STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

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SECRETARY

February 27, 2006

U.S. Army Corps of Engineers
P.O. Box 1890
Wilmington, North Carolina 28402

Attention: Richard Spencer
Regulatory Specialist

Subject: **Application for Section 404 and 401 permits for High Point East Beltway,** US 311 from south of US 29/70 to US 220, Guilford and Randolph Counties, State Project Nos. 8.1570601 and 8.1571501, Federal Aid Nos. MAF-F-119-1(1) and MAF-F-119-1(1), TIP R-0609 IA, IB and R-2606A, B and C: Divisions 7 and 8, Work Center Nos. 34345.1.1 and 34480.1.1

Dear Mr. Spencer:

The North Carolina Department of Transportation (NCDOT) proposes to construct a highway on new location on the southeastern side of High Point in Guilford and Randolph Counties. The proposed road will continue existing US 311 from just south of US 29/70 in Guilford County to US 220 in Randolph County, a distance of approximately 14 miles. The proposed project consists of constructing a four-lane median divided facility on 150 feet (46 meters) of right-of-way with controlled access. The project lies in the Piedmont Physiographic Province in the Cape Fear River Basin (Hydrologic Catalog Unit 03030003, Sub-basin 03-06-08) and the Yadkin River Basin (Hydrologic Catalog Unit 03040103, Sub-basin 03-07-09). This application package consists of this cover letter, an ENG Form 4345, permit drawings, half size plan sheets, interagency meeting minutes, a stormwater management plan, North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP) confirmation letter, Randleman Variance Request, and the Indirect and Cumulative Effects (ICE) document.

PROJECT SCHEDULE

For construction purposes, the US 311 bypass has been broken down into twelve sections. Table 1 reflects the project breakdown, section termini, and project let dates. A map depicting the sections associated with TIP Nos. R-609IA, IB and R-2606A, B and C is attached. Accordingly, the permit drawings for each section were independently prepared. This application addresses the impacts from construction of five sections, R-609IA, IB, R-2606 A, B, and C. Projects R-2606B and C have post year let dates and therefore these sections are still in preliminary

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design. Permit drawings have been prepared based on preliminary design. NCDOT will apply for any relevant permit modifications for R-2606B and C when final design is complete.

Table 1. Description of Project Sections for Construction Purposes

Section	Let Date	Project Termini
R-609D	11/92 (Complete)	West of High Point Reservoir to 2,000' west of NC 68
R-609EA	11/96 (Complete)	2000' feet west of NC68 to NC 68
R-609EB	5/98 (Complete)	NC 68 to 1,000' east of US29A/70A
R-609FA	5/98 (Complete)	1,000' east of US 29A/70A to 1,000 east of US 29/70
R-609FB	11/01 (Complete)	6 Structures at US 29/70 interchange
R-609G	11/95 (Complete)	Paving of Section D
R-609H	11/01 (Complete)	Paving of Sections EB and FB
R-609IA	9/16/06	From US 29/70 to I-85, North of Archdale
R-609IB	9/16/06	From I-85 to South of SR 1920 North of Archdale
R-2606A	9/16/06	From SR 1920 to north of SR 1929
R-2606B	Post Year	From SR 1929 to south of US 311
R-2606C	Post Year	From south of US 311 to US 220

Purpose and Need: The main purposes of the proposed High Point East Beltway is to provide a bypass of the High Point and Archdale central business districts and connect existing US 311 north of High Point to Interstate 85 east of Archdale, as well as provide for the US 311 High Point Bypass, which was included originally on the 1962 Thoroughfare Plan. This link will reduce congestion to existing US 311, which operates at near capacity during peak hours and passes through the Central Business Districts of High Point and Archdale with no bypass route for heavy trucks.

Summary of Impacts: The R-0609IA, IB, R-2606A, and B projects are in the Cape Fear River Basin, Hydrologic Unit Code (HUC) 03030003, Deep River sub-basin. These four sections of the project are located within the Randleman Lake Watershed. R-2606C is located within the Yadkin River Basin within HUC 03040103. Impacts on jurisdictional areas of the proposed project consist of a total of 4.424 acres of permanent wetland impacts. There will also be 12.174 acres of permanent impact to ponds (fill and/or draining) and approximately 29,860 linear feet of jurisdictional stream impacts. Wetland and stream impacts within the Cape Fear River basin total 4.181 acres and 22,241 feet. Wetland and stream impacts within the Yadkin River Basin total 0.243 acres and 7,619 feet.

Table 2: Summary of Jurisdictional Impacts (Federal Clean Water Act)

Section	Permanent Wetlands (ac)*	Streams (ft)	Temporary Streams (ft)	Ponds (ac)
R-609IA	0.672	8,973	542	2.63
R-609IB	0.45	2,884	0	2.56
R-2606A	0.814	4,377	402	3.454
R-2606B	2.245	6,007	0	1.77
R-2606C	0.243	7,619	0	1.76
Total	**4.424**	**29,860**	**904**	**12.174**

*Includes fill, excavation, and mechanized clearing

Summary of Mitigation:
The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the NEPA and design processes. However, project impacts will still require mitigation. Impacts that will require mitigation include 4.424 acres of wetland mitigation and 28,009 feet of stream mitigation. Within the Cape Fear River basin mitigation requirements are comprised of 4.181 acres of wetland and 20,767 feet of stream impacts. Within the Yadkin River Basin are mitigation requirements are comprised of 0.243 acres of wetlands and 7,242 feet of stream impacts. Onsite mitigation will occur at R-609IA Site 6, and will compensate for 946 feet of stream impacts in the Cape Fear River Basin. Compensatory mitigation for the remaining 4.424 acres of wetlands and 27,063 feet of impacts will be provided by the Ecosystem Enhancement Program (EEP) at a 2:1 ratio. Detailed descriptions of these actions are presented in the mitigation portion of this application.

NEPA DOCUMENT STATUS

The Final Environmental Impact Statement (FEIS) was approved by the Federal Highway Administration (FHWA) on December 7, 1987 for R-609. On September 28, 1988, the Record of Decision (ROD) was approved. The Final Environmental Assessment was approved on March 31, 1997 and the FONSI was approved February 26, 1999 for R-2606. After the documents were approved they were circulated to the agencies.

INDEPENDENT UTILITIES

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

(1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope;
(2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
(3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Delineations:
Wetland and stream determination and delineations within R-609 were conducted in August 1999 by Mr. Jamie Shern formally of LandMark Design Group, Inc. using the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). Mr. Eric Alsmeyer of the USACE Raleigh Regulatory Field Office and Mr. John Hennessy of the DWQ verified the delineations in September 1999. Stream mitigation requirements for R-609 were determined on February 22, 2002 by Eric Alsmeyer and Jamie Shern.

Wetlands and stream delineations within R-2606 were conducted between December 1997 and February 1998 by Scientists from Environmental Services, Inc using the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual.* On January 15, 1998 and February 5, 1998 wetlands and streams were verified by Eric Alsmeyer. Stream mitigation requirements for R-2606 were reviewed and determined on June 22, 2005 by Richard Spencer of the USACE Wilmington District Office and Brett Feulner of the NCDOT.

On September 29, 2004 Brett Feulner and Elizabeth Lusk updated the wetland delineation within R-609, and R-2606 to confirm that no changes have occurred to jurisdictional resources. The attached permit application package consists of drawings depicting jurisdictional impacts.

Wetlands:
Wetland impacts occur at 19 sites within the Cape Fear River Basin and 3 sites in the Yadkin River Basin within Hydrologic Unit Codes (HUC) 03030003 and 03040103 respectively. Table 3(A-E) is a list of verified impacts to jurisdictional wetland resources (which include impacts resulting from fill, excavation and mechanized clearing), riverine or non-riverine status, river basin and the Cowardin description. Since wetland delineations were conducted after the NEPA documents were completed, it is not possible to accurately compare actual wetland impacts with the impacts described in the NEPA documents. The calculations and drawings by NCDOT Hydraulics Unit are presented in the attached permit drawings. A description of each wetland site is as follows.

R-609IA
Site 1 (Station 12+00 to 12+80). The impacts at Site 1 consists of 0.04 acre of excavation and 0.01 acre of mechanized clearing to a non-riverine wetland and 0.12 acre of excavation in a man made pond. The wetland is located upstream of the pond and is located in an area that was formally a pond before the dam was breached. The wetland at this site is an immature hardwood-shrub community.

Site 3 (Station 23+45 to 23+60). Impacts at Site 3 consist of 0.03 acre of fill in a riverine bottomland wetland vegetated with grasses. Impacts occur due the placement of fill from the roadway.

Site 4 (Station 25+65 to 25+95). Impacts at Site 4 consist of 0.16 acre of fill and 0.03 acre of mechanized clearing in a riverine bottomland wetland vegetated with immature hardwoods and shrubs. Impacts occur due the placement of fill from the roadway.

Site 11 (Station 53+00 to 56+75). Impacts at Site 11 consist of 0.20 acre of fill, 0.03 acre of excavation and 0.04 acre of mechanized clearing in a riverine bottomland hardwood wetland. Impacts occur due the placement fill from the roadway.

Site 12 (Station 58+20 to 59+00). Impacts at Site 12 consist of 0.12 acre of fill in a riverine bottomland wetland vegetated with immature hardwoods and shrubs. Impacts occur due the placement of fill from the roadway.

R-609IB
Site 6 (Station Y-9 12+23) Impacts at Site 6 consist of 0.091 acre of fill and 0.049 acre of mechanized clearing in a riverine bottomland vegetated with immature hardwoods and shrubs. Impacts occur due the placement of fill from the roadway.

Site 7 (Station 84+28) Impacts at Site 7 consist of 0.296 acre of fill in a riverine bottomland hardwood forest. Impacts occur due the placement of fill from the roadway.

Site 8 (Station 87+00) Impacts at Site 8 consist of 0.007 acre of fill in a riverine bottomland hardwood forest. Impacts occur due the placement of fill from the roadway.

Site 9 (Station 90+00) Impacts at Site 9 consist of 0.002 acre of fill and 0.005 acres of mechanized clearing in a riverine bottomland vegetated with immature hardwoods and shrubs. Impacts occur due the placement of fill from the roadway.

R-2606A

Site 2 (Station 45+99) Impacts at Site 2 consist of 0.277 acre of fill in a riverine bottomland hardwood forest. Impacts occur due to the placement of fill from the roadway.

Site 6 (Station Ramp C 10+50). Impacts at Site 6 consist of 0.241 acre of fill and 0.04 acre of excavation in a riverine bottomland vegetated with immature hardwoods and shrubs. Impacts occur due to the placement of fill from the roadway.

Site 7 (106+60 to 115+75). Impacts at Site 7 consist of 0.24 acre of fill and 0.016 acre of excavation in a non-riverine bottomland vegetated with immature hardwoods and shrubs. Impacts occur due to the placement of fill from the roadway.

R-2606B and C

Site 13 (Station 48+00 to 49+70) Impacts at Site 13 consist of 0.308 acre of fill and 0.01 acre of mechanized clearing in a non-riverine bottomland hardwood forest. Impacts occur due to the placement of fill from the roadway.

Site 14 (Station 51+50 to 52+60) Impacts at Site 14 consist of 0.451 acre of fill and 0.042 acre of mechanized clearing in a non-riverine wetland located in cow pasture. Vegetation in this wetland is composed of grasses. Impacts occur due to the placement of fill from the roadway.

Site 15 (Station 57+07 to 53+30) Impacts at Site 15 consist of 0.17 acre of fill in a non-riverine bottomland hardwood wetland. Impacts occur due to the placement of fill from the roadway.

Site 16 (Station 63+50 to 64+10) Impacts at Site 16 consist of 0.419 acre of fill and 0.017 acre of mechanized clearing in a riverine wetland vegetated with shrubs. Impacts occur due to the placement of fill from the roadway and construction access.

Site 19 (Station 91+60 to 92+24) Impacts at Site 19 consist of 0.178 acre of fill in a riverine bottomland hardwood wetland. Impacts occur due to the placement of fill from the roadway.

Site 20 (Station 101+40 to 102+30) Impacts at Site 20 consist of 0.628 acre of fill and 0.021 acre of mechanized clearing in a non-riverine bottomland hardwood wetland. Impacts occur due to the placement of fill from the roadway and construction access.

Site 24 (Station 102+90 to 121+10) Impacts at Site 24 consist of 0.027 acre of fill in a non-riverine wetland vegetated with grasses. Impacts occur due to the placement of fill from the roadway.

Site 25 (Station 128+40 to 128+60) Impacts at Site 25 consist of 0.006 acre of fill in a riverine bottomland hardwood wetland. Impacts occur due to the placement of fill from the roadway.

Site 27 (Station 142+60 to 143+40) Impacts at Site 27 consist of 0.21 acre of fill in a riverine bottomland hardwood wetland. Impacts occur due to the placement of fill from the roadway.

Table 3A- R-609IA Wetland Impacts and Descriptions

Site	River Basin	Riverine(R) or Non-Riverine(NR) Wetland Impacts	Impacts (Acres)	Cowardin Description
1	Cape Fear	NR	0.05	PSS1B
3	Cape Fear	R	0.03	PEM2C
4	Cape Fear	R	0.19	PSS1C
11	Cape Fear	R	0.27	PFO1C
12	Cape Fear	R	0.12	PSS1B
17	Cape Fear	NR	0.012	PFO1C
Total			**0.672**	

Table 3B- R-609IB Wetland Impacts and Descriptions

Site	River Basin	Riverine(R) or Non-Riverine(NR) Wetland Impacts	Impacts (Acres)	Cowardin Description
6	Cape Fear	R	0.14	PSS1C
7	Cape Fear	R	0.296	PFO1C
8	Cape Fear	R	0.007	PFO1B
9	Cape Fear	R	0.007	PSS1C
Total			**0.45**	

Table 3C- R-2606A Wetland Impacts and Descriptions

Site	River Basin	Riverine(R) or Non-Riverine(NR) Wetland Impacts	Impacts (Acres)	Cowardin Description
2	Cape Fear	R	0.277	PFO1C
6	Cape Fear	R	0.281	PSS1C
7	Cape Fear	NR	0.256	PSS1B
Total			**0.814**	

Table 3D- R-2606B Wetland Impacts and Descriptions

Site	River Basin	Riverine(R) or Non-Riverine(NR) Wetland Impacts	Impacts (Acres)	Cowardin Description
13	Cape Fear	NR	0.317	PFO/SS1B
14	Cape Fear	NR	0.493	PEM1B
15	Cape Fear	NR	0.171	PFO1B
16	Cape Fear	R	0.437	PSS1B
19	Cape Fear	R	0.178	PFO1B
20	Cape Fear	NR	0.649	PFO1C
Total			**2.245**	

Table 3D- R-2606C Wetland Impacts and Descriptions				
Site	River Basin	Riverine(R) or Non-Riverine(NR) Wetland Impacts	Impacts (Acres)	Cowardin Description
24	Yadkin	NR	0.027	PEM1B
25	Yadkin	NR	0.006	PFO1B
27	Yadkin	R	0.210	PFO1B
Total			**0.243**	

Streams:

Stream impacts total 29,860 linear feet and occur at 43 sites. Impacts to streams occur within HUC 03030003 of the Cape Fear River Basin and 03040103 of the Yadkin River Basin. Stream impacts within the Cape Fear River Basin total 22,241 feet and within the Yadkin River Basin total 7,619 feet. The HUC division line corresponds with the division between projects R-2606B and C. Tables 4A-E is a list site number, stream name, type of structure, amount of stream impacts, amount of mitigation required, temporary impacts, pond impacts, DWQ classification and DWQ index number.

Table 4A – R-609IA Surface Water Impacts								
Site	Stream Name	Structure/ Size Type	Existing Channel impacted (feet)	Mitigation Required (feet)	Temp. Impacts (acres)	Pond Impacts (acres)	DWQ Class	DWQ Index number
2	UT to Mile Branch	1350mm	461	461	0.01		WS-IV	17-7-3
3	UT to Mile Branch	450mm	0	0	0.01		WS-IV	17-7-3
4	UT to Mile Branch	1350mm	409	409	0.01		WS-IV	17-7-3
5	UT to Mile Branch	900mm	231	231	<0.01		WS-IV	17-7-3
6	UT to Richland Creek	3@3.4mx 2.4m RCBC	1,458	1,458*			WS-IV	17-7-3
7	UT to Richland Creek	600mm	146	146			WS-IV	17-7-3
8	UT to Richland Creek	1050mm	591	591			WS-IV	17-7-05
9	UT to Richland Creek	3.7m x 3.7m	-	-		2.37	WS-IV	17-7-05
10	UT to Richland Creek	Interchange	2,992	2,992			WS-IV	17-7-05
11	UT to Richland Creek	Interchange	1,933	1,933	0.01		WS-IV	17-7-05
12	UT to Richland Creek	900mm	390	390			WS-IV	17-7-05
13	UT to Richland Creek	900mm	5	5			WS-IV	17-7-05
14	UT to Richland Creek	1050	105	105	<0.01		WS-IV	17-7-05
15	UT to Richland Creek	900mm	75	75		0.26	WS-IV	17-7-05
16	UT to Richland Creek	900mm & 1050mm	177	177	<0.01		WS-IV	17-7-05
Total			**8,973**	**8,973**	**542**	**2.63**		

*Onsite natural channel design will provide 946 linear feet of stream mitigation at Site 6

Table 4B – R-609IB Surface Water Impacts								
Site	Stream Name	Structure/ Size Type	Existing Channel impacted (feet)	Mitigation Required (feet)	Temp. Impacts (acres)	Pond Impacts (acres)	DWQ Class	DWQ Index number
1	UT to Taylor Branch	750 RCP	850	850		0.44	WS-IV	17-9.3-(1)
2	Taylor Branch	2100 RCP	525	525			WS-IV	17-9.3-(1)
3	Taylor Branch	2 @ 2.1m x 2.1m RCBC	587	587			WS-IV	17-9.3-(1)
4	UT to Taylor Branch	900RCP	282	0		1.58	WS-IV	17-9.3-(1)
5	UT to Taylor Branch	900 RCP	151	151		0.54	WS-IV	17-9.3-(1)
6	Taylor Branch	2 @ 1.8m x 2.4m RCBC	256	256			WS-IV	17-9.3-(1)
9	UT to Taylor Branch	750 RCP	233	233			WS-IV	17-9.3-(1)
Total			**2,884**	**2,602**		**2.56**		

Table 4C – R-2606A Surface Water Impacts								
Site	Stream Name	Structure/ Size Type	Existing Channel impacted (feet)	Mitigation Required (feet)	Temp. Impacts (acres)	Pond Impacts (acres)	DWQ Class	DWQ Index number
1	Muddy Creek	Bridge	0	0			WS-IV	17-9-(1)
2	UT to Muddy Creek	12'x8' RCBC	350	350	0.02		WS-IV	17-9-(1)
3	UT to Muddy Creek	8'x5' Conspan & 30"RCP	1,100	1,100	0.022		WS-IV	17-9-(1)
4	UT to Muddy Creek	30" RCP & 36" RCP	765	580	0.008		WS-IV	17-9-(1)
5	UT to Muddy Creek	30" RCP	472	472			WS-IV; CA	17-9-(2)
6	UT to Muddy Creek	3-36" RCP	200	200	0.004	0.634	WS-IV; CA	17-9-(2)
7	UT to Muddy Creek	60" RCP & 6'x6' RCBC w/2-60" RCPs	1,490	1,490	0.004		WS-IV; CA	17-9-(2)
8	UT to Muddy Creek	42" RCP				2.82	WS-IV; CA	17-9-(2)
Total			**4,377**	**4,192**	**402**	**3.454**		

Table 4D – R-2606B Surface Water Impacts								
Site	Stream Name	Structure/ Size Type	Existing Channel impacted (feet)	Mitigation Required (feet)	Temp. Impacts (acres)	Pond Impacts (acres)	DWQ Class	DWQ Index number
13	UT to Muddy Creek	-	738	738		1.02	WS-IV CA	17-9-(2)
14	UT to Muddy Creek	-	804	338			WS-IV CA	17-9-(2)
15	UT to Muddy Creek	-	430	430			WS-IV CA	17-9-(2)
16	UT to Muddy Creek	-	75	0		0.75	WS-IV CA	17-9-(2)
17	Bob Branch	-	813	813			WS-IV	17-9.6-(1)
18	UT to Bob Branch	-	466	0			WS-IV	17-9.6-(1)
19	UT to Bob Branch	-	420	420			WS-IV	17-9.6-(1)
20	UT to Deep River	-	719	719			WS-IV CA	17-(4)
21	UT to Deep River	-	1542	1542			WS-IV CA	17-(4)
Total			**6,007**	**5,000**		**1.77**		

Table 4E – R-2606C Surface Water Impacts								
Site	Stream Name	Structure/ Size Type	Existing Channel impacted (feet)	Mitigation Required (feet)	Temp. Impacts (acres)	Pond Impacts (acres)	DWQ Class	DWQ Index number
23	UT to Caraway Creek	-	1171	1050		0.12	C	12-2-3
24	UT to Caraway Creek	-	886	630			C	12-2-3
25	UT to Back Creek	-	1723	1723			WS-II HQW	13-2-3-3-(0.5)
26	UT to Back Creek	-	-	-		1.64	WS-II HQW	13-2-3-3-(0.5)
27	UT to Back Creek	-	299	299			WS-II HQW	13-2-3-3-(0.5)
28	UT to Back Creek	-	902	902			WS-II HQW	13-2-3-3-(0.5)
29	UT to Back Creek	-	1959	1959			WS-II HQW	13-2-3-3-(0.5)
30	UT to Back Creek	-	679	679			WS-II HQW	13-2-3-3-(0.5)
Total			**7,619**	**7,242**		**1.76**		

PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 29, 2003, the U.S. Fish and Wildlife Service (FWS) lists one federally protected species for Guilford County and two for Randolph County (Table 5).

Biological Conclusions of No Effect have been rendered for the Bald Eagle and the Cape Fear Shiner due to lack of suitable habitat. Suitable habitat does exist within the project area for Schweinitz's sunflower. Initial surveys for Schweinitz's sunflower were conducted by Environmental Services, Inc. in the fall of 1997. Follow up surveys were conducted on September 29, 2004 by NCDOT biologists Brett Feulner and Elizabeth Lusk and no specimens were found. The biological conclusion of No Effect remains valid for the Schweinitz's sunflower.

Table 5. Federally Protected Species for Randolph and Guilford Counties

Scientific Name	Common Name	County	Status	Biological Conclusion
Haliaeetus leucocephalus	Bald Eagle	Guilford	T	No Effect
Notropis mekistocholas	Cape Fear Shiner	Randolph	E	No Effect
Helianthus schweinitzii	Schweinitz's sunflower	Randolph	E	No Effect

"E" denotes Endangered (a species that is in danger of extinction throughout all or a significant portion of its range).

"T" denotes Threatened "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

CULTURAL RESOURCES

Archaeology:

Archeological surveys were conducted for R-609 as part of the EIS and for R-2606 as part of the EA. In a letter dated August 18, 1987 the State Historic Preservation Office (SHPO) concluded that R-609 would have No Effect upon significant archeological resources. The NCDOT concluded in the FONSI for R-2606 that no archeological sites eligible for the register were discovered. Detailed information regarding surveys including methods used and the findings is contained in the planning document for each project.

Historic Architecture:

Historic architecture surveys were conducted for R-609 as part of the EIS and for R-2606 as part of the EA. In a letter dated September 16, 1987 the State Historic Preservation Office (SHPO) concluded that R-609 would have No Effect upon significant architectural or historical resources. In a letter dated June 26, 1996 SHPO concurred with the NCDOT's conclusion that no properties within R-2606 were considered eligible for the National Register. Detailed information regarding surveys including methods used and the findings is contained in the planning document for each project.

FEMA COMPLIANCE

These projects will cross two streams that are located in a flood insurance study area. NCDOT has received compliance from FEMA for the crossing of Muddy Creek and Mile Branch.

UTILIY IMPACTS

No additional impacts will occur due to the relocation of utilities.

ICE STUDY

An ICE study for this project has been completed and is included with this permit application.

WILD AND SCENIC RIVERS

This project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended).

ESSENTIAL FISH HABITAT

The project will not impact any essential fish habitat afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C 1801 et *seq.*).

PROJECT COMMITMENTS

The following environmental commitments were agreed to in the NEPA process and will be followed by NCDOT.

- Borrow material will be taken from upland sources in the construction of this project.
- NCDOT will avoid placing erosion control devices in wetlands.
- NCDOT will use Design Standards in Sensitive Watersheds and High Quality Storm Erosion Control Measures at all stream crossings currently or potentially designated as Water Supplies (WS-I or II), and where the project is located in any Watershed Critical Area.
- Hazardous Spill Basins will be provided at crossings of Muddy Creek, Back Creek, and their associated tributaries in accordance with NCDOT's Guidance for the Location and Design of Hazardous Spill Basins.
- A wetland mitigation plan will be provided in the application for a Water Quality Certification.

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

Avoidance:

All wetland areas not affected by the project will be protected from unnecessary encroachment. No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.

General avoidance measures incorporated into the project design

- Relocation of utility lines within roadway fill in jurisdictional areas

Specific avoidance measures

R-2606A

Wetland Site 1 (Buffer Site 1)

- Station –L- 14+00 Lt to –L-24+50 Lt, The road has been aligned to completely avoid the wetland system north of the road

Minimization:

Minimization has been employed in the project area to the maximum extent particle. Reduction of fill-slopes at stream/wetland crossings and the selection of alternatives that will minimize wetland impacts will reduce unnecessary wetland takings.

Project Wide Minimization Measures

- Use of 2:1 side slopes in jurisdictional areas.
- All culverts will be buried 20% below the streambed.
- NCDOT BMP's for the protection of surface waters will be strictly enforced during the construction of this project.

Site Specific Minimization Measures

R-609IA, Wetland Site 2 (Buffer Site 1)

- Station -L- 19+15 M, -L- 20+10 Rt, -L- 19+90 Lt, and –L- 20+40 M, Grass swales treat stormwater before discharging into buffer

Wetland Site 4 (Buffer Site 2)

- Station –L- 25+50 M, -L- 25+40 Lt, Grass swales treat stormwater before discharging into buffer

Wetland Site 5 (Buffer Site 3)

- Station –L- 27+95 Lt, -L- 28+05 Rt, -L- 28+15 M, -L- 28+60 M, -L- 28+60 Lt, and –Y2-14+50, Grass swales treat stormwater before discharging into buffer

Wetland Site 6 (Buffer Site 4)

- Natural stream design will be used to relocate the 946 feet of the Unnamed Tributary to Richland Creek
- Station –L-34+00, Hazardous spill basin will be constructed and can be used in the event of a hazardous chemical spill
- Station –L- 31+85 Rt, -L- 32+00 Lt, -L- 34+15 Rt, -L- 34+15 M, Grass swales treat stormwater before discharging into buffer
- Station -L- 33+50 Rt, Level spreader diffuses flow before discharging into the stream

Wetland Site 7 (Buffer Site 5)

- Station -L-35+70 Lt, Grass swales treat stormwater before discharging into buffer
- Station –L- 35+60 Lt, Hazardous spill basin will be constructed and can be used in the event of a hazardous chemical spill

Wetland Site 8 (Buffer Site 6)

- Station –L- 40+60 Lt, -L- 39+90 Lt-, Hazardous spill basin will be constructed and can be used in the event of an hazardous chemical spill

Wetland Site 9 (Buffer Site 7)

- Station -Y5- 13+90 Rt, -Y5- 15+20 Rt, Hazardous spill basin will be constructed and can be used in the event of an hazardous chemical spill
- Station –L- 45+20 Lt, -L- 45+20 M, -Y5- 13+60 Lt, -Y5- 13+60 Rt, -Y5- 15+30 Rt, Grass swales treat stormwater before discharging into buffer

Wetland Site 10 and 11 (Buffer Site 8)

- Station –L- 50+50 Lt, -L- 56+10 Lt, -L- 56+10 Rt, -Ramp D- 13+90 Lt, -L- 49+40 Rt, -Y5- 13+90 Rt, -Y5- 15+20 Rt, Hazardous spill basin will be constructed and can be used in the event of an hazardous chemical spill
- Station –L- 50+50-Lt, -Y6- 49+40 Rt, -Y6- 49+40 M, -L-50+35 Rt, -L-50+40 Rt, -L-50+35 M, -L- 50+40 M, -Y6- 23+40 Lt, -L-56+10 Lt, -L- 55+00-Rt, -L-56+10 Rt, Grass swales treat stormwater before discharging into buffer
- Station -L- 50+50 Lt, Level spreader diffuses flow before discharging into the stream
- Station –Y6- 20+60 Lt, -L- 51+10-Rt, -Y6- 20+60 Rt Dry detention basin regulates the outflow of stormwater and removes sediments and other pollutants
- Station -Ramp B- 14+20 Rt-, Energy dissipater slows water velocity discharging from pipe

R-609IB, Wetland Site 1 (Buffer Site 1)

- Station –L-62+50 Lt and –L- 63+40 Rt, Grass Swales treat stormwater before discharging into stream
- Station –L- 64+80 Rt, Energy dissipater slows the water velocity discharging from pipe

Buffer Site 2

- Station -Y8-11+00 Rt Level spreader, grass swale and silt basin treat water before discharging into the stream

Wetland Site 2 (Buffer Site 3)

- Station -L- 68+00 Rt, and –L-70+20 Lt, Grass swales treat stormwater before discharging into stream
- Station –L- 68+80 Rt, Cross vane placed into stream to slow water velocity
- Station –L- 70+80-Rt and –L- 70+80 Lt, Grass swales treat stormwater before discharging into pipes.
- Station –L- 70+80 Rt, Energy dissipater slows water velocity discharging from pipe

Wetland Site 3 (Buffer Site 4)

- Station –L- 77+20 Lt and –L-76+70 Rt, Grass swales treat stormwater before discharging into the stream
- Station –L-76+25 Rt, Preformed scour hole slows water velocity before discharging into the buffer
- Station –L-77+25 Lt, Cross Vane Rock Weir placed in stream to slow water velocity

Wetland Site 4 (Buffer Site 5)

- Station 79+40-Rt-L-, Preformed scour hole slows water velocity before entering the buffer

Wetland Site 5 (Buffer Site 6)

- Station –L-82+00-Rt, Grass swale treats stormwater before discharging into the stream
- Station –L-84+40-Lt, Energy dissipater slows water velocity discharging from pipe

Wetland Site 6 (Buffer Site 7)

- Station –Y9-12+00 Lt, Level spreader diffuses flow before discharging into buffer
- Station –Y9-11+90 Lt, B Basin treats stormwater before discharging into the buffer
- Station -Y9-12+15 Lt, Cross vain rock weir placed in stream to slow water velocity
- Station –Y9-12+80 Lt, Preformed scour hole slows water velocity before entering the buffer

Wetland Site 7

- Station –L-84+20 Rt, Grass swales treat stormwater before discharging into the stream
- Station –L-84+40 Lt, Energy dissipater slows water velocity discharging from pipe

R-2606A, Wetland Site 1 (Buffer Site 1)

- Station –L-21+80 to 23+50, The bridge over Muddy Creek will span the creek and the buffer and the embankment has been redesigned to avoid any lateral encroachment into the buffer. Hand clearing will be used under the bridge.
- Station –L-21+20 Lt, and 26+00, Hazardous spill basin will be constructed and can be used in the event of an hazardous chemical spill.

RANDLEMAN BUFFERS

The proposed road project impacts an area protected by the Randleman Buffer Rules. The purpose of this project cannot be accomplished without impacting buffers protected under the Randleman Buffer rules. Within R-609IA, IB and R-2606A, there will be impacts to protected buffers at 23 sites. Of the 23 sites, 21 sites do not meet the objectives set forth in the Randleman Buffer Rules, due to either parallel impacts to stream buffers or the inability to disperse concentrated runoff into sheet flow prior to entering the buffer. Buffer impacts total 2,391,770 ft^2 of which 2,332,004 ft^2 will require mitigation and are summarized in Table 6 below. Wetlands within the buffers will be mitigated as wetland impacts. The NCDOT has attached to this permit application information relevant to impacts to these buffers, entitled "Randleman General Major Variance Application Form."

Table 6: Randleman Buffer Impacts

	Impacts Requiring Mitigation (ft^2)		Impacts with No Mitigation Required (ft^2)		Onsite Mitigation (ft^2)
	Zone 1	Zone 2	Zone 1	Zone 2	
R-609IA	548,737	353,348	20,878	17,837	102,036
R-609IB	200,542	122,237	0	0	0
R-2606A	292,051	177,048	11,935	9,116	0
R-2606B	410,718	227,323	0	0	0
Sub-Total	**1,452,048**	**879,956**	**32,813**	**26,953**	**102,036**
Wetlands in buffer	**55,307**	**12,347**			
Total	**1,396,741**	**867,609**			

Buffer Mitigation:

Buffer impacts total 2,391,770 ft^2 of which 2,264,350 ft^2 will require mitigation and are summarized in Table 7 below. Wetlands that are located within the buffer zones will be mitigated as wetland impacts. The Randleman Buffer Rules require that mitigation for Zone 1 impacts are compensated at a ration of 3 to 1 and Zone 2 impacts be mitigated at a ratio of 1.5 to 1. Mitigation requirements for the entire project will total 5,491,636 ft^2. Onsite restoration of riparian stream buffers will occur at R-609IA Buffer Sites 4 and 12. The buffer restoration entails the planting of native trees and shrubs along the stream channel. The NC Ecosystem Enhancement Program will provide the remaining 5,389,601 ft^2 of mitigation. A copy of the EEP confirmation letter is included in this application.

Table 7: Randleman Buffer Impacts

	Zone 1 (ft^2)	Zone 2 (ft^2)
Impacts Requiring Mitigation	1,396,741	867,609
Mitigation Required after Ratio	4,190,223	1,301,414
Total Mitigation Required	5,491,637	
Onsite Mitigation	102,036	
Offsite Mitigation Required	5,389,601	

SUMMARY

Application is hereby made for a Department of the Army Section 404 Individual Permit as required for the above-described activities for the proposed TIP project R-0609IA and IB, R-2606A, B and C. The NCDOT understands that permit modifications will be required for R-2606B and C after final design is complete and prior to construction. We are also hereby requesting a 401 Water Quality Certification, and a Randleman Buffer Certification from the Division of Water Quality. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $475 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing seven copies of this application to the North Carolina Department of Environment and Natural Resources, Division of Water Quality, for their review.

Thank you for you assistance with this project. If you have any questions or need any additional information about this project, please contact Brett Feulner at (919) 715-1488.

Sincerely,

Greg Thorpe, P.E., Branch Manager
Project Development and Environmental Analysis Branch

GT/bmf

Attachments
cc:
Mr. John Hennessy, NCDWQ (5 copies)
Ms. Becky Fox, USEPA – Whittier, NC
Mr. Gary Jordan, USFWS
Mr. Mark Staley, Roadside Environmental
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 DEO
Mr. Clarence Coleman, P.E., FHWA
Mr. Travis Wilson, NCWRC
Mr. Ronald Mikulak, USEPA – Atlanta, GA
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. J.M. Mills, P.E., Division 7 Engineer
Mr. Jerry Parker, Division 7 DEO

w/o attachment
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Todd Jones, NCDOT-, External Audit Branch
Mr. Mike Penny, P.E., Planning Engineer
Mr. Scott McLendon, USACE, Wilmington
Ms. Beth Harmon, EEP
Mr. Carl Goode, NCDOT- HEU

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)	OMB APPROVAL NO. 071-0003 Expires December 31, 2004

The public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided, the permit application cannot be processed nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4.DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANTS NAME Gregory J. Thorpe, Ph.D., Environmental Management Director Project Development and Environmental Analysis North Carolina Department of Transportation	8. AUTHORIZED AGENTS NAME AND TITLE (an agent is not required) Not applicable
6.APPLICANTS ADDRESS 1598 Mail Service Center Raleigh, North Carolina 27699-1548	9. AGENTS ADDRESS
7. APPLICANTS PHONE NOS. WITH AREA CODE a. Residence b. Business (919) 715-1488	10. AGENTS PHONE NOS. WITH AREA CODE a. Residence b. Business

11. STATEMENT OF AUTHORIZATION

I hereby authorize, ---------- to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

APPLICANT=S SIGNATURE	DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE(*see instructions*)
High Point East Belt, US 311 Bypass, State Project No. 81570601 and 81571501, TIP No. R-609IA, and IB, R-2606 A, B and C.

13. NAME OF WATERBODY, IF KNOWN (*if applicable*) Too many to list here, please see attached cover letter	14. PROJECT STREET ADDRESS (*if applicable*) NA
LOCATION OF PROJECT **Guilford/Randolph** COUNTIES **NC** STATE	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (*see instructions*)
Too many to list here, please see attached cover letter

17. DIRECTIONS TO THE SITE
See the attached permit drawings and half size plan sheets.

18. Nature of Activity (*Description of project, include all features*)
Transportation Improvement Program (TIP) project R-609 and R-2606
Construction of US 311 bypass on new location. The project length is approximately 14 miles. These improvements are proposed to reduce congestion and provide a bypass of the central business district and to connect existing US 311 to Interstate 85 east of Archdale.

19. Project Purpose (*Describe the reason or purpose of the project, see instructions*)
These improvements are proposed to reduce congestion and provide a bypass of the central business district and to connect existing US 311 to Interstate 85 east of Archdale.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge
Construction of new highway that impacts several jurisdictional waters of the US

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards
See the attached permit drawings.

22. Surface Area in Acres of Wetlands or Other Waters Filled (*see instructions*)
See impact summary table in the attached permit drawings.

23. Is Any Portion of the Work Already Complete? YES_x_ NO __ IF YES, DESCRIBE THE COMPLETED WORK
See cover letter for description of project sections completed

24. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (If more than can be entered here, please attach a supplemental list).
Please see affected adjacent landowner table in the attached permit drawings.

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

Agency	Type approval*	Identification number	Date applied	Date approved	Date Denied
FEMA	CLOMR	Muddy Creek/Mile Branch		10/17/2001 and 10/20/2003	

*Would include but is not restricted to zoning, building, and flood plain permits.

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the information is this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT DATE 2/27/06 SIGNATURE OF AGENT DATE

The application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manor within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statements of entry, shall be fines not more than $10,000 or imprisoned not more than five years or both.

DRAFT VERSION 2
02/26/02

OFFICE USE ONLY: Date Received _____ Request # _____

State of North Carolina, Department of Environment and Natural Resources, Division of Water Quality

"General" Major Variance Application Form –

From the Randleman Lake Water Supply Watershed: Protection and Maintenance of Riparian Areas Rule (Randleman Buffer Rule) for PUBLIC ROAD CONSTRUCTION, IMPROVEMENT & MAINTENANCE ACTIVITIES (As approved by the Water Quality Committee of the Environmental Management Commission on February 14, 2002)

NOTE:
To constitute a complete application, all of the information requested in this form must be provided. Incomplete applications will be returned to the applicant. The original and two copies of the completed "General" Variance Application Form and any attachments must be sent to the DWQ 401/Wetlands Certification Unit, 1650 Mail Service Center, Raleigh, NC 27699-1650, (919) 733-1786 and one copy needs to be sent to the Piedmont Triad Regional Water Authority (PTRWA), 2216 W. Meadowview Rd., Wilmington Bldg., Suite 204, Greensboro, NC 27407, (336) 547-8437 to constitute a complete submittal. This form may be photocopied for use as an original.

Part 1: General Information

(Please include attachments if the room provided is insufficient.)

1. Applicant's name (the Division Engineer, project manager, person responsible for project):
   Greg Thorpe, Ph.D., Director, NCDOT-PDEA

2. Print Owner/Signing Official (person legally responsible for the property and its compliance)
   Name: Greg Thorpe, Ph.D.
   Title: Director
   Street address: 1548 Mail Service Center
   City, State, Zip: Raleigh, NC 27699-1548
   Telephone: (919) 733-3141
   Fax: (919) 733-9794

3. Contact person who can answer questions about the proposed project:
   Name: Brett Feulner
   Telephone: (919) 715-1488
   Fax: (919) 715-5501
   Email: bmfeulner@dot.state.nc.us

4. Project Name (Subdivision, facility, or establishment name - consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):
   High Point East Belt (R-609 and R-2606)

5. Project Location:
   Street address: US 311
   City, State, Zip: High Point and Archdale
   County: Guilford and Randolph
   Latitude/longitude: UTM 17 592758E 3979228N

6. Directions to site from nearest major intersection (Also, attach an 8 ½ x 11 copy of the portion of the USGS topographic map and soil survey indicating the location and boundaries of the site):
   The project will begin at the end of the existing US 311 bypass, to the east of US 29-70, near High Point

7. Stream to be impacted by the proposed activity:
   Stream name (for unnamed streams label as "UT" to the nearest named stream):
   See Attached cover letter for stream names
   Stream classification [as identified within the Schedule of Classifications 15A NCAC 2B .0311 (Cape Fear River Basin)]: See attached cover letter

8. Which of the following permits/approvals will be required or have been received already for this project?

Required:	Received:	Date received:	Permit Type:
X			401 Certification/404 Permit
			Others (specify)

Part 2: Proposed Activity

(Please include attachments if the room provided is insufficient.)

1. Description of proposed activity [Also, please attach a map of sufficient detail (such as construction or site plans) to accurately delineate the boundaries of the land to be utilized in carrying out the activity, the location and dimension of any disturbance in the riparian buffers associated with the activity, and the extent of riparian buffers on the land. **Include the area of buffer impact in ft^2 for each zones.**:
   Please See Attached enclosure for the reminder of information requested on this form

2. State reasons why this plan for the proposed activity cannot be practically accomplished, reduced or reconfigured to better minimize or eliminate disturbance to the riparian buffers:

3. If sheet flow of concentrated runoff cannot be achieved prior to entering the buffers, then please provide information on any on-site stormwater management facilities (e.g., grassed swales, extended detention wetlands, etc.) that will be used to control nutrients and attenuate flow (attach construction details and site locations of these plans):

4. How do you intend to provide mitigation if required under Condition No. 7 of the variance? (Attach a Mitigation Plan if you intend to satisfy the mitigation requirement through the restoration of riparian buffers.)

5. Please provide an explanation of the following:
   (1) The practical difficulties or hardships that would result from the strict application of this Rule._____

   (2) How these difficulties or hardships result from conditions that are unique to the property involved.

Part 3: Agent Authorization

If you wish to designate submittal authority to another individual or firm so that they may provide information on your behalf, please complete this section:

Designated agent (individual or firm): ___NA_____
Mailing address: _____
City, State, Zip: _____
Telephone: _____
Fax: _____
Email: _____

Part 4: Applicant's Certification

I, Greg Thorpe, Ph. D. (print or type name of person listed in Part I, Item 2), certify that the information included on this permit application form is correct, that the project will be constructed in conformance with the approved plans and that the deed restrictions in accordance with Part 5 of this form will be recorded with all required permit conditions.

Signature: [signature]
Date: 2/27/06
Title: PDEA - New Head

NC Division of Water Quality (DWQ)
401 Wetlands Certification Unit
2321 Crabtree Blvd. (LOCATION)
1650 Mail Service Center (MAILING ADDRESS)
Raleigh, NC 27699-1650
(919) 733-1786

Piedmont Triad Regional Water Authority (PTRWA)
2216 W. Meadowview Rd.
Wilmington Bldg., Suite 204
Greensboro, NC 27407
(336) 547-8437

"General" Major Variance Application for Randleman Buffer Rules

PART 1: GENERAL INFORMATION

7-Streams Impacted

Classifications of the streams are included in the table below along with the corresponding site numbers. Unnamed tributaries receive the same classification as the stream that they flow into.

Stream Classification and Corresponding Site Number

Stream Name	NCDWQ Classification	Sites
Mile Branch	WS-IV	R-609IA 1-5
Richland Creek	WS-IV-CA	R-609IA 6-11
Taylor Branch	WS-IV	R-609IB 1-7
Muddy Creek	WS-IV	R-2606A 1
Muddy Creek	WS-IV-CA	R-2606A 2-6

PART 2: PROPOSED ACTIVITY

Contained below is the information requested in Part 2 of the Randleman General Major Variance Application Form. Information is provided on a site by site basis.

The NCDOT proposes to construct the ultimate roadway design for the US 311 Bypass/ High Point East Belt. The projects for which the variance is requested is TIP No. R-609 IA, IB, and R-2606A. The western terminus of this project begins at existing US 311 at US 29/70 and the western terminus will ultimately tie into US 220 South of Randleman.

NCDOT has not completed final avoidance and minimization analysis for R-2606B, therefore we would not be able to submit a complete Variance application on this section of the project at this time. NCDOT will apply for the General Major Variance for section R-2606B after final design, when the Clean Water Act permit modification is submitted for this section, prior to any construction. Per the request of NCDWQ, mitigation will be requested now for R-2606B based on preliminary impact numbers. R-2606C is not located within the Randleman Lake Watershed, therefore not subject to the Randleman Buffer rules.

Sites Requiring a General Major Variance

There are 22 areas that will require the issuance of the General Major Variance. The 22 sites will result in impacts to riparian buffers on five named streams or their unnamed tributaries.

It would not be feasible to construct the proposed project such that total avoidance of stream buffer impacts would occur. Impacts to stream buffers have been minimized to the maximum extent practical through the use of NCDOT and NCDENR Best Management Practices as well as the use of on-site stormwater management facilities. NCDOT requests that the NCDWQ issue a General Major Variance for the following sites.

R-609IA Buffer Site 1 (46,037 ft^2 of Buffer Impacts requiring mitigation)
Site 1 involves the crossing of an Unnamed Tributary to Mile Branch. The road has been aligned to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by grass swales prior to the grass swales entering the buffer.

R-609IA Buffer Site 2 (30,701 ft^2 of Buffer Impacts requiring mitigation)
Site 2 involves the crossing of an Unnamed Tributary to Mile Branch. The road has been aligned to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by grass swales prior to the grass swales entering the buffer.

R-609IA Buffer Site 3 (34,096 ft^2 of Buffer Impacts requiring mitigation)
Site 3 involves the relocation of existing Jackson Lake Road to the east and will result in impacts to the riparian buffer of Mile Branch and an Unnamed Tributary of Mile Branch. Currently Jackson Lake Road crosses Mile Branch with a 30-foot long bridge. The existing bridge will be replaced with a bridge that spans the creek and the buffer. The new roadway will also impact the buffers associated with the UT of Mile Branch. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by grass swales prior to the discharging into the buffer.

R-609IA Buffer Site 5 (16,897 ft^2 of Buffer Impacts requiring mitigation)
Site 5 involves the crossing of an intermittent Unnamed Tributary to Mile Branch. The road has been aligned to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by grass swales prior to discharging into the buffer.

R-609IA Buffer Site 6 (53,382 ft^2 of Buffer Impacts requiring mitigation)
Site 6 involves the crossing of an Unnamed Tributary to Richland Creek by the main roadway as well as the relocated Dresden Road (SR 1156). The road has been aligned as close to perpendicular as possible to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by grass swales prior to discharging into the buffer.

R-609IA Buffer Site 7 (47,750 ft^2 of Buffer Impacts requiring mitigation)
Site 7 involves the crossing of a man made pond that drains to an intermittent Unnamed Tributary to Richland Creek. The road has been aligned to minimize impacts to the riparian buffer. Level spreaders cannot be used to accomplish sheet flow because the

length of level spreaders would be greater than 300 feet. However, flow is treated by grass swales prior to discharging into the buffer.

R-609IA Buffer Site 8 (432,186 ft^2 of Buffer Impacts requiring mitigation)
Site 8 involves the construction of the interchange between existing I-85 and the US 311 Bypass. Several Unnamed Tributaries to Richland Creek converge within the footprint of this interchange. Shifting the alignment to the south was not considered feasible because there is an existing interchange with I-85 and NC 62. Shifting the alignment to the north would have caused large impacts to the Richland Creek ecosystem. All streams impacted at this site are crossed by the road project, however due to length required for level spreaders to accomplish sheet flow and topography constraints, sheet flow cannot be used to accomplished except at Station Ramp B 13+60 -L-. Treatment of stormwater is accomplished through the combination of grass swales and gore areas between culverts.

R-609IA Buffer Site 9 (45,074 ft^2 of Buffer Impacts requiring mitigation)
Site 9 involves the crossing of an intermittent Unnamed Tributary to Richland Creek. The road has been aligned to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by an hazardous spill basin and Lateral V ditches prior to entering the buffer.

R-609IA Buffer Site 10 (10,990 ft^2 of Buffer Impacts)
Site 10 involves the impacts associated with the improvements to I-85 north of the interchange with the US 311 Bypass. The riparian buffer on the upstream portion of a manmade pond that drains to Richland Creek will be impacted at this site. Flow is treated at this site with Lateral V ditches prior to entering the buffer. The Randleman Buffer rules do not require mitigation at sites less then 1/3 of an acre, therefore no buffer mitigation will be required at this site because impacts are less then 1/3 of an acre.

R-609IA Buffer Site 11 (10,624 ft^2 of Buffer Impacts)
Site 11 involves the impacts associated with the improvements to I-85 north of the interchange with the US 311 Bypass. Buffer impacts to an Unnamed Tributary to Richland Creek will occur due to the extension of an existing pipe under I-85. Flow is treated at this site with Lateral V ditches prior to entering the buffer. Buffer mitigation will not be required at this site because impacts are less then 1/3 of an acre.

R-609IA Buffer Site 12 (37,929 ft^2 of Buffer Impacts)
Site 12 involves the impacts associated with the construction of the north-bound ramp at the I-85 interchange. Buffer impacts to a ponded Unnamed Tributary to Richland Creek will occur due to the extension of an existing pipe under I-85. Flow is treated at this site with Lateral V ditches prior to entering the buffer. Onsite buffer mitigation will compensate for 29,815 ft^2 of buffer impacts.

R-609IB Buffer Site 1 (97,954 ft^2 of Buffer Impacts requiring mitigation)
Site 1 involves the crossing of a pond and Unnamed Tributary of Taylor Branch. The road has been aligned to minimize impacts to the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by the use of an energy dissipator and grass swales prior to discharging into the buffer.

R-609IB Buffer Site 3 (53,589 ft^2 of Buffer Impacts requiring mitigation)
Site 3 involves the crossing of the upper portion of Taylor Branch. The road has been aligned to minimize impacts to the riparian buffer of Taylor Branch and has been aligned to avoid impacts to an Unnamed Tributary. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by the use of grass swales prior to discharging into the buffer.

R-609IB Buffer Site 4 (50,675 ft^2 of Buffer Impacts requiring mitigation)
Site 4 involves the crossing of Taylor Branch. The road has been aligned to minimize impacts to the riparian buffer of Taylor Branch. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by the use of a preformed scour hole and grass swales prior to discharging into the buffer.

R-609IB Buffer Site 6 (52,535 ft^2 of Buffer Impacts requiring mitigation)
Site 6 involves the crossing of an Unnamed Tributary of Taylor Branch. The road has been aligned to minimize impacts to the riparian buffer of the Unnamed Tributary. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. However, flow is treated by the use of grass swales and is then run through pipes to the culvert that will be buried beneath the road.

R-609IB Buffer Site 7 (38,647 ft^2 Buffer Impacts requiring mitigation)
Site 7 involves the realignment of Tuttle Road (-Y9-). The relocation occurs near the convergence of Taylor Branch and an Unnamed Tributary of Taylor Branch. Currently Tuttle Road crosses Taylor Branch, and the fill slopes for Tuttle Road are within 50-feet of the UT to Taylor Branch. The UT to Taylor Branch flows into Taylor Branch upstream of the culvert that is located under Tuttle Road. Tuttle Road will be relocated to the south, the opposite direction of the UT to Taylor Branch. A bridge will be constructed over the new highway that will replace Tuttle Road in the current location. During construction of the new bridge, traffic will continue to use existing Tuttle Road.

Impacts to Taylor Branch are considered a road crossing and are treated using a level spreader, however a bypass device will be required at this site and diffuse flow will only be accomplished part of the time. Parallel impacts will occur to the Unnamed Tributary (UT) to Taylor Branch.

R-2606A Buffer Site 1 (9,104 ft^2 of buffer impacts requiring mitigation)
Site 1 involves the crossing of Muddy Creek. Buffer impacts have been minimized by building a bridge that spans the majority of the riparian buffer. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. Stormwater is treated by the use of Hazardous Spill/ Dry Detention Basins prior to entering the buffer.

R-2606A Buffer Site 2 (29,447 ft^2 of buffer impacts requiring mitigation)
Site 2 involves the crossing of an Unnamed Tributary to Muddy Creek by the proposed bypass and a service road. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader to accomplish sheet flow would be greater then 300 feet. On the north side of the UT a Hazardous Spill basin and energy dissipator treat stormwater prior to entering the buffer. On the south side of the UT a dry detention basin and preformed scour hole treat the stormwater prior to entering the buffer.

R-2606A Buffer Site 3 (83,243 ft^2 of buffer impacts requiring mitigation)
Site 3 involves the crossing of an Unnamed Tributary to Muddy Creek by the proposed bypass. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography. On the north side of the UT a Hazardous Spill basin and a preformed scour whole treat stormwater prior to entering the buffer. On the south side of the UT preformed scour holes treat the stormwater prior to entering the buffer.

R-2606A Buffer Site 4 and 5 (239,015 ft^2 of buffer impacts requiring mitigation)
Site 4 and 5 involves the crossing of an unnamed tributary to Muddy Creek and the filling of a pond that drains to the UT. Sheet flow cannot be accomplished prior to entering the buffer at this crossing due to steep topography and the length required for a level spreader. On the west side (Site 4) of the UT a Hazardous Spill / Dry Detention Basin and a preformed scour hole will treat stormwater prior to entering the stream. On the east side of the UT (Site 5) a Hazardous Spill / Dry Detention Basin will treat flow and will be constructed in the location of an existing pond, within the existing buffer.

R-2606A Buffer Site 6 (172,847 ft^2 of buffer impacts requiring mitigation)
Site 6 involves the construction of an interchange with existing Cedar Square Road. This site involves the relocation of four stream segments, two of which contain inline ponds that drain to Muddy Creek.

The location of the interchange was deemed to be the most practical location and had the smallest amount of impacts to the human and natural environment. Shifting the interchange to the west was not feasible due to the impacts to the town of Glenola and shifting the alignment to the east would not result in decreased impacts. The construction of the interchange at Cedar Square Road allows local users in the area access to the US 311 bypass and regional users access to and from existing US 311 and the bypass.

Both ponds will require drainage because portions of the ponds will be covered by the proposed road project. Type A natural stream design will be used to ensure that the channels are stable. Natural channel design will be used on all four of the stream relocations and vegetated buffers will be established. Buffer replacement at this site totals 126,020 ft^2 (78,495 ft^2 in Zone 1 and 47,424 ft^2 in Zone 2).

Mitigation for Buffer Impacts

Buffer impacts within the Randleman Watershed require that mitigation for Zone 1 impacts be multiplied by 3 and Zone 2 impacts to be multiplied by 1.5. Mitigation for the entire project will total 3,659,112 ft^2. Onsite mitigation will account for 269,360 ft^2. The remaining mitigation of 3,389,752 ft^2 will be provided through the Ecosystem Enhancement Program.

Total Buffer impacts and Buffer Mitigation required for R-609 and R-2606

	Zone 1 (ft^2)	Zone 2 (ft^2)
Impacts Requiring Mitigation	1,396,741	867,609
Mitigation Required after Ratio	4,190,223	1,301,414
Total Mitigation Required	5,491,637	
Onsite Mitigation	102,036	
Offsite Mitigation Required	5,389,601	

Buffer Impacts Not Subject to a Variance

There are two sites that will not require a variance, however these sites still require review by NCDWQ for avoidance and minimization as well as no practical alternative analysis. These sites are described below

<u>R-609IA Buffer Site 4 (122,020 ft^2 of Buffer Impacts)</u>

Site 4 involves the crossing of Mile Branch. Natural channel design will be used to minimize impacts to the stream as well as restoring portions of a degraded stream. Details regarding the natural channel design can be found in the Wetland Permit Drawings (Wetland Site 6) on pages 55-65. Sheet flow will be accomplished at this site through the use of level spreaders, preformed scour holes, silt basins and hazardous (emergency) spill basins. Onsite stream mitigation will result in 72,221 ft^2 (43,513 ft^2 in Zone 1 and 28,708 ft^2 in Zone 2) of buffer mitigation.

Ecosystem Enhancement PROGRAM

February 24, 2006

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, NC 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-0609IA/IB and R-2606A/B/C, US 311 Bypass (Future I-73/74), Guilford and Randolph Counties

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the required wetland and stream mitigation for the subject project. Based on the information supplied by you in letter dated February 10, 2006, the impacts are located in the Cape Fear and Yadkin River Basins of the Central Piedmont Eco-region (CP), and are as follows:

Cape Fear 03030003	Riverine Wetlands: 2.233 acres Non-Riverine Wetlands: 1.948 acres Stream: 19,821 feet
Yadkin 03040103	Riverine Wetlands: 0.21 acre Non-Riverine Wetlands: 0.033 acre Stream: 7,242 feet

The wetland and stream impacts referenced above are a combination of final and preliminary impact amounts. EEP understands as portions of the above projects are finalized, required wetland and stream mitigation amounts could increase or decrease.

Also, as indicated in your letter, this project will impact buffers located in CU 03030003 of the Cape Fear River Basin. The total buffer impacts are 1,396,741 square feet in Zone 1 and 867,609 square feet in Zone 2 with a total buffer mitigation requirement of 5,491,637 square feet. Approximately 102,036 square feet of the buffer mitigation will be completed within the existing right of way of the project. Therefore, EEP will commit to providing the remaining buffer mitigation need of 5,389,601 square

feet. If the buffer impacts or the amount of mitigation required for this project increases, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required.

The NCDOT estimated buffer impacts in the 7-year Impact Projection Database submitted to EEP in May 2005. The buffer mitigation required for the NCDOT's impact projections was incorporated into EEP's biennial budget that was submitted to the NCDOT for approval in June 2005. All buffer mitigation requests and approvals are administered through the Riparian Buffer Restoration Fund. Any buffer impact associated with projects located in the Neuse, Tar-Pamlico, and portions of the Catawba and Cape Fear River Basins are automatic acceptances by the EEP, per the agreement with the NCDWQ.

The NCDOT will be responsible to ensure that the appropriate monetary compensation for the buffer mitigation will be provided in the agreed upon method of fund transfer. Upon receipt of the NCDWQ's Buffer Certification, the NCDOT will provide the EEP a copy of the Certification along with a letter verifying the buffer impact/mitigation amounts and requesting a fund transfer to provide the required compensation. The EEP will transfer funds from the MOA Account (Fund 2984) into the Riparian Buffer Restoration Fund (Fund 2982) and commit to provide the appropriate buffer mitigation to offset the impacts associated with this project.

Compensatory wetland and stream mitigation for this project will be provided in accordance with 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, signed on July 22, 2003 (Tri-Party MOA). EEP commits to implementing sufficient compensatory wetland and stream mitigation to offset the impacts with this project as previously listed by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Tri-Party MOA. 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.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,

William D. Gilmore, P.E.
EEP Director

cc: Eric Alsmeyer, USACE-Raleigh
John Hennessy, Division of Water Quality, Wetlands/401 Unit
File: R-0609IA/IB and R-2606A/B/C

Subject: **Draft Minutes of Hydraulic Review for R-0609IA, Guilford County**

Team Members: Cynthia Van Derwiele, NCDWQ
Marshall Clawson, NCDOT Hydraulics
Kevin Williams, Stantec Consulting (Hydraulics)
David Chang, NCDOT Hydraulics
Michael Penney, NCDOT PD&EA

Cynthia will check with John if permit drawing is needed for <0.1 ac. Since the meeting DOT has decided to provide drawings for all sites.

At interchange with I-85, since stream is already impacted Cynthia agreed to closings loops and using dry detention

Subject: Draft Minutes from Interagency Permit Review Meeting on March 27, 2003 for R-0609IA in Guilford County

Team Members:

Eric Alsmeyer-USACE * (absent)
Cynthia Van Der Weile -NCDWQ (present)
Beth Barnes-NCDWQ (present)
Travis Wilson-NCWRC (present)
Gary Jordan-USFWS (absent)
Chris Militscher-EPA (absent)
Rachelle Beauregard-PDEA-ONE (present)
Elizabeth Lusk-PDEA-ONE (present)

Participants:
Galen Cail, NCDOT Hydraulics
Kevin Williams, Stantec (Hyd.-Consult.)
Jimmy Goodnight, NCDOT Roadway Design
Jason Moore, NCDOT Roadway Design
Michael Penney, NCDOT PD&EA

* Eric forwarded comments prior to meeting. His comment(s) are as follows:

> On sheet 4 of 59, in the wetland on the south side of the L –line, the drawing appears to show, based on scale, that approximately 5m (15') of wetlands will be impacted by mechanized clearing (Method III?), presumably to allow space for necessary sediment an erosion control. Typically, Method III is within 10' of the toe of slope. Has this been minimized to width that is absolutely necessary?

This was checked and the measurement is 3m (10'), the typical width for Method III.

Travis stated that all culvert inverts should be buried a minimum of 20% of culvert diameter or 1' for aquatic passage and that no rip rap should be placed in the bed of streams.

Galen stated that several items were missing from the permit that will be included with the permit resubmittal including details for hazardous spill basins and energy dissipaters.

Beth and Cynthia questioned if a maintenance plan had been set up for the sluice gates in the hazardous spill basins. It was stated that sluice gates were actually not specified and that the use of sand bags may be a better option. This will be investigated. If sluice gates are used a detail and maintenance notification will be needed.

Rachelle requested a summary sheet in English and that wetland symbology be used in the wetland areas.

Site 1 (Wetland/Stream):

Beth wanted to know how the topo was at the wetland South of –L- and how this effected the wetland, since it was in cut. It was stated the topo slopes toward the wetland and Southwest.

Site 4 (Wetland/Stream):

It was stated that the reference reach approval will need to be investigated for the stream relocation.

Site 6 (Wetland/Stream):

Kevin stated that low flow sills were proposed for the outside barrels of the 3 @ 3.4m x 2.4m RCBC.

Site 8 (Wetland/Stream):

Travis questioned the use of the energy dissipater at the outlet of the 1800mm and 2100mm pipes and if there were other options including outlet of the pipes away from the stream. It was stated the dissipater was used since the outlet energy is high and it was concluded it would be better to go ahead and armor the stream bed and allow the energy to be dissipated at a designed location instead of allowing the potential scour to migrate downstream. It was also stated this had been proposed on another project (R-2000AB) but the outcome of which has not been determined. Agency comments were that impacts upstream of this site, and others effected by the interchange, should be shown as "total take".

Kevin stated that 57 of 74 of the buffer permit is to be revised.

Beth and Cynthia questioned the status of mitigation for this project. Elizabeth stated that mitigation acquisition is on-going.

Subject: Draft Minutes from Interagency Hydraulic Design Review Meeting on July 24, 2003 for R-0609IB in Guilford/Randolph Counties

Team Members:

Eric Alsmeyer-USACE (not present)
Cynthia Van Der Wiele-NCDWQ (present)
Travis Wilson-NCWRC (present)
Gary Jordan-USFWS (not present)
Chris Militscher-EPA (present)
Brett Feulner-PDEA (present)
Jimmy Goodnight-Roadway Design (present)

Participants:
Max Price, NCDOT Hydraulics
Andy Healy, NCDOT Hydraulics
Steve Kendall, NCDOT Roadway Design
Lonnie Brooks, NCDOT Structure Design
Beth Barnes, NCDWQ

The meeting began with Max describing the project location. He then went over the Wetland and Buffer impacts Site by Site.

Wetland Impacts
Site 1

Max pointed out that an additional (64m – 210') of stream impacts right of Sta. 62+90 to Sta. 63+25 should be shown on the permit drawings. These impacts are the result of the elimination of hydrology by filling the pond.

Max addressed the rip-rap pad at the outlet of 1000mm CSP. Beth agreed that if velocities are high at pipe outlets, rip-rap may be needed. If so, the pad should be keyed into the ground and not piled up so as not to disturb aquatic life. A detail for this type of outlet protection is being investigated by the unit.

Site 2

Travis stated that all culvert inverts should be buried a minimum of 20% of culvert diameter or 1' for aquatic passage. Max verified with the culvert reports that the three significant structures were buried. A review design documentation has verified that the smaller pipes were designed to be buried also.

Site 3

Travis request to see a note on the roadway plans and permit drawings concerning the culvert sills and low-flow channels at the double barrel box sites. This note will be added.

Site 4

Brett Feulner was not aware of the status of using the pond at STA 79+00 Rt –L- for on site mitigation. Max will check with Elizabeth Lusk on the status.

Site 6

Max pointed out that there may not be enough easement at the culvert for the temporary diversion channel. The design to see if there will be any more impacts and easement requirements.

Site 7

There was concern during the 4B meeting about the new fill affecting the hydrology for the wetlands. Max confirmed that the 750mm RCP is providing the hydrology.

Buffer Impacts
All Sites

It was discussed that a "General" Major Variance would be required for this project.

It was discussed that the design data for grass swales, level spreaders, & preformed scour holes could best be shown on a set half size plans and or in a stormwater narrative instead of adding information to the permit drawings.

Cynthia, Beth and Max agreed to show buffer impacts all the way to the right of way and or easement.

Max agreed to check slopes through buffers at the preformed scour hole locations and to investigate other options if the slopes would not promote defused flow.

Max agreed to check grass swale lengths to make sure they meet or exceed the minimum requirements.

Subject: Minutes from R-2606A Interagency Hydraulic Design Review Meeting (2/21/02)

Team Members: Marshall Clawson, NCDOT Hydraulics
Galen Cail, NCDOT Hydraulics
John Nichols, Earth Tech
Richard Spencer, USACE
Rachelle Beauregard, NCDOT PD & EA
Elizabeth Lusk, NCDOT PD & EA
Michael Penny, NCDOT PD & EA

Cynthia Van der Wiele, NCDWQ (Reviewed on 2/14/02)

The meeting began with the distribution of the Stormwater Management Plan and a review of the overall project layout. The basin boundary for the Randleman Lake Watershed was then distinguished on quad maps. John Nichols proceeded to review each redline plan sheet and field agency comments and questions. The question/comments are summarized as follows:

1) Delineation of Jurisdictional Streams: Richard Spencer questioned whether the jurisdictional stream delineation has been completed for the project(s). PD & EA and Richard will investigate.

2) Constructability of bridge Sta 22+65 –L-. Richard Spencer asked if the potential impacts due to the access and construction of the bridge at Sta 22+65 –L- (Plan Sheet 5) had been considered. Marshall informed that these potential impacts will be investigated and quantified after the plans are reviewed by the Division Construction and/or Area Bridge Engineer at the Field Inspection. They can provide insight into how the bridge will be constructed. This information will be provided at the 90% review meeting.

3) Hazardous Spill Basins/Infiltration Facilities: John Nichols pointed out the locations where hazardous spill basins have been prescribed (Sta 43+50 –L- Lt, 56+50 –L- Lt, 78+50 –L- Lt, 112+00 –L- Rt). John also pointed out where berms will be used inside of quadrant Sta 110+00 –L- Rt for stormwater detention/infiltration and where reaches of natural stream design have been proposed. Although no comments were offered at this time, further field investigation by the agencies may be required for familiarization of the project site and overall acceptance of proposed drainage facilities.

May 23, 2003

Subject: Draft Minutes Interagency Hydraulic Design 4C Permit Review Meeting on May 22, 2003, for R2606A, Randolph County.

Team Members:
Eric Alsmeyer – USACE (Present)
Cynthia Van Der Wiele – NCDWQ (Present)
Travis Wilson– NCWRC (Absent*)
Gary Jordan – USFWS (Absent)
Chris Militscher – EPA (Absent)
Brett Feulner – NCDOT ONE (Present)
Teresa Bruton – NCDOT Design Services (Absent**)

Participants:
John Frye – NCDOT Structures
Mike Penney – NCDOT PDEA
Rachelle Beauregard– NCDOT ONE
Marshall Clawson – NCDOT Hydraulics
Anne Gamber – NCDOT Hydraulics

* Due to the time change, Travis Wilson could not attend.
** Teresa Bruton was not informed of the revised time.

Marshall Clawson began the meeting at 3:00 pm.

1. Causeway for Muddy Creek: Eric Alsmeyer questioned if consideration was taken for installing the bent in the northeast quadrant. He believes a causeway may be needed.

   Action since meeting: Structure Design will use single span bridge therefore no causeway is needed.

2. Culvert Geometry: The permit drawings showed the centerline of the culverts. This caused confusion over the number of barrels. The centerline must be removed.

3. Natural Channel Design: Cynthia Van Der Wiele questioned if mitigation would be allocated for this site. Eric Alsmeyer commented that the other agency representatives would be needed to determine this issue.

The meeting was adjourned at 3:30

STORMWATER MANAGEMENT PLAN

TIP No. R-609IA
Project: 34345.1.1
Guilford County

Hydraulics Project Manager: R. Kevin Williams, PE (Ko & Associates, PC)
Galen Cail, PE (NCDOT Hydraulics Unit)

ROADWAY DESCRIPTION

Project R-609IA, involves the construction if a new, four-lane limited access facility. The north end of the project begins south of US 29-70 and traverses in a southeasterly direction to just south of I-85 and north of NC-62 in Guilford County. The overall length of the project is approximately 4.9 kilometers (3.04 miles). The typical section of this project is set at two lanes traveling in each direction with a grass swale median and grass swales located left and right of the proposed travel way. The project creates impacts to fifteen streams within the Randleman Lake Water Supply Watershed. Table 1 below is a listing of the streams and the proposed crossing structure. The project drainage system consists of cross pipes, grated inlets with associated pipe systems, tail ditches, lateral stormwater ditches, stormwater swales, and dry detention drawdown structures.

Table 1. Stream Crossings

Location	Stream Name	Drainage Area	Proposed Structure
Site 1, Sta 19+94	UT to Mile Branch	18.5 Ha	1350 RCP
Site 2, Sta 25+73	UT to Mile Branch	18.8 Ha	1350 RCP
Site 3, Sta 28+10	UT to Mile Branch	11.7 Ha	900 RCP
Site 4, Sta 33+42	Mile Branch	581 Ha	3 @ 3.4x2.4 RCBC
Site 5, Sta 35+30	UT to Mile Branch	6.3 Ha	2 @ 600 RCP
Site 6, Sta 40+28	UT to Richland Creek	10.9 Ha	1050 RCP
Site 7, Sta 45+88	UT to Richland Creek	71.4 Ha	3.7x2.1 RCBC
Site 8 Sta 50+40 – 56+00	UT to Richland Creek	139.7 Ha	1800 & 2100 RCP
Site 9, Sta 58+65	UT to Richland Creek	5.2 Ha	900 RCP
Site 10 Sta 10+00 SBCD	UT to Richland Creek	N/A	Existing 750 & 900 CMP's
Site 11 Sta 12+90 SBCD	UT to Richland Creek	N/A	Existing 1050 CMP

ENVIROMENTAL DESCRIPTION

The project is located in the Randleman Lake Water Supply Watershed. The streams listed in Table 1 have been classified as jurisdictional stream and therefore riparian buffer rules apply. The purpose of the rule is to protect and preserve riparian buffers in

the Randleman Lake Water Supply Watershed to maintain their nutrient removal functions.

There are fourteen wetland sites that will be impacted by the proposed project. Wetland impacts have been kept to a minimum by keeping roadway fill slopes at 3:1 or steeper.

BEST MANAGEMENT PRACTICES (BMP's)

The primary goal of Best Management Practices (BMP) is to prevent degradation of the states surface waters by the location, construction and operation of the highway system. BMP's are activities, practices and procedures taken to prevent or reduce stormwater pollution. The BMP's were designed based on the North Carolina Department of Environment and Natural Resources publication entitled, "Stormwater Best Management Practices." The BMP's and measures that have been used on this project to reduce stormwater impacts are grassed swales, dry detention basins, level spreaders, emergency spill basins, natural channel design for stream relocation and the submergence of box culverts below stream beds.

GRASS SWALES
Grassed swales have been utilized along the entire project in the left, right and median drainage swales. The roadway left, right and median grass swales provide treatment in accordance with the NCDENR BMP manual. The roadway swale side slopes will be 3:1 or flatter. It has been determined that the 2-year discharge velocity is less than 0.61mps (2 fps) and the length of each swale is at least 30 meters (100 feet) per 0.4 hectares (1 acre).

DRY DETENTION BASINS
Dry Detention Basins have been utilized within Loops A, B and C (plan sheet 16) in an effort to attenuate and diffuse the stormwater runoff in the interchange area. The interchange drains directly into a jurisdictional stream and the use of Dry Detention Basins in this area will provide treatment for the stormwater discharge. The basins have been designed to capture the 2.54cm (1-inch) storm and allow it to drawdown over a period of 2 to 5 days.

LEVEL SPREADERS
The use of Level Spreaders has been investigated at multiple locations and utilized at three locations as follows:

plan sheet 11, -L- 33+40 right
plan sheet 16, -L- 50+43 left
plan sheet 16, Ramp B 13+57 right

The existing ground slope at many sites investigated was determined to be too steep for level spreaders. There were also several sites where the use of level spreaders was determined to be not feasible because the required length of level spreader was greater than 91meters (300 feet).

EMERGENCY SPILL BASINS

Emergency Spill Basins have been provided at twelve locations through out the project as follows:

plan sheet 11, -L- 34+00 right
plan sheet 12, -L- 35+60 left
plan sheet 13, -L- 39+90 left
plan sheet 13, -L- 40+70 left
plan sheet 15, -Y5- 14+00 right
plan sheet 15, -Y5- 15+20 right
plan sheet 16, -L- 50+40 left
plan sheet 16, FLY 16+20 left
plan sheet 16, Ramp B 12+90 right
plan sheet 17, -L- 56+00 left
plan sheet 17, -L- 58+20 right
plan sheet 17, Ramp D 15+20 right

NATURAL CHANNEL DESIGN

The stream relocation is required due to the location of the proposed fill slopes over the existing stream, making the relocation of the stream unavoidable. The design method used is in accordance with those recommended in, "Applied River Morphology" (Rosgen, 1996).

BOX CULVERT SUBMERGENCE

In addition, the proposed barrel box culverts sites 4 and 7 will be buried 1-foot below the stream bed. At site 4, sills will be installed in the two outside barrels to maintain the normal stream flow and channel characteristics.

STORMWATER MANAGEMENT PLAN

R-0609IB, State Project 8.1570601 Date: 9-10-04
Guilford/ Randolph County
Hydraulics Project Manager: Max S. Price, PE

ROADWAY DESCRIPTION

The project involves construction of US 311 Bypass on new location to provide a bypass of the High Point and Archdale central business districts. The overall length of the project is 1.85 miles. The proposed typical section is a four lane divided highway with a grass median.

ENVIRONMENTAL DESCRIPTION

The project is located in the Randleman Lake Watershed in the Piedmont Physiographic Province. There are seven stream crossings on this project, which are all classified as Class IV waters. All of the crossings except two are on new location. The two existing pipe culverts will be replaced to meet current design standards. Three of the crossings will be box culvert size structures and the remaining four structures will be pipe culverts. Approximately 2884 feet (879 m) of existing stream will be impacted due to the project. Three ponds will be drained for an impact of 2.56 Acres (1.04 ha). Four wetland sites will be impacted. Approximately 0.15 acres (0.06 ha) of wetlands will be impacted due to this project. Eight Randleman Lake Watershed Buffer sites will be impacted.

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. Level spreaders were used where feasible to attenuate and disperse flow into the buffer. Preformed scour holes (PSH) were also used to attenuate and disperse flow into the buffer. Grassed swales were also used to treat stormwater runoff prior to entering the buffer streams. Rip rapped ditches were used where warranted to control erosion. The inverts of all new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter up to 1 ft. deep. There are three major stream crossings consisting of two reinforced concrete box culverts and one 84 inch concrete pipe.

Level Spreaders

Station 76+26 –L- Rt. (PSH)
Station 79+41 –L- Rt. (PSH)
Station 12+79 –Y9- Rt. (PSH)
Station 10+90 –Y8- Rt. (17m level spreader)
Station 11+95 –Y9- Lt. (10m level spreader design for 1 inch per hour intensity with bypass for the 10 year storm)

Grass Swales

Station 62+00–L- Rt.
Station 62+20 –L- Med.
Station 62+40 –L- Lt.
Station 63+90–L- Lt.
Station 63+90 -L- Lt.
Station 63+94 –L- Med.
Station 64+80 –L- Lt.
Station 64+80 –L- Med. Lt.
Station 64+80 –L- Med. Rt.
Station 66+60 –L- Lt.
Station 66+60 –L- Med.
Station 67+20 –L- Lt.
Station 67+20 –L- Med.
Station 68+00 –L- Med.
Station 68+00 –L- Rt.
Station 70+31 –L- Lt.
Station 70+31 –L- Med.
Station 70+31 –L- Rt.
Station 70+70 –L- Med.
Station 70+80 –L- Lt.
Station 71+20 –L- Rt.
Station 72+60 –L- Med.
Station 72+60 –L- Rt.
Station 72+60 –L- Lt.
Station 75+20 –L- Lt.
Station 76+80 –L- Med.
Station 78+80 –L- Med.
Station 81+20 –L- Lt.
Station 81+23 –L- Med.
Station 81+20 –L- Rt.
Station 81+68 –L- Med.
Station 82+20 –L- Lt.
Station 82+02 –L- Med.
Station 82+00 –L- Rt.
Station 82+00 –L- Rt.
Station 84+30 –L- Med.
Station 84+27 –L- Med.
Station 86+40 –L- Rt.
Station 86+62 –L- Med.
Station 88+40 –L- Rt.
Station 88+40 –L- Rt.
Station 89+40 –L- Rt.
Station 89+40 –L- Med.
Station 89+40 –L- Lt.
Station 90+07 –L- Rt.

Station 90+00 –L- Med.
Station 17+30 –Y8AA- Rt.

Culverts

Station 68+55 –L-
Proposed 84 inch (2100 mm) concrete pipe with side tapered inlet. The stream will be diverted around the culvert entrance to allow for all dry construction.

Station 76+90 –L-
Proposed 2 @ 7 ft by 7 ft (2 @ 2.1 m by 2.1 m) RC Box Culvert. The stream will be diverted around the culvert entrance to allow for all dry construction.

Station 12+23 –Y9-
Proposed 2 @ 6 ft by 8 ft (2 @ 1.8 m by 2.4 m) RC Box Culvert. The stream will be diverted around the culvert entrance to allow for all dry construction.

STORMWATER MANAGEMENT PLAN
R-2606 A
US 311

Project Involvement

The project is located in the Randleman Lake water supply watershed and impacts waters classified as WS-IV CA. Part of the project lies within the Randleman Lake Critical Area; therefore, several stream crossings will require special consideration. In the "Administrative Action Finding of No Significant Impact" document, the following commitments were identified:

1) Borrow material will be taken from upland sources in the construction of this project.
2) NCDOT will make every effort during the erosion control design phase for this project to avoid placing erosion control devices on wetlands.
3) NCDOT will use Design Standards in Sensitive Watersheds (15A NCAC 04B .0024), and High Quality Storm Erosion Control Measures at all stream crossings currently or potentially designated as Water Supplies, and where the project is located in any Watershed Critical Area.
4) Hazardous Spill Basins will be provided at crossings of Muddy Creek, Back Creek, and their associated tributaries in accordance with NCDOT's Guidance for the Location and Design of Hazardous Spill Basins.
5) A comprehensive wetland and stream mitigation plan will be provided in the application for the 401 Water Quality Certification and the 404 permit.

Potential Impacts

Based on a preliminary evaluation of waterways on this project, it has been determined that the proposed roadway may pose a risk of pollution to the receiving streams. Due to the location of the project in a water supply critical area, the use of Best Management Practices and high quality erosion control measures are warranted. Also, the NCDENR Randleman Lake Water Supply Watershed Stormwater Requirements should be followed.

Best Management Practices

The following practices will be used to minimized impacts to streams along the project:

- Ditching and channelization through wetlands shall be avoided.
- Temporary erosion control plans will be provided that meet Design Standards in Sensitive Watersheds (15A NCAC 04B .0024).
- Discharge from highway drainage systems and ditches will be outlet prior to vegetated stream buffers to reduce pollutant loading into streams.
- Where possible, water will be discharged as sheet flow into buffers to reduce erosion, promote infiltration, and reduce pollutant loading.

- Hazardous Spill Basins will be used in accordance with NCDOT's Guidance for the Location and Design of Hazardous Spill Basins to minimize the impacts of potential hazardous spills on the roadway.
- Hazardous spill basins will be used as Type A sediment basins during construction to control sediment loading.
- Hazardous spill basins will be designed for use as permanent extended dry detention basins for suspended solid removal. These basins will also serve to attenuate discharges, thereby reducing sediment loading and erosion problems in receiving waterways.
- Low berms will be used in suitable locations to trap roadway runoff and promote infiltration.
- In locations where suitable, inlets will be left slightly higher than the surrounding ground to promote infiltration.
- Where feasible and warranted, natural stream design will be used to restore damaged or relocated streams to their stable dimension, pattern, and profile.
- Permanent check dams will be used in steep ditches to lower flow velocities before outletting into buffers.

OF NORTH CAROLINA
ION OF HIGHWAYS

FORD COUNTY

S 311 HIGH POINT EAST BELTWAY FROM
S 29-70 TO I-85 NORTH OF ARCHDALE

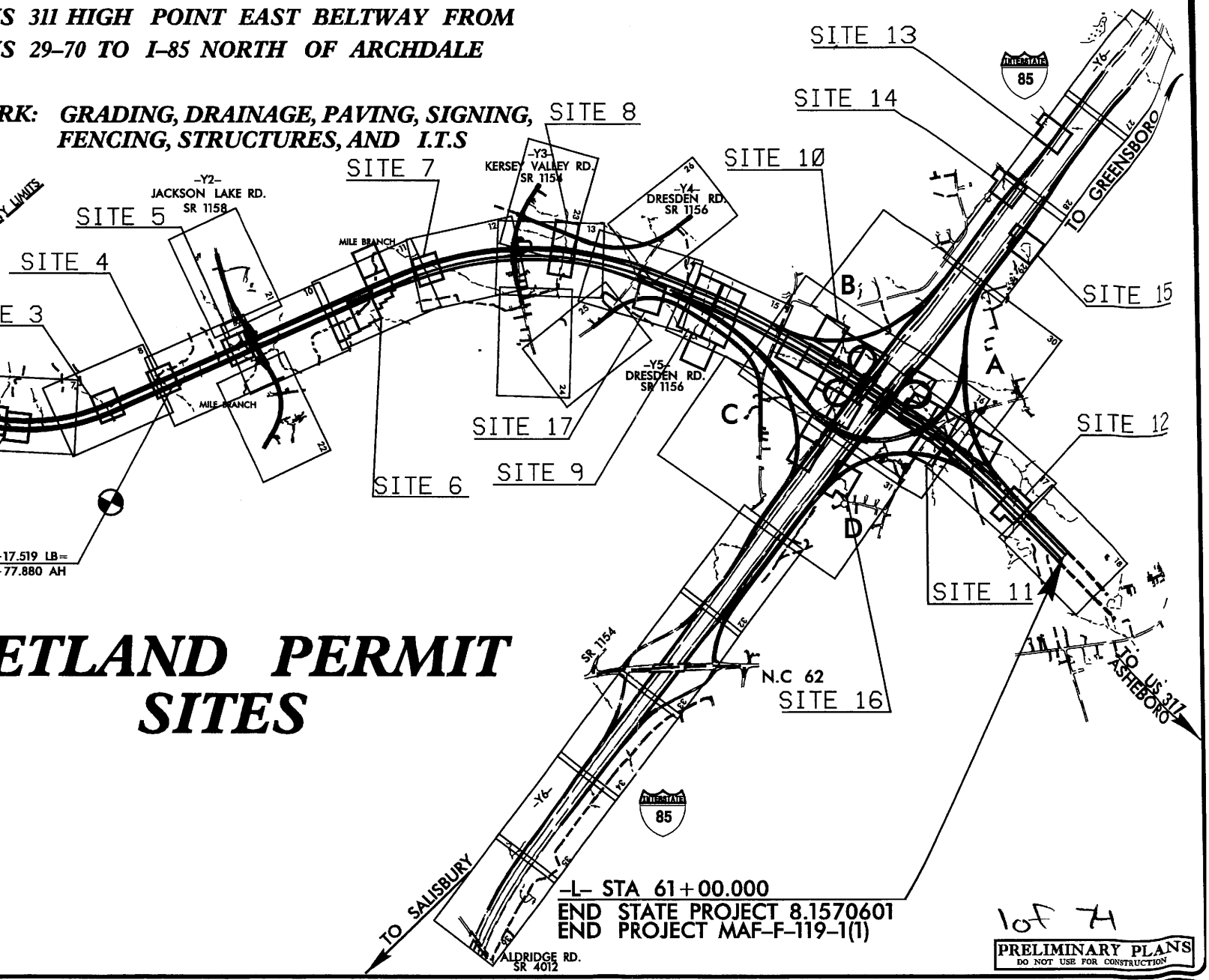
RK: GRADING, DRAINAGE, PAVING, SIGNING, FENCING, STRUCTURES, AND I.T.S

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IA	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34345.1.1	MAF-F-119-1(1)	PE
34345.2.7	STP-NHF-119-1(11)	ROW & UTILITIES



ETLAND PERMIT SITES

-L- STA 61+00.000
END STATE PROJECT 8.1570601
END PROJECT MAF-F-119-1(1)

1 of 74

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-1(1) = 4.901 KM
-1(1) = KM
4.901 KM

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER, 2003

LETTING DATE:
MARCH 15, 2005

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

STEVE KENDALL
PROJECT DESIGN ENGINEER

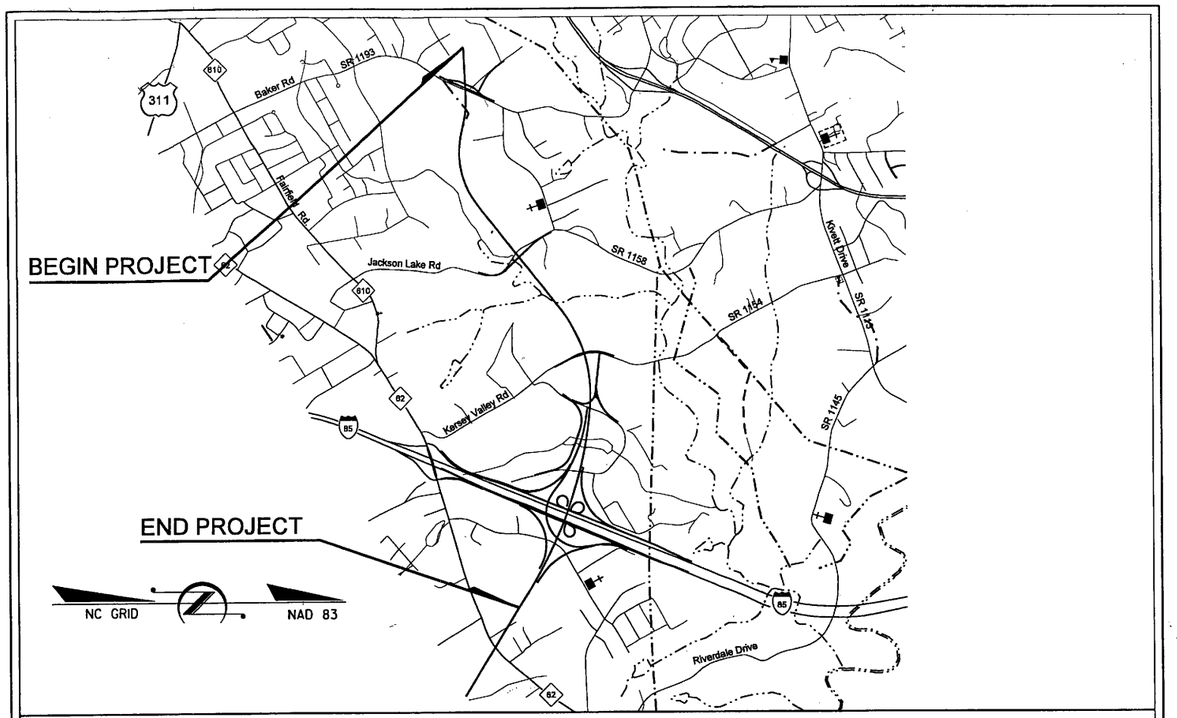
HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

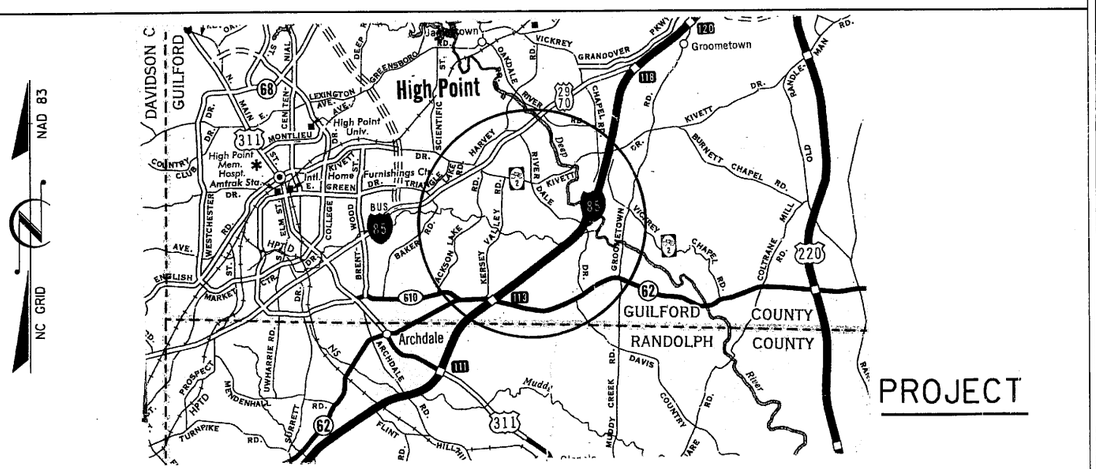
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE



PORTION OF GUILFORD COUNTY MAP



PORTION OF STATE MAP

WETLAND IMPACTS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 2 OF 74

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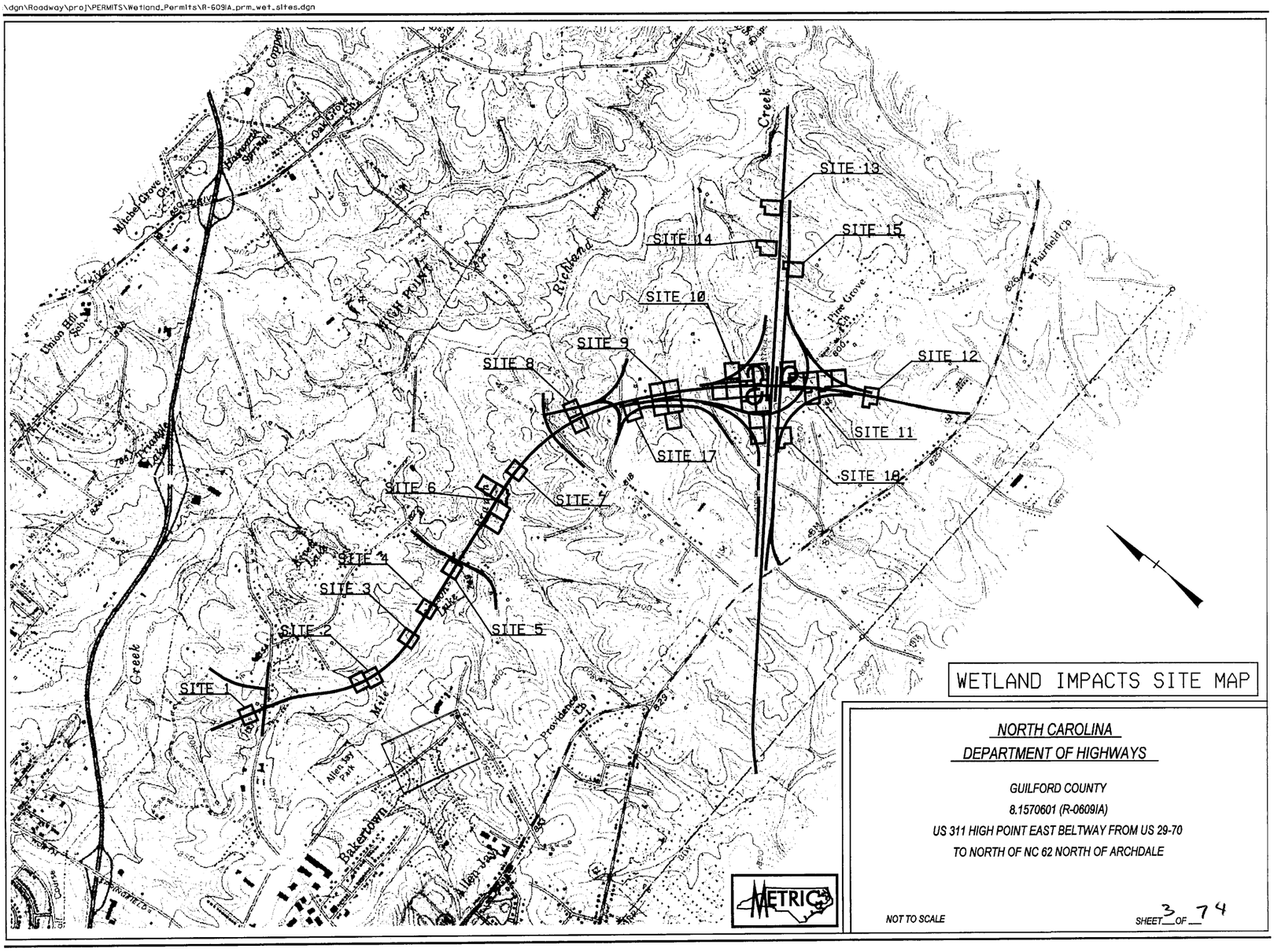

WETLAND IMPACTS SITE MAP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

NOT TO SCALE

SHEET 3 OF 74

WETLAND LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

F F — DENOTES FILL IN WETLAND

S S — DENOTES FILL IN SURFACE WATER

P P — DENOTES FILL IN SURFACE WATER (POND)

T T — DENOTES TEMPORARY FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT

12"-48" PIPES

54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTING STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 4 OF 74

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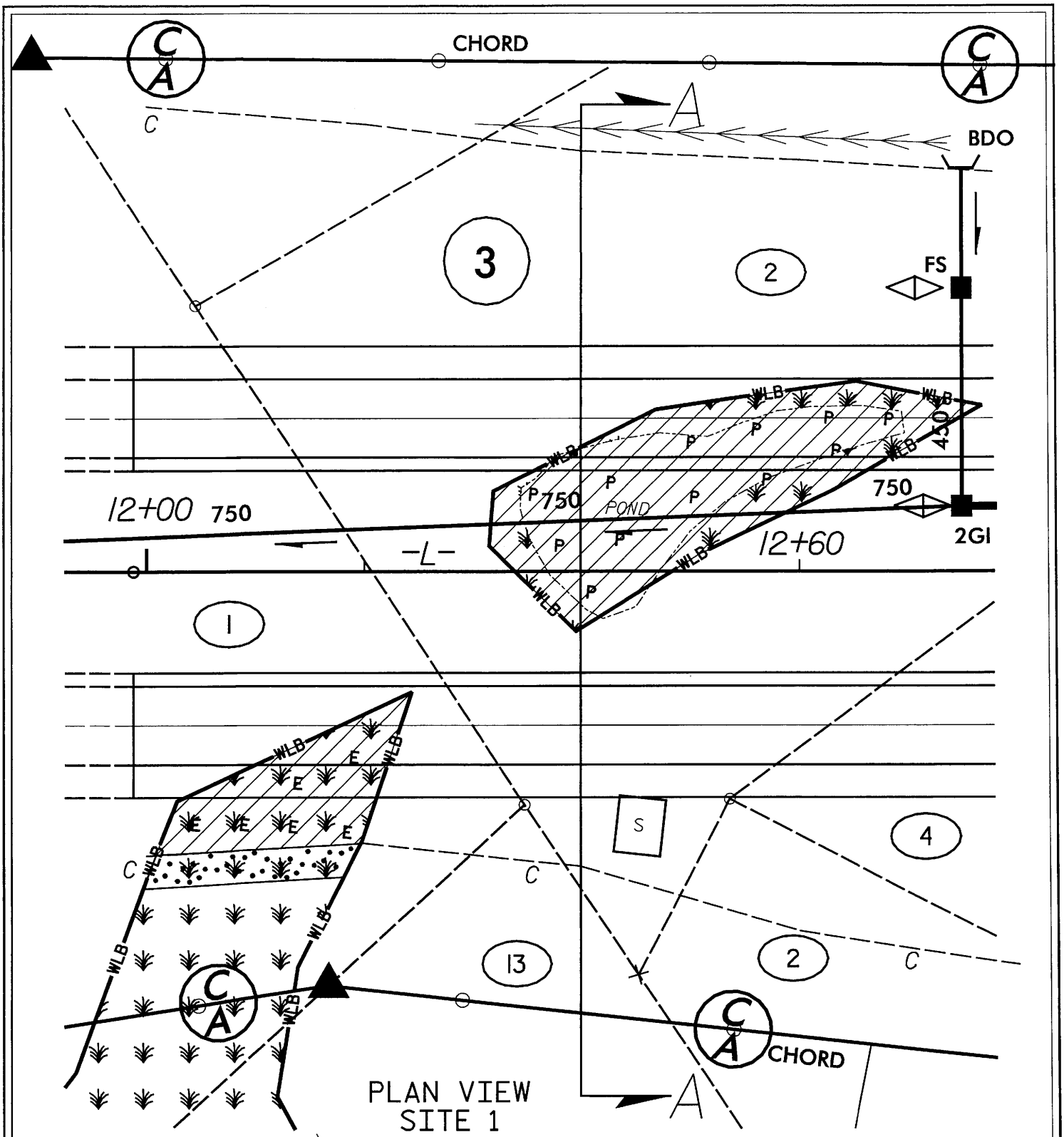

SHEET 1

LEGEND

- WLB — WETLAND
- E E — DENOTES EXCAVATION IN WETLAND
- P P — DENOTES FILL IN SURFACE WATER (POND)
- DENOTES MECHANIZED CLEARING

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 5 OF 74

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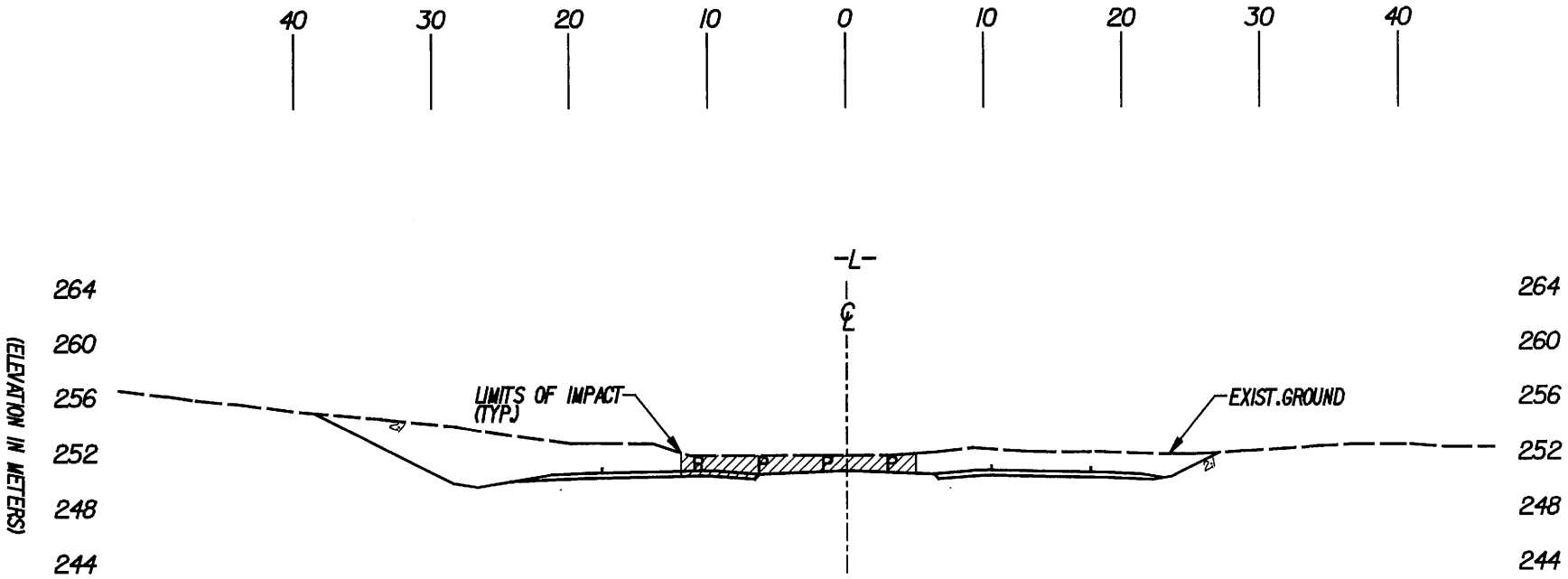


SECTION "A-A"

SITE 1

CROSS SECTION
(-L- 12+40)

LEGEND

P P DENOTES FILL IN SURFACE WATER (POND)

METRIC

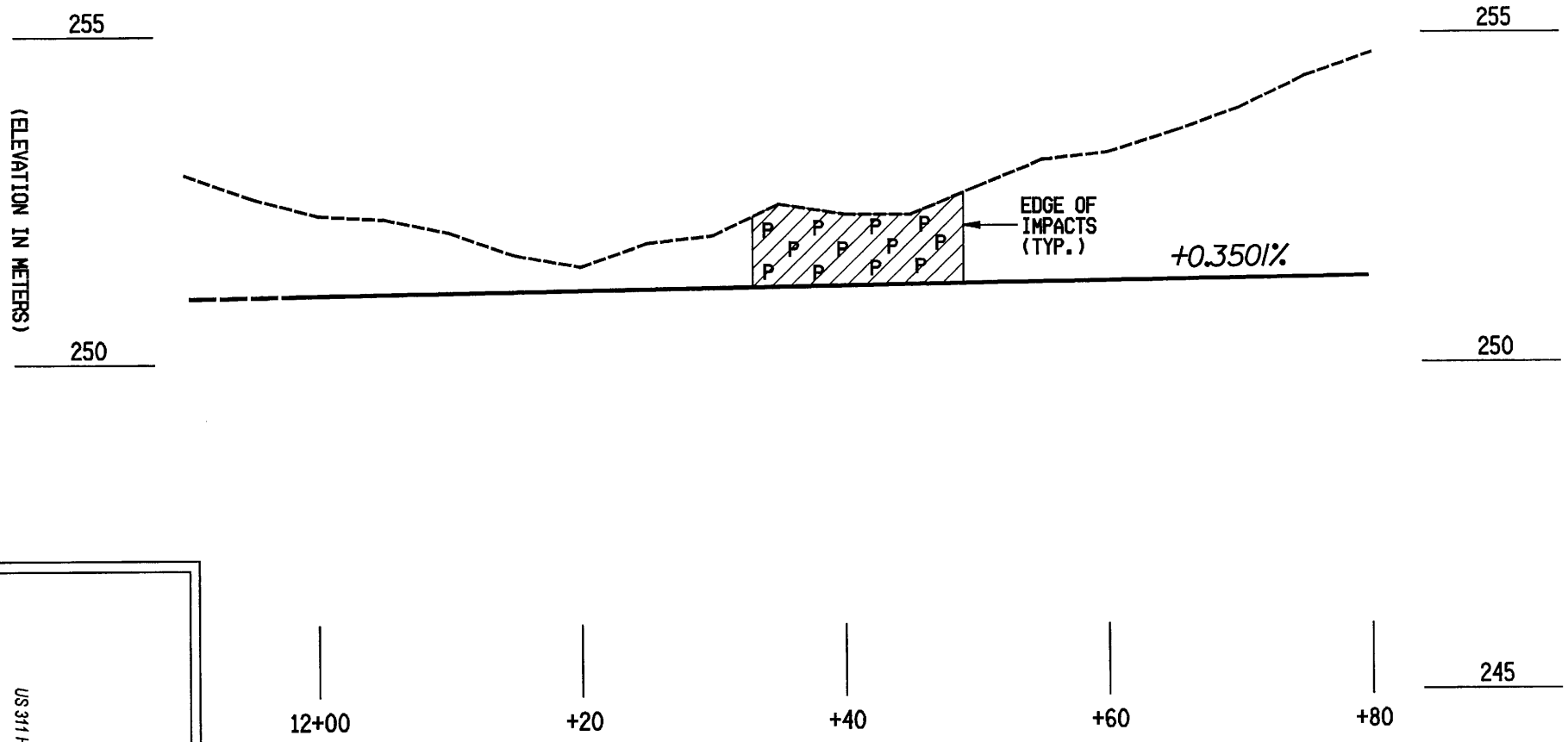
5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 6 OF 74



SITE 1
-L- LINE PROFILE

LEGEND

DENOTES FILL IN SURFACE WATER (POND)

METRIC

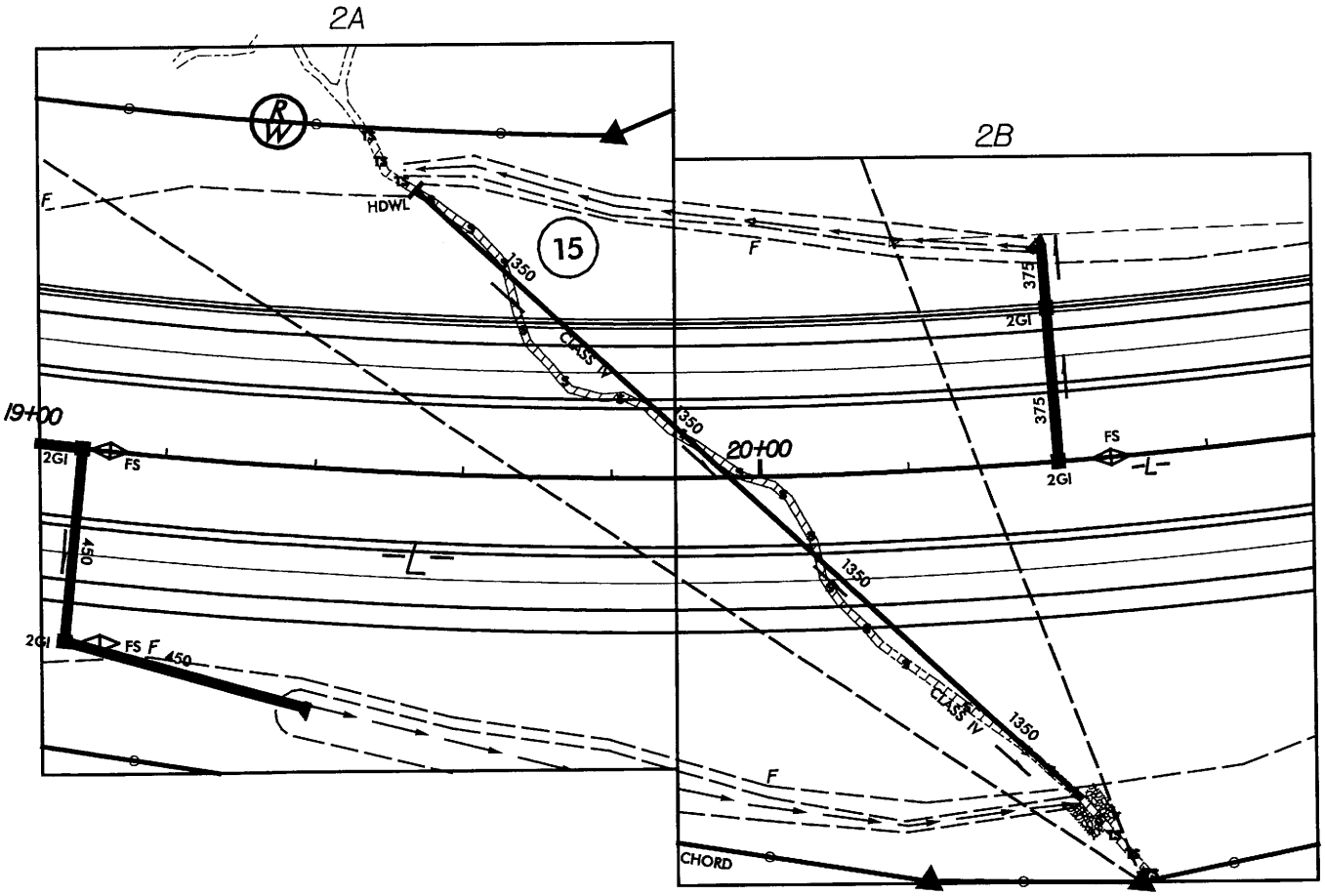
5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

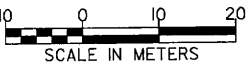
GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 7 OF 74



SHEET LAYOUT
PLAN VIEW
SITE 2



NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 8 OF 74

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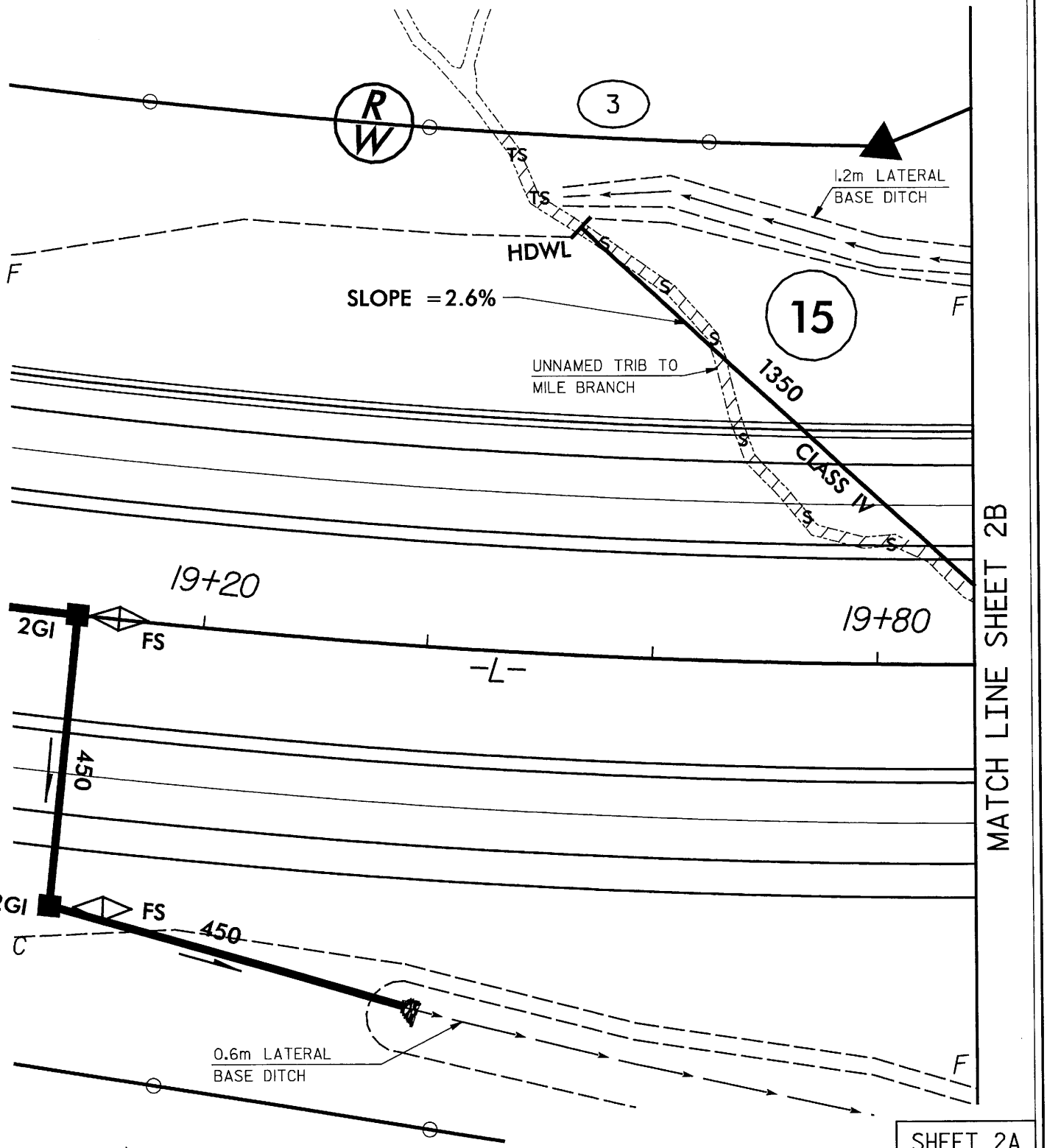

SHEET 2A

PLAN VIEW
SITE 2

LEGEND

S S DENOTES SURFACE WATER LOSS

TS TS DENOTES TEMPORARY SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

9 of 74

SCALE AS SHOWN

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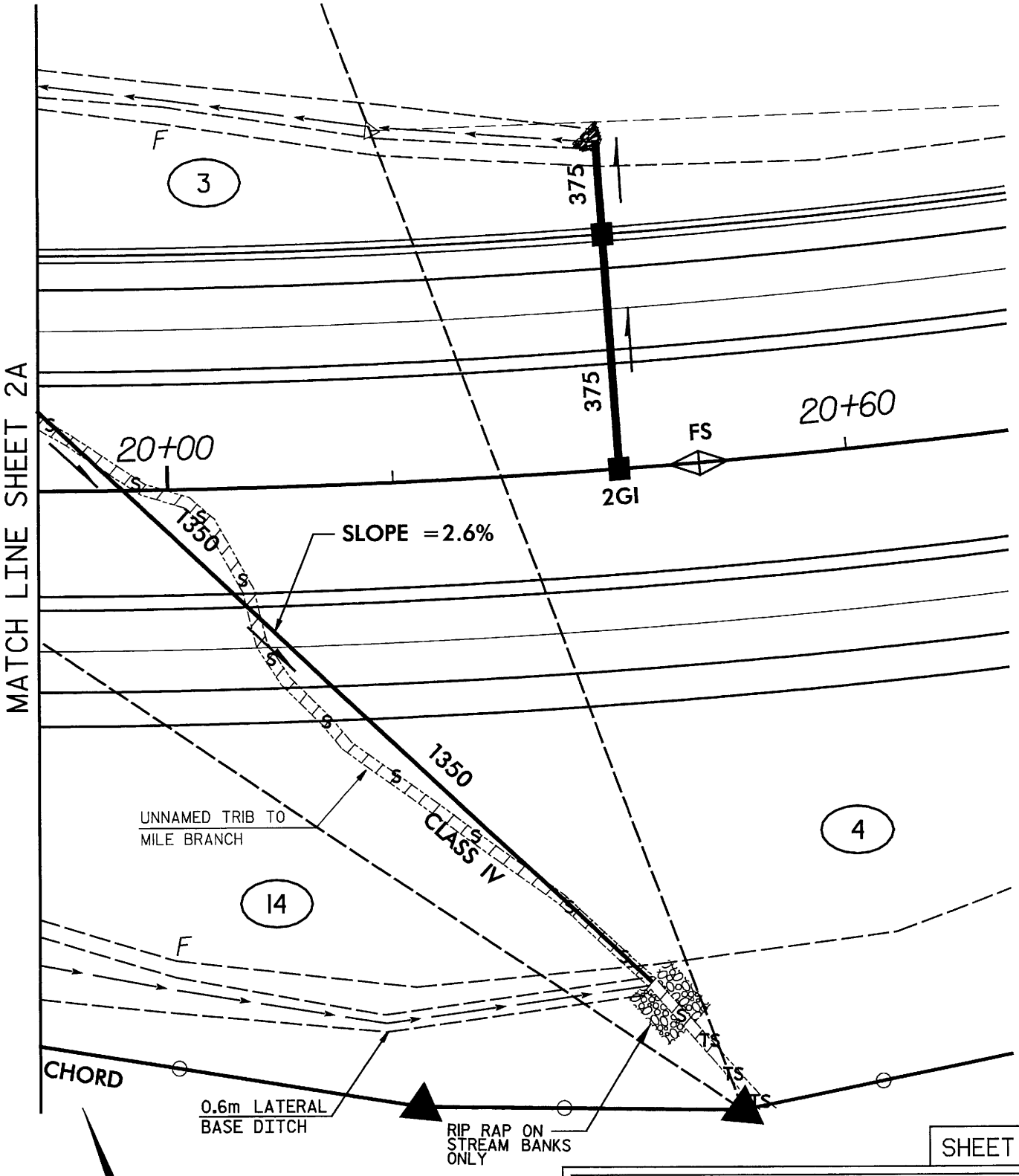

SHEET 2B

PLAN VIEW
SITE 2

LEGEND

S S DENOTES SURFACE WATER LOSS

TS TS DENOTES TEMPORARY SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

10 of 74

SCALE AS SHOWN

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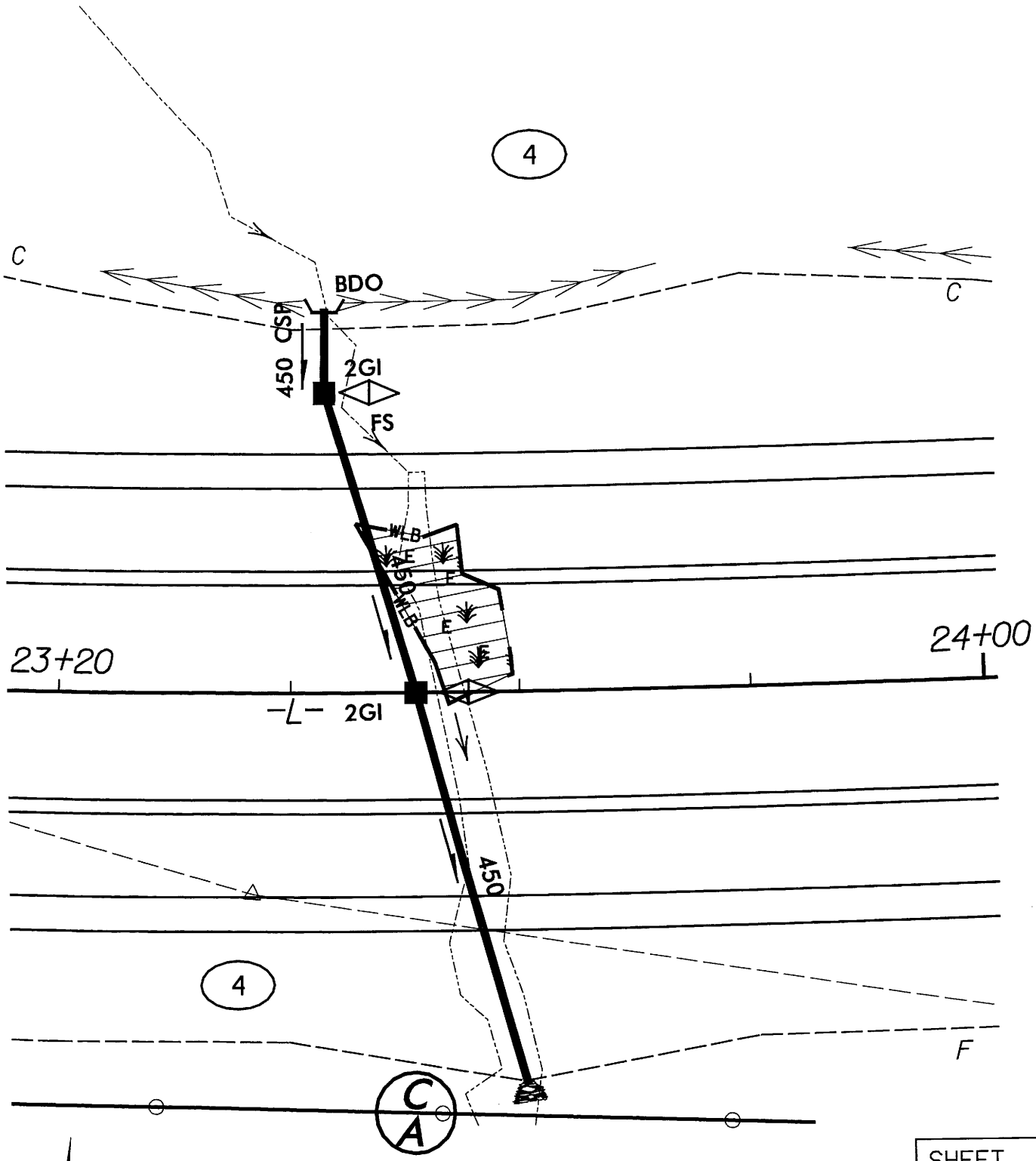

SHEET 3

PLAN VIEW
SITE 3

LEGEND

—WLB— WETLAND

E E DENOTES EXCAVATION IN WETLAND

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

11 of 74

SCALE AS SHOWN

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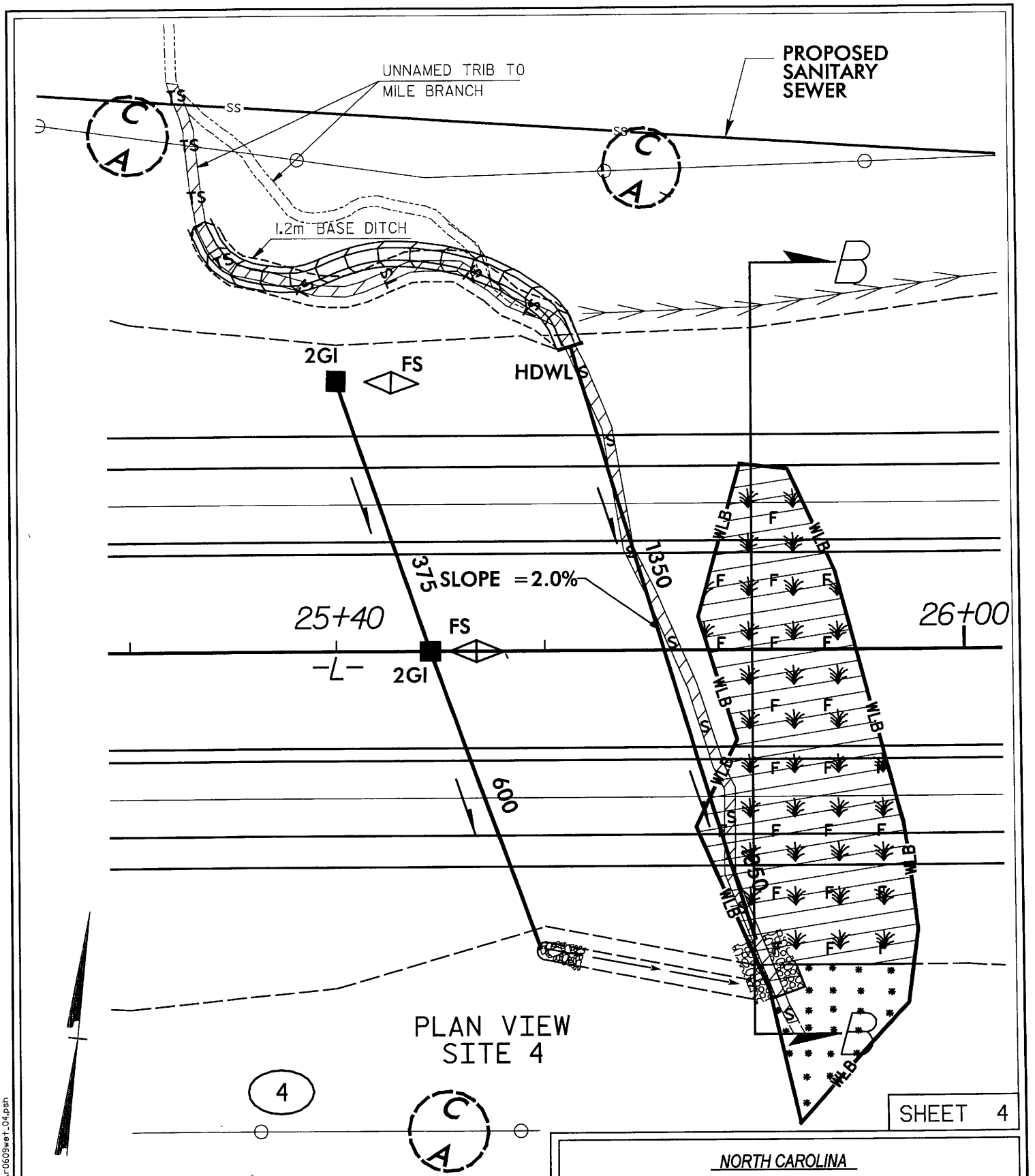

LEGEND

—WLB— WETLAND

F F DENOTES FILL IN WETLAND

S S DENOTES SURFACE WATER LOSS

DENOTES MECHANIZED CLEARING

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

12 OF 74

SCALE AS SHOWN

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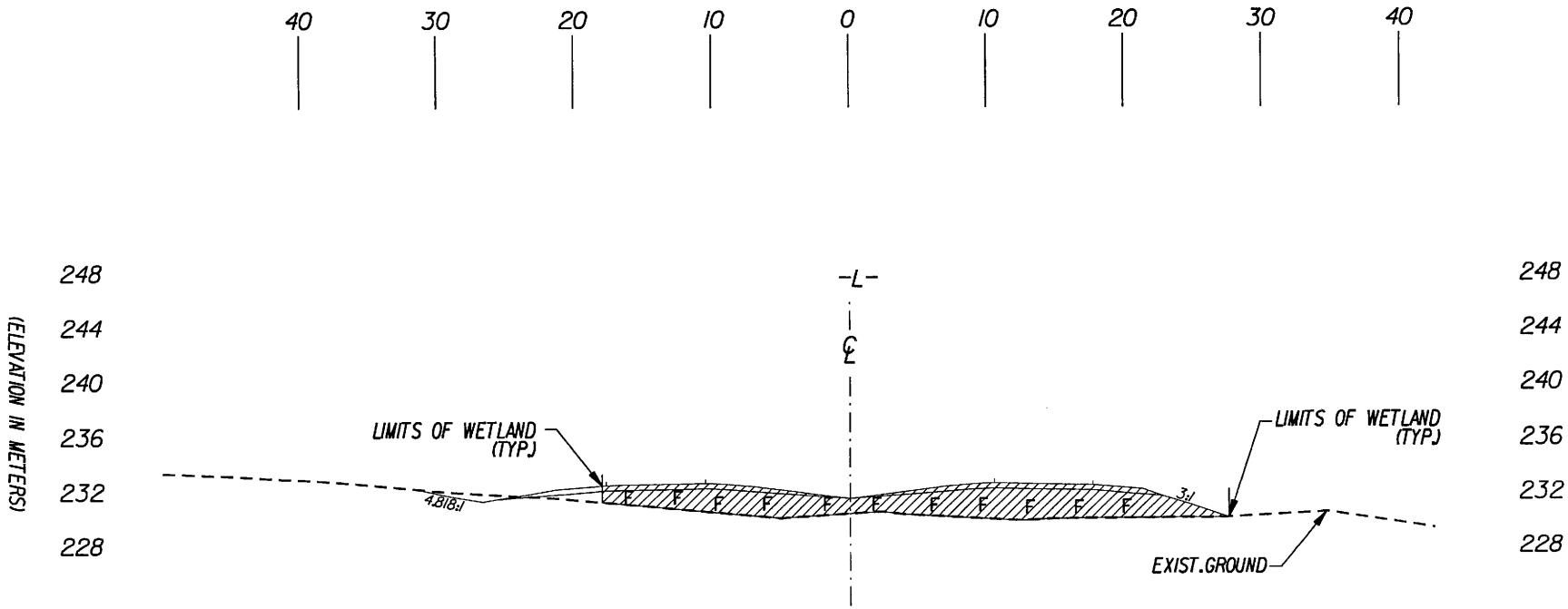

SECTION "B-B"

SITE 4

CROSS SECTION
(-L- 25+80)

LEGEND

F F DENOTES FILL IN WETLAND

METRIC

5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
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TO NORTH OF NC 62 NORTH OF ARCHDALE

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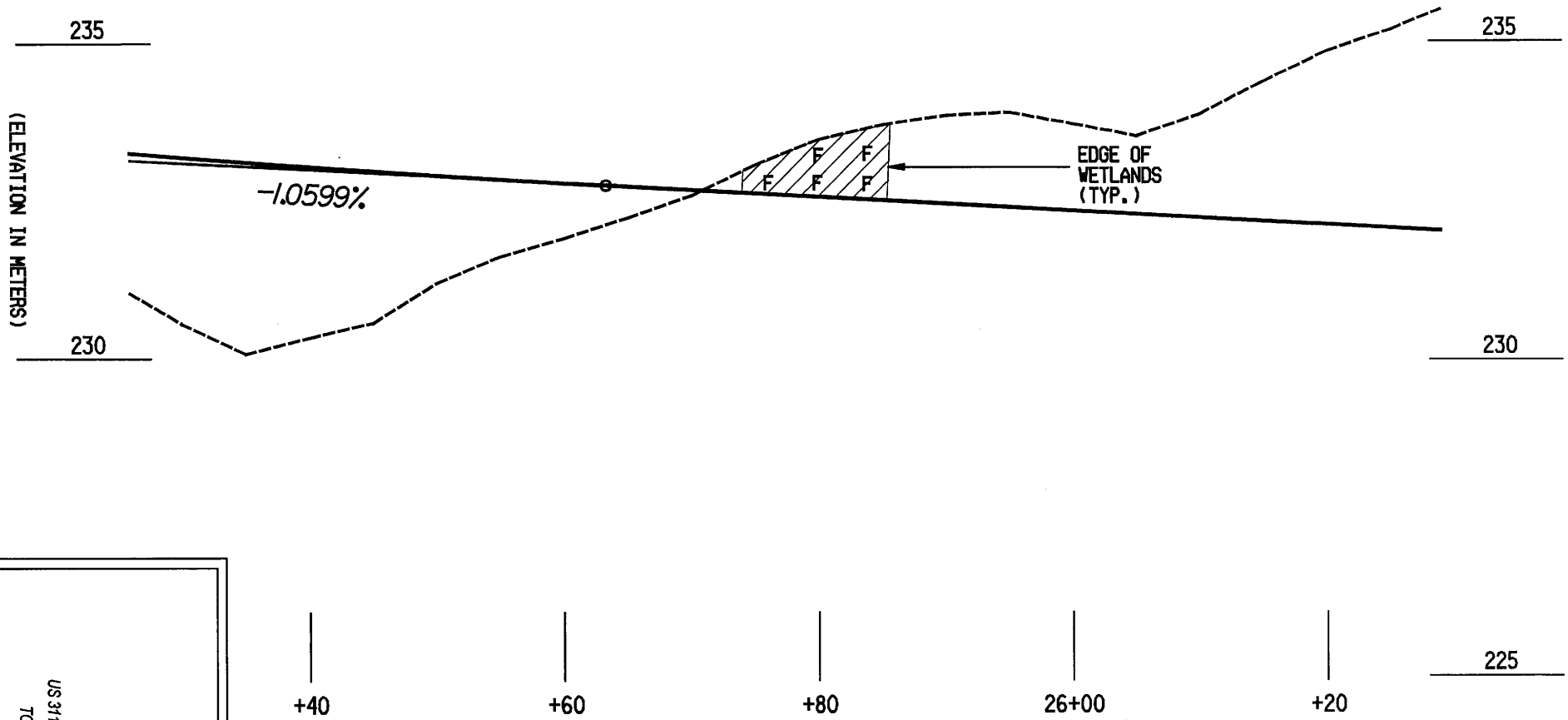


SITE 4
-L- LINE PROFILE

LEGEND

F F DENOTES FILL IN WETLAND

METRIC

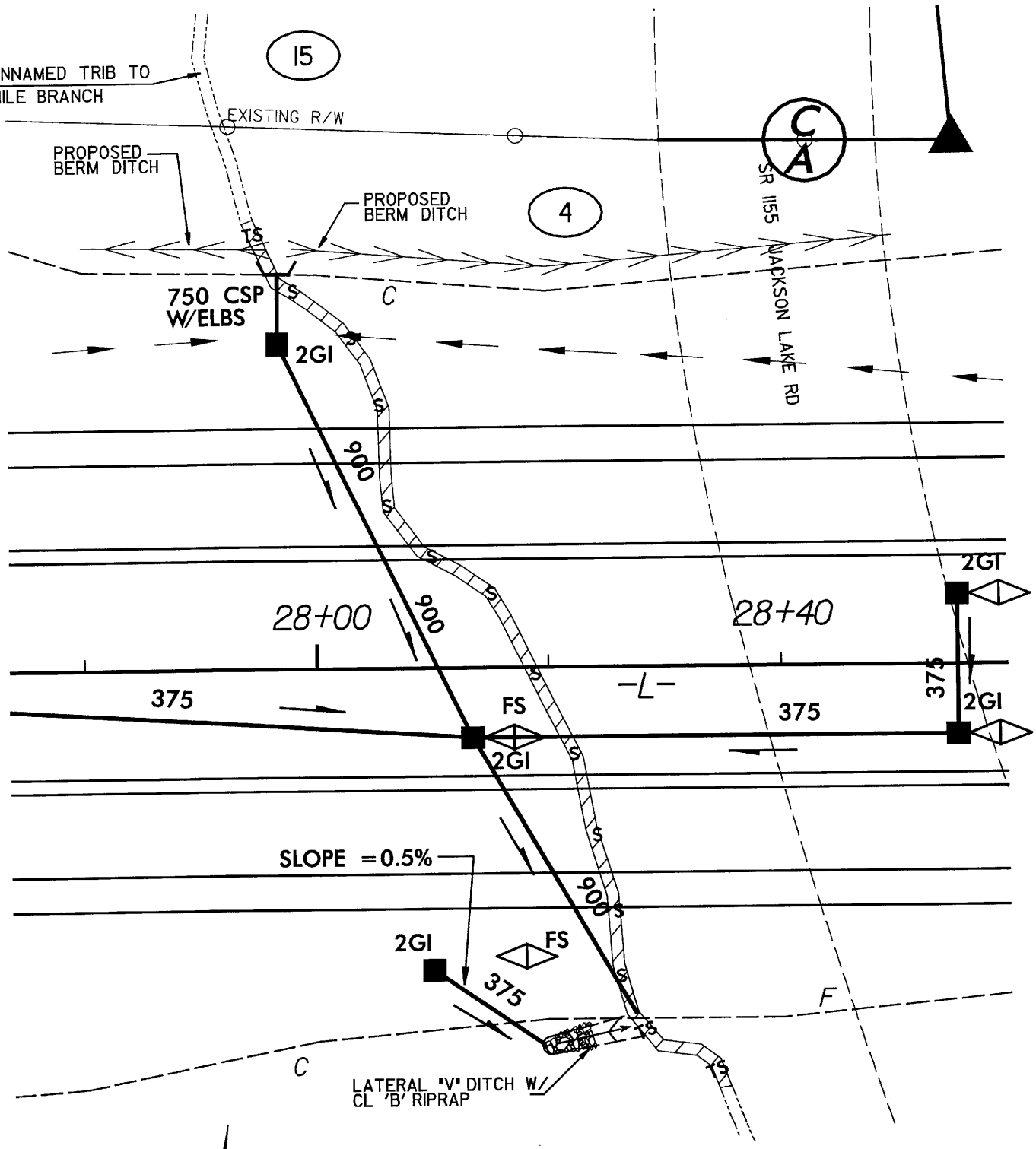
5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570801 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 14 OF 74 OF



SHEET 5

PLAN VIEW
SITE 5

LEGEND

S S DENOTES SURFACE WATER LOSS

TS TS DENOTES TEMPORARY SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

15 of 74

SCALE AS SHOWN

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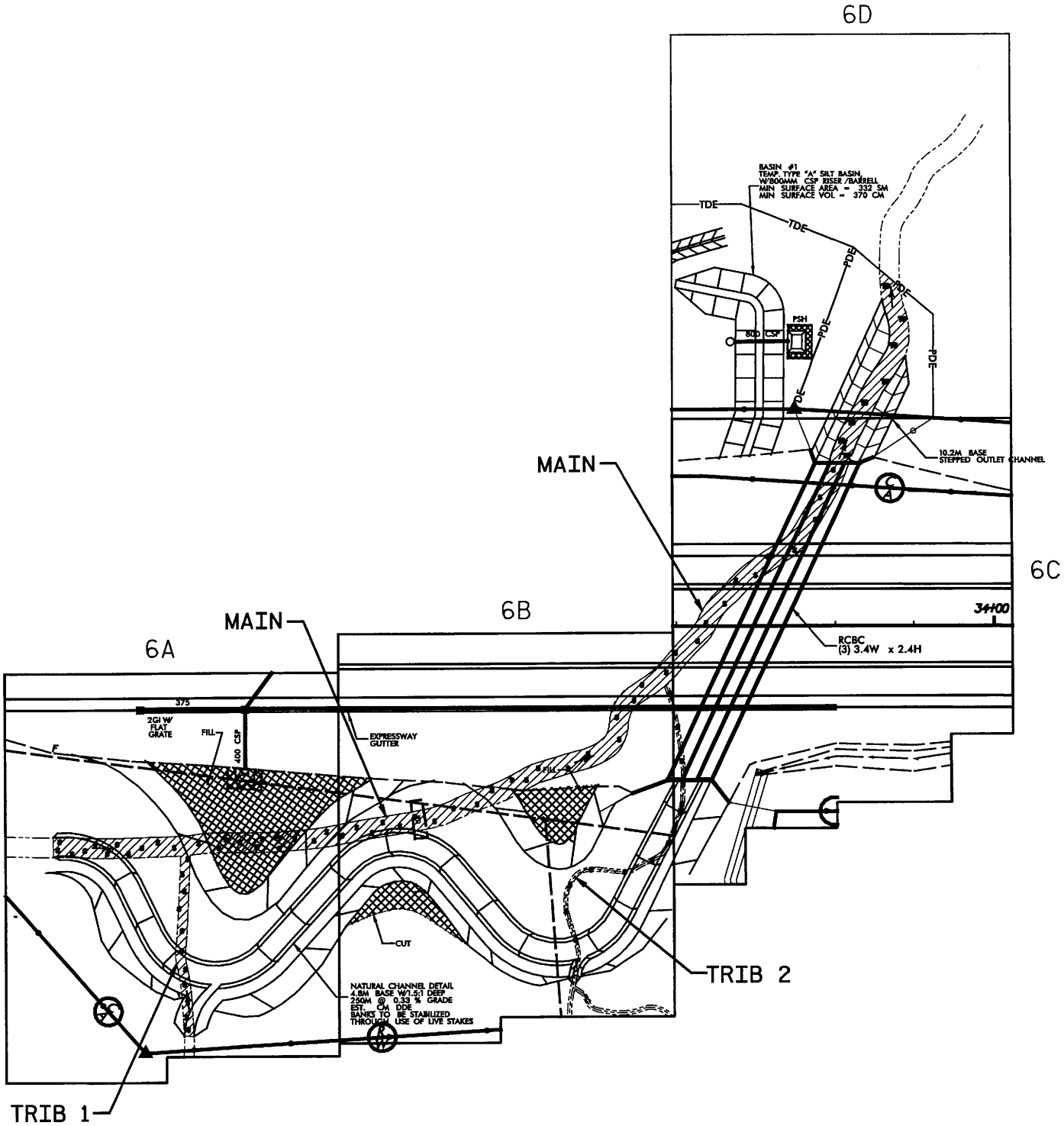

SHEET LAYOUT
PLAN VIEW
SITE 6

METRIC

15 0 15 30
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

16 of 74
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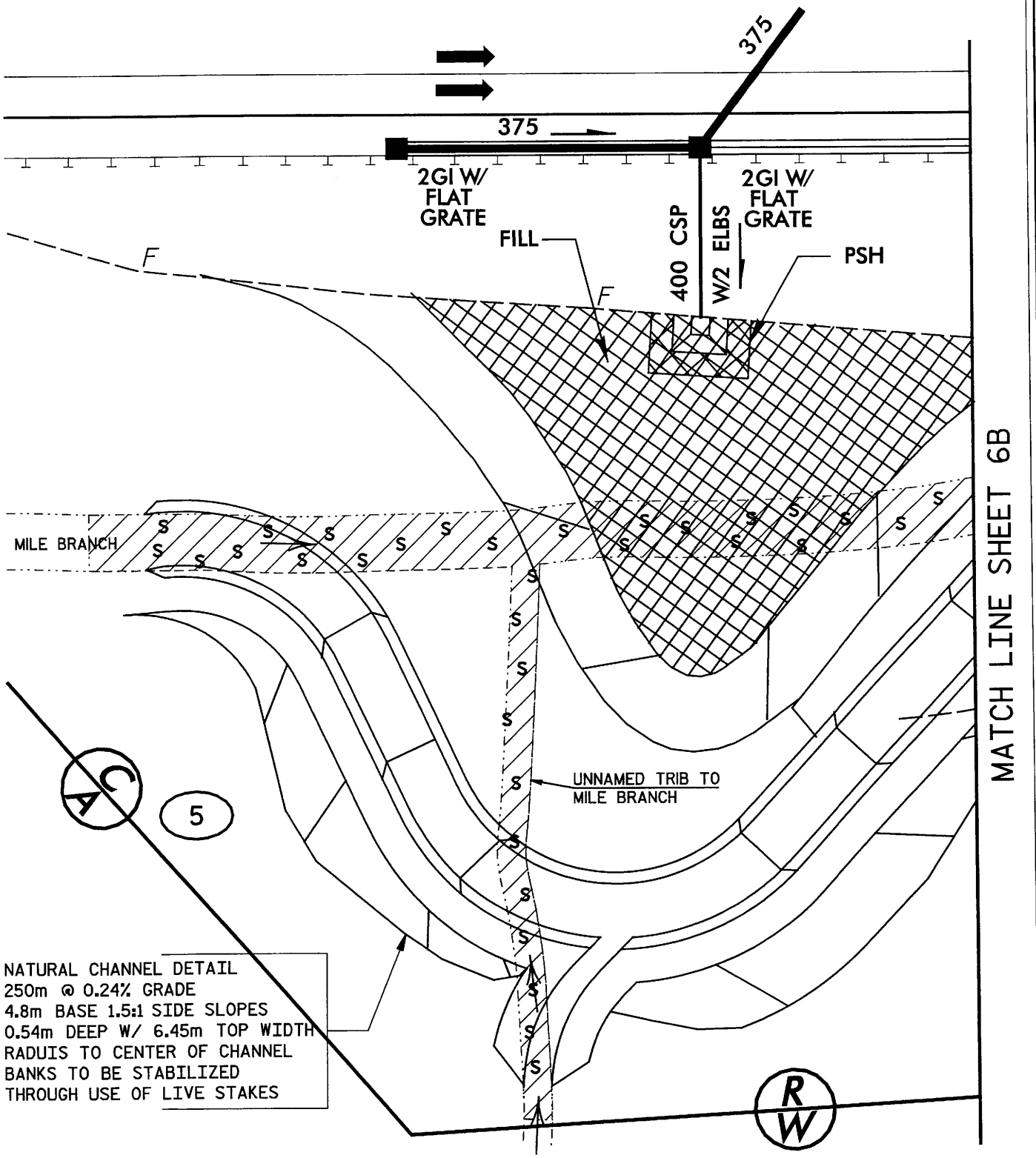

SHEET 6A

PLAN VIEW SITE 6

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 17 OF 74

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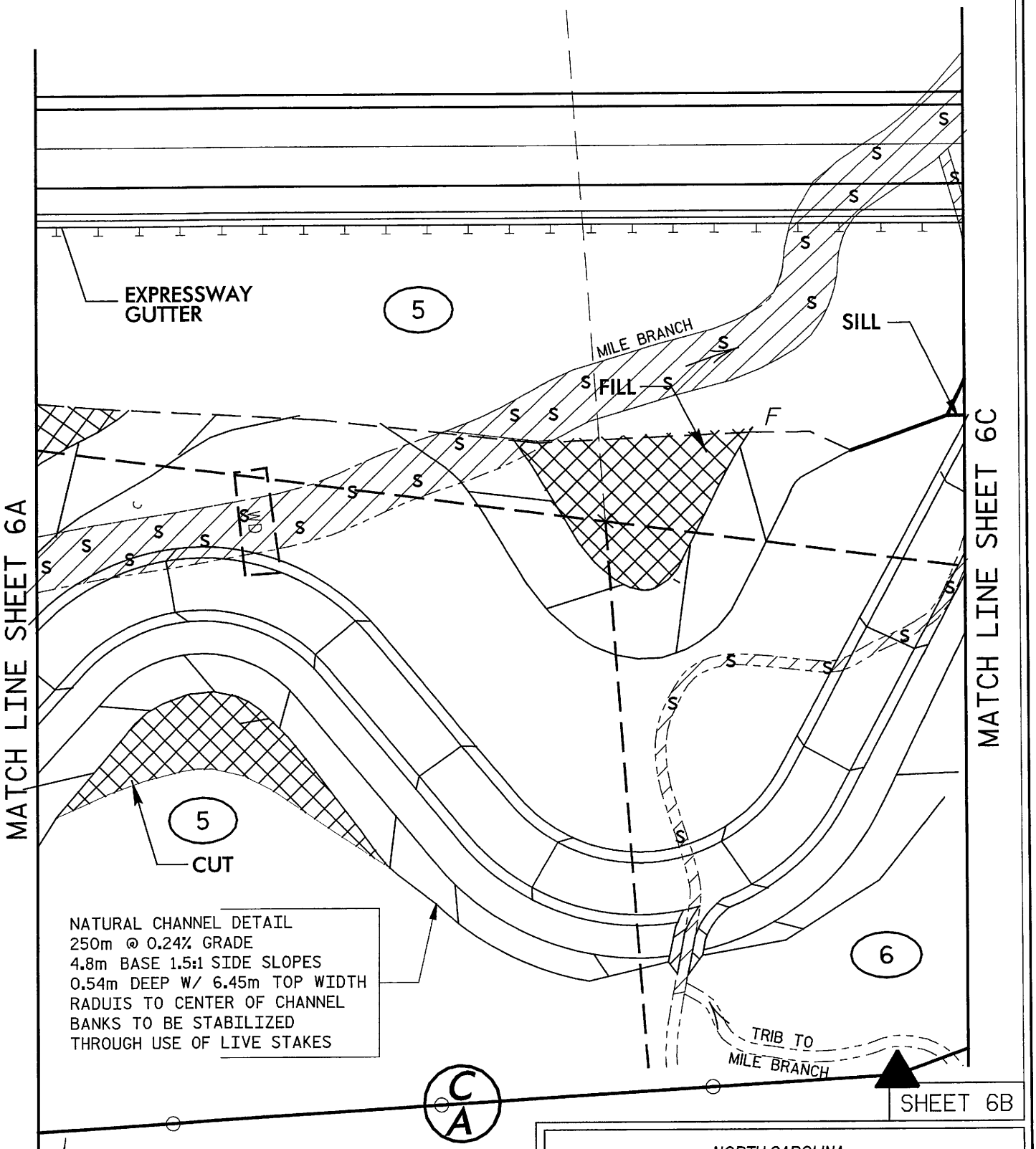

PLAN VIEW SITE 6

METRIC

LEGEND

S S — DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 11 OF 14

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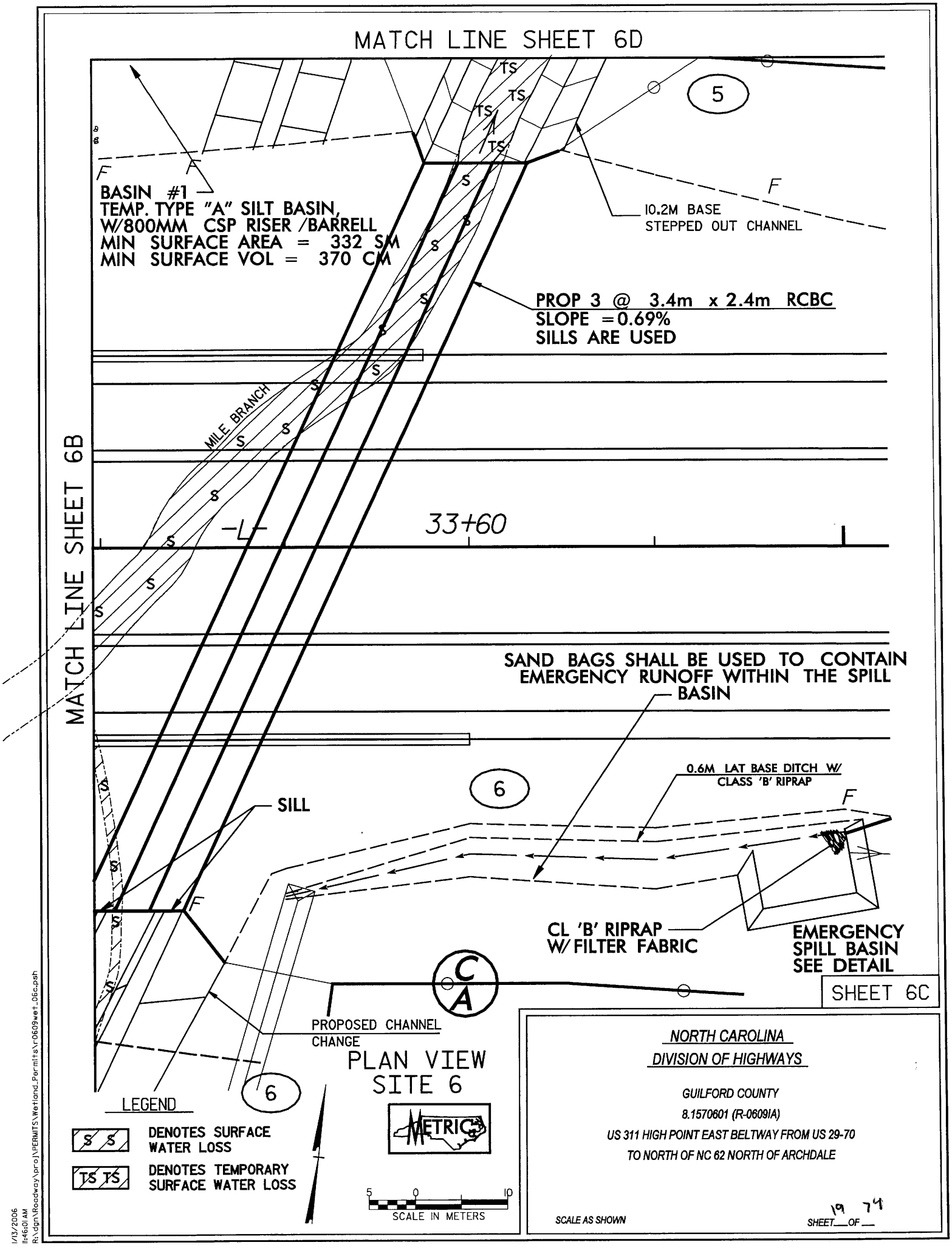
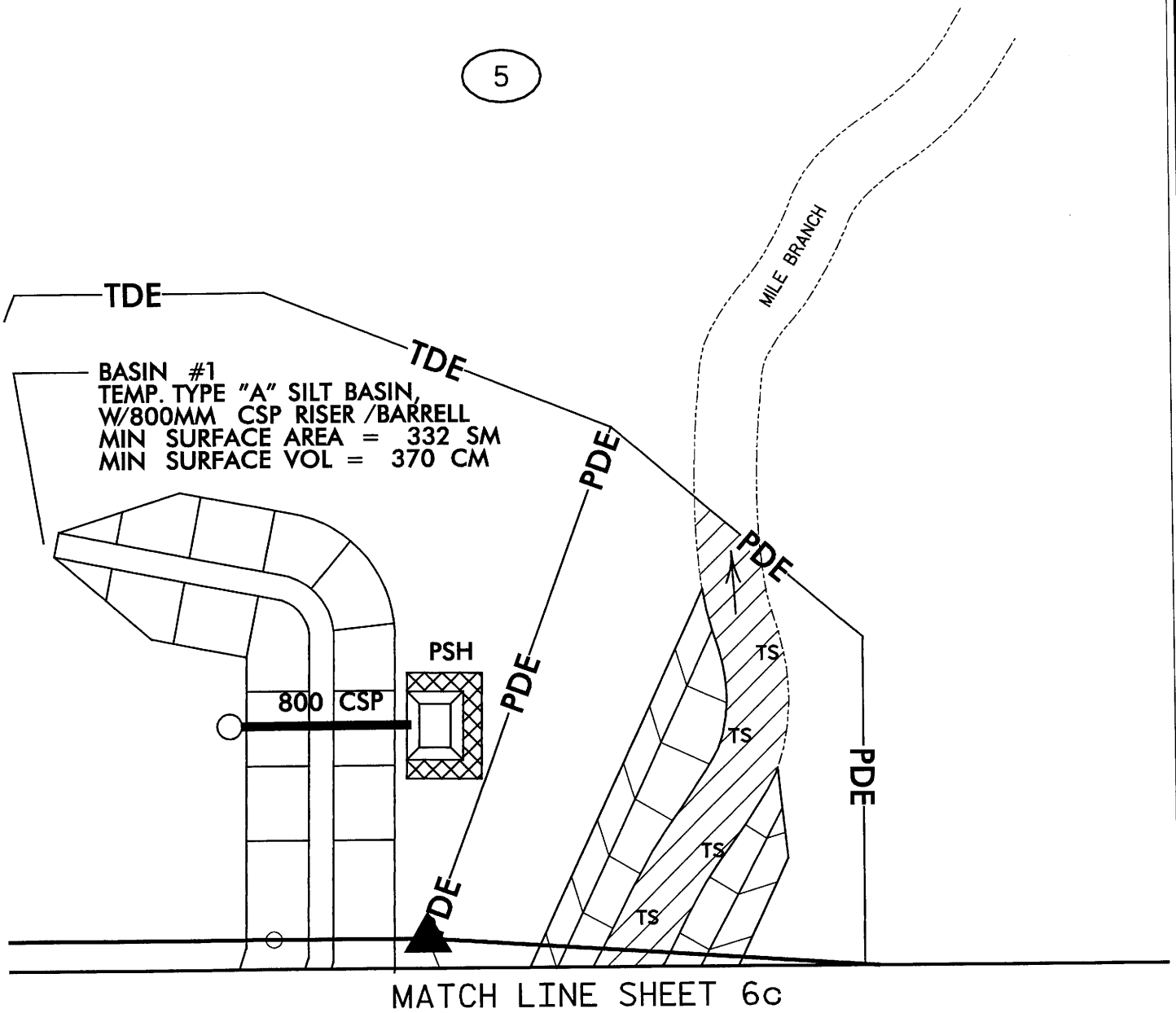

MATCH LINE SHEET 6D
MATCH LINE SHEET 6B
BASIN #1
TEMP. TYPE "A" SILT BASIN,
W/800MM CSP RISER /BARRELL
MIN SURFACE AREA = 332 SM
MIN SURFACE VOL = 370 CM
10.2M BASE
STEPPED OUT CHANNEL
PROP 3 @ 3.4m x 2.4m RCBC
SLOPE =0.69%
SILLS ARE USED
MILE BRANCH
33+60
-L-
SAND BAGS SHALL BE USED TO CONTAIN
EMERGENCY RUNOFF WITHIN THE SPILL
BASIN
0.6M LAT BASE DITCH W/
CLASS 'B' RIPRAP
SILL
CL 'B' RIPRAP
W/ FILTER FABRIC
EMERGENCY
SPILL BASIN
SEE DETAIL
SHEET 6C
PROPOSED CHANNEL
CHANGE
PLAN VIEW
SITE 6
LEGEND
DENOTES SURFACE
WATER LOSS
DENOTES TEMPORARY
SURFACE WATER LOSS
METRIC
SCALE IN METERS
NORTH CAROLINA
DIVISION OF HIGHWAYS
GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE
SCALE AS SHOWN
SHEET 19 OF 74



PLAN VIEW
SITE 6

LEGEND

S S DENOTES SURFACE WATER LOSS

TS TS DENOTES TEMPORARY SURFACE WATER LOSS

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 20 OF 74

13/2006
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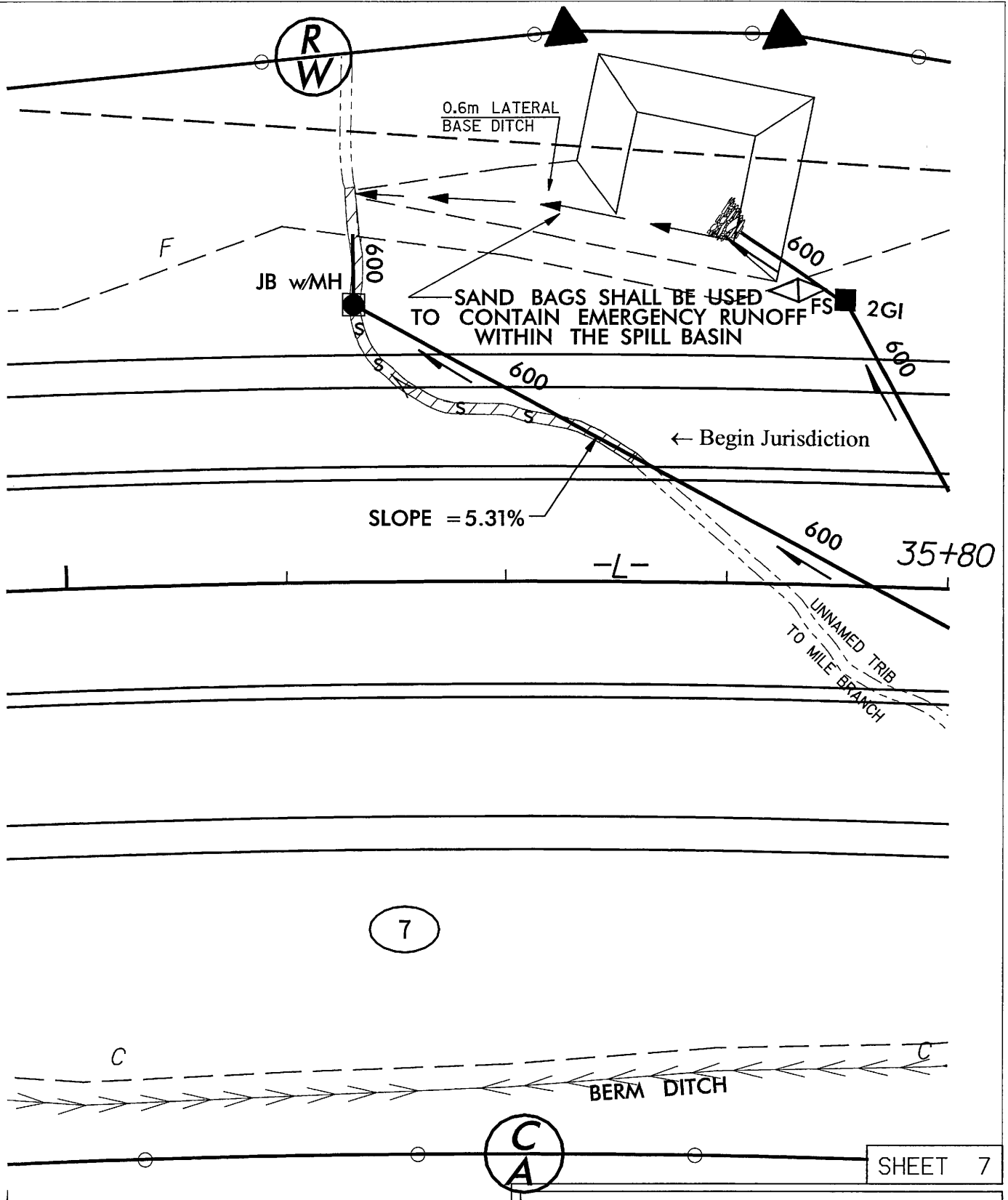

SHEET 7

PLAN VIEW
SITE 7

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 21 OF 74

01/09/2005
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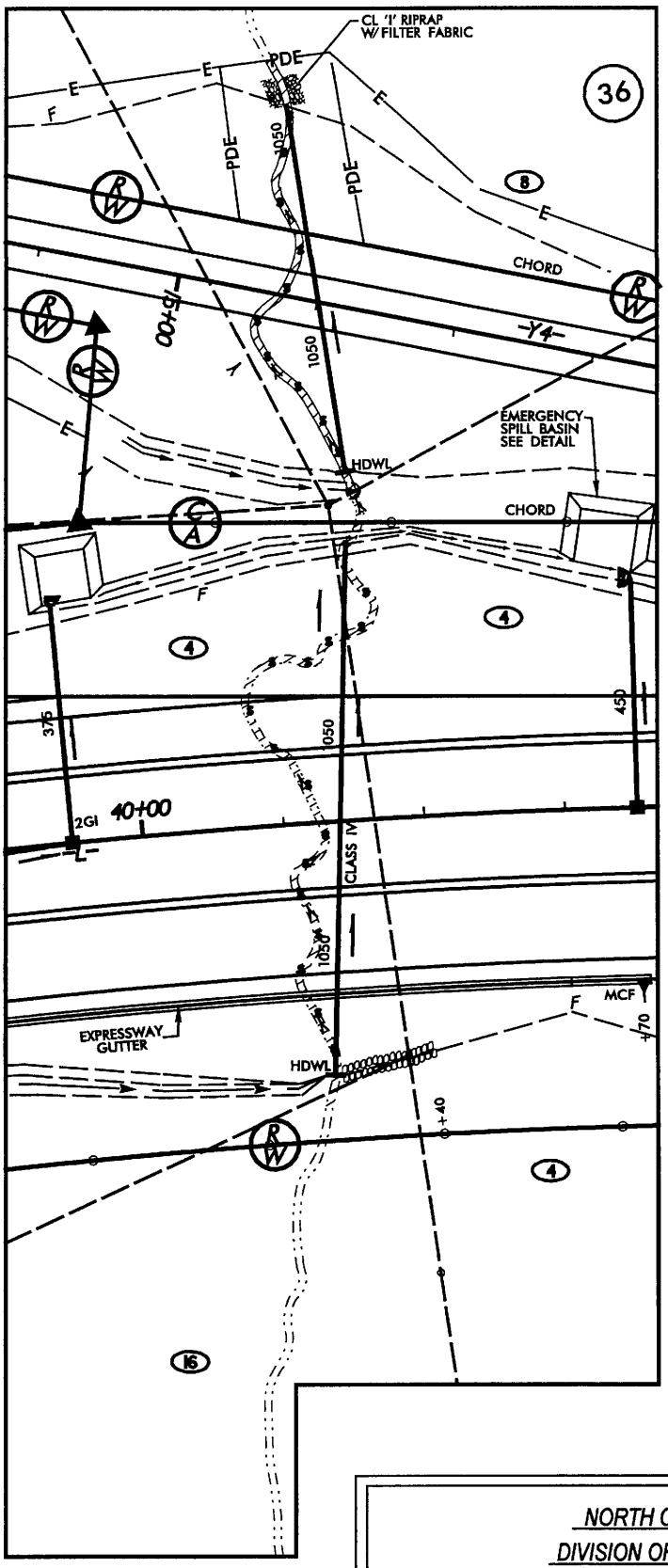

SHEET LAYOUT
PLAN VIEW
SITE 8

METRIC

10 0 20
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 22 OF 174

8/9/2005
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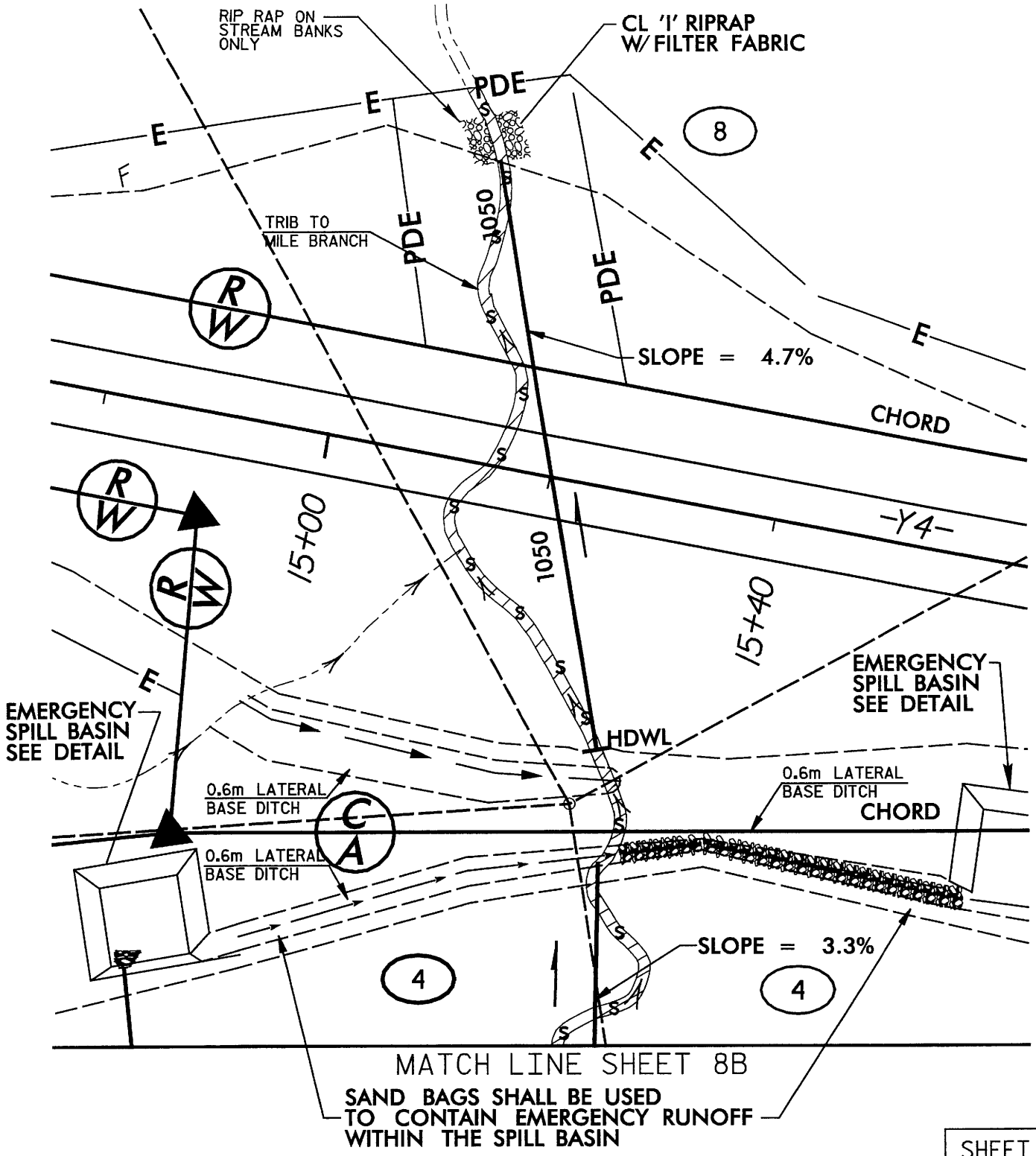

SHEET 8A

PLAN VIEW
SITE 8

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 3 OF 74

3/8/2005
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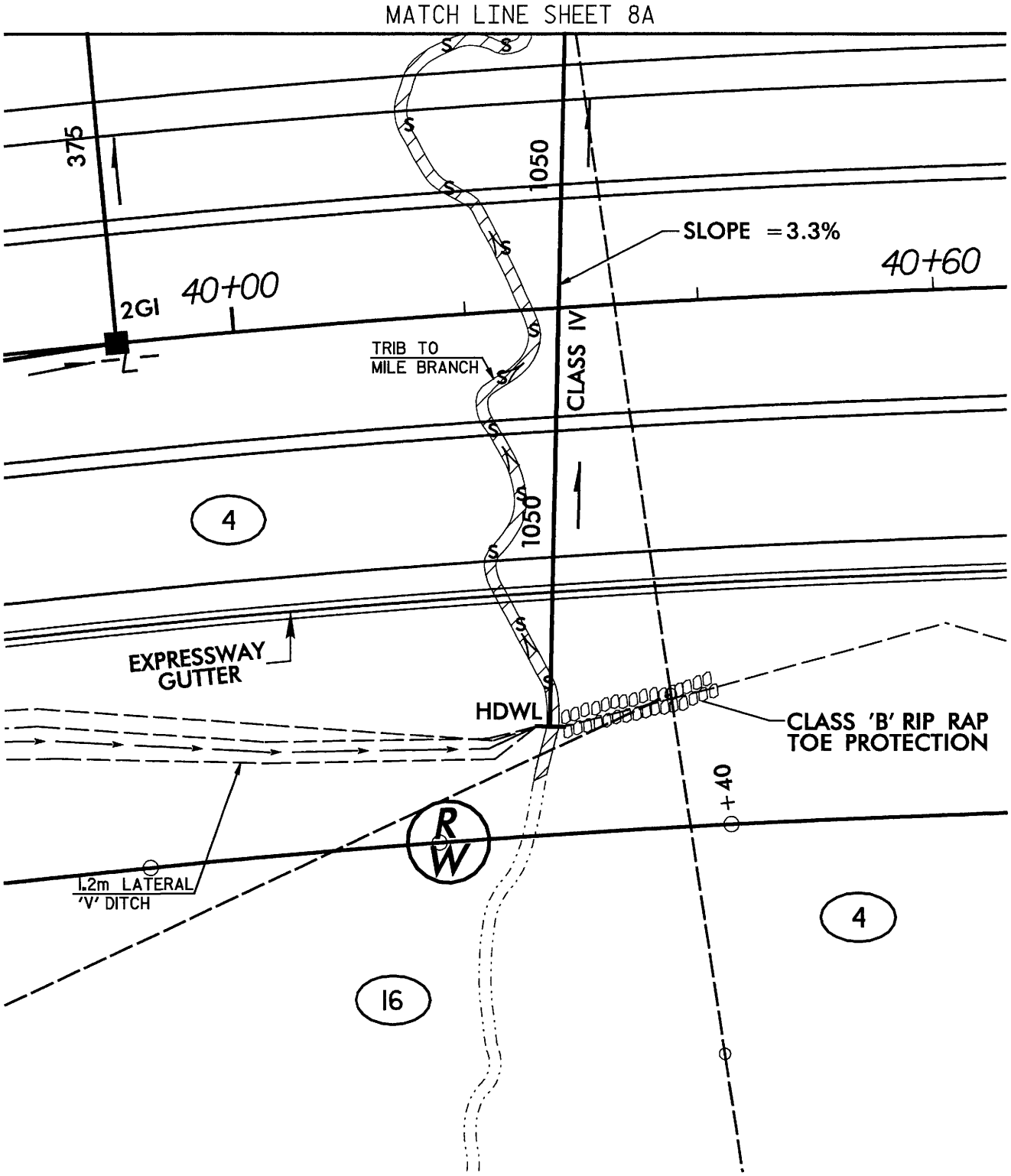

SHEET 8B

PLAN VIEW
SITE 8

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 47 OF 48

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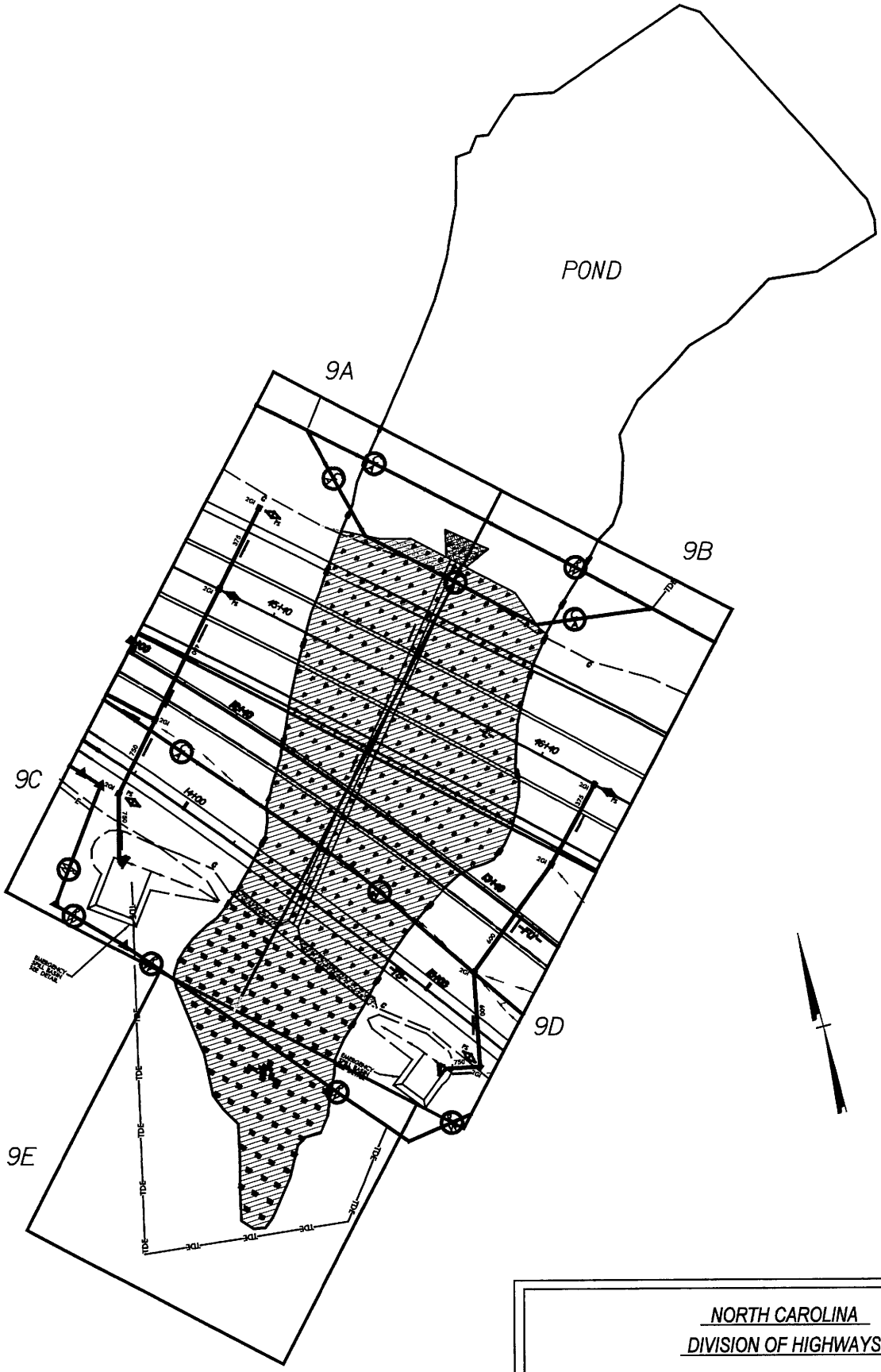

SHEET LAYOUT
PLAN VIEW
SITE 9

METRIC

20 0 30
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 25 OF 74

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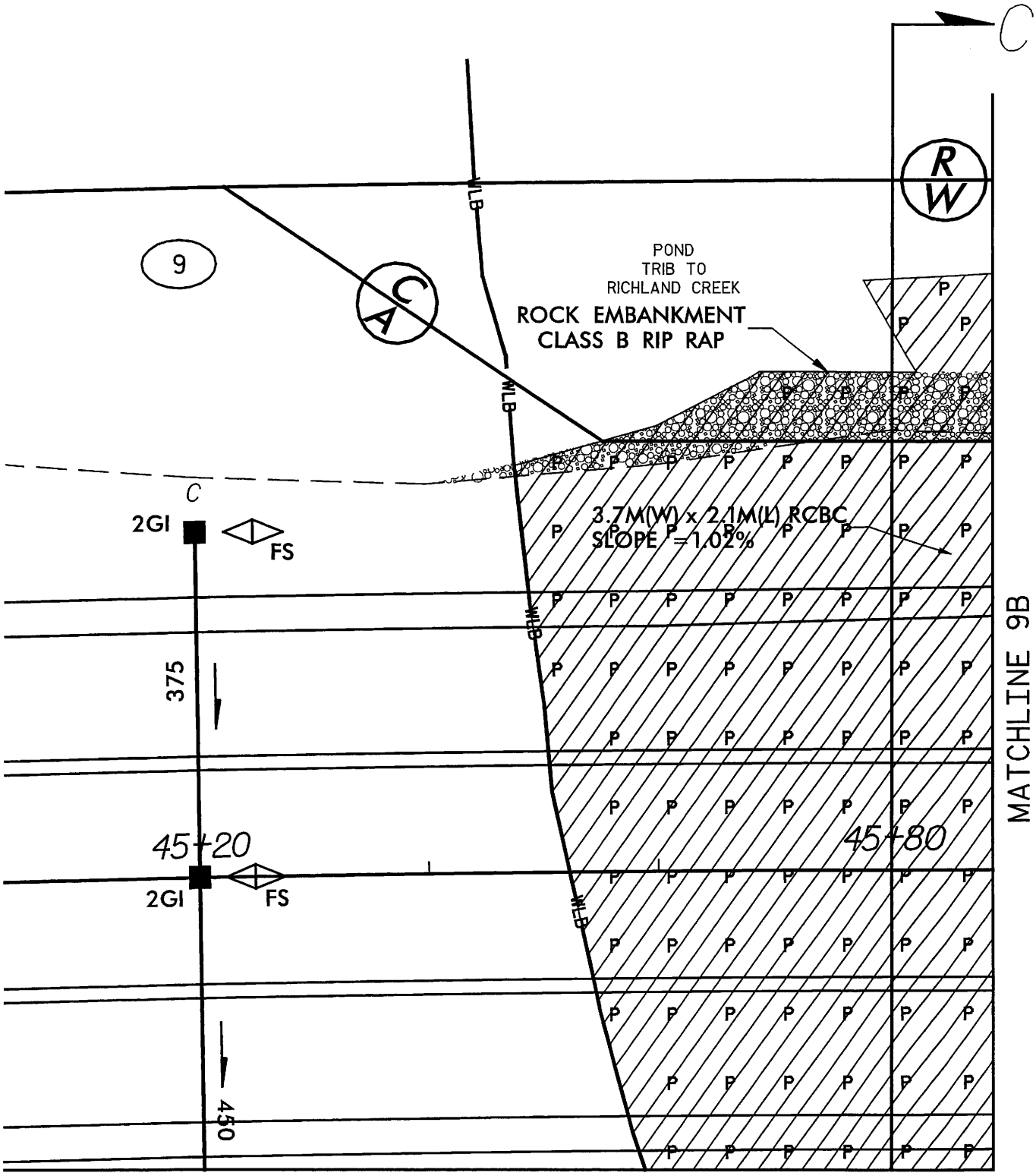

SHEET 9A

PLAN VIEW
SITE 9

LEGEND

—WLB— WETLAND

P/P DENOTES FILL IN POND

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 26 OF 74

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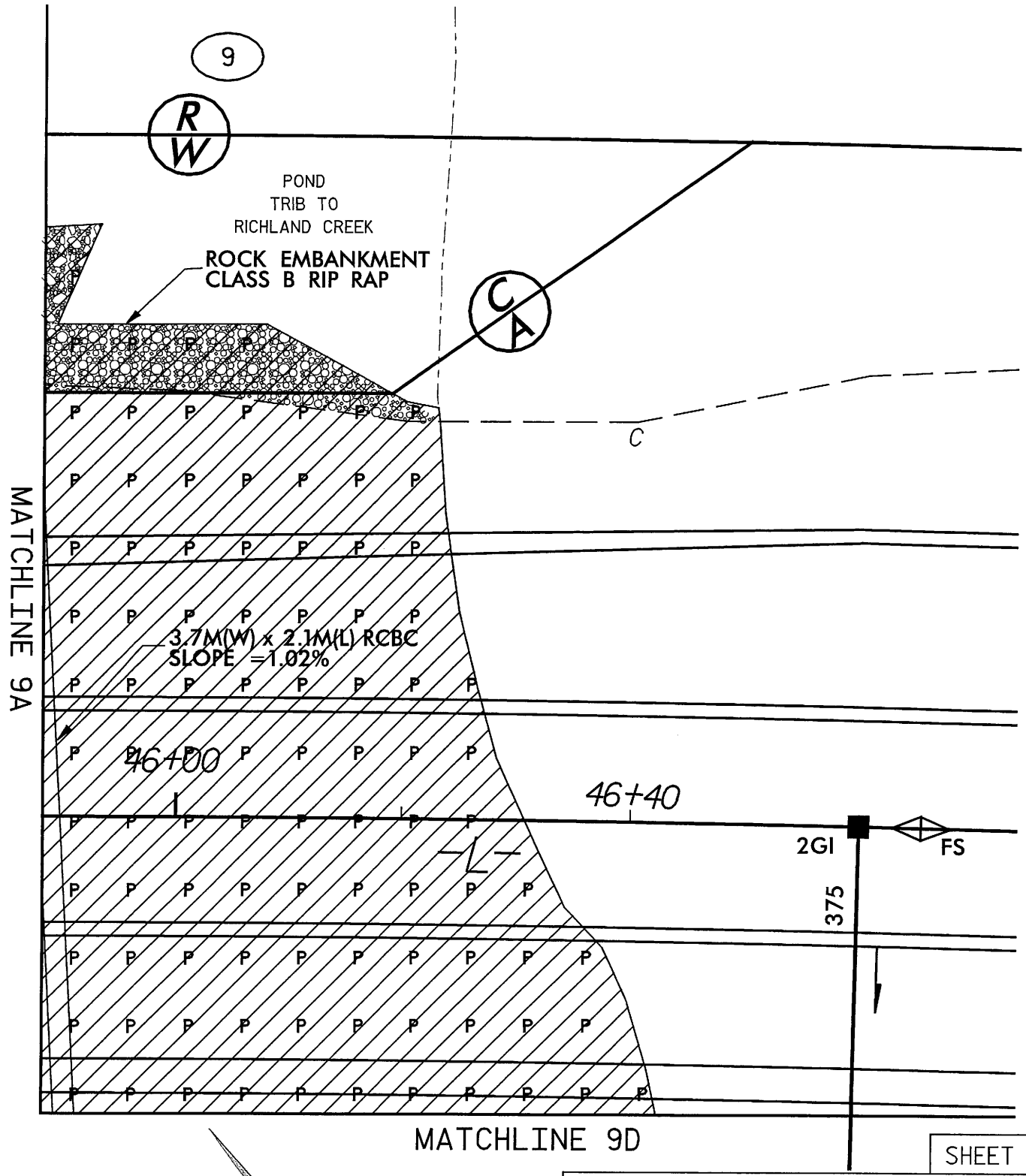

SHEET 9B

PLAN VIEW
SITE 9

LEGEND

WLB WETLAND

P P DENOTES FILL IN POND

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 27 OF 74

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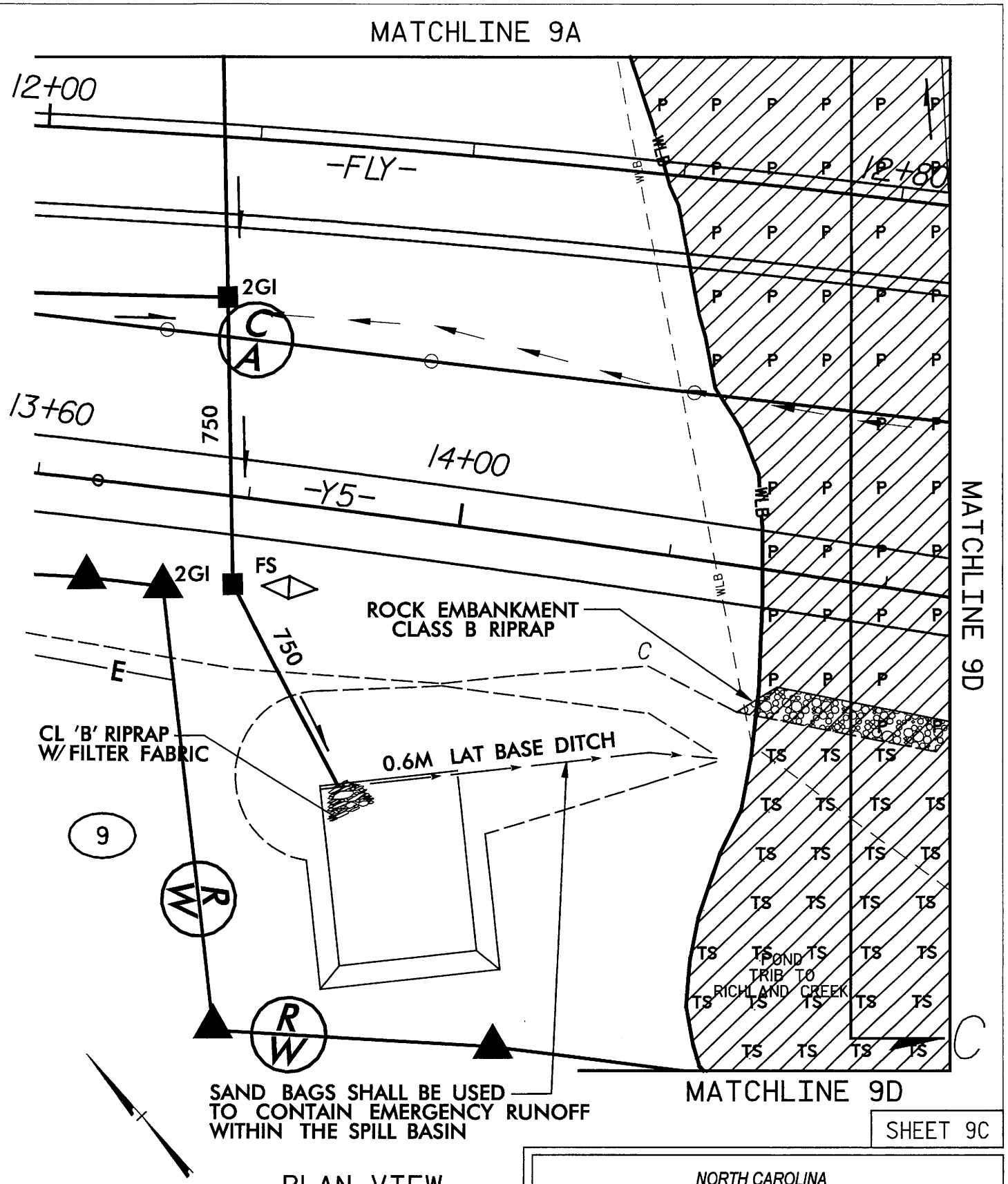

SHEET 9C

PLAN VIEW
SITE 9

LEGEND

WLB — WETLAND

P / P — DENOTES FILL IN POND

TS / TS — DENOTES TEMPORARY FILL IN SURFACE WATER (POND)

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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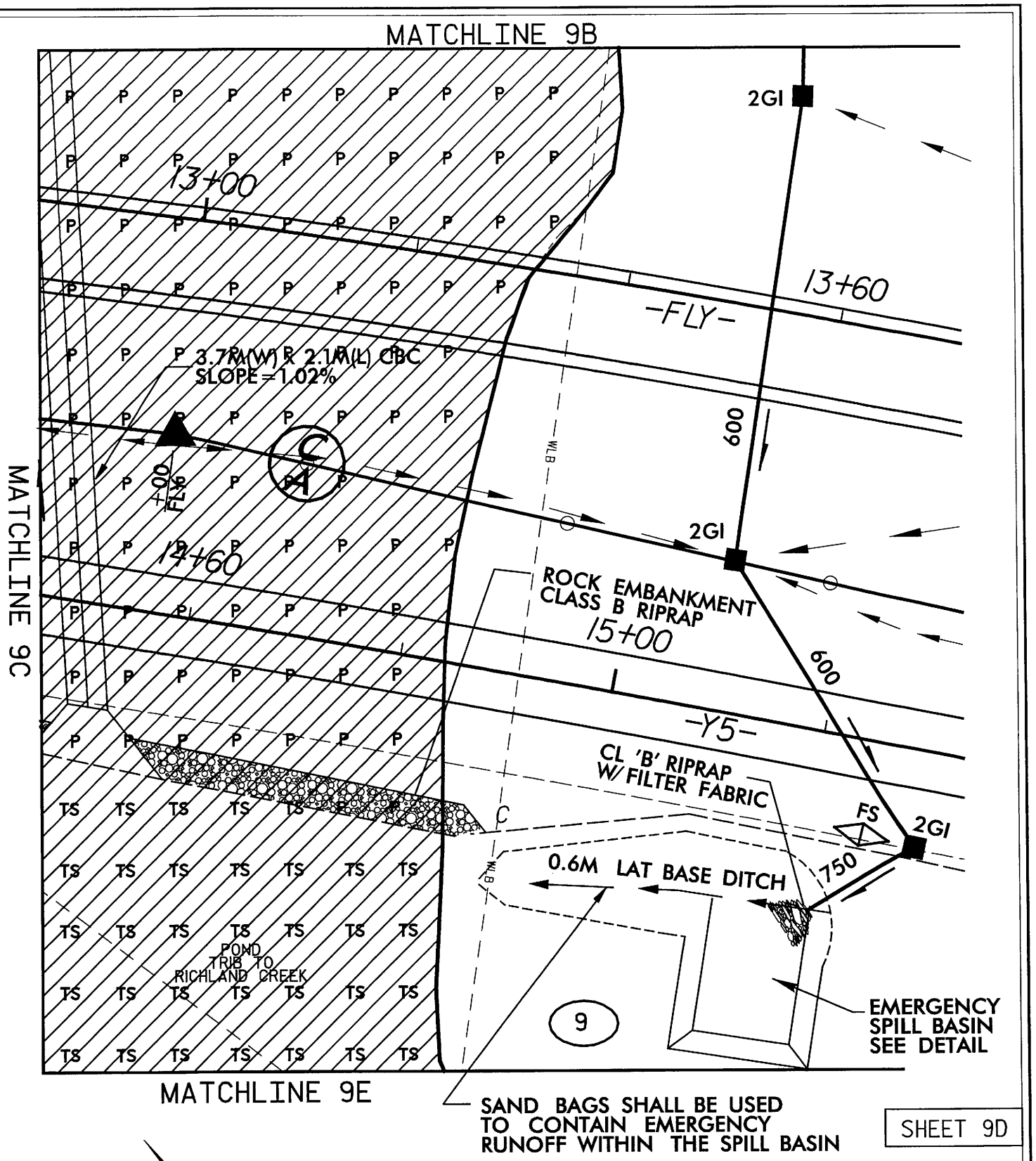

SHEET 9D

PLAN VIEW
SITE 9

LEGEND

—WLB— WETLAND

P P DENOTES FILL IN POND

TS TS DENOTES TEMPORARY FILL IN SURFACE WATER (POND)

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 9 OF 14

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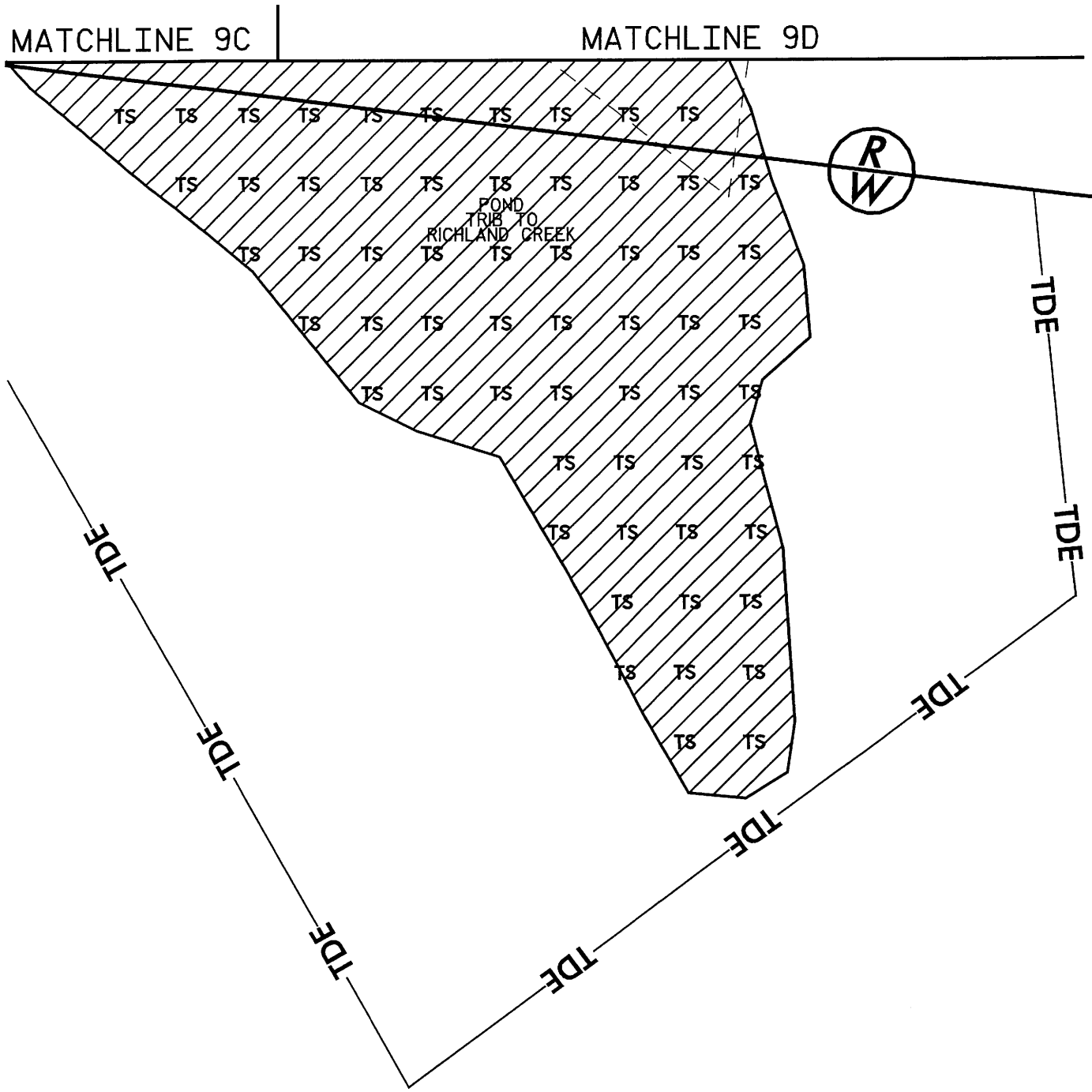

PLAN VIEW
SITE 9

SHEET 9E

LEGEND

—WLB— WETLAND

TS/TS DENOTES TEMPORARY FILL IN SURFACE WATER (POND)

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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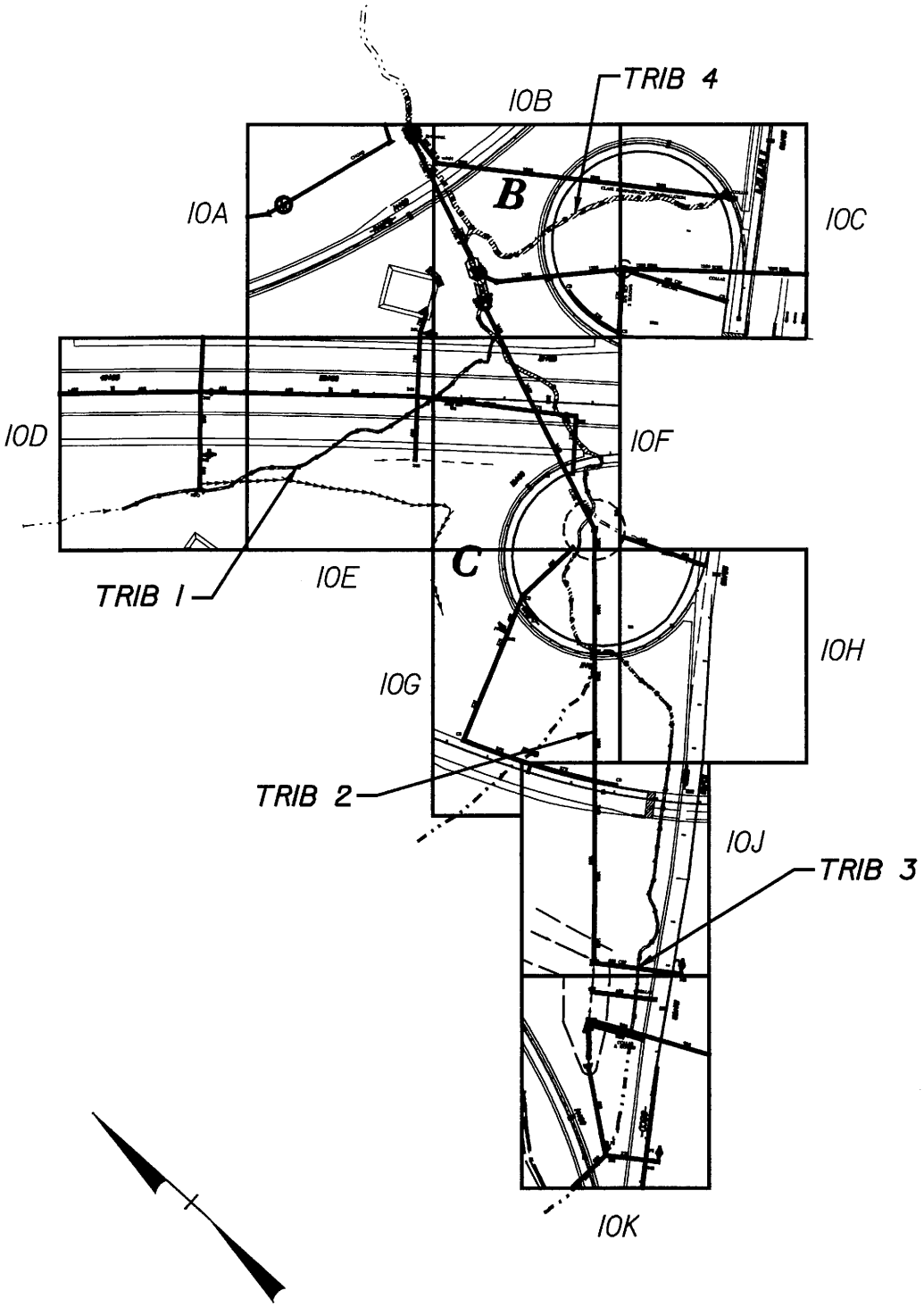

SHEET LAYOUT
PLAN VIEW
SITE 10

METRIC

30 0 30 60
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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8/9/2005
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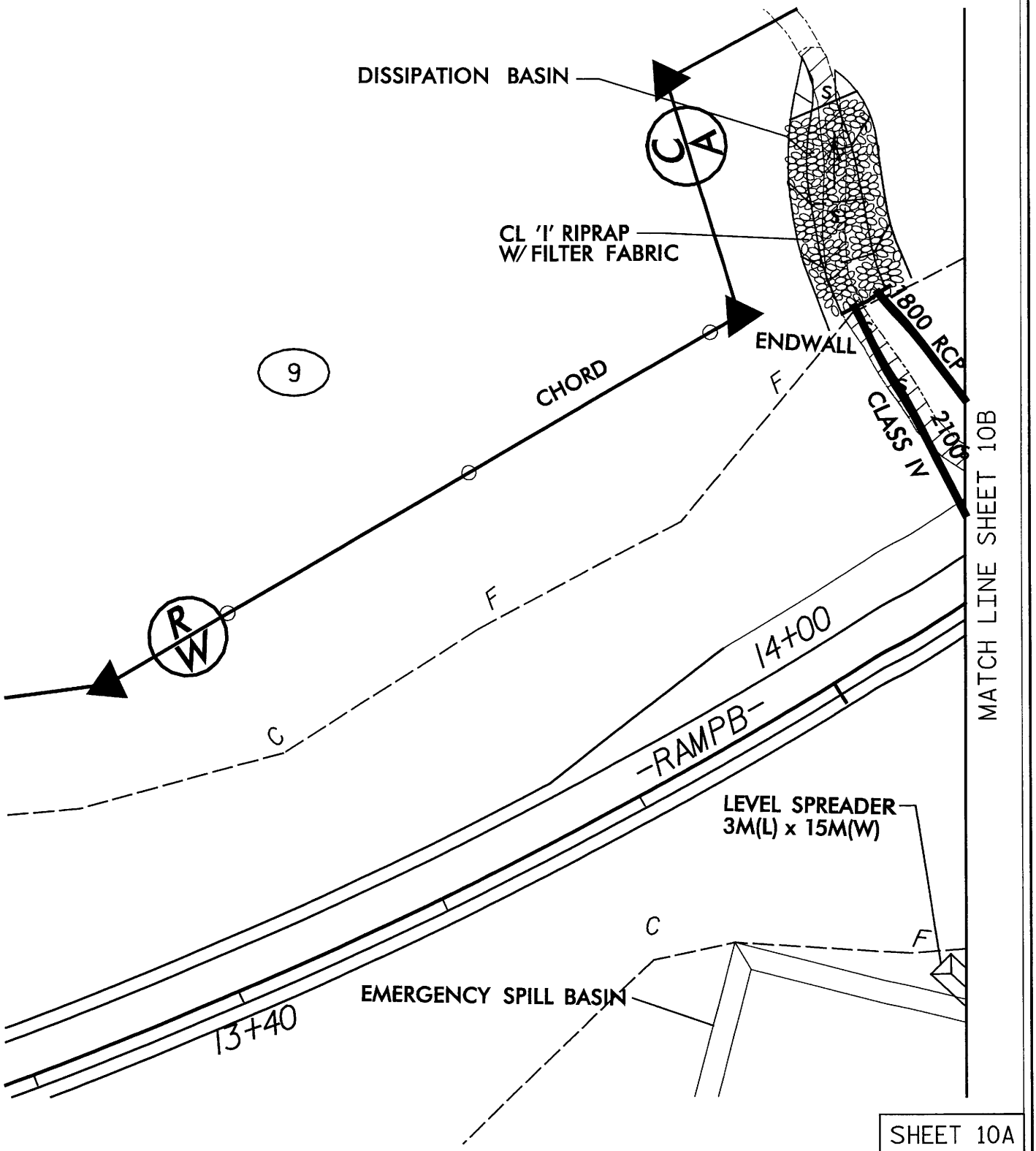

PLAN VIEW
SITE 10

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 38 OF 74

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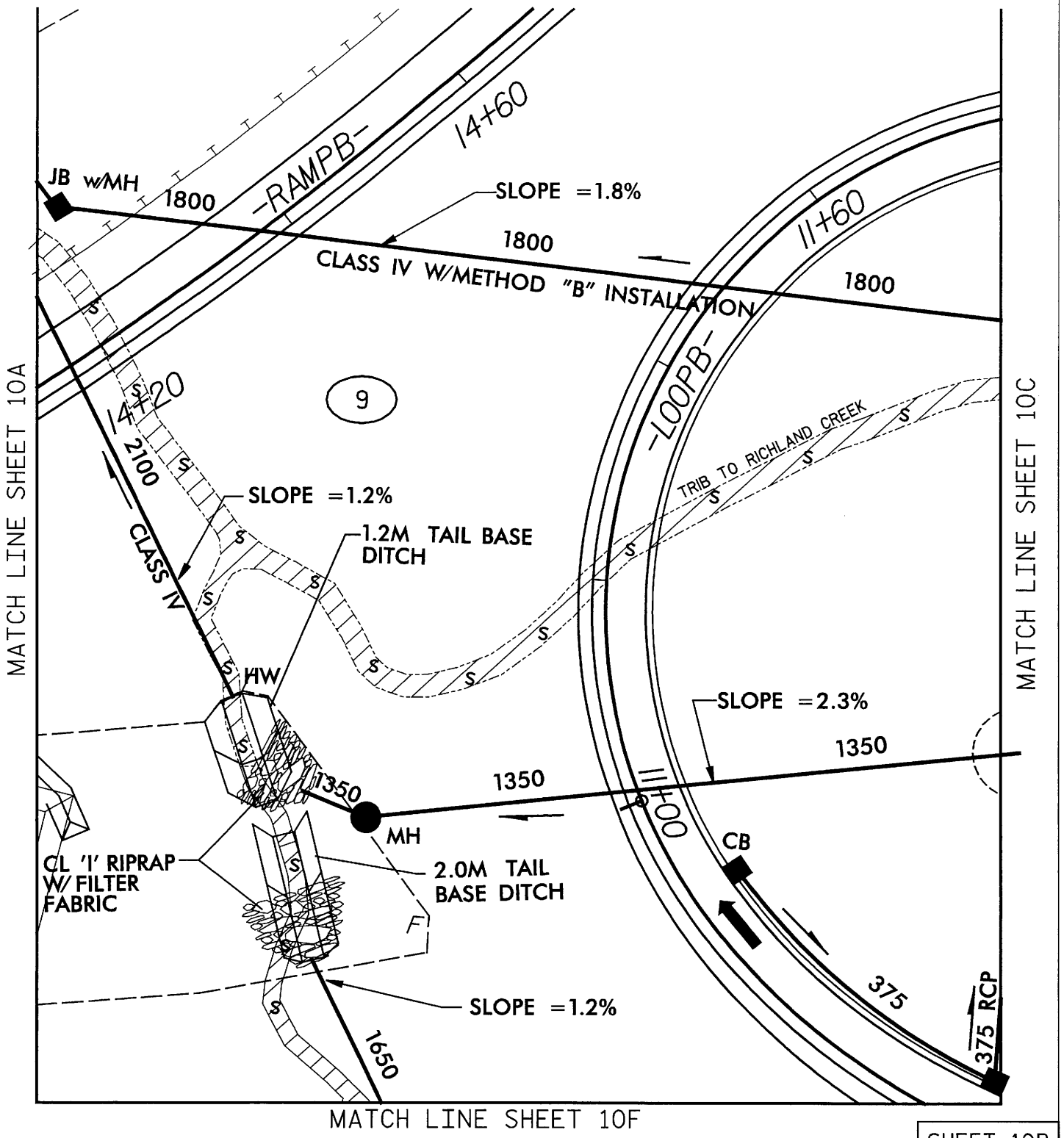

SHEET 10B

PLAN VIEW
SITE 10

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 33 OF 74

1/19/2006
9:34:59 AM
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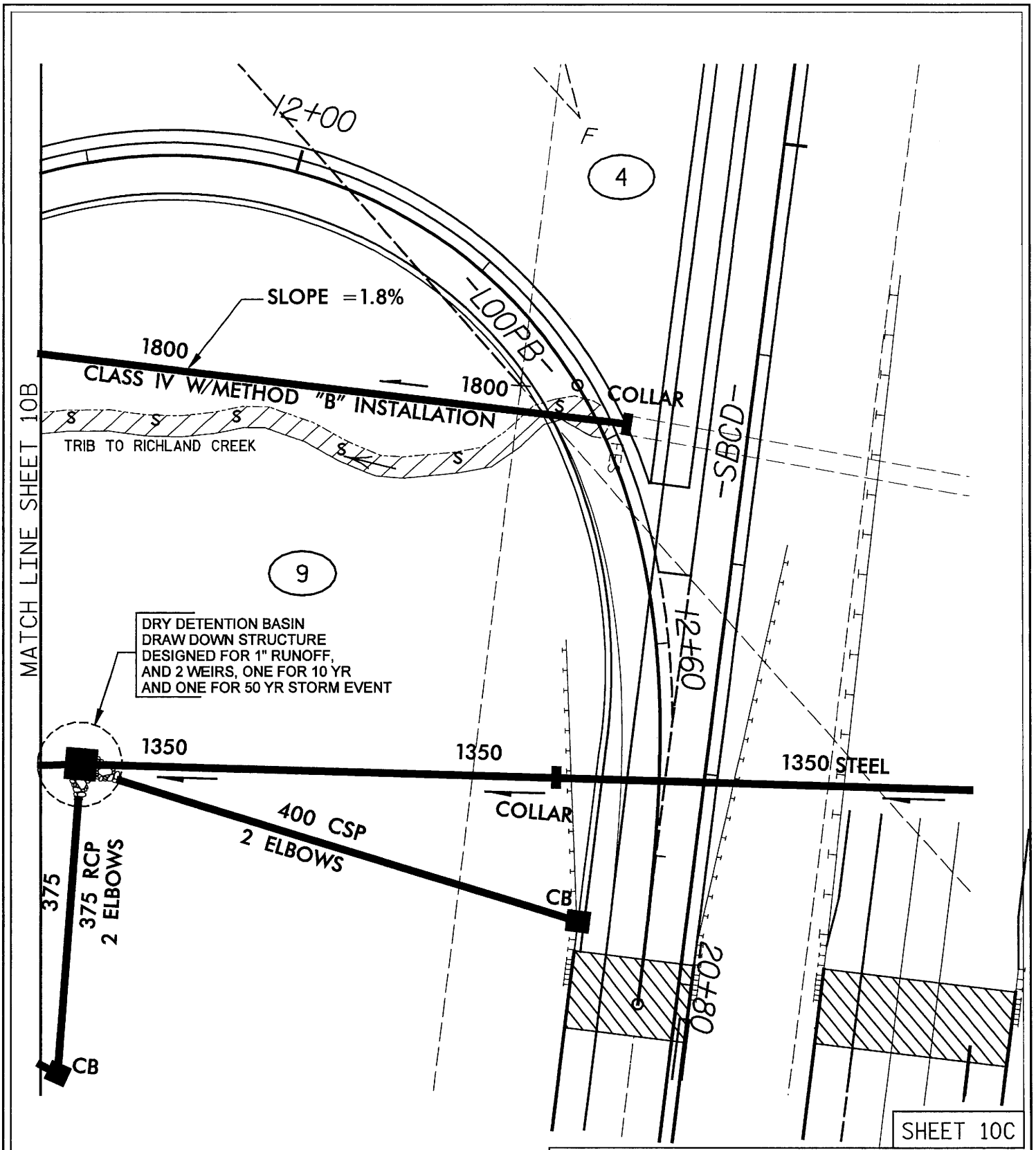

PLAN VIEW
SITE 10

LEGEND

DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 31 OF 74

1/19/2006
9:35:43 AM
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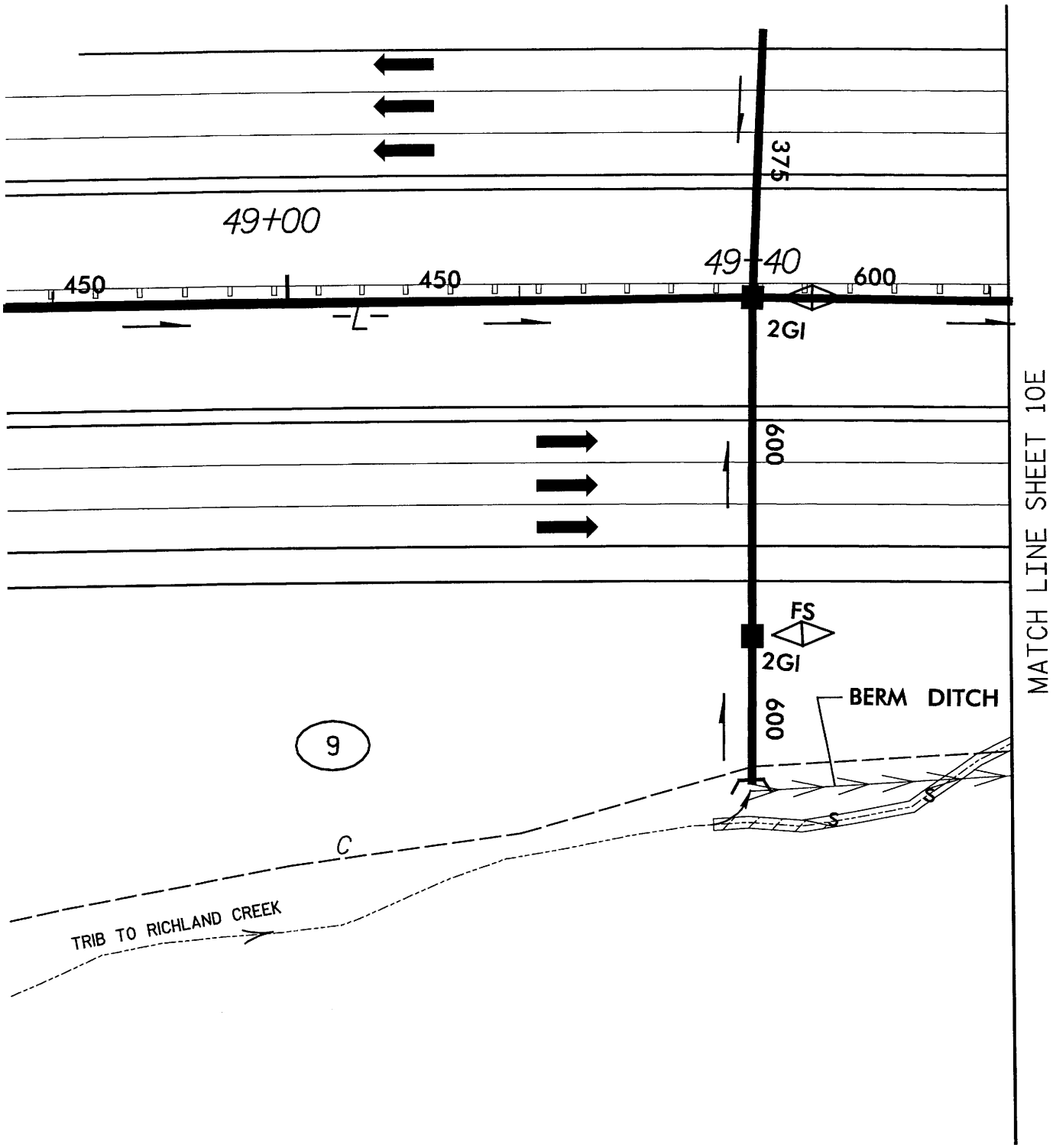

