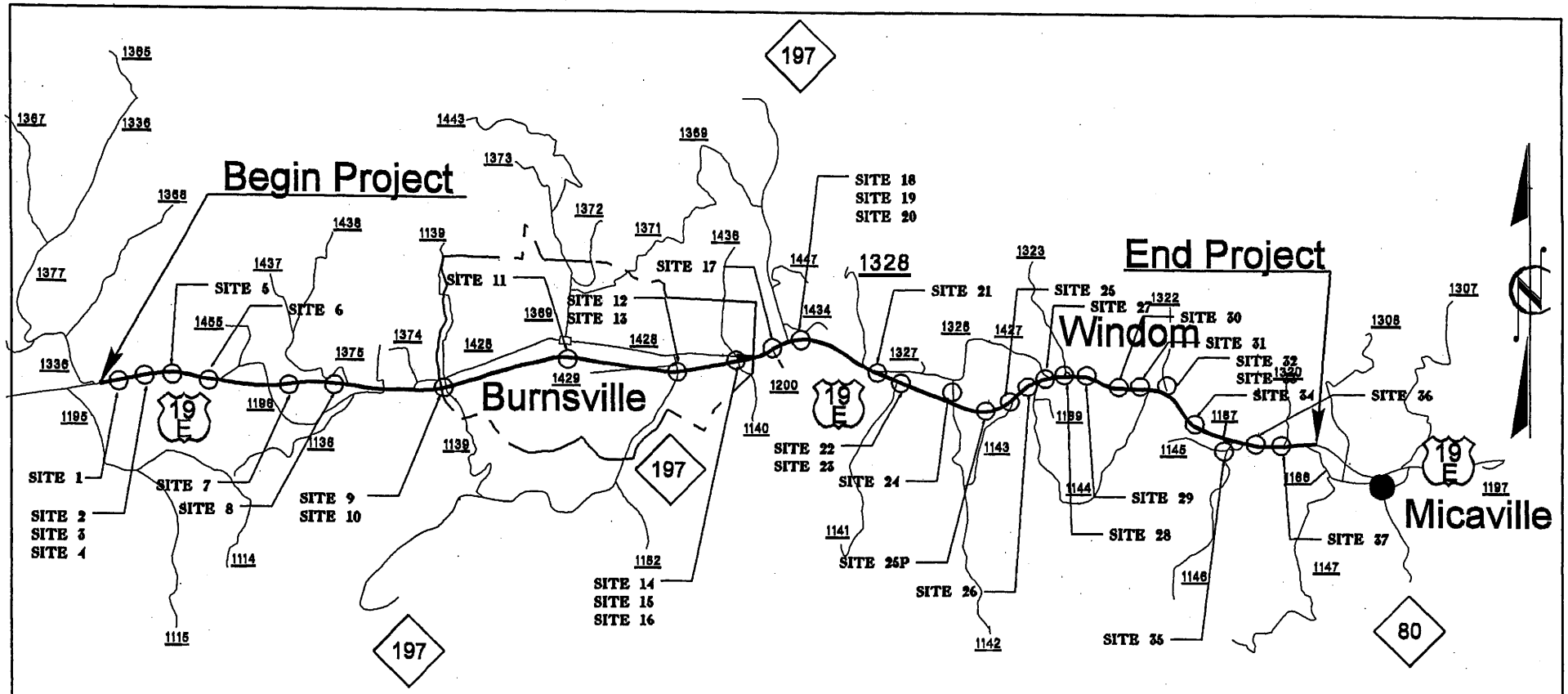
VICINITY MAPS

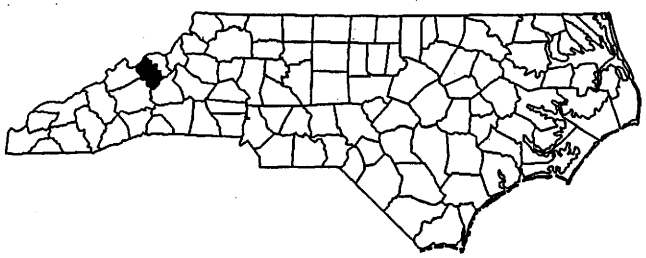
NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF SR 1336
(JACKS CREEK ROAD) TO
SR 1186 (OLD US 19)

SHEET OF 11/15/06

Permit Drawing
Sheet 1 of 86



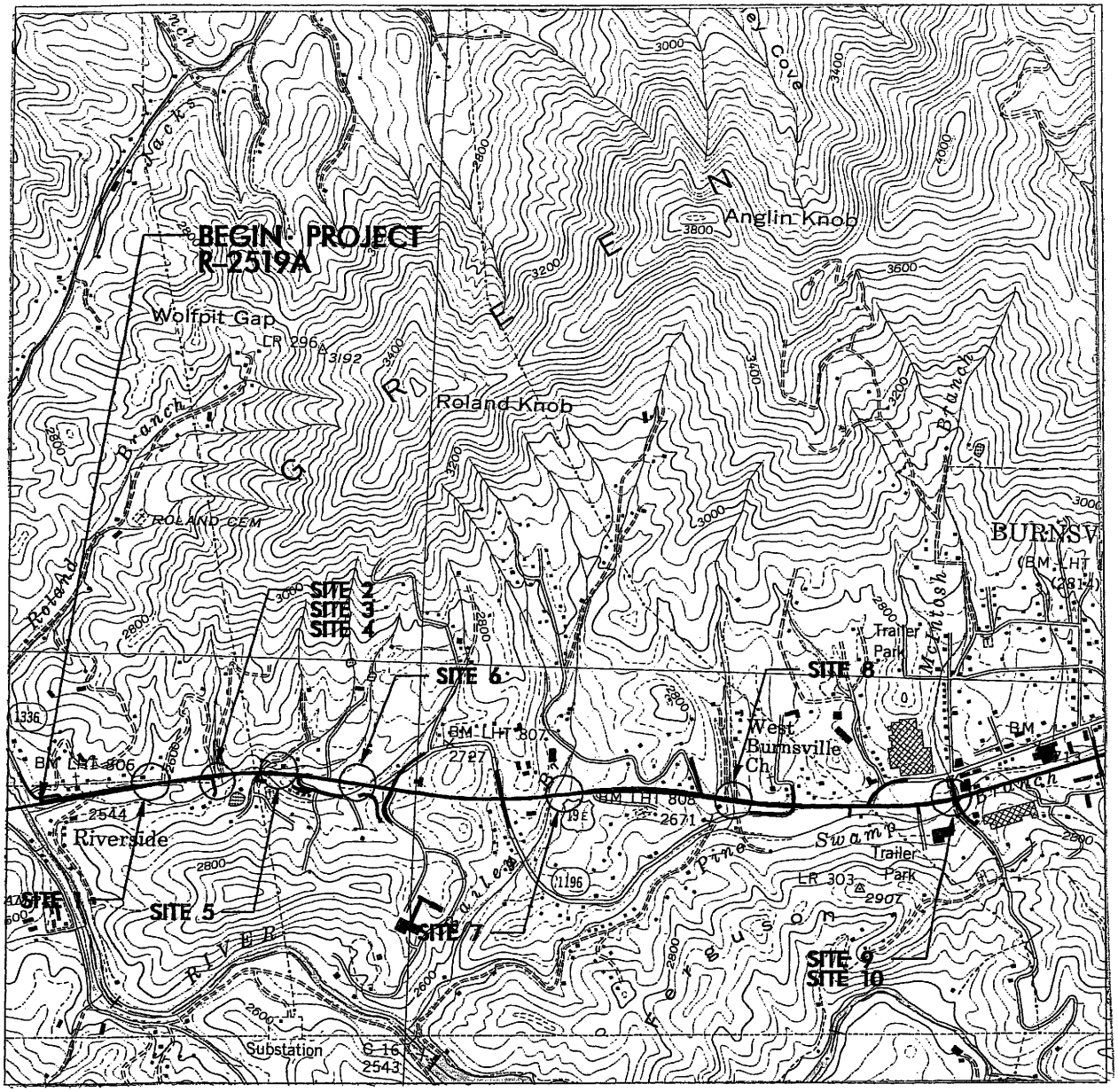


VICINITY MAP

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF SR 1336
(JACKS CREEK ROAD) TO
SR 1186 (OLD US 19)

SHEET OF 11/15/06

Permit Drawing
Sheet 2 of 86

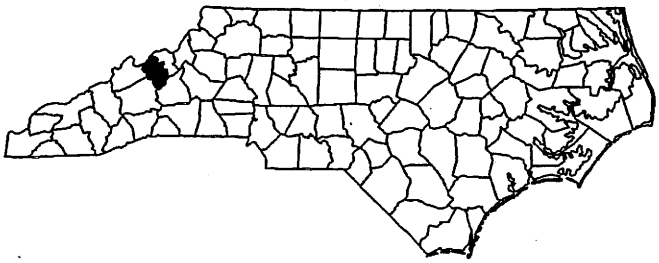


VICINITY MAP

0 ½ 1.0 mi

BURNSVILLE, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS

YANCEY COUNTY

PROJECT: WBS 35609.1.1 (R-2519A)

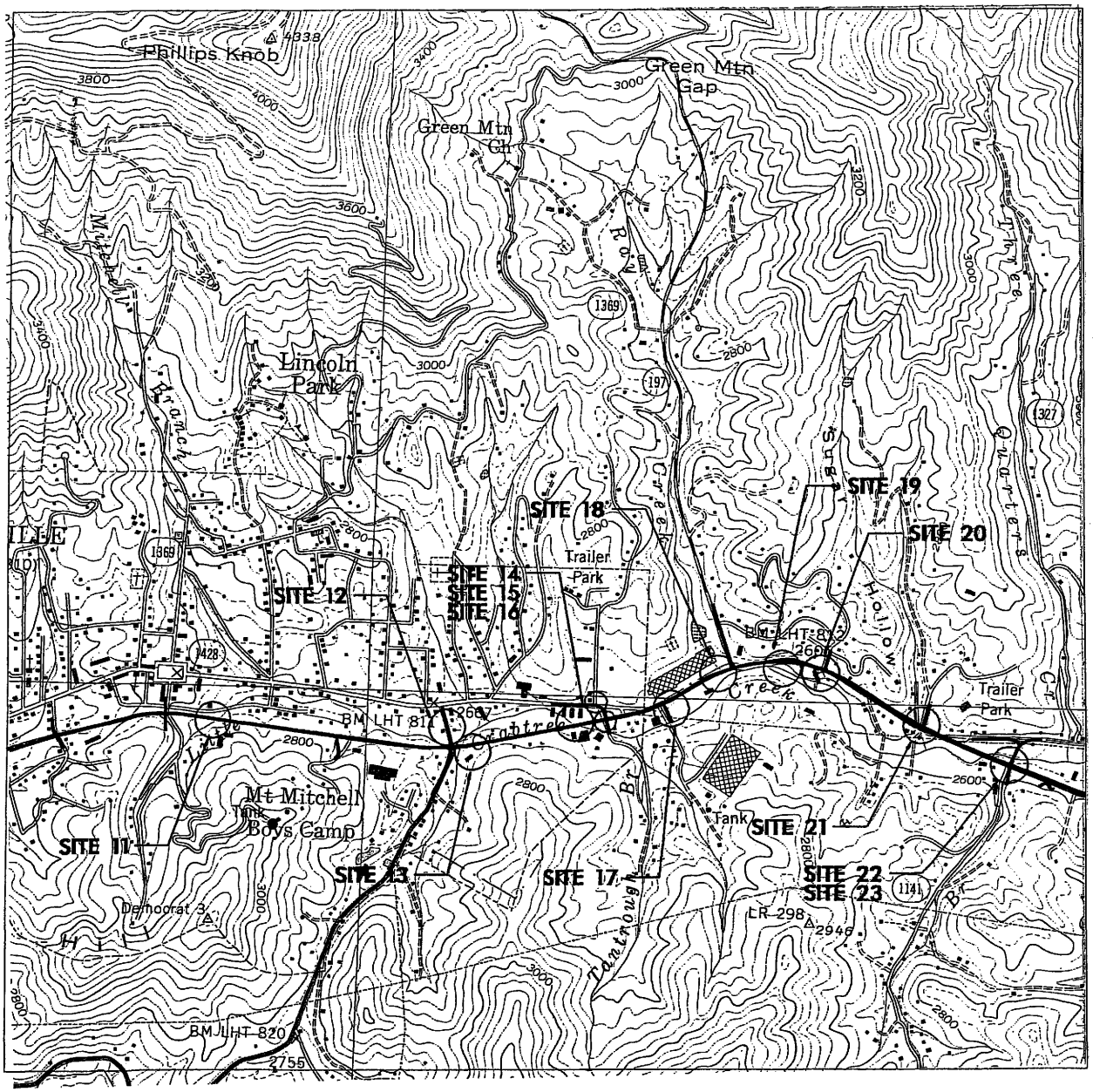
US 19 E EAST OF

SR 1336 (JACKS CREEK ROAD) TO

SR 1186 (OLD US 19)

Permit Drawing
Sheet 3 of 86

SHEET OF 11/17/06

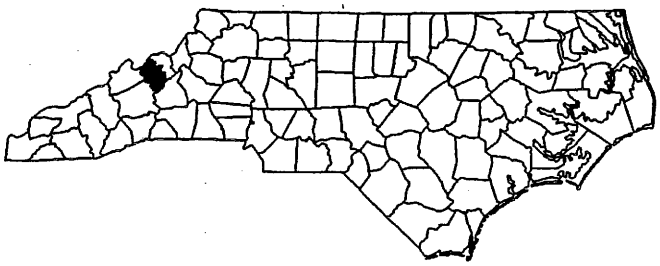


VICINITY MAP

0 ½ 1.0 mi

BURNSVILLE, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS

YANCEY COUNTY

PROJECT: WBS 35609.1.1 (R-2519A)

US 19 E EAST OF

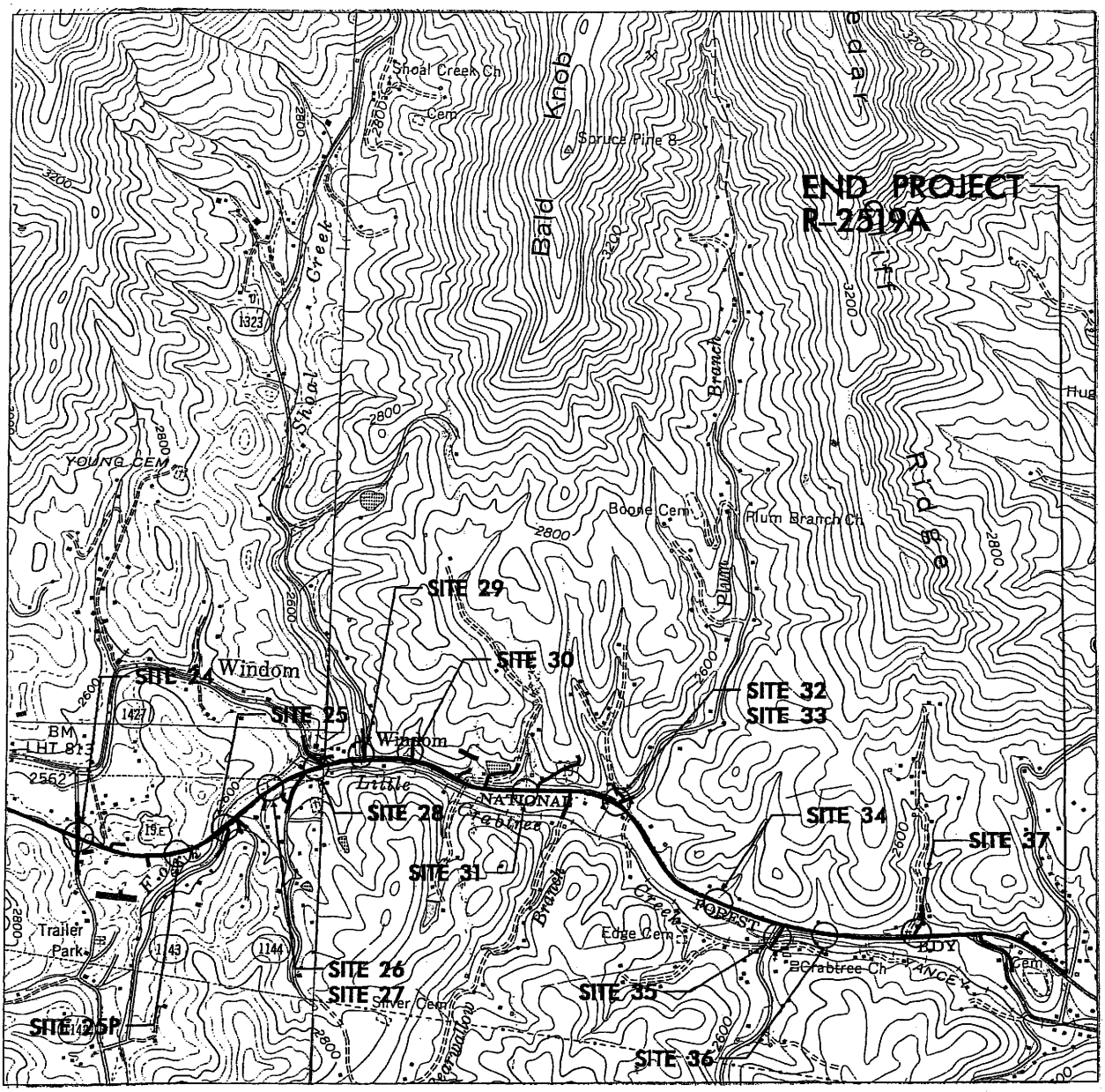
SR 1336 (JACKS CREEK ROAD) TO

SR 1186 (OLD US 19)

Permit Drawing

Sheet 4 of 86

SHEET OF 11/17/06

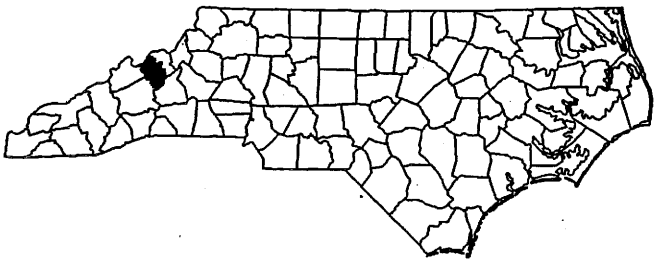


VICINITY MAP

0 ½ 1.0 mi

BURNSVILLE, NC QUAD MAP
MICAVILLE, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD) TO
SR 1186 (OLD US 19)

Permit Drawing
Sheet 5 of 86

SHEET OF 11/177/0

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- 228+50	1000mm CMP						0.01	<0.01	55	16	
1	-L- 228+50 RT	BANK STABILIZATION						<0.01		13		
2	-D1- 10+40	2.23m X 1.60m CS PIPE ARCH						0.02	<0.01	59	18	
2	-D1- 10+40 RT	BANK STABILIZATION						<0.01		26		
3	-L- 230+85	900mm CMP						0.01	<0.01	41	8	
3	-L- 230+85 RT	BANK STABILIZATION						<0.01		13		
4	-L- 231+50	1800mm CMP						<0.01	0.02	13	12	
4	-L- 231+50 RT	BANK STABILIZATION						0.01		33		
5	-L- 232+90	1500mm CMP						0.02	<0.01	83	13	
6	-L- 236+10	1400mm CMP						0.01	<0.01	51	11	
6	-L- 236+10 RT	BANK STABILIZATION						<0.01		30		
7	-L- 243+30	2100mm CMP						0.00	0.00	0	0	
8	-L- 249+65	1500mm CMP						<0.01	<0.01	19	9	
9	-D4- 10+30	2.41m X 1.70m CS PIPE ARCH						<0.01	<0.01	16	25	
9	-D4- 10+30	BANK STABILIZATION						<0.01		16		
9A	-L- 255+40 RT	BANK STABILIZATION						0.00		25		
10	-L- 257+35 / -Y10- 11+00	2@ 1.8m X 1.8m RCBC / BASIN						0.11	0.01	691	47	
10	-L- 257+35 RT	BANK STABILIZATION						<0.01		23		
11	-L- 270+55	1400mm CSP						<0.01	<0.01	13	10	
11	-L- 270+55 LT	BANK STABILIZATION						<0.01		19		
12	-Y17- 11+30	2@ 3.0m X 2.4m RCBC						0.01	<0.01	34	20	
12	-Y17- 11+30 LT/RT	BANK STABILIZATION						0.01		98		
13	-L- 279+93	1@ 2.13m X 1.52m RCBC						0.01	<0.01	66	15	
13	-L- 279+93 LT	BANK STABILIZATION						<0.01		16		
14	-L- 284+30 Lt.	2 - 2@ 3.35m X 2.74m RCBC						0.00	0.00	0	0	
14	-L- 283+96 / -L- 284+98 LT	BANK STABILIZATION						0.07		270		
SHEET TOTAL:								0.29	0.03	1723	204	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
WBS - 35609.1.1 (R2519A)

SHEET OF 04/30/09

Permit Drawing
Sheet 16 of 36

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)
15	-L- 285+00	2@ 3.6m X 2.4m RCBC						0.02	0.01	82	38	
15	-L- 285+00 RT	BANK STABILIZATION						0.01		48		
16	-Y19- 11+60	1050mm CMP						0.01	<0.01	41	15	
17	-L- 287+60	ROADWAY FILL	0.02			0.02						
18	-L- 289+80	1@ 1.83m X 1.83m RCBC						0.01		69		
18	-L- 289+80 RT	BANK STABILIZATION						0.01		40		
19	-L- 292+10	ROADWAY FILL	0.15			0.09						
20	-L- 293+40	1200mm RCP	0.01			0.01						
21	-L- 297+60	1800mm RCP						0.01	<0.01	46	35	
21	-L- 297+60 RT	BANK STABILIZATION						<0.01		20		
22	-L- 300+90	2@ 3.05m X 2.74m RCBC						0.08	0.01	211	19	
22	-L- 301+35 LT	BANK STABILIZATION						0.01		40		
23	-L- 301+40	2@ 1.8m X 1.8m RCBC						0.01	<0.01	45	9	
23	-L- 301+40 LT	BANK STABILIZATION						0.01		87		
24	-Y26- 9+44 LT to 12+26 RT	1050mm RCP						0.06	0.00	535	0	
25	-L- 312+60	2@ 2.13m X 1.83m RCBC						0.03	0.01	186	34	
26	-L- 314+05 to 315+67	STREAM RELOCATION						0.11	<0.01	583	11	580
27	-L- 314+40	1500mm RCP						0.02	<0.01	143	11	
28	-L- 316+60	4@ 3.05m X 2.44m RCBC						0.02	0.02	42	58	
28	-L- 316+60 LT / RT	BANK STABILIZATION						0.04		133		
29	-L- 318+15	2@ 2.44m X 2.13m RCBC						0.06	<0.01	294	14	233
30	-L- 320+10	1200mm CMP						0.02	<0.01	200	7	
31	-L- 324+50	1500mm RCP/CMP						0.01	<0.01	40	20	
31	-L- 324+50 RT	BANK STABILIZATION						<0.01		14		
32	-Y33- 9+90 to 10+40	STREAM RELOCATION						0.03	<0.01	217	10	210
33	-L- 327+90	1@ 3.0m X 1.8m RCBC						0.05	<0.01	325	26	157
SHEET TOTAL:			0.18			0.12		0.63	0.05	3441	307	1180

NOTE:
SITE 25P --> FILL IN ISOLATED POND (-L- 310+60 RT) - 0.040 ac

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
WBS - 35609.1.1 (R2519A)
SHEET OF 03/13/09

Permit Drawing
Sheet 7 of 16

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)
34	-L- 333+15	1350mm RCP / 1200mm RCP						0.05	<0.01	208	20	
35	-Y34- 10+51	3@ 3.35m X 3.05m RCBC						0.02	0.01	18	20	
35	-Y34- 10+51 LT / RT	BANK STABILIZATION						0.03		55		
36	-L- 337+25	1350mm RCP						<0.01	<0.01	24	12	
37	-L- 340+50	1500mm RCP						0.01	<0.01	59	10	
SHEET TOTAL:								0.11	0.01	364	62	
PROJECT TOTAL:			**0.18**			**0.12**		**1.03**	**0.09**	**5528**	**573**	**1180**

NOTE: TOTAL PERMANENT STREAM IMPACTS DUE TO BANK STABILIZATION = 1017 FT

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
WBS - 35609.1.1 (R2519A)

SHEET OF 03/13/09

Permit Drawing
Sheet 1 of 16

Site No.	Property Owner Name	Property Owner Address	Parcel Number
1	Gary Adkins	Rt. 1 Box 406, Burnsville, NC 28714	4
	Norman Rabek	Rt. 8 Box 842, Burnsville, NC 28714	2
2	Clarence Ball	Rt. 10 Box 613, Burnsville, NC 28714	6
	Rose Marilyn Angel	Rt. 3 Box 199, Burnsville, NC 28714	9
3	Rose Marilyn Angel	Rt. 3 Box 199, Burnsville, NC 28714	9
4	Rose Marilyn Angel	Rt. 3 Box 199, Burnsville, NC 28714	9
5	Zula Wheeler	Rt. 1 Box 256, Burnsville, NC 28714	12
	Jerry Jerome McIntosh	Rt. 10 Box 94, Burnsville, NC 28714	13
6	Vicki Banks Tipton	Rt. 10 Box 78, Burnsville, NC 28714	16
7	Freda Bryson	619 Norwood Street, Shelby, NC 28150	28
	Charles Phillip Styles	Rt. 10 Box 814, Burnsville, NC 28714	25
8	Bryant's Land and Development Ind.	N/A	34
	Ordie Brown	950 W. 19E, Burnsville, NC 28714	35
9	Yancey Mobile Home Sales, Inc.	P.O. Box 278, Burnsville, NC 28714	49
10	High Five Hospitality Holdings, LLC	N/A	90
	Properties on Main, LLC	N/A	52
	Charles Neill Ellis	P.O. Box 278, Burnsville, NC 28714	51
11	Yancey County	Room 11 Courthouse, Burnsville, NC 28714	79
12	Frank Fox	404 Pensacola Road, Burnsville, NC 28714	102
	Wallace B. Edge	P.O. Box 804, Burnsville, NC 28704	103
13	Eloise Briggs	P.O. Box 835, Burnsville, NC 28714	104
	E.J. Roland	P.O. Box 234, Burnsville, NC 28714	105
14	S.C.N. Enterprises	P.O. Box 309, Naples, NC 28760	115
15	David McIntosh	P.O. Box 728, Burnsville, NC 28714	118
16	Samuel S. Styles	P.O. Box 534, Burnsville, NC 28714	117
17	Yancey County	Room 11 Courthouse, Burnsville, NC 28714	122
18	Glen Raven Silk Mills, Inc.	Drawer 100, Burnsville, NC 28714	123
	Yancey County	Room 11 Courthouse, Burnsville, NC 28714	122
19	Yancey Railroad Company	C/O Walter Klements, 3127 Ponce De Leon Blvd, Coral Gables, Fl 33134	129

List of Property Owners

NC Dept. of Transportation
Division of Highways
Yancey County
Project: WBS 35609.1.1 (R-2519A)

US 19 E East of SR 1336
(Jacks Creek Road) to SR 1186 (Old US 19)

Sheet of 11/13/06

Site No.	Property Owner Name	Property Owner Address	Parcel Number
19	Yancey County	Room 11 Courthouse, Burnsville, NC 28714	122
20	Catalano Family Limited Partnership	3100 Airport West Drive, Vero Beach, Fl 32960	135
	Grady P. Melton	Rt. 8 Box 50, Burnsville, NC 28714	133
21	Charles Junior Peterson	P.O. Box 712, Burnsville, NC 28714	145
	Jay (Hannah) Styles	Rt. 8 Box 80, Burnsville, NC 28714	144
22	Yancey County	Room 11 Courthouse, Burnsville, NC 28714	155
	Farrell Hughes	Rt. 8 Box 230, Burnsville, NC 28714	156
	Quality Oil Company	N/A	152A
	Danny Leece Gouge	Rt. 8 Box 103, Burnsville, NC 28714	153
23	Farrell Hughes	Rt. 8 Box 230, Burnsville, NC 28714	156
	Dorothy Deyton	Rt. 8 Box 100, Burnsville, NC 28714	157
24	Zenus Elkins	N/A	238
	Yancey Railroad Company	C/O Walter Klements, 3127 Ponce De Leon Blvd, Coral Gables, Fl 33134	129
	S. Gail Crisp	N/A	165
	Rodney D. Shepard	Rt. 8 Box 1250, Burnsville, NC 28714	166
	Edds Independent Station	Rt. 6 Box 152, Burnsville, NC 28714	167
	William Harold Presnell	Rt. 7 Box 778, Burnsville, NC 28714	162
	Johnny Bennett	Georges Fork Road, Burnsville, NC 28714	169
25	Norman Evans	143 Bear Wallow Road, Burnsville, NC 28714	179
	Shoal Creek Baptist Church	N/A	178
25P	Eugene Styles	Rt. 8 Box 525, Burnsville, NC 28714	174
26	Shoal Creek Baptist Church	N/A	178
27	Norma P. Evans	P.O. Box 23, Burnsville, NC 28714	185
	Roger F. Penland	P.O. Box 741, Burnsville, NC 28714	186
	Elizabeth Young Huskins	Rt. 8 Box 549, Burnsville, NC 28714	187
28	Norman Evans	143 Bear Wallow Road, Burnsville, NC 28714	233
	Lewis J. McEntyre, Jr.	607 West By-Pass, Burnsville, NC 28714	189
29	William Ray Young	Rt. 8 Box 230, Burnsville, NC 28714	194
	Betty Revis	58 Ranchview Acres, Candler, NC 28715	195
30	Lillian Robinson	16 Prospect Street, Asheville, NC 28804	197
31	Beulah Hughes	N/A	201
	Dewey Pate, Jr.	Rt. 2 Box 5, Burnsville, NC 28714	198
	Allen D. Boone	Rt. 2 Box 8, Burnsville, NC 28714	236

List of Property Owners

NC Dept. of Transportation
Division of Highways
Yancey County
Project: WBS 35609.1.1 (R-2519A)

US 19 E East of SR 1336
(Jacks Creek Road) to SR 1186 (Old US 19)

Sheet of 11/13/06

Permit Drawing
Sheet 10 of 86

Site No.	Property Owner Name	Property Owner Address	Parcel Number
32	Carrie Blevins	Rt. 8 Box 951, Burnsville, NC 28714	206
33	Carrie Blevins	Rt. 8 Box 951, Burnsville, NC 28714	206
34	Charles R. Dellinger	317 Hillside Drive, Burnsville, NC 28714	214
35	Crabtree Baptist Church Charles R. Dellinger James Luther Thomas	Rt. 2, Burnsville, NC 28714 317 Hillside Drive, Burnsville, NC 28714 P.O. Box 89, Micaville, NC 28755	216 214 215
36	Jennings E. Ray	Rt. 2 Box 1165, Burnsville, NC 28714	218
37	Ovel Tomberlin	Rt. 2 Box 1164, Burnsville, NC 28714	223

List of Property Owners

NC Dept. of Transportation
Division of Highways
Yancey County
Project: WBS 35609.1.1 (R-2519A)

US 19 E East of SR 1336
(Jacks Creek Road) to SR 1186 (Old US 19)

Sheet of 11/13/06

Ecosystem Enhancement PROGRAM

October 22, 2007

Mr. Gregory J. Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

RECEIVED
OCT 25 2007
PDEA-OFFICE OF NATURAL ENVIRONMENT
DIVISION OF HIGHWAYS

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2518 A and B and R-2519A, Improvements to US 19, Madison and Yancey Counties

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory wetland and stream mitigation for the subject project. Based on the information supplied by you on June 25, 2007, and in a supplemental request dated October 10, 2007, the impacts are located in the French Broad River Basin in the Northern Mountains (NM) Eco-Region, and are as follows:

French Broad 06010105	Riparian Wetlands: 0.26 acre Non-Riparian Wetlands: 0.16 acre
French Broad 06010108	Riparian Wetlands: 0.37 acre Non-Riparian Wetlands: 0.15 acre Cold Stream: 1,867 feet

This mitigation acceptance letter replaces the mitigation acceptance letter issued on June 26, 2007. EEP commits to implementing sufficient compensatory wetland and stream mitigation to offset the impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

North Carolina Wildlife Resources Commission

Richard B. Hamilton, Executive Director

TO: Jeff Hemphill, Natural Environment Unit
N. C. Department of Transportation

FROM: Marla Chambers, Western NCDOT Permit Coordinator Marla Chambers
Habitat Conservation Program, NCWRC

DATE: July 19, 2007

SUBJECT: Moratoria for the US 19E widening project from I-26 in Madison County to the existing multilane section west of Spruce Pine in Mitchell County. TIP Nos. R-2518, R-2519A, and R-2519B.

As requested, this is to provide a list of moratoria recommended for the portion of the US 19 E widening project from Madison County to Mitchell County, specifically TIP Nos. R-2518, R-2519A, and R-2519B. These recommendations were originally made in our comment letters and communications at earlier stages of the project planning process for specific segments of the project. Recent fish sampling by NCDOT (May 2006 and May 2007) and NCWRC (August 2006) has provided information that allows the appropriate moratoria to be determined for specific bodies of water. They are provided below for your convenience.

Our comments dated May 23, 2003 and November 21, 2005 for R-2519B and February 24, 2005 for R-2518 and R-2519A, as well as email comments dated February 6, 2007, which referred to all three project segments, provided moratoria recommendations. A clarification should be noted regarding the two comment letters for R-2519B; Big Crabtree Creek was erroneously referred to as Cranberry Creek in both letters. This correction was also announced at a recent Concurrence meeting (April 17, 2007).

On the western end, we are not requesting a moratorium for Middle Fork Creek or its unnamed tributaries. An in-water work moratorium from April 1 to June 30 will apply to Cane River and South Toe River to protect federal and state listed species, including the federally Endangered Appalachian elktoe (*Alasmidonta raveneliana*). Smallmouth bass, an important game fish, will also receive some reproduction protection with this moratorium.

Mailing Address: Division of Inland Fisheries • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

The remaining perennial streams within the project will need to adhere to a trout moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer from October 15 to April 15 for streams containing brook or brown trout or from January 1 to April 15 for streams in which the only trout species occurring is rainbow trout. Current data lead us to recommend the October 15 to April 15 trout moratorium for Big Crabtree Creek and the January 1 to April 15 trout moratorium for California Creek, Bald Creek, Little Crabtree Creek, Prices Creek, Brushy Creek, and Long Branch. Unnamed tributaries should use the moratorium appropriate for the named stream they flow to, unless survey data indicate otherwise.

To summarize, we recommend the following work moratoria for waters within the R-2518, R-2519A, and R-2519B projects:

April 1 to June 30 in-water work moratorium: Cane River and South Toe River

October 15 to April 15 trout moratorium: Big Crabtree Creek

January 1 to April 15 trout moratorium: California Creek, Bald Creek, Little Crabtree Creek, Prices Creek, Brushy Creek, and Long Branch

We hope this information clarifies the moratoria needed for the subject project segments. These recommendations are subject to change if new information is presented. If you have any questions, please contact me at (704) 984-1070.

cc: David Baker, USACE
Brian Wrenn, NCDWQ
Marella Buncick, USFWS
Christopher Militscher, USEPA

R-2519A Final Permit Drawings updates from preliminary drawings

General updates:
Wetland impacts and surface water impacts rounded to the nearest 0.01 ac on summary sheet.
Permanent stream impacts due to Bank Stabilization have been quantified for each site where appropriate.

Site 1
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 2
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 3
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 4
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 5
Reduced stream realignment which reduced permanent stream impacts by 11 ft.
Corrected profile view to show correct pipe invert.

Site 6
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.
Showed correct pipe size 1400mm (54")

Site 7
Same

Site 8
Impacts the same, added profile view of pipe.

Site 9
The existing driveway at this site has been widened by the property owner since preliminary drawings were done. The plans have been update to show this and the impacts have been recalculated. Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Permanent stream impacts reduced by 3ft and temp impacts increased by 6ft. Updated profile view.

Site 9a
Showed bank stabilization detail on the permit drawing.

Site 10
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 11
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same. Showed correct pipe size (1400mm) for extension on profile view.

Site 12
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 13
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 14
Showed all the impacts as permanent stream impacts due to bank stabilization. (some were previously shown as temporary) Showed bank stabilization detail on the permit drawing. The new culverts are in the same location and the same length as the existing culverts. Total stream impacts (permanent and temp) decreased by 12 ft.

Site 15
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Some impacts that were previously shown as temporary impacts were shown as permanent stream impacts due to bank stabilization. Showed more temporary impacts to account for construction of retaining wall on –y18- downstream of culvert. Total stream impacts increased by 22 ft.

Site 16
Same except temporary impacts increased by 5ft. (these were previously included in the site 14 temporary impacts).

Site 17
Rip rap at pipe outlet in wetlands shown as permanent fill in wetlands. Impacts round off to be the same number.

Site 18
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 19
Showed mechanized clearing impacts to wetlands due to construction of retaining wall. Increased mechanized clearing impacts by 0.01 acres.

Site 20
Same

Site 21
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 22
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 23
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 24
Same

Site 25
Same

Site 26
Same

Site 27
Updated profile view to show pipe on correct grade.

Site 28
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 29
Same

Site 30
Same

Site 31
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. 4 ft of temp impacts changed to permanent impacts due to bank stabilization. Total stream impacts are the same. Corrected profile view to show pipe extension correctly.

Site 32
Same

Site 33
Same

Site 34
Same

Site 35
Permanent stream impacts due to Bank Stabilization have been quantified on the summary sheet. Showed bank stabilization detail on the permit drawing. Total stream impacts are the same.

Site 36
Same

Site 37
Same

STORMWATER MANAGEMENT PLAN

R-2519A, State Project: 35609.1.1 Date:4/27/2009
County: Yancey
Hydraulics Project Manager: Andrew Nottingham, PE

ROADWAY DESCRIPTION

The project involves the widening of US 19E from SR 1336 (Jacks Creek Road) to SR 1186 (old US 19) in Yancey County. The proposed typical section is a combination of a four lane divided shoulder and ditch section with a 20 ft raised median and a four lane divide curb and gutter section with a 20 ft. raised median. The curb and gutter section is used through the town of Burnsville.

ENVIRONMENTAL DESCRIPTION

The project is located in the French Broad River Basin. All of the streams on the project are either in the Cane River Watershed or the South Toe River Watershed. The endangered Appalachian Elktoe Mussel has been found in the Cane River and the South Toe River. The entire project eventually drains into occupied critical habitat for the Appalachian Elktoe within the Cane River or South Toe River. There are 35 stream impact sites on this project, which are all classified as Class C Tr. There are 14 Reinforced Concrete Box Culverts (RCBC) on this project. The following streams are crossed with RCBC's: Pine Swamp Branch, McIntosh Branch, Little Crabtree Creek (7 RCBC's), Ray Creek, Allen Branch, Georges Fork, Shoal Creek and Plum Branch. Approximately 6101 ft. of existing stream will be impacted (of which 573 ft. is temporary impact). 6 sites will require stream relocations. 4 of the sites are proposed for on site stream mitigation using natural stream design (1180 feet of stream mitigation proposed). The 2 other sites will be designed as open channels but will not be used for stream mitigation due to limited available right of way. 3 wetland sites will be impacted. Approximately 0.30 acres of wetlands will be impacted due to this project. The stream and wetland impacts for this project are summarized in the permit drawings.

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

Best Management Practices (BMPs) and measures used on the project are an attempt to reduce the stormwater impacts to the receiving streams due to erosion and runoff. The primary BMP on this project is the grass swale. Grass swales were used to reduce velocities and promote infiltration. Grass swales remove suspended solids, metals, and nutrients through sedimentation, vegetative filtration, infiltration, and biological uptake. The use of grassed roadway ditches (which meet grass swale criteria) and shoulders also aids in pollutant removal through vegetative filtration and infiltration. Approximately 4389m of grass swales were used on this project. Preformed scour holes and energy dissipators were used to attenuate and disperse flow. Preformed scour holes promote runoff infiltration and reduce downgrade erosion. 20 Preformed scour holes were used on this project. Rip rapped ditches and riprap along stream banks were used where warranted to control erosion. Where possible, piped drainage systems were designed to outlet away from surface waters to allow time for infiltration in ditches or natural areas.

Ditches were ended in flat floodplain areas where possible to allow dispersal and infiltration. One dry detention area was used. A dry detention basin is a stormwater runoff quantity control BMP that attenuates stormwater flows, promotes settlement of suspended solids and reduces erosive velocities downstream of the outlet structure. The dry detention basin is a permanent BMP device that will be maintained under the departments Inspection and maintenance program. The inverts of all new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter up to 1 ft. deep. Culverts were designed to protect stream stability and provide fish passage where possible. Low flow sills with low flow channels were used on new culverts or to retrofit existing culvert extensions where enough hydraulic conveyance exists.

Stream Relocations

- Station 257+66 to station 258+65 –L- left side. 321 feet of stream relocation proposed. Natural stream design not used due to limited available right of way.
- Station 314+05 to 315+67 -L- left side. 580 feet of natural stream design proposed.
- Station 10+27 to station 10+98 –Y30- right side. 233 feet of natural stream design proposed.
- Station 9+88 to station 10+40 –Y33- right side. 210 feet of natural stream design proposed.
- Station 9+85 to station 10+34 –Y32- right side. 157 feet of natural stream design proposed.
- Station 333+15 to station 333+59 –L- left side. 144 feet of stream relocation proposed. Natural stream design not used due to limited available right of way.

Culverts

- Station 230+60 –L- rt. Remove existing 1200mm CMP and replace with a 2.23m x 1.6m CS pipe arch with 0.15m high baffles space at 5m intervals. Bury culvert 0.3m and use riprap channel bank protection at outlet.
- Station 256+20 –L- rt. Remove existing 1500mm CMP and 900mm CMP and replace with 2.41m x 170m CS pipe arch. Bury culvert 0.3m and use riprap channel bank protection at outlet.
- Station 257+31.9 –L- Pine Swamp Branch and McIntosh Branch. Extend existing 2 @ 1.83m x 1.83m RCBC with 2 @ 1.83m x 2.74m RCBC with sills at outlet. Extend at inlet with 1 @ 1.83m x 2.13m RCBC and transition to an 2.44m x 2.13m RCBC with sills on McIntosh Branch. Extend at inlet with 1.83m x 2.13m RCBC and transition to a 2.13m x 2.13m RCBC with sills on Pine Swamp Branch. Use riprap channel bank protection at outlet.
- Station 11+28.9 –Y17- Little Crabtree Creek. Remove existing 2 @ 2.13m x 1.83m RCBC that is perched and replace with 2 @ 3.0m x 2.4m RCBC with sills and low flow channel. Construct low flow floodplain bench at inlet and outlet of culvert.
- Station 279+93 -L- Unnamed Tributary to Little Crabtree Creek. Retain and extend existing 2.13m x 1.52m RCBC up and downstream. Connect to new 1950 mm RCP at inlet end with Junction Box. Use riprap channel bank protection at outlet

- Station 284+22.78 –L-, 23.5m Lt. Little Crabtree Creek. Remove existing 2 @ 3.600m X 2.311m pipe arch and replace with 2 @ 3.35m x 2.74m RCBC. Culvert buried 1 foot and low flow diversion (rock sill) used upstream of culvert entrance. Use riprap channel bank protection at outlet
- Station 284+52.46 –L-, 23.0m Lt. Little Crabtree Creek. Remove existing 2 @ 3.600m X 2.311m pipe arch and replace with 2 @ 3.35m x 2.74m RCBC. Culvert buried 1 foot and low flow diversion (rock sill) used upstream of culvert entrance. Use riprap channel bank protection at outlet.
- Station 285+04.66 –L- Little Crabtree Creek. Remove existing 2 @ 2.4m x 2.1m RCBC and replace with 2 @ 3.6m x 2.4m RCBC. Culvert buried 1 foot and low flow diversion (rock sill) used upstream of culvert entrance. Use riprap channel bank protection at outlet and low flow floodplain bench at inlet and outlet of culvert.
- Station 289+81 –L- Ray Creek. Retain and extend existing 1.83m x 1.83m RCBC up and downstream. Construct floodplain bench at outlet end of culvert and use riprap channel bank protection at outlet.
- Station 300+91.7 –L- Little Crabtree Creek. Retain and extend existing 3.05m x 2.74m RCBC up and downstream. Low flow diversion (rock sill) used upstream of culvert entrance. Construct floodplain bench at outlet end of culvert and use riprap channel bank protection at outlet.
- Station 301+39.6 -L- Allen Branch. Remove and replace existing 2 @ 1500mm cmp's with 2 @ 1.8m x 1.8m RCBC with sills and low flow channel. Construct floodplain bench at outlet end of culvert and use riprap channel bank protection at outlet.
- Station 312+53.5 –L- George's Fork. Retain and extend existing bottomless 2 @ 2.13m x 1.83m RCBC up and downstream.
- Station 316+61.4 –L- Little Crabtree Creek. Retain and extend existing 3 @ 3.05m x 2.44m RCBC up and downstream and add additional 3.05m x 2.44m RCBC. Low flow diversion (rock sills) used upstream of culvert entrance. Construct floodplain bench at outlet and inlet of culvert and use riprap channel bank protection at outlet and inlet.
- Station 318+15.7 –L- Shoal Creek. Retain and extend existing 1 @ 2.44m x 2.13m RCBC upstream. Low flow diversion (rock sill) used upstream of culvert entrance.
- Station 327+86.6 –L- Plum Branch. Retain and extend existing 3.05m x 1.83m RCBC with 3.6m x 2.1m RCBC with low flow sills on inlet end and add low flow sills to existing culvert. Use rock cross vanes at outlet backfilled with native stone to bring stream grade up to culvert outlet elevation.
- Station 10+51.5 –Y34- Little Crabtree Creek. Retain and extend existing 3.35m x 3.05m RCBC up and downstream. Low flow diversion (rock sill) used upstream of culvert entrance. Use riprap channel bank protection at outlet and inlet.

BMP's

The following is a description of the stormwater outfalls for the project with BMP's noted where used. The distance of the stormwater outfall to the Cane or South Toe River is also noted.

Plan sheet 4

- Station 226+40 –L- lt. 140m Grass swale roadway ditch drains to 30-inch crosspipe at station 226+20 –L- then +/- 10m to UT to Cane River, then +/-230m to Cane River. **Distance to Cane River +/-240m.**

Plan sheet 5

- Station 227+53 –L- rt. Drainage system outlets into a Preformed scour hole (+/-23 m to UT to Cane River, then +/-376m to Cane River).
  Distance to Cane River +/-399m.
- Station 228 + 50 –L- Rt. UT to the Cane River existing 1000 cmp. A19 feet high cut would be required to replace the pipe. The pipe is presently on a 10% grade, which is not practical for fish passage. Since the pipe is in good shape and only a 42 inch, NCDOT proposes to retain the pipe using a Junction box at the point of extension to dissipate the energy and extend the pipe on a flatter grade, which will help reduce the outlet velocities. **Distance to Cane River +/-444m.**
- Station 228+80 –L- rt. 180m of grass swale roadway ditch drains to drainage system that outlets into a grass swale (+/-15m length) and then into a rip rapped lined ditch (+/-50m length) before entering stream (UT to Cane River) then +/-444m to Cane River. **Distance to Cane River +/-509 m.**
- Station 229+80 –L- rt. Drainage system outlets into a grass swale (+/-115m length) and then into a rip rapped lined ditch (+/-50m length) before entering stream (UT to Cane River) then +/-444m to Cane River.
  Distance to Cane River +/-609 m.

Plan sheet 6

- Station 230 + 85 –L- Rt. UT to the Cane River existing 900mm cmp. Retain and extend existing pipe on outlet end with rip rap stream bank protection at outlet. **Distance to Cane River +/-789m.**
- Station 231 + 50 –L- Rt. UT to the Cane River existing 1800mm csp. Retain and extend existing pipe on outlet end with rip rap stream bank protection at outlet. Existing stream bed and pipe in good shape. **Distance to Cane River +/-819m.**
- Station 231+80 –L- rt. Drainage system outlets into a rip rapped lined ditch (+/-50m length) before entering stream (UT to Cane River) then +/- 819m to Cane River. **Distance to Cane River +/-869 m.**
- Station 232 + 89 –L- Rt. UT to the Cane River existing 1500 mm cmp. Retain and extend existing pipe on inlet end. **Distance to Cane River +/-1062m.**
- Station 233+45 –L- rt. Drainage system outlets into a grassed lined ditch (+/-42m length) before entering stream (UT to Cane River) then +/-1062m to Cane River. **Distance to Cane River +/-1104 m.**

- Station 10+35 –Y2- rt. Drainage pipe outlets into a grassed lined ditch (+/-66m length) before entering stream (UT to Cane River) then +/-1062m to Cane River. **Distance to Cane River +/-1128 m.**

Plan sheet 7

- Station 235+00 –L- rt. Drainage system outlets into a Preformed scour hole then +/-181m before entering stream (UT to Cane River) then +/-1062m to Cane River. **Distance to Cane River +/-1243 m.**
- Station 236 + 10 –L- Rt. UT to the Cane River existing 1400 mm csp. Extend existing 1400 mm csp on outlet end. Banks of stream at outlet will be protected with rip rap and cross vane rock weir will be used at outlet to help stabilize stream bed. **Distance to Cane River +/-1492 m.**
- Station 236+00 –L- lt. Drainage system outlets into an existing ditch (+/-30m length) before entering stream (UT to Cane River) then +/-1492m to Cane River. **Distance to Cane River +/-1522 m.**
- Station 236+10 –L- rt. 310m of grass swale roadway ditches drain to drainage system that outlets into a rip rapped lined ditch (+/-15m length) before entering stream (UT to Cane River) then +/-1428m to Cane River. **Distance to Cane River +/-1443 m.**
- Station 237+00 –L- lt. Drainage outlets into small dry detention basin then into stream (UT to Cane River) then +/-1557m to Cane River. **Distance to Cane River +/-1557 m.**

Plan sheet 8

- Station 240+50 –L- lt. Drainage system outlets into a grass swale roadway ditch (+/-55m length) before entering existing drainage system. Then +/-305m to Bailey Branch then +/-605m to Cane River. **Distance to Cane River +/-965 m.**

Plan sheet 9

- Station 241+02 –L- lt. Drainage system outlets into a grass swale roadway ditch (+/-10m length) before entering existing drainage system. Then +/-305m to Bailey Branch then +/-605m to Cane River. **Distance to Cane River +/-920 m.**
- Station 242+15 –L- rt. Drainage system outlets into a roadway ditch (+/-50m length), then into a rip rapped lined ditch (22m length) and then through natural draw (+/-20m length) before entering stream (Bailey Branch) then +/-900m to Cane River. **Distance to Cane River +/-992 m.**
- Station 242+69 –L- rt. Drainage system outlets into a rip rapped lined ditch (+/-22m length) and then through natural draw (+/-20m length) before entering stream (Bailey Branch) then +/-900m to Cane River. **Distance to Cane River +/-942 m.**
- Station 242+92 –L- lt. Drainage system outlets into a rip rapped lined ditch (+/-22m length) and then through existing ditch (+/-30m length) before entering stream

(Bailey Branch) then +/-973m to Cane River.
Distance to Cane River +/-1025 m.

- Station 243+30 –L- Bailey Branch. Existing 2100 cmp does not need to be extended and will be retained. Pipe and stream bed in good shape. **Distance to Cane River +/-973 m.**

Plan sheet 10

- Station 244+38 –L- rt. Drainage system outlets into a grass swale roadway ditch (+/-18m length) and then through existing ditch (+/-115m length) before entering stream (Bailey Branch) then +/-900m to Cane River.
  Distance to Cane River +/-1033 m.
- Station 244+70 –L- rt. Drainage system outlets into a grass swale roadway ditch (+/-50m length) and then through existing ditch (+/-115m length) before entering stream (Bailey Branch) then +/-900m to Cane River.
  Distance to Cane River +/-1065 m.
- Station 245+10 –L- lt. Drainage system outlets into a Preformed scour hole then +/-160m to Bailey Branch, then +/-973m to Cane River.
  Distance to Cane River +/-1133 m.
- Station 246+91 –L- rt. Drainage system outlets into a grass swale roadway ditch (+/-130m length) and then into drainage inlet which outlets into existing pipe then +/-110m to Pine Swamp Branch, then +/-1370m to Cane River.
  Distance to Cane River +/-1610 m.

Plan sheet 11

- Station 248+12 –L- lt. Drainage system and grass swale roadway ditches (80m) outlet into existing cross pipe (not a stream) then +/-160m to Pine Swamp Branch, then +/-1370m to Cane River.
  Distance to Cane River +/-1530 m.
- Station 249+14 –L- lt. 55m of grass swale roadway ditches outlet into drainage system and then into existing cross pipe (UT to Pine Swamp Branch). This was done to dissipate energy in the pipe. Then +/-100m to Pine Swamp Branch, then +/-1430m to Cane River. **Distance to Cane River +/-1530 m.**
- Station 249+20 –L- rt. Roadway ditches outlet into drainage system and then into existing ditch. Then +/-60m to Pine Swamp Branch, then +/-1400m to Cane River.
  Distance to Cane River +/-1460 m.
- Station 249+60 –L- lt. +/- 115m of grass swale roadway ditches drain into stream (UT to Pine Swamp Branch). Then +/-100m to Pine Swamp Branch, then +/-1430m to Cane River.
  Distance to Cane River +/-1530 m.
- Station 249 + 65 –L- UT to Pine Swamp Branch existing 1500 cmp. Extend on upstream end. **Distance to Cane River +/-1530 m.**

Plan sheet 12 (curb and gutter typical section begins and continues to sheet 26)

- Station 251+97 –L- rt. Drainage system outlets into a Preformed scour hole. Then +/- 80m to Pine Swamp Branch, then +/-1610m to Cane River.
  Distance to Cane River +/-1690 m.
- Station 252+96 –L- rt. Drainage system outlets into a grass lined base ditch (120m length) before entering stream (Pine Swamp Branch) then +/-1760m to Cane River.
  Distance to Cane River +/-1760 m.
- Station 253+40 –L- rt. Drainage system outlets into a grass lined base ditch (+/-77m length) before entering stream (Pine Swamp Branch) then +/-1760m to Cane River.
  Distance to Cane River +/-1837 m.
- Station 253+72 –L- rt. Drainage system outlets into a grass lined base ditch (+/-42m length) before entering stream (Pine Swamp Branch) then +/-1760m to Cane River.
  Distance to Cane River +/-1802 m.

Plan sheet 13

- Station 255+40 –L- rt. Drainage system outlets into a grass lined ditch (+/-15m length) before entering stream (Pine Swamp Branch) then +/-1930m to Cane River.
  Distance to Cane River +/-1945 m.
- Station 255+80 –L- rt. Drainage system outlets into a grass lined ditch (+/-54m length) before entering stream (Pine Swamp Branch) then +/-1930m to Cane River.
  Distance to Cane River +/-1984 m.
- Station 257+40 –L- rt. Drainage system outlets into an energy dissipator basin at Pine Swamp Branch, then +/-2140m to Cane River.
  Distance to Cane River +/-2140m.
- Station 10+47 –Y10- lt. Catch Basin drains into culvert (Pine Swamp Branch) then +/-2140m to Cane River.
  Distance to Cane River +/-2140 m.

Plan sheet 17

- Station 269+93 –L- lt. Drainage system outlets into an existing ditch (+/-70m length) before entering stream (Little Crabtree Creek) then 9205m to South Toe River.
  Distance to South Toe River +/-9275 m.
- Station 270+27 –L- rt. Drainage system outlets into an existing drainage system at Little Crabtree Creek, then +/-9200m to South Toe River.
  Distance to South Toe River +/-9200 m.
- Station 271+03 –L- lt. Drainage system outlets into a Preformed scour hole, then +/- 6m to Little Crabtree Creek, then +/-9200m to South Toe River.
  Distance to South Toe River +/-9206 m.
- Station 270+55 –L- Little Crabtree Creek existing 1350 mm csp. The pipe is perched 3 feet at the outlet. NCDOT will use a Junction box at the outlet to dissipate the energy and extend a short section of pipe on a flatter grade, which will help reduce the outlet velocities. Rip rap stream bank protection will be used at outlet. **Distance to South Toe River +/-9200 m.**

Plan sheet 18

- Station 272+48 –L- lt. and rt. Drainage system outlets into an existing drainage system at Little Crabtree Creek, then +/-8990m to South Toe River.
  Distance to South Toe River +/-8990 m.

Plan sheet 19

- Station 276+45 –L- lt. Drainage system outlets into an energy dissipator basin and then through a grass swale (+/-46m length) before entering stream (Little Crabtree Creek) then 8590m to South Toe River.
  Distance to South Toe River +/-8636 m.

Plan sheet 20

- Station 278+26 –L- lt. Drainage system outlets into a Preformed scour hole, then +/-6m to Little Crabtree Creek, then +/-8415m to South Toe River.
  Distance to South Toe River +/-8421 m.
- Station 279+26 –L- lt. Drainage system outlets into box culvert (Little Crabtree Creek) then +/-8305m to South Toe River.
  Distance to South Toe River +/-8305 m.
- Station 11+05 –Y17- rt. Drainage system outlets into grass swale (+/-19m length) before entering stream (Little Crabtree Creek) then 8305m to South Toe River.
  Distance to South Toe River +/-8324 m.
- Station 280+40 –L- lt. Drainage system outlets into grass swale (+/-360m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-8135 m.
- Station 281+22 –L- lt. Drainage system outlets into grass swale (+/-284m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-8059m.

Plan sheet 21

- Station 281+61 –L- lt. Drainage system outlets into grass swale (+/-250m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-8025m.
- Station 282+29 –L- lt. Drainage system outlets into grass swale (+/-178m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7953m.
- Station 282+63 –L- lt. Drainage system outlets into grass swale (+/-145m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7920m.
- Station 283+39 –L- lt. Drainage system outlets into grass swale (+/-65m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7840m.

- Station 283+81 –L- lt. Drainage system outlets into grass swale (+/-20m from Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7795m.
- Station 284+96 –L- lt. Drainage system outlets into box culvert, then +/-7775m to South Toe River.
  Distance to South Toe River +/-7775m.

Plan sheet 22

- Station 285+04 –L- lt. Drainage system outlets into box culvert then +/-7775m to South Toe River.
  Distance to South Toe River +/-7775m.
- Station 285+04 –L- rt. Drainage system outlets into box culvert then +/-7775m to South Toe River.
  Distance to South Toe River +/-7775m.
- Station 11+70 –Y19- rt. Drainage system outlets into stream (Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7775m.
- Station 285+45 –L- lt. Drainage system outlets into grass swale (+/-28m length) before entering stream (Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7803m.
- Station 10+52 –Y18- lt. Drainage system outlets into stream (Little Crabtree Creek), then +/-7775m to South Toe River.
  Distance to South Toe River +/-7770m.
- Station 287+88 –L- rt. Drainage system outlets into a Preformed scour hole +/- 50 m from Little Crabtree Creek, then +/-7465m to South Toe River.
  Distance to South Toe River +/-7515m.
- Station 10+42 –Y20- lt. Drainage system outlets into wetland +/- 50 m from Little Crabtree Creek, then +/-7465m to South Toe River.
  Distance to South Toe River +/-7515m.

Plan sheet 23

- Station 288+50 –L- rt. Drainage system outlets into a Preformed scour hole +/- 80 m from Little Crabtree Creek, then +/-7300m to South Toe River.
  Distance to South Toe River +/-7380m.
- Station 289+52 –L- rt. Drainage system outlets into a Preformed scour hole +/- 15 m from Ray Creek, then +/-7160m to South Toe River.
  Distance to South Toe River +/-7175m.
- Station 290+00 –L- rt. Drainage system outlets into a Preformed scour hole +/- 10 m from Ray Creek, then +/-7160m to South Toe River.
  Distance to South Toe River +/-7170m.

Plan sheet 24

- Station 292+97 –L- rt. Drainage system outlets into a Preformed scour hole +/- 40 m from Little Crabtree Creek, then +/-6890m to South Toe River.
  Distance to South Toe River +/-6930m.
- Station 292+80 –L- lt. to Station 293+10 –L- lt. Grass swale used (30m length).
- Station 293+40 –L- lt. and rt. Drainage system outlets into existing drainage system, then to existing ditch (+/- 60m length) to Little Crabtree Creek, then +/-6860m to South Toe River.
  Distance to South Toe River +/-6920m.
- Station 294+00 –L- lt. and rt. Drainage system outlets into existing drainage system (+/- 60m length) to Little Crabtree Creek, then +/-6830m to South Toe River.
  Distance to South Toe River +/-6890m.

Plan sheet 25

- Station 295+22 –L- rt. Drainage system outlets into existing drainage system (+/- 80m length) to Little Crabtree Creek, then +/-6720m to South Toe River.
  Distance to South Toe River +/-6800m.
- Station 297+34 –L- lt. Drainage system outlets into existing stream (UT to Little Crabtree Creek), then +/- 90m to Little Crabtree Creek, then +/-6400m to South Toe River. **Distance to South Toe River +/-6490m.**
- Station 297+60 –L- UT to Little Crabtree Creek. Remove existing 1400 mm csp and replace with 1800 mm csp buried 0.3m. **Distance to South Toe River +/-6490m.**
- Station 298+20 –L- lt. Drainage system outlets into existing drainage ditch +/-45m from stream (Little Crabtree Creek), then +/-6325m to South Toe River.
  Distance to South Toe River +/-6370m.

Plan sheet 26(curb and gutter typical section ends on this sheet)

- Station 299+06 –L- rt. Drainage system outlets into a Preformed scour hole (+/- 15m length) to Little Crabtree Creek, then +/-6300m to South Toe River.
  Distance to South Toe River +/-6315m.
- Station 299+85 –L- lt. Drainage system outlets into a grass swale roadway ditch (+/- 120m length) before entering box culvert (Little Crabtree Creek), then +/-6150m to South Toe River.
  Distance to South Toe River +/-6270m.
- Station 301+03 –L- rt. Drainage system outlets into box culvert (Little Crabtree Creek, system drains roadway ditch drainage), then +/-6150m to South Toe River.
  Distance to South Toe River +/-6150m.
- Station 10+ 10 -Y24A- lt. and station 10+ 40 -Y24A- lt. Drainage systems outlet into a roadway ditch (+/-45m length) before entering box culvert (Little Crabtree Creek), then +/-6150m to South Toe River.
  Distance to South Toe River +/-6195m.

- Station 301+42 –L- rt. Drainage system outlets into box culvert (Allen Branch) +/- 6150m to South Toe River. Drainage system is draining 455 m of grass swale roadway ditches. **Distance to South Toe River +/-6270m.**

Plan sheet 27

- Station 304+49 –L- lt. 195m of grass swale roadway ditches drain to drainage system that outlets into existing drainage ditch +/-103m from stream (Little Crabtree Creek), then +/-5790m to South Toe River. **Distance to South Toe River +/-5893m.**

Plan sheet 28

- Station 306+08 –L- lt. 45m of grass swale roadway ditch drains to drainage system that outlets into existing drainage outlet +/-113m from stream (Little Crabtree Creek), then +/-5550m to South Toe River. **Distance to South Toe River +/-5663m.**
- Station 11+60 –Y- 26 lt. Drainage system outlets into proposed 36" pipe carrying stream (UT to Little Crabtree Creek), then +/-5550m to South Toe River. **Distance to South Toe River +/-5550m.**
- Station 307+12 –L- rt. 75m of roadway ditch outlets into proposed 36" pipe carrying stream (UT to Little Crabtree Creek), then +/-5550m to South Toe River. **Distance to South Toe River +/-5550m.**
- Station 307+80 –L- lt. 170m of grass swale roadway ditch drains to drainage system that outlets into roadway ditch (+/-50m length) then into 36" pipe carrying stream (UT to Little Crabtree Creek), then +/-5550m to South Toe River. **Distance to South Toe River +/-5600m.**

Plan sheet 29

- Station 310+38 –L- rt. 55m of grass swale roadway ditch drains to drainage system that outlets onto natural ground and then into man made pond. Then 70m to Georges Fork, then 600m to Little Crabtree Creek, then 4390m to South Toe River. **Distance to South Toe River +/-5060m.**

Plan sheet 30

- Station 312+78 –L- lt. Drainage system outlets into box culvert (Georges Fork). Most of this drainage is from roadway ditches. Then 600m to Little Crabtree Creek, then 4390m to South Toe River. **Distance to South Toe River +/-4990m.**
- Station 313+30 –L- rt. Drainage system outlets into a grassed lined ditch (+/-92m length) before entering stream (Georges Fork), then 200m to Little Crabtree Creek, then 4390m to South Toe River. **Distance to South Toe River +/-4682m.**
- Station 313+42 –L- rt. Drainage system outlets into a grassed lined ditch (+/-82m length) before entering stream (Georges Fork), then 200m to Little Crabtree Creek,

then 4390m to South Toe River.
Distance to South Toe River +/-4672m.

- Station 314+10 –L- rt. Drainage system outlets into a grassed lined ditch (+/-13m length) before entering stream (Georges Fork), then 200m to Little Crabtree Creek, then 4390m to South Toe River.
  Distance to South Toe River +/-4603m.

Plan sheet 31

- Station 316+60 –L- rt. Drainage system outlets into box culvert (Little Crabtree Creek), then +/-4300m to South Toe River.
  Distance to South Toe River +/-4300m.
- Station 317+35 –L- 18-inch crosspipe drains off site drainage to Little Crabtree Creek, then +/-4280m to South Toe River.
  Distance to South Toe River +/-4280m.
- Station 317+78 –L- lt. Drainage system outlets into grass swale roadway ditch (+/-33m length) then into stream (Shoal Creek), then +/-4160m to South Toe River.
  Distance to South Toe River +/-4193m.
- Station 318+08 –L- lt. Drainage system outlets into grass swale roadway ditch (+/-5m length) then into stream (Shoal Creek), then +/-4165m to South Toe River.
  Distance to South Toe River +/-4165m.
- Station 318+20 –L- lt. 145m of grass swale roadway ditch drains to drainage system that outlets into box culvert (Shoal Creek), then +/-4160m to South Toe River.
  Distance to South Toe River +/-4160m.

Plan sheet 32

- Station 319+64 –L- rt. Drainage system outlets into outlet ditch (+/-5m length) then into stream (Little Crabtree Creek), then +/-3960m to South Toe River.
  Distance to South Toe River +/-3965m.
- Station 320+07–L- lt. Drainage system outlets into 48 inch crosspipe (UT to Little Crabtree Creek), then +/-3960m to South Toe River.
  Distance to South Toe River +/-3960m.
- Station 320+07–L- lt. Drainage system outlets into 48 inch crosspipe (UT to Little Crabtree Creek), then +/-3960m to South Toe River.
  Distance to South Toe River +/-3960m.
- Station 322+38 –L- rt. 120m of grass swale roadway ditch drains to drainage system that outlets into outlet ditch (+/-5m length) then into stream (Little Crabtree Creek), then +/-3780m to South Toe River.
  Distance to South Toe River +/-3785m.

Plan sheet 33

- Station 323+17 –L- rt. 50m of grass swale roadway ditch drains to drainage system that outlets into a Preformed scour hole +/-20 m from Little Crabtree Creek, then +/-3700m to South Toe River. **Distance to South Toe River +/-3720m.**

- Station 323+93 –L- rt. 110m of grass swale roadway ditch drains to drainage system that outlets into a Preformed scour hole +/-20 m from Little Crabtree Creek, then +/-3700m to South Toe River. **Distance to South Toe River +/-3720m.**
- Station 324+50 –L- UT to Little Crabtree Creek. Retain and extend existing 1500 cmp up and downstream and use riprap steam bank protection at outlet.
- Station 324+55 –L- rt. 235m of grass swale roadway ditch enters UT to Little Crabtree Creek, then +/-3640m to South Toe River.
  Distance to South Toe River +/-3640m.

Plan sheet 34

- Station 328+07 –L- rt. Drainage system outlets into a Preformed scour hole +/-20 m from Plum Branch, then +/-120m to Little Crabtree Creek, then +/-3200m to South Toe River.
  Distance to South Toe River +/-3340m.
- Station 10+10 –Y32- rt. Drainage system outlets into a riprap pad then into Plum Branch, then +/-200m to Little Crabtree Creek, then +/-3200m to South Toe River.
  Distance to South Toe River +/-3400m.
- Station 329+08 –L- rt. 60m of grass swale roadway ditch drains to drainage system that outlets into outlet ditch (+/-75m length) then into to Little Crabtree Creek, then +/-3100m to South Toe River. **Distance to South Toe River +/-3400m.**

Plan sheet 35

- Station 330+96 –L- rt. 130m of grass swale roadway ditch drains to drainage system that outlets into outlet ditch (+/-28m length) then into Little Crabtree Creek, then +/-2910m to South Toe River. **Distance to South Toe River +/-2938m.**
- Station 331+00 –L- rt. Drainage system outlets into Preformed scour hole +/-28m from Little Crabtree Creek, then +/-2910m to South Toe River.
  Distance to South Toe River +/-2938m.
- Station 332+05 –L- rt. +/- 85m of grass swale roadway drainage ditch drainage system outlets into outlet ditch (+/-15m length) then into Little Crabtree Creek, then +/-2810m to South Toe River. **Distance to South Toe River +/-2825m.**

Plan sheet 36

- Station 333+06 –L- rt. Drainage system outlets into a Preformed scour hole +/-20m from Little Crabtree Creek, then +/-2710m to South Toe River.
  Distance to South Toe River +/-2730m.
- Station 333+00 –L- lt. +/-90m of grass swale outlets into UT to Little Crabtree Creek, then +/-2710m to South Toe River.
  Distance to South Toe River +/-2710m.
- Station 333+15 –L- UT to Little Crabtree Creek. Retain and extend existing 1200 mm csp up and downstream and bury inverts. **Distance to South Toe River +/-2710m**

- Station 333+80 –L- rt. Drainage system outlets into outlet ditch (+/-92m length) then into Little Crabtree Creek, then +/-2580m to South Toe River.
  Distance to South Toe River +/-2672m.
- Station 334+42 –L- rt. Drainage system outlets into outlet ditch (+/-33m length) then into Little Crabtree Creek, then +/-2580m to South Toe River.
  Distance to South Toe River +/-2613m.

Plan sheet 37

- Station 337+22 –L- lt. +/- 325m 0f roadway grass swale and storm drain system outlets into 54 inch crosspipe (UT to Little Crabtree Creek), then +/-2290m to South Toe River. **Distance to South Toe River +/-2290m.**
- Station 337+25–L- UT to Little Crabtree Creek. Extend existing 1350mm csp on upstream end. Pipe in good shape. Outlet buried and stable. **Distance to South Toe River +/-2290m.**
- Station 338+49 –L- rt. 105m of grass swale roadway ditch drains to drainage system that outlets into a Preformed scour hole +/-5m from Little Crabtree Creek, then +/-2170m to South Toe River. **Distance to South Toe River +/-2170m.**

Plan sheet 38

- Station 339+97 –L- rt. Drainage system outlets into outlet ditch (+/-5m length) then into Little Crabtree Creek, then +/-2010m to South Toe River.
  Distance to South Toe River +/-2015m.
- Station 340+5–L- UT to Little Crabtree Creek. Retain and extend existing 1500 mm csp upstream. Pipe in good shape. Outlet end buried. **Distance to South Toe River +/-1960m.**
- Station 340+52–L- lt. 145m of grass swale roadway ditch drains to drainage system that outlets into 60 inch crosspipe (UT to Little Crabtree Creek), then +/-1960m to South Toe River. **Distance to South Toe River +/-1960m.**
- Station 340+80 –L- rt. Drainage system outlets to Little Crabtree Creek, then +/-1920m to South Toe River.
  Distance to South Toe River +/-1920m.
- Station 341+36–L- lt. Drainage system outlets into 24 inch crosspipe then into Little Crabtree Creek then +/-1870m to South Toe River. This drainage is from roadway ditches.
  Distance to South Toe River +/-1870m.
- Station 342+40 –L- rt. Drainage system outlets into a Preformed scour hole +/-3m from Little Crabtree Creek, then +/-1770m to South Toe River.
  Distance to South Toe River +/-1773m.

Plan sheet 39

- Station 10+83 –Y-36- rt. Drainage system outlets into a Preformed scour hole +/-100m from Little Crabtree Creek, then +/-1585m to South Toe River.
  Distance to South Toe River +/-1685m.

- Station 11+30 –Y-36- rt. Drainage system outlets into outlet ditch (+/-90m length) then into Little Crabtree Creek, then +/-1525m to South Toe River. **Distance to South Toe River +/-1615m.**

Plan sheet 42

- Station 11+07 –Y21- rt. Drainage system outlets into outlet ditch (+/-5m length) then into Ray Creek, then +/-160m to Little Crabtree Creek, then +/-7160m to South Toe River. **Distance to South Toe River +/-7325m.**

Final Minutes for Permit Drawing Review Meeting
R-2519A

State Project 35609
US 19 FROM EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19), YANCEY COUNTY, DIVISION 13

A Permit Drawing Review Meeting was held on Wednesday, March 21, 2007 in the Hydraulics conference room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Andrew Nottingham-NCDOT Hydraulics (Present)
David Baker-USACE (Present)
John Hennessy for Brian Wrenn- NCDWQ (Present)
Marla Chambers-NCWRC (Present)
Marella Buncick-USFWS (Present)
Chris Militscher-EPA (Absent)
Kathy Matthews-EPA (Present)
Harold Draper-TVA (Absent)
Ricky Tipton- NCDOT Division 13 (Present)
Brenda Moore- NCDOT Roadway Design (Present)
Carla Dagnino- NCDOT NEU (Present)
Neb Bullock-NCDOT Structure Design (Present)
Mark Staley for David Harris- NCDOT REU (Present)
Donnie Brew-FHWA (Present)
Steve Brown for Linwood Stone-NCDOT PDEA (Present)

Participants:
Karen Gulledge-NCDOT Hydraulics
Rekha Patel-NCDOT Roadway Design
Jeff Hemphill- NCDOT NEU
Randy Griffin- NCDOT NEU
Jamie Lancaster- NCDOT NEU
Marissa Rodman- NCDOT NEU
Jeff Walston- NCDOT REU
Heather Renninger- NCDOT NEU

The meeting began at 1:05 p.m. with introductions and NCDOT Hydraulics giving a brief description of the project. Prior to reviewing the permit drawings the following comments were provided:

NCWRC noted that there were no bridges on this project and that they have concerns about large mammal crossings (especially bears) for this project. It was noted that bears

do not like to use culverts and that bridges and overpasses work best. They noted a recent incident on the new I-26 project (which is in close proximity to this project) that resulted in a bear mortality.

USACE asked if the R2518A, R2518B and R2519A projects would be constructed separately. It was noted that they have separate let dates but that they would all be permitted under one permit.

The Stormwater Management Plan was presented. Hydraulics noted that the stream impact number listed in the environmental description section of the Stormwater Management Plan should be changed from 5137ft to 6037 ft.

The team then proceeded to review the permit drawings. Copies of the "Final Minutes for Hydraulic Design Review Meeting With Actions Taken Since the Meeting" were also referenced as the permit drawings were reviewed.

Site 1: No changes recommended.

Site 2: Alternating baffles will be provided in the new pipe arch to provide a low flow channel through the culvert.

Site 3: No changes recommended.

Site 4: Permanent stream impacts will be extended to the end of the riprap at the outlet of the 1800mm pipe and temporary stream impacts will be shown beyond that point.

Site 5: No changes recommended.

Site 6: No changes recommended. It was noted that a stormwater retention basin is located right of -Y3- station 11+45 +/- north east of this site on the same page.

Site 7: No changes recommended.

Site 8: No changes recommended.

A new site will be added to show impacts where riprap is proposed where new ditch enters stream right of –L- station 255+40. This will be called Site 9a.

Site 9: No changes recommended.

Site 10: No changes recommended. Energy dissipator basin will be used as shown. No other treatment options were determined to be feasible at this location. Energy dissipator basin will help reduce velocities and sediment erosion.

Site 11: No changes recommended.

Site 12: No changes recommended. EPA had previously questioned in the Hydraulic Design review meeting if NCDOT had a policy on utilities in culverts. Hydraulics noted that per discussions with the NCDOT Utilities section that the utility owner must get an encroachment agreement with NCDOT. NCDOT will make a decision as to whether or not to allow it depending on the situation and factors involved (type of material used, how it will be connected, impedance on hydraulic flow etc.).

Site 13: No changes recommended. NCWRC asked if a new culvert could be used at this location to facilitate fish passage. After discussion it was determined that the grade and length of structure that would be required at this location would not make it practicable.

Site 14: Temporary stream impact will be changed to permanent stream impact where riprap is place below normal water level. It was noted that the existing riprap had naturalized at this location over time.

Site 15: No changes recommended.

Site 16: No changes recommended.

Site 17: NCDOT will investigate the wetland boundary and see if the drainage can be discharged outside of wetland. If it can not they will ensure that it will discharge into wetland at non-erosive velocities. **After review it was determined to leave the pipe as shown . The 10 year outlet velocity is non-erosive (V10=0.57ft/sec) and is shown on the permit drawing.**

Site 18: No changes recommended.

Site 19: No changes recommended.

Site 20: No changes recommended.

Site 21: No changes recommended.

Site 22: No changes recommended.

Site 23: No changes recommended.

Site 24: No changes recommended.

Site 25P: No changes recommended.

Site 25: No changes recommended.

Site 26: EPA had concerns that some of the variables in the morphological table were differing and wanted to make sure the stream was stable. NCDWQ also expressed some concerns about some of the numbers. NCDWQ noted that other reference reaches should

be investigated to insure that the design is consistent. They noted that a sediment transport analysis should be included with the natural stream design information. NCDOT noted that there were other reference reaches available for the area that had been used for the R-2518 projects that could be compared and that a sediment transport analysis could be included. NCDWQ questioned the use of coir fiber matting in the active channel. NCDOT noted that the coir fiber matting detail shows it placed above the normal water surface but within the bankfull channel and that this has been working well. NCDOT will adjust the coir fiber matting location on the stream relocation detail to be more consistent with the coir fiber matting detail. USACE expressed concern about the logistics of using the bed material excavated from the existing channel in the new channel. NCDWQ noted that it was typically not necessary to do this, as the existing material where the new channel is located is generally consistent with the existing channel material. NCDOT will investigate and determine the appropriate course of action.

Site 27: No changes recommended.

Site 28: No changes recommended. NCWRC expressed concerns about having the low flow going through more than one barrel. NCDOT noted that it is presently going through two barrels and the normal low flow channel is wider than one barrel.

Site 29: NCDWQ had same comments for the stream relocation about reference reaches and sediment transport as noted at site 26.

Site 30: No changes recommended.

Site 31: No changes recommended.

Site 32 and Site 33: NCDWQ had same comments for the stream relocations about reference reaches and sediment transport as noted at site 26. It was noted that quarried stone from the area would be used for the rock cross vanes backfilled with native stone at the downstream end of the culvert on Plum Branch at Site 33.

Site 34: No changes recommended.

Site 35: No changes recommended.

Site 36: No changes recommended.

Site37: NCWRC asked if lowering the stream grade at the inlet end could reduce the grade on the 1500mm csp extension. NCDOT will investigate if this could be done. **It was determined that deepening the stream at the inlet will create too steep of a grade for the stream coming into the pipe and it was decided to leave the pipe grade as designed.**

In closing, NCDOT noted that they plan to use extra mitigation credits from project R-2518A&B for R-2519A and there were no objections from the agencies.

Final Minutes for Hydraulic Design Review Meeting With Actions Taken Since the Meeting R-2519A

State Project 35609
US 19 FROM EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19), YANCEY COUNTY, DIVISION 13

A Hydraulic Design Review Meeting was held on Wednesday, January 21, 2004 in the Location and Surveys conference room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Andrew Nottingham-NCDOT Hydraulics (Present)
Steve Lund-USACE (Present)
Cynthia Van Der Wiele- NCDWQ (Present)
Marla Chambers-NCWRC (Present)
Marella Buncick-USFWS (Absent)
Chris Militscher-EPA (Present)
Brenda Moore- NCDOT Roadway Design (Present)
Lindsey Riddick-PDEA (Absent)
Harold Draper- TVA (Present)

Participants:
Marc Shown-NCDOT Hydraulics
Rekha Patel-NCDOT Roadway Design
Linwood Stone-PDEA
Bryan Kluchar-PDEA

Note: Actions taken since 4B meeting are shown in bold.

The meeting began at 9:00 a.m. with introductions and NCDOT Hydraulics giving a brief description of the project. The following items were discussed:

Sheet No. 5

- 228 + 20 –L- Rt. Tributary to the Cane River. The possibility for reestablishing fish passage through the existing 1000 (42 inch) cmp needs to be evaluated as the outlet end is perched approximately 4 feet above the outlet. If DOT replaces the pipe mitigation credit may be received. DOT will investigate alternatives.

A 19 feet high cut would be required to replace the pipe. The pipe is presently on a 10% grade, which is not practical for fish passage. Since the pipe is in good shape and only a 42 inch, NCDOT proposes to retain the pipe using a Junction box at the

point of extension to dissipate the energy and extend the pipe on a flatter grade, which will help reduce the outlet velocities.

- 230 + 60 –L- Rt. Tributary to the Cane River. Proposed steel pipe arch under driveway. DWQ asked about the possibility of having a bottomless structure at this location. DOT will investigate the use of a bottomless structure or using baffles in the proposed pipe arch.

A bottomless structure is not feasible at this site due to the lack of bedrock near the stream surface. NCDOT will bury the pipe arch and add baffles to the invert.

Sheet No. 6

- 231 + 30 –L- Rt. Tributary to the Cane River. DOT will investigate the use of a cross vane rock weir to dissipate energy at the outlet of the 1800 (72 inch) csp. Roadway drainage in this area may be able to be discharged on the north side of the roadway in order to increase the potential for treatment before it enters the stream.

Roadway drainage has been piped to grass swale right of station 229+80 –L-. Cross vane not used due to turn in stream just downstream of outlet. Banks of stream at outlet will be protected with rip rap. The bed at the outlet of this pipe is presently not eroded.

- 232 + 89 –L- Rt. Tributary to the Cane River. The inlet of the extended 1500 (60 inch) csp needs to be buried below the streambed. Roadway drainage in this area will be piped farther away from stream before being discharged.

The roadway drainage has been piped to a grass lined ditch right of station 233+45 –L-. The inlet of the 60 inch pipe will be buried below the streambed.

Sheet No. 7

- 236 + 00 –L- Rt. Tributary to the Cane River. Place a cross vane rock weir at the outlet of the 1400 (54 inch) csp.

Banks of stream at outlet will be protected with rip rap and cross vane rock weir will be used at outlet.

- 237 + 00 –L- Lt. The potential for stormwater treatment/detention in the available right of way should be evaluated.

Stormwater detention basin added in available right of way left of station 237+00 –L-.

Sheet No. 9

- Evaluate the need for a preformed scour hole or energy dissipater at the outlets of the rock lined draws at Sta. 242 + 65 –L- Rt. and Sta. 243 + 20 –L- Lt.

No energy dissipator needed. Existing outlets stable.

- 243+30 –L- Bailey Branch. Existing 2100 (84 inch) cmp does not need to be extended and will be retained. WRC inquired if existing pipes could be retrofitted with baffles. DOT will investigate.

Existing pipe already has bed material in it, no need to retrofit.

Sheet No. 11

- 249 + 50 –L- Lt. Tributary to Pine Swamp Branch. There may be a need to outlet the roadway drainage in this area into the 1500 (60 inch) pipe extension with a junction box to aid with energy dissipation.

Roadway drainage outleted into the 1500 (60 inch) pipe extension with a junction box to aid with energy dissipation.

Sheet No. 12

- 253 + 00 –L- to 253+70 –L- Rt. DOT will investigate the opportunity for additional stormwater treatment in this area.

Grass lined ditch added to aid in treatment.

Sheet No. 13

- 256 + 20 –L- Rt. WRC stated that if the proposed pipe arch under the drive at this site was relatively short and on a flat slope burying the pipe would be sufficient and no baffles would be needed.

- 257 + 40 –L- Rt. Some type of energy dissipater should be used at the outlet of the 1800 rcp under –Y10-. DOT suggested the use of cross vane rock weirs. DOT will also investigate the use of a natural rock energy dissipater pool also.

Rock energy dissipator pool added.

- 257+30 –L-. Pine Swamp Branch. Existing double barrel culvert will be extended up and down stream. Up stream the culvert will be extended in two directions. One barrel will extend up along –Y10- to about Sta. 10+00 –Y10- and one barrel will extend underneath –Y10- at Sta. 10+55 and then parallel the –L- line from –Y10- to +/- Sta. 258+60 –L-.

- 257+00 –L- Rt. Retaining wall will be used to avoid encroachment into Pine Swamp Branch.

Sheet No. 17

- 270 + 60 –L- Lt. There may be a need to dissipate the energy of Little Crabtree Creek at the outlet of the 1350 (54 inch) csp. DOT will investigate the use of a cross vane rock weir.

The pipe is perched 3 feet at the outlet. NCDOT proposes to use a Junction box at the outlet to dissipate the energy and extend a short section of pipe on a flatter grade, which will help reduce the outlet velocities.

- 270+40 –L- Lt. Retaining wall being used to avoid encroachment on -Y- line and creek.

Sheet No. 19

- 276 + 40 –L- Lt. DOT will evaluate the need for energy dissipation and stormwater treatment/detention at the outlet of the proposed 900 (36 inch) rcp.

Energy dissipator basin and grass swale used at outlet.

- 278+00 –L- Lt. Retaining wall being used to avoid encroachment on Little Crabtree Creek.

Sheet No. 20

- 279+00 –L- Lt. Retaining wall being used to avoid encroachment on Little Crabtree Creek. Retaining wall will be extended to +/- Sta. 278+40 to reduce fill in floodplain.

- 279 + 60 –L- Lt. Little Crabtree Creek. The culvert will be extended up and down stream. A retaining wall is being proposed on the right side of the culvert outlet in order to reduce the encroachment of the roadway fill into the floodplain. A cross vane rock weir is being proposed at the culvert outlet to help maintain low flow through the RCBC. Little Crabtree Creek is located in FEMA Flood Zone. A detailed flood study has been performed and 100 year water surface elevations have been determined. In lieu of placing sills in culverts along Little Crabtree Creek, NCDOT will investigate using low flow diversions upstream of the proposed box culvert extensions in order to maintain low flow through the culverts with out impeding the culvert performance.

This crossing is located in a regulated FEMA special flood hazard area. After further design analysis NCDOT determined that additional hydraulic conveyance is required at this crossing. The existing 2 @ 7'x 6' RCBC will be replaced with a 2 @ 10' x 8' RCBC with sills and a low flow channel.

- EPA asked if DOT had a policy on putting utilities in culverts. They were in agreement that there was a need to put the utilities through the culverts but were also concerned about the methods being used to install the utilities. DOT Hydraulics agreed to check with the DOT Utilities section about the policy and concerns.

- 279+90 –L-. Tributary to Little Crabtree Creek. Existing single barrel culvert will be extended up and down stream.

Sheet No. 22

- 285+00 –L-. Little Crabtree Creek. Existing double barrel culvert will be extended up and down stream.

This crossing is located in a regulated FEMA special flood hazard area. After further design analysis NCDOT determined that additional hydraulic conveyance is required at this crossing. The existing 2 @ 8'x 7' RCBC will be replaced with a 2 @ 12' x 8' RCBC buried 1 foot below the stream bed with low flow diversion to divert the low flow through one of the culvert barrels.

It was also determined that additional hydraulic conveyance is required just upstream of this crossing under the driveways left of stations 284+23 -L- and 284+52 –L-. The existing 2 @ 12' x 7.6' coruugated steel pipe arches located under each of these driveways will be replaced with 2 @ 11' x 9' RCBCs at each driveway crossing. The culverts will be buried 1 foot below the stream bed with a low flow diversion to divert the low flow through one of the culvert barrels.

The channel banks of Little Crabtree Creek from station 284+00 +/- -L- to station 285+00 +/- -L- will have to be lined with class I rip rap.

- 285 + 60 –L- Lt. DOT will investigate the potential for stormwater treatment/detention where –Y19- is being realigned resulting in an area of excess right of way.

Grass swales used in this area.

- 10 + 40 –Y20- Lt. It was suggested to shift the outlet of the drainage structure at this site to outside of the wetland boundary. USACOE indicated that the wetland boundary had been reduced and that the proposed outlet was no longer in the wetland.

Sheet No. 23

- 289+80 –L-. Ray Creek. Existing double barrel culvert will be extended up and down stream. Pipes up stream will be connected to culvert with a large junction box.

- 290 + 20 –L- Rt. A preformed scour hole will be used at the outlet of the 600 rcp in this area.

Preformed scour hole added.

- 290 + 20 to 293 + 50 –L- Rt. A retaining wall is being proposed in this area in order to minimize a lateral roadway encroachment into the floodplain of Little Crabtree Creek.

Sheet No. 24

- The systems being proposed to discharge into the wetland at Sta. 291 + 80 and 292 + 50 –L- Rt. will be connected and piped line ahead and discharged in an area adjacent to the wetland.

Systems changed as noted above and discharged in to preformed scour hole.

Sheet No. 25

- 297+60 –L-. Sugar Hollow Creek. The existing 1400 (54 inch) cmp and box culvert will be removed and replaced.

Replaced with a 72 inch rcp buried 1 foot below stream bed.

- 298 + 20 –L- Rt. Add a preformed scour hole at the outlet of the 600 rcp.

Ground is not flat in this area, outlet is an existing ditch. Standard rip rap outlet protection used.

Sheet No. 26

- 300+40 –L- Rt. Retaining wall being used to avoid encroachment on Little Crabtree Creek.

- 300 + 90 –L- Little Crabtree Creek. Extend existing box culvert up and downstream. Make the extensions of the existing box culvert taller in order to accommodate baffles and fill in with bed material. There may be a need to install a low flow diversion upstream of the culvert in order to direct low flow through a single barrel.

This crossing is located in a regulated FEMA special flood hazard area. Low flow diversion added to divert the low flow through one of the culvert barrels. Baffles not used in extensions since existing culvert is retaining bed material.

- 301 + 40 –L- Allen Branch. Remove existing pipes and replace with new culvert. The proposed box culvert at this location should have baffles and a sill to provide a low flow channel.

Culvert designed as noted above.

Sheet No. 27

- 304 + 50 –L- Lt. USACOE confirmed that the outfall at this location was not a jurisdictional stream.

Sheet No. 28

- -Y26-. The relocation of the stream in this location is proposed in order to reduce the potential for flooding of the downstream property owner.

Stream along –Y- 26 will be piped from intersection north along –Y-26 and outleted into rip rap lined channel approximately 100 feet before entering Little Crabtree Creek as shown on plans.

Sheet No. 30

- 312+60 -L-. George Fork. The existing bottomless culvert will be extended up and downstream. If a bottomless structure can not be used for the extensions, baffles and a low flow sill or diversion will be incorporated into the design.

Culvert design as a bottomless culvert.

- 313+40 –L- Lt. The need for a preformed scour hole will be investigated at the pipe outlet on the north side of the roadway adjacent to George Fork.

Drainage outleted to the south side of the road into a grass swale.

- Stream relocation will be required on George Fork from Sta. 314 + 00 to 315 + 80 – L- Lt.

Stream relocation designed as noted above.

- 314+40 –L-. Tributary to George Fork. Proposed 1500 rcp will be buried one foot.

Sheet No. 31

- 316 + 60 –L- Little Crabtree Creek. Extend existing box culvert up and downstream. A low flow diversion may be required upstream of this box culvert to keep the low flow width of stream comparable to that of the upstream section.

This crossing is located in a regulated FEMA special flood hazard area. After further design analysis NCDOT determined that additional hydraulic conveyance is required at this crossing. An additional barrel will be added to the existing 3 @ 10' x 8' RCBC on the east side. Low flow diversions will be used on the outer barrels to divert the low flow through the inner culvert barrels. Bed material and flow depth is being maintained in the culvert.

- 317 + 35 –L- Rt. DOT will investigate the need for a preformed scour hole or energy dissipater at the outlet of the 450 rcp.

Preformed scour hole can not be used due to invert of pipe being below natural ground. Standard rip rap outlet protection with a tail ditch will be used.

- 318+20 –L-. Shoal Creek. Extend existing box culvert upstream. In lieu of a retaining wall along -Y30- upstream of the culvert, DOT proposes a stream relocation due to the retaining wall encroaching on the creek.

Box culvert extended upstream with low flow diversion to divert flow through one barrel. Stream relocation designed as noted above.

Sheet No. 32

- 320 + 10 –L- energy dissipation needs to be addressed for the 1200 (48 inch) cmp at this site.

Existing 48 inch pipe in good condition and to be extended up stream. No changes proposed at outlet.

- 321 + 40 –L- This system needs to be piped upline in order to be discharged further from Little Crabtree Creek.

System piped to system located at station 322+40 –L-.

- 322 + 40 –L- This system needs to be shifted so as not to discharge into the existing outfall, but into a preformed scour hole in the floodplain.

Elevation of pipe to low for PSH. Standard rip rap outlet protection will be used.

Sheet no. 33

- The need for preformed scour holes should be investigated for the two systems discharging into the floodplain south of the roadway.

Preformed scour holes used at the outlet of the two systems noted.

- 324 + 50 –L-. Tributary to Little Crabtree Creek. Extend existing 1500 (60 inch) cmp up and down stream. The potential replacement of this pipe should be evaluated as well as the need for some type of energy dissipation.

Pipe in good shape outlet buried. Channel banks at outlet will be lined with rip rap.

Sheet No. 34

- 327 + 90 –L- Plum Branch. Extend existing single barrel culvert up and down stream. Measures need to be employed at the outlet of this culvert to correct the 0.6m perch that is present at the existing outlet. DOT will investigate using baffles in this culvert to create a low flow channel.

A series of cross vane rock wiers backfilled with rip rap used downstream of culvert to bring stream grade up. Existing culvert retrofitted with 6 inch baffles.

- 10+40 –Y33-. Plum Branch. A new box culvert is proposed on –Y33-. The culvert will be designed with baffles and a low flow channel. A stream relocation is proposed up stream of this culvert along –Y32- due to the encroachment of –Y32 into the existing channel. The stream will also be relocated downstream of this culvert to tie into the proposed culvert extension at Sta. 327+90 –L-.

Culvert on –Y- 33 designed with low flow channel and baffles. Stream relocation designed upstream of culvert as noted above. Down stream the culvert will be connected to the culvert extension at Sta. 327+90 –L- as there was not room for a stream relocation.

- -Y-33- Tributary to Plum Branch. This stream will likely be relocated along the west side of –Y33-.

Stream relocation designed as shown the plans.

Sheet No. 35

- 331 + 00 –L- Rt. Stormwater treatment needs to be evaluated at the outlet of the 750 rcp.

Roadway ditches will help treat stormwater.

Sheet No. 36

- 333+20 –L-. Tributary to Little Crabtree Creek. Extend existing pipe and culvert up and down stream. The potential replacement of this pipe should be evaluated as well as the need for some type of energy dissipation. Relocate stream from Sta. 333+60 –L- Rt. To Sta. 333+20 –L- Rt.

Pipe in good shape.

- 10+50 –Y34-. Little Crabtree Creek. Extend existing culvert up and down stream. A low flow diversion may be required upstream of this box culvert to keep the low flow width of stream comparable to that of the upstream section.

This crossing is located in a regulated FEMA special flood hazard area. Low flow diversion added to divert the low flow through two of the culvert barrels. Baffles not used in extensions since existing culvert is retaining bed material.

Sheet No. 37

- 337+25 –L-. Tributary to Little Crabtree Creek. Extend existing 1350 (54 inch) cmp on the upstream end. The potential replacement of this pipe should be evaluated as well as the need for some type of energy dissipation.

Pipe in good shape. Outlet buried and stable.

- 339+40 –L- Rt. Retaining wall being used to avoid encroachment on Little Crabtree Creek.

Sheet No. 38

- 340+55 –L-. Tributary to Little Crabtree Creek. Extend existing 1500 (60 inch) cmp on the upstream end. The potential replacement of this pipe should be evaluated as well as the need for some type of energy dissipation.

Pipe in good shape. Outlet end buried.

- 341+40 –L-. Rt. Retaining wall is proposed to avoid encroachment on Little Crabtree Creek.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

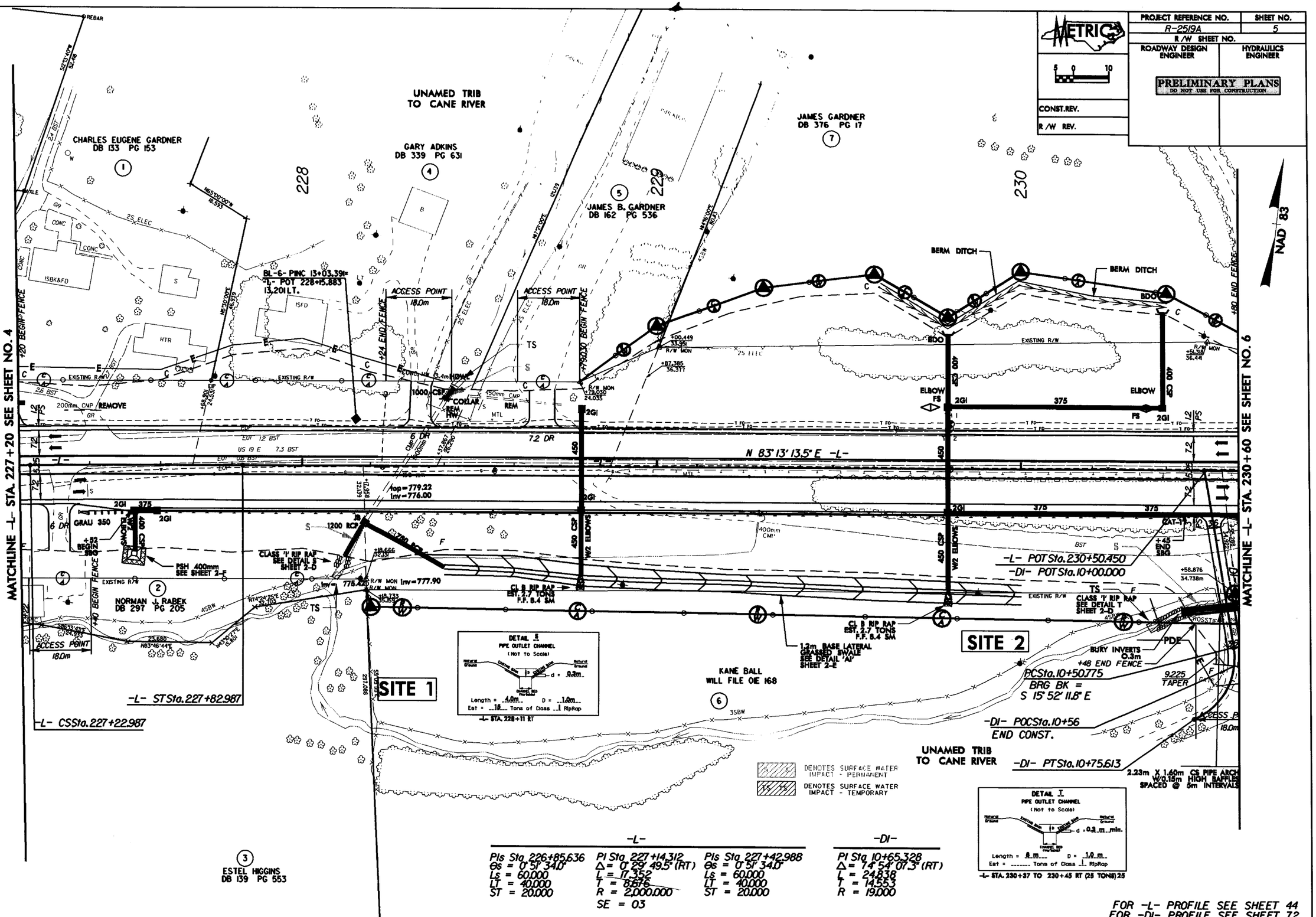
CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TWW): MOVED DRIVEWAY & ACCESS POINT FROM STA 226+96 TO STA 227+31 ON PARCEL 2; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 4; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 6 & PARCEL 7.
R/W REV. 10/25/07 (RVP): REMOVED PROP. R/W ON PARCEL 2.

8/17/99



FOR -L- PROFILE SEE SHEET 44
FOR -DI- PROFILE SEE SHEET 72

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

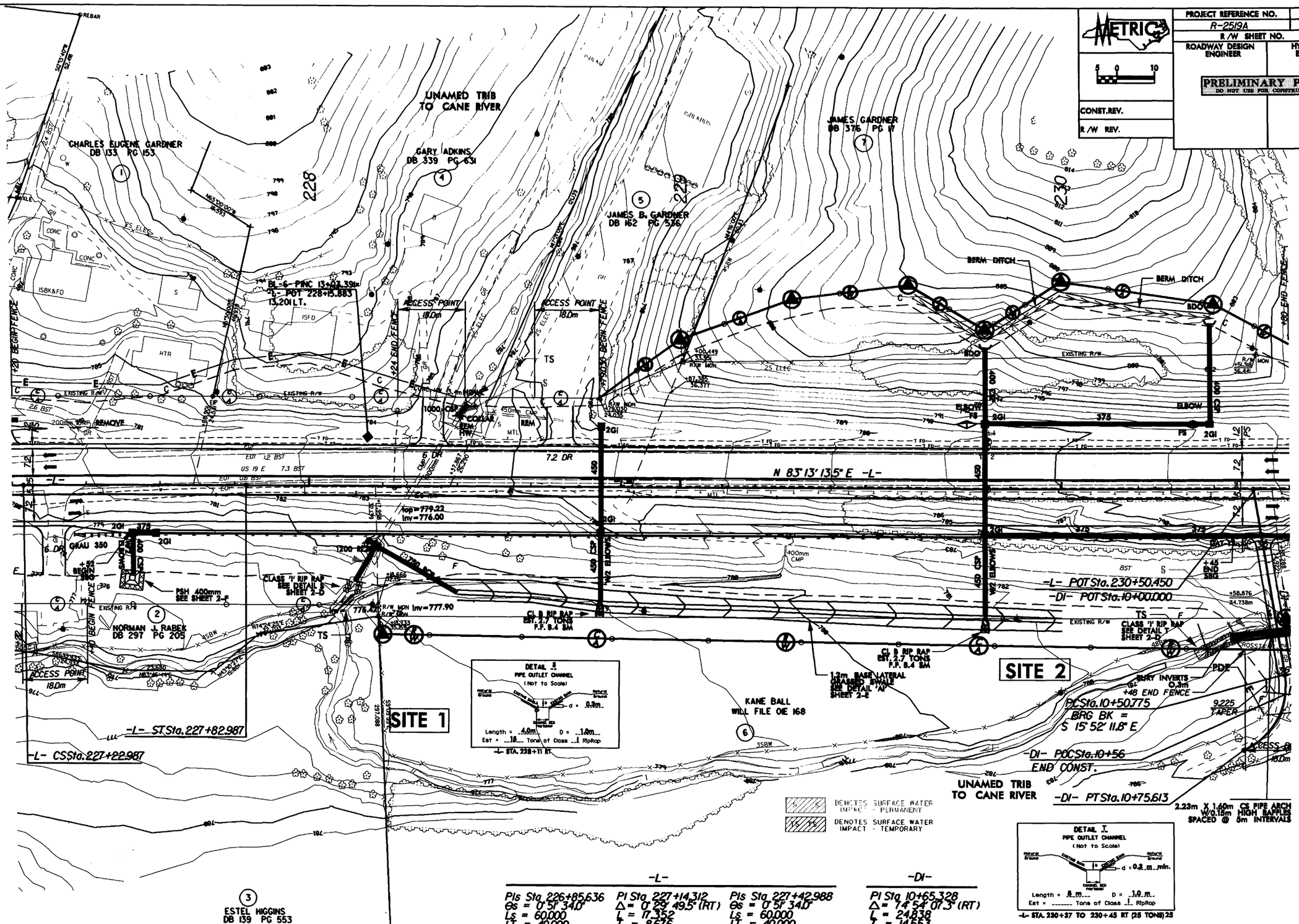
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TJW): MOVED DRIVEWAY & ACCESS POINT FROM STA 226+96 TO STA 227+31 ON PARCEL 2; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 4; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 6 & PARCEL 7.
R/W REV. 10/25/07 (RVP): REMOVED PROP. R/W ON PARCEL 2.



-L-

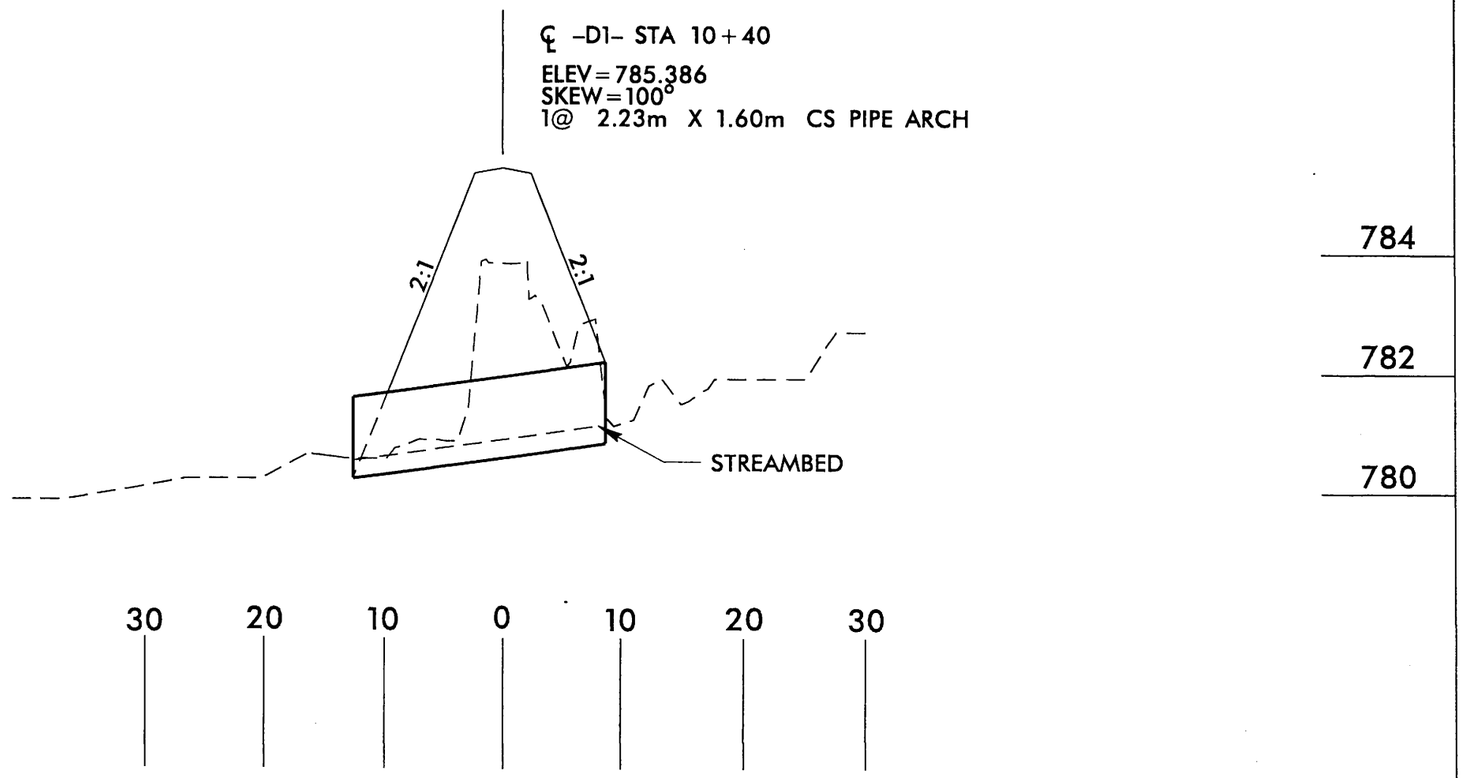
PIs Sta. 226+85.636	PI Sta. 227+14.312	PIs Sta. 227+42.988
Θs = 0°51'34.0"	Δ = 0°29'49.5" (RT)	Θs = 0°51'34.0"
Ls = 60.000	L = 17.352	Ls = 60.000
LT = 40.000	T = 8.676	LT = 40.000
ST = 20.000	R = 2,000.000	ST = 20.000
	SE = 03	

-DI-

PI Sta. 10+65.328
Δ = 74°54'07.3" (RT)
L = 24.838
T = 14.553
R = 19.000

FOR -L- PROFILE SEE SHEET 44
FOR -DI- PROFILE SEE SHEET 72

Permit Drawing



-D1- STATION 10+40
2.8m X 1.9m CS PIPE ARCH

SITE 2
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2419A)
US 19 E FROM EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 14 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

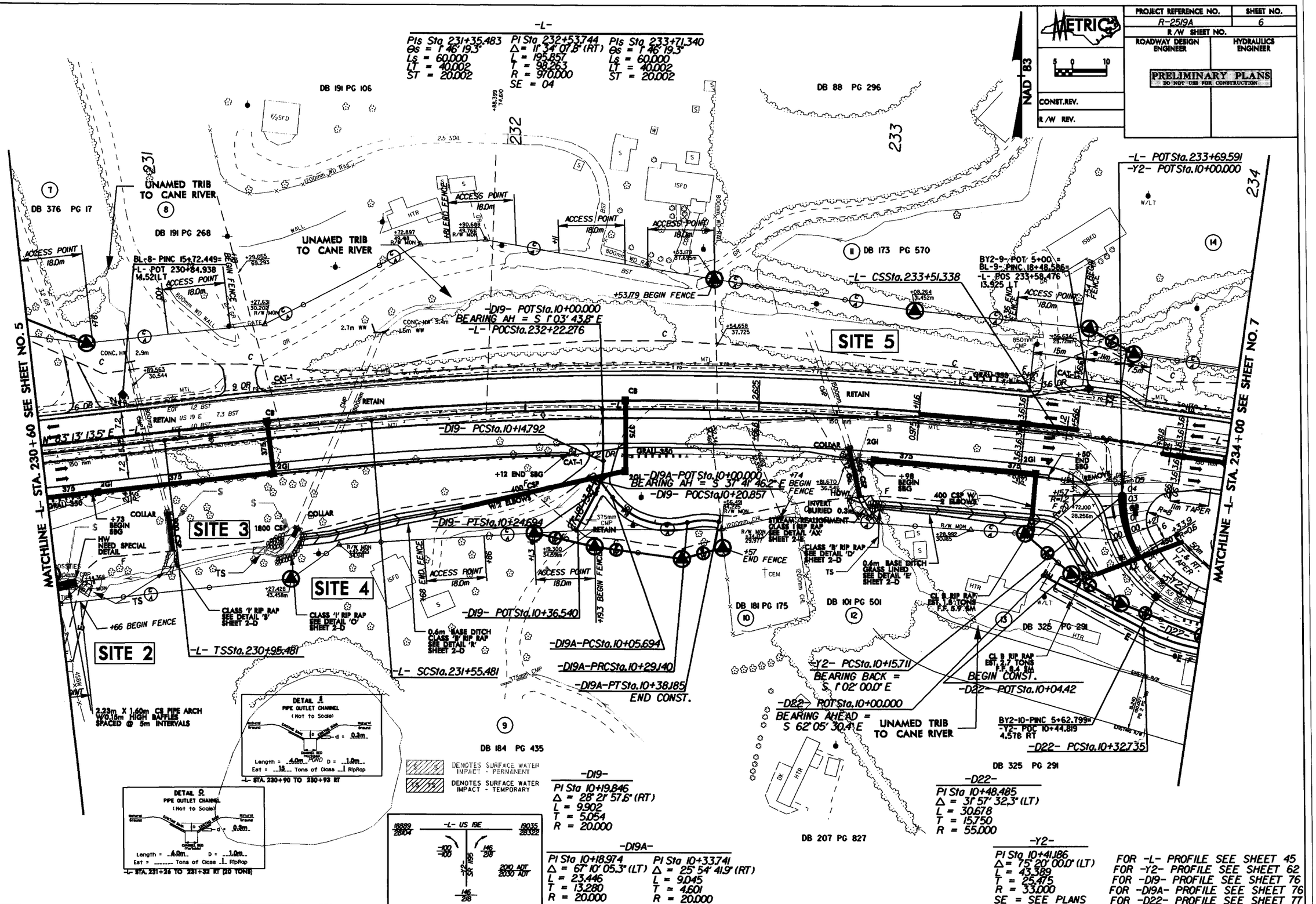
CONST. REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (RV/PJ): ADDED DRIVEWAY -D19A- FOR PARCEL 10; ADDED PROPOSED R/W ON PARCEL 9; ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENTS ON PARCEL 13; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 7.
R/W REV. 09/05/07 (TMW): REVISED PROPERTY OWNER DEED BOOK INFORMATION ON PARCEL 13.

8/17/99



Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 1983

REVISIONS

R/W REV. 11/18/05 (RVP): ADDED DRIVEWAY -D19- AND -D19A- FOR PARCEL 10; ADDED PROPOSED R/W ON PARCEL 9; ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENTS ON PARCEL 13; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 7.
R/W REV. 09/05/07 (TWW): REVISED PROPERTY OWNER DEED BOOK INFORMATION ON PARCEL 13.

8/11/20

-L-
PIs Sta 231+35.483
Θs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002

PI Sta 232+53.744
Δ = 11° 34' 01.8" (RT)
L = 195.857
T = 98.263
R = 970.000
SE = 04

PIs Sta 233+71.340
Θs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002

MATCHLINE -L- STA. 230+60 SEE SHEET NO. 5

MATCHLINE -L- STA. 234+00 SEE SHEET NO. 7

LARRY MCINTOSH
DB 191 PG 106

RANDY MCINTOSH
DB 88 PG 296

JAMES GARDNER
DB 376 PG 17

GRADY MCINTOSH
DB 191 PG 268

UNAMED TRIB
TO CANE RIVER

DANNY RANDOLPH
DB 173 PG 570

ROSE MARILYN ANGELL
DB 184 PG 435

WHEELER CEMETERY
DB 181 PG 175

ZULA WHEELER
DB 101 PG 501

JERRY JEROME MCINTOSH
DB 325 PG 291

BILLY RAY BRADFORD
DB 207 PG 827

SITE 2

SITE 3

SITE 4

SITE 5

-L- TSSta.230+95.481

-L- SCSta.231+55.481

-L- POTSta.233+69.591
-Y2- POTSta.10+00.000

-L- CSSta.233+51.338

BL-8-PINC 15+72.449=
-L- POT 230+84.938
14.521LT

BY2-9-POT 5+00 =
BL-9-PINC 18+48.586=
-L- POS 233+58.476
13.925 LT

+53.179 BEGIN FENCE

-D19- POTSta.10+00.000
BEARING AH = S 1°03' 43.8" E
-L- POCSta.232+22.276

-D19- POCSta.10+14.792

-D19A-POTSta.10+00.000
BEARING AH = S 37°41' 46.2" E
-D19- POCSta.10+20.857

-D19- PTSta.10+24.694

-D19- POTSta.10+36.540

-D19A-PCSta.10+05.694

-D19A-PRCSta.10+29.140

-D19A-PTSta.10+38.185
END CONST.

-Y2- PCSta.10+15.716
BEARING BACK =
S 1°02' 00.0" E

-D22- POTSta.10+04.42
BEGIN CONST.

-D22- POTSta.10+00.000
BEARING AHEAD =
S 62°05' 30.4" E

BY2-10-PINC 5+62.799=
-Y2- POC 10+44.819
4.516 RT

-D22- PCSta.10+32.735

2.23m X 1.60m CS PIPE ARCH
W/0.15m HIGH BAFFLES
SPACED @ 5m INTERVALS

DETAIL B
PIPE OUTLET CHANNEL
(Not to Scale)
Length = 4.0m POND D = 1.0m
Est = 18 Tons of Class 1 RipRap
-L- STA. 230+90 TO 230+93 RT

DETAIL O
PIPE OUTLET CHANNEL
(Not to Scale)
Length = 6.0m D = 1.0m
Est = ____ Tons of Class 1 RipRap
-L- STA. 231+26 TO 231+32 RT (20 TONS)

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

-L- US 19E
19889 28804
19035 28522
-100 -100
146 28
SR 1185
2010 ADT 2030 ADT
146 28

-D19-
PI Sta 10+19.846
Δ = 28° 21' 57.6" (RT)
L = 9.902
T = 5.054
R = 20.000

-D19A-
PI Sta 10+18.974
Δ = 67° 10' 05.3" (LT)
L = 23.446
T = 13.280
R = 20.000

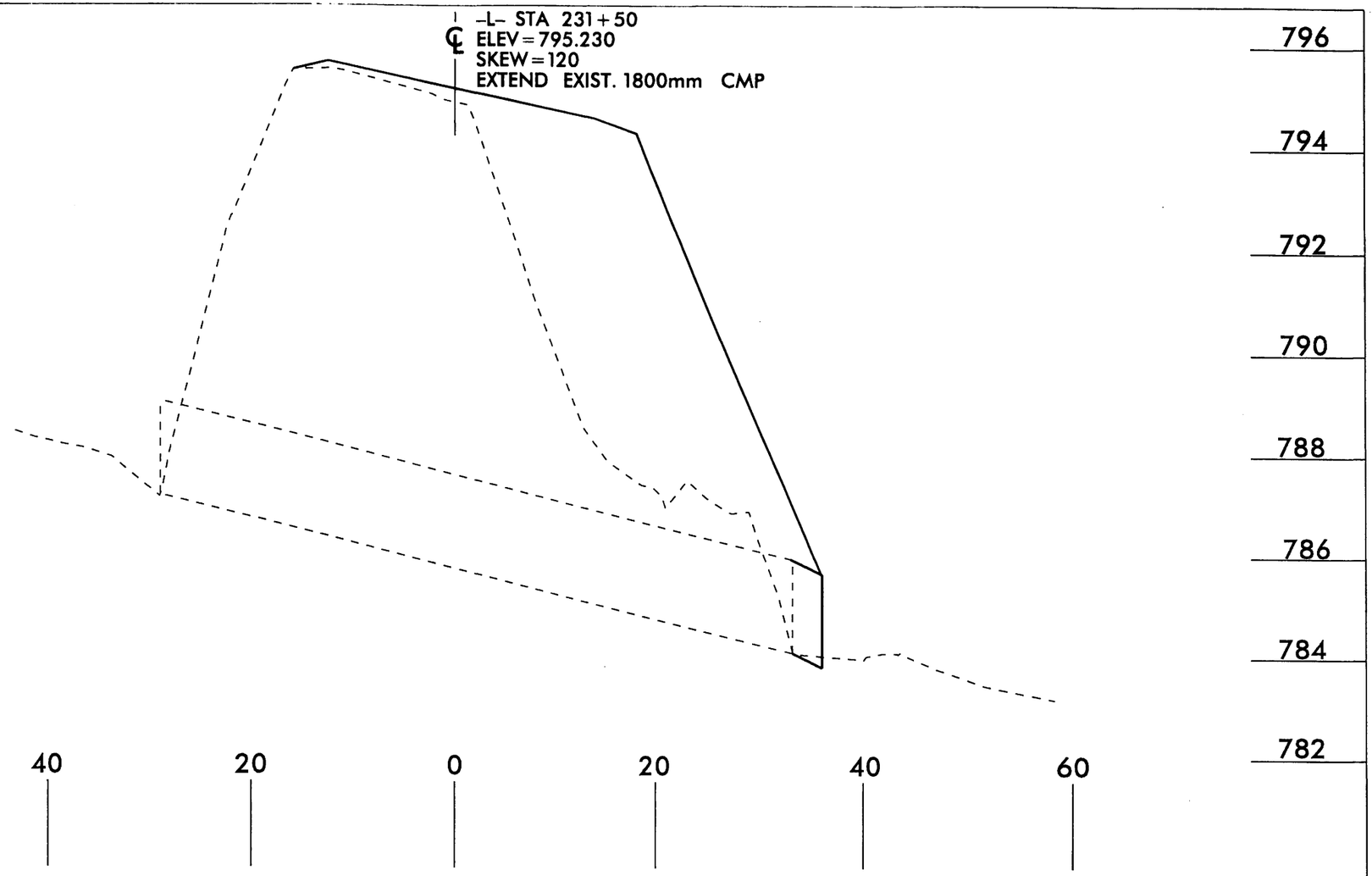
PI Sta 10+33.741
Δ = 25° 54' 41.9" (RT)
L = 9.045
T = 4.601
R = 20.000

-D22-
PI Sta 10+48.185
Δ = 31° 57' 32.3" (LT)
L = 30.678
T = 15.750
R = 55.000

-Y2-
PI Sta 10+41.186
Δ = 75° 20' 00.0" (LT)
L = 43.389
T = 25.475
R = 33.000
SE = SEE PLANS

FOR -L- PROFILE SEE SHEET 45
FOR -Y2- PROFILE SEE SHEET 62
FOR -D19- PROFILE SEE SHEET 76
FOR -D19A- PROFILE SEE SHEET 76
FOR -D22- PROFILE SEET 77

Permit Drawing



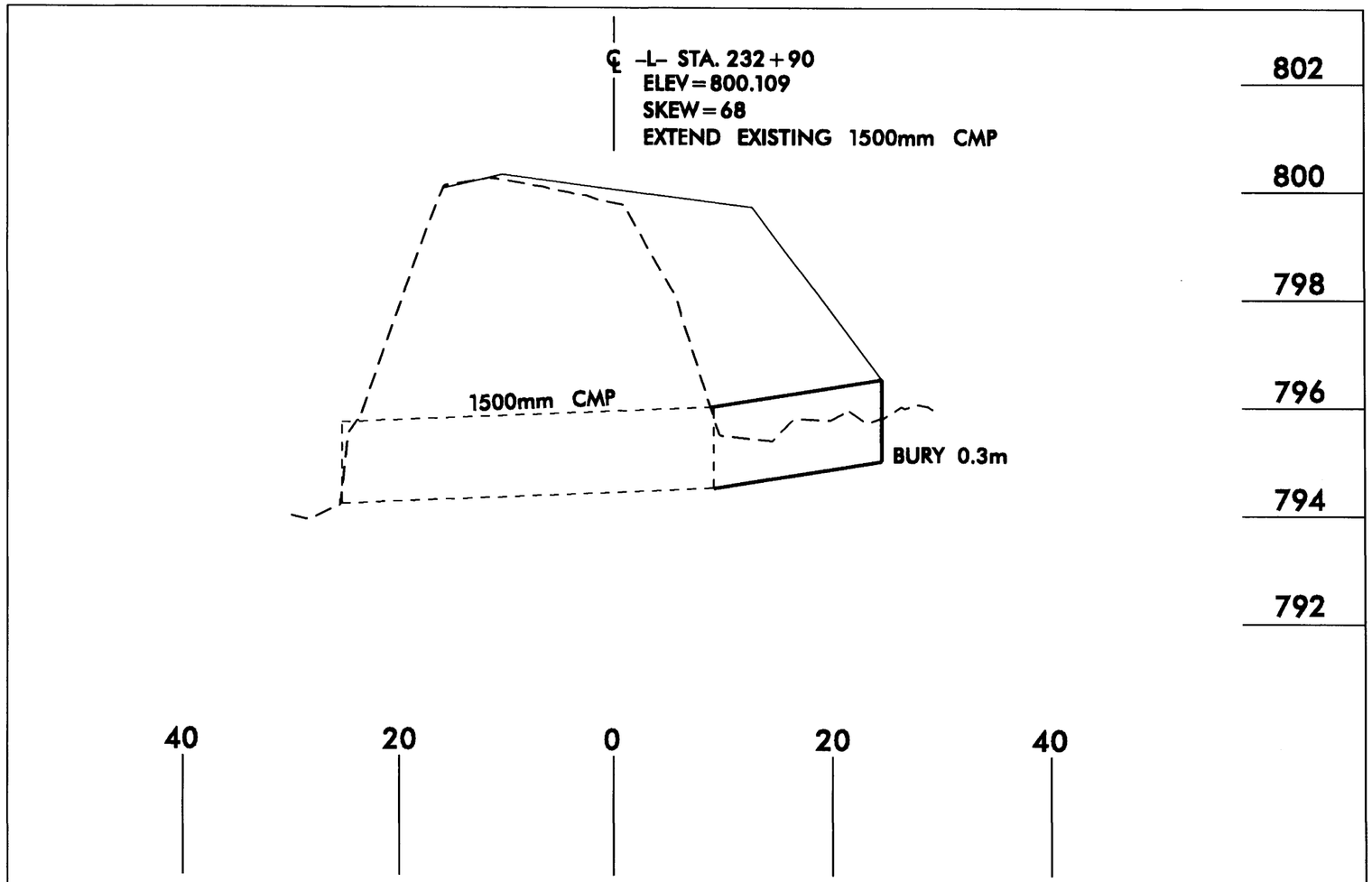
-L- STATION 231+50
EXTEND EXISTING 1800 CMP

SITE 4
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 17 of 86



-L- STATION 232+90
EXTEND w/1500mm CMP

SITE 5
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

03/12/09

Permit Drawing
Sheet 15 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

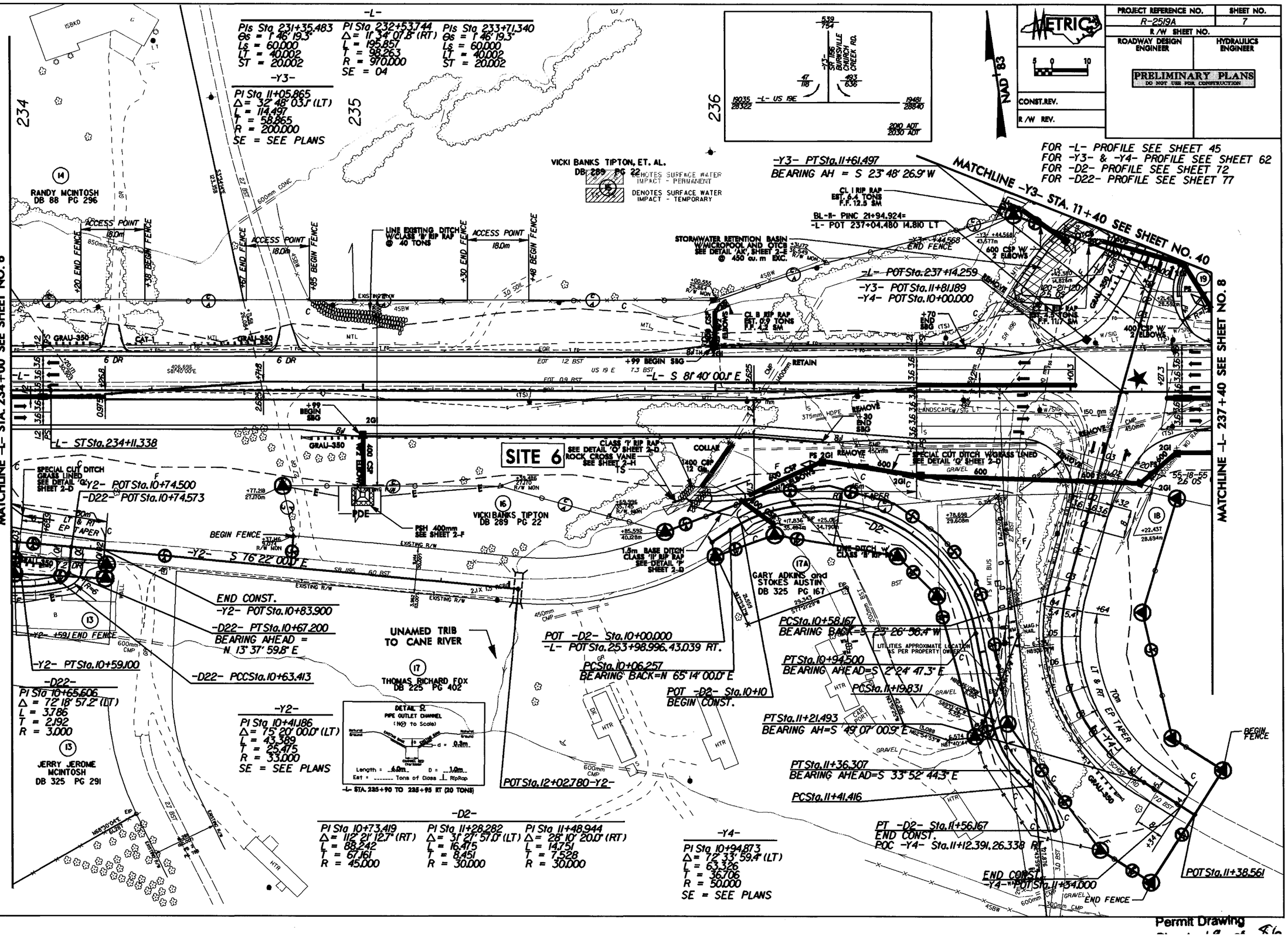
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

NAD 83

FOR -L- PROFILE SEE SHEET 45
FOR -Y3- & -Y4- PROFILE SEE SHEET 62
FOR -D2- PROFILE SEE SHEET 72
FOR -D22- PROFILE SEE SHEET 77



REVISIONS

R/W REV. 11/18/05 (TMW): ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W & CONSTRUCTION EASEMENTS ON PARCEL 13; ADDED PARCEL NUMBER 17A ; ADDED DRIVEWAY -D2- FOR PARCEL 17 ; REVISED PROPOSED R/W ON PARCELS 17,17A & 18 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV.02/27/06 (TMW): ADDED PAVED SHOULDER & EXPRESSWAY GUTTER & REVISED R/W & CONSTRUCTION EASEMENT ON PARCEL 19 R/W REV.04/19/06 (TMW): REVISED C/A & FENCE ON PARCEL 15. R/W REV.10/30/06 (KNW): REVISED PROPOSED R/W ON PARCELS 17,17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18. R/W REV.09/05/07 (TMW): REVISED PROPERTY OWNER NAME & ADDED ACCESS POINT ON PARCEL 15. R/W REV.09/05/07 (TMW): REVISED PROPERTY OWNER, DEED BOOK, INFORMATION ON PARCEL 13.

