STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 21, 2009

U. S. Army Corps of Engineers
Wilmington Regulatory Field Office
PO Box 1890
Wilmington, NC 28402

Attn: Mr. Richard Spencer
NCDOT Coordinator

Subject: **Request for Permit Modification of the Section 404 Individual Permit, Section 401 Water Quality Certification and Randleman Buffer Authorization** for the proposed US 311 Bypass, from north of Spencer Road (SR 1929) to US 220 – Future I-74, Randolph County. TIP No. **R-2606B**. W.B.S. 34480.1.1. NCDOT Division 8.

Debit $570.00 from WBS Element 34480.1.1

Reference: USACE 404 Permit Action ID SAW-2004-00340, issued March 14, 2007.
NCDWQ 401 Certification No. WQC003592, issued December 18, 2006.

Dear Mr. Spencer:

The North Carolina Department of Transportation (NCDOT) proposes to construct a 6.85 mile long, four-lane divided freeway with full control of access from north of Spencer Road (SR 1929) to US 220, a portion of the future I-74 (R-2606B, formerly sections B and C, but now combined under B). The purpose of this document is to submit the final design and revised impact calculations for modification of the Clean Water Act (CWA) Section 404 Individual Permit and Section 401 Water Quality Certification, and to request a buffer variance as it pertains to the Randleman Lake Water Supply Watershed: Protection and Maintenance of Riparian Areas Rules, hereafter referred to as the Randleman Buffer Rules. Included in this application package are the following: (1) "General" Major Variance application for the Randleman Buffer Rules, (2) stormwater management plan, (3) Merger 01 Combined 4B-4C Meeting minutes, (4) permit drawings, and (5) a half-size set of roadway plans.

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LOCATION:
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RALEIGH, NC 27604

The other sections that were part of the previous permit application, R-0609 IA & IB and R-2606A, are currently under construction under one conventional letting. The anticipated completion date is May 15, 2011.

Project Schedule

This design-build project is scheduled to begin construction in early summer 2009 and to be completed by November 2012.

Summary of Impacts

The R-2606B project lies within the Piedmont Physiographic Province. The project's northern half lies within the Randleman Lake watershed in the Cape Fear River Basin (USGS Hydrologic Unit 03030003) and the southern half is in the Yadkin River Basin (USGS Hydrologic Unit 03040103). Table 1 lists the revised impacts associated with construction of R-2606B. These impacts are detailed by site in the Resource Impacts section of this document. Utility relocations and construction activities have been assessed with no additional environmental impacts.

Table 1: Summary of Revised Impacts

	Permanent Wetland* (ac)	Temporary Wetland (ac)	Streams (lf)	Streams Requiring Mitigation (lf)	Total Randleman Buffers[!] (ft^2)	Buffers Requiring Mitigation (ft^2) ^	Surface Waters[#] (ac)
Revised Impacts	**2.24**	**0**	**11,855**	**9,380**	**479,949**	**435,836**	**3.61**
Original 2006 Permitted Impacts	2.49	0	14,325	12,941	638,040	638,040	3.41
Net Change	**-0.25**	**0.00**	**-2,470**	**-3,561**	**-158,091**	**-202,204**	**+0.20**

* Wetland impact calculations include fill, excavation, and mechanized clearing.
^ This area takes into account impacts which do not require mitigation because they are considered "Allowable", "Exempt" or fall within a wetland that is already to be mitigated.
# Surface water calculations include ponds and streams without mitigation requirements; difference from permit impact summary sheet is due to rounding to two decimal places at each site.
[!] Slight variations are due to rounding, as compared to Tables 4 and 5 below.

Summary of Mitigation

Avoidance and minimization measures have been maximized to the greatest practical extent throughout the planning and design effort. The remaining unavoidable impacts were mitigated through the EEP in 2007 after the original permits were issued, based on the preliminary impact calculations at the time. Based on the revised impacts that require mitigation, the EEP credits that have already been paid by NCDOT exceed those currently required, with the exception of 0.10 acre of non-riverine wetland impact that resulted from total take requirements. The increase in non-riverive wetland mitigation has been recently requested from EEP.

- 0.48 acres (ac) of riverine wetlands
- 1.76 acres of non-riverine wetlands (original impact totaled 1.66 acres)
- 9,380 linear feet (lf) of Mitigable Stream Channel
- 255,185 square feet (ft^2) of Zone 1 Randleman Buffer
- 180,651 square feet (ft^2) of Zone 2 Randleman Buffer

On-site mitigation opportunities have been fully evaluated and are being pursued as part of this overall project, as described later in this document. Right-of-way negotiation is currently underway with individual landowners, and the outcome of the February 9, 2009, regulatory field meeting will be integrated into the design plans. Once the status of the on-site mitigation is finalized, the appropriate permitting agencies will be notified with regard to any modifications of the permit/variance related to on-site mitigation activities.

RESOURCE STATUS

Wetland and stream delineations were conducted from December 1997 through February 1998 using the 1987 US Army Corps of Engineers' (USACE) methodology. A representative (Eric Alsmeyer) from the USACE Raleigh Regulatory Field Office verified the wetland and stream delineations on January 15, 1998 and February 5, 1998. On September 29, 2004, Brett Feulner and Elizabeth Lusk of NCDOT updated the wetland delineations to confirm that no changes had occurred to jurisdictional resources. Stream mitigation requirements were reviewed and determined by the USACE (Richard Spencer) on June 22, 2005. The delineations and corresponding verifications are valid through December 31, 2010. Randleman stream buffers and NC Division of Water Quality (NCDWQ) mitigation requirements were reviewed by the design-build team during design, and verified by NCDWQ (Amy Euliss) during a November 17, 2008 field visit. At this time, Richard Spencer with the USACE has not made a final determination on the streams reviewed with NCDWQ.

RESOURCE IMPACTS

The following section describes the issues related to proposed impacts to jurisdictional wetlands and streams associated with R-2606B. The final plans showing the projected impacts are attached. Site-specific avoidance and minimization techniques are detailed below in the Mitigation section. Tables 2, 3, 4 and 5 present a summary of site impacts, while a detailed breakdown of the proposed impacts is attached with the permit impact sheets. Sites 13-21 are located in the Cape Fear Basin (and within the Randleman Lake watershed), and sites 23-30 are located in the Yadkin Basin. The site numbers were retained from the original permit application, and there is no Site 22.

Table 2: Jurisdictional Streams

Site No.	Stream Name #	Stream Status ^	Revised Perm. Impact (lf)	Original Perm. Impact (lf)	Net Change in Perm. Impact (lf)	Revised Impacts Requiring Mitigation (lf)	Original Impacts Requiring Mitigation (lf)	Net Change Requiring Mitigation (lf)
HUC 03030003 (Class WS-IV)								
13	UT to Muddy Creek	P	407	738	**-178**	407	738	**-331**
13	UT to Muddy Creek	IN	153			0		
14	UT to Muddy Creek	IN	27	466	**-439**	0	0	**n/a**
14	UT to Muddy Creek	P	431	338	**+93**	431	338	**+93**
15	UT to Muddy Creek	P	586	430	**+156**	586	430	**+156**
16	UT to Muddy Creek	E	0	75	**-75**	0	0	**n/a**
HUC 03030003 (Class WS-IV)								

Site No.	Stream Name #	Stream Status ^	Revised Perm. Impact (lf)	Original Perm. Impact (lf)	Net Change in Perm. Impact (lf)	Revised Impacts Requiring Mitigation (lf)	Original Impacts Requiring Mitigation (lf)	Net Change Requiring Mitigation (lf)
17	UT to Bob Branch	P	18	0	**+18**	18	0	**+18**
17	UT to Bob Branch	P	157	469	**-42**	157	469	**-42**
17	Bob Branch	P	270			270		
17	UT to Bob Branch	P	304	344	**-40**	304	344	**-40**
18	UT to Bob Branch	IN	161	49	**+112**	0	0	**n/a**
18	UT to Bob Branch	IN	314	417	**-103**	0	0	**n/a**
19	UT to Bob Branch	P	467	420	**+47**	467	420	**+47**
HUC 03030003 (Class WS-IV)								
20	UT to Deep River	P	294	315	**-21**	294	315	**-21**
20	UT to Deep River	E		404	**-404**		404	**-404**
21	UT to Deep River	P	110	1542	**-540**	110	1542	**-540**
21	UT to Deep River	P	892			892		
HUC 03040103 (Class C)								
23	UT to Caraway Crk	P/IM	130	617	**-487**	130	617	**-487**
23	UT to Caraway Crk	P	350	433	**-83**	350	433	**-83**
23	UT to Caraway Crk	IN	165	121	**+44**	0	0	**n/a**
24	UT to Caraway Crk	P	475	630	**-155**	475	630	**-155**
24	UT to Caraway Crk	IN	1,035	256	**+779**	0	0	**n/a**
HUC 03040103 (Class WS-II HQW)								
25	UT to Back Creek	IN	496	1296	**+179**		1296	**-441**
25	UT to Back Creek	P	855			855		
25	UT to Back Creek	IN	124					
25	UT to Back Creek	P	435	427	**+8**	435	427	**+8**
26	UT to Back Creek	P	322	0	**+322**	322	0	**+322**
27	UT to Back Creek	P	96	164	**-68**	96	164	**-68**
27	UT to Back Creek	P	363	279	**+84**	363	279	**+84**
27	UT to Back Creek	P	136	135	**+1**	136	135	**+1**
28	UT to Back Creek	P	444	341	**+103**	444	341	**+103**
28	UT to Back Creek	P	0	276	**-276**	0	276	**-276**
28	UT to Back Creek	P	0	285	**-285**	0	285	**-285**
28	UT to Back Creek	P	480	420	**+60**	480	420	**+60**
29	UT to Back Creek	P	0	427	**-427**	0	427	**-427**
29	Back Creek	P	341	984	**-643**	341	984	**-643**
29	Back Creek	P		548	**-548**		548	**-548**
30	UT to Back Creek	P	694	551	**+143**	694	551	**+143**
30	UT to Back Creek	P	285	128	**+157**	285	128	**+157**
30	UT to Back Creek	P	12	0	**+12**	12	0	**+12**
30	UT to Back Creek	P	26	0	**+26**	26	0	**+26**
Total:			**11,855**	**14,325**	**-2,470**	**9,380**	**12,941**	**-3,561**

* Structures: Reinforced concrete box culvert (RCBC);
# Unnamed tributary (UT);
^ Stream status: Perennial (P), Intermittent Non-mitigable (IN); Intermittent Mitigable (IM); Ephemeral (E);
All impacted stream reaches fall outside the ½-mile critical area of Randleman Lake.

Table 3: Jurisdictional Wetlands

Site No.	Riverine (R)/ Non-riverine (NR) ^	Revised Impact Acreage	Original Impact Acreage*	Net Change in Impact Acreage
HUC 03030003				
13	NR	0.36	0.32	**+0.04**
14	NR	0.48	0.49	**-0.01**
15	NR	0.11	0.17	**-0.06**
16	R	0.14	0.44	**-0.30**
19	R	0.15	0.18	**-0.03**
20	NR	0.76	0.65	**+0.11**
HUC 03040103				
24	NR	0.03	0.03	**0**
25	NR	0.02	0.01	**+0.01**
26	R	< 0.01	0	**< +0.01**
27	R	0.19	0.21	**-0.02**
Total:		**2.24**	**2.49**	**-0.25**

^ Based on NRTR-provided data and field review;
* Slight variations are due to rounding.

Table 4: Revised vs. Original Randleman Buffer Impacts

Site No.	Revised Impacts		Original Impacts		Net Change in Impacts	
	Zone 1 (ft^2)	Zone 2 (ft^2)	Zone 1 (ft^2)	Zone 2 (ft^2)	Zone 1 (ft^2)	Zone 2 (ft^2)
13	34,300	23,949	49,535	24,563	-15,235	-614
14	27,401	18,597	57,102	24,531	-29,701	-5,934
15	36,361	23,547	30,839	16,856	+5,522	+6,691
16	0	0	21,818	34,671	-21,818	-34,671
17	52,532	34,754	60,569	30,408	-8,037	+4,346
18	30,004	23,029	33,325	17,190	-3,321	+5,839
19	28,744	18,923	29,881	15,446	-1,137	+3,477
20	18,886	14,200	22,335	11,377	-3,449	+2,823
21	58,251	36,470	105,314	52,280	-47,063	-15,810
Total:	**286,479**	**193,469**	**410,718**	**227,322**	**-124,239**	**-33,853**

Table 5: Randleman Buffer Impacts

Site No.	Total Buffer Impacts		"Allowable" Impacts (no mitigation req'd)		Wetlands in Buffers (no mitigation req'd)		Impacts Requiring Mitigation	
	Zone 1 (ft^2)	Zone 2 (ft^2)	Zone 1 (ft^2)	Zone 2 (ft^2)	Zone 1 (ft^2)	Zone 2 (ft^2)	Zone 1 (ft^2)	Zone 2 (ft^2)
13	34,300	23,949	n/a	n/a	13,896	784	20,404	23,165
14	27,401	18,597	n/a	n/a	2,004	697	25,397	17,900
15	36,361	23,547	n/a	n/a	3,180	1,394	33,181	22,153
16	0	0	n/a	n/a	n/a	n/a	0	0
17	52,532	34,754	n/a	n/a	n/a	n/a	52,532	34,754
18	30,004	23,029	n/a	n/a	n/a	n/a	30,004	23,029
19	28,744	18,923	n/a	n/a	5,750	610	22,994	18,313
20	18,886	14,200	409	2,058	6,055	7,275	12,422	4,867
21	58,251	36,470	n/a	n/a	n/a	n/a	58,251	36,470
Total:	**286,479**	**193,469**	**409**	**2,058**	**30,885**	**10,760**	**255,185**	**180,651**

Wetland, Stream, and Randleman Buffer Impacts

Sites 13 through 21 are located in the Randleman Lake watershed within the Cape Fear River Basin, but outside of the ½-mile Critical Area for the water-supply. Sites 23 and 24 are class C waters located in the Yadkin River Basin, and sites 25 through 30 are class WS-II HQW in the Yadkin River Basin (there is no Site 22). Per NCDOT and NC Department of Environment and Natural Resources (DENR) requirements, land quality measures will meet the High Quality Waters requirements, including 25-year storm retention in the sediment and erosion control design.

The project will impact areas protected by the Randleman Buffer Rules. The purpose of this project cannot be accomplished without impacting buffers protected under the Randleman Lake Water Supply Watershed Buffer Rules (15A NCAC 02B .0250). A site-by-site description of impacts follows:

Site 13 (Permit Sheet 11, Roadway Sheet 7, -L- Sta. 143+75 to 148+00) has impacts to 407 linear feet of perennial stream, 153 linear feet of intermittent non-mitigable stream, 0.36 acre of wetlands (fill, excavation, and clearing), 34,300 sq. ft. of Zone 1 buffer and 23,949 sq. ft. of Zone 2 buffer. The stream and wetland impacts are due to roadway fill and a 36" RCP, with a very small amount of wetland impact due to excavation for a level spreader bypass channel below the dry detention basin. The wetland and stream totals include a total take of the area upstream of the alignment per 4B/4C meeting discussions. The 153 linear feet of stream at 146+40, presented in the original mapping as a perennial stream channel, was determined not to be perennial by DWQ (11/17/08) and is now listed as intermittent non-mitigable. This change in designation accounts for part of the net decrease in impacts at this site. The 178 feet of reduction in stream impacts is largely due to reducing the width of the footprint, as described in the Minimization section below. The small increase (0.04 acre) in wetland impacts is mainly due to adding the minor wetland impact at 143+75 near the hazardous spill basin.

Site 14 (Permit Sheets 14-22, Roadway Sheets 8-9, -L- Sta. 155+75 to 165+00) has impacts to 431 linear feet of perennial stream, 27 linear feet of intermittent non-mitigable stream, 0.48 acres of wetlands, 27,401 sq. ft. of Zone 1 buffer and 18,597 sq. ft. of Zone 2 buffer. The perennial stream at 163+40 is a UT of Muddy Creek and is impacted by an 11'x9' RCBC. The intermittent stream and wetland impacts are due to roadway fill. The 27 linear feet of non-mitigable intermittent channel at 159+30 is also part of another UT to Muddy Creek. It was determined to be ephemeral with no defined channel farther upstream by DWQ (11/17/08 meeting), whereas in the previous permit application the ephemeral/undefined reach was mapped as intermittent and considered a jurisdictional stream impact. The 439-foot decrease in impacts is primarily associated with this change in stream mapping, but can partially be attributed to reducing the overall width of the roadway fill. The 93-foot increase in stream impact at the culvert location is due to reaching final design on the culvert and including bank stabilization requirements and quantities.

Site 15 (Permit Sheets 21-25, Roadway Sheets 9-10, -L- Sta. 174+50 to 179+25) has impacts to 586 linear feet of perennial stream, less than 0.01 acre of temporary stream impact, 0.11 acres of associated bottomland hardwood wetlands, 36,361 sq. ft. of Zone 1 buffer and 23,547 sq. ft. of Zone 2 buffer. The perennial stream is to be piped in a 36" pipe, and the wetland will be impacted by roadway fill. The 0.06-acre wetland impact reduction is due to excluding the area that overlaps with the stream channel. The 156-foot increase in stream impacts is due to more detailed stream mapping and final design requirements.

Site 16 (Permit Sheets 26-28, Roadway Sheet 11, -L- Sta. 195+00 to 196+80) has impacts to 0.14 acres of wetlands. A ditch/ephemeral swale flows into the site from the southwest and drains into the wetland/pond system. The wetland impacts are primarily from roadway fill, but include a small amount of excavation to tie the level spreader bypass channel into an existing drainage swale within the wetland. The ephemeral ditch was calculated as intermittent stream in the previous application, which accounts for the 75-foot reduction shown in Table 2. The alignment was shifted farther southwest to avoid a residence, which also reduced the wetland impact by 0.30 acres and avoided the pond completely.

Site 17 (Permit Sheets 29-38, Roadway Sheets 12-14, -L- Sta. 214+50 to 239+50) has impacts to 749 linear feet of perennial stream (with 0.01 acre of temporary stream impact), 52,532 sq. ft. of Zone 1 buffer and 34,754 sq. ft. of Zone 2 buffer. The impacts are mainly on Bob Branch and a UT to Bob Branch, both of which will be in RCBC's (12'x8' and 8'x7'). The changes in impacts (18-foot increase, 42-foot decrease and 40-foot decrease on streams) at this site are due to final design and minor alignment shifts.

Site 18 (Permit Sheets 39-42, Roadway Sheet 17, -L- Sta. 268+70 to 279+90) has impacts to 475 linear feet of intermittent non-mitigable stream, 30,004 sq. ft. of Zone 1 buffer and 23,029 sq. ft. of Zone 2 buffer. Two different intermittent streams begin within the footprint of the project at this site and will be impacted with roadway fill. The stream at 269+00 begins in a natural valley. The stream at 279+50 begins at a pipe outlet from an upland farm pond. The farm pond will be drained due to the dam being within the ROW, and therefore impacts 1.46 acres of open waters. As the eventual presence/location of a channel within the drained pond is difficult to determine, the stabilization of the channel will be accomplished in the field with

agency consultation, per discussions in the 4B/4C Merger meeting. Changes in the impacts (112-foot increase and 103-foot decrease) are due to alignment shifts and roadway profile changes.

Site 19 (Permit Sheets 43-46, Roadway Sheet 18, -L- Sta. 287+70 to 290+60) has impacts to 467 linear feet of perennial stream, 0.15 acres of wetlands, 28,744 sq. ft. of Zone 1 buffer and 18,923 sq. ft. of Zone 2 buffer. The perennial stream at 287+70 begins at a headcut upstream of the alignment. This stream will be impacted with roadway fill and a 48" RCP. Due to the curve in the service road (SR2) and the required superelevation, off-site runoff was combined with service road stormwater in a ditch. Due to steep topography, this ditch needs to be riprap-lined and tied directly into the stream channel to provide adequate long-term stability. The small wetland impact reduction (0.03 acre) is due to excluding the area that overlaps with the stream channel. The small increase in stream impact (47 feet) is due to small alignment shifts and reaching final hydraulic design.

Site 20 (Permit Sheets 47-52, Roadway Sheet 21, -L- Sta. 320+60 to 334+14) has impacts to 294 linear feet of perennial stream (with less than 0.01 acre of temporary stream impact), 0.76 acres of associated forested wetlands, 18,886 sq. ft. of Zone 1 buffer and 14,200 sq. ft. of Zone 2 buffer. The impacts will be due to roadway fill and a 60" pipe in the stream channel. During the 4B/4C Meeting, these wetlands were deemed total takes due to the potential alteration of their hydrology. The wetland impact increased by 0.10 acre due to the total take decision. The stream impacts decreased mainly due to the DWQ determination on 11/17/08 that a long reach (404 feet) of previously-mapped intermittent channel is actually ephemeral (near Sta. 332+50).

Site 21 (Permit Sheets 49-53, Roadway Sheet 22, -L- Sta. 346+20 to 347+60 & -RP2B- Sta. 22+80) has impacts to 1002 linear feet of perennial stream, 58,251 sq. ft. of Zone 1 buffer and 36,470 sq. ft. of Zone 2 buffer at this interchange with existing US 311. The stream is impacted on the main alignment at 347+00 by pipes under Loop 2C, Ramp 2C and the -L- line, and then again downstream at Ramp 2B. The 540-foot reduction in stream impacts (and corresponding buffer impacts) is primarily due to the lowering of the roadway profile, which reduced the slope-stake footprint and allowed for keeping some channel daylighted internal to the Ramp 2B interchange.

Site 23 (Permit Sheets 54-56, Roadway Sheet 24, -L- Sta. 373+20 to 381+00) has impacts to 480 linear feet of intermittent-mitigable/perennial stream and 165 linear feet of intermittent non-mitigable stream. A 130' reach of intermittent-mitigable/perennial stream will be filled; it begins at a large headcut and drains into the main perennial channel at 374+50. The main perennial channel impacts are due to a 60" RCP. The intermittent non-mitigable stream will be impacted by roadway fill. An upstream reach of the intermittent-mitigable channel was determined to be ephemeral by DWQ (11/17/08), which resulted in the 487-foot reduction in impacts shown in Table 2. The roadway profile changes reduced perennial stream impacts by 83 feet at Station 374+00. A small alignment shift, in combination with the details of final design, increased impacts slightly by 44 feet near Station 381+00.

Site 24 (Permit Sheets 54-57, Roadway Sheets 24-25, -L- Sta. 384+70 to 392+80) has impacts to 475 linear feet of perennial stream, 1035 linear feet of intermittent non-mitigable stream and 0.03 acre of associated wetland. The perennial reach will be in a 48" RCP, and the wetland will

be in roadway fill. The intermittent stream will be in a 36" RCP that flows into a 2' lateral base ditch that is 250+ feet long. The upstream end (at Station 393+00) was considered a total take in the 4B/4C meeting due to the short reach remaining after impact and isolation from downstream resources, which increased impacts as compared to the original application by 85 feet. In addition, this stream reach was mis-mapped during the original permit application, and the upstream portion of the reach (approximately 500 feet) was not included. This error has been corrected and is accounted for in this application. An alignment shift and final design requirements around Station 388+50 also added a 200-foot parallel reach to the impact calculations that previously was considered unimpacted. The perpendicular stream impacts at Station 385+00 were reduced by 155 feet due to an alignment shift and slight profile changes.

Site 25 (Permit Sheets 60-64, Roadway Sheets 26-27, -L- Sta. 401+40 to 412+80) has impacts to 1290 linear feet of perennial stream (with less than 0.01 acre of temporary stream impact), 620 linear feet of intermittent non-mitigable stream and 0.02 acre of associated wetlands. The 855 linear feet of perennial stream beginning at 404+80 will be located in a 48" RCP under two service roads in addition to the -L- line. The second perennial stream at 411+70 has 435 linear feet of impacts and will be put in a 48" RCP. The two riparian wetlands lie within benches and seeps along the first perennial channel, and are both total takes due to fill. The two intermittent channels at 401+40 and 407+25 flow east into the longer perennial reach and are impacted by roadway fill. The stream southwest of -SR4- will be relocated into 200+ feet of a 2' lateral base ditch. Current evidence from field investigations does not suggest the need for a spring box at these locations, but these will be monitored during construction and addressed as necessary. Stream impacts at this site increased by 187 feet due to refining the final hydraulic design and small shifts in alignments and roadway profiles. Wetland impacts increased by 0.01 acre due to a total take.

Site 26 (Permit Sheets 65-67, Roadway Sheet 28, -L- Sta.425+60 to 427+80) has impacts to 322 linear feet of perennial stream and less than 0.01 acre of wetland. A 1.57-acre pond upstream of the impact site will be drained due to the dam being within the ROW. The vast majority of the channel impacts are due to fill in the man-made spillway channel that drains from the side of the pond. As the eventual location of a stream channel within the drained pond is difficult to determine, the stabilization of the stream channel will be accomplished in the field with agency consultation, per discussions in the Combined 4B-4C Merger meeting. Stream and wetland impacts increased (322 feet for streams, 0.0007 acre of wetland fill and 0.0030 acre of mechanized clearing) over the original application due to a slight alignment shift to the southwest and refinements in the stream mapping. The original application did not show the stream channel coming out of the side of the pond through the primary spillway, which is where most of the impact occurs in the current design. The wetland fill and mechanized clearing cumulatively add up to less than 0.01 acre of impact.

Site 27 (Permit Sheets 68-75, Roadway Sheet 30, -L- Sta. 445+80 to 458+50, -SR6- Sta. 17+70 to 19+00) has impacts to three different perennial streams totaling 595 linear feet (with less than 0.01 acre of temporary stream impact), and 0.19 acre of wetlands (the lower wetland is a total take per 4B/4C discussions). At Sta. 445+80, 96 feet at the top of a stream is impacted by the roadway fill. A 363-foot reach will be put into a 10'x7' culvert at Sta. 450+23. At -SR6- Sta. 18+00, the top of a watershed will be impacted with fill; this impact will fill a small area of

emergent wetland above the pond, the pond itself, and the scrub-shrub wetlands and 136 feet of stream channel below the pond. At Sta. 445+80, the stream origin was mis-mapped slightly in the original application and shown to be upgradient of the stream origin determined by the USACE during their verification. This error has been corrected in this application and the 6/22/05 stream origin determination is accurately shown on this mapping, resulting in a 68-foot reduction in impacts. At 450+00, an 84-foot increase in stream impact resulted from changes to the roadway profile and other refinements during final design.

Site 28 (Permit Sheets 76-77, Roadway Sheet 31, -L- Sta. 470+20 to 479+10) has impacts to 924 linear feet of perennial stream (and 0.01 acre of temporary stream impact). These impacts comprise two stream reaches that are diagonal to the alignment, which increases their impact length. Both streams will be filled and piped (36" RCP) diagonal across the road alignment. The Sta. 471+00 outlet was adjusted to better align with the downstream channel, and the stormwater outfall will be daylighted in the existing channel to tie into the realigned outlet. Per Table 2, the 103-foot and 60-foot increases in stream impact are due to the changes in the interchange design; at this location the lanes are beginning to diverge toward ramps. The 276-foot and 285-foot impacts along Ramp 3CA in the original application have been eliminated due to the revised interchange design.

Site 29 (Permit Sheets 78-79, Roadway Sheet 32, -RP3C- Sta.50+40 to 51+40 @ -Y12- 58+50) has impacts to 341 linear feet of Back Creek, a large perennial stream. This includes the 321-foot culvert extension impact on the downstream side of US 220. A 20-foot section of Back Creek will be impacted by a ditch tying into the left bank of the Creek, just upstream of the culvert inlet. The 427-foot impact along Ramp 3CA in the original application has been eliminated due to the revised interchange design. The original Back Creek impact downstream of US 220 was reduced by 643 feet, and upstream of US 220 it was essentially eliminated (548-feet of original impact).

Site 30 (Permit Sheets 80-89, Roadway Sheets 32/45/48, -Y12- Sta. 51+00 to 57+80, -RP3B- 25+00 to 26+10) has impacts to 1017 linear feet of perennial stream. The vast majority of these impacts are from 3 different pipes along the same stream, a UT to Back Creek. At the upstream end, west of US 220 on Ramp 3B, 285 feet of stream will be piped under the ramp connecting southbound US 220 to northbound 311 Bypass. Downstream of US 220, two different reaches will be piped to accommodate the fill for Ramp/Loop 3CA. These two sections of stream run parallel to US 220; this stream is a straightened channel at the base of the existing fill slope for US 220. Since this leaves a remnant channel within the loop, this reach is a 694' total take per 4B/4C discussions. Due to fill slopes being pushed out slightly for ramps, two minor pipe extensions along existing US 220 are also included in this impact site (12 feet at -Y12- Sta. 27+25, and 26 feet at -Y12- Sta. 81+50). These were not included in the original permit application. Stream impacts on Ramp 3B increased by 157 feet due to slight alignment refinements and steep topography.

PROTECTED SPECIES

Plants and animals classified as Endangered or Threatened by the U.S. Fish and Wildlife Service (USFWS) are protected under provisions of Section 7 and Section 9 of the Endangered Species

Act of 1973, as amended. Table 6 presents the USFWS list of federally protected species for Randolph County, North Carolina as of January 31, 2008.

Table 6: Federally-Listed Protected Species for Randolph County, NC

Scientific Name	Common Name	Federal Status	Biological Conclusion
Helianthus schweinitzii	Schweinitz's sunflower	E	No Effect
Notropis mekistocholas	Cape Fear shiner	E	No Effect
Haliaeetus leucocephalus	Bald eagle	Bald and Golden Eagle Protection Act	No Effect

Suitable habitat for the Schweinitz's sunflower exists within the project area. Surveys for Schweinitz's sunflower were performed in the fall of 1997, September 29, 2004, and re-verified in 2007. A biological conclusion of "No Effect" was reached for this species. Minor changes to the roadway alignment have occurred during final design. All changes are within the area covered by the original surveys.

Suitable habitat does not exist for the Cape Fear shiner within the project area. A biological conclusion of "No Effect" was reached based on lack of habitat.

The bald eagle, although no longer listed as Threatened by the USFWS, is protected under the Bald and Golden Eagle Protection Act. A biological conclusion of "No Effect" was based on no suitable habitat existing for the bald eagle within the project area.

UTILITY IMPACTS

No additional impacts will occur due to the relocation of utilities. No staging of materials or construction will occur until all permits have been approved by the respective regulatory agencies, with the exception of the following circumstance. As discussed during the September 25, 2008 regulatory meeting to address the realignment of the US 220 interchange, utility relocations will likely occur prior to permit issuance along existing US 311. The proposed relocations will include a Piedmont Triad Regional Water Authority main and a Piedmont Natural Gas line with the proposed US 311 interchange. NCDOT and the design-build team are in discussions with Piedmont Triad Regional Water Authority and Piedmont Natural Gas to locate these utilities in the same easement, thereby avoiding an additional utility re-location while R-2606B is under construction. The easement will run parallel to the proposed realignment of existing US 311 with no impacts to jurisdictional areas.

MITIGATION

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the Waters of the United States. Mitigation of wetland and surface water impacts has been defined by the CEQ to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time and compensating for impacts (40 CFR 1508.20).

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.

As previously stated, R-2606B has been designed to incorporate all reasonable and practical design features to avoid and minimize impacts to jurisdictional areas. Avoidance measures were taken during the planning and design processes. Minimization measures were implemented during the design phase to include the examination of appropriate and practicable steps to reduce adverse impacts from the project. Onsite mitigation measures have been evaluated and are being pursued for 3 locations on the project. These are discussed below with compensatory mitigation following for the remaining necessary mitigation.

Avoidance

The following measures were taken during the planning and design phase of the project, or will occur during the construction of the project to avoid impacts to jurisdictional areas:

- Relocation of utility lines will occur within the roadway fill when crossing jurisdictional areas.
- NCDOT will avoid placing erosion control devices in wetlands.

Minimization

Minimization has been employed in the project area to the maximum extent practicable. Minimization techniques were implemented as follows:

- The roadway profile (the overall elevation of the road, as compared to the existing ground elevations) was considerably altered in several locations in order to minimize jurisdictional impacts, balance the cut/fill on the project and eliminate the need for borrow or waste sites. Individual locations are noted in the site specific measures below.
- Sediment and erosion control measures will meet the requirements of High Quality Waters regulations, including accommodating a 25-year storm event. This will maintain design continuity across the project, even though these more stringent measures are not required in every watershed within the project limits.
- Special sediment control fence, consisting of 57-stone and hardware cloth with filtration fabric, will be used in wetland areas to prevent sediment from the project site entering undisturbed wetland areas. This fence will be placed at the toe of fill slopes, as noted on the plans, and will be underlain by fabric to aid in the removal of the stone upon project completion. The fence is not shown on the permit impact sheets, since final placement of the fence will be based on site conditions. However, the fencing will be limited to the toe of slope and completely contained within the first five feet of the mechanized clearing areas, which are already accounted for in the permit.
- At both interchange locations, stream channels internal to the interchange are being retained to the greatest extent practical. Although some of these areas were determined to be total takes in the Combined 4B-4C Merger meeting, the proposed design retains as

much of the function as possible at these locations (discussions of site-by-site total takes are in the Impacts section beginning on page 7).

- Fill slopes will be at a 3:1 ratio or steeper at all jurisdictional crossings per the FONSI. Generally, all fill slopes were steepened to 2:1. In some areas, where the fill height was less than 5 feet, a 3:1 slope was designed in order to minimize impacts. Below 5 feet of fill, the impacts of using a 2:1 slope are greater due to the requirement for guardrail (3:1 slopes do not require guardrail at this fill height).
- Dry detention basins (that also act as hazardous spill basins) are located at every applicable stream crossing throughout the Randleman watershed portion of the project (Sites 13-21); Site 21 will have two basins even though it falls outside the area where basins are required. These basins are equipped with level spreaders, where conditions allow, to create sheet flow prior to the stormwater entering the stream buffers.
- Where practical (based on topography, pipe size, and velocities) pre-formed scour holes are designed at stormwater outlets adjacent to streams in the non-Randleman watershed areas. This provides sheet flow at these locations and avoids additional impacts.
- Grass swales are utilized throughout the project to provide stormwater treatment. The majority of grass swales met the criteria for stormwater treatment (3:1 or flatter side slopes and <2 ft./sec. velocities for a 2-year storm). These are summarized in the attached Stormwater Management Plan.
- No riprap will be placed in the bed of the channels during stabilization of outlet structures.

Site Specific Minimization Measures:

- *Site 13* – The curve in the service road (SR1) was designed with a reverse crown so that it drained into the area between SR1 and the mainline toward the dry detention basin; this allowed for additional stormwater treatment and minimization of downstream water quality impacts. The roadway fill was minimized by lowering the profile of the roadway and using 2:1 side slopes.
- *Site 14* – The fill was minimized by lowering the profile of the roadway and using 2:1 side slopes at the culvert location.
- *Site 14* – Inlet protection (riprap) was provided for stabilization of the stream confluence. This may be replaced by a realigned tie-in if the mitigation associated with this site is implemented.
- *Site 15* - The roadway fill was minimized by lowering the profile and using 2:1 side slopes.
- *Site 16* – The profile was raised in order to avoid cut adjacent to the wetlands. The alignment was pushed south slightly to avoid a home and the pond; this minimized the wetland impacts and allowed room for a dry detention basin to be incorporated.
- *Site 17* – The service road on the northeast side of the alignment was eliminated, thereby reducing the corridor footprint. The profile was lowered considerably through this section and 2:1 slopes were utilized.
- *Site 18* – This area has an approximate ½-mile long earthen noise berm running along the west side of the alignment, which pushed the fill slope out away from the roadway but did not alter the jurisdictional impacts. The profile was lowered slightly to minimize impacts.

- *Site 19* – Fill slopes were reduced to 2:1 to minimize impacts on the upstream side of this site, which avoided an impact to an intermittent-mitigable channel at 290+05 Lt.
- *Site 20* – The fill was minimized in this section and 2:1 side slopes were utilized to minimize stream and wetland impacts.
- *Site 21* – The roadway profile was lowered as much as 50 feet at this interchange site in order to get the proposed alignment underneath the rail line and existing US 311. This change in profile allowed portions of the stream reach to remain daylighted internal to the interchange and minimized the fill extent on the outside slopes. These measures resulted in an impact reduction of 540 feet, from 1542 feet in the preliminary design to 1002 feet in this final design. The outlet of the dry detention basin located inside Loop 2B was altered after the Combined 4B/4C Merger meeting in order to outlet upstream in the ephemeral drainage, well above the ephemeral/intermittent breakpoint and outside of the Randleman buffers. To minimize downstream impacts, an energy dissipater pad was added at the outlet of the 30" pipe under Ramp 2B and class I rip-rap was added at the dry detention basin outlet. No further stabilization measures were deemed necessary due to on-site conditions.
- *Site 23* – This site benefits from the profile change noted at Site 21. The profile remained low at this site and thus stream impacts were reduced. In addition, 2:1 side slopes were used to further minimize impacts.
- *Site 24* - The fill was minimized in this section and 2:1 side slopes were utilized to minimize stream and wetland impacts.
- *Site 25* – The fill was minimized and 2:1 side slopes were utilized to minimize impacts. A service road (-SR4-) was added to provide access to multiple property owners. Toe protection was added outside of -SR5- in order to avoid adding a lateral ditch along the bottom of the slope; a lateral ditch would have created additional impacts to the stream at the pipe inlet.
- *Site 26* – Fill slopes were reduced to 2:1 and a service road was removed to minimize impacts through this site.
- *Site 27* - The fill was minimized in this section and 2:1 side slopes were utilized to minimize stream and wetland impacts.
- *Site 27* – Additional hydraulic structures were added to route more drainage to the two pre-formed scour holes and provide additional stormwater treatment at this location.
- *Site 28* – The beginning of Ramps 3C and 3CA affect this site. They were both realigned, as discussed above in the Avoidance section. These realignments helped to minimize the impacts at this site, in addition to using 2:1 side slopes.
- *Site 28* – The Sta. 471+00 pipe was adjusted to align with the downstream channel and avoid potential stream degradation.
- *Sites 28 and 29* - During final design Ramp 3CA was changed from a long arcing ramp to a loop with a fairly small footprint east of US 220. When compared to the preliminary design, this avoided nearly 1,000 linear feet of stream impact southwest of the interchange.
- *Site 29* - Ramp 3BD's alignment was altered to keep it closer to US 220 and to fly-over southwest of the old alignment, which avoided the need to extend the culvert inlet on Back Creek and eliminated more than 500 linear feet of impact from the preliminary design.

- *Site 29* – Ramp 3C's alignment was shifted slightly northeast from its preliminary location, and a retaining wall was added between Back Creek and the ramp. Impacts were reduced from 984 linear feet to 341 linear feet at this culvert extension. This helped to avoid a long, stable, sinuous reach of Back Creek and to create a straight culvert extension.
- *Sites 29 and 30* – These sites pertain to the overall US 220 interchange. In addition to those measures previously noted, outside slopes were reduced to 2:1 and the stream channels internal to Loop 3CA and Ramp 3B retained, although portions are considered total takes due to loss of habitat connectivity.

Compensatory Mitigation

This permit modification for R-2606B will result in a total of 2.24 acres of permanent wetland impacts and 11,855 feet of permanent stream impacts. Mitigation will be required for 2.24 acres of wetland impacts and 9,380 feet of stream impacts within the Cape Fear and Yadkin River basins. Within the Cape Fear River basin, mitigation requirements are comprised of 0.29 acres of riverine wetlands, 1.71 acres of non-riverine wetlands, and 3,936 feet of stream impacts. Within the Yadkin River basin, mitigation requirements are comprised of 0.19 acres of riverine wetlands, 0.05 acres of non-riverine wetlands, and 5,444 feet of stream impacts. The wetland and stream impacts have already been mitigated through payment to the EEP, per the impacts in the December 2006 DWQ 401 Certification and March 2007 USACE 404 Permit, with the exception of the 0.10 acre of non-riverine wetland that exceeded the original permitted impacts due to total takes during the Combined 4B/4C Merger Meeting. Overall, mitigable impacts were reduced by this final design compared to those in the original permit. Buffer impacts and mitigation are summarized in the attached Buffer Variance Addendum.

Table 7: Summary of Jurisdictional Impacts Requiring Mitigation

HUC	Riverine Wetland* (ac)			Non-Riverine Wetland* (ac)			Streams (lf)		
	Revised	Original	Net Change	Revised	Original	Net Change	Revised	Original	Net Change
03030003	0.29	0.62	-0.33	1.71	1.63	+0.08	3,936	5,000	-1,064
03040103	0.19	0.21	-0.02	0.05	0.03	+0.02	5,444	7,941	-2,497
Total:	**0.48**	**0.83**	**-0.35**	**1.76**	**1.66**	**+0.10**	**9,380**	**12,941**	**-3,561**

* Wetland calculations include fill, excavation, and mechanized clearing; difference from permit impact summary sheet is due to rounding and impacts that were less than 0.001.

Onsite mitigation is currently being pursued at three sites in the Cape Fear River basin, as was reviewed during the February 9, 2009 site meeting with DWQ, EPA, WRC and USFWS. This project is an NCDOT Design-Build project, meaning it is on an accelerated schedule which overlays the design, permitting and right-of-way acquisition process in order to expedite the project's construction. As right-of-way is acquired for the overall project over the next 2 months, we will learn whether the mitigation sites were able to be acquired. Once acquisition has been determined, we will notify the permitting agencies of the status of the mitigation sites. If one or more sites are acquired, we will submit final mitigation construction plans for the applicable on-site mitigation to the permitting agencies for their review and approval.

REGULATORY APPROVALS

This application is hereby made to the applicable agencies for a modification to the Section 404 Individual Permit, Section 401 Water Quality Certification, and Randleman Buffer "General" Major Variance for construction of R-2606B. In compliance with Section 143-215.3D(e) of the NCAC and 15A NCAC 07J.0204b(6A) NCDOT will provide $570 to act as payment for processing the 401 Certification as previously noted in this application.

A copy of this permit modification request will be posted on the NCDOT website at: http://www.ncdot.org/doh/preconstruct/pe. If you have any questions or need additional information, please contact Mr. Brett Feulner at (919) 431-6663 or via email at bmfeulner@ncdot.gov.

Sincerely,

E. L. Luck

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

Cc:
With attachments:
Mr. Brian Wrenn, NCDWQ (5 copies)
Ms. Kathy Matthews, USEPA

Without attachments (see website for attachments):
Dr. David Chang, P.E., Hydraulics
Mr. Mark Staley, Roadside Environmental
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services Unit
Mr. Tim Johnson, P.E., Division 8 Engineer
Mr. Art King, Division 8 Environmental Officer
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P.E., Programming and TIP
Mr. Art McMillan, P.E., Highway Design
Mr. Scott McLendon, USACE – Wilmington
Mr. Clarence W. Coleman, P.E., FHWA
Mr. Travis Wilson, NCWRC
Mr. Gary Jordan, USFWS
Mr. Michael Penney, P.E., PDEA
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch
Mr. Drew Joyner, P.E., Human Environment Unit
Ms. LeiLani Paugh, NEU
Mr. Randy Griffin, NEU
Mr. Roger Rochelle, P.E., Transportation Program Management (Design-Build)

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 -

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 Transportation Unit, 1650 Mail Service Center, Raleigh, NC 27699-1650 and one copy must be sent to the Piedmont Triad Regional Water Authority (PTRWA), 2216 W. Meadowview Rd, Wilmington Bldg., Suite 204, Greensboro, NC 27407 to constitute a complete submittal.

This form may be photocopied for use as an original.

Part 1: General Information

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, PDEA
   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, Sr. Environmental Specialist
   Telephone: (919) 431-6663
   Fax: (919) 431-2001
   Email: ( ) bmfeulner@ncdot.gov

4. Project Name (Subdivision, facility, or establishment name - consistent with project name on plans, specifications, letters, operation and maintenance agreements, etc.):
   US 311 Bypass (R-2606B)

5. Location of Facility
   Street address: US 311 - new alignment
   City, State, Zip: Randleman, NC
   County: Randolph
   Latitude/longitude: 35° 52.20' N, 79° 53.80'

6. Directions to facility from nearest major intersection (Also attach a map):
   The project will begin at the end of the existing construction of the US 311 Bypass (R-2606A) at Spencer Rd.

7. Stream to be impacted by the proposed activity:
   Stream name (for unnamed streams label as "UT" to the nearest named stream):
   See attached enclosures and tables
   Stream classification [as identified within the Schedule of Classifications 15A NCAC 2B .0311 (Cape Fear River Basin)]: WS-IV; see attached enclosures & tables

Part 2: Proposed Activity
(Please include attachments if additional explanation is necessary)

1. Description of proposed activity:
   - Also, please attach a map of sufficient details to accurately delineate the boundaries of the land to be utilized in carrying out the activity and to show the location and dimension of any disturbance in the riparian buffers associated with the activity.

   Please see the attached enclosures.

2. What is the total area of buffer impact? Zone 1: 286,479 ft^2
   Zone 2: 193,471 ft^2

3. State the reasons why this activity cannot be practically accomplished without a general major variance approval. State what measures have been taken to minimize or eliminate disturbance to the riparian buffers:

   Please see the attached enclosures.

4. 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) that will be used to control nutrients and attenuate flow (attach construction details and site locations for these facilities):

   Please see the attached enclosures.

5. 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.)

   Please see the attached enclosures.

6. Please explain the practical difficulties or hardships that would result from the strict application of this Rule:

Please see the attached enclosures.

Part 3: Applicant's Certification

I, Elizabeth Lusk (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: E.A. Lusk
Date: 4.21.09
Title: Environmental Supervisor

Addendum to "General" Major Variance Application for Randleman Buffer Rules

Portions of this Addendum are repeated and/or referenced in the attached Application for Permit Modification.

PART 1: GENERAL INFORMATION

1. Stream to be Impacted by the Proposed Activity

Classifications of the streams are included in the table below along with the corresponding site numbers. Unnamed tributaries receive the same classification as their downstream receiving waters (Note: all three of the downstream waters receive the supplementary classification of Critical Area (CA) once they are within ½ mile of Randleman Lake, the water-supply reservoir; none of the affected tributaries are within ½ mile of the Lake).

Stream Name	DWQ Classification	Site #'s
Muddy Creek	WS-IV	13-16
Bob Branch	WS-IV	17-19
Deep River	WS-IV	20-21

PART 2: PROPOSED ACTIVITY

1. & 3. Description of Proposed Activity & Avoidance/Minimization

The NCDOT proposes to construct the US 311 Bypass from north of Spencer Road (SR 1929) to US 220/future I-73/74, also known as R-2606B. The northern half of the R-2606B alignment falls within the Randleman Lake watershed and is subject to the Randleman Buffer Rules. This project was previously included in the "General" Major Buffer Variance application for R-609/R-2606 in February 2006 (Water Quality Certification # WQC003592, dated December 16, 2006). However, it was only approved as a corridor permit/certification based on preliminary design, and DWQ and the Corps required further design and a permit modification in order to approve final impacts.

There are 16 different buffer impact areas within the 8 sites listed below. All of the sites will require mitigation, except the smaller impact at Site 20. The impacts at this site are considered "Allowable" under the Buffer Rules due to impacts of less than 150 linear feet of stream and less than one-third of an acre of buffer. In addition, impacted buffers that coincide with impacted wetland areas do not require mitigation since the wetlands themselves will be mitigated. The site numbers are retained from the original application to maintain continuity.

Construction of the proposed project with total avoidance of stream buffer impacts is not feasible. Therefore, impacts to stream buffers have been minimized through use of the Least Environmentally Damaging Practical Alternative as decided through the NEPA process, the avoidance and minimization of stream impacts as documented in the attached 404/401 permit application, and the use of NCDOT and NCDENR Best Management Practices (BMP's).

There are two designs employed for the dry detention basin BMP's. The first design is found on the outside of the mainline where there is no constraining alignment and utilizes an emergency spillway. A majority of the dry detention basins for the project have the ability to use an emergency spillway in this manner. These dry detention basins are sized such that the primary spillway handles all flows up to the 10-yr storm, and flows larger than the 10-yr storm will be routed through the emergency spillway. This allows the outlet of the primary spillway to be a smaller pipe, usually 15" or 18". This smaller outlet pipe provides for the use of a level spreader since larger storms will be routed around via the emergency spillway.

The second dry detention basin design is found between the alignments (for example, between the -L- line and a service road). The only relief provided in these areas would typically occur with overtopping the road. In order to reduce the chance of the road overtopping, the basin is designed to route the 50-yr storm. The 50-yr water surface must be lower than the elevation of the top of the basin. In order to route the larger design storm, the outlet pipes must be increased greatly, ranging between 30" and 42". This gives the illusion that there is much more discharge coming out of the basin, but only because the drainage for the remainder of the project is sized for the 10-year event. During the 10-yr event, the discharge coming out of the 30" pipe would be equal to what would be coming out of a 15" pipe. Only during storms greater than the 10-year event would the full size of the larger discharge pipes be utilized. The primary outlet is a 2- or 3-inch orifice, depending on design parameters.

NCDOT requests that NCDWQ issue a "General" Major Variance for the following impact sites (as summarized in Table 4 in the attached permit application letter):

Site 13 (Permit Sheets 10-11, Roadway Sheet 7, -L- Sta. 143+75 to 148+00) has impacts to 34,300 sq. ft. of Zone 1 buffer and 23,949 sq. ft. of Zone 2 buffer on two different stream reaches. The horizontal curve of the service road (SR1) to the east of the -L- line is designed with a reverse crown, allowing the road to drain into the area between SR1 and the mainline and to the dry detention basin, providing additional stormwater treatment and minimization of downstream water quality impacts. A level spreader was used below one of the dry detention basins to disperse the flows emanating from the basin. The roadway fill was minimized by lowering the profile of the roadway and using 2:1 side slopes. An impacted wetland coincides with 14,680 sq. ft. of buffer (mostly Zone 1) at this site and is not included in the mitigation required.

Site 14 (Permit Sheets 12-15, Roadway Sheets 8-9, -L- Sta. 155+75 to 165+00) has impacts to 27,401 sq. ft. of Zone 1 buffer and 18,597 sq. ft. of Zone 2 buffer, mainly along a large perennial channel. The intermittent stream and its buffer have been heavily impacted by cattle. A dry detention basin is proposed between the -L- line and the service road. This larger outlet pipe would require an extremely long and impractical level spreader design. Outletting the basin beyond the fill slopes was evaluated but deemed impractical due to topography and space limitations. The fill was minimized by lowering the profile of the roadway and using 2:1 side slopes at the culvert location. An

impacted wetland coincides with 2,701 sq. ft. of buffer (mostly Zone 1) at this site and is not included in the mitigation required.

Site 15 (Permit Sheets 14-17, Roadway Sheets 9-10, -L- Sta. 174+50 to179+25) has impacts to 36,361 sq. ft. of Zone 1 buffer and 23,547 sq. ft. of Zone 2 buffer along a small perennial stream. This site's canopy has been cut-over in recent years and is just beginning to re-generate with typical early-successional species. A dry detention basin is located between the -L- line and the service road, and outlets directly into the stream coincident to the pipe outlet. This larger outlet pipe would require an extremely long and impractical level spreader design. From the 4B/4C meeting, the shoulder berm gutter has been extended 50 ft to begin at Station 176+00 to catch additional roadway runoff on Sheet 10. An impacted wetland coincides with 4,574 sq. ft. of buffer (primarily Zone 1) at this site and is not included in the mitigation required.

Site 17 (Permit Sheets 18-23, Roadway Sheets 12-14, -L- Sta. 214+50 to 239+50) has impacts to 52,532 sq. ft. of Zone 1 buffer and 34,754 sq. ft. of Zone 2 buffer along Bob Branch and a UT to Bob Branch. A service road on the northeast side of the alignment was eliminated, thereby minimizing the corridor footprint. The profile was lowered considerably through this section and 2:1 slopes were utilized. Three dry detention basins and their associated level spreaders are proposed at this impact site.

Site 18 (Permit Sheets 24-25, Roadway Sheet 17, -L- Sta. 268+70 to 279+90) has impacts to 30,004 sq. ft. of Zone 1 buffer and 23,029 sq. ft. of Zone 2 buffer on two intermittent stream reaches. This site has an approximate ½-mile long earthen noise berm running along the west side of the alignment, which pushed the fill slope out away from the roadway but did not alter the jurisdictional impacts. The profile was lowered slightly to minimize impacts on the east side of the alignment. Two dry detention basins, located between the -L- line and the service road, will treat stormwater prior to entering the stream; level spreaders would not have been practical with this size outlet pipe. These basins discharge directly into the stream channels for the same reasons as those described for Site 14.

Site 19 (Permit Sheets 26-27, Roadway Sheet 18, -L- Sta. 287+70 to 290+60) has impacts to 28,744 sq. ft. of Zone 1 buffer and 18,923 sq. ft. of Zone 2 buffer. Fill slopes of 2:1 are used to minimize impacts on the upstream side of this site, avoiding an impact to an intermittent-mitigable channel at 290+05 Lt. The detention basin is constrained by the -L- line and the service road, requiring direct discharge as mentioned in previous site descriptions. Due to the significant curve in the service road (SR2) and the required superelevation, stormwater from the service road is routed to a ditch along with additional off-site runoff. Steep topography requires this ditch to be riprap-lined and tie directly into the stream channel to provide adequate long-term stability. An impacted wetland coincides with 6,360 sq. ft. of buffer (mostly Zone 1) at this site and is not included in the mitigation required.

Site 20 (Permit Sheets 28-29, Roadway Sheet 21, -L- Sta. 320+60 to 334+14) has impacts to 18,886 sq. ft. of Zone 1 buffer and 14,200 sq. ft. of Zone 2 buffer at these two

areas of impact, of which 409 sq. ft of Zone 1 and 2,058 sq. ft. of Zone 2 buffer are considered "Allowable" and do not require mitigation due to the impacts being below 150 linear feet of channel and 1/3 acre of buffers. The Allowable impact is located between Sta. 331+00 and 334+14. The fill height was reduced in this section and 2:1 side slopes were utilized to minimize stream and buffer impacts. The stormwater flowing to these two stream reaches is treated by the dry detention basins upgradient of the alignment and discharged through level spreaders into the riparian buffers. An impacted wetland coincides with 13,330 sq. ft. of buffer (Zone 1 and Zone 2) at this site and is not included in the mitigation required.

Site 21 (Permit Sheets 30-31, Roadway Sheet 22, -L- Sta. 346+20 to 347+60 & -RP2B- Sta. 22+80) has impacts to 58,251 sq. ft. of Zone 1 buffer and 36,470 sq. ft. of Zone 2 buffer at this interchange with existing US 311. The downstream impact area, at Ramp 2B, is in a cattle pasture where the stream has only a grass riparian buffer existing. Potential mitigation site CF-21 is immediately downstream of this impact site. The roadway profile was lowered as much as 50 feet at this interchange site in order to get the proposed alignment underneath the rail line and existing US 311. This change in profile allowed portions of the stream reach to remain daylighted internal to the interchange and minimized the fill extent on the outside slopes. The dry detention basin located inside Loop 2B was altered after the 4B/4C meeting in order to outlet upstream in the ephemeral drainage, well above the ephemeral/intermittent breakpoint and outside of the Randleman buffers. An energy dissipater pad was added at the outlet to minimize downstream impacts. Discharge from the Loop 2B basin is routed to the stream through the existing ephemeral channel. A dry detention basin is proposed between the -L- line and Ramp 2B, and is equipped with a level spreader to provide diffuse flow into the buffer.

4. Stormwater Efforts in lieu of Sheet Flow

At Site 19 (-SR2- Station 50+50 to 58+00, Sheets 18 & 35), the curve in the service road required a superelevation that directed stormwater away from the proposed stormwater facilities and toward the outside shoulder of the project. The service road would contribute 8.7% of the 3.1 acre drainage area for the proposed ditchline. The topography at this location was not conducive to grass swale treatment, and the velocity of the water (above 4 ft/s for the 10-year storm) flowing through the ditch required rip-rap lining of the ditch. With a 7% ditch slope and little room for stormwater treatment, tying the ditch directly to the stream channel was unavoidable.

The entire project utilizes grass swales between the roadways and in typical ditches to provide the first available treatment. Most of the grass swales on the project provide treatment, while a minority of the swales cannot meet the requirement of less than 2 ft/s (Q_2). As noted above, several other sites had dry detention basins that had to be located between the -L- line and a service road. Their location between two roads required they be designed for the 50-year storm event, and therefore beyond the capacity of level spreaders. The discharge points were located at the most reasonable location possible, typically within a pipe or coincident to a pipe outlet.

5. Mitigation

Buffer impacts within the Randleman watershed require mitigation for Zone 1 impacts be multiplied by 3, and Zone 2 impacts be multiplied by 1.5. Mitigable impacts for the entire project will total 435,836 square feet (which does not include Allowable impacts and buffers that fall within impacted wetlands).

Mitigation has been provided through the Ecosystem Enhancement Program, unless on-site mitigation is able to be acquired and is applied to this project. If on-site mitigation is approved and right-of-way acquired, this permit/variance will be modified to address the changes. Mitigation totaling 1,573,137 square feet of buffer credits was paid to EEP for R-2606B during the previous permit acquisition process in 2006-2007. The impacts revised under this modification application represent a decrease of more than 500,000 square feet of required credit.

	Zone 1 (ft^2)	**Zone 2 (ft^2)**
Wetlands in Buffers (no mit. req'd)	30,885	10,760
"Allowable" Impacts (no mit. Req'd)	409	2,058
Impacts Requiring Mitigation	255,185	180,651
Mitigation Required (after Ratios)	765,555	270,977
Total Mitigation Credits Required	1,036,532	

6. Practical Difficulties or Hardships

If the rules were to be strictly enforced and no variance granted, the DOT would be required to take a significant amount of additional right-of-way from private landowners outside the typical roadway limits. This would potentially place an unreasonable hardship on adjacent landowners. Relatively steep topography is a limiting factor in this geographic region, as rolling hills dominate the landscape and level ground is uncommon. This prevents the use of level spreaders and pre-formed scour holes in many locations. Discharging into flatter areas (if available) would result in significant rerouting of drainages potentially drying-up downstream resources. In addition, evidence of shallow bedrock makes outcrops a potential problem for constructing BMP's.

GENERAL PROJECT INFORMATION			
Project No.: 34480.3.GVI		**Date:** 2/10/2009	
TIP No.: R-2606B	**Designer:** Jonathan Henderson, PE		
City/Town: Randleman	**Project Manager:** Jeff Garland, PE - NCDOT Alternative Delivery		
County: A–B C–D E–L M–P R–U Randolph V–W		**County:** A–B C–D E–L M–P R–U Randolph V–W	
CAMA County: ☐ Yes	**TVA County:** ☐ Yes	**CAMA County:** ☐ Yes	**TVA County:** ☐ Yes
River Basin(s): (1) Cape Fear		(2) Yadkin-Pee Dee	
Primary Receiving Water: Randleman Lake (Cape Fear, WS-IV), Back Creek (Yadkin, WS-II HQW)			
NCDWQ Surface Water Classification			
Primary: WS-IV and WS-II			
Supplemental: HQW for the WS-II streams			
Other Stream Classification:			
303(d) Stream: ☐ Yes	**Type of Impairment:**		
State Stormwater Permit Required? ☒ Yes ☐ No			
Section 7 Threatened or Endangered Species Concern? ☐ Yes ☒ No			
Description:			
Anadromous Fish Present? ☐ Yes ☒ No			
Description:			
Buffer Rules in Effect? ☒ Yes ☐ No	**Buffer Rules:** Randleman		
Existing Site			
Existing Roadway Description: N/A			
ADT: N/A			
Existing Cross-Section: N/A			
Surrounding Land Use: Agricultural and low density housing			
General Comments: this project is a new alignment			

Project Description	
Proposed Roadway Description: Four-lane divided highway with full control of access	
ADT: 27,400	
Proposed Cross-Section: -L- line shall consist of 12-foot outside and median shoulders, with two lanes on each side of a 70-foot median (to total four lanes)	
Interchange Modification: None - new alignment	**Median Type:** grass swale
North **Terminus:** R-2606A	South **Terminus:** US 220 / I-73
Length of Project: 6.85 miles feet	**% Increase Impervious Area: .03 %**
General Comments:	

ENVIRONMENTAL SUMMARY

Jurisdictional Stream Crossings

Station	Stream Name	Type	Classification	Proposed Structure
-L- Sta 145+00 - 148+00	UT to Muddy Crk	Perennial	WS-IV	36" pipe/fill/cut
-L- Sta 146+40	UT to Muddy Crk	Intermittent	WS-IV	36" pipe/fill
-L- Sta 159+30 - 159+70	UT to Muddy Crk	Intermittent	WS-IV	18" pipe/fill
-L- Sta 163+40 - 165+00	UT to Muddy Crk	Perennial	WS-IV	11' x 9' RCBC
-L- Sta 175+10 - 179+25	UT to Muddy Crk	Perennial	WS-IV	36" pipe/fill
-L- Sta 214+50 - 216+60	UT to Bob Br	Perennial	WS-IV	fill
-L- Sta 225+70 - 230+10	UT to Bob Br	Perennial	WS-IV	fill/relocation
-L- Sta 230+10 - 231+20	UT to Bob Br	Perennial	WS-IV	12' x 8' RCBC
-L- Sta 237+50 - 239+50	UT to Bob Br	Perennial	WS-IV	8' x 7' RCBC
-L- Sta 268+70 - 269+80	UT to Bob Br	Intermittent	WS-IV	fill
-L- Sta 279+30 - 279+90	UT to Bob Br	Intermittent	WS-IV	fill
-L- Sta 287+70 - 290+20	UT to Bob Br	Perennial	WS-IV	54" & 48" pipes/fill
-L- Sta 321+30 - 322+25	UT to Deep River	Perennial	WS-IV	60" pipe/fill
-L- Sta 346+20 - 346+80	UT to Deep River	Perennial	WS-IV	54" pipe/fill
-L- Sta 347+00 - 347+60	UT to Deep River	Perennial	WS-IV	48" pipe/fill
-L- Sta 373+20 - 374+20	UT to Caraway Crk	Perennial	C	fill
-L- Sta 374+00 - 374+40	UT to Caraway Crk	Perennial	C	60" pipe/fill
-L- Sta 380+10 - 381+00	UT to Caraway Crk	Intermittent	C	24" pipe/fill
-L- Sta 384+70 - 385+40	UT to Caraway Crk	Perennial	C	48" pipe/fill
-L- Sta 384+90 - 392+80	UT to Caraway Crk	Intermittent	C	36" pipe/fill/ditch
-L- Sta 401+40 - 405+30	UT to Back Crk	Intermittent	WS-II HQW	fill
-L- Sta 404+80 - 409+70	UT to Back Crk	Perennial	WS-II HQW	48" pipe/fill
-L- Sta 407+25 - 408+00	UT to Back Crk	Intermittent	WS-II HQW	ditch

ENVIRONMENTAL SUMMARY				
Jurisdictional Stream Crossings				
-L- Sta 411+70 - 412+80	UT to Back Crk	Perennial	WS-II HQW	48" pipe/fill
-L- Sta 425+70 - 427+80	UT to Back Crk	Perennial	WS-II HQW	36" pipe/fill
-L- Sta 445+80 - 445+90	UT to Back Crk	Perennial	WS-II HQW	18" pipe/fill
-L- Sta 450+10 - 450+50	UT to Back Crk	Perennial	WS-II HQW	10' x 7' RCBC
-SR6- Sta 17+70 - 19+00	UT to Back Crk	Perennial	WS-II HQW	fill
-L- Sta 470+20 - 471+60	UT to Back Crk	Perennial	WS-II HQW	36" pipe/fill
-L- Sta 477+20 - 479+10	UT to Back Crk	Perennial	WS-II HQW	36" pipe/fill
-RP3C- Sta 50+40 - 51+40	UT to Back Crk	Perennial	WS-II HQW	10' x 9' RCBC ext.
-Y12- Sta 51+00 - 57+80	UT to Back Crk	Perennial	WS-II HQW	48" pipes/fill
-RP3B- Sta 25+00 - 26+10	UT to Back Crk	Perennial	WS-II HQW	42" pipe/fill
-Y12- Sta 27+25	UT to Back Crk	Perennial	WS-II HQW	54" pipe ext.
-Y12- Sta 81+50	UT to Back Crk	Perennial	WS-II HQW	48" pipe/fill

Stream Relocation			
Station	**Stream Name**	**Length of Stream**	**Additional Information**
-L- Sta 215+50 - 216+00	UT to Bob Br	18.00 feet	adjacent to proposed mitigation site
-L- Sta 225+70 - 230+10	UT to Bob Br	80.00 feet	adjacent to proposed mitigation site

Jurisdictional Wetlands		
Station	**Type of Impact**	**Minimization of Impact**
-L- Sta 143+75	cut	Stormwater diverted to DDB to reduce water quality impacts, fill minimized by lowering roadway profile
-L- Sta 145+00 - 148+00	fill	Fill minimized by lowering roadway profile and using 2:1 side slopes
-L- Sta 155+75 - 159+70	fill	Fill minimized by lowering roadway profile and using 2:1 side slopes
-L- Sta 174+50 - 175+10	fill	Fill minimized by lowering roadway profile and using 2:1 side slopes
-L- Sta 195+00 - 196+80	fill/cut	Alignment changed to avoid pond, roadway profile was raised to avoid cut adjacent to wetlands
-L- Sta 288+60 - 290+60	fill	Fill slopes were reduced to 2:1 to minimize impacts on the upstream side of this site, which avoided an impact to an intermittent-mitigable channel at 290+05 Lt
-L- Sta 320+60 - 322+00	fill	Fill minimized and 2:1 slopes were used
-L- Sta 321+60 - 323+50	fill	Fill minimized and 2:1 slopes were used
-L- Sta 384+90 - 385+60	fill	Fill minimized and 2:1 slopes were used
-L- Sta 405+00 - 405+25	fill	Fill minimized and 2:1 slopes were used

-L- Sta 409+25 - 409+90	fill	Fill minimized and 2:1 slopes were used
-L- Sta 427+10 - 427+80	fill	Fill minimized and 2:1 slopes were used
-L- Sta 456+00 - 458+50	fill	Fill minimized and 2:1 slopes were used

STORMWATER CONTROLS AND BEST MANAGEMENT PRACTICES

Description of Stormwater Controls and Best Management Practices

Type	Water Quality Benefit
Level Spreader (LS)	provides for diffuse outlet flow across a stable slope
Dry Detention Basin	temporarily captures storm runoff and attenuates peak flows; also acts as a hazardous spill basin for emergency response
Preformed Scour Hole (PSH)	is designed to dissipate energy and promote diffuse flow
Swale	provides nutrient removal through the use of vegetated channels and treats on-site stormwater and small drainage areas

Location of Stormwater Controls

Station	Receiving Stream	Stormwater Control	DA[a]	Q_2	Q_{10}	WQv[b]
-L- Sta 143+00 Rt	UT to Muddy Crk	LS	7.95 acres	15.99 ft^3/s	20.21 ft^3/s	7781 ft^3
-L- Sta 198+00 Lt	UT to Muddy Crk	LS	6.97 acres	14.46 ft^3/s	18.28 ft^3/s	7374 ft^3
-L- Sta 220+00 Rt	UT to Bob Br	LS	13.64 acres	27.76 ft^3/s	35.09 ft^3/s	13714 ft^3
-L- Sta 230+00 Lt	UT to Bob Br	LS	9.74 acres	23.50 ft^3/s	29.70 ft^3/s	14215 ft^3
-L- Sta 240+00 Lt	UT to Bob Br	LS	9.74 acres	23.28 ft^3/s	29.70 ft^3/s	16337 ft^3
-L- Sta 323+00 Rt	UT to Deep River	LS	9.14 acres	22.26 ft^3/s	28.13 ft^3/s	13583 ft^3
-L- Sta 335+00 Rt	UT to Deep River	LS	8.97 acres	23.40 ft^3/s	29.25 ft^3/s	8362 ft^3
-L- Sta 345+00 Lt	UT to Deep River	LS	5.03 acres	10.66 ft^3/s	13.48 ft^3/s	15825 ft^3
-RP2B-Sta 22+00	UT to Deep River	LS	14.29 acres	25.46 ft^3/s	32.17 ft^3/s	9828 ft^3
-L- Sta 143+00 Rt	UT to Muddy Crk	Basin	7.95 acres	16.13 ft^3/s	20.21 ft^3/s	7781 ft^3
-L- 164+50, Lt	UT to Muddy Crk	Basin	21.59 acres	48.69 ft^3/s	70.00 ft^3/s	26853 ft^3
-L- 176+00, Lt	UT to Muddy Crk	Basin	9.7 acres	21.44 ft^3/s	31.00 ft^3/s	11594 ft^3
-L- Sta 199+50 Lt	UT to Muddy Crk	Basin	6.97 acres	14.46 ft^3/s	18.28 ft^3/s	7374 ft^3
-L- Sta 220+00 Rt	UT to Bob Br	Basin	13.64 acres	27.76 ft^3/s	35.09 ft^3/s	13714 ft^3
-L- Sta 230+00 Lt	UT to Bob Br	Basin	9.74 acres	23.50 ft^3/s	29.70 ft^3/s	14215 ft^3
-L- Sta 240+00 Lt	UT to Bob Br	Basin	9.74 acres	23.28 ft^3/s	29.70 ft^3/s	16337 ft^3
-L- Sta 270+50 Lt	UT to Bob Br	Basin	13.87 acres	30.03 ft^3/s	38.00 ft^3/s	9507 ft^3
-L- Sta 281+00 Lt	UT to Bob Br	Basin	10.78 acres	21.87 ft^3/s	27.84 ft^3/s	10875 ft^3
-L- Sta 291+00 Lt	UT to Bob Br	Basin	15.38 acres	32.60 ft^3/s	48.00 ft^3/s	17166 ft^3
-L- Sta 323+00 Rt	UT to Deep River	Basin	9.14 acres	22.26 ft^3/s	28.13 ft^3/s	13583 ft^3
-L- Sta 335+00 Lt	UT to Deep River	Basin	8.97 acres	23.14 ft^3/s	29.25 ft^3/s	8362 ft^3
-L- Sta 345+00 L	UT to Deep River	Basin	5.03 acres	10.66ft^3/s	13.48 ft^3/s	15825 ft^3
-RP2B-Sta 22+00	UT to Deep River	Basin	14.29 acres	25.46 ft^3/s	32.17 ft^3/s	9828 ft^3
-L- Sta 374+00 Lt	UT to Caraway Crk	PSH	0.43 acres	1.73 ft^3/s	2.20 ft^3/s	N/A

-L- Sta 428+00 Rt	UT to Back Crk	PSH	1.89 acres	4.09 ft^3/s	5.20 ft^3/s	N/A
-L- Sta 345+00 Rt	UT to Back Crk	PSH	1.8 acres	5.03 ft^3/s	6.38 ft^3/s	N/A
-L- Sta 449+75 Rt	UT to Back Crk	PSH	1.1 acres	3.13 ft^3/s	3.95 ft^3/s	N/A

[a] Drainage Area
[b] Water Quality Volume

ADDITIONAL COMMENTS

Methodology for finding % impervious surface: The acreage of R-2606B pavement (107) divided by the impacted DWQ sub-basins (03-07-09 and 03-06-08) (362,653) and then converted to percentage.

A description of each grass swale is attached and those that meet the treatment criteria are noted on the sheet.

REFERENCES

North Carolina Department of Transportation
Highway Stormwater Program

LEVEL SPREADER CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Cape Fear

City: Randleman **NCDWQ Stream Classification**

County: Randolph **Primary:** WS-IV and WS-II

CAMA County: Yes ✔ No **Supplemental:** HQW for the WS-II streams

TVA County: Yes ✔ No **303(d) Stream:** Yes ✔ No

Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Were different level spreader locations and orientations considered to optimize water quality benefit? Explain.	☑	☐	☐	The bypass channel option was used to fit level spreaders at outlet of dry detention basins.
2	Was a field visit made to the proposed level spreader site?	☑	☐	☐	
3	Was the level spreader positioned outside the roadway clear recovery zone?	☑	☐	☐	
4	Were all permitting requirements addressed? Attach a list of required permits to this checklist.	☑	☐	☐	The permit was prepared by the designers, as part of the design-build process.
5	Were off-site drainage areas verified and accommodated?	☑	☐	☐	Offsite drainage areas were separated where possible. LS were placed at outlets of DDB/HSB.
6	Was care taken to prevent hydraulic encroachment on nearby properties from flow bypass structure and level spreader design?	☑	☐	☐	These structures were placed adjacent to receiving streams.
7	Was a geotechnical investigation performed for the level spreader location?	☐	☑	☐	Investigation was not done for each specific LS location, but it was done for the project in general.
8	Was adequate maintenance ingress and egress provided within the right-of-way?	☑	☐	☐	
9	During design, was flow entering the level spreader slowed or dissipated to avoid concentrating the flow and exiting the lip at one area?	☑	☐	☐	LSs were located at the outlets of the HSB/DDBs.
10	Was topography downgrade of the level spreader reviewed for ability to diffuse flow?	☑	☐	☐	Buffer slopes are < 8%.