SHEET 10D

PLAN VIEW
SITE 10

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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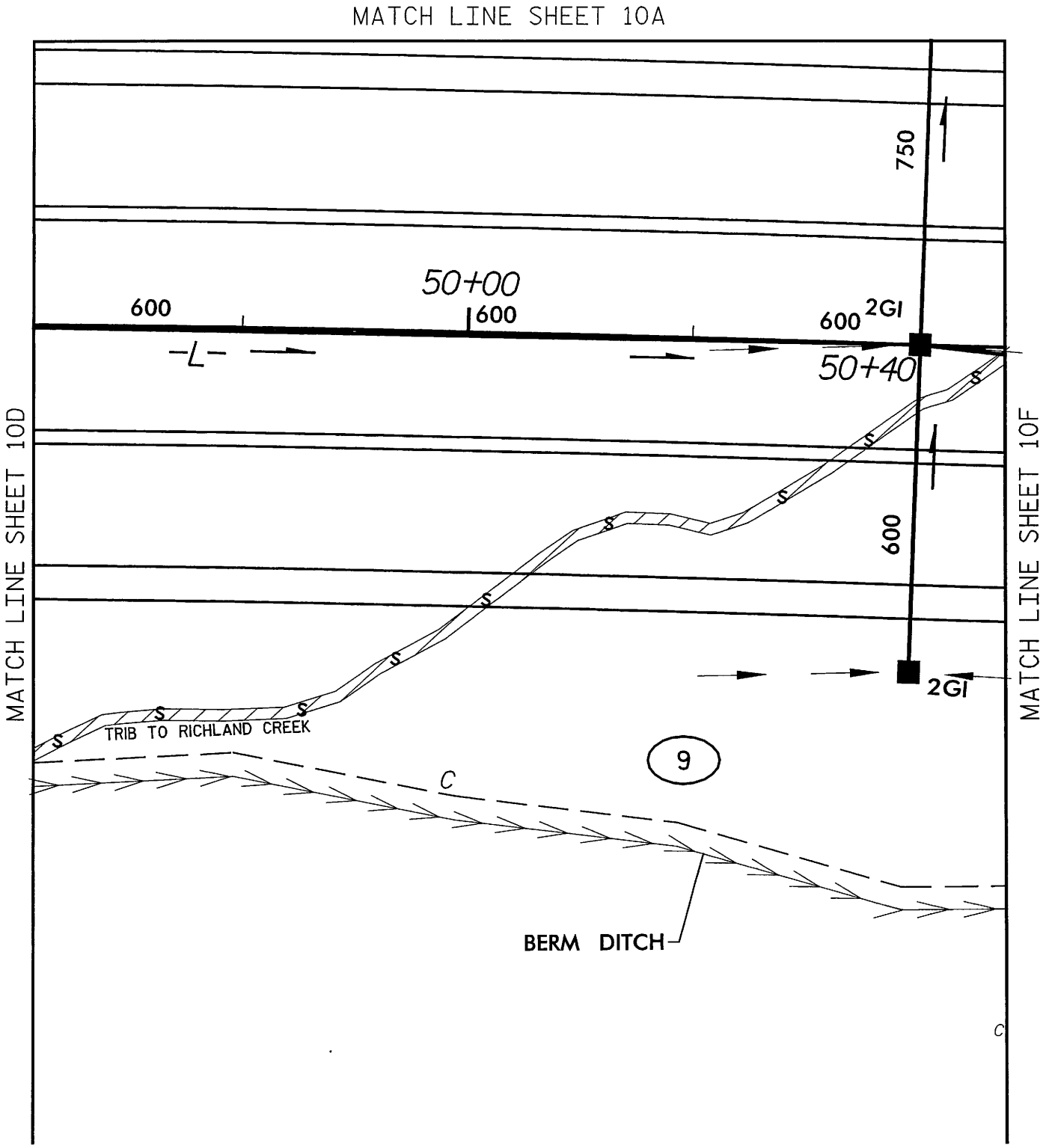

SHEET 10E

PLAN VIEW
SITE 10

METRIC

5 0 10
SCALE IN METERS

LEGEND

S S DENOTES SURFACE WATER LOSS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 39 OF 47

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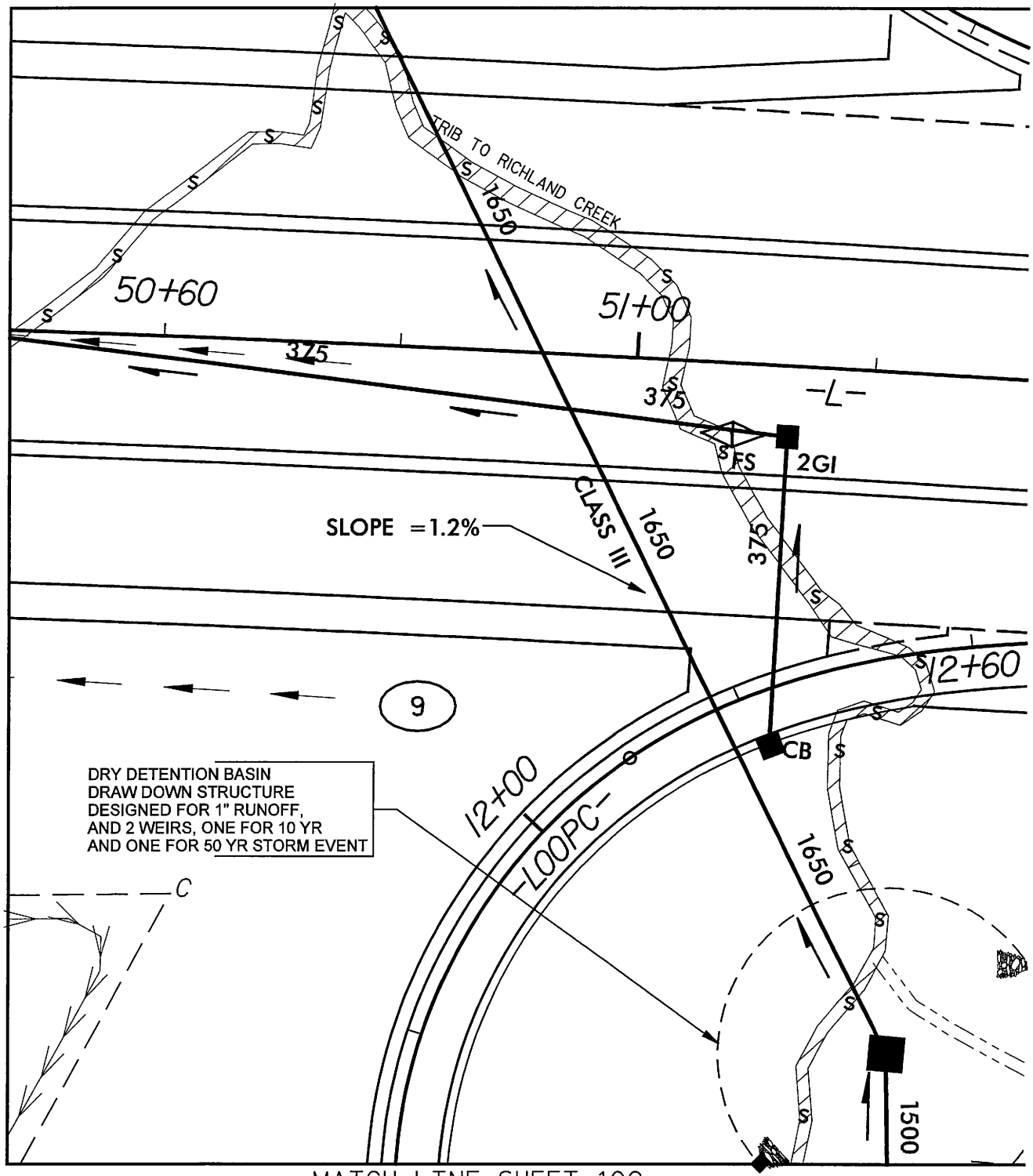
MATCH LINE SHEET 10B



MATCH LINE SHEET 10E

MATCH LINE SHEET 10G

SHEET 10F

PLAN VIEW
SITE 10

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 37 OF 74

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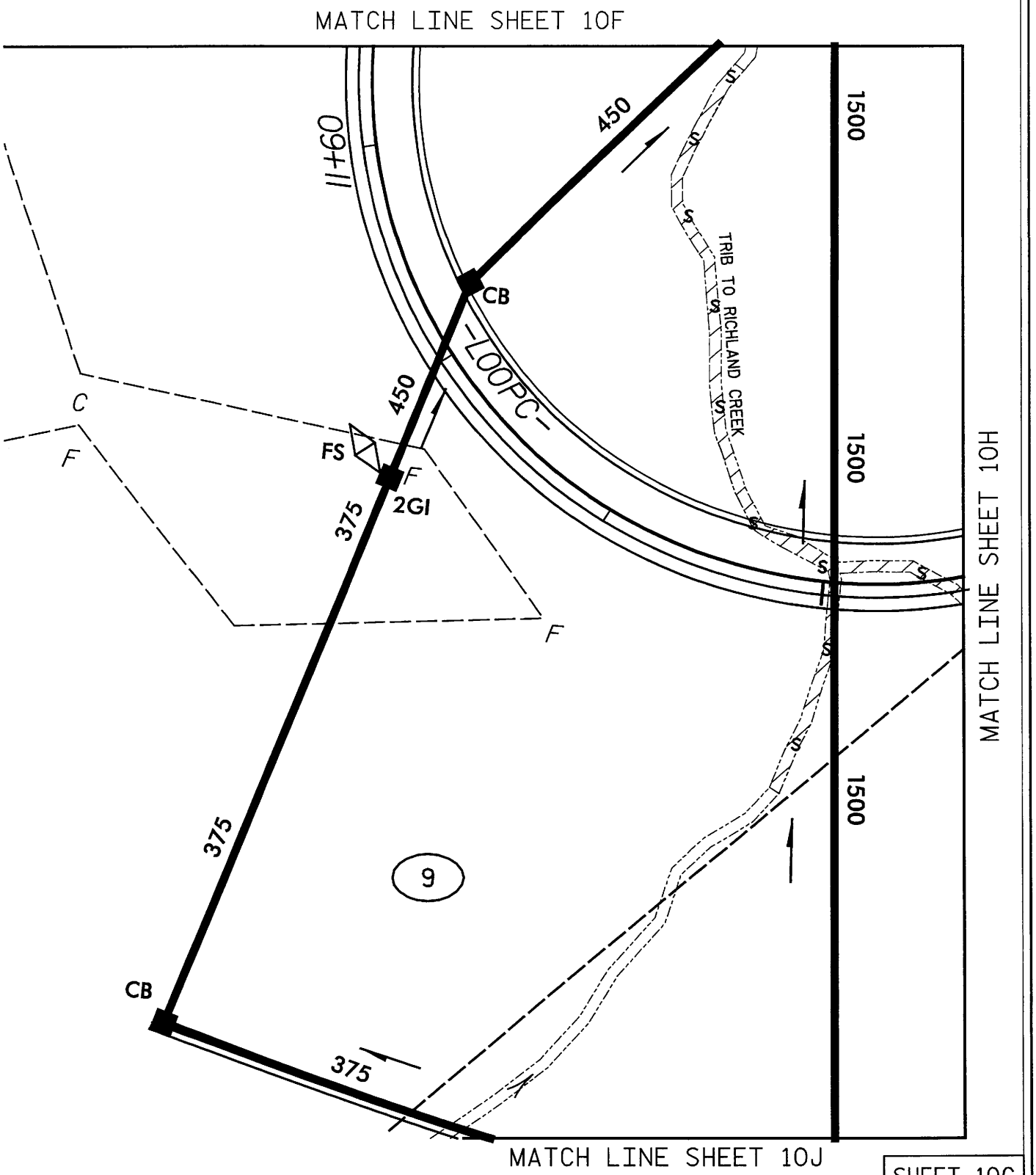

PLAN VIEW
SITE 10

LEGEND

S/S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 3 OF 14

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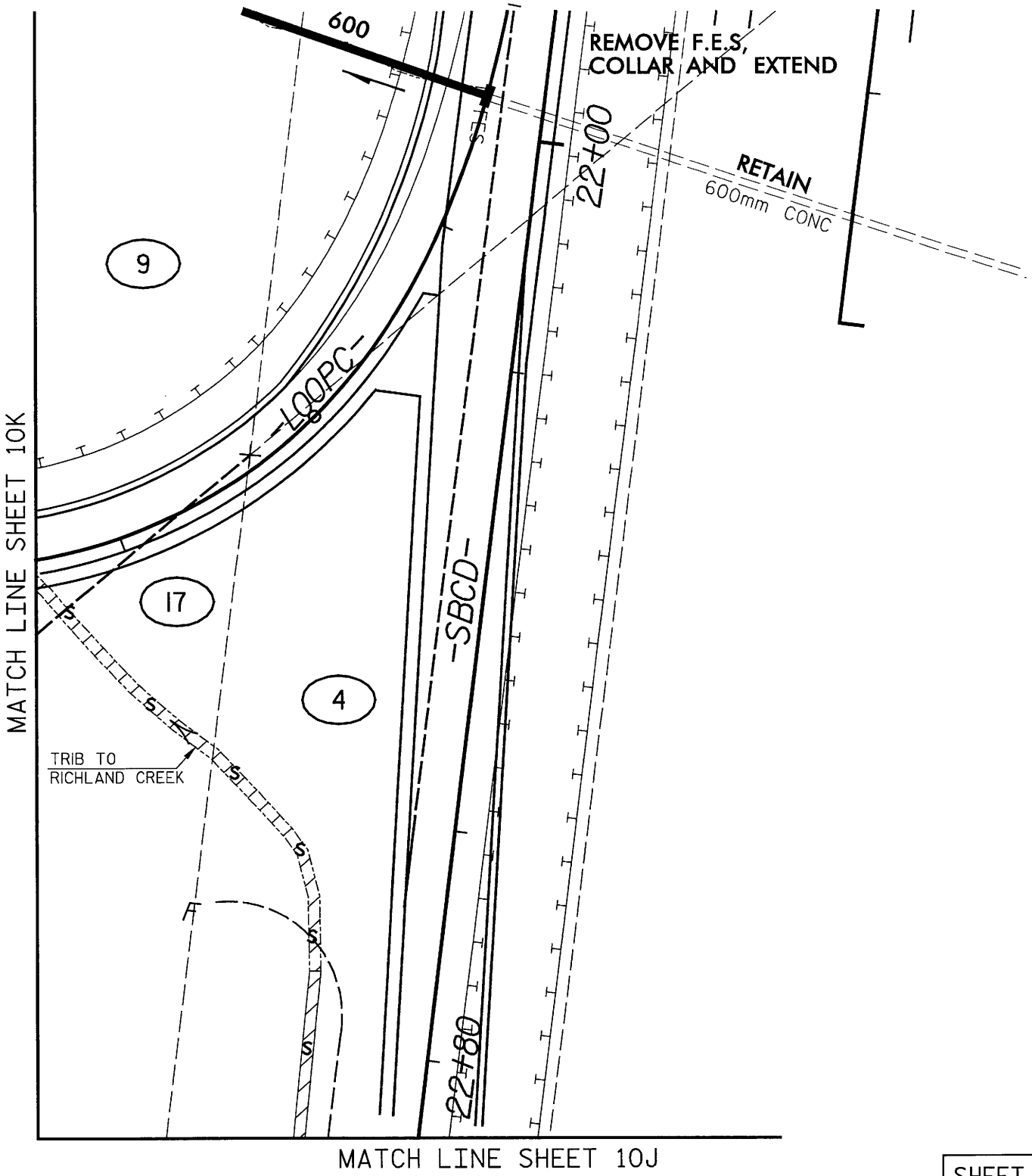

SHEET 10H

PLAN VIEW
SITE 10

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 39 OF 74

1/13/2006
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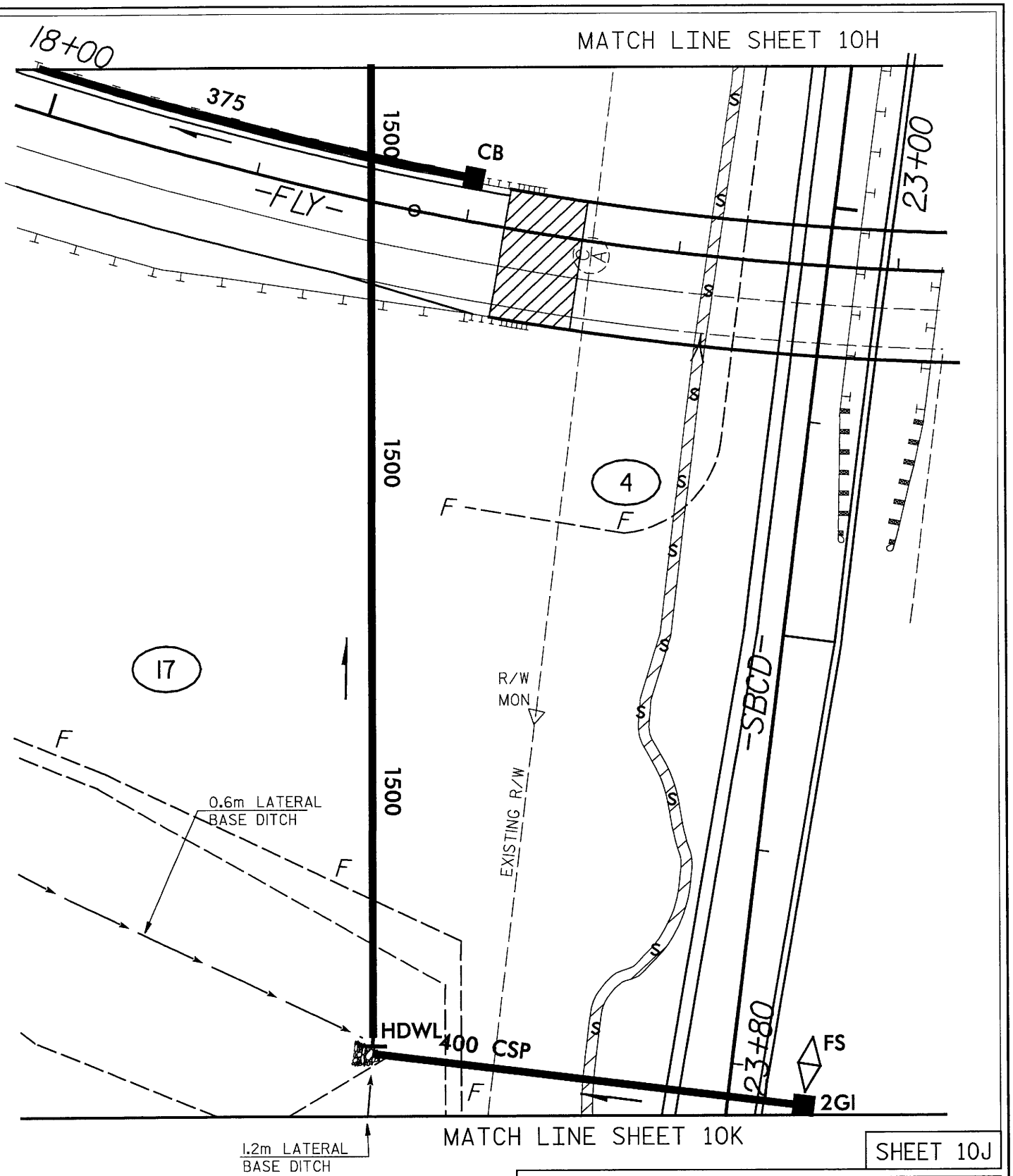

SHEET 10J

PLAN VIEW
SITE 10

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 40 OF 74

1/19/2006
9:38:22 AM
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MATCH LINE SHEET 10J

CL 'B' RIPRAP W/ FILTER FABRIC

450

COLLAR

450mm CMP

FES

24+00

CL 'B' RIPRAP W/ FILTER FABRIC

1050 STEEL

SLOPE =0.98%

17

13+60

1050

CLASS IV BORE & JACK UNDER Y6 (I-85)

1.2m LATERAL BASE DITCH

FES

COLLAR & EXTEND

1050mm CONC

SLOPE =0.98%

F

EXISTING R/W

4

C

600

-SBCD-

-RAMPC-

14+00

F

FS

10

R/W MON

375

FS

0.6M BASE LATERAL DITCH

600

2GI

2GI

24+80

F

SHEET 10K

PLAN VIEW
SITE 10

METRIC

LEGEND

DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 41 OF 74

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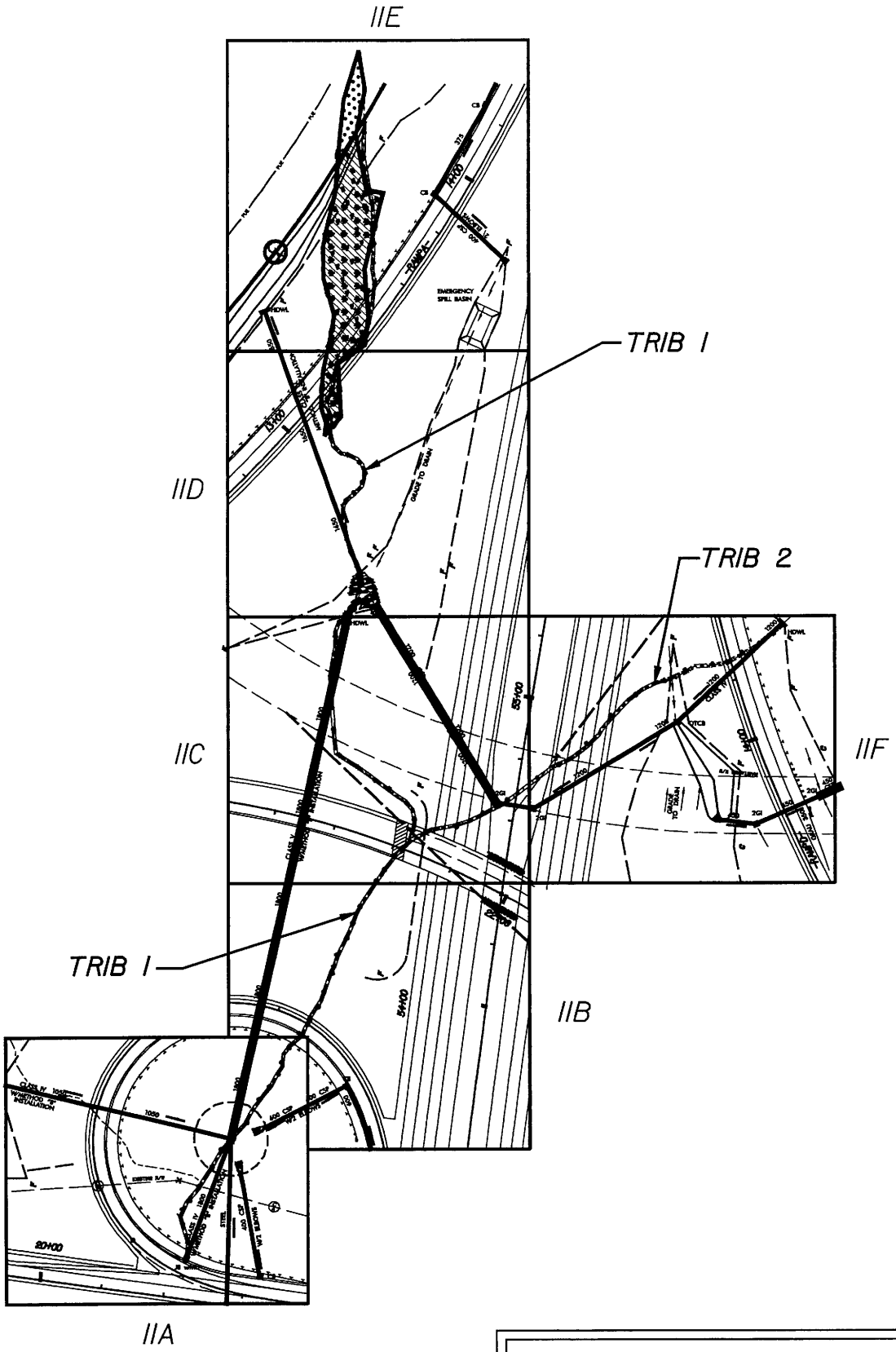

SHEET LAYOUT
PLAN VIEW
SITE 11

METRIC

20 0 20 40
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 47 OF 74

1/13/2006
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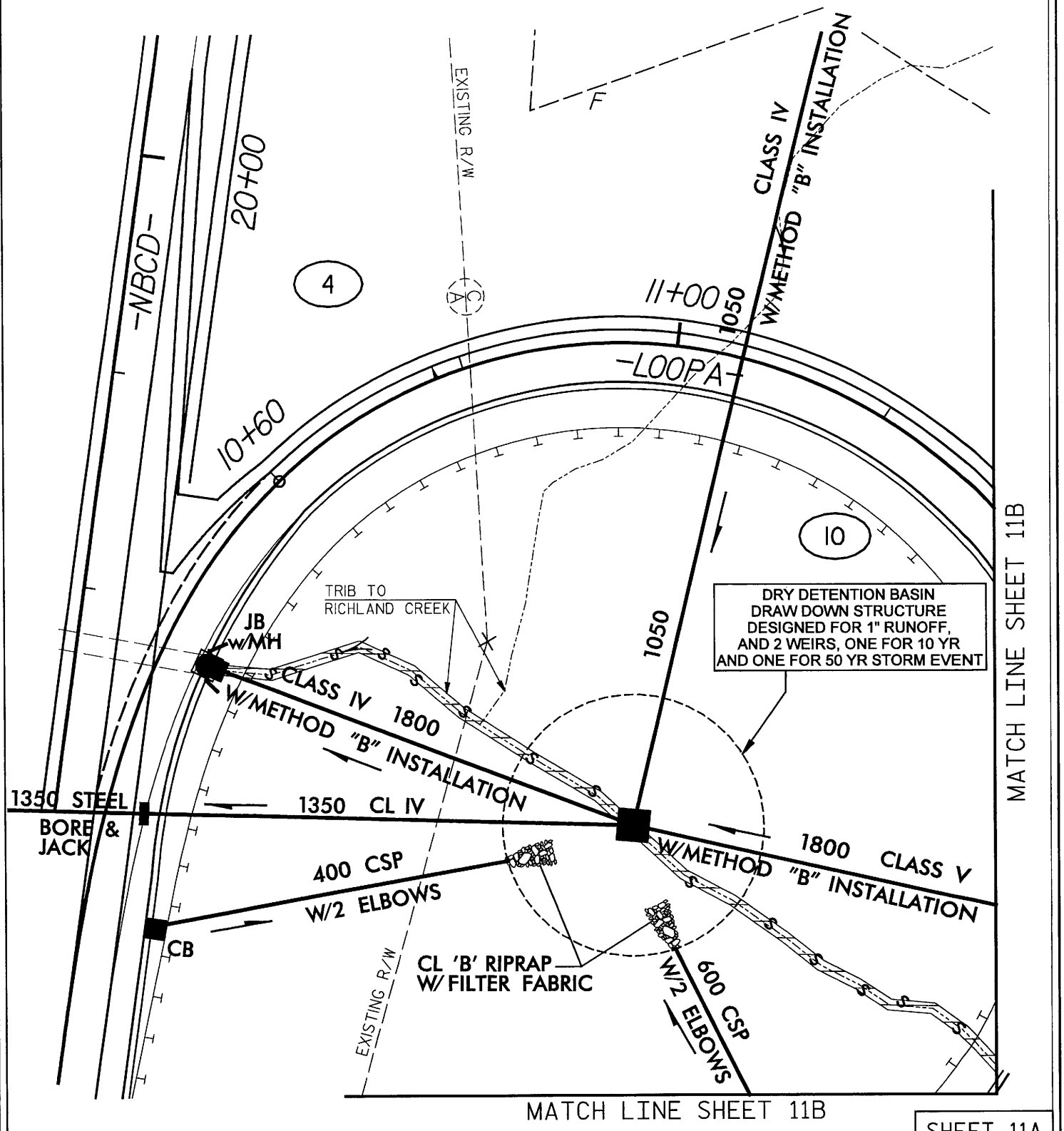

SHEET 11A

PLAN VIEW
SITE 11

METRIC

LEGEND

DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 43 OF 74

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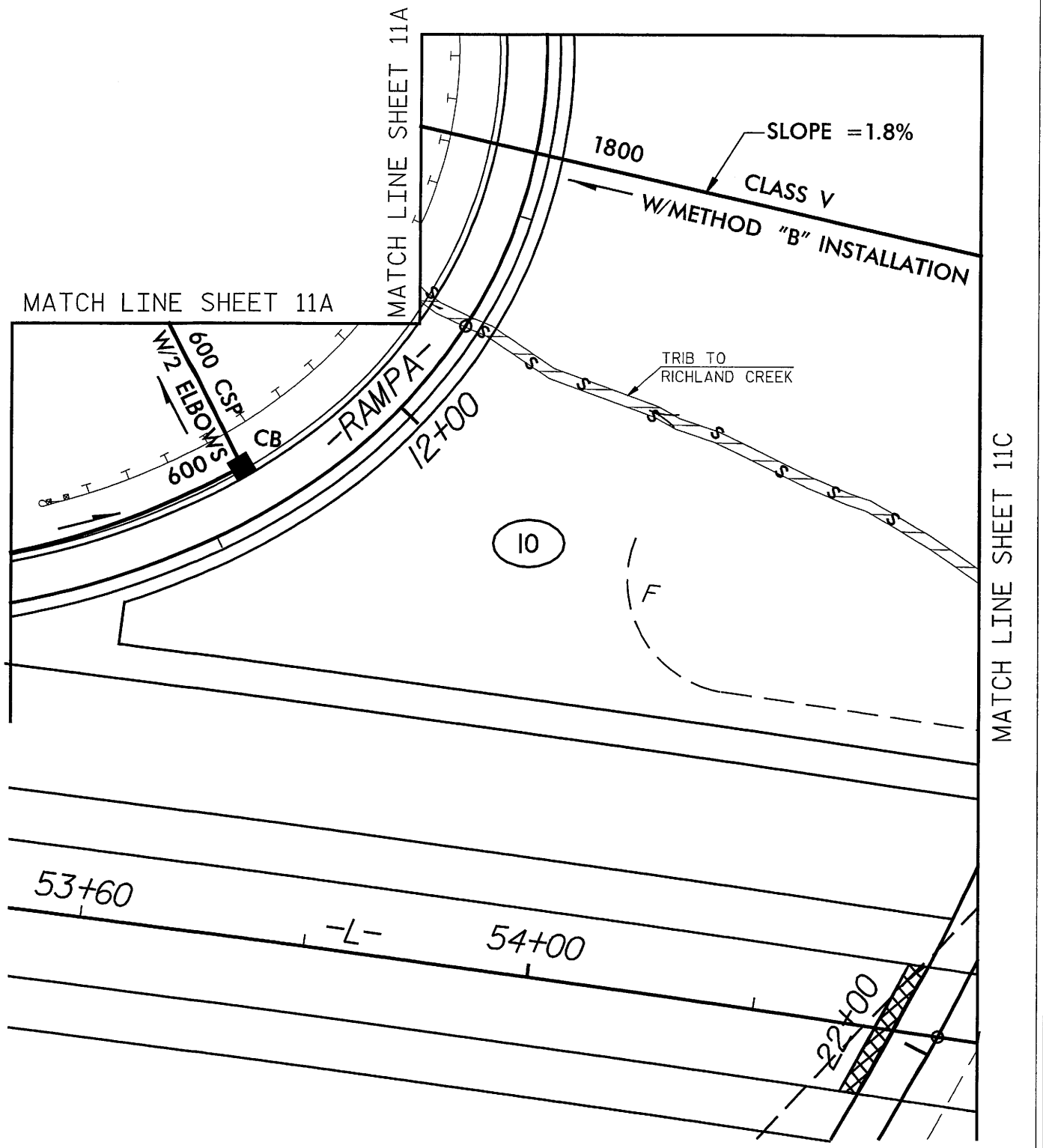

SHEET 11B

PLAN VIEW
SITE 11

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 44 OF 74

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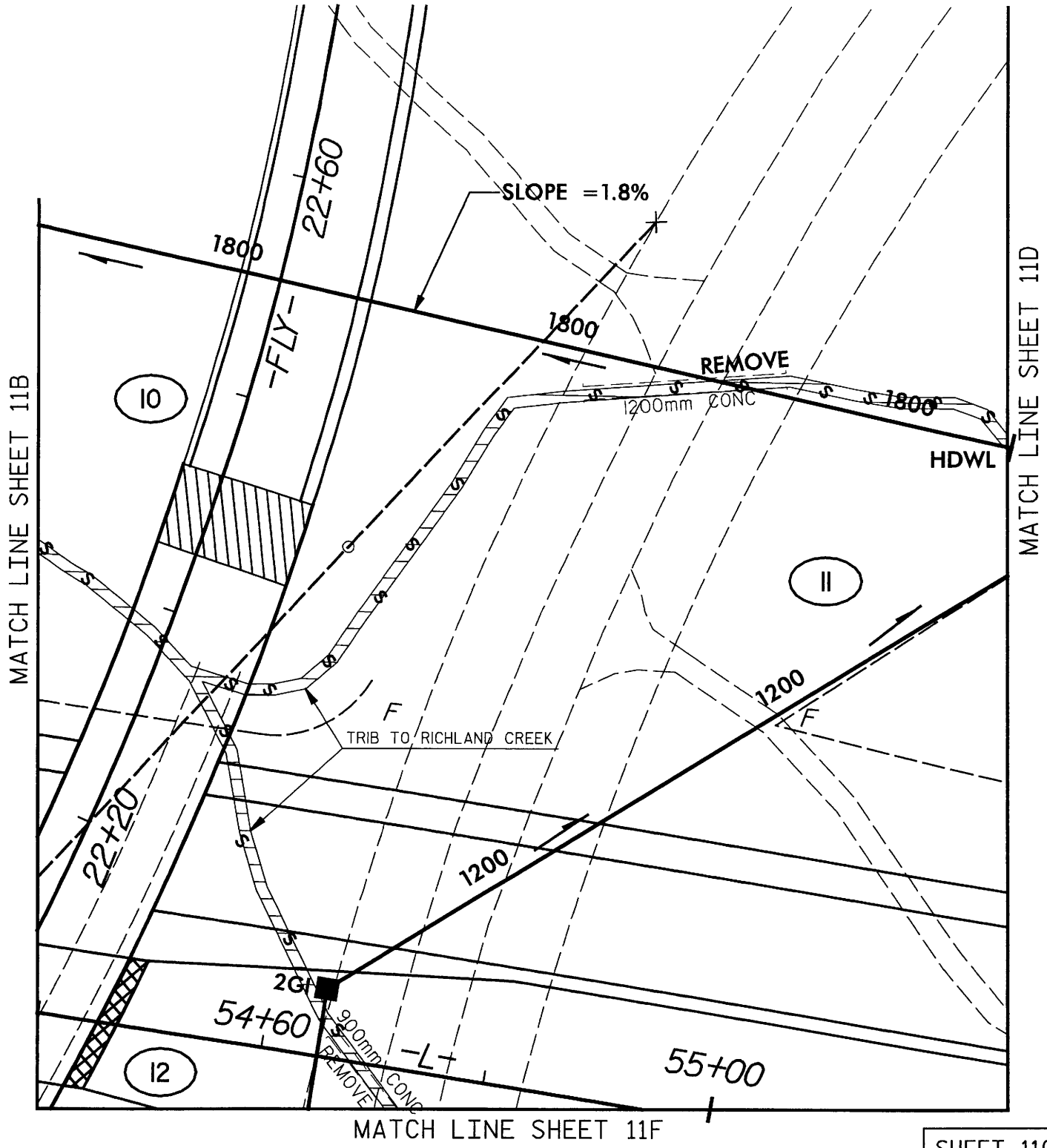

SHEET 11C

PLAN VIEW
SITE 11

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 45 OF 79

8/9/2005
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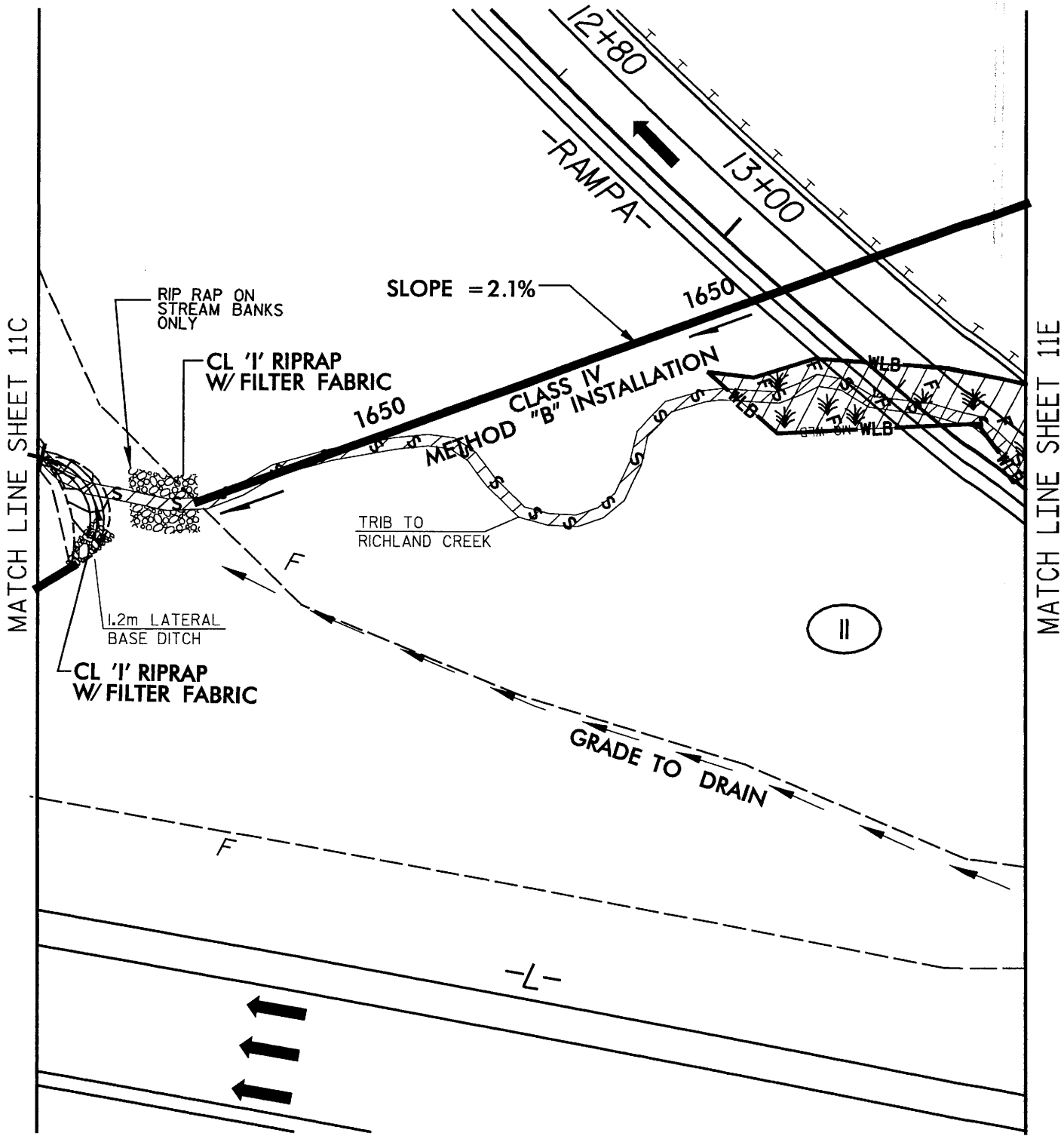

SHEET 11D

PLAN VIEW
SITE 11

LEGEND

F F DENOTES FILL IN WETLAND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 46 OF 74

9/8/2005
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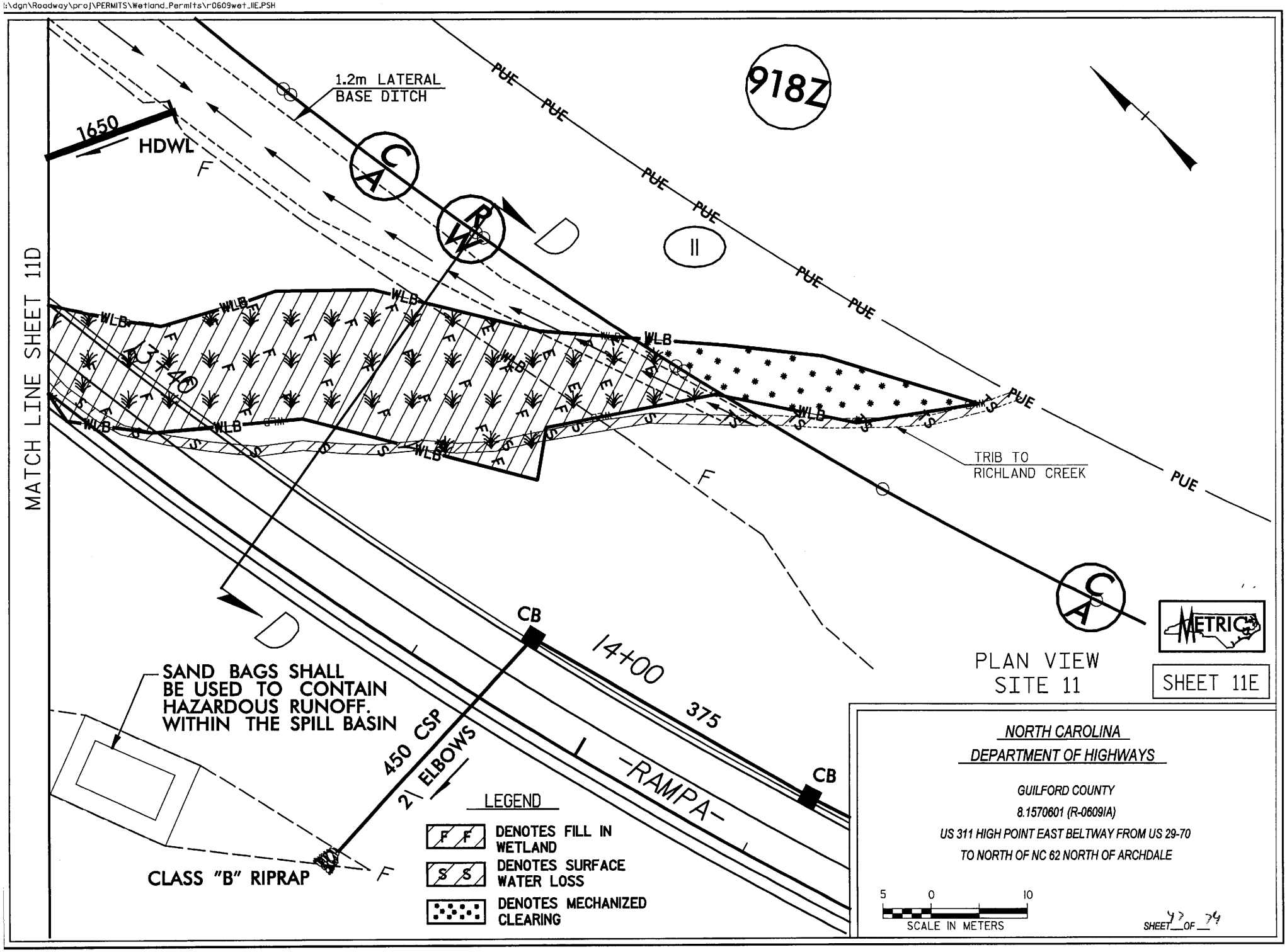

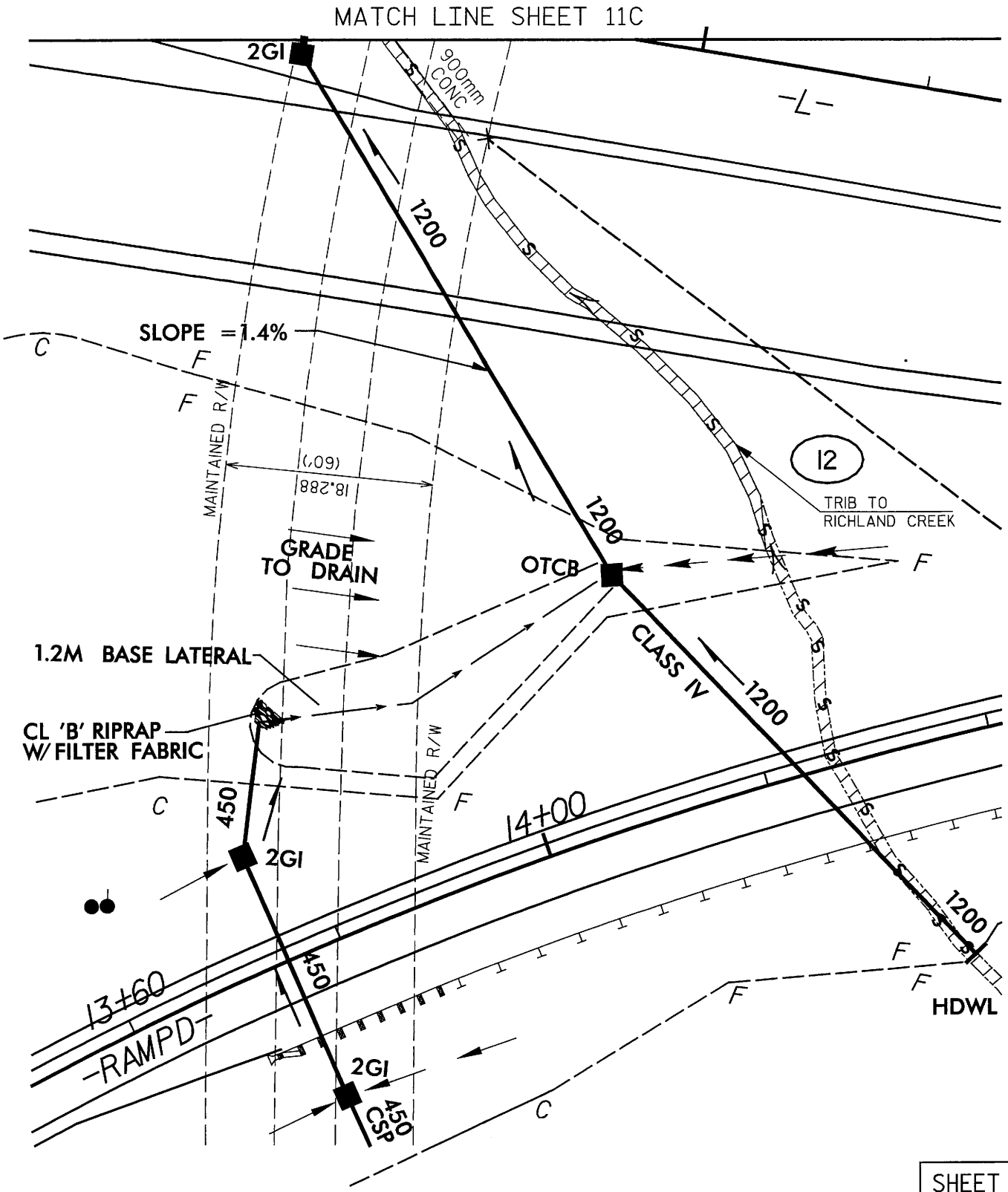

SHEET 11F

PLAN VIEW
SITE 11

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 48 OF 74

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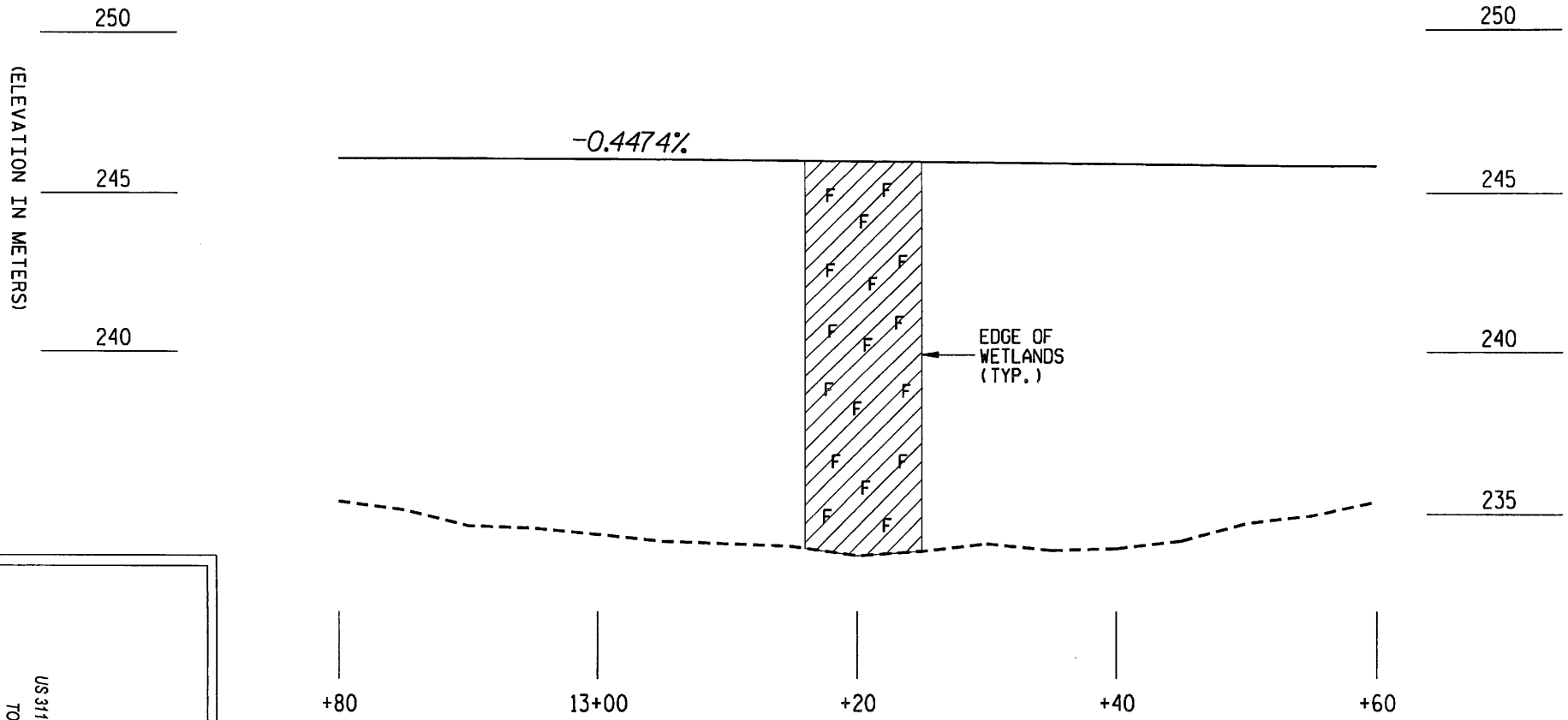

SITE 11
-RAMPA- LINE PROFILE

LEGEND

WLB WETLAND

F F DENOTES FILL IN WETLAND

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 46 OF 74

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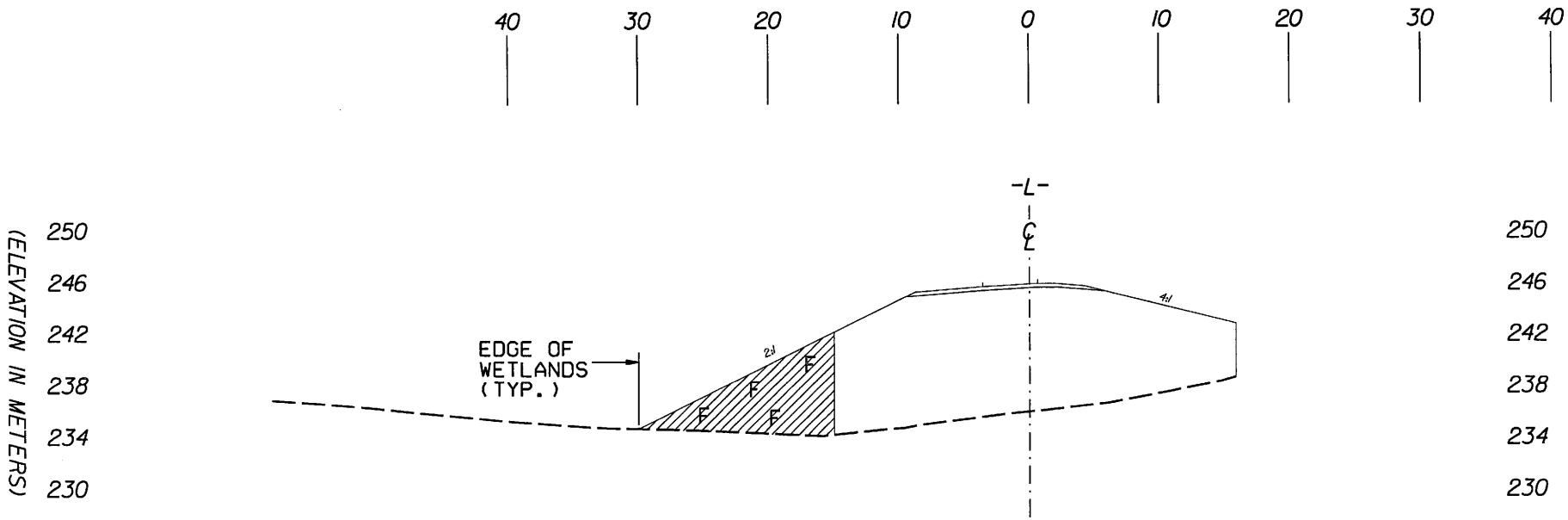


SECTION "D-D"

SITE II

CROSS SECTION
(-RAMPA- 13+60)

METRIC

5 0 10

LEGEND

WLB — WETLAND

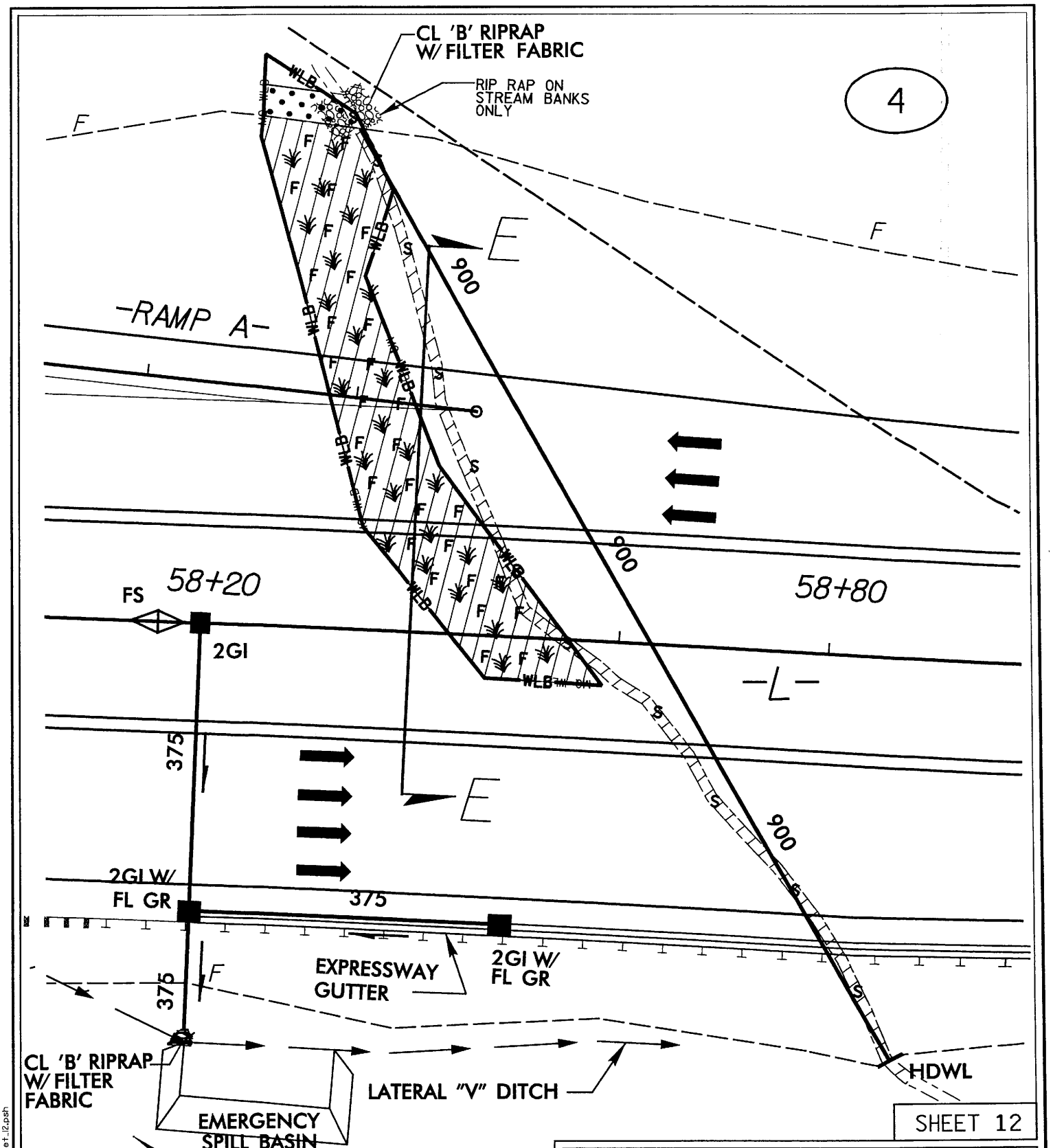
F F DENOTES FILL IN WETLAND

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 50 OF 74



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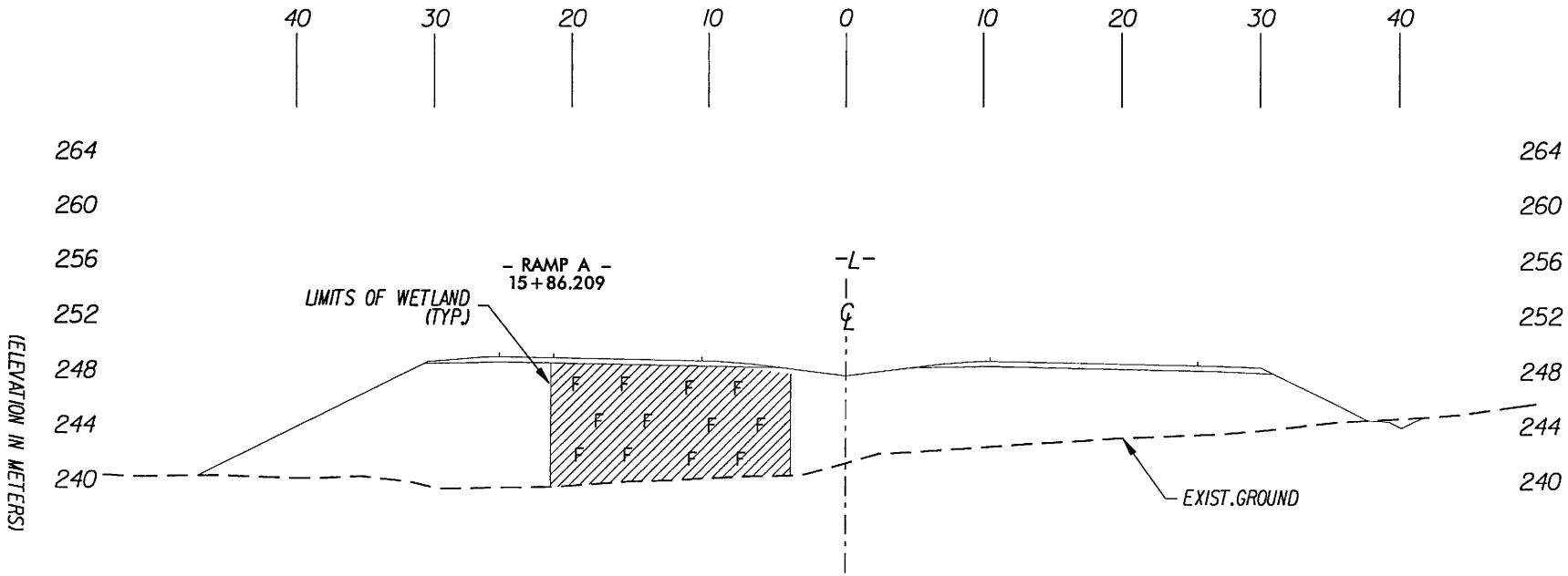

SECTION "E-E"

SITE 12

CROSS SECTION
(-L- 58+40)

LEGEND

F F DENOTES FILL IN WETLAND

METRIC

5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 12 OF 14

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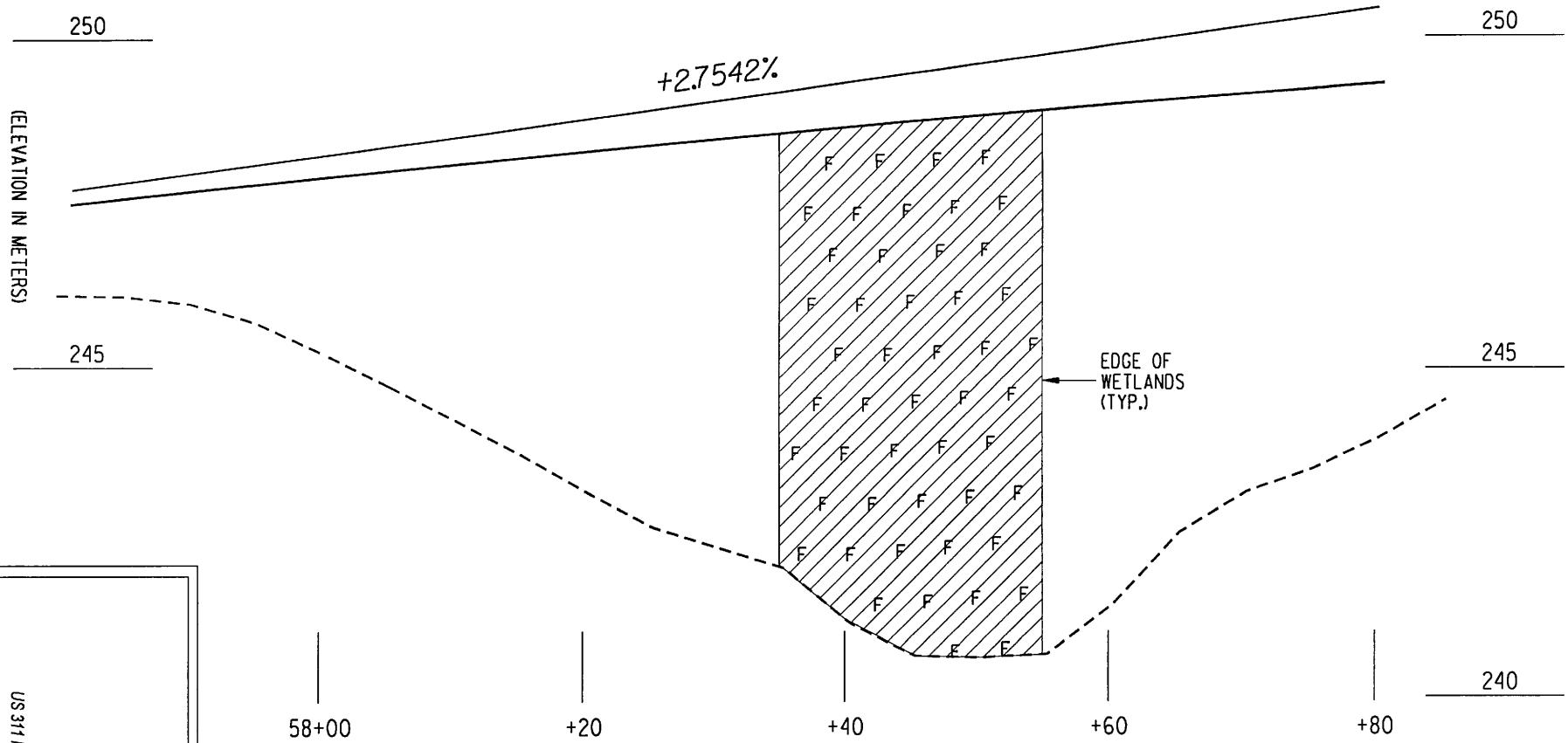


SITE 12
-L- LINE PROFILE

LEGEND

F F DENOTES FILL IN WETLAND

METRIC

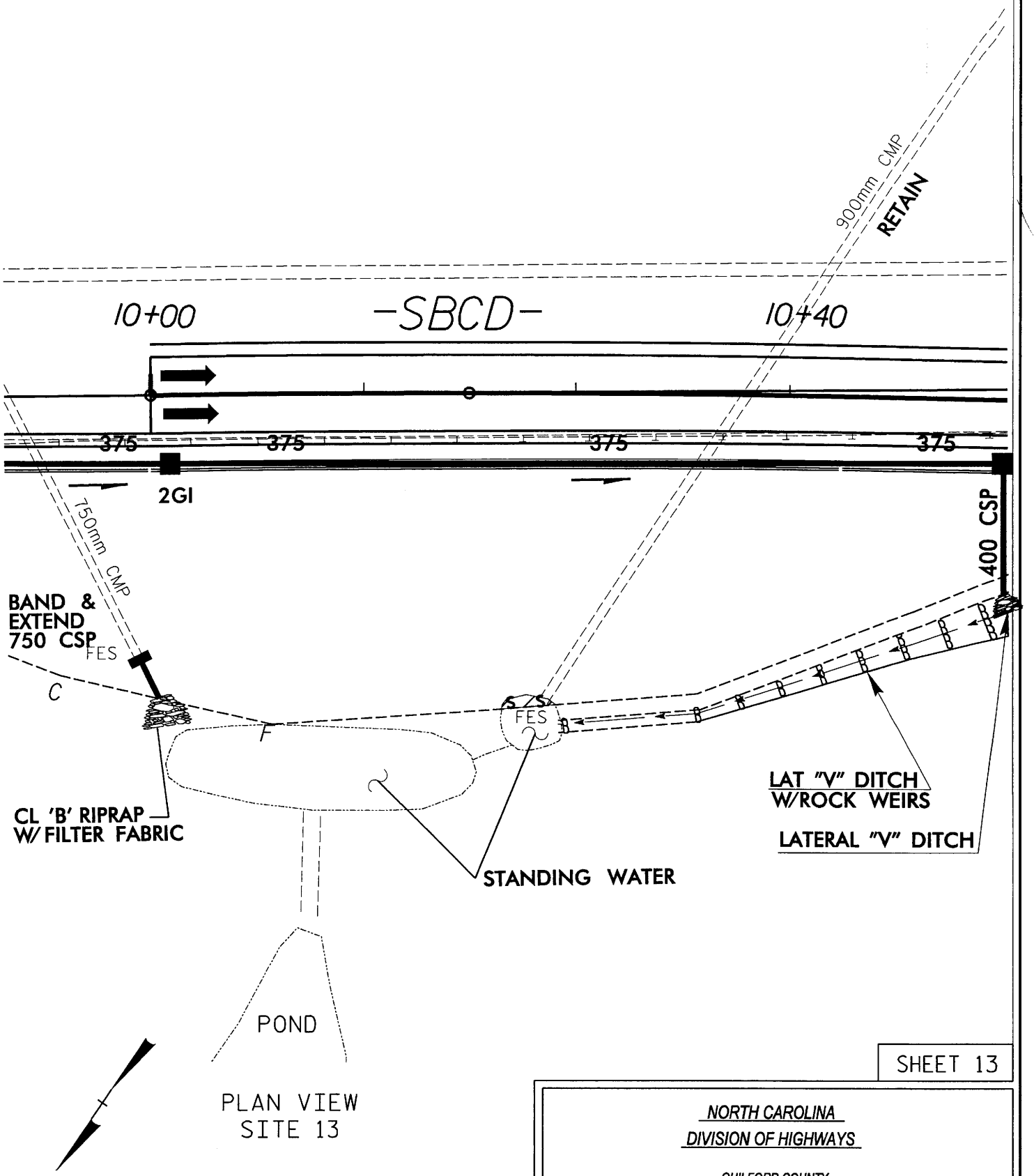
5 0 10

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 53 OF 94



PLAN VIEW
SITE 13

SHEET 13

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

SCALE AS SHOWN

SHEET 54 OF 74

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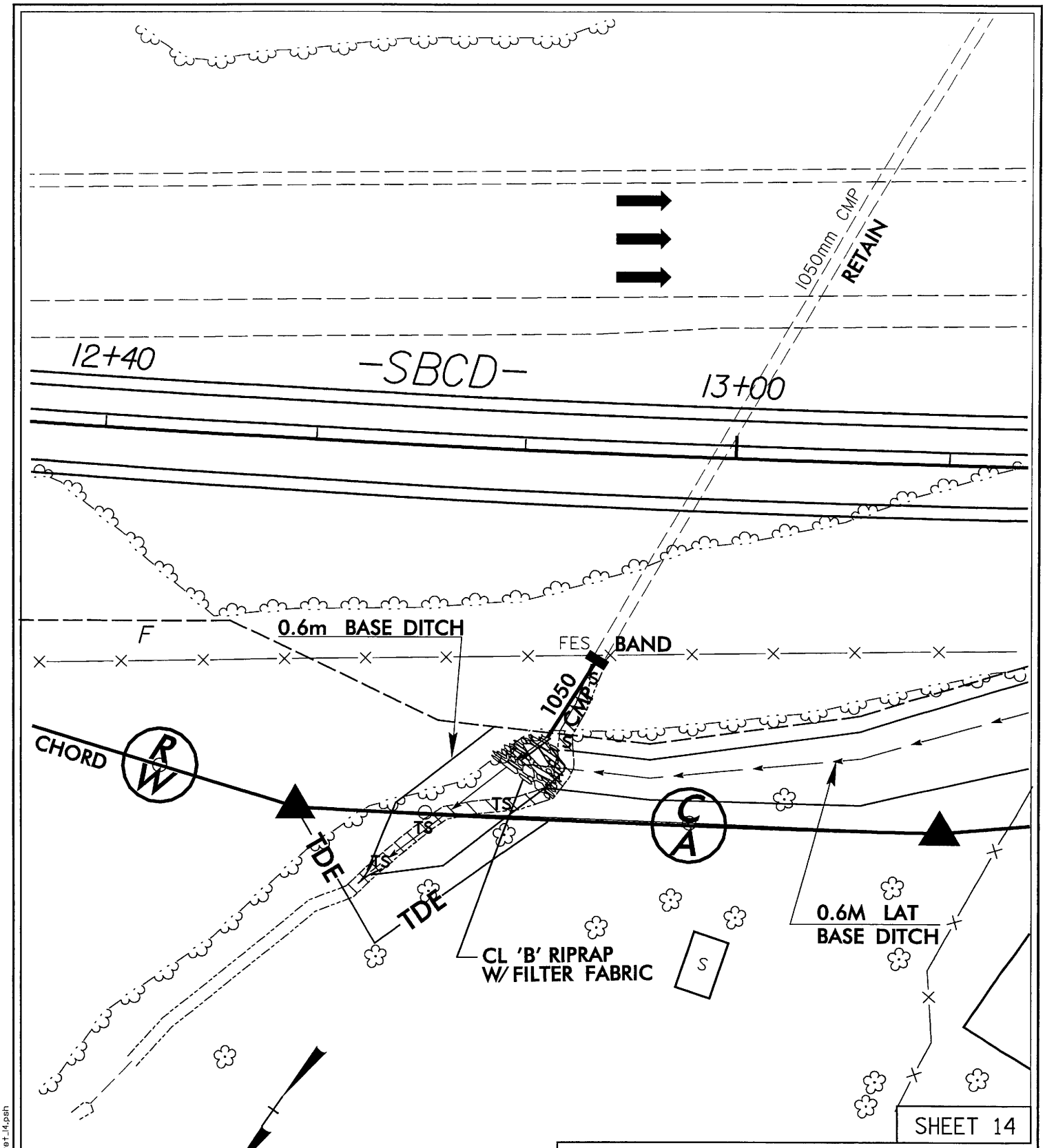

PLAN VIEW
SITE 14

METRIC

LEGEND

S S DENOTES SURFACE WATER LOSS

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 35 OF 74

1/13/2006
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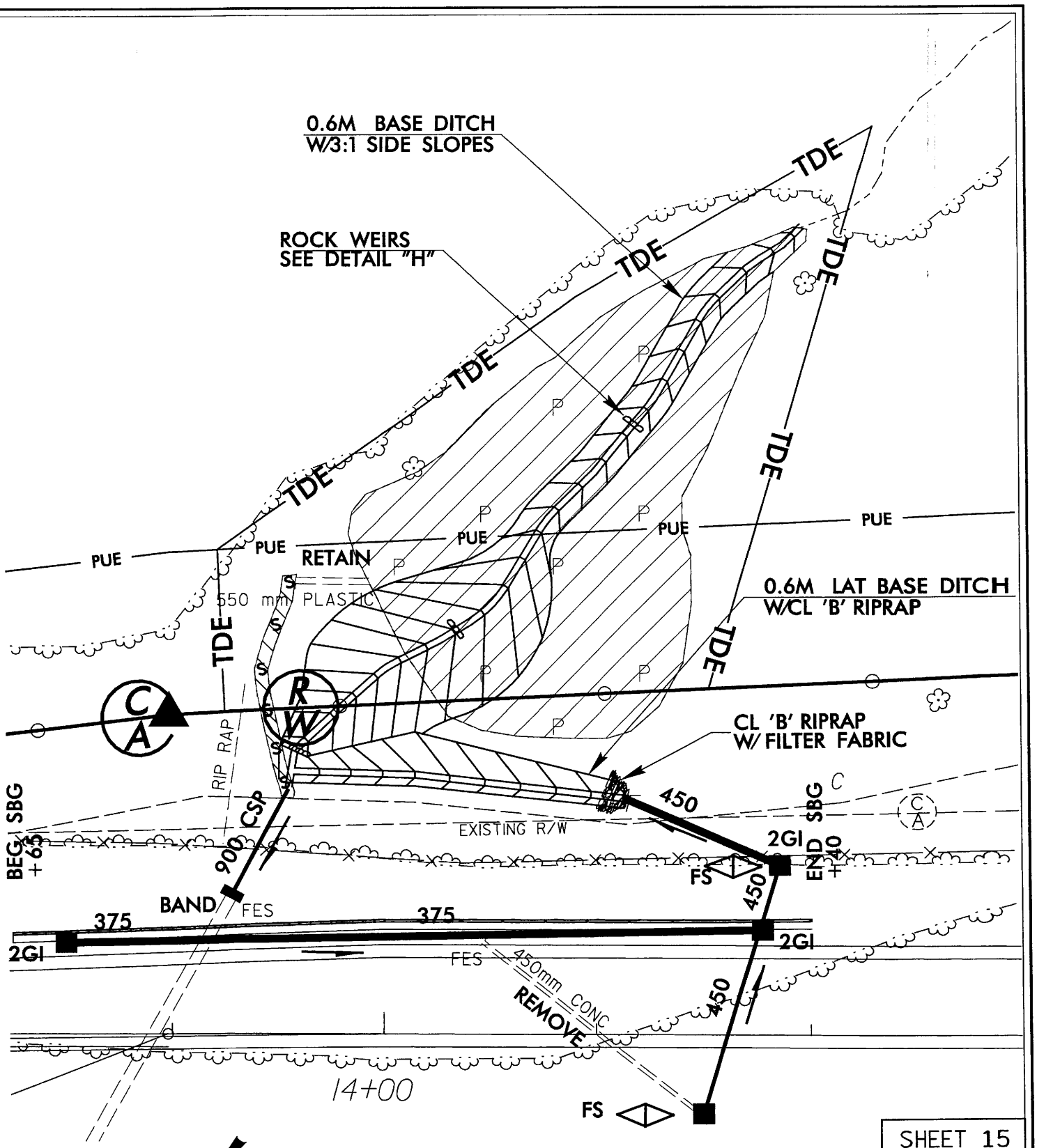

PLAN VIEW
SITE 15

LEGEND

S S DENOTES SURFACE WATER LOSS

P P DENOTES SURFACE WATER LOSS (POND)

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 56 OF 74

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24+00

11+40

RAMP D

C

11+00

900

COLLAR & EXTEND

EXISTING R/W

HDWL

S1050 RCP HDWL

12

F

0.6m BASE DITCH W/ CLASS "B" RIP RAP

R/W

PDE

PDE

PDE

PUE

PUE

PUE

PUE

19

TS

TS

TS

TRIB TO RICHLAND CREEK

1.2m LATERAL BASE DITCH

SHEET 16

PLAN VIEW
SITE 16

LEGEND

S S DENOTES SURFACE WATER LOSS

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 57 OF 74

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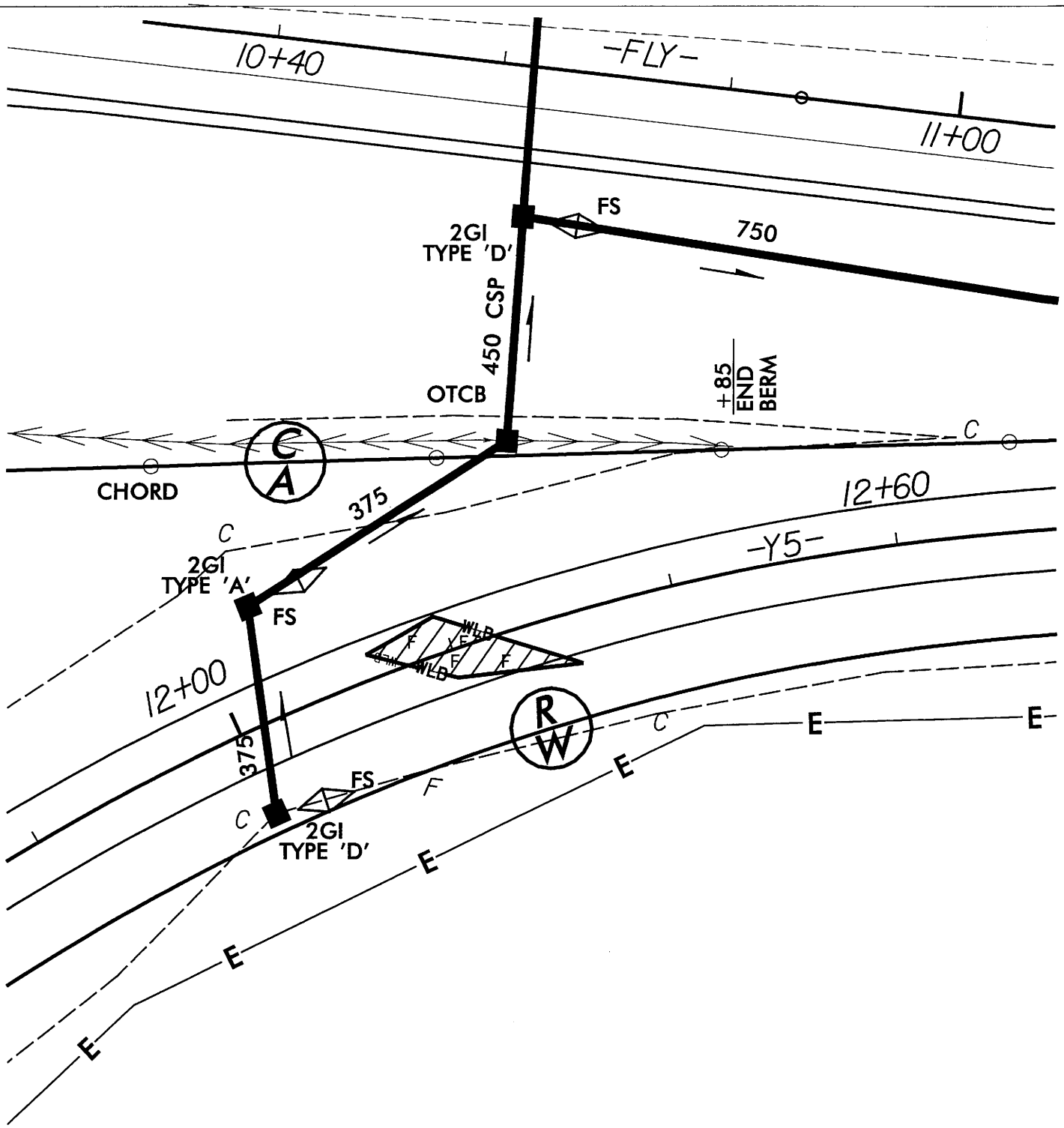

SHEET 17

PLAN VIEW
SITE 17

LEGEND

F F DENOTES FILL IN WETLAND

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 58 OF 71

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NCDOT Project I.D. R-609IA
Guildford County, NC
US 311 High Point East Beltway From US 29-70
To North of NC 62 North of Archdale

Prepared by: Stantec Consulting
801 Jones Franklin Road Suite 300
Raleigh, NC 27606

May 20, 2002

NATURAL CHANNEL DESIGN

MILE BRANCH

Right of Project Station 31+60
through
Right of Project Station 33+25
Permit Site 6

The alignment of US 311 (High Point East Beltway) will require that a portion of Mile Branch be relocated south from Project Station 31+60 Rt. to 33+25 Rt. of L-Line for approximately 165 meters in length. The proposed channel relocation is designed according to "natural channel" design principles proposed by Dave Rosgen.

The stream was found to be perennial in nature, having flow through the riffles and pools.

There is no hydraulic gage data available on this stream nor on nearby streams. Current discharges were estimated using the NCDOT procedures for rural watersheds.

EXISTING CHANNEL

A representative portion of the existing channel (around station 32+20) was surveyed in detail for the purpose of channel classification. The existing channel was measured to have an entrenchment ratio of 7.37, a width/depth ratio of 6.23, a sinuosity of 1.24 and an average slope of 0.003 m/m. A pebble count was preformed and the channel was found to have a concentration of sand in the pools, gravel in the riffles and a classification of gravel bottom. The channel was found to be a B4c stream type according to the Rosgen classification system.

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 59 OF 74

06/14/2002
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REFERENCE REACH

The reference reach was surveyed in detail for the purpose of channel classification and use in natural channel design. A 143 ft long reach was surveyed in detail. The reference reach channel was measured to have an entrenchment ratio of 8.55, a width/depth ratio of 10.13, a sinuosity of 1.19 and an average slope of 0.015 ft/ft. A pebble count was preformed and the channel was found to have a classification of sand bottom. The channel was found to be a C5 stream type according to the Rosgen classification system.

PROPOSED CHANNEL

Based upon the existing valley type and the flood prone width desired, the proposed channel design has a C4 stream type classification. Design data is given in the attached table along with existing reach and reference reach data. Channel gradient is controlled by the natural channel tie upstream and by the three 3.4m by 2.4m reinforced concrete box culverts downstream. Mean "bankfull" depth was set at 0.54 meters. This gives a maximum bankfull depth of 0.80 meters. Above bankfull depth it is proposed to excavate an approximately 45 meter wide flood plain (including the channel).

It is believed that by forming a flood plain above bankfull depth channel stability will be enhanced by reducing velocities for those discharges above the bankfull discharge. This should lead to a more stable channel during and after watershed development. It is anticipated that the proposed channel will have a natural gravel bottom. Maximum pool depths of 1.61 meters are proposed at outside bends of meanders.

Using the proposed channel geometry, sediment transport computations were performed to determine whether the bankfull discharge would be able to initiate movement of the D50 particle obtained. The proposed bankfull shear stress has been reduced from 2.39 to 1.24 kg/m2 (0.49 to 0.254 lbs/ft sq). The D50 particle recorded during the bar sample was 16mm. Using Rosgen's version of Shields Curve the shear stress to initiate movement of a 16mm particle can be a low as 0.97 kg/m2 (0.20 lbs/ft sq). Therefore since the proposed shear stress for the Type C channel is less than the existing conditions the proposed channel should be stable.

Proposed channel stabilization is shown on the attached detail sheet. It is anticipated that channel banks will be planted with native trees and shrubs above bankfull depth. Rock Vanes, Cross Vanes and Root Wads will be utilized to control the near bank shear stress in the meanders, along the proposed roadway.

Stantec

Location: WETLAND PERMIT SITE 6

Site #1b Sta 32+20-L-R to 33+25 -L-R

Design by: C. Heath Wadsworth, EI 12/1/2000

Checked by: Kevin Williams, PE 12/2/2000

ITEM	EXISTING CHANNEL	PROPOSED REACH	REFERENCE REACH (English)	REFERENCE REACH (Metric)
STREAM NAME	Mile Branch	Mile Branch	Dixon Branch	Dixon Branch
STREAM TYPE	B4c	C4	C5	C5
DRAINAGE AREA (DA)	581.03 ha	581.03 ha	402 Ac	162.69 ha
BANKFULL WIDTH (W_{bkf})	5.75 m	6.45 m	15.20 ft	4.63 m
BANKFULL MEAN DEPTH (d_{bkf})	0.92 m	0.54 m	1.50 ft	0.46 m
WIDTH/DEPTH RATIO (W_{bkf}/d_{bkf})	6.23	12.00	10.13	10.13
BANKFULL X-SECTION AREA (A_{bkf})	5.32 m^2	3.45 m^2	22.70 ft^2	2.11 m^2
BANKFULL MEAN VELOCITY, m/s	1.15 mps	1.77 mps	2.81 fps	0.86 mps
BANKFULL DISCHARGE, m^3/s	6.09 m^3/s	6.10 m^3/s	64 cfs	1.81 m^3/s
BANKFULL MAX DEPTH (d_{max})	1.37 m	0.80 m	1.60 ft	0.49 m
WIDTH Flood-Prone Area (W_{fpa})	42.40 m	45.00 m	130.0 ft	39.62 m
ENTRENCHMENT RATIO (ER)	7.37	6.98	8.55	8.55
MEANDER LENGTH (Lm)	9.5 m	75 m	33 - 71 ft	10 - 22 m
RATIO OF Lm TO W_{bkf}	1.65	12	2.2 - 4.7	2.2 - 4.7
RADIUS OF CURVATURE	10.0 m	18 m	6 - 9 ft	2 - 3 m
RATIO OF Rc TO W_{bkf}	1.7	2.8	0.37	0.4
BELT WIDTH	16.0	45.2	30	9.14
MEANDER WIDTH RATIO	2.8	7.0	2.0	2.0
SINUOSITY (K)	1.24	1.40	1.19	1.19
VALLEY SLOPE	0.004 m/m	0.0034 m/m	0.018 ft/ft	0.018 m/m
AVERAGE SLOPE (S)	0.003 m/m	0.0024 m/m	0.015 ft/ft	0.015 m/m
POOL SLOPE	0.005 m/m	0.0005 m/m	0.003 - 0.012 ft/ft	0.003 - 0.012m/m
RATIO OF POOL SLOPE TO AVERAGE SLOPE	1.78	0.20	0.19 - 0.83	0.19 - 0.83
MAX POOL DEPTH	1.86 m	1.61 m	1.90 - 5.80 ft	0.58 - 2 m
RATIO OF POOL DEPTH TO AVERAGE BANKFULL WIDTH	2.01	3.00	1.3 - 3.9	1.3 - 3.9
POOL WIDTH	10.98 m	9.68 m	31 ft	9 m
RATIO OF POOL WIDTH TO BANKFULL WIDTH	1.91	1.50	2.04	2.04
POOL TO POOL SPACING	30.00 m	32.3 m	18 - 30 ft	5 - 9 m
RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	5.21	5	1.2 - 2.0	1.2 - 2.0

NORTH CAROLINA

DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70

TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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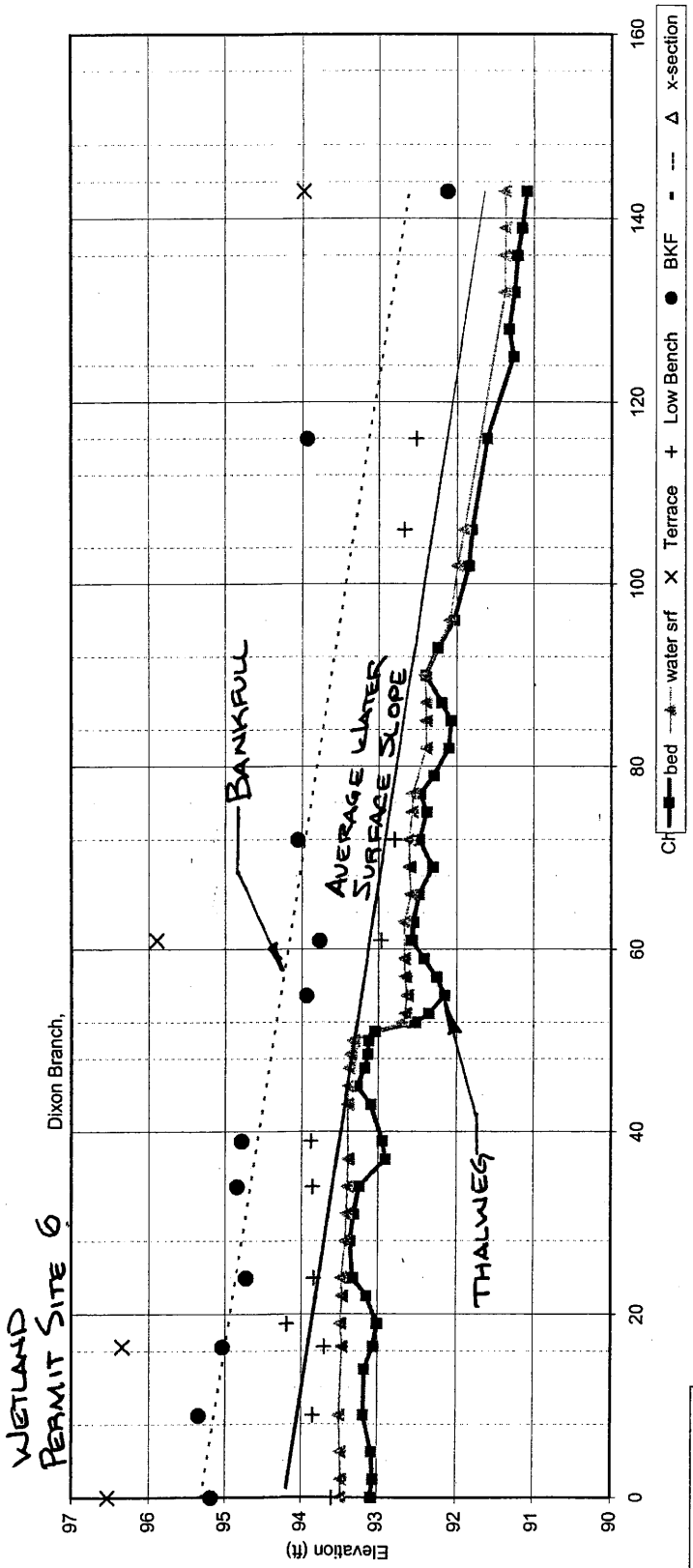

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 62 OF 71

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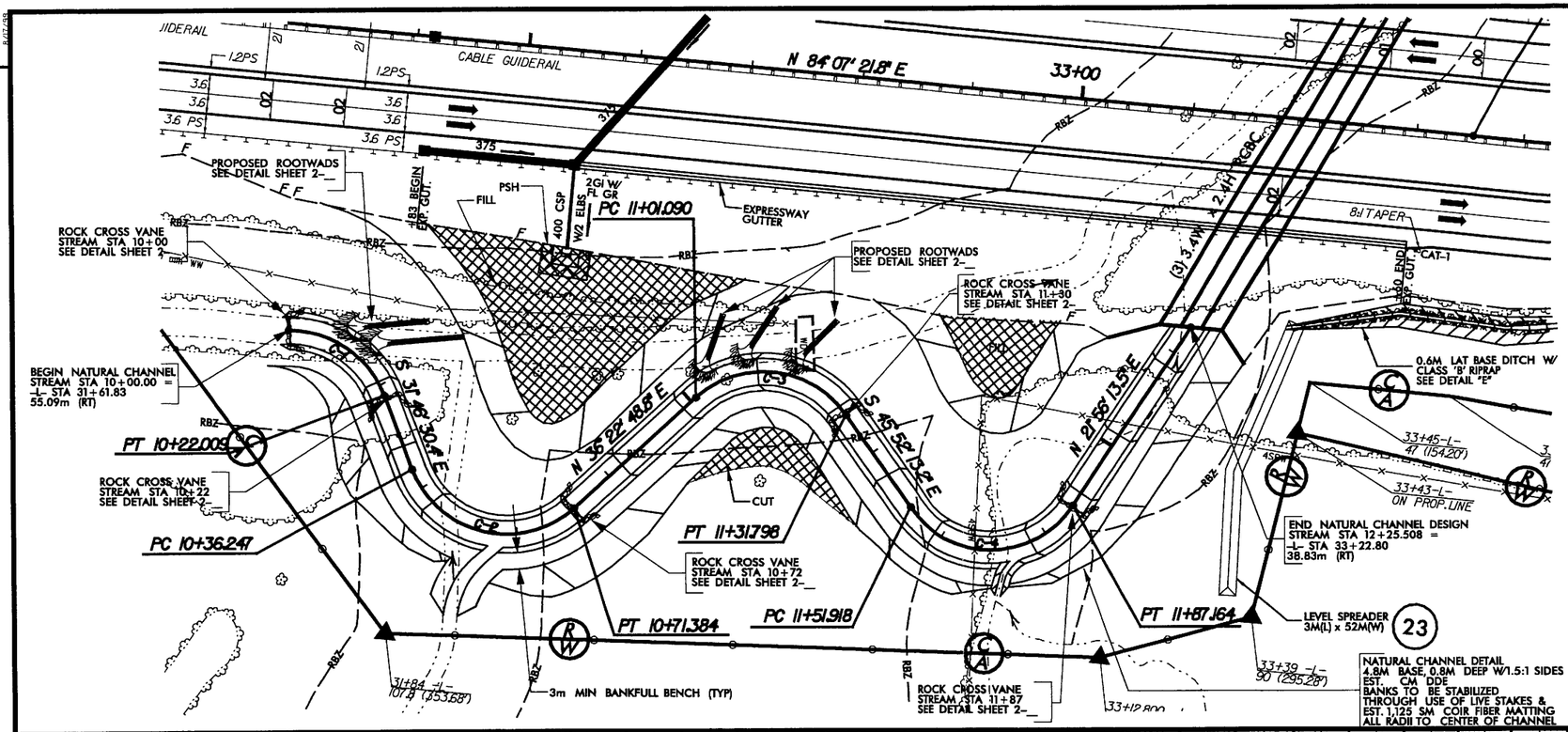

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T = 12.617	T = 26.608
R = 18.000	R = 18.000

C-3	C-4
PI Sta 11+21.705	PI Sta 11+78.701
Δ = 97° 44' 58.0" (RT)	Δ = 112° 11' 33.3" (LT)
L = 30.709	L = 35.246
T = 20.615	T = 26.783
R = 18.000	R = 18.000

METRIC

5 0 10

CONST.REV.

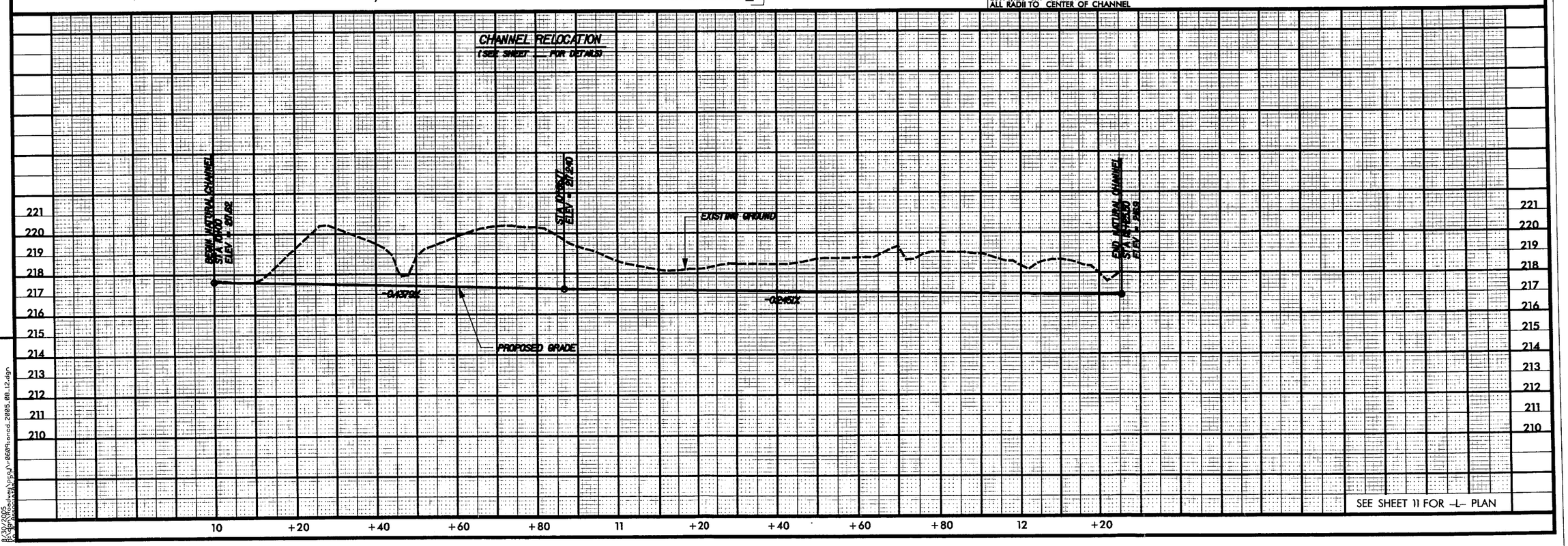
R /W REV.

PROJECT REFERENCE NO.	SHEET NO.
R6091A	
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

63 of 74



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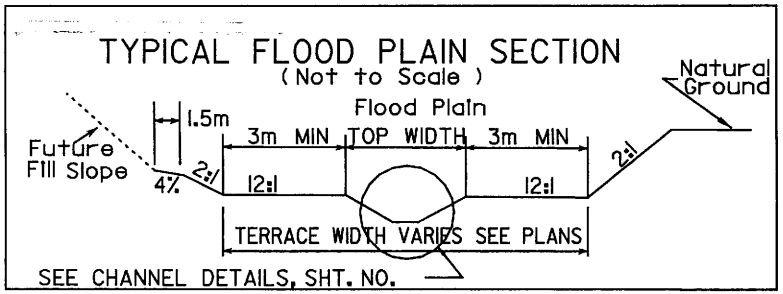
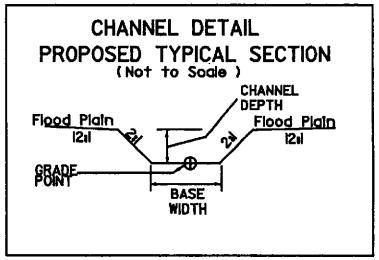
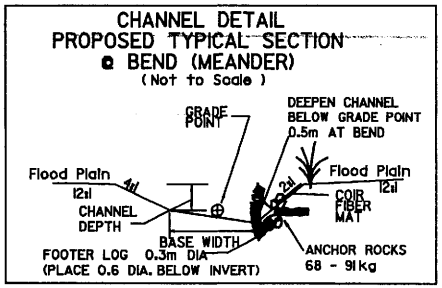
NATURAL CHANNEL DESIGN TYPICALS





TYPICAL SECTION 1 BETWEEN BENDS



TYPICAL SECTION 2 AT BENDS

NOTES:

NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE

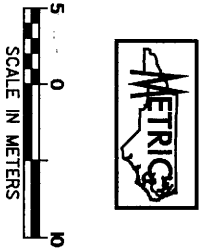
NUMBER OF LOW STAGE CHECK DAMS TO BE DETERMINED ON SITE

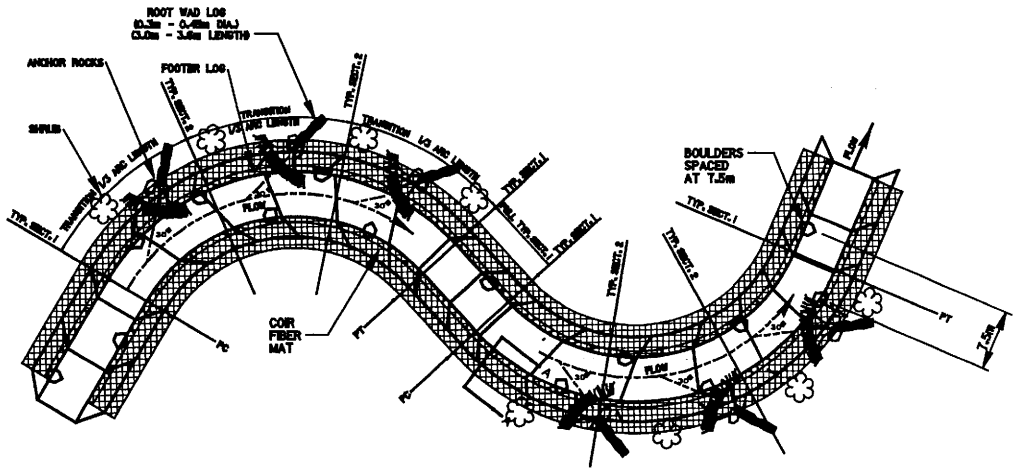
ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE

FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE CHANNEL.

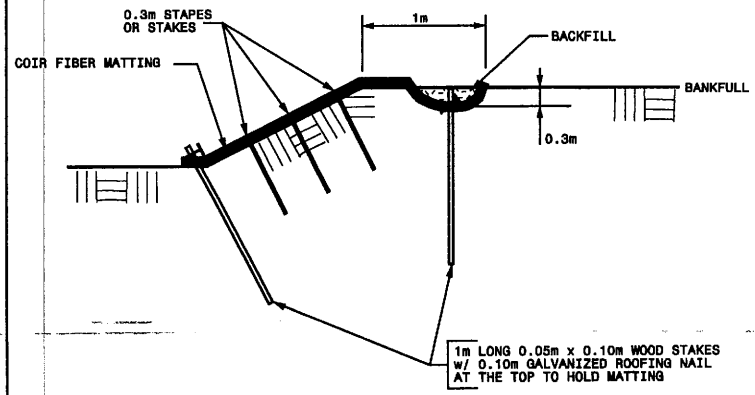
WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, ROOTWAD LOGS AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH





CHANNEL PLAN VIEW



SECTION A-A

NOTES:
1. USE WOOD STAKES (NOT METAL) FOR MATTING INSTALLED IN PUMP AROUNDS OR IN THE WET.
2. USE OF METAL STAPLES IS ACCEPTABLE WHEN CONSTRUCTING IN THE DRY AND VEGETATION IS ESTABLISHED PRIOR TO DIVERTING WATER.

NORTH CAROLINA
DIVISION OF HIGHWAYS

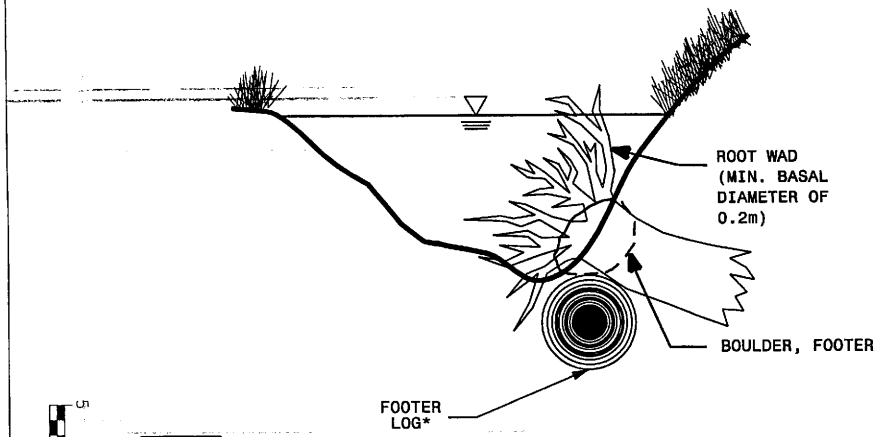
GUILFORD COUNTY

8.1570601 (R-0609A)

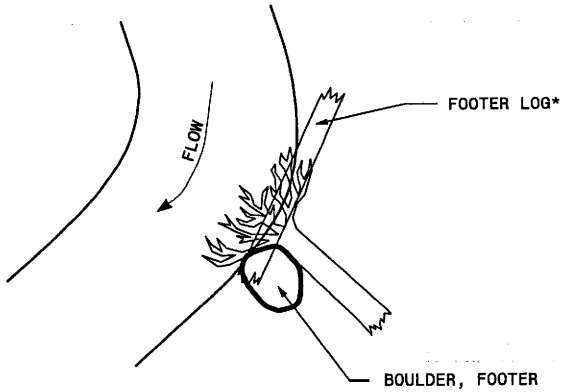
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 57 OF 74



CROSS SECTION



PLAN VIEW

5 0 10
SCALE IN METERS

METRIC

*FOOTER LOGS SHALL HAVE A MINIMUM BASAL DIAMETER OF 0.2m AND HAVE A LENGTH OF 2.1m -3.0m.

ROOT WAD

SCALE: NTS

PLACEMENT OF ROOT WAD STRUCTURES

A TRENCH SHALL BE DUG ALONG THE TOE OF THE BANK TO A DEPTH OF ½ THE DIAMETER OF THE FOOTER LOG. A PRUNED FOOTER LOG SHALL BE PLACED AT THE TOE OF THE CHANNEL AND THE ROOT WAD SHALL BE PLACED DIRECTLY ABOVE IT. THE ROOT MASS SHALL BE ORIENTED IN SUCH A WAY THAT THE VELOCITY VECTORS OF THE WATER WILL INTERSECT THE ROOT MASS AT A 90-DEGREE ANGLE. THERE SHALL BE NO VOID BETWEEN THE ROOT MASS AND THE BANK ON THE UPSTREAM SIDE OF THE CHANNEL. A BOULDER SHALL BE PLACED ON THE DOWNSTREAM SIDE BETWEEN THE ROOT MASS AND THE BANK TO PROVIDE EROSION CONTROL. THE BOULDER, FOOTER SHALL BE APPROXIMATELY 0.9m X 0.9m X 0.6m.

THE PREFERRED METHOD FOR INSTALLATION OF A ROOT WAD IS TO DRIVE THE SHARPENED TRUNK OF THE ROOT WAD INTO THE STREAMBANK USING A BACKHOE. IF IT IS DEEMED NOT POSSIBLE TO DRIVE THE TRUNK INTO THE BANK, A TRENCH SHALL BE DUG IN THE BANK AND THE TRUNK SHALL BE PLACED IN THE TRENCH. THE TRENCH SHALL BE BACK FILLED AND COMPACTED.

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 65 OF 74

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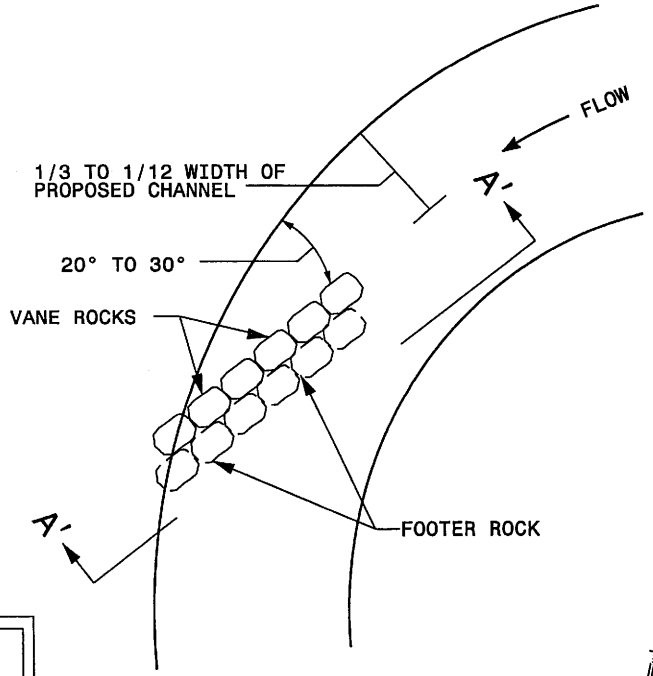
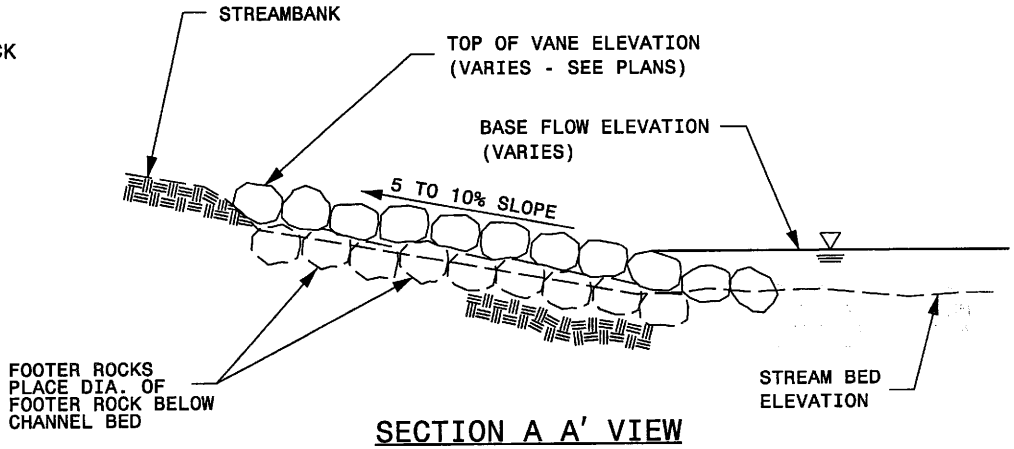


PLAN VIEW

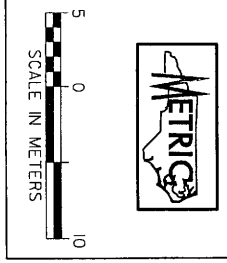


SECTION A A' VIEW

NOTE: ALL ROCKS OR STONE ARE NATURAL STONE BOULDERS

ROCK VANE

SCALE: NTS



NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 66 OF 74

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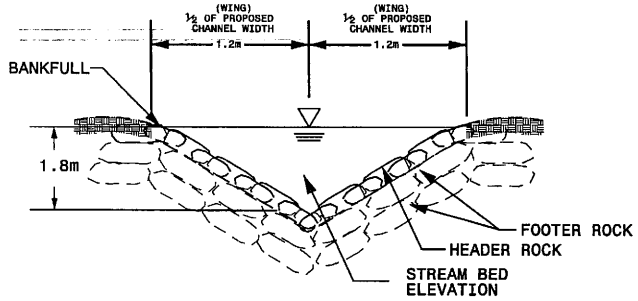
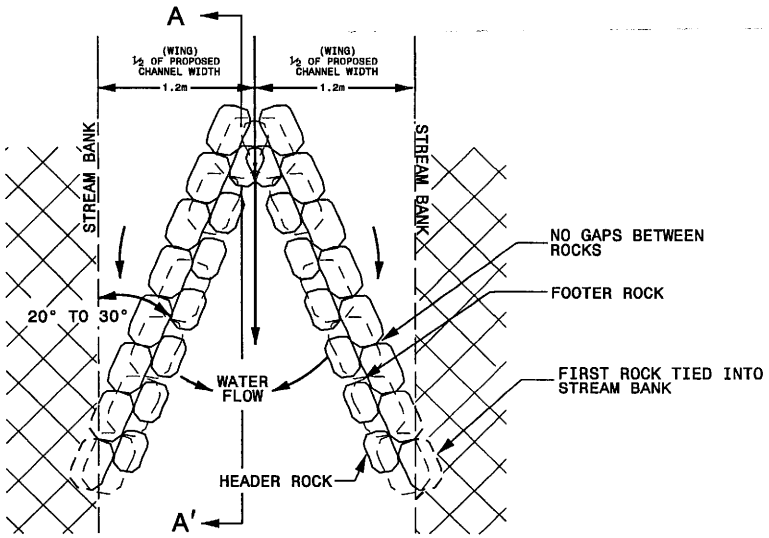
"V" CROSS VANE

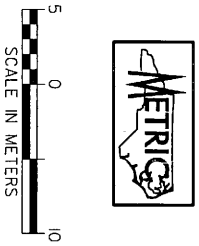
SCALE: NTS

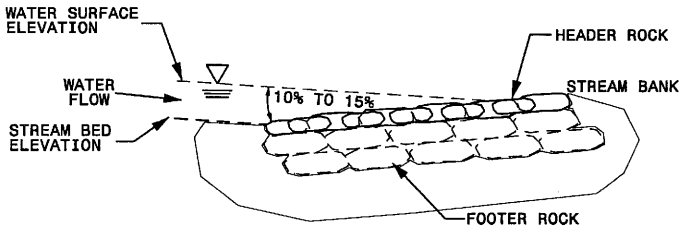


CROSS SECTION

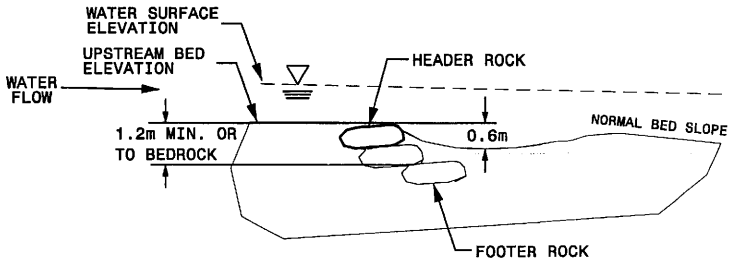
PLAN VIEW







PROFILE VIEW



SECTION A A' VIEW

INSTALLATION OF CROSS VANE

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS, THE CROSS HEADER ROCKS AND AT LEAST 1/3 OF THE WING HEADER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.9m X 0.9m X0.6m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH. IN THE CENTER, OR CROSS, PORTION OF THE CHANNEL, THE HEADER ROCKS SHALL BE PLACED SUCH THAT THE TOP OF THE HEADER ROCK IS PLACED AT AN ELEVATION EQUAL TO THE BED ELEVATION. THE HEADER ROCKS ON THE SIDE, OR WING, PORTION SHALL BE PLACED IN SUCH A MANNER AS THEY SLOPE UP FROM BED ELEVATION AT THE CROSS PORTION TO THE TOP OF THE BANK AT A 10-15% SLOPE.

NORTH CAROLINA
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GUILFORD COUNTY
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US 311 HIGH POINT EAST BELTWAY FROM US 29-70
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SCALE AS SHOWN

SHEET 67 OF 74

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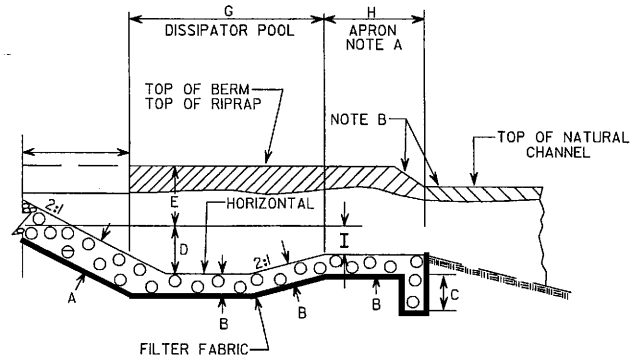
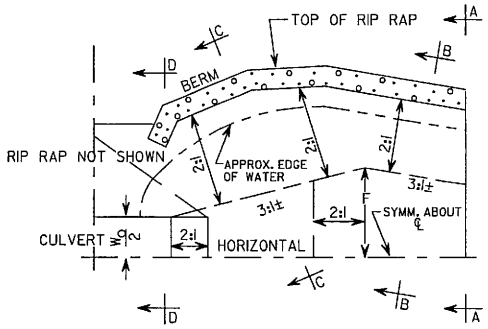
℄ SECTION

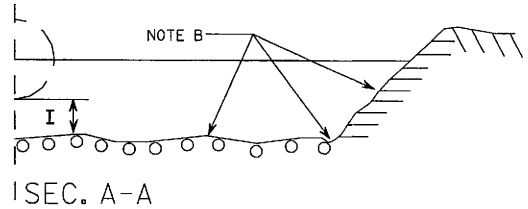


HALF PLAN

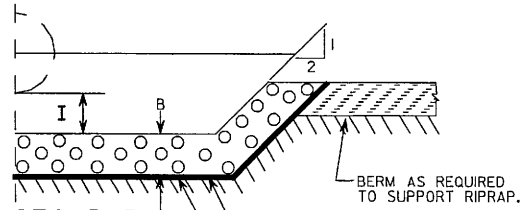


NOTE A IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q_{des} /(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED EXIT VELOCITY.

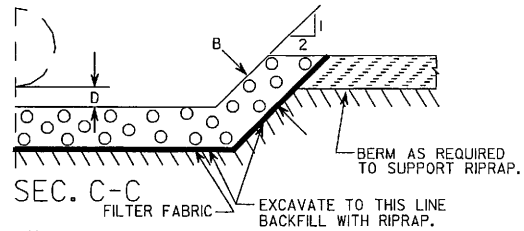
NOTE B WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



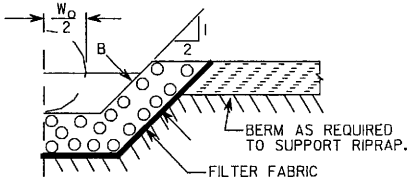
SEC. A-A



SEC. B-B



SEC. C-C



SEC. D-D

NOTE:
W_o = DIAMETER FOR PIPE CULVERT
W_o = BARREL WIDTH FOR BOX CULVERT
W_o = SPAN OF PIPE-ARCH CULVERT

DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	0.68							
B	0.68							
C	0							
D	1.19							
E	0.30							
F	7.95							
G	11.94							
H	5.97							
I	0.55							

ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	13+80 -RP B-
2	
3	
4	
5	
6	
7	
8	

DETAIL OF RIP-RAPPED ENERGY DISSIPATOR BASIN

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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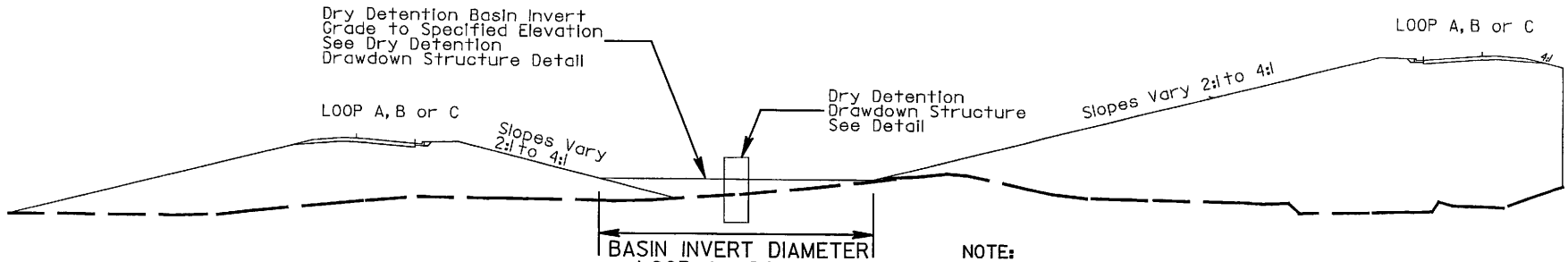
DRY DETENTION BASIN GRADING DETAIL



BASIN INVERT DIAMETER
LOOP A 24M
LOOP B 8M
LOOP C 28M

NOTE:
BASIN NVERT ELEVATIONS HAVE BEEN SET TO PROVIDE 2-3 FEET OF FREEBOARD BETWEEN THE CONTROLLING ROADWAY CENTERLINE ELEVATION AND THE 50 YEAR EVENT. ADJUSTING THE BASIN INVERT OR DRAWDOWN STRUCTURE ELEVATIONS HIGHER THAN INDICATED IN PLANS MAY RESULT IN STORMWATER ENCROACHING INTO THE ROADWAY.

NORTH CAROLINA
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GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
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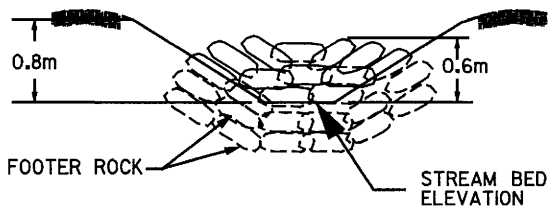
SCALE AS SHOWN

SHEET 66 OF 74

METRIC

ROCK WEIR

SCALE: NTS



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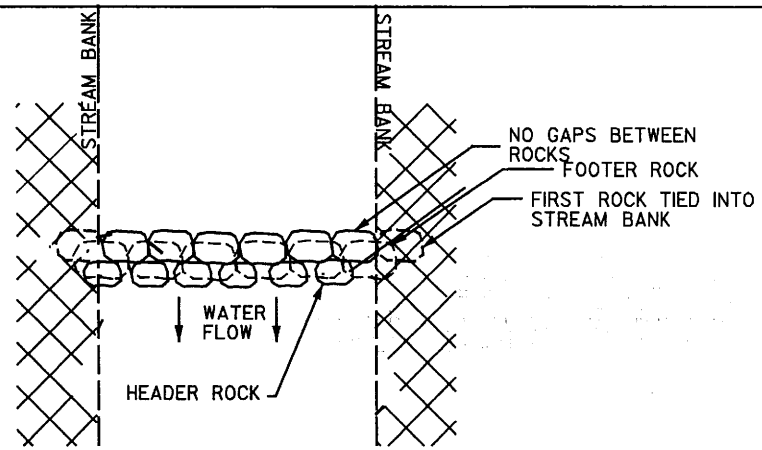
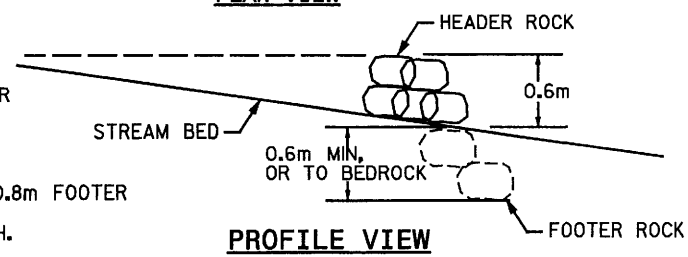


PLAN VIEW



PROFILE VIEW

INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.5m X 0.5m X 0.8m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609A)

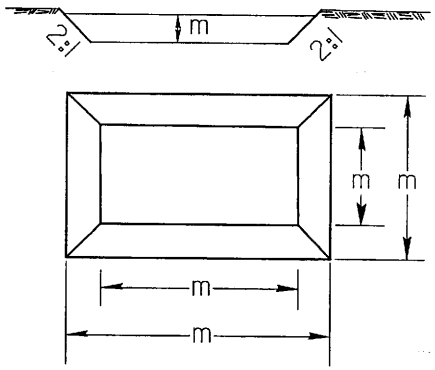
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 70 OF 74

DETAIL OF EMERGENCY SPILL BASIN

TOTAL CAPACITY REQUIRED : cu. m.
TOTAL CAPACITY PROVIDED : cu. m.



Ditch to be blocked with sandbags 1.0 m deep at outlet

STATION	REQ. VOL. (Cu. m.)	DEPTH (m)	BOTTOM LENGTH (m)	BOTTOM WIDTH (m)	TOP LENGTH (m)	TOP WIDTH (m)	PROVIDED VOL (Cu. m.)
FLY 16+20 L	78	1.0	9.0	5.0	13.0	9.0	81
-L- 34+00 R	104	1.0	10.0	7.0	14.0	11.0	112
-L- 35+60 L	158	1.0	11.0	10.0	15.0	14.0	160
-L- 39+90 L	78	1.0	7.0	7.0	11.0	11.0	85
-L- 40+70 L	103	1.0	8.0	8.0	12.0	12.0	104
-L- 50+40 L	396	1.0	20.0	16.0	24.0	20.0	400
-L- 56+00 L	50	1.0	5.0	5.0	9.0	9.0	53
-L- 58+20 R	77	1.0	11.0	4.0	15.0	8.0	82
-Y5- 14+00 R	275	1.0	17.0	13.0	21.0	17.0	289
-Y5- 15+20 R	178	1.0	14.0	9.0	18.0	13.0	180
RAMPB 12+90 R	174	1.0	14.0	9.0	18.0	13.0	180
RAMPD 15+20 R	127	1.0	12.0	7.0	16.0	11.0	130

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 74 OF 74

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Hand Clearing in Wetlands (ha)	Permanent SW Impacts (ha)	Temporary SW Impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacted Temporary (m)	Natural Stream Design (m)
1	12+00 to 12+80 *	750mm			0.017	0.006		0.048				
2	19+30 to 20+40	1350mm						0.013	0.003	140.600	21.0	
3	23+45 to 23+60	450mm	0.011						0.003		21.0	
4	25+65 to 25+95	1350mm	0.066			0.011		0.008	0.006	124.800	50.0	
5	28+00 to 28+30	900mm						0.006	0.001	70.300	15.0	
6 (Main)	31+70 to 33+60	3@3.4m x 2.4m RCBC						0.024		294.600		288.2
6 (Trib 1)	32+00	Stream						0.025		51.200		
6 (Trib 2)	33+00	Stream						0.010		98.500		
7	35+20 to 35+50	600mm						0.004		44.600		
8	40+20 to 40+40	1050mm						0.018		180.000		
9	45+30 to 46+30 **	1 @ 3.7m x 3.7m						0.958				
10 (Trib 1)	48+85 to 50+75	Interchange						0.015		193.200		
10 (Trib 2)	51+20	Interchange						0.002		20.600		
10 (Trib 3)	50+20 to 51+60	Interchange						0.056		560.100		
10 (Trib 4)	900 mm	Interchange						0.027		137.800		
11 (Trib 1)	53+00 to 56+75	Interchange	0.081		0.013	0.014		0.042	0.003	455.600	21.0	
11 (Trib 2)	54+40 to 55+45	Interchange						0.013		133.400		
12	58+20 to 59+00	900mm	0.050			0.002		0.012		118.800		
13	10+20 R -SBCD-	900mm						0.001		1.500		
14	12+80 R -SBCD-	1050						0.001	0.002	31.900	17.0	
15	14+00 -NBCD- **	900 mm						0.108		22.800		
16	10+90 -RPD-	900mm& 1050mm						0.005	0.002	54	20.0	
17	12+20 -Y5-	Roadway Fill	0.005									
TOTALS:			0.212	0.000	0.013	0.028		1.397	0.020	2734.300	165.0	288.2

* Excavation in Pond (0.048 ha)

** Fill in Surface Water (Pond): Site 9 = 0.958 ha; Site 15 = 0.105 ha

Form Revised 3/22/01

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34345.1.1 (R-609IA)
Jan-06
SHEET 72 OF 74

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (Ac)	Temp. Fill In Wetlands (Ac)	Excavation In Wetlands (Ac)	Mechanized Clearing (Method III) (Ac)	Hand Clearing in Wetlands (Ac)	Permanent SW impacts (Ac)	Temp. SW impacts (Ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temporary (ft)	Natural Stream Design (ft)
1	12+00 to 12+80 *	750mm			0.04	0.01		0.12		0		
2	19+30 to 20+40	1350mm						0.03	0.01	461	69	
3	23+45 to 23+60	450mm	0.03						0.01	0	69	
4	25+65 to 25+95	1350mm	0.16			0.03		0.02	0.01	409	164	
5	28+00 to 28+30	900mm						0.01	0.00	231	49	
6 (Main)	31+70 to 33+60	3@3.4m x 2.4m RCBC						0.06		967	0	946
6 (Trib 1)	32+00	Stream						0.06		168	0	
6 (Trib 2)	33+00	Stream						0.02		323	0	
7	35+20 to 35+50	600mm						0.01		146	0	
8	40+20 to 40+40	1050mm						0.04		591	0	
9	45+30 to 46+30 **	1 @ 3.7m x 3.7m						2.37		0		
10 (Trib 1)	48+85 to 50+75	Interchange						0.04		634	0	
10 (Trib 2)	51+20	Interchange						0.00		68	0	
10 (Trib 3)	50+20 to 51+60	Interchange						0.14		1838	0	
10 (Trib 4)	50+70 to 51+90	Interchange						0.07		452	0	
11 (Trib 1)	53+00 to 56+75	Interchange	0.20		0.030	0.04		0.10	0.01	1495	69	
11 (Trib 2)	54+40 to 55+45	Interchange						0.03		438	0	
12	58+20 to 59+00	900mm	0.12					0.03		390	0	
13	10+20 R -SBCD-	900mm						0.00		5	0	
14	12+80 R -SBCD-	1050						0.00	0.00	105	56	
15	14+00 -NBCD- **	900 mm						0.27		75	0	
16	10+90 -RPD-	900mm& 1050mm						0.01	0.00	177	66	
17	12+20 -Y5-	Roadway Fill	0.012					0.00		0	0	
TOTALS:			0.52	0.00	0.03	0.07		3.43	0.04	8971	541	946

* Excavation in Pond (0.12 ac)

** Fill in Surface Water (Pond): Site 9 = 2.37 ac; Site 15 = 0.026 ac)

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34345.1.1 (R-609IA)

Jan-06

Form Revised 3/22/01

SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
1	M.C. DEVELOPMENT COMPANY	P.O. BOX 506 HIGH POINT,NC 27263	1
2	ALLEN J. BODENHEIMER	400 FORESTDALE DR JAMESTOWN,NC 27282	1
3	BEVERLY B. CAUDLE	1308 COX AVE HIGH POINT,NC 27263	2
4	NCDOT	P.O. BOX 14996 GREENSBORO,NC 27145	3,4,5,8,12
5	CLIFFORD L. HILL	RT. 4 BOX 345 HIGH POINT,NC 27263	6
6	VIRGINIA HUBBARD	1566 KERSEY VALLEY RD HIGH POINT,NC 27263	6
7	MARJORIE SURRETT	6802 DRESDEN RD HIGH POINT,NC 27263	7
8	FRANK MARTINEZ	1539 KERSEY VALLEY RD HIGH POINT,NC 27263	9
9	BOBBY L. CECIL	1119 LIBERTY RD ARCGDALE,NC 27263	10
10	GLENN P. MORGAN	6027 CHECKER RD HIGH POINT,NC 27263	11
11	LILLIE L. CRUTHIS	6027 CHECKER RD HIGH POINT,NC 27263	11
12	LAWRENCE E. MODLIN	6132 CHECKER RD HIGH POINT,NC 27263	11 & 16
13	ROBERT WARD	3001 ALAMANCE RD GEENSBORO,NC 27407	1
14	WALTER DANIEL	1620 EASTCHESTER DR HIGH POINT,NC 27263	2
15	THOMAS RAGSDALE	P.O. BOX 757 JAMESTOWN,NC 27282	5
16	CHARLES BOYD	1553 KERSEY VALLEY RD HIGH POINT,NC 27263	8
17	MR. FOSTER	6861 DRESDEN RD HIGH POINT,NC 27263	10
18	W. GERALD LEONARD	6801 JOPLIN RD HIGH POINT,NC 27263	15
19	ROBERT L. SLATE		16

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 74 OF 74

8/12/2005
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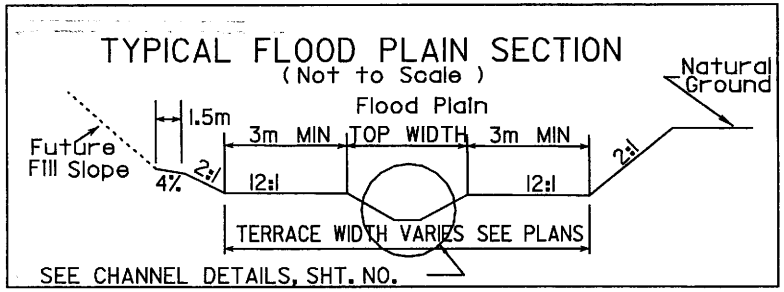
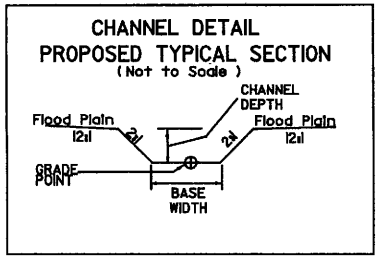
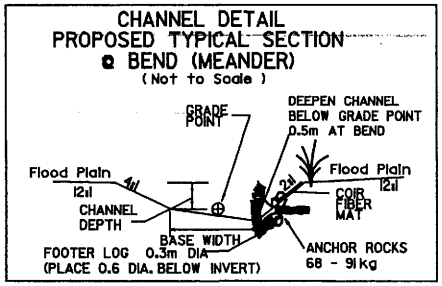
NATURAL CHANNEL DESIGN TYPICALS





TYPICAL SECTION 1 BETWEEN BENDS



TYPICAL SECTION 2 AT BENDS

NOTES:

NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE

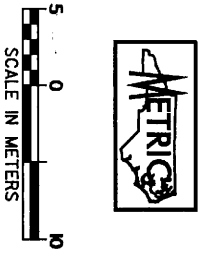
NUMBER OF LOW STAGE CHECK DAMS TO BE DETERMINED ON SITE

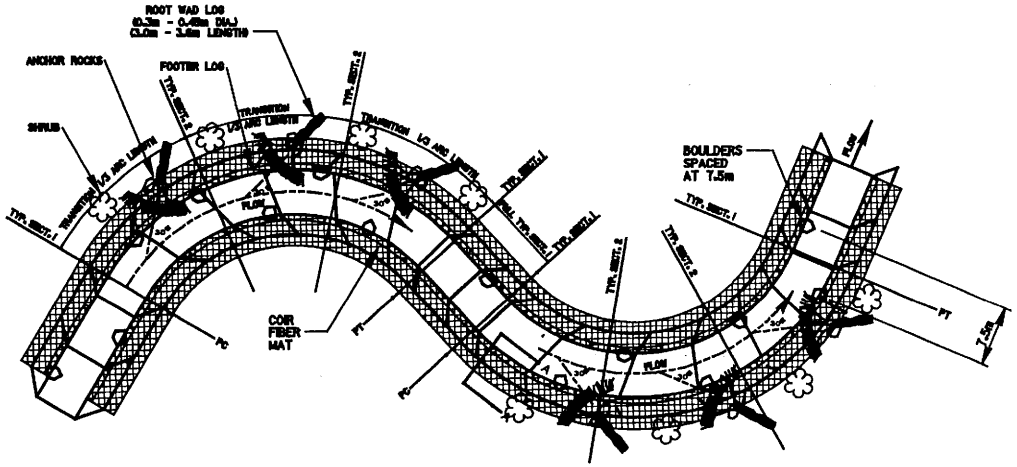
ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE

FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE CHANNEL.

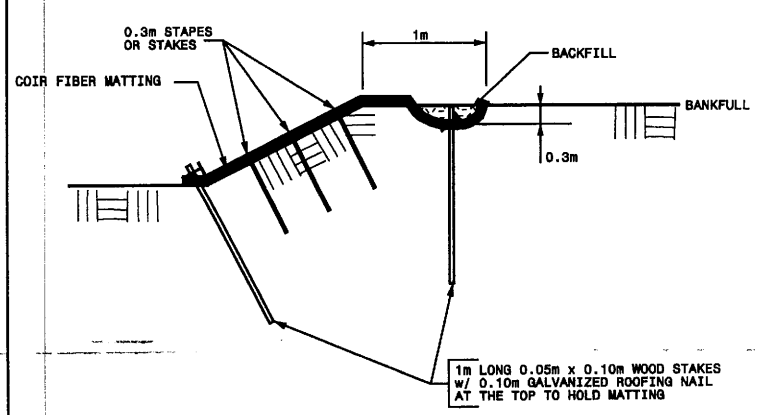
WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, ROOTWAD LOGS AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH





CHANNEL PLAN VIEW



SECTION A-A

NOTES:
1. USE WOOD STAKES (NOT METAL) FOR MATTING INSTALLED IN PUMP AROUNDS OR IN THE WET.
2. USE OF METAL STAPLES IS ACCEPTABLE WHEN CONSTRUCTING IN THE DRY AND VEGETATION IS ESTABLISHED PRIOR TO DIVERTING WATER.

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

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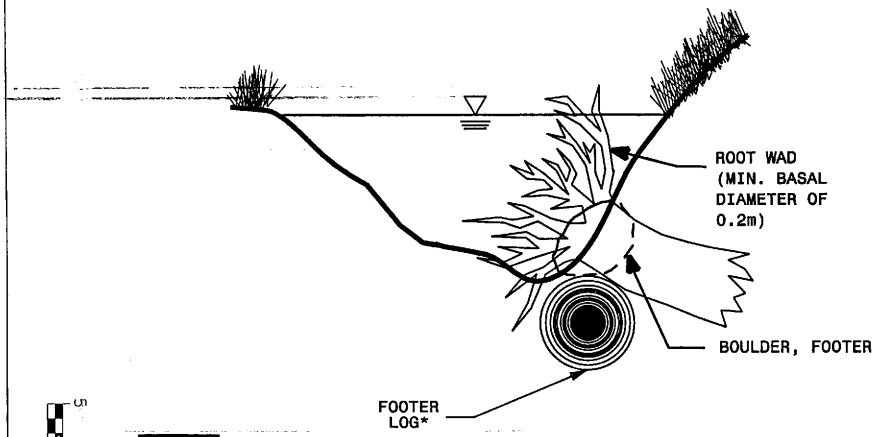
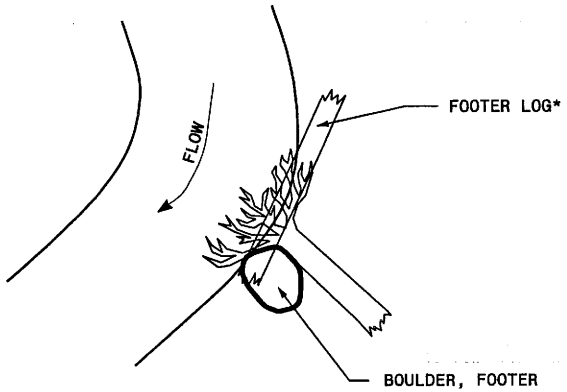
US 311 HIGH POINT EAST BELTWAY FROM US 29-70 TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

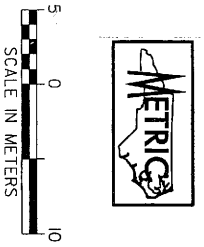
SHEET 59 OF 74



CROSS SECTION



PLAN VIEW



*FOOTER LOGS SHALL HAVE A MINIMUM BASAL DIAMETER OF 0.2m AND HAVE A LENGTH OF 2.1m -3.0m.

ROOT WAD

SCALE: NTS

PLACEMENT OF ROOT WAD STRUCTURES

A TRENCH SHALL BE DUG ALONG THE TOE OF THE BANK TO A DEPTH OF ½ THE DIAMETER OF THE FOOTER LOG. A PRUNED FOOTER LOG SHALL BE PLACED AT THE TOE OF THE CHANNEL AND THE ROOT WAD SHALL BE PLACED DIRECTLY ABOVE IT. THE ROOT MASS SHALL BE ORIENTED IN SUCH A WAY THAT THE VELOCITY VECTORS OF THE WATER WILL INTERSECT THE ROOT MASS AT A 90-DEGREE ANGLE. THERE SHALL BE NO VOID BETWEEN THE ROOT MASS AND THE BANK ON THE UPSTREAM SIDE OF THE CHANNEL. A BOULDER SHALL BE PLACED ON THE DOWNSTREAM SIDE BETWEEN THE ROOT MASS AND THE BANK TO PROVIDE EROSION CONTROL. THE BOULDER, FOOTER SHALL BE APPROXIMATELY 0.9m X 0.9m X 0.6m.

THE PREFERRED METHOD FOR INSTALLATION OF A ROOT WAD IS TO DRIVE THE SHARPENED TRUNK OF THE ROOT WAD INTO THE STREAMBANK USING A BACKHOE. IF IT IS DEEMED NOT POSSIBLE TO DRIVE THE TRUNK INTO THE BANK, A TRENCH SHALL BE DUG IN THE BANK AND THE TRUNK SHALL BE PLACED IN THE TRENCH. THE TRENCH SHALL BE BACK FILLED AND COMPACTED.

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GUILFORD COUNTY
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SCALE AS SHOWN

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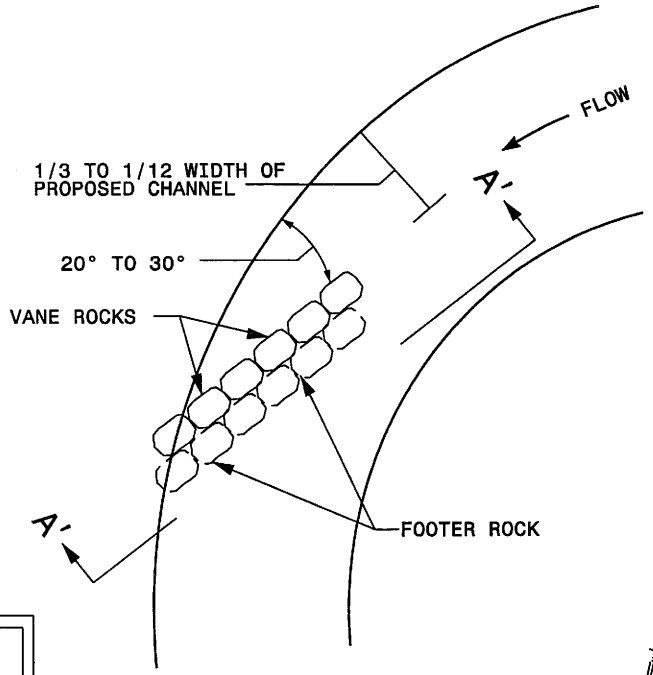
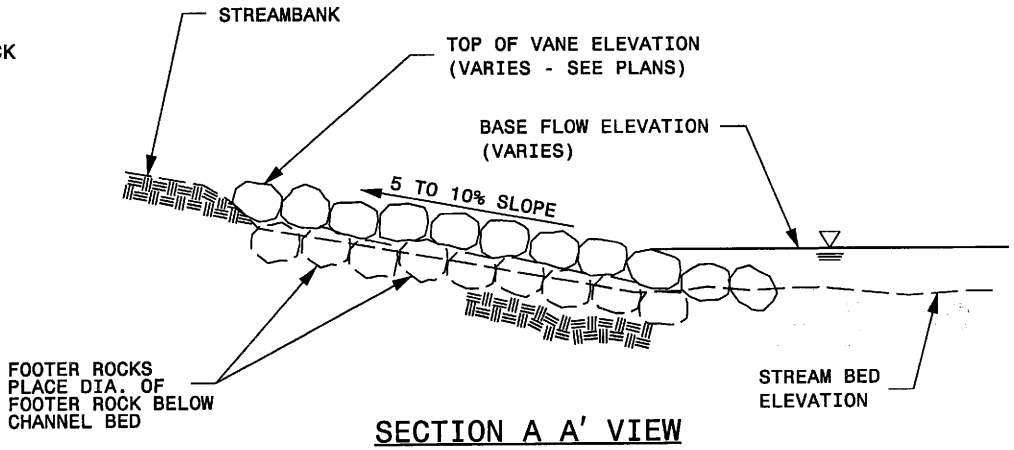


PLAN VIEW

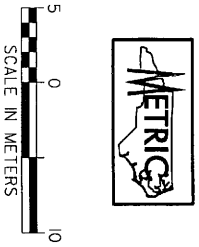


SECTION A A' VIEW

NOTE: ALL ROCKS OR STONE ARE NATURAL STONE BOULDERS

ROCK VANE

SCALE: NTS



NORTH CAROLINA
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GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
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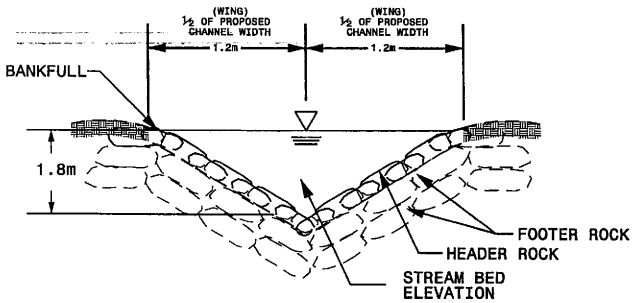
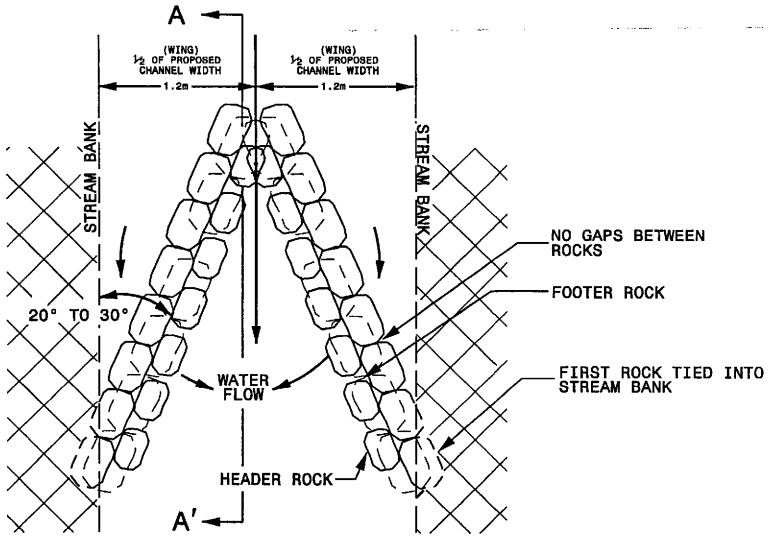
"V" CROSS VANE

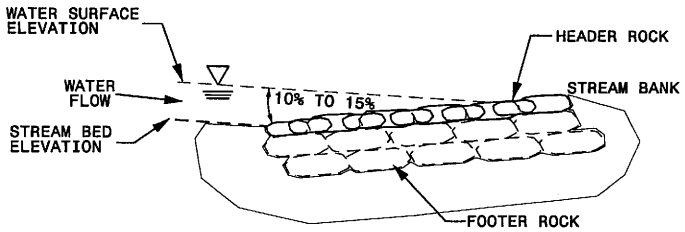
SCALE: NTS



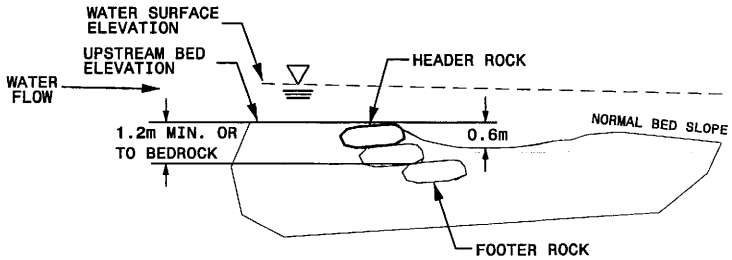
CROSS SECTION

PLAN VIEW





PROFILE VIEW



SECTION A A' VIEW

INSTALLATION OF CROSS VANE

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS, THE CROSS HEADER ROCKS AND AT LEAST 1/3 OF THE WING HEADER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.9m X 0.9m X0.6m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH. IN THE CENTER, OR CROSS, PORTION OF THE CHANNEL, THE HEADER ROCKS SHALL BE PLACED SUCH THAT THE TOP OF THE HEADER ROCK IS PLACED AT AN ELEVATION EQUAL TO THE BED ELEVATION. THE HEADER ROCKS ON THE SIDE, OR WING, PORTION SHALL BE PLACED IN SUCH A MANNER AS THEY SLOPE UP FROM BED ELEVATION AT THE CROSS PORTION TO THE TOP OF THE BANK AT A 10-15% SLOPE.

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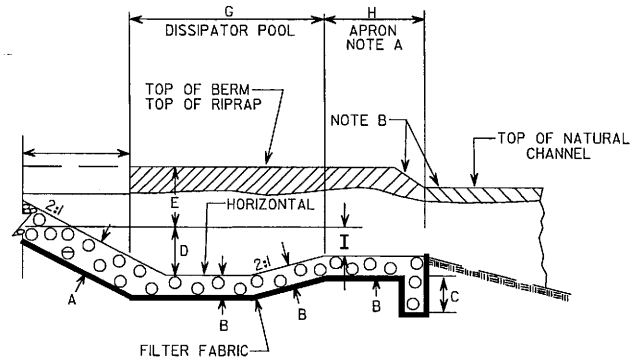
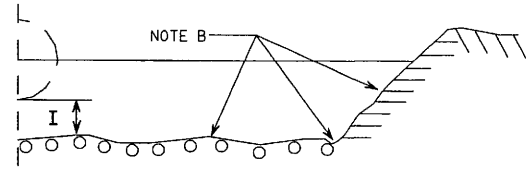
℄ SECTION



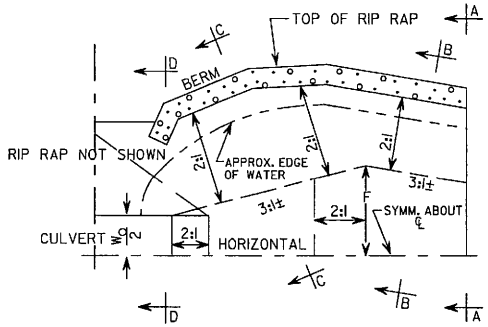
NOTE A IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q_{des} /(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED EXIT VELOCITY.

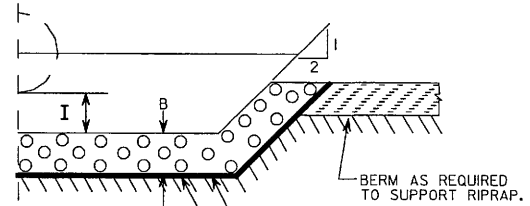
NOTE B WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



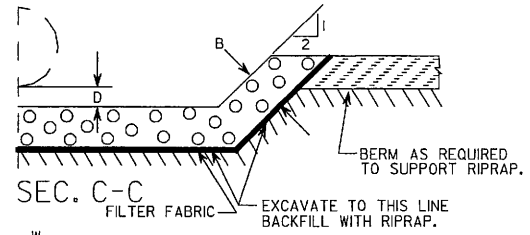
SEC. A-A

HALF PLAN

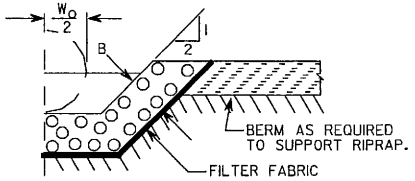




SEC. B-B



SEC. C-C



SEC. D-D

NOTE:
W_o = DIAMETER FOR PIPE CULVERT
W_o = BARREL WIDTH FOR BOX CULVERT
W_o = SPAN OF PIPE-ARCH CULVERT

DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	0.68							
B	0.68							
C	0							
D	1.19							
E	0.30							
F	7.95							
G	11.94							
H	5.97							
I	0.55							

ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	13+80 -RP B-
2	
3	
4	
5	
6	
7	
8	

DETAIL OF RIP-RAPPED ENERGY DISSIPATOR BASIN

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
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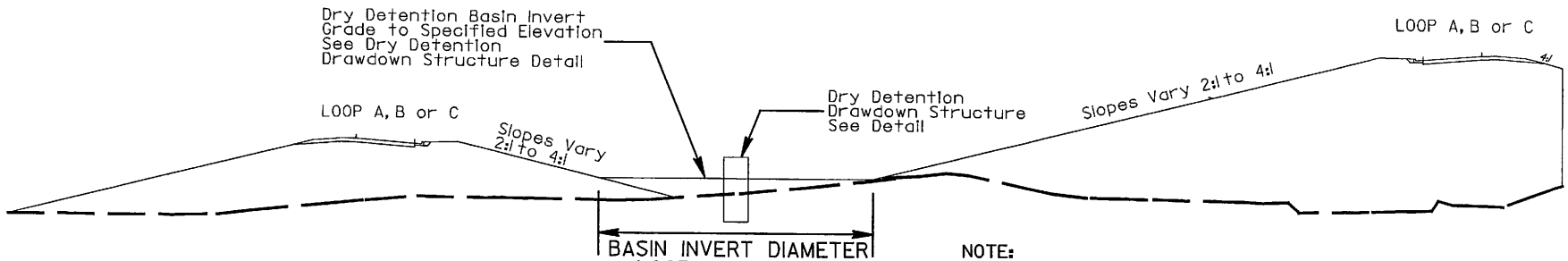
DRY DETENTION BASIN GRADING DETAIL



BASIN INVERT DIAMETER
LOOP A 24M
LOOP B 8M
LOOP C 28M

NOTE:
BASIN NVERT ELEVATIONS HAVE BEEN SET TO PROVIDE 2-3 FEET OF FREEBOARD BETWEEN THE CONTROLLING ROADWAY CENTERLINE ELEVATION AND THE 50 YEAR EVENT. ADJUSTING THE BASIN INVERT OR DRAWDOWN STRUCTURE ELEVATIONS HIGHER THAN INDICATED IN PLANS MAY RESULT IN STORMWATER ENCROACHING INTO THE ROADWAY.

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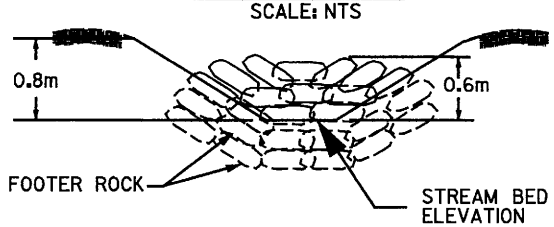
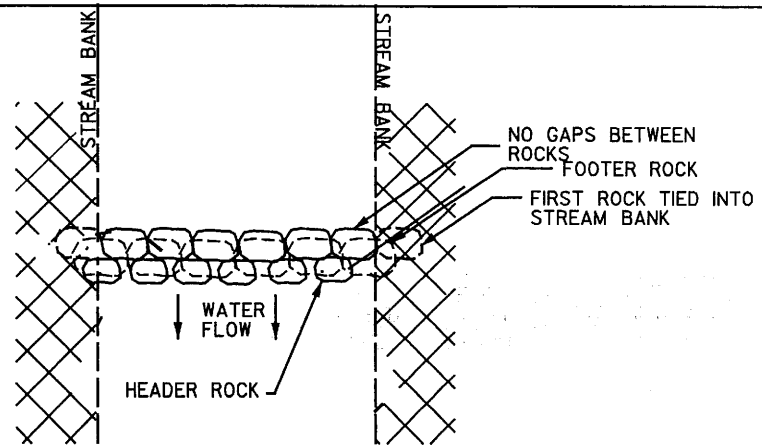
ROCK WEIR

SCALE: NTS



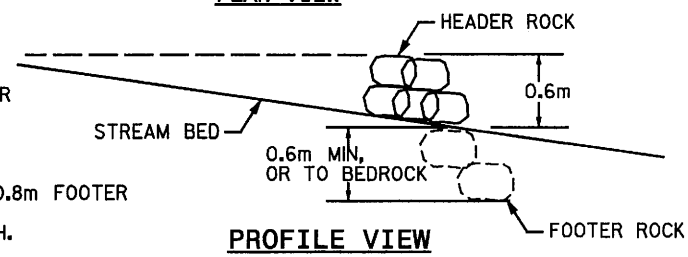
CROSS SECTION



PLAN VIEW

INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.5m X 0.5m X 0.8m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.



PROFILE VIEW

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570801 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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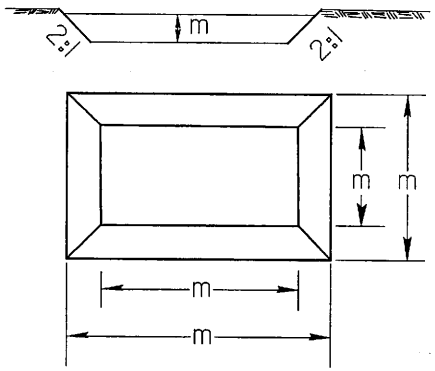
DETAIL OF EMERGENCY SPILL BASIN

TOTAL CAPACITY REQUIRED : cu. m.
TOTAL CAPACITY PROVIDED : cu. m.



Ditch to be blocked with sandbags 1.0 m deep at outlet

STATION	REQ. VOL. (Cu. m.)	DEPTH (m)	BOTTOM LENGTH (m)	BOTTOM WIDTH (m)	TOP LENGTH (m)	TOP WIDTH (m)	PROVIDED VOL (Cu. m.)
FLY 16+20 L	78	1.0	9.0	5.0	13.0	9.0	81
-L- 34+00 R	104	1.0	10.0	7.0	14.0	11.0	112
-L- 35+60 L	158	1.0	11.0	10.0	15.0	14.0	160
-L- 39+90 L	78	1.0	7.0	7.0	11.0	11.0	85
-L- 40+70 L	103	1.0	8.0	8.0	12.0	12.0	104
-L- 50+40 L	396	1.0	20.0	16.0	24.0	20.0	400
-L- 56+00 L	50	1.0	5.0	5.0	9.0	9.0	53
-L- 58+20 R	77	1.0	11.0	4.0	15.0	8.0	82
-Y5- 14+00 R	275	1.0	17.0	13.0	21.0	17.0	289
-Y5- 15+20 R	178	1.0	14.0	9.0	18.0	13.0	180
RAMPB 12+90 R	174	1.0	14.0	9.0	18.0	13.0	180
RAMPD 15+20 R	127	1.0	12.0	7.0	16.0	11.0	130

METRIC

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SCALE AS SHOWN

SHEET 71 OF 74

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Hand Clearing in Wetlands (ha)	Permanent SW Impacts (ha)	Temporary SW Impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacted Temporary (m)	Natural Stream Design (m)
1	12+00 to 12+80 *	750mm			0.017	0.006		0.048				
2	19+30 to 20+40	1350mm						0.013	0.003	140.600	21.0	
3	23+45 to 23+60	450mm	0.011						0.003		21.0	
4	25+65 to 25+95	1350mm	0.066			0.011		0.008	0.006	124.800	50.0	
5	28+00 to 28+30	900mm						0.006	0.001	70.300	15.0	
6 (Main)	31+70 to 33+60	3@3.4m x 2.4m RCBC						0.024		294.600		288.2
6 (Trib 1)	32+00	Stream						0.025		51.200		
6 (Trib 2)	33+00	Stream						0.010		98.500		
7	35+20 to 35+50	600mm						0.004		44.600		
8	40+20 to 40+40	1050mm						0.018		180.000		
9	45+30 to 46+30 **	1 @ 3.7m x 3.7m						0.958				
10 (Trib 1)	48+85 to 50+75	Interchange						0.015		193.200		
10 (Trib 2)	51+20	Interchange						0.002		20.600		
10 (Trib 3)	50+20 to 51+60	Interchange						0.056		560.100		
10 (Trib 4)	900 mm	Interchange						0.027		137.800		
11 (Trib 1)	53+00 to 56+75	Interchange	0.081		0.013	0.014		0.042	0.003	455.600	21.0	
11 (Trib 2)	54+40 to 55+45	Interchange						0.013		133.400		
12	58+20 to 59+00	900mm	0.050			0.002		0.012		118.800		
13	10+20 R -SBCD-	900mm						0.001		1.500		
14	12+80 R -SBCD-	1050						0.001	0.002	31.900	17.0	
15	14+00 -NBCD- **	900 mm						0.108		22.800		
16	10+90 -RPD-	900mm& 1050mm						0.005	0.002	54	20.0	
17	12+20 -Y5-	Roadway Fill	0.005									
TOTALS:			0.212	0.000	0.013	0.028		1.397	0.020	2734.300	165.0	288.2

* Excavation in Pond (0.048 ha)

** Fill in Surface Water (Pond): Site 9 = 0.958 ha; Site 15 = 0.105 ha

Form Revised 3/22/01

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34345.1.1 (R-609IA)
Jan-06
SHEET 72 OF 74

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (Ac)	Temp. Fill In Wetlands (Ac)	Excavation In Wetlands (Ac)	Mechanized Clearing (Method III) (Ac)	Hand Clearing in Wetlands (Ac)	Permanent SW impacts (Ac)	Temp. SW impacts (Ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temporary (ft)	Natural Stream Design (ft)
1	12+00 to 12+80 *	750mm			0.04	0.01		0.12		0		
2	19+30 to 20+40	1350mm						0.03	0.01	461	69	
3	23+45 to 23+60	450mm	0.03						0.01	0	69	
4	25+65 to 25+95	1350mm	0.16			0.03		0.02	0.01	409	164	
5	28+00 to 28+30	900mm						0.01	0.00	231	49	
6 (Main)	31+70 to 33+60	3@3.4m x 2.4m RCBC						0.06		967	0	946
6 (Trib 1)	32+00	Stream						0.06		168	0	
6 (Trib 2)	33+00	Stream						0.02		323	0	
7	35+20 to 35+50	600mm						0.01		146	0	
8	40+20 to 40+40	1050mm						0.04		591	0	
9	45+30 to 46+30 **	1 @ 3.7m x 3.7m						2.37		0		
10 (Trib 1)	48+85 to 50+75	Interchange						0.04		634	0	
10 (Trib 2)	51+20	Interchange						0.00		68	0	
10 (Trib 3)	50+20 to 51+60	Interchange						0.14		1838	0	
10 (Trib 4)	50+70 to 51+90	Interchange						0.07		452	0	
11 (Trib 1)	53+00 to 56+75	Interchange	0.20		0.030	0.04		0.10	0.01	1495	69	
11 (Trib 2)	54+40 to 55+45	Interchange						0.03		438	0	
12	58+20 to 59+00	900mm	0.12					0.03		390	0	
13	10+20 R -SBCD-	900mm						0.00		5	0	
14	12+80 R -SBCD-	1050						0.00	0.00	105	56	
15	14+00 -NBCD- **	900 mm						0.27		75	0	
16	10+90 -RPD-	900mm& 1050mm						0.01	0.00	177	66	
17	12+20 -Y5-	Roadway Fill	0.012					0.00		0	0	
TOTALS:			0.52	0.00	0.03	0.07		3.43	0.04	8971	541	946

* Excavation in Pond (0.12 ac)

** Fill in Surface Water (Pond): Site 9 = 2.37 ac; Site 15 = 0.026 ac)

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 34345.1.1 (R-609IA)

Jan-06

Form Revised 3/22/01

SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
1	M.C. DEVELOPMENT COMPANY	P.O. BOX 506 HIGH POINT,NC 27263	1
2	ALLEN J. BODENHEIMER	400 FORESTDALE DR JAMESTOWN,NC 27282	1
3	BEVERLY B. CAUDLE	1308 COX AVE HIGH POINT,NC 27263	2
4	NCDOT	P.O. BOX 14996 GREENSBORO,NC 27145	3,4,5,8,12
5	CLIFFORD L. HILL	RT. 4 BOX 345 HIGH POINT,NC 27263	6
6	VIRGINIA HUBBARD	1566 KERSEY VALLEY RD HIGH POINT,NC 27263	6
7	MARJORIE SURRETT	6802 DRESDEN RD HIGH POINT,NC 27263	7
8	FRANK MARTINEZ	1539 KERSEY VALLEY RD HIGH POINT,NC 27263	9
9	BOBBY L. CECIL	1119 LIBERTY RD ARCGDALE,NC 27263	10
10	GLENN P. MORGAN	6027 CHECKER RD HIGH POINT,NC 27263	11
11	LILLIE L. CRUTHIS	6027 CHECKER RD HIGH POINT,NC 27263	11
12	LAWRENCE E. MODLIN	6132 CHECKER RD HIGH POINT,NC 27263	11 & 16
13	ROBERT WARD	3001 ALAMANCE RD GEENSBORO,NC 27407	1
14	WALTER DANIEL	1620 EASTCHESTER DR HIGH POINT,NC 27263	2
15	THOMAS RAGSDALE	P.O. BOX 757 JAMESTOWN,NC 27282	5
16	CHARLES BOYD	1553 KERSEY VALLEY RD HIGH POINT,NC 27263	8
17	MR. FOSTER	6861 DRESDEN RD HIGH POINT,NC 27263	10
18	W. GERALD LEONARD	6801 JOPLIN RD HIGH POINT,NC 27263	15
19	ROBERT L. SLATE		16

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 74 OF 74

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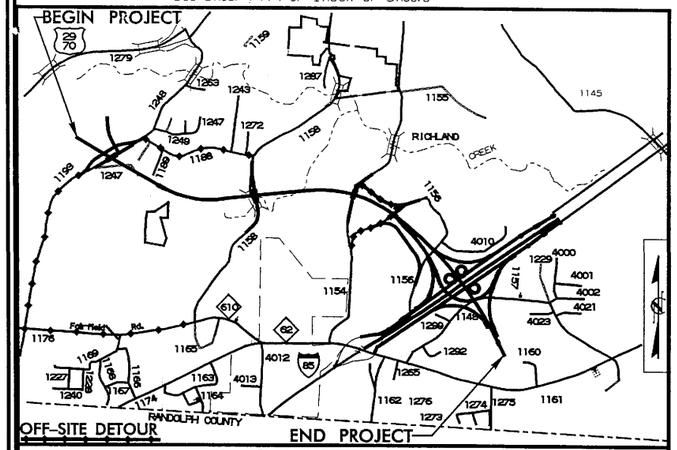
CONTRACT: 34345.1.1 TIP: R-0609IA

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

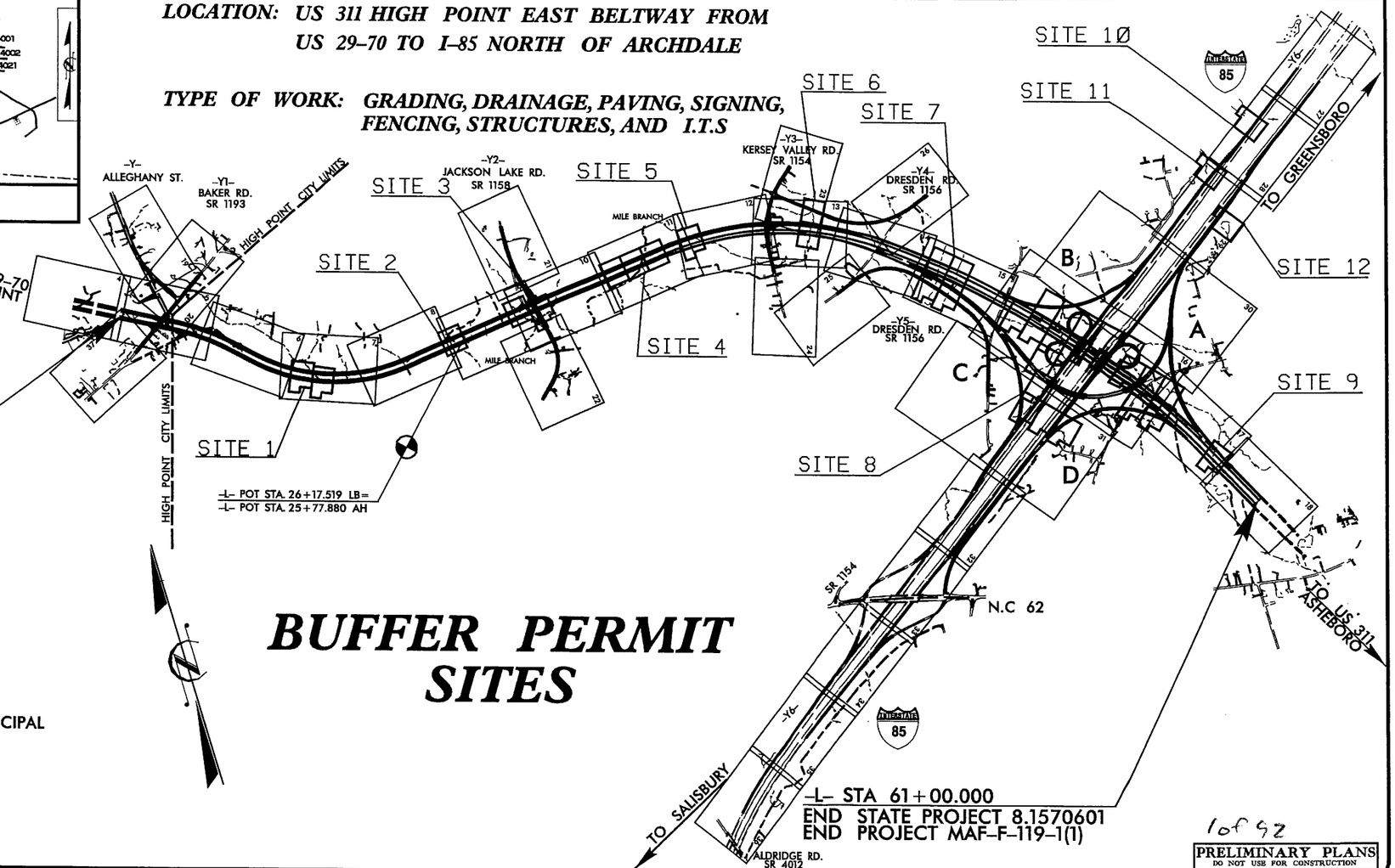
LOCATION: US 311 HIGH POINT EAST BELTWAY FROM US 29-70 TO I-85 NORTH OF ARCHDALE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, FENCING, STRUCTURES, AND I.T.S

METRIC
ALL DIMENSIONS IN THESE PLANS ARE IN METERS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IA	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34345.1.1	MAF-F-119-1(1)	PE
34345.2.7	STP-NHF-119-1(11)	ROW & UTILITIES



-L- STA 11+98.805
BEGIN STATE PROJECT 8.1570601
BEGIN PROJECT MAF-F-119-1(1)

-L- POT STA. 26+17.519 LB=
-L- POT STA. 25+77.880 AH

BUFFER PERMIT SITES

-L- STA 61+00.000
END STATE PROJECT 8.1570601
END PROJECT MAF-F-119-1(1)

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HIGH POINT

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

CLEARING ON THIS PROJECT SHALL BE PREFORMED TO THE LIMITS ESTABLISHED BY METHOD (III)

1 of 92

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES
5 0 10 PLANS
5 0 10 PROFILE (HORIZONTAL)
1 0 2 PROFILE (VERTICAL)

DESIGN DATA

ADT 2005	=	27,000
ADT 2025	=	39,000
DHV	=	10 %
D	=	60 %
T	=	13 % *
V	=	110 km/h

* TTST 7 % DUAL 6 %
FUNC CLASS - FREEWAY

PROJECT LENGTH

LENGTH ROADWAY F.A PROJECT MAF-F-119-1(1) =	4.901 KM
LENGTH STRUCTURE F.A PROJECT MAF-F-119-1(1) =	KM
TOTAL LENGTH STATE PROJECT 8.1570601 =	4.901 KM

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER, 2003

LETTING DATE: MARCH 15, 2005

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

STEVE KENDALL
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

9/09/99
1/19/2006
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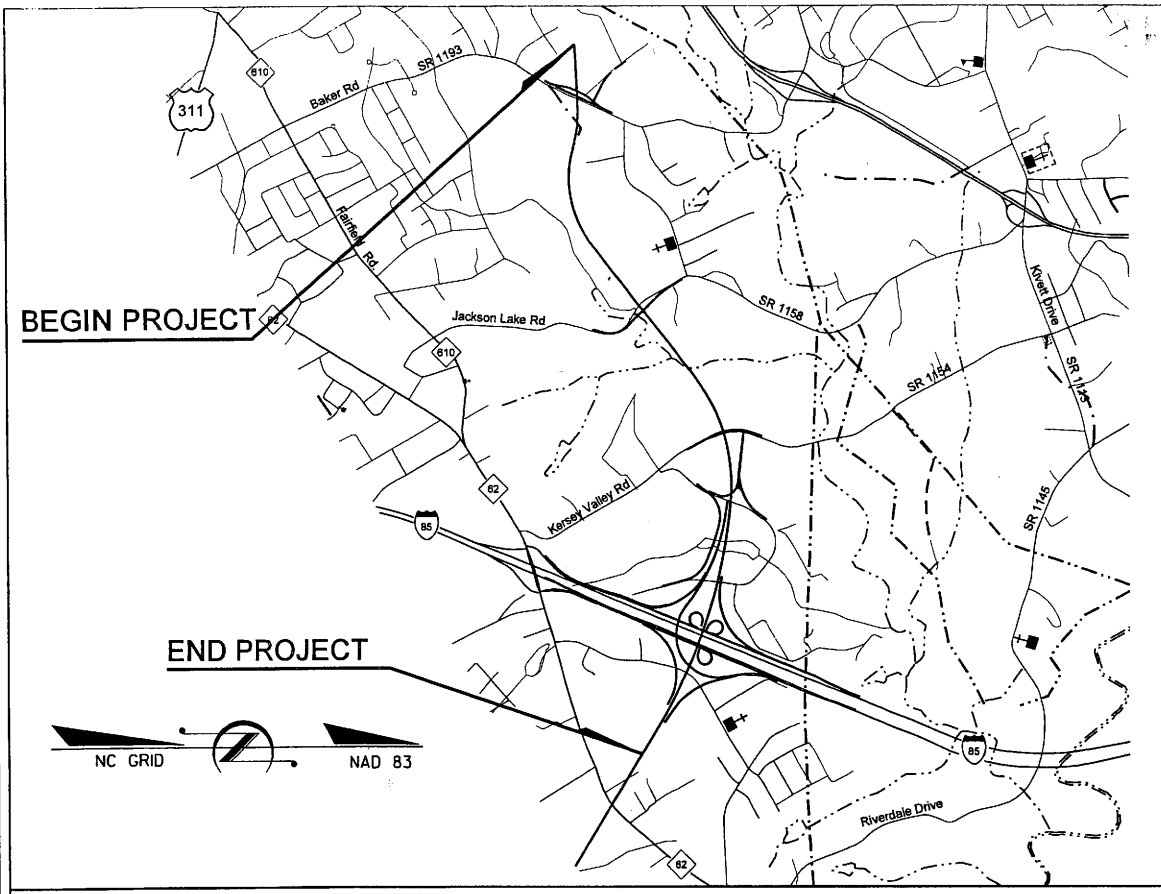
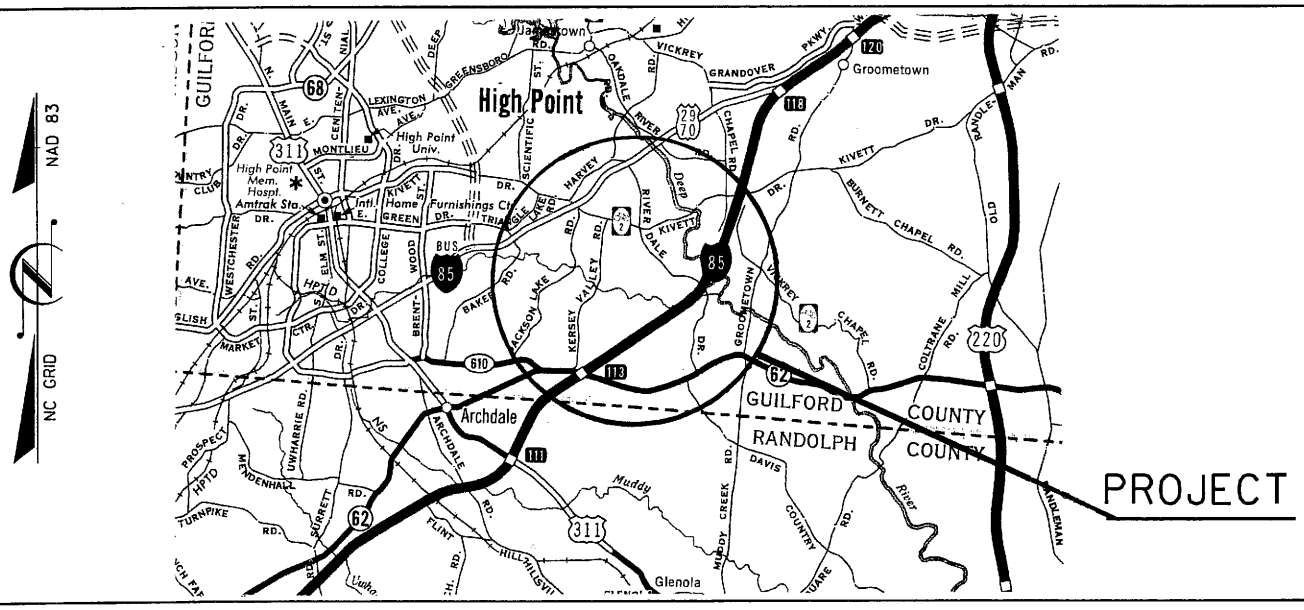


PORTION OF GUILFORD COUNTY MAP



PORTION OF STATE MAP

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 2 OF 12

BUFFER IMPACTS

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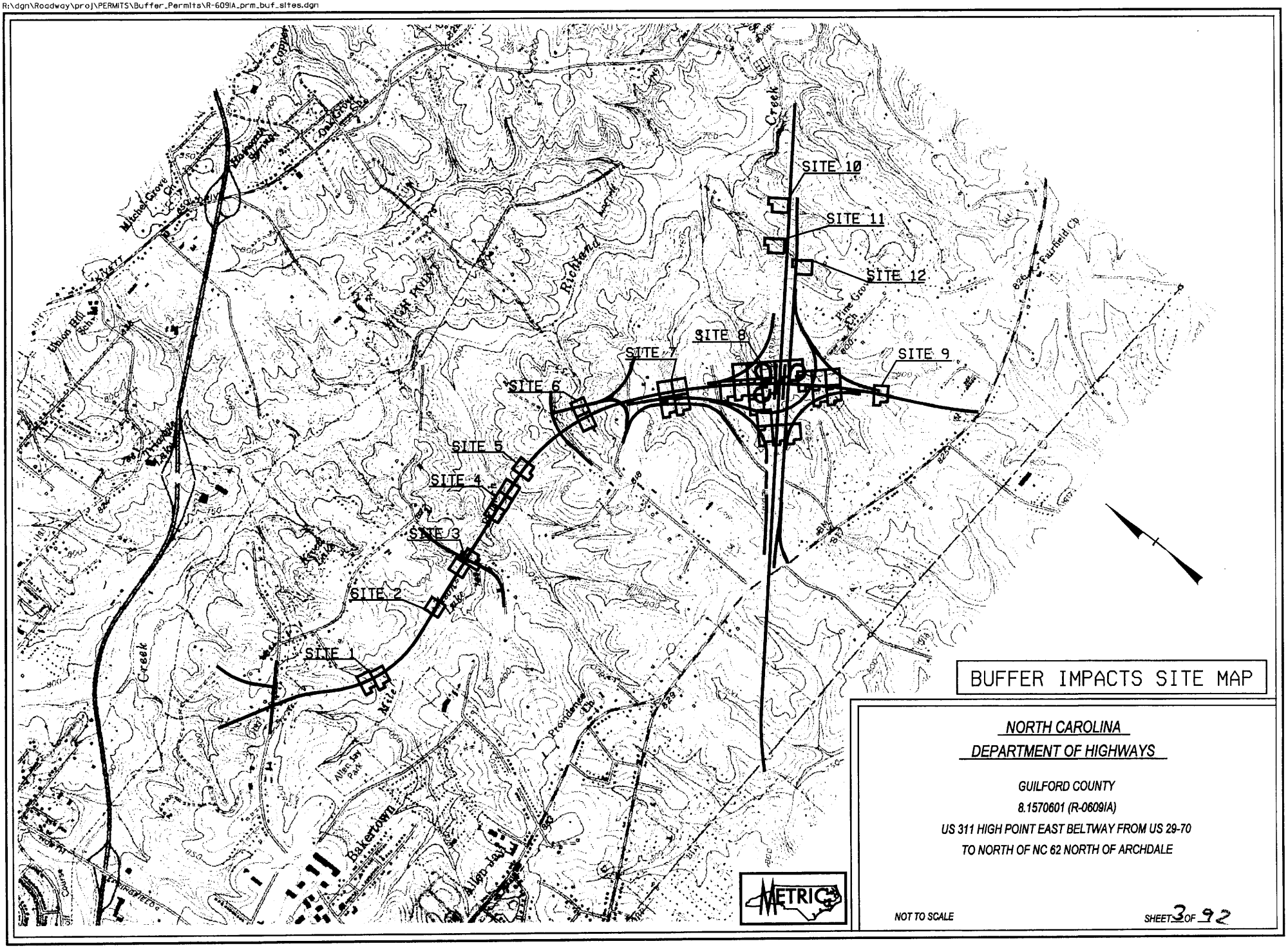

BUFFER IMPACTS SITE MAP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

NOT TO SCALE

SHEET 3 OF 92

BUFFER LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

— RBZ — RIPARIAN BUFFER ZONE

— RBZ1 — RIPARIAN BUFFER ZONE 1
30 ft (9.2m)

— RBZ2 — RIPARIAN BUFFER ZONE 2
20 ft (6.1m)

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

— NG — NATURAL GROUND

PL — PROPERTY LINE

— TDE — TEMP. DRAINAGE EASEMENT

— PDE — PERMANENT DRAINAGE EASEMENT

— EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

— EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTING STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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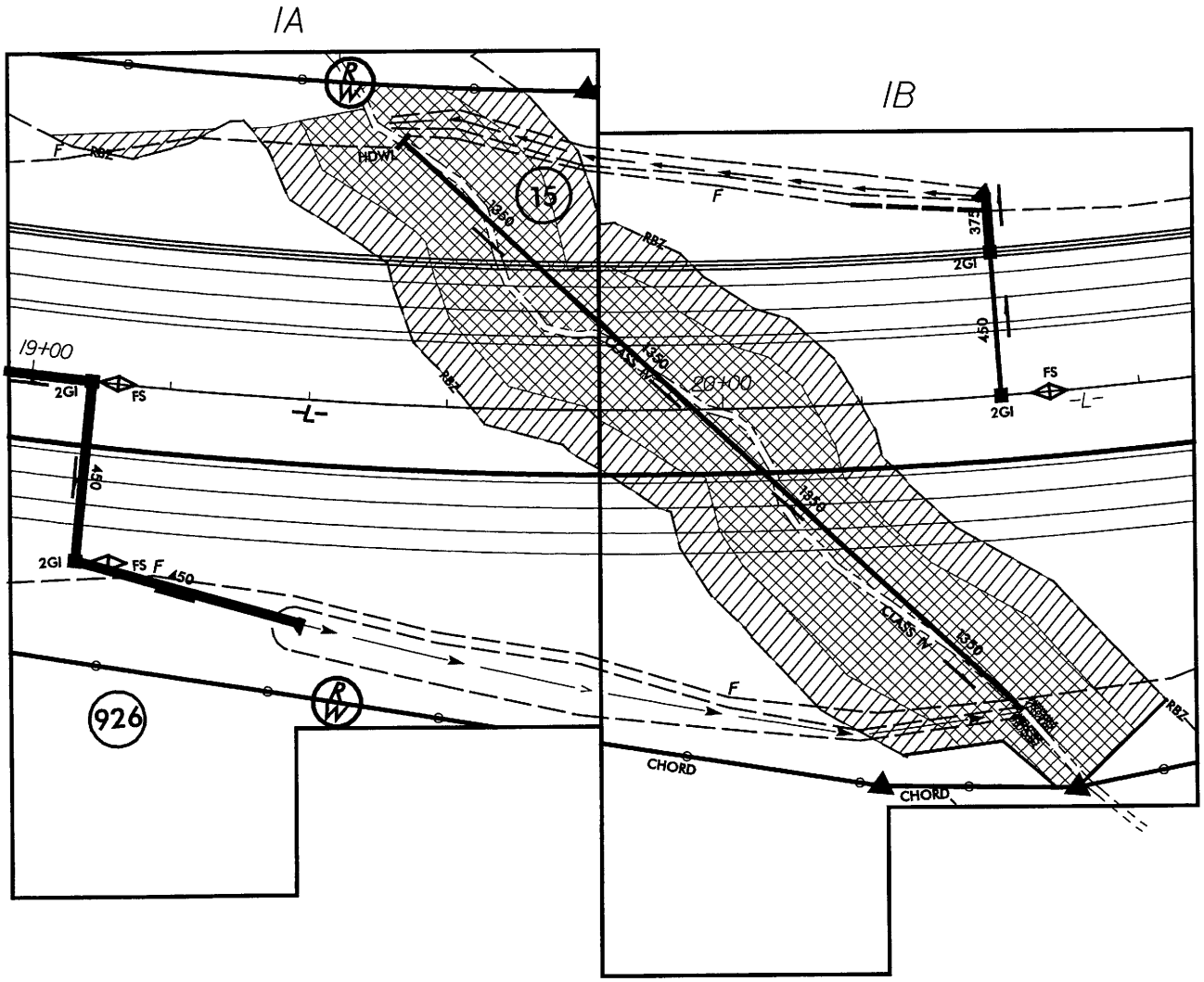

SHEET LAYOUT
PLAN VIEW
SITE I

METRIC

10 0 20
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 5 OF 92

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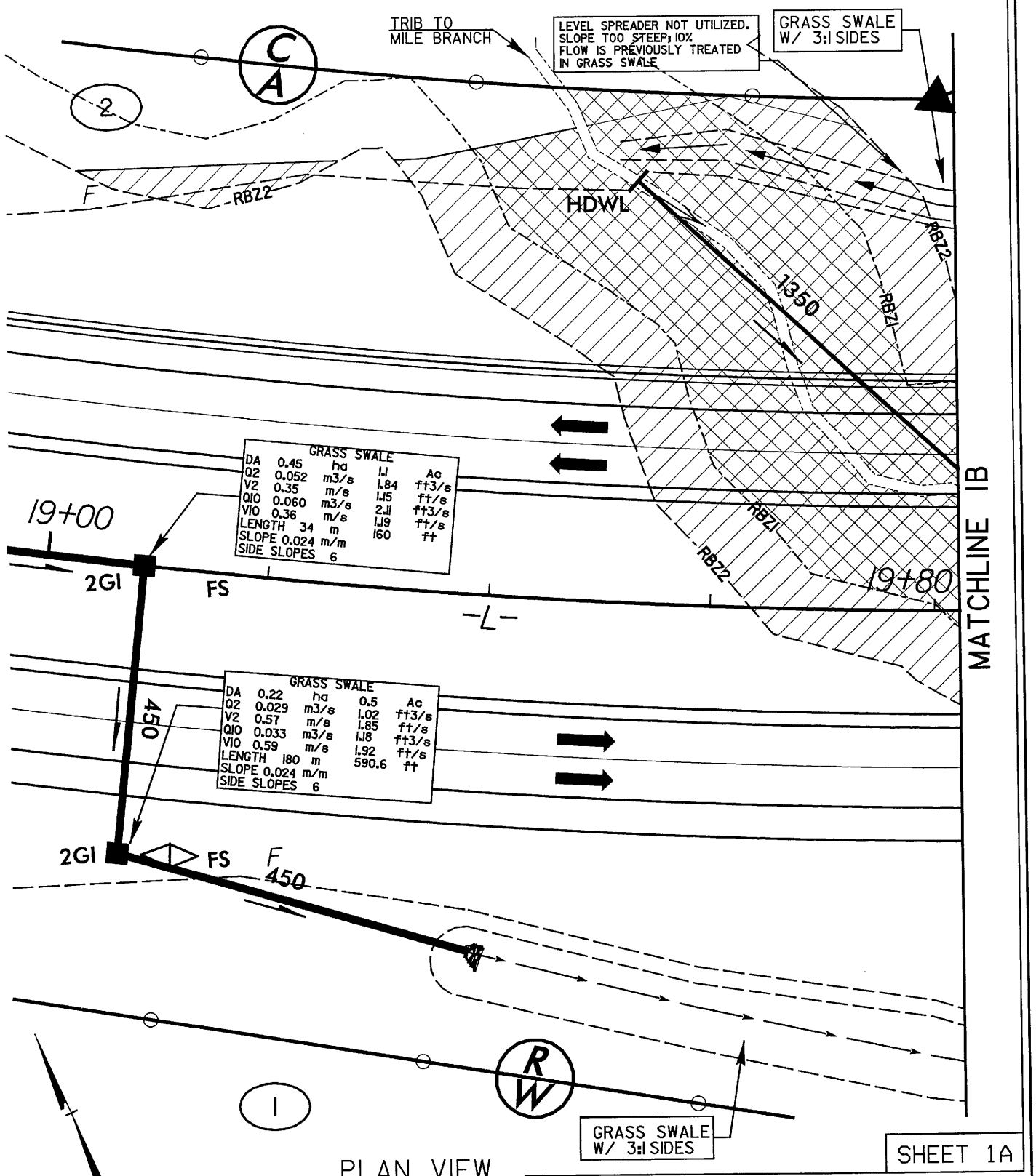

SHEET 1A

PLAN VIEW
SITE 1

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 6 OF 92

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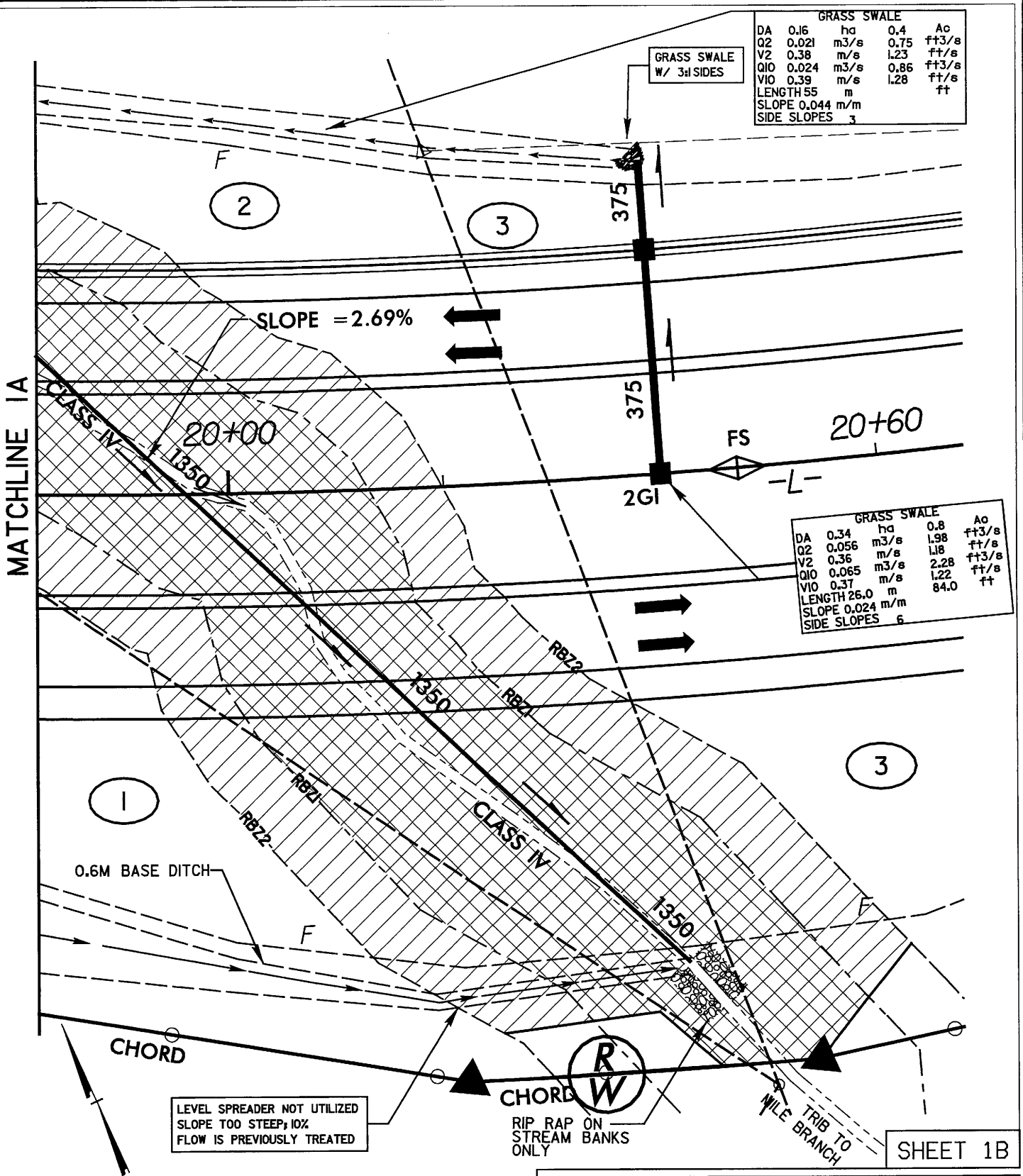

SHEET 1B

PLAN VIEW
SITE 1

LEGEND

RBZ1 — RIPARIAN BUFFER - ZONE 1

RBZ2 — RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 7 OF 92

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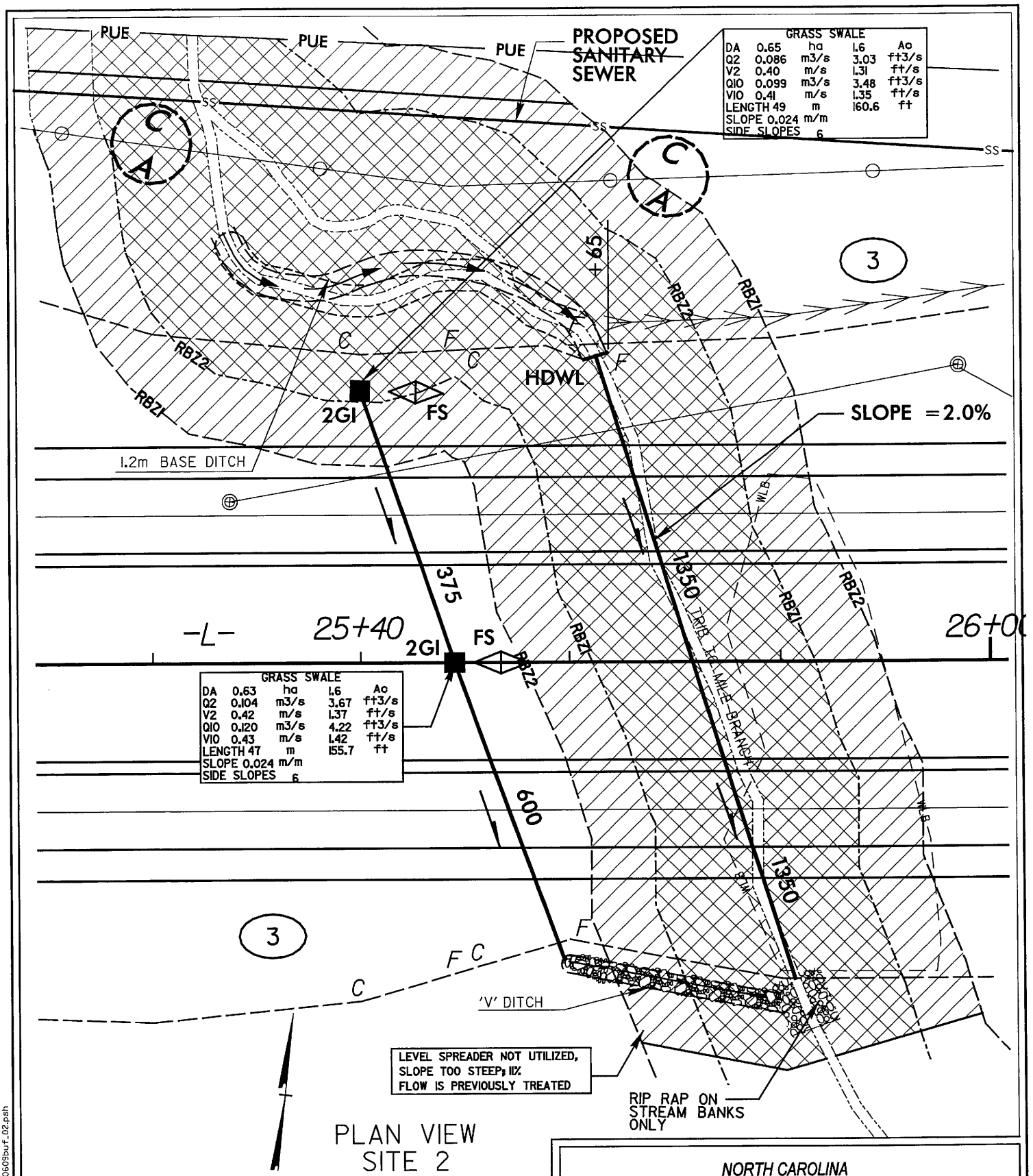

PLAN VIEW
SITE 2

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 5 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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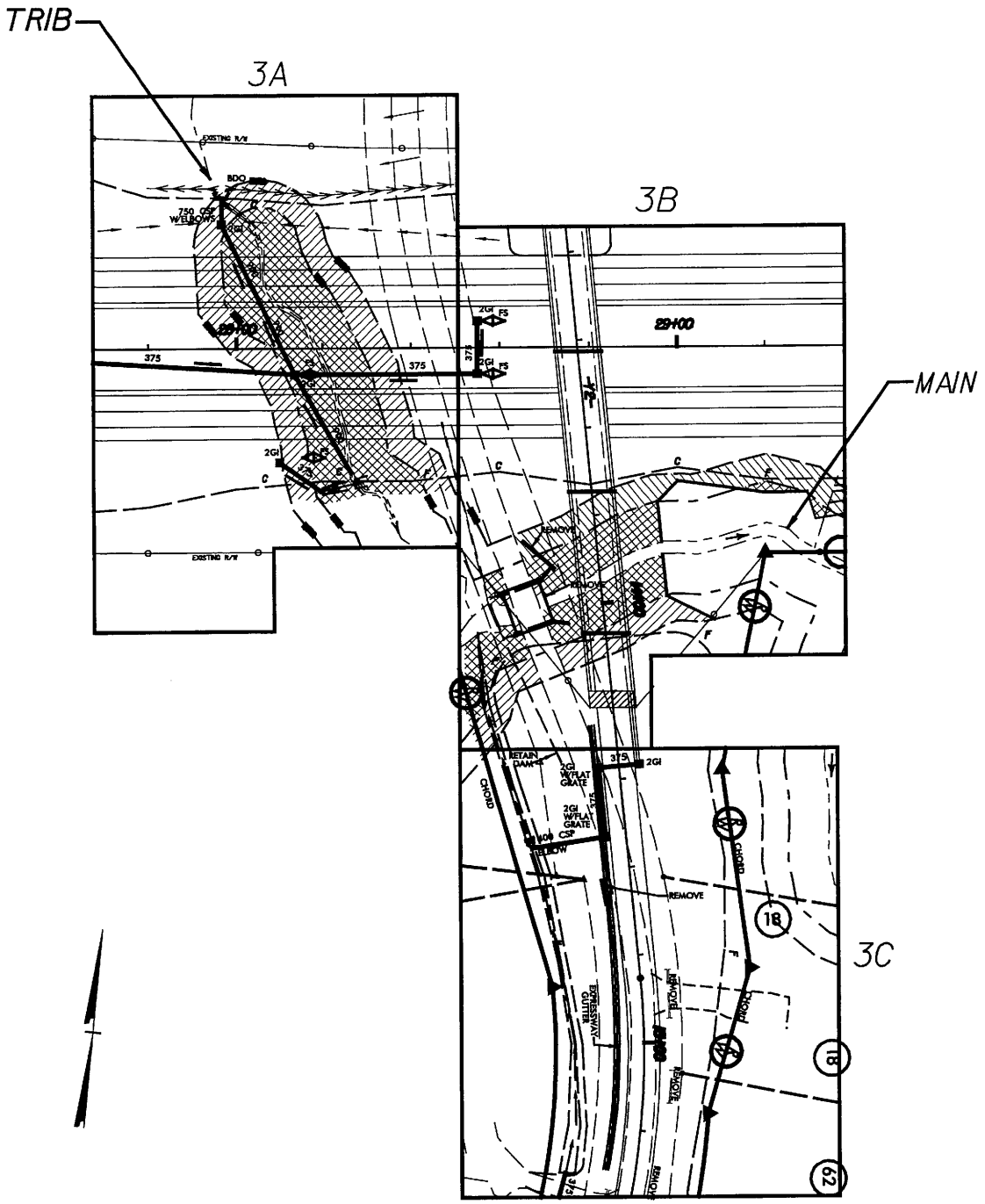

SHEET LAYOUT
PLAN VIEW
SITE 3

METRIC

10 0 20
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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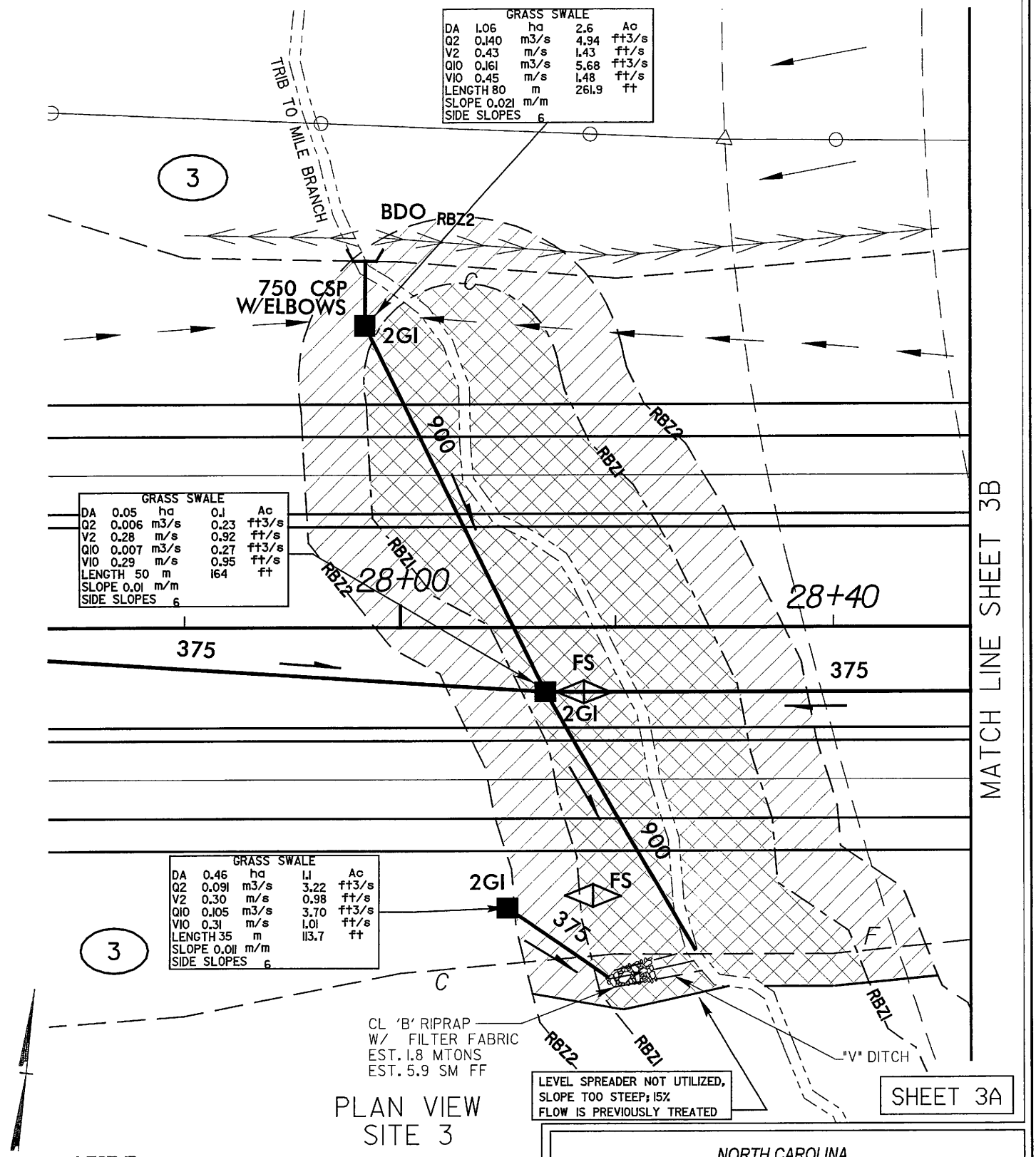

PLAN VIEW
SITE 3

LEGEND

RBZ1 — RIPARIAN BUFFER - ZONE 1

RBZ2 — RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 10 OF 92

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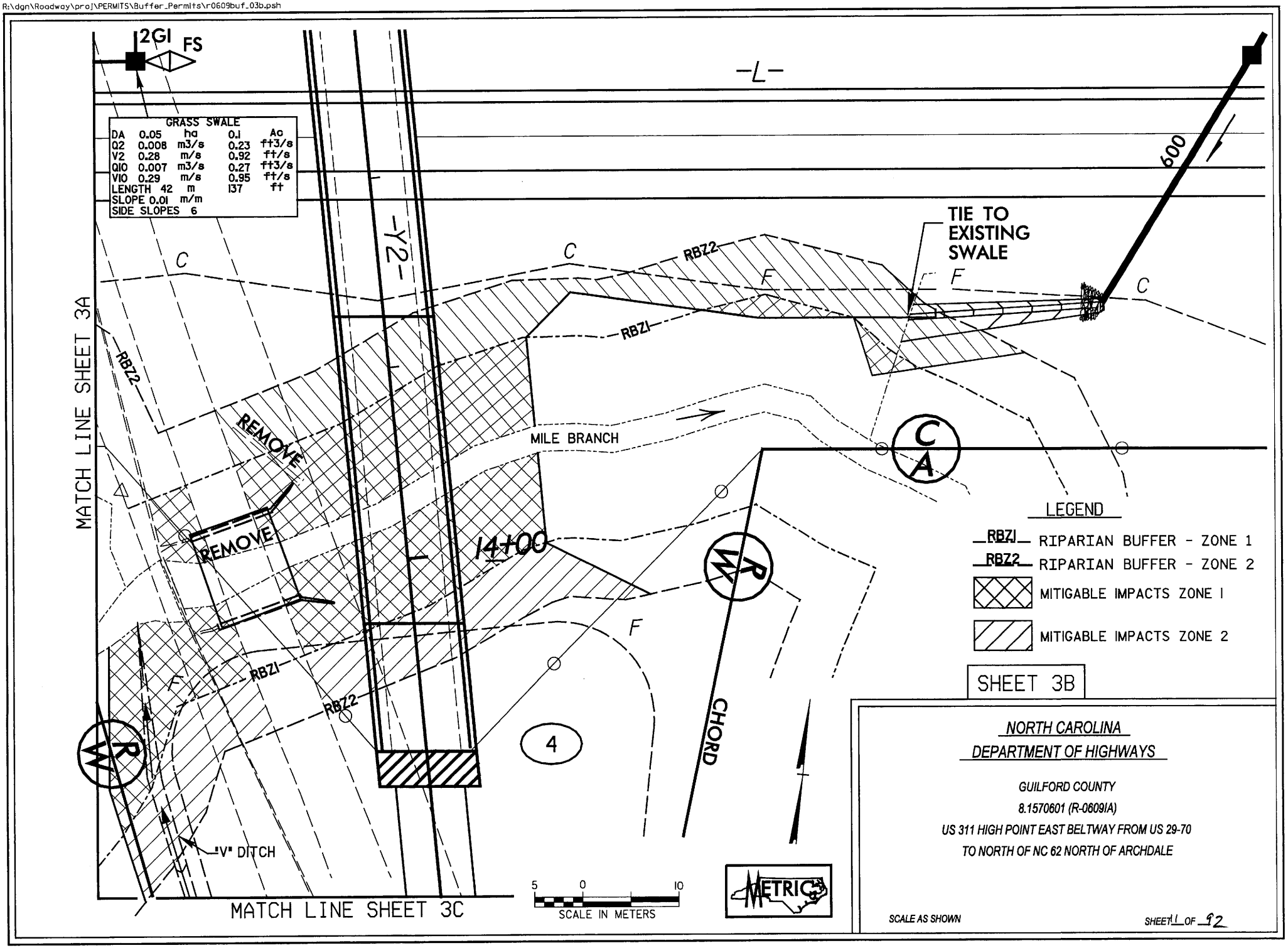

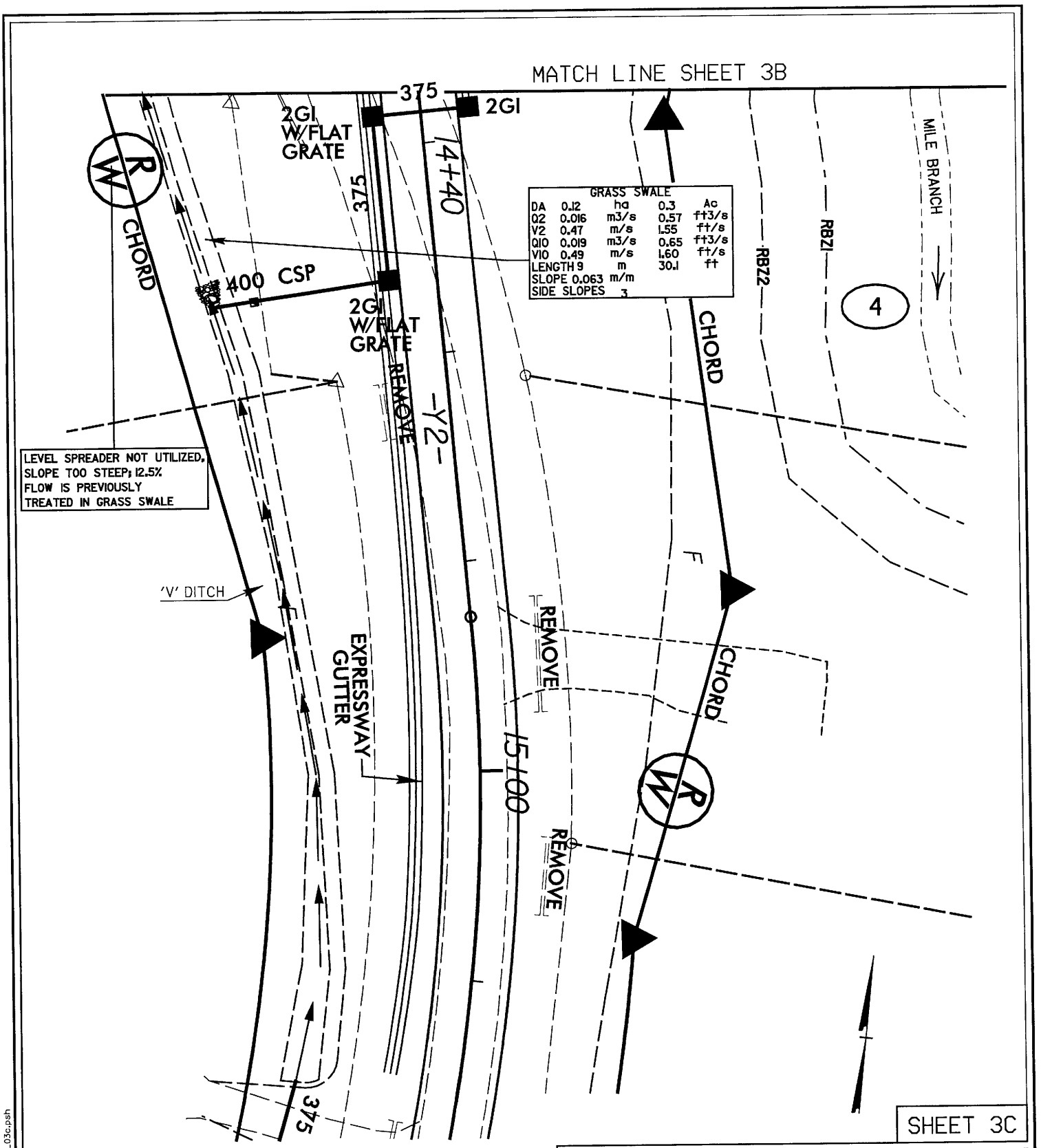

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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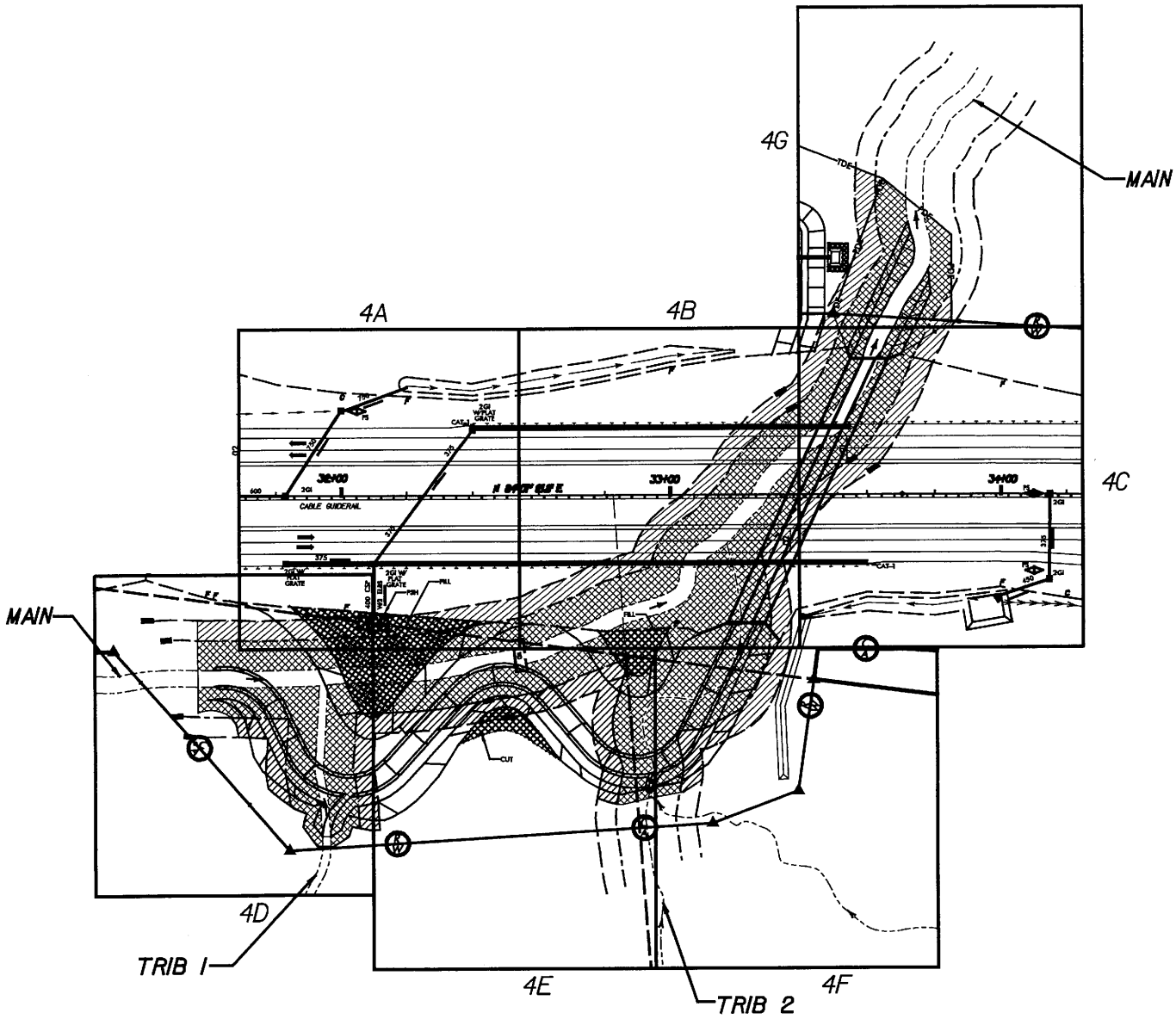