8/31/09

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

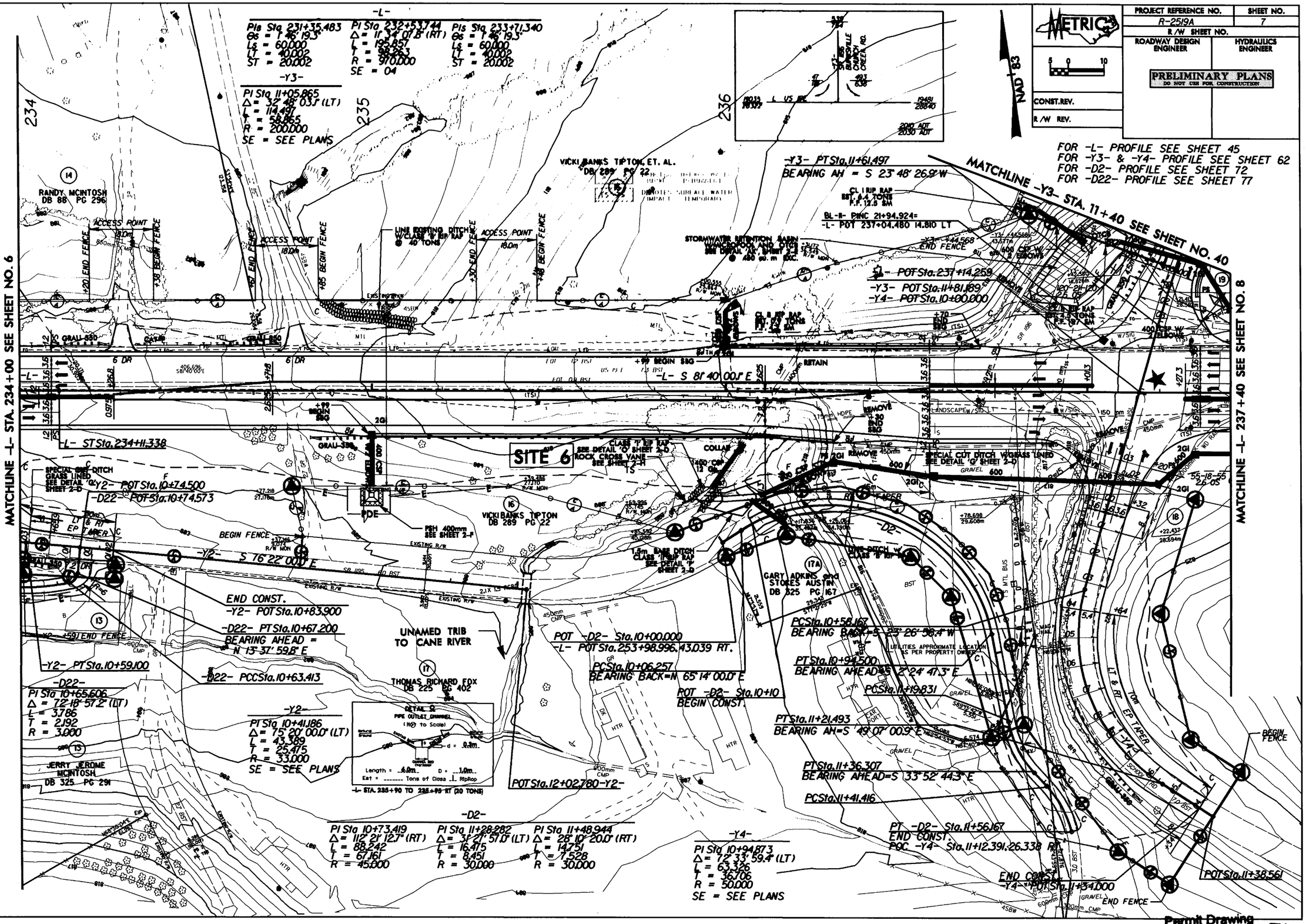
NAD 83

FOR -L- PROFILE SEE SHEET 45
FOR -Y3- & -Y4- PROFILE SEE SHEET 62
FOR -D2- PROFILE SEE SHEET 72
FOR -D22- PROFILE SEE SHEET 77

REVISIONS

R/W REV. 11/18/05 (TMW): ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W & CONSTRUCTION EASEMENTS ON PARCEL 13; ADDED PARCEL NUMBER 17A; ADDED DRIVEWAY -D2- FOR PARCEL 17; REVISED PROPOSED R/W ON PARCELS 17, 17A & 18; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/27/06 (TMW): ADDED PAVED SHOULDER & EXPRESSWAY GUTTER & REVISED R/W & CONSTRUCTION EASEMENT ON PARCEL 19. R/W REV. 04/19/06 (TMW): REVISED C/A & FENCE ON PARCEL 15. R/W REV. 10/30/06 (KMW): REVISED PROPOSED R/W ON PARCELS 17, 17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18. R/W REV. 09/05/07 (TMW): REVISED PROPERTY OWNER NAME & ADDED ACCESS POINT ON PARCEL 15. R/W REV. 11/13/07 (TMW): REVISED PROPERTY OWNER DEED BOOK INFORMATION ON PARCEL 13. REVISED PROPERTY OWNER NAME & ADDED ACCESS POINT ON PARCEL 15.

8/21/08



Permit Drawing
Sheet 20 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

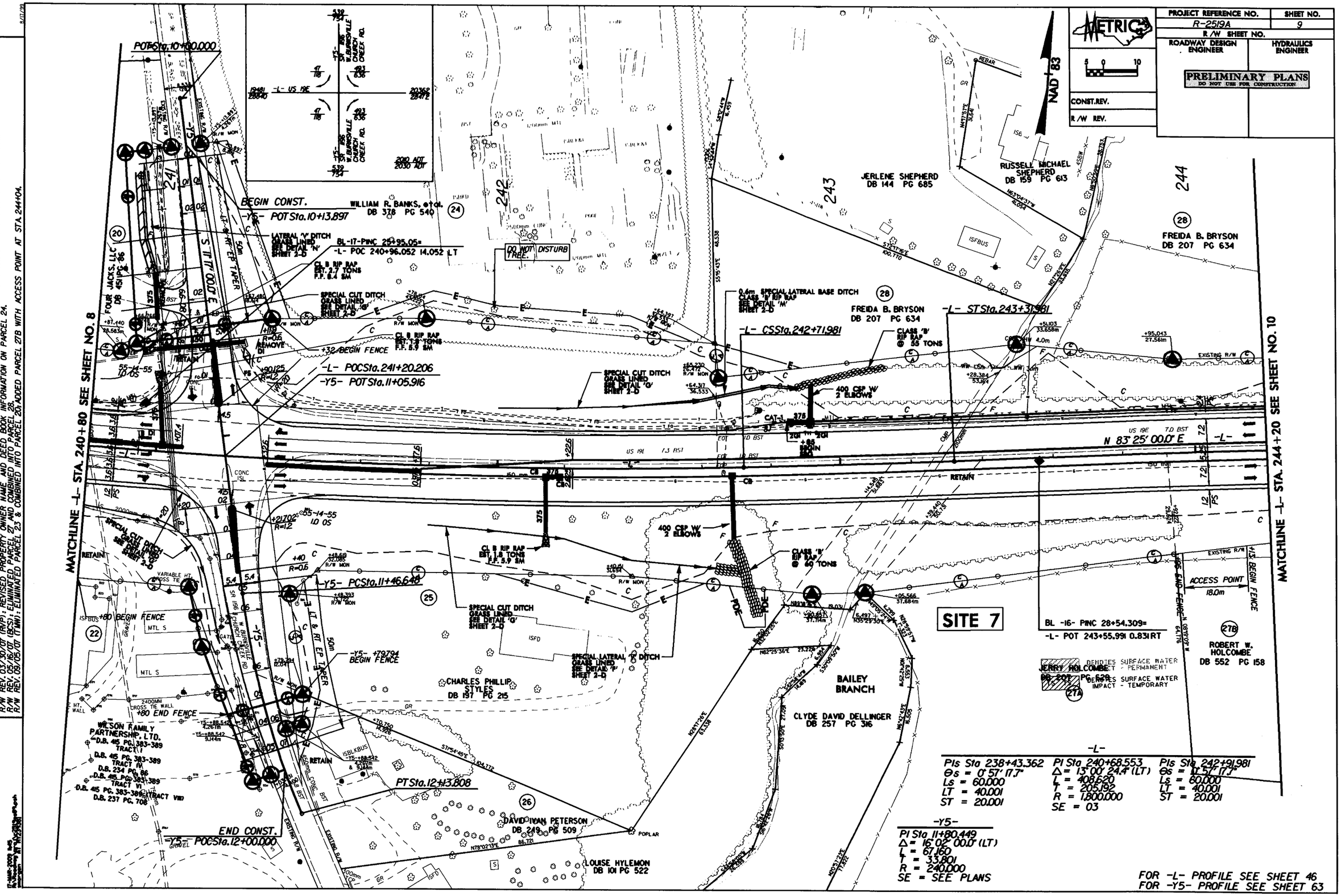
R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED C/A & FENCE ON PARCEL 22.
R/W REV. 5/08/06 (RVP): REVISED PROPERTY OWNER NAME, C/A & FENCE ON PARCEL 22.
R/W REV. 03/30/07 (RVP): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 24.
R/W REV. 05/16/07 (RCS): ELIMINATED PARCEL 27 AND COMBINED INTO PARCEL 28.
R/W REV. 09/05/07 (TMW): ELIMINATED PARCEL 23 & COMBINED INTO PARCEL 20; ADDED PARCEL 27B WITH ACCESS POINT AT STA. 244+04.

8/17/99



Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

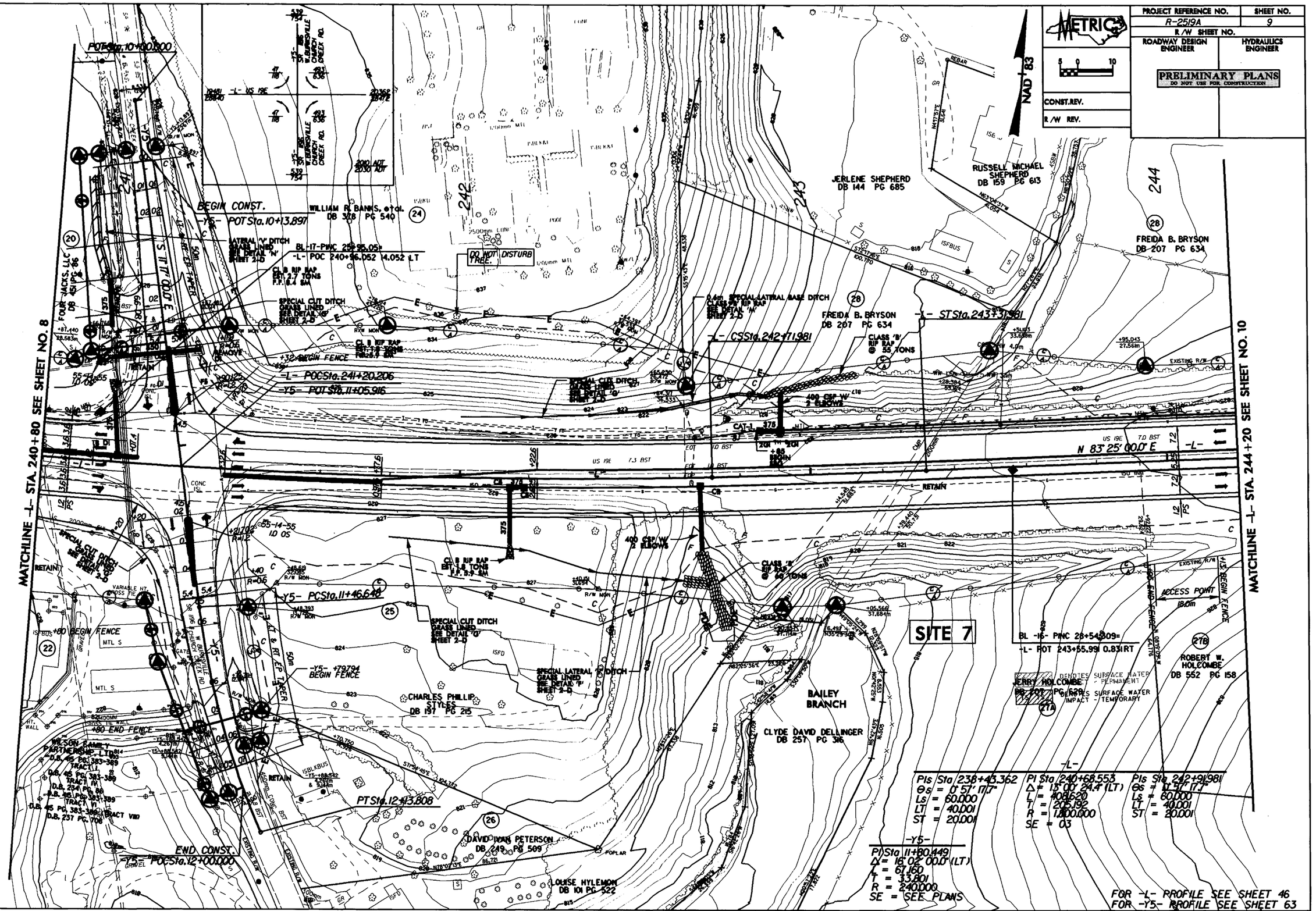
CONST.REV.

R/W REV.

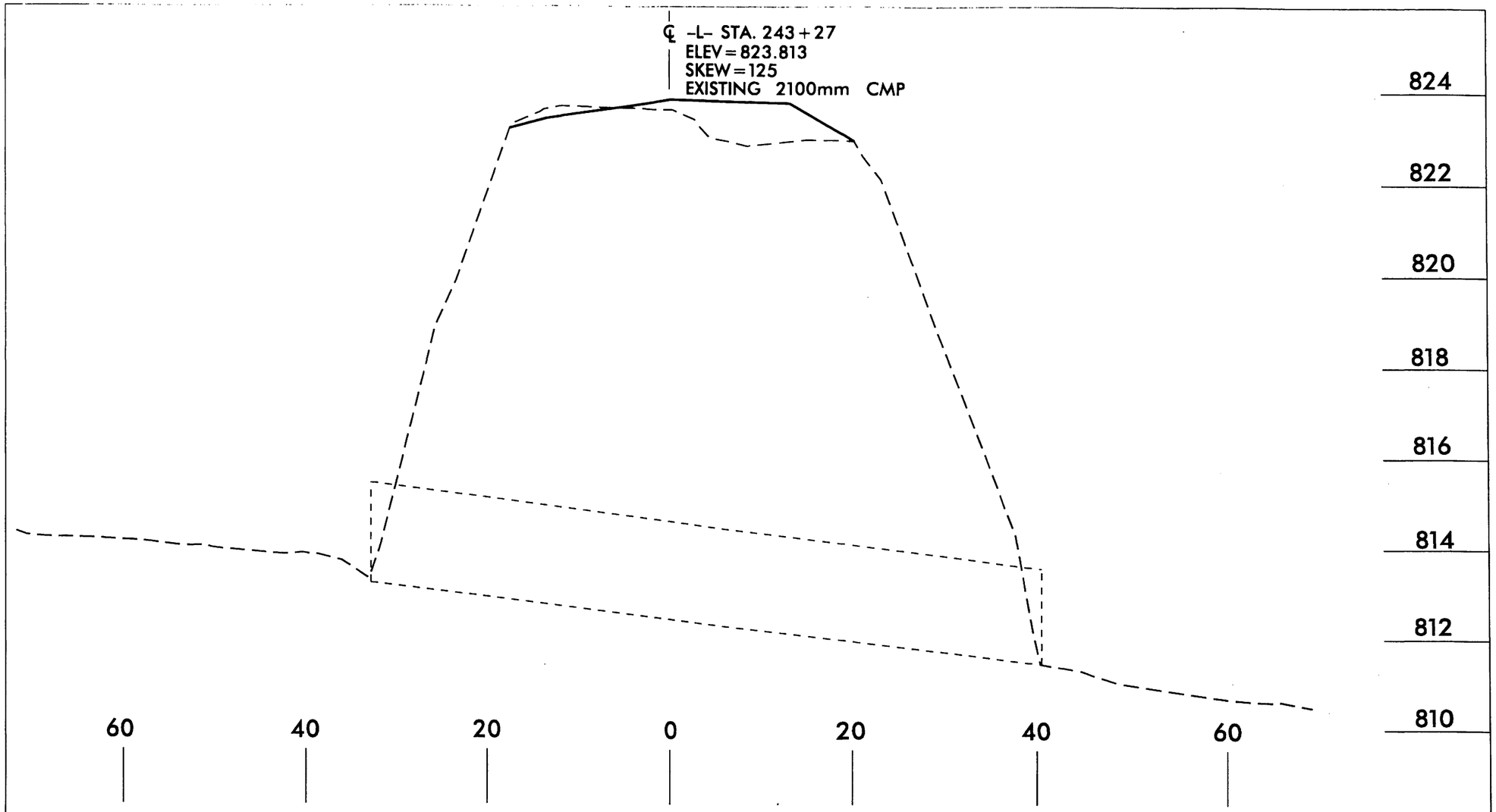
8/17/99

REVISIONS

R/W REV. 11/18/05 (TMW) ; REVISED C/A & FENCE ON PARCEL 22 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 5/08/06 (RVP) ; REVISED PROPERTY OWNER NAME,C/A & FENCE ON PARCEL 22. R/W REV. 01/09/07 (RVP) ; ADDED NOTE ON PARCEL 24.
R/W REV. 03/30/07 (RVP) ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 24.
R/W REV. 05/16/07 (BCS) ; ELIMINATED PARCEL 27 AND COMBINED INTO PARCEL 28.
R/W REV. 09/05/07 (TMW) ; ELIMINATED PARCEL 23 & COMBINED INTO PARCEL 20; ADDED PARCEL 27B WITH ACCESS POINT AT STA. 244+04.



Permit Drawing



-L- STATION 243+27
RETAIN EXISTING 2100mm CMP

SITE 7
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 23 of 56

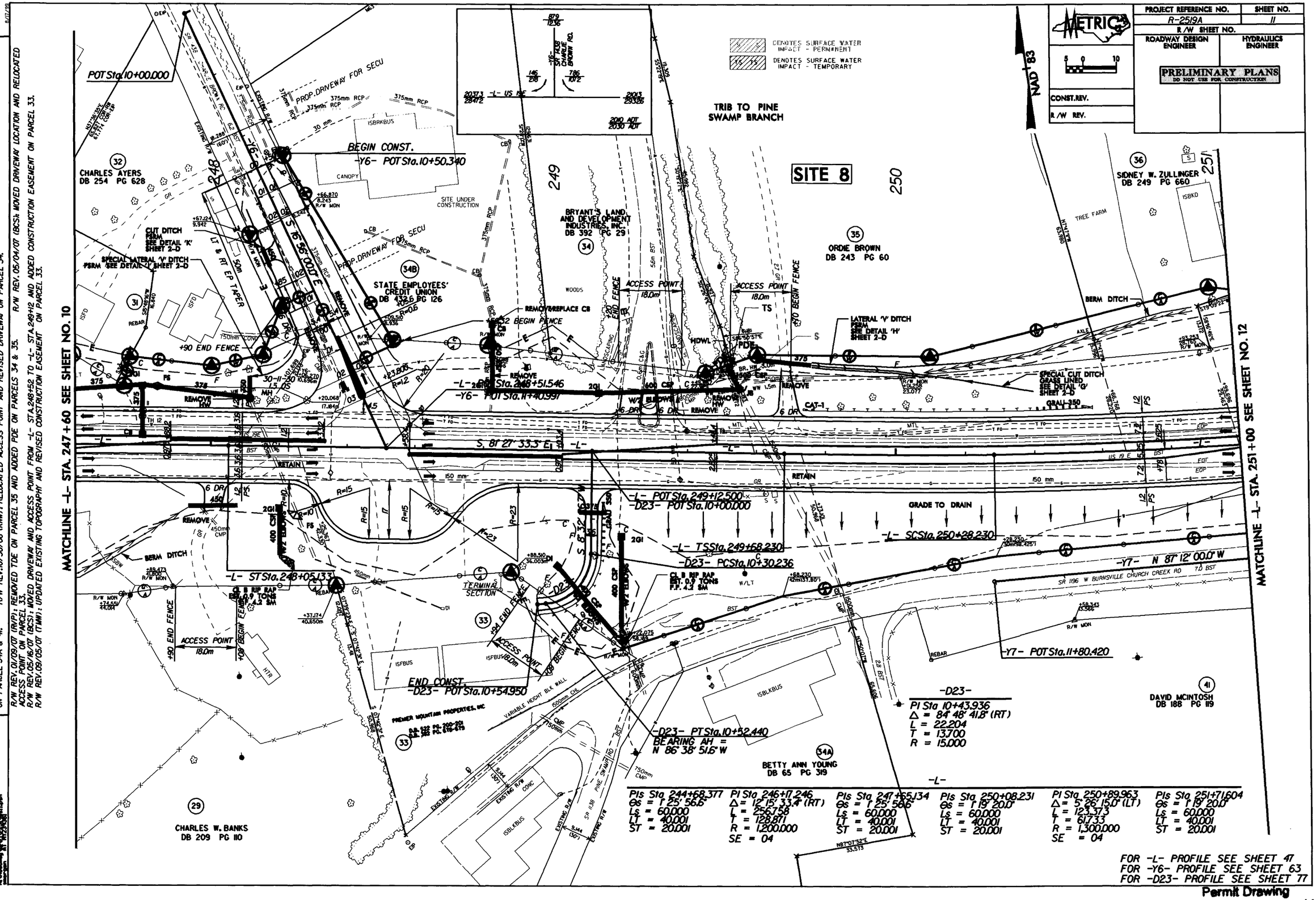
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.



REVISIONS

R/W REV. 11/18/05 (TMW): ADDED ACCESS POINT AT STA.248+01 FOR PARCEL 29; REMOVED PARCEL NUMBER 33A; COMBINED PARCELS 33 & 33A; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 33; ADDED PROP R/W & CONSTRUCTION EASEMENT LINES; REVISED PROPERTY OWNER NAME ON PARCEL 34; REVISED EXIST.R/W TO NUMERICAL OFFSET. R/W REV.8/10/06 (TMW): REVISED C/A LINE AND PROP FENCE FROM -L- STA 249+22 TO -L- STA 251+05 ON PARCEL 34A & 41. R/W REV.10/30/06 (KMW): RELOCATED ACCESS POINT AND REVISED DRIVEWAY ON PARCEL 34.

R/W REV.01/09/07 (RVP): REMOVED TDE ON PARCEL 35 AND ADDED PDE ON PARCELS 34 & 35. R/W REV.05/04/07 (BCS): MOVED DRIVEWAY LOCATION AND RELOCATED ACCESS POINT ON PARCEL 33.
R/W REV.05/16/07 (BCS): MOVED DRIVEWAY AND ACCESS POINT FROM -L- STA.248+52 TO -L- STA.248+12 AND ADDED CONSTRUCTION EASEMENT ON PARCEL 33.
R/W REV.09/05/07 (TMW): UPDATED EXISTING TOPOGRAPHY AND REVISED CONSTRUCTION EASEMENT ON PARCEL 33.

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

SITE 8

TRIB TO PINE SWAMP BRANCH

MATCHLINE -L- STA. 247+60 SEE SHEET NO. 10

MATCHLINE -L- STA. 251+00 SEE SHEET NO. 12

POT Sta.10+00.000

BEGIN CONST.
-Y6- POT Sta.10+50.340

END CONST.
-D23- POT Sta.10+54.950

-L- POT Sta.249+12.500
-D23- POT Sta.10+00.000

-L- TSS Sta.249+68.230
-D23- PCS Sta.10+30.236

-L- SCS Sta.250+28.230

-Y7- N 87° 12' 00.0" W

-Y7- POT Sta.11+80.420

-L- ST Sta.248+05.133

-L- S 81° 27' 33.3" E

-D23-
PI Sta 10+43.936
Δ = 84° 48' 41.8" (RT)
L = 22.204
T = 13.700
R = 15.000

-D23- PT Sta.10+52.440
BEARING AH =
N 86° 38' 51.6" W

-L-

PIs Sta 244+68.377	PI Sta 246+17.246	PIs Sta 247+65.134	PIs Sta 250+08.231	PI Sta 250+89.963	PIs Sta 251+71.604
Θs = 1° 25' 56.6"	Δ = 12° 15' 33.4" (RT)	Θs = 1° 25' 56.6"	Θs = 1° 19' 20.0"	Δ = 5° 26' 15.0" (LT)	Θs = 1° 19' 20.0"
Ls = 60.000	L = 256.758	Ls = 60.000	Ls = 60.000	L = 123.373	Ls = 60.000
LT = 40.001	T = 128.871	LT = 40.001	LT = 40.001	T = 61.733	LT = 40.001
ST = 20.001	R = 1,200.000	ST = 20.001	ST = 20.001	R = 1,300.000	ST = 20.001
	SE = 04			SE = 04	

FOR -L- PROFILE SEE SHEET 47
FOR -Y6- PROFILE SEE SHEET 63
FOR -D23- PROFILE SEE SHEET 77

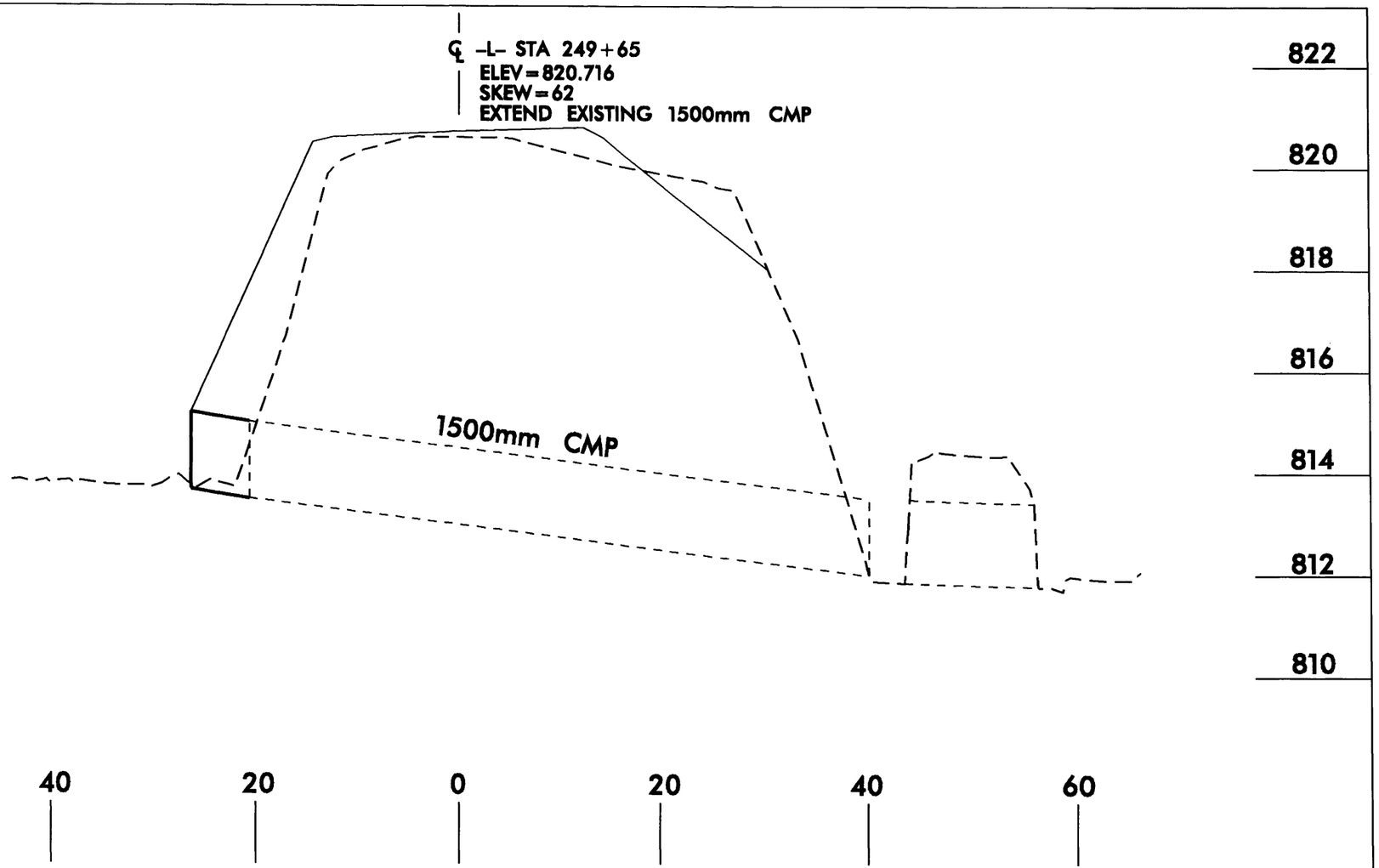
Permit Drawing
Sheet 24 of 77

REVISIONS

R/W REV. 11/18/05 (TMW): ADDED ACCESS POINT AT STA.248+10 FOR PARCEL 29; REMOVED PARCEL NUMBER 33A; COMBINED PARCELS 33 & 33A; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 33; ADDED PARCEL 34A; REVISED PROPERTY OWNER NAME ON PARCEL 34; REVISED EXIST. R/W & CONSTRUCTION EASEMENT LINES; REVISED PROPERTY OWNER NAME ON PARCEL 34A & 41. R/W REV. 8/10/06 (TMW): REVISED C/A LINE AND PROP. FENCE FROM -L- STA 249+22 TO -L- STA 251+05
R/W REV. 10/30/06 (KMW): RELOCATED ACCESS POINT AND REVISED DRIVEWAY ON PARCEL 34.

R/W REV. 01/09/07 (RVP): REMOVED TDE ON PARCEL 35 AND ADDED PDE ON PARCELS 34 & 35. R/W REV. 05/04/07 (BCS): MOVED DRIVEWAY LOCATION AND RELOCATED ACCESS POINT ON PARCEL 33.
R/W REV. 05/16/07 (BCS): MOVED DRIVEWAY AND ACCESS POINT FROM -L- STA.248+52 TO -L- STA.248+12 AND ADDED CONSTRUCTION EASEMENT ON PARCEL 33.
R/W REV. 09/05/07 (TMW): UPDATED EXISTING TOPOGRAPHY AND REVISED CONSTRUCTION EASEMENT ON PARCEL 33.

8/17/09



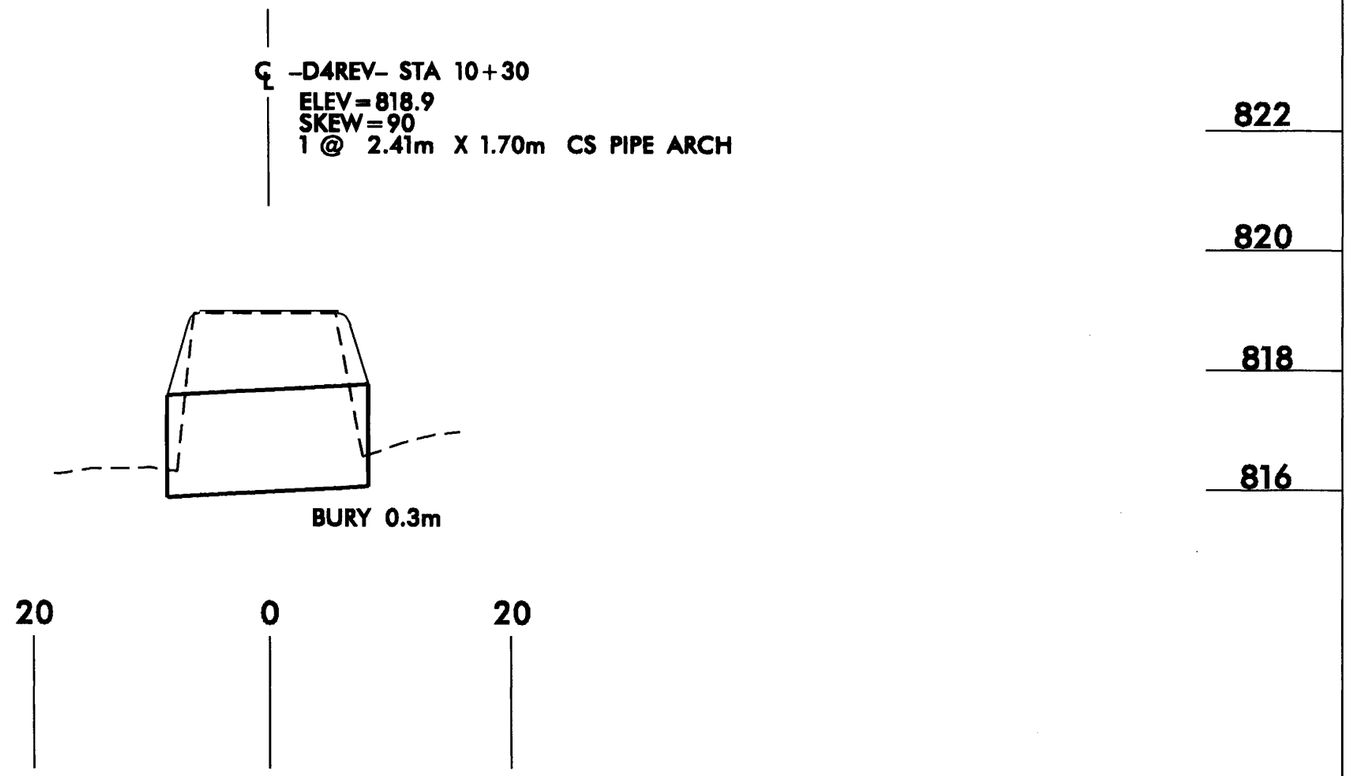
-L- STATION 249+65
EXTEND EXISTING 1500mm CMP

SITE 8
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 26 of 86



-D4REV- STATION 10+30
2.41m X 1.70m CS PIPE ARCH

SITE 9
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

03/12/09

Permit Drawing
Sheet 22 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

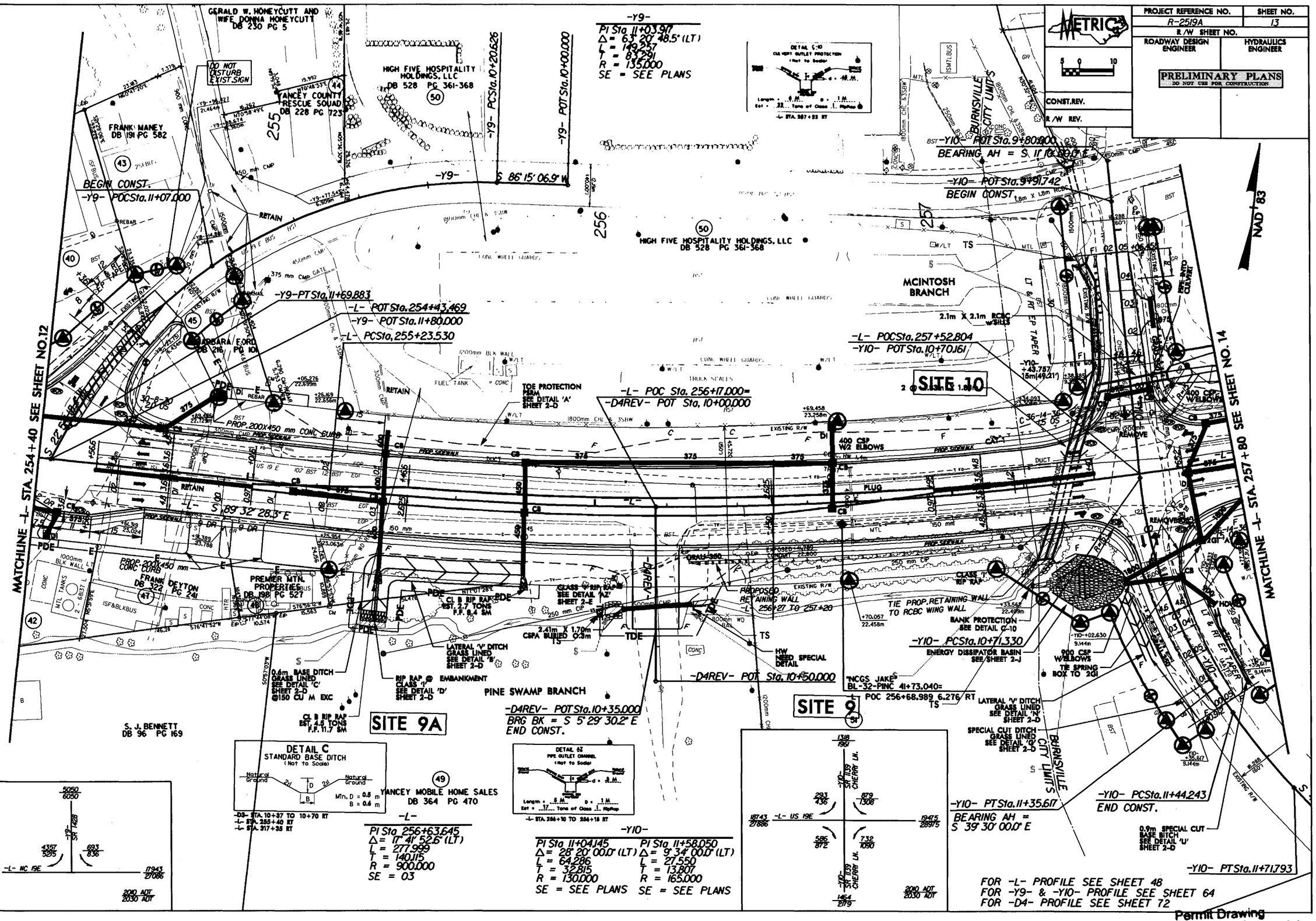
CONST.REV.

R/W REV.

8/17/99

REVISIONS

R/W REV. 11/18/05 (TWW); REVISED PROPERTY OWNER NAME FOR PARCEL 48 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 4/19/06 (TWW); REVISED CONSTRUCTION EASEMENT ON PARCEL 48 & 49.
R/W REV. 8/10/06 (TWW); REVISED PROP R/W ON PARCEL 40,43,45 & 50 ; REMOVED PROP R/W ON PARCEL 44 AND 46.
R/W REV. 10/30/06 (KWW); REVISED PROPERTY OWNER NAMES AND DEED BOOK INFORMATION FOR PARCELS 49 & 50. ELIMINATED PARCEL 46.
R/W REV. 01/09/07 (RVP); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 47. INCREASED SIZE OF 6m DRIVEWAYS TO 9m ON PARCELS 47 AND 48.
R/W REV. 03/30/07 (RVP); REVISED PROPOSED R/W ON PARCEL 45.
R/W REV. 05/16/07 (BCS); CHANGED PDE TO TDE ON PARCEL 49 @ STA.256+20 ; REVISED PROPOSED R/W ON PARCEL 50 ALONG -Y10-.
R/W REV. 09/12/08 (RVP); INCREASED DRIVEWAY TO 12.8m AND REVISED TIDE ON PARCEL 49.



Permit Drawing
Sheet 25 of 75

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

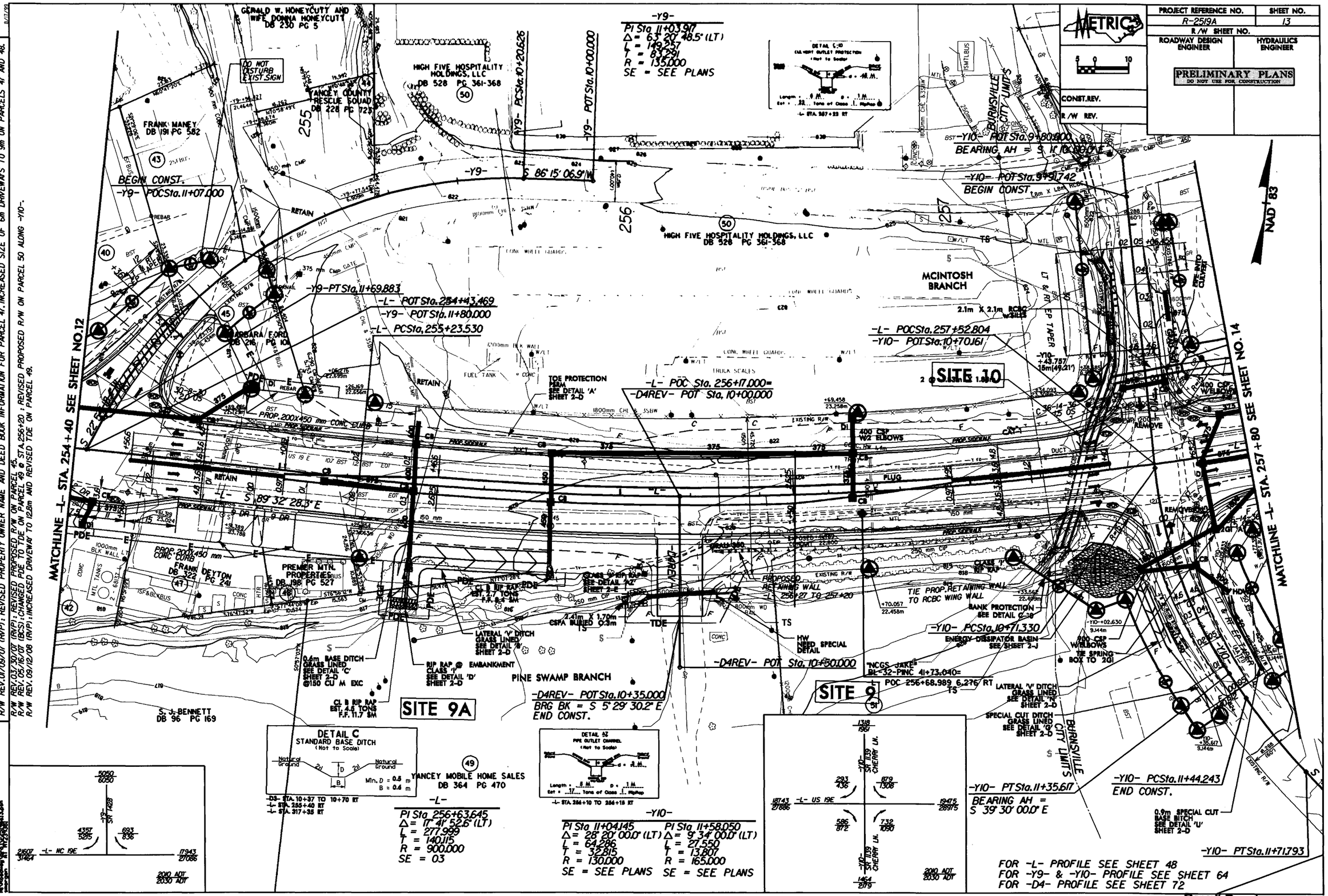
CONST.REV.

R/W REV.

REVISIONS

R/W REV.11/18/05 (TJW) ; REVISED PROPERTY OWNER NAME FOR PARCEL 48 ; R/W REV.4/19/06 (TJW) ; REVISED CONSTRUCTION EASEMENT ON PARCEL 48 & 49 ; R/W REV.8/10/06 (TJW) ; REMOVED PROP R/W ON PARCEL 44 AND 46 ; R/W REV.10/30/06 (KMW) ; REVISED PROPERTY LINES,PROPERTY OWNER NAMES,AND DEED BOOK INFORMATION FOR PARCEL 43,45 & 50. REMOVED R/W REV.01/09/07 (RVP) ; REVISED PROP. R/W ON PARCEL 49 & 50. ELIMINATED PARCEL 46. R/W REV.09/12/08 (RVP) ; INCREASED SIZE OF 6m DRIVEWAY TO 9m ON PARCELS 47 AND 48. 8/17/09

R/W REV.03/30/07 (RVP) ; REVISED PROPOSED R/W ON PARCEL 45.
R/W REV.05/16/07 (BCS) ; CHANGED PDE TO TDE ON PARCEL 49 @ STA.256+20 ; R/W REV.09/12/08 (RVP) ; INCREASED DRIVEWAY TO 12.2m AND REVISED TDE ON PARCEL 49.



Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST.REV.

R/W REV.

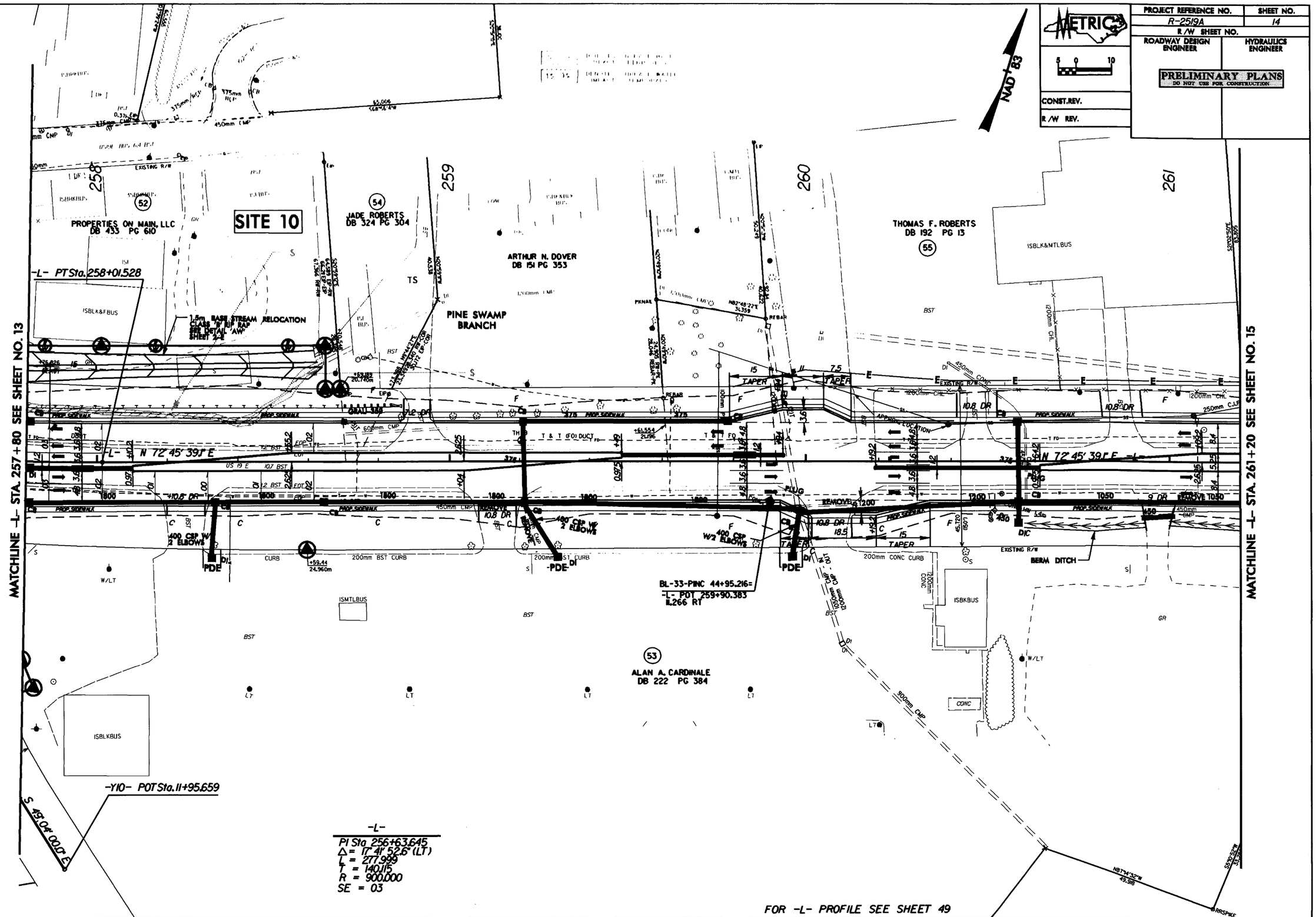
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME FOR PARCEL 52 ; ADDED DRIVEWAY TO PARCEL 55 AT STA.260+90 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RMP); REVISED PDE ON PARCEL 53.
R/W REV. 03/05/07 (TMW); ADDED DRIVEWAY AT STA.259+14 AND REVISED PDE ON PARCEL 53.

9/11/99



Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

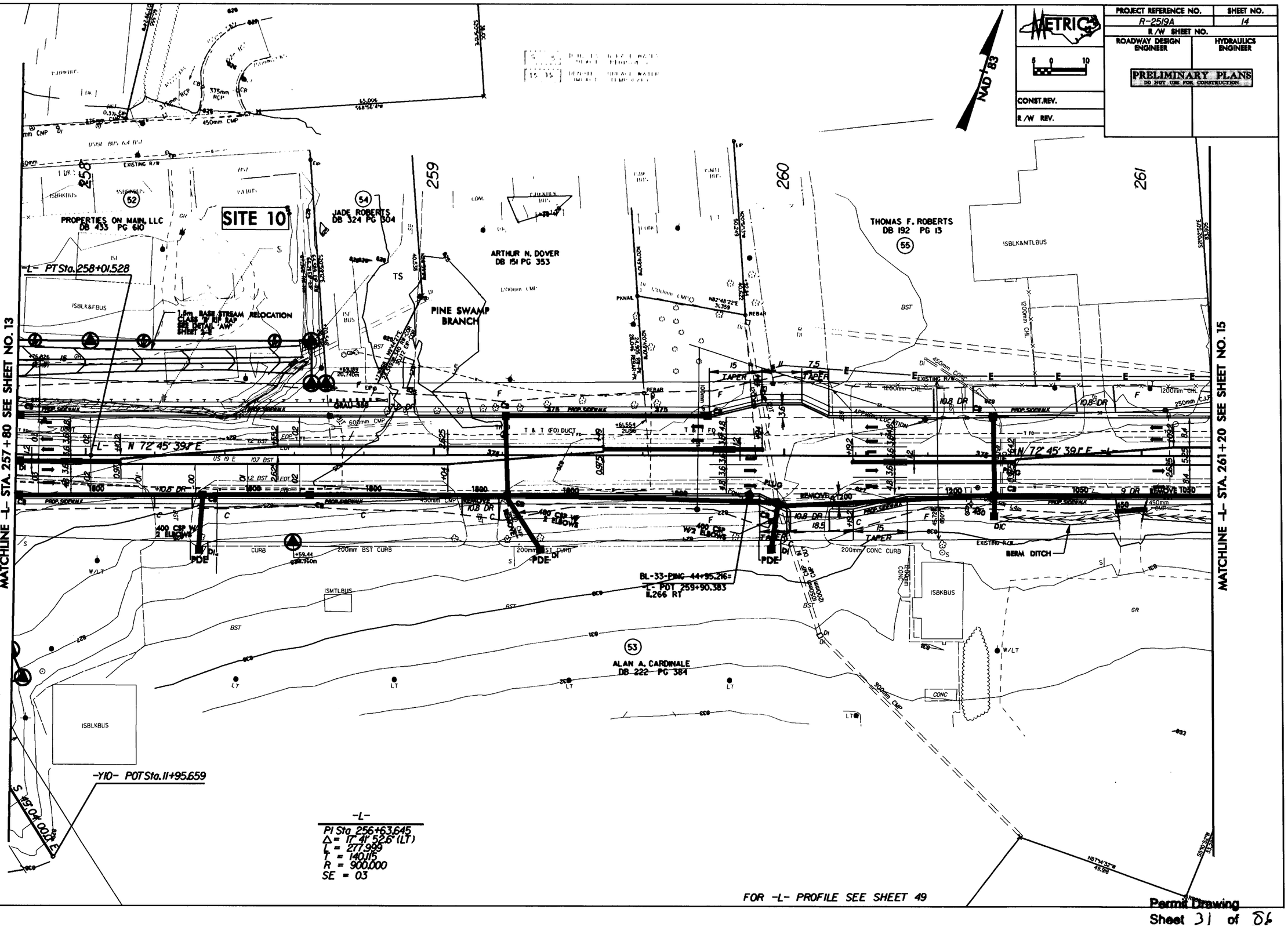
R/W REV.

NAD 83

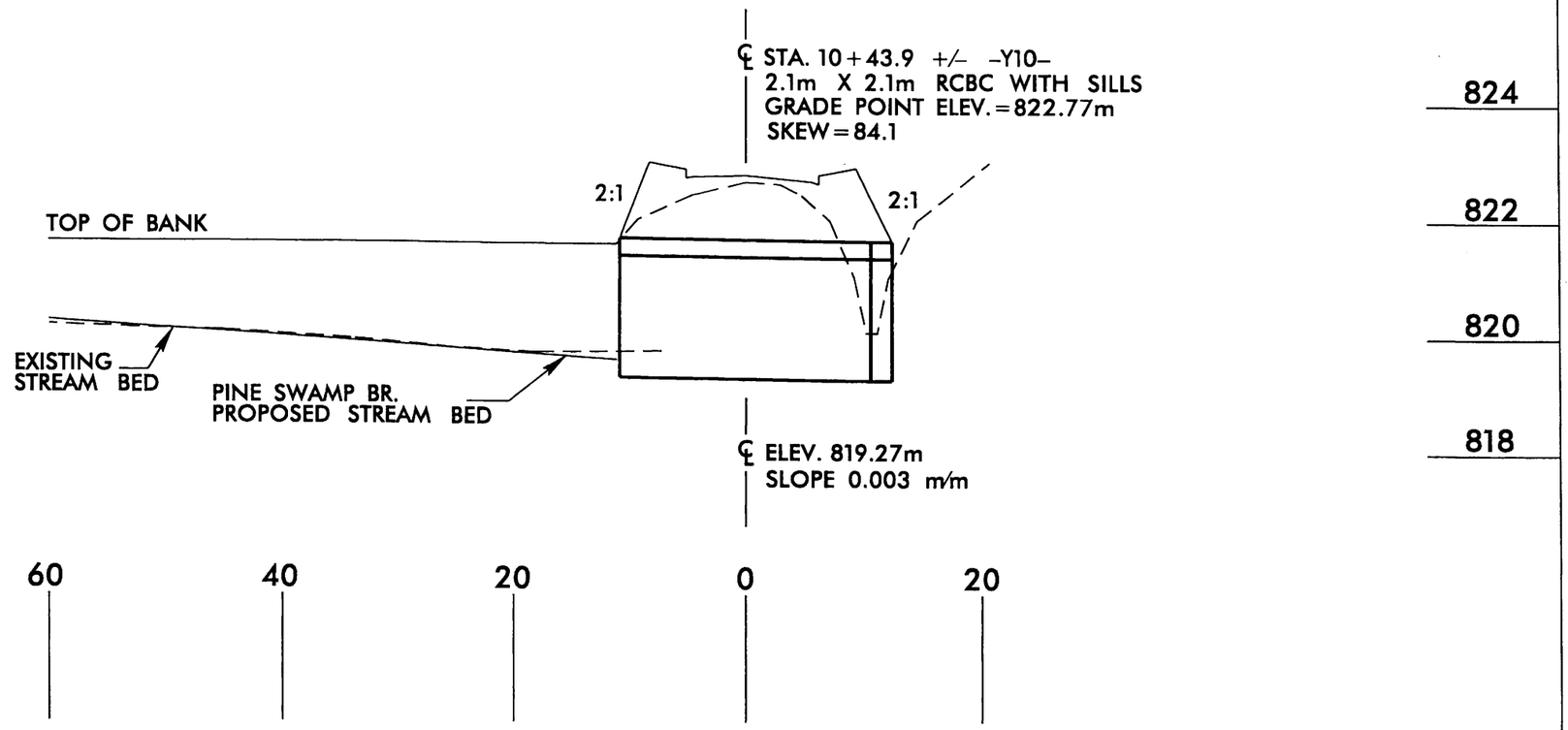
REVISIONS

R/W REV. 11/18/05 (TMW) ; REVISED PROPERTY OWNER NAME FOR PARCEL 52 ; ADDED DRIVEWAY TO PARCEL 55 AT STA.260+90 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RVP) ; REVISED PDE ON PARCEL 53.
R/W REV. 09/05/07 (TMW) ; ADDED DRIVEWAY AT STA. 259+14 AND REVISED PDE ON PARCEL 53 .

8/17/09



Permit Drawing
Sheet 31 of 86



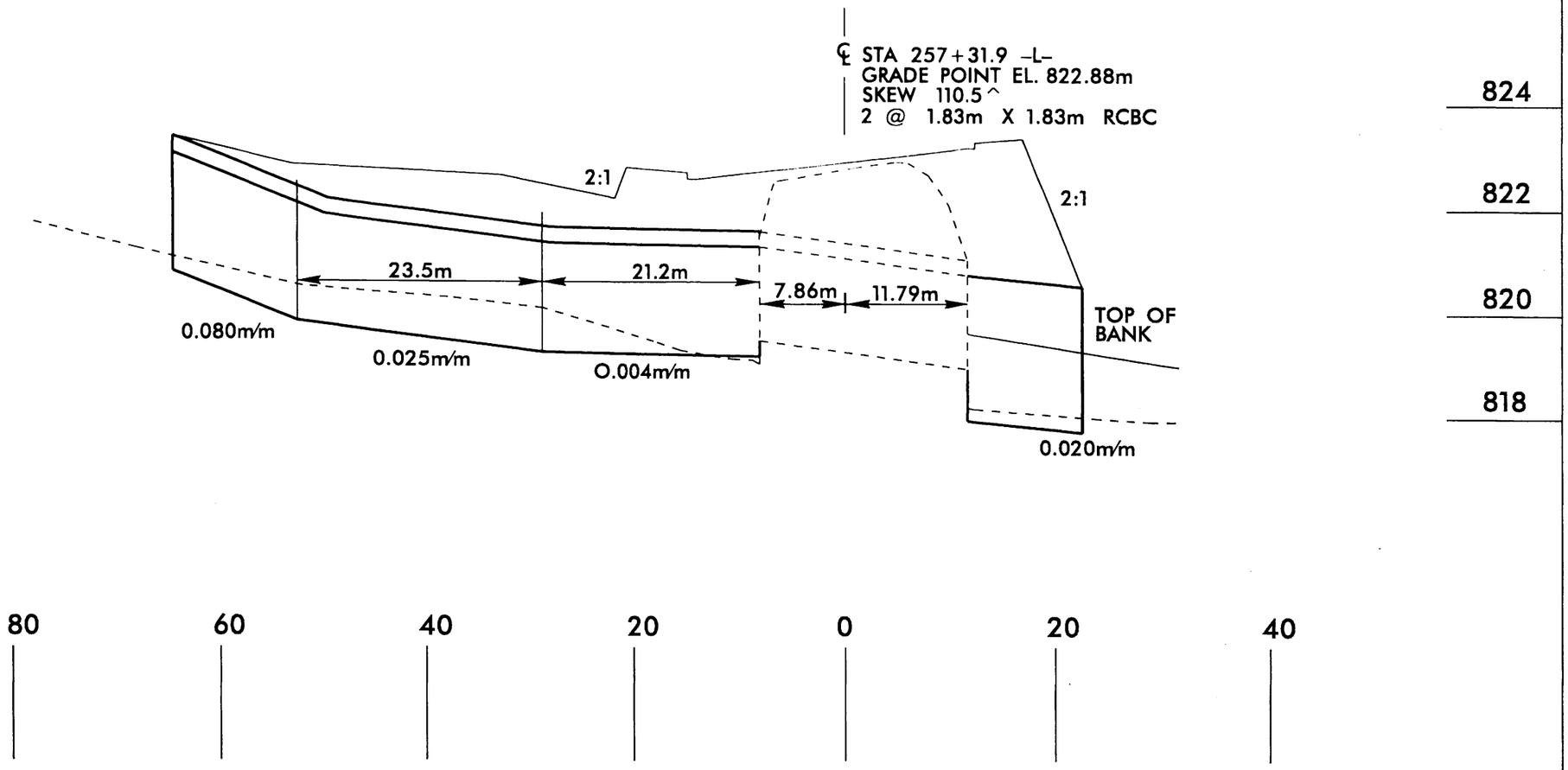
-Y10- STATION 10+44
2.1m X 2.1m RCBC WITH SILLS

SITE 10 PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

SHEET OF 10/25/06

Permit Drawing
Sheet 32 of 86



-L- STATION 257+32
2 @ 1.83m X 1.83m RCBC

0.3m HIGH SILLS ARE TO BE PLACED IN THE PROPOSED RCBC EXTENSIONS. SPACING SHALL BE AS FOLLOWS: McINTOSH BRANCH AND PINE SWAMP BRANCH AT INLET EXTENSIONS 8m +/-; AT OUTLET EXTENSIONS 5.5m +/- WITH THE INTERIOR SILL BEING 0.6m HIGH.

SITE 10
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E FROM EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

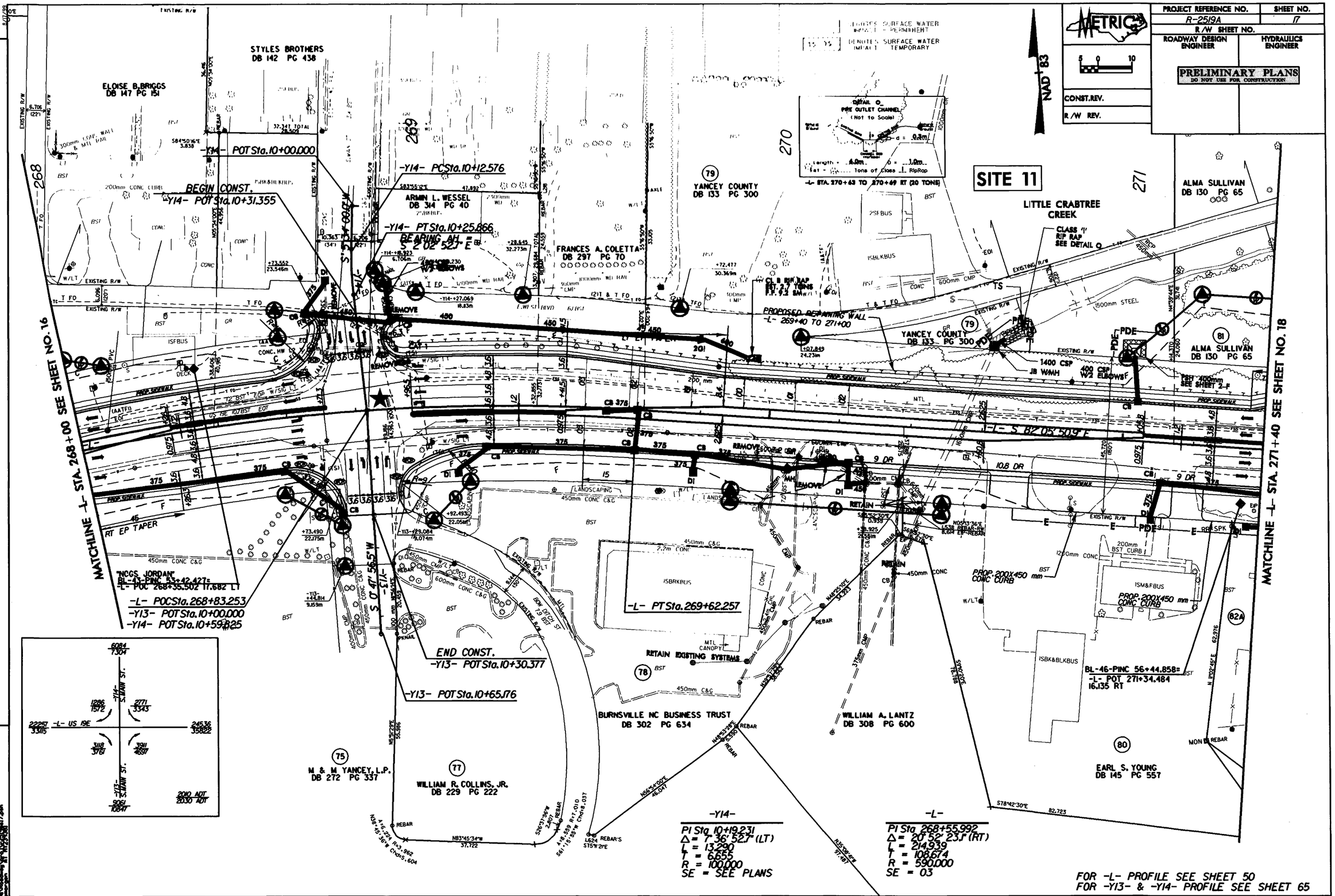
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 8/10/06 (TMW): REVISED PROP. R/W ON PARCEL 75.
R/W REV. 10/30/06 (KMW): ADDED PARCEL 82A.
R/W REV. 01/09/07 (RVP): ADDED PDE TO PARCEL 79 NEAR STA.270+66 LT.



Permit Drawing

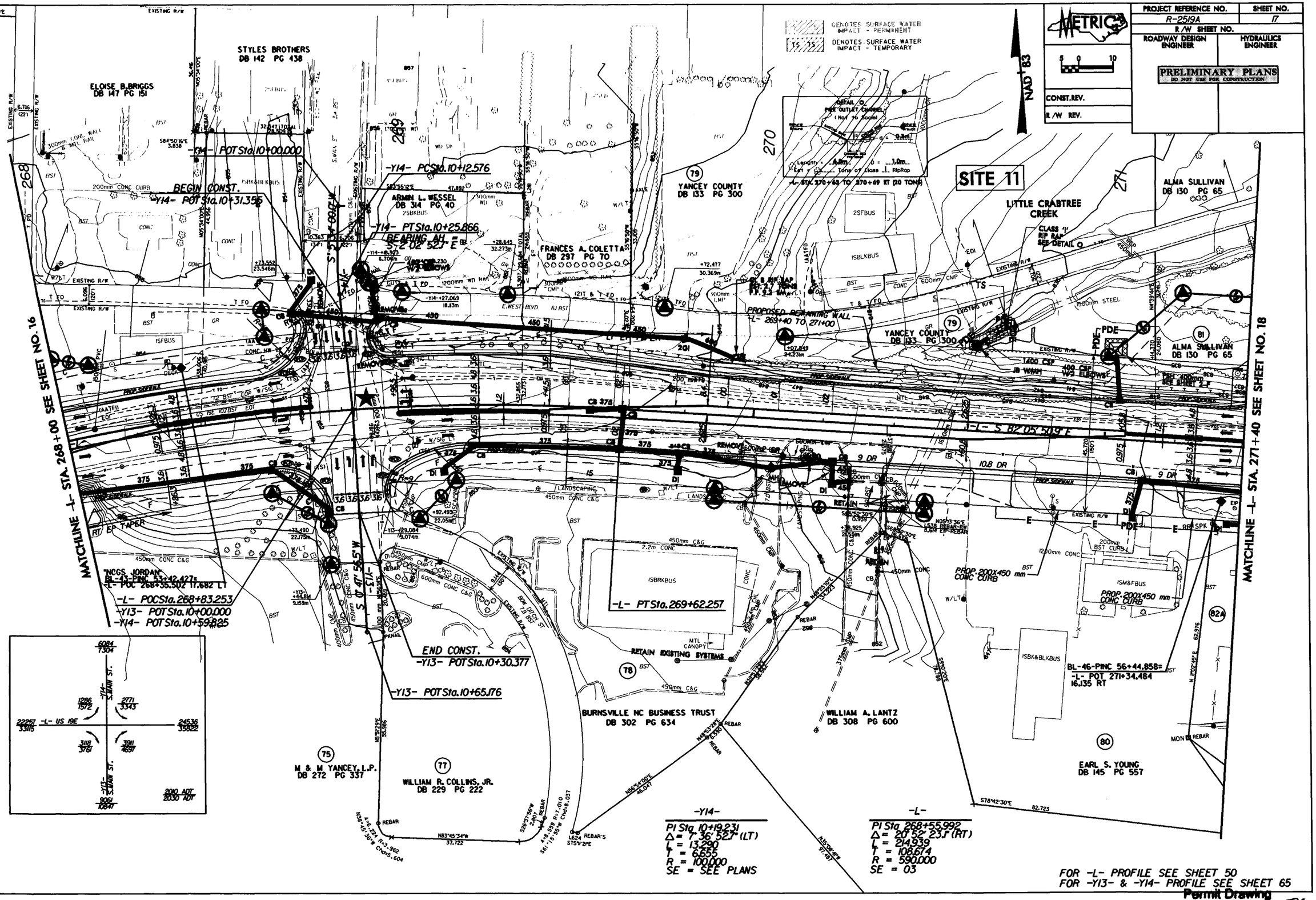
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

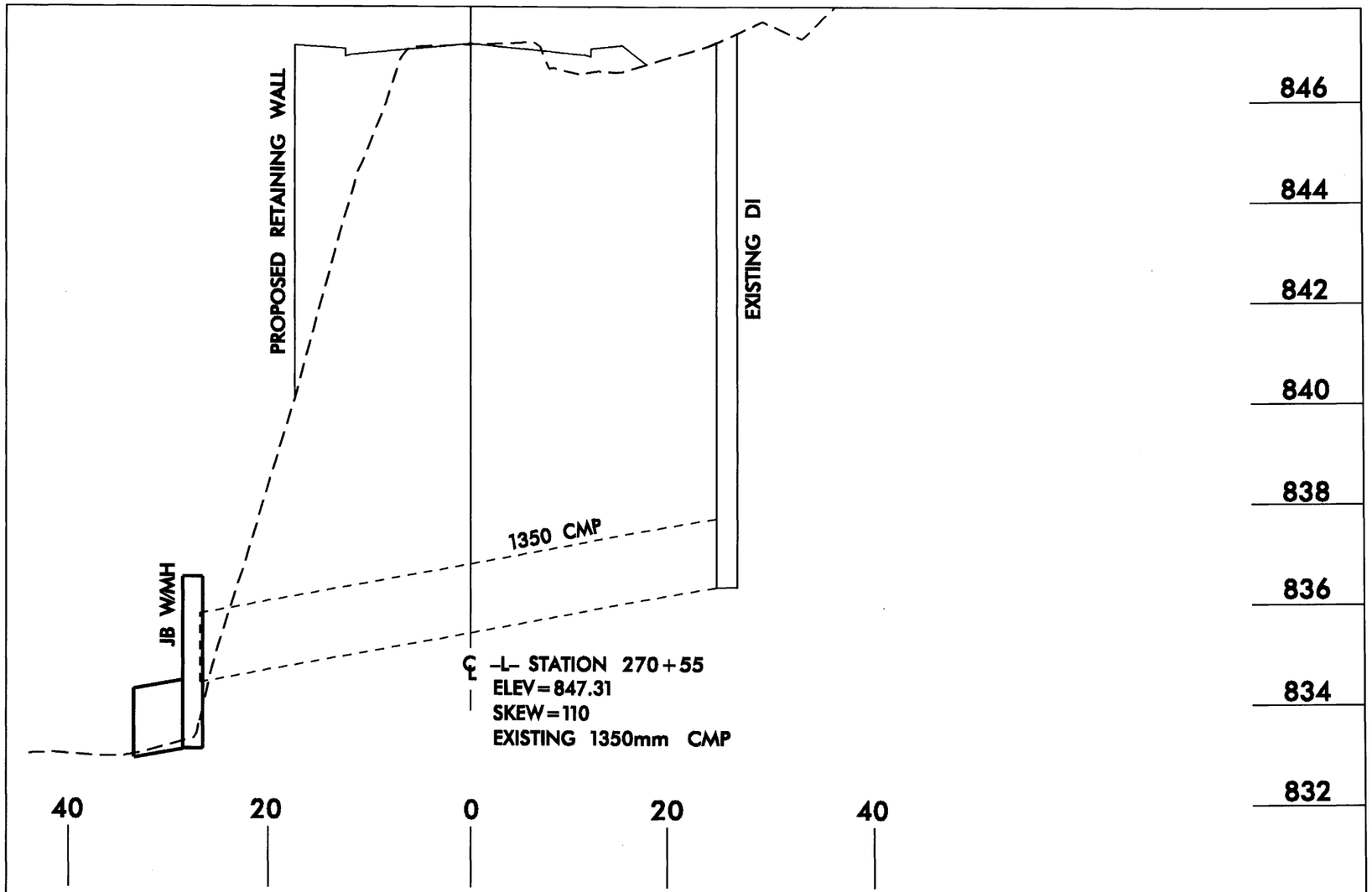
R/W REV.



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 8/19/06 (TMW): REVISED PROP R/W ON PARCEL 75.
R/W REV. 10/30/06 (KNW): ADDED PARCEL 82A
R/W REV. 01/09/07 (RWP): ADDED PDE TO PARCEL 79 NEAR STA. 270+66 LT.

Permit Drawing
Sheet 35 of 56



-L- STATION 270+55
RETAIN EXISTING 1350mm CMP
EXTEND W/1400mm CSP

SITE 11
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

03/12/09

Permit Drawing
Sheet 36 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

METRIC 5 0 10

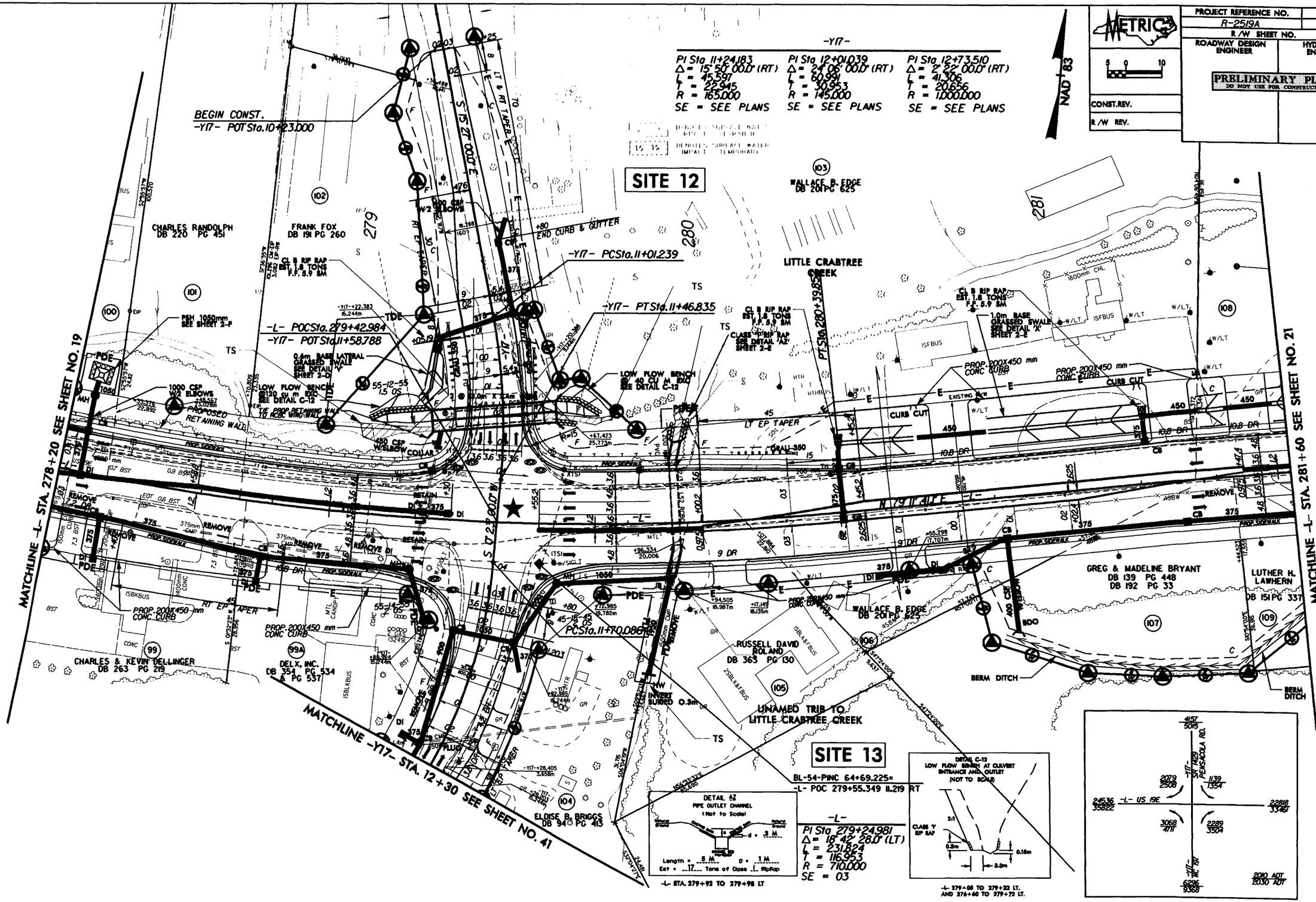
NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW) ; ADDED DRIVEWAY TO PARCEL 103 AT STA.11+16 -Y17- ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RVP) ; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 105.
R/W REV. 05/16/07 (BCS) ; REVISED PROPERTY OWNER'S NAME AND PROPERTY LINE ON PARCEL 99 ; ADDED PARCEL 99A (DELX, INC).
R/W REV. 09/05/07 (TMW) ; REVISED PROPERTY OWNER NAME ON PARCEL 107
R/W REV. 03/17/09 (RVP) ; REVISED STATION OFFSETS AND EXISTING RIGHT OF WAY ON PARCEL 99, 99A, 100, 101, 102, 103, 104, 105 AND 106.

-Y17-

PI Sta 11+24.183	PI Sta 12+01.039	PI Sta 12+73.510
Δ = 15° 50' 00.0" (RT)	Δ = 24° 06' 00.0" (RT)	Δ = 2° 22' 00.0" (RT)
L = 45.597	L = 60.991	L = 41.306
T = 22.945	T = 30.953	T = 20.656
R = 165.000	R = 145.000	R = 1,000.000
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS



FOR -L- PROFILE SEE SHEET 52
FOR -Y17- PROFILE SEE SHEET 66

Permit Drawing
Sheet 32 of 76

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

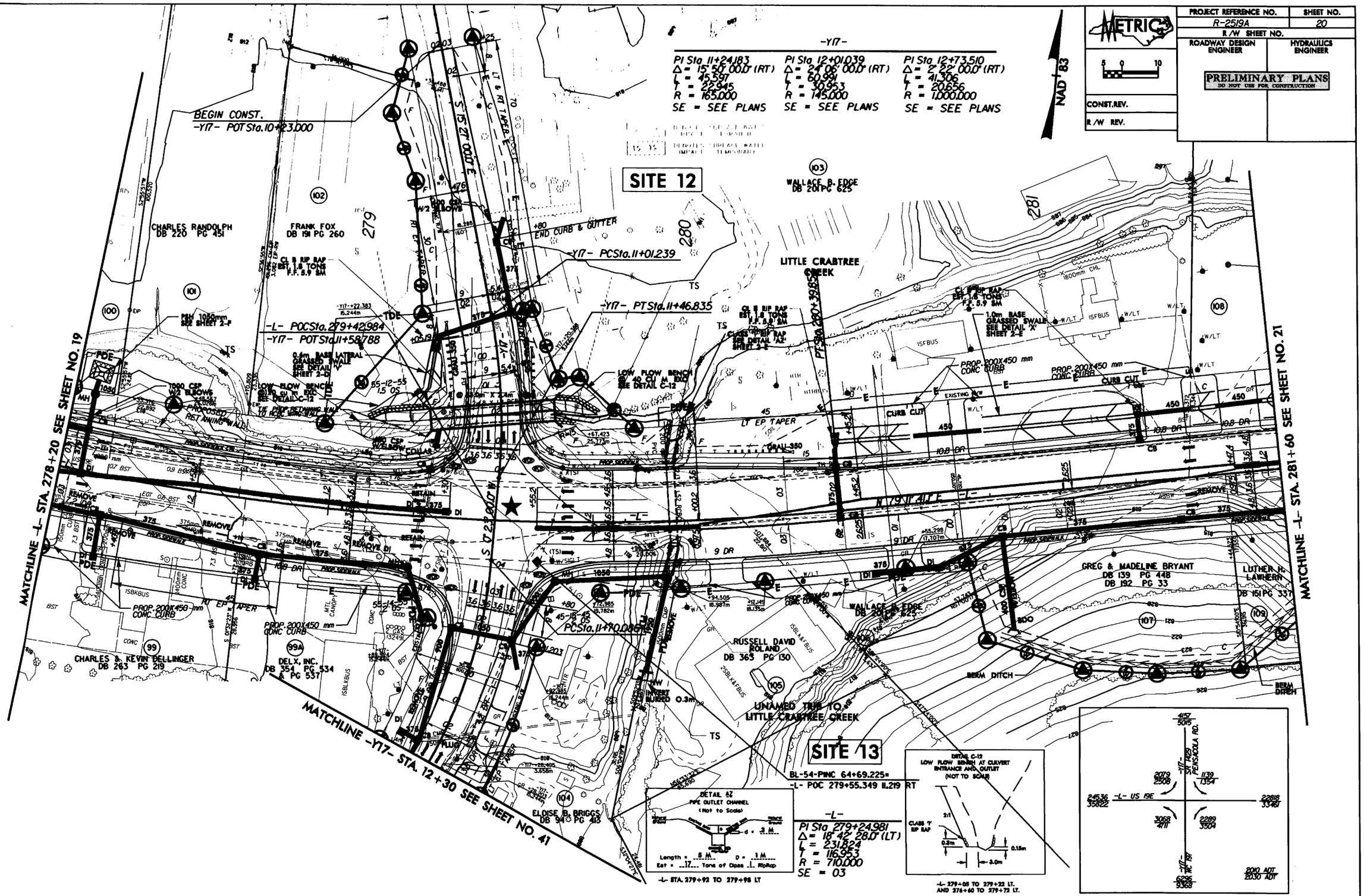
R/W REV.

METRIC 5 0 10

NAD 83

-Y17-

PI Sta. 11+24.183	PI Sta. 12+01.039	PI Sta. 12+73.510
Δ = 15° 50' 00.0" (RT)	Δ = 24° 08' 00.0" (RT)	Δ = 2° 22' 00.0" (RT)
L = 45.597	L = 60.991	L = 41.306
T = 22.945	T = 30.953	T = 20.656
R = 165.000	R = 145.000	R = 1,000.000
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS



FOR -L- PROFILE SEE SHEET 52
FOR -Y17- PROFILE SEE SHEET 66

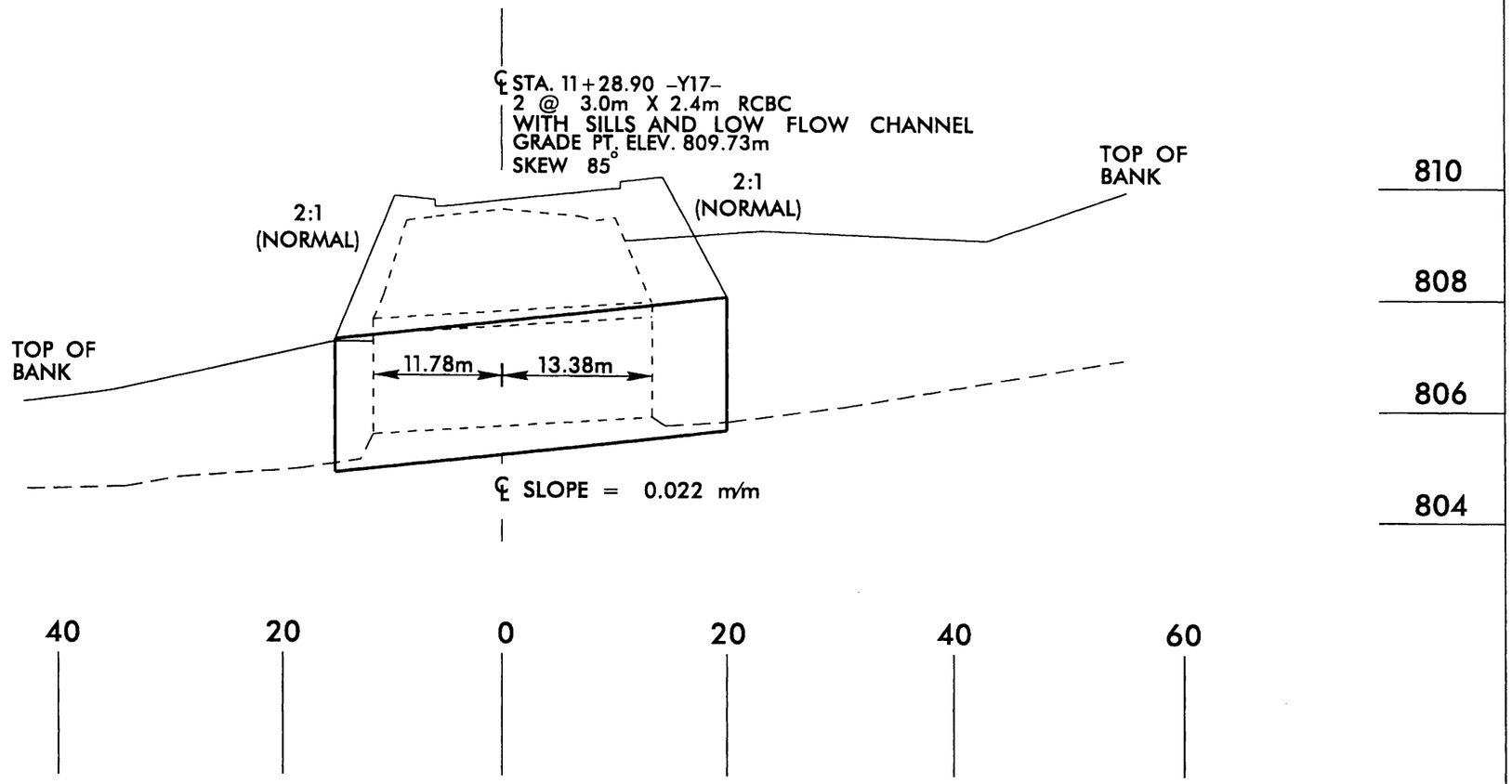
Permit Drawing

REVISIONS

R/W REV. 11/18/05 (TJW); ADDED DRIVEWAY TO PARCEL 103 AT STA.11+96 -Y17- ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 06/08/07 (RVP); REVISED PROPERTY OWNER'S NAME ON PARCEL 105.
R/W REV. 06/08/07 (RCS); REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 105.
R/W REV. 08/06/07 (TJW); REVISED PROPERTY OWNER'S NAME ON PARCEL 99 ; ADDED PARCEL 99A (DELX,INC).
R/W REV. 03/07/08 (RVP); REVISED STATION OF FSET'S AND EXISTING RIGHT OF WAY ON PARCEL 99, 99A, 100, 101, 102, 103, 104, 105 AND 106.

8/17/09

18-MAR-2009 09:03
R:\Roadway\R2519A_H01_PRELIM_PR_01.dgn



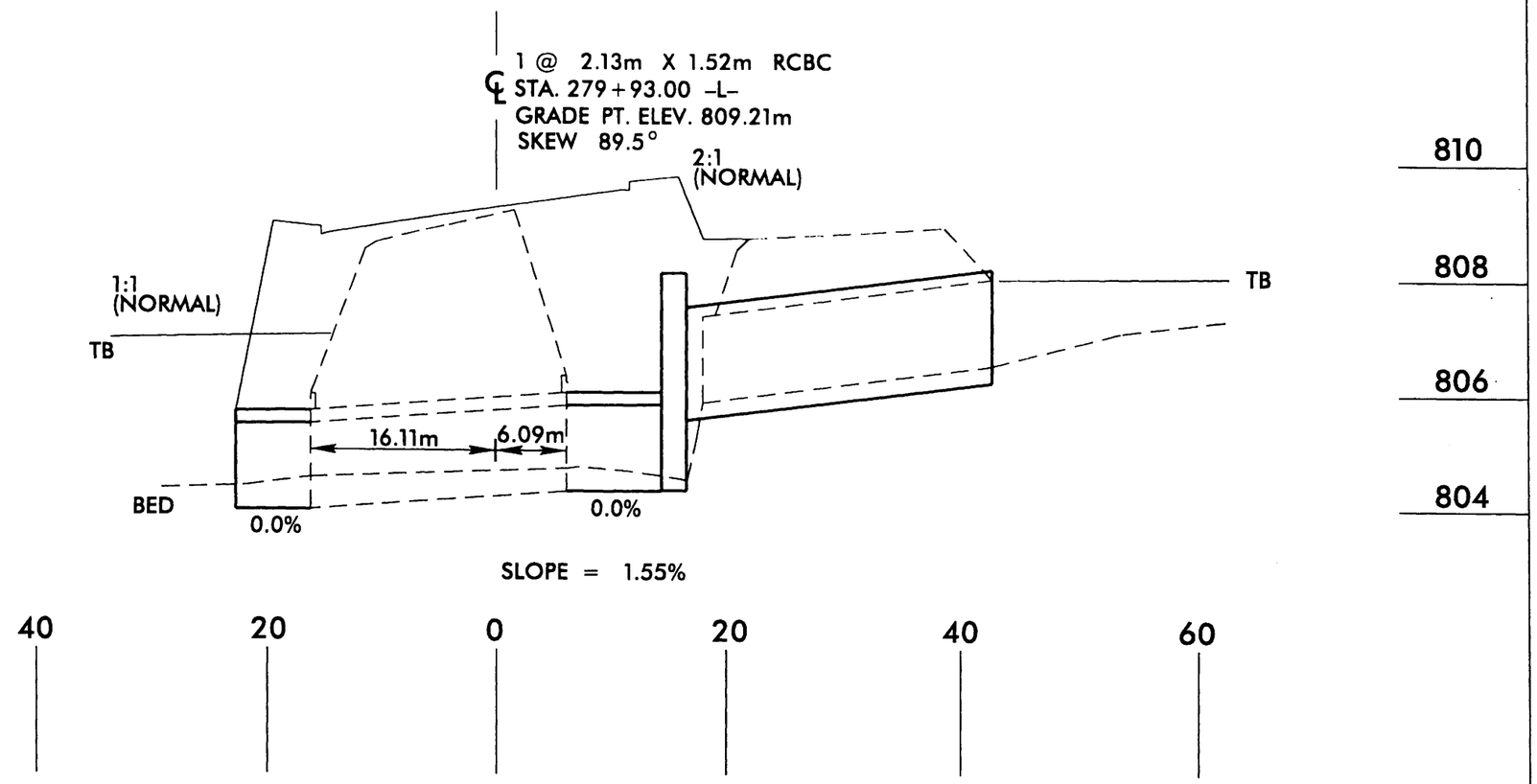
-Y17- STATION 11+28.90
2 @ 3.0m X 2.4M RCBC

SITE 12
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 39 of 86



-L- STATION 279+93
1 @ 2.13m X 1.52m RCBC

SITE 13
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 40 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

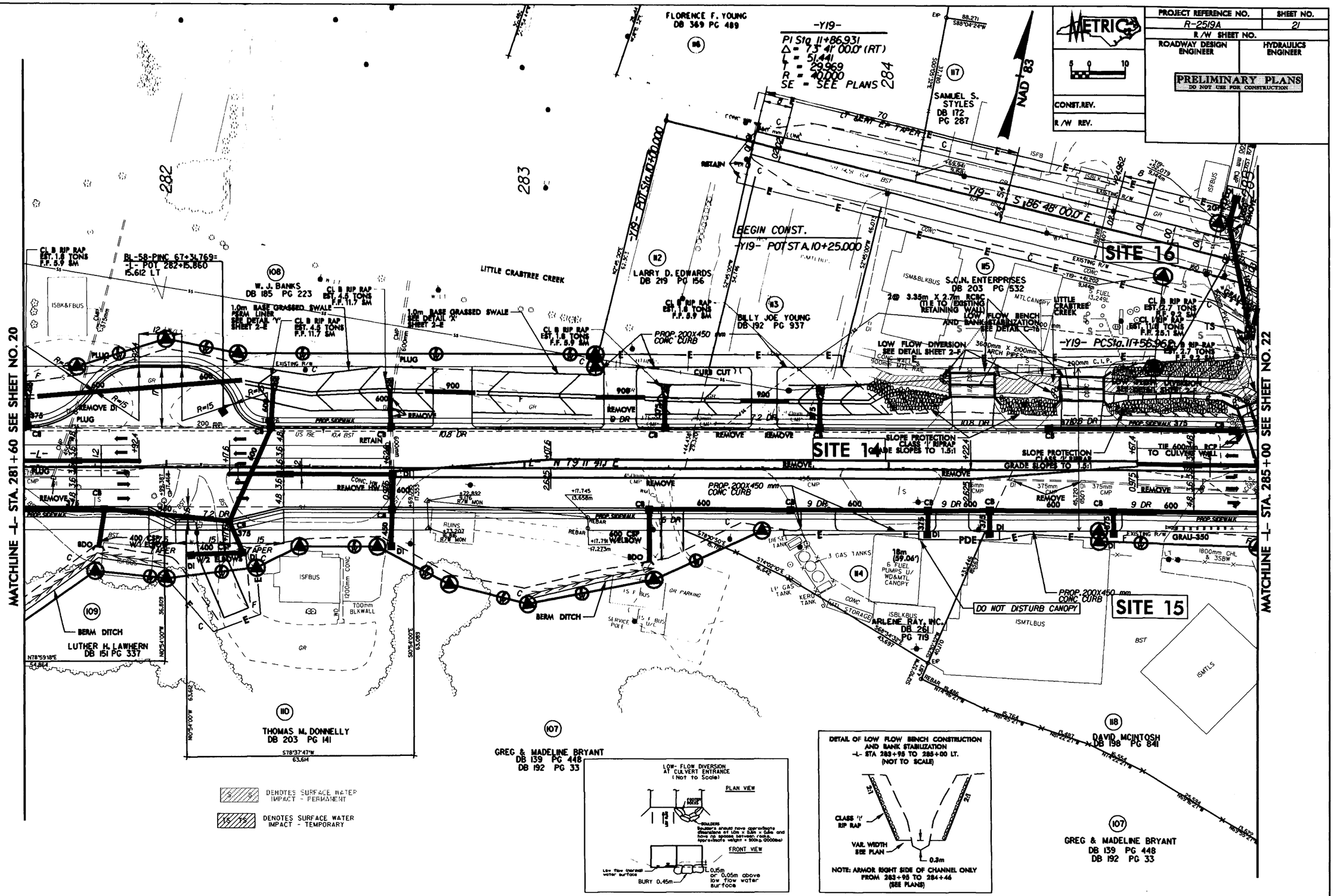
CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

R/W REV. 11/18/05 (TMW): ADDED PROPERTY OWNER NAME FOR PARCEL 117; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W TO PARCEL 117.
R/W REV. 02/27/06 (TMW): ADDED CONSTRUCTION EASEMENT ON PARCEL 114 AND PARCEL 115.
R/W REV. 03/08/06 (RVP): REMOVED PROPOSED R/W AND ADDED POE FOR PARCEL 114.
R/W REV. 01/09/07 (RVP): ADDED A 5m DRIVEWAY AT STA.282+80 ON PARCEL 108; REVISED PROPERTY OWNERS NAME AND DEED BOOK INFORMATION ON PARCEL 115.
R/W REV. 05/05/07 (TMW): REVISED PROPERTY OWNER NAME; ADDED A 6m DRIVEWAY AT STA.283+41.8. REVISED PROPOSED R/W ON PARCEL 107; ELIMINATED PARCEL 111 AND COMBINED INTO PARCEL 107; INCREASED DRIVEWAY AT STA.282+80 TO 10.0m ON PARCEL 108.



FOR -L- PROFILE SEE SHEET 52
FOR -Y19- PROFILE SEE SHEET 66

Permit Drawing
Sheet 41 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

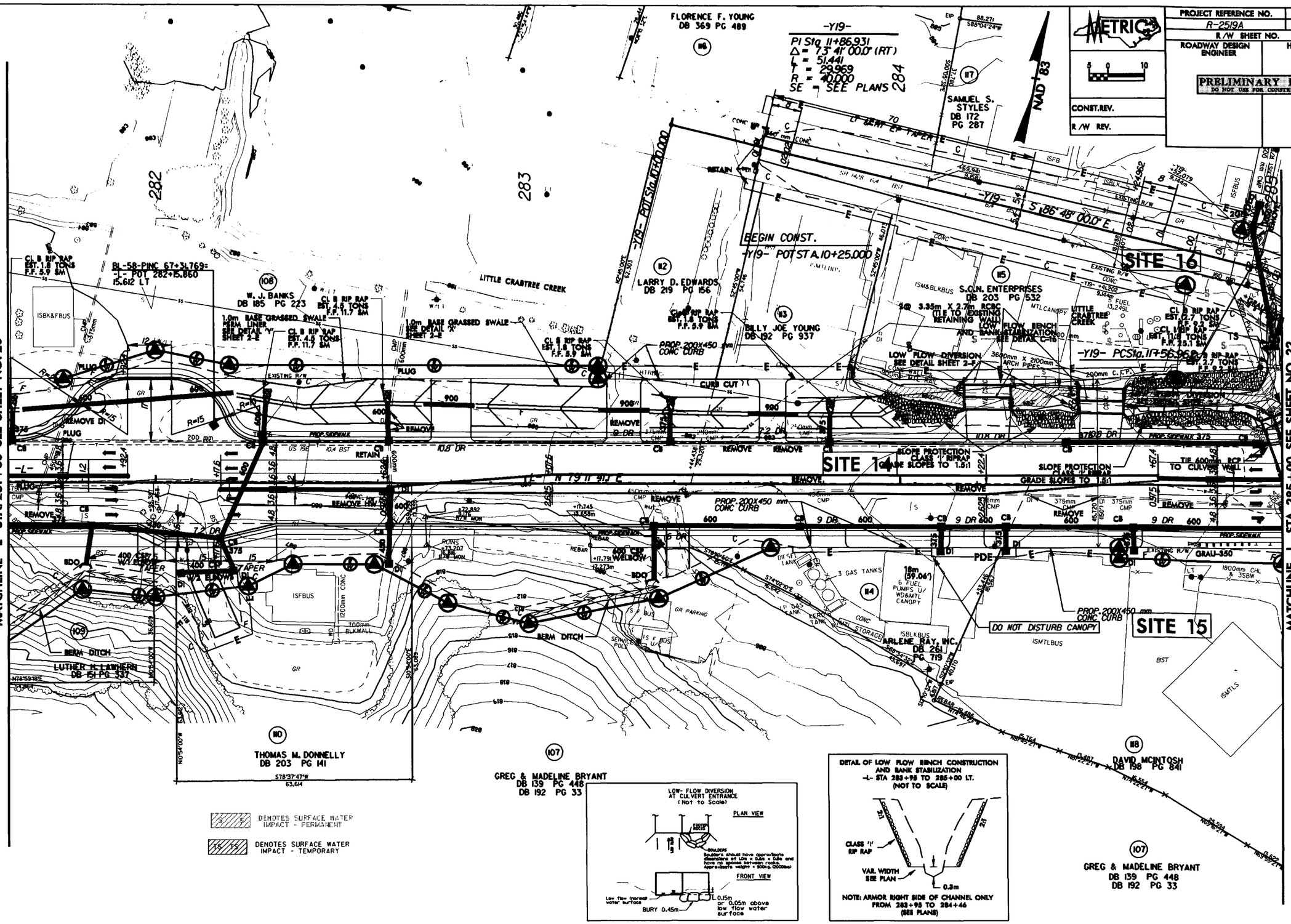
CONST. REV.
R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW): ADDED PROPERTY OWNER NAME FOR PARCEL 117 ; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W TO PARCEL 117.
R/W REV. 02/27/06 (TMW): ADDED CONSTRUCTION EASEMENT ON PARCEL 115. R/W REV. 04/19/06 (TMW): REVISED CONSTRUCTION EASEMENT ON PARCEL 114 AND PARCEL 116.
R/W REV. 05/08/06 (RVP): REMOVED PROPSED R/W AND ADDED PDE FOR PARCEL 117. R/W REV. 10/30/06 (KMW): ADDED NOTE ON PARCEL 114.
R/W REV. 01/09/07 (RVP): ADDED A 9m DRIVEWAY AT STA. 282+80 ON PARCEL 116. R/W REV. 02/27/07 (KMW): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 116.
R/W REV. 09/05/07 (TMW): REVISED PROPERTY OWNER NAME, ADDED A 6m DRIVEWAY AT STA. 283+41, & REVISED PROPOSED R/W ON PARCEL 107 ; ELIMINATED PARCEL 111 AND COMBINED INTO PARCEL 107 ; INCREASED DRIVEWAY AT STA. 282+80 TO 10.8m ON PARCEL 108.

8/17/99



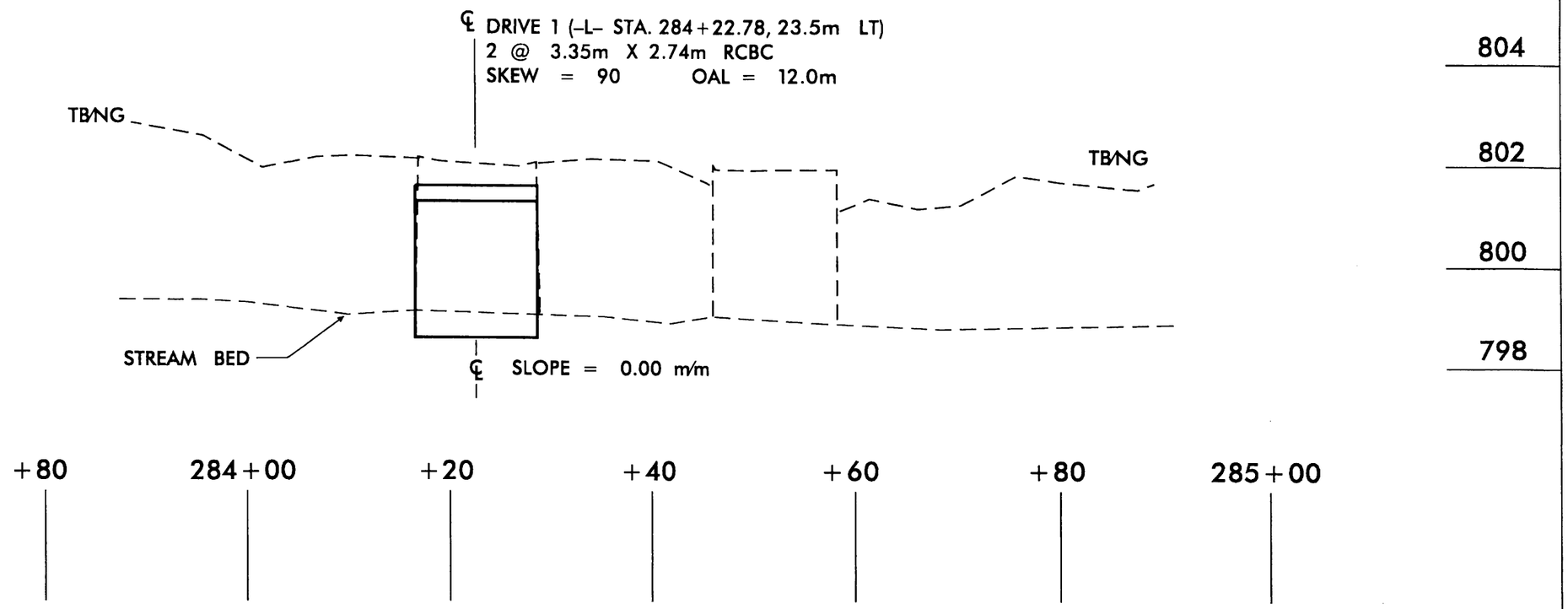
LOW-FLOW DIVERSION AT CULVERT ENTRANCE (NOT to Scale)

DETAIL OF LOW FLOW BENCH CONSTRUCTION AND BANK STABILIZATION -L- STA 283+98 TO 285+00 LT. (NOT TO SCALE)

NOTE: ARMOR RIGHT SIDE OF CHANNEL ONLY FROM 283+95 TO 284+46 (SEE PLANS)

FOR -L- PROFILE SEE SHEET 52
FOR -Y19- PROFILE SEE SHEET 66

Permit Drawing
Sheet 112 of 86

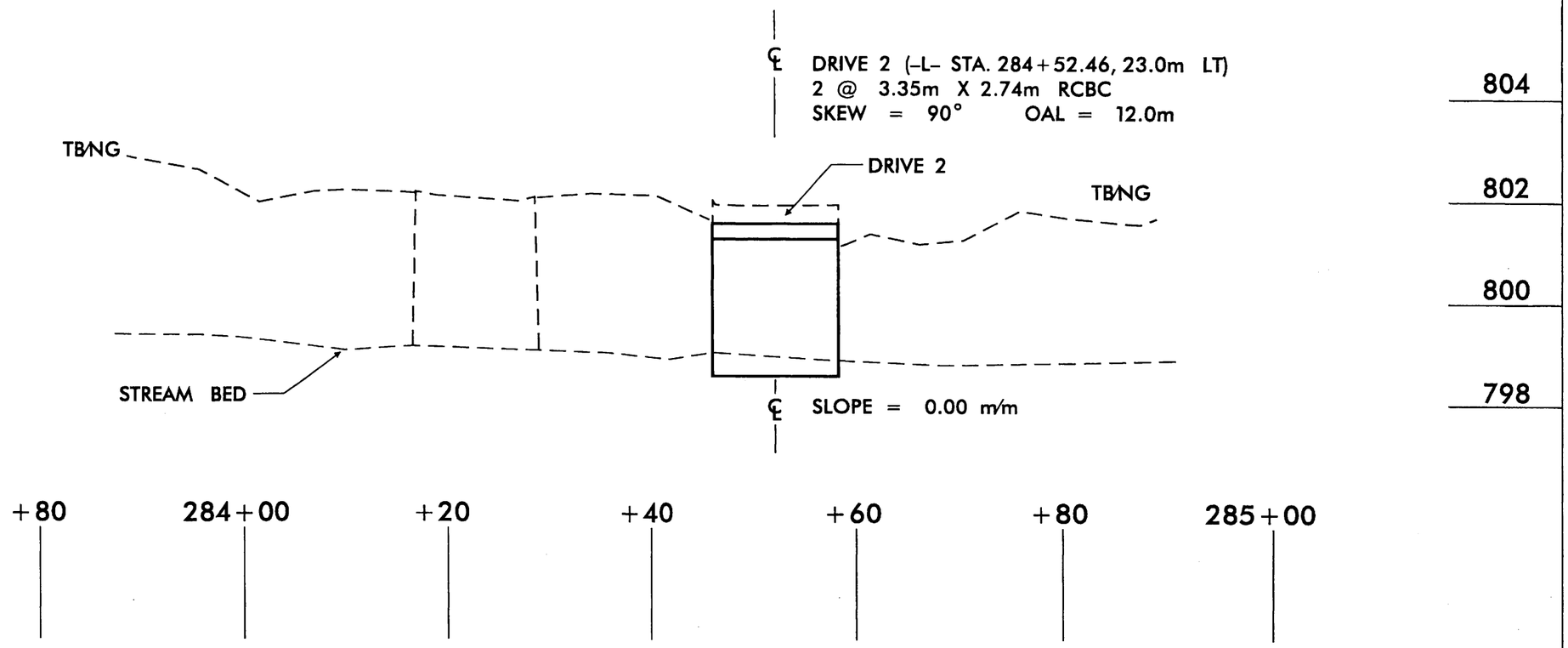


-L- STATION 284+22.78
2-2 @ 3.35m X 2.71m RCBC

SITE 14
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06



-L- STATION 284+52.46 (23m LT)
2 @ 3.35m X 2.74m RCBC

SITE 14
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

METRIC

NAD 83

REVISIONS

R/W REV. 11/18/05 (TLW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122; ADDED LEFTOVER @ STA 286+85 AND DRIVEWAY DI7 FOR PARCEL 123; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W AND CONSTRUCTION EASEMENT TO PARCEL 123.

R/W REV. 10/30/06 (KWW); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION AND ADDED A DRIVEWAY ON PARCEL 121; REMOVED CONSTRUCTION EASEMENT AND ADDED PDE ON PARCEL 123.

R/W REV. 01/09/07 (RVP); REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.

R/W REV. 05/16/07 (BCS); ADDED 6M DRIVE AT STA 288+15 ON PARCEL 107; ELIMINATED PARCEL III AND COMBINED INTO PARCEL 107.

R/W REV. 09/05/07 (TLW); REVISED PROPERTY OWNER NAME ON PARCEL 119.

R/W REV. 04/24/08 (RVP); ADDED 7.2m DRIVEWAY ON PARCEL 119.

8/17/09

-DI7-
PI Sta 10+16.341
Δ = 46° 20' 49.6" (RT)
L = 10.341
T = 5.351
R = 12.500

PI Sta 11+04.181
Δ = 19° 05' 57.8" (LT)
L = 16.667
T = 8.412
R = 50.000

PI Sta 11+82.663
Δ = 101° 04' 51.7" (LT)
L = 23.361
T = 16.918
R = 12.500

-Y19-
PI Sta 11+86.931
Δ = 73° 41' 00.0" (RT)
L = 51.441
T = 29.969
R = 40.000
SE = SEE PLANS

-Y19- POC Sta. 11+88.660
-DI7- POT Sta. 10+00.000
BEARING AH =
N 48° 35' 51.2" E

-DI7- PC Sta. 10+10.990

-Y19- PT Sta. 12+08.402
BEARING AH =
S 13° 07' 00.0" E

-DI7- PT Sta. 10+21.102

-DI7- PC Sta. 11+65.745

-L- PC Sta. 285+86.237

-DI7- PC Sta. 10+95.770

-DI7- PT Sta. 11+12.437

END CONST.
-DI7- POT Sta. 11+99.737

-DI7- PT Sta. 11+89.107
BEARING AH = N 31° 14' 08.6" W

-L- POC Sta. 287+35.854
-Y20- POT Sta. 10+00.000

-L- PT Sta. 287+87.653

-L- POT Sta. 285+23.067
-Y18- POT Sta. 10+00.000
-Y19- POT Sta. 12+30.788

END CONST.
-Y18- POT Sta. 10+50.000
BEARING BACK =
S 13° 07' 00.0" E

-Y18- POT Sta. 10+54.069

BL-59-PINC 70+54.285=
-L- POT 285+34.648 5.947 RT

BL-62-PINC 73+45.599=
-L- POT 288+28.361
10.496 RT

-L-
PI Sta 286+87.870
Δ = 18° 55' 06.6" (LT)
L = 201.416
T = 101.633
R = 610.000
SE = 03

END CONST.
-Y20- POT Sta. 10+72.980

-Y20- POT Sta. 10+75.992

MATCHLINE -L- STA. 285+00 SEE SHEET NO. 21

MATCHLINE -L- STA. 288+40 SEE SHEET NO. 23

SITE 15

SITE 17

(118) DAVID MCINTOSH DB 198 PG 841

(119) SAMUEL S. STYLES DB 112 PG 287

(120) ELOISE B. BRIGGS DB 147 PG 253

(121) DB 519 PG 296 GARY ATKINS

(122) YANCEY COUNTY

(123) GLEN RAVEN FILAMENT FABRICS, LLC DB 349 PG 71

(107) GREG & MADELINE BRYANT DB 139 PG 448 DB 192 PG 33

(107) GREG & MADELINE BRYANT DB 139 PG 448 DB 192 PG 33

BURNSVILLE CITY LIMITS

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

FOR -L- PROFILE SEE SHEET 53
FOR -Y18- & -Y19- PROFILE SEE SHEET 66
FOR -Y20- PROFILE SEE SHEET 67
FOR -DI7- PROFILE SEE SHEET 76

Permit Drawing
Sheet 45 of 56

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122; ADDED LEFTOVER @ STA 286+85 AND DRIVEWAY D17 FOR PARCEL 123; REVISED EXIST. R/W TO NURESERL OFFSET AND CONSTRUCTION EASEMENT TO PARCEL 123.

R/W REV. 10/30/06 (KWW): REVISED PROPERTY OWNER NAME DEED BOOK INFORMATION AND ADDED A DRIVEWAY ON PARCEL 121; REMOVED CONSTRUCTION EASEMENT AND ADDED PDE ON PARCEL 123.

R/W REV. 01/08/07 (RVP): REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.

R/W REV. 05/16/07 (BCS): ADDED GM DRIVE AT STA 288+15 ON PARCEL 123.

R/W REV. 09/05/07 (TMW): REVISED PROPERTY OWNER NAME ON PARCEL 107 ; ELIMINATED PARCEL 111 AND COMBINED INTO PARCEL 107.

R/W REV. 04/24/08 (RVP): ADDED 7.2m DRIVEWAY ON PARCEL 119.

-D17-
PI Sta 10+16.341
Δ = 46° 20' 49.6" (RT)
L = 10.411
T = 5.351
R = 12.500

PI Sta 11+04.181
Δ = 19° 05' 57.8" (LT)
L = 16.667
T = 8.412
R = 50.000

PI Sta 11+82.663
Δ = 107° 04' 51.7" (LT)
L = 23.361
T = 16.918
R = 12.500

-Y19-
PI Sta 11+86.931
Δ = 73° 41' 00.0" (RT)
L = 51.441
T = 29.969
R = 40.000
SE = SEE PLANS

-Y19- POC Sta. 11+88.660
-D17- POT Sta. 10+00.000
BEARING AH =
N 48° 35' 51.2" E

-D17- PC Sta. 10+10.990

-D17- PT Sta. 10+21.102

-Y19- PT Sta. 12+08.402
BEARING AH =
S 13° 07' 00.0" E

-D17- PC Sta. 11+65.745

-L- PC Sta. 285+86.237

-D17- PC Sta. 10+95.770

-D17- PT Sta. 11+12.437

END CONST.
-D17- POT Sta. 11+99.737

-D17- PT Sta. 11+89.107
BEARING AH = N 31° 14' 08.6" W

-L- POC Sta. 287+35.854
-Y20- POT Sta. 10+00.000

-L- PT Sta. 287+87.653

-L- POT Sta. 285+23.067
-Y18- POT Sta. 10+00.000
-Y19- POT Sta. 12+30.788

END CONST.
-Y18- POT Sta. 10+50.000
BEARING BACK =
S 13° 07' 00.0" E

BL-59-PINC 70+51.285=
-L- POT 285+34.648 5.947 RT

-Y18- POT Sta. 10+54.969

PI Sta 286+87.870
Δ = 18° 55' 06.6" (LT)
L = 201.416
T = 101.633
R = 610.000
SE = 03

END CONST.
-Y20- POT Sta. 10+72.980

-Y20- POT Sta. 10+75.992

BL-62-PINC 73+45.599=
-L- POT 288+28.361
10.496 RT

Q_{10} = 0.67 cfs
V_{10} = 0.57 ft/s

SITE 15

SITE 17

DETAIL C-15
LOW FLOW BENCH
AT CULVERT OUTLET
-Y18- 10+35 TO 10+41 RT.
(NOT TO SCALE)

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

MATCHLINE -L- STA. 285+00 SEE SHEET NO. 21

MATCHLINE -L- STA. 288+40 SEE SHEET NO. 23

(118) DAVID MCINTOSH DB 198 PG 841

(119) SAMUEL S. STYLES DB 172 PG 287

(120) ELOISE B. BRIGGS DB 147 PG 253

(121) DB 519 PG 296 GARY ATKINS

(122) YANCEY COUNTY

(123) GLEN RAVEN FILAMENT FABRICS, LLC DB 349 PG 71

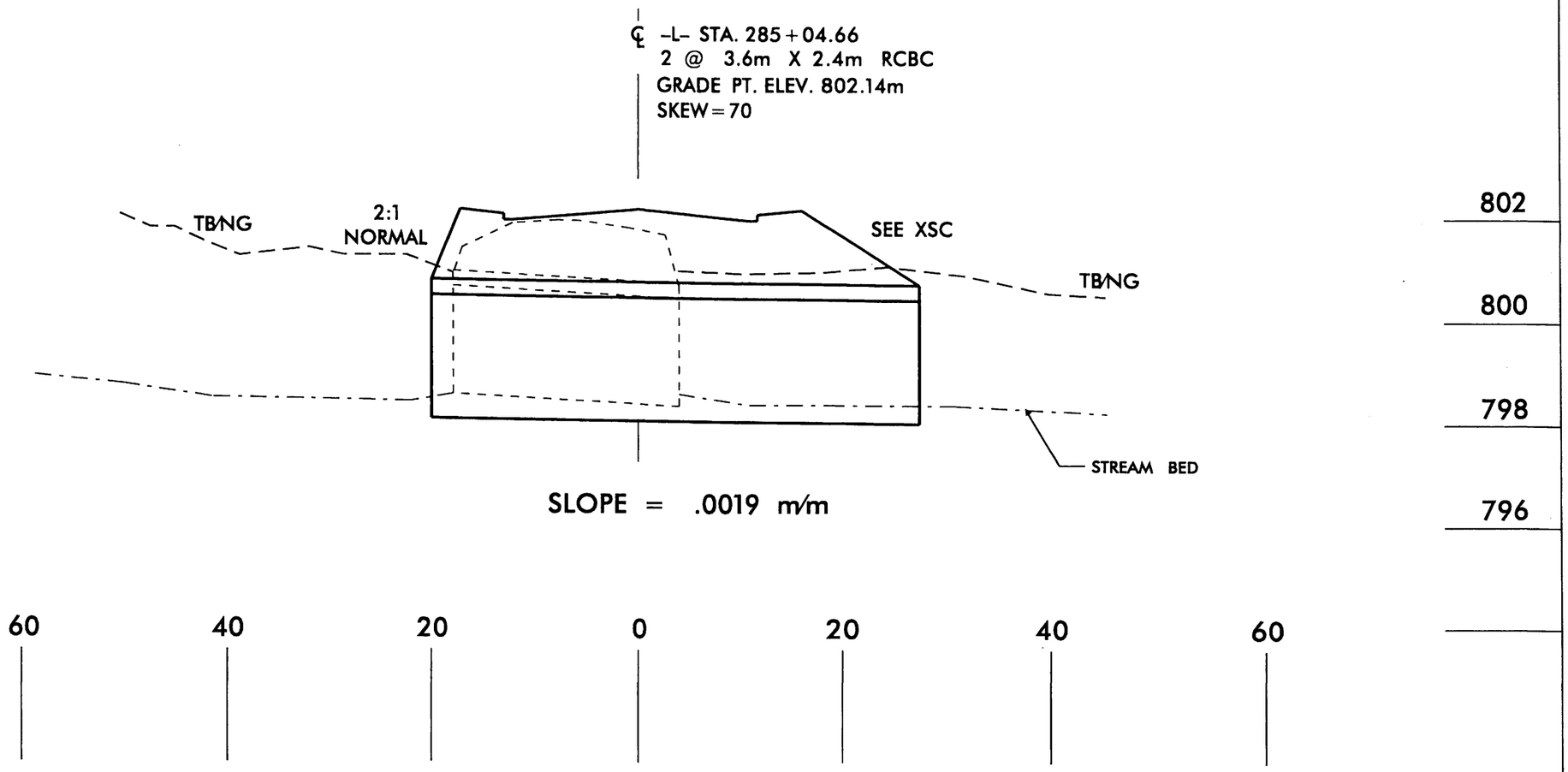
(107) GREG & MADELINE BRYANT DB 139 PG 448 DB 192 PG 33

(107) GREG & MADELINE BRYANT DB 139 PG 448 DB 192 PG 33

BURNSVILLE CITY LIMITS

FOR -L- PROFILE SEE SHEET 53
FOR -Y18- & -Y19- PROFILE SEE SHEET 66
FOR -Y20- PROFILE SEE SHEET 67
FOR -D17- PROFILE SEE SHEET 76

Permit Drawing



-L- STATION 285+04.66
2 @ 3.6m X 2.4m RCBC

SITE 15
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

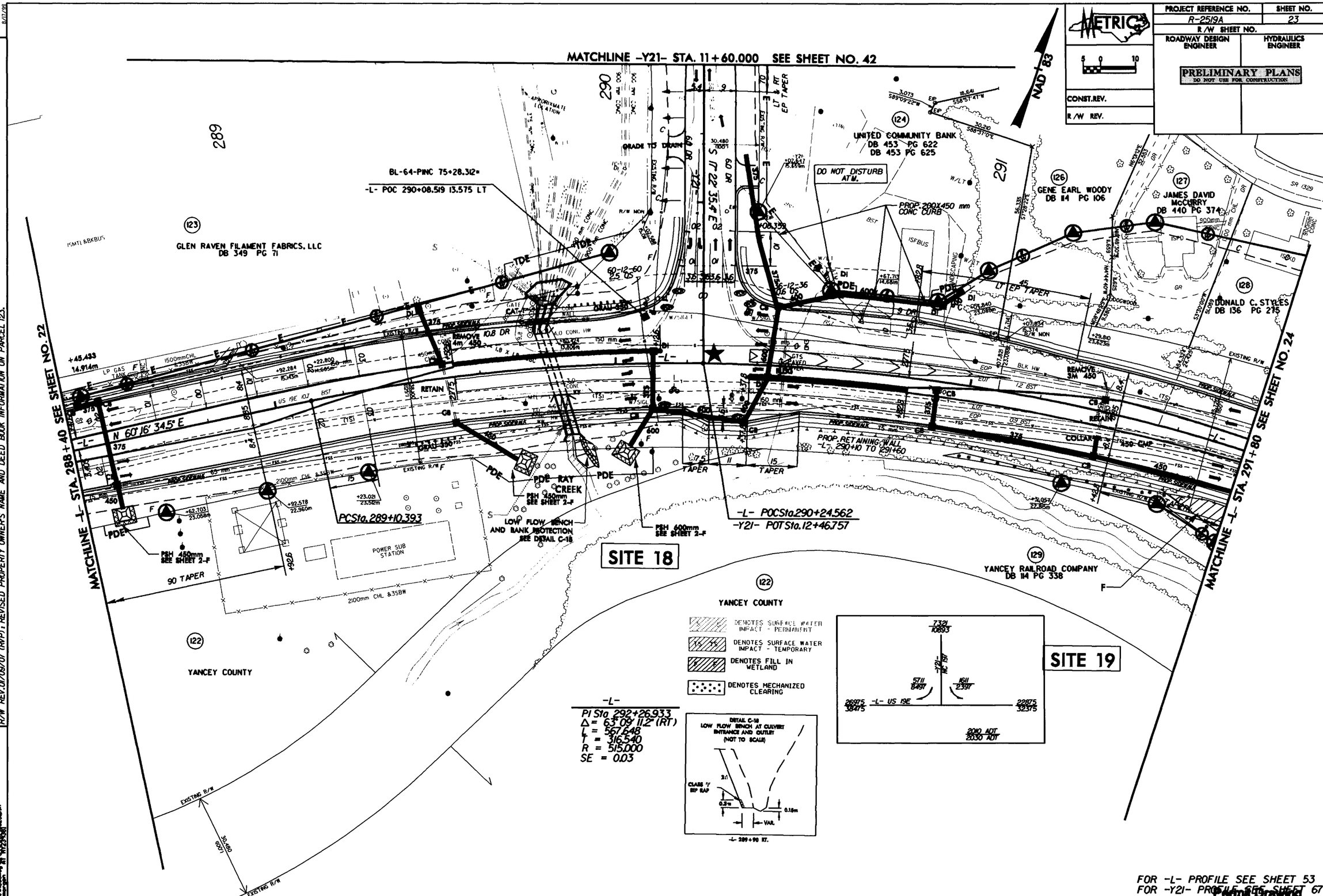
Permit Drawing
Sheet 47 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



FOR -L- PROFILE SEE SHEET 53
FOR -Y21- PROFILE SEE SHEET 67

Permit Drawing
Sheet 41 of 86

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 122 ,124 & 127 ; REMOVED PARCEL NUMBER 125 ; REVISED EXIST.R/W TO NWE REV. 01/31/06 (TMW): ADDED CHANNELIZATION ON PARCEL 124,REVISED R/W & CONSTRUCTION EASEMENT & ADDED PDE.
R/W REV. 02/27/06 (TMW): REVISED PDE ON PARCEL 124
R/W REV. 04/19/06 (TMW): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
R/W REV. 09/09/07 (RVP): REVISED PROPERTY OWNER'S NAME

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

MATCHLINE -Y21- STA. 11+60.000 SEE SHEET NO. 42

MATCHLINE -L- STA. 288+40 SEE SHEET NO. 22

MATCHLINE -L- STA. 291+80 SEE SHEET NO. 24

BL-64-PINC 75+28.312*
-L- POC 290+08.519 13.575 LT

GLEN RAVEN FILAMENT FABRICS, LLC
DB 349 PG 71

UNITED COMMUNITY BANK
DB 453 PG 622
DB 453 PG 625

GENE EARL WOODY
DB 84 PG 106

JAMES DAVID MCCURRY
DB 440 PG 374

DONALD C. STYLES
DB 136 PG 276

YANCEY RAILROAD COMPANY
DB 114 PG 338

YANCEY COUNTY

DO NOT DISTURB ATM.