Check the correct response.		Yes	No	Not Applicable	Comments/Design Assumptions
11	Does the entire level spreader system safely pass the 10-year storm event?	☑	☐	☐	
12	Was the level spreader implemented in a system with another stormwater control? Explain.	☑	☐	☐	Dry detention basins Hazardous spill basins Grass swales
13	Was a forebay considered? Why or why not?	☐	☑	☐	Outlet of dry detention basins
14	Were all design assumptions documented?	☑	☐	☐	

North Carolina Department of Transportation
Highway Stormwater Program

PREFORMED SCOUR HOLE CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Yadkin-Pee Dee

City: Randleman **NCDWQ Stream Classification**

County: Randolph **Primary:** WS-IV and WS-II

CAMA County: Yes ✔ No **Supplemental:** HQW for the WS-II streams

TVA County: Yes ✔ No **303(d) Stream:** Yes ✔ No

Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Was a field visit made for the proposed preformed scour hole site/location?	☑	☐	☐	
2	Was the preformed scour hole positioned outside the roadway clear recovery zone?	☑	☐	☐	
3	Were permit requirements addressed?	☑	☐	☐	
4	Were off-site drainage areas verified and accommodated?	☑	☐	☐	
5	Were adequate ingress and egress for maintenance provided within right-of-way?	☑	☐	☐	
6	Were different preformed scour hole locations and orientations considered to optimize water quality benefits? Explain.	☑	☐	☐	They were orientated with surrounding topography.
7	Was topography downgrade of the preformed scour hole reviewed for ability to diffuse flow?	☑	☐	☐	
8	Is the PSRM apron shown on the plans to be flush with the natural ground?	☑	☐	☐	In detail.
9	Is the discharge pipe an allowable size for use with a preformed scour hole (15 in. or 18 in.)?	☑	☐	☐	
10	Have maximum allowable discharges based on the Q_{10} discharge been verified?	☑	☐	☐	
11	Were all design assumptions documented?	☑	☐	☐	

North Carolina Department of Transportation
Highway Stormwater Program

DRY DETENTION BASIN CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Cape Fear

City: Randleman **NCDWQ Stream Classification**

County: Randolph **Primary:** WS-IV and WS-II

CAMA County: Yes ✔ No **Supplemental:** HQW for the WS-II streams

TVA County: Yes ✔ No **303(d) Stream:** Yes ✔ No

Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Was a field visit made to the proposed dry detention basin site?	☑	☐	☐	
2	Is the dry detention basin positioned outside the roadway clear recovery zone?	☐	☑	☐	It is positioned between L and SR and the slopes are recoverable.
3	Was maintenance access provided?	☑	☐	☐	
4	Were off-site drainage areas verified and accommodated?	☑	☐	☐	Grass swales and forebays were also used.
5	Was a pretreatment BMP used in series with the dry detention basin?	☑	☐	☐	
6	Was soil compaction information provided in the project specifications?	☑	☐	☐	
7	Was energy dissipation required for the emergency spillway (if used)?	☑	☐	☐	
8	Was the buoyancy of the outlet structure calculated?	☑	☐	☐	145 lb/ft3 x 33.13 ft3 = 4,803 lbs downforce, 62.4 lb/ft3 x 27 ft3 x 1.2 = 2,022 lbs buoyancy
9	Was the vegetative cover specified?	☑	☐	☐	
10	Was the grade of the basin bottom shown to slope and drain toward the orifice?	☑	☐	☐	
11	Was topography downgrade of the dry detention basin outlet reviewed for ability to handle flow?	☑	☐	☐	
12	Were velocities evaluated for scour and erosion potential?	☑	☐	☐	
13	Were all design assumptions documented?	☑	☐	☐	

North Carolina Department of Transportation
Highway Stormwater Program

SWALE CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Cape Fear and Yadkin-Pee Dee

City: Randleman **NCDWQ Stream Classification**

County: Randolph **Primary:** WS-IV and WS-II

CAMA County: Yes ✔ No **Supplemental:** HQW for the WS-II streams

TVA County: Yes ✔ No **303(d) Stream:** Yes ✔ No

Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Was a field visit made to the proposed swale site?	☑	☐	☐	
2	Were off-site drainage areas verified and accommodated?	☑	☐	☐	
3	Were different swale locations and orientations considered to optimize water quality benefits? Explain.	☑	☐	☐	Generally, the swales are located in the medians and along typical roadside ditches.
4	Was NCDENR (2006) Erosion and Sediment Control Planning and Design Manual reviewed for proper vegetative cover selection?	☑	☐	☐	
5	Is selected vegetation specified?	☑	☐	☐	Typical ground cover required for project stabilization.
6	Were adequate ingress and egress for maintenance provided within the right-of-way?	☑	☐	☐	
7	Were water quality rock checks used in the swale design?	☐	☑	☐	
8	Was temporary erosion-resistant lining specified?	☐	☐	☑	Stability was checked.
9	Were all design assumptions documented?	☑	☐	☐	

North Carolina Department of Transportation
Highway Stormwater Program

FOREBAY CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Yadkin-Pee Dee

City: Randleman **NCDWQ Stream Classification**

County: Randolph **Primary:** WS-IV and WS-II

CAMA County: Yes ✔ No **Supplemental:** HQW for the WS-II streams

TVA County: Yes ✔ No **303(d) Stream:** Yes ✔ No

Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Was a field visit made to the proposed forebay site?	☑	☐	☐	
2	Was forebay positioned outside the roadway clear recovery zone?	☑	☐	☐	
3	Were off-site drainage areas verified and accommodated?	☑	☐	☐	
4	Were adequate ingress and egress for maintenance provided within right-of-way?	☑	☐	☐	
5	Is a forebay provided at each inflow point at this site? How many?	☐	☑	☐	Only with DDB/HSBs.
6	Was the sizing criteria equation in Chapter 7 used for estimating the volume of the forebay?	☑	☐	☐	
7	Was the forebay liner material specified?	☑	☐	☐	
8	Was the liner designed to meet velocity requirements?	☑	☐	☐	
9	Is the forebay in series with another BMP? If so, what type?	☑	☐	☐	Dry detention basins, hazardous spill basins, level spreaders and grass swales
10	Does the forebay safely pass the 10-year storm event?	☑	☐	☐	
11	Is the depth of the forebay set between 3 and 5 feet?	☑	☐	☐	
12	Were all design assumptions documented?	☑	☐	☐	

North Carolina Department of Transportation
Highway Stormwater Program

HAZARDOUS SPILL BASIN CHECKLIST

GENERAL PROJECT INFORMATION

Project: US 311 Bypass **TIP No:** R-2606B

Prepared by: Jonathan Henderson **Date:** 2/10/09 **Checked by:** James Rice **Date:** 2/10/09

NCDOT Division: 8 **River Basin:** Yadkin-Pee Dee

City: Randleman **NCDWQ Stream Classification**

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Buffer Required: ✔ Yes No

PROJECT DESCRIPTION This is a new alignment, that is a four land divided facility.

	Check the correct response.	Yes	No	Not Applicable	Comments/Design Assumptions
1	Were the planning documents reviewed and information therein verified to determine whether a hazardous spill basin is applicable?	☑	☐	☐	
2	Was a field visit made to the proposed hazardous spill basin site?	☑	☐	☐	
3	Is the hazardous spill basin positioned outside the roadway clear recovery zone?	☐	☑	☐	
4	Was maintenance access provided to accommodate appropriate maintenance equipment?	☑	☐	☐	
5	Were off-site drainage areas verified and accommodated?	☑	☐	☐	
6	Was energy dissipation required?	☐	☑	☐	
7	Is the outlet structure (i.e., sluice gate) or obstruction material (i.e., sand bags) specified?	☑	☐	☐	
8	Was the grade of the basin bottom designed to slope and drain toward the outlet pipe?	☑	☐	☐	
9	Was topography downgrade of the hazardous spill basin outlet assessed for its ability to handle flow?	☑	☐	☐	
10	Were all design assumptions documented?	☑	☐	☐	

Grass Swale Comps

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Date: 3/19/2009
Dsn. By: JRR
Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
6	13200 - 13625	-L-	LT	13	OPEN	1.04	104.00	425	1.42%	0.00	2.00	**NO**	2.53	2.39	3.22	2.54	DDB, LS
6	13200 - 13300	-L-	MD	13	2GI	0.81	81.00	100	0.71%	0.00	8.00	**YES**	1.35	1.17	1.72	1.25	GS, DDB, LS
6	13200 - 13625	-L-	RT	13	DITCH	1.04	104.00	425	2.17%	2.00	2.00	**NO**	2.49	2.60	3.16	2.79	DDB, LS
6	13625 - 13750	-L-	LT	13	OPEN	0.21	21.00	125	0.50%	0.00	2.00	**YES**	0.44	1.04	0.55	1.11	GS, DDB, LS
6	13300 - 13625	-L-	MD	13	2GI	0.52	52.00	325	1.56%	0.00	8.00	**YES**	0.87	1.41	1.10	1.50	GS, DDB, LS
6	13625 - 14050	-L-	RT	13	DITCH	4.53	453.00	425	4.45%	2.00	2.00	**NO**	9.68	4.51	12.33	4.82	DDB, LS
6	13625 - 14050	-L-	MD	13	DITCH	0.91	91.00	425	3.06%	0.00	8.00	**NO**	2.01	2.24	2.56	2.38	DDB, LS

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7	1044 - 1353	-SR1-	LT	13	2GI	0.36	36.00	309	2.23%	0.00	4.00	**YES**	0.93	1.93	1.18	2.05	GS, DDB, LS
7	2214 - 2720	-SR1-	LT	14	DITCH	0.50	50.00	506	2.34%	0.00	4.00	**YES**	0.95	1.98	1.21	2.10	GS
7	14200 - 14500	-L-	LT	14	2GI	1.15	115.00	300	3.63%	0.00	6.00	**NO**	2.13	2.60	2.71	2.76	DDB
7	1663 - 2005	-SR1-	LT	13	DITCH	4.58	458.00	342	3.41%	2.00	2.00	**NO**	7.23	3.78	9.20	4.04	NONE
7	1044 - 1403	-SR1-	RT	14	2GI	0.83	83.00	359	2.20%	0.00	4.00	**NO**	1.35	2.11	1.72	2.24	DDB, LS
7	14500 - 14950	-L-	LT	14	2GI	1.11	111.00	450	1.50%	0.00	6.00	**YES**	2.10	1.86	2.68	1.98	GS, DDB
7	14050 - 14500	-L-	MD	14	2GI	0.95	95.00	450	3.72%	0.00	8.00	**NO**	2.14	2.45	2.73	2.60	DDB
7	14500 - 14950	-L-	MD	14	2GI	0.97	97.00	450	1.88%	0.00	8.00	**YES**	2.19	1.91	2.78	2.03	GS, DDB
7	14050 - 14080	-L-	RT	13	DITCH	6.79	679.00	30	4.37%	2.00	2.00	**NO**	14.39	5.00	18.32	5.33	DDB, LS
7	14050 - 14200	-L-	LT	13	DITCH	1.15	115.00	150	3.97%	0.00	6.00	**NO**	2.13	2.69	2.71	2.85	DDB

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8	3125 - 3625	-SR1-	LT	14	OPEN	0.56	56.00	500	2.02%	0.00	4.00	**YES**	1.11	1.95	1.41	2.07	GS, DDB
8	14950 - 15500	-L-	LT	14	2GI	1.41	141.00	550	1.50%	0.00	6.00	**YES**	2.67	1.98	3.40	2.10	GS, DDB
8	15500 - 15800	-L-	LT	14	DITCH	0.81	81.00	300	1.70%	0.00	6.00	**YES**	1.35	1.75	2.32	2.00	GS, DDB
8	14950 - 15300	-L-	MD	14	2GI	0.76	76.00	350	1.50%	0.00	8.00	**YES**	1.71	1.65	1.83	1.68	GS, DDB
8	15300 - 15500	-L-	MD	14	2GI	0.43	43.00	200	1.50%	0.00	8.00	**YES**	0.97	1.43	1.18	1.50	GS, DDB
8	15500 - 15800	-L-	MD	14	2GI	0.62	62.00	300	1.18%	0.00	12.00	**YES**	1.34	1.28	1.71	1.36	GS, DDB
8	15800 - 16050	-L-	MD	14	2GI	0.40	40.00	250	1.66%	0.00	8.00	**YES**	0.67	1.35	0.85	1.44	GS, DDB
8	16050 - 16185	-L-	MD	14	2GI	0.22	22.00	135	0.36%	0.00	8.00	**YES**	0.37	0.66	0.47	0.70	GS, DDB
8	16185 - 16300	-L-	MD	14	2GI	0.18	18.00	115	0.30%	0.00	8.00	**YES**	0.30	0.59	0.38	0.62	GS, DDB
8	14950 - 15277	-L-	RT	14	OPEN	0.61	61.00	327	1.33%	0.00	2.00	**NO**	1.57	2.07	2.00	2.20	DDB
8	15350 - 15700	-L-	RT	14	2GI	0.75	75.00	350	1.50%	0.00	6.00	**YES**	2.06	1.85	2.63	1.97	GS, DDB
8	15800 - 15900	-L-	MD	14	DITCH	0.16	16.00	100	6.84%	0.00	12.00	**YES**	0.27	1.66	0.34	1.76	GS, DDB
8	15800 - 16150	-L-	LT	14	DITCH	1.62	162.00	350	1.95%	0.00	6.00	**NO**	2.70	2.19	3.44	0.57	DDB

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8	15700 - 15800	-L-	RT	14	2GI	0.75	75.00	100	0.61%	0.00	6.00	**YES**	2.06	1.32	2.63	1.40	GS, DDB

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9	4025 - 4775	-SR1-	LT	14	OPEN	0.74	74.00	750	2.60%	0.00	4.00	**NO**	1.74	2.39	2.21	2.54	DDB
9	16425 - 16650	-L-	LT	14	DITCH	3.44	344.00	225	0.70%	0.00	5.00	**NO**	6.98	1.97	8.89	2.09	DDB
9	16650 - 17250	-L-	LT	14	DITCH	2.32	232.00	600	2.70%	0.00	6.00	**NO**	5.23	2.91	6.66	3.09	DDB
9	17250 - 17380	-L-	LT	15	DITCH	0.20	20.00	130	3.13%	0.00	6.00	**YES**	0.45	1.67	0.57	1.77	GS, DDB
9	17625 - 18100	-L-	LT	15	2GI	1.59	159.00	475	3.24%	0.00	5.00	**NO**	3.59	2.96	4.56	3.15	DDB
9	16300 - 16650	-L-	MD	14	2GI	0.56	56.00	350	1.36%	0.00	8.00	**YES**	0.93	1.37	1.19	1.45	GS, DDB
9	16650 - 17650	-L-	MD	14	2GI	1.61	161.00	1000	1.66%	0.00	8.00	**YES**	2.69	1.92	3.42	2.04	GS, DDB
9	16700 - 17500	-L-	RT	14	2GI	1.88	188.00	800	1.66%	0.00	6.00	**NO**	4.58	2.35	5.83	2.49	DDB
9	17650 - 18100	-L-	MD	15	2GI	0.73	73.00	450	1.66%	0.00	8.00	**YES**	1.22	1.57	1.55	1.67	GS, DDB
8	2720 - 2760	-SR1-	LT	14	DITCH	0.53	53.00	40	0.94%	0.00	4.00	**NO**	1.10	1.46	1.40	1.55	TIE TO EXIST. SWALE

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10	5572 - 5572	-SR1-	LT	15	DITCH	0.22	22.00	20	8.02%	0.00	2.00	**NO**	0.52	3.08	0.66	3.27	TIE TO EXIST. SWALE
10	18100 - 18967	-L-	LT	15	2GI	2.10	210.00	867	1.04%	0.00	6.00	**YES**	4.55	1.97	5.79	2.09	DDB
10	18100 - 18967	-L-	MD	15	2GI	1.52	152.00	867	1.06%	0.00	8.00	**YES**	2.81	1.76	3.58	1.74	GS, DDB
10	18100 - 18967	-L-	RT	15	2GI	1.59	159.00	867	1.22%	0.00	6.00	**YES**	3.59	0.56	4.56	2.09	GS, DDB
10	17600 - 17922	-L-	RT	15	DITCH	2.58	258.00	322	0.74%	0.00	2.00	**NO**	4.65	2.18	5.92	2.31	OFFSITE

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11	18967 - 19600	-L-	LT	16	2GI	1.15	115.00	633	0.72%	0.00	6.00	**YES**	2.90	1.53	3.70	1.62	GS, DDB, LS
11	18967 - 19600	0	MD	16	2GI	1.37	137.00	633	0.72%	0.00	8.00	**YES**	3.09	1.45	3.93	1.54	GS, DDB, LS
11	19600 - 19800	0	MD	16	2GI	0.43	43.00	200	1.02%	0.00	8.00	**YES**	0.97	1.24	1.23	1.32	GS, DDB, LS
11	19800 - 19900	0	MD	16	2GI	0.22	22.00	100	1.03%	0.00	8.00	**YES**	0.50	1.05	0.63	1.12	GS, DDB, LS
11	18967 - 19600	0	RT	16	2GI	0.95	95.00	633	0.71%	0.00	6.00	**YES**	1.67	1.33	2.13	1.41	GS, DDB, LS
11	19750 - 19850	0	RT	16	2GI	0.16	16.00	100	1.02%	0.00	6.00	**YES**	0.36	1.04	0.46	1.10	GS, DDB, LS
11	2680 - 2680	-Y3-	RT	16	DITCH	0.40	40.00	50	3.20%	0.00	2.00	**NO**	0.99	2.57	1.26	2.73	TIE TO EXIST. SWALE
11	1850 - 2024	-Y3-	RT	16	OPEN	0.23	23.00	174	3.20%	0.00	2.00	**NO**	0.74	2.38	0.94	2.53	TIE TO EXIST. SWALE
11	19910 - 20015	-L-	LT	16	DITCH	0.25	25.00	105	0.30%	0.00	6.00	**YES**	0.56	0.73	0.72	0.77	GS, DDB, LS

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12	20550 - 20650	-L-	LT	17	BDOS	1.27	127.00	100	8.20%	2.00	2.00	**NO**	1.72	3.64	2.19	3.94	OFFSITE
12	20650 21250	-L-	LT	17	BDOS	1.27	127.00	600	0.69%	2.00	2.00	**NO**	1.72	1.49	2.19	1.89	OFFSITE
12	21250 - 21460	-L-	LT	17	BDOS	3.60	360.00	210	5.34%	2.00	2.00	**NO**	4.87	3.96	6.20	4.25	OFFSITE
12	21460 - 21750	-L-	LT	17	BDOS	0.89	89.00	290	3.29%	0.00	2.00	**NO**	1.81	3.01	2.30	3.20	OFFSITE
12	20015 - 21100	-L-	LT	17	2GI	1.63	163.00	1085	1.00%	0.00	6.00	**YES**	4.19	1.90	5.33	2.02	GS, DDB, LS
12	21100 - 21400	-L-	LT	17	2GI	0.48	48.00	300	1.29%	0.00	6.00	**YES**	1.28	1.55	1.63	1.65	GS, DDB, LS
12	19900 - 20750	-L-	MD	17	2GI	1.56	156.00	850	1.02%	0.00	8.00	**YES**	3.03	1.65	3.85	1.75	GS, DDB, LS
12	20750 - 21100	-L-	MD	17	2GI	0.56	56.00	350	1.03%	0.00	8.00	**YES**	0.93	1.23	1.19	1.31	GS, DDB, LS
12	21100 - 21450	-L-	MD	17	2GI	0.56	56.00	350	1.36%	0.00	8.00	**YES**	0.93	1.37	1.19	1.45	GS, DDB, LS
12	19850 - 20750	-L-	RT	17	2GI	1.45	145.00	900	1.17%	0.00	6.00	**YES**	3.14	1.87	4.00	1.99	GS, DDB, LS
12	20900 - 21150	-L-	RT	17	2GI	0.59	59.00	250	1.02%	0.00	6.00	**YES**	1.65	1.52	2.10	1.61	GS, DDB, LS

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13	21750 - 21850	-L-	LT	17	BDOS	1.55	155.00	100	4.07%	2.00	2.00	**NO**	3.15	3.47	4.00	3.73	OFFSITE
13	21850 - 22150	-L-	LT	17	BDOS	2.16	216.00	300	2.13%	2.00	2.00	**NO**	4.38	3.05	5.58	3.27	OFFSITE
13	21400 - 21850	-L-	LT	17	2GI	0.46	46.00	450	1.81%	0.00	6.00	**YES**	1.04	1.67	1.32	1.78	GS, DDB, LS
13	21850 - 22350	-L-	LT	17	2GI	1.35	135.00	500	1.80%	0.00	6.00	**NO**	3.11	2.20	3.95	2.33	DDB, LS
13	22350 - 22750	-L-	LT	17	2GI	0.55	55.00	400	1.15%	0.00	6.00	**YES**	1.36	1.51	1.74	1.61	GS, DDB, LS
13	21450 - 21650	-L-	MD	17	2GI	0.32	32.00	200	1.81%	0.00	8.00	**YES**	0.53	1.32	0.68	1.40	GS, DDB, LS
13	21650 - 21900	-L-	MD	17	2GI	0.40	40.00	250	1.82%	0.00	8.00	**YES**	0.67	1.40	0.85	1.49	GS, DDB, LS
13	21900 - 22350	-L-	MD	17	2GI	0.88	88.00	450	1.80%	0.00	8.00	**YES**	1.47	1.70	1.87	1.81	GS, DDB, LS
13	22350 - 22750	-L-	MD	17	2GI	0.48	48.00	400	1.16%	0.00	8.00	**YES**	0.80	1.24	1.02	1.31	GS, DDB, LS
13	22750 - 22876	-L-	MD	17	2GI	0.20	20.00	126	0.46%	0.00	8.00	**YES**	0.33	0.70	0.42	0.75	GS, DDB, LS
13	21650 - 21923	-L-	RT	17	OPEN	0.52	52.00	273	0.55%	0.00	3.00	**YES**	1.36	1.34	1.73	1.42	DDB, LS
13	21950 - 22350	-L-	RT	17	2GI	0.77	77.00	400	1.80%	0.00	6.00	**NO**	2.15	2.01	2.74	2.13	GS, DDB, LS

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Grass Swale Comps

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2 yr. velocity is less than or equal to 2 ft./sec.

Date: 3/20/2009

Dsn. By: JRR

Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
14	23300 - 23450	-L-	LT	17	2GI	0.65	65.00	150	0.35%	0.00	6.00	**YES**	1.82	1.04	2.31	1.10	GS, DDB, LS
14	24000 - 24100	-L-	LT	17	DITCH	13.42	1342.00	100	4.45%	2.00	2.00	**NO**	29.66	6.10	37.75	6.49	DDB, LS
14	22876 - 22990	-L-	MD	17	2GI	0.20	20.00	114	0.18%	0.00	8.00	**YES**	0.33	0.50	0.42	0.53	GS, DDB, LS
14	22990 - 23250	-L-	MD	17	2GI	0.42	42.00	260	0.35%	0.00	8.00	**YES**	0.70	0.76	0.89	0.81	GS, DDB, LS
14	23250 - 23450	-L-	MD	17	2GI	0.72	72.00	200	0.76%	0.00	8.00	**YES**	1.20	1.17	1.53	1.24	GS, DDB, LS
14	23700 - 24200	-L-	MD	17	2GI	0.80	80.00	500	2.28%	0.00	8.00	**YES**	1.33	1.81	1.70	1.93	GS, DDB, LS
14	23200 - 23450	-L-	RT	17	2GI	1.00	100.00	250	0.29%	0.00	6.00	**YES**	2.44	1.04	3.10	1.10	GS, DDB, LS
14	23450 - 23600	-L-	LT	17	DITCH	0.39	39.00	150	1.40%	0.00	6.00	**YES**	1.09	1.54	1.39	1.63	GS, DDB, LS
14	23450 - 23700	-L-	MD	17	DITCH	0.41	41.00	250	1.28%	0.00	8.00	**YES**	0.68	1.24	0.87	1.31	GS, DDB, LS
14	23450 - 23650	-L-	RT	17	DITCH	0.49	49.00	200	1.37%	0.00	6.00	**YES**	1.19	1.56	1.52	1.66	GS, DDB, LS
14	22850 - 23020	-L-	RT	18	DITCH	115.00	11500.00	170	1.50%	4.00	2.00	**NO**	280.07	7.16	356.45	7.61	NONE

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Grass Swale Comps

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Date: 3/20/2009

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Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
15	1094 - 1807	-SR2-	LT	17	2GI	0.56	56.00	713	1.83%	0.00	4.00	**YES**	0.88	1.77	1.13	1.88	GS, DDB, LS
15	24150 - 24850	-L-	LT	17	2GI	1.30	130.00	700	2.40%	0.00	6.00	**NO**	3.34	2.49	4.25	2.65	DDB, LS
15	24950 - 25600	-L-	LT	17	2GI	1.23	123.00	650	1.89%	0.00	8.00	**YES**	2.16	1.91	2.75	2.03	GS, DDB, LS
15	24200 - 24900	-L-	MD	17	2GI	1.12	112.00	700	2.39%	0.00	8.00	**YES**	1.82	1.99	2.31	2.12	GS, DDB, LS
15	24900 - 25600	-L-	MD	17	2GI	1.48	148.00	700	2.30%	0.00	8.00	**NO**	3.34	2.29	4.25	2.43	DDB, LS
15	24250 - 24900	-L-	RT	17	2GI	1.05	105.00	650	2.39%	0.00	6.00	**NO**	2.79	2.38	3.56	2.53	DDB, LS
15	24900 - 25600	-L-	RT	17	2GI	1.12	112.00	700	2.27%	0.00	6.00	**NO**	2.98	2.37	3.79	2.52	DDB, LS
15	24900 - 24950	-L-	LT	17	2GI	1.23	123.00	50	0.60%	0.00	6.00	**NO**	2.22	1.34	2.82	1.42	DDB, LS

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SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
16	1807 - 2650	-SR2-	LT	18	2GI	0.53	53.00	843	1.59%	0.00	6.00	**YES**	0.84	1.51	1.06	1.60	GS
16	2650 - 2883	-SR2-	LT	18	DITCH	0.13	13.00	233	1.25%	0.00	4.00	**YES**	0.21	1.07	0.26	1.13	GS
16	25600 - 26200	-L-	LT	18	2GI	1.01	101.00	600	1.66%	0.00	6.00	**YES**	1.87	1.87	2.38	1.99	GS, DDB
16	26200 - 26550	-L-	LT	18	DITCH	1.65	165.00	350	0.43%	0.00	6.00	**YES**	2.98	1.27	3.79	1.35	GS, DDB
16	26550 - 26800	-L-	LT	18	DITCH	1.65	165.00	250	2.78%	0.00	6.00	**NO**	2.98	2.56	3.79	2.72	DDB
16	25600 - 26200	-L-	MD	18	2GI	1.29	129.00	600	0.90%	0.00	8.00	**YES**	2.91	1.55	3.70	1.65	GS, DDB
16	26200 - 26650	-L-	MD	18	2GI	0.97	97.00	450	0.46%	0.00	8.00	**YES**	2.19	1.13	2.78	1.20	GS, DDB
16	25600 - 26200	-L-	RT	18	2GI	1.22	122.00	600	0.90%	0.00	6.00	**YES**	2.92	1.66	3.71	1.77	GS, DDB
16	26200 - 26650	-L-	RT	18	2GI	1.22	122.00	450	0.46%	0.00	6.00	**YES**	2.59	1.26	3.29	1.34	GS, DDB
16	26300 - 26650	-L-	RT	18	BDOS	3.01	301.00	350	5.50%	2.00	2.00	**NO**	6.11	4.28	7.77	4.58	OFFSITE

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Grass Swale Comps

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Date: 3/20/2009

Dsn. By: JRR

Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
17	3650 - 4060	-SR2-	LT	18	2GI	0.29	29.00	410	2.35%	0.00	4.00	**YES**	0.48	1.67	0.62	1.78	GS, DDB
17	27100 - 27500	-L-	LT	18	2GI	1.32	132.00	400	2.38%	0.00	6.00	**NO**	2.68	2.35	3.41	2.50	DDB
17	27500 - 27819	-L-	LT	18	2GI	0.93	93.00	319	2.22%	0.00	7.00	**YES**	1.76	1.99	2.24	2.11	GS, DDB
17	26650 - 27050	-L-	MD	18	2GI	0.86	86.00	400	0.59%	0.00	8.00	**YES**	1.94	1.20	2.47	1.28	GS, DDB
17	27050 - 27750	-L-	MD	18	2GI	1.51	151.00	700	0.60%	0.00	8.00	**YES**	3.41	1.39	4.33	1.47	GS, DDB
17	27750 - 28100	-L-	MD	18	2GI	0.73	73.00	350	0.59%	0.00	8.00	**YES**	1.61	1.14	2.05	1.21	GS, DDB
17	26650 - 27050	-L-	RT	18	2GI	1.12	112.00	400	0.60%	0.00	6.00	**YES**	2.37	1.36	3.02	1.44	GS, DDB
17	27050 - 27750	-L-	RT	18	2GI	1.99	199.00	700	0.60%	0.00	6.00	**YES**	4.13	1.56	5.25	1.66	GS, DDB
17	27750 - 28100	-L-	RT	18	2GI	0.98	98.00	350	0.53%	0.00	6.00	**YES**	2.08	1.25	2.64	1.33	GS, DDB
17	26650 - 26850	-L-	RT	18	BDOS	0.75	75.00	200	5.05%	0.00	2.00	**NO**	1.52	3.39	1.94	3.60	OFFSITE
17	26850 - 27050	-L-	RT	18	BDOS	1.46	146.00	200	3.84%	0.00	2.00	**NO**	2.96	3.62	3.77	3.84	OFFSITE
17	27050 - 27250	-L-	RT	18	BDOS	1.48	148.00	200	5.00%	0.00	2.00	**NO**	3.00	4.00	3.82	4.25	OFFSITE

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Dsn. By: JRR
Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
18	4324 - 4714	-SR2-	LT	18	2GI	0.44	44.00	390	1.82%	0.00	4.00	**YES**	0.89	1.77	1.14	1.88	GS, DDB
18	5047 - 5500	-SR2-	LT	19	DITCH	1.63	163.00	453	6.07%	2.00	2.00	**NO**	3.09	3.61	3.93	3.89	NONE
18	5507 - 5800	-SR2-	RT	19	DITCH	1.47	147.00	293	6.93%	2.00	2.00	**NO**	2.39	3.49	3.04	3.76	NONE
18	28050 - 28400	-L-	LT	19	DITCH	1.01	101.00	350	1.97%	0.00	6.00	**YES**	1.80	1.98	2.29	2.11	GS, DDB
18	28400 - 28850	-L-	LT	19	DITCH	1.44	144.00	450	0.33%	0.00	6.00	**YES**	2.92	1.14	3.72	1.21	GS, DDB
18	29100 - 29200	-L-	LT	19	DITCH	2.57	257.00	100	2.18%	2.00	2.00	**NO**	4.98	3.19	6.34	3.42	DDB
18	29200 - 29250	-L-	LT	19	DITCH	0.77	77.00	50	5.56%	2.00	2.00	**NO**	1.74	3.21	2.21	3.46	DDB
18	28100 - 28500	-L-	MD	19	2GI	0.64	64.00	400	0.59%	0.00	8.00	**YES**	1.07	1.04	1.36	1.10	GS, DDB
18	28500 - 28860	-L-	MD	19	2GI	0.58	58.00	360	0.51%	0.00	8.00	**YES**	0.97	0.95	1.23	1.01	GS, DDB
18	28860 - 28900	-L-	MD	19	2GI	0.06	6.00	40	0.13%	0.00	8.00	**YES**	0.10	0.32	0.13	0.34	GS, DDB
18	28900 - 29100	-L-	MD	19	2GI	0.32	32.00	200	0.75%	0.00	8.00	**YES**	0.53	0.95	0.68	1.01	GS, DDB
18	28100 - 28500	-L-	RT	19	2GI	1.10	110.00	400	0.60%	0.00	6.00	**YES**	2.33	1.35	2.97	1.44	GS, DDB
18	28500 - 28860	-L-	RT	19	2GI	0.93	93.00	360	0.51%	0.00	6.00	**YES**	1.97	1.22	2.51	1.29	GS, DDB

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Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
19	29250 - 29600	-L-	LT	19	2GI	0.77	77.00	350	2.05%	0.00	6.00	**YES**	1.74	1.99	2.21	2.12	GS, DDB
19	29600 - 29878	-L-	LT	19	2GI	0.60	60.00	278	1.56%	0.00	6.00	**YES**	1.41	1.71	1.79	1.81	GS, DDB
19	29878 - 30100	-L-	LT	19	2GI	0.42	42.00	222	1.09%	0.00	6.00	**YES**	0.93	1.34	1.18	1.43	GS, DDB
19	30450 - 30842	-L-	LT	20	2GI	1.03	103.00	392	0.33%	0.00	6.00	**YES**	2.18	1.07	2.78	1.13	GS, DDB, LS
19	29100 - 29600	-L-	MD	19	2GI	0.80	80.00	500	1.94%	0.00	8.00	**YES**	1.33	1.71	1.70	1.81	GS,DDB
19	29600 - 29950	-L-	MD	19	2GI	0.56	56.00	350	1.49%	0.00	8.00	**YES**	0.93	1.41	1.19	1.50	GS,DDB
19	29950 - 30557	-L-	MD	19	2GI	0.97	97.00	607	0.58%	0.00	8.00	**YES**	1.62	1.14	2.06	1.21	GS,DDB
19	29100 - 29600	-L-	RT	19	2GI	1.00	100.00	500	1.94%	0.00	6.00	**YES**	1.80	1.97	2.30	2.09	GS,DDB
19	29600 - 30018	-L-	RT	19	2GI	0.86	86.00	418	1.43%	0.00	6.00	**YES**	1.75	1.74	2.22	1.85	GS,DDB
19	30018 - 30200	-L-	RT	19	2GI	0.22	22.00	182	0.86%	0.00	6.00	**YES**	0.53	1.07	0.67	1.13	GS,DDB
19	30300 - 30758	-L-	RT	20	2GI	0.97	97.00	458	0.23%	0.00	6.00	**YES**	2.06	0.92	2.62	0.98	GS, DDB, LS
19	30100 - 30217	-L-	RT	19	BDO	0.76	76.00	117	5.18%	0.00	2.00	**NO**	1.37	3.33	1.74	3.54	OFFSITE
19	30217 - 30600	-L-	RT	19	BDO	4.20	420.00	383	4.71%	2.00	2.00	**NO**	7.58	4.30	9.64	4.60	OFFSITE
19	3550 - 3850	-Y5-	LT	19	BDO	1.31	131.00	300	4.97%	2.00	2.00	**NO**	3.90	3.62	4.96	3.88	NONE
19	2950 - 3205	-Y5-	LT	19	OPEN	0.50	50.00	255	2.24%	0.00	2.00	**NO**	1.01	2.26	1.29	2.40	OFFSITE

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Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
20	30850 - 31350	-L-	LT	20	2GI	1.07	107.00	500	1.02%	0.00	6.00	**YES**	2.51	1.68	3.19	1.78	GS, DDB, LS
20	31350 - 31750	-L-	LT	20	2GI	0.69	69.00	400	1.32%	0.00	6.00	**YES**	1.77	1.70	2.26	1.81	GS, DDB, LS
20	30800 - 31350	-L-	MD	20	2GI	0.88	88.00	550	0.97%	0.00	6.00	**YES**	1.47	1.44	1.87	1.53	GS, DDB, LS
20	31350 - 31750	-L-	MD	20	2GI	0.64	64.00	400	1.32%	0.00	6.00	**YES**	1.07	1.50	1.36	1.59	GS, DDB, LS
20	31750 - 32350	-L-	MD	20	2GI	0.88	88.00	600	1.32%	0.00	6.00	**YES**	1.47	1.62	1.87	1.72	GS, DDB, LS
20	30800 - 31350	-L-	RT	20	2GI	1.18	118.00	550	0.97%	0.00	6.00	**YES**	2.87	1.71	3.66	1.82	GS, DDB, LS
20	31350 - 31700	-L-	RT	20	2GI	0.62	62.00	350	1.32%	0.00	6.00	**YES**	1.57	1.65	1.99	1.75	GS, DDB, LS
20	1350 - 1727	-Y6-	LT	20	DITCH	0.35	35.00	377	4.58%	0.00	4.00	**NO**	0.76	2.41	0.96	2.55	NONE
20	2050 - 2241	-Y6-	LT	20	DITCH	0.26	26.00	191	0.23%	0.00	3.00	**NO**	0.53	0.75	0.67	0.80	NONE
20	1350 - 1500	-Y6-	RT	20	DITCH	0.28	28.00	150	4.19%	0.00	4.00	**NO**	0.61	2.20	0.77	2.34	NONE
20	1500 - 1750	-Y6-	RT	20	DITCH	0.19	19.00	250	3.52%	0.00	4.00	**YES**	0.44	1.90	0.56	2.02	GS
20	2100 - 2245	-Y6-	RT	20	DITCH	0.29	29.00	145	0.31%	0.00	3.00	**NO**	0.59	0.87	0.75	0.93	NONE
20	30557 - 30800	-L-	MD	20	2GI	0.88	88.00	243	0.23%	0.00	6.00	**YES**	1.47	0.85	1.87	0.90	GS, DDB, LS

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2 yr. velocity is less than or equal to 2 ft./sec.

Date: 3/20/2009

Dsn. By: JRR

Check: JRH

SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
21	32500 - 32850	-L-	LT	20	2GI	0.62	62.00	350	1.18%	0.00	6.00	**YES**	1.71	1.62	2.17	1.72	GS, DDB, LS
21	32350 - 32900	-L-	MD	20	2GI	0.96	96.00	550	1.32%	0.00	6.00	**YES**	1.60	1.66	2.04	1.76	GS, DDB, LS
21	32900 - 33200	-L-	MD	20	2GI	0.71	71.00	300	0.86%	0.00	6.00	**YES**	1.70	1.43	2.16	1.52	GS, DDB, LS
21	33200 - 33450	-L-	MD	20	2GI	0.73	73.00	250	0.41%	0.00	6.00	**YES**	1.74	1.09	2.22	1.16	GS, DDB, LS
21	32400 - 32500	-L-	RT	20	2GI	0.22	21.60	100	0.50%	0.00	6.00	**YES**	0.55	0.88	0.69	0.93	GS, DDB, LS
21	32500 - 32900	-L-	RT	20	2GI	0.86	86.00	400	1.32%	0.00	6.00	**YES**	2.21	1.80	2.81	1.91	GS, DDB, LS
21	32900 - 33200	-L-	RT	20	2GI	0.57	57.00	300	1.21%	0.00	6.00	**YES**	1.47	1.57	1.86	1.66	GS, DDB, LS

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22	33750 - 33900	-L-	LT	21	2GI	0.28	28.00	150	1.06%	0.00	6.00	**YES**	0.44	1.11	0.56	1.17	GS, DDB, LS
22	35150 - 35250	-L-	LT	21	2GI	0.42	42.00	100	0.30%	0.00	6.00	**YES**	1.06	0.86	1.35	0.91	GS, DDB
22	35250 - 36150	-L-	LT	n/a	2GI	2.20	220.00	900	0.39%	0.00	6.00	**YES**	4.86	1.39	6.19	1.47	GS
22	33450 - 33900	-L-	MD	21	2GI	0.94	94.00	450	0.41%	0.00	8.00	**YES**	2.29	1.09	2.91	1.16	GS, DDB, LS
22	33900 - 34200	-L-	MD	21	2GI	0.66	66.00	300	0.41%	0.00	8.00	**YES**	1.52	0.98	1.93	1.04	GS, DDB, LS
22	34200 - 34650	-L-	MD	21	2GI	0.84	84.00	450	0.38%	0.00	8.00	**YES**	1.67	0.98	2.12	1.04	GS, DDB, LS
22	34650 - 35150	-L-	MD	22	2GI	0.80	80.00	500	0.41%	0.00	8.00	**YES**	1.33	0.95	1.70	1.01	GS, DDB
22	35150 - 36150	-L-	MD	n/a	2GI	1.61	161.00	1000	0.42%	0.00	8.00	**YES**	2.69	1.14	3.42	1.21	GS
22	1488 - 1630	-RP2C-	LT	21	DITCH	0.45	45.00	142	1.68%	0.00	6.00	**YES**	1.40	1.75	1.78	1.86	GS, DDB, LS
22	34200 - 34550	-L-	RT	21	DITCH	1.21	121.00	350	0.92%	0.00	6.00	**YES**	2.51	1.62	3.19	1.72	GS, DDB, LS
22	34550 - 34700	-L-	RT	21	DITCH	1.70	170.00	150	4.65%	2.00	2.00	**NO**	3.37	3.71	4.29	3.99	DDB, LS
22	34700 - 34800	-L-	RT	21	DITCH	0.40	40.00	100	9.34%	0.00	4.00	**NO**	1.01	3.38	1.29	3.59	DDB, LS
22	35000 - 35200	-L-	RT	21	2GI	0.59	59.00	200	0.31%	0.00	4.00	**YES**	1.81	1.09	2.30	1.16	GS, DDB, LS
22	35200 - 36150	-L-	RT	n/a	2GI	2.33	233.00	950	0.42%	0.00	6.00	**YES**	5.04	1.43	6.42	1.52	GS
22	34050 - 34200	-L-	RT	21	2GI	0.45	45.00	150.00	0.25%	0.00	6.00	**YES**	1.40	0.86	1.78	0.92	GS, DDB, LS

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22	1197 - 1583	-RP2C-	RT	21	2GI	1.13	113.00	386	0.94%	0.00	6.00	**YES**	2.96	1.70	3.76	1.80	GS, DDB, LS
22	1583 - 1771	-RP2C-	RT	21	2GI	0.32	32.00	188	0.61%	0.00	6.00	**YES**	0.65	0.99	0.83	1.05	GS, DDB, LS
22	1771 - 2150	-RP2C-	RT	21	2GI	0.68	68.00	379	1.45%	0.00	6.00	**YES**	1.44	1.67	1.83	1.77	GS, DDB, LS
22	1630 - 1771	-RP2C-	LT	21	2GI	1.00	100.00	141	0.54%	0.00	6.00	**YES**	4.51	1.53	5.74	1.63	GS, DDB, LS
22	1771 - 2100	-RP2C-	LT	21	2GI	1.00	100.00	329	0.85%	0.00	6.00	**YES**	4.51	1.82	5.74	1.93	GS, DDB, LS
22	1380 - 2000	-RP2B-	LT	21	OPEN	0.91	91.00	620	2.05%	0.00	6.00	**YES**	1.68	1.98	2.14	2.10	GS, LS
22	2650 - 3070	-RP2B-	LT	21	DITCH	2.50	250.00	420	4.45%	2.00	2.00	**NO**	5.41	3.83	6.89	4.10	TIE TO EXIST. SWALE
22	1625 - 2100	-RP2B-	RT	21	DITCH	0.81	81.00	475	2.42%	0.00	6.00	**YES**	1.28	1.97	1.63	2.09	GS, LS
22	1440 - 1765	-RP2C-	RT	21	BDOS	1.88	188.00	325	1.60%	0.00	2.00	**NO**	2.97	2.60	3.78	2.77	OFFSITE
22	1765 - 1900	-RP2C-	RT	21	BDOS	1.11	111.00	135	3.93%	0.00	2.00	**NO**	1.75	3.20	2.23	3.39	OFFSITE
22	320 - 544	-LP2C-	RT	21	OPEN	1.40	140.00	224	1.81%	0.00	2.00	**NO**	2.27	2.55	2.89	2.71	DDB, LS
22	180 - 400	-LP2C-	LT	21	DITCH	1.87	187.00	220	1.35%	0.00	2.00	**NO**	3.71	2.58	4.72	2.74	NONE
22	400 - 450	-LP2C-	LT	21	OTCB	1.87	187.00	50	0.26%	2.00	2.00	**NO**	3.71	1.36	4.72	1.46	NONE
22	194 - 400	-LP2B-	RT	21	DITCH	0.56	56.00	206	3.91%	0.00	2.00	**NO**	0.88	2.69	1.13	2.86	DDB
22	650 - 850	-LP2B-	RT	21	DITCH	0.38	38.00	200	3.25%	0.00	2.00	**NO**	0.75	2.41	0.96	2.56	DDB

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SHT.	Station Range	Align	Side	Site	Type	D.A. (ac)	Required length for treatment	Actual Length	Slope	Base Width	Side Slope	Treated Discharge	Q2 (cfs)	Q2 vel. (fps)	Q10 (cfs)	Q10 vel. (fps)	Treatment Provided
22	3600 - 3700	Y7	LT	21	OPEN	0.20	20.00	100	0.50%	2.00	3.00	**YES**	0.45	0.88	0.57	0.95	ON RR SIDE
22	3700 - 4550	Y7	LT	21	OPEN	1.22	122.00	850	1.05%	2.00	3.00	**YES**	2.31	1.85	2.94	1.98	ON RR SIDE
22	1982 - 2632	-NSRR-	RT	21	OPEN	0.36	36.00	650	0.66%	5.00	2.00	**NO**	0.65	0.89	0.83	0.97	NONE
22	33450 - 33600	L	LT	21	2GI	0.28	28.00	150	0.50%	0.00	6.00	**YES**	0.40	0.82	0.51	0.87	GS, DDB, LS
22	33600 - 33750	L	LT	21	DITCH	0.28	28.00	150	1.68%	0.00	6.00	**YES**	0.40	1.28	0.51	1.36	GS, DDB, LS
22																	
22	2100 - 2150	RP2B	RT	21	DITCH	0.81	81.00	50	0.46%	0.00	6.00	**NO**	1.68	1.13	2.14	1.20	LS
22	2150 - 2195	RP2B	RT	21	DITCH	0.81	81.00	45	0.27%	0.00	4.00	**NO**	1.68	1.01	2.14	1.07	LS
22	450 - 550	LP2C	LT	21	DITCH	1.00	100.00	100	2.24%	0.00	2.00	**NO**	2.07	2.70	2.64	2.87	NONE
22	1435 - 1982	-NSRR-	RT	21	OPEN	0.23	23.00	547	0.58%	5.00	2.00	**NO**	0.41	0.72	0.53	0.79	NONE
22	2100 - 2632	-NSRR-	LT	n/a	DITCH	0.32	32.00	532	0.54%	5.00	2.00	**NO**	0.58	0.80	0.73	0.87	NONE
22	1832 - 2100	-NSRR-	LT	n/a	DITCH	0.37	37.00	268	0.78%	5.00	2.00	**NO**	0.67	0.94	0.85	1.03	NONE
22	1682 - 1832	-NSRR-	LT	n/a	DITCH	0.20	20.00	150	0.27%	5.00	2.00	**NO**	0.36	0.54	0.46	0.59	NONE
22	2100 - 1950	-NSRR-	LT	n/a	DITCH	0.69	69.00	192	1.04%	5.00	2.00	**NO**	1.24	1.30	1.58	1.42	NONE

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Subject: Minutes from the **Interagency 4B/4C Combined Concurrence Meeting** for Hydraulic Design & Permit Drawings Review on January 13, 2008 for **R-2606B in Randolph County**

Team Members Present:
Richard Spencer - USACE
Gary Jordan - USFWS
Travis Wilson - NCWRC
Amy Euliss - NCDWQ
Kathy Matthews - EPA
Teresa Bruton - ADU
Michael Penney - PDEA
Brett Feulner - NEU
Nilesh Surti - ADU
John Partin – Division 8
John Olinger – Division 8
Jeff Loflin – Division 8
Jackie Armstrong - ADU
Jeff Garland - ADU
Jennifer Parish - REU
Mark Staley - REU
Lonnie Brooks – Structure Design
Chris Militscher - EPA

Other Participants:
Jonathan Henderson, HDR
John Jamison, HDR
James Rice, HDR
Paul Meehan, HDR
Greg Kempf, HDR
Will Moody, HDR
Vickie Miller, HDR
Phil May, Carolina Ecosystems
Drew Johnson, Barnhill
Lewis Cuthrell, Barnhill
Michael Taylor, Barnhill
Anne Gamber - Hydraulics

General introduction of the project was initiated by Teresa Bruton. Introductions were made by all in attendance. Jonathan Henderson, hydraulic design engineer for the Barnhill/HDR Design-Build team, initiated the review by describing the overall project. The combined 4B/4C Concurrence Meeting was based on agency discussions during the interchange configuration meeting in the fall. Watershed locations were reviewed, as well as the lack of need for borrow and waste sites since the job is balanced. The 311/railroad crossing has been flipped, thereby reducing impacts, and the 220 interchange was reconfigured to minimize impacts to Back Creek. Grass swale data has been provided at each ditch, but this does not necessarily mean a ditch meets criteria for grass swale credit. The project is scheduled to go to construction in Summer 2009. Two handouts (Permit Impact Summary Table and Permit Site Descriptions) were passed out to those in attendance.

Amy Euliss initially mentioned the Team may prefer a separate buffer meeting to discuss those impacts, as most of the agencies wouldn't be involved with buffers. Jonathan Henderson responded the intent is the discussions of buffers would be in conjunction with the discussion of stream/wetland impacts and the hydraulic design, and it would be difficult to split up the meeting that way.

After this discussion, every plan sheet was reviewed and mitigation sites were discussed.

Sheets 4-6:

These sheets were covered in the R-2606A portion of the project. The fine grading is part of R-2606A, so this will only be paving. No impact sites.

Sheet 6:

Grading for the R-2606B project begins on this sheet. No jurisdictional sites appear on this sheet.

Sheet 7:

Amy Euliss asked if the pond still exists at this site.
John Jamison responded the pond is no longer there and all that remains is a small pool with vegetation, which would likely be considered wetland. There will be no impact to this location.

Kathy Matthews asked how much of the wetland will be left on the north side of Site 13 and suggested it be viewed as a total take due to its small area.
Richard Spencer agreed it should be a total take because of the disruption to the system.

Richard Spencer asked how much of the tributary to the west is jurisdictional, if the stream section should also be a total take, and voiced concerns we may be missing something.
John Jamison stated there is a breakpoint on the stream where it goes from being a grass swale to a stream. This channel and impact are shown in the wetland plan set accurately.

Richard Spencer asked the location of the mitigation sites.
Jonathan Henderson answered they are on Sheets 7 and 8, west of the alignment.

Travis Wilson asked if the stream at the culvert was perennial and reminded no riprap should be placed in the channel.
Jonathan Henderson answered the stream was perennial at the outlet and the channel note would be included.
Note to "not place rock in bed of jurisdictional streams" will be added to all plan sheets.

Anne Gamber asked about the constructability of the hazardous spill basin.
Jonathan Henderson answered there is room for the basin in this area but it is close to the wetland/former pond.
Anne Gamber asked if there is room for adequate erosion control measures in this location.

Jonathan Henderson answered there will be orange fencing in the area to mark the extents of the wetlands to keep the contractor from inadvertently impacting the wetlands; in addition, the contractor is present at this meeting, which allows them to hear the concerns about constructability of these measures.
Richard Spencer shared the same concerns as Anne and noted he was OK as long as all impacts, including erosion control measures, stayed out of the adjacent wetlands.
Jonathan Henderson stated the basin area would be used as an erosion control basin first and then converted to the detention basin. Construction in this area would be performed from the roadway side and no additional clearing would be needed.

Sheet 8:

Kathy Matthews asked about the stream missing at the bottom of the sheet.
John Jamison stated it was an issue with planimetric files, but is shown in the mitigation plans.
Kathy Matthews discussed that often if these features are not shown on the plans then during construction the features inadvertently get impacted as the contractor may not realize the feature is jurisdictional if it is missing from their plan sets.
John Jamison stated the stream bank limits will be added to the planimetrics as appropriate.

Amy Euliss voiced concern about having the two stream channels going into the single barrel culvert.
James Rice stated this is part of the mitigation site and the channels are to tie into one single channel prior to entering the single barrel.
Inlet is protected by rip-rap. If mitigation goes forward at this site any design changes will be coordinated with the Hydraulics Unit and the Natural Environment Unit.

Amy Euliss asked where the intermittent stream begins.
Jonathan Henderson stated it begins about 20' above the pipe outlet.

Sheet 9:

Amy Euliss asked why there is not a level spreader for the hazardous spill basin and this should be addressed/justified in the Randleman Buffer variance request.
Jonathan Henderson responded the site is between the service road and the alignment, and there isn't any room for a level spreader. The basins within this area cannot have an emergency spillway and therefore the outlet pipe must be sized for the 50-year storm. This size of pipe would require an infeasible length of level spreader. Therefore direct discharge from the pipe is required, but below a 50-year storm the discharge would be through a much smaller orifice.

Kathy Matthews asked if there was a way to outlet to the left or north rather than directly into the stream.

Jonathan Henderson answered it was proposed this way because of the steep topography at this location, and the size of the pipe was for the 50-year storm.

Amy Euliss reminded this will require a major variance for buffers.

Amy Euliss asked if the 15" pipe near site 14 discharged outside the basin.
Jonathan Henderson stated this discharge is routed to the basin through a ditch.

Amy Euliss asked about the sharp bend in the stream at Site 14 and voiced concerns of bank erosion/instability and whether there is anything that can be done to help the alignment of the pipe, perhaps by shifting to the left.
John Jamison stated to shift the pipe would require excavation of the opposite bank.
Jonathan Henderson stated rock stabilization is provided for the outlet.

Sheet 10:

This is a continuation of the previous site. Anne Gamber stated the lateral ditch conveyed only off-site drainage. Shoulder berm gutter has been extended 50 feet to begin at Station 176+00 to catch roadway runoff.

Sheet 11:

Anne Gamber asked if the bypass channel is in excavation.
Jonathan Henderson answered it is excavated, the numbers are included in the permit impact summary, and the bypass channel impacts were required to tie into an existing drainage feature rather than release the bypass flow into the general wetland.

Sheet 12:

No comments were made on this sheet.

Sheet 13:

Amy Euliss asked if the lateral ditch was going to the hazardous spill basin.
Jonathan Henderson answered yes.

Sheet 14:

Amy Euliss was concerned the level spreader to the west was going into a steep area and asked about the slope in that area.
James Rice answered it just met the 8% cutoff for design at 7.9% and the only alternate option at this location is to not provide the BMP.
Amy Euliss said during construction we may want to review this area again and discuss if the measure is appropriate at this location.

Sheet 15:

Amy Euliss suggested the channel outside the ROW at the bottom of the plan sheet should have buffers shown to keep the contractor out of the jurisdictional areas during construction.
John Jamison said they would check whether this was a buffered stream and show buffers if appropriate.

Sheet 16:

Jonathan Henderson stated this sheet shows the noise berm being proposed in place of a noise wall. No comments were made on this sheet.

Sheet 17:

Kathy Matthews asked where the pipe outlet was in the southern hazardous spill basin.
Jonathan Henderson stated the outlet was into the 42" pipe crossing the alignment from the pond.

Sheet 18:

Anne Gamber noted on-site drainage was being conveyed through the buffers in a riprap lined ditch directly outletting to the stream.
Amy Euliss asked if there is an alternative to doing this.
Jonathan Henderson said the inputs are primarily off-site drainage with a small percentage of stormwater from the service road, less than 5%. Routing the stormwater separately from off-site was not practical since it would require two parallel ditches in steep topography. The service road is supered due to the curve at this location and therefore must drain to the north. Routing all this additional drainage through the basin would make the length increase significantly to the north, due to elevation constraints to the south. This would cause a short-circuiting of the flow within the basin from the lateral ditch and treatment time would not be provided.
Amy Euliss requested it be documented in the Buffer Variance if there is no possible alternative.
Anne Gamber asked if it was OK to outlet on-site drainage in a buffered stream.
Amy Euliss said yes, if it is not feasible or reasonable to otherwise treat it.

NOTE: Jonathan Henderson noted he intended to bring this identical issue up on Sheet 7 but was sidetracked by the other Sheet 7 discussions. Sheet 7 was re-evaluated based on the previous discussion of ditching on-site drainage into buffered streams.

Sheet 7:

Jonathan Henderson noted at this location it would be possible to catch the on-site drainage if the crown of the service road was changed.

Paul Meehan pointed out this goes against design standards and what drivers would expect to encounter.
John Olinger said they would prefer to maintain typical roadway design standards.
Amy Euliss said to maintain the design standards and to document in the buffer application why the on-site drainage is conveyed in the ditch at this location.
As a follow up to the meeting the design has been changed to reverse crown through this curve directing this discharge towards the L line and into the DDB provided. No documentation is required of DWQ for this change.

Sheet 19:

No comments were made on this sheet.

Sheet 20:

No comments were made on this sheet.

Sheet 21:

Jonathan Henderson stated the bypass channel at this level spreader would tie into the stream channel as there is no existing drainage feature to tie into. He then asked if this would be considered an exempt or allowable impact and not require mitigation.

Amy Euliss said she would check on the mitigation requirement for bypass channels.

Richard Spencer asked if the wetlands in this area are seeps.
John Jamison said they are bottomland hardwood forests perched on clay.
Richard Spencer shared concerns he thinks these may be ground water discharge areas since the wetlands climb the slopes.
John Jamison said he may not have looked at the specific area Richard was concerned with and agreed there may be a groundwater component to the hydrology, particularly up into those valleys.
Richard Spencer stated the road embankment will alter the hydrology of these sites, therefore they should be considered total takes.

Sheet 22:

Amy Euliss asked if we can show the small segment of stream within the interchange originating between Ramp 2B and Loop 2B will be stable due to the stormwater discharges being proposed.
Jonathan Henderson suggested this discussion be held until review of the mitigation sites.

Amy Euliss asked if the absence of a level spreader on the outlet of the basin inside Loop 2B is due to steep topography.
Jonathan Henderson verified that topography was the obstacle at this location.

Amy Euliss voiced concern about the stability of the two channels and their alignment in the steep area. She suggested it was a total take and requested we make certain the outlet on the intermittent reach didn't cause instability of the channel. If it is determined to not be a total take, then make certain it is a stable reach and discuss in the permit.
Jonathan Henderson stated this issue would be investigated and addressed in the permit application.

Sheet 23:

No comments were made on this sheet.

Sheets 24 and 25:

Amy Euliss asked where the ditch ties-in near the match line between these sheets, and if it was entering the channel at a 90° angle. If so, can it be shifted to enter the channel at a better angle for stability?
Jonathan Henderson stated this ditch ties in at the riprap outlet of the culvert at a similar angle to the existing stream channel.

Anne Gamber noted there are several places on the project where drainage boxes emptied dirtectly into streams.

Amy Euliss asked if the velocity warranted the riprap ditch.
Jonathan Henderson said the topography on this portion of the job is steeper than the other basin and riprap was required for stability.
John Jamison asked if this should be considered a total take of the channel. It is intermittent above the inlet on Sheet 25.
Kathy Matthews asked how much of the stream would be remaining after the roadway is built.
Jonathan Henderson said 80' to 100' would remain.
Kathy Matthews suggested this is a total take.
Richard Spencer said the habitat upstream would be impacted and therefore should be considered a total take above the culvert.
Travis Wilson asked why the pipe was so large for the intermittent channel and if it was sized according to the watershed area.
Jonathan Henderson said it was designed for the drainage area.

Sheet 26:

John Jamison asked for confirmation the small wetland at the outlet of the 48" pipe would be considered a total take.
Kathy Matthews and Richard Spencer agreed it would be a take.

Richard Spencer asked if the stream running along the alignment is intermittent.

John Jamison said it was classified as intermittent with unimportant aquatic function, and barely met the 19 point threshold on the NCDWQ stream classification form.
Richard shared concerns this may be groundwater fed and could cause issues during construction. He suggested evaluating if a spring is present at this location, in case a spring box was necessary.
John Jamison said the site will be reviewed again in the field to determine if a groundwater discharge is present, and a spring box will be added if necessary.

Anne Gamber mentioned there is a lot of roadway drainage in this area that is not getting treatment.
Richard Spencer concurred with Anne but stated the steep topography didn't provide any alternatives.

Sheets 27 & 28:

Amy Euliss asked what will be done to stabilize the channel bed when the pond is drained.
Jonathan Henderson said this had not been determined at this time.
Amy Euliss said on previous sections of the US 311 Bypass the permit requested a channel through a drained pond be stabilized via methods determined in the field during construction.
Jonathan Henderson agreed this condition would be added to the permit application.

Mark Staley asked why the pond impacts were missing from the impact summary table.
John Jamison showed the table was off by one line for that site but the impacts were in the table. This has already been fixed in the current impact table but was not caught in time to distribute prior to the meeting.

Sheet 29:

Anne Gamber suggested additional boxes could be routed to the pre-formed scour hole to get more treatment at this location. Also the system could be revised to outlet into another pre-formed scour hole at the inlet side of the culvert. This change has been made.
Kathy Matthews agreed that it would be good to redirect more flow to that BMP, since a lot of water is being routed to the smaller stream channel.
Jonathan Henderson said those discussions had occurred during design, but could not remember why this was not incorporated.
Anne Gamber suggested it was because it would add boxes or depth to systems the contractor did not want to provide.
Joanthan Henderson noted it would only add minimal depth, 1' or so, and it looked like there is potential to reroute some of this drainage to the preformed scour hole. This area will be re-investigated.

Amy Euliss asked if the tributary channel is tied-in through the riprap protection at the culvert outlet and if this impact is accounted for.

Jonathan Henderson said the impact is counted, and no riprap is placed in the channel bottom of either channel.
Anne Gamber stated the better view of this tie-in is in the detail sheets of the permit. The plan sheet note "to not place rip-rap in the bed of jurisdictional streams" will help ensure that this tie-in is constructed appropriately.

Sheet 30:

Jonathan Henderson asked if the wetland below the pond would be considered a total take.
Richard Spencer suggested a total take of this wetland since the hydrology is altered and the discharge is untreated.
Anne Gamber stated the discharge is getting grass swale treatment.
Jonathan Henderson noted the grass swale is providing some treatment but does not meet NCDWQ standards for this BMP.
Richard Spencer stated it would still be considered a total take.

Sheet 31:

Amy Euliss was concerned with the stability of the southernmost stream channel and the angle at which the cross pipe and stormwater pipe were discharging.
Anne Gamber suggested shifting the cross pipe to better align with the stream near the ROW and tying in the stormwater drainage.
James Rice stated this would require daylighting the pipe and ditching it perpendicular to the fill slope.
Amy Euliss felt that this would help at this location.
Jonathan Henderson stated this area will be re-investigated.

Richard Spencer suggested including a statement in the drawings that pipes should be adjusted accordingly in the field (field adjustment) to properly align with stream channels. This note should be on the permit set and in the construction drawings, realizing the survey data may not show the stream in its exact location. Any such "field adjustment" would not require a permit modification.

Sheet 32:

Kathy Matthews asked about the daylighted section of the stream at Site 30 internal to Loop 3CA. It may be a total take since it is such a small section, is in the middle of the interchange, and provides little habitat.
John Jamison said the channel was rerouted for the construction of US 220 and is stable, as it has cut down to either bedrock or cobble substrate.
Kathy Matthews, Travis Wilson, and Richard Spencer agreed it needs to be included as an impact between the pipes.

Amy Euliss expressed concern regarding the stability of the remaining downstream section of this stream due to the increased stormwater, and suggested extending riprap down this segment should be considered.
Jonathan Henderson said the use of additional riprap at this location would be reviewed to make certain the project does not cause instability.

Jonathan Henderson brought up the opposite side of Back Creek where the base ditch discharges, and asked whether to count this as an impact.
Amy Euliss said to show it as a linear impact in the bank of Back Creek.
Richard Spencer agreed to show as a linear impact.

Mitigation Sites:

John Jamison started the discussions of the mitigation sites for the project discussing, noting right-of-way has not yet been acquired and the plans are all preliminary at this time.

Site CF-17, Main Channel

Kathy Matthews voiced concerns with moving the stream channel and felt it is in its historic location. She would prefer to see it left in the historic location with measures added for bank stability and cattle exclusion.
John Jamison stated the design was provided to eliminate sharp bends in the channel that were causing instability.
Travis Wilson said he concurred with Kathy Matthews and would prefer to discuss in depth at a field meeting. He suggested leaving the stream in place and laying back slopes as necessary.

Site CF-17, Tributary 2

Kathy Matthews asked if the wetland impacts of channel construction had been taken into account.
John Jamison said it was generally an on-site balance with the restoration of wetland within the current channel, and if we need to address beyond that we can discuss it further during the field review.

Kathy Matthews asked where Tributary 3 was located.
John Jamison showed the location on Sheet 4 and said it was being treated as Priority 3 restoration, with laying back slopes and no change to the channel alignment.

Amy Euliss asked if any of the tributaries were intermittent.
John Jamison said they are all perennial with the exception of Tributary 4, an intermittent tributary coming from under the alignment that is not proposed for mitigation.
Amy Euliss asked if the stream being intermittent was the only reason mitigation was not proposed on this tributary.

John Jamison stated the tributary was borderline intermittent/ephemeral and therefore mitigation is not proposed since it could convert to ephemeral if restoration were attempted.

Site CF-19

Kathy Matthews voiced concerns about the mature riparian area in this location. She would like to see it first before making a determination on mitigation, but stated the EPA has started to move away from impacting stable mature forests for full stream restoration.
Travis Wilson asked what the total length of the mitigation site is.
John Jamison responded it was approximately 1500 linear feet.

Site CF-21

Kathy Matthews, Travis Wilson, and Richard Spencer all agreed no channel mitigation should be proposed within the loop at the upstream end of this site.

Amy Euliss wanted to ensure the stability of the channel between LP2B and RP2B during and after construction. As a follow-up to the meeting an energy dissipater basin has been added at the outlet of the 30" RCP under RP2B and the outlet of the DDB in LP2B has been relocated outside the buffers.

General Comments on Mitigation

Amy Euliss asked if the reference reaches have the same stormwater quantity the restoration reaches will have.
James Rice said they do not but the restored streams are designed to account for the stormwater resulting from the project.

Kathy Matthews reiterated in general they are being more cognitive of mitigation sites with impacts to mature forested systems, etc.

Travis Wilson suggested not oversizing the channels to accommodate stormwater, but instead to design the floodplain to carry the stormwater flows.

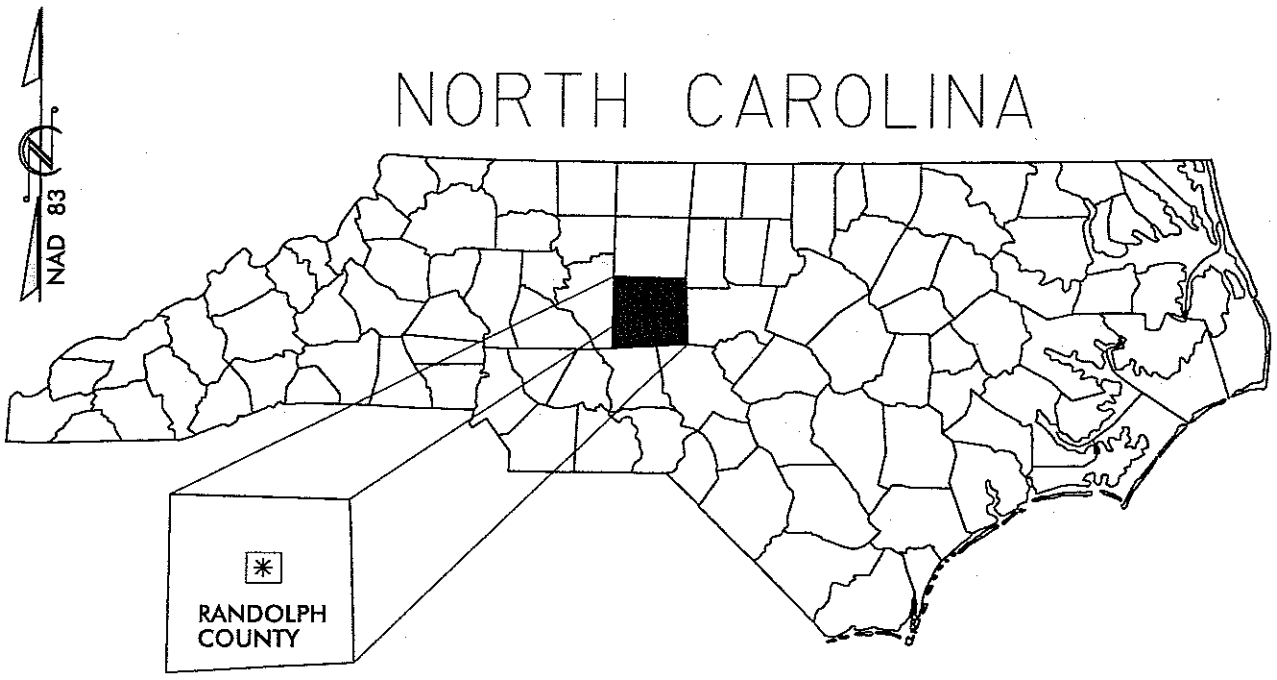
Brett Feulner will be arranging a field meeting for the agencies to review the mitigation sites sometime the 2nd week of February. Amy Euliss said she has only the 9th and 10th available at this time. The others will check their calendars and coordinate with Brett.

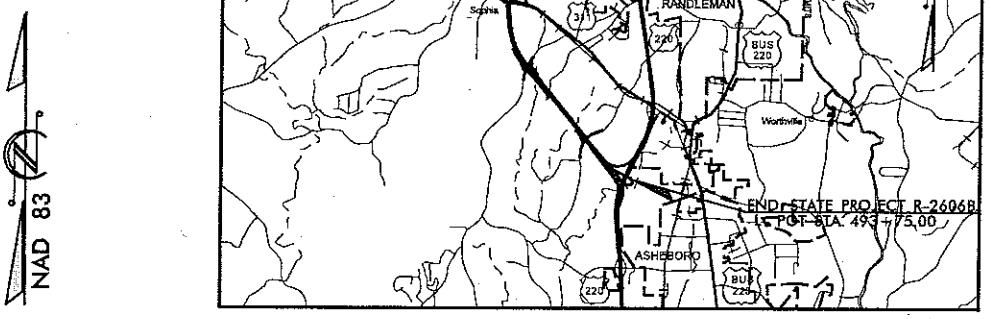
Meeting Adjourned

Note:

- As of 1/14/09, the aforementioned field meeting has been scheduled for February 9th at 10 AM.

- After the meeting, Anne Gamber called HDR to inquire whether there were any impacts associated with utility relocations. To clarify this point, all of the existing utilities follow the existing -Y- lines, and any associated utility work will be outside of jurisdictional/buffer areas.