SHEET LAYOUT
PLAN VIEW
SITE 4

METRIC

15 0 30
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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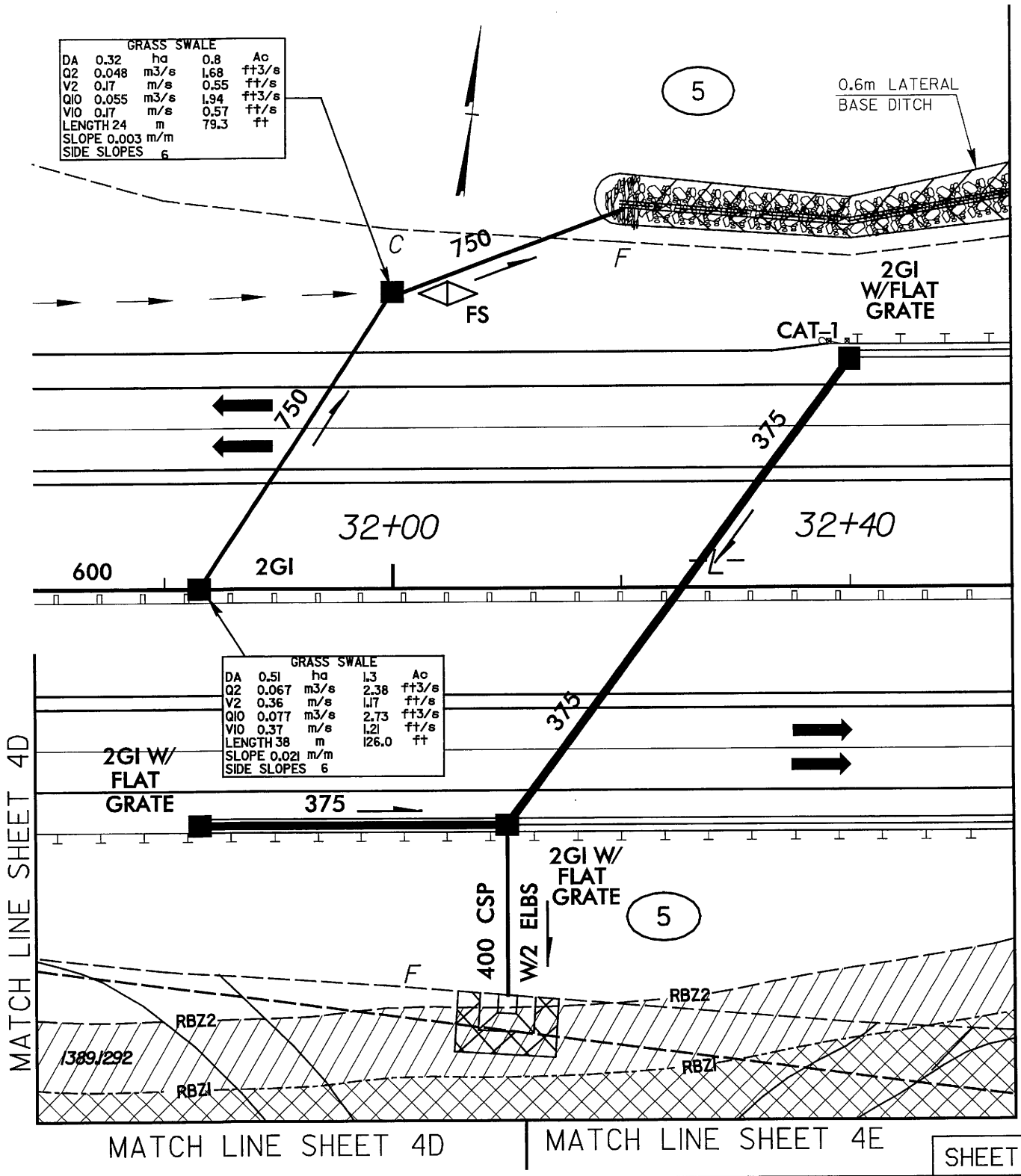

SHEET 4A

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

PLAN VIEW
SITE 4

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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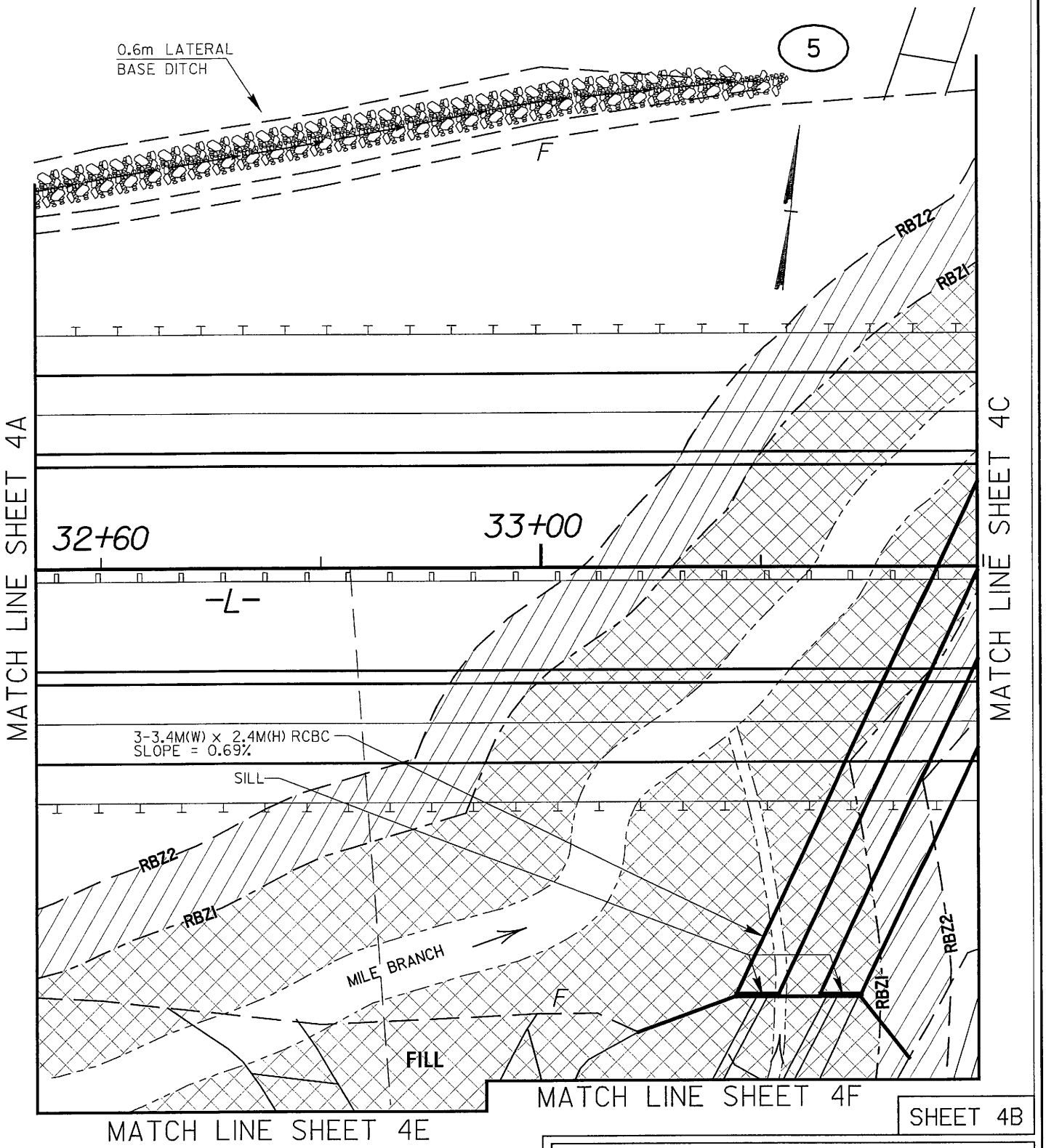

SHEET 4B

PLAN VIEW
SITE 4

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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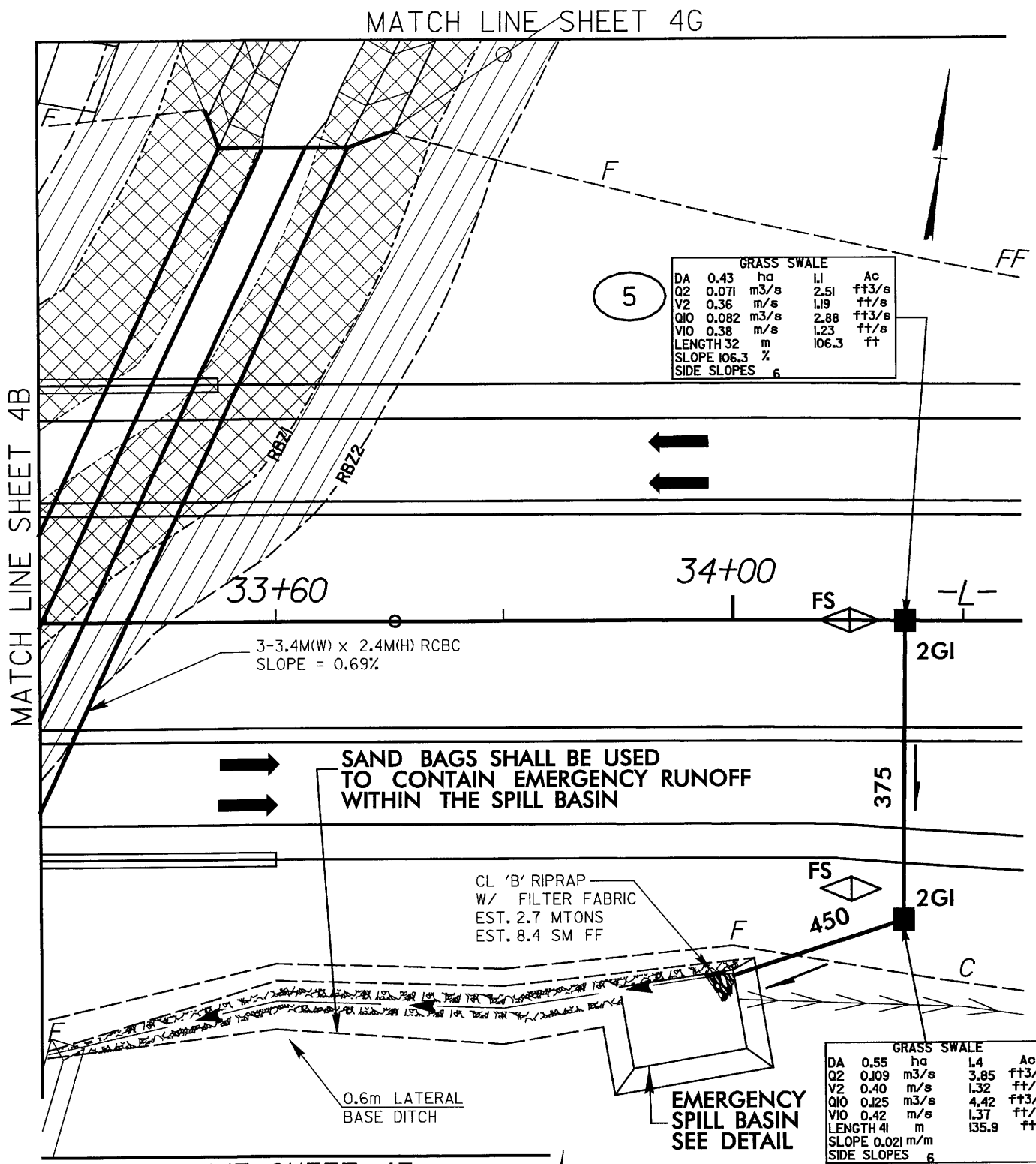

SHEET 4C

PLAN VIEW
SITE 4

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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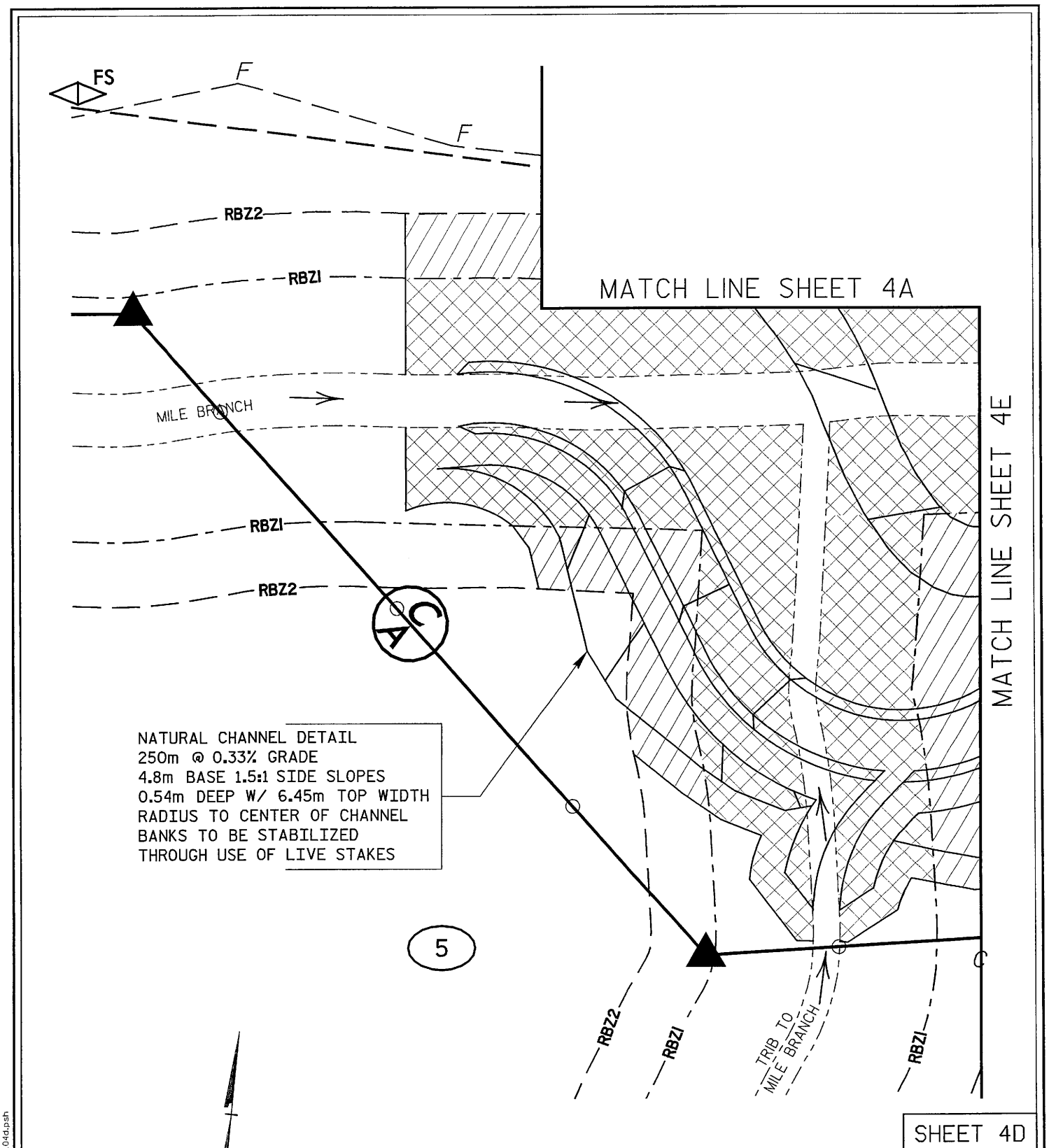

PLAN VIEW
SITE 4

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 17 OF 92

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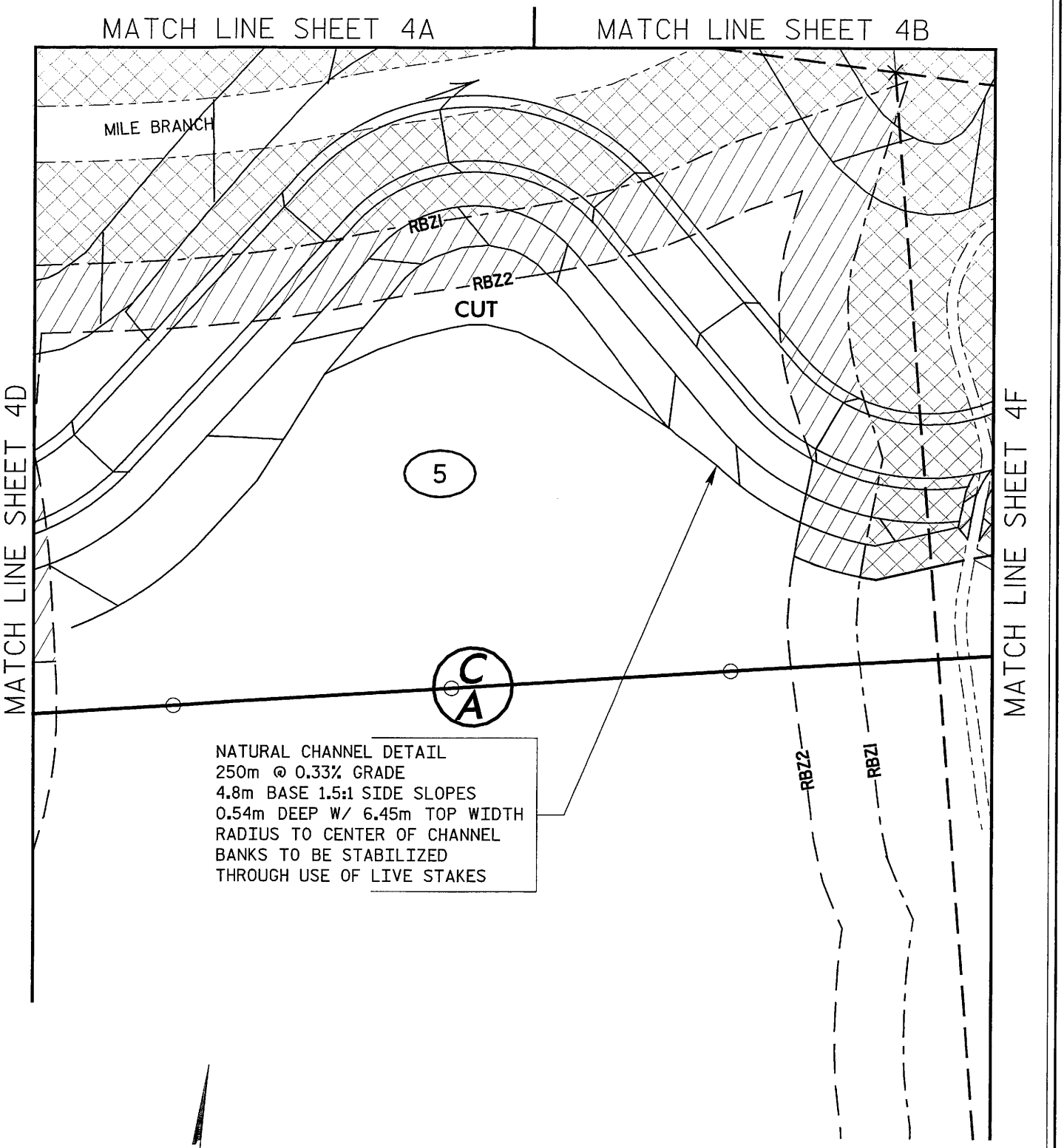

SHEET 4E

PLAN VIEW
SITE 4

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 18 OF 92

01/03/2005
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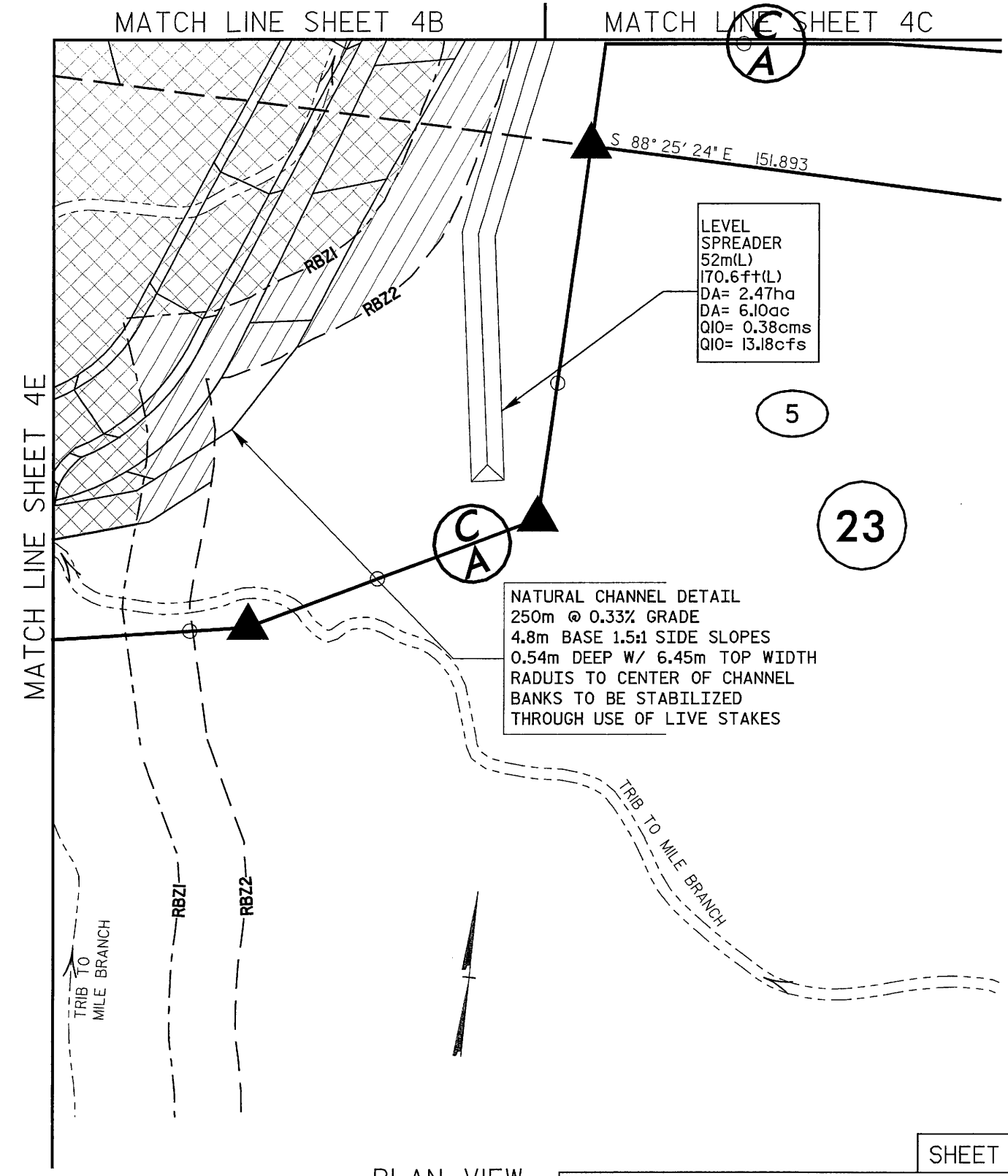

SHEET 4F

PLAN VIEW
SITE 4

LEGEND

RBZ1 — RIPARIAN BUFFER - ZONE 1

RBZ2 — RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 14 OF 92

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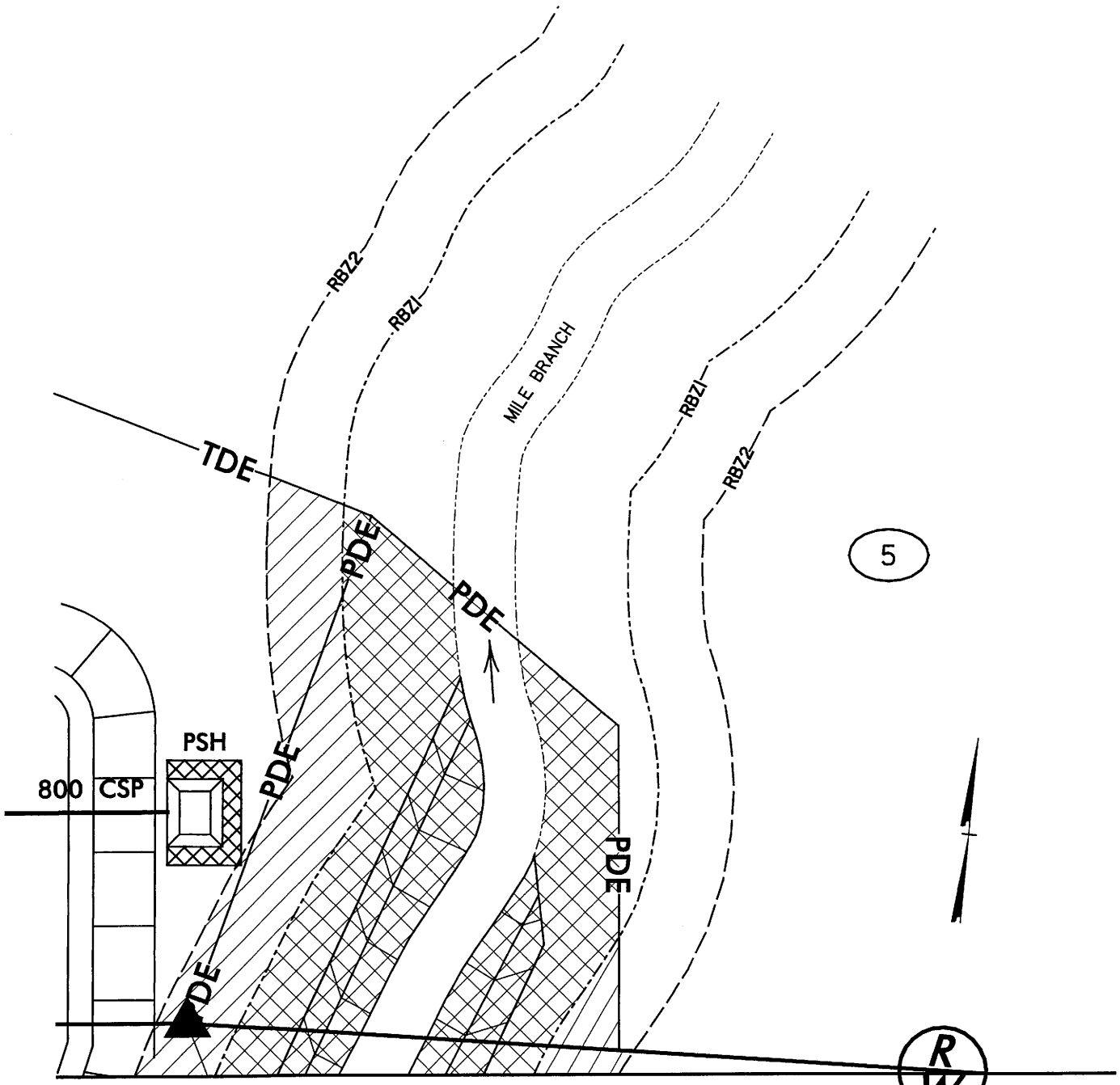

MATCH LINE SHEET 4C

SHEET 4G

PLAN VIEW
SITE 4

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 20 OF 92

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3/12/2005
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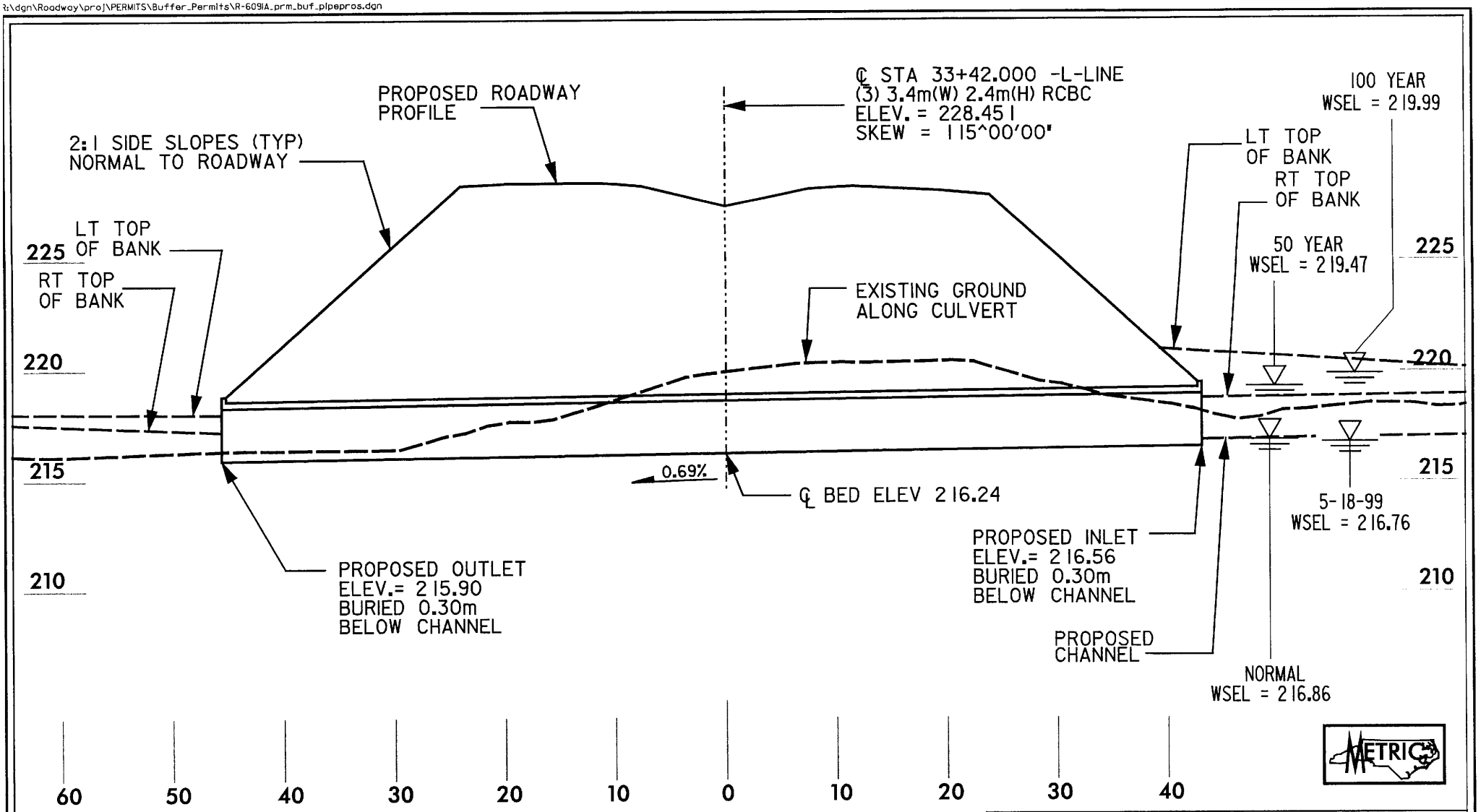


SCALE:
1 = 500 HORIZONTAL
1 = 250 VERTICAL

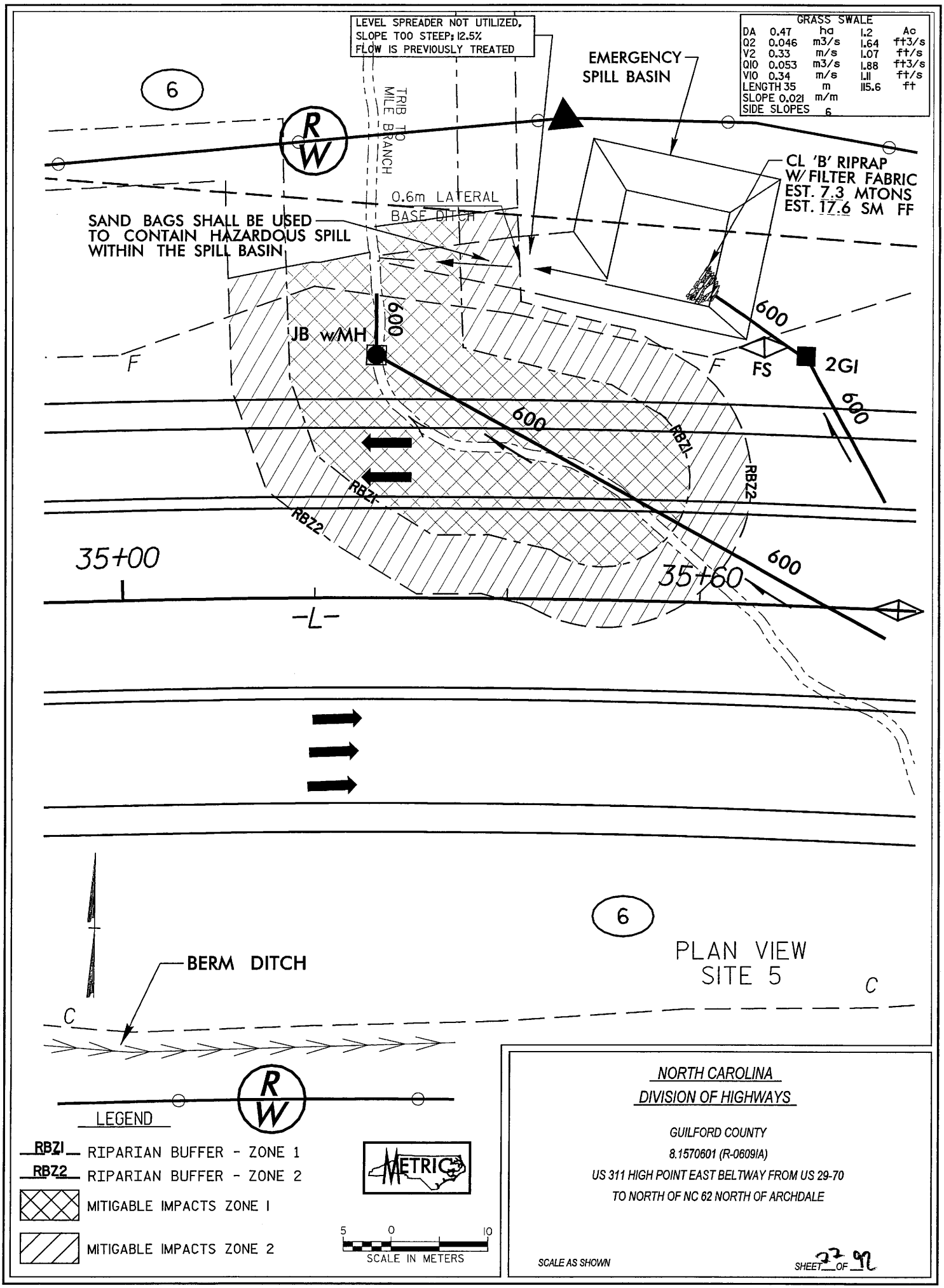
PROFILE
PERMIT SITE 4 (4B & 4C)
(3) 3.4m X 2.4m RCBC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 26 OF 92



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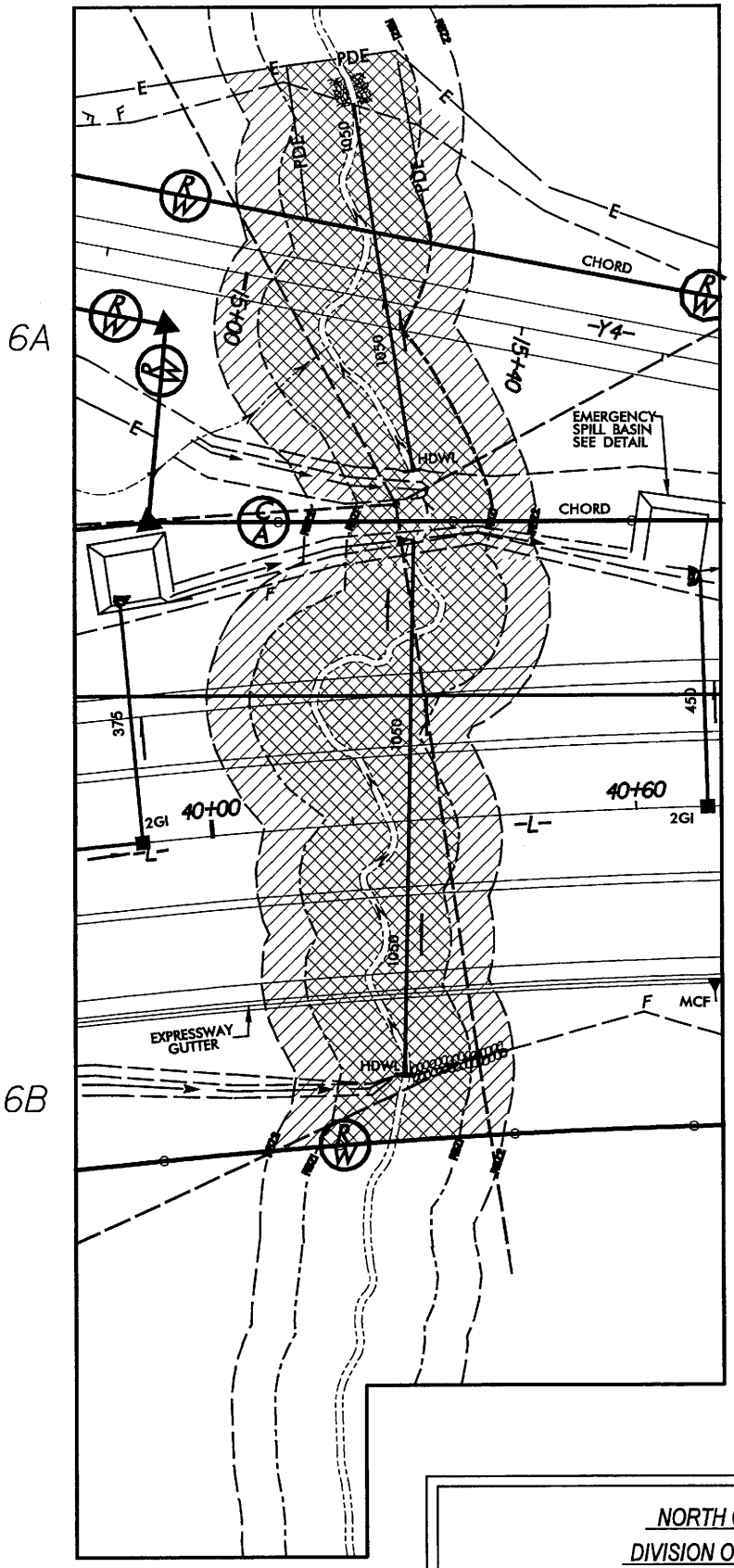

SHEET LAYOUT
PLAN VIEW
SITE 6

METRIC

10 0 20
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 23 OF 92

1/12/2006
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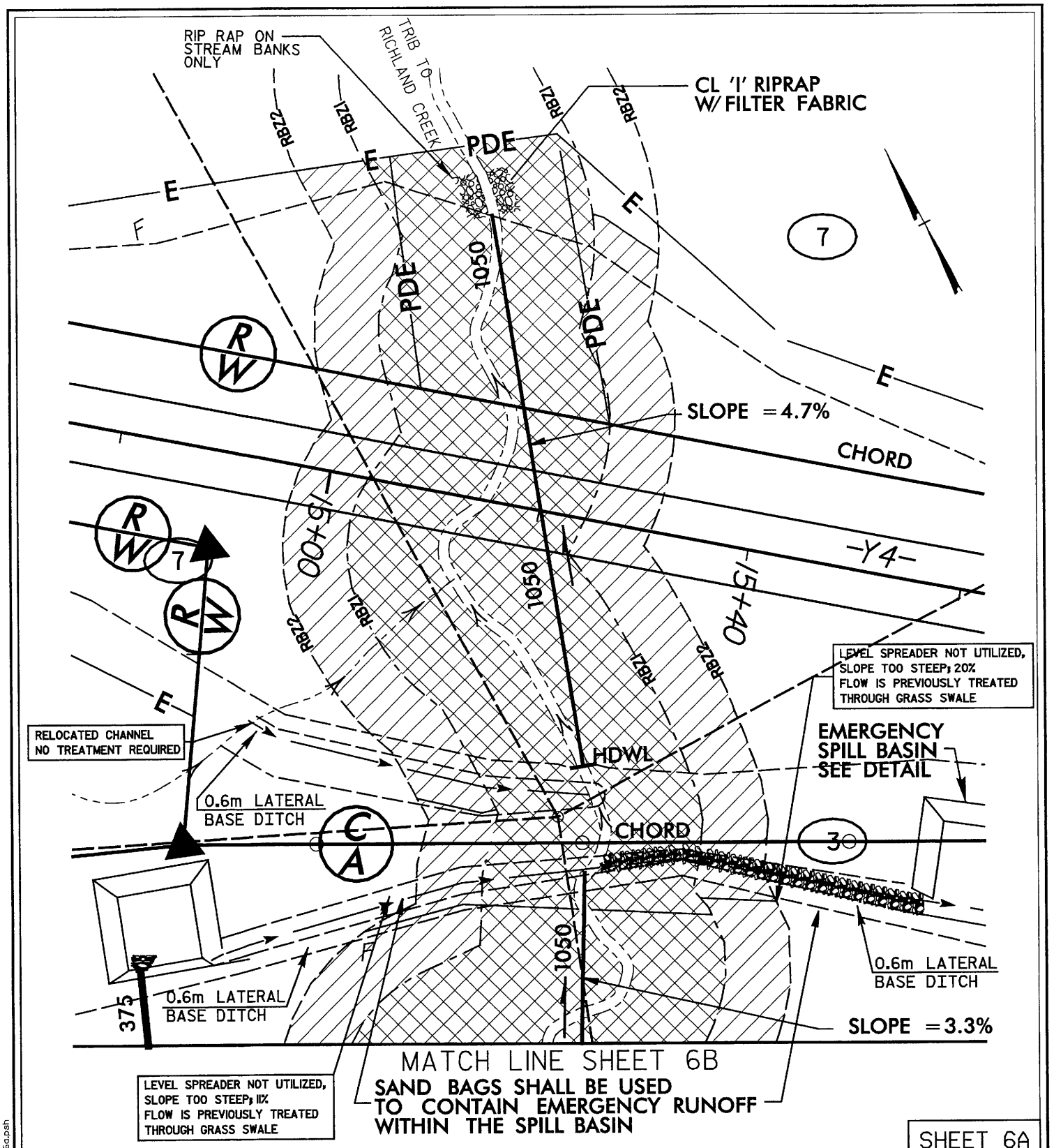

SHEET 6A

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

PLAN VIEW
SITE 6

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 21 OF 92

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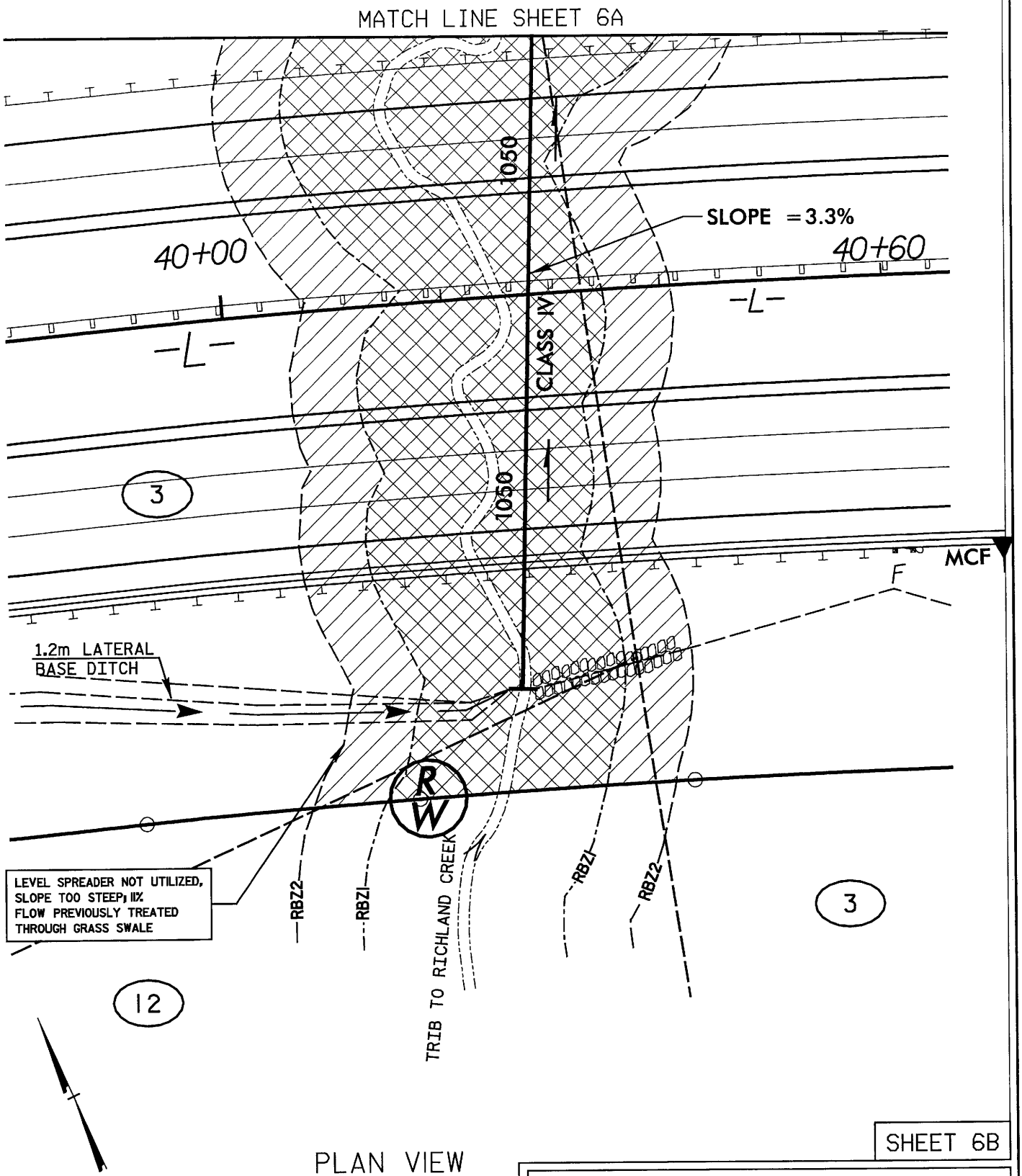

SHEET 6B

PLAN VIEW
SITE 6

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 25 OF 92

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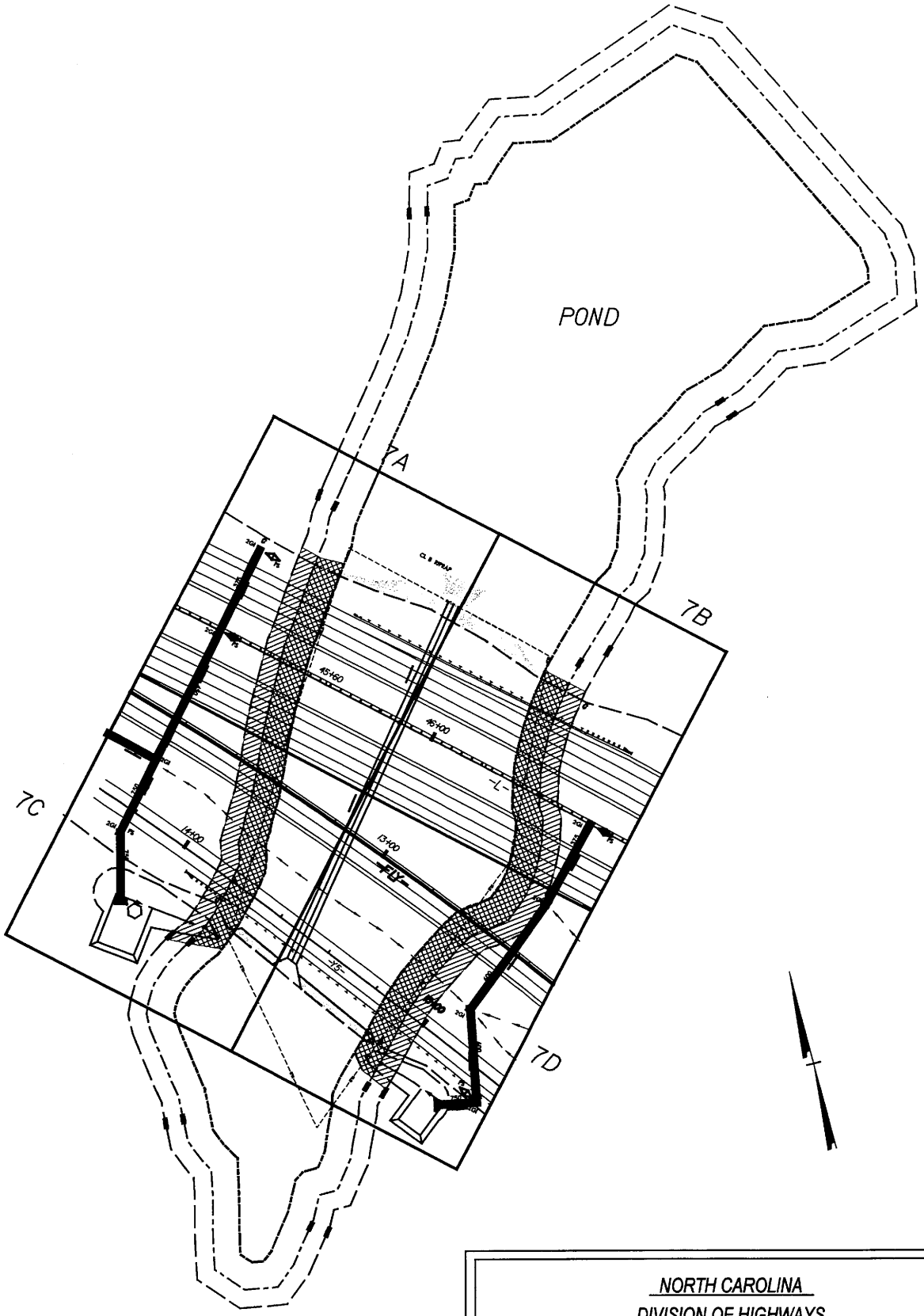

SHEET LAYOUT
PLAN VIEW
SITE 7

METRIC

20 0 30
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 26 OF 92

1/19/2006
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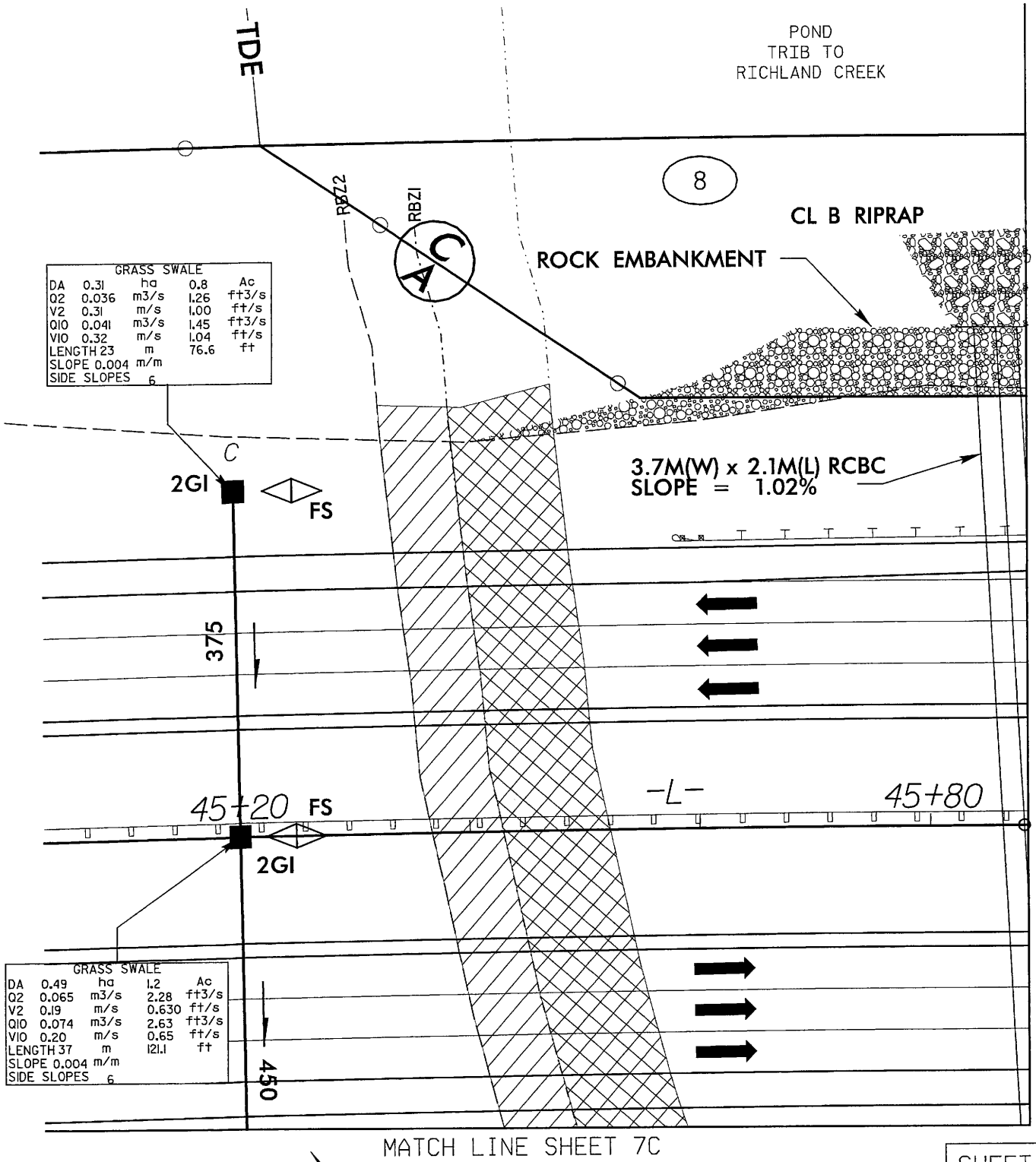

MATCH LINE SHEET 7C

SHEET 7A

PLAN VIEW
SITE 7

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 27 OF 92

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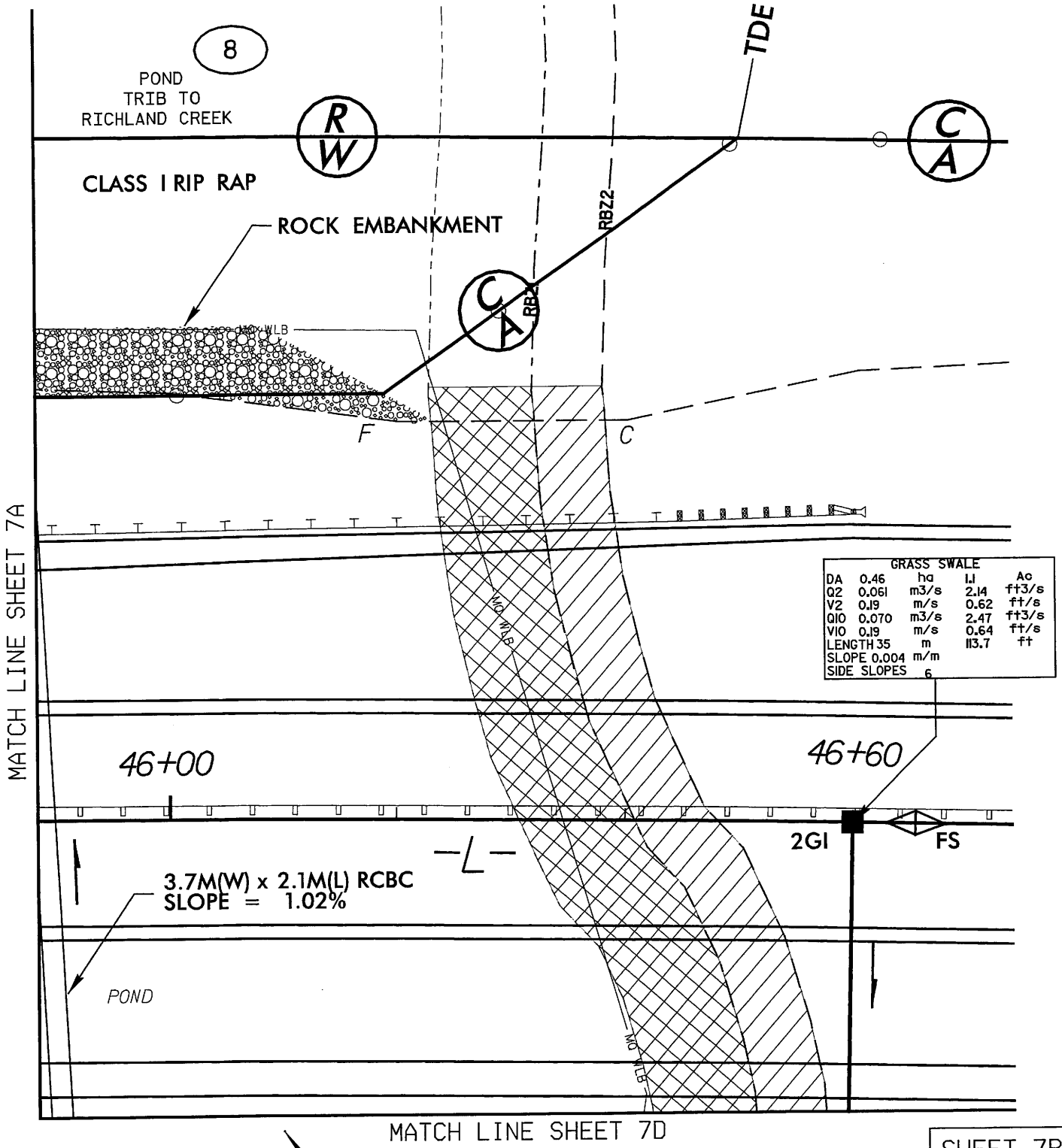

SHEET 7B

PLAN VIEW
SITE 7

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 28 OF 92

12/13/2004
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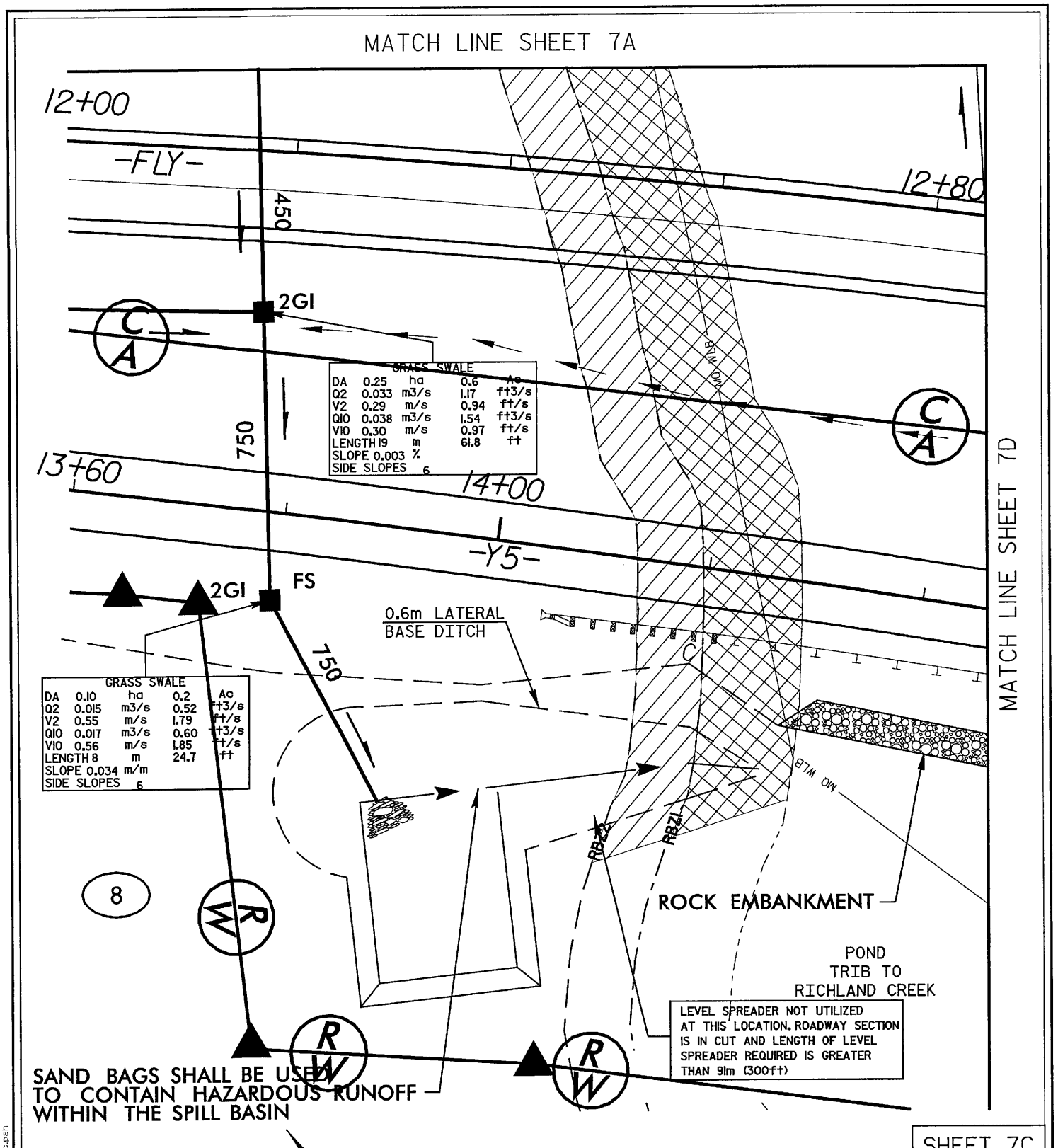

SHEET 7C

PLAN VIEW
SITE 7

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 29 OF 92

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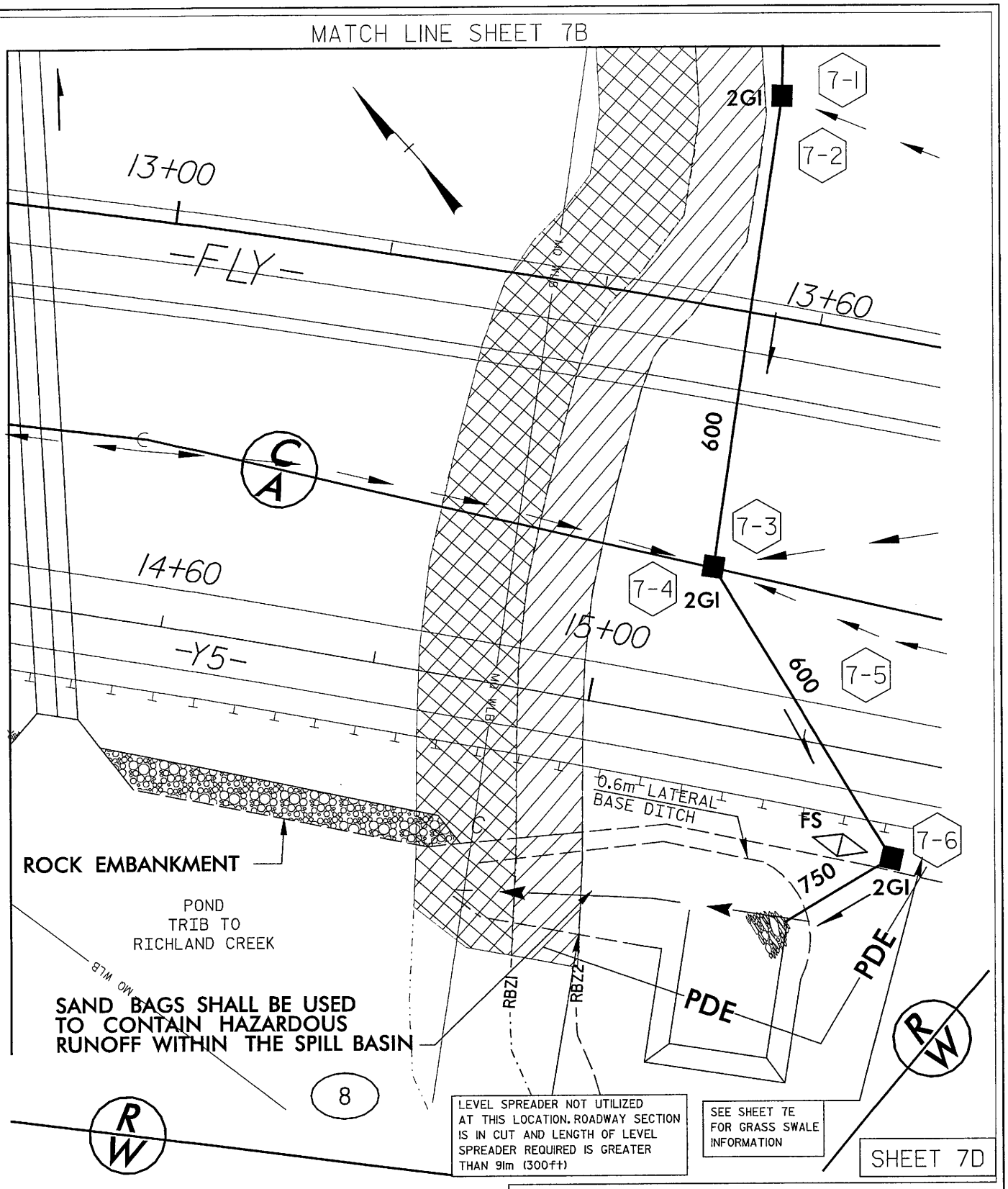

LEGEND

- RBZ1 -- RIPARIAN BUFFER - ZONE 1
- RBZ2 -- RIPARIAN BUFFER - ZONE 2
- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

PLAN VIEW
SITE 7

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 39 OF 92

12/10/2004
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7-1

GRASS SWALE				
DA	0.40	ha	1.0	Ac
Q2	0.066	m3/s	2.33	ft3/s
V2	0.19	m/s	0.63	ft/s
Q10	0.076	m3/s	2.68	ft3/s
V10	0.20	m/s	0.65	ft/s
LENGTH	30	m	98.8	ft
SLOPE	0.004	m/m		
SIDE SLOPES	6			

7-2

GRASS SWALE				
DA	0.44	ha	1.1	Ac
Q2	0.058	m3/s	2.05	ft3/s
V2	0.49	m/s	1.61	ft/s
Q10	0.067	m3/s	2.36	ft3/s
V10	0.51	m/s	1.66	ft/s
LENGTH	33	m	108.7	ft
SLOPE	0.054	m/m		
SIDE SLOPES	6			

7-3

GRASS SWALE				
DA	0.60	ha	1.5	Ac
Q2	0.099	m3/s	3.50	ft3/s
V2	0.69	m/s	2.26	ft/s
Q10	0.114	m3/s	4.02	ft3/s
V10	0.71	m/s	2.34	ft/s
LENGTH	45	m	148.3	ft
SLOPE	0.094	m/m		
SIDE SLOPES	6			

7-4

GRASS SWALE				
DA	0.18	ha	0.4	Ac
Q2	0.030	m3/s	1.05	ft3/s
V2	0.40	m/s	1.30	ft/s
Q10	0.034	m3/s	1.21	ft3/s
V10	0.41	m/s	1.34	ft/s
LENGTH	14	m	44.5	ft
SLOPE	0.009	m/m		
SIDE SLOPES	6			

7-5

GRASS SWALE				
DA	0.24	ha	0.6	Ac
Q2	0.032	m3/s	1.12	ft3/s
V2	0.48	m/s	1.57	ft/s
Q10	0.036	m3/s	1.29	ft3/s
V10	0.50	m/s	1.63	ft/s
LENGTH	18	m	59.3	ft
SLOPE	0.076	m/m		
SIDE SLOPES	6			

7-6

GRASS SWALE				
DA	0.12	ha	0.3	Ac
Q2	0.020	m3/s	0.70	ft3/s
V2	0.71	m/s	2.33	ft/s
Q10	0.023	m3/s	0.80	ft3/s
V10	0.73	m/s	2.41	ft/s
LENGTH	9	m	29.7	ft
SLOPE	0.056	m/m		
SIDE SLOPES	6			

SHEET 7E

NORTH CAROLINA

DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70

TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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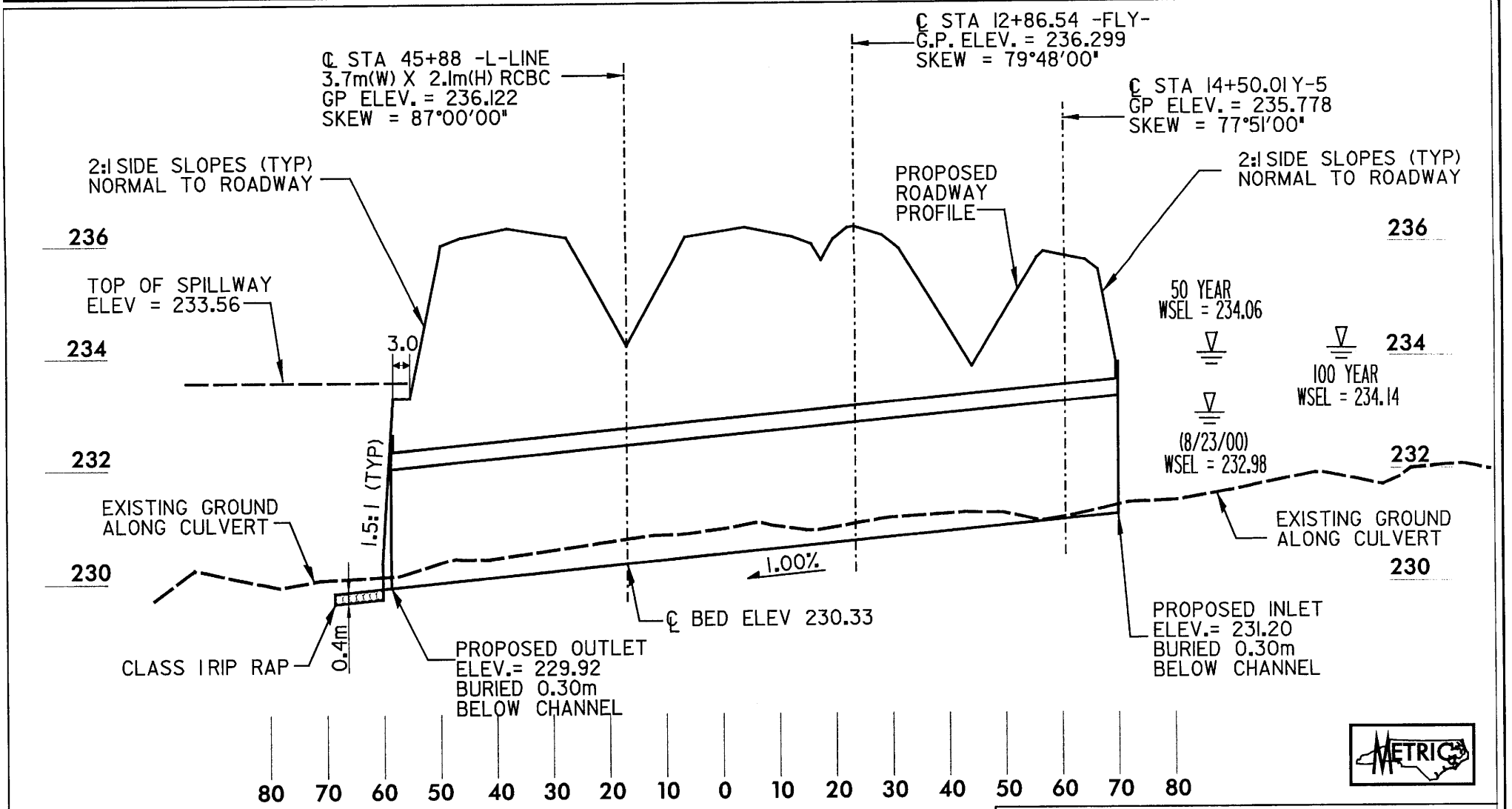


SCALE:
1 = 100 HORIZONTAL
1 = 100 VERTICAL

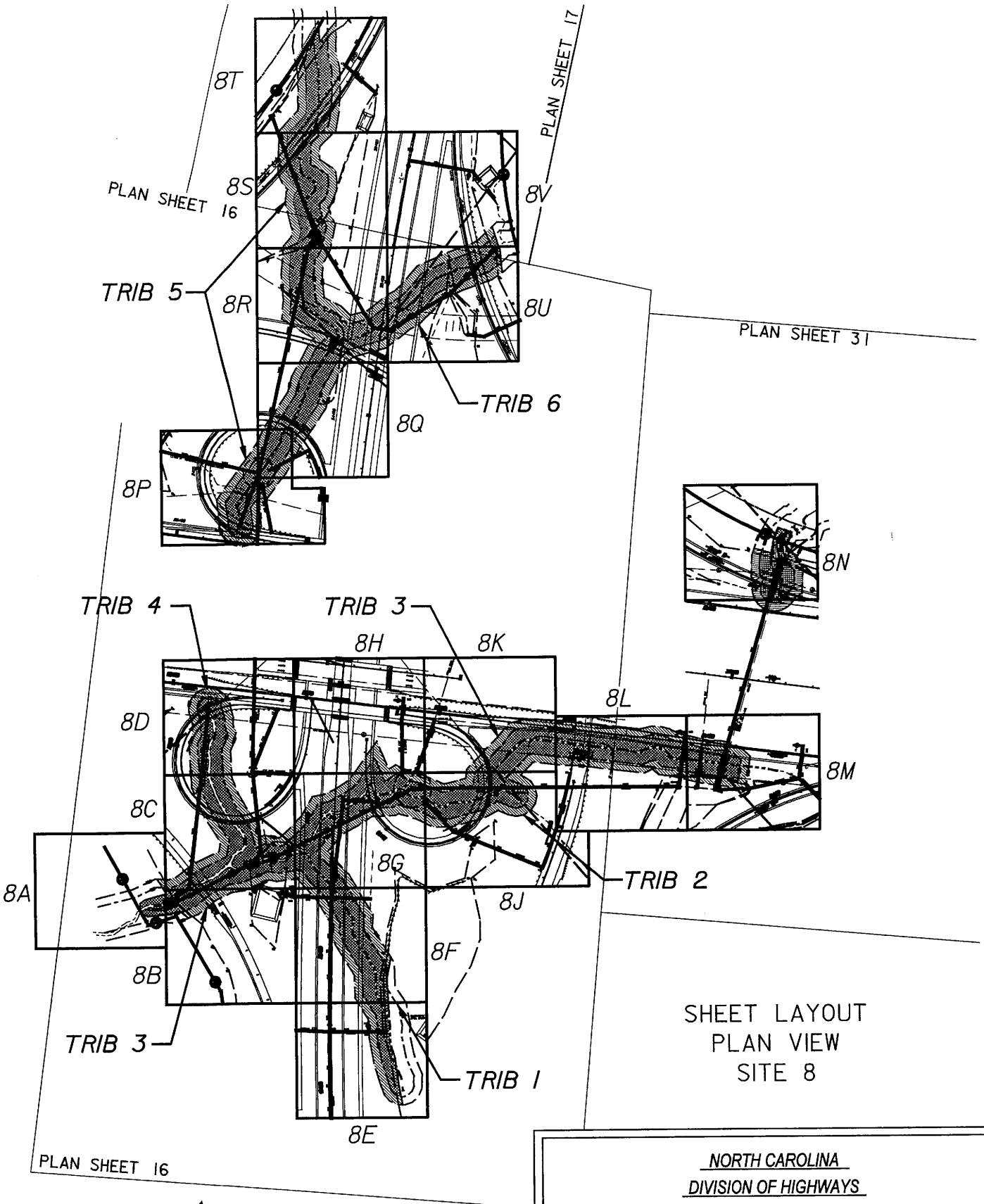
PROFILE
PERMIT SITE 7 (7A - 7D)
2 100mm RCP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 72 OF 92



SHEET LAYOUT
PLAN VIEW
SITE 8

METRIC

40 0 80
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 3 OF 92

19/2006
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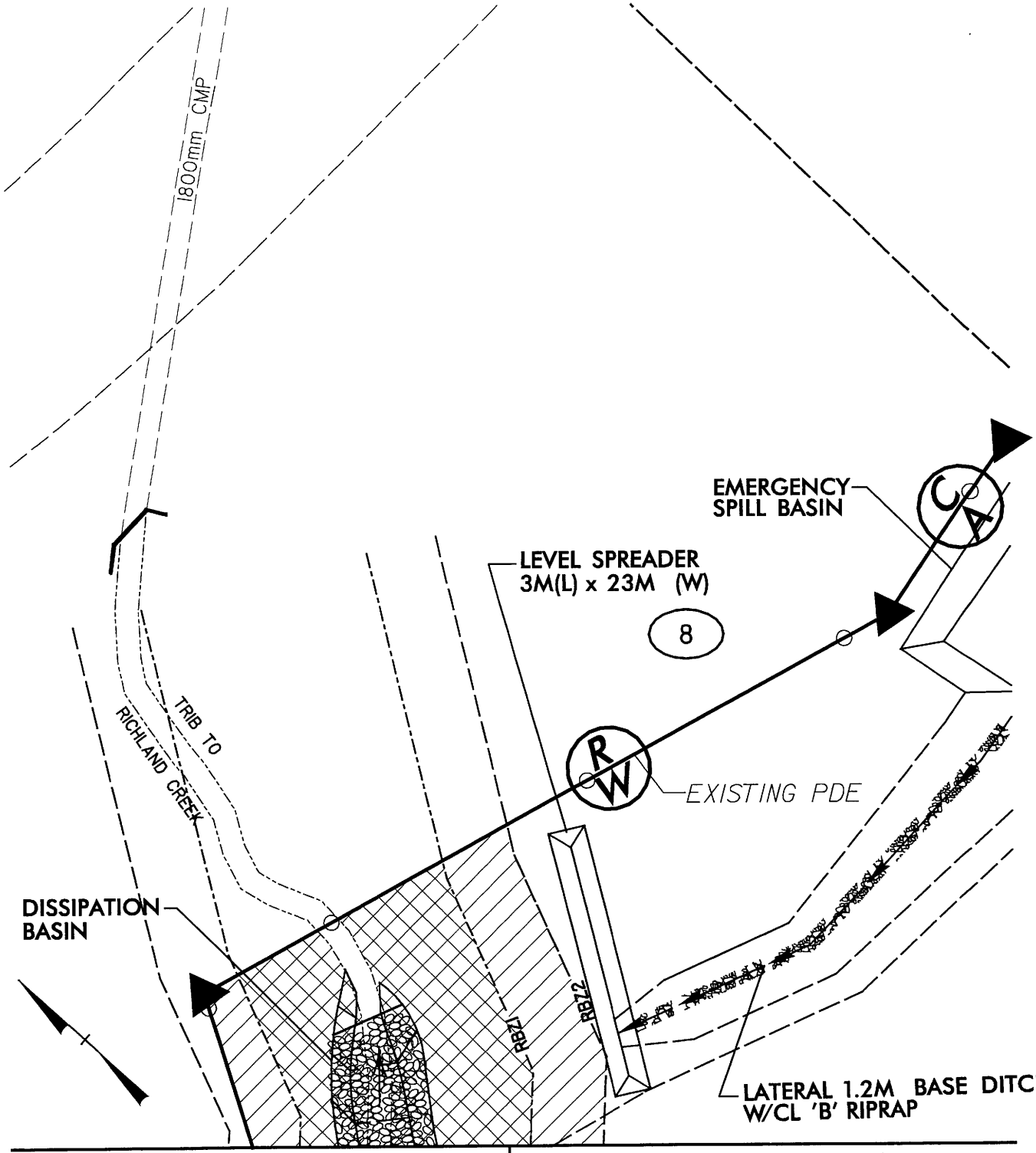

MATCH LINE SHEET 8B | MATCH LINE SHEET 8C

SHEET 8A

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 51 OF 62

12/2006
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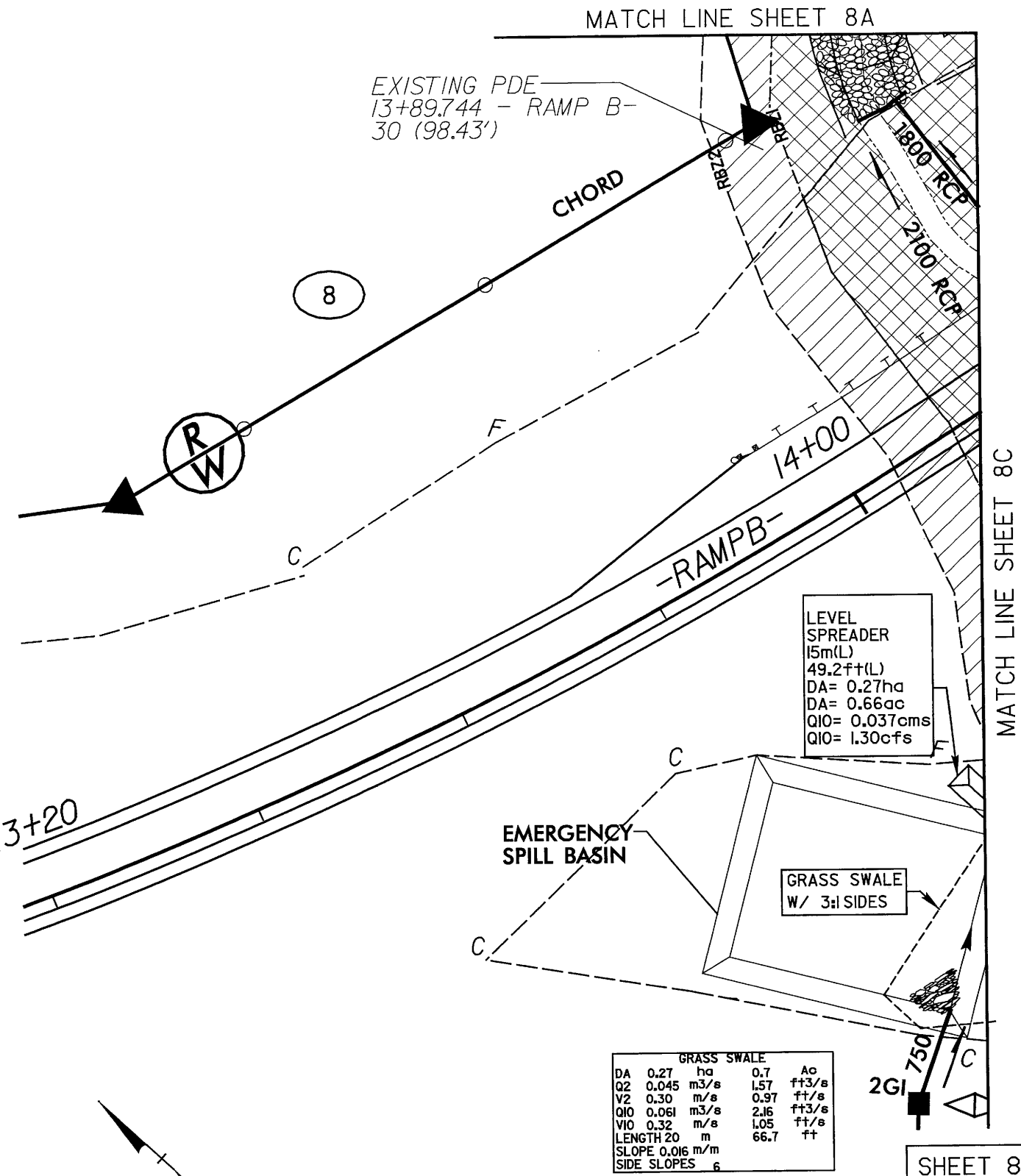

GRASS SWALE				
DA	0.27	ha	0.7	Ac
Q2	0.045	m3/s	1.57	ft3/s
V2	0.30	m/s	0.97	ft/s
Q10	0.061	m3/s	2.16	ft3/s
V10	0.32	m/s	1.05	ft/s
LENGTH	20	m	66.7	ft
SLOPE	0.016	m/m		
SIDE SLOPES	6			

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 25 OF 92

9/2006
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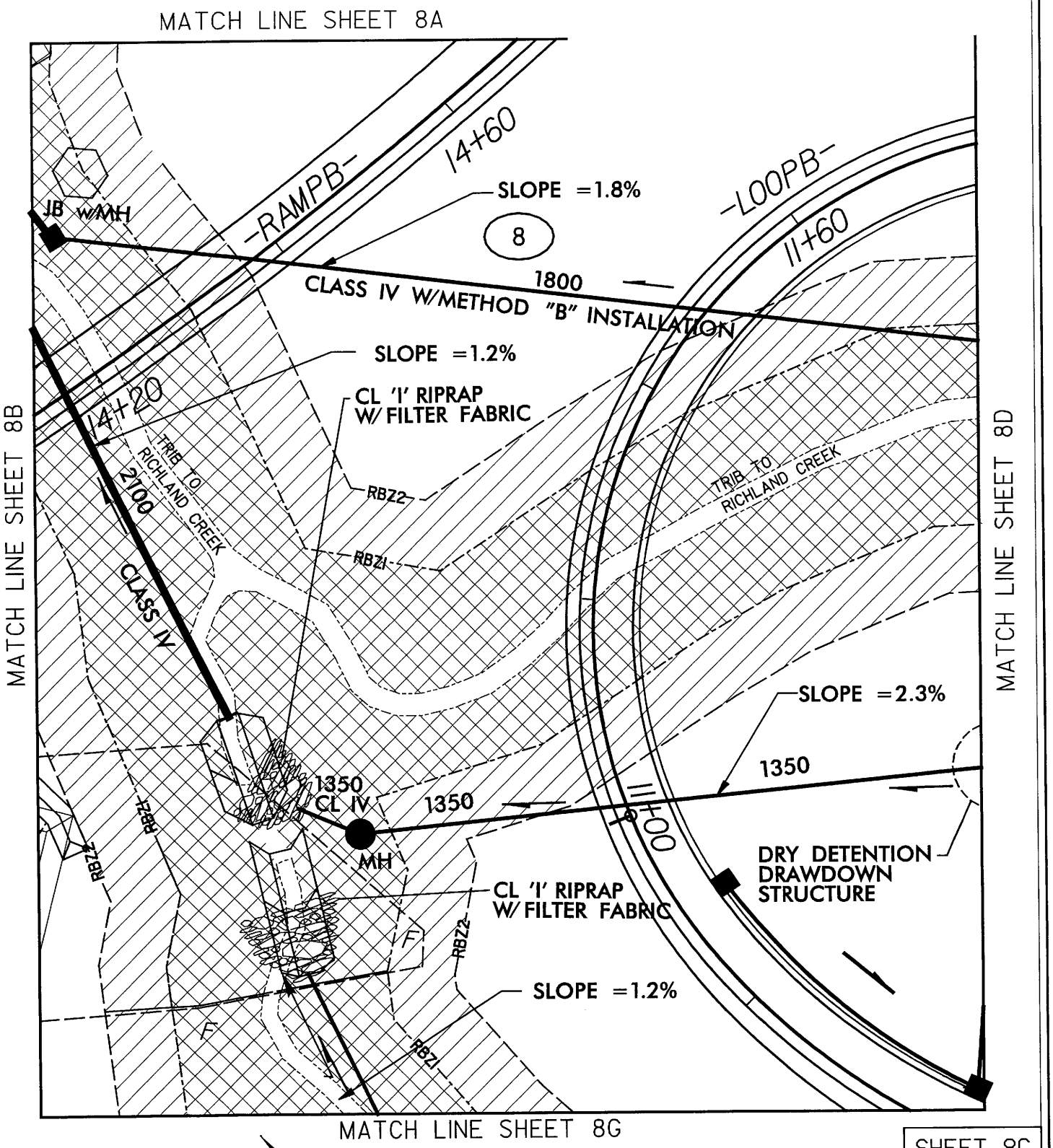

SHEET 8C

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 16 OF 92

19/2006
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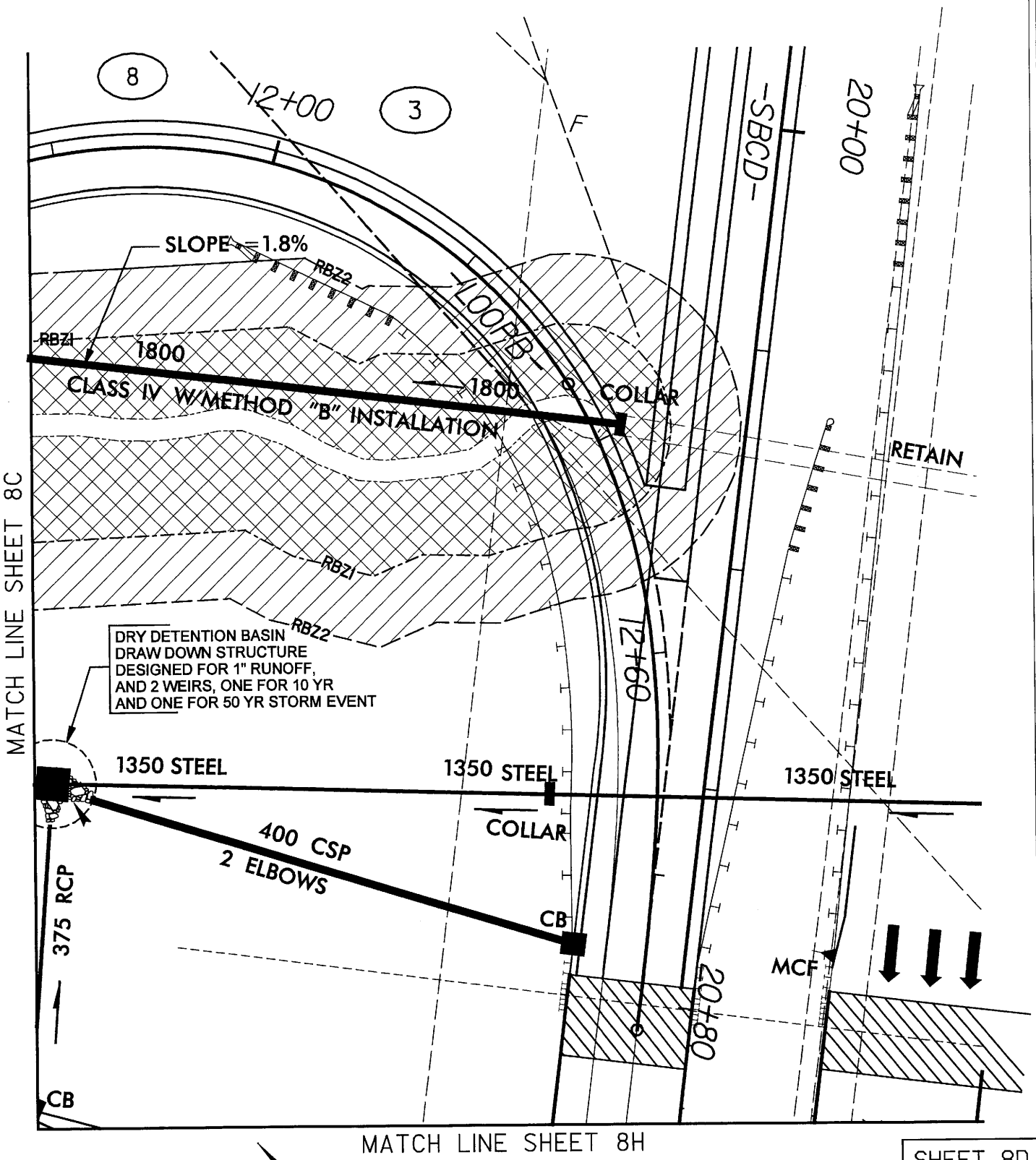

SHEET 8D

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 37 OF 92

19/2006
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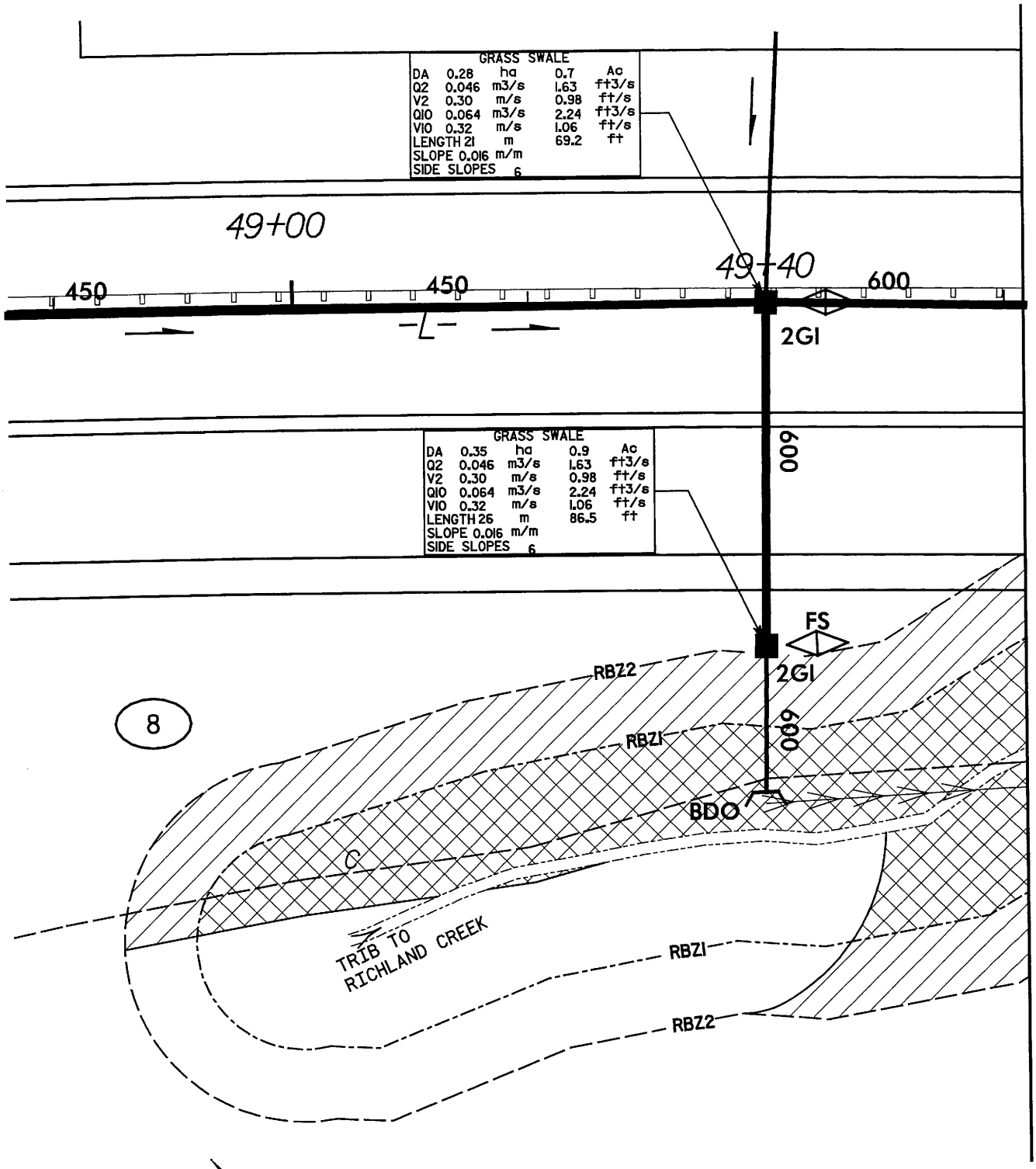

SHEET 8E

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 38 OF 42

2/2006
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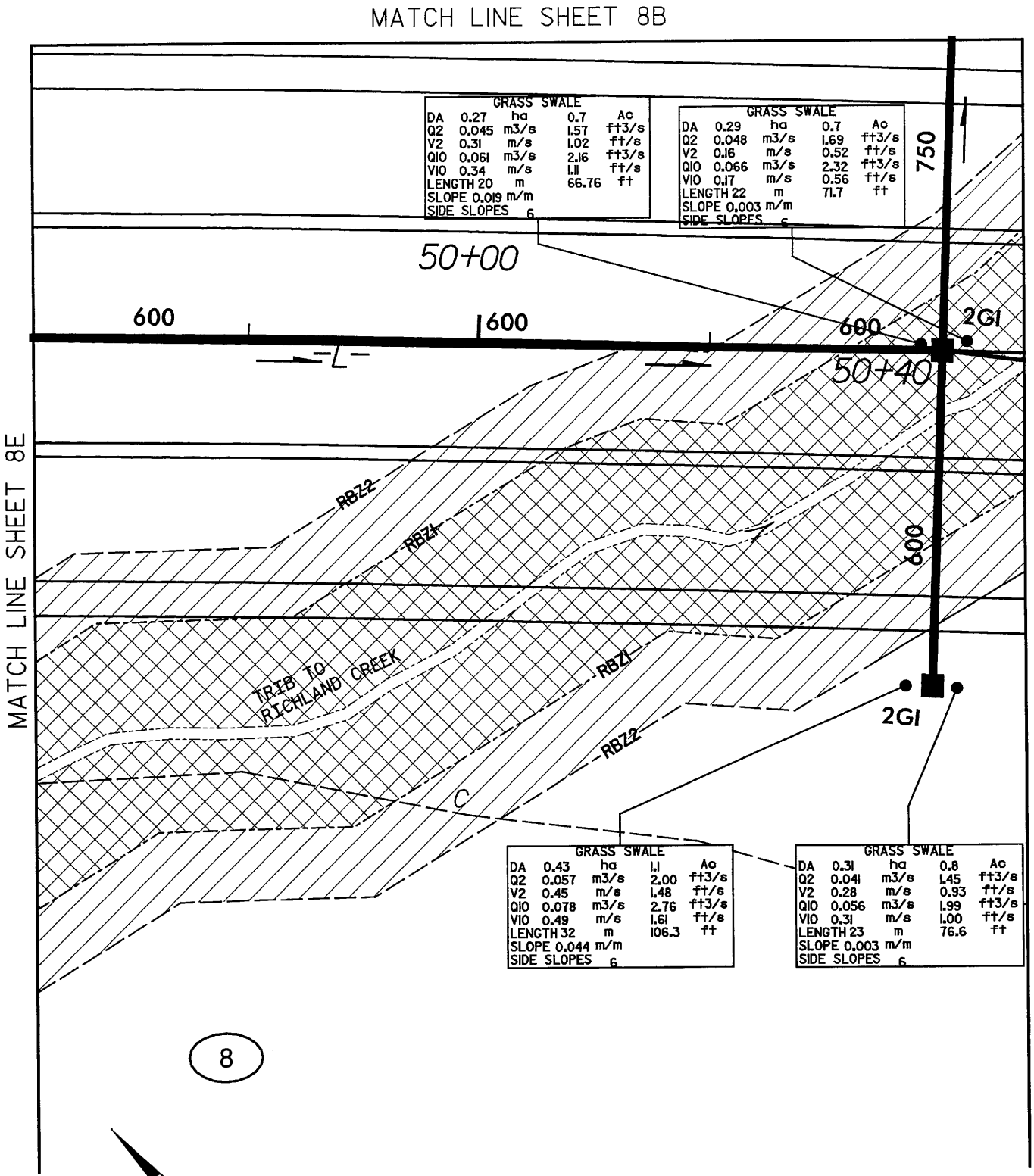

SHEET 8F

LEGEND

- RBZ1 — RIPARIAN BUFFER - ZONE 1
- RBZ2 — RIPARIAN BUFFER - ZONE 2
- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

PLAN VIEW
SITE 8

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 39 OF 92

12/2006
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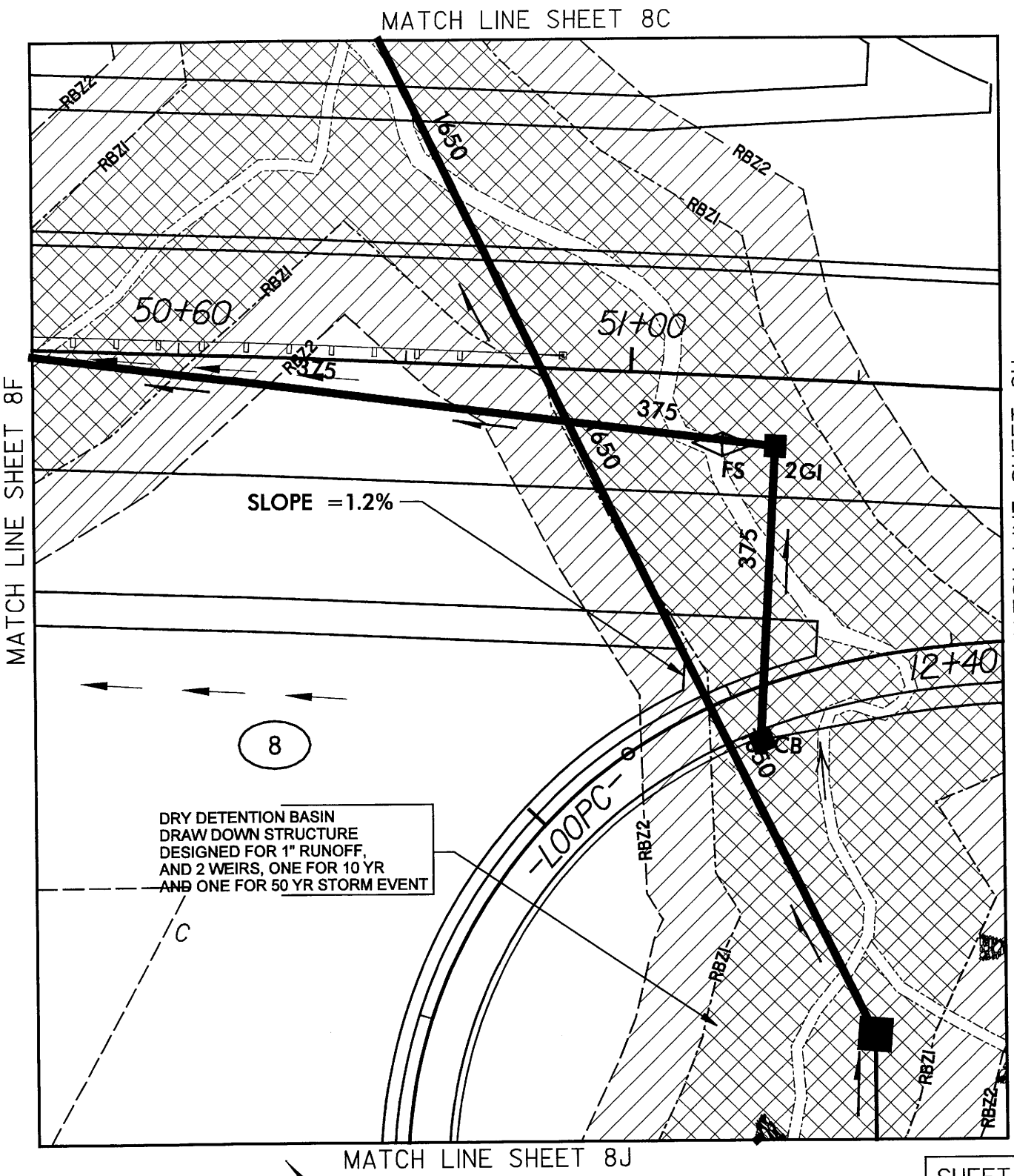

SHEET 8G

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 90 OF 92

12/2006
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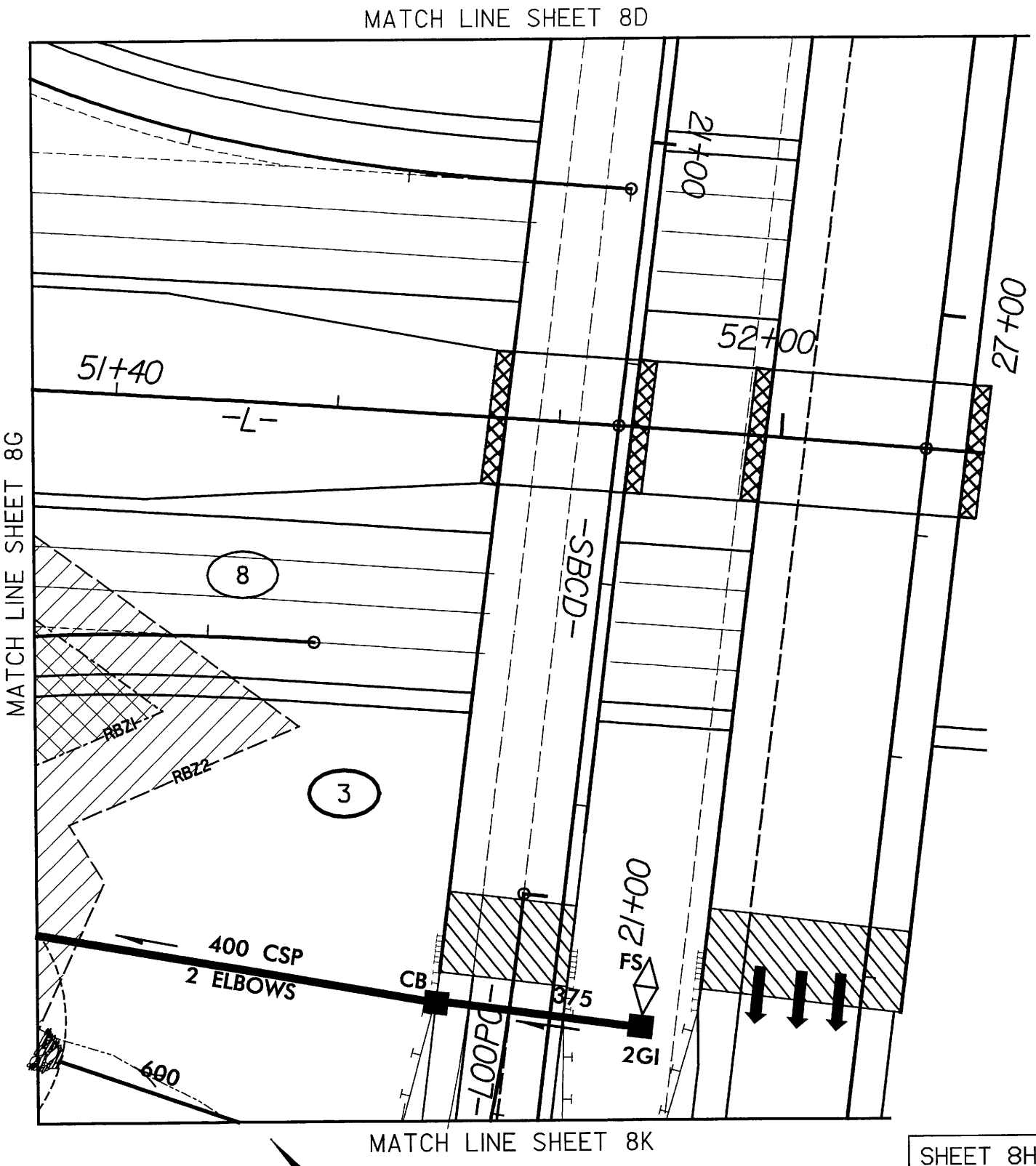

SHEET 8H

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 41 OF 92

12/2006
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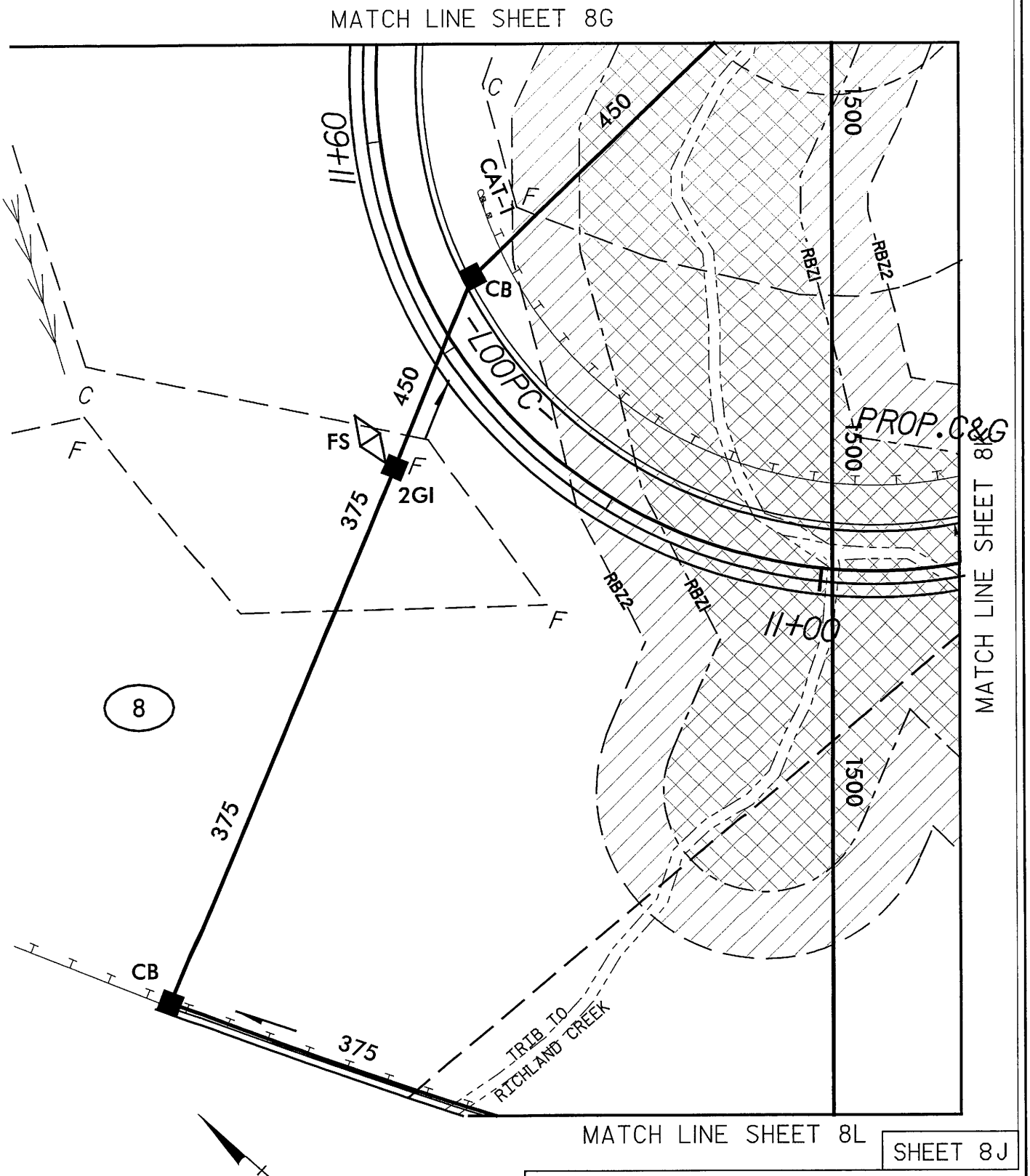

SHEET 8J

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 42 OF 62

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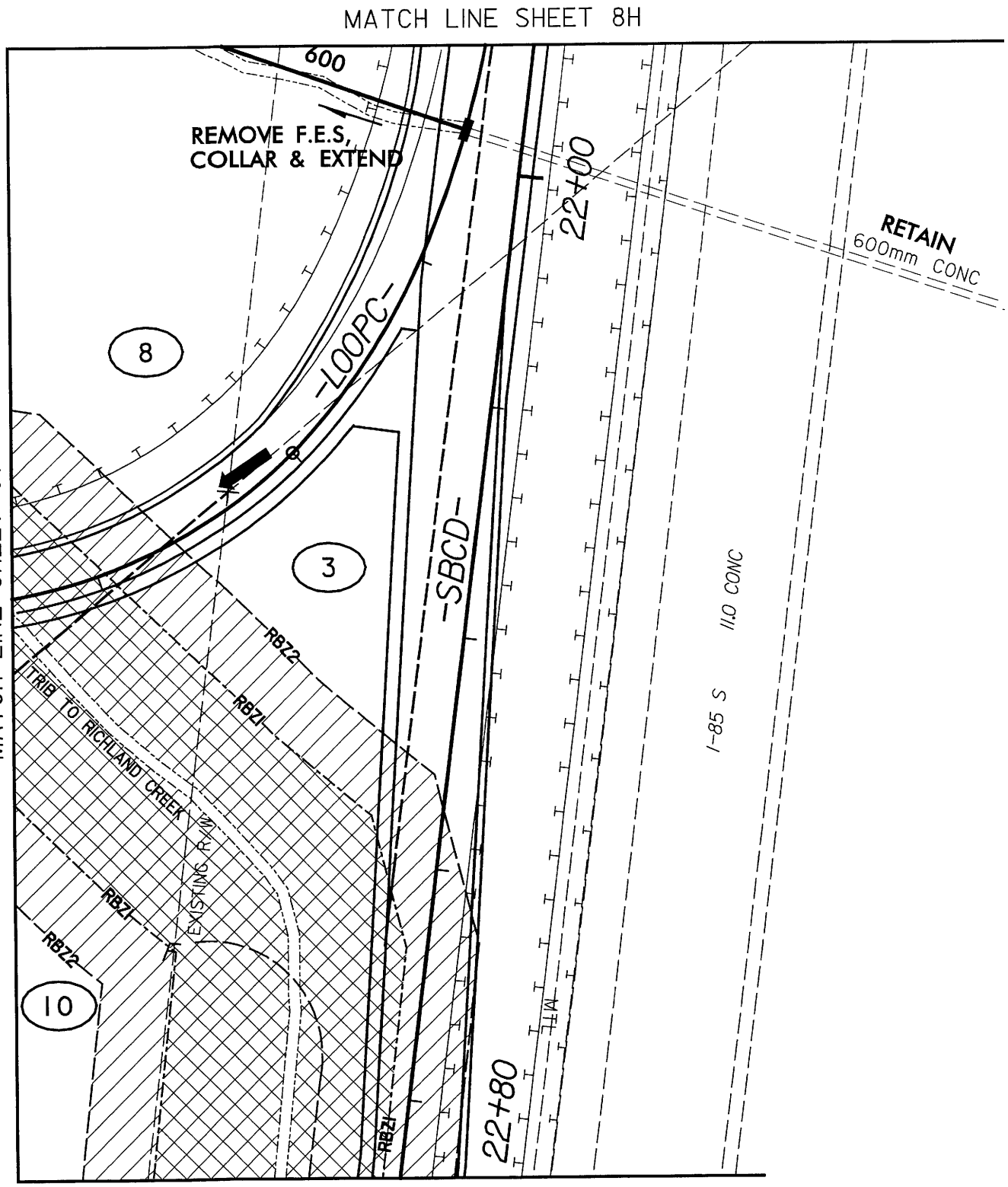

SHEET 8K

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 13 OF 92

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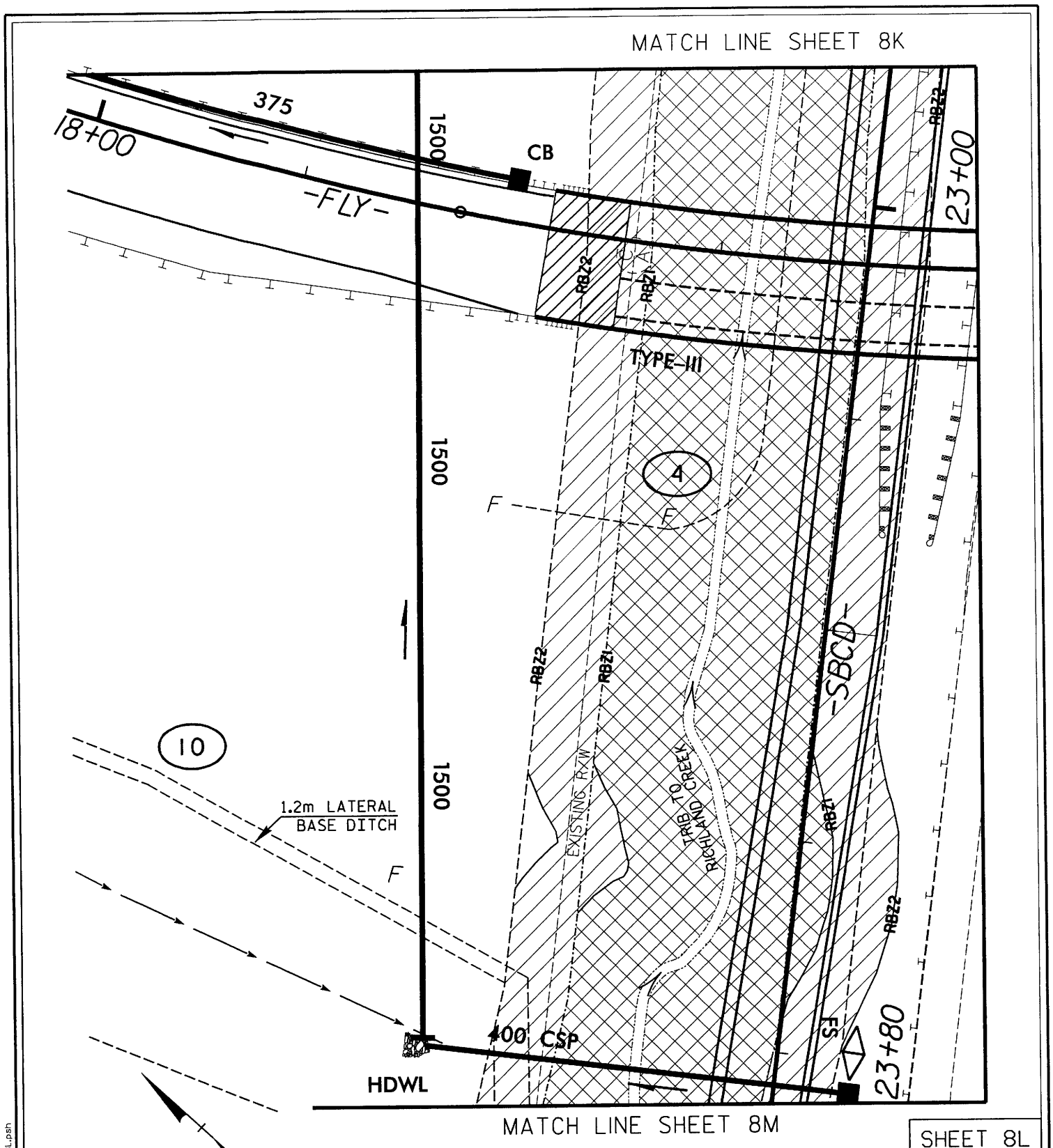

SHEET 8L

LEGEND

- RBZ1 - RIPARIAN BUFFER - ZONE 1
- RBZ2 - RIPARIAN BUFFER - ZONE 2
- MITIGABLE IMPACTS ZONE 1
- MITIGABLE IMPACTS ZONE 2

PLAN VIEW
SITE 8

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 41 OF 62

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MATCH LINE SHEET 8L

CL 'B' RIPRAP W/ FILTER FABRIC

1.2m LATERAL BASE DITCH

CL 'B' RIPRAP W/ FILTER FABRIC

450

1050

1050

1050 STEEL CLASS IV BORE & JACK UNDER -Y6- (I-85)

2GI

RBZ1

RBZ2

COLLAR

24+00

13+60

10

RBZ2

F

EXISTING R/W

600

14+00

-RAMPC-

-SBCD-

9

FS

375

FS

2GI

2GI

24+80

600

SHEET 8M

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70 TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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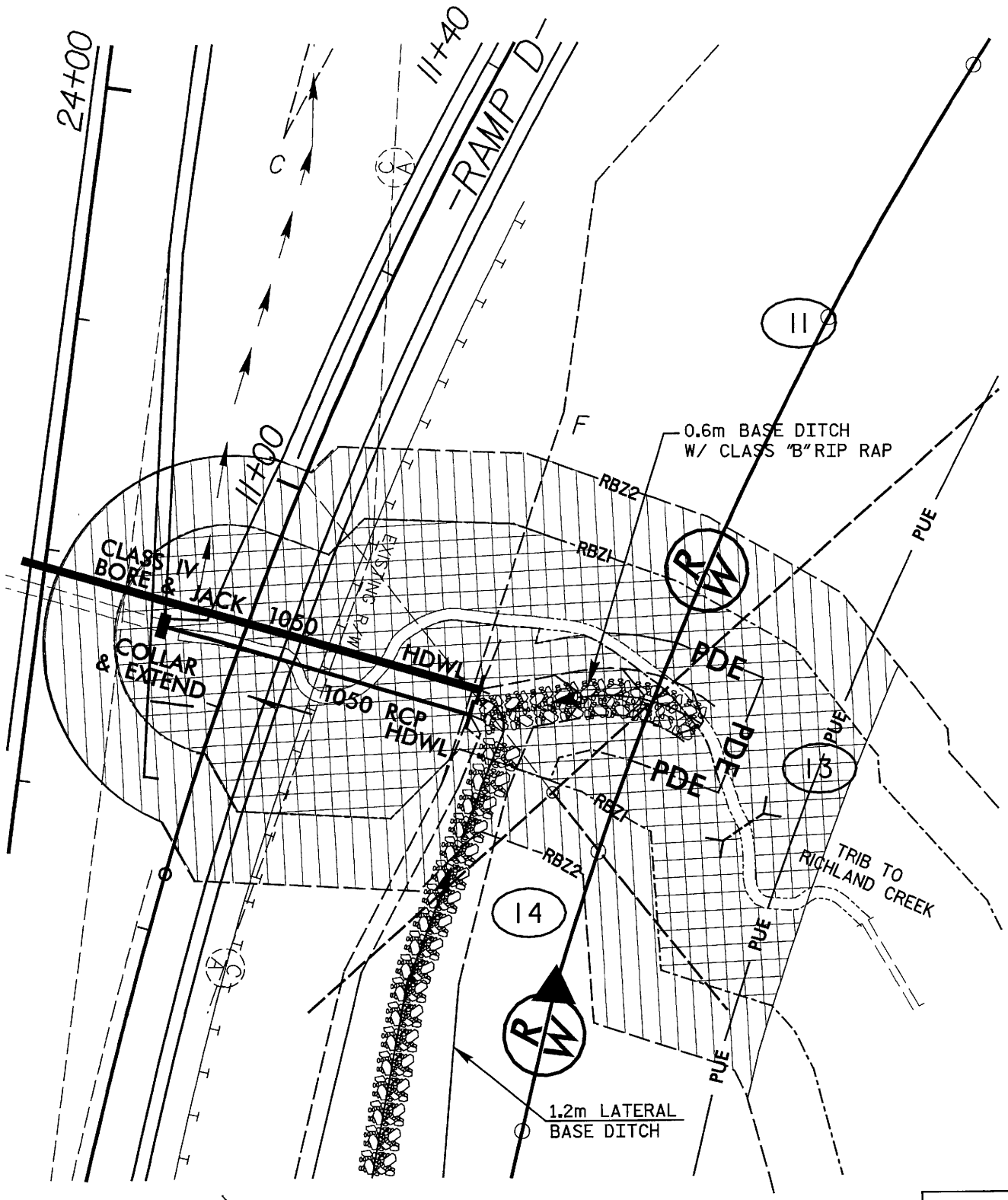

SHEET 8N

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 46 OF 92

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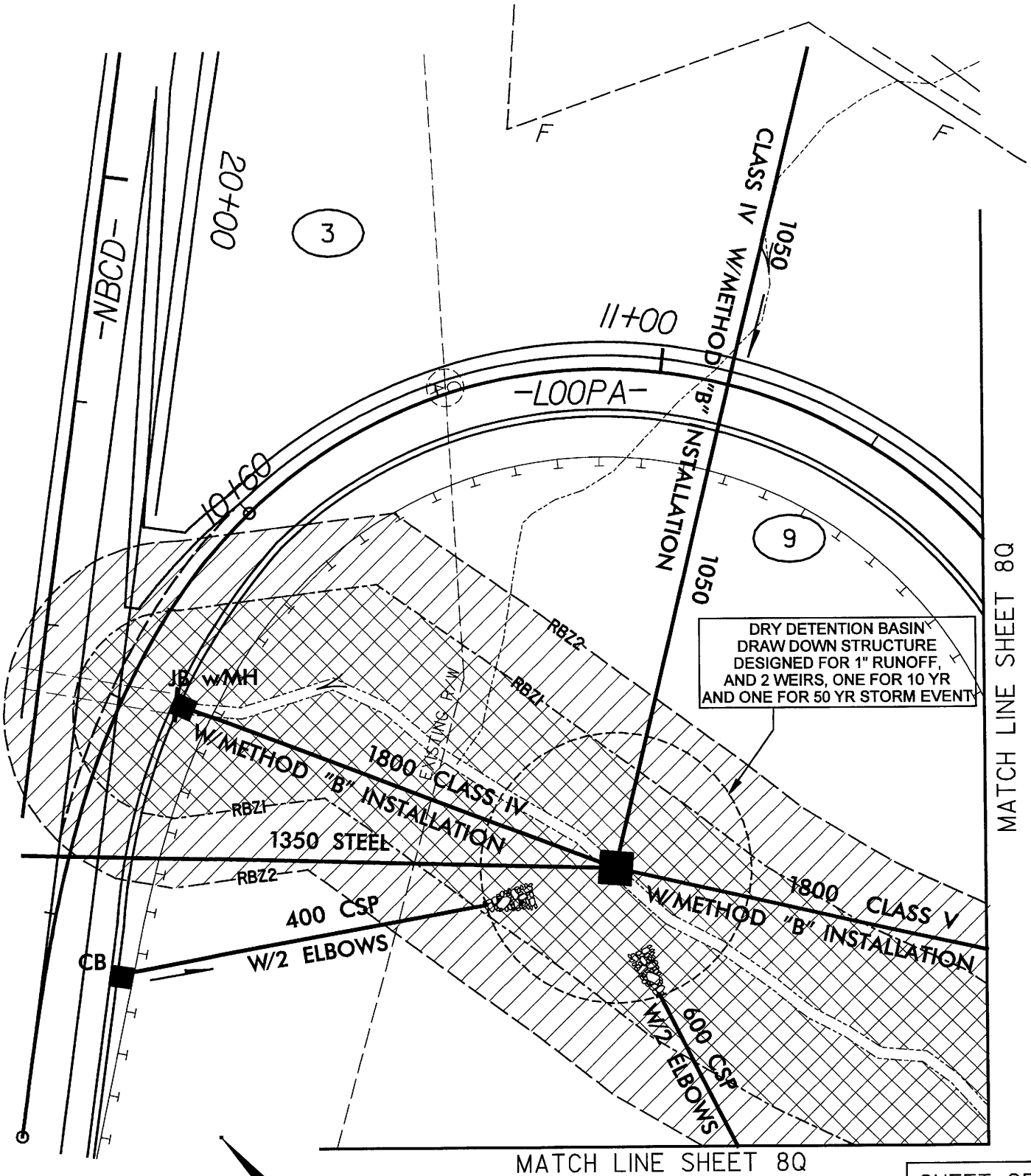

SHEET 8P

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 47 OF 92

19/2006
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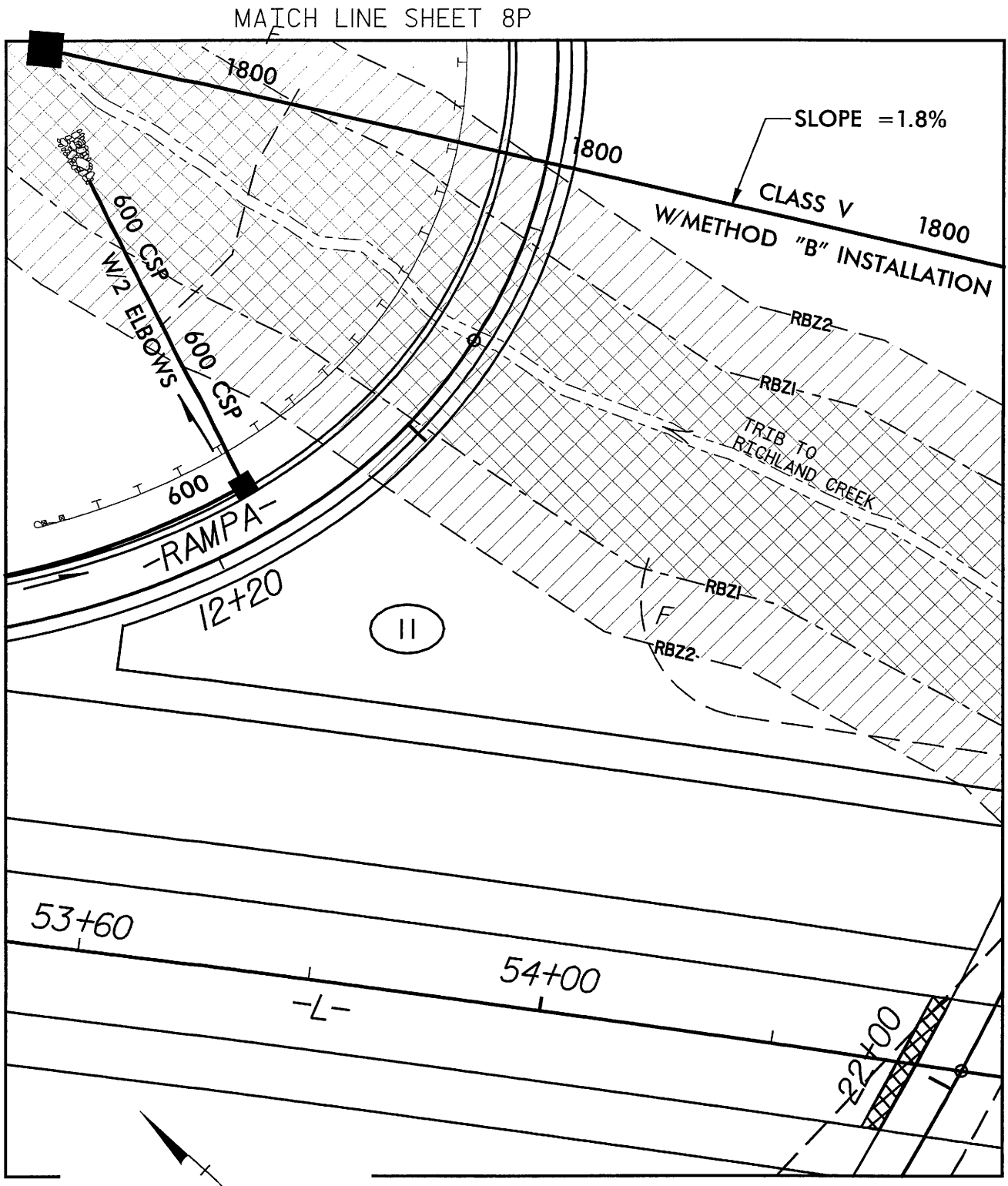

SHEET 8Q

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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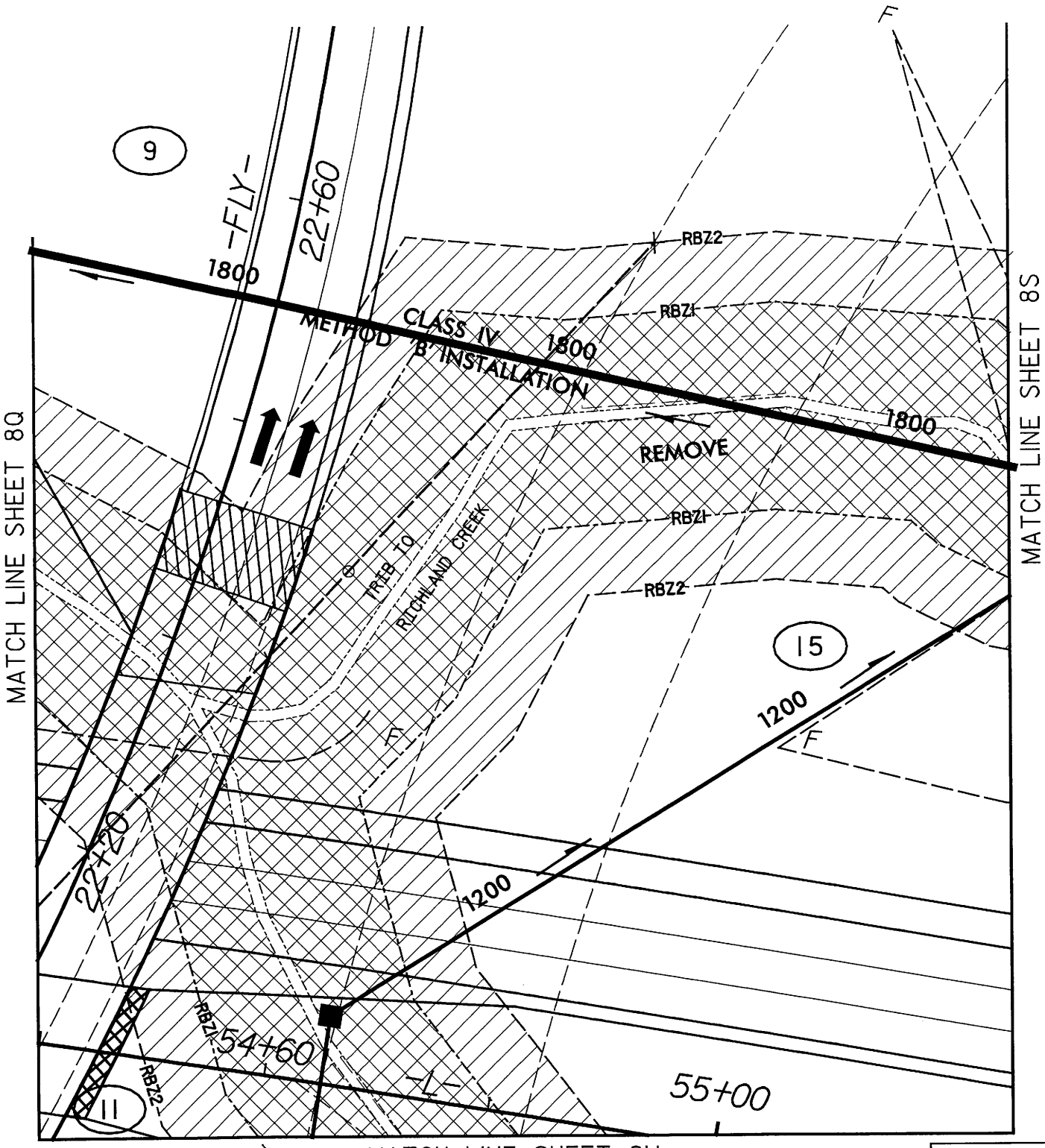

SHEET 8R

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 46 OF 92

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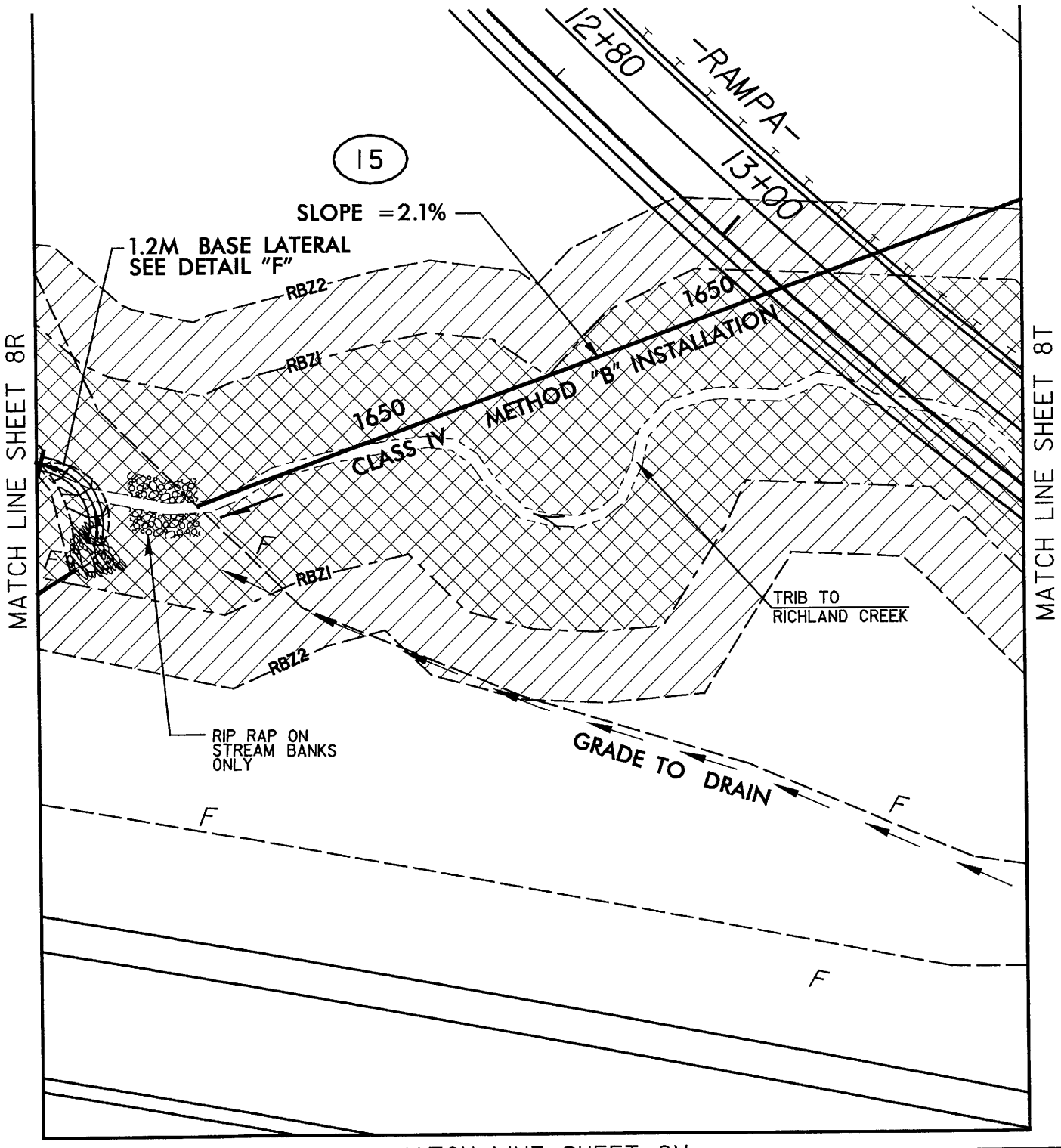

MATCH LINE SHEET 8V

SHEET 8S

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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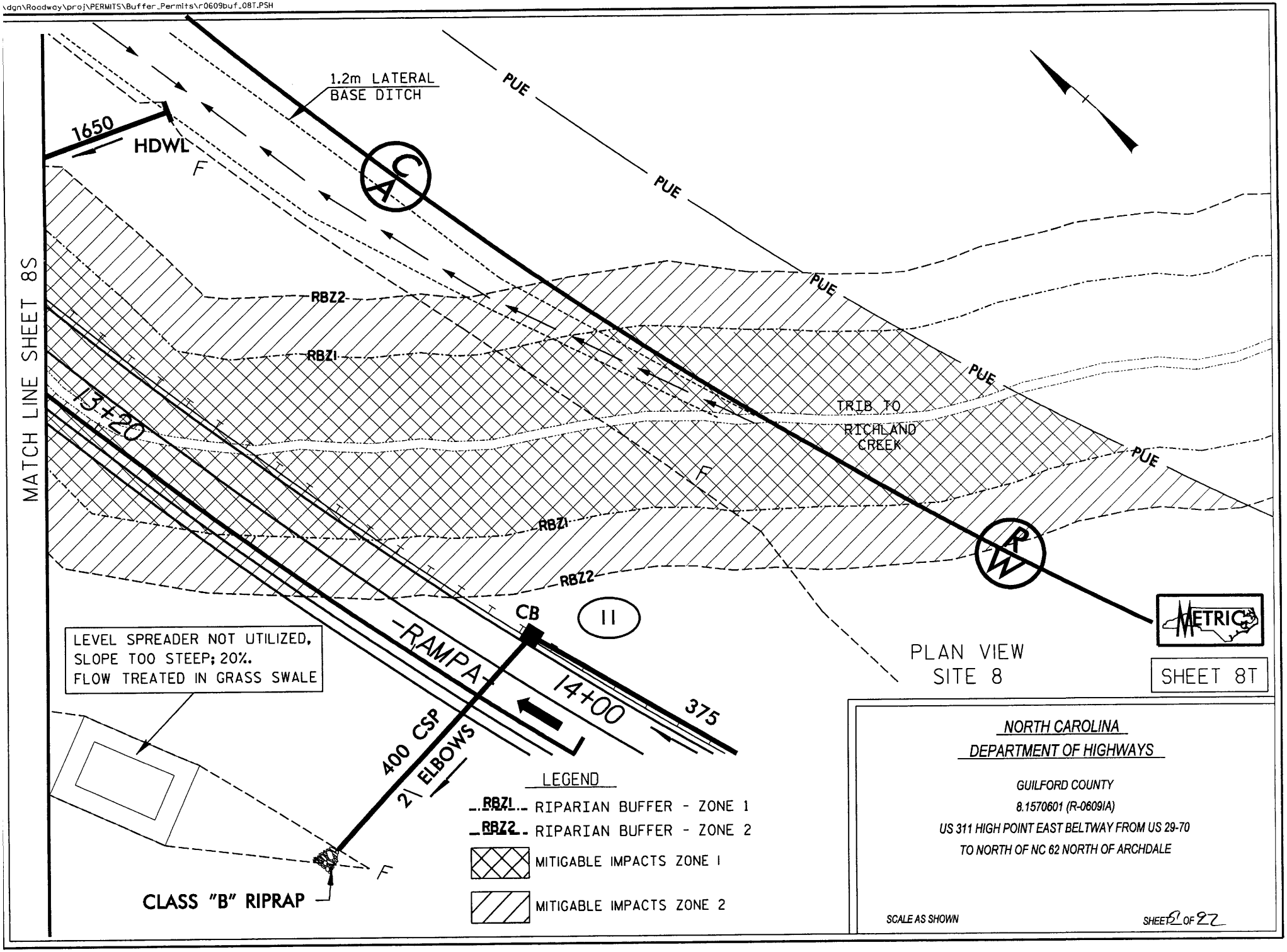
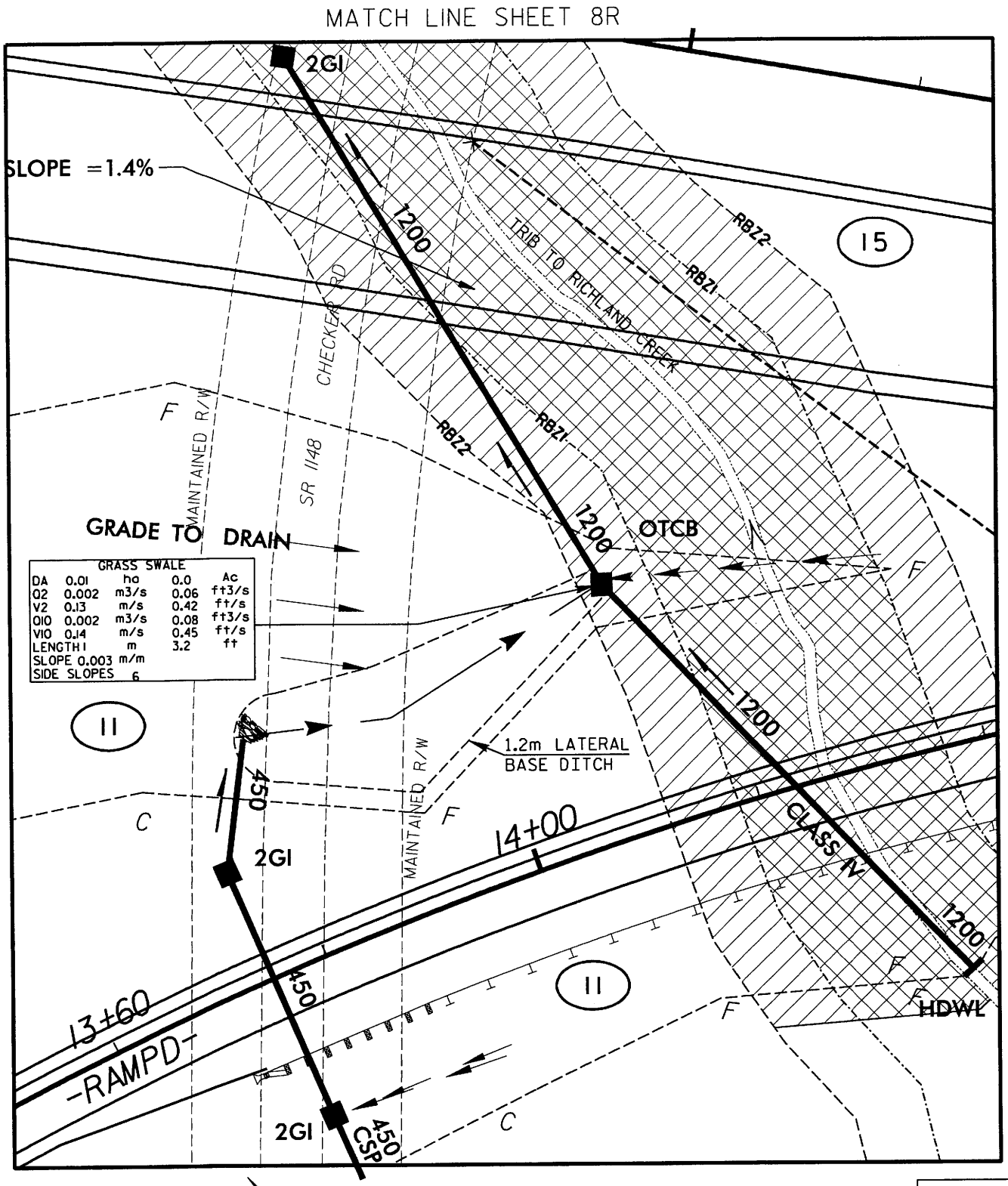

1.2m LATERAL
BASE DITCH
PUE
PUE
PUE
PUE
PUE
1650
HDWL
F
C
A
RBZ2
RBZ1
13+20
TRIB TO
RICHLAND
CREEK
F
RBZ1
RBZ2
P
W
CB
11
RAMP A
14+00
375
400 CSP
2\ ELBOWS
F
CLASS "B" RIPRAP
MATCH LINE SHEET 8S
LEVEL SPREADER NOT UTILIZED,
SLOPE TOO STEEP; 20%.
FLOW TREATED IN GRASS SWALE
LEGEND
RBZ1 RIPARIAN BUFFER - ZONE 1
RBZ2 RIPARIAN BUFFER - ZONE 2
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2
METRIC
PLAN VIEW
SITE 8
SHEET 8T
NORTH CAROLINA
DEPARTMENT OF HIGHWAYS
GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE
SCALE AS SHOWN
SHEET 21 OF 22



SHEET 8U

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 52 OF 92

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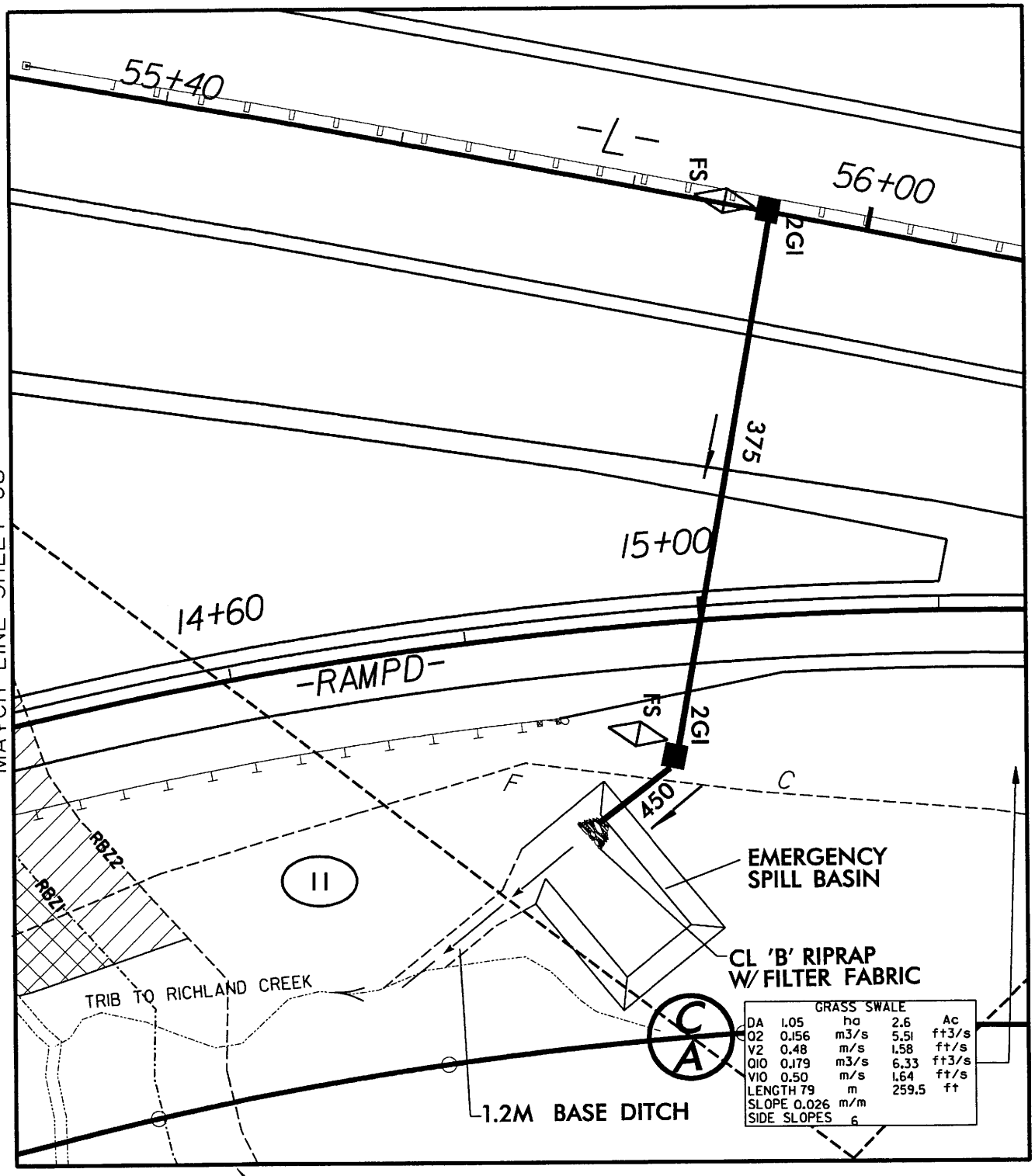
MATCH LINE SHEET 8S



GRASS SWALE				
DA	1.05	ha	2.6	Ac
Q2	0.156	m3/s	5.51	ft3/s
V2	0.48	m/s	1.58	ft/s
Q10	0.179	m3/s	6.33	ft3/s
V10	0.50	m/s	1.64	ft/s
LENGTH 79		m	259.5	ft
SLOPE 0.026		m/m		
SIDE SLOPES		6		

SHEET 8V

PLAN VIEW
SITE 8

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

8.1570601 (R-0609IA)

US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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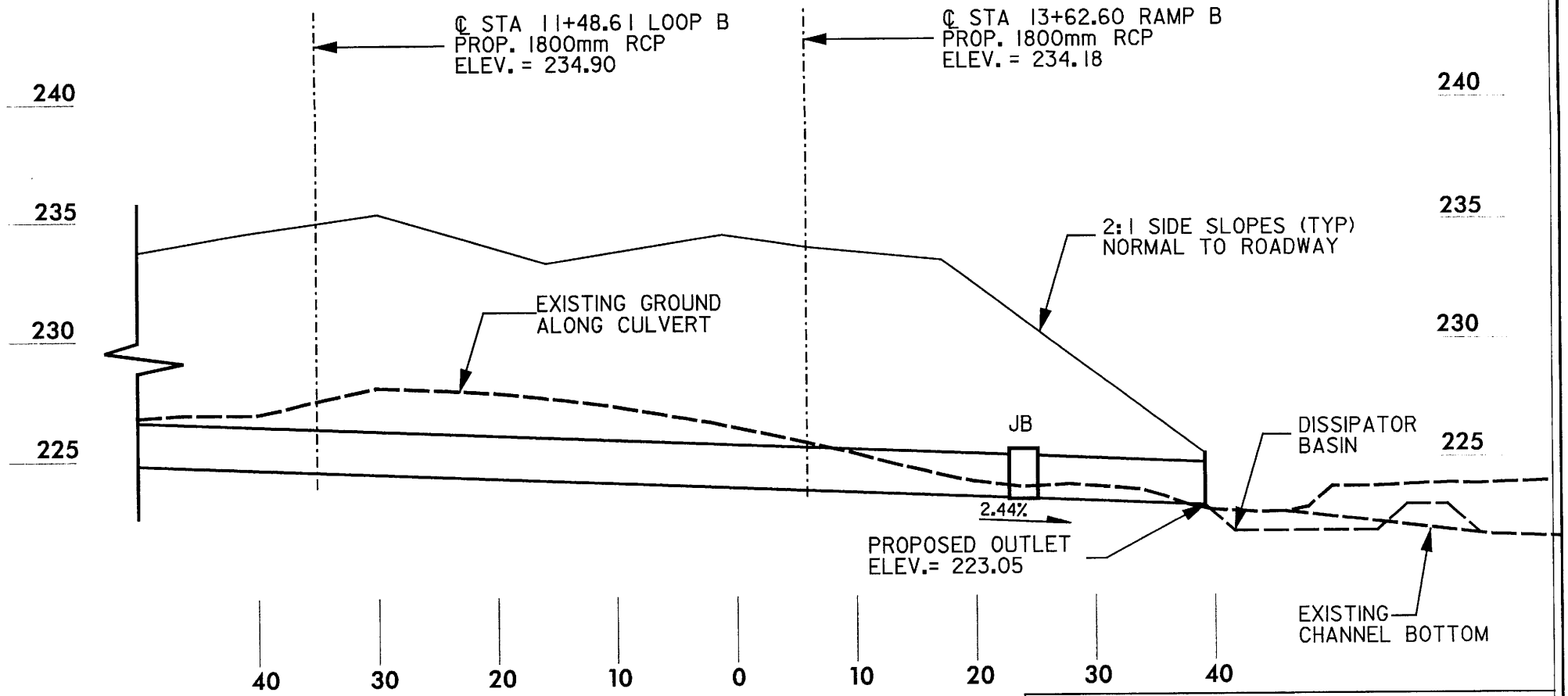


SCALE:
1 = 500 HORIZONTAL
1 = 250 VERTICAL

METRIC

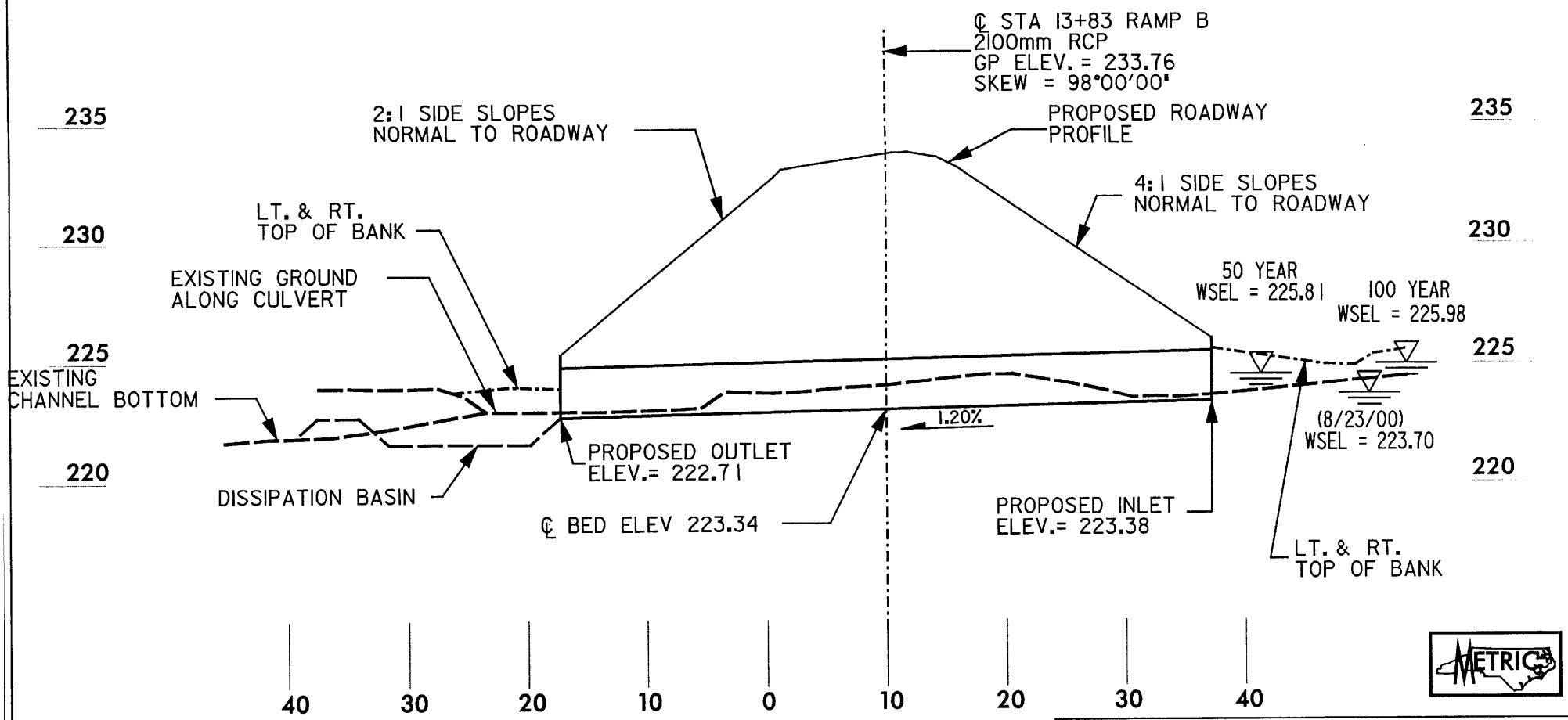
PROFILE
PERMIT SITE 8 (8B & 8C)
1800mm RCP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 54 OF 92



SCALE:
1 = 500 HORIZONTAL
1 = 250 VERTICAL

PROFILE
PERMITE SITE 8 (8B & 8C)
2100mm RCP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 55 OF 92

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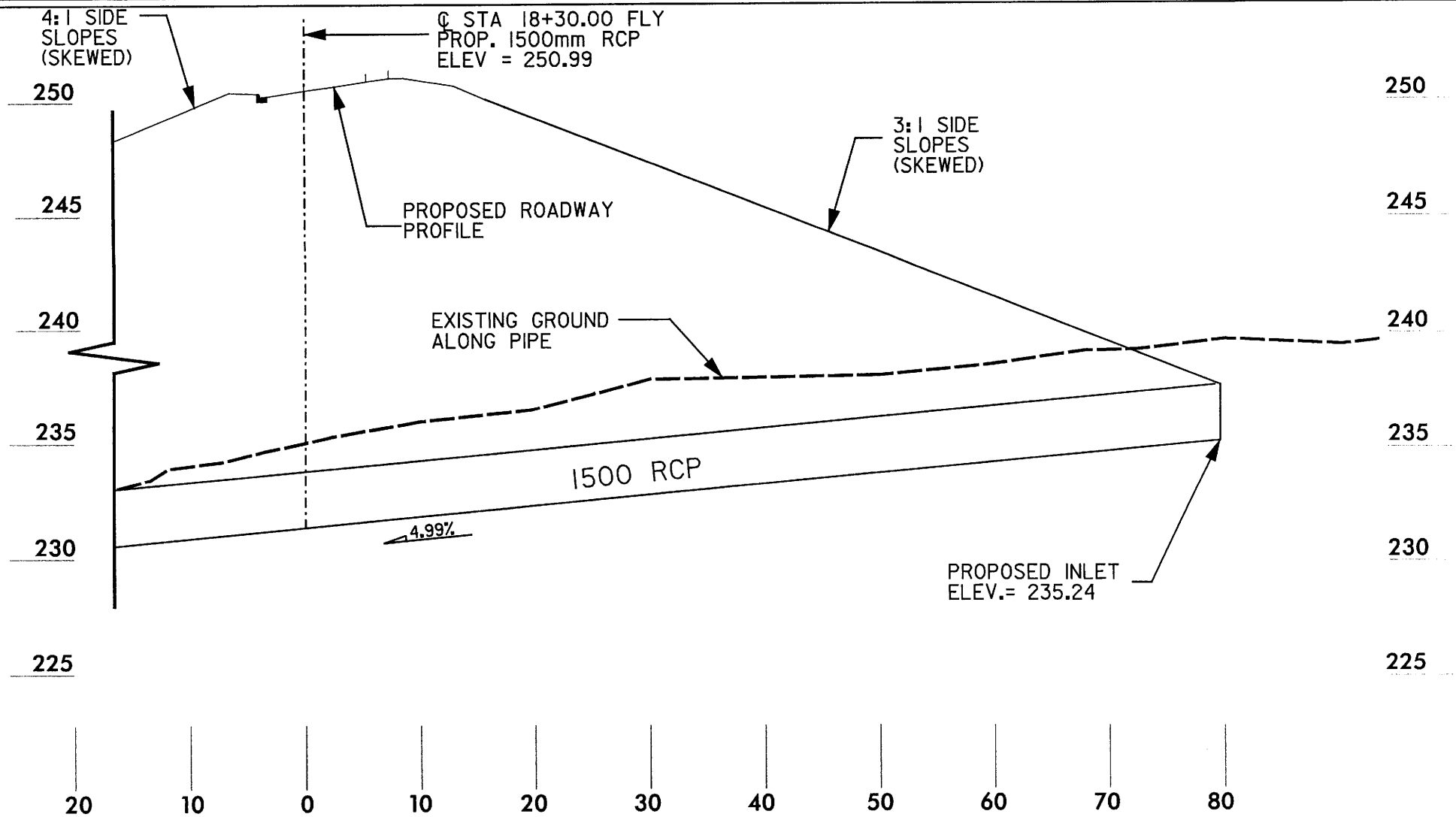

SCALE:
1 = 500 HORIZONTAL
1 = 250 VERTICAL

METRIC

PROFILE
PERMIT SITE 8 (8L)
1500mm RCP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 55 OF 92

8/12/2005
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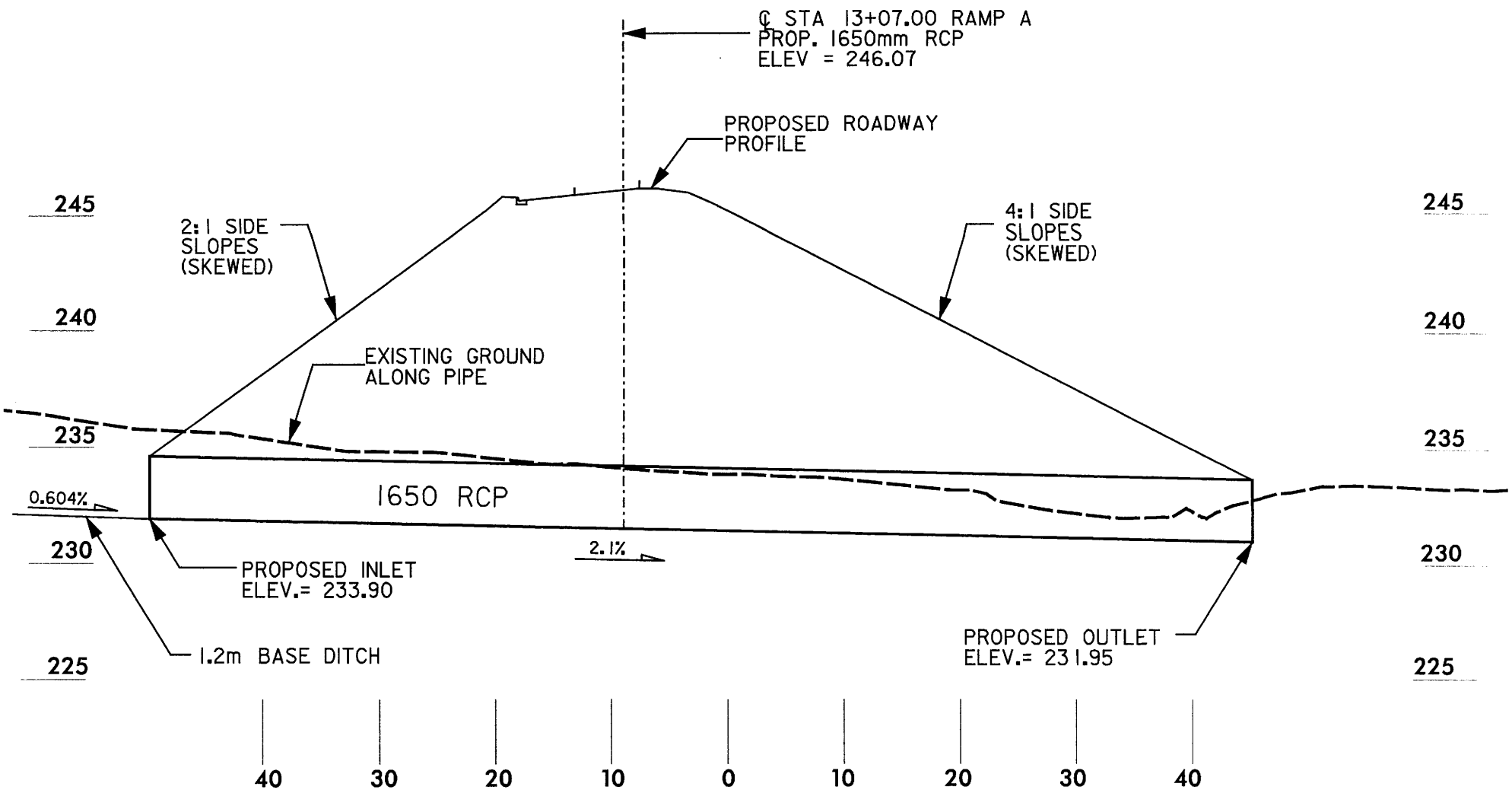


SCALE:
1 = 500 HORIZONTAL
1 = 250 VERTICAL

METRIC

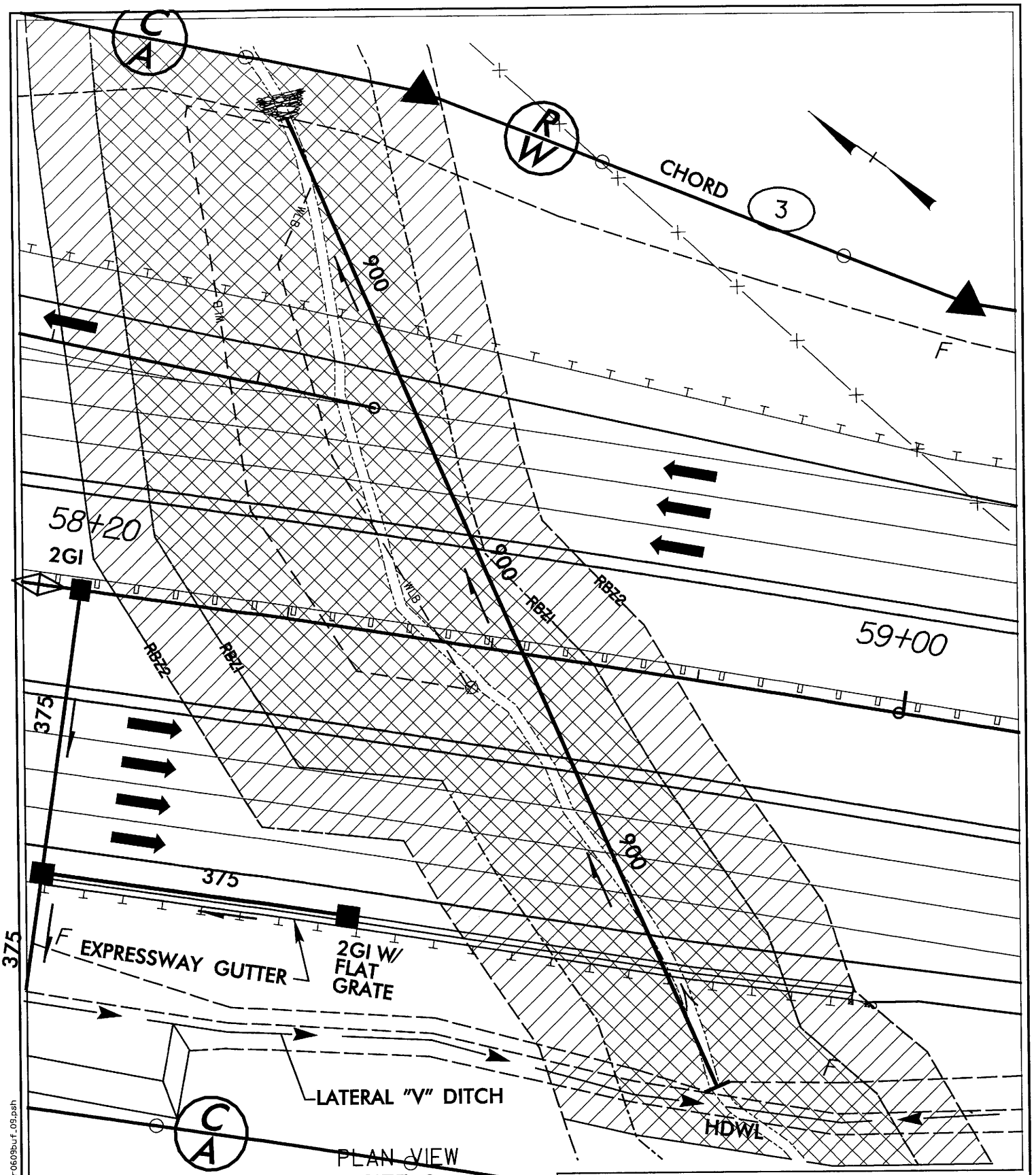
PROFILE
PERMIT SITE 8 (8S & 8T)
1650mm RCP

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 57 OF 92



PLAN VIEW
SITE 9

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1
RBZ2 RIPARIAN BUFFER - ZONE 2
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 58 OF 92

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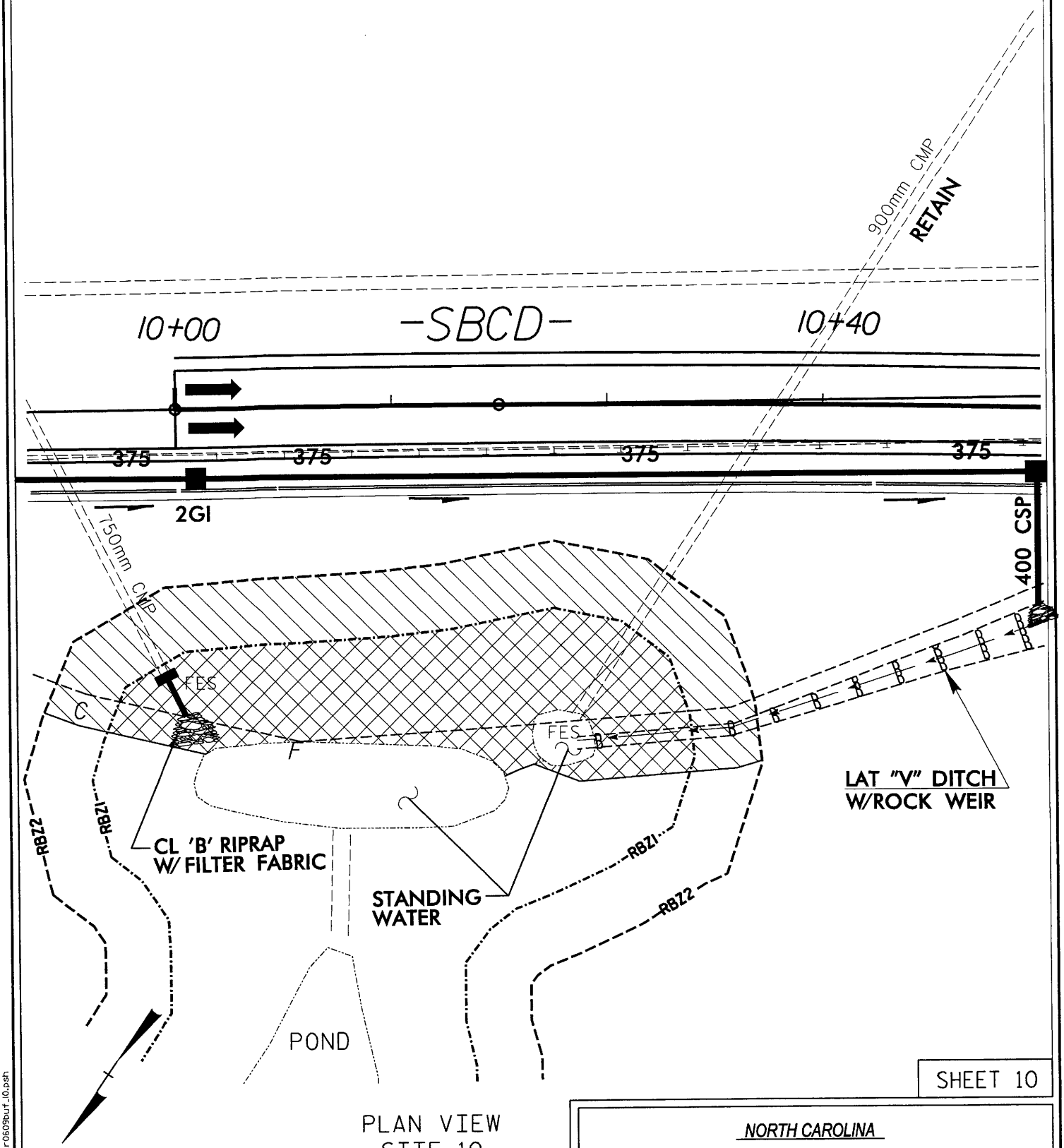

SHEET 10

PLAN VIEW
SITE 10

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 59 OF 92

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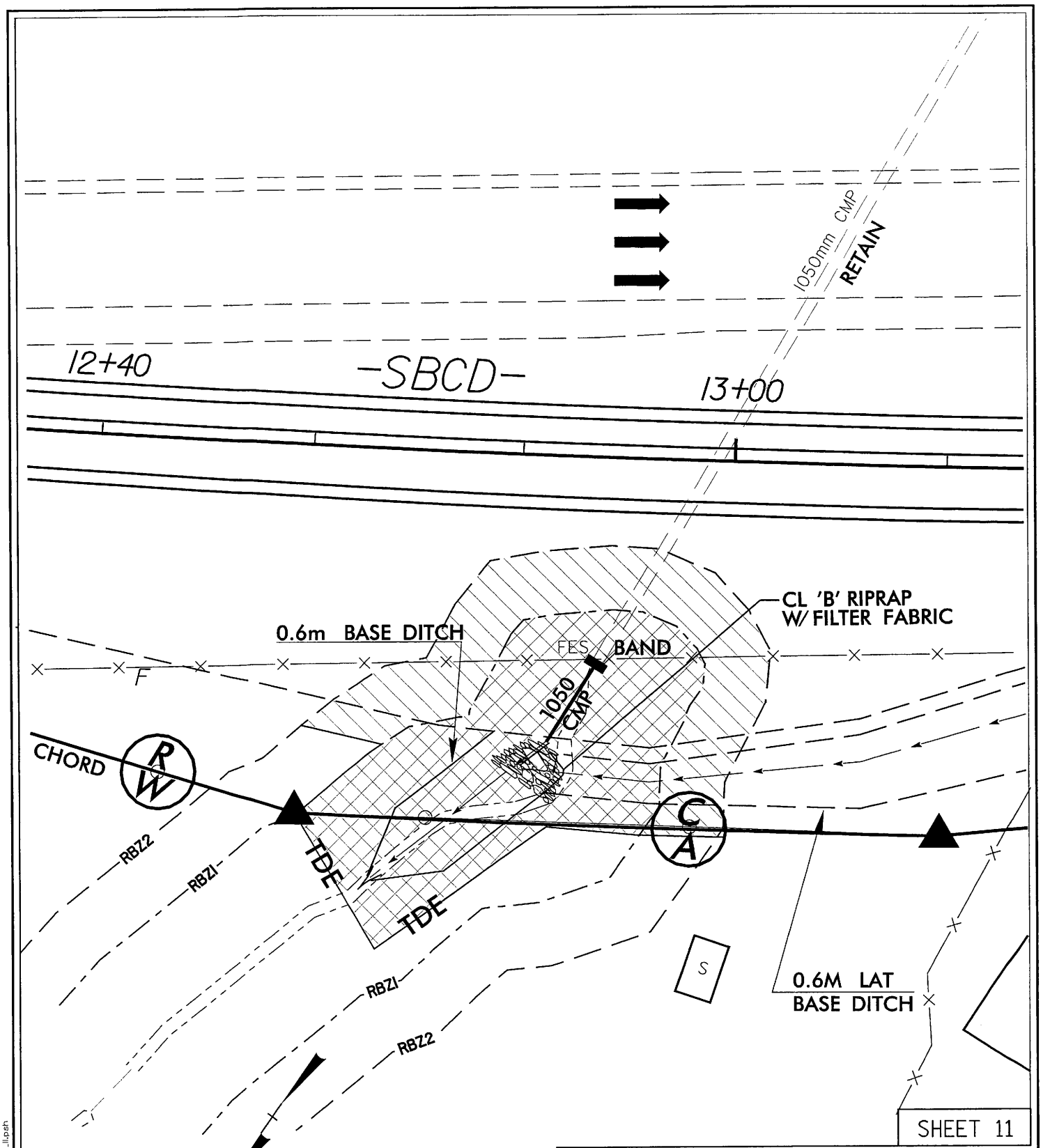

PLAN VIEW
SITE 11

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1

RBZ2 RIPARIAN BUFFER - ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 60 OF 92

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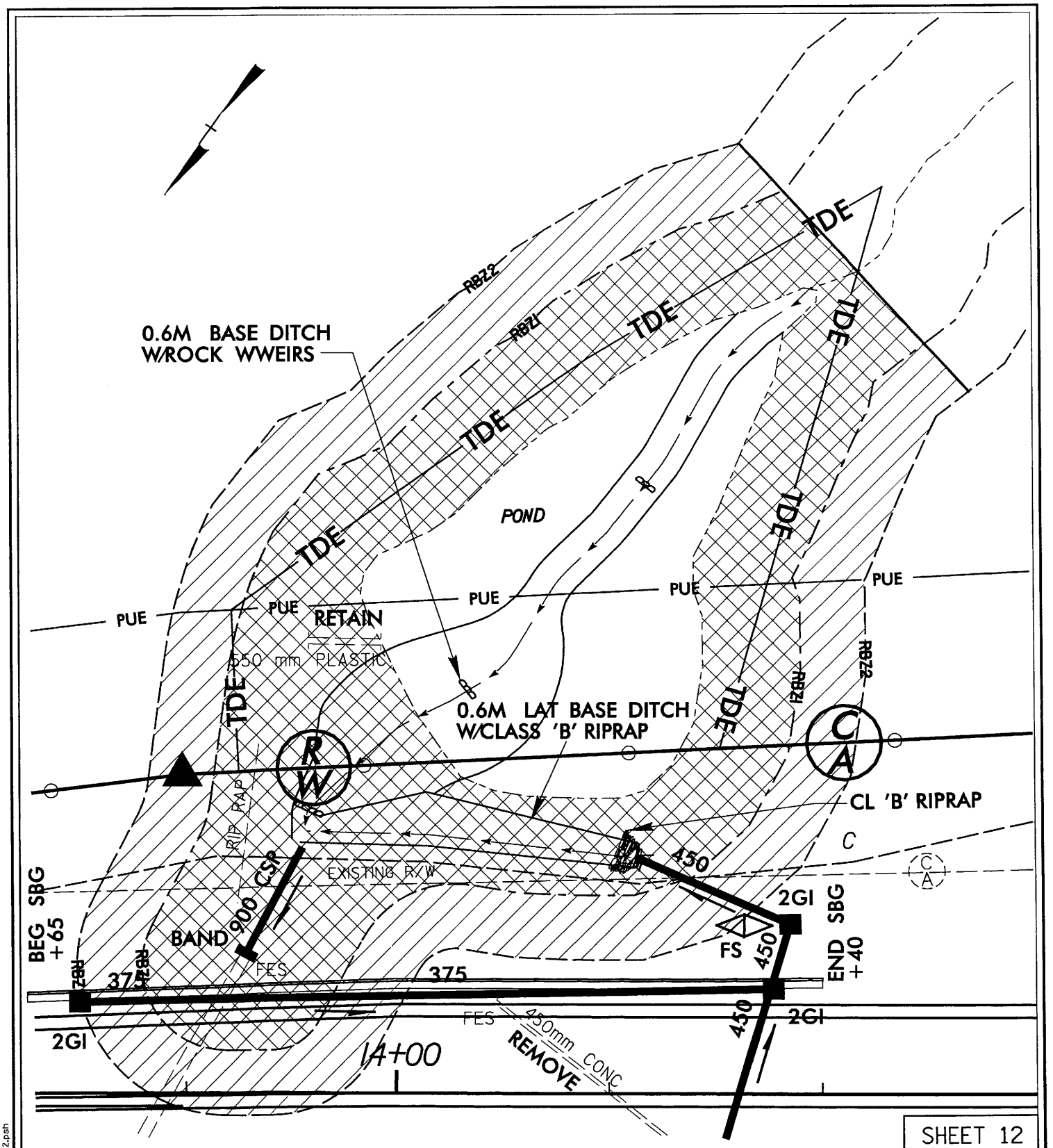

PLAN VIEW
SITE 12

LEGEND

RBZ1 RIPARIAN BUFFER - ZONE 1
RBZ2 RIPARIAN BUFFER - ZONE 2
MITIGABLE IMPACTS ZONE 1
MITIGABLE IMPACTS ZONE 2

METRIC

5 0 10
SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 61 OF 92

3/8/2005
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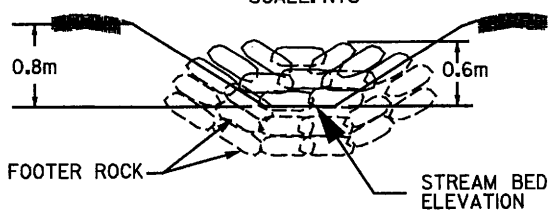
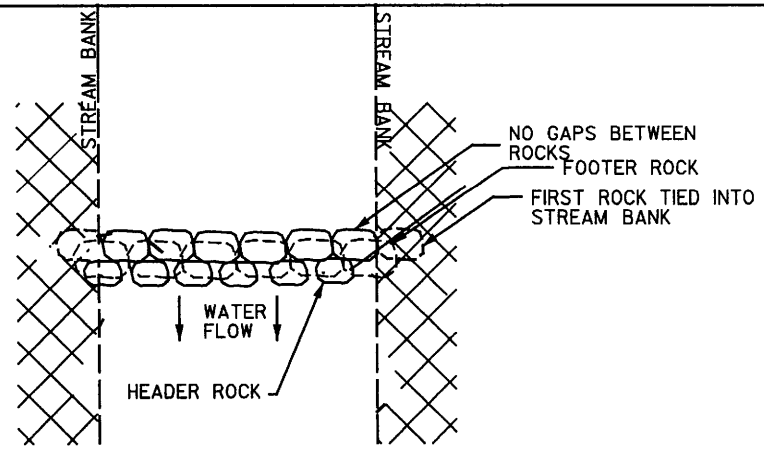
ROCK WEIR

SCALE: NTS



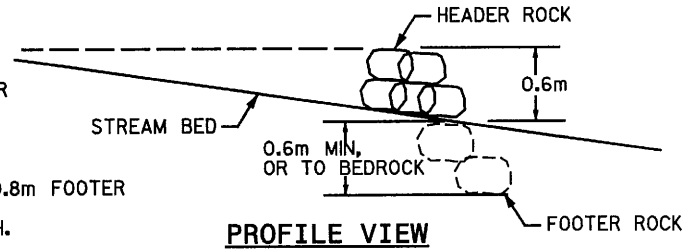
CROSS SECTION



PLAN VIEW

INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.5m X 0.5m X 0.8m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.



PROFILE VIEW

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570801 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 62 OF 92

R-0609IA GUILFORD COUNTY Co. Level Spreaders

Date: 8/11/2005
Dsn. By: RKW
Check:

PLAN SHT.	Align	Station	Total D.A. Ha	Total D.A. (ac)	Ex Ground Slope (%)	Rational C	Q10 138 mm/hr	Q10 5.4 in/hr	Ground Cover None - Forested	Ground Cover Thick - Grass	Level Spreader Design for	Level Spreader Length Required in meters	REMARKS
13	L	40+10R	1.9	4.6	11	0.4	0.284	9.981	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
13	L	40+10L	0.2	0.4	11	0.4	0.023	0.801		X	13 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
13	L	40+15L	0.70	1.73	10	0.4	0.106	3.736		X	13 ft/cfs	**Too Steep for Level Spreader**	**Relocated Channel, No Treatment Required**
13	L	40+50L	1.58	3.90	20	0.7	0.420	14.758		X	13 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
15	L	45+20R	6.46	15.96	10	0.28	0.686	24.136	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
15	L	46+50R	3.02	7.46	11	0.45	0.516	18.134	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
16	RpB	14+50R	0.14	0.35	6	0.4	0.021	0.747	X		100 ft/cfs	**23**	**Flow previously treated in grass swale**
17	RpA	13+60R	34.56	85.40	7	0.2	2.623	92.230	X		100 ft/cfs	**Too Steep for Level Spreader**	**Relocated Channel, No Treatment Required**
17	L	58+70R	1.23	3.04	7	0.5	0.233	8.206	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
17	L	59+10R	0.30	0.74	10	0.6	0.068	2.402	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-609IA)

8/10/2005
SHEET 63 OF 92

R-0609IA GUILFORD COUNTY Co. Level Spreaders

Date: 8/11/2005
Dsn. By: RKW
Check:

PLAN SHT.	Align	Station	Total D.A. Ha	Total D.A. (ac)	Ex Ground Slope (%)	Rational C	Q10 138 mm/hr	Q10 5.4 in/hr	Ground Cover None - Forested	Ground Cover Thick - Grass	Level Spreader Design for	Level Spreader Length Required in meters	REMARKS
7	L	19+80L	2.7	6.6	14	0.4	0.407	14.304	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
7	L	20+20R	0.4	0.9	19	0.4	0.058	2.028	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
9	L	25+65R	1.58	3.90	10	0.7	0.420	14.758	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
10	L	28+20R	0.46	1.14	15	0.6	0.105	3.683	X		100 ft/cfs	**Too Steep for Level Spreader**	**Discharge point is inside of Zone 1 and previously treated**
10	Y2	14+30R	0.29	0.72	12	0.5	0.055	1.935	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
10	L	29+40R	2.32	5.73	15	0.36	0.317	11.144	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**
11	L	33+40L	4.13	10.21	6	0.4	0.627	22.043		X	13 ft/cfs	**87**	**Level Spreader not utilized due to Basin and PSH**
11	L	33+40R	2.47	6.10	8	0.4	0.375	13.183		X	13 ft/cfs	**52**	**USE LEVEL SPREADER**
12	L	35+40L	2.71	6.70	12.5	0.45	0.463	16.272	X		100 ft/cfs	**Too Steep for Level Spreader**	**Flow previously treated in grass swale**

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-609IA)

8/10/2005
SHEET 64 OF 92

R-609 IA Guilford Co. Affected Buffer Areas **Site #1**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 10/1/2003
Dsn. By: HAH/SNR
Check: RKW

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
5	L		11+80L	GS	0.24	0.6	60.0	18	95	0.0035	6	YES	1.42	0.53	1.63	0.54	GS
5	L	2	12+75L	2GI	0.22	0.5	54.4	17	70	0.0035	6	YES	1.28	0.51	1.47	0.53	GS
5	L	6	13+45L	2GI	0.11	0.3	27.2	8	95	0.0275	3	YES	0.51	1.03	0.59	1.07	GS
5	L	9	13+80L	2GI	0.51	1.3	126.0	38	194	0.003	6	YES	2.67	0.58	3.08	0.60	GS
5	L	9	13+80L	SDG	0.03	0.1	7.4	2	20	0.0371	6	YES	0.24	1.53	0.28	1.58	GS
																	GS
5	L	8B	15+05M	2GI	0.21	0.5	51.9	16	69	0.0028	6	YES	1.35	0.89	1.55	0.92	GS
5	L	8	13+85ML	2GI	0.24	0.6	59.3	18	85	0.003	6	YES	1.79	0.98	2.06	1.01	GS
5	L	3	12+75ML	2GI	0.13	0.3	32.1	10	110	0.003	6	YES	0.67	0.76	0.77	0.79	GS
5	L		11+85ML	GS	0.09	0.2	22.2	7	90	0.008	6	YES	0.37	0.95	0.42	0.98	GS
5	L		11+80R	GS	0.31	0.8	77.2	24	145	0.0035	6	YES	2.37	0.60	2.72	0.62	GS
5	L		13+70R	SDG	0.09	0.2	22.2	7	30	0.0271	6	YES	0.52	1.64	0.60	1.70	GS
5	L	7	13+70R	2GI	0.40	1.0	98.8	30	194	0.0035	6	YES	2.33	0.59	2.68	0.62	GS
5	L		14+62R	BERM	0.30	0.7	72.9	22	237	0.07	3	YES	1.03	1.74	1.19	1.80	GS
5	Y1		11+83L	SDG	0.30	0.7	73.6	22	103	0.003	3	YES	1.39	0.58	1.60	0.60	GS
5	Y1	5	13+00L	2GI	0.11	0.3	28.2	9	20	0.0176	3	YES	0.66	0.93	0.76	0.96	GS
5	Y1		13+20L	SDG	0.11	0.3	28.2	9	20	0.0145	6	YES	0.66	1.38	0.76	1.43	GS
5	Y1		13+41L	GS	0.09	0.2	21.0	6	40	0.0298	6	YES	0.50	1.68	0.57	1.74	GS
5	Y1		14+04L	GS	0.02	0.1	5.1	2	20	0.0115	6	YES	0.12	0.82	0.14	0.85	GS
5	Y1		11+65R	SDG	0.13	0.3	30.9	9	86	0.003	3	YES	0.58	0.86	0.67	0.89	GS
5	Y1	4	13+09R	2GI	0.07	0.2	16.3	5	20	0.0184	3	YES	0.38	1.53	0.44	1.59	GS
5	Y1		13+20R	SDG	0.07	0.2	16.3	5	20	0.0145	6	YES	0.38	1.20	0.44	1.24	GS
5	Y1		13+41R	GS	0.04	0.1	10.6	3	40	0.0298	6	YES	0.25	1.41	0.29	1.46	GS
5	L	8A	13+85MR	2GI	0.12	0.3	29.7	9	115	0.004	6	YES	0.49	0.79	0.56	0.82	GS
5	L		11+85MR	GS	0.20	0.5	49.4	15	200	0.005	6	YES	0.82	0.97	0.94	1.01	GS
5	L	470	11+18M	2GI	0.13	0.3	32.1	10	67	0.01	6	YES	0.53	1.13	0.61	1.17	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER
PT=PREVIOUSLY TREATED

METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site #2

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	equired length for treatmen (ft.)	equired length for treatmen (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
6	L	10	17+60L	2G	0.45	1.1	111.2	34	187	0.024	6	**YES**	2.62	1.26	3.02	1.31	GS
6	L		18+00L	GS	0.05	0.1	12.8	4	40	0.024	6	**YES**	0.30	1.37	0.35	1.42	GS
6	L		18+60L	GS	0.05	0.1	12.8	4	40	0.024	6	**YES**	0.30	1.37	0.35	1.42	GS
6	L	12	17+60M	2GI	0.44	1.1	108.7	33	187	0.024	6	**YES**	1.54	1.10	1.77	1.14	GS
6	L	11	17+60R	2GI	0.51	1.3	126.0	38	187	0.024	6	**YES**	3.86	1.39	4.44	1.44	GS
6	L	13A	19+30R	2GI	0.37	0.9	91.4	28	180	0.024	6	**YES**	1.29	1.06	1.49	1.09	GS

2GI = 2 GRATED INLET
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #3**

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
7	L		19+52L	LAT	0.86	2.1	212.5	65	83	0.0444	3	**YES**	4.01	1.86	4.61	1.94	PT
7	L	15	20+40L	2GI	0.16	0.4	39.5	12	55	0.044	3	**YES**	0.75	1.23	0.86	1.28	GS
7	L		21+22L	LAT	0.92	2.3	227.3	69	48	0.085	3	**NO**	4.29	2.87	4.93	2.98	PT
7	L	18	21+70L	2GI	0.31	0.8	76.6	23	48	0.08	3	**YES**	1.45	1.85	1.66	1.93	GS
7	L	13	19+20M	2GI	0.45	1.1	111.2	34	160	0.024	6	**YES**	1.84	1.15	2.11	1.19	GS
7	L	16	20+40M	2GI	0.34	0.8	84.0	26	120	0.024	6	**YES**	1.98	1.18	2.28	1.22	GS
7	L	19	21+80M	2GI	0.39	1.0	96.4	29	120	0.024	6	**YES**	2.27	1.22	2.61	1.26	GS
7	L	13A	19+30R	2GI	0.22	0.5	54.4	17	180	0.024	6	**YES**	1.03	1.85	1.18	1.92	GS
7	L		20+35R	LAT	0.37	0.9	91.4	28	95	0.1233	3	**NO**	1.72	2.45	1.98	2.53	PT

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #4**

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
8	L	21	23+43L	2GI	0.96	2.4	237.2	72	163	0.024	6	**YES**	4.48	1.44	5.15	1.49	GS
8	L	26	25+60L	2GI	0.65	1.6	160.6	49	120	0.024	6	**YES**	3.03	1.31	3.48	1.35	GS
8	L	22	23+51M	2GI	0.48	1.2	118.6	36	171	0.024	6	**YES**	2.80	1.28	3.22	1.33	GS
8	L	27	25+45M	2GI	0.63	1.6	155.7	47	225	0.024	6	**YES**	3.67	1.37	4.22	1.42	GS
8	L		25+40R	GS	0.20	0.5	49.4	15	100	0.024	6	**YES**	1.17	1.03	1.34	1.07	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 68 OF 92

R-609 IA Guilford Co. Affected Buffer Areas Site #5
Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 10/1/2003
Dsn. By: HAH/SNR
Check: RKW

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
9	L		25+25L	TAIL D	0.98	2.4	242.2	74	45	0.0106	3	NO	5.14	1.30	5.91	1.34	PT
9	L	28	26+90L	2GI	0.77	1.9	190.3	58	160	0.01	6	YES	4.04	1.01	4.64	1.05	GS
9	L		27+60L	GS	0.20	0.5	49.4	15	60	0.01	6	YES	1.05	1.34	1.21	1.39	PT
9	L	31	28+00L	2GI	0.30	0.7	74.1	23	100	0.022	6	YES	1.40	1.04	1.61	1.08	GS
9	L		25+80R	TAIL D	2.26	5.6	558.4	170	15	0.003	3	NO	10.01	0.95	11.51	0.98	PT
9	L	33	28+10R	2GI	0.49	1.2	121.1	37	214	0.01	6	YES	3.43	0.97	3.94	1.01	GS
9	L	29	27+20M	2GI	0.44	1.1	108.7	33	210	0.01	6	YES	2.05	0.85	2.36	0.88	GS
9	L	29	27+20M	2GI	0.05	0.1	12.4	4	44	0.009	6	YES	0.23	0.89	0.27	0.92	GS
9	L	32A	28+55ML	2GI	0.12	0.3	29.7	9	91	0.01	6	YES	0.56	1.15	0.64	1.19	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site #6
Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 10/1/2003
Dsn. By: HAH/SNR
Check: RKW

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
10	L	31	27+98L	SDG	0.15	0.4	38.1	12	100	0.003	6	YES	1.08	0.46	1.24	0.48	GS
10	L		28+50L	BASE BERM	3.80	9.4	939.0	286	50	0.016	3	NO	13.29	2.28	15.28	2.37	PT
10	L	33D	29+91L	2GI	0.36	0.9	89.0	27	111	0.01	6	YES	1.89	0.84	2.17	0.87	GS
10	L	34A	31+20L	2GI	0.45	1.1	111.2	34	130	0.01	6	YES	2.36	0.88	2.71	0.92	GS
10	L	33C	32+91LL	2GI	1.48	3.7	365.7	111	140	0.0031	3	YES	7.76	0.90	8.93	0.93	GS
10	L	37	32+00L	SDG	0.32	0.8	79.3	24	80	0.0035	6	YES	1.68	0.55	1.94	0.57	GS
10	L	33E	29+78ML	2GI	0.10	0.2	24.7	8	93	0.01	6	YES	0.47	1.10	0.54	1.14	GS
10	L		30+20M	GS	0.05	0.1	12.4	4	42	0.009	6	YES	0.23	0.89	0.27	0.92	GS
10	L	32	28+14MR	2GI	0.05	0.1	12.4	4	50	0.01	6	YES	0.23	0.92	0.27	0.95	GS
10	L	32B	28+55MR	2GI	0.05	0.1	12.4	4	42	0.01	6	YES	0.23	0.92	0.27	0.95	GS
10	L	33F	29+71MR	2GI	0.09	0.2	22.2	7	86	0.01	6	YES	0.42	1.07	0.48	1.11	GS
10	L		31+20M	GS	0.05	0.1	12.4	4	49	0.01	6	YES	0.23	0.92	0.27	0.95	GS
10	L	34B	31+20M	2GI	0.31	0.8	76.6	23	100	0.019	6	YES	1.45	1.00	1.66	1.03	GS
10	L		28+20R	SDG	0.50	1.2	123.6	38	20	0.074	6	NO	2.91	1.98	3.35	2.05	PT
10	L		28+37R	LAT	12.90	31.9	3187.6	972	17	0.003	3	NO	52.62	1.86	60.51	1.93	PT
10	L		29+55R	LAT	2.32	5.7	573.3	175	20	0.026	3	NO	9.73	2.53	11.19	2.62	PT
10	L	34	31+20R	2GI	0.42	1.0	103.8	32	160	0.01	6	YES	2.69	0.91	3.10	0.95	GS
10	Y2		14+52R	LAT	0.12	0.3	30.1	9	177	0.063	3	YES	0.57	1.44	0.65	1.49	GS
10	Y2		14+00R	LAT	0.33	0.8	81.5	25	52	0.063	3	YES	1.54	1.85	1.77	1.91	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER
PT= PREVIOUSLY TREATED

METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 22 OF 92

R-609 IA Guilford Co. Affected Buffer Areas **Site #7**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated ischarge	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
11	L		33+00L	LAT	3.19	7.9	788.2	240	80	0.0741	3	**NO**	14.87	4.62	17.10	4.80	PT
11	L		33+20L	LAT	4.13	10.2	1020.5	311	20	0.01	3	**NO**	11.55	1.76	13.28	1.82	PT
11	L	36	31+84M	2GI	0.51	1.3	126.0	38	231	0.0211	6	**YES**	2.38	1.17	2.73	1.21	GS
11	L	39	34+15M	2GI	0.43	1.1	106.3	32	155	0.0211	6	**YES**	2.51	1.19	2.88	1.23	GS
11	L		33+40R	LAT	2.47	6.1	610.3	186	60	0.095	3	**NO**	11.51	4.64	13.24	4.81	PT
11	L	40	34+15R	2GI	0.55	1.4	135.9	41	120	0.0211	6	**YES**	3.85	1.32	4.42	1.37	GS

2GI = 2 GRATED INLET
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #8**

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
12	L		35+23L	LAT	6.76	16.7	1670.4	509	15	0.0226	3	**NO**	18.00	2.99	20.70	3.10	PT
12	L	48	37+50L	2GI	0.45	1.1	111.2	34	125	0.0211	6	**YES**	1.57	1.06	1.81	1.10	GS
12	L	42	35+70L	2GI	0.47	1.2	115.6	35	180	0.0211	6	**YES**	1.64	1.07	1.88	1.11	GS
12	L	41	35+70M	2GI	0.18	0.4	44.5	14	65	0.0211	6	**YES**	1.05	0.96	1.21	0.99	GS
12	L	43	36+35M	2GI	0.28	0.7	69.2	21	105	0.0211	6	**YES**	1.63	1.07	1.88	1.11	GS
12	L	46	37+40M	2GI	0.35	0.9	86.5	26	130	0.0211	6	**YES**	3.06	1.25	3.52	1.29	GS
12	L	44	36+35R	2GI	0.47	1.2	116.1	35	235	0.0211	6	**YES**	4.11	1.34	4.72	1.39	GS

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #9**

Date: 10/1/2003
Dsn. By: HAH/SNR
Check: RKW

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
13	L	49	38+75L	2GI	0.15	0.4	37.8	12	85	0.0211	6	YES	0.71	1.61	0.82	1.67	GS
13	L	49	38+75L	SDG	0.02	0.0	4.9	2	22	0.0368	6	YES	0.09	1.20	0.11	1.24	GS
13	L		40+10L	LAT	0.04	0.1	8.6	3	20	0.14	3	NO	0.20	2.80	0.23	2.90	PT
13	L		40+30L	LAT	0.04	0.1	8.6	3	20	0.07	3	NO	0.20	2.16	0.23	2.23	PT
13	L		40+30L	LAT	0.18	0.4	44.5	14	20	0.14	3	NO	1.26	2.37	1.45	2.46	PT
13	L		40+50L	LAT	0.18	0.4	44.5	14	20	0.09	3	YES	0.84	1.82	0.96	1.88	GS
13	L	49A	38+75ML	2GI	0.26	0.6	64.2	20	80	0.0029	6	YES	1.97	0.53	2.26	0.55	GS
13	L	51	38+75MR	2GI	0.13	0.3	32.1	10	80	0.003	6	YES	0.61	0.75	0.70	0.77	GS
13	L	51B	40+70M	2GI	0.44	1.1	108.7	33	80	0.0075	6	YES	2.05	0.77	2.36	0.79	GS
13	L	50	38+70R	2GI	0.25	0.6	62.3	19	90	0.0211	6	YES	1.17	0.98	1.35	1.02	GS
13	L	50	38+70R	SDG	0.03	0.1	7.4	2	20	0.0135	6	YES	0.17	0.96	0.20	0.99	GS
13	L		39+00R	LAT	1.12	2.8	276.8	84	40	0.0975	3	NO	7.83	3.55	9.01	3.70	PT
13	L		39+45R	LAT	1.12	2.8	276.8	84	45	0.077	3	NO	5.22	2.64	6.00	2.76	PT
13	L		40+25R	LAT	1.87	4.6	462.1	141	80	0.0562	3	NO	8.72	3.01	10.02	3.13	PT
13	L		39+95R	LAT	1.87	4.6	462.1	141	86	0.04	3	NO	8.72	2.62	10.02	2.73	PT
13	L		40+25R	LAT	1.87	4.6	462.1	141	66	0.0405	3	NO	8.72	2.64	10.02	2.75	PT
13	Y-3		11+75L	SDG	0.08	0.2	19.8	6	25	0.0512	6	YES	0.33	1.85	0.38	1.92	GS
13	Y-3		13+15L	SDG	0.03	0.1	7.4	2	20	0.0435	6	YES	0.10	1.31	0.12	1.36	GS
13	Y-3		13+15L	SDG	0.40	1.0	98.8	30	125	0.0385	3	YES	2.33	1.71	2.68	1.77	GS
13	Y-3		13+46L	GS	0.35	0.9	86.5	26	94	0.0145	6	YES	1.22	0.86	1.41	0.89	GS
13	Y-3		13+15R	SDG	0.02	0.0	4.9	2	22	0.0468	6	YES	0.07	1.22	0.08	1.26	GS
13	Y-3		13+15R	SDG	0.31	0.8	76.6	23	25	0.0404	3	YES	1.45	1.54	1.66	1.60	GS
13	Y-3		13+46R	GS	0.28	0.7	69.2	21	94	0.0042	6	YES	1.63	0.58	1.88	0.60	GS
13	Y-4		14+72L	LAT	0.85	2.1	210.0	64	30	0.0462	3	NO	3.96	2.13	4.56	2.22	PT
13	Y-4	53	13+73L	SDG	0.17	0.4	42.0	13	15	0.072	6	YES	0.99	1.49	1.14	1.55	GS
13	Y-4	52	13+95R	2GI	0.18	0.4	44.5	14	115	0.0077	6	YES	1.05	0.65	1.21	0.68	GS

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #10**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
14	L	302	42+00M	2GI	0.55	1.4	135.9	41	198	0.00405	6	**YES**	3.85	0.71	4.42	0.74	GS
14	L	301	42+00L	2GI	0.20	0.5	49.4	15	100	0.00405	6	**YES**	0.82	0.90	0.94	0.93	GS
14	L	303	42+00R	2GI	0.64	1.6	158.1	48	140	0.00405	6	**YES**	2.98	0.67	3.43	0.69	GS
14	L	308	43+65M	2GI	0.51	1.3	126.4	39	165	0.00405	6	**YES**	3.28	0.68	3.77	0.71	GS
14	L	309	43+65L	2GI	0.49	1.2	121.1	37	165	0.00405	6	**YES**	2.00	0.60	2.30	0.63	GS
14	L	307	43+65R	2GI	0.83	2.0	203.9	62	165	0.00405	6	**YES**	5.29	0.77	6.08	0.80	GS
14	Y-4		13+40L	GS	0.10	0.2	23.5	7	75	0.0388	6	**YES**	0.33	1.67	0.38	1.73	GS
14	Y-4	53	13+73L	SDG	0.10	0.2	23.5	7	33	0.0341	6	**YES**	0.33	1.60	0.38	1.65	GS
14	Y-4	313	13+80R	2GI	0.10	0.2	24.7	8	33	0.0341	6	**YES**	0.52	1.79	0.60	1.85	GS
14	Y-4	52	14+00R	2GI	0.21	0.5	51.9	16	130	0.0388	6	**YES**	0.73	1.10	0.84	1.14	GS
14	Y-5	305	12+05L	2GI	0.22	0.6	55.1	17	84	0.0697	6	**YES**	0.78	1.39	0.90	1.44	GS
14	Y-5	304	12+00R	2GI	0.64	1.6	158.6	48	81	0.0697	6	**YES**	2.62	1.88	3.01	1.95	GS
14	Y-5		13+80R	GS	0.67	1.7	166.5	51	140	0.0481	6	**YES**	3.14	1.71	3.61	1.77	GS

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site #11
Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
15	L	310	45+20L	2GI	0.31	0.8	76.6	23	155	0.00405	6	**YES**	1.26	1.00	1.45	1.04	GS
15	L		48+40L	GS	0.60	1.5	148.3	45	200	0.0168	6	**YES**	2.80	1.12	3.22	1.16	GS
15	L	311	45+20M	2GI	0.49	1.2	121.1	37	155	0.00405	6	**YES**	2.28	0.63	2.63	0.65	GS
15	L	314	46+60M	2GI	0.46	1.1	113.7	35	140	0.00405	6	**YES**	2.14	0.62	2.47	0.64	GS
15	L		48+40M	GS	0.63	1.6	155.7	47	180	0.0168	6	**YES**	4.41	1.26	5.07	1.30	GS
15	L	315	46+60R	SDG	0.44	1.1	108.7	33	40	0.054	6	**YES**	2.05	1.61	2.36	1.66	GS
15	L	315	46+60R	2GI	0.40	1.0	98.8	30	160	0.00405	6	**YES**	2.33	0.63	2.68	0.65	GS
15	L		48+40R	GS	0.77	1.9	190.3	58	180	0.0169	6	**YES**	4.49	1.26	5.16	1.31	GS
15	Y5		15+30L	GS	0.54	1.3	133.4	41	217	0.0341	6	**YES**	3.15	1.51	3.62	1.56	GS
15	Y5		14+14R	GS	0.03	0.1	6.2	2	36	0.0481	6	**YES**	0.15	1.48	0.17	1.53	GS
15	Y5		14+30R	LAT	6.46	16.0	1596.3	487	30	0.003	3	**NO**	33.12	1.57	38.09	1.63	PT
15	Y5		14+90R	LAT	3.02	7.5	746.2	227	30	0.003	3	**NO**	15.84	1.18	18.21	1.22	PT
15	Y5		15+11R	GS	0.01	0.0	3.2	1	19	0.0568	6	**YES**	0.08	1.34	0.09	1.38	GS
15	Y5	317	15+30R	2GI	0.12	0.3	29.7	9	175	0.0568	6	**NO**	0.70	2.33	0.80	2.41	PT
15	FLY		13+93L	GS	0.40	1.0	98.8	30	175	0.0341	6	**YES**	1.86	1.32	2.14	1.37	GS
15	FLY		13+74R	GS	0.22	0.5	54.4	17	222	0.0568	6	**YES**	1.03	1.38	1.18	1.43	GS
15	FLY	312	12+17R	SDG	0.25	0.6	61.8	19	83	0.0036	6	**YES**	1.17	0.94	1.34	0.97	GS
15	FLY	316	13+54R	SDG	0.18	0.4	44.5	14	54	0.0091	6	**YES**	1.05	1.30	1.21	1.34	GS
15	FLY	316	13+54R	SDG	0.24	0.6	59.3	18	20	0.076	6	**YES**	1.12	1.57	1.29	1.63	GS
15	FLY	316	13+54R	SDG	0.60	1.5	148.3	45	176	0.094	6	**NO**	3.50	2.26	4.02	2.34	PT

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 15 OF 92

R-609 1A Guilford Co. Affected Buffer Areas **Site #12**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
16	L	60	48+40L	2GI	0.60	1.5	148.3	45	180	0.0168	6	YES	3.50	1.19	4.81	1.28	GS
16	L	71	50+40L	2GI	0.27	0.7	66.7	20	120	0.0168	6	YES	1.57	0.97	2.16	1.05	GS
16																	
16	L	61	48+40M	2GI	0.63	1.6	155.7	47	180	0.0168	6	YES	2.94	1.14	4.04	1.23	GS
16	L	65	49+40M	2GI	0.28	0.7	69.2	21	100	0.0168	6	YES	1.63	0.98	2.24	1.06	GS
16	L		50+20M	GS	0.22	0.5	54.4	17	80	0.0168	6	YES	1.28	0.92	1.76	1.00	GS
16	L	72	50+40M	SDG	0.27	0.7	66.7	20	20	0.0194	6	YES	1.57	1.02	2.16	1.11	GS
16	L		50+70M	GS	0.21	0.5	51.9	16	55	0.0303	6	YES	1.22	1.14	1.68	1.23	GS
16	L	72	50+40M	SDG	0.29	0.7	71.7	22	30	0.003	6	YES	1.69	0.52	2.32	0.56	GS
16	L	82	51+15M	2GI	0.53	1.3	131.0	40	220	0.0276	6	YES	3.09	1.38	4.25	1.50	GS
16	L	98	53+35M	2GI	0.38	0.9	93.9	29	135	0.0276	6	YES	2.21	1.27	3.04	1.38	GS
16	L	109	54+70M	2GI	0.42	1.0	103.8	32	150	0.0276	6	YES	2.45	1.31	3.37	1.41	GS
16																	
16	L	62	48+40R	2GI	0.77	1.9	190.3	58	180	0.0169	6	YES	3.59	1.20	4.94	1.30	GS
16	L	66	49+40R	2GI	0.35	0.9	86.5	26	100	0.0168	6	YES	1.63	0.98	2.24	1.06	GS
16	L		50+20R	GS	0.32	0.8	79.1	24	80	0.0168	6	YES	1.49	0.96	2.05	1.04	GS
16	L	73	50+40R	SDG	0.31	0.8	76.6	23	30	0.003	6	YES	1.45	0.93	1.99	1.00	GS
16	L	73	50+40R	SDG	0.43	1.1	106.3	32	100	0.0443	6	YES	2.00	1.48	2.76	1.61	GS
16	L		50+70R	GS	0.21	0.5	51.9	16	30	0.0275	6	YES	0.98	1.04	1.35	1.12	GS
16	L	99	53+35R	SDG	0.11	0.3	27.2	8	30	0.003	6	YES	0.51	0.71	0.71	0.77	GS
16	L	101	53+72R	2GI	0.16	0.4	39.5	12	47	0.0276	6	YES	0.75	0.97	1.03	1.05	GS
16	L	99	53+35R	SDG	0.22	0.5	54.4	17	35	0.034	6	YES	1.03	1.14	1.41	1.23	GS
16	L	110	54+95R	2GI	0.30	0.7	74.1	23	205	0.0276	6	YES	1.40	1.14	1.92	1.23	GS
16	L		54+60R	SDG	0.12	0.3	29.7	9	30	0.0033	6	YES	0.56	0.76	0.77	0.82	GS
16	L	110	54+95R	SDG	0.32	0.8	79.1	24	35	0.0057	6	YES	1.49	0.64	2.05	0.69	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER
NOTE 1: Actual Length includes distance of entire swale from the structure located upstream.
PT=PREVIOUSLY TREATED

METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #12**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/14/2002
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
16	Ramp B	75	12+70L	SDG	0.18	0.4	44.5	14	61	0.003	6	YES	0.84	0.81	1.15	0.88	GS
16	Ramp B	64	15+06L	2GI	0.10	0.2	24.7	8	81	0.016	6	YES	0.47	1.31	0.64	1.42	GS
16	Ramp B	64	15+06L	2GI	0.03	0.1	7.4	2	81	0.021	6	YES	0.14	1.07	0.19	1.16	GS
16	Ramp B	74	12+70R	2GI	0.29	0.7	71.7	22	130	0.0217	6	YES	1.35	1.03	1.86	1.11	GS
16	Ramp B		13+75R	LAT	3.09	7.6	763.5	233	30	0.0567	3	NO	14.40	4.16	19.81	4.51	PT
16	Ramp B	63	15+06R	2GI	0.40	1.0	98.8	30	101	0.0096	6	YES	1.86	0.82	2.56	0.89	GS
16	Ramp B	63	15+06R	2GI	0.18	0.4	44.5	14	59	0.0217	6	YES	0.84	1.70	1.15	1.84	GS
16	Ramp D		13+67L	2GI	0.44	1.1	108.7	33	220	0.0256	6	YES	2.05	1.22	2.82	1.32	GS
16	Ramp D	105	13+75L	SDG	0.01	0.0	3.2	1	8	0.003	6	YES	0.06	0.42	0.08	0.45	GS
16	Ramp D	110	14+10L	LAT	1.15	2.8	284.2	87	33	0.403	3	NO	5.36	6.72	7.37	7.28	PT
16	Ramp D																
16	Ramp D		13+67R	2GI	0.44	1.1	108.7	33	220	0.0256	6	YES	2.05	1.22	2.82	1.32	GS
16	Ramp D	106	13+75R	SDG	0.01	0.0	2.5	1	8	0.003	6	YES	0.05	0.39	0.06	0.43	GS
16	Ramp D	106	13+75R	SDG	0.03	0.1	7.4	2	17	0.0048	3	YES	0.14	0.72	0.19	0.78	GS
* 16	Loop A		11+35L	LAT	0.54	1.3	133.4	41	42	0.003	3	YES	2.52	0.67	3.46	0.72	GS
16	Loop A		11+07L	LAT	0.13	0.3	32.1	10	28	0.1133	3	YES	0.61	1.83	0.83	1.98	GS
16	Loop A		11+07L	LAT	0.64	1.6	158.1	48	15	0.074	3	NO	2.98	2.46	4.10	2.66	PT
16	Loop B		12+15L	LAT	0.34	0.8	84.0	26	50	0.01	3	YES	1.58	0.93	2.18	1.01	GS
16	Loop C	85	11+35L	2GI	0.18	0.4	44.5	14	55	0.1	4	YES	0.84	1.78	1.15	1.93	GS
16	Loop C		50+90R	GS	0.10	0.2	24.7	8	80	0.066	4	YES	0.47	1.31	0.64	1.42	GS
16	Ramp C	68	11+33L	2GI	0.06	0.1	14.3	4	26	0.0341	6	YES	0.27	1.52	0.37	1.64	GS
16	Ramp C		12+45L	SDG	0.16	0.4	39.5	12	40	0.0325	6	YES	0.75	1.03	1.03	1.12	GS
16	Ramp C	68	11+33L	2GI	0.10	0.2	24.7	8	57	0.0164	6	YES	0.47	1.32	0.64	1.43	GS
16	NBCD		19+98L	LAT	0.55	1.4	135.7	41	58	0.13	3	NO	3.20	3.27	4.40	3.54	PT
16	NBCD	92	22+20L	2GI	0.11	0.3	27.2	8	40	0.008	6	YES	0.64	1.09	0.88	1.18	GS
16	NBCD	94	23+30L	SDG	0.07	0.2	17.3	5	35	0.003	6	YES	0.41	0.68	0.56	0.73	GS

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER
PT=PREVIOUSLY TREATED

* NOTE 1: Actual Length includes distance of entire swale from the structure located upstream.

METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas **Site #12**

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
16	Y6	162	25+20L	2GI	0.63	1.6	155.7	47	155	0.0107	6	**YES**	3.67	1.01	5.05	1.10	GS
16	Y6	91	28+07L	2GI	0.30	0.7	74.1	23	99	0.009	6	**YES**	1.75	0.79	2.40	0.85	GS
16	Y6	91	28+07L	SDG	0.14	0.3	34.6	11	47	0.0019	6	**YES**	0.82	0.68	1.12	0.73	GS
16																	
16	Y6	77	25+70R	2GI	0.28	0.7	69.2	21	100	0.0095	6	**YES**	1.63	0.79	2.24	0.86	GS
16	Y6	89	27+60R	2GI	0.48	1.2	118.6	36	170	0.0095	6	**YES**	2.80	0.91	3.85	0.98	GS
16	Y6	90	27+90M	SGD	0.24	0.6	59.3	18	40	0.003	6	**YES**	1.40	0.49	1.92	0.54	GS

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 78 OF 97

R-609 IA Guilford Co. Affected Buffer Areas Site #13

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
17	L		56+40L	RDWY	0.30	0.7	74.1	23	80	0.0275	6	**YES**	1.75	1.20	2.01	1.24	GS
17	L	112	55+90M	2GI	0.79	1.9	194.7	59	250	0.0275	6	**YES**	5.51	1.60	6.34	1.65	GS
17	L	113	55+90R	SDG	1.05	2.6	259.5	79	110	0.0268	6	**YES**	5.51	1.58	6.33	1.64	GS
17	L		57+00R	SDG	0.84	2.1	207.6	63	40	0.003	4	**NO**	3.92	0.70	4.50	0.73	PT
17	L		57+40R	SDG	0.42	1.0	103.8	32	20	0.045	5	**NO**	1.96	1.55	2.25	1.60	PT
17	L		57+60R	SDG	0.16	0.4	39.5	12	40	0.0914	6	**YES**	0.84	1.57	0.96	1.62	GS
17	L		57+80R	GS	0.05	0.1	12.8	4	20	0.0275	6	**YES**	0.39	1.54	0.45	1.59	GS
17	L		58+40R	LAT	0.12	0.3	29.7	9	40	0.08	3	**YES**	0.84	1.74	0.96	1.80	GS
17	L		58+72R	LAT	1.23	3.0	303.9	93	32	0.031	3	**NO**	7.17	2.42	8.24	2.50	PT
17	A		12+80L	LAT	0.46	1.1	113.7	35	70	0.06	3	**YES**	2.14	1.88	2.47	1.95	GS
17	A		13+25L	LAT	0.70	1.7	173.0	53	45	0.0466	3	**NO**	3.26	1.95	3.75	2.03	PT
17	A		13+25L	LAT	34.56	85.4	8539.8	2603	75	0.006	3	**NO**	120.83	3.35	138.95	3.47	PT
17	D		14+70R	LAT	1.90	4.7	469.5	143	20	0.0511	3	**NO**	11.07	3.23	12.73	3.37	PT

2GI = 2 GRATED INLET
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GS = GRASS SWALE

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OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site #14
Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
18	L		60+60L	LAT	2.16	5.3	533.7	163	40	0.05	3	**NO**	8.81	3.15	10.13	3.27	PT
18	L		61+00L	LAT	2.11	5.2	521.4	159	70	0.0333	3	**NO**	8.61	2.62	9.90	2.72	PT
18	L	116	58+40M	2GI	0.58	1.4	142.1	43	177	0.0275	6	**YES**	3.02	1.37	3.47	1.42	GS
18	L		61+00M	GS	0.17	0.4	42.0	13	95	0.0193	6	**YES**	0.65	1.53	0.75	1.58	GS
18	L		59+15R	LAT	0.18	0.4	44.5	14	45	0.066	3	**YES**	1.26	1.79	1.45	1.85	GS
18	L		59+40R	GS	0.30	0.7	74.1	23	65	0.0275	6	**YES**	2.10	1.26	2.41	1.30	GS
18	L		61+00R	GS	0.55	1.4	135.9	41	95	0.0193	6	**YES**	2.88	1.19	3.32	1.23	GS

2GI = 2 GRATED INLET
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site #15

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
20	Y1		10+40L	GS	0.20	0.5	49.4	15	20	0.0298	6	**YES**	0.93	1.96	1.07	2.03	GS
20	Y1		10+80L	SDG	0.25	0.6	61.3	19	40	0.0656	3	**YES**	1.30	1.80	1.50	1.86	GS
20	Y1		10+97L	SDG	0.26	0.6	64.2	20	57	0.003	3	**YES**	1.36	0.57	1.57	0.59	GS
20	Y1		10+97L	SDG	0.15	0.4	36.3	11	23	0.0767	6	**NO**	0.77	2.67	0.89	2.76	PT
20	Y1		11+20L	GS	0.12	0.3	29.7	9	80	0.0114	6	**YES**	0.56	1.21	0.64	1.25	GS
20	Y1		10+60R	GS	0.10	0.2	23.5	7	40	0.0298	6	**YES**	0.50	1.68	0.57	1.74	GS
20	Y1		11+00R	SDG	0.32	0.8	79.8	24	40	0.0369	6	**YES**	1.51	1.29	1.73	1.34	GS
20	Y1		11+00R	LAT	0.35	0.9	85.7	26	240	0.0148	3	**YES**	1.62	1.09	1.86	1.13	GS

2GI = 2 GRATED INLET
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Area Site #15

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
21	Y2		10+45L	GS	0.10	0.2	24.0	7	45	0.0523	6	**YES**	0.40	1.96	0.45	2.03	GS
21	Y2		10+77L	GS	0.23	0.6	56.8	17	32	0.0672	6	**YES**	1.07	1.48	1.23	1.54	GS
21	Y2		11+57L	GS	1.00	2.5	246.6	75	80	0.0493	6	**YES**	4.65	1.91	5.35	1.97	GS
21	Y2		12+20L	GS	1.15	2.8	284.2	87	67	0.00815	6	**NO**	5.36	1.01	6.16	1.04	PT
21	Y2		12+60L	LAT	1.22	3.0	301.5	92	40	0.093	3	**NO**	6.40	3.76	7.36	3.90	PT
21	Y2		13+00L	LAT	1.40	3.5	345.9	105	40	0.003	3	**NO**	7.34	0.87	8.44	0.90	PT
21	Y2		12+50R	GS	0.43	1.1	106.3	32	80	0.04	6	**YES**	2.00	1.43	2.31	1.48	GS
21	Y2		10+80R	GS	0.11	0.3	27.7	8	80	0.0672	6	**NO**	0.65	2.44	0.75	2.52	DGS
21	Y2		11+40R	SDG	0.16	0.4	38.8	12	20	0.0725	6	**NO**	0.73	2.58	0.84	2.67	DGS
21	Y2		11+20R	SDG	0.16	0.4	38.8	12	40	0.0725	6	**NO**	0.73	2.58	0.84	2.67	DGS

2GI = 2 GRATED INLET
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BDOS = BERM DRAINAGE OUTLET STRUCTURE
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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 12 OF 12

R-609 IA Guilford Co. Affected Buffer Areas Site #15

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By: HAH
Check: RKW/SNR

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
22	Y2		16+00L	GS	0.04	0.1	9.9	3	56	0.00127	6	**YES**	0.19	0.40	0.21	0.42	GS
22	Y2		17+40L	GS	0.11	0.3	27.7	8	84	0.0224	6	**YES**	0.52	1.53	0.60	1.58	GS
22	Y2		14+00R	LAT	0.12	0.3	30.1	9	40	0.063	3	**NO**	0.78	2.90	0.90	3.00	PT
22	Y2		15+00R	GS	0.18	0.4	44.5	14	156	0.046	6	**NO**	0.63	2.09	0.72	2.17	PT
22	Y2		16+20R	GS	0.09	0.2	22.2	7	40	0.00127	6	**YES**	0.63	0.55	0.72	0.56	GS

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METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

R-609 IA Guilford Co. Affected Buffer Areas Site # 12

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 6/13/02
Dsn. By:
Check:

SHT.	Align	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided
31		166	23+40R	2GI	0.35	0.9	86.5	26	130	0.0087	6	**YES**	2.04	0.81	2.80	0.88	GS

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B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER

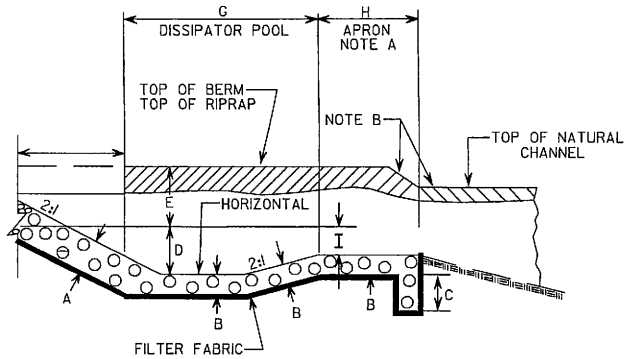
METRIC

NORTH CAROLINA
DEPARTMENT OF HIGHWAYS

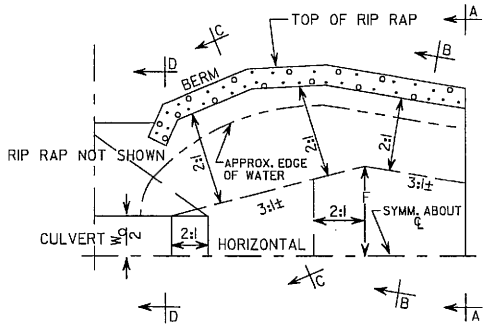
GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

℄ SECTION

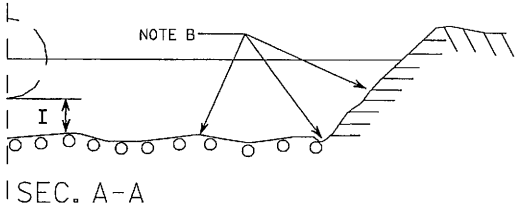


HALF PLAN

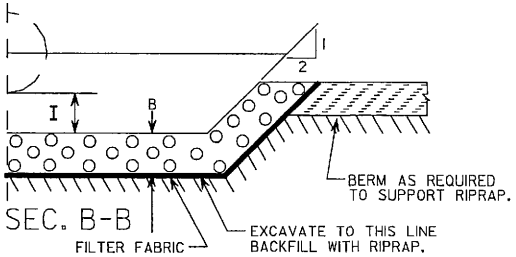


NOTE A IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des /(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED EXIT VELOCITY.

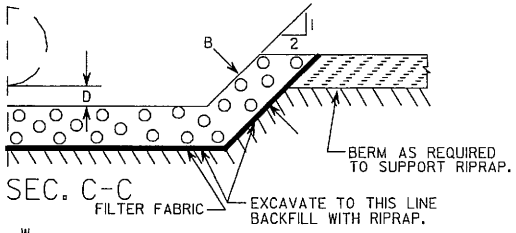
NOTE B WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



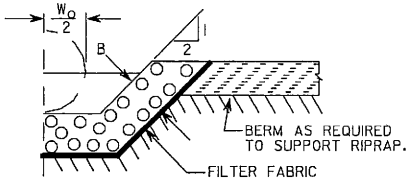
SEC. A-A



SEC. B-B



SEC. C-C



SEC. D-D

NOTE:
W_o = DIAMETER FOR PIPE CULVERT
W_o = BARREL WIDTH FOR BOX CULVERT
W_o = SPAN OF PIPE-ARCH CULVERT

DIM.	RIP RAP BASIN #							
	1	2	3	4	5	6	7	8
A	0.68							
B	0.68							
C	0							
D	1.19							
E	0.30							
F	7.95							
G	11.94							
H	5.97							
I	0.55							

ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	13+80 -RP B-
2	
3	
4	
5	
6	
7	
8	

DETAIL OF RIP-RAPPED ENERGY DISSIPATOR BASIN

METRIC

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET___OF___

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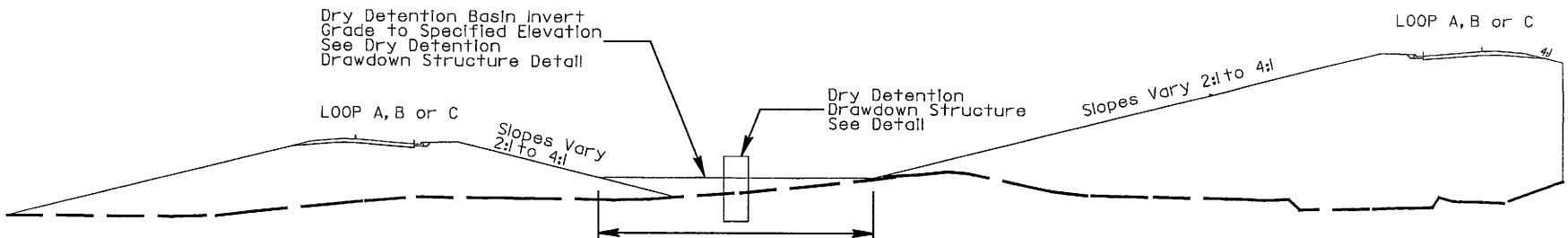
DRY DETENTION BASIN GRADING DETAIL



BASIN INVERT DIAMETER
LOOP A 24M
LOOP B 8M
LOOP C 28M

NOTE:
BASIN NVERT ELEVATIONS HAVE BEEN SET TO PROVIDE 2-3 FEET OF FREEBOARD BETWEEN THE CONTROLLING ROADWAY CENTERLINE ELEVATION AND THE 50 YEAR EVENT. ADJUSTING THE BASIN INVERT OR DRAWDOWN STRUCTURE ELEVATIONS HIGHER THAN INDICATED IN PLANS MAY RESULT IN STORMWATER ENCROACHING INTO THE ROADWAY.

NORTH CAROLINA
DIVISION OF HIGHWAYS

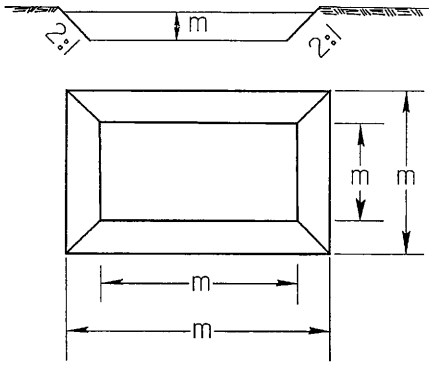
GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 76 OF 92

DETAIL OF EMERGENCY SPILL BASIN

TOTAL CAPACITY REQUIRED : cu. m.
TOTAL CAPACITY PROVIDED : cu. m.



Ditch to be blocked with sandbags 1.0 m deep at outlet

STATION	REQ. VOL. (Cu. m.)	DEPTH (m)	BOTTOM LENGTH (m)	BOTTOM WIDTH (m)	TOP LENGTH (m)	TOP WIDTH (m)	PROVIDED VOL (Cu. m.)
FLY 16+20 L	78	1.0	9.0	5.0	13.0	9.0	81
-L- 34+00 R	104	1.0	10.0	7.0	14.0	11.0	112
-L- 35+60 L	158	1.0	11.0	10.0	15.0	14.0	160
-L- 39+90 L	78	1.0	7.0	7.0	11.0	11.0	85
-L- 40+70 L	103	1.0	8.0	8.0	12.0	12.0	104
-L- 50+40 L	396	1.0	20.0	16.0	24.0	20.0	400
-L- 56+00 L	50	1.0	5.0	5.0	9.0	9.0	53
-L- 58+20 R	77	1.0	11.0	4.0	15.0	8.0	82
-Y5- 14+00 R	275	1.0	17.0	13.0	21.0	17.0	289
-Y5- 15+20 R	178	1.0	14.0	9.0	18.0	13.0	180
RAMPB 12+90 R	174	1.0	14.0	9.0	18.0	13.0	180
RAMPD 15+20 R	127	1.0	12.0	7.0	16.0	11.0	130

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609A)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

SHEET 87 OF 92

SUMMARY OF AFFECTED PROPERTY OWNERS

TRACT NO.	PROPERTY OWNER	ADDRESS	SITE NO.
1	WALTER S. DANIEL	1620 EASTCHESTER DIVE HIGH POINT, NC 27265	1
2	BEVERLY B. CAUDLE	1308 COX AVE HIGH POINT, NC 27263	1
3	NCDOT	P. O. BOX 14996 GEENSBORO, NC 27415	1,2,3,6,8,9
4	LAWSON INGRAM	1603 JACKSON LAKE RD HIGH POINT, NC 27263	3
5	CLIFFORD L. HILL	RT. 4 BOX 385 HIGH POINT, NC 27263	4
6	MARJORIE SURRETT	6802 DRESDEN RD HIGH POINT, NC 27263	5
7	FRANK MARTINEZ	1539 KESEY VALLEY RD HIGH POINT, NC 27263	6
8	BOBBY L. CECIL	1119 LIBERTY RD ARCHDALE, NC 27263	7,8
9	GLENN P. MORGAN	6027 CHECKER RD HIGH POINT, NC 27263	8
10	MR. FOSTER	6861 DRESDEN RD HIGH POINT, NC 27263	8
11	LAWRENCE E. MODLIN	6132 CHECKER RD HIGH POINT, NC 27263	8
12	CHARLES BOYD	1553 KESEY VALLEY RD HIGH POINT, NC 27263	6
13	ROBERT L. SLATE	7008 WINDCREEK CT HIGH POINT, NC 27263	8
14	JERRY W. LEWIS	7010 WINDCREEK CT HIGH POINT, NC 27263	8
15	LILLIE CRUTHERS	6027 CRUTHERS RD HIGH POINT, NC 27263	8
16	W. GERALD LEONARD	6801 JOPLIN DRIVE HIGH POINT, NC 27263	12

METRIC

SCALE IN METERS

NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY
8.1570601 (R-0609IA)
US 311 HIGH POINT EAST BELTWAY FROM US 29-70
TO NORTH OF NC 62 NORTH OF ARCHDALE

SCALE AS SHOWN

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BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (m^2)	ZONE 2 (m^2)	TOTAL (m^2)	ZONE 1 (m^2)	ZONE 2 (m^2)	TOTAL (m^2)	ZONE 1 (m^2)	ZONE 2 (m^2)
1	1350mm	19+60 to 20+20	X					2655.0	1737.1	4392.1		
2	1350mm	25+55 to 25+90	X					2402.3	1371.2	3773.5		
3 (Trib)	900mm	27+95 to 28+35	X					1276.4	1024.6	2300.9		
3 (Main)	Bridge	28+60 to 29+00	X		800.7	788.5	1589.2					
4 (Trib 1)	Stream	32+00		X				643.7	290.5	934.3		
4 (Trib 2)	Stream	33+00		X				1753.3	722.3	2475.6		
4 (Main)	3@3.4m x 2.4m	31+60 to 33+80	X					5321.9	2955.0	8276.9	4042.6	2667.2
5	600mm	35+10 to 35+65	X					832.6	737.1	1569.8		
6	1050mm	40+00 to 40+40	X					3125.8	2003.2	5129.0		
7	1@3.8m x 3.8m	45+30 to 46+50	X					2645.2	1791.0	4436.3		
8 (Trib 1)	Interchange	48+85 to 50+75	X					3004.2	1917.6	4921.8		
8 (Trib 2)	Interchange	51+20	X					770.3	688.1	1458.4		
8 (Trib 3)	Interchange	50+20 to 51+60	X					9564.6	5999.9	15564.5		
8 (Trib 4)	Interchange	50+70 to 51+90	X					1972.7	1557.0	3529.7		
8 (Trib 5)	Interchange	53+00 to 56+75	X					7851.8	5525.0	13376.8		
8 (Trib 6)	Interchange	54+40 to 55+45	X					2284.1	1577.7	3861.8		
9	900mm	58+20 to 59+00	X					2779.3	1507.6	4286.9		
10	900mm	10+20 R -SBCD-	X		551.3	469.7	1021.0					
11	1050mm	12+80 R -SBCD-	X		587.6	398.9	986.5					
12	900mm	14+00 -NBCD-	X					2097.3	1426.5	3523.8	1538.0	1232.0
TOTAL:					1939.6	1657.1	3596.7	50980.6	32831.4	83812.0	5580.6	3899.2

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-6091A)

1/18/2006
SHEET 89 OF 92

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	54 inch	19+60 to 20+20	X					28578	18697	47275		
2	54 inch	25+55 to 25+90	X					25858	14759	40617		
3 (Trib)	36 inch	27+95 to 28+35	X					13738	11028	24766		
3 (Main)	Bridge	28+60 to 29+00	X		8618	8487	17105					
4 (Trib 1)	Stream	32+00		X				6929	3127	10056		
4 (Trib 2)	Stream	33+00		X				18871	7775	26646		
4 (Main)	3@ 11.2 ft x 7.8 ft	31+60 to 33+80	X					57283	31807	89090	43513	28708
5	24 inch	35+10 to 35+65	X					8962	7934	16896		
6	42 inch	40+00 to 40+40	X					33645	21562	55207		
7	1@12.5 ft x 12.5 ft	45+30 to 46+50	X					28472	19278	47750		
8 (Trib 1)	Interchange	48+85 to 50+75	X					32336	20640	52976		
8 (Trib 2)	Interchange	51+20	X					8291	7406	15697		
8 (Trib 3)	Interchange	50+20 to 51+60	X					102950	64581	167531		
8 (Trib 4)	Interchange	50+70 to 51+90	X					21234	16759	37993		
8 (Trib 5)	Interchange	53+00 to 56+75	X					84514	59469	143983		
8 (Trib 6)	Interchange	54+40 to 55+45	X					24586	16981	41567		
9	36 inch	58+20 to 59+00	X					29915	16227	46142		
10	900mm	10+20 R -SBCD-	X		5935	5056	10991					
11	1050mm	12+80 R -SBCD-	X		6325	4294	10619					
12	900mm	14+00 -NBCD-	X					22575	15354	37929	16554	13261
TOTAL:					20878	17837	38715	548737	353384	902121	60067	41969

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-609IA)

1/18/2006
SHEET 90 OF 92

BUFFER IMPACTS SUMMARY

		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (m^2)	ZONE 2 (m^2)
2	25+75 to 25+95	334.2	289.1
8 (Trib 5)	55+70 to 56+60	632.4	171.1
9	58+20 to 59+00	2780.6	0.0
		3747.2	460.2

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-609IA)

2/19/2004
SHEET 91 OF 92

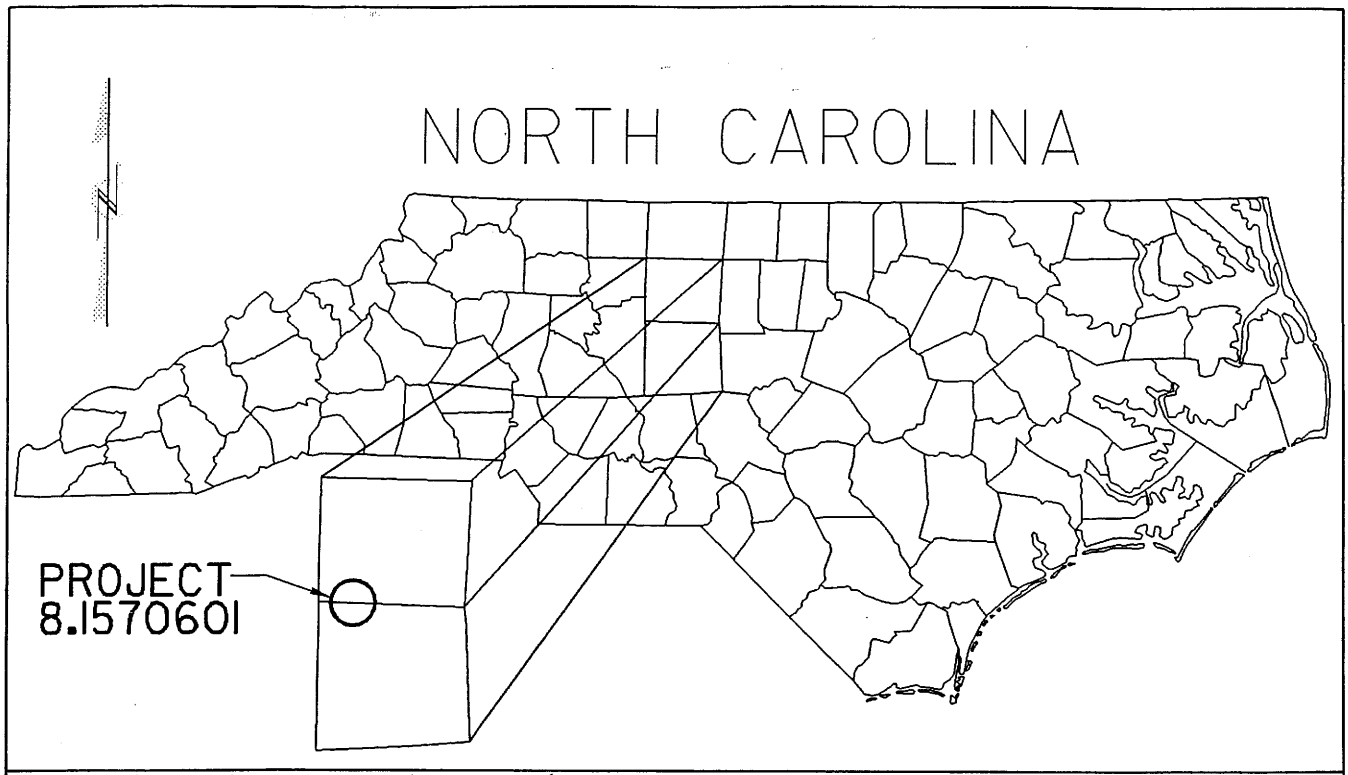
BUFFER IMPACTS SUMMARY

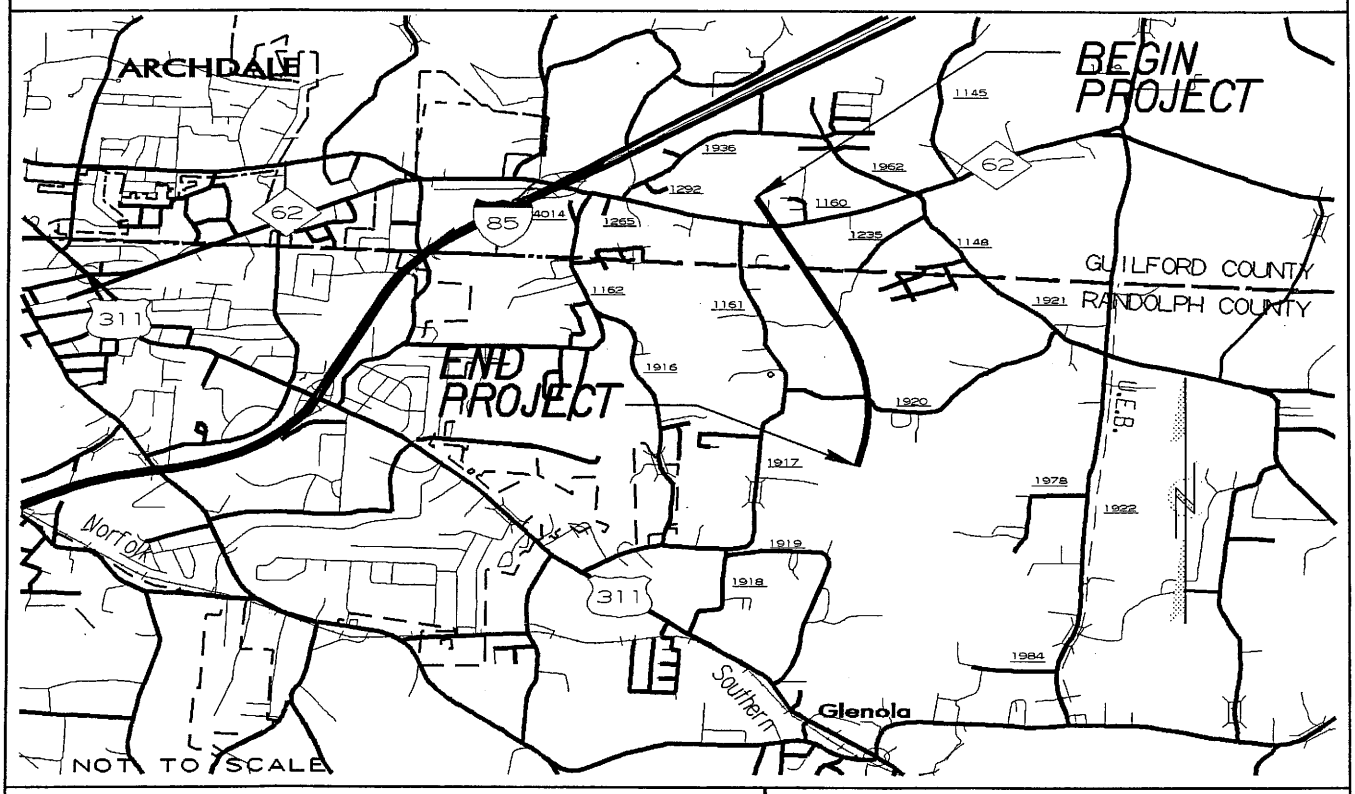
		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (ft^2)	ZONE 2 (ft^2)
2	25+75 to 25+95	3597.2	3111.8
8 (Trib 5)	55+70 to 56+60	6806.9	1841.7
9	58+20 to 59+00	29930.1	0.0
		40334.3	4953.4

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
PROJECT: 8.1570601 (R-609IA)

2/19/2004
SHEET 92 OF 92





WETLAND AND STREAM IMPACTS VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 1 OF 17 **9/27/04**

WETLAND LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

F F — DENOTES FILL IN WETLAND

S S — DENOTES FILL IN SURFACE WATER

P P — DENOTES FILL IN SURFACE WATER (POND)

T T — DENOTES TEMPORARY FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT

12"-48" PIPES

54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE

LEVEL SPREADER (LS)

DITCH / GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

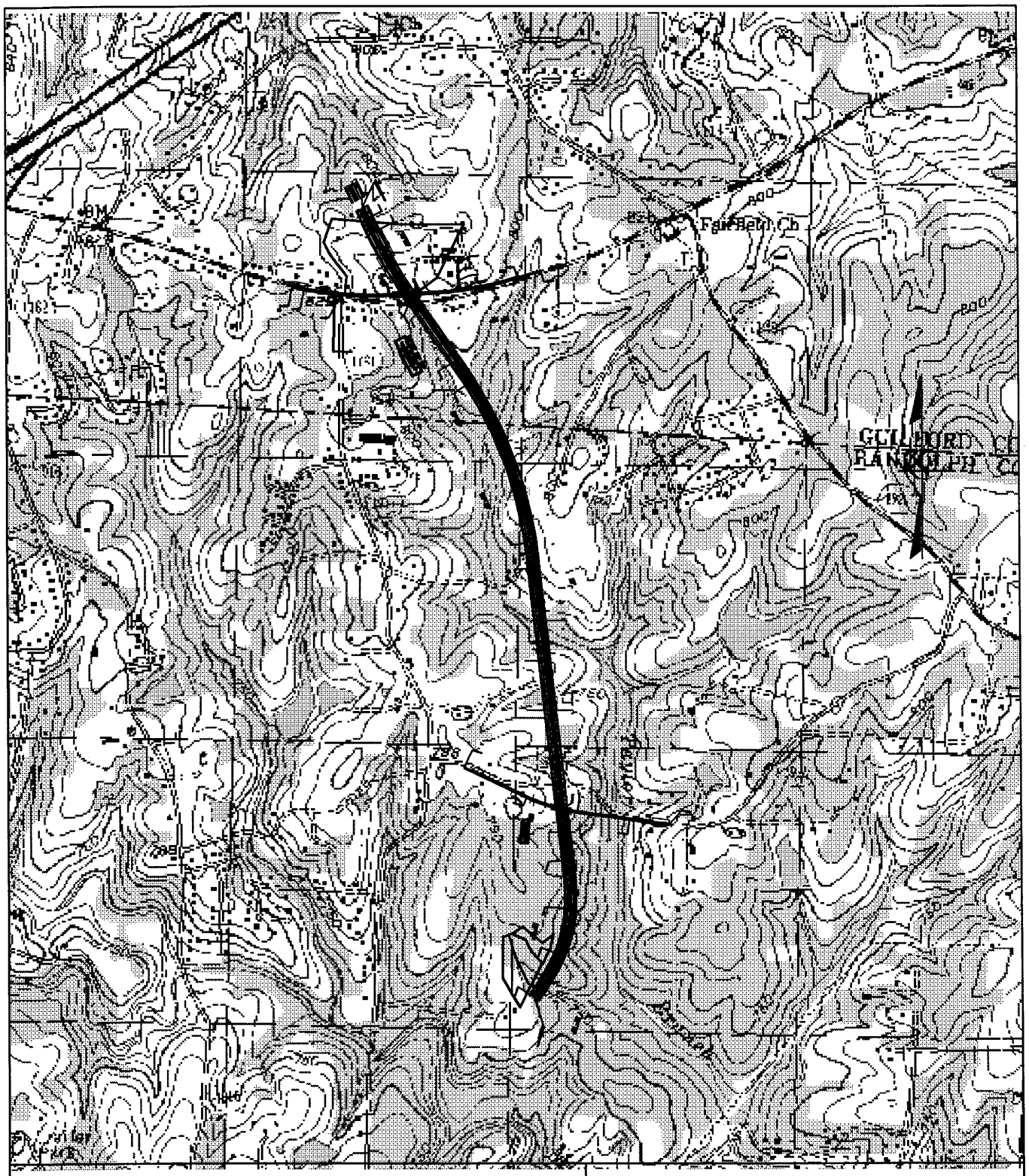
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 2 OF 17 **9 / 27 / 04**



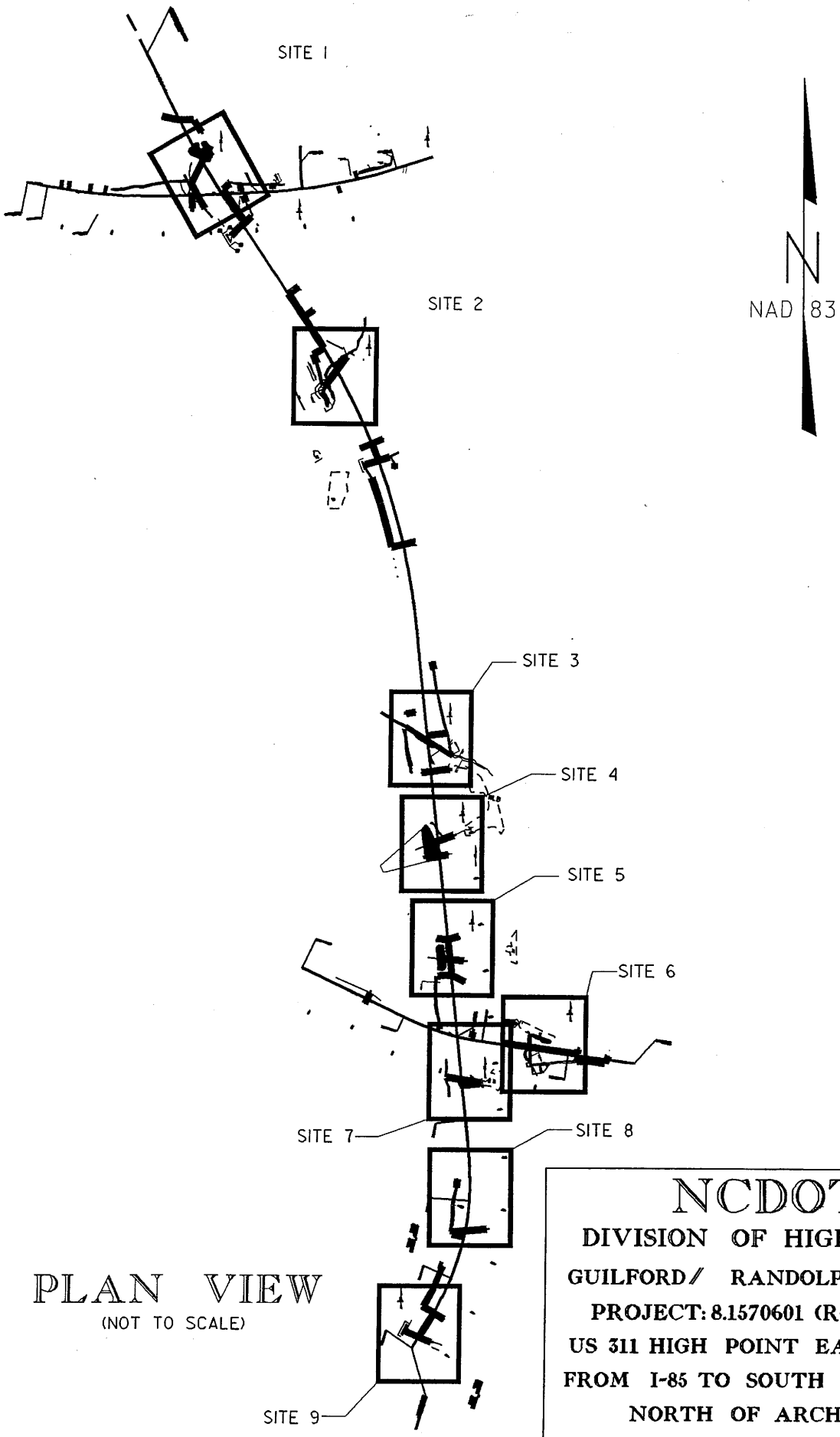
LOCATION MAPS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
GUILFORD / RANDOLPH COUNTIES

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE

SHEET 3 OF 12 / 31 / 02



PLAN VIEW

(NOT TO SCALE)

NCDOT

DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

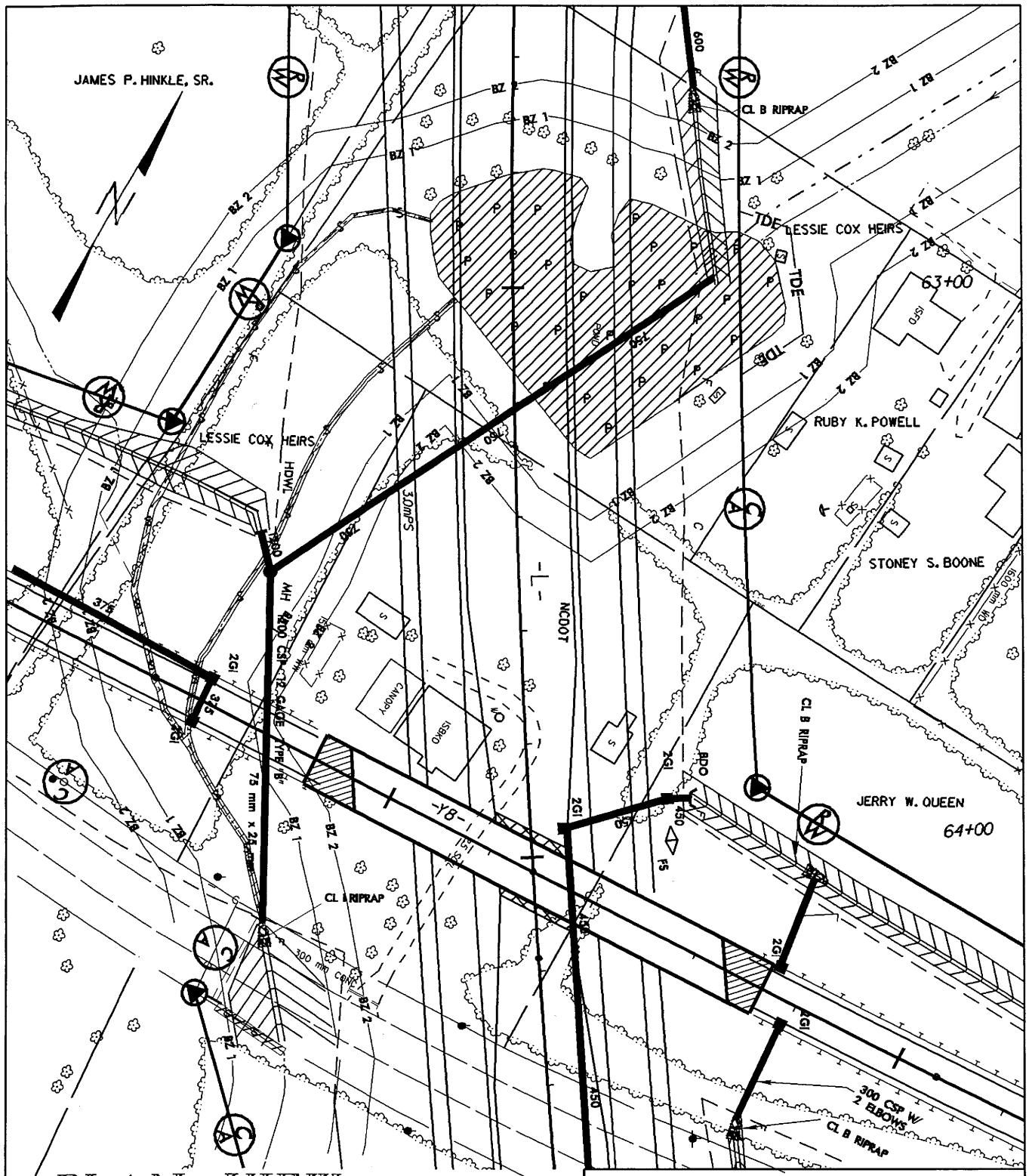
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 4 OF 17 **9 / 27 / 04**



PLAN VIEW
SITE 1

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN SURFACE WATER (POND)

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS
GUILFORD/ RANDOLPH COUNTY

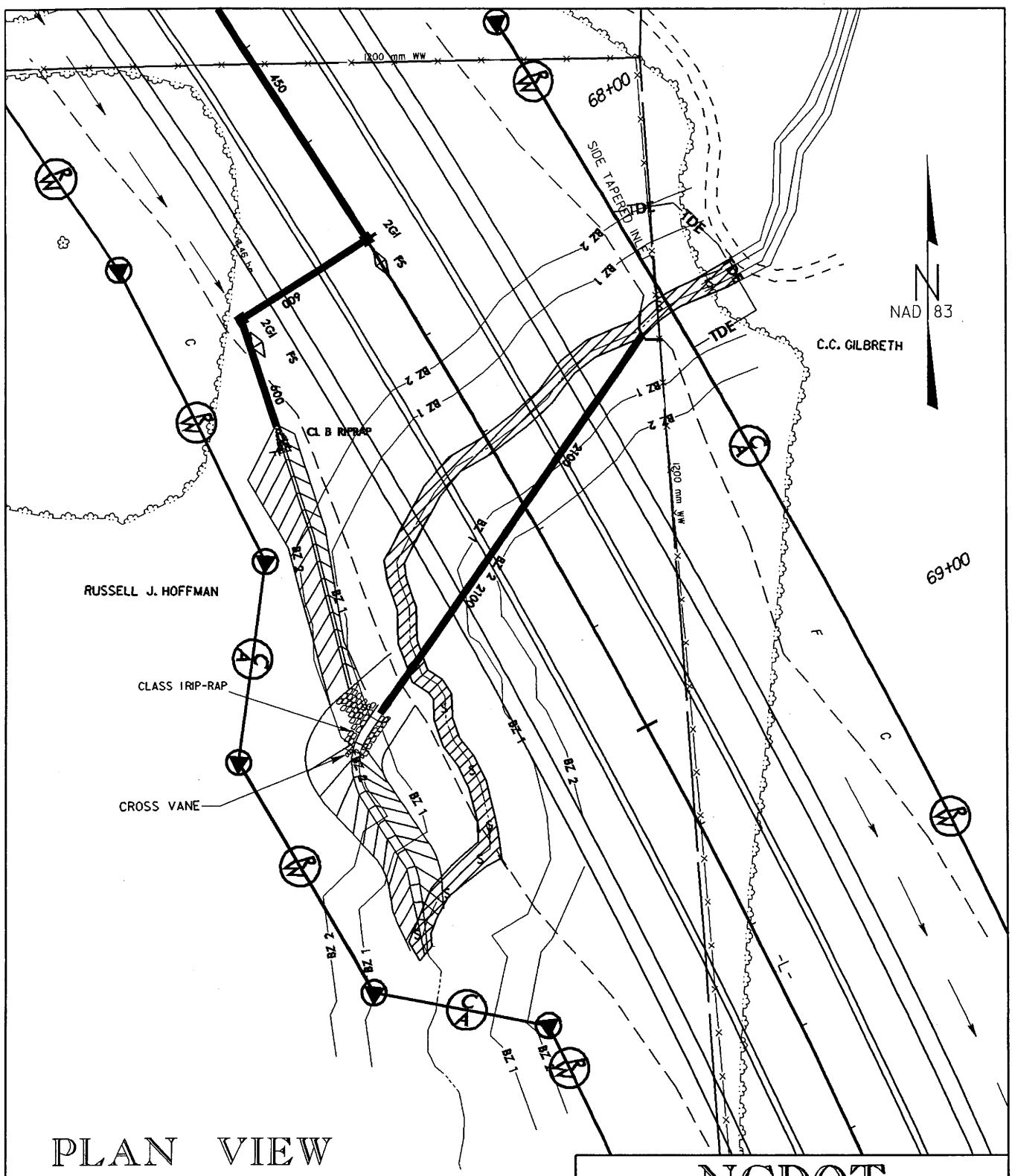
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 5 OF 17 11/12/04



PLAN VIEW
SITE 2

DENOTES FILL IN SURFACE WATER

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

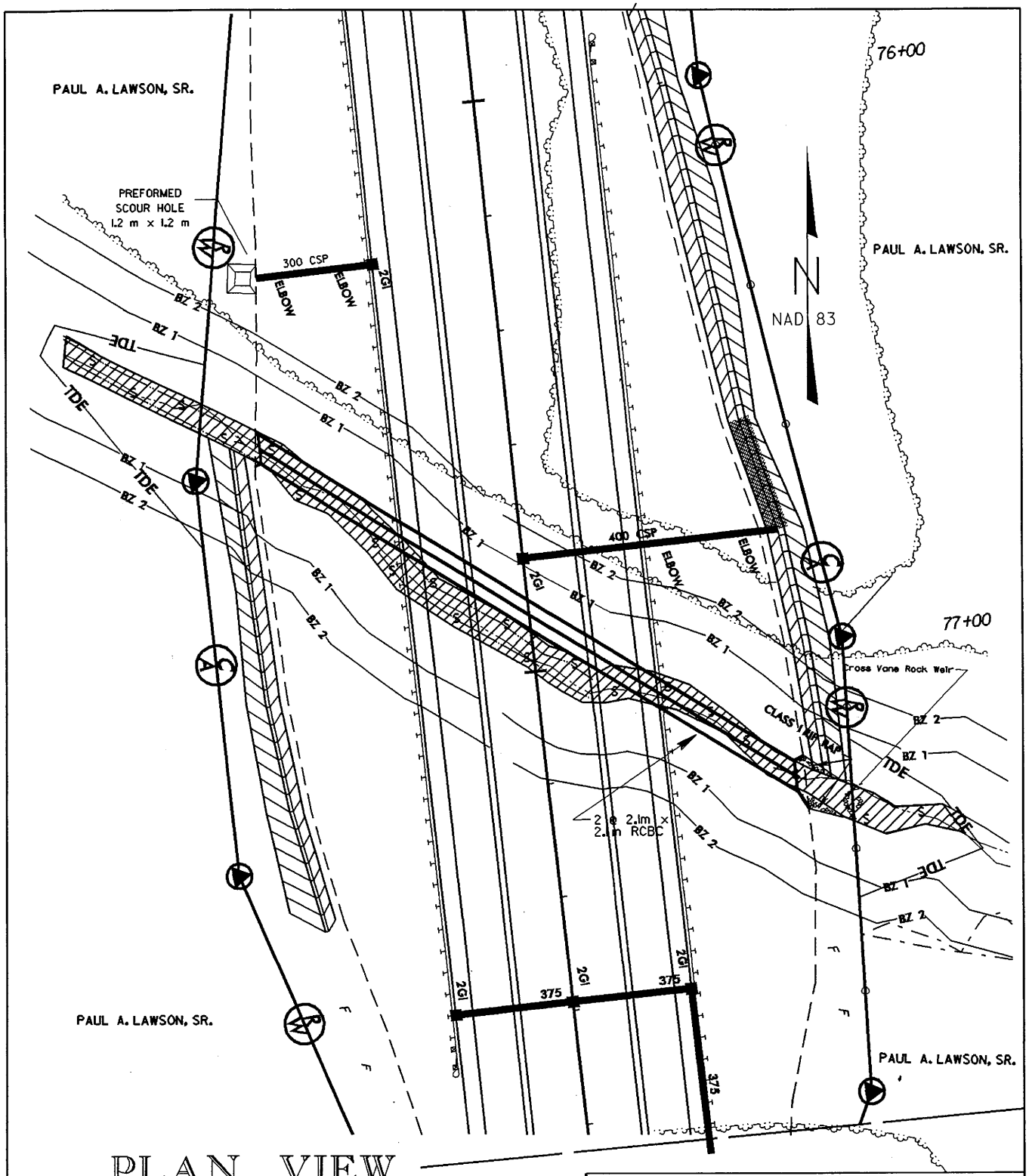
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 6 OF 17 **9 / 27 / 04**



PLAN VIEW
SITE 3

DENOTES FILL IN SURFACE WATER

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

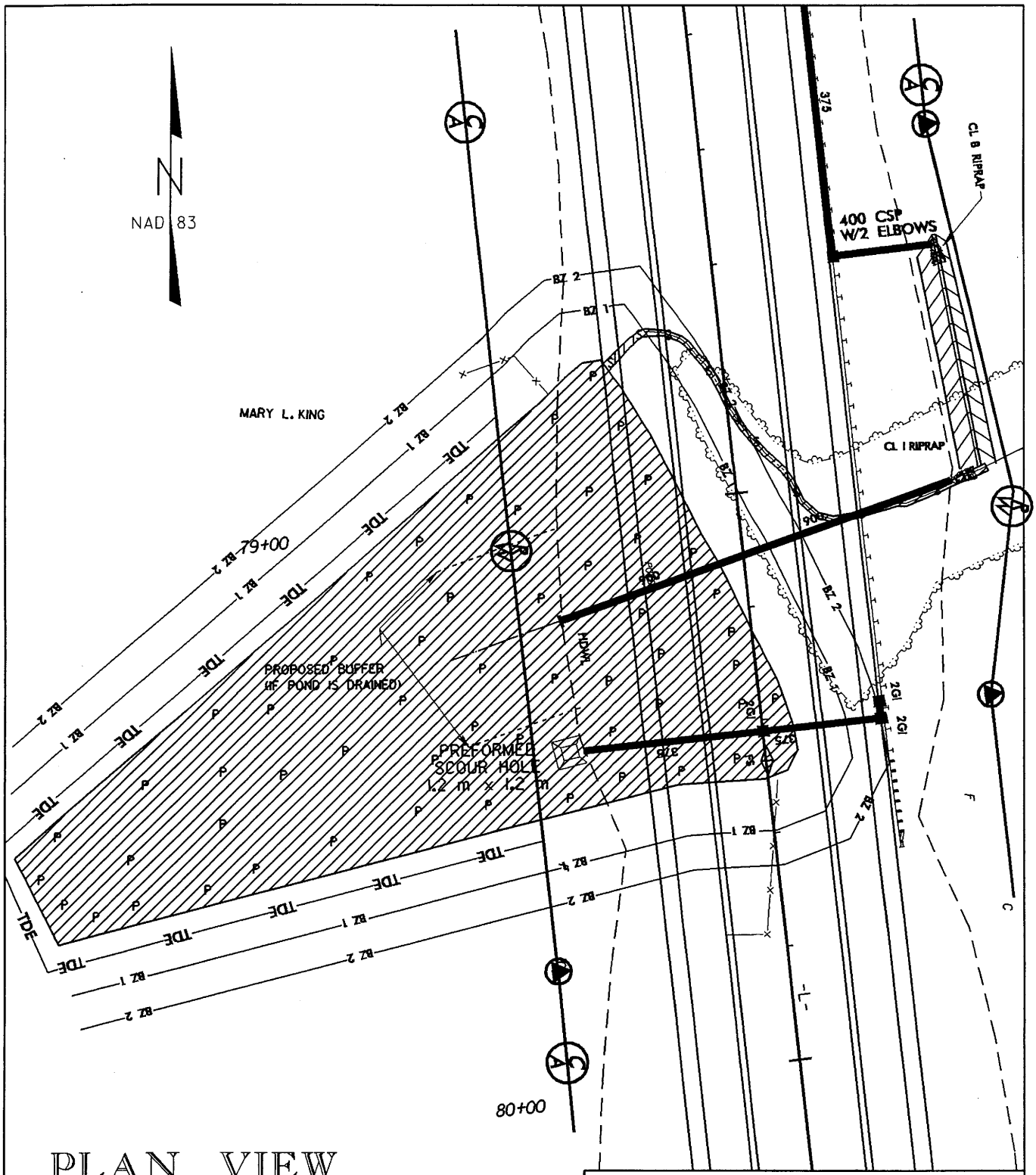
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 7 OF 17 **9/27/04**



PLAN VIEW
SITE 4

S S DENOTES FILL IN SURFACE WATER

P P DENOTES FILL IN SURFACE WATER (POND)

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

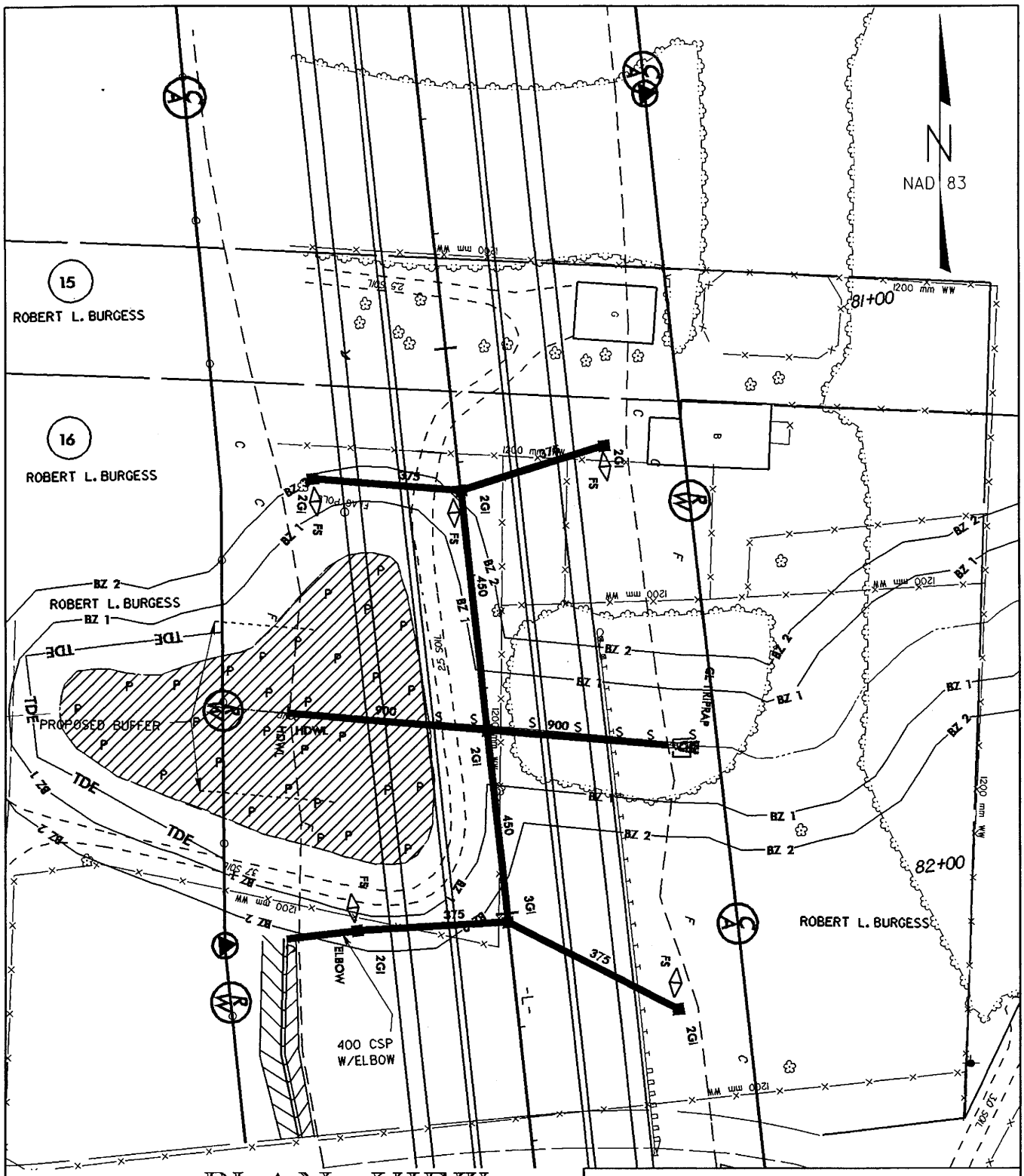
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 8 OF 17 **9/27/04**



PLAN VIEW
SITE 5

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN SURFACE WATER (POND)

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

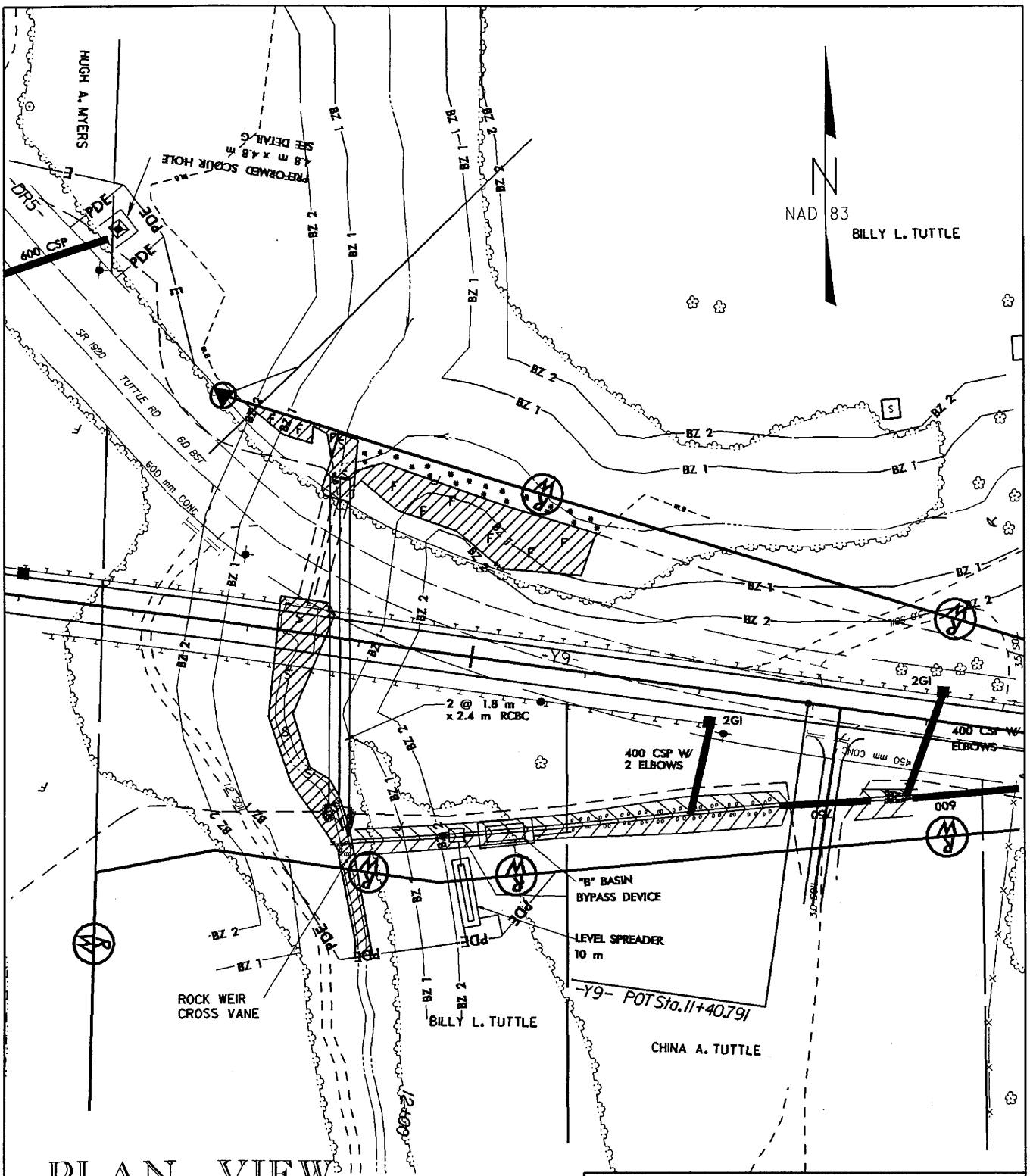
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 9 OF 17 **1/10/06**



PLAN VIEW
SITE 6

DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

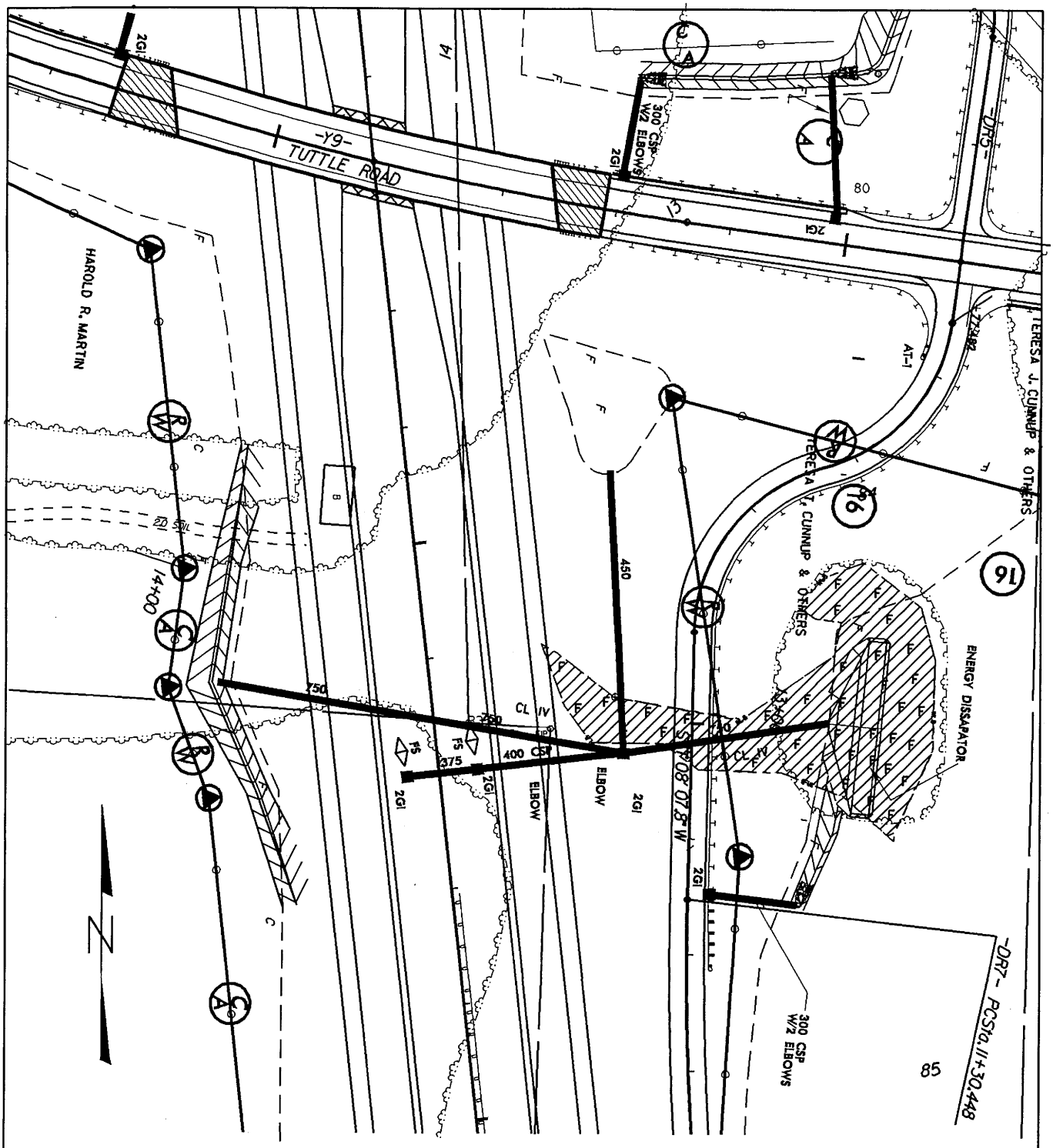
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 10 OF 17 **9 / 27 / 04**



PLAN VIEW
SITE 7

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

10m 20m

HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

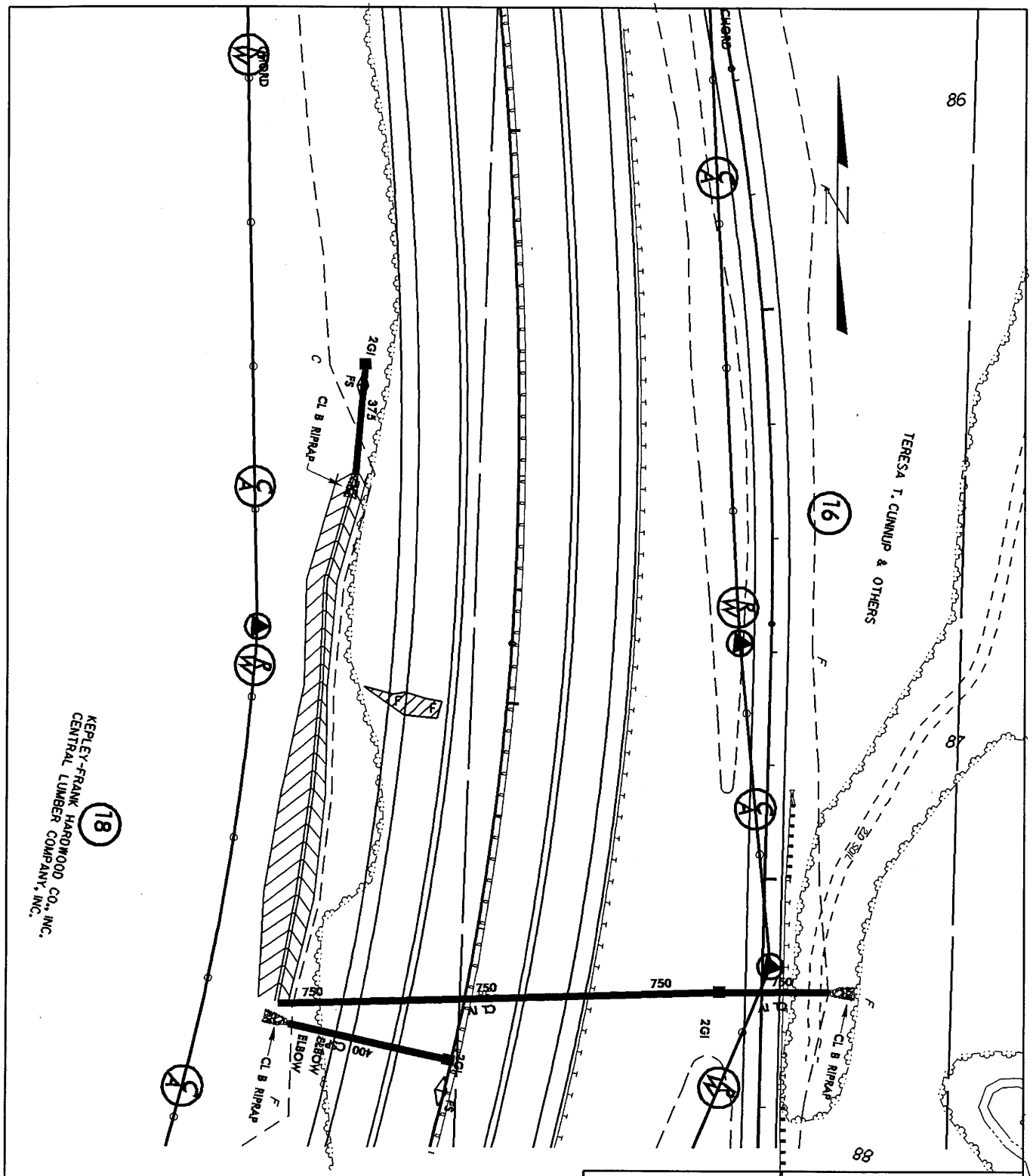
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 11 OF 17 **11/9/04**



PLAN VIEW
SITE 8

F F DENOTES FILL IN WETLAND

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

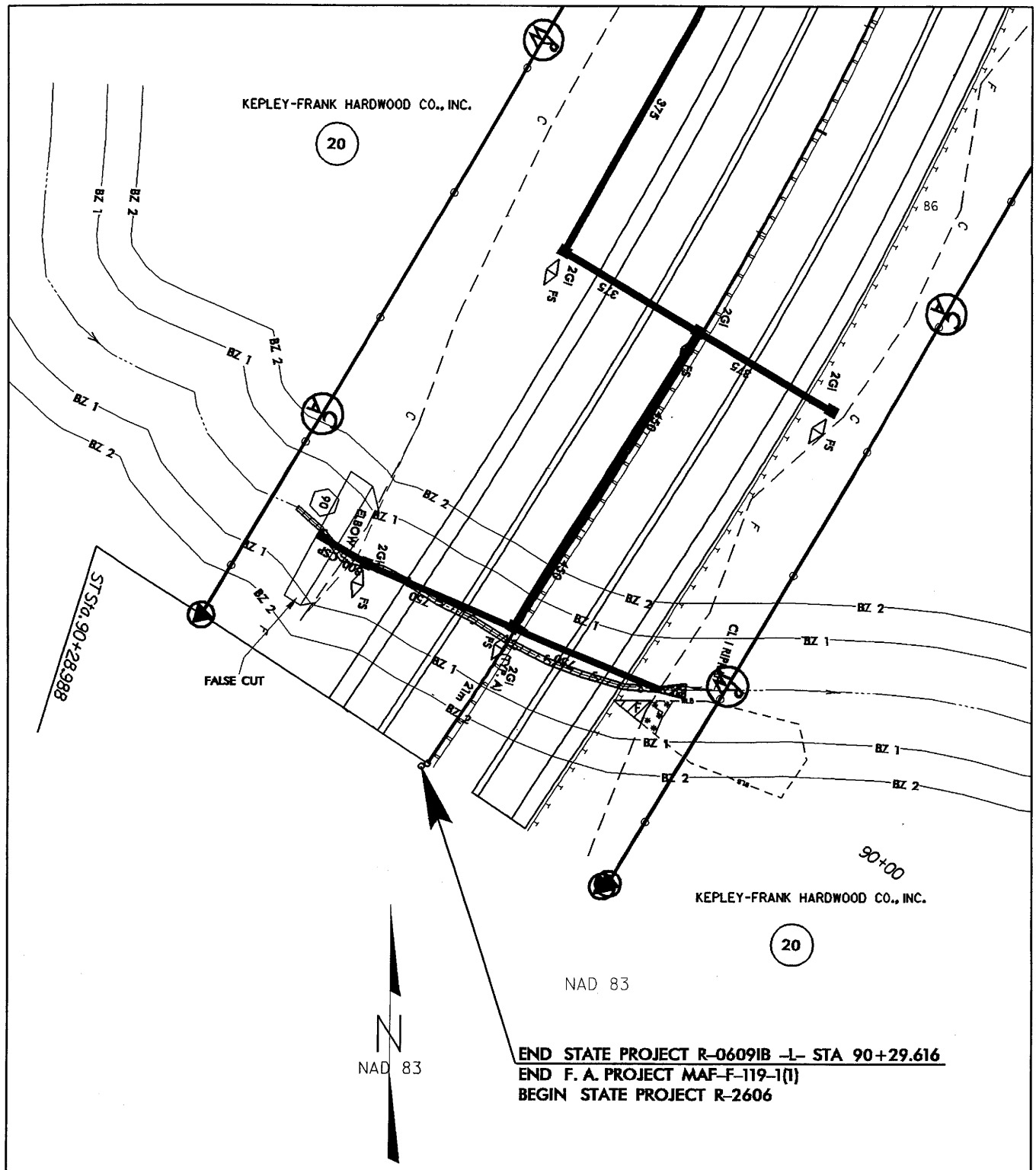
US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 12 OF 17 **11/12/04**

NAD 83



PLAN VIEW
SITE 9

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 13 OF 17 **1/10/06**

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
	Lessie Cox	5905 Hyde Park Drive High Point, N.C. 27263
	C. C. Gilbreth	Rt. 4 Box 252 High Point, N.C. 27260
	Margaret Haney	1625 NC 62 West High Point, N.C. 27263
	James Hinkle, Sr.	1515 Sheldon Ct High Point, N.C. 27263
	Russell J. Hoffman	P. O. Box 4250 Archdale, N.C. 27263
	Robert Burgess	P.O. Box 405 Dover Plains, NY 12522
	Kepley-Frank Hardwood Co	975 Conrad Mine Rd Lexington, N.C. 27292
	Mary King	6891 Suits Road Arcdale, N.C. 27263
	Paul Lawson, Sr.	7082 Suits Road Arcdale, N.C. 27263
	Harold Tuttle	921 West Sixth Street Siler City, N.C. 27344

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 14 OF 17 9/27/04

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
	Billy Tuttle	3180 Tuttle Road Archdale, N.C. 27263
	China Tuttle	3193 Tuttle Road Archale, N.C. 27263

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 15 OF 17 9/27/04

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
1	63+20 -L- TO	750 RCP					0.022	0.18		259	
	64+00 -L-										
2	68+55 -L-	2100 RCP					0.055			160	
3	76+90 -L-	2@ 2.1m x 2.1m RCBC					0.09			179	
4	79+10 -L-	900 RCP					0.009	0.64		86	
5	81+67	900 RCP					0.005	0.22		46	
6	12+23 -Y9-	2@ 1.8m x 2.4m RCBC	0.037			0.02	0.038			78	
7	84+28 -L-	750 RCP	0.12								
8	87+00 -L-	ROADWAY FILL	0.003								
9	90+00 -L-	750 RCP	0.001			0.002	0.08			71	
TOTALS:			0.161	0	0	0.022	0.299	1.04	0	879	0

Form Revised 3/22/01

NCDOT

DIVISION OF HIGHWAYS
GUILFORD/RANDOLPH COUNTY
PROJECT 8.1570601 (R-0609IB)
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE

11/22/2004

WETLAND PERMIT IMPACT SUMMARY

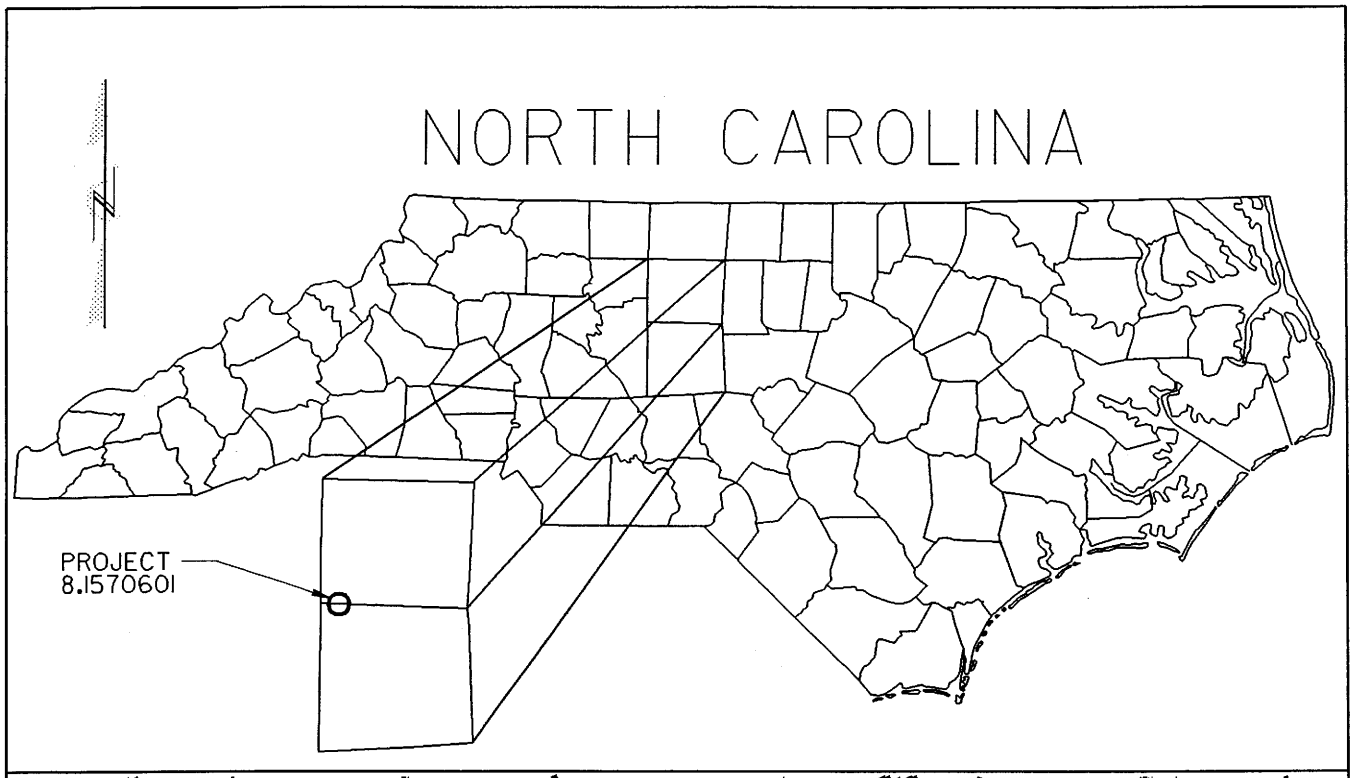
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
1	63+20 -L- TO	30" RCP					0.054	0.445		850	
	64+00 -L-										
2	68+55 -L-	84" RCP					0.136			525	
3	76+90 -L-	2@ 7 ft x 7 ft RCBC					0.222			587	
4	79+10 -L-	36" RCP					0.022	1.581		282	
5	81+67	36" RCP					0.012	0.543		151	
6	12+23 -Y9-	2@ 6 ft x 8 ft RCBC	0.091			0.049	0.094			256	
7	84+28 -L-	30" RCP	0.296								
8	87+00 -L-	ROADWAY FILL	0.007								
9	90+00 -L-	30" RCP	0.002			0.005	0.198			233	
TOTALS:			0.398	0	0	0.054	0.738	2.569	0	2884	0

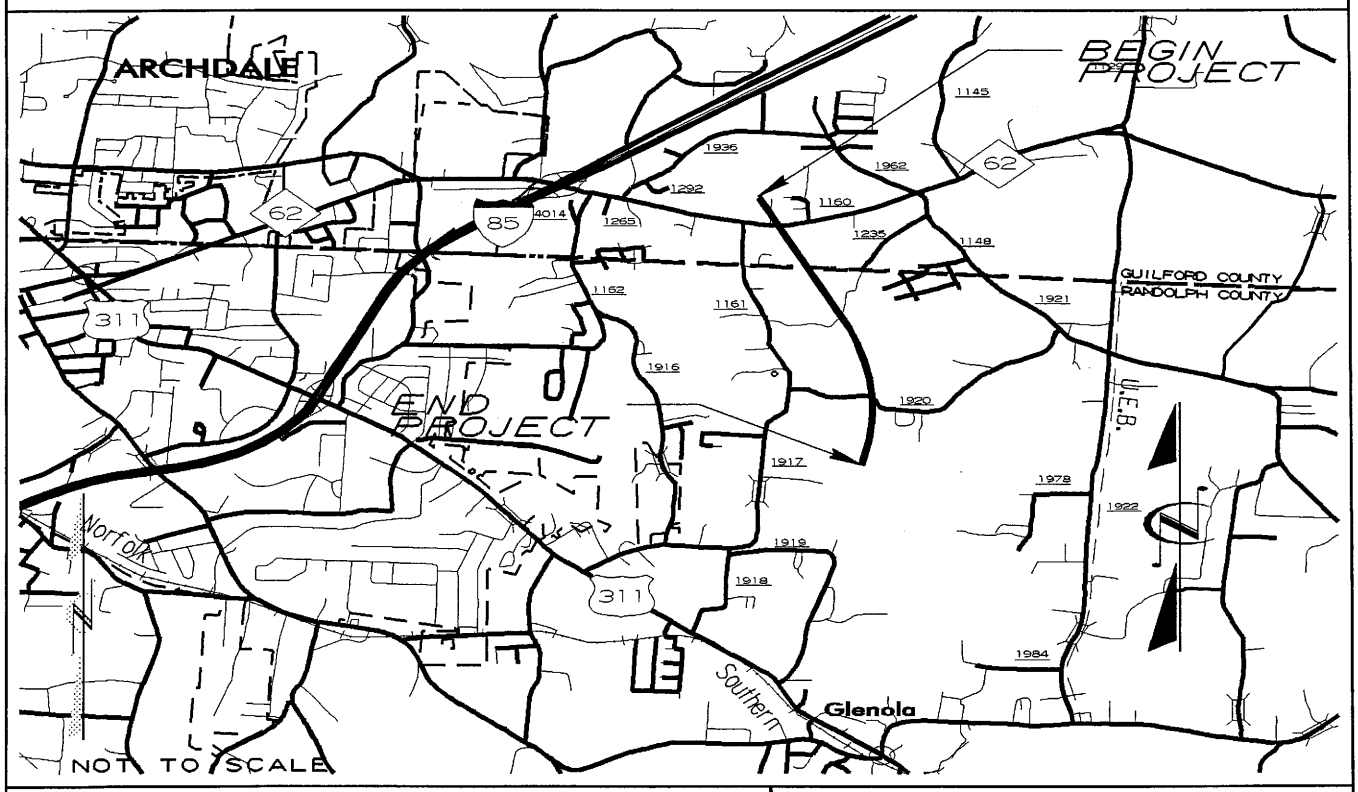
Form Revised 3/22/01

NCDOT

DIVISION OF HIGHWAYS
GUILFORD/RANDOLPH COUNTY
PROJECT 8.1570601 (R-0609IB)
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE

 1/25/2005





BUFFER VICINITY MAPS

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 1 OF 18 10/15/03

BUFFER LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

BZ — RIPARIAN BUFFER ZONE

BZ1 — RIPARIAN BUFFER ZONE 1
30 ft (9.2m)

BZ2 — RIPARIAN BUFFER ZONE 2
20 ft (6.1m)

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

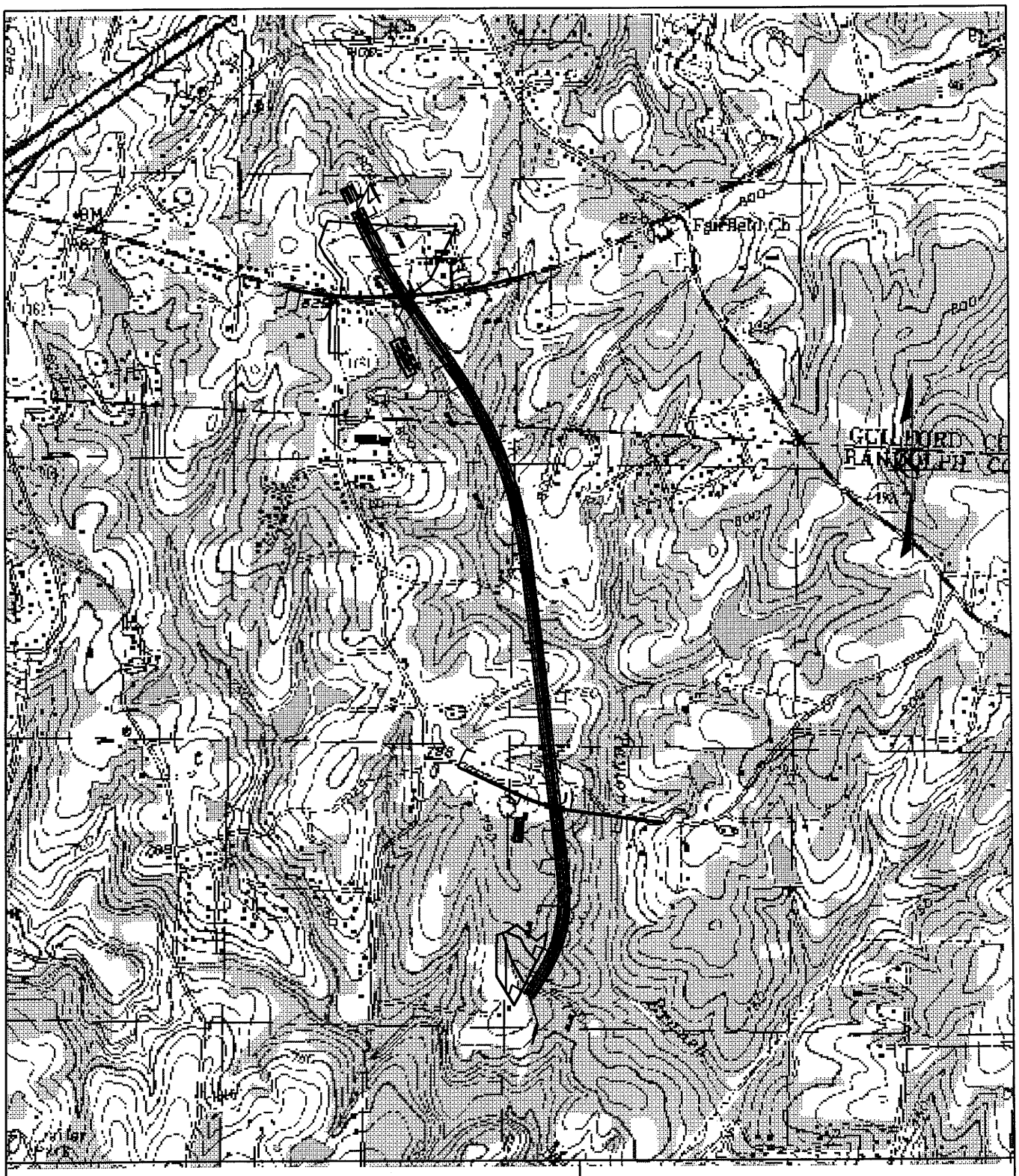
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 1 OF 18 10/15/03



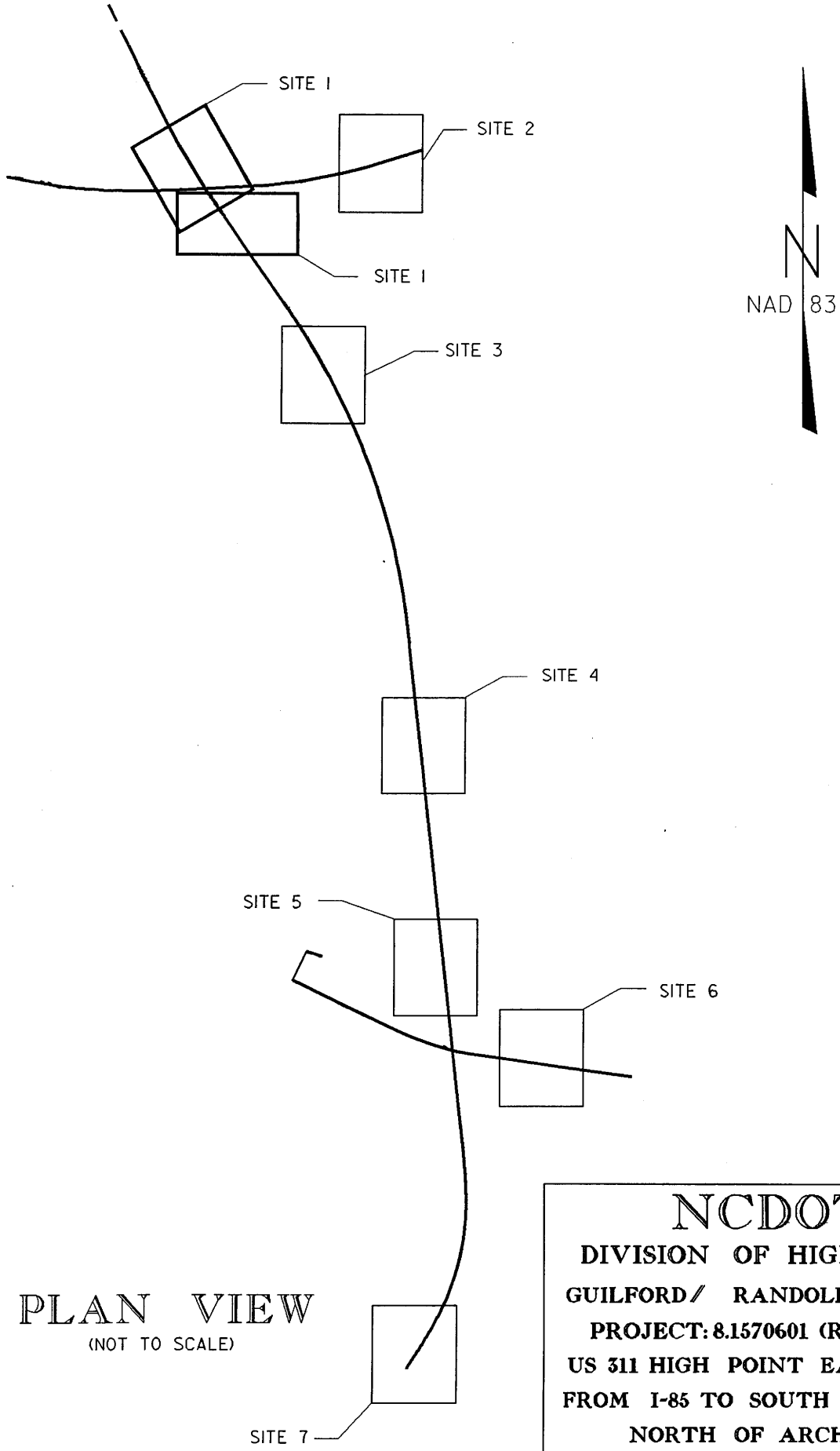
LOCATION MAPS

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
GUILFORD / RANDOLPH COUNTIES

PROJECT: 8.1570601 (R-0609IB)

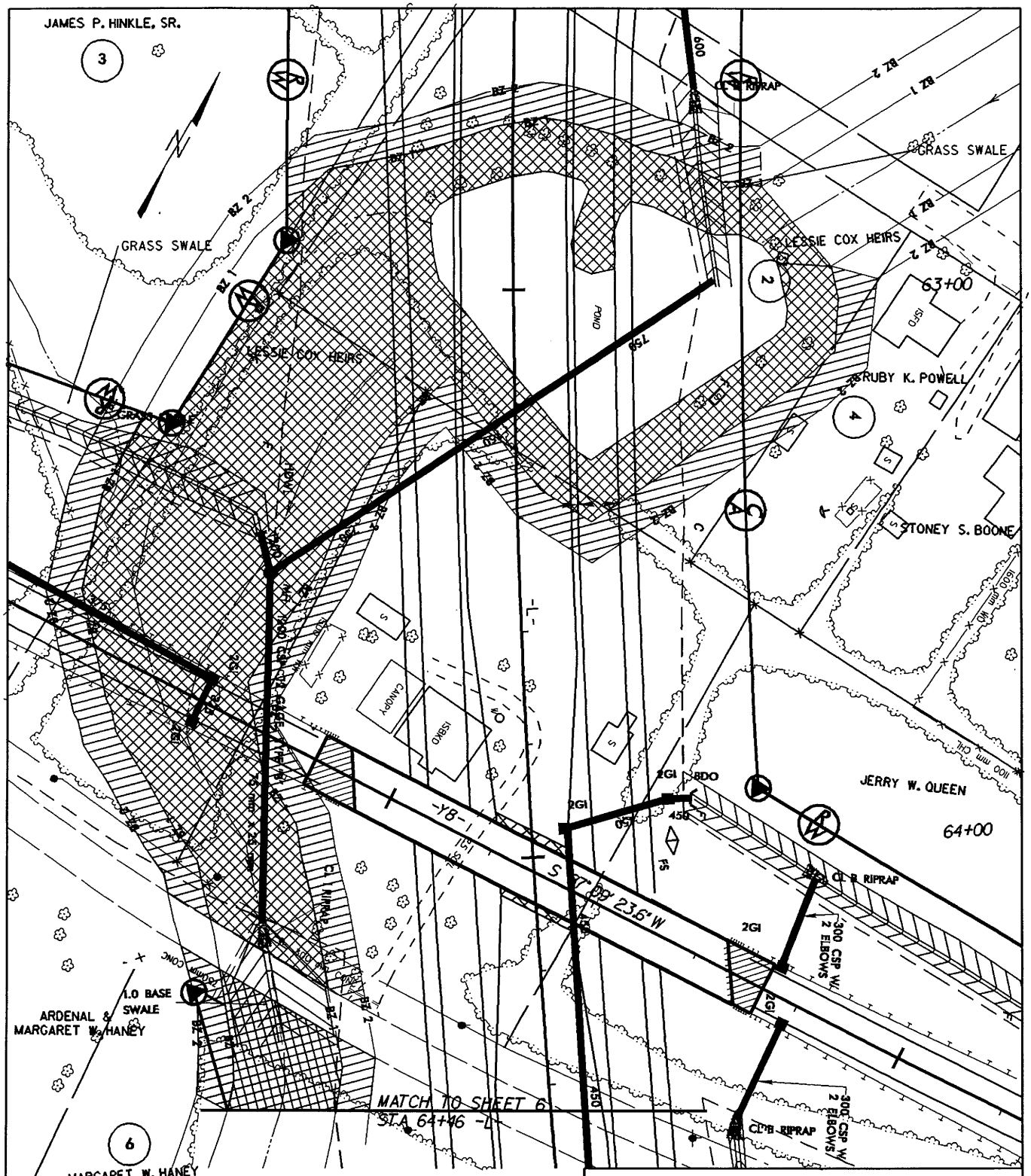
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE

SHEET 3 OF 18 12 / 31 / 02



PLAN VIEW
(NOT TO SCALE)

NCDOT
DIVISION OF HIGHWAYS
GUILFORD / RANDOLPH COUNTY
PROJECT: 8.1570601 (R-0609IB)
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE
SHEET 4 OF 18 10/15/03



PLAN VIEW
SITE 1

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

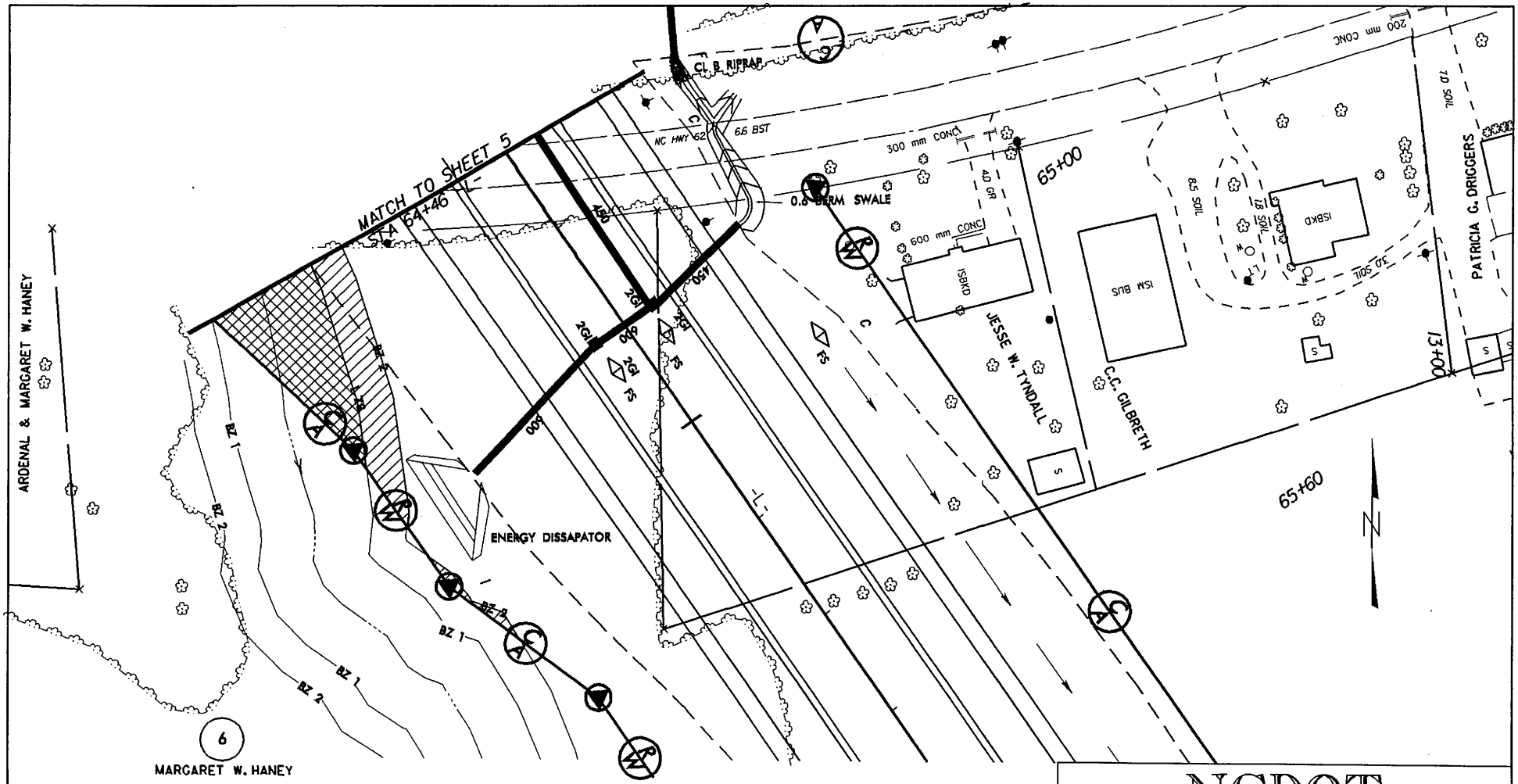
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 5 OF 18 7/8/2005



PLAN VIEW

SITE 1

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

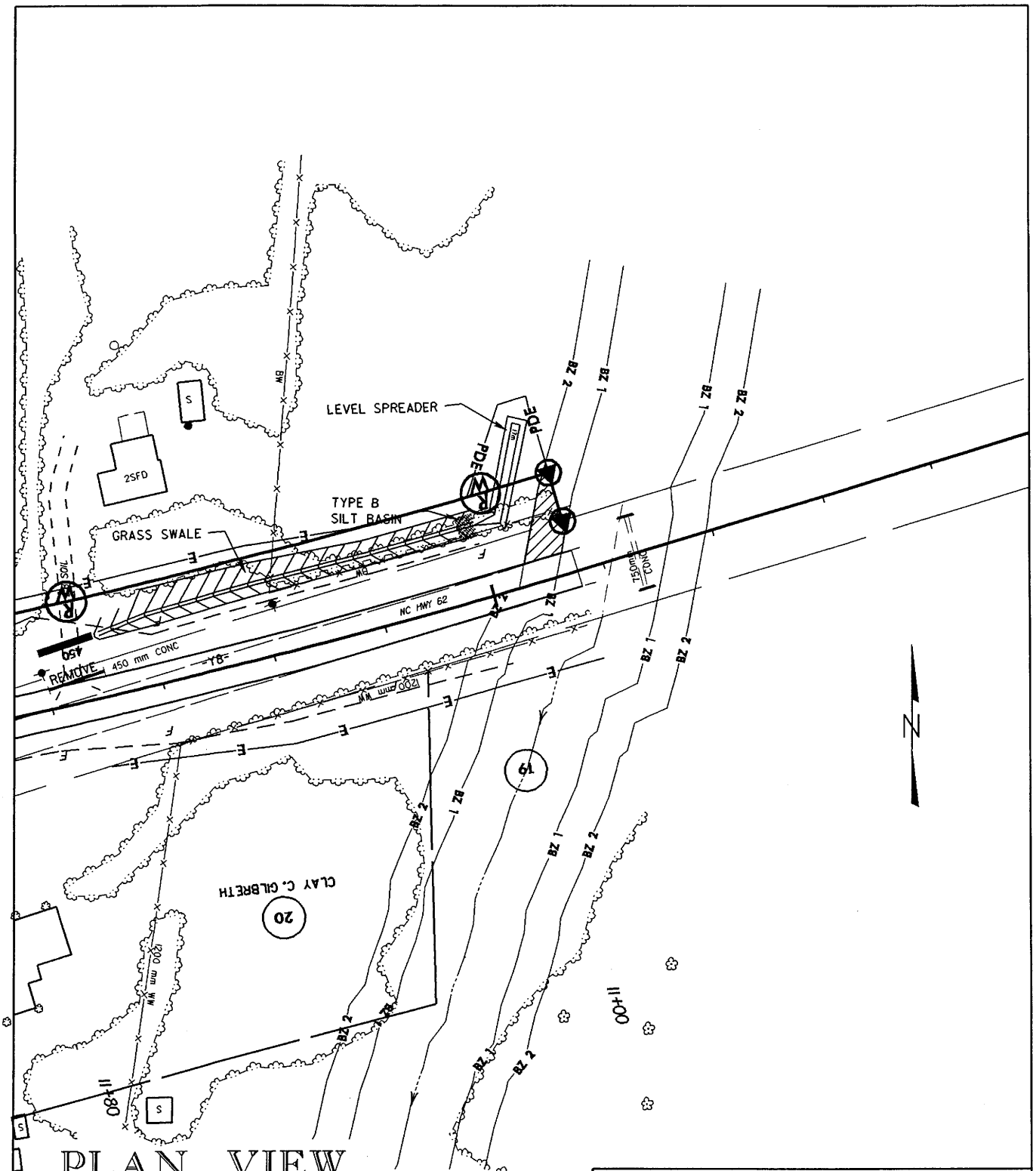
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 6 OF 8 10/15/03



PLAN VIEW
SITE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

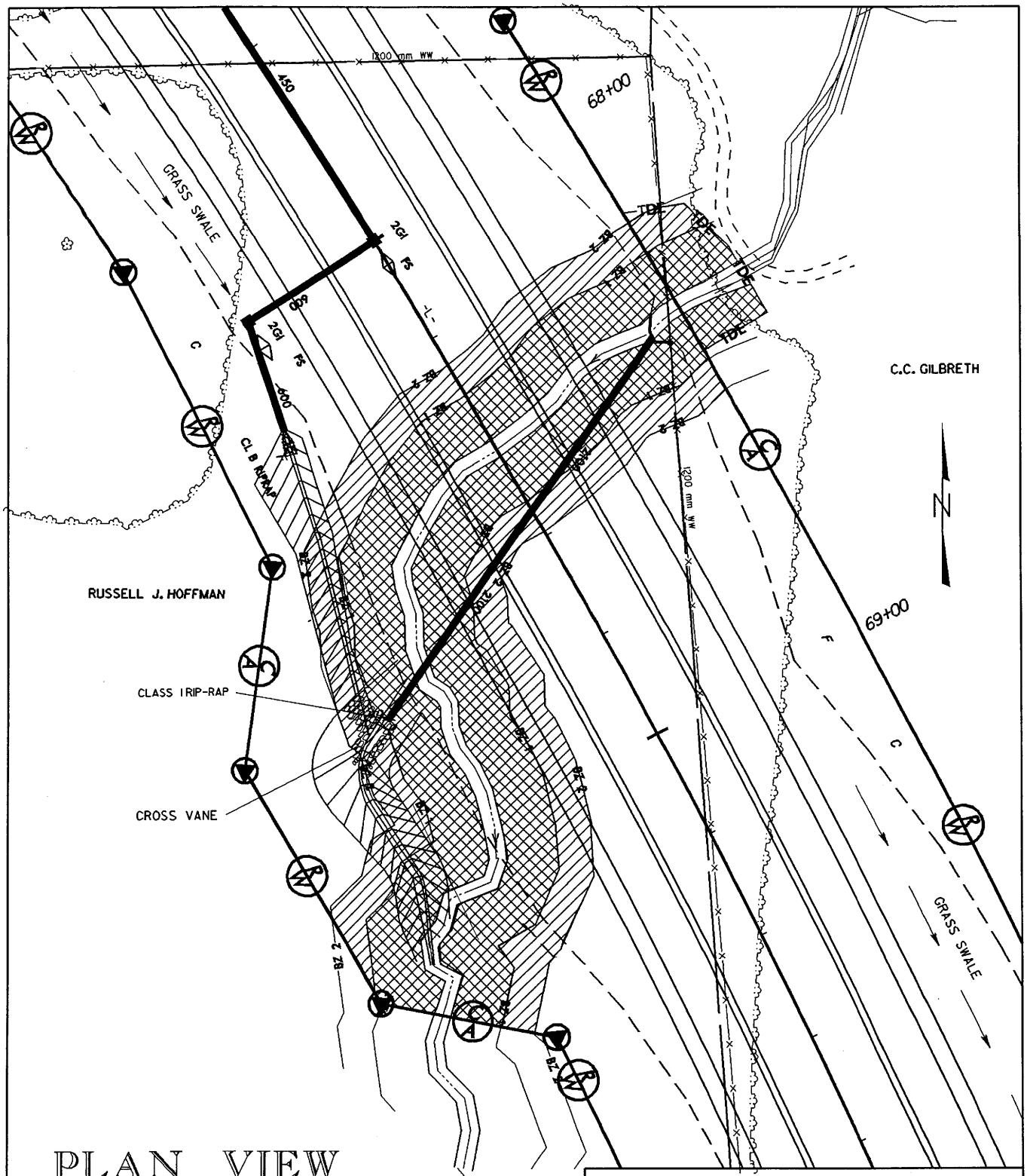
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 7 OF 18 10/15/03



PLAN VIEW
SITE 3

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

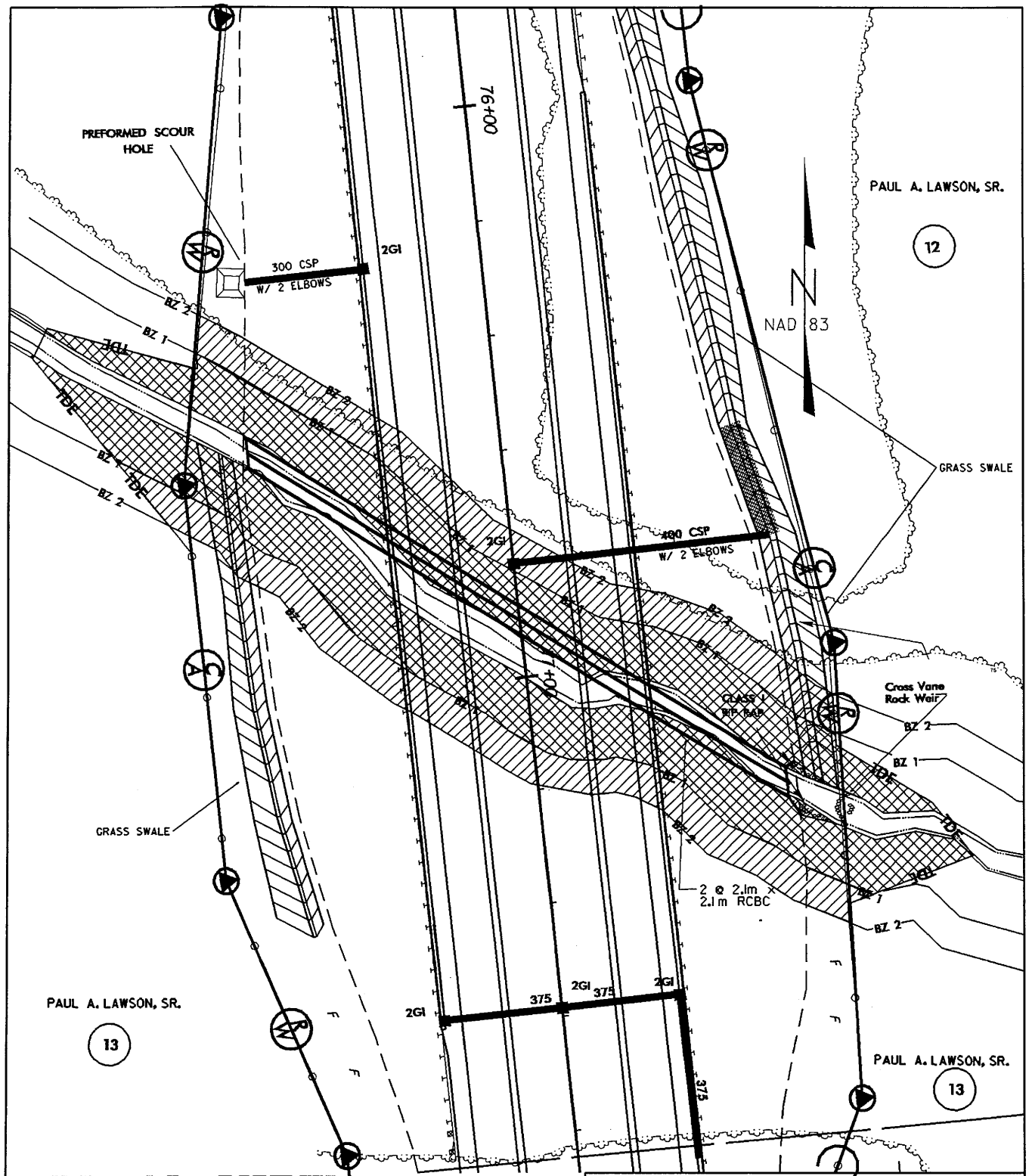
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 8 OF 18 10 / 15 / 03



PLAN VIEW
SITE 4

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT
DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

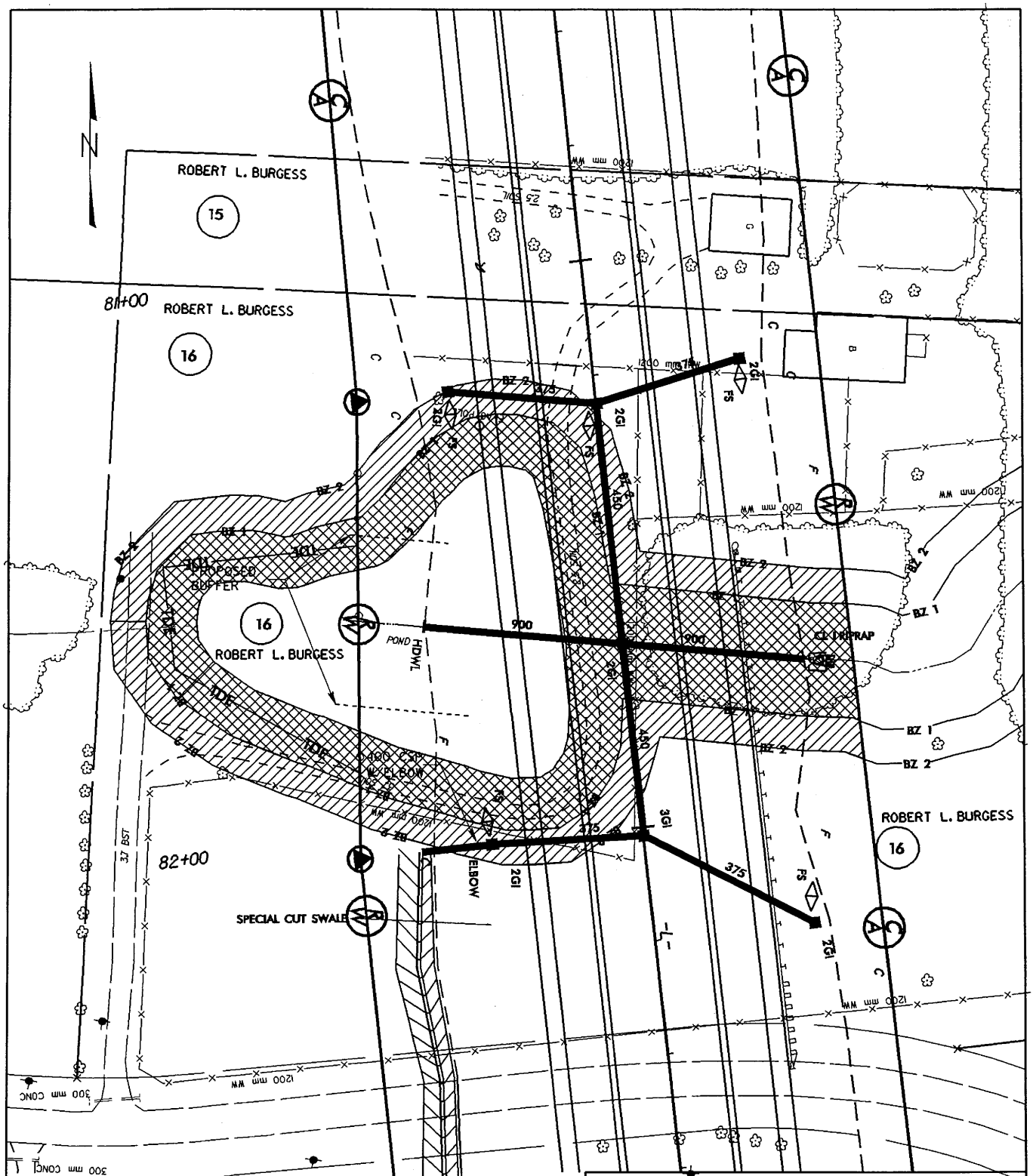
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 9 OF 18 **10/15/03**



PLAN VIEW
SITE 5

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

10m 20m HORIZONTAL SCALE

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

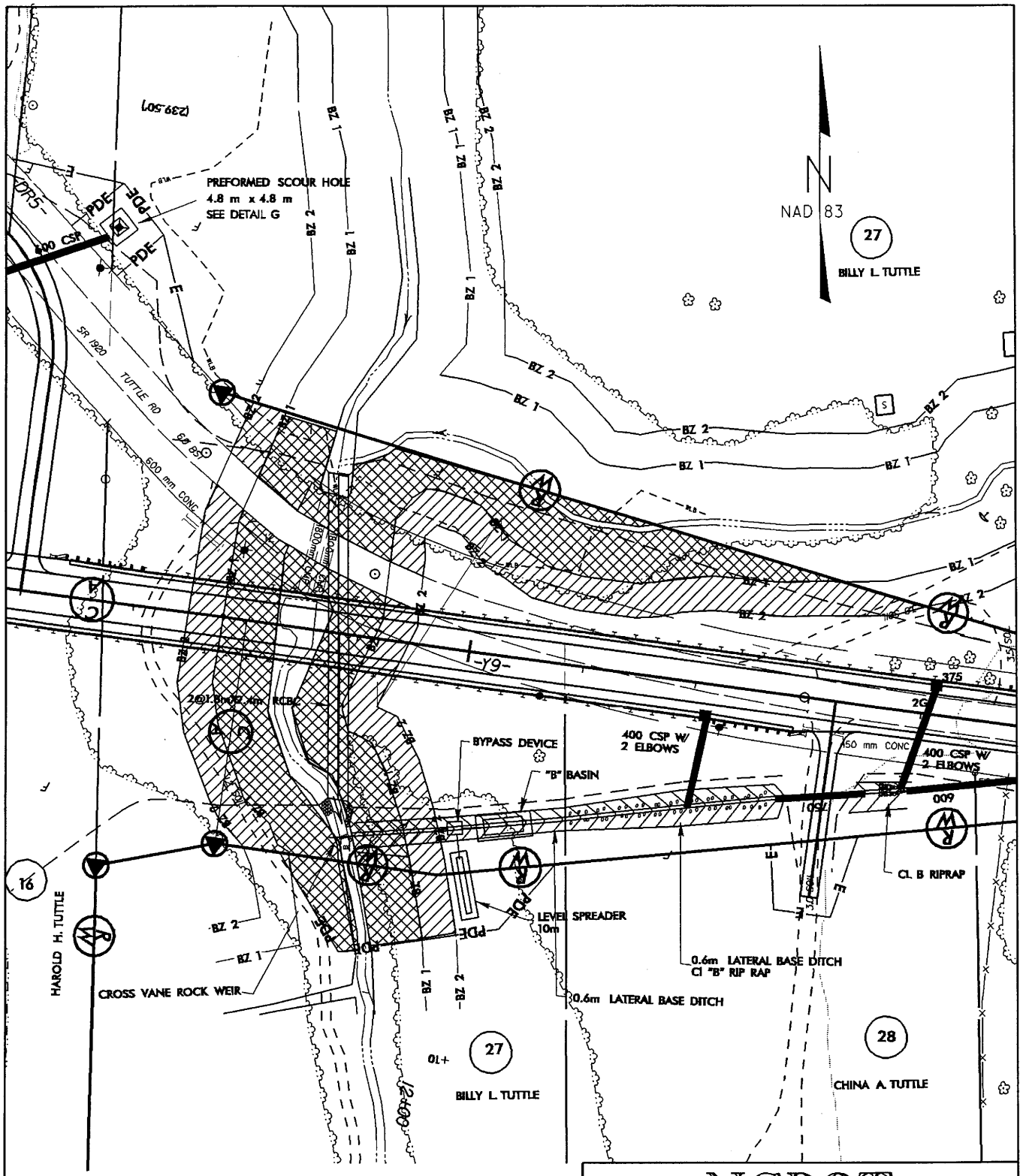
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 10 OF 18 3/14/05



PLAN VIEW
SITE 6

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

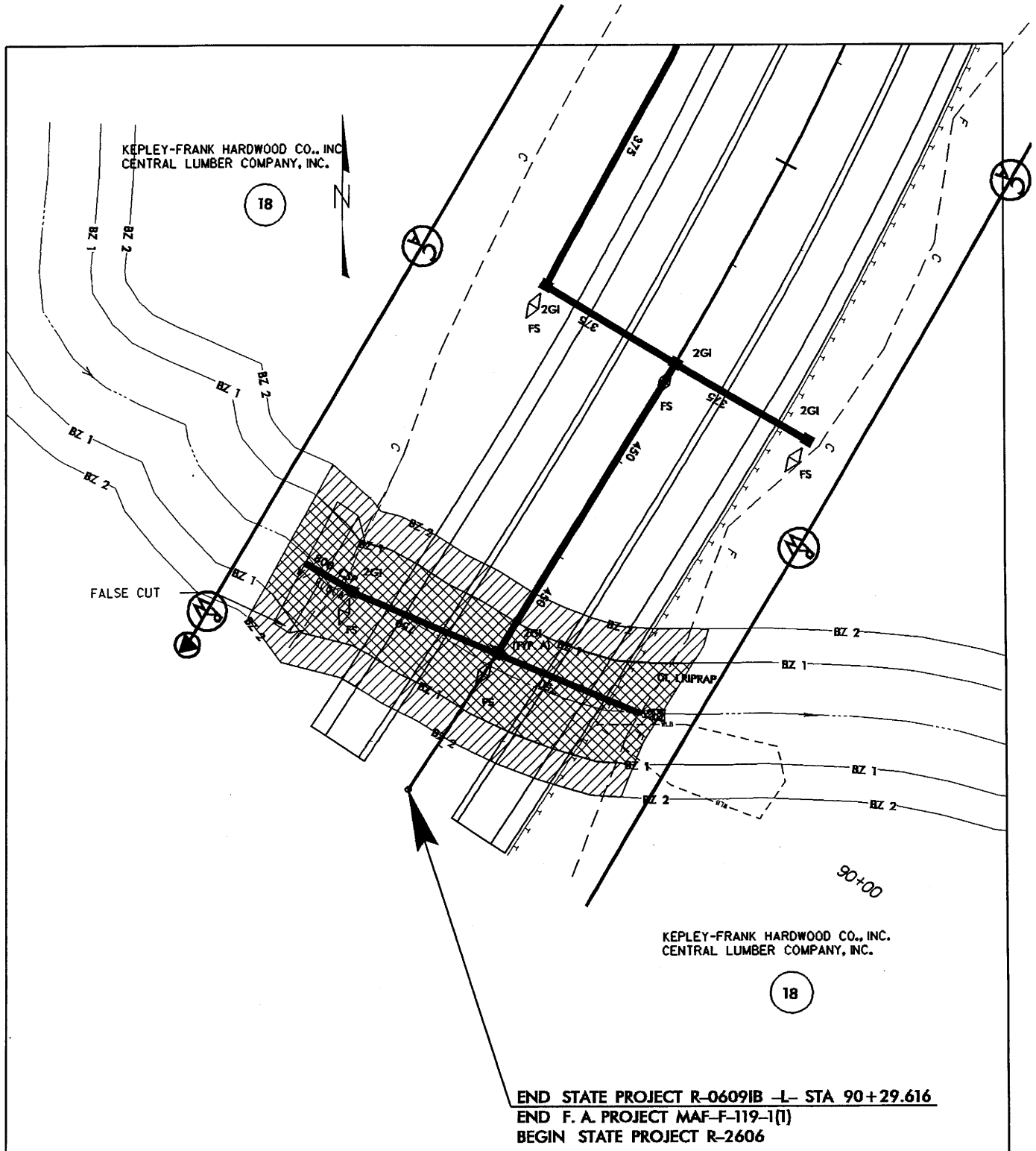
PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 11 OF 18 3/14/05



END STATE PROJECT R-0609IB -L- STA 90+29.616
END F. A. PROJECT MAF-F-119-1(1)
BEGIN STATE PROJECT R-2606

PLAN VIEW
SITE 7

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT
DIVISION OF HIGHWAYS
GUILFORD/ RANDOLPH COUNTY
PROJECT: 8.1570601 (R-0609IB)
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHDALE

SHEET 12 OF 18 3/14/05

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
	Lessie Cox	5905 Hyde Park Drive High Point, N.C. 27263
	C. C. Gilbreth	Rt. 4 Box 252 High Point, N.C. 27260
	Margaret Haney	1625 NC 62 West High Point, N.C. 27263
	James Hinkle, Sr.	1515 Sheldon Ct High Point, N.C. 27263
	Russell J. Hoffman	P. O. Box 4250 Archdale, N.C. 27263
	Robert Burgess	P.O. Box 405 Dover Plains, NY 12522
	Kepley-Frank Hardwood Co	975 Conrad Mine Rd Lexington, N.C. 27292
	Mary King	6891 Suits Road Arcdale, N.C. 27263
	Paul Lawson, Sr.	7082 Suits Road Arcdale, N.C. 27263
	Harold Tuttle	921 West Sixth Street Siler City, N.C. 27344

NCDOT

DIVISION OF HIGHWAYS

GUILFORD / RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 13 OF 17 10/15/03

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
	Billy Tuttle	3180 Tuttle Road Archdale, N.C. 27263
	China Tuttle	3193 Tuttle Road Archale, N.C. 27263

NCDOT

DIVISION OF HIGHWAYS

GUILFORD/ RANDOLPH COUNTY

PROJECT: 8.1570601 (R-0609IB)

US 311 HIGH POINT EAST BELT

FROM I-85 TO SOUTH OF SR 1920

NORTH OF ARCHDALE

SHEET 14 OF 18 10/15/03

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1			X					66177	31777	97954		
2			X					0	774	774		
3			X					33164	20425	53589		
4			X					32497	18178	50675		
6			X					31089	21466	52555		
7			X					22898	15749	38647		
8			X					14717	13868	28585		
TOTAL:					0	0	0	200542	122237	322779		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD \ RANDOLPH
PROJECT: 8.1570601 (R-0609IB)
US 311 HIGH POINT EAST BELT FROM I-85 TO
SOUTH OF SR 1920 NORTH OF ARCHDALE
7/8/2005
SHEET 15 OF 18

R-0609IB Guilfrod/Randolph County

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 12/8/2004
Dsn. By: WHE
Check: MSP

SHT.	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided	Remarks
6	28	68+00 0-L-	2GI	0.36	0.9	89.0	27	120	0.015	6:1	**YES**	3.99	1.48	5.23	1.57	GS	
8	44	75+20 -L-	2GI	0.45	1.1	111.2	34	120	0.004	6:1	**YES**	3.46	0.89	4.53	0.92	GS	
8	46	76+26 -L-	2GI	0.15	0.4	37.1	11									PSH	
8	48	76+80 -L-	2GI	0.42	1.0	103.8	32	200	0.009	6:1	**YES**	3.23	1.12	4.23	1.15	GS	
9	55	79+39 -L-	2GI	0.22	0.5	54.4	17									PSH	
9	56	79+42 -L-	2GI	0.01	0.0	2.5	1									PSH	
9	57	79+42 -L-	2GI	0.39	1.0	96.4	29	180	0.012	6:1	**YES**	3.30	1.41	4.33	1.48	GS, PSH	
10	59	81+20 -L-	2GI	0.32	0.8	79.1	24	120	0.003	6:1	**YES**	3.46	0.82	3.22	0.89	GS	
10	60	81+25 -L-	2GI	0.49	1.2	121.1	37	120	0.004	6:1	**YES**	3.76	0.95	4.93	1.02	GS	
10	61	81+20 -L-	2GI	0.97	2.4	239.7	73	120	0.003	6:1	**YES**	7.45	1.08	9.76	1.15	GS	
10	62	81+68 -L-	2GI	0.17	0.4	42.0	13	75	0.001	6:1	**YES**	1.31	0.59	1.71	0.62	GS	
10	65	82+01 -L-	2GI	0.22	0.5	54.4	17	150	0.019	6:1	**YES**	3.69	1.71	4.83	1.84	GS	
10	66	82+20 -L-	2GI	0.48	1.2	118.6	36	120	0.003	6:1	**YES**	1.69	0.75	2.21	0.79	GS	
10	67	82+00 -L-	2GI	0.12	0.3	29.7	9	100	0.003	6:1	**YES**	0.92	0.69	1.21	0.72	GS	
10	68	82+00 -L-	BERM	0.82	2.0	202.6	62			6:1							See Note

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER

Note: The Berm Outlet picks up 0.77 Ha of offsite drainage and 0.05 Ha from structure 69. Structure 69 will be treated by a grass swale draining to structure 68.

NCDOT DIVISON OF HIGHWAYS
GUILFORD/ RANDOLPH COUNTIES
PROJECT: 8.1570601 (R-0609IB0
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHADALE

SHEET 1 12/8/04

R-0609IB Guilfrod/Randolph County

Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 12/8/2004
Dsn. By: WHE
Check: MSP

SHT.	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided	Remarks
10	69	14+30 -Y9-	2GI	0.05	0.1	12.4	4	40	0.005	3:1	YES	0.50	0.77	0.65	0.84	GS	
10	71	13+40 -Y9-	2GI	0.09	0.2	22.2	7									PSH AT	STR 114
10	113	13+00 -Y9-	2GI	0.04	0.1	9.9	3									PSH AT	STR 114
12	82	88+40 -L-	BERM	0.61	1.5	150.7	46										OFFSITE
12	83	88+40 -L-	2GI	0.10	0.2	24.7	8	40	0.016	6:1	YES	0.77	1.15	1.01	1.25	GS	
12	84	89+40 -L-	2GI	0.29	0.7	71.7	22	100	0.015	6:1	YES	2.23	1.48	2.92	1.54	GS	
12	85	89+40 -L-	2GI	0.39	1.0	96.4	29	100	0.021	6:1	YES	3.00	1.71	3.92	1.80	GS	
12	86	89+40 -L-	2GI	0.05	0.1	12.4	4	40	0.026	6:1	YES	0.38	1.21	0.50	1.25	GS	
12	87	90+00 -L-	2GI	0.16	0.4	39.5	12	67	0.03	6:1	YES	1.23	1.61	1.61	1.74	GS	
12	89	90+05 -L-	2GI	0.17	0.4	42.0	13	60	0.02	6:1	YES	1.31	1.48	1.71	1.57	GS	
12	90	90+06 -L-	BERM														OFFSITE
13		11+00 -Y8-	DITCH	0.42	1.0	103.8	32									LS	
13	93	13+60 -Y8-	2GI	0.06	0.1	14.8	5									Included	in Str 12
14		15+80 -Y8-	DITCH	0.48	1.2	118.6	36	40	0.04	3:1	YES	3.60	1.90	4.80	2.20	GS	See Note

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
OTCB = OPEN THROAT CATCH BASIN
OPEN = OPEN END PIPE
PSH = PRE FORMED SCOUR HOLE
LS = LEVEL SPREADER

NOTE: This ditch treats the drainage areas for Structures 9, 10, 11, and 119.

NCDOT DIVISON OF HIGHWAYS
GUILFORD/ RANDOLPH COUNTIES
PROJECT: 8.1570601 (R-0609IB0
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHADALE

SHEET 12/8/04

R-0609IB Guilfrod/Randolph County
Discharge is considered to be treated if it meets the following criteria:
100 ft. of grass swale for every 1 acre of drainage area. AND
2 yr. velocity is less than or equal to 2 ft./sec.

Date: 12/8/2004
Dsn. By: WHE
Check: MSP

SHT.	Structure	Station	Type	Total D.A. ha	Total D.A. (ac)	Required length for treatment (ft.)	Required length for treatment (m.)	Actual Length (m)	Channel Slope (m/m)	Side Slopes	Treated Discharge?	Q2 cfs	Q2 vel. fps	Q10 cfs	Q10 vel. fps	Treatment Provided	Remarks
14		17+20 -Y9-	DITCH	0.32	0.8	79.1	24	120	0.03	3:1	**YES**	2.50	1.90	3.20	2.00	GS	
14		17+30 -Y9-	DITCH	0.32	0.8	79.1	24	40	0.23	4:1	**YES**	2.38	1.97	3.12	2.07	GS	
15	103	10+56 -Y9-	2GI	0.29	0.7	71.7	22									LS	
15	104	10+60 -Y9-	2GI	1.20	3.0	296.5	90									LS	
15	105	10+95 -Y9-	2GI	0.10	0.2	24.7	8									LS	
15	108	11+57 -Y9-	2GI	0.09	0.2	22.2	7									LS	
15	110	11+18 -Y9-	2GI	0.06	0.1	14.8	5									LS	

2GI = 2 GRATED INLET
SBG = SHOULDER BERM GUTTER
CB = CATCH BASIN
DDB = DRY DETENTION BASIN
B = BASIN
GS = GRASS SWALE

BDOS = BERM DRAINAGE OUTLET STRUCTURE
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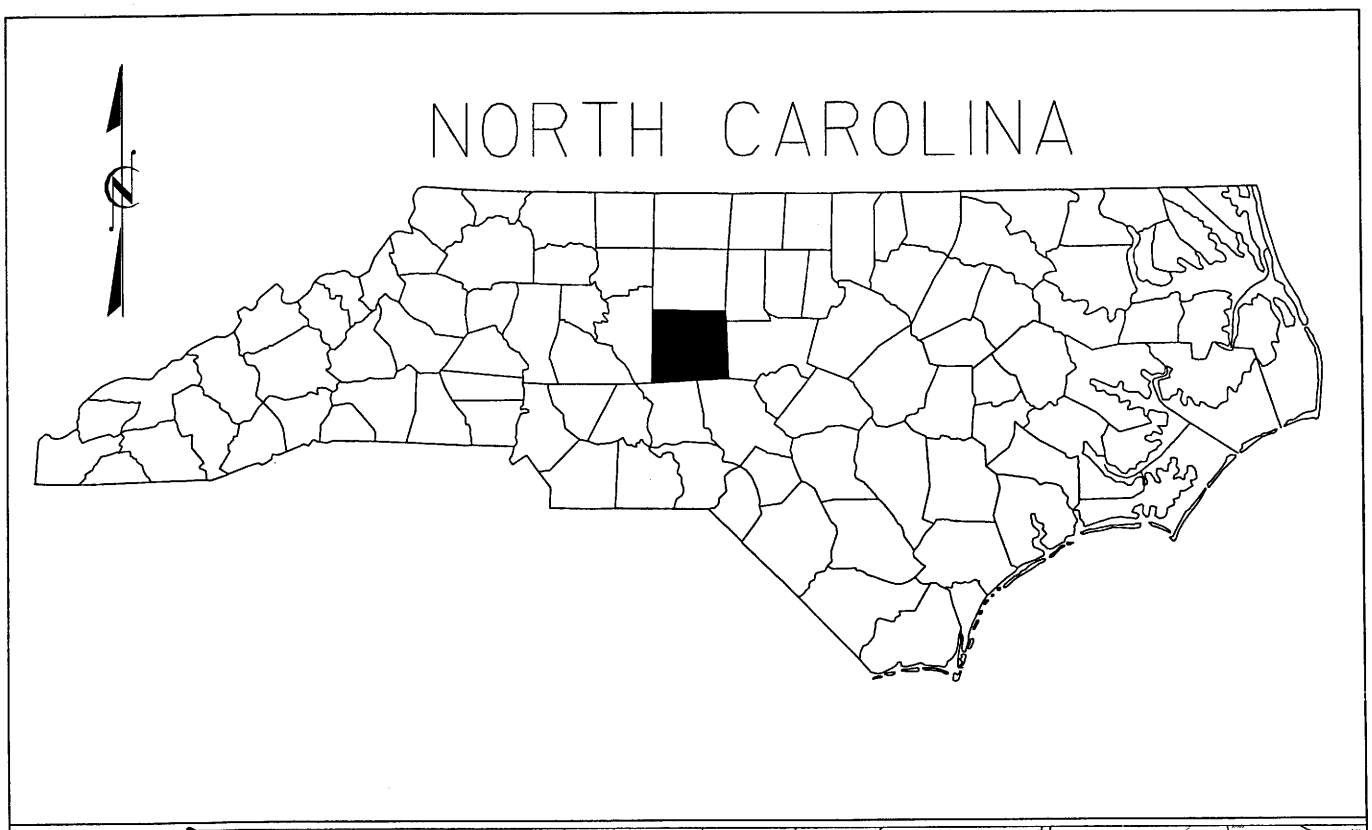
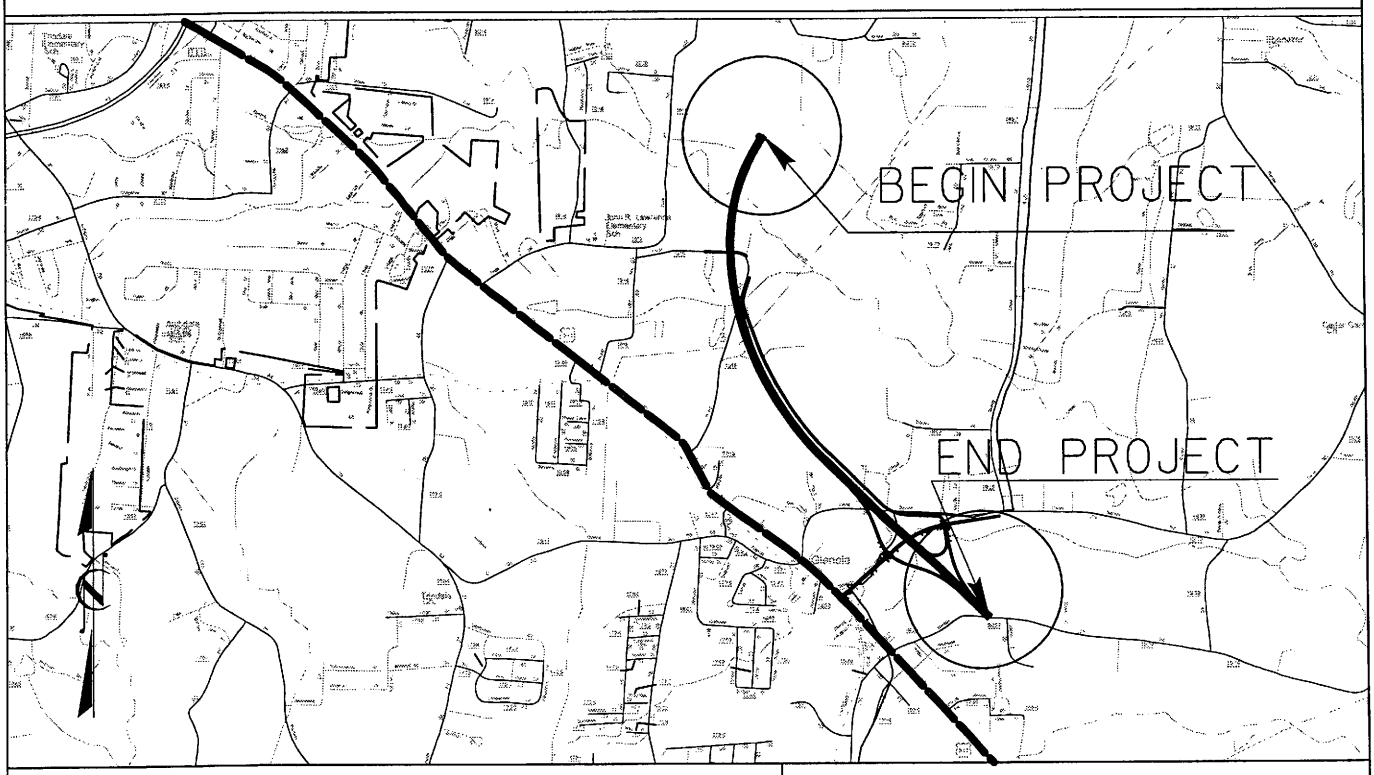
NCDOT DIVISON OF HIGHWAYS
GUILFORD/ RANDOLPH COUNTIES
PROJECT: 8.1570601 (R-0609IB0
US 311 HIGH POINT EAST BELT
FROM I-85 TO SOUTH OF SR 1920
NORTH OF ARCHADALE

SHEET 12/8/04





VICINITY MAPS

NCDOT

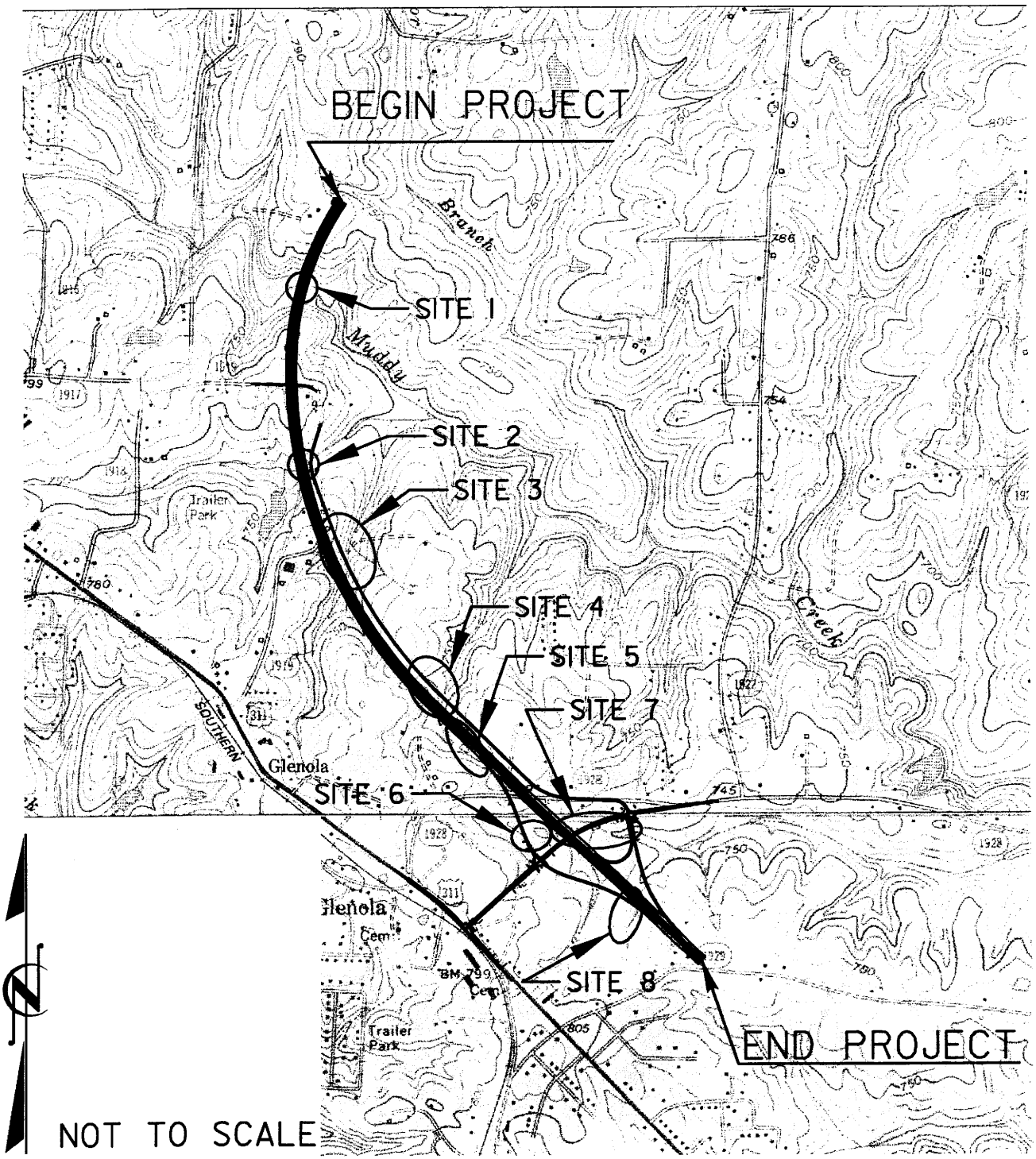
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 1 OF 46

USER: rremy
DGN: k:\4155\8\r2606a\hydraulics\VICINITY.WET
DATE: 07/14/2005

106



RANDLEMAN LAKE
WATER SUPPLY
SURFACE WATERS

LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 2 **OF** 46 1 / **2006**

USER: ej
DGN: k:\41558\r2606a\hydraulics\LOCWET
DATE: 1/30/2006

WETLAND LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

F F — DENOTES FILL IN WETLAND

S S — DENOTES FILL IN SURFACE WATER

P P — DENOTES FILL IN SURFACE WATER (POND)

T T — DENOTES TEMPORARY FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT

12"-48" PIPES

54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 3 OF 46 1/06

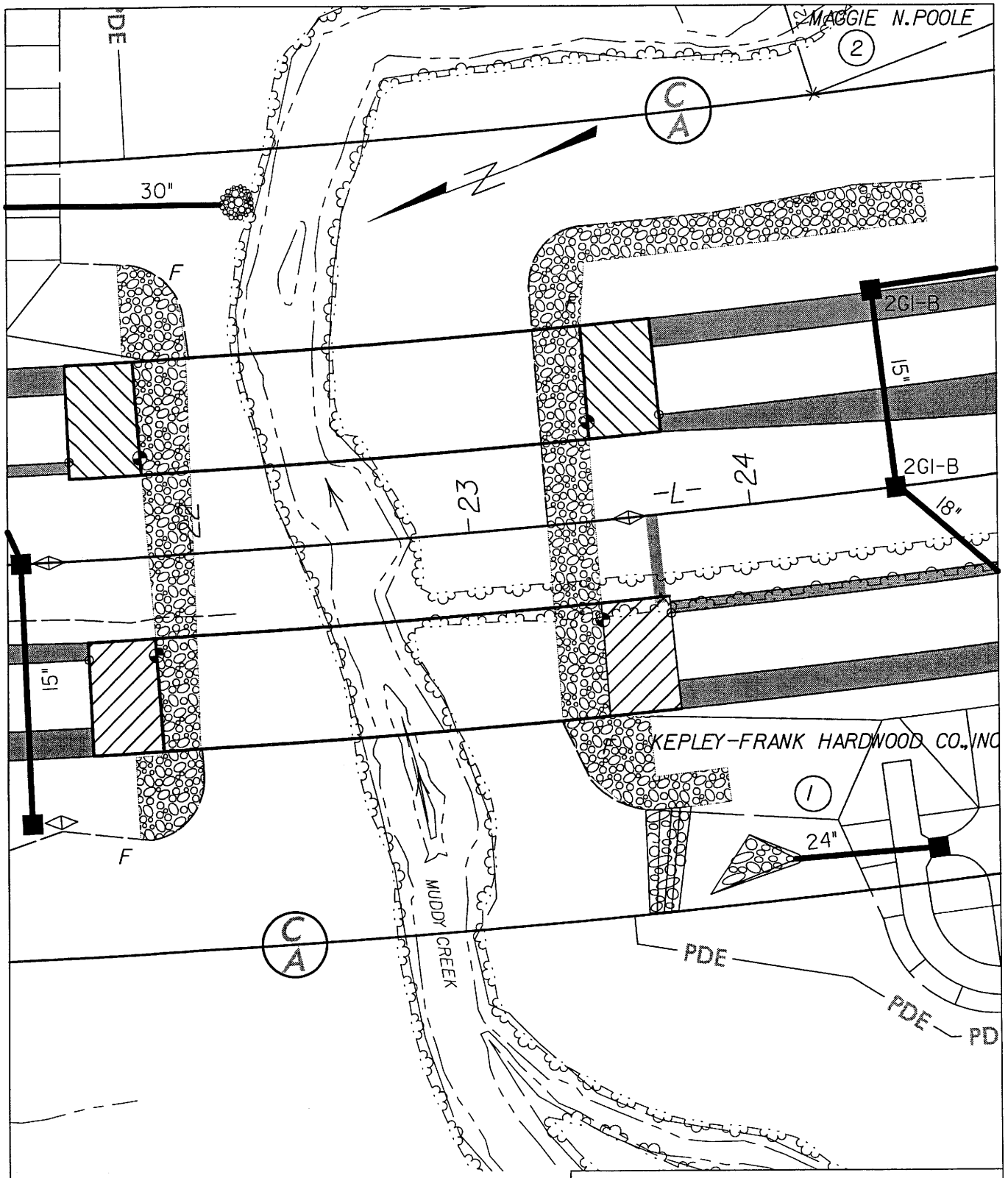
USER: rremy
DGN: k:\4\558\r-2606a\Hydraulics\new_legend1.dgn
DATE: 07/14/2005

R-2606A

HAZARDOUS SPILL BASINS

Location	Drainage Areas (Acres)	Basin Surface Area (SF)	Qp2 (cfs)
-L-Sta. 21+50 LT	8.15	13764	15.94
-L- Sta. 24+50 RT	3.96	10400	8.2
-L- Sta. 44+50 RT	11.63	10435	28.9
-L- Sta. 47+50 RT	7.01	3632	17.9
-L- Sta. 57+00 LT	13.23	10486	28.3
-L- Sta. 79+00 LT	13.08	21126	22.7
-L- Sta. 89+00 RT	15.4	9689	**(Qp5) 15.4**
-L- Sta. 111+34 RT	9.91	12878	16.5

Location	Qp2 Velocity (fps)	Treatment Provided	Comments
-L- Sta. 31+02 LT	**1.55**	Preformed Scour Hole	
-Y- Sta. 16+60 LT	Exempt due to existing drainage way		
-SR- Sta. 13+20 LT		Dissipator Basin	Exempt
-L- Sta. 59+44 LT			Cross Pipe/ Exempt
-L- Sta. 81+70 LT			Cross Pipe/ Exempt
-L- Sta. 81+78 LT			Cross Pipe/ Exempt
-SR-Sta. 56+57 LT to	Exempt due to existing drainage way		
-SR- Sta. 63+50 LT	Exempt due to existing drainage way		
-L- Sta 110+55 LT			Cross Pipe/Exempt
-L- Sta. 110+50 LT	No Buffer 6/12/2001 Field Inspection		
-L- Sta. 112+90 LT			Cross Pipe/Exempt
-L- Sta. 116+63 RT	**0.68**	Earth Berm W/ Level Spreader	
-Ramp A- Sta 10+44 RT		Dry Det. Basin	Exempt
'-Ramp A- Sta 13+88 RT	-		Cross Pipe/Exemp
'-Ramp A- Sta 14+55 RT	-		Cross Pipe/Exemp
-Y1- Sta. 37+96 RT	**3.01**	Exempt due to existing ditch	
-Y1- Sta. 38+56 RT	Exempt due to entering ditch before buffer		
-Loop A- Sta. 4+10 RT	Exempt due to existing drainage way		



0 50 ft 100 ft

PLAN VIEW SITE 1

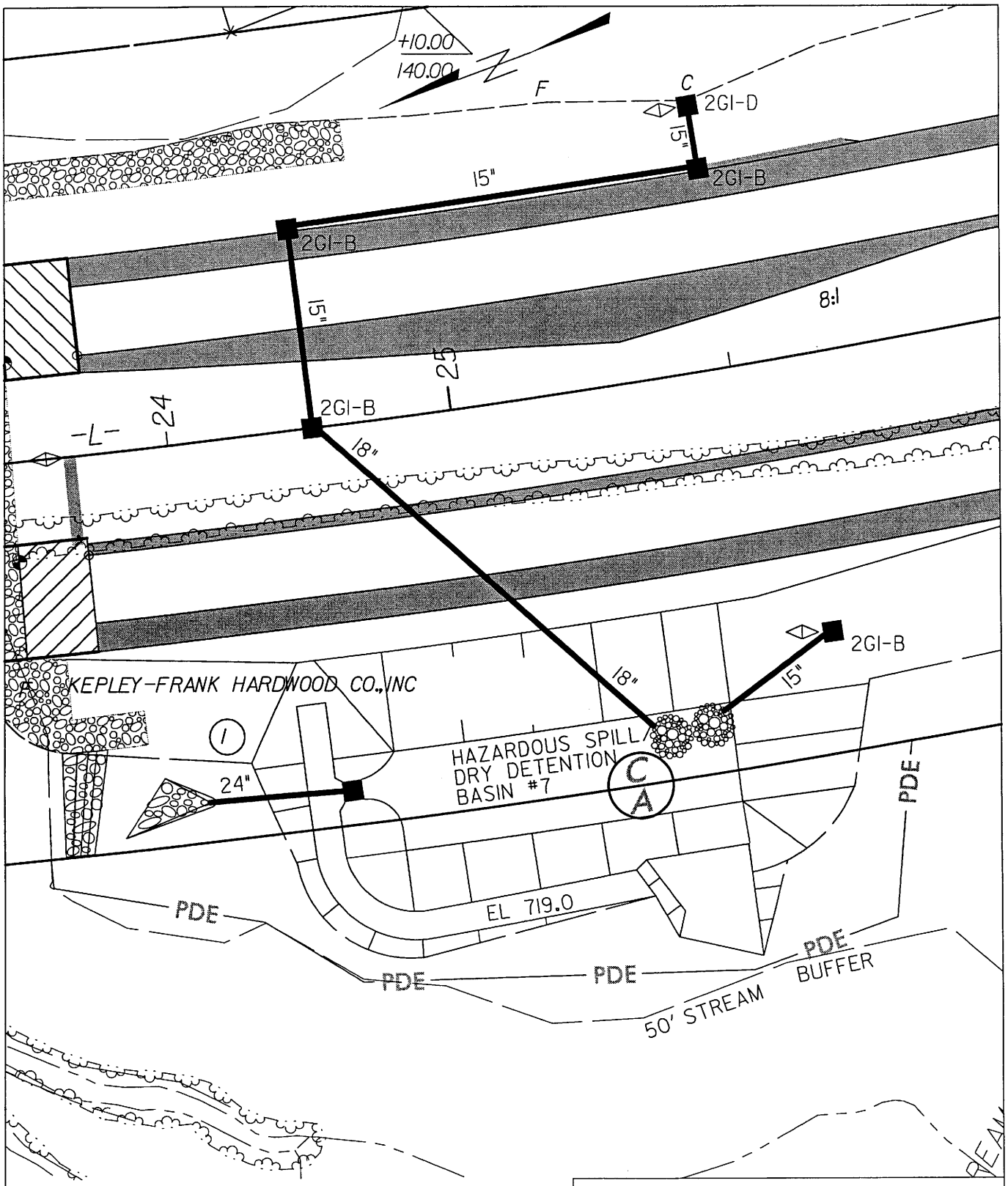
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 5 **OF** 46 1.106

USER: rrainy
DGN: KH1559V-2606aVHydraulicsVUNET
DATE: 07/14/2005



0 50 ft 100 ft

PLAN VIEW SITE 1

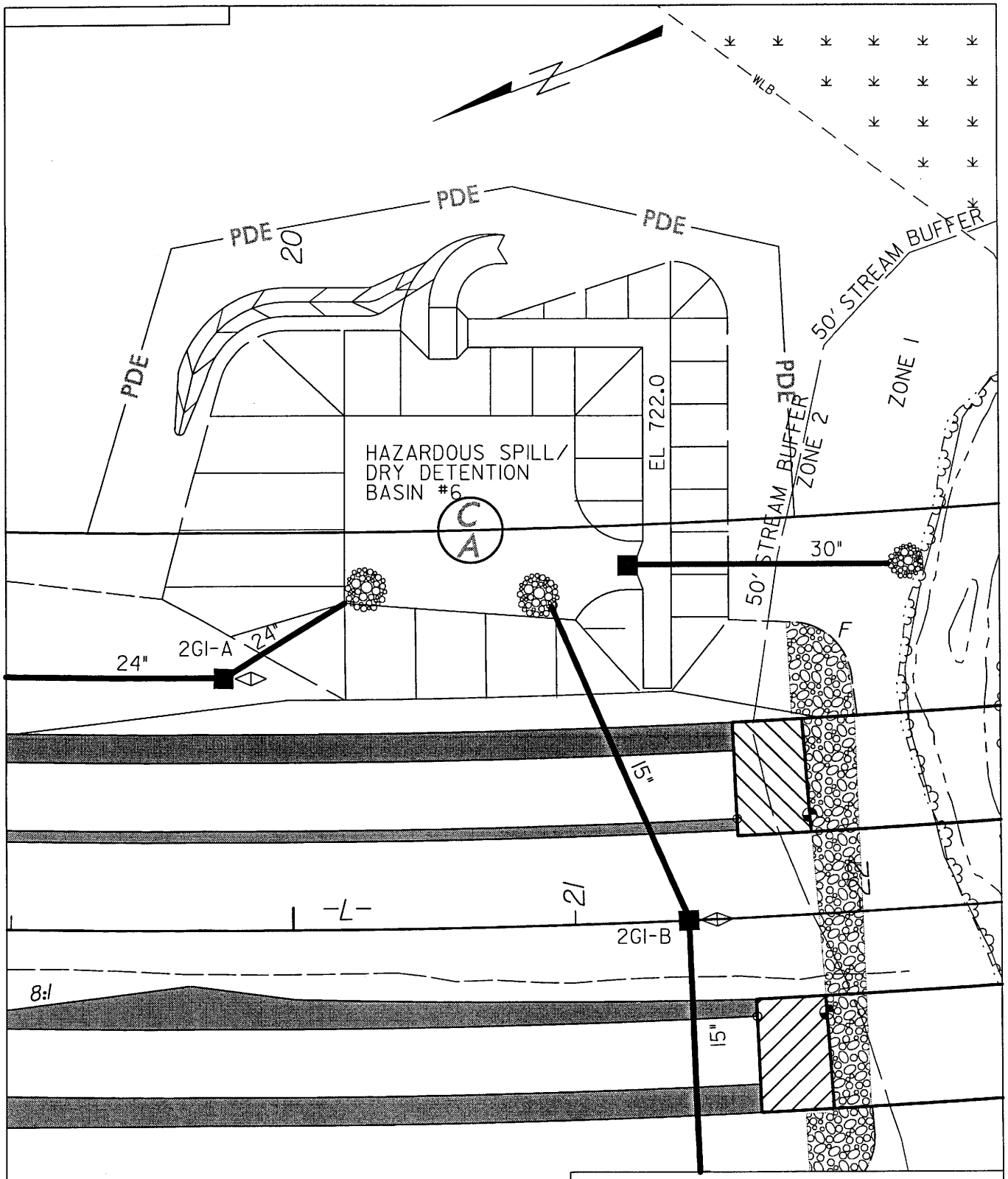
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 6 **OF** 46 1/06

USER: rwm
DGN: 6\8158\r2606\hydraulics\basin7_surfacewinterwet
DATE: 07/14/2005



0 50 ft 100 ft

PLAN VIEW SITE 1

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

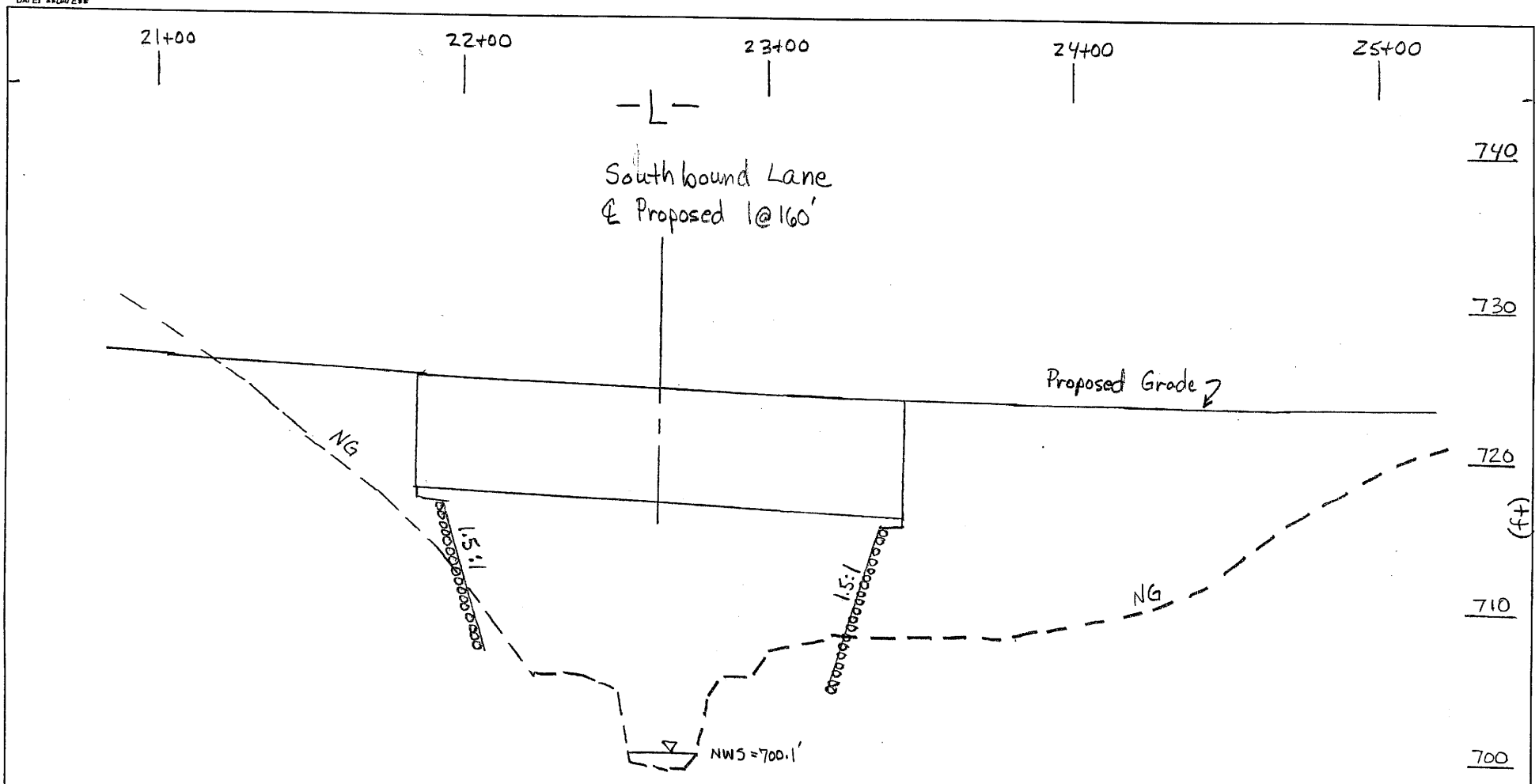
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

SHEET 7 OF 46 / 106

USER: rwm
DGN: 8.1571501_R2606A\hydraulics\basin6_surfacewater.wet
DATE: 07/14/2005

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



PROFILE VIEW
SITE 1

0 50 ft 100 ft HORIZ

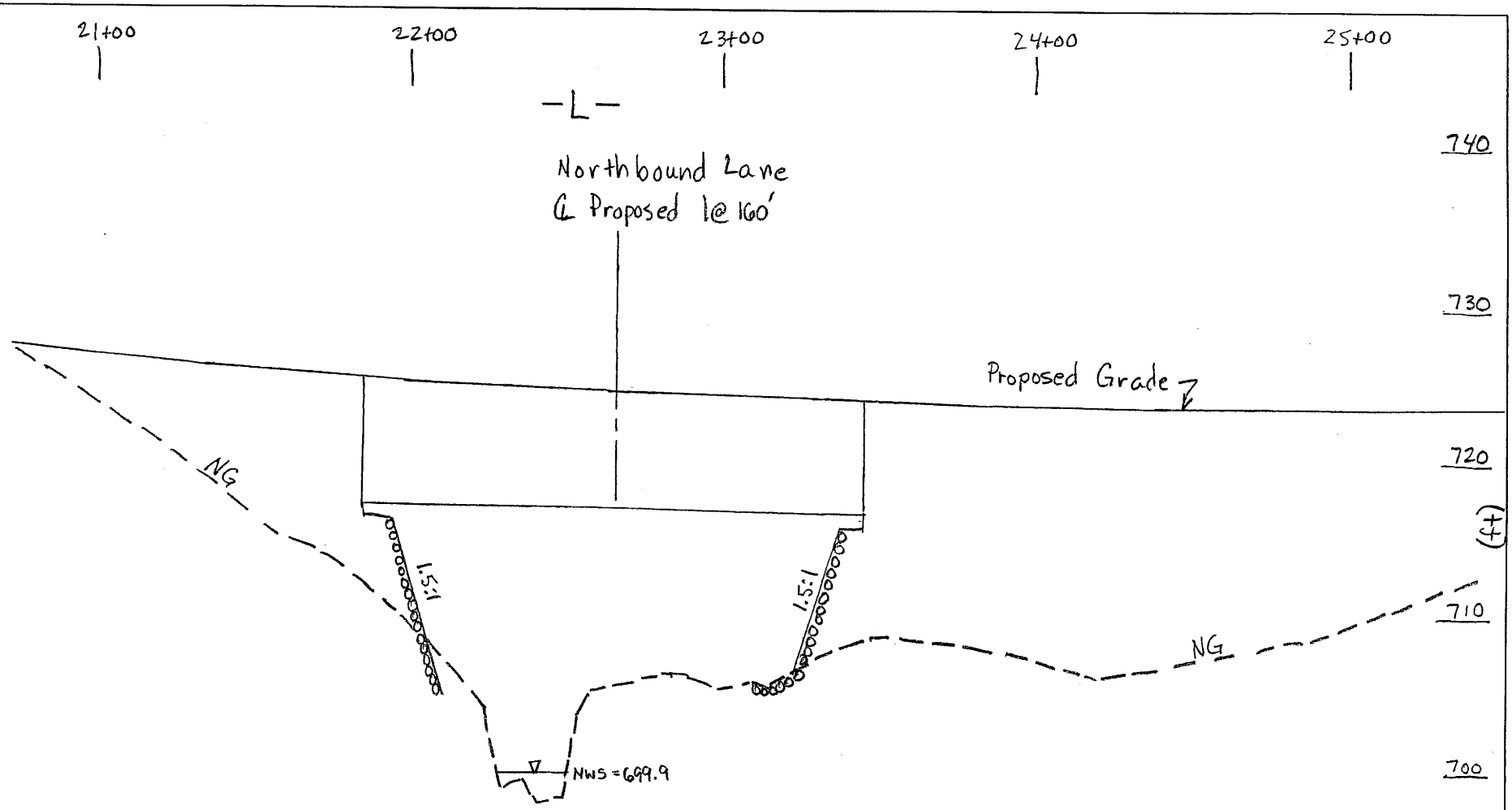
0 10 ft 20 ft VERT

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 8 **OF** 46 / 106

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



PROFILE VIEW
SITE 1

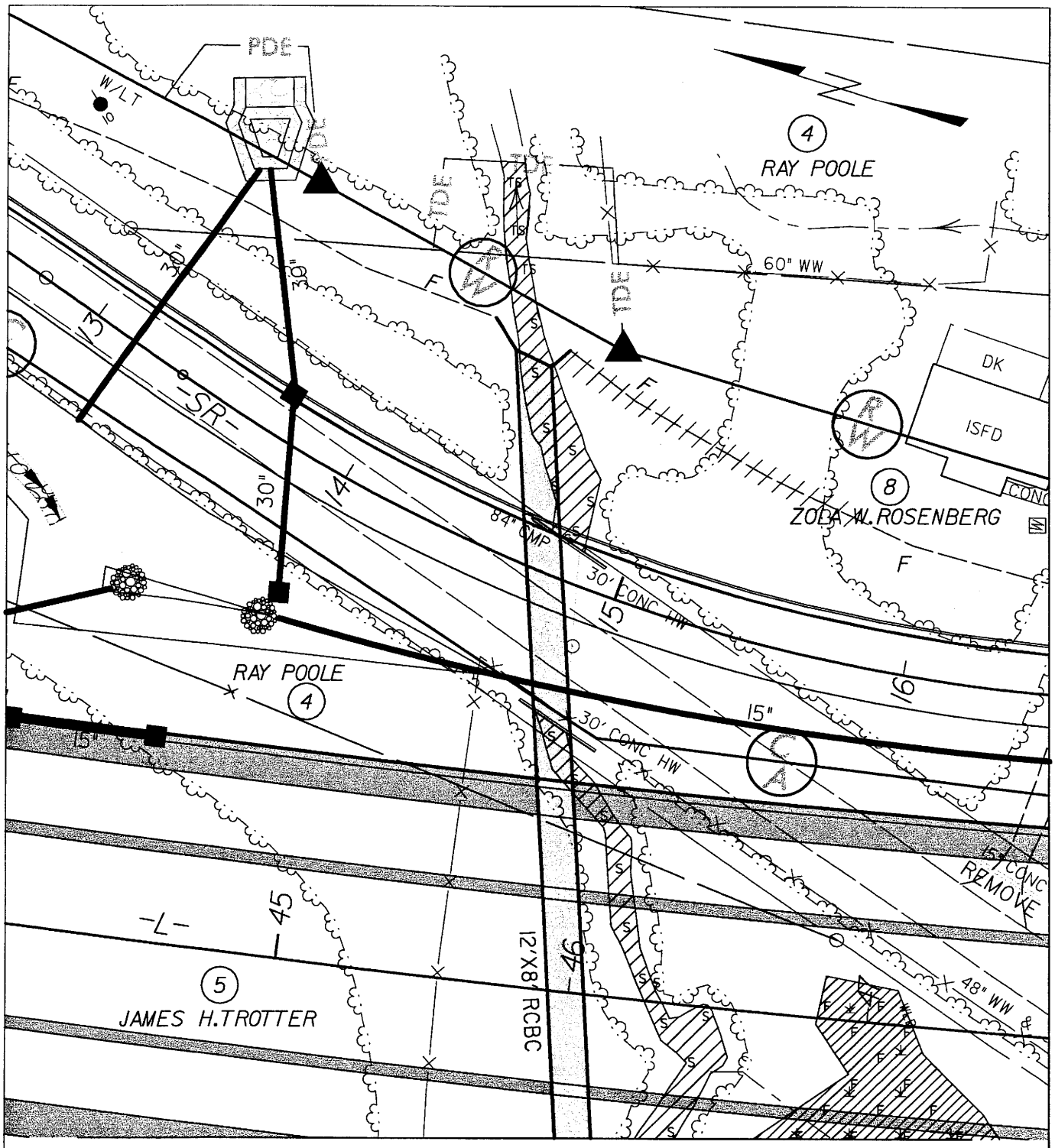
0 50 ft 100 ft HORIZ

0 10 ft 20 ft VERT

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 9 **OF** 46 / 106



MATCH LINE A

0 50 ft 100 ft

PLAN VIEW SITE 2

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

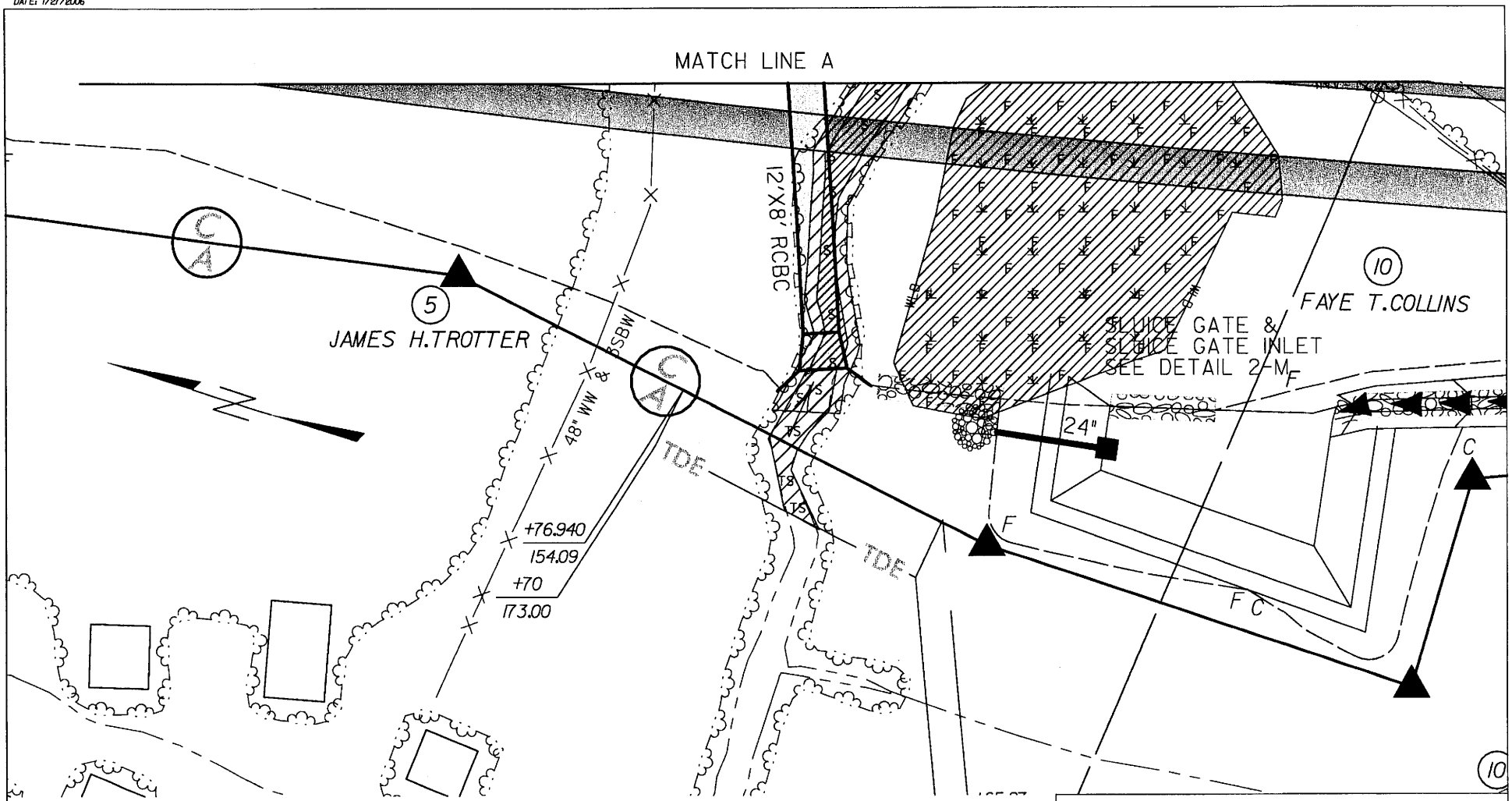
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

SHEET 10 **OF** 46 **/ 2006**

USER: ej
DGN: k:\r2606\r2606hydraulics\2pwr
DATE: 1/31/2006

USER: aj
DGN: h:\41558\r-2606d\hydraulics\2b.wrel
DATE: 1/27/2006



PLAN VIEW
SITE 2

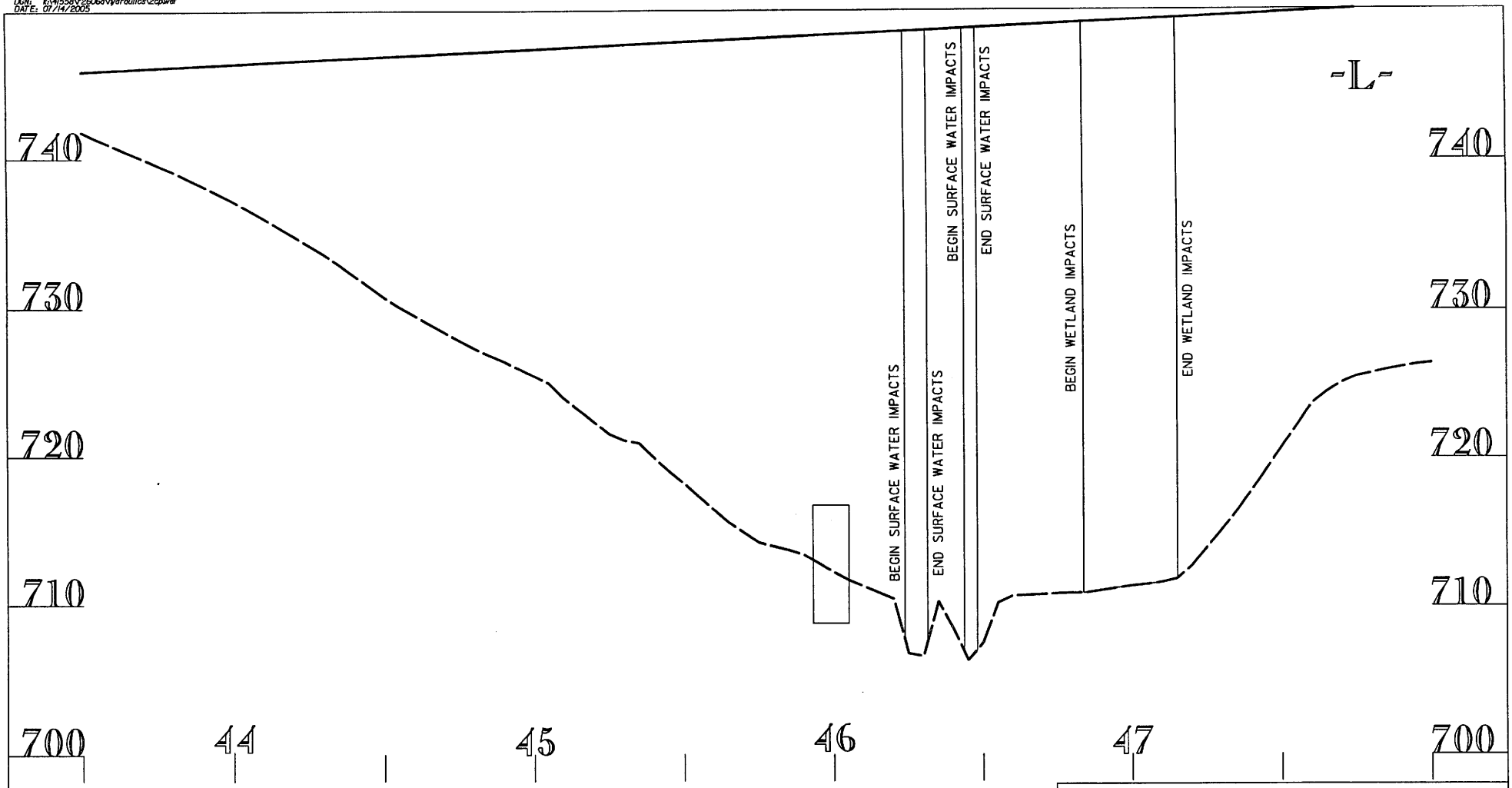
0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 11 **OF** 46 **/ 2006**

USER: rremy
DGN: k:\41558\r2606a\hydraulics\2cpwet
DATE: 07/14/2005



PROFILE VIEW
SITE 2

HORIZONTAL SCALE: 0 — 50 ft — 100 ft

VERTICAL SCALE: 0 — 10 ft — 20 ft

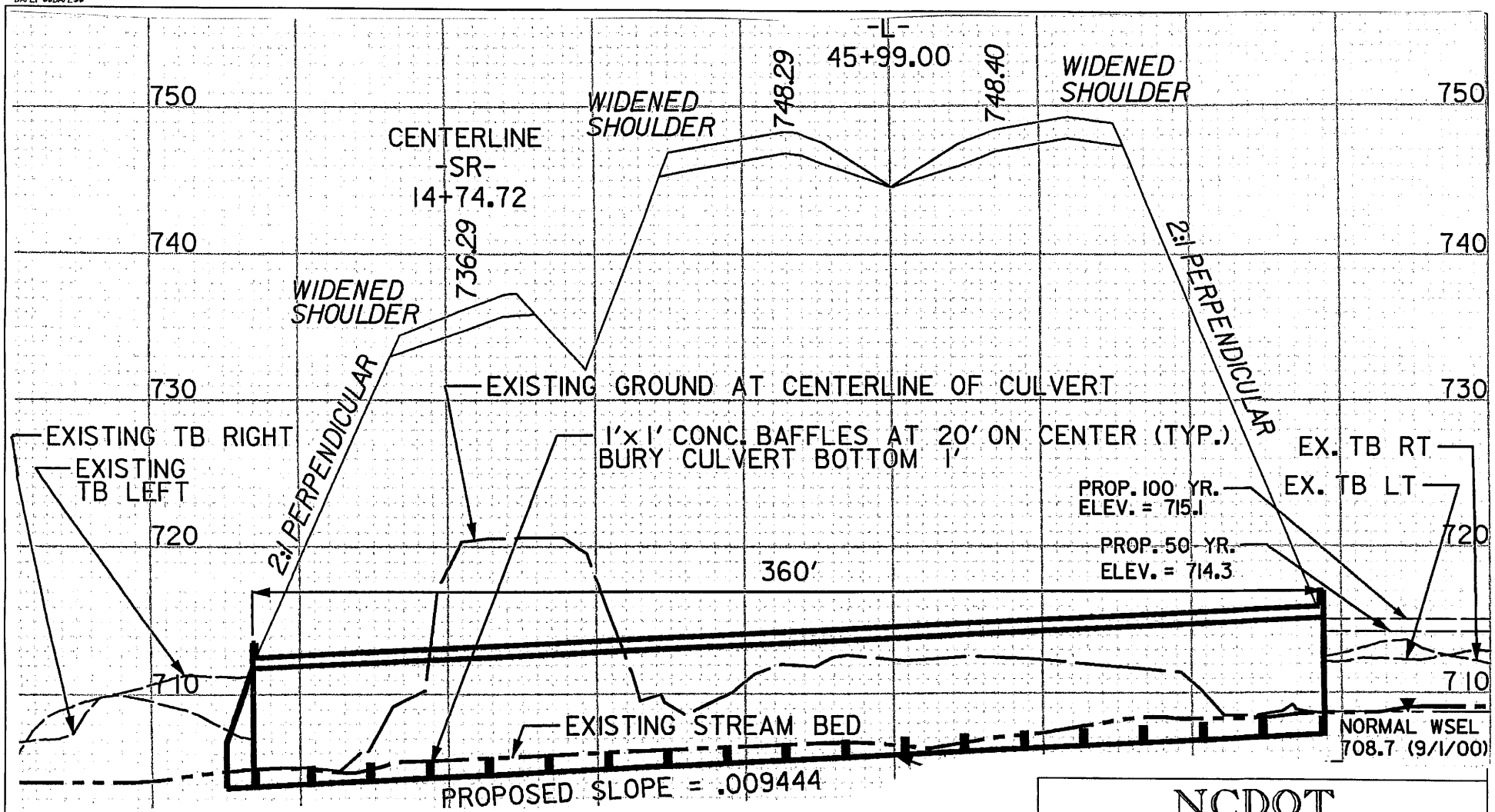
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 12 **OF** 46 1:06

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



0 50 ft 100 ft HORIZ

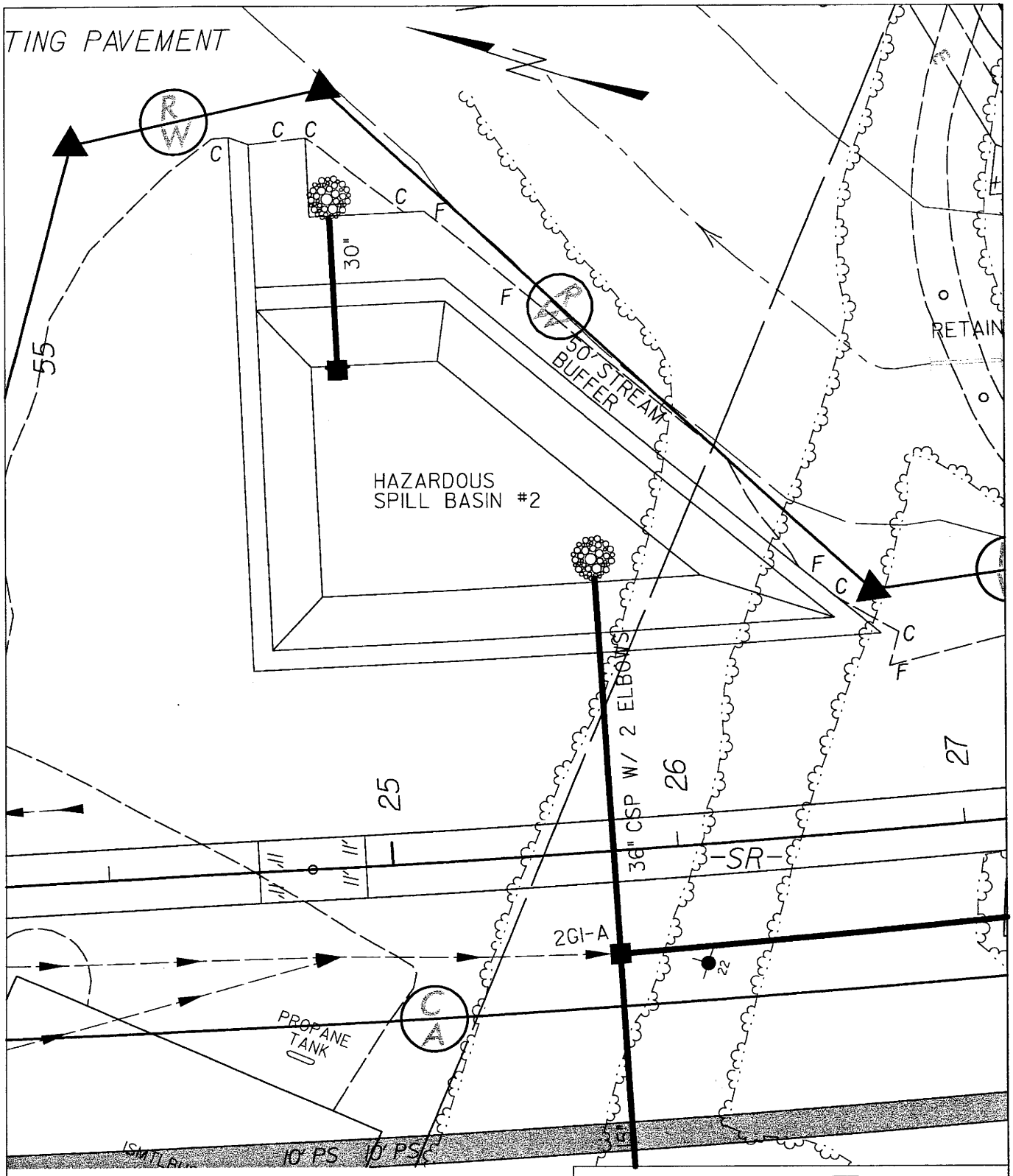
0 10 ft 20 ft VERT

PROFILE VIEW
SITE 2

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 13 OF 46 1/06



0 50 ft 100 ft

PLAN VIEW SITE 3

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

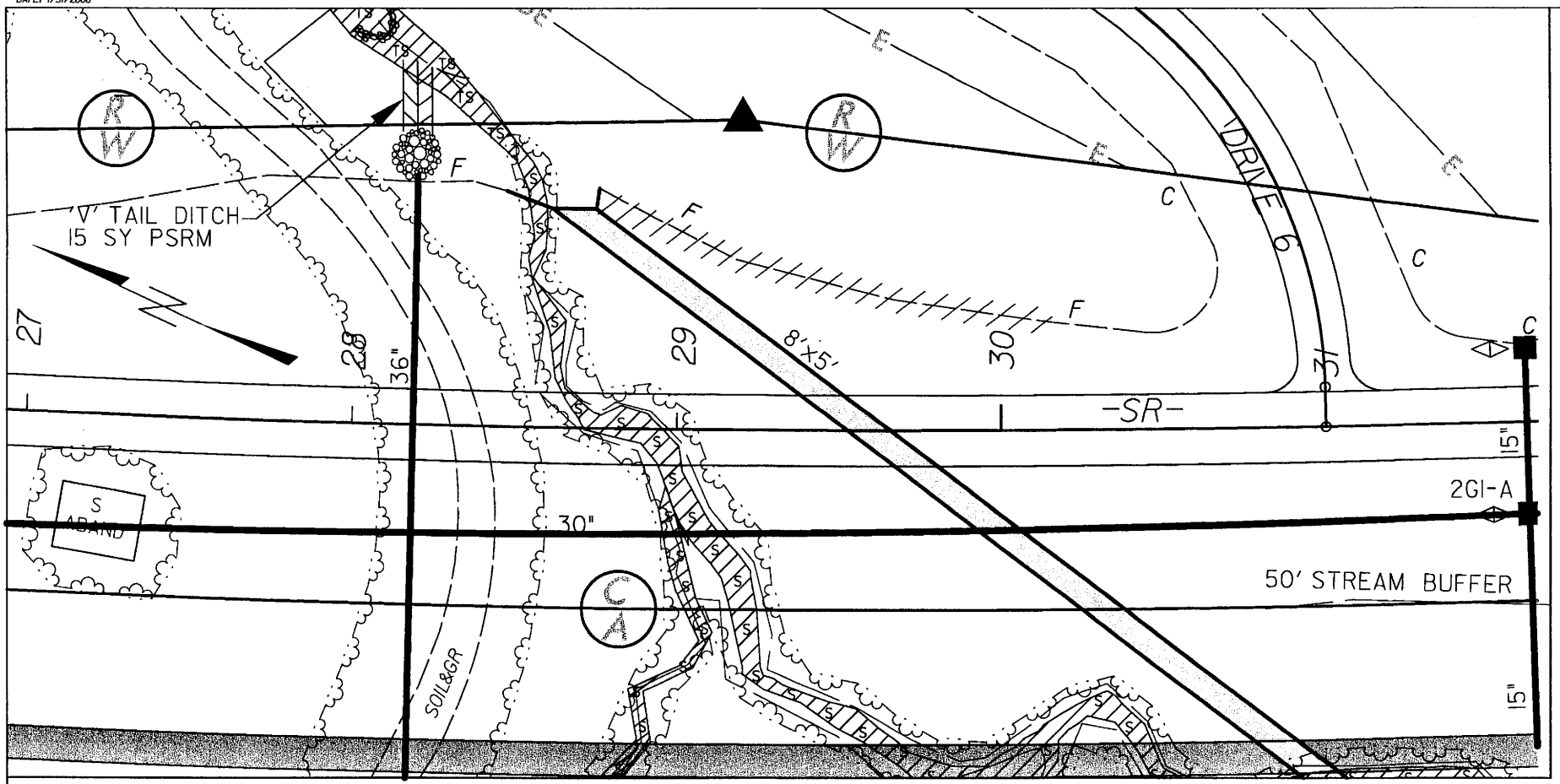
PROJECT: 8.1571501 (R-2606 A)

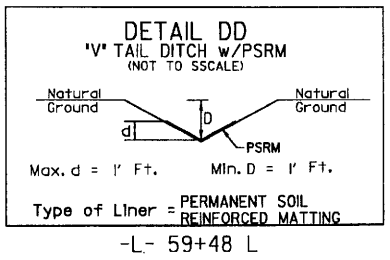
US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 14 **OF** 46 1 **/2006**

USER: al
DGN: R:\R2606\hydraulics\basin2_surfacewater.wet
DATE: 1/30/2006

USER: a)
DGN: h:\41558\r2606a\hydraulics\3a.wet
DATE: 1/31/2006





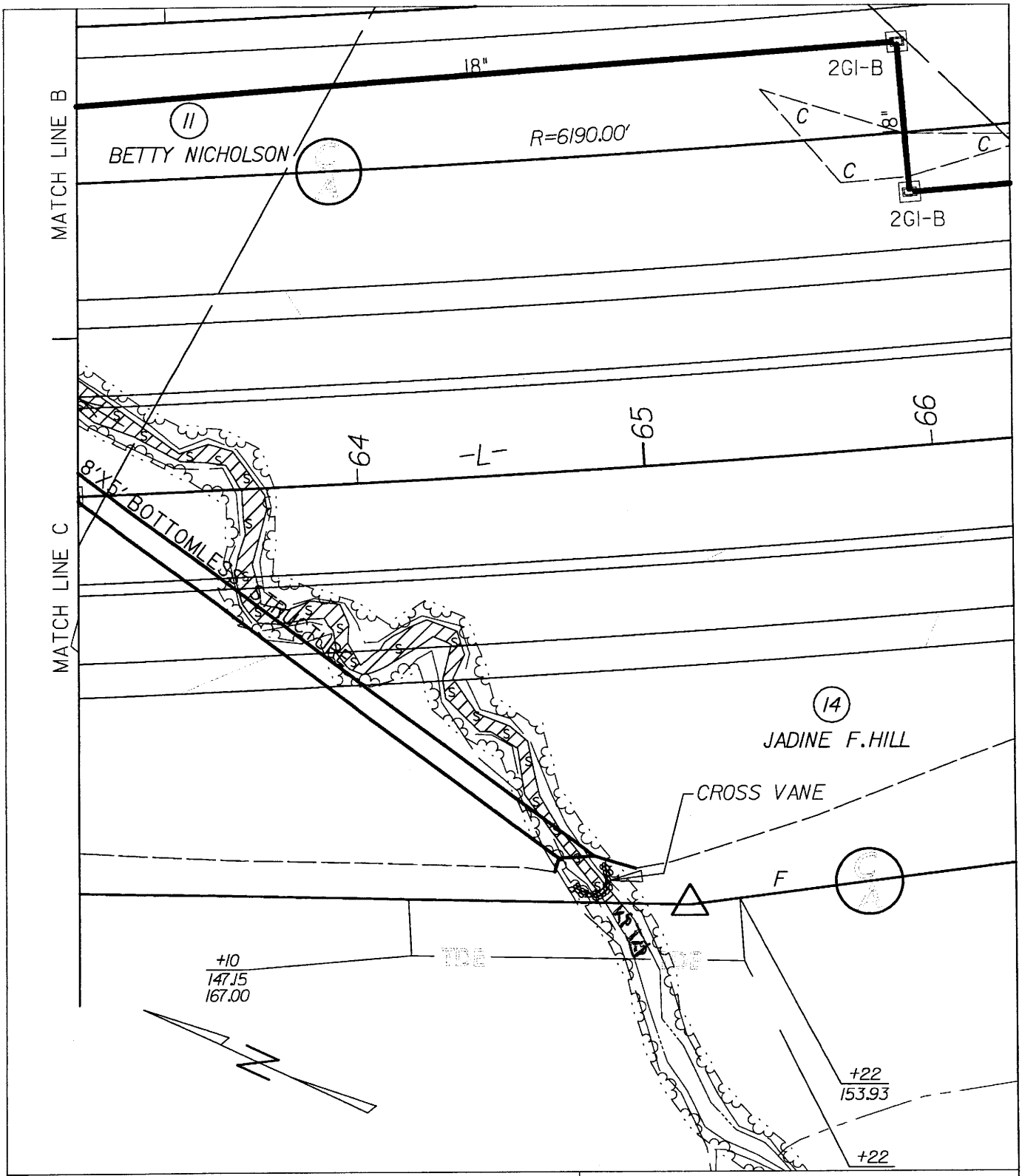
PLAN VIEW
SITE 3

0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 15 **OF** 46 / / **2006**



0 50 ft 100 ft

PLAN VIEW SITE 3

NCDOT

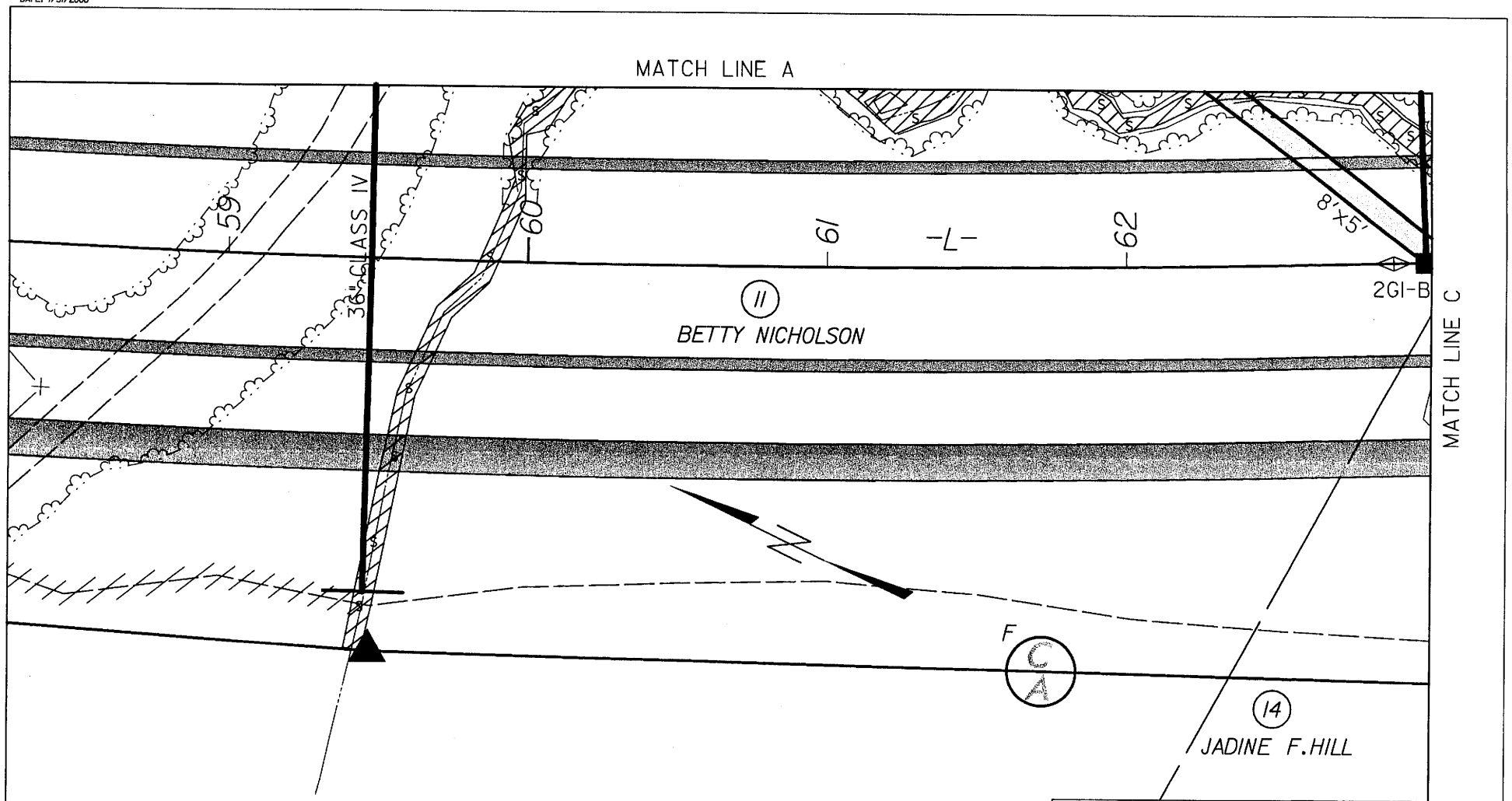
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 16 OF 46 / /2006

USER: ej
DGN: h:\4558\r2606\hydr\auf\ca\3.dgn
DATE: 1/27/2006

USER: al
DGN: h:\41558\r2606\hydraulics\3b.wet
DATE: 1/31/2006



PLAN VIEW
SITE 3

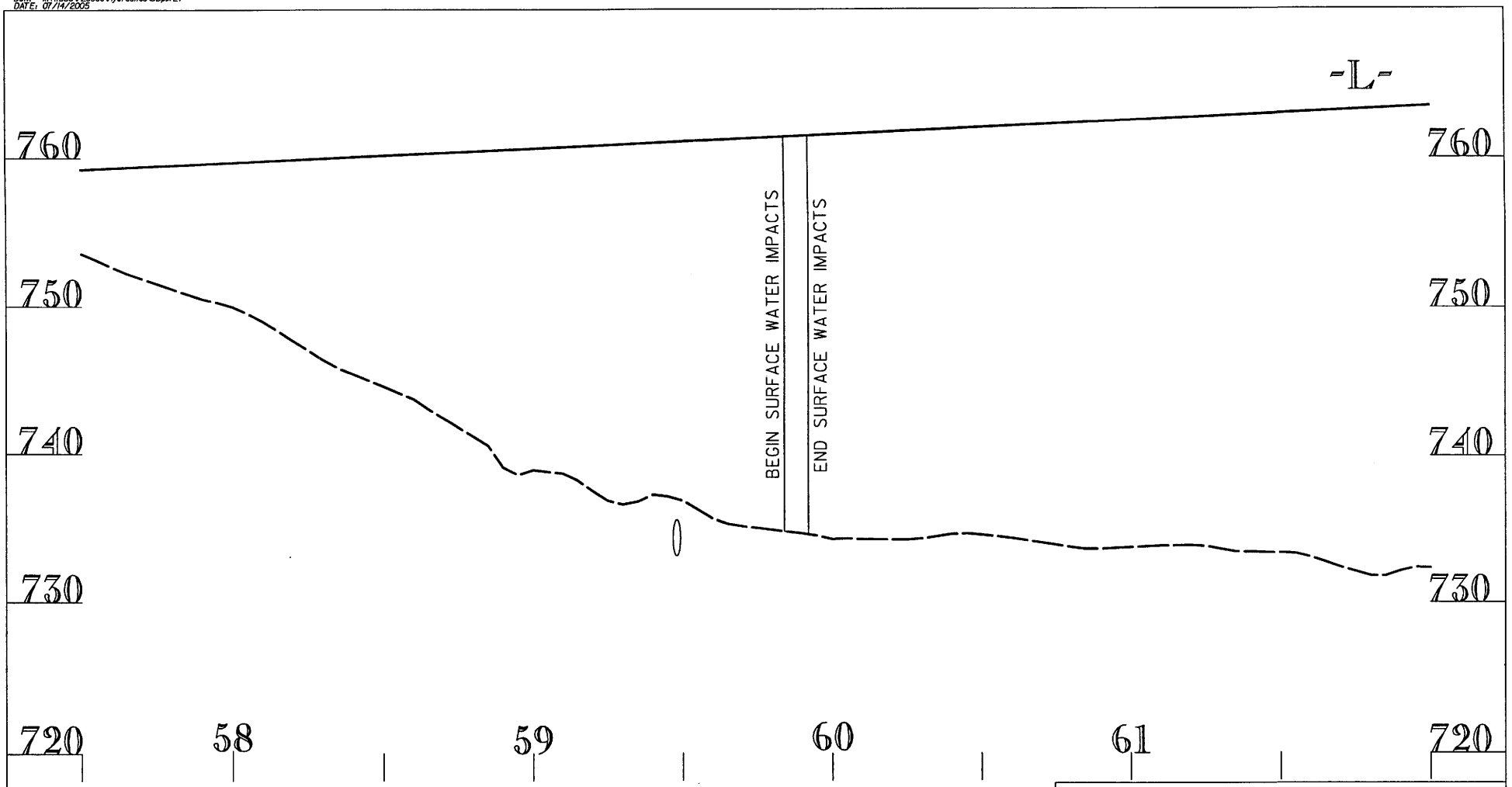
0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 17 **OF** 46 1 / **2006**

USER: rtemy
DGN: k:\41558\r2606d\Hydraulics\3DpWET
DATE: 07/14/2005



PROFILE VIEW
SITE 3

HORIZONTAL SCALE 0 50 ft 100 ft

VERTICAL SCALE 0 10 ft 20 ft

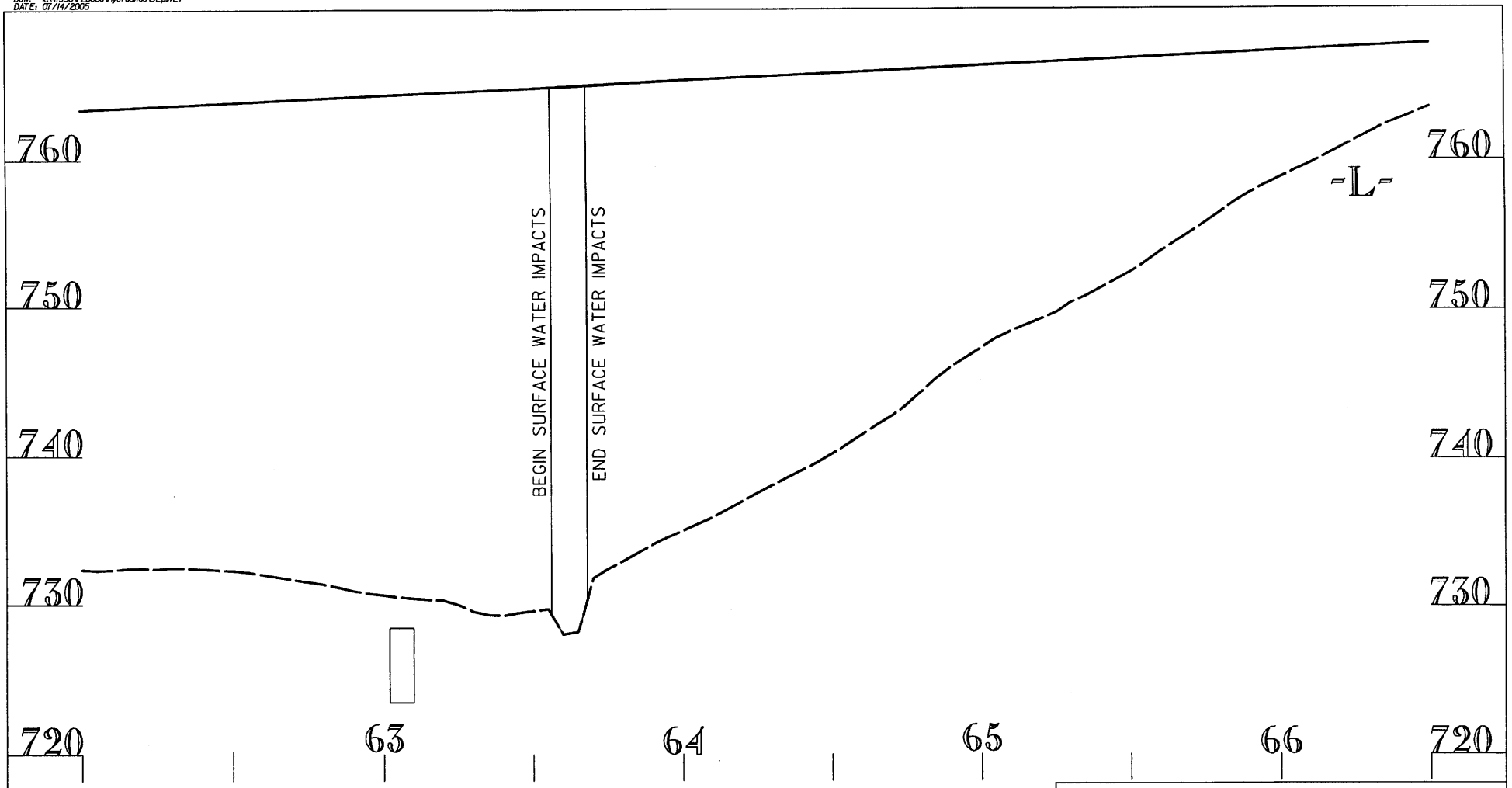
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 18 **OF** 46 1/108

USER: rremy
DGN: k:\4558\r2606a\Hydraulics\3Ep.WET
DATE: 07/14/2005



PROFILE VIEW
SITE 3

HORIZONTAL SCALE 0 50 ft 100 ft

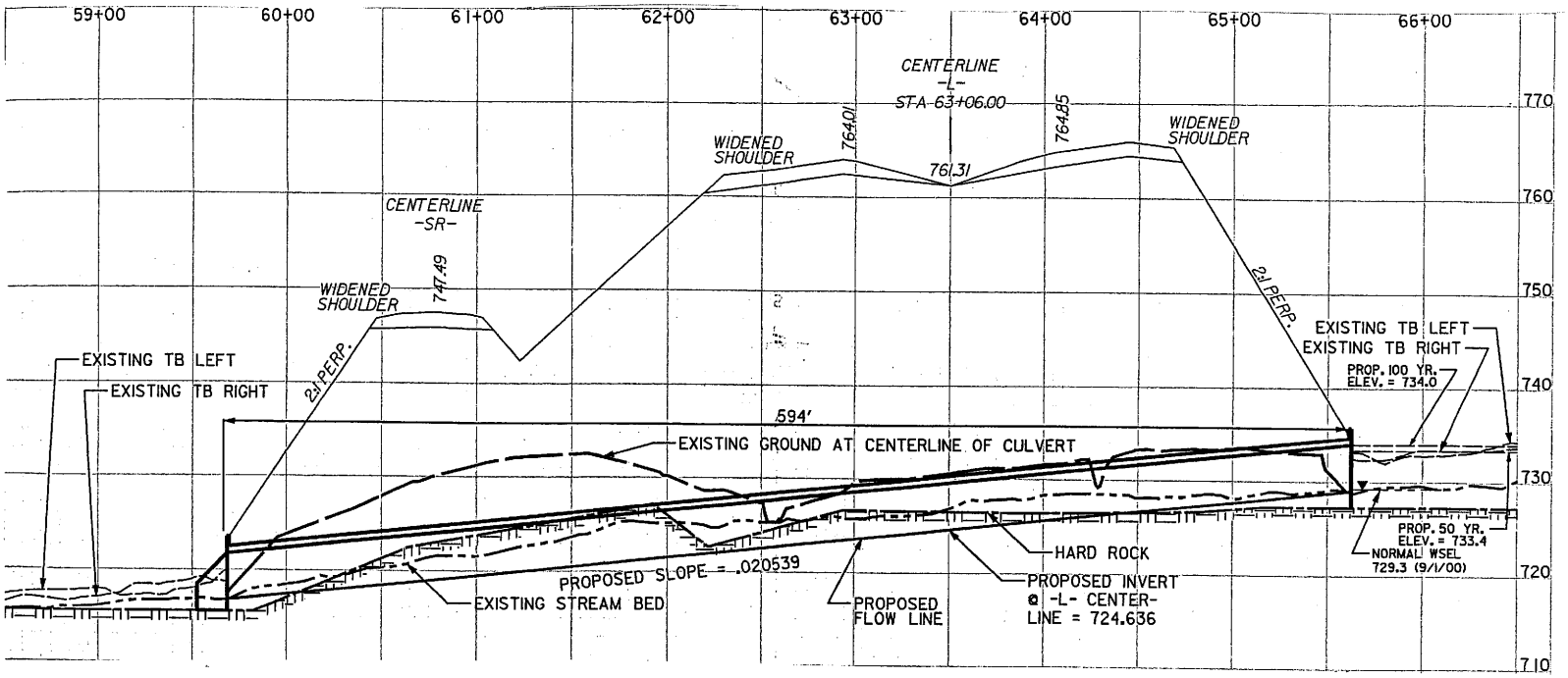
VERTICAL SCALE 0 10 ft 20 ft

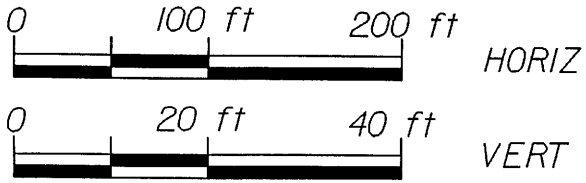
NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 19 **OF** 46 / 106