PROP. 260X450 mm CONC CURB

PROP. RETAINING WALL
-L- 290+10 TO 291+60

-L- POCSta.290+24.562
-Y21- POTSta.12+46.757

PCSta.289+10.393

RAY CREEK

LOW FLOW BENCH AND BANK PROTECTION SEE DETAIL C-18

POWER SUB STATION

90 TAPER

SITE 18

SITE 19

-L-
PI Sta 292+26.933
Δ = 63° 09' 11.2" (RT)
L = 567.648
T = 316.540
R = 515.000
SE = 0.03

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DETAIL C-18
LOW FLOW BENCH AT CULVERT ENTRANCE AND OUTLET
(NOT TO SCALE)

CLASS "I" RIP RAP

-L- 289+90 RT.

2020 ADT
2030 ADT

-L- US 19E

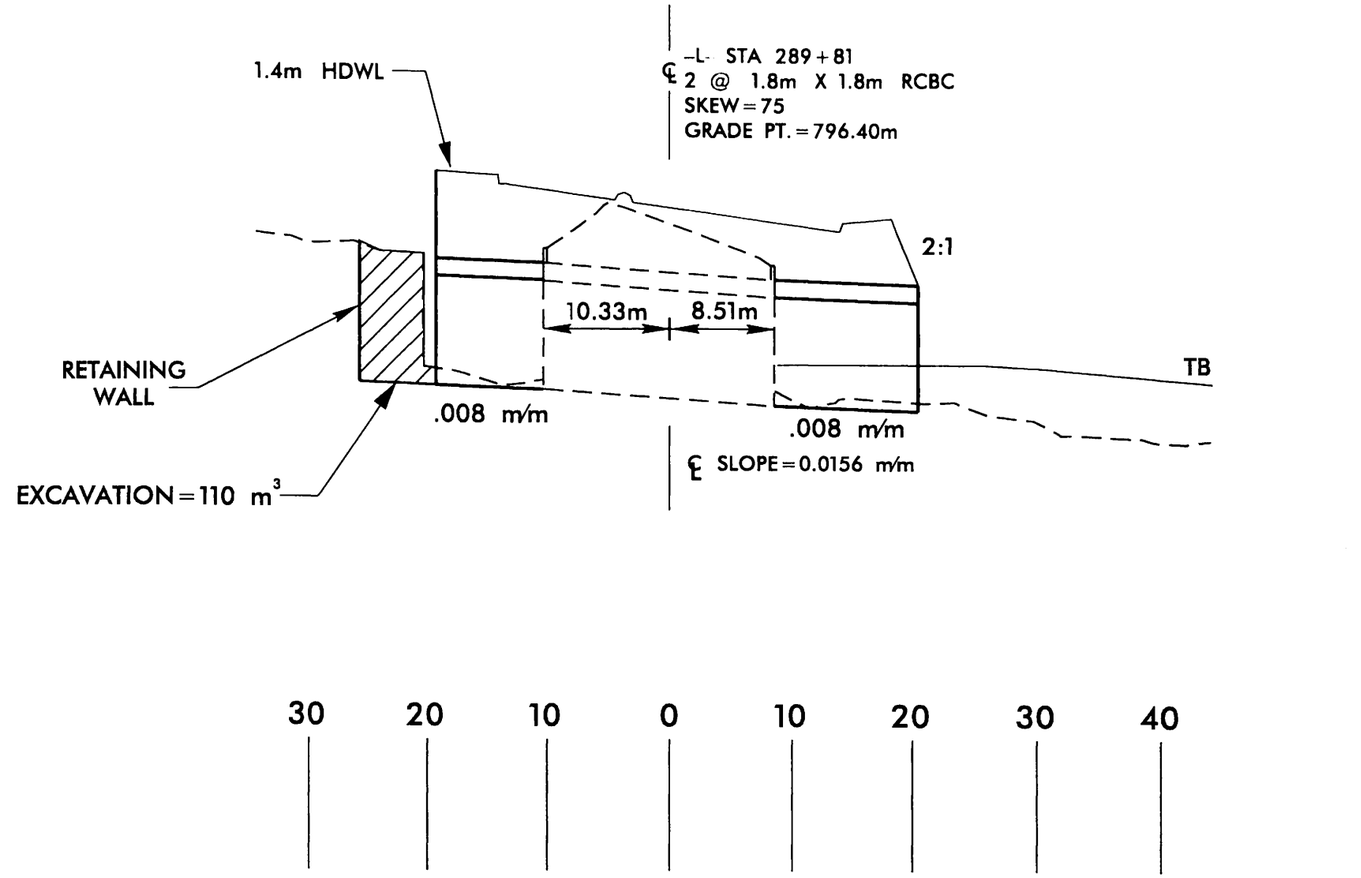
FOR -L- PROFILE SEE SHEET 53
FOR -Y21- PROFILE SEE SHEET 67

Permit Drawing
Sheet 40 of 47

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 122, 124 & 127; REMOVED PARCEL NUMBER 125; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/27/06 (TMW): ADDED CHANNELIZATION ON PARCEL 124, REVISED R/W & CONSTRUCTION EASEMENT & ADDED PDE.
R/W REV. 04/19/06 (TMW): REVISED PDE ON PARCEL 124, REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.
R/W REV. 01/09/07 (RVP): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.

8/17/99



-L- STATION 289+81
2 @ 1.8m X 1.8m RCBC

SITE 18
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 50 of 86

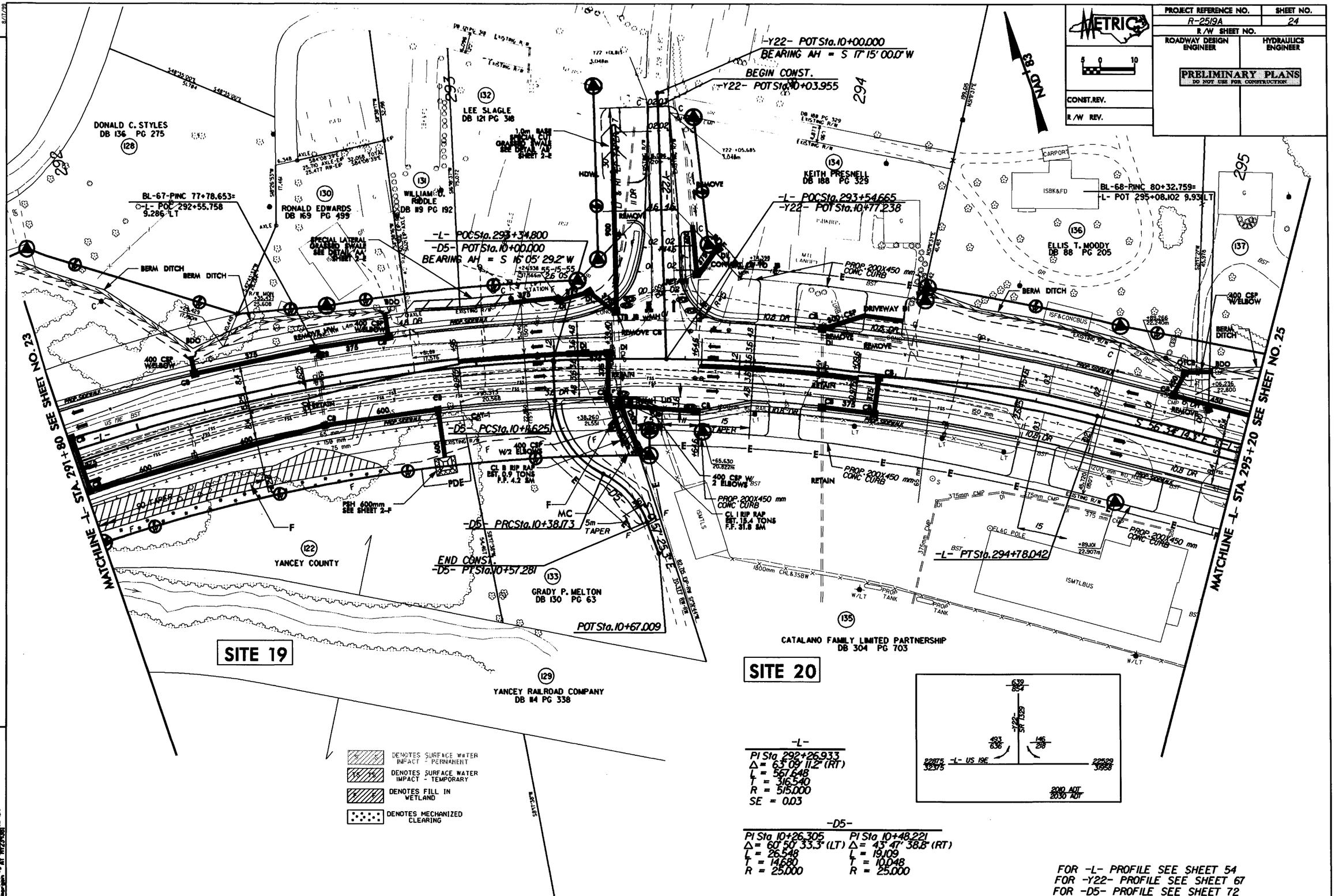
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



FOR -L- PROFILE SEE SHEET 54
FOR -Y22- PROFILE SEE SHEET 67
FOR -D5- PROFILE SEE SHEET 72

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.

Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST. REV.

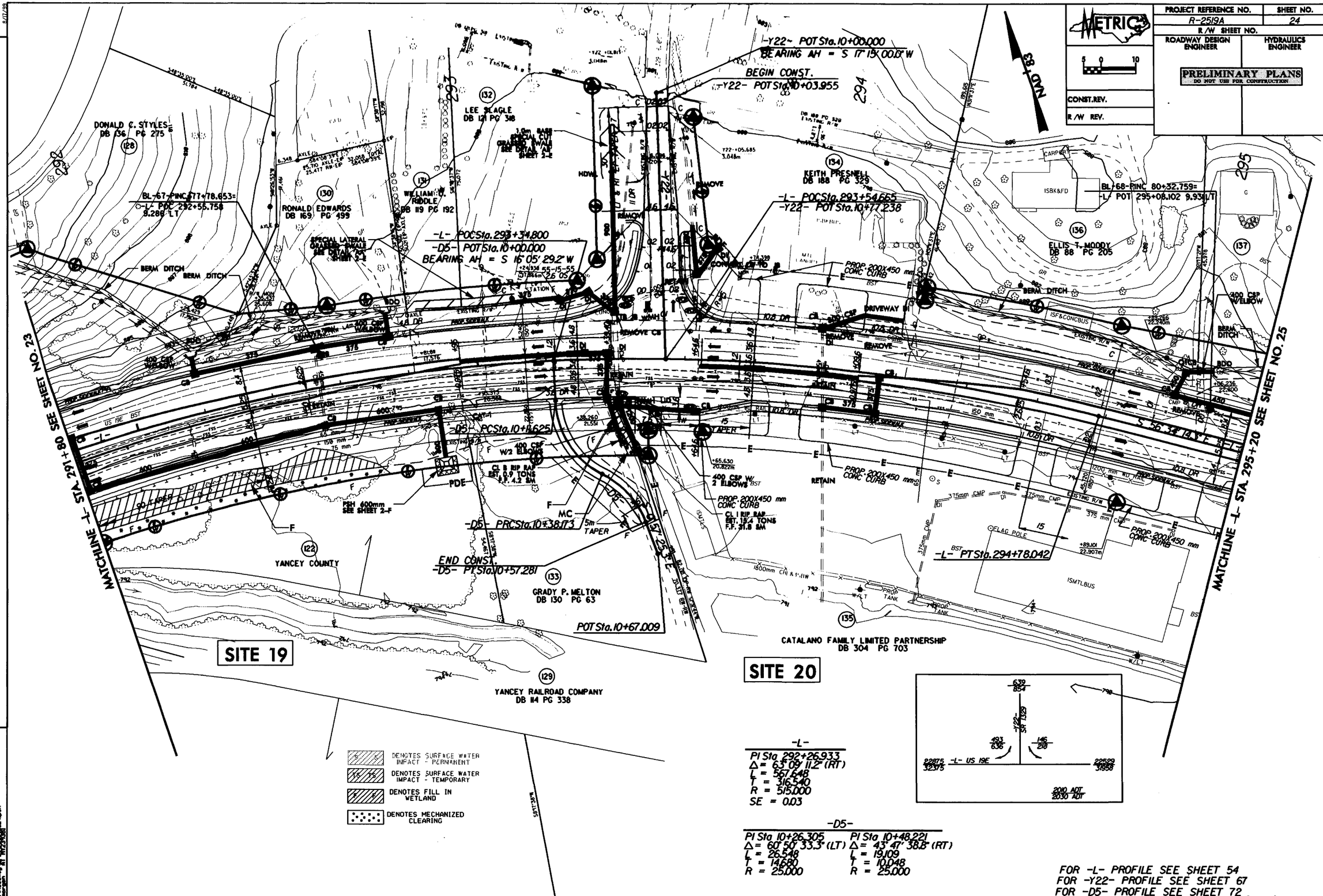
R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

R/W REV. 11/18/05 (TMM); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.

8/17/99



FOR -L- PROFILE SEE SHEET 54
FOR -Y22- PROFILE SEE SHEET 67
FOR -D5- PROFILE SEE SHEET 72

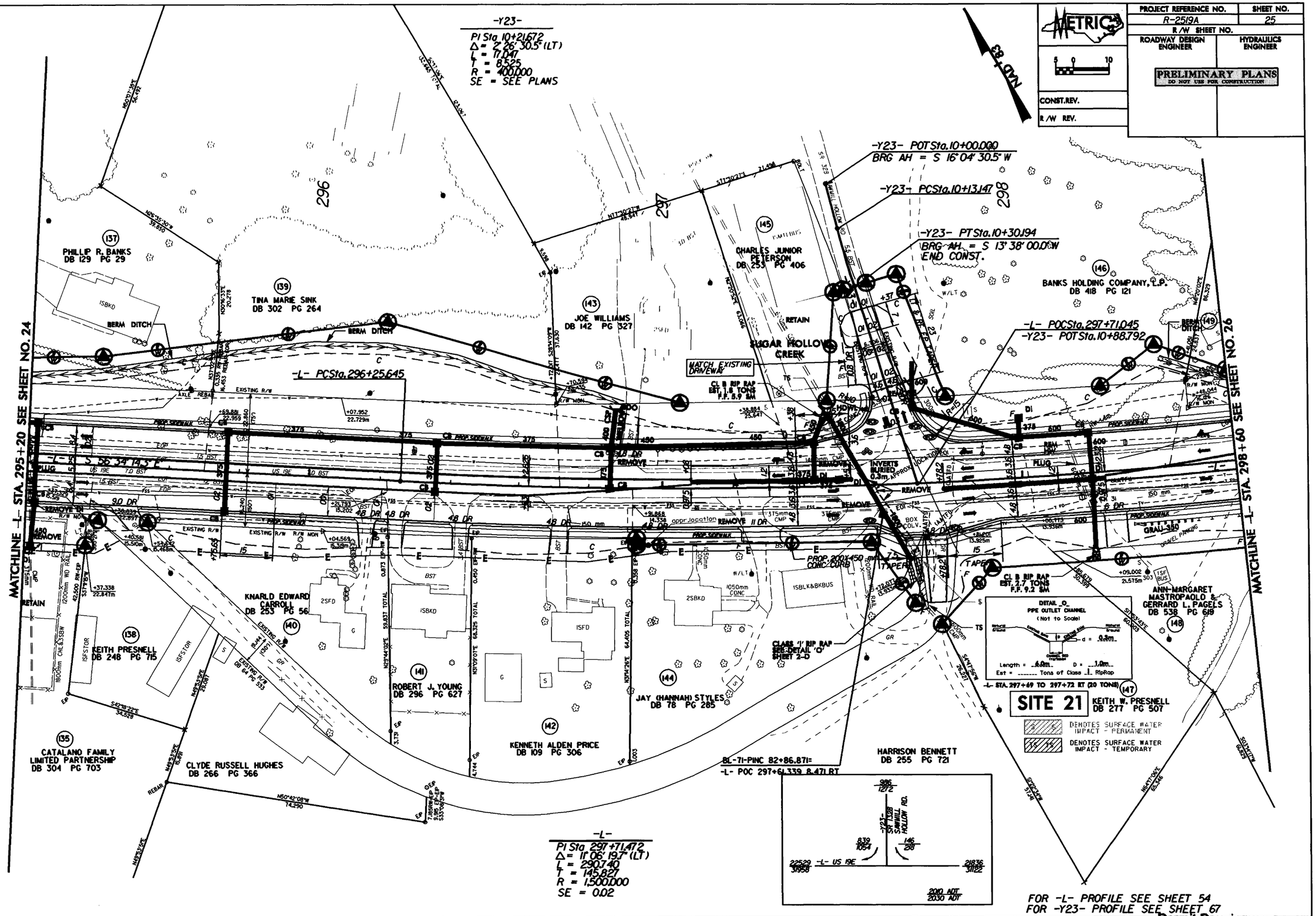
Permit Drawing
Sheet 52 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 8/10/06 (TMW); REVISED CONST. EASEMENT, REMOVED PROP. R/W & MOVED DRIVEWAY FROM STA 295+60 TO STA 295+45 ON PARCEL 140, INCREASED SIZE OF 6M DRIVEWAY TO 10.2M ON PARCEL 145.
R/W REV. 03/30/07 (RVP); REVISED A DRIVEWAY TO MATCH EXISTING PAVEMENT ON PARCEL 145.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 146.
R/W REV. 08/05/07 (TMW); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION, & ADDED A 6M DRIVEWAY ON PARCEL 148 ; ADDED NOTE ON PARCEL 145.
R/W REV. 10/25/07 (RVP); ADDED 4.8m DRIVEWAY AT STA.296+97 ON PARCEL 144.

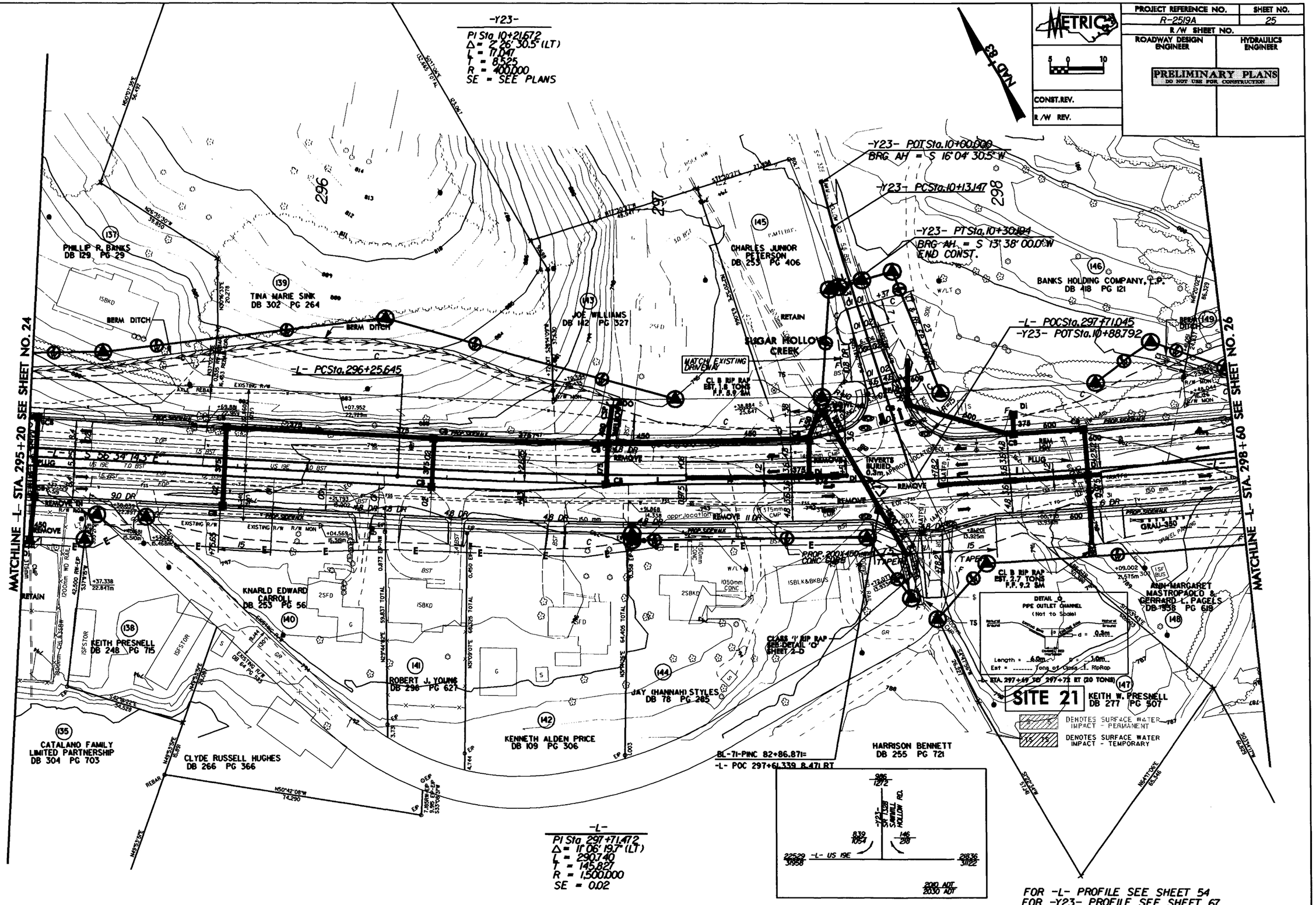
Permit Drawing
Sheet 53 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

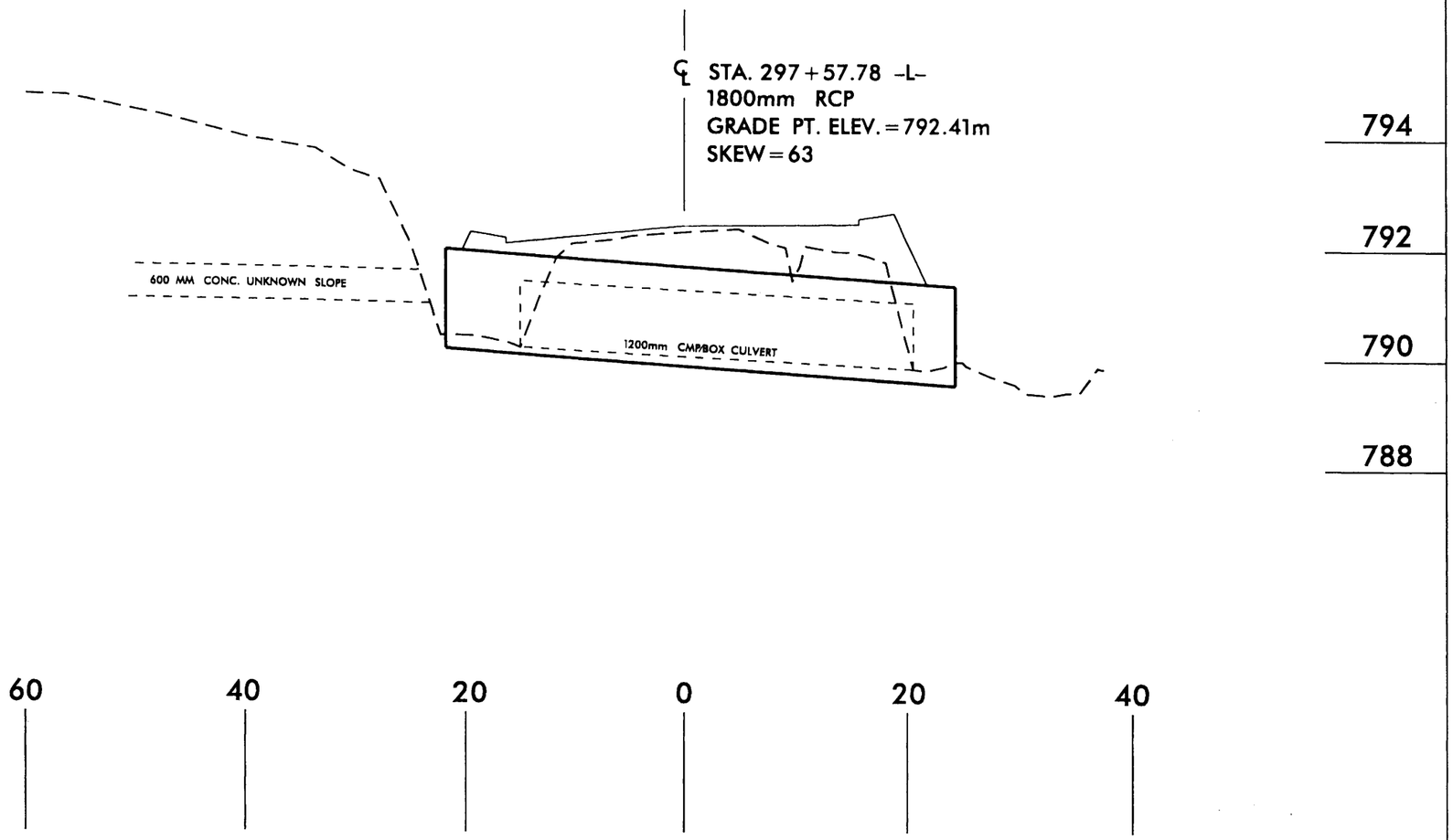
R/W REV.



REVISIONS

R/W REV. 11/18/05 (TJW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/10/06 (TJW): REVISED CONST. EASEMENT, REMOVED PROP. R/W & MOVED DRIVEWAY FROM STA 295+60 TO STA 295+45 ON PARCEL NO. 144.
DRIVEWAY TO ROAM ON PARCEL NO. 145. R/W REV. 01/09/07 (RVP): MOVED DRIVEWAY FROM -Y23- STA 10+45 TO -Y23- STA 10+50 ON PARCEL 145.
R/W REV. 03/30/07 (RVP): REVISED A DRIVEWAY TO MATCH EXISTING PAVEMENT ON PARCEL 145.
R/W REV. 06/16/07 (RVP): REVISED PROPERTY OWNER NAME, DEED, BOOK INFORMATION, & ADDED A 6M DRIVEWAY ON PARCEL 145.
R/W REV. 10/25/07 (RVP): ADDED 4.8m DRIVEWAY AT STA. 296+97 ON PARCEL 144.

Permit Drawing



-L- STATION 297+57.78
1800mm RCP

SITE 21
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

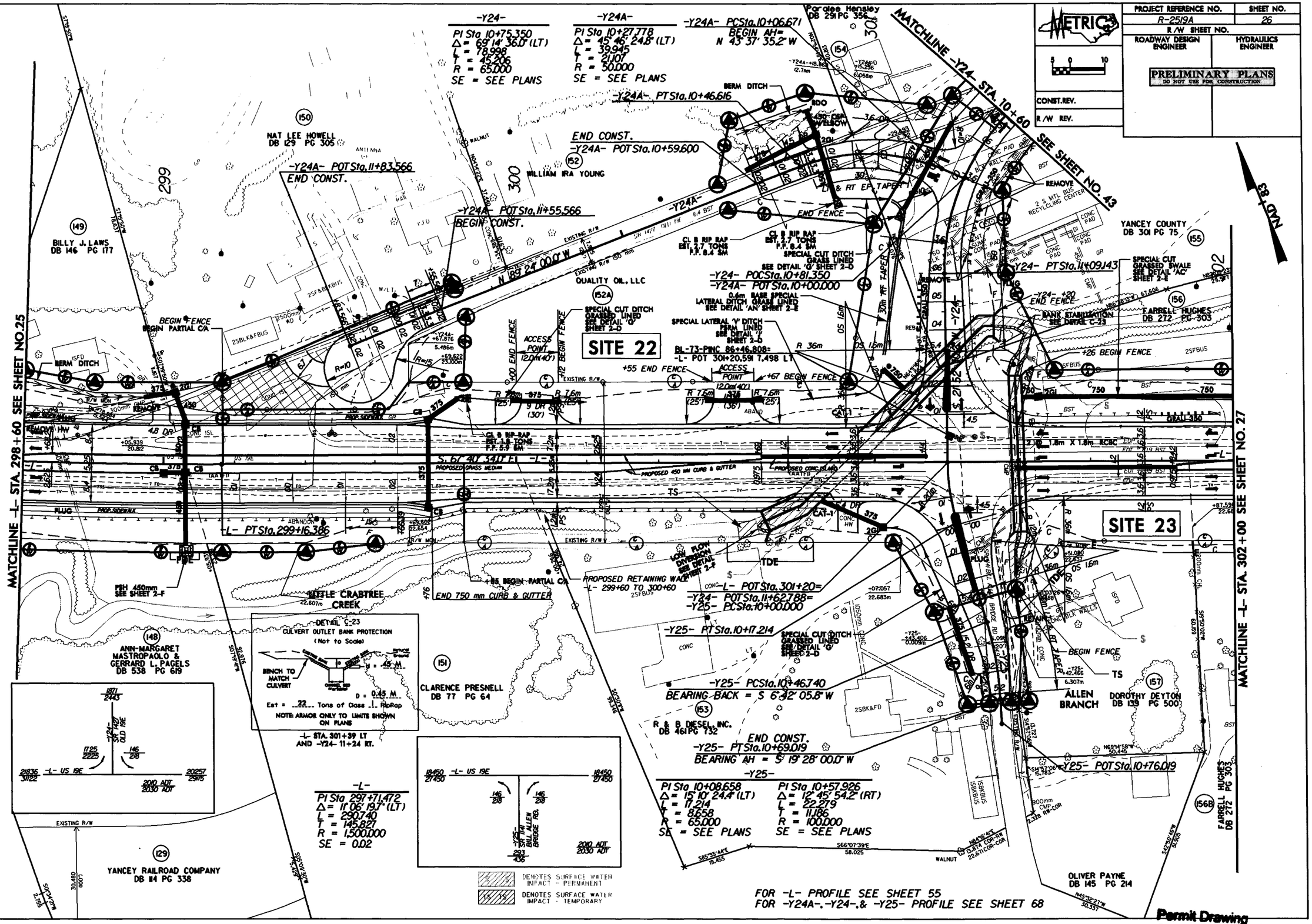
Permit Drawing
Sheet 55 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	
R/W REV.	

METRIC 5 0 10

REVISIONS

R/W REV. 11/18/05 (TMW): CHANGED PARCEL NUMBER ON 152 (TERRILL YOUNG) TO 152A ; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION & ADDED DRIVEWAY AT -Y24A- 10+46 FOR PARCEL 152 ; REVISED C/A LINE FROM STA.299+16.27' TO 299+85 ; CHANGED PARCEL NUMBER 156 (FARRELL HUGHES) TO 156B ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 12/15/05 (TMW): REVISED PROPERTY OWNER NAME & ADDED DRIVEWAYS AND ACCESS POINTS AT STA.300+06 AND 300+61 FOR PARCEL 152A.
R/W REV. 03/30/07 (RVP): REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA. 10+60 ON PARCEL 153.
R/W REV. 05/16/07 (BCS): REMOVED THE 4.5M DRIVEWAY ON PARCEL 150.
R/W REV. 08/05/07 (TMW): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 148.
R/W REV. 04/24/08 (RVP): ADDED 5.4m DRIVEWAY AT -L- STA. 300+95 ON PARCEL 153.
R/W REV. 09/12/08 (RVP): REVISED C/A AND FENCE LINE ON PARCEL 150.



Permit Drawing
Sheet 56 of 76

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

METRIC 5 0 10

REVISIONS

R/W REV. 11/18/05 (TMW): CHANGED PARCEL NUMBER ON 152 (TERRILL YOUNG) TO 152A; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION & ADDED DRIVEWAY AT -Y24A- 10+46 FOR PARCEL 152; REVISED C/A LINE FROM STA.299+16.27 TO 299+85; CHANGED PARCEL NUMBER 156 (FARRELL HUGHES) TO 156B; REVISED EXIST. R/W TO NUMERICAL OFFSET.

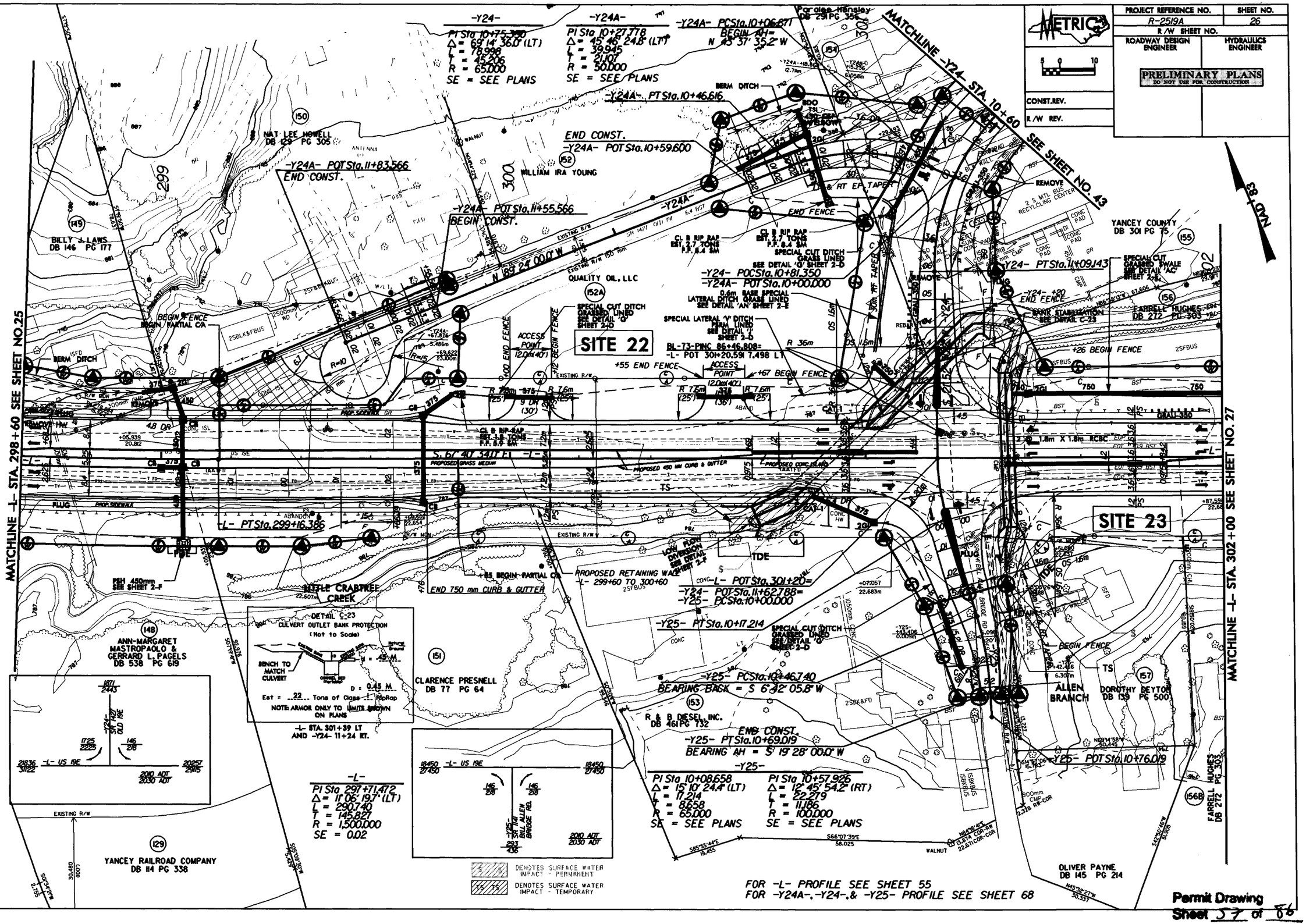
R/W REV. 12/15/05 (TMW): REVISED PROPERTY OWNER NAME & ADDED DRIVEWAYS AND ACCESS POINTS AT STA.300+06 AND 300+61 FOR PARCEL 152A.

R/W REV. 05/16/07 (BCS): REMOVED THE 4.5M DRIVEWAY ON PARCEL 150.

R/W REV. 09/05/07 (TMW): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA. 10+60 ON PARCEL 152.

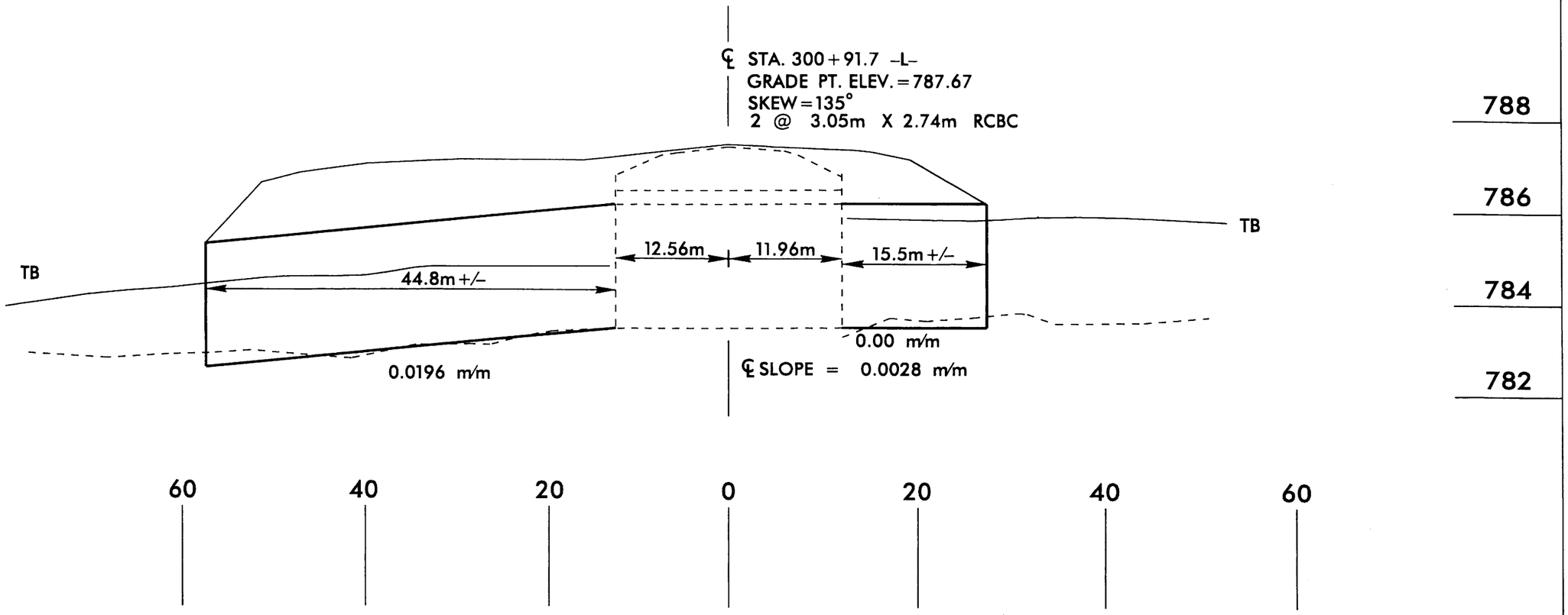
R/W REV. 04/24/08 (RVP): ADDED 5.4m DRIVEWAY AT -L- STA. 300+95 ON PARCEL 153.

R/W REV. 08/12/08 (RVP): REVISED C/A AND FENCE LINE ON PARCEL 150.



FOR -L- PROFILE SEE SHEET 55
FOR -Y24A-, -Y24-, & -Y25- PROFILE SEE SHEET 68

Permit Drawing
Sheet 57 of 86



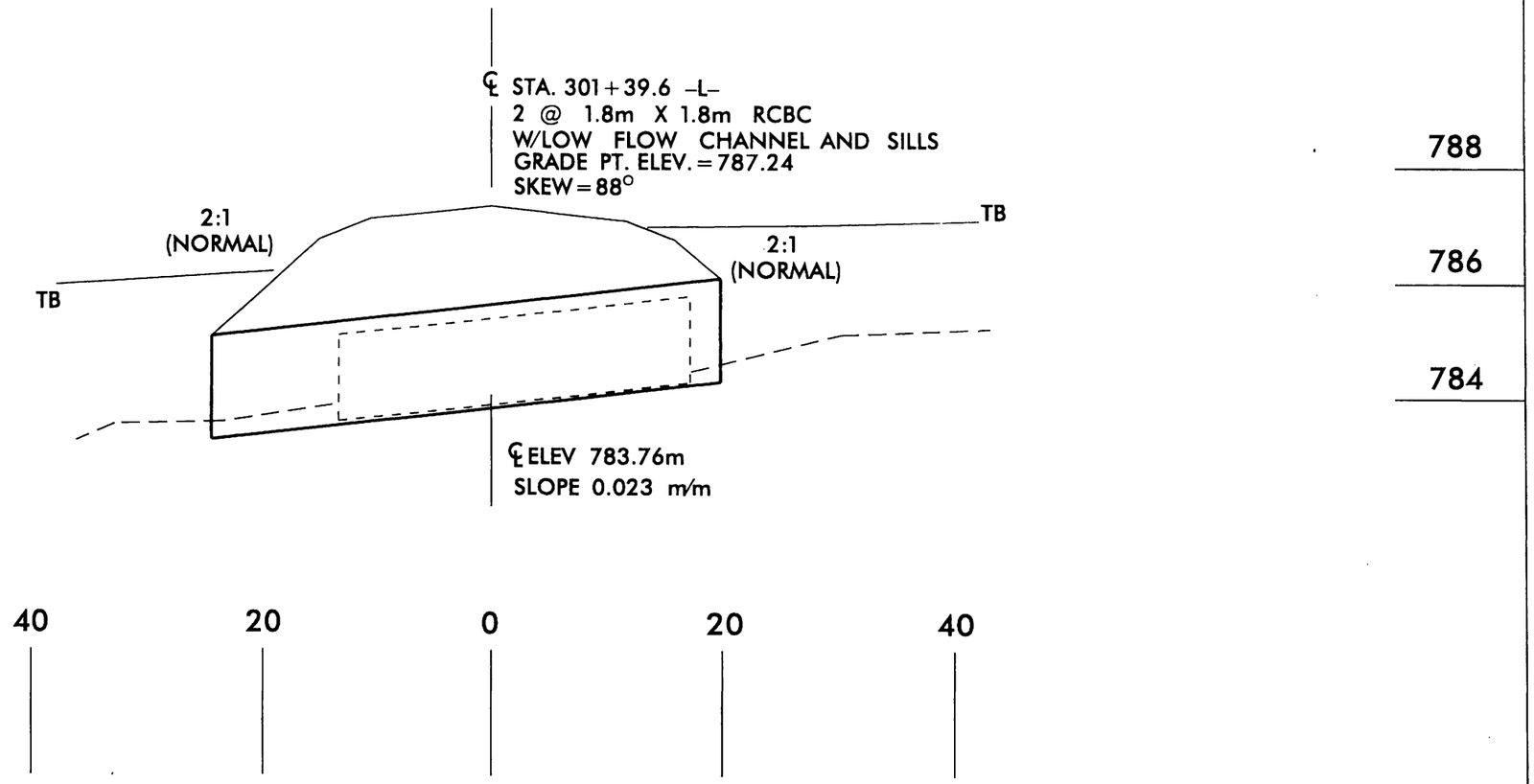
-L- STATION 300+91.7
2 @ 3.05m X 2.74m RCBC

SITE 22
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 58 of 86



–L– STATION 301+39.6
2 @ 1.8m X 1.8m RCBC

SITE 23
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50MPH)

SEE INSET A MATCH LINE A

FOR -L- PROFILE SEE SHEET 56
FOR -Y26- PROFILE SEE SHEET 69
FOR -D20- PROFILE SEE SHEET 77

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

REVISIONS
R/W REV. 11/18/05 (TJW): ADDED DRIVEWAY -D20- AND REVISED ADDED PDE TO PARCEL 171.
R/W REV. 2/27/06 (TJW): ADDED PDE TO PARCELS 165, 237, AND
R/W REV. 10/30/06 (KNW): CHANGED PARCEL NO. 237 TO PARCEL
R/W REV. 05/16/07 (BCS): MOVED ACCESS POINT FROM STA. 308+

-Y26-
PI Sta 10+99.760 △ = 9° 45' 32.9" (RT) L = 119.230 T = 59.760 R = 700.000 SE = SEE PLANS
PI Sta 12+14.021 △ = 11° 47' 39.1" (LT) L = 108.699 T = 54.790 R = 350.000 SE = SEE PLANS

-Y26- PINC Sta. 9+97.763
-Y26- POT Sta. 10+26.848 BEGIN CONST.
-Y26- PCSta. 10+40.000
-L- POT Sta. 306+89.841
-Y26- POC Sta. 11+28.136
-Y26- PRCSta. 11+59.250
-Y26- POT Sta. 9+40.000
-Y26- .S 1°54' 14.2" E.
END CONST. -Y26- POCSta. 12+63.347
-Y26- PT Sta. 12+67.929
-Y26- +80 BEGIN FENCE
BL-78-PINC 92+38.018 = -L- POT 307+11.038 9.112 LT
-L- TSSta. 307+63.144
-D20- PTSta. 10+33.238
-D20- PCSta. 10+14.074
-D20- POTSta. 10+69.707
-L- SCSta. 308+53.144
-L- POCSta. 308+10.000
-D20- POT Sta. 10+00.000
BEARING AH = N 25° 25' 10.6" E

Pls Sta 308+23.184 Θs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036
PI Sta 310+51.778 △ = 52° 48' 59.8" (LT) L = 368.730 T = 198.634 R = 400.000 SE = 0.06 ××V = 96 kph
Pls Sta 312+51.910 Θs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036

MATCHLINE -L- STA. 305+40 SEE SHEET NO. 27
MATCHLINE -L- STA. 308+80 SEE SHEET NO. 29

YANCEY RAILROAD COMPANY DB 84 PG 338
ZENUS ELKINS DB 172 PG 205
SITE 24
JOHN SHEPHERD DB 169 PG 639
CLYDE BLALOCK DB 159 PG 629
RODNEY D. SHEPHERD DB 296 PG 714
WILLIAM CLAUDE DAVIS, Jr. DB 309 PG 259
WILLIAM HAROLD PRESNELL DB 164 PG 251
THULA JEAN HUGHES DB 212 PG 507
EDDS INDEPENDENT STATION
SAMUEL J. JONES DB 201 PG 137
YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633
JOHNNY BENNETT DB 128 PG 489

DO NOT DISTURB CANOPY.
DENOTES SURFACE WATER IMPACT - PERMANENT

INSET A
ZENUS ELKINS DB 172 PG 205
1.2m BASE DITCH CLASS 'A' LINED SEE DETAIL 'AL' SHEET 2-E
PDE
-Y26- .S 1°54' 14.2" E.
-Y26- POT Sta. 9+40.000
MATCH LINE A

WILLIAM HAROLD PRESNELL
SEE INSET FOR ADDITIONAL SITE 24 IMPACTS

NAD 83

Permit Drawing
Sheet 6 of 6

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

METRIC 5 0 10

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50MPH)

FOR -L- PROFILE SEE SHEET 56
FOR -Y26- PROFILE SEE SHEET 69
FOR -D20- PROFILE SEE SHEET 77

SEE INSET A MATCH LINE A

SITE 24

-Y26-
PI Sta. 10+99.760
Δ = 9° 45' 32.9" (RT)
L = 119.230
T = 59.760
R = 700.000
SE = SEE PLANS

PI Sta. 12+14.021
Δ = 17° 41' 39.1" (LT)
L = 108.699
T = 54.790
R = 350.000
SE = SEE PLANS

-Y26- PINC Sta. 9+97.763

-Y26- POT Sta. 10+26.848
BEGIN CONST.

-Y26- PCS Sta. 10+40.000

-L- POT Sta. 306+89.841
-Y26- POC Sta. 11+28.136

-Y26- PRC Sta. 11+58.250

-Y26- +80
BEGIN FENCE
BL-78-PINC 92+36.018
-L- POT 307+11.038 9.12 LT

-L- TS Sta. 307+63.144

-D20- PT Sta. 10+33.238

-D20- POT Sta. 10+69.707
-L- SC Sta. 308+53.144

-D20- PCS Sta. 10+74.074

-L- POC Sta. 308+10.000
-D20- POT Sta. 10+00.000
BEARING AH = N 25° 25' 10.6" E

PIs Sta. 308+25.184
Gs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

PI Sta. 310+51.778
Δ = 52° 46' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
xxV = 96 kph

PIs Sta. 312+51.910
Gs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

-L- POC Sta. 312+63.347
-Y26- POT Sta. 12+67.929

MATCHLINE -L- STA. 305+40 SEE SHEET NO. 27

MATCHLINE -L- STA. 308+80 SEE SHEET NO. 29

NAD '83

YANCEY RAILROAD COMPANY DB 84 PG 338

ZENUS ELKINS DB 172 PG 205

JOHN SHEPERD DB 169 PG 639

CLYDE BLALOCK DB 159 PG 529

GARY DRISP DB [illegible] PG 21

RODNEY D. SHEPHERD DB 296 PG 714

WILLIAM CLAUDE DAVIS, Jr. DB 309 PG 259

WILLIAM HAROLD PRESNELL DB 164 PG 251

THULA JEAN HUGHES DB 212 PG 507

EDDS INDEPENDENT STATION

SAMUEL J. JONES DB 201 PG 137

YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633

WILLIAM HAROLD PRESNELL DB 164 PG 251

JOHNNY BENNETT DB 128 PG 489

SEE INSET FOR ADDITIONAL SITE 24 IMPACTS

DO NOT DISTURB CANOPY.

REMOVE DB 15 PG 165

REMOVE 200mm PVC (16m)

END CONST.

ACCESS POINT 18.0m

ACCESS POINT 21.0m

BEGIN FENCE

END FENCE

BERM DITCH

1.5m SPECIAL CUT BASE DITCH CLASS 'A' RIP RAP SEE DETAIL 'AO' SHEET 2-E

CL B RIP RAP EST. 1.8 TONS F.F. 5.9 SM

CL B RIP RAP EST. 2.7 TONS F.F. 8.4 SM

8.0m SPECIAL LATERAL MAIN DITCH CLASS 'A' RIP RAP SEE DETAIL 'AI' SHEET 2-E

450 CSP COLLAR

450 CSP W/ ELBOW

400 CSP W/ ELBOW

375 CSP

REMOVE INLET

REMOVE PIPE

REMOVE HW

RT EP TAPER

REMOVE FENCE

REMOVE 01

REMOVE 02

REMOVE 03

REMOVE 04

REMOVE 05

REMOVE 06

REMOVE 07

REMOVE 08

REMOVE 09

REMOVE 10

REMOVE 11

REMOVE 12

REMOVE 13

REMOVE 14

REMOVE 15

REMOVE 16

REMOVE 17

REMOVE 18

REMOVE 19

REMOVE 20

REMOVE

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

REVISIONS
R/W REV. 11/18/05 (MW): LEFTOVER ADDED FOR PARCEL 171 AT STA 309+60 AND ADDED CONSTRUCTION EASEMENT ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 177.
R/W REV. 10/25/07 (RVP): REVISED PROP R/W AND ADDED ACCESS POINT AT 309+88 FOR PARCEL 174.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100 kph (60mph) TO 80 kph (50 mph)

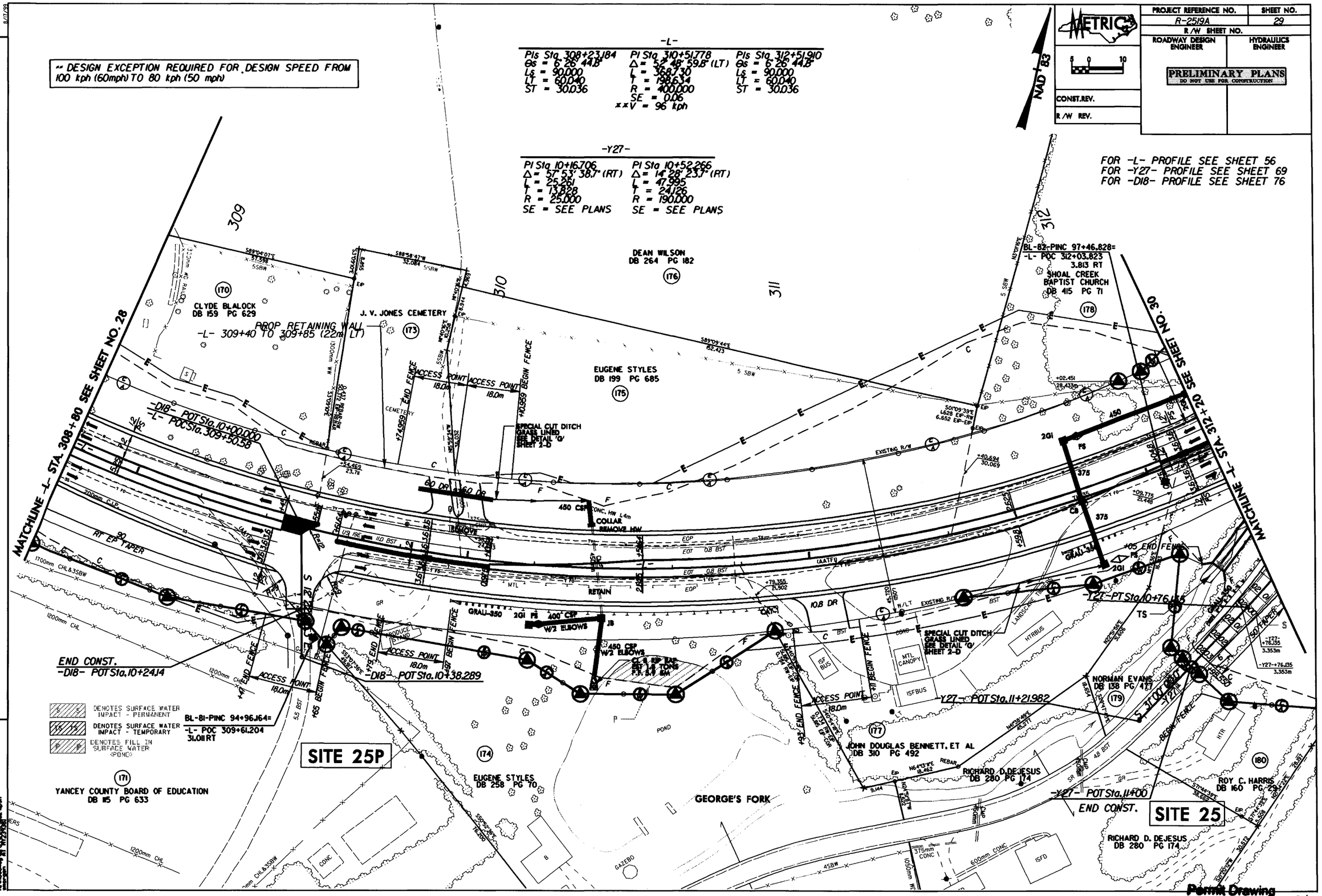
-L-

PIs Sta 308+23.184	PI Sta 310+51.778	PIs Sta 312+51.910
θs = 6°26'44.8"	Δ = 52°48'59.8" (LT)	θs = 6°26'44.8"
Ls = 90.000	L = 368.730	Ls = 90.000
LT = 60.040	T = 198.634	LT = 60.040
ST = 30.036	R = 400.000	ST = 30.036
	SE = 0.06	
	xxV = 96 kph	

-Y27-

PI Sta 10+16.706	PI Sta 10+52.266
Δ = 57°53'38.7" (RT)	Δ = 14°28'23.7" (RT)
L = 25.261	L = 47.995
T = 13.828	T = 24.126
R = 25.000	R = 190.000
SE = SEE PLANS	SE = SEE PLANS

FOR -L- PROFILE SEE SHEET 56
FOR -Y27- PROFILE SEE SHEET 69
FOR -D18- PROFILE SEE SHEET 76



Permit Drawing
Sheet 62 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST. REV.	
R/W REV.	

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC 5 0 10

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100 kph (60mph) TO 80 kph (50 mph)

-L-

PIs Sta. 308+23.184	PI Sta. 310+51.778	PIs Sta. 312+51.910
θs = 6°26'44.8"	Δ = 32°45'39.8" (LT)	θs = 6°26'44.8"
Ls = 90.000	L = 358.730	Ls = 90.000
LT = 60.040	T = 183.634	LT = 60.040
ST = 30.036	R = 400.000	ST = 30.036
	SE = 0.06	
	**V = 96 kph	

-Y27-

PI Sta. 10+16.706	PI Sta. 10+52.966
Δ = 57°53'38.7" (RT)	Δ = 14°28'23.7" (RT)
L = 25.261	L = 47.995
T = 13.828	T = 24.126
R = 25.000	R = 190.000
SE = SEE PLANS	SE = SEE PLANS

FOR -L- PROFILE SEE SHEET 56
FOR -Y27- PROFILE SEE SHEET 69
FOR -DI8- PROFILE SEE SHEET 76

MATCHLINE -L- STA. 308+80 SEE SHEET NO. 28

MATCHLINE -L- STA. 312+20 SEE SHEET NO. 30

CLYDE BLALOCK DB 159 PG 629 (170)

J. V. JONES CEMETERY (173)

PROP. RETAINING WALL -L- 309+40 TO 309+85 (22m LT)

DEAN WILSON DB 264 PG 182 (176)

EUGENE STYLES DB 199 PG 685 (175)

BL-82-PINC 97+46.828=
-L- POC 312+03.823
3.815 RT

SHOAL CREEK BAPTIST CHURCH DB 415 PG 71 (178)

-DI8- POT Sta. 10+00.000
-L- POC Sta. 309+50.58

END CONST.
-DI8- POT Sta. 10+24.14

-DI8- POT Sta. 10+38.289

BL-81-PINC 94+96.164=
-L- POC 309+61.204
31.0m RT

DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY
DENOTES FILL IN SURFACE WATER (POND)

SITE 25P

YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633 (171)

EUGENE STYLES DB 258 PG 70 (174)

JOHN DOUGLAS BENNETT, ET AL DB 310 PG 492 (177)

RICHARD D. DE JESUS DB 280 PG 174

GEORGE'S FORK

-Y27- POT Sta. 11+21.982

-Y27- POT Sta. 11+00

END CONST.

SITE 25

NORMAN EVANS DB 138 PG 417 (179)

ROY C. MARRS DB 160 PG 23 (180)

RICHARD D. DE JESUS DB 280 PG 174

SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D

COLLAR REMOVE HW

REVISIONS

R/W REV. 11/18/05 (TWW): LEFTOVER ADDED FOR PARCEL 171 IN STA 309+60 AND ADDED CONSTRUCTION EASEMENT; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 173. R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 177. R/W REV. 10/25/07 (RVP): REVISED PROP R/W AND ADDED ACCESS POINT AT 309+88 FOR PARCEL 174.

8/17/09

Permit Drawing
Sheet 63 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

NAD 83/95

-Y27-

PI Sta 10+16.706
Δ = 57° 53' 38.7" (RT)
L = 25.261
T = 13.828
R = 25.000
SE = SEE PLANS

PI Sta 10+52.266
Δ = 14° 28' 23.7" (RT)
L = 47.895
T = 24.126
R = 190.000
SE = SEE PLANS

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

FOR -L- PROFILE SEE SHEET 57
FOR -Y27- & -Y28- PROFILE SEE SHEET 69
FOR -D8-, -D9-, & -D10- PROFILE SEE SHEET 73
FOR -D16- PROFILE SEE SHEET 75

-L-

PIs Sta 308+23.184
Δs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

PI Sta 310+51.778
Δ = 52° 48' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
xxV = 96 kph

PIs Sta 312+51.910
Δs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

PIs Sta 314+01.908
Δs = 4° 26' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017

PI Sta 316+01.330
Δ = 32° 43' 50.7" (LT)
L = 329.617
T = 169.442
R = 577.000
SE = 0.06

PIs Sta 317+91.523
Δs = 4° 28' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017

-Y28-

PI Sta 10+12.569
Δ = 43° 00' 00.0" (RT)
L = 18.782
T = 9.848
R = 25.000
SE = SEE PLANS

PI Sta 10+69.835
Δ = 23° 26' 00.0" (LT)
L = 53.169
T = 26.961
R = 130.000
SE = SEE PLANS

PI Sta 11+36.930
Δ = 5° 42' 00.0" (LT)
L = 59.690
T = 29.870
R = 600.000

SITE 26

-D8-

PI Sta 10+26.115
Δ = 46° 33' 12.8" (RT)
L = 12.188
T = 6.453
R = 15.000

PI Sta 10+45.515
Δ = 49° 30' 17.7" (LT)
L = 12.960
T = 6.916
R = 15.000

-D9-

PI Sta 10+36.059
Δ = 10° 35' 38.7" (LT)
L = 9.245
T = 4.636
R = 50.000

-D10-

PI Sta 10+27.157
Δ = 41° 37' 50.3" (LT)
L = 21.798
T = 11.405
R = 30.000

-L- POS Sta. 312+61.529
-Y27- POT Sta. 10+00.000

-L- CS Sta. 312+21.874

-Y27- PC Sta. 10+02.879
BEARING BACK = S 41° 22' 02.4" E

-L- POS Sta. 313+02.930
-D8- POT Sta. 10+00.000
BEARING AH = S 43° 17' 55.4" E

-L- ST Sta. 313+11.874

-L- POT Sta. 313+12.000
-D9- POT Sta. 10+00.000
BEARING AH = S 43° 23' 03.4" E

-L- TS Sta. 313+41.889

-D16- POT Sta. 10+00.000
-L- POS Sta. 314+30
BRG. AH = S 39° 06' 05.0" E

-L- SC Sta. 314+31.889

SHOAL CREEK BAPTIST CHURCH
DB 415 PG 71

GEORGE'S FORK

MATCHLINE -L- STA. 312+20 SEE SHEET NO. 29

MATCHLINE -L- STA. 315+60 SEE SHEET NO. 31

-D16- PC Sta. 10+17.939
-D10- POT Sta. 10+00.000

-D16- PT Sta. 10+32.546

-D9- PC Sta. 10+31.423

-Y27- PCC Sta. 10+28.040

PC Sta. 10+38.599

-D9- PT Sta. 10+40.668
BEARING AH = S 53° 58' 42.4" E

PC Sta. 10+19.662

-D8- PT Sta. 10+31.850
BEARING AH = S 3° 15' 17.5" W

-D8- PT Sta. 10+51.559
BEARING AH = S 46° 15' 00.3" E

-D8- POT Sta. 10+58
END CONST.

-D8- POT Sta. 10+60.107

-D9- POT Sta. 10+52.722

-D16- PI Sta. 10+25.880
Δ = 55° 41' 36.8" (RT)
L = 14.607
T = 7.941
R = 15.000

-D16- PT Sta. 10+45
END CONST.

-D16- PT Sta. 10+57.734

-D10- PC Sta. 10+15.752

-D10- PT Sta. 10+37.549

-D10- POT Sta. 10+42.519
END CONST.

-D10- POT Sta. 10+10.000
BEGIN CONST.

-Y28- PT Sta. 10+42.874 TO 10+67.662

END CONST. -Y28-
POC Sta. 10+67.662

-Y28- PT Sta. 10+96.043

-Y28- PC Sta. 11+07.061

-Y28- POC Sta. 11+27.106
-D10- POT Sta. 10+45.413

-Y28- PT Sta. 11+66.751

SITE 25

SITE 27

BARBARA FORD
DB 216 PG 36

ROY C. HARRIS
DB 160 PG 29

JAMES G. MARSH, JR.
DB 297 PG 447

JETER BISS BUCHANAN
DB 156 PG 547

DANNY HUGHES
DB 196 PG 829

HERMAN HUGHES
DB 158 PG 229

NORMA P. EVANS
DB 142 PG 568

ELIZABETH YOUNG HUSKINS
DB 264 PG 231

DANNY HIGGINS
DB 201 PG 179

ROGER F. PENLAND
DB 254 PG 405

WINDOM METHODIST CHURCH
DB 128 PG 24

DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KHW): ADDED EASEMENT ON PARCEL NOS. 185 & 186.
R/W REV. 8/10/06 (TMW): INCREASED SIZE OF 3.6M DRIVE TO 4.8M ON PARCEL 184.

Permit Drawing
Sheet 6 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KNW): ADDED EASEMENT ON PARCEL NOS. 185 & 186.
R/W REV. 8/10/06 (TMW): INCREASED SIZE OF 3.6M DRIVE TO 4.8M ON PARCEL 184.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

FOR -L- PROFILE SEE SHEET 57
FOR -Y27- & -Y28- PROFILE SEE SHEET 69
FOR -D8-, -D9-, & -D10- PROFILE SEE SHEET 73
FOR -D16- PROFILE SEE SHEET 75

-Y27-
PI Sta 10+16.706 Δ = 57° 53' 38.7" (RT) L = 25.261 T = 13.828 R = 25.000 SE = SEE PLANS
PI Sta 10+52.066 Δ = 14° 28' 23.3" (RT) L = 47.995 T = 24.126 R = 190.000 SE = SEE PLANS

-L-
PIs Sta 308+23.184 Gs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036
PI Sta 310+51.778 Δ = 54° 46' 59.8" (LT) L = 368.730 T = 199.634 R = 400.000 SE = 0.06 xxV = 96 kph
PIs Sta 312+51.910 Gs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036
PIs Sta 314+01.908 Gs = 4° 28' 06.5" Ls = 90.000 LT = 60.019 ST = 30.017
PI Sta 315+01.330 Δ = 32° 43' 50.7" (LT) L = 329.517 T = 169.442 R = 577.000 SE = 0.06
PIs Sta 317+91.523 Gs = 4° 28' 06.5" Ls = 90.000 LT = 60.019 ST = 30.017

-Y28-
PI Sta 10+12.569 Δ = 43° 00' 00.0" (RT) L = 18.782 T = 9.848 R = 25.000 SE = SEE PLANS
PI Sta 10+69.835 Δ = 23° 26' 00.0" (LT) L = 53.169 T = 26.961 R = 130.000 SE = SEE PLANS
PI Sta 11+36.930 Δ = 5° 42' 00.0" (LT) L = 59.690 T = 29.870 R = 600.000

-D8-
PI Sta 10+26.115 Δ = 46° 35' 12.8" (RT) L = 12.188 T = 6.463 R = 15.000

-D9-
PI Sta 10+36.059 Δ = 17° 35' 38.7" (LT) L = 9.245 T = 4.636 R = 50.000

-D10-
PI Sta 10+46.515 Δ = 49° 30' 17.7" (LT) L = 12.960 T = 6.916 R = 15.000
PI Sta 10+27.157 Δ = 41° 37' 50.3" (LT) L = 21.798 T = 11.405 R = 30.000

-D16-
PI Sta 10+25.880 Δ = 55° 41' 36.8" (RT) L = 14.607 T = 7.941 R = 15.000

NAD 83/95

SITE 25

SITE 26

SITE 27

MATCHLINE -L- STA. 312+20 SEE SHEET NO. 29

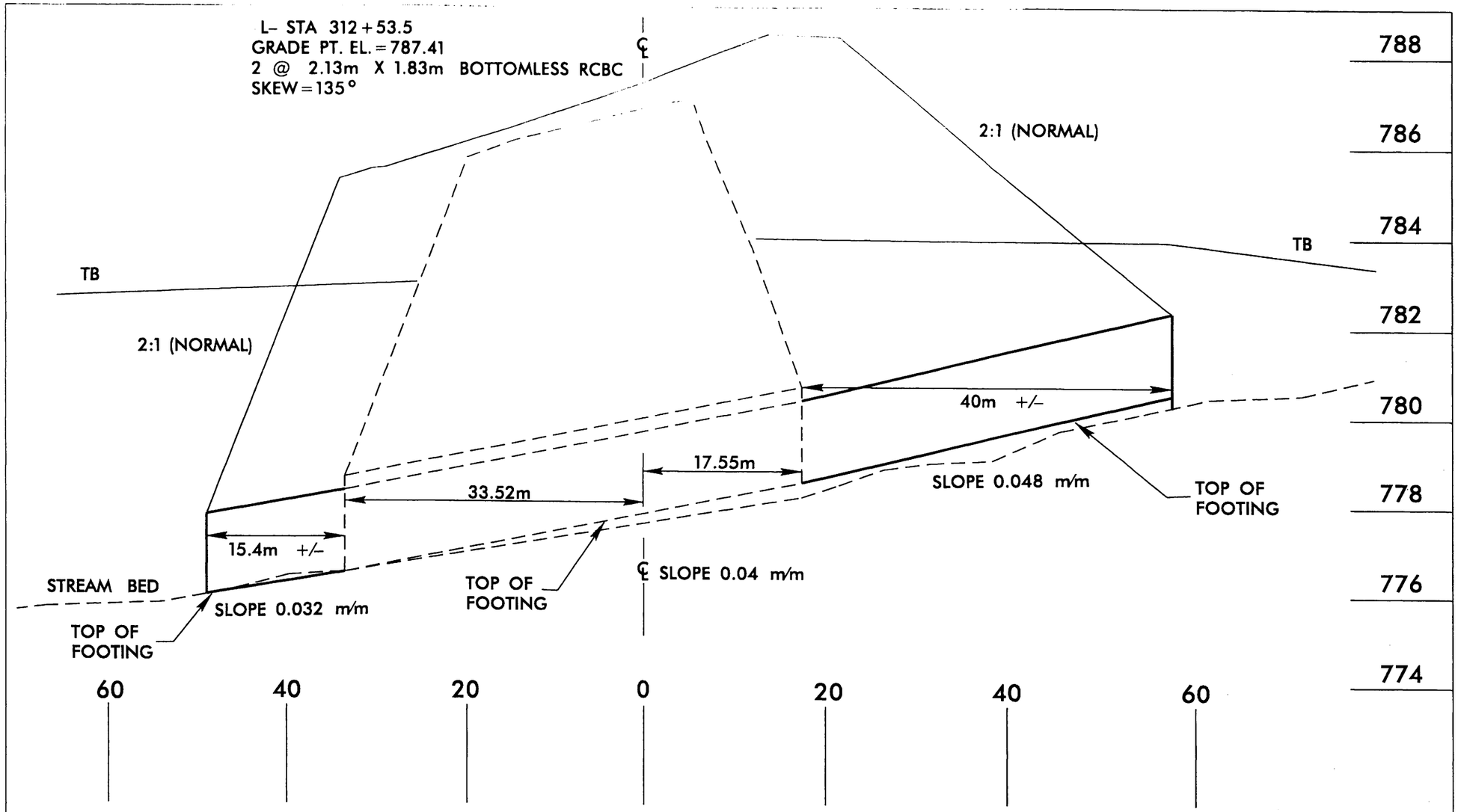
MATCHLINE -L- STA. 315+60 SEE SHEET NO. 31

-L- POS Sta. 312+61.529
-Y27- POT Sta. 10+00.000
-L- CS Sta. 312+21.874
-Y27- PC Sta. 10+02.879
BEARING BACK = S 41° 22' 02.4" E
-L- POS Sta. 313+02.930
-D8- POT Sta. 10+00.000
BEARING AH = S 43° 17' 55.4" E
-L- ST Sta. 313+11.874
-L- POT Sta. 313+12.000
-D9- POT Sta. 10+00.000
BEARING AH = S 43° 23' 03.4" E
-L- TS Sta. 313+41.889
-D16- POT Sta. 10+00
-L- POS Sta. 314+30
BRG. AH = S 39° 06' 05.0" E
-L- SC Sta. 314+31.889
-L- POC 314+44.867
-D16- PC Sta. 10+17.939
-D10- POT Sta. 10+00.000
-D16- PT Sta. 10+32.546
-D9- PC Sta. 10+31.423
-D8- PC Sta. 10+19.662
-D8- PT Sta. 10+31.259
BEARING AH = S 3° 15' 17.4" W
-D8- PT Sta. 10+51.559
BEARING AH = S 36° 15' 00.3" E
-D8- POT Sta. 10+58
END CONST.
-D8- POT Sta. 10+60.107
-D9- PT Sta. 10+40.668
BEARING AH = S 53° 58' 42.4" E
-D9- POT Sta. 10+45
END CONST.
-D9- POT Sta. 10+52.722
-D16- PT Sta. 10+45
END CONST.
-D16- POT Sta. 10+57.734
-D10- PT Sta. 10+37.549
-D10- POT Sta. 10+42.519
END CONST.
-D10- PC Sta. 10+15.752
-D10- POT Sta. 10+10.000
BEGIN CONST.
-Y28- PT Sta. 10+96.843
-Y28- POC Sta. 10+67.662
END CONST.
-Y28- PC Sta. 11+07.061
-Y28- POC Sta. 11+27.106
-D10- POT Sta. 10+45.413
-Y28- PT Sta. 11+66.751
-Y28- 10+42.874 TO 10+67.662 PROP. RETAINING WALL

SHOAL CREEK BAPTIST CHURCH DB 415 PG 71
GEORGE'S FORK
BARBARA EDRO DB 216 PG 36
ROY C. HARRIS DB 160 PG 29
JAMES G. MARSH, JR. DB 297 PG 447
JETER BISS BUCHANAN DB 156 PG 547
DANNY HUGHES DB 196 PG 320
HERMAN HUGHES DB 158 PG 229
NORMA P. EVANS DB 142 PG 568
ROGER F. PENLAND DB 254 PG 406
ELIZABETH YOUNG HUSKINS DB 254 PG 231
DANNY HIGGINS DB 201 PG 179
WINDOM METHODIST CHURCH DB 128 PG 24

DENOTES SURFACE WATER IMPACT - PERMANENT
DENOTES SURFACE WATER IMPACT - TEMPORARY

Permit Drawing
Sheet 65 of 76



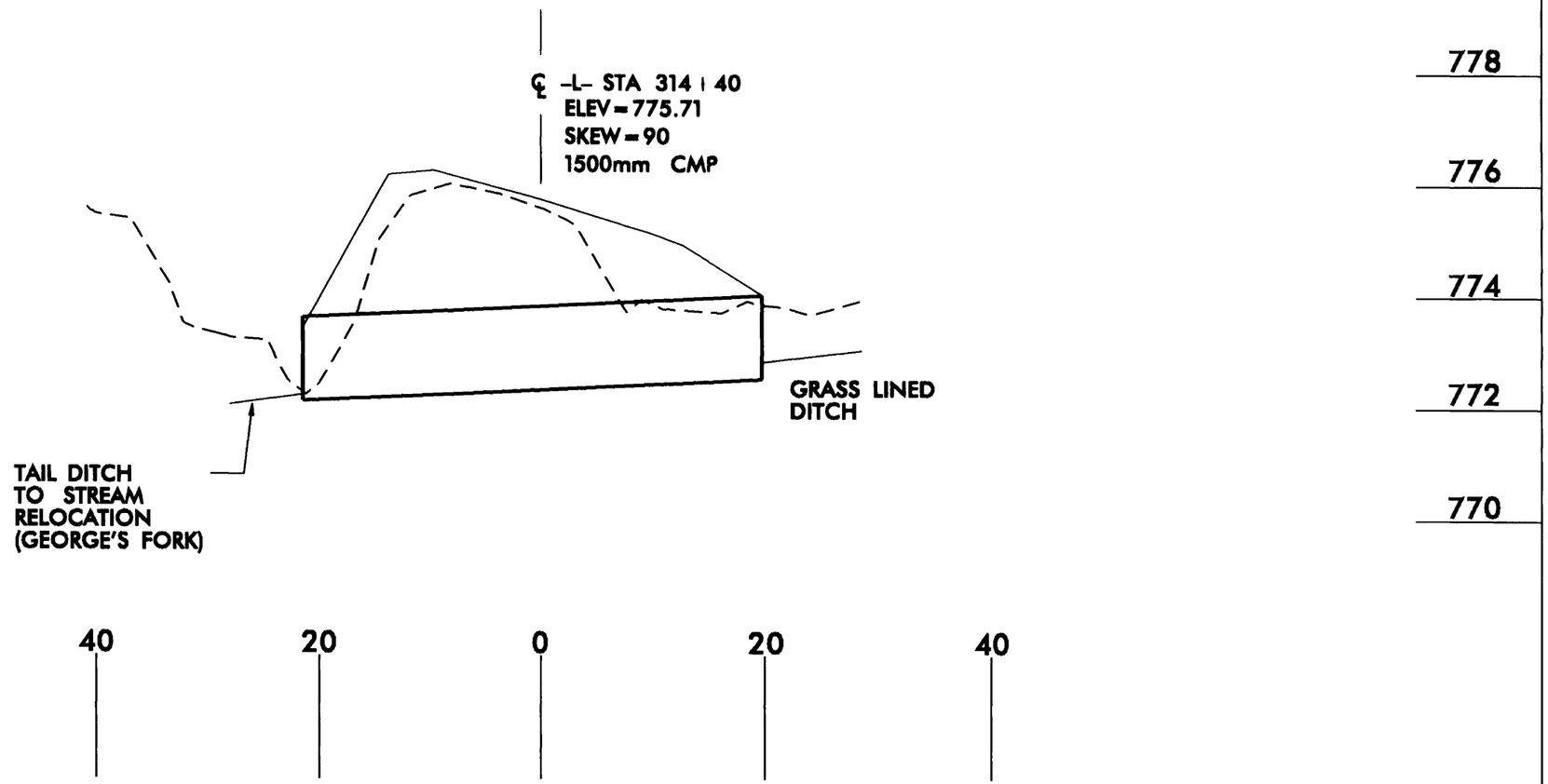
-L- STATION 312+53.5
2 @ 2.13m X 1.83m BOTTOMLESS RCBC

SITE 25
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing



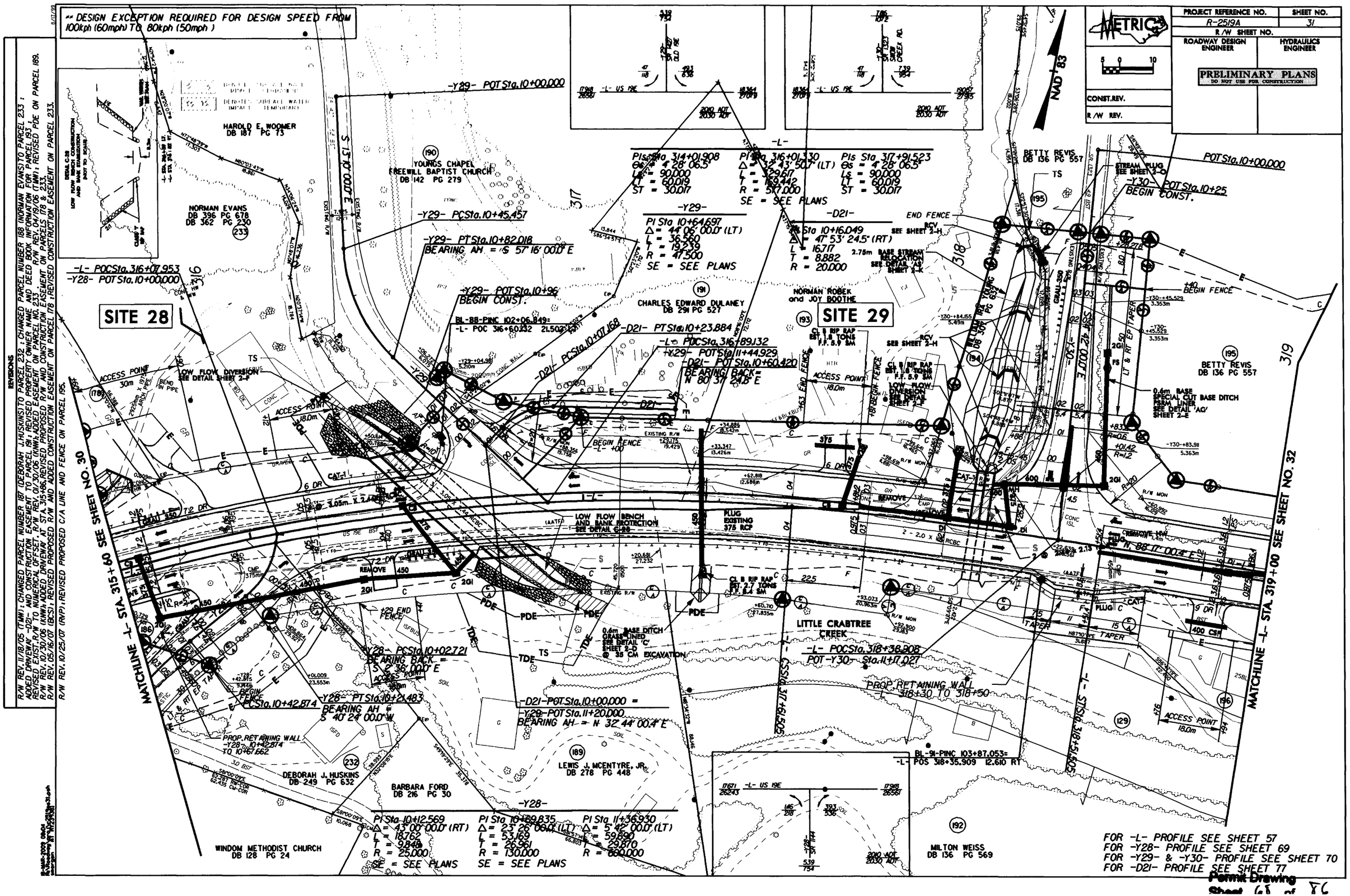
-L- STATION 314+40
1500mm CMP

SITE 27
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

03/12/09

Permit Drawing
Sheet 67 of 86



Permit Drawing
Sheet 68 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

METRIC

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

REVISIONS

R/W REV. 11/18/05 (TMW): CHANGED PARCEL NUMBER 187 (DEBORAH J.HUSKINS) TO PARCEL 232 ; CHANGED PARCEL NUMBER 188 (NORMAN EVANS) TO PARCEL 233 ; ADDED DRIVEWAY -D21- AND CONSTRUCTION EASEMENT TO PARCEL 191 ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 193 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 01/30/06 (TMW) ; REVISED PDE ON PARCEL 189.
R/W REV. 10/30/06 (KNW): ADDED EASEMENT ON PARCEL NO. 233 R/W REV. 04/19/06 (TMW) ; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCELS 178 & 233.
R/W REV. 05/16/07 (BCS) ; REVISED PROPOSED R/W AND ADDED CONSTRUCTION EASEMENT ON PARCEL 178 ; REVISED CONSTRUCTION EASEMENT ON PARCEL 233.
R/W REV. 10/25/07 (RVP) ; REVISED PROPOSED C/A LINE AND FENCE ON PARCEL 195.

SITE 28

SITE 29

MATCHLINE -L- STA. 315+60 SEE SHEET NO. 30

MATCHLINE -L- STA. 319+00 SEE SHEET NO. 32

HAROLD E. WOOMER DB 187 PG 73

YOUNGS CHAPEL FREEWILL BAPTIST CHURCH DB 142 PG 279

NORMAN EVANS DB 396 PG 678 DB 362 PG 230

CHARLES EDWARD DURANEY DB 291 PG 627

NORMAN ROBEK and JOY BOOTHE

BETTY REVIS DB 136 PG 557

DEBORAH J. HUSKINS DB 249 PG 632

BARBARA FORD DB 216 PG 30

LEWIS J. MCENTYRE, JR. DB 278 PG 448

WINDOM METHODIST CHURCH DB 128 PG 24

MILTON WEISS DB 136 PG 569

LITTLE CRABTREE CREEK

-L- POC Sta. 316+07.953
-Y28- POT Sta. 10+00.000

-Y29- POT Sta. 10+00.000

-Y29- PC Sta. 10+45.497

-Y29- PT Sta. 10+82.018
BEARING AH = S 57° 16' 00.0" E

-Y29- POT Sta. 10+96
BEGIN CONST.

BL-BB-PINC 102+06.849=
-L- POC 316+50.0242 21.502 RT

-D21- PC Sta. 10+97.169

-D21- PT Sta. 10+23.884

-L- POC Sta. 316+89.132

-Y29- POT Sta. 11+44.929

-D21- POT Sta. 10+60.420
BEARING BACK = N 80° 37' 24.0" E

-Y28- PC Sta. 10+02.721
BEARING BACK = S 2° 36' 00.0" E

-Y28- PT Sta. 10+21.483
BEARING AH = S 40° 24' 00.0" W

-Y28- PC Sta. 10+42.814

PROP. RETAINING WALL -Y28- 10+42.814 TO 10+67.662

D21- POT Sta. 10+00.000 =
-Y29- POT Sta. 11+20.000
BEARING AH = N 37° 44' 00.0" E

-L- POC Sta. 318+38.808
POT -Y30- Sta. 11+17.027

PROP. RETAINING WALL -L- 318+30 TO 318+50

BL-9-PINC 103+87.053=
-L- POS 318+35.909 12.610 RT

PI Sta. 10+12.569
Δ = 43° 00' 00.0" (RT)
T = 18.762
L = 9.848
R = 25.000
SE = SEE PLANS

PI Sta. 10+89.835
Δ = 23° 26' 00.0" (LT)
T = 53.169
L = 26.961
R = 130.000
SE = SEE PLANS

PI Sta. 11+36.930
Δ = 5° 42' 00.0" (LT)
T = 59.890
L = 29.876
R = 600.000
SE = SEE PLANS

PI Sta. 314+01.908
Δ = 4° 28' 06.5"
Ls = 90.000
T = 60.019
ST = 30.017

PI Sta. 316+01.330
Δ = 24° 43' 50.0" (LT)
T = 129.67
L = 258.442
R = 577.000
SE = SEE PLANS

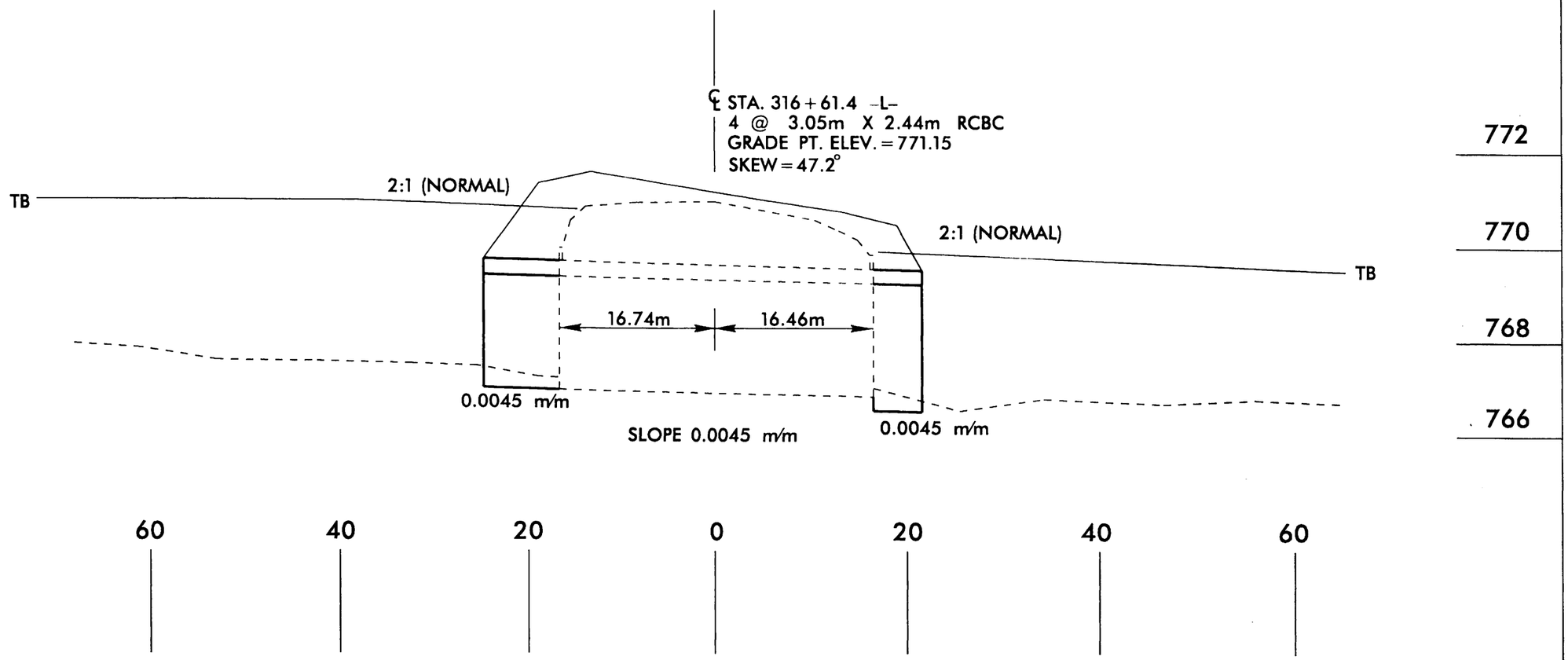
PI Sta. 317+91.525
Δ = 4° 28' 06.5"
Ls = 90.000
T = 60.019
ST = 30.017

PI Sta. 10+64.697
Δ = 44° 06' 00.0" (LT)
T = 36.560
L = 76.239
R = 47.500
SE = SEE PLANS

PI Sta. 10+16.049
Δ = 47° 53' 24.5" (RT)
L = 16.717
T = 8.882
R = 20.000

FOR -L- PROFILE SEE SHEET 57
FOR -Y28- PROFILE SEE SHEET 69
FOR -Y29- & -Y30- PROFILE SEE SHEET 70
FOR -D21- PROFILE SEE SHEET 77

Permit Drawing
Sheet 69 of 86

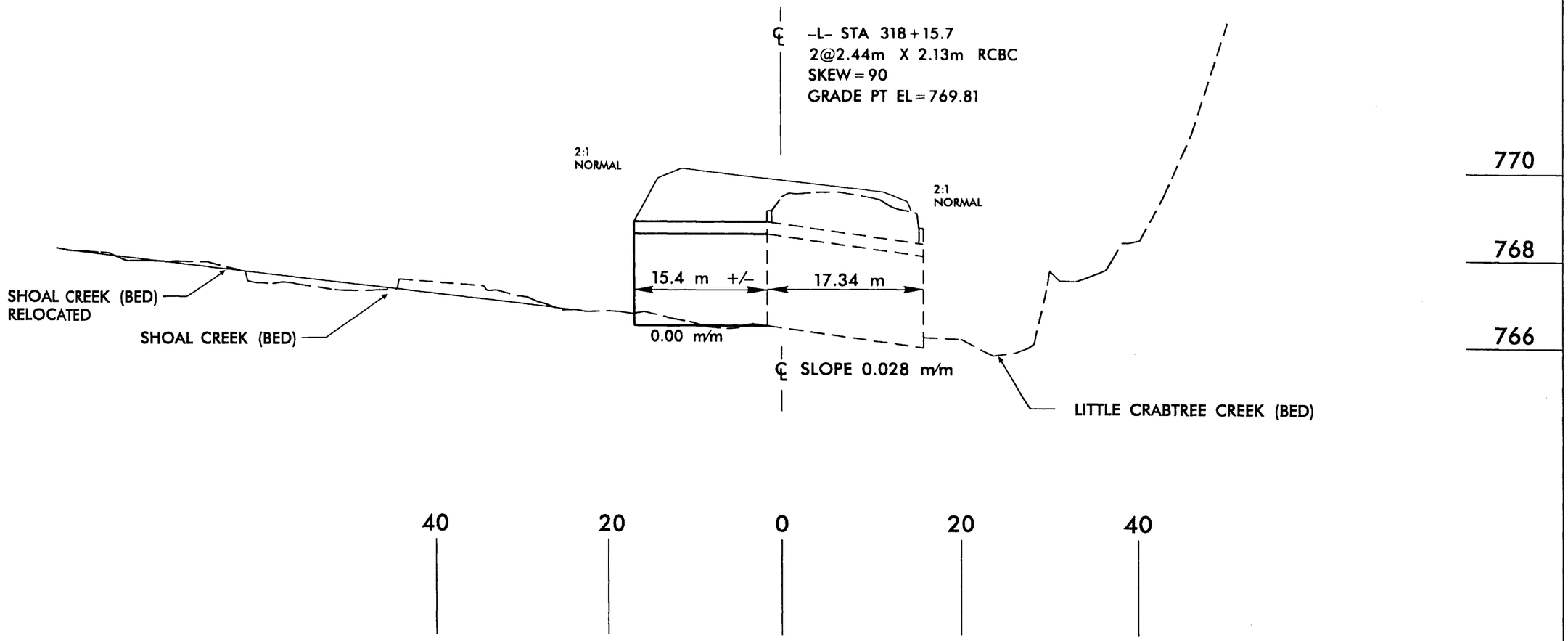


-L- STATION 316+61.4
4 @ 3.05m X 2.44m RCBC

SITE 28
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06



-L- STATION 318+15.7
2 @ 2.44m X 2.13m RCBC

SITE 29
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 71 of 86

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

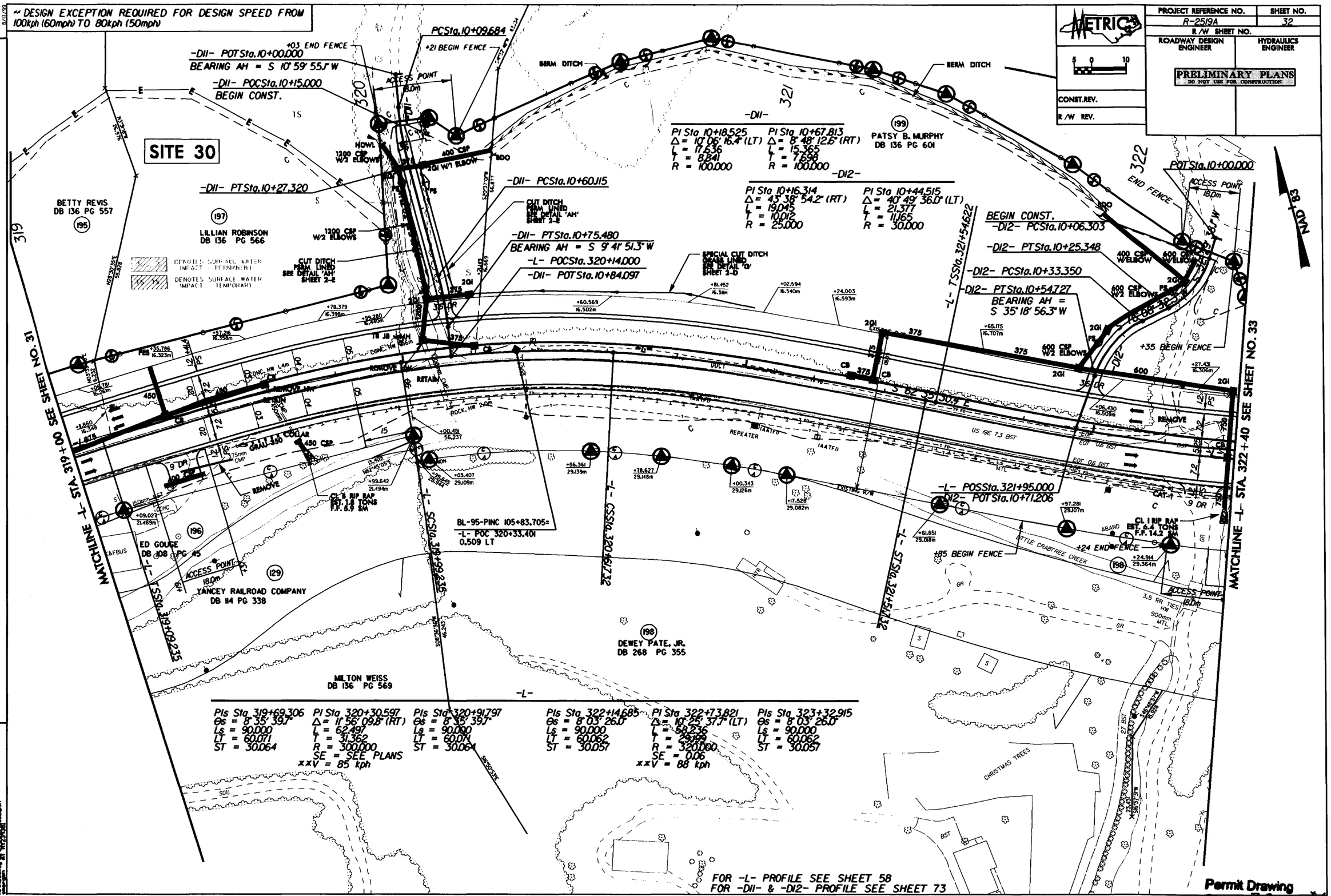
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 09/12/08 (RVP): ADDED 9.0m DRIVEWAY AT STA. 319+30 FOR PARCEL 196.

Permit Drawing
Sheet 72 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

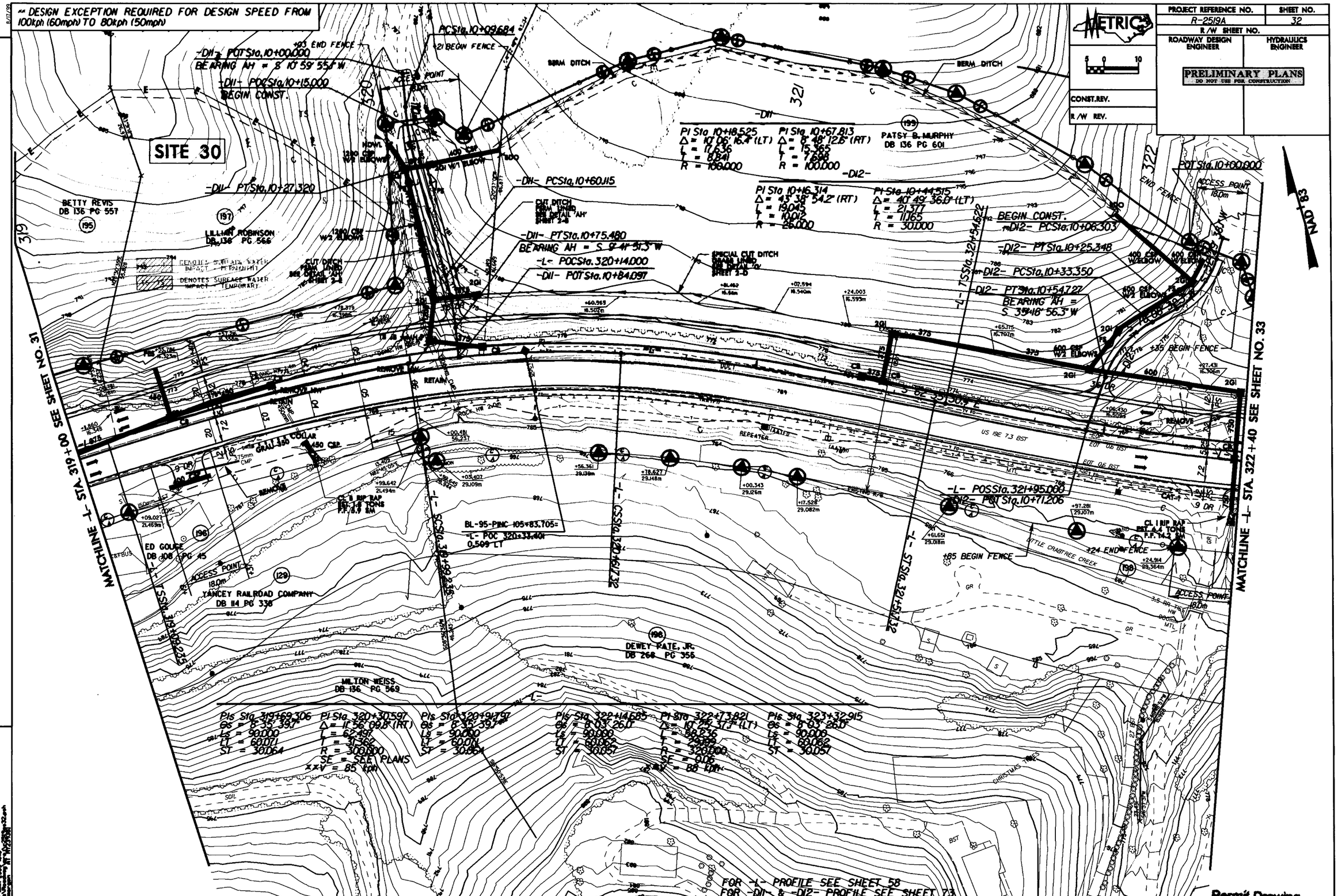
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 09/12/08 (RVP): ADDED 9.0m DRIVEWAY AT STA. 319+30 FOR PARCEL 196.

Permit Drawing
Sheet 73 of 86

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED PARCEL 199A ; REVISED PROPOSED R/W ON PARCEL 199 AND 201 ; ADDED PARCEL NUMBER 236 ; MOVED ACCESS POINT FOR PARCEL 236 ; REVISED DRIVEWAYS -DI3- AND -DI4- ; REVISED EXIST.R/W TO NUMERICAL OFFSET. R/W REV. 02/11/06 (TMW); REVISED PARCEL OWNER NAME & DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A . R/W REV. 04/19/06 (TMW); MOVED DRIVEWAY FROM STA.324+55 TO 324+75 ON PARCEL 236 .

-DI4REV-
PI Sta 11+00.718
Δ = 20° 57' 01.9" (LT)
L = 73.131
T = 36.979
R = 200.000

PI Sta 11+46.038
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000

-DI4-
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000

-L-
PIs Sta 322+14.685
θs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057

PI Sta 322+73.821
Δ = 10° 25' 37.7" (LT)
L = 58.236
T = 29.199
R = 320.000
SE = SEE PLANS
** V = 88 kph

PIs Sta 323+32.915
θs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057

-DI3REV-
PI Sta 10+35.160
Δ = 69° 48' 22.3" (RT)
L = 24.367
T = 13.954
R = 20.000

PI Sta 10+69.802
Δ = 7° 53' 33.3" (LT)
L = 6.888
T = 3.449
R = 50.000

PI Sta 11+30.698
Δ = 66° 31' 34.6" (LT)
L = 23.222
T = 13.119
R = 20.000

-DI3-
~~PI Sta 10+39.779~~
~~Δ = 49° 57' 38.4" (RT)~~
~~L = 43.599~~
~~T = 23.294~~
~~R = 50.000~~

PI Sta 11+33.250
Δ = 64° 12' 06.9" (LT)
L = 22.411
T = 12.546
R = 20.000

NAD 83

FOR -L- PROFILE SEE SHEET 58
FOR -DI3REV- PROFILE SEE SHEET 74
FOR -DI4REV- PROFILE SEE SHEET 75

DETAIL W
PIPE OUTLET CHANNEL
(Not to Scale)
Length = 4.0 m D = 0.5 m
Est = 10 Tons of Class I RipRap
-L- STA. 324+43 TO 324+47 RT

MATCHLINE -L- STA. 322+40 SEE SHEET NO. 32

MATCHLINE -L- STA. 325+80 SEE SHEET NO. 34

(199) PATSY B. MURPHY DB 136 PG 601

(201A) DONNA GOUGE DB 399 PG 677

(201) BEULAH HUGHES DB 448 PG 92 DB 146 PG 329

(199A) JOEL RALPH MURPHY JOEY RANDALL MURPHY BY WILL DB 111 PG 200

(200) DAVID WAYNE GARLAND DB 202 PG 591

(198) DEWEY PATE, JR. DB 268 PG 355

(129) YANCEY RAILROAD COMPANY DB 114 PG 338

(236) ALLEN D. BOONE DB 217 PG 391

(202) SHERRILL McCOURRY DB 436 PG 607

OLLIS REECE BOONE DB 173 PG 487

UNNAMED TRIB TO LITTLE CRABTREE CREEK

LITTLE CRABTREE CREEK

-DI3- POT Sta. 10+00.000 =
-DI3REV- POT Sta. 10+00.000
BEARING AH = S 19° 57' 42.9" W

-DI3REV- PT Sta. 10+45.574

-DI3REV- PC Sta. 10+66.353

-DI3REV- PT Sta. 10+73.241

-DI3- PC Sta. 10+16.484

-DI3REV- PC Sta. 10+21.207
BEGIN CONST.

-DI4REV- PT Sta. 11+55.153 BK =
-DI4- POT Sta. 11+54.543 AH

-DI3REV- PC Sta. 11+17.579

-DI3REV- S 81° 52' 31.9" W

S 89° 46' 05.2" W

-DI3REV- PT Sta. 11+40.801

-DI3- PC Sta. 11+20.703

-DI3- S 69° 55' 01.7" W

-DI3- PT Sta. 10+60.083

-L- ST Sta. 323+92.858

-L- CS Sta. 323+02.858

-DI3- PT Sta. 11+43.114

-DI4- PT Sta. 12+04.068
BEARING AH =
S 9° 59' 59.5" W

-DI4- PC Sta. 11+76.344

-DI4REV- PRC Sta. 11+36.871

S 62° 57' 00.0" W

S 62° 56' 59.0" W

S 89° 08' 00.7" E -L-

POT Sta. 325+00.000

-DI4- POT Sta. 12+17.001

-L- POS Sta. 323+23.000
-DI3- POT Sta. 11+55.744
BEARING BK =
S 5° 43' 14.8" W

-L- POS Sta. 323+04.95
-DI3REV- POT Sta. 11+80.916

BL-96-PINC 108+17.771=
-L- POC 322+65.869
13.099 RT

"NCGS WINDOM"
BL-97-PINC 111+24.964 =
-L- POT 325+70.388 14.253 RT

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

NOTE TO ROADWAY:
USE 2:1 SLOPES FROM
-L- STA 323+20 TO 324+40 RT

SITE 31

Permit Drawing
Sheet 74 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-DI4REV-
PI Sta 11+00.718
Δ = 20° 57' 01.9" (LT)
L = 73.131
T = 36.979
R = 200.000

PI Sta 11+46.038
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000

-DI4-
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000

-L-
PIs Sta 322+14.685
Θs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057

PI Sta 322+73.821
Δ = 11° 55' 37.1" (LT)
L = 59.236
T = 29.719
R = 320.000
SE = SEE PLANS
xxV = 80 kph

PIs Sta 323+32.915
Θs = 8° 03' 26.0"
Ls = 90.000
LT = 60.062
ST = 30.057

-DI3REV-
PI Sta 10+35.160
Δ = 69° 48' 22.3" (RT)
L = 24.367
T = 13.954
R = 20.000

PI Sta 10+69.803
Δ = 7° 53' 35.3" (LT)
L = 6.888
T = 3.449
R = 50.000

PI Sta 11+30.698
Δ = 86° 31' 34.6" (LT)
L = 21.282
T = 13.19
R = 25.000

-DI3-
PI Sta 10+39.779
Δ = 49° 57' 38.4" (RT)
L = 43.599
T = 23.294
R = 50.000

PI Sta 11+33.250
Δ = 64° 12' 08.9" (LT)
L = 22.411
T = 12.546
R = 20.000

FOR -L- PROFILE SEE SHEET 58
FOR -DI3REV- PROFILE SEE SHEET 74
FOR -DI4REV- PROFILE SEE SHEET 75

DETAIL 'W'
PIPE OUTLET CHANNEL
(Not to Scale)
Length = 4.6 m D = 0.6 m
Est. = 10 Tons of Class I Riprap
d = 0.3 MIN.
STA 324+49 TO 324+47 RT

PATSY B. MURPHY
DB 136 PG 601

DONNA GOUGE
DB 399 PG 677

-DI3- POT Sta. 10+00.000 =
-DI3REV- POT Sta. 10+00.000
BEARING AH S 19° 57' 42.9" W

-DI3REV- PT Sta. 10+45.574

-DI3REV- PC Sta. 10+66.353

-DI3REV- PT Sta. 10+73.241

-DI3REV- PC Sta. 10+76.484

-DI4REV- PT Sta. 11+55.153 BK =
-DI4- POT Sta. 11+54.543 AH

-DI3REV- PC Sta. 10+21.207
BEGIN CONST.

BEULAH HUGHES
DB 446 PG 92
DB 146 PG 329

ACCESS POINT
18.0m

+10 END FENCE

-DI3REV- PC Sta. 11+17.579

-DI3REV- S 81° 52' 31.9" W

S 87° 46' 05.2" W

BERM DITCH

CUT DITCH
PERM. LINED
SEE DETAIL 'AH'
SHEET 2-E

UNNAMED TRIB TO
LITTLE CRABTREE CREEK

JOEL RALPH MURPHY
JOEY RANDALL MURPHY
BY WILL
DB MPG 200

+28 BEGIN FENCE

-DI3REV- PT Sta. 11+40.801

-DI3- PC Sta. 11+20.703

-DI3- PT Sta. 10+60.083

-L- ST Sta. 323+92.858

-L- CS Sta. 323+02.858

-DI4- PT Sta. 12+04.068
BEARING AH =
S 5° 39' 59.5" W

-DI4- PC Sta. 11+76.344

-DI4REV- PRC Sta. 11+36.871

S 62° 57' 00.0" W

DAVID WAYNE GARLAND
DB 202 PG 591

-DI3- PT Sta. 11+43.114

REMOVE HW AND BOX

REMOVE HW

RETAIN

MATCHLINE -L- STA. 322+40 SEE SHEET NO. 32

MATCHLINE -L- STA. 325+80 SEE SHEET NO. 34

S 89° 08' 00.0" E

POT Sta. 325+00.000

-DI4- POT Sta. 12+17.001

BL-96-PINC 108+17.771=
-L- PDC 322+65.869
13.099 RT

-L- POS Sta. 323+23.000
-DI3- POT Sta. 11+55.744
BEARING BK =
S 5° 43' 14.8" W

-L- POS Sta. 323+04.95
-DI3REV- POT Sta. 11+80.916

PIPE OUTLET CHANNEL
SEE DETAIL 'W' SHEET 2-D

"NCGS WINDOM"
BL-97-PINC 111+24.964 =
-L- POT 325+70.388 14.253 RT

DEWEY PATE, JR.
DB 268 PG 355

PSH 600
SEE SHEET 2-F

+42 BEGIN FENCE

+66 END FENCE

+84 BEGIN FENCE

+45 END FENCE

+27 BEGIN FENCE

LITTLE CRABTREE CREEK

NOTE TO ROADWAY:
USE 2:1 SLOPES FROM
-L- STA 323+20 TO 324+40 RT

DENOTES SURFACE WATER IMPACT - PERMANENT

DENOTES SURFACE WATER IMPACT - TEMPORARY

OLLIS REECE BOONE
DB 173 PG 487

SITE 31

YANCEY RAILROAD COMPANY
DB 114 PG 338

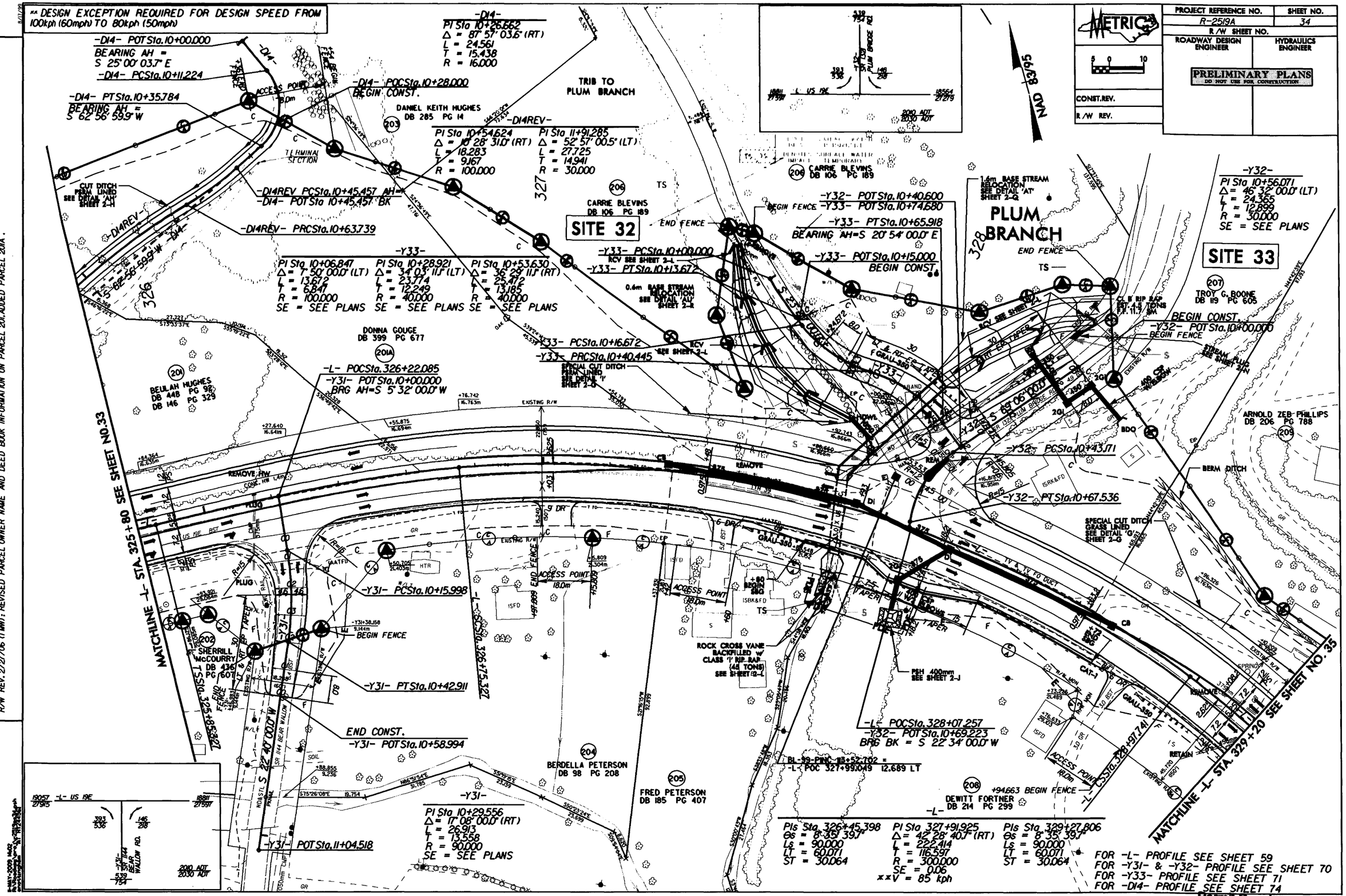
ALLEN D. BOONE
DB 217 PG 391

SHERRILL McCOURRY
DB 436 PG 607

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED PARCEL 199A; REVISED PROPOSED R/W ON PARCEL 199A AND 201; ADDED PARCEL NUMBER 236; MOVED ACCESS POINT FOR PARCEL 236; REVISED DRIVEWAYS -DI3- AND -DI4-; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/11/06 (TMW); REVISED PARCEL OWNER NAME & DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A. R/W REV. 04/19/06 (TMW); MOVED DRIVEWAY FROM STA. 324+55 TO 324+75 ON PARCEL 236.

Permit Drawing
Sheet 36 of 96


** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
METRIC
PROJECT REFERENCE NO. R-2519A
SHEET NO. 34
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST. REV.
R/W REV.
NAD 83/95
REVISIONS
R/W REV. 11/18/05 (TMW); REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A.
-D14- POT Sta. 10+00.000
BEARING AH = S 25° 00' 03.7" E
-D14- PCSta. 10+11.224
-D14- PT Sta. 10+35.784
BEARING AH = S 62° 56' 59.9" W
-D14- PI Sta 10+28.662
Δ = 87° 57' 03.6" (RT)
L = 24.561
T = 15.438
R = 16.000
-D14- POCSta. 10+28.000
BEGIN CONST.
TRIB TO PLUM BRANCH
DANIEL KEITH HUGHES DB 285 PG 14
-D14REV-
PI Sta 10+54.624
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000
-D14REV PCSta. 10+45.457 AH=
-D14- POT Sta 10+45.457 BK
-D14REV- PRCSta. 10+63.739
CUT DITCH PERM. LINED SEE DETAIL 'AU' SHEET 2-H
CARRIE BLEVINS DB 106 PG 189
SITE 32
-Y33-
PI Sta 10+06.847
Δ = 7° 50' 00.0" (LT)
L = 13.672
T = 6.847
R = 100.000
SE = SEE PLANS
PI Sta 10+28.921
Δ = 34° 03' 11.1" (LT)
L = 23.774
T = 12.249
R = 40.000
SE = SEE PLANS
PI Sta 10+53.630
Δ = 36° 29' 11.1" (RT)
L = 25.412
T = 13.185
R = 40.000
SE = SEE PLANS
-Y33- PCSta. 10+00.000
RCV SEE SHEET 2-L
-Y33- PT Sta. 10+13.672
0.6m BASE STREAM RELOCATION SEE DETAIL 'AU' SHEET 2-R
DONNA GOUGE DB 399 PG 677
201A
-Y33- PCSta. 10+16.672
RCV SEE SHEET 2-L
-Y33- PRCSta. 10+40.445
SPECIAL CUT DITCH PERM. LINED SEE DETAIL 'I' SHEET 2-G
-L- POCSta. 326+22.085
-Y31- POT Sta. 10+00.000
BRG AH=S 5° 32' 00.0" W
BEULAH HUGHES DB 448 PG 98 DB 146 PG 329
201
MATCHLINE -L- STA. 325+80 SEE SHEET NO. 33
EXISTING R/W
REMOVE
-Y31- PCSta. 10+15.998
-Y31+38.158
BEGIN FENCE
SHERRILL McCOURRY DB 436 PG 601
202
-Y31- PT Sta. 10+42.911
END CONST.
-Y31- POT Sta. 10+58.994
S 22° 40' 00.0" W
-Y31-
PI Sta 10+29.556
Δ = 17° 08' 00.0" (RT)
L = 26.913
T = 13.558
R = 90.000
SE = SEE PLANS
-Y31- POT Sta. 11+04.518
BERDELLA PETERSON DB 98 PG 208
204
FRED PETERSON DB 185 PG 407
205
ROCK CROSS VANE BACKFILLED W/ CLASS 'I' RIP RAP (44 TONS) SEE SHEET 2-L
CARRIE BLEVINS DB 106 PG 189
206
BEGIN FENCE
END FENCE
-Y32- POT Sta. 10+40.600
-Y33- POT Sta. 10+74.880
-Y33- PT Sta. 10+65.918
BEARING AH=S 20° 54' 00.0" E
-Y33- POT Sta. 10+15.000
BEGIN CONST.
1.6m BASE STREAM RELOCATION SEE DETAIL 'AT' SHEET 2-Q
PLUM BRANCH
328
-Y32-
PI Sta 10+56.071
Δ = 46° 32' 00.0" (LT)
L = 24.365
T = 12.899
R = 30.000
SE = SEE PLANS
SITE 33
TROY G. BOONE DB 119 PG 605
207
BEGIN CONST.
-Y32- POT Sta. 10+00.000
BEGIN FENCE
C & G RIP RAP EST. 4.5 TONS F.F. 11.7 SM
-Y32- PCSta. 10+43.171
-Y32- PT Sta. 10+67.536
BERM DITCH
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-G
ARNOLD ZEB PHILLIPS DB 206 PG 788
209
-L- POCSta. 328+07.257
-Y32- POT Sta. 10+69.223
BRG BK = S 22° 34' 00.0" W
BL-99-PWC-13+52.102 =
-L- POC 327+99.049 12.689 LT
DEWITT FORTNER DB 214 PG 299
208
+94.663 BEGIN FENCE
-L- PCSSta. 328+97.141
MATCHLINE -L- STA. 329+20 SEE SHEET NO. 35
Pls Sta. 326+45.398
θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
PI Sta 327+91.925
Δ = 42° 28' 40.7" (RT)
L = 222.414
T = 116.597
R = 300.000
SE = 0.06
** V = 85 kph
Pls Sta. 329+27.806
θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 70
FOR -Y33- PROFILE SEE SHEET 71
FOR -D14- PROFILE SEE SHEET 74
Permit Drawing

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

METRIC

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW): REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201. ADDED PARCEL 201A.

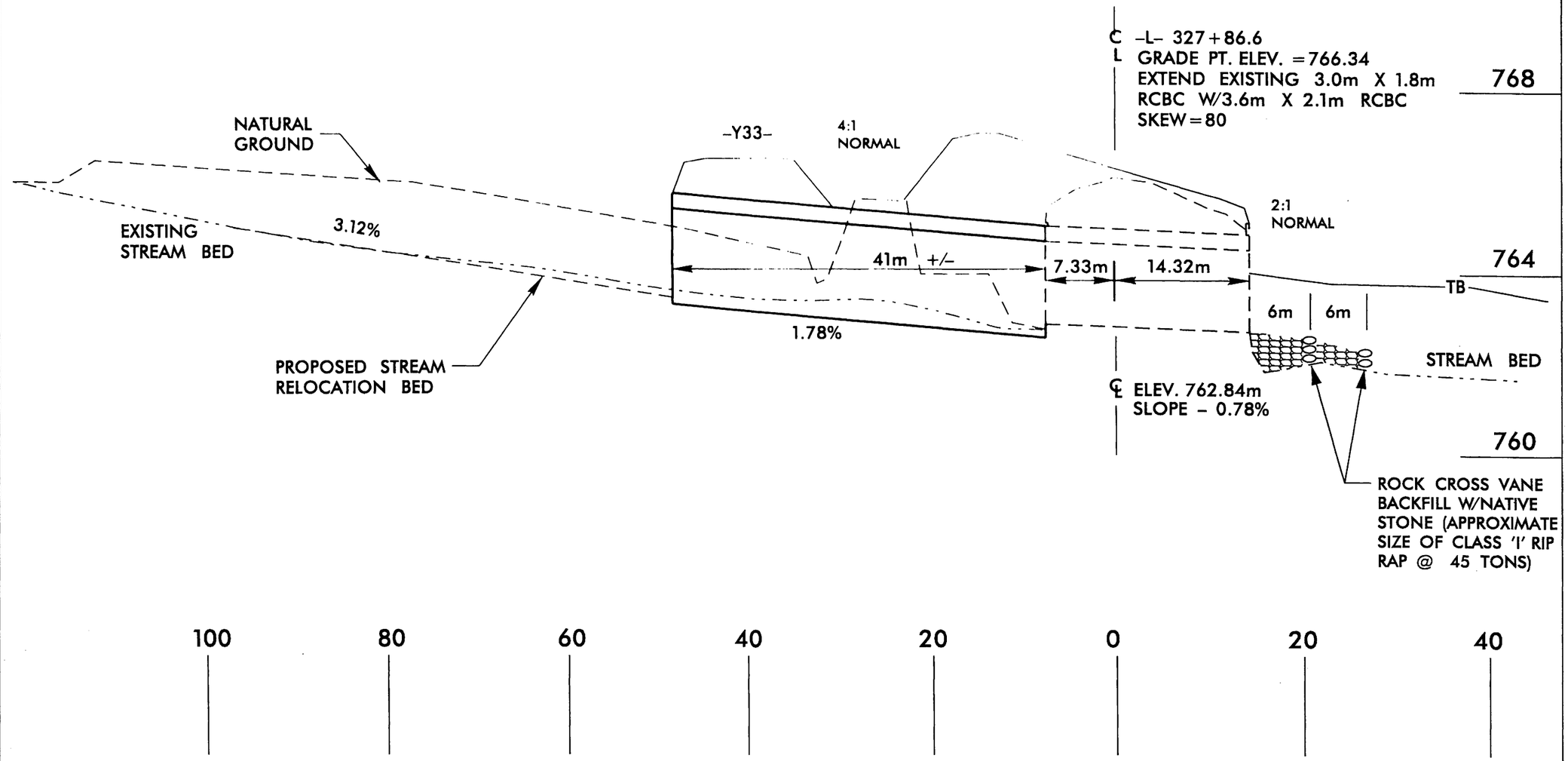
** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-D14- POT Sta. 10+00.000
BEARING AH = S 25° 00' 03.7" E
-D14- PCS Sta. 10+11.224
-D14A PT Sta. 10+35.784
BEARING BK = S 62° 56' 59.9" W
-D14- POC Sta. 10+28.000
BEGIN CONST.
-D14- PI Sta. 10+26.662
Δ = 87° 57' 03.6" (RT)
L = 24.561
T = 15.438
R = 16.000
-D14REV- PI Sta. 10+64.824 Δ = 10° 28' 31.0" (RT) L = 18.283 T = 9.157 R = 100.000
-D14REV- PI Sta. 11+91.285 Δ = 52° 57' 00.5" (LT) L = 27.725 T = 14.941 R = 30.000
-D14REV- PCS Sta. 10+45.457 BK =
-D14- POT Sta. 10+45.457 BK
-D14REV- PRC Sta. 10+63.739
-Y33- PI Sta. 10+06.847 Δ = 7° 50' 00.0" (LT) L = 13.612 T = 6.841 R = 100.000 SE = SEE PLANS
-Y33- PI Sta. 10+28.921 Δ = 34° 03' 11.1" (LT) L = 23.774 T = 12.249 R = 40.000 SE = SEE PLANS
-Y33- PI Sta. 10+53.630 Δ = 36° 29' 11.1" (RT) L = 25.412 T = 13.185 R = 40.000 SE = SEE PLANS
-Y33- PCS Sta. 10+00.000
-Y33- POT Sta. 10+13.682
-Y33- PRC Sta. 10+40.836
-Y32- PRC Sta. 10+40.836
-L- POC Sta. 326+22.085
-Y31- POT Sta. 10+00.000
BRG AH = S 5° 32' 00.0" W
-Y31- PCS Sta. 10+15.998
-Y31- PT Sta. 10+42.911
-Y31- POT Sta. 10+58.994
END CONST.
-Y31- PI Sta. 10+29.556
Δ = 17° 08' 00.0" (RT)
L = 26.913
T = 13.558
R = 90.000
SE = SEE PLANS
-Y31- POT Sta. 11+04.518
-Y32- POT Sta. 10+40.600
-Y33- POT Sta. 10+74.680
-Y33- PT Sta. 10+65.918
BEARING AH = S 20° 34' 00.0" E
-Y33- POT Sta. 10+15.000
BEGIN CONST.
-Y32- PI Sta. 10+56.071
Δ = 46° 32' 00.0" (LT)
L = 24.365
T = 12.899
R = 30.000
SE = SEE PLANS
-Y32- POT Sta. 10+00.000
BEGIN CONST.
-Y32- PCS Sta. 10+43.171
-Y32- PT Sta. 10+67.536
-L- POC Sta. 328+07.257
-Y32- POT Sta. 10+69.223
BRG BK = S 22° 34' 00.0" W
BL-99-PINC 13+52.702 =
-L- POC 327+99.049 12.689 LT
+94.663 BEGIN FENCE
-L- PI Sta. 326+45.398
Ls = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
-L- PI Sta. 327+91.925
Δ = 42° 28' 40.7" (RT)
L = 222.414
T = 116.597
R = 300.000
SE = 0.06
xxV = 85 kph
-L- PI Sta. 329+27.806
Ls = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

SITE 32
SITE 33
PLUM BRANCH
MATCHLINE -L- STA. 325+80 SEE SHEET NO. 33
MATCHLINE -L- STA. 329+20 SEE SHEET NO. 35
NAD 83/95

FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 70
FOR -Y33- PROFILE SEE SHEET 71
FOR -D14- PROFILE SEE SHEET 74

Permit Drawing



-L- STATION 327+86.6
EXTEND EXISTING 3.0m X 1.8m RCBC
W/3.6m X 2.1m RCBC WITH BAFFLES
AND LOW FLOW CHANNEL ON
EXTENSION AND IN EXISTING CULVERT

SITE 33
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 78 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

PIs Sta 330+67.086
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

PI Sta 331+55.524
Δ = 22° 04' 18.3" (LT)
L = 115.567
T = 58.509
R = 300.000
SE = SEE PLANS
** V = 85 kph

PIs Sta 332+42.647
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

PIs Sta 334+41.527
Θs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

PI Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = SEE PLANS

PIs Sta 340+23.570
Θs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

-Y34-

PI Sta 10+75.879
Δ = 9° 54' 00.0" (RT)
L = 20.735
T = 10.393
R = 120.000
SE = SEE PLANS

MAG 83

SITE 34

SITE 35

333 334 335 336

CHARLES R. DELLINGER
DB 300 PG 612

0.6m BASE SPECIAL LATERAL GRASSED SWALE SEE DETAIL 'AA' SHEET 2-E

-L- ST Sta. 333+02.582

INVERT BURIED 0.3m

1.2m BASE STREAM RELOCATION CLASS VI RIP RAP SEE DETAIL 'AP' SHEET 2-E

ACCESS POINT 16.0m

ACCESS POINT 26.0m

-L- TS Sta. 334+01.526

-L- SC Sta. 334+61.526

"NCGS CRABTREE" BL-105-PINC 121+57.166=
-L- POC 335+93.367 17.522 RT

BERM DITCH

-L- POC Sta. 335+77.506
-Y34- POT Sta. 10+00.000

MATCHLINE -L- STA. 332+60 SEE SHEET NO. 35

MATCHLINE -L- STA. 336+00 SEE SHEET NO. 37

400 END FENCE

REMOVE HW

REMOVE

RETAIN

400 CSP W/ 2 ELBOWS RETAIN

400 CSP W/2 ELBOWS

CL B RIP RAP EST. 0.9 TONS P.F. 4.2 SM

UT TO LITTLE CRABTREE CREEK

BL-124-PINC 118+86.812=
-L- POT 333+24.703
12.014 RT

END FENCE

GAS PUMPS

BANK PROTECTION SEE DETAIL C-35

ACCESS POINT 24m

BEGIN FENCE

END FENCE

LOW FLOW DIVERSION SEE DETAIL SHEET 2-F

-Y34- PC Sta. 10+65.485

-Y34- PT Sta. 10+86.220

-Y34- POT Sta. 10+89.563
END CONST.