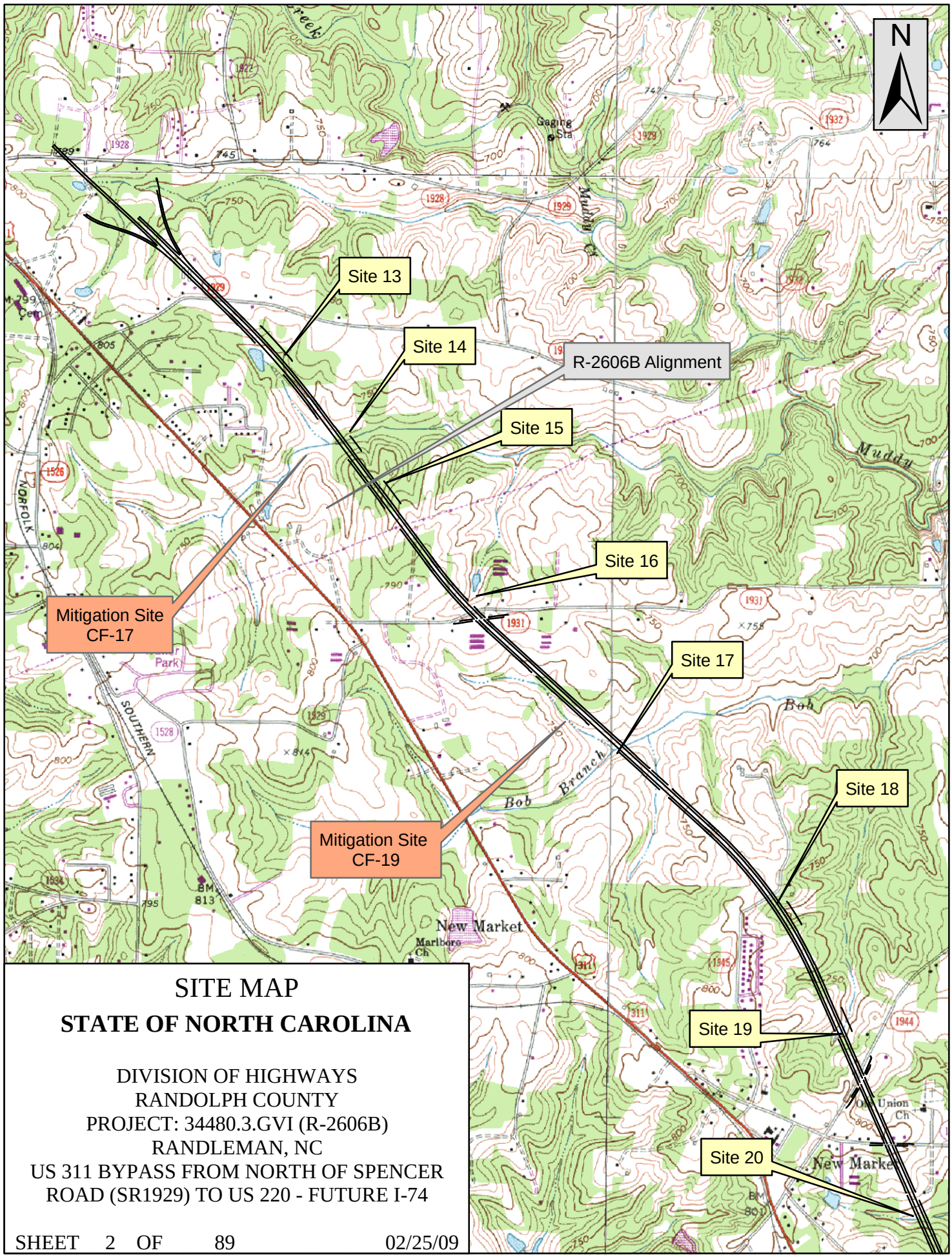


VICINITY MAPS

NORTH CAROLINA

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1920) TO US 220 - FUTURE I-74

SHEET 1 OF 89 **02/25/09**

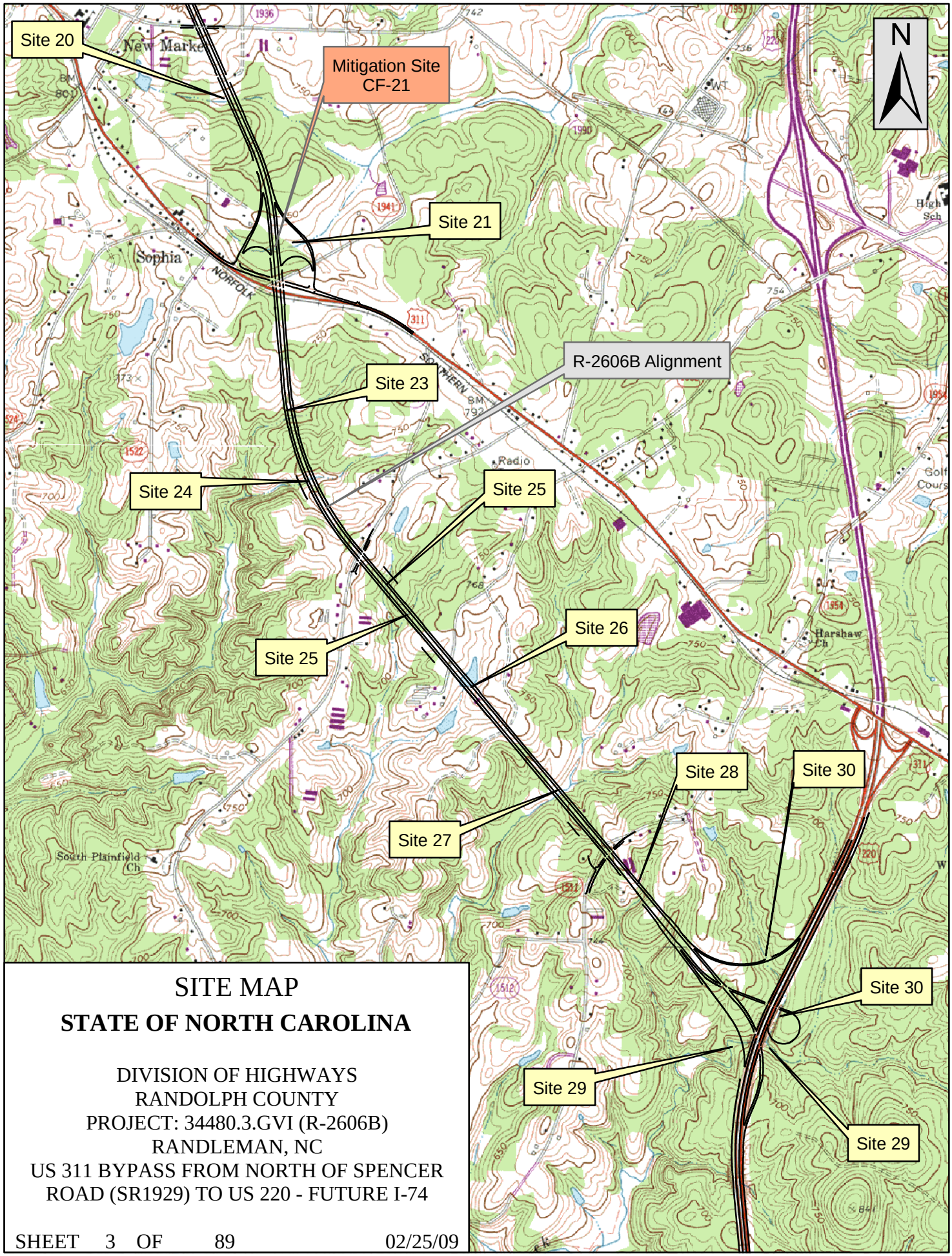


SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
RANDLEMAN, NC
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR1929) TO US 220 - FUTURE I-74

SHEET 2 OF 89 02/25/09



SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
RANDLEMAN, NC
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR1929) TO US 220 - FUTURE I-74

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
13	-L- Sta 143+75	cut/clearing			<0.01	0.01						
	-L- Sta 145+00 - 148+00	36" pipe/fill/cut	0.34		0.01			0.05		407		
	-L- Sta 146+40	36"pipe/fill						0.02		153		
14	-L- Sta 155+75 - 159+70	fill/clearing	0.45			0.03						TBD
	-L- Sta 159+30 - 159+70	18" pipe						<.01		27		
	-L- Sta 163+40 - 165+00	11' X 9' RCBC						0.21		431		
15	-L- Sta 174+50 - 175+10	fill/clearing	0.10			0.01						
	-L- Sta 175+10 - 179+25	36" pipe						0.07	<.01	586	15	
16	-L- Sta 195+00 - 196+80	fill/clearing	0.11		<.01	0.03						
17	-L- Sta 214+50 - 216+60 Rt	fill						0.01		18		
	-L- Sta 225+70 - 230+10 Rt	fill						0.08		157		
	-L- Sta 230+10 - 231+20	12' X 8' RCBC						0.09	0.01	270	35	TBD
	-L- Sta 237+50 - 239+50	8' X 7' RCBC						0.07	0.01	304	62	
18	-L- Sta 268+70 - 269+80 Lt	fill/clearing						0.01		161		
	-L- Sta 279+30 - 279+90	fill/clearing						0.06		314		
	-L- Sta 277+10 - 279+80	fill/drain pond						1.46				
19	-L- Sta 288+60 - 290+60	fill	0.15									
	-L- Sta 287+70 - 290+20	54 and 48" pipes						0.09		467		
20	-L- Sta 320+60 - 322+00	fill/clearing	0.39									
	-L- Sta 321+60 - 323+50	fill/clearing	0.37									
	-L- Sta 321+30 - 322+25	60" pipe						0.06		294		
	-L- Sta 321+50	bypass channel							<.01		14	
21	-L- Sta 346+20 - 346+80 Lt	54" pipe						0.02		110		TBD
	-L- Sta 347+00 - 347+60	48" pipe						0.16		892		
TOTALS:			1.91	0.00	0.01	0.08	0.00	2.45	0.02	4,591	126	TBD

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT 34480.3.GVI (R-2606B)
RANDOLPH COUNTY
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1929) TO US 220 - FUTURE I-74

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)
23	-L- Sta 373+20 - 374+20 Rt	fill						0.03		130		
	-L- Sta 374+00 - 374+40	60" pipe						0.05		350		
	-L- Sta 380+10 - 381+00 Rt	24" pipe						0.04		165		
24	-L- Sta 384+90 - 385+60	fill	0.03									
	-L- Sta 384+70 - 385+40	48" pipe						0.11		475		
	-L- Sta 384+90 - 392+80	36" pipe/ditch						0.23		1035		
25	-L- Sta 401+40 - 405+30	fill						0.11		496		
	-L- Sta 404+80 - 409+70	48" pipe						0.20		855		
	-L- Sta 405+00 - 405+25 Lt	fill	0.01									
	-L- Sta 407+25 - 408+00 Rt	ditch						0.03		124		
	-L- Sta 409+25 - 409+90 Rt	fill/clearing	0.01									
	-L- Sta 411+70 - 412+80	48" pipe						0.11	<.01	435	25	
26	-L- Sta 425+60 - 427+50	fill/drain pond						1.57				
	-L- Sta 427+10 - 427+80	fill/clearing	<0.01			<0.01						
	-L- Sta 425+70 - 427+80	36" pipe						0.07		322		
27	-L- Sta 445+80 - 445+90	18" pipe						0.02		96		
	-L- Sta 450+10 - 450+50	10' X 7' RCBC						0.09	0.01	363	39	
	-L- Sta 456+00 - 458+50 Rt	fill	0.19					0.05				
	-SR6- Sta 17+70 - 19+00	fill						0.03		136		
28	-L- Sta 470+20 - 471+60	36" pipe						0.10	<.01	444	15	
	-L- Sta 477+20 - 479+10	36" pipe						0.11	<.01	480	8	
29	-RP3C- Sta 50+40 - 51+40	10' X 9' RCBC ext.						0.08		341		
30	-Y12- 51+00 - 57+80	48" pipes						0.06		694		
	-RP3B- 25+00 - 26+10	42" pipe						0.02		285		
	-Y12- 27+25	54" extension						<.01		12		
	-Y12- 81+50	48" pipe						0.01		26		
TOTALS:			0.24	0.00	0.00	0.00	0.00	3.11	0.02	7,264	87	0
SHEET 1 AND 2 TOTALS:			2.15	0.00	0.01	0.08	0.00	5.56	0.04	11,855	213	TBD

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
1	RANDALL C. SPENCER	2989 Spencer Road Archdale, NC 27263	13
3	MILFRED C. FARLOW	2768 Bronzie Lawson Road Archdale, NC 27263	14
4	JAMES H. ROBERTS	7624 U.S. Hwy. 311 Archdale, NC 27263	14
5	LEWIS J. LOFLIN	4867 Edger Road Sophia, NC 27350	15
6	DANNY D. PUGH	301 Rosemont Avenue Concord, NC 28025	15
11	DONNA JACKSON	2625 Banner Whitehead Road Sophia, NC 27350	16
13	MICHAEL DAVIS & OTHERS	2625 Banner Whitehead Road Sophia, NC 27350	17
16	CLIFFORD W. LOFLIN	2410 Loflin Dairy Road Sophia, NC 27350	17
16A	PIEDMONT TRIAD REGOINAL WATER AUTHORITY	2216 W. Meadowview Road, Suite 204 Greensboro, NC 27407	17
18	MORRIS A. RICE	1924 Cedar Road Asheboro, NC 27203	18

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
19	JOHN & WILLIAM NELSON	4570 Nelson Park Road #7 Sophia, NC 27350	18
20	L.A.I. PROPERTIES	6202 Moores Creek Drive Summerfield, NC 27358	18
21	EDWARD L. LAWRENCE	4875 Branson Davis Road Sophia, NC 27350	19
22	NC DOT		19
42	MABEL FARLOW	5080 Walker Mill Road Sophia, NC 27350	20
43	ROY M. CROTTS	5082 Walker Mill Road Sophia, NC 27350	20
44	PHILIP TRACY WALL LIMITED PARTNERSHIP	536 Woodvale Drive Greensboro, NC 27410	21
45	RUSSEL GRAY	P.O. Box 55 Sophia, NC 27350	21
46	CHARLES & SPENCER HARTLEY	4916 Walker Mill Road Sophia, NC 27350	21
48	ACE / AVENT REAL PROPERTY COMPANY	109 Seminole Drive Archdale, NC 27263	23

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
49	ANNE M. CRAVEN	4025 Old Way Road Sophia, NC 27350	24
51	JAMES E. RICH	3060 Tower View Lane Sophia, NC 27350	24
51	JILL M. RICH	4689 Plainfield Road Sophia, NC 27350	24
54	LARRY NEWMAN	4609 Plainfield Road Sophia, NC 27350	24
58	BLANCHE POWELL (LE)	4694 Plainfield Road Sophia, NC 27350	25
59	RANDALL B. MATTHEWS	4570 Plainfield Road Sophia, NC 27350	25
62	KATHERINE ANN MCDOWELL	4534 Plainfield Road Sophia, NC 27350	25
64	WILL A. CULLER	4476 Plainfield Road Sophia, NC 27350	25
65	LEWIS MICHAEL LINTHICUM	3823 Old Courthouse Road Sophia, NC 27350	25
66	JAMES PATRICK LINTHICUM	3779 Old Courthouse Road Sophia, NC 27350	25

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
68	JUNE H. HILL	3754 Old Courthouse Road Sophia, NC 27350	26
68B	DAVID LEE JOHNSON	3934 Old Courthouse Road Sophia, NC 27350	26
70	KENNETH RAY HOLLINGSWORTH	731 Hollingsworth Road Randleman, NC 27317	27
72	ELIZABETH H. BULLINS	724 Hollingsworth Road Randleman, NC 27317	27
73	MILDRED FREEMAN	7420 Hwy. 49 South Denton, NC 27239	27
75	EUGENE HEATH	1350 Turner Dairy Road Randleman, NC 27317	27
85	JOHN M. LAMB	3794 Heath Dairy Road Randleman, NC 27317	28
92	ALFRED A. THOMAS	3568 Dairy Breeze Drive Randleman, NC 27317	28
93	VAN H. LEDBETTER	3221 Heath Dairy Road Randleman, NC 27317	28
94	ROBERT REID LEDBETTER	3221 Heath Dairy Road Randleman, NC 27317	29
95	JOHN L. DUNLAP	3800 Staley Snow Camp Road Staley, NC 27355	30

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

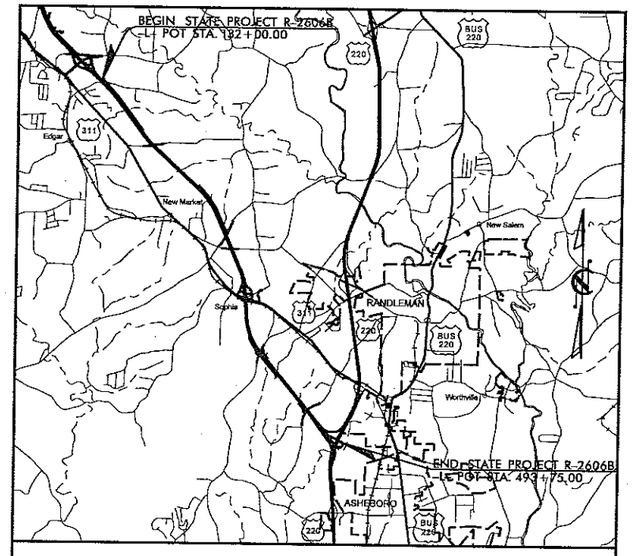
PROJECT: 34480.3.GVI (R-2606B)

09/08/99

TIP PROJECT: R-2606B

CONTRACT: C 201918

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34480.3.GVI	NHF-0311(23)	CONSTRUCTION	

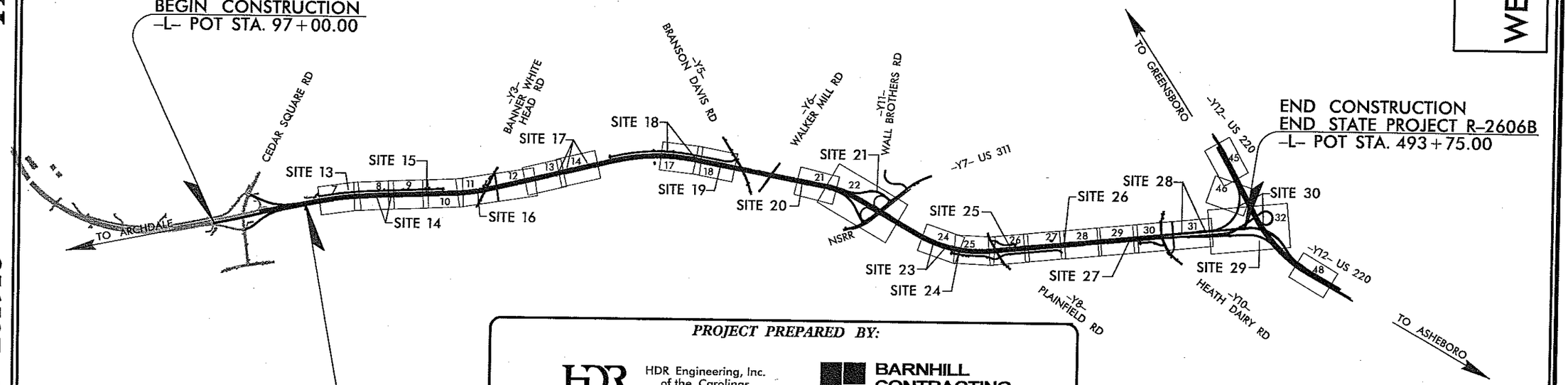
LOCATION: *US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1929) TO US 220 – FUTURE I-74*

TYPE OF WORK: *DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS*

NAD 83

2606B WETLAND SITE MAP

BEGIN CONSTRUCTION
-L- POT STA. 97+00.00



BEGIN STATE PROJECT R-2606B
-L- POT STA. 132+00.00

END CONSTRUCTION
END STATE PROJECT R-2606B
-L- POT STA. 493+75.00

PROJECT PREPARED BY:

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

PERMIT SHEET 10 OF 89

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 5 2.5 0 5 10

DESIGN DATA

ADT 2008 = 12,890
ADT 2030 = 27,400
DHV = 11 %
D = 60 %
T = 13 % *
V = 70 MPH

* TTST 6% DUAL 7%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2606B	=	6.851 MILES
LENGTH STRUCTURE TIP PROJECT R-2606B	=	0.000 MILES
TOTAL LENGTH STATE PROJECT R-2606B	=	6.851 MILES

DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: July 25, 2008

LETTING DATE: July 25, 2008

GREGORY KEMPF, P.E.
PROJECT ENGINEER

PAUL A. MEEHAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

3/17/2009
C:\PWorking\TPA\d0\49860\R2606B_hyd_permits_tsh.dgn
jmosser

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	7
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-L-
PI Sta 137+84.28
θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 41' 41.2" (RT)
D = 0° 27' 30.1"
L = 1700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PI Sta 156+18.17
θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 11+33.50
Δ = 48° 23' 33.7" (LT)
D = 22° 55' 05.9"
L = 211.15'
T = 112.34'
R = 250.00'
DS = 30 mph
e = 0.04

PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND

NAD 83

(1) RANDALL C. SPENCER
DB 1043 PG 223

-SR1- PRC Sta. 12+32.32

BEGIN PROP. R/W
STATE PROJ. R-2606B
-SR1- 60.59
75.00' LT

RANDALL C. SPENCER
DB 550, PG 28

PROP. SLOPE STAKES

PROP. R/W

-SR1- +62.00
90.00' LT

-SR1- +92.00
75.00' LT

-SR1- +50.00
75.00' LT

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

SITE 13

PROP. GUARDRAIL

+00, GRAU 350

-SR1-

PROP. C/A FENCE

SDG SEE DETAIL "D"

767.10'

-L- 50.94
135.00' LT

PROP. DBL FACE CBL GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

6.04 m CLEARANCE

2GI (D) W/ 15" GRATE

I-61, CAT-1 END SBG

2GI W/ FLAT GRATE

MATCHLINE STA. 138+00 -L- SEE SHEET NO. 6

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 8

+50, BEGIN SBG

BYPASS STRUCTURE

BYPASS CHANNEL

PROP. SHOULDER BERM GUTTER

LEVEL SPREADER

EMERGENCY OVERFLOW

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

30' DIAMETER FOREBAY CLASS 'B' RIP RAP 2:1 SIDES 3' DEEP

DRY DETENTION / HAZARDOUS SPILL BASIN

(1)

-L- SC Sta. 138+50.94

BEGIN PROP. R/W
STATE PROJ. R-2606B
-L- 19.70
160.00' RT

-L- 98.89
160.55' RT

-L- 95.50
160.00' RT

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

LATERAL "Y" DITCH SEE DETAIL "A"

POND

CLYDE R. SPENCER
DB 651 PG 354
DB 351 PG 112
DB 933 PG 82

(2) KEVEN D. ALBERTSON
DB 1908 PG 1928

PERMIT SHEET
11 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/11/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	7
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

-L-
PIs Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 49' 41.2" (RT)
D = 0° 27' 30.1"
L = 1700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PIs Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 11+33.50
Δ = 48° 23' 33.7" (LT)
D = 22° 55' 05.9"
L = 211.15'
T = 112.34'
R = 250.00'
DS = 30 mph
e = 0.04

PI Sta 21+31.39
Δ = 8° 01' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

-SR1- PRC Sta. 12+32.32

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND

NAD 83

SITE 13

MATCHLINE STA. 138+00 -L- SEE SHEET NO. 6

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 8

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

30' DIAMETER FOREBAY CLASS 'B' RIP RAP 2:1 SIDES 3' DEEP

DRY DETENTION / HAZARDOUS SPILL BASIN (1)

-L- SC Sta. 138+50.94

BYPASS STRUCTURE

BYPASS CHANNEL

LEVEL SPREADER

EMERGENCY OVERFLOW

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

LATERAL "C" DITCH SEE DETAIL "A"

PROP. SLOPE STAKES

PROP. GUARDRAIL

PROP. SHOULDER BERM GUTTER

PROP. DBL. FACE CBL. GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

6.04' CLEARANCE

2GI (D) W/ FLAT GRATE

16' GRATE

+61, CAT-1 END SBG

+00, GRAU 350

+50, BEGIN SBG

SDG SEE DETAIL "D"

PROP. C/A FENCE

EXISTING R/W

POND

(1)

(2)

PERMIT SHEET
12 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-6

WETLANDS WETLANDS

SR1
20+62.08

P
0.020
2:1
4.537:1
6:1
0.020
8:1
8:1
0.020
0.040
2:1

L
147+00.00
147+00.00

D.P. 747.429

147+00.00

2606B
PERMIT SITE 13

WETLANDS WETLANDS

SR1
20+11.40

P
0.020
2:1
4.647:1
6:1
0.020
8:1
8:1
0.020
0.040
2:1

L
146+50.00
146+50.00

D.P. 748.382

146+50.00

2606B
PERMIT SITE 13

WETLANDS WETLANDS

SR1
19+60.72

P
0.020
2:1
4.78:1
6:1
0.020
8:1
8:1
0.020
0.040
2:1

L
146+00.00
146+00.00

D.P. 749.470

146+00.00

2606B
PERMIT SITE 13

WETLANDS WETLANDS

SR1
19+10.03

P
0.020
2:1
5:1
6:1
0.020
8:1
8:1
0.020
0.040
2:1

L
145+50.00
145+50.00

745.378
S.S. 743.826
S.S. 744.794
D.P. 750.693
745.01
S.S. 742.906

145+50.00

2606B
PERMIT SITE 13

WETLANDS WETLANDS

SR1
18+59.35

P
0.020
2:1
5.279:1
6:1
0.020
8:1
8:1
0.020
0.040
2:1

L
145+00.00
145+00.00

747.106
S.S. 746.971
S.S. 747.005
D.P. 752.051
746.62
S.S. 742.520
739.79

145+00.00

2606B
PERMIT SITE 13

PERMIT SHEET
13 OF 89

2/25/2009
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imassroc

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-L-
PI Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 41' 41.2" (RT)
D = 0° 27' 30.1"
L = 1,700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PI Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1,795.13'
T = 899.01'
R = 12,670.00'
DS = 50 mph
e = NC

SITE 14

-SR1- PT Sta. 30+27.46

-L- CS Sta. 155+51.50

-L- ST Sta. 157+51.50

-L- 163+97.82
GP ELEV.=732.16
SKEW=11°
11'x9' RCBC BURIED 1'

S 36° 47' 19.7" E

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 7

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 9

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

NAD '83

3 ALFRED C. FARLOW DB 0SE PG 298

4 JAMES H. ROBERTS DB 1382 PG 70

2 DRY DETENTION / HAZARDOUS SPILL BASIN

3A ALFRED C FARLOW & OTHERS DB 0SE PG 298

PROP. R/W
PROP. SLOPE STAKES
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
SDG SEE DETAIL "D"
PROP. C/A FENCE
PROP. DBL FACE CBL. GUIDERAIL
6.0 in CLEARANCE
PROP. GUARDRAIL
LATERAL "Y" DITCH SEE DETAIL "A"
TOE PROTECTION SEE DETAIL "T"
CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC
2GI W/ SLAT GRATE
2GI W/ FLAT GRATE
NOTE: STABILIZE STREAM BANKS AT CULVERT INLETS
END C/A FENCE

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/3/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	8
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-L-
PI Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PI Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

NAD 83

SITE 14

-SR1- PT Sta. 30+27.46

-L- SEE SHEET NO. 7

MATCHLINE STA. 151+00 -L-

MATCHLINE STA. 164+00 -L-

-L- SEE SHEET NO. 9

-L- CS Sta. 155+51.50

-L- ST Std. 157+51.50

-L- 163+97.82
GP ELEV = 732.18'
SKEW = 11°
11'x9' RCBC BURIED 1'

S 36° 47' 19.7" E

PROP. SLOPE STAKES

CLASS "B" RIP RAP, EST. 5 TONS, 10 SY FILTER FABRIC

SDG SEE DETAIL "D"

LATERAL -Y- DITCH SEE DETAIL "A"

TOE PROTECTION SEE DETAIL "T"

DRY DETENTION / HAZARDOUS SPILL BASIN

PROP. GUARDRAIL

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET

END C/A FENCE

PROP. R/W

PROP. C/A FENCE

PROP. DB. FACE CRL. GUIDERAIL

6.0' \in CLEARANCE

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
15 OF 89

3/3/2009
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5/28/99

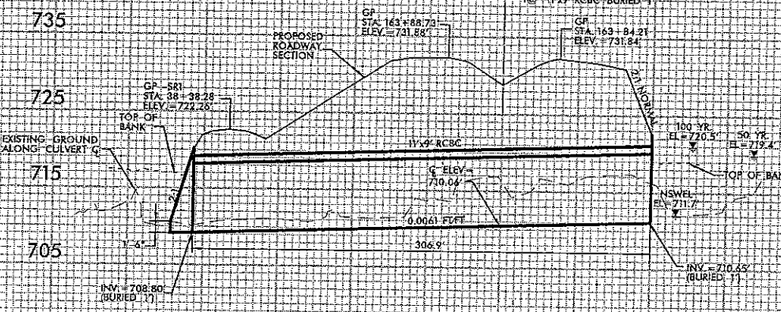
SITE 14 2606B

PROJECT REFERENCE NO.	SHEET NO.
R-2233AA	CSR-9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

*ALL DISTANCES MEASURED ALONG CENTERLINE OF CULVERT.
*DEBRIS POTENTIAL IS LOW.
*NO "UPSTREAM" STRUCTURES WILL BE IMPACTED



WSEL TABLE

YEAR	DISCHARGE (CFS)	NATURAL*	PROPOSED
10	360	717.1	714.9
50	650	719.01	719.4
100	800	719.9	720.5
500	1200	721.7	724.54

* NATURAL ELEVATIONS WERE CALCULATED BASED ON TAILWATER DEPTH @ CHANNEL INVERT @ UPSTREAM CULVERT FACE

PROFILE ALONG ℄ OF CULVERT

2/25/2009
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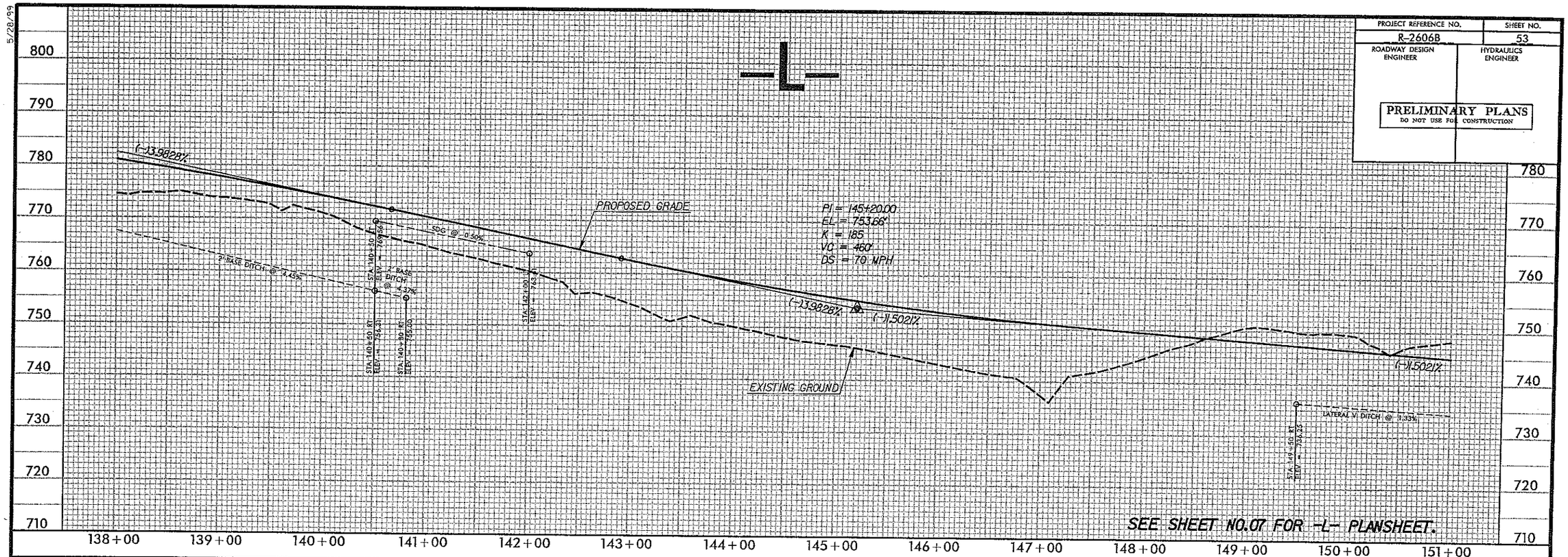
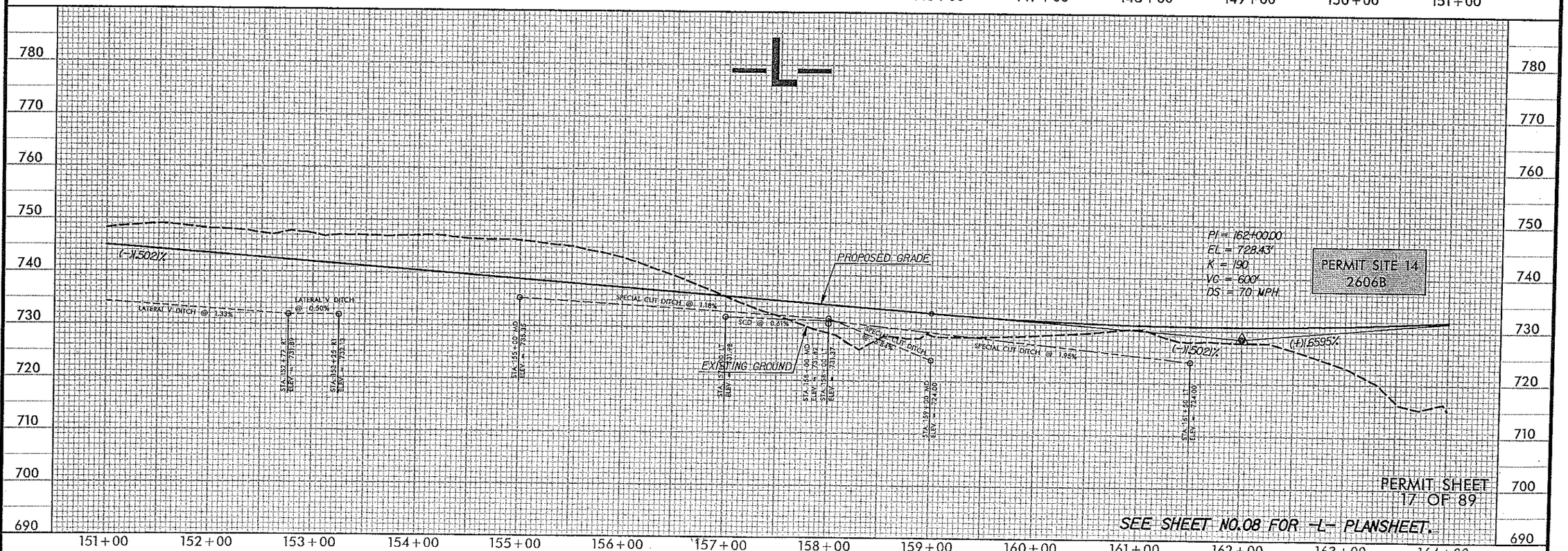
mossco

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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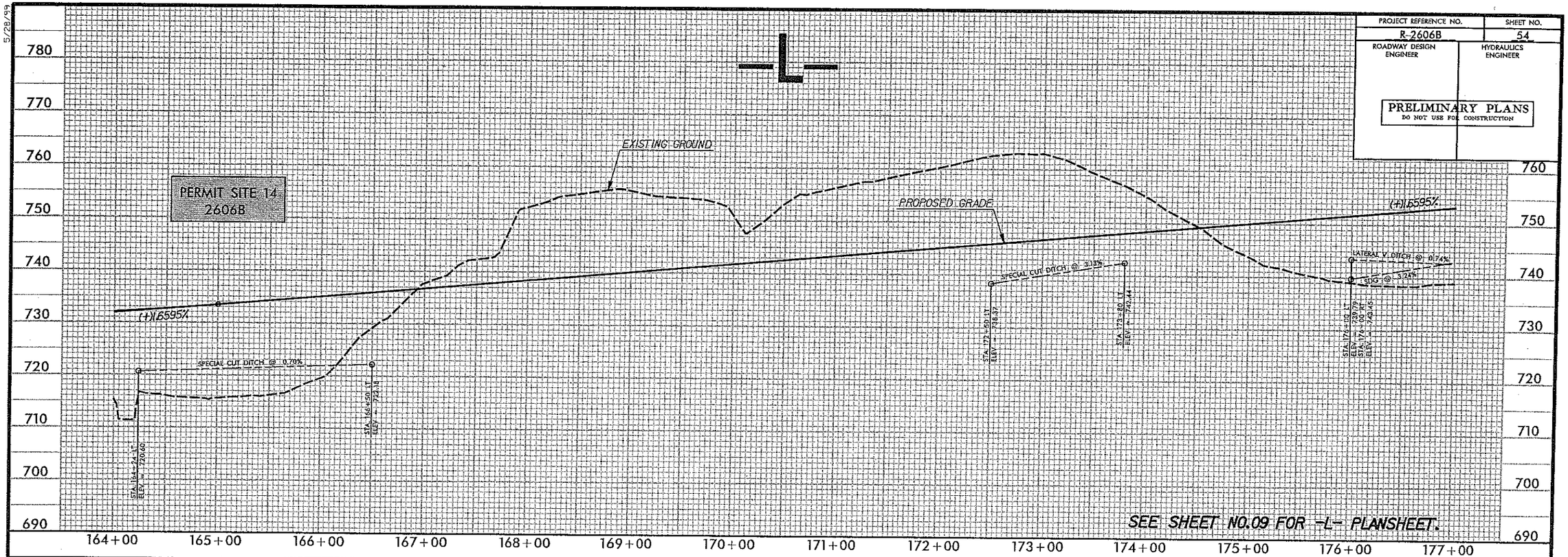
5/28/99

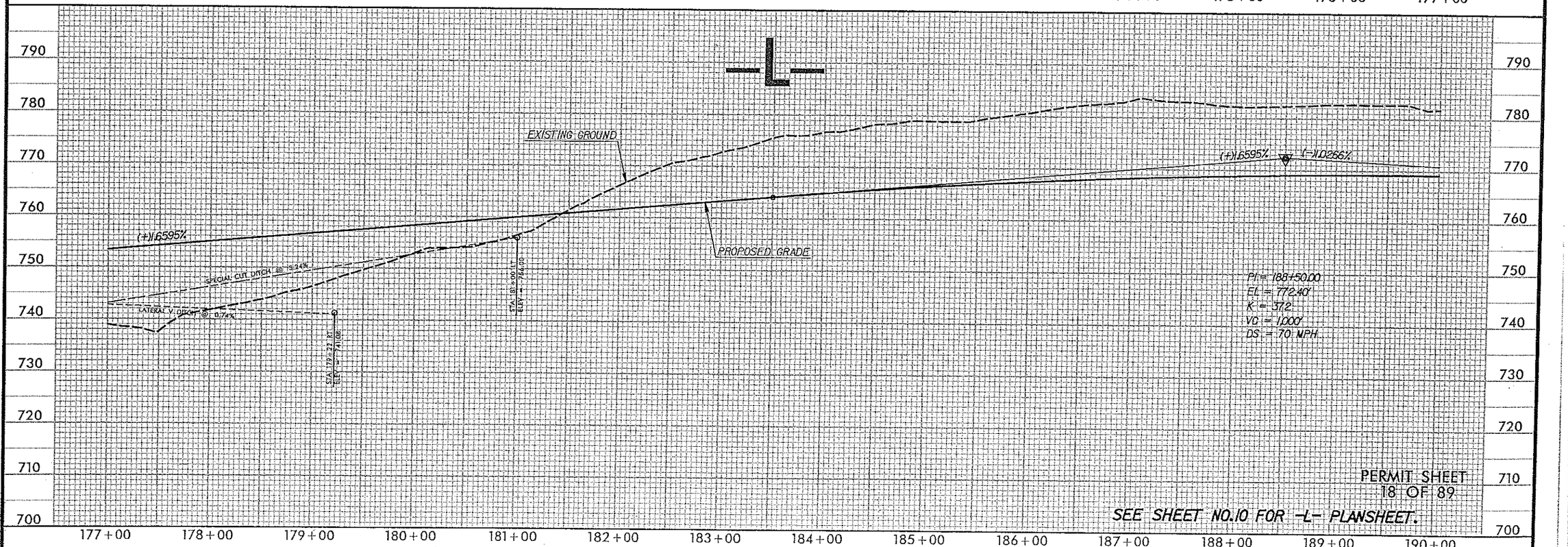
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT SITE 14
2606B



SEE SHEET NO.09 FOR -L- PLANSHEET.



SEE SHEET NO.10 FOR -L- PLANSHEET.

PERMIT SHEET
18 OF 89

2/25/2009
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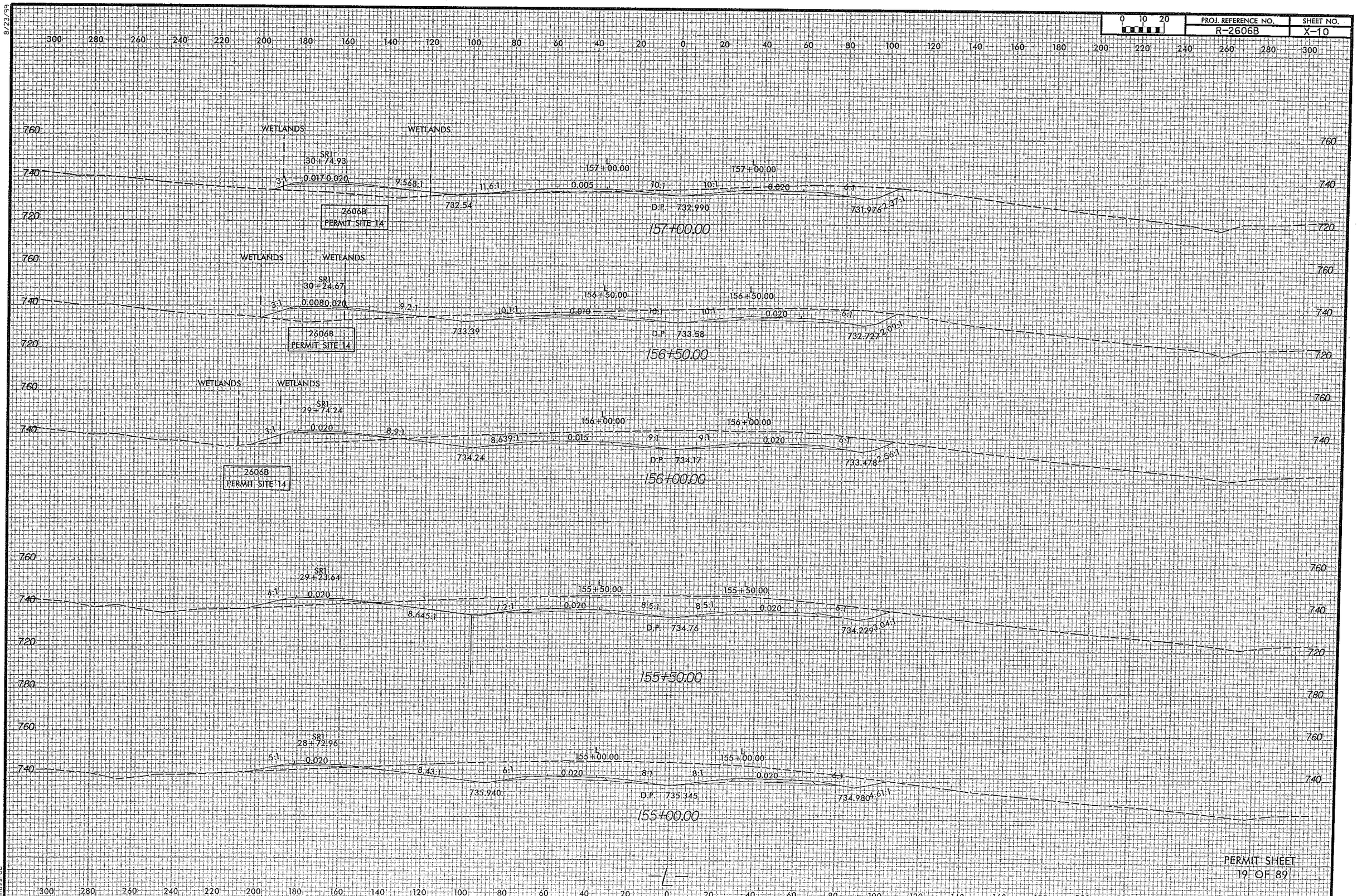
8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-10



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PERMIT SHEET
19 OF 89

8/23/99

PROJ. REFERENCE NO. R-2606B | SHEET NO. X-11

0 10 20

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

760 740 720

SR1 33+25.02 | L 159+50.00 | L 159+50.00

2:1 6:1 0.020 0.020 11.5:1 15.727:1 0.020 8:1 8:1 0.020 2:1

728.030 727.67 D.P. 728.651

159+50.00

WETLANDS WETLANDS

SR1 32+75.02 | L 159+00.00 | L 159+00.00

2:1 6:1 0.020 0.020 11.148:1 15.6:1 0.015 12:1 12:1 0.020 2:1

729.551 728.73 D.P. 729.336

159+00.00

2606B PERMIT SITE 14

WETLANDS WETLANDS

SR1 32+25.02 | L 158+50.00 | L 158+50.00

2:1 6:1 0.020 0.020 10.8/8.1 15.125:1 0.010 8:1 8:1 0.020 2:1

731.072 729.78 D.P. 730.088

158+50.00

2606B PERMIT SITE 14

WETLANDS WETLANDS

SR1 31+75.02 | L 158+00.00 | L 158+00.00

2:1 6:1 0.020 0.020 10.7:1 14.63:1 0.005 12:1 12:1 0.020 9.46:1 10.56:1

732.593 730.84 D.P. 731.81 731.37

2606B PERMIT SITE 14

158+00.00

WETLANDS WETLANDS

SR1 31+25.02 | L 157+50.00 | L 157+50.00

5:1 6:1 0.020 0.020 10:1 13:1 0.000 11:1 11:1 0.020 7:1 6.4:1

734.114 D.P. 732.400 731.673

2606B PERMIT SITE 14

157+50.00

PERMIT SHEET 20 OF 89

2/25/2009 C:\PWworking\TPA\d0149860\R2606B_rdy_xpl_L_permits.dgn jmessroe

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	9
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

LEGEND

- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 8

MATCHLINE STA. 177+00 -L- SEE SHEET NO. 10

SITE 14

SITE 15

4 JAMES H. ROBERTS DB 1382 PG 70

5 LEWIS J. LOFLIN DB 902 PG 79

6 DANNY D. FUGH DB 165 PG 291

3A MILFORD C FARLOW & OTHERS DB 635E PG 299

CLASS 'I' RIP RAP EST. 52 TONS 60 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

5' DIAMETER FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES +70, GRAU 350

DRY DETENTION / HAZARDOUS SPILL BASIN 3

28' X 15' FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES

PROP. SLOPE STAKES

PROP. GUARDRAIL

PROP. C/A FENCE

PROP. R/W

SDG SEE DETAIL "D"

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

+75, CAT-1 END-SBG

PROP. DBL FACE CBL GUIDERAIL

LATERAL "V" DITCH SEE DETAIL "A"

S 36° 41' 19.7" E

PERMIT SHEET 21 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	9
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99
REVISIONS

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

NAD '83

SITE 15

CLASS "B" RIP RAP
EST. 11 TONS /
28 SY FILTER FABRIC

DRY DETENTION HAZARDOUS SPILL BASIN ③

28'-3"x75' FOREBAY CLASS "B" RIP RAP 3' DEEP, 2:1 SIDES

MATCHLINE STA. 164+00 –L– SEE SHEET NO. 8

MATCHLINE STA. 177+00 –L– SEE SHEET NO. 10

PERMIT SHEET
22 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 54 FOR –L– PROFILE.
SEE SHEET NO. 97 FOR –SR1– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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mgreene

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

Pls Sta 188+67.24
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

Pl Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 201+18.30
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

NAD 83

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES TEMPORARY SURFACE WATER IMPACTS

7 CHARLES W. HUGHES
DB 109 PG 513
DB 109 PG 514

8 MICHAEL HUGHES
DB 2081 PG 556

END CONSTRUCTION -SR1- Sta. 58+17.01

-SR1- POT Sta. 59+17.01

-L- TS Sta. 187+33.91

-L- SC Sta. 189+33.91

PROP. SLOPE STAKES

PROP. R/W

PROP. C/A FENCE

PROP. GUARDRAIL

SDG SEE DETAIL "D"

5.6 ft CLEARANCE

PROP. DBL FACE CBL. GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+75, CAT-1 END SEC.

LATERAL "V" DITCH SEE DETAIL "A"

SITE 15

S 36° 47' 19.7" E

-SR1-

-L-

MATCHLINE STA. 177 + 00 -L- SEE SHEET NO. 9

MATCHLINE STA. 190 + 00 -L- SEE SHEET NO. 11

5 LEWIS J. LOFLIN
DB 102 PG 79

6 DANNY D. PUGH
DB 185 PG 251

FRANCIS G. DAVIS
DB 1274 PG 1

PERMIT SHEET
23 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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jmassey

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

Pls Sta 188+67.24
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 201+18.30
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

MATCHLINE STA. 177+00 -L- SEE SHEET NO. 9

MATCHLINE STA. 190+00 -L- SEE SHEET NO. 11

LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY SURFACE WATER IMPACTS

END CONSTRUCTION -SR1- Sta. 58+17.01

-SR1- POT. Sta. 59+17.01

-L- TS Sta. 187+33.91

-L- SC Sta. 189+33.91

STANDARD "V" TAIL DITCH SEE DETAIL "K" 54" LENGTH @ 8.02%

PROP. SLOPE STAKES

S 36° 41' 19.7" E

SDG SEE DETAIL "D"

PROP. CHAINLINK FENCE

PROP. GUARDRAIL

+6% GRAD. 350

5.6 ft CLEARANCE

PROP. DBL FACE CRL GUIDERAIL

+25' PROP. GUIDERAIL ANCHOR

+75' PROP. GUIDERAIL ANCHOR

+75' CAT-1 END SBC

LATERAL "V" DITCH SEE DETAIL "A"

SITE 15

PROP. R/W

CHORD

PERMIT SHEET
24 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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wtheon

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-18

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

780 760 740

SR1 50+75.02 — L 177+00.00 — L 177+00.00

4:1 P 0.020 0.020 4:1 4.343:1 3.678:1 P 0.020 8:1 8:1 0.020 0.040 P 2:1 2:1

742.894 D.P. 749.723 742.72

177+00.00

SR1 50+25.02 — L 176+50.00 — L 176+50.00

3:1 P 0.020 0.020 4:1 4.114:1 3.645:1 P 0.020 8:1 8:1 0.020 0.040 P 2:1 2:1

741.257 D.P. 748.893 743.08

176+50.00

SR1 49+75.02 — L 176+00.00 — L 176+00.00

2:1 P 0.020 0.020 4:1 2:1 2:1 P 0.020 8:1 8:1 0.020 0.040 P 3:1 3:1 2:1

D.P. 748.063 743.45

176+00.00

SR1 49+25.02 — L 175+50.00 — L 175+50.00

2:1 P 0.020 0.020 4:1 2:1 2:1 P 0.020 8:1 8:1 0.020 4:1 2:1

D.P. 747.232 743.82

175+50.00

WETLANDS WETLANDS

SR1 48+75.02 — L 175+00.00 — L 175+00.00

2:1 P 0.020 0.020 4:1 2:1 2:1 P 0.020 8:1 8:1 0.020 6:1 2:1

D.P. 746.404 746.039

175+00.00

2606B PERMIT SITE 15

—L—

PERMIT SHEET
25 OF 89

2/25/2009
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mesroa

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	11
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES EXCAVATION IN WETLAND

-L- Pls Sta 188+67.24
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-L- Pl Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1,117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

-L- Pls Sta 201+18.30
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

MATCHLINE STA. 18+50 -Y3-
SEE SHEET NO. 33

MATCHLINE STA. 190+00 -L-
SEE SHEET NO. 10

MATCHLINE STA. 203+00 -L-
SEE SHEET NO. 12

MATCHLINE STA. 27+00 -Y3-
SEE SHEET NO. 34

-Y3- POT Sta. 21+92.98
-L- POC Sta. 200+13.39

-L- ST Sta. 202+51.63
S 47° 34' 28.2" E

-L- CS Sta. 200+51.63

SITE 16

(8) MICHAEL HUGHES DB 2051 PG 555

(10) FAYE B. DAVIS DB 1069 PG 897

(11) DONNA JACKSON DB 0SE PG 301

(13B) MICHAEL S. DAMS

(14) TERRY W. JACKSON DB 1416 PG 1776

(101) JANE D. MULLINS DB 1235 PG 714, DB 1527 PG 804, PB 61 PG 5

PROP. SLOPE STAKES

PROP. R/W

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

LATERAL "V" DITCH SEE DETAIL "A"

DRY DETENTION HAZARDOUS SPILL BASIN

EMERGENCY OVERFLOW

20' DIAMETER FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

LEVEL SPREADER

BYPASS CHANNEL

BYPASS CULVERT

END OF ROADWAY MARKERS

SEE DETAIL "B"

+50, GRAU 350

+47, PROP. GUIDERAIL ANCHOR

+79, PROP. GUIDERAIL ANCHOR

PROP. DBL FACED CBL GUIDERAIL

11.4 ft CLEARANCE

TAIL DITCH SEE DETAIL "A" 50' LENGTH @ 3:1

DECKS DRAINS REQUIRED STA. 22+80 TO 23+04 RT. STA. 22+62 TO 23+08 LT @ 12 FT SPACING

PERMIT SHEET
26 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

SEE SHEET NO. 55 FOR -L- PROFILE.
SEE SHEET NO. 67 FOR -Y3- PROFILE.
SEE SHEET NO. 2-H FOR -Y3- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS

8/17/99

3/17/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	11
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-L-
Pls Sta 188+67.24
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

Pl Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1,117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 201+18.30
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

LEGEND
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND

MATCHLINE STA. 18+50 -Y3-
SEE SHEET NO. 33

MATCHLINE STA. 190+00 -L-
SEE SHEET NO. 10

MATCHLINE STA. 203+00 -L-
SEE SHEET NO. 12

MATCHLINE STA. 27+00 -Y3-
SEE SHEET NO. 34

-Y3- POT Sta. 21+92.98
-L- POC Sta. 200+13.39

-L- ST Sta. 202+51.63
S 47° 34' 28.2" E
-L- CS Sta. 200+51.63

SITE 16
POND
PROP. SLOPE STAKES
PROP. 6'W
PROP. DBL FACED CBL GUIDERAIL
PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS
LATERAL "V" DITCH SEE DETAIL "A"
DRY DETENTION HAZARDOUS SPILL BASIN
EMERGENCY OVERFLOW
20' DIAMETER FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SLOPES
CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
KEY SPREADER
BYPASS CHANNEL
BYPASS STRUCTURE
2GI(D) 2GI W/ FLAT GRATE TB
SD 60 CAT-I END SBG
GRADE DRAIN
+50, GRAU 350
END OF ROADWAY MARKERS
SDG SEE DETAIL "D"
+47, PROP. GUIDERAIL ANCHOR
+79, PROP. GUIDERAIL ANCHOR
11.4-ft CLEARANCE
15:1 TAPER
BEGIN C/A FENCE
END C/A FENCE
DECKS DRAINS REQUIRED STA. 22+80 TO 23+04 RT. STA. 22+62 TO 23+08 LT @ 12 FT SPACING
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
TAIL DITCH SEE DETAIL "A" 50' LENGTH @ 3.0%
REMOVE
PROP. 6'W
R=7160'

PERMIT SHEET
27 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

(13B)

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 55 FOR -L- PROFILE.
SEE SHEET NO. 67 FOR -Y3- PROFILE.
SEE SHEET NO. 2-H FOR -Y3- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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mastersc

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-26

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

780 760

L 199+00.00 — L 199+00.00
2:1 6:1 0.030 7.890:1 8:1 0.030 2:1
757.423 D.P. 757.988
199+00.00

780 760

L 198+50.00 — L 198+50.00
2:1 6:1 0.030 7.890:1 8:1 0.030 2:1
757.736 D.P. 758.501
198+50.00

780 760

L 198+00.00 — L 198+00.00
3:1 R 0.040 0.030 7.890:1 8:1 0.030 2:1
D.P. 759.015
198+00.00

780 760

L 197+50.00 — L 197+50.00
2:1 R 0.040 0.030 7.890:1 8:1 0.030 2:1
D.P. 759.528
197+50.00

780 760 800

WETLANDS WETLANDS
L 197+00.00 — L 197+00.00
2:1 R 0.040 0.030 7.890:1 8:1 0.030 6:1
D.P. 760.041
26068 PERMIT SITE 16
197+00.00

780 760

WETLANDS WETLANDS
L 196+50.00 — L 196+50.00
2:1 R 0.040 0.030 7.890:1 8:1 0.030 6:1
D.P. 760.554
26068 PERMIT SITE 16
196+50.00

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

PERMIT SHEET
28 OF 89

2/25/2009
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mossc

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/95

MATCHLINE STA. 203+00 –L– SEE SHEET NO. 11

MATCHLINE STA. 216+00 –L– SEE SHEET NO. 13

LEGEND

F/F/ DENOTES FILL IN WETLAND

13A
MICHAEL DAVIS & OTHERS
DB 0SE PG 301

15A
JAMES D. DAVIS & BETTY S.
DB 1010 PG 175

13
MICHAEL DAVIS & OTHERS
DB 0SE PG 301

14
TERRY L. JACKSON
DB 0SW PG 111

16
CLIFFORD W. LOFLIN
DB 1034 PG 7
DB 1034 PG 8
SB 882-47

THE CARAWAY COMPANY
DB 1064 PG 305

JAMES D. DAVIS
DB 1010 PG 175

POULTRY HOUSE ABAND

POULTRY HOUSE ABAND

PROP. SLOPE STAKES

PROP. R/W

BERM DITCH SEE DETAIL "M"

PROP. CRL. FACE CRL. GUIDERAIL

S 41° 34' 28.2" E

-L-

1:1 R CLEARANCE

+00, BEGIN SBC

GRADE TO DRAIN

EXISTING ADDITIONAL DEBRIS PILE SITE

SITE 17

PROP GUARDRAIL & SHOULDER/DITCH GUTTER

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

763.260

755.652

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 55 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
29 OF 89

3/17/2008
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc.
of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

F/F/F DENOTES FILL IN WETLAND

MATCHLINE STA. 203+00 –L– SEE SHEET NO. 11

MATCHLINE STA. 216+00 –L– SEE SHEET NO. 13

13A 15A 14 13 16

POULTRY HOUSE ABAND

BERM DITCH SEE DETAIL "M"

PROP. SLOPE STAKES

PROP. R/W

S 41° 34' 28.2" E 18"

205 210 215

1:1 R CLEARANCE

+00. BEGIN SBG

+50. GRAU

GRADE TO DRAIN

EXISTING ADDITIONAL DEBRIS PILE SITE

SITE 17

CLASS 'B' RIP-RAP EST. 11 TONS 28 SY FILTER FABRIC

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 55 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
30 OF 89

3/17/2009
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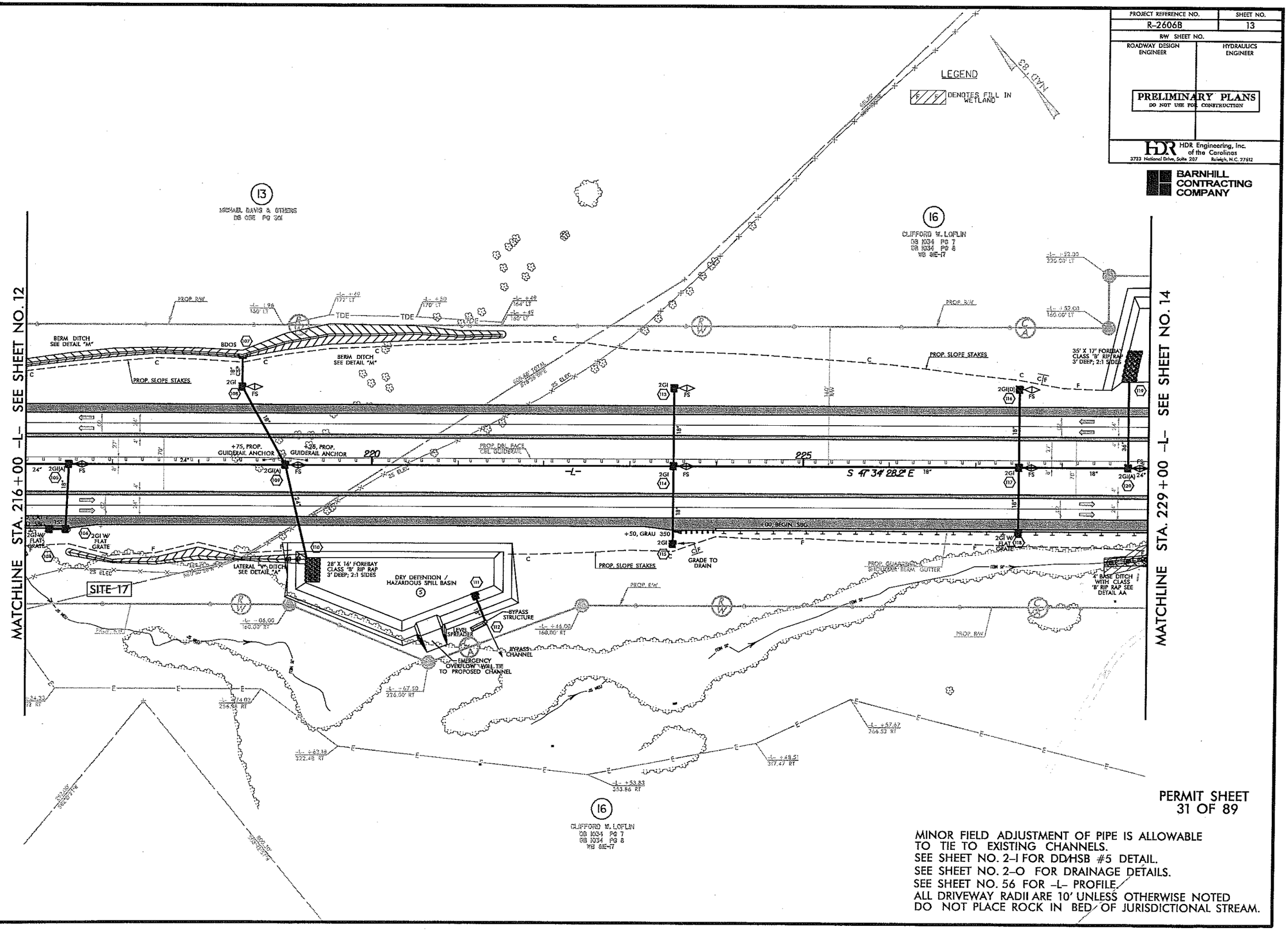
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99



PERMIT SHEET
31 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-I FOR DD/HSB #5 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/7/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

LEGEND

F F DENOTES FILL IN WETLAND

NAD 83

MATCHLINE STA. 216+00 -L- SEE SHEET NO. 12

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 14

SITE 17

PERMIT SHEET
32 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-I FOR DD/HSB #5 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/17/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	14
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY FILL IN SURFACE WATER

16 CLIFFORD W. LOFLIN DB 1034 PG 7 DB 1034 PG 8 MB 85-17

16A PIEDMONT TRIAD REGIONAL WATER AUTHORITY

16 CLIFFORD W. LOFLIN DB 1034 PG 7 DB 1034 PG 8 MB 85-17

16B CLIFFORD W. LOFLIN DB 1677 PG 1922

SITE 17

DRY DETENTION / HAZARDOUS SPILL BASIN

EMERGENCY OVERFLOW

BYPASS STRUCTURE

BYPASS CHANNEL

LEVEL SPREADER

CLASS 'I' RIP RAP EST. 70 TONS 75 SY FILTER FABRIC

PROP. GUARDRAIL & SHOULDER BERM GUTTER

PROP. SLOPE STAKES

SDG SEE DETAIL "D"

2GI(A) W/ FLAT GRATE

2GI W/ FLAT GRATE

2GI(D)

6 in CLEARANCE w/1 ft slab

PROP. DBL FACE CBC GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

S 41° 34' 28.2" E

4' BASE DITCH WITH CLASS 'B' RIP RAP SEE DETAIL AA

NOTE: STABILIZE STREAM BANKS AT CULVERT OUTLETS SEE DETAIL 'Y'

CLASS 'I' RIP RAP EST. 95 TONS 100 SY FILTER FABRIC

35' X 17' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

-L- 230+64.80
GP ELEV.=722.25'
SKEW=115°
12'x8' RCBC BURIED 1'

-L- 238+46.00
GP ELEV.=732.99'
SKEW=5°
8'x7' RCBC BURIED 1'

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 13

MATCHLINE STA. 242+00 -L- SEE SHEET NO. 15

PERMIT SHEET
33 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/12/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	14
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY FILL IN SURFACE WATER

NAD '83

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 13

MATCHLINE STA. 242+00 -L- SEE SHEET NO. 15

16 16A 16 16B

DRY DETENTION / HAZARDOUS SPILL BASIN

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL & SHOULDER BERM GUTTER

SDG SEE DETAIL "D"

+50, GRAU 350

+00, CAT 1 BEGIN SBG

+00, END SBG

2GI(A) GRATE

2GI(D)

GRADE TO DRAIN

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET

-L- 230+64.80
GP ELEV.=722.25'
SKEW=115°
12'x8' RCBC BURIED 1'

+50, CAT 1 BEGIN SBG

+50, END SBG

+00, GRAU 350

+00, BEGIN SBG

2GI W FLAT GRATE

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

EMERGENCY OVERFLOW

35' X 17' FOREBAY CLASS "B" RIP-RAP 3' DEEP, 2:1 SIDES

2' LATERAL BASE DITCH W/CLASS "B" RIP RAP SEE DETAIL "C"

PROP. GUARDRAIL & SHOULDER BERM GUTTER

PROP. DBL FACE CBA GUIDERAIL

S 41°34'28.2"E

-L- 238+46.00
GP ELEV.=732.99'
SKEW=5°
8'x7' RCBC BURIED 1'

PERMIT SHEET
34 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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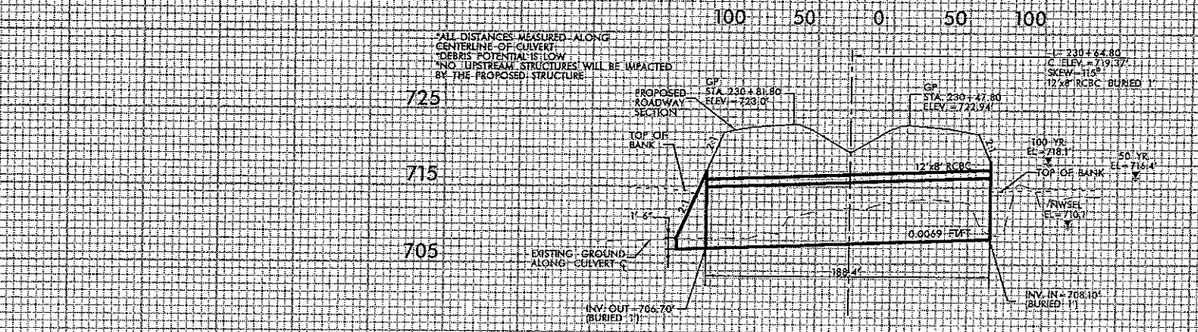
jmasters

5/28/99

SITE 17 2606B

PROJECT REFERENCE NO.	SHEET NO.
R-2233AA	CSR-14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



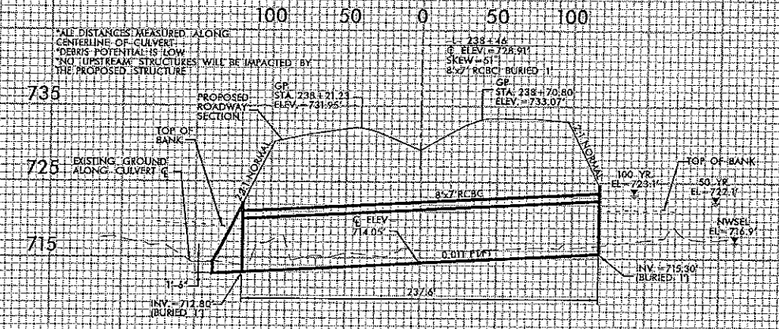
PROFILE ALONG ℄ OF CULVERT

WSEL TABLE

YEAR	DISCHARGE (CFS)	NATURAL	PROPOSED
10	370	714.4	714.1
50	650	716.2	716.4
100	850	717.2	718.1
500	1300	719.3	723.2

*NATURAL ELEVATIONS WERE CALCULATED BASED ON TAILWATER DEPTH @ CHANNEL INVERT@ US CULVERT FACE

SITE 17 2606B



PROFILE ALONG ℄ OF CULVERT

WSEL TABLE

YEAR	DISCHARGE (CFS)	NATURAL	PROPOSED
10	170	720.1	720.2
50	310	721.5	723.1
100	390	722.1	723.1
500	600	723.5	725.1

*NATURAL ELEVATIONS WERE CALCULATED BASED ON TAILWATER DEPTH @ CHANNEL INVERT @ US CULVERT FACE

2/25/2009
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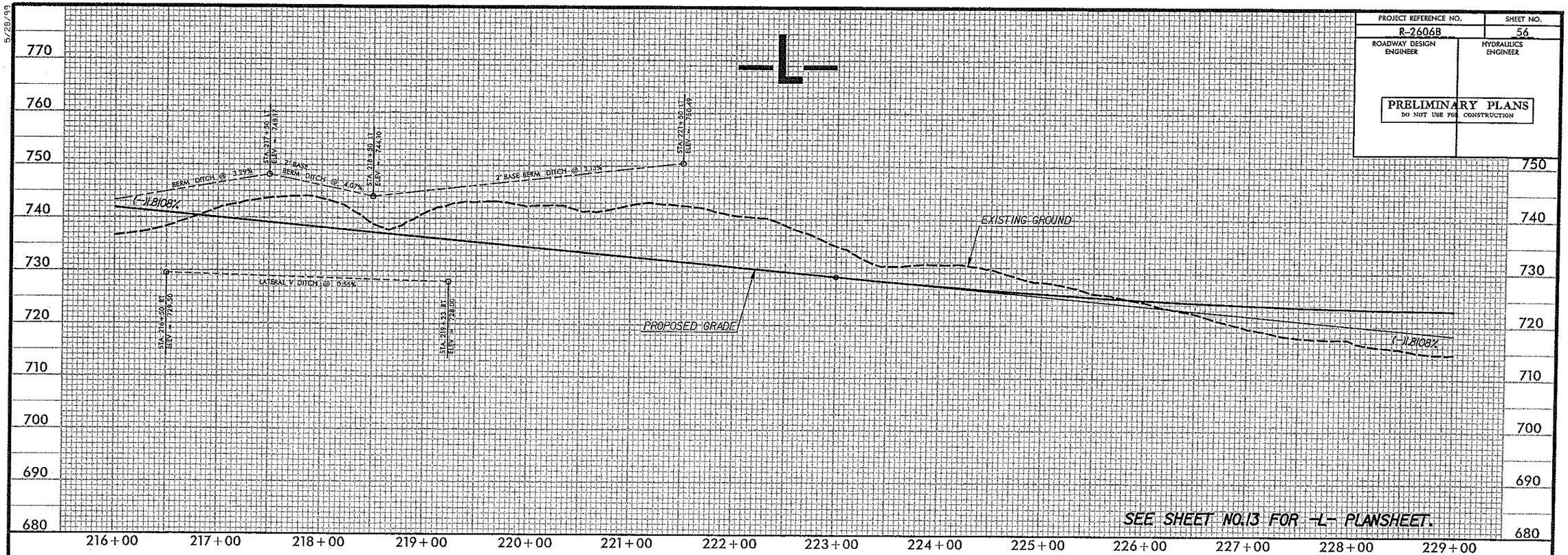
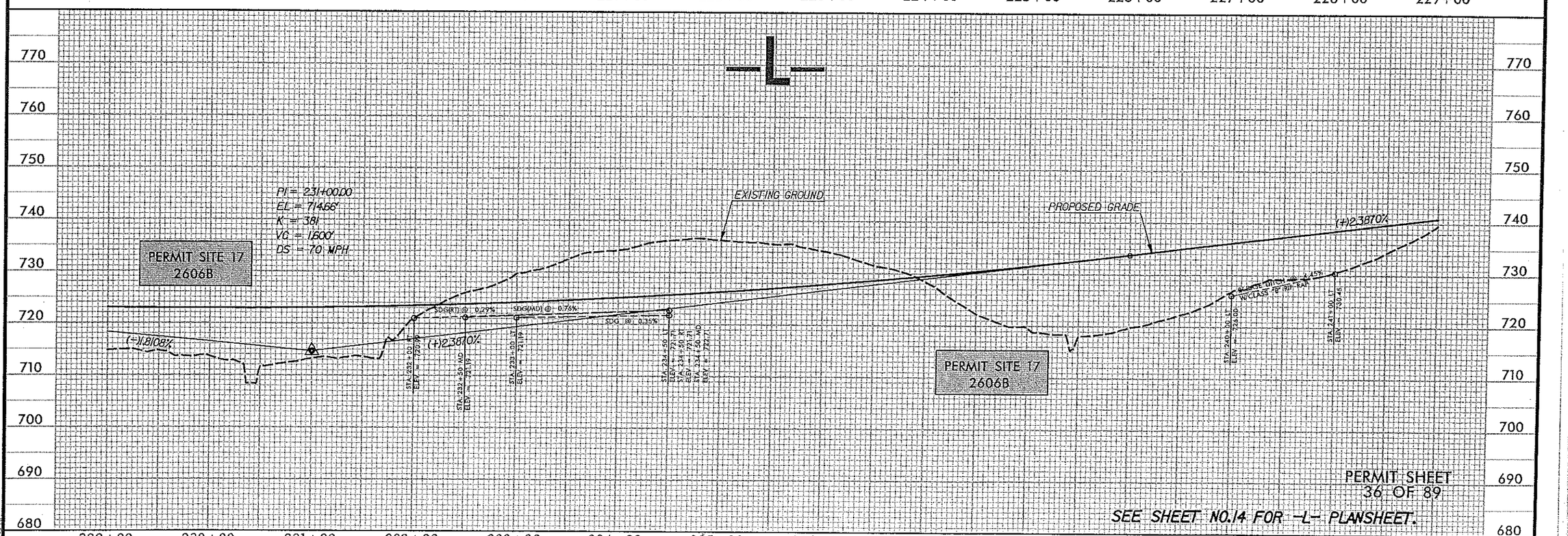
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





2/25/2009
jmcclenny
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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-38

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

760 740 720

L 232+50.00 — L 232+50.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 6:1 — 2:1

D.P. 720.184 — 721.127

232+50.00

L 232+00.00 — L 232+00.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 6:1 — 2:1

D.P. 719.876 — 719.511

232+00.00

L 231+50.00 — L 231+50.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 6:1 — 2:1

D.P. 719.633 — 719.268

231+50.00

L 231+00.00 — L 231+00.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 0.040 — P — 2:1

D.P. 719.457

231+00.00

L 230+50.00 — L 230+50.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 0.040 — P — 2:1

D.P. 719.345

230+50.00

2606B
PERMIT SITE 17

L 230+00.00 — L 230+00.00 — 2:1 — P 0.040 — 0.020 — 8:1 — 8:1 — 0.020 — 0.040 — P — 2:1

D.P. 719.300

230+00.00

—L—

PERMIT SHEET
37 OF 89

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

2/25/2009
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imasroc

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-40

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

760 740 720

238+50.00 L — 238+50.00 L
2:1 | 0.040 | 0.020 | 8:1 | 8:1 | 0.020 | 0.040 | 2:1
D.P. 728.996
238+50.00

238+00.00 L — 238+00.00 L
2:1 | 0.040 | 0.020 | 8:1 | 8:1 | 0.020 | 0.040 | 2:1
D.P. 727.901
238+00.00

2606B
PERMIT SITE 17

237+50.00 L — 237+50.00 L
2:1 | 0.040 | 0.020 | 8:1 | 8:1 | 0.020 | 0.040 | 2:1
D.P. 726.871
237+50.00

237+00.00 L — 237+00.00 L
2:1 | 0.040 | 0.020 | 8:1 | 8:1 | 0.020 | 0.040 | 2:1
D.P. 725.908
237+00.00

236+50.00 L — 236+50.00 L
2:1 | 0.020 | 8:1 | 8:1 | 0.020 | 6:1 | 2:1
D.P. 725.009 724.444
236+50.00

236+00.00 L — 236+00.00 L
6:1 | 0.020 | 8:1 | 8:1 | 0.020 | 6:1 | 2:1
3.32:1 723.811 D.P. 724.176 723.811
236+00.00

—L—

PERMIT SHEET
38 OF 89

2/25/2009
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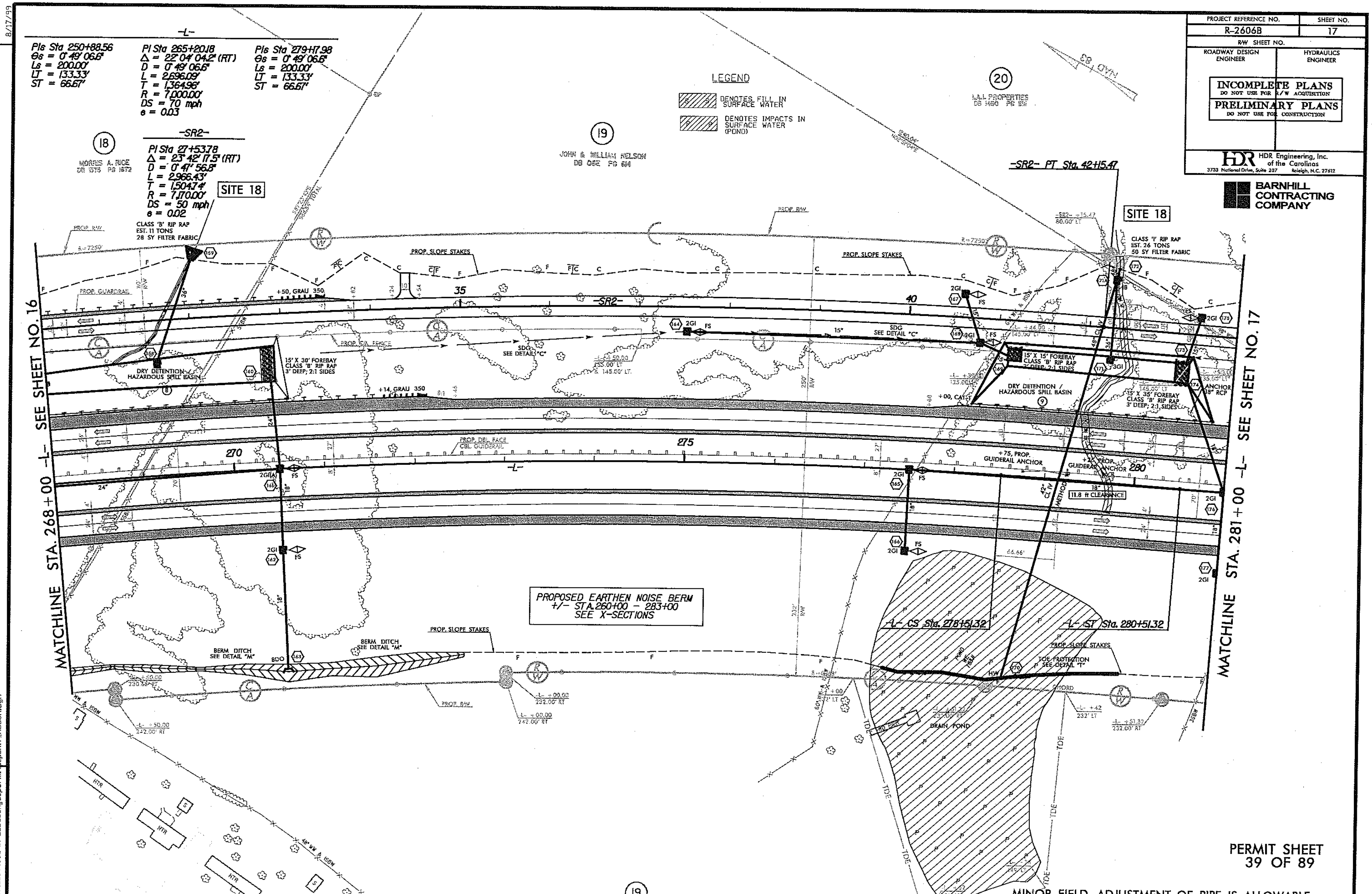
mbssroe



DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

SEE SHEET NO. 58 FOR -L- PROFILE.