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





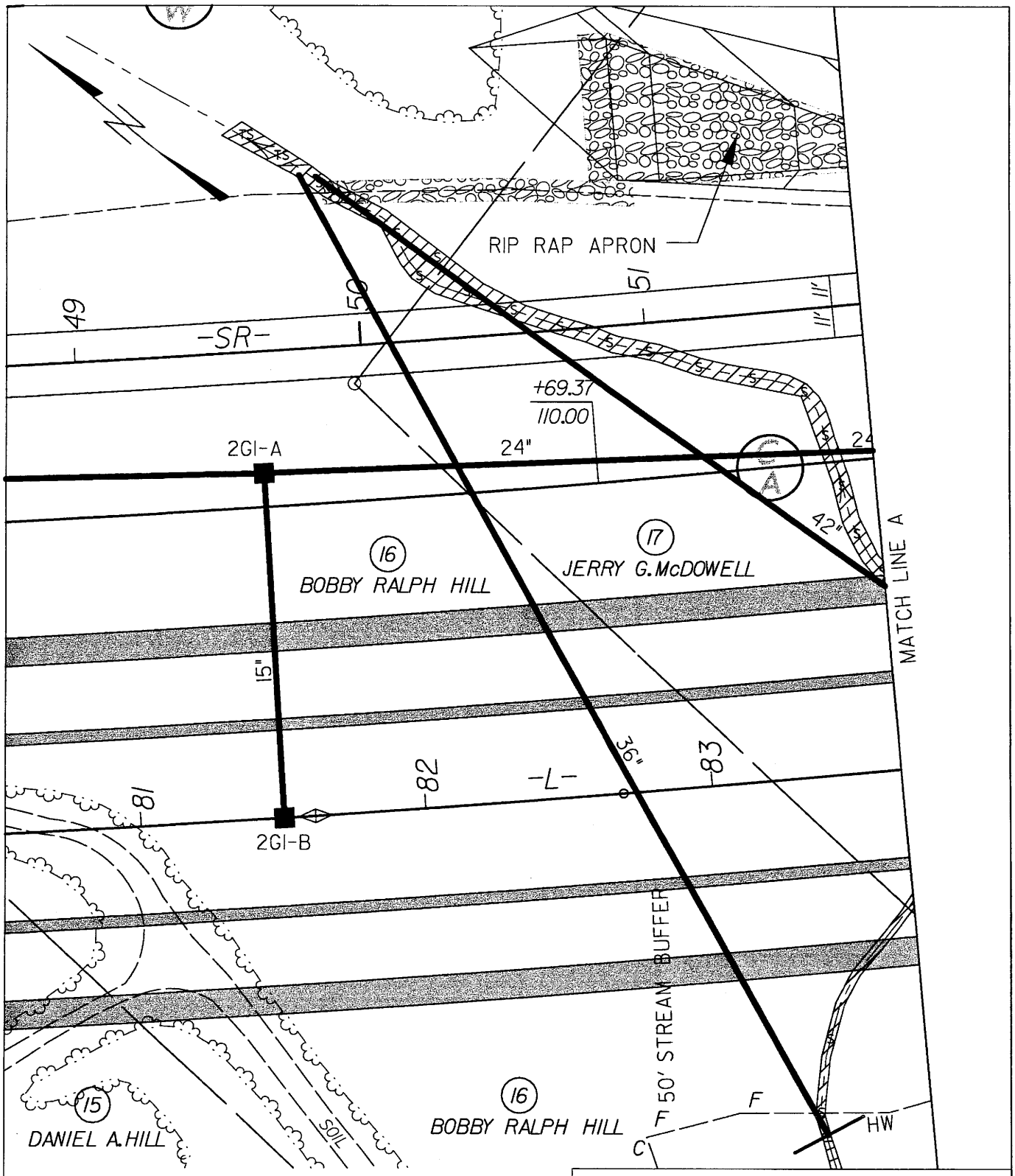
PROFILE VIEW
SITE 3

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 26 **OF** 46 1:106



0 50 ft 100 ft

PLAN VIEW SITE 4

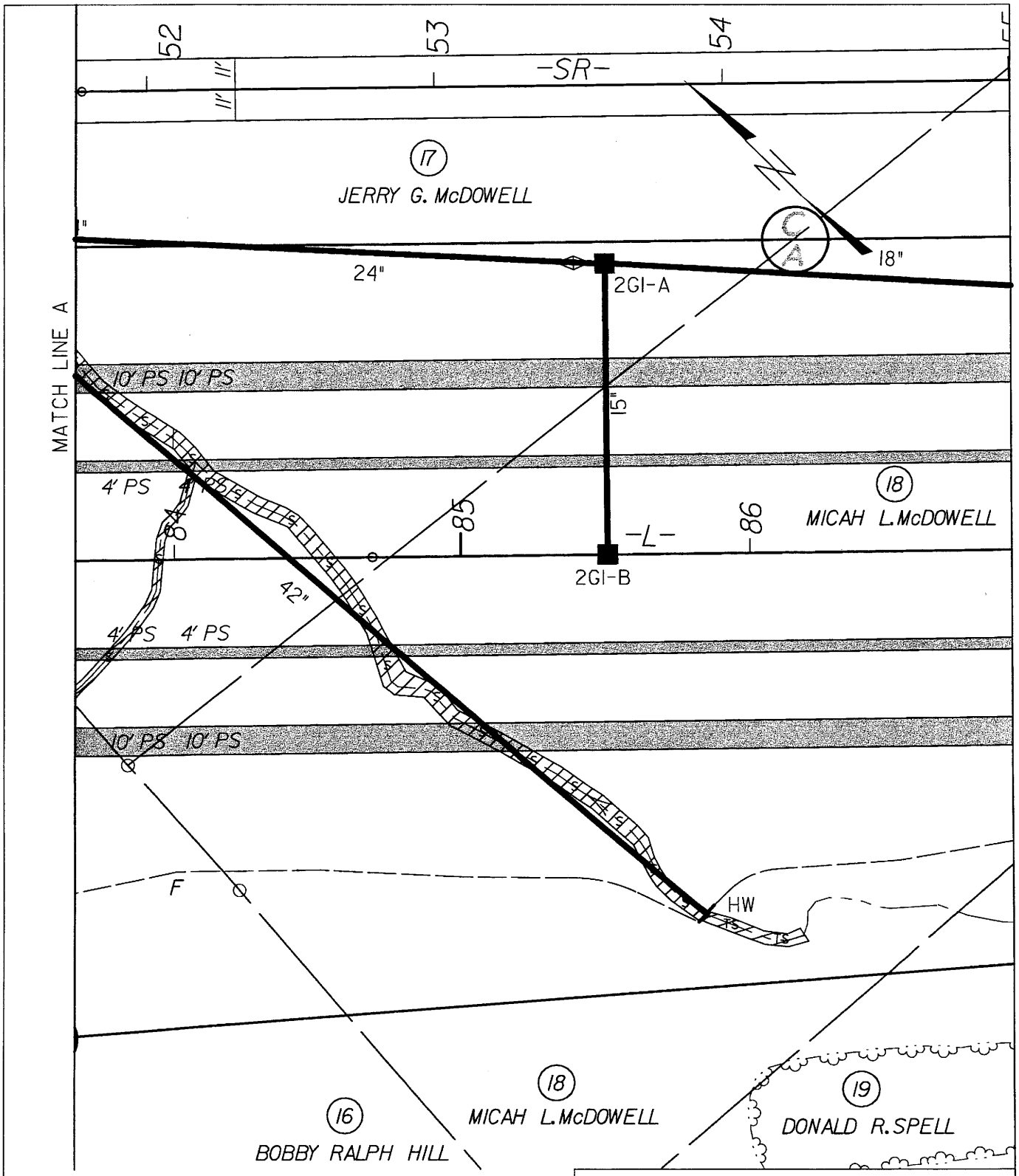
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 21 **OF** 46 / 1 / **2006**

USER: aj
DGN: N:\MSSR\r2606\hydraulics\4.dgn
DATE: 1/31/2006



0 50 ft 100 ft

PLAN VIEW SITE 4

NCDOT

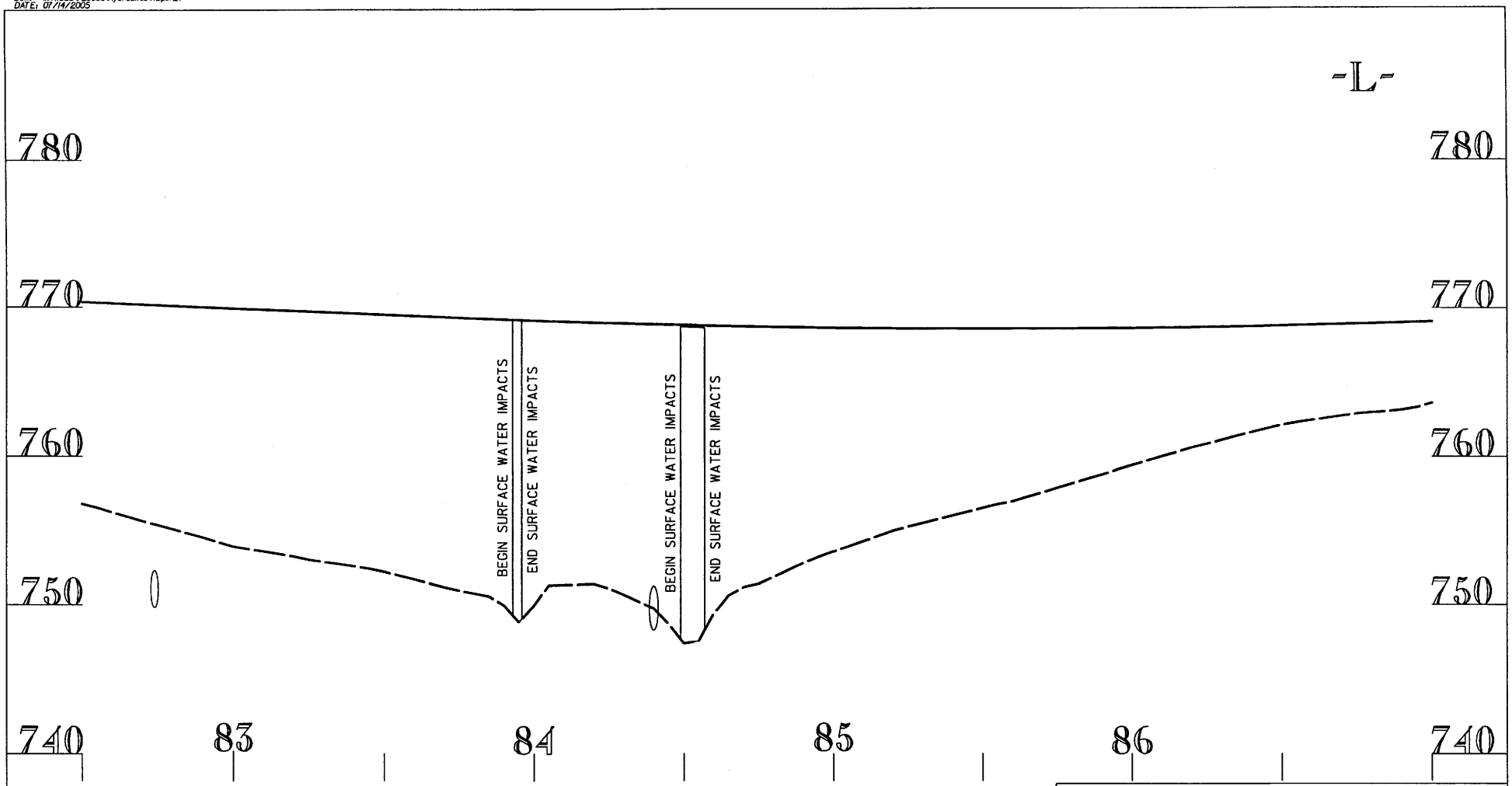
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 22 **OF** 46 / **/2006**

USER: el
DGN: R:\41571501\r2606a\hydraulics\4tower
DATE: 1/31/2006

USER: rrem
DGN: k:\4\558\r2606a\Hydraulics\4Dp.WET
DATE: 07/14/2005



PROFILE VIEW
SITE 4

HORIZONTAL SCALE: 0 — 50 ft — 100 ft

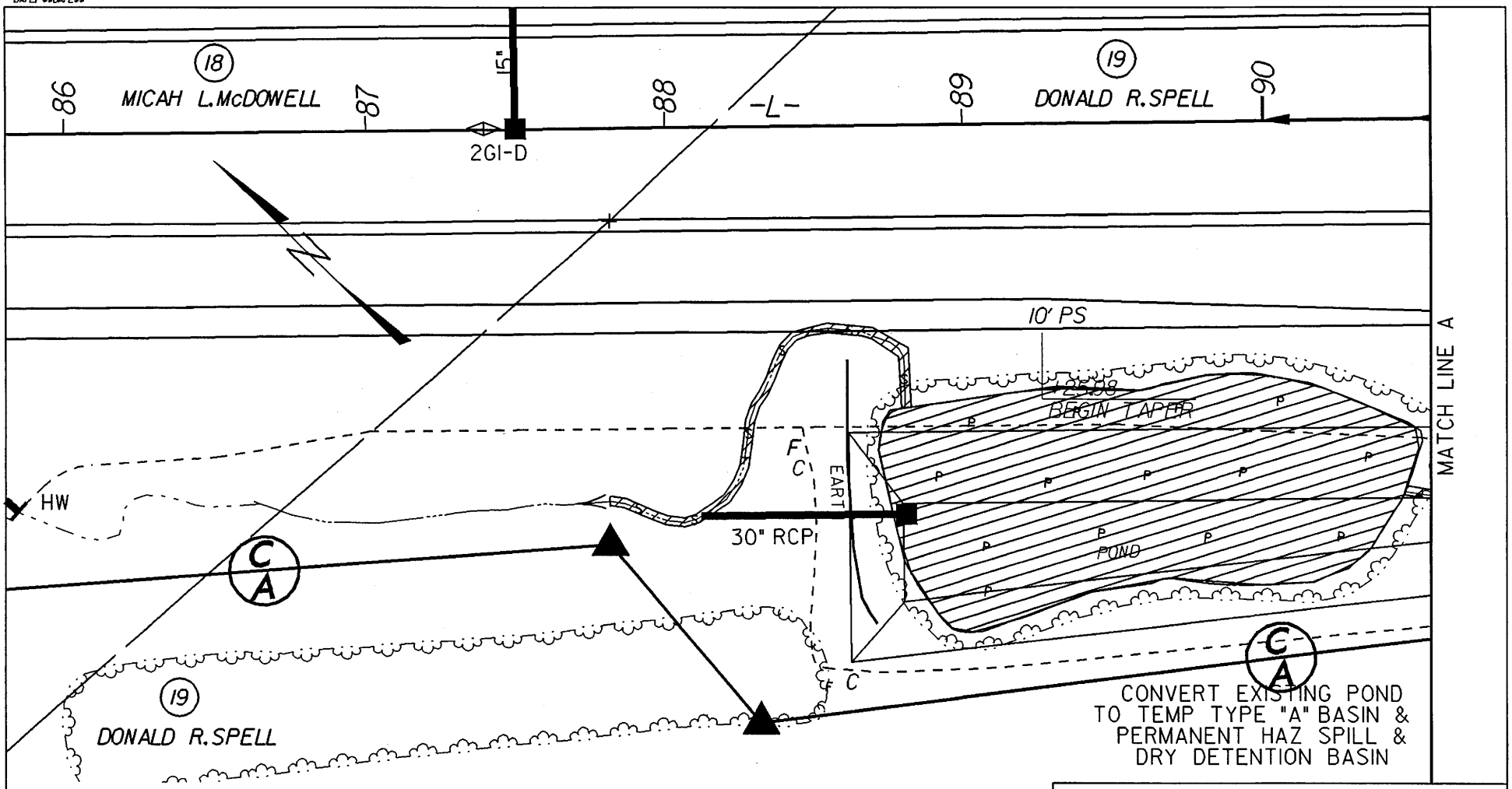
VERTICAL SCALE: 0 — 10 ft — 20 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 23 **OF** 46 / / **2005**

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



PLAN VIEW
SITE 5

0 100 ft 200 ft HORIZ

0 20 ft 40 ft VERT

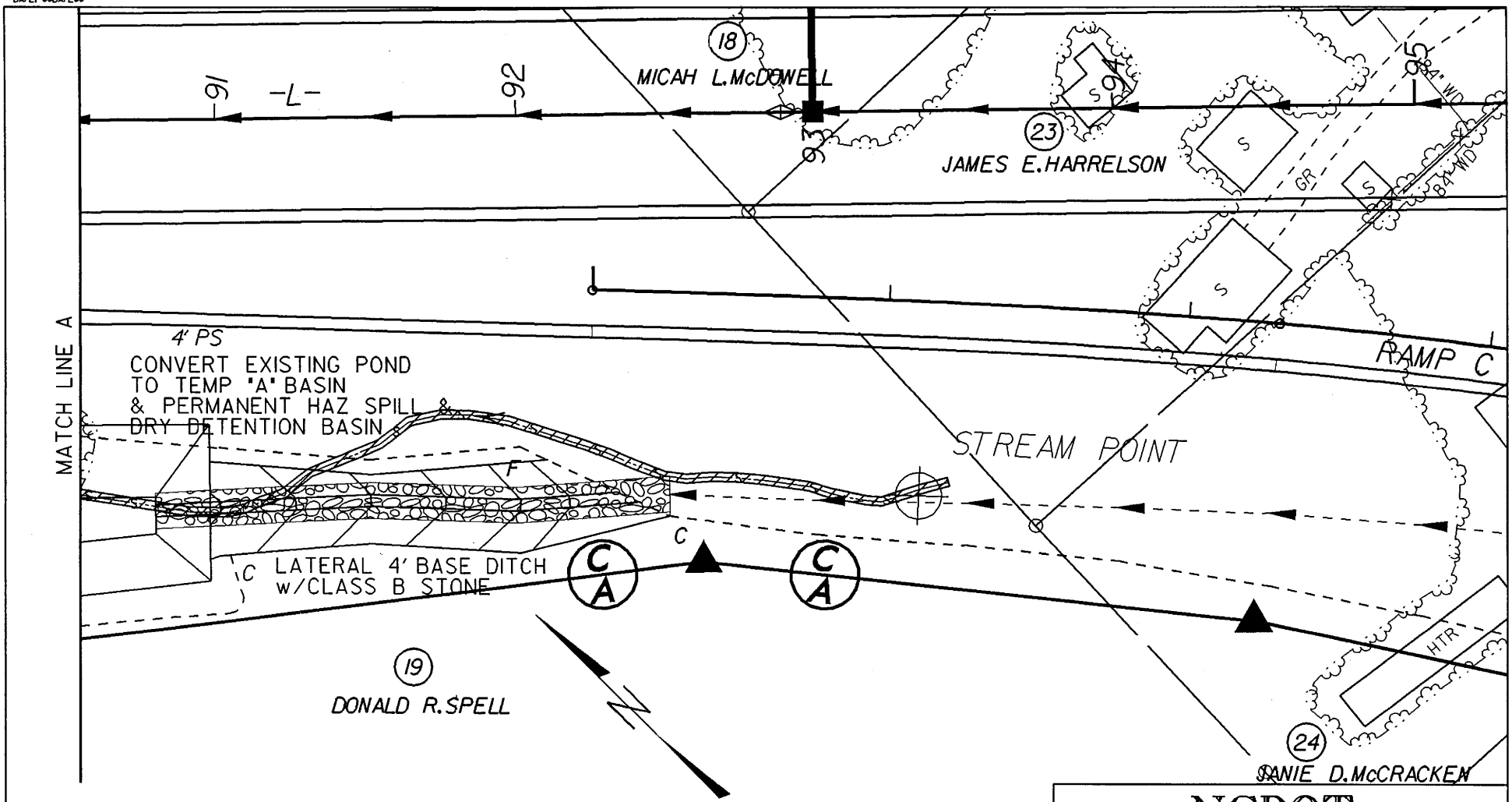
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 24 **OF** 46 1/02

USER: $$USER$$
CONC: $$CONC$$
DATE: $$DATE$$



PLAN VIEW
SITE 5

0 100 ft 200 ft HORIZ

0 20 ft 40 ft VERT

NCDOT

DIVISION OF HIGHWAYS

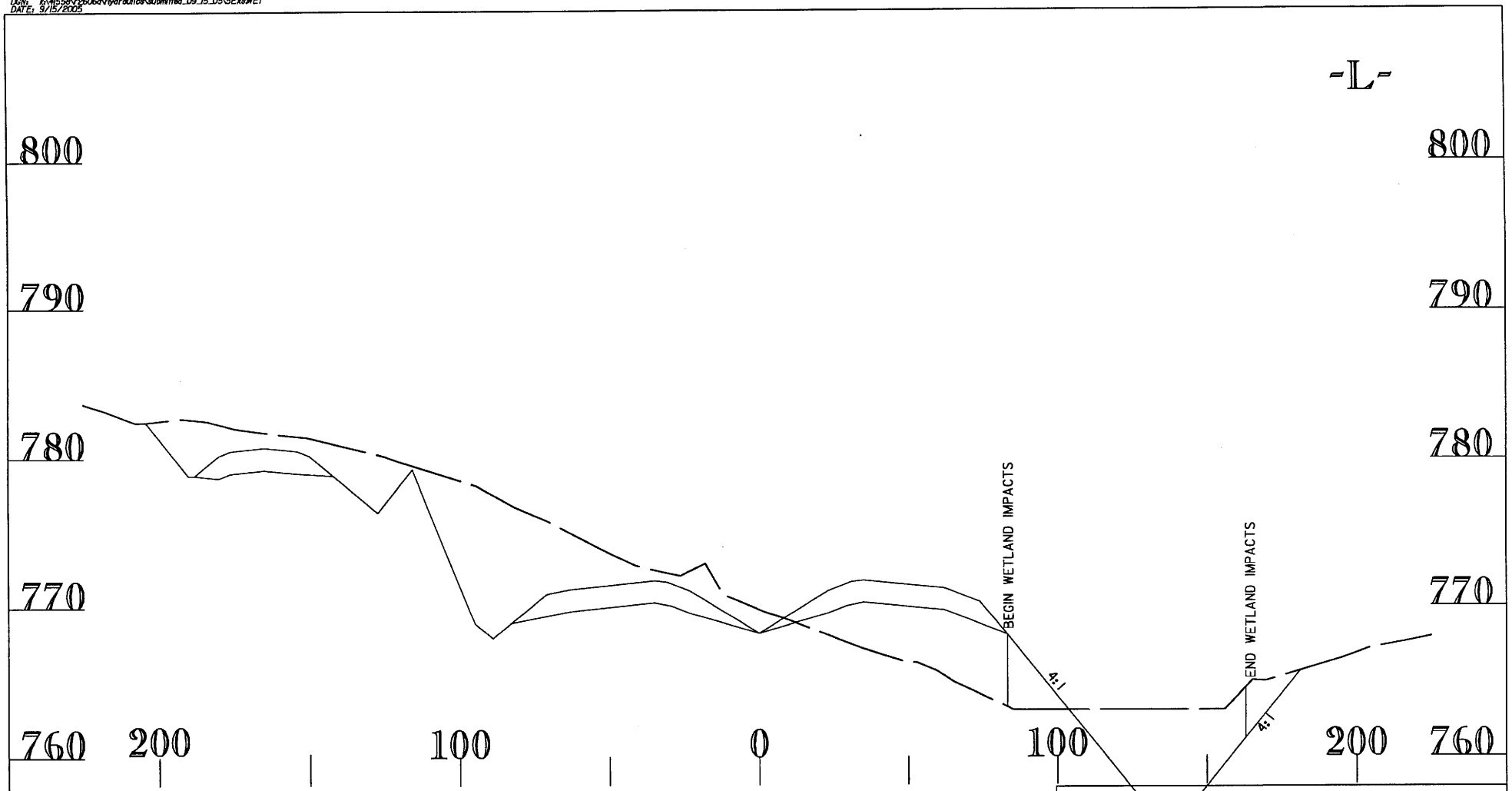
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 25 **OF** 46 1/06

USER: ej
DGN: h:\1558\r-2606d\hydraulics\submitted_09_15_05\5ExsWET
DATE: 9/15/2005



CROSS SECTION 90 + 00
SITE 5

HORIZONTAL SCALE 0 50 ft 100 ft

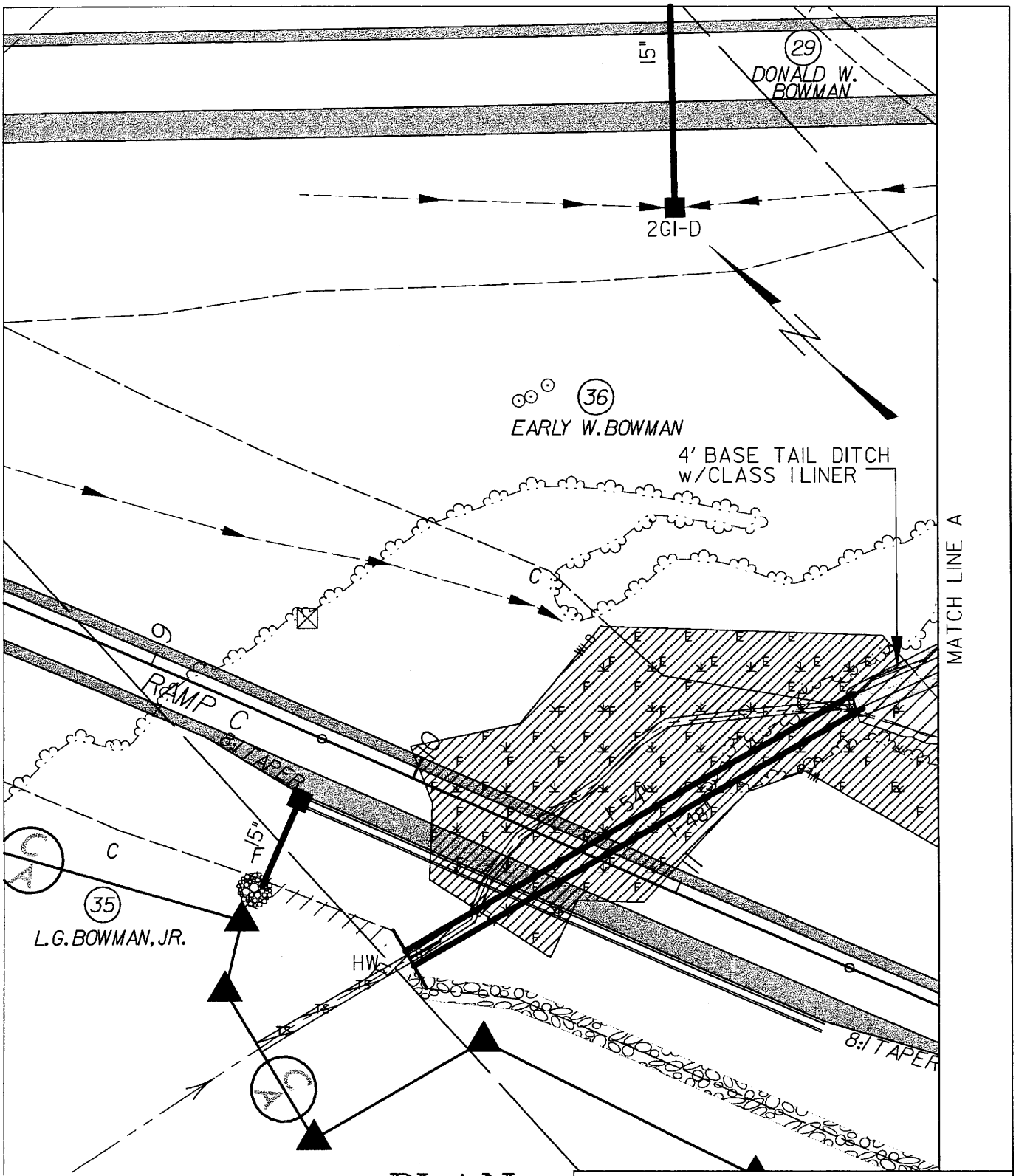
VERTICAL SCALE 0 10 ft 20 ft

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 26 OF 46 2006



PLAN VIEW SITE 6

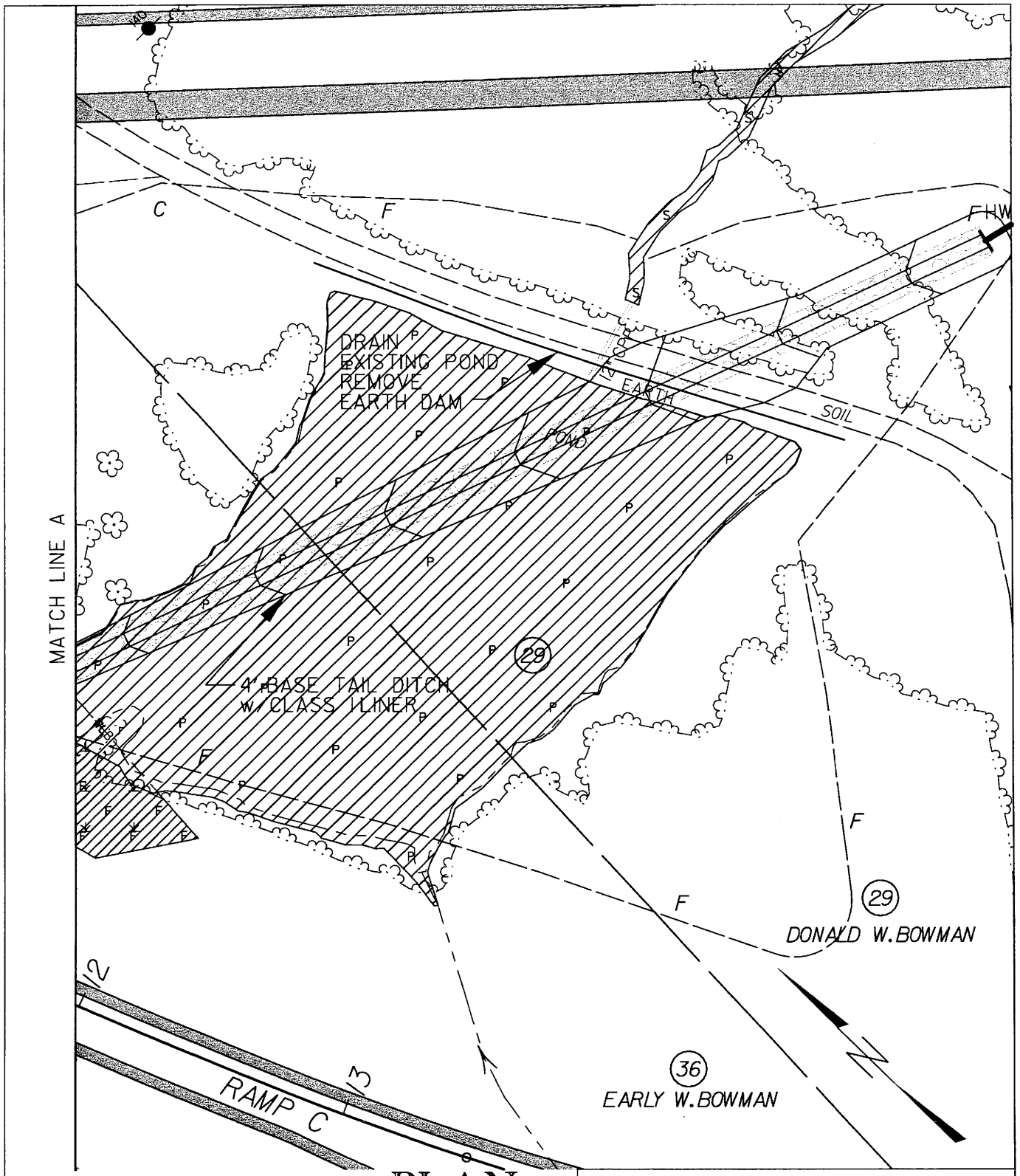
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 27 OF 46 / / 2006

USER: ej
DGN: 8.1571501r2606a\pdtraulis\Gsurvt
DATE: 1/31/2006



0 50 ft 100 ft

PLAN VIEW SITE 6

NCDOT

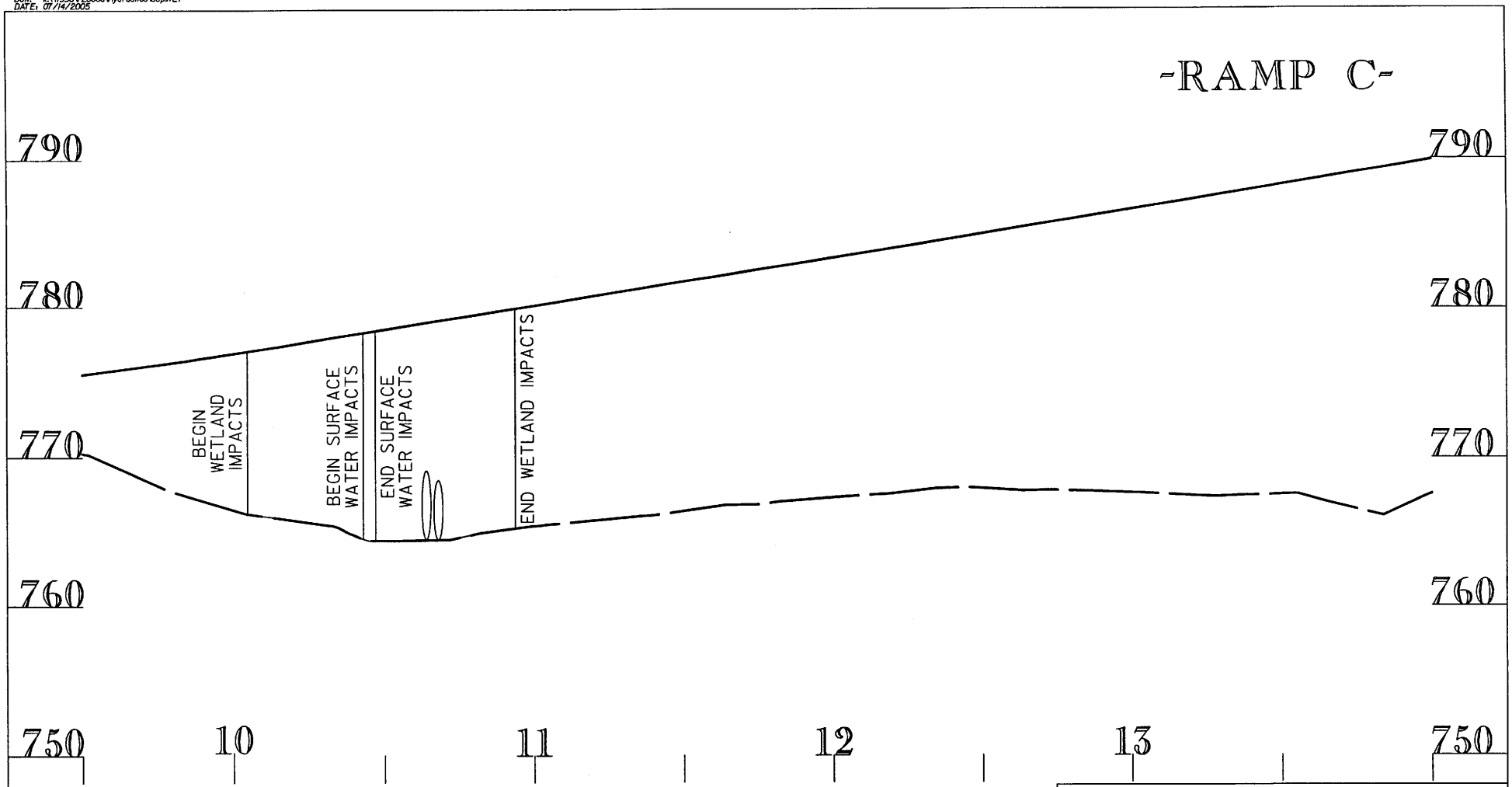
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 28 OF 46 1/2006

USER: ej
DGN: K:\4155\r2606\hydraulics\Sheet
DATE: 1/31/2006

USER: rramx
DGN: k:\4558\r2606a\Hydraulics\6CpWET
DATE: 07/14/2005



PROFILE VIEW
SITE 6

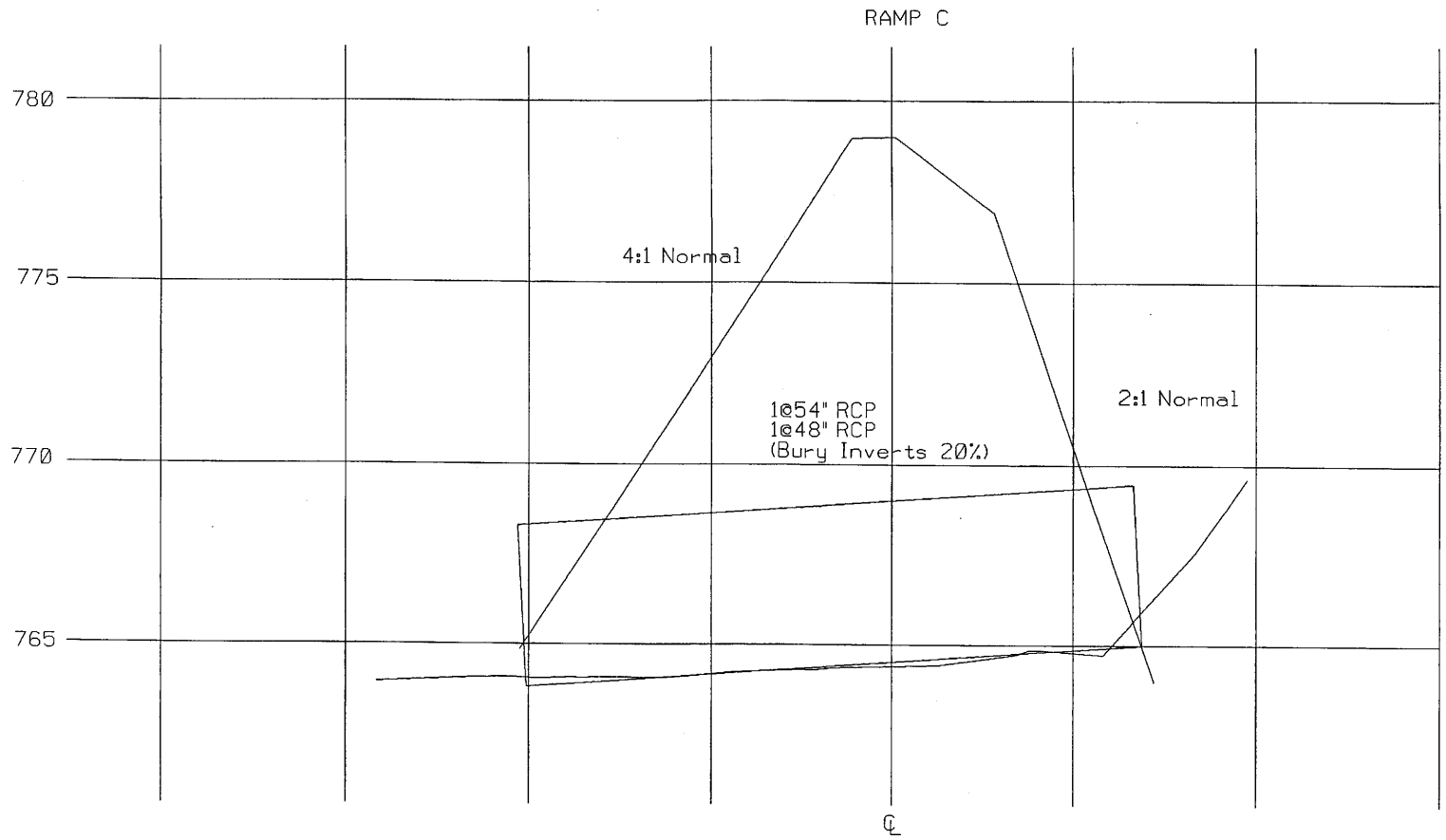
HORIZONTAL SCALE: 0 — 50 ft — 100 ft

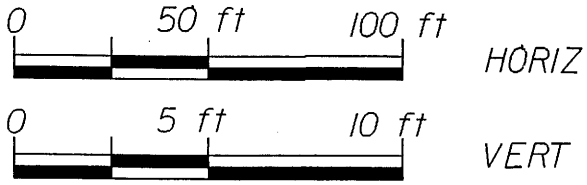
VERTICAL SCALE: 0 — 10 ft — 20 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 29 OF 46 1 / 2005





PROFILE VIEW
SITE 6

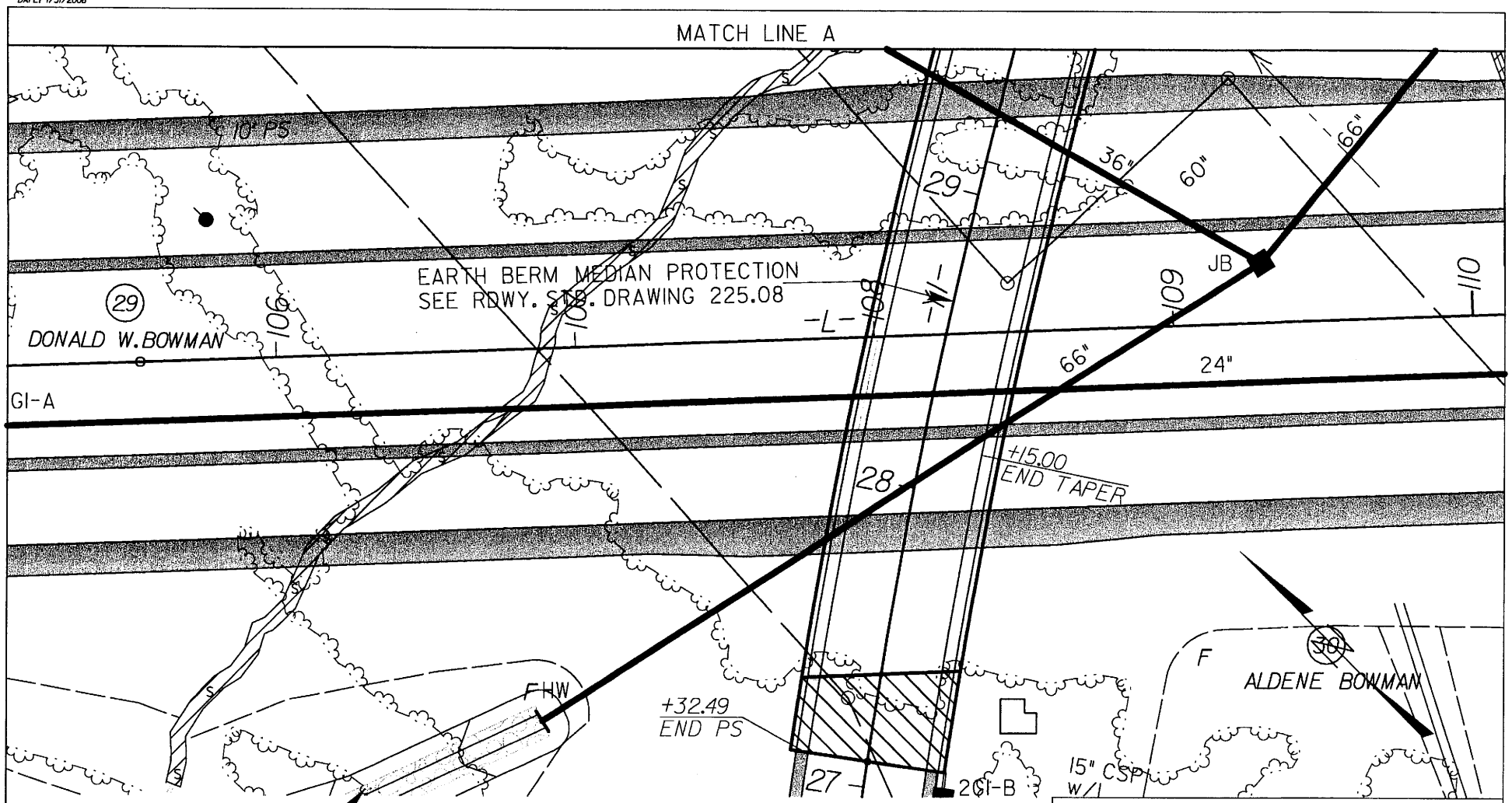
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 30 **OF** 46 1/06

USER: a)
DGN: h:\41558\r2606d\hydraulics7.dwg
DATE: 1/31/2006



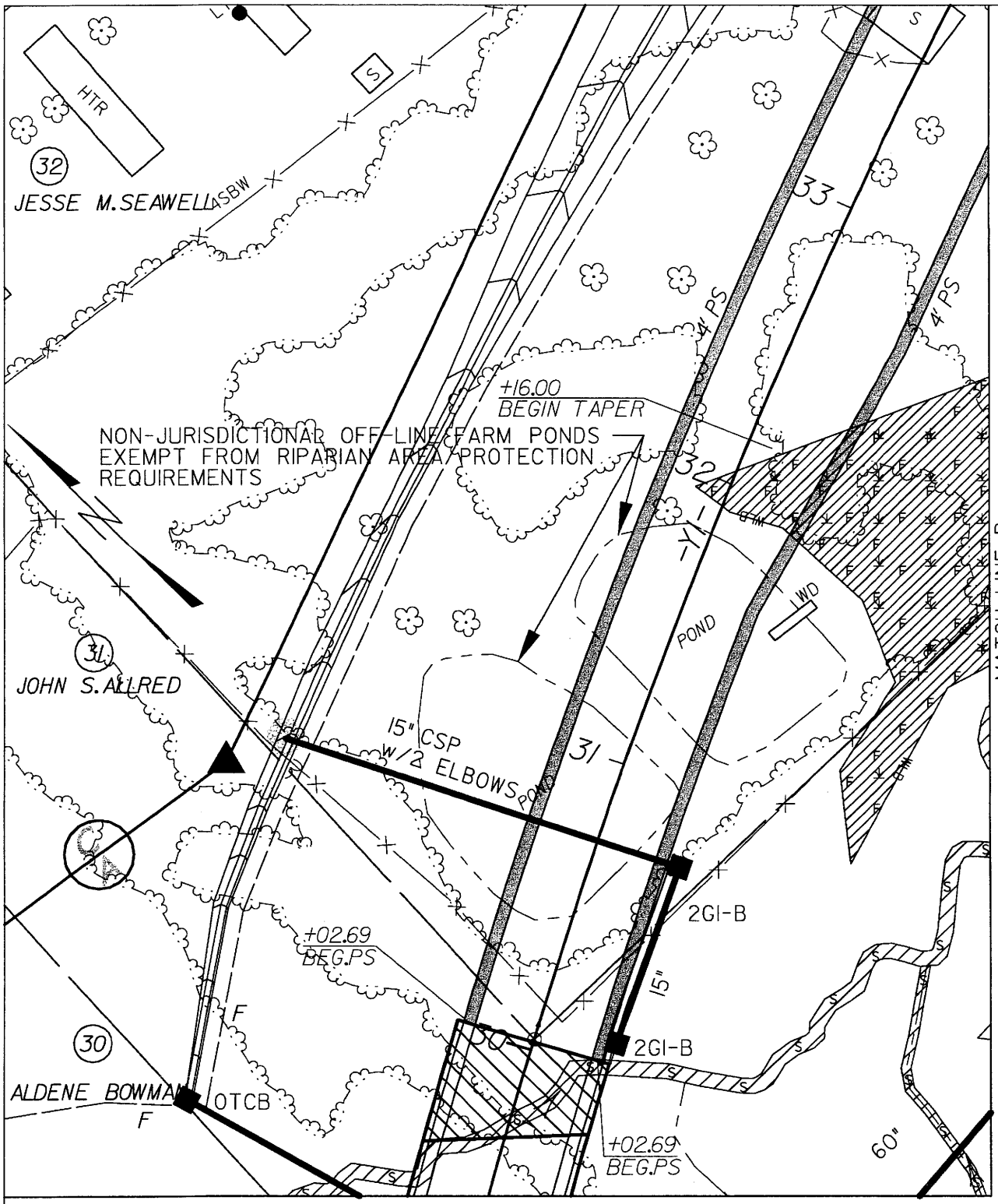
PLAN VIEW
SITE 7

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 31 **OF** 46 / / **2006**



0 50 ft 100 ft

PLAN VIEW SITE 7

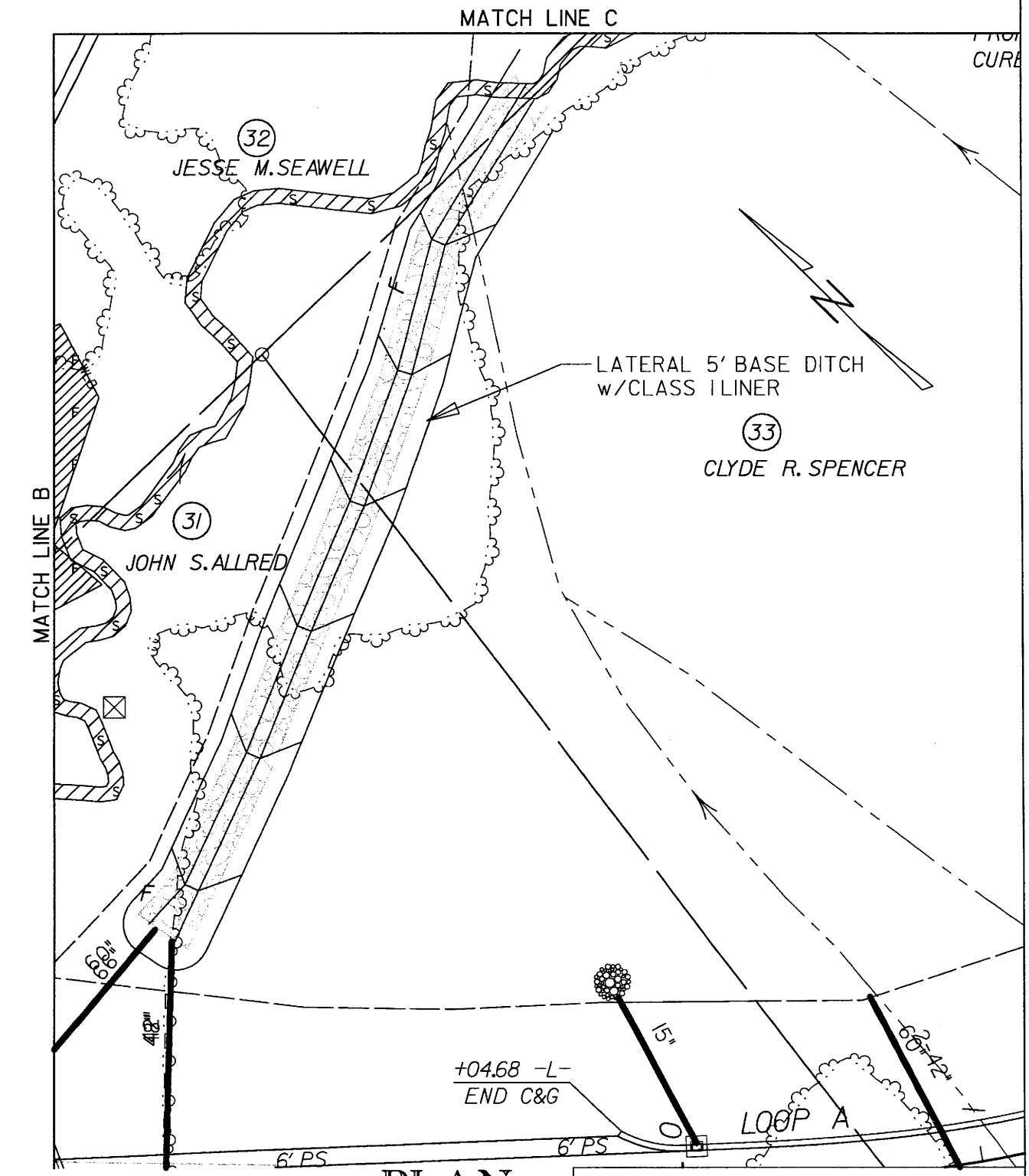
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 32 OF 46 1 /2006

USER: rj
DGN: N:\4153R\r2606a\petrau\tcs7.dwnt
DATE: 1/31/2006



0 50 ft 100 ft

PLAN VIEW SITE 7

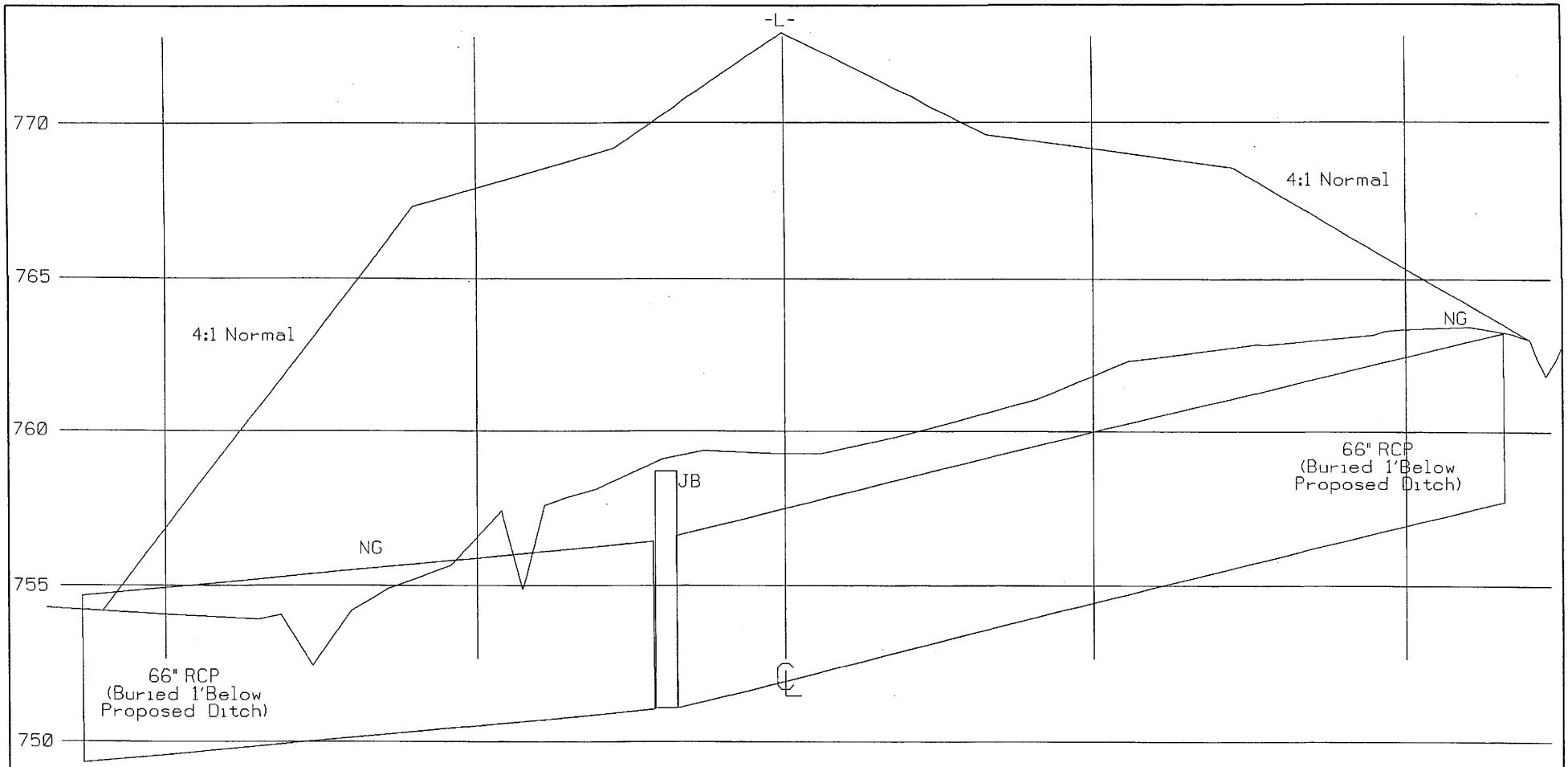
NCDOT

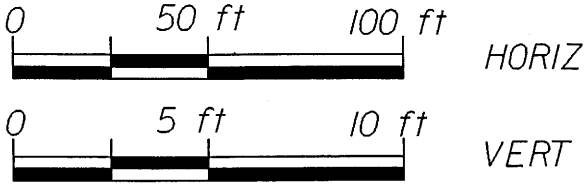
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 33 OF 46 1/2006

USER: aj
DGN: N:\R2606\Hydraulics\7.dwg
DATE: 1/31/2006





PROFILE VIEW
SITE 7

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

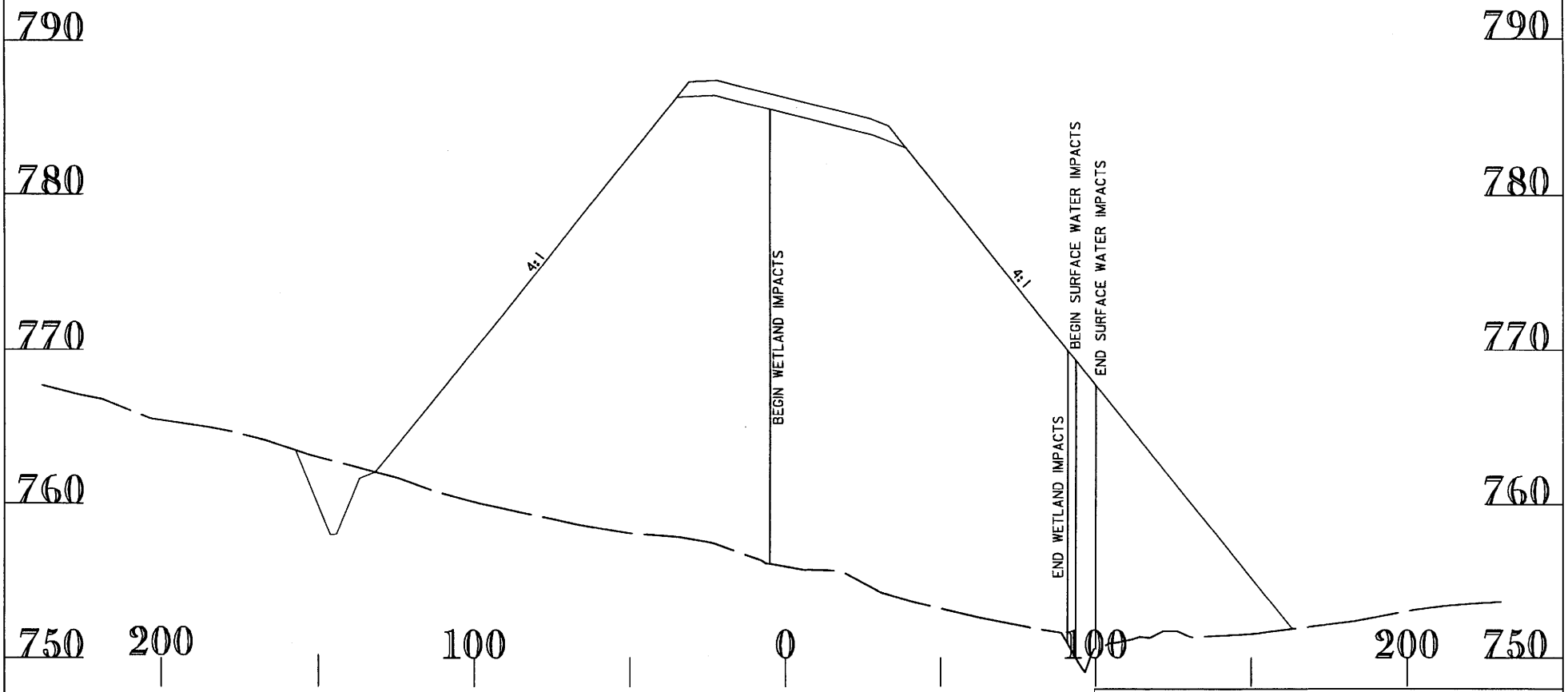
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 34 **OF** 46 12/05

USER: al
DGN: h:\41558\r2606d\hydraulics\submitted_09_15_05\7WxsWET
DATE: 9/15/2005

-Y1-



CROSS SECTION 32+00
SITE 7

HORIZONTAL SCALE 0 50 ft 100 ft

VERTICAL SCALE 0 10 ft 20 ft

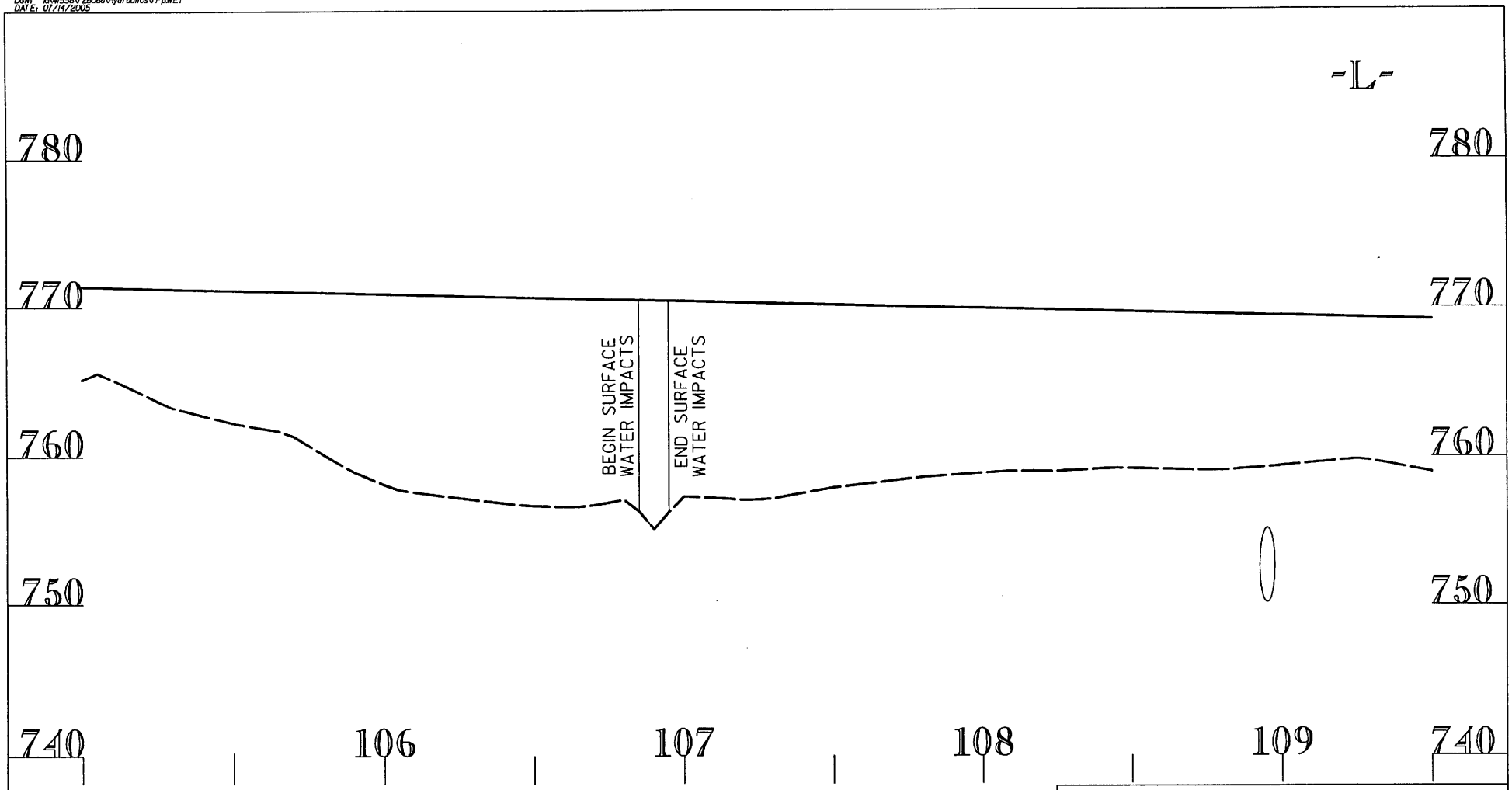
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 35 **OF** 46 / / 2006

USER: rremy
DGN: k:\4\558\v-2606a\Hydraulics\7Fp.WET
DATE: 07/14/2005



PROFILE VIEW
SITE 7

HORIZONTAL SCALE: 0 — 50 ft — 100 ft

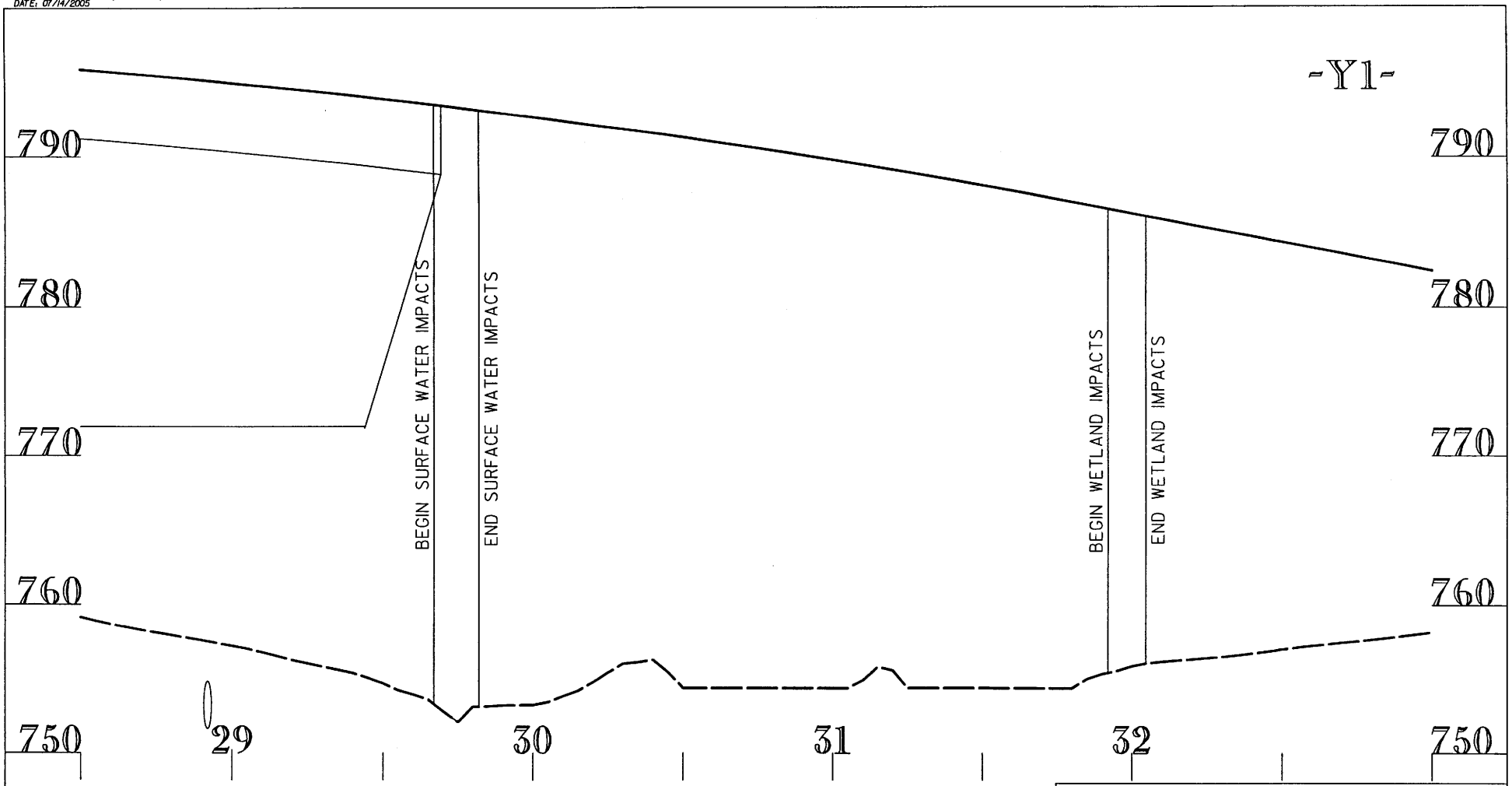
VERTICAL SCALE: 0 — 10 ft — 20 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 36 **OF** 46 / / 2006

USER: rremy
DGN: ...\R558\r2606a\Hydraulics\7GpWET
DATE: 07/14/2005



PROFILE VIEW
SITE 7

HORIZONTAL SCALE: 0 — 50 ft — 100 ft

VERTICAL SCALE: 0 — 10 ft — 20 ft

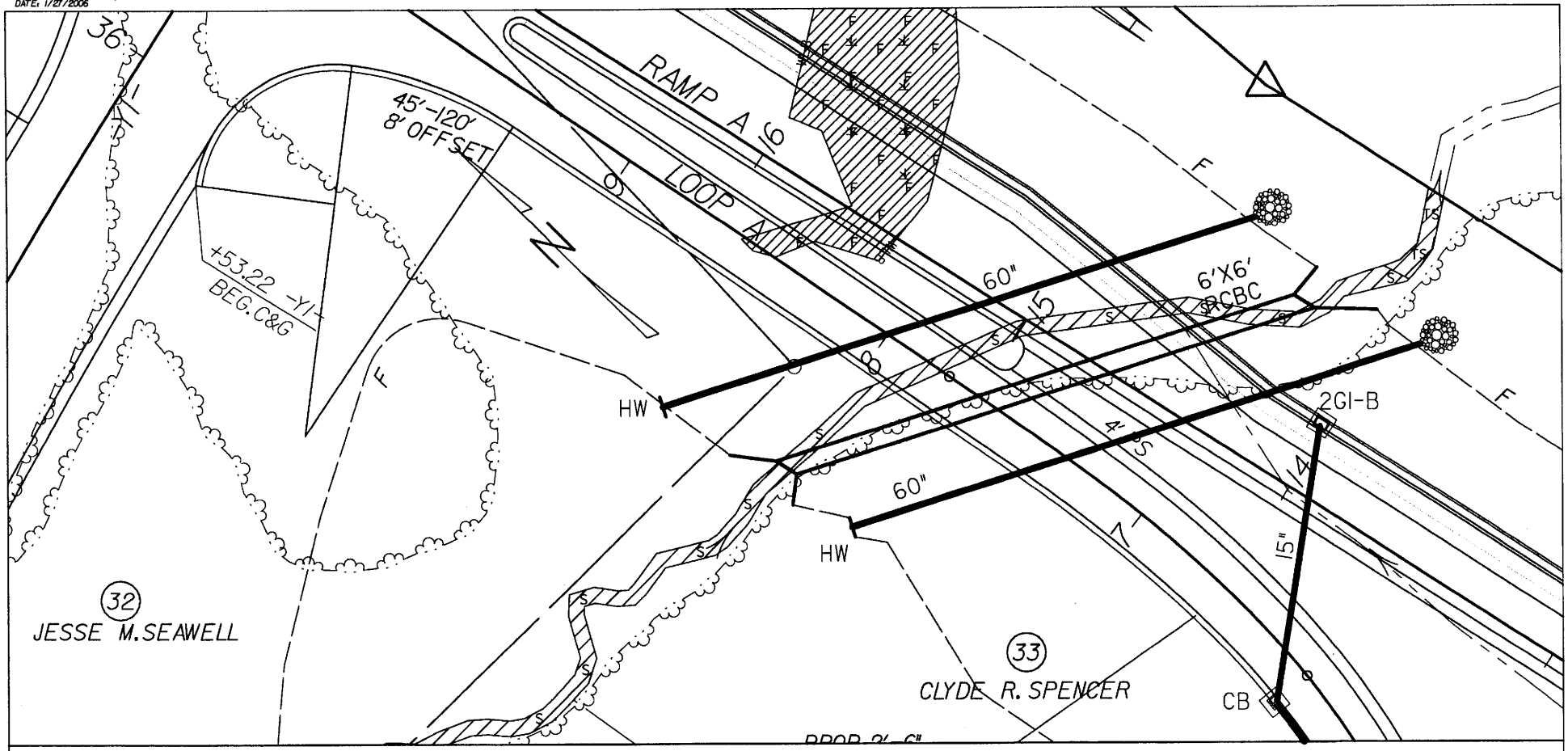
NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 37 **OF** 46 / / **2006**

USER: u
DGN: h:\41558\r2606d\hydraulics\7.dwg
DATE: 1/27/2006

MATCH LINE D



MATCH LINE C

PLAN VIEW
SITE 7

0 50 ft 100 ft

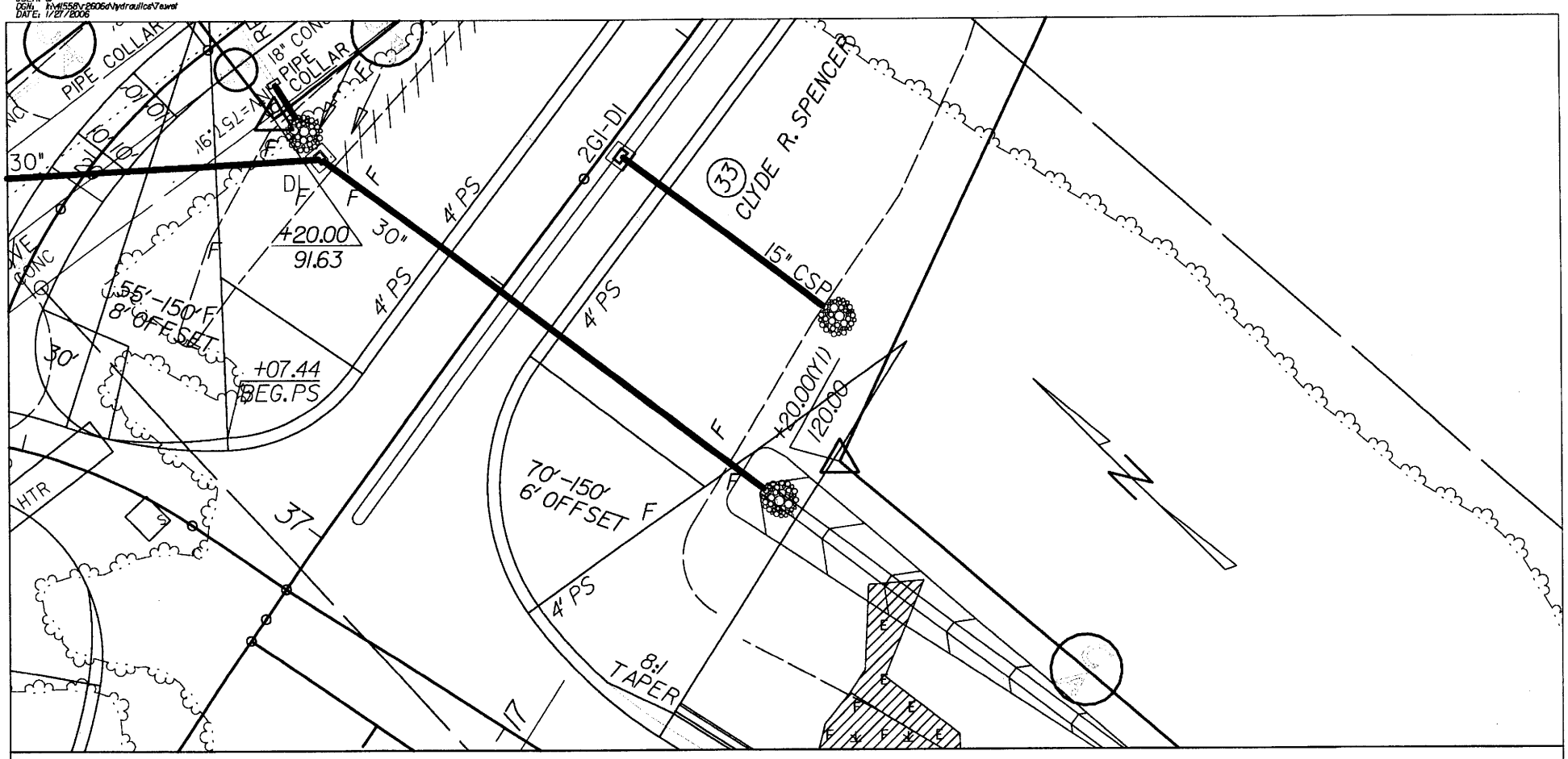
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 38 **OF** 46 / / **2006**

USER: ej
DGN: k:\41558\r2606d\hydraulics\7ewat
DATE: 1/27/2006



MATCH LINE D

PLAN VIEW
SITE 7

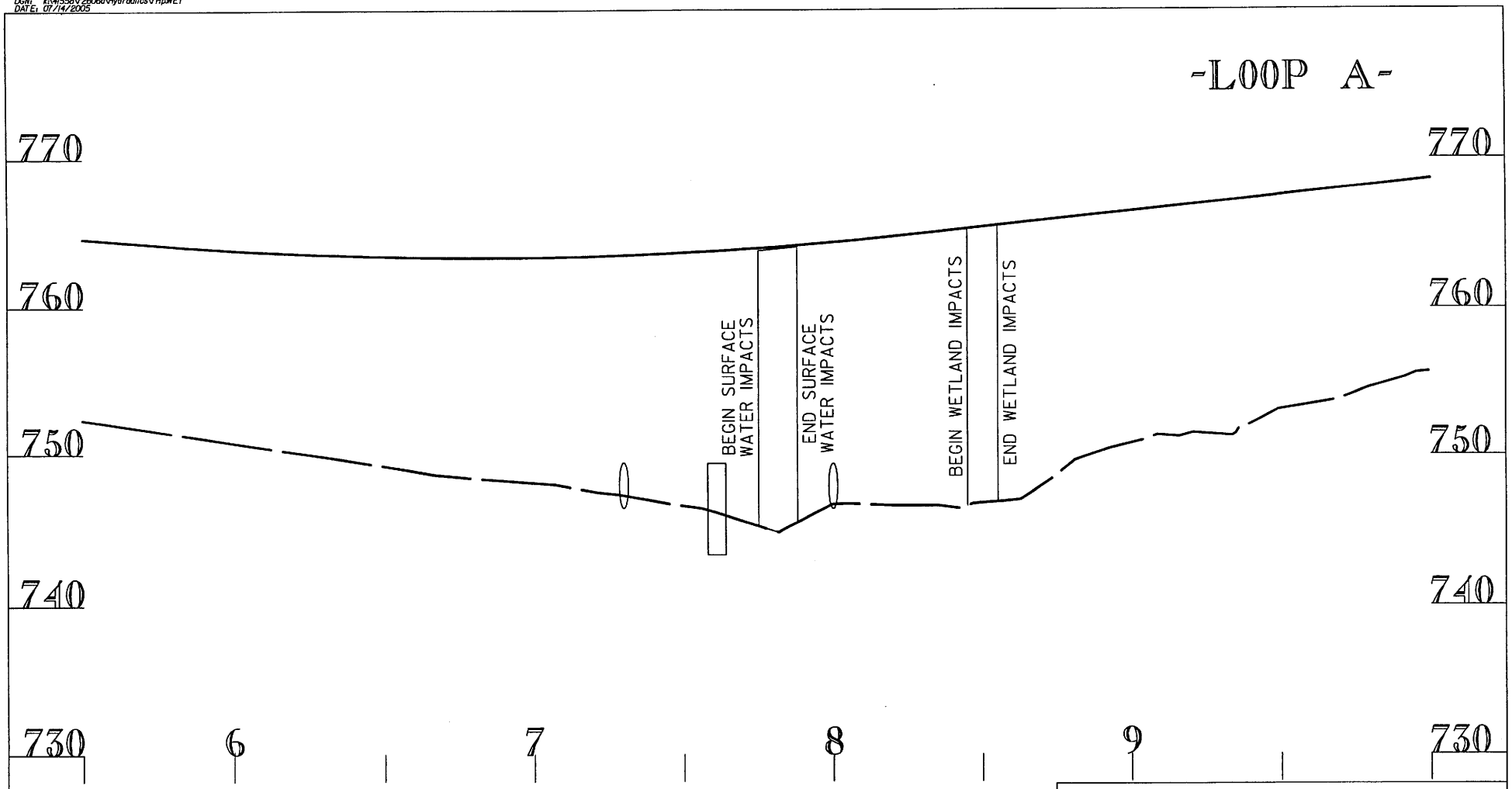
0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 39 **OF** 46 / / **2006**

USER: rrank
DGN: ev4558\r2606a\Hydraulics\7HpWET
DATE: 07/14/2005



PROFILE VIEW
SITE 7

HORIZONTAL SCALE: 0 — 50 ft — 100 ft

VERTICAL SCALE: 0 — 10 ft — 20 ft

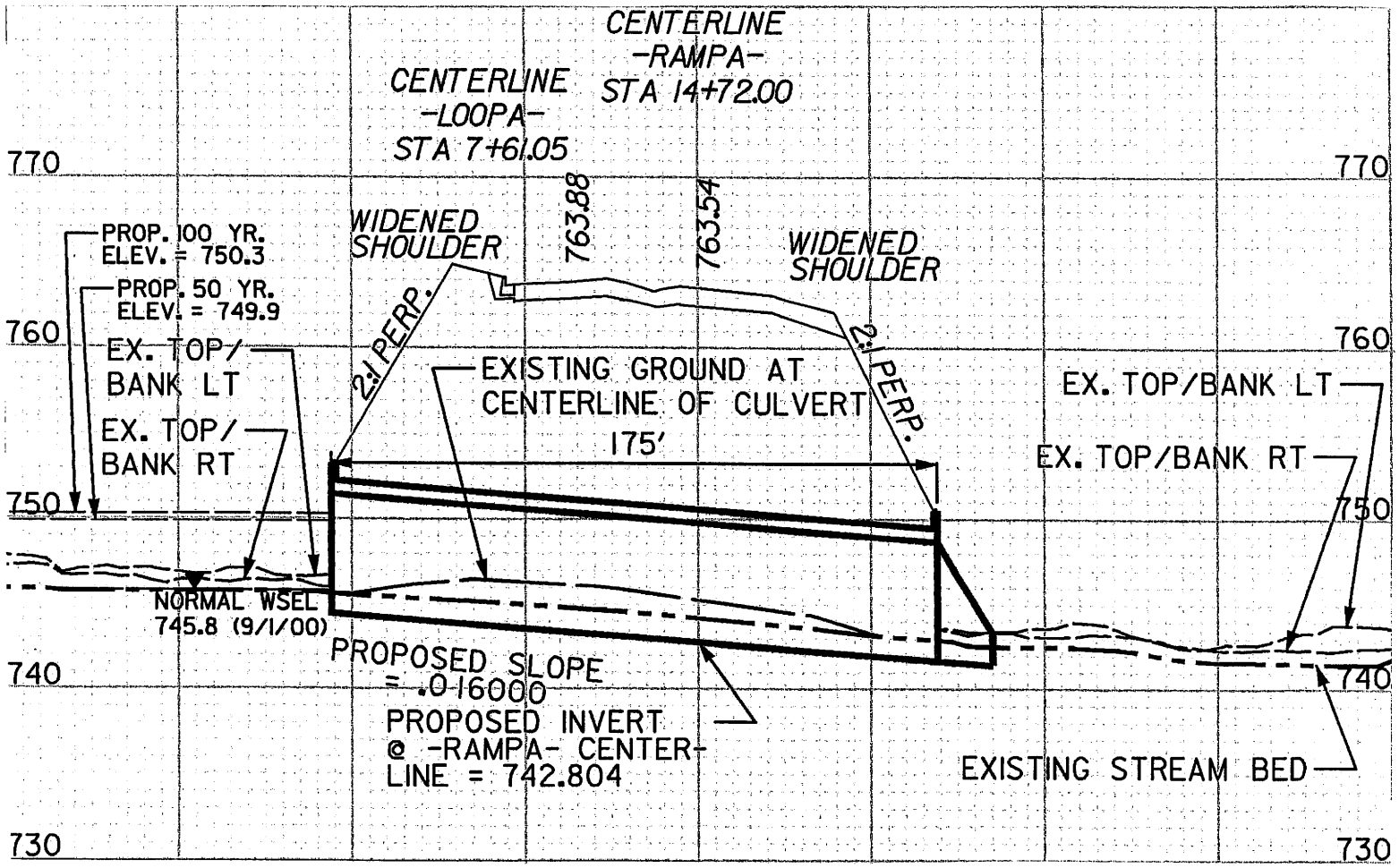
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 40 **OF** 46 **1/1/2006**

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



0 50 ft 100 ft HORIZ

0 10 ft 20 ft VERT

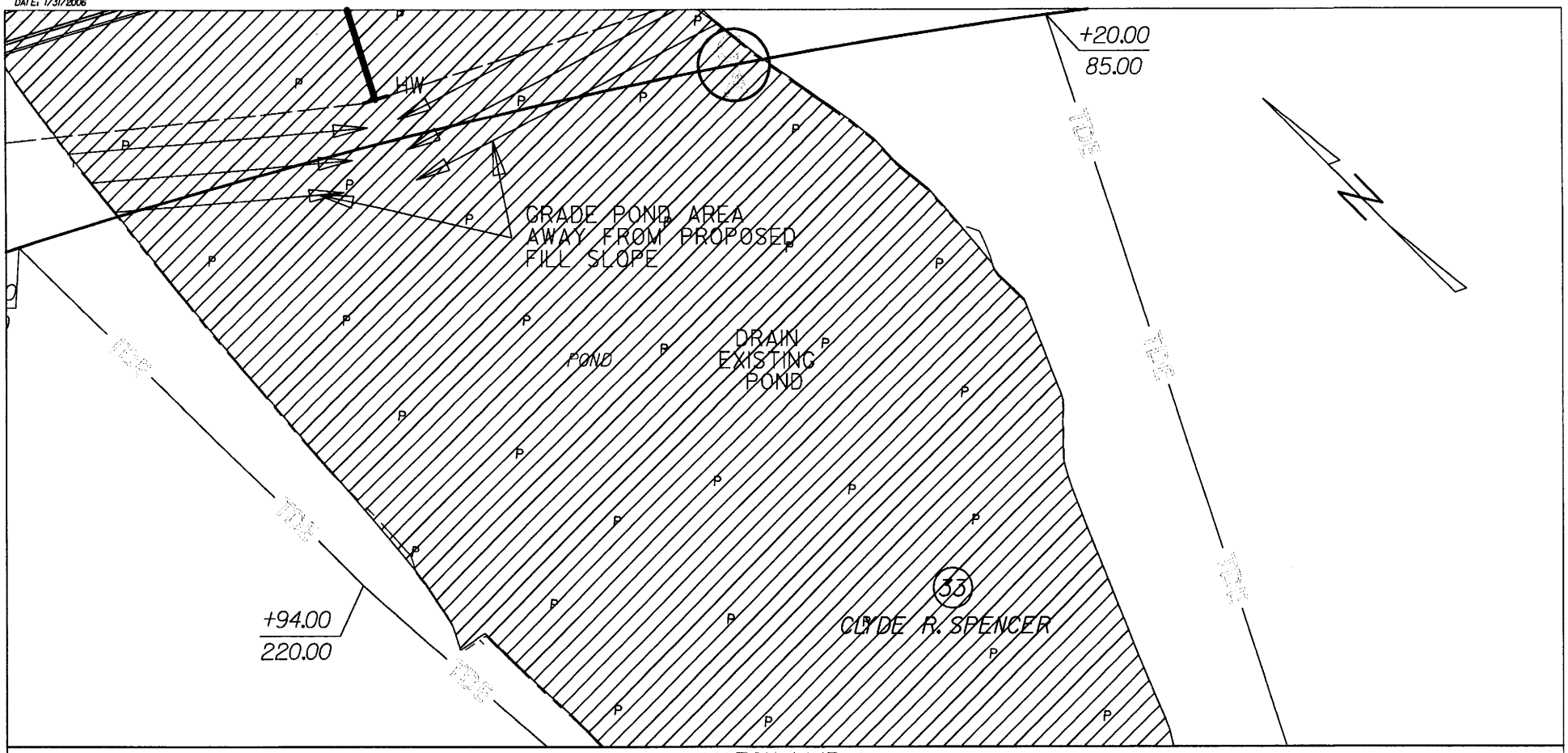
PROFILE VIEW
SITE 7

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 41 OF 46 1/06

USER: a)
DGN: h:\41558\r2606a\hydraulics\10a.wsf
DATE: 1/31/2006



MATCH LINE A

PLAN VIEW
SITE 8

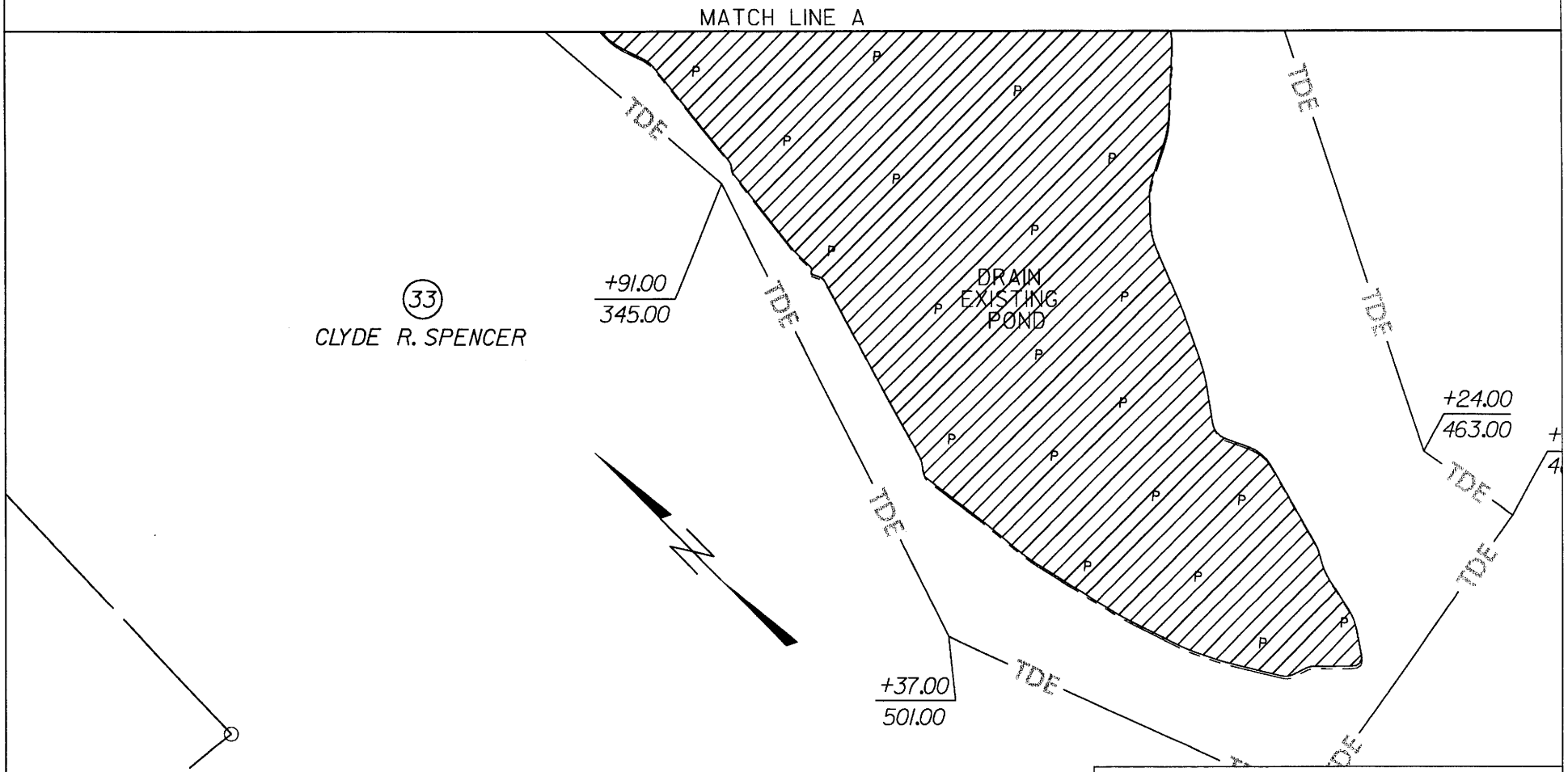
0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 42 **OF** 46 / / **2006**

USER: s)
DGN: k:\41558\r2606d\Hydraulics\10b.wat
DATE: 1/31/2006



PLAN VIEW
SITE 8

0 50 ft 100 ft

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 43 OF 46 / / 2006

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	22+65 -L-	1@160' Dual Bridges										
2	45+99 -L-	1@12'x8' RCBC	0.277					0.079	0.020	350	100	
3	63+06 -L-	1@8'x5' Bottomless Struc						0.112	0.020	790	115	
	59+48 -L- **	36" RCP						0.037	0.002	310	20	
4	82+75 -L- **	36" RCP						0.013	0.002	185	20	
	84+40 -L-	42" RCP						0.084	0.006	580	65	
5	87+80-93+50 -L- Rt *	Perm. A Basin w/ 36" Riser						0.291		472		
6	10+50 -RAMPC-	1@54"; 1@ 48" RCP	0.241		0.040			0.648	0.004	200	50	
	12+50 -RAMPC- Lt *											
7	106+90 -L-	1@ 66" RCP	0.240		0.016			0.171	0.004	1490	32	
	14+72 -RAMPA-	1@6'x6' RCBC & 2@60" RCP										
8	5+45 -RAMPD- Rt *	Drain Pond						2.820				
TOTALS:			0.76	0.00	0.06	0.00	0.00	4.26	0.06	4377	402	0

** Impacts to Tributaties

* Includes Impact to Surface Water to Ponds (Site 5- 0.262 Ac, Site 6- 0.634 Ac; Site 8- 2.82 Ac)

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
R-2606A

SHEET 44 of 46 ########

ATN Revised 3/31/05

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	KEPLEY-FRANK HARDWOOD CO., INC.	975 CONRAD HILL MINE ROAD LEXINGTON, NC 27292
2	MAGGIE N. POOLE	6020 POOLE ROAD ARCHDALE, NC 27263
4	RAY POOLE	P.O. BOX 14411 ARCHDALE, NC 27263
5	JAMES H. TROTTER	6191 POOLE ROAD ARCHDALE, NC 27263
7	TIMOTHY LARUE TROTTER	5930 POOLE ROAD ARCHDALE, NC 27263
8	ZOLA ROSENGERG	5930 POOLE ROAD ARCHDALE, NC 27263-7850
11	BETTY NICHOLSON	5848 POOLE ROAD ARCHDALE, NC 27263-7850
14	JADINE F. HILL	6461 LEWIS DAVID ROAD RANDLEMAN, NC 27317-7219
16	BOBBY RALPH HILL	3638 HOOVER HILL ROAD TRINITY, NC 27370
17	JERRY G. McDOWELL	5597 GODNICK LANE ARCHDALE, NC 27263
18	MICAH L. McDOWELL	3310 MOUNT OLIVE CHURCH ROAD SOPHIA, NC 27350
19	DONALD R. SPELL	214 ASHLAND STREET ARCHDALE, NC 27263
23	JAMES E. HARRELSON	5557 GODNICK LANE ARCHDALE, NC 27263
24	JANIE D. McCRACKEN	5547 GODNICK LANE ARCHDALE, NC 27263
29	DONALD W. BOWMAN	323 KENDALL MILL ROAD THOMASVILLE, NC 27360
30	ALDENE BOWMAN	ROUTE 2, BOX 264 TRINITY, NC 27370

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 45 OF 46 1/06

USER: rremy
DGN: k:\4558\r2606a\Hydraulics\OWNER.WET
DATE: 07/14/2005

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
31	JOHN S. ALLRED	ROUTE 3, BOX 393 HIGH POINT, NC 27263
32	JESSE M. SEAWELL	ROUTE 3, BOX 392 HIGH POINT, NC 27263
33	CLYDE R. SPENCER	ROUTE 3, BOX 518 HIGH POINT, NC 27263
35	L. G. BOWMAN, JR.	5590 CEDAR SQUARE ROAD ARCHDALE, NC 27263-8222
36	EARLY W. BOWMAN	215 LINDA DRIVE ARCHDALE, NC 27263-3313

NCDOT

DIVISION OF HIGHWAYS

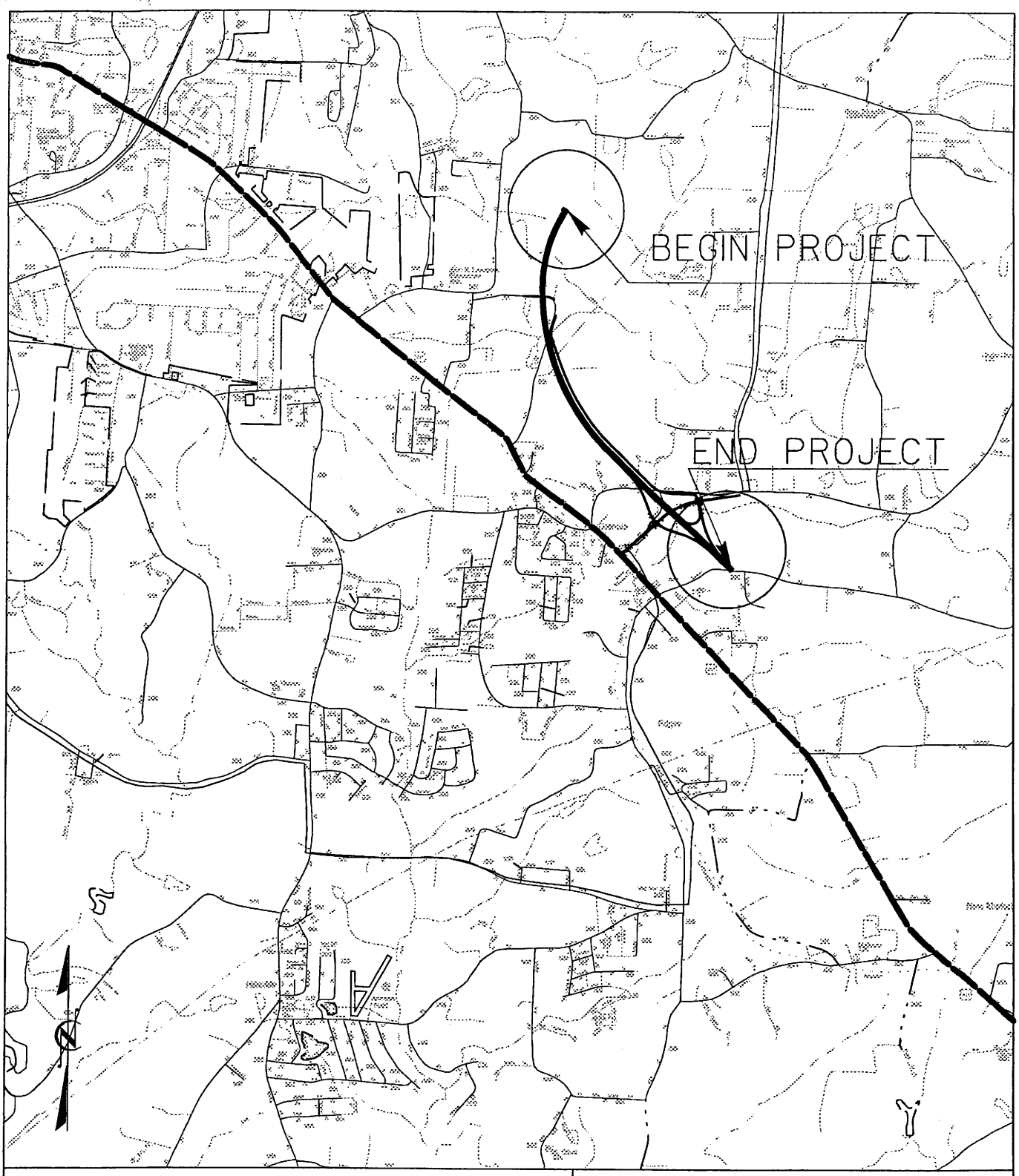
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 46 OF 46 1/06

USER: rremy
DGN: K:\4558\r-2606a\Hydraulics\OWNER.WET
DATE: 07/14/2005



RANDLEMAN LAKE
WATER SUPPLY
BUFFER

VICINITY MAP

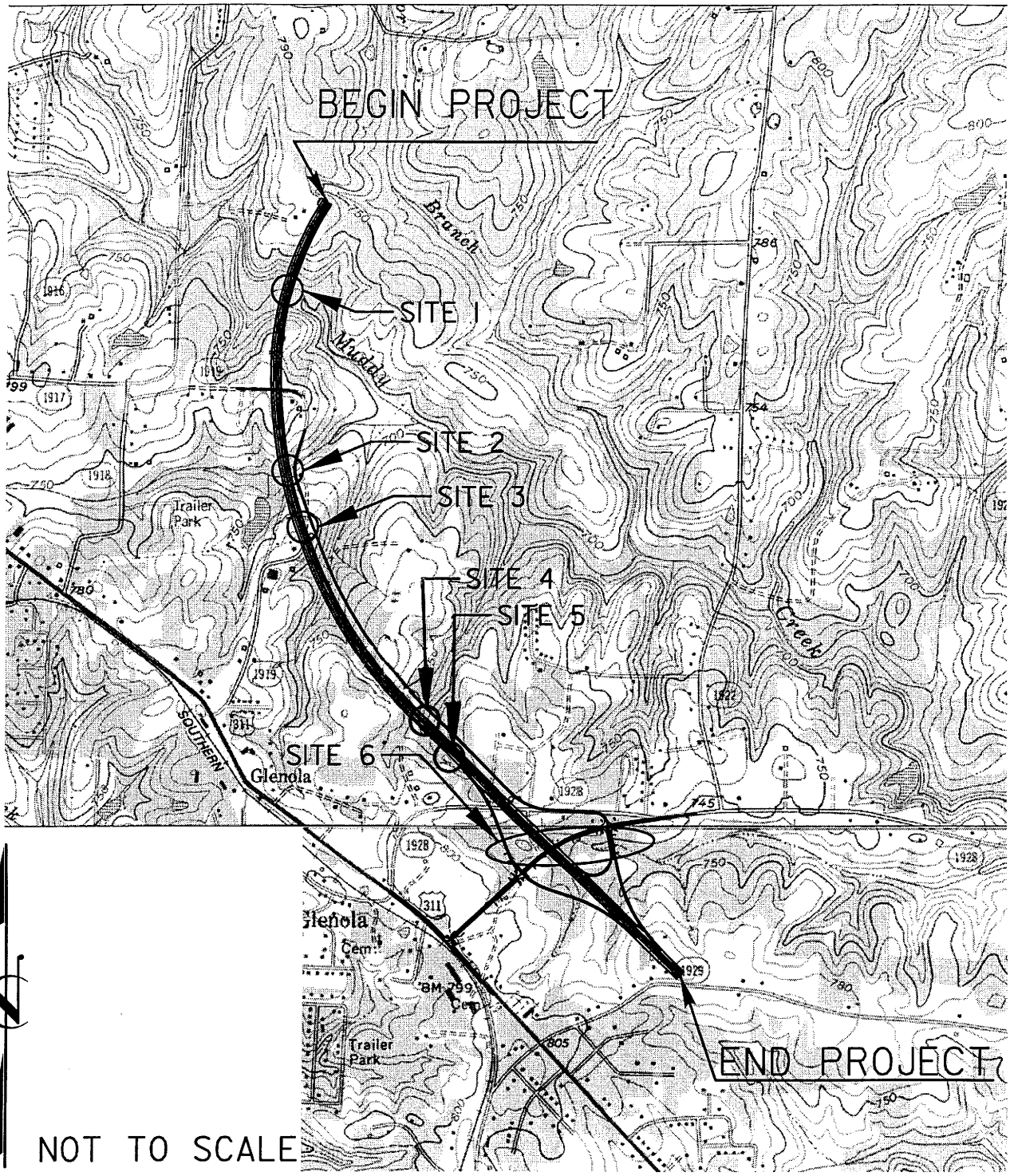
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 1 **OF** 26 - 1106

USER: a)
DGN: k:\4558\r2606a\hydraulics\BUFVICINITY.WET
DATE: 9/15/2005



RANDLEMAN LAKE WATER SUPPLY BUFFER

LOCATION MAP

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

SHEET 2 **OF** 26 1/06

USER: rremy
DGN: k:\4558\r2606a\Hydraulics\BUFILOC.WET
DATE: 07/14/2005

BUFFER LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

BZ — RIPARIAN BUFFER ZONE

BZ1 — RIPARIAN BUFFER ZONE 1
30 ft (9.2m)

BZ2 — RIPARIAN BUFFER ZONE 2
20 ft (6.1m)

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

GRASS SWALE

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1029

SHEET 3 OF 26 1/06

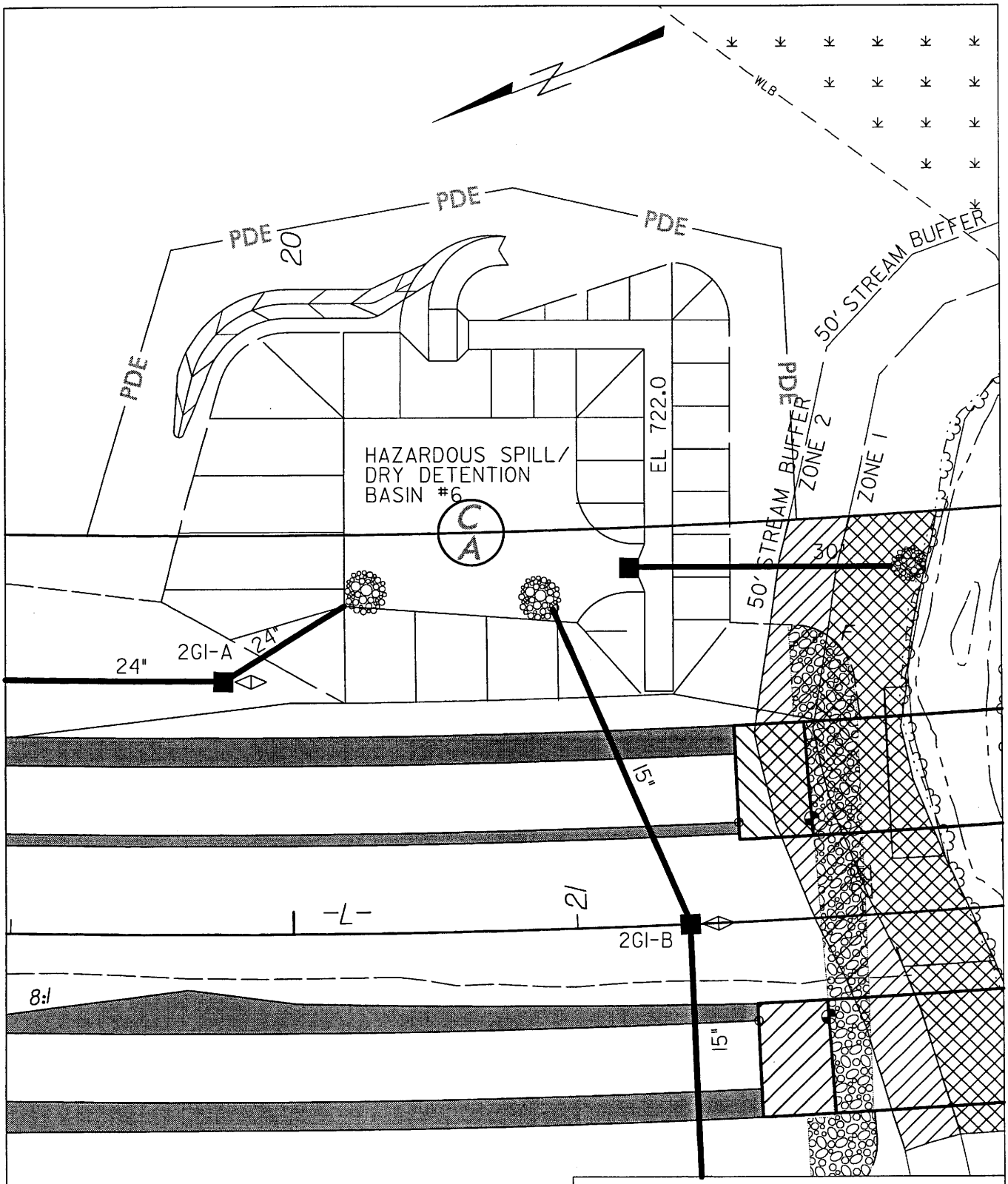
USER: rremy
DGN: k:\4155b\r2606a\Hydraulics\new_legend.dgn
DATE: 07/14/2005

R-2606A

HAZARDOUS SPILL BASINS

Location	Drainage Areas (Acres)	Basin Surface Area (SF)	Qp2 (cfs)
-L-Sta. 21+50 LT	8.15	13764	15.94
-L- Sta. 24+50 RT	3.96	10400	8.2
-L- Sta. 44+50 RT	11.63	10435	28.9
-L- Sta. 47+50 RT	7.01	3632	17.9
-L- Sta. 57+00 LT	13.23	10486	28.3
-L- Sta. 79+00 LT	13.08	21126	22.7
-L- Sta. 89+00 RT	15.4	9689	**(Qp5) 15.4**
-L- Sta. 111+34 RT	9.91	12878	16.5

Location	Qp2 Velocity (fps)	Treatment Provided	Comments
-L- Sta. 31+02 LT	**1.55**	Preformed Scour Hole	
-Y- Sta. 16+60 LT	Exempt due to existing drainage way		
-SR- Sta. 13+20 LT		Dissipator Basin	Exempt
-L- Sta. 59+44 LT			Cross Pipe/ Exempt
-L- Sta. 81+70 LT			Cross Pipe/ Exempt
-L- Sta. 81+78 LT			Cross Pipe/ Exempt
-SR-Sta. 56+57 LT to	Exempt due to existing drainage way		
-SR- Sta. 63+50 LT	Exempt due to existing drainage way		
-L- Sta 110+55 LT			Cross Pipe/Exempt
-L- Sta. 110+50 LT	No Buffer 6/12/2001 Field Inspection		
-L- Sta. 112+90 LT			Cross Pipe/Exempt
-L- Sta. 116+63 RT	**0.68**	Earth Berm W/ Level Spreader	
-Ramp A- Sta 10+44 RT		Dry Det. Basin	Exempt
'-Ramp A- Sta 13+88 RT	-		Cross Pipe/Exemp
'-Ramp A- Sta 14+55 RT	-		Cross Pipe/Exemp
-Y1- Sta. 37+96 RT	**3.01**	Exempt due to existing ditch	
-Y1- Sta. 38+56 RT	Exempt due to entering ditch before buffer		
-Loop A- Sta. 4+10 RT	Exempt due to existing drainage way		



0 50 ft 100 ft

PLAN VIEW SITE 1

NCDOT

DIVISION OF HIGHWAYS

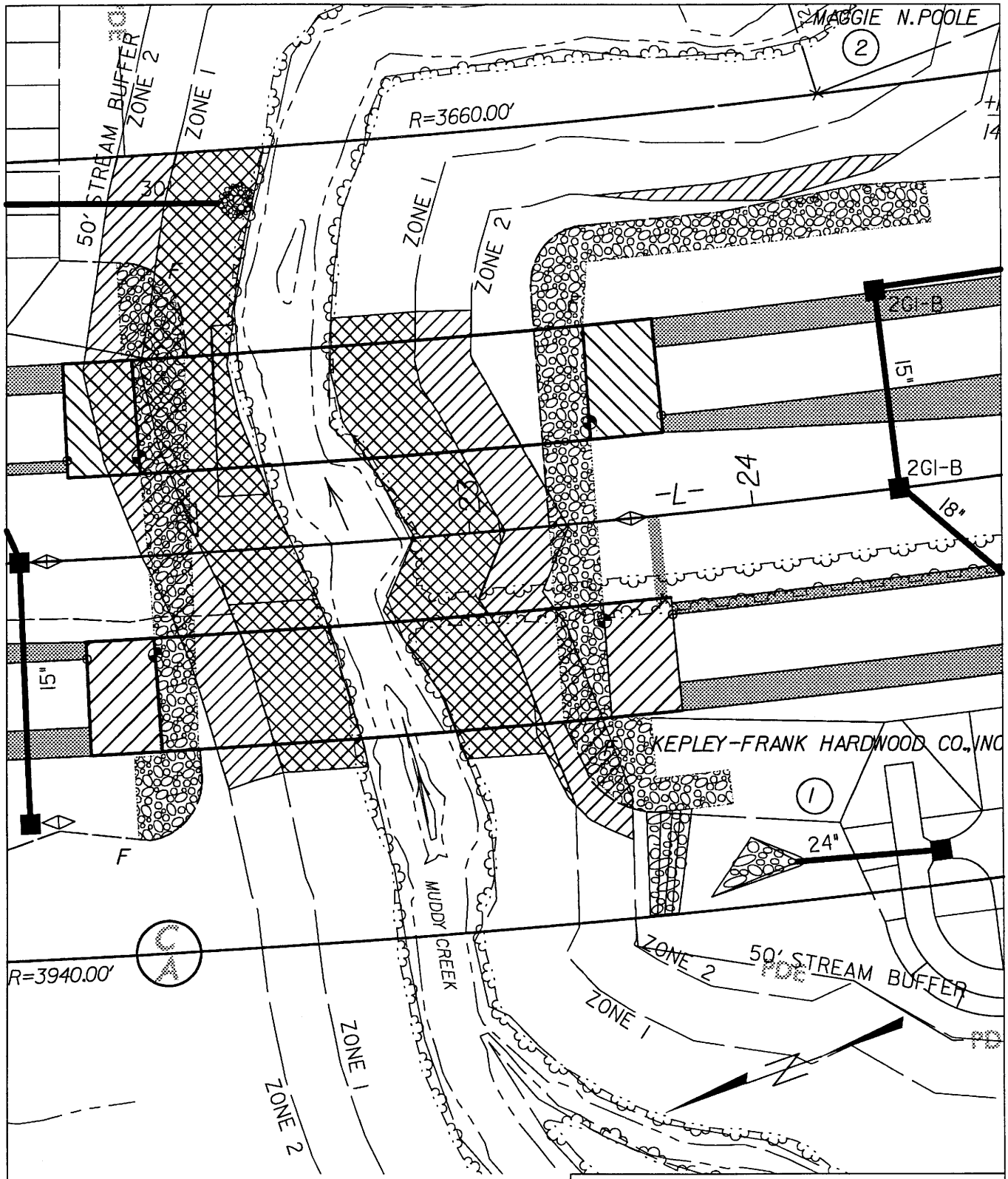
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

SHEET 5 OF 26 / 2006

USER: rsam
DGN: k:\4155\r-2606a\Hydraulics\bos1fig.dgn
DATE: 07/14/2005



0 50 ft 100 ft

PLAN VIEW SITE 1

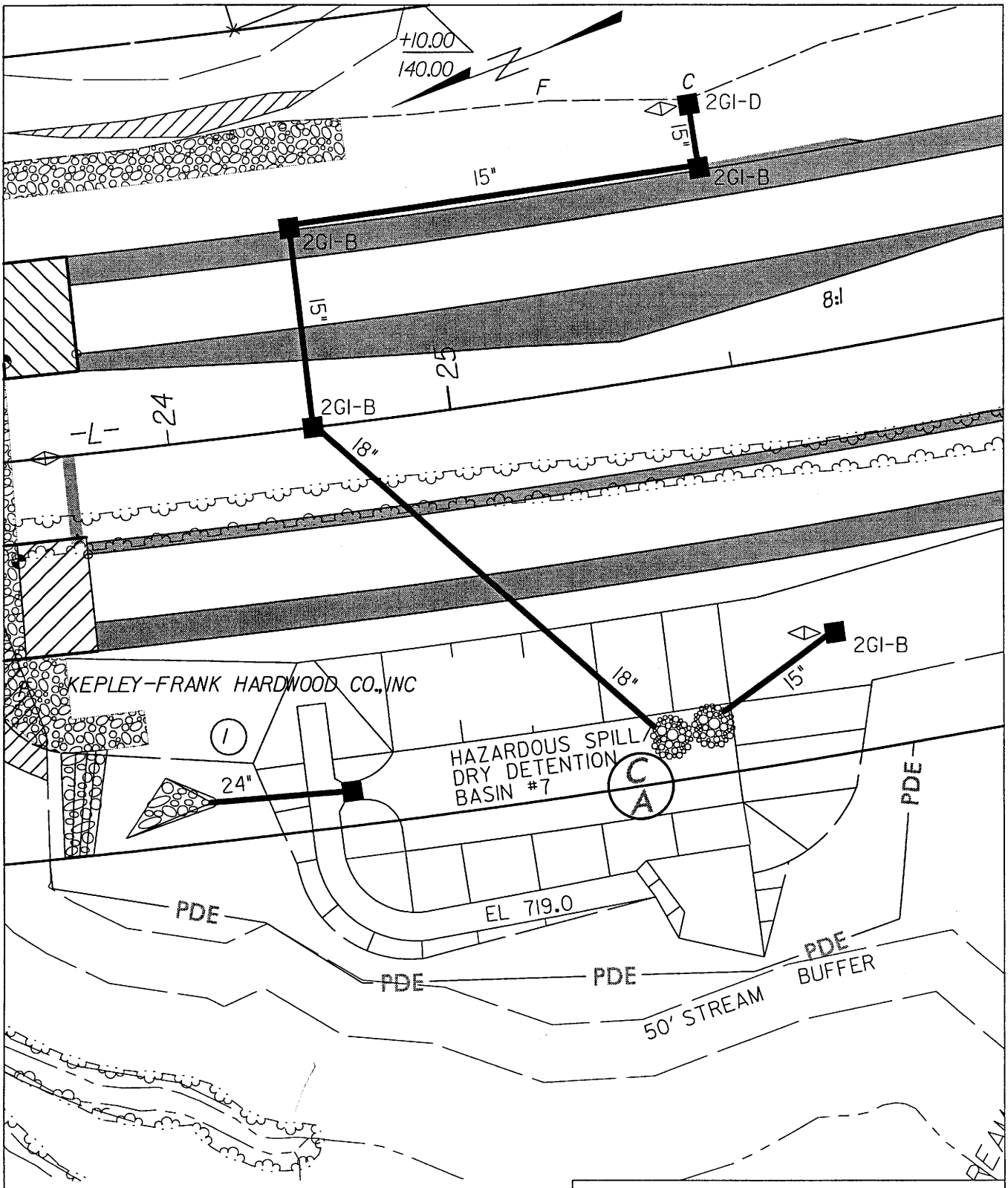
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 6 **OF** 26 / / **2006**

USER: el
DGN: R:\MISSR\2606A\Hydraulics\buffl.wnf
DATE: 9/15/2005



0 50 ft 100 ft

PLAN VIEW SITE 1

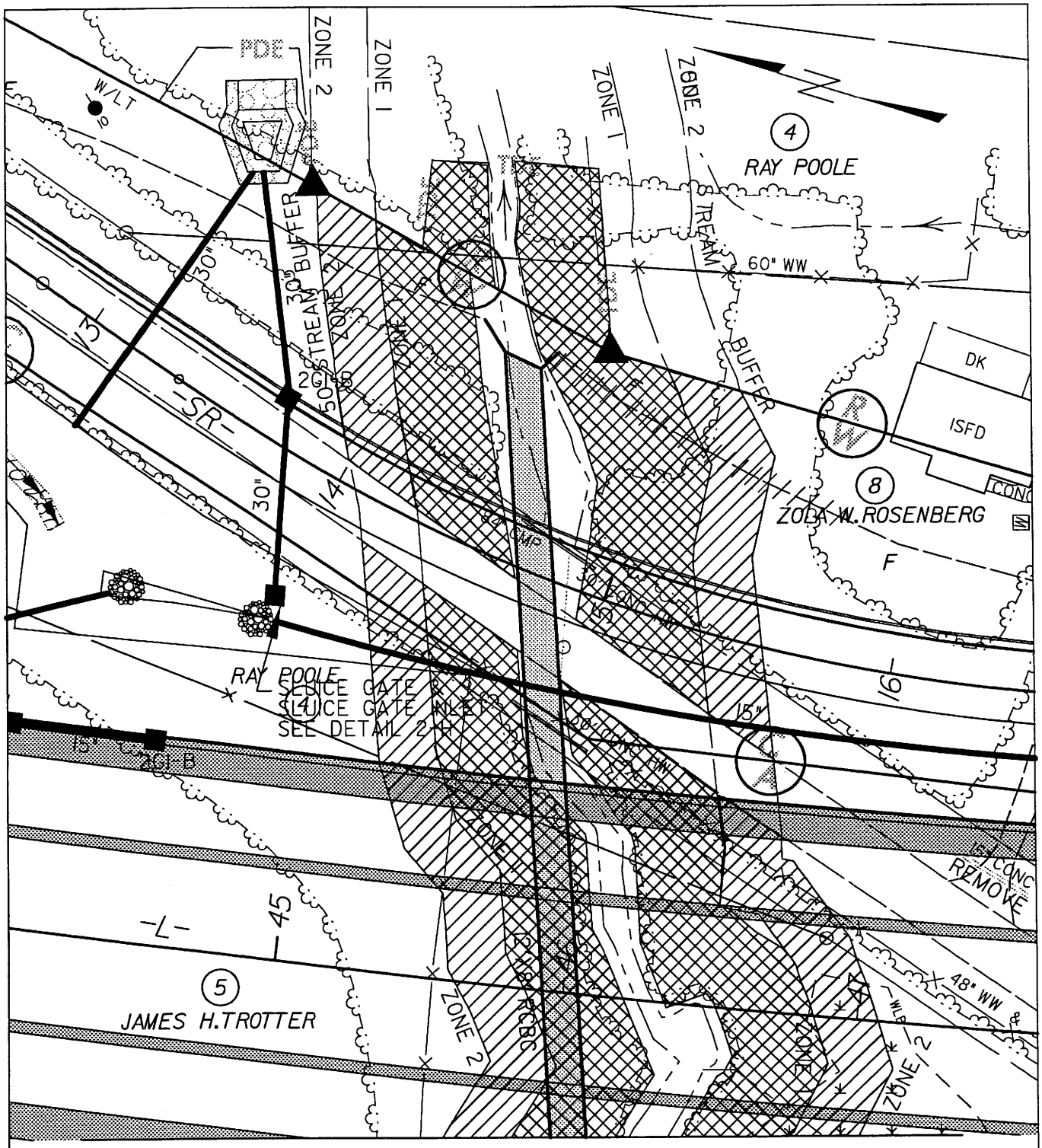
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 7 **OF** 26 1/1/2006

USER: rtsmy
DGN: b:\R2606\R-2606a\Hydraulics\basin7.wet
DATE: 07/14/2005



MATCH LINE A

0 50 ft 100 ft

PLAN VIEW SITE 2

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

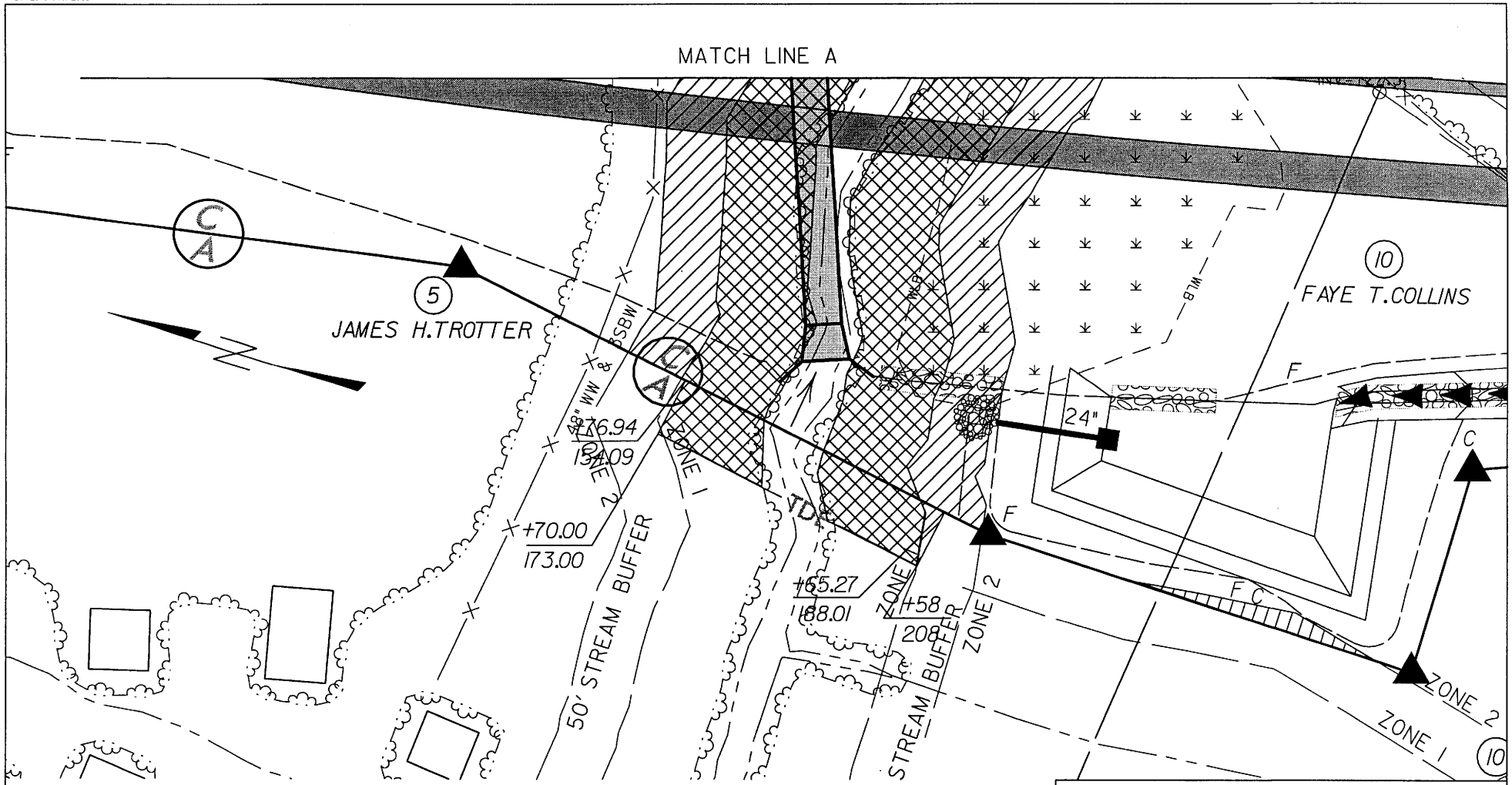
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

SHEET 8 **OF** 26 **/ 2006**

USER: ej
DGN: 8.1571501-2606A-Hydraulics-Not Sized.dgn
DATE: 9/15/2005

USER: rrem
DGN: k:\41558\r-2606a\Hydraulics\buf2b.wet
DATE: 07/14/2005



PLAN VIEW
SITE 2

0 50 ft 100 ft

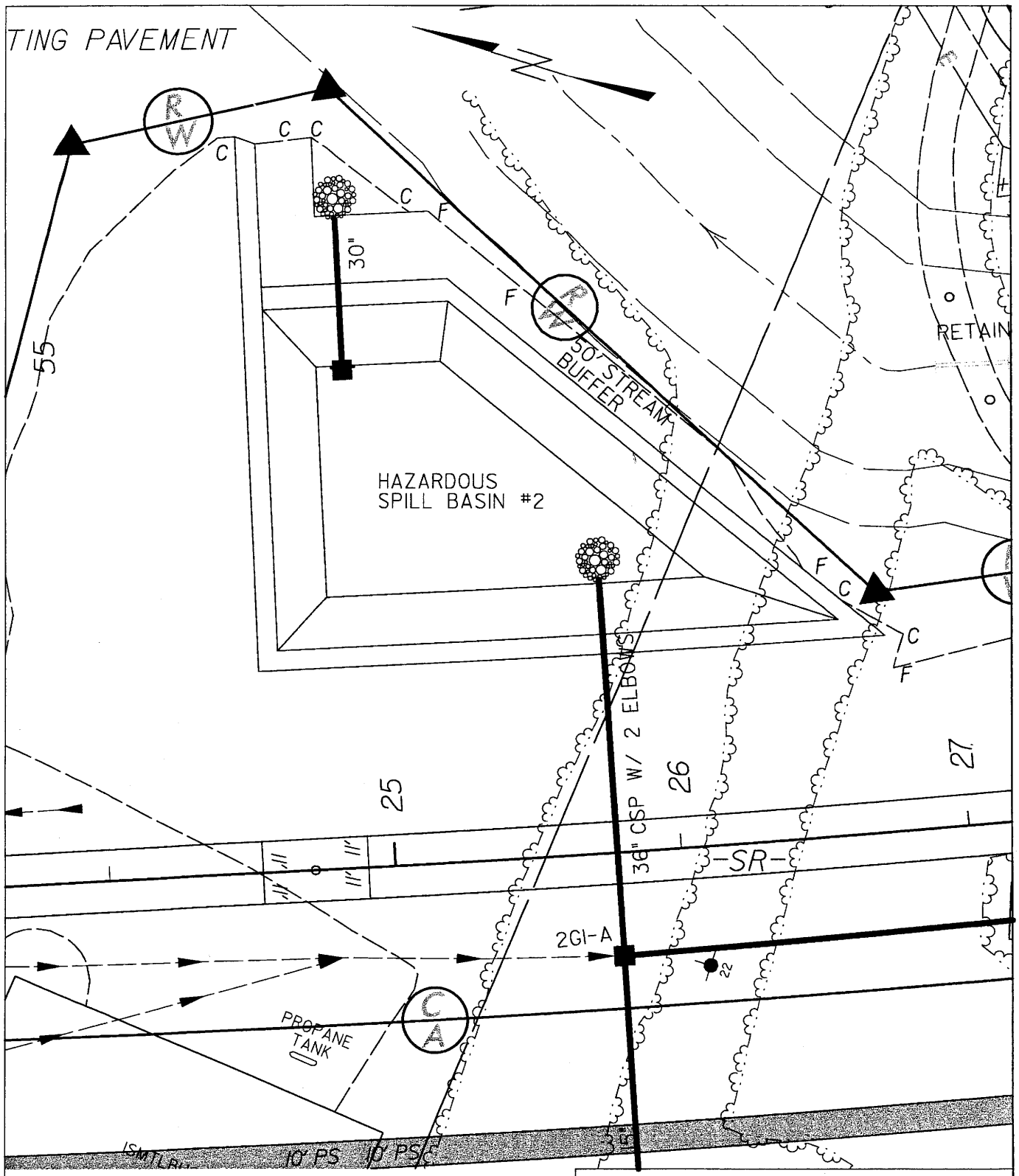
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 9 **OF** 26 **/ 2005**

90/1



0 50 ft 100 ft

PLAN VIEW SITE 3

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

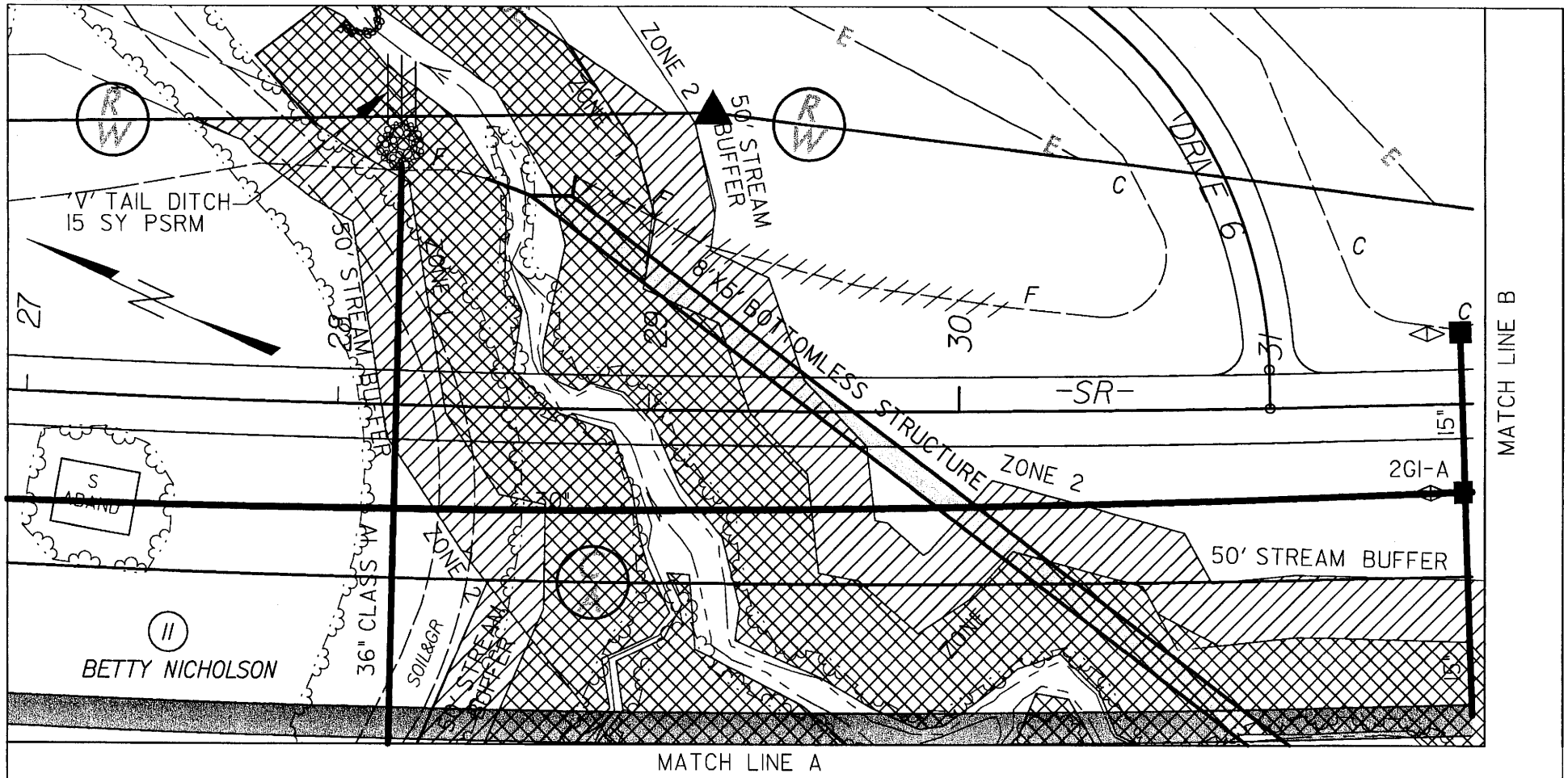
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

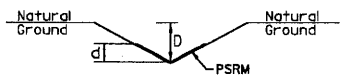
SHEET 10 **OF** 26 / / **2006**

USER: al
DGN: h:\4155\r-2606a\hydraulics\bos\h2.dgn
DATE: 1/30/2006

USER: al
DGN: N:\41558\r2606d\hydraulics\buf3a.wrel
DATE: 1/30/2006



DETAIL DD
'V' TAIL DITCH w/PSRM
(NOT TO SSCALE)



Max. d = 1' Ft. Min. D = 1' Ft.

Type of Liner = PERMANENT SOIL REINFORCED MATTING

-L- 59+48 L

PLAN VIEW
SITE 3

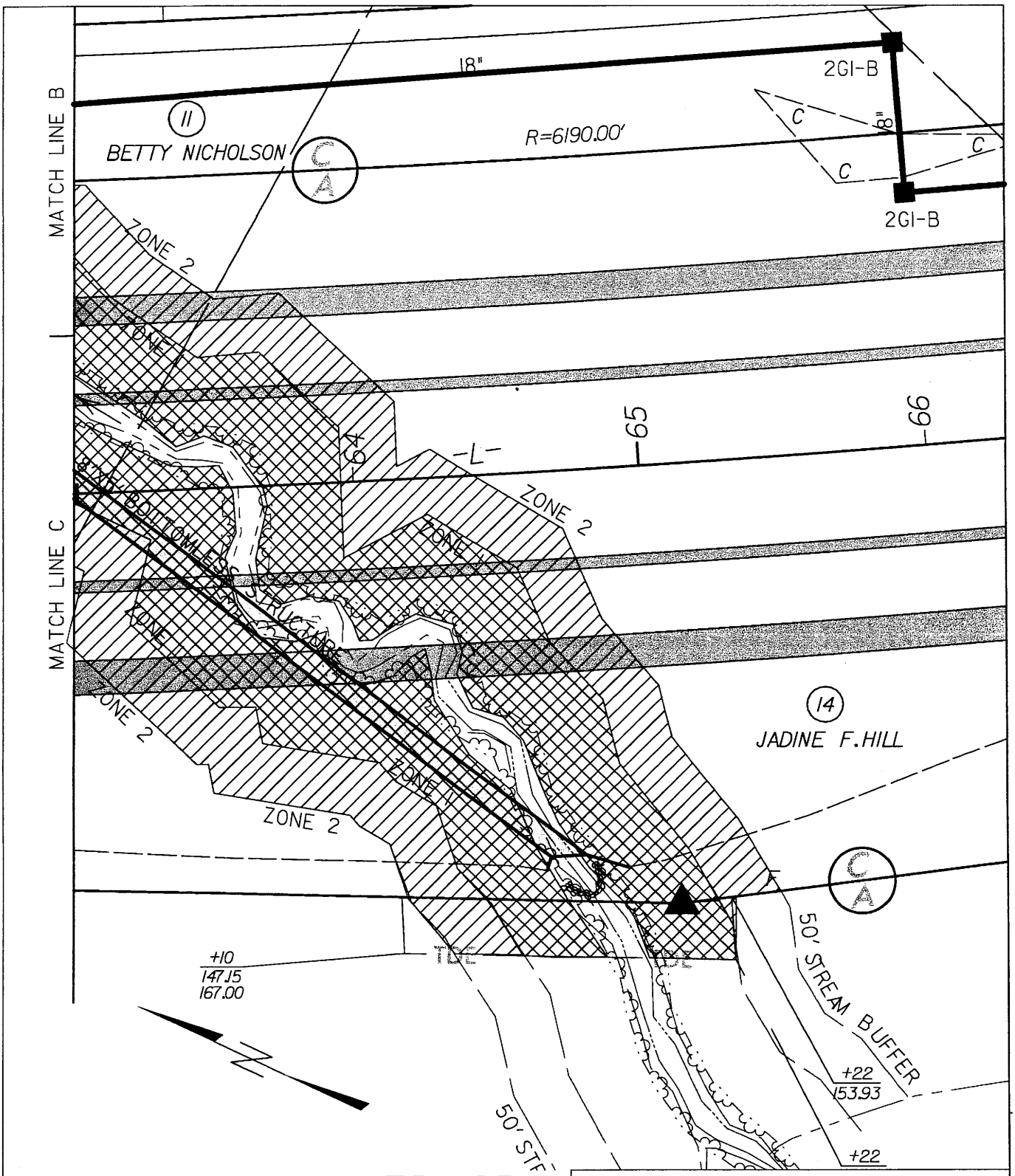
0 50 ft 100 ft

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 11 OF 26 1/1/2006



PLAN VIEW SITE 3

0 50 ft 100 ft

NCDOT

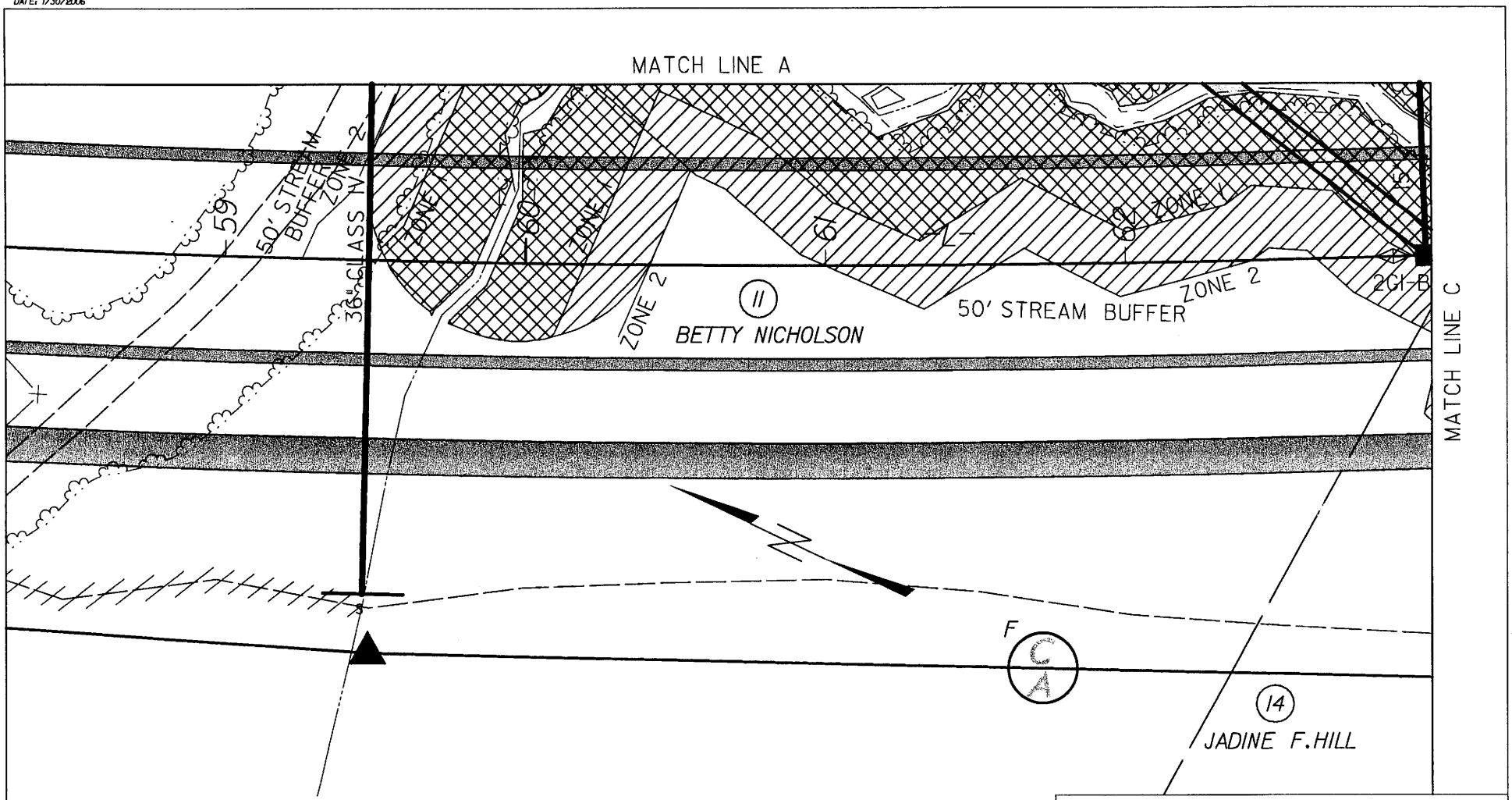
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 12 **OF** 26 **1 / 2006**

USER: RJ
FILE: M:\4155R-2606A\hydraulics\bur3.swf
DATE: 1/30/2006

USER: a)
DGN: h:\41558\r2606d\hydraulics\buf3.bwrd
DATE: 1/30/2006



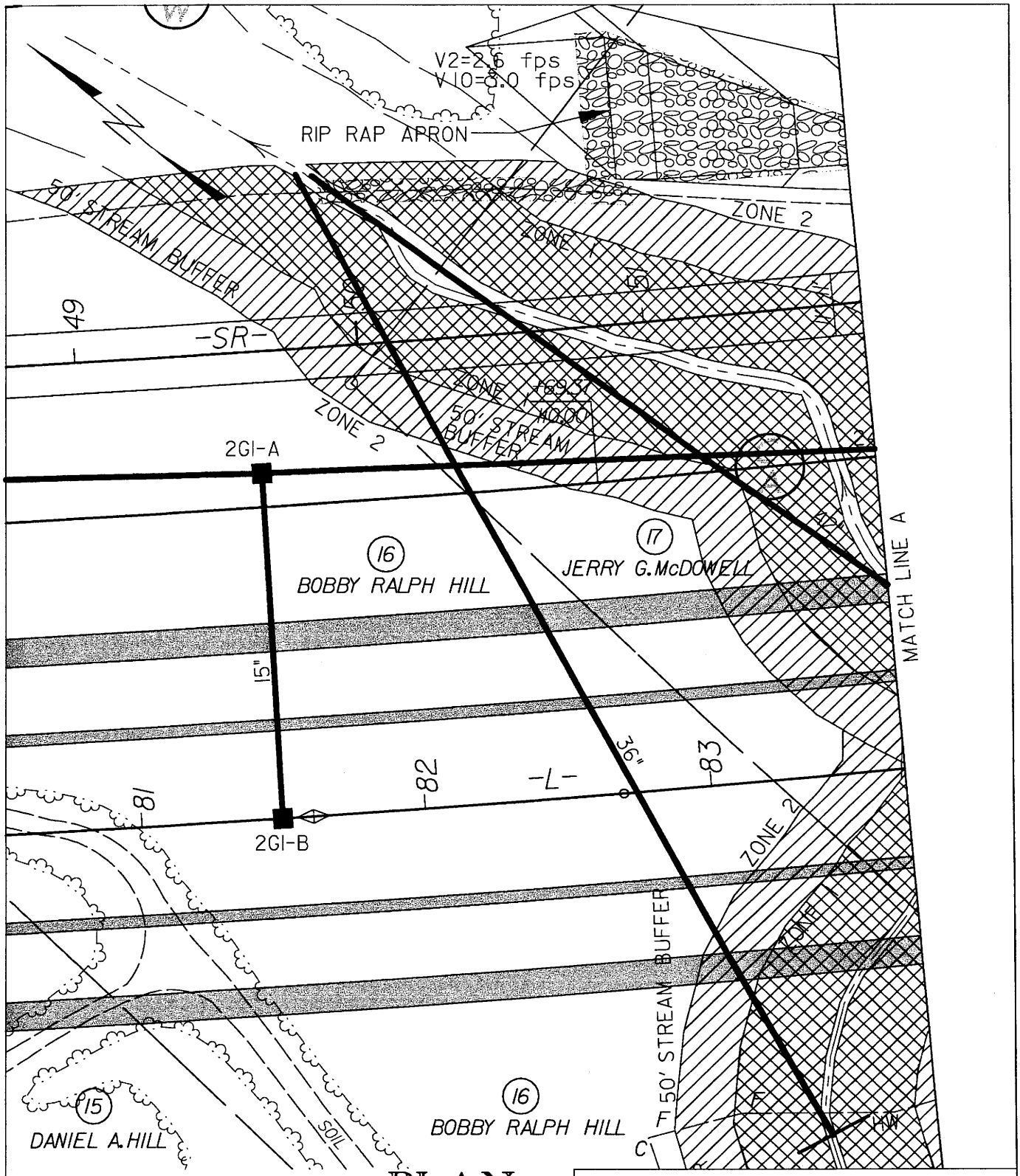
PLAN VIEW
SITE 3

0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 13 **OF** 28 / **2006**



0 50 ft 100 ft

PLAN VIEW SITE 4

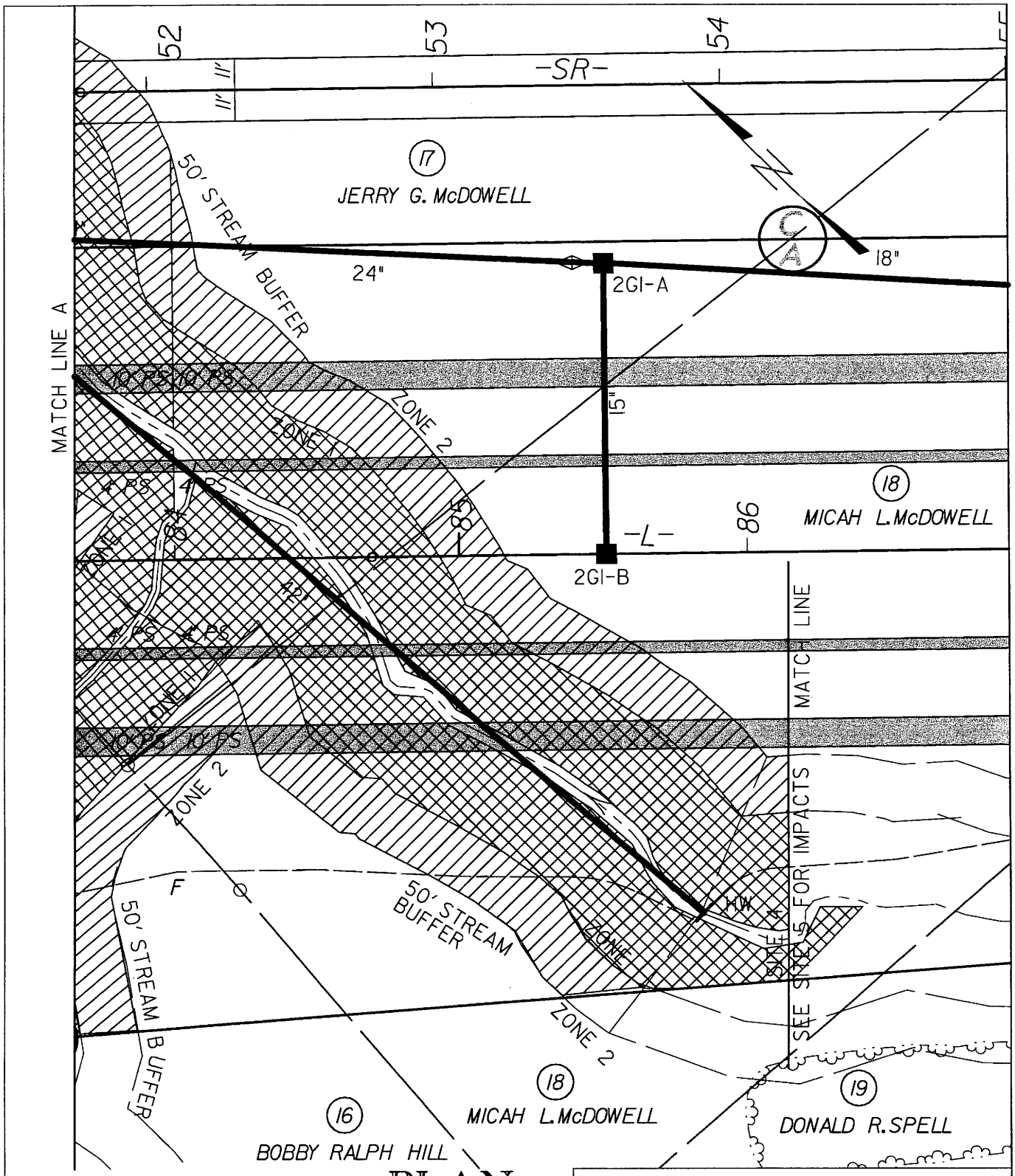
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 14 **OF** 26 **/ / 2006**

USER: ej
DGN: M158Ry2606Ahydraulicsbuffer.dgn
DATE: 1/31/2006



PLAN VIEW SITE 4

0 50 ft 100 ft

NCDOT

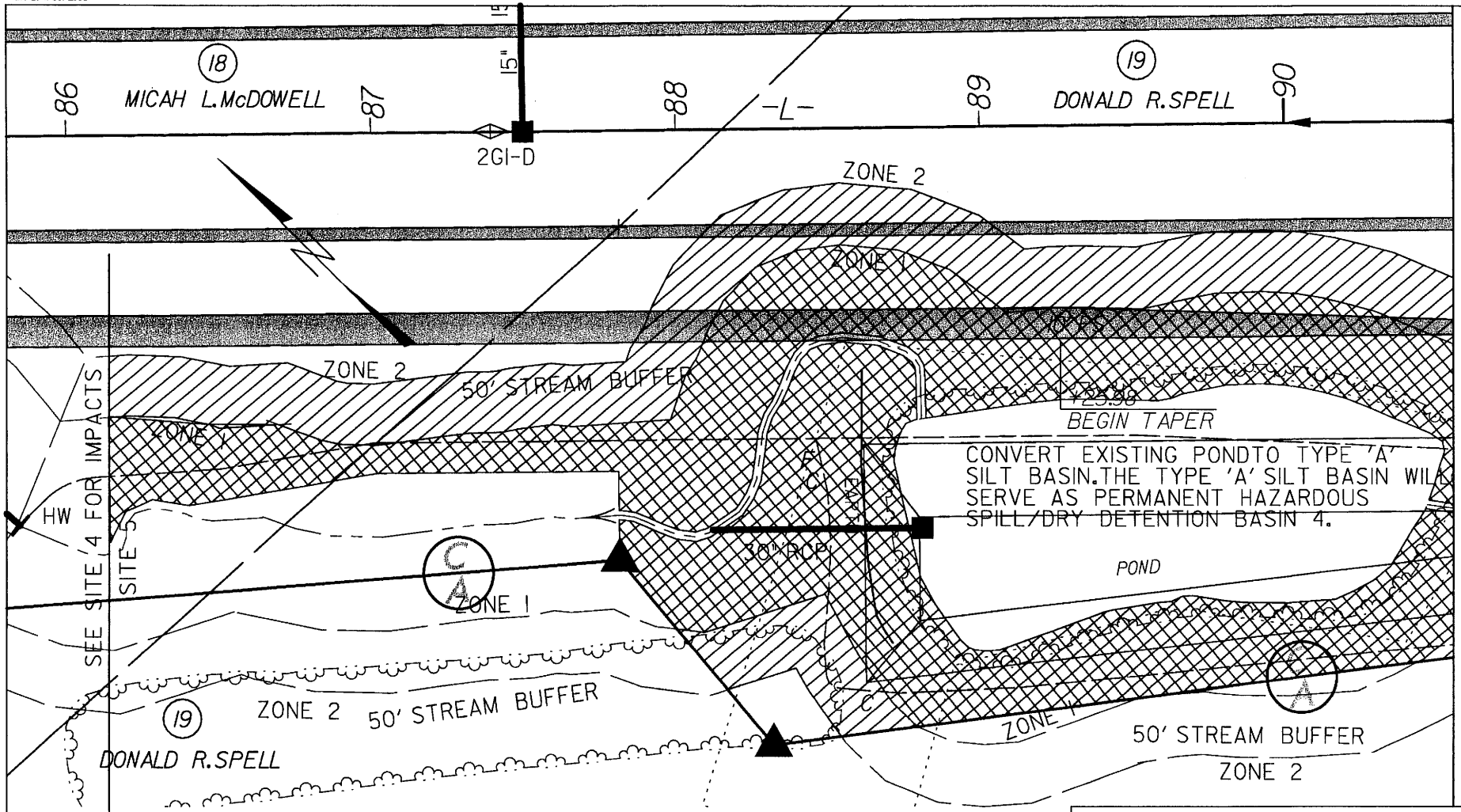
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 15 **OF** 26 **/ 2006**

USER: aj
DGN: N:\R2590-2606A\Hydraulics\Out-4bw.dgn
DATE: 1/30/2006

USER: ej
DGN: h:\41558\r2606a\hydraulics\buf5a.wet
DATE: 1/30/2006



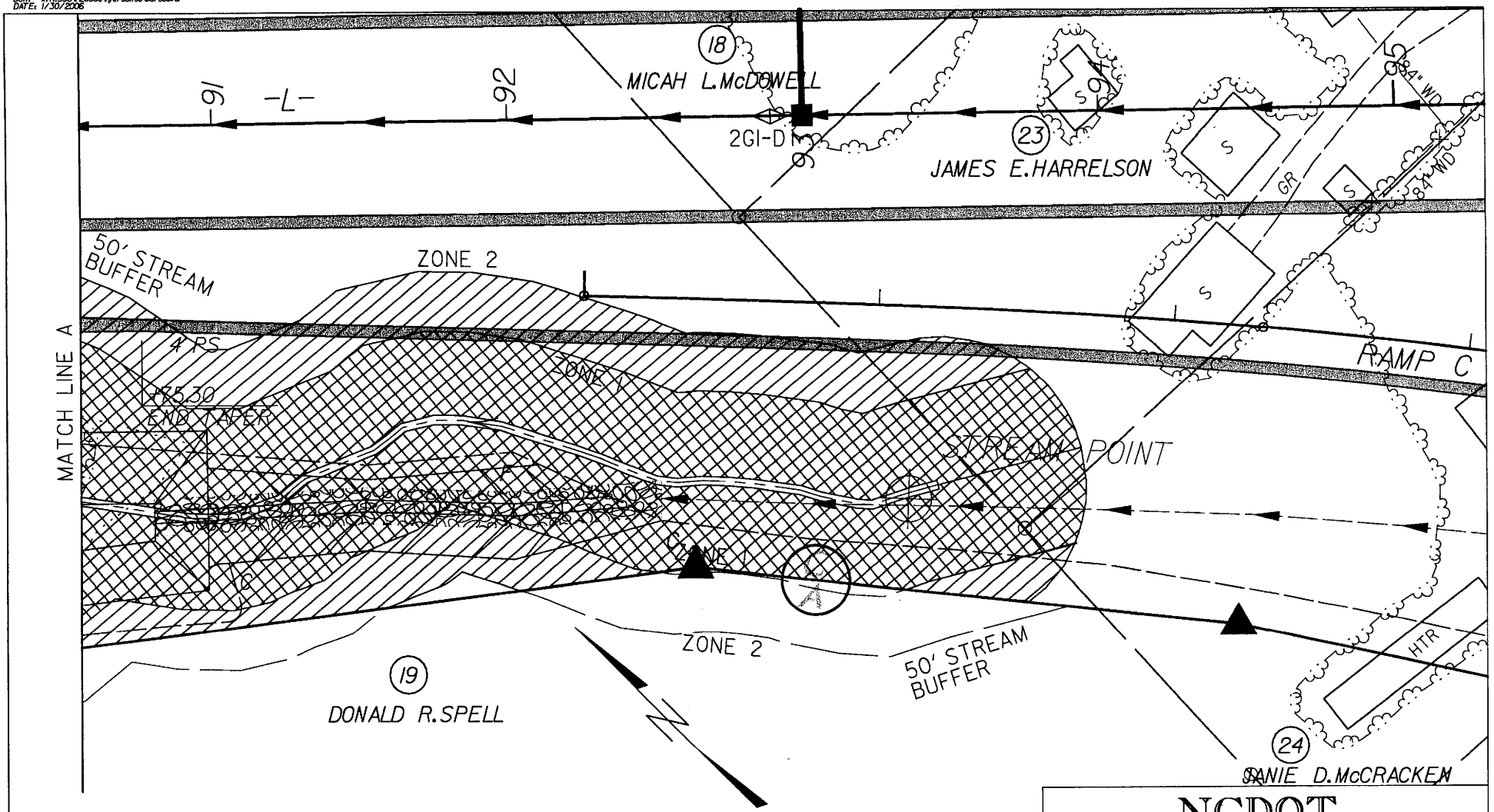
PLAN VIEW
SITE 5

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 16 **OF** 26 / **2006**

USER: e)
DGN: h:\41558\r2606a\hydraulics\buf5bwrat
DATE: 1/30/2006



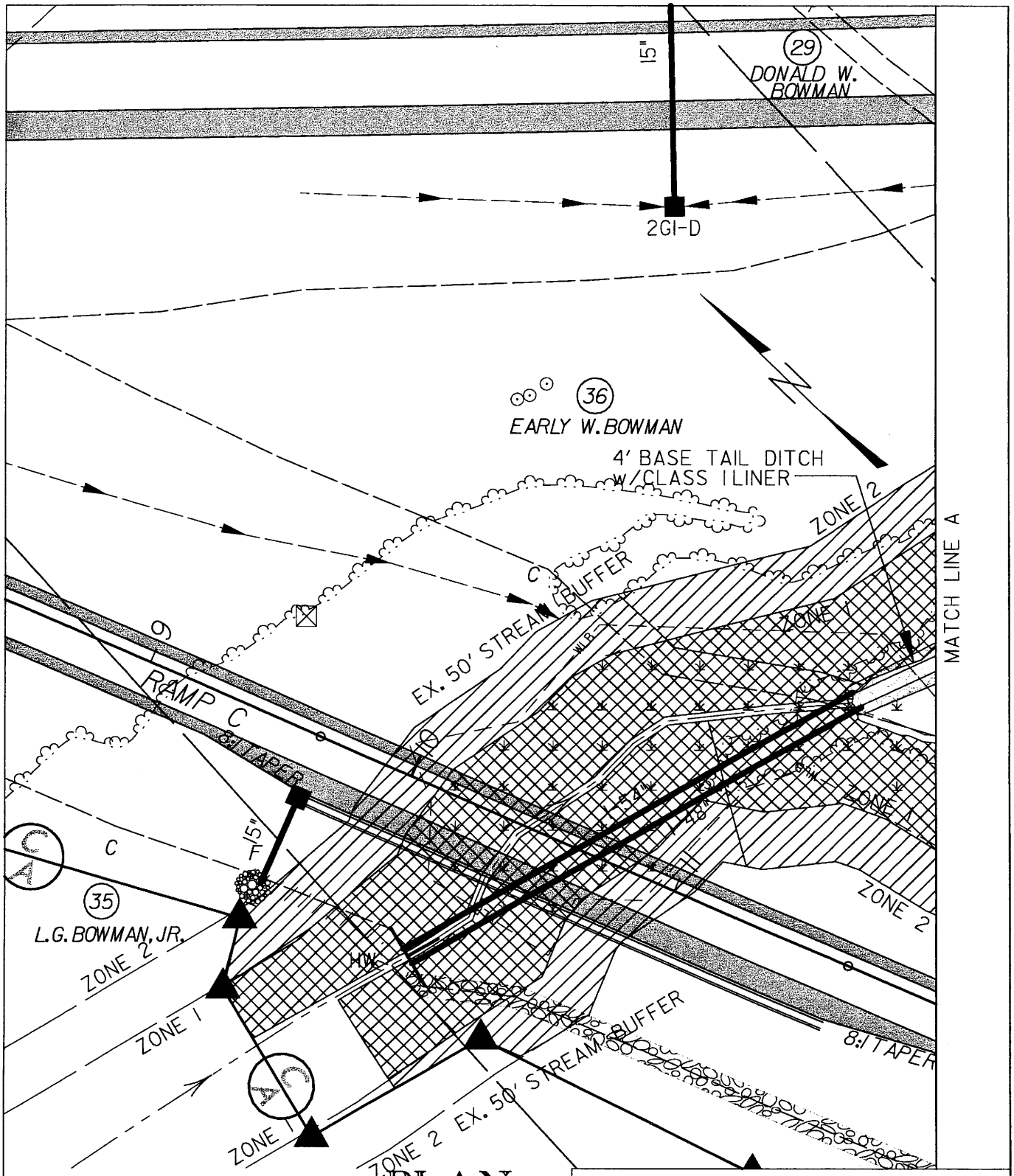
PLAN VIEW
SITE 5

0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 17 OF 28 1/ 2006



0 50 ft 100 ft

PLAN VIEW SITE 6

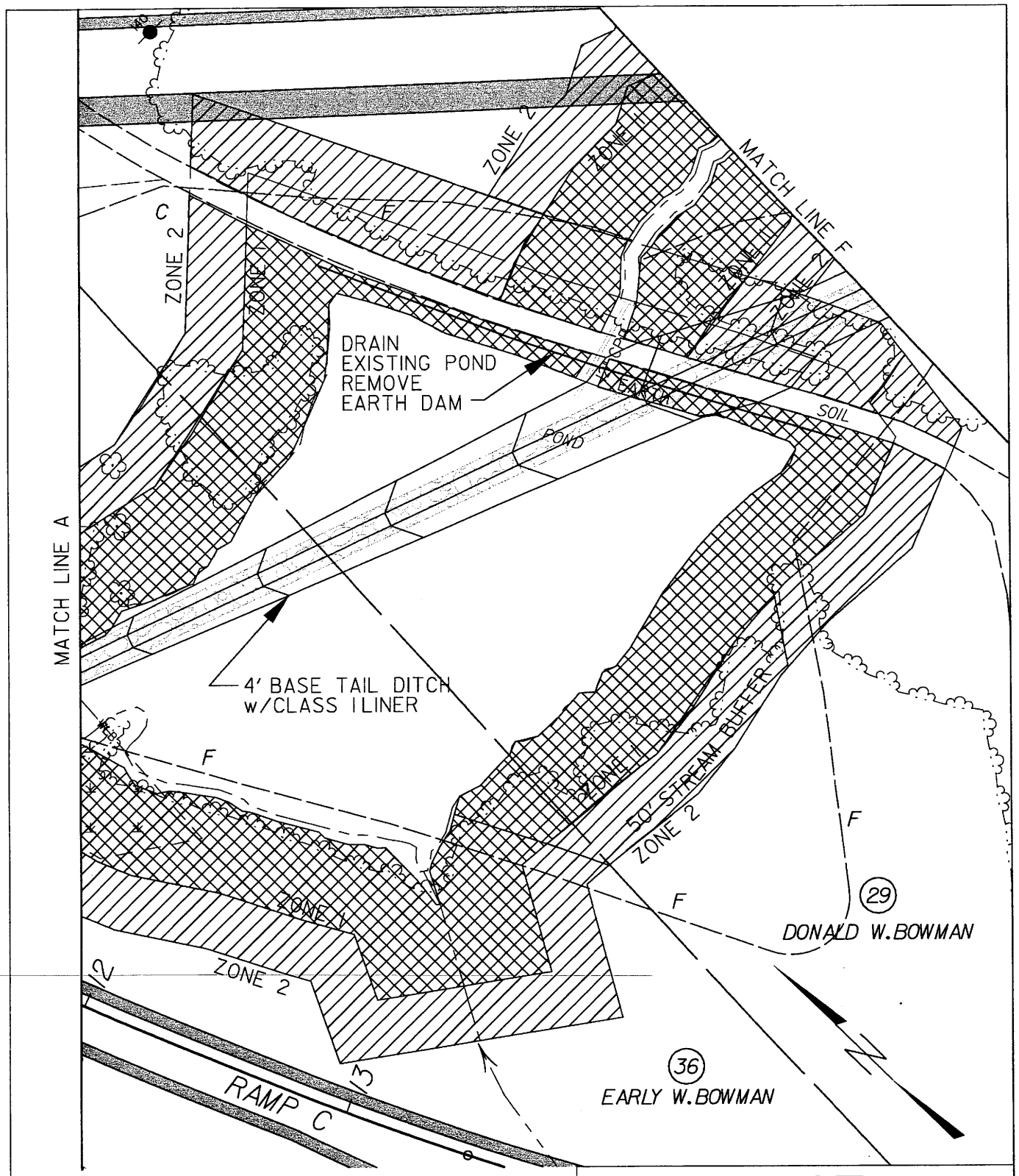
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 18 **OF** 26 1 / **2006**

USER: al
DGN: 8.1571501_R2606A_Hydraulics_Outfalls.dgn
DATE: 1/31/2006



0 50 ft 100 ft

PLAN VIEW SITE 6

NCDOT

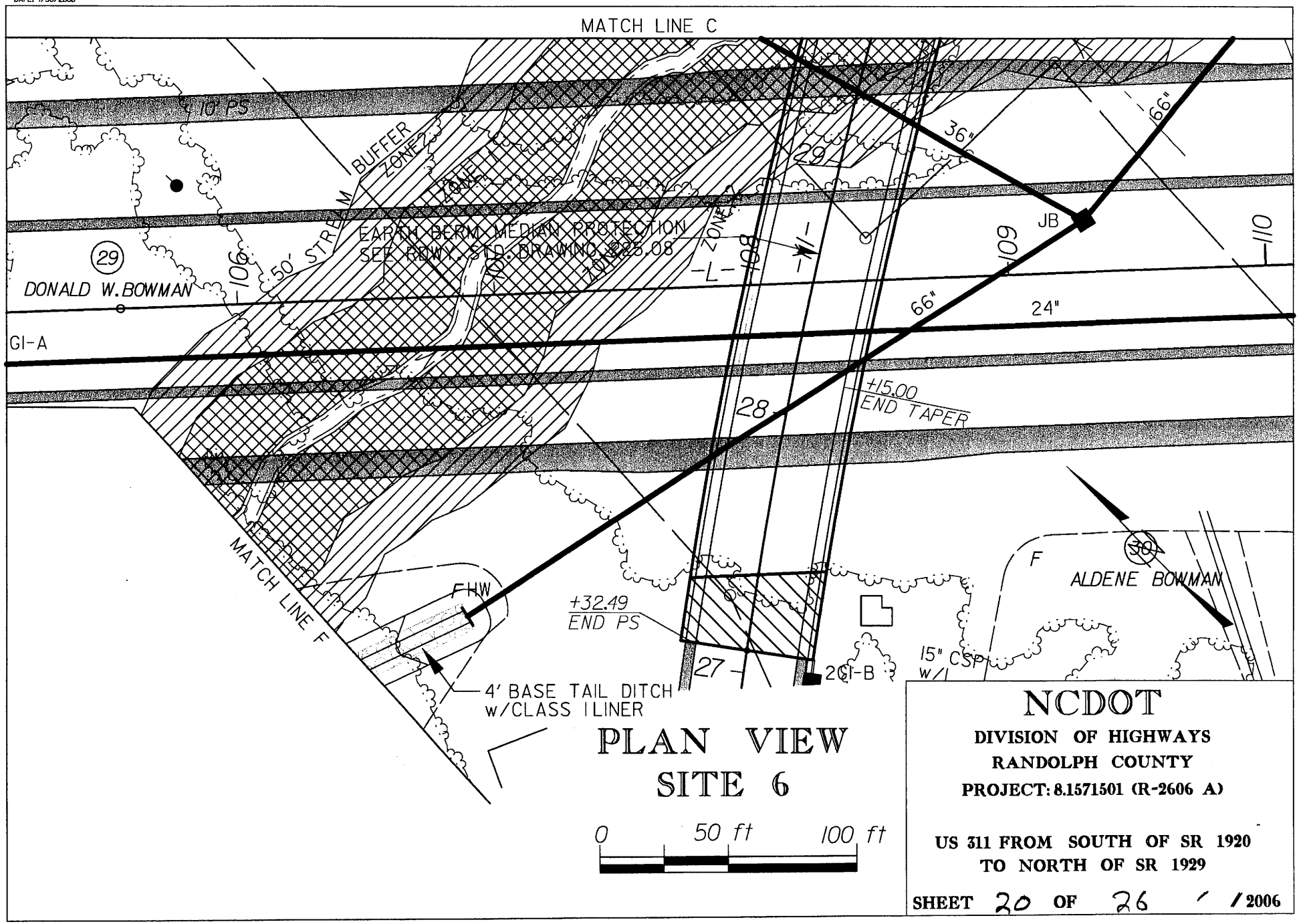
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 19 **OF** 26 1/31/2006

USER: aj
DGN: 41558\r2606\hydraulics\buf6bwet
DATE: 1/30/2006

USER: ej
DGN: h:\41558\r-2606a\hydraulics\buf7a.wet
DATE: 1/30/2006



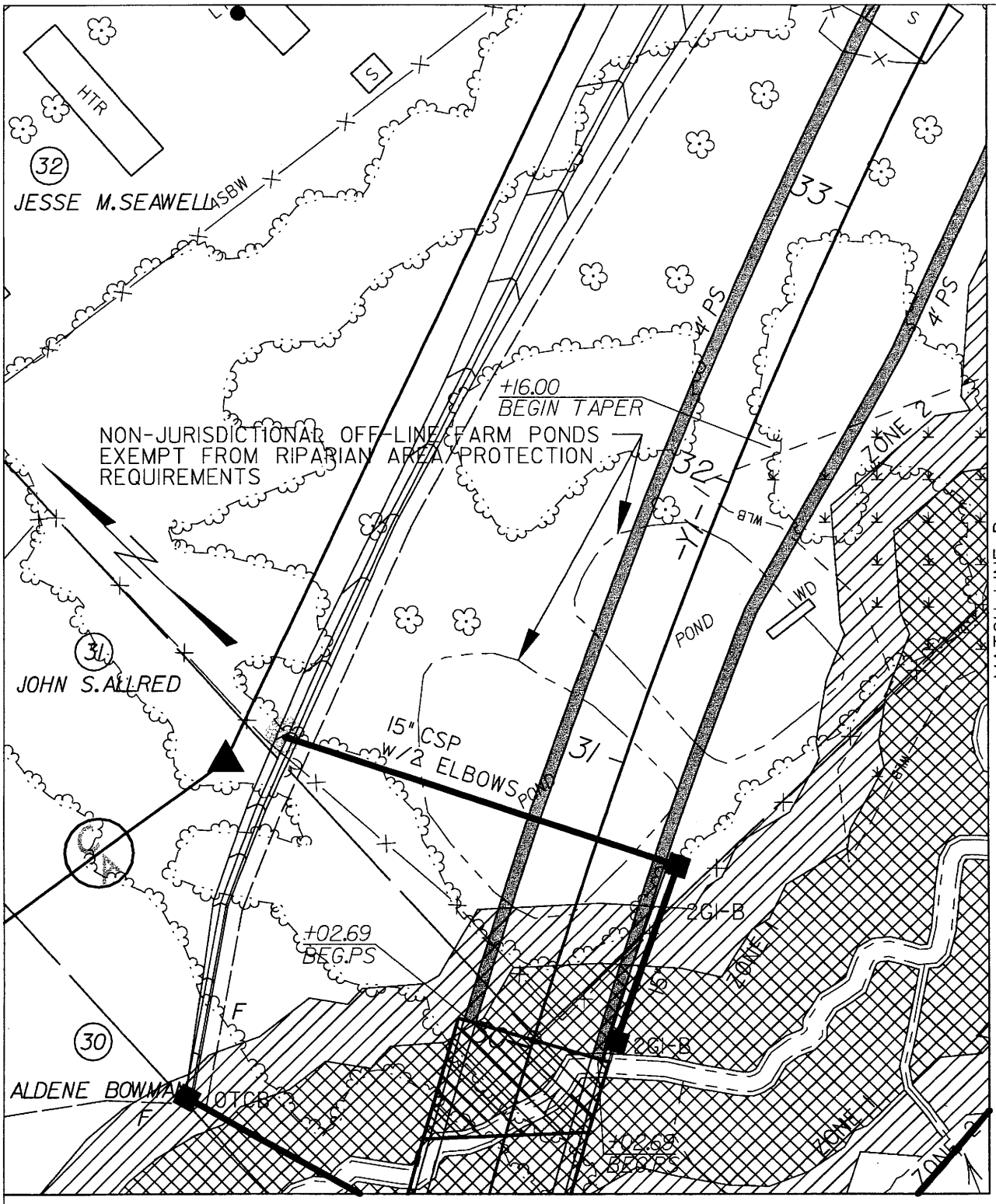
PLAN VIEW
SITE 6

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 20 **OF** 26 / **/2006**



MATCH LINE C

0 50 ft 100 ft

PLAN VIEW SITE 6

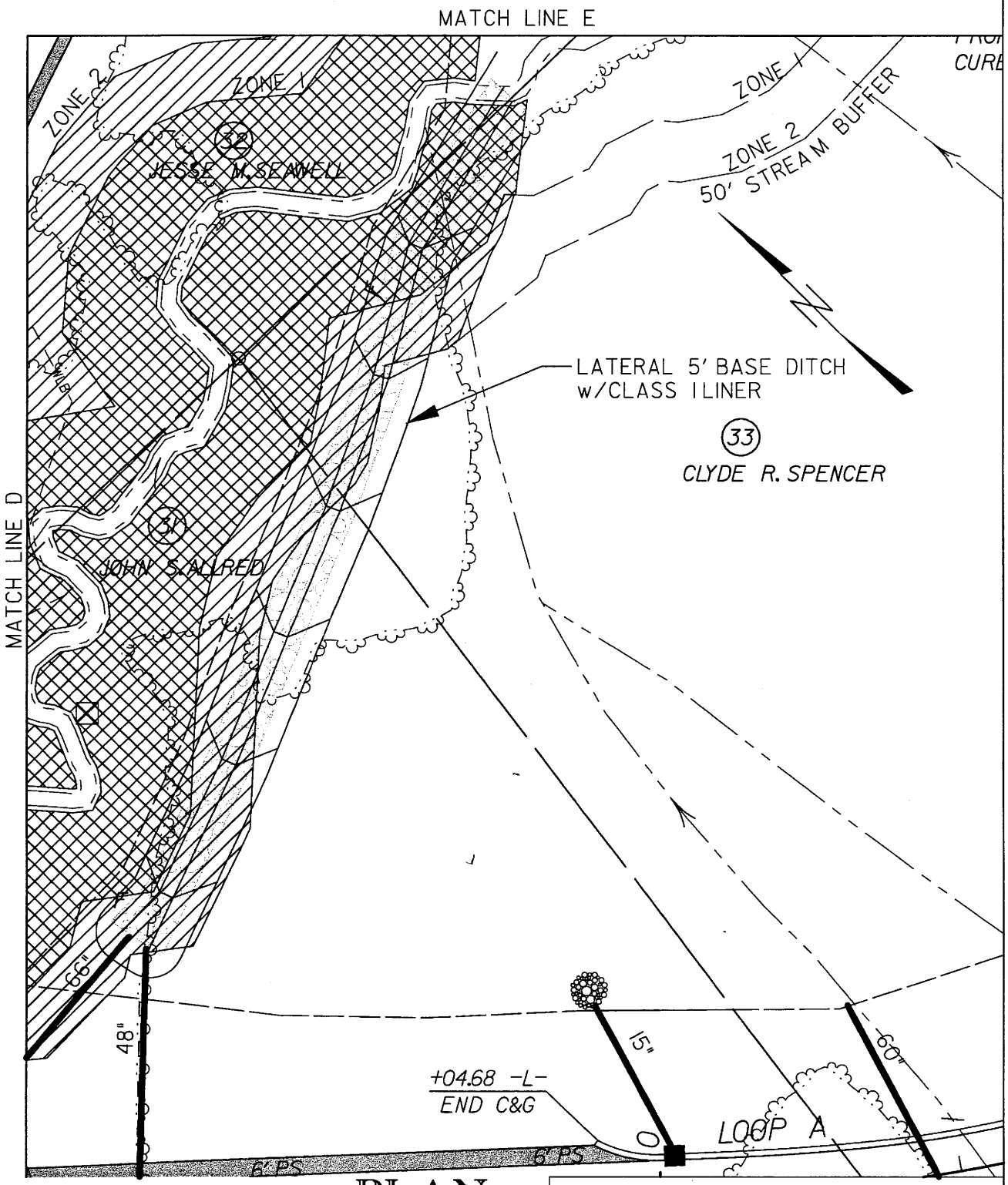
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 21 OF 26 / / **2006**

USER: rj
DGN: 41558-r2606a\hydraulics\bu17\bu17.dwl
DATE: 1/30/2006



0 50 ft 100 ft

PLAN VIEW SITE 6

NCDOT

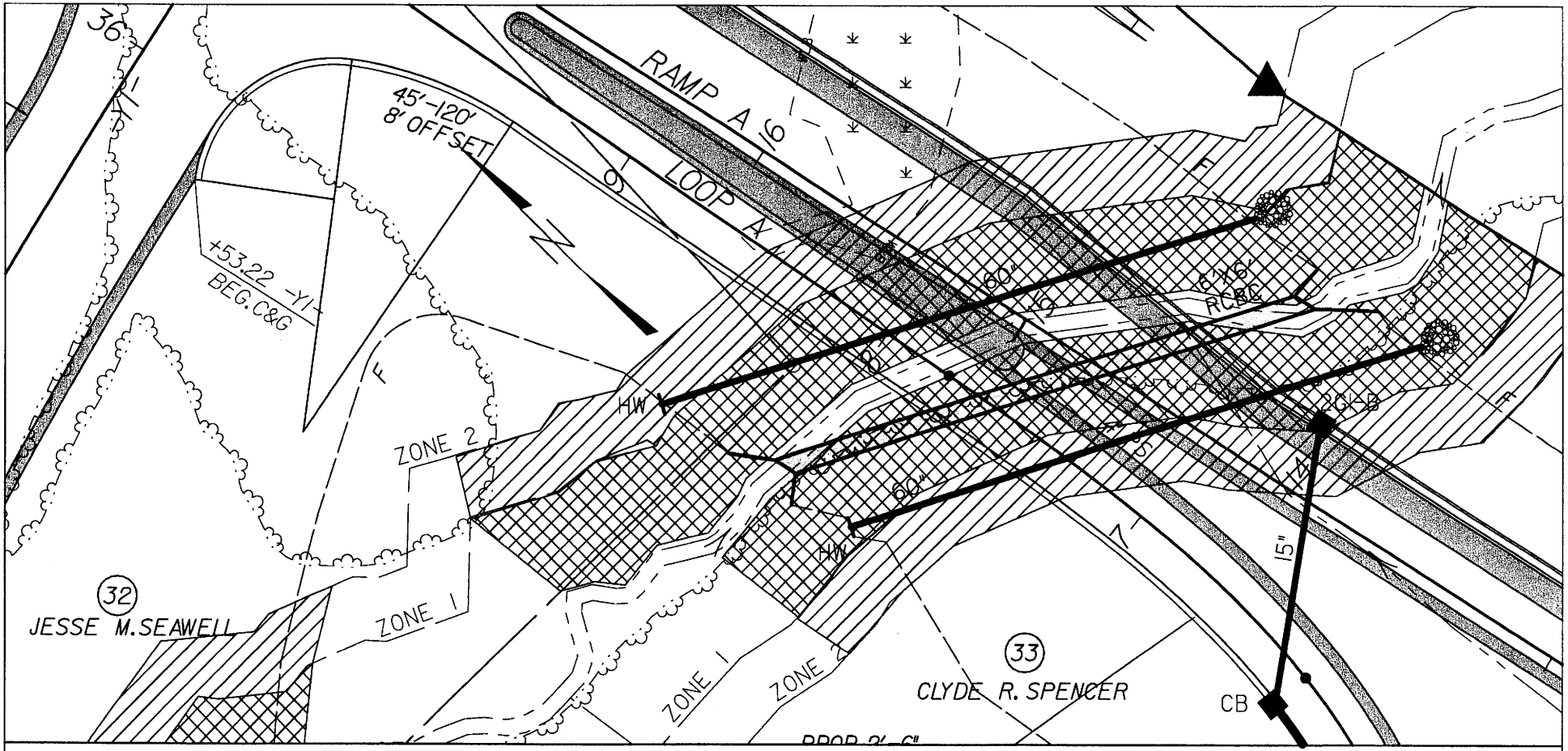
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 22 **OF** 26 / / **2006**

USER: ej
DGN: h:\8.1571501\r2606a\hydraulics\buffcurve
DATE: 11/30/2006

USER: aj
DGN: h:\41558\r-2606a\hydraulics\buff7d.wet
DATE: 1/30/2006



MATCH LINE E

PLAN VIEW
SITE 6

0 50 ft 100 ft

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 23 OF 26 / / **2006**

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (s.f.)	ZONE 2 (s.f.)	TOTAL (s.f.)	ZONE 1 (s.f.)	ZONE 2 (s.f.)	TOTAL (s.f.)	ZONE 1 (s.f.)	ZONE 2 (s.f.)
1	Bridge	-L- Sta 21+85	X		11935	9116	21051			0		
		TO 23+45					0			0		
							0			0		
2	1-12'x8' RCBC	-L- 45+99	X				0	29846	16473	46319		
	Note: 1250 sf (0.029ac) and 3560 sf (0.082 ac) of wetlands are within Zone1 and 2, respectively.						0			0		
							0			0		
3	1-8'x5' BOTTOMLESS STRUCTUR	-L- 63+06	X				0	55664	34704	90368		
	& 36" RCP						0			0		
4	1-36" RCP &	-L- 80+68	X				0	46952	28059	75011		
	1-42" RCP	TO 86+05					0			0		
5	30" RCP w/RISER	-L- 85+50	X				0	44530	21659	66189		
	IN PERM. A BASIN	TO 94+04					0			0		
							0			0		
							0			0		
6	1@54" RCP & 1@48" RCP	RAMP C 9+65	X				0	115059	76153	191212		
	66" RCP	-L- 106+90	X				0			0		
	1@6'x6' RCBC & 2@60" RCP	-RAMPA- 14+72	X				0			0		
							0			0		
	Note: 13723 sf (0.315 ac) and 3834 sf (0.088 ac) of wetlands are within Zone 1 and 2, respectively.						0			0		
TOTAL:					11935	9116	21051	292051	177048	469099	0	0

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606 A)

Jan-06

SHEET 24 OF 26

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
1	KEPLEY-FRANK HARDWOOD CO., INC.	975 CONRAD HILL MINE ROAD LEXINGTON, NC 27292
2	MAGGIE N. POOLE	6020 POOLE ROAD ARCHDALE, NC 27263
4	RAY POOLE	P.O. BOX 14411 ARCHDALE, NC 27263
5	JAMES H. TROTTER	6191 POOLE ROAD ARCHDALE, NC 27263
7	TIMOTHY LARUE TROTTER	5930 POOLE ROAD ARCHDALE, NC 27263
8	ZOLA ROSENGERG	5930 POOLE ROAD ARCHDALE, NC 27263-7850
11	BETTY NICHOLSON	5848 POOLE ROAD ARCHDALE, NC 27263-7850
14	JADINE F. HILL	6461 LEWIS DAVID ROAD RANDLEMAN, NC 27317-7219
16	BOBBY RALPH HILL	3638 HOOVER HILL ROAD TRINITY, NC 27370
17	JERRY G. McDOWELL	5597 GODNICK LANE ARCHDALE, NC 27263
18	MICAH L. McDOWELL	3310 MOUNT OLIVE CHURCH ROAD SOPHIA, NC 27350
19	DONALD R. SPELL	214 ASHLAND STREET ARCHDALE, NC 27263
23	JAMES E. HARRELSON	5557 GODNICK LANE ARCHDALE, NC 27263
24	JANIE D. McCRACKEN	5547 GODNICK LANE ARCHDALE, NC 27263
29	DONALD W. BOWMAN	323 KENDALL MILL ROAD THOMASVILLE, NC 27360
30	ALDENE BOWMAN	ROUTE 2, BOX 264 TRINITY, NC 27370

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 25 OF 26 1/06

USER: rremy
DGN: k:\4558\r2606a\Hydraulics\OWNER.WET
DATE: 07/14/2005

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
31	JOHN S. ALLRED	ROUTE 3, BOX 393 HIGH POINT, NC 27263
32	JESSE M. SEAWELL	ROUTE 3, BOX 392 HIGH POINT, NC 27263
33	CLYDE R. SPENCER	ROUTE 3, BOX 518 HIGH POINT, NC 27263
35	L. G. BOWMAN, JR.	5590 CEDAR SQUARE ROAD ARCHDALE, NC 27263-8222
36	EARLY W. BOWMAN	215 LINDA DRIVE ARCHDALE, NC 27263-3313

NCDOT

DIVISION OF HIGHWAYS

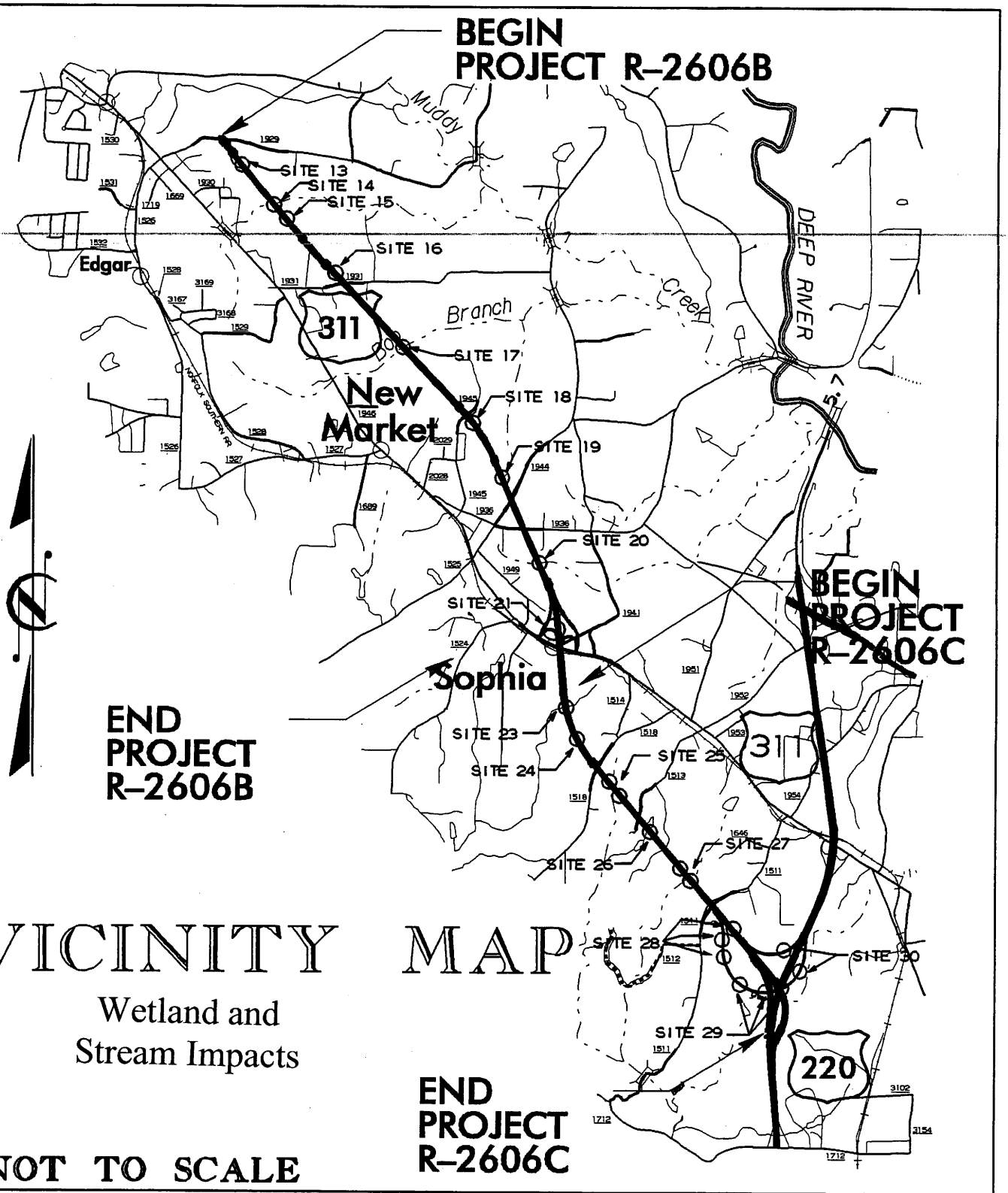
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606 A)

US 311 FROM SOUTH OF SR 1920
TO NORTH OF SR 1929

SHEET 26 OF 26

USER: rremy
DGN: k:\4558\r2606a\Hydraulics\OWNER.WET
DATE: 07/14/2005

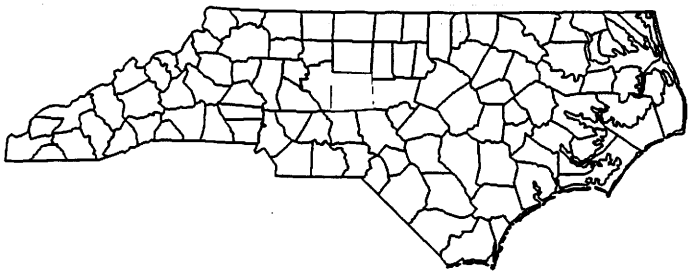


VICINITY MAP

Wetland and
Stream Impacts

NOT TO SCALE

NORTH CAROLINA



NCDOT

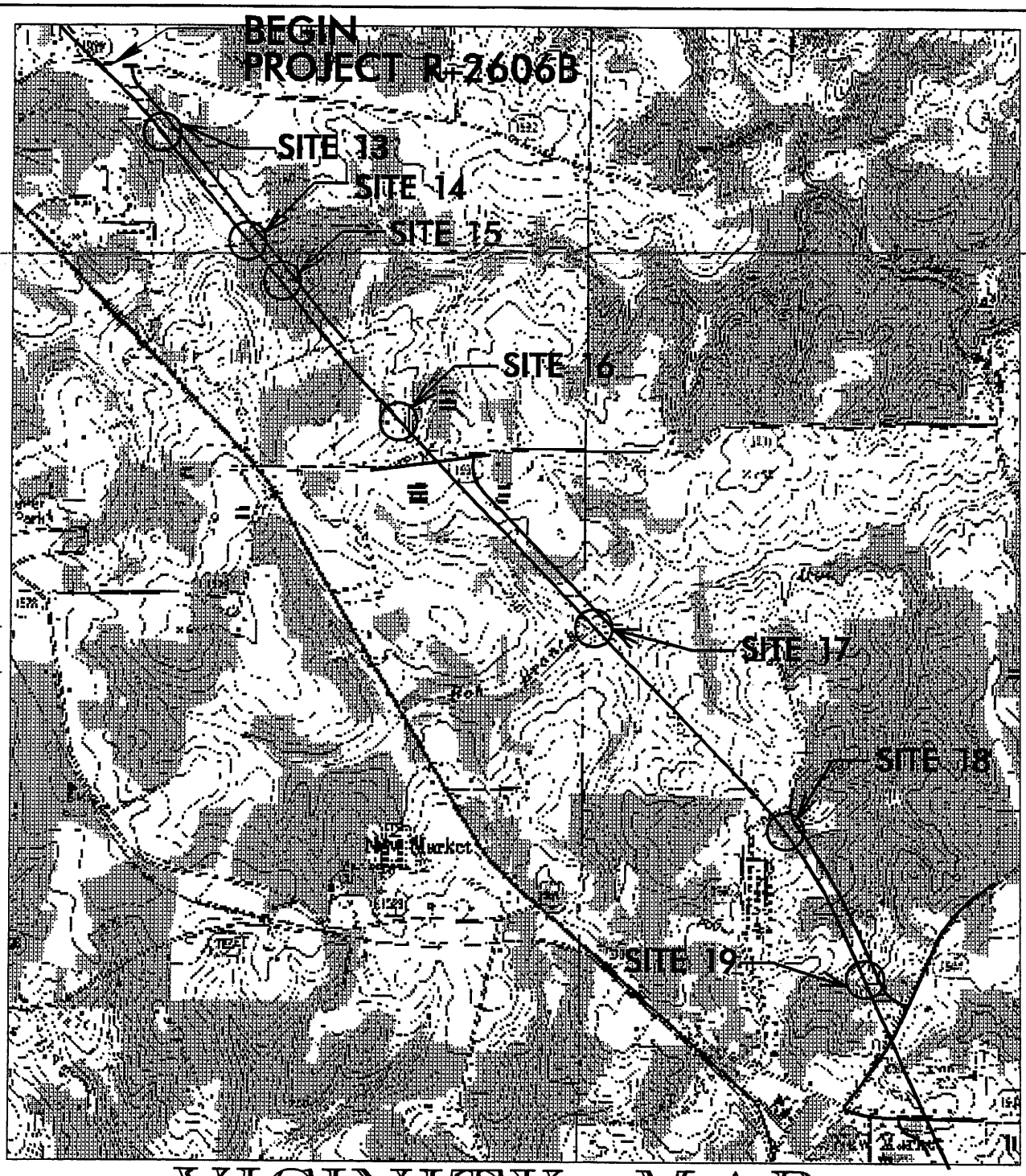
DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B & C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 1 OF 30 AUGUST 9, 2002

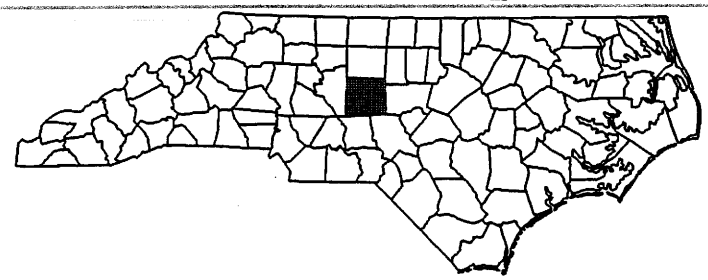


VICINITY MAP

0 1/2 1.0 mile

RANDLEMAN, NC QUAD MAP
GLENOLA, NC QUAD MAP

NORTH CAROLINA



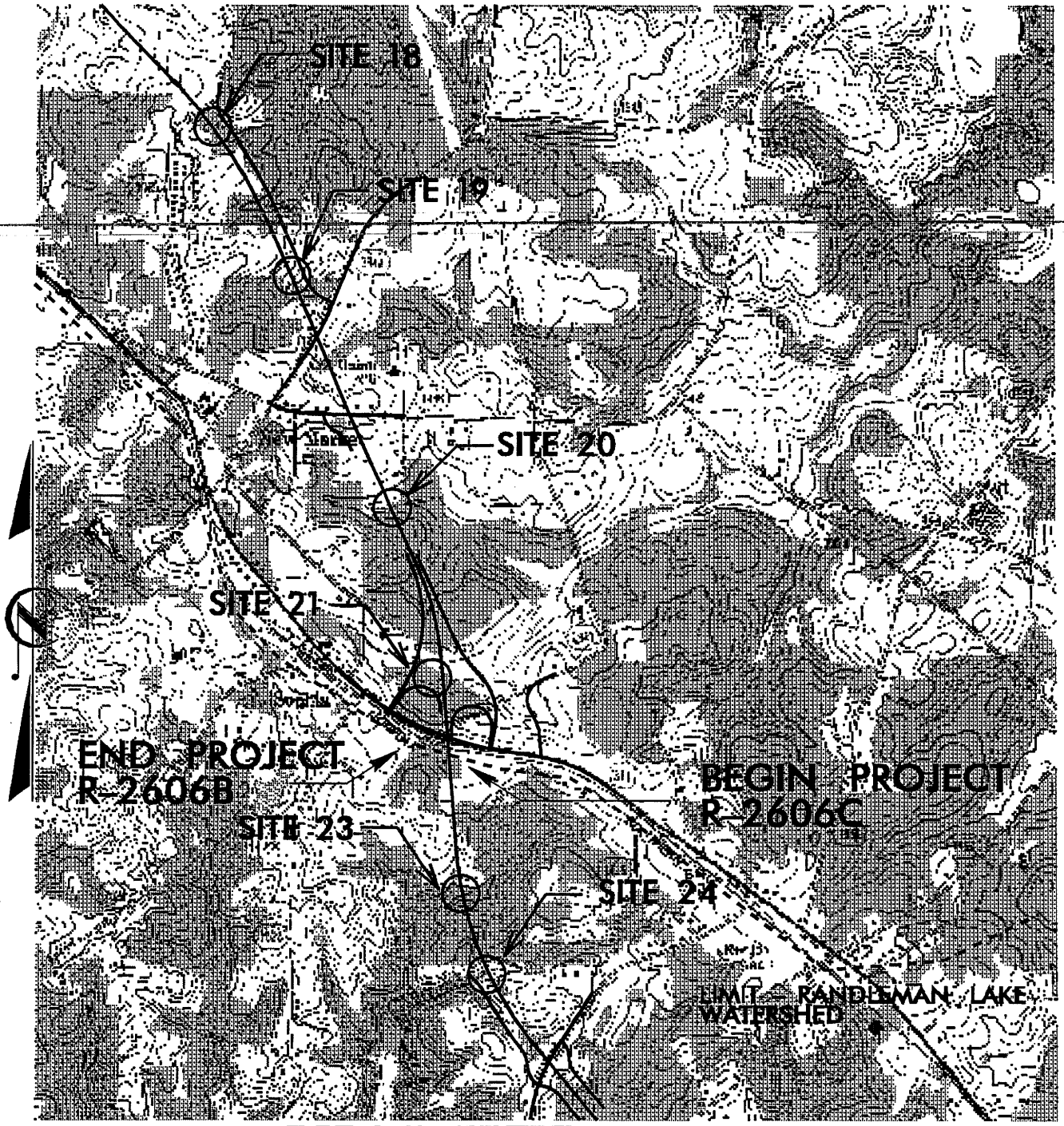
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B and C

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 2 OF 30 AUGUST 9, 2002

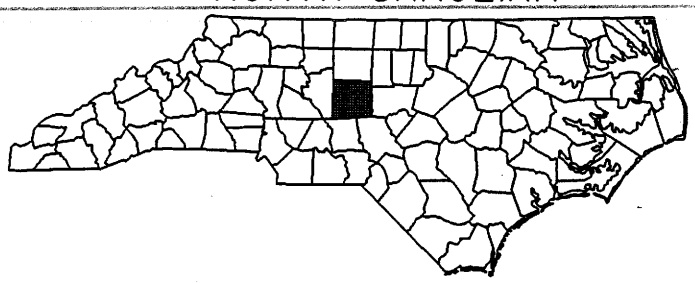


VICINITY MAP

0 ½ 1.0 mile

RANDLEMAN, NC QUAD MAP

NORTH CAROLINA



NCDOT

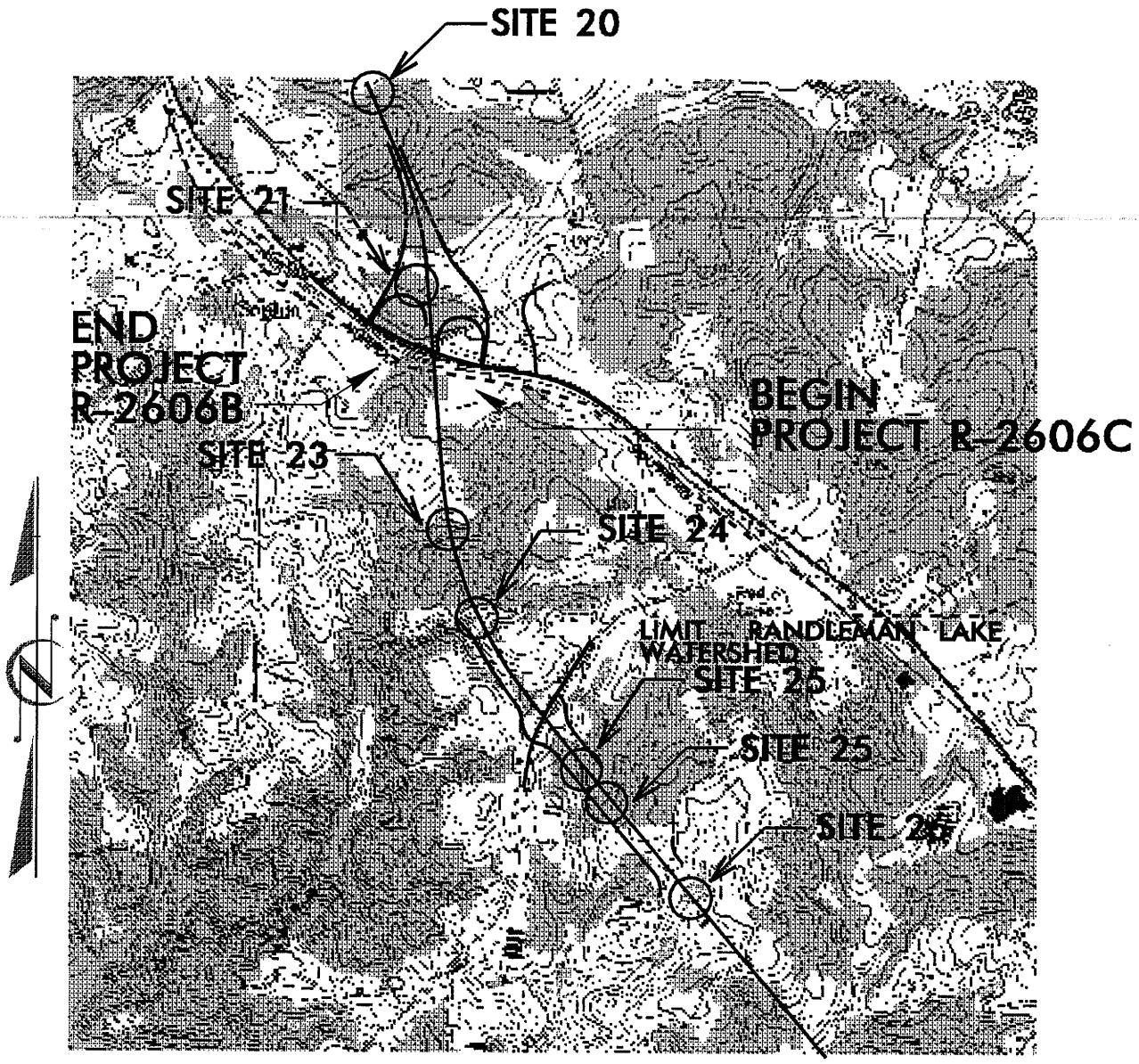
DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B and C

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 3 OF 30 AUGUST 9, 2002

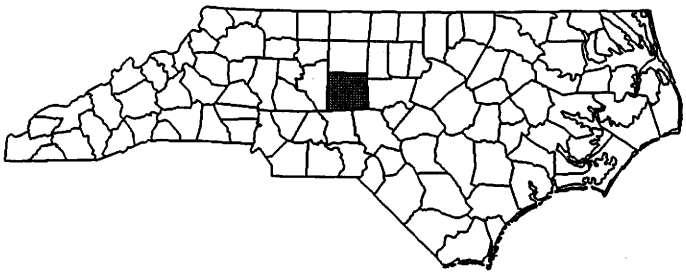


VICINITY MAP

0 ½ 1.0 mile

RANDLEMAN, NC QUAD MAP

NORTH CAROLINA



NCDOT

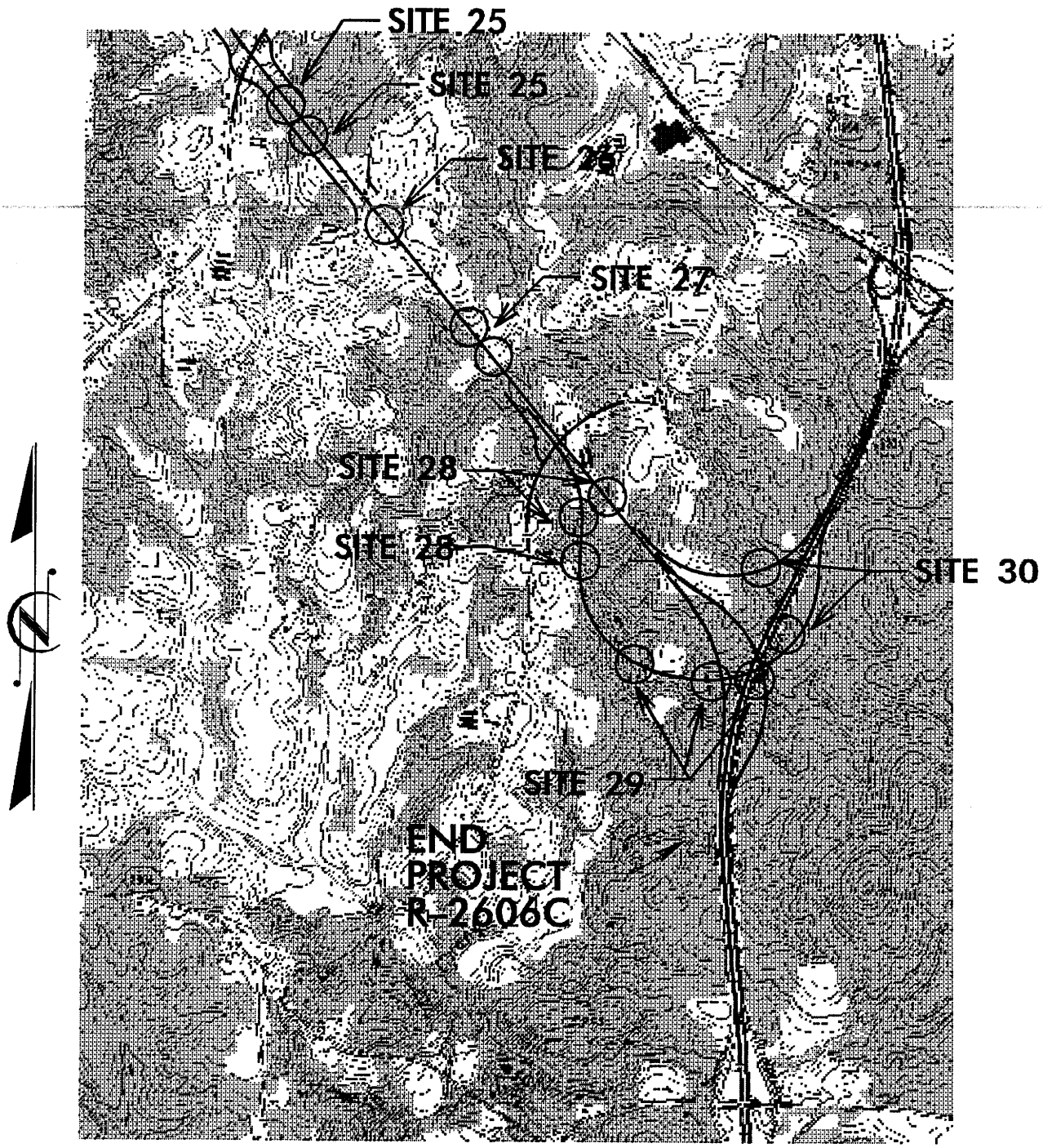
DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B and C

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 4 OF 30 AUGUST 9, 2002

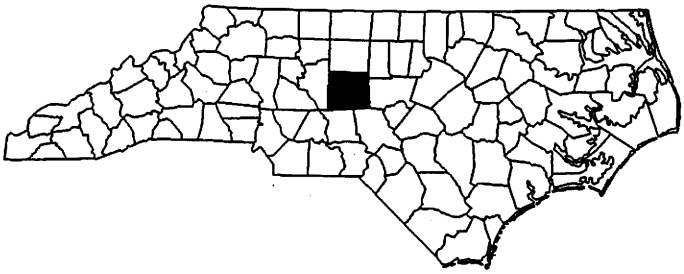


VICINITY MAP

0 ½ 1.0 mile

RANDLEMAN, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 5 OF 30 AUGUST 9, 2002

WETLAND LEGEND

WLB — WETLAND BOUNDARY

WLB WLB — WETLAND

F F — DENOTES FILL IN WETLAND

S S — DENOTES FILL IN SURFACE WATER

P P — DENOTES FILL IN SURFACE WATER (POND)

T T — DENOTES TEMPORARY FILL IN WETLAND

E E — DENOTES EXCAVATION IN WETLAND

TS TS — DENOTES TEMPORARY FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE

LEVEL SPREADER (LS)

DITCH / GRASS SWALE

NCDOT

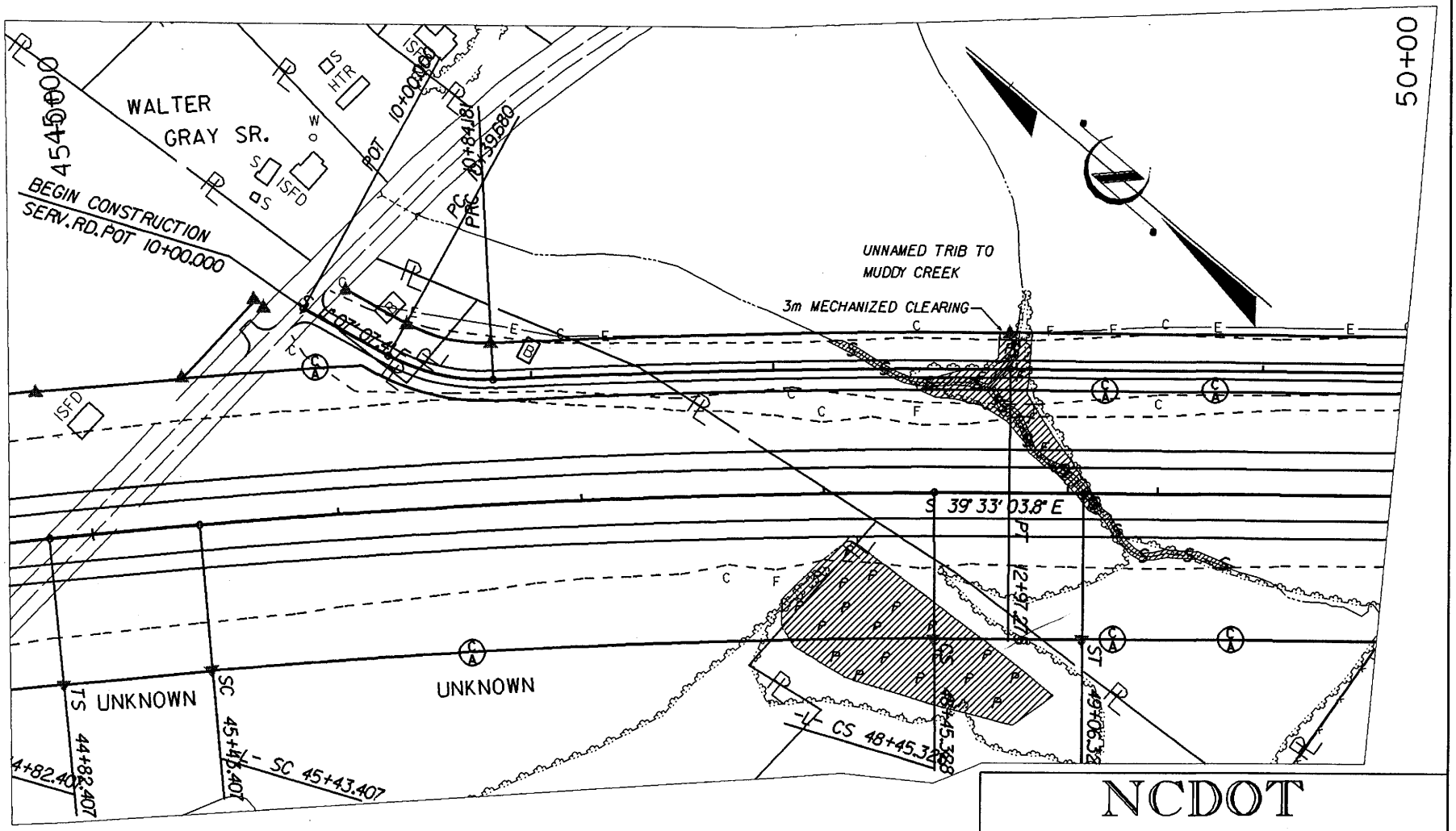
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 6 **OF** 30 **AUGUST 9, 2002**



SITE 13
PLAN VIEW

DENOTES MECHANIZED CLEARING

DENOTES FILL IN SURFACE WATER (POND)