-Y34- POT Sta. 11+01.88

DETAIL C-35
CULVERT OUTLET BANK PROTECTION
(Not to Scale)

Est = 42 Tons of Class I, Riprap
NOTE: ARMOR ONLY TO LIMITS SHOWN ON PLANS

-L- STA. 335+48 RT TO 335+57 RT. AND 335+75 TO 335+85 RT.

MTL CARPORT

MARK RAY
DB 280 PG 227

LITTLE CRABTREE CREEK

JAMES LUTHER THOMAS
DB 112 PG 484

MARK A. RAY
DB 243 PG 626

ALTON RAY
DB 224 PG 715

ISMTLG

-L- US 19E

18564 / 27279 — 18348 / 25961

393 / 536 — 146 / 218

-L- PT 146 Cane Bridge Rd.

539 / 754

2000 ADT
2030 ADT

YANCEY COUNTY RAILROAD
DB 114 PG 338
DB 41 PG 413
DB 40 PG 80

FOR -L- PROFILE SEE SHEET 60
FOR -Y34- PROFILE SEE SHEET 71

YANCEY COUNTY RAILROAD
DB 114 PG 338
DB 41 PG 413
DB 40 PG 80

CRABTREE BAPTIST CHURCH
DB 201 PG 505

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED DRIVEWAY & ACCESS POINT @ STA 334+93 FOR PARCEL 214; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/06 (TMW): REVISED PROPERTY LINE BETWEEN PARCELS 215 & 216.
R/W REV. 03/30/07 (RVP): ADDED ACCESS POINT AND TWO DRIVEWAYS AT -L- STA. 333+50 AND 333+65 ON PARCEL 214.

8/17/99

Permit Drawing
Sheet 79 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

PIs Sta 330+67.086
Δs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

PI Sta 331+55.524
Δ = 22° 04' 18.3" (LT)
L = 115.567
T = 58.209
R = 300.000
SE = SEE PLANS
xxV = 85 kph

PIs Sta 332+42.647
Δs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

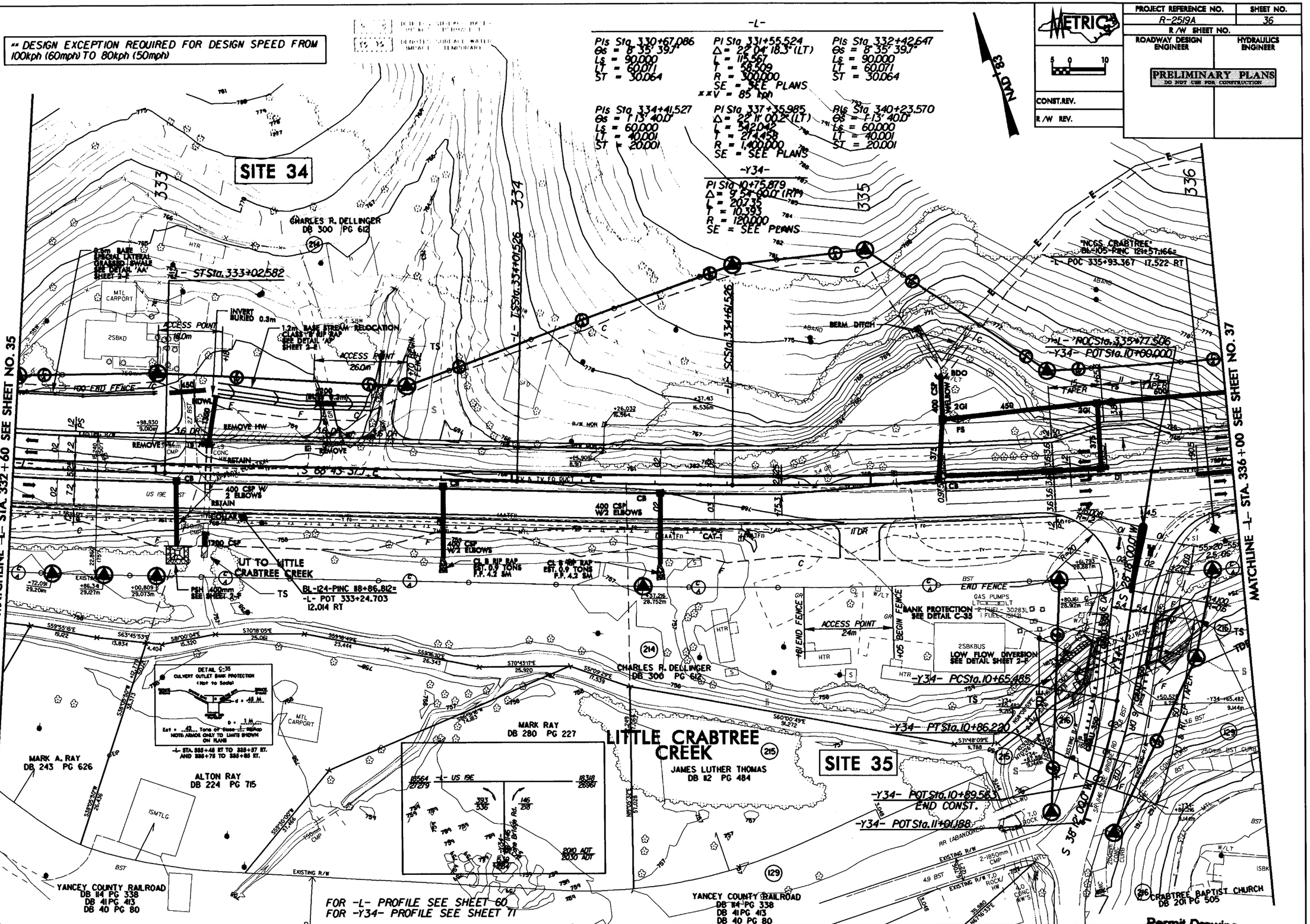
PIs Sta 334+41.527
Δs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

PI Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.040
T = 274.458
R = 1,400.000
SE = SEE PLANS

PIs Sta 340+23.570
Δs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

-Y34-

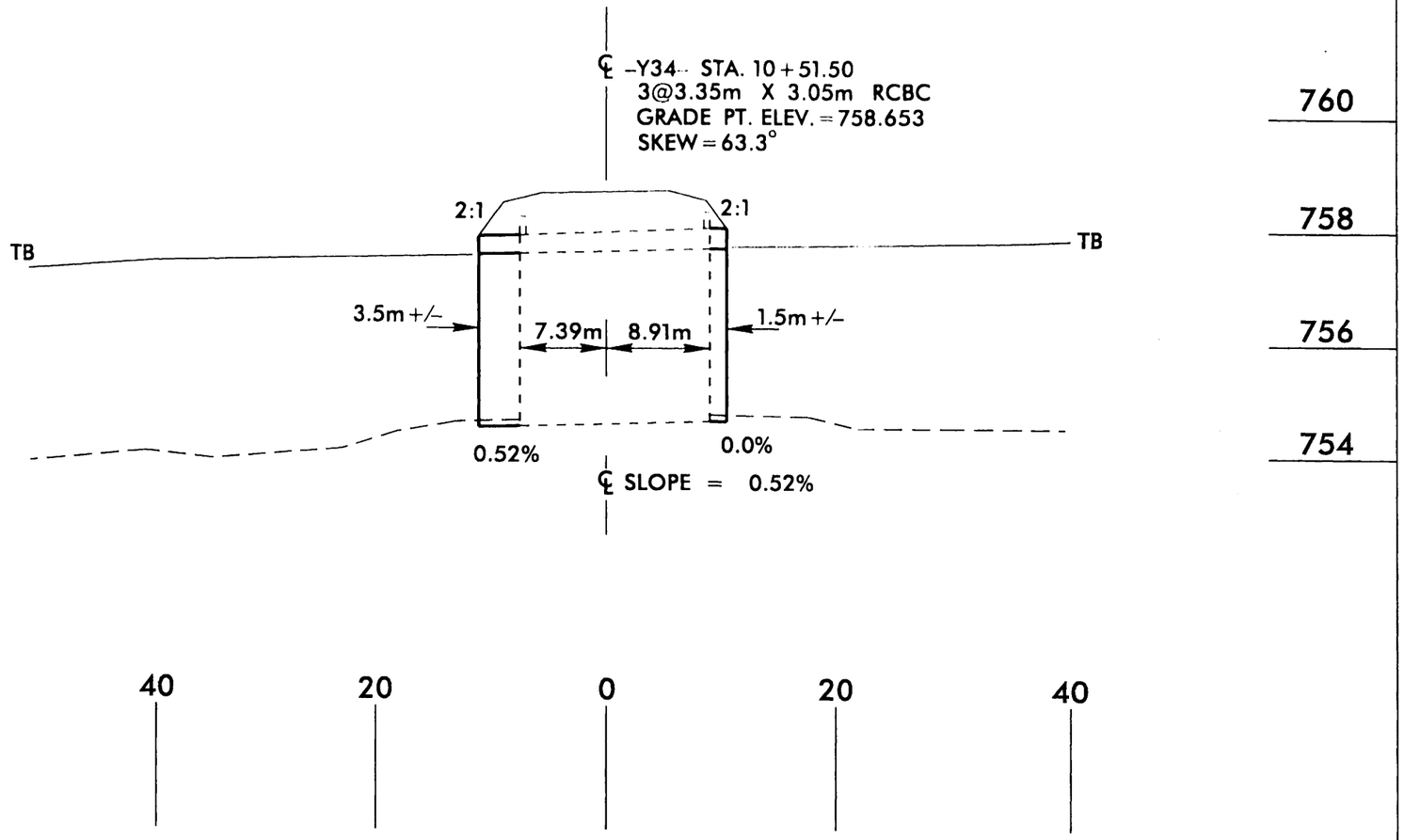
PI Sta 10+75.879
Δ = 9° 54' 00.0" (RT)
L = 207.35
T = 103.93
R = 1200.000
SE = SEE PLANS



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED DRIVEWAY & ACCESS POINT @ STA 334+93 FOR PARCEL 214; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/06 (TMW): REVISED PROPERTY LINE BETWEEN PARCELS 215 & 216.
R/W REV. 03/30/07 (RVP): ADDED ACCESS POINT AND TWO DRIVEWAYS AT -L- STA. 333+50 AND 333+65 ON PARCEL 214.

Permit Drawing
Sheet 80 of 86



-Y34- STATION 10+51.50
3 @ 3.35m X 3.05m RCBC

SITE 35
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

10/25/06

Permit Drawing
Sheet 51 of 56

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

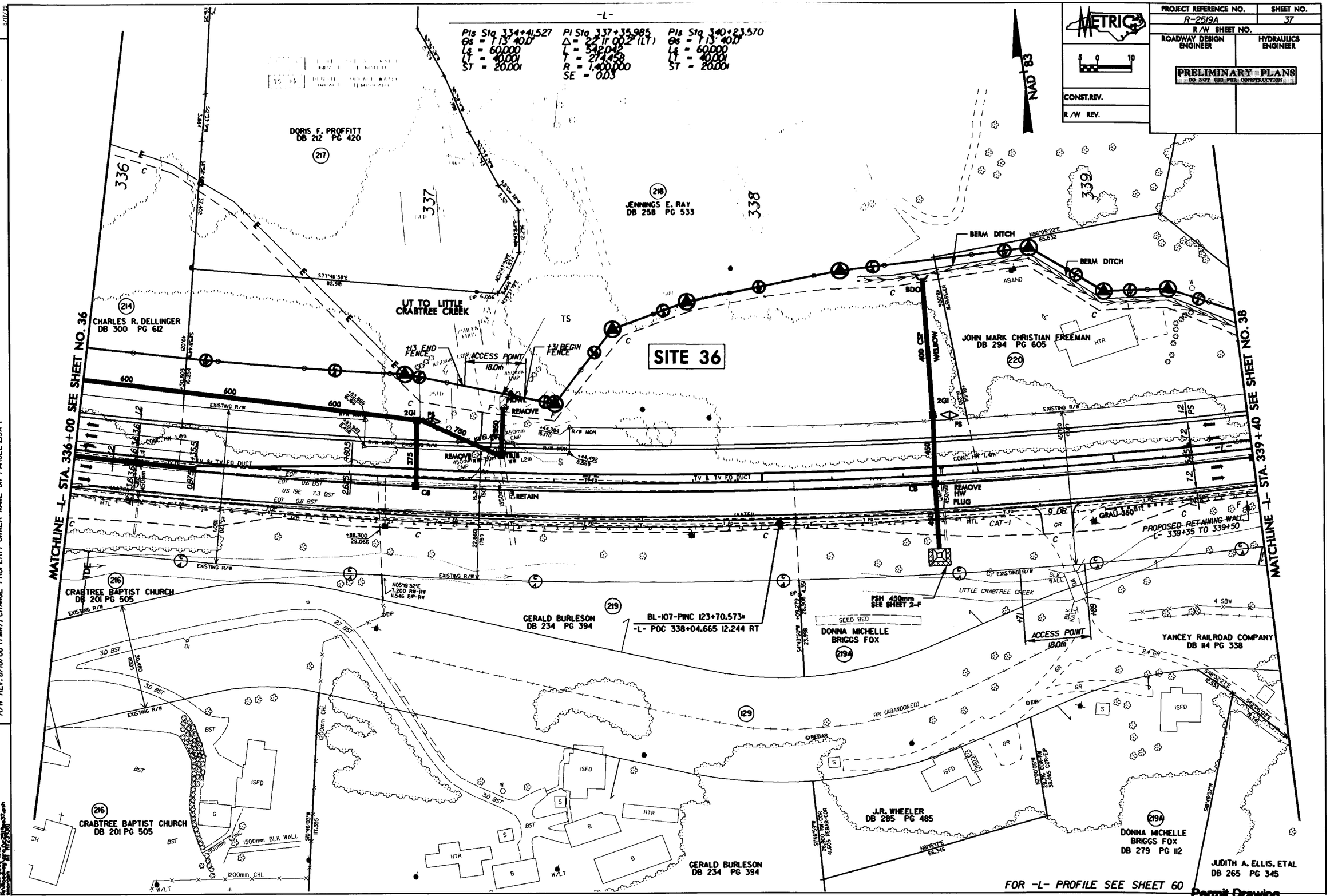
NAD 83

-L-

Pls Sta 334+41.527
Θs = 113° 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

Pl Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = 0.03

Pls Sta 340+23.570
Θs = 113° 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); ELIMINATED CLAIM ON PARCEL 220A (G.E. FREEMAN).
R/W REV. 8/10/06 (TMW); CHANGE PROPERTY OWNER NAME ON PARCEL 219A.

8/17/09

Permit Drawing
Sheet 82 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

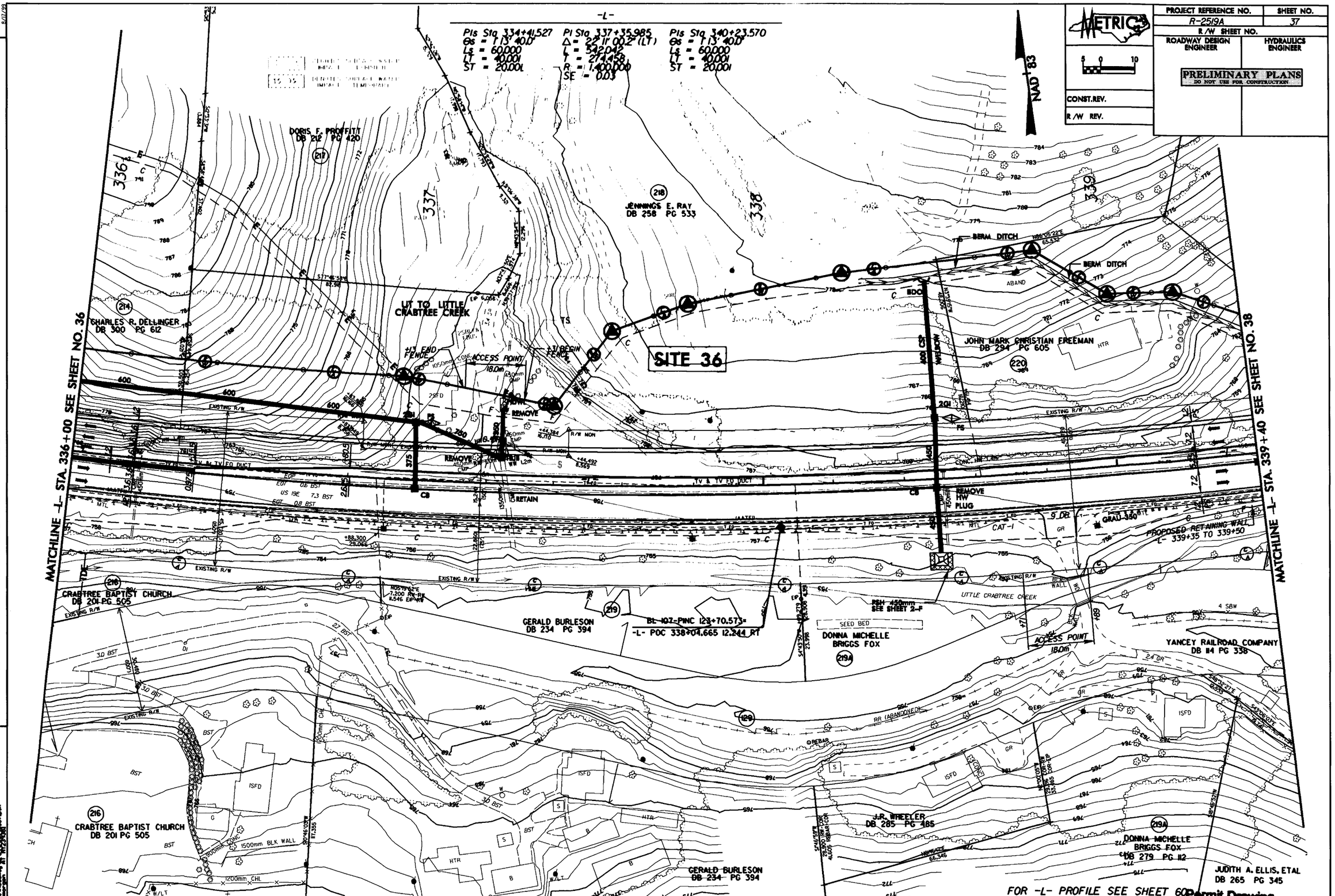
R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW): ELIMINATED CLAIM ON PARCEL 220A (G. E. FREEMAN).
R/W REV. 8/10/06 (TMW): CHANGE PROPERTY OWNER NAME ON PARCEL 219A.

8/17/99



Permit Drawing
Sheet 53 of 86

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-Y35- POT Sta. 10+00.000

UT TO LITTLE CHARTREE CREEK

-L-

PIs Sta 334+41.527	PI Sta 337+35.985	PIs Sta 340+23.570
θs = 1°13' 40.0"	Δ = 22°11' 00.2" (LT)	θs = 1°13' 40.0"
Ls = 60.000	L = 342.042	Ls = 60.000
LT = 40.001	T = 171.458	LT = 40.001
ST = 20.001	R = 1,400.000	ST = 20.001
	SE = 0.03	
PIs Sta 342+86.635	PI Sta 343+89.679	PIs Sta 344+90.063
θs = 8°35' 39.7"	Δ = 27°23' 38.4" (RT)	θs = 8°35' 39.7"
Ls = 90.000	L = 143.435	Ls = 90.000
LT = 60.071	T = 73.115	LT = 60.071
ST = 30.064	R = 300.000	ST = 30.064
	SE = SEE PLANS	
	xxV = 85 kph	

-Y35-

PI Sta 10+55.129	PI Sta 11+08.820
Δ = 38°14' 00.0" (RT)	Δ = 23°50' 00.0" (LT)
L = 33.365	L = 24.928
T = 17.330	T = 12.662
R = 50.000	R = 60.000
SE = SEE PLANS	SE = SEE PLANS

-Y35- PCSta. 10+37.798

SITE 37

-Y35- PTSta. 10+71.163
BRG AH = S 34°17' 00.0" W

BEGIN CONST.
-Y35- POCSta. 10+64.255

END FENCE

WOOD BRIDGE

G. E. FREEMAN
DB 256 PG 108

-Y35- PCSta. 10+96.158

-Y35- PTSta. 11+21.116
BRG AH = S 10°27' 00.0" W

JOHN ERIC GARLAND
DB 280 PG 536

BERM DITCH

-L- CSSta. 340+03.569

1.2m BASE STREAM RELOCATION
CLASS "B" RIP RAP
SEE DETAIL "A2"
SHEET 2-E

ACCESS POINT
5.38.0m

-L- TSSta. 342+26.564

OVEL TOMBERLIN
DB 118 PG 371

-L- POSSta. 342+75.338
-Y36- POT Sta. 10+00.000

MATCHLINE -L- STA. 339+40 SEE SHEET NO. 37

MATCHLINE -L- STA. 342+80 SEE SHEET NO. 39

PROPOSED RETAINING WALL
-L- 339+35 TO 339+50

PROPOSED RETAINING WALL F
-L- 341+22 TO 341+80

+00 BEGIN FENCE

ACCESS POINT
18.0m

BL-108-PINC 126+04.583 =
-L- POS 340+36.993
12.169 RT

RALPH R. TOMBERLIN
DB 130 PG 603

-L- ST Sta. 340+63.569

-L- POCSta. 340+40.112
-Y35- POT Sta. 11+26.151

BL-110-PINC 128+31.400=
-L- POS 342+64.105 13.364 RT

-Y36- PCSta. 10+12.480
BRG BK = S 1°28' 00.0" E

PSH 800mm
SEE SHEET 2-F

OVEL TOMBERLIN
DB 118 PG 371

-Y36-
PI Sta 10+28.891
Δ = 66°34' 00.0" (LT)
L = 29.045
T = 16.412
R = 25.000
SE = SEE PLANS

HUEY HARDING
DB 115 PG 396

YANCEY RAILROAD COMPANY
DB 114 PG 338

JUDITH A. ELLIS, ETAL
DB 265 PG 345

R. C. FOX, JR.
DB 125 PG 627

LITTLE CHARTREE CREEK

FOR -L- PROFILE SEE SHEET 61
FOR -Y35- & -Y36- PROFILE SEE SHEET 71

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); ELIMINATED CLAIM AND PARCEL 220A (G. E. FREEMAN)
R/W REV. 3/30/07 (RVP); REVISED PROPOSED PDE ON PARCEL 223.
R/W REV. 02/15/08 (RVP); ADDED DRIVEWAY & ACCESS POINT AT STA. 340+80 ON PARCEL 223.

Permit Drawing
Sheet 54 of 61

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83

-Y35- POT Sta. 10+00.000

UT TO LITTLE CRABTREE CREEK

-L-

PI Sta 334+41.527
Gs = 7 13' 40.0"
Ls = 60.000
Lt = 40.001
ST = 20.001

PI Sta 337+35.985
Δ = 22 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = 0.03

PI Sta 340+23.570
Gs = 7 13' 40.0"
Ls = 60.000
Lt = 40.001
ST = 20.001

PI Sta 342+86.635
Gs = 8 35' 39.7"
Ls = 90.000
Lt = 60.071
ST = 30.064

PI Sta 343+89.679
Δ = 27 23' 38.4" (RT)
L = 143.435
T = 73.115
R = 300.000
SE = SEE PLANS
** V = 85 kph

PI Sta 344+90.063
Gs = 8 35' 39.7"
Ls = 90.000
Lt = 60.071
ST = 30.064

-Y35-

PI Sta 10+55.129
Δ = 38 14' 00.0" (RT)
L = 33.365
T = 17.330
R = 50.000
SE = SEE PLANS

PI Sta 11+08.820
Δ = 23 50' 00.0" (LT)
L = 24.958
T = 12.662
R = 60.000
SE = SEE PLANS

SITE 37

-Y35- PCSta. 10+37.798

-Y35- PTSta. 10+71.163
BRG. AH = S 34 17' 00.0" W

-Y35- PCSta. 10+96.158

-Y35- PTSta. 11+21.16
BRG. AH = S 10 27' 00.0" W

BEGIN CONST.
-Y35- POCSta. 10+64.255

-L- TSSta. 342+26.564

-L- POSSta. 342+75.338
-Y36- POT Sta. 10+00.006

-L- CSSta. 340+03.569

MATCHLINE -L- STA. 339+40 SEE SHEET NO. 37

MATCHLINE -L- STA. 342+80 SEE SHEET NO. 39

G. E. FREEMAN
DB 258 PG 108

JOHN ERIC GARLAND
DB 280 PG 536

OVEL TOMBERLIN
DB 118 PG 371

BERM DITCH

END FENCE

WOOD BRIDGE

1.0m BASE STREAM RELOCATION
CLASS "B" RIP RAP
SEE DETAIL A2
SHEET 2-E

ACCESS POINT
38.0m

CL B RIP RAP
EST. 0.9 TONS
P.F. 4.2 SM

PROPOSED RETAINING WALL
-L- 339+35 TO 339+50

PROPOSED RETAINING WALL F
-L- 341+22 TO 341+80

+00 BEGIN FENCE

RT EP TAPER

ACCESS POINT
18.0m

BL-108-PINC 126+04.583 =
-L- POS 340+36.993
12.169 RT

-L- POCSta. 340+40.112
-Y35- POT Sta. 11+26.151

-L- STSta. 340+63.569

RALPH R. TOMBERLIN
DB 130 PG 603

BL-110-PINC 128+31.400 =
-L- POS 342+64.105 13.364 RT

-Y36- PCSta. 10+12.480
BRG. BK = S 1 28' 00.0" E

PSH 800mm
SEE SHEET 2-F

OVEL TOMBERLIN
DB 118 PG 371

-Y36-
PI Sta 10+28.891
Δ = 66 34' 00.0" (LT)
L = 29.045
T = 16.412
R = 25.000
SE = SEE PLANS

1500mm WD RAIL

2010 ADT
2030 ADT

HUEY HARDING
DB 115 PG 346

YANCEY RAILROAD COMPANY
DB 114 PG 338

JUDITH A. ELLIS, ETAL
DB 265 PG 345

R. C. FOX, JR.
DB 125 PG 627

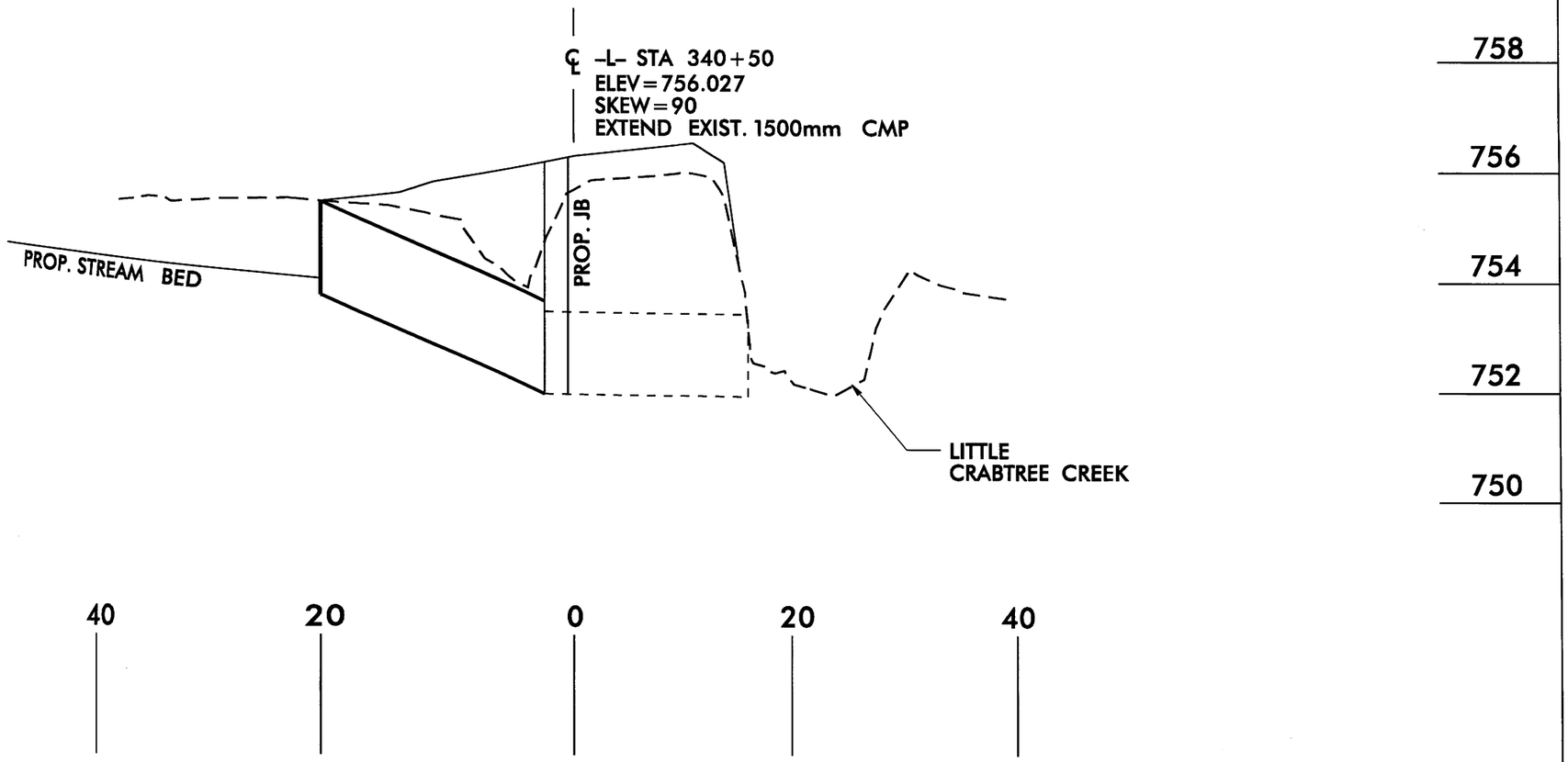
LITTLE CRABTREE CREEK

FOR -L- PROFILE SEE SHEET 61
FOR -Y35- & -Y36- PROFILE SEE SHEET 71

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET
R/W REV. 2/27/06 (TMW): ELIMINATE PARCEL 222A AND PORTION OF PARCEL 222
R/W REV. 2/21/06 (RVP): REVISED PROPOSED R/W ON PARCEL 221.
R/W REV. 02/15/08 (RVP): ADDED DRIVEWAY & ACCESS POINT AT STA. 340+80 ON PARCEL 223.

Permit Drawing
Sheet 85 of 86



-L- STATION 340+50
EXTEND EXISTING 1500mm CMP
W/1500mm RCP

SITE 37
PROFILE VIEW

NCDOT
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: WBS 35609.1.1 (R-2519A)
US 19 E EAST OF
SR 1336 (JACKS CREEK ROAD)
TO SR 1186 (OLD US 19)

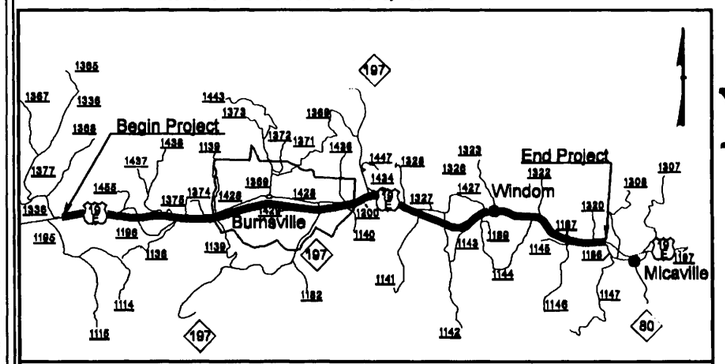
10/25/06

Permit Drawing
Sheet 86 of 86

6/24/99

R-2519A

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

YANCEY COUNTY

LOCATION: US 19 E FROM EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19)

TYPE OF WORK: GRADING, DRAINAGE, WIDENING, RESURFACING CURB & GUTTER, SIGNALS, GUARDRAIL, AND STRUCTURES

METRIC
ALL DIMENSIONS IN THESE PLANS ARE IN METERS

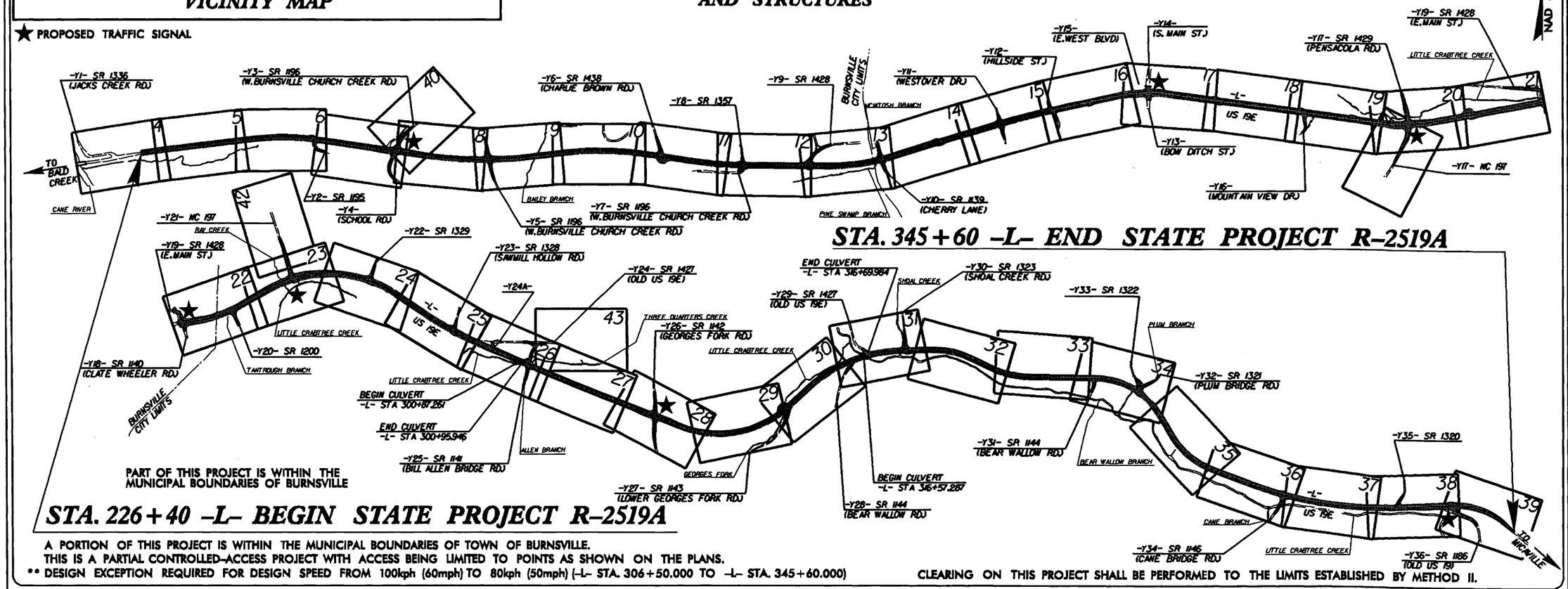
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2519A	1	

STATE PROJ. NO.	R.A. PROJ. NO.	DESCRIPTION
35609.1.1		PE
35609.2.1		R/W, UTILI
35609.3.1		CONST

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83

★ PROPOSED TRAFFIC SIGNAL



STA. 345+60 -L- END STATE PROJECT R-2519A

PART OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF BURNSVILLE

STA. 226+40 -L- BEGIN STATE PROJECT R-2519A

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF TOWN OF BURNSVILLE.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph) (-L- STA. 306+50.000 TO -L- STA. 345+60.000)

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

CONTRACT:

GRAPHIC SCALES
PLANS (5 0 10)
PROFILE (HORIZONTAL) (5 0 10)
PROFILE (VERTICAL) (1 0 2)

DESIGN DATA

ADT 2006	=	25539
ADT 2026	=	37182
DHV	=	8 %
D	=	63 %
T	=	8 % *
(C&G sect.)V	=	80 km/h
(Shld. sect.)V	=	100 km/h**

* TTST 4 % DUAL 4 %

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT R-2519A	=	11.899 Km
LENGTH OF STRUCTURE PROJECT R-2519A	=	0.021 Km
TOTAL LENGTH OF ROADWAY PROJECT R-2519A	=	11.920 Km

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 31, 2005

LETTING DATE: FEBRUARY 16, 2010

BRENDA MOORE, PE
PROJECT ENGINEER

REKHA PATEL, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

03-MAR-2009 07:38
R:\Roadway\Proj\r2519a.tsh
Plotted on Mar 3, 2009

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJ. REFERENCE NO.	SHEET NO.
R-2519A	1-B

METRIC

*S.U.E = SUBSURFACE UTILITY ENGINEER

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

Edge of Pavement
Curb
Prop. Slope Stakes Cut — C
Prop. Slope Stakes Fill — F
Prop. Woven Wire Fence
Prop. Chain Link Fence
Prop. Barbed Wire Fence
Prop. Wheelchair Ramp — WCR
Exist. Guardrail
Prop. Guardrail
Equality Symbol
Pavement Removal

RIGHT OF WAY

Baseline Control Point
Existing Right of Way Marker
Exist. Right of Way Line wMarker
Prop. Right of Way Line with Proposed R/W marker (Iron Pin & Cap)
Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
Exist. Control of Access Line — CA
Prop. Control of Access Line — CA
Exist. Easement Line — E
Prop. Temp. Construction Easement Line — E
Prop. Temp. Drainage Easement Line — TDE
Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

Stream or Body of Water
Flow Arrow
Disappearing Stream
Spring
Swamp Marsh
Shoreline
Falls, Rapids
Prop Lateral, Tail, Head Ditches — FLOW

STRUCTURES

MAJOR
Bridge, Tunnel, or Box Culvert — CONC
Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR
Head & End Wall — CONC HW
Pipe Culvert
Footbridge
Drainage Boxes — CB
Paved Ditch Gutter

UTILITIES

Exist. Pole
Exist. Power Pole
Prop. Power Pole
Exist. Telephone Pole
Prop. Telephone Pole
Exist. Joint Use Pole
Prop. Joint Use Pole
Telephone Pedestal — T
Cable TV Pedestal — C
Hydrant
Satellite Dish
Exist. Water Valve
Sewer Clean Out
Power Manhole — P
Telephone Booth
Water Manhole — W
Light Pole
H-Frame Pole
Power Line Tower
Pole with Base
Gas Valve
Gas Meter
Telephone Manhole — T
Power Transformer
Sanitary Sewer Manhole
Storm Sewer Manhole — S
Tank; Water, Gas, Oil
Water Tank With Legs
Traffic Signal Junction Box — S
Fiber Optic Splice Box — F
Television or Radio Tower
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS — TS

Recorded Water Line — W
Designated Water Line (S.U.E.*) — W
Sanitary Sewer — SS
Recorded Sanitary Sewer Force Main — FSS
Designated Sanitary Sewer Force Main(S.U.E.*) — FSS
Recorded Gas Line — G
Designated Gas Line (S.U.E.*) — G
Storm Sewer — S
Recorded Power Line — P
Designated Power Line (S.U.E.*) — P
Recorded Telephone Cable — T
Designated Telephone Cable (S.U.E.*) — T
Recorded U/G Telephone Conduit — TC
Designated U/G Telephone Conduit (S.U.E.*) — TC
Unknown Utility (S.U.E.*) — 2UTL
Recorded Television Cable — TV
Designated Television Cable (S.U.E.*) — TV
Recorded Fiber Optics Cable — FO
Designated Fiber Optics Cable (S.U.E.*) — FO
Exist. Water Meter — D
U/G Test Hole (S.U.E.*)
Abandoned According to U/G Record — ATTUR
End of Information — E.O.I.

BOUNDARIES & PROPERTIES

State Line
County Line
Township Line
City Line
Reservation Line
Property Line
Property Line Symbol — PL
Exist. Iron Pin — EIP
Property Corner
Property Monument — ECM
Property Number — 123
Parcel Number — 6
Fence Line — WW & ISBW
Existing Wetland Boundaries — WLB
Proposed Wetland Boundaries — WLB
Existing Endangered Animal Boundaries — EAB
Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

Buildings
Foundations
Area Outline
Gate
Gas Pump Vent or U/G Tank Cap
Church
School
Park
Cemetery
Dam
Sign
Well
Small Mine
Swimming Pool

TOPOGRAPHY

Loose Surface
Hard Surface
Change in Road Surface
Curb
Right of Way Symbol — R/W
Guard Post — GP
Paved Walk
Bridge
Box Culvert or Tunnel
Ferry
Culvert
Footbridge
Trail, Footpath
Light House

VEGETATION

Single Tree
Single Shrub
Hedge
Woods Line
Orchard
Vineyard — VINEYARD

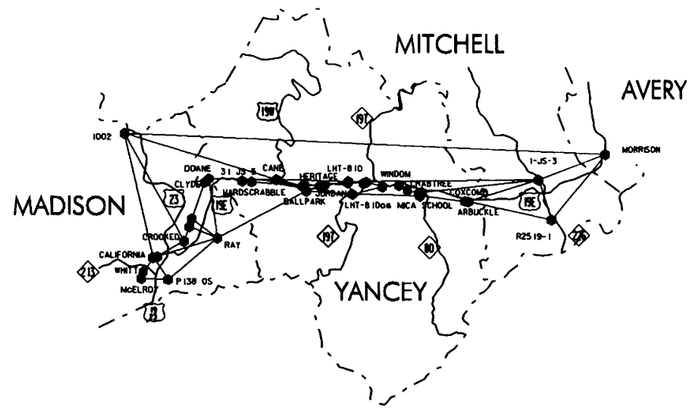
RAILROADS

Standard Gauge — CSX TRANSPORTATION
RR Signal Milepost — MILEPOST 35
Switch — SWITCH

revised 2/25/97

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	1C
LOCATION & SURVEYS	

SURVEY CONTROL SHEET



GPS CONTROL NETWORK
NOT TO SCALE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2519A-1"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF
NORTHING= 244960.7311(m) EASTING= 307037.9041(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999822000
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2519A-1" TO -L- STATION 224+30.000 IS
N 82°14'01" E 417.095m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES:

THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO EXISTING NCGS AND NCDOT MONUMENTS USING USING A NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

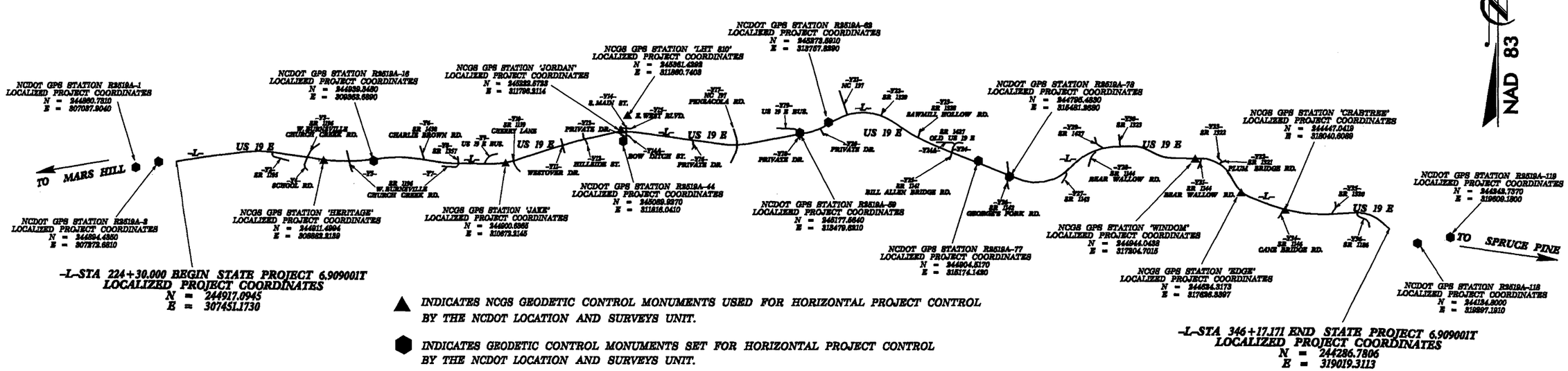
THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:

R2519A_LS_GPSCALIB_030710.HTML
R2519A_LS_WGS84_030710.TXT
R2519A_LS_LOCAL_030710.TXT
R2519A_LS_CONTROL_030710.TXT

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



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

⬢ INDICATES GEODETIC CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED UTILIZING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING NCGS AND NCDOT MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES

NOTE: DRAWING NOT TO SCALE

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	1D
LOCATION & SURVEYS	

METRIC

SURVEY CONTROL SHEET

GPS CALIBRATION REPORT

PROJECT : 6.909001T

TIP NUMBER	R 2519A		
USER NAME	J.GORDON	DATE & TIME	9:50:08 AM 7/10/03
COORDINATE SYSTEM	US STATE PLANE 1983(AT GROUND)	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM		GEOID MODEL	GEOID99 (CONUS)
COORDINATE UNITS	METERS		
DISTANCE UNITS	METERS		
HEIGHT UNITS	METERS		

LOCAL SITE INFORMATION
LOCALIZED AROUND

LATITUDE	35°54'40.40569"N
LONGITUDE	82°21'10.08524"W
SITE SCALE FACTOR	1.0001780300

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED. PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS. THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	242970.986M
EASTING COORDINATE OF ROTATION CENTER	307548.408M
ROTATION ABOUT THE CENTER POINT	0°00'01"
TRANSLATION NORTH	0.182M
TRANSLATION EAST	0.134M
SCALE FACTOR	0.99999376

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	250378.278M
EASTING COORDINATE OF ORIGIN POINT	288404.211M
VERTICAL SEPARATION AT ORIGIN	-0.164M
SLOPE NORTH	-6.147PPM
SLOPE EAST	2.750PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.051M	0.022	MCELROY WGS84
VERTICAL	0.058M	0.019	R2519-1 WGS84
THREE-DIMENSIONAL	0.070M	0.030	R2519-1 WGS84

POINT RESIDUALS

WGS84 COORDINATES — CALCULATED POINT FOR DISPLAY ONLY — LOCAL COORDINATES

POINT (WGS84)	LATITUDE	LONGITUDE	HEIGHT	NORTHING	EASTING	ELEVATION	HORZ ERROR	VERT ERROR	3D ERROR	POINT (LOCAL)	NORTHING	EASTING	ELEVATION	UTILIZED	QUALITY
1002 WGS84	35°57'18.23692"N	82°33'40.58624"W	1138.290M	250378.278M	288404.211M	1168.476M	0.005M	0.029M	0.029M	1002 LOCAL	250378.282M	288404.209M	1168.505M	HORZ AND VERT	SURVEY QUALITY
MORRISON WGS84	35°57'01.20615"N	82°00'06.61923"W	785.629M	248185.080M	338836.069M	816.593M	0.045M	0.038M	0.059M	MORRISON LOCAL	248185.061M	338836.110M	816.631M	HORZ AND VERT	SURVEY QUALITY
P1380S WGS84	35°49'07.57718"N	82°30'18.43879"W	609.483M	235083.000M	292933.378M	639.625M	0.044M	0.024M	0.050M	P1380S LOCAL	235082.994M	292933.422M	639.601M	HORZ AND VERT	SURVEY QUALITY
MCELROY WGS84	35°49'08.34324"N	82°32'10.84083"W	623.054M	235206.669M	290114.142M	653.216M	0.051M	0.018M	0.054M	MCELROY LOCAL	235206.667M	290114.193M	653.234M	HORZ AND VERT	SURVEY QUALITY
A29 WGS84	35°49'12.60019"N	82°32'09.91589"W	624.831M	235336.974M	290142.022M	654.993M	0.021M	0.003M	0.021M	A29 LOCAL	235336.956M	290142.011M	654.996M	HORZ AND VERT	SURVEY QUALITY
WHIT WGS84	35°49'30.74194"N	82°32'04.47281"W	646.937M	235890.954M	290298.490M	677.098M	0.019M	0.009M	0.021M	WHIT LOCAL	235890.937M	290298.480M	677.107M	HORZ AND VERT	SURVEY QUALITY
R2518A-1 WGS84	35°50'20.53533"N	82°31'25.07228"W	669.985M	237389.661M	291341.410M	700.142M	0.031M	0.013M	0.034M	R2518A-1 LOCAL	237389.656M	291341.441M	700.155M	HORZ AND VERT	SURVEY QUALITY
CALIFORNIA WGS84	35°50'21.68963"N	82°31'19.73202"W	651.305M	237420.463M	291476.622M	681.461M	0.018M	0.010M	0.020M	CALIFORNIA LOCAL	237420.447M	291476.613M	681.471M	HORZ AND VERT	SURVEY QUALITY
R2518A-2 WGS84	[illegible]	[illegible]	651.704M	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.024M	R2518A-2 LOCAL	237475.804M	[illegible]	681.867M	HORZ AND VERT	SURVEY QUALITY
CROOKED WGS84	35°51'18.87216"N	82°29'17.64808"W	662.295M	[illegible]	[illegible]	682.436M	[illegible]	0.009M	0.018M	CROOKED LOCAL	239073.799M	294600.792M	682.427M	HORZ AND VERT	SURVEY QUALITY
BUCKNER WGS84	35°52'08.98706"N	[illegible]	674.185M	[illegible]	[illegible]	[illegible]	0.013M	0.001M	0.013M	BUCKNER LOCAL	240600.347M	295146.315M	704.323M	HORZ AND VERT	SURVEY QUALITY
WILJOR WGS84	35°52'35.84055"N	82°28'49.33304"W	680.686M	241419.904M	[illegible]	710.821M	[illegible]	0.006M	0.008M	WILJOR LOCAL	241419.908M	295394.042M	710.827M	HORZ AND VERT	SURVEY QUALITY
RAY WGS84	35°51'33.46645"N	82°26'59.21916"W	687.007M	239402.005M	298087.976M	717.120M	0.013M	0.022M	0.026M	RAY LOCAL	239402.005M	298087.989M	717.098M	HORZ AND VERT	SURVEY QUALITY
CLYDE WGS84	35°54'41.56352"N	82°28'00.48532"W	839.678M	245250.038M	296754.060M	869.810M	0.012M	0.023M	0.026M	CLYDE LOCAL	245250.044M	296754.070M	869.833M	HORZ AND VERT	SURVEY QUALITY
DOANE WGS84	35°54'54.30626"N	82°27'43.68444"W	825.867M	245627.891M	297188.804M	856.001M	0.008M	0.028M	0.029M	DOANE LOCAL	245627.896M	297188.809M	856.029M	HORZ AND VERT	SURVEY QUALITY
31-JS-5 WGS84	35°54'50.87911"N	82°25'22.76679"W	755.917M	245399.784M	300716.558M	786.076M	0.015M	0.023M	0.027M	31-JS-5 LOCAL	245399.793M	300716.546M	786.099M	HORZ AND VERT	SURVEY QUALITY
HARDSCRABBLE WGS84	35°54'48.93389"N	82°24'43.83053"W	747.653M	245306.248M	301690.259M	777.820M	0.014M	0.022M	0.026M	HARDSCRABBLE LOCAL	245306.258M	301690.250M	777.842M	HORZ AND VERT	SURVEY QUALITY
CANE WGS84	35°55'00.14153"N	82°23'00.86249"W	725.587M	245563.151M	304282.501M	755.785M	0.010M	0.008M	0.013M	CANE LOCAL	245563.159M	304282.495M	755.793M	HORZ AND VERT	SURVEY QUALITY
R2519A-1 WGS84	35°54'40.39980"N	82°21'10.09045"W	750.582M	244860.726M	307037.912M	780.787M	0.009M	0.005M	0.011M	R2519A-1 LOCAL	244860.731M	307037.904M	780.782M	HORZ AND VERT	SURVEY QUALITY
R2519A-2 WGS84	35°54'41.74954"N	82°21'00.77825"W	744.760M	244894.425M	307272.698M	774.967M	0.020M	0.015M	0.025M	R2519A-2 LOCAL	244894.435M	307272.681M	774.952M	HORZ AND VERT	SURVEY QUALITY
BALLPARK WGS84	35°54'23.14085"N	82°20'53.15029"W	770.452M	244314.688M	307444.525M	800.648M	0.012M	0.007M	0.014M	BALLPARK LOCAL	244314.694M	307444.514M	800.641M	HORZ AND VERT	SURVEY QUALITY
HERITAGE WGS84	35°54'44.06027"N	82°19'56.65147"W	806.938M	244911.491M	308882.232M	837.158M	0.023M	0.020M	0.030M	HERITAGE LOCAL	244911.502M	308882.212M	837.138M	HORZ AND VERT	SURVEY QUALITY
R2519A-16 WGS84	35°54'45.48704"N	82°19'37.49870"W	793.841M	244939.338M	309363.708M	824.066M	0.021M	0.024M	0.032M	R2519A-16 LOCAL	244939.348M	309363.689M	824.042M	HORZ AND VERT	SURVEY QUALITY
LHT-8200S WGS84	35°54'18.88995"N	82°17'39.37039"W	807.636M	244021.155M	312297.024M	837.877M	0.016M	0.026M	0.031M	LHT-8200S LOCAL	244021.161M	312297.009M	837.851M	HORZ AND VERT	SURVEY QUALITY
R2519A-44 WGS84	35°54'53.02476"N	82°17'59.95512"W	827.195M	245089.920M	311816.058M	857.448M	0.018M	0.013M	0.022M	R2519A-44 LOCAL	245089.927M	311816.041M	857.435M	HORZ AND VERT	SURVEY QUALITY
JORDAN WGS84	35°54'57.30402"N	82°18'00.92167"W	824.227M	245222.561M	311796.220M	854.482M	0.042M	0.024M	0.048M	JORDAN LOCAL	245222.580M	311796.183M	854.458M	HORZ AND VERT	SURVEY QUALITY
LHT-810 WGS84	[illegible]	[illegible]	[illegible]	245361.425M	311860.760M	857.975M	0.020M	0.015M	0.025M	LHT-810 LOCAL	245361.432M	311860.741M	857.960M	HORZ AND VERT	SURVEY QUALITY
R2519A-59 WGS84	[illegible]	[illegible]	[illegible]	245177.559M	313479.638M	801.378M	0.018M	0.020M	0.027M	R2519A-59 LOCAL	245177.565M	313479.621M	801.358M	HORZ AND VERT	SURVEY QUALITY
R2519A-62 WGS84	[illegible]	[illegible]	[illegible]	245273.584M	313757.846M	798.707M	0.018M	0.025M	0.030M	R2519A-62 LOCAL	245273.592M	313757.830M	798.682M	HORZ AND VERT	SURVEY QUALITY
R2519A-77 WGS84	[illegible]	[illegible]	[illegible]	244904.511M	315174.158M	787.276M	0.016M	0.022M	0.027M	R2519A-77 LOCAL	244904.517M	315174.143M	787.254M	HORZ AND VERT	SURVEY QUALITY
R2519A-78 WGS84	35°54'47.40597"N	82°15'33.47902"W	759.246M	244795.477M	315481.283M	789.561M	0.016M	0.014M	0.022M	R2519A-78 LOCAL	244795.484M	315481.268M	789.547M	HORZ AND VERT	SURVEY QUALITY
WINDOM WGS84	35°54'54.05602"N	82°14'24.97990"W	736.954M	244944.128M	317204.715M	767.316M	0.016M	0.011M	0.020M	WINDOM LOCAL	244944.136M	317204.701M	767.305M	HORZ AND VERT	SURVEY QUALITY
CRABTREE WGS84	35°54'38.82413"N	82°13'51.01720"W	728.854M	244447.099M	318040.600M	759.236M	0.016M	0.012M	0.020M	CRABTREE LOCAL	244447.108M	318040.587M	759.224M	HORZ AND VERT	SURVEY QUALITY
R2519A-118 WGS84	35°54'30.02196"N	82°13'00.52932"W	725.077M	244134.802M	319297.196M	755.499M	0.004M	0.010M	0.011M	R2519A-118 LOCAL	244134.800M	319297.192M	755.489M	HORZ AND VERT	SURVEY QUALITY
R2519A-119 WGS84	35°54'33.84966"N	82°12'48.23409"W	717.739M	244242.743M	319609.183M	748.172M	0.007M	0.001M	0.007M	R2519A-119 LOCAL	244242.737M	319609.180M	748.171M	HORZ AND VERT	SURVEY QUALITY
MICA SCHOOL WGS8	35°54'21.33548"N	82°12'55.79738"W	720.561M	243863.339M	319407.125M	750.985M	0.009M	0.003M	0.009M	MICA SCHOOL LOCAL	243863.330M	319407.124M	750.982M	HORZ AND VERT	SURVEY QUALITY
COXCOMB WGS84	35°54'07.61367"N	82°09'47.14351"W	804.762M	243288.591M	324122.253M	835.346M	0.014M	0.008M	0.016M	COXCOMB LOCAL	243288.579M	324122.259M	835.354M	HORZ AND VERT	SURVEY QUALITY
ARBUCKLE WGS84	35°54'06.69143"N	82°09'33.55389"W	803.741M	243249.325M	324461.991M	834.337M	0.015M	0.003M	0.015M	ARBUCKLE LOCAL	243249.312M	324461.998M	834.340M	HORZ AND VERT	SURVEY QUALITY
1-JS-3 WGS84	35°55'28.51772"N	82°04'44.51009"W	741.764M	245542.637M	331785.627M	772.570M	0.037M	0.014M	0.040M	1-JS-3 LOCAL	245542.613M	331785.655M	772.584M	HORZ AND VERT	SURVEY QUALITY
R2519-1 WGS84	35°53'14.14677"N	82°03'45.84036"W	758.812M	241357.144M	333128.111M	789.778M	0.039M	0.058M	0.070M	R-2519-1 LOCAL	241357.118M	333128.140M	789.836M	HORZ AND VERT	SURVEY QUALITY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2519A-1"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 244860.731(m) EASTING: 307037.904(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.999822000
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2519A-1" TO -L- STATION 224+30.000 IS N 82°14'01" E 417.095m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES:

THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO EXISTING NCGS AND NCDOT MONUMENTS USING USING A NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:

R2519A_LS_GPSCALIB_030710.HTML
R2519A_LS_WGS84_030710.TXT
R2519A_LS_LOCAL_030710.TXT
R2519A_LS_CONTROL_030710.TXT

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

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	1E
LOCATION & SURVEYS	

SURVEY CONTROL SHEET

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	244860.7310	307037.9040	780.732	OUTSIDE PROJECT LIMITS	
2	BL-2	244894.4350	307272.6810	774.922	OUTSIDE PROJECT LIMITS	
4	BL-4	244933.9180	307520.2420	771.104	225+00.760	4.900 LT
6	BL-6	244986.8490	307831.3020	781.495	228+15.002	13.200 LT
8	BL-8	245019.7220	308090.3200	792.987	230+84.930	14.621 LT
9	BL-9	245023.3460	308374.4330	803.886	233+58.476	13.924 LT
11	BL-11	244974.4490	308717.3020	819.447	237+04.400	14.809 LT
15	BL-15	244911.4990	308882.2130	837.124	238+78.202	24.176 RT
17	BL-17	244936.2470	309104.4490	823.539	240+96.852	14.862 LT
16	BL-16	244939.3400	309363.6090	824.826	243+55.991	0.831 RT
18	BL-18	244971.7460	309600.0190	828.309	246+02.122	12.061 LT
21	BL-21	244925.7910	309858.7090	823.838	248+54.932	8.973 RT
23	BL-23	244885.5850	310169.1160	817.976	251+66.585	13.821 RT
30	BL-30	244909.3780	310421.2690	817.369	254+18.368	12.267 LT
32	BL-32	244900.6360	310672.2140	821.589	256+68.909	6.276 RT
33	BL-33	244981.8810	310983.9780	826.537	259+90.303	11.266 RT
37	BL-37	245061.4980	311236.8090	830.776	262+55.449	10.163 RT
40	BL-40	245125.9970	311467.1690	837.716	264+95.404	9.361 RT
43	BL-43	245222.5720	311796.2110	864.420	268+35.502	17.682 LT
46	BL-46	245161.4230	312092.3950	845.831	271+34.403	16.135 RT
51	BL-51	245152.6830	312343.5050	834.800	273+84.501	9.665 LT
52	BL-52	245093.6270	312632.0520	823.804	276+70.337	9.091 RT
54	BL-54	245068.5820	312909.5120	810.768	279+55.349	11.220 RT
58	BL-58	245138.9770	313162.4430	804.220	282+15.059	15.612 LT
59	BL-59	245177.5640	313479.6210	801.341	285+34.640	5.947 RT
62	BL-62	245273.5910	313767.0290	790.665	288+28.361	10.496 RT
64	BL-64	245376.4942	313988.8090	795.760	290+08.519	13.676 LT
67	BL-67	245394.3930	314158.5000	796.691	292+55.757	9.205 LT
68	BL-68	245297.6680	314393.4060	795.972	295+00.102	9.938 LT
71	BL-71	245147.6280	314598.5730	792.062	297+61.338	8.472 RT
73	BL-73	245018.2660	314934.4610	786.783	301+20.691	7.497 LT
77	BL-77	244904.5170	315174.1420	787.224	303+65.515	8.685 RT
78	BL-78	244795.4830	315481.2680	789.493	307+11.038	9.112 LT
81	BL-81	244689.9760	315716.8680	799.870	309+61.204	31.012 RT
82	BL-82	244787.5980	315947.7410	790.152	312+03.822	3.813 RT
84	BL-84	244947.6610	316120.1350	775.152	314+44.866	2.861 RT
88	BL-88	245066.8960	316311.6550	770.987	316+60.131	21.501 LT
91	BL-91	245057.9800	316491.6340	769.879	318+35.988	12.610 RT
95	BL-95	245065.3940	316680.1430	768.844	320+33.480	0.509 LT
96	BL-96	244961.7660	316898.0190	768.196	322+65.868	13.899 RT
97	BL-97	244944.8430	317204.7810	767.259	325+78.387	14.254 RT
99	BL-99	244918.2730	317430.9760	765.676	327+99.849	12.600 LT
103	BL-103	244741.2120	317543.1300	766.907	330+07.994	13.077 RT
104	BL-104	244624.3170	317626.3390	764.660	331+47.606	15.121 RT
124	BL-124	244541.3340	317787.2300	760.677	333+24.782	12.015 RT
105	BL-105	244447.8410	318040.6000	759.171	335+93.366	17.523 RT
107	BL-107	244413.9790	318251.4300	757.648	338+04.664	12.244 RT
108	BL-108	244408.8770	318485.3920	755.706	340+36.992	12.169 RT
110	BL-110	244420.6420	318711.9040	763.935	342+64.104	13.365 RT
112	BL-112	244395.5650	318983.8620	771.071	344+59.343	9.939 LT
113	BL-113	244278.0380	319029.1300	768.686	OUTSIDE PROJECT LIMITS	
115	BL-115	244176.5190	319144.1390	762.674	OUTSIDE PROJECT LIMITS	
118	BL-118	244134.8000	319297.1910	755.477	OUTSIDE PROJECT LIMITS	
119	BL-119	244242.7370	319609.1800	748.171	OUTSIDE PROJECT LIMITS	
122	BL-122	244218.1250	319872.3150	758.866	OUTSIDE PROJECT LIMITS	

BY

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y2	BL-2	244894.4350	307272.6810	774.922	OUTSIDE PROJECT LIMITS	
3	BY-3	244819.8130	307370.9140	776.160	OUTSIDE PROJECT LIMITS	

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
7	BY1-7	245025.5310	307371.7940	771.921	OUTSIDE PROJECT LIMITS	
5	BY1-5	244934.4010	307417.8160	771.752	OUTSIDE PROJECT LIMITS	
Y4	BL-4	244933.9105	307520.2430	773.311	225+08.751	4.559 LT

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y9	BL-9	245023.3460	308374.4330	803.808	233+58.476	13.925 LT
10	BY2-10	244963.5740	308393.6940	802.419	233+85.622	42.804 RT
12	BY2-12	244920.2570	308571.8740	807.770	235+68.442	59.808 RT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
14	BY3-14	245087.4090	308851.2780	824.186	238+28.878	145.986 LT
Y11	BL-11	244974.4580	308717.3020	819.433	237+04.480	14.810 LT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y111	BL-11	244974.4580	308717.3020	819.433	237+04.480	14.810 LT
13	BY4-13	244870.7540	308693.4610	821.932	236+95.920	91.246 RT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
19	BY5-19	245108.1050	309085.4220	831.819	240+75.829	177.810 LT
Y17	BL-17	244936.2472	309104.4490	823.538	240+96.852	14.862 LT
20	BY5-20	244866.7690	309148.8010	820.824	241+39.837	55.977 RT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
28	BY6-28	245184.8815	309387.8010	819.831	243+98.992	160.758 LT
27	BY6-27	245059.5690	309492.0460	824.428	244+94.173	104.587 LT
26	BY6-26	245091.1740	309602.7580	832.670	245+96.133	131.474 LT
25	BY6-25	244988.5380	309638.9270	838.320	246+31.433	29.366 LT
24	BY6-24	245032.8690	309724.3660	840.152	247+18.401	78.951 LT
22	BY6-22	245092.8330	309809.9120	834.380	247+82.403	148.997 LT
Y21	BL-21	244925.7918	309858.7090	823.828	248+54.932	8.973 RT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
29	BY7-29	244856.8130	309886.4460	814.527	248+92.606	73.067 RT
Y231	BL-23	244885.5055	310169.1163	817.981	251+66.585	13.820 RT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
123	BY8-123	244981.5410	310181.9580	824.471	251+77.877	82.431 LT
Y23	BL-23	244885.5055	310169.1163	817.981	251+66.585	13.820 RT

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
31	BY9-31	244986.9330	310523.9000	821.491	255+20.366	90.641 LT
Y30	BL-30	244909.3785	310421.2697	817.371	254+18.360	12.267 LT

BY10

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
35	BY10-35	244989.8400	310736.7150	823.520	257+51.606	67.867 LT
34	BY10-34	244908.7900	310763.9810	823.091	257+59.302	16.080 RT
36	BY10-36	244837.6740	310814.3940	827.426	257+87.248	98.863 RT

BY11

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
39	BY11-39	245148.8780	311220.8670	831.739	262+73.762	75.663 LT
Y37	BL-37	245061.4900	311236.8100	830.791	262+55.449	10.163 RT
38	BY11-38	245004.4410	311256.2410	835.698	262+57.100	70.408 RT

BY12

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
41	BY12-41	245201.5460	311444.1720	836.917	264+98.830	69.432 LT
Y40	BL-40	245125.9970	311467.1692	837.716	264+95.404	9.361 RT
42	BY12-42	245081.3040	311474.8780	843.948	264+87.690	71.930 RT

BY13

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y43	BL-43	245222.5723	311796.2115	864.443	268+35.502	17.682 LT
44	BY13-44	245009.9270	311816.0410	857.390	268+47.426	115.990 RT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
45	BY14-45	245361.4290	311860.7400	867.904	268+95.800	154.956 LT
Y44	BY13-44	245009.9270	311816.0410	857.420	268+47.426	115.990 RT

BY15

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
48	BY15-48	245255.6720	311763.7820	865.120	268+08.122	53.075 LT
47	BY15-47	245232.1730	311854.8820	862.605	268+92.361	25.883 LT
49	BY15-49	245226.8640	311960.5970	844.160	269+94.941	30.584 LT
50	BY15-50	245235.1310	312070.7110	833.571	271+10.795	54.992 LT

BY16

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
53	BY16-53	245126.8070	312529.7500	820.237	275+72.554	0.917 LT
55	BY16-55	245044.8170	312483.6110	840.806	275+30.126	70.630 RT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
56	BY17-56	245166.7290	312877.9360	809.871	279+27.155	80.394 LT
Y54	BL-54	245068.5830	312909.5127	810.774	279+55.349	11.219 RT
57	BY17-57	244908.7550	312838.9130	810.253	278+89.433	169.541 RT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y59	BL-59	245177.5640	313479.6210	801.341	285+34.640	5.947 RT
60	BY18-60	245097.9050	313485.6820	801.061	285+26.602	85.262 RT

BY19

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
61	BY19-61	245239.2060	313420.3120	801.411	284+87.946	85.721 LT
63	BY19-63	245219.9800	313669.5858	800.785	287+26.684	16.427 RT

BY20

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y63	BY19-63	245219.9800	313669.5855	800.789	287+26.685	16.427 RT
65	BY20-65	245143.8000	313714.0950	799.467	287+34.670	104.909 RT

BY21

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
66	BY21-66	245479.6360	313889.3310	800.745	290+20.578	117.663 LT
Y64	BL-64	245376.4940	313988.8080	795.764	290+08.519	13.575 LT

BY22

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
70	BY22-70	245432.4180	314278.9120	799.757	293+48.479	73.376 LT
69	BY22-69	245355.4500	314253.2270	795.235	293+56.917	5.078 RT
Y67	BL-67	245355.4083	314253.2178	796.781	293+56.923	5.121 RT

BY23

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
72	BY23-72	245275.6300	314645.2090	797.569	297+40.127	126.259 LT
Y71	BL-71	245147.6288	314598.5735	792.864	297+61.339	8.471 RT

BY24

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y711	BL-71	245147.6288	314598.5735	792.864	297+61.339	8.471 RT
74	BY24-74	245100.6350	314743.2830	789.240	299+12.425	11.070 LT
75	BY24-75	245098.7450	314919.4310	788.277	300+76.110	76.235 LT

BY25

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y73	BL-73	245018.2679	314934.4618	786.797	301+20.691	7.498 LT
76	BY25-76	244914.8760	314913.8770	788.493	301+40.082	96.266 RT

BY26

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
79	BY26-79	244914.5955	315446.2218	788.123	306+33.374	105.985 LT
Y78	BL-78	244795.4830	315481.2680	789.493	307+11.038	9.112 LT
80	BY26-80	244686.8720	315454.4950	794.058	307+27.527	101.528 RT

BY27

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
87	BY27-87	244641.4770	315836.9970	786.885	310+59.822	93.597 RT
86	BY27-86	244700.5470	315936.1260	783.754	311+54.821	72.785 RT
85	BY27-85	244703.4760	315998.9680	786.468	312+40.544	37.920 RT
83	BY27-83	244847.7290	315996.6730	785.875	312+80.201	11.981 LT

BY28

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y88	BL-88	245066.8978	316311.6555	770.999	316+60.132	21.502 LT
90	BY28-90	244962.1830	316224.5790	779.057	315+37.306	42.597 RT
93	BY28-93	244868.2260	316206.6750	788.757	314+55.986	119.175 RT

BY29

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
92	BY29-92	245283.5240	316249.7820	774.129	316+43.787	170.285 LT
89	BY29-89	245182.9170	316267.4190	772.692	316+31.283	69.275 LT
Y881	BL-88	245066.8978	316311.6555	770.999	316+60.132	21.502 LT

BY30

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
94	BY30-94	245212.3140	316485.3040	776.547	318+34.626	141.920 LT
Y91	BL-91	245057.9800	316491.6345	769.891	318+35.909	12.610 RT

BY31

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y97	BL-97	244944.8438	317204.7815	767.266	325+78.388	14.253 RT
98	BY31-98	244932.2410	317260.7880	766.341	326+27.465	24.750 RT
100	BY31-100	244835.4790	317211.8110	763.547	325+79.123	121.698 RT

BY32

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
102	BY32-102	244969.8490	317519.8970	767.166	328+33.274	107.092 LT
Y991	BL-99	244918.2740	317430.9767	765.684	327+99.849	12.689 LT

BY33

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	BY33-101	245001.6150	317410.4530	768.894	327+48.867	76.564 LT
Y99	BL-99	244918.2740	317430.9767	765.684	327+99.849	12.689 LT

BY34

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y105	BL-105	244447.8420	318040.6090	759.177	335+93.367	17.522 RT
106	BY34-106	244369.0280	317975.1900	758.517	335+52.977	110.173 RT

BY35

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
109	BY35-109	244580.9370	318523.5070	757.924	340+80.395	77.531 LT
Y108	BL-108	244408.8775	318485.3930	755.697	340+36.993	12.169 RT

BY36

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y110	BL-110	244420.6420	318711.9050	763.935	342+64.105	13.364 RT
111	BY36-111	244204.9060	318828.7350	754.652	344+53.849	123.296 RT

BY37

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
116	BY37-116	244361.1020	319065.3070	763.543	346+82.859	86.266 LT
114	BY37-114	244237.6610	319053.4430	757.404	OUTSIDE PROJECT LIMITS	
117	BY37-117	244140.8790	319027.4920	752.590	OUTSIDE PROJECT LIMITS	

BY38

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
120	BY38-120	244370.4050	319687.9990	744.615	OUTSIDE PROJECT LIMITS	
Y119	BL-119	244242.7370	319609.1800	748.171	OUTSIDE PROJECT LIMITS	

BY39

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
Y1191	BL-119	244242.7370	319609.1800	748.171	OUTSIDE PROJECT LIMITS	
121	BY39-121	244116.5330	319594.8080	750.722	OUTSIDE PROJECT LIMITS	

BM1 ELEVATION - 774.815
N 244742 E 307465
L STATION 224+38
S 1° 14' 29.5" E DIST 175.429
SPIKE IN BASE OF 36" OAK

BM2 ELEVATION - 822.420
N 244840 E 308712
L STATION 237+19 119 RIGHT
SPIKE IN BASE OF 12" MAPLE

BM3 ELEVATION - 837.809
N 245092 E 309815
L STATION 247+87 140 LEFT
SPIKE IN BASE OF 14" LOCUST

BM4 ELEVATION - 826.544
N 245068 E 310018
L STATION 250+49 122 LEFT
SPIKE IN BASE OF 14" POPLAR

BM5 ELEVATION - 861.192
N 245232 E 311723
L STATION 267+68 38 LEFT
SPIKE IN BASE OF 24" FORKED LOCUST

BM6 ELEVATION - 816.882
N 244941 E 312842
L STATION 278+91 138 RIGHT
SPIKE IN BASE OF 15" DOUBLE LOCUST

BM7 ELEVATION - 883.589
N 245278 E 313437
L STATION 285+10 93 LEFT
SPIKE IN BASE OF 18" MAPLE

BM8 ELEVATION - 794.759
N 245198 E 314649
L STATION 297+83 58 LEFT
SPIKE IN BASE OF 18" OAK

BM9 ELEVATION - 796.952
N 244672 E 315408
L STATION 307+44 111 RIGHT
SPIKE IN BASE OF 20" WALNUT

BM10 ELEVATION - 781.844
N 245186 E 316291
L STATION 316+67 123 LEFT
SPIKE IN BASE OF 16" OAK

BM11 ELEVATION - 765.845
N 244895 E 317197
L STATION 325+64 154 RIGHT
SPIKE IN BASE OF 30" WAHOO

BM12 ELEVATION - 758.772
N 244335 E 317982
L STATION 335+81 147 RIGHT
SPIKE IN BASE OF 35" SYCAMORE

BM13 ELEVATION - 758.116
N 244152 E 319814
L STATION 348+17
S 2° 28' 47.1" W DIST 134.552
SPIKE IN BASE OF 9" POPLAR

BM14 ELEVATION - 744.678
N 244378 E 319695
L STATION 346+17
N 82° 59' 15.8" E DIST 688.838
SPIKE IN BASE OF 24" POPLAR

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2519A-1"
WITH NAD 1983/95 STATE PLANE GRID COORDINATES OF NORTHING: 244860.731(m) EASTING: 307037.904(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99982200
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2519A-1" TO -L- STATION 224+30.000 IS
N 82°14'01" E 417.095m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

NOTES:

THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO EXISTING NCGS AND NCDOT MONUMENTS USING USING A NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:

HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

THE FILES TO BE FOUND ARE AS FOLLOWS:

R2519A_LS_GPSCALIB_030710.HTML
R2519A_LS_WGS84_030710.TXT
R2519A_LS_LOCAL_030710.TXT
R2519A_LS_CONTROL_030710.TXT

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

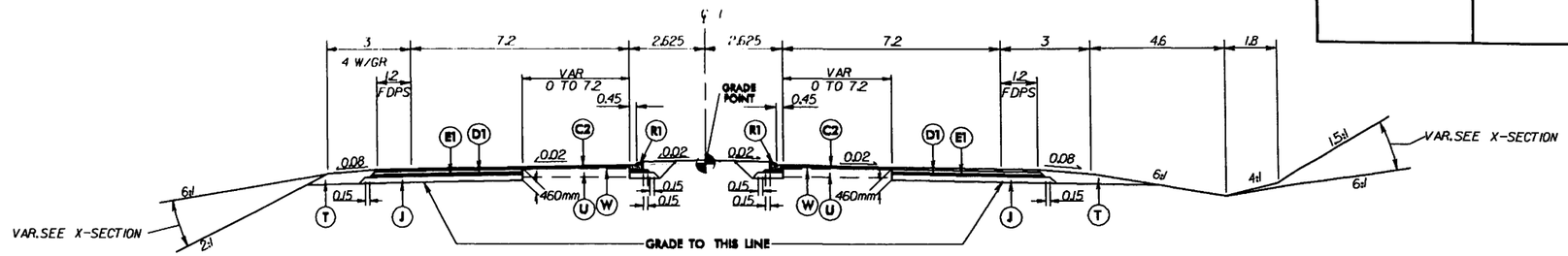
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PRELIM. PAVEMENT SCHEDULE

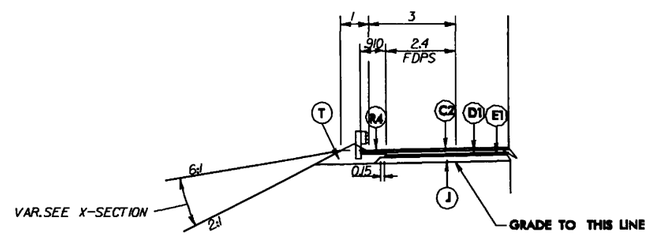
A1	150 mm PORTLAND CEMENT CONCRETE PAVEMENT.
C1	PROP. APPROX. 60 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5A, AT AN AVERAGE RATE OF 72 kg PER SQ. METER IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 70 mm ASPHALT CONC. SURFACE COURSE, TYPE S12.5C, AT AN AVERAGE RATE OF 84 kg PER SQ. METER IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S12.5C, AT AN AVERAGE RATE OF 2.4 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 35 mm IN DEPTH OR GREATER THAN 60 mm IN DEPTH.
D1	PROP. APPROX. 110 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 270 kg PER SQ. METER
D2	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 55 mm OR GREATER THAN 110 mm IN DEPTH.
E1	PROP. APPROX. 80 mm ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 196 kg PER SQ. METER.
E2	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 75 mm IN DEPTH OR GREATER THAN 140 mm IN DEPTH.
J	PROP. 200 mm AGGREGATE BASE COURSE.
R1	450 mm CONCRETE CURB AND GUTTER.
R2	750 mm CONCRETE CURB AND GUTTER.
R3	CONCRETE EXPRESSWAY GUTTER.
R4	SHOULDER BERM GUTTER.
S	100 mm CONCRETE SIDEWALK.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE WEDGING DETAIL)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



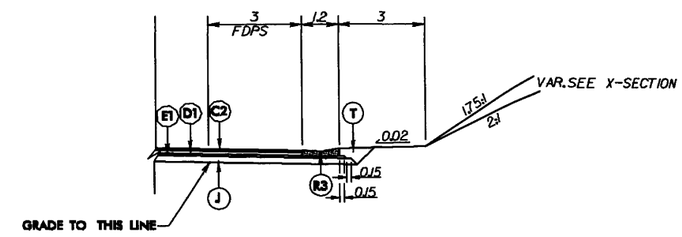
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 226+40.000 TO -L- STA. 251+83.430
-L- STA. 299+76.000 TO -L- STA. 344+00.000



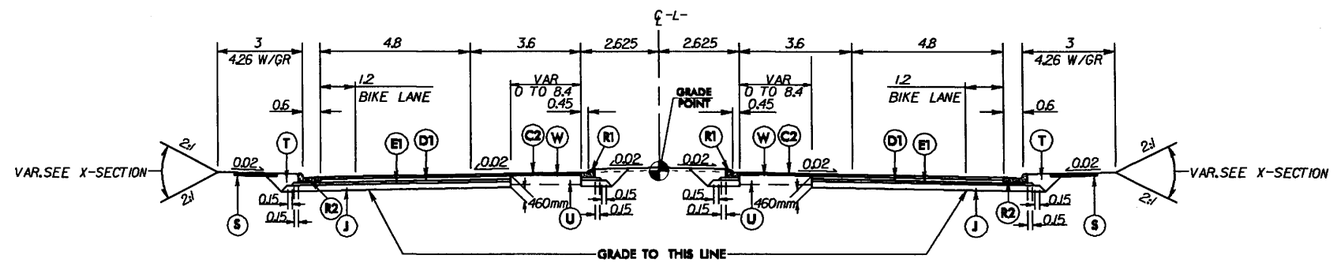
TYPICAL SECTION NO. 1B

USE TYPICAL SECTION NO. 1B IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 227+45.000 TO -L- STA. 2230+45.000 RT
-L- STA. 230+75.000 TO -L- STA. 232+12.000 RT
-L- STA. 232+98.000 TO -L- STA. 233+50.000 RT
-L- STA. 234+99.000 TO -L- STA. 236+30.000 RT
-L- STA. 235+99.000 TO -L- STA. 236+70.000 LT
-L- STA. 242+85.000 TO -L- STA. 244+28.500 LT
-L- STA. 312+66.000 TO -L- STA. 313+45.000 LT
-L- STA. 313+36.000 TO -L- STA. 314+13.000 RT
-L- STA. 327+80.000 TO -L- STA. 328+72.000 RT
-L- STA. 340+79.000 TO -Y36- STA. 10+84.000 RT



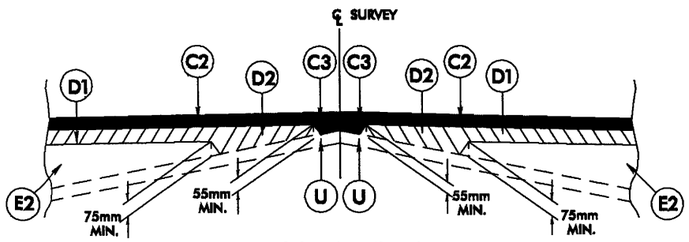
TYPICAL SECTION NO. 1A

USE TYPICAL SECTION NO. 1A IN CONJUNCTION WITH TYPICAL SECTION NO. 1
-L- STA. 244+80.000 TO -L- STA. 246+80.000 RT
-L- STA. 246+20.000 TO -L- STA. 247+00.000 LT



TYPICAL SECTION NO. 2

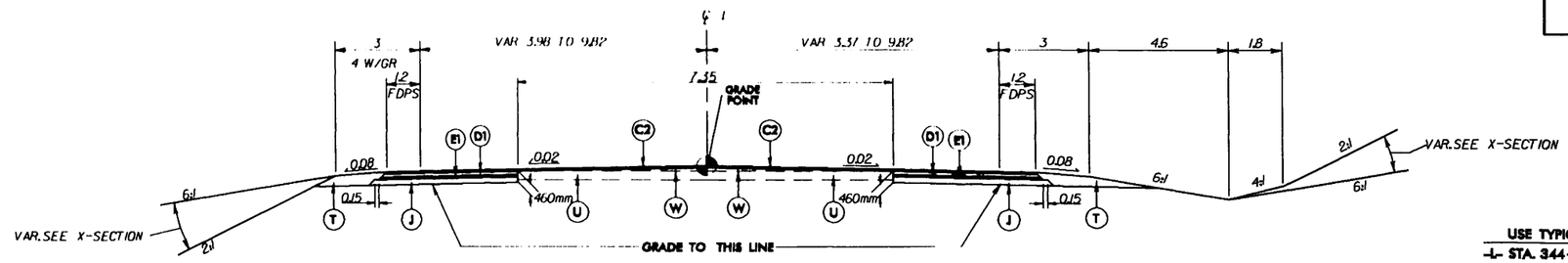
USE TYPICAL SECTION NO. 2
-L- STA. 251+83.430 TO -L- STA. 299+76.000



Wedging Detail

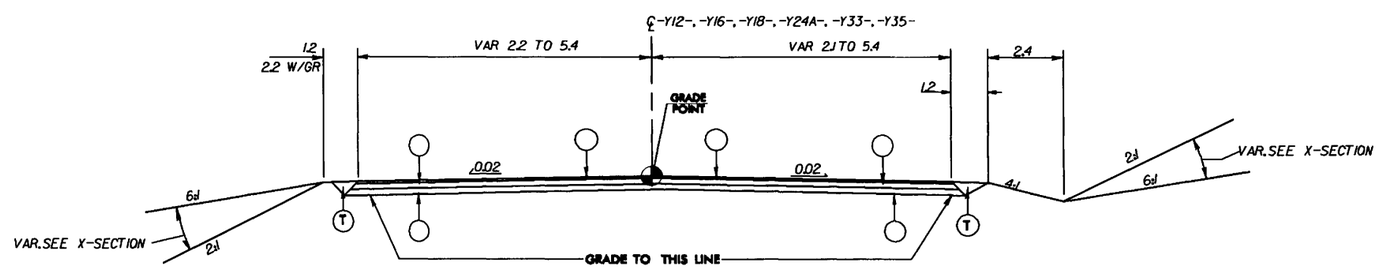
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



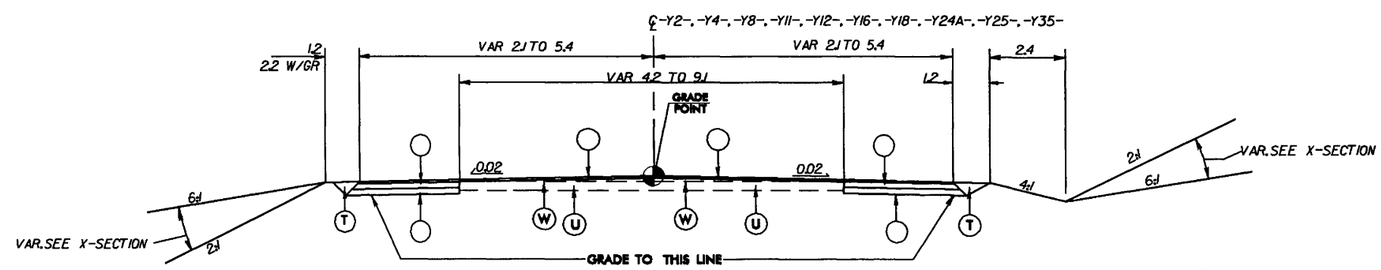
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3
-L- STA. 344+00.000 TO -L- STA. 345+60.000



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4
-Y12- STA. 10+30.000 TO -Y12- STA. 10+55.694
-Y12- STA. 10+78.902 TO -Y12- STA. 10+90.000
-Y16- STA. 10+11.414 TO -Y16- STA. 10+70.000
-Y18- STA. 10+11.034 TO -Y18- STA. 10+25.000
-Y24A- STA. 10+03.600 TO -Y24A- STA. 10+19.000
-Y33- STA. 10+15.000 TO -Y33- STA. 10+70.080
-Y35- STA. 10+90.000 TO -Y35- STA. 11+15.981



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5
-Y2- STA. 10+09.935 TO -Y2- STA. 10+83.900
-Y4- STA. 10+10.177 TO -Y4- STA. 11+34.000
-Y8- STA. 10+32.155 TO -Y8- STA. 10+60.264
-Y11- STA. 10+26.868 TO -Y11- STA. 10+58.037
-Y11- STA. 10+80.125 TO -Y11- STA. 11+38.355
-Y12- STA. 10+19.000 TO -Y12- STA. 10+30.000
-Y12- STA. 10+90.000 TO -Y12- STA. 11+15.000
-Y16- STA. 10+70.000 TO -Y16- STA. 10+90.198
-Y18- STA. 10+25.000 TO -Y18- STA. 10+31.000
-Y24A- STA. 10+19.000 TO -Y24A- STA. 10+59.600
-Y24A- STA. 11+55.566 TO -Y24A- STA. 11+83.566
-Y25- STA. 10+09.869 TO -Y25- STA. 10+69.019
-Y35- STA. 10+64.255 TO -Y35- STA. 10+90.000

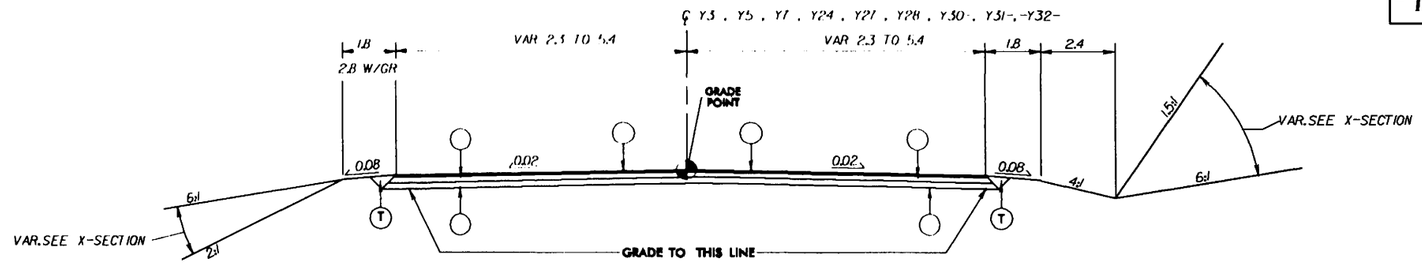
PRELIM. PAVEMENT SCHEDULE	
A1	150mm, PORT CEM PVMT
C1	60mm, TYPE S9.5A
C2	70mm, TYPE S12.5C
C3	VAR. TYPE S12.5C
D1	110mm, TYPE I19.0C
D2	VAR. TYPE I19.0C
E1	80mm, TYPE B25.0C
E2	VAR. TYPE B25.0C
J	200mm, ABC
R1	450mm, C & G
R2	750mm, C & G
S	100mm, SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

6/16/09

09-MAR-2009 07:38
r-25191 R:\R2519A_sp-J\v-2519a.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

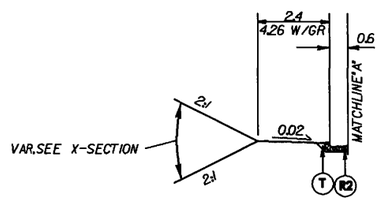
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6

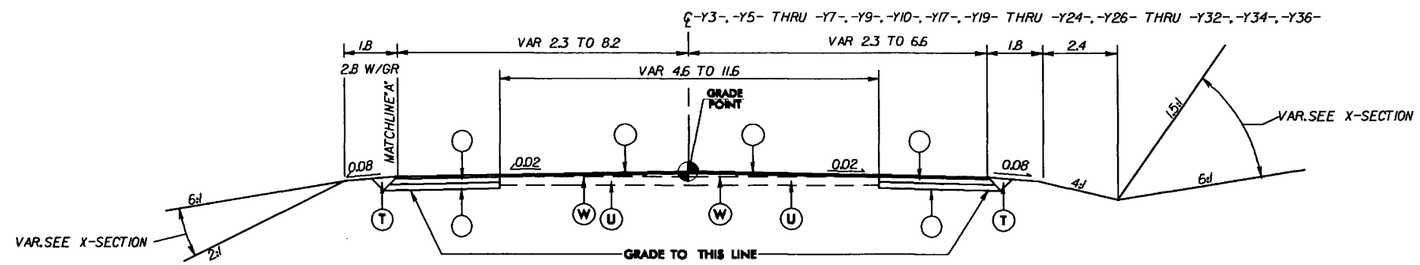
-Y3- STA. 10+70.000 TO -Y3- STA. 11+70.994
-Y5- STA. 11+15.907 TO -Y5- STA. 11+40.000
-Y7- STA. 10+09.883 TO -Y7- STA. 10+30.000
-Y24- STA. 10+59.000 TO -Y24- STA. 11+52.962
-Y27- STA. 10+09.917 TO -Y27- STA. 10+80.000
-Y28- STA. 10+11.019 TO -Y28- STA. 10+60.000
-Y30- STA. 10+80.000 TO -Y30- STA. 11+07.189
-Y31- STA. 10+09.841 TO -Y31- STA. 10+30.000
-Y32- STA. 10+10.000 TO -Y32- STA. 10+59.314



INSET NO. 1

USE INSET NO. 1

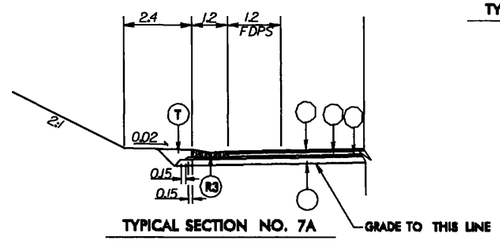
-Y17- STA. 10+80.000 TO -Y17- STA. 11+47.744	LEFT
-Y17- STA. 11+69.832 TO -Y17- STA. 12+94.160	RIGHT
-Y26- STA. 11+59.000 TO -Y26- STA. 12+63.374	LEFT



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

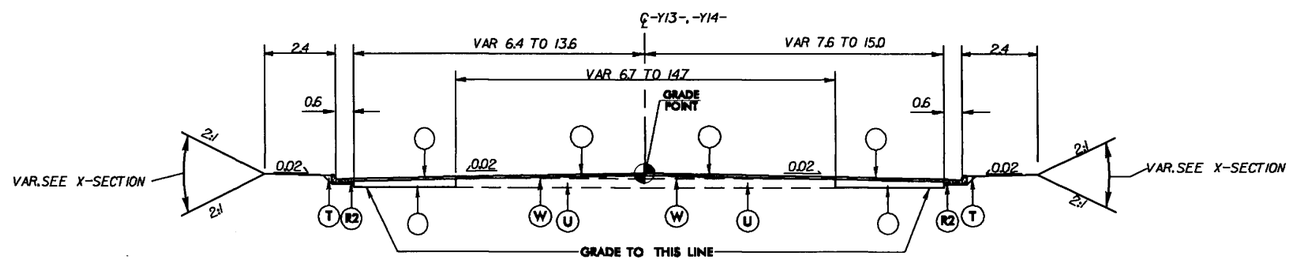
-Y3- STA. 10+47.000 TO -Y3- STA. 10+70.000
-Y5- STA. 10+17.709 TO -Y5- STA. 10+95.923
-Y5- STA. 11+40.000 TO -Y5- STA. 11+93.760
-Y6- STA. 10+50.340 TO -Y6- STA. 11+30.114
-Y7- STA. 10+30.000 TO -Y7- STA. 10+40.720
-Y9- STA. 10+40.000 TO -Y9- STA. 11+68.066
-Y10- STA. 10+06.458 TO -Y10- STA. 10+59.121
-Y10- STA. 10+81.191 TO -Y10- STA. 11+40.912
-Y17- STA. 10+25.000 TO -Y17- STA. 11+47.744
-Y17- STA. 11+69.832 TO -Y17- STA. 13+40.000
-Y19- STA. 10+25.000 TO -Y19- STA. 12+19.754
-Y20- STA. 10+11.029 TO -Y20- STA. 10+72.980
-Y21- STA. 10+67.500 TO -Y21- STA.12+33.932
-Y22- STA. 10+03.955 TO -Y22- STA. 10+66.203
-Y23- STA. 10+37.000 TO -Y23- STA. 10+77.414
-Y24- STA. 10+30.144 TO -Y24- STA. 10+59.000
-Y26- STA. 10+26.848 TO -Y26- STA. 11+17.687
-Y26- STA. 11+38.531 TO -Y26- STA. 12+63.374
-Y27- STA. 10+80.000 TO -Y27- STA. 10+95.550
-Y28- STA. 10+60.000 TO -Y28- STA. 10+67.662
-Y29- STA. 11+00.000 TO -Y29- STA. 11+31.399
-Y30- STA. 10+28.278 TO -Y30- STA. 10+80.000
-Y31- STA. 10+30.000 TO -Y31- STA. 10+58.994
-Y32- STA. 10+00.000 TO -Y32- STA. 10+10.000
-Y34- STA. 10+10.082 TO -Y34- STA. 10+89.563
-Y36- STA. 10+09.826 TO -Y36- STA. 11+39.000



TYPICAL SECTION NO. 7A

USE TYPICAL SECTION NO. 7A IN CONJUNCTION WITH TYPICAL SECTION NO. 7

-Y3- STA. 10+66.200 TO -L- STA. 11+50.000 LT



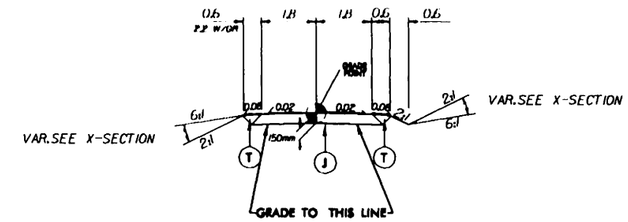
TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8

-Y13- STA. 10+11.026 TO -Y13- STA. 10+30.377
-Y14- STA. 10+31.355 TO -Y14- STA. 10+48.791

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

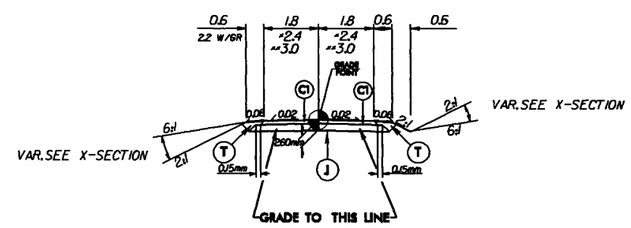
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

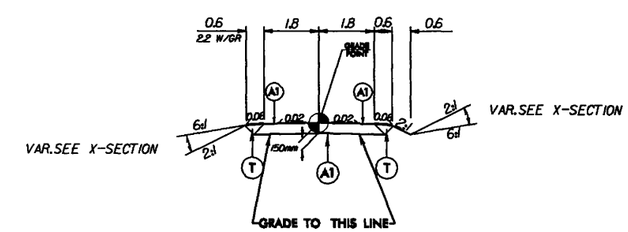
-D5- STA. 10+11.625 TO -D5- STA. 10+57.281
-D9- STA. 10+11.025 TO -D9- STA. 10+45.000
-D22- STA. 10+04.420 TO -D22- STA. 10+71.140



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

-D1- STA. 10+11.165 TO -D1- STA. 10+56.000
-D3- STA. 10+11.630 TO -D3- STA. 10+42.000
-D4- STA. 10+11.625 TO -D4- STA. 10+35.000
*-D6- STA. 10+11.025 TO -D6- STA. 10+42.000
-D7- STA. 10+11.025 TO -D7- STA. 10+40.000
**-D8- STA. 10+11.025 TO -D8- STA. 10+58.000
*-D10- STA. 10+10.000 TO -D10- STA. 10+42.519
-D12- STA. 10+06.303 TO -D12- STA. 10+60.024
-D13- STA. 10+33.000 TO -D13- STA. 11+44.719
-D14- STA. 10+28.000 TO -D14- STA. 12+05.834
-D15- STA. 10+00.000 TO -D15- STA. 10+34.986
-D16- STA. 10+09.825 TO -D16- STA. 10+45.000
-D2- STA. 10+10.000 TO -D2- STA. 11+56.187
-D19- STA. 10+09.825 TO -D19- STA. 19+33.830
-D19A- STA. 10+02.178 TO -D19A- STA. 10+38.185
-D20- STA. 10+11.065 TO -D20- STA. 10+60.420
-D21- STA. 10+04.430 TO -D21- STA. 10+60.400



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11

-D11- STA. 10+15.000 TO -D11- STA. 10+73.072

6/16/09

09-MAR-2009 07:58
r:\proj\ R2519\R2519_typ.dgn

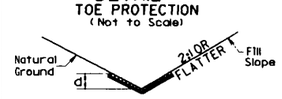
DRAINAGE DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

DETAIL A
TOE PROTECTION
(Not to Scale)

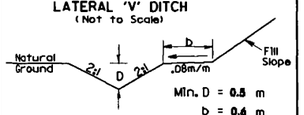


d = 0.5 m

Type of Liner = PSRM

-L- STA 255+40 TO 256+00 LT

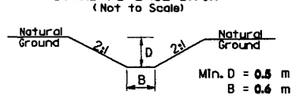
DETAIL B
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 m
b = 0.6 m

-L- STA 255+40 TO 255+80 RT

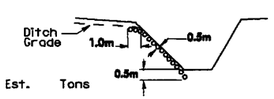
DETAIL C
STANDARD BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-D3- STA. 10+37 TO 10+70 RT
-L- STA. 255+40 RT
-L- STA. 317+35 RT

DETAIL D
RIP RAP AT EMBANKMENT
(Not to Scale)

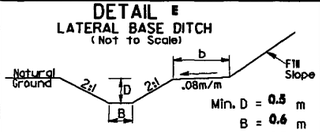


Est. Tons

Type of Liner = CLASS 'I' RIP RAP

-L- STA. 233+00 TO 233+03 RT (5 TONS)
-L- STA. 255+40 TO 255+43 RT (15 TONS)

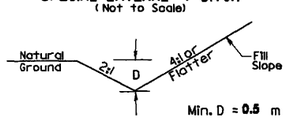
DETAIL E
LATERAL BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m
b = 1.5 m

-L- STA. 233+00 TO 233+55 RT
-L- STA 252+96 TO 253+74 RT
-L- STA 313+30 TO 314+20 RT
-Y2- STA 10+22 TO 10+32 RT

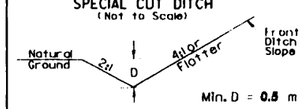
DETAIL F
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 m

-L- STA. 242+40 TO 242+68 RT
-L- STA 254+00 TO 254+20 LT

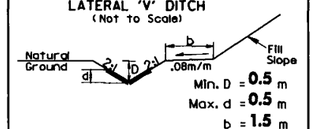
DETAIL G
SPECIAL CUT DITCH
(Not to Scale)



Min. D = 0.5 m

-Y2- STA. 10+40 TO 10+69 LT
-L- STA. 236+40 TO 236+80 RT
-L- STA. 237+40 TO 237+60 LT
-L- STA. 239+00 TO 239+80 RT
-L- STA. 240+80 TO 241+11 RT
-L- STA. 241+80 TO 242+40 RT
-L- STA. 242+00 TO 242+50 LT
-Y5- STA. 10+64 TO 10+73 RT
-Y5- STA. 11+30 TO 11+60 RT
-L- STA. 250+20 TO 250+40 LT
-Y10- STA. 11+20 TO 11+40 RT
-L- STA. 297+80 TO 300+20 LT
-L- STA 301+03 TO 301+12 RT
-Y24- STA. 10+12 TO 10+40 LT
-Y24- STA. 10+40 TO 10+70 RT
-Y25- STA 10+20 TO 10+40 RT
-L- STA. 310+06 TO 310+36 LT
-L- STA. 311+40 TO 311+80 RT
-L- STA. 320+20 TO 321+00 LT
-L- STA. 328+80 TO 329+30 LT

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

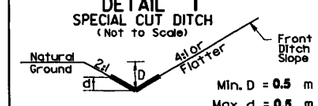


Min. D = 0.5 m
Max. d = 0.5 m
b = 1.5 m

Type of Liner = PSRM

-L- STA. 249+76 TO 250+20 LT

DETAIL I
SPECIAL CUT DITCH
(Not to Scale)

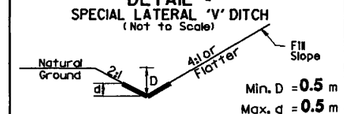


Min. D = 0.5 m
Max. d = 0.5 m

Type of Liner = PSRM

-L- STA 327+40 TO 327+80 LT

DETAIL J
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

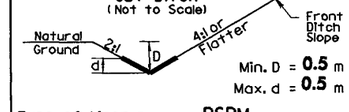


Min. D = 0.5 m
Max. d = 0.5 m

Type of Liner = PSRM

-L- STA. 248+10 TO 248+25 LT
-L- STA. 300+80 TO 301+02 LT

DETAIL K
CUT DITCH
(Not to Scale)

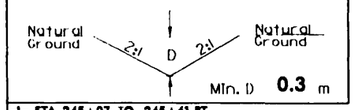


Min. D = 0.5 m
Max. d = 0.5 m

Type of Liner = PSRM

-Y6- STA. 10+60 TO 11+00 RT
-Y17- STA. 13+07 TO 13+40 RT

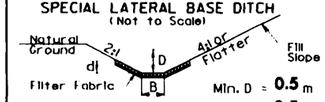
DETAIL L
STANDARD 'V' DITCH
(Not to Scale)



Min. D 0.3 m

-L- STA. 245+07 TO 245+61 RT

DETAIL M
SPECIAL LATERAL BASE DITCH
(Not to Scale)

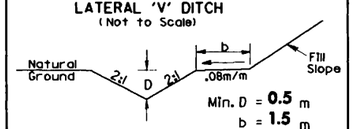


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m

Type of Liner = CLASS 'B' RIP RAP

-L- STA 242+50 TO 242+88 LT

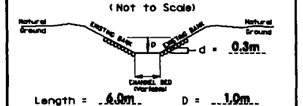
DETAIL N
LATERAL 'V' DITCH
(Not to Scale)



Min. D = 0.5 m
b = 1.5 m

-Y5- STA. 10+20 TO 10+50 RT
-Y10- STA 11+02 TO 11+20 RT

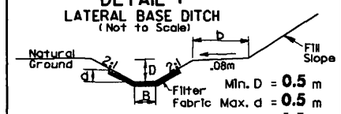
DETAIL O
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 4.0m D = 1.0m
Est = ------- Tons of Class I RipRap

-L- STA. 231+26 TO 231+32 RT (20 TONS)
-L- STA. 235+90 TO 235+95 RT (20 TONS)
-L- STA. 270+43 TO 270+69 RT (20 TONS)
-L- STA. 297+69 TO 297+72 RT (20 TONS)

DETAIL P
LATERAL BASE DITCH
(Not to Scale)



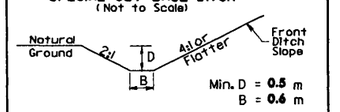
Min. D = 0.5 m
Max. d = 0.5 m
B = 1.5 m
b = 1.5 m

* When B is < 1.8m

Type of Liner = CLASS 'II' RIP RAP

-L- STA. 235+95 TO 236+10 RT.

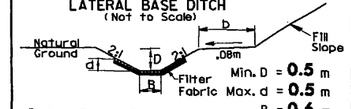
DETAIL Q
SPECIAL CUT BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-L- STA 324+55 TO 325+00 LT

DETAIL R
LATERAL BASE DITCH
(Not to Scale)



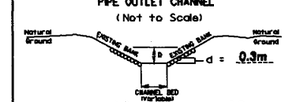
Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m
b = 1.5 m

* When B is < 1.8m

Type of Liner = CLASS 'B' RIP RAP

-L- STA. 231+30 TO 231+80 RT

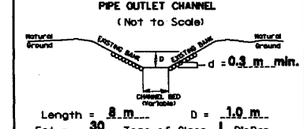
DETAIL S
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 4.0m D = 1.0m
Est = 15 Tons of Class I RipRap

-L- STA. 228+10 RT
-L- STA. 230+90 TO 230+93 RT

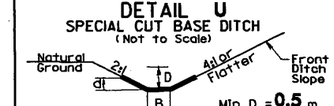
DETAIL T
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 8 m D = 1.0 m
Est = 30 Tons of Class I RipRap

-L- STA. 230+37 TO 230+45 RT (25 TONS)

DETAIL U
SPECIAL CUT BASE DITCH
(Not to Scale)

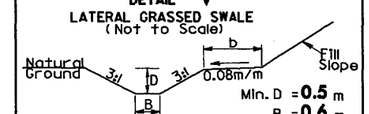


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.9 m

Type of Liner = PSRM

-Y10- STA 11+15 TO 11+40 LT

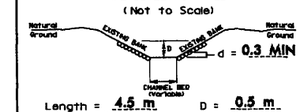
DETAIL V
LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m
b = 1.5 m

-Y17- STA 11+05 TO 11+27 RT

DETAIL W
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 4.5 m D = 0.5 m
Est = 10 Tons of Class I RipRap

-L- STA. 314+40 TO 314+42 LT
-L- STA. 324+43 TO 324+47 RT

8/17/99
RS-MUR-2009 07/98
Date/Time 10:09:00 AM
rdsw1 MT RD2DS2

DRAINAGE DITCH DETAILS

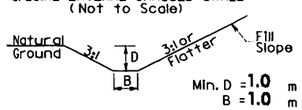
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

CONST. REV.

R/W REV.

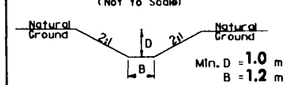
DETAIL X
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 1.0 m
B = 1.0 m

-L- STA 280+40 TO 281+63 LT
-L- STA 282+68 TO 283+95 -LT

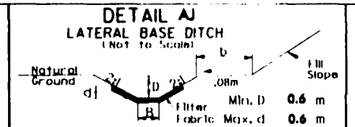
DETAIL AD
STANDARD BASE DITCH
(Not to Scale)



Min. D = 1.0 m
B = 1.2 m

-L- STA. 304+32 TO 304+50 LT

DETAIL AJ
LATERAL BASE DITCH
(Not to Scale)



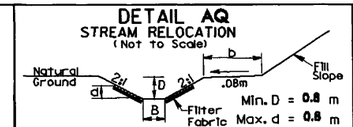
Min. D 0.6 m
Max. d 0.6 m
B = 1.2 m
b 1.5 m

* When B is < 1.8m

Type of Liner = CLASS 'B' RIP RAP

-L- STA 228+13 TO 228+65 RT

DETAIL AQ
STREAM RELOCATION
(Not to Scale)

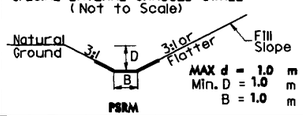


Min. D = 0.8 m
Max. d = 0.8 m
B = 3.0 m
b = 1.2 m

Type of Liner = CLASS 'B' RIP RAP

-Y35- STA. 10+66 TO 10+94 LT

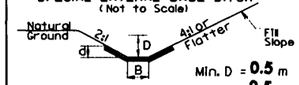
DETAIL Y
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



MAX d = 1.0 m
Min. D = 1.0 m
B = 1.0 m

-L- STA 282+22 TO 282+68 LT

DETAIL AE
SPECIAL LATERAL BASE DITCH
(Not to Scale)

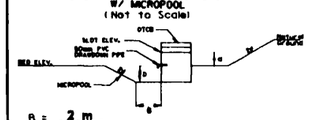


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m

Type of Liner = PSRM

-L- STA 307+20 TO 307+80 LT

DETAIL AK
STORMWATER RETENTION BASIN
W/ MICROPOOL
(Not to Scale)

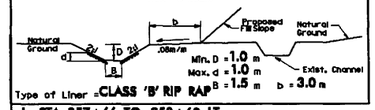


B = 2 m
d = 0.9 m
D = 0.6 m

BED ELEV. = 816.60 m

-Y3- STA. 11+38 TO 11+64 LT

DETAIL AW
STREAM RELOCATION
(Not to Scale)

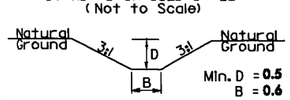


Min. D = 1.0 m
Max. d = 1.0 m
B = 1.5 m b = 3.0 m

Type of Liner = CLASS 'B' RIP RAP

-L- STA 257+66 TO 258+60 LT

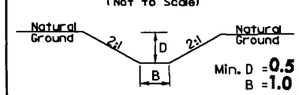
DETAIL Z
STANDARD GRASSED SWALE
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-L- STA. 285+35 TO 285+45 LT

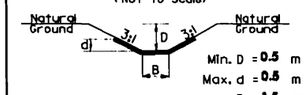
DETAIL AF
STANDARD BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 1.0 m

-D16- STA. 10+19 TO 10+24 LT

DETAIL AM
STANDARD GRASSED SWALE
(Not to Scale)

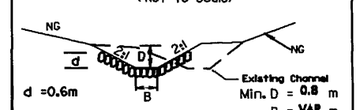


Min. D = 0.5 m
Max. d = 0.5 m
B = 1.5 m

Type of Liner = PSRM

-L- STA. 276+50 TO 276+83 LT

DETAIL AX
STREAM REALIGNMENT
(Not to Scale)



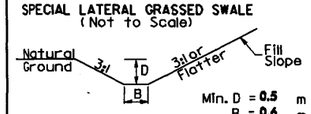
d = 0.6m

Min. D = 0.8 m
B = VAR m

Type of Liner = CLASS 'I' RIP RAP

-L- STA. 233+00 RT

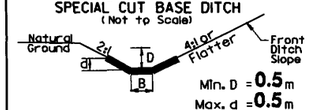
DETAIL AA
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-L- STA 292+84 TO 293+12 LT
-L- STA 332+60 TO 333+00 LT

DETAIL AG
SPECIAL CUT BASE DITCH
(Not to Scale)

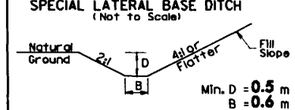


Min. D = 0.5 m
Max. d = 0.5 m
B = 0.6 m

Type of Liner = PSRM

-Y30- STA 10+40 TO 11+00 LT

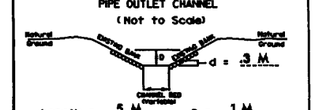
DETAIL AN
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-Y24- STA. 10+94 TO 11+32 RT

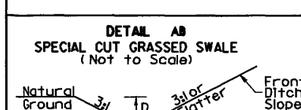
DETAIL AZ
PIPE OUTLET CHANNEL
(Not to Scale)



Length = .5 M D = 1 M
Est = 17 Tons of Class I RipRap

-L- STA. 256+10 TO 256+15 RT
-L- STA. 279+92 TO 279+98 LT

DETAIL AB
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Min. D = 1.0 m
B = 1.0 m

-Y22- STA 10+09 TO 10+23 RT

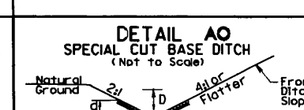
DETAIL AH
CUT DITCH
(Not to Scale)

Min. D = 0.3 m
Max. d = 0.3 m

Type of Liner = PSRM

-D11- STA 10+27 TO 10+67 LT
-D11- STA 10+27 TO 10+67 RT
-D13REV- STA 10+21 TO 11+63 LT
-D13REV- STA 10+21 TO 11+64 RT
-D14- STA 10+28 TO 12+00 RT

DETAIL AO
SPECIAL CUT BASE DITCH
(Not to Scale)

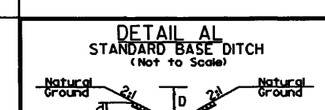


Min. D = 0.5 m
Max. d = 0.5 m
B = 1.5 m

Type of Liner = CLASS 'I' RIP RAP

-Y26- STA 11+60 TO 12+40 RT

DETAIL AL
STANDARD BASE DITCH
(Not to Scale)

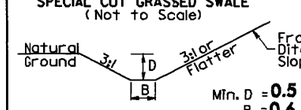


Min. D= 1M
Max. d= .6 M
B= 1.2 M

Type of Liner= CLASS I Rip-Rap

-Y26- STA. 9+35 TO STA. 9+72 LT

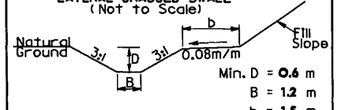
DETAIL AC
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Min. D = 0.5 m
B = 0.6 m

-L- STA 301+43 TO 302+60 LT

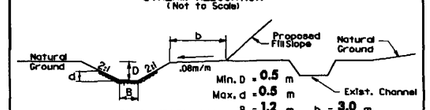
DETAIL AI
LATERAL GRASSED SWALE
(Not to Scale)



Min. D = 0.6 m
B = 1.2 m
b = 1.5 m

-L- STA 228+40 TO 230+00 RT

DETAIL AP
STREAM RELOCATION
(Not to Scale)



Min. D = 0.5 m
Max. d = 0.5 m
B = 1.2 m b = 3.0 m

Type of Liner = CLASS 'B' RIP RAP

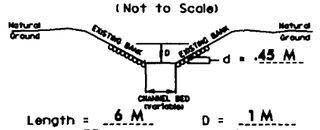
-L- STA 333+17 TO 333+60 LT

02-MAR-2009 07:38
R:\Roadway\Proj\2519a_ditch_dgn
pbowen

DRAINAGE DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

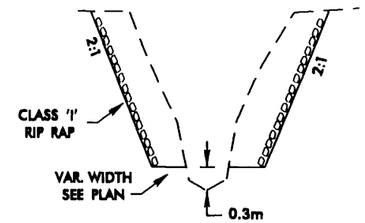
DETAIL C-10
CULVERT OUTLET BANK PROTECTION
(Not to Scale)



Length = 6 M D = 1 M
Est = 22 Tons of Class I RipRap

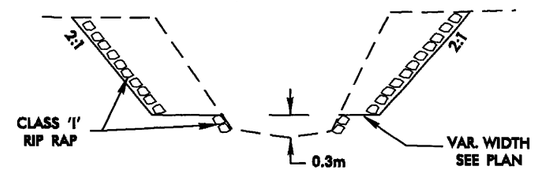
-L- STA. 257+22 RT

DETAIL C-16
LOW FLOW BENCH CONSTRUCTION
AND BANK STABILIZATION
-L- STA 283+95 TO 285+00 LT.
(NOT TO SCALE)



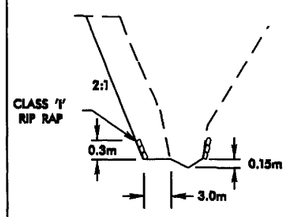
NOTE: ARMOR RIGHT SIDE OF CHANNEL ONLY
FROM 283+95 TO 284+46
(SEE PLANS)

DETAIL C-28
LOW FLOW BENCH CONSTRUCTION
AND BANK STABILIZATION
(NOT TO SCALE)



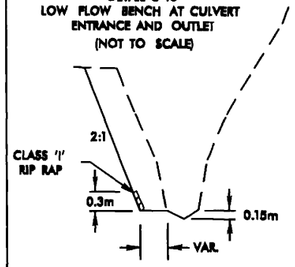
-L- STA. 316+39 LT.
-L- STA 316+82 RT.

DETAIL C-12
LOW FLOW BENCH AT CULVERT
ENTRANCE AND OUTLET
(NOT TO SCALE)



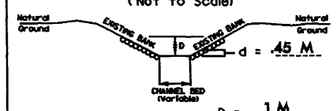
-L- 279+05 TO 279+22 LT.
AND 276+60 TO 279+72 LT.

DETAIL C-18
LOW FLOW BENCH AT CULVERT
ENTRANCE AND OUTLET
(NOT TO SCALE)



-L- 289+90 RT.

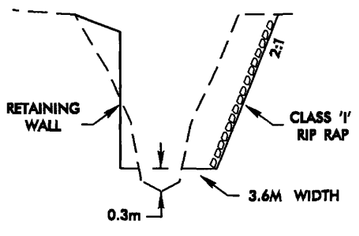
DETAIL C-35
CULVERT OUTLET BANK PROTECTION
(Not to Scale)



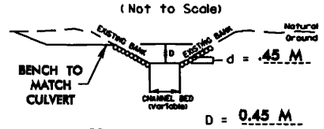
D = 1 M
Est = 42 Tons of Class I RipRap
NOTE: ARMOR ONLY TO LIMITS SHOWN
ON PLANS

-L- STA. 335+48 RT TO 335+57 RT.
AND 335+75 TO 335+85 RT.

DETAIL C-15
LOW FLOW BENCH
AT CULVERT OUTLET
-Y18- 10+25 TO 10+41 RT.
(NOT TO SCALE)



DETAIL C-23
CULVERT OUTLET BANK PROTECTION
(Not to Scale)



D = 0.45 M
Est = 22 Tons of Class I RipRap
NOTE: ARMOR ONLY TO LIMITS SHOWN
ON PLANS

-L- STA. 301+39 LT
AND -Y24- 11+24 RT.

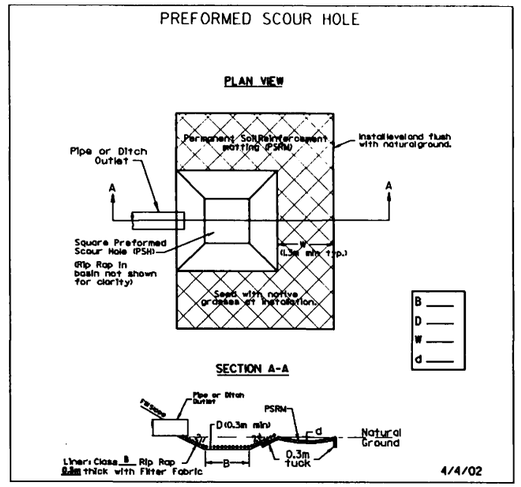
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

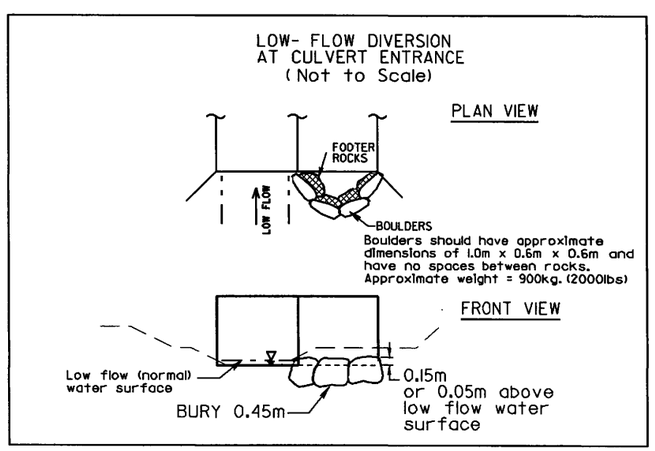
R/W REV.