SEE SHEET NOS. 98-99 FOR -SR2- PROFILE.

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
39 OF 89

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-L-
Pls Sta 250+88.56
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 265+20.18
Δ = 22° 04' 04.2" (RT)
D = 0° 49' 06.6"
L = 2,696.09'
T = 1,364.96'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 279+17.98
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-
PI Sta 27+53.78
Δ = 23° 42' 17.5" (RT)
D = 0° 41' 56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

-SR2- PT Sta. 42+15.47

SITE 18

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

CLASS 'I' RIP RAP
EST. 26 TONS
50 SY FILTER FABRIC

DRY DETENTION / HAZARDOUS SPILL BASIN

15' X 30' FOREBAY
CLASS 'B' RIP RAP
3' DEEP, 2:1 SIDES

15' X 15' FOREBAY
CLASS 'B' RIP RAP
3' DEEP, 2:1 SIDES

15' X 35' FOREBAY
CLASS 'B' RIP RAP
3' DEEP, 2:1 SIDES

ANCHOR
18" RCP

PROP. SLOPE STAKES

PROP. GUARDRAIL

PROP. DBL. FACE CSL GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

18" CLEARANCE

11.8 ft CLEARANCE

SDD SEE DETAIL "C"

BERM DITCH SEE DETAIL "M"

PROPOSED EARTHEN NOISE BERM
+/- STA. 260+00 - 283+00
SEE X-SECTIONS

-L- CS Sta. 278+51.32

-L- ST Sta. 280+51.32

TOE PROTECTION SEE DETAIL "I"

DRAIN. POND

MATCHLINE STA. 268+00 -L-

SEE SHEET NO. 16

MATCHLINE STA. 281+00 -L-

SEE SHEET NO. 17

PERMIT SHEET
40 OF 89

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NOS. 98-99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/1/2009
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User: wthcon

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-51

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

820 800 780 760

SR2
31+38.63
P 0.020 0.020 4:1
2:1 2:1 2:1 2:1
L
269+00.00
P 0.030 8:1 7.890:1 0.030 6:1
L
269+00.00
2:1 2:1 2:1 2:1
780.97
D.P. 771.891
771.326

2606B
PERMIT SITE 18

269+00.00

SR2
30+87.42
P 0.020 0.020 4:1
2:1 2:1 2:1 2:1
L
268+50.00
P 0.030 8:1 7.890:1 0.030 6:1 6:1
L
268+50.00
2:1 2:1 2:1 2:1
782.89
D.P. 772.190
771.625

268+50.00

SR2
30+36.20
P 0.020 0.020 4:1
2:1 2:1 2:1 2:1
L
268+00.00
P 0.030 8:1 7.890:1 0.030 6:1
L
268+00.00
2:1 2:1 2:1 2:1
780.37
D.P. 772.488
765.00

268+00.00

SR2
29+84.99
P 0.020 0.020
2:1 4.414:1 4:6:1 2:1 2:1
L
267+50.00
0.030 8:1 7.890:1 0.030 6:1
L
267+50.00
2:1 2:1 2:1 2:1
777.85
D.P. 772.786
769.391

267+50.00

PERMIT SHEET
41 OF 89

2/25/2009
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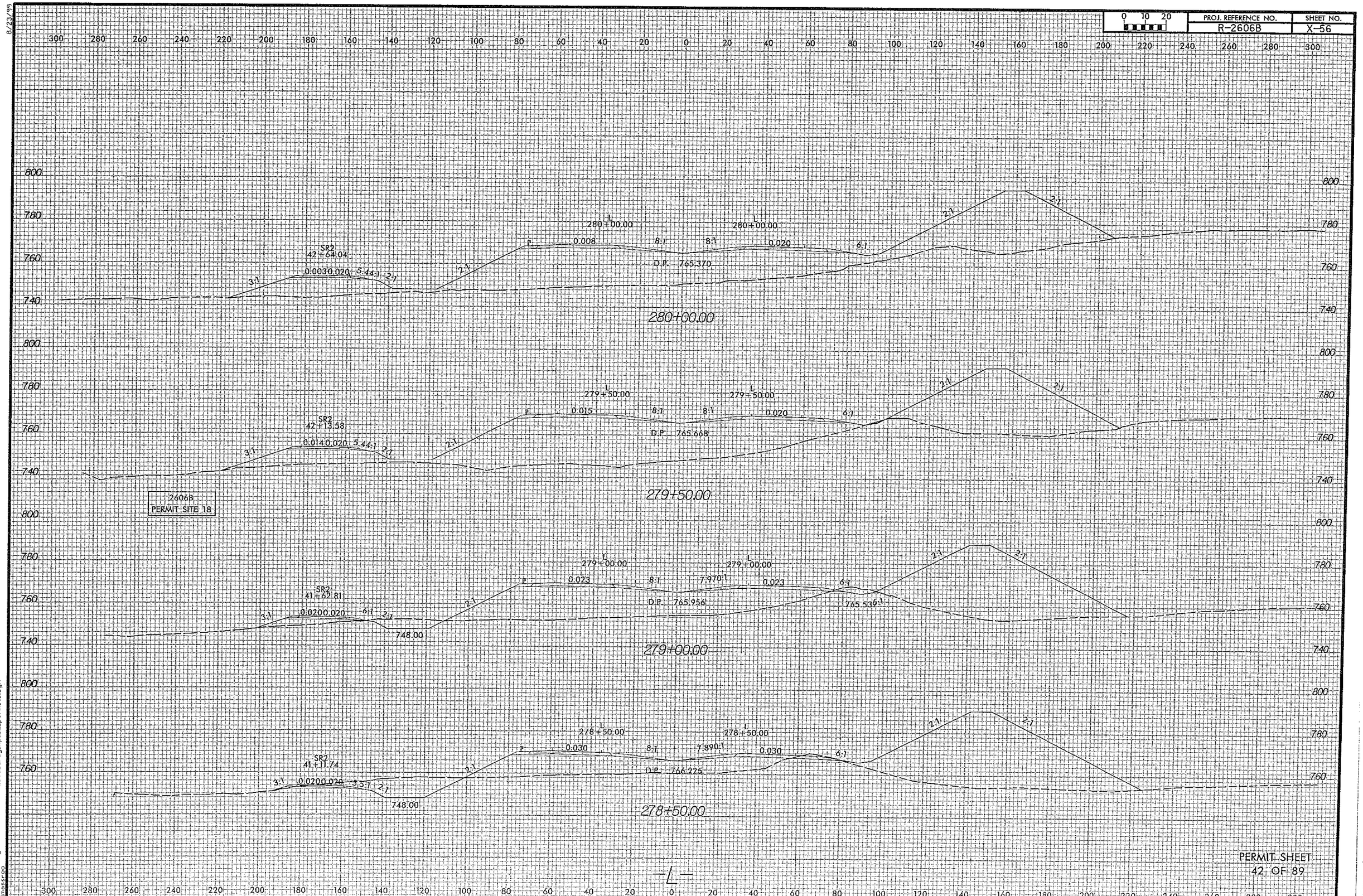
mossco

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-56



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bcassone

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	18
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES FILL IN WETLAND

NAD 83

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

-SR2- PC Sta. 54+22.89

SITE 19

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

MATCHLINE -SR2- STA. 56+50 SEE SHEET NO. 35

MATCHLINE STA. 294+00 -L- SEE SHEET NO. 19

20 LAL PROPERTIES DB 1460 PG 858

21 EDWARD L. LAWRENCE DB 985 PG 537

22 NCDOT DB 1703 PG 1048

19 JOHN & WILLIAM NELSON DB 682 PG 814

PROP. R/W
PROP. SLOPE STAKES
PROP. C/A FENCE
PROP. GUARDRAIL
PROP. DBL FACE CBL GUIDERAIL
CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"
2' LATERAL BASE DITCH SEE DETAIL "B"
SDG SEE DETAIL "D"
15' X 40' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
20' X 30' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
DRY DETENTION /HAZARDOUS SPILL BASIN
2GI(A)
2GI(B) W/FLAT GRATE
GRADE TO DRAIN
+00, GRAU 350
+34, GRAU 350
+10, GRAU 350
+50, GRAU 350
+29, CAT-1
+50, CAT-1
S 23° 52' 10.7" E
285
290
PROPOSED EARTHEN NOISE BERM +/- STA.260+00 - 283+00 SEE X-SECTIONS
POND
HOUSE
CONC
ISF POULTRY HOUSE

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 43 OF 89

REVISIONS 8/17/99

3/7/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	18
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES FILL IN WETLAND

NAD '83

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

SITE 19

-SR2- PC Sta. 54+22.89

MATCHLINE -SR2- STA. 56+50 SEE SHEET NO. 35

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

MATCHLINE -L- STA. 294+00 SEE SHEET NO. 19

PROPOSED EARTHEN NOISE BERM +/- STA 260+00 - 283+00 SEE X-SECTIONS

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 44 OF 89

REVISIONS 8/17/99

3/17/2009
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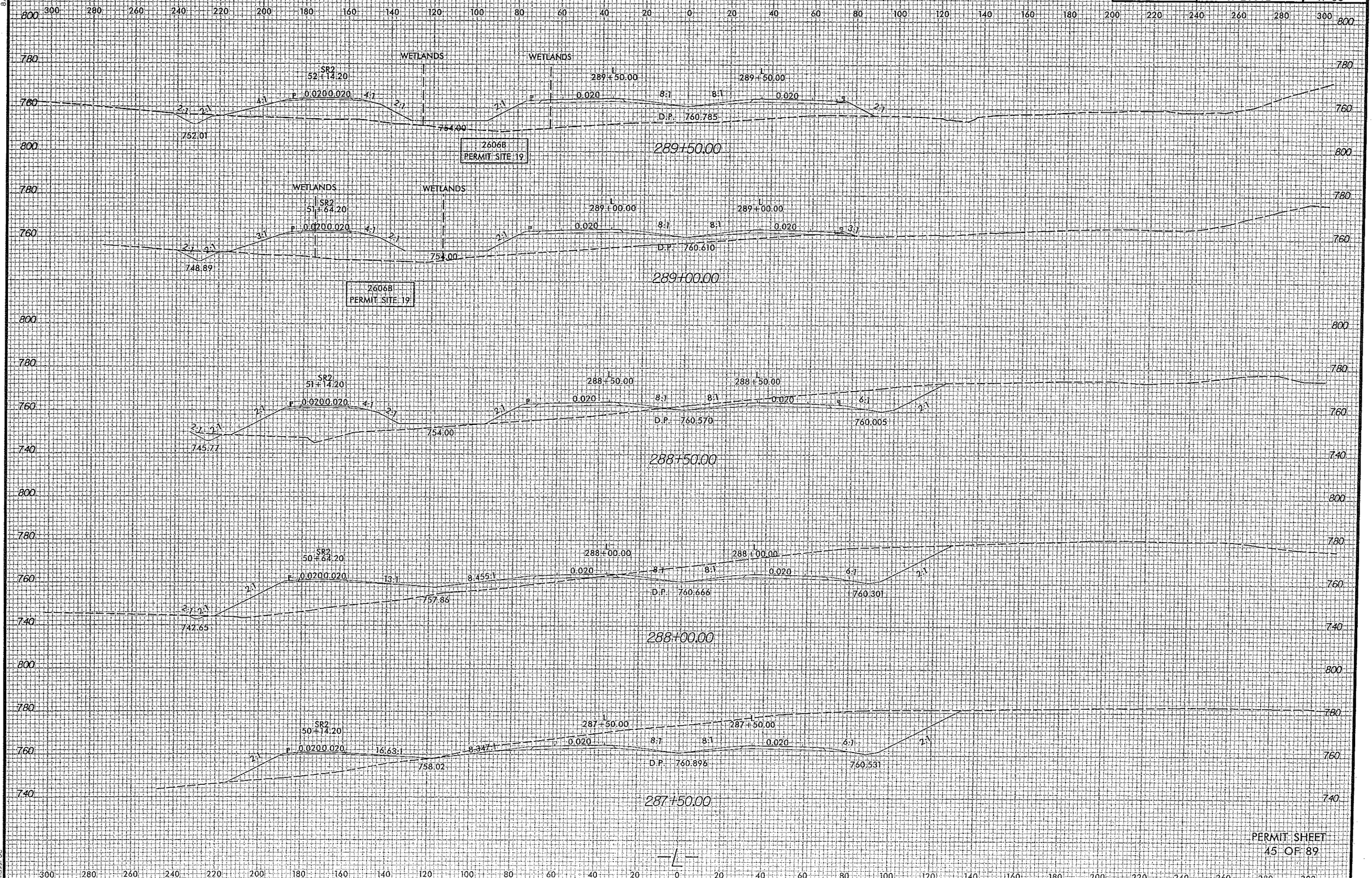
8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-60



PERMIT SHEET
45 OF 89

2/25/2009
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mesmroe

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-61

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

800 780 760

SR2 55+07.06 — 770.28 — 2:1 2:1 4:1 0.050 0.050 4:1 — 763.71 — 6:1 2:1 — 764.310 — L 292+50.00 — 6:1 0.020 8:1 — D.P. 764.675 — 292+50.00 — 8:1 0.020 6:1 — 764.310 — 2:1

SR2 54+60.64 — 767.39 — 2:1 2:1 4:1 0.050 0.050 4:1 — 760.929 — 2:1 P 0.020 8:1 — L 292+00.00 — D.P. 763.689 — 292+00.00 — 8:1 0.020 6:1 — 763.324 — 2:1

SR2 54+14.20 — 764.49 — 2:1 2:1 5:1 0.029 0.029 4:1 — 759.84 — 2:1 2:1 5:1 P 0.020 8:1 — L 291+50.00 — D.P. 762.838 — 291+50.00 — 8:1 0.020 6:1 — 762.473 — 2:1

SR2 53+64.20 — 761.37 — 2:1 2:1 4:1 0.020 0.003 4:1 — 2:1 2:1 5.138:1 P 0.020 8:1 — L 291+00.00 — D.P. 762.122 — 291+00.00 — 8:1 0.020 6:1 — 761.557 — 2:1

WETLANDS WETLANDS

SR2 53+14.20 — 758.25 — 2:1 2:1 4:1 0.020 0.020 4:1 — 754.00 — 2:1 2:1 P 0.020 8:1 — L 290+50.00 — D.P. 761.541 — 290+50.00 — 8:1 0.020 6:1 — 2:1

2606B PERMIT SITE 19

WETLANDS WETLANDS

SR2 52+64.20 — 755.13 — 2:1 2:1 4:1 0.020 0.020 4:1 — 754.00 — 2:1 2:1 P 0.020 8:1 — L 290+00.00 — D.P. 761.095 — 290+00.00 — 8:1 0.020 6:1 — 2:1

2606B PERMIT SITE 19

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

PERMIT SHEET 46 OF 89

2/25/2009
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cbessco

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	21
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-
Pls Sta 330+57.77
θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

Pl Sta 336+88.45
Δ = 15° 35' 01.5" (RT)
D = 1° 25' 56.6"
L = 1,087.95'
T = 547.35'
R = 4,000.00'
DS = 70 mph
e = 0.05

Pls Sta 343+12.39
θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

NAD 83

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES TEMPORARY SURFACE WATER IMPACTS

SITE 20

J.W. COCCHIS HEIRS
DB 382 PG 567

(43) ROY M. CROTTS
DB 932 PG 515

(44) PHILIP TRACY WALL FAMILY LIMITED PARTNERSHIP
DB 1562 PG 185

(42) MABEL FARLOW
DB 2009 PG 2085

-L- TS Sta. 328+91.10

-L- SC Sta. 331+41.10

-L- +91.10 160.00' LT

-L- +97.00 160.00' LT & 170.00' LT

-L- +96.00 160.00' LT & 170.00' LT

-L- +91.10 160.00' RT

-L- +41.10 160.00' RT

-L- +16.00 160.00' RT

-L- +16.00 215.00' RT

-L- +73.50 160.00' RT

-L- +76.50 215.00' RT

CHORD

R=4160'

R=3840'

TDE

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

2GI W/ FLAT GRATE

GRADE TO DRAIN +50, GRAU 350

50' END SBG

GRADE TO DRAIN

2GI(A) FS

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

PROP. DBL. FACE CBL. GUIDERAIL

S 23° 52' 10.7" E

2GI(D) FS

2GI(B) W/ FLAT GRATE

+00, GRAU 350

50' BEGIN SBG

2GI FS

160.0' CLEARANCE

EMERGENCY OVERFLOW

25' X 25' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

DRY DETENTION / HAZARDOUS SPILL BASIN

BYPASS CHANNEL

BYPASS STR. LEVEL SPREADER

+48, CAT-1 END SBG

SDG SEE DETAIL "D"

SEDIMENT BASIN OUTLET

MATCHLINE STA. 320+00 -L- SEE SHEET NO. 20

MATCHLINE STA. 333+00 -L- SEE SHEET NO. 22

PERMIT SHEET
47 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 60 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
C:\PWworking\TPA\d0149860\R-2606B_hyd_permits_sh21_pagan.dgn
jmassey

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	21
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-L-
Pls Sta 330+57.77
Θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

Pl Sta 336+88.45
Δ = 15° 35' 01.5" (RT)
D = 1° 25' 56.6"
L = 1,087.95'
T = 547.35'
R = 4,000.00'
DS = 70 mph
e = 0.05

Pls Sta 343+12.39
Θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

NAD 83

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES TEMPORARY SURFACE WATER IMPACTS

SITE 20

-L- TS Sta. 328+91.10

-L- SC Sta. 331+41.10

-L- SEE SHEET NO. 20

-L- SEE SHEET NO. 22

MATCHLINE STA. 320+00 -L-

MATCHLINE STA. 333+00 -L-

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PROP. SLOPE STAKES

2GI W/ FLAT GRATE

GRADE TO DRAIN + 50' GRAU 350

50' END SBG

PROP. DBL FACE CBLT GUIDERAIL

+75' PROP. GUIDERAIL ANCHOR

+25' PROP. GUIDERAIL ANCHOR

S 23° 52' 10" E

16.0' CLEARANCE

2GI(A)

2GI(B) W/ FLAT GRATE

2GI(D)

50' BEGIN SBG

GRADE TO DRAIN

PROP. GUARDRAIL & SBG

EMERGENCY OVERFLOW

25' X 25' FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES

DRY DETENTION / HAZARDOUS SPILL BASIN

BYPASS CHANNEL

BYPASS STR. LEVEL SPREADER

SEE DETAIL "D"

PROP. R/W

PROP. SLOPE STAKES

CHORD

TIE

PERMIT SHEET 48 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 60 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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imasson

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-72

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

800
780
760
740

WETLANDS WETLANDS

L 322+00.00 322+00.00

0.040 0.020 8:1 8:1 0.020 0.040

2:1 D.P. 763.432 2:1

322+00.00

2606B PERMIT SITE 20

WETLANDS WETLANDS

L 321+50.00 321+50.00

0.040 0.020 8:1 8:1 0.020 0.040

2:1 D.P. 764.093 2:1

2606B PERMIT SITE 20

321+50.00

WETLANDS WETLANDS

L 321+00.00 321+00.00

0.040 0.020 8:1 8:1 0.020 0.040

2:1 D.P. 764.753 2:1

2606B PERMIT SITE 20

321+00.00

L 320+50.00 320+50.00

0.040 0.020 8:1 8:1 0.020 0.040

2:1 D.P. 765.413 2:1

320+50.00

PERMIT SHEET
51 OF 89

2/25/2009
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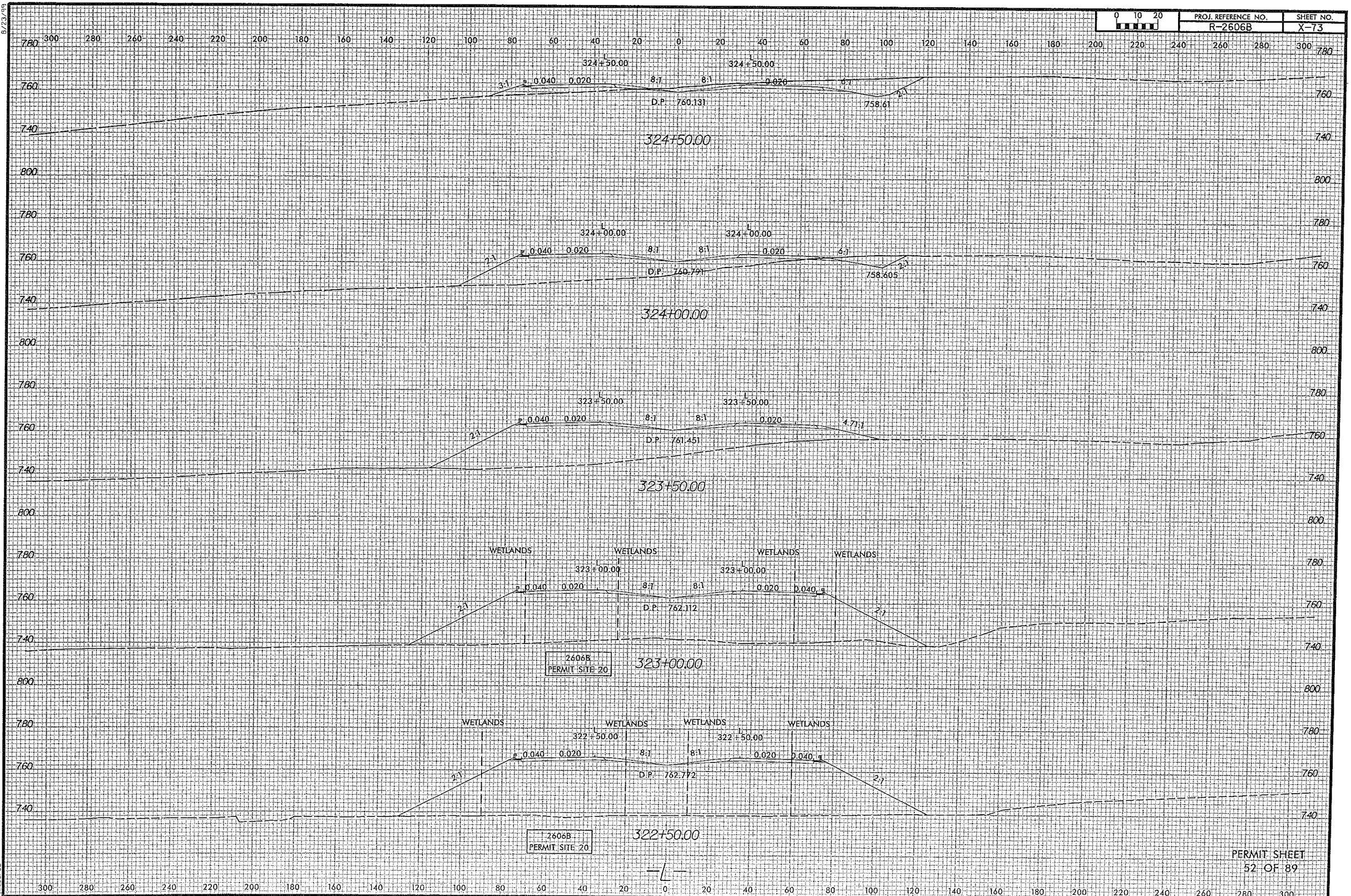
8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-73



PERMIT SHEET
52 OF 89

2/25/2000
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mosscoe

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2608B	22
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

SITE 21

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 38

MATCHLINE STA. 359+00 -L-
SEE SHEET NO. 23

MATCHLINE STA. 333+00 -L-
SEE SHEET NO. 21

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 39

LEGEND

DENOTES FILL IN SURFACE WATER

-L-
Pt Sta 330+57.77
Gs = 1 47' 25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

Pt Sta 336+88.45
Δ = 15° 39' 05.5" (RT)
D = 7 25' 59.6"
L = 1,087.95'
T = 549.32'
R = 1,000.00'
DS = 70 mph
e = 0.05

Pt Sta 343+12.39
Gs = 1 47' 25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

-LP2B-
Pt Sta 1+34.47
Gs = 22° 55' 05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pt Sta 9+64.64
Δ = 143° 41' 22.6" (RT)
D = 22° 55' 05.9"
L = 629.40'
T = 164.64'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 8+95.10
Gs = 22° 55' 05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B-
Pt Sta 10+66.67
Gs = 1 2' 40.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pt Sta 14+15.97
Gs = 1 9' 30.0"
Ls = 325.00'
LT = 216.59'
ST = 108.51'

Pt Sta 15+65.28
Δ = 15° 36' 13.6" (LT)
D = 5° 43' 46.5"
L = 278.74'
T = 140.28'
R = 1,000.00'
DS = 50 mph
e = 0.08

Pt Sta 18+70.47
Gs = 1 0' 43.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

Pt Sta 21+37.18
Gs = 1 0' 43.5"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

Pt Sta 24+69.02
Δ = 16° 41' 28.8" (RT)
D = 7° 09' 43.5"
L = 512.34'
T = 258.28'
R = 800.00'
DS = 50 mph
e = 0.08

Pt Sta 27+82.81
Gs = 1 0' 09.4.3"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-RP2C-
Pt Sta 10+21.76
Δ = 0° 37' 57.7" (RT)
D = 1° 27' 13.8"
L = 43.58'
T = 21.79'
R = 3,941.00'

Pt Sta 11+73.20
Gs = 1 39' 54.6"
Ls = 200.00'
LT = 129.68'
ST = 90.57'

Pt Sta 15+86.83
Δ = 30° 09' 29.3" (RT)
D = 4° 46' 28.7"
L = 639.83'
T = 323.37'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pt Sta 19+68.54
Gs = 1 25' 07.6"
Ls = 220.00'
LT = 152.71'
ST = 75.39'

-Y7-
Pt Sta 40+39.45
Gs = 5 20' 54.4"
Ls = 200.00'
LT = 186.75'
ST = 93.44'

Pt Sta 43+09.60
Δ = 13° 27' 07.3" (RT)
D = 3° 49' 11.0"
L = 352.11'
T = 176.90'
R = 1,500.00'
DS = 60 mph
e = 0.08

Pt Sta 45+78.28
Gs = 5 20' 54.4"
Ls = 200.00'
LT = 186.75'
ST = 93.44'

-NSRR-
Pt Sta 32+60.19
Gs = 1 55' 47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

Pt Sta 35+93.81
Δ = 18° 34' 08.3" (RT)
D = 3° 02' 00.0"
L = 668.91'
T = 337.29'
R = 1,900.00'

Pt Sta 39+20.49
Gs = 1 55' 47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

-LP2C-
Pt Sta 1+34.47
Gs = 22° 55' 05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pt Sta 5+10.95
Δ = 102° 24' 05.3" (LT)
D = 22° 59' 05.5"
L = 446.86'
T = 301.09'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 7+14.51
Gs = 22° 55' 05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B- SC Sta. 22+10.74
-RP2B- SRS Sta. 20+10.74
-RP2B- CS Sta. 18+10.74
-RP2B- SRS Sta. 12+00.00
-RP2B- SC Sta. 15+25.00
-RP2B- ST Sta. 10+00.00 = -L- PCC Sta. 335+31.14 OFFSET 59.00' LEFT
-RP2B- CS Sta. 27+16.74
-RP2B- ST Sta. 29+16.74
-RP2B- POT Sta. 31+12.09 = -Y7- POT Sta. 28+69.33
-LP2B- POT Sta. 12+00.75 = -Y7- POT Sta. 28+93.87
-LP2B- CS Sta. 8+27.40
-LP2B- ST Sta. 10+27.40
-LP2B- ST Sta. 0+00.00 = -L- POT Sta. 352+46.52 OFFSET 59.00' LEFT
-LP2B- SC Sta. 2+00.00
-L- CS Sta. 342+29.05
-L- ST Sta. 344+79.05
-RP2C- SC Sta. 12+63.52
-RP2C- CS Sta. 10+43.52
-RP2C- PC Sta. 10+00.00 = -L- PCC Sta. 334+00.00 OFFSET 59.00' RIGHT
-RP2C- CS Sta. 18+95.15
-RP2C- ST Sta. 21+15.15
-LP2C- SC Sta. 2+00.00
-LP2C- ST Sta. 0+00.00 = -L- POT Sta. 350+30.79 OFFSET 59.00' RIGHT
-Y7- TS Sta. 38+52.70
-LP2C- CS Sta. 6+46.81
-LP2C- ST Sta. 8+46.81
-LP2C- POT Sta. 9+65.95 = -Y7- POT Sta. 41+36.41
-RP2C- POT Sta. 26+93.62 = -Y7- POT Sta. 41+82.41
-NSRR- POT Sta. 28+04.41 = -L- POT Sta. 353+46.27
-Y7- POT Sta. 34+55.24 = -L- POT Sta. 352+55.04
-NSRR- TS Sta. 32+03.34
-NSRR- SC Sta. 32+56.34
-Y7- SC Sta. 41+32.70

S 4° 55' 25.9" W
S 42° 17' 16.6" E
S 82° 03' 25.3" W

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NOS. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 93 FOR -LP2B- PROFILE.
SEE SHEET NO. 94 FOR -LP2C- PROFILE.
SEE SHEET NO. 85 FOR -RP2B- PROFILE.
SEE SHEET NO. 86 FOR -RP2C- PROFILE.
SEE SHEET NOS. 71-72 FOR -Y7- PROFILE.
SEE SHEET NO. 2-I FOR -Y7- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
49 OF 89

GRAPHIC SCALE
0
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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5/6/2020

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	22
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

SITE 21

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 38

MATCHLINE STA. 359+00 -L-
SEE SHEET NO. 23

MATCHLINE STA. 333+00 -L-
SEE SHEET NO. 21

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 39

-L-
Pt Sta 330+57.77
θs = 1°47'25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

Pt Sta 336+88.45
Δ = 15°39'05.5" (RT)
D = 7°25'59.5"
L = 1,087.95'
T = 549.39'
R = 770.00'
DS = 70 mph
e = 0.05

Pt Sta 343+12.39
θs = 1°47'25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

-RP2B-
Pt Sta 10+66.67
θs = 1°21'49.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pt Sta 14+65.97
θs = 3°8'38.0"
Ls = 325.00'
LT = 216.59'
ST = 108.61'

Pt Sta 16+65.28
Δ = 15°36'13.6" (LT)
D = 5°43'46.5"
L = 278.74'
T = 140.28'
R = 1,000.00'
DS = 50 mph
e = 0.08

Pt Sta 18+70.47
θs = 5°43'46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

Pt Sta 21+37.18
θs = 1°09'43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

Pt Sta 24+69.02
Δ = 16°41'28.8" (RT)
D = 7°09'43.1"
L = 562.34'
T = 283.28'
R = 800.00'
DS = 50 mph
e = 0.08

Pt Sta 27+82.81
θs = 1°09'43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-LP2B-
Pt Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70

Pt Sta 9+64.64
Δ = 143°41'22.6" (RT)
D = 22°55'05.9"
L = 629.40'
T = 1,764.64'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 8+95.10
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70

-RP2C-
Pt Sta 1+20.76
Δ = 0°37'57.7" (RT)
D = 1°8'13.8"
L = 43.52'
T = 21.76'
R = 5,040.00'

Pt Sta 1+47.20
θs = 1°35'51.6"
θs = 5°8'13.2"
Ls = 200.00'
LT = 129.68'
ST = 90.57'

Pt Sta 5+85.83
Δ = 30°09'29.3" (RT)
D = 4°46'28.7"
L = 631.65'
T = 323.37'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pt Sta 9+68.54
θs = 5°5'07.6"
Ls = 200.00'
LT = 146.73'
ST = 73.39'

-Y7-
Pt Sta 40+39.45
θs = 5°20'54.4"
Ls = 280.00'
LT = 186.70'
ST = 93.47'

Pt Sta 43+08.60
Δ = 13°29'07.3" (RT)
D = 5°49'11.0"
L = 552.12'
T = 276.90'
R = 1,000.00'
DS = 60 mph
e = 0.08

Pt Sta 48+78.28
θs = 5°20'54.4"
Ls = 280.00'
LT = 186.70'
ST = 93.47'

-NSRR-
Pt Sta 32+60.19
θs = 17°55'47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

Pt Sta 35+93.31
Δ = 18°34'08.3" (RT)
D = 3°00'00.0"
L = 648.91'
T = 362.90'
R = 1,910.08'

Pt Sta 39+20.49
θs = 17°55'47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

-LP2C-
Pt Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pt Sta 5+10.95
Δ = 102°24'05.3" (LT)
D = 22°55'05.9"
L = 446.86'
T = 340.96'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 7+14.51
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B- SC Sta. 22+40.74

-RP2B- SRS Sta. 20+03.74

-RP2B- CS Sta. 18+40.74

-RP2B- SRS Sta. 12+00.00

-RP2B- SC Sta. 15+25.00

-RP2B- ST Sta. 10+00.00 =
-L- POC Sta. 335+31.14
OFFSET 59.00 LEFT

-RP2B- CS Sta. 27+16.04

-RP2B- ST Sta. 29+16.04

-LP2B- CS Sta. 8+27.40

-LP2B- ST Sta. 10+27.40

-RP2B- POT Sta. 31+12.09 =
-Y7- POT Sta. 28+69.33

-LP2B- POT Sta. 12+00.75 =
-Y7- POT Sta. 28+93.87

-RP2B- ST Sta. 0+00.00 =
-L- POT Sta. 352+48.52
OFFSET 59.00 LEFT

-LP2B- SC Sta. 2+00.00

-L- CS Sta. 342+29.05

-L- ST Sta. 344+79.05

-RP2C- SC Sta. 12+63.52

-RP2C- CS Sta. 10+43.52

-RP2C- PC Sta. 10+00.00 =
-L- POC Sta. 334+00.00
OFFSET 59.00 RIGHT

-RP2C- CS Sta. 18+95.15

-RP2C- ST Sta. 21+15.15

-LP2C- SC Sta. 2+00.00

-LP2C- ST Sta. 0+00.00 =
-L- POT Sta. 350+38.79
OFFSET 59.00 RIGHT

-Y7- TS Sta. 38+52.70

-LP2C- CS Sta. 6+46.81

-LP2C- ST Sta. 8+46.81

-Y7- SC Sta. 41+32.70

-LP2C- POT Sta. 9+65.95 =
-Y7- POT Sta. 41+56.41

-RP2C- POT Sta. 26+93.62 =
-Y7- POT Sta. 41+82.41

-NSRR- POT Sta. 28+04.41 =
-L- POT Sta. 353+46.27

-Y7- POT Sta. 34+55.94 =
-L- POT Sta. 353+55.04

-NSRR- TS Sta. 32+03.34

-NSRR- SC Sta. 32+96.34

LEGEND
DENOTES FILL IN SURFACE WATER

CAPE FEAR/ RANDLEMAN WATERSHED

YADKIN WATERSHED

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NOS. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 93 FOR -LP2B- PROFILE.
SEE SHEET NO. 94 FOR -LP2C- PROFILE.
SEE SHEET NO. 85 FOR -RP2B- PROFILE.
SEE SHEET NO. 86 FOR -RP2C- PROFILE.
SEE SHEET NOS. 71-72 FOR -Y7- PROFILE.
SEE SHEET NO. 2-1 FOR -Y7- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
50 OF 89

GRAPHIC SCALE
0
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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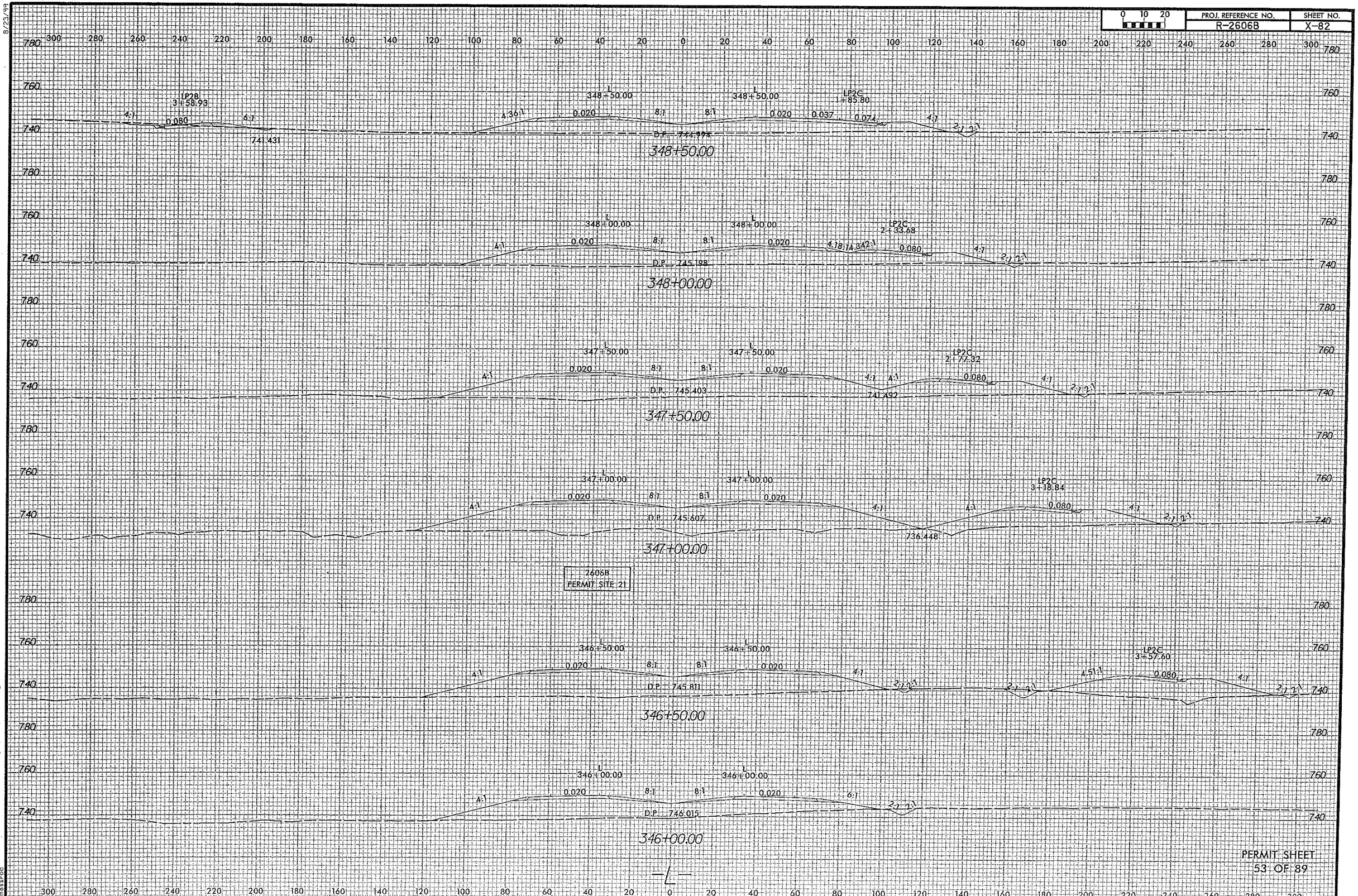
4/2/2020
dchang

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-82



PERMIT SHEET
53 OF 89

2/25/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	24
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

NAD '83

REVISIONS

8/17/99

-L-

Pls Sta 369+79.64
θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

Pls Sta 397+74.59
θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 285
PB 39 PG 87

SITE 23

SITE 24

SEE SHEET NO. 23 -L- STA. 372+00

SEE SHEET NO. 25 -L- STA. 385+00

MATCHLINE STA. 372+00

MATCHLINE STA. 385+00

TOE PROTECTION SEE DETAIL "T"

PROP. GUARDRAIL & SBG

+00, CAT-1 BEGIN SBG

PROP. SLOPE STAKES

SDG SEE DETAIL "D"

2GI W/ FLAT GRATE

+00, GRAU 350

+50 END SBG

+50, CAT-1 BEGIN SBG

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

PROP. DBL. FACE CSL GUIDERAIL

PROP. R/W

PROP. -L-

-SR3- PT Sta. 34+23.73

CLASS 'I' RIP RAP EST. 40 TONS 73 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

END CONSTRUCTION -SR3- Sta. 28+82.00

-SR3-
PI Sta 25+90.96
Δ = 19° 53' 55.3" (RT)
D = 1° 10' 57.3"
L = 1,682.68'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 285
PB 39 PG 87

49
ANNE M. CRAVEN
DB 1916 PG 1237
PB 94 PG 2

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
54 OF 89

3/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	24
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES FILL IN WETLAND

NAD '83

-L-
Pls Sta 369+79.64
θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

Pls Sta 397+74.59
θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

48

SITE 23

SITE 24

SEE SHEET NO. 23

SEE SHEET NO. 25

MATCHLINE STA. 372+00 -L-

MATCHLINE STA. 385+00 -L-

-SR3- PT Sta. 34+23.73

-SR3-
PI Sta 25+90.96
Δ = 19° 53' 55.3" (RT)
D = 1° 10' 57.3"
L = 1,682.66'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

END CONSTRUCTION -SR3- Sta. 28+82.00

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

49

PERMIT SHEET
55 OF 89

8/17/99

REVISIONS

3/17/2009
R-2606B_wthcon.dgn
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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-93

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

760 740 720 700

374+50.00

L 374+50.00 — L 374+50.00

0.050 — 0.050 — 7.088:1 — 8:1 — 0.050

D.P. 724.995

2:1 — 2:1

760 740 720 700

374+00.00

2606B
PERMIT SITE 23

L 374+00.00 — L 374+00.00

0.050 — 0.050 — 7.088:1 — 8:1 — 0.050

D.P. 725.576

2:1 — 2:1

760 740 720 700

373+50.00

L 373+50.00 — L 373+50.00

0.050 — 0.050 — 7.088:1 — 8:1 — 0.050

D.P. 726.157

2:1 — 2:1

760 740 720 700

373+00.00

L 373+00.00 — L 373+00.00

0.050 — 0.050 — 7.088:1 — 8:1 — 0.050

D.P. 726.738

2:1 — 2:1

760 740 720 700

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

—L—

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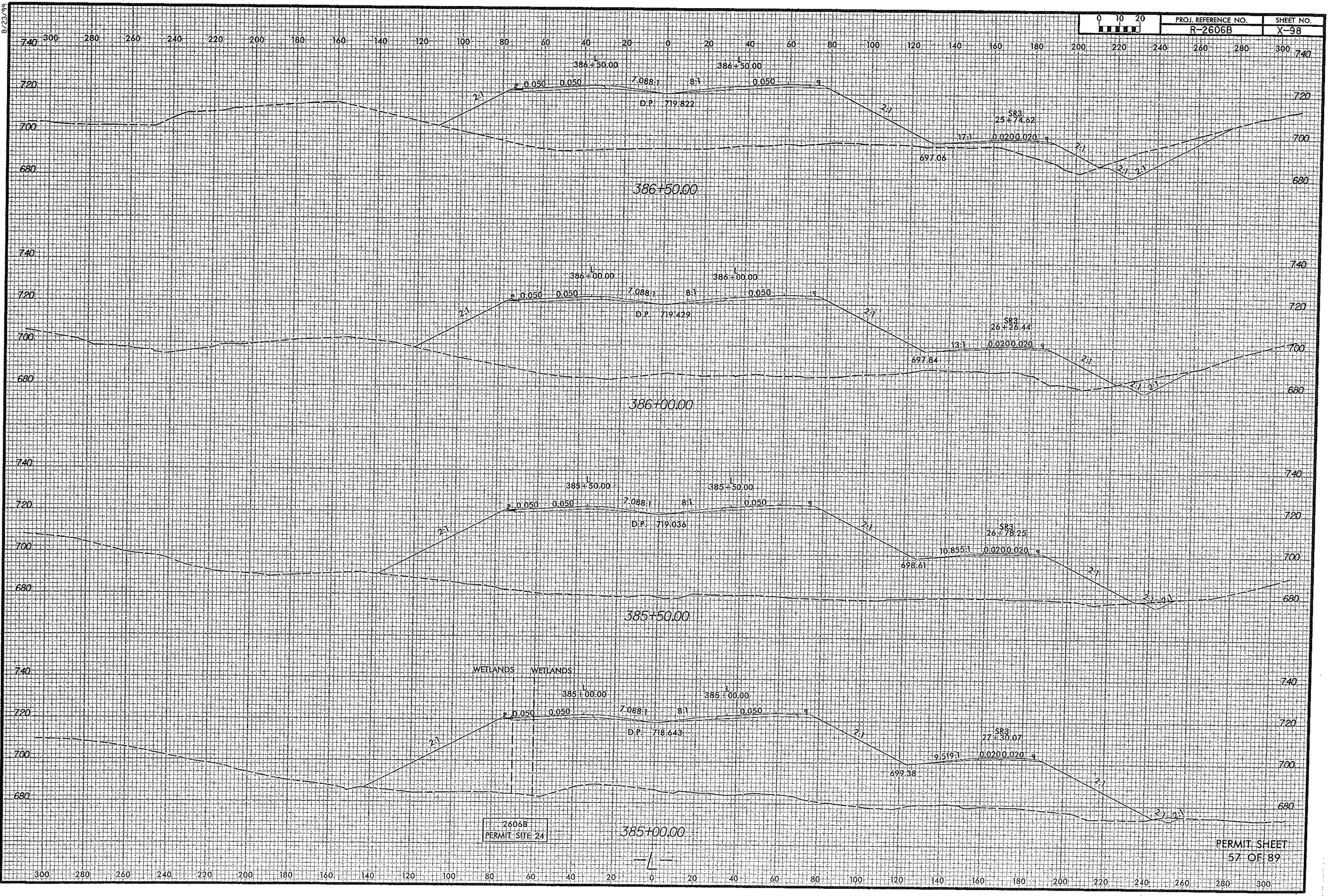
PERMIT SHEET
56 OF 89

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-98



PERMIT SHEET
57 OF 89

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	25
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

REVISIONS

8/17/99

-L-
Pls Sta 369+79.64
Θs = 1°31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

Pl Sta 384+12.85
Δ = 32°12' 42.3" (LT)
D = 1°13' 32.2"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

Pls Sta 397+74.59
Θs = 1°31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

NAD 83

SITE 24

-L- CS Sta. 396+91.26

MATCHLINE STA. 385+00 -L- SEE SHEET NO. 24

MATCHLINE STA. 398+00 -L- SEE SHEET NO. 26

-SR3-

-SR3- PC Sta. 14+85.65

-SR3- PRC Sta. 17+41.07

PI Sta 25+90.96
Δ = 19°53' 55.3" (RT)
D = 1°10' 57.3"
L = 1,682.66'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

PI Sta 16+14.46
Δ = 18°17' 36.8" (LT)
D = 7°09' 43.1"
L = 255.43'
T = 128.81'
R = 800.00'
DS = 40 mph
e = NC

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
58 OF 89

3/17/2008
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	25
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

-L-

Pls Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

Pl Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

Pls Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

-L- CS Sta. 396+91.26

SITE 24

MATCHLINE STA. 385+00 -L- SEE SHEET NO. 24

MATCHLINE STA. 398+00 -L- SEE SHEET NO. 26

-SR3-

Pl Sta 25+90.96
Δ = 19° 53' 55.3" (RT)
D = 1° 10' 57.3"
L = 1,682.66'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

Pl Sta 16+14.46
Δ = 18° 17' 36.8" (LT)
D = 7° 09' 43.1"
L = 255.43'
T = 128.81'
R = 800.00'
DS = 40 mph
e = NC

-SR3- PRC Sta. 17+41.07

-SR3- PC Sta. 14+85.65

N 17° 15' 03.4" W

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
59 OF 89

3/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	26
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- DENOTES FILL IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND

MATCHLINE STA. 15+00 -Y8- SEE SHEET NO. 40

-SR5- POT Sta. 10+00.00 =
-Y8- POC Sta. 15+70.93

-SR5- PC Sta. 10+25.00
-Y8- CS Sta. 15+86.31

-SR5- PRC Sta. 12+66.81

-SR5-
PI Sta 11+56.31
Δ = 55° 25' 07.8" (RT)
D = 22° 55' 05.9"
L = 241.81'
T = 131.31'
R = 250.00'
DS = 30 mph
e = 0.04

-SR5-
PI Sta 14+61.28
Δ = 43° 41' 57.0" (LT)
D = 11° 48' 48.8"
L = 369.91'
T = 194.47'
R = 485.00'
DS = 40 mph
e = 0.06

-L-
Pls Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

-L-
PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

-L-
Pls Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

-Y8-
Pls Sta 13+88.59
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

-Y8-
PI Sta 15+20.80
Δ = 3° 07' 44.3" (LT)
D = 2° 23' 14.4"
L = 131.07'
T = 65.55'
R = 2,400.00'
DS = 60 mph
e = 0.06

-Y8-
Pls Sta 16+52.99
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

SITE 25

-SR5- PT Sta. 16+36.72

END CONSTRUCTION
-SR5- POT Sta. 19+99.44

-SR5- POT Sta. 20+91.00

-Y8- ST Sta. 17+86.31

-Y8- POT Sta. 19+70.71 =
-L- POT Sta. 400+22.09

DECKS DRAINS REQUIRED
STA. 18+54 TO 18+90 RT.
STA. 20+72 TO 20+36 RT.
STA. 16+70 TO 19+06 LT.
STA. 20+74 TO 20+50 LT.
@ 12 FT SPACING

-SR5- S 51° 42' 00.9" E

-SR5- S 39° 58' 50.1" E

-L- S 39° 58' 50.1" E

-SR4- S 39° 58' 50.1" E

-SR4- PC Sta. 10+90.87

-SR4- PT Sta. 13+18.67

-SR3- PC Sta. 10+64.03

-SR3- PT Sta. 12+77.10

-SR3- POT Sta. 10+00.00 =
-SR4- POT Sta. 10+00.00 =
-Y8- POS Sta. 22+59.27

-SR3-
PI Sta 11+77.52
Δ = 48° 50' 00.4" (RT)
D = 22° 55' 05.9"
L = 213.08'
T = 113.49'
R = 250.00'
DS = 30 mph
e = 0.04

-L- ST Sta. 399+41.26

-Y8- TS Sta. 21+54.16

-Y8- SC Sta. 23+74.16

-Y8-
Pls Sta 23+00.88
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

-Y8-
PI Sta 24+76.36
Δ = 8° 39' 32.4" (LT)
D = 4° 14' 38.9"
L = 204.02'
T = 102.21'
R = 1,350.00'
DS = 60 mph
e = 0.08

-Y8-
Pls Sta 26+51.56
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

-SR4-
PI Sta 12+06.78
Δ = 26° 06' 13.7" (RT)
D = 11° 27' 33.0"
L = 227.80'
T = 115.91'
R = 500.00'
DS = 30 mph
e = NC

58 BLANCHE POWELL (LE) DB 1203 PG 282

59 RANDALL B. MATTHEWS DB 1320 PG 196

59A RANDALL MATTHEWS DB 1874 PG 505

59B BLANCHE POWELL (LE) DB 1203 PG 282

56 NA R. NELSON DB 1301 PG 631 DB 1301 PG 636

56A LARRY NEWMAN DB 1755 PG 1

57 EUGENE RICH DB 550 PG 367

57A DONNA RAY RICH DB 1829 PG 1669

62 KATHERINE ANN McDOWELL DB 825 PG 541

63 WILL A. CUELLER DB 1582 PG 1369 PG 61 PG 2

MATCHLINE STA. 24+00 -Y8- SEE SHEET NO. 41

MATCHLINE STA. 398+00 -L- SEE SHEET NO. 25

MATCHLINE STA. 411+00 -L- SEE SHEET NO. 27

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 63 FOR -L- PROFILE.
SEE SHEET NO. 74 FOR -Y8- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
SEE SHEET NO. 101 FOR -SR4- PROFILE.
SEE SHEET NO. 102 FOR -SR5- PROFILE.
SEE SHEET NO. 2-I FOR -Y8- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PERMIT SHEET 60 OF 89

REVISIONS 8/17/99

3/17/2009
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8/17/99

REVISIONS

MATCHLINE STA. 15+00 –Y8– SEE SHEET NO. 40

–SR5– POT Sta. 10+00.00 =
–Y8– POC Sta. 15+70.93

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

SDG SEE DETAIL "D"

–SR5– PC Sta. 10+25.00

–Y8– CS Sta. 15+86.31

PROP. SLOPE STAKES

–SR5– PRC Sta. 12+66.81

S 51° 42' 00.9" E

PROP. SLOPE STAKES

–Y8– ST Sta. 17+86.31

DECKS DRAINS REQUIRED
STA. 18+54 TO 18+90 RT.
STA. 20+72 TO 20+36 RT.
STA. 18+70 TO 19+06 LT.
STA. 20+74 TO 20+50 LT.
@ 12' FT SPACING

TB 2GI W/ FLAT GRATE

PROP. SLOPE STAKES

–Y8– POT Sta. 19+70.71 =
–L– POT Sta. 400+22.09

SDG SEE DETAIL "D"

S 84° 52' 28.1" W

+37 PROP. GUIDERAIL ANCHOR

83. PROP. GUIDERAIL ANCHOR

–L– ST Sta. 399+41.26

TB 2GI W/ FLAT GRATE

PROP. SLOPE STAKES

N 66° 05' 03.8" W

–SR3– PC Sta. 10+64.03

N 17° 15' 03.4" W

SDG SEE DETAIL "D"

–SR3–

PROP. SLOPE STAKES

–SR3– PT Sta. 12+77.10

–SR3– POT Sta. 10+00.00 =
–SR4– POT Sta. 10+00.00 =
–Y8– POS Sta. 22+59.27

PI Sta 11+77.52
Δ = 48° 50' 00.4" (RT)
D = 22° 55' 05.9"
L = 213.08'
T = 113.49'
R = 250.00'
DS = 30 mph
e = 0.04

MATCHLINE STA. 398+00 –L– SEE SHEET NO. 25

MATCHLINE STA. 24+00 –Y8– SEE SHEET NO. 41

MATCHLINE STA. 411+00 –L– SEE SHEET NO. 27

–SR5–

PI Sta 11+56.31
Δ = 55° 25' 07.8" (RT)
D = 22° 55' 05.9"
L = 241.81'
T = 131.31'
R = 250.00'
DS = 30 mph
e = 0.04

PI Sta 14+61.28
Δ = 43° 41' 57.0" (LT)
D = 11° 48' 48.8"
L = 369.91'
T = 194.47'
R = 485.00'
DS = 40 mph
e = 0.06

–L–

PIs Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

PIs Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

–Y8–

PIs Sta 13+88.59
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 15+20.80
Δ = 3° 07' 44.3" (LT)
D = 2° 23' 14.4"
L = 131.07'
T = 65.55'
R = 2,400.00'
DS = 60 mph
e = 0.06

PIs Sta 16+52.99
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

SITE 25

–SR5– FT Sta. 16+36.72

TOE PROTECTION SEE DETAIL "I"

PROP. SLOPE STAKES

S 39° 58' 50.1" E

END CONSTRUCTION
–SR5– POT Sta. 19+99.44

–SR5– POT Sta. 20+91.00

LATERAL "V" DITCH SEE DETAIL "A"

PROP. SLOPE STAKES

2GI W/ +50 CAT 1 FLAT GRATE

SBG

PROP. DIR. FACE OF GUIDERAIL

–L– S 39° 58' 50.1" E

–Y8– TS Sta. 21+54.16

–SR4– PC Sta. 10+90.87

–SR4– S 39° 58' 50.1" E

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

LATERAL DITCH SEE DETAIL "C"

CLASS B RIP-RAP SEE DETAIL "C"

PROP. SLOPE STAKES

–SR4– PT Sta. 13+18.67

S 66° 05' 03.8" E

–Y8– SC Sta. 23+74.16

PIs Sta 23+00.88
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

–Y8–

PI Sta 24+76.36
Δ = 8° 39' 32.4" (LT)
D = 4° 14' 38.9"
L = 204.02'
T = 102.21'
R = 1,350.00'
DS = 60 mph
e = 0.08

PIs Sta 26+51.56
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

–SR4–

PI Sta 12+06.78
Δ = 26° 06' 43.7" (RT)
D = 11° 27' 33.0"
L = 227.80'
T = 115.91'
R = 500.00'
DS = 30 mph
e = NC

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 63 FOR –L– PROFILE.
SEE SHEET NO. 74 FOR –Y8– PROFILE.
SEE SHEET NO. 100 FOR –SR3– PROFILE.
SEE SHEET NO. 101 FOR –SR4– PROFILE.
SEE SHEET NO. 102 FOR –SR5– PROFILE.
SEE SHEET NO. 2-I FOR –Y8– BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	26
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

PERMIT SHEET 61 OF 89

3/17/2009
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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-107

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

760 740 720 700

SR5 17+98.28 — L 406+00.00 — 406+00.00 — SR4 14+71.89

0.020 0.020 — 3:1 — 4:248:1 — 4:138:1 — 0.020 — 8:1 — 8:1 — 0.020 — 3.744:1 — 4:1 — 0.020 0.011

D.P. 735.268 — 724.96 — 722.34

406+00.00

760 740 720 700

SR5 17+48.28 — L 405+50.00 — 405+50.00 — SR4 14+21.89

0.020 0.013 — 2:1 — 4.257:1 — 4.173:1 — 0.020 — 8:1 — 8:1 — 0.020 — 4.812:1 — 4:1 — 0.020 0.012 — 6:1 6:1

D.P. 734.875 — 725.00 — 729.067

405+50.00

760 740 720 700

WETLANDS WETLANDS

SR5 16+98.28 — L 405+00.00 — 405+00.00 — SR4 13+71.89

0.020 0.011 — 2:1 — 4:1 — 4:1 — 0.020 — 8:1 — 8:1 — 0.020 — 4:1 — 4:1 — 0.020 0.013 — 6:1 6:1

D.P. 734.482 — 732.289

405+00.00

26068
PERMIT SITE 25

760 740 720

SR5 16+48.28 — L 404+50.00 — 404+50.00 — SR4 13+21.89

0.034 0.034 — 2:1 — 4:1 — 4:1 — 0.020 — 8:1 — 8:1 — 0.020 — 5.40:1 — 4:1 — 0.020 0.014 — 5:1

D.P. 734.089

404+50.00

PERMIT SHEET
62 OF 89

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

2/25/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	27
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES FILL IN SURFACE WATER
- DENOTES TEMPORARY SURFACE WATER IMPACTS

REVISIONS

8/17/99

-L- SEE SHEET NO. 26

MATCHLINE STA. 411+00 -L-

MATCHLINE STA. 425+00 -L-

SEE SHEET NO. 28

ROBERT G. POWELL
DB 1044 PG 102

CHAMP H. COOPER
DB 1078 PG 936
PB 23 PG 88

(65) LEWIS MICHAEL LINTHICUM
DB 825 PG 533

(68B) DAVID LEE JOHNSON
DB 1068 PG 255
PB 23 PG 88

(68A) JUNE H. HILL
DB 1144 PG 6

(66) JAMES PATRICK LINTHICUM
DB 825 PG 543

(64) WILL A CULLER
DB 1082 PG 1489
PB 81 PG 20

(67) JANET SUE LINTHICUM
DB 826 PG 537

SITE 25

LATERAL "V" DITCH SEE DETAIL "A"

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

2GI W/ FLAT GRATE

+00, GRAU 350

50' END SBG

PROP. DBL FACE CBL. GUIDERAIL

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

S 39° 58' 50.1" E

+50, CAT-1 END SBG

PROP. C/A FENCE

JB W/ MH

CLASS 'I' RIP RAP EST. 26 TONS 49 SY FILTER FABRIC

2' LATERAL BASE DITCH SEE DETAIL "B"

PROP. R/W

2' LATERAL BASE DITCH SEE DETAIL "B"

SDG SEE DETAIL "D"

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

END OF ROADWAY MARKERS

PROP. SLOPE STAKES

TOE PROTECTION SEE DETAIL "T"

CLASS 'B' RIP RAP EST. 8 TONS 10 SY FILTER FABRIC

-SR4-

-SR4- PC Sta. 31+34.98

END CONSTRUCTION
-SR4- POC Sta. 33+83.99

-SR4- PT Sta. 33+93.97

-SR4- POT Sta. 34+36.65

S. 19° 22' 30.0" W

-SR4-
PI Sta 32+77.45
Δ = 59° 21' 20.1" (RT)
D = 22° 55' 05.9"
L = 258.99'
T = 142.41'
R = 250.00'
DS = 30 mph
e = 0.04

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 63 FOR -L- PROFILE.
SEE SHEET NO. 101 FOR -SR4- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 63 OF 89

3/17/2009
R:\Roadway\TPA\d0149860\R-2606B_hyd_permits_pah27_necon.dgn
mpatsios

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES FILL IN SURFACE WATER
- DENOTES TEMPORARY SURFACE WATER IMPACTS

MATCHLINE STA. 411+00 –L– SEE SHEET NO. 26

MATCHLINE STA. 425+00 –L– SEE SHEET NO. 28

SITE 25

LATERAL "V" DITCH SEE DETAIL "A"

2' LATERAL BASE DITCH SEE DETAIL "B"

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

END OF ROADWAY MARKERS

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

PROP. CA FENCE

SDG SEE DETAIL "D"

TOE PROTECTION SEE DETAIL "T"

CLASS II RIP RAP EST. 76 TONS 49 SY FILTER FABRIC

CLASS II RIP RAP EST. 48 TONS 18 SY FILTER FABRIC

-SR4- PC Sta. 31+34.98

-SR4- POC Sta. 33+83.99

-SR4- PT Sta. 33+93.91

-SR4- POT Sta. 34+36.65

S 39° 58' 50" E

-L- +25, PROP. GUIDERAIL ANCHOR

-L- +75, PROP. GUIDERAIL ANCHOR

-L- +50, CAT-1 END SBG

-L- +00, BEGIN SBG

-L- +00, GRAU 350

-L- +70, GRAU 350

-L- +20, GRAU 350

-SR4- PI Sta. 32+77.45
Δ = 59° 21' 20" (RT)
D = 22° 55' 05.9"
L = 258.99'
T = 142.47'
R = 250.00'
DS = 30 mph
e = 0.04

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 63 FOR -L- PROFILE.
SEE SHEET NO. 101 FOR -SR4- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 64 OF 89

REVISIONS

8/17/99

3/19/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	28
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

SITE 26

68A JUNE H. HILL DB 844 PG 5

68 JUNE H. HILL DB 841 PG 596

71 TED L. HOLLINGSWORTH DB 1473 PG 1061 PB 47 PG 58

NAD 83

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

-L- STA. 425+00 MATCHLINE SEE SHEET NO. 27

-L- STA. 439+00 MATCHLINE SEE SHEET NO. 29

POND DRAIN POND

PROP. SLOPE STAKES

TOE PROTECTION SEE DETAIL "T"

+50, CAT-1 BEGIN SBG

+00, GRAU 350

2' BASE BERM DITCH SEE DETAIL "J"

PROP. R/W

PROP. DBL FACE CBL GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

S 39° 58' 50.1" E

-L-

+00, CAT-1 END SBG

2' BASE TAIL DITCH W/CLASS 'B' RIP RAP SEE DETAIL "G" 42' LENGTH @ 2.43%

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PROP. GUARDRAIL SBG

PROP. CA FENCE

69 CHAMP R. COOPER DB 1078 PG 938

70 KENNETH RAY HOLLINGSWORTH DB 47 PG 58 PB 47 PG 58

PERMIT SHEET 65 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 64 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/11/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	28
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

SITE 26

MATCHLINE STA. 425+00 -L- SEE SHEET NO. 27

MATCHLINE STA. 439+00 -L- SEE SHEET NO. 29

NAD 83

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

PROP. SLOPE STAKES

2' BASE BERM DITCH SEE DETAIL "J"

TOE PROTECTION SEE DETAIL "T"

+50, CAT 5 BEGIN SBG

+00, GRAU 350

2GI W/ FLAT GRATE

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

S 39°58'50" E

2 ELBOWS

+00, CAT 5 END SBG

2' BASE TAIL DITCH W/CLASS "B" RIP RAP SEE DETAIL "Q" 42' LENGTH @ 43%

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PSH

PROP. GUARDRAIL

PROP. SBL-FACE (SBL/GUIDERAIL)

PROP. SAW

PROP. CL FENCE

PERMIT SHEET 66 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 64 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/17/2009
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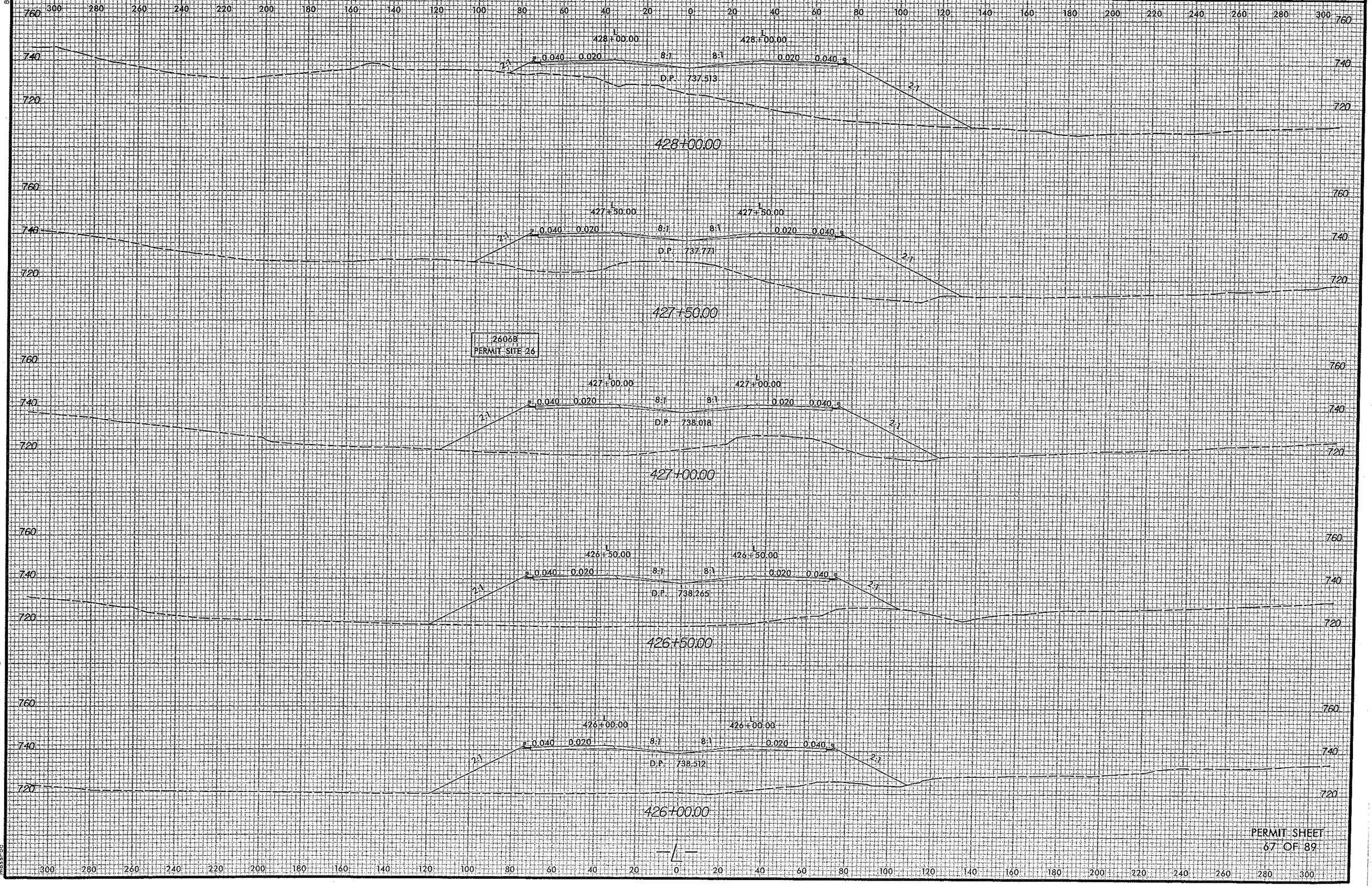
8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-117



2/25/2009
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mesarge

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	29
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

71
TED L. HOLLINGSWORTH
DB 1473 PG 1061
PB 47 PG 58

70
KENNETH RAY HOLLINGSWORTH
DB 47 PG 58
PB 47 PG 58

72
ELIZABETH H. BULLINS
DB 1473 PG 1063
PB 47 PG 58

73
MILDRED FREEMAN
DB 899 PG 120

LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY FILL IN SURFACE WATER

MATCHLINE STA. 439+00 -L- SEE SHEET NO. 28

MATCHLINE STA. 453+00 -L- SEE SHEET NO. 30

PROP. SLOPE STAKES
PROP. R/W
PROP. DBL FACE
PROP. GUARDRAIL & SRG
PROP. SLOPE STAKES
PROP. SLOPE STAKES
PROP. R/W

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET

+50, CAT-1 BEGIN SBG

+75, PROP GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

14.4 ft CLEARANCE

S 39°58'50.1" E

-L- +14.95 117.32' LT END C/A FENCE

-L- +41.42 148.12' LT BEGIN C/A FENCE

-L- +75.00 190.00' LT

-L- +90.00 190.00' LT

-L- +70.00 200.00' RT

-L- +20.89 161.43' RT BEGIN C/A FENCE

-L- +30.00 200.00' RT

-L- +10.83 161.68' RT END C/A FENCE

-L- +00.00 200.00' RT

TOE PROTECTION F SEE DETAIL "T"

CLASS "B" RIP RAP EST. 8 TONS 21 SY FILTER FABRIC

CLASS "I" RIP RAP EST. 40 TONS 45 SY FILTER FABRIC

-L- 450+23.00
GP ELEV.=706.58'
SKEW=91°
10'X7' RCBC BURIED 1'

SITE 27

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 64 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 68 OF 89

3/17/2009
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noconc

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	29
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

MATCHLINE STA. 439+00 -L- SEE SHEET NO. 28

MATCHLINE STA. 453+00 -L- SEE SHEET NO. 30

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY FILL IN SURFACE WATER

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET

PROP. SLOPE STAKES

PROP. GUARDRAIL

+50 CAT-1 BEGIN SBG

+00 GRAU 350

+75 PROP GUIDERAIL ANCHOR

+25 PROP GUIDERAIL ANCHOR

14.4 ft CLEARANCE

TOE PROTECTION SEE DETAIL 'T'

CLASS 'B' RIP RAP EST. 8 TONS 21 SY FILTER FABRIC

CLASS 'I' RIP RAP EST. 40 TONS 45 SY FILTER FABRIC

-L- 450+23.00
GP ELEV.=706.58'
SKEW=9°
10'X7' RCBC BURIED 1'

SITE 27

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

SEE SHEET NO. 64 FOR -L- PROFILE.