DENOTES FILL IN WETLAND

DENOTES FILL IN SURFACE WATER

25m 0 50m

SCALE

NCDOT

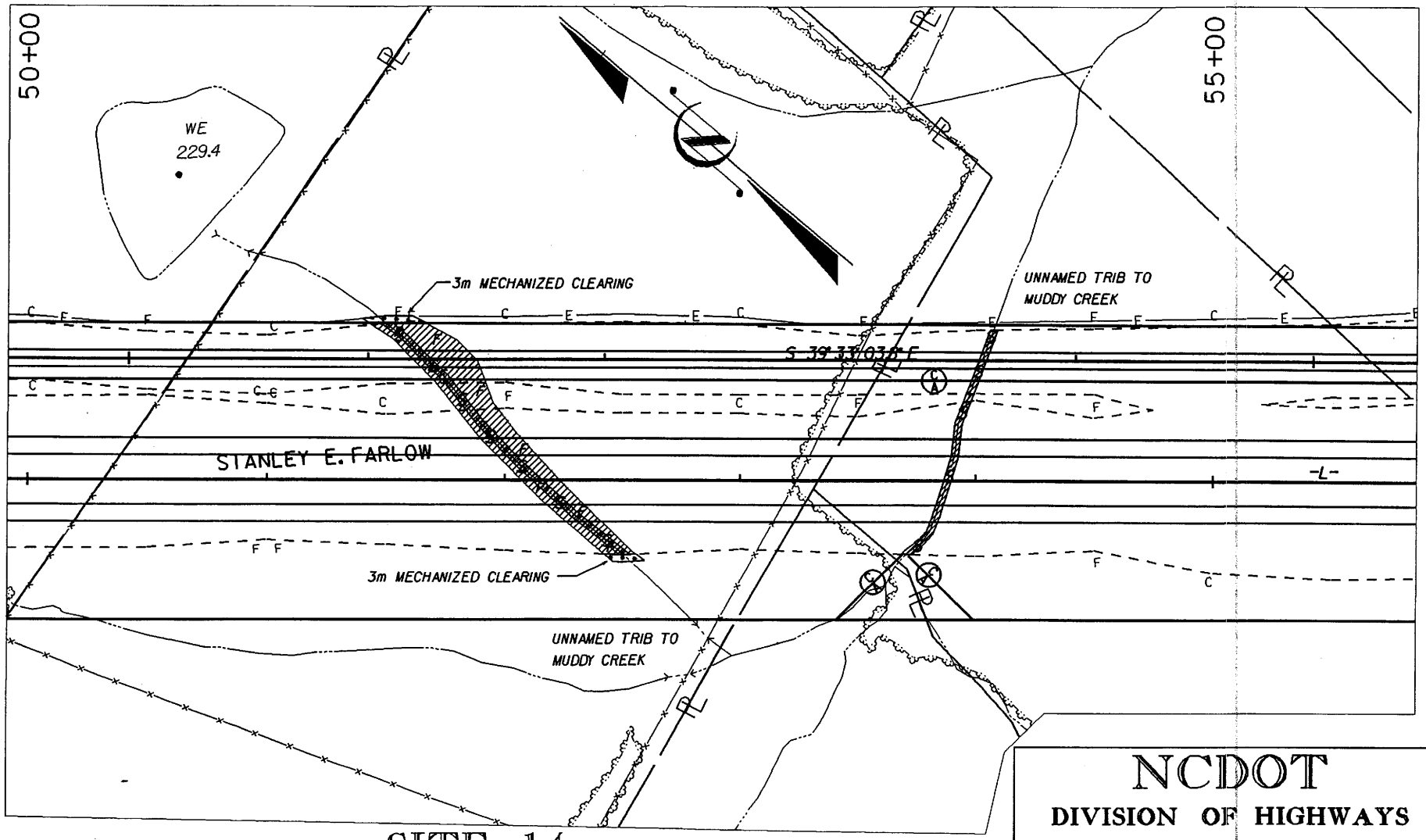
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606)B

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 7 OF 30 AUGUST 9, 2002



SITE 14

PLAN VIEW

DENOTES FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

25m 0 50m

SCALE

NCDOT

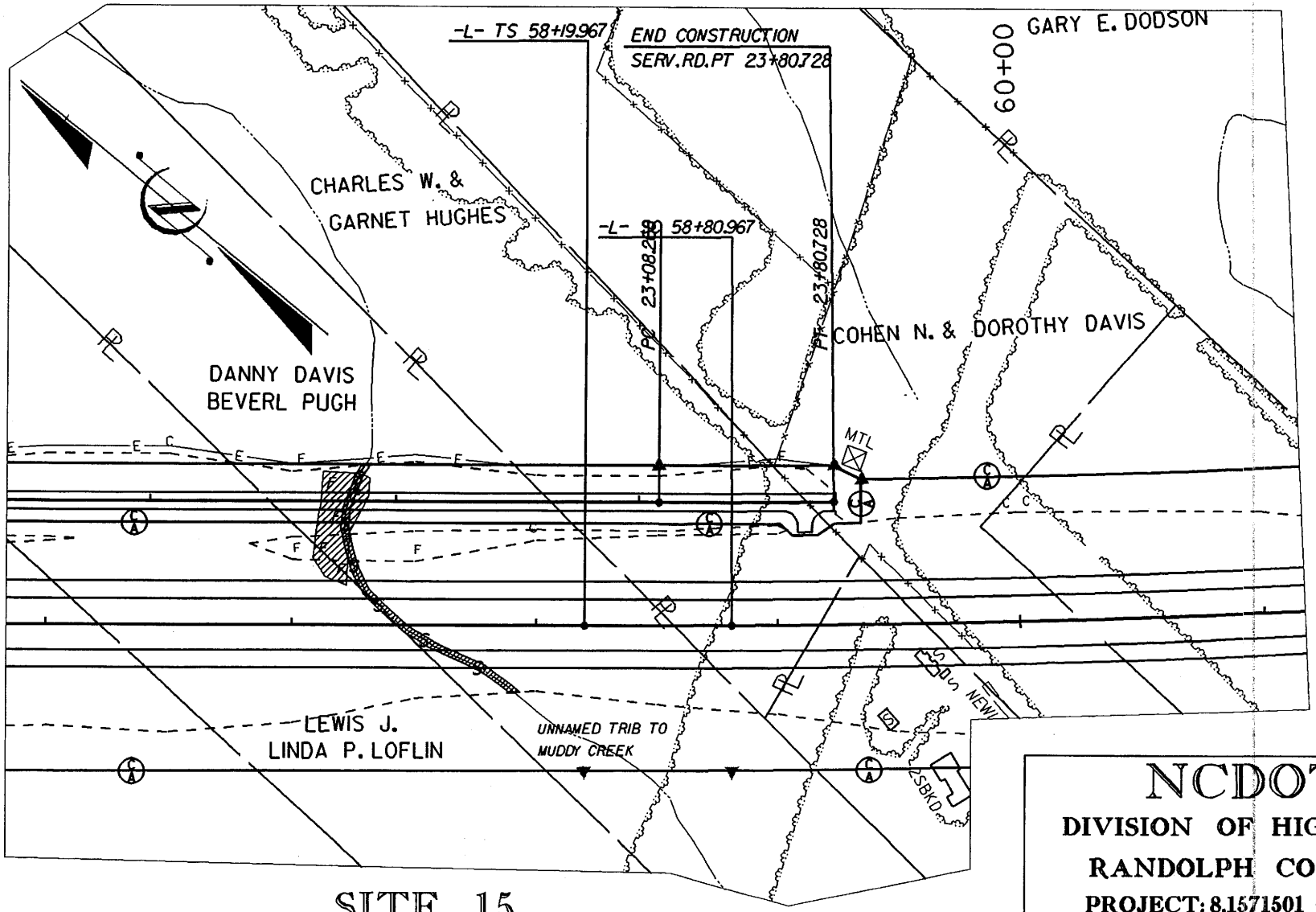
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 8 OF 30 AUGUST 9, 2002



SITE 15
PLAN VIEW

25m 0 50m SCALE

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

NCDOT

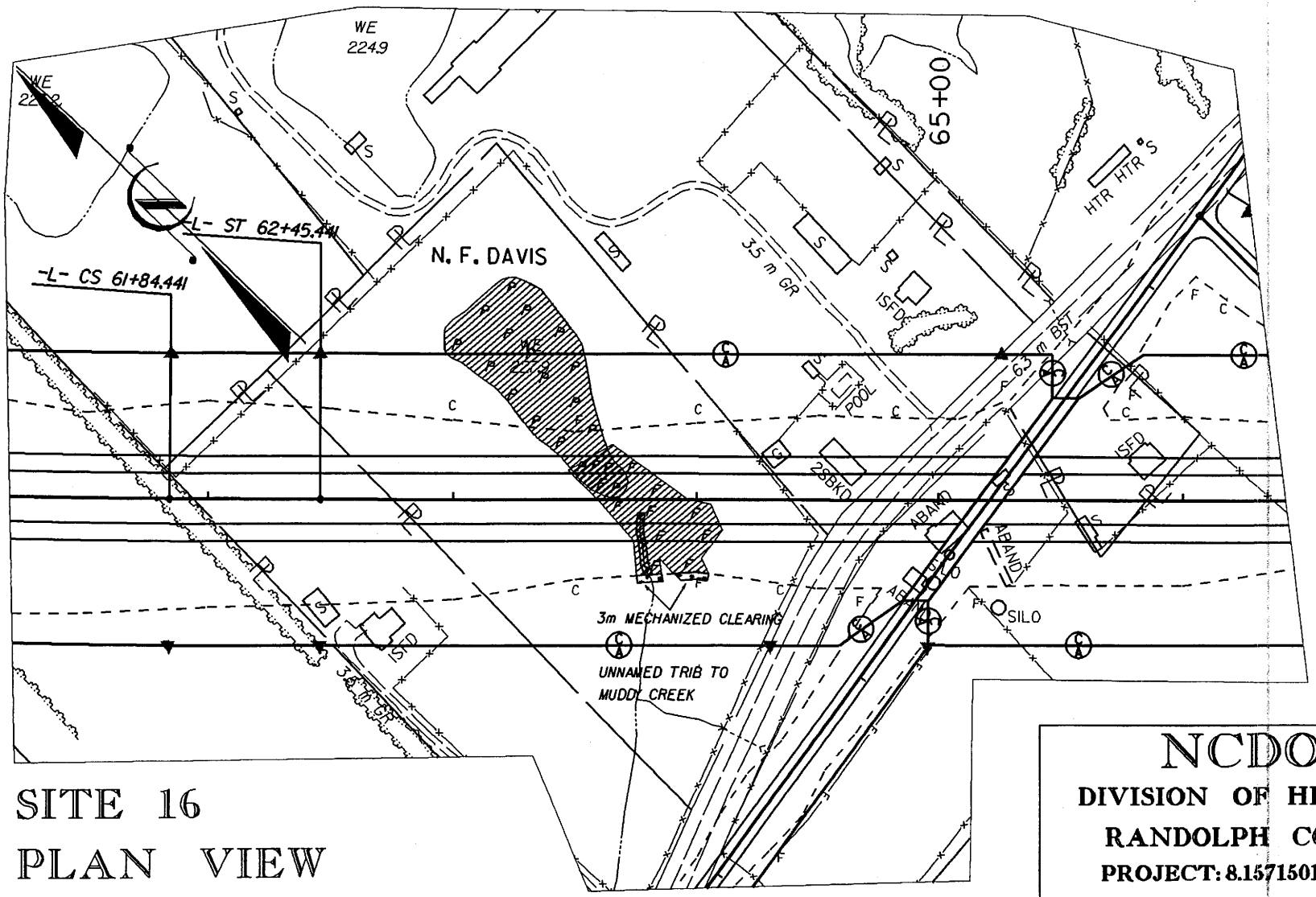
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 9 OF 30 AUGUST 9, 2002



SITE 16
PLAN VIEW

DENOTES MECHANIZED CLEARING

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN SURFACE WATER (POND)

DENOTES FILL IN WETLAND

25m 0 50m

SCALE

NCDOT

DIVISION OF HIGHWAYS

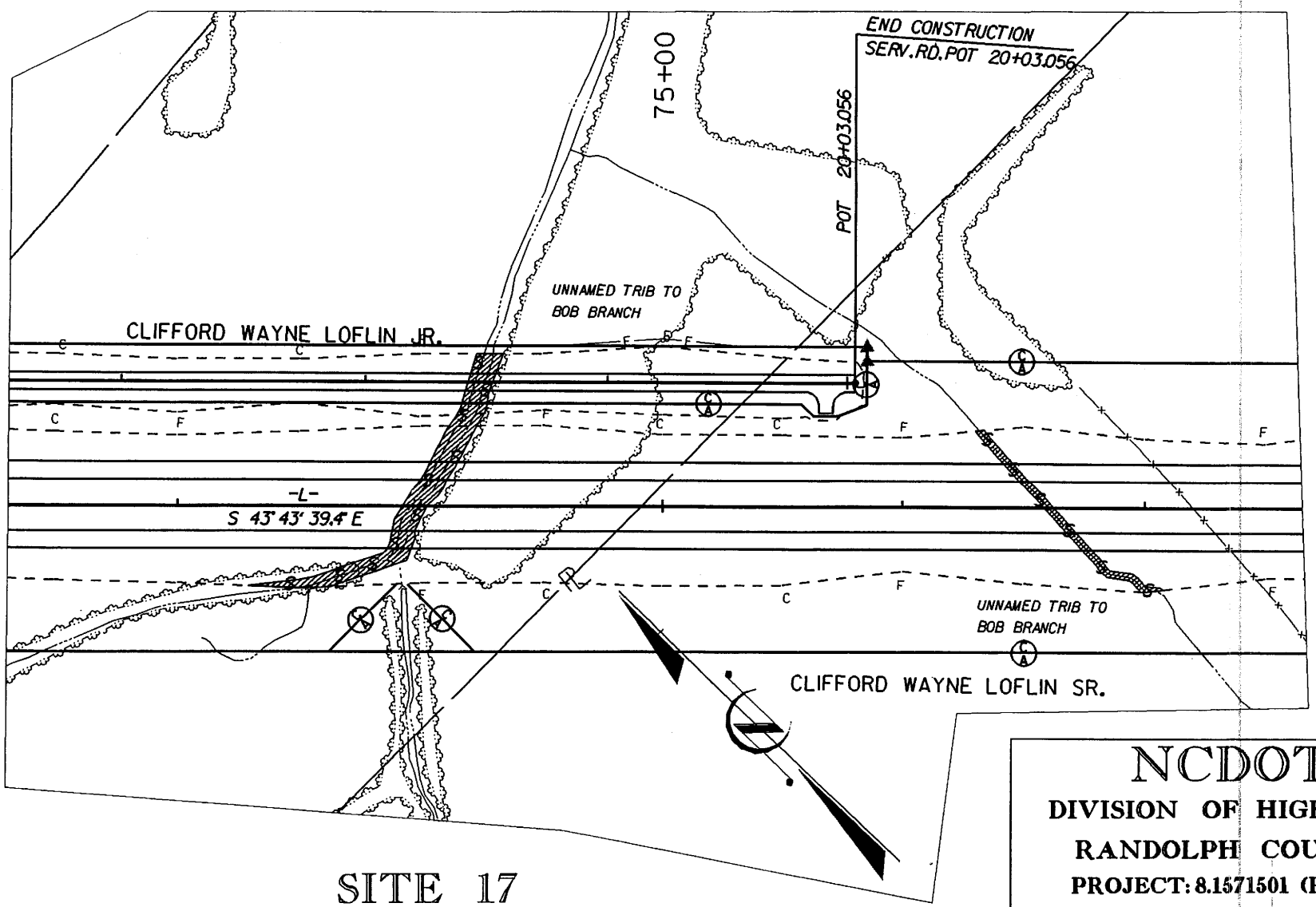
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2001

SHEET 10 OF 30 AUGUST 9, 2002



SITE 17
PLAN VIEW

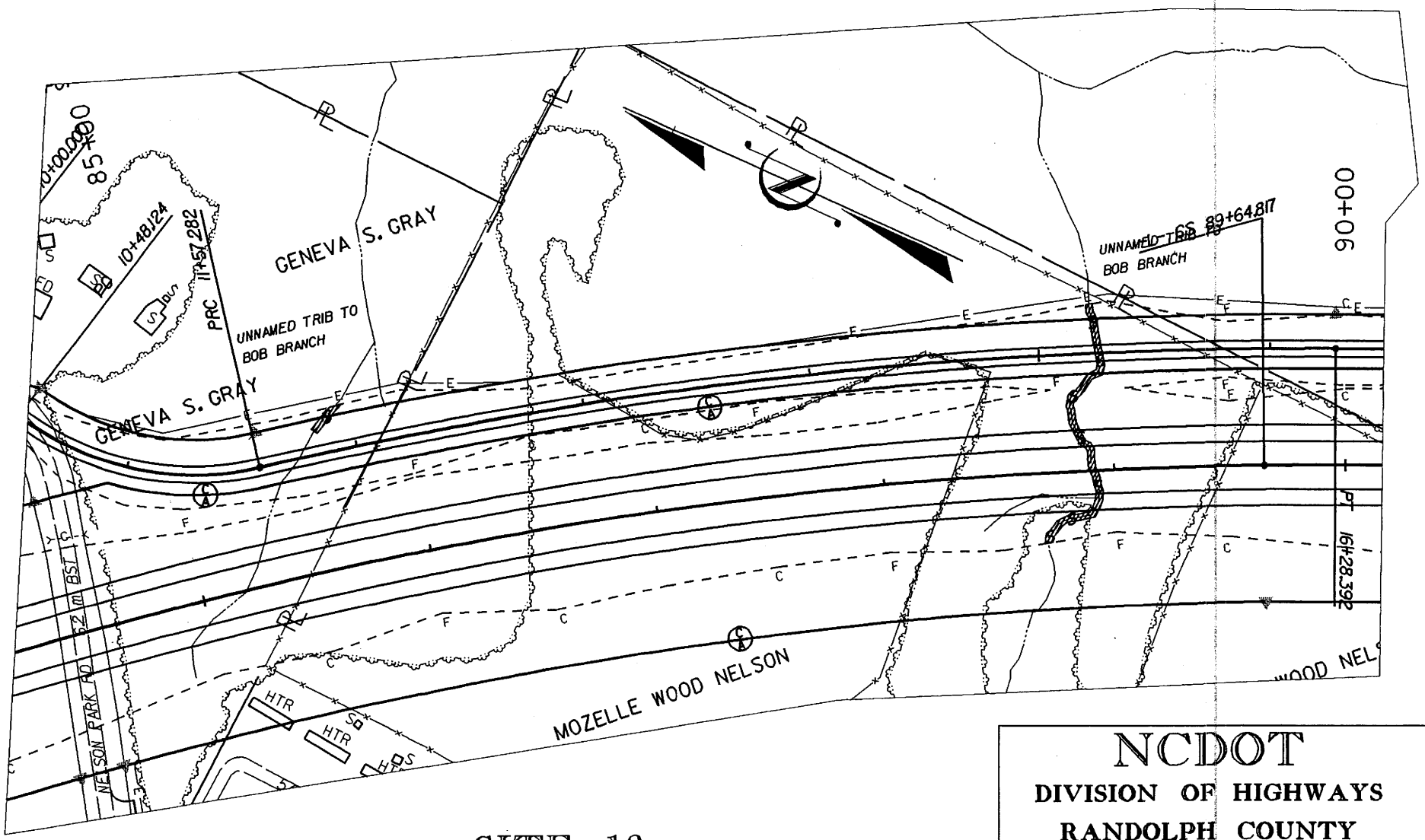
25m 0 50m
SCALE

DENOTES FILL IN SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 11 OF 30 AUGUST 9, 2002



SITE 18
PLAN VIEW

25m 0 50m
SCALE

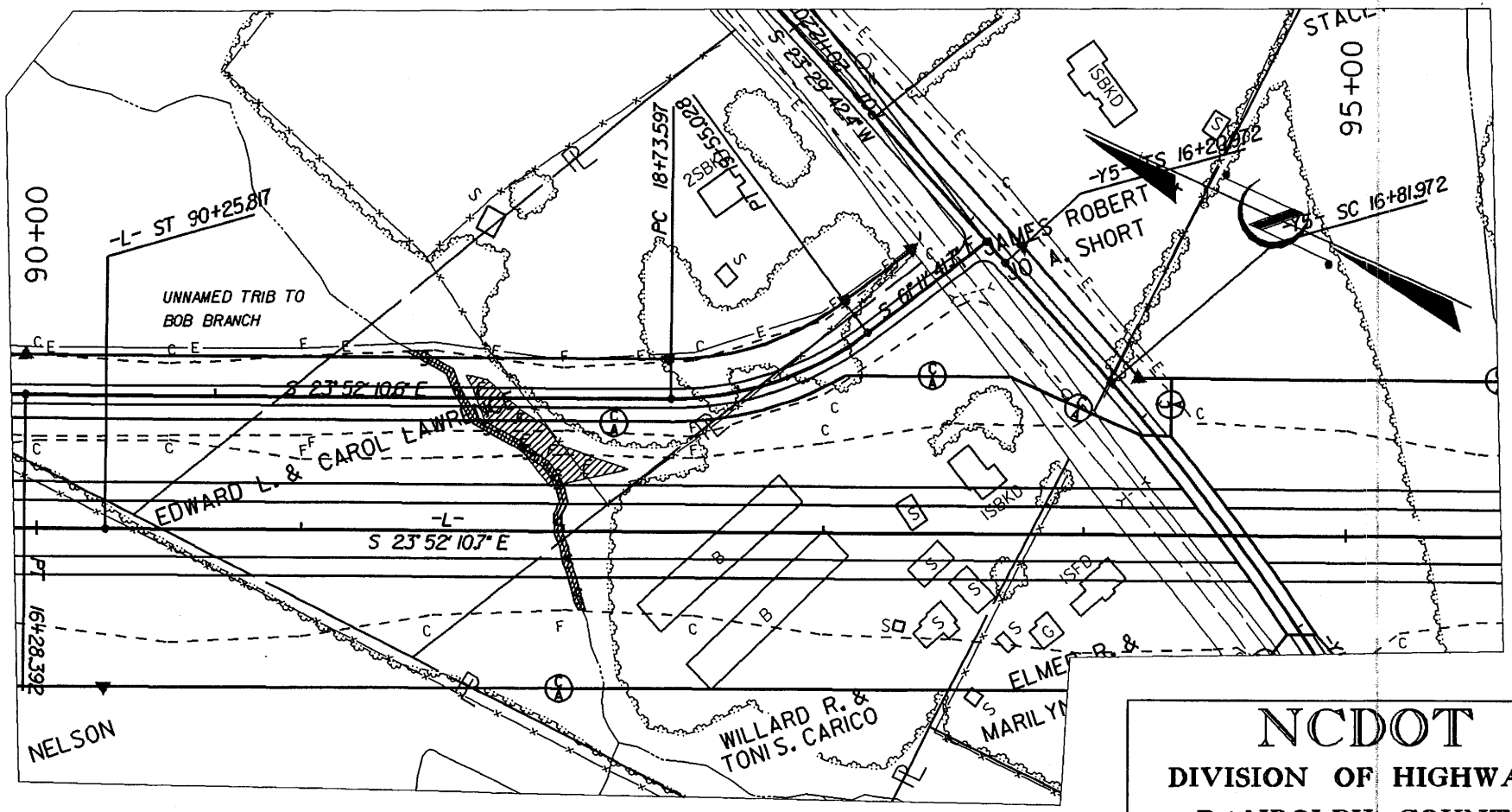
DENOTES FILL IN SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26,2006

SHEET 12 **OF** 30 **AUGUST 9, 2002**



SITE 19
PLAN VIEW

25m 0 50m SCALE

DENOTES FILL IN WETLAND

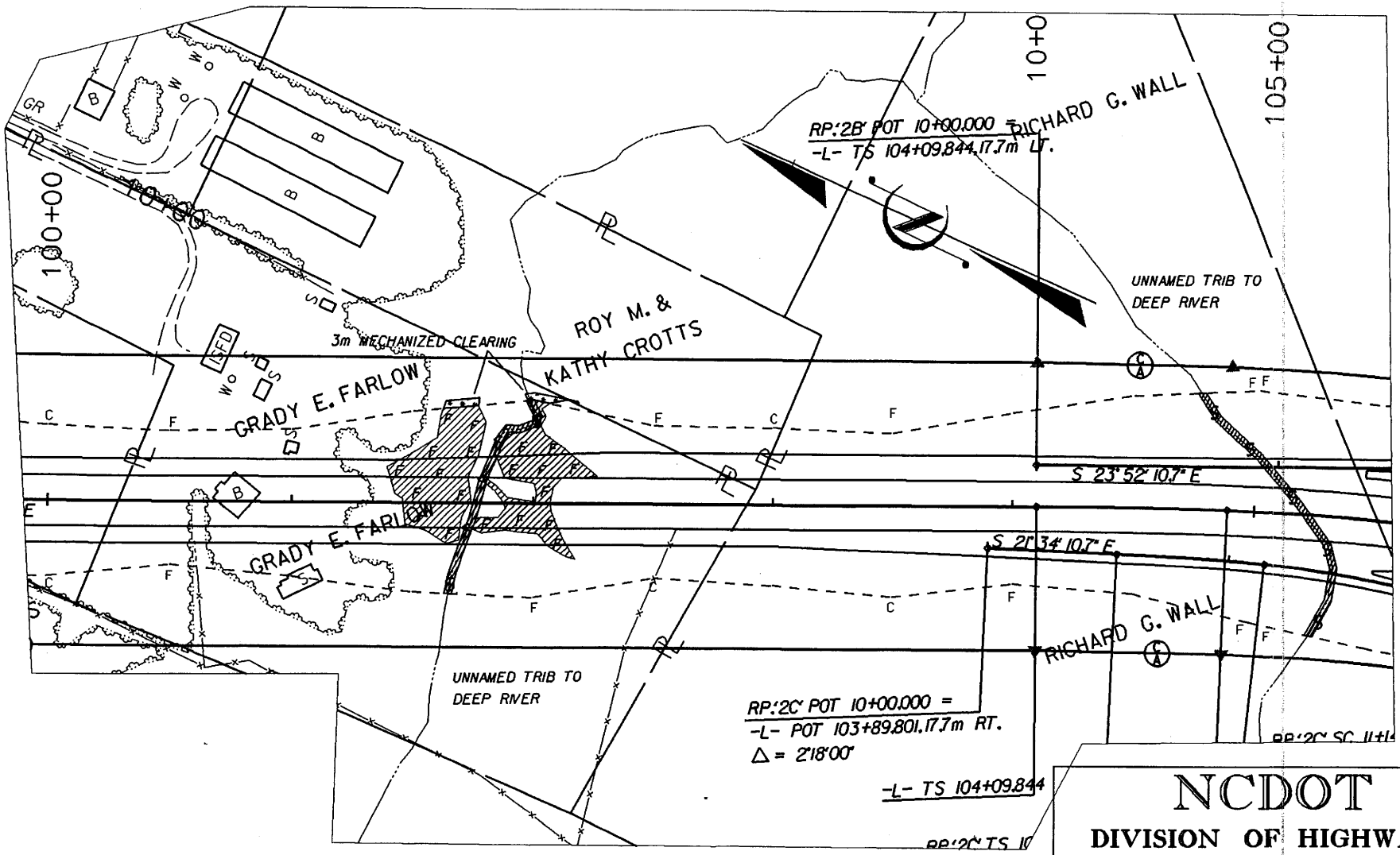
DENOTES FILL IN SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 13 OF 30 AUGUST 9, 2002



SITE 20
PLAN VIEW

DENOTES MECHANIZED CLEARING

25m 0 50m SCALE

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

NCDOT

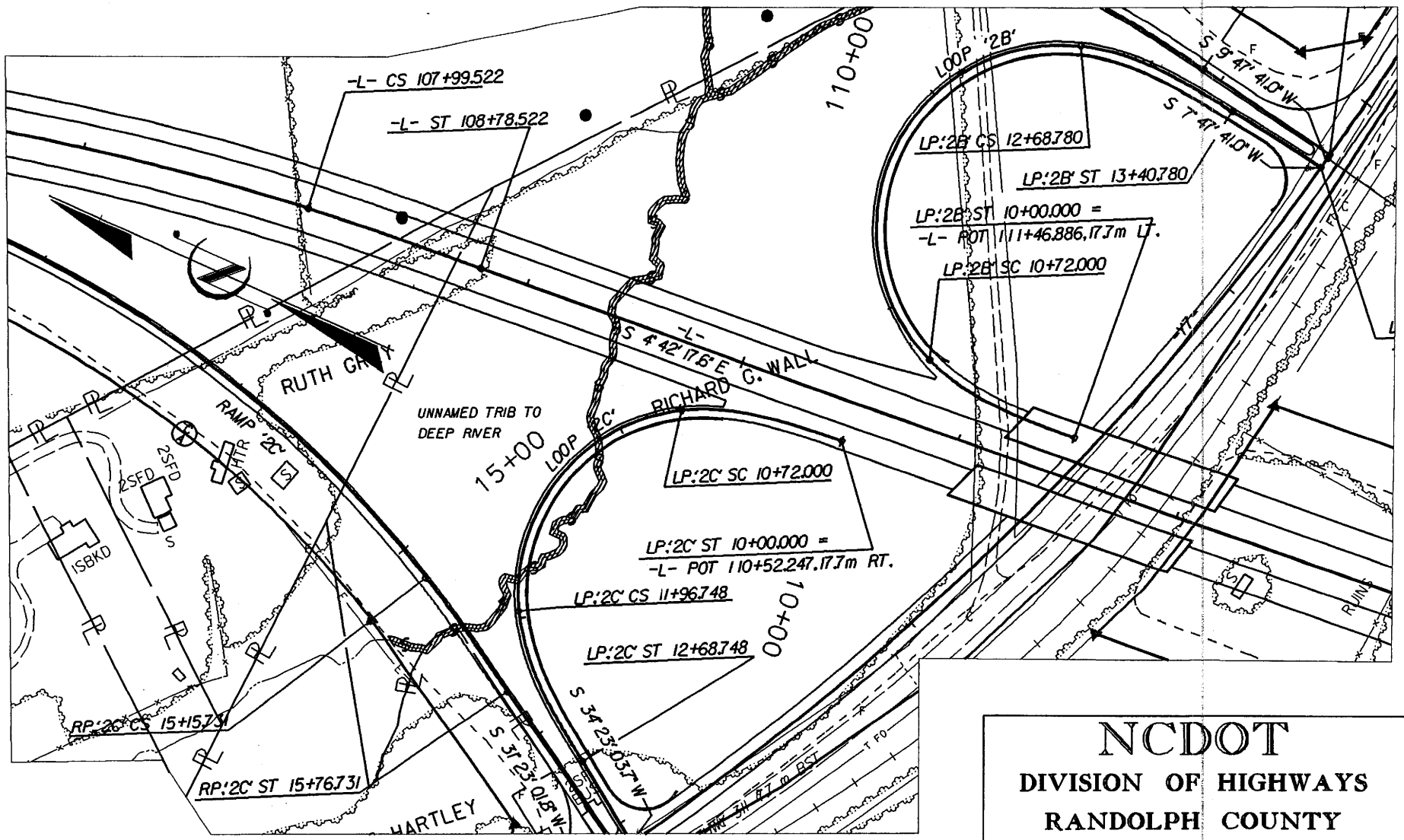
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 11 OF 30 AUGUST 9, 2002



SITE 21

PLAN VIEW

25m 0 50m

SCALE

DENOTES FILL IN SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

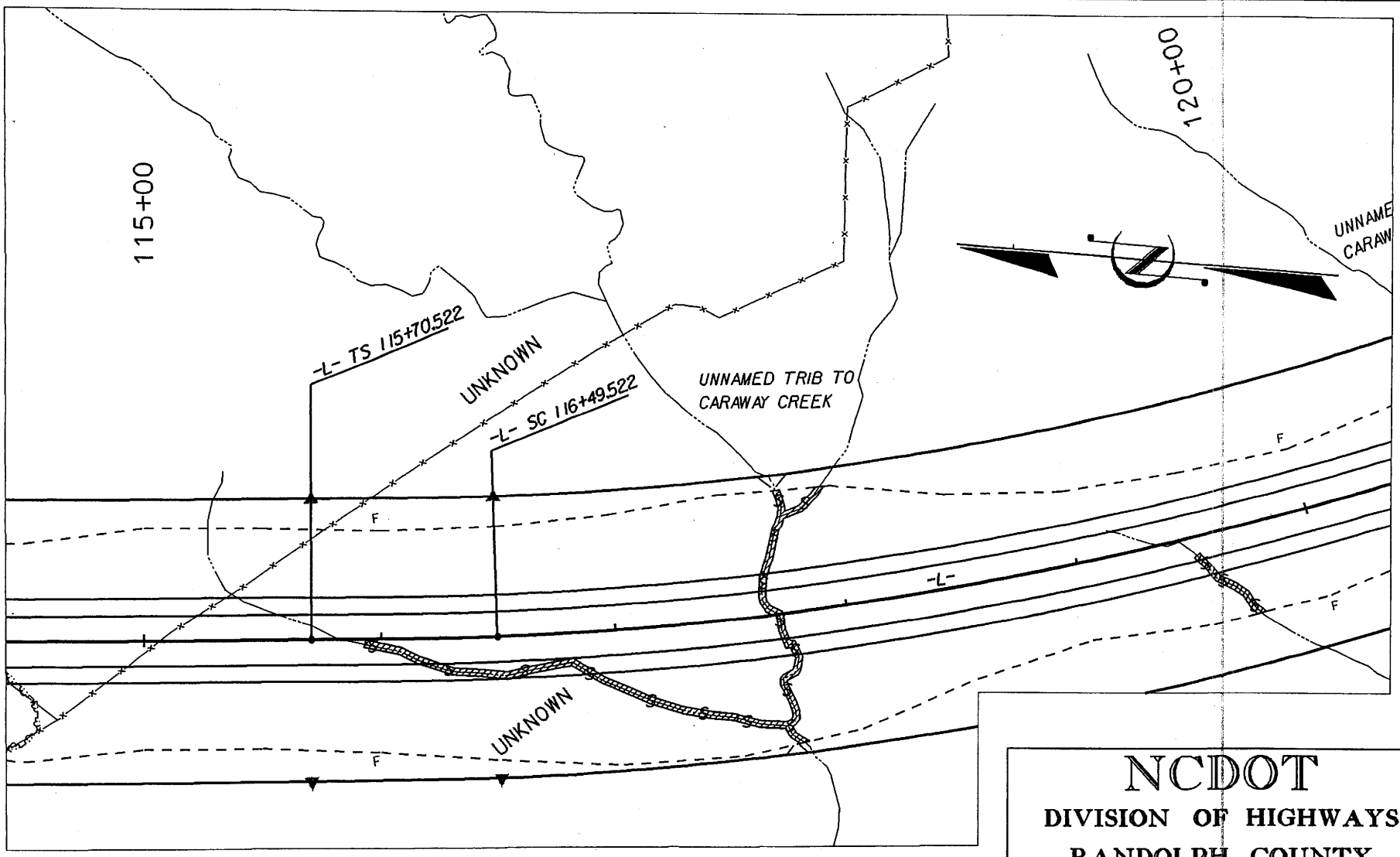
PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 15 OF 30

REVISED APRIL 26, 2005

AUGUST 9, 2002



SITE 23
PLAN VIEW

25m 0 50m SCALE

DENOTES FILL IN SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

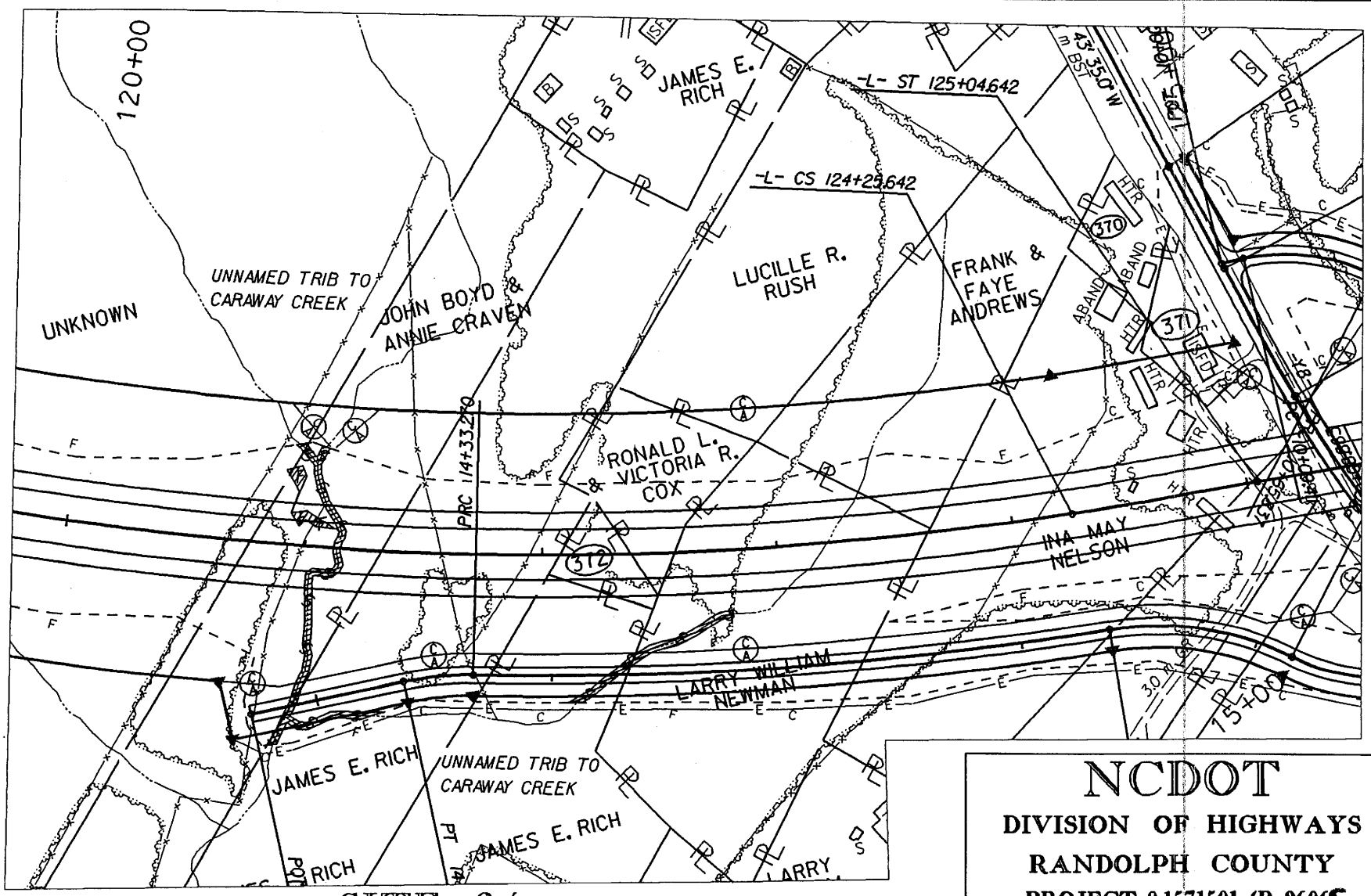
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 24, 2006

SHEET 16 OF 30 AUGUST 9, 2002



SITE 24

PLAN VIEW

25m 0 50m SCALE

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

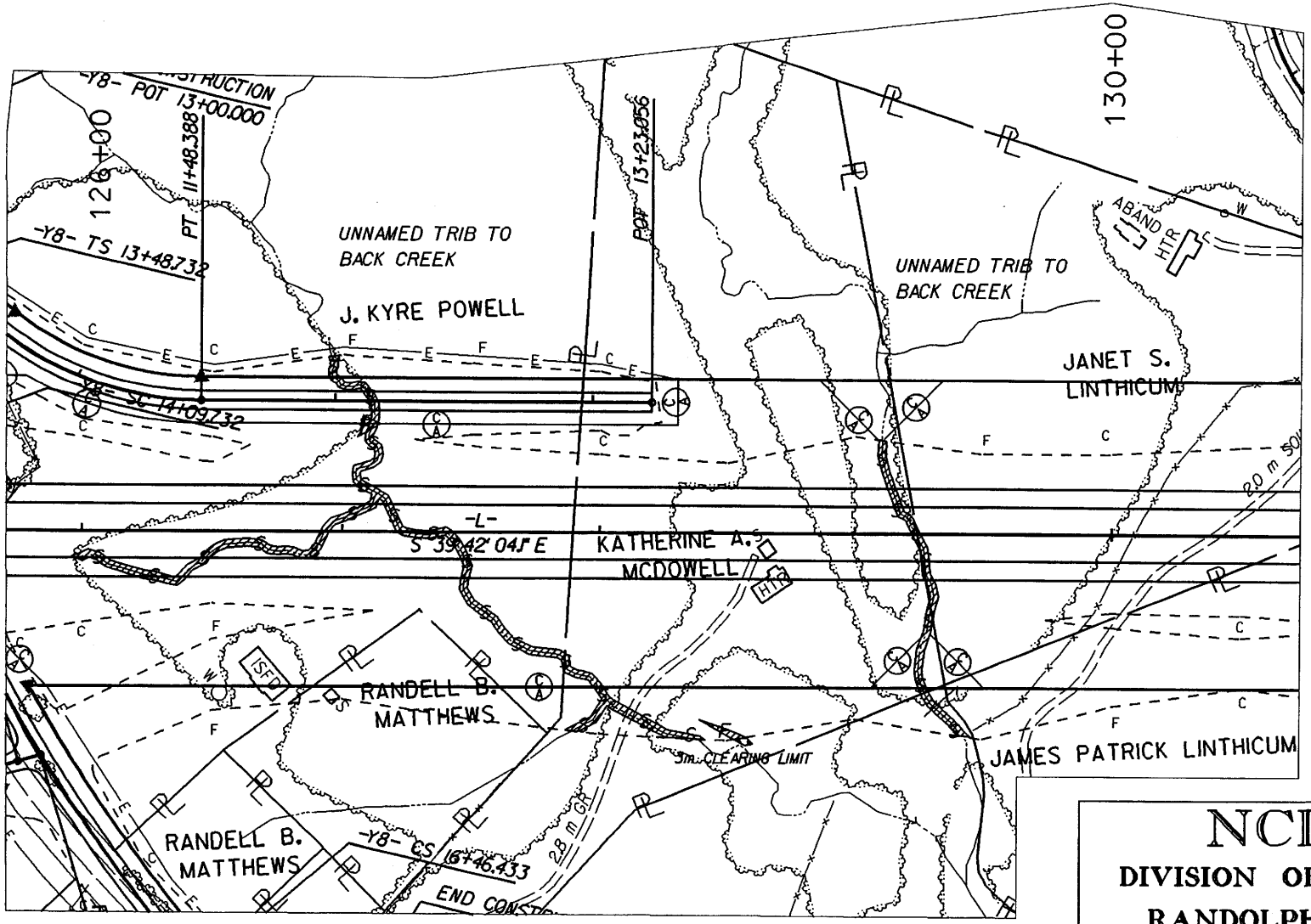
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 17 OF 30 AUGUST 9, 2002



SITE 25

PLAN VIEW

25m 0 50m SCALE

DENOTES FILL IN SURFACE WATER

NCDOT

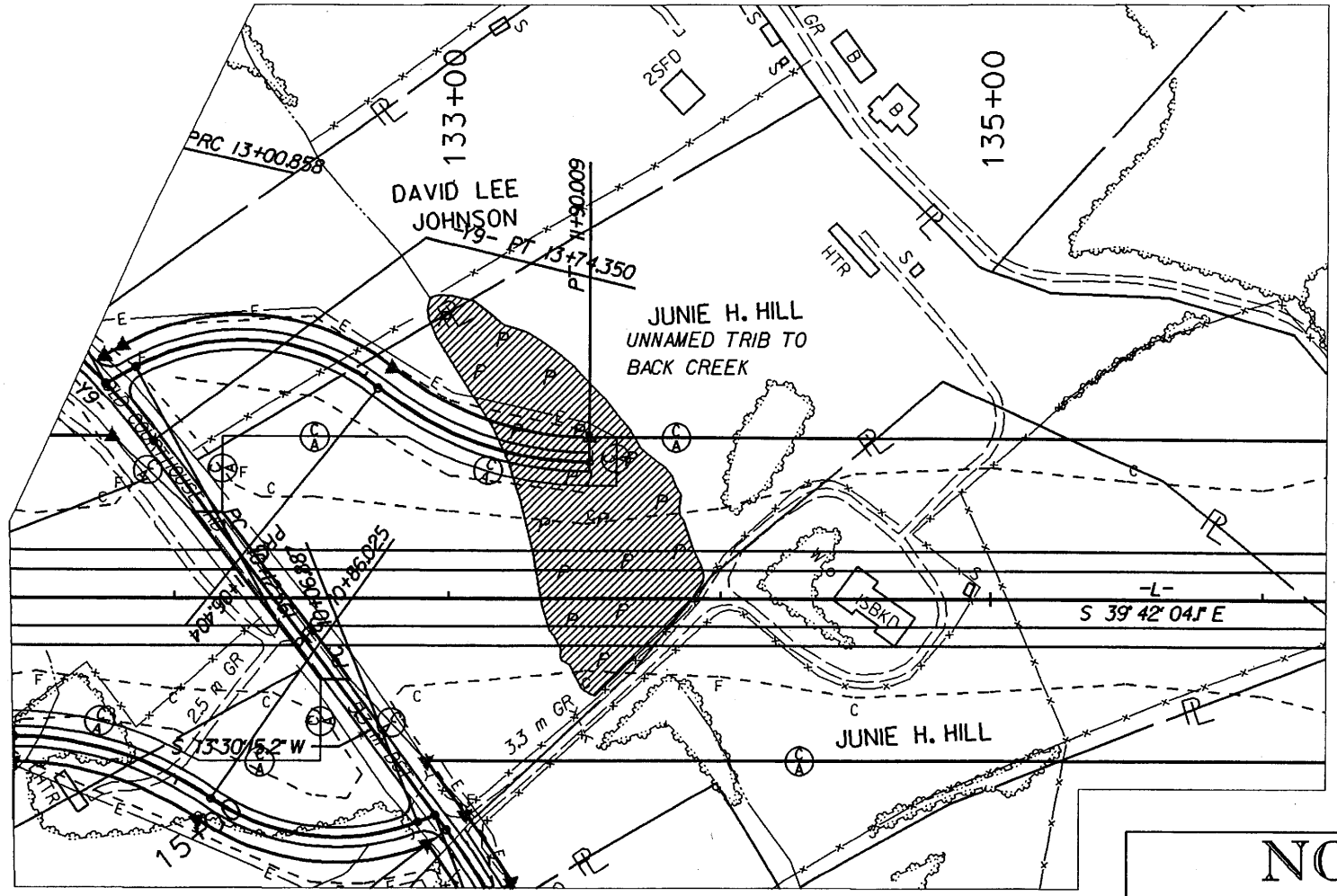
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 18 OF 30 AUGUST 9, 2002



SITE 26
PLAN VIEW

25m 0 50m
SCALE

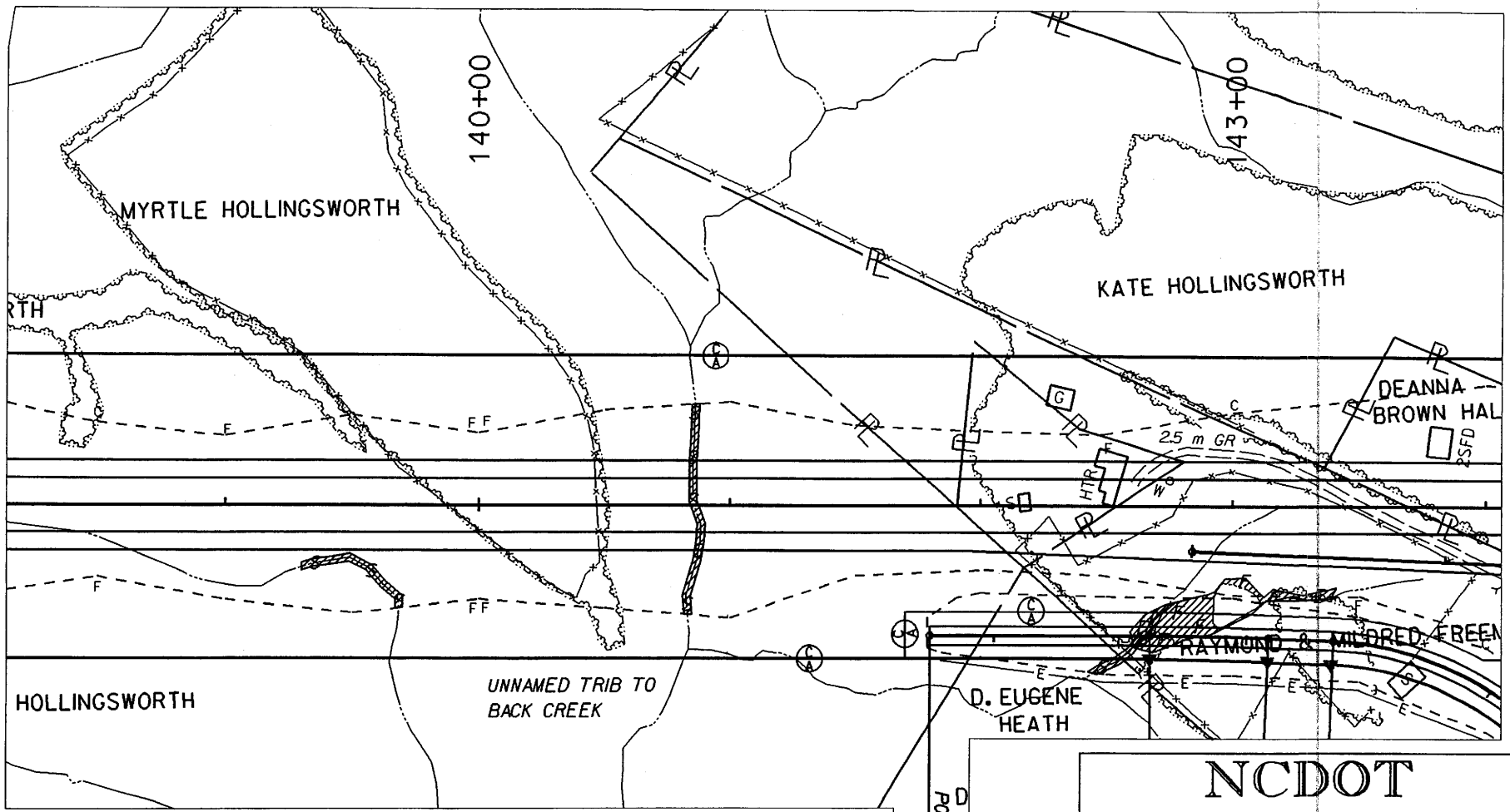
DENOTES FILL IN SURFACE WATER (POND)

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606L)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 19 OF 30 AUGUST 9, 2002



SITE 27
PLAN VIEW

25m 0 50m SCALE

F F DENOTES FILL IN WETLAND

S S DENOTES FILL IN SURFACE WATER

NCDOT

DIVISION OF HIGHWAYS

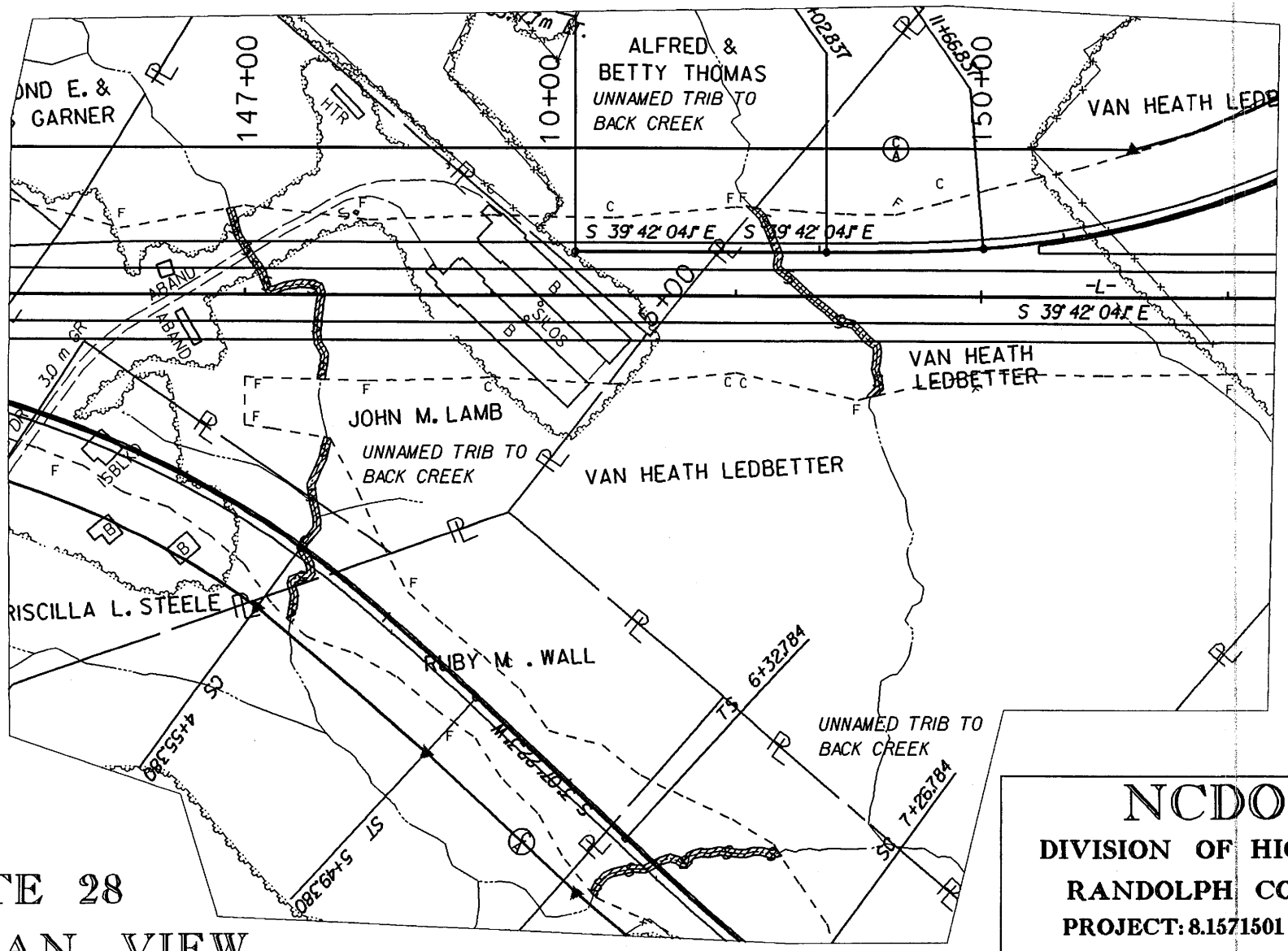
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 20 OF 30

REVISED APRIL 26, 2005
AUGUST 9, 2002



SITE 28
PLAN VIEW

25m 0 50m
SCALE

DENOTES FILL IN SURFACE WATER

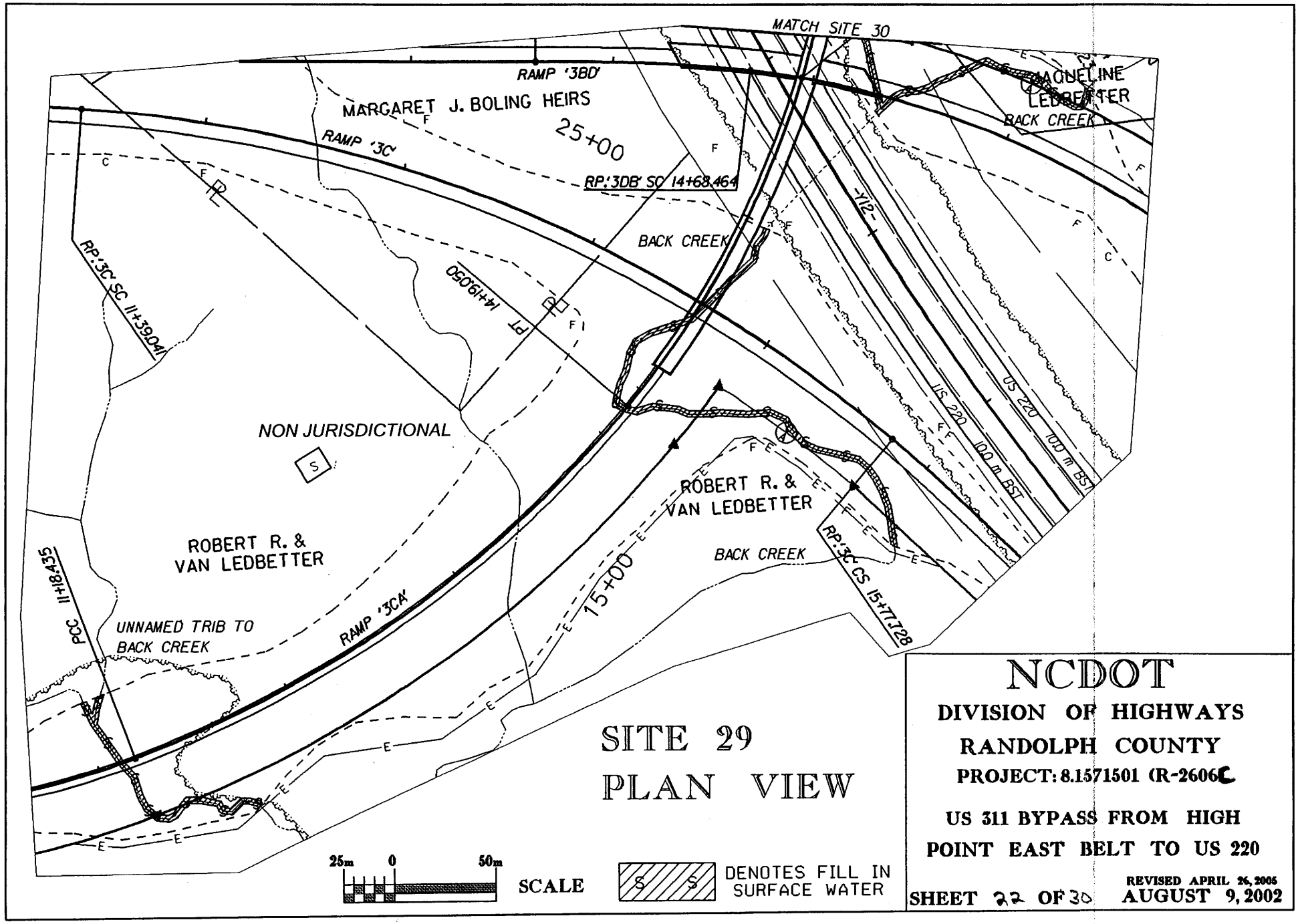
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 21 OF 30

REVISED APRIL 26, 2005
AUGUST 9, 2002



NCDOT

DIVISION OF HIGHWAYS

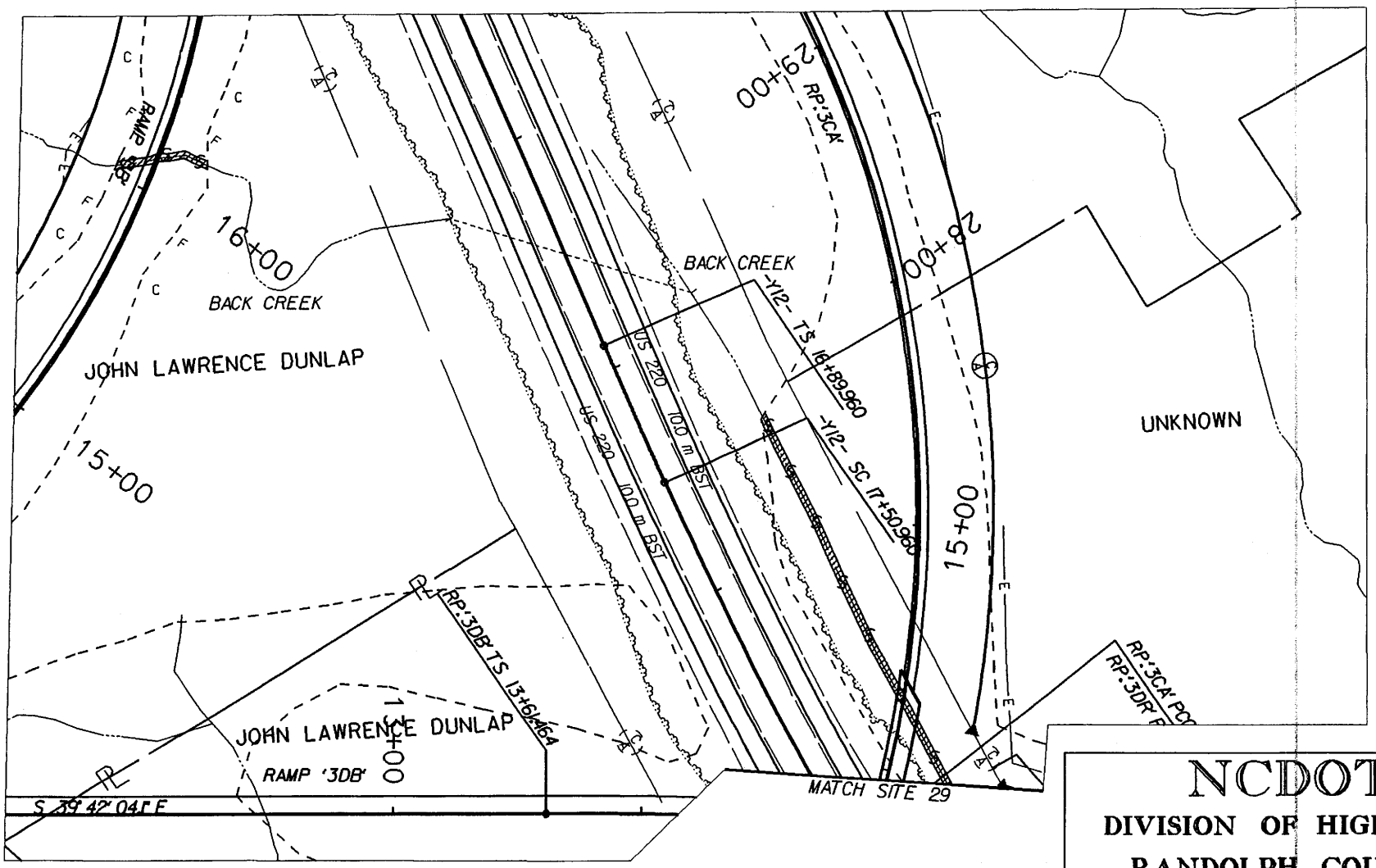
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606C)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 22 OF 30

REVISED APRIL 26, 2005
AUGUST 9, 2002



SITE 30
PLAN VIEW

25m 0 50m SCALE

DENOTES FILL IN SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606E

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 23 OF 30 AUGUST 9, 2002

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
13	47+80 - 48+90 -L-							0.4095			
	48+00 - 49+70 -L-		0.1245			0.0039	0.0667			225	
14	51+50 - 52+60 -L-		0.1825			0.0170	0.0423			142	
	53+90 -L-						0.0314			103	
15	57+07 - 53+30 L-		0.0691								
	57+50 -L-						0.0390			131	
16	63+00 - 63+70 -L-							0.3049			
	63+50 - 64+10 -L-		0.1697			0.0070					
	63+80 -L-						0.0070			23	
17	74+00 -L-						0.1162			143	
	76+60 -L-						0.0301			105	
18	84+80 -L-						0.0042			15	
	88+90 -L-						0.0385			127	
19	92+00 -L-						0.0385			128	
	91+60 - 92+24 -L-		0.0720								
20	101+75 -L-						0.0289			96	
	105+20 -L-						0.0368			123	
	101+40 - 102+30 -L-		0.2541			0.0086					
21	109+40 -L-						0.1400			470	
TOTALS:			0.872	0	0	0.037	0.620	0.714	0	1831	0

Form Revised 3/22/01

NCDOT

DIVISION OF HIGHWAYS
RANDLOPH COUNTY
PROJECT 8.1571501 (R-2606B

US 311BYPASS FROM HIGH
POINT EAST BELT TO US 220

Revised 4/26/05
8/9/2002

SHEET 21 OF 30

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS				SURFACE WATER IMPACTS				
			Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation In Wetlands (ha)	Mechanized Clearing (Method III) (ha)	Fill In SW (Natural) (ha)	Fill In SW (Pond) (ha)	Temp. Fill In SW (ha)	Existing Channel Impacted (m)	Natural Stream Design (m)
23	117+70 -L-						0.0432			132	
	119+50 -L-						0.0112			37	
	115+95 - 117+70 -L-						0.0565			188	
24	120+90 - 121+10 -L-		0.0111								
	121+15 -L-						0.0570			192	
	122+10 - 122+80 -L-						0.0235			78	
25	127+00 -L-						0.1207			395	
	128+40 - 128+60 -L-		0.0026								
	129+00 -L-						0.0383			130	
26	133+00 - 133+90 -L-							0.6626			
27	139+30 - 139+70 -L-						0.0145			50	
	140+85 -L-						0.0255			85	
	142+50 -L-						0.0123			41	
	142+60 - 143+40 -L-		0.0850								
28	147+30 -L-						0.0286			104	
	4+55 RP						0.0248			84	
	6+50 RP						0.0256			87	
	149+30 -L-						0.0307			128	
29	11+10 RP						0.0416			130	
	14+20 RP						0.0897			300	
	15+30 RP -'3DB'-						0.0472			167	
30	MATCH SHEET '3CA'						0.0505			168	
	MATCH SHEET '3CA'						0.0114			39	
TOTALS:			0.099	0	0	0.000	0.753	0.663	0	2535	0

Form Revised 3/22/01

NCDOT

DIVISION OF HIGHWAYS
RANDLOPH COUNTY
PROJECT 8.1571501 (R-2606C

US 311BYPASS FROM HIGH POINT EAST BELT TO US 220

Revised 4/26/05
8/9/2002

SHEET 25 OF 30

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS				SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
13	47+80 - 48+90 -L-							1.0119			
	48+00 - 49+70 -L-		0.3076			0.0096	0.1648			738	
14	51+50 - 52+60 -L-		0.4510			0.0420	0.1045			466	
	53+90 -L-						0.0776			338	
15	57+07 - 53+30 L-		0.1707								
	57+50 -L-						0.0964			430	
16	63+00 - 63+70 -L-							0.7534			
	63+50 - 64+10 -L-		0.4193			0.0173					
	63+80 -L-						0.0173			75	
17	74+00 -L-						0.2871			469	
	76+60 -L-						0.0744			344	
18	84+80 -L-						0.0104			49	
	88+90 -L-						0.0951			417	
19	92+00 -L-						0.0951			420	
	91+60 - 92+24 -L-		0.1779								
20	101+75 -L-						0.0714			315	
	105+20 -L-						0.0909			404	
	101+40 - 102+30 -L-		0.6279			0.0213					
21	109+40 -L-						0.3459			1542	
TOTALS:			2.155	0	0	0.090	1.531	1.765	0	6007	0

NCDOT

DIVISION OF HIGHWAYS
RANDLOPH COUNTY
PROJECT 8.1571501 (R-2606)C

US 311BYPASS FROM HIGH
POINT EAST BELT TO US 220

Revised 4/26/05
8/9/2002

SHEET 26 OF 30

Form Revised 3/22/01

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing (Method III) (ac)	SURFACE WATER IMPACTS: Fill In SW (Natural) (ac)	Fill In SW (Pond) (ac)	Temp. Fill In SW (ac)	Existing Channel Impacted (ft)	Natural Stream Design (ft)
23	117+70 -L-						0.1067			433	
	119+50 -L-						0.0277			121	
	115+95 - 117+70 -L-						0.1396			617	
24	120+90 - 121+10 -L-		0.0274								
	121+15 -L-						0.1408			630	
	122+10 - 122+80 -L-						0.0581			256	
25	127+00 -L-						0.2983			1296	
	128+40 - 128+60 -L-		0.0064								
	129+00 -L-						0.0946			427	
26	133+00 - 133+90 -L-							1.6373			
27	139+30 - 139+70 -L-						0.0000			0	
	140+85 -L-						0.0358			164	
	142+50 -L-						0.0304			135	
	142+60 - 143+40 -L-		0.2100								
28	147+30 -L-						0.0707			0	
	4+55 RP						0.0613			341	
	6+50 RP						0.0633			276	
	149+30 -L-						0.0759			285	
29	11+10 RP						0.1028			427	
	14+20 RP						0.2217			984	
	15+30 RP -'3DB'-						0.1166			548	
30	MATCH SHEET '3CA'						0.1248			551	
	MATCH SHEET '3CA'						0.0283			128	
TOTALS:			0.244	0	0	0.00	1.797	1.637	0	7618	0

No mitigation

NCDOT

DIVISION OF HIGHWAYS
RANDLOPH COUNTY
PROJECT 8.1571501 (R-2606C

US 311BYPASS FROM HIGH
POINT EAST BELT TO US 220

Revised 4/26/05
8/9/2002

SHEET 27 OF 30

Form Revised 3/22/01

Site No.	Property Owner Name	Property Owner Address
13	Clyde R. & Randall Spencer	N/A
14	Stanley E. Farlow	N/A
15	Danny Davis & Beverly Pugh	N/A
	Lewis J. & Linda P. Loflin	N/A
16	N. F. Davis	2709 Banner Withehead Rd., Sophia, NC 27350
17	Clifford Wayne Loflin, Jr.	2410 Loflin Dairy Rd., Sophia, NC 27350
	Clifford Wayne Loflin, Sr.	2410 Loflin Dairy Rd., Sophia, NC 27350
18	Geneva S. Gray	6590 US Hwy 311, Sophia, NC 27350
	Mozelle Wood Nelson	4570 Nelson Park Rd., Sophia, NC 27350
19	Edward L. & Carol Lawrence	4875 Branson Davis Rd., Sophia, NC 27350
	Willard R. & Toni S. Carico	4833 Branson Davis Rd., Sophia, NC 27350
20	Grady E. Farlow	5080 Walker Mill Rd., Sophia, NC 27350
21	Richard G. Wall	N/A
22	Richard G. Wall	N/A

List of Property Owners

NC Dept. of Transportation
Division of Highways
Randolph County
Project:8.1571501 (R-2606)

US 311 Bypass From High Point East Belt to US 220

Sheet 29 of 30 08/09/02

Site No.	Property Owner Name	Property Owner Address
23		
24	John Boyd & Annie Craven	4025 Old Way Rd., Sophia, NC 27350
	~~James E. Rich~~	~~1630 Tower View Ln., Sophia, NC 27350~~
	Ronald L. & Victoria Cox	2601 Pinecroft Rd., Greensboro, NC 27407
	Larry William Newman	4609 Plainfield Rd., Sophia, NC 27350
	Frank & Faye Andrews	1111 Mackie Ave, Asheboro, NC 27203
25	J. Kyre Powell	N/A
	Katherine A. McDowell	4534 Plainfield Rd., Sophia, NC 27350
	Janet S. Linthicum	102 Brittany Lane, Randleman, NC 27317
	James Patrick Linthicum	3779 Old Courthouse Rd., Sophia, NC 27350
26	David Lee Johnson	3739 Old Courthouse Rd., Sophia, NC 27350
	Junie H. Hill	3754 Old Courthouse Rd., Sophia, NC 27350
27	Myrtle Hollingsworth	N/A
	D. Eugene Heath	1350 Turner Dairy Rd., Randleman, NC 27317
	Raymond & Mildred Freeman	3833 Heath Dairy Rd., Randleman, NC 27317

List of Property Owners

NC Dept. of Transportation
Division of Highways
Randolph County
Project:8.1571501 (R-2606)

US 311 Bypass From High Point East Belt to US 220

Sheet 29 of 30 08/09/02

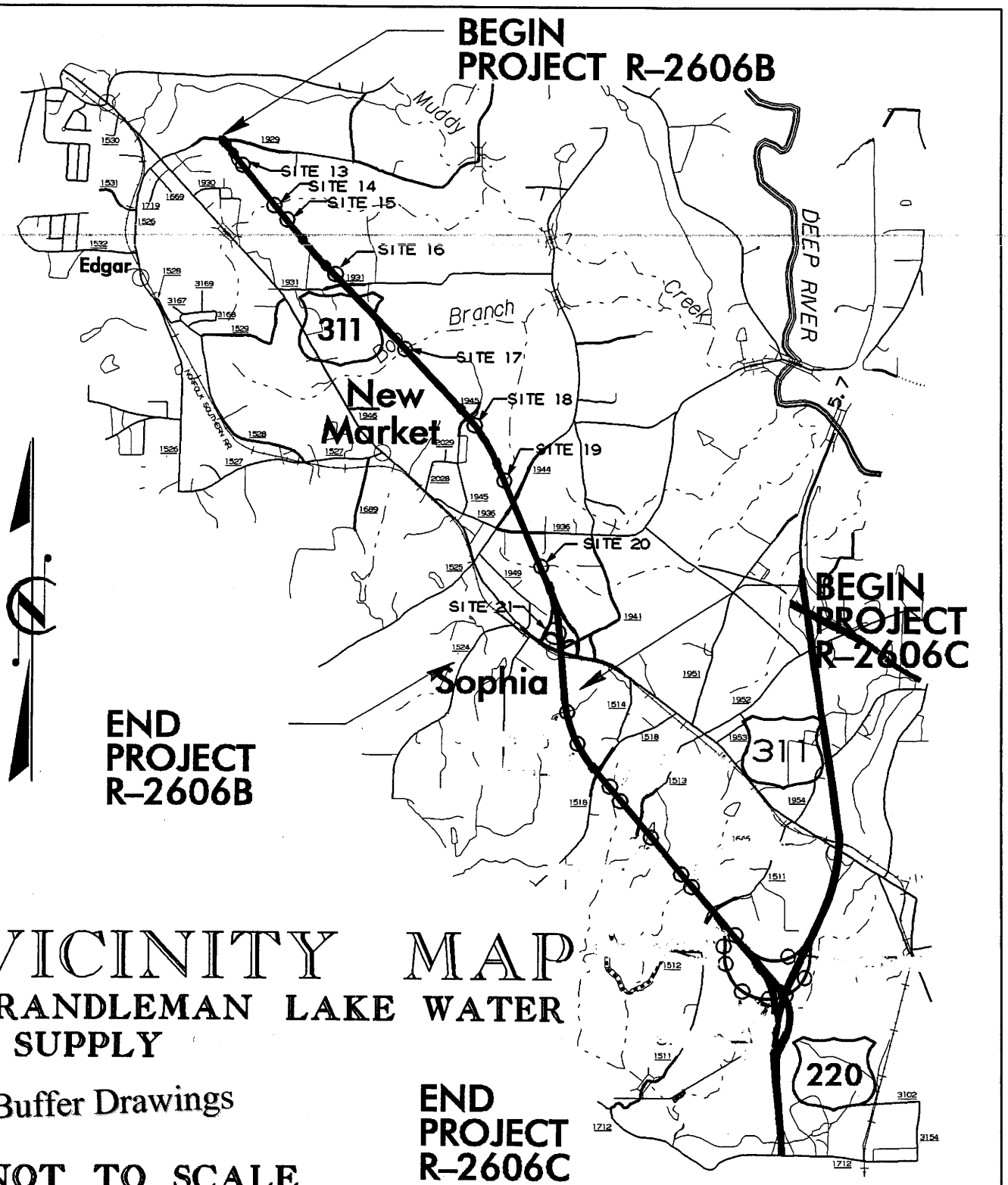
Site No.	Property Owner Name	Property Owner Address
28	John M. Lamb	849 Steele Lamb Dr., Randleman, NC 27317
	Ruby M. Wall	3757 Heath Dairy Rd., Randleman, NC 27317
	Van Heath Ledbetter	3221 Heath Dairy Rd., Randleman, NC 27317
	Alfred & Betty Thomas	3568 Dairy Breeze Dr., Randleman, NC 27317
29	Robert R. & Van Ledbetter	3337 Heath Dairy Rd., Randleman, NC 27317
	Jaqueline Ledbetter	5101 Hoover Hill Rd., Trinity, NC 27370
30	John Lawrence Dunlap	3800 Stanley Snow Camp Rd., Staley, NC 27355

List of Property Owners

NC Dept. of Transportation
Division of Highways
Davidson County
Project:8.1571501 (R-2606)

US 311 Bypass From High Point East Belt to US 220

Sheet 30 of 30 08/09/02



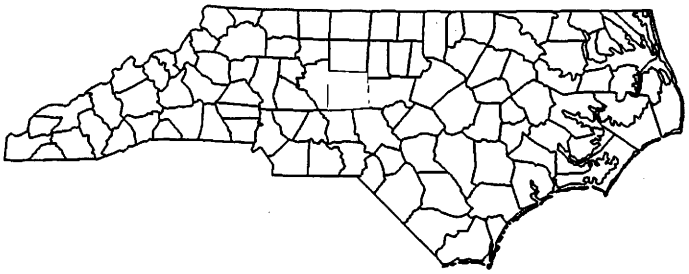
VICINITY MAP

RANDLEMAN LAKE WATER SUPPLY

Buffer Drawings

NOT TO SCALE

NORTH CAROLINA



NCDOT

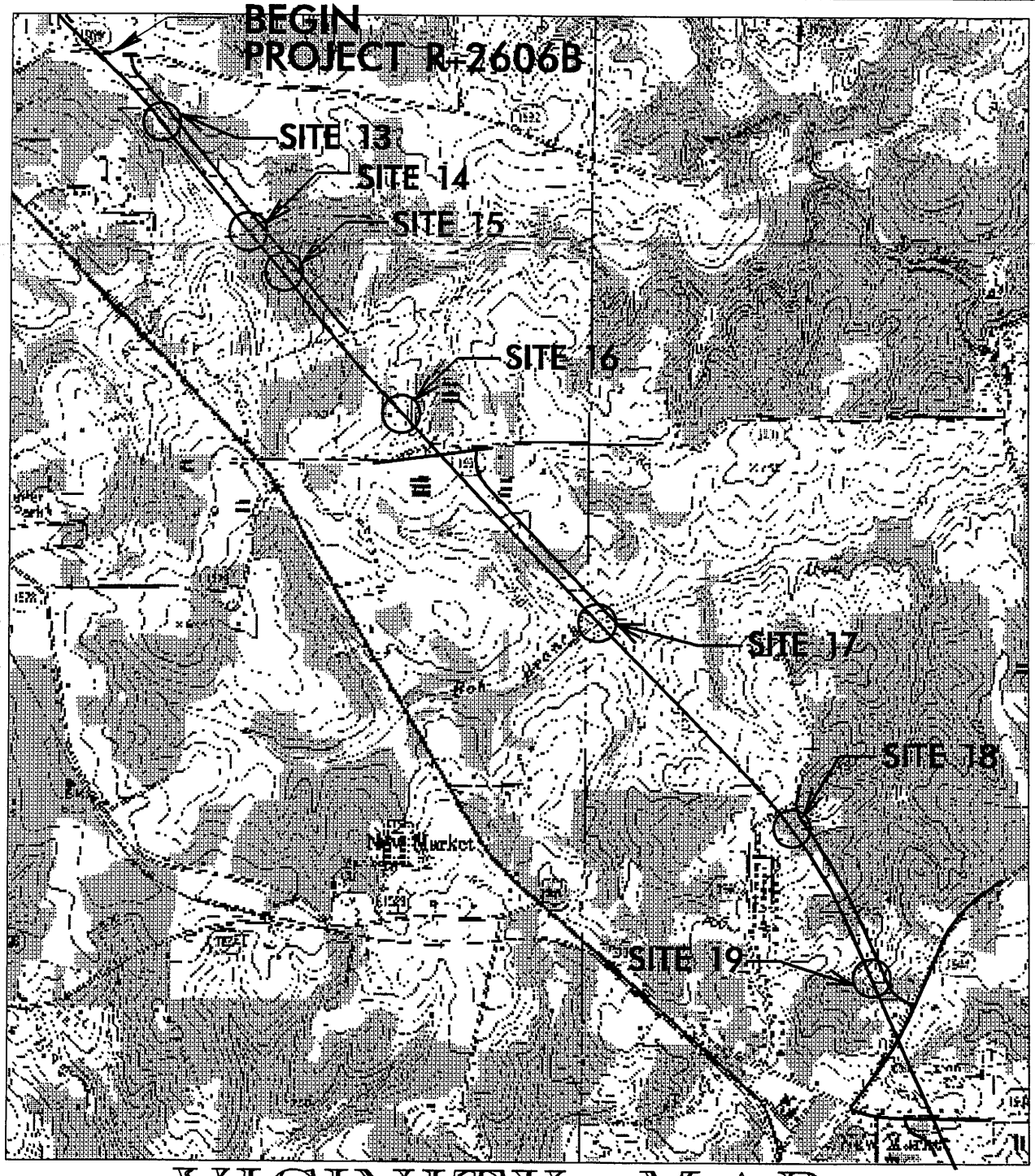
DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 1 OF 16 AUGUST 9, 2002

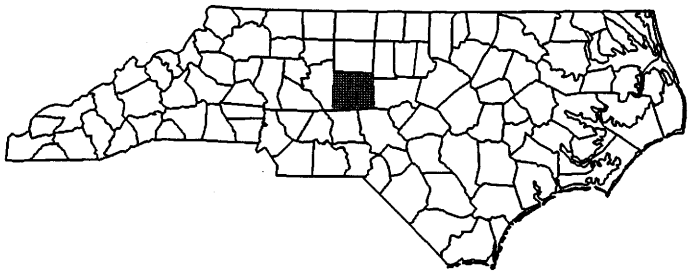


VICINITY MAP

0 ½ 1.0 mile

RANDLEMAN, NC QUAD MAP
GLENOLA, NC QUAD MAP

NORTH CAROLINA



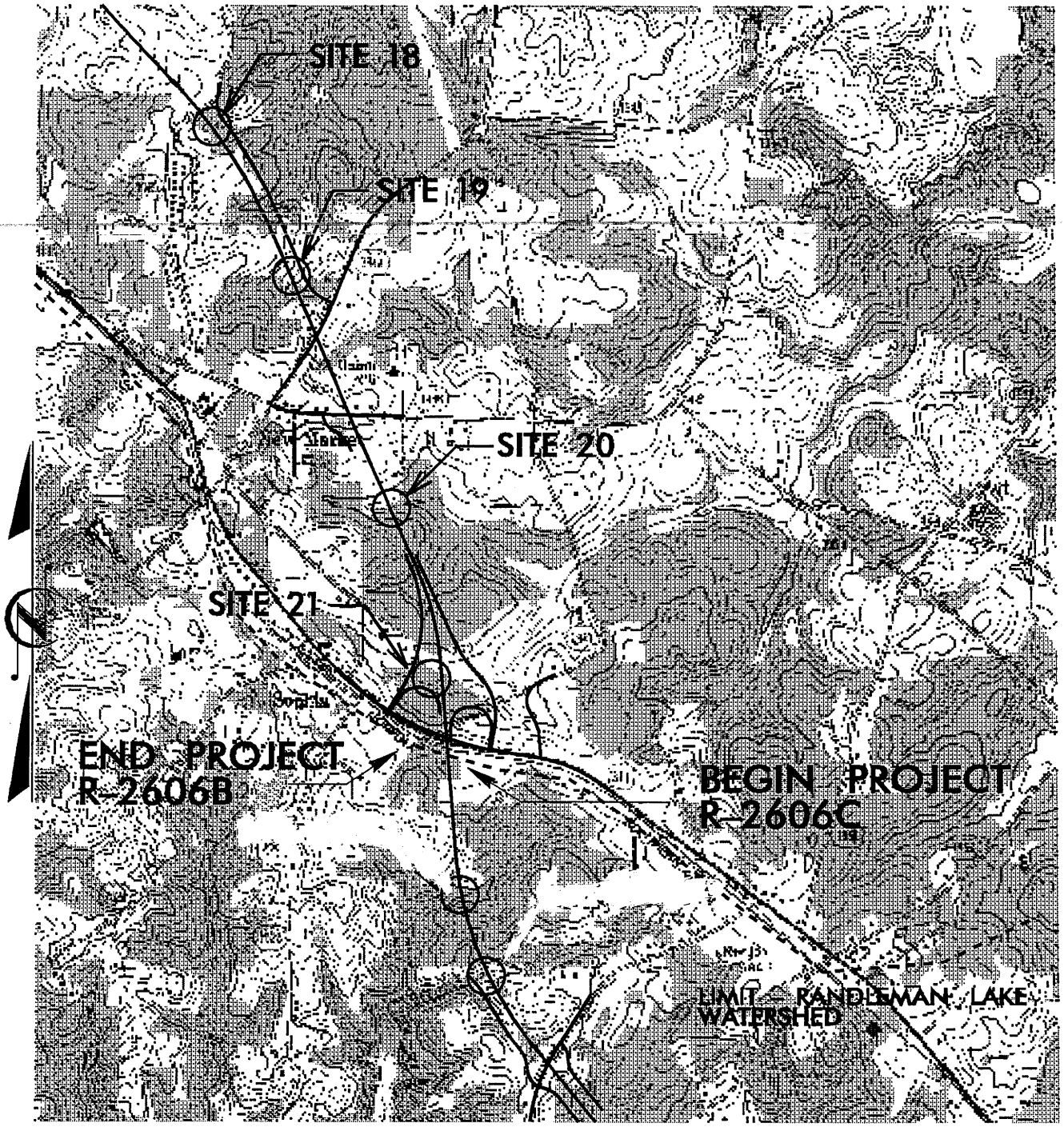
NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 2 OF 16 AUGUST 9, 2002

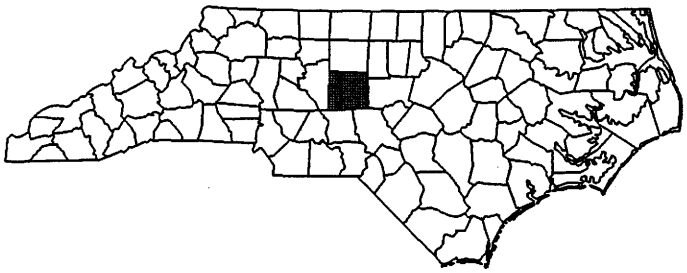


VICINITY MAP

0 ½ 1.0 mile

RANDLEMAN, NC QUAD MAP

NORTH CAROLINA



NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2005

SHEET 3 OF 16 AUGUST 9, 2002

BUFFER LEGEND

WLB — WETLAND BOUNDARY

WLB — WETLAND

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

BZ — RIPARIAN BUFFER ZONE

BZ1 — RIPARIAN BUFFER ZONE 1
30 ft (9.2m)

BZ2 — RIPARIAN BUFFER ZONE 2
20 ft (6.1m)

FLOW DIRECTION

TB — TOP OF BANK

WE — EDGE OF WATER

C — PROP. LIMIT OF CUT

F — PROP. LIMIT OF FILL

PROP. RIGHT OF WAY

NG — NATURAL GROUND

PL — PROPERTY LINE

TDE — TEMP. DRAINAGE EASEMENT

PDE — PERMANENT DRAINAGE EASEMENT

EAB — EXIST. ENDANGERED ANIMAL BOUNDARY

EPB — EXIST. ENDANGERED PLANT BOUNDARY

WATER SURFACE

LIVE STAKES

BOULDER

CORE FIBER ROLLS

PROPOSED BRIDGE

PROPOSED BOX CULVERT

PROPOSED PIPE CULVERT
12"-48" PIPES
54" PIPES & ABOVE

(DASHED LINES DENOTE EXISTNG STRUCTURES)

SINGLE TREE

WOODS LINE

DRAINAGE INLET

ROOTWAD

RIP RAP

5 — ADJACENT PROPERTY OWNER OR PARCEL NUMBER IF AVAILABLE

PREFORMED SCOUR HOLE (PSH)

LEVEL SPREADER (LS)

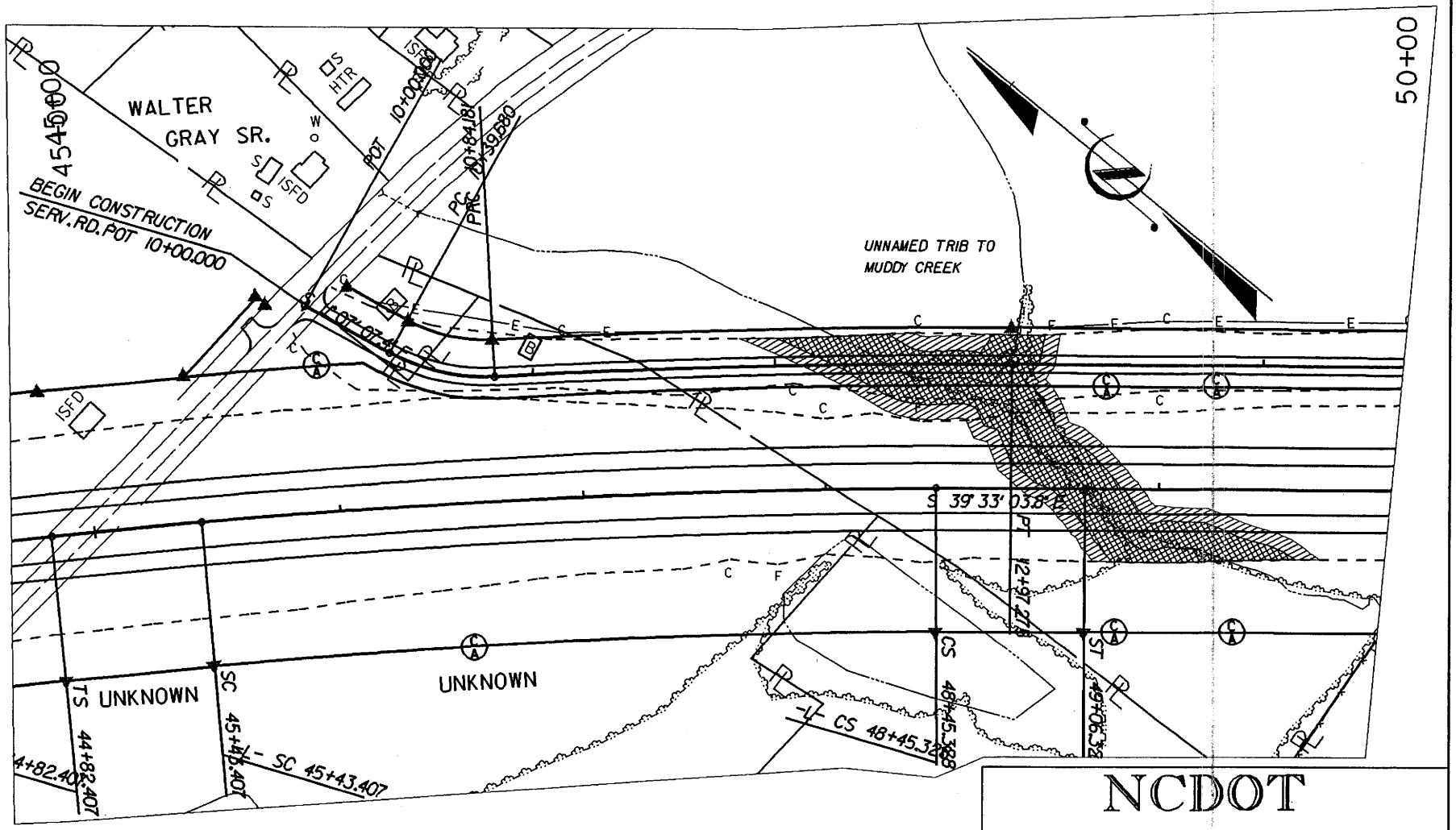
GRASS SWALE

NCDOT

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 4 OF 16 AUGUST 9, 2002



SITE 13
PLAN VIEW

25m 0 50m

SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

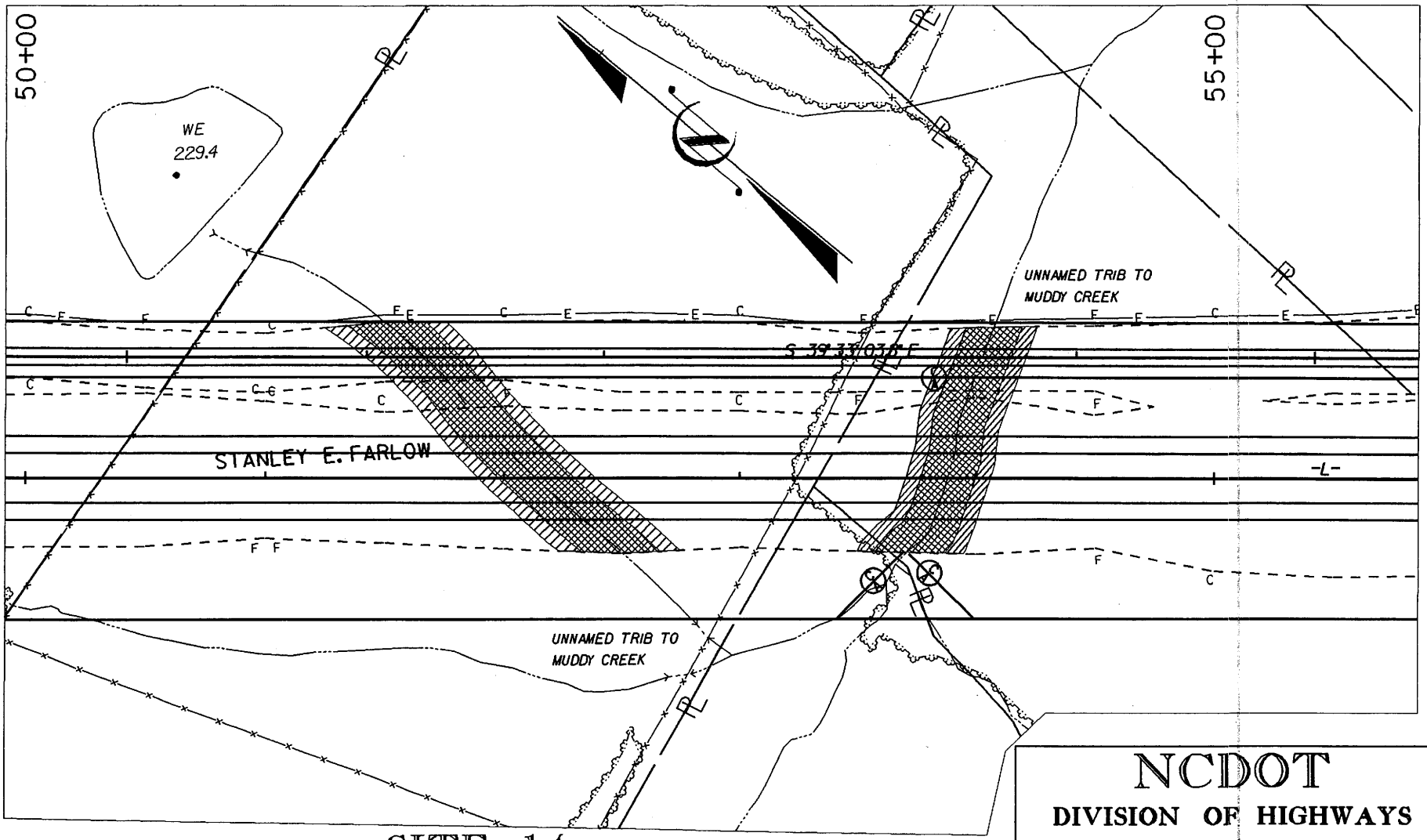
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 5 OF 16 AUGUST 9, 2002



SITE 14
PLAN VIEW

25m 0 50m SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

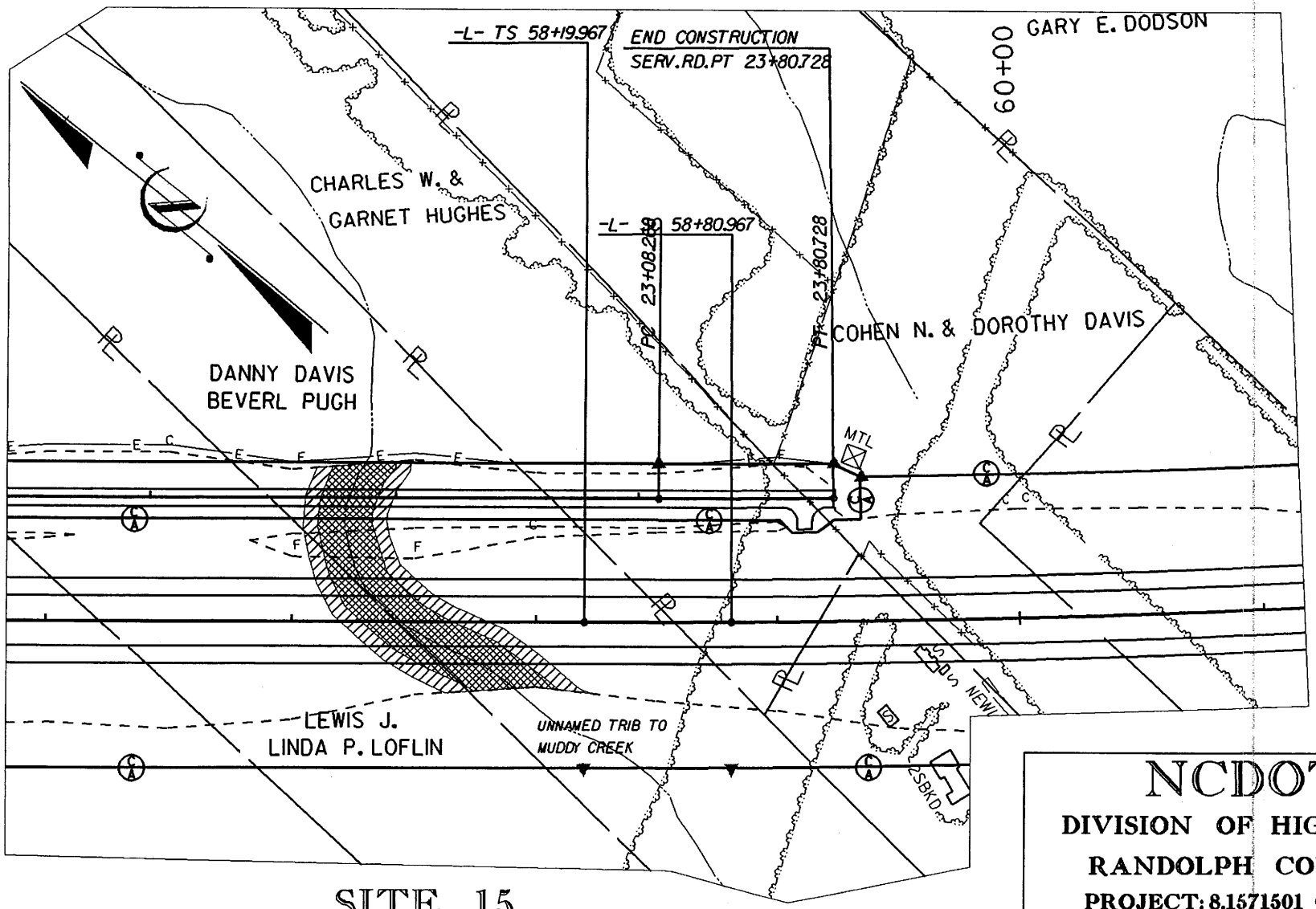
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 6 OF 16 AUGUST 9, 2002



SITE 15
PLAN VIEW

25m 0 50m SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

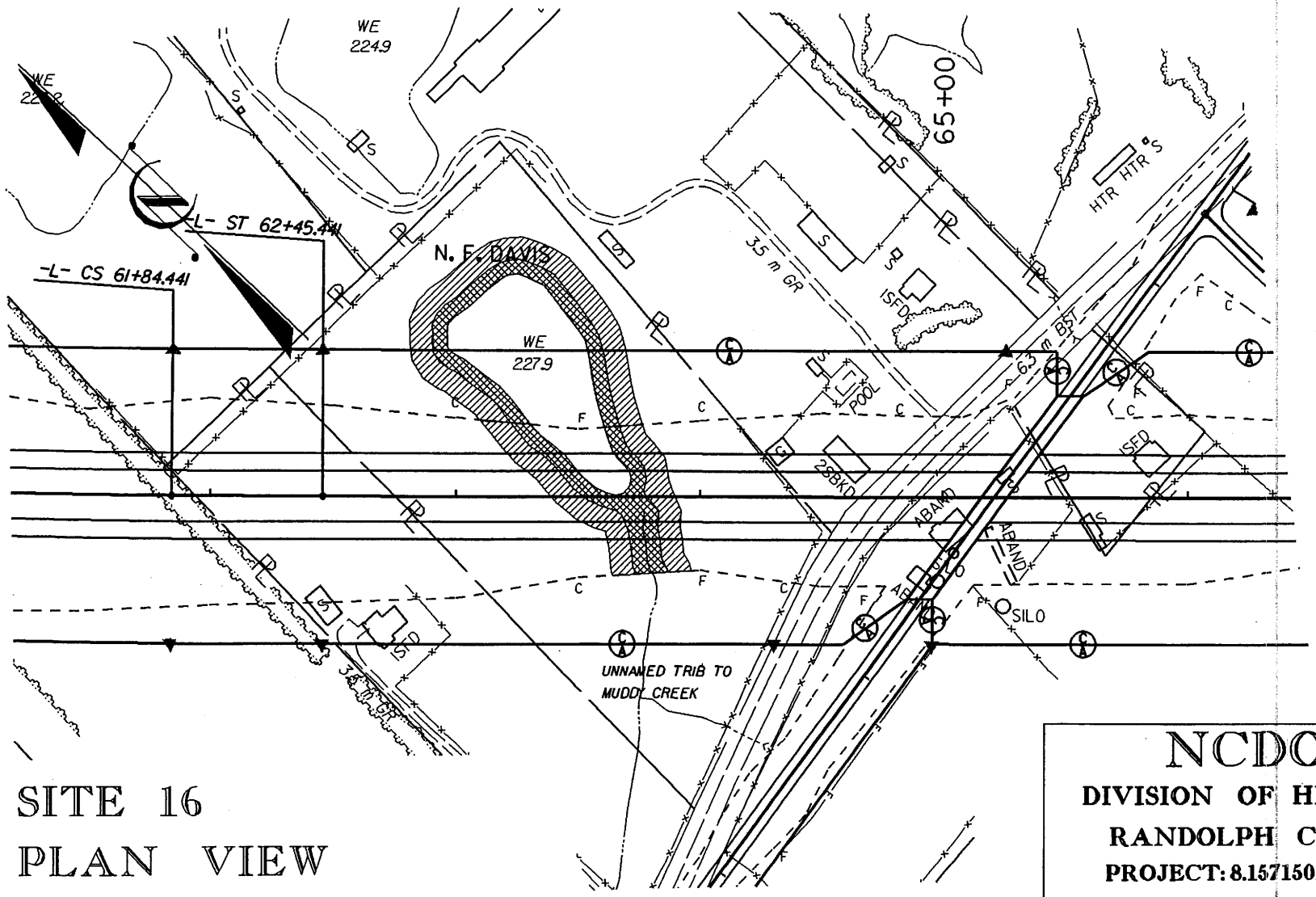
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 7 OF 16 AUGUST 9, 2002



SITE 16
PLAN VIEW

MITIGABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

25m 0 50m

SCALE

NCDOT

DIVISION OF HIGHWAYS

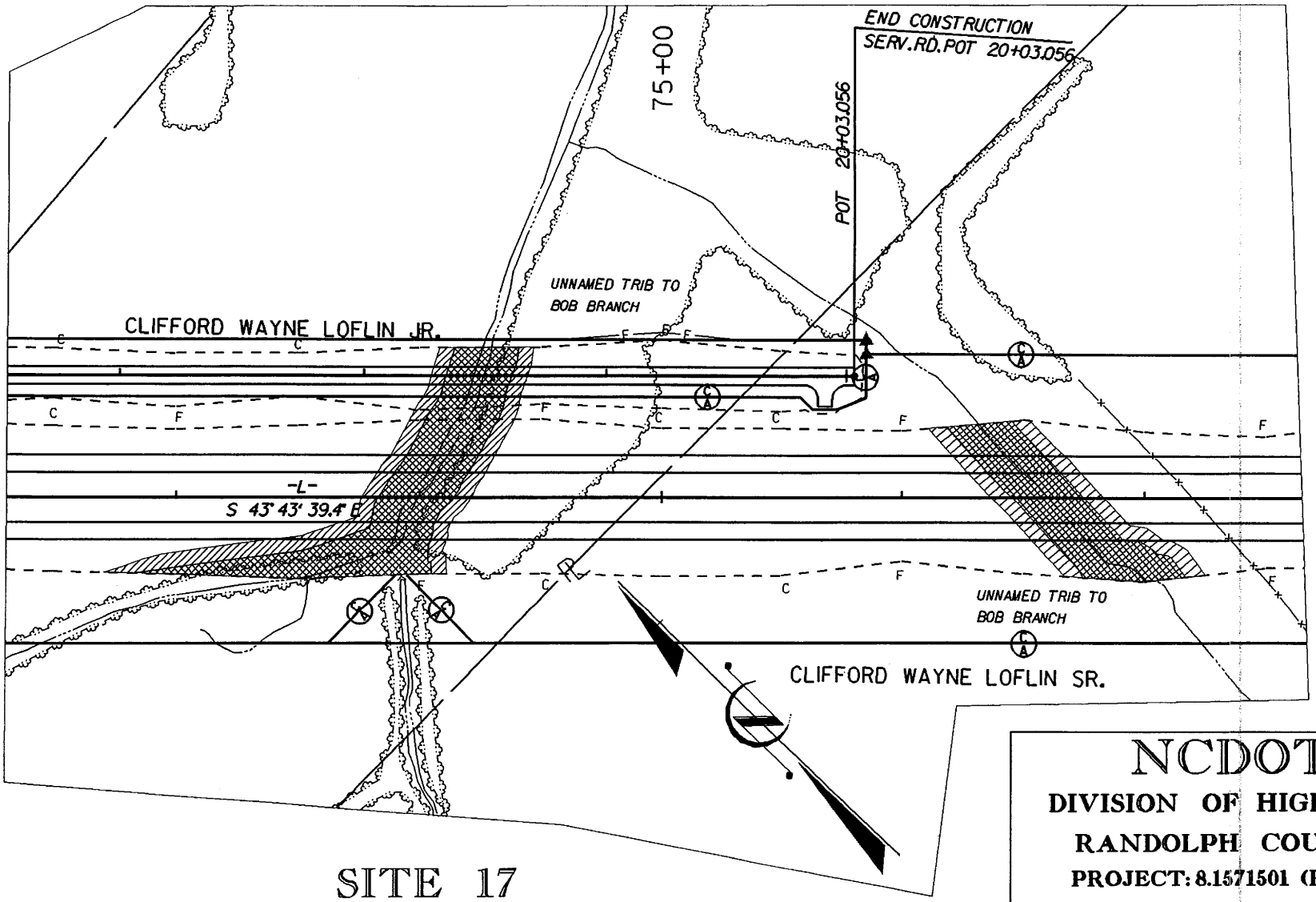
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26, 2006

SHEET 8 OF 16 **AUGUST 9, 2002**



SITE 17
PLAN VIEW

25m 0 50m

SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

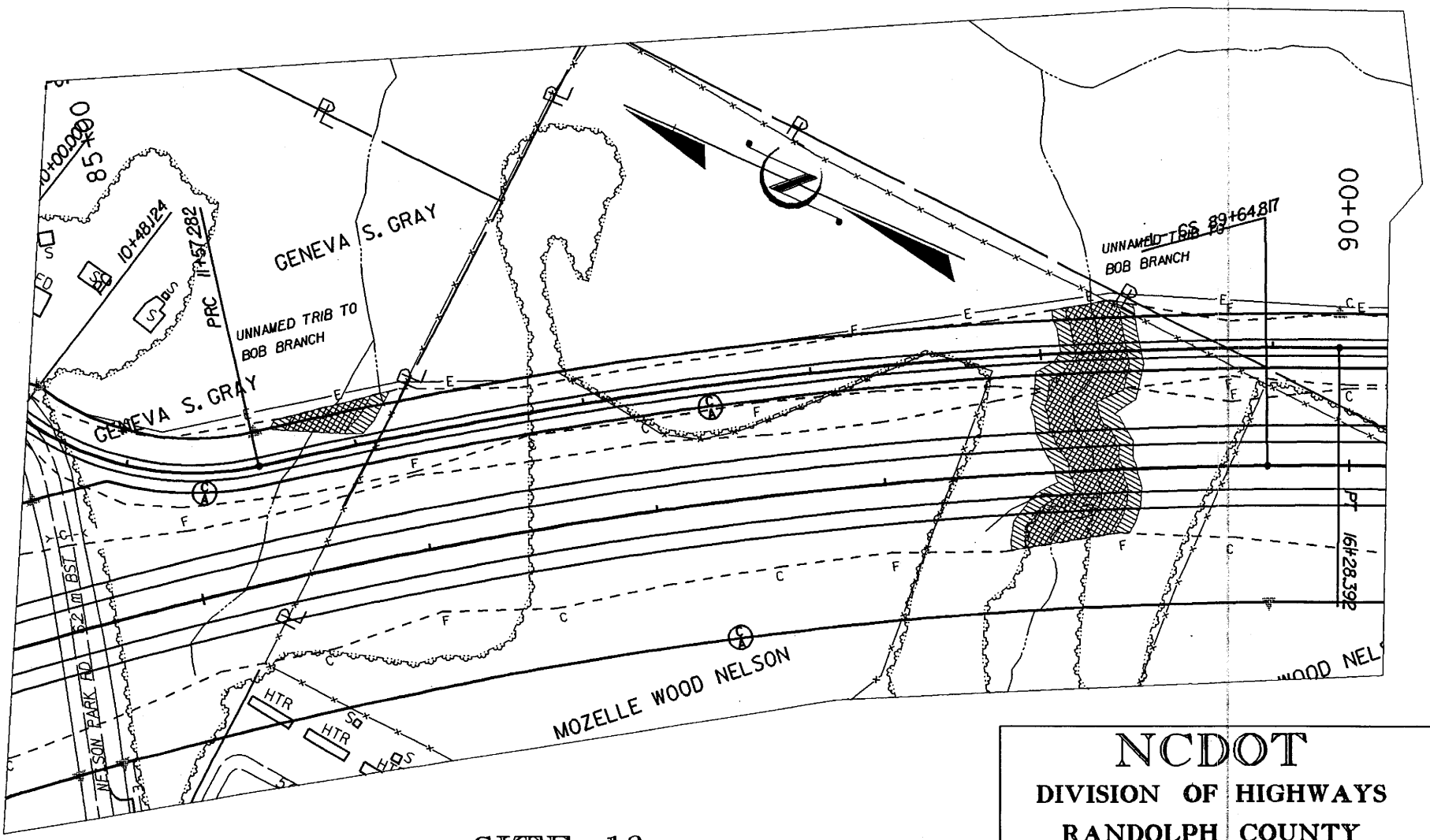
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 9 OF 16 AUGUST 9, 2002



SITE 18
PLAN VIEW

25m 0 50m SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

DIVISION OF HIGHWAYS

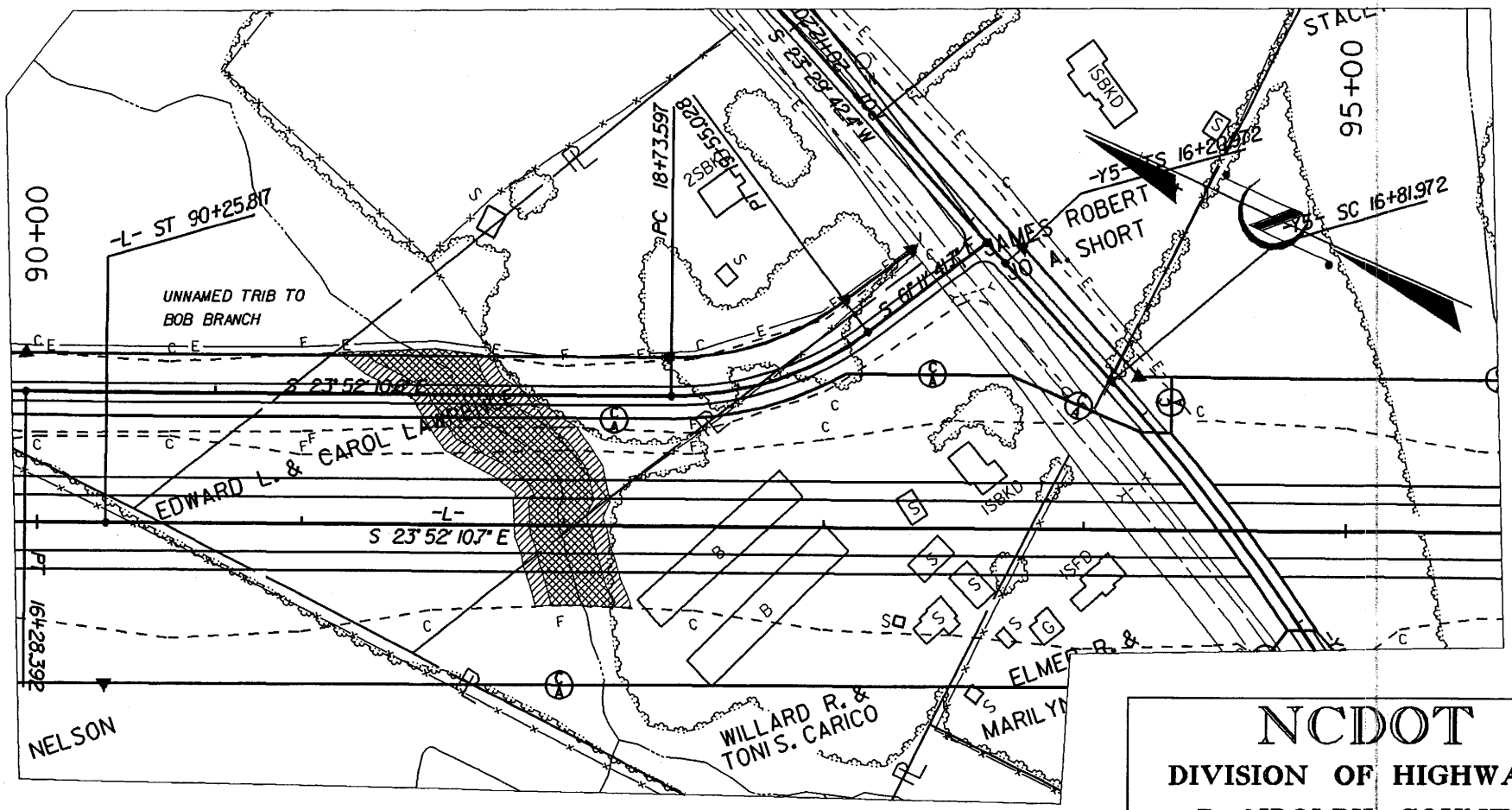
RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

REVISED APRIL 26,2006

SHEET 10 OF 16 AUGUST 9, 2002



SITE 19
PLAN VIEW

25m 0 50m

SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT

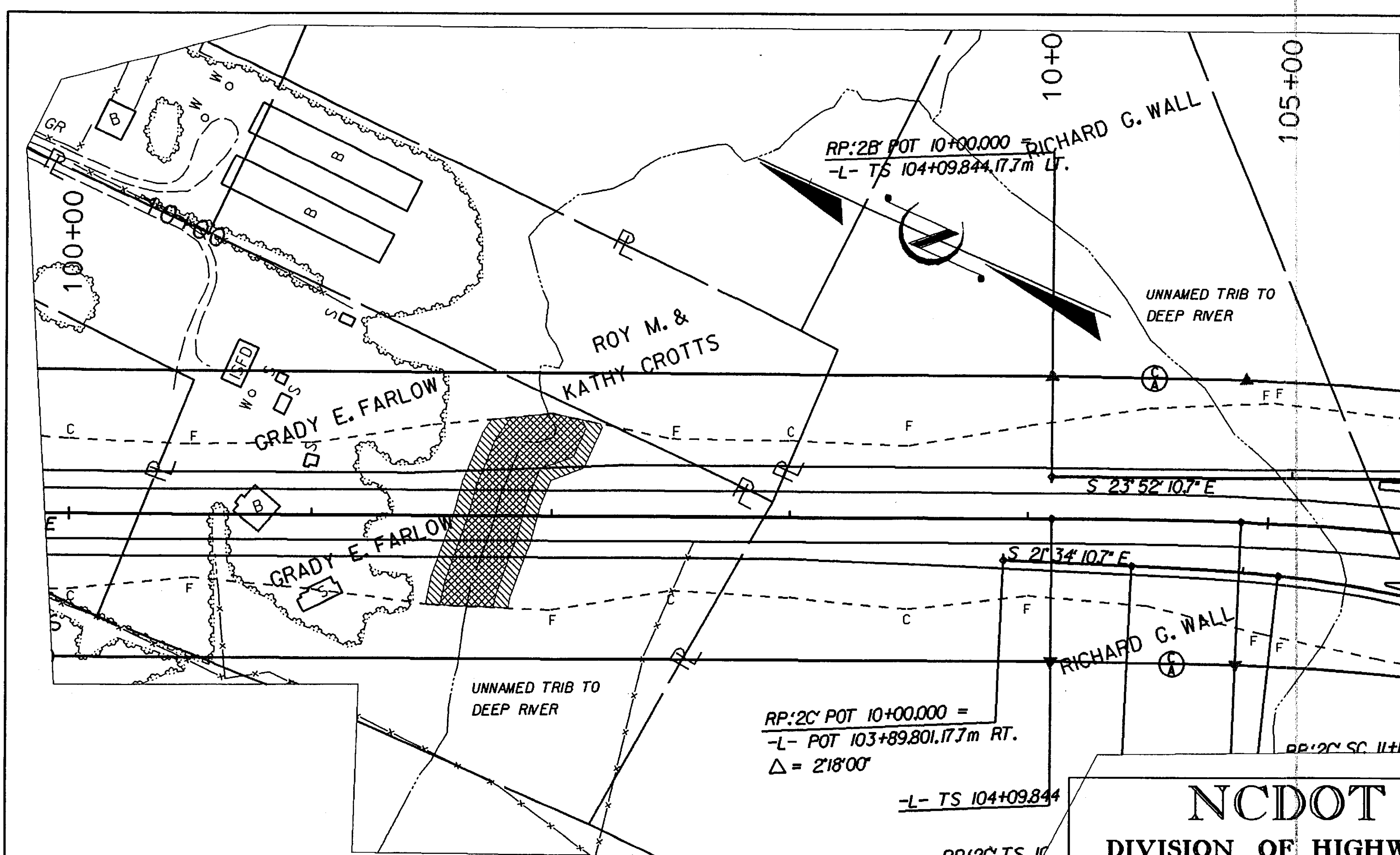
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 11 OF 16 AUGUST 9, 2002



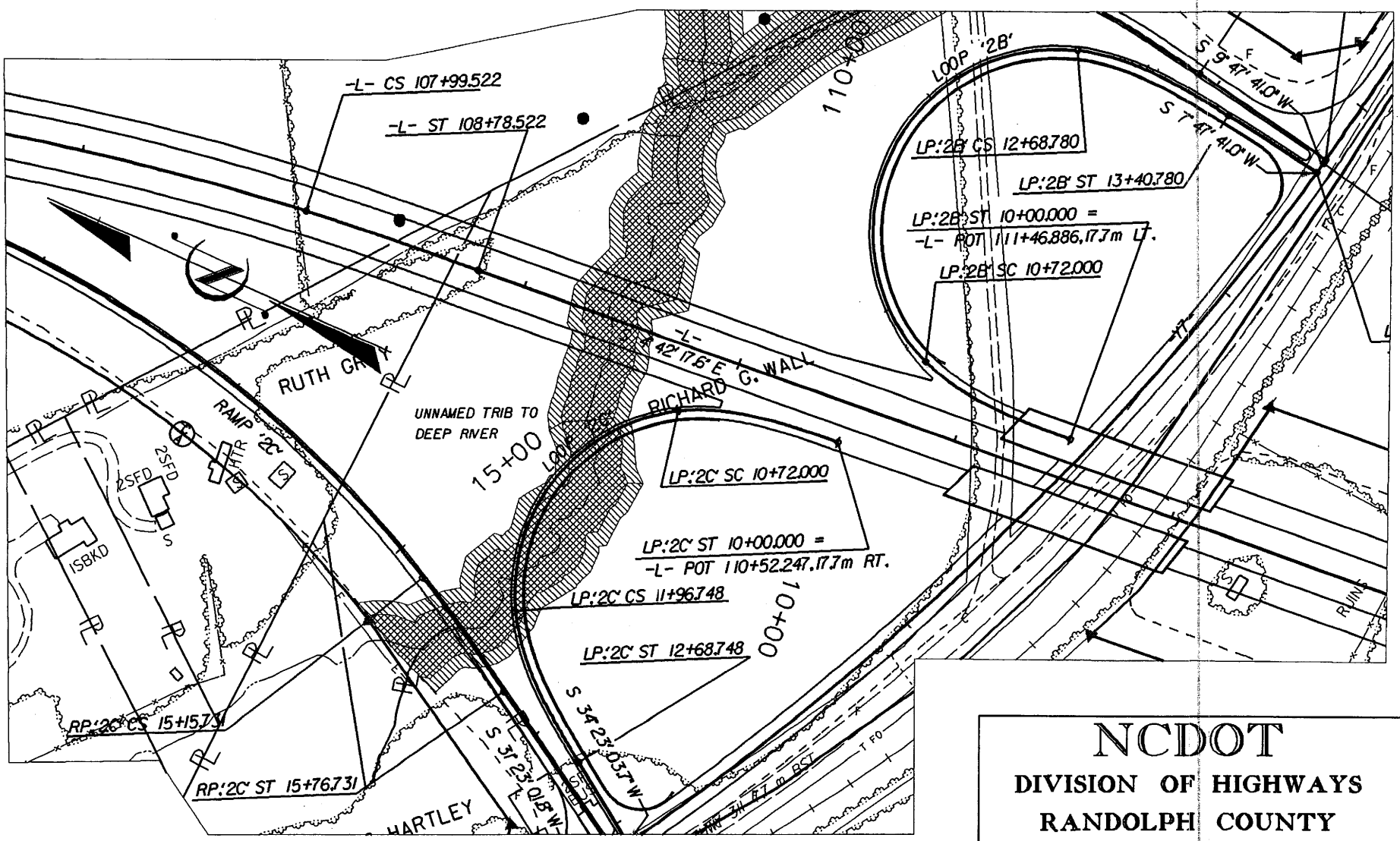
SITE 20
PLAN VIEW

25m 0 50m
SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B
US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220
SHEET 12 OF 16 AUGUST 9, 2002



SITE 21
PLAN VIEW

25m 0 50m SCALE

MITIGABLE IMPACTS ZONE 1

MITIGABLE IMPACTS ZONE 2

NCDOT
DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

US 311 BYPASS FROM HIGH POINT EAST BELT TO US 220

SHEET 13 OF 16

REVISED APRIL 26, 2005
AUGUST 9, 2002

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (m^2)	ZONE 2 (m^2)	TOTAL (m^2)	ZONE 1 (m^2)	ZONE 2 (m^2)	TOTAL (m^2)	ZONE 1 (m^2)	ZONE 2 (m^2)
13		47+70 - 50+00 -L-	X					4602	2282	6884		
14		51+26 - 52+74 -L-	X					3075	1035	4110		
		53+50 - 54+26 -L-	X					2230	1244	3474		
15		57+05 - 58+20 -L-	X					2865	1566	4431		
16		62+85 - 63+90 -L-						2027	3221	5248		
17		72+70 - 74+45 -L-	X					3500	1711	5211		
		76+10 - 77+25 -L-	X					2127	1114	3241		
18		85+40 - 85+95 -L-	X					320	162	482		
		88+55 - 89+10 -L-	X					2776	1435	4211		
19		91+10 - 92+28-L-	X					2822	1630	4452		
20		101+50 - 102+20 -L-	X					2075	1057	3132		
21		109+50 -L-	X					9784	4857	14641		
TOTAL:								38203	21314	59517		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

8/9/2002
SHEET 11 OF 14

Revised 4/26/05

BUFFER IMPACTS SUMMARY

			IMPACT								BUFFER REPLACEMENT	
			TYPE		ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
13		47+70 - 50+00 -L-	X					49535	24563	74099		
14		51+26 - 52+74 -L-	X					33099	11141	44240		
		53+50 - 54+26 -L-	X					24003	13390	37394		
15		57+05 - 58+20 -L-	X					30839	16856	47695		
16		62+85 - 63+90 -L-						21818	34671	56489		
17		72+70 - 74+45 -L-	X					37674	18417	56091		
		76+10 - 77+25 -L-	X					22895	11991	34886		
18		85+40 - 85+95 -L-	X					3444	1744	5188		
		88+55 - 89+10 -L-	X					29881	15446	45327		
19		91+10 - 92+28-L-	X					29881	15446	45327		
20		101+50 - 102+20 -L-	X					22335	11377	33713		
21		109+50 -L-	X					105314	52280	157594		
TOTAL:								410718	227323	638041		

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
PROJECT: 8.1571501 (R-2606B)

8/9/2002
SHEET 15 OF 16

Revised 4/26/05

Site No.	Property Owner Name	Property Owner Address
13	Clyde R. & Randall Spencer	N/A
14	Stanley E. Farlow	N/A
15	Danny Davis & Beverly Pugh	N/A
	Lewis J. & Linda P. Loflin	N/A
16	N. F. Davis	2709 Banner Withehead Rd., Sophia, NC 27350
17	Clifford Wayne Loflin, Jr.	2410 Loflin Dairy Rd., Sophia, NC 27350
	Clifford Wayne Loflin, Sr.	2410 Loflin Dairy Rd., Sophia, NC 27350
18	Geneva S. Gray	6590 US Hwy 311, Sophia, NC 27350
	Mozelle Wood Nelson	4570 Nelson Park Rd., Sophia, NC 27350
19	Edward L. & Carol Lawrence	4875 Branson Davis Rd., Sophia, NC 27350
	Willard R. & Toni S. Carico	4833 Branson Davis Rd., Sophia, NC 27350
20	Grady E. Farlow	5080 Walker Mill Rd., Sophia, NC 27350
21	Richard G. Wall	N/A

List of Property Owners

NC Dept. of Transportation
Division of Highways

Randolph County
Project:8.1571501 (R-2606B

US 311 Bypass From High Point East Belt to US 220

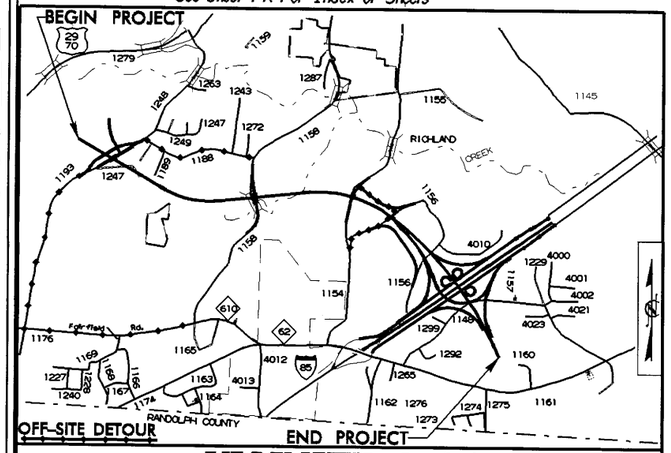
Sheet 16 of 16 08/09/02

9/09/06

TIP: R-0609IA

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD COUNTY

METRIC

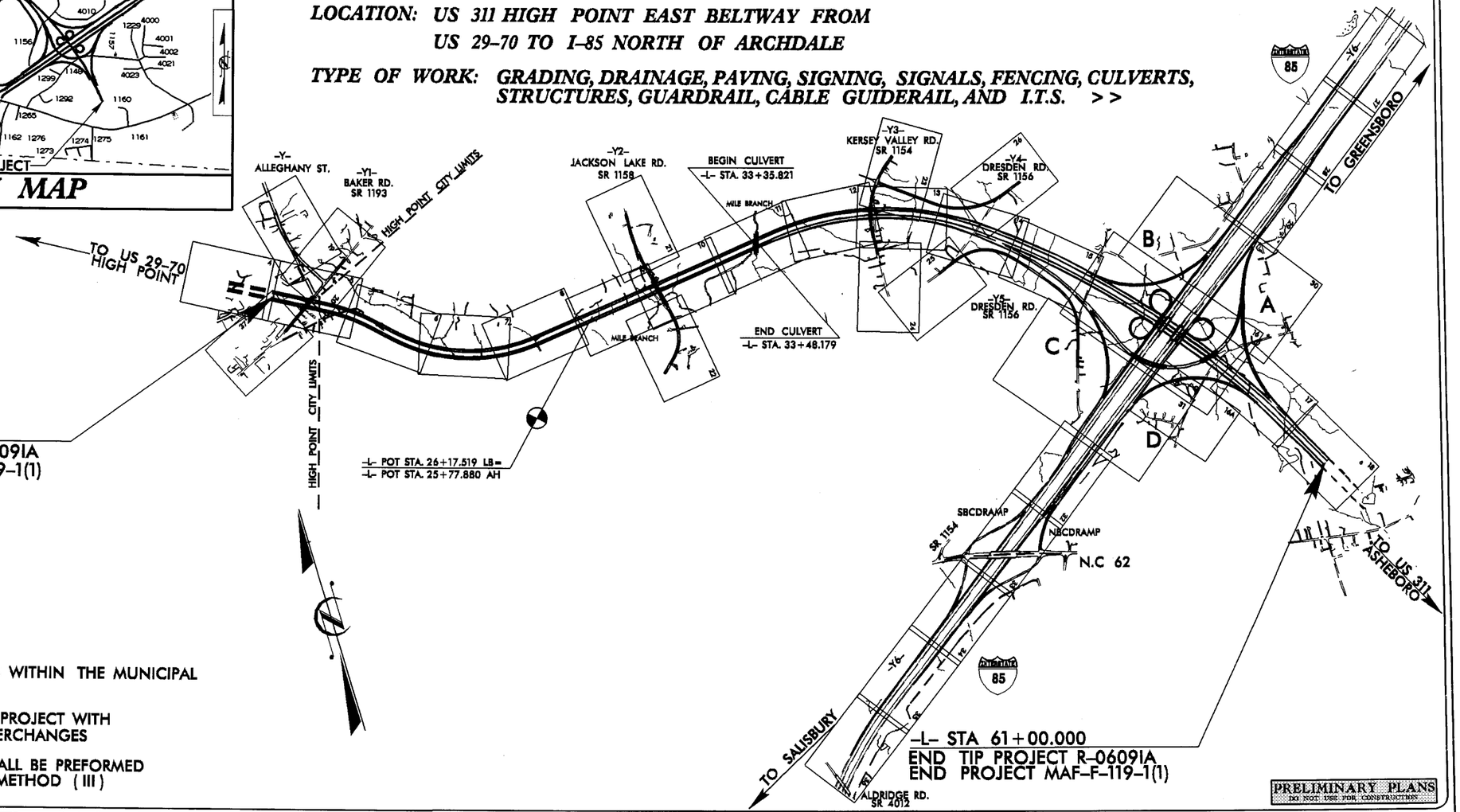
ALL DIMENSIONS IN THESE PLANS ARE IN METERS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IA	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34345.1.1	MAF-F-119-1(1)	PE
34345.2.7	STP-NHF-119-1(11)	ROW & UTILITIES

LOCATION: US 311 HIGH POINT EAST BELTWAY FROM US 29-70 TO I-85 NORTH OF ARCHDALE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, SIGNALS, FENCING, CULVERTS, STRUCTURES, GUARDRAIL, CABLE GUIDERAIL, AND I.T.S. >>



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF HIGH POINT

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES

CLEARING ON THIS PROJECT SHALL BE PREFORMED TO THE LIMITS ESTABLISHED BY METHOD (III)

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

5 0 10 PLANS

5 0 10 PROFILE (HORIZONTAL)

1 0 2 PROFILE (VERTICAL)

DESIGN DATA

ADT 2005 = 27,000
ADT 2025 = 39,000
DHV = 10 %
D = 60 %
T = 13 % *
V = 110 km/h
* TTST 7 % DUAL 6 %
FUNC CLASS - FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-0609IA = 4.929 KM
LENGTH STRUCTURE TIP PROJECT R-0609IA = 0.012 KM
TOTAL LENGTH TIP PROJECT R-0609IA = 4.941 KM

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER, 2003

LETTING DATE: SEPTEMBER 19, 2006

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

STEVE KENDALL
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

31-JAN-2006 13:35
r:\proj\0609ia.tsh
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	2-M

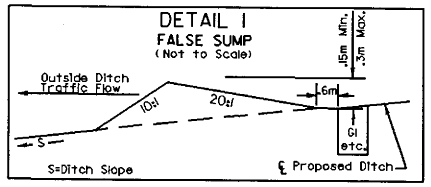
R/W SHEET NO.

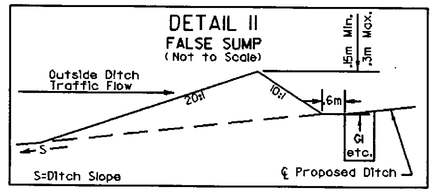
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

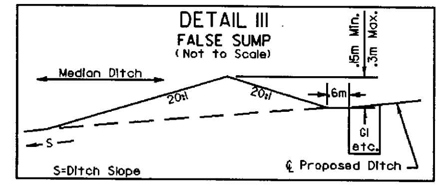
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

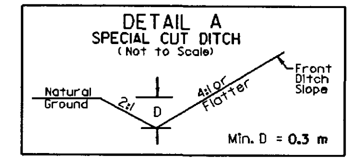
CONST.REV.

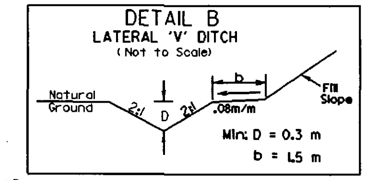
R/W REV.

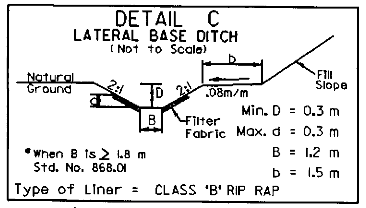




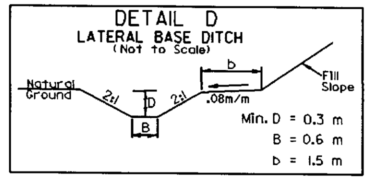






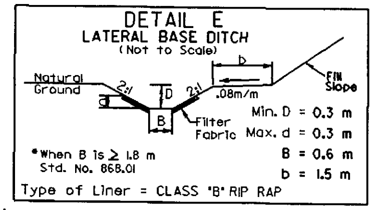


STA 12+85 RT TO 13+55 RT -RP B-
STA 24+45 RT TO 25+80 RT -NBCD-



STA 19+40 RT TO 20+39 RT -L-
STA 21+22 LT TO 21+70 LT -L-
STA 39+90 LT TO 40+33 LT -L-
STA 58+88 RT TO 59+60 RT -L-
STA 60+60 LT TO 61+00 RT -L-
STA 14+72 LT TO 15+02 LT -Y4-
STA 13+85 RT TO 14+30 RT -Y5-
STA 14+90 RT TO 15+20 RT -Y5-

STA 12+10 LT TO 13+25 LT -RP A-
STA 24+00 LT TO 24+25 LT -FLY-
STA 25+20 LT Y6 TO 11+07 LT -LP A-
STA 11+07 LT TO 11+35 LT -LP A-
STA 17+90 RT TO 18+40 RT -FLY-
STA 13+80 RT TO 14+12 RT -RP C-
STA 18+70 RT TO 19+53 RT -Y6-
STA 24+15 RT TO 24+32 RT -SBCD-

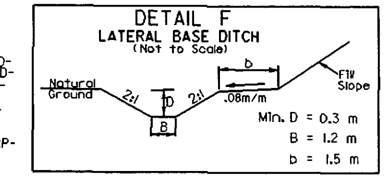


STA 32+20 LT TO 33+20 LT -L-
STA 33+40 RT TO 34+00 RT -L-
STA 40+33 LT TO 40+70 LT -L-
STA 14+70 RT TO 14+90 RT -RP D-
STA 19+65 LT TO 20+05 LT -Y6-
STA 35+26 LT TO 35+60 LT -L-

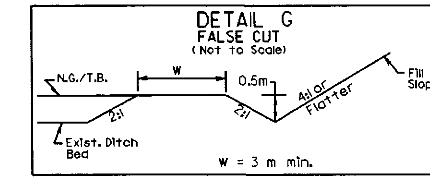
STA 13+40 RT TO 13+70 RT -L-
STA 13+09 RT TO 13+20 RT -L-
STA 13+00 LT TO 13+20 LT -L-
STA 45+60 RT TO 13+93 -L-
STA 27+60 LT TO 27+98 LT -L-
STA 27+98 LT TO 28+70 LT -L-
STA 31+20 LT TO 32+00 LT -L-
STA 38+50 RT TO 38+70 RT -L-
STA 50+20 M TO 50+40 M -L-
STA 50+20 RT TO 50+40 RT -L-
STA 50+40 RT TO 50+76.53 RT -L-
STA 50+40 RT TO 50+76.53 M -L-
STA 53+05 RT TO 53+35 RT -L-
STA 53+35 RT TO 53+60 RT -L-
STA 57+00 RT TO 57+80 RT -L-
STA 10+40 LT TO 11+20 LT -Y1-
STA 10+60 RT TO 11+00 RT -Y1-
STA 10+80 RT TO 11+40 RT -Y2-
STA 10+85 RT TO 11+00 RT -Y3-
STA 11+75 LT TO 12+00 LT -Y3-
STA 13+15 RT TO 13+40 RT -Y3-
STA 13+15 LT TO 13+40 LT -Y3-
STA 10+00 RT TO 10+60 RT -Y4-
STA 11+19.41LT TO 11+40 LT -Y4-
STA 13+58.50 RT TO 13+98.14 RT -Y5-

STA 15+10 LT TO 15+47 LT -Y5-
STA 17+45 RT TO 17+85 RT -Y5-
STA 17+70 LT TO 18+12 LT -Y5-
STA 27+50 RT TO 27+95 RT -Y6-
STA 27+60 LT TO 28+07 LT -Y6-
STA 32+00 LT TO 31+40 LT -Y6-
STA 36+20 LT TO 36+60 LT Y6
STA 41+60 RT TO 41+77 RT -Y6-
STA 43+80 LT TO 44+23 LT -Y6-
STA 49+40 RT TO 49+64 RT -Y6-
STA 12+17 RT TO 13+74 RT -FLY-
STA 16+15 RT TO 16+40 RT -FLY-
STA 10+81RT TO 11+65 RT -DE1-
STA 10+81LT TO 11+83 LT -DE1-
STA 12+50 LT TO 13+45 LT -DET-
STA 13+00 LT TO 13+40 LT -DET2-
STA 13+00 RT TO 13+20 RT -DET2-
STA 12+68 LT TO 12+95 LT -DET3-
STA 17+00 LT TO 17+60 LT -NBCD-
STA 18+80 RT TO 19+40 RT -NBCD-
STA 13+67.05 LT TO 13+75 LT -RP D-
STA 13+67.05 RT TO 13+92.71RT -RP D-
STA 12+09.76 LT TO 12+70 LT -RP B-
STA 12+05 LT TO 12+45 LT -RP C-
STA 27+03 LT TO 27+42 LT -NBCD-
STA 14+10 LT TO 14+50.68 LT -RP D-
STA 21+83 LT TO 22+20 LT -NBCD-
STA 10+41.5 RT TO 10+61.5 RT -SBCDRP-

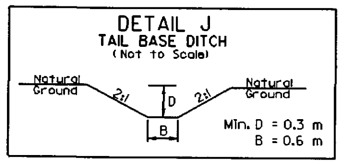
STA 28+20 RT TO 28+30 RT -L-
STA 58+00 RT TO 58+88 RT -L-
STA 11+00 RT TO 11+40 RT -Y1-
STA 14+05 RT TO 16+20 RT -Y2-
STA 40+70 LT TO 13+74 -Y4-
STA 13+80 LT TO 14+30 LT -Y4-
STA 16+25 RT TO 17+00 RT -Y6-
STA 17+65 RT TO 18+00 RT -Y6-
STA 36+00 RT TO 36+20 RT -Y6-
STA 11+35 LT TO 11+50 LT -LP A-
STA 11+80 LT TO 12+10 LT -LP B-
STA 14+34 RT TO 15+00 RT -RP C-



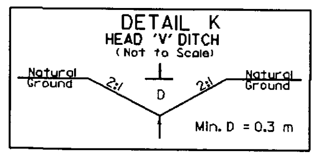
STA 19+50 LT TO 20+40 LT -L-
STA 38+60 RT TO 40+25 RT -L-
STA 13+77 LT TO 14+10 LT -RP D-
STA 13+25 LT TO 14+00 LT -RP A-
STA 14+70 RT TO 14+90 RT -RP D-
STA 12+20 LT TO 12+95 LT -Y2-
STA 23+40 RT TO 24+15 RT -SBCD-
STA 22+60 RT TO 22+70 RT -FLY-



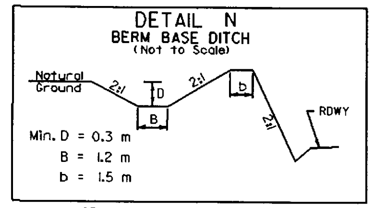
STA 34+20 RT TO 34+40 RT -Y6-



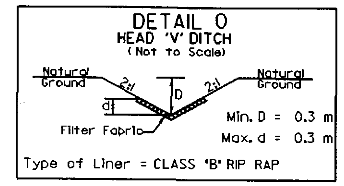
STA 29+35 RT TO 29+55 RT -L-
STA 12+80 RT -SBCD-



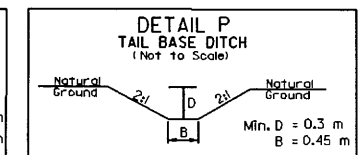
STA 11+40 RT -Y4-



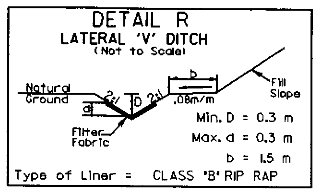
STA 28+90 LT TO 29+91LT -L-
STA 38+57 RT TO 39+45 RT -L-



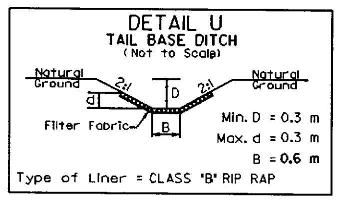
STA 25+85 LT TO 25+65 LT -NBCD-



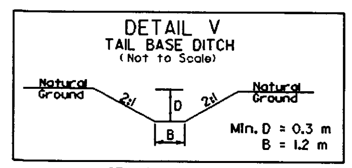
STA 10+84 LT TO 10+97 LT



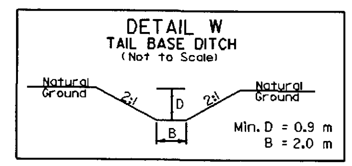
STA 25+55 RT TO 25+80 RT -L-



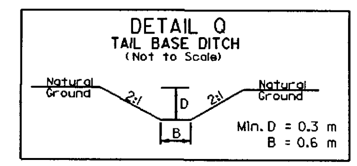
STA 21+30 LT TO BDOS -FLY-
STA 24+45 LT -NBCD-



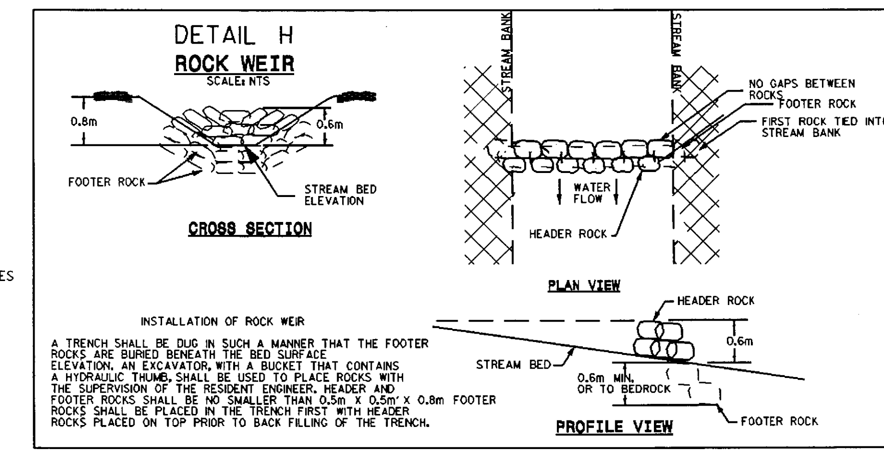
STA 10+40 RT -LP B-



STA 50+70 LT -L-

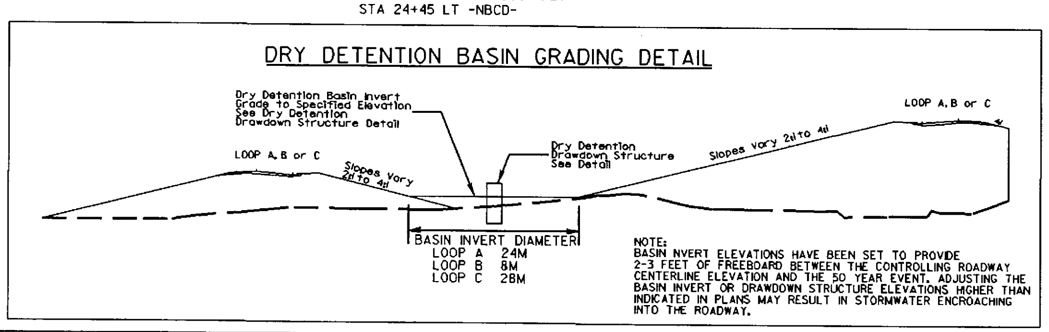


STA 25+28 LT TO 25+65 LT -L-
STA 21+30 LT TO OTCB -L-
STA 50+45 LT -L-
STA 13+90 LT TO 14+40 LT-NBCD-3:1 SIDE SLOPES

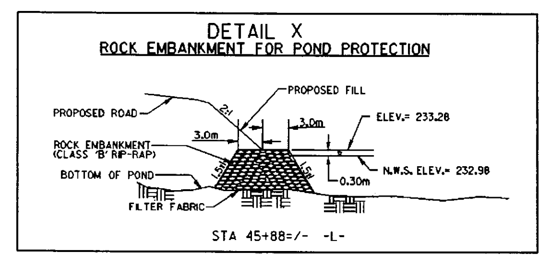


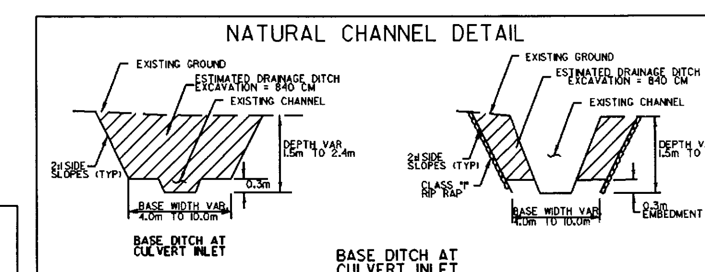
INSTALLATION OF ROCK WEIR

A TRENCH SHALL BE DUG IN SUCH A MANNER THAT THE FOOTER ROCKS ARE BURIED BENEATH THE BED SURFACE ELEVATION. AN EXCAVATOR, WITH A BUCKET THAT CONTAINS A HYDRAULIC THUMB, SHALL BE USED TO PLACE ROCKS WITH THE SUPERVISION OF THE RESIDENT ENGINEER. HEADER AND FOOTER ROCKS SHALL BE NO SMALLER THAN 0.5m X 0.5m X 0.8m FOOTER ROCKS SHALL BE PLACED IN THE TRENCH FIRST WITH HEADER ROCKS PLACED ON TOP PRIOR TO BACK FILLING OF THE TRENCH.

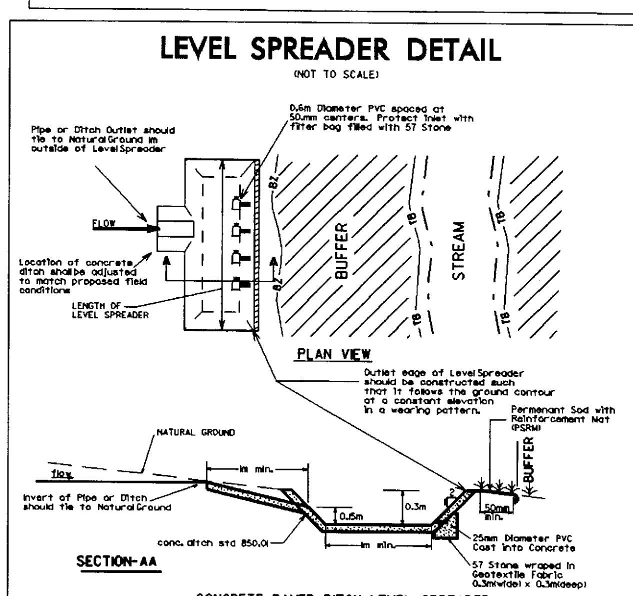


NOTE:
BASIN INVERT ELEVATIONS HAVE BEEN SET TO PROVIDE 2-3 FEET OF FREEBOARD BETWEEN THE CONTROLLING ROADWAY CENTERLINE ELEVATION AND THE 50 YEAR EVENT. ADJUSTING THE BASIN INVERT OR DRAWDOWN STRUCTURE ELEVATIONS HIGHER THAN INDICATED IN PLANS MAY RESULT IN STORMWATER ENCROACHING INTO THE ROADWAY.

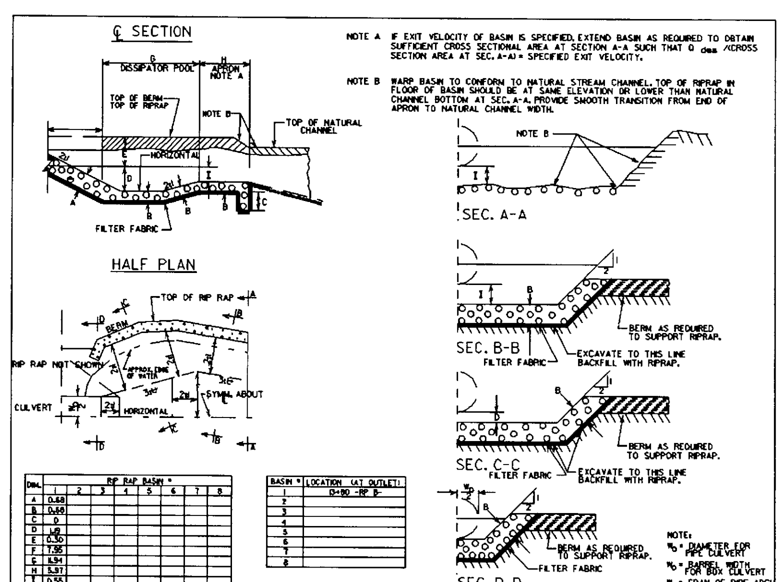




STA 31+41RT TO 33+25 RT -L-



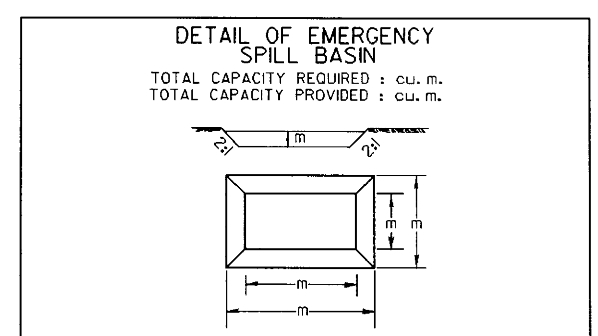
STA 13+57 RT -RP B-
STA 33+40 RT -L-
STA 50+43 LT -L-



NOTE A IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des /CROSS SECTION AREA AT SEC. A-A = SPECIFIED EXIT VELOCITY.

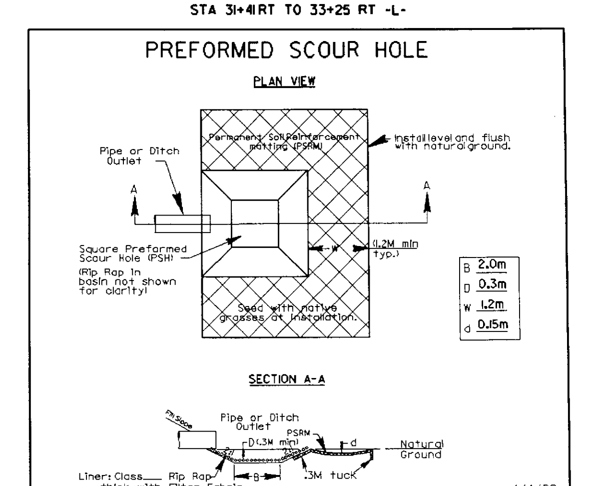
NOTE B WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

DETAIL OF RIP-RAPPED ENERGY DISSIPATOR BASIN



Ditch to be blocked with sandbags 1.0 m deep at outlet

STATION	REQ. VOL. (Cu. m.)	DEPTH (m)	BOTTOM LENGTH (m)	BOTTOM WIDTH (m)	TOP LENGTH (m)	TOP WIDTH (m)	PROVIDED VOL (Cu. m.)
FLY 16+20 L	78	1.0	9.0	5.0	13.0	9.0	81
-L- 34+00 R	104	1.0	10.0	7.0	14.0	11.0	112
-L- 35+60 L	158	1.0	11.0	10.0	15.0	14.0	160
-L- 39+90 L	78	1.0	7.0	7.0	11.0	11.0	85
-L- 40+70 L	103	1.0	8.0	8.0	12.0	12.0	104
-L- 50+40 L	396	1.0	20.0	16.0	24.0	20.0	400
-L- 58+00 L	50	1.0	5.0	5.0	9.0	9.0	53
-L- 58+20 R	77	1.0	11.0	4.0	15.0	8.0	82
-Y5- 14+00 R	275	1.0	17.0	13.0	21.0	17.0	289
-Y5- 15+20 R	178	1.0	14.0	9.0	18.0	13.0	180
RAMPB 12+90 R	174	1.0	14.0	9.0	18.0	13.0	180
RAMPD 15+20 R	127	1.0	12.0	7.0	16.0	11.0	130



REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R6091A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
[redacted]	

METRIC

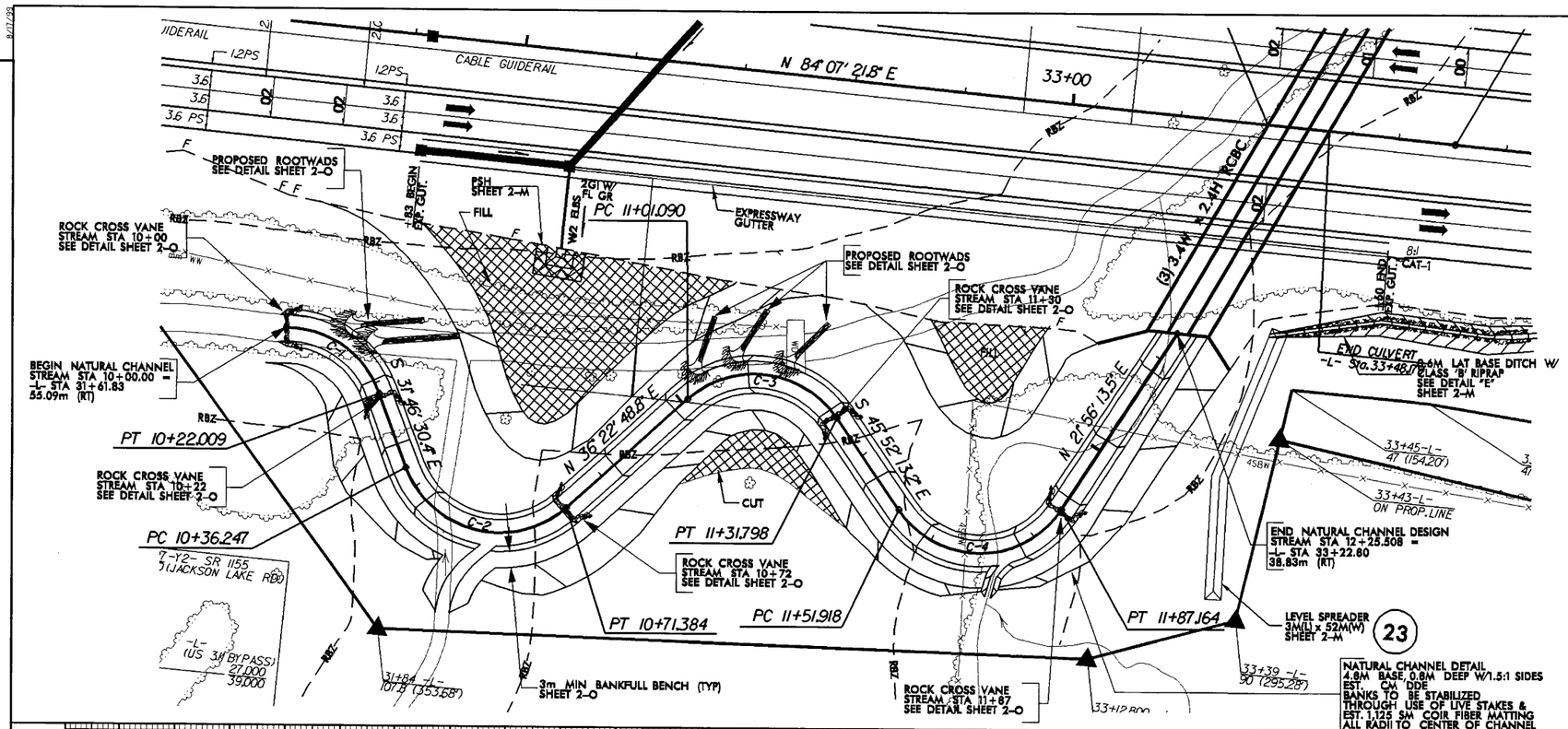
5 0 10

CONST.REV.

R/W REV.

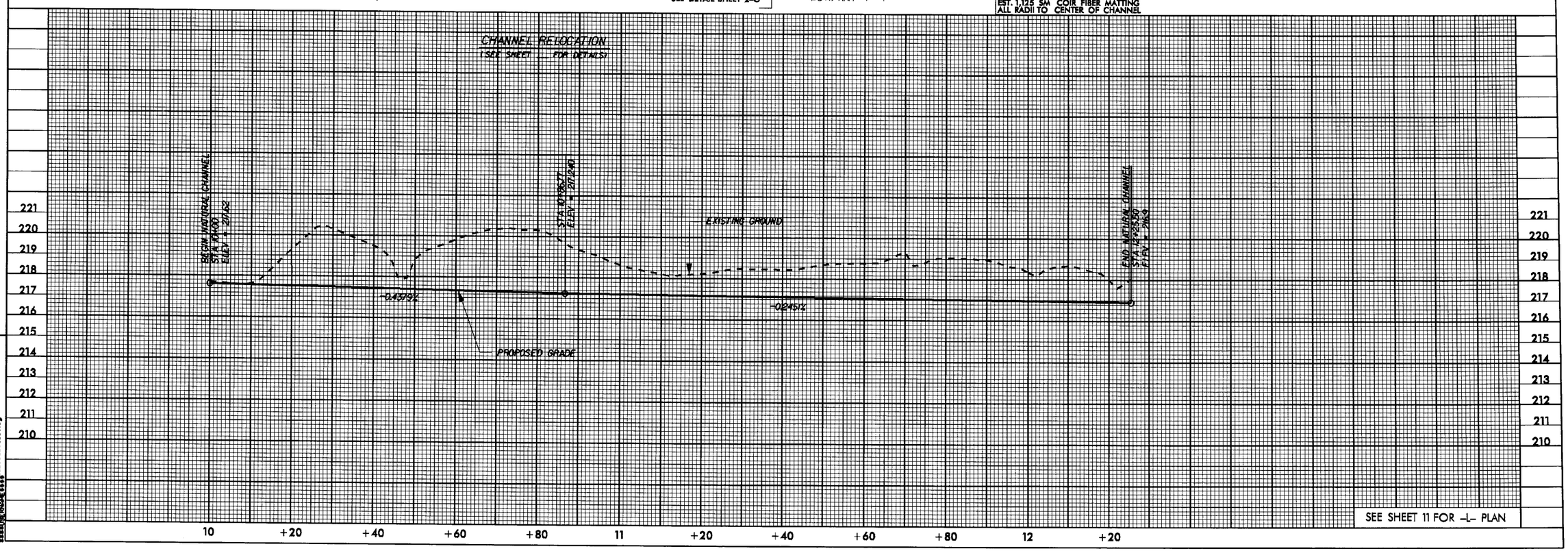
REVISIONS

8/17/99



C-1	C-2
PI Sta 10+12.617	PI Sta 10+62.855
Δ = 70° 03' 22.2" (RT)	Δ = 111° 50' 40.8" (LT)
L = 22.009	L = 35.137
T = 12.617	T = 26.608
R = 18.000	R = 18.000

C-3	C-4
PI Sta 11+21.705	PI Sta 11+78.701
Δ = 97° 44' 58.0" (RT)	Δ = 112° 11' 33.3" (LT)
L = 30.709	L = 35.246
T = 20.615	T = 26.783
R = 18.000	R = 18.000



SEE SHEET 11 FOR -L- PLAN

R-1041 ROBS. BRCD
RESEARCH TRIANGLE PARK

PROJECT REFERENCE NO.	SHEET NO.
R6091A	2-0
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
[redacted]	

NOT TO SCALE

CONST.REV.

R/W REV.

REVISIONS

8/17/99

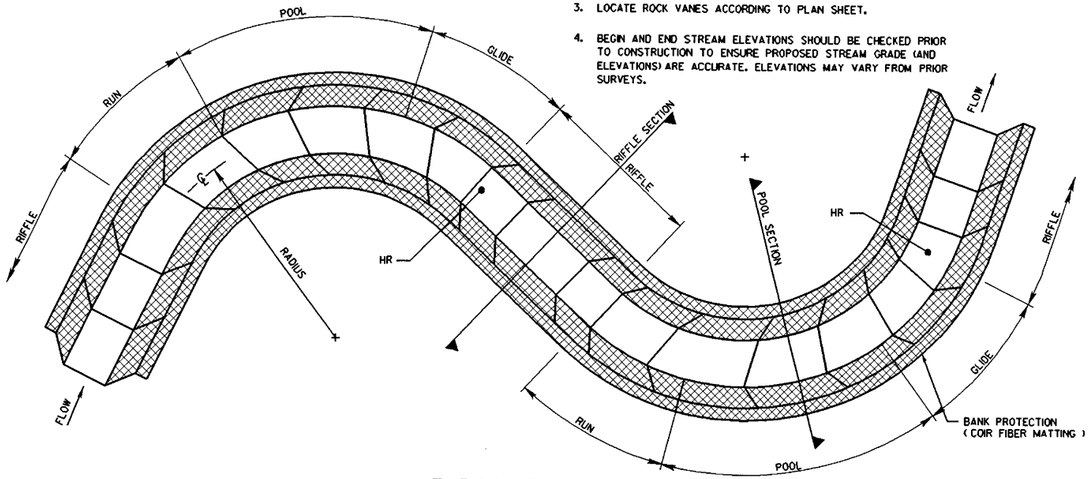
NOTES:

1. THE CONTRACTOR SHALL LAYOUT THE CHANNEL ALIGNMENT WHICH SHALL CONSIST OF STAKING OUT THE CENTER OF EACH RADIUS, SCRIBING THE CENTER LINE OF THE CHANNEL FOR EACH BEND USING THE INDICATED RADIUS, AND SCRIBING CENTERLINE OF THE TANGENT SECTIONS BY CONNECTING SUCCESSIVE BENDS WITH A STRAIGHT LINE. RI= +/-18m.

2. FIELD ADJUSTMENTS OF THE ALIGNMENT MAY BE REQUIRED TO AVOID CERTAIN OBSTACLES. APPROVAL BY THE ENGINEER OF THE STAKE-OUT ALIGNMENT SHALL BE REQUIRED PRIOR TO INITIATION OF THE CONSTRUCTION OF THE CHANNEL.

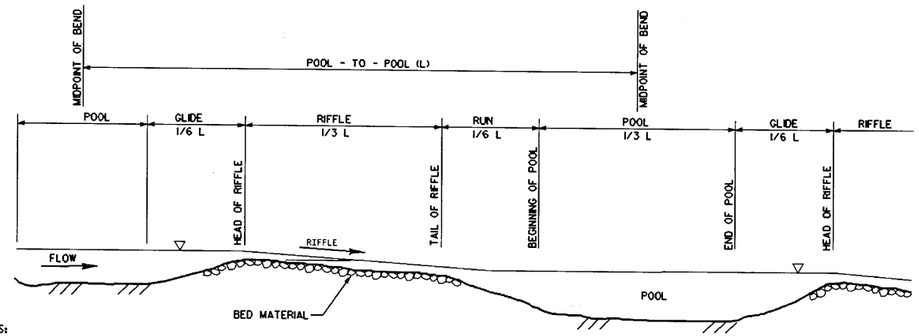
3. LOCATE ROCK VANES ACCORDING TO PLAN SHEET.

4. BEGIN AND END STREAM ELEVATIONS SHOULD BE CHECKED PRIOR TO CONSTRUCTION TO ENSURE PROPOSED STREAM GRADE (AND ELEVATIONS) ARE ACCURATE. ELEVATIONS MAY VARY FROM PRIOR SURVEYS.



TYPICAL PLAN

NOT TO SCALE



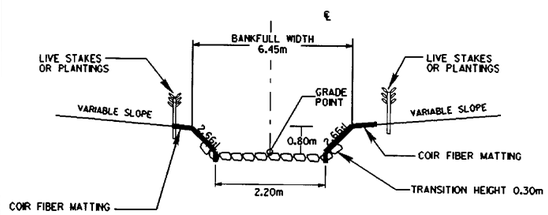
NOTES:

1. THE POOL TO POOL SPACING (L) SHALL BE MEASURED AS THE DISTANCE FROM THE MIDPOINT OF THE UPSTREAM BEND TO THE MIDPOINT OF THE DOWNSTREAM BEND.

2. REFER TO MORPHOLOGICAL MEASUREMENT TABLE AND PLAN SHEET FOR DIMENSIONS. NOTE THAT POOL TO POOL SPACING VARIES.

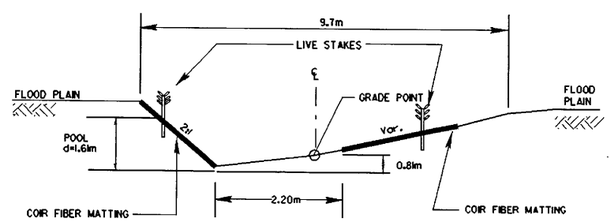
TYPICAL PROFILE

NOT TO SCALE



TYPICAL RIFFLE SECTION

NOT TO SCALE



TYPICAL POOL SECTION

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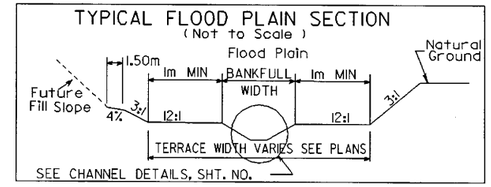
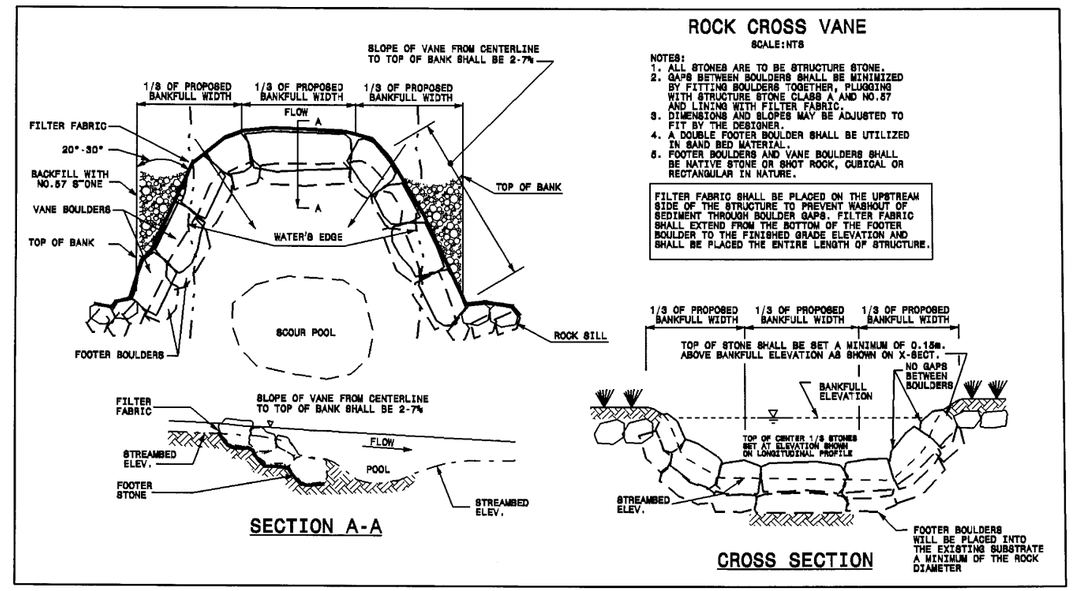
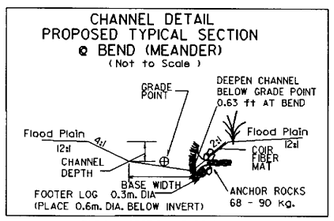






TYPICAL SECTION AT BENDS

NOTES:

NUMBER OF ROOTWADS INSTALLED TO BE DETERMINED ON SITE

NUMBER OF LOW STAGE CHECK DAMS TO BE DETERMINED ON SITE

ROOTWADS TO BE SPACED 4x DIAMETER OF ROOT BASE

FOOTER LOG ANCHOR ROCK TO BE PLACED ON THE DOWNSTREAM END OF EACH FOOTER LOG SO THAT IT IS LEANING AGAINST THE LOG ON THE SIDE AWAY FROM THE CHANNEL.

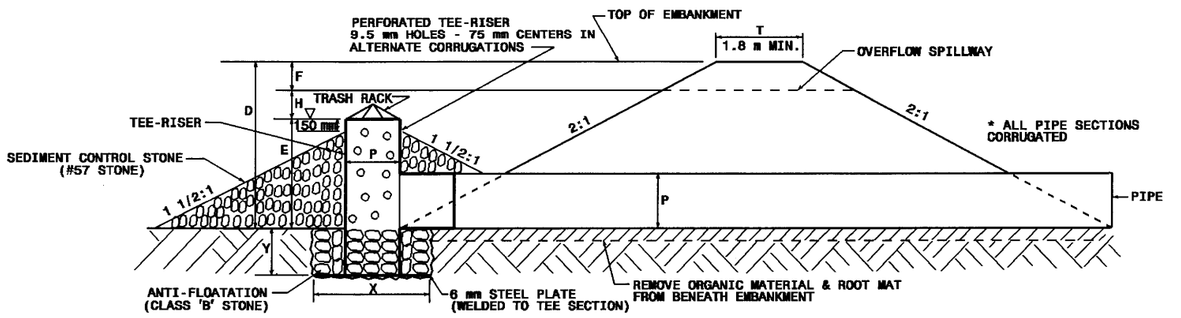
WHEN BACKFILLING OVER AND AROUND FOOTER LOGS, ROOTWAD LOGS AND ANCHOR ROCKS FIRMLY SECURE ALL COMPONENTS INCLUDING JOINTS, CONNECTIONS AND GAPS.

PLANTINGS SHOULD BE PLACED ABOVE BANKFULL DEPTH

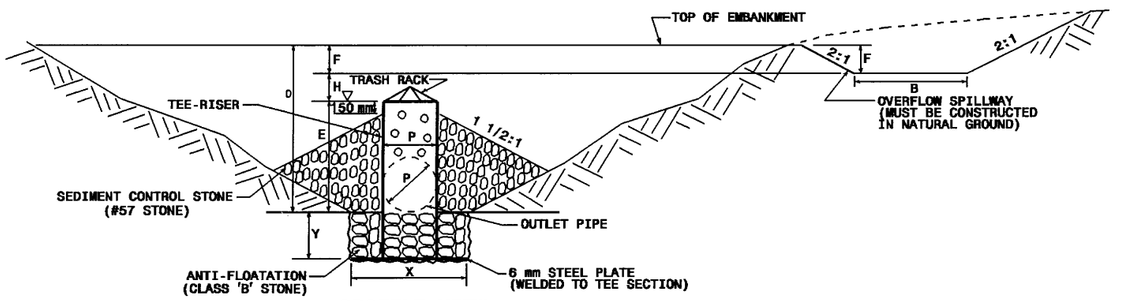
MORPHOLOGICAL MEASUREMENT TABLE

VARIABLES	EXISTING CHANNEL	PROPOSED REACH 1	REFERENCE REACH
1) STREAM TYPE	B4c	C4	C5
2) DRAINAGE AREA	58.03Ha	58.03Ha	162.69Ha
3) BANKFULL WIDTH	5.75m	6.45m	4.63m
4) BANKFULL MEAN DEPTH	0.92m	0.54m	0.46m
5) WIDTH/DEPTH RATIO	6.23	12.00	10.13
6) BANKFULL CROSS-SECTIONAL AREA	5.32sm	3.45sm	2.11sm
7) BANKFULL MEAN VELOCITY	1.15mps	1.77mps	0.86mps
8) BANKFULL DISCHARGE, cfs	6.09cm	6.10cm	1.81cm
9) BANKFULL MAX. DEPTH	1.37m	0.80m	0.49m
10) WIDTH OF FLOODPRONE AREA	42.40m	45.00m	39.62m
11) ENTRENCHMENT RATIO	7.37	6.98	8.55
12) MEANDER LENGTH	9.5m	75m	10 - 22m
13) RATIO OF MEANDER LENGTH TO BANKFULL WIDTH	1.65	12	2.2 - 4.7
14) RADIUS OF CURVATURE	10.0m	18m	2 - 3m
15) RATIO OF RADIUS OF CURVATURE TO BANKFULL WIDTH	1.7	2.8	0.4
16) BELT WIDTH	16.0	45.2	9.14
17) MEANDER WIDTH RATIO	2.8	7.0	2.0
18) SINUOSITY (STREAM LENGTH/VALLEY LENGTH	1.24	1.40	1.19
19) VALLEY SLOPE	0.004m/m	0.0034m/m	0.018m/m
20) AVERAGE SLOPE	0.003m/m	0.0024m/m	0.015 m/m
21) POOL SLOPE	0.005m/m	0.0005m/m	0.003 - 0.012m/m
22) RATIO OF POOL SLOPE TO AVERAGE SLOPE	1.78	0.20	0.19 - 0.83
23) MAXUMUM POOL DEPTH	1.86m	1.6im	0.58 - 2m
24) RATIO OF POOL DEPTH TO AVERAGE BANKFULL DEPTH	2.01	3.00	1.3 - 3.9
25) POOL WIDTH	10.98m	9.68m	9m
26) RATIO OF POOL WIDTH TO BANKFULL WIDTH	1.91	1.50	2.04
27) POOL TO POOL SPACING	30.00m	32.3m	5 -9m
28) RATIO OF POOL TO POOL SPACING TO BANKFULL WIDTH	5.21	5.0	1.2 - 2.0

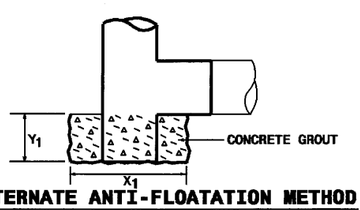
3-JUN-2004 15:15



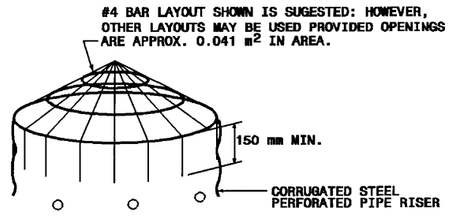
SECTIONAL VIEW



PROFILE VIEW



ALTERNATE ANTI-FLOATATION METHOD

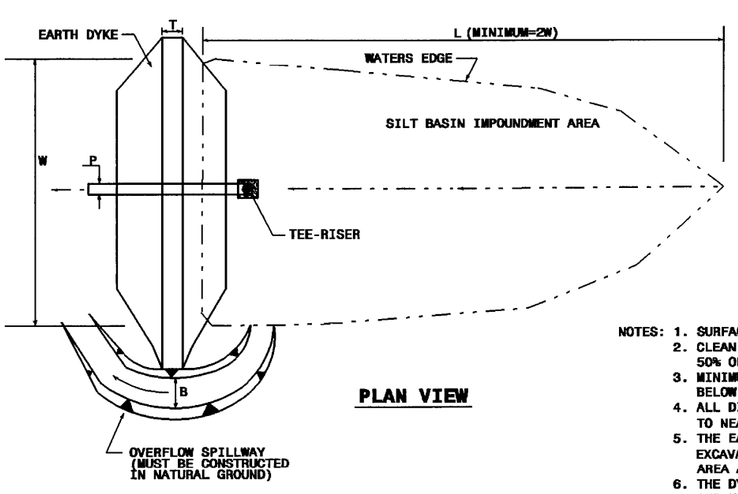


RISER DETAIL

SHEET 2 OF 2

SPECIAL DETAIL FOR TYPE "A" SILT BASIN

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



PLAN VIEW

NOTES:
1. SURFACE AREA AND VOLUME ARE TO BE SITE SPECIFIC.
2. CLEAN OUT SEDIMENT WHEN STORAGE VOLUME REACHES 50% OF MIN. STORAGE VOLUME.
3. MINIMUM SURFACE AREA AND MINIMUM VOLUME ARE MEASURED BELOW THE TOP OF PRINCIPLE SPILLWAY (TOP OF RISER).
4. ALL DIMENSIONS OF BASIN WILL NOT REQUIRE CONSTRUCTION TO NEAT LINES.
5. THE EARTH DYKE MAY BE CONSTRUCTED ALONG ONE OR MORE SIDES. EXCAVATION MAY BE REQUIRED TO PROVIDE MINIMUM SURFACE AREA AND/OR MINIMUM STORAGE VOLUME.
6. THE DYKE SHALL BE CONSTRUCTED OF MATERIAL SUITABLE FOR AND MEETING ROADWAY EMBANKMENT SPECIFICATIONS.
7. TO FACILITATE DETERMINATION OF MAINTENANCE CLEANOUT REQUIREMENT A MARKER SHOULD BE PLACED IN THE BASIN INDICATING THE 50% VOLUME LEVEL.

BASIN #	APPROX. STA.	P	H	T (min)	D*	E	F	B (min)	X (min)	Y (min)	X_1 (min)	Y_1 (min)	SURFACE AREA (min)	STORAGE VOLUME (min)
		mm	m	m	m	m	m	m	m	m	m	m	m^2	m^3
1	33+40 (LT)	600	0.3	1.8	2.11	1.20	0.61	1.81	1.2	0.45	1.1	0.45	332	370
2	35+30 (LT)	600	0.3	1.8	2.41	1.50	0.61	2.92	1.3	0.45	1.2	0.45	534	513

* SHALL NOT EXCEED 3.7 m

HYDRAULICS ENGINEER

P.K.
SIGNATURE

SHEET 1 OF 2

SPECIAL DETAIL FOR TYPE "A" SILT BASIN

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

PROJECT REFERENCE NO. R-0609 1A
SHEET NO. 20

PROJECT REFERENCE NO.	SHEET NO.
R-0690 1A	4
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

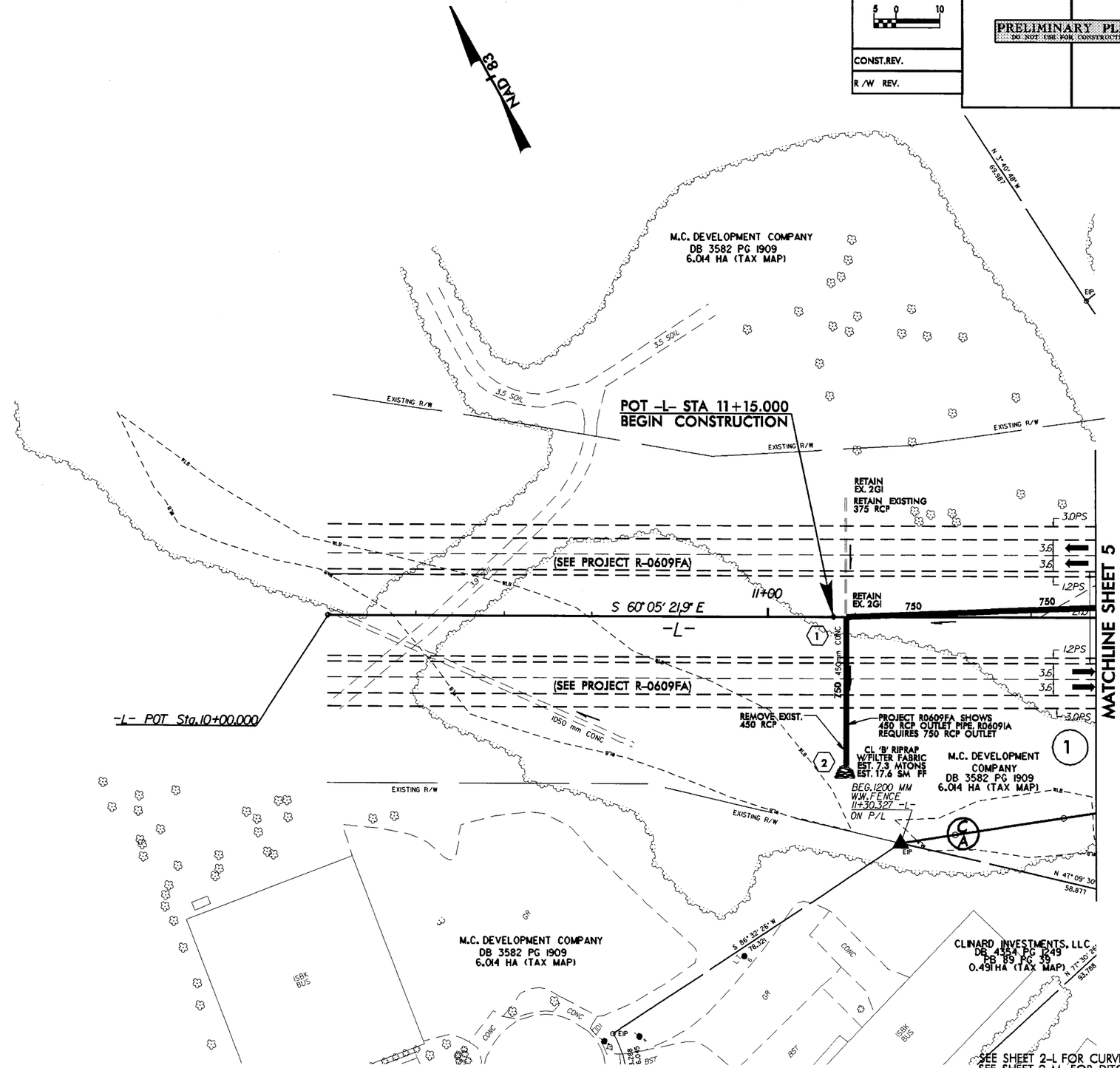
CONST.REV.

R /W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

RON REVISION.THIS REVISION CONSISTS OF ADDING EXISTING ROW TO PARCEL 1.
WPW 03-17-2005



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 3B FOR -L- PROFILE

31-JAN-2006 11:35
r:\roadway\proj\r0690_rw_sht04.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

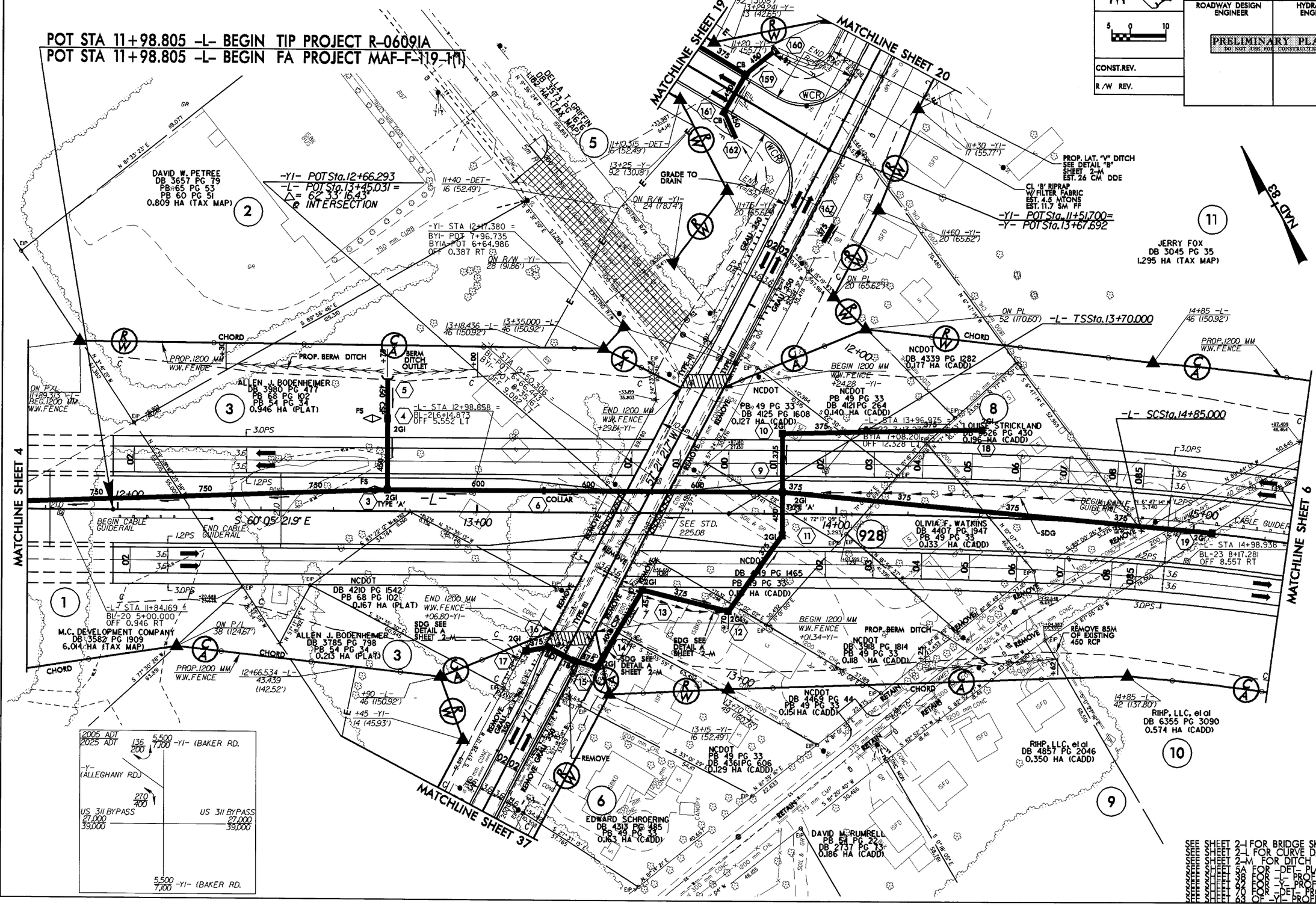
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

POT STA 11+98.805 -L- BEGIN TIP PROJECT R-0609IA
POT STA 11+98.805 -L- BEGIN FA PROJECT MAF-F-119-1(1)



SEE SHEET 2-I FOR BRIDGE SKETCH
SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 5A FOR -DET- PLAN VIEW
SEE SHEET 38 FOR -L- PROFILE
SEE SHEET 39 FOR -Y- PROFILE
SEE SHEET 70 FOR -DET- PROFILE
SEE SHEET 63 OF -Y1- PROFILE

NOTE: SEE SHEET 5 FOR R/W AND EASEMENT LIMITS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	5A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

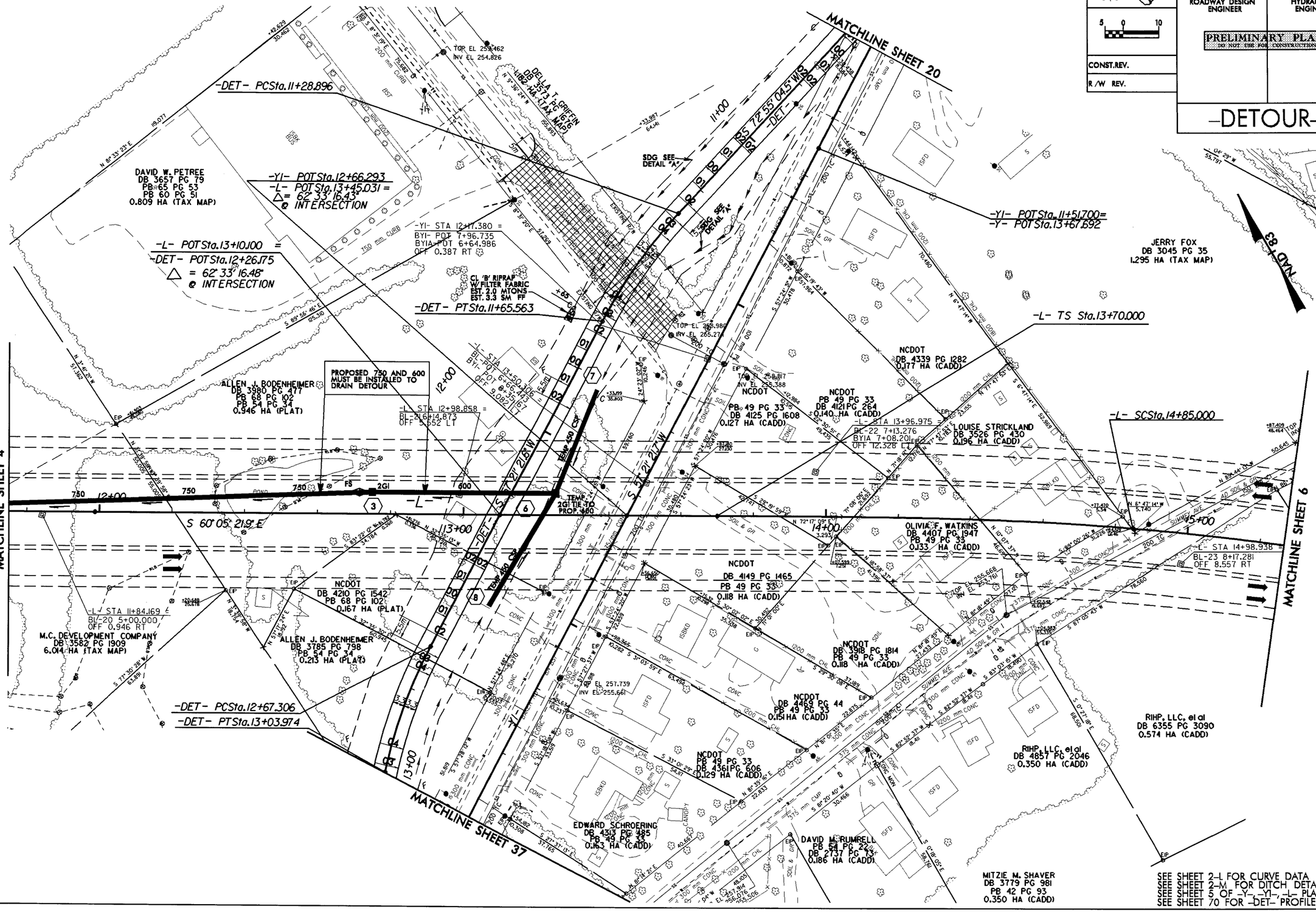
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

-DETOUR-



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 5 OF -Y-, -YI-, -L- PLAN VIEW
SEE SHEET 70 FOR -DET- PROFILE

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

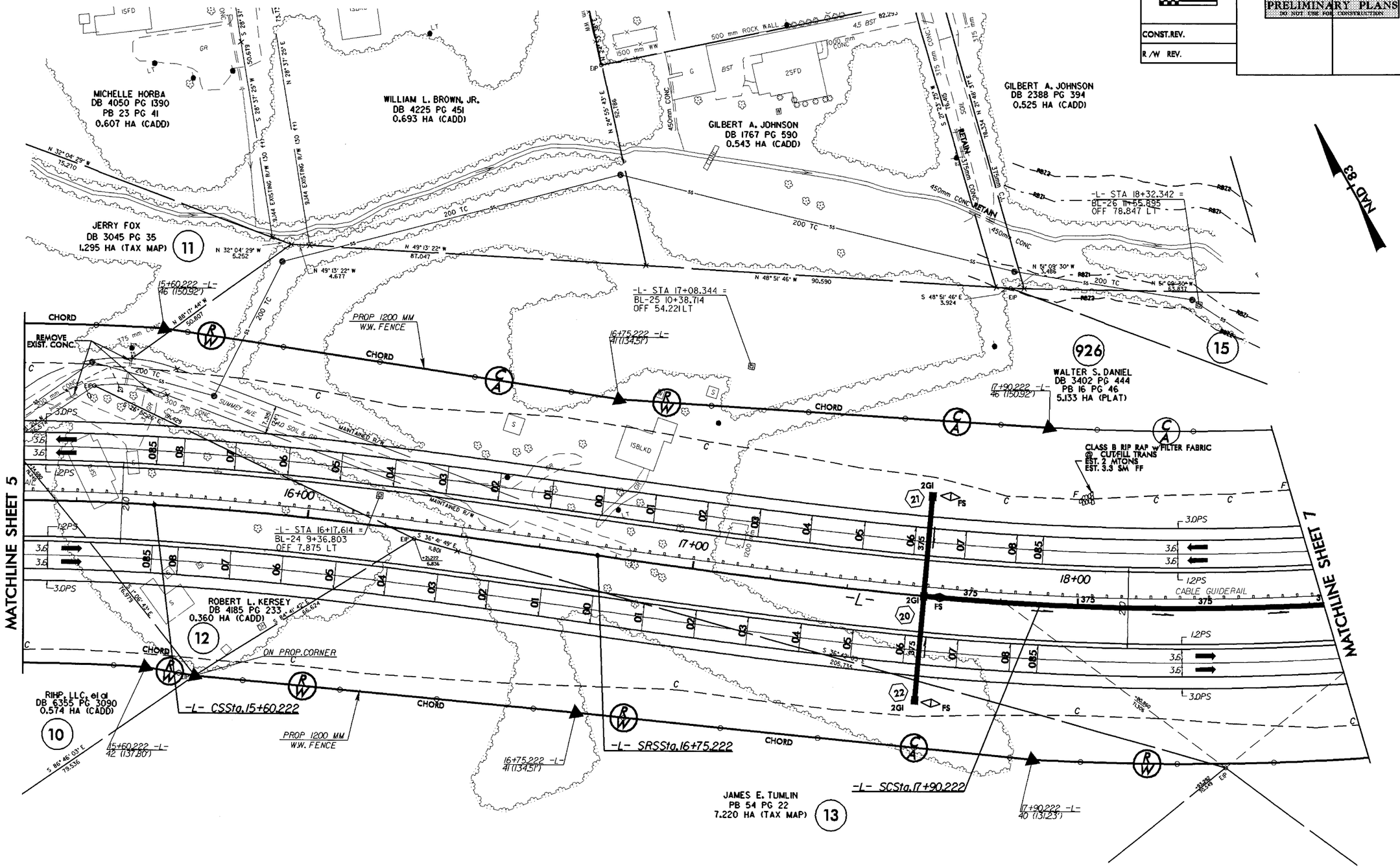
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 38, 39 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

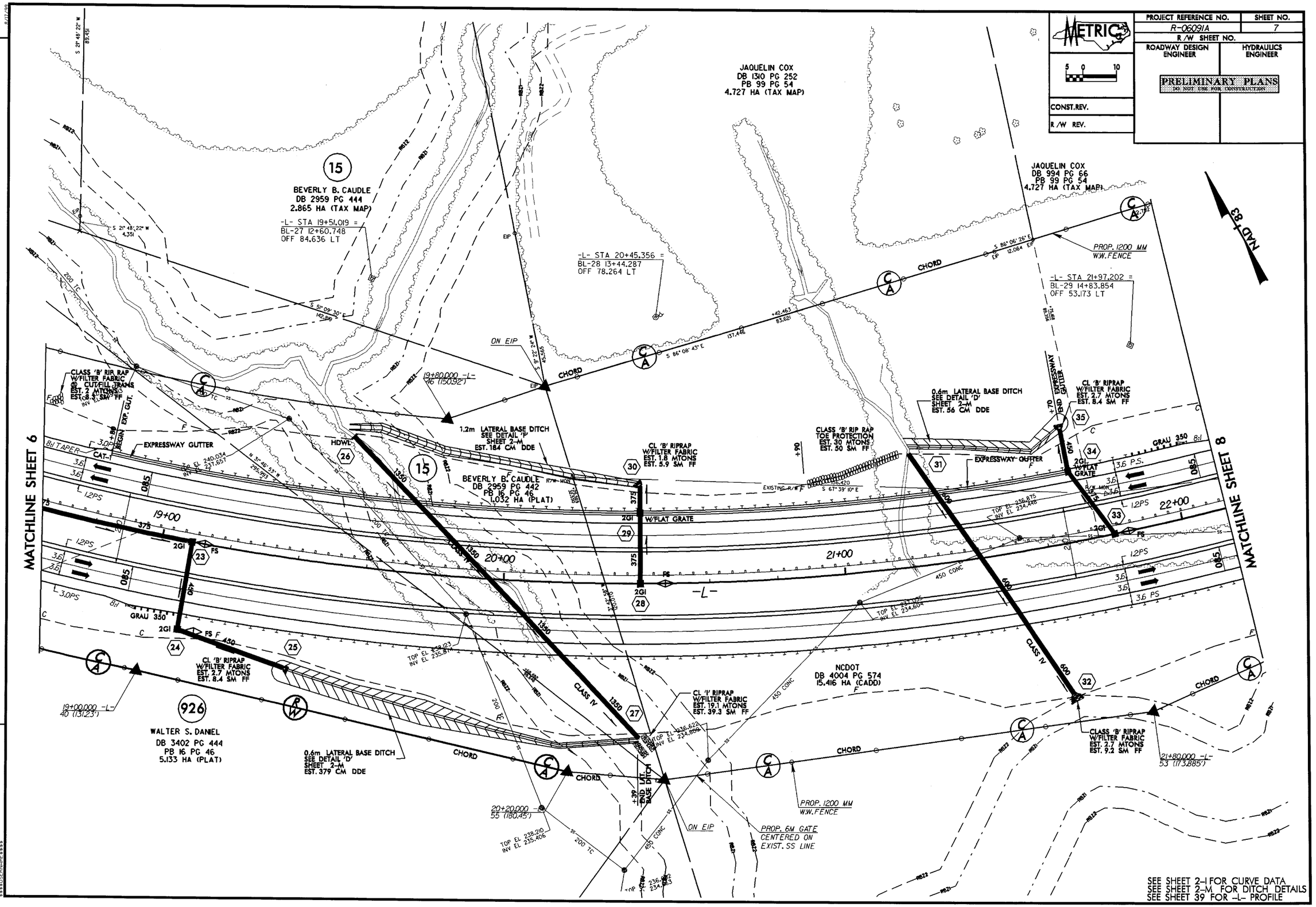
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

RON REVISIONS, ADDED PARCEL #15, LETTER DATED, 10-05-2004
WPW 10-25-2004



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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

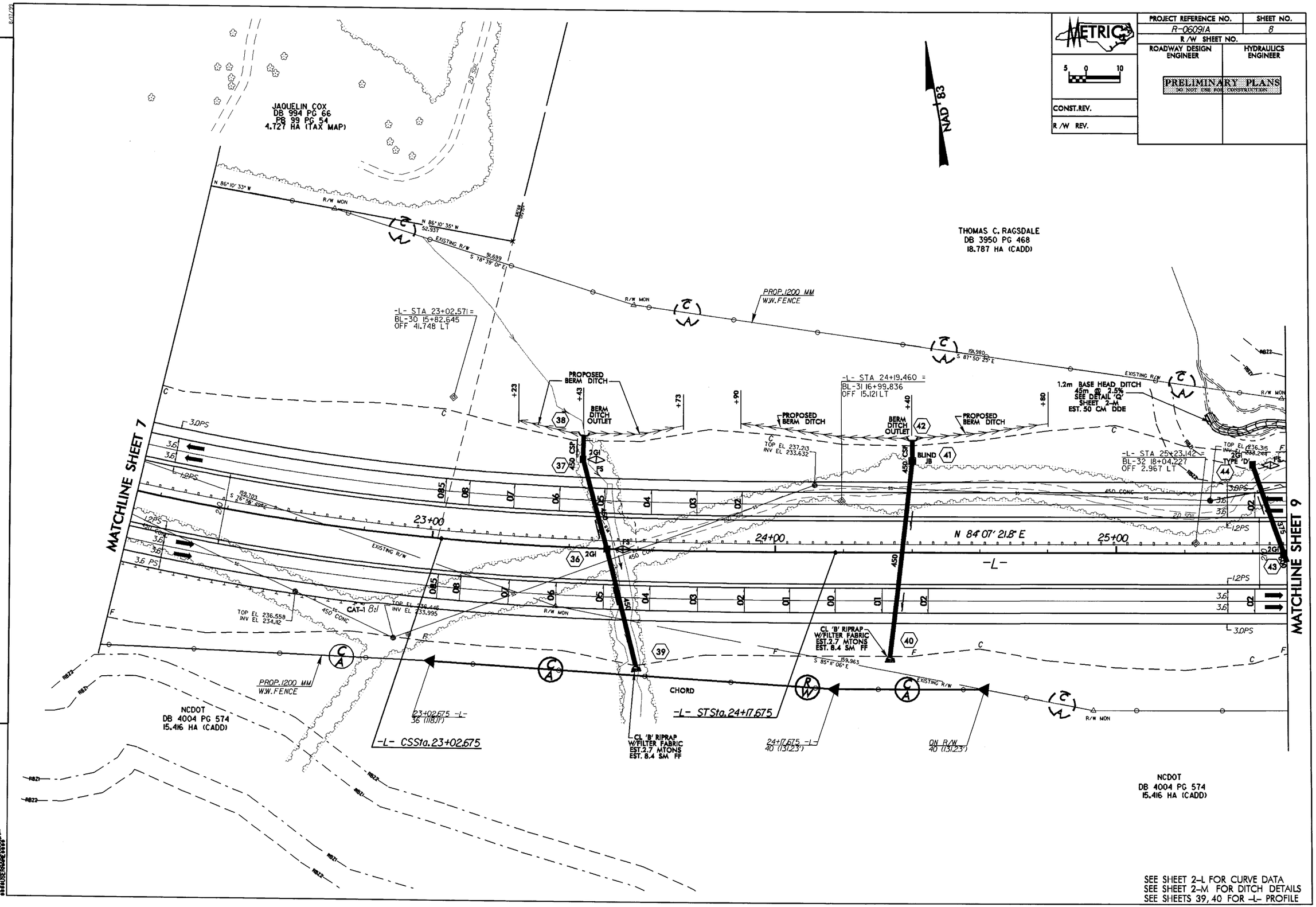
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

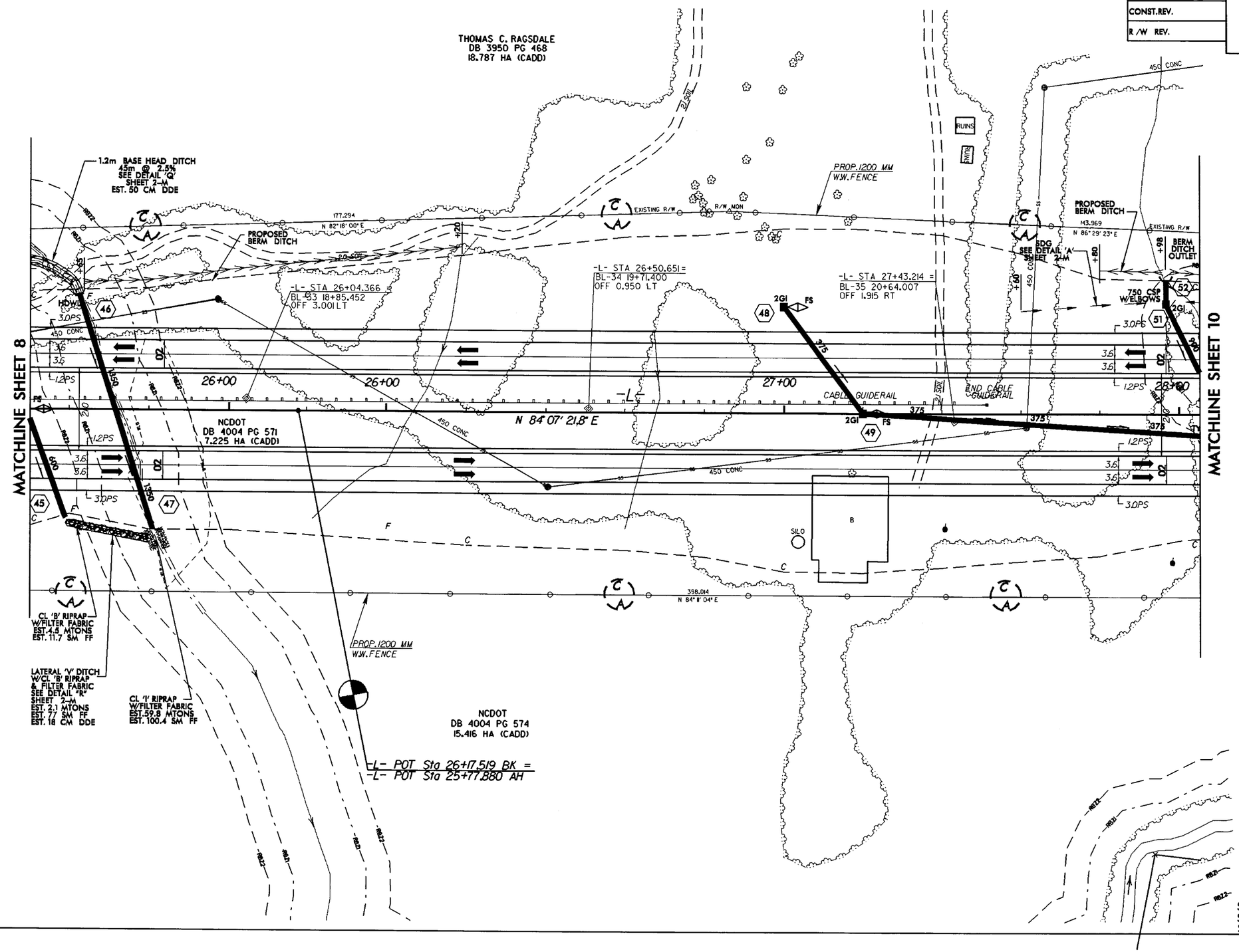
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 40 FOR -L- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

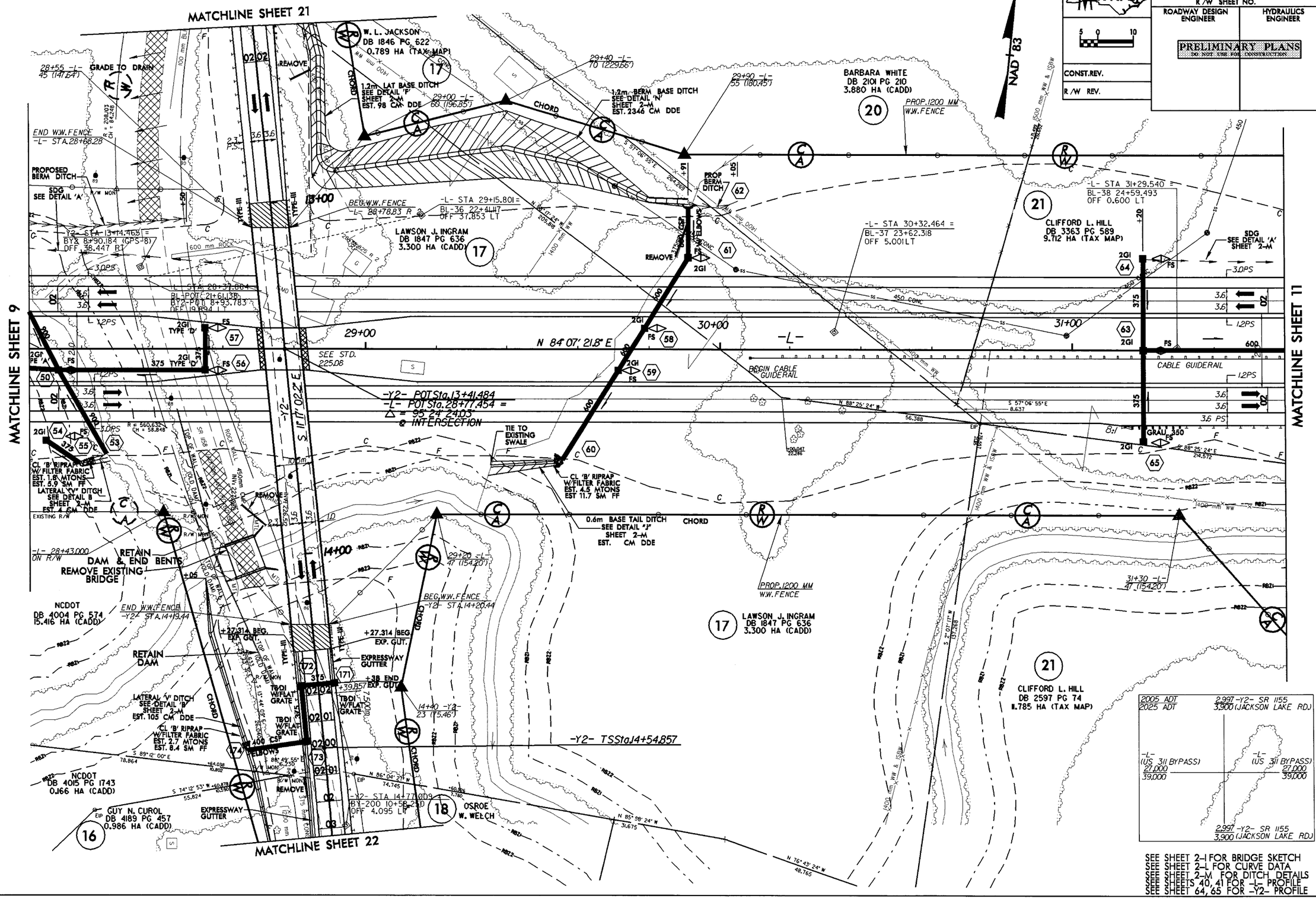
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/2012



SEE SHEET 2-I FOR BRIDGE SKETCH
SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 40, 41 FOR -L- PROFILE
SEE SHEET 64, 65 FOR -Y2- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

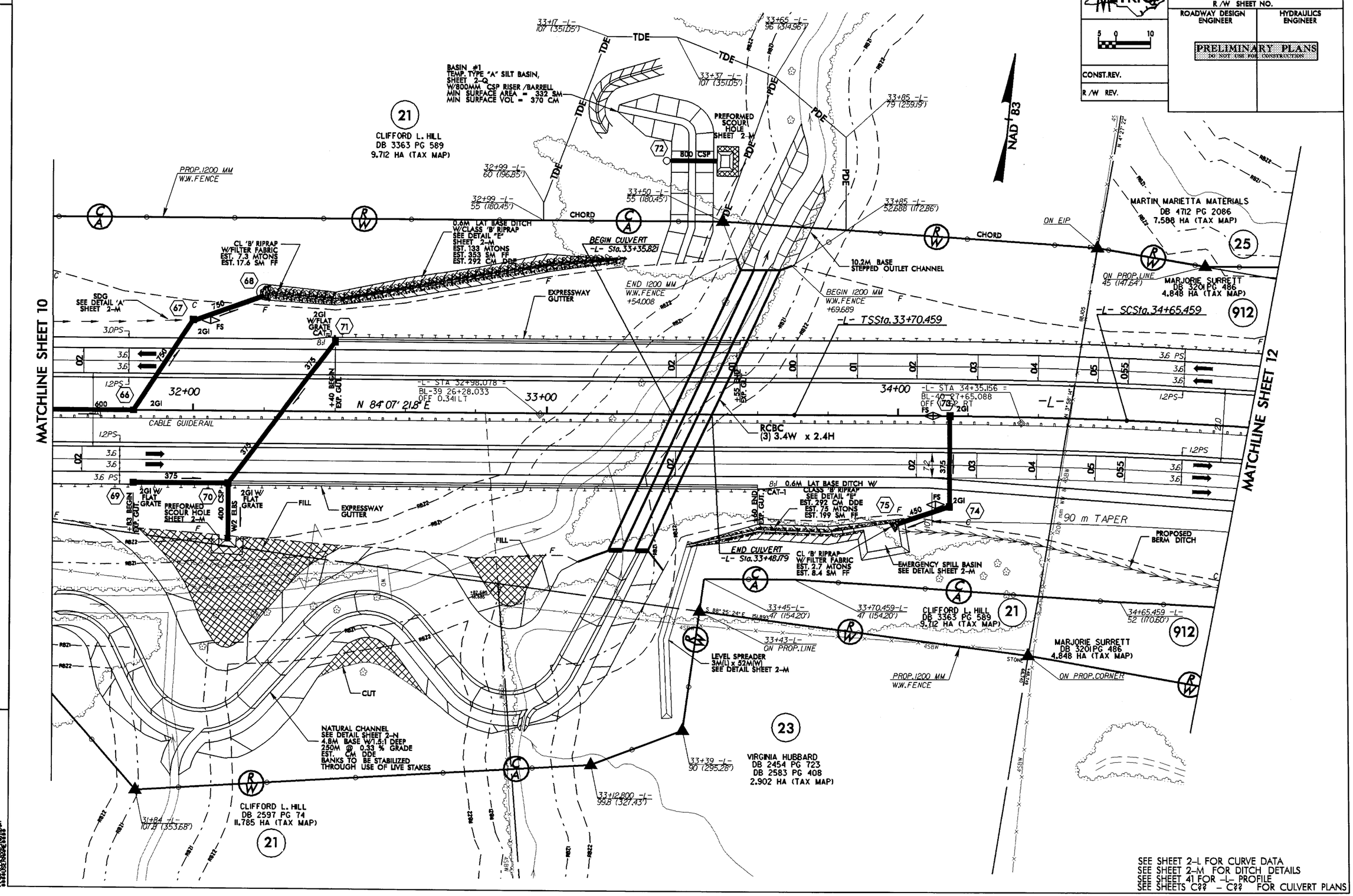
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/17/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 41 FOR -L- PROFILE
SEE SHEETS C?? - C?? FOR CULVERT PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

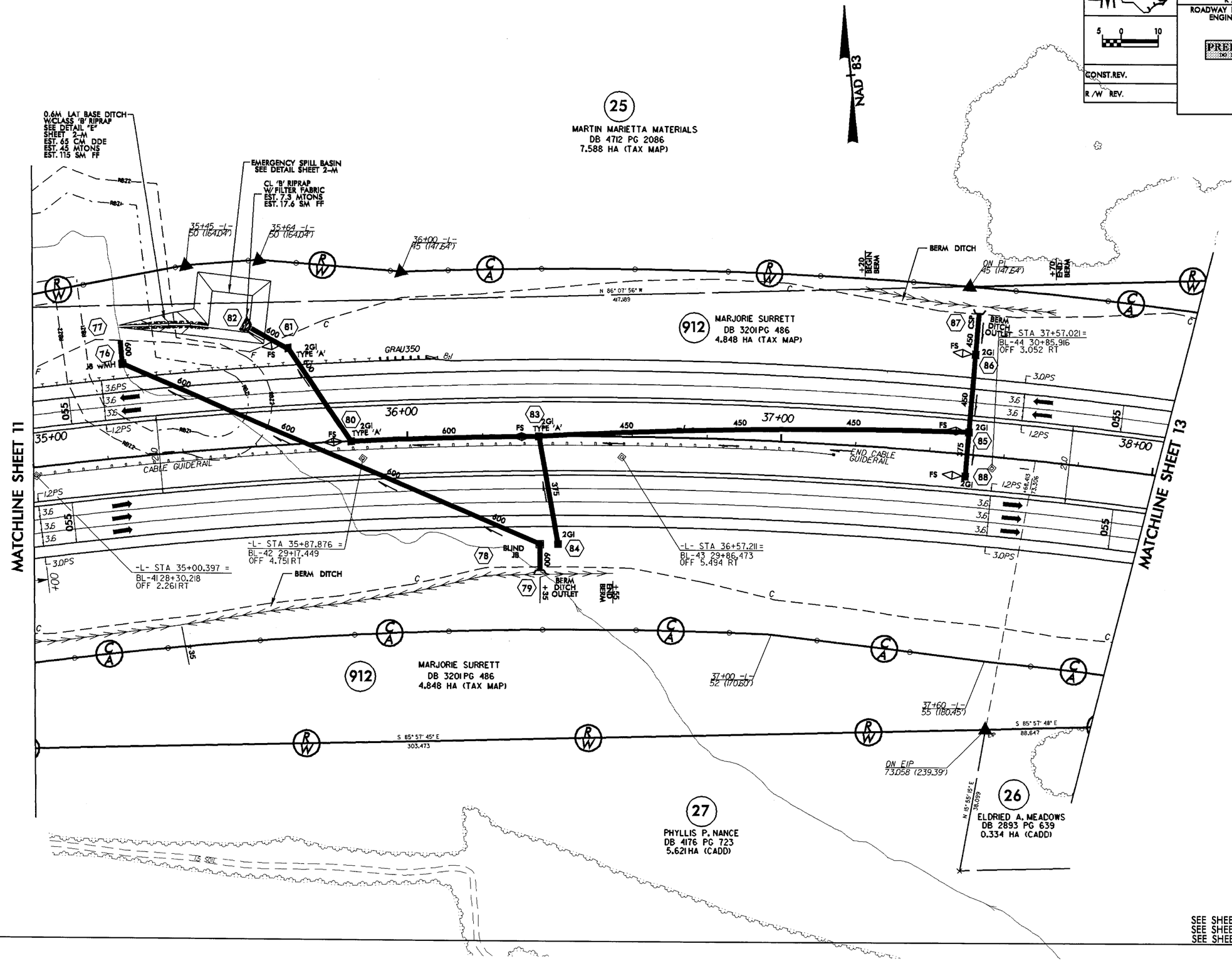
CONST.REV.