PREFORMED SCOUR HOLE



SHEET #	STATION	PIPE SIZE	B	D	W	d
5	L 227+52 RT	400	1.2m	0.6m	1.3m	0.3m
7	L 235+00 RT	400	1.2m	0.6m	1.3m	0.3m
10	L 245+12 LT	375	1.2m	0.6m	1.3m	0.3m
12	L 251+99 RT	800	2.4m	0.6m	1.3m	0.3m
17	L 271+02 LT	400	1.2m	0.6m	1.3m	0.3m
20	L 278+26 LT	1050	3.15m	0.6m	1.3m	0.3m
22	L 287+88 RT	750	2.4m	0.6m	1.3m	0.3m
23	L 288+50 RT	450	1.35m	0.6m	1.3m	0.3m
23	L 289+70 RT	450	1.35m	0.6m	1.3m	0.3m
23	L 290+02 RT	600	1.8m	0.8m	1.3m	0.3m
24	L 292+88 RT	600	1.8m	0.6m	1.3m	0.3m
26	L 299+06 RT	450	1.35m	0.6m	1.3m	0.3m
33	L 323+17 RT	600	1.8m	0.6m	1.3m	0.3m
33	L 323+93 RT	375	1.2m	0.6m	1.3m	0.3m
34	L 328+11 RT	400	1.2m	0.6m	1.3m	0.3m
35	L 331+12 RT	400	1.2m	0.6m	1.3m	0.3m
36	L 333+06 RT	400	1.2m	0.6m	1.3m	0.3m
37	L 338+49 RT	450	1.5m	0.6m	1.3m	0.3m
38	L 342+30 RT	800	2.4m	0.6m	1.3m	0.3m
39	Y36 10+84 RT	400	1.2m	0.6m	1.3m	0.3m

LOW- FLOW DIVERSION

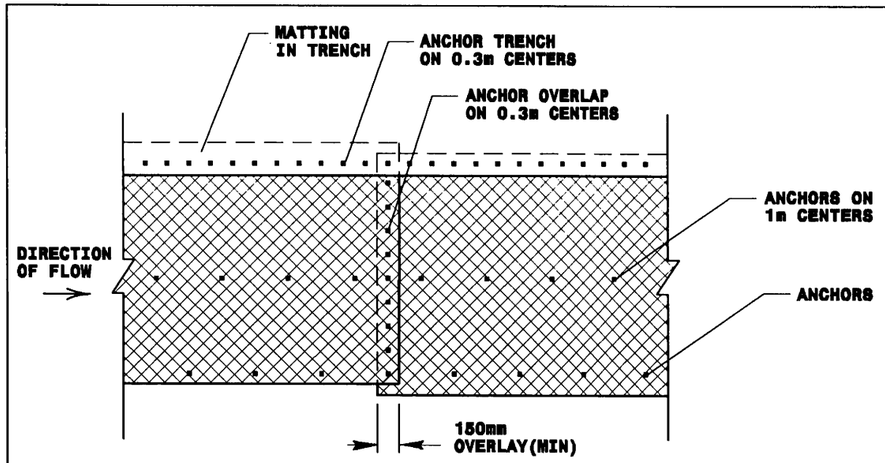


SHEET #	STATION	BOULDERS TONS	FOOTER ROCKS TONS
21	-L- 284+17 LT	2.5	2.5
21	-L- 284+45 LT	2.5	2.5
21	-L- 285+06 LT	2.5	2.5
26	-L- 300+70 RT	2.5	2.5
31	-L- 316+39 LT	2.5	2.5
31	-L- 316+49 LT	2.5	2.5
31	-L- 318+15 LT	2.5	2.5
36	-Y34- 10+60 RT	2.5	2.5

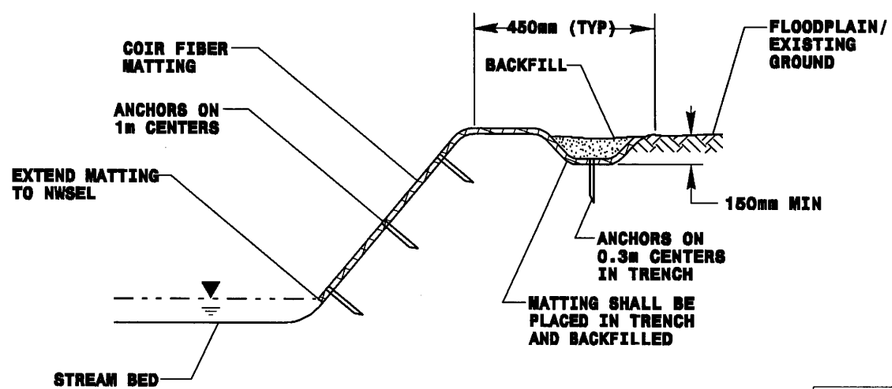
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

COIR FIBER MATTING DETAIL

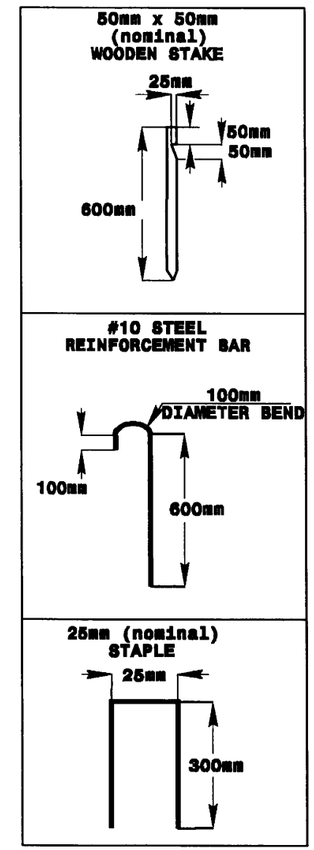
NOT TO SCALE



PLAN VIEW



TYPICAL CROSS SECTION



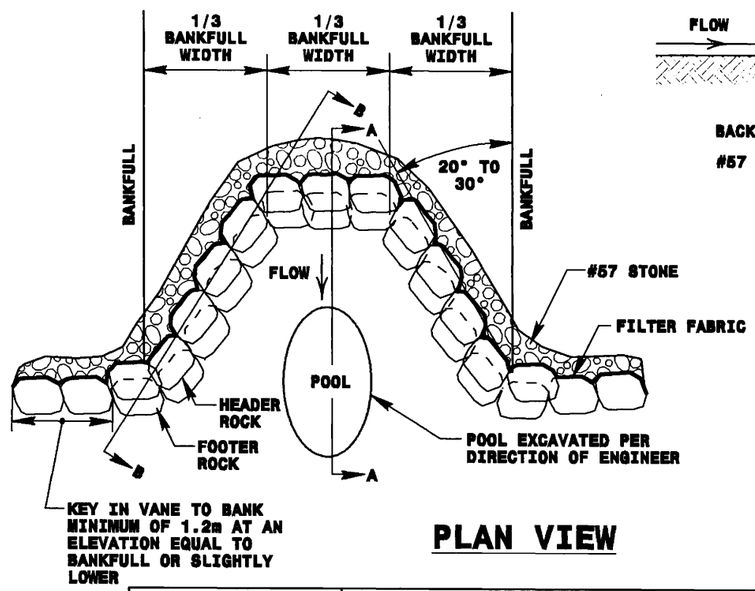
ANCHOR OPTIONS

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

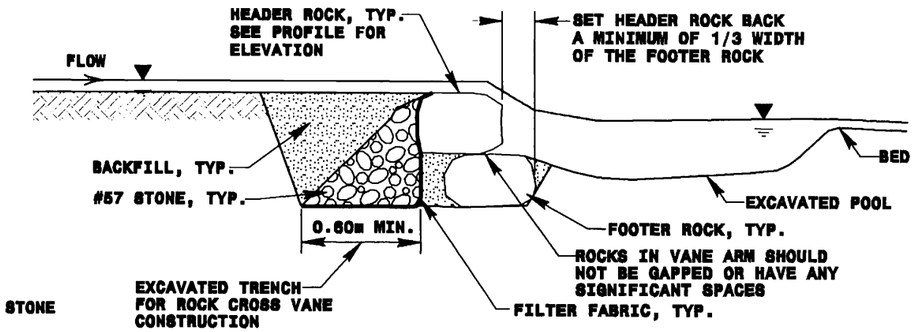
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

ROCK CROSS VANE DETAIL

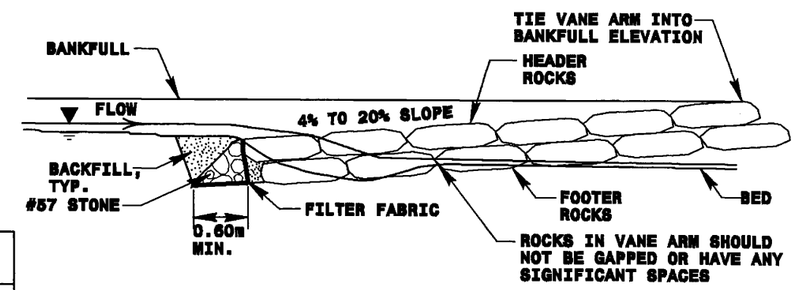
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

STATION	BOULDER DIMENSIONS (METERS) HEIGHT	LENGTH	WIDTH	1/3 BANKFULL WIDTH (m)
-L- 235+90 RT	0.6	1.2	0.9	1.2
-L- 314+05 LT	0.6	1.2	0.9	2.1
-L- 314+40 LT	0.6	1.2	0.9	2.1
-L- 314+42 LT	0.6	1.2	0.9	2.1
-L- 314+64 LT	0.6	1.2	0.9	2.1
-L- 315+49 LT	0.6	1.2	0.9	2.1
-Y30- 10+29 RT	0.6	1.2	0.9	2.0
-Y30- 10+50 RT	0.6	1.2	0.9	2.0
-Y30- 10+68 RT	0.6	1.2	0.9	2.0
-Y30- 10+88 RT	0.6	1.2	0.9	2.0
-Y32- 10+03 RT	0.6	1.2	0.9	1.33
-Y32- 10+20 RT	0.6	1.2	0.9	1.33
-Y33- 9+88 RT	0.45	0.9	0.6	0.6
-Y33- 10+01 RT	0.45	0.9	0.6	0.6
-Y33- 10+14 RT	0.45	0.9	0.6	0.6
-Y33- 10+28 RT	0.45	0.9	0.6	0.6
-L- 327+95 RT	0.6	1.2	0.9	1.33
-L- 327+95 RT	0.6	1.2	0.9	1.33

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

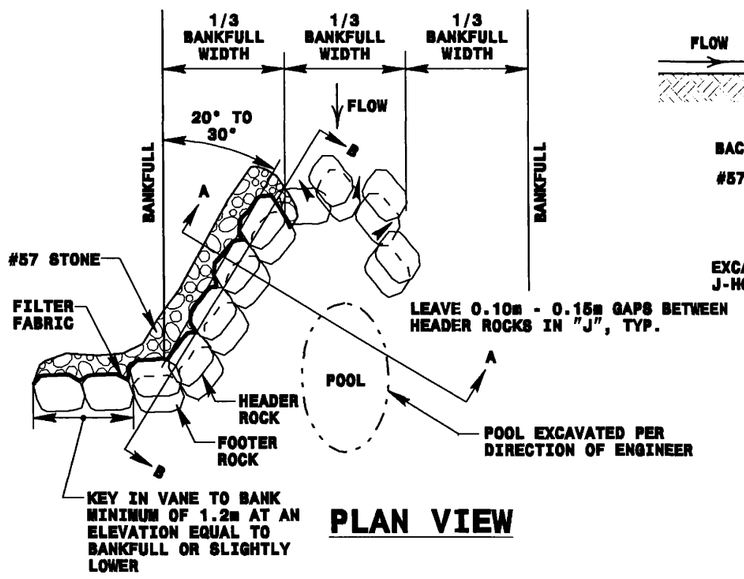
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST. REV.

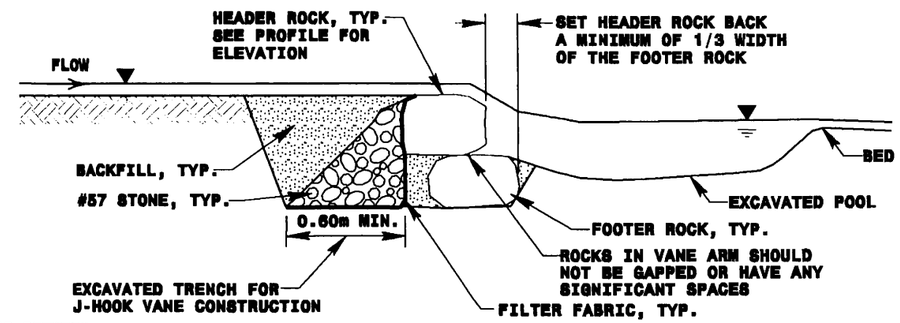
R/W REV.

J-HOOK VANE DETAIL

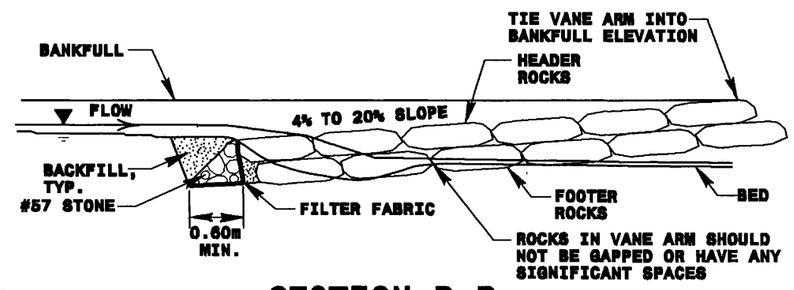
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (METERS)			1/3 BANKFULL WIDTH (m)
STATION	HEIGHT	LENGTH	WIDTH	
-L- 315+00 LT	0.6	1.2	0.9	2.1
-L- 315+20 LT	0.6	1.2	0.9	2.1
-Y32- 9+85 RT	0.6	1.2	0.9	1.33

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-J
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

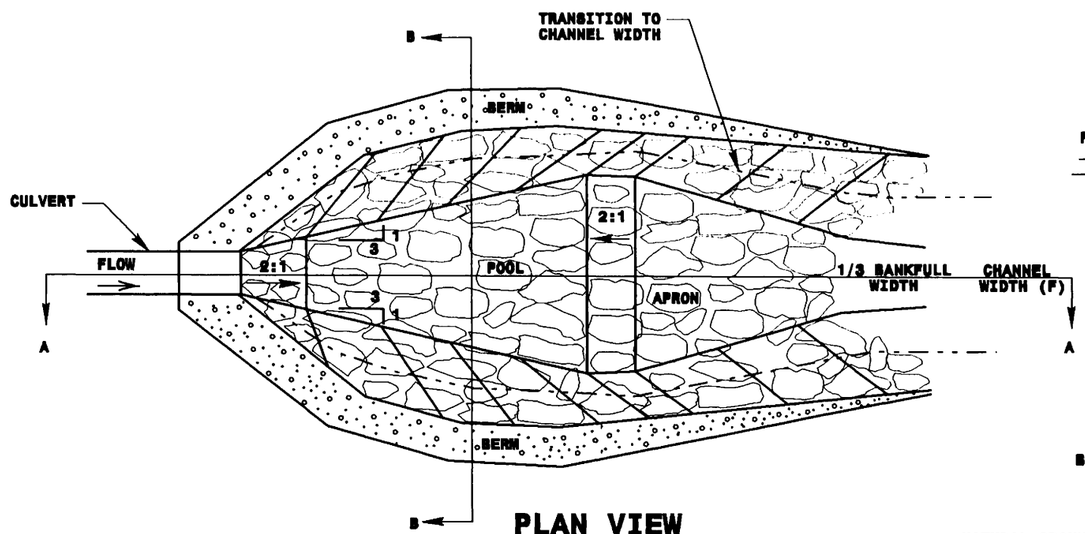
METRIC

CONST.REV.

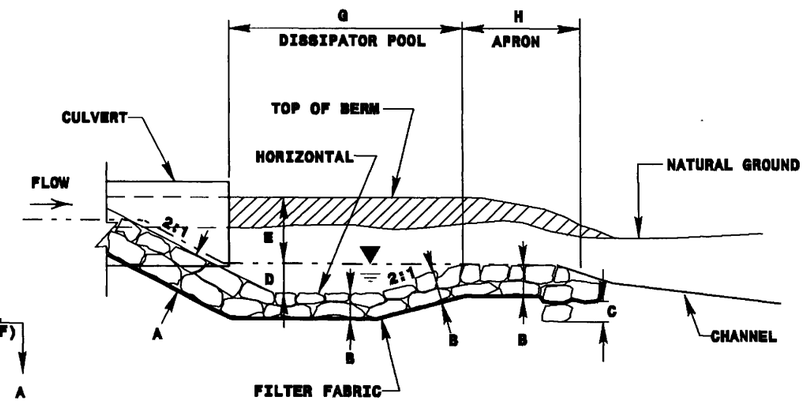
R/W REV.

ROCK ENERGY DISSIPATOR BASIN DETAIL

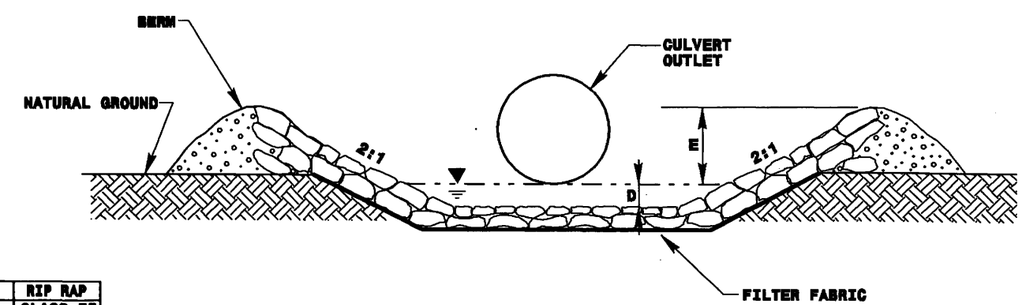
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

	RIP RAP BASIN NUMBER							
DIM.	1	2	3	4	5	6	7	8
A	1.0	1.0						
B	1.0	0.6						
C	0.6	0.6						
D	1.3	0.65						
E	1.0	0.65						
F	1.8	1.5						
G	13.0	6.3						
H	6.5	3.25						

ALL DIMENSIONS APPROXIMATE IN FEET (METERS)

BASIN #	LOCATION (AT OUTLET)	RIP RAP
1	-Y10- STA. 11+00 Rt	CLASS II
2	-L- STA. 276+44 Lt	CLASS II
3		
4		
5		
6		
7		
8		

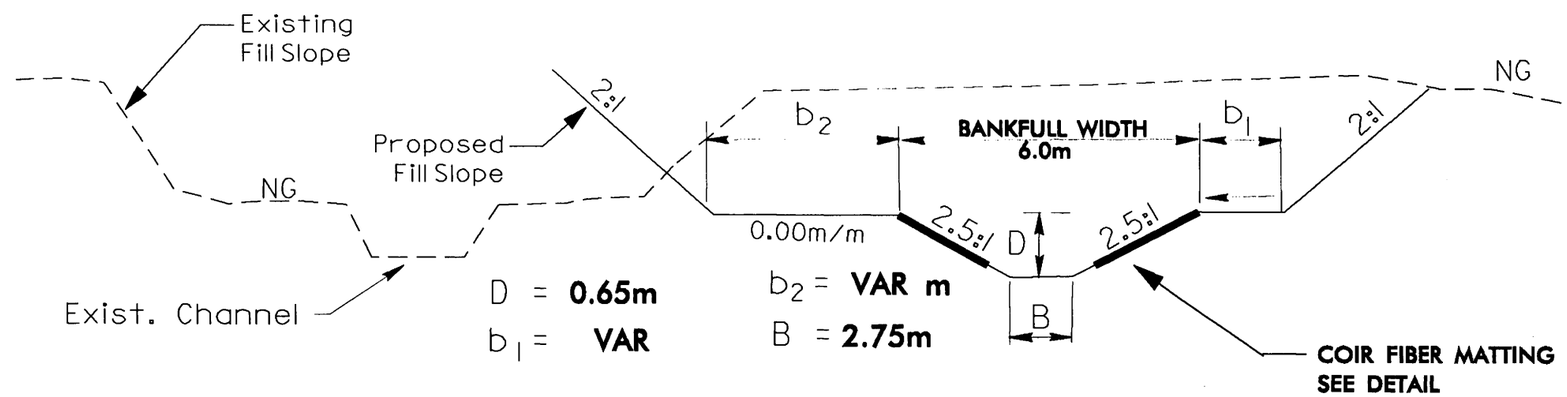
8/17/99

03-MAR-2009 07:38
R:\Roadway\Proj\R2519a_ditch.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-K
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

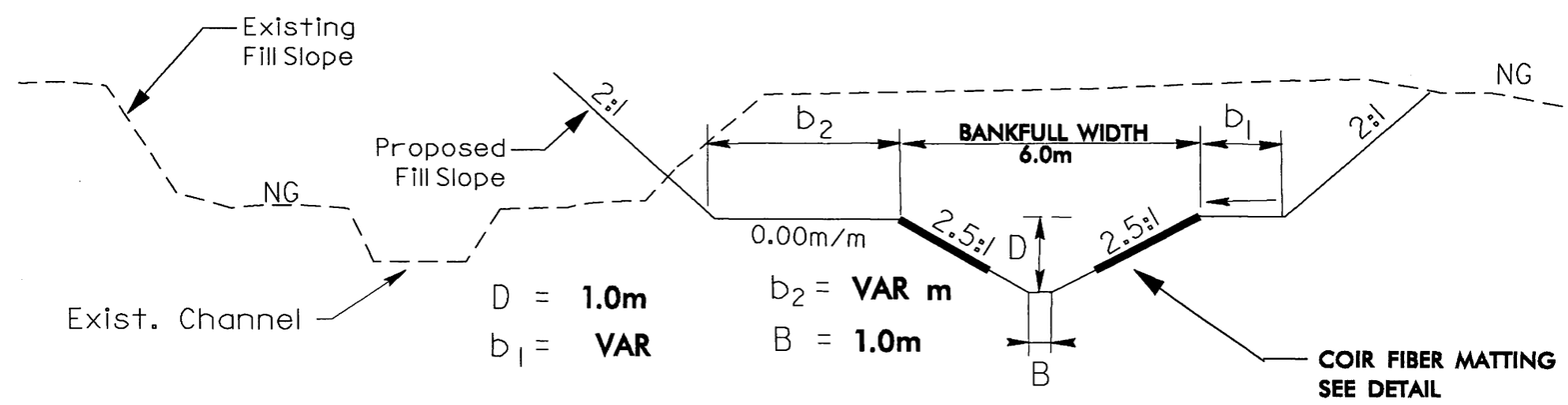
DETAIL "AS"
SHOAL CREEK STREAM RELOCATION
-Y30- STA. 10+28 TO STA. 10+99 RT

TYPICAL RIFFLE SECTION



NOTE: SEE -Y30- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

TYPICAL POOL SECTION

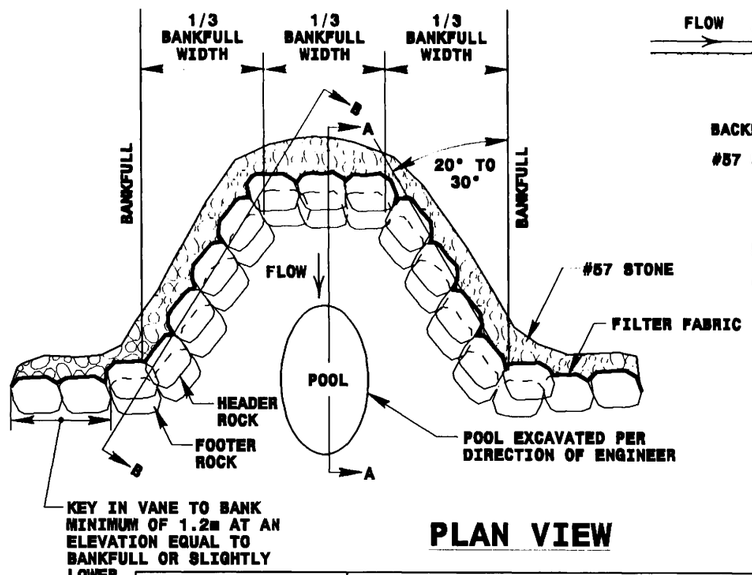


NOTE: SEE -Y30- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

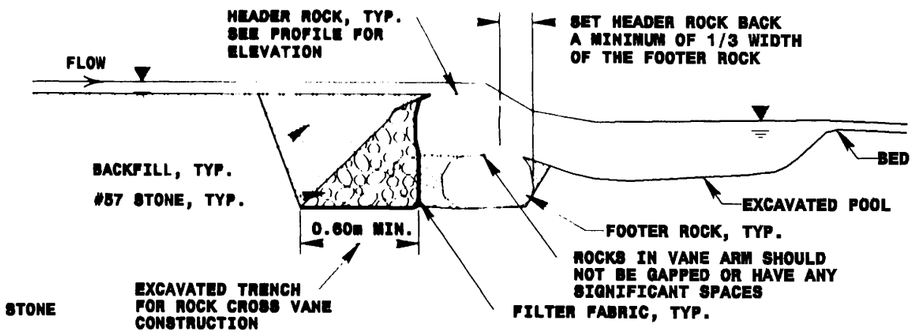
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-L
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

ROCK CROSS VANE DETAIL

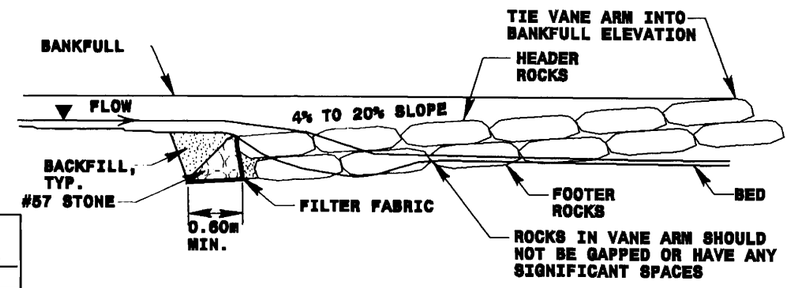
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

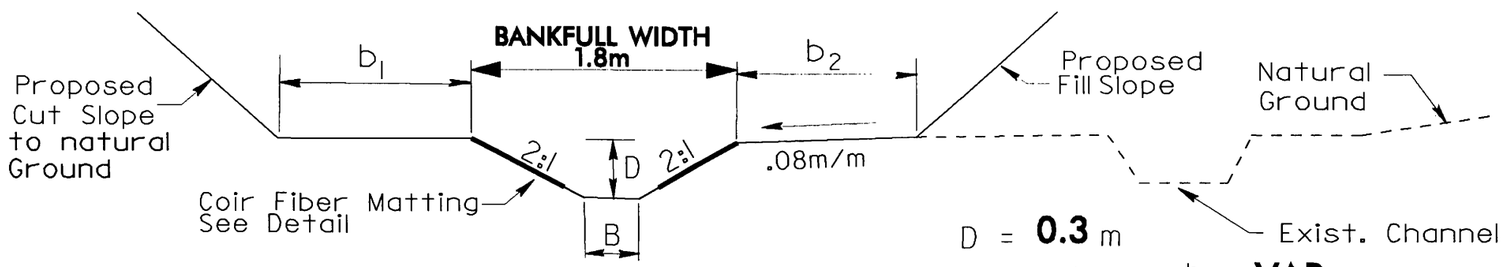
	BOULDER DIMENSIONS (METERS)			1/3 BANKFULL WIDTH (m)
STATION	HEIGHT	LENGTH	WIDTH	
-L- 235+90 RT	0.6	1.2	0.9	1.2
-L- 314+05 LT	0.6	1.2	0.9	2.1
-L- 314+40 LT	0.6	1.2	0.9	2.1
-L- 314+42 LT	0.6	1.2	0.9	2.1
-L- 314+64 LT	0.6	1.2	0.9	2.1
-L- 315+00 LT	0.6	1.2	0.9	2.1
-L- 315+20 LT	0.6	1.2	0.9	2.1
-L- 315+49 LT	0.6	1.2	0.9	2.1
-Y30- 10+29 RT	0.6	1.2	0.9	2.0
-Y30- 10+50 RT	0.6	1.2	0.9	2.0
-Y30- 10+68 RT	0.6	1.2	0.9	2.0
-Y30- 10+88 RT	0.6	1.2	0.9	2.0
-Y32- 9+85 RT	0.6	1.2	0.9	1.33
-Y32- 10+03 RT	0.6	1.2	0.9	1.33
-Y32- 10+20 RT	0.6	1.2	0.9	1.33
-Y33- 9+88 RT	0.45	0.9	0.6	0.6
-Y33- 10+01 RT	0.45	0.9	0.6	0.6
-Y33- 10+14 RT	0.45	0.9	0.6	0.6
-Y33- 10+28 RT	0.45	0.9	0.6	0.6
-L- 327+95 RT	0.6	1.2	0.9	1.33
-L- 327+95 RT	0.6	1.2	0.9	1.33

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-M
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

TRIBUTARY TO PLUM BRANCH STREAM RELOCATION DETAIL "AU" -Y33- STA. 9+86 TO STA. 10+40 RT

TYPICAL RIFFLE SECTION



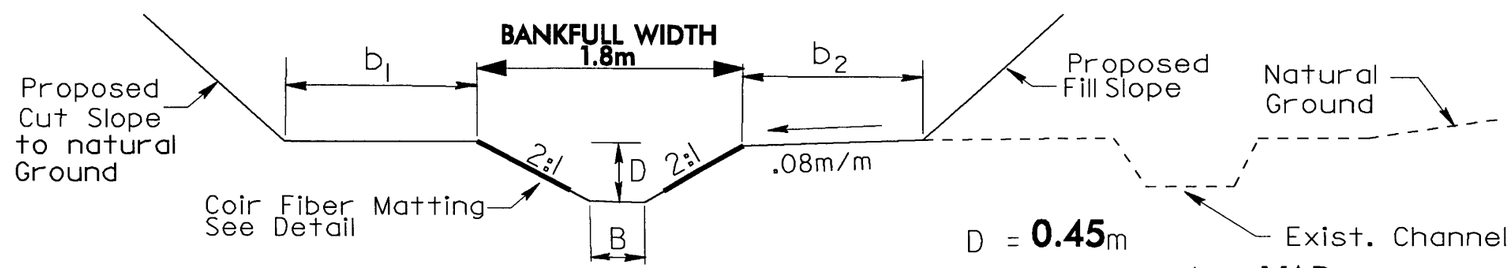
D = **0.3** m

B = **0.6** m

b_1 = **VAR** m

b_2 = **VAR** m

TYPICAL POOL SECTION



D = **0.45**m

B = **0** m

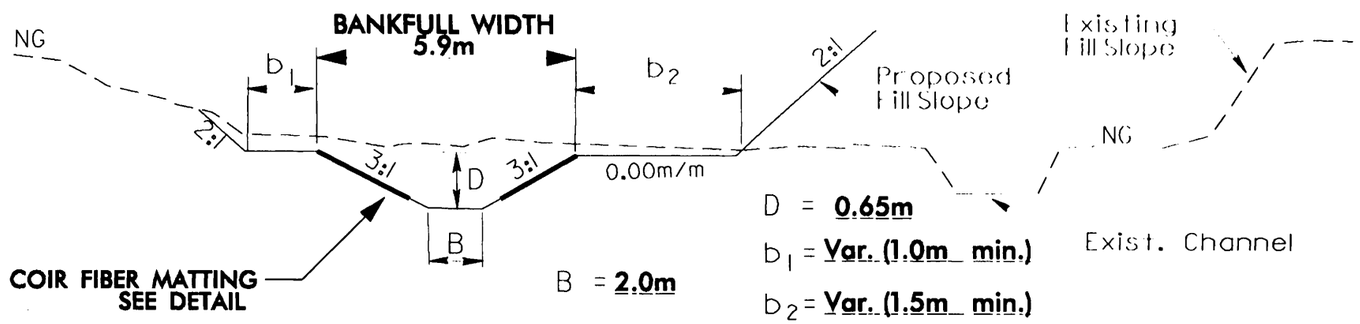
b_1 = **VAR** m

b_2 = **VAR** m

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

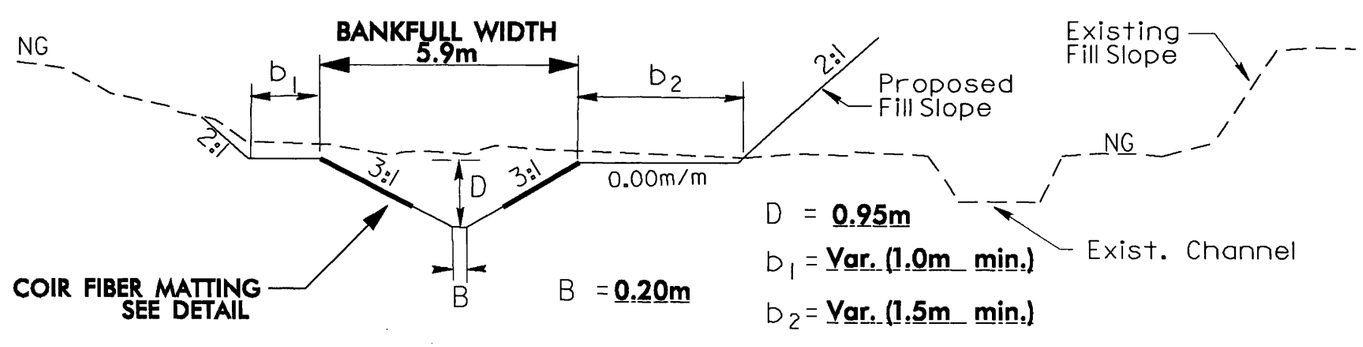
DETAIL "AV"
GEORGES FORK STREAM RELOCATION
-L- STA. 314+04 TO STA. 315+67 LT

TYPICAL RIFFLE SECTION



NOTE: SEE -L- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

TYPICAL POOL SECTION



NOTE: SEE -L- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

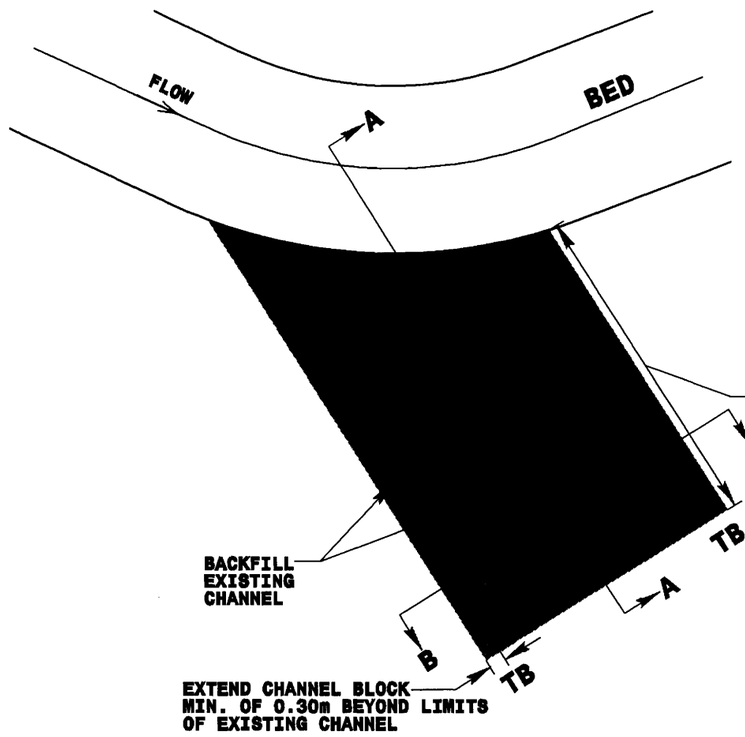
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-0
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

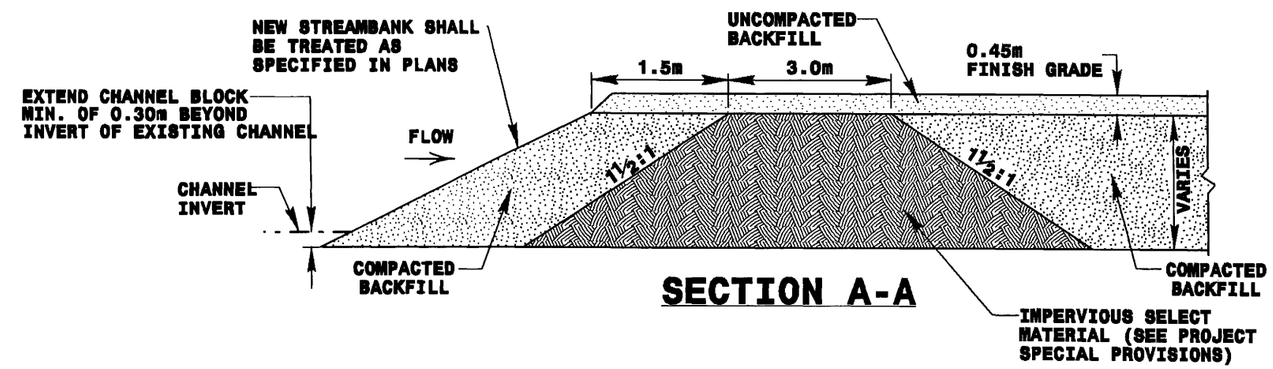
R/W REV.

STREAM PLUG

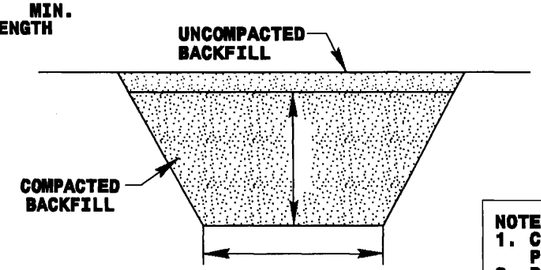
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

NOTES:
1. CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2. BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3. BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 0.30m BELOW THE INVERT OF THE EXISTING CHANNEL.
4. BLOCK SHOULD EXTEND A MINIMUM OF 0.30m BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5. INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

-L- 314+10 LT

-Y30- 10+30 RT

-Y32- 9+95 RT

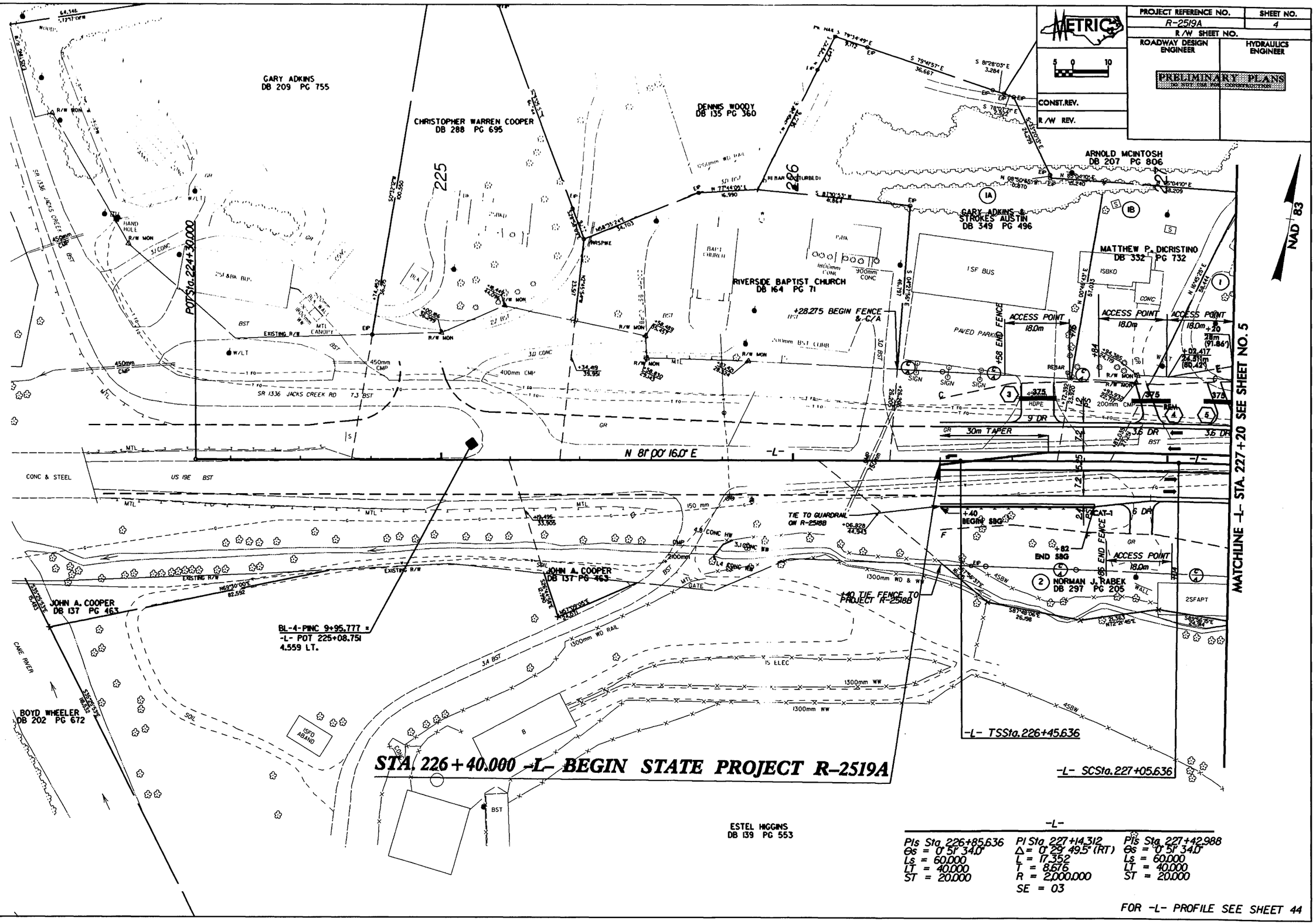
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
CONST. REV.	
R/W REV.	

METRIC 5 0 10

REVISIONS

R/W REV. 11/18/05 (TWW); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL IA; ADDED DRIVEWAY & ACCESS POINT ON PARCEL IA
@ STA.226+57 ; MOVED DRIVEWAY & ACCESS POINT FROM STA 226+96 TO STA 227+31 ON PARCEL 2 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME, PROPERTY LINE, AND DEED BOOK INFORMATION ON PARCELS IA & IB ; MOVED DRIVEWAY & ACCESS POINT FROM STA 226+57 TO STA 226+67 ON PARCEL IA.
R/W REV. 10/25/07 (RVP); ADDED DRIVEWAY AND ACCESS POINT AT STA.226+95 ON PARCEL 2.
R/W REV. 05/12/08 (RVP); REVISED PROPOSED C/A AND FENCE ON PARCEL IA.

8/17/99



-L-

Pls Sta. 226+85.636	Pl Sta. 227+14.312	Pls Sta. 227+42.988
Gs = 0°51' 34.0"	Δ = 0°29' 49.5" (RT)	Gs = 0°51' 34.0"
Ls = 60.000	L = 17.352	Ls = 60.000
LT = 40.000	T = 8.676	LT = 40.000
ST = 20.000	R = 2,000.000	ST = 20.000
	SE = 03	

FOR -L- PROFILE SEE SHEET 44

09-MAR-2009 07:32

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

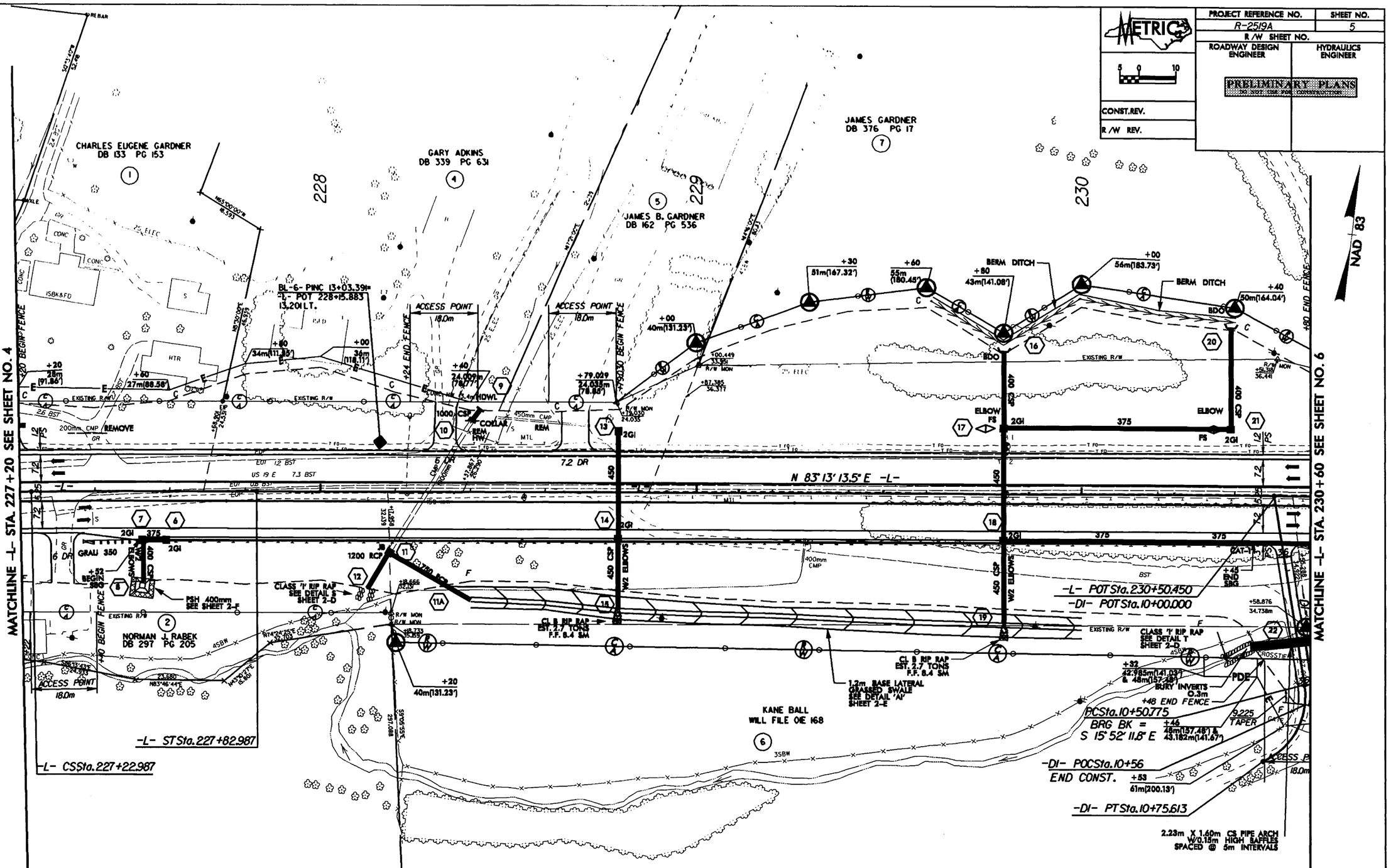
CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TWH); MOVED DRIVEWAY & ACCESS POINT FROM STA 226+96 TO STA 227+31 ON PARCEL 2; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 4; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 6 & PARCEL 7.
R/W REV. 10/25/07 (RVP); REMOVED PROP. R/W ON PARCEL 2.

8/17/99



-L-			-DI-
PIs Sta. 226+85.636	PI Sta. 227+14.312	PIs Sta. 227+42.988	PI Sta. 10+65.328
θs = 0° 51' 34.0"	Δ = 0° 29' 49.5" (RT)	θs = 0° 51' 34.0"	Δ = 7° 54' 07.3" (RT)
Ls = 60.000	L = 17.352	Ls = 60.000	L = 24.838
LT = 40.000	T = 8.676	LT = 40.000	T = 14.553
ST = 20.000	R = 2,000.000	ST = 20.000	R = 19.000
	SE = 03		

FOR -L- PROFILE SEE SHEET 44
FOR -DI- PROFILE SEE SHEET 72

09-MAR-2009 07:32
R:\Roadway\Proj\R2519a_rw_sht05.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

PRELIMINARY PLANS

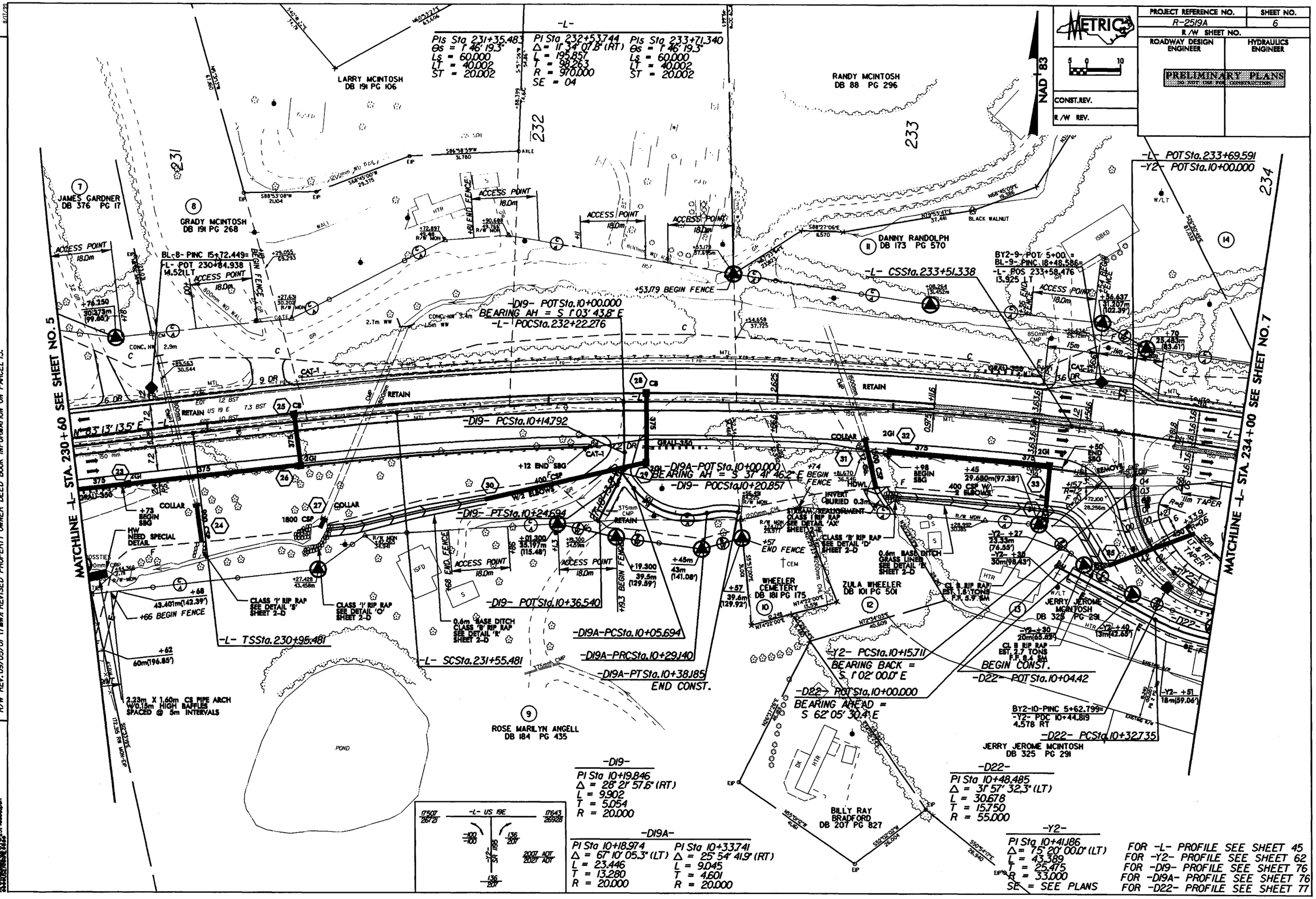
CONST. REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (RVP): ADDED DRIVEWAY -D19- AND -D19A- FOR PARCEL 10; ADDED PROPOSED R/W ON PARCEL 9; ADDED DRIVEWAY -D22- FOR PARCEL 13; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENTS ON PARCEL 13; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 7.
R/W REV. 09/05/07 (TWW): REVISED PROPERTY OWNER DEED BOOK INFORMATION ON PARCEL 13.

8/17/98



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83

FOR -L- PROFILE SEE SHEET 45
FOR -Y3- & -Y4- PROFILE SEE SHEET 62
FOR -D2- PROFILE SEE SHEET 72
FOR -D22- PROFILE SEE SHEET 77

MATCHLINE -Y3- STA. 11+40 SEE SHEET NO. 40

MATCHLINE -L- STA. 234+00 SEE SHEET NO. 6

MATCHLINE -L- 237+40 SEE SHEET NO. 8

-L-
PIs Sta 231+35.483
Δs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002

PI Sta 232+53.744
Δ = 11° 34' 07.8" (RT)
L = 195.857
T = 98.263
R = 970.000
SE = 04

PIs Sta 233+71.340
Δs = 1° 46' 19.3"
Ls = 60.000
LT = 40.002
ST = 20.002

-Y3-
PI Sta 11+05.865
Δ = 32° 48' 03.5" (LT)
L = 114.497
T = 58.865
R = 200.000
SE = SEE PLANS

-Y3- PT Sta. 11+61.497
BEARING AH = S 23° 48' 26.9" W

-L- POT Sta. 237+14.259
-Y3- POT Sta. 11+81.89
-Y4- POT Sta. 10+00.000

-L- ST Sta. 234+11.338

-L- S 81° 40' 00.5" E

-Y2- POT Sta. 10+74.500
-D22- POT Sta. 10+74.573

-Y2- S 76° 22' 00.0" E

END CONST.
-Y2- POT Sta. 10+83.900
-D22- PT Sta. 10+67.200
BEARING AHEAD = N 13° 37' 59.8" E

-Y2- PT Sta. 10+59.100

-D22- PCC Sta. 10+63.413

-D22-
PI Sta 10+65.606
Δ = 72° 18' 57.2" (LT)
L = 3.786
T = 2.192
R = 3.000

-Y2-
PI Sta 10+41.86
Δ = 75° 20' 00.0" (LT)
L = 43.389
T = 25.475
R = 33.000
SE = SEE PLANS

POT -D2- Sta. 10+00.000
-L- POT Sta. 253+98.996, 43.039 RT.

PC Sta. 10+06.257
BEARING BACK = N 65° 14' 00.0" E

POT -D2- Sta. 10+10
BEGIN CONST.

POT Sta. 12+02.780 -Y2-

PC Sta. 10+56.167
BEARING BACK = S 23° 26' 36.4" W

PT Sta. 10+94.500
BEARING AHEAD = S 2° 24' 47.3" E

PC Sta. 11+19.831

PT Sta. 11+21.493
BEARING AH = S 49° 07' 00.9" E

PT Sta. 11+36.307
BEARING AHEAD = S 33° 52' 44.3" E

PC Sta. 11+41.416

PT -D2- Sta. 11+56.167
END CONST.
POC -Y4- Sta. 11+12.391, 26.338 RT.

END CONST.
-Y4- POT Sta. 11+54.000

POT Sta. 11+38.561

-D2-
PI Sta 10+73.419
Δ = 112° 21' 12.7" (RT)
L = 88.242
T = 67.161
R = 45.000

PI Sta 11+28.282
Δ = 31° 27' 57.0" (LT)
L = 16.475
T = 8.451
R = 30.000

PI Sta 11+48.944
Δ = 28° 10' 20.0" (RT)
L = 14.751
T = 7.528
R = 30.000

-Y4-
PI Sta 10+94.873
Δ = 72° 33' 59.4" (LT)
L = 63.326
T = 36.706
R = 50.000
SE = SEE PLANS

RANDY MCINTOSH
DB 88 PG 296

VICKI BANKS TIPTON, ET. AL.
DB 289 PG 22

VICKI BANKS TIPTON
DB 289 PG 22

GARY ADKINS and STOKES AUSTIN
DB 325 PG 167

THOMAS RICHARD FOX
DB 225 PG 402

JERRY JEROME MCINTOSH
DB 325 PG 291

STORMWATER RETENTION BASIN W/MICROPOOL AND OTCB SEE DETAIL 'AA', SHEET 2-E @ 450 cu. m EXC.

CLASS 'I' RIP RAP SEE DETAIL 'O' SHEET 2-D ROCK CROSS VANE SEE SHEET 2-H

SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'Q' SHEET 2-D

UTILITIES APPROXIMATE LOCATION AS PER PROPERTY OWNER

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED DRIVEWAY -D22- FOR PARCEL 17; REVISED PROPOSED R/W & CONSTRUCTION EASEMENTS ON PARCEL 13; ADDED DRIVEWAY -D2- FOR PARCEL 17; REVISED PROPOSED R/W ON PARCELS 17, 17A & 18; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/27/06 (TMW); ADDED PAVED SHOULDER & EXPRESSWAY GUTTER & REVISED R/W & CONSTRUCTION EASEMENT ON PARCEL 19. R/W REV. 04/19/06 (TMW); REVISED C/A & FENCE ON PARCEL 15. R/W REV. 10/30/06 (KWW); REVISED PROPOSED R/W ON PARCELS 17, 17A & 18 AND ADDED CONSTRUCTION EASEMENTS ON PARCEL 17 & 18. R/W REV. 09/05/07 (TMW); REVISED PROPERTY OWNER DEED BOOK INFORMATION ON PARCEL 13. REVISED PROPERTY OWNER NAME & ADDED ACCESS POINT ON PARCEL 15.

8/17/99

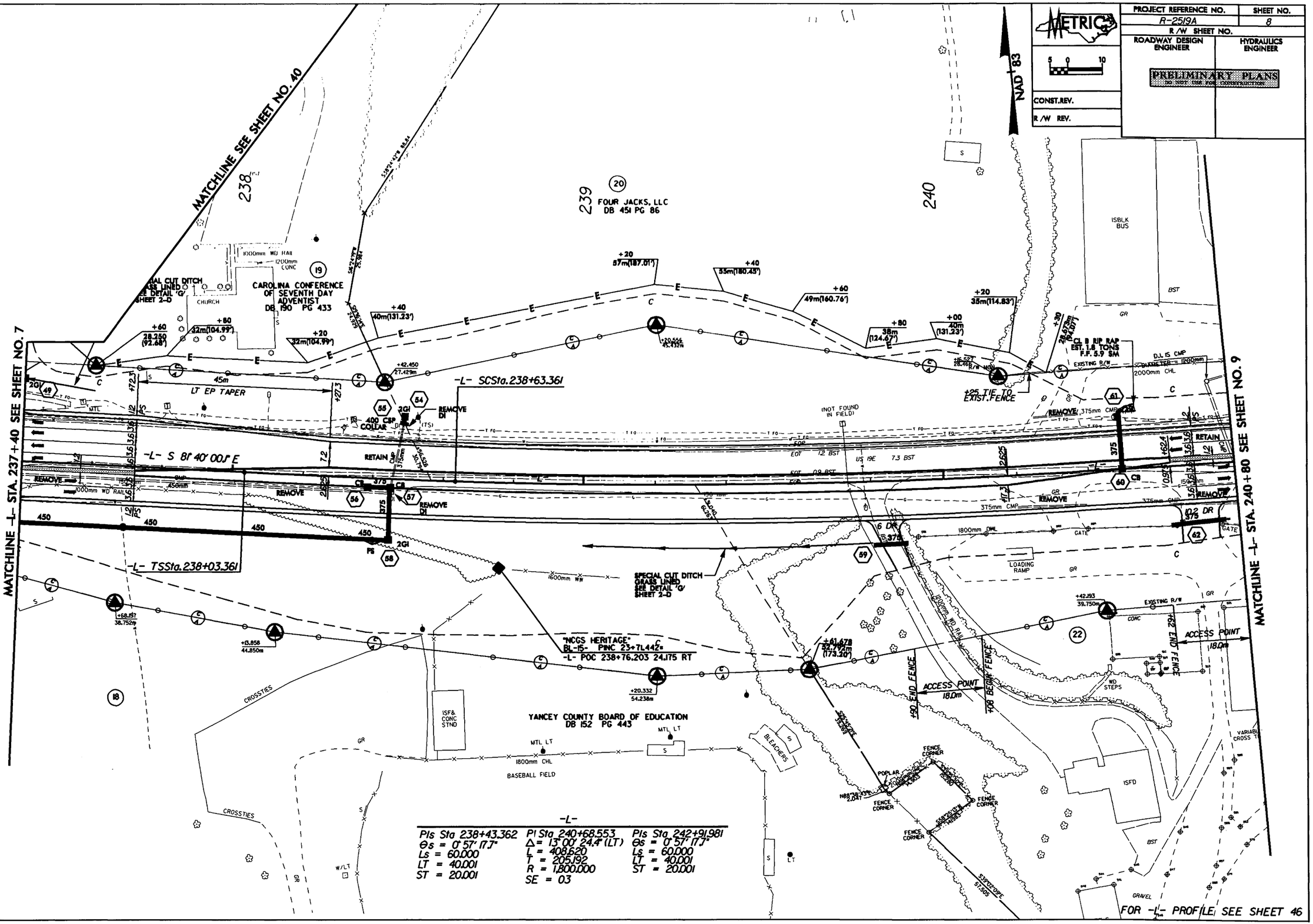
02-MAR-2009 07:39

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



-L-

PIs Sta 238+43.362	PI Sta 240+68.553	PIs Sta 242+91.981
θs = 0° 57' 17.7"	Δ = 13° 00' 24.4" (LT)	θs = 0° 57' 17.7"
Ls = 60.000	L = 408.620	Ls = 60.000
LT = 40.001	T = 205.192	LT = 40.001
ST = 20.001	R = 1,800.000	ST = 20.001
	SE = 03	

REVISIONS

R/W REV. 11/18/05 (TMW): ADDED DRIVE AND ACCESS POINT FOR PARCEL 22 AT STA 239+83 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 5/08/06 (RVP): REVISED PROPERTY OWNER NAME ON PARCEL 22.
R/W REV. 09/05/07 (TMW): REVISED PROPERTY LINES, OWNER NAME, & DEED BOOK INFORMATION ON PARCEL 20, ELIMINATED PARCELS 21 & 23 AND COMBINED INTO PARCEL 20.

R/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

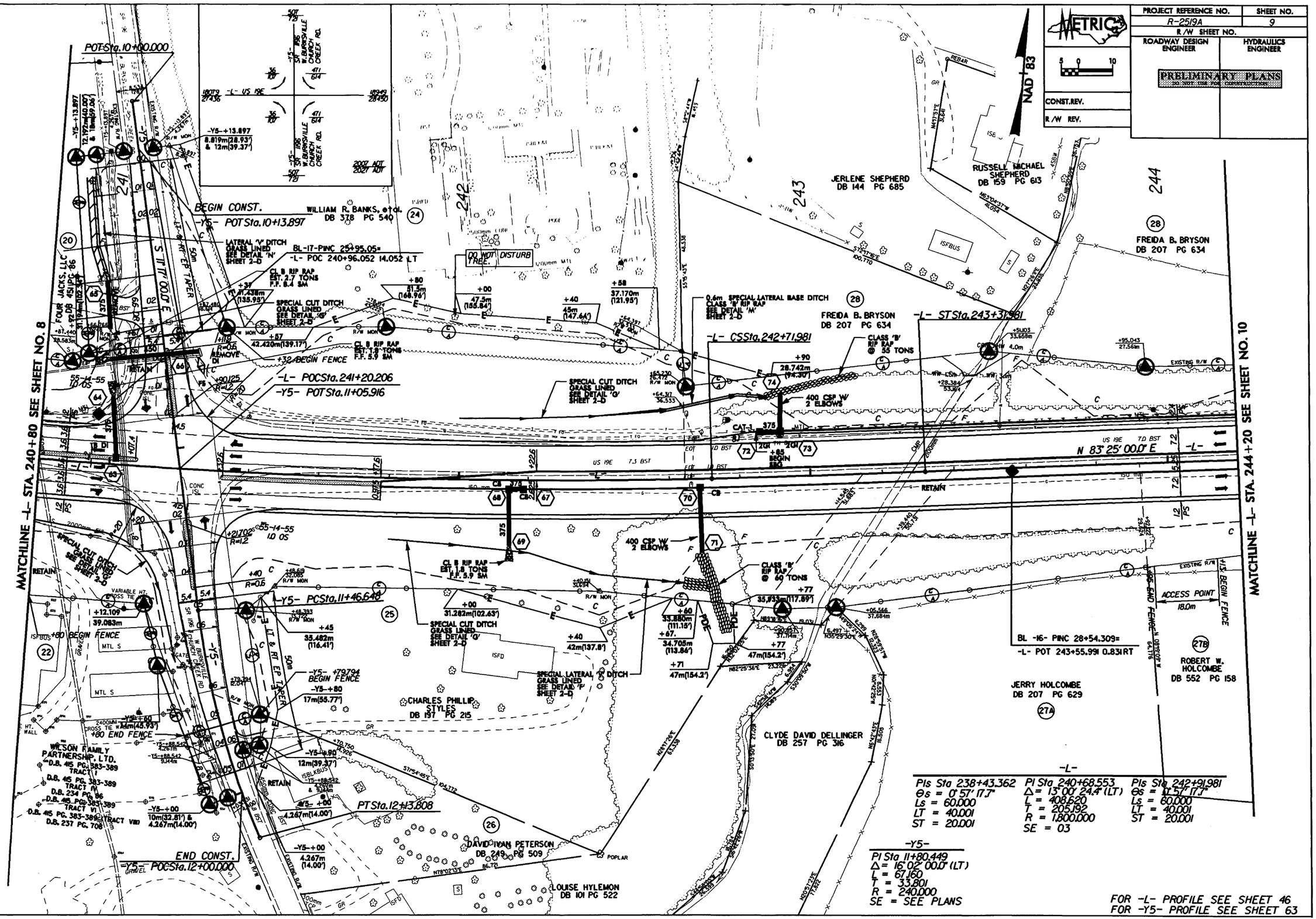
METRIC 5 0 10

NAD 83

REVISIONS

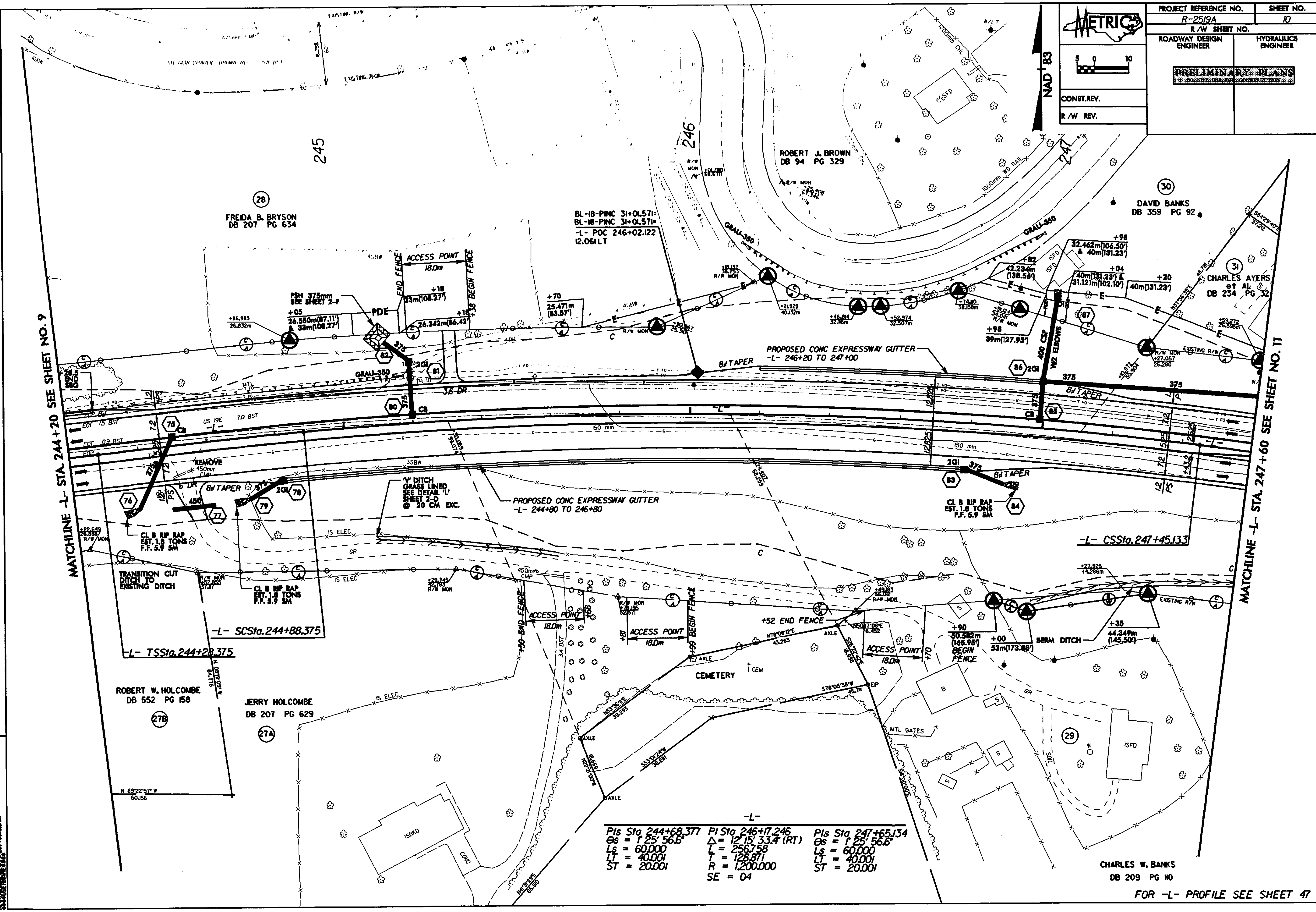
R/W REV. 11/18/05 (TMW): REVISED C/A & FENCE ON PARCEL 22; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 5/08/06 (RVP): REVISED PROPERTY OWNER NAME, C/A & FENCE ON PARCEL 22; R/W REV. 9/09/07 (RVP): ADDED NOTE ON PARCEL 24.
R/W REV. 03/30/07 (RVP): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 28.
R/W REV. 05/16/07 (BCS): ELIMINATED PARCEL 27 AND COMBINED INTO PARCEL 27B.
R/W REV. 09/05/07 (TMW): ELIMINATED PARCEL 23 & COMBINED INTO PARCEL 20; ADDED PARCEL 27B WITH ACCESS POINT AT STA. 244+04.

8/17/99



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME ON PARCEL 31; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 04/19/06 (TMW); REVISED CONSTRUCTION EASEMENT, PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 30.
R/W REV. 10/30/06 (KMW); ADDED DRIVEWAY AND ACCESS POINT FOR PARCEL 28 AT STA 245+30.
R/W REV. 09/05/07 (TMW); ADDED PARCEL 27B, ADDED ACCESS POINT AT STA 245+90 ON PARCEL 27A AND REVISED FENCE ON PARCEL 29.



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

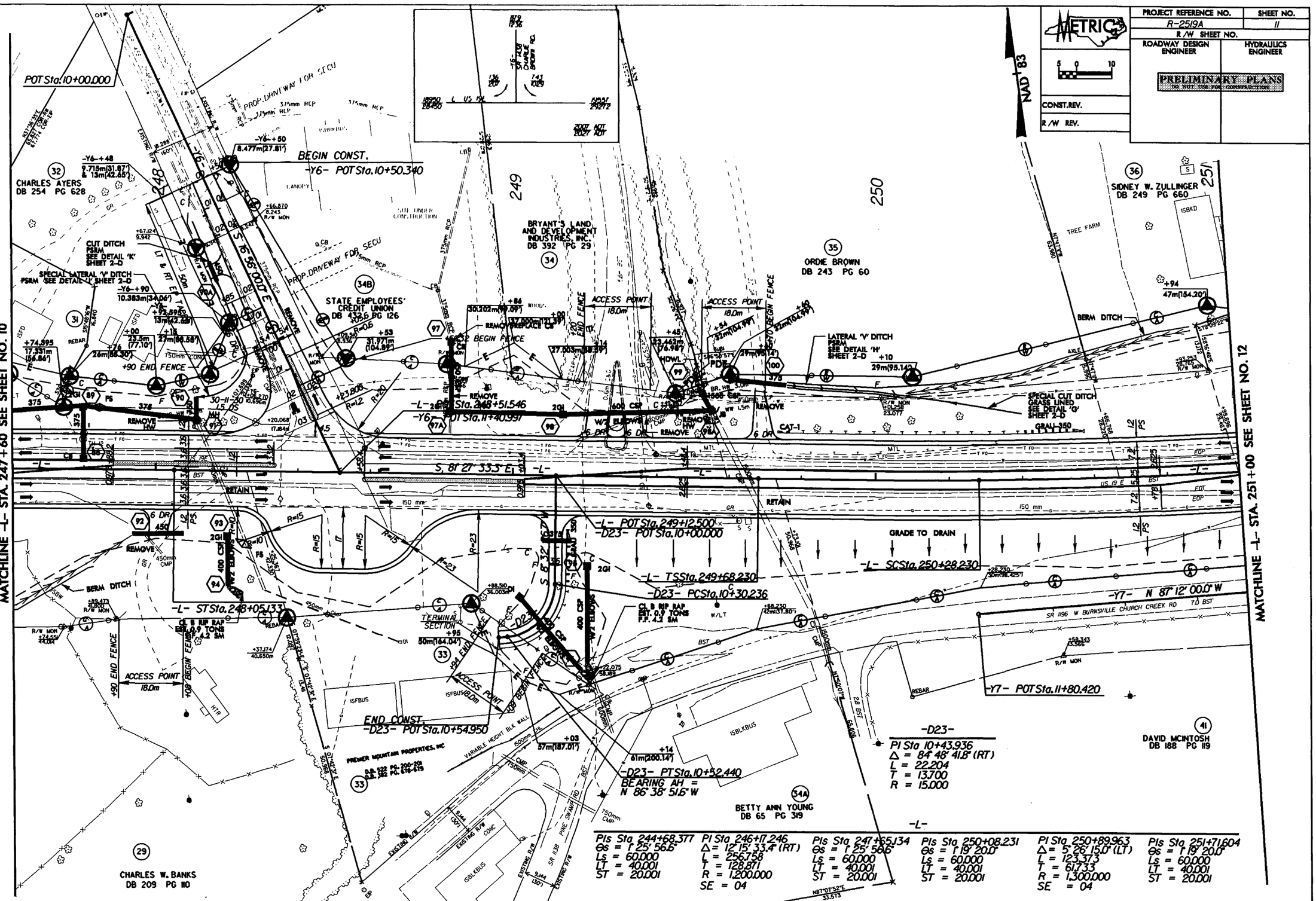
R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED ACCESS POINT AT STA.248+01 FOR PARCEL 29; REMOVED PARCEL NUMBER 33A; COMBINED PARCELS 33 & 33A; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 33; ADDED REVISED PROP R/W & CONSTRUCTION EASEMENT LINES; REVISED PROPERTY OWNER NAME ON PARCEL 34; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 8/10/06 (TMW); REVISED C/A LINE AND PROP FENCE FROM -L- STA 249+22 TO -L- STA 251+05 ON PARCEL 34A & 41. R/W REV. 10/30/06 (KNW); RELOCATED ACCESS POINT AND REVISED DRIVEWAY ON PARCEL 34.

R/W REV. 01/09/07 (RVP); REMOVED TDE ON PARCEL 35 AND ADDED PDE ON PARCELS 34 & 35. R/W REV. 05/04/07 (BCS); MOVED DRIVEWAY LOCATION AND RELOCATED ACCESS POINT ON PARCEL 33. R/W REV. 05/16/07 (BCS); MOVED DRIVEWAY AND ACCESS POINT FROM -L- STA.248+52 TO -L- STA.249+12 AND ADDED CONSTRUCTION EASEMENT ON PARCEL 33. R/W REV. 09/05/07 (TMW); UPDATED EXISTING TOPOGRAPHY AND REVISED CONSTRUCTION EASEMENT ON PARCEL 33.

8/17/99



FOR -L- PROFILE SEE SHEET 47
FOR -Y6- PROFILE SEE SHEET 63
FOR -D23- PROFILE SEE SHEET 77

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS

CONST. REV.

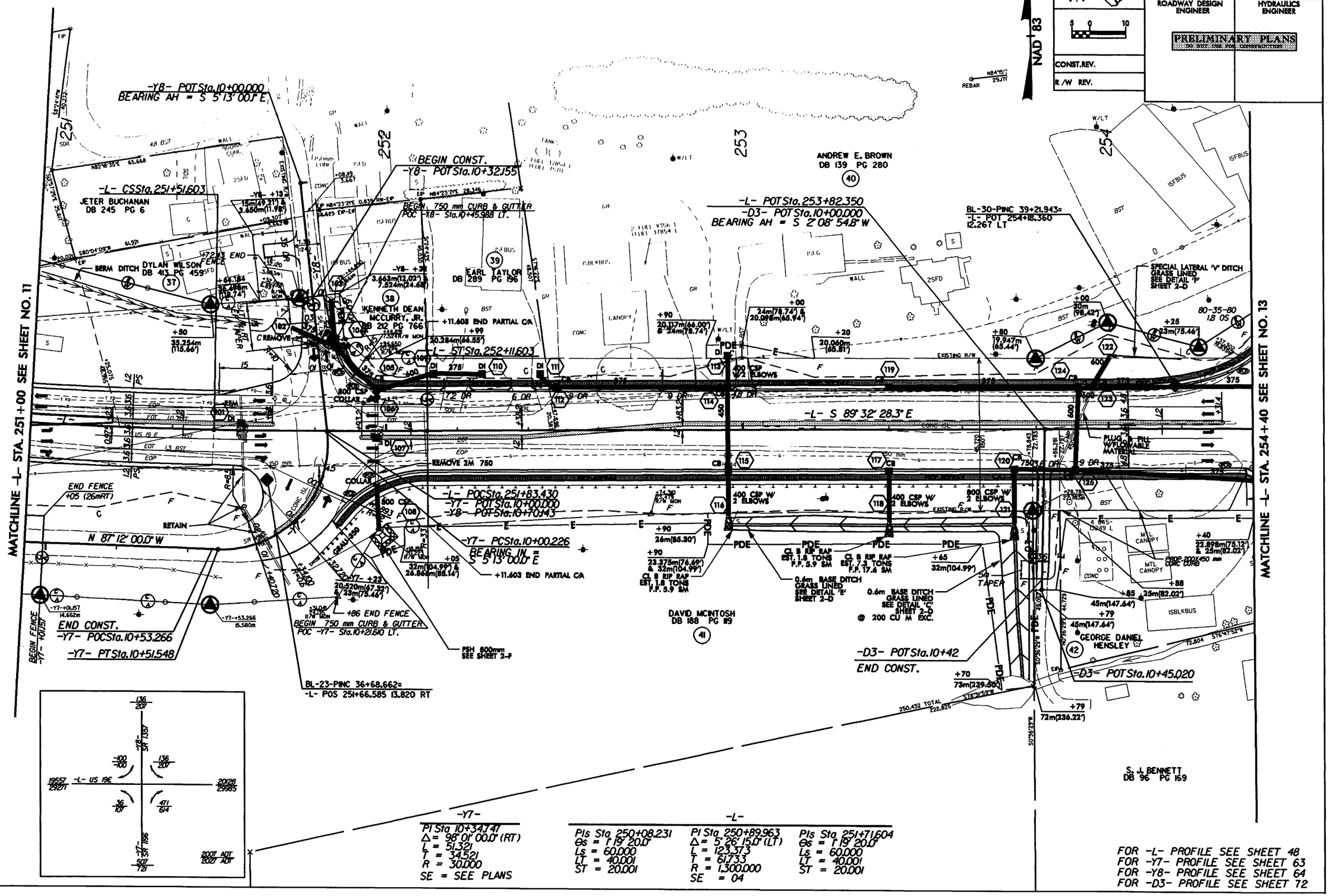
R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 37 & 42 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.

R/W REV. 8/10/06 (TMW); REVISED PROP R/W ON PARCEL 40 . REVISED C/A LINE & PROP FENCE FROM -L- STA 249+22 TO -L- STA 251+05 ON PARCEL 34A AND 41.



FOR -L- PROFILE SEE SHEET 48
FOR -Y7- PROFILE SEE SHEET 63
FOR -Y8- PROFILE SEE SHEET 64
FOR -D3- PROFILE SEE SHEET 72

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

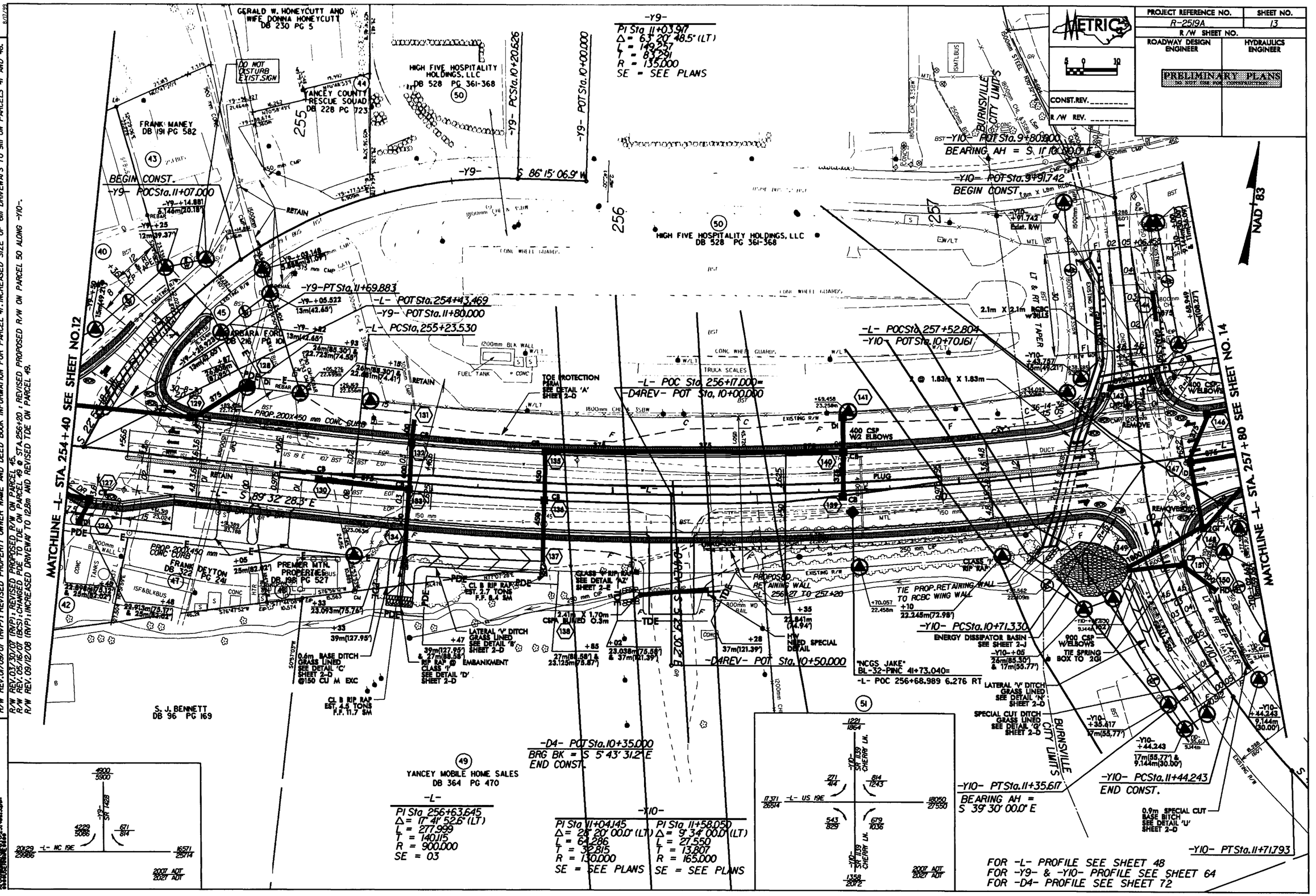
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV. _____

R/W REV. _____

REVISIONS

R/W REV. 11/18/05 (TLW): REVISED PROPERTY OWNER NAME FOR PARCEL 45.
R/W REV. 4/19/06 (TLW): REVISED CONSTRUCTION EASEMENT ON PARCEL 49 & REVISED PROP. R/W ON PARCEL 44 AND 46.
R/W REV. 10/30/06 (TLW): REVISED PROPERTY OWNERS NAMES AND DEED BOOK INFORMATION FOR PARCELS 49 & 50, ELIMINATED PARCEL 46.
R/W REV. 01/30/06 (RWP): REVISED PROPERTY LINES PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 47. INCREASED SIZE OF 6m DRIVEWAYS TO 9m ON PARCELS 47 AND 48.
R/W REV. 01/29/07 (RVP): REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 45.
R/W REV. 03/30/07 (RVP): REVISED PROPOSED R/W ON PARCEL 49 @ STA.256+20 : REVISED PROPOSED R/W ON PARCEL 50 ALONG -Y10-.
R/W REV. 05/16/07 (BCS): CHANGED PIDE TO TDE ON PARCEL 49 & REVISED TDE ON PARCEL 49.
R/W REV. 09/12/08 (RVP): INCREASED DRIVEWAY TO 12.8m AND REVISED



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

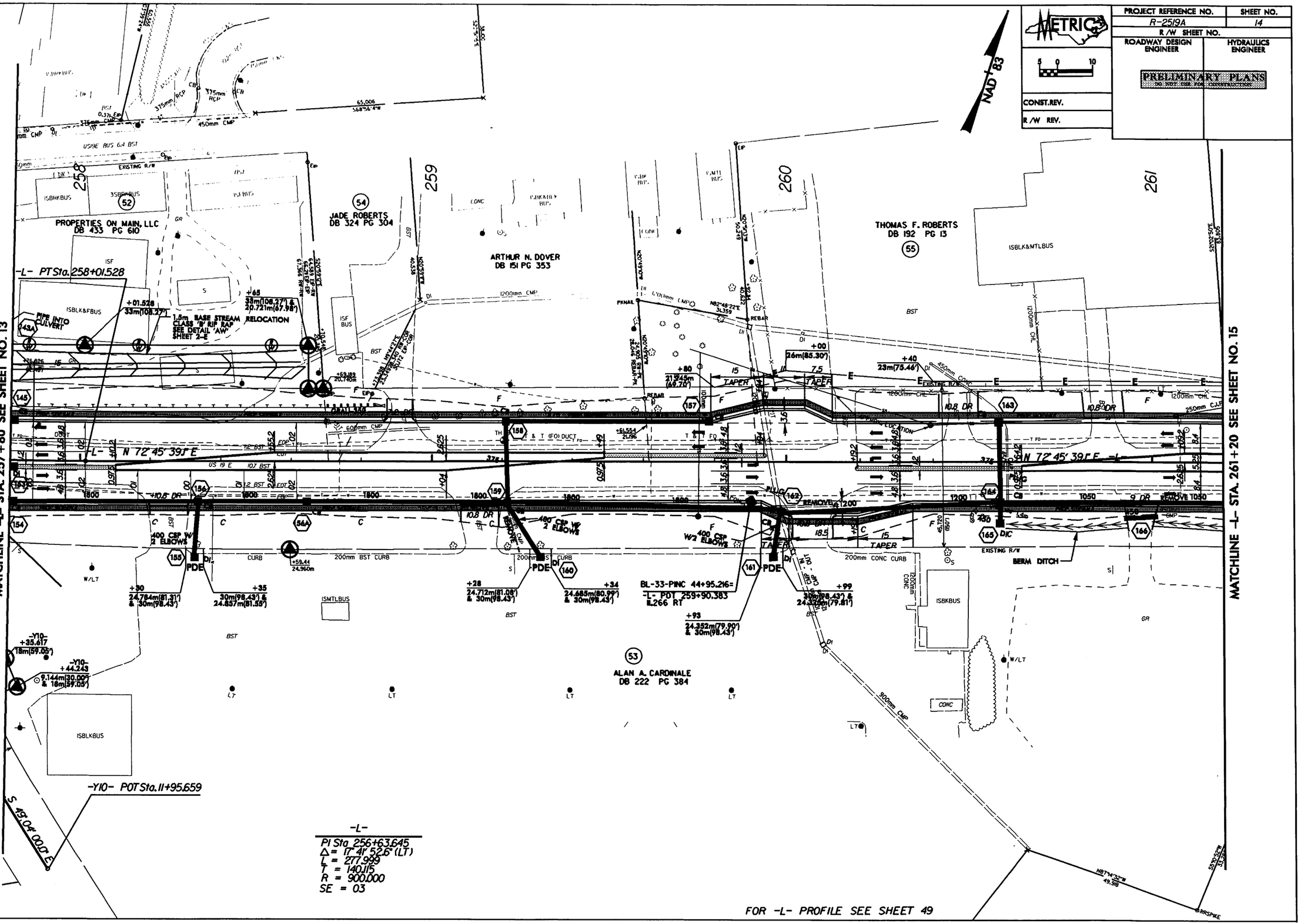
METRIC
5 0 10

CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME FOR PARCEL 52 ; ADDED DRIVEWAY TO PARCEL 55 AT STA.260+90 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RVP); REVISED PDE ON PARCEL 53.
R/W REV. 09/05/07 (TMW); ADDED DRIVEWAY AT STA.259+14 AND REVISED PDE ON PARCEL 53 .



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS NOT TO BE USED FOR CONSTRUCTION	
CONST.REV.	
R/W REV.	

METRIC 5 0 10

NAD '83

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED DRIVEWAY AT STA 262+15 AND REVISED CONSTRUCTION EASEMENT ON PARCEL 60 ; CHANGED PARCEL NUMBER 60 (MATTIE SUE LAWS ANGEL) TO 60A ; CHANGED PARCEL NUMBER 61 (SHELBY SILVERS) TO 62 ; REVISED PROPERTY OWNER NAME FOR PARCEL 66 ; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCEL 64 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.

R/W REV. 10/30/06 (KNW); REVISED PROPERTY LINE AND OWNER'S NAME ON PARCEL 64; ADDED DRIVEWAY'S AT STA. 263+40 AND STA. 263+94 ON PARCEL 64.

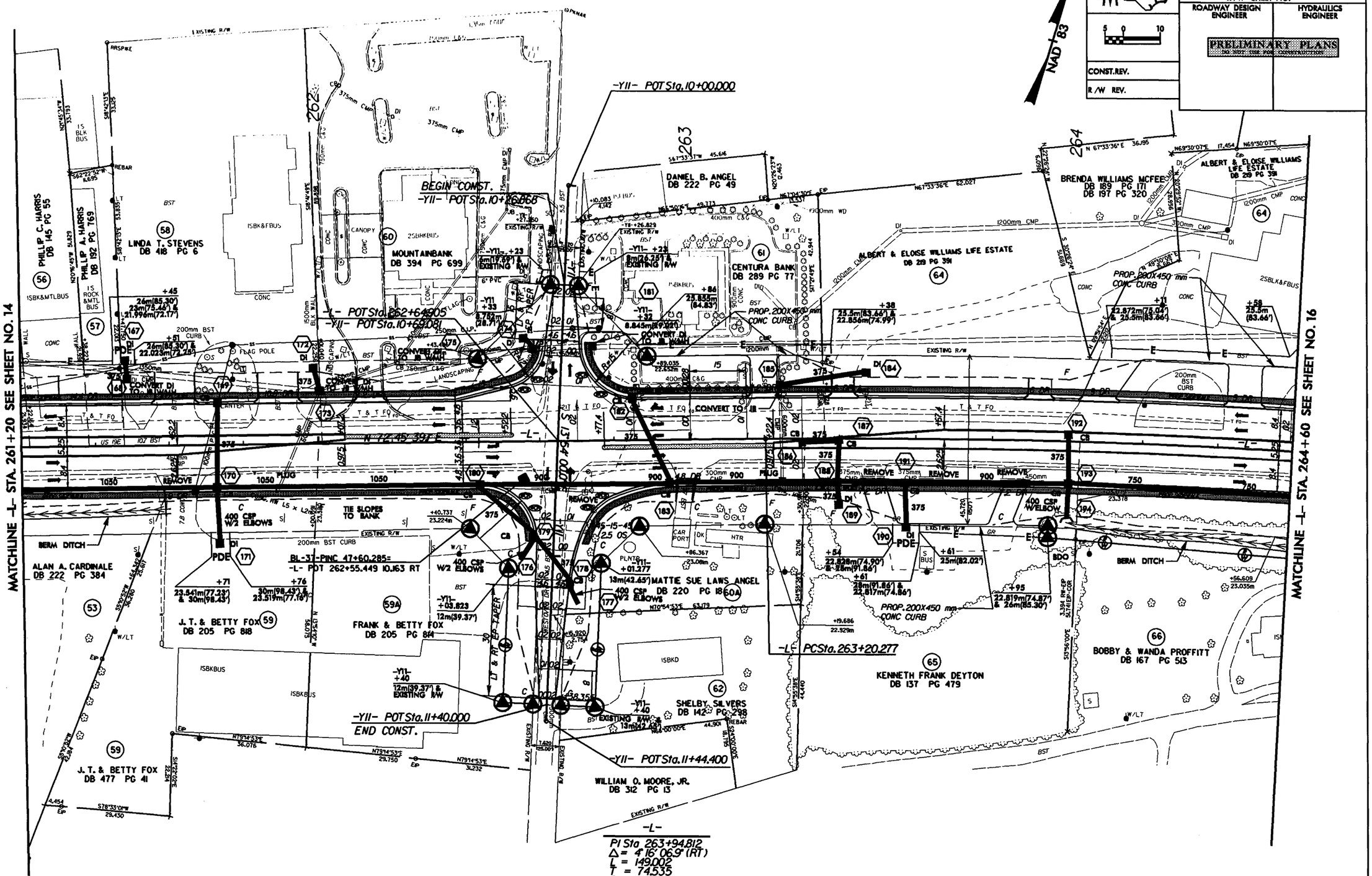
R/W REV. 01/09/07 (RVP); REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 58.

R/W REV. 09/05/07 (TMW); ADDED A DRIVEWAY AT STA. 261+37 ON PARCEL 59A, ADDED PARCEL 59A.

R/W REV. 09/06/07 (KNW); UPDATED EXISTING R/W ON PARCELS 59A,60,60A,61,& 62 ; REVISED CONSTRUCTION EASEMENT ON PARCELS 60 AND 61.

R/W REV. 04/24/08 (RVP); INCREASED DRIVEWAY WIDTH TO 14.4m ON PARCEL 57.

8/01/99



FOR -L- PROFILE SEE SHEET 49

09-MAR-2009 07:40
S:\Structure Design\2519a\sht15.psh

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC 5 0 10

CONST.REV.

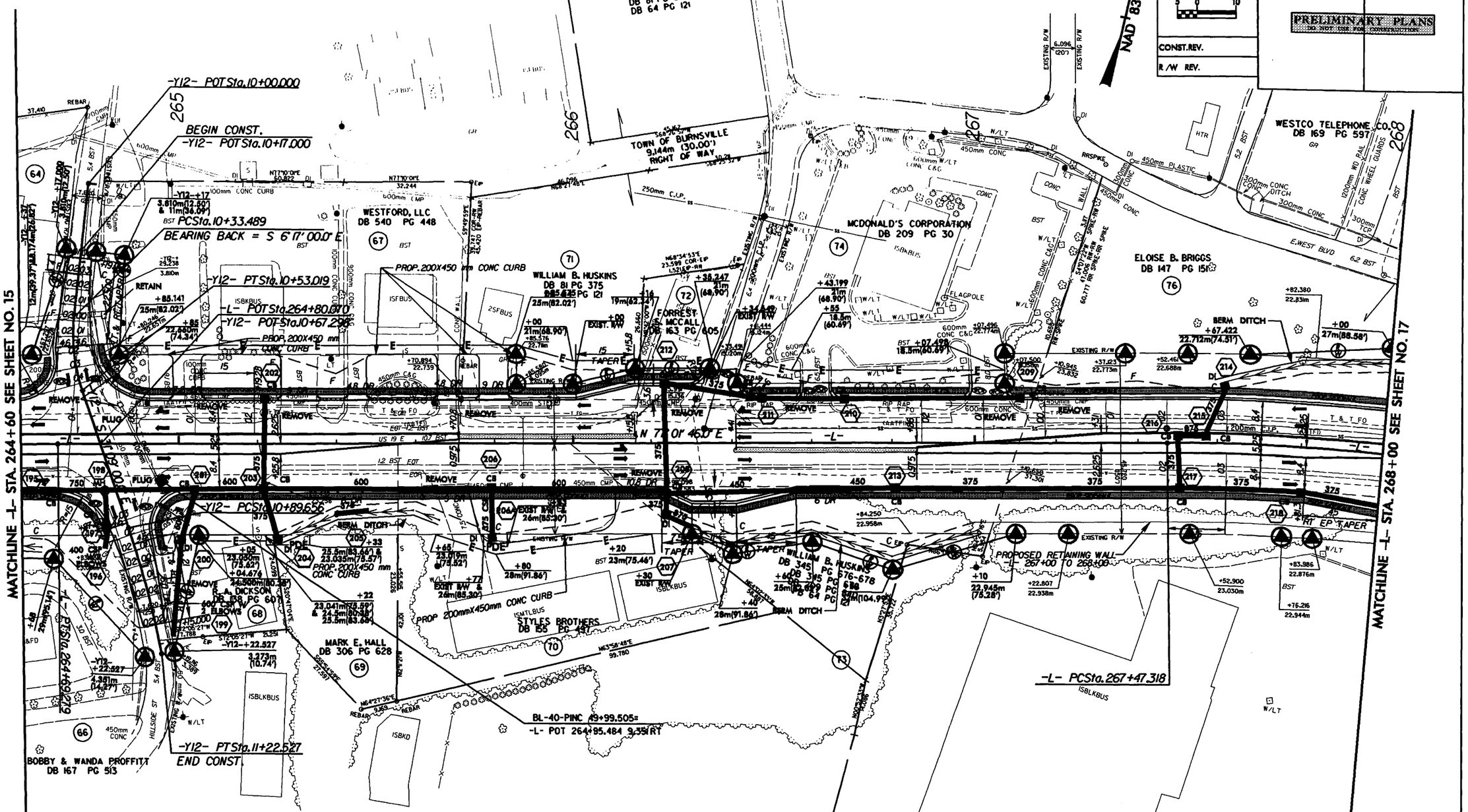
R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 66; REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCEL 64; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); ADDED PROPOSED R/W ON PARCELS 71 & 72.
R/W REV. 09/05/07 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 67.
R/W REV. 04/24/08 (RVP); REVISED PROP.R/W AND ADDED POE AND TCE ON PARCEL 70.

8/11/99



-Y12-

PI Sta 10+43.410	PI Sta 11+06.115
Δ = 24° 52' 00.0" (LT)	Δ = 7° 32' 00.0" (RT)
L = 19.530	L = 32.870
T = 9.921	T = 16.459
R = 45.000	R = 250.000
SE = SEE PLANS	SE = SEE PLANS

-L-

PI Sta 263+94.812	PI Sta 268+55.992
Δ = 4° 16' 06.9" (RT)	Δ = 20° 52' 23.1" (RT)
L = 149.002	L = 214.939
T = 74.535	T = 108.674
R = 2,000.000	R = 590.000
SE = 02	SE = 03

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

METRIC 5 0 10

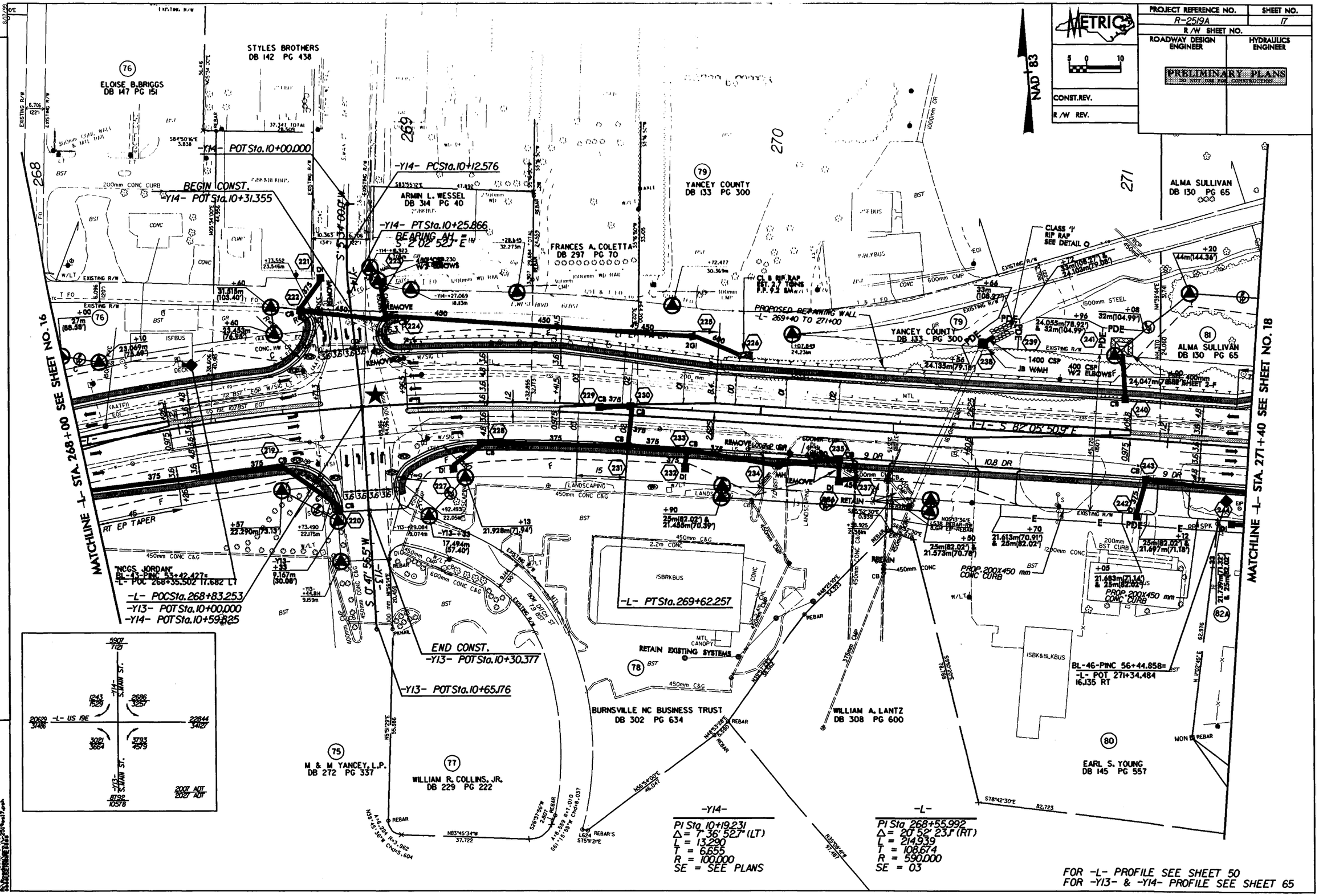
CONST. REV.

R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 6/16/06 (TMW); REVISED PARCEL 79 R/W.
R/W REV. 02/20/08 (KVP); ADDED PDE TO PARCEL 79 NEAR STA.270+66 LT.
R/W REV. 01/09/07 (KVP); ADDED PDE TO PARCEL 79 NEAR STA.270+66 LT.



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

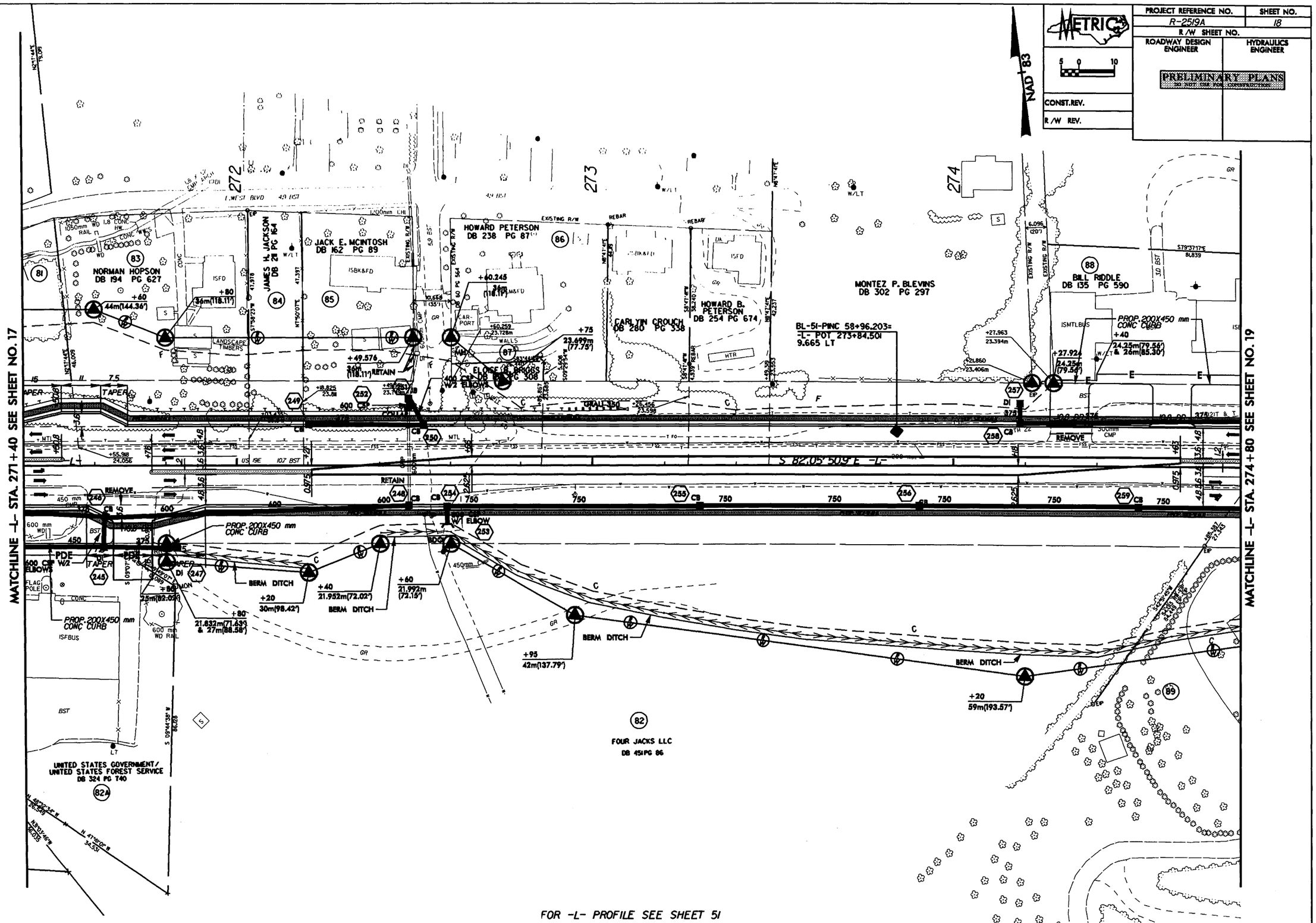
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 10/30/06 1(KNW): ADDED PARCEL 82A; MOVED DRIVEWAY FROM STA. 274+45 TO STA. 274+33 AND ADDED A NEW DRIVEWAY AT STA. 274+60 ON PARCEL 88.



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

METRIC
5 0 10

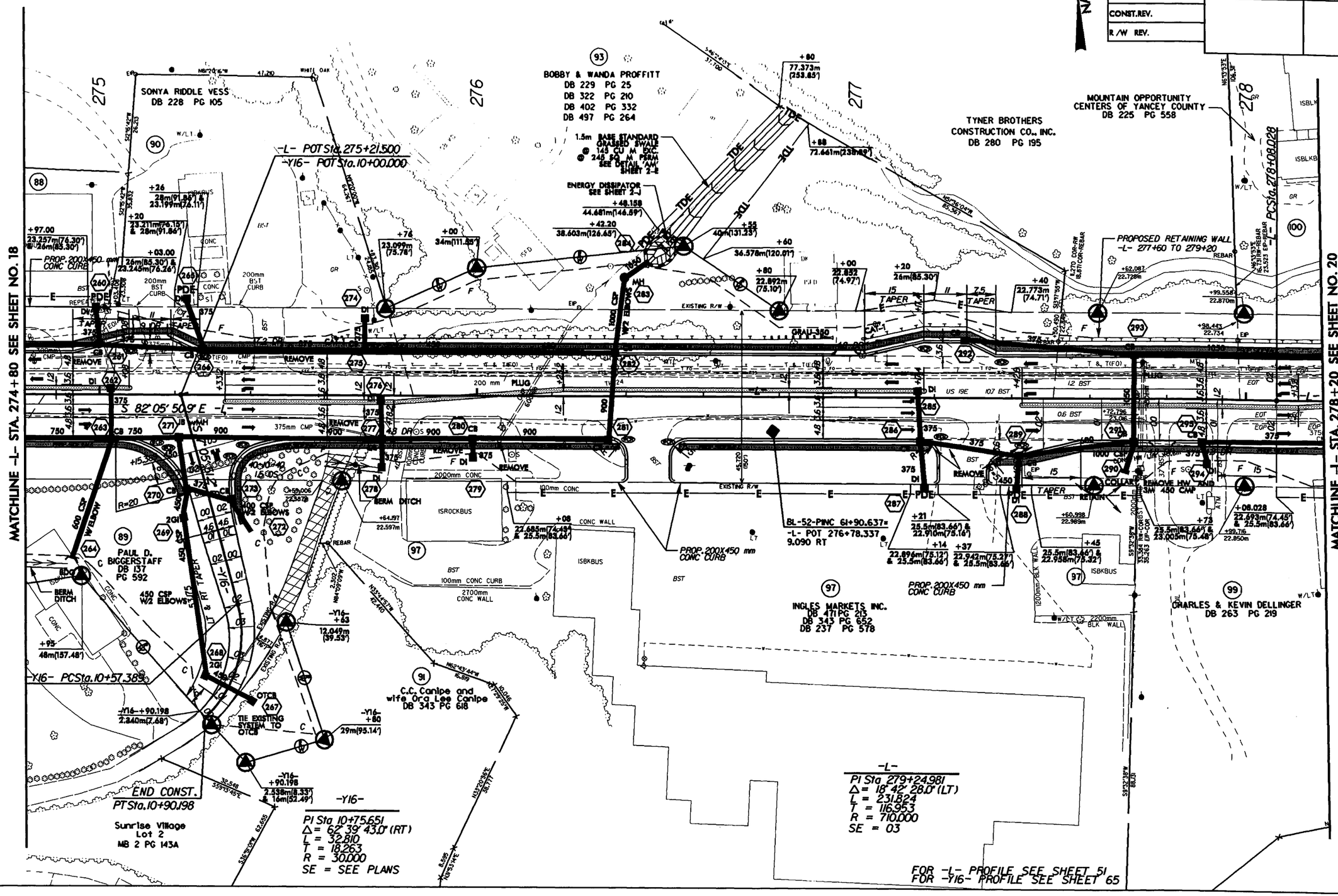
CONST.REV.
R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); REVISED NAME, PROPERTY LINE AND DEED BOOK INFORMATION ON PARCEL 93 AND ELIMINATED PARCEL 94 (BOBBY LEE PROFFITT).
R/W REV. 5/16/07 (BCS); REVISED PROPERTY OWNER NAME AND PROPERTY LINE ON PARCEL 99 ; ELIMINATED PARCELS 92 & 98 AND COMBINED INTO PARCEL 97.
R/W REV. 10/25/07 (RVP); REVISED PROP PDE AND ADDED PROP TDE ON PARCEL 93.

8/17/99



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS

NAD '83

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED DRIVEWAY TO PARCEL 103 AT STA.11+46 -Y17-; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/09/07 (RVP); REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 105
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER'S NAME AND PROPERTY LINE ON PARCEL 99 ; ADDED PARCEL 99A (DELX,INC).
R/W REV. 09/05/07 (TMW); REVISED PROPERTY OWNER NAME ON PARCEL 107 .

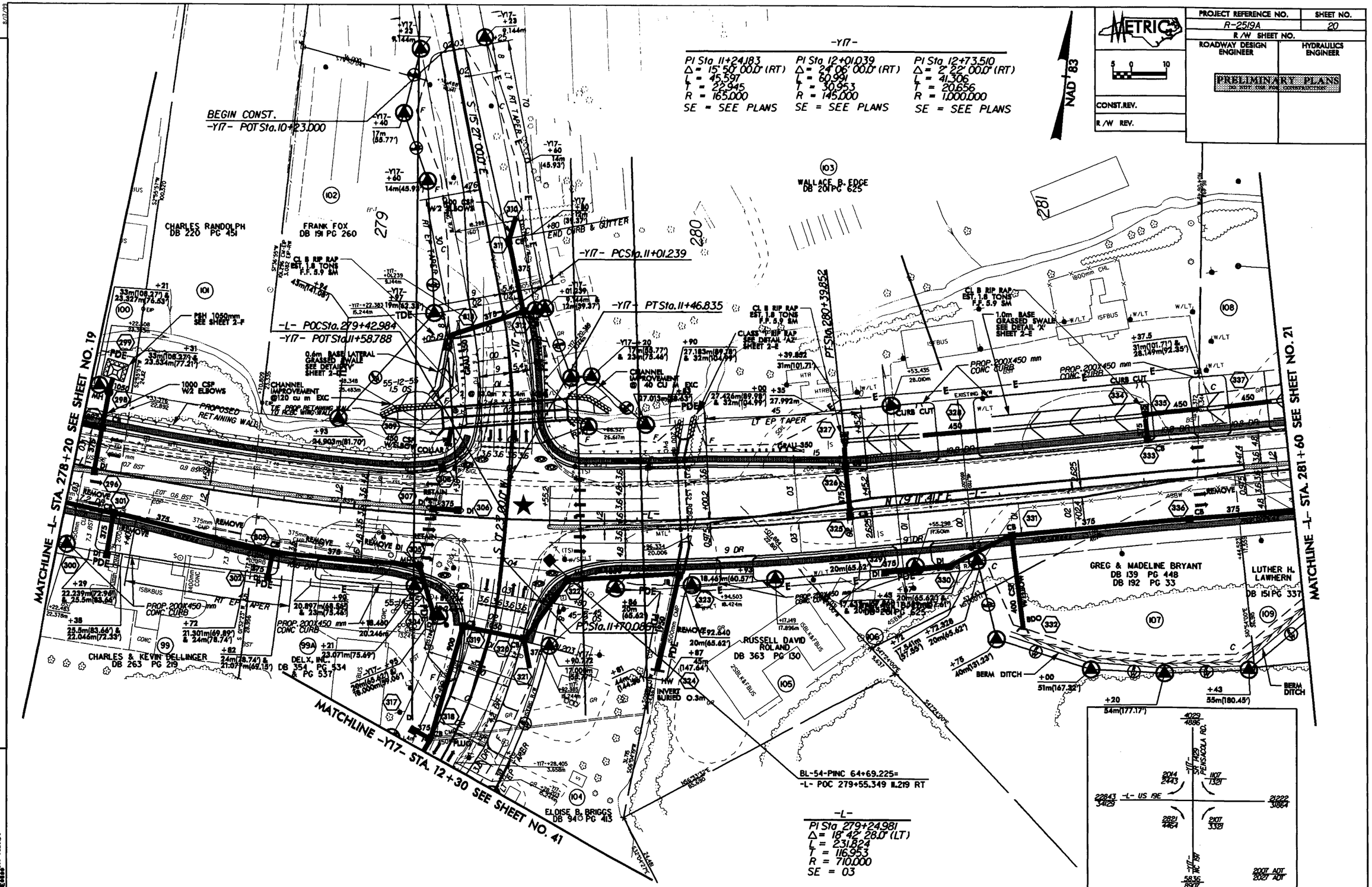
8/17/99

-Y17-

PI Sta 11+24.183	PI Sta 12+01.039	PI Sta 12+73.510
Δ = 15° 50' 00.0" (RT)	Δ = 24° 06' 00.0" (RT)	Δ = 2° 22' 00.0" (RT)
L = 45.597	L = 60.994	L = 41.306
T = 22.945	T = 30.953	T = 20.656
R = 165.000	R = 145.000	R = 1,000.000
SE = SEE PLANS	SE = SEE PLANS	SE = SEE PLANS

-L-

PI Sta 279+24.981
Δ = 18° 42' 28.0" (LT)
L = 231.824
T = 116.953
R = 710.000
SE = 03



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

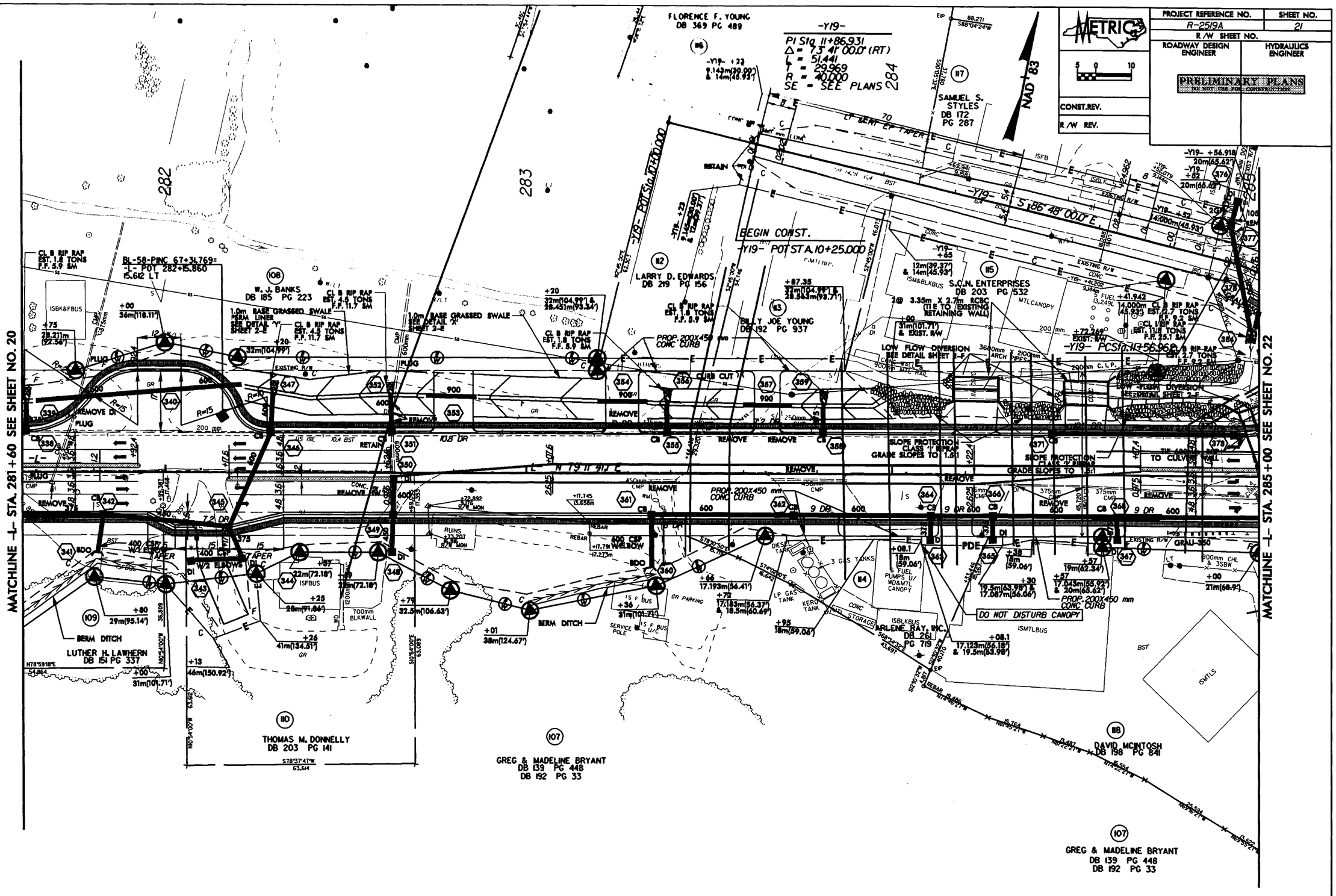
PRELIMINARY PLANS
NOT FOR CONSTRUCTION

NAD 83

REVISIONS

R/W REV. 11/18/05 (TIAW): ADDED PROPERTY OWNER NAME FOR PARCEL 117; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W TO PARCEL 117.
R/W REV. 02/27/06 (TIAW): ADDED CONSTRUCTION EASEMENT ON PARCEL 114 AND PARCEL 118.
R/W REV. 05/08/06 (RFP): REVISED R/W REV. 04/19/06 & R/W REV. 05/05/06 (TIAW); ADDED PDE FOR PARCEL 115.
R/W REV. 06/08/06 (RFP): REMOVED PROPOSED R/W AND ADDED PDE FOR PARCEL 117.
R/W REV. 06/05/07 (RFP): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 116.
R/W REV. 09/05/07 (TIAW): REVISED R/W AT STA.282+80 TO 10.8m ON PARCEL 107 ELIMINATED PARCEL III AND COMBINED INTO PARCEL 107 ; INCREASED DRIVEWAY AT STA.282+80 TO 10.8m ON PARCEL 108.

8/17/99



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

R/W REV.

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 & ADDED LEFTOVER @ STA 286+85 AND DRIVEWAY D17 FOR PARCEL 123; REVISED EXIST. R/W TO NUMERICAL OFFSET; ADDED PROPOSED R/W AND CONSTRUCTION EASEMENT FOR PARCEL 123.

R/W REV. 10/30/06 (KWH); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION, AND ADDED A DRIVEWAY ON PARCEL 121; REMOVED CONSTRUCTION EASEMENT AND ADDED PDE ON PARCEL 121; REVISED PROPOSED R/W ON PARCEL 122; REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.

R/W REV. 05/16/07 (BCS); ADDED 6M DRIVE AT STA 286+15 ON PARCEL 119.

R/W REV. 09/05/07 (TMW); REVISED PROPERTY OWNER NAME ON PARCEL 107; ELIMINATED PARCEL 111 AND COMBINED INTO PARCEL 107.

R/W REV. 04/24/08 (RVP); ADDED 7.2m DRIVEWAY ON PARCEL 119.

8/17/09

09-MAR-2009 07:58
R:\Roadway\Proj\2519a_sh22.pgh
$$$$DELETE$$$$

-D17-
PI Sta 10+16.341
Δ = 46° 20' 49.6" (RT)
L = 10.311
T = 5.351
R = 12.500

PI Sta 11+04.181
Δ = 19° 05' 57.8" (LT)
L = 16.667
T = 8.412
R = 50.000

PI Sta 11+82.663
Δ = 101° 04' 51.7" (LT)
L = 23.361
T = 16.918
R = 12.500

-Y19-
PI Sta 11+86.931
Δ = 73° 41' 00.0" (RT)
L = 51.441
T = 29.969
R = 40.000
SE = SEE PLANS

-Y19- POCSta.11+88.660
-D17- POTSta.10+00.000
BEARING AH =
N 48° 35' 51.2" E

-D17- PCSta.10+10.990

-Y19- PTSta.12+08.402
BEARING AH =
S 13° 07' 00.0" E

-D17- PTSta.10+21.102

-D17- PCSta.11+65.745

-D17- PCSta.10+95.770

-D17- PTSta.11+12.437

-L- PCSta.285+86.237

-D17- S 85° 03' 19.2" E

END CONST.
-D17- POTSta.11+99.737

-D17- PTSta.11+89.107
BEARING AH = N 31° 14' 08.6" W

-L- POCSta.287+35.854
-Y20- POTSta.10+00.000

-L- PTSta.287+87.653

-L- N 79° 11' 47.1" E

-L- N 80° 16' 34.5" E -L-

-L- POTSta.285+23.067
-Y18- POTSta.10+00.000
-Y19- POTSta.12+30.788

BL-59-PINC 70+51.285=
-L- POT 285+34.648 5.947 RT

END CONST.
-Y18- POTSta.10+50.000
BEARING BACK=
S 13° 07' 00.0" E

-Y18- POTSta.10+54.969

-L-
PI Sta 286+87.870
Δ = 18° 55' 06.6" (LT)
L = 201.416
T = 101.633
R = 610.000
SE = 03

-Y20- S 26° 20' 00.0" E

END CONST.
-Y20- POTSta.10+72.980

-Y20- POTSta.10+75.992

BL-62-PINC 73+45.599=
-L- POT 288+28.361
10.496 RT

MATCHLINE -L- STA. 285+00 SEE SHEET NO. 21

MATCHLINE -L- STA. 288+40 SEE SHEET NO. 23

GLEN RAVEN FILAMENT FABRICS, LLC
DB 349 PG 71

ELOISE B. BRIGGS
DB 147 PG 253

SAMUEL S. STYLES
DB 172 PG 287

DAVID MCINTOSH
DB 198 PG 841

GREG & MADELINE BRYANT
DB 139 PG 448
DB 192 PG 33

DB 519 PG 296
GARY ATKINS

YANCEY COUNTY

BURNSVILLE CITY LIMITS

FOR -L- PROFILE SEE SHEET 53
FOR -Y18- & -Y19- PROFILE SEE SHEET 66
FOR -Y20- PROFILE SEE SHEET 67
FOR -D17- PROFILE SEE SHEET 76

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS

NAD 83

MATCHLINE -Y21- STA. 11+60.000 SEE SHEET NO. 42

MATCHLINE -L- STA. 288+40 SEE SHEET NO. 22

MATCHLINE -L- STA. 291+80 SEE SHEET NO. 24

GLEN RAVEN FILAMENT FABRICS, LLC
DB 349 PG 71

UNITED COMMUNITY BANK
DB 453 PG 622
DB 453 PG 625

GENE EARL WOODY
DB 114 PG 106

JAMES DAVID MCCURRY
DB 440 PG 374

DONALD C. STYLES
DB 136 PG 215

YANCEY RAILROAD COMPANY
DB 114 PG 338

YANCEY COUNTY

YANCEY COUNTY

BL-64-PINC 75+28.312=
-L- POC 290+08.519 13.575 LT

PCSta. 289+10.393

-L- POCSta.290+24.562
-Y21- POTSta.12+46.757

PROP. RETAINING WALL
-L- 290+10 TO 291+60

DO NOT DISTURB AT M.

POWER SUB STATION

90 TAPER

-L-
PI Sta 292+26.933
Δ = 63°09'11.2" (RT)
L = 567.648
T = 316.540
R = 515.000
SE = 0.03

-Y21- NC 191
6786 / 10357
5293 / 8079
1493 / 2279
25250 / 36750 -L- US 19E 21450 / 30950
2007 ADT
2027 ADT

FOR -L- PROFILE SEE SHEET 53
FOR -Y21- PROFILE SEE SHEET 67

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCELS 122, 124 & 127; REMOVED PARCEL NUMBER 125; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/27/06 (TMW); ADDED CHANNELIZATION ON PARCEL 124, REVISED R/W & CONSTRUCTION EASEMENT & ADDED PDE.
R/W REV. 04/19/06 (TMW); REVISED PDE ON PARCEL 124.
R/W REV. 01/09/07 (RVP); REVISED PROPERTY OWNERS NAME AND DEED BOOK INFORMATION ON PARCEL 123.