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 69 OF 89

8/4/2009
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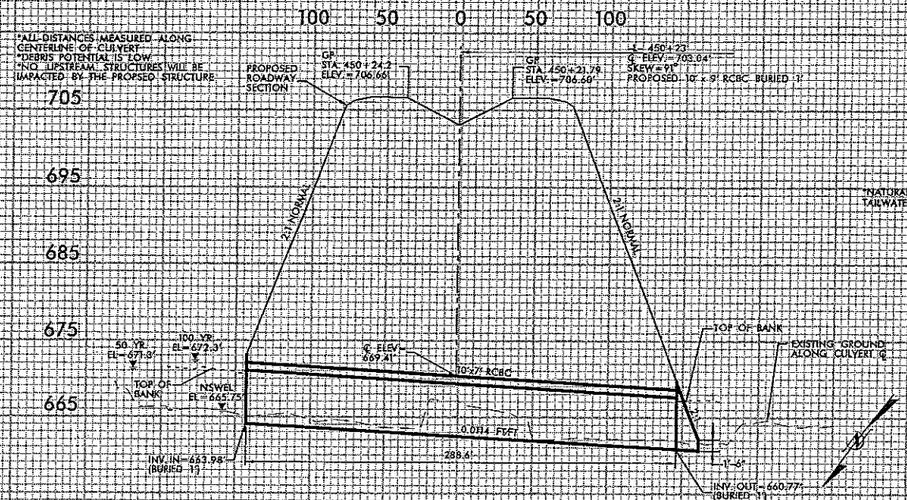
5/26/99

SITE 27 2606B

PROJECT REFERENCE NO.	SHEET NO.
R-2233AA	CSR-29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PROFILE ALONG ℄ OF CULVERT

WSEL TABLE

YEAR	DISCHARGE (CFS)	NATURAL	PROPOSED
10	240	669.1	669.2
50	440	670.7	671.3
100	550	671.4	672.3
500	850	672.9	675.1

*NATURAL ELEVATIONS WERE CALCULATED BASED ON TAILWATER DEPTH @ CHANNEL INVERT @ UPSTREAM CULVERT FACE

2/25/2009
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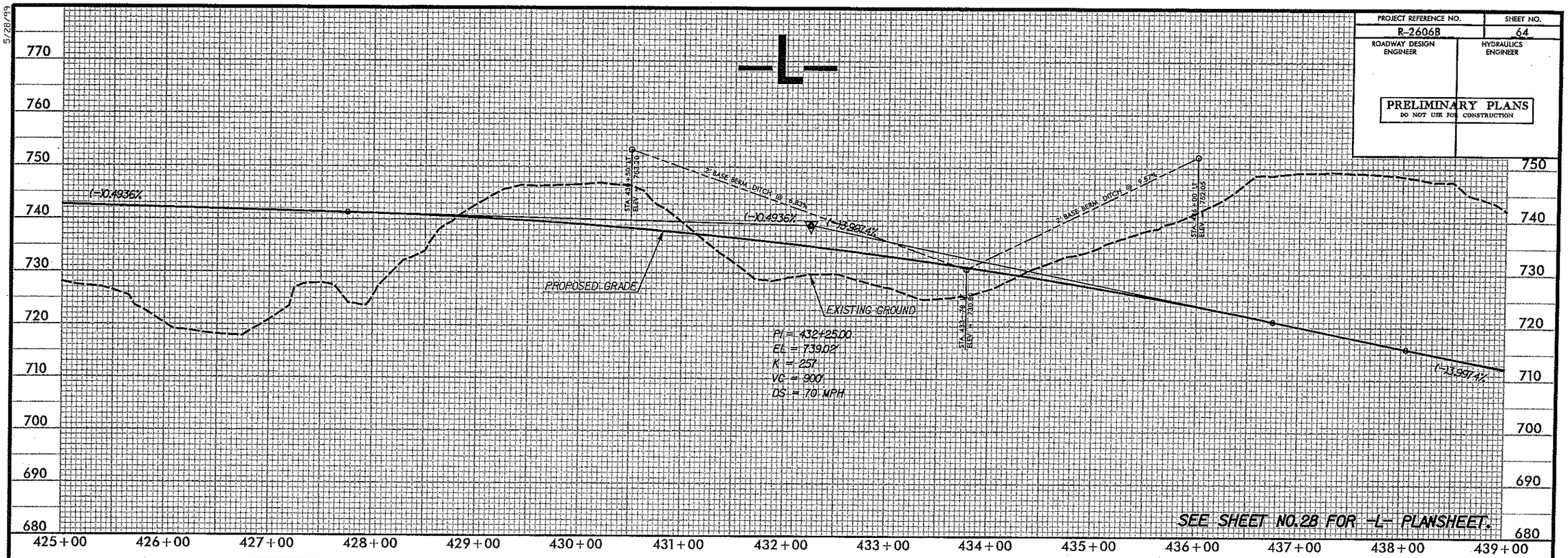
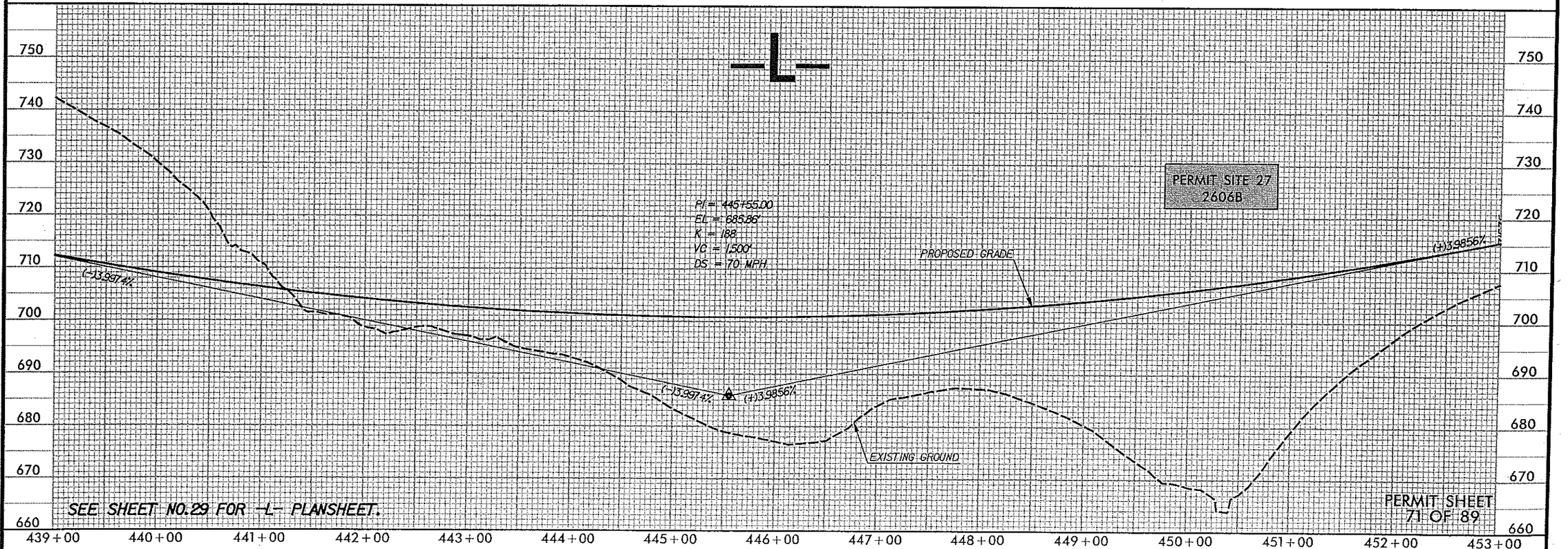
mcconnell

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





PERMIT SHEET
71 OF 89

2/25/2009
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mcgarrr

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	30
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

MATCHLINE STA. 17+50 -Y10-
SEE SHEET NO. 42

MATCHLINE STA. 453+00 -L-
SEE SHEET NO. 29

MATCHLINE STA. 467+00 -L-
SEE SHEET NO. 31

MATCHLINE STA. 26+50 -Y10-
SEE SHEET NO. 43

-Y10-

Pls Sta 14+08.38
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

Pl Sta 24+73.51
Δ = 63° 55' 59.7" (LT)
D = 3° 34' 51.6"
L = 1,785.35'
T = 998.50'
R = 1,600.00'
DS = 50 mph
e = 0.05

Pls Sta 33+27.06
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

-RP3C-

Pls Sta 11+33.33
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

Pl Sta 16+49.19
Δ = 2° 34' 23.6" (RT)
D = 0° 17' 11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 70 mph
e = NC

Pls Sta 21+64.89
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

LEGEND

- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES FILL IN WETLAND
- DENOTES FILL IN SURFACE WATER

-Y10- POC Sta. 22+12.45 =
-L- POT Sta. 462+61.47

-RP3C- ST Sta. 10+00.00 =
-L- POT Sta. 458+91.82
OFFSET 35.00' RIGHT

-RP3C- SC Sta. 12+00.00

-SR6- PC Sta. 10+30.91

-SR6- PT Sta. 16+23.33

-SR6- PC Sta. 13+24.26

-SR6- PT Sta. 12+26.76

-SR6- POT Sta. 20+50.00 =
-Y10- POC Sta. 25+24.10

END CONSTRUCTION
-SR6- Sta. 19+68.82

SITE 27

-SR6-

Pl Sta 14+76.97
Δ = 28° 33' 35.4" (LT)
D = 9° 32' 57.5"
L = 299.08'
T = 152.71'
R = 600.00'
DS = 40 mph
e = 0.02

Pl Sta 11+33.59
Δ = 44° 39' 28.0" (RT)
D = 22° 55' 05.9"
L = 194.86'
T = 102.68'
R = 250.00'
DS = 30 mph
e = 0.04

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-R FOR -Y10- BRIDGE DETAIL.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 103 FOR -SR6- PROFILE.
SEE SHEET NO. 75 FOR -Y10- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PERMIT SHEET
72 OF 89

3/12/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 17+50 -Y10-
SEE SHEET NO. 42

MATCHLINE STA. 453+00 -L- SEE SHEET NO. 29

MATCHLINE STA. 467+00 -L- SEE SHEET NO. 31

MATCHLINE STA. 26+50 -Y10-
SEE SHEET NO. 43

-Y10-
PI Sta 14+08.38
Θs = 3°34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI Sta 24+73.51
Δ = 63°55' 59.7" (LT)
D = 3°34' 51.6"
L = 1785.35'
T = 998.50'
R = 1600.00'
DS = 50 mph
e = 0.05

PI Sta 33+27.06
Θs = 3°34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

-RP3C-
PI Sta 11+33.33
Θs = 0°17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 16+49.19
Δ = 2°34' 23.6" (RT)
D = 0°17' 11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 70 mph
e = NC

PI Sta 21+64.89
Θs = 0°17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

LEGEND
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES FILL IN WETLAND
DENOTES FILL IN SURFACE WATER

-Y10- POC Sta. 22+12.45 =
-L- POT Sta. 462+61.47

-RP3C- ST. Sta. 10+00.00 =
-L- POT Sta. 458+91.82
OFFSET 35.00' RIGHT

-SR6-
PI Sta 14+76.97
Δ = 28°33' 35.4" (LT)
D = 9°32' 57.5"
L = 299.08'
T = 152.71'
R = 600.00'
DS = 40 mph
e = 0.02

PI Sta 11+33.59
Δ = 44°39' 28.0" (RT)
D = 22°55' 05.9"
L = 194.86'
T = 102.68'
R = 250.00'
DS = 30 mph
e = 0.04

-RP3C- SC Sta. 12+00.00
-SR6- PC Sta. 10+30.91
-SR6- PT Sta. 16+23.33
-SR6- PC Sta. 13+24.26
-SR6- PT Sta. 12+25.76
-SR6- POT Sta. 20+50.00
END CONSTRUCTION -SR6- Sta. 19+68.82
-SR6- POT Sta. 10+00.00 =
-Y10- POC Sta. 25+24.10

SITE 27

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-R FOR -Y10- BRIDGE DETAIL.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 103 FOR -SR6- PROFILE.
SEE SHEET NO. 75 FOR -Y10- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

PERMIT SHEET
73 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

3/17/2009
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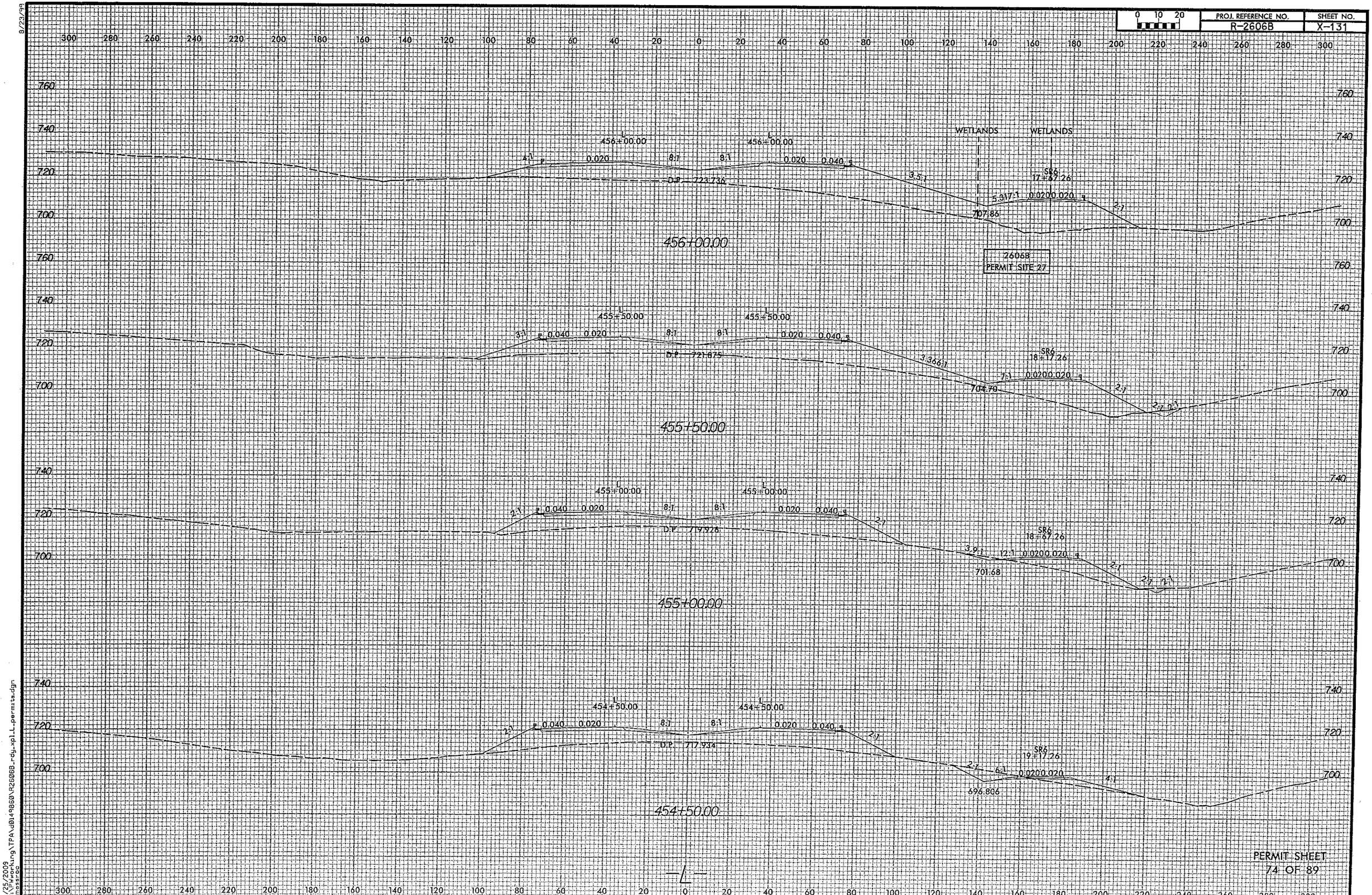
jmasters

8/23/99

PROJ. REFERENCE NO. R-2606B | SHEET NO. X-131



PERMIT SHEET
74 OF 89

2/25/2009
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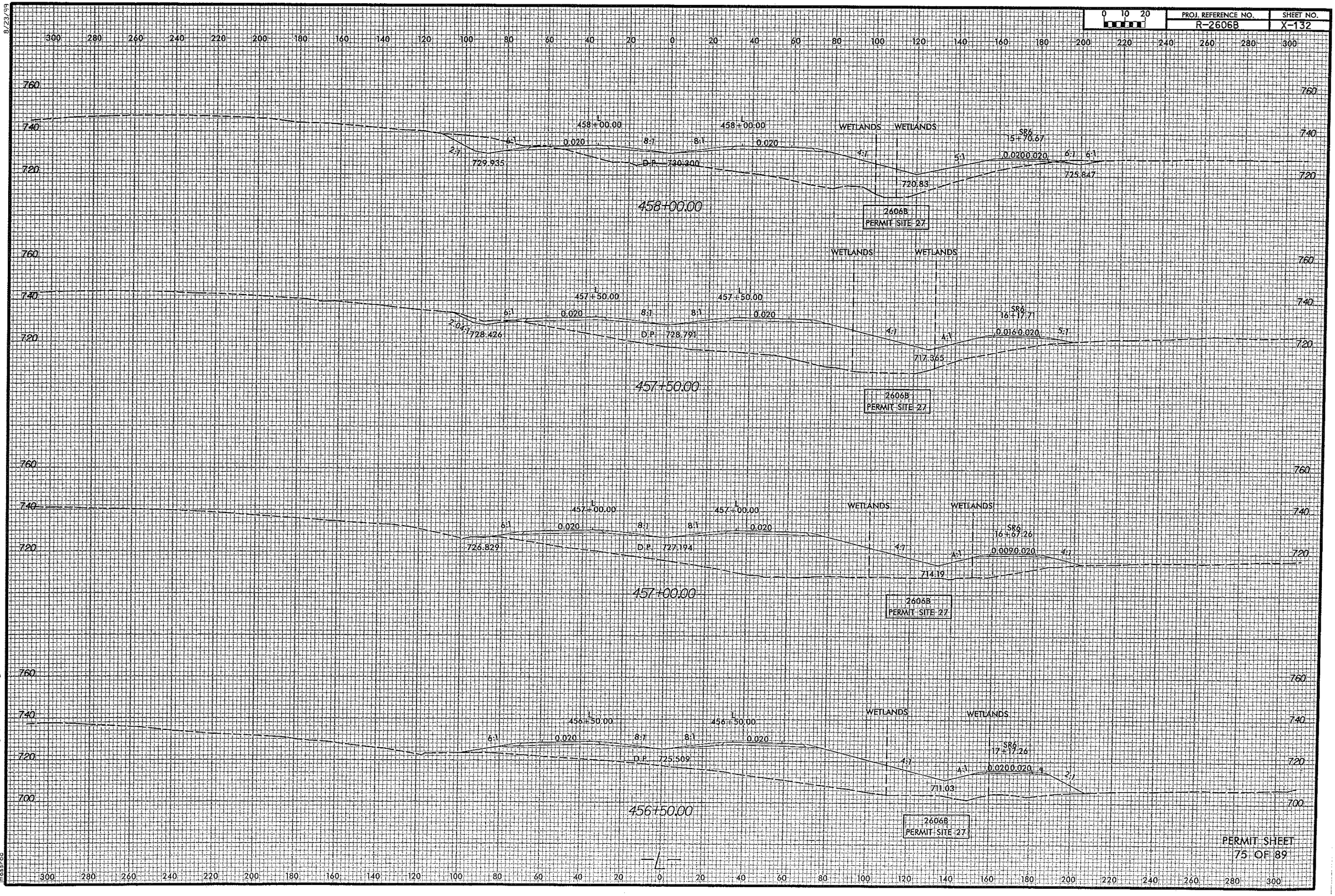
mesarog

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-132



2/25/2009
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mssroc

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	31
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207. Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

-RP3B-
Pls Sta 11+46.73
Θs = 5°15'07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

PI Sta 26+62.62
Δ = 100°29'28.5" (LT)
D = 4°46'28.7"
L = 2,104.68'
T = 1,442.62'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pls Sta 33+98.08
Θs = 5°15'07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

LEGEND
DENOTES FILL IN SURFACE WATER
DENOTES TEMPORARY SURFACE WATER IMPACTS

-RP3B- / ST Sta. 10+00.00 = -L- POT Sta. 479+80.13 59.00' LT

MATCHLINE STA. 467+00 -L- SEE SHEET NO. 30

MATCHLINE STA. 481+00 -L- SEE SHEET NO. 32

SITE 28

91 RAYMOND GARNER DB 908 PG 178

85 JOHN M. LAMB DB 965 PG 53

92 ALFRED A. THOMAS DB 897 PG 182

84 PRISCILLA STEELE DB 982 PG 464

83 RUBY WALL DB 681 PG 408

93 VAN H. LEDBETTER DB 1325 PG 878

PROP. SLOPE STAKES
PROP. GUARDRAIL & SBG
SDG SEE DETAIL "D"
+00, CAT-1 BEGIN SBG
+50, GRAU 350
+00, END SBG
2GI W/ FLAT GRATE
+50, CAT-1 END SBG
+00, GRAU 350
+00, PROP. GUARDRAIL ANCHORS
PROP. DBL FACE C&L GUARDRAIL
2' LATERAL BASE DITCH SEE DETAIL "B"
2' LATERAL BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL "C"
2' LATERAL BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL "R"
CLASS 'B' RIP RAP EST. 19 TONS 38 SY FILTER FABRIC
CLASS 'B' RIP RAP EST. 9 TONS 10 SY FILTER FABRIC
CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC
3' BASE TAIL DITCH SEE DETAIL "Z"
36" CLASS IV WEIRFORD INSTALLATION
36" CLASS IV WELDED INSTALLATION
15" CSP
18" CSP
PROP. R/W
CHORD
TIDE
POULTRY HOUSE
-RP3C- CS Sta. 20+98.22
-RP3C- ST Sta. 22+98.22
-RP3CA- POT Sta. 10+00.00 = -RP3C- POT Sta. 25+69.93
-RP3C- +98.22 140.00' RT
-RP3C- +25 150' RT
-RP3C- +63 150' RT
S 39°58'50" E
S 39°08'03.9" E
S 36°50'03.9" E
-RP3CA-
-RP3C-
-RP3B-
-L- +50.13 180.00' LT

-RP3C-
Pls Sta 11+33.33
Θs = 0°17'11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 16+49.19
Δ = 2°34'23.6" (RT)
D = 0°17'11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 60 mph
e = NC

Pls Sta 21+64.89
Θs = 0°17'11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 87 FOR -RP3B- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 92 FOR -RP3CA- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET 76 OF 89

3/11/2009
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mwarren

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	31
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

-RP3B-

Pls Sta 11+46.73
Θs = 5°15'07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

PI Sta 26+62.62
Δ = 100°29'28.5" (LT)
D = 4°46'28.7"
L = 2,104.68'
T = 1,442.62'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pls Sta 33+98.08
Θs = 5°15'07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES TEMPORARY SURFACE WATER IMPACTS

NAD 83

MATCHLINE STA. 467+00 -L- SEE SHEET NO. 30

MATCHLINE STA. 481+00 -L- SEE SHEET NO. 32

SITE 28

-RP3B- ST Sta. 10+00.00 = -L- POT Sta. 479+80.13 59.00' LT

-RP3CA- POT Sta. 10+00.00 = -RP3C- POT Sta. 25+69.93

-RP3C- CS Sta. 20+98.22

-RP3C- ST Sta. 22+98.22

S 39°58'50" E

S 39°08'03.9" E

S 36°50'03.9" E

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

SDG SEE DETAIL "D"

2' LATERAL BASE DITCH SEE DETAIL "B"

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

2' LATERAL BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL "R"

3' BASE TAIL DITCH SEE DETAIL "Z"

CLASS 'B' RIP RAP EST. 73 TONS 38 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 9 TONS 10 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

+00 CAT-1 BEGIN SBG

+00 END SBG

+00 GRAU 350

+50 CAT-1 END SBG

2GI W/ FLAT GRATE

PROP. DBL FACE CBC GUIDERAIL

+00 PROP. GUIDERAIL ANCHOR

SILT BARRIER

CLAY INSULATION

WILDLIFE CROSSING

POULTRY WIRE

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 87 FOR -RP3B- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 92 FOR -RP3CA- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

-RP3C-

Pls Sta 11+33.33
Θs = 0°17'11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 16+49.19
Δ = 2°34'23.6" (RT)
D = 0°17'11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 60 mph
e = NC

Pls Sta 21+64.89
Θs = 0°17'11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

3/11/2009
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jmasters

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2604B	32
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 202 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 46

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 46

MATCHLINE STA. 481+00 –L– SEE SHEET NO. 31

MATCHLINE STA. 24+50 –RP3BD– SEE SHEET NO. 47

MATCHLINE STA. 64+50 –Y12– SEE SHEET NO. 47

–RP3B–
Pt Sta 11+46.73 Bs = N 15° 51' 07.6" Ls = 200.00' LT = 146.73' ST = 73.39'
Pt Sta 26+62.66 Δ = 107° 29' 28.5" (LT) D = 4° 46' 28.7" L = 224.48' T = 144.26' R = 1,200.00' DS = 60 mph e = 0.08
Pt Sta 33+86.06 Bs = S 75° 51' 01.6" Ls = 200.00' LT = 146.73' ST = 73.39'

–RP3CA–
Pt Sta 21+27.85 Bs = T 39° 23' 51.5" Ls = 320.00' LT = 213.53' ST = 106.85'
Pt Sta 23+40.04 Δ = 14° 41' 17.7" (LT) D = 4° 46' 28.7" L = 359.72' T = 180.73' R = 1,200.00' DS = 60 mph e = 0.08
Pt Sta 26+50.89 Bs = T 39° 23' 51.5" Ls = 320.00' LT = 213.53' ST = 106.85'

–RP3C–
Pt Sta 46+89.12 Bs = T 39° 22' 07.5" Ls = 320.00' LT = 213.53' ST = 106.85'
Pt Sta 51+43.54 Δ = 39° 20' 25.0" (RT) D = 4° 46' 28.7" L = 677.33' T = 347.95' R = 1,200.00' DS = 60 mph e = 0.08
Pt Sta 55+79.77 Bs = T 39° 22' 07.5" Ls = 320.00' LT = 213.53' ST = 106.85'
Pt Sta 59+26.26 Bs = S 75° 51' 23.5" Ls = 200.00' LT = 133.54' ST = 66.67'

–RP3D–
Pt Sta 11+94.41 Bs = S 22° 55' 05.9" Ls = 200.00' LT = 134.47' ST = 67.70'
Pt Sta 7+92.98 Δ = 225° 57' 34.8" (RT) D = 22° 55' 05.9" L = 961.91' T = 582.96' R = 250.00' DS = 30 mph e = 0.08
Pt Sta 12+58.63 Bs = S 75° 59.5" Bs = S 22° 55' 42.8" Ls = 200.00' LT = 134.81' ST = 70.66'

–Y12–
Pt Sta 5+45.31 Bs = T 75° 59.5" Ls = 200.00' LT = 133.54' ST = 66.67'
Pt Sta 67+18.29 Δ = 37° 01' 05.0" (LT) D = 11° 55' 59.1" L = 1,000.01' T = 533.32' R = 480.00' DS = 70 mph e = 0.04
Pt Sta 82+50.67 Bs = T 75° 59.5" Ls = 200.00' LT = 133.54' ST = 66.67'

–RP3BD–
Pt Sta 24+50.63 Bs = T 75° 59.5" Ls = 200.00' LT = 133.54' ST = 66.67'

–RP3CA– SC Sta. 22+34.32
–RP3CA– TS Sta. 19+14.32
–RP3CA– CS Sta. 25+44.04
–RP3C– TS Sta. 44+75.50
–RP3C– SC Sta. 47+95.59
–RP3C– CS Sta. 54+72.82
–RP3B– SC Sta. 12+20.00
–RP3CA– ST Sta. 28+64.04
–RP3CA– SC Sta. 15+87.97 = –Y12– PCC Sta. 5.5+47.82 OFFSET 58.00' LEFT
–RP3CA– CS Sta. 11+87.97
–RP3CA– ST Sta. 0+00.00 = –RP3CA– POT Sta. 36+19.40 OFFSET 8.00' LEFT
–RP3CA– POT Sta. 36+19.40
–RP3CA– SC Sta. 2+00.00
–RP3BD– SC Sta. 12+40.00
–RP3BD– TS Sta. 20+29.68 CP ELEV=740.00 SKEW=108 RETAIN AND EXTEND EXISTING 10'x9' RCBC WITH 10'x9' RCBC BURIED 1'
–RP3C– POT Sta. 493+75.00
–RP3C– SC Sta. 10+00.00 = –L– POT Sta. 493+75.00 OFFSET 41.00' LEFT
–RP3C– ST Sta. 10+46.45
–RP3C– SC Sta. 13+65.17
–RP3C– TS Sta. 16+84.09
–RP3C– SC Sta. 38+24.30
–Y12– TS Sta. 494+81.97
–Y12– SC Sta. 514+81.97

SITE 30
SITE 29

LEGEND
RENSTER FILL IN SURFACE WATER

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.

SEE SHEET NO. 66 FOR –L– PROFILE.
SEE SHEET NO. 95 FOR –LP3CA– PROFILE.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NO. 88 FOR –RP3BD– PROFILE.
SEE SHEET NOS. 90–91 FOR –RP3C– PROFILE.
SEE SHEET NO. 92 FOR –RP3CA– PROFILE.
SEE SHEET NOS. 78,79,82 FOR –Y12– PROFILE.
SEE SHEET NO. 2–J FOR –Y12– BRIDGE DETAIL.
SEE SHEET NO. 2–K FOR –RP3CA– BRIDGE DETAIL
SEE SHEET NO. 2–K FOR –RP3BD– BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PERMIT SHEET 78 OF 89

GRAPHIC SCALE 0 PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2608B	32
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 202 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 46

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 46

MATCHLINE STA. 481+00 –L– SEE SHEET NO. 31

MATCHLINE STA. 24+50 –RP3BD– SEE SHEET NO. 47

MATCHLINE STA. 64+50 –Y12– SEE SHEET NO. 47

–RP3B–
Pt Sta 11+46.73 | Pt Sta 28+62.62 | Pt Sta 33+96.06
Bs = 15°51'01.6" | Δ = 107°29'38.5" (LT) | Bs = 5°51'01.6"
Ls = 320.00' | D = 4°46'28.7" | Ls = 320.00'
LT = 140.73' | L = 2,249.58' | LT = 140.73'
ST = 73.39' | T = 1,442.56' | ST = 73.39'
R = 1,200.00' | R = 1,200.00'
DS = 60 mph | DS = 60 mph
e = 0.08 | e = 0.08

–RP3CA–
Pt Sta 21+27.85 | Pt Sta 23+90.04 | Pt Sta 26+50.89
Bs = 1°36'23.0" | Δ = 14°41'17.7" (LT) | Bs = 7°36'52.0"
Ls = 320.00' | D = 4°46'28.7" | Ls = 320.00'
LT = 213.53' | L = 359.72' | LT = 213.53'
ST = 106.85' | T = 180.73' | ST = 106.85'
R = 1,200.00' | R = 1,200.00'
DS = 60 mph | DS = 60 mph
e = 0.08 | e = 0.08

–LP3CA–
Pt Sta 1+34.61 | Pt Sta 7+62.30 | Pt Sta 12+58.63
Bs = 22°55'05.9" | Δ = 225°23'34.8" (RT) | Bs = 0°59'59.6"
Ls = 200.00' | D = 22°55'05.9" | Ls = 200.00'
LT = 134.47' | L = 787.29' | LT = 134.47'
ST = 67.70' | T = 582.56' | R = 250.00'
R = 250.00' | DS = 50 mph | e = 0.08
DS = 50 mph
e = 0.08

–Y12–
Pt Sta 5+45.31 | Pt Sta 67+48.29 | Pt Sta 82+50.67
Bs = 0°57'59.7" | Δ = 32°07'05.0" (LT) | Bs = 0°59'59.7"
Ls = 200.00' | D = 0°59'59.7" | Ls = 200.00'
LT = 153.34' | R = 5,730.00' | LT = 153.34'
ST = 66.67' | DS = 70 mph | ST = 66.67'
e = 0.04

–RP3C–
Pt Sta 46+89.12 | Pt Sta 51+43.54 | Pt Sta 55+79.77 | Pt Sta 59+26.26
Bs = 7°36'22.0" | Δ = 32°20'25.0" (RT) | Bs = 7°36'22.0" | Bs = 0°59'23.7"
Ls = 320.00' | D = 4°46'28.7" | Ls = 320.00' | Ls = 200.00'
LT = 213.53' | L = 677.33' | LT = 213.53' | LT = 133.34'
ST = 106.85' | T = 347.95' | ST = 106.85' | ST = 66.67'
R = 1,200.00'
DS = 60 mph
e = 0.08

–RP3BD–
Pt Sta 11+60.05 | Pt Sta 19+99.67 | Pt Sta 27+26.43 | Pt Sta 30+46.45 | Pt Sta 32+89.55 | Pt Sta 36+14.09 | Pt Sta 38+24.30
Bs = 4°35'01.2" | Δ = 53°43'11.3" (RT) | Bs = 4°35'01.2" | Bs = 5°10'10.4" | Δ = 13°59'18.7" (LT) | Bs = 12°43'59" | Δ = 5°46'26.4" (LT)
Ls = 240.00' | D = 5°49'11.0" | Ls = 240.00' | Ls = 240.00' | D = 4°46'28.6" | Ls = 240.00' | D = 1°07'36.5"
LT = 160.05' | L = 1,402.58' | LT = 160.05' | LT = 160.01' | L = 324.17' | LT = 160.03' | L = 266.36'
ST = 80.05' | T = 758.67' | ST = 80.05' | ST = 80.06' | T = 163.11' | ST = 80.01' | T = 133.23'
R = 1,200.00' | R = 1,200.00' | R = 1,330.00' | R = 5,672.00'
DS = 60 mph | DS = 60 mph | DS = 60 mph | DS = 60 mph
e = 0.08 | e = 0.08 | e = 0.08 | e = 0.04

–RP3CA– ST Sta. 28+64.04
–RP3CA– TS Sta. 19+44.32
–RP3CA– SC Sta. 22+34.32
–RP3CA– CS Sta. 25+44.04
–RP3C– TS Sta. 44+75.59
–RP3C– SC Sta. 47+95.59
–RP3C– CS Sta. 54+72.82
–RP3BD– SC Sta. 12+20.00
–RP3BD– ST Sta. 10+00.00 = –L– POT Sta. 493+75.00 OFFSET 47.00' LEFT
–RP3BD– SC Sta. 12+40.00
–RP3BD– POT Sta. 49+96.46 OFFSET 47.00' LEFT SKEW=105 RET.WALL AND EXTEND EXISTING 10'x9' RCBC WITH 10'x9' RCBC BURIED 1'
–RP3CA– ST Sta. 0+00.00 = –RP3CA– POT Sta. 36+91.40 OFFSET 8.00' LEFT
–LP3CA– SC Sta. 2+00.00
–RP3CA– POT Sta. 36+91.40
–LP3CA– SC Sta. 13+87.97 = –Y12– POC Sta. 53+47.82 OFFSET 58.00' LEFT
–LP3CA– CS Sta. 11+87.97
–Y12– SC Sta. 51+48.97
–Y12– TS Sta. 49+48.97

SITE 29
SITE 30

LEGEND
DENOTES FILL IN SURFACE WATER

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 66 FOR –L– PROFILE.
SEE SHEET NO. 95 FOR –LP3CA– PROFILE.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NO. 88 FOR –RP3BD– PROFILE.
SEE SHEET NOS. 90–91 FOR –RP3C– PROFILE.
SEE SHEET NO. 92 FOR –RP3CA– PROFILE.
SEE SHEET NOS. 78,79,82 FOR –Y12– PROFILE.
SEE SHEET NO. 2–J FOR –Y12– BRIDGE DETAIL.
SEE SHEET NO. 2–K FOR –RP3CA– BRIDGE DETAIL
SEE SHEET NO. 2–K FOR –RP3BD– BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PERMIT SHEET 79 OF 89

GRAPHIC SCALE
0
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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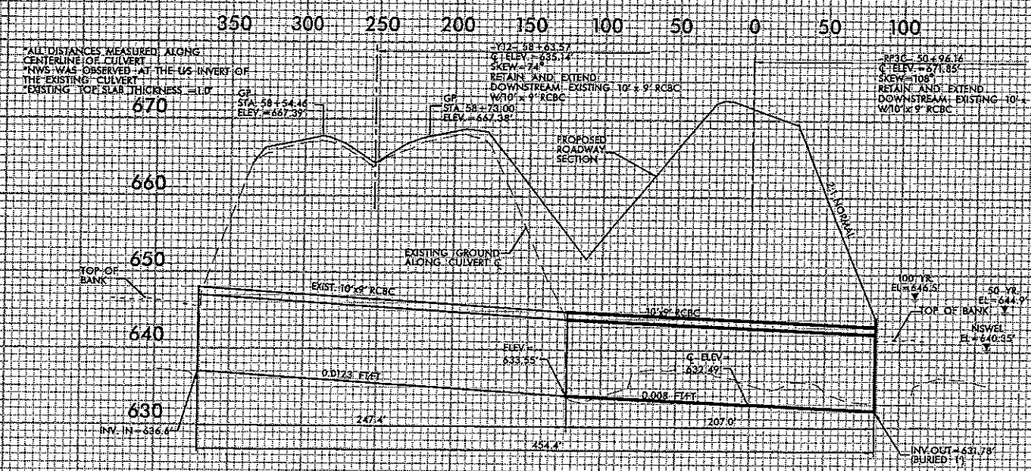
5/28/99

SITE 30 2606B

PROJECT REFERENCE NO.	SHEET NO.
R-2233AA	CSR-32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PROFILE ALONG ℄ OF CULVERT

WSEL TABLE

YEAR	DISCHARGE (CFS)	NATURAL	EXISTING	PROPOSED
10	370	641.6	642.0	642.3
50	650	643.4	644.9	644.9
100	850	644.4	646.5	646.5
500	1300	646.3	649.7	649.7

*NATURAL ELEVATIONS WERE CALCULATED BASED ON TAILWATER DEPTH @ CHANNEL INVERT @ US CULVERT FACE

PERMIT SHEET
80 OF 89

2/25/2009
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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	91
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3C-

(-)4.4859%

SPECIAL CUT DITCH @ 0.30%

SPECIAL CUT DITCH @ 3.08%

STA. 38+80 RT
ELEV. = 714.22

STA. 44+67.31 LT
ELEV. = 706.11

EXISTING GROUND

PROPOSED GRADE

PI = 38+00.00
EL = 723.91'
K = 210
VC = 700'
DS = 60 MPH

PI = 51+00.00
EL = 665.60'
K = 146
VC = 850'
DS = 60 MPH

SDG @ 5.14%

STA. 48+20 LT
ELEV. = 691.95

STA. 48+80 LT
ELEV. = 684.85

(+)1.3455%

(-)4.4859%

SDG @ 1.72%

SDG @ 2.20%

STA. 50+00
ELEV. = 658.00

STA. 50+78.11
ELEV. = 656.50

PERMIT SITE 30
2606B

SEE SHEET NO.32 FOR -RP3C- PLANSHEET.

38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00

720 710 700 690 680 670 660 650 640 630

-RP3C-

END GRADE
-RP3C- STA. 59+92.92
EL. = 676.56'

PROPOSED GRADE

(+)1.3455%

(+)1.0600%

SDG @ 5.25%

SDG @ 2.20%

STA. 54+28.11
ELEV. = 668.58

STA. 52+40 LT
ELEV. = 660.55

EXISTING GROUND

PI = 56+25.00
EL = 672.66'
K = 701
VC = 200'
DS = 60 MPH

PERMIT SHEET
81 OF 89

SEE SHEETS NO.32,47 FOR -RP3C- PLANSHEET.

52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00

720 710 700 690 680 670 660 650 640 630

2/25/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-Y12-

PI Sta 17+88.83
Δ = 15° 37' 22.9" (RT)
D = 0° 59' 47.2"
L = 1,567.81'
T = 788.83'
R = 5750.00'
DS = 70 mph
e = 0.04

PIs Sta 26+34.54
Θs = 0° 59' 47.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

TIMKEN COMPANY
DB 1217 PG 1275
DB 1217 PG 1268

NAD '83

MATCHLINE STA. 22+00 -Y12- SEE SHEET NO. 44

MATCHLINE STA. 35+50 -Y12- SEE SHEET NO. 46

PROP. SLOPE STAKES

PIEDMONT NATURAL GAS EASEMENT
DB 1488 PG 286

48" NW & ISBW

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

INVERT IN COLLAR & EXTEND

+00, CAT-1 & BEGIN SBG

+50, END SBG

-Y12NB-

-Y12SB-

25

30

35

S 25° 43' 26.2" W

Adj. 2GI

INVERT IN

50' TYP.

2GI W/FLAT GRATE

+00, GAU 350 C

+50, CAT-1 END SBG

PROP. GUARDRAIL & SSG

JB W/ SLAB

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC

SITE 30

COLLAR & EXTEND

OPEN END

SDG SEE DETAIL "D"

BEGIN CONSTRUCTION
-Y12SB- Sta. 22+50.00

-Y12- CS Sta. 25+67.87

-Y12- ST Sta. 27+67.87

2' BASE BERM DITCH SEE DETAIL "J"

48" NW & ISBW

EXISTING R/W

58' POWER LINE R/W
DUKE POWER COMPANY

RONALD L. MYERS
DB 252 PG 162

JANIE A. HAYES
DB 1345 PG 766
PB 28 PG 80

96
BOBBIE BROWN
BRUCE HUGGINS
DB 1559 PG 87
PB 29 PG 80

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 77,81 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
82 OF 89

REVISIONS

8/17/99

3/17/2009
C:\Pw_working\TPA\d0149860\R-2606B_hyd_permit_psh45_nocon.dgn
jmassey

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-Y12-

PI Sta 17+88.83
Δ = 15° 37' 22.9" (RT)
D = 0° 59' 47.2"
L = 1,567.81'
T = 788.83'
R = 5,750.00'
DS = 70 mph
e = 0.04

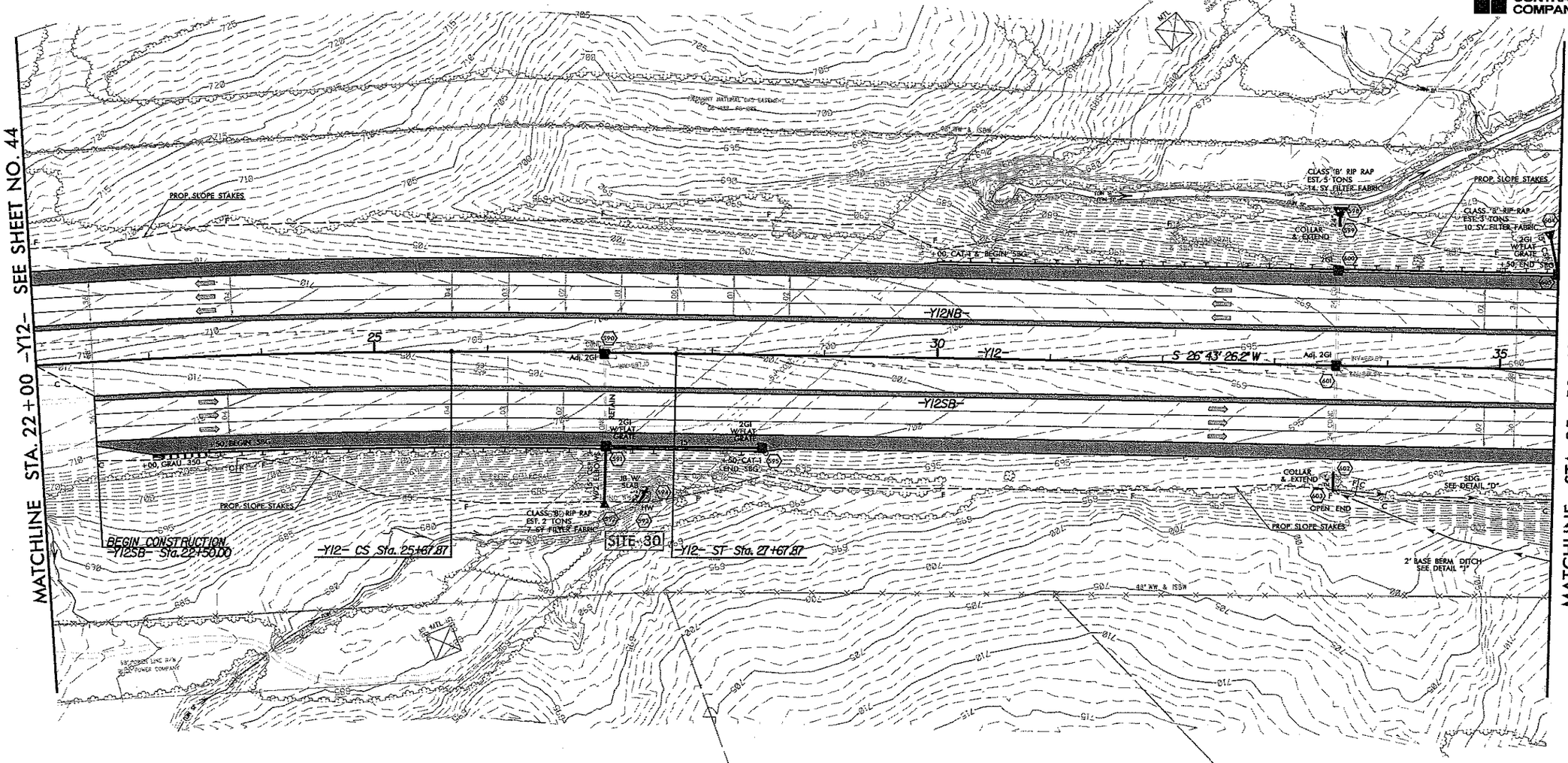
PIs Sta 26+34.54
θs = 0° 59' 47.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

NAD '83



MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 77,81 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
83 OF 89

3/17/2009
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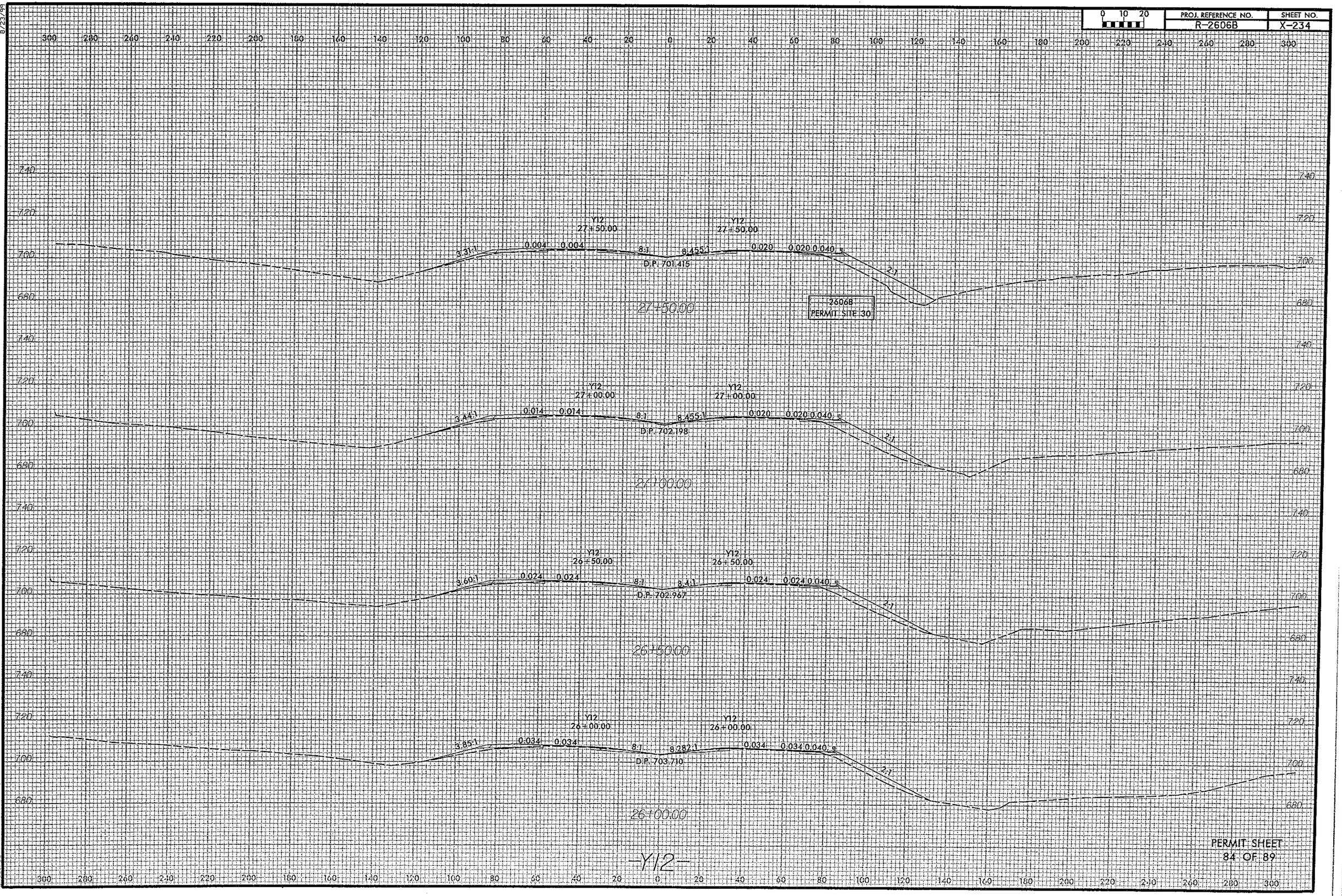
mossco

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-234



PERMIT SHEET
84 OF 89

-Y12-

2/25/2009
Dan Workman
Workspace: jmworking\TPA\d0149860\R2606B_rdy_xp1_Y12.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	46
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

3/11/2009
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SEDIMENT NATURAL GAS EASEMENT
DB 1908 PG 284

RAMPLEMAN CITY LIMITS

DUKE POWER COMPANY
DB 506 PG 287

NAD 83

TIMKEN COMPANY
DB 1217 PG 1275
DB 1227 PG 1268

BACK CREEK CORP.
DB 1322 PG 278

LEGEND

DENOTES FILL IN SURFACE WATER

MATCHLINE STA. 35+50 –Y12– SEE SHEET NO. 45

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 32

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 32

48" WW & ISBW

EXISTING R/W

PROP. SLOPE STAKES

2GI W/FLAT GRATE
+00, GRAU 350

REMOVE & EXTEND COLLAR

CLASS 'B' RIP RAP
EST. 8 TONS
21 SY FILTER FABRIC

SDG SEE DETAIL "D"

–Y12NB–

–Y12SB–

–Y12–

–RP3B–

S 26° 43' 26.2" W

N 29° 01' 26.2" E

Adj. 2GI

Adj. 20'F +23, TIE TO EXISTING GUIDERAIL

RETAIN

30" CONC

2GI(D)

FS

BERM DITCH SEE DETAIL "M"

BDO

–RP3B– +09.35
135.00' LT
END CA FENCE

–RP3B– ST Sta. 35+44.68

–RP3B– POT Sta. 36+44.68 =
–Y12– POT Sta. 36+05.60
OFFSET 58.00' RIGHT

–RP3B– +24.68
170.00' LT

–RP3B– CS Sta. 33+24.68

CHORD

222.80'
N 60° 28' 35" W

STONE

PROP. R/W

R = 1030'

95
JOHN L. DUNLAP
DB 1322 PG 436

96
BOBBIE BROWN
BRUCE HUGGINS
DB 1959 PG 87
PB 93 PG 80

SITE 30

2' LATERAL BASE DITCH W/CLASS "B" RIP RAP
SEE DETAIL "C"

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 15 TONS
37 SY FILTER FABRIC

+25, GRAU 350

4:50 CAT.I END SBG

PROP. GUARDRAIL & SBG

–RP3B–

PIs Sta 11+46.73	PI Sta 26+62.62	PIs Sta 33+98.08
θs = 5° 15' 07.6"	Δ = 100° 29' 28.5" (LT)	θs = 5° 15' 07.6"
Ls = 220.00'	D = 4° 46' 28.7"	Ls = 220.00'
LT = 146.73'	L = 2,104.68'	LT = 146.73'
ST = 73.39'	T = 1,442.62'	ST = 73.39'
	R = 1,200.00'	
	DS = 60 mph	
	e = 0.08	

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NOS. 78,81,82 FOR –Y12– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
85 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	46
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

MATCHLINE STA. 35+50 –Y12– SEE SHEET NO. 45

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 32

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 32

LEGEND

DENOTES FILL IN SURFACE WATER

PROP. SLOPE STAKES

SITE 30

DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAMS.
SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NOS. 78,81,82 FOR –Y12– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
86 OF 89

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.

3/17/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

LEGEND
- DENOTES FILL IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER (POND)

NAD 83

ASHEBORO CITY LIMITS

CHARLES L. HEATH
DB 1450 PG 466
PB 46 PG 90

GOODYEAR TIRE AND RUBBER COMPANY
DB 1017 PG 463
DB 1097 PG 468

-RP3BD- SC Sta. 36+91.09

-RP3BD- PT Sta. 39+57.45 =
-Y12- POC Sta. 80+00.00
OFFSET 58.00' LEFT

-Y12- CS Sta. 81+84.00

-Y12- ST Sta. 83+84.00

MATCHLINE STA. 77+00 -Y12- SEE SHEET NO. 47

MATCHLINE STA. 89+50 -Y12- SEE SHEET NO. 49

EXISTING R/W 45' WW & ISBW

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC

15" CSP

COLLAR & EXTEND

15.9 X 0.5 CONC HW

2GI W/FLAT GRATE

PROP. GUARDRAIL & SBG

+47, END SBG +97, GRAD 350

-Y12NB-

-Y12SB-

-Y12-

80

85

S 5°11' 38.3" E

Adj. 2GI

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
SEE DETAIL "C"

JB w/MH

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

SITE 30

CLASS 'I' RIP RAP
EST. 26 TONS
50 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC

LATERAL "V" DITCH
SEE DETAIL "A"

DEWEY HEATH
DB 1450 PG 503

CHARLES L. HEATH
DB 1450 PG 466

-Y12-

PIs Sta 51+15.31	PI Sta 67+18.29	PIs Sta 82+50.67
θs = 0° 59' 59.7"	Δ = 30° 01' 05.0" (LT)	θs = 0° 59' 59.7"
Ls = 200.00'	D = 0° 59' 59.7"	Ls = 200.00'
LT = 133.34'	L = 3,002.03'	LT = 133.34'
ST = 66.67'	T = 1,536.32'	ST = 66.67'
	R = 5,730.00'	
	DS = 70 mph	
	e = 0.04	

-RP3BD-

PIs Sta 11+60.05	PI Sta 19+99.67	PIs Sta 27+26.43	PIs Sta 30+46.45	PI Sta 32+89.55	PIs Sta 36+11.09	PI Sta 38+24.30
θs = 4° 35' 01.2"	Δ = 53° 43' 11.3" (RT)	θs = 4° 35' 01.2"	θs = 5° 10' 10.4"	Δ = 13° 59' 18.8" (LT)	θs = 1° 12' 43.9"	Δ = 2° 41' 26.4" (LT)
Ls = 240.00'	D = 3° 49' 11.0"	Ls = 240.00'	Ls = 240.00'	D = 4° 18' 28.6"	Ls = 240.00'	D = 1° 00' 36.5"
LT = 160.05'	L = 1,406.38'	LT = 160.05'	LT = 160.07'	L = 324.71'	LT = 160.00'	L = 266.36'
ST = 80.05'	T = 759.67'	ST = 80.05'	ST = 80.06'	T = 163.11'	ST = 80.00'	T = 133.21'
	R = 1,500.00'			R = 1,330.00'		R = 5,672.00'
	DS = 60 mph			DS = 60 mph		DS = 60 mph
	e = 0.06			e = 0.06		e = 0.04

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 88,89 FOR -RP3BD- PROFILE.
SEE SHEET NOS. 79,83 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
87 OF 89

2/17/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

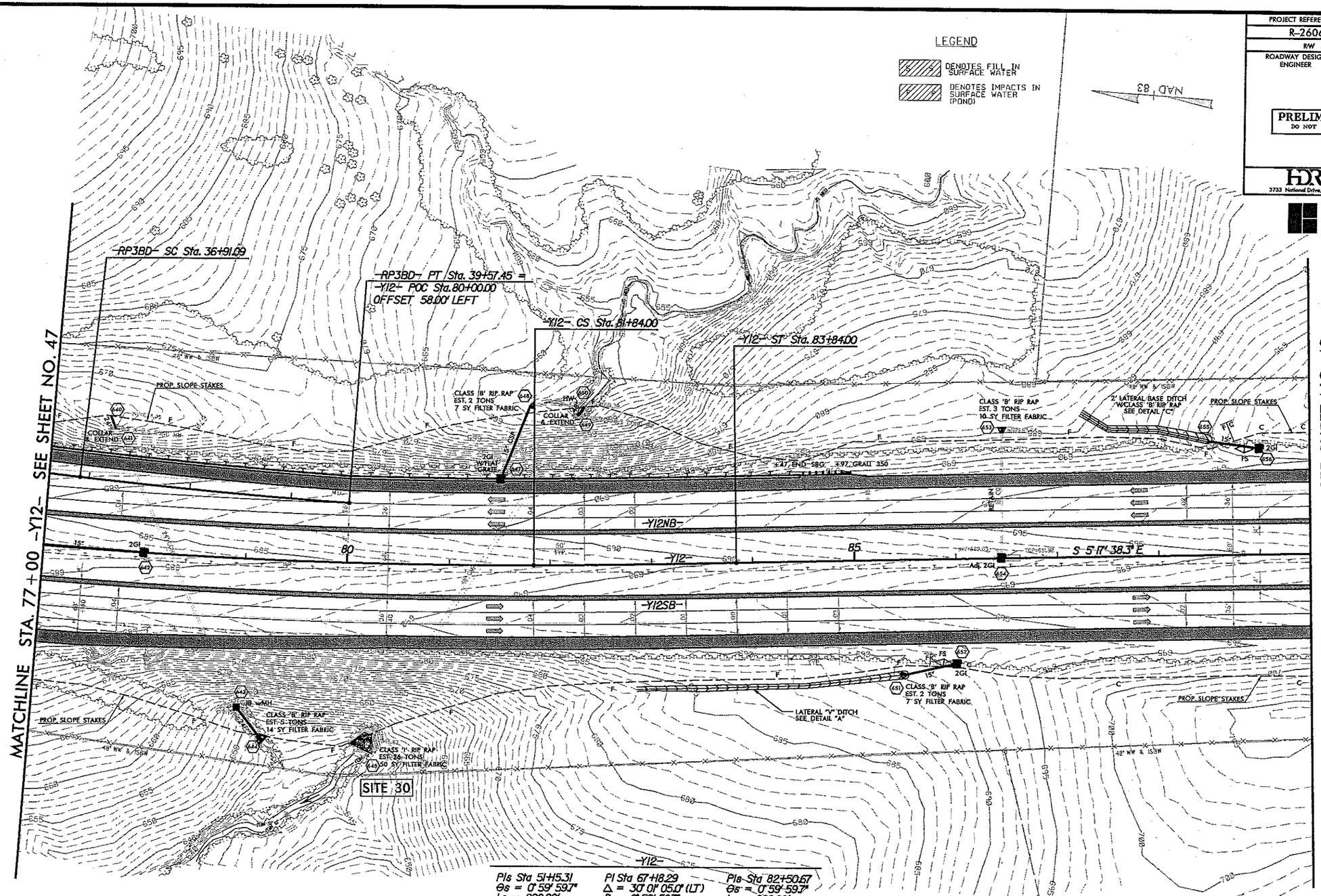
BARNHILL CONTRACTING COMPANY

LEGEND

DENOTES FILL IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER (POND)

NAD 83



-Y12-

Pls Sta 51+15.31
Θs = 0°59'59.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pl Sta 67+18.29
Δ = 30°01'05.0" (LT)
D = 0°59'59.7"
L = 3,002.03'
T = 1,536.32'
R = 5730.00'
DS = 70 mph
e = 0.04

Pls Sta 82+50.67
Θs = 0°59'59.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

-RP3BD-

Pls Sta 11+60.05
Θs = 4°35'01.2"
Ls = 240.00'
LT = 160.05'
ST = 80.05'

Pl Sta 19+99.67
Δ = 53°43'11.3" (RT)
D = 3°49'11.0"
L = 1,406.38'
T = 759.67'
R = 1,500.00'
DS = 60 mph
e = 0.06

Pls Sta 27+26.43
Θs = 4°35'01.2"
Ls = 240.00'
LT = 160.05'
ST = 80.05'

Pls Sta 30+46.45
Θs = 5°10'10.4"
Ls = 240.00'
LT = 160.07'
ST = 80.06'

Pl Sta 32+89.55
Δ = 13°59'18.1" (LT)
D = 4°18'28.6"
L = 324.71'
T = 163.17'
R = 1,330.00'
DS = 60 mph
e = 0.06

Pls Sta 36+11.09
Θs = 1°12'43.9"
Ls = 240.00'
LT = 160.00'
ST = 80.00'

Pl Sta 38+24.30
Δ = 2°41'26.4" (LT)
D = 1°00'36.5"
L = 266.36'
T = 133.21'
R = 5,672.00'
DS = 60 mph
e = 0.04

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 88,89 FOR -RP3BD- PROFILE.
SEE SHEET NOS. 79,83 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

PERMIT SHEET
88 OF 89

3/1/2009
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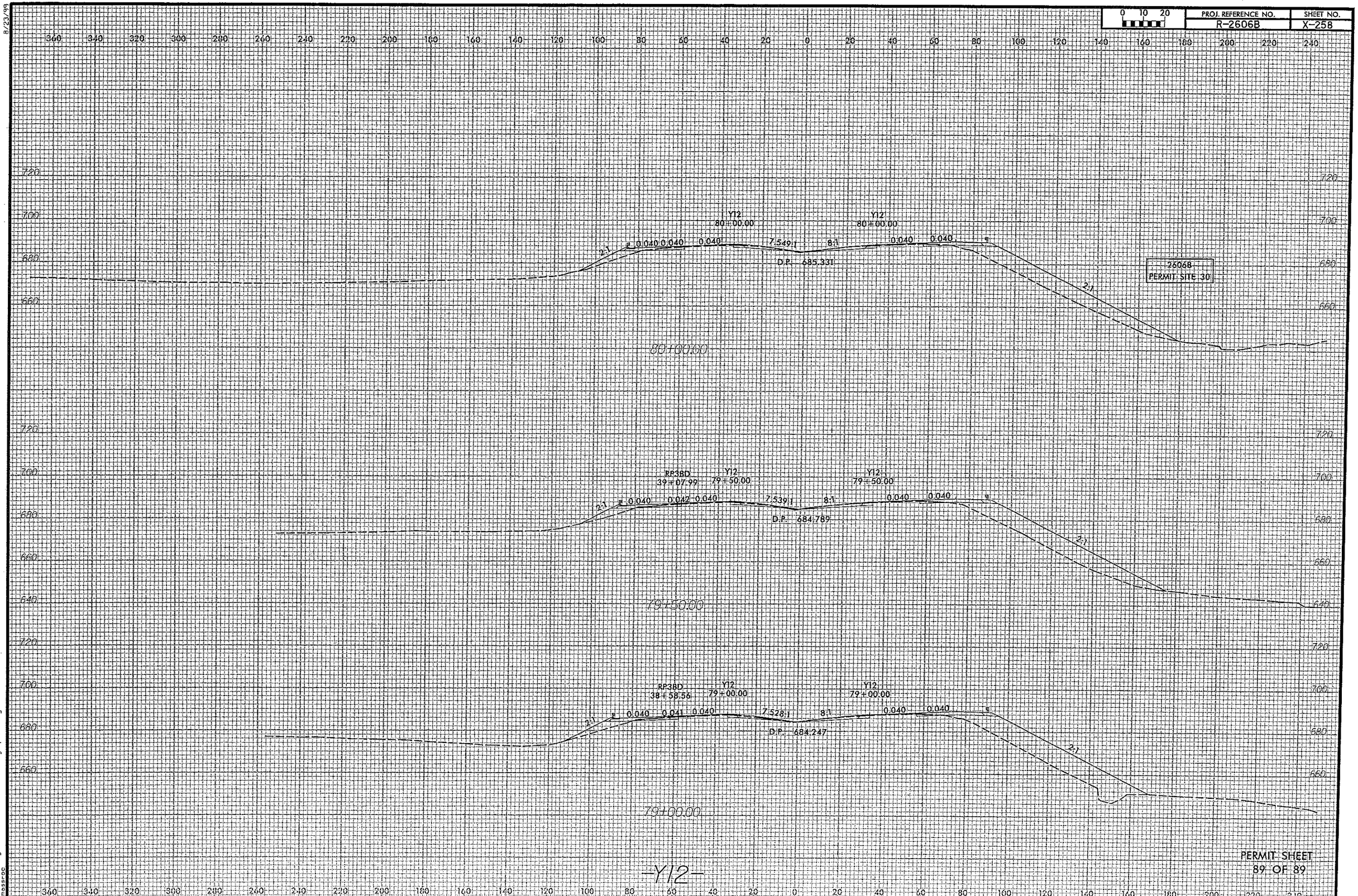
mwatson

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	R-2606B	X-258



PERMIT SHEET
89 OF 89

2/25/2009
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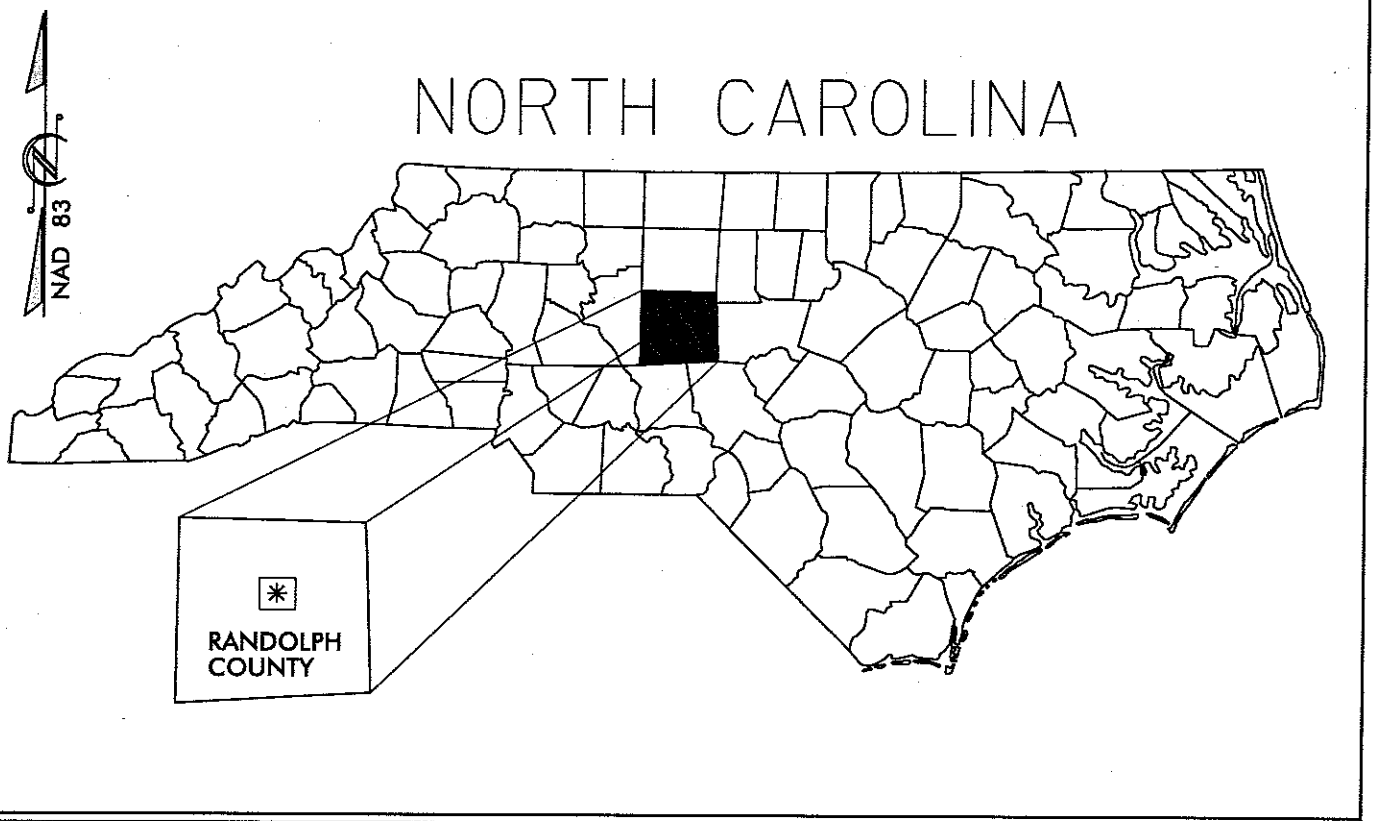
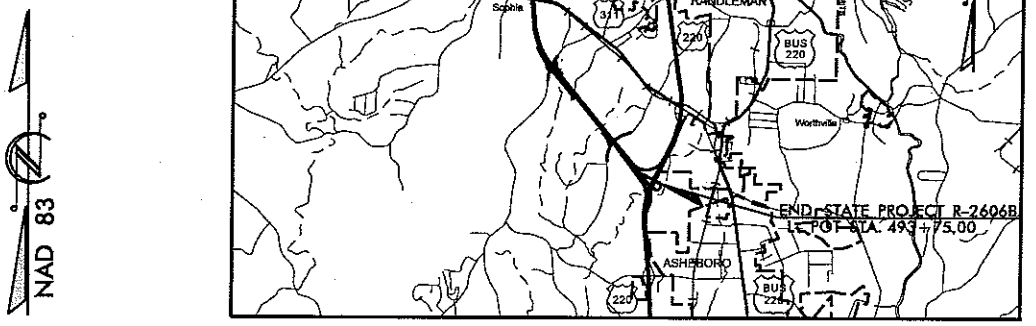