R/W REV.

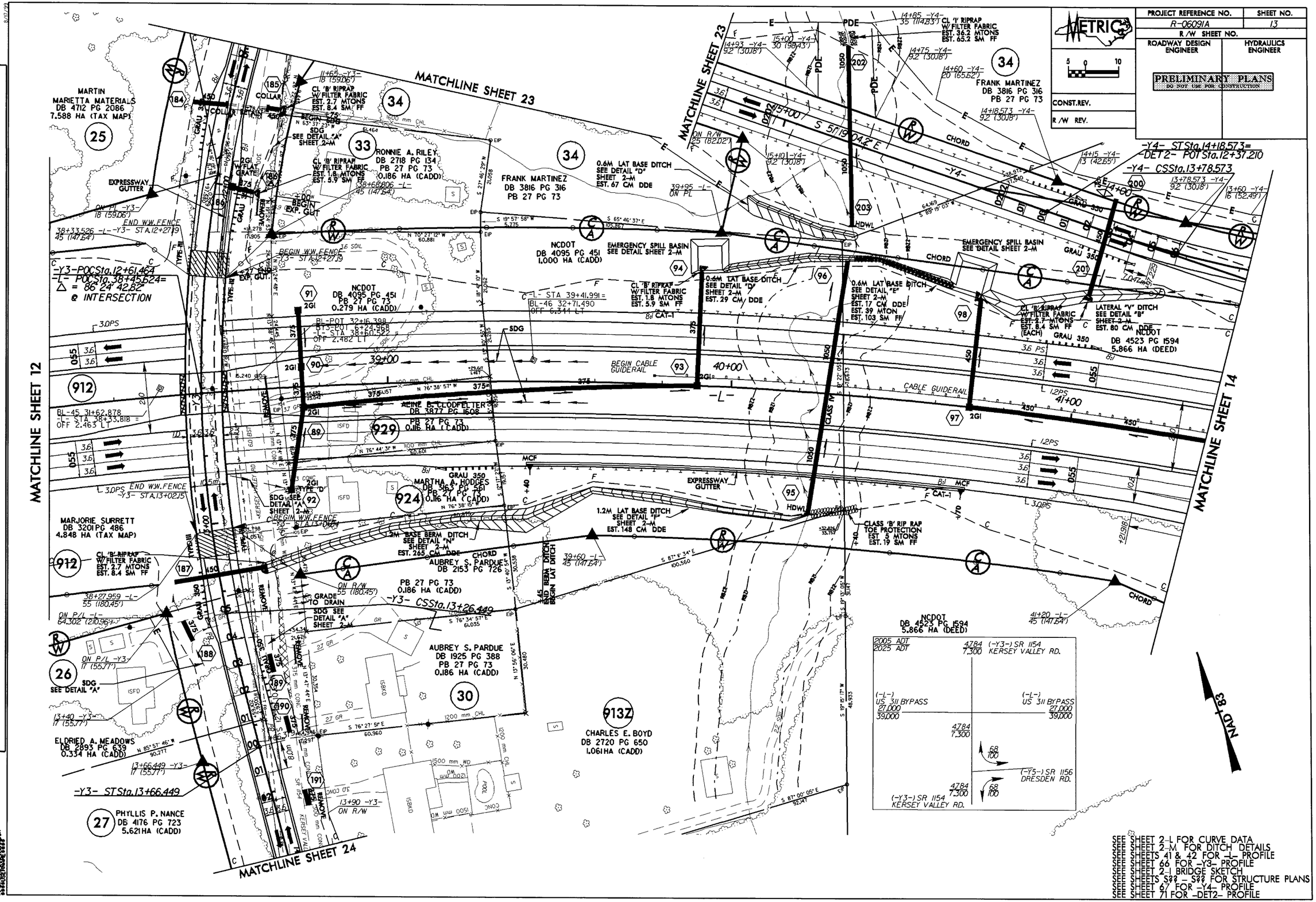
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

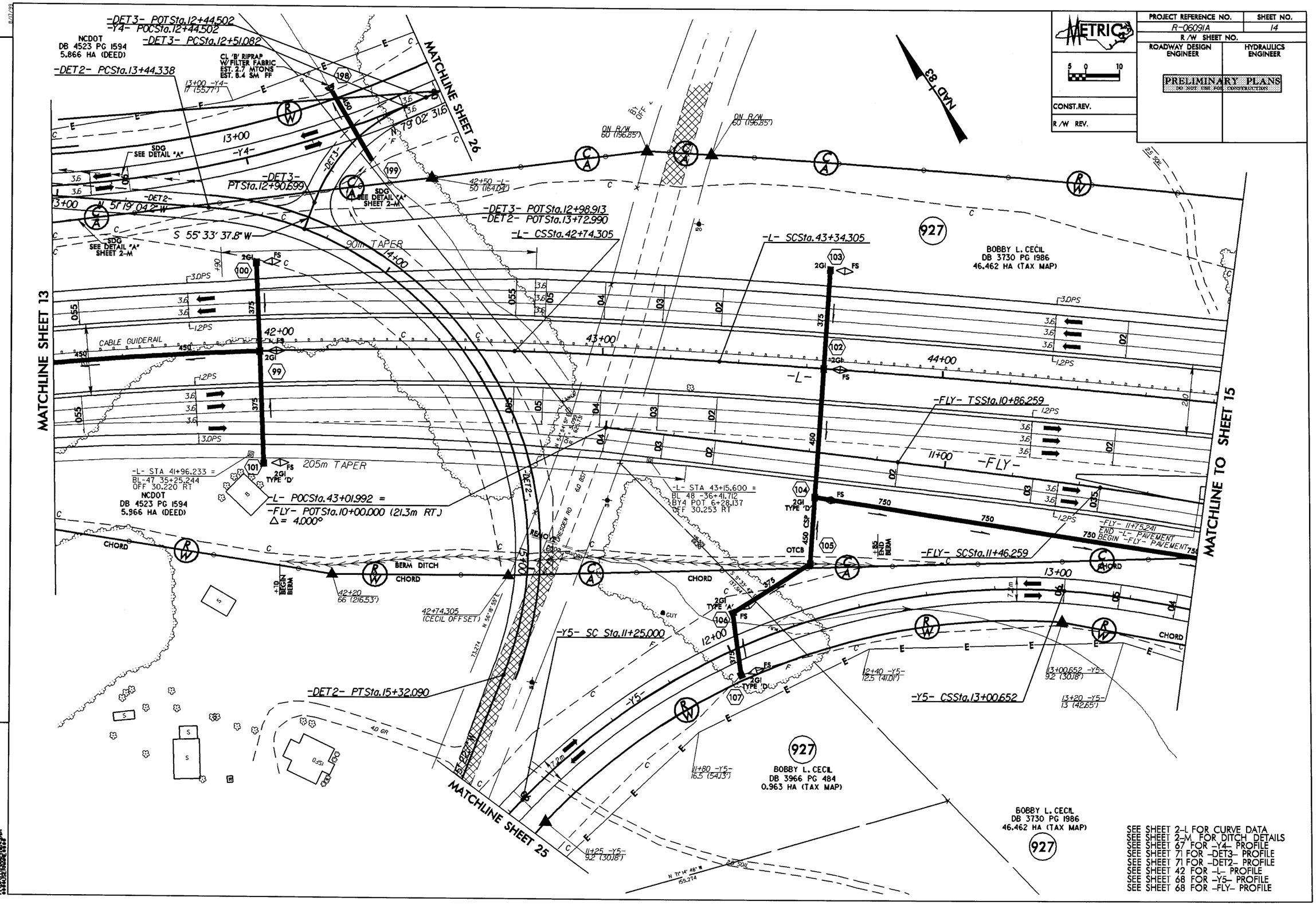
REVISIONS

8/17/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 41 FOR -L- PROFILE

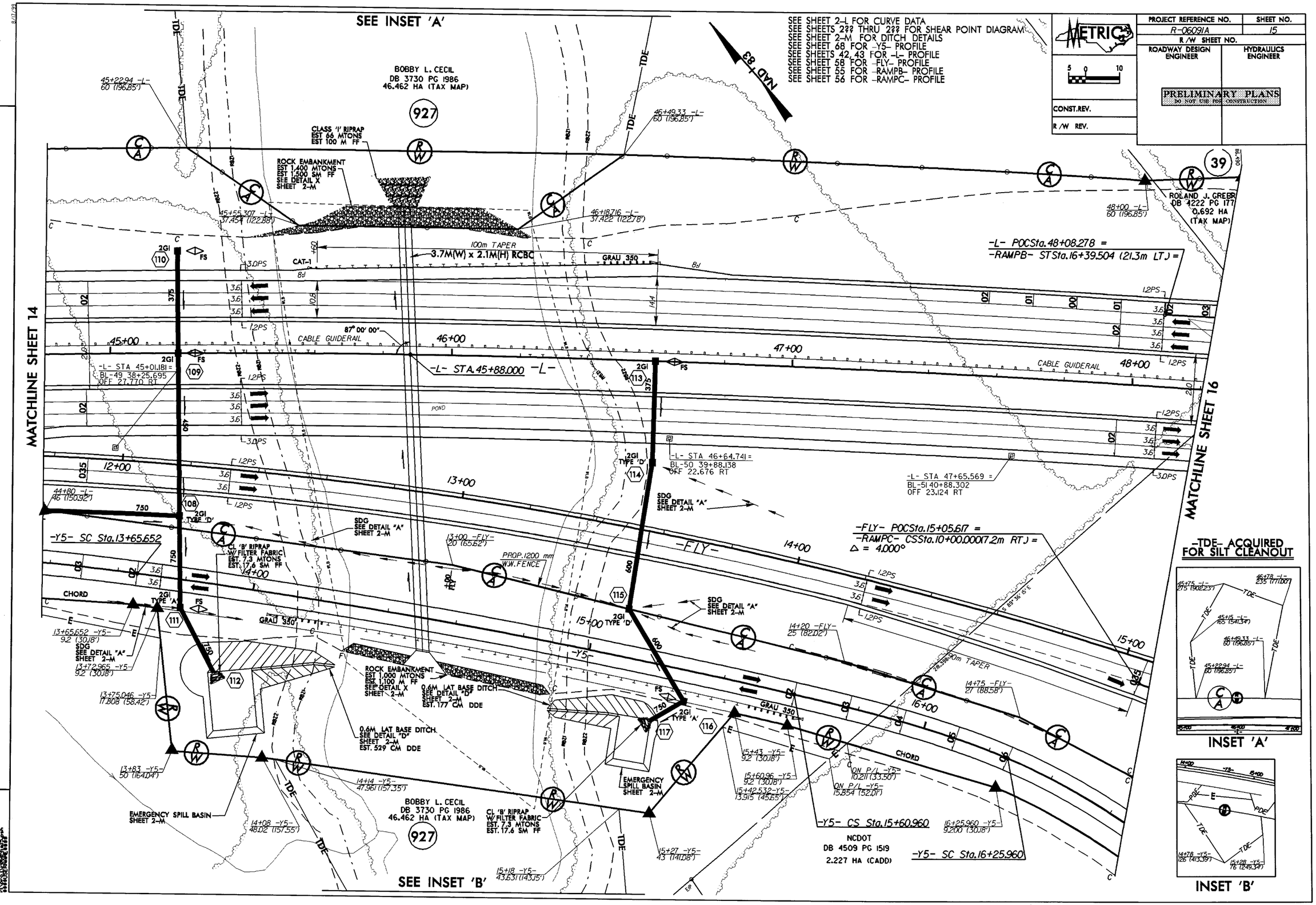

METRIC
PROJECT REFERENCE NO.
R-0609IA
SHEET NO.
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
REVISIONS
MATCHLINE SHEET 12
MATCHLINE SHEET 23
MATCHLINE SHEET 24
MATCHLINE SHEET 14
MARTIN MARETTA MATERIALS DB 4712 PG 2086 7.588 HA (TAX MAP)
RONNIE A. RILEY DB 2718 PG 134 PB 27 PG 73 0.186 HA (CADD)
FRANK MARTINEZ DB 3816 PG 316 PB 27 PG 73
NCDOT DB 4095 PG 451 1.000 HA (CADD)
NCDOT DB 4095 PG 451 PB 27 PG 73 0.279 HA (CADD)
ALINE B. CLODFELTER DB 3877 PG 1608 PB 27 PG 73 0.186 HA (CADD)
MARTHA A. HODGES DB 3653 PG 561 PB 27 PG 73 0.186 HA (CADD)
MARJORIE SURRETT DB 3201 PG 486 4.848 HA (TAX MAP)
AUBREY S. PARDUE DB 2153 PG 726 PB 27 PG 73 0.186 HA (CADD)
AUBREY S. PARDUE DB 1925 PG 388 PB 27 PG 73 0.186 HA (CADD)
ELDRIED A. MEADOWS DB 2893 PG 639 0.334 HA (CADD)
PHYLLIS P. NANCE DB 4176 PG 723 5.621HA (CADD)
CHARLES E. BOYD DB 2720 PG 650 1.061HA (CADD)
NCDOT DB 4523 PG 1594 5.866 HA (DEED)
-Y3-POCSta.12+61.464
-L- POCSta.38+45.624= △ = 86°24'42.82" @ INTERSECTION
-Y3- STSta.13+66.449
-Y3- CSSta.13+26.449
-Y4- STSta.14+18.573= -DET2- POTSta.12+37.210
-Y4- CSSta.13+78.573
EXPRESSWAY GUTTER
CLASS 'B' RIP RAP TOE PROTECTION EST. 5 MTONS EST. 19 SM FF
EMERGENCY SPILL BASIN SEE DETAIL SHEET 2-M
LATERAL "V" DITCH SEE DETAIL "B" SHEET 2-M EST. 80 CM DDE
2005 ADT 4784 (-Y3-) SR 1154
2025 ADT 7,300 KERSEY VALLEY RD.
(-L-) US 311 BYPASS 27,000 39,000
(-Y5-) SR 1156 DRESDEN RD.
(-Y3-) SR 1154 KERSEY VALLEY RD.
NAD 83
SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 41 & 42 FOR -L- PROFILE
SEE SHEET 66 FOR -Y3- PROFILE
SEE SHEET 2-I BRIDGE SKETCH
SEE SHEETS S?? - S?? FOR STRUCTURE PLANS
SEE SHEET 67 FOR -Y4- PROFILE
SEE SHEET 71 FOR -DET2- PROFILE

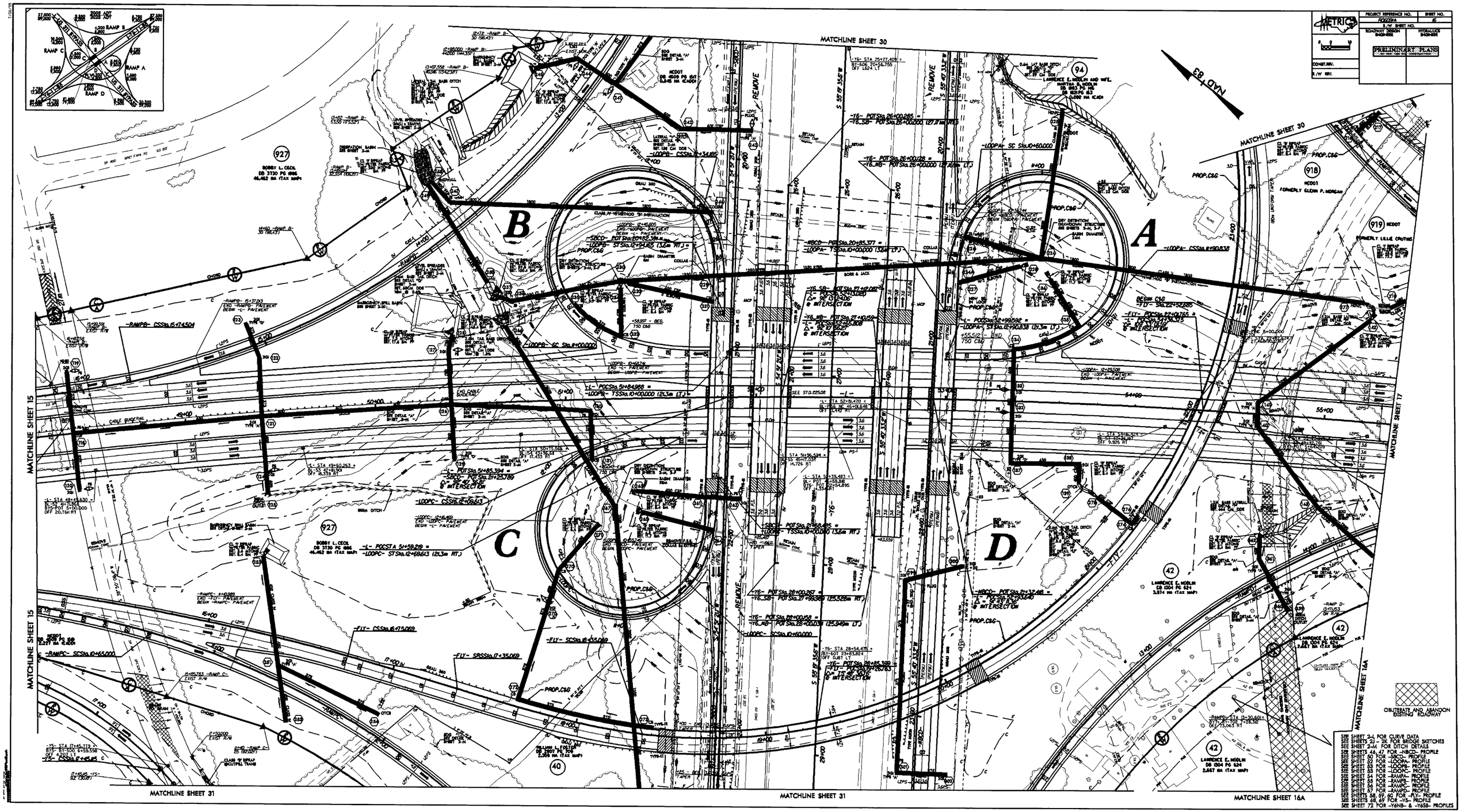


REVISIONS

ROW REVISIONS, PARCELS 37, 38, 73 COMBINED INTO PARCEL 927, LETTER DATED 3-2-2004
WPW 04-20-2004

8/07/98


SEE INSET 'A'
SEE INSET 'B'
MATCHLINE SHEET 14
MATCHLINE SHEET 16
NAD 83
METRIC
PROJECT REFERENCE NO.
R-0609IA
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
CONST.REV.
R/W REV.
SEE SHEET 2-L FOR CURVE DATA
SEE SHEETS 2?? THRU 2?? FOR SHEAR POINT DIAGRAM
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 68 FOR -Y5- PROFILE
SEE SHEETS 42, 43 FOR -L- PROFILE
SEE SHEET 58 FOR -FLY- PROFILE
SEE SHEET 55 FOR -RAMPB- PROFILE
SEE SHEET 56 FOR -RAMPC- PROFILE
BOBBY L. CECIL
DB 3730 PG 1986
46.462 HA (TAX MAP)
927
CLASS 'I' RIPRAP
EST 66 MTONS
EST 100 M FF
ROCK EMBANKMENT
EST 1,400 MTONS
EST 1,500 SM FF
SEE DETAIL X
SHEET 2-M
ROLAND J. GREER
DB 4222 PG 177
0.692 HA
(TAX MAP)
39
-L- POCSta.48+08.278 =
-RAMPB- STSta.16+39.504 (21.3m LT) =
100m TAPER
3.7M(W) x 2.1M(H) RCBC
GRAU 350
CAT-1
CABLE GUIDERAIL
87° 00' 00"
-L- STA.45+88.000 -L-
-L- STA 45+01.181 =
BL-49 38+25.695
OFF 27.770 RT
-L- STA 46+64.741 =
BL-50 39+88.138
OFF 22.676 RT
-L- STA 47+65.569 =
BL-51 40+88.302
OFF 23.124 RT
POND
SDG
SEE DETAIL "A"
SHEET 2-M
-FLY- POCSta.15+05.617 =
-RAMPC- CSSta.10+00.000(7.2m RT) =
Δ = 4.000°
-FLY-
-Y5- SC Sta.13+65.652
-Y5-
CL 'B' RIPRAP
W/FILTER FABRIC
EST. 7.3 MTONS
EST. 17.6 SM FF
PROP. 1200 mm
W.W. FENCE
CHORD
GRAU 350
ROCK EMBANKMENT
EST 1,000 MTONS
EST. 1,100 M FF
SEE DETAIL X
SHEET 2-M
0.6M LAT BASE DITCH
SEE DETAIL "D"
SHEET 2-M
EST. 177 CM DDE
0.6M LAT BASE DITCH
SEE DETAIL "D"
SHEET 2-M
EST. 529 CM DDE
EMERGENCY SPILL BASIN
SHEET 2-M
-Y5- CS Sta.15+60.960
-Y5- SC Sta.16+25.960
NCDOT
DB 4509 PG 1519
2.227 HA (CADD)
-TDE- ACQUIRED
FOR SILT CLEANOUT
INSET 'A'
INSET 'B'
REVISIONS


MATCHLINE SHEET 30
MATCHLINE SHEET 15
MATCHLINE SHEET 17
MATCHLINE SHEET 31
MATCHLINE SHEET 16A
NAD 83
A
B
C
D
PROJECT REFERENCE NO.
SHEET NO.
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
NOT FOR CONSTRUCTION
CONST.MIN.
R/W MIN.
OBLITERATE AND ABANDON EXISTING ROADWAY
SEE SHEET 2-J FOR CURVE DATA
SEE SHEETS 3J - 3K FOR BRIDGE SKETCHES
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 46,47 FOR -NBCD- PROFILE
SEE SHEET 50 FOR -LOOPA- PROFILE
SEE SHEET 51 FOR -LOOPB- PROFILE
SEE SHEET 52 FOR -LOOPC- PROFILE
SEE SHEET 54 FOR -RAMPA- PROFILE
SEE SHEET 55 FOR -RAMPB- PROFILE
SEE SHEET 56 FOR -RAMPC- PROFILE
SEE SHEET 57 FOR -RAMPD- PROFILE
SEE SHEETS 68,69 FOR -FLY- PROFILE
SEE SHEETS 68,69 FOR -Y5- PROFILE
SEE SHEET 72 FOR -Y6NB- & -Y6SB- PROFILES

PROJECT REFERENCE NO.	SHEET NO.
R06091A	16A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

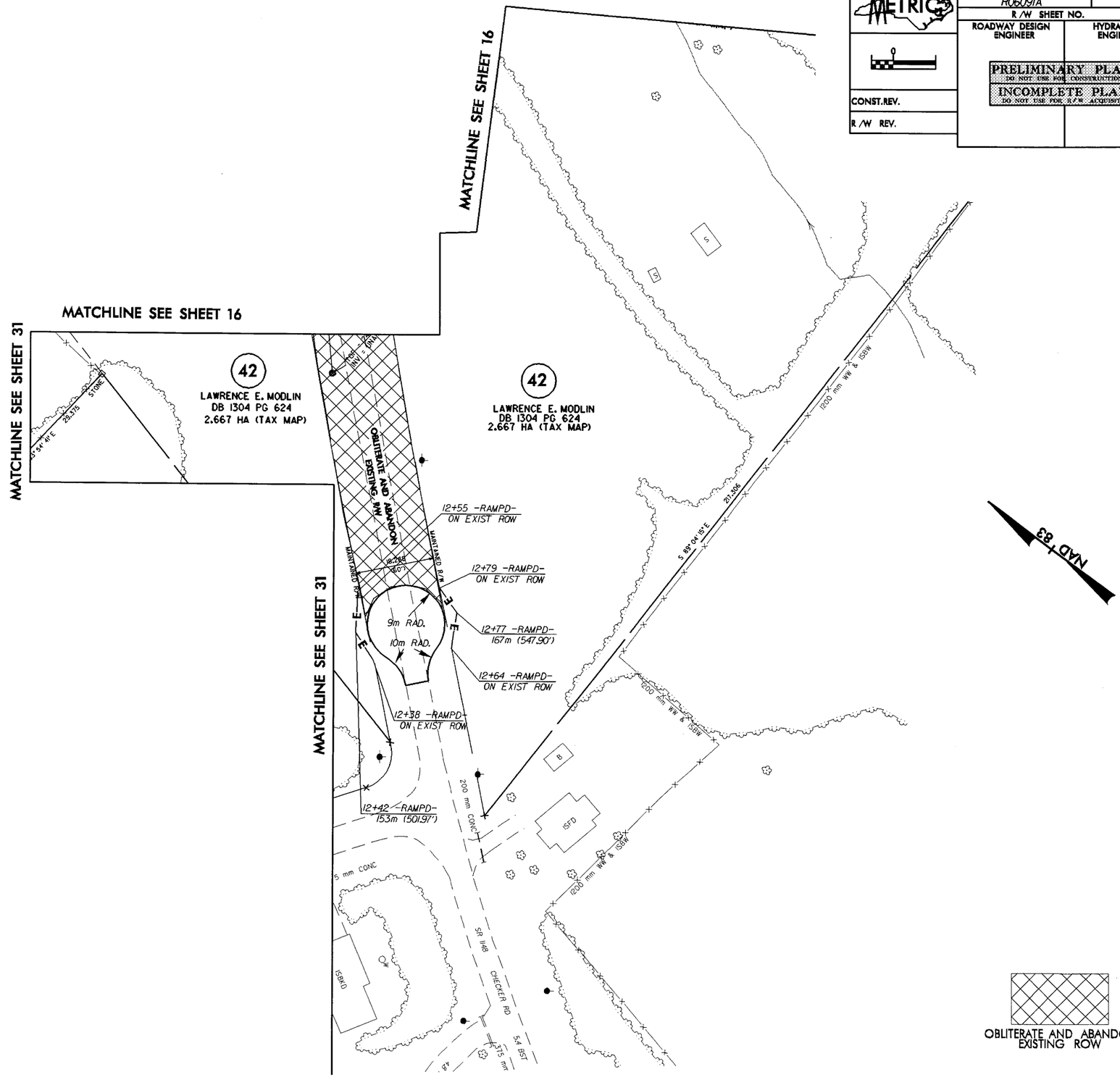
METRIC

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION



REVISIONS

ROW REVISIONS-MOVED CUL-DE-SAC SOUTHWEST-ADDED EASEMENT-ADDED NOTES TO OBLITERATE AND ABANDON EXISTING ROW, COMBINED PARCELS 42 AND 43 AS PARCEL 42. LETTER DATED 3-2-2004
WPW 04-20-2004

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

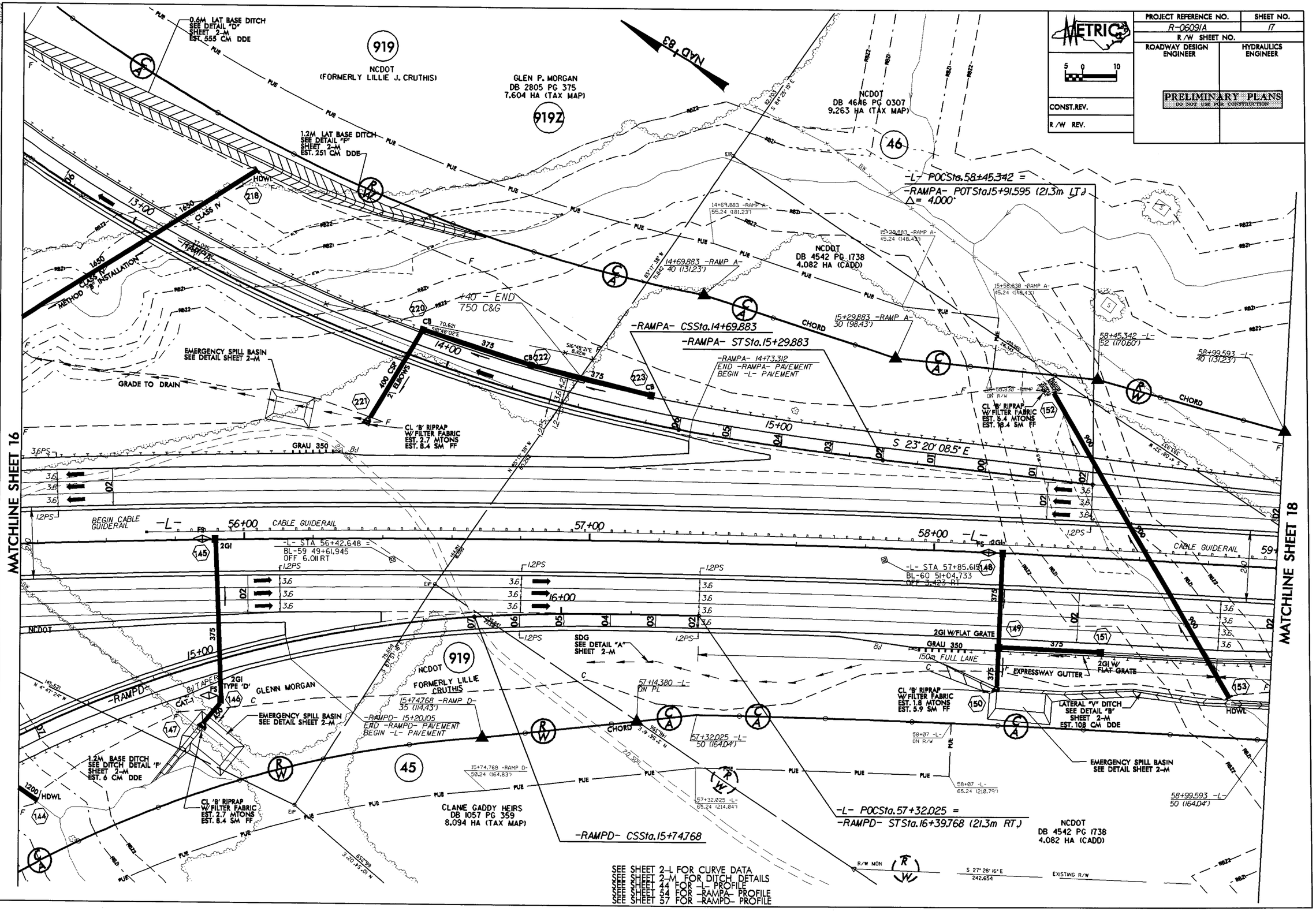
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 44 & 45 FOR -L- PROFILE

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.
R/W REV.

REVISIONS
ROW REVISIONS, PARCEL 46 PROPERTY OWNER CHANGED, LETTER DATED 1-22-2004
WPW 04-20-2004

MATCHLINE SHEET 17

NAD 83

FAIRFIELD GOLF CLUB, INC.
DB 3345 PG 707
PB 5 PG 351
22.140 HA (TAX MAP)

NCDOT
DB 4646 PG 0307
9.263 HA (TAX MAP)

LESSIE COX HEIRS
DB 3345 PG 707
PB 5 PG 351
1.025 HA (CADD)

LESSIE COX HEIRS
DB 1523 PG 215
PB 45 PG 5
0.721 HA (CADD)

NCDOT
DB 4542 PG 1738
4.082 HA (CADD)

JAMES P. HINKLE, SR.
DB 4167 PG 590
DB 4167 PG 593
2.028 HA (TAX MAP)

POT STA. 61+00.000 -L- END TIP PROJECT R-0609IA
POT STA. 61+00.000 -L- END FA PROJECT MAF-F-119-1(1)
R-0609IA -L- STA. 61+00.000 (BK) = R-0609IB -L- STA. 60+59.109 (AH)

58+99.593 -L-
40 (131.23')
59+34.593 -L-
40 (131.23')
61+01.143 -L-
40 (131.23')
61+55.143 -L-
40 (131.23')
ON PL
40 (131.23')

TEMP. 0.6M LAT BASE DITCH
SEE DETAIL "D"
SHEET 2-M
EST. 26 CM DDE

CL 'B' RIPRAP
W/FILTER FABRIC
EST. 1.8 MTONS
EST. 5.9 SM FF

TSSta. 61+01.143
SCSta. 61+55.143
-L- CSSta. 58+99.593
-L- STSta. 59+34.593
-L- STA 59+63.544 =
BL-61 52+82.602
OFF 0.075 LT
-L- STA 60+52.472 =
BL-62 53+71.630
OFF 4.128 RT
BL-63 54+72.535
OFF 1.510 RT
BL-64 55+71.752
OFF 9.538 LT
S 25° 48' 31.0" E
60+00
61+00
62+00
CABLE GUIDERAIL
END CABLE GUIDERAIL
GRAU 350
SEE PROJECT R-0609IB
CHORD
CAT-B1
90m TAPER
0.6M LAT BASE DITCH
SEE DETAIL "D"
SHEET 2-M
EST. 79 CM DDE
POND
EXISTING R/W
R/W MON
S 27° 28' 16" E
242.654
S 25° 47' 00" E
48.914

-L- (R-0609IB)

PIs Sta 61+37.143	PI Sta 62+86.616
θs = 0° 46' 24.6"	Δ = 7° 31' 19.4" (LT)
Ls = 54.000	L = 262.569
LT = 36.000	T = 131.473
ST = 18.000	R = 2,000.000

PROJECT REFERENCE NO.	SHEET NO.
R06091A	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

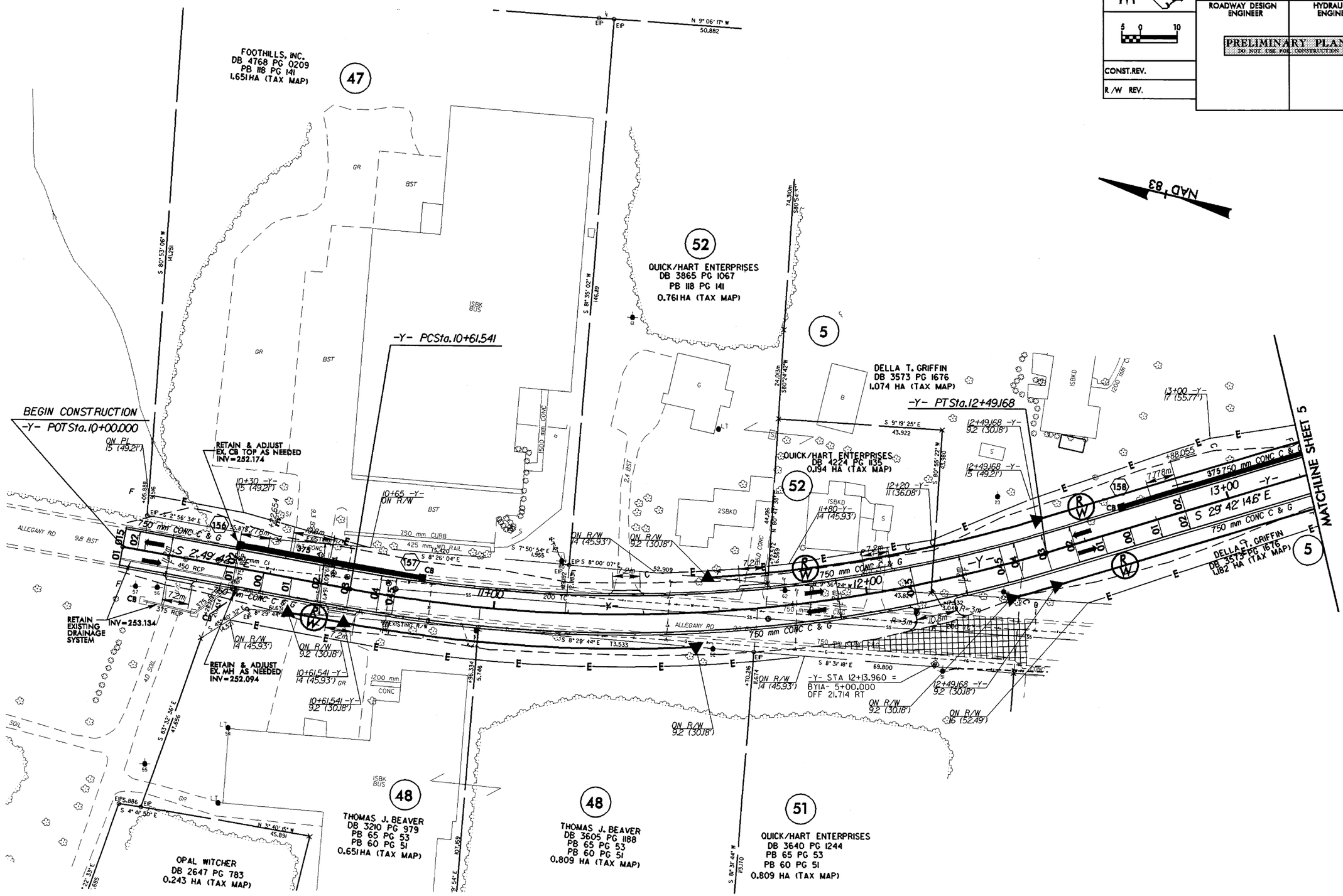
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 62 FOR -Y- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

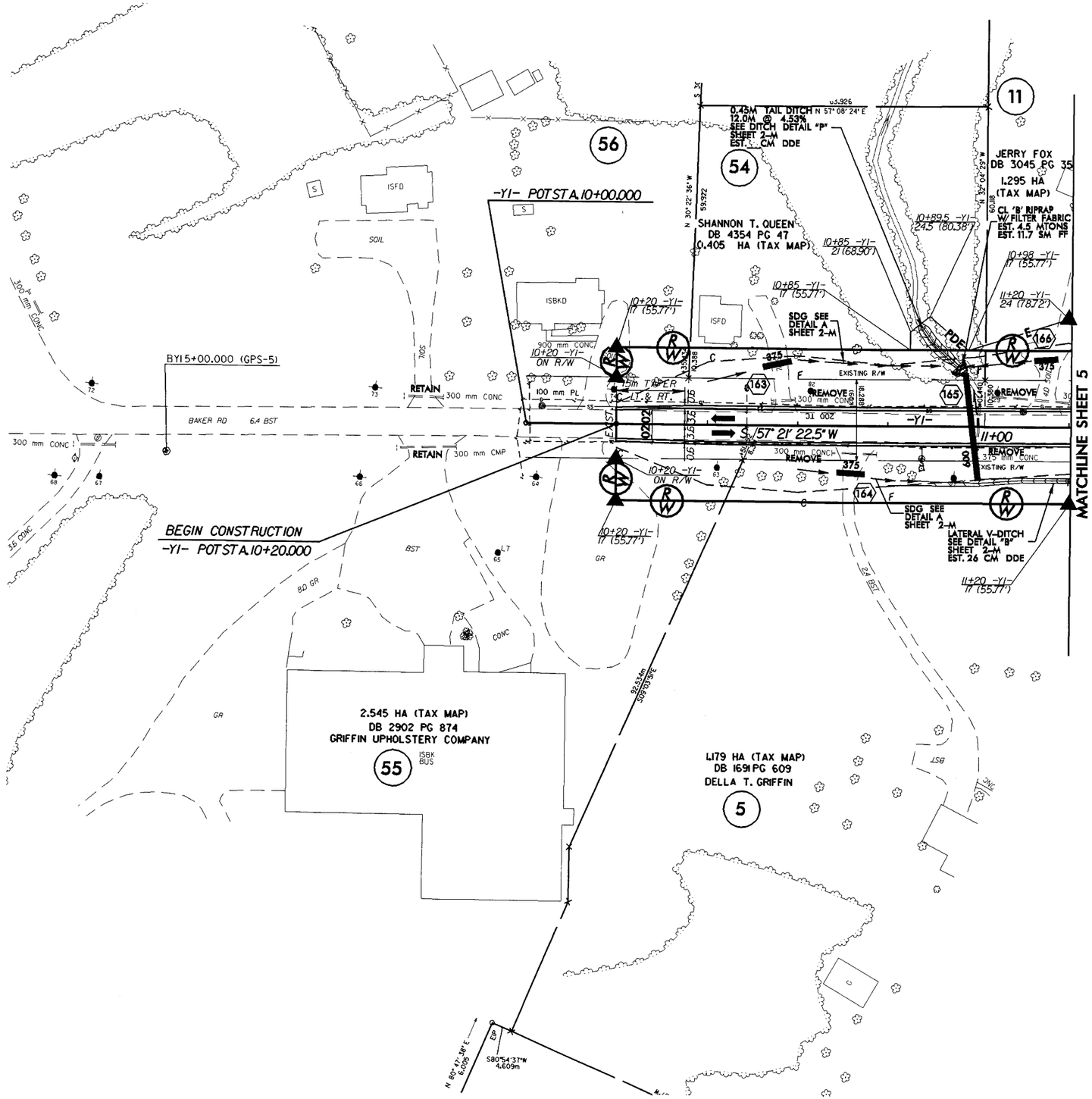
METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.



SEE SHEET 2-I FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 70 FOR -DET- PROFILE
SEE SHEET 63 FOR -Y1- PROFILE

REVISIONS

ROW REVISIONS, CHANGED PARCEL 56 OWNER INFORMATION, LETTER DATED 04-29-2004
WPW 08-31-2004

8/11/99

3-MAY-2006 13:36

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

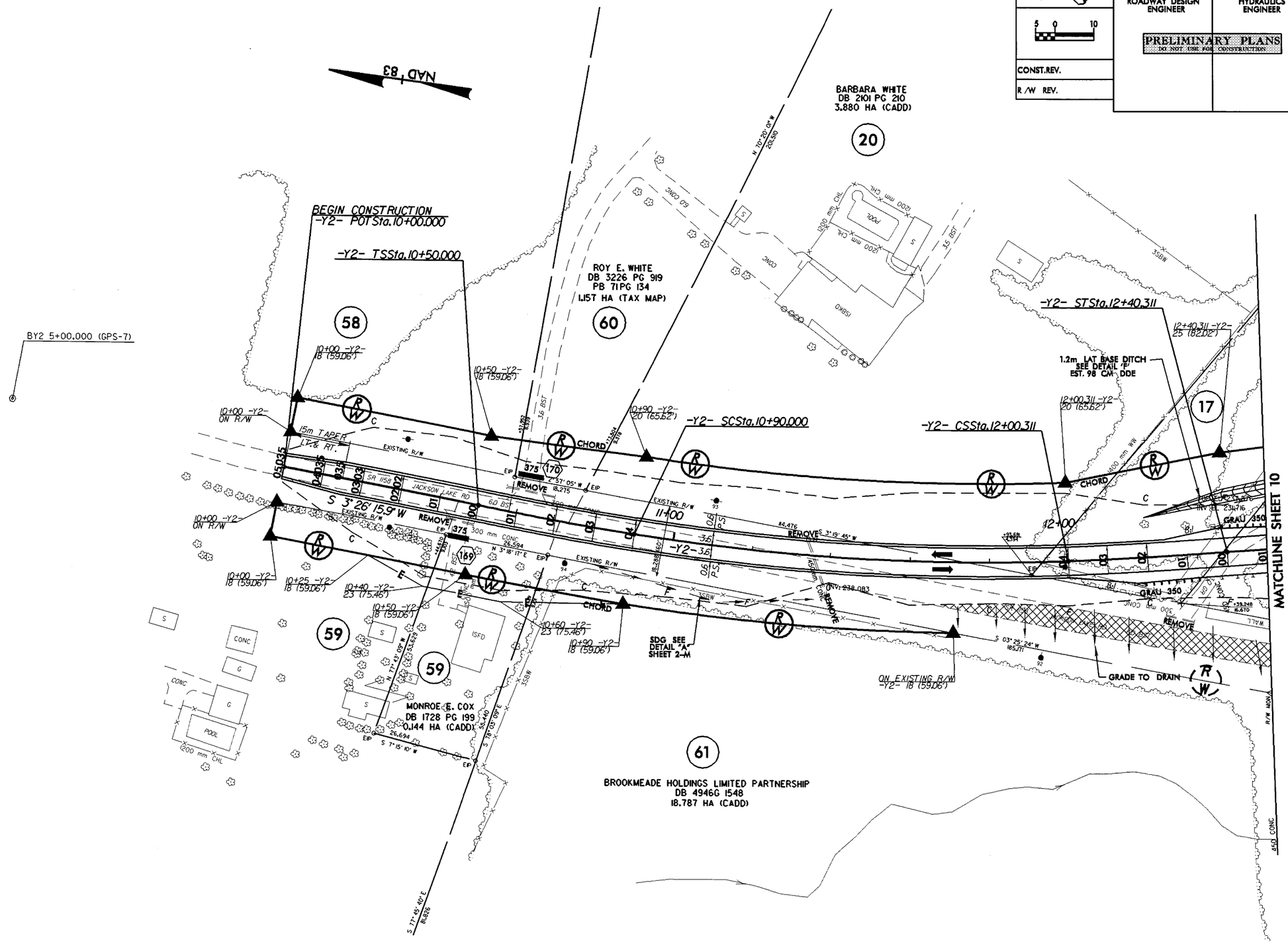
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99



SEE SHEET 2-I FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 64 FOR -Y2- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

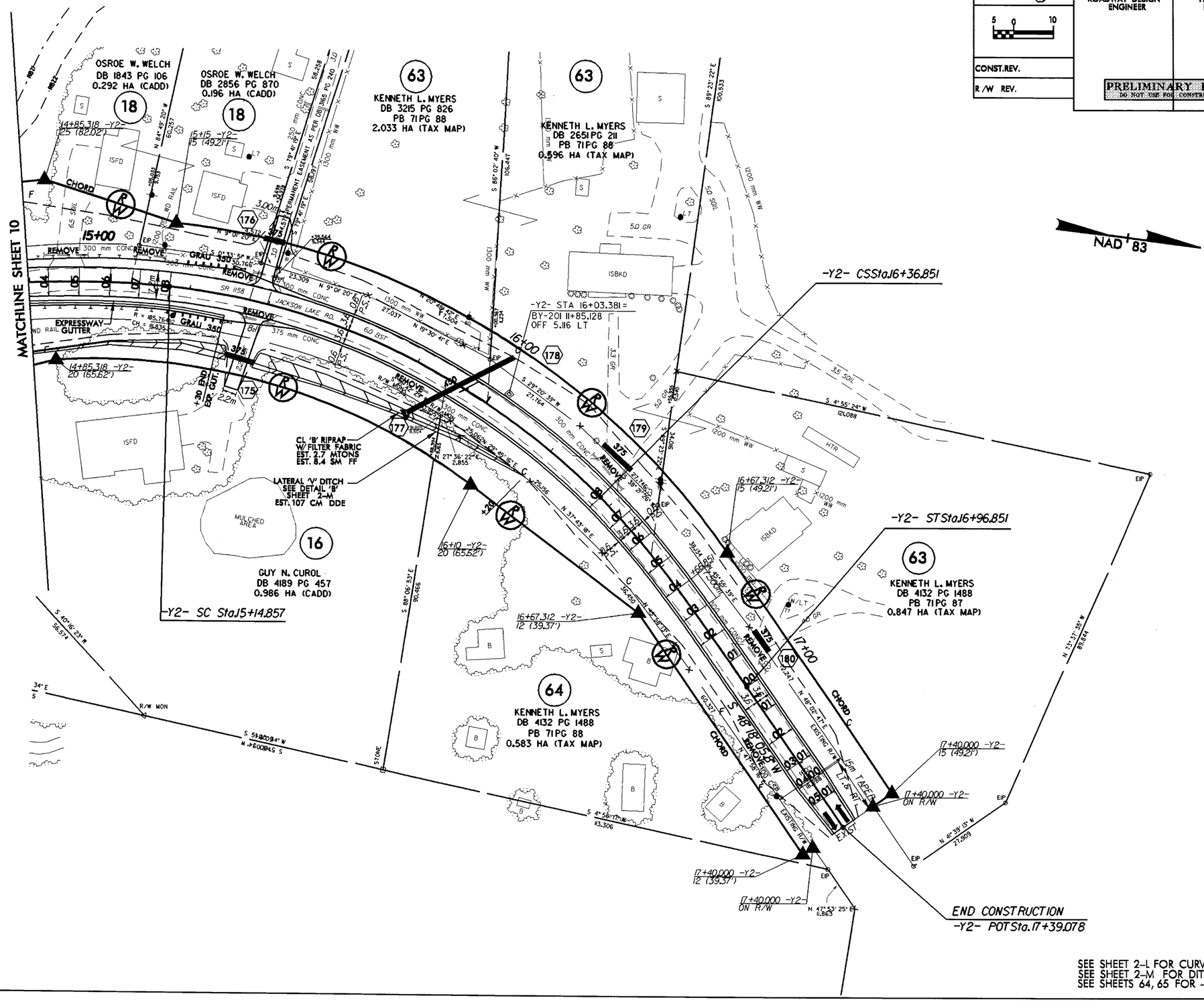
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

ROW REVISIONS, PARCELS 18 AND 62 COMBINED, PARCELS 63,65, AND 66 COMBINED, LETTER DATED 1-22-2004
WPW 04-20-2004



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 64, 65 FOR -Y2- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

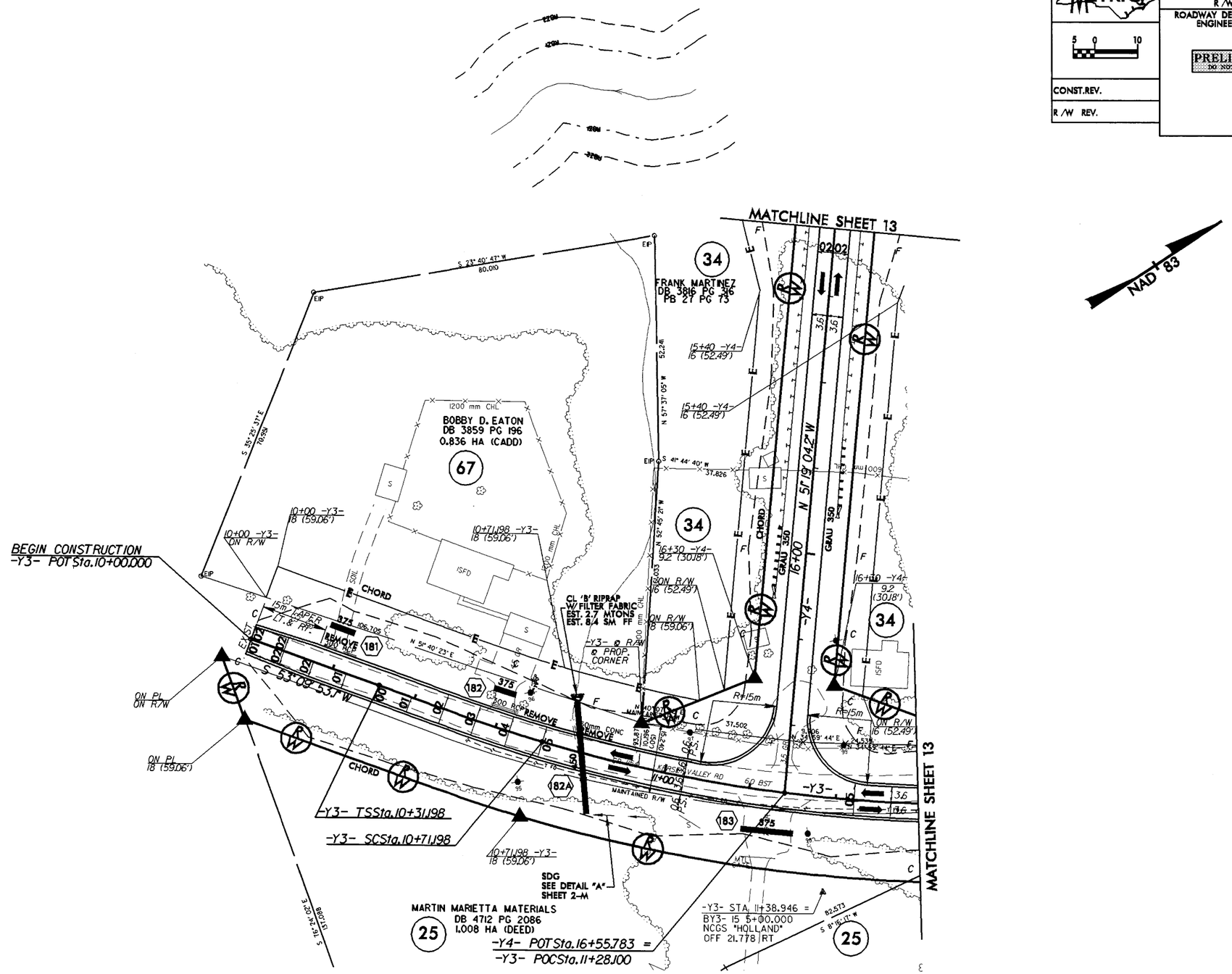
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 66 FOR -Y3- PROFILE
SEE SHEET 67 FOR -Y4- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-6091A	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

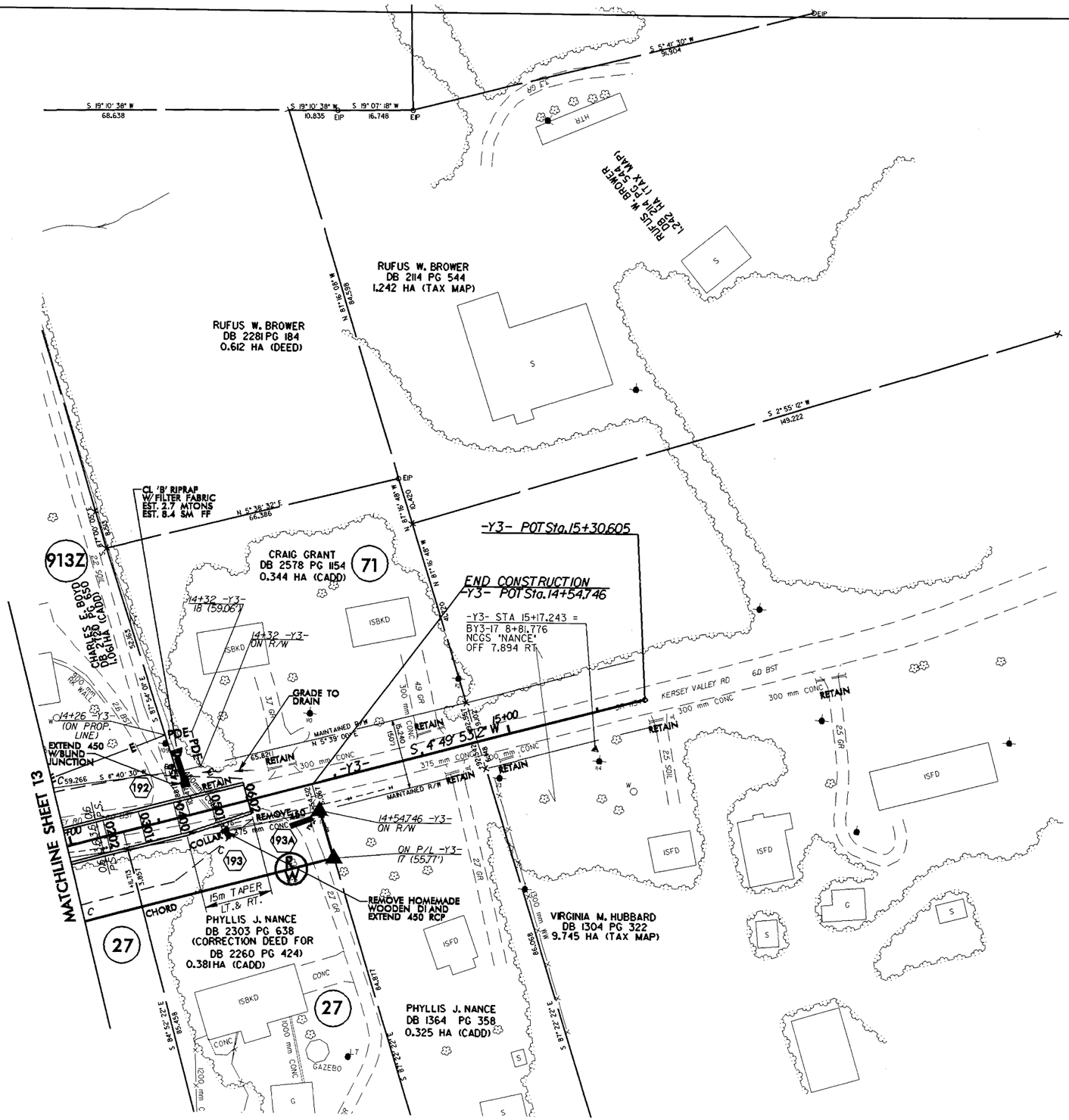
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/01/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 66 FOR -Y3- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

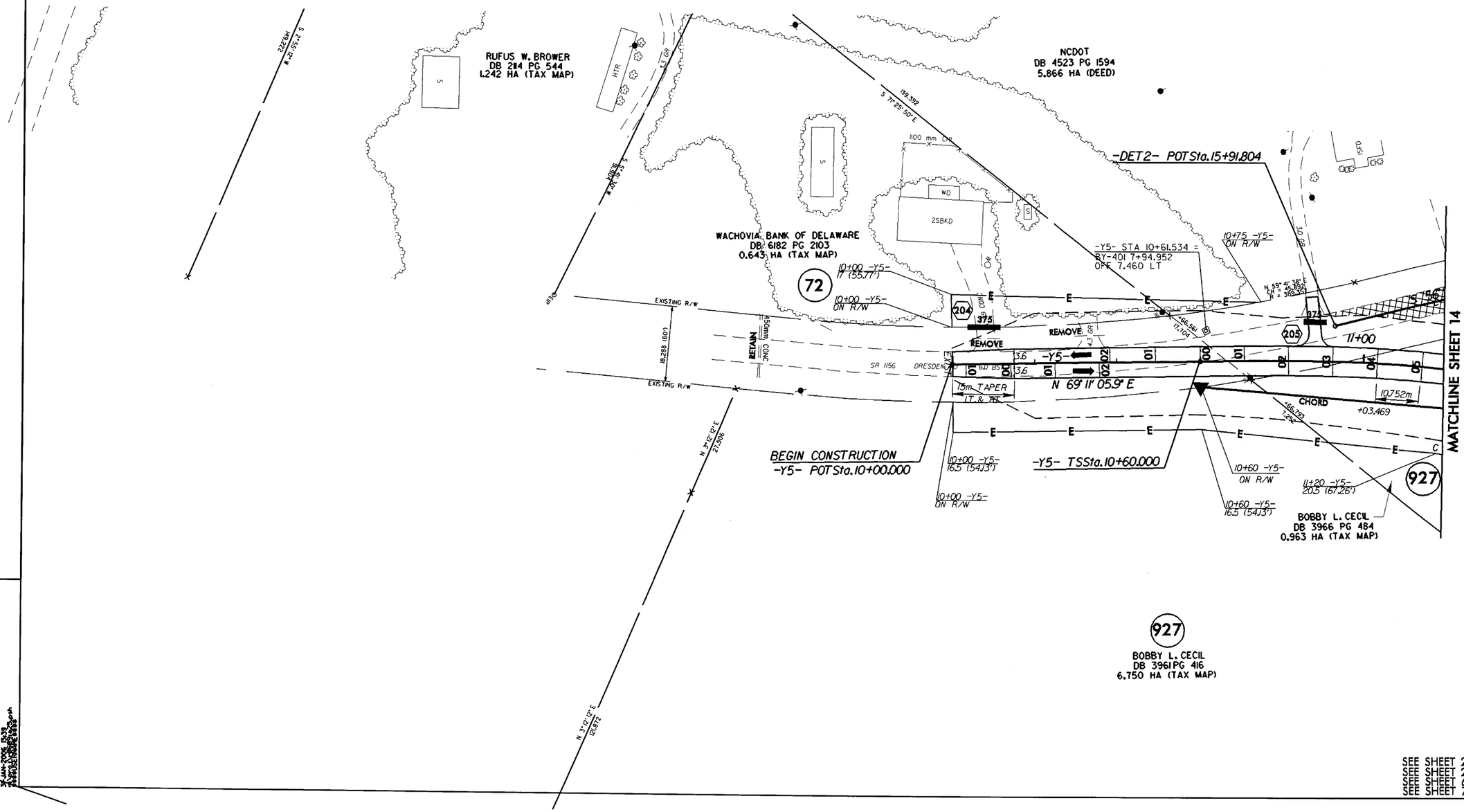
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 68 FOR -Y5- PROFILE
SEE SHEET 70 FOR -DET- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

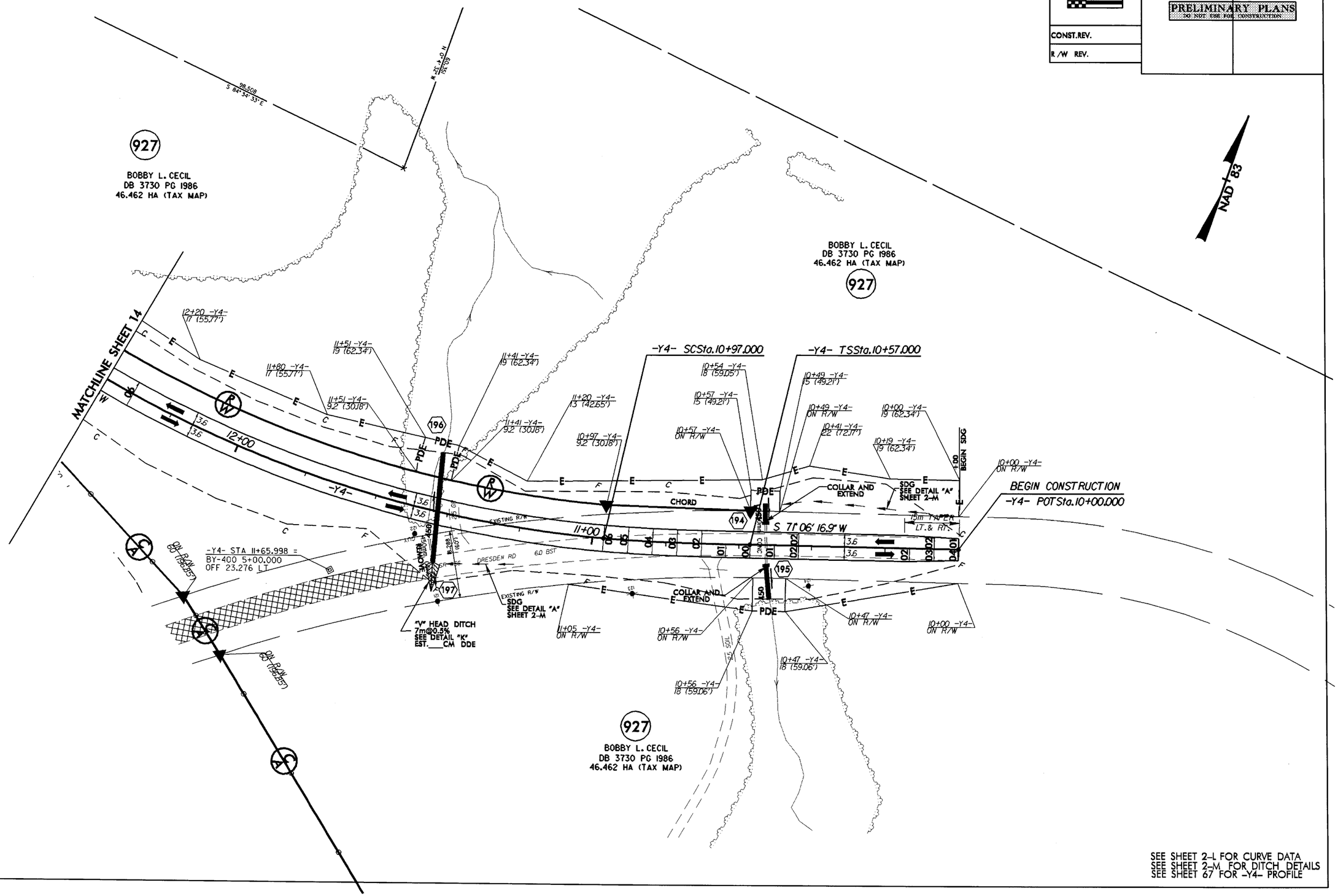
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

ROW REVISIONS.PARCELS 37,38,73,AND 927 COMBINED INTO PARCEL 927.LETTER DATED 3-24-2004
WPW 04-20-2004



PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

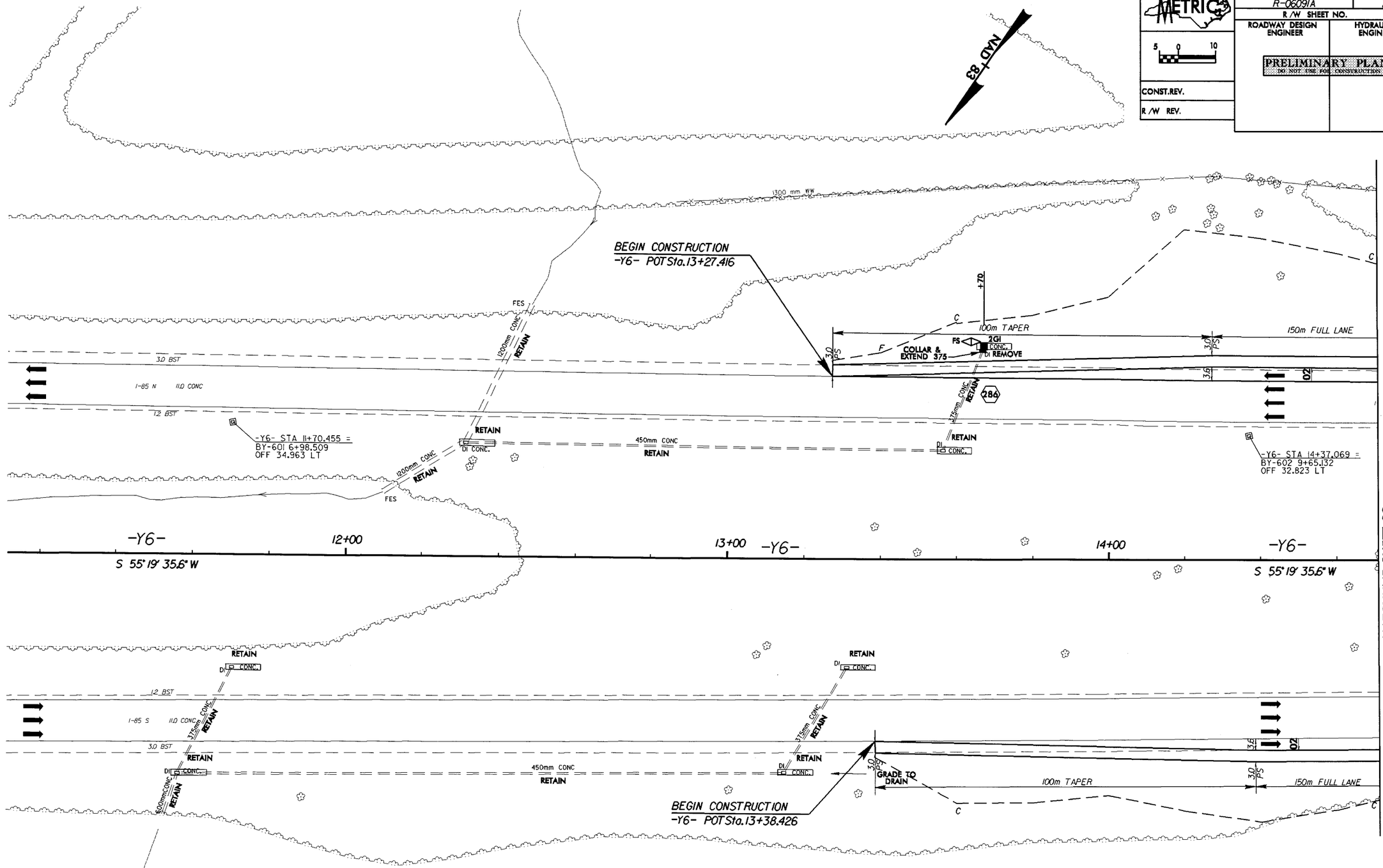
5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

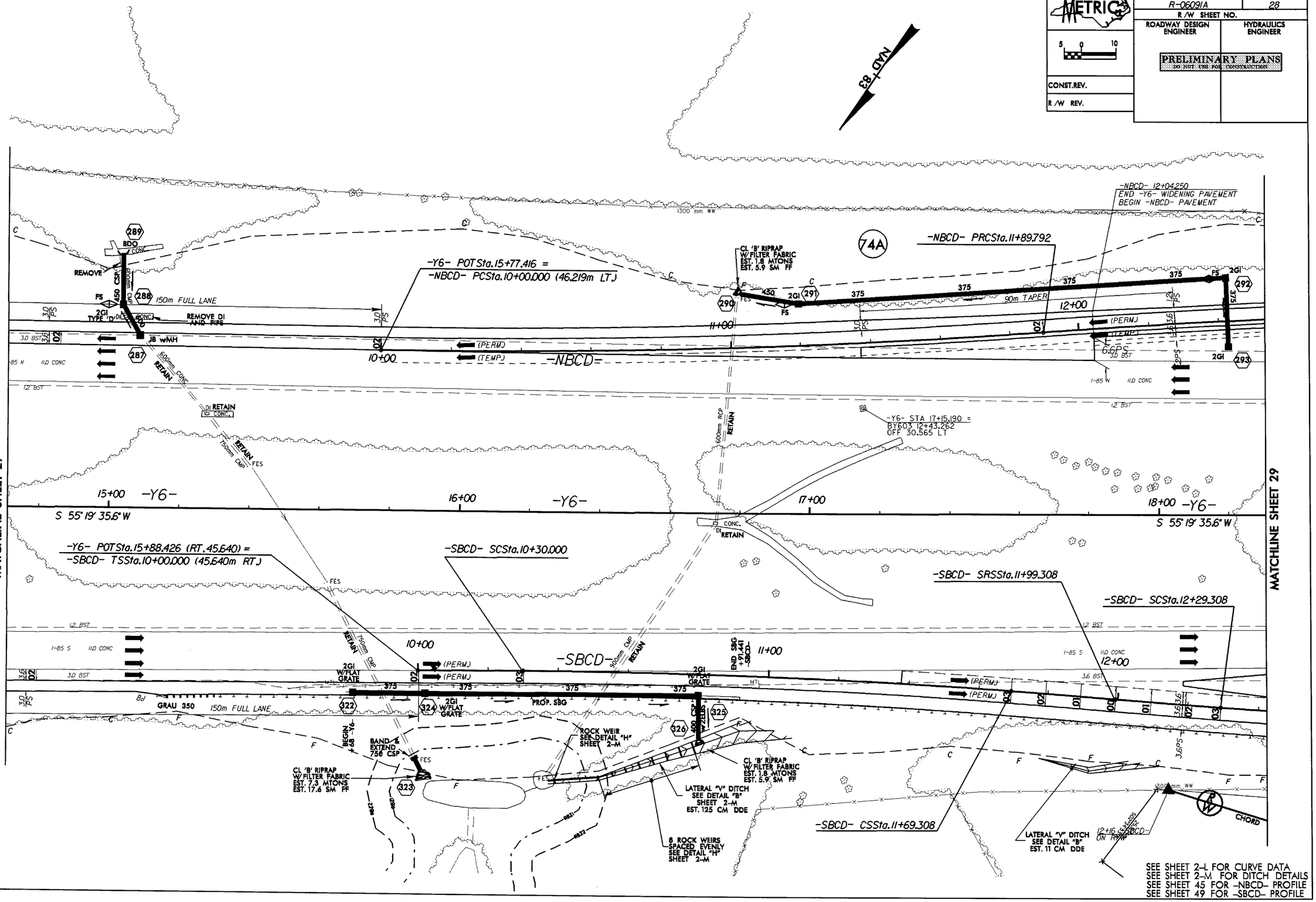
CONST.REV.

R/W REV.

REVISIONS

ROW REVISIONS, PROPOSED ROW ADJUSTED, PARCEL 76 PROPERTY LINES CHANGED, LETTER DATED 1-22-2004
W/PW 04-20-2004

8/17/99



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 45, 46 FOR -NBCD- PROFILE
SEE SHEET 49 FOR -SBCD- PROFILE
SEE SHEET 61 FOR -FLY- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R06091A	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

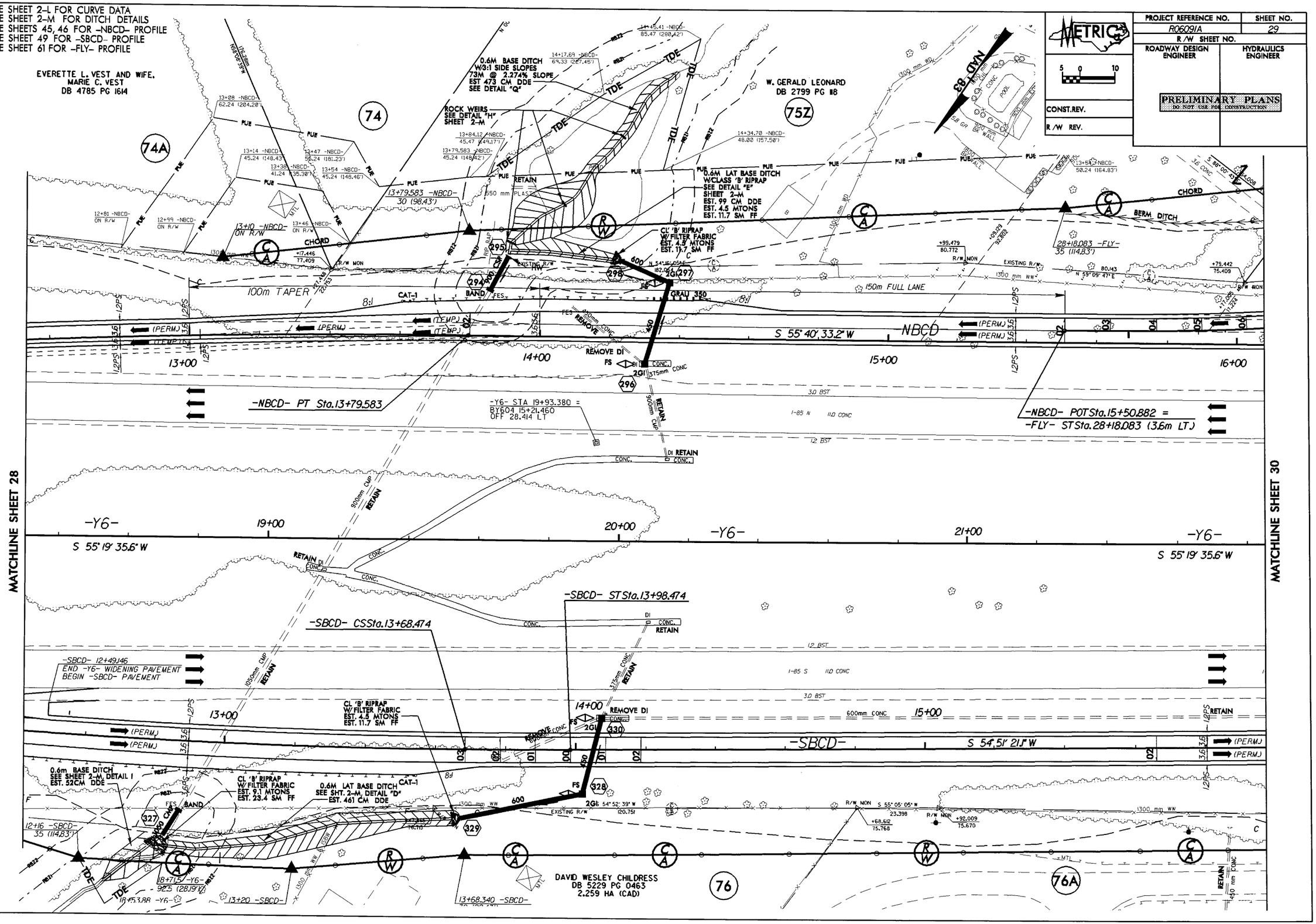
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

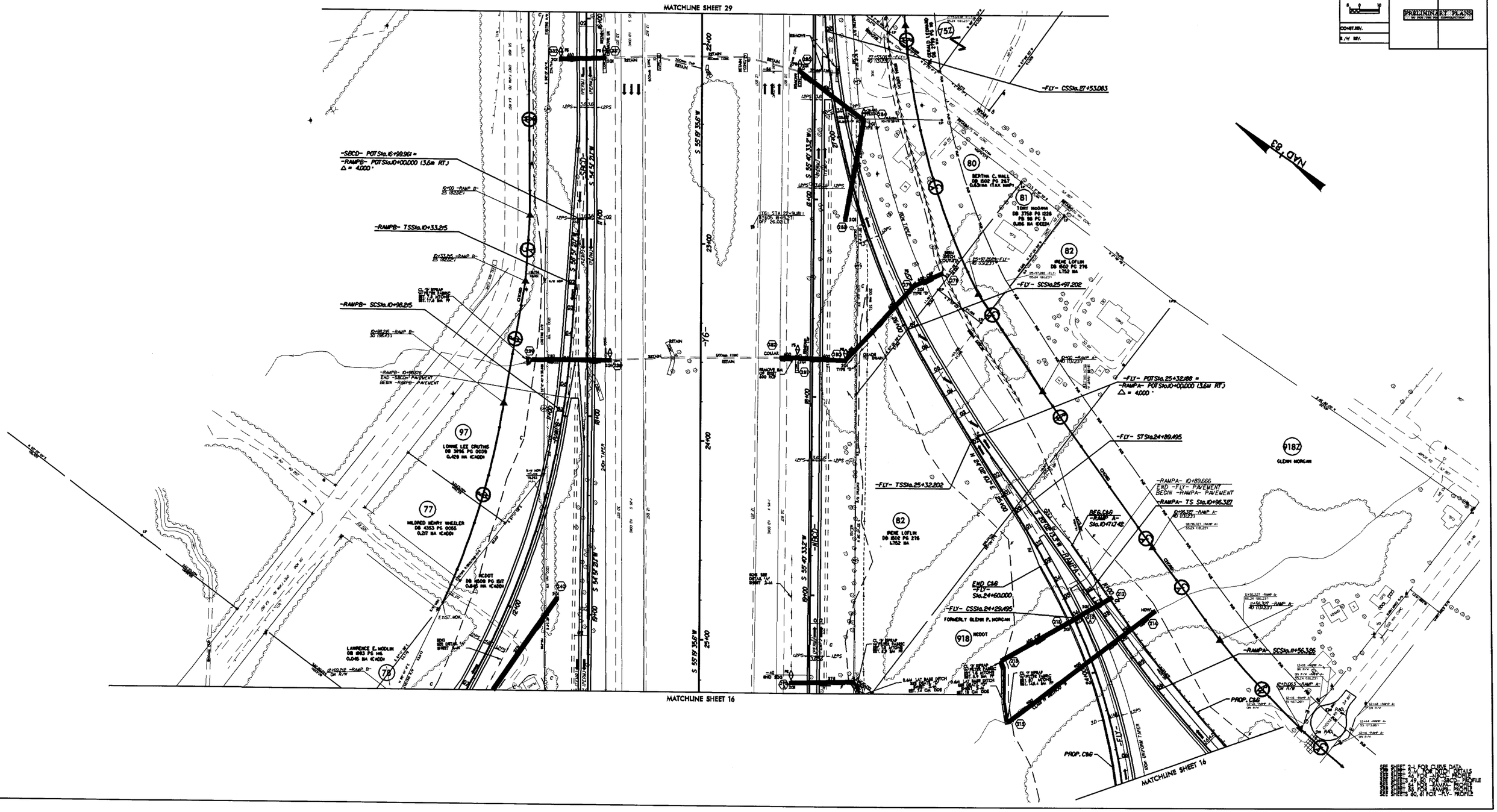
R/W REV.

REVISIONS

ROW REVISIONS, ADDED TDE AND CHANGED PARCEL NUMBER TO 75Z. ELECTRONIC FILE FROM HYDROLOGY DATED. 09-15-2005.
WPW 09-22-2005



METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-4091A	30
	S.P. SHEET NO.	
	ROADWAY DESIGN BRADN-RISE	HYDRAULICS BRADN-RISE
	PRELIMINARY PLANS	
CONSTRN.		
R/W SRV.		

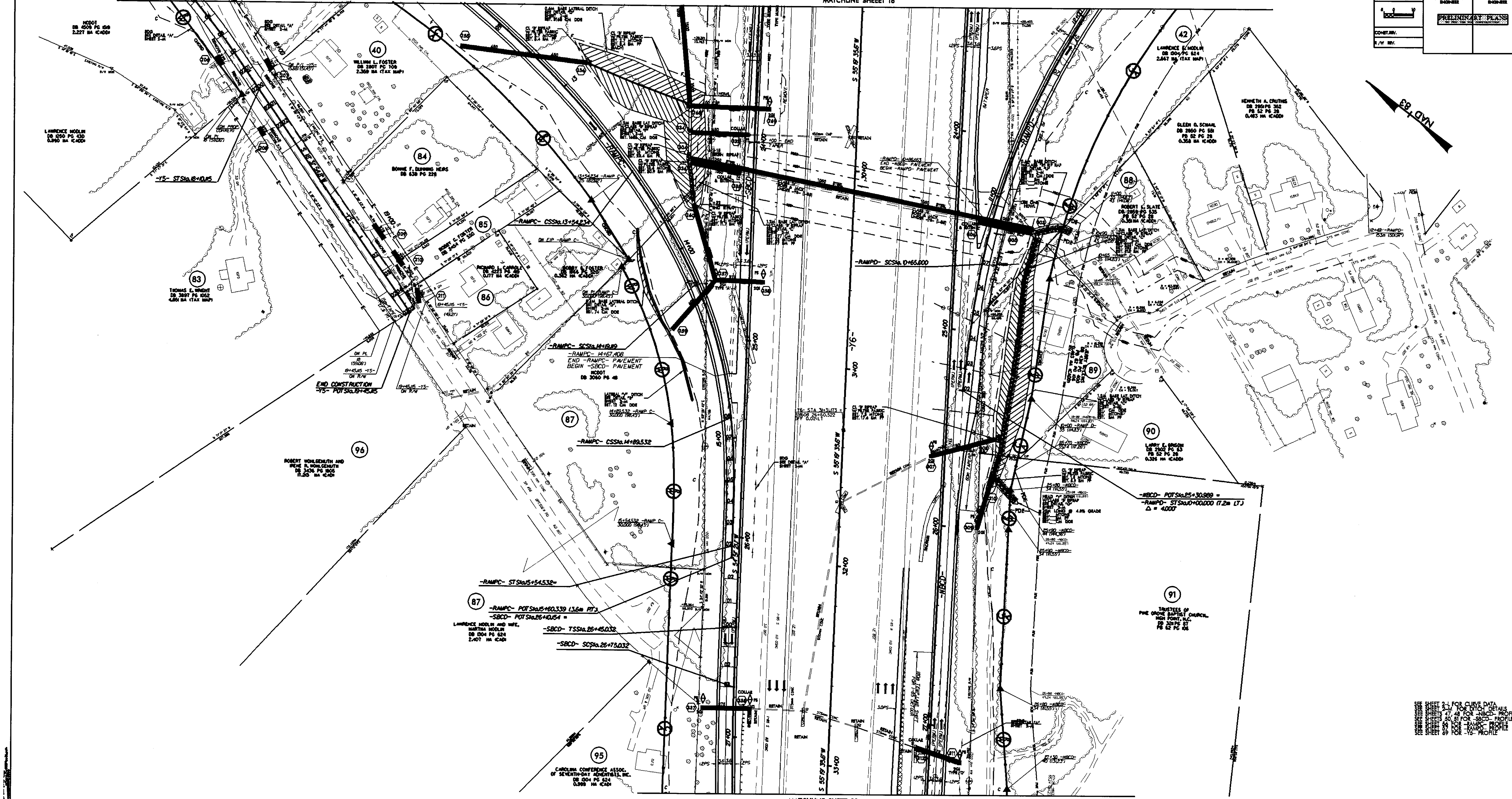


PROJECT REFERENCE NO.	SHEET NO.
R-609A	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

MATCHLINE SHEET 16



MATCHLINE SHEET 32

SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEETS 47, 48 FOR -NBCD- PROFILE
SEE SHEETS 50, 51 FOR -SBCD- PROFILE
SEE SHEET 56 FOR -RAMPC- PROFILE
SEE SHEET 57 FOR -RAMPD- PROFILE
SEE SHEET 69 FOR -Y5- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609 1A	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

METRIC

CONST.REV.

R/W REV.

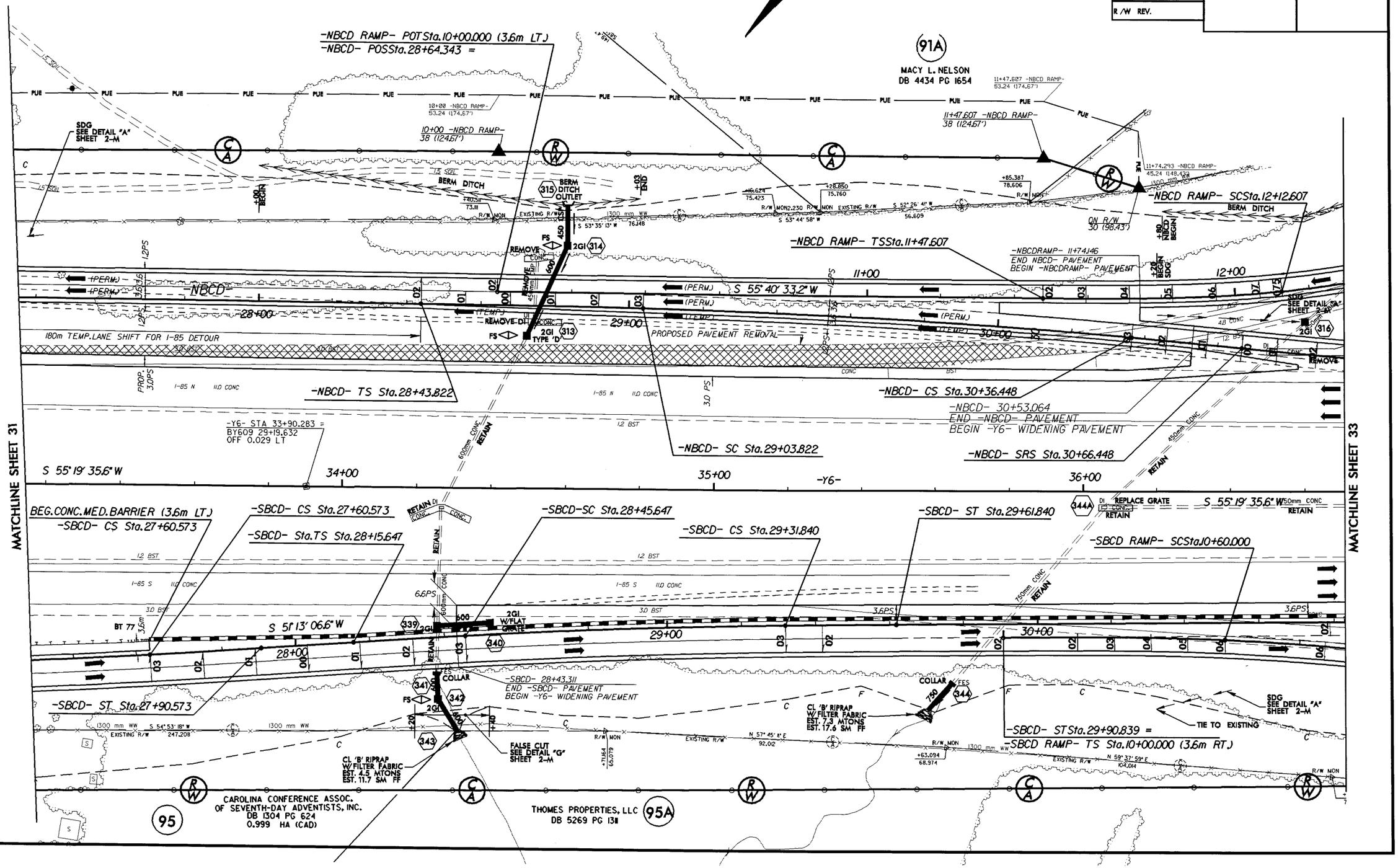
SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 48 FOR -NBCD- PROFILE
SEE SHEET 51 FOR -SBCD- PROFILE
SEE SHEET 52 FOR -NBCD RAMP- PROFILE

PAVEMENT REMOVAL

NAD 83

REVISIONS

R/W REVISIONS, ADDED PARCEL #91A, ADDED PARCEL #91B AND OWNER INFORMATION. LETTER DATED 10-05-2004
WPW 10-25-2004



PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

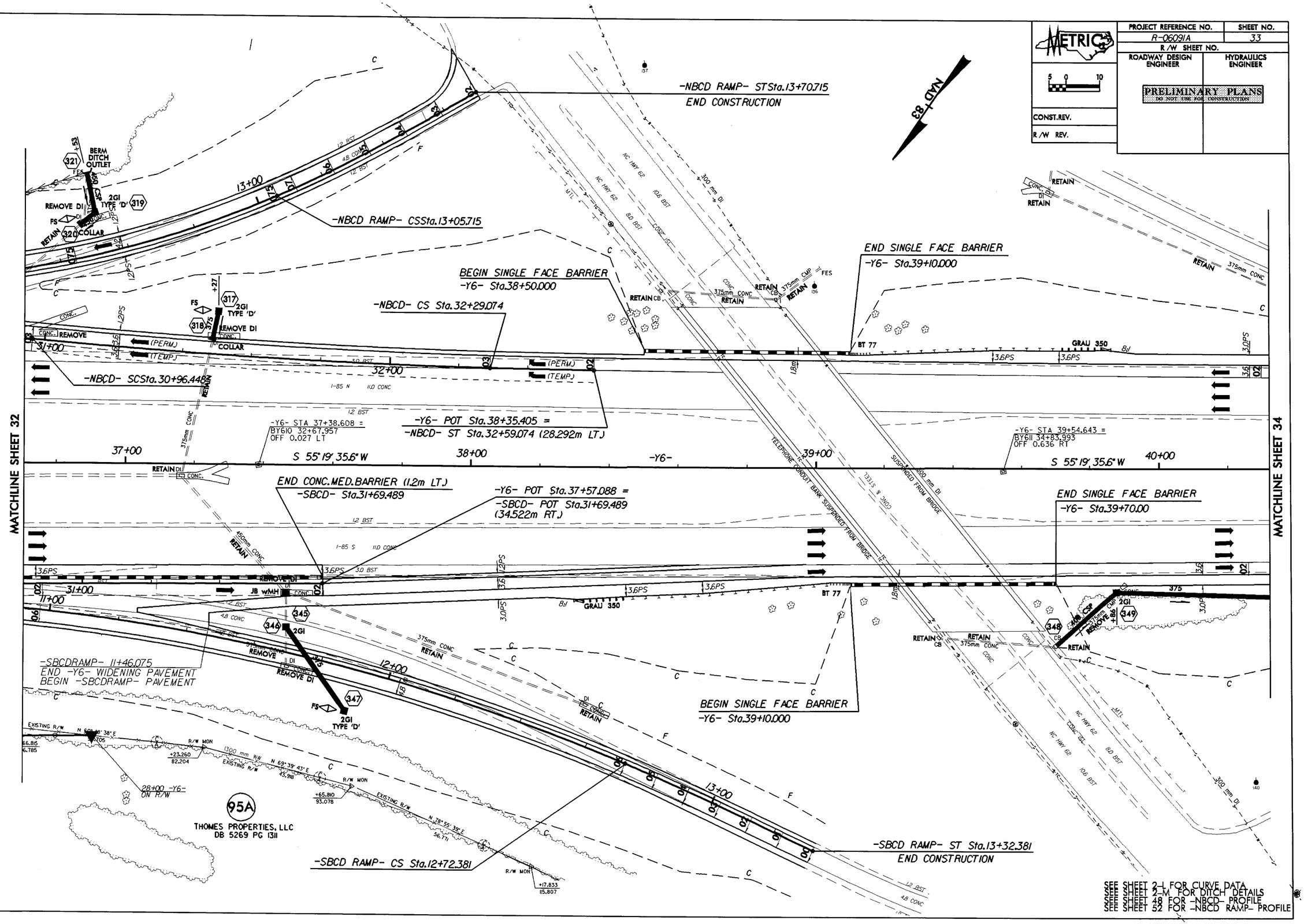
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

ROW REVISIONS, ADDED PARCEL 95A AND OWNER INFORMATION, LETTER DATED 07-22-2004
WPW 08-31-2004



SEE SHEET 2-L FOR CURVE DATA
SEE SHEET 2-M FOR DITCH DETAILS
SEE SHEET 48 FOR -NBCD- PROFILE
SEE SHEET 52 FOR -NBCD RAMP- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

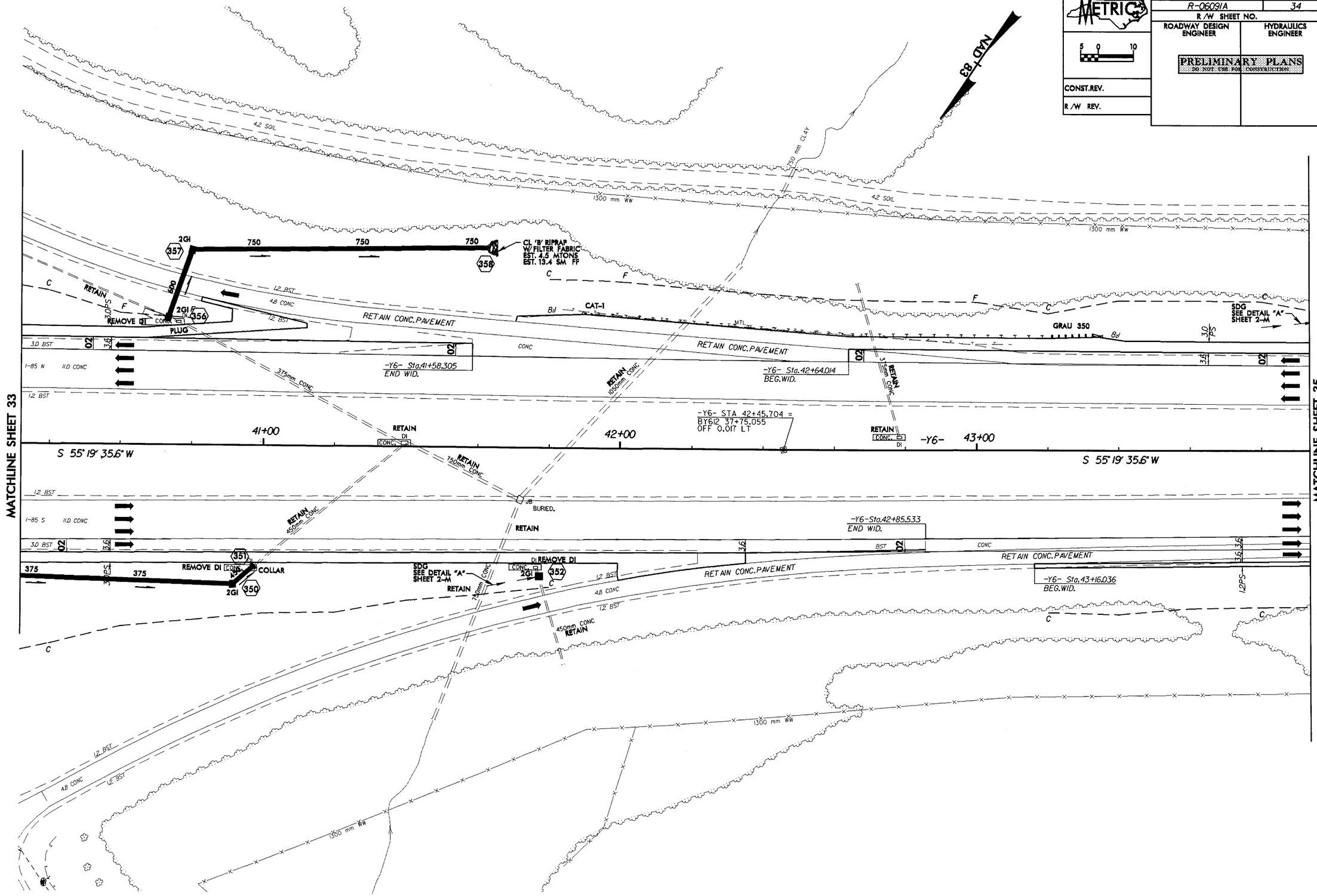
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

8/27/99



SEE SHEET 2-J FOR CURVE DATA
SEE SHEET 2-K FOR DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

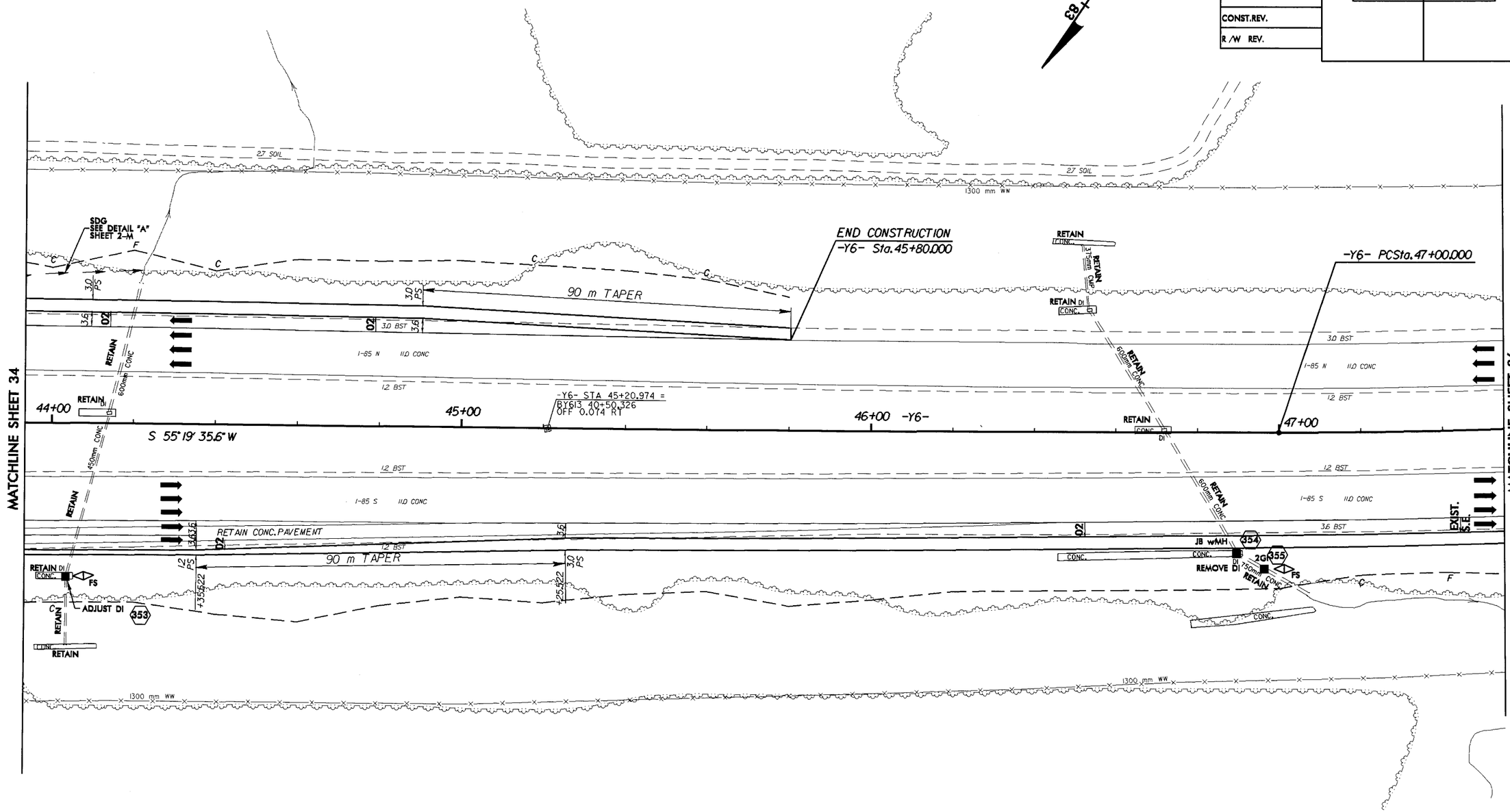
5 0 10

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS



SEE SHEET 2-J FOR CURVE DATA
SEE SHEET 2-K FOR DITCH DETAILS

8/11/99

3-JAN-2006 DMD

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

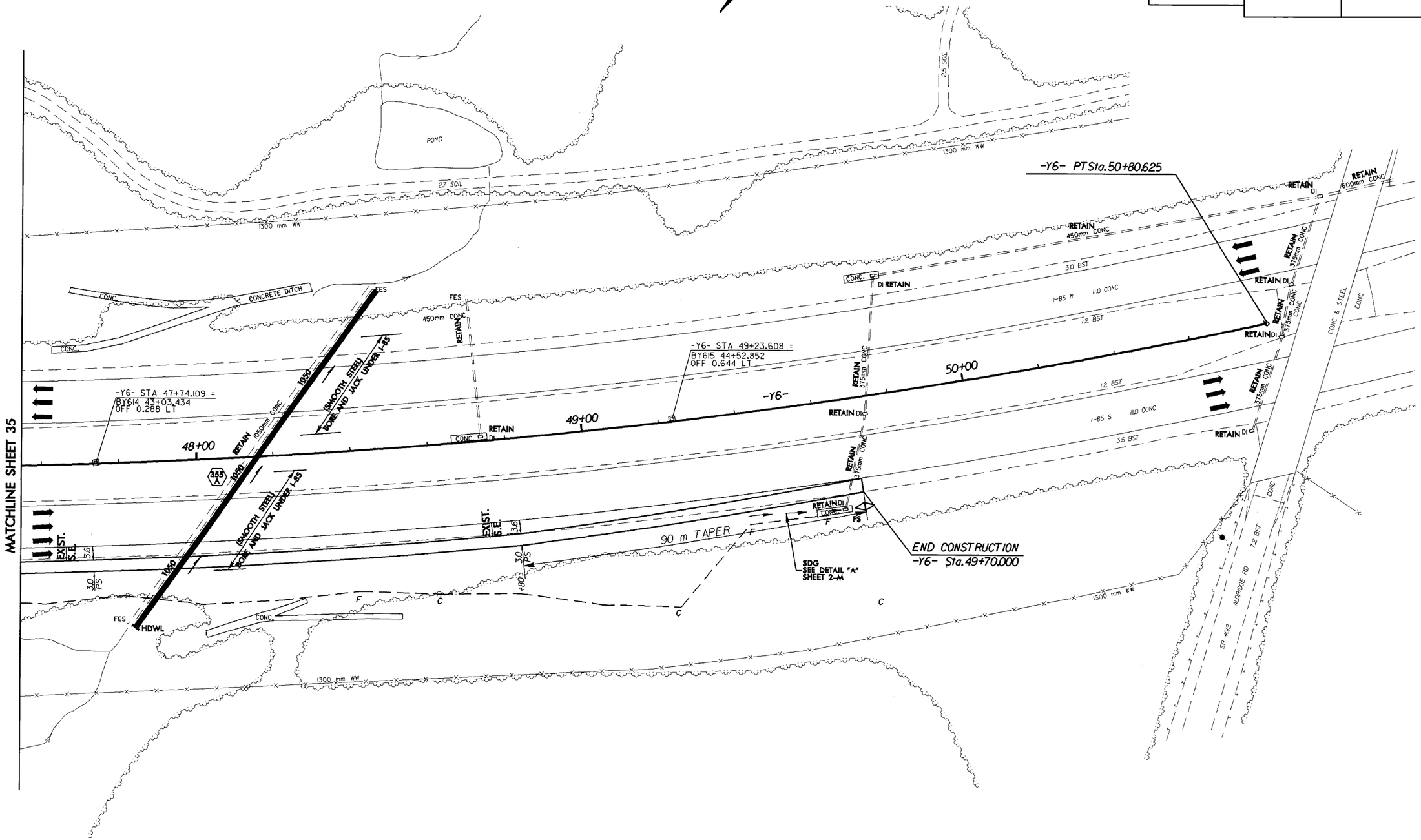
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

R/W REV.

REVISIONS

8/17/99



SEE SHEET 2-J FOR CURVE DATA
SEE SHEET 2-K FOR DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

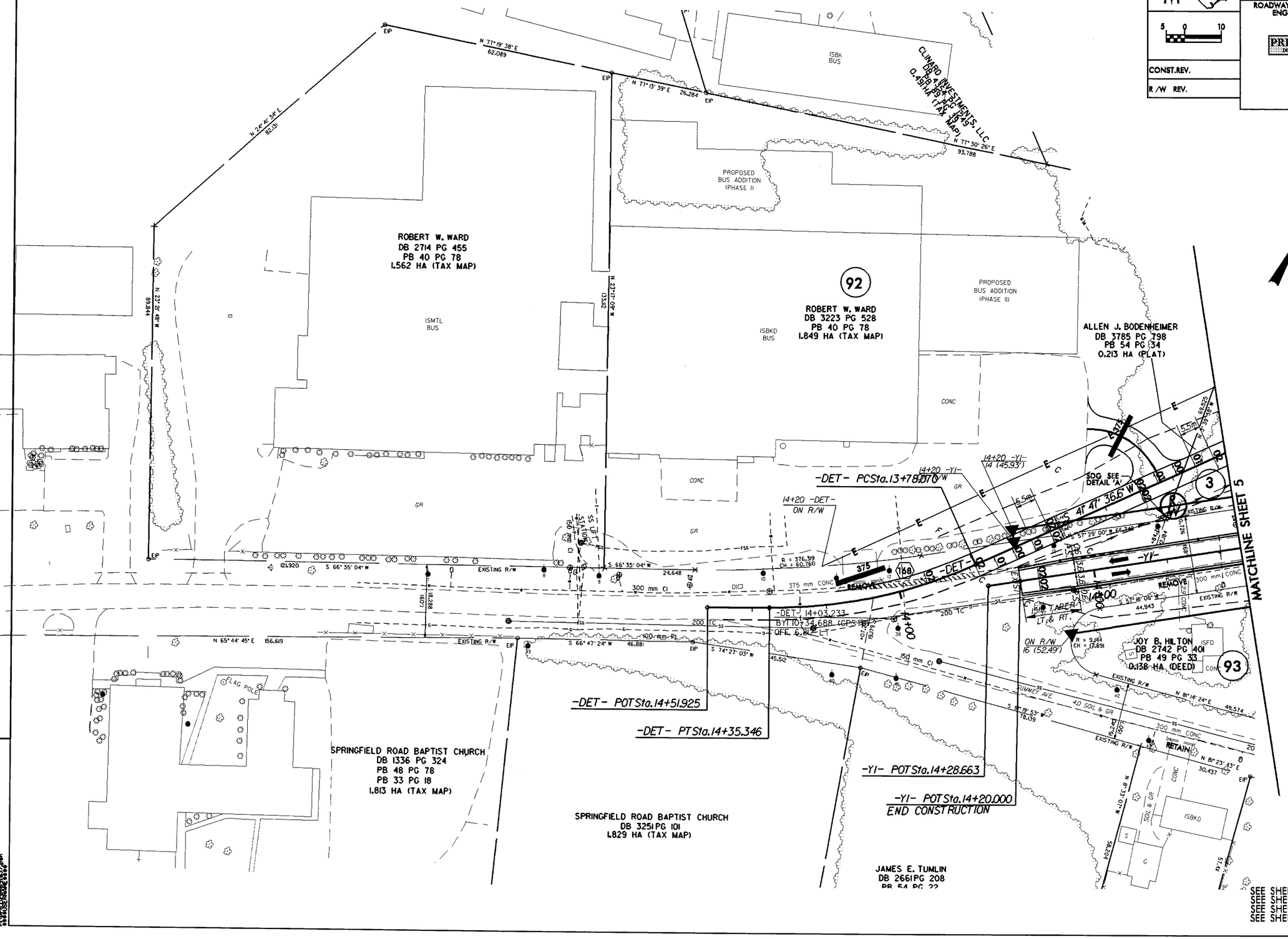
CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

ROW REVISIONS, CHANGED OWNER AND INFORMATION PARCEL #93, LETTER DATED 10-05-2004
WPW 10-25-2004



TIP: R-0609IB

CONTRACT: C201225

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GUILFORD – RANDOLPH

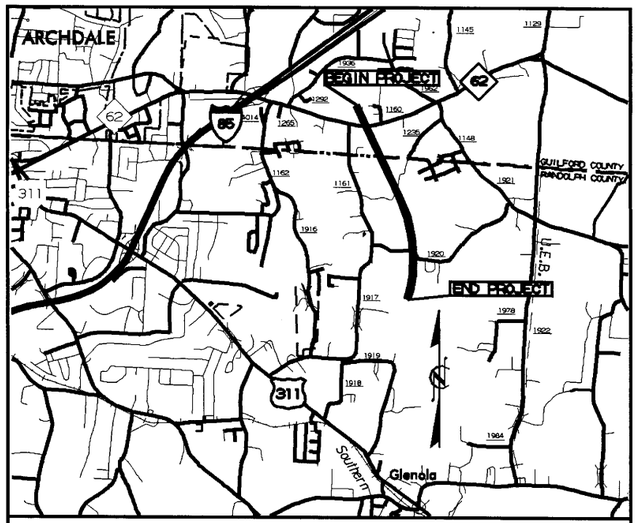
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-0609IB	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34345.1.1	MAF-F-119-(1)	PE
34345.2.8	NHF-119-1(12)	R/W, UTIL.

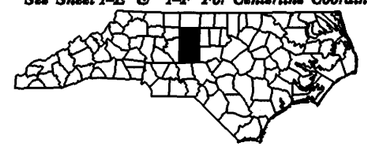
METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols
See Sheet 1-C & 1-D For Survey Control Sheets
See Sheet 1-E & 1-F For Centerline Coordinate List

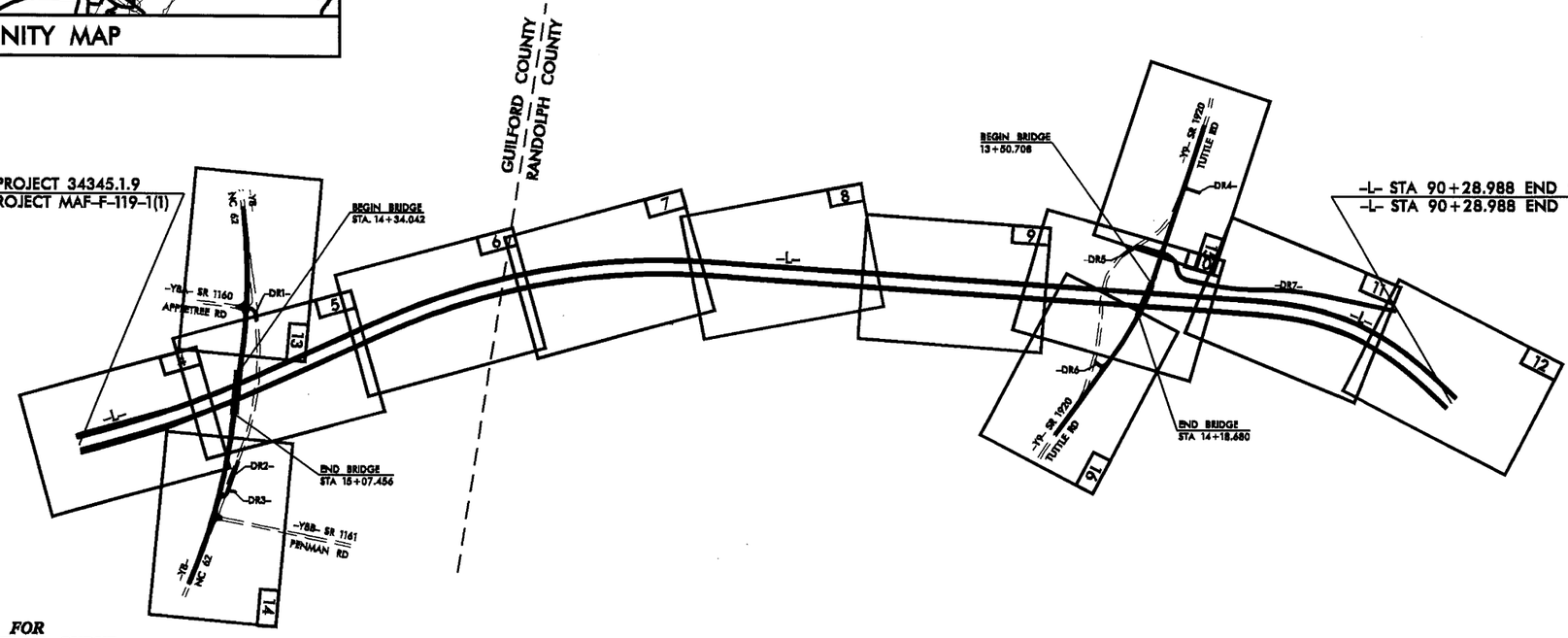


VICINITY MAP



LOCATION: US 311 HIGH POINT EAST BELT FROM I-85 TO SOUTH OF SR 1920 (TUTTLE RD) NORTH OF ARCHDALE

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, AND STRUCTURES



DESIGN EXCEPTION REQUIRED FOR BRIDGE WIDTH AND SAG VERTICAL CURVE ON SR 1920 TUTTLE ROAD (-Y9-)

THIS IS A CONTROLLED ACCESS PROJECT

GRAPHIC SCALES	DESIGN DATA	PROJECT LENGTH
5 0 10 PLANS	ADT 2000 = 18,000	LENGTH ROADWAY PROJECT R-0609IB = 2.970 Km
5 0 10 PROFILE (HORIZONTAL)	ADT 2025 = 29,000	TOTAL LENGTH ROADWAY PROJECT R-0609IB = 2.970 Km
1 0 2 PROFILE (VERTICAL)	DHV = 10 %	
	D = 60 %	
	T = 13 % *	
	V = 110 km/h	
	* TTST 7% DUAL 6%	
	FUNC CLASS – FREEWAY	

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MAY 30, 2003

LETTING DATE: MAY 16, 2005

JIMMY GOODNIGHT, PE
PROJECT ENGINEER

STEVE KENDALL
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

09-FEB-2006 15:51
r:\proj\r0609ib.tsh
$$$$USERNAME$$$$

9/85/99

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

METRIC

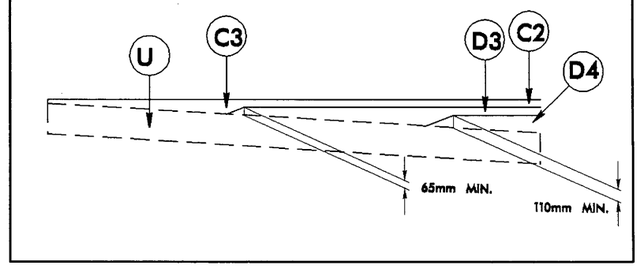
NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER

PAVEMENT SCHEDULE

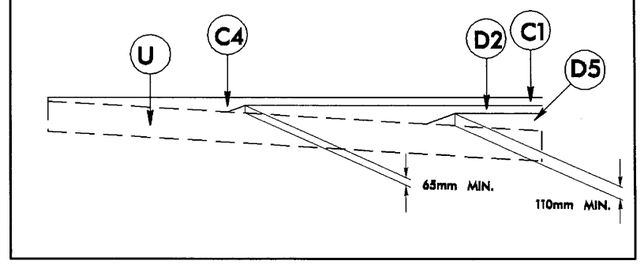
C1	PROP. APPROX. 50 mm ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 117.5 kg PER SQ. METER.	E2	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 75 mm IN DEPTH OR GREATER THAN 140 mm IN DEPTH.
C2	PROP. APPROX. 80 mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 96 kg PER SQ. METER IN EACH OF TWO LAYERS.	J1	PROP. 250 mm AGGREGATE BASE COURSE.
C3	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 2.4 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 40 mm IN DEPTH OR GREATER THAN 50 mm IN DEPTH.	J2	PROP. 200 mm AGGREGATE BASE COURSE.
C4	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5A, AT AN AVERAGE RATE OF 2.4 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 40 mm IN DEPTH OR GREATER THAN 50 mm IN DEPTH.	J3	PROP. 150 mm AGGREGATE BASE COURSE.
D1	PROP. APPROX. 70 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 171.5 kg PER SQ. METER.	K	CEMENT STABILIZATION: 60% OF PROJECT; 30 kg/sm @ 180mm DEPTH. ALSO, 135 kg/sm OF ABC FOR 5% OF CEMENT AREA. LIME STABILIZATION (method-slurry): 40% OF PROJECT; 11kg/sm @ 200mm DEPTH.
D2	PROP. APPROX. 70 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 171.5 kg PER SQ. METER.	P	PRIME COAT; 1.58 LITERS PER SQUARE METER
D3	PROP. APPROX. 110 mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 269.5 kg PER SQ. METER.	T	EARTH MATERIAL.
D4	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 65 mm OR GREATER THAN 110 mm IN DEPTH.	U	EXISTING PAVEMENT.
D5	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1 mm DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 65 mm OR GREATER THAN 110 mm IN DEPTH.	V	RUMBLE STRIPS
E1	PROP. APPROX. 80 mm ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 196 kg PER SQ. METER.	W	WEDGING

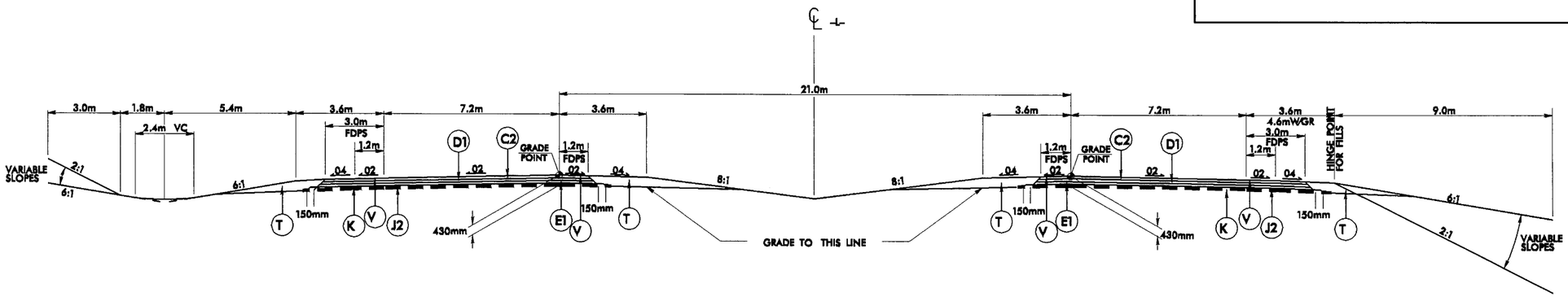
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

DETAIL FOR SHOWING METHOD OF WEDGING FOR -Y8-



DETAIL FOR SHOWING METHOD OF WEDGING FOR -Y9-





TYPICAL SECTION NO. 1

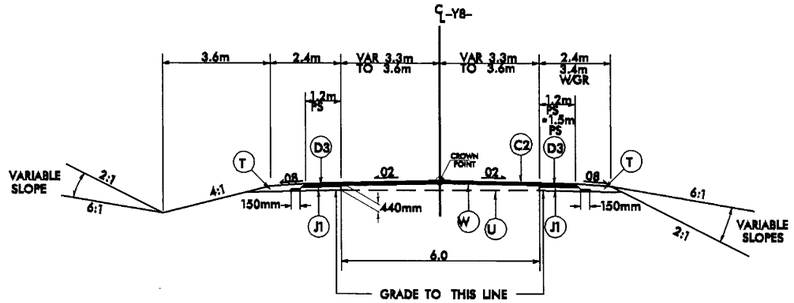
USE TYPICAL SECTION NO. 1 AS FOLLOWS:
-L- STA. 60+59.109 TO 90+28.988

09-FEB-2006 8:42

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

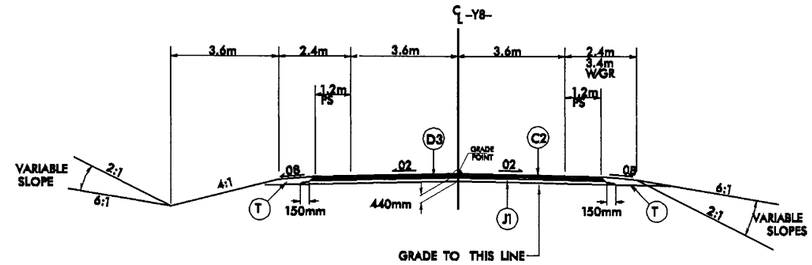
NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

PAVEMENT SCHEDULE		
C1	50 mm	SF9.5A
C2	80 mm	S9.5C
D2	70 mm	I19.0B
D3	110 mm	I19.0C
J1	250 mm	ABC
J2	200 mm	ABC
J3	150 mm	ABC
P	PRIME COAT	
W	WEDGING	
U	EXIST PAVEMENT	
T	EARTH MATERIAL	



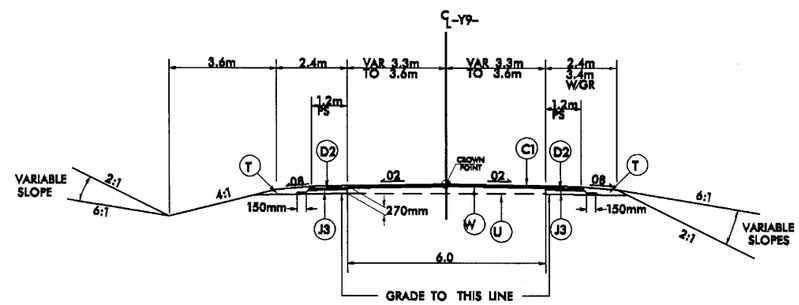
TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:
-Y8- STA 10+84.660 TO STA 11+99.545 (WIDENING & RESURFACING)
-Y8- STA 17+04.269 TO STA 18+82.197 (WIDENING & RESURFACING)
* -Y8- STA 17+00 TO STA 17+18 (RT.)



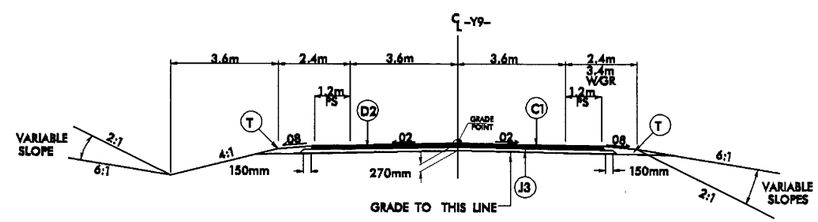
TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3 AS FOLLOWS:
-Y8- STA 11+99.545 TO 14+34.042 (BEG BRIDGE)
-Y8- STA 15+07.456 (END BRIDGE) TO 17+04.269



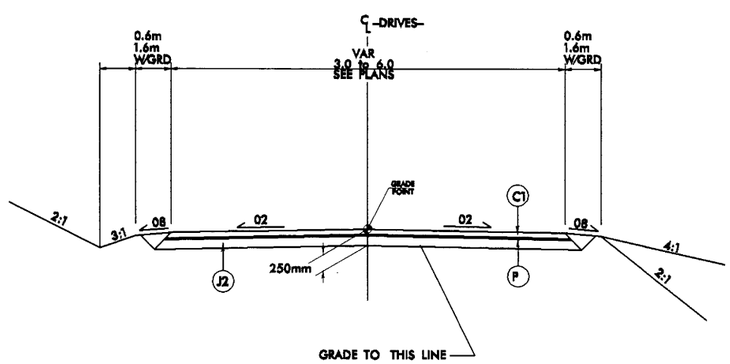
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:
-Y9- STA 10+00 TO 10+62.134 (RESURFACING&WIDENING)
-Y9- STA 16+48.008 TO 17+20 (RESURFACING & WIDENING)



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 AS FOLLOWS:
-Y9- STA 10+62.134 TO 13+50.708 (BEG BRIDGE)
-Y9- STA 14+18.680 (END BRIDGE) TO 16+48.008



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AS FOLLOWS:

DRIVE -DR1-	STA 10+03.620	TO	10+40
DRIVE -DR2-	STA 10+03.600	TO	10+90
DRIVE -DR3-	STA 10+02.400	TO	10+17.035
DRIVE -DR4-	STA 10+03.300	TO	10+35
DRIVE -DR5-	STA 10+03.600	TO	10+90
DRIVE -DR6-	STA 10+03.600	TO	10+23.187
DRIVE -DR7-	STA 10+03.600	TO	15+23.485

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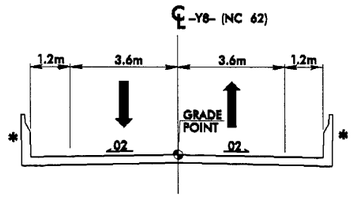
PROJECT REFERENCE NO.	SHEET NO.
R-0609B	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

METRIC

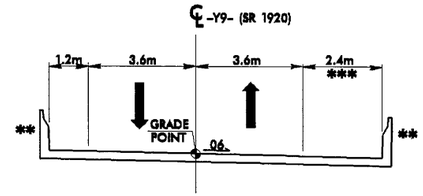
NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER



TYPICAL SECTION ON STRUCTURE

*BRIDGE RAIL TO BE DETERMINED BY STRUCTURE DESIGN

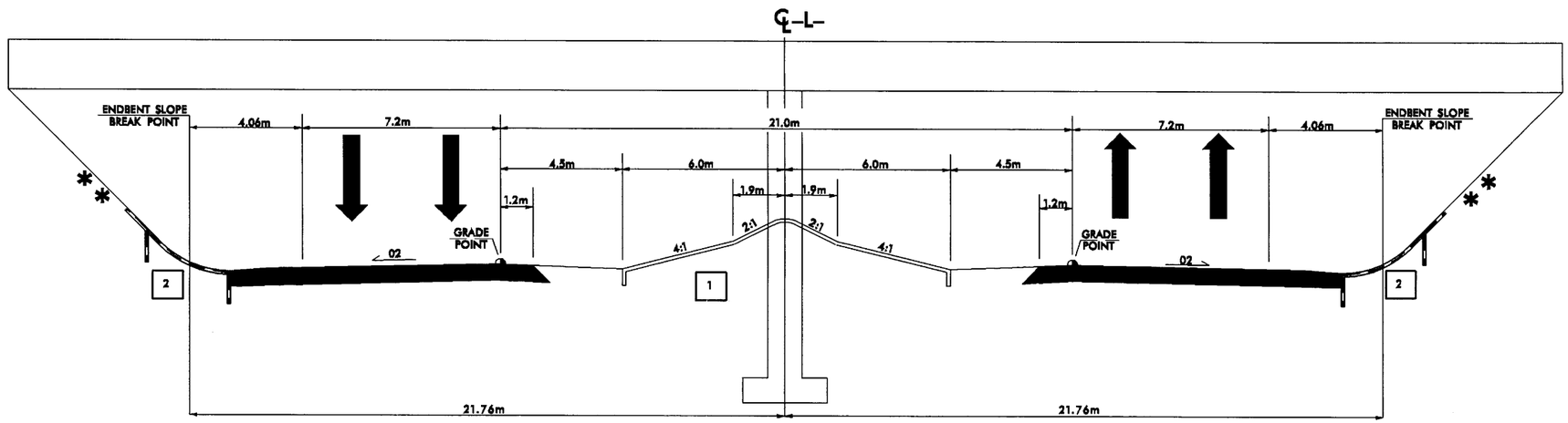
DESIGN DATA -Y8-
ADT 2000 = 10,600
ADT 2025 = 20,000
D = 60%
DHV = 10%
TTST = 5%
DUAL = 2%
V = 100 km/h
FUNC CLASS-COLLECTOR



TYPICAL SECTION ON STRUCTURE

**BICYCLE SAFE RAIL REQUIRED
***WIDEN FOR STOPPING SIGHT DISTANCE

DESIGN DATA -Y9-
ADT 2000 = 1,000
ADT 2025 = 2,700
D = 60%
DHV = 10%
TTST = 5%
DUAL = 2%
V = 100 km/h
FUNC CLASS-LOCAL



DETAIL OF TYPICAL SECTION UNDER STRUCTURE

MINIMUM VERTICAL CLEARANCE = 5.2m
**SLOPES DETERMINED BY SOILS AND FOUNDATIONS UNIT

1	SEE STD. 225.08
2	SEE STD. 610.03

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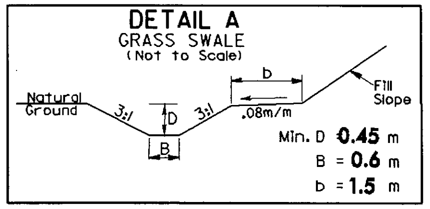
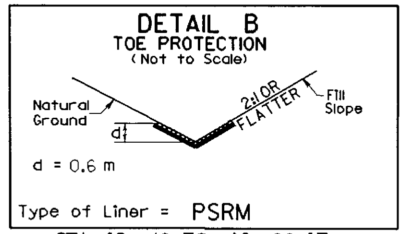
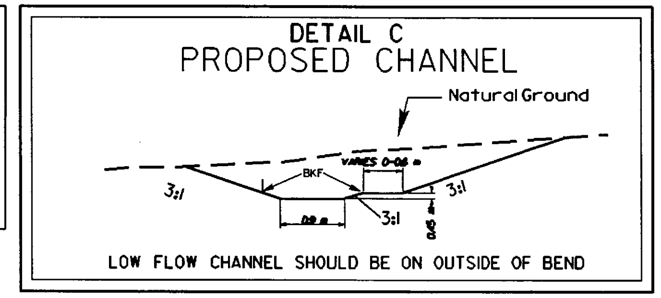
PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	2-C
R/W SHEET NO.	



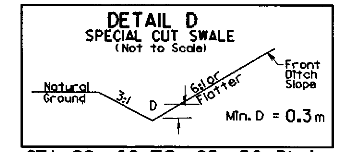
STA. 62+60 TO 63+00 LT -L-
STA. 68+20 TO 68+70 RT. -L-
STA. 70+70 TO 70+90 LT. -L-
STA. 70+70 TO 71+00 RT. -L-
STA. 76+60 TO 77+40 RT. -L-
STA. 78+60 TO 79+00 LT. -L-
STA. 83+80 TO 84+60 RT. -L-
STA. 86+60 TO 87+60 RT. -L-
STA. 11+00 TO 11+60 RT -Y8-
STA. 13+20 TO 14+52 RT -Y8-
STA. 15+40 TO 17+00 RT -Y8-
STA. 11+80 TO 12+16 LT. -Y9-
STA. 13+00 TO 13+40 RT. -Y9-
STA. 10+30 TO 10+60 LT. -DR5-



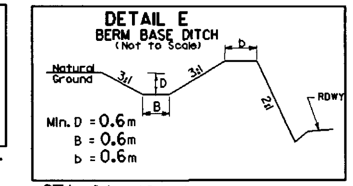
STA. 68+40 TO 69+00 LT.
STA. 77+40 TO 78+00 RT.
STA. 78+80 TO 79+20 RT.



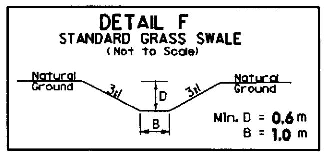
STA. 68+76 TO 69+17 RT.



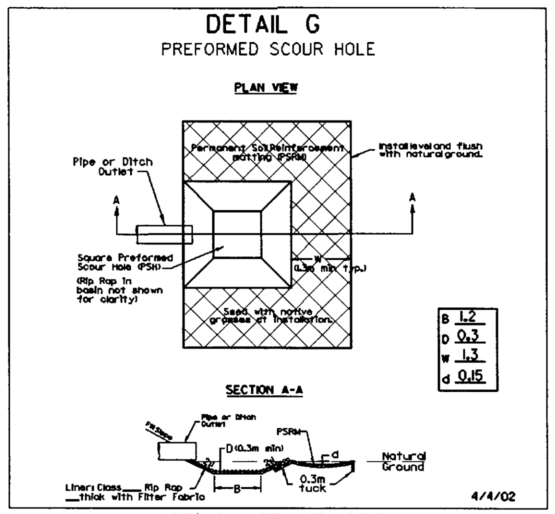
STA. 82+00 TO 82+20 Rt -L-
STA. 82+20 TO 82+40 Lt -L-
STA. 86+20 TO 86+40 RT. -L-
STA. 11+80 TO 12+00 RT. -Y8-
STA. 15+60 TO 16+60 LT. -Y9
STA. 16+00 TO 16+80 RT. -Y9-
STA. 17+20 TO 17+40 RT. -Y9-
STA. 17+00 TO 17+50 LT. -Y9-
USE THIS TYPICAL w/PROPOSED PROFILE
STA. 17+20 TO 18+40 RT. -Y8-



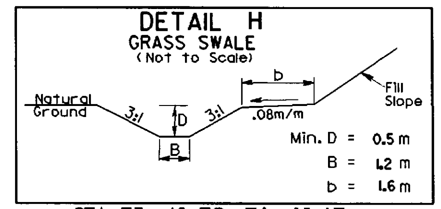
STA. 64+48 TO 64+76 -L- Lt
STA. 82+00 TO 83+00 -L- Rt
STA. 88+10 TO 89+00 -L- Rt



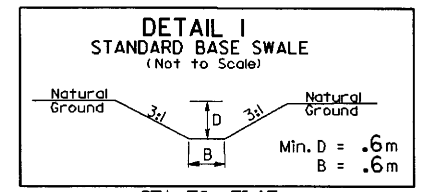
STA. 64+08 TO 64+31 RT -L-



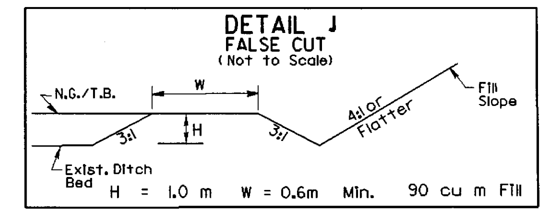
STA. 10+57 LT. -DR5-
STA. 76+20 RT. -L-
STA. 79+42 RT. -L-



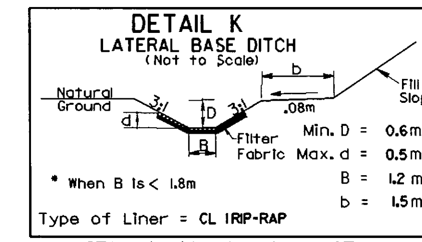
STA. 75+40 TO 76+60 LT.
STA. 76+80 TO 77+20 LT.



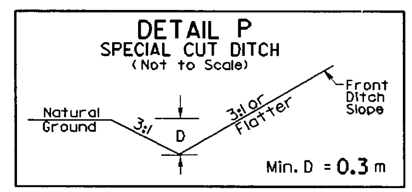
STA. 70+71 LT.
DDE 35 cm



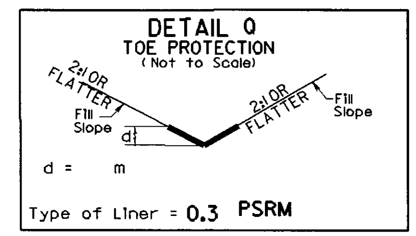
STA. 90+06 RT. -L-



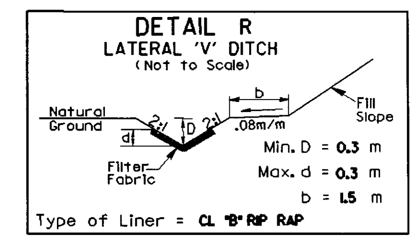
STA. 76+60 TO 76+80 LT.



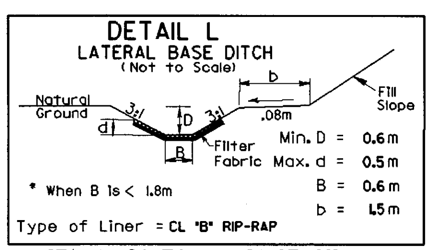
STA. 12+00 TO 13+80 DR7 RT.
STA. 14+60 TO 15+20 DR7 RT.



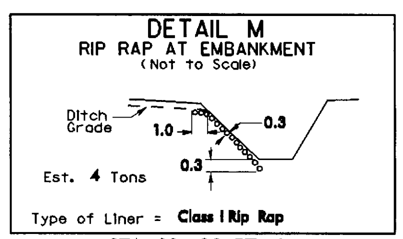
STA. 83+90 TO 85+10 -L- LT.
STA. 13+80 TO 14+30 DR7 RT.



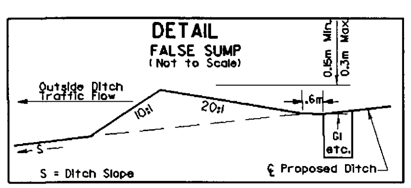
STA 11+12 TO 11+30 -DR7- LT

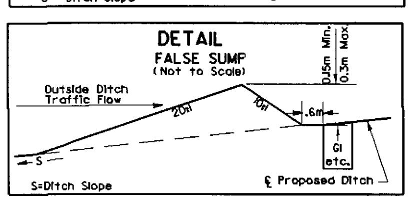


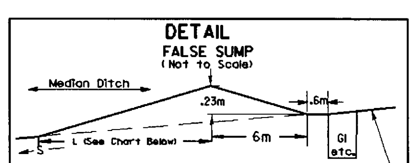
STA. 11+20 TO 11+80 LT -Y9-



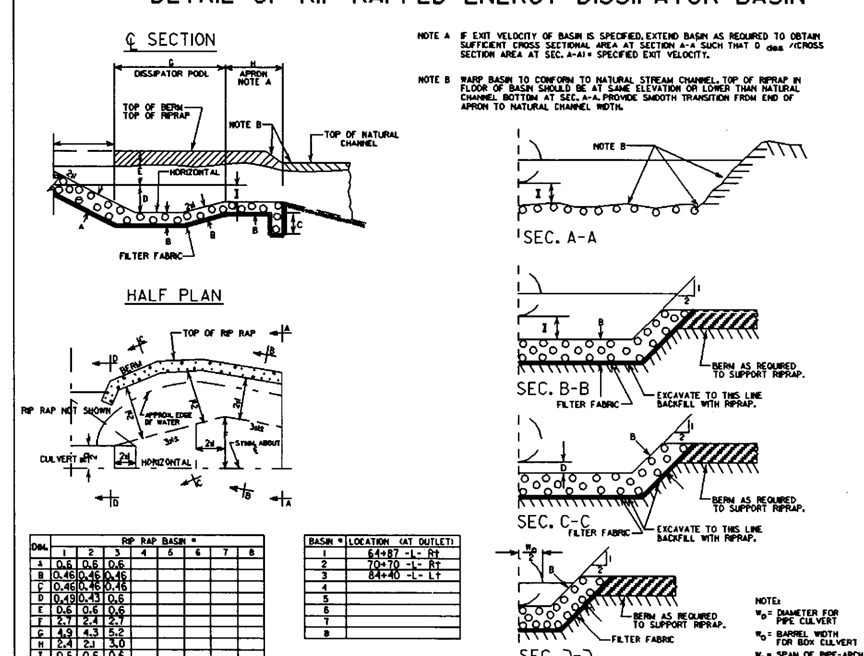
STA. 68+80 RT. -L-







Ditch Grade		Ditch Grade
0.0% To 2.0%		Over 4.0% To 6.0%
Over 2.0% To 4.0%		Over 6.0%



NOTE A IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des /CROSS SECTION AREA AT SEC. A-A) = SPECIFIED EXIT VELOCITY.

NOTE B WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIPRAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

NOTE: W_0 = DIAMETER FOR PIPE CULVERT; W_0 = BARREL WIDTH FOR BOX CULVERT; W_0 = SPAN OF PIPE-ARCH CULVERT

DIM.	1	2	3	4	5	6	7	8
A	0.6	0.6	0.6					
B	0.46	0.46	0.46					
C	0.46	0.46	0.46					
D	0.45	0.43	0.6					
E	0.6	0.6	0.6					
F	2.7	2.4	2.7					
G	4.9	4.3	5.2					
H	2.4	2.1	3.0					
I	0.6	0.6	0.6					

RIP RAP BASIN *; ALL DIMENSIONS APPROXIMATE

BASIN *	LOCATION (AT OUTLET)
1	64+87 -L- Rt
2	70+70 -L- Rt
3	84+40 -L- Lt
4	
5	
6	
7	
8	

STA 64+87 -L-
FILTER FABRIC = 140 sq m
CL IRIP RAP = 105 mtons
DDE = 150 cu m

STA 70+70 -L-
FILTER FABRIC = 100 sq m
CL IRIP RAP = 65 mtons
DDE = 125 cu m

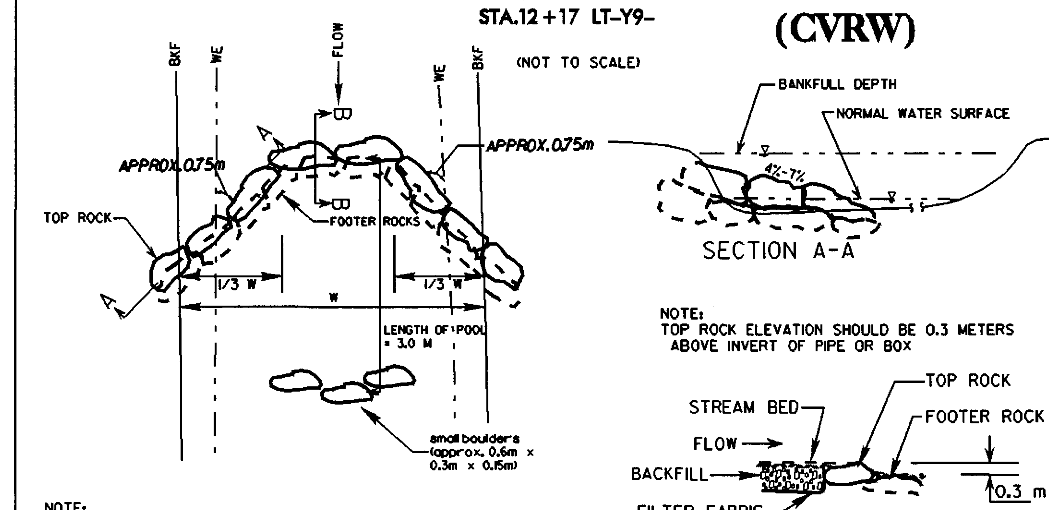
STA 84+40 -L-
FILTER FABRIC = 250 sq m
CL IRIP RAP = 195 mtons
DDE = 350 cu m

DETAIL O

CROSS VANE ROCK WEIR

STA. 68+80 RT. -L-
STA. 77+25 LT. -L-
STA. 12+17 LT-Y9-

(CVRW)



NOTE:
TOP ROCK ELEVATION SHOULD BE 0.3 METERS ABOVE INVERT OF PIPE OR BOX

NOTE:
ROCKS SHOULD BE NATIVE STONE OR SHOT ROCK, ANGULAR AND OBLONG WITH AXIS APPROXIMATELY 1m IN LENGTH

STA 68+80 -L-
FILTER FABRIC = 18 sq m
LARGE BOULDERS = 15
SMALL BOULDERS = 3
TOTAL mtons = 46

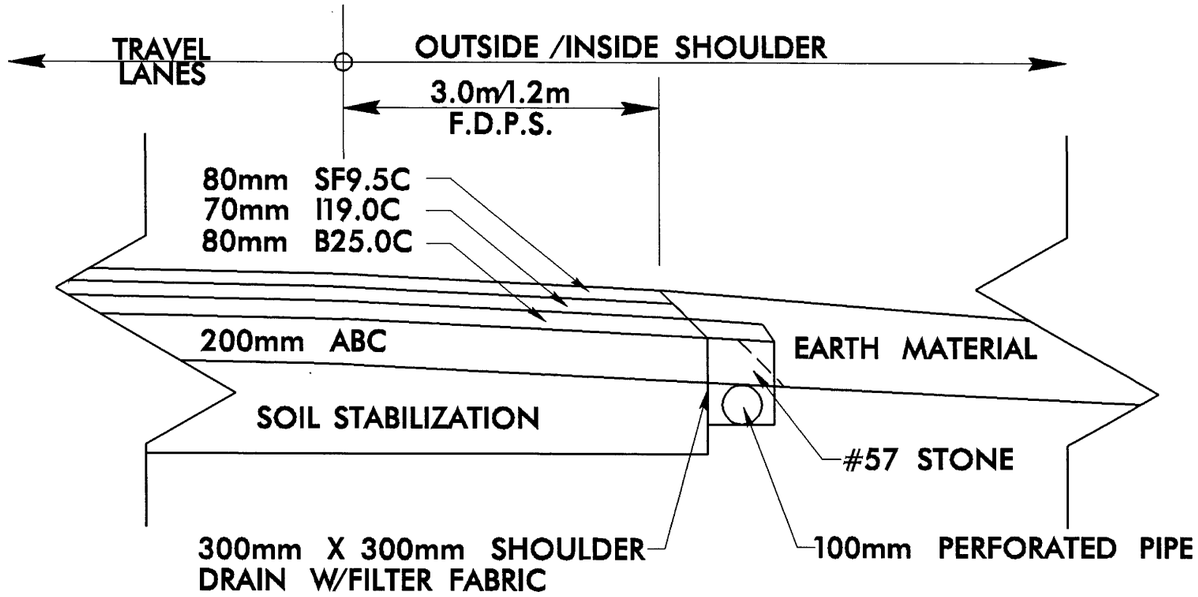
STA 77+25 -L-
FILTER FABRIC = 25 sq m
LARGE BOULDERS = 20
SMALL BOULDERS = 3
TOTAL mtons = 52

STA 12+17 -Y9-
FILTER FABRIC = 25 sq m
LARGE BOULDERS = 20
SMALL BOULDERS = 3
TOTAL mtons = 52

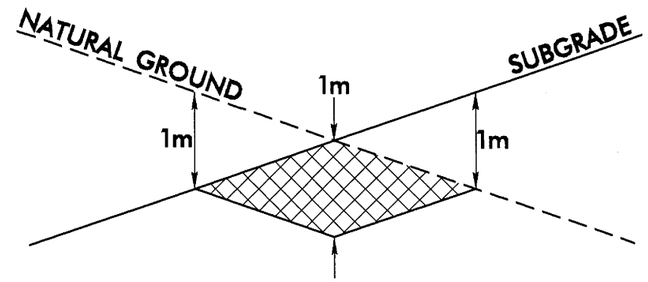
8/17/99

09-FEB-2006 15:52

PROJECT REFERENCE NO.	SHEET NO.
R-0609/B	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



DETAIL OF SHOULDER DRAIN PLACEMENT
FOR MEDIAN AND OUTSIDE PAVED SHOULDERS



DETAIL OF PROPOSED UNDERCUT AT GRADE POINT

RECOMMENDED SHOULDER DRAINS:

–L– STA. 67+60 TO 73+60 (RT., OUTSIDE)
OUTLETS: 68+60, 69+50, 70+31 +/–, 71+20, 72+60
(2GI) (2GI) (2GI)

–L– STA. 80+20 TO 83+00 (RT., OUTSIDE)
OUTLETS: 81+20, 82+00 +/–
(2GI) (2GI)

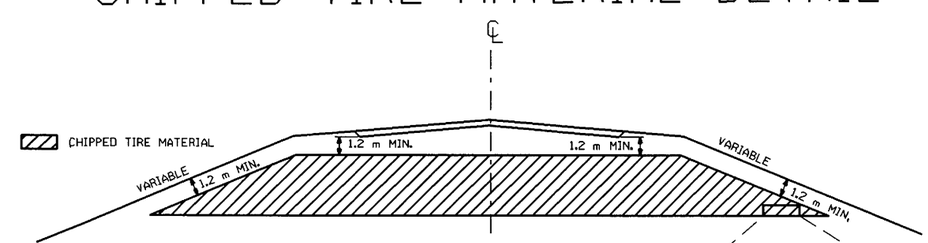
–L– STA. 85+50 TO 88+40 (RT., OUTSIDE)
OUTLETS: 86+40, 87+40, 88+40
(2GI) (2GI)

–L– STA. 69+30 TO 71+70 (LT., MEDIAN)
OUTLETS: 70+31 +/–, 70+70
(2GI) (2GI)

–L– STA. 80+20 TO 83+20 (LT., OUTSIDE)
OUTLETS: 81+20, 82+20 +/–
(2GI) (2GI)

NOTE:
STATION +/– : INDICATES VERTICAL SAG WHICH HAS TWO OUTLETS.
(EXAMPLE: –L– STA. 82+20 +/–)

CHIPPED TIRE MATERIAL DETAIL



CHIPPED TIRE MATERIAL NOT TO BE PLACED
BELOW AN ELEVATION OF 1.2m MIN. ABOVE THE
100 YR FLOOD ELEVATION AS INDICATED BY HYDRAULICS

ESTIMATED CHIP TIRE MATERIAL = 72,244 m^3

30-60% CHIPPED TIRE MATERIAL PER 250 mm LIFT
100% EMBANKMENT SOIL PER 250 mm LIFT
30-60% CHIPPED TIRE MATERIAL PER 250 mm LIFT
100% EMBANKMENT SOIL PER 250 mm LIFT

USE DETAIL AS FOLLOWS:

-Y8- 13+20 TO 14+18.802
-Y8- 15+22.282 TO 16+80
-Y9- 11+00 TO 13+35.468
-Y9- 14+33.920 TO 15+00

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

SEE SHEETS 17 & 18 FOR -L- PROFILE
SEE SHEET 2-C FOR DITCH DETAILS

NAD 83

FAIRFIELD GOLF CLUB, INC.
DB 3345 PG 707
PB 5 PG 351
22.140 HA (TAX MAP)

FAIRFIELD GOLF CLUB INC
DB 5077 PG 1190
PB 5 PG 351
1.025 HA (CADD)

FAIRFIELD GOLF CLUB INC
DB 5077 PG 1190
PB 45 PG 5
0.721 HA (CADD)

FAIRFIELD GOLF CLUB INC
DB 5077 PG 1190
PB 45 PG 5
0.598 HA (CADD)

RUBY K. POWELL
DB 4338 PG 1511
PB 45 PG 5
0.160 HA (CADD)

HAROLD G. COX
DB 4491 PG 841
PB 45 PG 5
0.341 HA (CADD)

JAMES P. HINKLE, SR.
DB 4167 PG 590
DB 4167 PG 593
2.028 HA (TAX MAP)

NCDOT
DB 4646 PG 307
9.263 HA (TAX MAP)

ROGER D. QUEEN
DB 4151 PG 2056
3.769 HA (CADD)

END STATE PROJECT R-0609IA -L- STA 61+00.000 =
BEGIN STATE PROJECT R-0609IB -L- STA 60+59.109
BEGIN F. A. PROJECT MAF-F-119-1(1)

BL-PINC 53+71.630
BL-62

TSSta. 61+01.43

BL-63
BL PINC 54+72.535 =
-L- POT Sta. 61+12.367
1.51m RT

SCSta. 61+55.143

BL-64
BL-PINC 55+71.752 =
-L- POC Sta. 62+11.315
7.7757m LT

BL-65
BL-PINC 56+74.315 =
-L- POC Sta. 63+12.847
6.066m RT

PL
40 (LT)
(131.23')
BEGIN FENCE

PL
40 (RT)
(131.23')
BEGIN FENCE

PL
40 (RT -L-)
(131.23')

CL B RIPRAP
4.5 m tons.
FF= 11.7 am

SEE DETAIL "A"
0.6 m LATERAL BASE SWALE
3:1 SIDE SLOPES

100m TAPER

Special Median Ditch
62+06.75 to 62+60

R-0609IA NBL

R-0609IA SBL

S 25° 48' 31.0" E

3.0mPS

1.2mPS

10.8m

21m

7.2m

+59.478

+63.143

+37.910

SEE SHEET 5

MATCHLINE -L- STA 63+20

-L-
PIs Sta 61+37.143 PI Sta 62+86.616
θs = 0° 46' 24.6" Δ = 7° 31' 19.4" (LT)
Ls = 54.000 L = 262.569
LT = 36.000 T = 131.473
ST = 18.000 R = 2,000.000

S 25° 47' 00" E
48.914
EXISTING R/W

R/W MON

09-FEB-2006 8:42

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

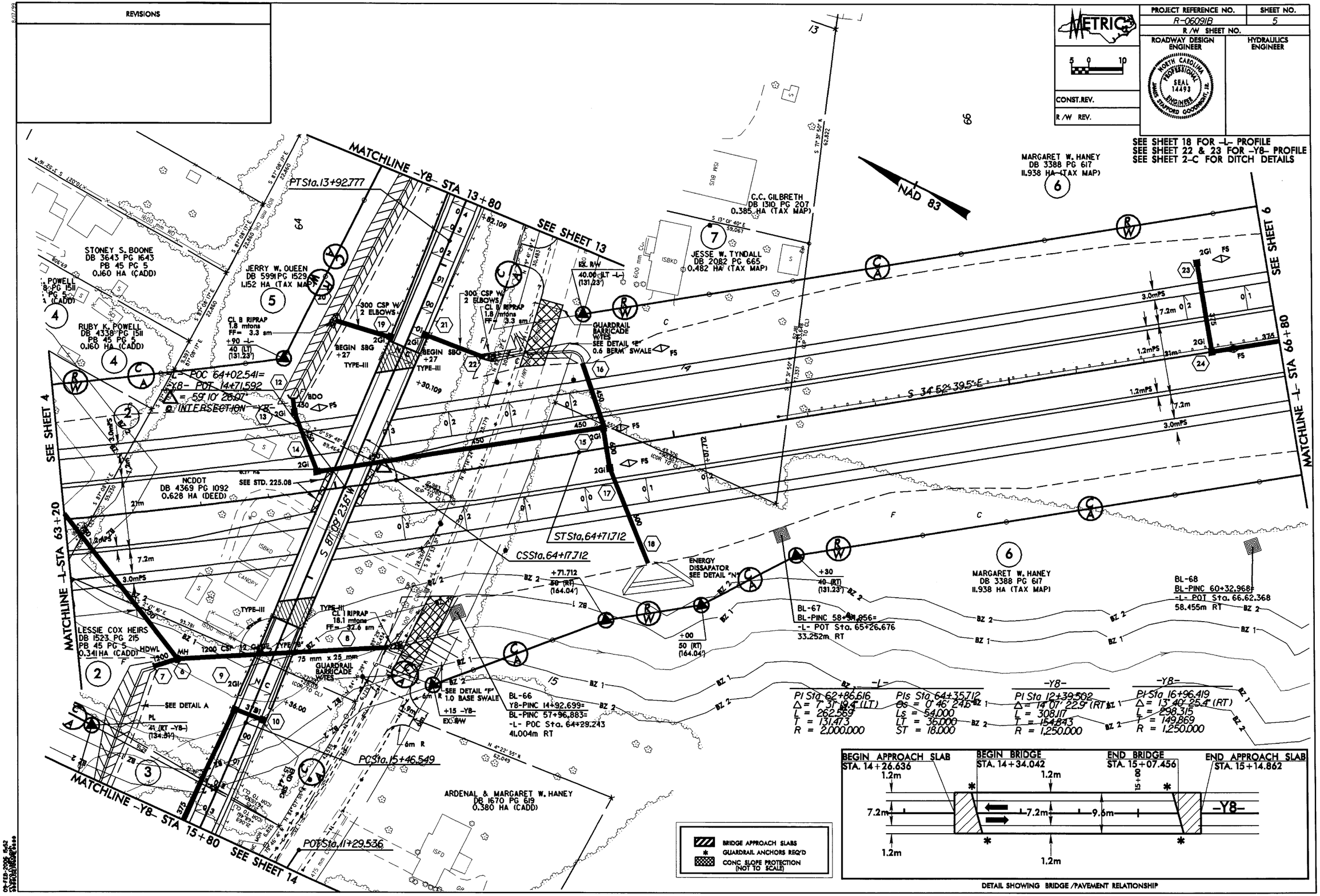
5 0 10

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODNIGHT, JR.

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 22 & 23 FOR -Y8- PROFILE
SEE SHEET 2-C FOR DITCH DETAILS



DETAIL SHOWING BRIDGE/PAVEMENT RELATIONSHIP

REVISIONS

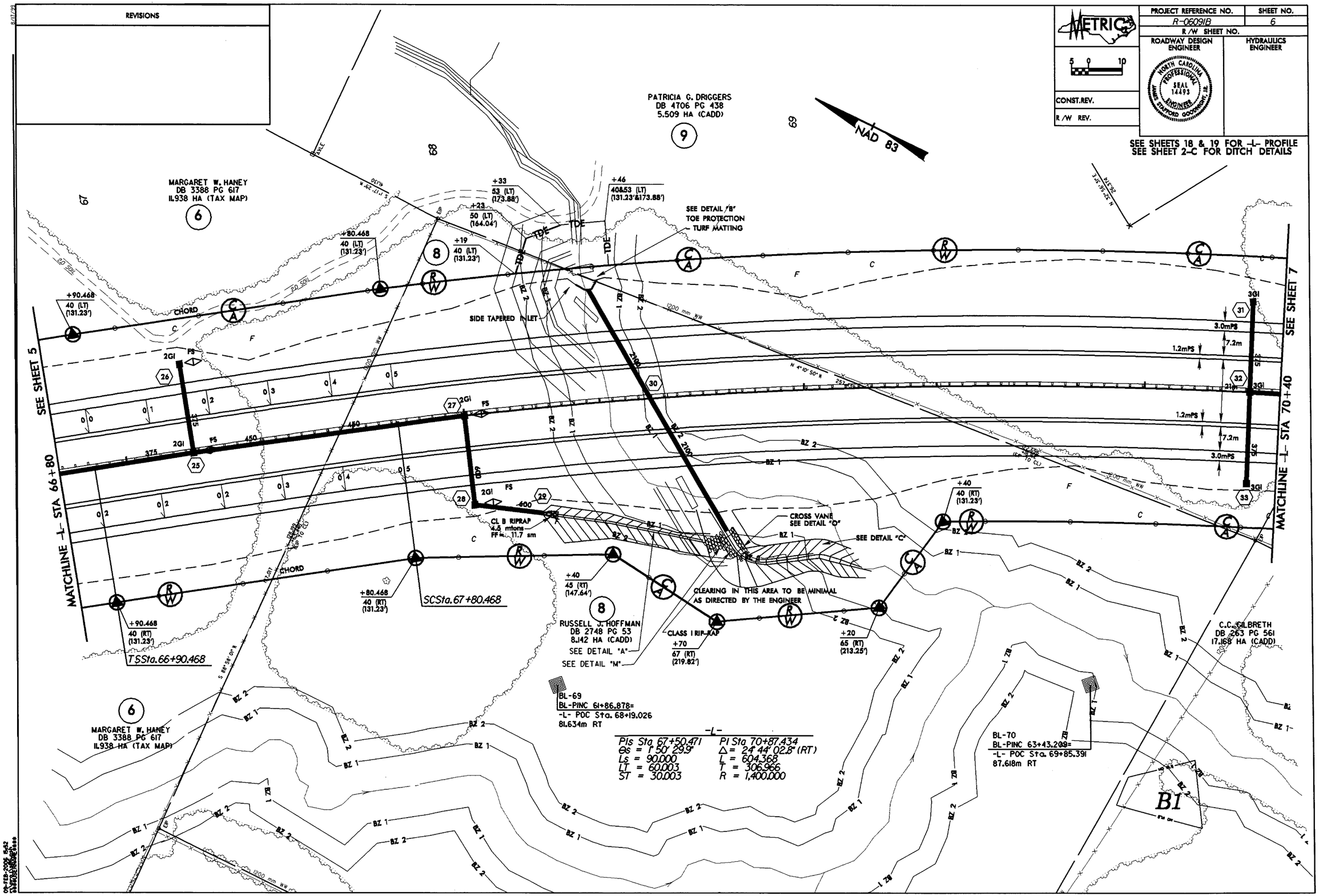
PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

METRIC

5 0 10

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

SEE SHEETS 18 & 19 FOR -L- PROFILE
SEE SHEET 2-C FOR DITCH DETAILS



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

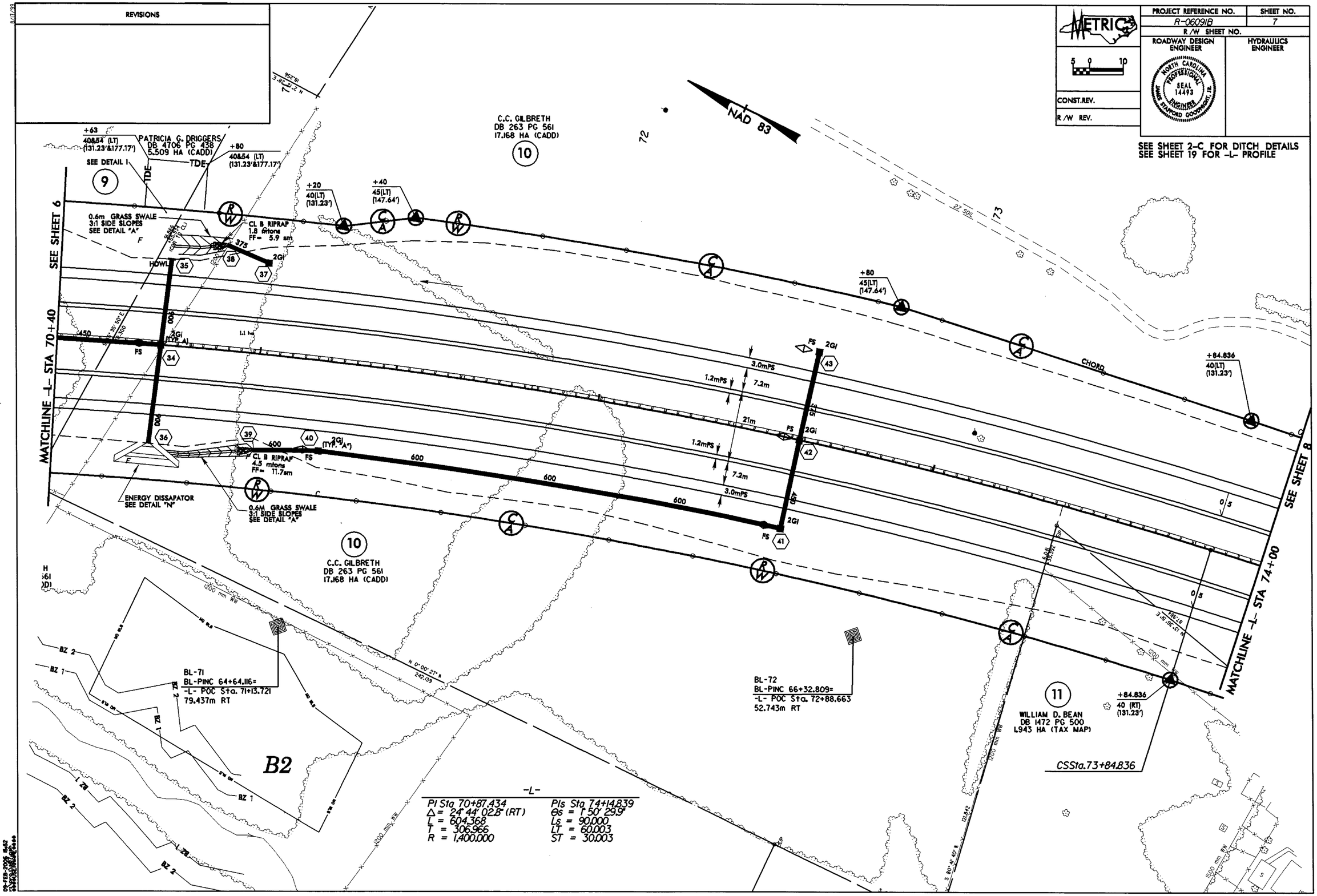
5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, III

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEET 19 FOR -L- PROFILE



REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

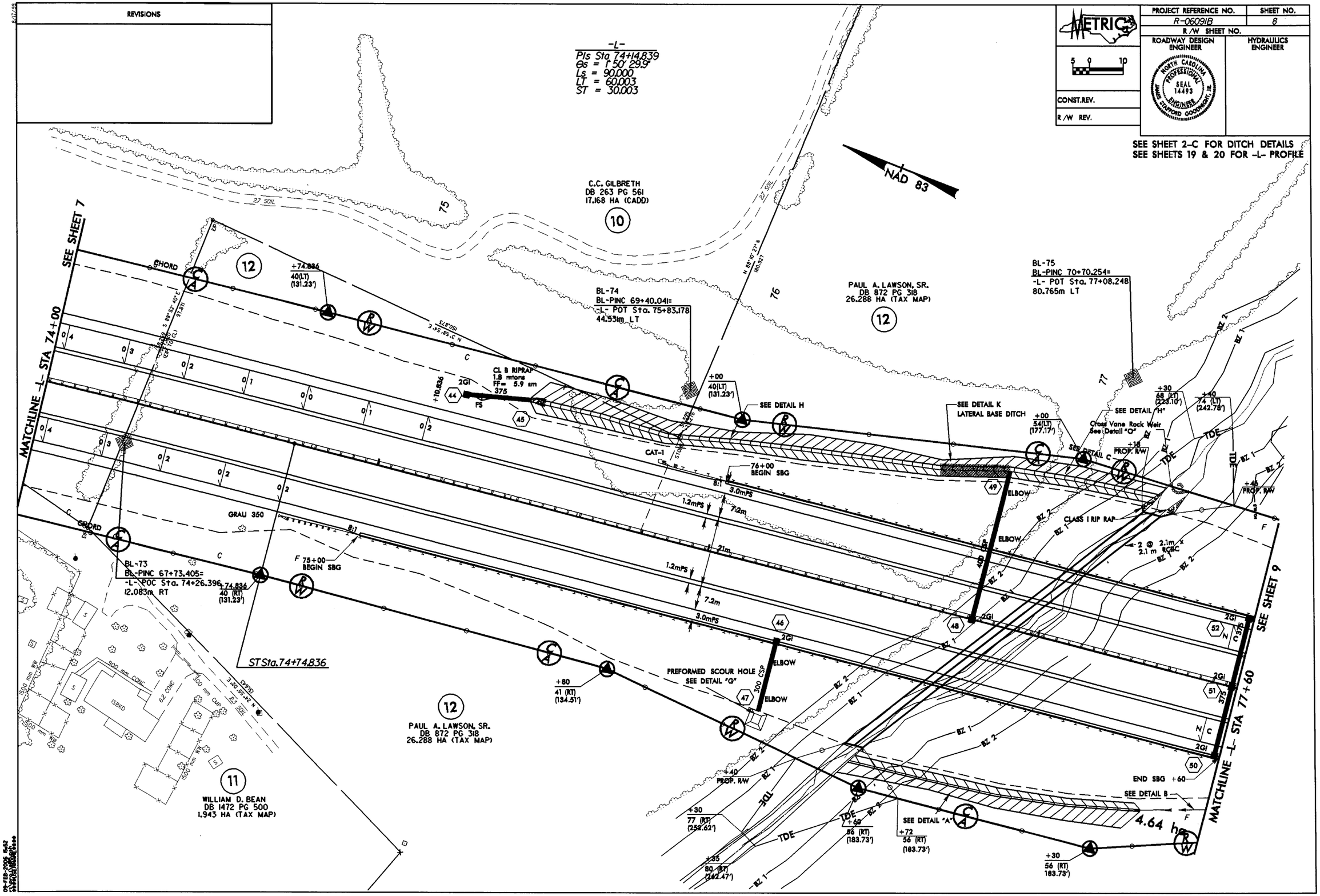
5 0 10

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODWIN, JR.

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 19 & 20 FOR -L- PROFILE



REVISIONS
ROW REVISION - PER SUBMITTAL OF 04-12-2005 CHANGED PARCEL 15 TO BE PARCEL 14 WPW 07-06-2005

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

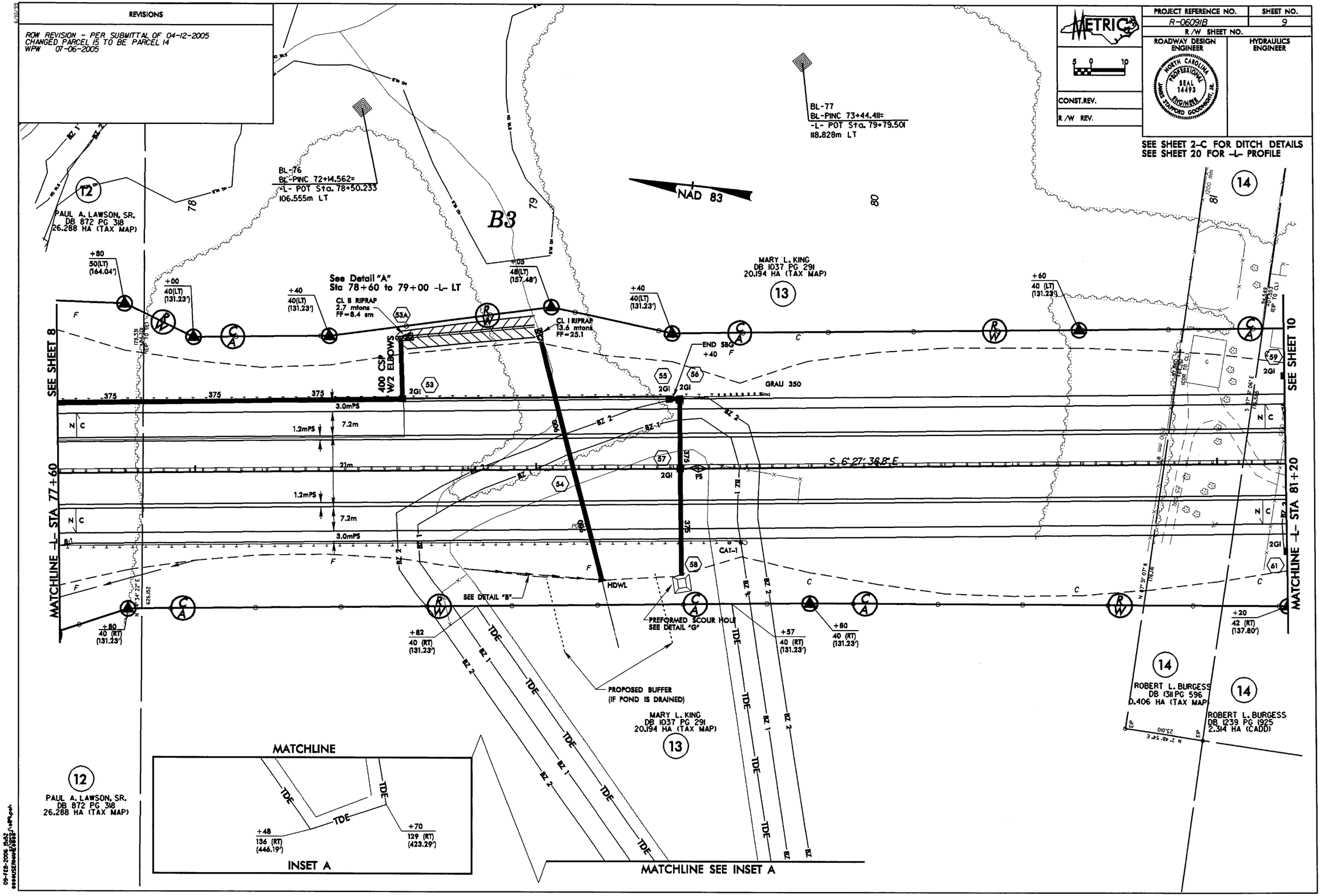
5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODNIGHT, III

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEET 20 FOR -L- PROFILE



REVISIONS
ROW REVISIONS - PER SUBMITTAL OF 04-12-2005 CHANGED PARCEL 15 TO BE PARCEL 14 WPW 07-06-2005

PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	10

MATCHLINE STA 12+70 -Y9- SEE SHEET 15

-DR5-
PI Sta 11+04.320
Δ = 31° 28' 47.5" (LT)
L = 65.931
T = 33.821
R = 120.000

PI Sta 10+52.506
Δ = 49° 47' 03.9" (LT)
L = 26.067
T = 13.921
R = 30.000

PRECAST PERFORMED SCOUR HOLE
4.8 m x 4.8 m
SEE DETAIL G

HUGH A. MYERS
DB 1130 PG 444
0.405 HA (TAX MAP)

PT Sta. 10+64.653
PC Sta. 10+70.499

BL-78
BL-PINC 74+82.249=
-L- POT Sta. 81+17.324
116.782m LT

BL-79
BL-PINC 76+33.655= END CONST. +90
BY9-PINC 84+86.176=
-Y9- PINC 13+27.040=
-L- POT Sta. 82+62.847
90.478m RT

BL-80
BL-PINC 77+19.337=
-L- POT Sta. 83+48.237
82.049m LT

-DR7-PC Sta. 10+10.550
-DR7-PRC Sta. 10+45.583
TERESA T. CUNNUP & OTHERS
DB 1667 PG 732
5.342 HA (TAX MAP)

ENERGY DISSAPATOR

BL-81
BL-PINC 77+96.298=
-L- POT Sta. 84+23.640
66.638m LT

-DR5-POT Sta. 10+00=
-Y9- POT Sta. 12+80
-DR7-POT Sta. 10+00.000

-Y9- PC Sta. 13+27.482

-DR7-PT Sta. 10+84.175

NAD 83

TERESA T. CUNNUP & OTHERS
DB 1667 PG 732
5.342 HA (TAX MAP)

ROBERT L. BURGESS
DB 1239 PG 1925
2.314 HA (CADD)

PT Sta. 11+36.430

-L- POT 83+34.392=
-Y9- POC 13+82.717
Δ = 70° 20' 04.35"
@ INTERSECTION -Y9- 83.872, -97.092 (COR TO CL)

SEE STD. 225.08

SEE DETAIL D
SPECIAL DITCH

SEE DETAIL "E"
BERM DITCH

SEE DETAIL "Q"

SEE DETAIL "A"

SEE DETAIL 2-W
DEPTH = 5.42

400 CSP W/2 ELBOWS
CL B RIPRAP
2.7 mtons
FF=8.4 sm

300 CSP W/2 ELBOWS
CL B RIPRAP
1.8 mtons
FF=3.3 sm

CL I RIPRAP
13.6 mtons
FF=25.1 sm

400 CSP W/ELBOW

GRAU 350

TYPE III

TUTTLE ROAD

SEE SHEET 9

SEE SHEET 11

MATCHLINE -L- STA 81+20

MATCHLINE -L- STA 84+60

MATCHLINE -Y9- 15+00

SEE SHEET 16

ARTHUR LEE LOMAX
DB 1893 PG 1961
PB 88 PG 42
2.850 HA (CADD)

KEPLEY-FRANK HARDWOOD CO., INC.
CENTRAL LUMBER COMPANY, INC
DB 1359 PG 155
18.384 HA

PROPOSED BUFFER

SPECIAL DITCH
SEE DETAIL D

GUARDRAIL BARRICADE W/TES

END SBG
14+80

END C/A AND FENCE +00
Lt. and Rt.

HDWL

0.63 ha

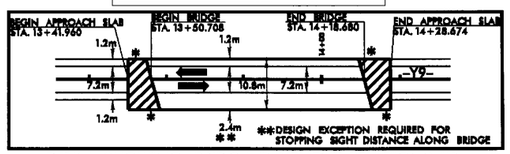
-Y9-
PI Sta 14+19.605
Δ = 17° 27' 28.4" (RT)
L = 182.818
T = 92.123
R = 600.000
SE = 0.06

-DR7-
PI Sta 10+30.372
Δ = 66° 54' 35.1" (RT)
L = 35.034
T = 19.823
R = 30.000

PI Sta 10+68.069
Δ = 73° 42' 16.2" (LT)
L = 38.582
T = 22.486
R = 30.000

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 20 & 21 FOR -L- PROFILE
SEE SHEETS 23 & 24 FOR -Y9- PROFILE
SEE SHEET 25 FOR -DR5- PROFILE
SEE SHEET 26 FOR -DR7- PROFILE

BRIDGE APPROACH SLABS
GUARDRAIL ANCHORS REQ'D
CONC SLOPE PROTECTION (NOT TO SCALE)



DETAIL SHOWING BRIDGE /PAVEMENT RELATIONSHIP

METRIC

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

09-FEB-2006 8:53

REVISIONS

BILLY L. TUTTLE
DB 1200 PG 1950
9.380 HA (TAX MAP)

NAD 83

-DR7-
PI Sta 11+79.174 △= 11° 07' 55.1" (LT) L = 97.145 T = 48.726 R = 500.000
PI Sta 13+06.607 △= 11° 07' 55.6" (RT) L = 97.146 T = 48.726 R = 500.000

-DR7- PCSta.11+30.448
-DR7- PTSta.12+27.593
-DR7- PCSta.12+57.880
-DR7- PTSta.13+55.026

TERESA T. CUNNUP & OTHERS
DB 1667 PG 732
5.342 HA (TAX MAP)

16

BL-82
BL-PINC 78+75.260=
-L- POT Sta. 85+01.144
51.534m LT

BL-83
BL-PINC 79+55.277=
-L- POC Sta. 85+77.324
29.524m LT

BL-84
BL-PINC 80+45.182=
-L- POC Sta. 86+63.222
10.154m LT

BL-85
BL-PINC 81+35.140=
-L- POC Sta. 87+51.869
2.401m LT

S 9°59'41.3" E
S 1°08'08.4" W

SEE DETAIL "P"
SEE DETAIL "Q"
SEE DETAIL "R"
SEE DETAIL "A"
SEE DETAIL "D"
SPECIAL SWALE

CL I RIPRAP 5.4 mtons FF=14.2 sm
CL B RIPRAP 1.8 mtons FF=3.3 sm
CL B RIPRAP 1.8 mtons FF=5.9
CL B RIPRAP 2.7 mtons FF=8.4 sm
300 CSP W/2 ELBOWS
END SBG +30'
CAT-1
GRAU 350
ELBOW
FS
CHORD
3.0mPS
1.2mPS
7.2m
750
400
375
419.519
+89.480
45 (RT)
(147.64')
SCSta.86+89.480
+17.480
40 (RT)
(131.23')
TSSta.85+17.480

18

KEPLEY-FRANK HARDWOOD CO., INC.
CENTRAL LUMBER COMPANY, INC.
DB 1359 PG 155
118.384 HA

SEE SHEET 10
SEE SHEET 12
MATCHLINE -L- STA 84+60
MATCHLINE -L- STA 88+20

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -DR7- PROFILE

-L-
PIs Sta 86+32.332 θs = 10° 03' 58.6" Ls = 172.000 LT = 114.953 ST = 57.502
PI Sta 87+74.061 △= 19° 36' 24.4" (RT) L = 167.508 T = 84.581 R = 489.500

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-0609IB	11
	R/W SHEET NO.	
5 0 10	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.	
R/W REV.		

09-FEB-2006 8:43

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

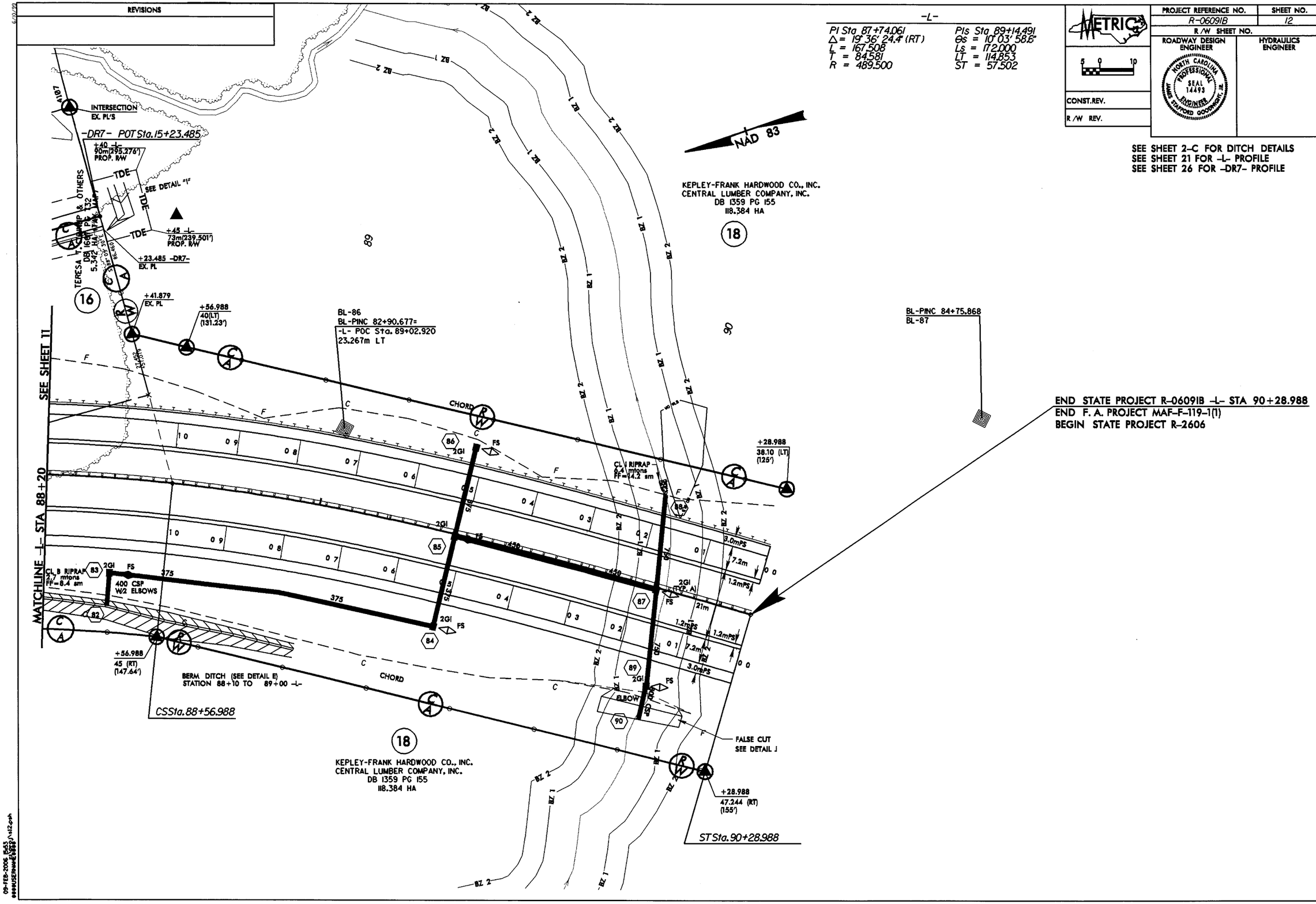
NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODWYN, JR.

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 26 FOR -DR7- PROFILE

-L-

PI Sta 87+74.061
Δ = 19° 36' 24.4" (RT)
L = 167.508
T = 84.581
R = 489.500

PIs Sta 89+14.491
Θs = 10° 03' 58.8"
Ls = 172.000
LT = 114.853
ST = 57.502



09-FEB-2006 15:43
$$$$USERNAME$$$$

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-0609IB	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC 5 0 10

CONST. REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODNIGHT, III

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 22 & 23 FOR -Y8- PROFILE
SEE SHEET 25 FOR -DR1- PROFILE

-Y8A-
PI Sta 10+78.015
Δ = 10° 47' 43.6" (LT)
L = 43.5241
T = 21.8267
R = 231.0000

-Y8-
PI Sta 12+39.503
Δ = 14° 07' 23.0" (RT)
L = 308.117
T = 154.843
R = 1,250.000
SE = 0.04

DRIVE DR1
PI Sta 10+18.206
Δ = 7° 25' 06.8" (RT)
L = 19.483
T = 11.389
R = 15.000

NAD 83

19 BEGIN CONST. -Y8-
PCSta.10+84.660
HALLIE GILBREATH MYERS
DB 3604 PG 1869
PB 139 PG 61

21
CLAY C. GILBRETH
DB 2895 PG 420
0.854 HA (TAX MAP)

20
ROBERT L. KEARNS
DB 1766 PG 591

22
JOHNNY MORRIS FRYE
DB 3472 PG 1247

1
FAIRFIELD GOLF CLUB, INC.
DB 3345 PG 707
PB 5 PG 351
22.140 HA (TAX MAP)

6
PATRICIA G. DRIGGERS
DB 3114 PG 188
0.304 HA (TAX MAP)

5
JERRY W. QUEEN
DB 5991 PG 1529
1.152 HA (TAX MAP)

7
JESSE M. TYNDALL
PO BOX 2
0.482 HA (TAX MAP)

13
C.C. GILBRETH
DB 3134
0.382 HA (TAX MAP)

POT Sta.10+43.511
GPS-10
BY8-PINC 9+23.007=
-Y8- POC Sta. 13+42.821
32.603m LT

PT Sta.10+26.239

PCSta.10+06.816

DRI POT Sta.10+00 =
-Y8- POC Sta.12+94.657

-Y8- POCSta.12+94.657 =
-Y8A- POCSta.10+91.215

-Y8A- PCSta.10+56.188

-Y8A- POTSta.10+00.000

S 73° 02' 00.6" W

S 73° 01' 28.2" W

S 17° 48' 28.4" E

MATCHLINE -Y8- STA 13+80

SEE SHEET 5

END CONST +40

END FENCE

GRAU 350

da = .06 ha

2GI

CL B RIPRAP
1.8 mtons
FF= 3.3 MT

GRADE TO DRAIN

300 CSP W/
2 ELBOWS

SEE DETAIL A

SEE DETAIL D
SPECIAL DITCH

TYPE B
SILT BASIN

LEVEL SPREADER

48m TAPER

MAINTAINED R/W

EX. R/W

EXISTING R/W

R=15m

GOLF COURSE

APPLETREE CT

ISBKD

ISM BUS

CANOPY

CONC

ISFD

2SFD

09-FEB-2006 15:43
s:\design\r0609ib\v13.dgn

REVISIONS
R/W REVISIONS - PER SUBMITTAL OF 08-02-2005 ELIMINATED CLAIM ON PARCEL #27 BY MAINTAINING SLOPES WITHIN EXISTING R/W. BY WPW 08-29-2005

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER WILLIS STANFORD GOODWRIGHT, JR.

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 22 & 23 FOR -Y8- PROFILE
SEE SHEET 25 FOR -DR2- PROFILE
SEE SHEET 25 FOR -DR3- PROFILE

-Y8-	DRIVE
PI Sta 16+96.418	PI Sta 10+14.019
Δ = 13° 40' 25.4" (RT)	Δ = 85° 20' 55.5" (LT)
L = 298.314	L = 14.896
T = 149.869	T = 9.219
R = 1,250.000	R = 10.000

NAD 83

SEE SHEET 5

MATCHLINE -L- STA 15+80

CLARENCE E. MARSHALL
DB 2804 PG 284
0.344 HA (CADD)

POSEY E. MARSHALL
DB 3459 PG 1905
0.082 HA (CADD)

POSEY E. MARSHALL
DB 3722 PG 394
0.082 HA (CADD)

POSEY E. MARSHALL
DB 2137 PG 442
0.373 HA (CADD)

GARY R. HILL
DB 4037 PG 2012
0.149 HA (CADD)

JAMES P. HINKLE, SR.
DB 4167 PG 590
DB 4167 PG 593
2.028 HA (TAX MAP)

NCDOT
DB 4646 PG 307
9.263 HA (TAX MAP)

JEFFREY L. BOSWELL & WIFE
CATHY L. BOSWELL
DB 4920 PG 694
0.368 HA (TAX MAP)

ROGER D. QUEEN
DB 4151 PG 2066
3.769 HA (CADD)

(NO CLAIM)
JAMES RONALD GRAY
CHARLENE R. GRAY
DB 4681 PG 1581
PB 103 PG 87

WILLIAM LEON SPARKS
DB 3481 PG 860

PATRICK TODD RIDGE
ANGELA M. RIDGE
DB 4472 PG 1580

POT Sta.10+20.156
-DR3-POT Sta.10+00=
-DR2- POT Sta.10+26
PT Sta.10+19.696
PCSta.10+04.800
-DR2-POT Sta.10+00=
-Y8-POC Sta.16+98
BY-800
BY8-PINC 13+21.385=
-Y8- POC Sta.17+32.998
1.65m RT
-Y8-POC Sta.17+35.356=
-Y8B- POT Sta.9+95.138
PT Sta.18+44.863
END CONST
18+82.197
POT Sta.18+88.934

END CONST. +90
END FENCE +80
END PAVING
END FENCE ON PL
PROP. R/W
CL B RIPRAP 2.7 mtons FF= 8.4 sm
GRAU 350
PROP R/W
EX. R/W
ON PL
DOCK WALL
48m TAPER
N 79° 10' 11.0" W
S 87° 37' 00.7" E
S 15° 09' 09.5" W

REVISIONS

NAD 83

CHINA A. TUTTLE
DB 1200 PG 1946
0.815 HA (TAX MAP)
32

DONALD C. HENDERSON
DB 1411 PG 1206
0.896 HA (TAX MAP)
30

BILLY L. TUTTLE
DB 1200 PG 1950
9.380 HA (TAX MAP)
31

BILLY L. TUTTLE
DB 1200 PG 1950
6.180 HA (CADD)
31

TERESA J. CUNNIP & OTHERS
DB 1695 PG 732
3.42 HA (TAX MAP)
16

BY9-PINC 5+00.000
GPS-11

BEGIN CONST.
-Y9- POTSta. 10+00.000

POT Sta. 10+35.000
END CONST.

-DR4- POT Sta. 10+00
-Y9- POT Sta. 11+35.166

N. 82° 04' 09.7" W.

SR 1920 TUTTLE RD 6.0 BST

60m TAPER
BOTH SIDES

0.6m LATERAL BASE DITCH
STA 11+80 TO 12+16 LT -Y9-
SEE DETAIL "A"

0.6m LATERAL BASE DITCH
STA 11+20 TO 11+80 LT -Y9-
SEE DETAIL "L"

CL B RIPRAP
4.5 m/gms
1.7 sm

400 CSP W/
2 ELBOWS
GRAU 350 2GI

LEVEL SPREADER
10m

"B" BASIN

BYPASS DEVICE

2@1.8mX2.4m RCBC

CROSS VANE ROCK WEIR
SEE DETAIL O

GPS-12
BY9-PINC 7+69.043=
-Y9- POT Sta. 12+38.604
14.539m RT

DRIVE -DR5-
PI Sta 10+52.506
Δ = 49° 47' 03.9" (LT)
L = 26.067
T = 13.921
R = 30.000

SEE SHEET 10

MATCHLINE -Y9- STA 12+80

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 23 & 24 FOR -Y9- PROFILE
SEE SHEET 25 FOR -DR4- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODWYN, JR.

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REVISIONS
ROW REVISIONS- PER SUBMITTAL OF 04-12-2005 CHANGED PARCEL 15 TO BE PARCEL 14 WPW 07-06-2005

PROJECT REFERENCE NO.	SHEET NO.
R-0609B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R/W REV.	

METRIC 5 0 10

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER STAFFORD GOODWRIGHT JR.

SEE SHEET 2-C FOR DITCH DETAILS
SEE SHEETS 23 & 24 FOR -Y9- PROFILE
SEE SHEET 25 FOR -DR6- PROFILE

-Y9-
PI Sta 14+19.605
Δ = 17° 27' 28.4" (RT)
L = 182.818
T = 92.123
R = 600.000

NAD 83

15+00
16+00
17+00

MATCHLINE -Y9- STA 15+00
SEE SHEET 10

JOHN K. WRIGHT
DB 1479 PG 879
0.718 HA (CADD)
34

HAROLD R. MARTIN
DB 1003 PG 397
DB 966 PG 126
PB 88 PG 42
0.685 HA (CADD)
17

ARTHUR LEE LOMAX
DB 1893 PG 1961
PB 88 PG 42
17A

RONNIE G. STANLEY & WIFE
MONA L. STANLEY
DB 1541 PG 1310
2.332 HA (CADD)
38

ARTHUR L. LOMAX
DB 1149 PG 889
1.519 HA (CADD)
35

ARTHUR L. LOMAX
DB 1130 PG 445
1.178 HA (CADD)
37

ARTHUR L. LOMAX
DB 1095 PG 737
0.539 HA (CADD)

14

-Y9- PT Sta.15+10.300

-DR6- POT Sta.10+00 =
-Y9- POC Sta.15+50

POT Sta.10+30.000

BY-900
BY9-PINC 10+84.490=
-Y9- POT Sta. 15+39.331
34.168m RT

BY-901
BY9-PINC 12+22.376=
-Y9- POT Sta. 16+71.888
3.794m LT

-Y9- POT Sta.17+54.760

-Y9- STA. 17+20
END CONST

SEE DETAIL D
SPECIAL DITCH

SEE DETAIL D
SPECIAL DITCH

SEE DETAIL D
SPECIAL DITCH

+10.300
17 (LT)
(55.77')

+80
17 (LT)
(55.77')

+00
20 (LT)
(65.62')

+20
20 (LT)
(65.62')

+20
17 (LT)
(55.77')

+20
12 (LT)
(39.37')

+30
EX. R/W

PL
EX. R/W

PL
15 (RT)
(49.21')

EX. R/W
20 (RT)
(65.62')

+35
17 (RT)
(55.77')

+80
12 (RT)
(39.37')

+00
EX. R/W

+20
13 (RT)
(42.65')

+30
EX. R/W

END CONST.
+23.187

CL B RIPRAP

REMOVE

60m TAPER
BOTH SIDES

N 64° 36' 41.3" W

300 mm CONC

EXISTING R/W

SR 1920 TUTTLE RD 6D BST

37 BST

37 SOIL

HTR

ISBKD

ISBLKD

GRAU 350

N 22° 52' 14.6" E
135.504

S 2° 46' 57.1" E
129.564

S 2° 34' 57.1" E
86.468

S 87° 37' 03" E
108.204

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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODNIGHT, JR.

BM 7 RR SPIKE IN BASE OF 320mm HICKORY 90m LT OF BASELINE STA 57+97 ELEV. 247.151

PI = 63+23.110
EL = 248.700 m
VC = 200 m
K = 139

248.684 LT = 246.800
PI = 63+19.000 LT = 246.700
END DITCH GRADE LT STA 63+00 EL = 246.0
-0.9286%
-2.5716%
-1.14%
-1.5882%
750mm
BEG DITCH GRADE LT STA 64+25 EL = 246.0
END DITCH GRADE LT STA 64+80 EL = 245.614
-1.2174%
-1.22%
BEG DITCH GRADE RT STA 64+05 EL = 240.260
END DITCH GRADE RT STA 64+55 EL = 240.260
-L-

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.5

DRAINAGE AREA	= 4.0	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.67	CMS
DESIGN HW ELEVATION	= 245.73	M
100 YEAR DISCHARGE	= 0.77	CMS
100 YEAR HW ELEVATION	= 245.8	M
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 246.8	M

+80 63+00 +20 +40 +60 +80 64+00 +20 +40 +60 +80 65+00 +20 +40 +60 +80 66+00 +20 +40

-L-

PI = 69+50.000
EL = 233.631 m
VC = 560 m
K = 152

241.184
-1.5882%
-2.5716%
-1.2174%
-2.4882%
-1.2986%
-2.3716%
-1.5305%
200mm
BEG DITCH GRADE RT STA 68+20 EL = 234.800
PI = 68+40.000 LT = 233.800
PI = 68+40.000 RT = 233.800
END DITCH GRADE RT STA 69+05 EL = 231.80

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 7.67	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 233.95	M
BASE DISCHARGE	= 9.01	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 234.25	M
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 236.4	M

+40 +60 +80 67+00 +20 +40 +60 +80 68+00 +20 +40 +60 +80 69+00 +20 +40 +60 +80 70+00

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PROJECT REFERENCE NO.	SHEET NO.
R-0609A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

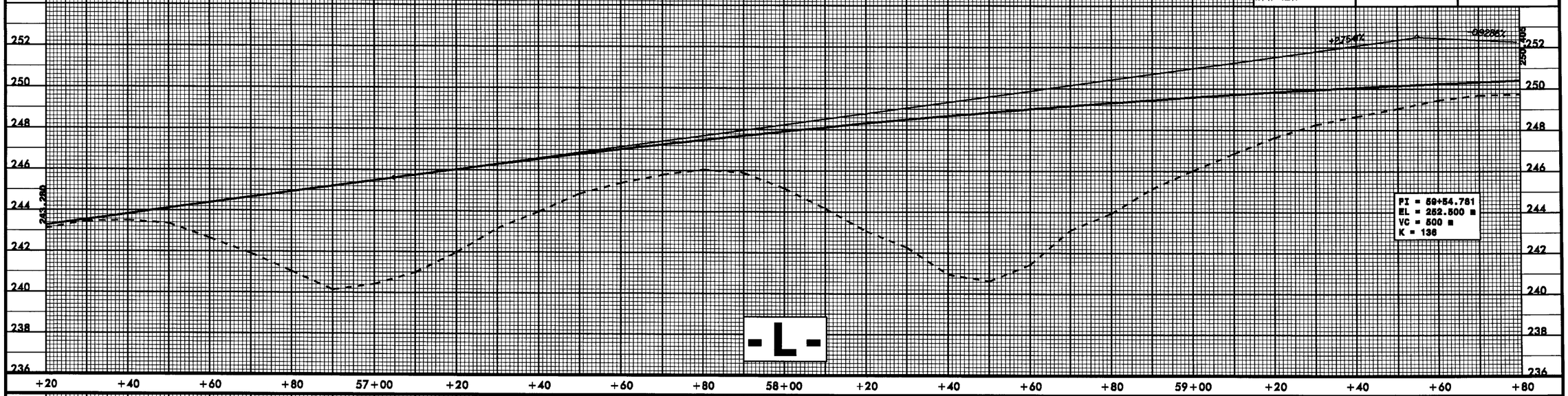
5 0 10

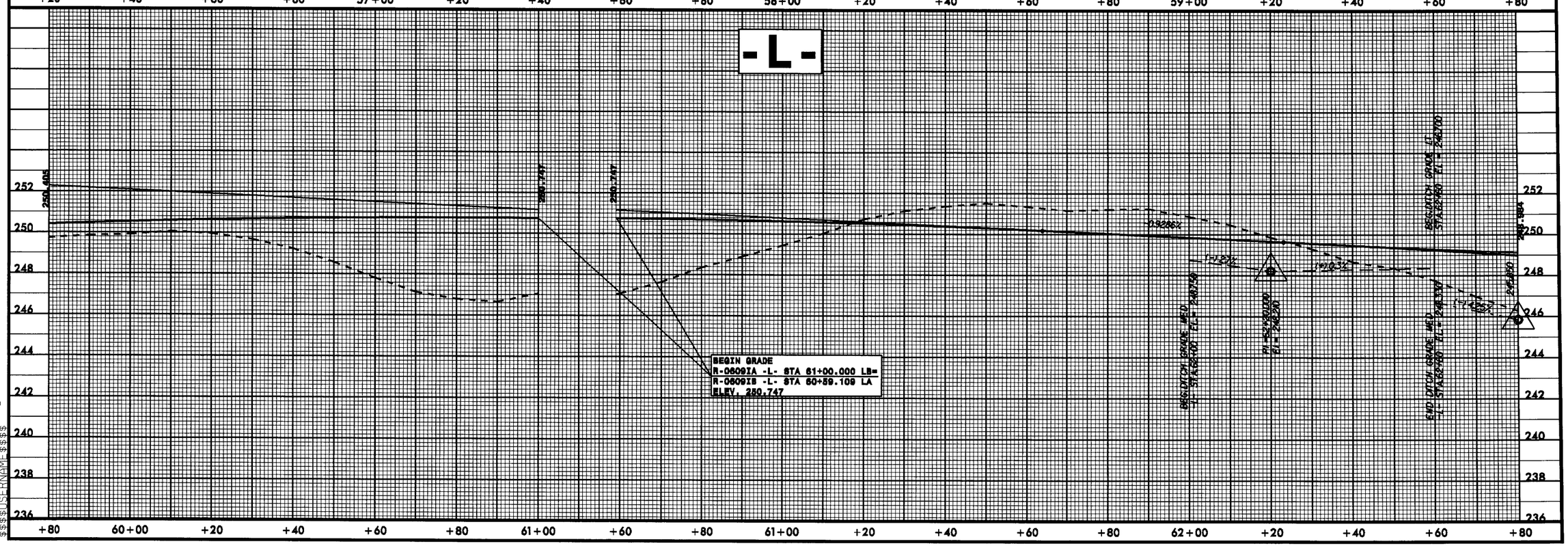
CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODNIGHT, JR.

BM 6 RR SPIKE IN BASE OF 470mm POPLAR
67m LT OF BASELINE STA 49+62
ELEV. 236.030





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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

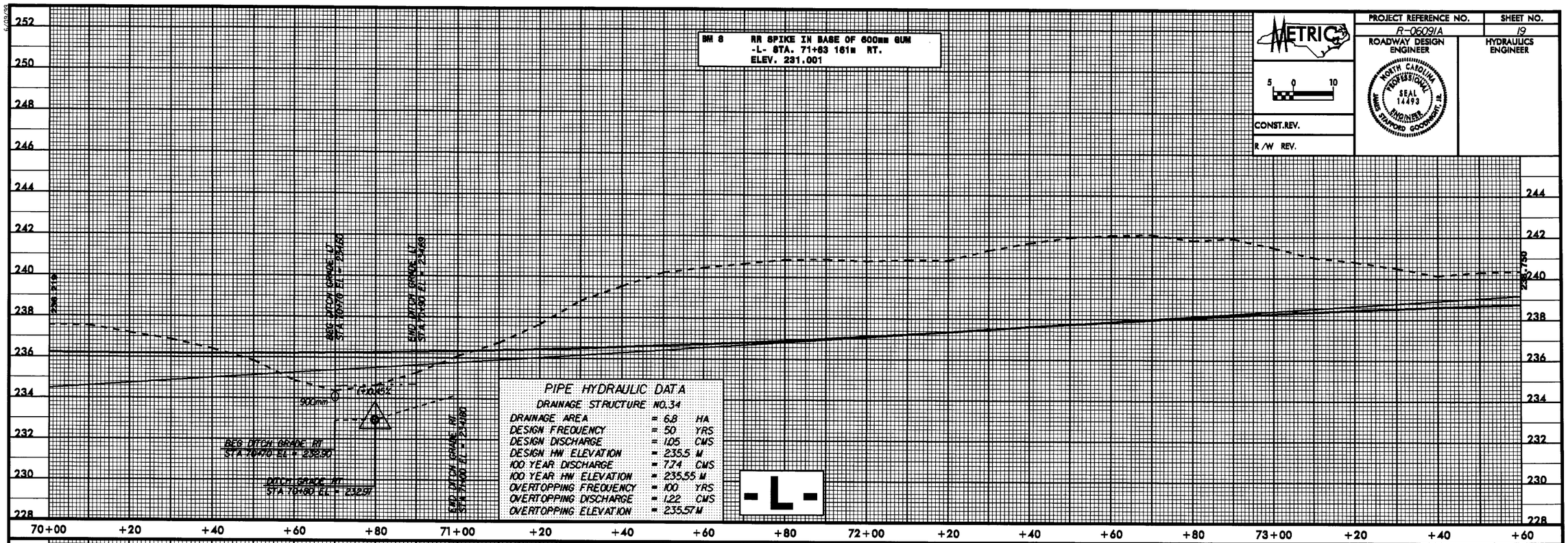
5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODWYN, JR.

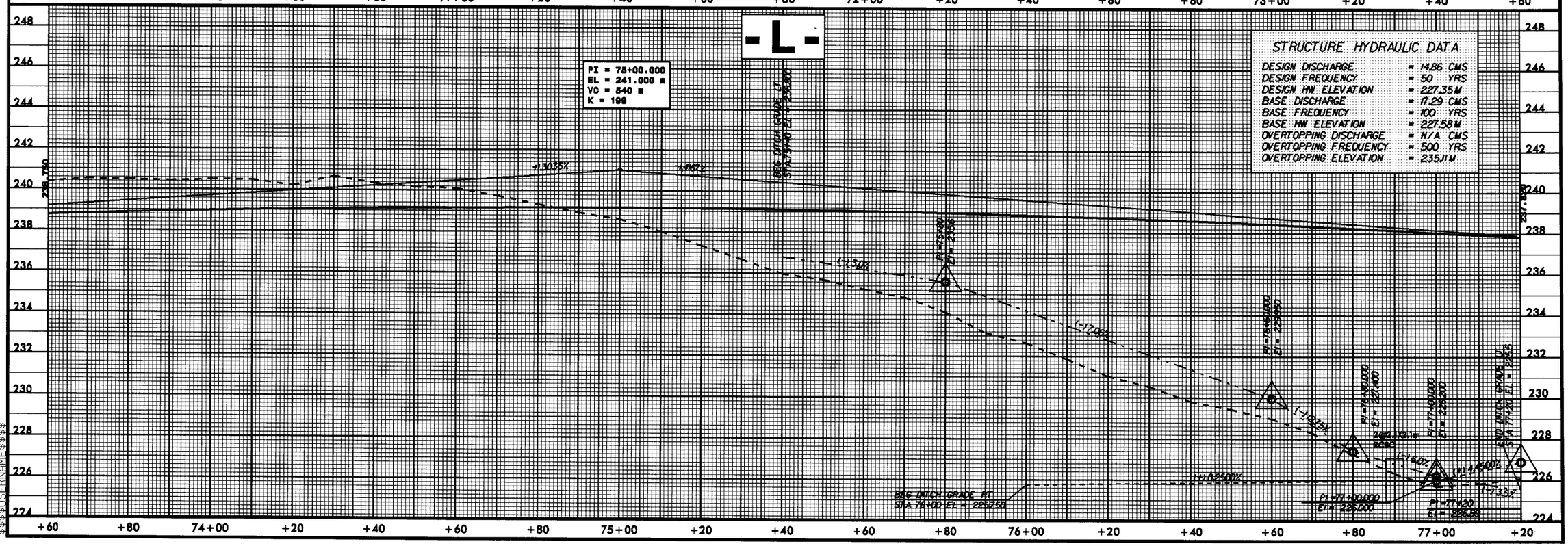
BM 8 RR SPIKE IN BASE OF 600mm GUM
-L- STA. 71+63 161m RT.
ELEV. 231.001



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 34

DRAINAGE AREA	= 6.8	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 10.5	CMS
DESIGN HW ELEVATION	= 235.5	M
100 YEAR DISCHARGE	= 7.74	CMS
100 YEAR HW ELEVATION	= 235.55	M
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 1.22	CMS
OVERTOPPING ELEVATION	= 235.57	M



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 14.86	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 227.35	M
BASE DISCHARGE	= 17.29	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 227.58	M
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 235.11	M

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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STANFORD GOODNIGHT, JR.