8/17/99

05-MAR-2009 07:48

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS

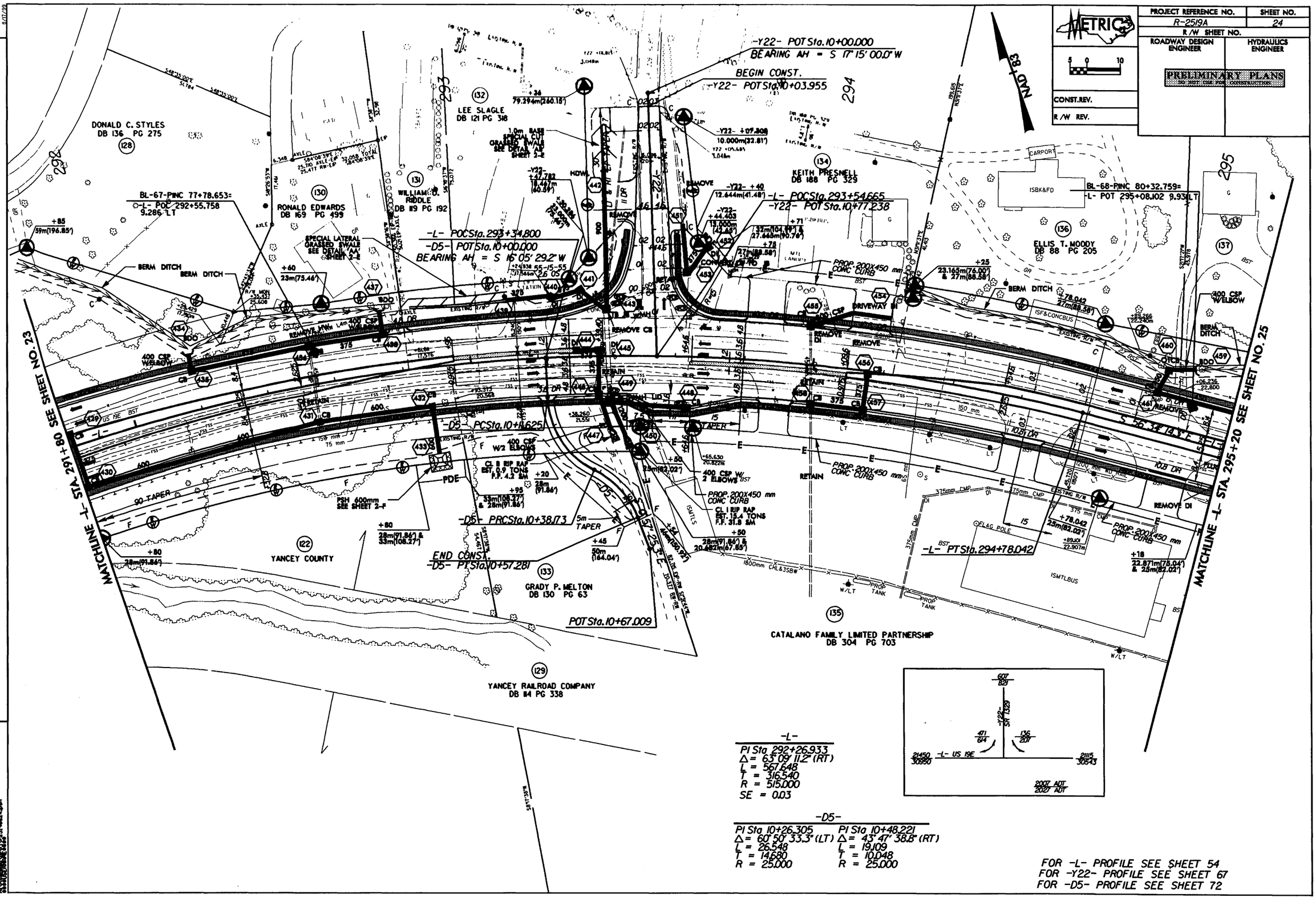
CONST. REV.

R/W REV.

REVISIONS

R/W REV. 11/18/05 (TWM); REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 122 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.

8/17/99



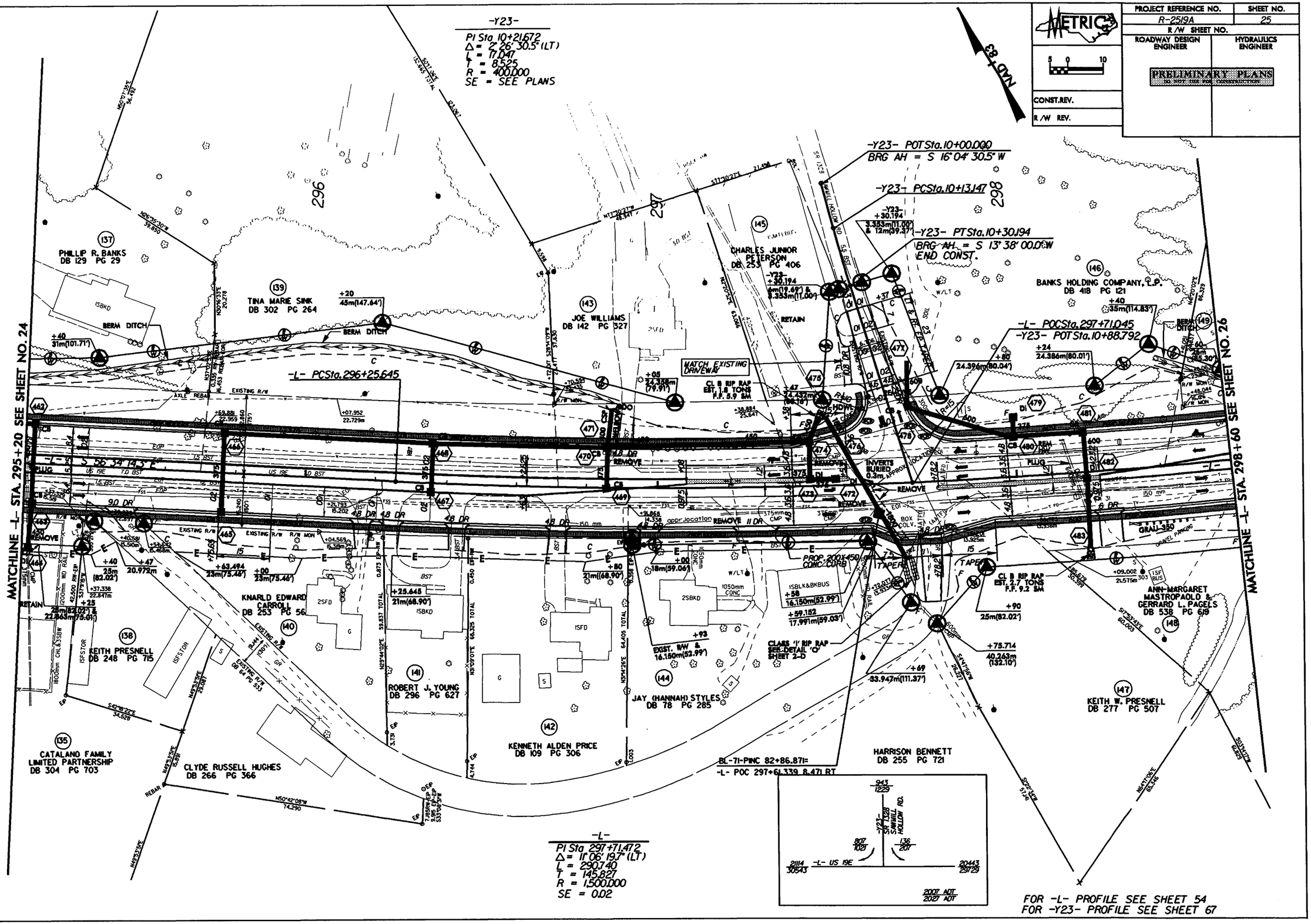
FOR -L- PROFILE SEE SHEET 54
FOR -Y22- PROFILE SEE SHEET 67
FOR -D5- PROFILE SEE SHEET 72

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

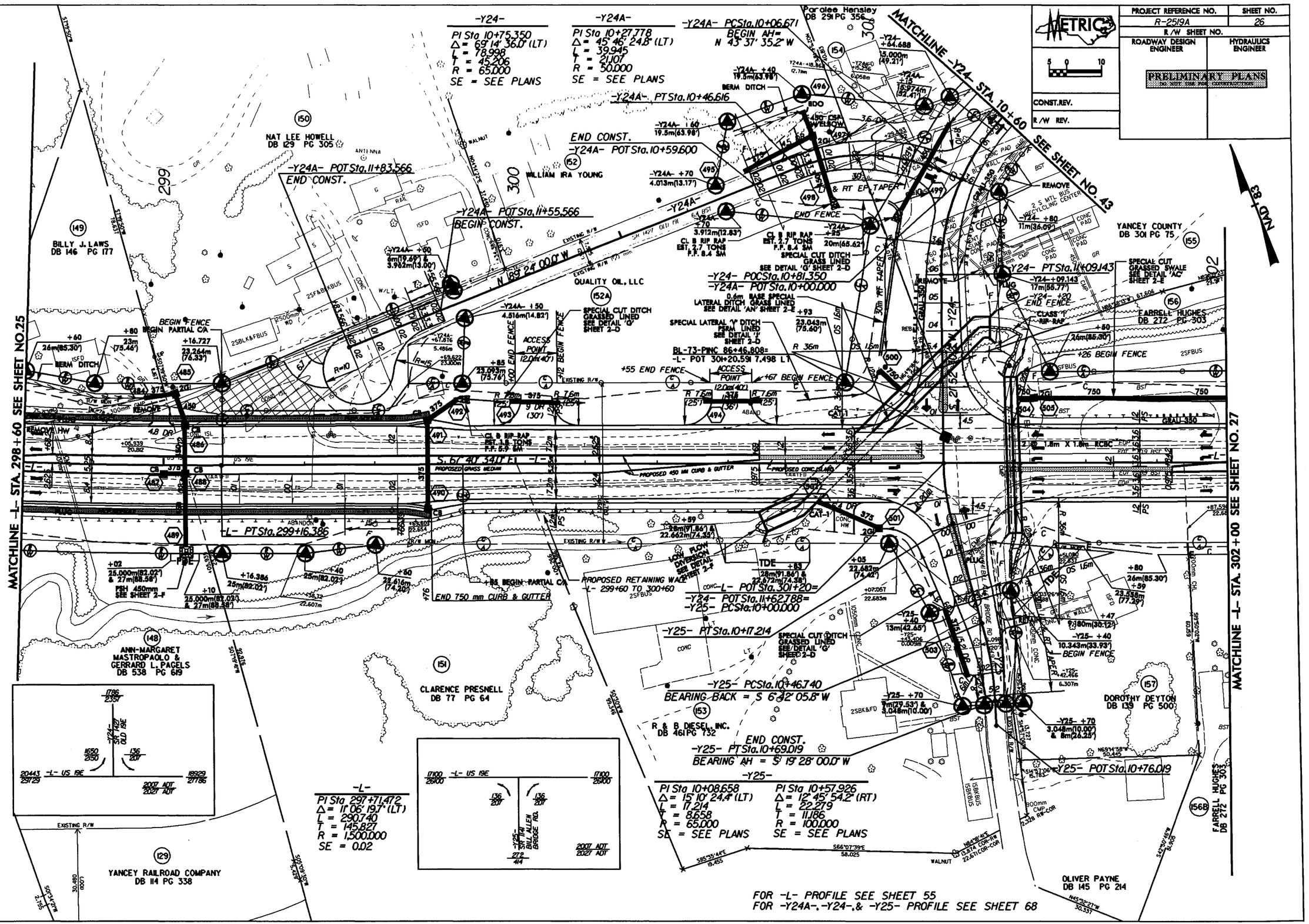
CONST. REV.

R/W REV.



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 8/10/06 (TMW); REVISED CONST. EASEMENT & REVISED PROP. R/W & EASEMENT ON PARCEL NO. 144.
DRIVEWAY TO 10.0M ON PARCEL 145.
R/W REV. 03/30/07 (RVP); REVISED A DRIVEWAY TO MATCH EXISTING PAVEMENT ON PARCEL 145.
R/W REV. 05/16/07 (GRC); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION, & ADDED A 6M DRIVEWAY ON PARCEL 146.
R/W REV. 10/25/07 (RVP); ADDED 4.8m DRIVEWAY AT STA. 296+97 ON PARCEL 144.
R/W REV. 01/30/08 (KKW); REVISED R/W & EASEMENT ON PARCEL NO. 144.
R/W REV. 8/01/09 (RVP); MOVED DRIVEWAY FROM STA. 295+60 TO STA. 295+45 ON PARCEL 140. INCREASED SIZE OF 6M DRIVEWAY FROM -Y23- STA. 10+45 TO -Y23- STA. 10+50 ON PARCEL 145.
R/W REV. 8/17/09 (TMW); REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION, & ADDED NOTE ON PARCEL 145.



REVISIONS

R/W REV. 11/18/05 (TWW) ; CHANGED PARCEL NUMBER ON 152 (TERRILL YOUNG) TO 152A ; REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION & ADDED DRIVEWAY AT -Y24A- 10+46 FOR PARCEL 152 ; REVISED C/A LINE FROM STA.299+16.27' TO 299+95 ; CHANGED PARCEL NUMBER 156 (FARRELL HUGHES) TO 156B ; REVISED EXIST.R/W TO NUMERICAL OFFSET.

R/W REV.12/15/05 (TWW) ; REVISED PROPERTY OWNER NAME & ADDED DRIVEWAYS AND ACCESS POINTS AT STA.300+06 AND 300+61 FOR PARCEL 152A.

R/W REV.03/30/07 (RVP) ; REVISED PROPERTY OWNER NAME, DEED BOOK INFORMATION AND MOVED PROPOSED DRIVEWAY FROM -L- STA. 300+95 TO -Y25- STA.10+60 ON PARCEL 153. 8/17/99

R/W REV. 05/16/07 (BSS) ; REMOVED THE 4.5M DRIVEWAY ON PARCEL 150.

R/W REV. 09/05/07 (TWW) ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 148.

R/W REV.04/24/08 (RVP) ; ADDED 5.4m DRIVEWAY AT -L- STA.300+95 ON PARCEL 150.

R/W REV.09/12/08 (RVP) ; REVISED C/A AND FENCE LINE ON PARCEL 150.

08-MAR-2009 07:48

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

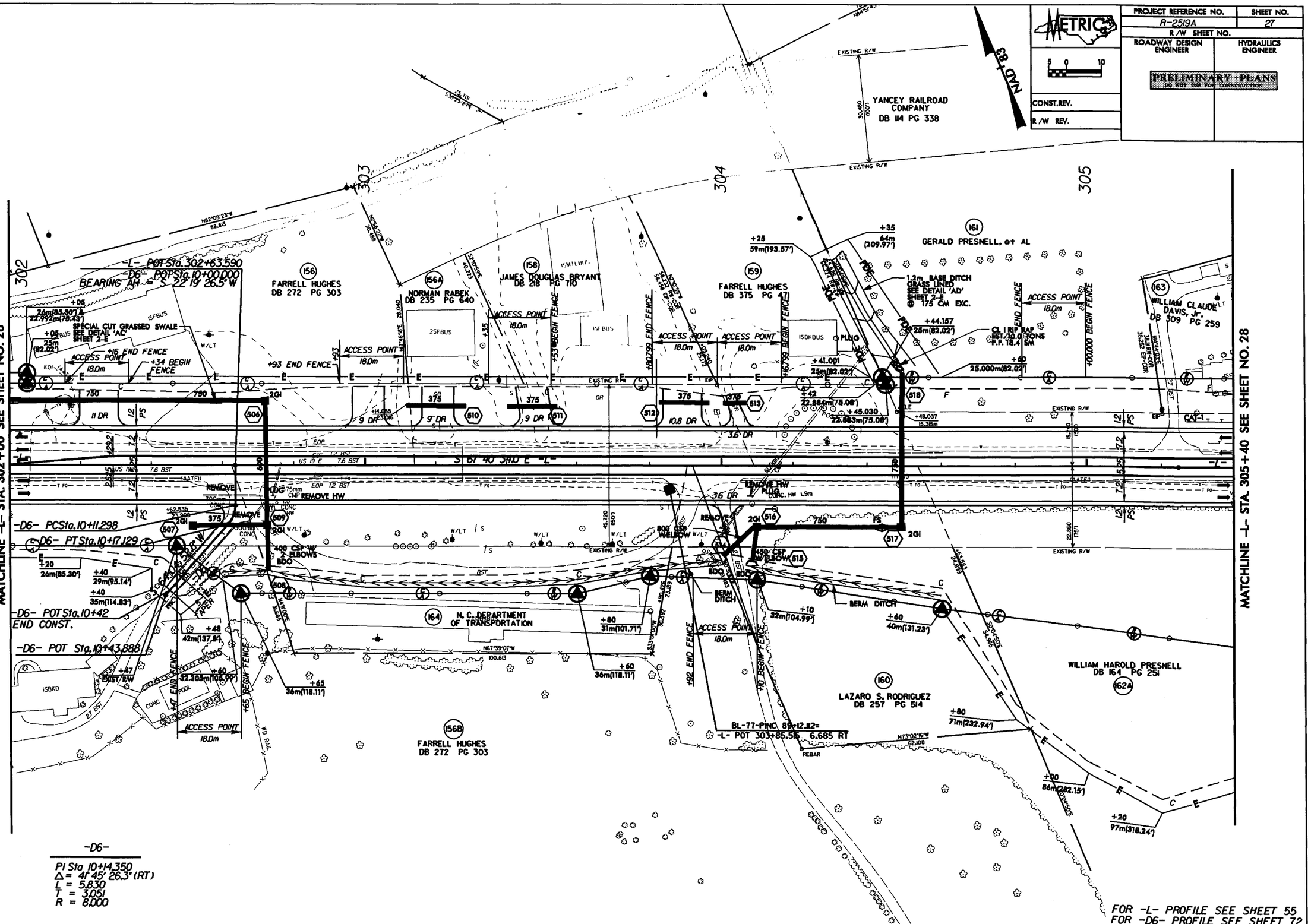
METRIC 5 0 10

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); ADDED DRIVEWAY AND ACCESS POINT AT STA 303+01 FOR PARCEL 156 ; CHANGED PARCEL NUMBER 156 (FARRELL HUGHES) TO 156B ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 159 ; REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 8/10/06 (TMW); REVISED CONSTRUCTION EASEMENT & ADDED PROP R/W ON PARCEL 156B . REMOVED PROP RETAINING WALL, PDE & CONST EASEMENT; REVISED PROP R/W & CHANGED PROPERTY OWNER NAME ON PARCEL 164 . R/W REV. 10/30/06 (KMW); REVISED PROPERTY OWNER NAME & ADDED ACCESS POINT ON PARCEL 161.
R/W REV. 05/16/07 (BCS); CHANGED 35M DRIVEWAY TO 9M DRIVEWAY ON PARCEL 156.
R/W REV. 09/05/07 (TMW); INCREASED DRIVEWAY AT STA.303+90 TO 10.8m ON PARCEL 156.

8/17/98



FOR -L- PROFILE SEE SHEET 55
FOR -D6- PROFILE SEE SHEET 72

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50MPH)

FOR -L- PROFILE SEE SHEET 56
FOR -Y26- PROFILE SEE SHEET 69
FOR -D20- PROFILE SEE SHEET 77

-Y26-
PI Sta 10+99.760 Δ = 9° 45' 32.9" (RT) L = 119.230 T = 59.760 R = 700.000 SE = SEE PLANS
PI Sta 12+14.021 Δ = 17° 47' 39.1" (LT) L = 108.699 T = 54.790 R = 350.000 SE = SEE PLANS

-Y26- PINC Sta.9+97.763
-Y26- POT Sta.10+26.848 BEGIN CONST.
-Y26- PCSta.10+40.000
-L- POT Sta.306+89.841
-Y26- POC Sta.11+28.136
-Y26- PRCSta.11+59.230
-Y26- POT Sta.9+40.000
-Y26- BEGIN FENCE
-Y26- END FENCE
-L- POT 307+11.038 9.112 LT
BL-78-PINC 92+38.048
-L- TSSta.307+63.144
-D20- POTSta.10+69.707
-L- SCSta.308+53.144
-D20- PTSta.10+33.238
-D20- PCSta.10+74.074
-L- POCSta.308+10.000
-D20- POTSta.10+00.000
BEARING AH = N 25° 25' 10.6" E
END CONST.
-Y26- POCSta.12+63.347
-Y26- PTSta.12+67.929

Pls Sta 308+23.184 Θs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036
PI Sta 310+51.778 Δ = 52° 48' 59.8" (LT) L = 368.730 T = 198.634 R = 400.000 SE = 0.06 ** V = 96 kph
Pls Sta 312+51.910 Θs = 6° 26' 44.8" Ls = 90.000 LT = 60.040 ST = 30.036

MATCHLINE -L- STA. 305+40 SEE SHEET NO. 27
MATCHLINE -L- STA. 308+80 SEE SHEET NO. 29

SEE INSET A MATCH LINE A

YANCEY RAILROAD COMPANY DB 114 PG 338
ZENUS ELKINS DB 172 PG 205
JOHN SHEPHERD DB 169 PG 639
CLYDE BLALOCK DB 159 PG 629
RODNEY D. SHEPHERD DB 296 PG 714
WILLIAM CLAUDE DAVIS, JR. DB 309 PG 259
WILLIAM HAROLD PRESNELL DB 164 PG 251
THULA JEAN HUGHES DB 212 PG 507
EDDS INDEPENDENT STATION DB 151 PG 165
SAMUEL J. JONES DB 201 PG 137
YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633
JOHNNY BENNETT DB 128 PG 489

ACCESS POINT 21.0m
ACCESS POINT 18.0m
ACCESS POINT 18.0m
DO NOT DISTURB CANOPY.
1.5m SPECIAL CUT BASE DITCH CLASS 'I' RIP RAP SEE DETAIL 'AO' SHEET 2-E
0.6m SPECIAL LATERAL BASE DITCH PAVM LINER SEE DETAIL 'A2' SHEET 2-E
CL B RIP RAP EST. 1.8 TONS F.F. 5.9 SM
CL B RIP RAP EST. 2.7 TONS F.F. 8.4 SM
450 CSP COLLAR
450 CSP W/ ELBOW
400 CSP W/ ELBOW
600 CSP W/ ELBOW
RETAIN
REMOVE INW
REMOVE DB 151 PG 165
REMOVE 200mm PVC (16m)
BERM DITCH
RT EP TAPER
EXISTING R/W
NAD 83

INSET A
ZENUS ELKINS DB 172 PG 205
1.2m BASE DITCH CLASS 'IV' LINED SEE DETAIL 'A1' SHEET 2-E
-Y26- S 15° 54' 14.2" E
-Y26- POT Sta.9+40.000
SEE INSET A MATCH LINE A
NAD 83

-L- US 19E
SR 1142 GEORGES FORK RD.
2007 ADT
2027 ADT

REVISIONS
R/W REV. 11/18/05 (TIW): ADDED DRIVEWAY -D20- AND REVISED CONSTRUCTION EASEMENT AND ACCESS POINT FOR PARCEL 170; REVISED EXIST. R/W TO NUMERICAL OFFSET. ADDED PDE TO PARCEL 171.
R/W REV. 2/27/06 (TIW): ADDED PDE TO PARCELS 165, 237, AND 238.
R/W REV. 10/30/06 (KNW): CHANGED PARCEL NO. 237 TO PARCEL NO. 129; REVISED STA. 308+0.50 AND INCREASED THE WIDTH FROM 18M TO 21M ON PARCEL 170.
R/W REV. 05/16/07 (BCS): MOVED ACCESS POINT FROM STA. 308+15 TO STA. 308+80.

8/17/09

09-MAR-2009 07:48

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	
R/W REV.	

METRIC 5 0 10

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100 kph (60mph) TO 80 kph (50 mph)

-L-

PIs Sta 308+23.184	PI Sta 310+51.778	PIs Sta 312+51.910
θs = 6°26'44.8"	Δ = 52°48'59.8" (LT)	θs = 6°26'44.8"
Ls = 90.000	L = 368.730	Ls = 90.000
LT = 60.040	T = 198.634	LT = 60.040
ST = 30.036	R = 400.000	ST = 30.036
	SE = 0.06	
	xxV = 96 kph	

-Y27-

PI Sta 10+16.706	PI Sta 10+52.266
Δ = 57°53'38.7" (RT)	Δ = 14°28'23.7" (RT)
L = 25.261	L = 47.995
T = 13.828	T = 24.126
R = 25.000	R = 190.000
SE = SEE PLANS	SE = SEE PLANS

FOR -L- PROFILE SEE SHEET 56
FOR -Y27- PROFILE SEE SHEET 69
FOR -D18- PROFILE SEE SHEET 76

MATCHLINE -L- STA. 308+80 SEE SHEET NO. 28

MATCHLINE -L- STA. 312+20 SEE SHEET NO. 30

CLYDE BLALOCK DB 159 PG 629 (170)

J. V. JONES CEMETERY (173)

DEAN WILSON DB 264 PG 182 (176)

EUGENE STYLES DB 199 PG 685 (175)

BL-82-PINC 97+46.828= -L- POC 312+03.823 3.813 RT SHOAL CREEK BAPTIST CHURCH DB 415 PG 71 (178)

PROP RETAINING WALL -L- 309+40 TO 309+85 (22m LT)

-D18- POT Sta. 10+00.00 -L- POC Sta. 309+50.58

SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D

-Y27- POT Sta. 10+76.135

-D18- POT Sta. 10+38.289

END CONST. -D18- POT Sta. 10+24.14

BL-81-PINC 94+96.164= -L- POC 309+61.204 31.011 RT

YANCEY COUNTY BOARD OF EDUCATION DB 115 PG 633 (171)

EUGENE STYLES DB 258 PG 70 (174)

JOHN DOUGLAS BENNETT, ET AL DB 310 PG 492 (177)

NORMAN EVANS DB 138 PG 417 (179)

RICHARD D. DEJESUS DB 280 PG 174

ROY C. HARRIS DB 160 PG 29 (180)

-Y27- POT Sta. 11+21.982

-Y27- POT Sta. 11+00 END CONST.

REVISIONS

R/W REV. 11/18/05 (TMW); LEFTOVER ADDED FOR PARCEL 171 AT STA. 309+60 AND ADDED CONSTRUCTION EASEMENT ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 173 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 05/16/07 (BCS); REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 177.
R/W REV. 10/25/07 (RVP); REVISED PROP. R/W AND ADDED ACCESS POINT AT 309+88 FOR PARCEL 174.

8/11/99

02-MAR-2009 07:48

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST.REV.

R/W REV.

METRIC

NAD 83/95

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPERTY OWNER NAME & DEED BOOK INFORMATION FOR PARCEL 178 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KWW): ADDED EASEMENT ON PARCEL NOS. 185 & 186.
R/W REV. 8/10/06 (TMW): INCREASED SIZE OF 3.6M DRIVE TO 4.8M ON PARCEL 184 .

-Y27-

PI Sta 10+16.706
Δ = 57° 53' 38.7" (RT)
L = 25.261
T = 13.828
R = 25.000
SE = SEE PLANS

PI Sta 10+52.266
Δ = 14° 28' 23.7" (RT)
L = 47.995
T = 24.126
R = 190.000
SE = SEE PLANS

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

FOR -L- PROFILE SEE SHEET 57
FOR -Y27- & -Y28- PROFILE SEE SHEET 69
FOR -D8-, -D9-, & -D10- PROFILE SEE SHEET 73
FOR -D16- PROFILE SEE SHEET 75

-L-

PIs Sta 308+23.184
Θs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

PI Sta 310+51.778
Δ = 52° 46' 59.8" (LT)
L = 368.730
T = 198.634
R = 400.000
SE = 0.06
xxV = 96 kph

PIs Sta 312+51.910
Θs = 6° 26' 44.8"
Ls = 90.000
LT = 60.040
ST = 30.036

PIs Sta 314+01.908
Θs = 4° 28' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017

PI Sta 316+01.330
Δ = 32° 43' 50.7" (LT)
L = 329.617
T = 169.442
R = 577.000
SE = 0.06

PIs Sta 317+91.523
Θs = 4° 28' 06.5"
Ls = 90.000
LT = 60.019
ST = 30.017

-Y28-

PI Sta 10+12.569
Δ = 43° 00' 00.0" (RT)
L = 187.62
T = 9.848
R = 25.000
SE = SEE PLANS

PI Sta 10+69.835
Δ = 23° 26' 00.0" (LT)
L = 53.169
T = 26.961
R = 130.000
SE = SEE PLANS

PI Sta 11+36.930
Δ = 5° 42' 00.0" (LT)
L = 59.690
T = 29.870
R = 600.000

-D8-

PI Sta 10+26.115
Δ = 46° 33' 12.8" (RT)
L = 12.188
T = 6.453
R = 15.000

PI Sta 10+45.515
Δ = 49° 30' 17.7" (LT)
L = 12.960
T = 6.916
R = 15.000

-D9-

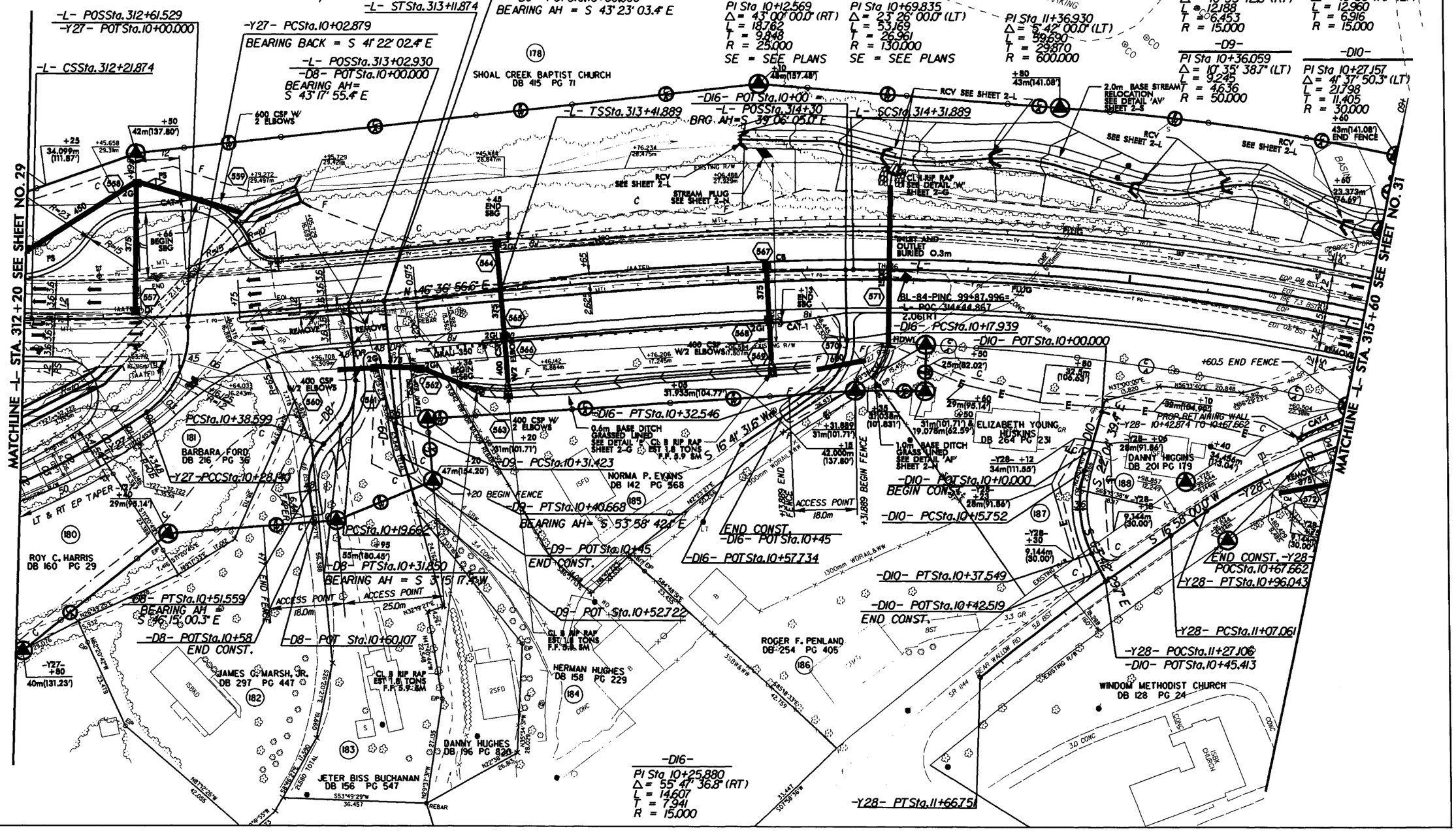
PI Sta 10+36.059
Δ = 10° 35' 38.7" (LT)
L = 9.245
T = 4.636
R = 50.000

-D10-

PI Sta 10+27.157
Δ = 41° 37' 50.3" (LT)
L = 21.798
T = 11.405
R = 30.000

-D16-

PI Sta 10+25.880
Δ = 55° 41' 36.8" (RT)
L = 14.607
T = 7.941
R = 15.000



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

R/W REV.

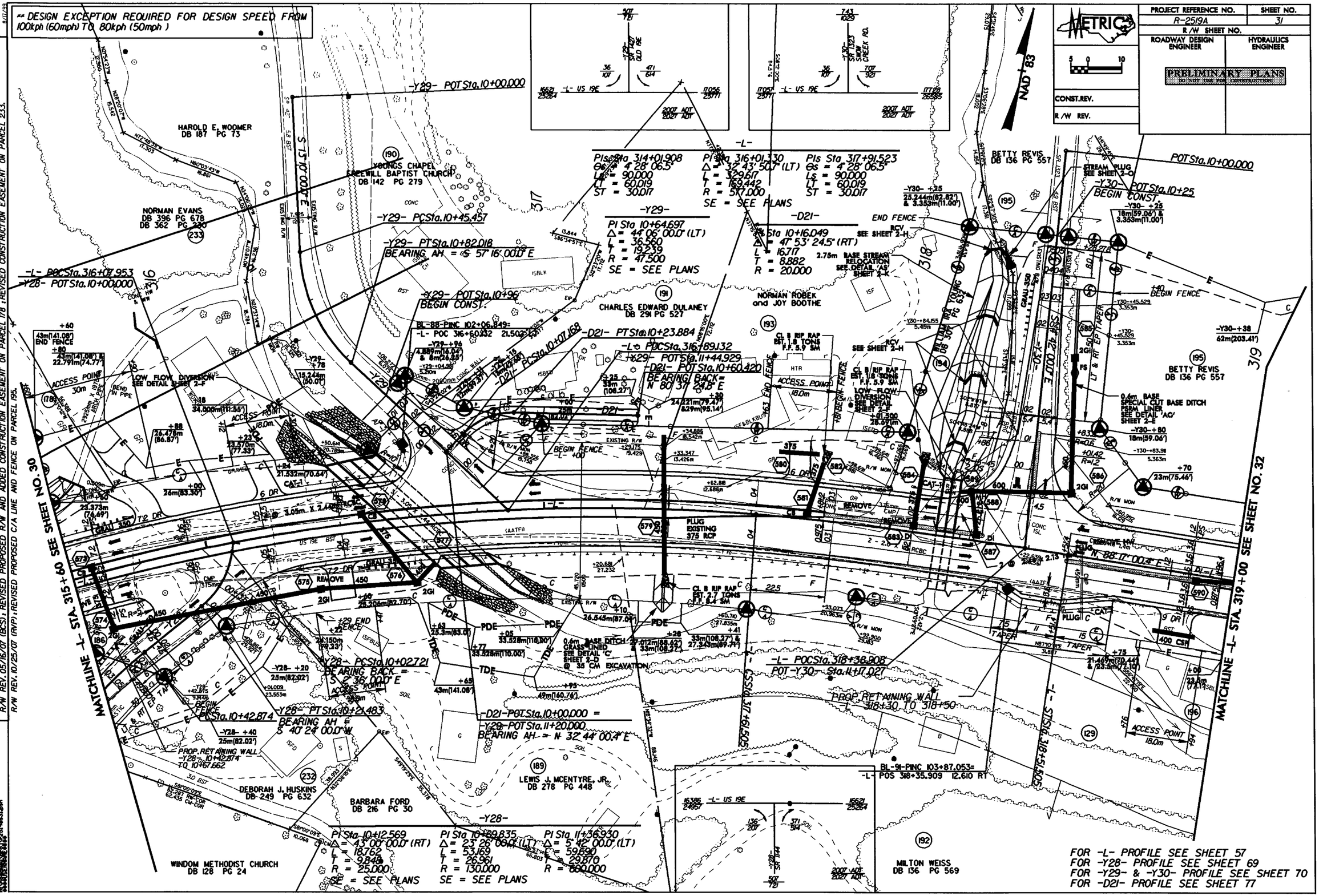
METRIC

5 0 10

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

REVISIONS

R/W REV. 11/18/05 (TJW): CHANGED PARCEL NUMBER 187 (DEBORAH J.HUSKINS) TO PARCEL 232 ; ADDED DRIVEWAY -D21- AND CONSTRUCTION EASEMENT TO PARCEL 191 ; REVISED PROPERTY OWNER NAME AND DEED BOOK INFORMATION FOR PARCEL 193 ; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 04/19/06 (TJW): REVISED PDE ON PARCEL 189. R/W REV. 10/30/06 (KNW): ADDED EASEMENT ON PARCEL NO. 233 R/W REV. 04/19/06 (TJW): REVISED PDE ON PARCEL 189. R/W REV. 05/16/07 (BCS): REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCELS 178 & 233. R/W REV. 10/25/07 (RVP): REVISED PROPOSED C/A LINE AND FENCE ON PARCEL 195. R/W REV. 11/13/07 (RVP): REVISED CONSTRUCTION EASEMENT ON PARCEL 178 ; REVISED CONSTRUCTION EASEMENT ON PARCEL 233.



** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT TO BE USED FOR CONSTRUCTION

CONST. REV.
R/W REV.

REVISIONS
R/W REV.11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV.09/12/08 (RVP): ADDED 9.0m DRIVEWAY AT STA.319+30 FOR PARCEL 196.

-D11- POT Sta. 10+00.000
BEARING AH = S 10° 59' 55.1" W
-D11- POC Sta. 10+15.000
BEGIN CONST.
PC Sta. 10+09.684
-D11- PT Sta. 10+27.320
-D11- PC Sta. 10+60.115
-D11- PT Sta. 10+75.480
BEARING AH = S 9° 41' 51.3" W
-L- POC Sta. 320+14.000
-D11- POT Sta. 10+84.097

-D11-
PI Sta 10+18.525 Δ = 10° 06' 16.4" (LT) L = 17.636 T = 8.841 R = 100.000
PI Sta 10+67.813 Δ = 8° 48' 12.6" (RT) L = 15.365 T = 7.698 R = 100.000

-D12-
PI Sta 10+16.314 Δ = 43° 38' 54.2" (RT) L = 19.045 T = 10.012 R = 25.000
PI Sta 10+44.515 Δ = 40° 49' 36.0" (LT) L = 21.377 T = 11.165 R = 30.000

BEGIN CONST.
-D12- PC Sta. 10+06.303
-D12- PT Sta. 10+25.348
-D12- PC Sta. 10+33.350
-D12- PT Sta. 10+54.727
BEARING AH = S 35° 18' 56.3" W
-D12- POT Sta. 10+00.000
-L- POS Sta. 321+95.000
-D12- POT Sta. 10+71.206

-L- PI Sta. 319+69.306 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064
-L- PI Sta. 320+30.597 Δ = 11° 56' 09.8" (RT) L = 62.497 T = 31.362 R = 300.000 SE = SEE PLANS xxV = 85 kph
-L- PI Sta. 320+91.797 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064
-L- PI Sta. 322+14.685 Θs = 8° 03' 26.0" Ls = 90.000 LT = 60.062 ST = 30.057
-L- PI Sta. 322+73.821 Δ = 10° 25' 37.7" (LT) L = 58.236 T = 29.199 R = 320.000 SE = 0.06 xxV = 88 kph
-L- PI Sta. 323+32.915 Θs = 8° 03' 26.0" Ls = 90.000 LT = 60.062 ST = 30.057

BL-95-PINC 105+83.705=
-L- POC 320+33.401
0.509 LT

-L- T SSta. 319+09.235
-L- C SSta. 320+61.32
-L- ST Sta. 321+54.32
-L- T SSta. 321+54.622

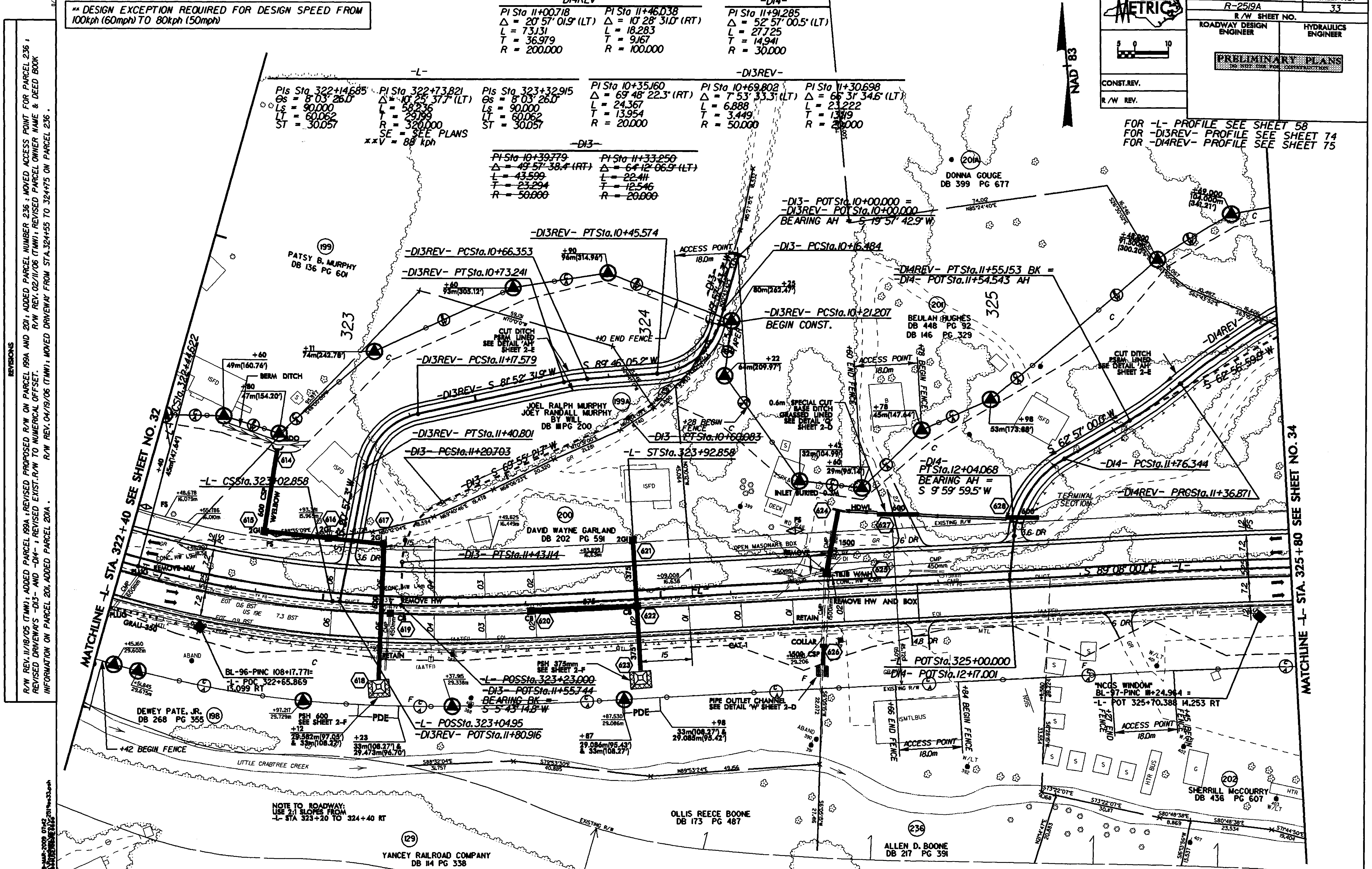
MATCHLINE -L- STA. 319+00 SEE SHEET NO. 31
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 33

BETTY REVIS DB 136 PG 557 (195)
LILLIAN ROBINSON DB 136 PG 566 (197)
ED GOUGE DB 108 PG 45 (196)
YANCEY RAILROAD COMPANY DB 114 PG 338 (129)
MILTON WEISS DB 136 PG 569
DEWEY PATE, JR. DB 268 PG 355 (198)
PATSY B. MURPHY DB 136 PG 601 (199)

BERM DITCH
CUT DITCH PERM LINED SEE DETAIL 'AH' SHEET 2-E
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-D
ACCESS POINT
END FENCE
BEGIN FENCE
LITTLE CRABTREE CREEK
CHRISTMAS TREES
REPEATER
US 19E 7.3 BST
NAD 83

FOR -L- PROFILE SEE SHEET 58
FOR -D11- & -D12- PROFILE SEE SHEET 73

09-MAR-2009 07:42
S:\Projects\R2519a\sht32.dgn



REVISIONS
R/W REV. 11/18/05 (TMW); ADDED PARCEL 199A; REVISED PROPOSED R/W ON PARCEL 199A AND 201; ADDED PARCEL NUMBER 236; MOVED ACCESS POINT FOR PARCEL 236; REVISED DRIVEWAYS -DI3- AND -DI4-; REVISED EXIST. R/W TO NUMERICAL OFFSET. R/W REV. 02/11/06 (TMW); REVISED PARCEL OWNER NAME & DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A. R/W REV. 04/19/06 (TMW); MOVED DRIVEWAY FROM STA. 324+55 TO 324+75 ON PARCEL 236.
8/17/99
** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)
PROJECT REFERENCE NO. R-2519A
SHEET NO. 33
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
METRIC
CONST. REV.
R/W REV.
NAD 83
FOR -L- PROFILE SEE SHEET 58
FOR -DI3REV- PROFILE SEE SHEET 74
FOR -DI4REV- PROFILE SEE SHEET 75
-DI4REV-
PI Sta 11+00.718 Δ = 20° 57' 01.9" (LT) L = 73.131 T = 36.979 R = 200.000
PI Sta 11+46.038 Δ = 10° 28' 31.0" (RT) L = 18.283 T = 9.167 R = 100.000
-DI4-
PI Sta 11+91.285 Δ = 52° 57' 00.5" (LT) L = 27.725 T = 14.941 R = 30.000
-L-
PIs Sta 322+14.685 θs = 8° 03' 26.0" Ls = 90.000 LT = 60.062 ST = 30.057
PI Sta 322+73.821 Δ = 10° 25' 37.7" (LT) L = 58.236 T = 29.199 R = 320.000 SE = SEE PLANS **V = 88 kph
PIs Sta 323+32.915 θs = 8° 03' 26.0" Ls = 90.000 LT = 60.062 ST = 30.057
-DI3REV-
PI Sta 10+35.160 Δ = 69° 48' 22.3" (RT) L = 24.367 T = 13.954 R = 20.000
PI Sta 10+69.802 Δ = 7° 53' 33.3" (LT) L = 6.888 T = 3.449 R = 50.000
PI Sta 11+30.698 Δ = 66° 31' 34.6" (LT) L = 23.222 T = 13.119 R = 20.000
-DI3-
PI Sta 10+39.779 Δ = 49° 57' 38.4" (RT) L = 43.599 T = 23.294 R = 50.000
PI Sta 11+33.250 Δ = 64° 12' 06.9" (LT) L = 22.411 T = 12.546 R = 20.000
-DI3- POT Sta. 10+00.000 = -DI3REV- POT Sta. 10+00.000 BEARING AH = S 19° 57' 42.9" W
-DI3REV- PT Sta. 10+45.574
-DI3REV- PC Sta. 10+66.353
-DI3REV- PT Sta. 10+73.241
-DI3- PC Sta. 10+16.484
-DI3REV- PC Sta. 10+21.207 BEGIN CONST.
-DI3REV- PC Sta. 11+17.579
-DI3REV- PT Sta. 11+40.801
-DI3- PC Sta. 11+20.703
-DI3- PT Sta. 10+60.083
-DI3- PT Sta. 11+43.114
-DI3REV- S 81° 52' 31.9" W
S 89° 46' 05.2" W
-DI3- S 69° 55' 21.7" W
-L- ST Sta. 323+92.858
-L- CS Sta. 323+02.858
-L- CS Sta. 322+44.622
-L- POS Sta. 323+23.000
-DI3- POT Sta. 11+55.744 BEARING BK = S 5° 43' 14.8" W
-L- POS Sta. 323+04.95
-DI3REV- POT Sta. 11+80.916
-DI4REV- PT Sta. 11+55.153 BK = -DI4- POT Sta. 11+54.543 AH
-DI4- PT Sta. 12+04.068 BEARING AH = S 9° 59' 59.5" W
-DI4- PC Sta. 11+76.344
-DI4REV- PRC Sta. 11+36.871
-L- POT Sta. 325+00.000
-DI4- POT Sta. 12+17.001
S 62° 57' 00.0" W
S 62° 56' 59.9" W
S 89° 08' 00.1" E -L-
"NCGS WINDOM" BL-97-PINC 111+24.964 = -L- POT 325+70.388 14.253 RT
BL-96-PINC 108+17.771 = -L- POC 322+65.869 13.099 RT
MATCHLINE -L- STA. 322+40 SEE SHEET NO. 32
MATCHLINE -L- STA. 325+80 SEE SHEET NO. 34
PATSY B. MURPHY DB 136 PG 601 (199)
JOEL RALPH MURPHY JOEY RANDALL MURPHY BY WILL DB 111 PG 200 (199A)
DAVID WAYNE GARLAND DB 202 PG 591 (200)
BEULAH HUGHES DB 448 PG 92 DB 146 PG 329 (201)
DONNA GOUGE DB 399 PG 677 (201A)
SHERRILL McCOURRY DB 436 PG 607 (202)
DEWEY PATE, JR. DB 268 PG 355 (198)
YANCEY RAILROAD COMPANY DB 114 PG 338 (129)
OLLIS REECE BOONE DB 173 PG 487
ALLEN D. BOONE DB 217 PG 391 (236)
CUT DITCH PSRM LINED SEE DETAIL 'AH' SHEET 2-E
0.6m SPECIAL CUT BASE DITCH GRASSED LINED SEE DETAIL 'G' SHEET 2-D
PIPE OUTLET CHANNEL SEE DETAIL 'W' SHEET 2-D
PSH 600 SEE SHEET 2-F
PSH 375mm SEE SHEET 2-F
ACCESS POINT 18.0m
+10 END FENCE
+28 BEGIN FENCE
+60 END FENCE
+78 BEGIN FENCE
+42 BEGIN FENCE
+66 END FENCE
+84 BEGIN FENCE
+27 END FENCE
+45 BEGIN FENCE
BERM DITCH
TERMINAL SECTION
INLET BURIED 0.3M
OPEN MASONARY BOX
REMOVE HW
REMOVE HW AND BOX
RETAIN
US 19E
LITTLE CRABTREE CREEK
EXISTING R/W
NOTE TO ROADWAY: USE 2:1 SLOPES FROM -L- STA 323+20 TO 324+40 RT
323
324
325

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST.REV.
R/W REV.

REVISIONS
R/W REV. 11/18/05 (TMW); REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201; REVISED EXIST.R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-D14- POT Sta.10+00.000
BEARING AH = S 25° 00' 03.7" E
-D14- PCSta.10+11.224
-D14- PT Sta.10+35.784
BEARING AH = S 62° 56' 59.9" W
-D14- POCSta.10+28.000
BEGIN CONST.
-D14-
PI Sta 10+26.662
Δ = 87° 57' 03.6" (RT)
L = 24.561
T = 15.438
R = 16.000
-D14REV-
PI Sta 10+54.624
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000
PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000
-D14REV PCSta.10+45.457 AH=
-D14- POT Sta 10+45.457 BK
-D14REV- PRCSta.10+63.739
-Y33-
PI Sta 10+06.847
Δ = 7° 50' 00.0" (LT)
L = 13.672
T = 6.841
R = 100.000
SE = SEE PLANS
PI Sta 10+28.921
Δ = 34° 03' 11.5" (LT)
L = 23.774
T = 12.249
R = 40.000
SE = SEE PLANS
PI Sta 10+53.630
Δ = 36° 29' 11.5" (RT)
L = 25.412
T = 13.185
R = 40.000
SE = SEE PLANS
-Y33- PCSta.10+00.000
RCV SEE SHEET 2-L
-Y33- PT Sta.10+13.672
-Y33- PCSta.10+16.672
-Y33- PRCSta.10+40.445
-L- POCSta.326+22.085
-Y31- POT Sta.10+00.000
BRG AH=S 5° 32' 00.0" W
-Y32- POT Sta.10+40.600
-Y33- POT Sta.10+74.680
-Y33- PT Sta.10+65.918
BEARING AH=S 20° 54' 00.0" E
-Y33- POT Sta.10+15.000
BEGIN CONST.
-Y32-
PI Sta 10+56.071
Δ = 46° 32' 00.0" (LT)
L = 24.365
T = 12.899
R = 30.000
SE = SEE PLANS
-Y32- POT Sta.10+00.000
BEGIN CONST.
-Y32- PCSta.10+43.171
-Y32- PT Sta.10+67.536
-Y31- PCSta.10+15.998
-Y31- PT Sta.10+42.911
END CONST.
-Y31- POT Sta.10+58.994
-Y31-
PI Sta 10+29.556
Δ = 17° 08' 00.0" (RT)
L = 26.913
T = 13.558
R = 90.000
SE = SEE PLANS
-Y31- POT Sta.11+04.518
-L- POCSta.328+07.257
-Y32- POT Sta.10+69.223
BRG BK = S 22° 34' 00.0" W
BL-99-PINC 113+52.702 =
-L- POC 327+99.049 12.689 LT
+94.663 BEGIN FENCE
-L-
Pls Sta 326+45.398
Gs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064
Pl Sta 327+91.925
Δ = 42° 28' 40.7" (RT)
L = 222.414
T = 116.597
R = 300.000
SE = 0.06
**V = 85 kph
Pls Sta 329+27.806
Gs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 70
FOR -Y33- PROFILE SEE SHEET 71
FOR -D14- PROFILE SEE SHEET 74

MATCHLINE -L- STA. 325+80 SEE SHEET NO.33
MATCHLINE -L- STA. 329+20 SEE SHEET NO. 35

DANIEL KEITH HUGHES DB 285 PG 14
CARRIE BLEVINS DB 106 PG 189
DONNA GOUGE DB 399 PG 677
BEULAH HUGHES DB 448 PG 96 DB 146 PG 329
SHERRILL McCOURRY DB 436 PG 607
BERDELLA PETERSON DB 98 PG 208
FRED PETERSON DB 185 PG 407
DEWITT FORTNER DB 214 PG 299
TROY G. BOONE DB 119 PG 605
ARNOLD ZEB PHILLIPS DB 206 PG 788

CUT DITCH PSRM LINED SEE DETAIL 'AH' SHEET 2-H
SPECIAL CUT DITCH PSRM LINED SEE DETAIL 'I' SHEET 2-G
1.6m BASE STREAM RELOCATION SEE DETAIL 'AT' SHEET 2-Q
0.6m BASE STREAM RELOCATION SEE DETAIL 'AU' SHEET 2-R
SPECIAL CUT DITCH GRASS LINED SEE DETAIL 'G' SHEET 2-G
ROCK CROSS VANE BACKFILLED W/ CLASS 'I' RIP RAP (45 TONS) SEE SHEET 2-L
CL II RIP RAP EST. 4.5 TONS F.F. 11.7 SM
PSH 400mm SEE SHEET 2-J
STREAM PLUG SEE SHEET 2-N
BERM DITCH
EXISTING R/W
REMOVE
ACCESS POINT
END FENCE
BEGIN FENCE
TERMINAL SECTION
NAD 83/95

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-D14- POT Sta. 10+00.000
BEARING AH = S 25° 00' 03.7" E
-D14- PC Sta. 10+11.224

-D14- PT Sta. 10+35.784
BEARING AH = S 62° 56' 59.9" W

-D14-
PI Sta 10+26.662
Δ = 87° 57' 03.6" (RT)
L = 24.561
T = 15.438
R = 16.000

-D14- POC Sta. 10+28.000
BEGIN CONST.

-D14REV-
PI Sta 10+54.624
Δ = 10° 28' 31.0" (RT)
L = 18.283
T = 9.167
R = 100.000

PI Sta 11+91.285
Δ = 52° 57' 00.5" (LT)
L = 27.725
T = 14.941
R = 30.000

-D14REV PC Sta. 10+45.457 AH =
-D14- POT Sta 10+45.457 BK

-D14REV- PRC Sta. 10+63.739

-Y33-
PI Sta 10+06.847
Δ = 7° 50' 00.0" (LT)
L = 13.672
T = 6.847
R = 100.000
SE = SEE PLANS

PI Sta 10+28.921
Δ = 34° 03' 11.1" (LT)
L = 23.774
T = 12.249
R = 40.000
SE = SEE PLANS

PI Sta 10+53.630
Δ = 36° 29' 11.1" (RT)
L = 25.472
T = 13.185
R = 40.000
SE = SEE PLANS

-Y33- PC Sta. 10+16.672
-Y33- PRC Sta. 10+40.445

-L- POC Sta. 326+22.085
-Y31- POT Sta. 10+00.000

-Y31- PC Sta. 10+15.998
-Y31- PT Sta. 10+42.911
-Y31- POT Sta. 10+58.994
-Y31- POT Sta. 11+04.518

-Y31-
PI Sta 10+29.556
Δ = 17° 08' 00.0" (RT)
L = 26.913
T = 13.558
R = 90.000
SE = SEE PLANS

-Y32-
PI Sta 10+56.071
Δ = 46° 32' 00.0" (LT)
L = 24.365
T = 12.899
R = 30.000
SE = SEE PLANS

-Y32- POT Sta. 10+40.600
-Y33- POT Sta. 10+74.680
-Y33- PT Sta. 10+65.918
BEARING AH = S 20° 54' 00.0" E
-Y33- POT Sta. 10+15.000
BEGIN CONST.
-Y33- PC Sta. 10+00.000
-Y33- PT Sta. 10+13.672

-Y32- POT Sta. 10+00.000
BEGIN FENCE
-Y32- PC Sta. 10+43.171
-Y32- PT Sta. 10+67.536

-L- POC Sta. 328+07.257
-Y32- POT Sta. 10+69.223

BL-99-PINC 118+52.702 =
-L- POC 327+99.049 12.689 LT

-L- POC Sta. 328+97.741

+94.663 BEGIN FENCE

Pls Sta 326+45.398
θs = 8° 35' 39.1"
Ls = 90.000
LT = 60.071
ST = 30.064

PI Sta 327+91.925
Δ = 42° 28' 40.1" (RT)
L = 222.414
T = 116.597
R = 300.000
SE = 0.06
**V = 85 kph

Pls Sta 329+27.806
θs = 8° 35' 39.1"
Ls = 90.000
LT = 60.071
ST = 30.064

FOR -L- PROFILE SEE SHEET 59
FOR -Y31- & -Y32- PROFILE SEE SHEET 70
FOR -Y33- PROFILE SEE SHEET 71
FOR -D14- PROFILE SEE SHEET 74

MATCHINE -L- STA. 325+80 SEE SHEET NO. 33

MATCHINE -L- STA. 329+20 SEE SHEET NO. 35

DANIEL KEITH HUGHES DB 285 PG 14 (203)
CARRIE BLEVINS DB 106 PG 189 (206)
DONNA GOUGE DB 399 PG 677 (201A)
BEULAH HUGHES DB 448 PG 92 DB 146 PG 329 (201)
SHERRILL McCOURRY DB 436 PG 607 (202)
TROY G. BOONE DB 119 PG 605 (207)
ARNOLD ZEB PHILLIPS DB 206 PG 788 (209)
BERDELLA PETERSON DB 98 PG 208 (204)
FRED PETERSON DB 185 PG 407 (205)
DEWITT FORTNER DB 214 PG 299 (208)

REVISIONS

R/W REV. 11/18/05 (TWW); REVISED DRIVEWAY -D14- AND PROPOSED R/W ON PARCEL 201; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TWW); REVISED PARCEL OWNER NAME AND DEED BOOK INFORMATION ON PARCEL 201, ADDED PARCEL 201A.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	

METRIC

CONST. REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

PIs Sta 326+45.398 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064	PI Sta 327+91.925 Δ = 42° 28' 40.7" (RT) L = 222.414 T = 116.597 R = 300.000 SE = 0.06 xxV = 85 kph	PIs Sta 329+27.806 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064
PIs Sta 330+67.086 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064	PI Sta 331+55.524 Δ = 22° 04' 18.3" (LT) L = 115.567 T = 58.509 R = 300.000 SE = SEE PLANS xxV = 85 kph	PIs Sta 332+42.647 Θs = 8° 35' 39.7" Ls = 90.000 LT = 60.071 ST = 30.064

NAD 83

FOR -L- PROFILE SEE SHEET 59

MATCHLINE -L- STA. 329+20 SEE SHEET NO. 34

MATCHLINE -L- STA. 332+60 SEE SHEET NO. 36

JACK HAROLD HUGHES DB 192 PG 199

ARNOLD ZEB PHILLIPS DB 206 PG 788 (209)

K. O. STYLES DB 91 PG 312 (210)

BRETT HUGHES DB 341 PG 1 DB 287 PG 115 (212)

CHARLES R. DELLINGER DB 300 PG 612 (214)

DEWITT FORTNER DB 214 PG 299 (208)

JOHN GRIFFITH HEIRS DB 12 PG 41 (211)

RALPH L. BLEVINS DB 212 PG 424 (213)

YANCEY RAILROAD COMPANY DB 114 PG 338 (129)

ALTON RAY DB 224 PG 715

-L- TSS1a. 330+07.05

-L- SCS1a. 330+97.015

-L- CSS1a. 332+12.582

-L- STS1a. 329+87.24

S 29° 28' 00.0" E

BL-103-PINC 115+62.295=
-L- POS 330+07.994 13.076 RT

BL-104-PINC 117+05.781=
-L- POC 331+47.606
15.120 RT

CL I RIP-RAP
EST. 6.4 TONS
FF 14.2 SY
"NCDS EDGE"

PSH 400mm SEE SHEET 2-F

ACCESS POINT

BERM DITCH

LITTLE CRABTREE CREEK

EXISTING R/W

REMOVE 450 CSP

RETAIN

ELBOW

CHRISTMAS TREES

DBL BUCKEYE

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED DRIVEWAY FROM 6W TO 9W FOR PARCEL 212.

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

Pls Sta 330+67.086
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

Pl Sta 331+55.524
Δ = 22° 04' 18.3" (LT)
L = 115.567
T = 58.309
R = 300.000
SE = SEE PLANS
xxV = 85 kph

Pls Sta 332+42.647
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

Pls Sta 334+41.527
Θs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

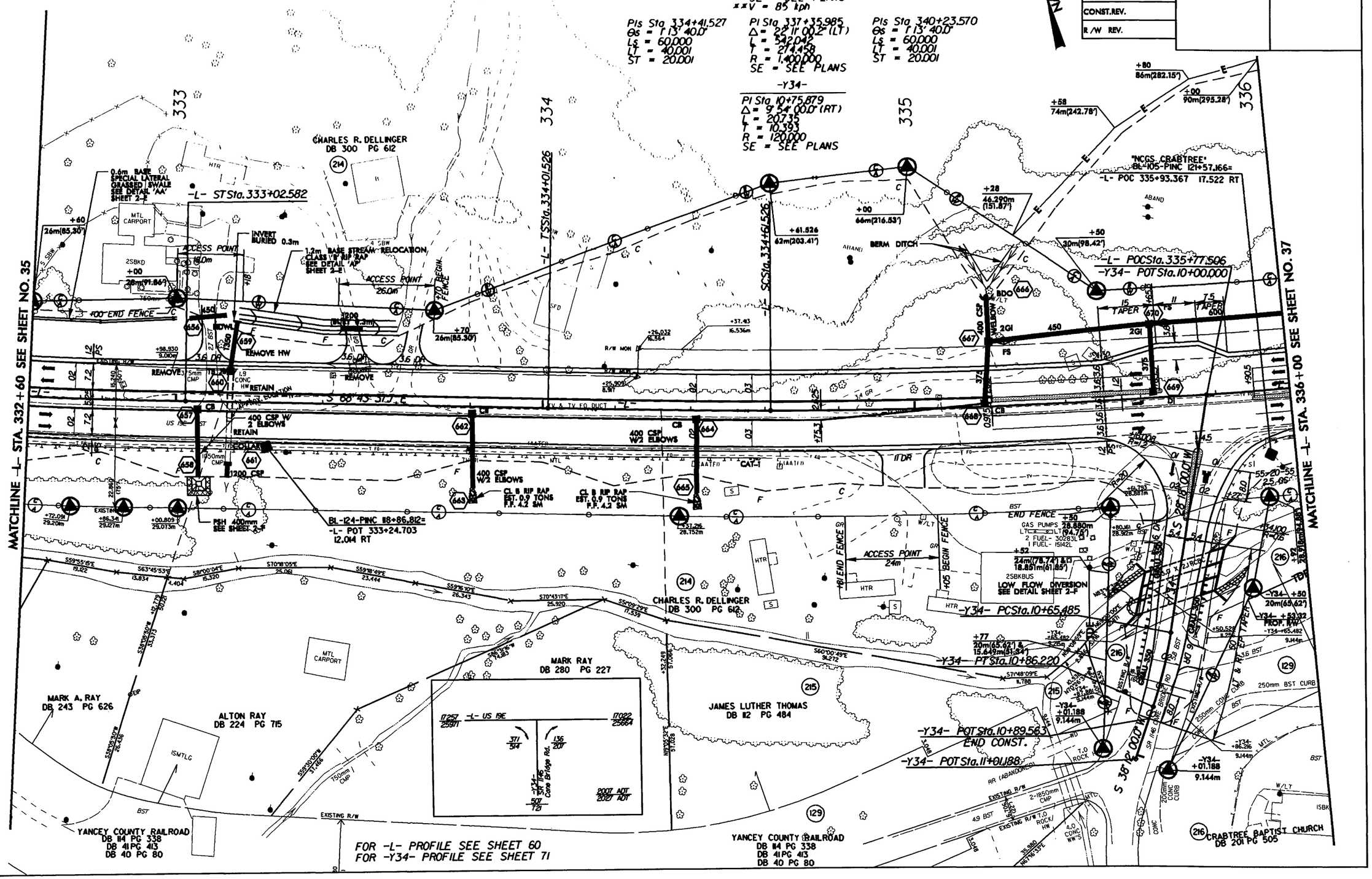
Pl Sta 337+35.985
Δ = 22° 11' 00.2" (LT)
L = 542.042
T = 274.458
R = 1,400.000
SE = SEE PLANS

Pls Sta 340+23.570
Θs = 1° 13' 40.0"
Ls = 60.000
LT = 40.001
ST = 20.001

-Y34-

Pl Sta 10+75.879
Δ = 9° 54' 00.0" (RT)
L = 207.35
T = 103.93
R = 1200.000
SE = SEE PLANS

NAD 83



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED DRIVEWAY & ACCESS POINT @ STA 334+93 FOR PARCEL 214 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/06 (TMW); REVISED PROPERTY LINE BETWEEN PARCELS 215 & 216
R/W REV. 03/30/07 (RVP); ADDED ACCESS POINT AND TWO DRIVEWAYS AT -L- STA. 333+50 AND 333+65 ON PARCEL 214.

8/17/99

07-MAR-2009 07:42
S:\Preliminary\R2519\sht36.pch

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

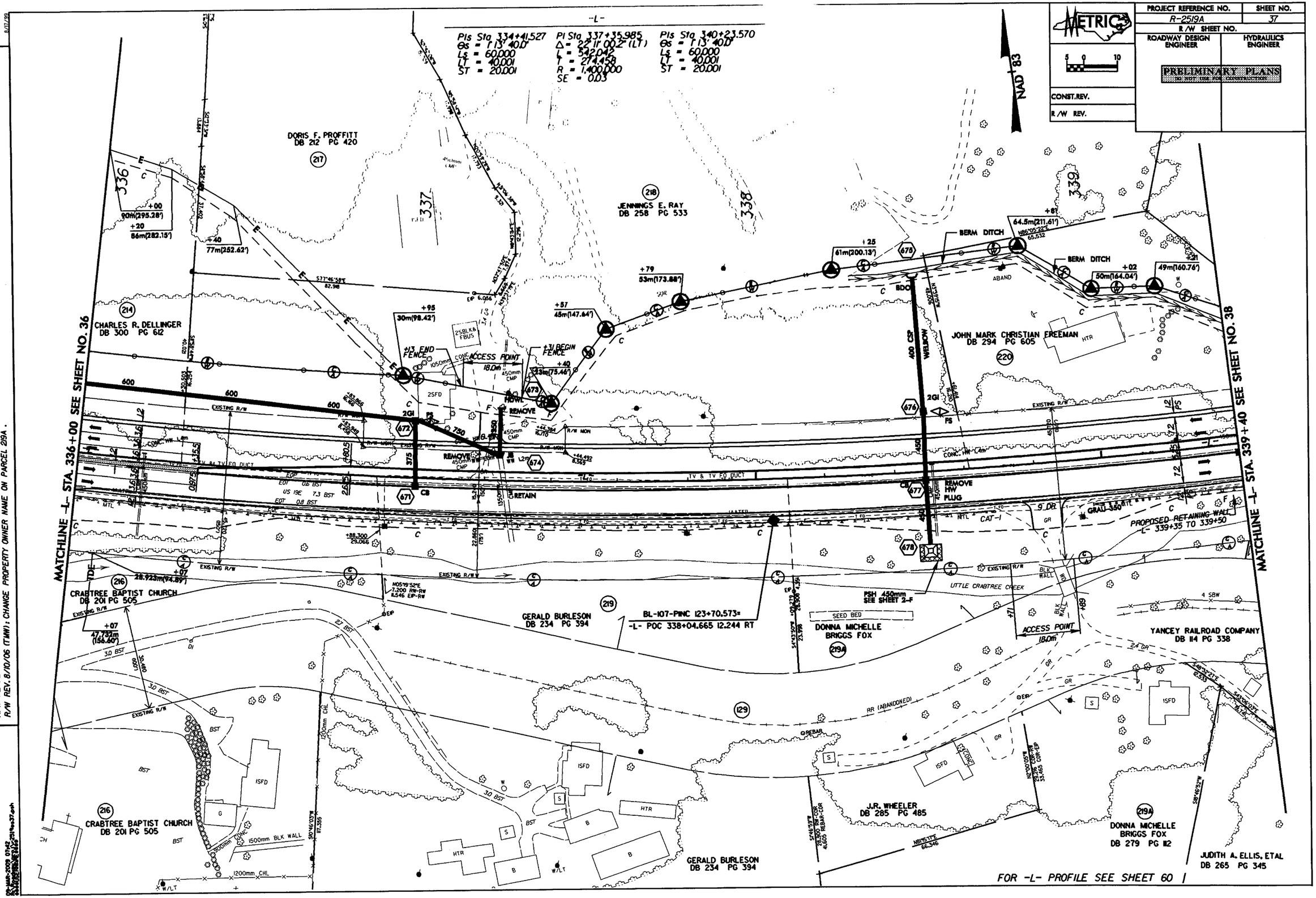
CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST R/W TO NUMERICAL OFFSET.
R/W REV. 2/27/06 (TMW); ELIMINATED CLAIM ON PARCEL 220A (G. E. FREEMAN).
R/W REV. 8/10/06 (TMW); CHANGE PROPERTY OWNER NAME ON PARCEL 219A.



08-MAR-2009 07:42

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

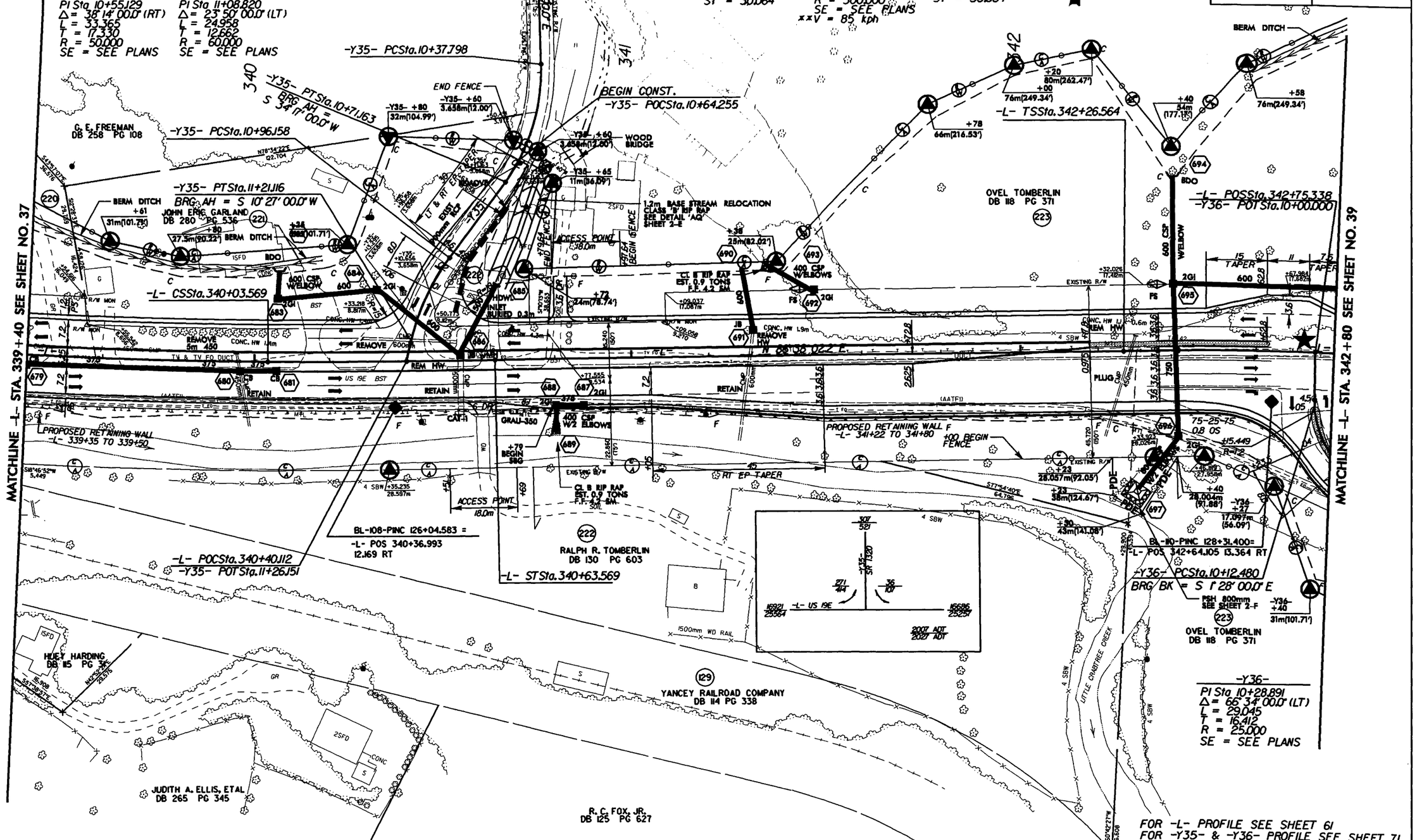
PIs Sta 334+41.527	PI Sta 337+35.985	PIs Sta 340+23.570
Θs = 1°13' 40.0"	Δ = 22° 11' 00.2" (LT)	Θs = 1°13' 40.0"
Ls = 60.000	L = 542.042	Ls = 60.000
LT = 40.001	T = 274.458	LT = 40.001
ST = 20.001	R = 1,400.000	ST = 20.001
	SE = 0.03	

PIs Sta 342+86.635	PI Sta 343+89.679	PIs Sta 344+90.063
Θs = 8° 35' 39.7"	Δ = 27° 23' 38.4" (RT)	Θs = 8° 35' 39.7"
Ls = 90.000	L = 143.435	Ls = 90.000
LT = 60.071	T = 73.115	LT = 60.071
ST = 30.064	R = 300.000	ST = 30.064
	SE = SEE PLANS	

xxV = 85 kph

-Y35-

PI Sta 10+55.129	PI Sta 11+08.820
Δ = 38° 14' 00.0" (RT)	Δ = 23° 50' 00.0" (LT)
L = 33.365	L = 24.958
T = 17.330	T = 12.662
R = 50.000	R = 60.000
SE = SEE PLANS	SE = SEE PLANS



REVISIONS

R/W REV. 11/18/05 (TMW); REVISED EXIST. R/W TO NUMERICAL OFFSET
R/W REV. 2/27/06 (TMW); ELIMINATED CLAIM AND PARCEL 220A (G. E. FREEMAN)
R/W REV. 3/30/07 (RVP); REVISED PROPOSED PDE ON PARCEL 223.
R/W REV. 02/15/08 (RVP); ADDED DRIVEWAY & ACCESS POINT AT STA. 340+80 ON PARCEL 223.

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
CONST.REV.	
R/W REV.	

METRIC 5 0 10

NAD 83

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-
PIs Sta 342+86.635
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

PI Sta 343+89.679
Δ = 27° 23' 38.4" (RT)
L = 143.435
T = 73.115
R = 300.000
SE = SEE PLANS
xxV = 85 kph

PIs Sta 344+90.063
Θs = 8° 35' 39.7"
Ls = 90.000
LT = 60.071
ST = 30.064

-DI5-
~~PI Sta 10+22.059~~
~~Δ = 28° 59' 29.0" (LT)~~
~~L = 20.240~~
~~T = 10.341~~
~~R = 40.000~~

-DI5REV-
PI Sta 10+32.850
Δ = 32° 02' 58.8" (LT)
L = 11.187
T = 5.744
R = 20.000

PI Sta 10+92.562
Δ = 41° 14' 23.7" (LT)
L = 7.198
T = 3.763
R = 10.000

-DI5REV- PCSta.10+27.105
BEGIN CONST.
-DI5REV- POT STA.10+02.00
-DI5REV- POT Sta.10+00.000
BEARING AH = N 74° 56' 22.1" W

-DI5REV- PCSta.10+88.799
-DI5REV- PT Sta.10+38.293
BEARING AH = S 73° 00' 39.1" W

-L- SCSta.343+16.564
-DI5REV- PT Sta.10+95.997
BEARING AH = S 31° 46' 15.4" W

~~-DI5- PT Sta.10+31.957~~
~~BEARING AH = S 24° 18' 08.6" W~~

~~BEGIN CONST.~~
~~-DI5- POT Sta.10+00.000~~
~~BEARING AH = S 53° 11' 37.5" W~~

BC-B2-PINC 130+24.195=
-L- POS 344+59.343
9.939 LT

-L- POCSta.343+77.00
-DI5REV- POT Sta.11+08.886

-L- POCSta.344+16.440
-DI5- POT Sta.10+45.781

-L- CSSta.344+59.998

END CONST.
-Y36- POCSta.11+40
BEGIN FENCE

-Y36- PT Sta.10+41.525

-Y36- PCSta.10+95.473
END FENCE

-Y36- PT Sta.11+65.924

-Y36- POT Sta.11+96.960

-L- ST Sta.345+49.998

-L- POT Sta.346+17.171

STA. 345 + 60.000 -L- END STATE PROJECT R-2519A

MATCHLINE -L- STA. 342+80 SEE SHEET NO. 38

S 68° 02' 00.0" E
S 48° 47' 00.0" E -L-
S 5° 56' 00.0" E

-Y36-
PI Sta 10+28.891
Δ = 66° 34' 00.0" (LT)
L = 29.045
T = 16.412
R = 25.000
SE = SEE PLANS

PI Sta 11+34.607
Δ = 62° 06' 00.0" (RT)
L = 70.450
T = 39.133
R = 65.000
SE = SEE PLANS

GERALD T. BLALOCK DB 198 PG 359
OVEL TOMBERLIN DB 118 PG 371
MICAVILLE PRESBYTERIAN CHURCH DB 249 PG 376
GEORGE BUCHANAN DB 138 PG 156
JERALYNE J. RAY DB 248 PG 9
S. G. HALL DB 58 PG 161
MICHAEL ANTHONY GILLEY DB 295 PG 455
RABON ROBINSON DB 202 PG 112
HERMAN BEAVER DB 237 PG 225
HALL CEMETERY

FOR -L- PROFILE SEE SHEET 61
FOR -Y36- PROFILE SEE SHEET 71
FOR -DI5REV- PROFILE SEE SHEET 73

REVISIONS
R/W REV. 11/18/05 (TWM): ADDED ACCESS POINT FOR PARCEL 225A; ADDED PARCEL NUMBER 235; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 01/30/06 (KWW): REVISED R/W ALONG -Y36- ON PARCEL 235.
R/W REV. 04/19/06 (TWM): REVISED DRIVEWAY DIS. AND ADDED CONSTRUCTION EASEMENT ON PARCEL 224; REMOVED CONTROL OF ACCESS AND FENCE ON PARCEL 225A.
R/W REV. 01/30/07 (RVP): REVISED PROPOSED R/W ON PARCEL 224 AND 226.
R/W REV. 03/30/07 (RVP): REVISED PROPOSED R/W ON PARCEL 226.

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

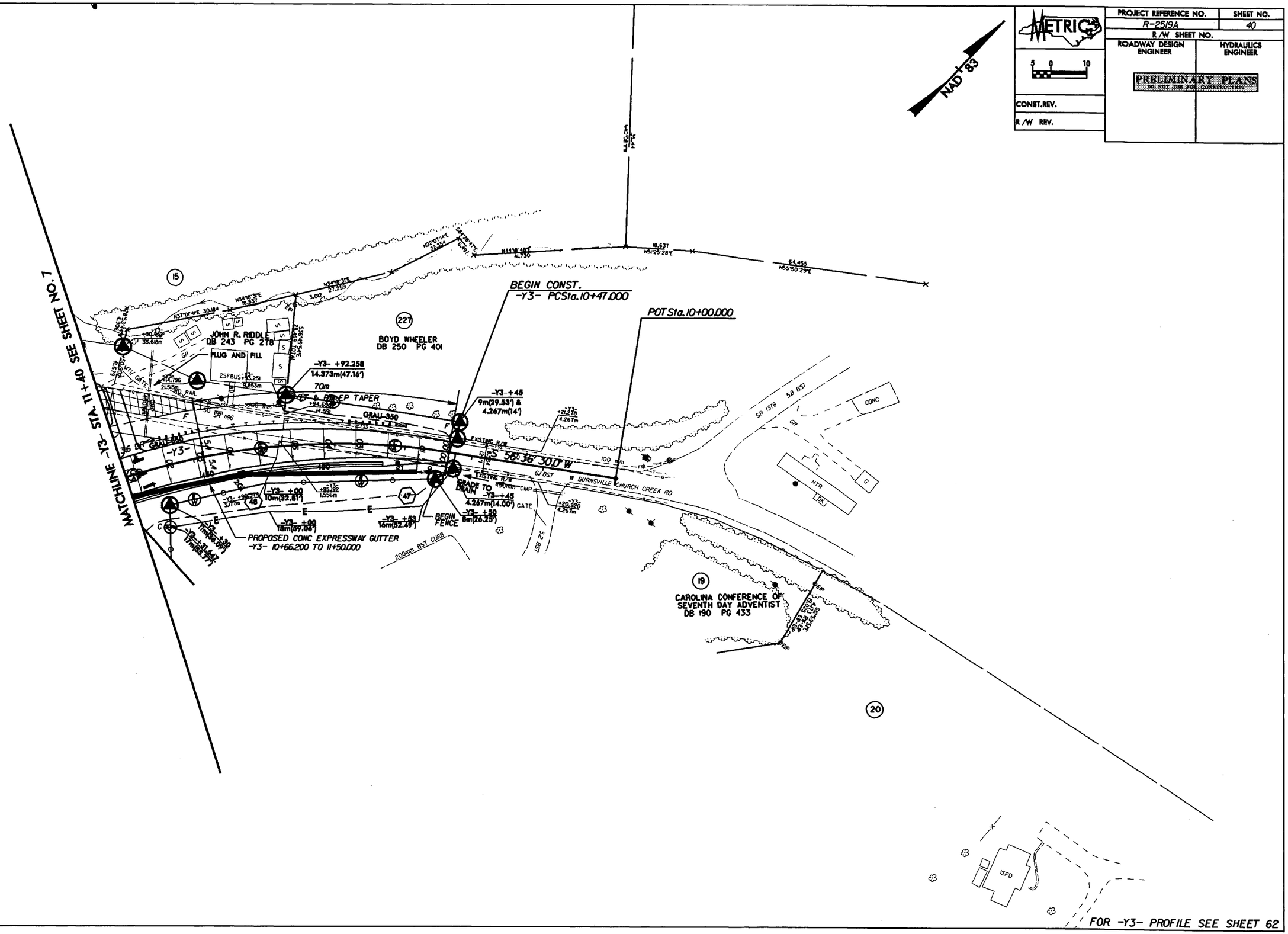
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PROPOSED R/W AND CONSTRUCTION EASEMENT ON PARCEL 19 ; REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 02/27/06 (TMW): ADDED PAVED SHOULDER AND EXPRESSWAY GUTTER TO PARCEL 19 ; REVISED PROPOSED R/W, FENCE, CONSTRUCTION EASEMENT ON PARCEL 19 .
R/W REV. 04/19/06 (TMW): REVISED CONTROL OF ACCESS AND FENCE FOR PARCEL 15 .

8/17/99

06-MAR-2009 07:43
S:\ENGINEERING\PROJECTS\2519aa40.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

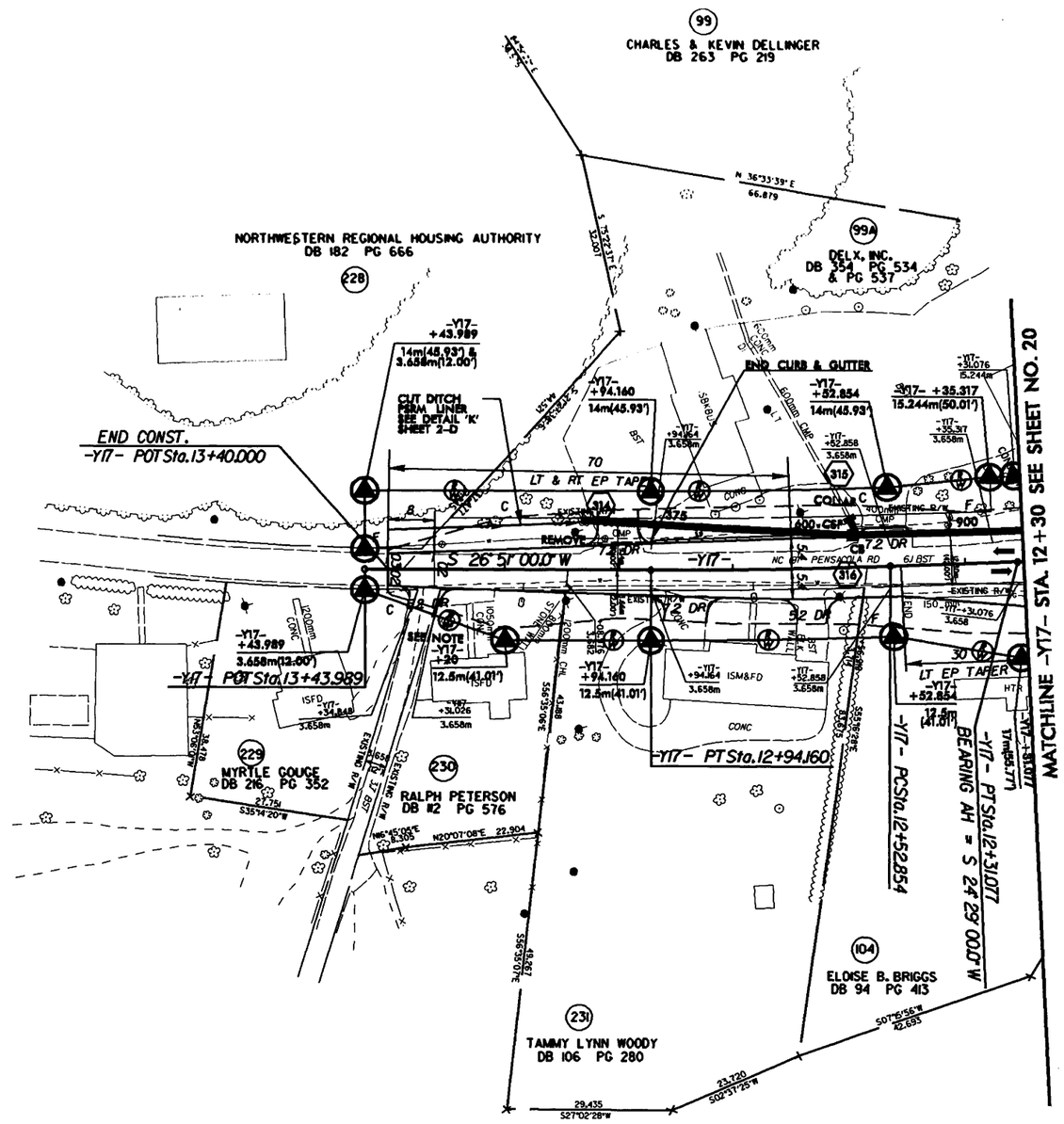
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.

NAD 83



REVISIONS

R/W REV. 11/18/05 (TMW): REVISED EXIST. R/W TO NUMERICAL OFFSET.
R/W REV. 08/10/06 (TMW): CHANGED PROPERTY OWNER NAME ON PARCEL 231.
R/W REV. 05/16/07 (BCS): REVISED PROPERTY OWNERS NAME AND PROPERTY LINE ON PARCEL 99 & ADDED PARCEL 99A (DELX, INC).

8/17/99

FOR -Y17- PROFILE SEE SHEET 66

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

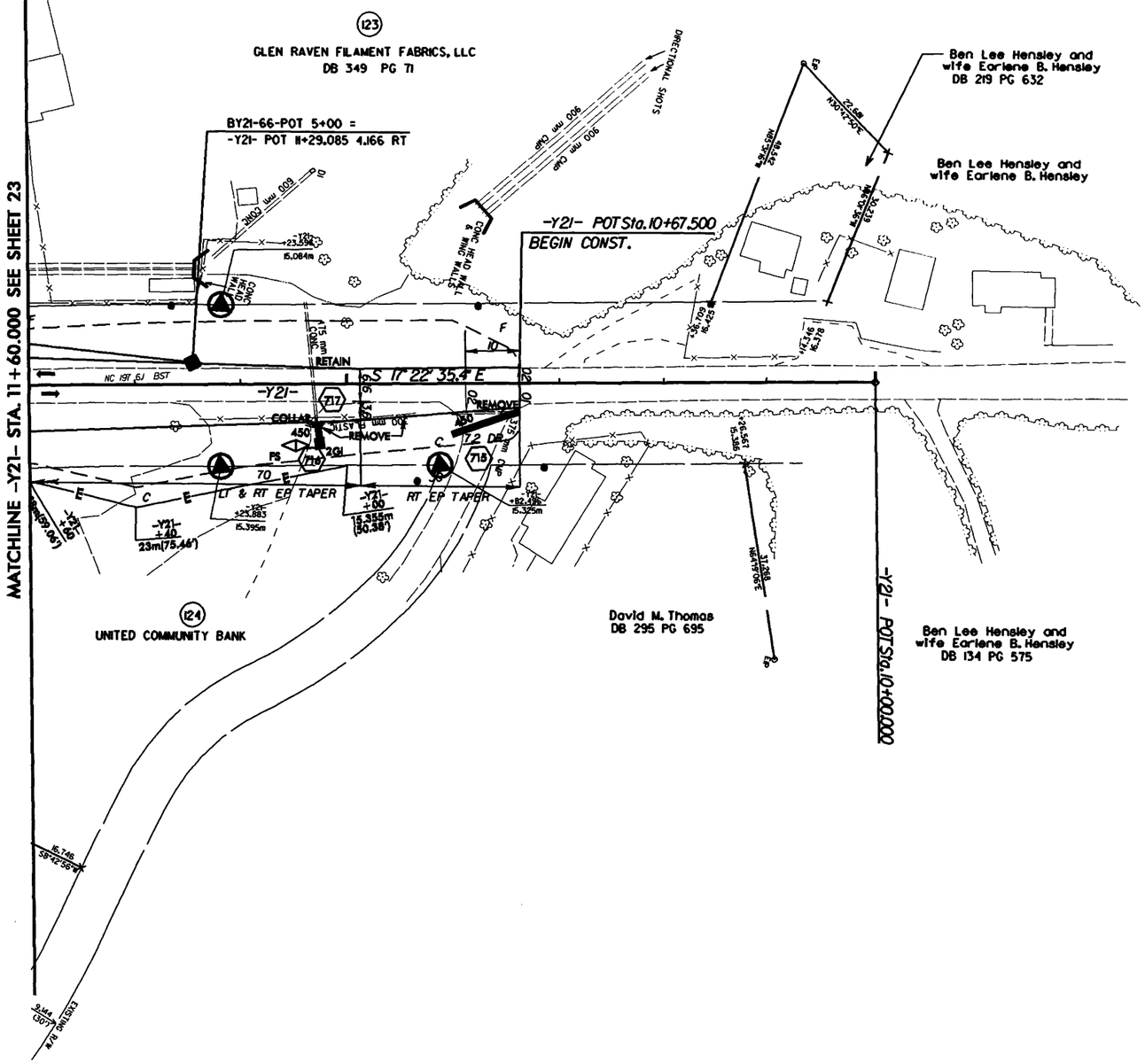
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW): REVISED PARCEL NUMBER, PROPERTY OWNER NAME & DEED BOOK INFORMATION ON PARCEL 124 : CHANGED PARCEL NUMBER 118 (GLEN RAVEN SILK MILLS) TO 123 : REVISED EXIST.R/W TO NUMERICAL OFFSET
R/W REV. 01/08/07 (RVP): REVISED PROPERTY OWNER'S NAME AND DEED BOOK INFORMATION ON PARCEL 123.

6/17/99



FOR -Y21- PROFILE SEE SHEET 67

09-MAR-2009 07:43
S:\Structures\R-2519a\sht42.dgn

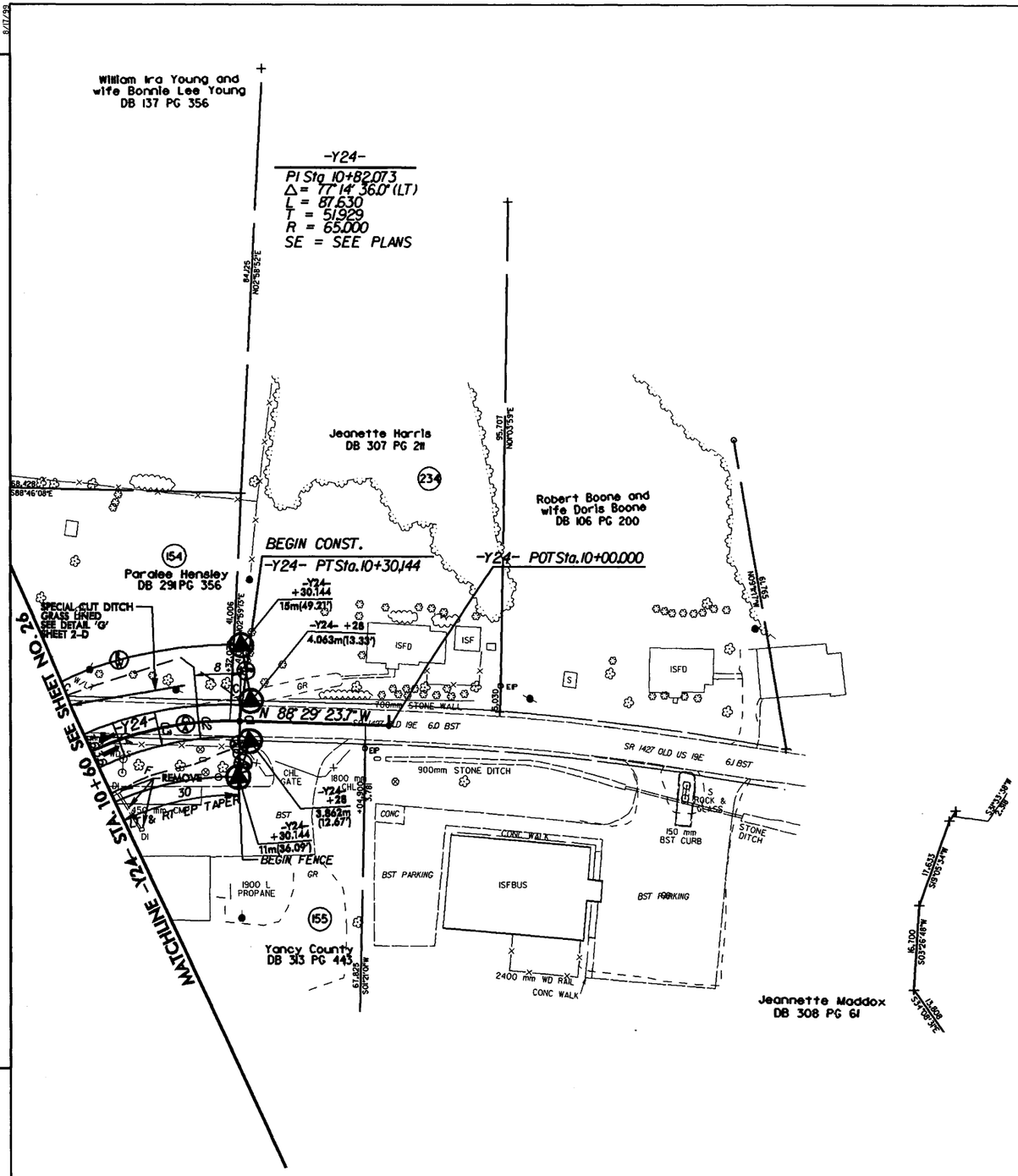
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	
R/W REV.	

METRIC 5 0 10

NAD 83

REVISIONS

R/W REV. 11/18/05 (TMW); CHANGED PARCEL NUMBER 228 JEANETTE HARRIS TO 234 ; REVISED EXIST.R/W TO NUMERICAL OFFSET.



FOR -Y24- PROFILE SEE SHEET 68

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

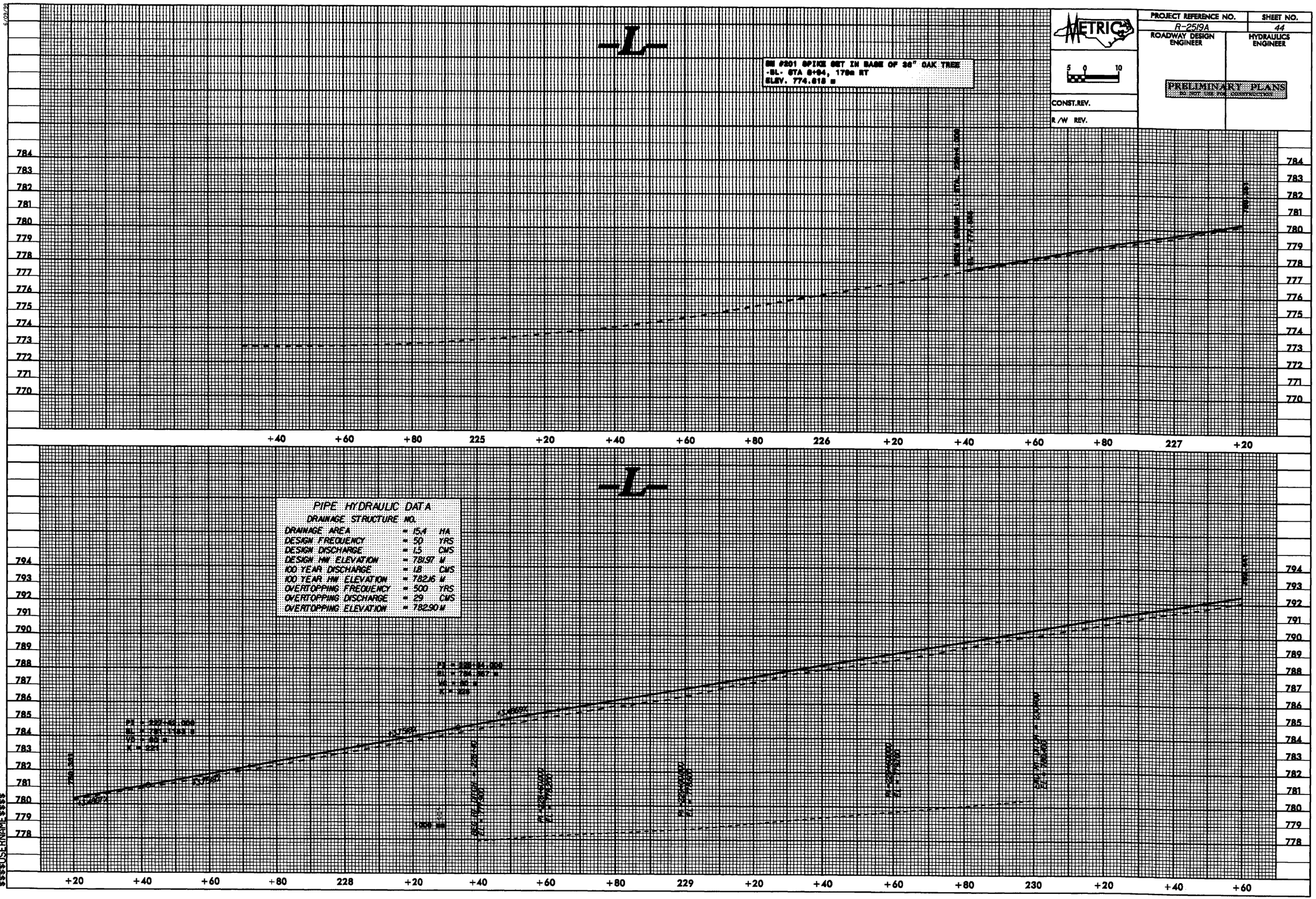
METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

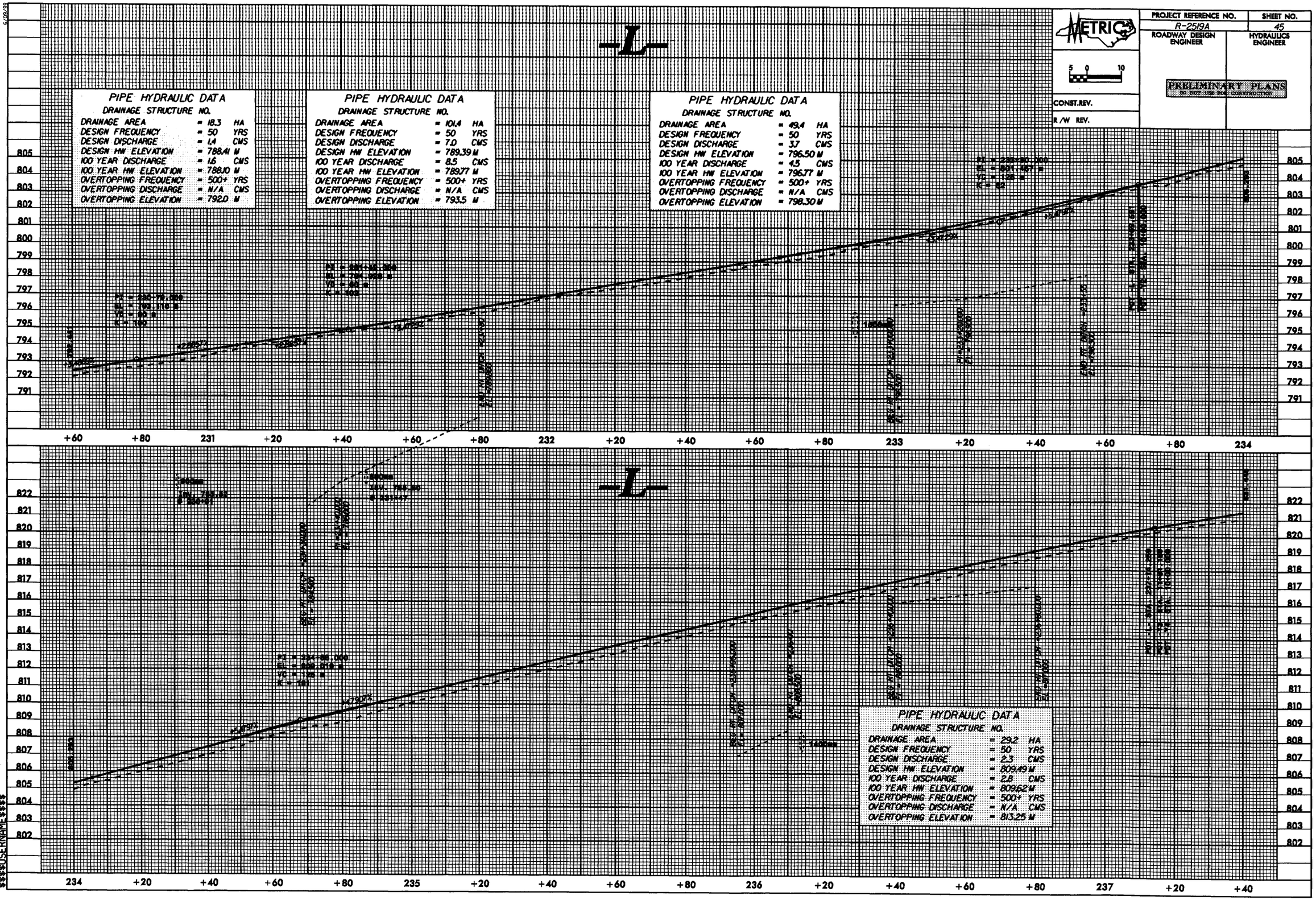
METRIC

5 0 10

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST. REV.

R/W REV.



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 18.3	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.4	CMS
DESIGN HW ELEVATION	= 788.41	M
100 YEAR DISCHARGE	= 1.6	CMS
100 YEAR HW ELEVATION	= 788.10	M
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 792.0	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 101.4	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 7.0	CMS
DESIGN HW ELEVATION	= 789.39	M
100 YEAR DISCHARGE	= 8.5	CMS
100 YEAR HW ELEVATION	= 789.77	M
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 793.5	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 49.4	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 3.7	CMS
DESIGN HW ELEVATION	= 796.50	M
100 YEAR DISCHARGE	= 4.5	CMS
100 YEAR HW ELEVATION	= 796.77	M
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 798.30	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 29.2	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.3	CMS
DESIGN HW ELEVATION	= 809.49	M
100 YEAR DISCHARGE	= 2.8	CMS
100 YEAR HW ELEVATION	= 809.62	M
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 813.25	M

5/09/09
09-MAR-2009 07:45
R:\Roadway\PRS1\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.

BM #202 SPIKE SET IN BASE OF 12" MAPLE TREE
-BL- STA 22+38, 127m RT
ELEV. 822.426 m

-L-

PI = 238+75.000
EL = 826.366 m
VC = 120 m
K = 60

VC=120

"SUPER"

END BRIDGE

BEG BRIDGE

END PIPE STA 239+40.000

BEG PIPE STA 239+20.000

END PIPE STA 238+80.000

BEG PIPE STA 238+60.000

831 830 829 828 827 826 825 824 823 822 821 820 819 818 817

+40 +60 +80 238 +20 +40 +60 +80 239 +20 +40 +60 +80 240 +20 +40 +60 +80

-L-

PI = 244+08.000
EL = 828.821 m
VC = 100 m
K = 100

PI = 242+50.000
EL = 821.847 m
VC = 200 m
K = 80

END PIPE STA 243+60.000

BEG PIPE STA 243+40.000

END PIPE STA 242+60.000

BEG PIPE STA 242+40.000

END PIPE STA 241+60.000

BEG PIPE STA 241+40.000

END PIPE STA 240+60.000

BEG PIPE STA 240+40.000

END BRIDGE

BEG BRIDGE

"SUPER"

835 834 833 832 831 830 829 828 827 826 825 824 823 822 821 820 819 818 817 816 815

+80 241 +20 +40 +60 +80 242 +20 +40 +60 +80 243 +20 +40 +60 +80 244 +20

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	=	150	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	7.2	CMS
DESIGN HW ELEVATION	=	815.68	M
100 YEAR DISCHARGE	=	11.6	CMS
100 YEAR HW ELEVATION	=	815.05	M
OVERTOPPING FREQUENCY	=	N/A	YRS
OVERTOPPING DISCHARGE	=	N/A	CMS
OVERTOPPING ELEVATION	=	N/A	M

09-MAR-2009 07:45
R:\Roadway\proj\r2519a.pf1
$$$$USERNAME$$$$

5/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

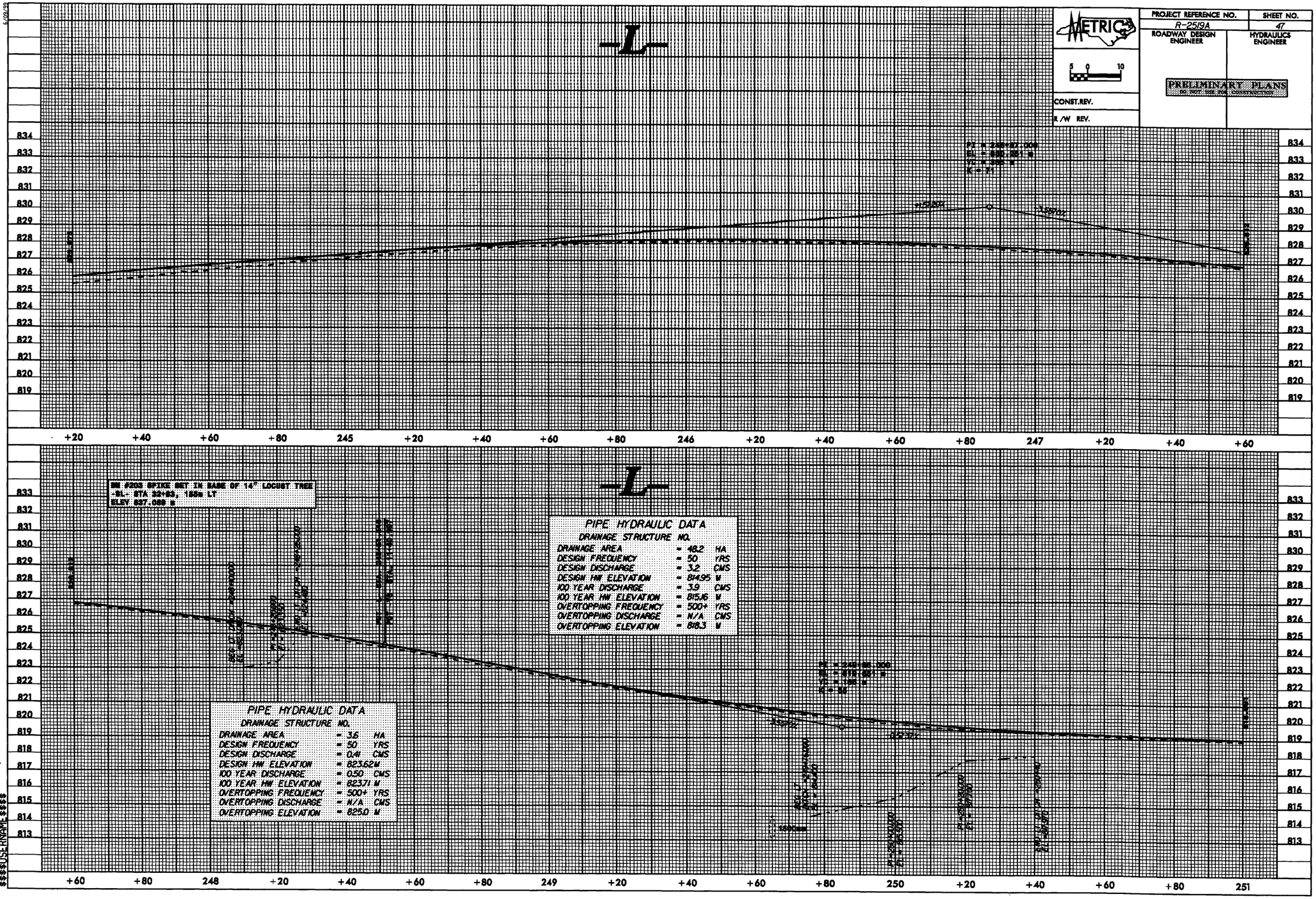
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.



09-MAR-2009 07:45
R:\Roadway\PROJ\r-2519a.pfl
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	48

METRIC

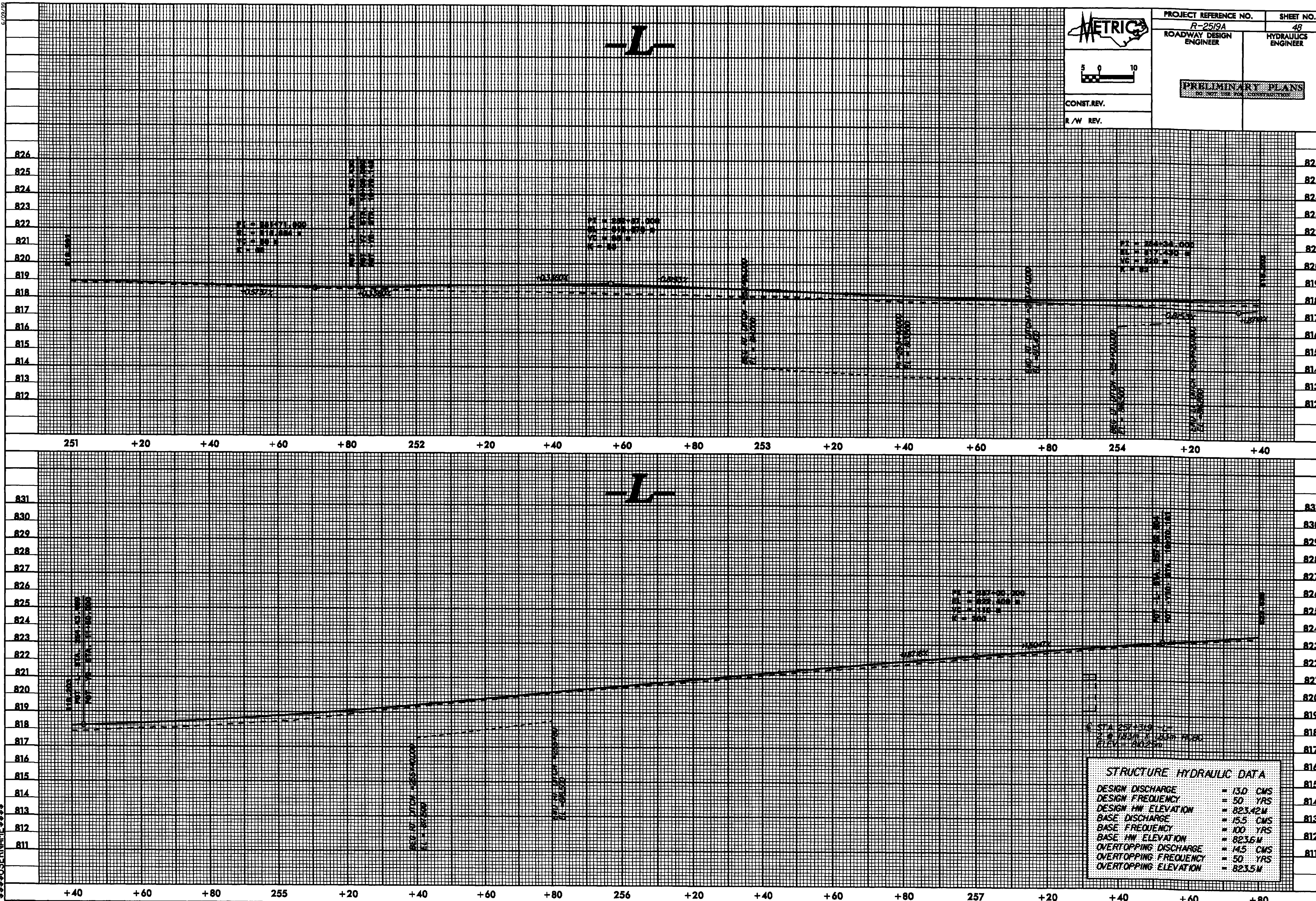
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 13.0 CMS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 823.42 M
BASE DISCHARGE	= 15.5 CMS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 823.6 M
OVERTOPPING DISCHARGE	= 14.5 CMS
OVERTOPPING FREQUENCY	= 50 YRS
OVERTOPPING ELEVATION	= 823.5 M

6/09/99

09-MAR-2009 07:45
R:\Roadway\proj\r2519a.pfl
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

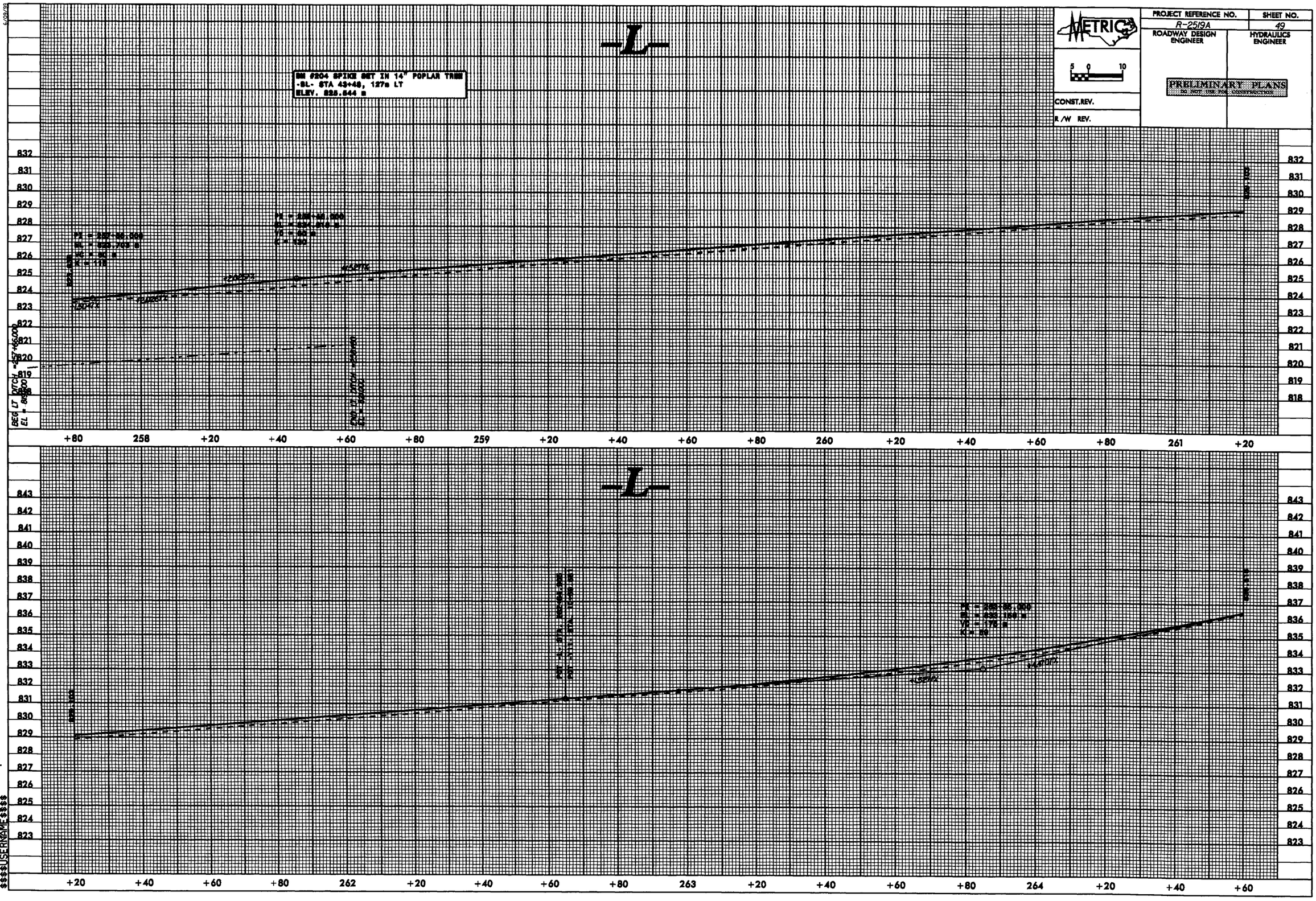
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.