VICINITY MAPS

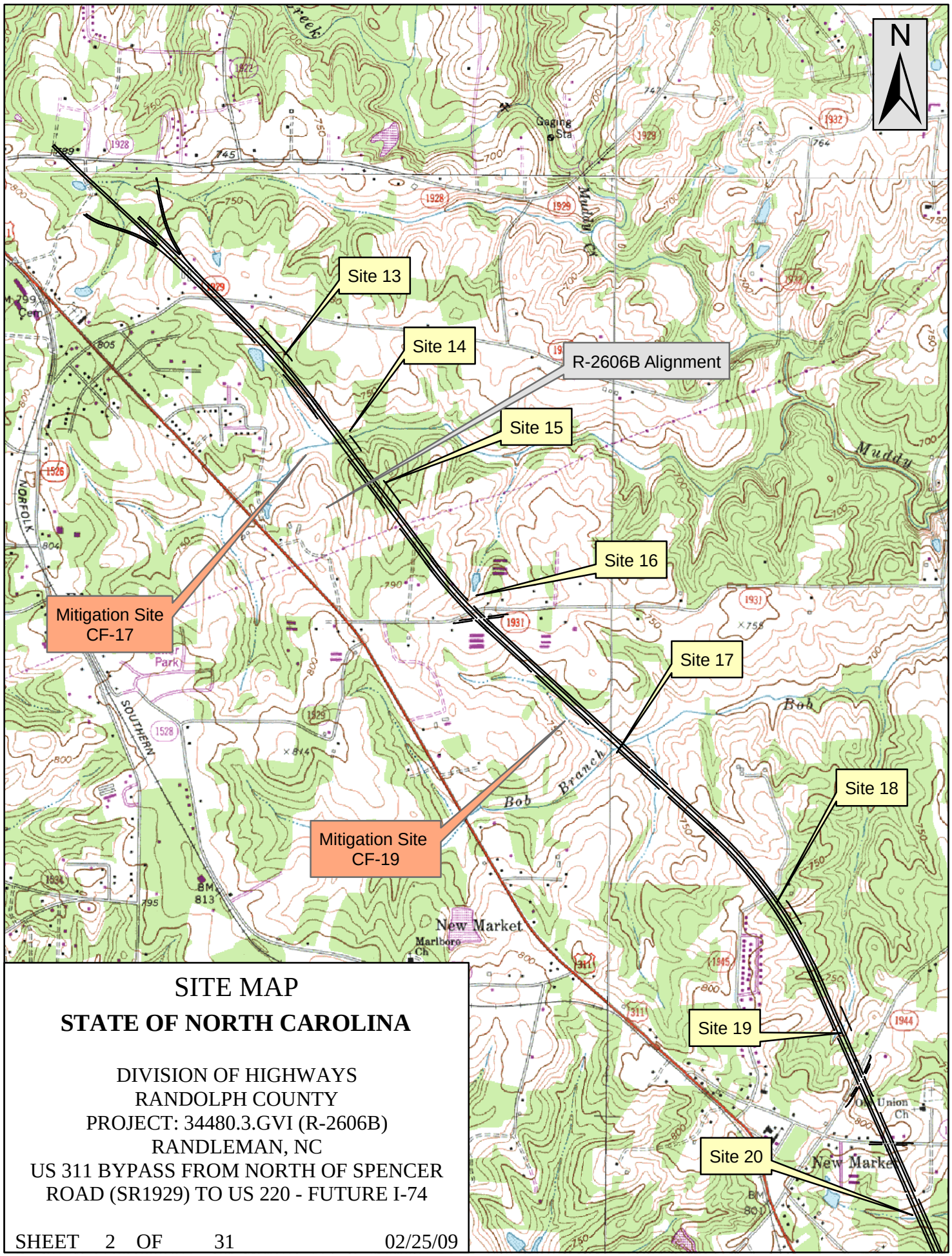
NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1920) TO US 220 - FUTURE I-74

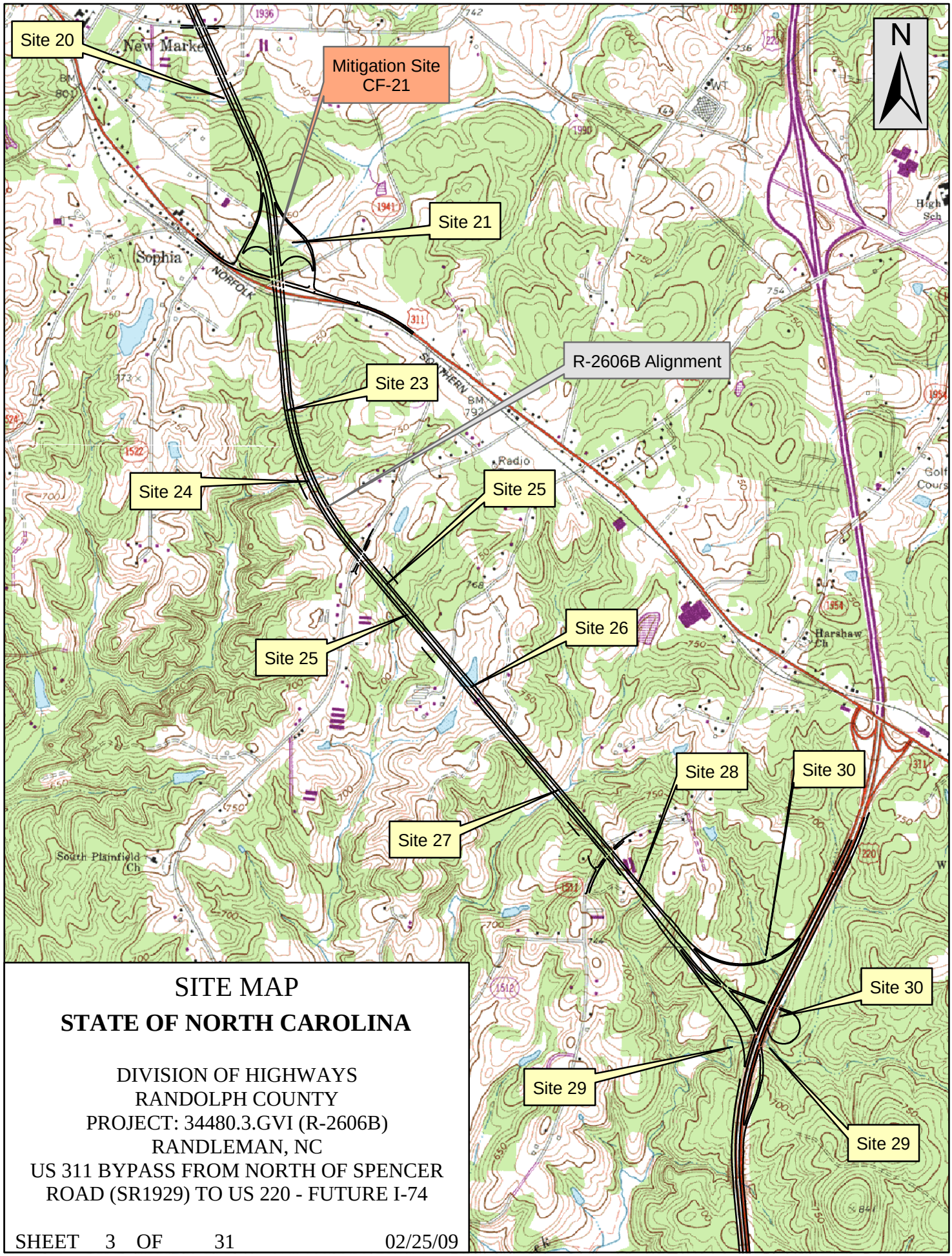


SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
RANDLEMAN, NC
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR1929) TO US 220 - FUTURE I-74

SHEET 2 OF 31 02/25/09



SITE MAP

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS
RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
RANDLEMAN, NC
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR1929) TO US 220 - FUTURE I-74

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
13	36" pipe/fill/cut	-L- Sta 145+00 - 148+00	X						25,494	17,118	42,612		
	36" pipe/fill	-L- Sta. 146+40	X						8,806	6,831	15,637		
14	18" pipe	-L- Sta 159+30 - 159+70	X						3,958	4,015	7,973	TBD	TBD
	11' X 9' RCBC	-L- Sta 163+40 - 165+00	X						23,443	14,582	38,025		
15	36" pipe	-L- Sta 175+10 - 179+25	X						36,361	23,547	59,908		
17	fill	-L- Sta 214+50 - 216+60 Rt			X				3,634	6,222	9,856		
	fill	-L- Sta 225+70 - 230+10 Rt			X				10,580	8,340	18,921	TBD	TBD
	12' X 8' RCBC	-L- Sta 230+10 - 231+20	X						18,256	8,596	26,853		
	8' X 7' RCBC	-L- Sta 237+50 - 239+50	X						20,062	11,596	31,658		
18	fill/clearing	-L- Sta 268+70 - 269+80 Lt	X						11,068	8,698	19,766		
	fill/clearing	-L- Sta 279+30 - 279+90	X						18,936	14,331	33,267		
19	54 and 48" pipe	-L- Sta 287+70 - 290+20	X						28,744	18,923	47,667		
20	60" pipe	-L- Sta 321+30 - 322+25	X						18,477	12,142	30,619		
	fill	-L- Sta 331+00 - 334+14 Lt	X			409	2,058	2,467					
21	54" pipe	-L- Sta 346+20 - 346+80 Lt	X						6,761	4,365	11,125	TBD	TBD
	48" pipe	-L- Sta 347+00 - 347+60	X						51,490	32,105	83,595		
TOTAL:						409	2,058	2,467	286,069	191,413	477,482	TBD	TBD

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
PROJECT: 34480.3.GVI (R-2606B)
US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1929) TO US 220 - FUTURE 1-74
2/25/2009
SHEET 4a OF 31

Rev. May 2006

BUFFER IMPACTS SUMMARY

			WETLANDS IN BUFFERS		
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	**ZONE 1 (ac)**	**ZONE 2 (ac)**	**COMMENTS**
13	36" pipe/fill/cut	-L- Sta 145+00 - 148+00	0.319	0.018	
14	18" pipe	-L- Sta 159+30 - 159+70	0.046	0.016	
15	36" pipe	-L- Sta 175+10 - 179+25	0.073	0.032	
19	54 and 48"pipe	-L- Sta 287+70 - 290+20	0.132	0.014	
20	60" pipe	-L- Sta 321+30 - 322+25	0.139	0.167	
TOTAL:			0.709	0.247	

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

RANDOLPH COUNTY
PROJECT 34480.3.GVI (R-2606B)
US 311 BYPASS FROM NORTH OF SPENCER
ROAD (SR 1929) TO US 220 - FUTURE I-74
2/25/2009

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
1	RANDALL C. SPENCER	2989 Spencer Road Archdale, NC 27263	13
3	MILFRED C. FARLOW	2768 Bronzie Lawson Road Archdale, NC 27263	14
4	JAMES H. ROBERTS	7624 U.S. Hwy. 311 Archdale, NC 27263	14
5	LEWIS J. LOFLIN	4867 Edger Road Sophia, NC 27350	15
6	DANNY D. PUGH	301 Rosemont Avenue Concord, NC 28025	15
11	DONNA JACKSON	2625 Banner Whitehead Road Sophia, NC 27350	16
13	MICHAEL DAVIS & OTHERS	2625 Banner Whitehead Road Sophia, NC 27350	17
16	CLIFFORD W. LOFLIN	2410 Loflin Dairy Road Sophia, NC 27350	17
16A	PIEDMONT TRIAD REGOINAL WATER AUTHORITY	2216 W. Meadowview Road, Suite 204 Greensboro, NC 27407	17
18	MORRIS A. RICE	1924 Cedar Road Asheboro, NC 27203	18

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
19	JOHN & WILLIAM NELSON	4570 Nelson Park Road #7 Sophia, NC 27350	18
20	I.A.I. PROPERTIES	6202 Moores Creek Drive Summerfield, NC 27358	18
21	EDWARD L. LAWRENCE	4875 Branson Davis Road Sophia, NC 27350	19
22	NC DOT		19
42	MABEL FARLOW	5080 Walker Mill Road Sophia, NC 27350	20
43	ROY M. CROTTS	5082 Walker Mill Road Sophia, NC 27350	20
44	PHILIP TRACY WALL LIMITED PARTNERSHIP	536 Woodvale Drive Greensboro, NC 27410	21
45	RUSSEL GRAY	P.O. Box 55 Sophia, NC 27350	21
46	CHARLES & SPENCER HARTLEY	4916 Walker Mill Road Sophia, NC 27350	21
48	ACE/AVENT REAL PROPERTY COMPANY	109 Seminole Drive Archdale, NC 27263	23

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
49	ANNE M. CRAVEN	4025 Old Way Road Sophia, NC 27350	24
51	JAMES E. RICH	3060 Tower View Lane Sophia, NC 27350	24
51	JILL M. RICH	4689 Plainfield Road Sophia, NC 27350	24
54	LARRY NEWMAN	4609 Plainfield Road Sophia, NC 27350	24
58	BLANCHE POWELL (LE)	4694 Plainfield Road Sophia, NC 27350	25
59	RANDALL B. MATTHEWS	4570 Plainfield Road Sophia, NC 27350	25
62	KATHERINE ANN MCDOWELL	4534 Plainfield Road Sophia, NC 27350	25
64	WILL A. CULLER	4476 Plainfield Road Sophia, NC 27350	25
65	LEWIS MICHAEL LINTHICUM	3823 Old Courthouse Road Sophia, NC 27350	25
66	JAMES PATRICK LINTHICUM	3779 Old Courthouse Road Sophia, NC 27350	25

NORTH CAROLINA

DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

PROPERTY OWNERS

NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES	SITE NO.
68	JUNE H. HILL	3754 Old Courthouse Road Sophia, NC 27350	26
68B	DAVID LEE JOHNSON	3934 Old Courthouse Road Sophia, NC 27350	26
70	KENNETH RAY HOLLINGSWORTH	731 Hollingsworth Road Randleman, NC 27317	27
72	ELIZABETH H. BULLINS	724 Hollingsworth Road Randleman, NC 27317	27
73	MILDRED FREEMAN	7420 Hwy. 49 South Denton, NC 27239	27
75	EUGENE HEATH	1350 Turner Dairy Road Randleman, NC 27317	27
85	JOHN M. LAMB	3794 Heath Dairy Road Randleman, NC 27317	28
92	ALFRED A. THOMAS	3568 Dairy Breeze Drive Randleman, NC 27317	28
93	VAN H. LEDBETTER	3221 Heath Dairy Road Randleman, NC 27317	28
94	ROBERT REID LEDBETTER	3221 Heath Dairy Road Randleman, NC 27317	29
95	JOHN L. DUNLAP	3800 Staley Snow Camp Road Staley, NC 27355	30

NORTH CAROLINA

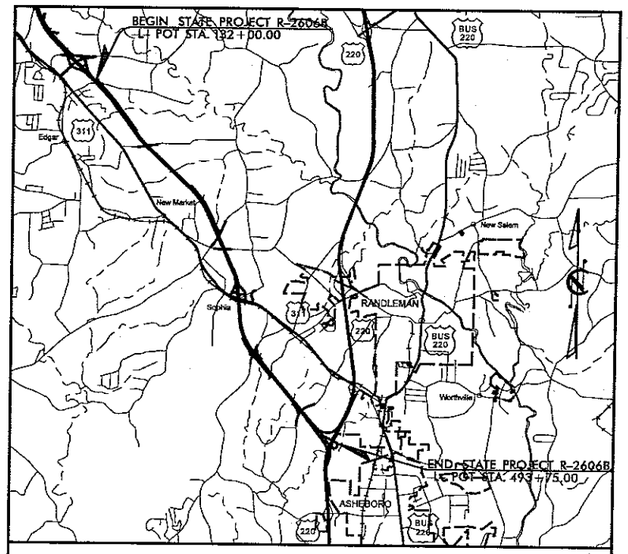
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

PROJECT: 34480.3.GVI (R-2606B)

09/08/99

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RANDOLPH COUNTY

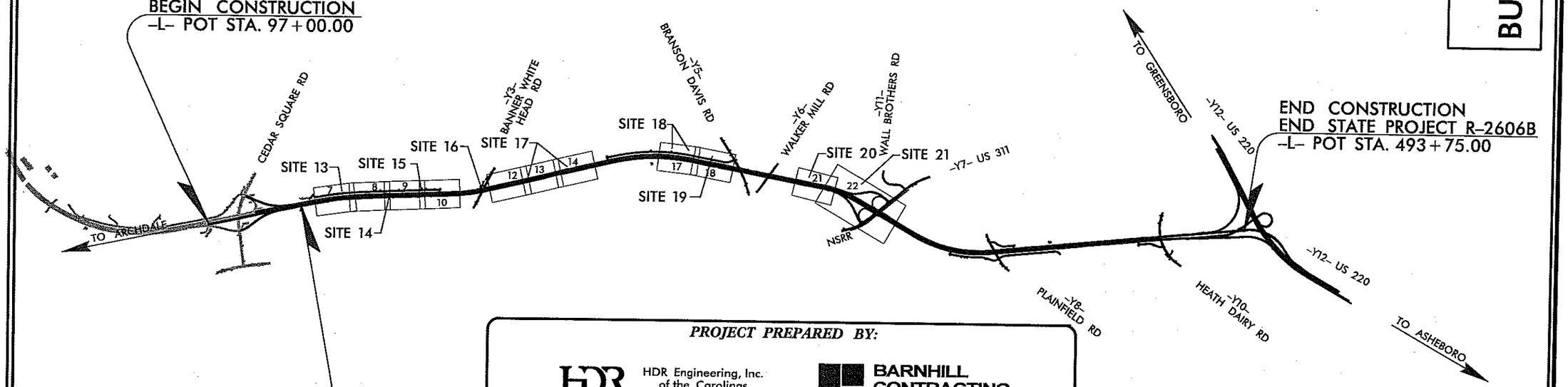
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606B	1	
STATE PROJ.NO.	F.A. PROJ.NO.	DESCRIPTION	
34480.3.GVI	NHF-0311(23)	CONSTRUCTION	

LOCATION: *US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1929) TO US 220 – FUTURE I-74*

TYPE OF WORK: *DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS*

NAD 83

2606B BUFFER SITE MAP



PROJECT PREPARED BY:

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

PERMIT SHEET 9 OF 31

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 5 2.5 0 5 10

DESIGN DATA

ADT 2008 = 12,890
ADT 2030 = 27,400
DHV = 11 %
D = 60 %
T = 13 % *
V = 70 MPH

* TTST 6% DUAL 7%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2606B	=	6.851 MILES
LENGTH STRUCTURE TIP PROJECT R-2606B	=	0.000 MILES
TOTAL LENGTH STATE PROJECT R-2606B	=	6.851 MILES

DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: July 25, 2008

LETTING DATE: July 25, 2008

GREGORY KEMPF, P.E.
PROJECT ENGINEER

PAUL A. MEEHAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

CONTRACT: C 201918

TIP PROJECT: R-2606B

3/18/2009
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jmassroc

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	7
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-L-
Pls Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

Pl Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1700.58'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

Pls Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
Pl Sta 11+33.50
Δ = 48° 23' 33.7" (LT)
D = 22° 55' 05.9"
L = 211.15'
T = 112.34'
R = 250.00'
DS = 30 mph
e = 0.04

Pl Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

GRASS SWALE DATA
DA = 1.15 AC.
Q2 = 2.13 ft^3/s
V2 = 2.69 ft/s
Q10 = 2.71 ft^3/s
V10 = 2.85 ft/s
LENGTH = 150 ft
SLOPE = 3.97%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.36 AC.
Q2 = 0.93 ft^3/s
V2 = 1.93 ft/s
Q10 = 1.18 ft^3/s
V10 = 2.05 ft/s
LENGTH = 309 ft
SLOPE = 2.23%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.83 AC.
Q2 = 1.35 ft^3/s
V2 = 2.11 ft/s
Q10 = 1.72 ft^3/s
V10 = 2.24 ft/s
LENGTH = 359 ft
SLOPE = 2.20%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 4.58 AC.
Q2 = 7.23 ft^3/s
V2 = 3.18 ft/s
Q10 = 9.20 ft^3/s
V10 = 4.04 ft/s
LENGTH = 342 ft
SLOPE = 3.4 1%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.50 AC.
Q2 = 0.95 ft^3/s
V2 = 1.98 ft/s
Q10 = 1.21 ft^3/s
V10 = 2.10 ft/s
LENGTH = 506 ft
SLOPE = 2.34%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 6.79 AC.
Q2 = 14.39 ft^3/s
V2 = 5.00 ft/s
Q10 = 18.32 ft^3/s
V10 = 5.33 ft/s
LENGTH = 30 ft
SLOPE = 4.37%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.11 AC.
Q2 = 2.10 ft^3/s
V2 = 1.86 ft/s
Q10 = 2.68 ft^3/s
V10 = 1.98 ft/s
LENGTH = 450 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.15 AC.
Q2 = 2.13 ft^3/s
V2 = 2.60 ft/s
Q10 = 2.71 ft^3/s
V10 = 2.76 ft/s
LENGTH = 300 ft
SLOPE = 3.63%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.95 AC.
Q2 = 2.14 ft^3/s
V2 = 2.45 ft/s
Q10 = 2.73 ft^3/s
V10 = 2.60 ft/s
LENGTH = 450 ft
SLOPE = 3.72%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.11 AC.
Q2 = 2.10 ft^3/s
V2 = 1.86 ft/s
Q10 = 2.68 ft^3/s
V10 = 1.98 ft/s
LENGTH = 450 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.97 AC.
Q2 = 2.19 ft^3/s
V2 = 1.91 ft/s
Q10 = 2.78 ft^3/s
V10 = 2.03 ft/s
LENGTH = 450 ft
SLOPE = 1.88%
SIDE SLOPES = 8

LEGEND
MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
DENOTES MECHANIZED CLEARING

NAD 83

SITE 13

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

RANDALL & SPENCER DB 966, PG 28

PROP. SLOPE STAKES

PROP. GUARDRAIL

+00, GRAU 350

SDG SEE DETAIL "D"

PROP DBL FACE CBL GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

2GI (D) W/ 16" GRATE

+50, BEGIN SBG

BYPASS STRUCTURE

BYPASS CHANNEL

PROP. SHOULDER BERM GUTTER

LEVEL SPREADER

EMERGENCY OVERFLOW

30' DIAMETER FOREBAY CLASS 'B' RIP RAP 2:1 SIDES 3' DEEP

DRY DETENTION / HAZARDOUS SPILL BASIN (1)

EXISTING 18" RCP

POND

+41, CAT.-1 END SBG

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

LATERAL "Y" DITCH SEE DETAIL "A"

MATCHLINE STA. 138+00 -L- SEE SHEET NO. 6

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 8

PERMIT SHEET
10 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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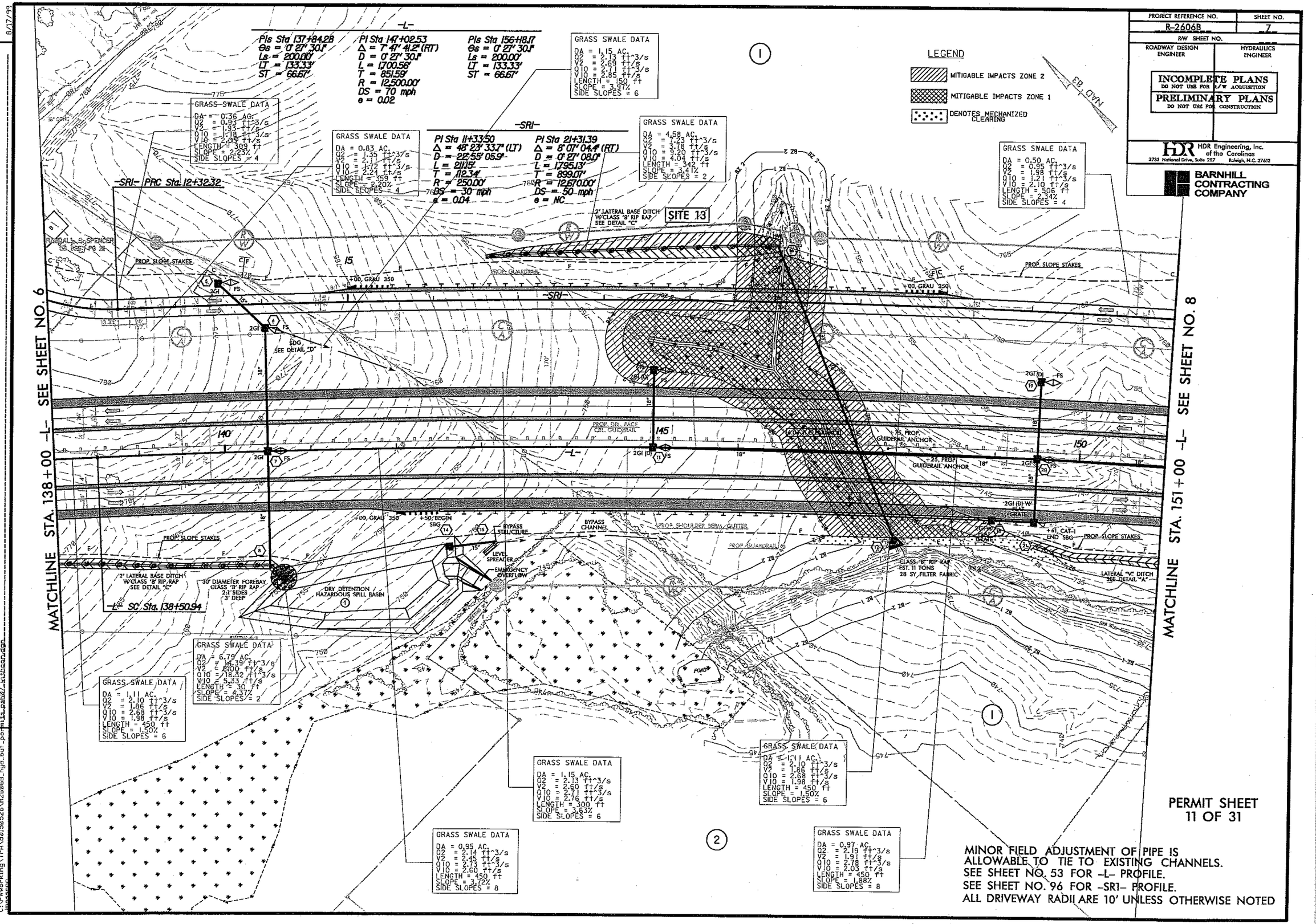
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99



PERMIT SHEET
11 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/6/2009
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mosstiffer

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	8
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-L-
PIs Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1,700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PIs Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

GRASS SWALE DATA
DA = 1.41 AC.
Q2 = 2.67 ft^3/s
V2 = 1.98 ft/s
Q10 = 3.40 ft^3/s
V10 = 2.10 ft/s
LENGTH = 550 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.76 AC.
Q2 = 1.71 ft^3/s
V2 = 1.65 ft/s
Q10 = 1.83 ft^3/s
V10 = 1.68 ft/s
LENGTH = 350 ft
SLOPE = 1.50%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.53 AC.
Q2 = 1.10 ft^3/s
V2 = 1.46 ft/s
Q10 = 1.40 ft^3/s
V10 = 1.55 ft/s
LENGTH = 40 ft
SLOPE = 0.94%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.81 AC.
Q2 = 1.44 ft^3/s
V2 = 1.35 ft/s
Q10 = 1.75 ft^3/s
V10 = 2.32 ft^3/s
LENGTH = 300 ft
SLOPE = 1.70%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 1.11 ft^3/s
V2 = 1.95 ft/s
Q10 = 1.41 ft^3/s
V10 = 2.07 ft/s
LENGTH = 500 ft
SLOPE = 2.02%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 1.62 AC.
Q2 = 2.70 ft^3/s
V2 = 2.13 ft/s
Q10 = 3.44 ft^3/s
V10 = 0.57 ft/s
LENGTH = 350 ft
SLOPE = 1.95%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.16 AC.
Q2 = 0.27 ft^3/s
V2 = 1.66 ft/s
Q10 = 0.34 ft^3/s
V10 = 1.76 ft/s
LENGTH = 100 ft
SLOPE = 6.84%
SIDE SLOPES = 12

GRASS SWALE DATA
DA = 0.18 AC.
Q2 = 0.30 ft^3/s
V2 = 0.59 ft/s
Q10 = 0.38 ft^3/s
V10 = 0.62 ft/s
LENGTH = 115 ft
SLOPE = 0.30%
SIDE SLOPES = 8

LEGEND
MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
DENOTES MECHANIZED CLEARING

NAD 83

SITE 14

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 7

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 9

PROP. SLOPE STAKES
CLASS 'B' RIP RAP EST. 8 TONS / 10 SY FILTER FABRIC
SDG SEE DETAIL "D"
S 36° 47' 19.7" E
25' X 35' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
DRY DETENTION / HAZARDOUS SPILL BASIN
PROP. GUARDRAIL
PROJ. DBL FACE CBL. GUARDRAIL
6.0 in CLEARANCE
7.6 ft CLEARANCE
BEGIN JS
GRADE TO DRAIN
TOE PROTECTION SEE DETAIL "T"
NOTE: STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "Y"
LATERAL "V" DITCH SEE DETAIL "A"
2GI W/ FLAT GRATE
2GI(A)
2GI
FS
100' TYP.
+23, CAT-1

GRASS SWALE DATA
DA = 0.61 AC.
Q2 = 1.57 ft^3/s
V2 = 2.07 ft/s
Q10 = 2.00 ft^3/s
V10 = 2.20 ft/s
LENGTH = 327 ft
SLOPE = 1.33%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.43 AC.
Q2 = 0.97 ft^3/s
V2 = 1.43 ft/s
Q10 = 1.18 ft^3/s
V10 = 1.50 ft/s
LENGTH = 200 ft
SLOPE = 1.50%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.62 AC.
Q2 = 1.34 ft^3/s
V2 = 1.28 ft/s
Q10 = 1.71 ft^3/s
V10 = 1.36 ft/s
LENGTH = 300 ft
SLOPE = 1.18%
SIDE SLOPES = 12

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 2.06 ft^3/s
V2 = 1.85 ft/s
Q10 = 2.63 ft^3/s
V10 = 1.97 ft/s
LENGTH = 350 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 2.06 ft^3/s
V2 = 1.32 ft/s
Q10 = 2.63 ft^3/s
V10 = 1.40 ft/s
LENGTH = 100 ft
SLOPE = 0.61%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.40 AC.
Q2 = 0.67 ft^3/s
V2 = 1.33 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.44 ft/s
LENGTH = 250 ft
SLOPE = 1.66%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.22 AC.
Q2 = 0.57 ft^3/s
V2 = 0.66 ft/s
Q10 = 0.47 ft^3/s
V10 = 0.70 ft/s
LENGTH = 135 ft
SLOPE = 0.36%
SIDE SLOPES = 8

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/3/2009
C:\Projects\Working\TPA\0015026\R-2606B_hyd_buf_permits.dgn jdavidson

PERMIT SHEET
12 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	8
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-
Pls Sta 137+84.28
θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

Pls Sta 156+18.17
θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-
PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

GRASS SWALE DATA
DA = 0.76 AC.
Q2 = 1.71 ft^3/s
V2 = 1.65 ft/s
Q10 = 1.83 ft^3/s
V10 = 1.68 ft/s
LENGTH = 350 ft
SLOPE = 1.50%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.41 AC.
Q2 = 2.67 ft^3/s
V2 = 1.98 ft/s
Q10 = 3.40 ft^3/s
V10 = 2.10 ft/s
LENGTH = 550 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.53 AC.
Q2 = 1.10 ft^3/s
V2 = 1.46 ft/s
Q10 = 1.40 ft^3/s
V10 = 1.55 ft/s
LENGTH = 40 ft
SLOPE = 0.94%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.8 AC.
Q2 = 1.35 ft^3/s
V2 = 1.75 ft/s
Q10 = 2.32 ft^3/s
V10 = 2.00 ft/s
LENGTH = 300 ft
SLOPE = 1.70%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 1.11 ft^3/s
V2 = 1.95 ft/s
Q10 = 1.41 ft^3/s
V10 = 2.01 ft/s
LENGTH = 500 ft
SLOPE = 2.02%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 1.62 AC.
Q2 = 2.70 ft^3/s
V2 = 2.19 ft/s
Q10 = 3.44 ft^3/s
V10 = 2.57 ft/s
LENGTH = 350 ft
SLOPE = 1.95%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.16 AC.
Q2 = 0.27 ft^3/s
V2 = 1.66 ft/s
Q10 = 0.34 ft^3/s
V10 = 1.76 ft/s
LENGTH = 100 ft
SLOPE = 6.84%
SIDE SLOPES = 12

GRASS SWALE DATA
DA = 0.18 AC.
Q2 = 0.30 ft^3/s
V2 = 0.58 ft/s
Q10 = 0.38 ft^3/s
V10 = 0.762 ft/s
LENGTH = 115 ft
SLOPE = 0.30%
SIDE SLOPES = 8

SITE 14

LEGEND
MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
DENOTES MECHANIZED CLEARING

NAD 83

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 7

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 9

PROP. SLOPE STAKES
CLASS 'B' RIP RAP EST. 45 TONS 16 SY FILTER FABRIC
SDG SEE DETAIL "D"
-SR1-
S 36° 47' 19.7" E
25' X 35' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
DRY DETENTION / HAZARDOUS SPILL BASIN
PROP. GUARDRAIL
+23, CAT-1
6.0' in CLEARANCE
PROP. OB. FACE OF SHOULDER
BEGIN JS
GRADE TO DRAIN
TOE PROTECTION SEE DETAIL "T"
CLASS 'B' RIP RAP EST. 15 TONS 16 SY FILTER FABRIC
NOTE-STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "Y"
LATERAL "V" DITCH SEE DETAIL "A"
2GI(A)
2GI
2GI W/ FLAT GRATE
FS

GRASS SWALE DATA
DA = 0.61 AC.
Q2 = 1.57 ft^3/s
V2 = 2.07 ft/s
Q10 = 2.00 ft^3/s
V10 = 2.20 ft/s
LENGTH = 327 ft
SLOPE = 1.33%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.43 AC.
Q2 = 0.97 ft^3/s
V2 = 1.43 ft/s
Q10 = 1.18 ft^3/s
V10 = 1.50 ft/s
LENGTH = 200 ft
SLOPE = 1.50%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.62 AC.
Q2 = 1.34 ft^3/s
V2 = 1.28 ft/s
Q10 = 1.71 ft^3/s
V10 = 1.36 ft/s
LENGTH = 300 ft
SLOPE = 1.18%
SIDE SLOPES = 12

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 2.06 ft^3/s
V2 = 1.85 ft/s
Q10 = 2.63 ft^3/s
V10 = 1.97 ft/s
LENGTH = 350 ft
SLOPE = 1.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 2.06 ft^3/s
V2 = 1.32 ft/s
Q10 = 2.63 ft^3/s
V10 = 1.40 ft/s
LENGTH = 100 ft
SLOPE = 0.61%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.40 AC.
Q2 = 0.67 ft^3/s
V2 = 1.35 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.44 ft/s
LENGTH = 250 ft
SLOPE = 1.66%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.22 AC.
Q2 = 0.37 ft^3/s
V2 = 0.66 ft/s
Q10 = 0.47 ft^3/s
V10 = 0.70 ft/s
LENGTH = 135 ft
SLOPE = 0.36%
SIDE SLOPES = 8

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

2/3/2009
C:\Working\TPA\d0150526\R-2606B_hyd_buf_permits.rsh03_withgrading

PERMIT SHEET
13 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	9
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

GRASS SWALE DATA
DA = 3.44 AC.
Q2 = 6.98 ft^3/s
V2 = 1.97 ft/s
Q10 = 8.89 ft^3/s
V10 = 2.09 ft/s
LENGTH = 225 ft
SLOPE = 0.70%
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.74 AC.
Q2 = 1.74 ft^3/s
V2 = 2.39 ft/s
Q10 = 2.21 ft^3/s
V10 = 2.54 ft/s
LENGTH = 750 ft
SLOPE = 2.60%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 2.32 AC.
Q2 = 5.23 ft^3/s
V2 = 2.91 ft/s
Q10 = 6.66 ft^3/s
V10 = 3.09 ft/s
LENGTH = 600 ft
SLOPE = 2.70%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.61 AC.
Q2 = 2.69 ft^3/s
V2 = 1.92 ft/s
Q10 = 3.42 ft^3/s
V10 = 2.04 ft/s
LENGTH = 1000 ft
SLOPE = 1.66%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.45 ft^3/s
V2 = 1.67 ft/s
Q10 = 0.57 ft^3/s
V10 = 1.77 ft/s
LENGTH = 130 ft
SLOPE = 3.13%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.59 AC.
Q2 = 3.59 ft^3/s
V2 = 2.97 ft/s
Q10 = 4.56 ft^3/s
V10 = 3.16 ft/s
LENGTH = 500 ft
SLOPE = 3.28%
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 0.93 ft^3/s
V2 = 1.37 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.45 ft/s
LENGTH = 350 ft
SLOPE = 1.36%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.88 AC.
Q2 = 4.58 ft^3/s
V2 = 2.35 ft/s
Q10 = 5.83 ft^3/s
V10 = 2.49 ft/s
LENGTH = 800 ft
SLOPE = 1.66%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.22 ft^3/s
V2 = 1.57 ft/s
Q10 = 1.55 ft^3/s
V10 = 1.67 ft/s
LENGTH = 450 ft
SLOPE = 1.66%
SIDE SLOPES = 8

SITE 14
SITE 15

CLASS 'I' RIP RAP
EST. 93 TONS
60 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

PROP. SLOPE STAKES

+30, GRAU 350
+00, GRAU 350
+75, GRAU 350
+50, GRAU 350

S 36° 41' 19.7" E

SDG
SEE DETAIL "D"

DRY DETENTION / HAZARDOUS SPILL BASIN
3

+77, CAT-1

+25, PROP. GUIDERAIL ANCHOR
+75, PROP. GUIDERAIL ANCHOR
+75, CAT-1 END-18G
2GI
2GI(A)
2GI W/ FLAT GRATE

PROP. DBL FACE CSL GUIDERAIL
PROP. GUARDRAIL
LATERAL "V" DITCH SEE DETAIL "A"
BEGIN SR 2

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 8
MATCHLINE STA. 177+00 -L- SEE SHEET NO. 10

PERMIT SHEET
14 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS
8/17/99

3/18/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	9
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

GRASS SWALE DATA
DA = 3.44 AC.
Q2 = 6.98 ft^3/s
V2 = 1.97 ft/s
Q10 = 8.89 ft^3/s
V10 = 2.09 ft/s
LENGTH = 225 ft
SLOPE = 0.70%
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.74 AC.
Q2 = 1.74 ft^3/s
V2 = 2.39 ft/s
Q10 = 2.21 ft^3/s
V10 = 2.54 ft/s
LENGTH = 750 ft
SLOPE = 2.60%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 2.32 AC.
Q2 = 5.23 ft^3/s
V2 = 2.51 ft/s
Q10 = 6.66 ft^3/s
V10 = 3.09 ft/s
LENGTH = 600 ft
SLOPE = 2.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.61 AC.
Q2 = 2.69 ft^3/s
V2 = 1.92 ft/s
Q10 = 3.42 ft^3/s
V10 = 2.04 ft/s
LENGTH = 1000 ft
SLOPE = 1.66%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.45 ft^3/s
V2 = 1.67 ft/s
Q10 = 0.57 ft^3/s
V10 = 1.77 ft/s
LENGTH = 130 ft
SLOPE = 3.19%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.59 AC.
Q2 = 3.59 ft^3/s
V2 = 2.97 ft/s
Q10 = 4.56 ft^3/s
V10 = 3.16 ft/s
LENGTH = 500 ft
SLOPE = 3.28%
SIDE SLOPES = 5

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 0.93 ft^3/s
V2 = 1.34 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.45 ft/s
LENGTH = 350 ft
SLOPE = 1.36%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.88 AC.
Q2 = 4.58 ft^3/s
V2 = 2.35 ft/s
Q10 = 5.83 ft^3/s
V10 = 2.49 ft/s
LENGTH = 800 ft
SLOPE = 1.66%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.22 ft^3/s
V2 = 1.57 ft/s
Q10 = 1.55 ft^3/s
V10 = 1.67 ft/s
LENGTH = 450 ft
SLOPE = 1.66%
SIDE SLOPES = 8

SITE 14
SITE 15

MATCHLINE STA. 164+00 –L– SEE SHEET NO. 8
MATCHLINE STA. 177+00 –L– SEE SHEET NO. 10

PERMIT SHEET
15 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 54 FOR –L– PROFILE.
SEE SHEET NO. 97 FOR –SR1– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS
8/17/99

3/18/2009
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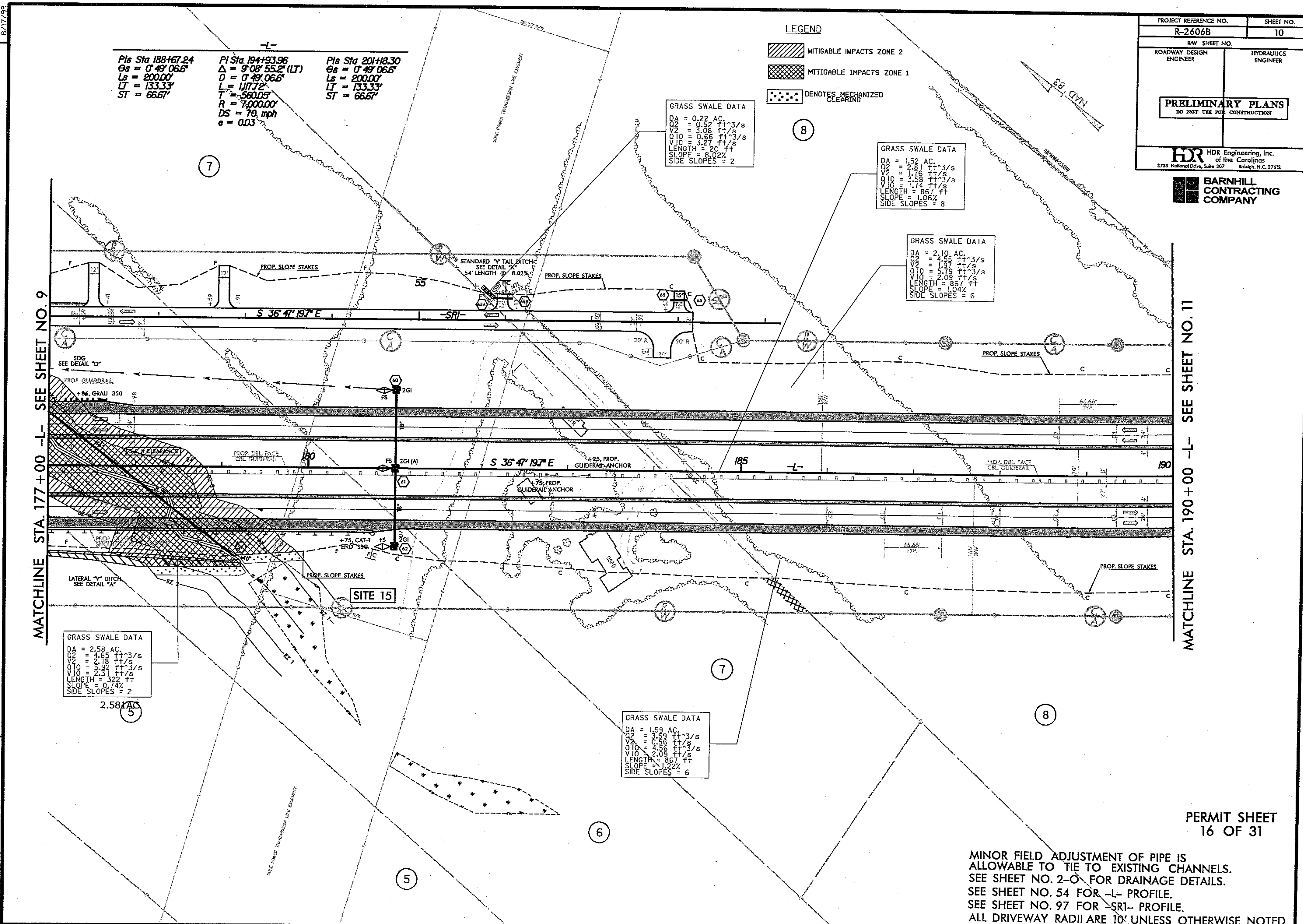

REVISIONS

8/17/99

3/18/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

-L-
Pls Sta 188+67.24
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1,117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 201+18.30
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

GRASS SWALE DATA
DA = 0.22 AC.
Q2 = 0.52 ft^3/s
V2 = 1.08 ft/s
Q10 = 0.66 ft^3/s
V10 = 1.27 ft/s
LENGTH = 20 ft
SLOPE = 8.02%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.52 AC.
Q2 = 2.81 ft^3/s
V2 = 1.76 ft/s
Q10 = 3.58 ft^3/s
V10 = 1.74 ft/s
LENGTH = 867 ft
SLOPE = 1.06%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 2.10 AC.
Q2 = 4.55 ft^3/s
V2 = 1.97 ft/s
Q10 = 5.78 ft^3/s
V10 = 2.09 ft/s
LENGTH = 867 ft
SLOPE = 1.04%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 2.68 AC.
Q2 = 4.65 ft^3/s
V2 = 2.18 ft/s
Q10 = 5.92 ft^3/s
V10 = 2.31 ft/s
LENGTH = 322 ft
SLOPE = 0.74%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.59 AC.
Q2 = 3.59 ft^3/s
V2 = 0.56 ft/s
Q10 = 4.56 ft^3/s
V10 = 2.09 ft/s
LENGTH = 867 ft
SLOPE = 1.22%
SIDE SLOPES = 6

STANDARD "V" TAIL DITCH SEE DETAIL "A" 54' LENGTH @ 8.02%

PROP. SLOPE STAKES

S 36° 47' 19.7" E -SR1-

SDG SEE DETAIL "D"

PROP GUARDRAIL

+ 6% GRAD. 350

CL R CLEARANCE

PROP. DBL FACE CSL GUIDERAIL

4.25' PROP. GUIDERAIL ANCHOR

75' PROP. GUIDERAIL ANCHOR

+75' CAT-1 END SBC

LATERAL "V" DITCH SEE DETAIL "A"

SITE 15

2.58 AC

PERMIT SHEET
17 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

MATCHLINE STA. 177+00 -L- SEE SHEET NO. 9

MATCHLINE STA. 190+00 -L- SEE SHEET NO. 11

3/18/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

MATCHLINE STA. 203+00 –L– SEE SHEET NO. 11

MATCHLINE STA. 216+00 –L– SEE SHEET NO. 13

GRASS SWALE DATA
DA = 1.63 AC.
Q2 = 4.19 ft^3/s
V2 = 1.90 ft/s
Q10 = 5.33 ft^3/s
V10 = 2.02 ft/s
LENGTH = 1085 ft
SLOPE = 1.00%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.27 AC.
Q2 = 3.64 ft^3/s
V2 = 3.64 ft/s
Q10 = 2.19 ft^3/s
V10 = 3.94 ft/s
LENGTH = 100 ft
SLOPE = 8.20%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.27 AC.
Q2 = 1.72 ft^3/s
V2 = 1.49 ft/s
Q10 = 2.19 ft^3/s
V10 = 1.89 ft/s
LENGTH = 600 ft
SLOPE = 0.69%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.48 AC.
Q2 = 1.28 ft^3/s
V2 = .55 ft/s
Q10 = 1.63 ft^3/s
V10 = 1.65 ft/s
LENGTH = 300 ft
SLOPE = .29%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.89 AC.
Q2 = 1.81 ft^3/s
V2 = 3.01 ft/s
Q10 = 2.30 ft^3/s
V10 = 3.20 ft/s
LENGTH = 290 ft
SLOPE = 3.29%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.60 AC.
Q2 = 4.87 ft^3/s
V2 = 3.96 ft/s
Q10 = 6.20 ft^3/s
V10 = 4.25 ft/s
LENGTH = 210 ft
SLOPE = 5.34%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.56 AC.
Q2 = 3.03 ft^3/s
V2 = 1.65 ft/s
Q10 = 3.85 ft^3/s
V10 = 1.75 ft/s
LENGTH = 850 ft
SLOPE = 1.02%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.45 AC.
Q2 = 3.14 ft^3/s
V2 = 1.87 ft/s
Q10 = 4.00 ft^3/s
V10 = 1.99 ft/s
LENGTH = 900 ft
SLOPE = 1.17%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 0.93 ft^3/s
V2 = 1.23 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.31 ft/s
LENGTH = 350 ft
SLOPE = 1.03%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.59 AC.
Q2 = 1.65 ft^3/s
V2 = 1.52 ft/s
Q10 = 2.10 ft^3/s
V10 = 1.61 ft/s
LENGTH = 250 ft
SLOPE = 1.02%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC.
Q2 = 0.93 ft^3/s
V2 = 1.37 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.45 ft/s
LENGTH = 350 ft
SLOPE = 1.36%
SIDE SLOPES = 8

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 55 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
18 OF 31

3/16/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

MATCHLINE STA. 203+00 –L– SEE SHEET NO. 11

MATCHLINE STA. 216+00 –L– SEE SHEET NO. 13

GRASS SWALE DATA
DA = 1.63 AC
Q2 = 4.19 ft^3/s
V2 = 1.90 ft/s
Q10 = 5.33 ft^3/s
V10 = 2.02 ft/s
LENGTH = 1085 ft
SLOPE = 1.00%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.27 AC
Q2 = 3.64 ft^3/s
V2 = 3.64 ft/s
Q10 = 2.19 ft^3/s
V10 = 3.94 ft/s
LENGTH = 100 ft
SLOPE = 8.20%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.27 AC
Q2 = 1.72 ft^3/s
V2 = 1.49 ft/s
Q10 = 2.19 ft^3/s
V10 = 1.89 ft/s
LENGTH = 600 ft
SLOPE = 0.69%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 3.60 AC
Q2 = 4.81 ft^3/s
V2 = 3.96 ft/s
Q10 = 6.20 ft^3/s
V10 = 4.25 ft/s
LENGTH = 210 ft
SLOPE = 5.34%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.48 AC
Q2 = 1.28 ft^3/s
V2 = 1.55 ft/s
Q10 = 1.63 ft^3/s
V10 = 1.65 ft/s
LENGTH = 300 ft
SLOPE = 1.29%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.89 AC
Q2 = 1.84 ft^3/s
V2 = 3.01 ft/s
Q10 = 2.30 ft^3/s
V10 = 3.20 ft/s
LENGTH = 290 ft
SLOPE = 3.29%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.56 AC
Q2 = 3.03 ft^3/s
V2 = 1.65 ft/s
Q10 = 3.85 ft^3/s
V10 = 1.75 ft/s
LENGTH = 850 ft
SLOPE = 1.02%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.45 AC
Q2 = 3.14 ft^3/s
V2 = 1.67 ft/s
Q10 = 4.00 ft^3/s
V10 = 1.99 ft/s
LENGTH = 900 ft
SLOPE = 1.17%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC
Q2 = 0.93 ft^3/s
V2 = 1.23 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.31 ft/s
LENGTH = 350 ft
SLOPE = 1.03%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.59 AC
Q2 = 1.65 ft^3/s
V2 = 1.52 ft/s
Q10 = 2.10 ft^3/s
V10 = 1.61 ft/s
LENGTH = 250 ft
SLOPE = 1.02%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.56 AC
Q2 = 0.93 ft^3/s
V2 = 1.37 ft/s
Q10 = 1.19 ft^3/s
V10 = 1.45 ft/s
LENGTH = 350 ft
SLOPE = 1.36%
SIDE SLOPES = 8

S 41°34'28.2" E

SITE 17

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 55 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
19 OF 31

3/18/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99
REVISIONS

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

MATCHLINE STA. 216+00 -L- SEE SHEET NO. 12

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 14

GRASS SWALE DATA
DA = 0.32 AC.
Q2 = 0.53 ft^3/s
V2 = 1.32 ft/s
Q10 = 0.68 ft^3/s
V10 = 1.40 ft/s
LENGTH = 200 ft
SLOPE = 1.81%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.40 AC.
Q2 = 0.67 ft^3/s
V2 = 1.40 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.49 ft/s
LENGTH = 250 ft
SLOPE = 1.82%
SIDE SLOPES = 8

13

GRASS SWALE DATA
DA = 0.46 AC.
Q2 = 1.04 ft^3/s
V2 = 1.67 ft/s
Q10 = 1.32 ft^3/s
V10 = 1.78 ft/s
LENGTH = 450 ft
SLOPE = 1.81%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.55 AC.
Q2 = 3.15 ft^3/s
V2 = 3.47 ft/s
Q10 = 4.00 ft^3/s
V10 = 3.73 ft/s
LENGTH = 100 ft
SLOPE = 4.07%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.35 AC.
Q2 = 3.11 ft^3/s
V2 = 2.18 ft/s
Q10 = 3.95 ft^3/s
V10 = 2.31 ft/s
LENGTH = 600 ft
SLOPE = 1.76%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 2.16 AC.
Q2 = 4.38 ft^3/s
V2 = 3.05 ft/s
Q10 = 5.58 ft^3/s
V10 = 3.21 ft/s
LENGTH = 300 ft
SLOPE = 2.13%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.88 AC.
Q2 = 1.47 ft^3/s
V2 = 1.68 ft/s
Q10 = 1.87 ft^3/s
V10 = 1.79 ft/s
LENGTH = 550 ft
SLOPE = 1.76%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.48 AC.
Q2 = 0.80 ft^3/s
V2 = 1.18 ft/s
Q10 = 1.02 ft^3/s
V10 = 1.26 ft/s
LENGTH = 300 ft
SLOPE = 1.02%
SIDE SLOPES = 8

16

GRASS SWALE DATA
DA = 0.55 AC.
Q2 = 1.36 ft^3/s
V2 = 1.45 ft/s
Q10 = 1.74 ft^3/s
V10 = 1.54 ft/s
LENGTH = 300 ft
SLOPE = 1.03%
SIDE SLOPES = 6

BERM DITCH SEE DETAIL "M"
PROP. SLOPE STAKES
BDOS
18" CSP
2GI
FS
TDE
+75, PROP. GUIDERAIL ANCHOR
+25, PROP. GUIDERAIL ANCHOR
220
PROP. DBL FACE CBL GUIDERAIL
225
S 41° 34' 28.2" E
35' X 17' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
2GI(D)
2GI(A)
2GI W/ FLAT GRATE
LATERAL "M" DITCH SEE DETAIL "A"
28' X 16' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES
DRY DETENTION / HAZARDOUS SPILL BASIN
5
LEVEL SPREADER
BYPASS STRUCTURE
BYPASS CHANNEL
EMERGENCY OVERFLOW WILL TIE TO PROPOSED CHANNEL
SITE 17
+50, GRAU 350
CLF
GRADE TO DRAIN
+00, BEGIN SBG
PROP. GUARDRAIL
SHOULDER BERM GUTTER
4' BASE DITCH WITH CLASS 'B' RIP RAP SEE DETAIL AA
ITEM 5'
BZ 1
BZ 2
E
F

GRASS SWALE DATA
DA = 0.52 AC.
Q2 = 1.36 ft^3/s
V2 = 1.43 ft/s
Q10 = 1.73 ft^3/s
V10 = 1.52 ft/s
LENGTH = 273 ft
SLOPE = 0.55%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.17 AC.
Q2 = 2.15 ft^3/s
V2 = 1.98 ft/s
Q10 = 2.74 ft^3/s
V10 = 2.11 ft/s
LENGTH = 500 ft
SLOPE = 1.75%
SIDE SLOPES = 6

16

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.33 ft^3/s
V2 = 0.70 ft/s
Q10 = 0.42 ft^3/s
V10 = 0.75 ft/s
LENGTH = 126 ft
SLOPE = 0.46%
SIDE SLOPES = 8

PERMIT SHEET 20 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-I FOR DD/HSB #5 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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imassey

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

LEGEND

MITIGABLE IMPACTS ZONE 2

MITIGABLE IMPACTS ZONE 1

DENOTES MECHANIZED CLEARING

NAD 83

MATCHLINE STA. 216+00 -L- SEE SHEET NO. 12

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 14

GRASS SWALE DATA
DA = 0.32 AC.
Q2 = 0.53 ft^3/s
V2 = 1.32 ft/s
Q10 = 0.68 ft^3/s
V10 = 1.40 ft/s
LENGTH = 200 ft
SLOPE = 1.81%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.40 AC.
Q2 = 0.67 ft^3/s
V2 = 1.40 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.48 ft/s
LENGTH = 250 ft
SLOPE = 1.82%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.35 AC.
Q2 = 2.11 ft^3/s
V2 = 2.18 ft/s
Q10 = 3.95 ft^3/s
V10 = 2.37 ft/s
LENGTH = 600 ft
SLOPE = 1.76%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.88 AC.
Q2 = 1.47 ft^3/s
V2 = 1.68 ft/s
Q10 = 1.87 ft^3/s
V10 = 1.79 ft/s
LENGTH = 550 ft
SLOPE = 1.76%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.48 AC.
Q2 = 0.80 ft^3/s
V2 = 1.18 ft/s
Q10 = 1.02 ft^3/s
V10 = 1.26 ft/s
LENGTH = 300 ft
SLOPE = 1.02%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.46 AC.
Q2 = 1.04 ft^3/s
V2 = 1.67 ft/s
Q10 = 1.32 ft^3/s
V10 = 1.78 ft/s
LENGTH = 450 ft
SLOPE = 1.81%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.55 AC.
Q2 = 3.15 ft^3/s
V2 = 3.47 ft/s
Q10 = 4.00 ft^3/s
V10 = 3.73 ft/s
LENGTH = 100 ft
SLOPE = 4.07%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 2.16 AC.
Q2 = 4.38 ft^3/s
V2 = 3.05 ft/s
Q10 = 5.58 ft^3/s
V10 = 3.27 ft/s
LENGTH = 300 ft
SLOPE = 2.13%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.58 AC.
Q2 = 1.36 ft^3/s
V2 = 1.45 ft/s
Q10 = 1.74 ft^3/s
V10 = 1.54 ft/s
LENGTH = 300 ft
SLOPE = 1.03%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.52 AC.
Q2 = 1.36 ft^3/s
V2 = 1.43 ft/s
Q10 = 1.73 ft^3/s
V10 = 1.52 ft/s
LENGTH = 273 ft
SLOPE = 0.55%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 0.77 AC.
Q2 = 2.15 ft^3/s
V2 = 1.98 ft/s
Q10 = 2.74 ft^3/s
V10 = 2.11 ft/s
LENGTH = 500 ft
SLOPE = 1.75%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.33 ft^3/s
V2 = 0.70 ft/s
Q10 = 0.42 ft^3/s
V10 = 0.75 ft/s
LENGTH = 126 ft
SLOPE = 0.46%
SIDE SLOPES = 8

BERM DITCH SEE DETAIL "M"

PROP. SLOPE STAKES

75' PROP. GUIDERAIL ANCHOR

28' PROP. GUIDERAIL ANCHOR

LATERAL DITCH SEE DETAIL "A"

28'X 16' FOREBAY CLASS "B" RIP RAP 3' DEEP; 2:1 SIDES

DRY DETENTION / HAZARDOUS SPILL BASIN

BYPASS STRUCTURE

LEVEL SPREADER

BYPASS CHANNEL

EMERGENCY OVERFLOW - WILL TIE TO PROPOSED CHANNEL

35' X 17' FOREBAY CLASS "B" RIP RAP 3' DEEP; 2:1 SIDES

GRADE TO DRAIN

PROP. GUARDRAIL SHOULDER BERM GUTTER

BASE DITCH WITH CLASS "B" RIP RAP SEE DETAIL "A"

SITE 17

S 41° 34' 28.2" E

PERMIT SHEET
21 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 2-I FOR DD/HSB #5 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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mcstep

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	14
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

9/17/99

REVISIONS

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD '83

SITE 17

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.33 ft^3/s
V2 = 0.50 ft/s
Q10 = 0.42 ft^3/s
V10 = 0.53 ft/s
LENGTH = 114 ft
SLOPE = 0.18%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.65 AC.
Q2 = 1.82 ft^3/s
V2 = 1.04 ft/s
Q10 = 2.31 ft^3/s
V10 = 1.10 ft/s
LENGTH = 150 ft
SLOPE = 0.35%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.39 AC.
Q2 = 1.09 ft^3/s
V2 = 1.54 ft/s
Q10 = 1.38 ft^3/s
V10 = 1.63 ft/s
LENGTH = 150 ft
SLOPE = 1.40%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 13.42 AC.
Q2 = 29.66 ft^3/s
V2 = 6.10 ft/s
Q10 = 37.75 ft^3/s
V10 = 6.49 ft/s
LENGTH = 100 ft
SLOPE = 4.45%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.00 AC.
Q2 = 2.44 ft^3/s
V2 = 1.04 ft/s
Q10 = 3.10 ft^3/s
V10 = 1.10 ft/s
LENGTH = 250 ft
SLOPE = 0.29%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.42 AC.
Q2 = 0.70 ft^3/s
V2 = 0.76 ft/s
Q10 = 0.89 ft^3/s
V10 = 0.81 ft/s
LENGTH = 260 ft
SLOPE = 0.35%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.72 AC.
Q2 = 1.20 ft^3/s
V2 = 1.17 ft/s
Q10 = 1.53 ft^3/s
V10 = 1.24 ft/s
LENGTH = 200 ft
SLOPE = 0.76%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.49 AC.
Q2 = 1.19 ft^3/s
V2 = 1.56 ft/s
Q10 = 1.52 ft^3/s
V10 = 1.66 ft/s
LENGTH = 200 ft
SLOPE = 1.37%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.41 AC.
Q2 = 0.68 ft^3/s
V2 = 1.24 ft/s
Q10 = 0.87 ft^3/s
V10 = 1.31 ft/s
LENGTH = 250 ft
SLOPE = 1.28%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.80 AC.
Q2 = 1.33 ft^3/s
V2 = 1.81 ft/s
Q10 = 1.70 ft^3/s
V10 = 1.93 ft/s
LENGTH = 500 ft
SLOPE = 2.28%
SIDE SLOPES = 8

MATCHLINE STA. 229+00 –L– SEE SHEET NO. 13

MATCHLINE STA. 242+00 –L– SEE SHEET NO. 15

DRY DETENTION / HAZARDOUS SPILL BASIN
EMERGENCY OVERFLOW
BYPASS STRUCTURE
BYPASS CHANNEL
LEVEL SPREADER
CLASS 'I' RIP RAP EST. 70 TONS 75 SY FILTER FABRIC
PROP. GUARDRAIL & SHOULDER BERM GUTTER
PROP. SLOPE STAKES
SDG SEE DETAIL "D"
2GI(A) W/ FLAT GRATE
2GI(D)
2GI W/ FLAT GRATE
+50, GRAU 350
+50, CAT BEGIN SBG
+00, END SBG
+00, BEGIN SBG
6.8m CLEARANCE w/1 ft slab
S 41° 34' 28.2" E
PROP. DBL FACE CBL. GUIDERAIL
+25, PROP. GUIDERAIL ANCHOR
35' X 17' FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"
4' BKSE DITCH WITH CLASS 'B' RIP RAP SEE DETAIL AA
GRADE TO DRAIN
NOTE: STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "Y"
L = 88.04
214.50 RT
L = 88.62
375.03 RT

PERMIT SHEET
22 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 56 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/16/2009
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mastrac

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	14
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD 83

16 | 16A | 16 | 16B

GRASS SWALE DATA
DA = 0.20 AC.
Q2 = 0.33 ft^3/s
V2 = 0.50 ft/s
Q10 = 0.42 ft^3/s
V10 = 0.53 ft/s
LENGTH = 114 ft
SLOPE = 0.18%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.39 AC.
Q2 = 1.09 ft^3/s
V2 = 1.54 ft/s
Q10 = 1.39 ft^3/s
V10 = 1.63 ft/s
LENGTH = 150 ft
SLOPE = 1.40%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.65 AC.
Q2 = 1.82 ft^3/s
V2 = 1.04 ft/s
Q10 = 2.31 ft^3/s
V10 = 1.10 ft/s
LENGTH = 150 ft
SLOPE = 0.35%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 13.42 AC.
Q2 = 29.66 ft^3/s
V2 = 5.10 ft/s
Q10 = 37.75 ft^3/s
V10 = 6.49 ft/s
LENGTH = 100 ft
SLOPE = 4.45%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.00 AC.
Q2 = 2.44 ft^3/s
V2 = 1.04 ft/s
Q10 = 3.10 ft^3/s
V10 = 1.10 ft/s
LENGTH = 250 ft
SLOPE = 0.29%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.42 AC.
Q2 = 0.70 ft^3/s
V2 = 0.76 ft/s
Q10 = 0.89 ft^3/s
V10 = 0.81 ft/s
LENGTH = 260 ft
SLOPE = 0.35%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.72 AC.
Q2 = 1.20 ft^3/s
V2 = 1.17 ft/s
Q10 = 1.53 ft^3/s
V10 = 1.24 ft/s
LENGTH = 200 ft
SLOPE = 0.76%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.49 AC.
Q2 = 1.19 ft^3/s
V2 = 1.56 ft/s
Q10 = 1.52 ft^3/s
V10 = 1.66 ft/s
LENGTH = 200 ft
SLOPE = 1.37%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.80 AC.
Q2 = 1.33 ft^3/s
V2 = 1.81 ft/s
Q10 = 1.70 ft^3/s
V10 = 1.93 ft/s
LENGTH = 500 ft
SLOPE = 2.28%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.1 AC.
Q2 = 0.68 ft^3/s
V2 = 1.24 ft/s
Q10 = 0.87 ft^3/s
V10 = 1.31 ft/s
LENGTH = 250 ft
SLOPE = 1.28%
SIDE SLOPES = 8

SITE 17

DRY DETENTION / HAZARDOUS SPILL BASIN
BYPASS STRUCTURE
BYPASS CHANNEL
LEVEL SPREADER
EMERGENCY OVERFLOW
CLASS 'I' RIP RAP EST. 70 TONS 75-SY FILTER FABRIC
PROP. GUARDRAIL & SHOULDER BERM GUTTER
PROP. SLOPE STAKES
2GI(A) W/ FLAT GRATE
2GI(A) W/ FLAT GRATE
2GI(D)
SDG SEE DETAIL "D"
+50, GRAU 350
+00 END SBG
+00 BEGIN SBG
+50 CAT BEGIN SBG
2.5% CLEARANCE w/ ft.slo6
24" CMP
18"
FS
C/F
PROP. DBL FACE CRV. GUIDERAIL
+25, PROP GUIDERAIL ANCHOR
GRADE TO DRAIN
END SBG
2GI W FLAT GRATE
2GI(A) GRATE
2GI W FLAT GRATE
2GI(A)
2GI -L-
S 41°34'28"E
235
240
275
NOTE: STABILIZE STREAM BANKS AT CULVERT INLET/SEE DETAIL "A"
NOTE: STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "A"
35'-X-17' FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"
2' LATERAL BASE DITCH WITH CLASS 'B' RIP RAP SEE DETAIL AA
BZ 1
BZ 2
715
720
725
730
735
740
745
750

MATCHLINE STA. 229+00 -L- SEE SHEET NO. 13

MATCHLINE STA. 242+00 -L- SEE SHEET NO. 15

PERMIT SHEET
23 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

REVISIONS
8/17/99

3/18/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	17
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD 83

-L-
PI Sta 250+88.56
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 265+20.18
Δ = 22° 04' 04.2" (RT)
D = 0° 49' 06.6"
L = 2,696.09'
T = 1,364.96'
R = 7,000.00'
DS = 70 mph
e = 0.03

PI Sta 279+17.98
θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-
PI Sta 27+53.78
Δ = 23° 42' 17.5" (RT)
D = 0° 41' 56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

-SR2- PT Sta. 42+15.47

SITE 18

SITE 18

GRASS SWALE DATA
DA = 0.29 AC.
Q2 = 0.48 ft^3/s
V2 = 1.67 ft/s
Q10 = 0.62 ft^3/s
V10 = 1.78 ft/s
LENGTH = 410 ft
SLOPE = 2.35%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.86 AC.
Q2 = 1.94 ft^3/s
V2 = 1.20 ft/s
Q10 = 2.47 ft^3/s
V10 = 1.28 ft/s
LENGTH = 400 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.32 AC.
Q2 = 2.68 ft^3/s
V2 = 2.20 ft/s
Q10 = 3.41 ft^3/s
V10 = 2.33 ft/s
LENGTH = 400 ft
SLOPE = 1.99%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.93 AC.
Q2 = 1.76 ft^3/s
V2 = 1.99 ft/s
Q10 = 2.24 ft^3/s
V10 = 2.11 ft/s
LENGTH = 319 ft
SLOPE = 2.22%
SIDE SLOPES = 7

GRASS SWALE DATA
DA = 1.12 AC.
Q2 = 2.37 ft^3/s
V2 = 1.36 ft/s
Q10 = 3.02 ft^3/s
V10 = 1.44 ft/s
LENGTH = 400 ft
SLOPE = 0.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 1.52 ft^3/s
V2 = 3.38 ft/s
Q10 = 1.94 ft^3/s
V10 = 3.60 ft/s
LENGTH = 200 ft
SLOPE = 5.05%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.46 AC.
Q2 = 2.96 ft^3/s
V2 = 3.62 ft/s
Q10 = 3.77 ft^3/s
V10 = 3.84 ft/s
LENGTH = 200 ft
SLOPE = 3.84%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.48 AC.
Q2 = 3.00 ft^3/s
V2 = 4.00 ft/s
Q10 = 3.82 ft^3/s
V10 = 4.25 ft/s
LENGTH = 200 ft
SLOPE = 5.00%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.51 AC.
Q2 = 3.41 ft^3/s
V2 = 1.39 ft/s
Q10 = 4.33 ft^3/s
V10 = 1.47 ft/s
LENGTH = 700 ft
SLOPE = 0.60%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.99 AC.
Q2 = 4.13 ft^3/s
V2 = 1.56 ft/s
Q10 = 5.25 ft^3/s
V10 = 1.66 ft/s
LENGTH = 700 ft
SLOPE = 0.60%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.61 ft^3/s
V2 = 1.14 ft/s
Q10 = 2.05 ft^3/s
V10 = 1.21 ft/s
LENGTH = 350 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.98 AC.
Q2 = 2.08 ft^3/s
V2 = 1.25 ft/s
Q10 = 2.64 ft^3/s
V10 = 1.33 ft/s
LENGTH = 350 ft
SLOPE = 0.53%
SIDE SLOPES = 6

PROPOSED EARTHEN NOISE BERM
+/- STA.260+00 - 283+00
SEE X-SECTIONS

-L- CS Sta. 278+51.32

-L- ST Sta. 280+51.32

DRAIN POND

MATCHLINE STA. 268+00 -L-

MATCHLINE STA. 281+00 -L-

SEE SHEET NO. 16

SEE SHEET NO. 17

PERMIT SHEET
24 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NOS. 98-99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	17
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD '83

-L-
Pls Sta 250+88.56
Θs = 0°49'06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

Pl Sta 265+20.18
Δ = 22°04'04.2" (RT)
D = 0°49'06.6"
L = 2,696.09'
T = 1,364.98'
R = 7,000.00'
DS = 70 mph
e = 0.03

Pls Sta 279+17.98
Θs = 0°49'06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-
Pl Sta 27+53.78
Δ = 23°42'17.5" (RT)
D = 0°41'56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