BM 9 RR SPIKE IN BASE OF 600mm PIN OAK
-L- STA. 78+43 183m LT.
ELEV. 225.037

-L-

PI = 78+20.000
EL = 226.800

END DITCH GRADE RT
STA 77+40 EL = 229.500

BEG DITCH GRADE LT
STA 78+60 EL = 229.500

END DITCH GRADE LT
STA 79+60 EL = 229.500

(-1)20.0%
(-1.46)%
(-1.25)%
(-1.46)%
900mm

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 54

DRAINAGE AREA	=	7.0	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	1.08	CMS
DESIGN HW ELEVATION	=	230.8	M
100 YEAR DISCHARGE	=	1.26	CMS
100 YEAR HW ELEVATION	=	230.87	M
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	2.1	CMS
OVERTOPPING ELEVATION	=	233.58	M

-L-

PI = 81+00.000
EL = 232.500 m
VC = 600 m

BEG DITCH GRADE RT
STA 80+20 EL = 232.500

END DITCH GRADE LT
STA 82+40 EL = 232.500

(-1)5.0%
(-1)8.0%
(-1)5.6%
(-1)8.0%
(-1)8.0%
(-1.46)%
(-0.89)%
(+0.55)%
(+0.85)%
(-1)7.0%
(-1)4.0%
(-1.46)%
900mm
900mm
750mm

BEG DITCH GRADE RT
STA 82+00 EL = 231.000

BEG DITCH GRADE RT
STA 82+20 EL = 232.200

END DITCH GRADE RT
STA 82+21 EL = 232.325

PI = 82+21.000
EL = 232.400

PI = 82+40.000
EL = 232.900

PI = 82+90.000
EL = 237.700

END DITCH GRADE RT
STA 83+00 EL = 237.500

BEG DITCH GRADE RT
STA 83+60 EL = 233.000

PI = 84+00.000
EL = 237.500

PI = 84+50.000
EL = 232.300

PI = 84+90.000
EL = 232.000

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 63

DRAINAGE AREA	=	5	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	1.31	CMS
DESIGN HW ELEVATION	=	231.07	M
100 YEAR DISCHARGE	=	1.53	CMS
100 YEAR HW ELEVATION	=	231.23	M
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	N/A	CMS
OVERTOPPING ELEVATION	=	232.67	M

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 73

DRAINAGE AREA	=	5.0	HA
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	0.89	CMS
DESIGN HW ELEVATION	=	231.4	M
100 YEAR DISCHARGE	=	1.03	CMS
100 YEAR HW ELEVATION	=	231.57	M
OVERTOPPING FREQUENCY	=	500	YRS
OVERTOPPING DISCHARGE	=	1.29	CMS
OVERTOPPING ELEVATION	=	233.06	M

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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

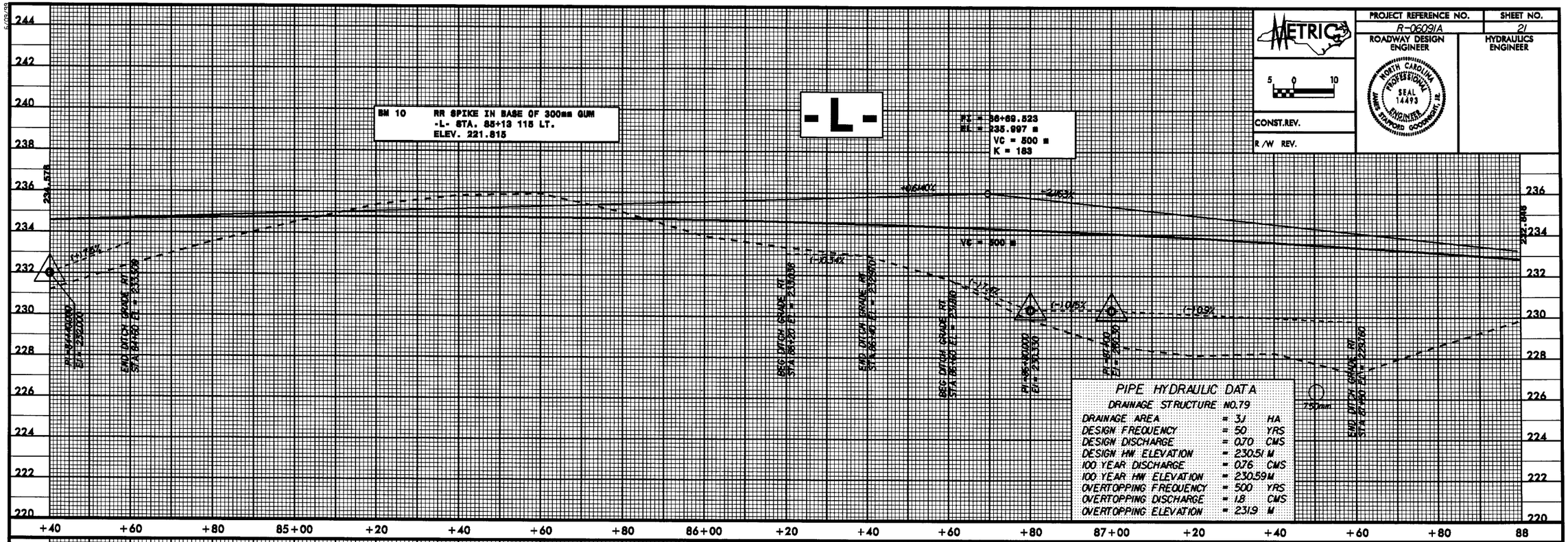
METRIC

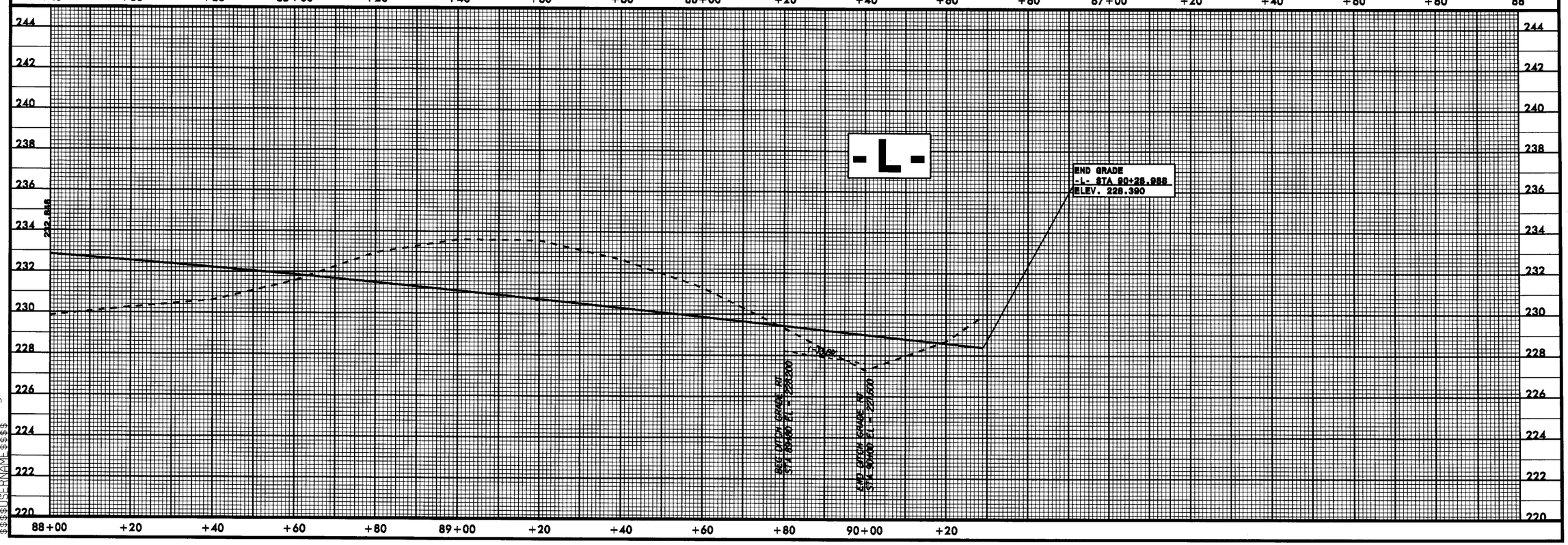
5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JOHN STAFFORD GOODNIGHT, JR.





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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

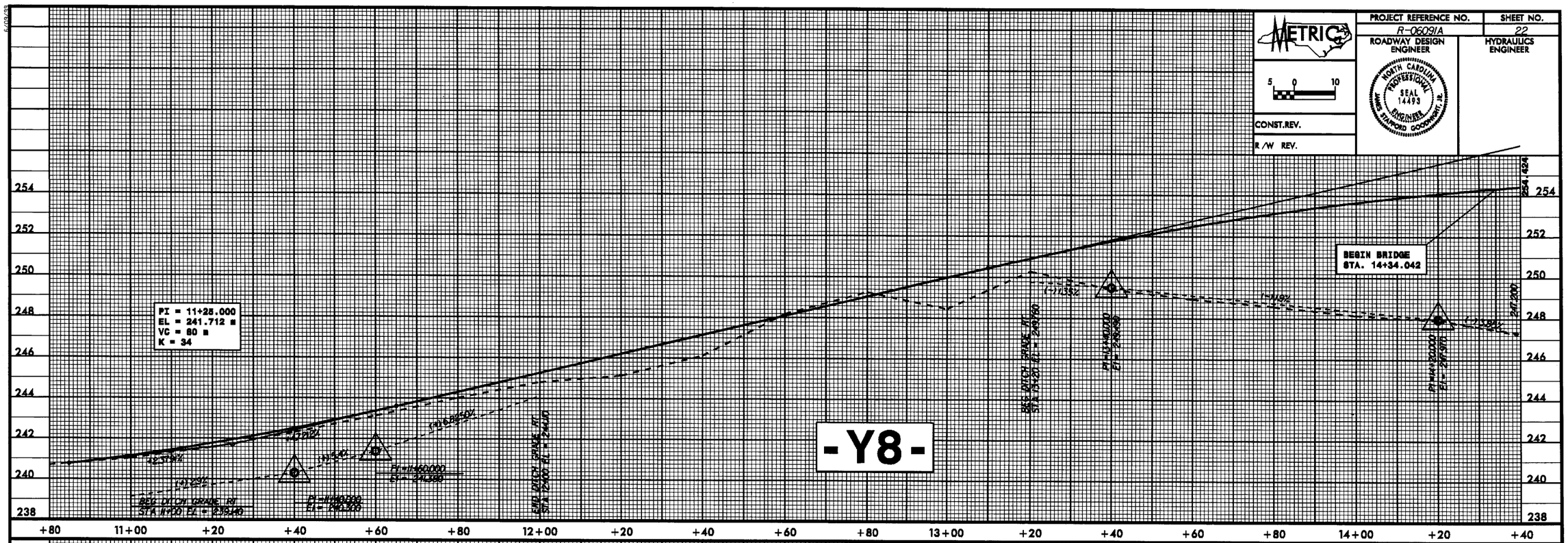
METRIC

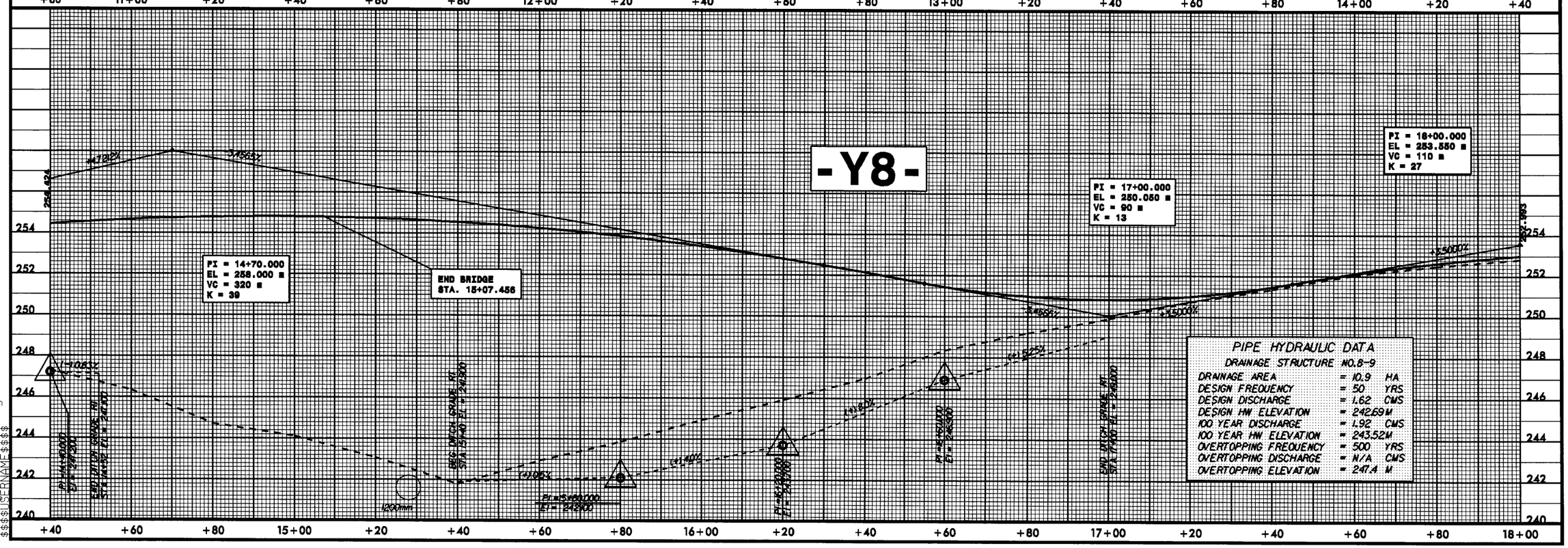
5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JERRY STAFFORD GOODNIGHT, JR.





PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.8-9

DRAINAGE AREA	= 10.9	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.62	CMS
DESIGN HW ELEVATION	= 242.69	M
100 YEAR DISCHARGE	= 1.92	CMS
100 YEAR HW ELEVATION	= 243.52	M
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= N/A	CMS
OVERTOPPING ELEVATION	= 247.4	M

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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

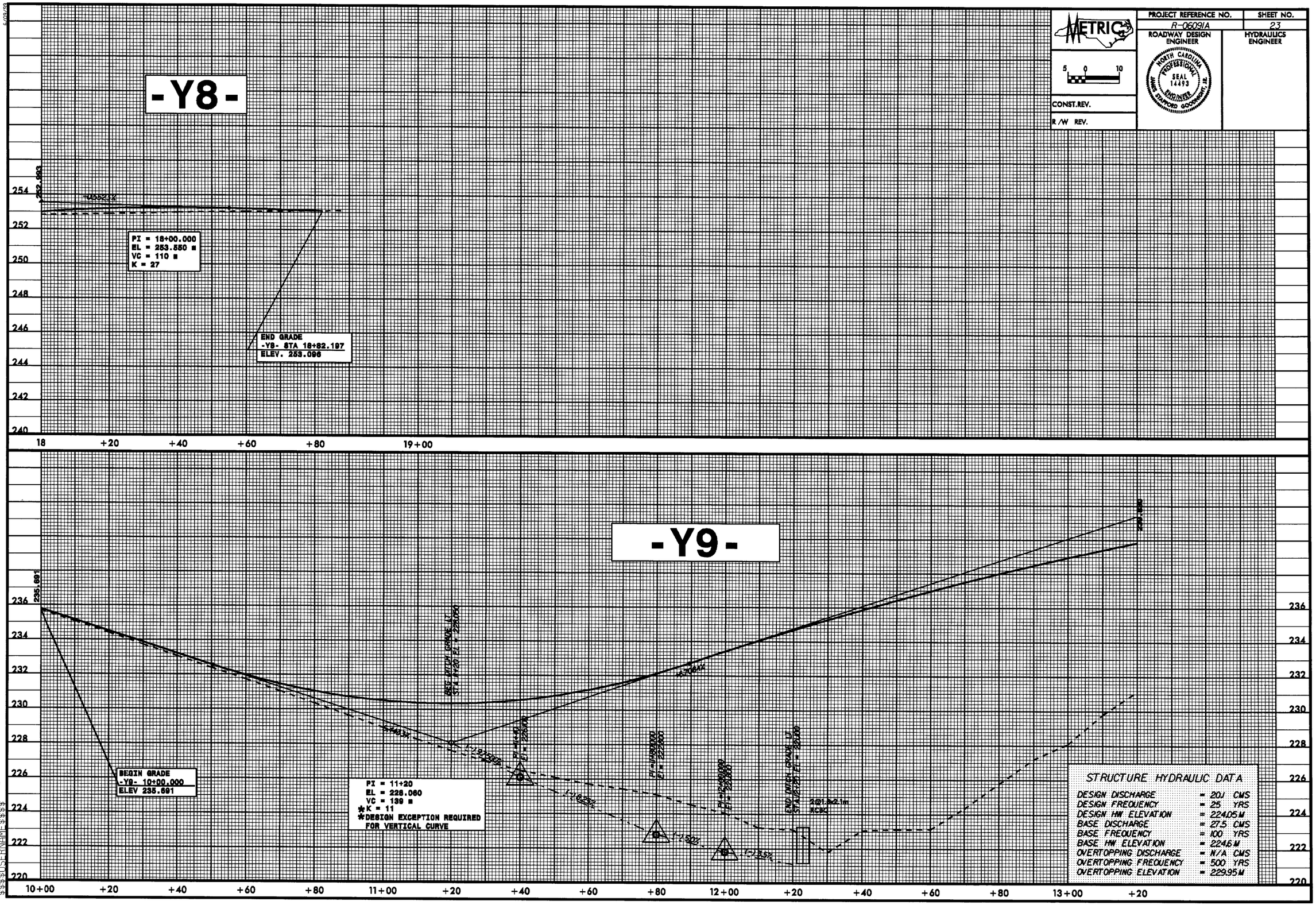
METRIC

5 0 10

CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER JAMES STAFFORD GOODWIN, JR.



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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

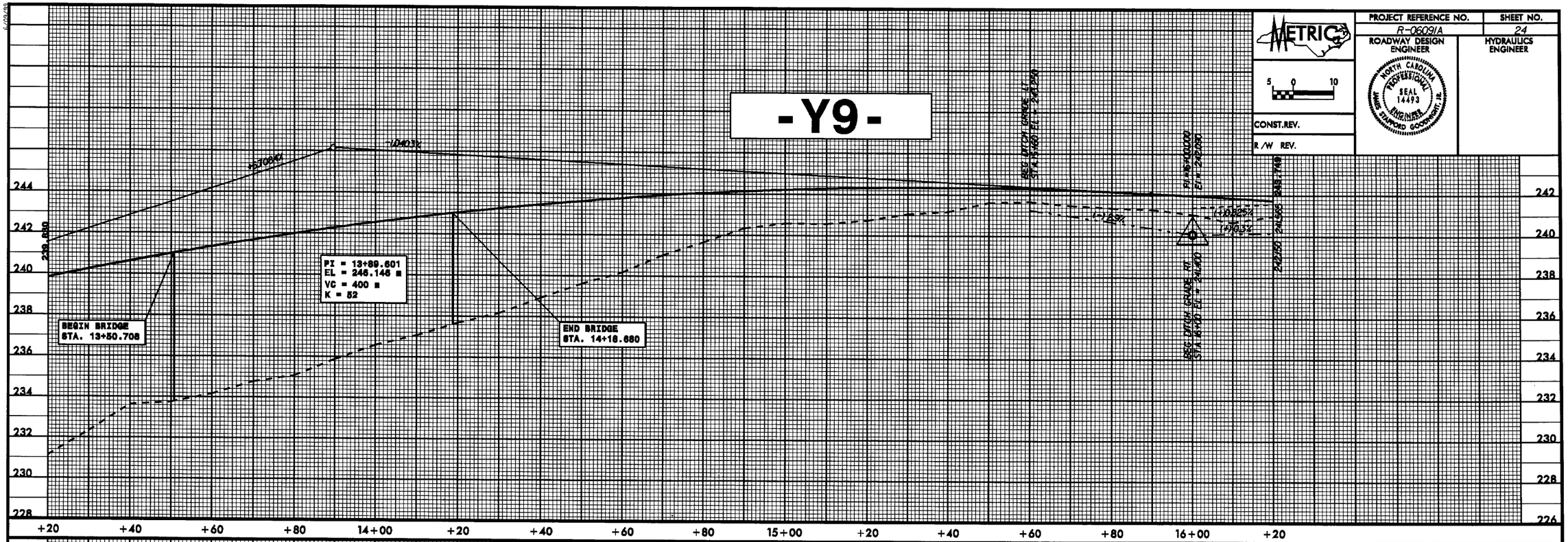
METRIC

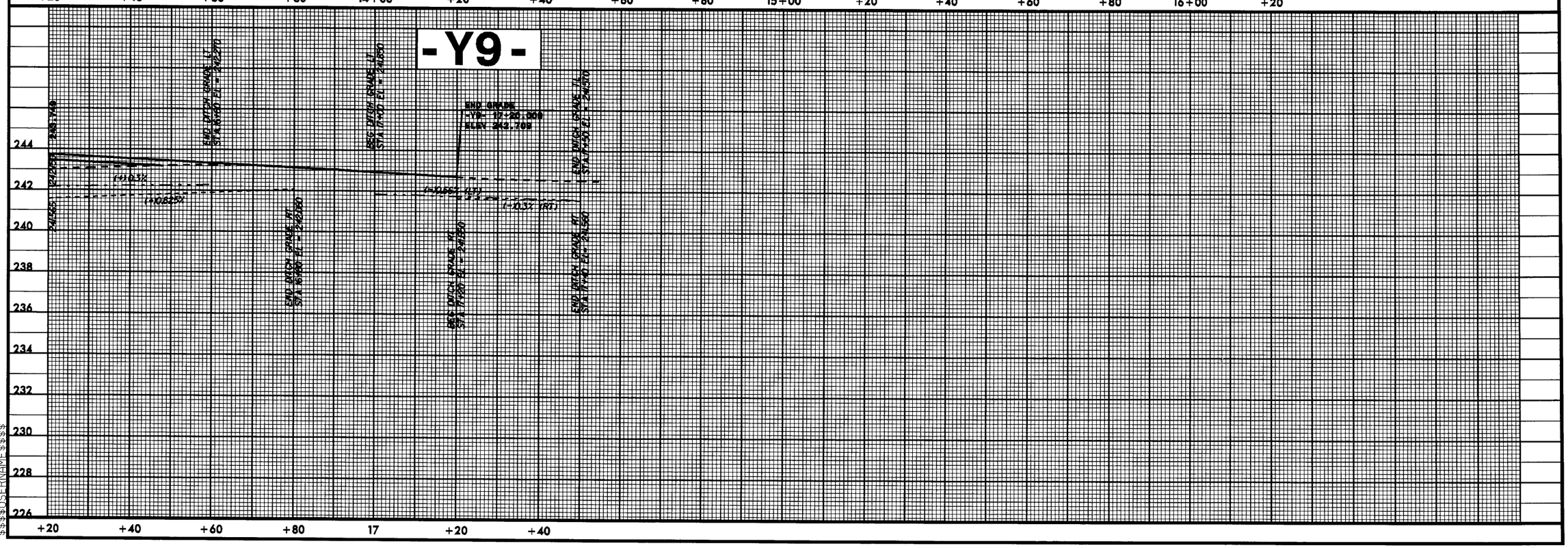
5 0 10

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER STAFFORD GOODNIGHT III





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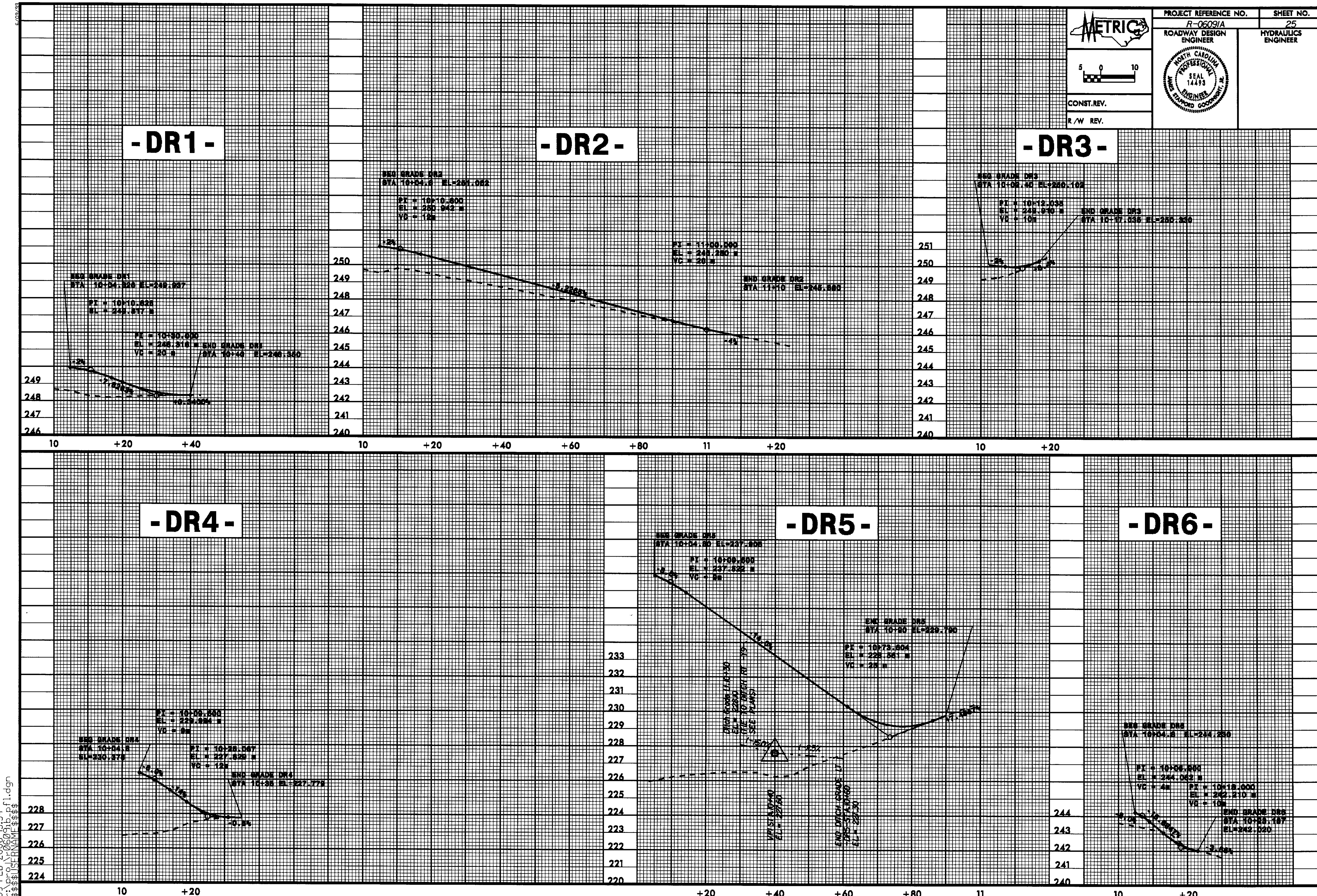
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SHEET NO. 25
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14493 JAMES STAFFORD GOODNIGHT, JR.
METRIC
CONST.REV.
R/W REV.
-DR1-
BEG GRADE DR1 STA 10+04.328 EL=249.937
PI = 10+10.628 EL = 248.817 m
PI = 10+30.000 EL = 248.318 m VC = 20 m
END GRADE DR1 STA 10+40 EL=248.350
-2%
-DR2-
BEG GRADE DR2 STA 10+04.6 EL=251.062
PI = 10+10.600 EL = 250.942 m VC = 12m
PI = 11+00.000 EL = 245.280 m VC = 20 m
END GRADE DR2 STA 11+10 EL=245.880
-2%
-4%
-DR3-
BEG GRADE DR3 STA 10+08.40 EL=250.102
PI = 10+12.035 EL = 249.910 m VC = 10m
END GRADE DR3 STA 10+17.035 EL=250.330
-DR4-
BEG GRADE DR4 STA 10+04.8 EL=230.378
PI = 10+09.600 EL = 229.984 m VC = 8m
PI = 10+28.067 EL = 227.829 m VC = 12m
END GRADE DR4 STA 10+35 EL=227.779
-0.8%
-DR5-
BEG GRADE DR5 STA 10+04.80 EL=237.808
PI = 10+08.600 EL = 237.522 m VC = 8m
PI = 10+73.604 EL = 228.561 m VC = 25 m
END GRADE DR5 STA 10+90 EL=229.790
Ditch Grade Lt. 10+30 EL = 228.00 (TIE TO DITCH RT -Y9- SEE PLANS)
VPI STA 10+40 EL = 227.60
END DITCH GRADE LT -DR5- STA 10+60 EL = 227.30
-DR6-
BEG GRADE DR6 STA 10+04.8 EL=244.250
PI = 10+06.800 EL = 244.062 m VC = 4m
PI = 10+18.000 EL = 242.210 m VC = 10m
END GRADE DR6 STA 10+23.187 EL=242.020
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PROJECT REFERENCE NO.	SHEET NO.
R-0609IA	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

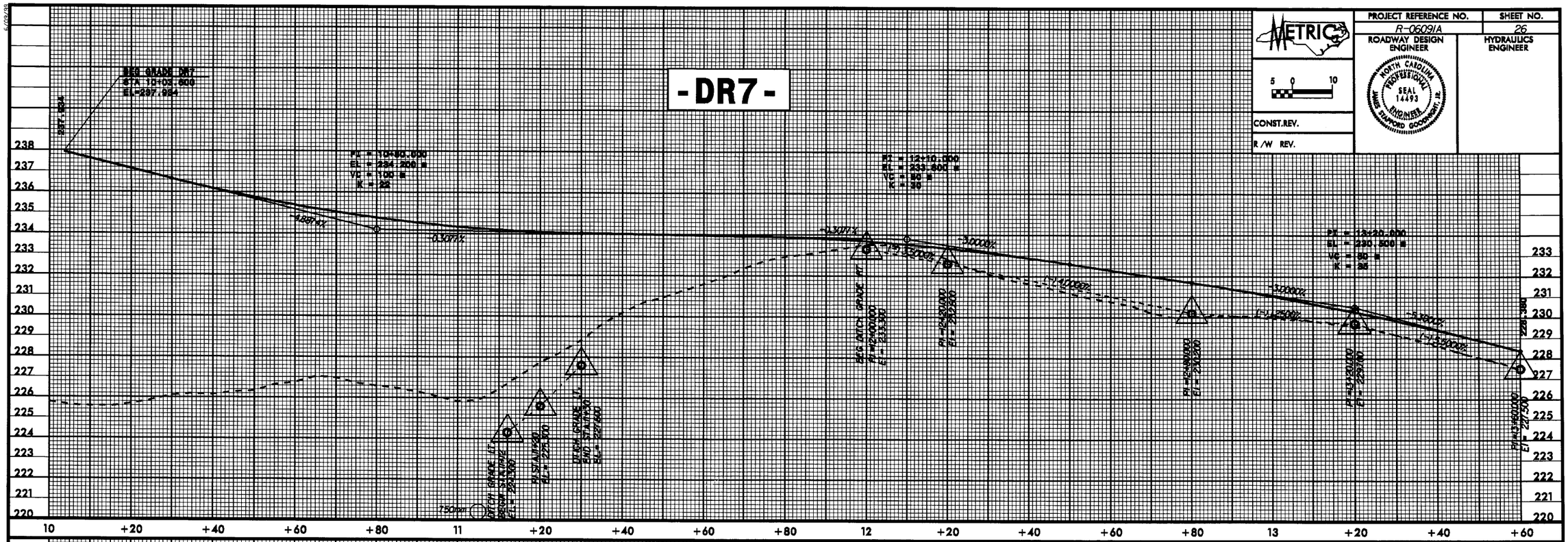
METRIC

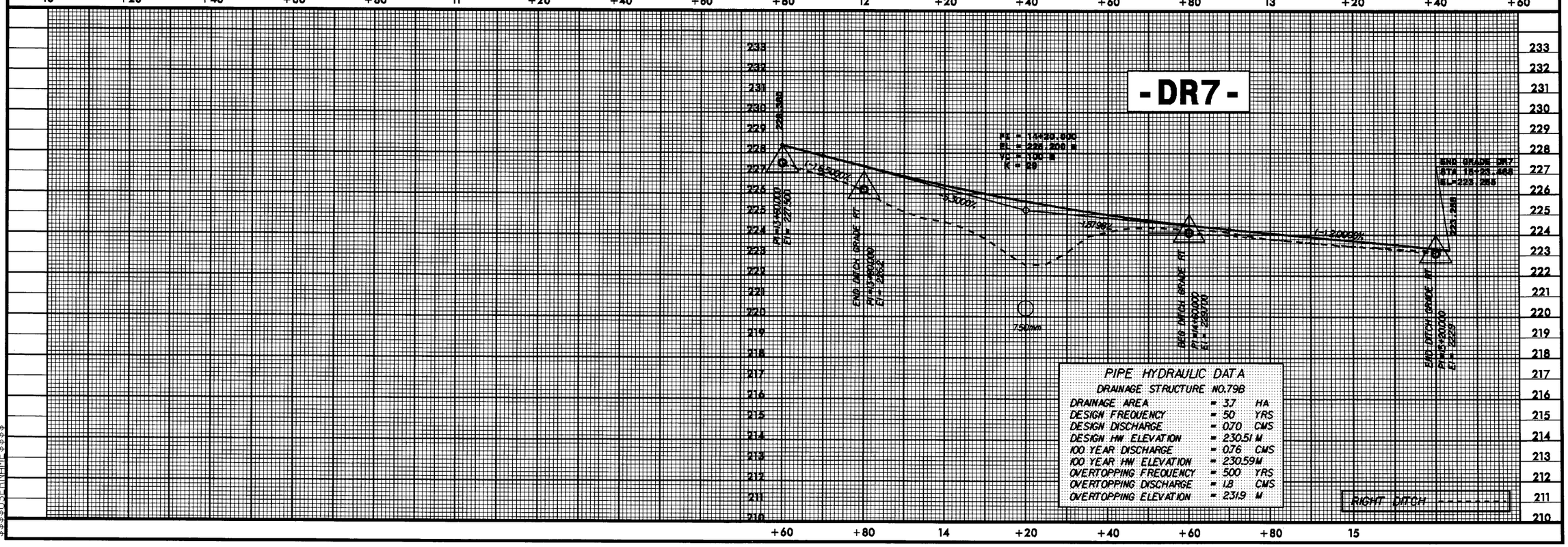
5 0 10

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 14493 ENGINEER MARK STANFORD GOODNIGHT, JR.





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7/01/99

CONTRACT: C201296 TIP PROJECT: R-2606A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606A	1	

W.B.S. NO.	F.A. PROJ. NO.	DESCRIPTION
34480.1.1	STP-NHF-311(3)	PE
34480.2.2	NHF-311(17)	R /W, UTIL.
34480.3.2	NHF-311(18)	CONSTRUCTION

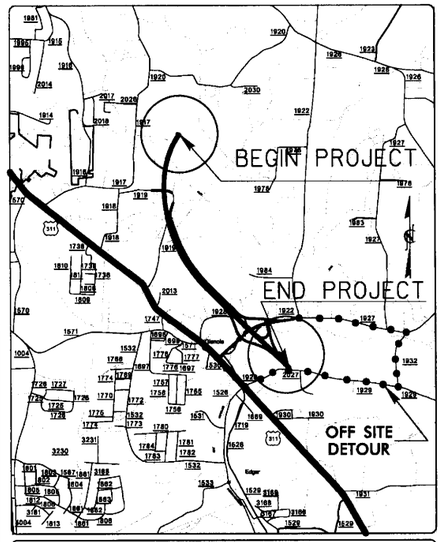
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN AND PROFILE OF PROPOSED STATE HIGHWAY

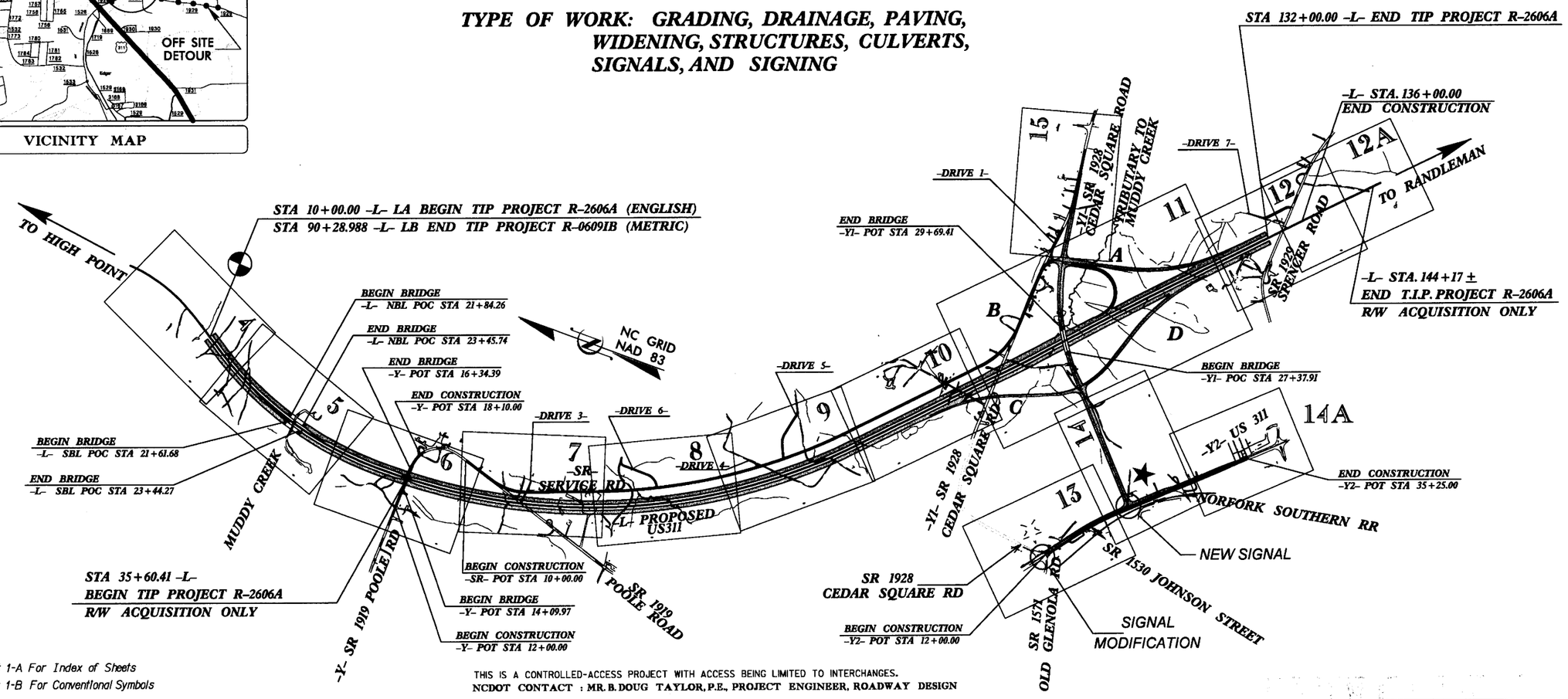
RANDOLPH COUNTY

LOCATION: US 311 FROM SOUTH OF SR 1920 TO NORTH OF SR 1929

TYPE OF WORK: GRADING, DRAINAGE, PAVING, WIDENING, STRUCTURES, CULVERTS, SIGNALS, AND SIGNING



VICINITY MAP



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

THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
NCDOT CONTACT : MR. B. DOUG TAYLOR, P.E., PROJECT ENGINEER, ROADWAY DESIGN

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2006 = xxxxxx
ADT 2026 = xxxxxx
DHV = 10%
D = 60%
T = 20%
(TTST 6% & DUAL 14%)
V = 70 mph

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2606A = 2.281 MILES
LENGTH STRUCTURES TIP PROJECT R-2606A = 0.030 MILES*
TOTAL LENGTH TIP PROJECT R-2606A = 2.311 MILES
*LENGTH BASED ON NBL BRIDGE

2006 STANDARD SPECIFICATIONS

R/W DATE : August 4, 2003
LETTING DATE : September 16, 2006

TOM SHEARIN, P.E.
EARTH TECH PROJECT MANAGER

Prepared In the Office of:

EarthTech
A Tyco International Ltd. Company

FOR NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
701 Corporate Center Drive
Suite 475
Raleigh, N.C. 27607
(919)-854-6200
FAX (919)-854-6259

HYDRAULICS ENGINEER

JOHN NICHOLS, P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

G. T. SHEARIN, P.E.
SIGNATURE:

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

ART McMILLIAN, P.E.
STATE HIGHWAY DESIGN ENGINEER

USER: rmmmw
DATE: 07/12/06 3:56:59 PM
Dgn: k:\c201296\roadway\rmp\r2606a_rdy_bridge.dgn

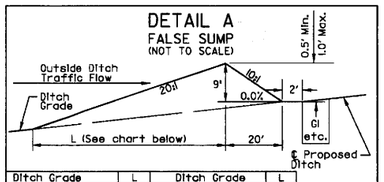
DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

NOT TO SCALE

DETAIL A
FALSE SUMP
(NOT TO SCALE)

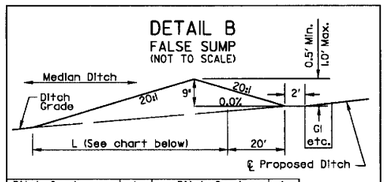


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

-L- 16+14 L
-L- 21+19 L
-L- 25+16 R
-L- 29+86 R
-L- 29+86 R (BERM)
-Y- 14+00 L

-Y- 14+00 R
-Y- 16+56 R
-L- 54+36 R
-L- 79+14 L
-SR- 55+43.61 R
-L- 105+14 L

DETAIL B
FALSE SUMP
(NOT TO SCALE)



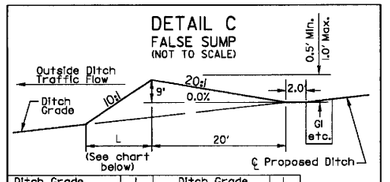
Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

-L- 16+24 M
-L- 21+64 M
-L- 23+57 M
-L- 29+76 M
-L- 43+26 M
-L- 47+76 M
-L- 54+26 M

-SR- 34+29.93 R
-L- 56+76 M
-L- 62+76 L
-L- 62+76 M
-L- 68+76 M
-L- 81+74 M
-DRIVE5- 10+45 R

-DRIVE5- 10+45 L
-L- 87+26 M
-L- 92+76 M
-L- 118+06 M
-L- 123+76 M

DETAIL C
FALSE SUMP
(NOT TO SCALE)

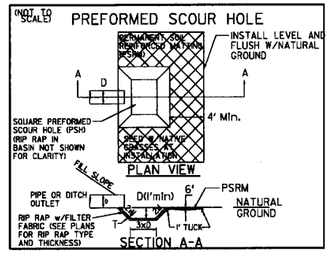


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

-L- 16+24 R
-L- 21+64 R
-L- 25+76 L
-L- 29+76 L
-L- 31+26 L
-L- 37+36 L
-L- 40+56 L
-L- 43+26 L

-L- 47+76 L
-SR-31+37.78 L
-L- 65+76 L
-L- 68+76 L
-L- 85+27 L
-L- 87+26 L
-L- 92+76 L

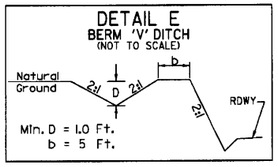
PREFORMED SCOUR HOLE
(NOT TO SCALE)



-L- 31+05 L
-L- 46+80 R
-L- 59+48 L
-L- 112+05 L
-SR- 48+00 L

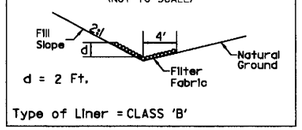
-SR- 24+90 L
-DRIVE5- 15+60 R
-DRIVE6- 13+63 L
-RAMPC- 9+67 R
-RAMPD- 14+00 R

DETAIL E
BERM 'V' DITCH
(NOT TO SCALE)



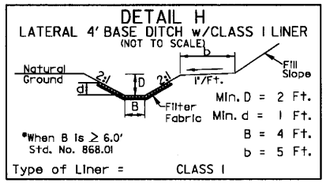
-L- 30+00 - 35+12 R
(DDE = 847 CY)

DETAIL F
TOE PROTECTION
(NOT TO SCALE)



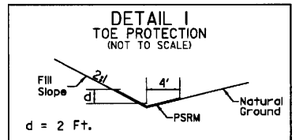
-L- 46+40 - 46+80 R
-L- 47+16 - 47+50 R
-L- 70+50 - 72+00 R
-SR- 49+90 - 51+00 L
-RAMPC- 10+25 - 15+00 R
-RAMPD- 14+28 - 14+80 L

DETAIL H
LATERAL 4' BASE DITCH w/CLASS I LINER
(NOT TO SCALE)



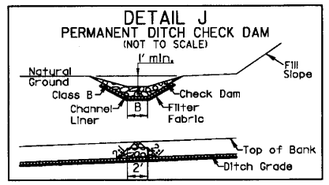
-L- 47+89 - 52+50 R
DDE = 458 CY

DETAIL I
TOE PROTECTION
(NOT TO SCALE)



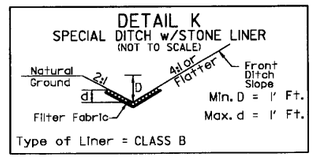
-SR- 14+45 - 15+75 L
-L- 58+10 - 59+48 R
-L- 60+00 - 61+50 L

DETAIL J
PERMANENT DITCH CHECK DAM
(NOT TO SCALE)



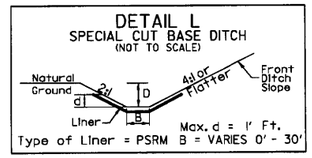
-L- 47+95 R
-L- 48+09 R
-L- 48+23 R
-L- 48+37 R

DETAIL K
SPECIAL DITCH w/STONE LINER
(NOT TO SCALE)



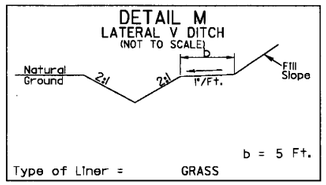
-SR- 10+00 - 11+85.62 R

DETAIL L
SPECIAL CUT BASE DITCH
(NOT TO SCALE)



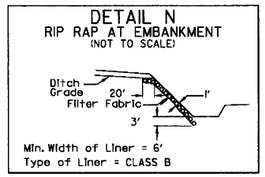
-SR- 11+85.62 - 13+30 R

DETAIL M
LATERAL V DITCH
(NOT TO SCALE)



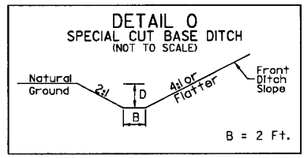
-L- 72+00 - 73+50 R (DDE = 31 CY)
-RAMPA- 3+30 - 7+90 R (DDE = 236 CY)
-DRIVE 6- 12+50 - 13+20 R (DDE = 22 CY)
-DRIVE 6- 12+50 - 13+60 L (DDE = 62 CY)

DETAIL N
RIP RAP AT EMBANKMENT
(NOT TO SCALE)



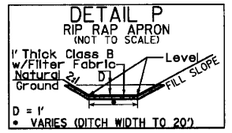
-SR- 45+60 - 46+30 L

DETAIL O
SPECIAL CUT BASE DITCH
(NOT TO SCALE)



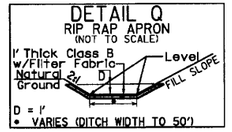
-L- 78+50 - 82+00 R

DETAIL P
RIP RAP APRON
(NOT TO SCALE)



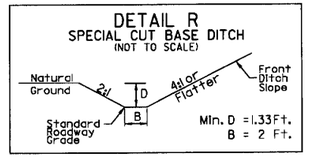
-L- 82+00 - 82+65 R

DETAIL Q
RIP RAP APRON
(NOT TO SCALE)



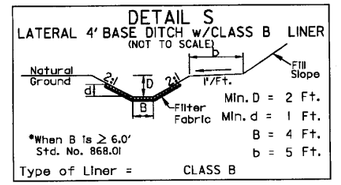
-SR- 50+95 - 52+00 L

DETAIL R
SPECIAL CUT BASE DITCH
(NOT TO SCALE)



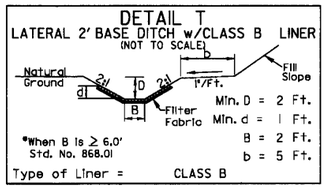
-SR- 76+50 - 77+80 L
-SR- 56+57.61 - 63+50 L
-SR- 69+50 - 76+50 L

DETAIL S
LATERAL 4' BASE DITCH w/CLASS B LINER
(NOT TO SCALE)



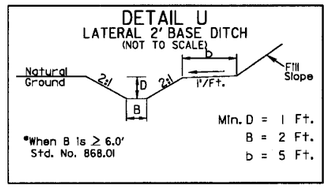
-L- 90+80 - 92+50 R (DDE = 408 CY)
-SR- 52+00 - 56+57.61 L (DDE = 1578 CY)

DETAIL T
LATERAL 2' BASE DITCH w/CLASS B LINER
(NOT TO SCALE)



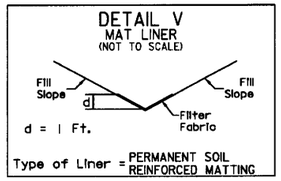
-RAMPD- 14+80 - 16+75 L (DDE = 56 CY)
-Y1- 19+50 - 22+93 R (DDE = 232 CY)

DETAIL U
LATERAL 2' BASE DITCH
(NOT TO SCALE)



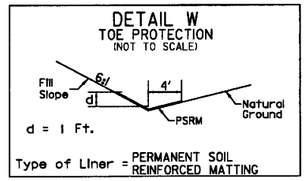
-Y1- 29+55 - 35+50 L (DDE = 1220 CY)
-DRIVE 6- 13+25 - 15+35 R (DDE = 110 CY)

DETAIL V
MAT LINER
(NOT TO SCALE)



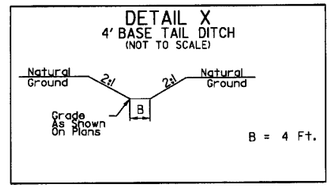
-L- 118+08 - 120+50 L
-L- 59+48 L

DETAIL W
TOE PROTECTION
(NOT TO SCALE)



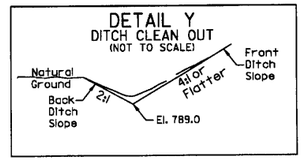
-L- 77+75 - 78+50 R
-RAMPC- 9+65 - 10+15 R
-RAMPD- 11+80 - 14+28 L
-SR- 77+80 - 80+20 L
-Y1- 18+75 - 22+80 L
-Y1- 38+00 - 39+10 L

DETAIL X
4' BASE TAIL DITCH
(NOT TO SCALE)



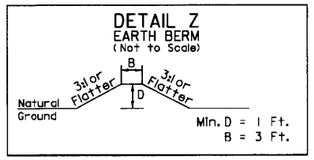
-Y1- 37+98 R
(DDE = 165 CY)

DETAIL Y
DITCH CLEAN OUT
(NOT TO SCALE)



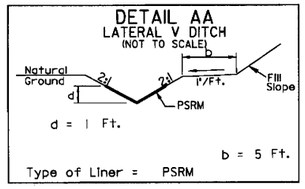
-Y2- 16+74 R
(2-24" RCP OUTLET INVERT TO RAILROAD R/W)

DETAIL Z
EARTH BERM
(Not to Scale)



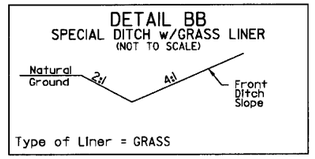
-L- 115+15 R
-Y1- 25+90 R
-Y1- 27+31 R

DETAIL AA
LATERAL V DITCH
(NOT TO SCALE)



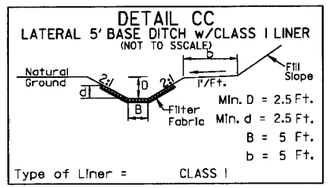
-Y2- 30+83 - 32+25 L
(DDE = 35 CY)

DETAIL BB
SPECIAL DITCH w/GRASS LINER
(NOT TO SCALE)



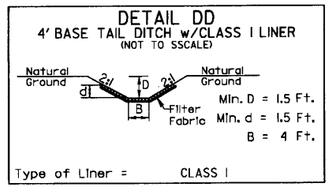
-Y2- 29+15 - 30+83 R
-Y2- 30+83 - 31+50 R
-Y2- 32+50 - 34+00 L

DETAIL CC
LATERAL 5' BASE DITCH w/CLASS I LINER
(NOT TO SSCALE)



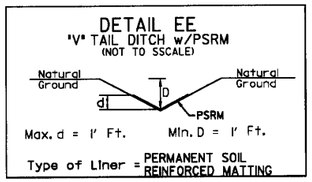
-Y1- 30+75 - 34+15 R
(DDE = 658 CY)

DETAIL DD
4' BASE TAIL DITCH w/CLASS I LINER
(NOT TO SSCALE)



-RAMP C- 10+67 L
(DDE = 434 CY)

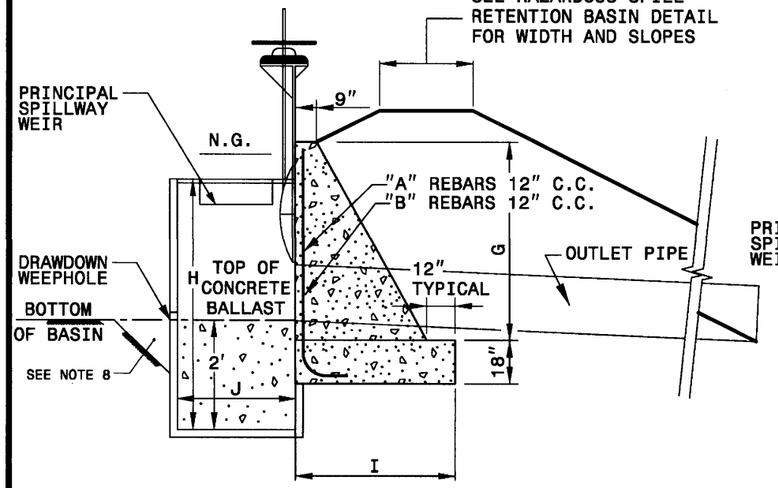
DETAIL EE
'V' TAIL DITCH w/PSRM
(NOT TO SSCALE)



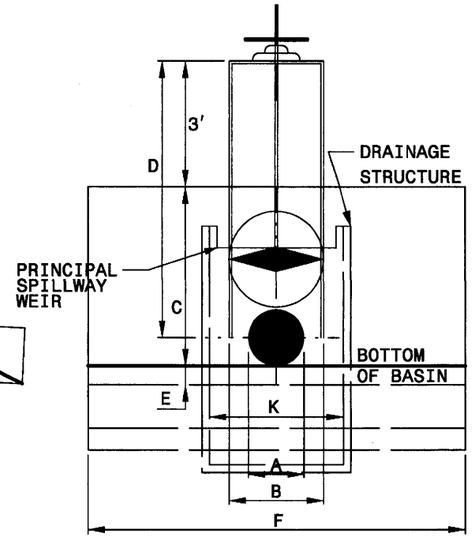
-L- 59+48 L
(DDE = 5 CY)

USER: sj
DGN: 2606a_DETAILS.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



SECTION VIEW



ELEVATION VIEW

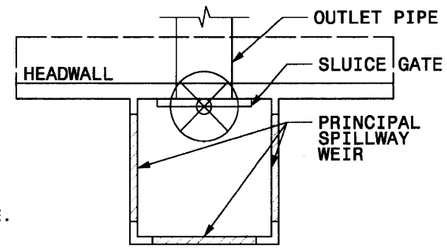
BASIN #		1	2
SLUICE GATE DIMENSIONS			
PIPE DIAMETER	A	30"	30"
GATE DIAMETER	B	36"	36"
HEADWALL HT.	C	8'-0"	7'-0"
FRAME HEIGHT	D	9'-9"	8'-9"
INVERT HEIGHT	E	7"	7"
HEADWALL WIDTH	F	9'-4"	9'-4"
HEADWALL DIMENSIONS			
PIPE DIAMETER	A	30"	30"
HEADWALL HT.	G	8'-7"	7'-7"
HEADWALL DEP.	I	5'-0"	4'-0"

DRAINAGE STRUC. DIMENSIONS			
DRAWDOWN DIA.		1 1/8"	1 3/4"
DRAWDOWN INV.		724.00	716.00
STRUCTURE INV.		722.00	714.00
STRUCTURE DEP.	H	9'-0"	7'-0"
STRUCTURE DIM.	J	5'-0"	5'-0"
STRUCTURE DIM.	K	5'-0"	5'-0"
PRINCIPAL SPILLWAY ELEV.		729.00	720.00
PRINCIPAL WEIR SPILLWAY WIDTH		9'	9'

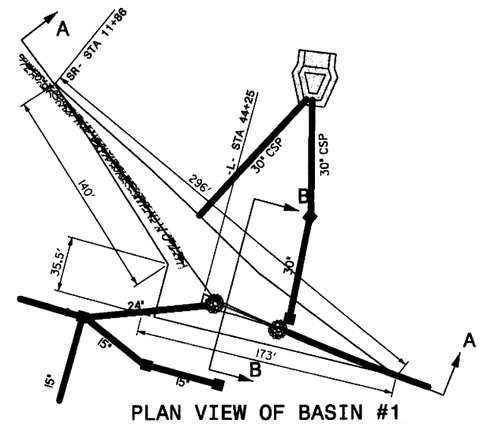
Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

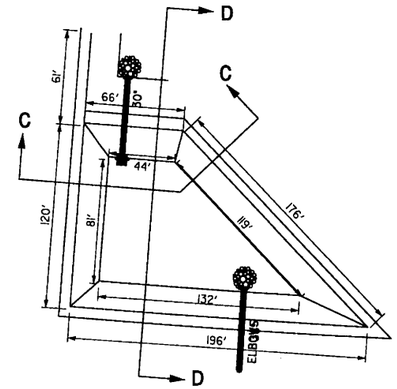
GENERAL NOTES:
1- REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO THE HEADWALL AND HEADWALL SHALL BE PAID FOR ON YD^3 BASIS.
2- CONCRETE SHALL BE CLASS "B" THROUGHOUT STRUCTURE.
3- DELETE REINFORCING STEEL WHEN BRICK ALTERNATE IS USED.
4- SEE PLAN SHEET FOR LOCATION OF OUTLET PIPE WITH SLUICE GATE.
5- INCORPORATE DRAINAGE STRUCTURE WALL INTO HEADWALL.
6- PAYMENT FOR DRAINAGE STRUCTURE IS TO BE PAID FOR AS "MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE".
7- FOR BALLAST, FILL STRUCTURE WITH CONCRETE TO PIPE INVERT. HOWEVER, DO NOT OBSTRUCT SLUICE GATE FROM FULLY CLOSING OVER PIPE. CONRETE BALLAST SHALL BE INCIDENTAL TO MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE.
8- TO AVOID CLOGGING OF THE DRAWDOWN WEEPHOLE, EXCAVATE 1' BELOW BASIN BOTTOM ELEVATION IN THE IMMEDIATE VICINITY OF THE SPILLWAY.
9- SEE STANDARD 838.02 FOR ADDITIONAL INFORMATION, INCLUDING REBAR SPECIFICATIONS.



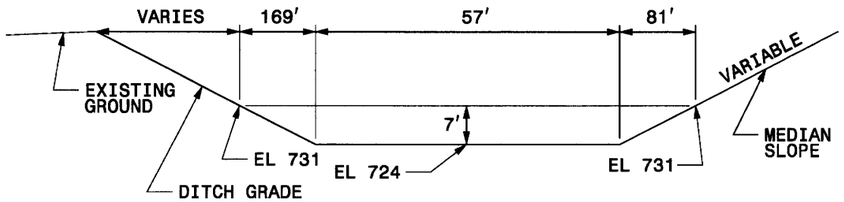
PLAN VIEW



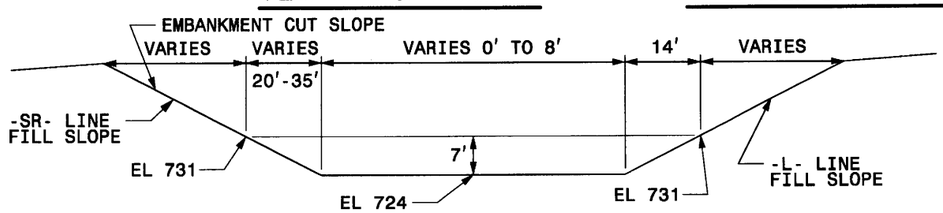
PLAN VIEW OF BASIN #1



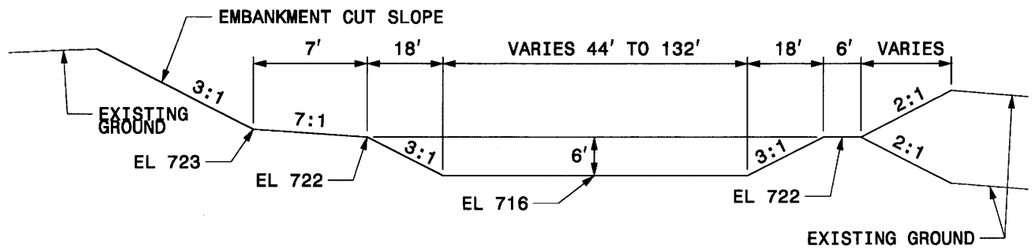
PLAN VIEW OF BASIN #2



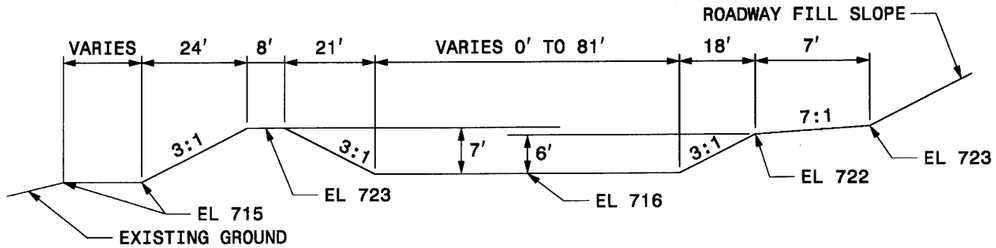
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

HAZARDOUS SPILL/DRY DETENTION BASIN							
BASIN #	PIPE SIZE	TOP ELEV.	BOTTOM ELEV.	D		CAPACITY	STATION
1	30"	731.00	724.00	7'		50264+ CF	-L- 44+50 LT
2	30"	722.00	716.00	6'		57934+ CF	-L- 57+00 LT

Hazardous Spill Retention Basins are provided at new and/or improved roadway sections to aid in containment and clean up of accidental spills by truck traffic. Basins are provided in particular locations including areas in proximity to sensitive waters and water supplies.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

HAZARDOUS SPILL/ DRY DETENTION BASIN

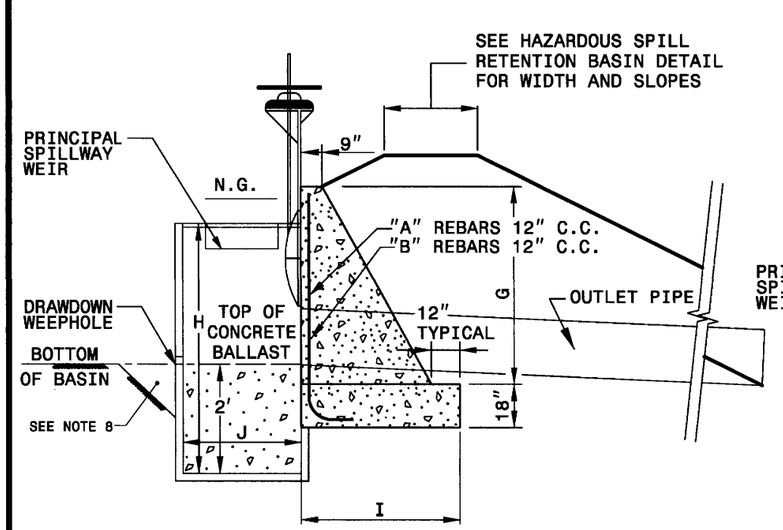
ORIGINAL BY: JDRN DATE: 2/21/01
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

USER: sl
DGN: R-2606a_rdy_sph_02b.dgn
DATE: 5/13/2002

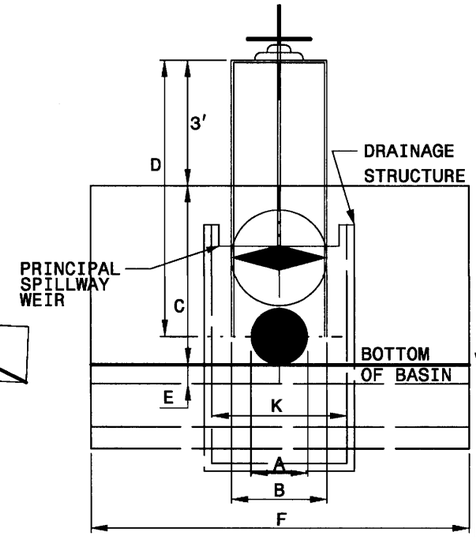
PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



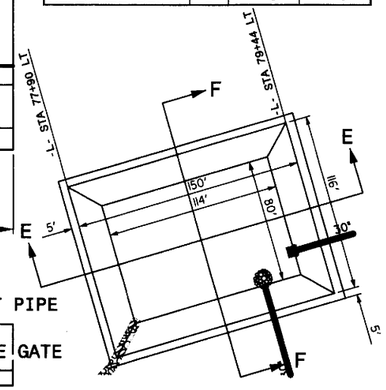
SECTION VIEW



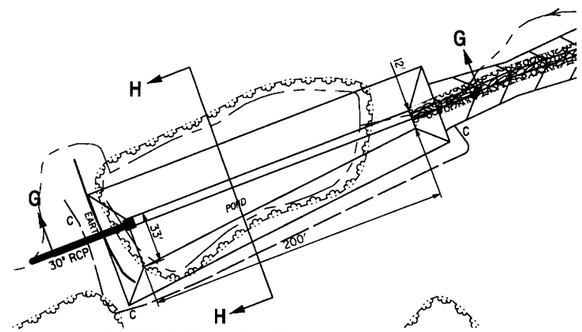
ELEVATION VIEW

BASIN #		3	4
SLUICE GATE DIMENSIONS			
PIPE DIAMETER	A	30"	30"
GATE DIAMETER	B	36"	36"
HEADWALL HT.	C	7'-0"	7'-0"
FRAME HEIGHT	D	8'-9"	8'-9"
INVERT HEIGHT	E	7"	7"
HEADWALL WIDTH	F	9'-4"	9'-4"
HEADWALL DIMENSIONS			
PIPE DIAMETER	A	30"	30"
HEADWALL HT.	G	7'-7"	7'-7"
HEADWALL DEP.	I	4'-0"	4'-0"

DRAINAGE STRUC. DIMENSIONS			
DRAWDOWN DIA.		2"	1 7/16"
DRAWDOWN INV.		750.00	756.50
STRUCTURE INV.		748.00	754.50
STRUCTURE DEP.	H	6'-6"	6'-6"
STRUCTURE DIM.	J	3'-0"	3'-0"
STRUCTURE DIM.	K	3'-0"	3'-0"
PRINCIPAL SPILLWAY ELEV.		753.50	760.00
PRINCIPAL WEIR SPILLWAY WIDTH		7'	5'

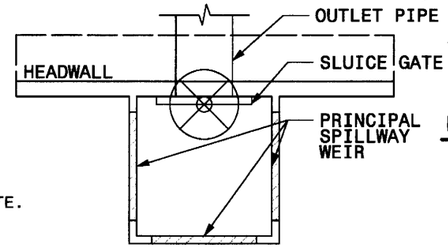


PLAN VIEW OF BASIN #3

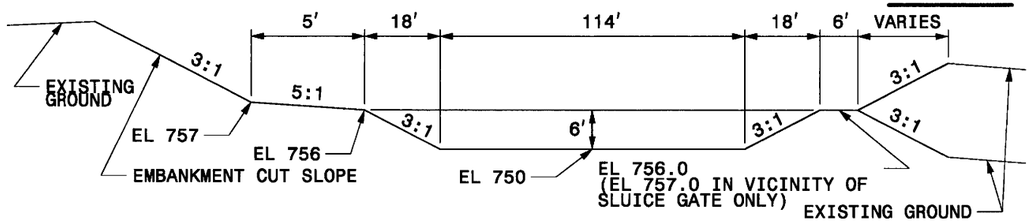


PLAN VIEW OF BASIN #4

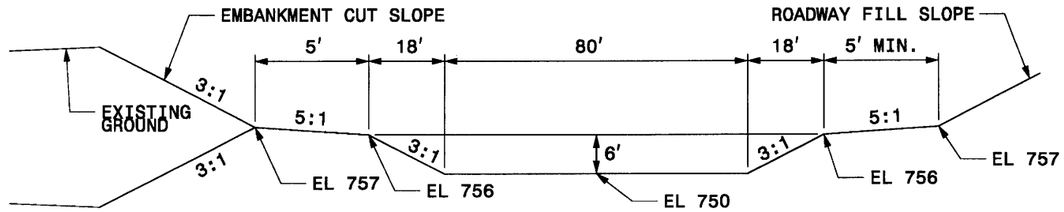
GENERAL NOTES:
1- REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO THE HEADWALL AND HEADWALL SHALL BE PAID FOR ON YD^3 BASIS.
2- CONCRETE SHALL BE CLASS "B" THROUGHOUT STRUCTURE.
3- DELETE REINFORCING STEEL WHEN BRICK ALTERNATE IS USED.
4- SEE PLAN SHEET FOR LOCATION OF OUTLET PIPE WITH SLUICE GATE.
5- INCORPORATE DRAINAGE STRUCTURE WALL INTO HEADWALL.
6- PAYMENT FOR DRAINAGE STRUCTURE IS TO BE PAID FOR AS "MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE".
7- FOR BALLAST, FILL STRUCTURE WITH CONCRETE TO PIPE INVERT. HOWEVER, DO NOT OBSTRUCT SLUICE GATE FROM FULLY CLOSING OVER PIPE. CONRETE BALLAST SHALL BE INCIDENTAL TO MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE.
8- TO AVOID CLOGGING OF THE DRAWDOWN WEEPHOLE, EXCAVATE 1' BELOW BASIN BOTTOM ELEVATION IN THE IMMEDIATE VICINITY OF THE SPILLWAY.
9- SEE STANDARD 838.02 FOR ADDITIONAL INFORMATION, INCLUDING REBAR SPECIFICATIONS.



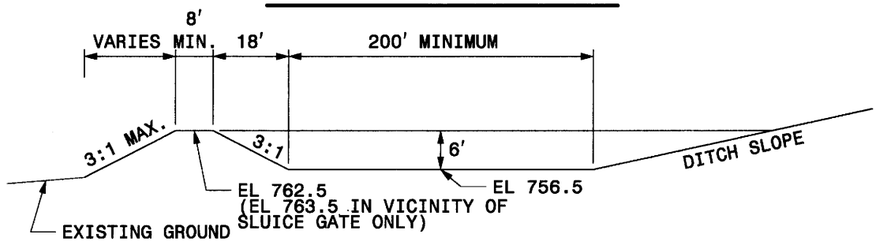
PLAN VIEW



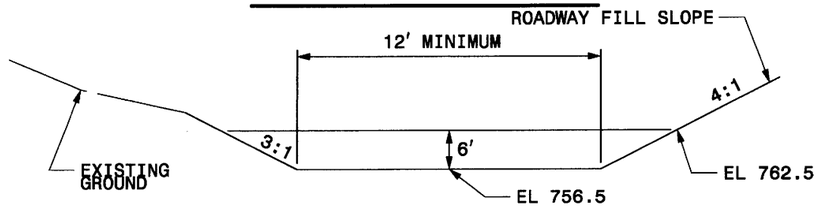
SECTION E-E



SECTION F-F



SECTION G-G



SECTION H-H

HAZARDOUS SPILL/DRY DETENTION BASIN							
BASIN #	PIPE SIZE	TOP ELEV.	BOTTOM ELEV.	D		CAPACITY	STATION
3	30"	756.00	750.00	6'		70968+ CF	-L- 79+00 LT
4	30"	762.5	756.5	6'		33500+ CF	-L- 89+00 RT

Hazardous Spill Retention Basins are provided at new and/or improved roadway sections to aid in containment and clean up of accidental spills by truck traffic. Basins are provided in particular locations including areas in proximity to sensitive waters and water supplies.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

HAZARDOUS SPILL/ DRY DETENTION BASIN

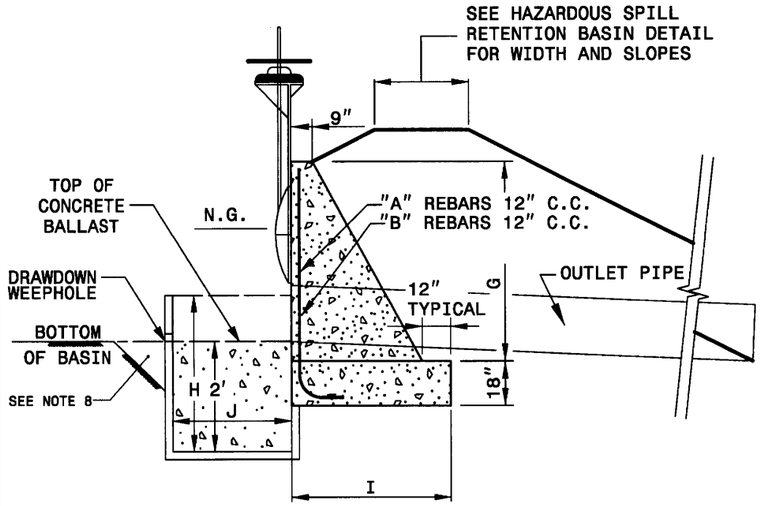
ORIGINAL BY: JDRN DATE: 2/21/01
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

USER: sd
DGN: 2606ss.dgn
DATE: 5/15/2006

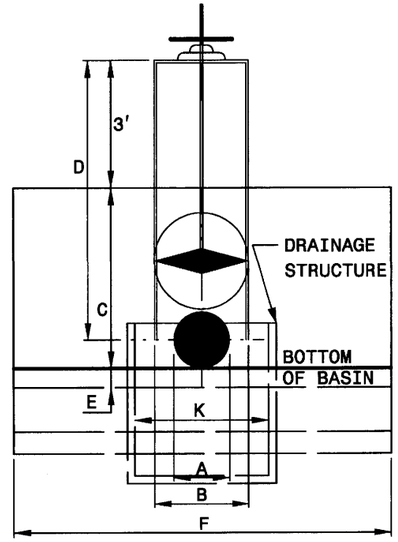
PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-J
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

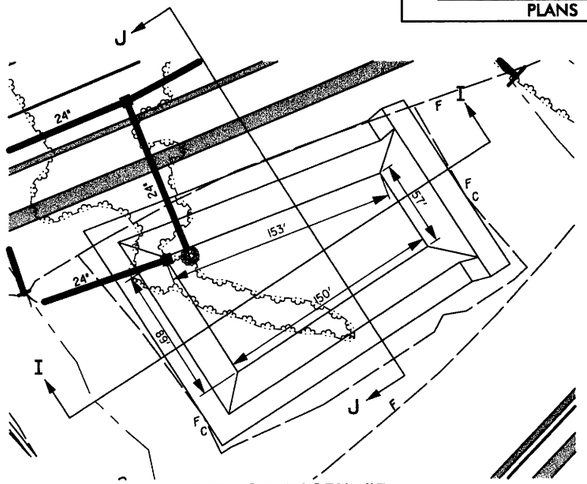


SECTION VIEW



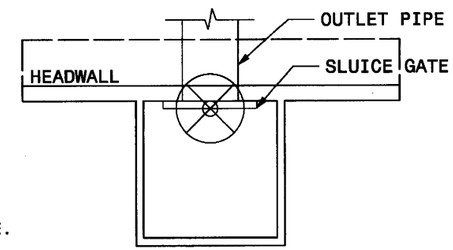
ELEVATION VIEW

BASIN #		5
SLUICE GATE DIMENSIONS		
PIPE DIAMETER	A	24"
GATE DIAMETER	B	30"
HEADWALL HT.	C	6'-0"
FRAME HEIGHT	D	8'-0"
INVERT HEIGHT	E	7"
HEADWALL WIDTH	F	8'-2"
HEADWALL DIMENSIONS		
PIPE DIAMETER	A	24"
HEADWALL HT.	G	6'-7"
HEADWALL DEP.	I	4'-0"
DRAINAGE STRUC. DIMENSIONS		
DRAWDOWN DIA.		1 ½"
DRAWDOWN INV.		758.00
STRUCTURE INV.		756.00
STRUCTURE DEP.	H	2'-6"
STRUCTURE DIM.	J	2'-0"
STRUCTURE DIM.	K	3'-0"

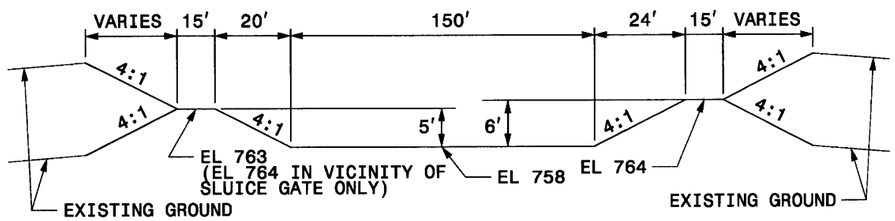


PLAN VIEW OF BASIN #5

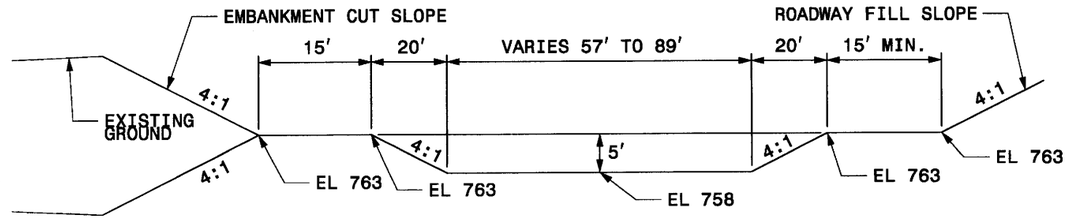
GENERAL NOTES:
1- REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO THE HEADWALL AND HEADWALL SHALL BE PAID FOR ON YD^3 BASIS.
2- CONCRETE SHALL BE CLASS "B" THROUGHOUT STRUCTURE.
3- DELETE REINFORCING STEEL WHEN BRICK ALTERNATE IS USED.
4- SEE PLAN SHEET FOR LOCATION OF OUTLET PIPE WITH SLUICE GATE.
5- INCORPORATE DRAINAGE STRUCTURE WALL INTO HEADWALL.
6- PAYMENT FOR DRAINAGE STRUCTURE IS TO BE PAID FOR AS "MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE".
7- FOR BALLAST, FILL STRUCTURE WITH CONCRETE TO PIPE INVERT. HOWEVER, DO NOT OBSTRUCT SLUICE GATE FROM FULLY CLOSING OVER PIPE. CONRETE BALLAST SHALL BE INCIDENTAL TO MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE.
8- TO AVOID CLOGGING OF THE DRAWDOWN WEEPHOLE, EXCAVATE 1' BELOW BASIN BOTTOM ELEVATION IN THE IMMEDIATE VICINITY OF THE SPILLWAY.
9- SEE STANDARD 838.02 FOR ADDITIONAL INFORMATION, INCLUDING REBAR SPECIFICATIONS.



PLAN VIEW



SECTION I-I



SECTION J-J

HAZARDOUS SPILL/DRY DETENTION BASIN							
BASIN #	PIPE SIZE	TOP ELEV.	BOTTOM ELEV.	D		CAPACITY	STATION
5	24"	763.0	758.0	5.0'		79730 CF	-L- 112+00 RT

Hazardous Spill Retention Basins are provided at new and/or improved roadway sections to aid in containment and clean up of accidental spills by truck traffic. Basins are provided in particular locations including areas in proximity to sensitive waters and water supplies.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

HAZARDOUS SPILL/
DRY DETENTION BASIN

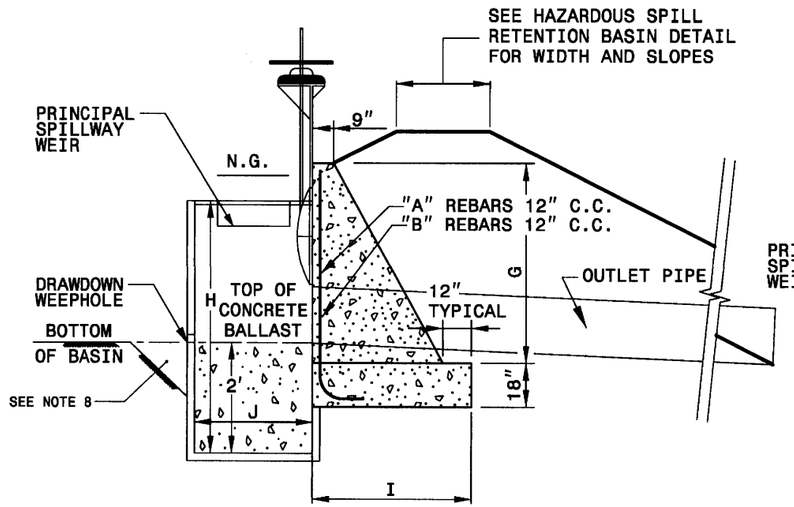
ORIGINAL BY: JDRN DATE: 2/21/01
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

USER: d
DGN: R:\R2606\R2606a\Roadway\Proj\r2606a_rdy_sht_02.dgn
DATE: 2/21/2008

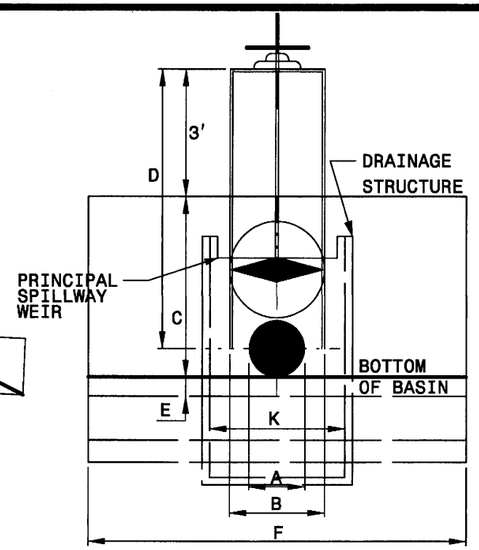
PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-K
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



SECTION VIEW

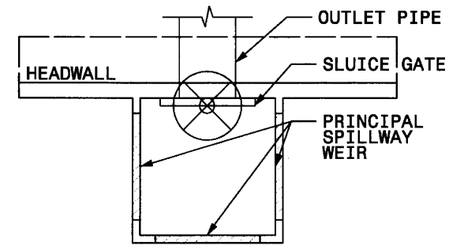


ELEVATION VIEW

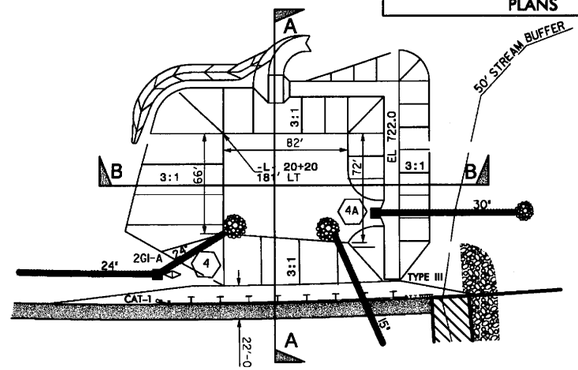
BASIN #		6	7
SLUICE GATE DIMENSIONS			
PIPE DIAMETER	A	30"	24"
GATE DIAMETER	B	36"	30"
HEADWALL HT.	C	8'-0"	5'-5"
FRAME HEIGHT	D	9'-9"	7'-6"
INVERT HEIGHT	E	7"	7"
HEADWALL WIDTH	F	9'-4"	8'-2"
HEADWALL DIMENSIONS			
PIPE DIAMETER	A	30"	24"
HEADWALL HT.	G	7'-7"	6'-1"
HEADWALL DEP.	I	5'-0"	4'-0"

DRAINAGE STRUC. DIMENSIONS			
DRAWDOWN DIA.		3"	2"
DRAWDOWN INV.		714.00	713.00
STRUCTURE INV.		712.00	711.00
STRUCTURE DEP.	H	9'-0"	7'-6"
STRUCTURE DIM.	J	5'-0"	5'-0"
STRUCTURE DIM.	K	5'-0"	5'-0"
PRINCIPAL SPILLWAY ELEV.		720.00	717.50
PRINCIPAL WEIR SPILLWAY WIDTH		10'	9'

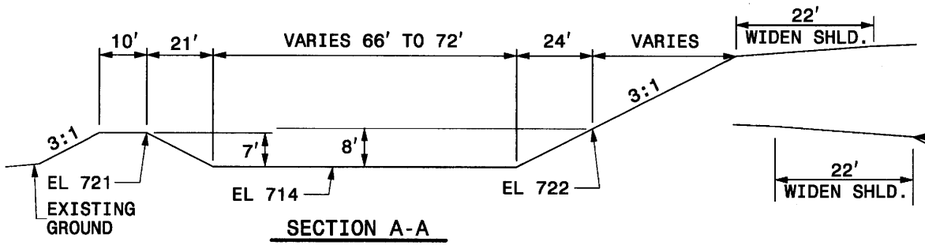
GENERAL NOTES:
1- REINFORCING STEEL SHALL BE CONSIDERED INCIDENTAL TO THE HEADWALL AND HEADWALL SHALL BE PAID FOR ON YD^3 BASIS.
2- CONCRETE SHALL BE CLASS "B" THROUGHOUT STRUCTURE.
3- DELETE REINFORCING STEEL WHEN BRICK ALTERNATE IS USED.
4- SEE PLAN SHEET FOR LOCATION OF OUTLET PIPE WITH SLUICE GATE.
5- INCORPORATE DRAINAGE STRUCTURE WALL INTO HEADWALL.
6- PAYMENT FOR DRAINAGE STRUCTURE IS TO BE PAID FOR AS "MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE".
7- FOR BALLAST, FILL STRUCTURE WITH CONCRETE TO PIPE INVERT. HOWEVER, DO NOT OBSTRUCT SLUICE GATE FROM FULLY CLOSING OVER PIPE. CONRETE BALLAST SHALL BE INCIDENTAL TO MASONRY DRAINAGE STRUCTURE FOR SLUICE GATE.
8- TO AVOID CLOGGING OF THE DRAWDOWN WEEPHOLE, EXCAVATE 1' BELOW BASIN BOTTOM ELEVATION IN THE IMMEDIATE VICINITY OF THE SPILLWAY.
9- SEE STANDARD 838.02 FOR ADDITIONAL INFORMATION, INCLUDING REBAR SPECIFICATIONS.



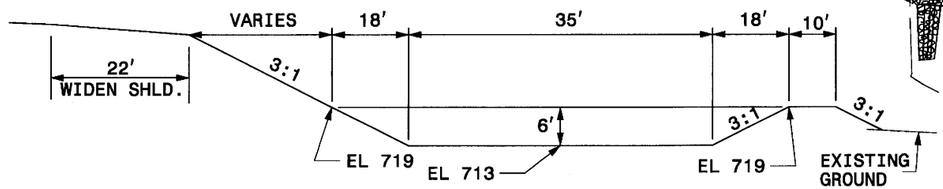
PLAN VIEW



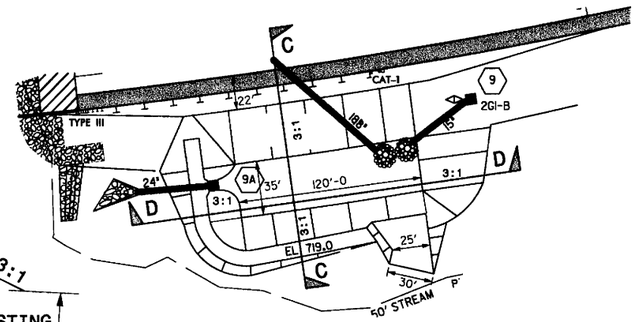
PLAN VIEW OF BASIN #6



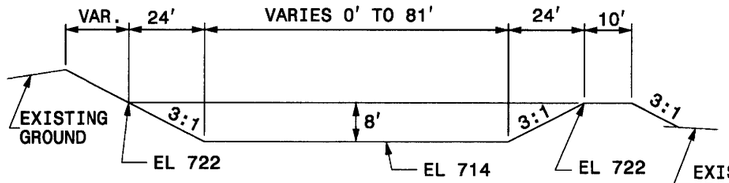
SECTION A-A



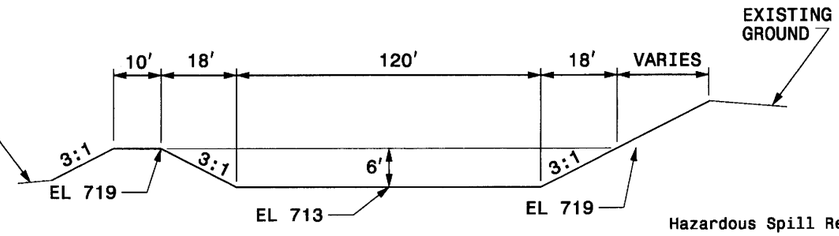
SECTION C-C



PLAN VIEW OF BASIN #7



SECTION B-B



SECTION D-D

HAZARDOUS SPILL/DRY DETENTION BASIN							
BASIN #	PIPE SIZE	SPILLOVER ELEV.	BOTTOM ELEV.	D		CAPACITY	STATION
6	30"	721.00	714.00	8'		66069+ CF	-L- 20+50 LT
7	24"	718.50	713.00	6'		36950+ CF	-L-25+00 RT

Hazardous Spill Retention Basins are provided at new and/or improved roadway sections to aid in containment and clean up of accidental spills by truck traffic. Basins are provided in particular locations including areas in proximity to sensitive waters and water supplies.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

HAZARDOUS SPILL/ DRY DETENTION BASIN

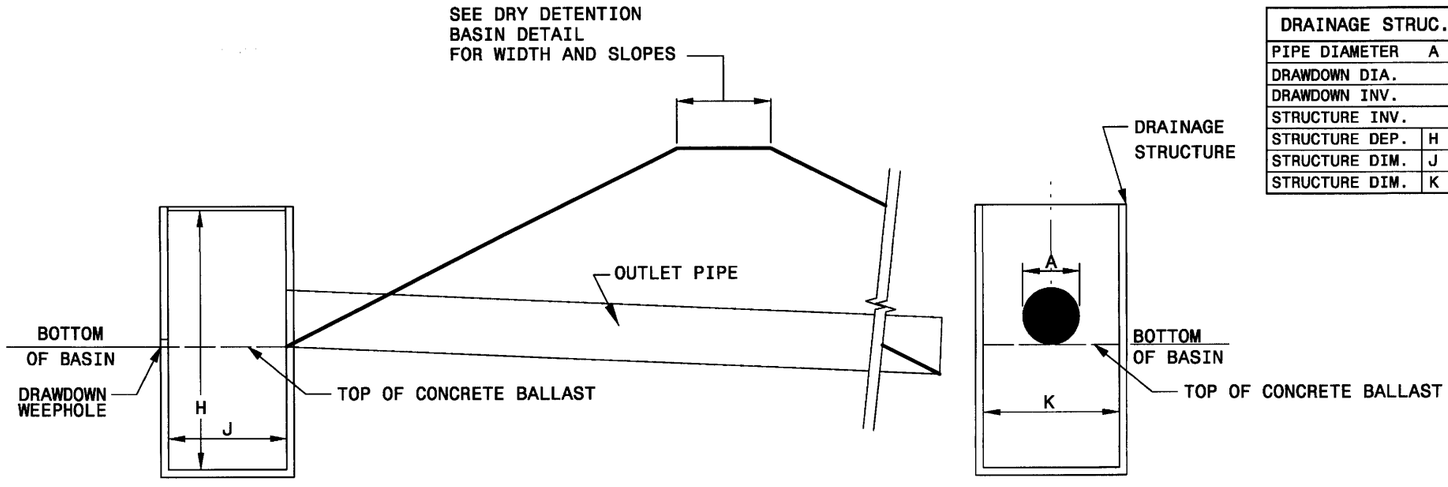
ORIGINAL BY: RWS DATE: 10/27/04
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

USER: a
DATE: 9/17/2025

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-M
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

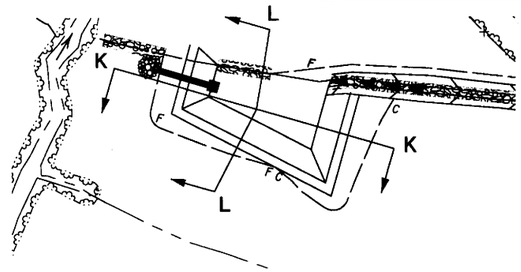
GRAPHIC SCALE
50 25 0 50 100
PLANS



SECTION VIEW

ELEVATION VIEW

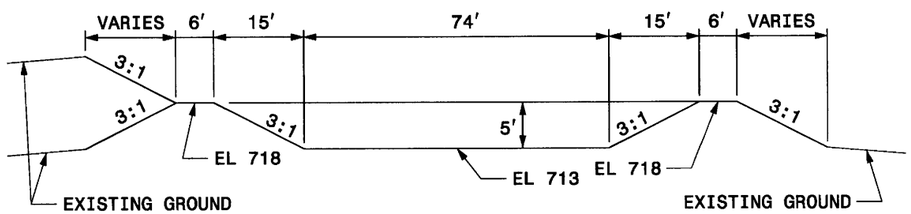
DRAINAGE STRUC. DIMENSIONS			
PIPE DIAMETER	A	24"	
DRAWDOWN DIA.		7/8"	
DRAWDOWN INV.		713.00	
STRUCTURE INV.		710.00	
STRUCTURE DEP.	H	7'-0"	
STRUCTURE DIM.	J	2'-0"	
STRUCTURE DIM.	K	3'-0"	



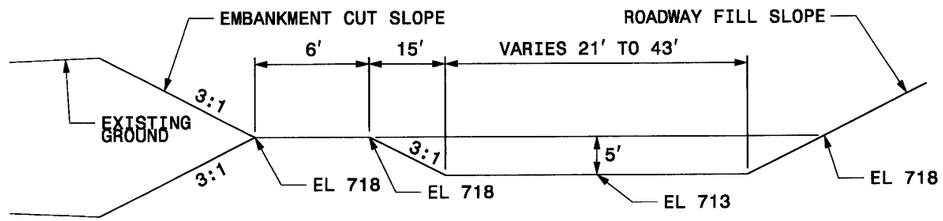
PLAN VIEW OF BASIN

GENERAL NOTES:

1- SEE PLAN SHEET FOR LOCATION OF OUTLET PIPE WITH DRAINAGE STRUCTURE.
2- PAYMENT FOR DRAINAGE STRUCTURES IS INCLUDED UNDER DRAINAGE STRUCTURES.
3- FOR BALLAST, FILL STRUCTURE WITH CONCRETE TO PIPE INVERT.
4- TO AVOID CLOGGING OF THE DRAWDOWN WEEPHOLE, EXCAVATE 1' BELOW BASIN BOTTOM ELEVATION IN THE IMMEDIATE VICINITY OF THE SPILLWAY.



SECTION K-K



SECTION L-L

DRY DETENTION BASIN						
PIPE SIZE	TOP ELEV.	BOTTOM ELEV.	D		CAPACITY	STATION
24"	718.0	713.0	5.0'		14818 CF	-L- 47+00 RT

Hazardous Spill Retention Basins are provided at new and/or improved roadway sections to aid in containment and clean up of accidental spills by truck traffic. Basins are provided in particular locations including areas in proximity to sensitive waters and water supplies.

DESIGN SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DRY DETENTION BASIN

ORIGINAL BY: JDRN DATE: 2/21/01
MODIFIED BY: DATE:
CHECKED BY: DATE:
FILE SPEC.:

USER: el
DGN: $$$$USER$$$$
DATE: $$$$DATE$$$$

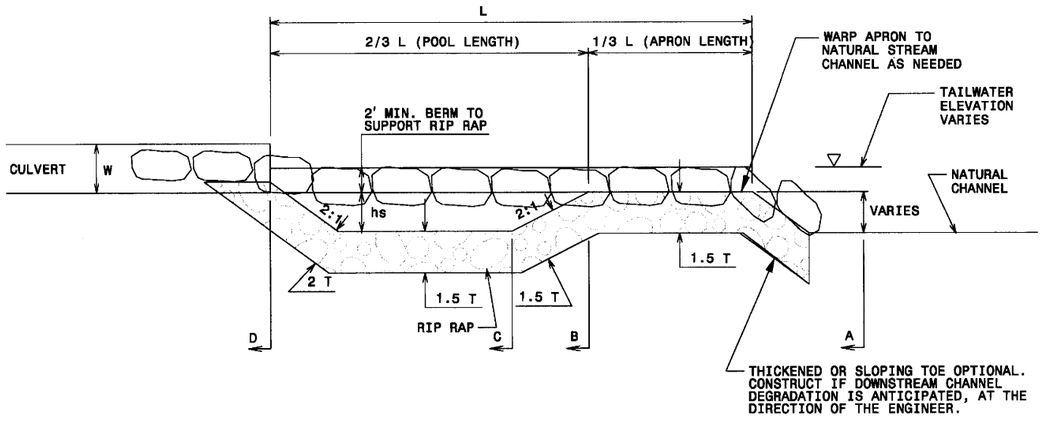
PROJECT REFERENCE NO.	SHEET NO.
R-2606A	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of:
EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

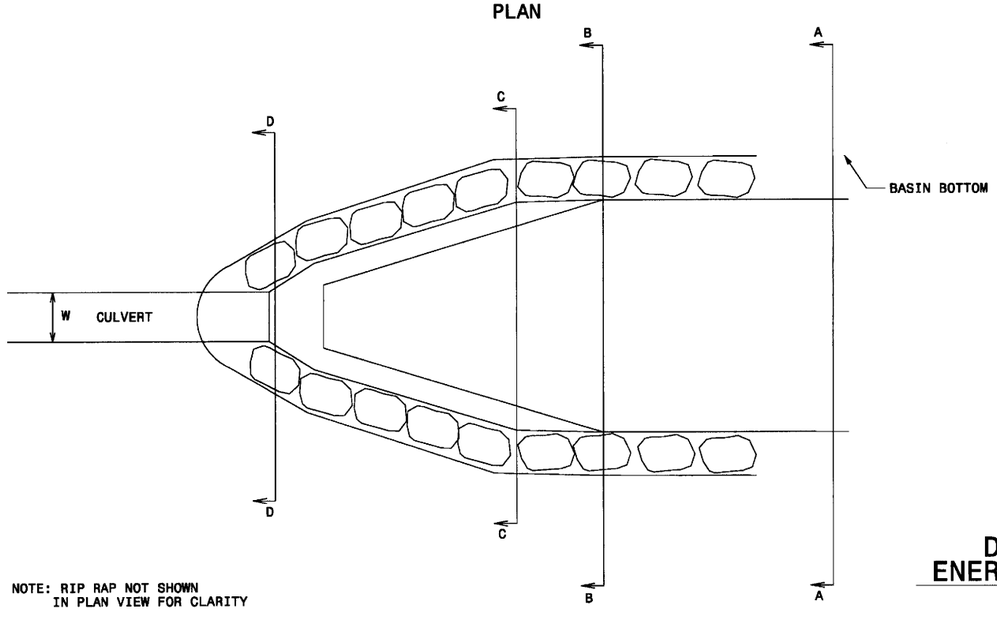
GRAPHIC SCALE
50 25 0 50 100
PLANS

RIP RAP BASIN	LOCATION	L (feet)	POOL LENGTH (feet)	APRON LENGTH (feet)	BASE WIDTH (feet)	APRON WIDTH (feet)	RIP RAP THICKNESS T (inches)	RIP RAP CLASS	DEPTH hs (feet)
#1	-SR- 13+11 LT	24	16	8	11	13	23	II	1.66

PROFILE

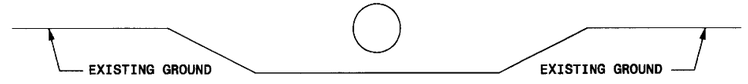


PLAN

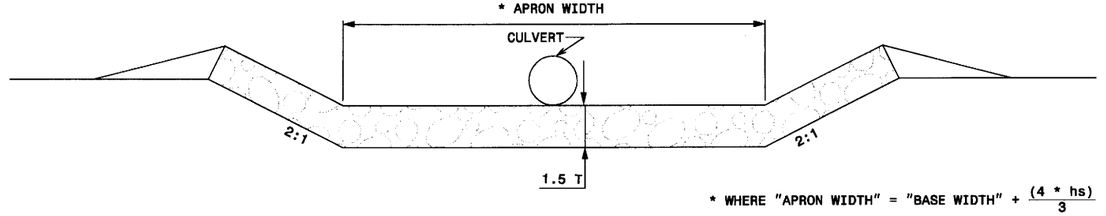


NOTE: RIP RAP NOT SHOWN IN PLAN VIEW FOR CLARITY

SECTION A-A

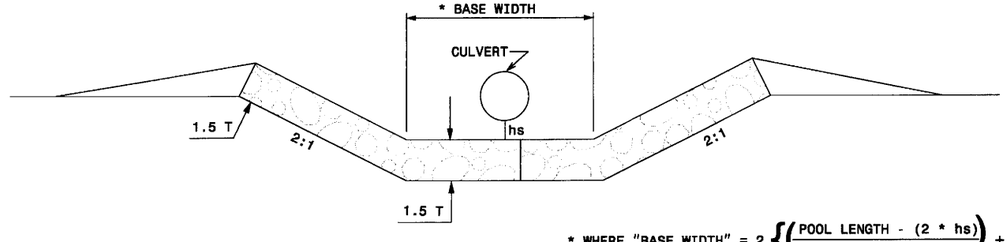


SECTION B-B



* WHERE "APRON WIDTH" = "BASE WIDTH" + $\frac{(4 * hs)}{3}$

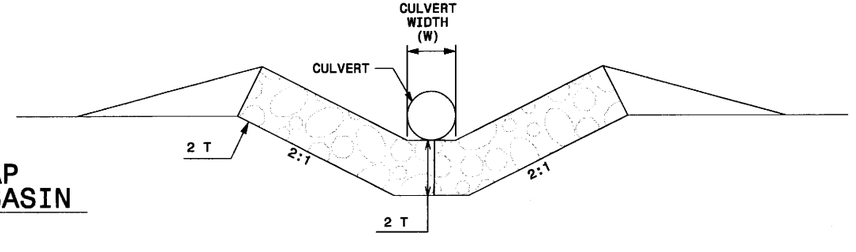
SECTION C-C



* WHERE "BASE WIDTH" = $2\left\{\left(\frac{\text{POOL LENGTH} - (2 * hs)}{3}\right) + \frac{W}{2}\right\}$

MINIMUM "BASE WIDTH" = 10'

SECTION D-D



DETAIL OF RIP RAP ENERGY DISSIPATOR BASIN

(NOT TO SCALE)

USER: el
FILE: g:\projects\r2606a\roadway\rnc\r2606a_rdy_sht12dtl.dgn
DATE: 5/15/2006

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of:
EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

NC GRID NAD 83

-U- R-0609 IB (METRIC)

PI Sta 87+73.063	PIs Sta 89+15.115	
Δ = 19° 48' 06.1" (RT)	Θs = 9° 58' 07.8"	
L = 170.827 m	Ls = 172 m	
T = 86.274 m	LT = 114.849 m	
R = 494.284 m	ST = 57.499 m	

-L-

PIs Sta 11+33.34	PI Sta 22+50.68
Θs = 1° 30' 28.0"	Δ = 30° 54' 42.0" (LT)
Ls = 200.00'	D = 1° 30' 28.0"
LT = 133.34'	L = 2,050.14
ST = 66.67'	T = 1,050.68'
	R = 3,800.00'
	SE = .055

BEGIN STATE PROJECT R-2606A
-L- TS Sta. 10+00.00 LA (ENGLISH)
N 782,770.4420 ft E 1,729,627.3072 ft (ENGLISH)
BEGIN CONSTRUCTION 10+00.00

END STATE PROJECT R-0609IB
-U- STS Sta 90+28.988 LB (METRIC)
N 238,588.9078 m E 527,191.4576 m (METRIC)

BY OTHERS

-U- CSSta. 88+57.616 (METRIC)

-U-

MATCH WIDTHS FOR PROJECT R-0609IB

BL-87
POT 5+00.00
-L- 11+64.22 OFF 241.51'

KEPLEY-FRANK HARDWOOD CO., INC
DB 1139 PG 155

BEG.FENCE TIE TO EXIST.
BEG.C/A
+00.00
125.00

PROP. W.W. FENCE

+00.00
165.00

+00.00
BEG.PS

GRAD. 350

-L- SCSta. 12+00.00

23.62'
3.94' PS
4' PS
68.87'
35'
24'
-L-

100' TAPER TO TYPICAL SECTION

BEG.C/A
+00.00
155.00
BEG.FENCE TIE TO EXIST.

+00.00
180.00

PROP. W.W. FENCE

MATCHLINE STA. 14+00 -L- SEE SHEET 5

KEPLEY-FRANK HARDWOOD CO., INC
DB 1139 PG 155

RIGHT OF WAY ON PARCELS 1 & 2 TO BE ACQUIRED UNDER ADJACENT PROJECT R-609 IB

PARCEL 1 ACCESS PROVIDED UNDER R-609IB

FOR -L- PROFILE SEE SHEET 16

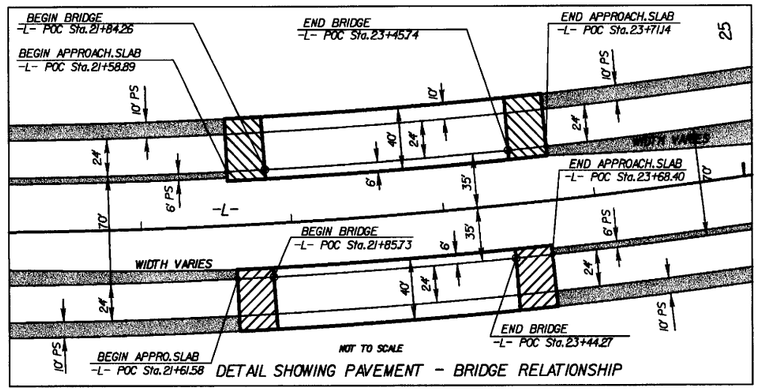
<> DENOTES FALSE SUMP SEE DETAIL SHEET 2-D

USER: rtanner
DGN: R2606A_R2606A\Roadway\Proj\R2606a_rdy_sch_04.dgn
DATE: 5/17/2006

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



DETAIL SHOWING PAVEMENT - BRIDGE RELATIONSHIP

-L-
PI Sta 22+50.68
Δ= 30° 54' 42.0" (LT)
D = 1° 30' 28.0"
L = 2,050.14
T = 1,050.68'
R = 3,800.00'
SE = .055

NC GRID NAD 83

KEPLEY-FRANK HARDWOOD CO., INC
DB 1139 PG 155

ROBER B. QUEEN
DB 1249 PG 2046

MAGGIE N. POOLE
DB 1100 PG 273

MATCHLINE STA. 14+00 -L- SEE SHEET 4

MATCHLINE STA. 28+00 -L- SEE SHEET 6

BEGIN BRIDGE
-L- POC Sta.21+84.26

BEGIN APPROACH.SLAB
-L- POC Sta.21+58.89

END BRIDGE
-L- POC Sta.23+45.74

END APPROACH.SLAB
-L- POC Sta.23+71.14

BL-500
PINC 8+76.59
-L- 14+62.79 OFF 7.81'

BL-501
PINC 12+41.46
-L- 18+22.42 OFF 14.35'

BL-502
PINC 15+38.41
-L- 21+18.18 OFF 19.85'

BL-503
PINC 17+59.99
-L- 23+38.78 OFF 26.52'
ELEV=708.47'

BL-504
PINC 20+78.20
-L- 26+52.48 OFF 36.66'

BEGIN APPRO.SLAB
-L- POC Sta.21+61.58

BEGIN BRIDGE
-L- POC Sta.21+85.73

END BRIDGE
-L- POC Sta.23+44.27

END APPROACH SLAB
-L- POC Sta.23+68.40

RIGHT OF WAY ON PARCELS 1 & 2 TO BE ACQUIRED UNDER ADJACENT PROJECT R-609 1B

PARCEL 1 ACCESS PROVIDED UNDER R-6091B

FOR -L- PROFILE SEE SHEET 16
FOR STRUCTURE PLANS SEE SHEETS S-XX THRU S-XX

◇ DENOTES FALSE SUMP
SEE DETAIL SHEET 2-D

USER: eJ
DGN: R:\R2606\R2606A\Roadway*ry\r2606a_rdy_sph_05.dgn
DATE: 5/17/2005

COMPUTED BY: DAP	DATE: 6/21/02
CHECKED BY: MDP	DATE: 11/22/02

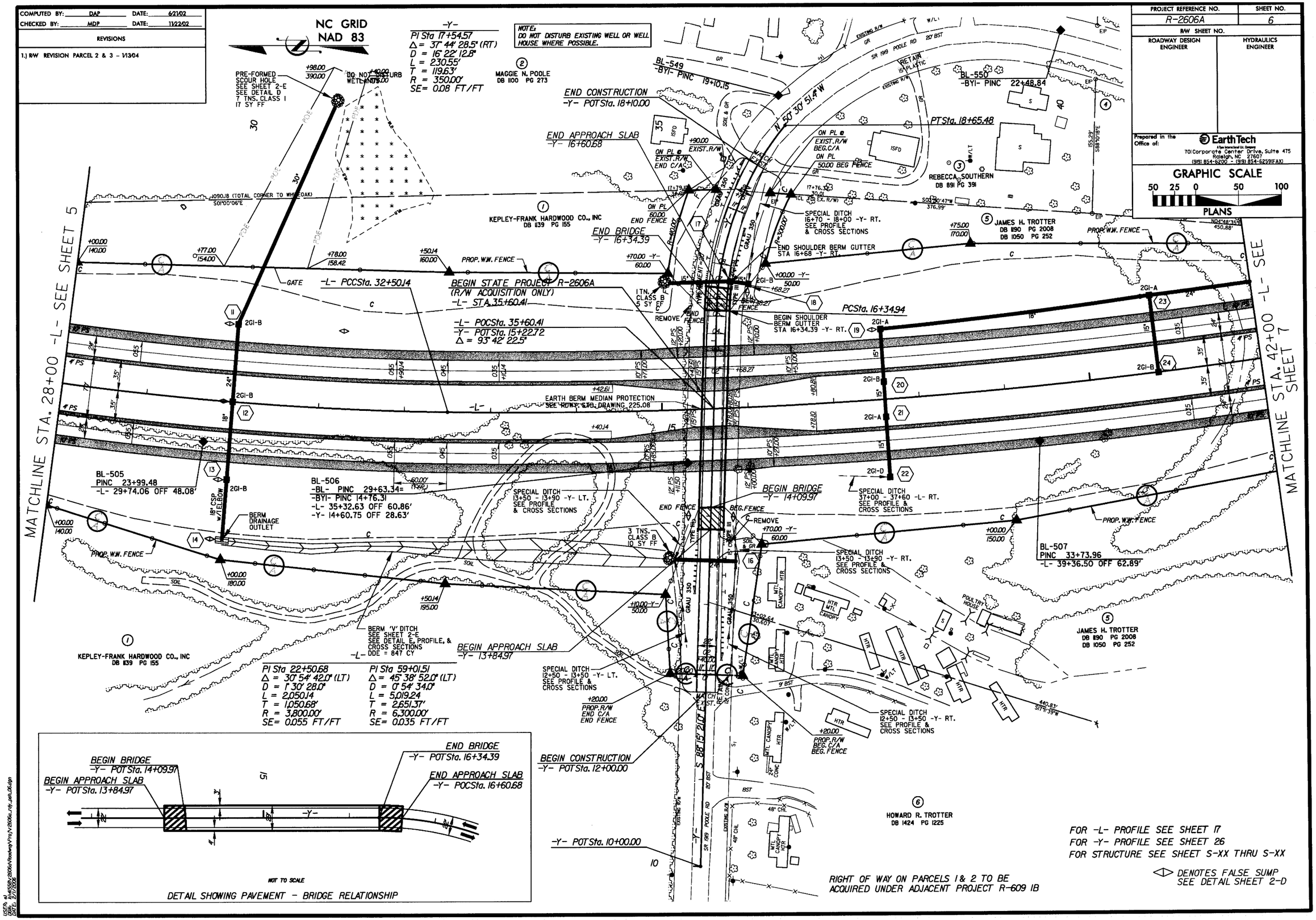
REVISIONS

1.) R/W REVISION PARCEL 2 & 3 - 1/13/04

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
The Investment Center
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 (919) 854-6259 (FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



REVISIONS
R/W Revisions – Parcels 8, 8A, 8B, 8C, 9A – 09/29/04
R/W Revisions – Parcels 5 & 14 – 08/08/05
R/W Revisions – Parcels 5 (TDE required for temp. stream diversion – 08/08/05

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 – (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

-L-
PI Sta 59+01.51
Δ = 45° 38' 52.0" (LT)
D = 0° 54' 34.0"
L = 5,019.24
T = 2,651.37'
R = 6,300.00'
SE= 0.035 FT/FT

-SR-
PI Sta 15+42.99
Δ = 38° 18' 02.7" (LT)
D = 9° 32' 57.5"
L = 401.08'
T = 208.36'
R = 600.00'
SE = .08 FT/FT

PI Sta 38+46.89
Δ = 25° 15' 58.2" (LT)
D = 0° 56' 02.1"
L = 2,705.40'
T = 1,375.06'
R = 6,135.00'
SE = NC

-DRIVE3-
PI Sta 10+60.77
Δ = 12° 42' 57.0" (RT)
D = 114° 35' 29.6"
L = 11.10'
T = 5.57'
R = 50.00'

NC GRID NAD 83

DENOTES FALSE SUMP SEE DETAIL SHEET 2-D

DENOTES REMOVAL OF EXISTING PAVEMENT

MATCHLINE STA. 42+00 -L- SEE SHEET 6

MATCHLINE STA. 56+00 -L- SEE SHEET 8

BEGIN CONSTRUCTION -SR- POT Sta. 10+00.00

-SR- PCSta. 13+34.63

-DRIVE3- POT Sta. 11+22.88

-DRIVE3- END CONST. Sta. 11+00.00

-DRIVE3- PT Sta. 10+66.29

-DRIVE3- PCSta. 10+55.20

-DRIVE3- POT Sta. 10+00.00
-SR- POT Sta. 17+40.00

-SR- PCSta. 24+71.83

-SR- PT Sta. 17+35.71

TIE EXISTING DITCH TO PROPOSED DITCH

FILL IN EXISTING DITCH AND GRADE TO DRAIN 9+70 - 10+00 -SR- LT.

BEGIN SHOULDER BERM GUTTER STA 11+50 -SR- LT.

RIP RAP ENERGY DISSIPATOR BASIN 1 SEE SHEET 2-N 142 TNS CLASS II 80 SY FF

30" CSP TYPE B (0.079") w/1 ELBOW

TOE PROTECTION SEE SHEET 2-E SEE DETAIL I 123 SY PSRM

SPEC. DITCH w/STONE LINER SEE SHEET 2-E SEE DETAIL K 77 TNS CLASS B 171 SY FF

SPEC. CUT BASE DITCH W/ LINER SEE SHEET 2-E SEE DETAIL L 96 SY PSRM

HAZARDOUS SPILL/DRY DETENTION BASIN 1 SEE DETAIL SHEET 2-H 3 TN CLASS I 11 SY FF

SLUICE GATE & SLUICE GATE INLET SEE DETAIL 2

BEGIN SHOULDER BERM GUTTER STA 44+02 -L- LT.

END SHOULDER BERM GUTTER STA 51+00

TIE PROPOSED DRIVEWAY DITCH TO EXISTING DRIVEWAY DITCH

TIE ROADSIDE DITCH INTO EXISTING DRAINAGE COURSE

HAZARDOUS SPILL/ DRY DETENTION BASIN 2 SEE DETAIL SHEET 2-H

SPECIAL DITCH 23+62 - 23+90 SR- LT SEE PROFILE & CROSS SECTIONS

SPECIAL DITCH 22+85.29 - 24+80.11 SR- RT. SEE PROFILE & CROSS SECTIONS

SPECIAL DITCH 54+00 - 56+00 -L- LT. SEE PROFILE & CROSS SECTIONS

PROP. W.W. FENCE

SEAL ABANDONED WELL

SIDE TAPERED INLET (16'x8' FACE)

PRE-FORMED SCOUR HOLE SEE SHEET 2-E SEE DETAIL D 3 TNS. CLASS I 11 SY FF

DRY DETENTION BASIN SEE DETAIL SHEET 2-M

PERMANENT DITCH CHECK DAMS SEE SHEET 2-E SEE DETAIL J

LATERAL 4' BASE DITCH w/CLASS I LINER SEE SHEET 2-E SEE DETAIL H, PROFILE, & CROSS SECTIONS 224 TNS CLASS I 362 SY FF EST. 458 CY DDE

TIE EXISTING ROADSIDE DITCH TO PROPOSED LATERAL 4' BASE DITCH MIN. 2:1 DITCH SLOPES (3:1 PREFERABLE)

ADJUST EXISTING DITCH AS NECESSARY TO ACCOMMODATE 4' SHOULDER MIN. 2:1 DITCH SLOPES (3:1 PREFERABLE)

TOE PROTECTION SEE SHEET 2-E SEE DETAIL F 36 TNS CLASS B 84 SY FF

50' STREAM BUFFER

BL-508
PINC 36+86.73
-L- 42+45.33 OFF 59.04'

BL-509
PINC 40+98.13
-L- 46+54.91 OFF 60.13'
ELEV=711.20'

BL-510
-BL- PINC 43+02.19
-BYI- PINC 31+87.23
-L- 48+52.34 OFF 54.01'

BL-512
PINC 48+87.85
-L- 54+37.90 OFF 57.79'

BL-511
PINC 46+55.35
-L- 52+05.56 OFF 50.57'

FOR -DR3- PROFILE SEE SHEET 29
FOR -L- PROFILE SEE SHEET 17
FOR -SR- PROFILE SEE SHEET 24
FOR CULVERT PLANS SEE SHEETS C-? TO C-?

TIMOTHY LARUE TROTTER DB 1570 PG 122 PB 39 PG 72

RAY POOLE DB 1598 PG 1330 PB 39 PG 72

TIMOTHY A. GREER DB 1694 PG 160 PB 67 PG 5

BRIAN K. PETERSON DB 1698 PG 203 PB 67 PG 5

ZOLA W. ROSENBERG DB 1774 PG 2220

CHARLES M. PENDLETON DB 1741 PG 856 PB 67 PG 5

JOHN FRANCIS REDDING DB 1234 PG 107 PB 12 PG 77

JAMES H. TROTTER DB 1190 PG 2008 DB 1050 PG 252

FAYE T. COLLINS DB 1150 PG 253 DB 1190 PG 202 DB 1584 PG 962 PB 50 PG 37

GARY M. REDDING DB 1740 PG 353 PB 71 PG 87

BETTY NICHOLSON DB 1171 PG 129

USER: dl
DGN: R-2606A-D200-Roadway(Pro)V2606a_rdy_plan07.dgn
DATE: 9/7/2006

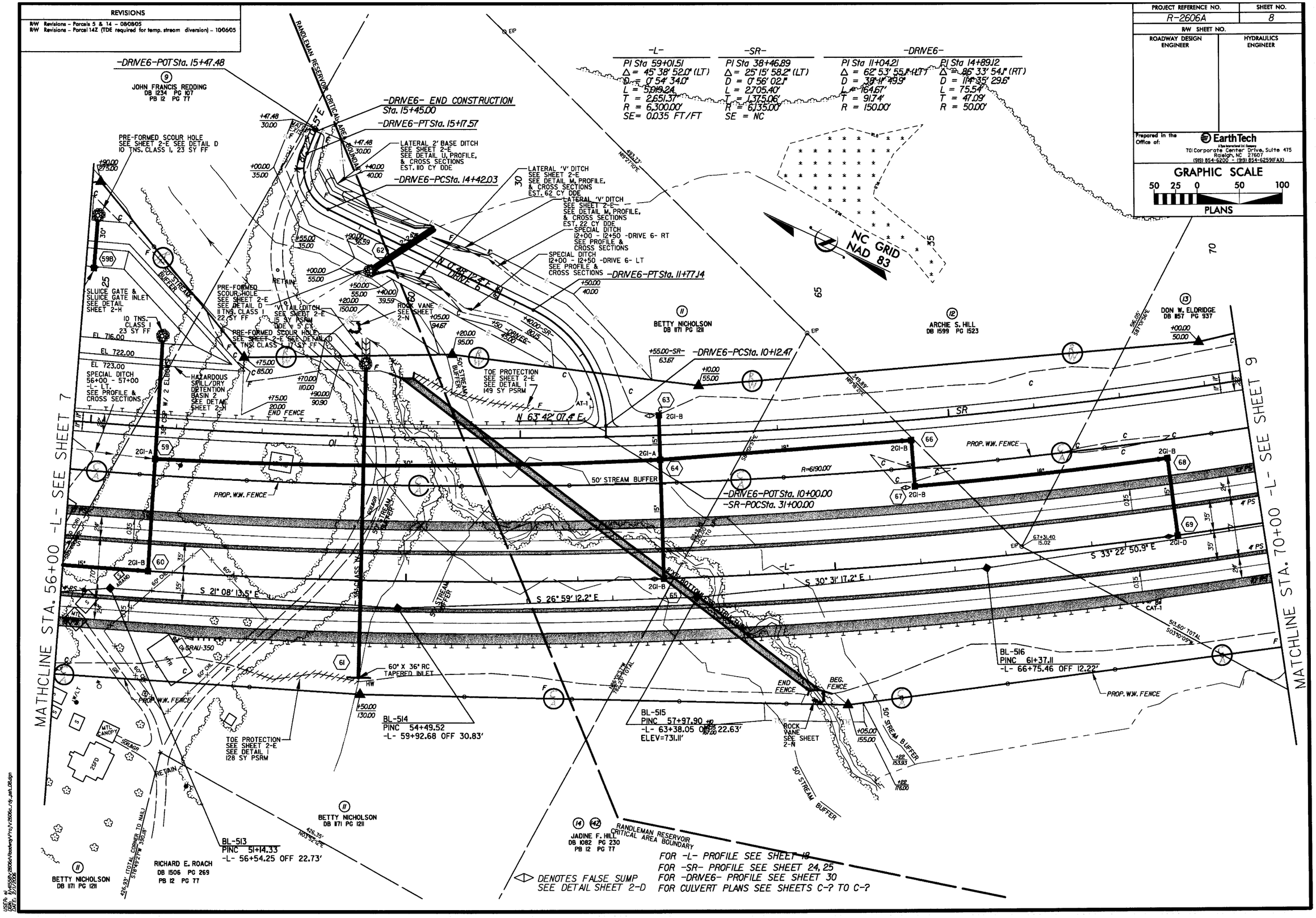
REVISIONS
R/W Revisions - Parcels 5 & 14 - 080805
R/W Revisions - Parcel 14Z (TDE required for temp. stream diversion) - 100605

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Member of the AECOM Family
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

-L-	-SR-	-DRIVE6-	
PI Sta 59+01.51	PI Sta 38+46.89	PI Sta 11+04.21	PI Sta 14+89.12
Δ = 45° 38' 52.0" (LT)	Δ = 25° 15' 58.2" (LT)	Δ = 62° 53' 55.1" (LT)	Δ = 86° 33' 54.1" (RT)
D = 0° 54' 34.0"	D = 0° 56' 02.1"	D = 38° 11' 49.9"	D = 114° 35' 29.6"
L = 5,919.24'	L = 2,705.40'	L = 164.67'	L = 75.54'
T = 2,651.37'	T = 1,375.06'	T = 91.74'	T = 47.09'
R = 6,300.00'	R = 6,135.00'	R = 150.00'	R = 50.00'
SE = 0.035 FT/FT	SE = NC		



COMPUTED BY: WCB	DATE: 3/1004
CHECKED BY: GTS	DATE: 3/1004

REVISIONS

1.) PARCEL 15 & 16 ADDED PERMANENT R/W ON PARCEL 15, ADDED DRIVEWAY ON PARCEL 16 - 3/1004

2.) MOVED RIGHT OF WAY FOR SERVICE ROAD ALONG PARCEL 15 SOUTHERN PROPERTY LINE - 10/22/04

3.) MOVED CONSTRUCTION EASEMENT FOR SERVICE ROAD ALONG PARCEL 16 PROPERTY LINE - 10/22/04

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	9

R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech, A Tyco International Company, 701 Corporate Center Drive, Suite 475, Raleigh, NC 27607, (919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE: 50 25 0 50 100

PLANS

NC GRID NAD 83

-L- ARCHIE S. HILL DB 1599 PG 1523

PI Sta 59+01.51
Δ = 45° 38' 52.0" (LT)
D = 0° 54' 34.0"
L = 5,019.24'
T = 2,651.37'
R = 6,300.00'
SE = 0.035 FT/FT

RIs Sta 83+36.04
Θs = 0° 54' 34.0"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR-
PI Sta 38+46.89
Δ = 25° 15' 56.2" (LT)
D = 0° 56' 02.1"
L = 2,705.40'
T = 1,375.06'
R = 6,135.00'
SE = NC

-DRIVE4-
PI Sta 10+45.64
Δ = 50° 27' 40.6" (LT)
D = 11° 35' 29.6"
L = 44.04'
T = 23.56'
R = 50.00'

-DRIVE5-
PI Sta 12+10.51
Δ = 36° 47' 14.9" (RT)
D = 28° 38' 52.4"
L = 128.41'
T = 66.51'
R = 200.00'

PI Sta 15+18.54
Δ = 40° 44' 03.9" (LT)
D = 57° 17' 44.8"
L = 71.10'
T = 37.12'
R = 100.00'

-DRIVE5- POT Sta. 15+94.28
-DRIVE5- END CONST. ST A.15+60.00
-DRIVE5- PT Sta. 15+52.51
-DRIVE5- PC Sta. 14+81.41
-DRIVE5- PT Sta. 12+72.41
-DRIVE4- POT Sta. 11+63.33
-DRIVE4- END CONST. Sta. 11+50.00
-DRIVE5- PC Sta. 11+44.00
-DRIVE4- PT Sta. 10+66.11
-DRIVE4- PC Sta. 10+22.08
-DRIVE5-POT Sta. 10+00.00
-SR-POC Sta. 44+50.00
-DRIVE4- POT Sta. 10+00.00
-SR- POC Sta 41+65.00
-SR- PT Sta. 51+77.23

N 61° 40' 49.0" E
S 77° 35' 07.1" E
N 65° 37' 38.0" E
N 53° 45' 21.1" E
S 45° 41' 51.2" E

MATCHLINE STA. 70+00 -L- SEE SHEET 8

MATCHLINE STA. 84+00 -L- SEE SHEET 10

DON W. ELDRIDGE DB 1157 PG 937

DANIEL A. HILL DB 1599 PG 1518

BOBBY RALPH HILL DB 1599 PG 1526

JERRY G. MCDOWELL DB 1552 PG 72

JADINE F. HILL DB 1082 PG 230 PB 12 PG 77

BL-517 PINC 65+10.50 -L- 70+49.01 OFF 3.16'

BL-518 PINC 69+78.03 -L- 75+16.95 OFF 20.40'

BL-519 PINC 74+63.81 -L- 80+04.29 OFF 36.16'

BL-520 PINC 77+86.58 -L- 83+29.62 OFF 46.81'

-L- CS Sta. 82+69.37

PROP. W.W. FENCE

SEAL ABANDONED WELL

DRAIN OBSCURED

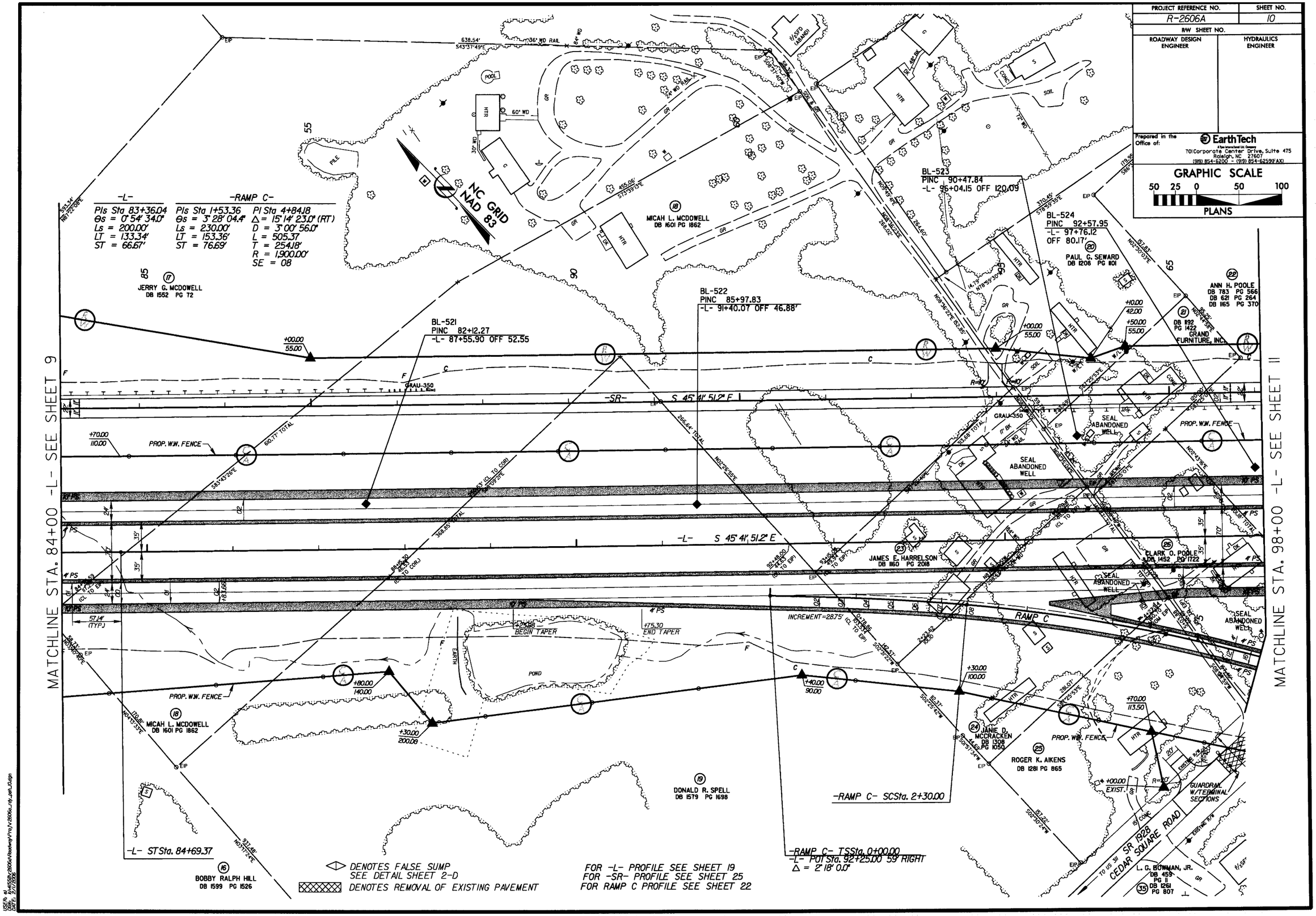
DENOTES FALSE SUMP SEE DETAIL SHEET 2-D

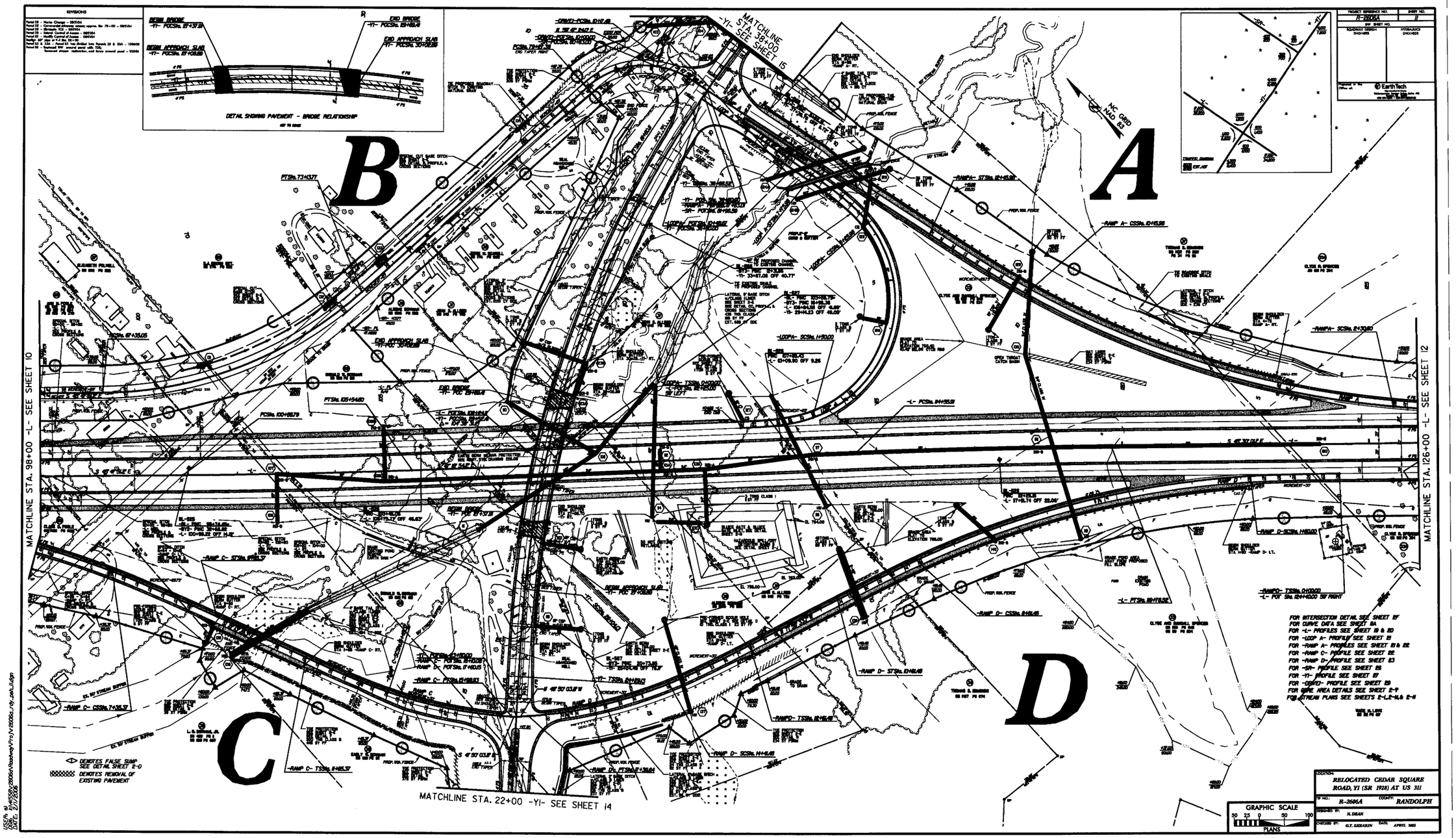
FOR -L- PROFILE SEE SHEET 18
FOR -SR- PROFILE SEE SHEET 25
FOR -DRIVE4- PROFILE SEE SHEET 29
FOR -DRIVE5- PROFILE SEE SHEET 30

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Member of the Earthtech Family
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259 (FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



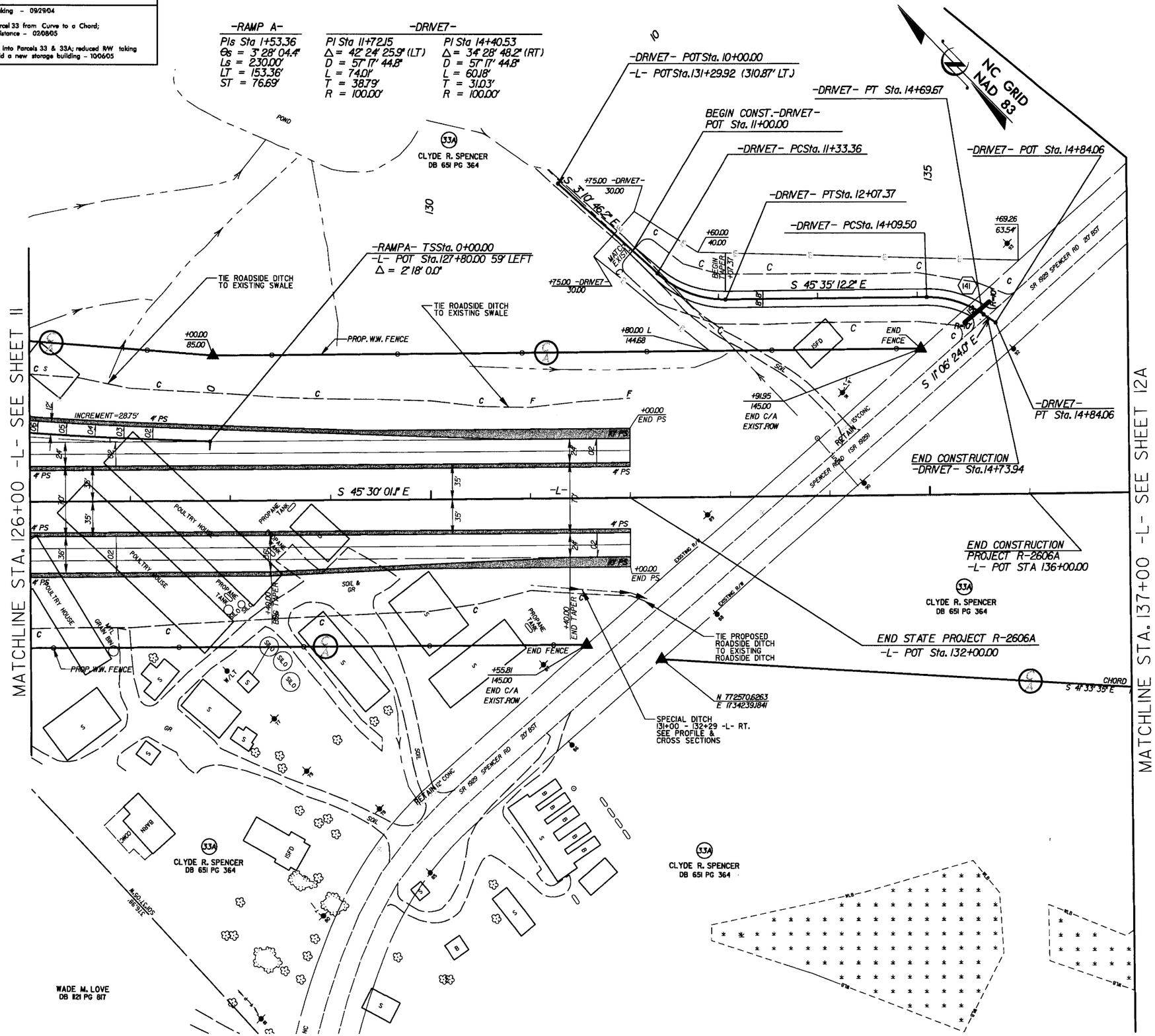

A
B
C
D
MATCHLINE STA. 98+00 -L- SEE SHEET 10
MATCHLINE STA. 126+00 -L- SEE SHEET 12
MATCHLINE STA. 22+00 -Y1- SEE SHEET 14
MATCHLINE -Y1- STA. 38+00 SEE SHEET 15
DETAIL SHOWING PAVEMENT - BRIDGE RELATIONSHIP
NC GRID NAD 83
FOR INTERSECTION DETAIL SEE SHEET 8F
FOR CURVE DATA SEE SHEET 8A
FOR -L- PROFILES SEE SHEET 8B & 8D
FOR -LOOP A- PROFILE SEE SHEET 8I
FOR -RAMP A- PROFILES SEE SHEET 8G & 8E
FOR -RAMP C- PROFILE SEE SHEET 8E
FOR -RAMP D- PROFILE SEE SHEET 8J
FOR -SR- PROFILE SEE SHEET 8B
FOR -Y1- PROFILE SEE SHEET 8F
FOR -DAW2- PROFILE SEE SHEET 8B
FOR SITE AREA DETAILS SEE SHEET E-7
FOR STREAM PLANS SEE SHEETS E-L,E-M,& E-N
DENOTES FALSE SUMP SEE DETAIL SHEET E-D
DENOTES REMOVAL OF EXISTING PAVEMENT
GRAPHIC SCALE
50 25 0 50 100
PLANS
LOCATION: RELOCATED CEDAR SQUARE ROAD, Y1 (SR 1928) AT US 311
TIP NO. R-2606A
COUNTY: RANDOLPH
DESIGNED BY: N. DEAN
CHECKED BY: G.T. KERSKIN
DATE: APRIL 2005
PROJECT REFERENCE NO. R-2606A
SHEET NO.
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
Earth Tech
USER: sl
DGN: R-2606A_ROD_Alt1.dgn
DATE: 5/17/2006

REVISIONS
R/W Revision - Extended Parcel 33 taking - 09/29/04
R/W Revision - Changed R/W on Parcel 33 from Curve to a Chord; Added bearing and distance - 02/08/05
R/W Revision - Parcel 33 has divided into Parcels 33 & 33A; reduced R/W taking on Parcel 33A to avoid a new storage building - 10/06/05

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Member of the AECOM Family
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS



FOR RAMP A PROFILE SEE SHEET 21
FOR DRIVE 7 PROFILE SEE SHEET 30

USER: al
DGN: R:\R2606\2606A\Roadway\Proj\r2606a_rdy_pth_12.dgn
DATE: 5/17/06

REVISIONS
R/W Revision – Parcel 33 has divided into parcels 33 & 33A; reduce R/W taking on Parcel 33 to avoid a new storage building – 100605
R/W Revision – Extended Parcel 33 taking – 09/29/04 Added Sheet 12A – 09/29/04
R/W Revision – Changed R/W on Spencer Parcel from curve to chord; Added bearing & distance – 02/08/05

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
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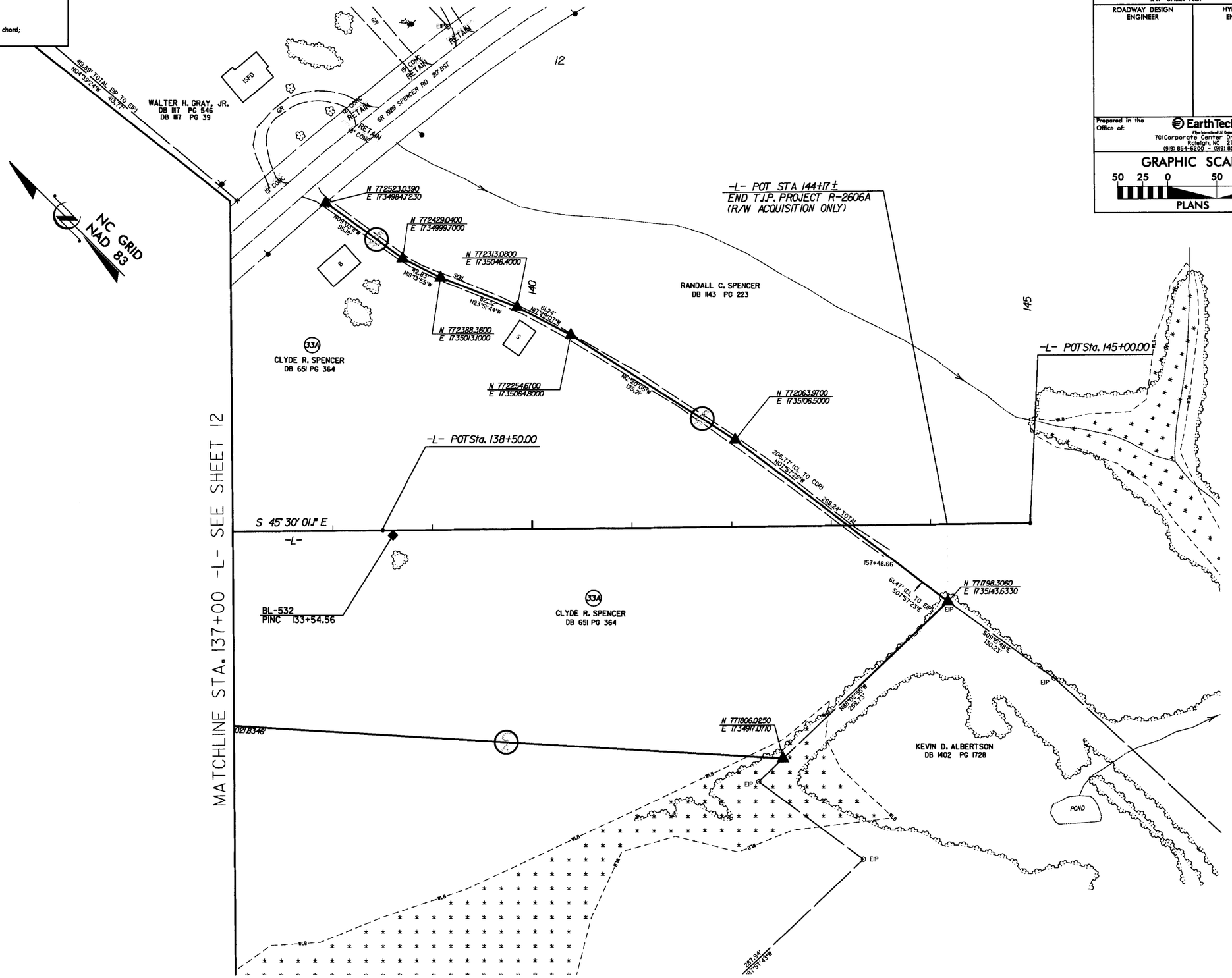
PLANS



REVISIONS
Parcels 38 & 39 - Revised R/W, Lt. side, from Sta. 12+00 to Sta. 15+46.56
Parcels 38 & 39A - parcel 38 has divided into Parcels 38 & 39A - 100605

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of:
EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
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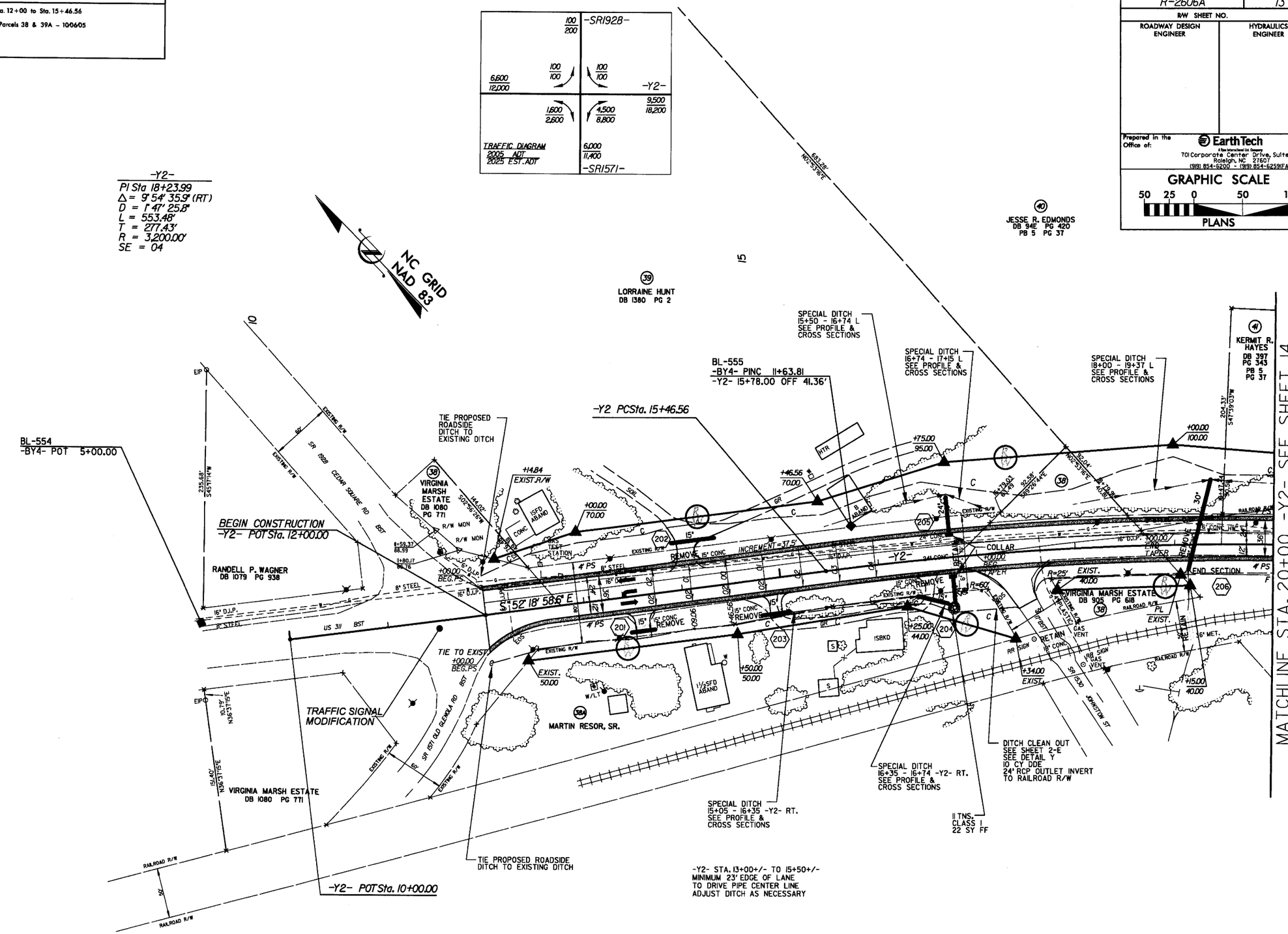
PLANS



◇ DENOTES FALSE SUMP SEE DETAIL SHEET 2-D

FOR -Y2- PROFILE SEE SHEET 28

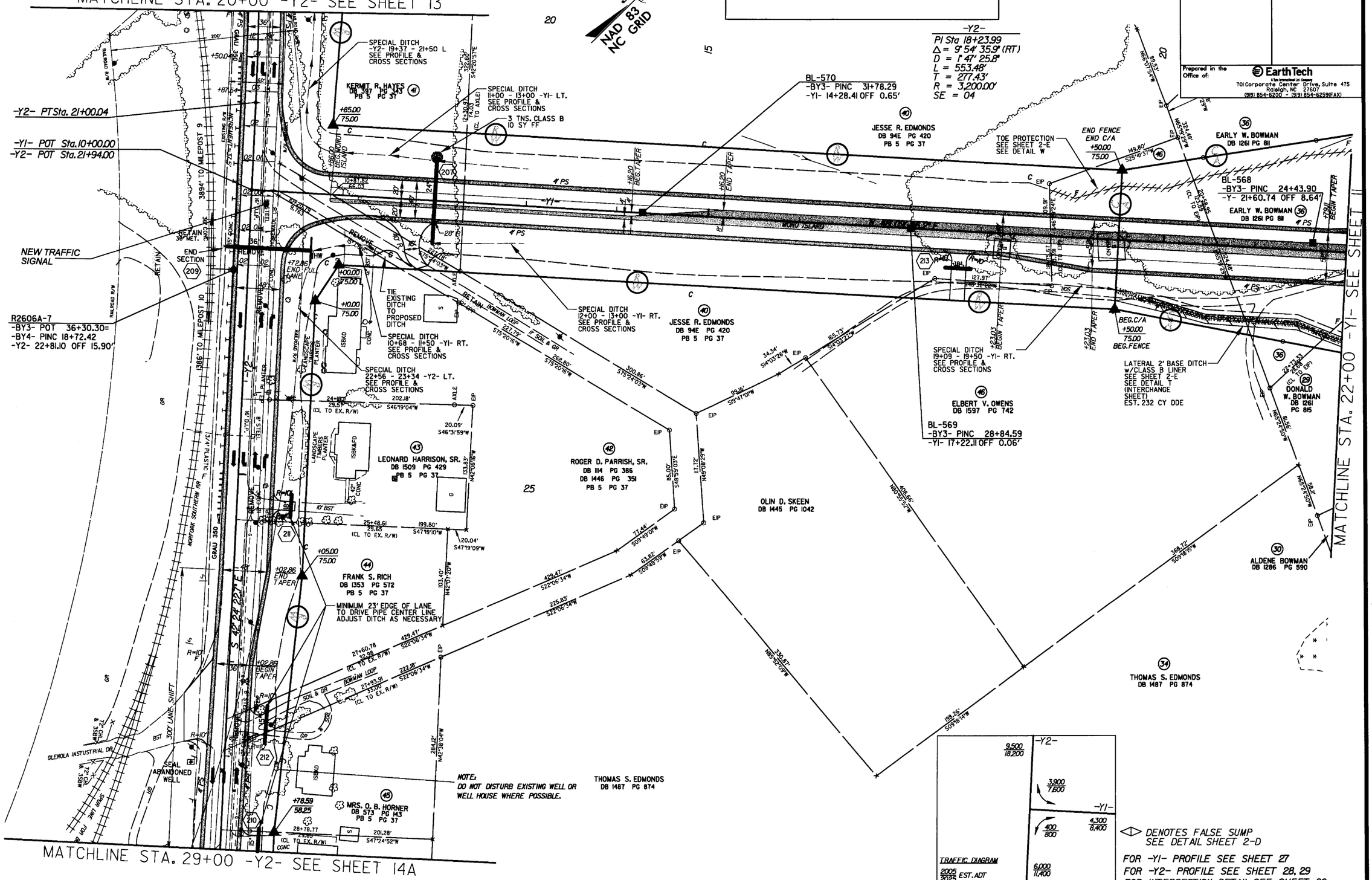
USER: a
DGN: R-2606A\R2606A\Roadway\Proj\r2606a_rdy_sht13.dgn
DATE: 9/1/2006

REVISIONS
PARCEL 46 – RESIDENTIAL DRIVEWAY ACCESS APPROX. SS 17+60 – 08/31/04
PARCEL 45 – EXTENDED R/W TO PROPERTY LINE – 09/29/04

GRAPHIC SCALE
50 25 0 50 100
PLANS

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tetra Tech Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)



REVISIONS
PARCEL 46 - RESIDENTIAL DRIVEWAY ACCESS APPROX. SS 17+60 - 08/31/04
ADDED PARCEL 53, 54, 55 - 09/29/04
PARCEL 55 - EXTEND R/W - ELIMINATE CONSTRUCTION EASEMENT - 11/04/04

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	14A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of:
EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-6200 - (919) 854-6259(FAX)

GRAPHIC SCALE
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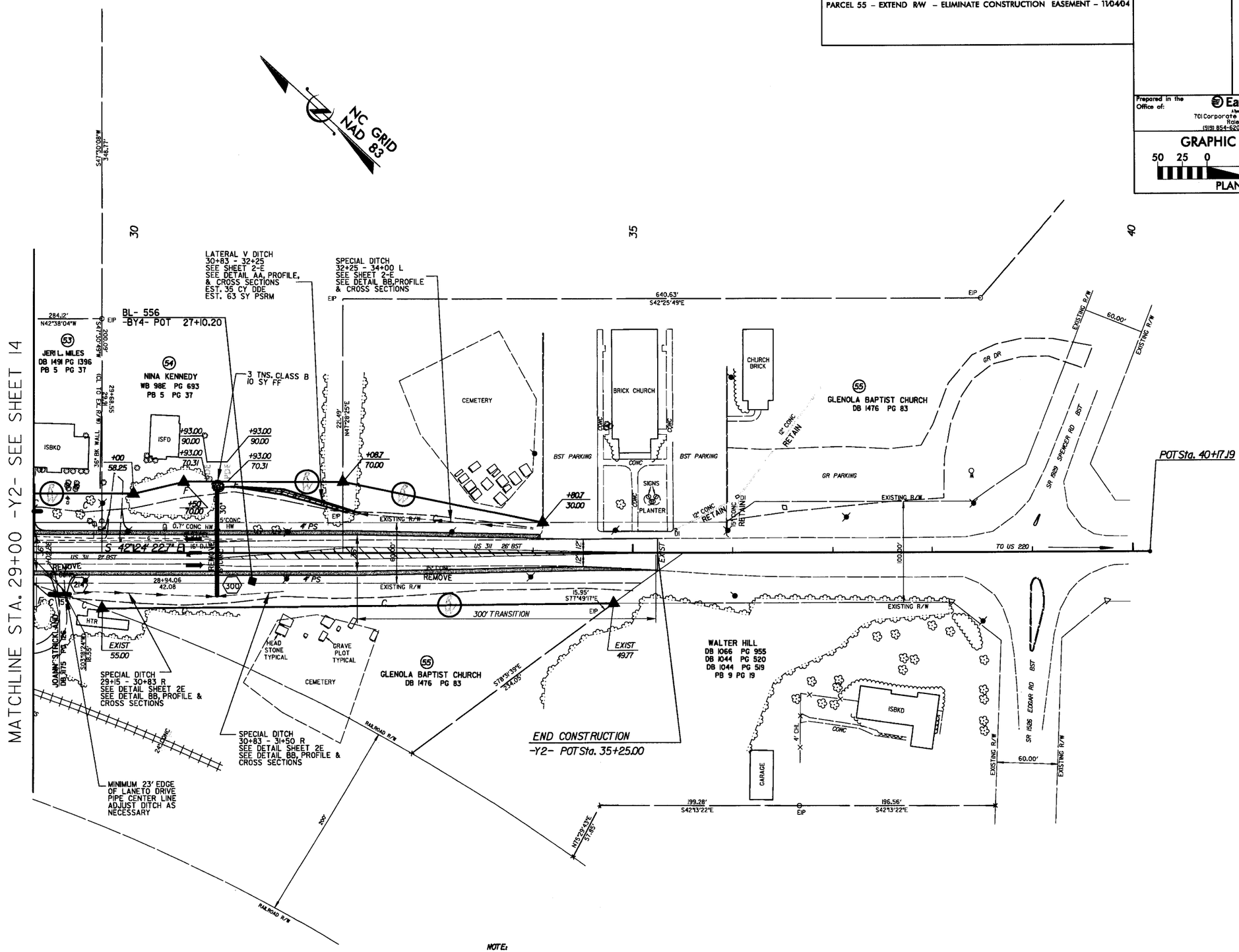
PLANS



NOTE:
DO NOT DISTURB EXISTING WELL OR WELL HOUSE WHERE POSSIBLE.

FOR -Y2- PROFILE SEE SHEET 29

USER: al
DATE: 5/17/2006
FILE: R:\R2606A\Roadway\Proj\r2606a_rdy_pet_14a.dgn

REVISIONS
PARCEL 28 - NAME CHANGE - 08/31/04
PARCEL 47 - EXTEND CONTROL OF ACCESS - 08/31/04
PARCEL 47 - ELIMINATE TCE - 08/31/04
PARCEL 33 - EXTEND CONTROL OF ACCESS - 08/31/04
PARCELS 47, 49, 50, 52 - 09/29/04

PROJECT REFERENCE NO.	SHEET NO.
R-2606A	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Prepared in the Office of: EarthTech
A Tyco International Company
701 Corporate Center Drive, Suite 475
Raleigh, NC 27607
(919) 854-5200 - (919) 854-5259(FAX)

GRAPHIC SCALE
50 25 0 50 100
PLANS

-DRIVE1- PT Sta. 11+50.76

-Y1-
PIs Sta 37+26.86
Θs = 2° 23' 14.4"
Ls = 175.00'
LT = 116.68'
ST = 58.34'

-DRIVE1-
PI Sta 10+86.71
Δ = 38° 10' 40.0" (RT)
D = 28° 38' 52.4"
L = 133.27'
T = 69.21'
R = 200.00'

NAD 83
NC GRID

NOTE:
DO NOT DISTURB EXISTING WELL OR WELL HOUSE WHERE POSSIBLE.

-DRIVE1- POT Sta. 13+73.93

END CONSTRUCTION
-Y1- POT Sta. 46+00.00

-Y1-POT Sta. 48+49.97

MATCHLINE STA. 38+00 -Y1- SEE SHEET 11

-Y1- ST Sta. 38+43.52

R2606A
-4-BY2- PINC 15+37.96=
-BY3- POT 5+00.00
-Y1- 41+22.45 OFF 7.30

BL-552
-BY2- POT 5+00.00

R.J. BROWN EST.
DB 276 PG 532

ANGELA H. TACKETT
DB 1386 PG 593

DONALD L. LINGERFELT
DB 1044 PG 265
DB 1390 PG 752

TERRY A. DAY
DB 1294 PG 991

PATRICIA G. MOSLEY
DB 1139 PG 842

ARNOLD R. MOSLEY
DB 1139 PG 841

BARRY. BAXTER
DB 841 PG 590

ERIC MICHAEL DAVIS

MARTIN AYLLON
DB 1873 PG 501
PB 90 PG 9

DANIEL L. ELLINGTON
DB 1307 PG 1422

CLYDE AND RANDALL SPENCER
DB 1133 PG 649
DB 1119 PG 534

THOMAS S. EDMONDS
DB 1437 PG 1557
PB 34 PG 98

TOE PROTECTION
SEE SHEET 2-E
SEE DETAIL W
99 SY PSRM

DITCH AROUND CUL-DE-SAC

TIE PROPOSED ROADSIDE DITCH TO EXISTING DITCH

TIE PROPOSED ROADSIDE DITCH TO EXISTING DITCH

N 81° 58' 50.4" E1

DENOTES REMOVAL OF EXISTING PAVEMENT

DENOTES FALSE SUMP
SEE DETAIL SHEET 2-D

FOR DRIVE 1 SEE SHEET 29
FOR DRIVE 2 SEE SHEET 29
FOR -Y1- PROFILE SEE SHEET 28

USER: jb
DGN: R:\R2606\R2606a\Roadway\Y1\Y1R2606a_rdy_path_5.dgn
DATE: 9/7/2006

09/09/99

PROJECT: 8.1571501 R-2606

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

LOCATION: US 311 FROM N OF SR 1929 TO S OF US 311

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

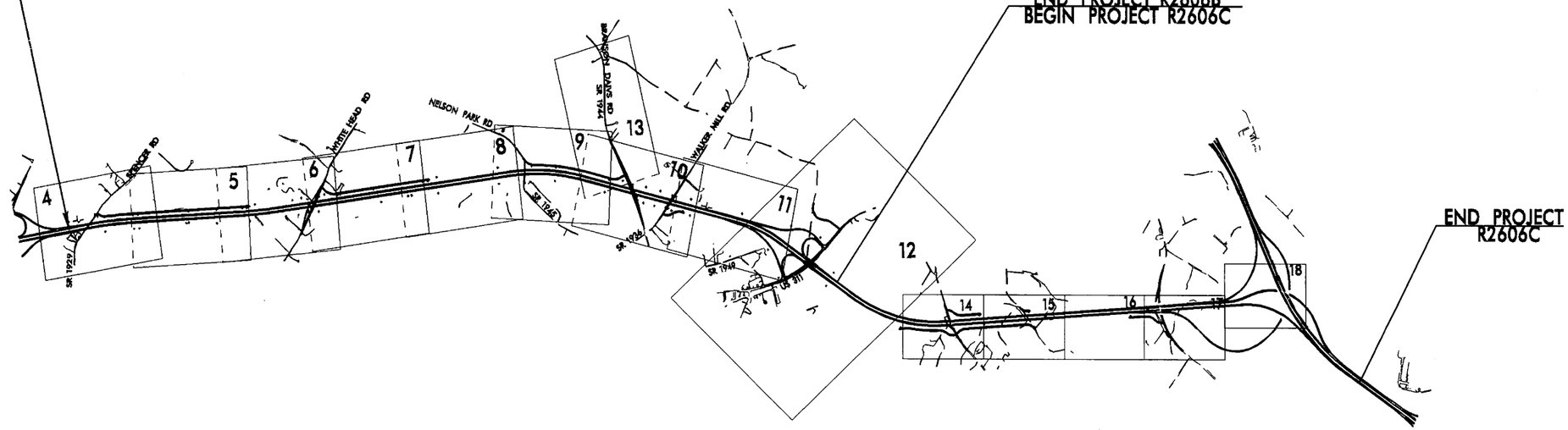
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	8.1571501	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
8.1571501	STP-NHF-311(3)	

BEGIN PROJECT R2606B

END PROJECT R2606B
BEGIN PROJECT R2606C

END PROJECT R2606C



RECEIVED
FEB 09 2006
DIVISION OF HIGHWAYS
HYDRAULICS UNIT

PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

GRAPHIC SCALES

PLANS 0

PROFILE (HORIZONTAL) 0

PROFILE (VERTICAL) 0

DESIGN DATA

ADT =
ADT =
DHV = %
D = %
T = % *
V = km/h

* TTST % DUAL %

PROJECT LENGTH

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh, NC 27610

1995 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

PROJECT ENGINEER

PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

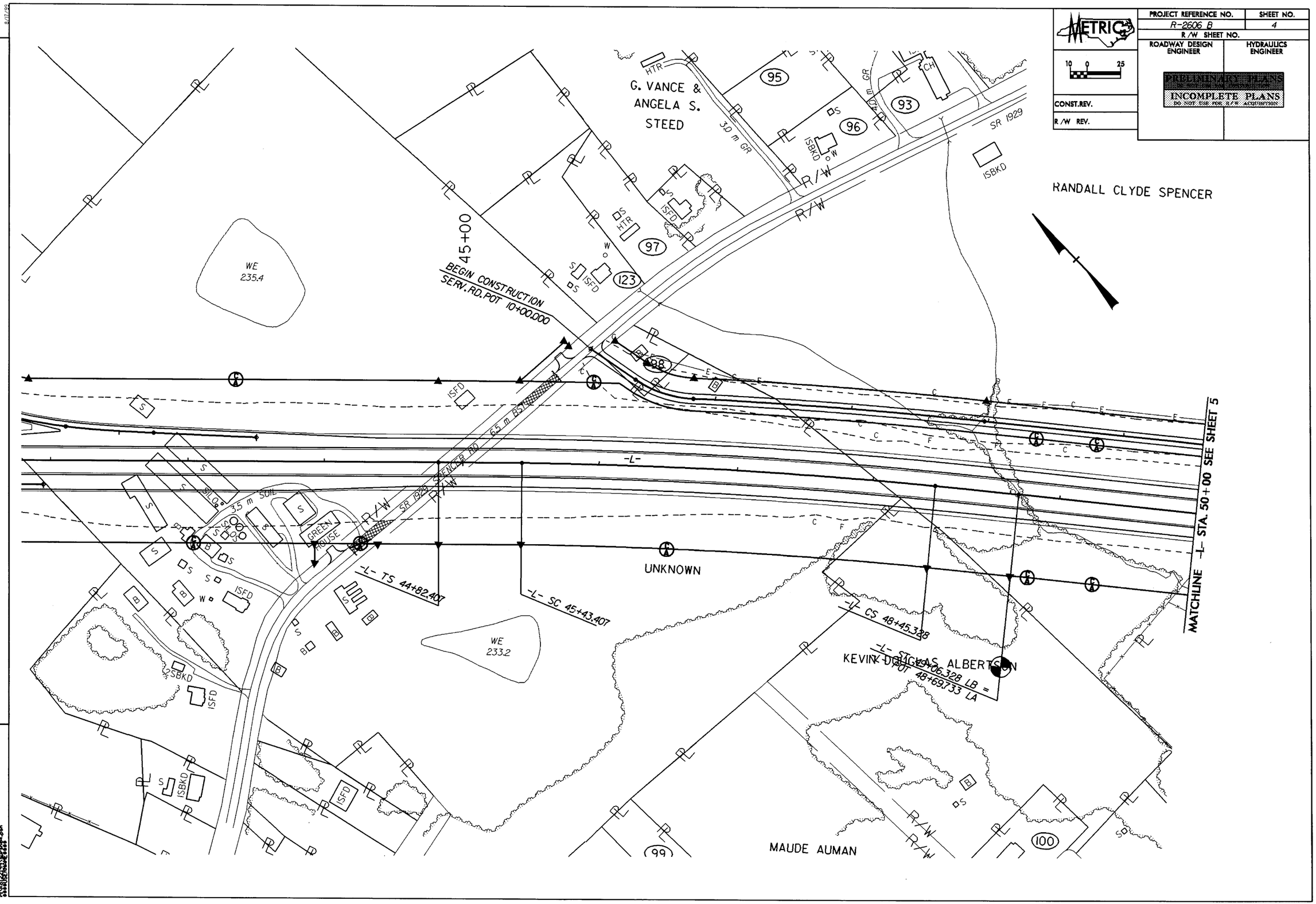
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

08-FEB-2006 09:00
c:\wsdot\2199_rc\hydr-o\20706\r-2606.tsh
$$$$USERNAME$$$$


METRIC
10 0 25
PROJECT REFERENCE NO.
R-2606 B
SHEET NO.
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
REVISIONS
8/17/99
G. VANCE & ANGELA S. STEED
RANDALL CLYDE SPENCER
KEVIN DOUGLAS ALBERTSON
MAUDE AUMAN
UNKNOWN
WE 235.4
WE 233.2
BEGIN CONSTRUCTION
SERV. RD. POT 10+00.000
45+00
SR 1929
SERVICE RD 6.5 m BS
-L- TS 44+82.407
-L- SC 45+43.407
-L- CS 48+45.338
-L- ST 49+06.328 LB =
POT 48+69.733 LA
-L- STA. 50+00 SEE SHEET 5
MATCHLINE
GREEN HOUSE
SILO
SOIL
35 m
30 m GR
40 m GR
HTR
ISBKD
ISFD
CH
R/W
-L-
95
96
93
97
123
98
99
100

PROJECT REFERENCE NO.	SHEET NO.
R-2606 B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

10 0 25

CONST.REV.

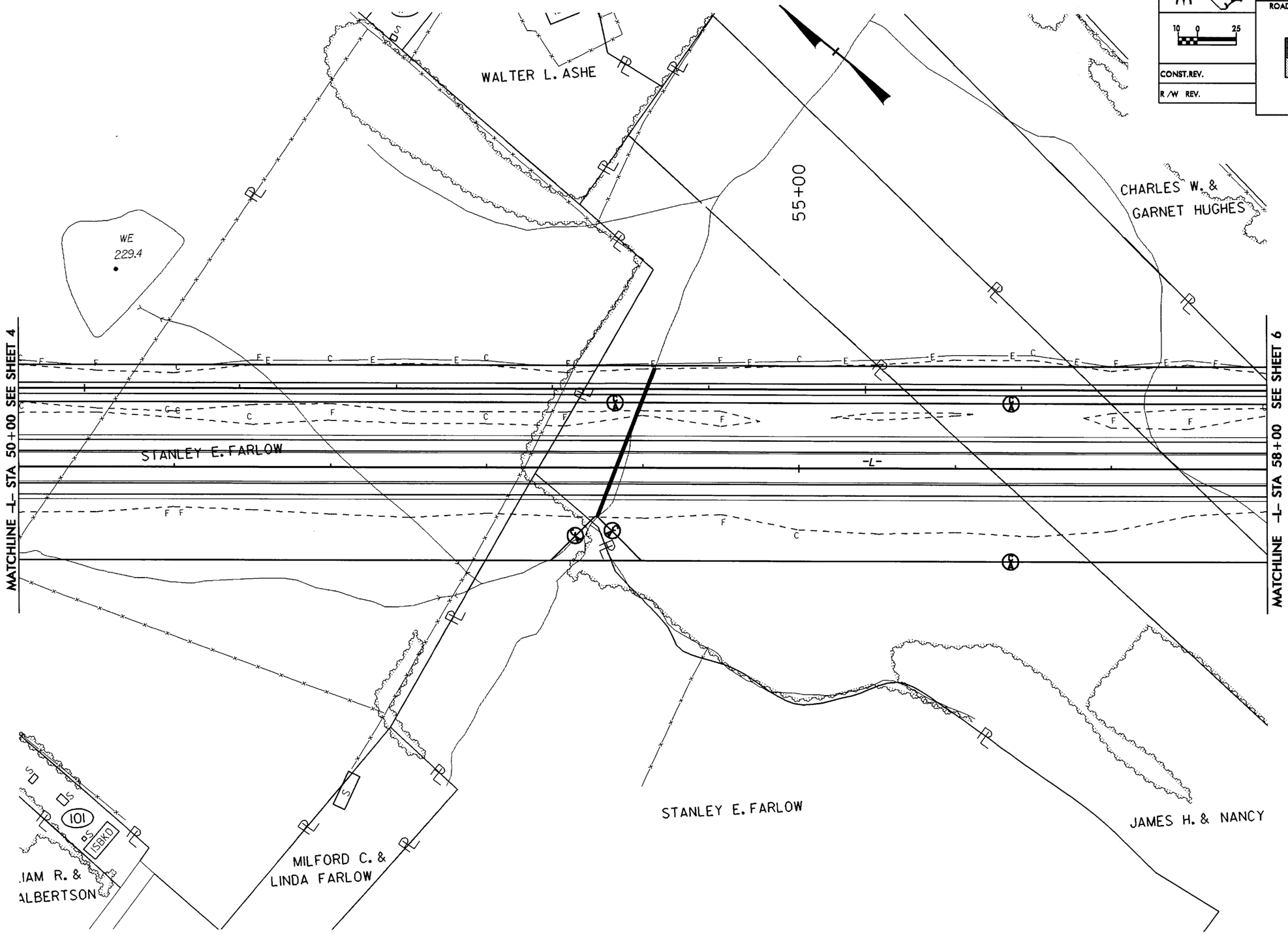
R/W REV.

PRELIMINARY PLANS

INCOMPLETE PLANS

DO NOT USE FOR R/W ACQUISITION

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
R-2606 B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

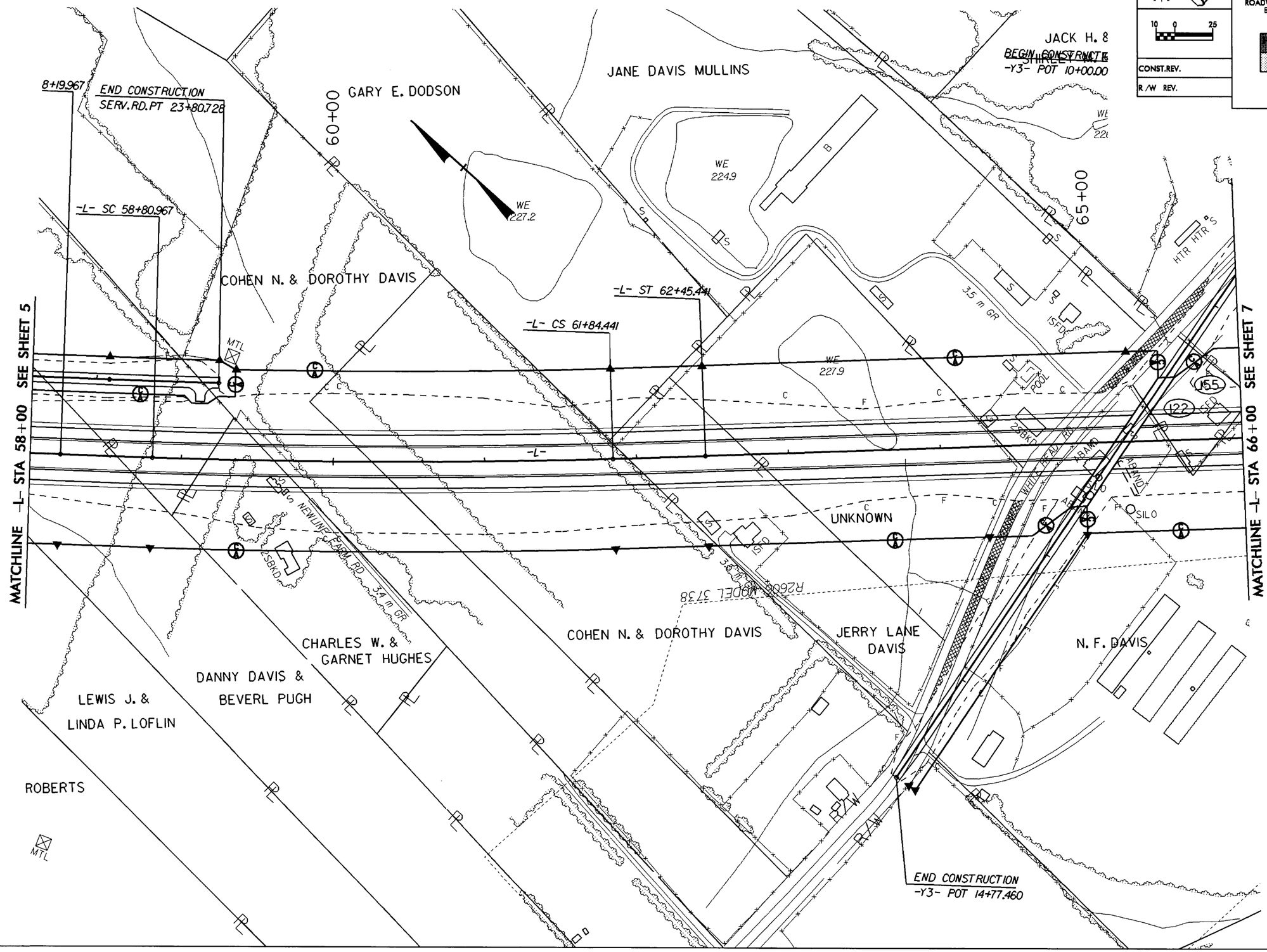
10 0 25

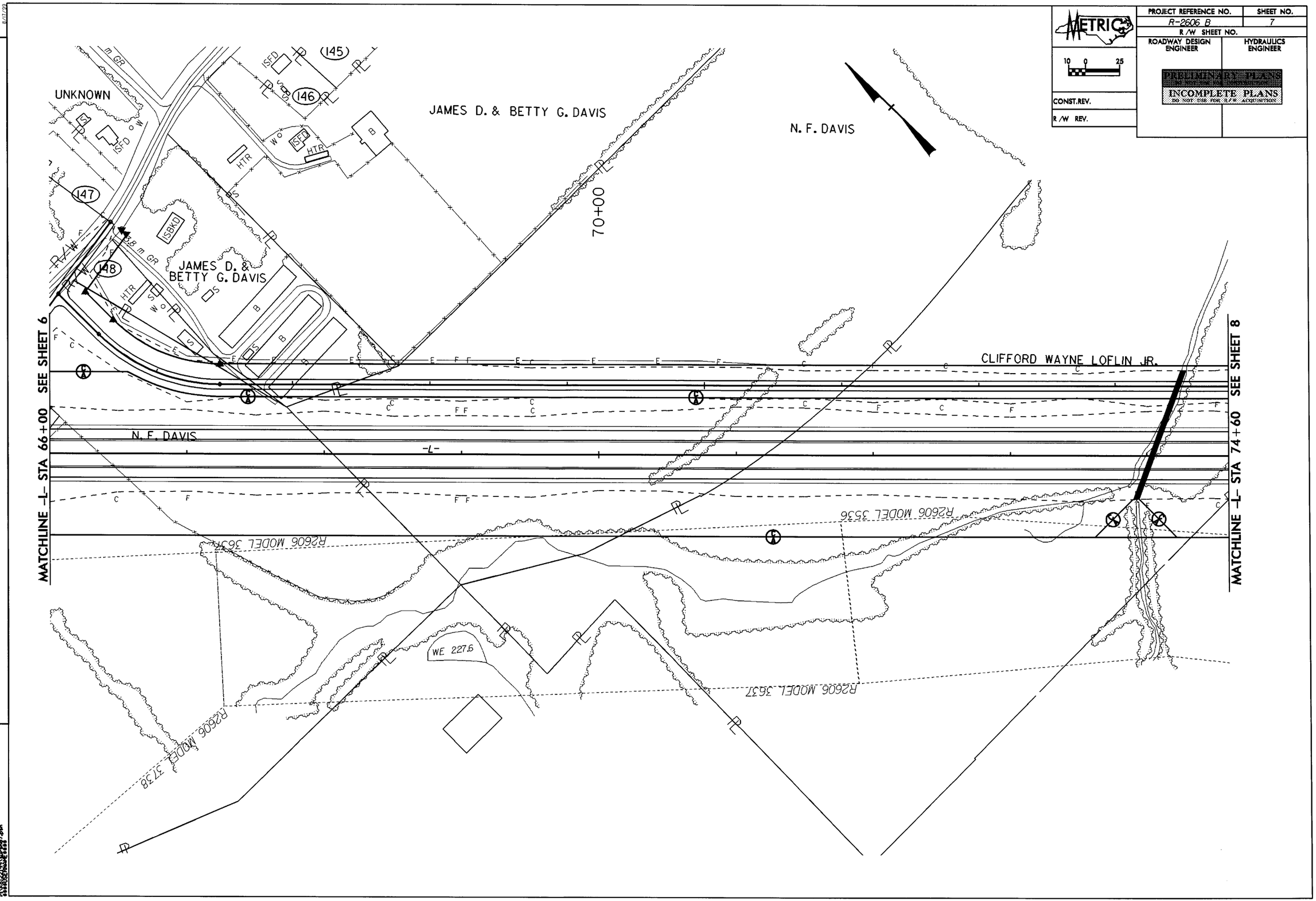
CONST.REV.

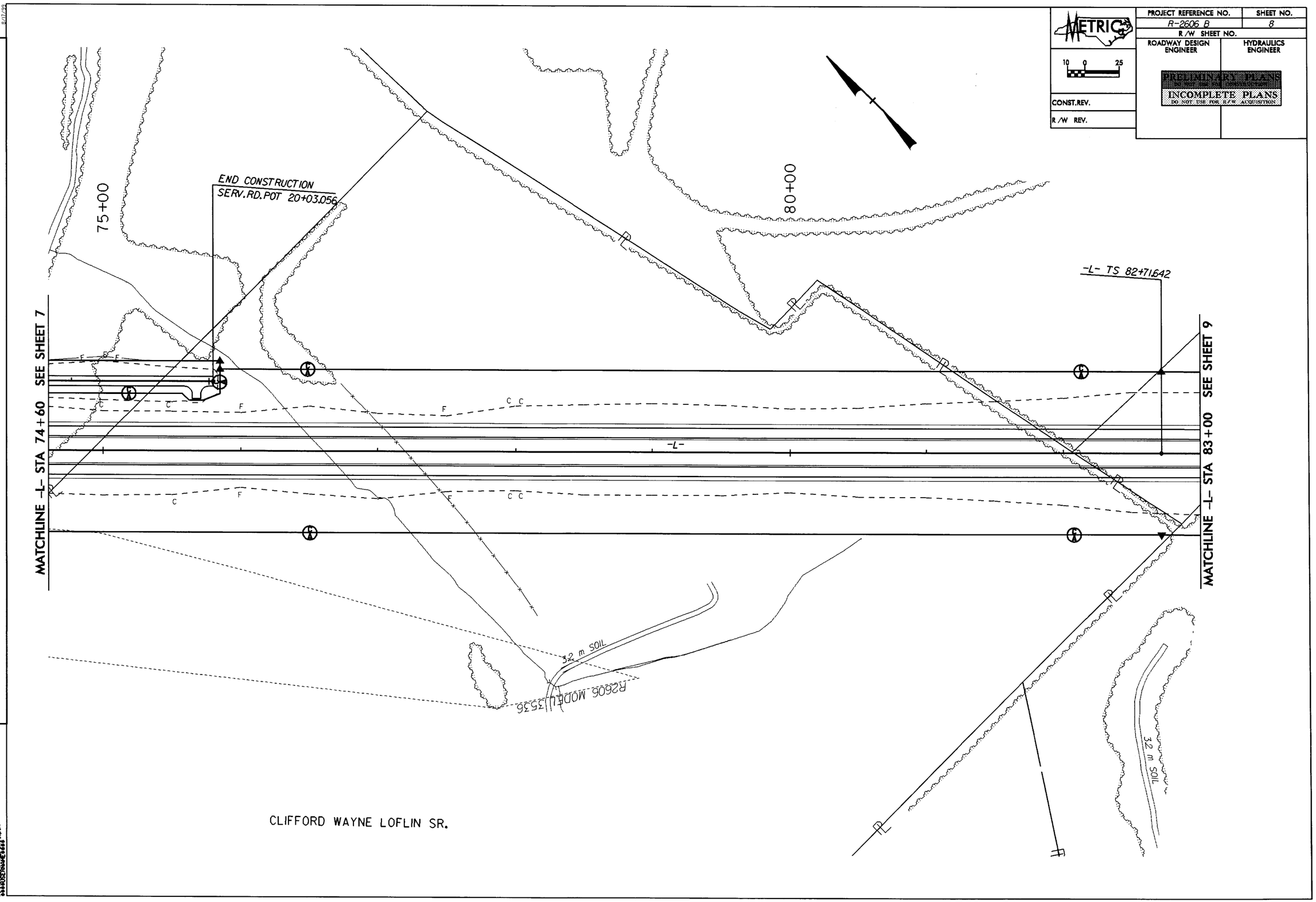
R/W REV.

PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

REVISIONS




METRIC
10 0 25
PROJECT REFERENCE NO.
R-2606 B
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
REVISIONS
UNKNOWN
JAMES D. & BETTY G. DAVIS
N. F. DAVIS
JAMES D. & BETTY G. DAVIS
CLIFFORD WAYNE LOFLIN JR.
N. F. DAVIS
-L-
70+00
MATCHLINE -L- STA 66+00 SEE SHEET 6
MATCHLINE -L- STA 74+60 SEE SHEET 8
R2606 MODEL 3536
R2606 MODEL 3537
R2606 MODEL 3537
R2606 MODEL 3538
WE 227.6
145
146
147
148
ISFD
HTR
ISBKD
B
S
W O
E
F
C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CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R-2606 B
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
REVISIONS
MATCHLINE -L- STA 74+60 SEE SHEET 7
MATCHLINE -L- STA 83+00 SEE SHEET 9
75+00
80+00
END CONSTRUCTION
SERV.RD.POT 20+03.056
-L- TS 82+71.642
-L-
3.2 m SOIL
R2606 MODEL 35.36
CLIFFORD WAYNE LOFLIN SR.

PROJECT REFERENCE NO.	SHEET NO.
R-2606 B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

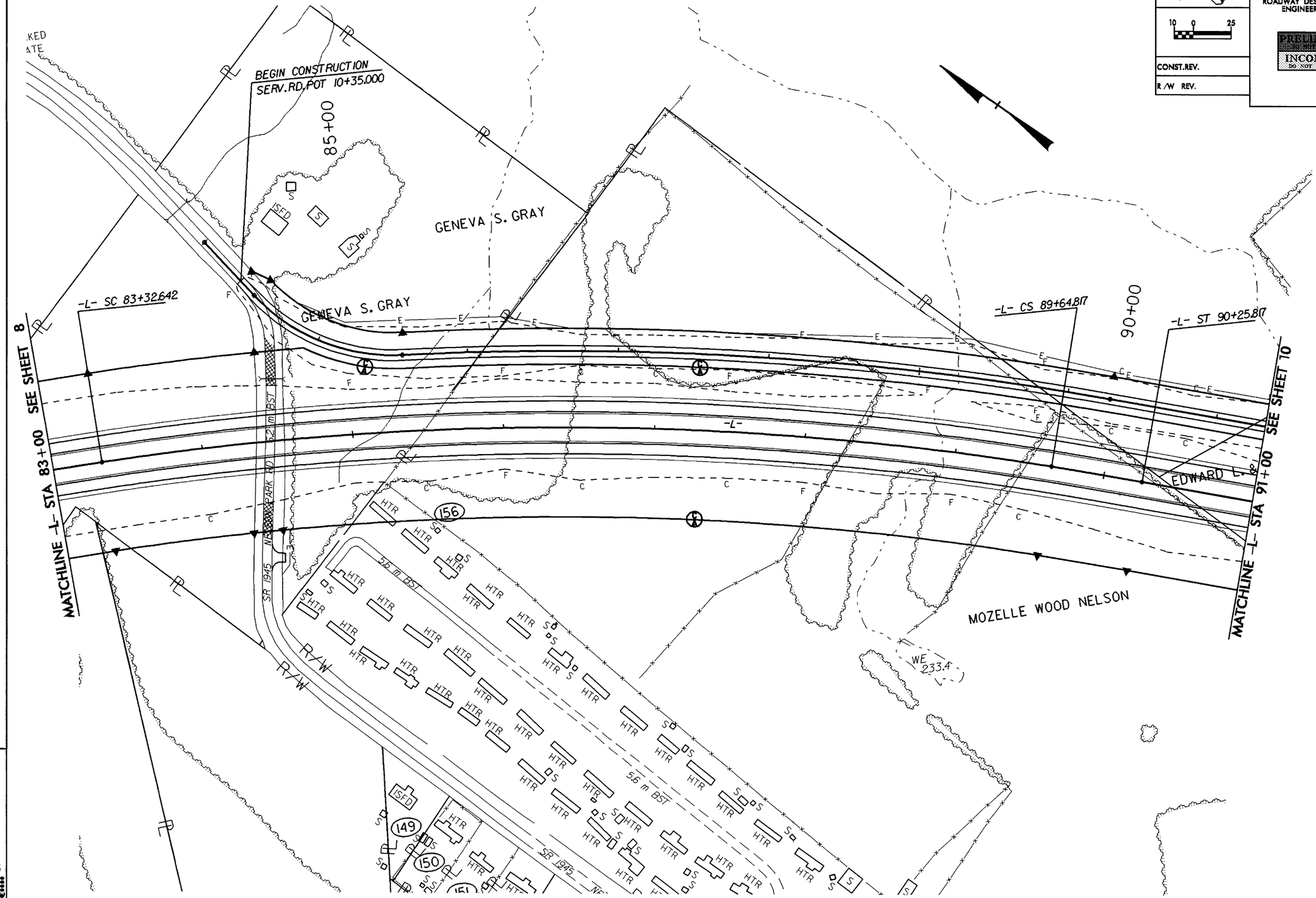
10 0 25

CONST. REV.

R/W REV.

PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

REVISIONS



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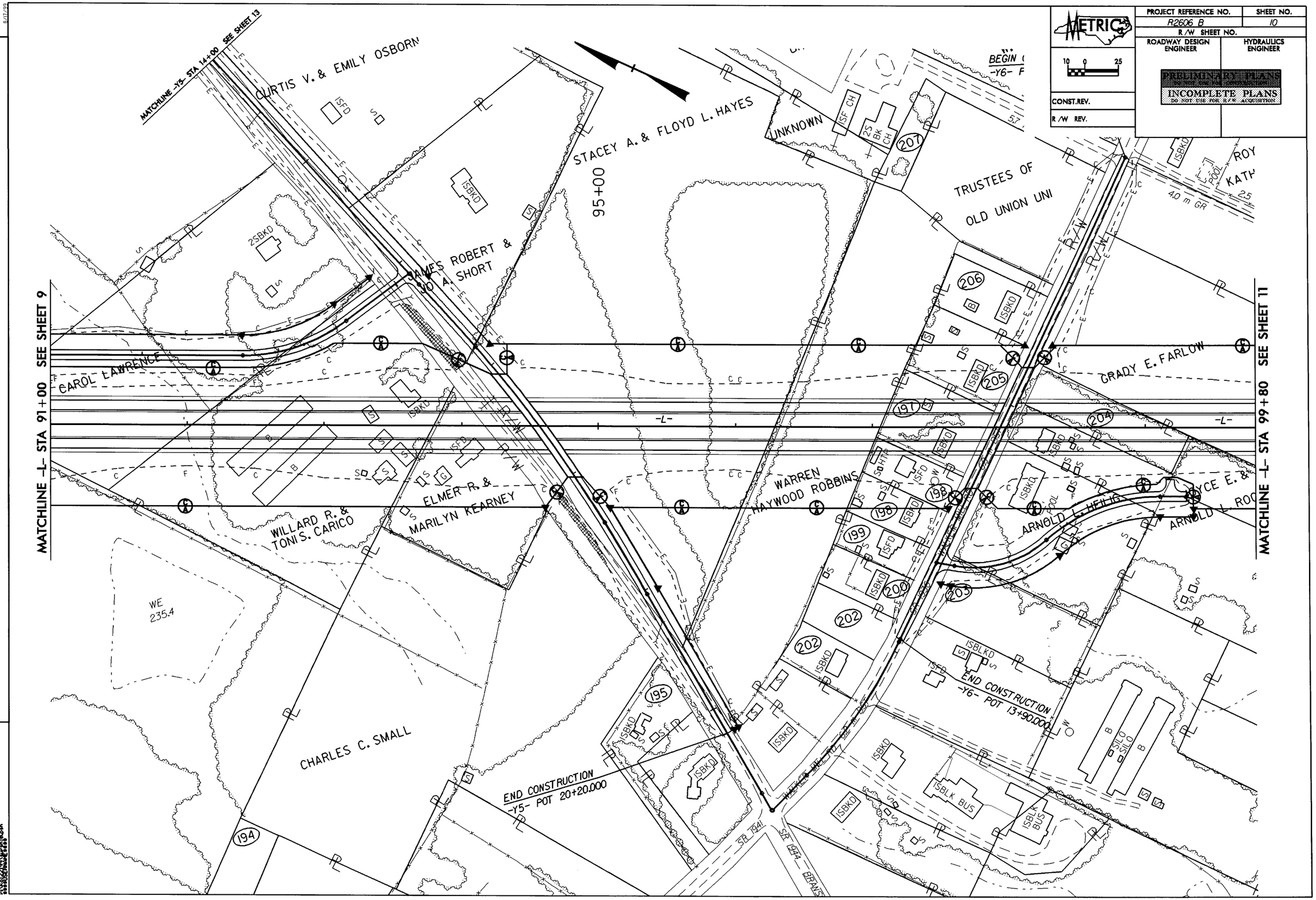
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CONST.REV.
R/W REV.
PROJECT REFERENCE NO.
R2606 B
SHEET NO.
10
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
REVISIONS
MATCHLINE -Y5- STA 14+00 SEE SHEET 13
MATCHLINE -L- STA 91+00 SEE SHEET 9
MATCHLINE -L- STA 99+80 SEE SHEET 11
CURTIS V. & EMILY OSBORN
STACEY A. & FLOYD L. HAYES
UNKNOWN
TRUSTEES OF
OLD UNION UNI
JAMES ROBERT &
JO A. SHORT
CAROL LAWRENCE
GRADY E. FARLOW
WARREN
HAYWOOD ROBBINS
ELMER R. &
MARILYN KEARNEY
WILLARD R. &
TONI S. CARICO
CHARLES C. SMALL
ARNOLD L. HEILIG
END CONSTRUCTION
-Y6- POT 13+90.000
END CONSTRUCTION
-Y5- POT 20+20.000
BEGIN
-Y6- F
95+00
-L-
-Y-
SR 1641
SR 1641 BRANCH
WE
235.4
40 m GR
ISBKD
2SBKD
ISFD
ISF CH
2S
BK
CH
ISBLKD
ISBLK BUS
SILO
SILO
B
POOL
ISFHTP
194
195
196
197
198
199
200
202
203
204
205
206
207

PROJECT REFERENCE NO.	SHEET NO.
R-2606 B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

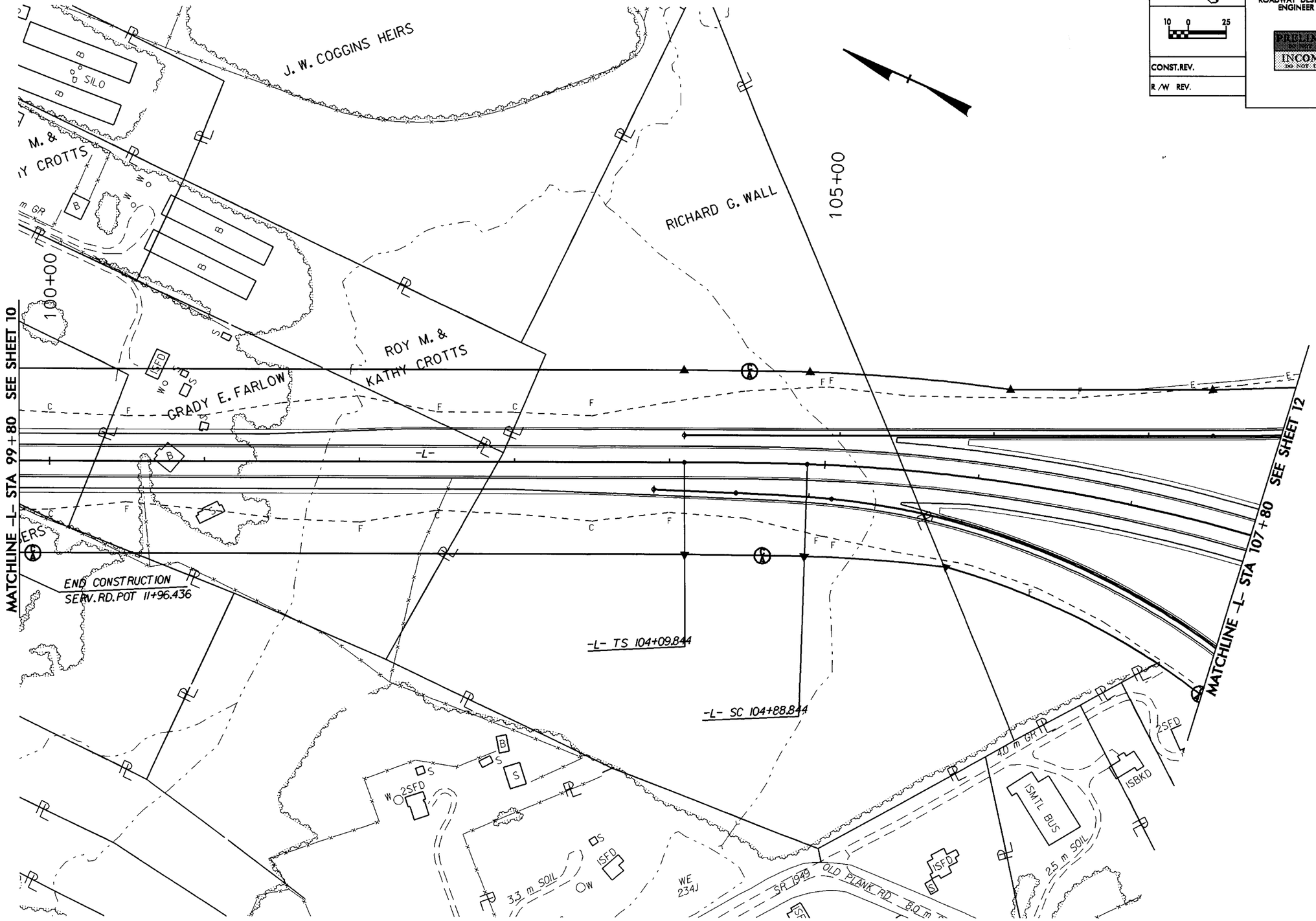
10 0 25

CONST.REV.

R/W REV.

PRELIMINARY PLANS
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

REVISIONS



09-FEB-2006 09:06
C:\DOCUMENTS AND SETTINGS\

JAMES K. WALLS & OTHERS
ELENOR HARTLEY
SOPHIA BAPTIST CHURCH
R.A. JOHNSON HEIRS
RICHARD G. WALL
ARTHUR D. WAY
DUKE J. WAY
PERRY J. GARNER
UNKNOWN
CRAWFORD ROAD & NEAL COVE
MATCHLINE ℄ STA 107+80 SEE SHEET
20+00
15+00
10+00
110+00
115+00
R/W

PROJECT REFERENCE NO.	SHEET NO.
R-2606	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
NOT FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

METRIC

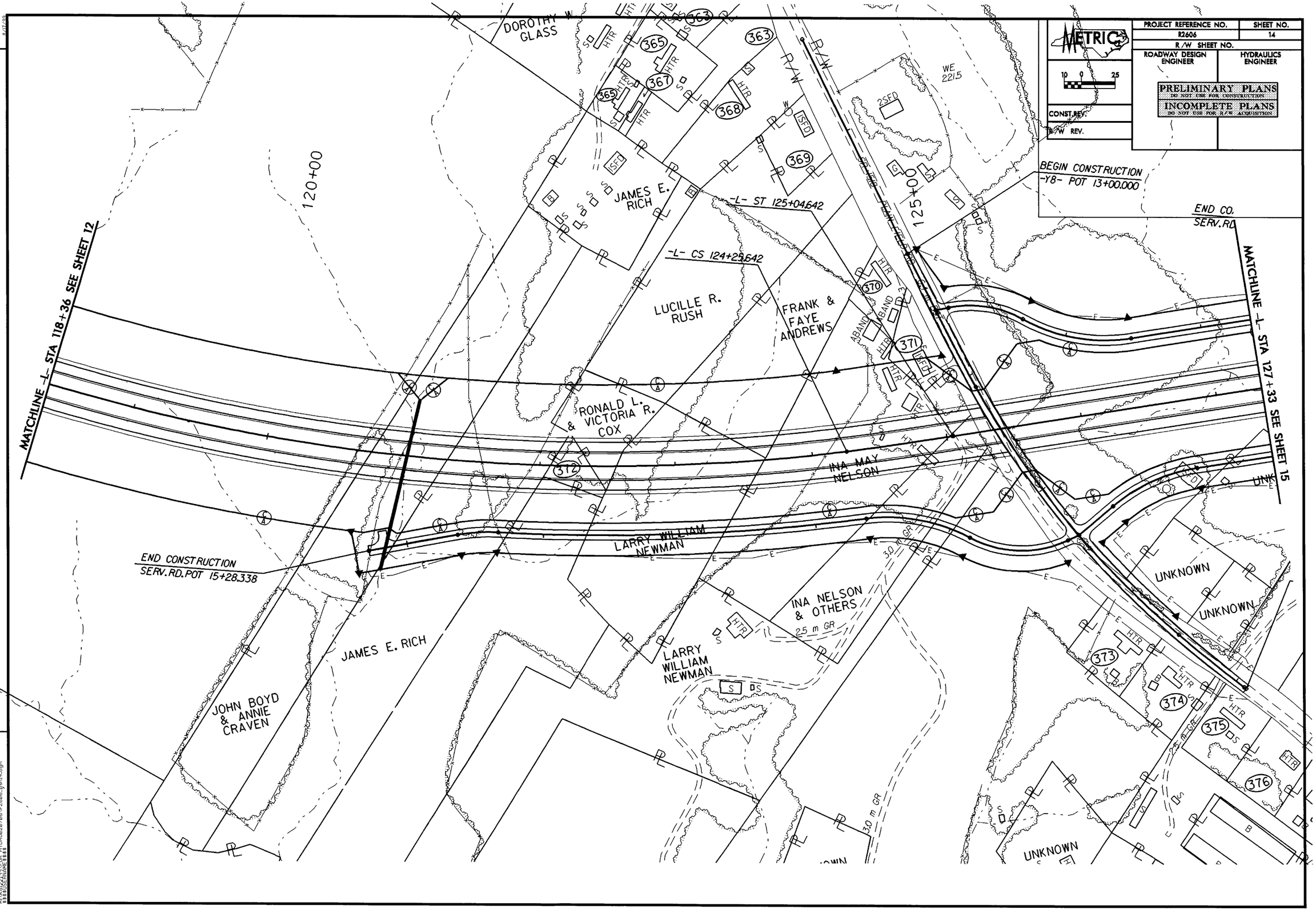
10 0 25

CONST.REV.

R/W REV.

REVISIONS

06-FEB-2006 08:05



REVISIONS

08-FEB-2006 08:21
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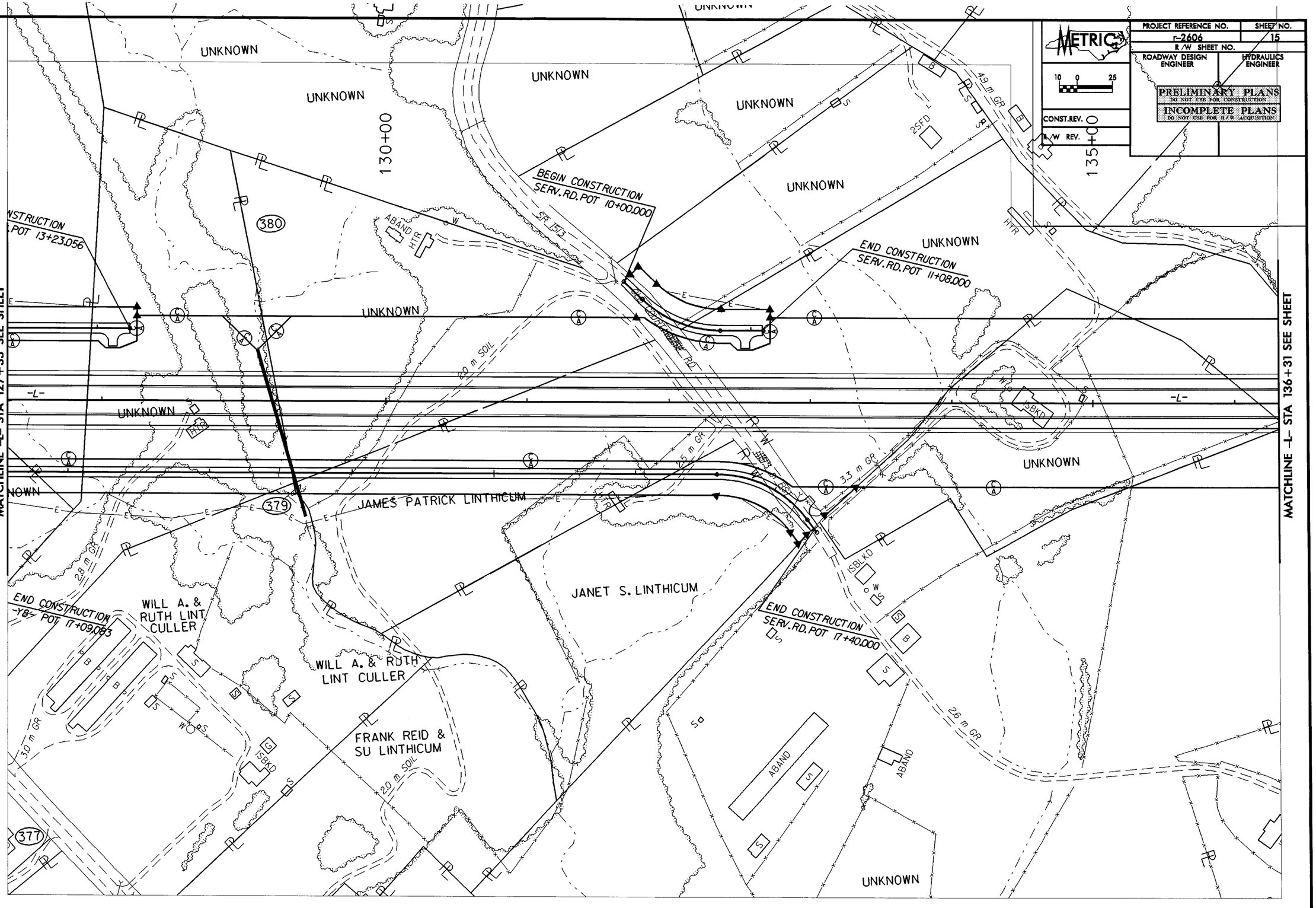

REVISIONS

8/17/99

08-FEB-2006 08:41
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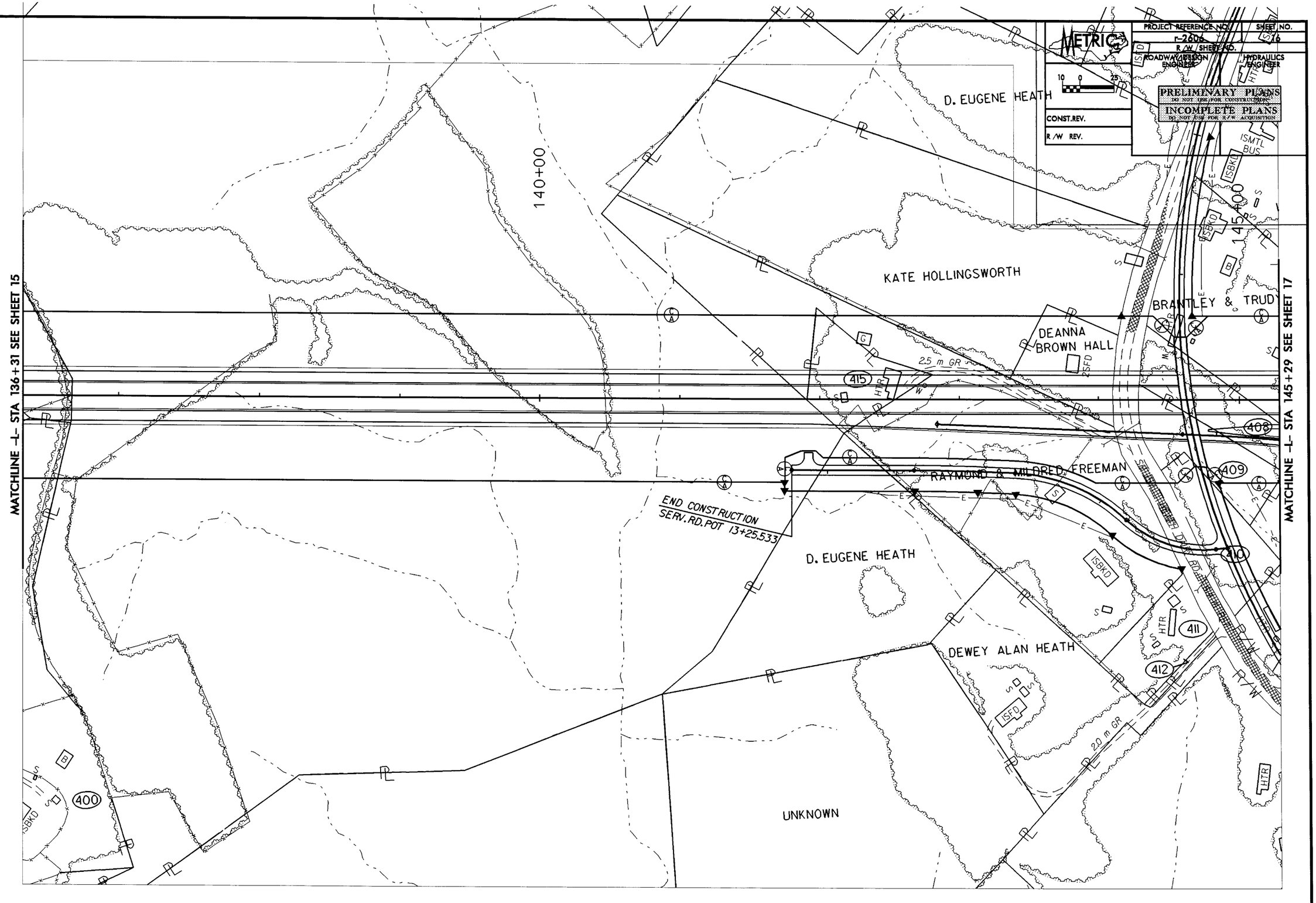

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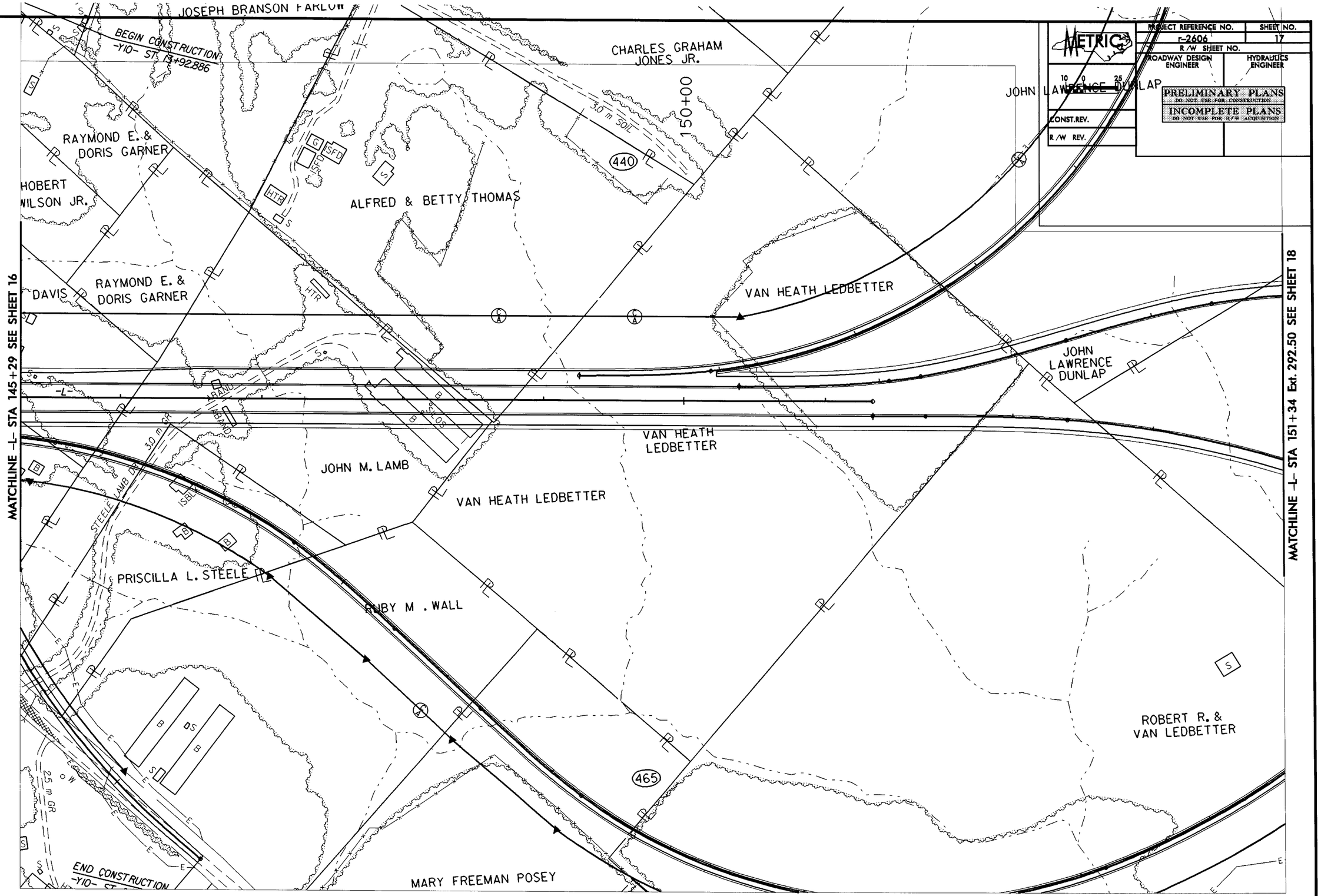

REVISIONS

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MATCHLINE -L- STA 151+34 Ext. 292.50 SEE SHEET 17
MATCHLINE -L- STA 151+34 Ext. 1190.20
UNKNOWN
UNKNOWN
UNKNOWN
JAQUELINE LEDBETTER
MARGARET J. BOLING HEIRS
MARGARET J. BOLING HEIRS
470
R/W (a)
R/W (c)
R/W
US 220 100 m BST
US 220 100 m BST
US 220 100 m BST
US 220 100 m BST
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
10 0 25
METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2606
18
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
REVISIONS
08-FEB-2006 08:18
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$$$$USERNAME$$$$
4/17/98