PROJECT REFERENCE NO.	SHEET NO.
R-2519A	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

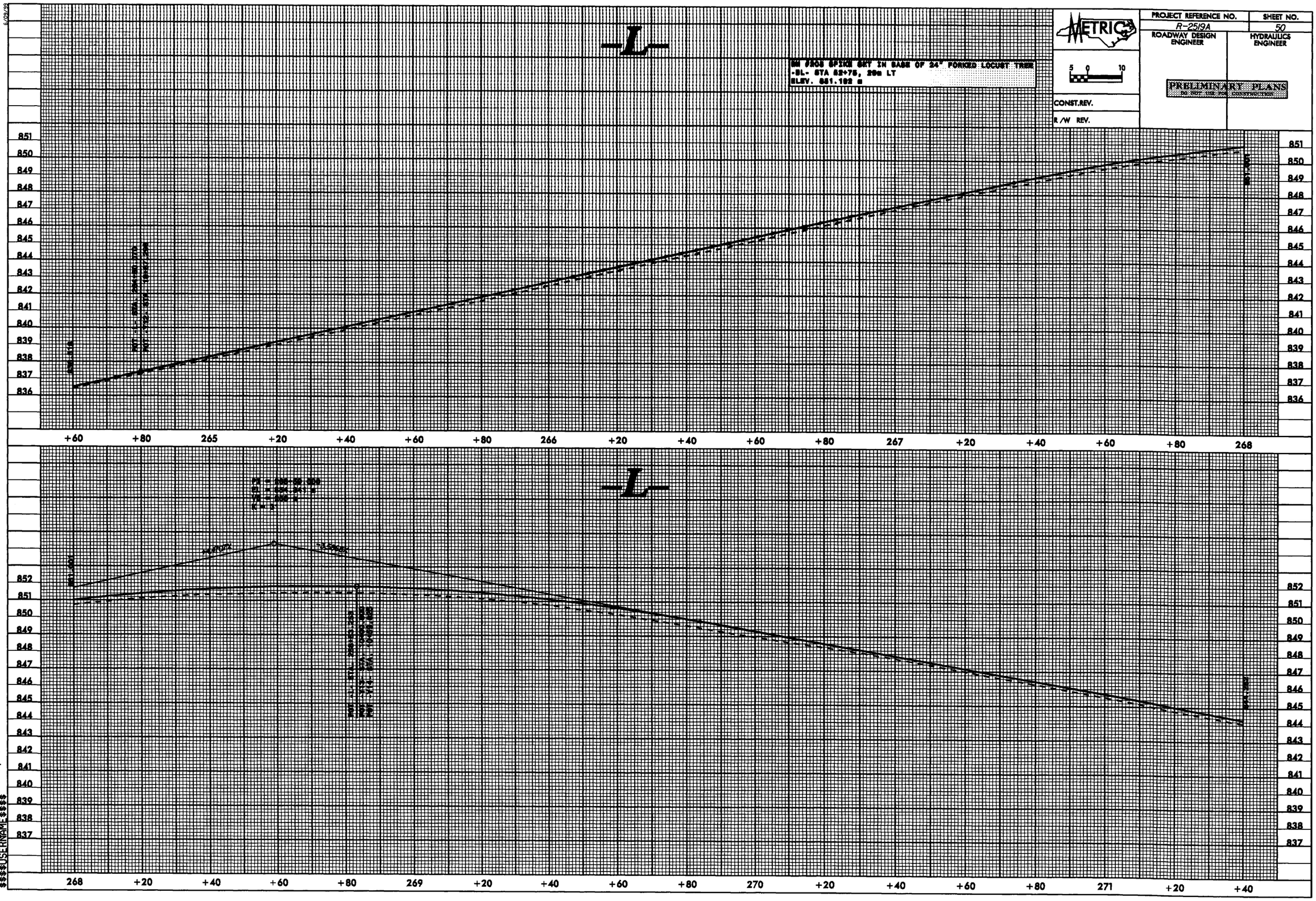
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:45
R:\Roadway\PEPLN\r2519a.pf1
$$$$$USERNAME$$$$$

6/09/99

5/09/09

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

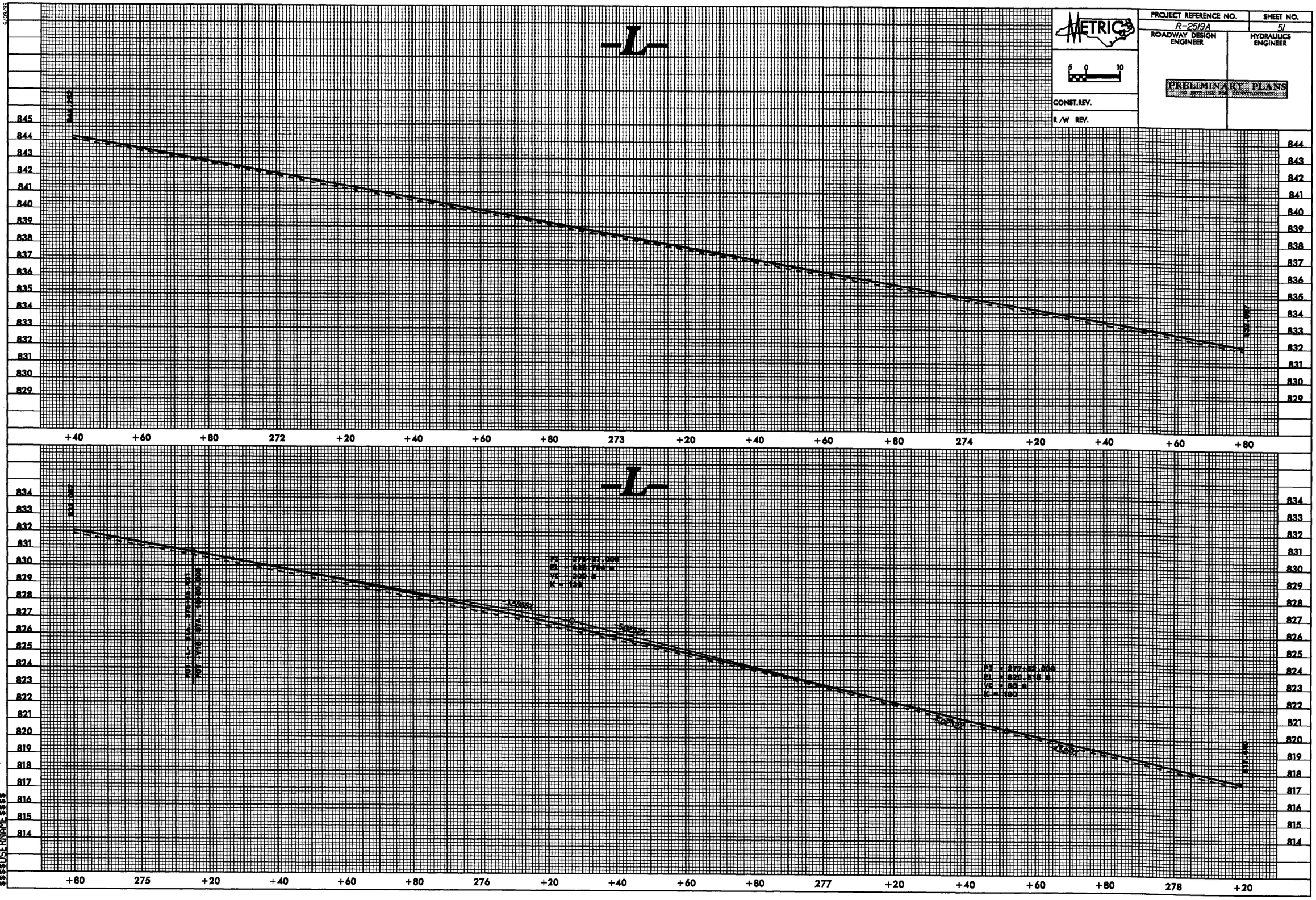
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:45
R:\Roadway\PER\r-2519a.pfl
$$$$USERNAME$$$$

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

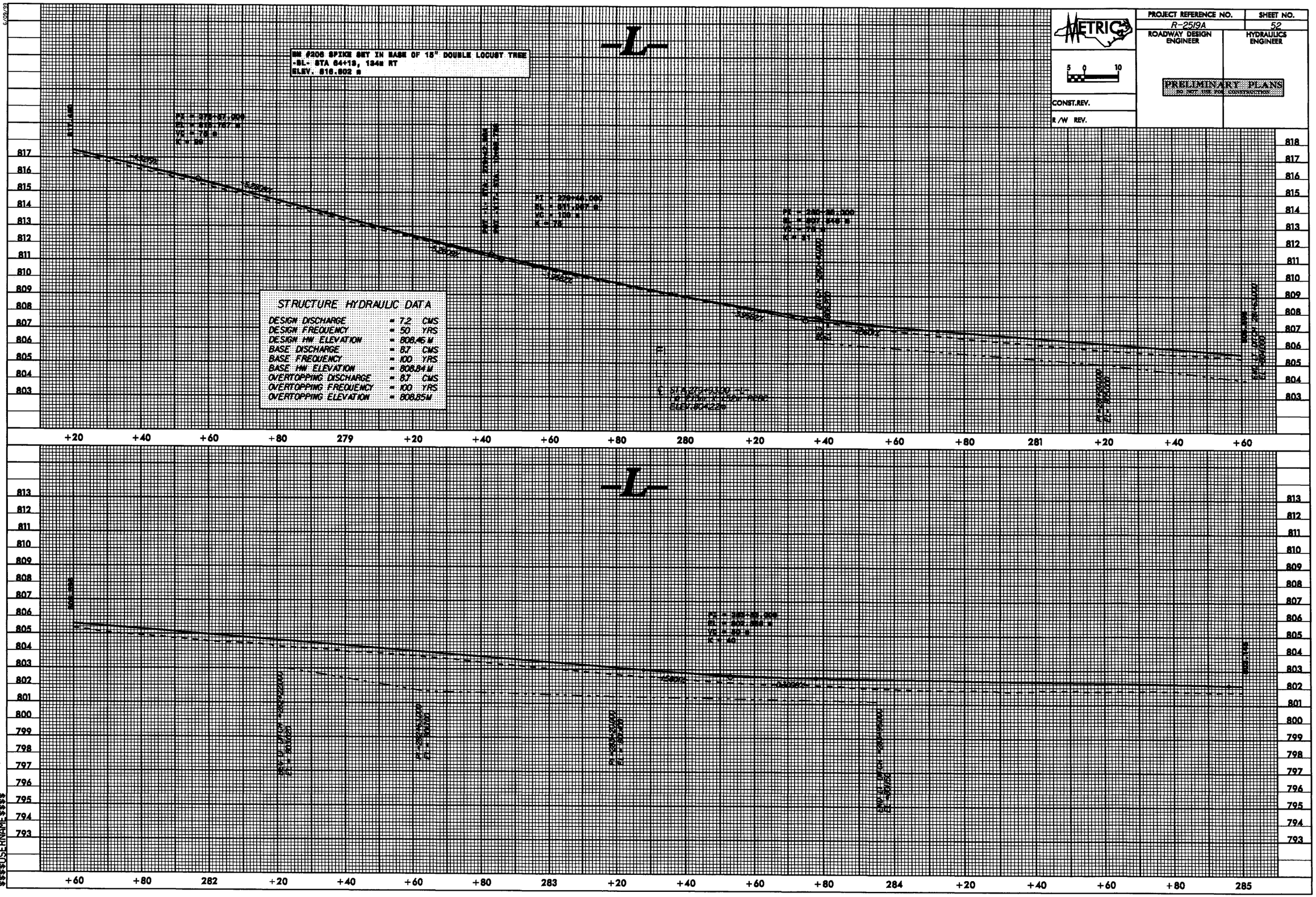
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 7.2	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 808.45	M
BASE DISCHARGE	= 8.7	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 808.84	M
OVERTOPPING DISCHARGE	= 8.7	CMS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 808.85	M

09-MAR-2009 07:45
R:\Roadway\PROJ\r-2519a_pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

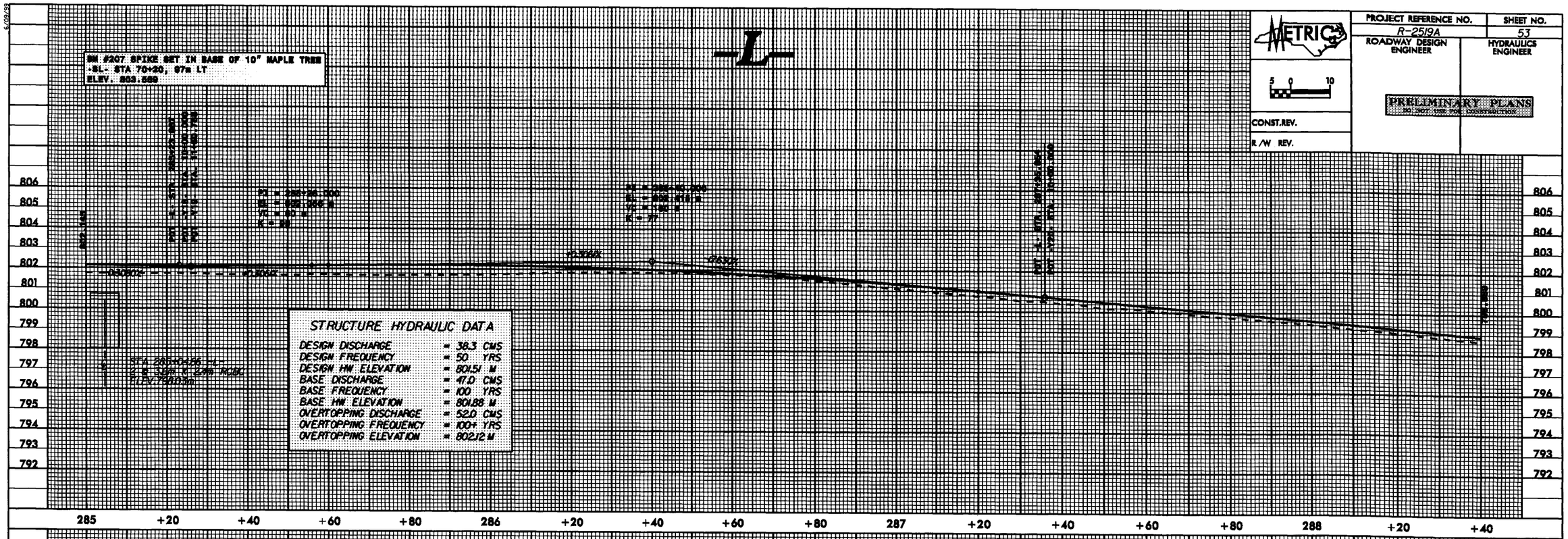
METRIC

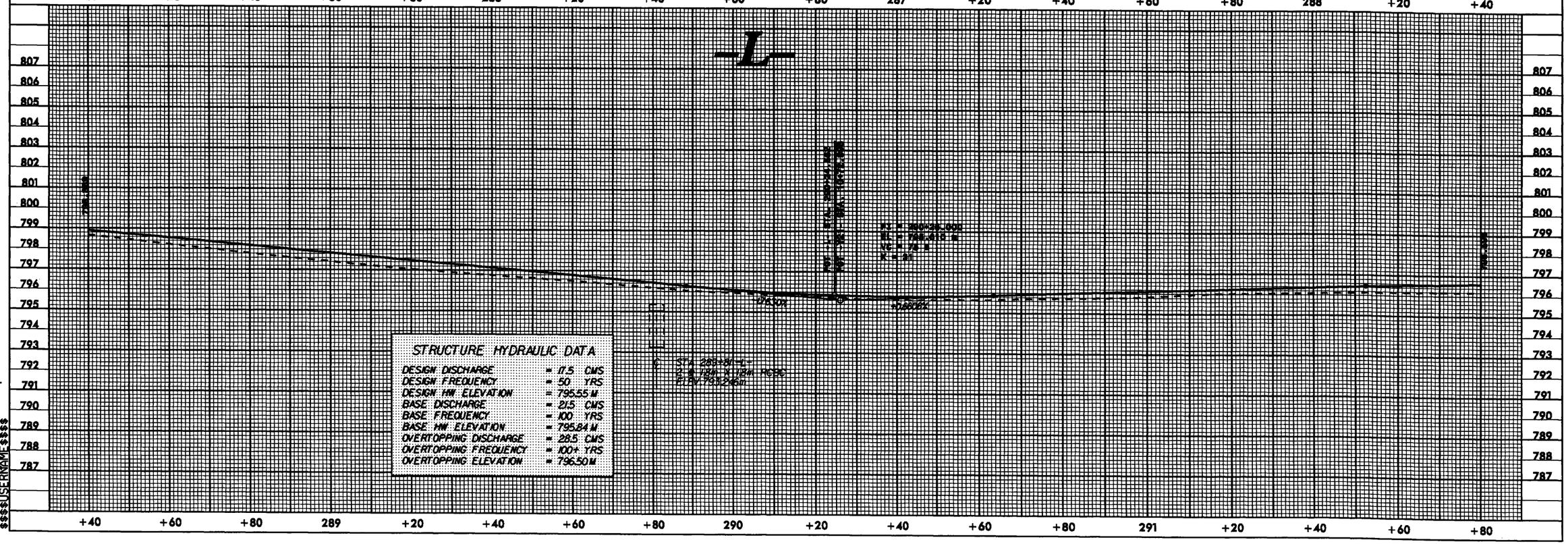
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.





6/09/93

09-MAR-2009 07:46
R:\Roadway\Proj\r2519a.pf1
$$$$USERNAME$$$$

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

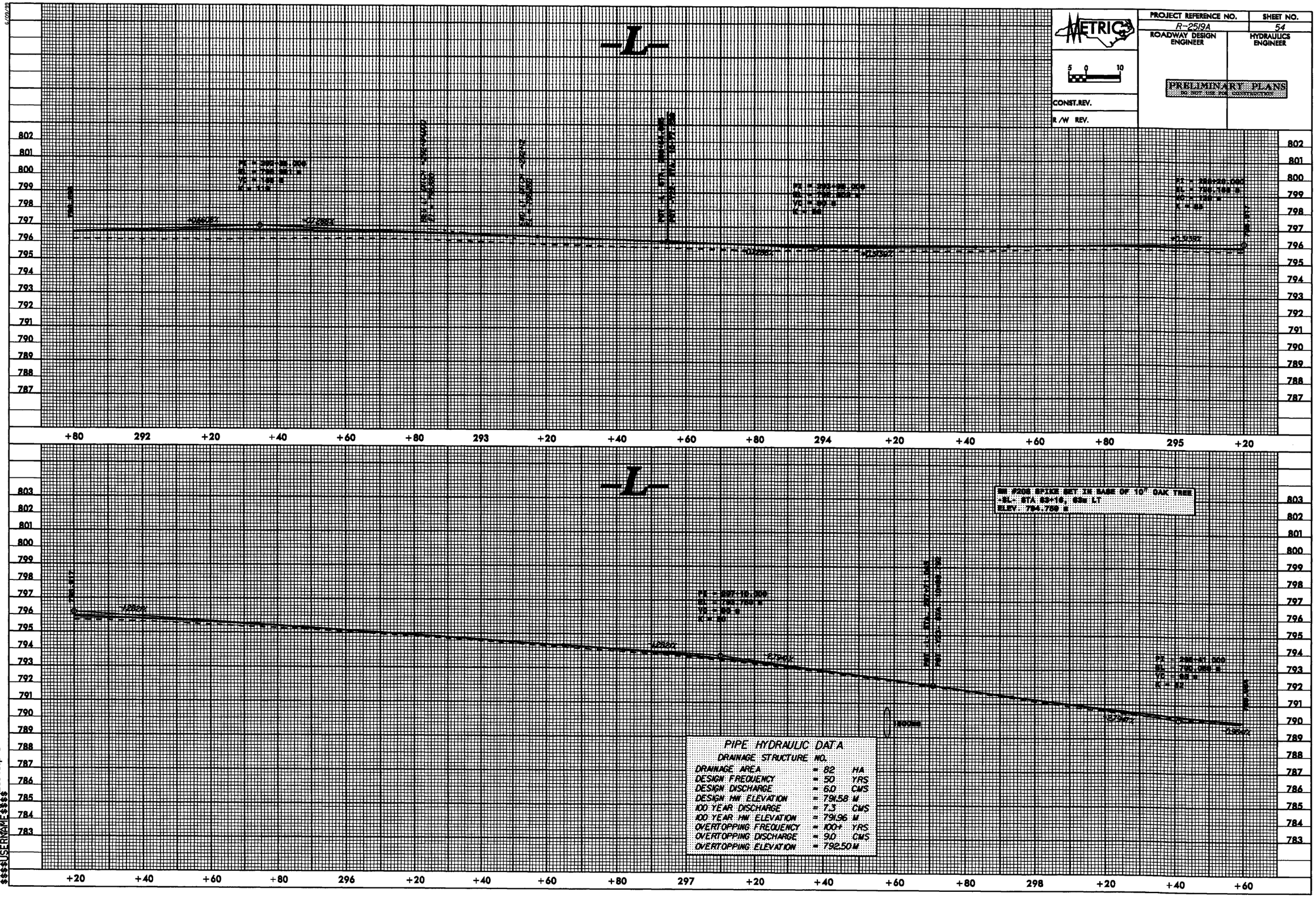
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\PROJ\R-2519a.pf1
$$$$USERNAME$$$$

6/09/98

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

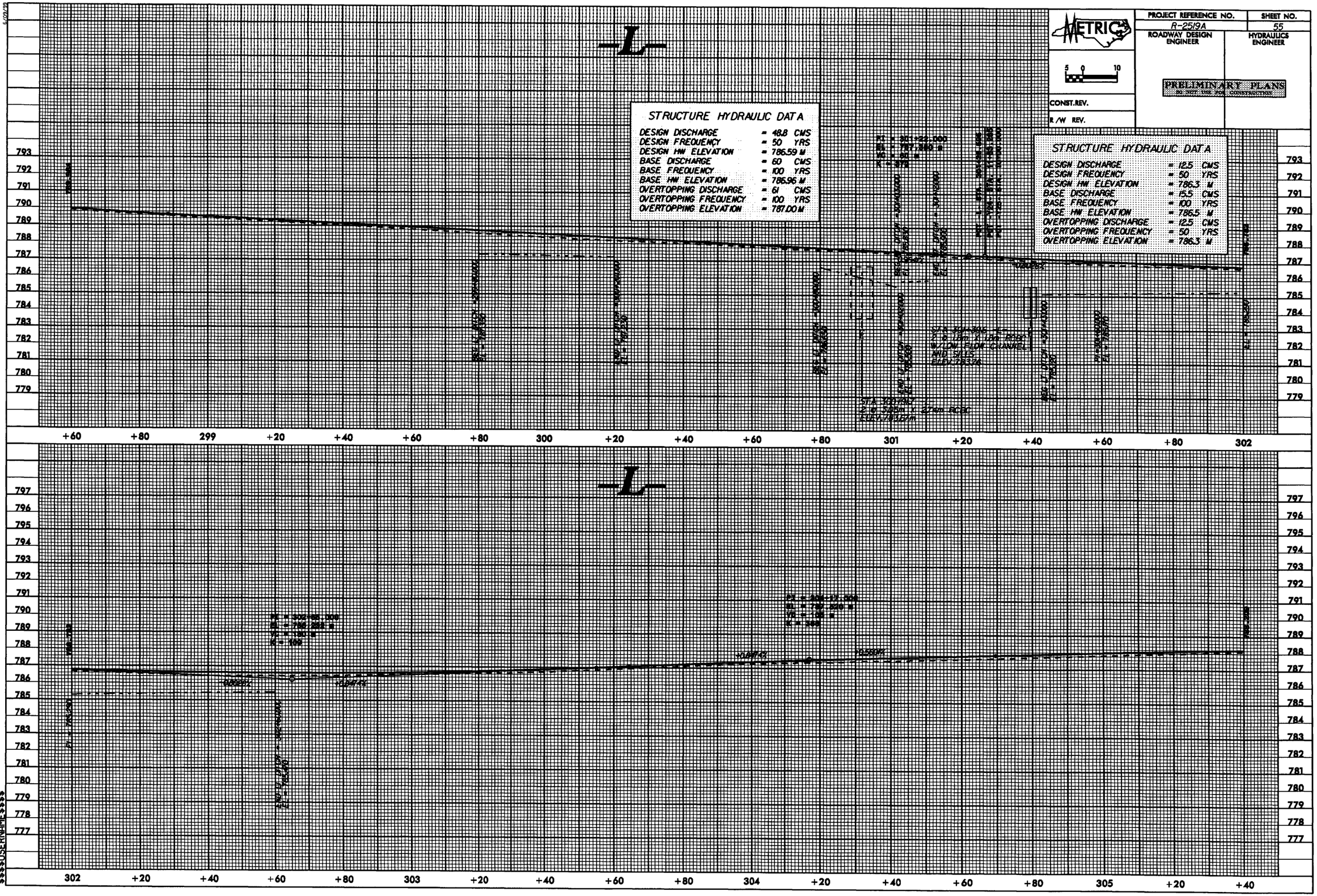
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\R2519a_pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

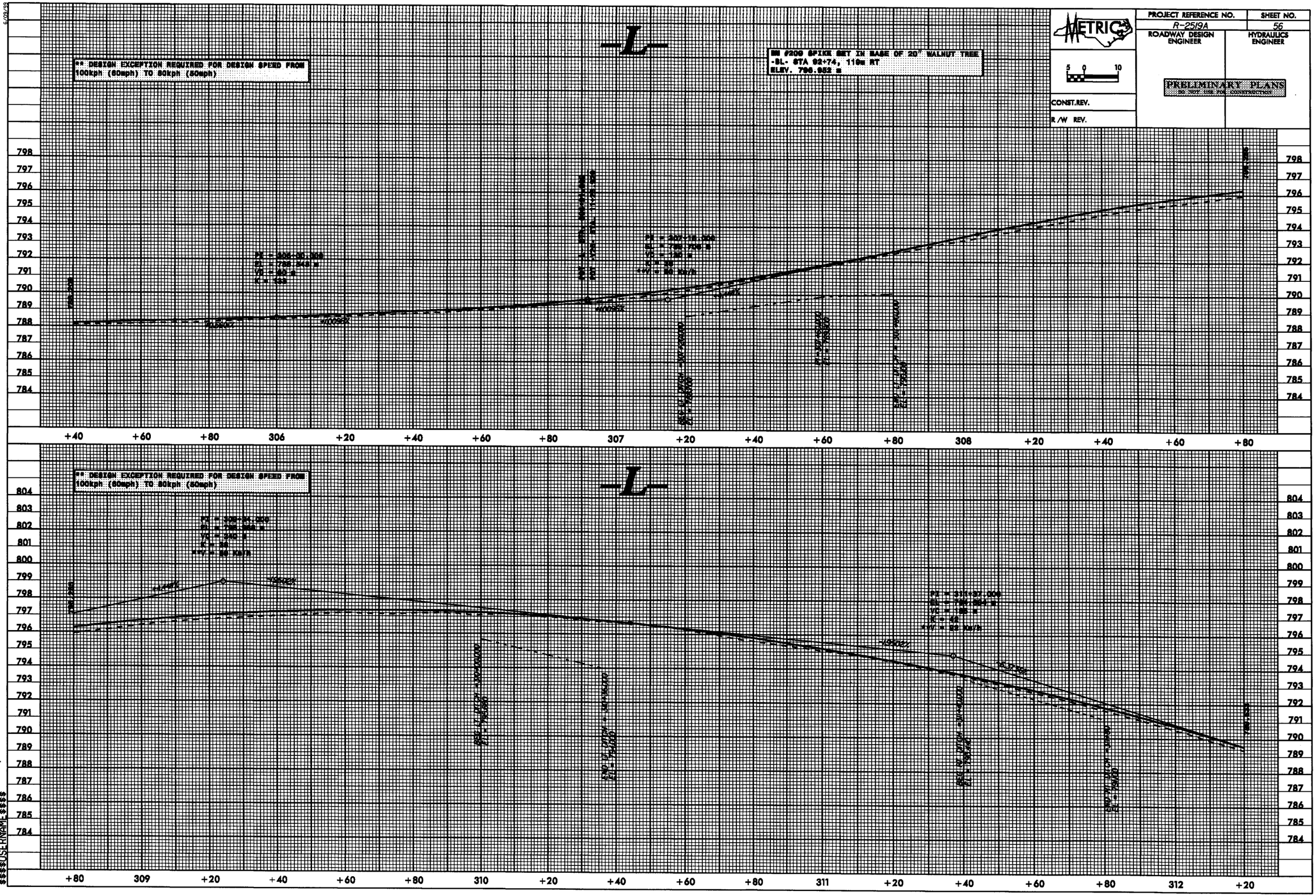
METRIC

5 0 10

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST.REV.

R/W REV.



03-MAR-2009 07:46
R:\Roadway\Proj\r2519a_pf1
$$$$USERNAME$$$$

5/09/98

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	57
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

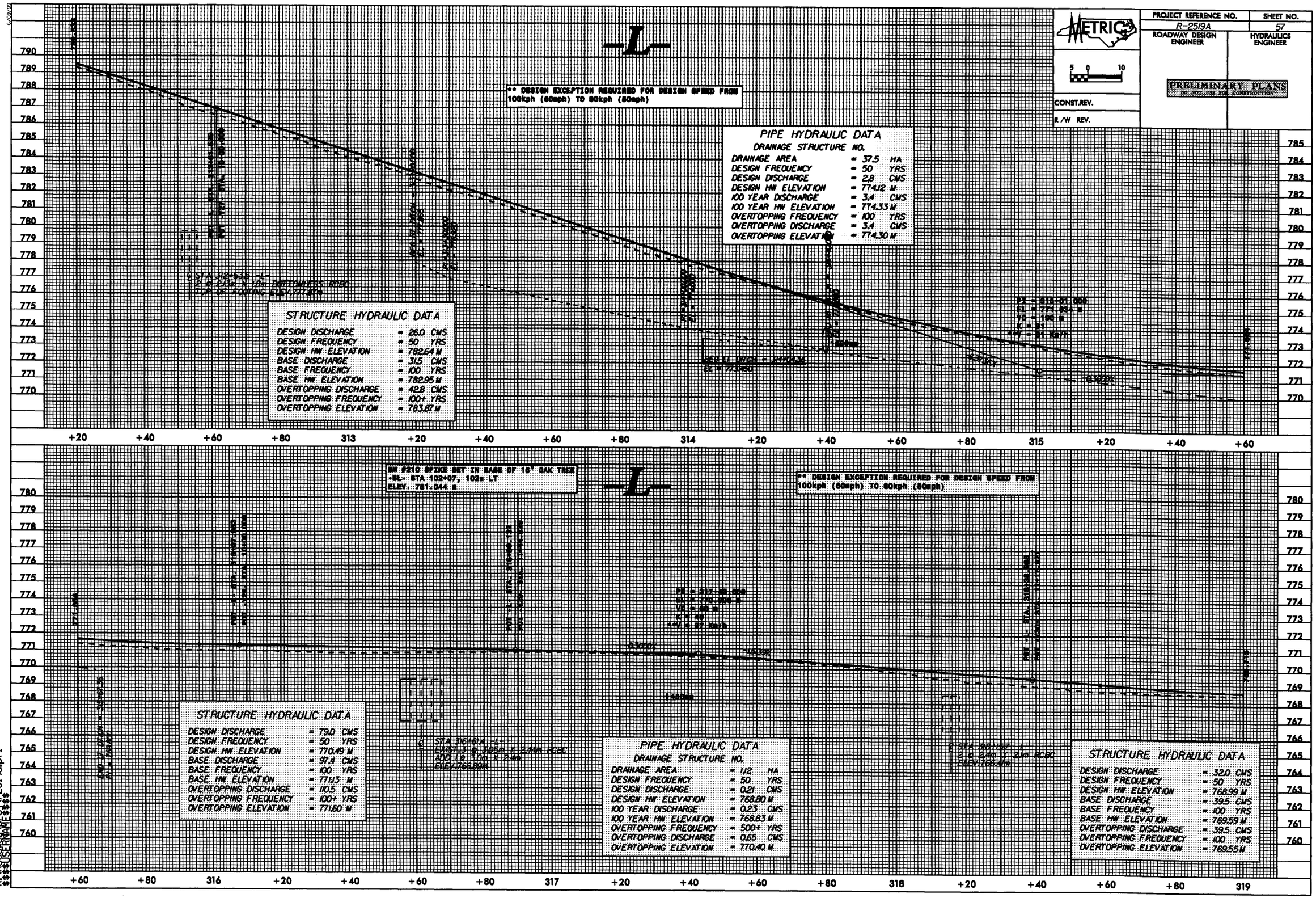
METRIC

5 0 10

CONST.REV.

R /W REV.

PRELIMINARY PLANS
NOT FOR CONSTRUCTION



09-MAR-2009 07:46
R:\Roadway\PROJ\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	58

METRIC

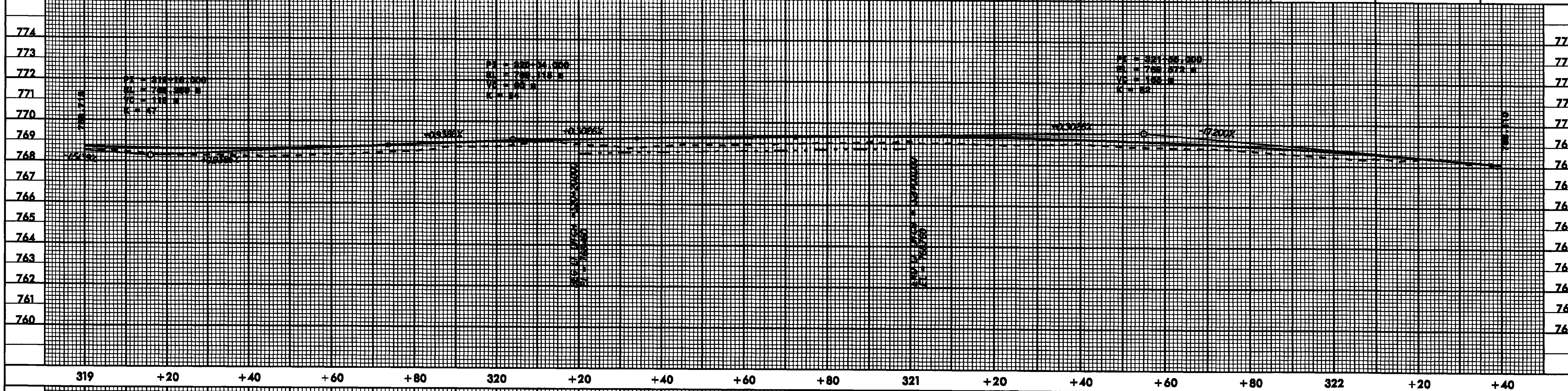
ROADWAY DESIGN ENGINEER

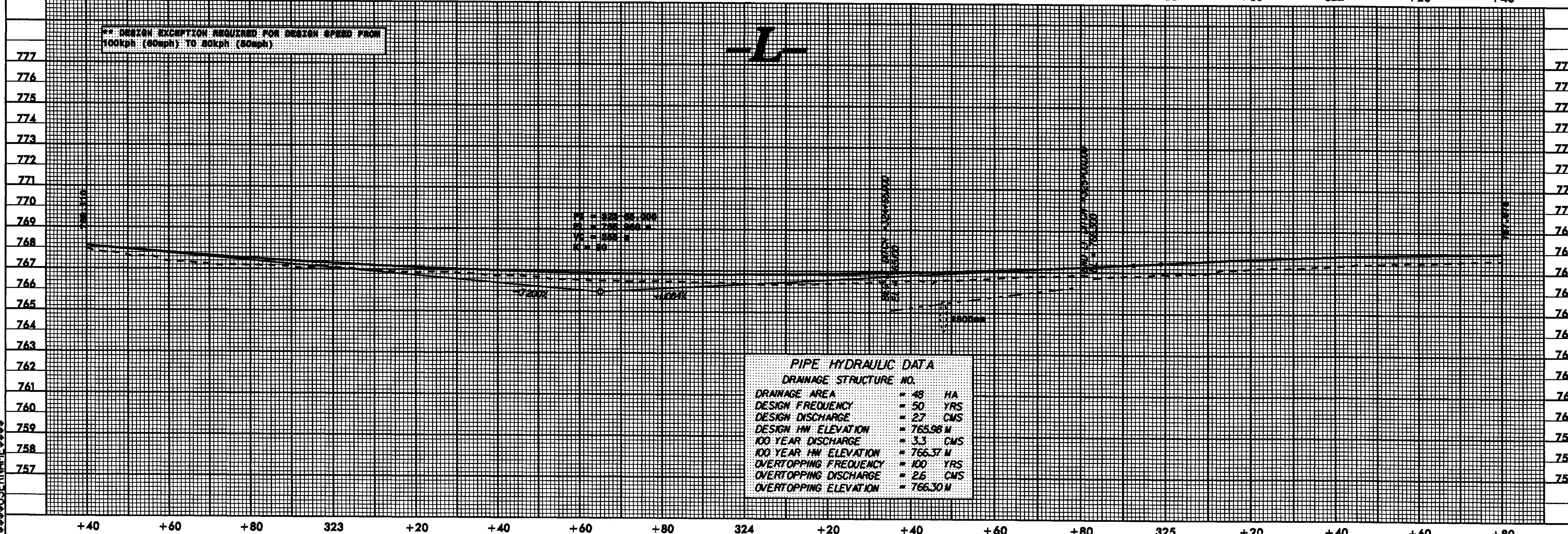
HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 48	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.7	CMS
DESIGN HW ELEVATION	= 765.98	M
100 YEAR DISCHARGE	= 3.3	CMS
100 YEAR HW ELEVATION	= 766.37	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 2.6	CMS
OVERTOPPING ELEVATION	= 766.30	M

09-MAR-2009 07:46
R:\Roadway\proj\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

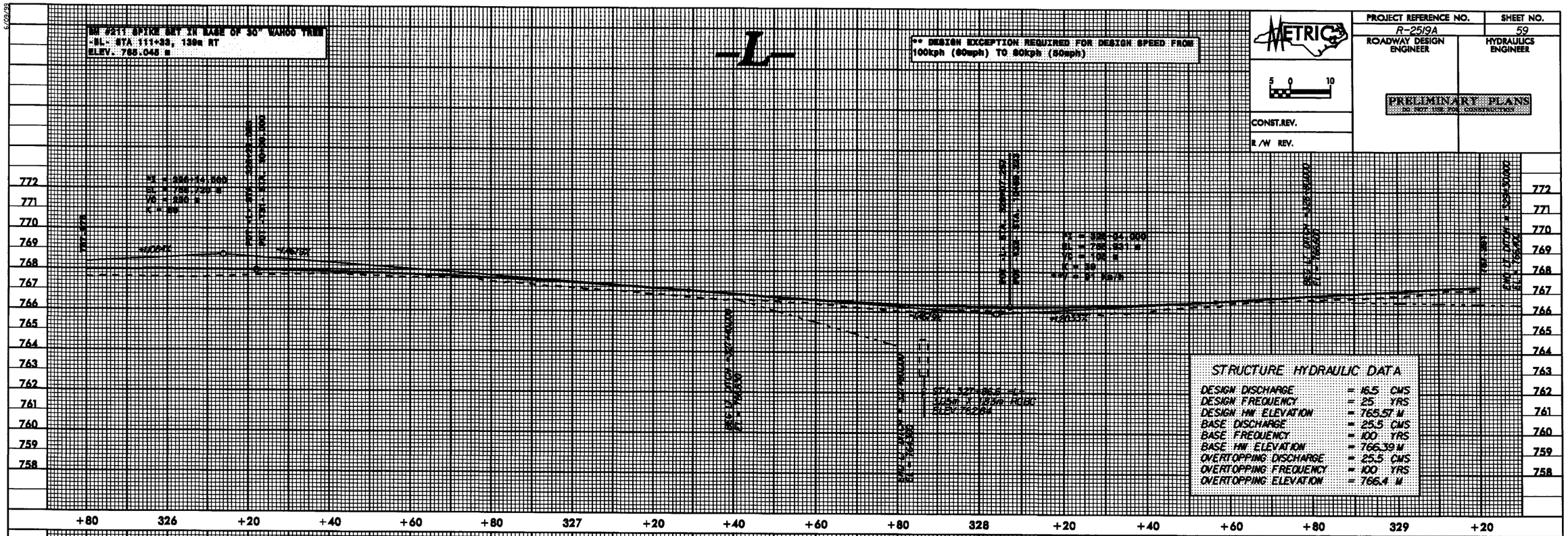
METRIC

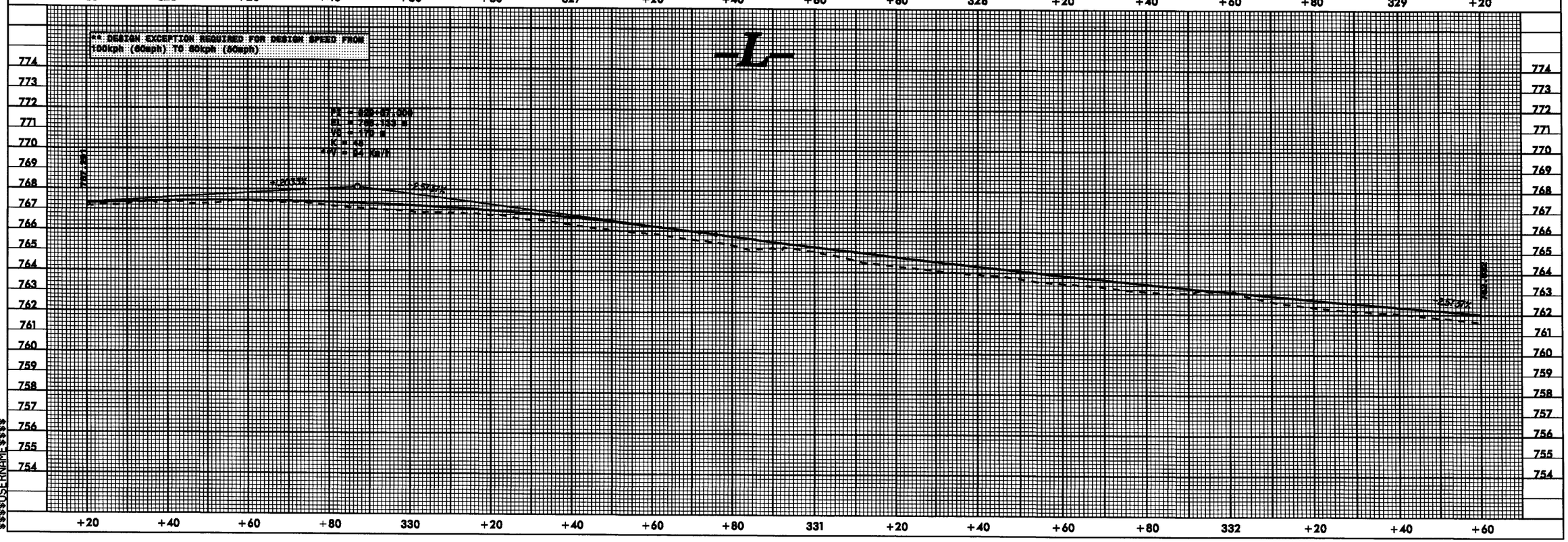
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.





03-MAR-2009 07:46
R:\Roadways\R2519a\R2519a_pfl
$$$$USERNAME$$$$

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

** DESIGN EXCEPTION REQUIRED FOR DESIGN SPEED FROM 100kph (60mph) TO 80kph (50mph)

-L-

BM #212 SPIKE SET IN 35" SYCAMORE TREE
-BL- STA.121.23, 132m RT
ELEV. 756.772 m

PVI = 333+61.000
EL = 751.087 m
VC = 270 m
K = 180

-0.5523%

-0.5523%

-0.5523%

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 17.7	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 17	CMS
DESIGN HW ELEVATION	= 758.32 M	
100 YEAR DISCHARGE	= 20	CMS
100 YEAR HW ELEVATION	= 759.42 M	
OVERTOPPING FREQUENCY	= 5004	YRS
OVERTOPPING DISCHARGE	= 3.3	CMS
OVERTOPPING ELEVATION	= 760.00 M	

-L-

PVI = 336+82.300
EL = 758.709 m
VC = 180 m
K = 240

-0.5603%

-0.0092%

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 16.6	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.5	CMS
DESIGN HW ELEVATION	= 756.70 M	
100 YEAR DISCHARGE	= 1.8	CMS
100 YEAR HW ELEVATION	= 756.83 M	
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 1.8	CMS
OVERTOPPING ELEVATION	= 756.78 M	

09-MAR-2009 07:46
R:\Roadway\PROJ\r2519a.pf1
$$$$USERNAME$$$$

6/03/98

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

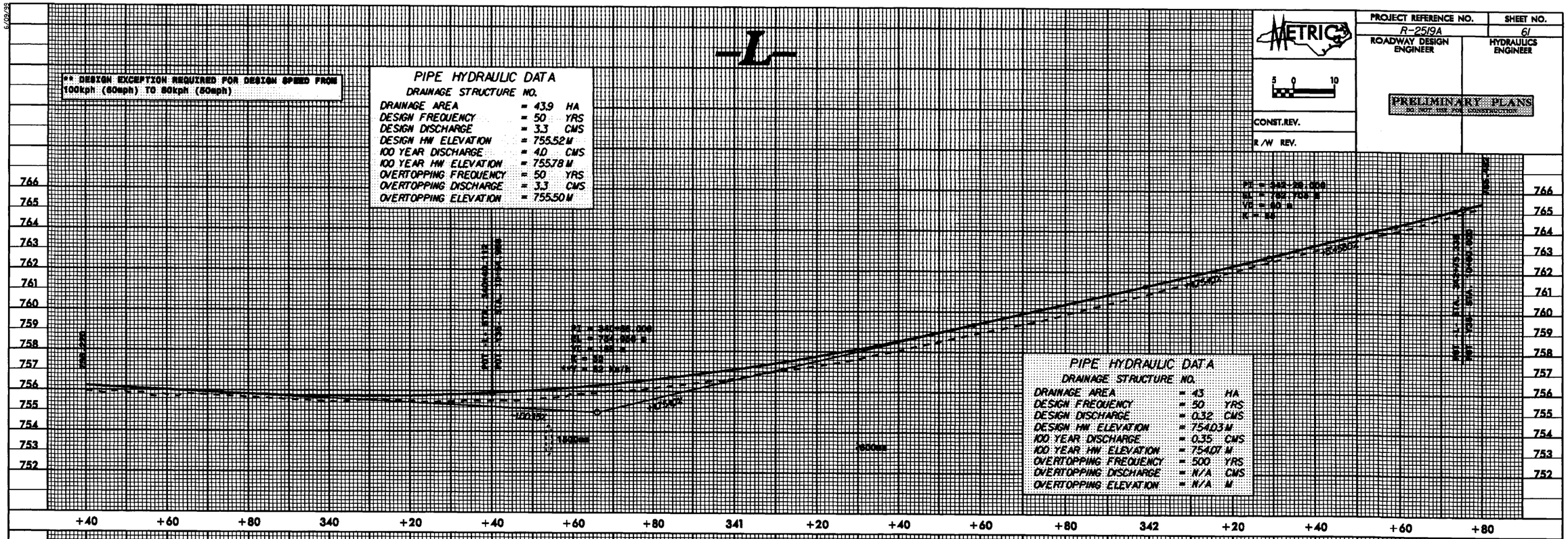
METRIC

5 0 10

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\PR8\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

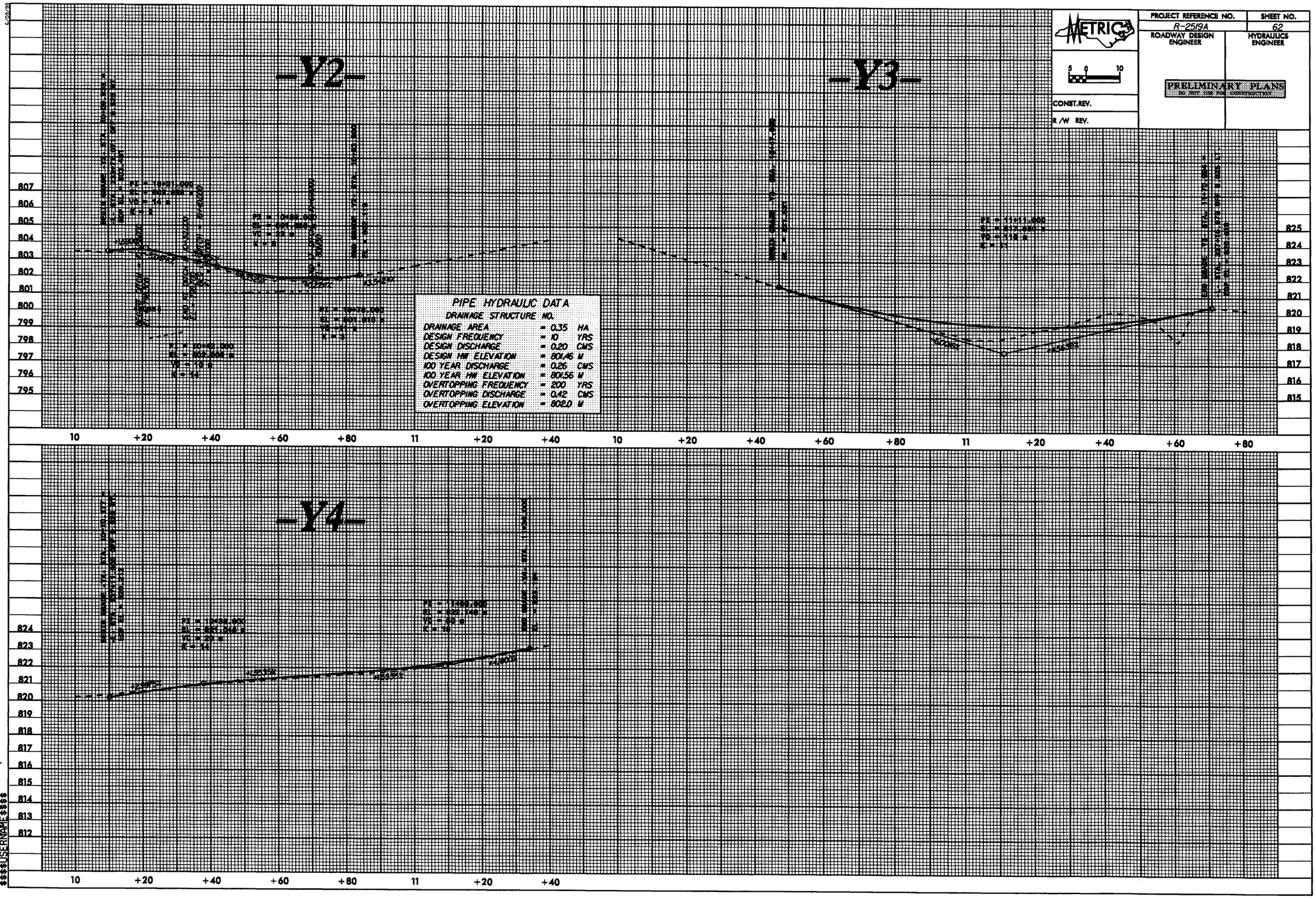
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



5/09/99

09-MAR-2009 07:46
R:\Roadway\Proj\r2519a_pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

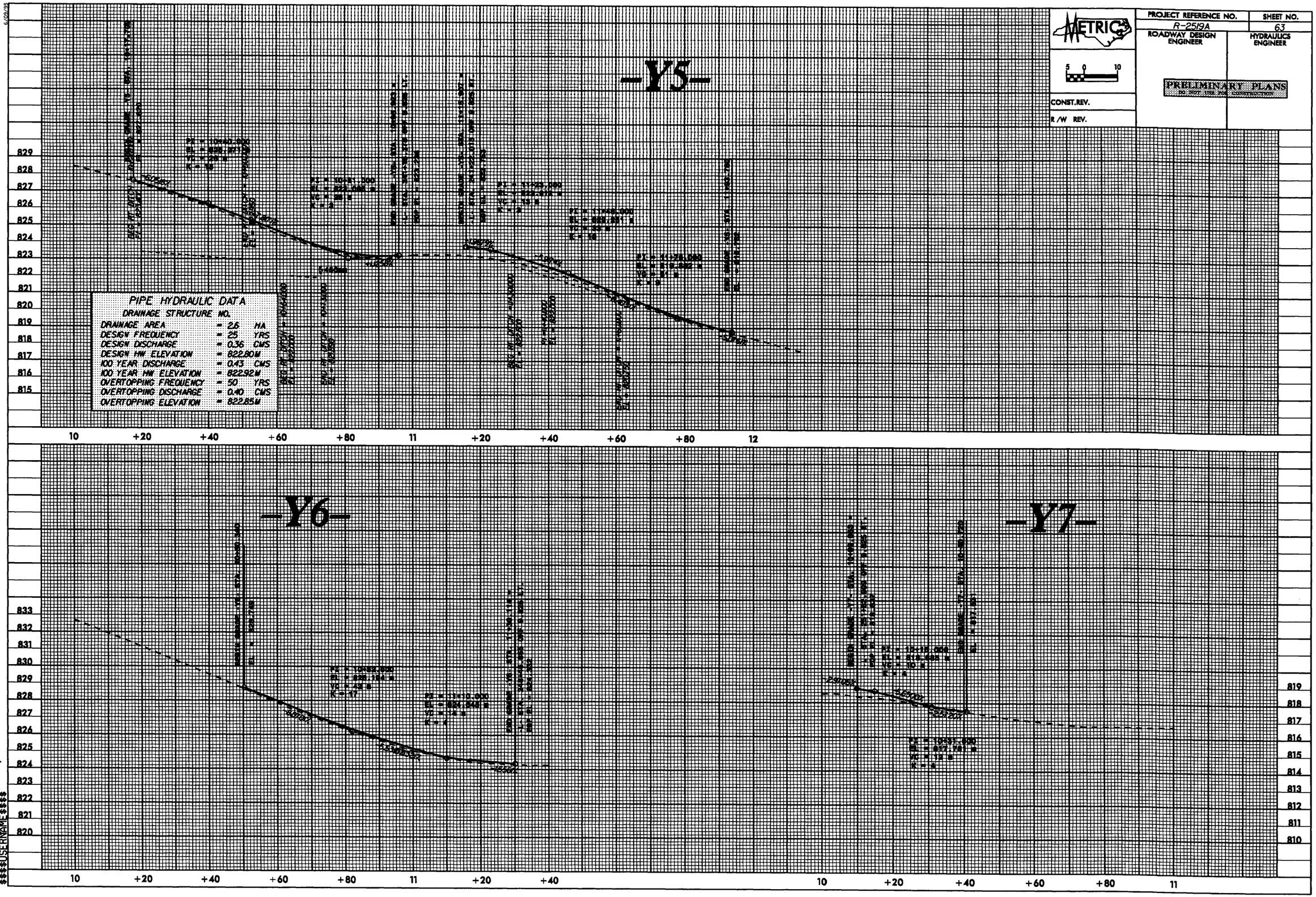
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\Proj\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

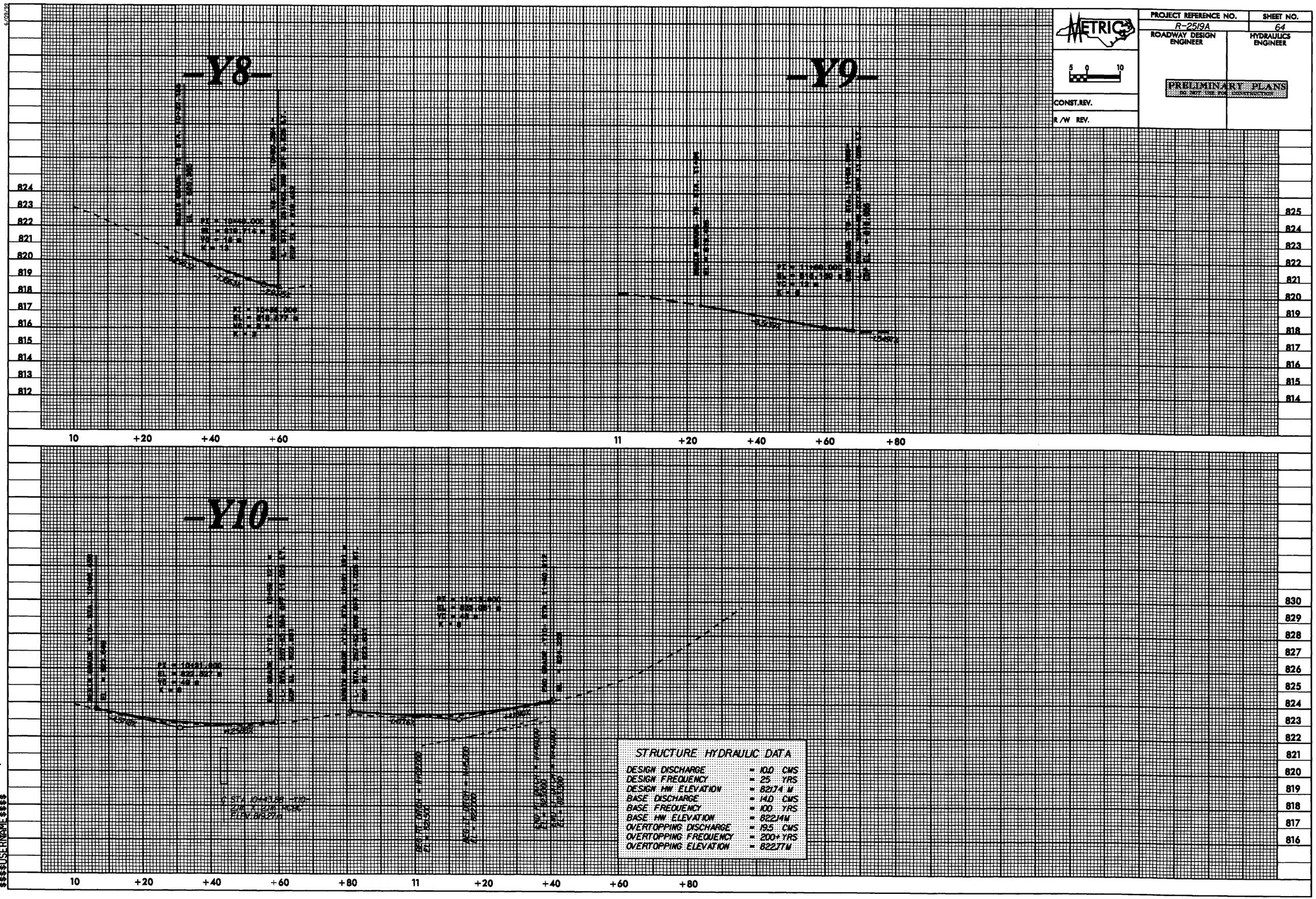
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\PRJ\r2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	65
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

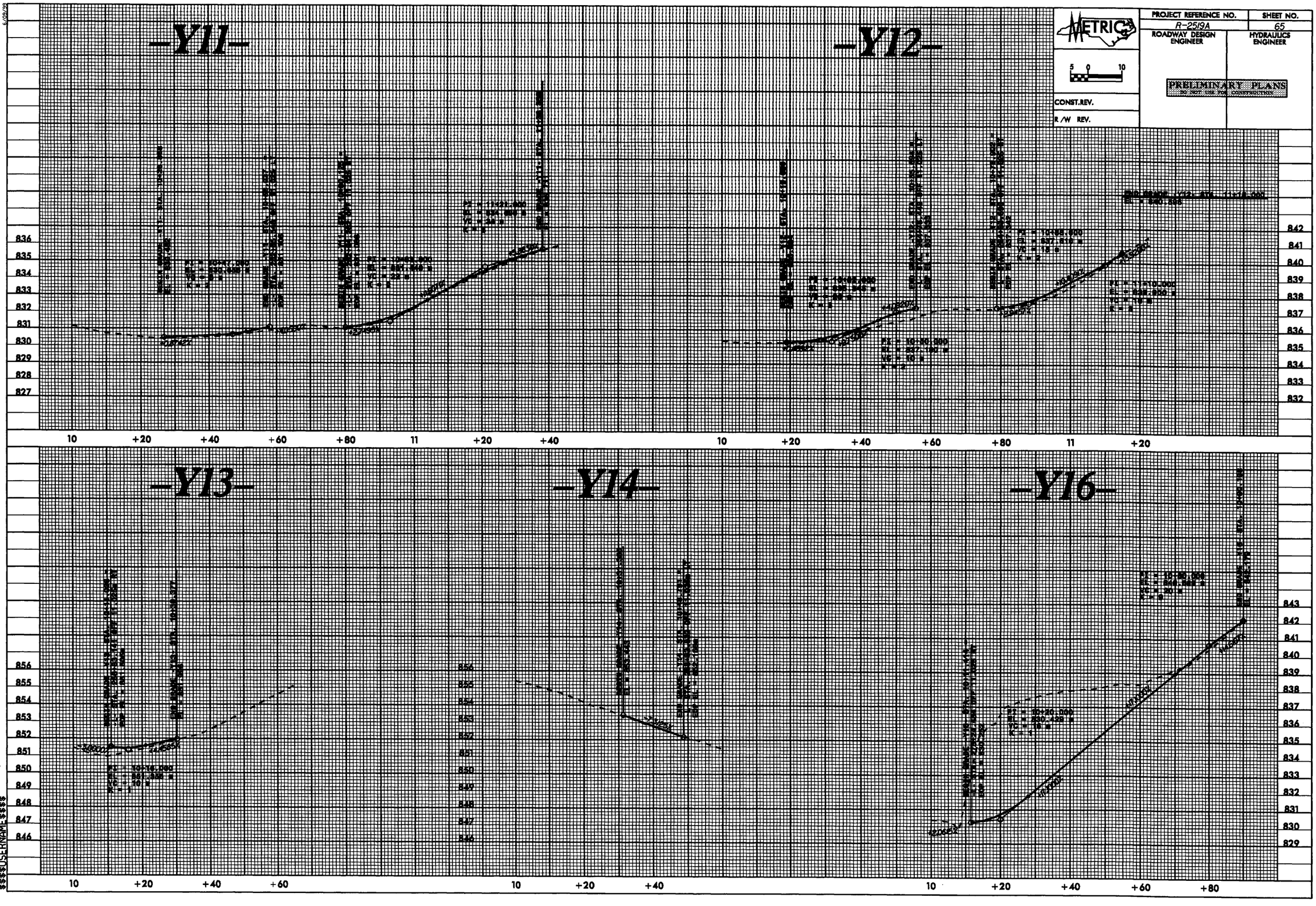
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



03-MAR-2009 07:46
R:\Roadway\Proj\r2519a_pf1
$$$$USERNAME$$$$

6/09/98

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

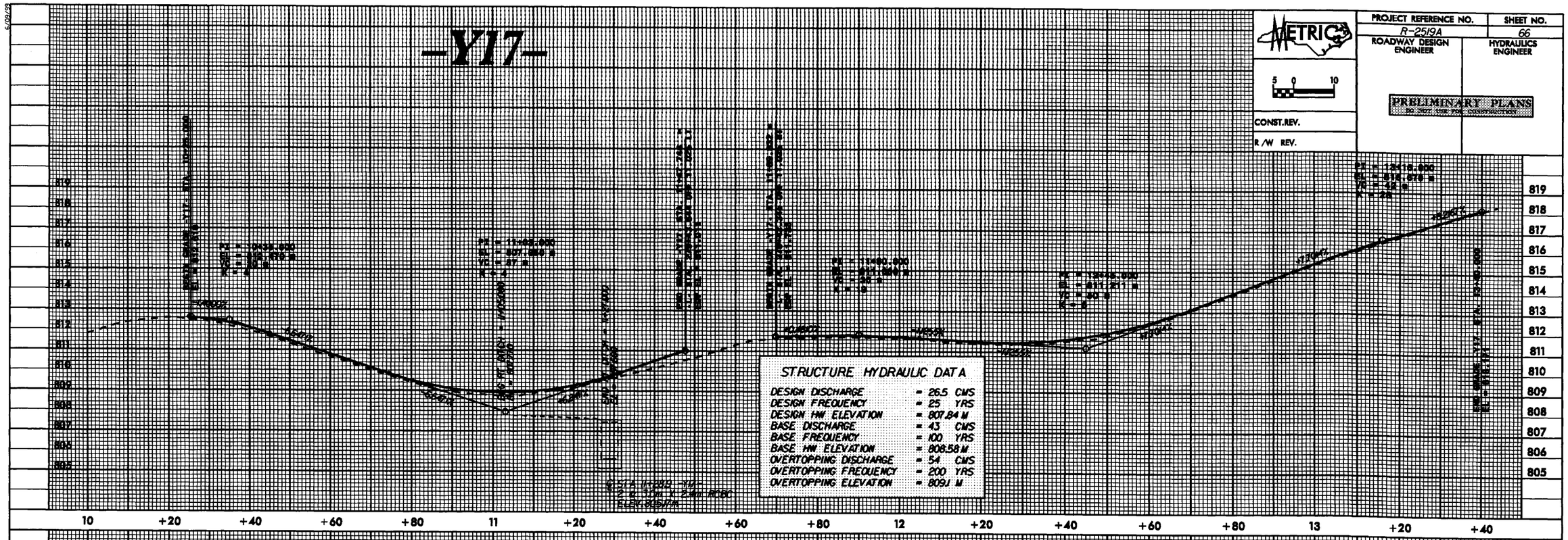
METRIC

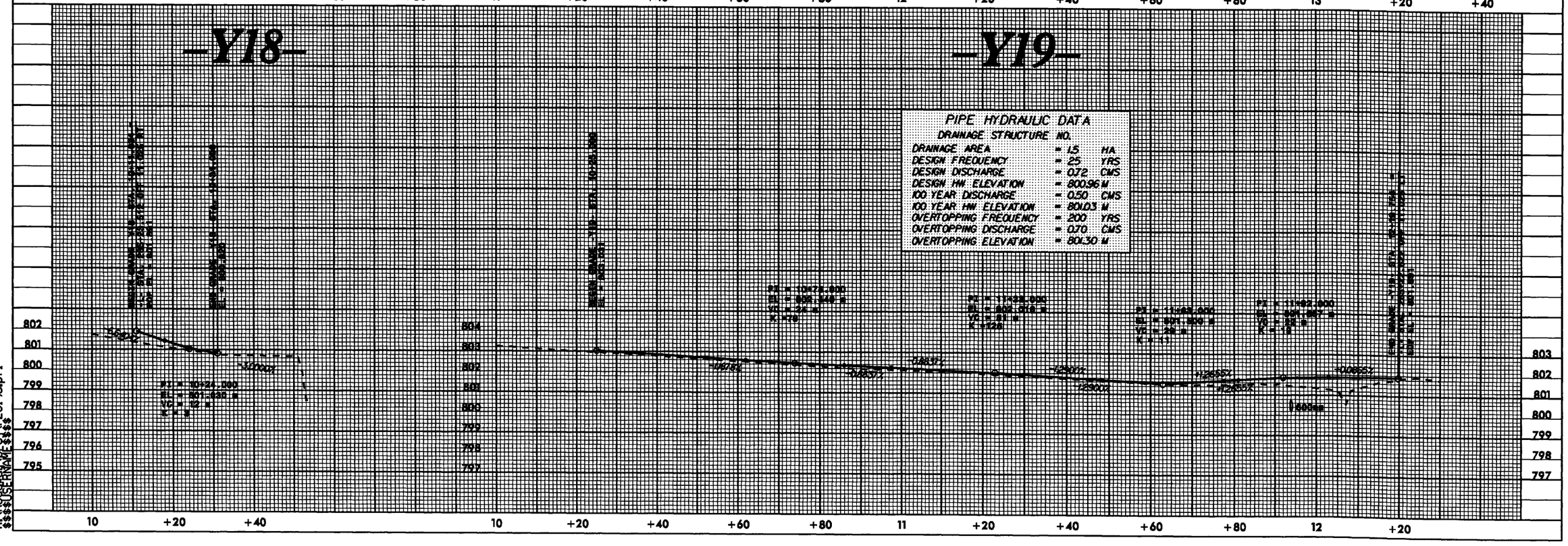
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.





09-MAR-2009 07:46
R:\Roadway\PER\R-2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

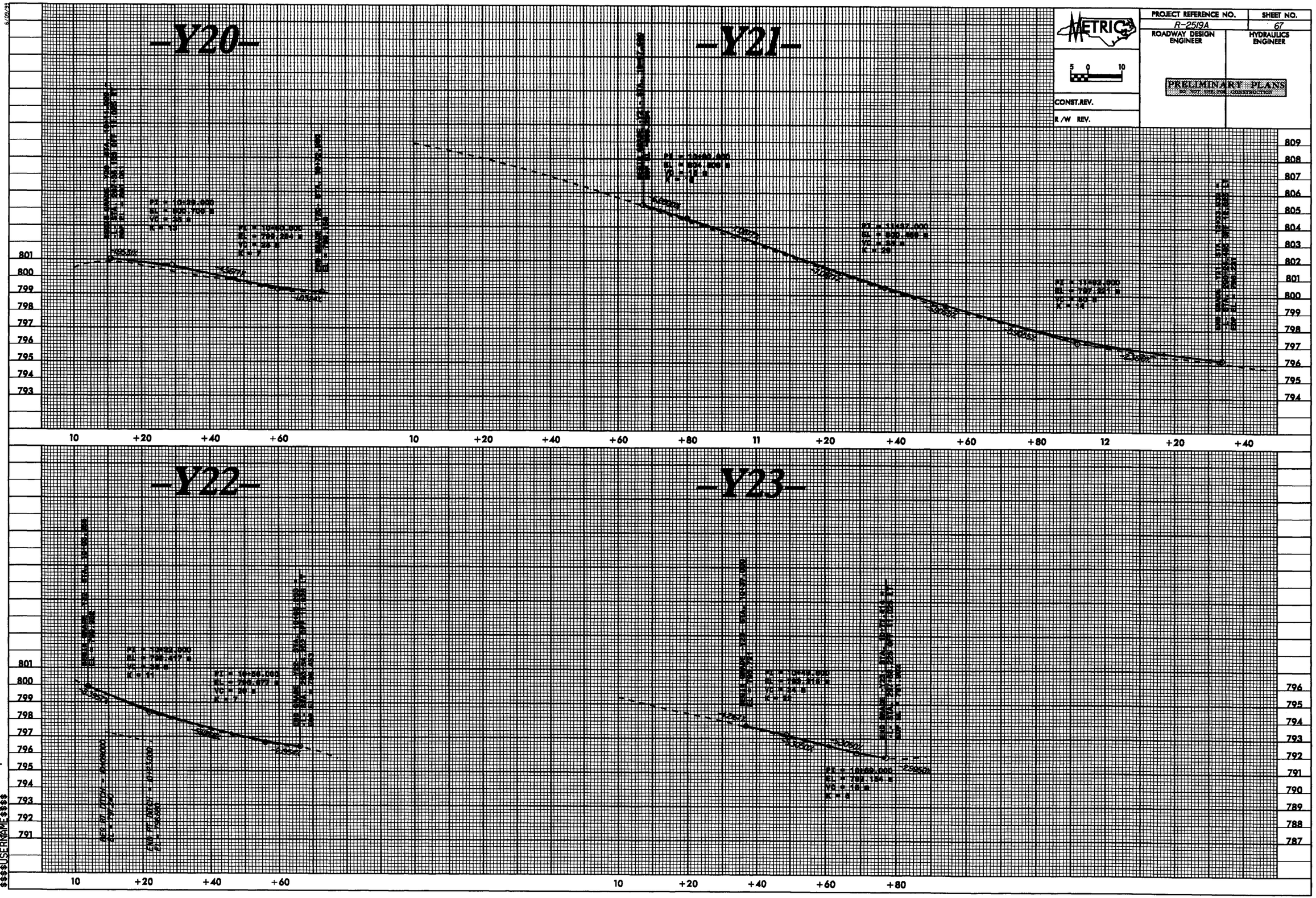
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.



6/09/99

09-MAR-2009 07:46
R:\Roadway\
$$$$USERNAME$$$$

r2519a-pf1

PROJECT REFERENCE NO. R-2519A | SHEET NO. 68

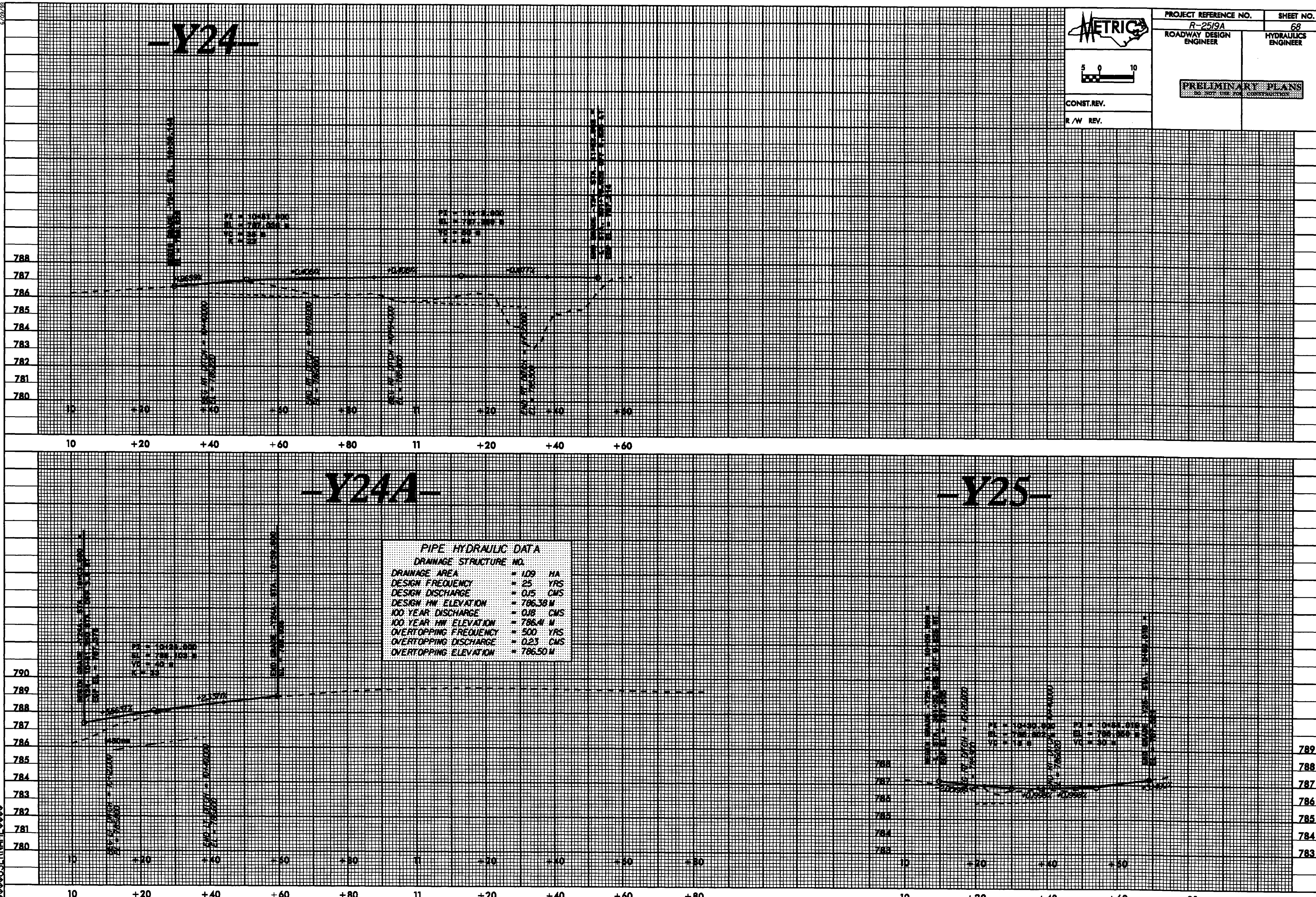
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

METRIC

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

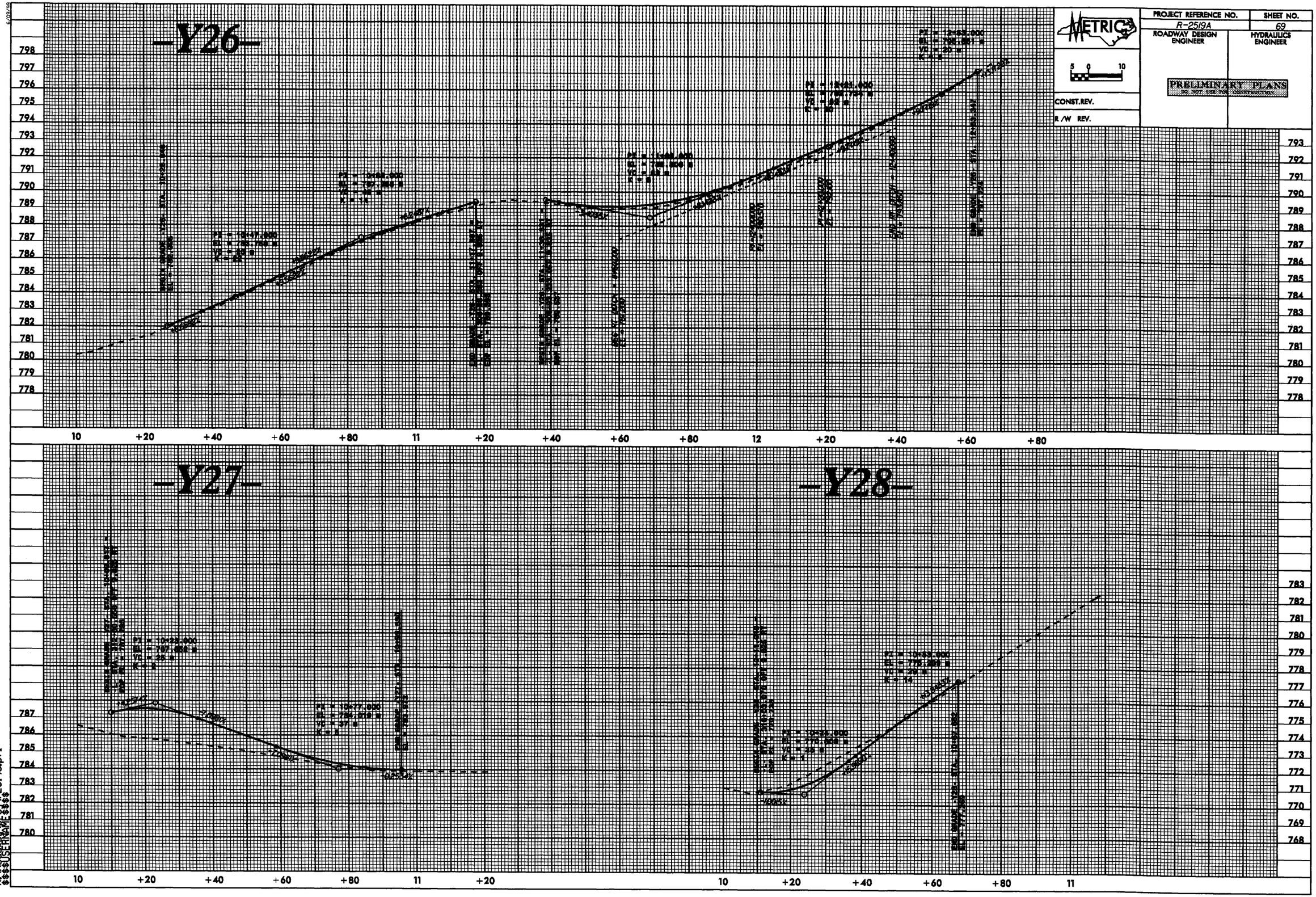


PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 1.09	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.15	CMS
DESIGN HW ELEVATION	= 786.38	M
100 YEAR DISCHARGE	= 0.18	CMS
100 YEAR HW ELEVATION	= 786.41	M
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 0.23	CMS
OVERTOPPING ELEVATION	= 786.50	M

09-MAR-2009 07:46
R:\Roadway\proj\r2519a.pf1
$$$$USERNAME$$$$



6/09/98

09-MAR-2009 07:46
R:\Roadway\PROJ\R-2519a.pfl
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	70
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

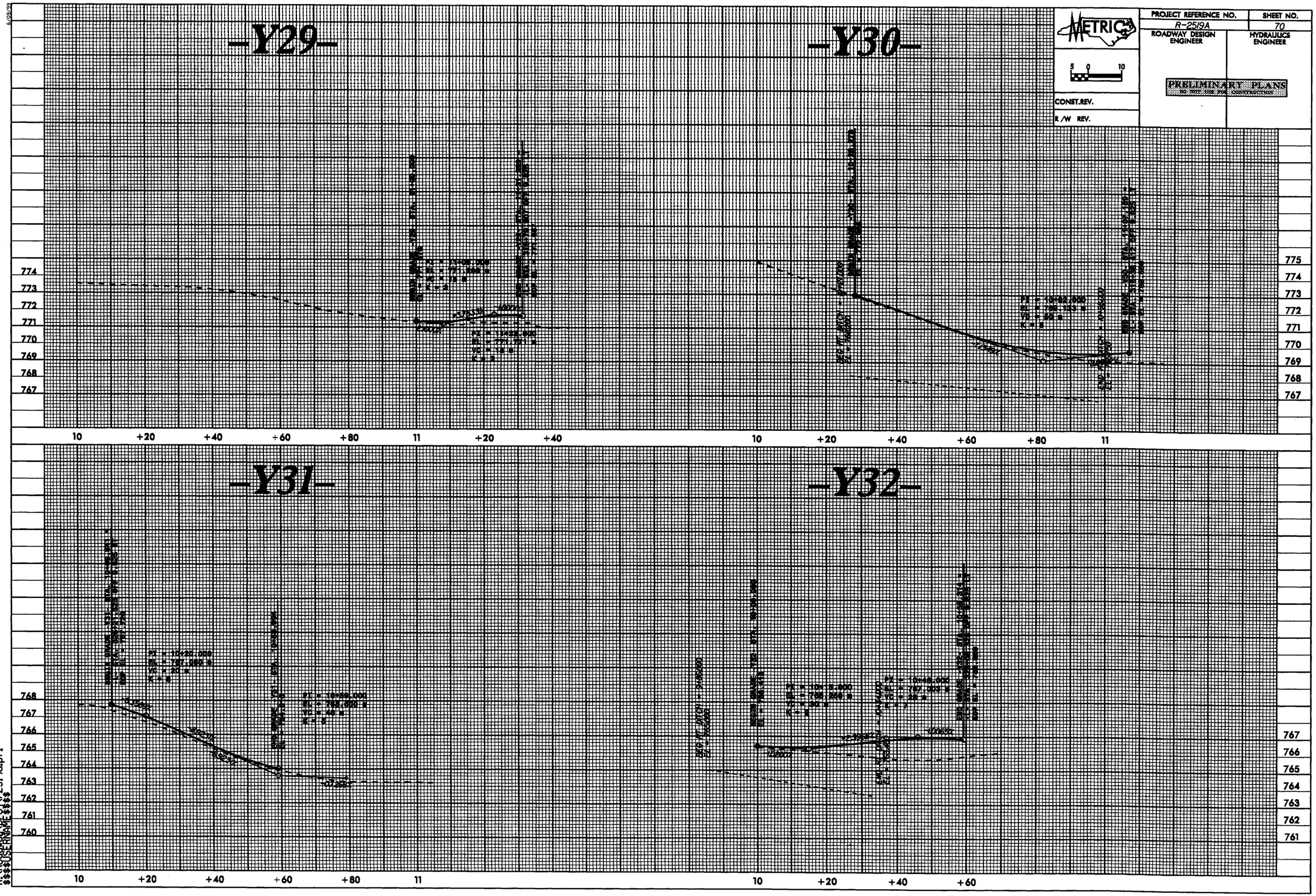
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R /W REV.



09-MAR-2009 07:46
R:\Roadway\PER\r-2519a.pfl
$$$$USERNAME$$$$

5/09/99

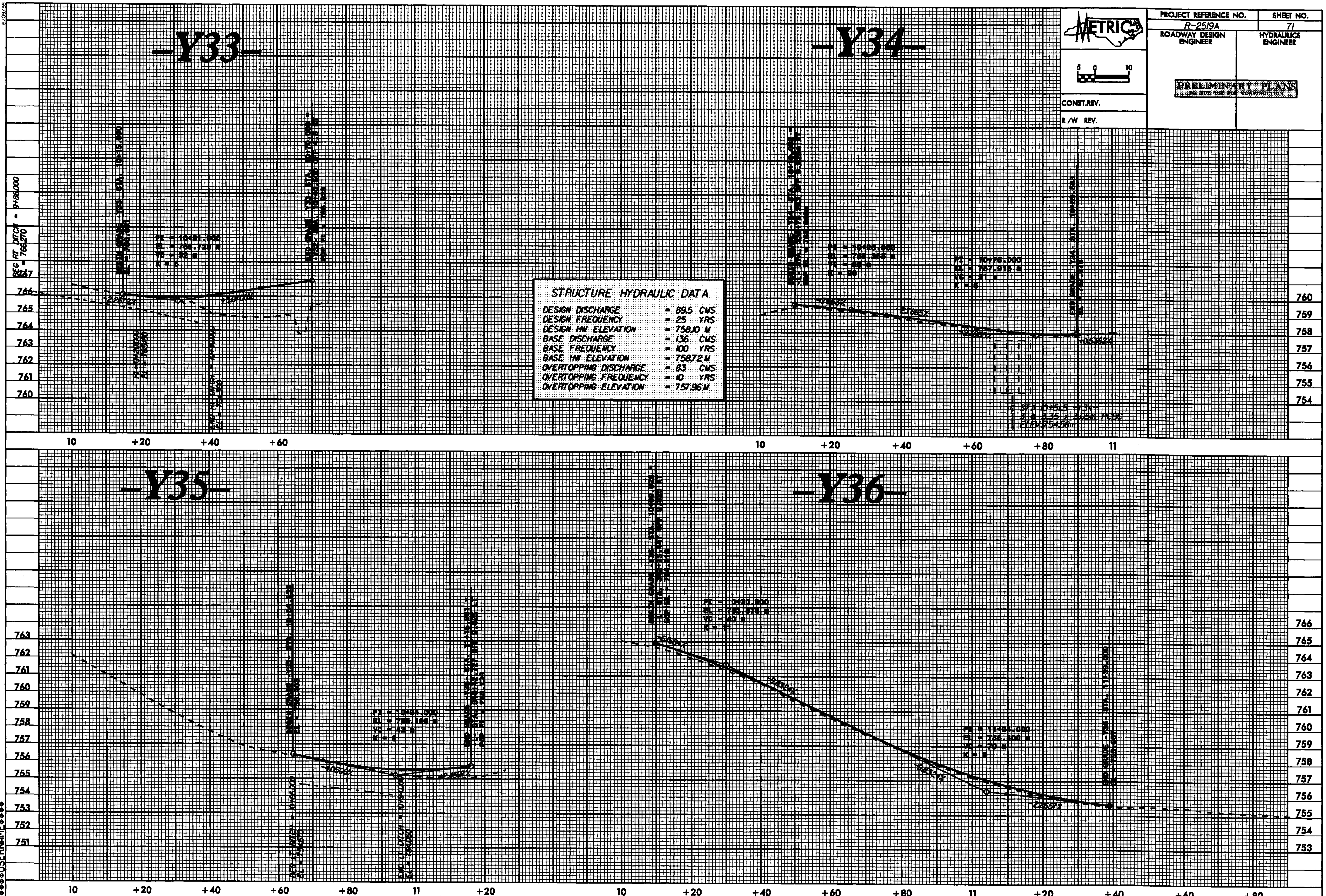
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	71
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

CONST.REV.

R /W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 89.5	CMS
DESIGN FREQUENCY	= 25	YRS
DESIGN HW ELEVATION	= 758.10	M
BASE DISCHARGE	= 136	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 758.72	M
OVERTOPPING DISCHARGE	= 83	CMS
OVERTOPPING FREQUENCY	= 10	YRS
OVERTOPPING ELEVATION	= 757.96	M

09-MAR-2009 07:46
R:\Roadway\proj\r2519a.pf1
$$$$USERNAME$$$$

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	72
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

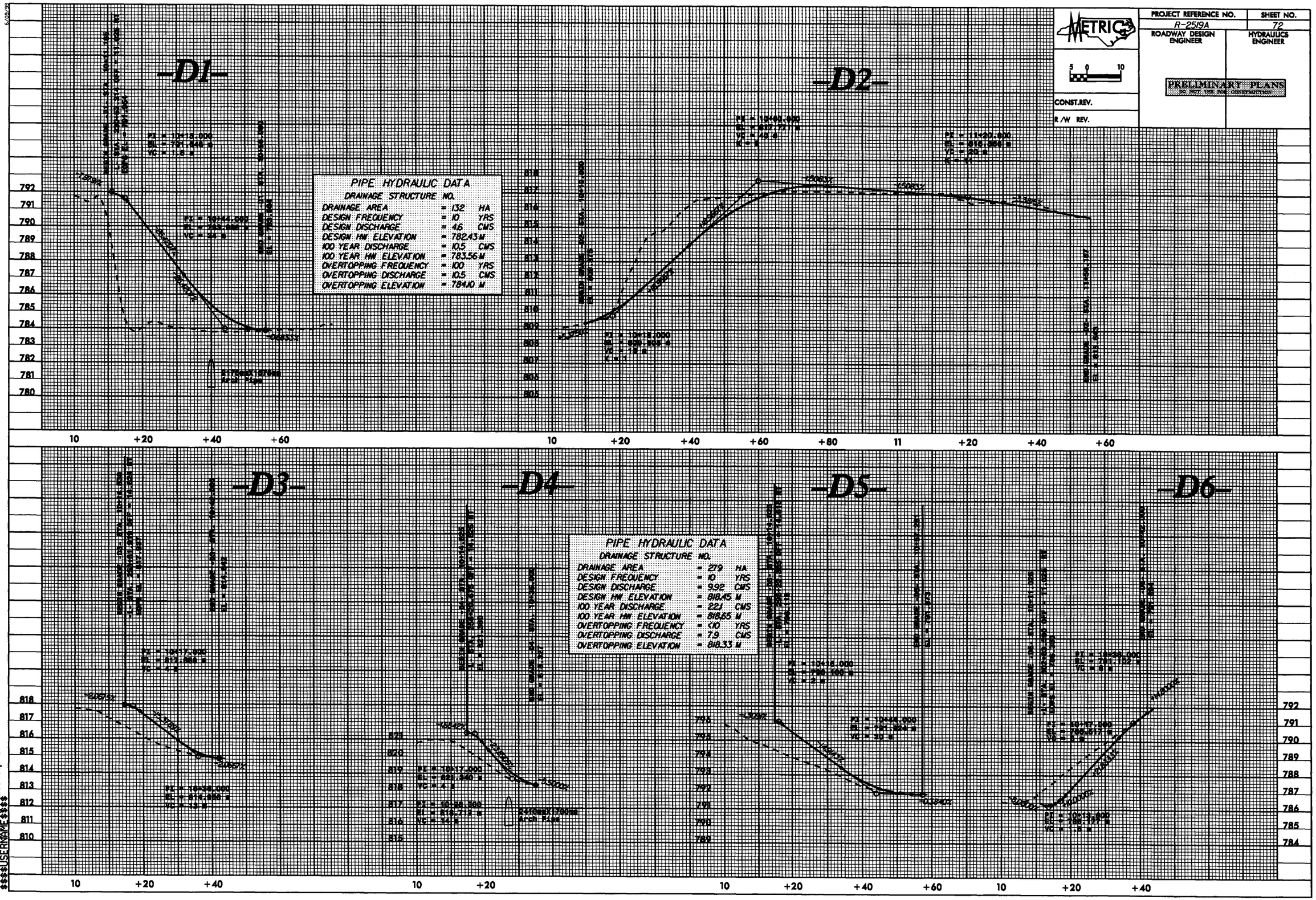
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
R:\Roadway\R-2519a.pf1
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	73

METRIC

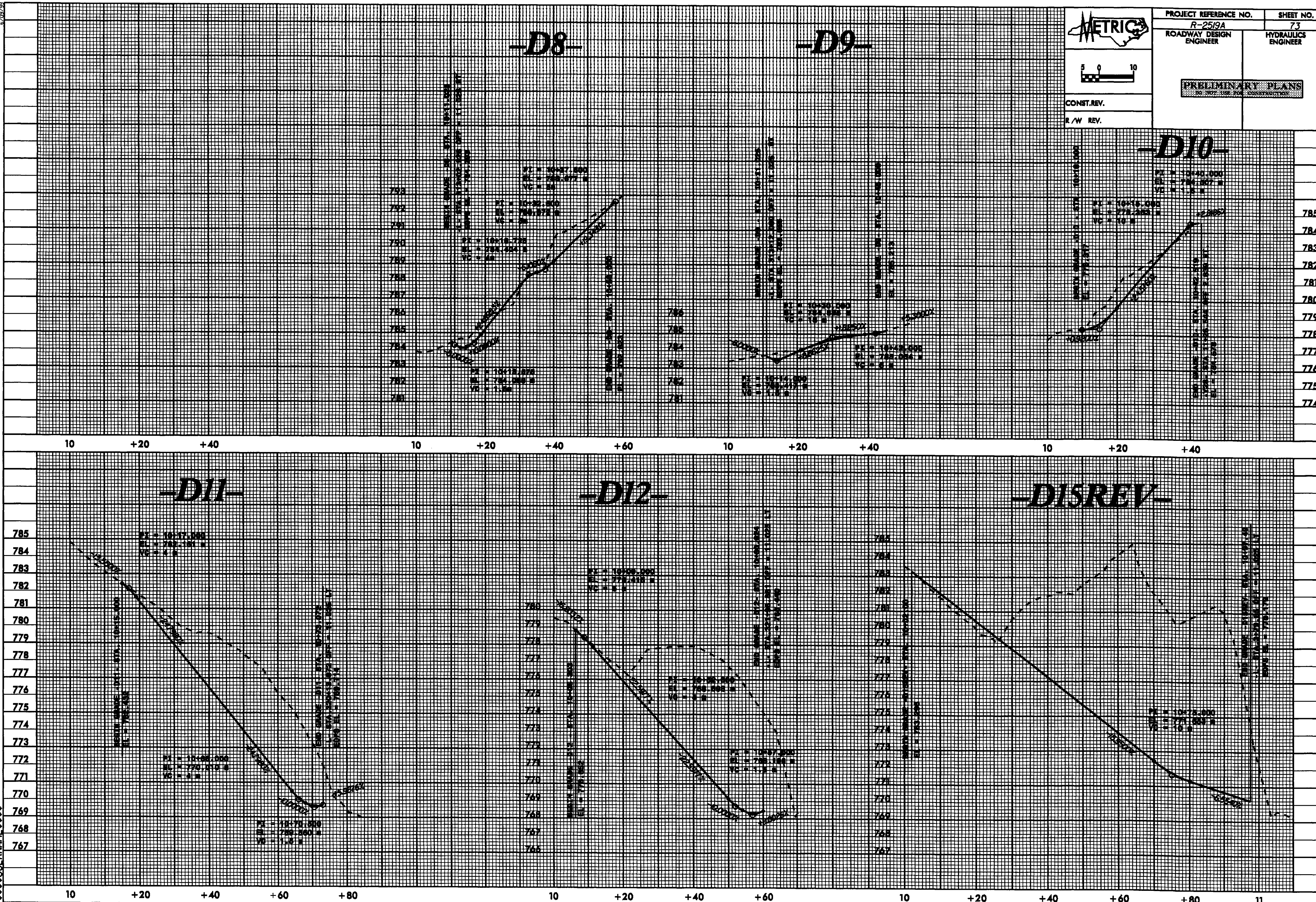
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



6/09/99

09-MAR-2009 07:46
R:\Roadway\proj\r2519a.pfl
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	74
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

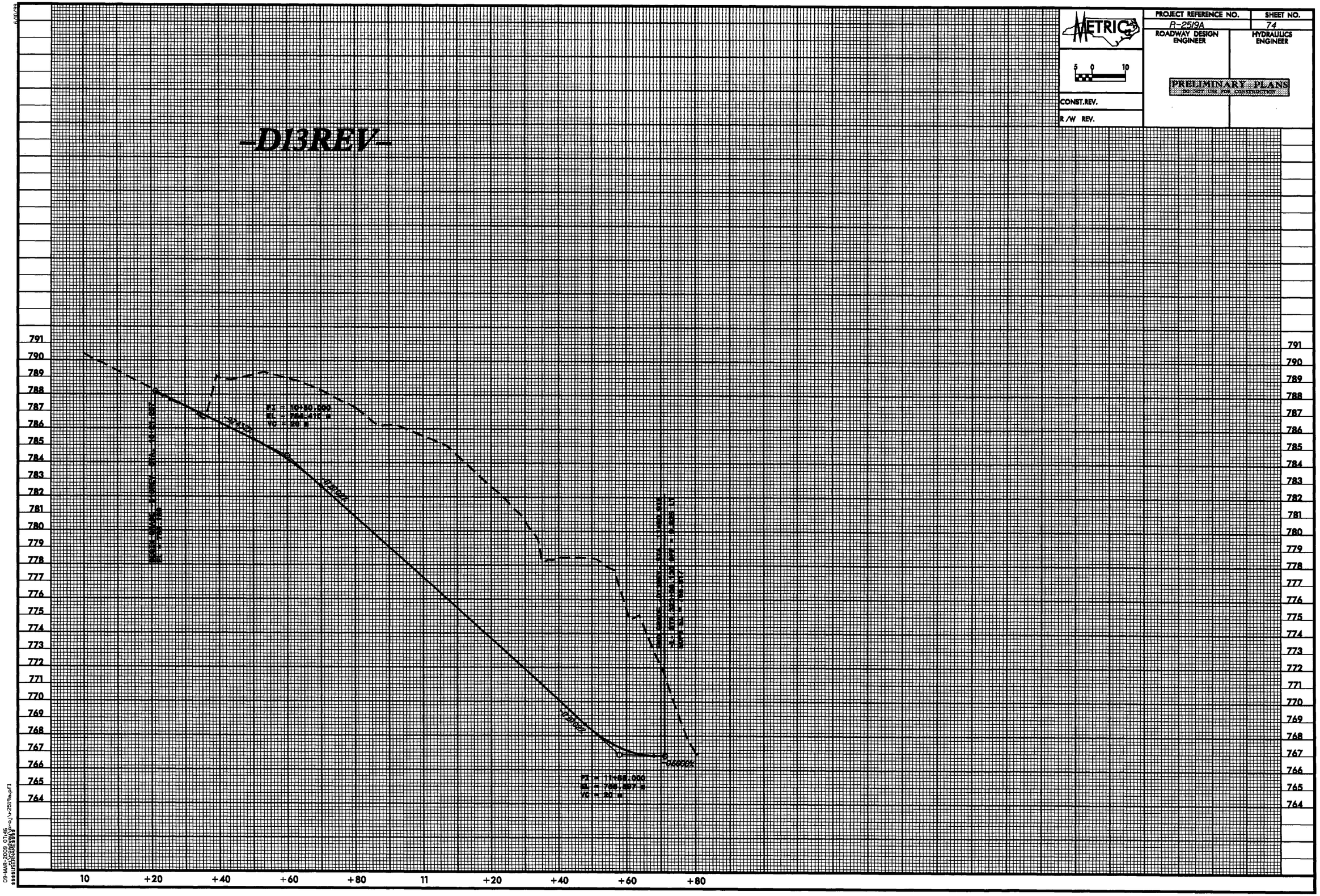
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

-D13REV-



09-MAR-2009 07:46
$$$$USERNAME$$$$ o:\r-2519a.pf1

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	75
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

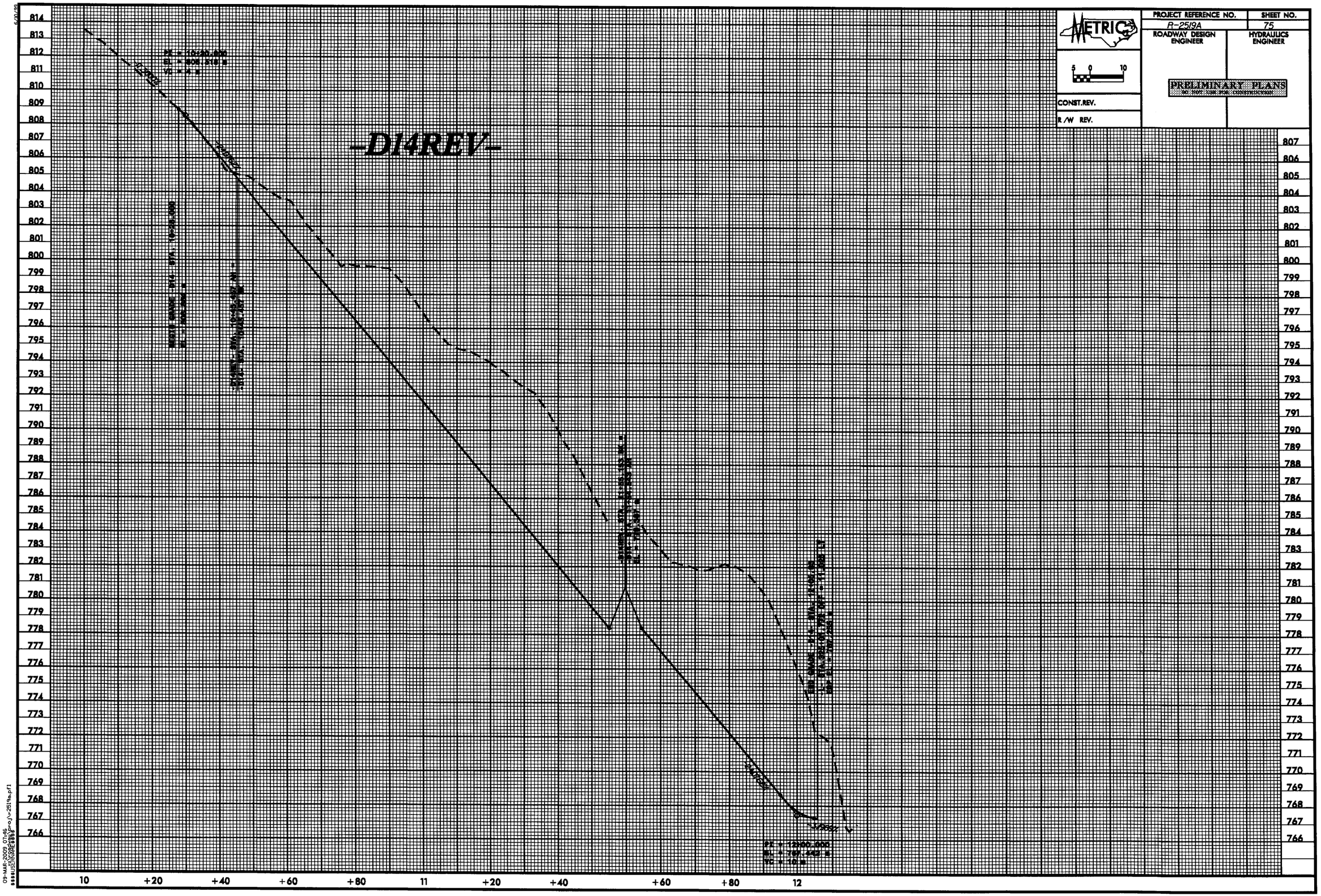
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



09-MAR-2009 07:46
$$$$USER
ENGINEER
$$$$DGN
$$$$PRF
$$$$PLT
$$$$PSM
$$$$SHT
$$$$MOD
$$$$CAT
$$$$XCR
$$$$XRF
$$$$LOG
$$$$MSG
$$$$QRY
$$$$SAV
$$$$TRN
$$$$USR
$$$$WIN
$$$$WRK
$$$$XFM
$$$$XRM
$$$$XWR
$$$$XWS
$$$$XWT
$$$$XWU
$$$$XWV
$$$$XWW
$$$$XWX
$$$$XWY
$$$$XWZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ
$$$$XXA
$$$$XXB
$$$$XXC
$$$$XXD
$$$$XXE
$$$$XXF
$$$$XXG
$$$$XXH
$$$$XXI
$$$$XXJ
$$$$XXK
$$$$XXL
$$$$XXM
$$$$XXN
$$$$XXO
$$$$XXP
$$$$XXQ
$$$$XXR
$$$$XXS
$$$$XXT
$$$$XXU
$$$$XXV
$$$$XXW
$$$$XXX
$$$$XXY
$$$$XXZ

6/29/2

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	76
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

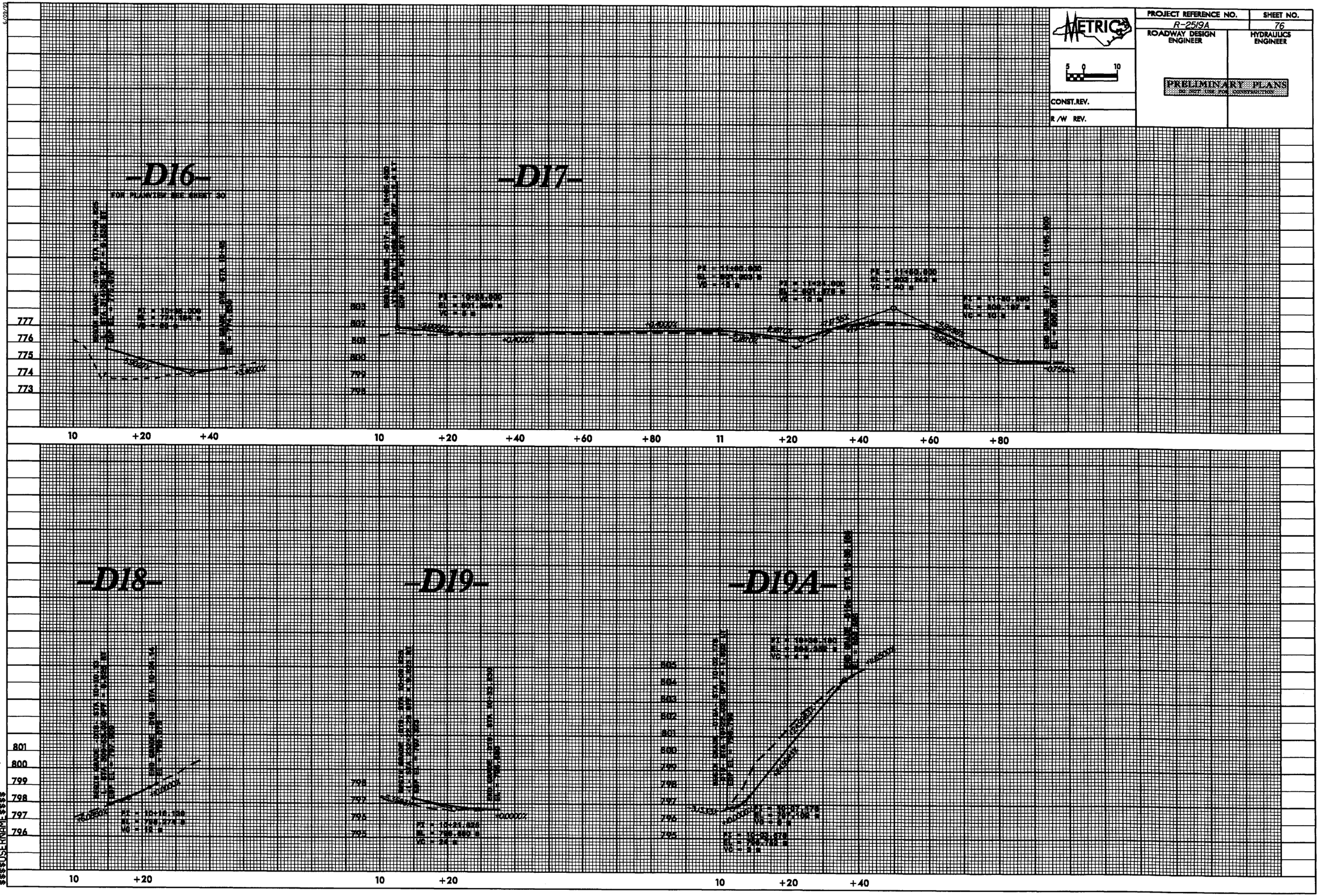
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



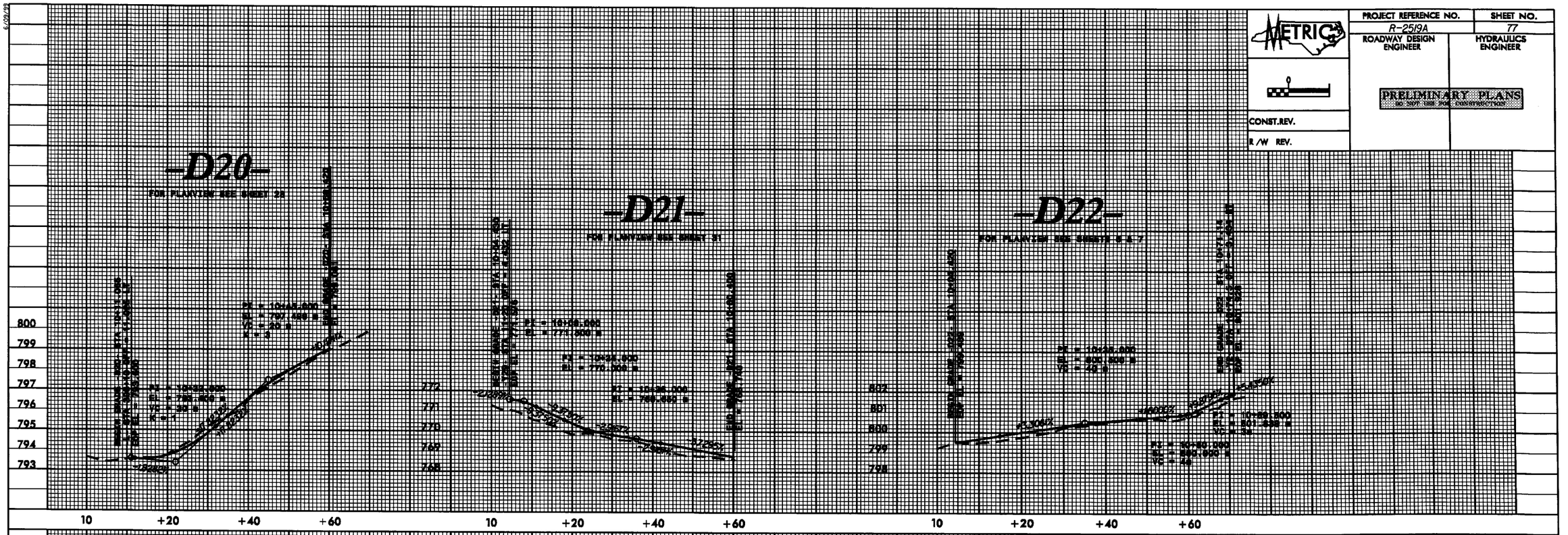
09-MAR-2009 07:46
r:\roadway\PROJECTS\r2519a.pfl
$$$$USERNAME$$$$

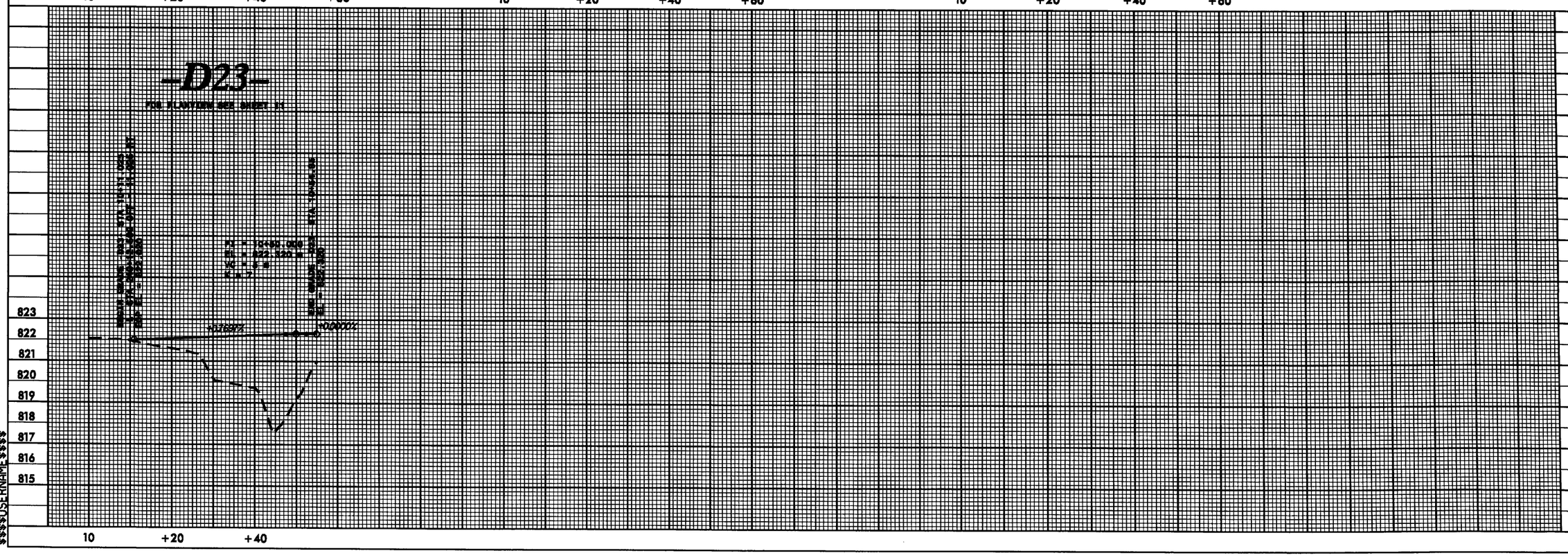
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	77
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

CONST.REV.

R/W REV.





09-MAR-2009 07:47
r:\roadway\proj\r2519a.pfl
$$$$USERNAME$$$$

R-2519A
US 19 FROM EAST OF SR 1336 (JACKS CREEK ROAD) TO SR 1186 (OLD US 19), YANCEY COUNTY, DIVISION 13

NATURAL STREAM DESIGN FOR:

SITE 26, GEORGES FORK
-L- STA. 314+04 TO STA. 315+67 Lt

SITE 29, SHOAL CREEK
-Y30- STA. 10+28 TO STA. 10+98 Rt

SITE 32, PLUM BRANCH TRIBUTARY
-Y33- STA. 9+86 TO STA. 10+40 Rt

SITE 33, PLUM BRANCH
-Y32- STA. 9+86 TO STA. 10+34 Rt

R-2519A NATURAL STREAM DESIGN SUMMARY

Site 26, Georges Fork , -L- Sta 314+04 to Sta 315+67 Lt

The existing stream at the proposed relocation site runs parallel to the existing roadway and was most likely relocated when the original road was built thus resulting in a G type stream due to the channel being deepened. The streambed has stabilized and material consists mainly of gravel, cobbles and boulders. The vegetation on the stream banks is well established and has helped to stabilize the banks although the riparian area has been disturbed recently and the woody vegetation around the stream banks has been cut down. Upstream of the relocation area the stream has been less disturbed and runs through a wooded area and exhibits stable stream characteristics. An existing channel cross section in this location (at –L- Sta 313+74 lt.) was used to determine the bankfull characteristics of the proposed channel and could be classified as a C4 type channel based on Rosgen classification variables. The proposed stream relocation is designed as a C4 type stream. Two C3 type stream reference reaches (from NCDOT reference reach database) were used to aid in the design of the proposed stream relocation (see morphological measurement table for site 26). Rock cross vanes and J hook vanes are used in the design to provide grade control, natural energy dissipation and pools. Floodplain relief and riparian buffers are provided. The stream grade of the relocation is designed to match the existing stream. The shear stress and stream power of the proposed stream is comparable to the existing stream and therefore should provide sediment transport without aggrading or degrading the stream. (See sediment transport calculations).

Site 29, Shoal Creek, -Y- Sta 10+28 to Sta 10+98 Rt

The existing stream at the proposed relocation site has been encroached upon by the road on one side and by fill from a commercial property on the other side. It can be classified as a G4 stream due to these encroachments, although it has stabilized and has created a bankfull channel in areas where there is room for it to develop. The bed material consists mainly of gravel, cobbles and large boulders and is stable. An existing channel cross section on a stable reach of stream upstream of the proposed relocation site was used to determine the bankfull characteristics of the proposed channel and could be classified as a B4 stream type based on the Rosgen classification variables. The proposed stream relocation is designed as a B4 type stream. Two B4c type stream reference reaches (from project R-2518A) were used to aid in the design of the proposed stream relocation (see morphological measurement table for site 29). Rock cross vanes are used in the design to provide grade control, natural energy dissipation and pools. Floodplain relief and riparian buffers are provided as practicable. The stream grade of the relocation is designed to match the existing stream. The shear stress and stream power of the proposed stream is comparable to the existing stream and therefore should provide sediment transport without aggrading or degrading the stream. (See sediment transport calculations).

Site 32, Plum Branch Tributary, -Y33- Sta 9+86 to Sta 10+40 Rt.

The existing stream at the proposed relocation site runs parallel to the existing road and is entrenched with a low width depth ratio and can be classified as a G4 stream. The bed material consists mainly of sand, gravel and cobbles. An existing channel cross section on a stable reach of stream upstream of the proposed relocation was used to determine the bankfull characteristics of the proposed channel and could be classified as an E4b stream type based on Rosgen classification variables. The proposed stream relocation is designed as a B4 type stream. Two B4c type stream reference reaches (from project R-2518A) were used to aid in the design of the proposed stream relocation (see morphological measurement table for site 32). Rock cross vanes are used in the design to provide grade control, natural energy dissipation and pools. Floodplain relief and riparian buffers are provided. The shear stress and stream power of the proposed stream is comparable to the existing stream and therefore should provide sediment transport without aggressing or degrading the stream. (See sediment transport calculations).

Site 33, Plum Branch, -Y32- Sta. 9+86 to Sta. 10+34 Rt.

The existing stream at the proposed relocation site runs parallel to the existing road is entrenched with a low width depth ratio and can be classified as a G4 stream. The bed material consists mainly of sand, gravel and cobbles and is stable. An existing channel cross section upstream of the proposed relocation was used to determine the bankfull characteristics of the proposed channel and could be classified as a B4 stream type based on Rosgen classification variables. The proposed stream relocation is designed as a B4 type stream. Two B4c type stream reference reaches (from project R-2518A) were used to aid in the design of the proposed stream relocation (see morphological measurement table for site 33). Rock cross vanes and a J hook vane are used in the design to provide grade control, natural energy dissipation and pools. Floodplain relief and riparian buffers are provided. The stream grade of the relocation is designed to match the existing stream. The shear stress and stream power of the proposed stream is comparable to the existing stream and therefore should provide sediment transport without aggressing or degrading the stream. (See sediment transport calculations).

R-2519A SEDIMENT TRANSPORT

Shear stress, $\tau = \gamma S R$

Where:
γ =specific weight of water (62.4 lbs/cu.ft.)
S = stream slope
R = hydraulic radius

Stream Power, $\omega = v \tau$

Where:
v = mean velocity
τ = Shear stress

Site 26, Georges Fork , -L- Sta 314+04 to Sta 315+67 Lt

Proposed stream:

$\tau = \gamma S R = (62.4)(0.0209)(1.38) = 1.80$

$\omega = v \tau = (5.9)1.80 = 10.62$

Existing stream:

$\tau = \gamma S R = (62.4)(0.0203)(1.33) = 1.74$

$\omega = v \tau = (5.7)1.74 = 9.58$

Site 29, Shoal Creek, -Y- Sta 10+28 to Sta 10+98 Rt

Proposed stream:

$\tau = \gamma S R = (62.4)(0.0222)(1.49) = 2.06$

$\omega = v \tau = (6.4)2.06 = 13.18$

Existing stream:

$\tau = \gamma S R = (62.4)(0.024)(1.35) = 2.02$

$\omega = v \tau = (6.3)2.02 = 12.73$

Site 32, Plum Branch Tributary, -Y33- Sta 9+86 to Sta 10+40 Rt

Proposed stream:

$\tau = \gamma S R = (62.4)(0.0327)(0.61) = 1.24$

$\omega = v \tau = (4.3)1.24 = 5.33$

Existing stream:

$\tau = \gamma S R = (62.4)(0.0310)(0.66) = 1.28$

$\omega = v \tau = (4.4)1.28 = 5.63$

Site 33, Plum Branch, -Y32- Sta 9+86 to Sta 10+34 Rt

Proposed stream:

$\tau = \gamma S R = (62.4)(0.0312)(1.29) = 2.51$

$\omega = v \tau = (6.9)2.51 = 17.32$

Existing stream:

$\tau = \gamma S R = (62.4)(0.0312)(1.26) = 2.45$

$\omega = v \tau = (6.8)2.45 = 16.66$

Variables	Existing Channel	Proposed Reach	Reference Reach (Lost Cove Creek)	Reference Reach (N Fork New River)
1. Stream type	C4 & G4	C4	C3	C3
2. Drainage area (D.A.)	1.92 mi^2 (4.78 km^2)	1.92 mi^2 (4.78 km^2)	24.8 mi^2 (64 km^2)	29.0 mi^2 (64 km^2)
3. Bankfull width (W_{bkf})	20.7 ft (6.31 m)	19.3 ft (5.9 m)	62.3 ft (19.0 m)	53 ft (16.2 m)
4. Bankfull mean depth (d_{bkf})	1.36 ft (0.41 m)	1.41 ft (0.43 m)	3.35 ft (1.02 m)	3.2 ft (0.98 m)
5. Width/depth ratio (W_{bkf}/d_{bkf})	15.2	13.7	18.5	16.2
6. Bankfull cross-sectional area (A_{bkf})	28.2 ft^2 (2.62 m^2)	27.6 ft^2 (2.56 m^2)	208 ft^2 (19.3 m^2)	160 ft^2 (14.9 m^2)
7. Bankfull mean velocity (V_{bkf})	5.7 ft/s (1.76 m/s)	5.9 ft/s (1.80 m/s)	---	5.9 ft/s (1.8 m/s)
8. Bankfull discharge (Q_{bkf})	160 cfs (4.5 cms)	163 cfs (4.6 cms)	---	1000 cfs (28.3 cms)
9. Bankfull max depth (d_{mbkf})	2.13 ft (0.65 m)	2.13 ft (0.65 m)	5.4 ft (1.65 m)	4.5 ft (1.37 m)
10. Width of floodprone area (W_{fpa})	64 ft (19.6 m)	43-63ft(13.1-19.2 m)	>200 ft (>61 m)	>150 ft (>45 m)
11. Entrenchment ratio (W_{fpa}/W_{bkf})	3.1	2.2-3.3	>3.0	>3.0
12. Meander length (L_m)	174-315 ft (53-96 m)	180-206 ft (55-63 m)	540 ft (164.6 m)	1005 ft (306.3 m)
13. Ratio of meander length to bankfull width (L_m/W_{bkf})	8.4-15.2	9.3-10.7	8.67	19.2
14. Radius of curvature (R_c)	49-164 ft (15-50 m)	66-164 ft (20-50 m)	62.5 ft (19.1 m)	54.0 ft (16.5 m)
15. Ratio of radius of curvature to bankfull width (R_c/W_{bkf})	2.37-7.9	3.41-8.50	1.00	1.02
16. Belt width (W_{blt})	50 ft (15.2 m)	33 ft (10.1 m)	500 ft (152.4 m)	254 ft (77.4 m)
17. Meander width ratio (W_{blt}/W_{bkf})	2.4	1.71	8.03	4.85
18. Sinuosity (stream length/valley length) (K)	1.05	1.04	1.20	1.50
19. Valley Slope (VS)	0.0213	0.0217	0.0088	0.007
20. Average slope (CS)	0.0203	0.0209	0.0084	0.048
21. Pool slope	0	0	---	---
22. Ratio of pool slope to average slope	0	0	---	---
23. Maximum pool depth (dp_{max})	3.1 ft (0.94 m)	3.0 ft (0.91 m)	7.7 ft (2.35 m)	7.68 ft (2.34 m)
24. Ratio of pool depth to average bankfull depth (dp/d_{bkf})	2.28	2.13	2.3	2.4
25. Pool width (Wp)	21.3 ft (6.5 m)	19.3 ft (5.9 m)	59.5 ft (18.1 m)	51.041ft (15.67 m)
26. Ratio of pool width to bankfull width	1.03	1.0	0.96	0.97
27. Pool to pool spacing	85.3 ft (26 m)	90.3 ft (27.5 m)	190 ft (57.9 m)	324 ft (98.8 m)
28. Ratio of pool to pool spacing to bankfull width	4.12	4.67	3.05	6.12
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BH_{low}/d_{mbkf})	1.0	1.0	1.0	1.0

NATURAL CHANNEL DESIGN DATA

MORPHOLOGICAL MEASUREMENT TABLE

SITE: 26, Georges Fork

-L- Sta. 314+04 to Sta. 315+67 Lt.