SITE 18

SITE 18

GRASS SWALE DATA
DA = 0.29 AC.
Q2 = 0.48 ft^3/s
V2 = 1.67 ft/s
Q10 = 0.62 ft^3/s
V10 = 1.78 ft/s
LENGTH = 410 ft
SLOPE = 2.35%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.86 AC.
Q2 = 1.94 ft^3/s
V2 = 1.20 ft/s
Q10 = 2.47 ft^3/s
V10 = 1.28 ft/s
LENGTH = 400 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.32 AC.
Q2 = 2.68 ft^3/s
V2 = 2.20 ft/s
Q10 = 3.41 ft^3/s
V10 = 2.33 ft/s
LENGTH = 400 ft
SLOPE = 1.99%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.93 AC.
Q2 = 1.76 ft^3/s
V2 = 1.99 ft/s
Q10 = 2.24 ft^3/s
V10 = 2.11 ft/s
LENGTH = 319 ft
SLOPE = 2.22%
SIDE SLOPES = 7

GRASS SWALE DATA
DA = 1.12 AC.
Q2 = 2.37 ft^3/s
V2 = 1.36 ft/s
Q10 = 3.02 ft^3/s
V10 = 1.44 ft/s
LENGTH = 400 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.75 AC.
Q2 = 1.52 ft^3/s
V2 = 3.39 ft/s
Q10 = 1.94 ft^3/s
V10 = 3.60 ft/s
LENGTH = 209 ft
SLOPE = 5.05%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.46 AC.
Q2 = 2.96 ft^3/s
V2 = 3.62 ft/s
Q10 = 3.77 ft^3/s
V10 = 3.84 ft/s
LENGTH = 200 ft
SLOPE = 3.84%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.48 AC.
Q2 = 3.00 ft^3/s
V2 = 4.00 ft/s
Q10 = 3.82 ft^3/s
V10 = 4.25 ft/s
LENGTH = 200 ft
SLOPE = 5.00%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.51 AC.
Q2 = 3.41 ft^3/s
V2 = 1.39 ft/s
Q10 = 4.33 ft^3/s
V10 = 1.47 ft/s
LENGTH = 700 ft
SLOPE = 0.60%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.99 AC.
Q2 = 4.13 ft^3/s
V2 = 1.56 ft/s
Q10 = 5.25 ft^3/s
V10 = 1.66 ft/s
LENGTH = 700 ft
SLOPE = 0.60%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.61 ft^3/s
V2 = 1.14 ft/s
Q10 = 2.05 ft^3/s
V10 = 1.21 ft/s
LENGTH = 350 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.96 AC.
Q2 = 2.08 ft^3/s
V2 = 1.25 ft/s
Q10 = 2.64 ft^3/s
V10 = 1.33 ft/s
LENGTH = 350 ft
SLOPE = 0.59%
SIDE SLOPES = 6

(18) (19) (20)

MATCHLINE STA. 268+00 -L- SEE SHEET NO. 16

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

PERMIT SHEET
25 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NOS. 98-99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	18
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND

- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

GRASS SWALE DATA
DA = 0.44 AC.
Q2 = 0.89 ft^3/s
V2 = 1.77 ft/s
Q10 = 1.14 ft^3/s
V10 = 1.88 ft/s
LENGTH = 390 ft
SLOPE = 1.82%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 0.33 AC.
Q2 = 0.67 ft^3/s
V2 = 1.43 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.52 ft/s
LENGTH = 150 ft
SLOPE = 1.61%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.01 AC.
Q2 = 1.80 ft^3/s
V2 = 1.98 ft/s
Q10 = 2.29 ft^3/s
V10 = 2.11 ft/s
LENGTH = 350 ft
SLOPE = 1.97%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.44 AC.
Q2 = 2.70 ft^3/s
V2 = 1.99 ft/s
Q10 = 3.43 ft^3/s
V10 = 2.11 ft/s
LENGTH = 300 ft
SLOPE = 1.52%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.63 AC.
Q2 = 3.09 ft^3/s
V2 = 2.61 ft/s
Q10 = 3.93 ft^3/s
V10 = 3.89 ft/s
LENGTH = 45.5 ft
SLOPE = 6.07%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 2.07 AC.
Q2 = 3.83 ft^3/s
V2 = 3.15 ft/s
Q10 = 4.87 ft^3/s
V10 = 3.37 ft/s
LENGTH = 100 ft
SLOPE = 2.60%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 1.45 AC.
Q2 = 2.39 ft^3/s
V2 = 3.49 ft/s
Q10 = 3.04 ft^3/s
V10 = 3.76 ft/s
LENGTH = 293 ft
SLOPE = 6.93%
SIDE SLOPES = 2

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

SITE 19

-SR2- PC Sta. 54+22.89

MATCHLINE -SR2- STA. 56+50 SEE SHEET NO. 35

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

MATCHLINE -L- STA. 294+00 SEE SHEET NO. 19

PROPOSED EARTHEN NOISE BERM
+/- STA. 260+00 - 283+00
SEE X-SECTIONS

GRASS SWALE DATA
DA = 0.64 AC.
Q2 = 1.07 ft^3/s
V2 = 1.04 ft/s
Q10 = 1.36 ft^3/s
V10 = 1.10 ft/s
LENGTH = 400 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.10 AC.
Q2 = 2.33 ft^3/s
V2 = 1.35 ft/s
Q10 = 2.97 ft^3/s
V10 = 1.44 ft/s
LENGTH = 400 ft
SLOPE = 0.60%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.93 AC.
Q2 = 1.97 ft^3/s
V2 = 1.22 ft/s
Q10 = 2.51 ft^3/s
V10 = 1.29 ft/s
LENGTH = 360 ft
SLOPE = 0.51%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.58 AC.
Q2 = 0.97 ft^3/s
V2 = 0.95 ft/s
Q10 = 1.23 ft^3/s
V10 = 1.01 ft/s
LENGTH = 360 ft
SLOPE = 0.51%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.06 AC.
Q2 = 0.10 ft^3/s
V2 = 0.32 ft/s
Q10 = 0.13 ft^3/s
V10 = 0.34 ft/s
LENGTH = 40 ft
SLOPE = 0.13%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.32 AC.
Q2 = 0.53 ft^3/s
V2 = 0.86 ft/s
Q10 = 0.68 ft^3/s
V10 = 1.01 ft/s
LENGTH = 200 ft
SLOPE = 0.75%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.77 AC.
Q2 = 1.74 ft^3/s
V2 = 3.21 ft/s
Q10 = 2.21 ft^3/s
V10 = 3.46 ft/s
LENGTH = 50 ft
SLOPE = 5.56%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 2.57 AC.
Q2 = 4.98 ft^3/s
V2 = 3.19 ft/s
Q10 = 6.34 ft^3/s
V10 = 3.42 ft/s
LENGTH = 100 ft
SLOPE = 2.18%
SIDE SLOPES = 2

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
26 OF 31

REVISIONS 8/17/99

3/10/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	18
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

GRASS SWALE DATA
DA = 0.44 AC.
Q2 = 0.89 ft^3/s
V2 = 1.77 ft/s
Q10 = 1.14 ft^3/s
V10 = 1.88 ft/s
LENGTH = 390 ft
SLOPE = 1.82%
SIDE SLOPES = 4

GRASS SWALE DATA
DA = 1.01 AC.
Q2 = 1.80 ft^3/s
V2 = 1.98 ft/s
Q10 = 2.29 ft^3/s
V10 = 2.11 ft/s
LENGTH = 350 ft
SLOPE = 1.97%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.33 AC.
Q2 = 0.61 ft^3/s
V2 = 1.43 ft/s
Q10 = 0.85 ft^3/s
V10 = 1.52 ft/s
LENGTH = 150 ft
SLOPE = 1.61%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.44 AC.
Q2 = 2.70 ft^3/s
V2 = 1.99 ft/s
Q10 = 3.43 ft^3/s
V10 = 2.11 ft/s
LENGTH = 300 ft
SLOPE = 1.52%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 1.63 AC.
Q2 = 3.09 ft^3/s
V2 = 3.61 ft/s
Q10 = 3.93 ft^3/s
V10 = 3.89 ft/s
LENGTH = 453 ft
SLOPE = 6.07%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 2.07 AC.
Q2 = 3.83 ft^3/s
V2 = 3.15 ft/s
Q10 = 4.67 ft^3/s
V10 = 3.37 ft/s
LENGTH = 100 ft
SLOPE = 2.60%
SIDE SLOPES = 2

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

GRASS SWALE DATA
DA = 1.43 AC.
Q2 = 2.38 ft^3/s
V2 = 3.49 ft/s
Q10 = 3.04 ft^3/s
V10 = 3.76 ft/s
LENGTH = 299 ft
SLOPE = 6.93%
SIDE SLOPES = 2

SITE 19

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

MATCHLINE -SR2- STA. 56+50 SEE SHEET NO. 35

MATCHLINE -L- STA. 294+00 SEE SHEET NO. 19

GRASS SWALE DATA
DA = 0.64 AC.
Q2 = 1.07 ft^3/s
V2 = 1.04 ft/s
Q10 = 1.36 ft^3/s
V10 = 1.10 ft/s
LENGTH = 400 ft
SLOPE = 0.59%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 1.10 AC.
Q2 = 2.33 ft^3/s
V2 = 1.35 ft/s
Q10 = 2.97 ft^3/s
V10 = 1.44 ft/s
LENGTH = 400 ft
SLOPE = 0.60%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.93 AC.
Q2 = 1.97 ft^3/s
V2 = 1.22 ft/s
Q10 = 2.64 ft^3/s
V10 = 1.29 ft/s
LENGTH = 360 ft
SLOPE = 0.51%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.58 AC.
Q2 = 0.97 ft^3/s
V2 = 0.95 ft/s
Q10 = 1.23 ft^3/s
V10 = 1.01 ft/s
LENGTH = 360 ft
SLOPE = 0.51%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.06 AC.
Q2 = 0.10 ft^3/s
V2 = 0.32 ft/s
Q10 = 0.13 ft^3/s
V10 = 0.34 ft/s
LENGTH = 40 ft
SLOPE = 0.13%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.32 AC.
Q2 = 0.53 ft^3/s
V2 = 0.95 ft/s
Q10 = 0.68 ft^3/s
V10 = 1.01 ft/s
LENGTH = 200 ft
SLOPE = 0.75%
SIDE SLOPES = 8

GRASS SWALE DATA
DA = 0.77 AC.
Q2 = 1.74 ft^3/s
V2 = 3.21 ft/s
Q10 = 2.21 ft^3/s
V10 = 3.46 ft/s
LENGTH = 50 ft
SLOPE = 5.36%
SIDE SLOPES = 2

GRASS SWALE DATA
DA = 2.57 AC.
Q2 = 4.98 ft^3/s
V2 = 3.19 ft/s
Q10 = 6.34 ft^3/s
V10 = 3.42 ft/s
LENGTH = 100 ft
SLOPE = 2.18%
SIDE SLOPES = 2

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
27 OF 31

REVISIONS 8/17/99

3/18/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	21
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-
Pls Sta 330+57.77
Θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

Pl Sta 336+88.45
Δ = 15° 35' 01.5" (RT)
D = 1° 25' 56.6"
L = 1,087.95'
T = 547.35'
R = 4,000.00'
DS = 70 mph
e = 0.05

Pls Sta 343+12.39
Θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD 83

GRASS SWALE DATA
DA = 0.62 AC.
Q2 = 1.71 ft^3/s
V2 = 2.62 ft/s
Q10 = 2.17 ft^3/s
V10 = 1.72 ft/s
LENGTH = 350 ft
SLOPE = 1.18%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.71 AC.
Q2 = 1.70 ft^3/s
V2 = 1.43 ft/s
Q10 = 2.16 ft^3/s
V10 = 1.52 ft/s
LENGTH = 300 ft
SLOPE = 0.86%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.74 ft^3/s
V2 = 1.09 ft/s
Q10 = 2.22 ft^3/s
V10 = 1.16 ft/s
LENGTH = 250 ft
SLOPE = 0.4%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.96 AC.
Q2 = 1.60 ft^3/s
V2 = 1.66 ft/s
Q10 = 2.04 ft^3/s
V10 = 1.76 ft/s
LENGTH = 550 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.88 AC.
Q2 = 1.47 ft^3/s
V2 = 1.62 ft/s
Q10 = 1.87 ft^3/s
V10 = 1.72 ft/s
LENGTH = 600 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.22 AC.
Q2 = 0.55 ft^3/s
V2 = 0.88 ft/s
Q10 = 0.69 ft^3/s
V10 = 0.93 ft/s
LENGTH = 100 ft
SLOPE = 0.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.86 AC.
Q2 = 2.21 ft^3/s
V2 = 1.80 ft/s
Q10 = 2.81 ft^3/s
V10 = 1.91 ft/s
LENGTH = 400 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.57 AC.
Q2 = 1.47 ft^3/s
V2 = 1.57 ft/s
Q10 = 1.86 ft^3/s
V10 = 1.66 ft/s
LENGTH = 300 ft
SLOPE = 1.2%
SIDE SLOPES = 6

SITE 20

-L- TS Sta. 328+91.10

-L- SC Sta. 331+41.10

CLASS 'B' RIP RAP EST. 11 TONS @ 28 SY FILTER FABRIC

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

2GI W FLAT GRATE

GRADE TO DRAIN

+50, END SBG

+50, BEGIN SBG

+00, GRAU 350

PROP. DBL FACE CBL. GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

+48, CAT-1 END SBG

S 23° 52' 10.7" E

16.0 ft CLEARING

EMERGENCY OVERFLOW

25' X 25' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

DRY DETENTION / HAZARDOUS SPILL BASIN

BYPASS CHANNEL

BYPASS STR.

LEVEL SPREADER

SDG SEE DETAIL D

TDE

MATCHLINE STA. 320+00 -L- SEE SHEET NO. 20

MATCHLINE STA. 333+00 -L- SEE SHEET NO. 22

PERMIT SHEET
28 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 60 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	21
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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

Pls Sta 330+57.77
θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

Pl Sta 336+88.45
Δ = 15° 35' 01.5" (RT)
D = 1° 25' 56.8"
L = 1,087.95'
T = 547.35'
R = 4000.00'
DS = 70 mph
e = 0.05

Pls Sta 343+12.39
θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

NAD 83

SITE 20

GRASS SWALE DATA
DA = 0.62 AC.
Q2 = 1.71 ft^3/s
V2 = 1.62 ft/s
Q10 = 2.17 ft^3/s
V10 = 1.72 ft/s
LENGTH = 350 ft
SLOPE = 1.18%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.71 AC.
Q2 = 1.70 ft^3/s
V2 = 1.43 ft/s
Q10 = 2.16 ft^3/s
V10 = 1.52 ft/s
LENGTH = 300 ft
SLOPE = 0.86%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.73 AC.
Q2 = 1.74 ft^3/s
V2 = 1.09 ft/s
Q10 = 2.22 ft^3/s
V10 = 1.16 ft/s
LENGTH = 250 ft
SLOPE = 0.41%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.96 AC.
Q2 = 1.60 ft^3/s
V2 = 1.66 ft/s
Q10 = 2.04 ft^3/s
V10 = 2.16 ft/s
LENGTH = 550 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.88 AC.
Q2 = 1.47 ft^3/s
V2 = 1.62 ft/s
Q10 = 1.87 ft^3/s
V10 = 1.72 ft/s
LENGTH = 600 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.86 AC.
Q2 = 2.21 ft^3/s
V2 = 1.80 ft/s
Q10 = 2.81 ft^3/s
V10 = 1.91 ft/s
LENGTH = 400 ft
SLOPE = 1.32%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.22 AC.
Q2 = 0.55 ft^3/s
V2 = 0.88 ft/s
Q10 = 0.69 ft^3/s
V10 = 0.93 ft/s
LENGTH = 100 ft
SLOPE = 0.50%
SIDE SLOPES = 6

GRASS SWALE DATA
DA = 0.57 AC.
Q2 = 1.47 ft^3/s
V2 = 1.57 ft/s
Q10 = 1.86 ft^3/s
V10 = 1.68 ft/s
LENGTH = 300 ft
SLOPE = 1.2%
SIDE SLOPES = 6

SEE SHEET NO. 20

MATCHLINE STA. 320+00

SEE SHEET NO. 22

MATCHLINE STA. 333+00

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PROP. SLOPE STAKES

2GI W/ FLAT GRATE

GRADE TO DRAIN+50, GRAU 350

50' END SBG

+75 PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

S 23° 52' 10" E

PROP. DBL. FACE CBL GUIDERAIL

4-48, CAT-1 SEND SBG

SDG SEE DETAIL "D"

EMERGENCY OVERFLOW

BYPASS CHANNEL

BYPASS STR. = 18" LEVEL SPREADER

25' X 25' FOREBAY CLASS 'B' RIP RAP 3' DEEP, 2:1 SIDES

DRY DETENTION HAZARDOUS SPILL BASIN

PROP. GUARDRAIL

PROP. SLOPE STAKES

2GI

GRADE TO DRAIN

2GI(D)

+00, BEGIN SBG

+00, GRAU 350

GRADE TO DRAIN

PROP. SLOPE STAKES

CLASS 'B' RIP RAP EST. 41 TONS 28-SY FILTER FABRIC

160.00' LT & 170.00' LT

PERMIT SHEET
29 OF 31

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NO. 60 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

3/18/2009
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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 210 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 38

MATCHLINE STA. 359+00 -L-
SEE SHEET NO. 23

MATCHLINE STA. 333+00 -L-
SEE SHEET NO. 21

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 39

SITE 21

-L-
Pt Sta 330+57.77
θs = 1°47'25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

Pt Sta 336+88.45
Δ = 15°39'05.5" (RT)
D = 7°25'55.6"
L = 1087.95'
T = 547.35'
R = 770.00'
DS = 70 mph
e = 0.05

Pt Sta 343+12.39
θs = 1°47'25.8"
Ls = 250.00'
LT = 166.65'
ST = 83.34'

-RP2B-
Pt Sta 10+66.67
θs = 1°21'41.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pt Sta 14+65.97
θs = 3°18'38.0"
Ls = 325.00'
LT = 216.59'
ST = 108.51'

Pt Sta 16+65.28
Δ = 15°36'13.6" (LT)
D = 5°43'46.5"
L = 278.74'
T = 140.28'
R = 1000.00'
DS = 50 mph
e = 0.08

Pt Sta 18+70.47
θs = 5°43'46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

Pt Sta 21+37.18
θs = 3°09'43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

Pt Sta 24+69.02
Δ = 16°41'28.5" (RT)
D = 7°10'43.1"
L = 562.34'
T = 283.08'
R = 800.00'
DS = 50 mph
e = 0.08

Pt Sta 27+82.81
θs = 3°09'43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-LP2B-
Pt Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pt Sta 9+64.64
Δ = 143°41'22.6" (RT)
D = 22°55'05.9"
L = 629.40'
T = 1764.64'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 8+95.10
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B- SC Sta. 22+03.74

-RP2B- SRS Sta. 20+03.74

-RP2B- CS Sta. 18+03.74

-RP2B- SRS Sta. 12+00.00

-RP2B- SC Sta. 15+25.00

-RP2B- ST Sta. 10+00.00 = -L- POC Sta. 335+31.14 OFFSET 59.00' LEFT

-L- CS Sta. 342+29.05

-RP2B- CS Sta. 27+16.74

-RP2B- ST Sta. 29+16.74

-RP2B- CS Sta. 8+27.40

-RP2B- ST Sta. 10+27.40

-RP2B- POT Sta. 31+12.09 = -Y7- POT Sta. 28+69.33

-RP2B- POT Sta. 12+00.75 = -Y7- POT Sta. 28+93.87

-L- ST Sta. 0+00.00 = -L- POT Sta. 352+46.52 OFFSET 59.00' LEFT

-LP2B- SC Sta. 2+00.00

-L- ST Sta. 344+79.05

-LP2C- SC Sta. 2+00.00

-LP2C- ST Sta. 0+00.00 = -L- POT Sta. 350+30.79 OFFSET 59.00' RIGHT

-Y7- TS Sta. 38+52.70

-LP2C- CS Sta. 6+46.81

-LP2C- ST Sta. 8+46.81

-RP2C- PC Sta. 10+00.00 = -L- POC Sta. 334+00.00 OFFSET 59.00' RIGHT

-RP2C- CS Sta. 10+43.52

-RP2C- SC Sta. 12+63.52

-RP2C- CS Sta. 18+95.15

-RP2C- ST Sta. 21+15.15

-Y7- SC Sta. 41+32.70

-LP2C- POT Sta. 9+65.95 = -Y7- POT Sta. 41+56.41

-RP2C- POT Sta. 26+93.62 = -Y7- POT Sta. 41+82.41

-NSRR- SC Sta. 32+56.34

-NSRR- TS Sta. 32+03.34

-NSRR- POT Sta. 28+04.41 = -L- POT Sta. 353+46.27

-Y7- POT Sta. 54+55.24 = -L- POT Sta. 352+55.04

-Y7-
Pt Sta 40+39.45
θs = 5°20'54.4"
Ls = 200.00'
LT = 186.75'
ST = 93.44'

Pt Sta 43+09.60
Δ = 13°21'07.3" (RT)
D = 3°49'11.0"
L = 352.11'
T = 176.80'
R = 1500.00'
DS = 70 mph
e = 0.08

Pt Sta 45+78.28
θs = 5°20'54.4"
Ls = 200.00'
LT = 186.75'
ST = 93.44'

-NSRR-
Pt Sta 32+60.19
θs = 1°55'41.6"
Ls = 62.50'
LT = 41.33'
ST = 20.67'

Pt Sta 35+93.81
Δ = 18°34'08.3" (RT)
D = 7°07'00.0"
L = 668.01'
T = 337.29'
R = 1340.00'

Pt Sta 39+20.49
θs = 1°55'41.6"
Ls = 62.50'
LT = 41.33'
ST = 20.67'

-LP2C-
Pt Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pt Sta 5+10.95
Δ = 102°24'08.3" (LT)
D = 22°55'05.9"
L = 448.86'
T = 301.09'
R = 250.00'
DS = 30 mph
e = 0.08

Pt Sta 7+14.51
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

DETAIL 2
RIP-RAPPED ENERGY DISSIPATOR BASIN

LEGEND
MITIGABLE IMPACTS ZONE 2
MITIGABLE IMPACTS ZONE 1
DENOTES MECHANIZED CLEARING

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NOS. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 93 FOR -LP2B- PROFILE.
SEE SHEET NO. 94 FOR -LP2C- PROFILE.
SEE SHEET NO. 85 FOR -RP2B- PROFILE.
SEE SHEET NO. 86 FOR -RP2C- PROFILE.
SEE SHEET NOS. 71-72 FOR -Y7- PROFILE.
SEE SHEET NO. 2-1 FOR -Y7- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

CAPE FEAR / NEUSE / YADKIN / CATAWBA / SANDY CREEK / RANDLEMAN / WATERSHED

PERMIT SHEET
30 OF 31

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

GRAPHIC SCALE
0
PLANS

C:\PWworkingDir\hdr\ajeffers.d208838_hyd_buf_plan-rdy_sht22_rdy.dgn

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 38

MATCHLINE STA. 359+00 -L-
SEE SHEET NO. 23

SEE SHEET NO. 21

MATCHLINE STA. 333+00 -L-
SEE SHEET NO. 21

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 39

SITE 21

NAD '83

-L-
Pis Sta 330+57.77
θs = 1°47'25.8"
Ls = 250.00'
LT = 156.68'
ST = 83.34'

Pis Sta 336+88.45
Δ = 15°35'01.5" (RT)
D = 1°26'56.6"
L = 1087.95'
T = 547.39'
R = 4000.00'
DS = 70 mph
e = 0.02

Pis Sta 343+12.39
θs = 1°47'25.8"
Ls = 250.00'
LT = 156.68'
ST = 83.34'

-LP2B-
Pis Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pi Sta 9+64.64
Δ = 143°47'22.8" (RT)
D = 22°55'05.9"
L = 627.40'
T = 1764.64'
R = 250.00'
DS = 30 mph
e = 0.08

Pis Sta 8+95.10
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B-
Pis Sta 10+66.67
θs = 1°24'41.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pis Sta 14+16.97
θs = 9°18'38.1"
Ls = 325.00'
LT = 216.91'
ST = 108.51'

Pi Sta 16+65.28
Δ = 15°58'13.6" (LT)
D = 5°43'46.5"
L = 278.74'
T = 140.28'
R = 1000.00'
DS = 50 mph
e = 0.08

Pis Sta 18+70.47
θs = 5°43'46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

Pis Sta 21+37.18
θs = 1°09'43.7"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

Pi Sta 24+69.02
Δ = 36°46'28.8" (RT)
D = 7°09'43.7"
L = 542.3'
T = 280.28'
R = 800.00'
DS = 50 mph
e = 0.08

Pis Sta 27+82.81
θs = 1°09'43.7"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

-RP2C-
Pi Sta 10+42.76
Δ = 17°37'57.7" (RT)
D = 7°27'13.8"
L = 435.2'
T = 219.6'
R = 769.00'

Pis Sta 11+73.20
θs = 1°35'51.6"
Ls = 5°15'13.2"
Ls = 220.00'
LT = 129.68'
ST = 90.57'

Pi Sta 15+86.83
Δ = 107°09'29.3" (RT)
D = 4°46'28.7"
L = 1631.63'
T = 1213.1'
R = 1200.00'
DS = 60 mph
e = 0.08

Pis Sta 19+68.54
θs = 5°15'07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

-Y7-
Pis Sta 40+39.45
θs = 5°20'54.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

Pi Sta 43+09.60
Δ = 13°27'07.3" (RT)
D = 3°49'11.0"
L = 352.07'
T = 176.90'
R = 1500.00'
DS = 60 mph
e = 0.08

Pis Sta 45+78.28
θs = 5°20'54.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

-NSRR-
Pis Sta 32+60.19
θs = 0°55'47.6"
Ls = 60.00'
LT = 40.33'
ST = 20.67'

Pi Sta 35+93.11
Δ = 18°34'08.3" (RT)
D = 3°00'00.0"
L = 618.00'
T = 312.26'
R = 1910.08'

Pis Sta 39+20.49
θs = 0°55'47.6"
Ls = 60.00'
LT = 40.33'
ST = 20.67'

-LP2C-
Pis Sta 1+34.47
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pi Sta 5+10.95
Δ = 102°54'05.3" (LT)
D = 22°55'05.9"
L = 446.81'
T = 310.95'
R = 250.00'
DS = 30 mph
e = 0.08

Pis Sta 7+44.51
θs = 22°55'05.9"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

DETAIL 2
RIP-RAPPED ENERGY DISSIPATOR BASIN

LEGEND
- MITIGABLE IMPACTS ZONE 2
- MITIGABLE IMPACTS ZONE 1
- DENOTES MECHANIZED CLEARING

MINOR FIELD ADJUSTMENT OF PIPE IS ALLOWABLE TO TIE TO EXISTING CHANNELS.
SEE SHEET NOS. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 93 FOR -LP2B- PROFILE.
SEE SHEET NO. 94 FOR -LP2C- PROFILE.
SEE SHEET NO. 85 FOR -RP2B- PROFILE.
SEE SHEET NO. 86 FOR -RP2C- PROFILE.
SEE SHEET NOS. 71-72 FOR -Y7- PROFILE.
SEE SHEET NO. 2-I FOR -Y7- BRIDGE DETAIL
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED

PERMIT SHEET
31 OF 31

GRAPHIC SCALE
0
PLANS

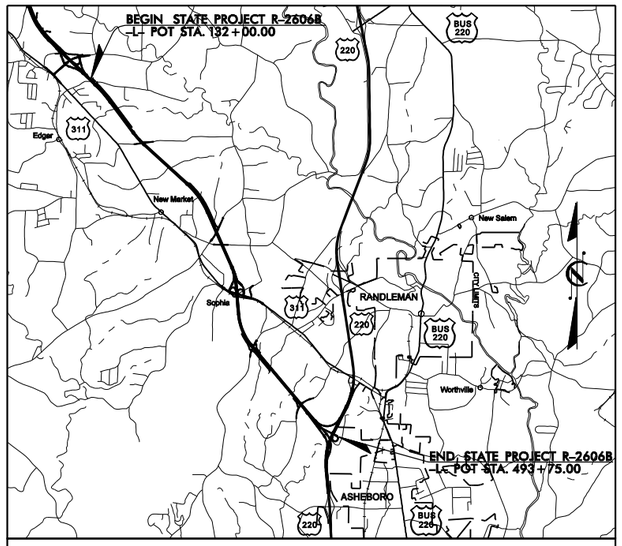
LOCATION:	
TIP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

09/08/09

TIP PROJECT: R-2606B

CONTRACT: C 201918

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

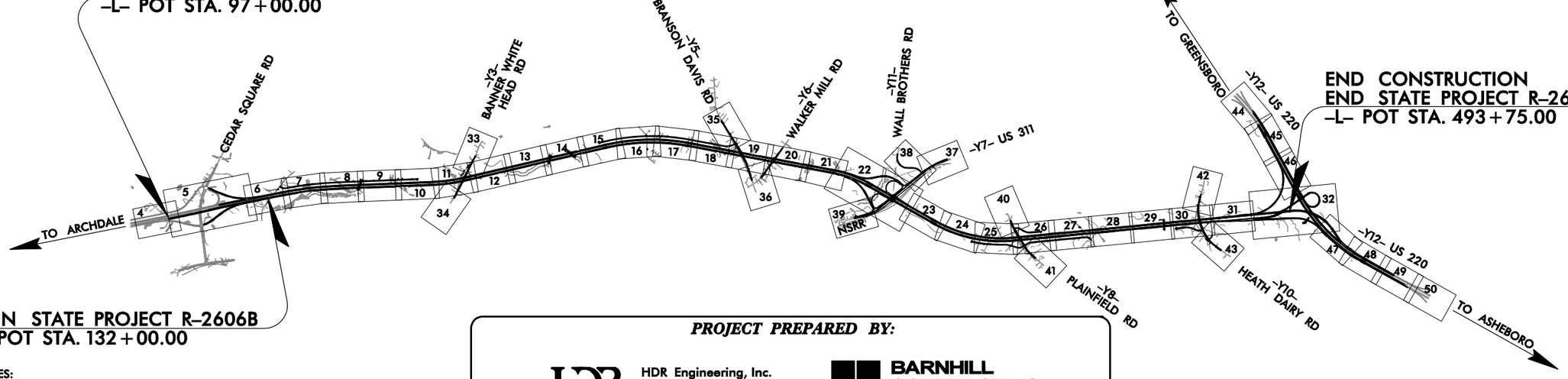
RANDOLPH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2606B	1	
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION	
34480.3.GVI	NHF-0311(23)	CONSTRUCTION	

LOCATION: US 311 BYPASS FROM NORTH OF SPENCER ROAD (SR 1929) TO US 220 – FUTURE I-74

TYPE OF WORK: DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS

NAD 83



NOTES:

1) US 311 BYPASS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
2) CLEARING ON THIS PROJECT SHALL BE PREPARED TO THE LIMITS ESTABLISHED BY METHOD III.

PROJECT PREPARED BY:

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2008 = 31,000
ADT 2025 = 45,000
DHV = 11 %
D = 55 %
T = 20 % *
V = 70 MPH

* TTST 14% DUAL 6%

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2606B	=	6.851 MILES
LENGTH STRUCTURE TIP PROJECT R-2606B	=	0.000 MILES
TOTAL LENGTH STATE PROJECT R-2606B	=	6.851 MILES

DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: July 25, 2008

LETTING DATE: July 25, 2008

GREGORY KEMPF, P.E.
PROJECT ENGINEER

PAUL A. MEEHAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER P.E.

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	I-A

INDEX OF SHEETS

SHEET NUMBER	SHEET
I	TITLE SHEET
I-A	INDEX OF SHEETS
I-B	CONVENTIONAL SYMBOLS
I-C THRU I-D	DESIGN CRITERIA
2 THRU 2-G	PAVEMENT SCHEDULE,TYPICAL SECTIONS,AND WEDGING DETAILS
2-H THRU 2-I	DETOUR PLAN SHEETS
2-J THRU 2-P	POTENTIAL MITIGATION SITES
4 THRU 50	PLAN SHEETS
5I THRU 107	PROFILE SHEETS
S-I THRU S-20	STRUCTURE PLANS
5 SHEETS	CROSS-SECTIONS
TCP-I THRU TCP-23	MAINTANECE OF TRAFFIC
6 SHEETS	CPM

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	1-B

Note: Not to Scale

****S.U.E. = Subsurface Utility Engineering***

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB

BUILDINGS AND OTHER CULTURE:

- Gas Pump Vent or U/G Tank Cap
- Sign — S
- Well — W
- Small Mine
- Foundation
- Area Outline
- Cemetery
- Building
- School
- Church
- Dam

HYDROLOGY:

- Stream or Body of Water
- Hydro, Pool or Reservoir
- Jurisdictional Stream — JS
- Buffer Zone 1 — BZ 1
- Buffer Zone 2 — BZ 2
- Flow Arrow
- Disappearing Stream
- Spring
- Wetland
- Proposed Lateral, Tail, Head Ditch — FLOW
- False Sump

RAILROADS:

- Standard Gauge — CSX TRANSPORTATION
- RR Signal Milepost — MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

- Baseline Control Point
- Existing Right of Way Marker
- Existing Right of Way Line
- Proposed Right of Way Line — RW
- Proposed Right of Way Line with Iron Pin and Cap Marker — RW
- Proposed Right of Way Line with Concrete or Granite Marker — RW
- Existing Control of Access — CA
- Proposed Control of Access — CA
- Existing Easement Line — E
- Proposed Temporary Construction Easement — E
- Proposed Temporary Drainage Easement — TDE
- Proposed Permanent Drainage Easement — PDE
- Proposed Permanent Utility Easement — PUE

ROADS AND RELATED FEATURES:

- Existing Edge of Pavement
- Existing Curb
- Proposed Slope Stakes Cut — C
- Proposed Slope Stakes Fill — F
- Proposed Wheel Chair Ramp — WCR
- Proposed Wheel Chair Ramp Curb Cut — WCC
- Curb Cut for Future Wheel Chair Ramp — CCFR
- Existing Metal Guardrail
- Proposed Guardrail
- Existing Cable Guiderail
- Proposed Cable Guiderail
- Equality Symbol
- Pavement Removal

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

- Existing Power Pole
- Proposed Power Pole
- Existing Joint Use Pole
- Proposed Joint Use Pole
- Power Manhole — P
- Power Line Tower
- Power Transformer
- U/G Power Cable Hand Hole — HH
- H-Frame Pole
- Recorded U/G Power Line — P
- Designated U/G Power Line (S.U.E.*) — P

TELEPHONE:

- Existing Telephone Pole
- Proposed Telephone Pole
- Telephone Manhole — T
- Telephone Booth
- Telephone Pedestal — T
- Telephone Cell Tower
- U/G Telephone Cable Hand Hole — HH
- Recorded U/G Telephone Cable — T
- Designated U/G Telephone Cable (S.U.E.*) — T
- Recorded U/G Telephone Conduit — TC
- Designated U/G Telephone Conduit (S.U.E.*) — TC
- Recorded U/G Fiber Optics Cable — T FO
- Designated U/G Fiber Optics Cable (S.U.E.*) — T FO

WATER:

- Water Manhole — W
- Water Meter
- Water Valve
- Water Hydrant
- Recorded U/G Water Line — W
- Designated U/G Water Line (S.U.E.*) — W
- Above Ground Water Line — A/G Water

TV:

- TV Satellite Dish
- TV Pedestal — C
- TV Tower
- U/G TV Cable Hand Hole — HH
- Recorded U/G TV Cable — TV
- Designated U/G TV Cable (S.U.E.*) — TV
- Recorded U/G Fiber Optic Cable — TV FO
- Designated U/G Fiber Optic Cable (S.U.E.*) — TV FO

GAS:

- Gas Valve
- Gas Meter
- Recorded U/G Gas Line — G
- Designated U/G Gas Line (S.U.E.*) — G
- Above Ground Gas Line — A/G Gas

SANITARY SEWER:

- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

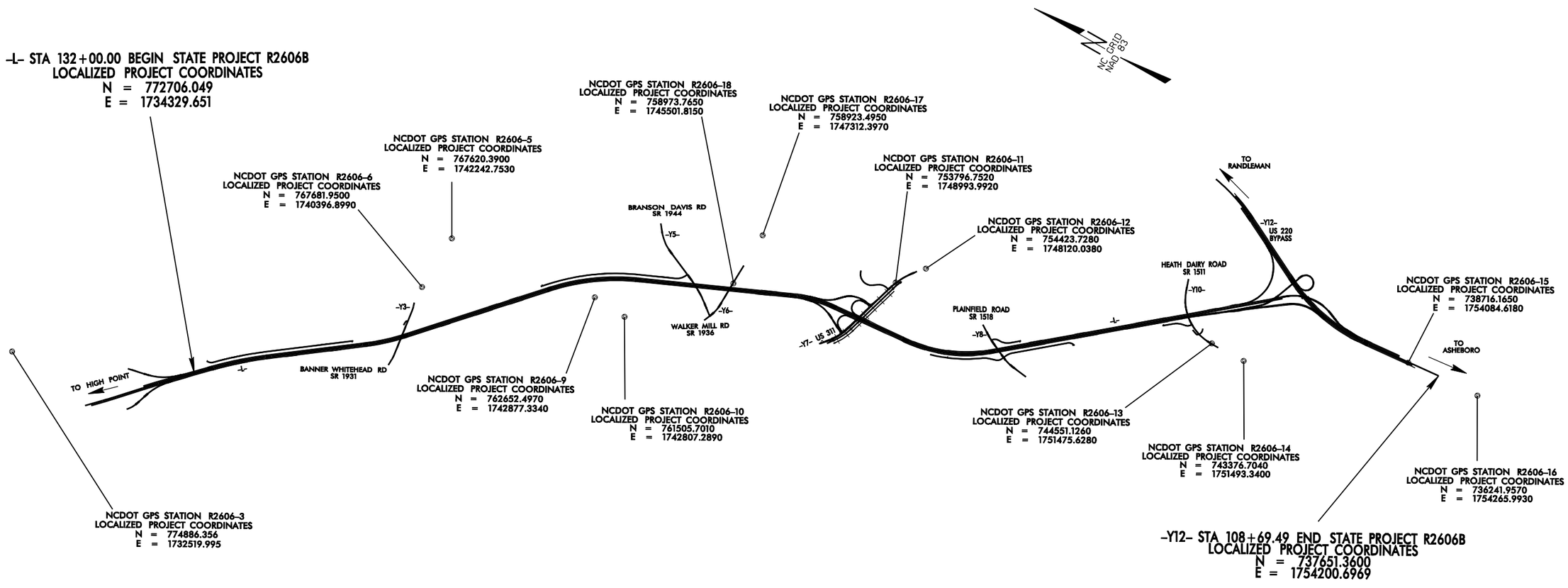
MISCELLANEOUS:

- Utility Pole
- Utility Pole with Base
- Utility Located Object
- Utility Traffic Signal Box — S
- Utility Unknown U/G Line — ?UTL
- U/G Tank; Water, Gas, Oil
- A/G Tank; Water, Gas, Oil
- U/G Test Hole (S.U.E.*)
- Abandoned According to Utility Records — AATUR
- End of Information — E.O.I.

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	1-C
Location and Surveys	

SURVEY CONTROL SHEET R-2606B



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "HOLLAND"
WITH NAD83 STATE PLANE GRID COORDINATES OF
NORTHING: 797565.242(ft) EASTING: 1722871.646(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99990836
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "HOLLAND" TO -L- STATION 132+00.00 IS
S 24° 44' 44.7" E 27372.712'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD29

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NAD 83 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*
2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/
   THE FILES TO BE FOUND ARE AS FOLLOW:
   R2606B_LS_GPSCALIB_09JUL.HTML
   R2606B_LS_WGS84_09JUL.TXT
   R2606B_LS_LOCAL_09JUL.TXT
   R2606B_LS_CONTROL_09JUL.TXT
   THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
3. *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
   PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
   NETWORK ESTABLISHED FROM EXISTING NAD83 MONUMENTATION
   SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	1-D
Location and Surveys	

SURVEY CONTROL SHEET R-2606B

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
524	BL-524	775118.2750	1731921.5690	794.51	97+91.33	70.71 LT
525	BL-525	774855.7000	1732098.2630	783.71	101+01.10	14.28 LT
526	BL-526	774554.3620	1732463.6370	761.82	105+74.51	46.63 LT
527	BL-527	774340.0900	1732688.6780	758.37	108+85.21	41.69 LT
528	BL-528	774827.8150	1732979.3860	761.75	113+10.62	9.23 LT
529	BL-529	773705.0000	1733279.4300	765.99	117+58.44	22.03 RT
530	BL-530	773178.2800	1733994.3940	790.20	126+29.89	101.84 LT
531	BL-531	772682.4720	1734412.4570	785.63	133+31.66	15.84 RT
532	BL-532	772239.5860	1734797.0970	774.68	138+68.39	4.46 RT
533	BL-533	771687.9000	1735349.1730	739.88	147+80.26	32.68 RT
534	BL-534	771299.6890	1735680.8870	744.46	152+96.80	48.14 RT
535	BL-535	770958.6890	1735882.4920	745.41	155+42.70	29.89 RT
536	BL-536	770430.2570	1736318.4400	727.78	162+27.24	2.17 LT
537	BL-537	770179.6340	1736497.5470	716.28	165+35.21	4.48 RT
538	BL-538	769969.3360	1736693.9460	753.74	168+21.24	26.86 LT
539	BL-539	769703.2070	1736920.1560	758.22	171+69.84	48.64 LT
540	BL-540	769551.5710	1737044.5640	755.45	173+65.79	57.47 LT
541	BL-541	769280.3650	1737276.3080	743.05	177+21.76	88.64 LT
542	BL-542	768842.2750	1737627.7820	774.45	182+83.89	99.76 LT
543	BL-543	768540.5200	1737901.2550	781.74	186+80.52	138.07 LT
544	BL-544	768155.8530	1738255.4730	774.51	192+18.85	188.83 LT
545	BL-545	767573.1220	1738810.1700	769.82	200+51.39	190.85 LT
546	BL-546	767330.9430	1739050.8620	774.46	203+89.26	169.28 LT
547	BL-547	766107.6200	1740213.8210	746.23	220+73.00	58.77 LT
100	BL-100	765428.3110	1740870.3800	712.34	230+15.92	7.73 RT
101	BL-101	765149.6040	1741126.9870	733.75	233+93.30	40.48 RT
102	BL-102	764280.1260	1741969.8440	752.61	246+01.51	114.08 RT
103	BL-103	763497.0630	1742715.8820	779.51	256+95.99	159.92 RT
104	BL-104	763186.5080	1743013.3860	780.94	261+35.21	175.81 RT
105	BL-105	762805.9140	1743257.3160	786.21	265+12.85	118.28 RT
106	BL-106	762598.4820	1743496.3230	774.73	269+86.91	84.25 RT
107	BL-107	762339.8470	1743677.3670	782.31	272+25.27	62.98 RT
108	BL-108	761898.3490	1743941.9800	769.20	277+42.82	33.84 RT
109	BL-109	761231.9500	1744266.2020	786.49	284+84.86	10.43 RT
110	BL-110	761811.1920	1744364.5150	777.25	287+26.15	9.69 RT
111	BL-111	760352.4740	1744653.6610	785.79	294+45.54	11.83 RT
112	BL-112	760059.5950	1744783.8260	790.71	297+66.84	11.32 RT
113	BL-113	759772.8830	1744918.7560	784.31	300+79.59	11.26 RT
114	BL-114	759254.1810	1745140.1990	793.50	306+46.77	11.34 RT
115	BL-115	759080.6970	1745248.7630	799.97	309+15.19	11.48 RT
116	BL-116	758668.8680	1745397.1630	790.59	312+86.00	13.21 RT
117	BL-117	758397.3920	1745519.3380	783.39	315+83.70	11.34 RT
118	BL-118	758087.6970	1745624.9980	762.38	319+11.69	35.46 RT
119	BL-119	757835.3610	1745771.3180	739.85	321+99.62	8.34 RT
120	BL-120	757584.7170	1745914.2890	769.72	325+54.84	11.39 RT
121	BL-121	757223.8710	1746038.1060	764.01	329+66.77	11.81 RT
122	BL-122	756296.3630	1746339.5570	759.13	337+58.19	3.23 RT
123	BL-123	756023.4210	1746413.6240	748.45	341+38.66	8.78 LT
124	BL-124	755647.7740	1746450.9620	743.47	345+08.18	8.29 LT
125	BL-125	755276.7560	1746481.6330	741.99	348+80.46	8.42 LT
126	BL-126	754699.2030	1746528.7450	775.17	354+59.85	8.01 LT
127	BL-127	754300.4510	1746563.8080	774.69	358+60.22	2.24 LT
128	BL-128	753756.2940	1746687.9000	757.00	364+06.16	1.63 LT
129	BL-129	753295.5350	1746648.4380	721.94	368+68.69	4.14 LT
130	BL-130	752879.4510	1746691.4030	714.74	372+87.17	8.74 RT
131	BL-131	752399.7440	1746882.6110	723.33	377+80.14	8.26 LT
600	BL-600	751943.4601	1746960.7817	713.98	382+64.53	17.75 LT
601	BL-601	751707.7961	1747060.8951	685.80	385+21.64	19.89 LT
602	BL-602	751395.3325	1747226.4651	717.07	388+57.09	29.93 LT
603	BL-603	751159.1569	1747366.8963	788.79	391+53.32	31.99 LT
604	BL-604	750985.9599	1747544.8910	726.74	394+65.64	39.88 LT
605	BL-605	750754.9019	1747726.6830	748.98	396+99.10	93.65 LT
606	BL-606	750548.2540	1747817.8986	760.30	399+18.46	32.82 LT
607	BL-607	750182.6225	1748135.0809	723.46	404+02.44	48.94 LT
608	BL-608	749914.4742	1748352.3315	721.40	407+47.50	35.12 LT
609	BL-609	749713.6638	1748520.7846	732.70	410+09.56	35.11 LT
610	BL-610	749522.3239	1748687.4904	716.39	412+63.34	39.97 LT
611	BL-611	749385.7969	1748795.6305	734.42	414+37.44	35.11 LT
612	BL-612	749126.4369	1749088.3336	747.65	417+72.84	31.45 LT
613	BL-613	748754.9383	1749318.1800	742.18	422+56.59	38.18 LT
614	BL-614	748356.9126	1749647.3638	729.18	427+73.89	26.68 LT
615	BL-615	748218.3519	1749825.4168	752.27	429+93.67	74.88 LT
616	BL-616	747950.2476	1750015.9919	730.83	433+21.52	47.88 LT
617	BL-617	747594.3492	1750280.8213	750.63	437+64.43	22.18 LT
618	BL-618	747429.6513	1750413.5364	734.75	439+75.91	17.97 LT
619	BL-619	747068.1314	1750730.3858	690.24	444+62.64	23.34 LT
620	BL-620	746735.4636	1750987.6656	683.12	448+76.73	11.87 LT
621	BL-621	746564.2538	1751148.5661	680.67	451+06.16	19.83 LT
622	BL-622	746487.2604	1751264.7951	707.68	453+06.28	13.35 LT
623	BL-623	746162.4117	1751454.6460	718.62	456+15.89	1.50 LT
624	BL-624	745738.8498	1751718.4682	748.33	461+24.82	74.62 RT
625	BL-625	745544.4973	1752015.3614	757.89	464+49.65	34.13 LT
626	BL-626	745319.8274	1752174.4422	752.88	467+24.82	11.67 LT
627	BL-627	745071.6684	1752251.9463	715.98	470+28.22	11.77 RT
628	BL-628	744872.9604	1752527.7565	735.95	472+93.45	4.72 RT
629	BL-629	744687.3040	1752512.4727	744.53	474+87.19	187.13 RT
630	BL-630	744542.9532	1752732.9278	729.36	476+78.15	59.55 RT
631	BL-631	744356.2936	1752968.7503	719.79	479+72.70	1.22 LT
632	BL-632	744229.2684	1753073.5625	734.32	481+37.38	0.08 RT
633	BL-633	743685.1768	1753525.7591	731.72	488+44.85	3.18 RT

POINT	DESC.	NORTH	EAST	ELEVATION	RP3BO STATION	OFFSET
634	BL-634	743197.1088	1753930.6534	695.30	11+84.80	52.99 RT

POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
635	BL-635	742763.6103	1754290.8135	664.22	57+05.69	10.25 RT

BY105

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
557	BY105-557	772451.4760	1735598.4980	775.63	142+54.63	718.63 LT
531	BL-531	772682.4720	1734412.4570	785.63	133+31.66	15.84 RT
558	BY105-558	772637.5390	1733905.9980	788.12	129+45.85	345.81 RT
559	BY105-559	772482.4280	1733514.9750	785.58	128+31.74	787.57 RT

BY106

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
560	BY106-560	767690.5860	1740064.3180	771.21	OUTSIDE PROJECT LIMITS	
561	BY106-561	767559.9170	1739508.9020	769.31	13+38.76	12.87 LT
545	BL-545	767573.1220	1738810.1700	769.82	20+21.81	90.69 RT
562	BY106-562	767559.1200	1738539.6210	771.78	22+99.79	113.29 RT
563	BY106-563	767394.5310	1738200.2910	773.08	26+57.76	5.45 LT
564	BY106-564	767389.8040	1737786.9760	782.81	31+52.68	13.94 RT

BY201

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
132	BY201-132	763443.2080	1743578.1140	781.23	262+74.18	461.35 LT
133	BY201-133	763875.4520	1743484.1880	786.18	265+87.42	172.89 LT
105	BL-105	762805.9140	1743257.3160	786.21	265+12.85	118.28 RT
9	R2606-9 (GPS)	762652.4970	1742877.3340	799.02	264+95.99	566.73 RT

BY202

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
134	BY202-134	762159.3610	1746233.2500	789.71	OUTSIDE PROJECT LIMITS	
135	BY202-135	761636.2180	1745988.7520	788.44	15+58.17	25.87 RT
112	BL-112	760859.5950	1744783.8260	790.71	33+16.49	49.99 RT
136	BY202-136	759382.2490	1744391.8060	814.18	41+84.92	6.01 RT
137	BY202-137	759134.1220	1744233.2250	810.44	43+97.35	24.77 LT

BY203

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
138	BY203-138	758956.9120	1746162.2380	769.76	OUTSIDE PROJECT LIMITS	
18	R2606-18 (GPS)	758973.7650	1745501.8150	796.74	16+68.43	14.63 LT
115	BL-115	759080.6970	1745248.7630	799.97	19+14.19	14.71 RT
139	BY203-139	758997.6750	1744687.6130	804.48	25+54.24	13.43 LT
137	BY202-137	759134.1220	1744233.2250	810.44	29+53.77	27.27 RT

BY204

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
11	R2606-11 (GPS)	753796.7520	1748993.9920	777.13	OUTSIDE PROJECT LIMITS	
12	R2606-12 (GPS)	754423.7280	1748120.8380	775.82	17+78.24	15.88 RT
126	BL-126	754694.2830	1746528.7450	775.17	33+80.82	190.82 LT
140	BY204-140	754776.3330	1746314.6920	769.10	36+07.97	178.12 LT
141	BY204-141	755381.4840	1745453.4660	776.62	45+83.31	40.25 LT
142	BY204-142	755972.3070	1744736.3390	777.42	OUTSIDE PROJECT LIMITS	

BY204A

POINT	DESC.	NORTH	EAST	ELEVATION	Y11 STATION	OFFSET
143	BY204A-143	755596.0120	1747936.7610	768.47	OUTSIDE PROJECT LIMITS	

POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
140	BY204-140	754776.3330	1746314.6920	769.10	36+07.97	178.12 LT

BY301

POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
636	BY301-636	751196.8965	1748288.4151	746.70	11+05.56	17.53 LT
606	BL-606	750548.2540	1747817.8986	760.30	18+96.97	79.86 RT
637	BY301-637	750202.8803	1747662.6129	755.01	22+73.79	76.44 RT
638	BY301-638	749373.8657	1747593.5303	737.73	30+89.59	21.50 LT

BY302

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
19	R2606-19 (GPS)	749737.2788	1749638.1748	763.87	417+84.33	980.43 LT
20	R2606-20 (GPS)	749389.0538	1749481.5510	755.24	418+85.56	458.10 LT
613	BL-613	748754.9383	1749318.1800	742.18	422+56.59	38.18 LT
639	BY302-639	748342.8961	1749222.5570	735.95	425+18.88	387.84 RT

BY303

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
640	BY303-640	746265.8188	1753033.8452	766.68	OUTSIDE PROJECT LIMITS	
641	BY303-641	746181.2283	1752452.3104	787.25	14+82.88	19.37 RT
624	BL-624	745738.8498	1751718.4682	748.33	22+59.88	166.48 RT
642	BY303-642	745805.8572	1751456.8474	738.72	29+27.93	71.47 RT
13	R2606-13 (GPS)	744551.1260	1751475.6280	749.74	34+28.55	15.82 LT
643	BY303-643	744154.6035	1751448.4779	742.79	OUTSIDE PROJECT LIMITS	

BY304

POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
692	BY304-692	747475.4932	1756217.8931	726.67	OUTSIDE PROJECT LIMITS	
693	BY304-693	746678.2676	1756077.6405	721.30	13+95.21	0.15 LT
694	BY304-694	745445.9071	1755614.0428	701.87	27+14.74	0.28 RT
695	BY304-695	744113.8777	1754944.1098	678.56	42+85.75	0.33 LT
635	BL-635	742763.6103	1754290.8135	664.22	57+05.69	10.25 RT
696	BY304-696	741787.4204	1754032.9105	671.02	67+15.81	1.04 LT
697	BY304-697	740290.1430	1753957.7226	687.50	82+19.53	0.89 LT
698	BY304-698	738796.2462	1754094.5791	697.80	97+19.70	0.83 RT
699	BY304-699	737302.1537	1754228.5406	683.65	OUTSIDE PROJECT LIMITS	

BM110 ELEVATION - 753.54
N 774373 E 1732938
L STATION 110+40 229 LEFT
RAILROAD SPIKE IN BASE OF 15"
WILLOW OAK TREE

BM111 ELEVATION - 796.63
N 773113 E 1733812
L STATION 125+46 73 RIGHT
RAILROAD SPIKE IN BASE OF 18"
OAK TREE

BM112 ELEVATION - 734.71
N 771254 E 1735454
L STATION 158+41 182 RIGHT
RAILROAD SPIKE IN BASE OF 15"
SWEET GUM TREE

BM113 ELEVATION - 720.06
N 770379 E 1735947
L STATION 168+46 326 RIGHT
RAILROAD SPIKE IN BASE OF 20"
PERSIMMON TREE

BM114 ELEVATION - 758.53
N 769615 E 1736804
L STATION 171+71 97 RIGHT
RAILROAD SPIKE IN BASE OF 15"
OAK TREE

BM115 ELEVATION - 775.40
N 768877 E 1737814
L STATION 183+66 269 LEFT
RAILROAD SPIKE IN BASE OF 24"
OAK TREE

BM116 ELEVATION - 768.53
N 768255 E 1738484
L STATION 192+40 358 LEFT
RAILROAD SPIKE IN BASE OF 30"
OAK TREE

BM117 ELEVATION - 768.83
N 767613 E 1739355
Y3 STATION 14+84 60 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM118 ELEVATION - 756.39
N 766171 E 1740377
L STATION 221+51 208 LEFT
RAILROAD SPIKE IN BASE OF 15"
OAK TREE

BM201 ELEVATION - 712.06
N 765526 E 1741164
L STATION 231+67 262 LEFT
RAILROAD SPIKE IN BASE OF 18"
SYCAMORE TREE

BM202 ELEVATION - 727.72
N 764845 E 1741631
L STATION 239+71 75 LEFT
RAILROAD SPIKE IN BASE OF 15"
ASH TREE

BM203 ELEVATION - 772.07
N 763830 E 1742657
L STATION 254+12 27 LEFT
RAILROAD SPIKE IN BASE OF 36"
SWEET GUM TREE

BM204 ELEVATION - 800.12
N 762358 E 1742830
L STATION 267+33 774 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM205 ELEVATION - 767.80
N 761837 E 1743666
L STATION 276+76 389 RIGHT
RAILROAD SPIKE IN BASE OF 12"
SWEET GUM TREE

BM206 ELEVATION - 761.10
N 760887 E 1744293
L STATION 289+93 206 RIGHT
RAILROAD SPIKE IN BASE OF 12"
PINE TREE

BM207 ELEVATION - 794.39
N 760213 E 1745105
L STATION 297+55 344 LEFT
RAILROAD SPIKE IN BASE OF 15"
BLACK GUM TREE

BM208 ELEVATION - 803.24
N 759835 E 1744728
Y6 STATION 24+36 29 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM209 ELEVATION - 757.23
N 758122 E 1745884
L STATION 319+83 210 LEFT
RAILROAD SPIKE IN BASE OF 15"
HONEY LOCUST TREE

BM210 ELEVATION - 744.67
N 756951 E 1746424
L STATION 332+58 239 LEFT
RAILROAD SPIKE IN BASE OF 18"
OAK TREE

BM211 ELEVATION - 740.55
N 756615 E 1746711
L STATION 345+63 257 LEFT
RAILROAD SPIKE IN BASE OF POWER POLE

BM212 ELEVATION - 770.51
N 754666 E 1746324
L STATION 354+76 207 RIGHT
RAILROAD SPIKE IN BASE OF 15"
POPLAR TREE

BM213 ELEVATION - 753.28
N 753810 E 1746427
L STATION 363+30 174 RIGHT
RAILROAD SPIKE IN BASE OF 15"
HONEY LOCUST TREE

BM214 ELEVATION - 703.64
N 752742 E 1746514
L STATION 373+91 199 RIGHT
RAILROAD SPIKE IN BASE OF 12"
BEECH TREE

BM301 ELEVATION - 698.29
N 751272 E 1747868
L STATION 389+89 168 RIGHT
RAILROAD SPIKE IN BASE OF 24"
POPLAR TREE

BM302 ELEVATION - 756.62
N 750252 E 1747643
Y8 STATION 22+38 115 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM303 ELEVATION - 718.89
N 749505 E 1748436
L STATION 411+15 164 RIGHT
RAILROAD SPIKE IN BASE OF 24"
WHITE OAK TREE

BM304 ELEVATION - 735.75
N 748327 E 1749286
L STATION 425+64 270 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM305 ELEVATION - 745.27
N 747559 E 1750863
L STATION 436+52 167 RIGHT
RAILROAD SPIKE IN BASE OF 12"
HICKORY TREE

BM306 ELEVATION - 681.05
N 746480 E 1751055
L STATION 451+15 101 RIGHT
RAILROAD SPIKE IN BASE OF 15"
HICKORY TREE

BM307 ELEVATION - 740.93
N 745395 E 1751549
Y10 STATION 26+86 188 RIGHT
RAILROAD SPIKE IN BASE OF POWER POLE

BM308 ELEVATION - 745.25
N 744620 E 1752477
L STATION 474+55 206 RIGHT
RAILROAD SPIKE IN BASE OF 15"
PINE TREE

BM309 ELEVATION - 672.42
N 743084 E 1754260
L STATION 493+75
S 63° 18' 82.0" E DIST 438.11
RAILROAD SPIKE IN BASE OF 20"
POPLAR TREE

BM310 ELEVATION - 733.08
N 74715I E 1756331
Y12 STATION 10+00
N 63° 20' 47.6" E DIST 191.65
RAILROAD SPIKE IN BASE OF 15"
SWEETGUM TREE

BM311 ELEVATION - 676.30
N 744543 E 1755369
Y12 STATION 36+31 187 LEFT
RAILROAD SPIKE IN BASE OF 30"
POPLAR TREE

BM312 ELEVATION - 688.64
N 739955 E 1753834
Y12 STATION 85+42 153 RIGHT
RAILROAD SPIKE IN BASE OF 18"
WHITE OAK TREE

BM313 ELEVATION - 683.18
N 737546 E 1754345
Y12 STATION 108+69
S 53° 55' 24.2" E DIST 178.78
RAILROAD SPIKE IN BASE OF 15"
MAPLE TREE

BM314 ELEVATION - 694.61
N 743758 E 1752278
L STATION 479+80 912 RIGHT
RAILROAD SPIKE IN BASE OF 24"
OAK TREE

BM315 ELEVATION - 671.68
N 742882 E 1753230
L STATION 492+70 747 RIGHT
RAILROAD SPIKE IN BASE OF 15"
PINE TREE

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "HOLLAND" WITH NAD83 STATE PLANE GRID COORDINATES OF NORTHING: 797565.242(ft) EASTING: 1722871.646(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99990836 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "HOLLAND" TO -L- STATION 132+00.00 IS S 24° 44' 44.7" E 27372.712' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD29

NOTES:

1. ***THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NAD 83 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.***
2. ***THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:***
   HTTP://WWW.NCDOT.ORG/DOI/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R2606B_LS_GPSCALIB_ONLY.HTML
   R2606B_LS_WGS84_ONLY.TXT
   R2606B_LS_LOCAL_ONLY.TXT
   R2606B_LS_CONTROL_ONLY.TXT

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

⊙ ***INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.***
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING NAD83 MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

3/16/2009
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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	1-E
Location and Surveys	

SURVEY CONTROL SHEET R-2606B

GPS CALIBRATION REPORT

PROJECT : R2606B

TIP NUMBER	R2606B		
USER NAME	SCRANFORD	DATE & TIME	2:36:47 PM 11/4/2008
COORDINATE SYSTEM	US STATE PLANE 1983(AT GROUND)	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)		
VERTICAL DATUM	NGVD29	GEOID MODEL	GEOID99 NC SUB GRID
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION

LOCALIZED AROUND	NCGS 'HOLLAND'
LATITUDE	35°56'16.10066"N
LONGITUDE	79°56'10.21577"W
SITE SCALE FACTOR	1.0000916400
HEIGHT	702.125SFT

THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION USES A LOCALIZED COORDINATE SYSTEM WHICH IS VERY SIMILAR TO NORTH CAROLINA ZONE 3200 FROM WHICH IT IS DERIVED.
PLEASE TAKE CARE IN UTILIZING THESE COORDINATES TO ELIMINATE CONFUSION OF THE TWO SYSTEMS.
THIS FILE IS TO AID IN THE USE OF REAL TIME KINEMATIC (RTK) GPS DURING CONSTRUCTION LAYOUT.

DATUM TRANSFORMATION PARAMETERS

DATUM TRANSFORMATION COMPUTATION NOT REQUESTED

UPDATED DEFAULT PROJECTION (TRANSVERSE MERCATOR) DEFINITION

UPDATED DEFAULT PROJECTION NOT REQUESTED

HORIZONTAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ROTATION CENTER	754038.843SFT
EASTING COORDINATE OF ROTATION CENTER	1747464.370SFT
ROTATION ABOUT THE CENTER POINT	0°00'00"
TRANSLATION NORTH	-0.158SFT
TRANSLATION EAST	-0.029SFT
SCALE FACTOR	0.99999585

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN POINT	774885.750SFT
EASTING COORDINATE OF ORIGIN POINT	1732520.244SFT
VERTICAL SEPARATION AT ORIGIN	0.017SFT
SLOPE NORTH	7.369PPM
SLOPE EAST	12.858PPM

GEOID MODEL DEFINITION

GEOID99 NC SUB GRID

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY

	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.125SFT	0.023	R2606-5 - WGS84
VERTICAL	0.122SFT	0.019	R2606-5 - WGS84
THREE-DIMENSIONAL	0.174SFT	0.029	R2606-5 - WGS84

POINT RESIDUALS

WGS84 COORDINATES		CALCULATED POINT FOR DISPLAY ONLY		LOCAL COORDINATES	
POINT	R2606-3 - WGS84	NORTHING	774885.750SFT	POINT	R2606-3 - LOCAL
LATITUDE	35°52'32.72052"N	EASTING	1732520.244SFT	NORTHING	774886.356SFT
LONGITUDE	79°54'10.38639"W	ELEVATION	781.931SFT	EASTING	1732519.995SFT
HEIGHT	681.777SFT	HORZ ERROR	?	ELEVATION	781.856SFT
		VERT ERROR	0.075SFT	UTILIZED	VERTICAL
		3D ERROR	0.075SFT	QUALITY	SURVEY QUALITY
POINT	R2606-5 - WGS84	NORTHING	767620.515SFT	POINT	R2606-5 - LOCAL
LATITUDE	35°51'21.73491"N	EASTING	1742242.756SFT	NORTHING	767620.390SFT
LONGITUDE	79°52'11.48289"W	ELEVATION	740.783SFT	EASTING	1742242.753SFT
HEIGHT	640.898SFT	HORZ ERROR	0.125SFT	ELEVATION	740.905SFT
		VERT ERROR	0.122SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.174SFT	QUALITY	SURVEY QUALITY
POINT	R2606-6 - WGS84	NORTHING	767682.037SFT	POINT	R2606-6 - LOCAL
LATITUDE	35°51'22.18279"N	EASTING	1740396.946SFT	NORTHING	767681.950SFT
LONGITUDE	79°52'33.91089"W	ELEVATION	770.982SFT	EASTING	1740396.899SFT
HEIGHT	671.091SFT	HORZ ERROR	0.099SFT	ELEVATION	771.072SFT
		VERT ERROR	0.090SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.133SFT	QUALITY	SURVEY QUALITY
POINT	R2606-9 - WGS84	NORTHING	762652.509SFT	POINT	R2606-9 - LOCAL
LATITUDE	35°50'32.66217"N	EASTING	1742877.334SFT	NORTHING	762652.497SFT
LONGITUDE	79°52'03.24720"W	ELEVATION	798.995SFT	EASTING	1742877.334SFT
HEIGHT	699.228SFT	HORZ ERROR	0.012SFT	ELEVATION	799.018SFT
		VERT ERROR	0.023SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.026SFT	QUALITY	SURVEY QUALITY
POINT	R2606-10 - WGS84	NORTHING	761505.688SFT	POINT	R2606-10 - LOCAL
LATITUDE	35°50'21.31539"N	EASTING	1742807.277SFT	NORTHING	761505.701SFT
LONGITUDE	79°52'03.97631"W	ELEVATION	802.342SFT	EASTING	1742807.289SFT
HEIGHT	702.600SFT	HORZ ERROR	0.018SFT	ELEVATION	802.374SFT
		VERT ERROR	0.032SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.037SFT	QUALITY	SURVEY QUALITY
POINT	R2606-11 - WGS84	NORTHING	753796.677SFT	POINT	R2606-11 - LOCAL
LATITUDE	35°49'05.61010"N	EASTING	1748993.972SFT	NORTHING	753796.752SFT
LONGITUDE	79°50'48.04234"W	ELEVATION	777.200SFT	EASTING	1748993.992SFT
HEIGHT	677.584SFT	HORZ ERROR	0.078SFT	ELEVATION	777.125SFT
		VERT ERROR	0.075SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.108SFT	QUALITY	SURVEY QUALITY
POINT	R2606-12 - WGS84	NORTHING	754423.658SFT	POINT	R2606-12 - LOCAL
LATITUDE	35°49'11.73644"N	EASTING	1748120.016SFT	NORTHING	754423.728SFT
LONGITUDE	79°50'58.71866"W	ELEVATION	775.071SFT	EASTING	1748120.038SFT
HEIGHT	675.448SFT	HORZ ERROR	0.073SFT	ELEVATION	775.015SFT
		VERT ERROR	0.056SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.093SFT	QUALITY	SURVEY QUALITY
POINT	R2606-13 - WGS84	NORTHING	744551.079SFT	POINT	R2606-13 - LOCAL
LATITUDE	35°47'34.38882"N	EASTING	1751475.629SFT	NORTHING	744551.126SFT
LONGITUDE	79°50'16.96362"W	ELEVATION	749.781SFT	EASTING	1751475.628SFT
HEIGHT	650.291SFT	HORZ ERROR	0.047SFT	ELEVATION	749.743SFT
		VERT ERROR	0.038SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.061SFT	QUALITY	SURVEY QUALITY
POINT	R2606-14 - WGS84	NORTHING	743376.724SFT	POINT	R2606-14 - LOCAL
LATITUDE	35°47'22.77707"N	EASTING	1751493.325SFT	NORTHING	743376.704SFT
LONGITUDE	79°50'16.62852"W	ELEVATION	722.107SFT	EASTING	1751493.340SFT
HEIGHT	622.633SFT	HORZ ERROR	0.025SFT	ELEVATION	722.132SFT
		VERT ERROR	0.025SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.035SFT	QUALITY	SURVEY QUALITY
POINT	R2606-15 - WGS84	NORTHING	738716.227SFT	POINT	R2606-15 - LOCAL
LATITUDE	35°46'36.90429"N	EASTING	1754084.641SFT	NORTHING	738716.165SFT
LONGITUDE	79°49'44.70465"W	ELEVATION	698.569SFT	EASTING	1754084.618SFT
HEIGHT	599.146SFT	HORZ ERROR	0.066SFT	ELEVATION	698.598SFT
		VERT ERROR	0.029SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.072SFT	QUALITY	SURVEY QUALITY
POINT	R2606-16 - WGS84	NORTHING	736242.032SFT	POINT	R2606-16 - LOCAL
LATITUDE	35°46'12.45172"N	EASTING	1754266.028SFT	NORTHING	736241.957SFT
LONGITUDE	79°49'42.25293"W	ELEVATION	672.224SFT	EASTING	1754265.993SFT
HEIGHT	572.833SFT	HORZ ERROR	0.083SFT	ELEVATION	672.269SFT
		VERT ERROR	0.045SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.094SFT	QUALITY	SURVEY QUALITY
POINT	R2606-17 - WGS84	NORTHING	758923.395SFT	POINT	R2606-17 - LOCAL
LATITUDE	35°49'56.16543"N	EASTING	1747312.373SFT	NORTHING	758923.495SFT
LONGITUDE	79°51'08.99403"W	ELEVATION	756.810SFT	EASTING	1747312.397SFT
HEIGHT	657.112SFT	HORZ ERROR	0.103SFT	ELEVATION	756.738SFT
		VERT ERROR	0.072SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.125SFT	QUALITY	SURVEY QUALITY
POINT	R2606-18 - WGS84	NORTHING	758973.690SFT	POINT	R2606-18 - LOCAL
LATITUDE	35°49'56.50849"N	EASTING	1745501.798SFT	NORTHING	758973.765SFT
LONGITUDE	79°51'30.98627"W	ELEVATION	796.786SFT	EASTING	1745501.815SFT
HEIGHT	697.092SFT	HORZ ERROR	0.077SFT	ELEVATION	796.738SFT
		VERT ERROR	0.048SFT	UTILIZED	HORZ AND VERT
		3D ERROR	0.091SFT	QUALITY	SURVEY QUALITY

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "HOLLAND"
WITH NAD83 STATE PLANE GRID COORDINATES OF
NORTHING: 797565.242(ft) EASTING: 1722871.646(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99990836
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "HOLLAND" TO -L- STATION 132+00.00 IS
S 24° 44' 44.7" E 27372.712'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD29

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE NAD83 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORKWITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.*
2. *THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:*
   HTTP://WWW.NCDOT.ORG/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R2606B_LS_GPSCALIB_081104.HTML
   R2606B_LS_WGS84_081104.TXT
   R2606B_LS_LOCAL_081104.TXT
   R2606B_LS_CONTROL_081104..TXT

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

- *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.*
  PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
  NETWORK ESTABLISHED FROM EXISTING NAD83 MONUMENTATION
  SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E1	PROP. APPROX. 3.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E2	PROP. APPROX. 4.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
C3	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E3	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
C4	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E4	PROP. APPROX. 5.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
C5	PROP. APPROX. 3.0" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E5	PROP. APPROX. 10.0" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1" IN DEPTH OR GREATER THAN 1.5" IN DEPTH.	E6	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3.0" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
C7	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5 " IN DEPTH OR GREATER THAN 2" IN DEPTH.	E7	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3.0" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
C8	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 1.5 " IN DEPTH OR GREATER THAN 2" IN DEPTH.	J1	PROP. 6.0" DEPTH AGGREGATE BASE COURSE
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	J2	PROP. 8.0" DEPTH AGGREGATE BASE COURSE
D2	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	J3	PROP. 10.0" DEPTH AGGREGATE BASE COURSE
D3	PROP. APPROX. 3.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	K	SUBGRADE STABILIZATION.
D4	PROP. APPROX. 3.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
D5	PROP. APPROX. 4.0" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R	2'-6" CONCRETE CURB AND GUTTER.
D6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4.0" IN DEPTH.	T	EARTH MATERIAL.
D7	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4.0" IN DEPTH.	U	EXISTING PAVEMENT.
		W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAILS).