Yancey County, NC

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: R2519A
US 19 Widening

DATE: 5/2/2007

GEORGES FORK

Station 314+10 lt. looking downstream

Variables	Existing Channel	Proposed Reach	Reference Reach (Middle Fork Crk)	Reference Reach (Middle Fork Crk)
1. Stream type	B4-G4	B4	B4c	B4c
2. Drainage area (D.A.)	2.72 mi^2 (7.05 km^2)	2.72 mi^2 (7.05 km^2)	7.3 mi^2 (18.9 km^2)	12 mi^2 (31.1 km^2)
3. Bankfull width (W_{bkf})	22.7 ft (6.92 m)	19.7 ft (6.0m)	19.4-20.1 ft (5.9-6.2 m)	25.5-28.6 ft (7.8-8.7 m)
4. Bankfull mean depth (d_{bkf})	1.39 ft (0.42 m)	1.55 ft (0.47 m)	1.9-2.0 ft (0.58-0.60 m)	2.24 ft (0.68 m)
5. Width/depth ratio (W_{bkf}/d_{bkf})	16.3	12.7	9.5-10.8	10.7-12.8
6. Bankfull cross-sectional area (A_{bkf})	31.5 ft^2 (2.93 m^2)	30.6 ft^2 (2.84 m^2)	37.3-39.7 ft^2 (3.47-3.69 m^2)	60.5-64.1 ft^2 (5.62-5.96 m^2)
7. Bankfull mean velocity (V_{bkf})	6.3 ft/s (1.92 m/s)	6.4 ft/s (1.95 m/s)	4.9-5.2 ft/s (1.5-1.6 m/s)	5.5 ft/s (1.67 m/s)
8. Bankfull discharge (Q_{bkf})	197 cfs (5.58 cms)	196 cfs (5.55 cms)	195 cfs (5.52 cms)	352 cfs (10.0 cms)
9. Bankfull max depth (d_{mbkf})	2.03 ft (0.62 m)	2.13 ft (0.65 m)	2.3-3.0 ft (0.70-0.91 m)	2.7-3.1 ft (0.82-0.94 m)
10. Width of floodprone area (W_{fpa})	42.7 ft (13.02 m)	32.8-43.3 ft (10.0-13.2 m)	25.5-27 ft (7.8-8.2 m)	34-90 ft (10.4-27.4 m)
11. Entrenchment ratio (W_{fpa}/W_{bkf})	1.9	1.7-2.2	1.3-1.4	1.2-3.5
12. Meander length (L_m)	25-90 ft (7.6-27 m)	98 ft (30 m)	---	---
13. Ratio of meander length to bankfull width (L_m/W_{bkf})	1.1-3.9	5.0	---	---
14. Radius of curvature (R_c)	45–90 ft (13.7–27 m)	65-90 ft (20-27 m)	23.5-51.8 ft (7.2-15.8 m)	30-122 ft (9.1-37.2 m)
15. Ratio of radius of curvature to bankfull width (R_c/W_{bkf})	2.0-4.0	3.3-4.6	1.2-2.7	1.1-4.8
16. Belt width (W_{blt})	25 ft (7.62 m)	21.3 ft (6.5 m)	---	---
17. Meander width ratio (W_{blt}/W_{bkf})	1.1	1.1	---	---
18. Sinuosity (stream length/valley length) (K)	1.06	1.03	1.04	1.0
19. Valley Slope (VS)	0.0254	0.0229	0.011	0.007
20. Average slope (CS)	0.0240	0.0222	0.0093-0.0108	0.007
21. Pool slope	0	0	0.0-0.001	0.0-0.004
22. Ratio of pool slope to average slope	0	0	0.093-0.11	0.0-0.6
23. Maximum pool depth (dp_{max})	3.0 ft (0.98 m)	3.3 ft (1.07 m)	3.1-3.3 ft (0.94-1.0 m)	3.1-4.9 ft (0.94-1.5 m)
24. Ratio of pool depth to average bankfull depth (dp/d_{bkf})	2.2	2.1	1.7-1.8	1.4-2.2
25. Pool width (Wp)	22 ft (6.7 m)	19.7 ft (6.0m)	16.4-17.8 ft (5.0-5.4 m)	23.4-25.8 ft (7.1-7.9 m)
26. Ratio of pool width to bankfull width	0.97	1.0	0.8-0.9	0.8-0.9
27. Pool to pool spacing	30-60 ft (9.1-18 m)	65.6 ft (20 m)	38-107 ft (11.5-32.6m)	65-190 ft (19.8-57.9m)
28. Ratio of pool to pool spacing to bankfull width	1.3 – 2.6	3.3	1.9-5.3	2.3-7.5
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BH_{low}/d_{mbkf})	1.0	1.0	---	---

NATURAL CHANNEL DESIGN DATA

MORPHOLOGICAL MEASUREMENT TABLE

SITE: 29, Shoal Creek

-Y30- STA. 10+28 to STA. 10+98 Rt

Yancey County, NC

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: R2519A
US 19 Widening

DATE: 5/1/2007

SHOAL CREEK

Looking upstream from US 19 crossing

Variables	Existing Channel	Proposed Reach	Reference Reach (Middle Fork Crk)	Reference Reach (Middle Fork Crk)
1. Stream type	E4b-G4	B4	B4c	B4c
2. Drainage area (D.A.)	0.17 mi^2 (0.45 km^2)	0.17 mi^2 (0.45 km^2)	7.3 mi^2 (18.9 km^2)	12 mi^2 (31.1 km^2)
3. Bankfull width (W_{bkf})	5.5 ft (1.68 m)	5.9 ft (1.8 m)	19.4-20.1 ft (5.9-6.2 m)	25.5-28.6 ft (7.8-8.7 m)
4. Bankfull mean depth (d_{bkf})	0.66 ft (0.20 m)	0.66 ft (0.20 m)	1.9-2.0 ft (0.58-0.60 m)	2.24 ft (0.68 m)
5. Width/depth ratio (W_{bkf}/d_{bkf})	8.3	8.9	9.5-10.8	10.7-12.8
6. Bankfull cross-sectional area (A_{bkf})	3.98 ft^2 (0.37 m^2)	3.88 ft^2 (0.36 m^2)	37.3-39.7 ft^2 (3.47-3.69 m^2)	60.5-64.1 ft^2 (5.62-5.96 m^2)
7. Bankfull mean velocity (V_{bkf})	4.4 ft/s (1.34 m/s)	4.3 ft/s (1.31 m/s)	4.9-5.2 ft/s (1.5-1.6 m/s)	5.5 ft/s (1.67 m/s)
8. Bankfull discharge (Q_{bkf})	17.5 cfs (0.50 cms)	16.5 cfs (.47 cms)	195 cfs (5.52 cms)	352 cfs (10.0 cms)
9. Bankfull max depth (d_{mbkf})	1.0 ft (0.30 m)	1.0 ft (0.30 m)	2.3-3.0 ft (0.70-0.91 m)	2.7-3.1 ft (0.82-0.94 m)
10. Width of floodprone area (W_{fpa})	12.0-30.0 ft (3.7-9.1 m)	12.0-30.0 ft (3.7-9.1 m)	25.5-27.0 ft (7.8-8.2 m)	34-90 ft (10.4-27.4 m)
11. Entrenchment ratio (W_{fpa}/W_{bkf})	2.2-5.6	1.7-5.1	1.3-1.4	1.2-3.5
12. Meander length (L_m)	30 ft (9.1 m)	--	--	--
13. Ratio of meander length to bankfull width (L_m/W_{bkf})	5.46	--	--	--
14. Radius of curvature (R_c)	15-20 ft (4.5-6.1 m)	17 ft (5.3 m)	23.5-51.8 ft (7.2-15.8 m)	30-122 ft (9.1-37.2 m)
15. Ratio of radius of curvature to bankfull width (R_c/W_{bkf})	2.73-3.64	2.6	1.2-2.7	1.1-4.8
16. Belt width (W_{blt})	15 ft (4.6 m)	--	--	--
17. Meander width ratio (W_{blt}/W_{bkf})	2.73	--	--	--
18. Sinuosity (stream length/valley length) (K)	1.03	1.03	1.04	1.0
19. Valley Slope (VS)	0.0319	0.0335	0.011	0.007
20. Average slope (CS)	0.0310	0.0327	0.0093-0.0108	0.007
21. Pool slope	0	0	0.0-0.001	0.0-0.004
22. Ratio of pool slope to average slope	0	0	0.093-0.11	0.0-0.6
23. Maximum pool depth (dp_{max})	1.50 ft (0.46 m)	1.5 ft (0.46 m)	3.1-3.3 ft (0.94-1.0 m)	3.1-4.9 ft (0.94-1.5 m)
24. Ratio of pool depth to average bankfull depth (dp/d_{bkf})	2.3	2.3	1.7-1.8	1.4-2.2
25. Pool width (Wp)	5.5 (1.2m)	5.9 ft (1.4 m)	16.4-17.8 ft (5.0-5.4 m)	23.4-25.8 ft (7.1-7.9 m)
26. Ratio of pool width to bankfull width	1.0	1.0	0.8-0.9	0.8-0.9
27. Pool to pool spacing	15-30 ft (4.9-9.1 m)	49 ft (15 m)	38-107 ft (11.5-32.6 m)	65-190 ft (19.8-57.9 m)
28. Ratio of pool to pool spacing to bankfull width	2.73-5.46	8.3	1.9-5.3	2.3-7.5
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BH_{low}/d_{mbkf})	1.0	1.0	---	---

NATURAL CHANNEL DESIGN DATA

MORPHOLOGICAL MEASUREMENT TABLE

SITE: 32, Plum Branch Tributary

-Y33- STA. 9+86 to STA. 10+40 Rt

Yancey County, NC

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: R2519A
US 19 Widening

DATE: 5/1/2007

PLUM BRANCH TRIBUTARY

Looking upstream from confluence with Plum Branch

Variables	Existing Channel	Proposed Reach	Reference Reach (Middle Fork Branch)	Reference Reach (Middle Fork Branch)
1. Stream type	B4-G4	B4	B4c	B4c
2. Drainage area (D.A.)	1.35 mi^2 (3.49 km^2)	1.35 mi^2 (3.49 km^2)	7.3 mi^2 (18.9 km^2)	12 mi^2 (31.1 km^2)
3. Bankfull width (W_{bkf})	13.3 ft (4.06 m)	13.1 ft (4.0 m)	19.4-20.1 ft (5.9-6.2 m)	25.5-28.6 ft (7.8-8.7 m)
4. Bankfull mean depth (d_{bkf})	1.34 ft (0.41 m)	1.38 ft (0.42 m)	1.9-2.0 ft (0.58-0.60 m)	2.24 ft (0.68 m)
5. Width/depth ratio (W_{bkf}/d_{bkf})	9.9	9.5	9.5-10.8	10.7-12.8
6. Bankfull cross-sectional area (A_{bkf})	17.9 ft^2 (1.66 m^2)	18.1 ft^2 (1.68 m^2)	37.3-39.7 ft^2 (3.47-3.69 m^2)	60.5-64.1 ft^2 (5.62-5.96 m^2)
7. Bankfull mean velocity (V_{bkf})	6.8 ft/s (2..07m/s)	6.9 ft/s (2.1 m/s)	4.9-5.2 ft/s (1.5-1.6 m/s)	5.5 ft/s (1.67 m/s)
8. Bankfull discharge (Q_{bkf})	122 cfs (3.44cms)	124 cfs (3.5 cms)	195 cfs (5.52 cms)	352 cfs (10.0 cms)
9. Bankfull max depth (d_{mbkf})	2.19 ft (0.67 m)	1.97 ft (0.60 m)	2.3-3.0 ft (0.70-0.91 m)	2.7-3.1 ft (0.82-0.94 m)
10. Width of floodprone area (W_{fpa})	26-41.5 ft (7.9-12.6 m)	26-46.6 ft (7.9-14.2 m)	25.5-27 ft (7.8-8.2 m)	34-90 ft (10.4-27.4 m)
11. Entrenchment ratio (W_{fpa}/W_{bkf})	2.0-3.1	2.0-3.6	1.3-1.4	1.2-3.5
12. Meander length (L_m)	40 ft (12.2 m)	30 ft (9.1 m)	---	---
13. Ratio of meander length to bankfull width (L_m/W_{bkf})	3.0	2.3	---	---
14. Radius of curvature (R_c)	15-20 ft (4.5-6.1 m)	17.4 ft (5.3 m)	23.5-51.8 ft (7.2-15.8 m)	30-122 ft (9.1-37.2 m)
15. Ratio of radius of curvature to bankfull width (R_c/W_{bkf})	1.13-1.5	1.3	1.2-2.7	1.1-4.8
16. Belt width (W_{blt})	15 ft (4.5 m)	16.5 ft (5.0 m)	---	---
17. Meander width ratio (W_{blt}/W_{bkf})	1.12	1.25	---	---
18. Sinuosity (stream length/valley length) (K)	1.02	1.02	1.04	1.0
19. Valley Slope (VS)	0.0318	0..0318	0.011	0.007
20. Average slope (CS)	0.0312	0.0312	0.0093-0.0108	0.007
21. Pool slope	0	0	0.0-0.001	0.0-0.004
22. Ratio of pool slope to average slope	0	0	0.093-0.11:1	0.0-0.06:1
23. Maximum pool depth (dp_{max})	2.34 ft (0.71 m)	2.97 ft (0.91 m)	3.1-3.3 ft (0.94-1.0 m)	3.1-4.9 ft (0.94-1.5 m)
24. Ratio of pool depth to average bankfull depth (dp/d_{bkf})	2.2	2.2	1.7-1.8	1.4-2.2
25. Pool width (Wp)	13 (3.96 m)	13.1 ft (3.99 m)	16.4-17.8 ft (5.0-5.4 m)	23.4-25.8 ft (7.1-7.9 m)
26. Ratio of pool width to bankfull width	0.98	1.0	0.8-0.9	0.8-0.9
27. Pool to pool spacing	40-90 ft (12.2-27.4 m)	53ft-59 ft (16m-18 m)	38-107 ft (11.5-32.6 m)	65-190 ft (19.8-57.9 m)
28. Ratio of pool to pool spacing to bankfull width	3.0-6.8	4.0-4.5	1.9-5.3	2.3-7.5
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BH_{low}/d_{mbkf})	1.0	1.0	---	---

NATURAL CHANNEL DESIGN DATA

MORPHOLOGICAL MEASUREMENT TABLE

SITE: 33, Plum Branch
-Y32- STA. 9+86 to STA 10+34 Rt

Yancey County, NC

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
YANCEY COUNTY
PROJECT: R2519A
US 19 Widening

DATE: 5/2/2007

PLUM BRANCH

Station 9+86 –Y32- rt. Looking upstream

LEGEND AND NOTES

DENOTES FILL IN SURFACE WATER

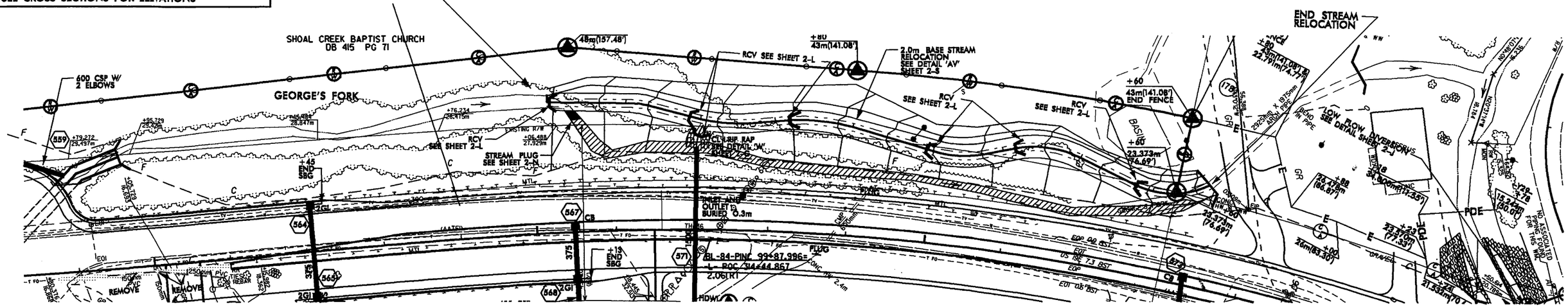
DENOTES ROCK CROSS VANE (RCV)

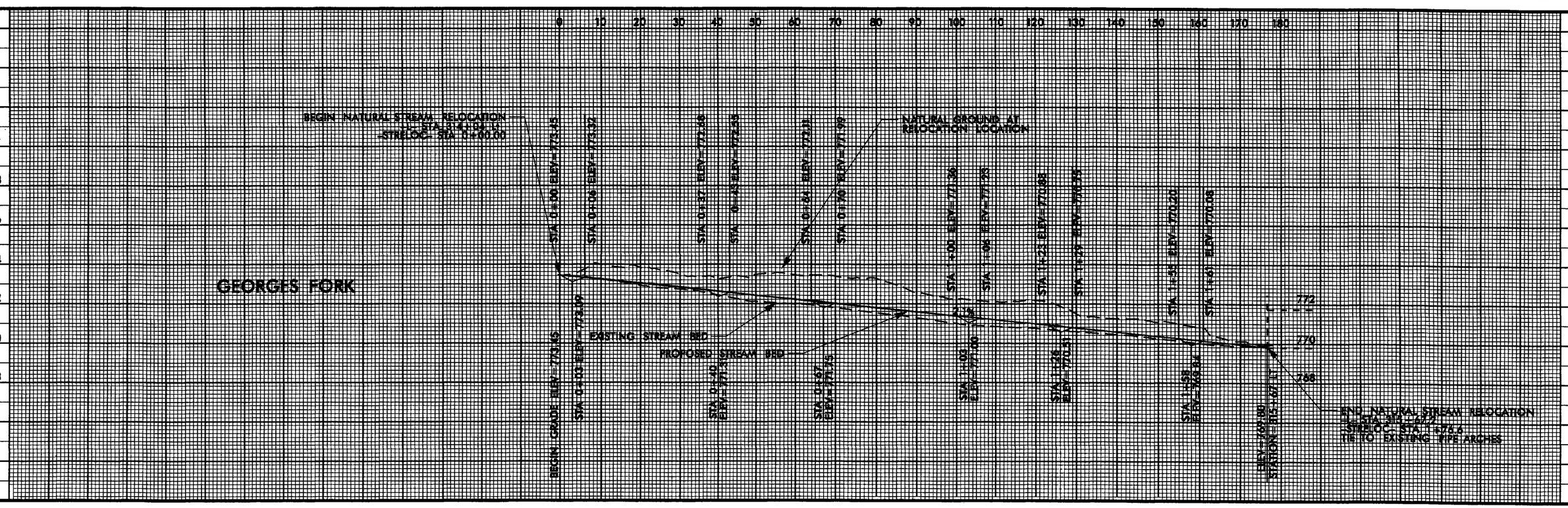
DENOTES J HOOK (JH)

NOTE: EXISTING FLOODPLAIN HAS BEEN MODIFIED. SEE CROSS SECTIONS FOR ELEVATIONS

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

SITE 26

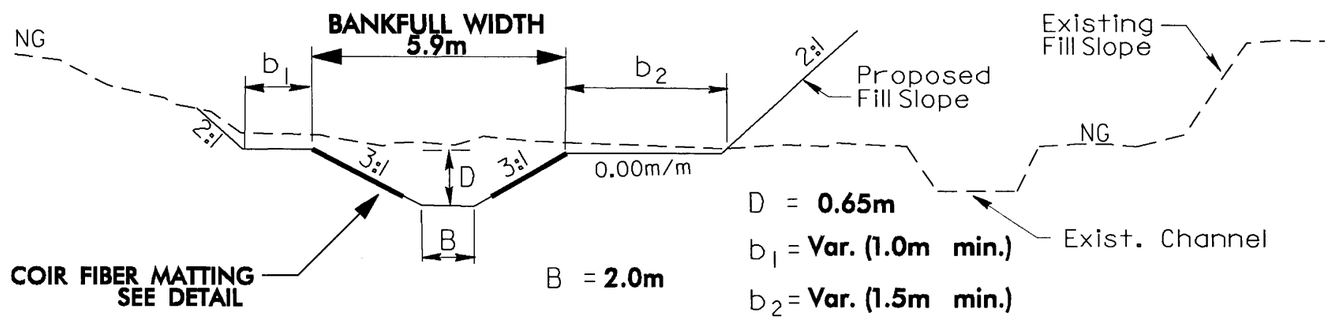




PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

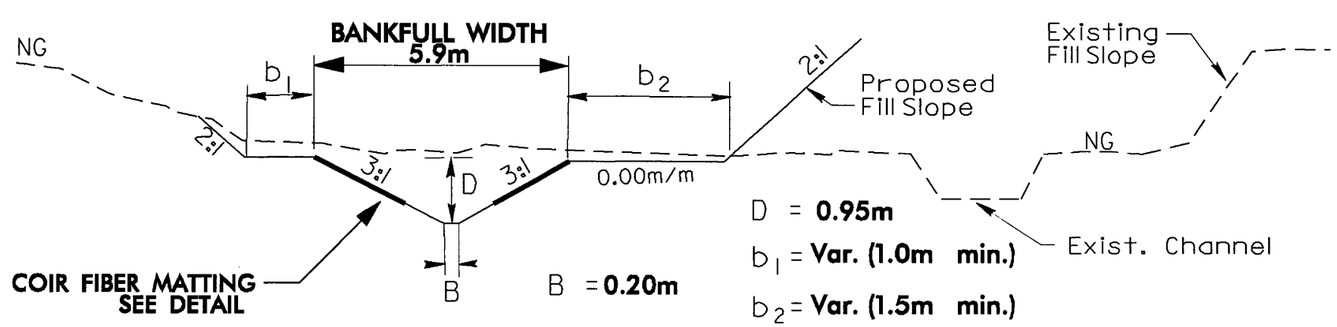
DETAIL "AV"
GEORGES FORK STREAM RELOCATION
-L- STA. 314+04 TO STA. 315+67 LT

TYPICAL RIFFLE SECTION



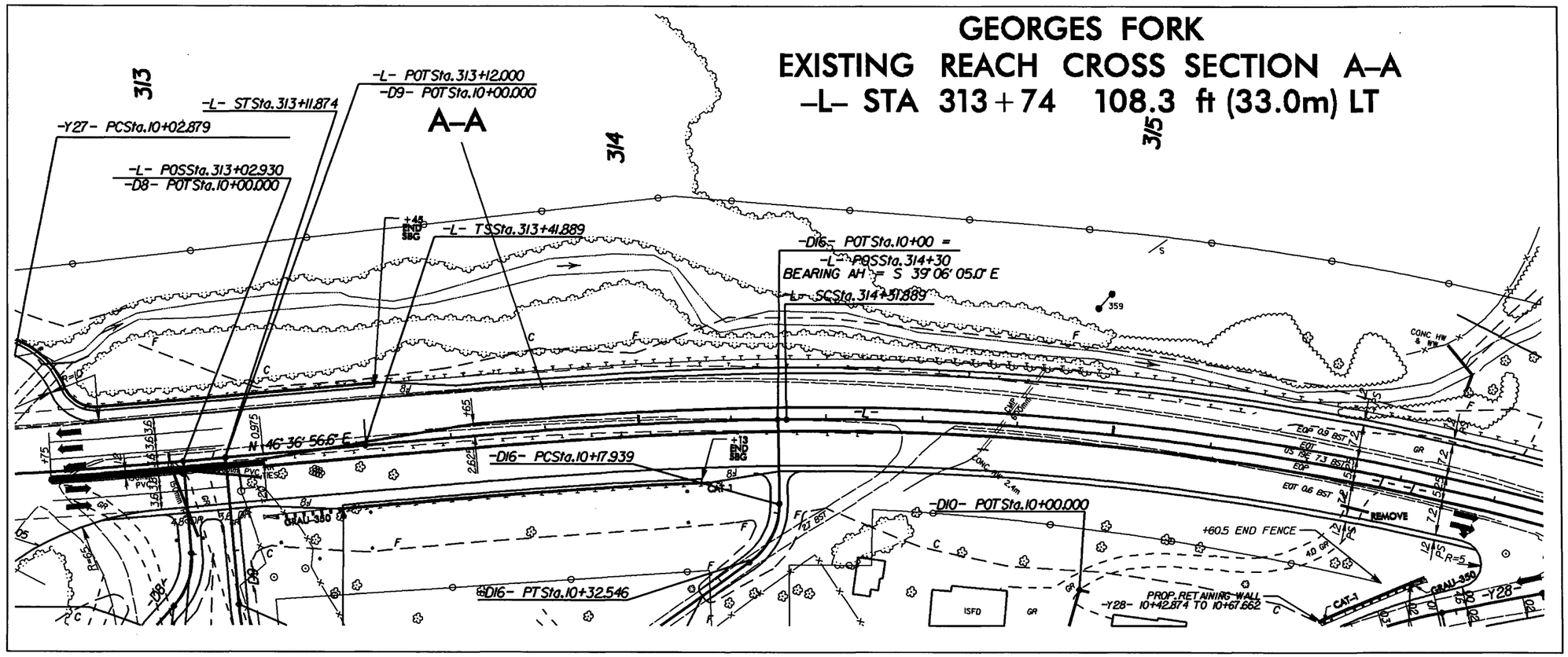
NOTE: SEE -L- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

TYPICAL POOL SECTION



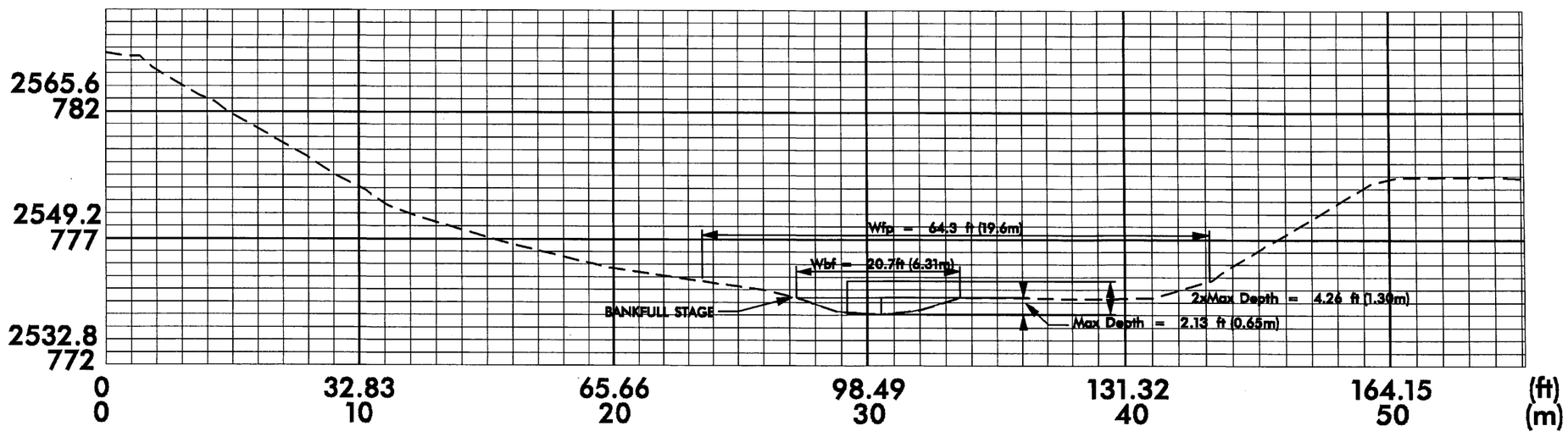
NOTE: SEE -L- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

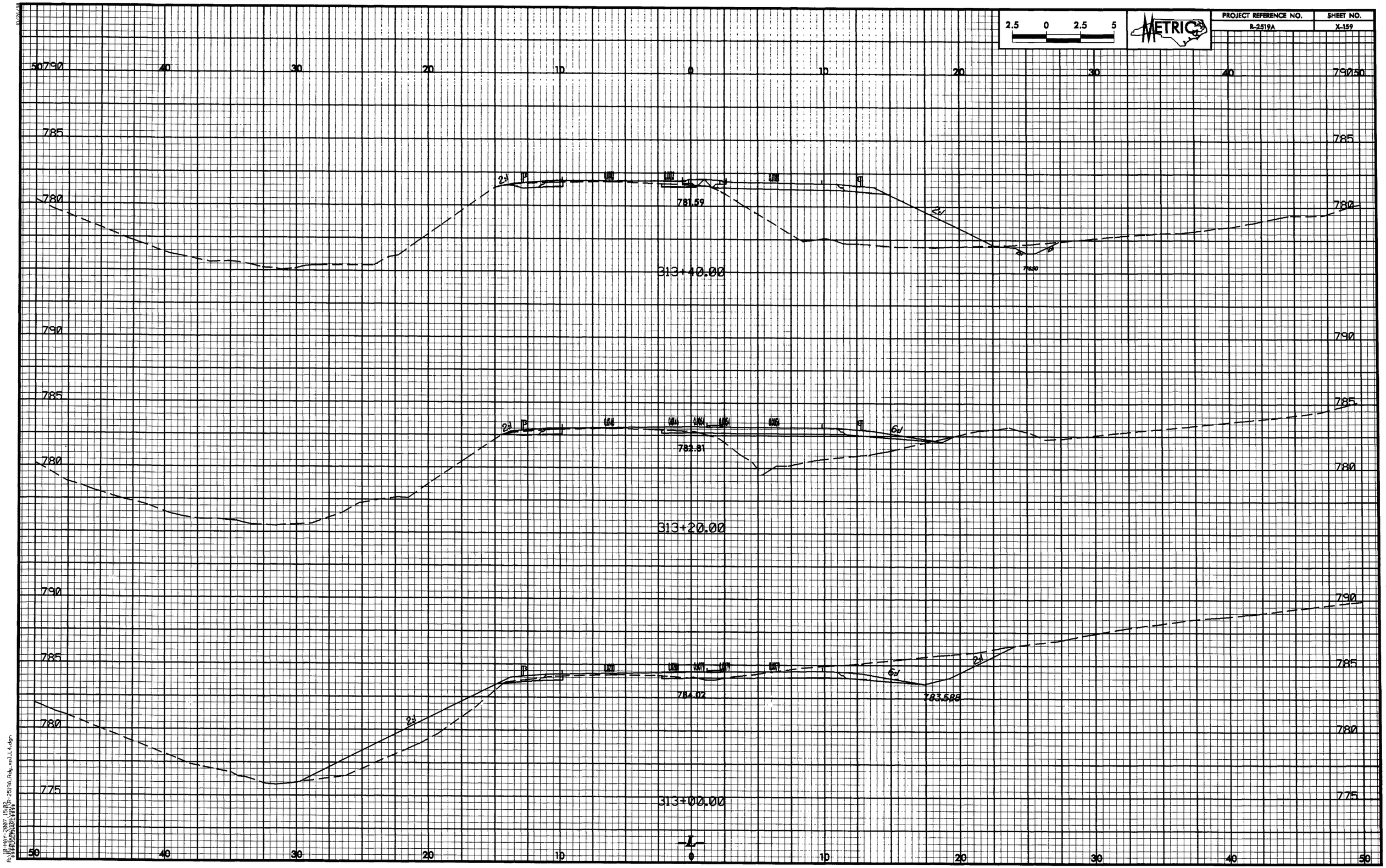
GEORGES FORK
EXISTING REACH CROSS SECTION A–A
–L– STA 313 + 74 108.3 ft (33.0m) LT

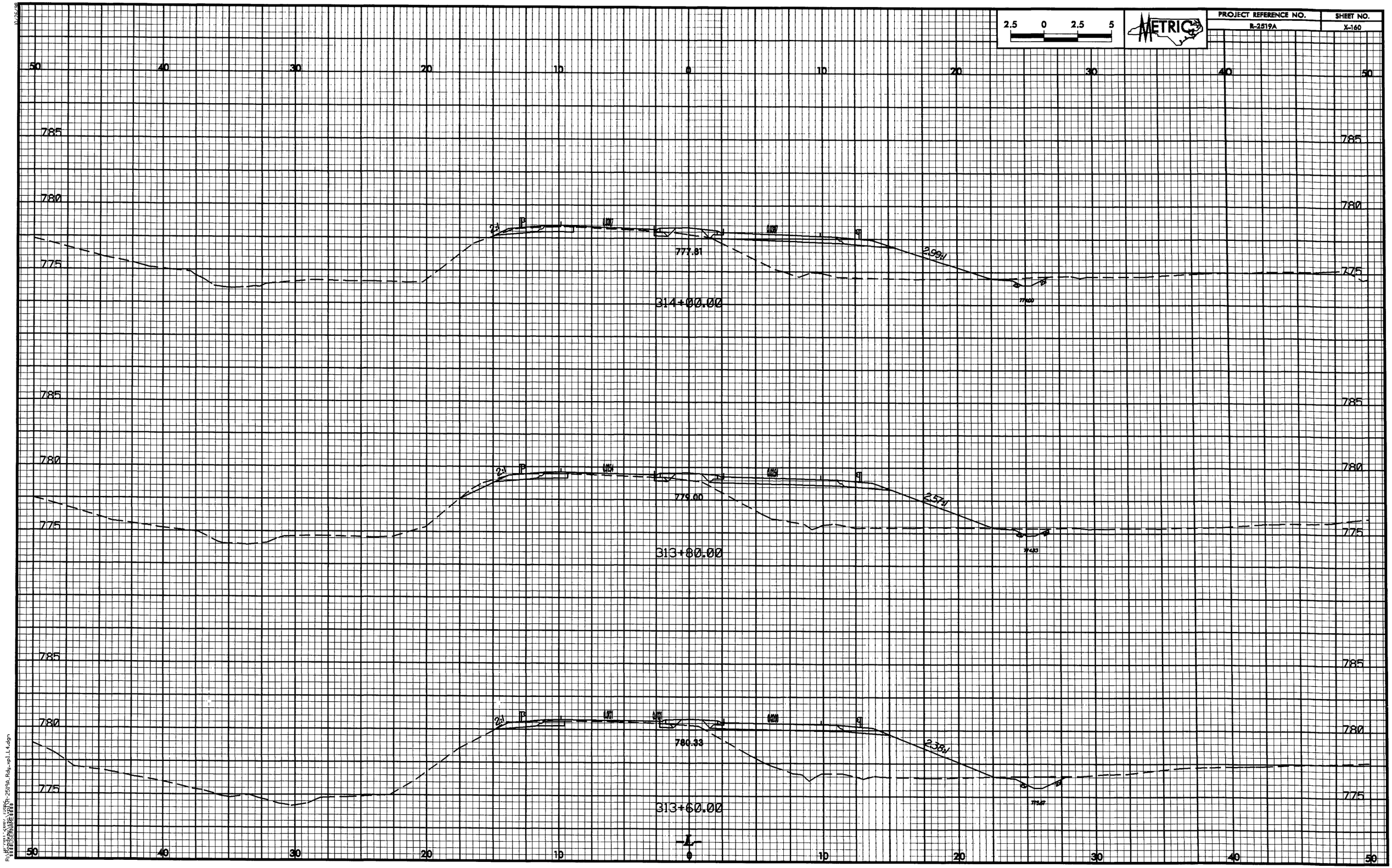


GEORGES FORK
EXISTING REACH CROSS SECTION A–A
–L– STA 313+74 108.3 ft (33.0m) LT

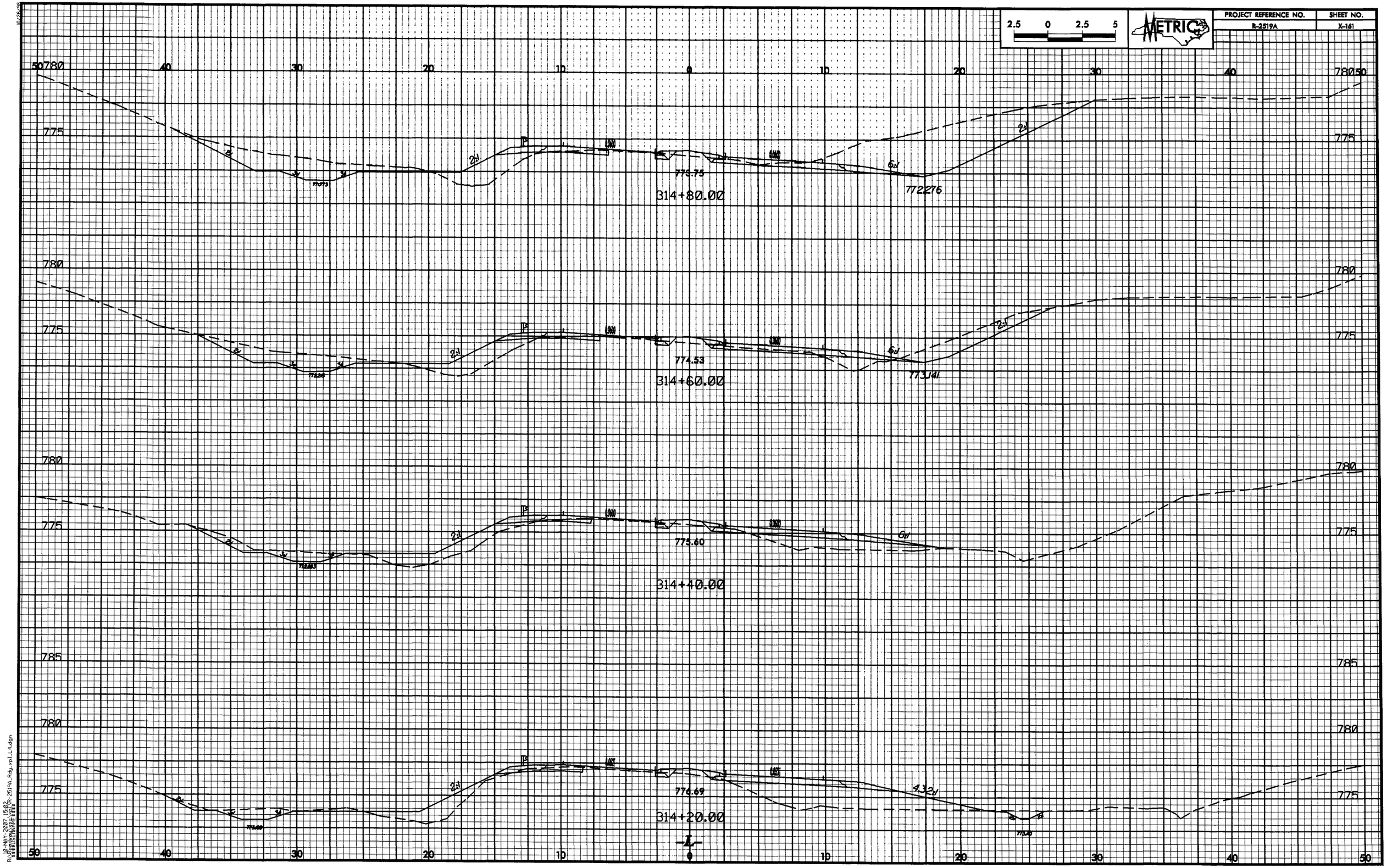
Rosgen Cross Section Classification Variables
- Stream Type = C4
- Drainage Area = 1.92 mi^2(4.78 km^2)
- Bankfull Area (Abf) = 28.2 ft^2(2.62m^2)
- Bankfull Mean Depth (Abf/Wbf) = 1.36 ft (0.41m)
- Width /Depth Ratio = (Wbf/dbf) = 15.2
- Entrenchment Ratio (ER) = (Wfp /Wbf) = 3.10
- Slope (s) = 0.02
- Bed Material = Gravel, Cobbles and boulders



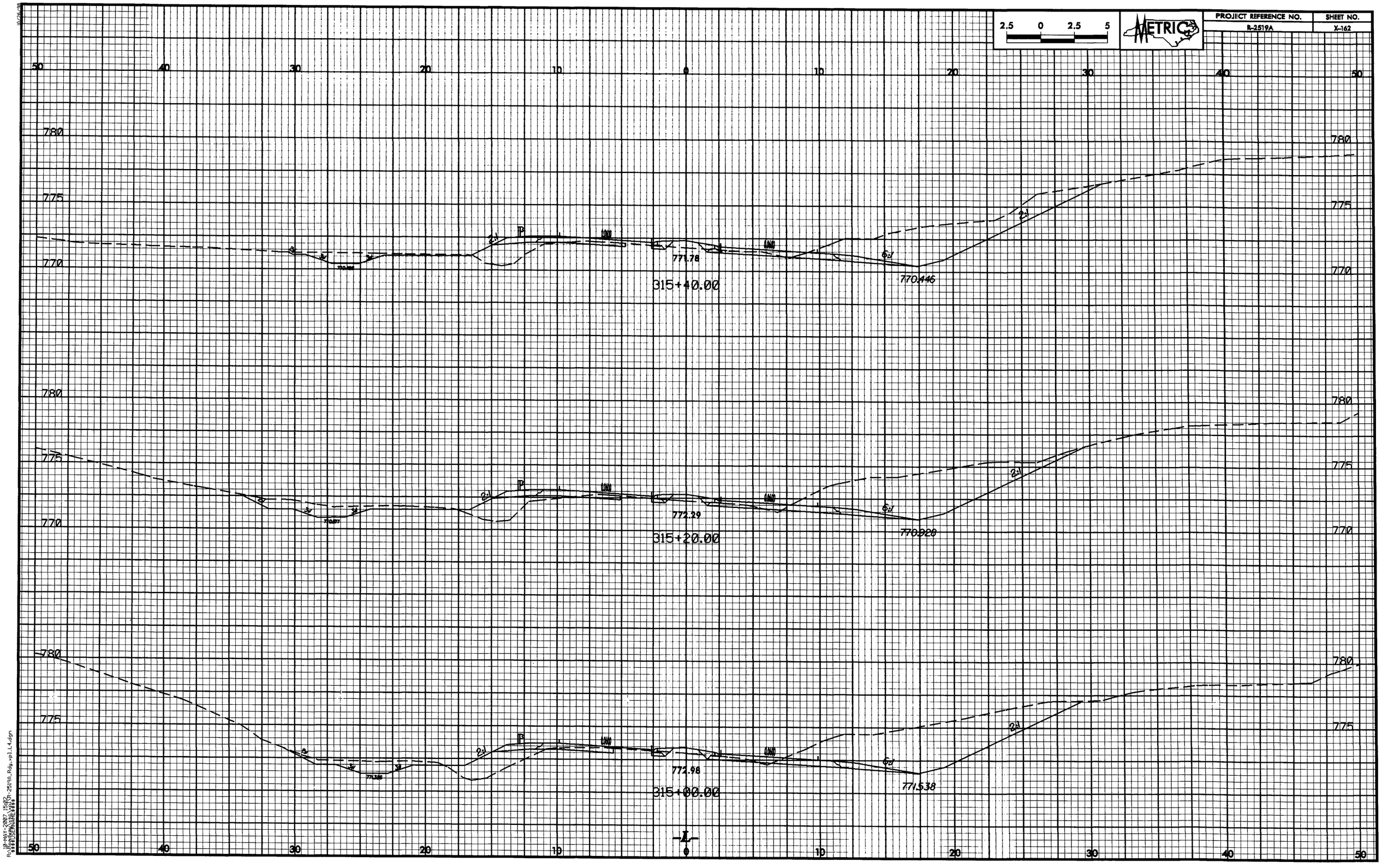

2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
X-159
50 40 30 20 10 0 10 20 30 40 50
790
785
780
775
781.59
313+40.00
782.81
313+20.00
784.02
783.588
313+00.00
-L-

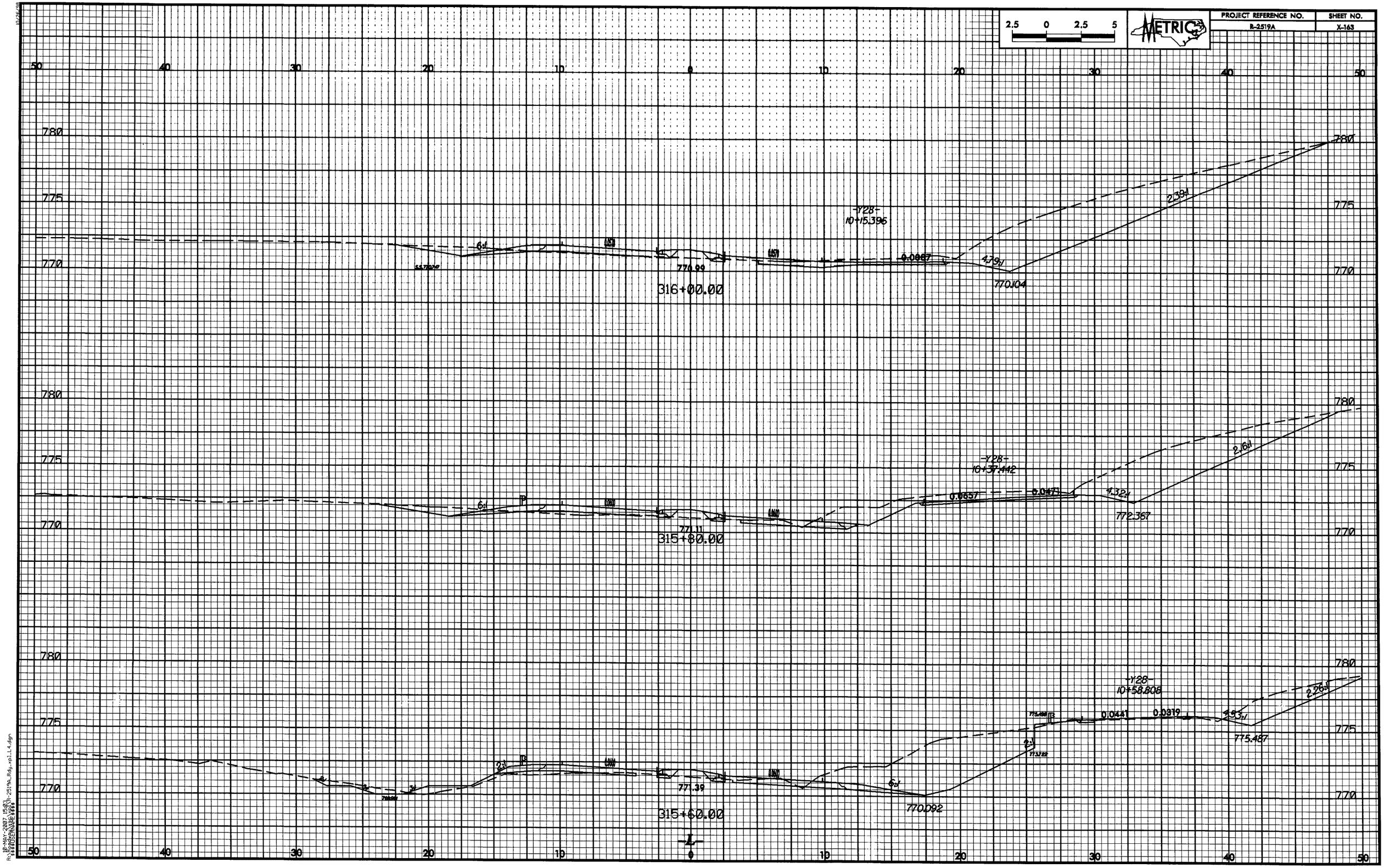

2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
X-160
50 40 30 20 10 0 10 20 30 40 50
785
780
775
2:1
IP
UBL
LBL
777.81
2.99%
314+00.00
779.00
2.57%
313+80.00
780.33
2.38%
313+60.00
-L-

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	X-161



10-MAY-2007 15:02
R:\Roadway\Proj\R-2519A_Rdy_xpl_L4.dgn
$$$$USER$$$$


2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
X-162
50 40 30 20 10 0 10 20 30 40 50
780
775
770
2:1
6:1
771.78
315+40.00
770.446
772.29
315+20.00
770.928
772.98
315+00.00
771.538
-L-



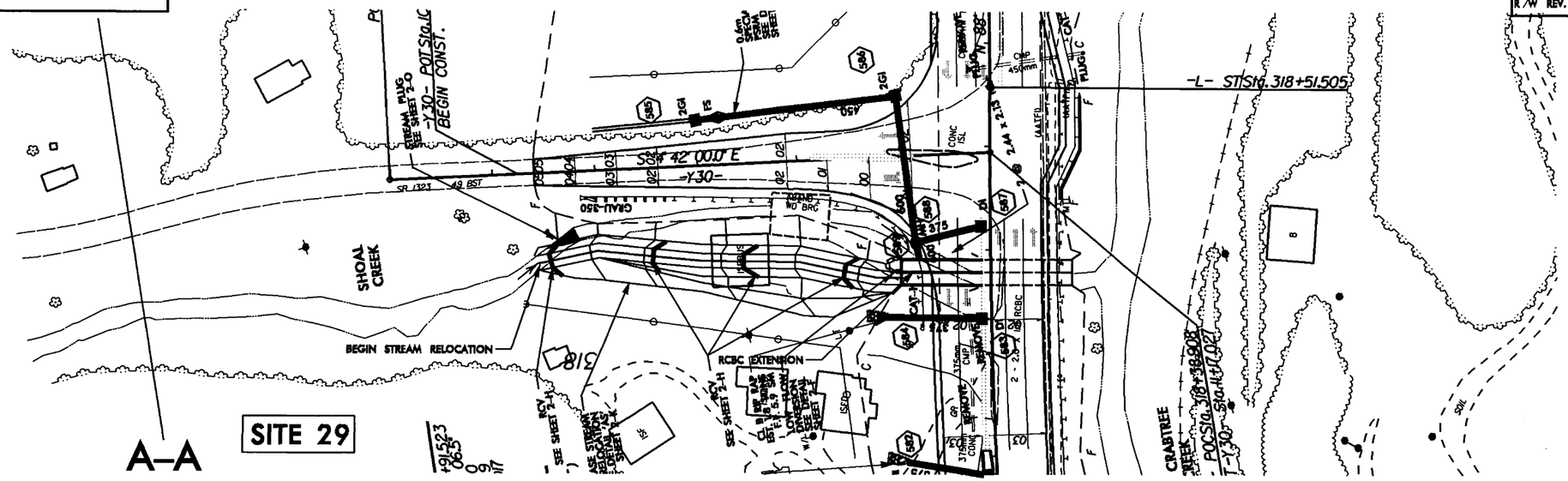
10/26/99

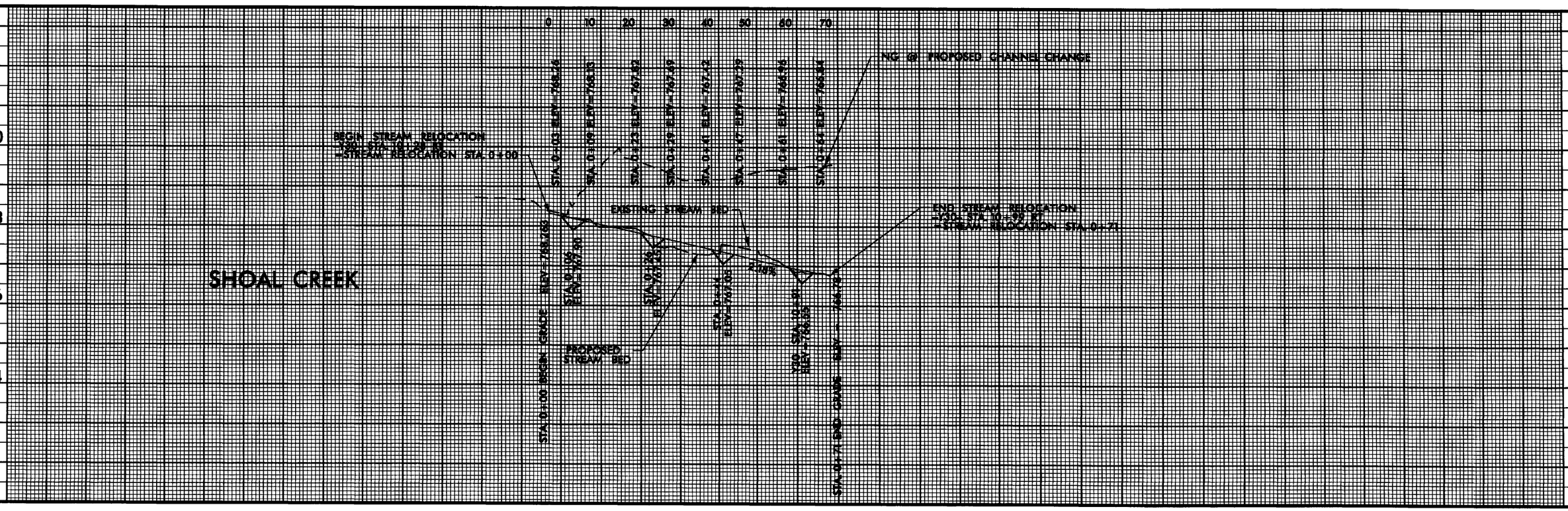
10-MAY-2007 15:03
R:\Roadway\Proj\R2519A_Rdy_wpi_L4.dgn
$$$$USERNAME$$$$

050197

REVISIONS

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



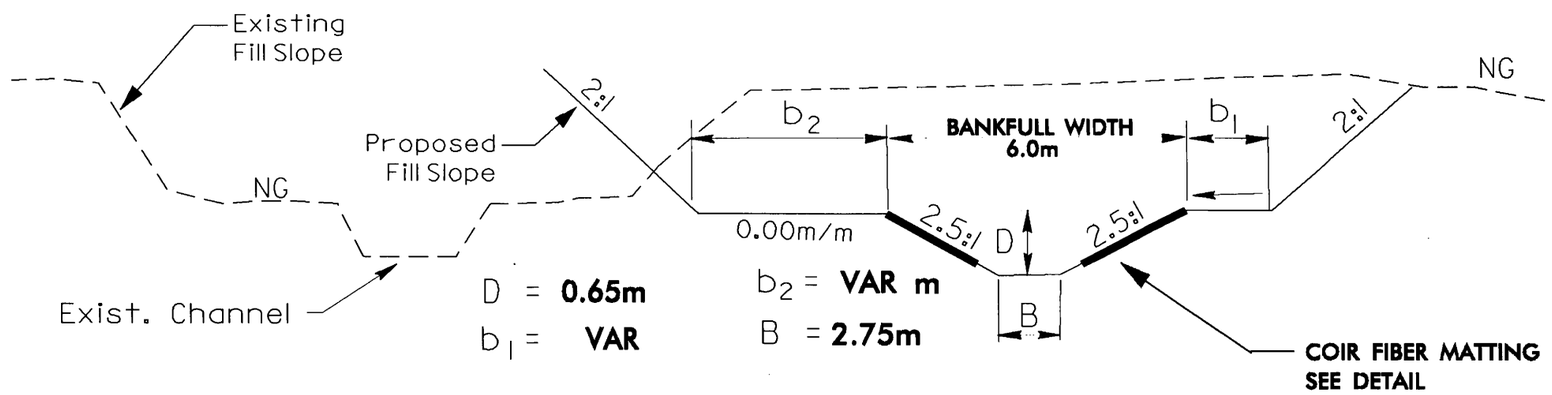


04-MAR-2009 16:53
stream_relocation\stream_ditch_2.dgn
nottingham AT 1V2456!

PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-K
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

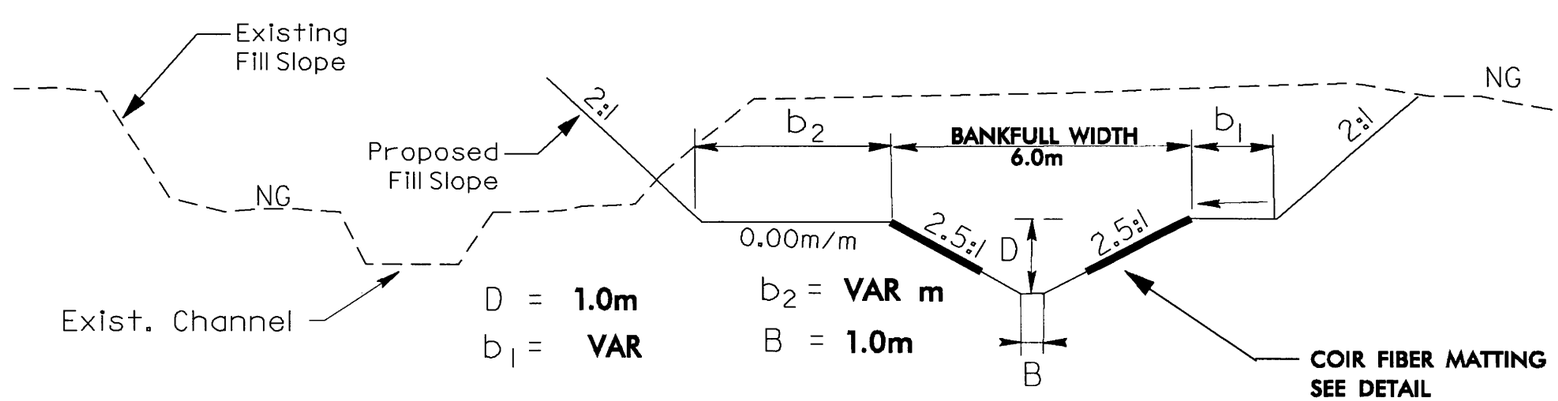
DETAIL "AS"
SHOAL CREEK STREAM RELOCATION
-Y30- STA. 10+28 TO STA. 10+99 RT

TYPICAL RIFFLE SECTION



NOTE: SEE -Y30- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

TYPICAL POOL SECTION

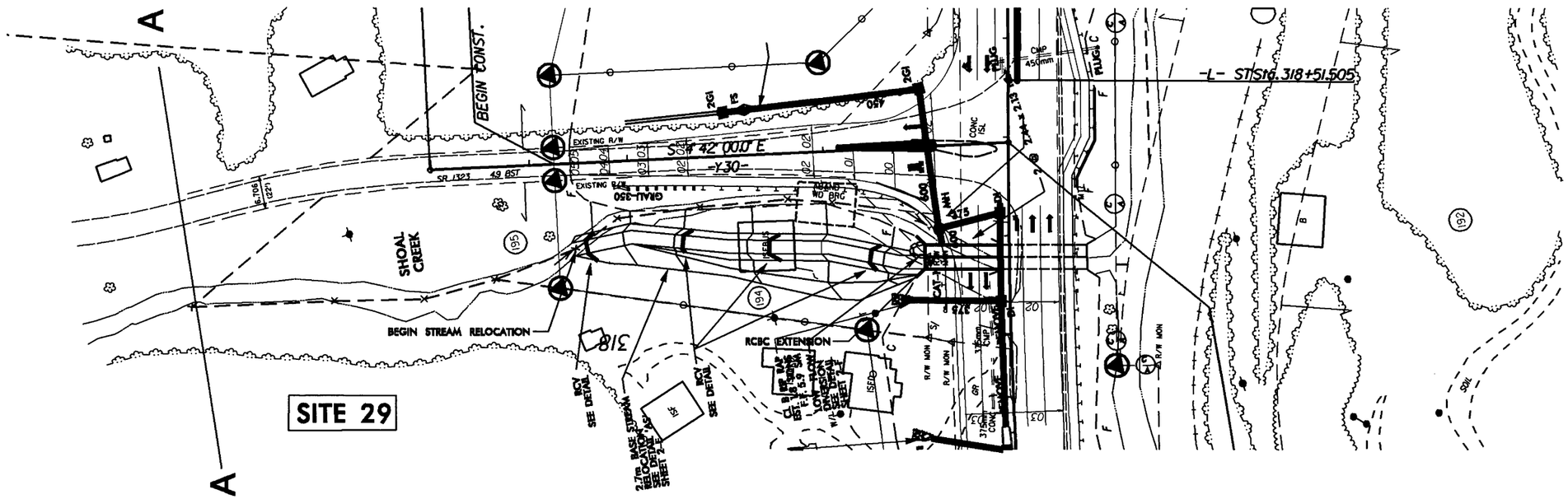


NOTE: SEE -Y30- CROSS SECTIONS FOR b_1 AND b_2 DIMENSIONS

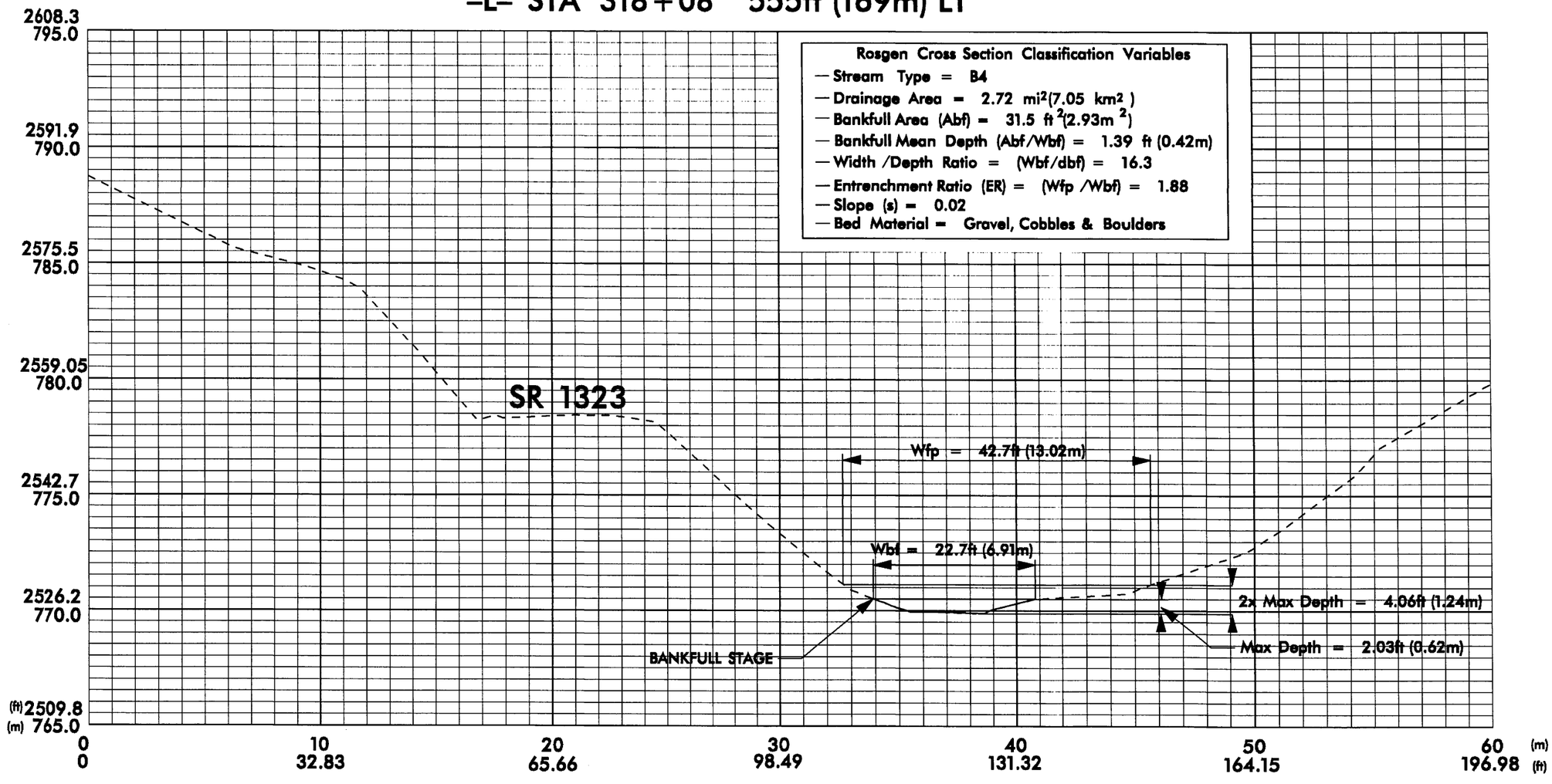
SHOAL CREEK

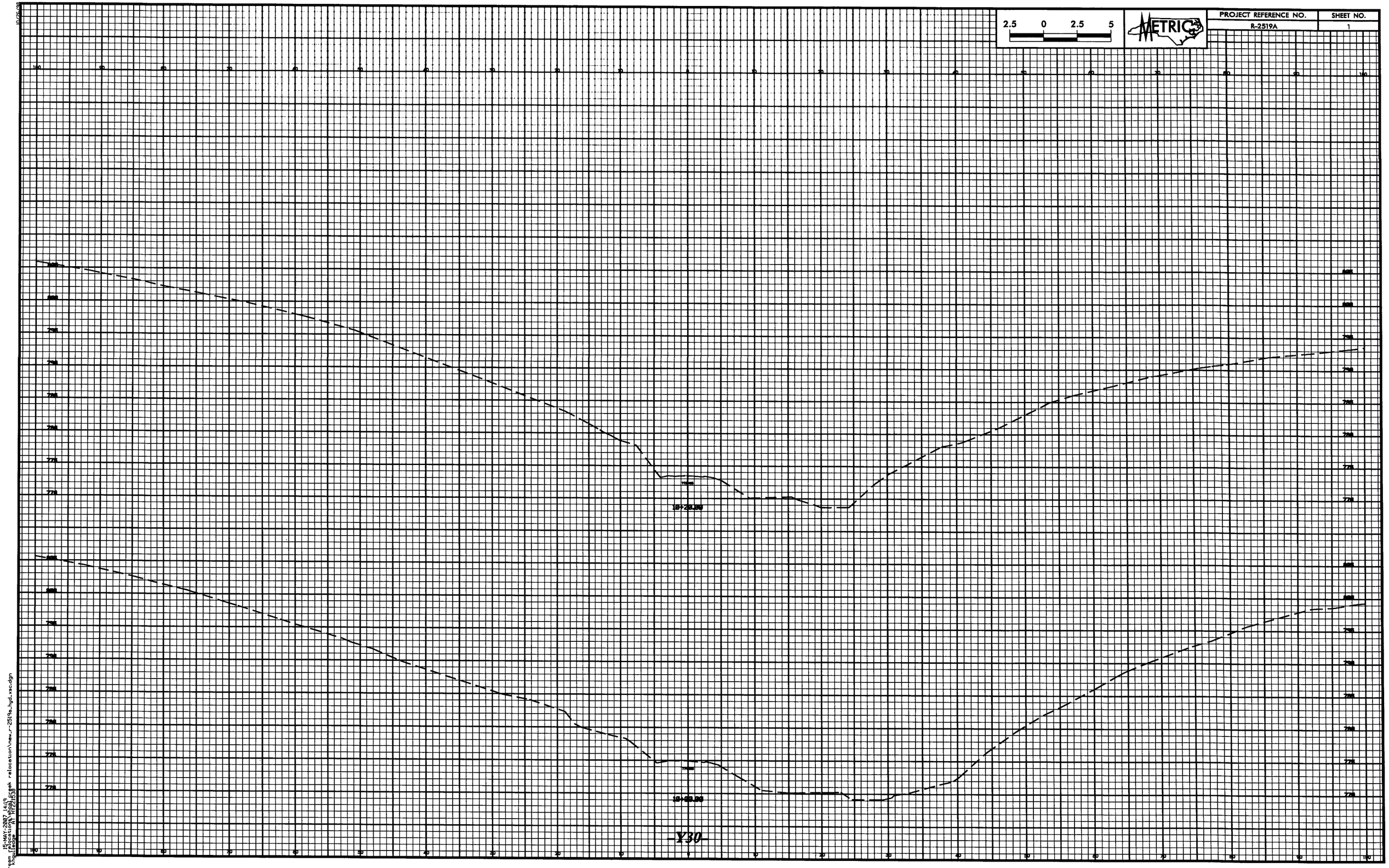
EXISTING REACH CROSS SECTION A–A

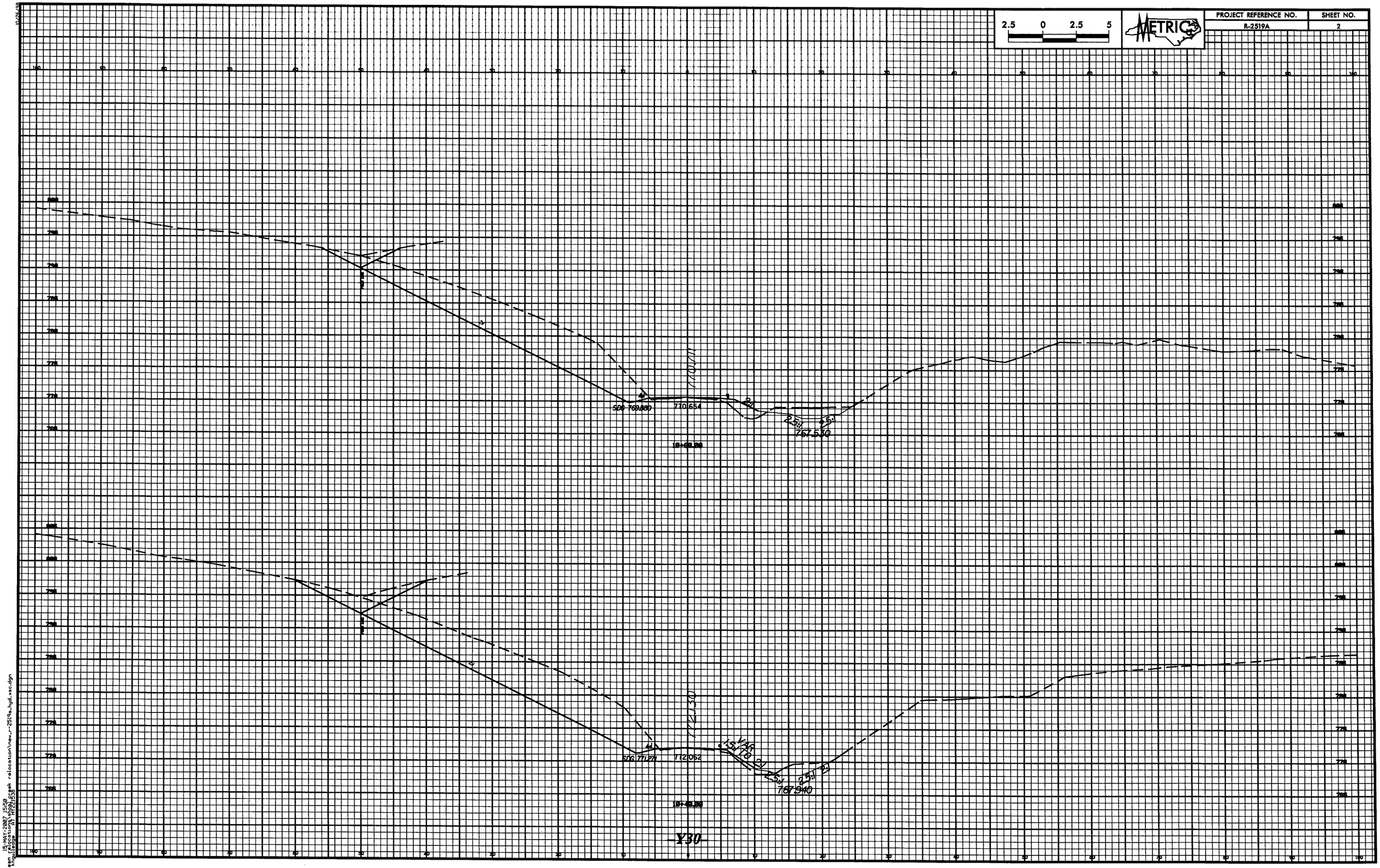
–L– STA 318+08 555ft (169m) LT



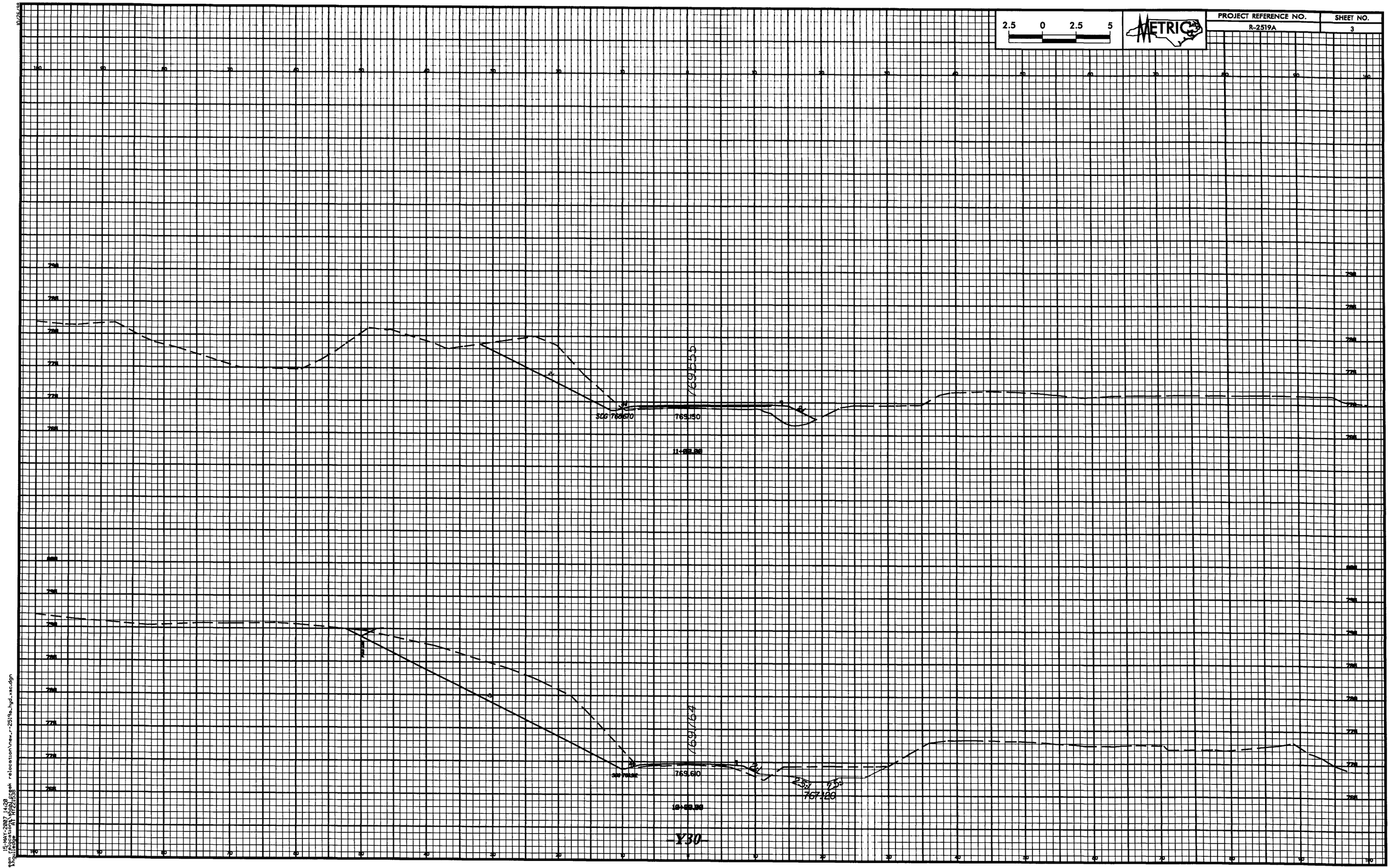
SHOAL CREEK
EXISTING REACH CROSS SECTION A–A
–L– STA 318+08 555ft (169m) LT




2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
1
10+28.00
10+02.00
-Y30-

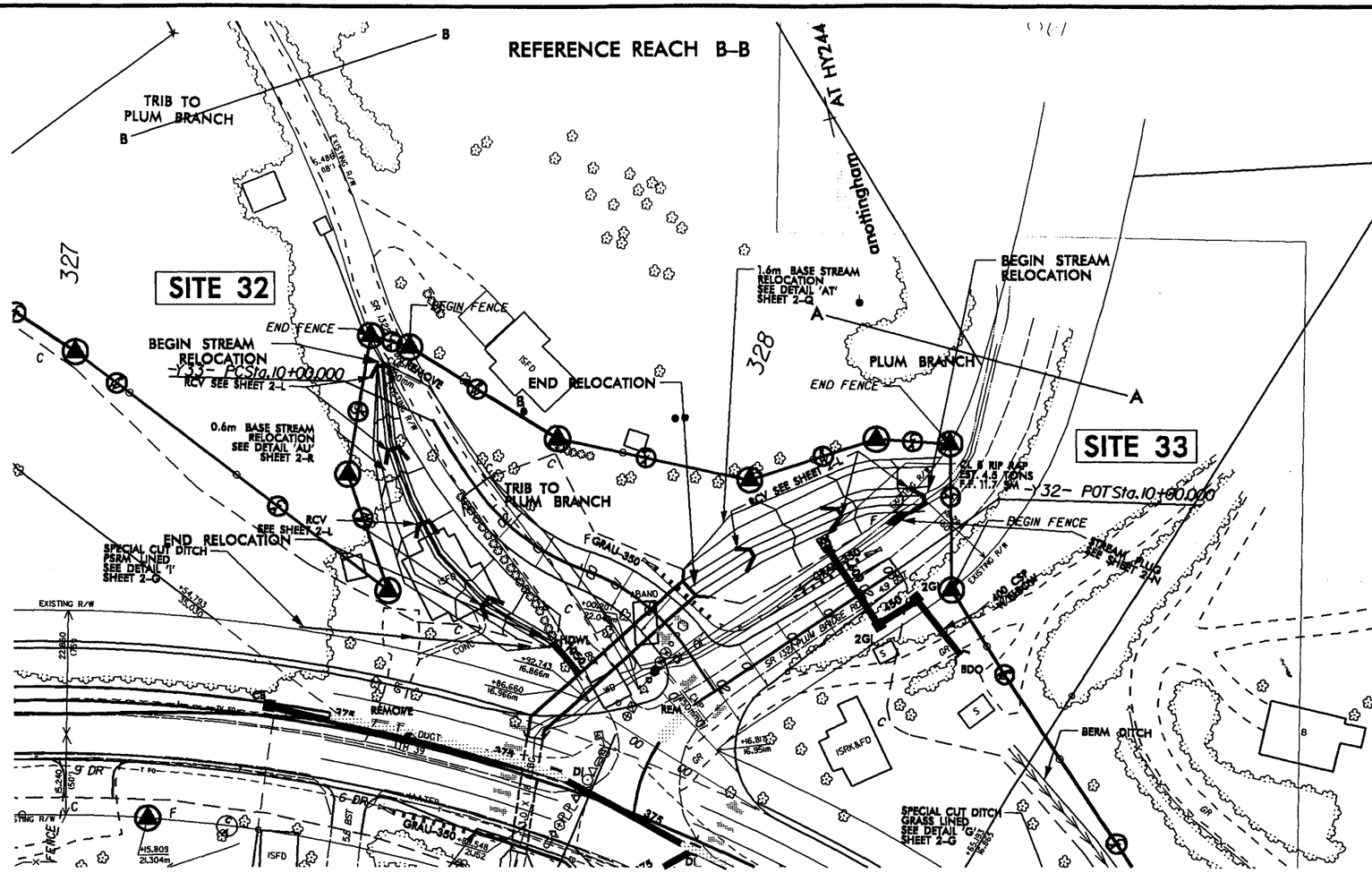


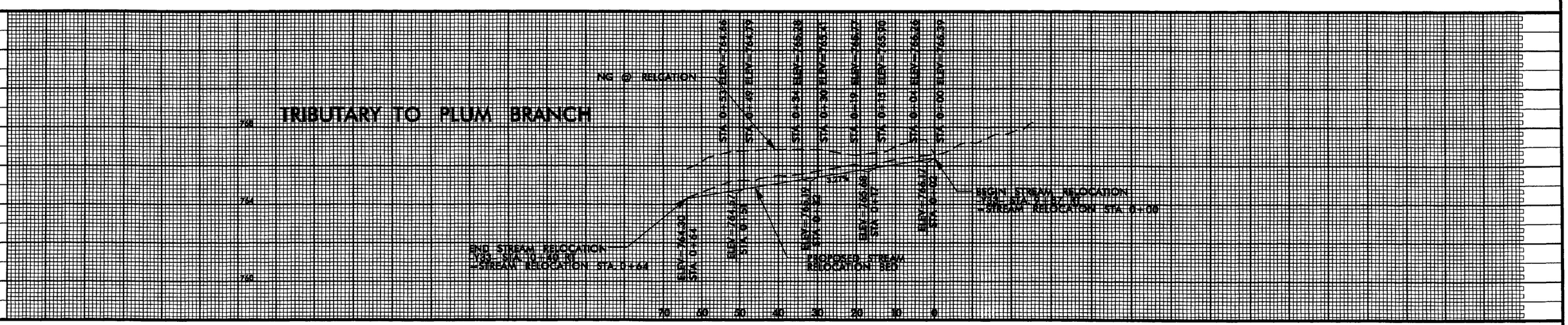
10/26/88
15-MAY-2007 15:59
team relocations\hydraulics\r-2519a_hyd_xsc.dgn
Kimley-Horn and Associates, Inc.


2.5 0 2.5 5
METRIC
PROJECT REFERENCE NO.
R-2519A
SHEET NO.
3
769.55
SCS 768.70
768.150
11+00.00
769.64
SCS 768.56
769.610
767.80
10+00.00
Y30

REVISIONS

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

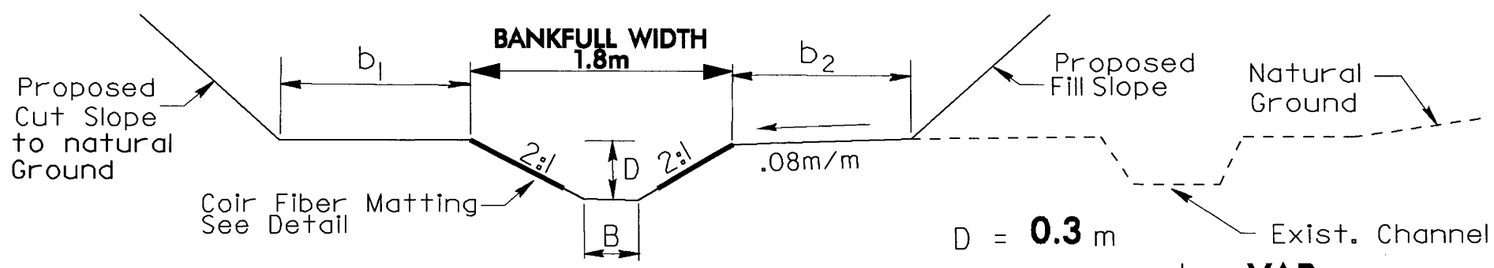




METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2519A	2-M
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R/W REV.		

TRIBUTARY TO PLUM BRANCH STREAM RELOCATION DETAIL "AU" -Y33- STA. 9+86 TO STA. 10+40 RT

TYPICAL RIFFLE SECTION



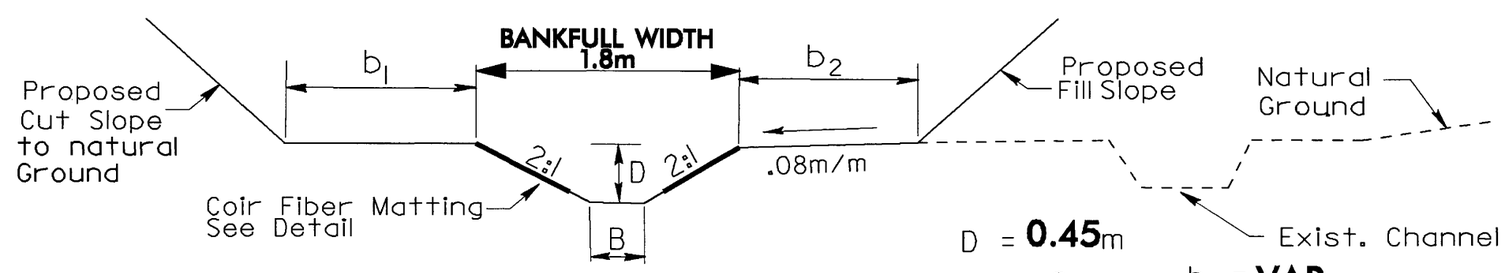
D = **0.3** m

B = **0.6** m

b_1 = **VAR** m

b_2 = **VAR** m

TYPICAL POOL SECTION



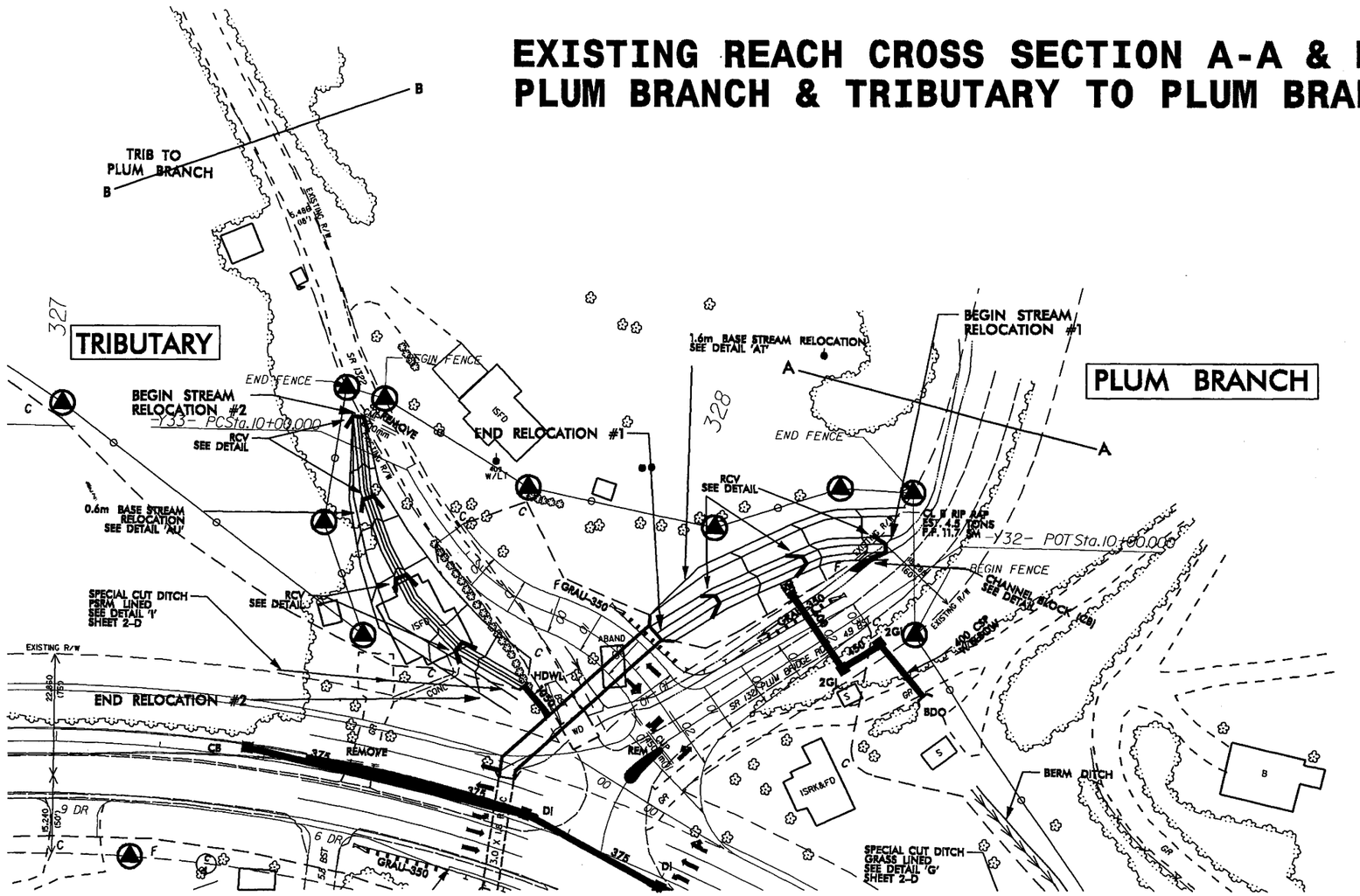
D = **0.45**m

B = **0** m

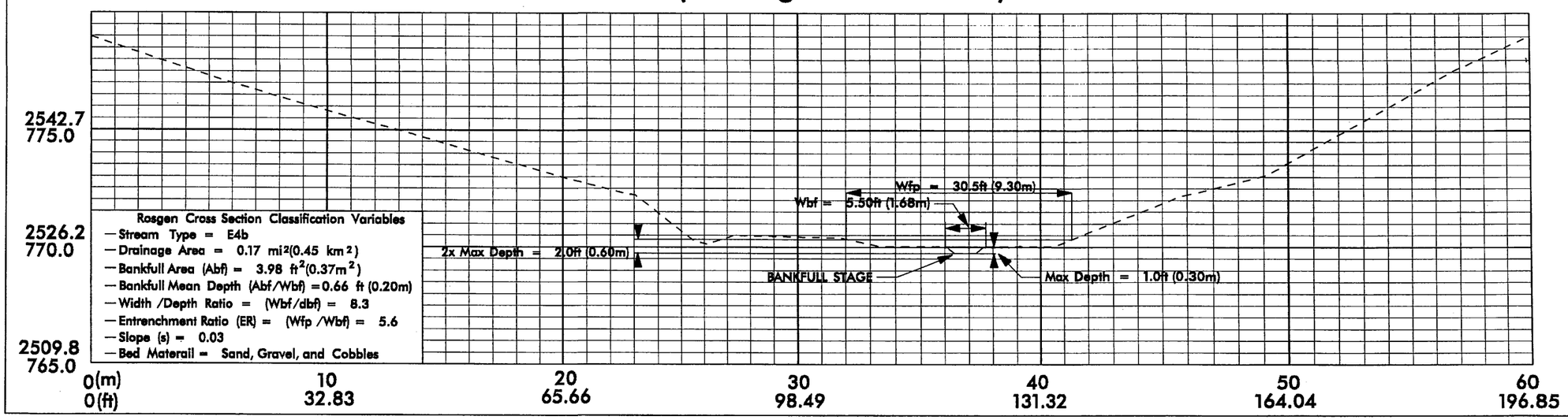
b_1 = **VAR** m

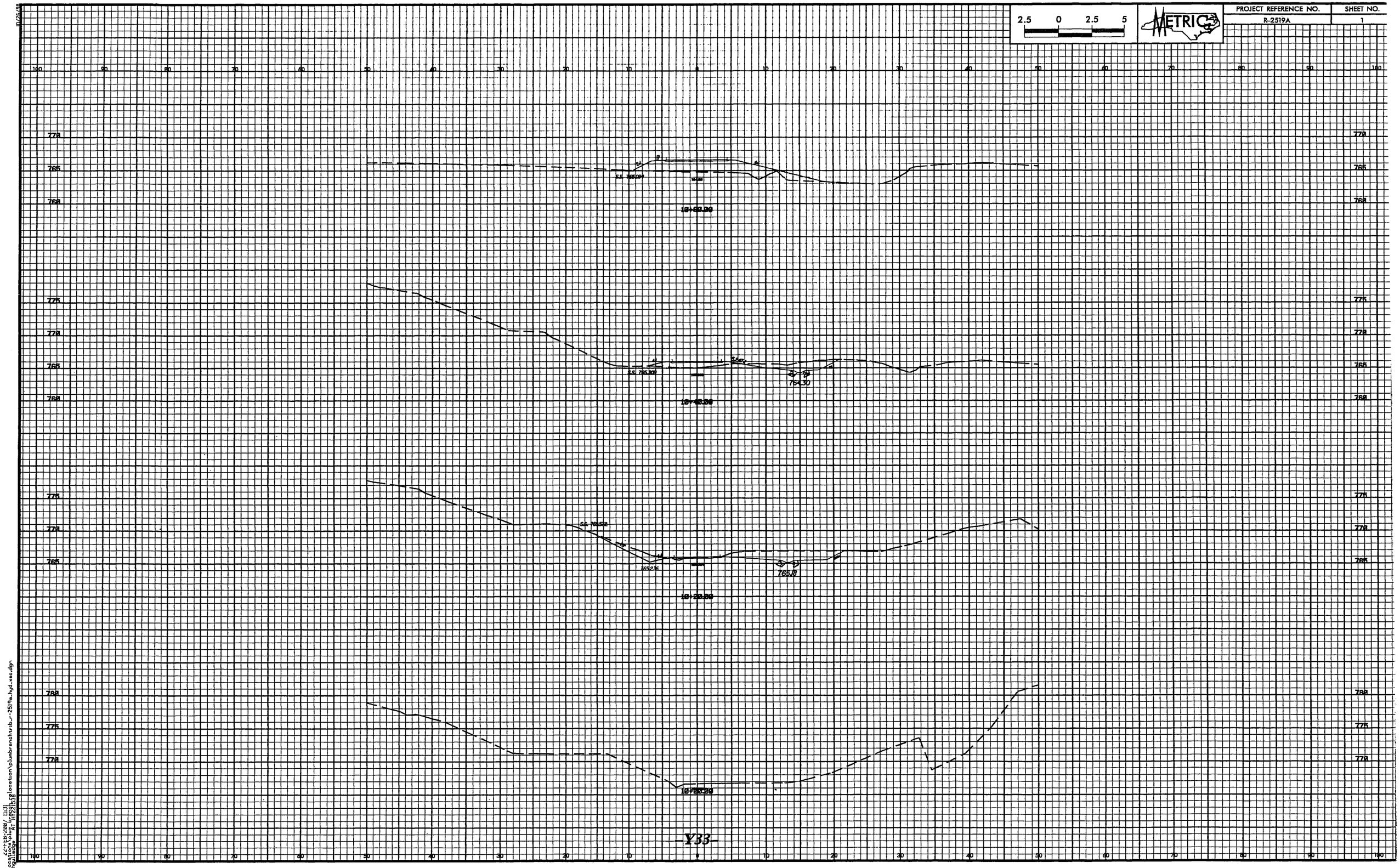
b_2 = **VAR** m

EXISTING REACH CROSS SECTION A-A & B-B
PLUM BRANCH & TRIBUTARY TO PLUM BRANCH



TRIBUTARY TO PLUM BRANCH – EXISTING REACH CROSS SECTION B–B
–Y33– (Looking Downstream)



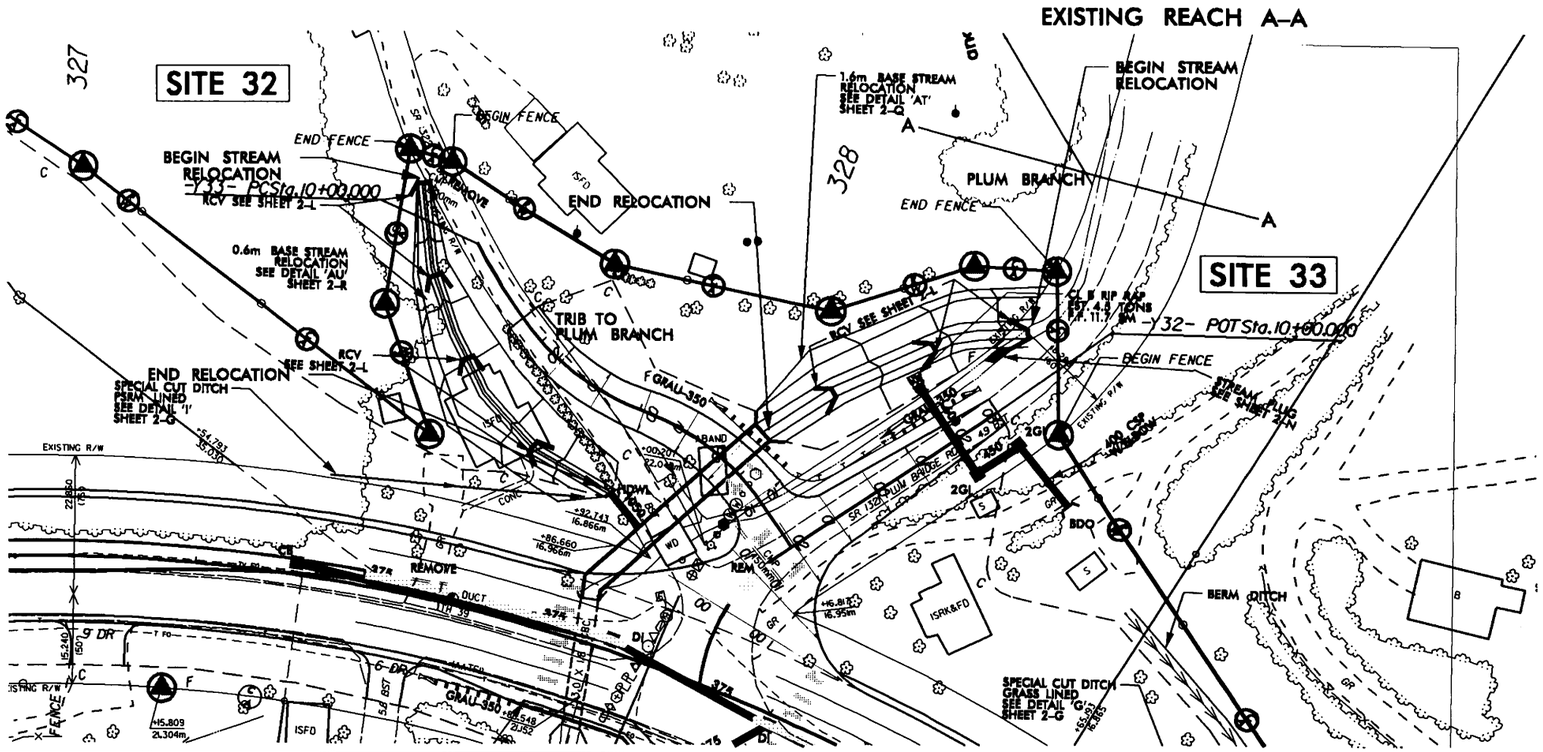


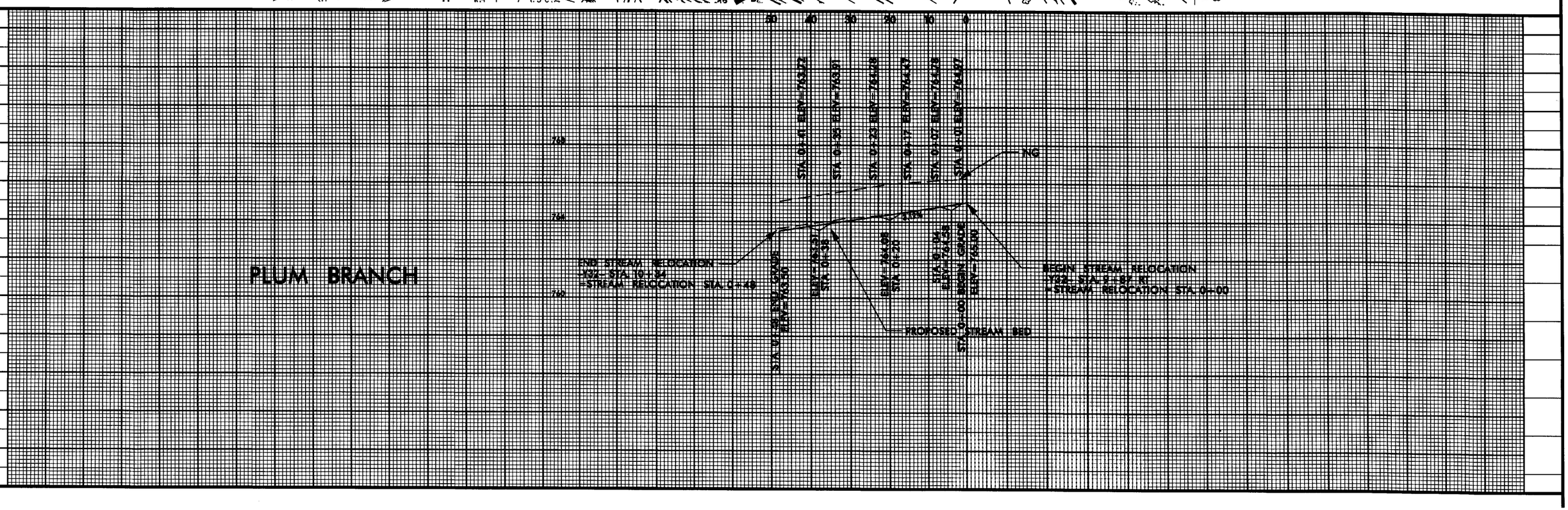
10/26/98
cdcntb01-c090 (11i3)
"relocation:proj:proj.gslocation\plumbranchtrib_r-2519a_hyd_xsec.dgn
knoll:ledge:ART_HYD2519A38

REVISIONS

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

METRIC

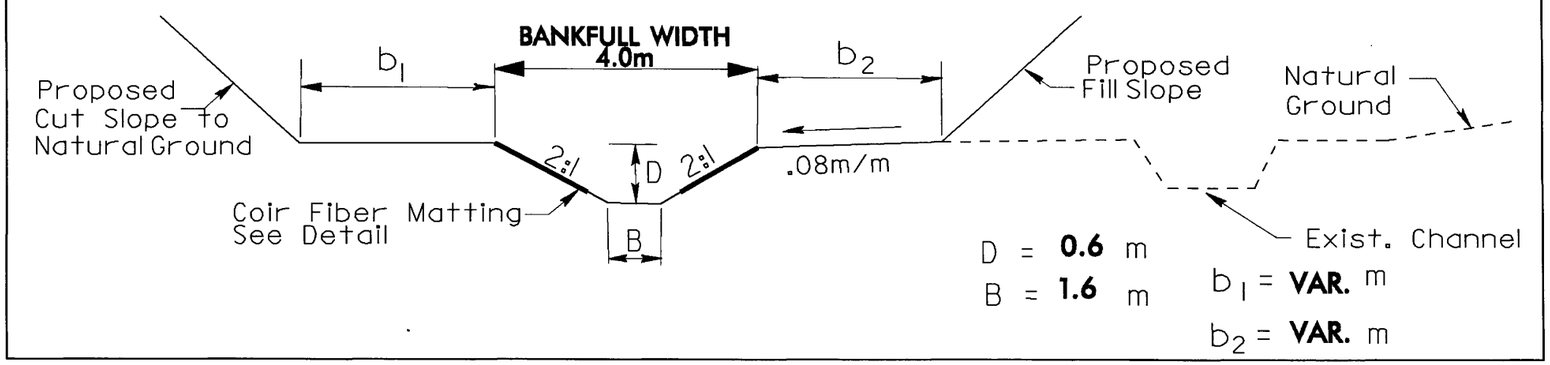




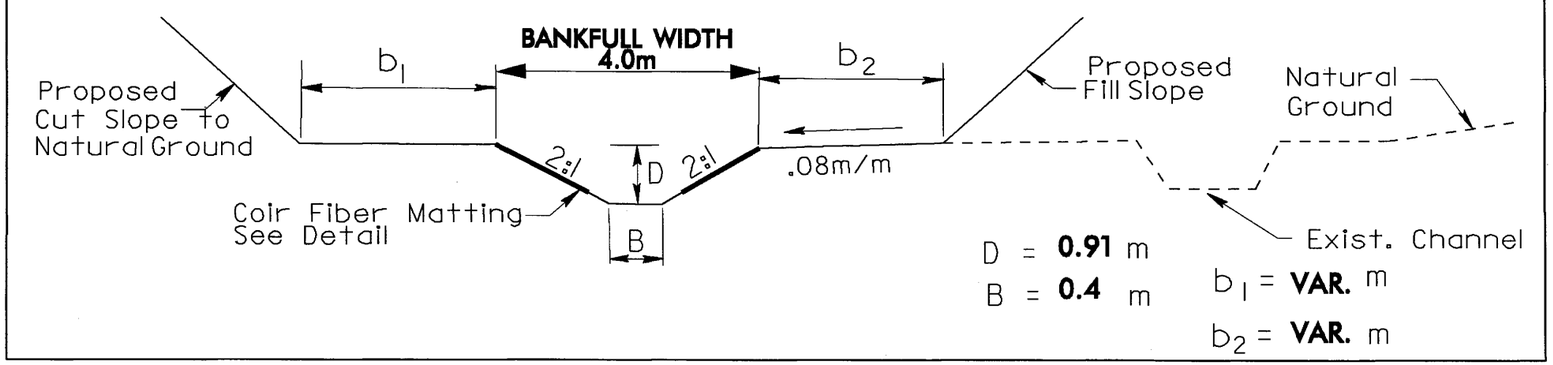
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2519A	2-L
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R/W REV.		

PLUM BRANCH STREAM RELOCATION DETAIL "AT" -Y32- STA. 9+86 TO STA. 10+34 RT

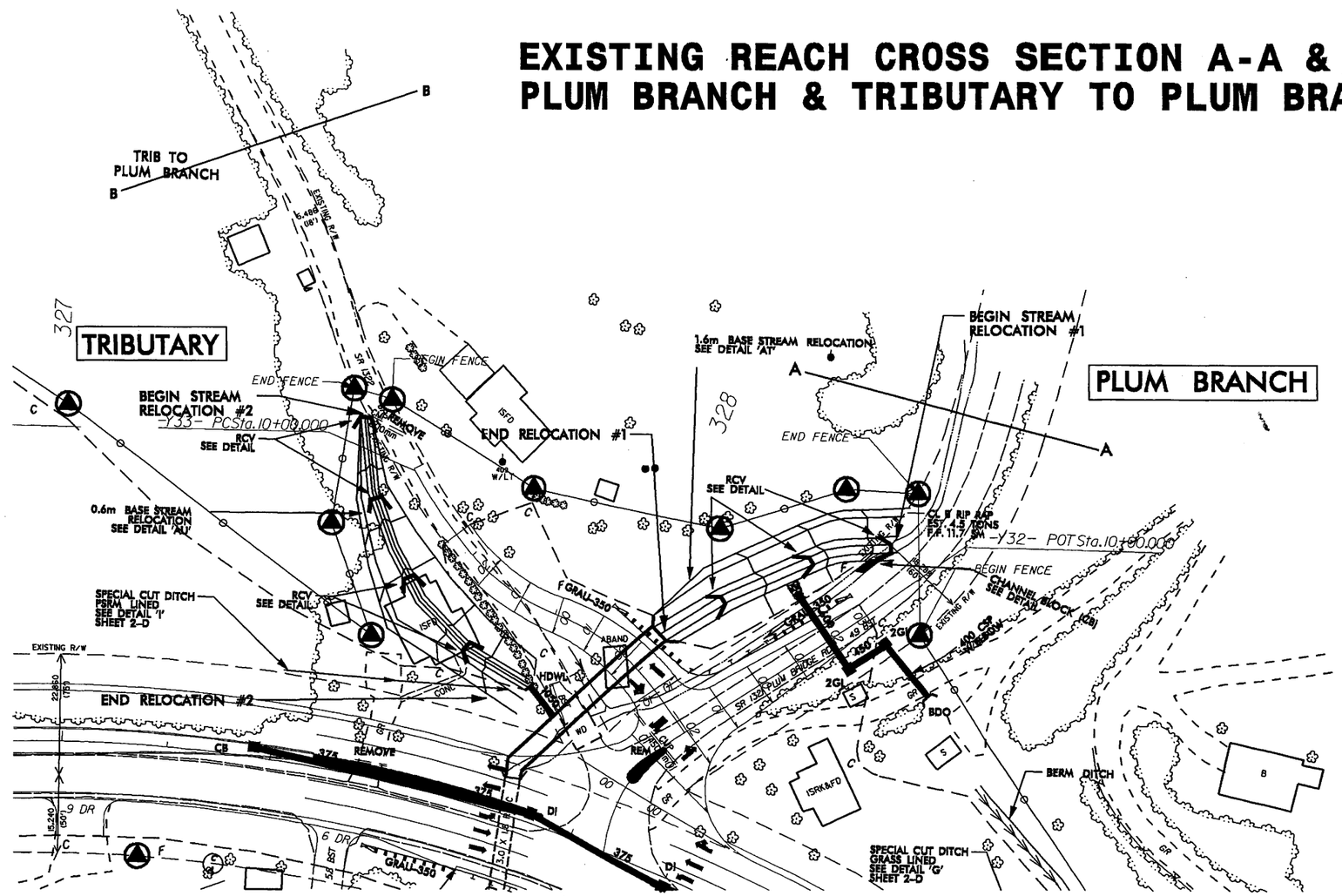
TYPICAL RIFFLE SECTION



TYPICAL POOL SECTION

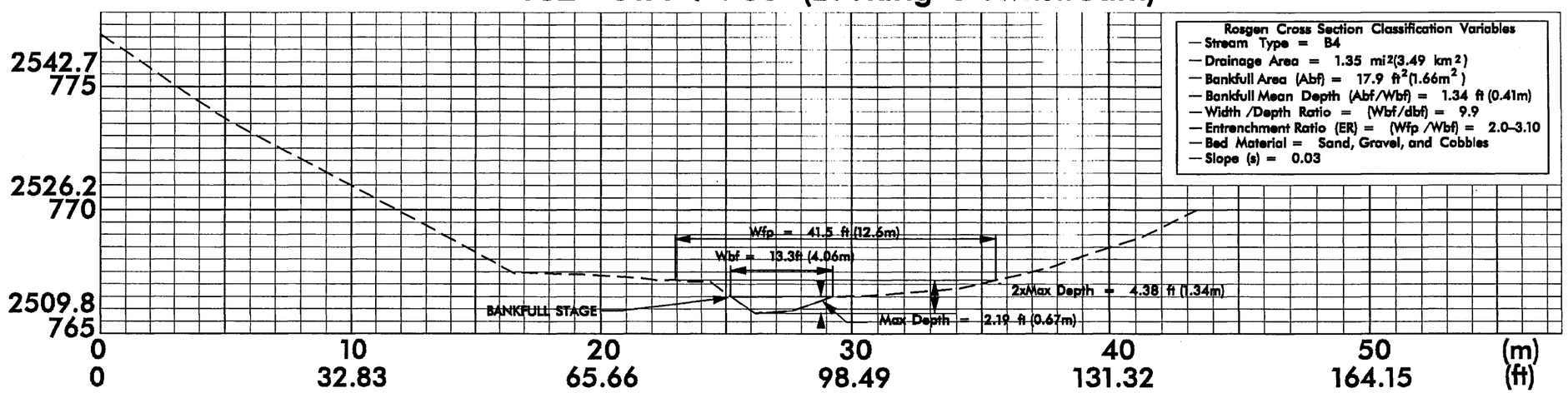


EXISTING REACH CROSS SECTION A-A & B-B
PLUM BRANCH & TRIBUTARY TO PLUM BRANCH

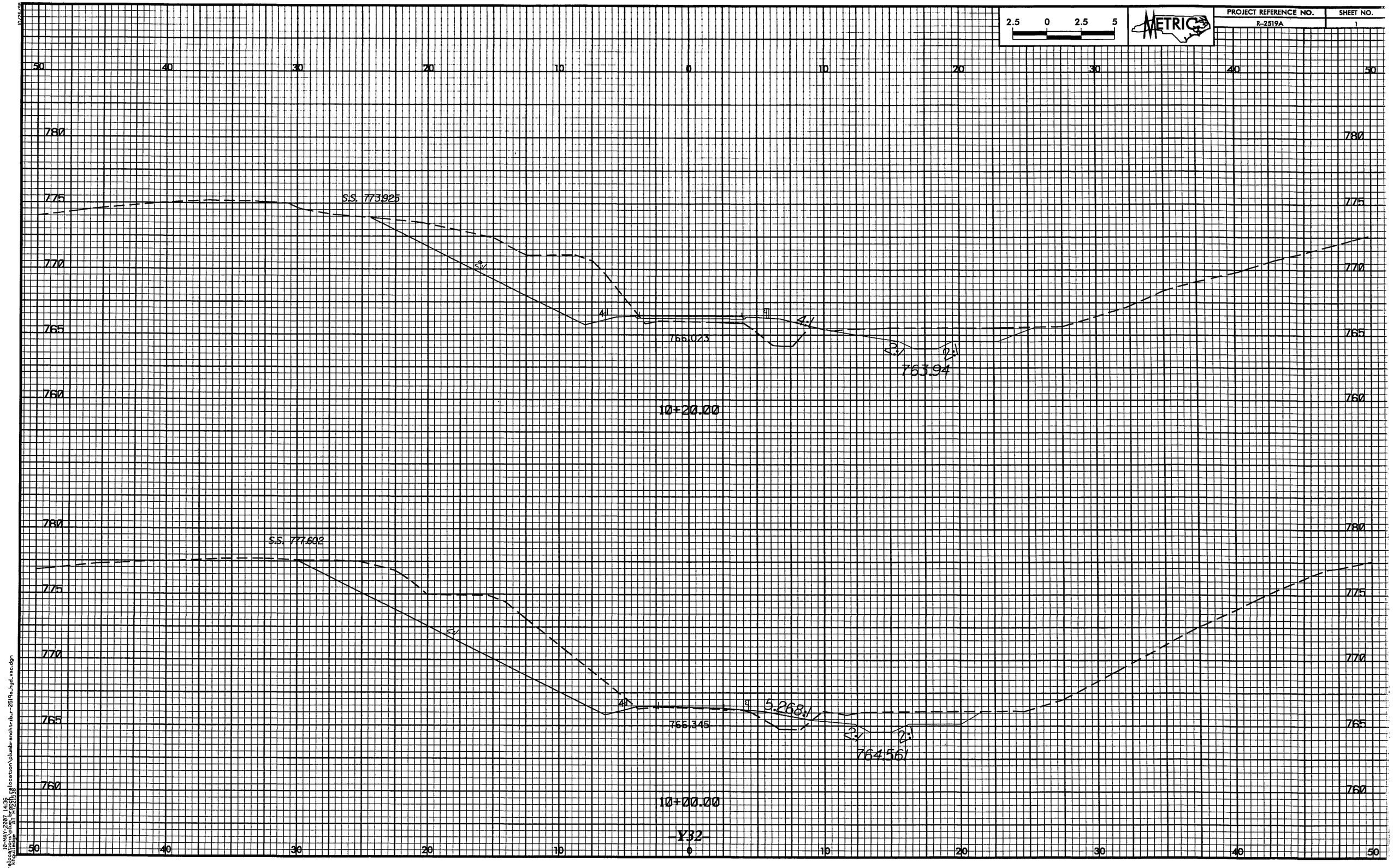


PLUM BRANCH – EXISTING REACH CROSS SECTION

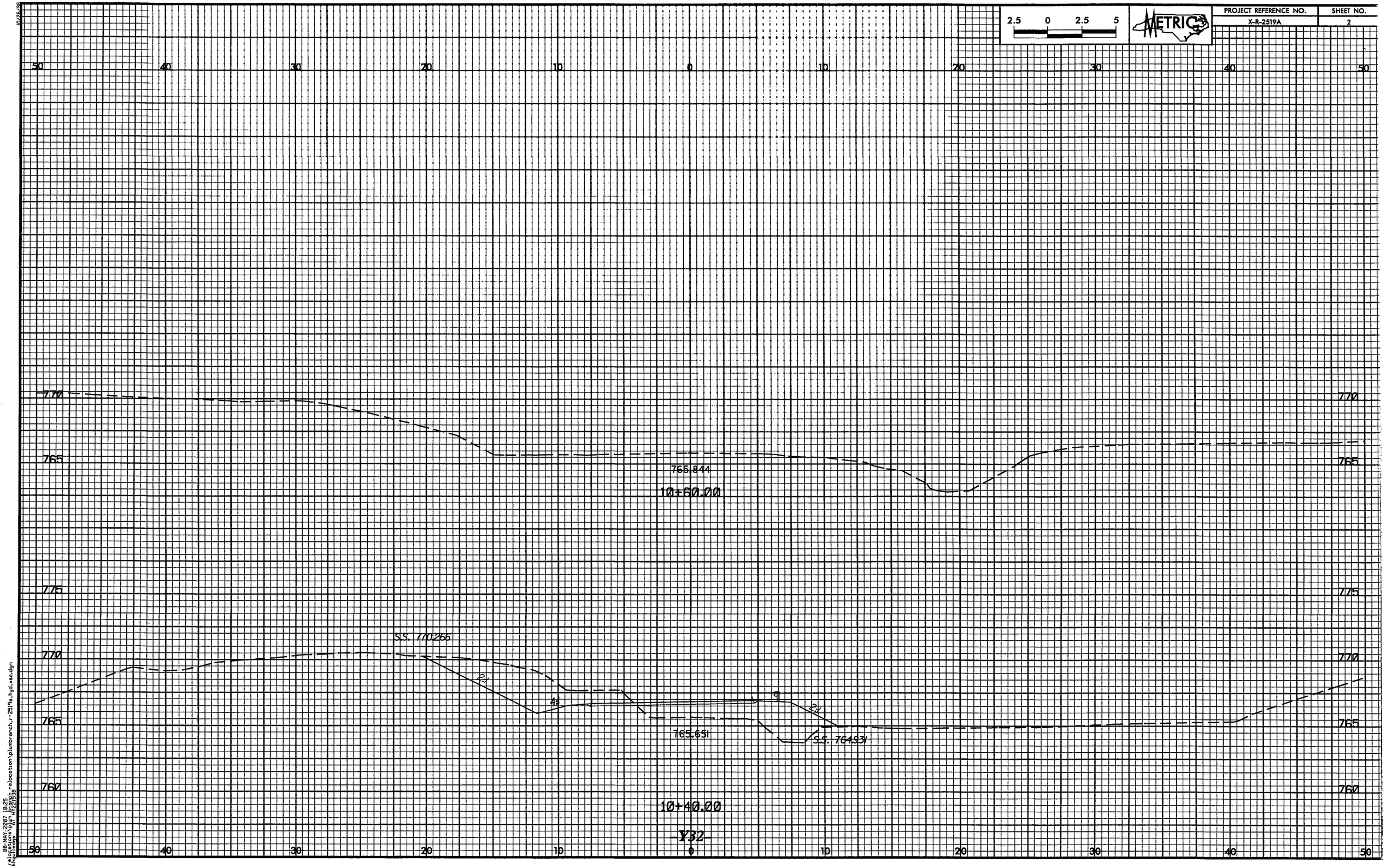
–Y32– STA 9+55 (Looking Downstream)



Use 1:200



10-MAY-2007 14:36
\locations\plan_h\R2519a\location\plumbranchtrib_r-2519a_hyd_xsc.dgn



10/26/98
08-MAY-2007 19:25
r:\roadway\proj\relocations\plumbranch_r-2519a_hyd_xsec.dgn
kheilbede PAT HYDRO38

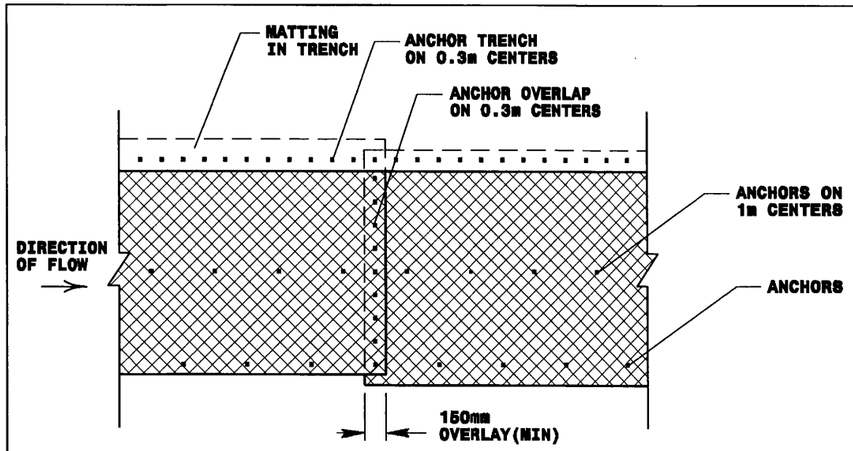
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

CONST.REV.

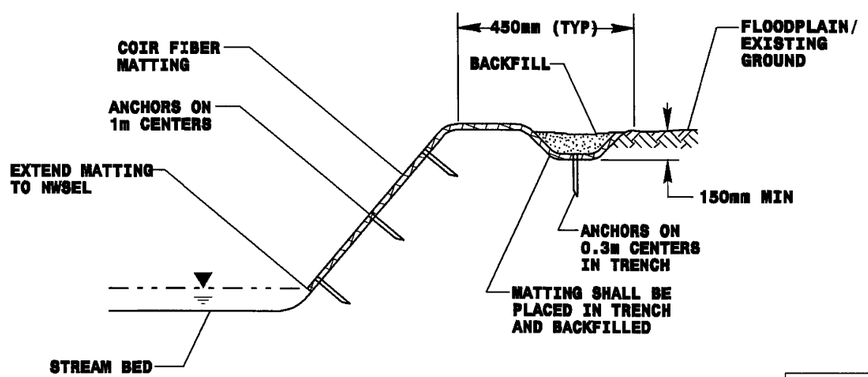
R/W REV.

COIR FIBER MATTING DETAIL

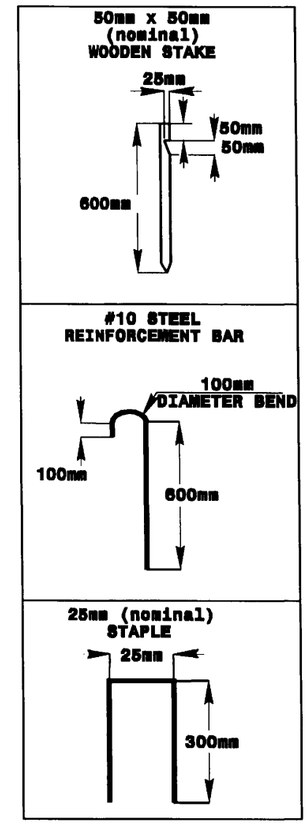
NOT TO SCALE



PLAN VIEW



TYPICAL CROSS SECTION



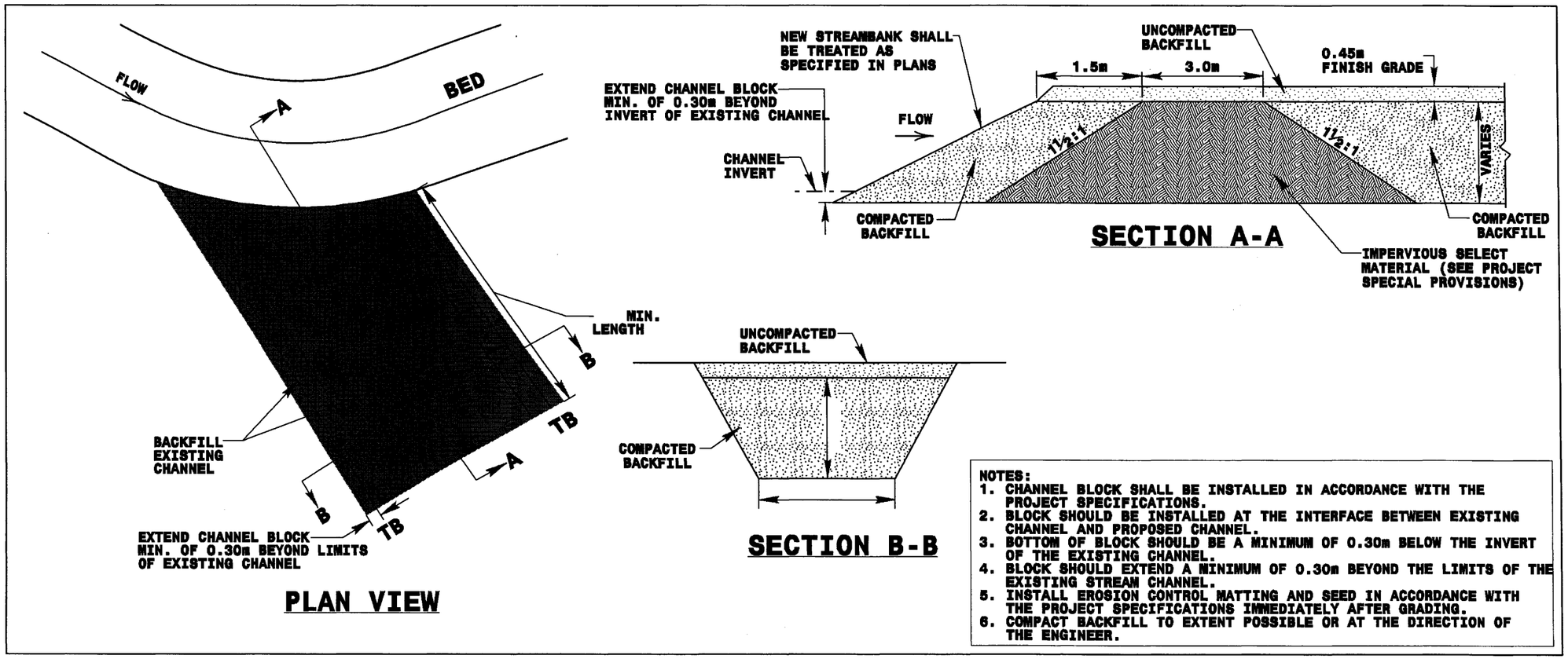
ANCHOR OPTIONS

NOTES:
1. IN AREAS TO BE MATTED, ALL SEEDING, SOIL AMENDMENTS, AND SOIL PREPARATION MUST BE COMPLETED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS PRIOR TO PLACEMENT OF COIR FIBER MATTING.
2. REBAR OR STAPLES MAY BE USED IN PLACE OF WOODEN STAKES AS DIRECTED BY THE ENGINEER.

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2519A	2-0
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.		
R/W REV.		

STREAM PLUG

NOT TO SCALE



NOTES:
1. CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2. BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3. BOTTOM OF BLOCK SHOULD BE A MINIMUM OF 0.30m BELOW THE INVERT OF THE EXISTING CHANNEL.
4. BLOCK SHOULD EXTEND A MINIMUM OF 0.30m BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5. INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6. COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

-L- 314+10 LT

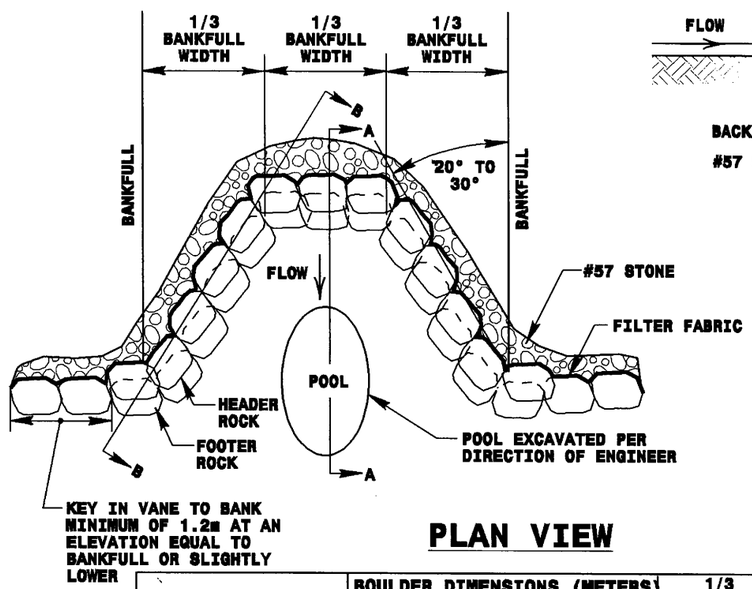
-Y30- 10+30 RT

-Y32- 9+95 RT

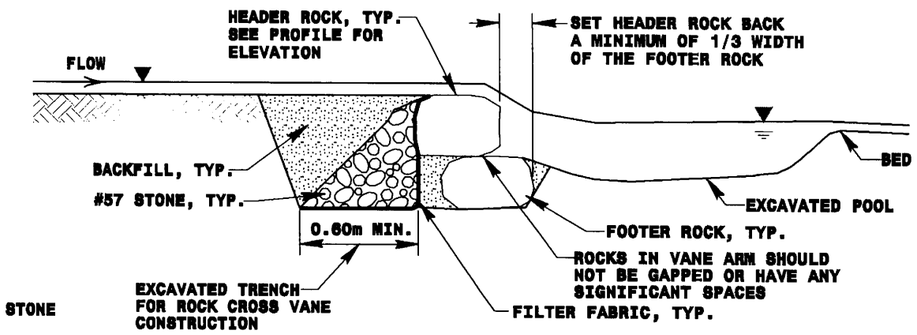
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-L
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

ROCK CROSS VANE DETAIL

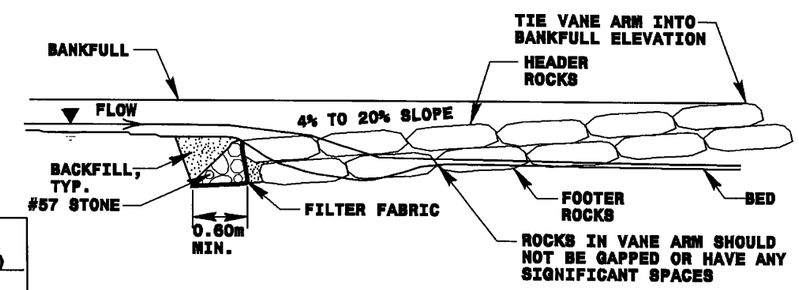
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

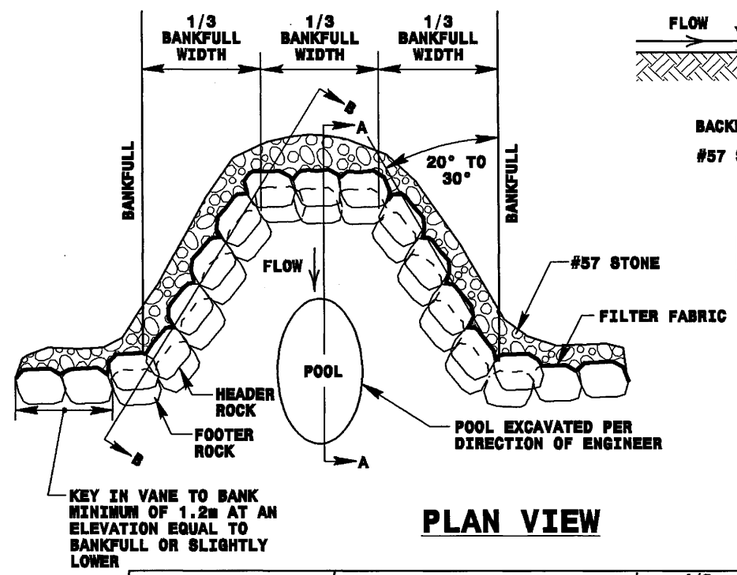
STATION	BOULDER DIMENSIONS (METERS) HEIGHT	LENGTH	WIDTH	1/3 BANKFULL WIDTH (m)
-L- 235+90 RT	0.6	1.2	0.9	1.2
-L- 314+05 LT	0.6	1.2	0.9	2.1
-L- 314+40 LT	0.6	1.2	0.9	2.1
-L- 314+42 LT	0.6	1.2	0.9	2.1
-L- 314+64 LT	0.6	1.2	0.9	2.1
-L- 315+00 LT	0.6	1.2	0.9	2.1
-L- 315+20 LT	0.6	1.2	0.9	2.1
-L- 315+49 LT	0.6	1.2	0.9	2.1
-Y30- 10+29 RT	0.6	1.2	0.9	2.0
-Y30- 10+50 RT	0.6	1.2	0.9	2.0
-Y30- 10+68 RT	0.6	1.2	0.9	2.0
-Y30- 10+88 RT	0.6	1.2	0.9	2.0
-Y32- 9+85 RT	0.6	1.2	0.9	1.33
-Y32- 10+03 RT	0.6	1.2	0.9	1.33
-Y32- 10+20 RT	0.6	1.2	0.9	1.33
-Y33- 9+88 RT	0.45	0.9	0.6	0.6
-Y33- 10+01 RT	0.45	0.9	0.6	0.6
-Y33- 10+14 RT	0.45	0.9	0.6	0.6
-Y33- 10+28 RT	0.45	0.9	0.6	0.6
-L- 327+95 RT	0.6	1.2	0.9	1.33
-L- 327+95 RT	0.6	1.2	0.9	1.33

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

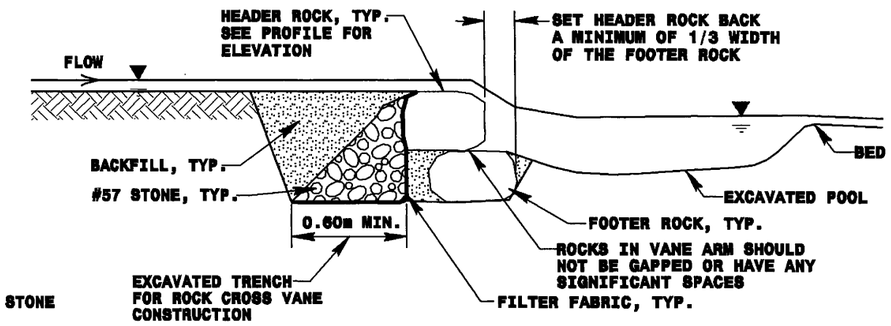
PROJECT REFERENCE NO.	SHEET NO.
R-2519A	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

ROCK CROSS VANE DETAIL

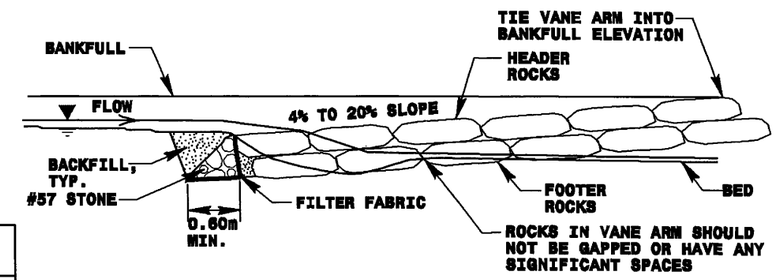
NOT TO SCALE



PLAN VIEW



SECTION A-A



SECTION B-B

	BOULDER DIMENSIONS (METERS)			1/3 BANKFULL WIDTH (m)
STATION	HEIGHT	LENGTH	WIDTH	
-L- 235+90 RT	0.6	1.2	0.9	1.2
-L- 314+05 LT	0.6	1.2	0.9	2.1
-L- 314+40 LT	0.6	1.2	0.9	2.1
-L- 314+42 LT	0.6	1.2	0.9	2.1
-L- 314+64 LT	0.6	1.2	0.9	2.1
-L- 315+49 LT	0.6	1.2	0.9	2.1
-Y30- 10+29 RT	0.6	1.2	0.9	2.0
-Y30- 10+50 RT	0.6	1.2	0.9	2.0
-Y30- 10+68 RT	0.6	1.2	0.9	2.0
-Y30- 10+88 RT	0.6	1.2	0.9	2.0
-Y32- 10+03 RT	0.6	1.2	0.9	1.33
-Y32- 10+20 RT	0.6	1.2	0.9	1.33
-Y33- 9+88 RT	0.45	0.9	0.6	0.6
-Y33- 10+01 RT	0.45	0.9	0.6	0.6
-Y33- 10+14 RT	0.45	0.9	0.6	0.6
-Y33- 10+28 RT	0.45	0.9	0.6	0.6
-L- 327+95 RT	0.6	1.2	0.9	1.33
-L- 327+95 RT	0.6	1.2	0.9	1.33

NOTES:
1. DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2. DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3. CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4. COMPACT BANKFULL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5. POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.