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C1	1.5″ S9.5C
C2	2.5″ SF9.5A
C3	3.0″ SF9.5A
C4	3.0″ S9.5B
C5	3.0″ S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5″ I19.0B
D2	2.5″ I19.0C
D3	3.0″ I19.0B
D4	3.0″ I19.0C
D5	4.0″ I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5″ B25.0C
E2	4.0″ B25.0B
E3	4.5″ B25.0C
E4	5.0″ B25.0B
E5	10.0″ B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0″ ABC
J2	8.0″ ABC
J3	10.0″ ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2′ – 6″ C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

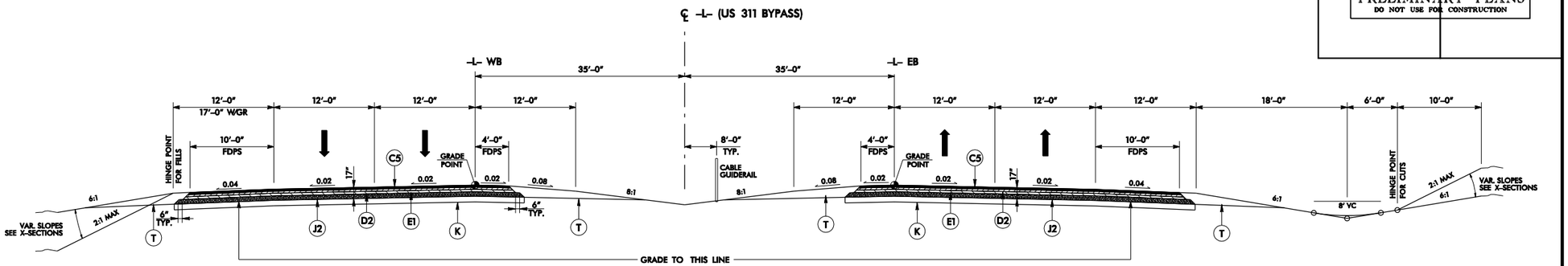
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

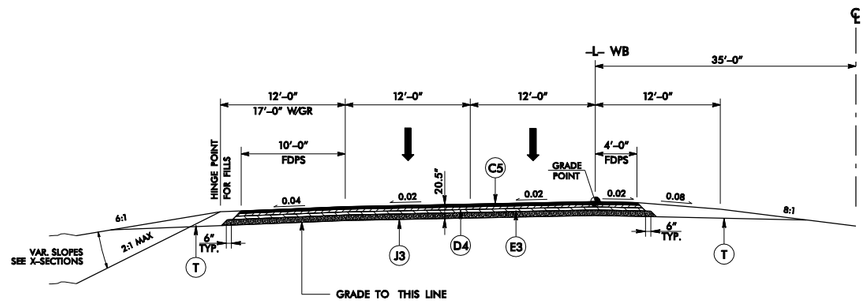
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



TYPICAL SECTION NO. 1

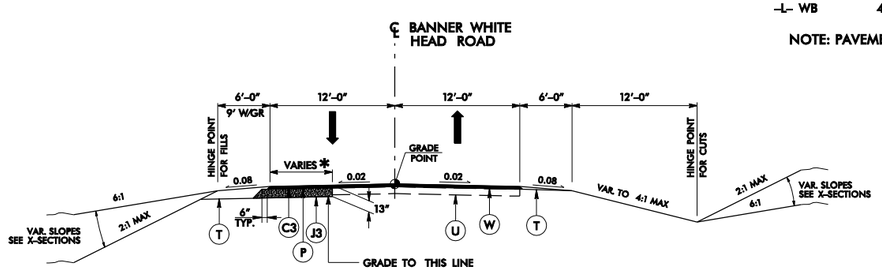
LINE	FROM STATION	TO STATION
–L– EB	97+00.00	481+96.65
–L– WB	97+00.00	483+22.39



TYPICAL SECTION NO. 2

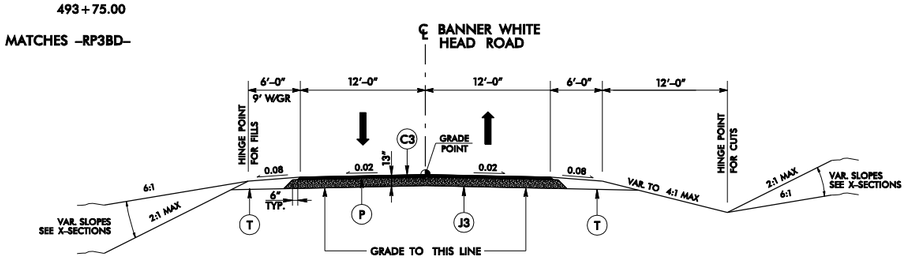
LINE	FROM STATION	TO STATION
–L– WB	483+22.39	493+75.00

NOTE: PAVEMENT DESIGN MATCHES –RP3BD–



TYPICAL SECTION NO. 3

LINE	FROM STATION	TO STATION	COMMENT (*)
–Y3–	12+70.00	13+75.00	USE E4 IN LIEU OF J3
–Y3–	13+75.00	14+25.00	
–Y3–	27+75.00	29+25.00	USE E4 IN LIEU OF J3



TYPICAL SECTION NO. 4

LINE	FROM STATION	TO STATION
–Y3–	14+25.00	20+71.81 (BEGIN BRIDGE)
–Y3–	23+14.15 (END BRIDGE)	27+75.00

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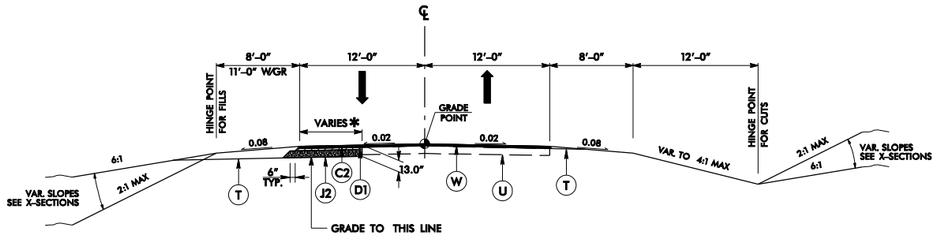
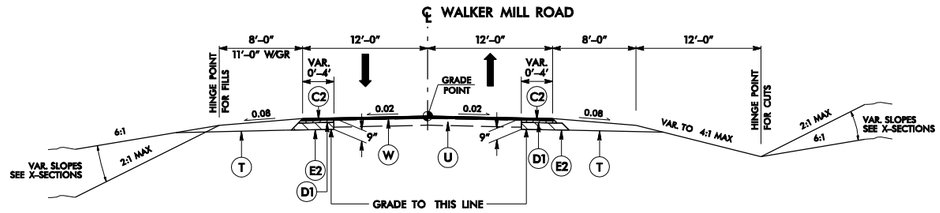
C1	1.5" S9.5C
C2	2.5" SF9.5A
C3	3.0" SF9.5A
C4	3.0" S9.5B
C5	3.0" S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	2.5" I19.0C
D3	3.0" I19.0B
D4	3.0" I19.0C
D5	4.0" I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5" B25.0C
E2	4.0" B25.0B
E3	4.5" B25.0C
E4	5.0" B25.0B
E5	10.0" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0" ABC
J2	8.0" ABC
J3	10.0" ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2' – 6" C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



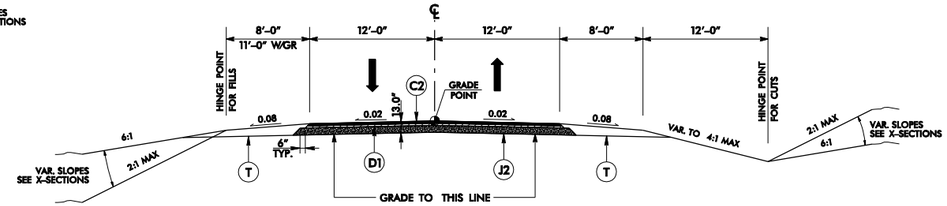
TYPICAL SECTION NO. 5

LINE	FROM STATION	TO STATION	COMMENT (*)
–Y5–	19+70.00	21+30.00	USE E2 IN LIEU OF J2
–Y5–	21+30.00	23+65.00	
–Y5–	40+86.00	41+99.00	
–Y5–	41+99.00	43+20.00	USE E2 IN LIEU OF J2
–Y8–	12+55.25	15+50.00	USE E2 IN LIEU OF J2
–Y8–	15+50.00	16+80.00	
–Y8–	24+36.00	25+40.00	
–Y8–	25+40.00	28+50.00	USE E2 IN LIEU OF J2



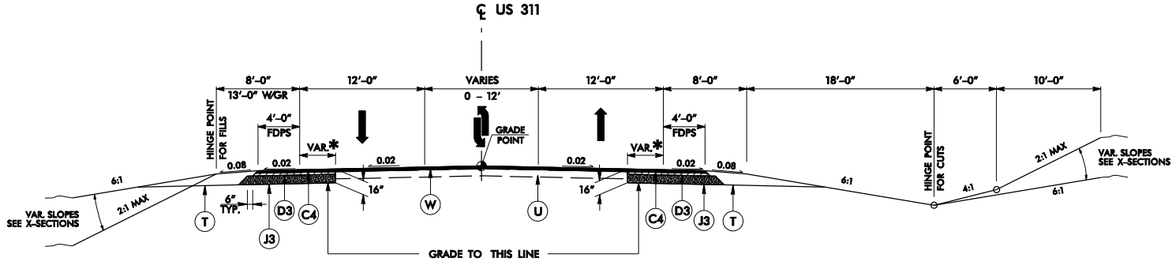
TYPICAL SECTION NO. 6

LINE	FROM STATION	TO STATION
–Y6–	13+50.00	16+25.00
–Y6–	24+75.00	26+37.50



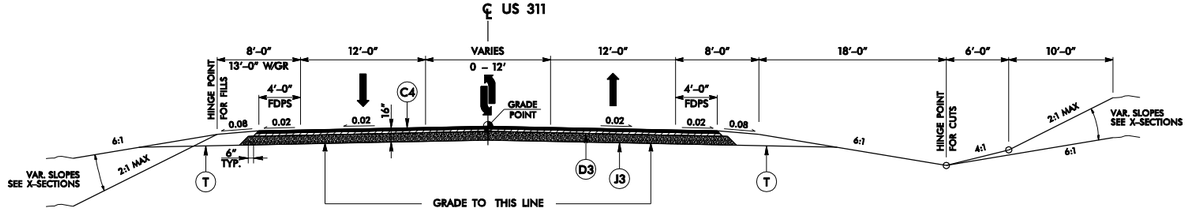
TYPICAL SECTION NO. 7

LINE	FROM STATION	TO STATION
–Y5–	23+65.00	32+21.41 (BEGIN BRIDGE)
–Y5–	34+59.11 (END BRIDGE)	40+86.00
–Y6–	16+25.00	17+91.95 (BEGIN BRIDGE)
–Y6–	19+97.45 (END BRIDGE)	24+75.00
–Y8–	16+80.00	18+55.71 (BEGIN BRIDGE)
–Y8–	20+85.71 (END BRIDGE)	24+36.00



TYPICAL SECTION NO. 8

LINE	FROM STATION	TO STATION	COMMENT (*)
–Y7–	11+00.00	19+45.00	USE E4 IN LIEU OF J3
–Y7–	19+45.00	21+34.00	
–Y7–	44+50.00	45+46.00	
–Y7–	45+46.00	49+53.09	USE E4 IN LIEU OF J3



TYPICAL SECTION NO. 9

LINE	FROM STATION	TO STATION
–Y7–	21+34.00	33+17.74 (BEGIN BRIDGE)
–Y7–	35+92.74 (END BRIDGE)	44+50.00

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-B
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

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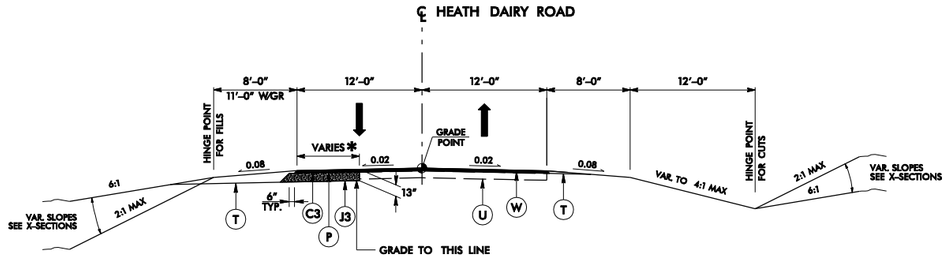
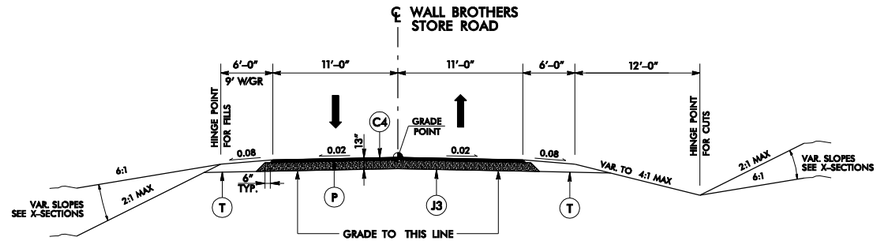
C1	1.5" S9.5C
C2	2.5" SF9.5A
C3	3.0" SF9.5A
C4	3.0" S9.5B
C5	3.0" S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	2.5" I19.0C
D3	3.0" I19.0B
D4	3.0" I19.0C
D5	4.0" I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5" B25.0C
E2	4.0" B25.0B
E3	4.5" B25.0C
E4	5.0" B25.0B
E5	10.0" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0" ABC
J2	8.0" ABC
J3	10.0" ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2'-6" C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

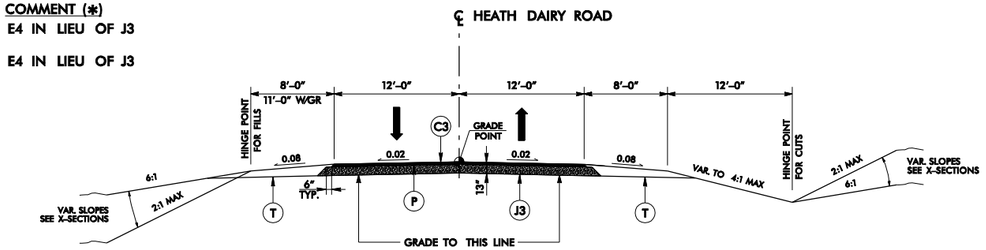
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



TYPICAL SECTION NO. 10

LINE	FROM STATION	TO STATION	COMMENT (*)
–Y10–	12+65.00	15+25.00	USE E4 IN LIEU OF J3
–Y10–	31+75.00	32+15.00	
–Y10–	32+15.00	35+00.00	USE E4 IN LIEU OF J3



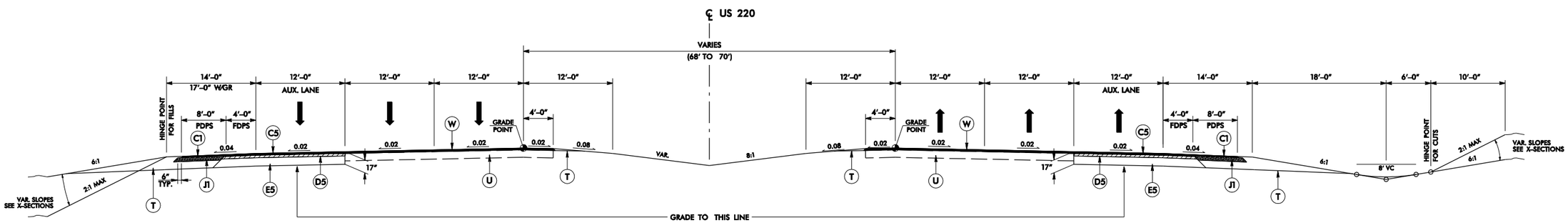


TYPICAL SECTION NO. 11

LINE	FROM STATION	TO STATION
–Y10–	15+25.00	21+11.80 (BEGIN BRIDGE)
–Y10–	23+14.03 (END BRIDGE)	31+75.00

TYPICAL SECTION NO. 12

LINE	FROM STATION	TO STATION
–Y11–	10+12.01	22+67.15



TYPICAL SECTION NO. 13

LINE	FROM STATION	TO STATION
–Y12– SB	22+50.00	41+19.00
–Y12– SB	62+70.00	99+49.26
–Y12– NB	18+31.22	55+70.00
–Y12– NB	71+33.58	94+50.00

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-C
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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C2	2.5″ SF9.5A
C3	3.0″ SF9.5A
C4	3.0″ S9.5B
C5	3.0″ S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5″ I19.0B
D2	2.5″ I19.0C
D3	3.0″ I19.0B
D4	3.0″ I19.0C
D5	4.0″ I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5″ B25.0C
E2	4.0″ B25.0B
E3	4.5″ B25.0C
E4	5.0″ B25.0B
E5	10.0″ B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0″ ABC
J2	8.0″ ABC
J3	10.0″ ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2′ – 6″ C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

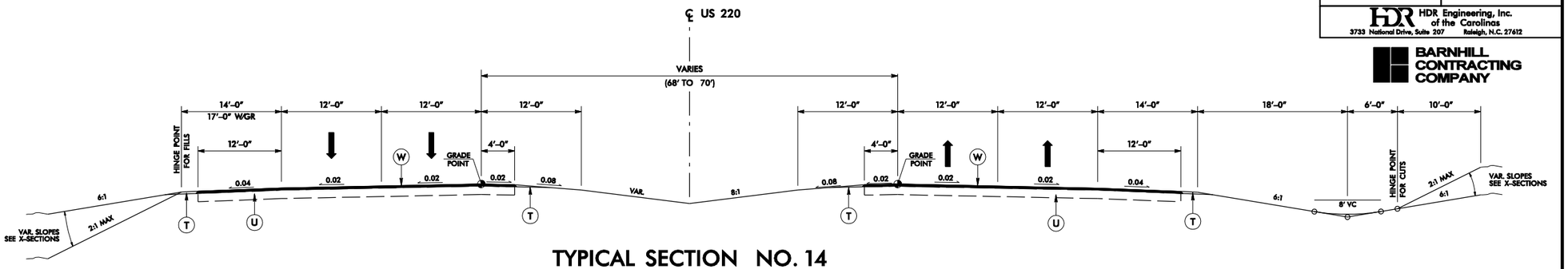
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-D
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

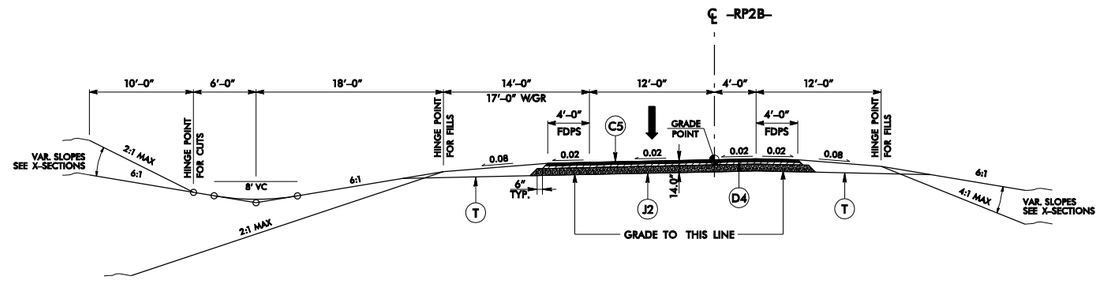
HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY



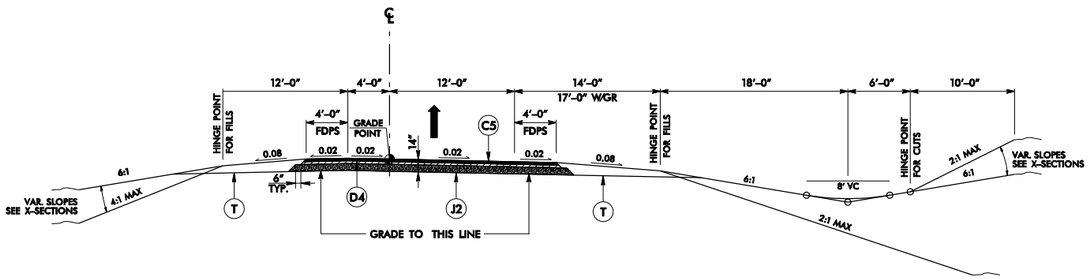
TYPICAL SECTION NO. 14

LINE	FROM STATION	TO STATION
–Y12– SB	41+19.00	62+70.00
–Y12– NB	55+70.00	71+33.58



TYPICAL SECTION NO. 15

LINE	FROM STATION	TO STATION
–RP2B–	14+82.33	30+93.71



TYPICAL SECTION NO. 16

LINE	FROM STATION	TO STATION
–RP2C–	14+08.20	26+78.28

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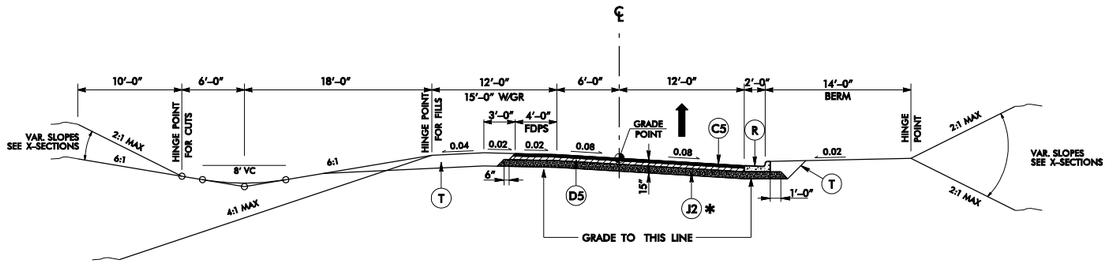
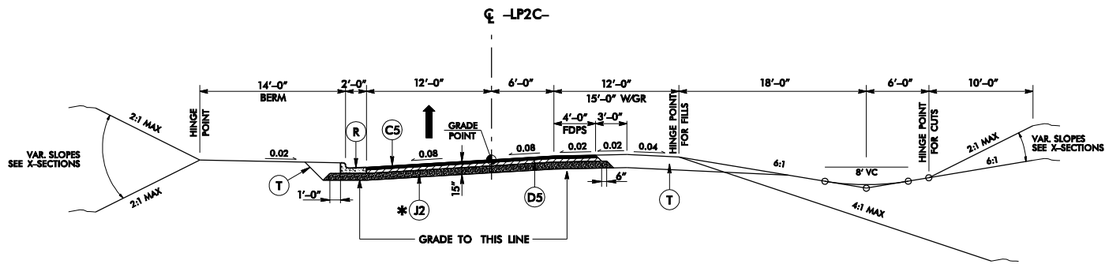
C1	1.5" S9.5C
C2	2.5" SF9.5A
C3	3.0" SF9.5A
C4	3.0" S9.5B
C5	3.0" S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	2.5" I19.0C
D3	3.0" I19.0B
D4	3.0" I19.0C
D5	4.0" I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5" B25.0C
E2	4.0" B25.0B
E3	4.5" B25.0C
E4	5.0" B25.0B
E5	10.0" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0" ABC
J2	8.0" ABC
J3	10.0" ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2' – 6" C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



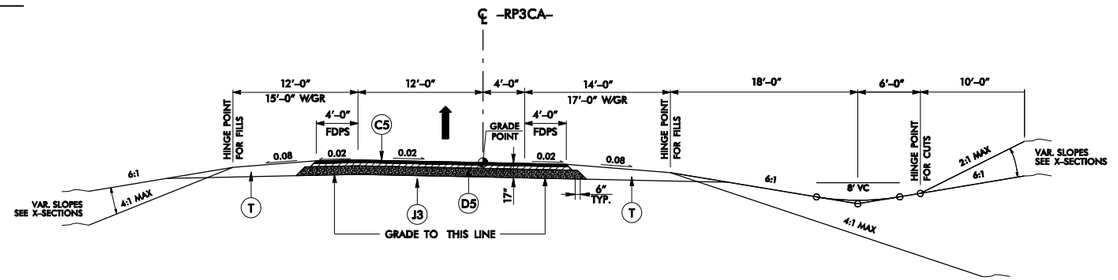
TYPICAL SECTION NO. 17

LINE	FROM STATION	TO STATION	COMMENT (*)
–LP2B–	2+37.78	11+82.37	
–LP3CA–	0+00.00	11+68.91	USE J3 IN LIEU OF J2



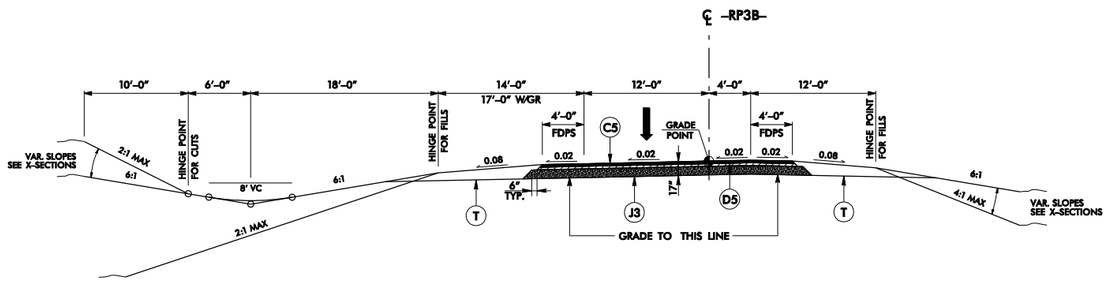
TYPICAL SECTION NO. 18

LINE	FROM STATION	TO STATION
–LP2C–	2+11.36	9+50.36



TYPICAL SECTION NO. 19

LINE	FROM STATION	TO STATION
–RP3CA–	17+36.87	26+17.32 (BEGIN BRIDGE)
–RP3CA–	27+63.53 (END BRIDGE)	33+83.50 (BEGIN BRIDGE)
–RP3CA–	35+98.50 (END BRIDGE)	36+91.40



TYPICAL SECTION NO. 20

LINE	FROM STATION	TO STATION
–RP3B–	13+42.21	32+10.53

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

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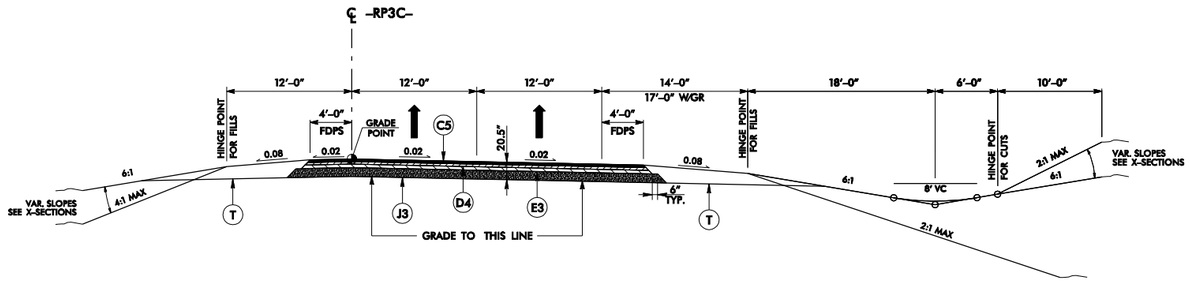
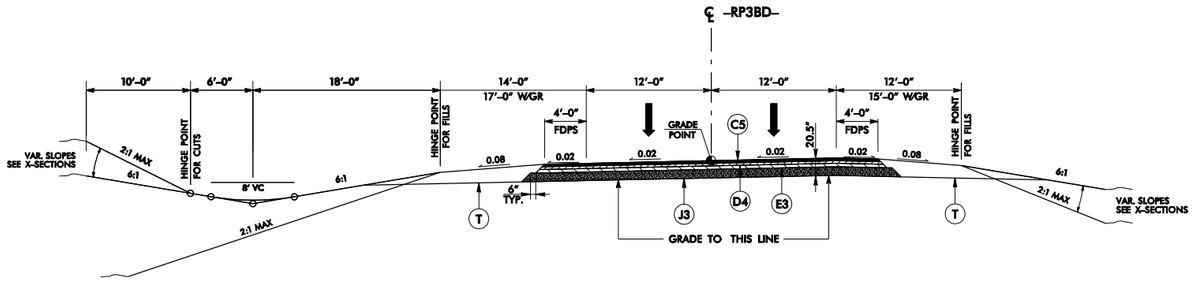
C3	3.0" SF9.5A
C4	3.0" S9.5B
C5	3.0" S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	2.5" I19.0C
D3	3.0" I19.0B
D4	3.0" I19.0C
D5	4.0" I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5" B25.0C
E2	4.0" B25.0B
E3	4.5" B25.0C
E4	5.0" B25.0B
E5	10.0" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0" ABC
J2	8.0" ABC
J3	10.0" ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2'-6" C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



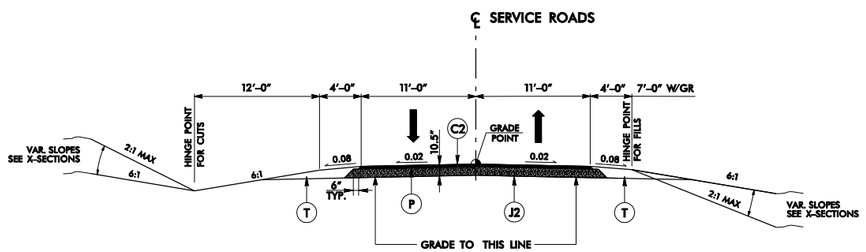
TYPICAL SECTION NO. 21

LINE	FROM STATION	TO STATION
–RP3C–	33+06.56	54+81.43



TYPICAL SECTION NO. 22

LINE	FROM STATION	TO STATION
–RP3BD–	10+00.00	16+10.62 (BEGIN BRIDGE)
–RP3BD–	18+85.93 (END BRIDGE)	31+71.13



TYPICAL SECTION NO. 23

LINE	FROM STATION	TO STATION
–SR1–	10+10.00	58+17.01
–SR2–	10+30.00	58+29.53
–SR3–	10+11.88	28+82.00
–SR4–	10+12.12	33+83.99
–SR5–	10+12.21	19+99.44
–SR6–	10+12.02	19+68.82

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-F
RW SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
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HDR Engineering, Inc. of the Carolinas
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BARNHILL CONTRACTING COMPANY

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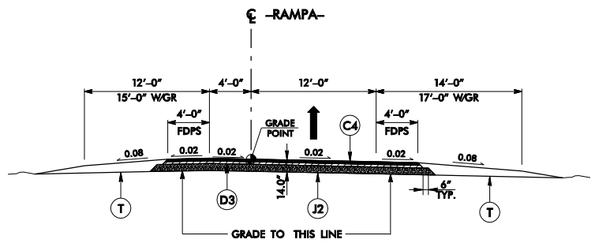
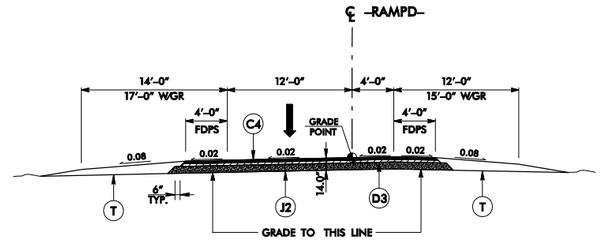
C5	3.0" S9.5C
C6	VAR. SF9.5A
C7	VAR. S9.5B
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	2.5" I19.0C
D3	3.0" I19.0B
D4	3.0" I19.0C
D5	4.0" I19.0C
D6	VAR. I19.0B
D7	VAR. I19.0C
E1	3.5" B25.0C
E2	4.0" B25.0B
E3	4.5" B25.0C
E4	5.0" B25.0B
E5	10.0" B25.0C
E6	VAR. B25.0B
E7	VAR. B25.0C
J1	6.0" ABC
J2	8.0" ABC
J3	10.0" ABC
K	SUBGRADE STABILIZATION
P	PRIME COAT
R	2' – 6" C & G
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



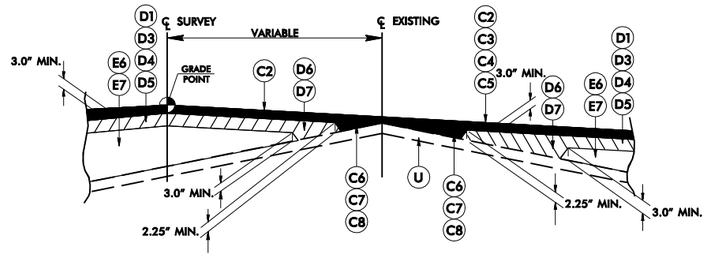
TYPICAL SECTION NO. 24

LINE	FROM STATION	TO STATION
–RAMPA– (CEDAR SQUARE RD.)	3+96.85	16+56.38



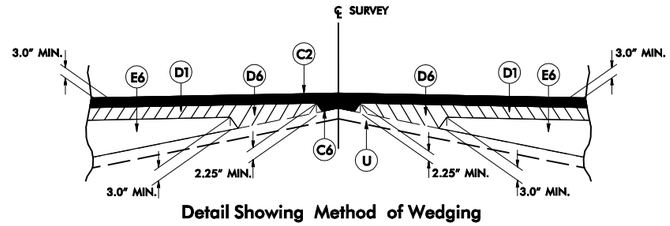
TYPICAL SECTION NO. 25

LINE	FROM STATION	TO STATION
–RAMPD– (CEDAR SQUARE RD.)	4+24.24	16+67.00



Detail Showing Method Of Wedging

STANDARD WEDGING DETAIL 1



Detail Showing Method of Wedging

STANDARD WEDGING DETAIL 2

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-G
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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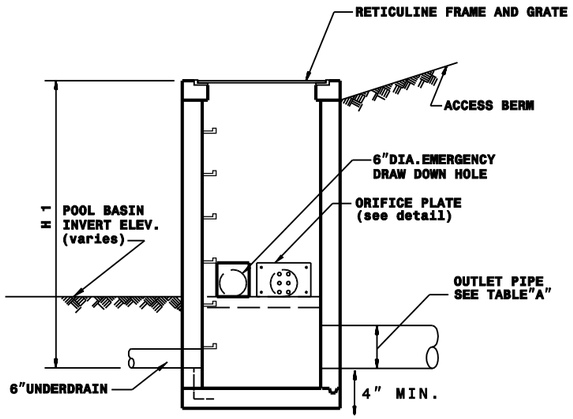
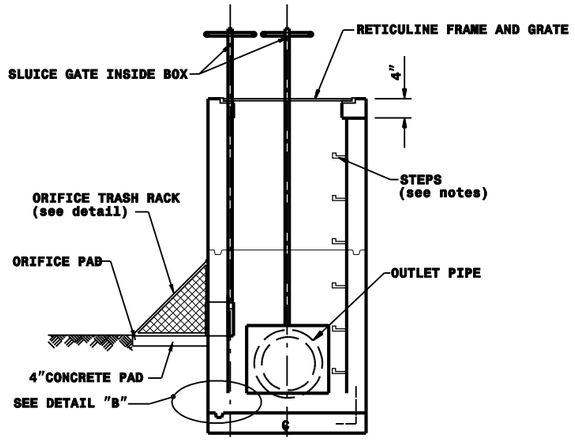
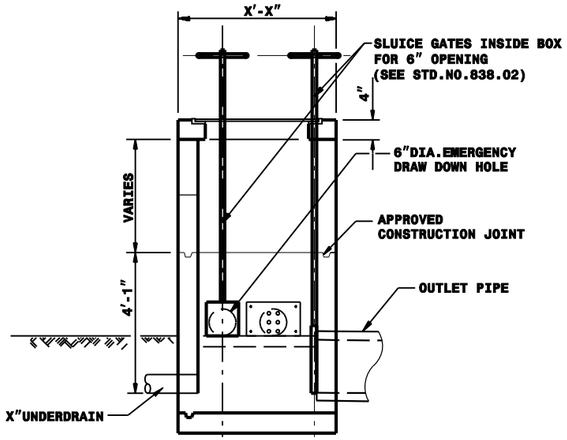


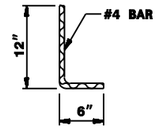
STRUCTURE SIDE 1



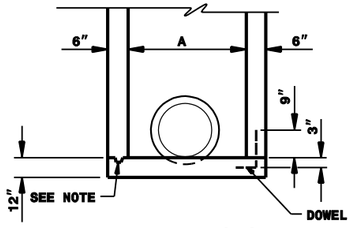
STRUCTURE SIDE 2



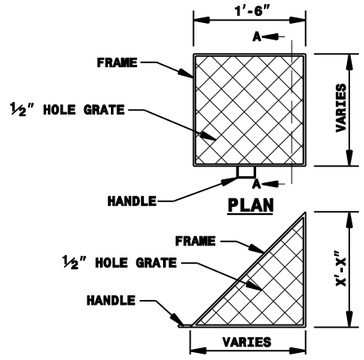
STRUCTURE SIDE 3



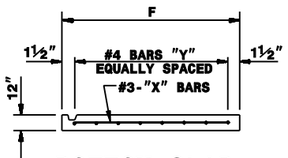
DOWEL



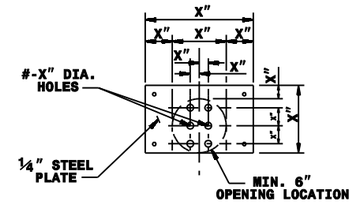
DETAIL 'B'



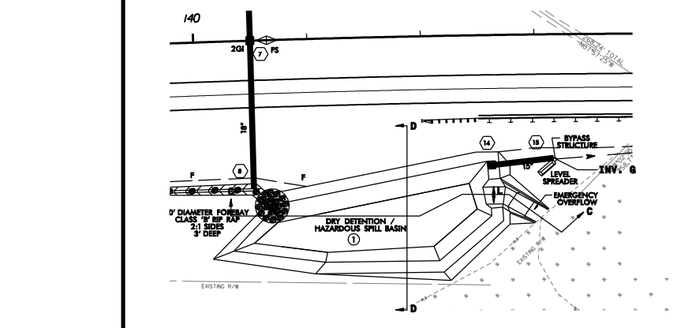
SECTION A-A



BOTTOM SLAB

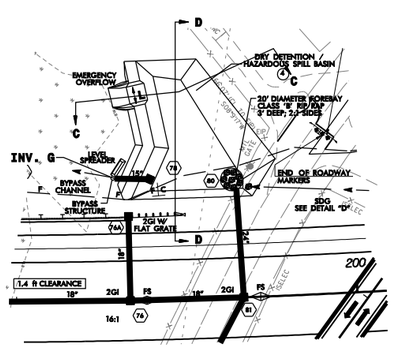


ORIFICE PLATE



DRY DETENTION/ HSB #1

STA.141+00 - STA.143+00 RT



DRY DETENTION/ HSB #4

STA.198+00 - STA.199+50 LT

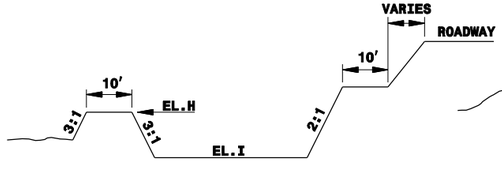
GENERAL NOTES:

* ALL SLOPES ON BERMS CREATED TO FORM EMBANKMENT MUST BE 3:1. SLOPES THAT ARE CUT INTO NATURAL GROUND MAY BE 2:1, BUT MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 6'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

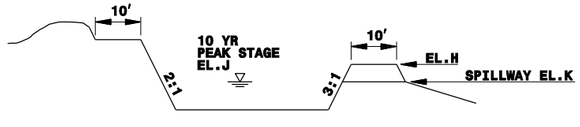
ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

REMOVABLE ORIFICE TRASH RACK



SECTION D-D



SECTION C-C

TABLE "A"

PIPE D	"A"	BARS-X		BARS-Y		"F"	TOTAL CONCRETE QUANTITIES
		QTY.	LENGTH	QTY.	LENGTH		

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin				
	Type	Span A	Wide B	Top. Ele. C	Bottom Ele. D	Inv. El. E	Dia	Dia. F	DS Inv G	Berm Top El. H	Basin Bottom I	10Y Peak Stage J	Spillway Top K	Spillway Wide L
1	2GI(B)	3'-8"	2'-0"	749.20'	745.85'	747.50'	3"	15"	745.50'	751.50'	747.50'	750.16'	750.00'	15'
4	2GI(B)	3'-8"	2'-0"	755.80'	752.75'	754.00'	2"	15"	752.00'	758.00'	754.00'	756.77'	756.50'	15'

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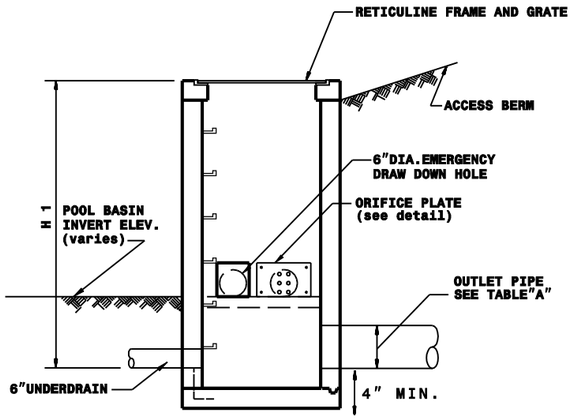
DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

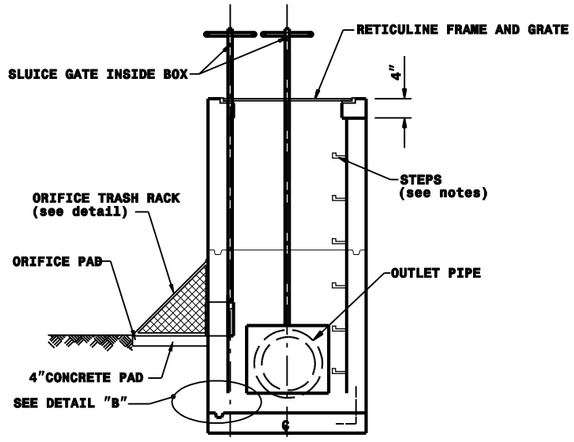
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY



STRUCTURE SIDE 1



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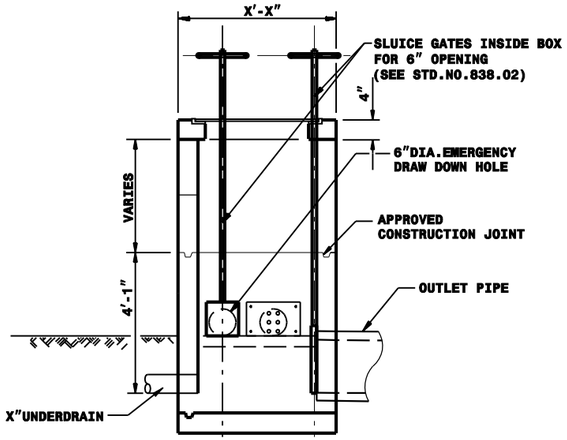
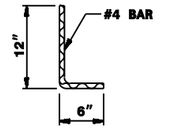
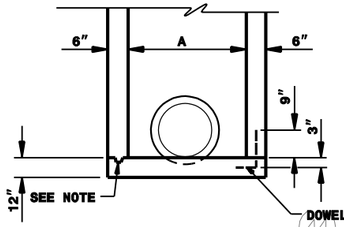


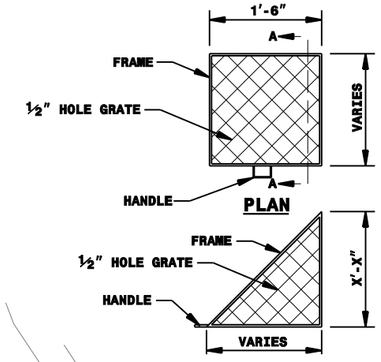
STRUCTURE SIDE 3



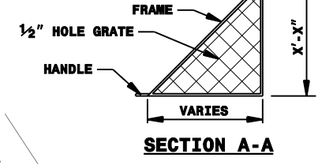
DOWEL



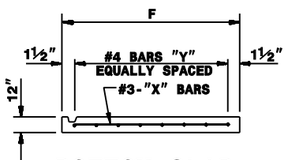
DETAIL 'B'



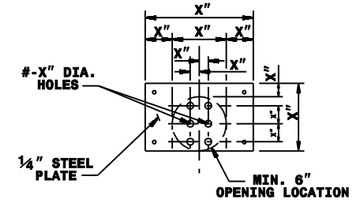
PLAN



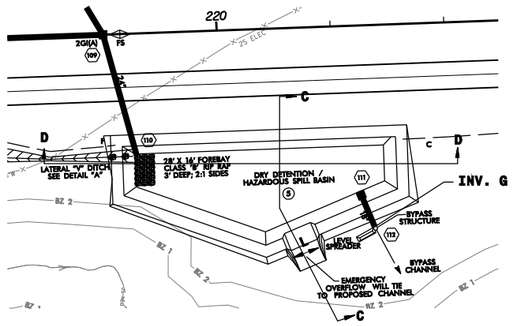
SECTION A-A



BOTTOM SLAB

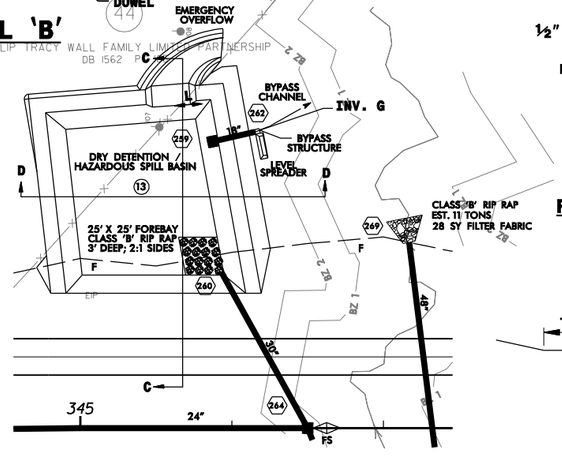


ORIFICE PLATE



DRY DETENTION/ HSB #5

STA.219+50 - STA.221+50 RT



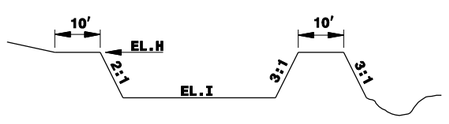
DRY DETENTION/ HSB #13

STA.343+80 - STA.346+20 RT

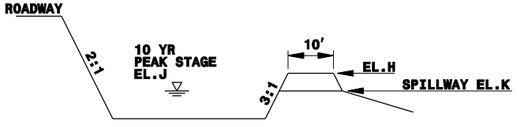
REMOVABLE ORIFICE TRASH RACK

ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.



SECTION D-D



SECTION C-C

GENERAL NOTES:

* ALL SLOPES ON BERMS CREATED TO FROM EMBANKMENT MUST BE 3:1 SLOPES THAT ARE CUT INTO NATURAL GROUND MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 6'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

TABLE "A"

PIPE D	"A"	BARS-X		BARS-Y		"F"	TOTAL CONCRETE QUANTITIES
		QTY.	LENGTH	QTY.	LENGTH		
24"							

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin				
	Type	Span	Wide	Top. Ele.	Bottom Ele.	Inv. El.	Dia	Dia.	DS Inv	Berm Top El.	Basin Bottom	10Y Peak Stage	Spillway Top	Spillway Wide
		A	B	C	D	E		F	G	H	I	J	K	L
5	2GI(B)	3'-8"	2'-0"	727.55'	725.25'	726.00'	2"	18"	725.00'	729.50'	726.00'	728.41'	728.05'	25'
13	2GI(B)	3'-8"	2'-0"	738.50'	736.00'	736.50'	3"	18"	735.50'	741.00'	736.50'	739.76'	739.50'	25'

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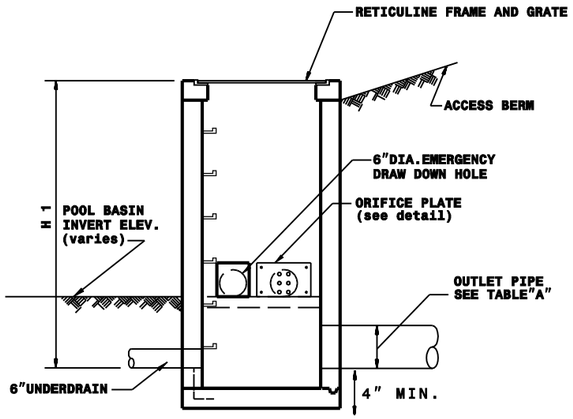
DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-J
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY



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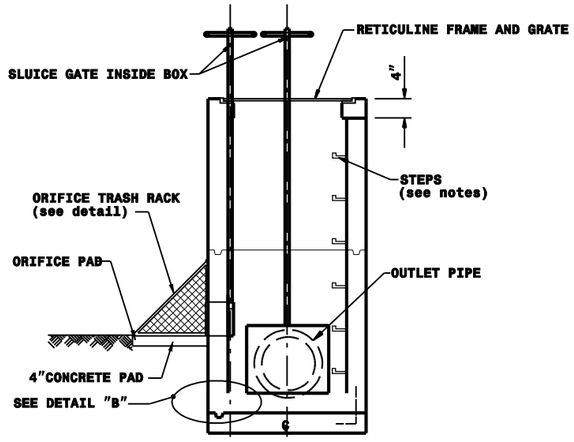

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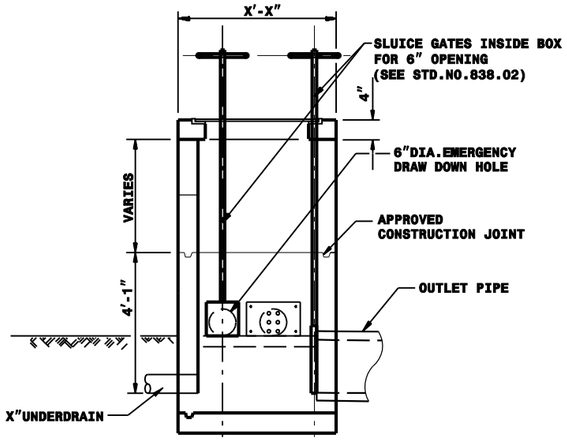
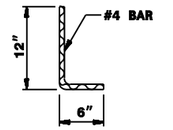
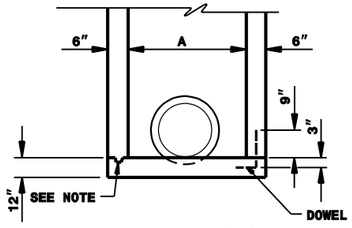


STRUCTURE SIDE 3



DOWEL



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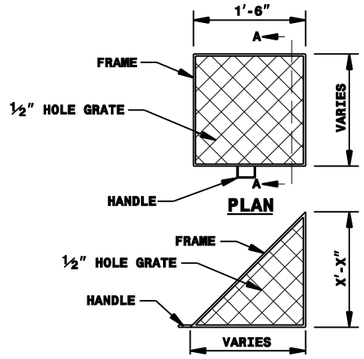
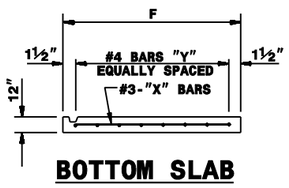
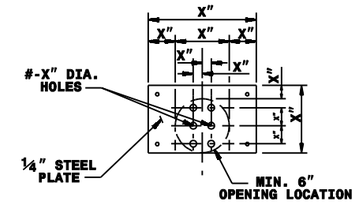


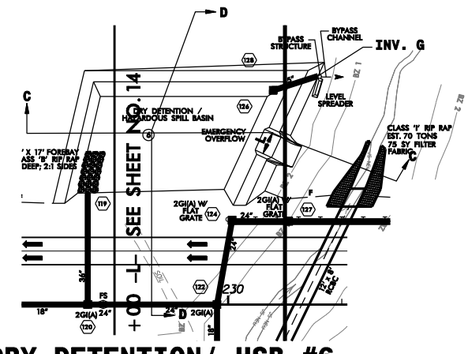
SECTION A-A



BOTTOM SLAB

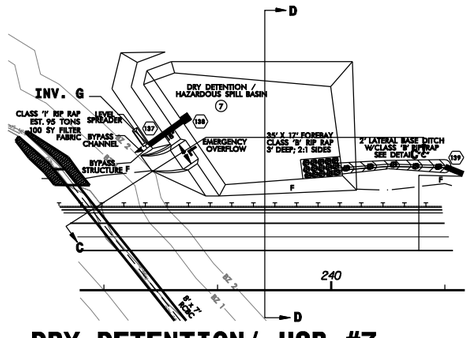


ORIFICE PLATE



DRY DETENTION/ HSB #6

STA.228+60 - STA.230+00 LT

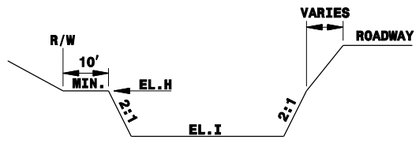


DRY DETENTION/ HSB #7

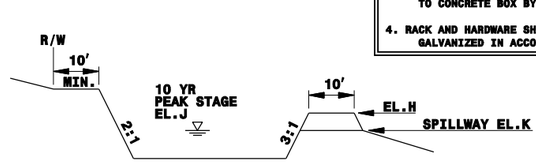
STA.239+00 - STA.240+20 LT

GENERAL NOTES:

* ALL SLOPES ON BERMS CREATED TO FROM EMBANKMENT MUST BE 3:1 SLOPES THAT ARE CUT INTO NATURAL GROUND MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 6'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..



SECTION D-D



SECTION C-C

REMOVABLE ORIFICE TRASH RACK

ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

TABLE "A"

PIPE D	"A" BARS-X QTY.	"A" BARS-X LENGTH	BARS-Y QTY.	BARS-Y LENGTH	"F"	TOTAL CONCRETE QUANTITIES
24"						

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin				
	Type	Span A	Wide B	Top. Ele. C	Bottom Ele. D	Inv. El. E	Dia	Dia. F	DS Inv G	Berm Top El. H	Basin Bottom I	10Y Peak Stage J	Spillway Top K	Spillway Wide L
6	2GI(B)	3'-8"	2'-0"	716.10'	713.00'	714.50'	2"	15"	712.50'	718.00'	714.50'	716.95'	716.80'	20'
7	2GI(B)	3'-8"	2'-0"	725.70'	721.50'	724.00'	3"	18"	720.00'	728.00'	724.00'	726.77'	726.50'	20'

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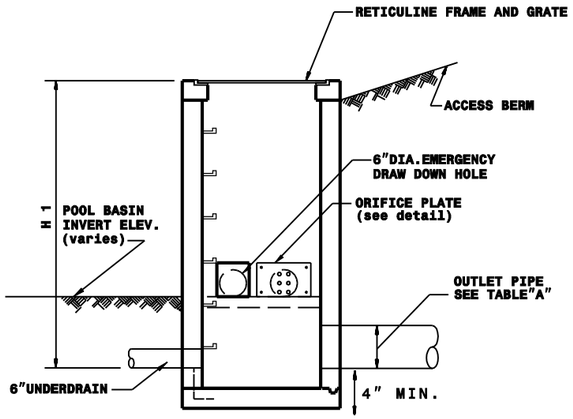
DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-K
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

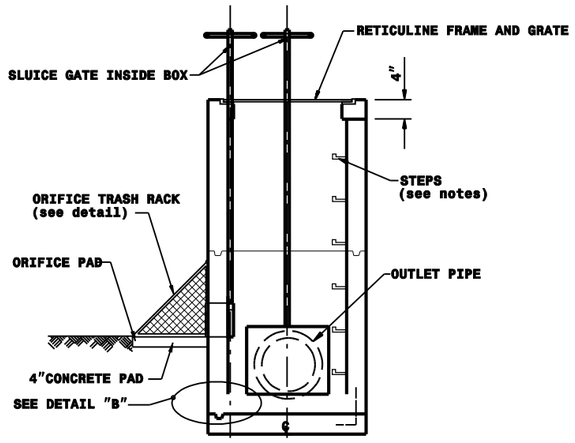
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY



STRUCTURE SIDE 1



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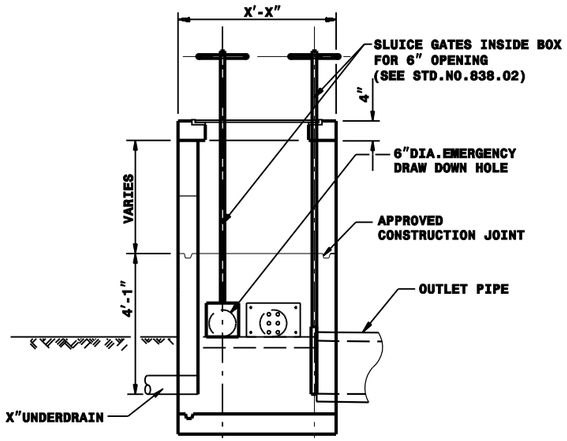

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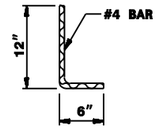

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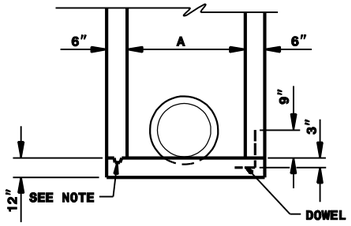
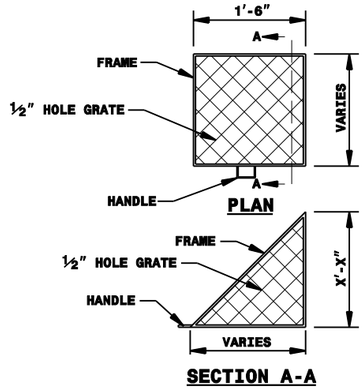
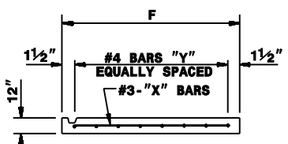


DETAIL 'B'

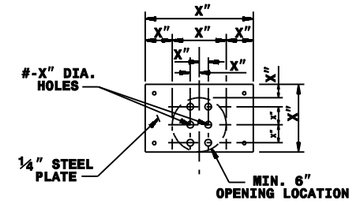


SECTION A-A

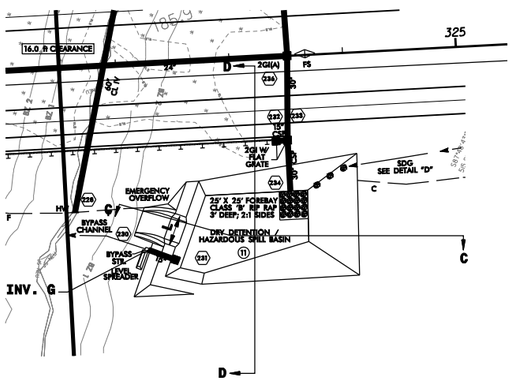
REMOVABLE ORIFICE TRASH RACK



BOTTOM SLAB

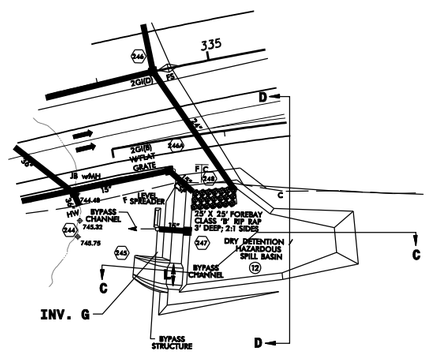


ORIFICE PLATE



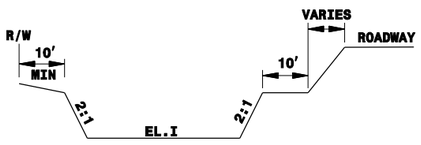
DRY DETENTION/ HSB #11

STA.322+70 - STA.323+70 RT

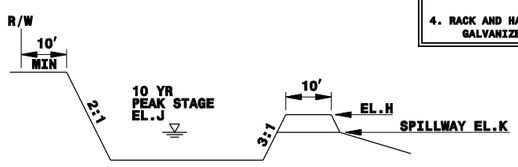


DRY DETENTION/ HSB #12

STA.334+60 - STA.335+85 RT



SECTION D-D



SECTION C-C

ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

GENERAL NOTES:

* ALL SLOPES ON BERMS CREATED TO FROM EMBANKMENT MUST BE 3:1 SLOPES THAT ARE CUT INTO NATURAL GROUND MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 8'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

TABLE "A"

PIPE D	"A" BARS-X QTY.	"A" BARS-X LENGTH	BARS-Y QTY.	BARS-Y LENGTH	"F"	TOTAL CONCRETE QUANTITIES
24"						

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin				
	Type	Span A	Wide B	Top. Ele. C	Bottom Ele. D	Inv. El. E	Dia	Dia. F	DS Inv G	Berm Top El. H	Basin Bottom I	10Y Peak Stage J	Spillway Top K	Spillway Wide L
11	2GI(B)	3'-8"	2'-0"	746.00'	741.00'	743.50'	2"	15"	740.50'	748.00'	743.50'	746.80'	746.50'	20'
12	2GI(B)	3'-8"	2'-0"	748.40'	746.40'	747.00'	2"	15"	746.00'	750.00'	747.00'	748.87'	748.90'	15'

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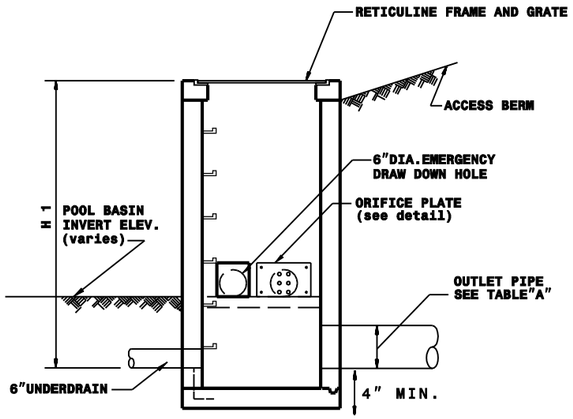
DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-L
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

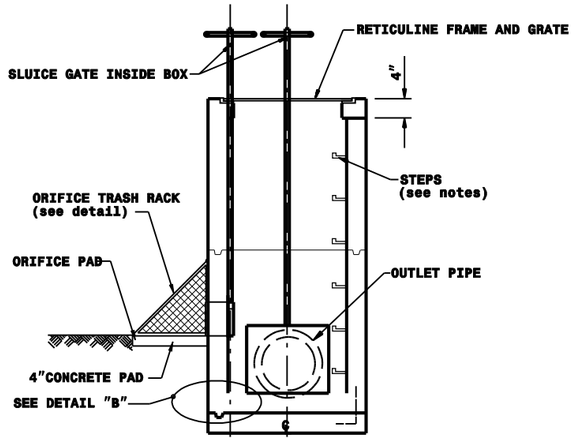
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

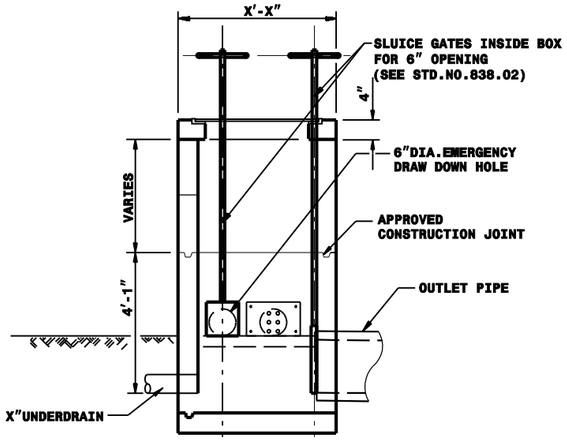
BARNHILL CONTRACTING COMPANY



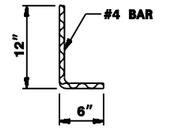
STRUCTURE SIDE 1



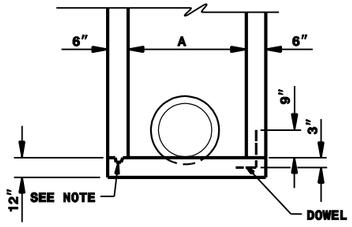
STRUCTURE SIDE 2



STRUCTURE SIDE 3



DOWEL



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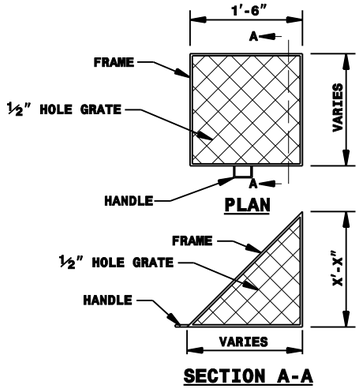
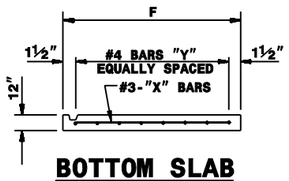
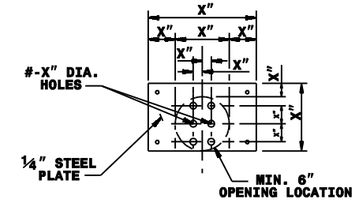


PLAN

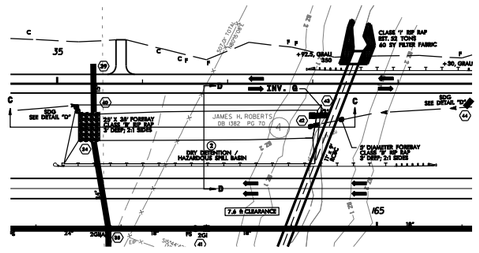
SECTION A-A



BOTTOM SLAB

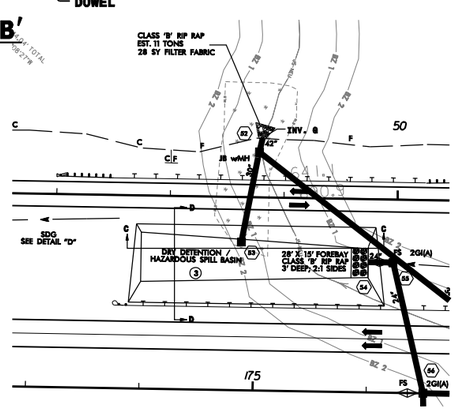


ORIFICE PLATE



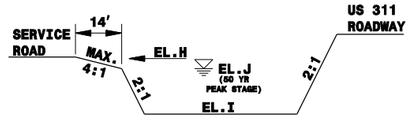
DRY DETENTION/ HSB #2

STA.161+30 - STA.164+20 LT

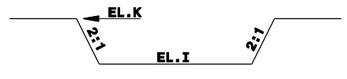


DRY DETENTION/ HSB #3

STA.173+90 - STA.176+15 LT



SECTION D-D



SECTION C-C

ORIFICE TRASH RACK NOTES:

1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

REMOVABLE ORIFICE TRASH RACK

GENERAL NOTES:

* ALL SLOPES ON BERMS CREATED TO FROM EMBANKMENT MUST BE 3:1 SLOPES THAT ARE CUT INTO NATURAL GROUND MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
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* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

TABLE "A"

PIPE D	"A"	BARS-X		BARS-Y		"F"	TOTAL CONCRETE QUANTITIES
		QTY.	LENGTH	QTY.	LENGTH		
24"							

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin			
	Type	Span A	Wide B	Top. Ele. C	Bottom Ele. D	Inv. El. E	Dia	Dia. F	DS Inv G	Min. Rdway EOP El. H	Min. Bank Top El. K	Basin Bottom I	50Y Peak Stage J
2	3GI(A)	5'-8"	2'-0	719.20'	714.50'	716.00'	3"	42"	710.50'	721.65'	720.60'	716.00'	720.49'
3	3GI(A)	5'-8"	2'-0	739.80'	736.50'	738.00'	2"	30"	728.20'	743.19'	740.60'	738.00'	740.55'

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DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-M
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
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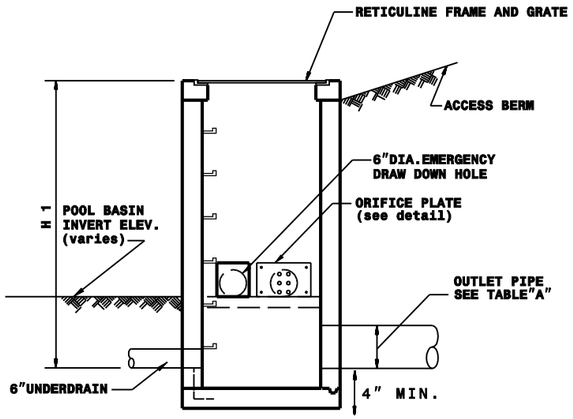
BARNHILL CONTRACTING COMPANY



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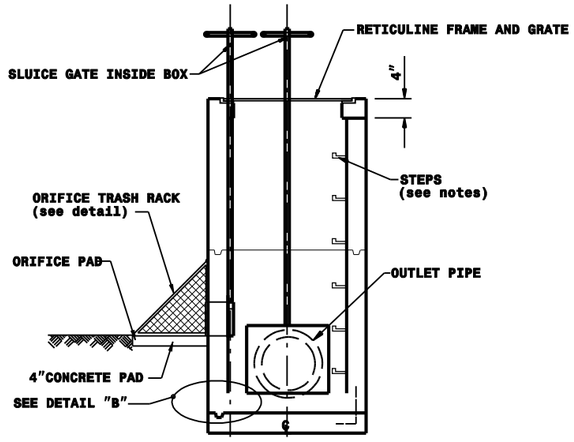

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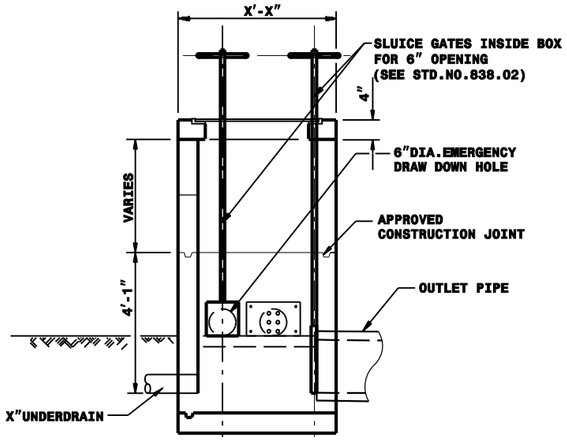

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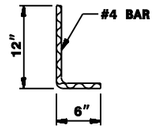
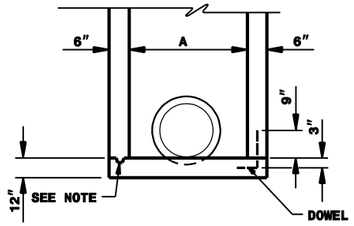


DOWEL



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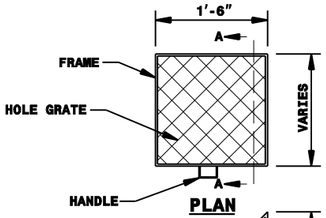
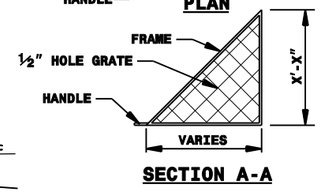
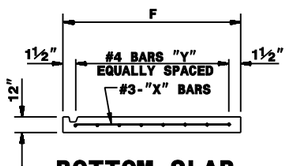


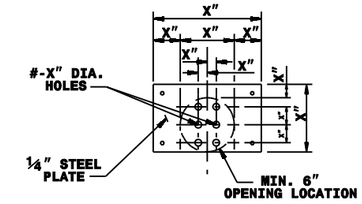
PLAN



SECTION A-A



BOTTOM SLAB



ORIFICE PLATE

REMOVABLE ORIFICE TRASH RACK

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
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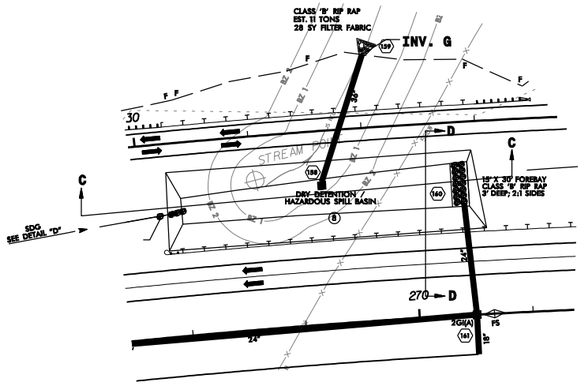
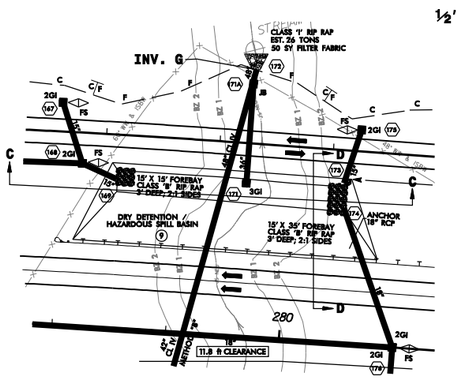


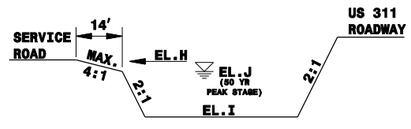
DRY DETENTION/ HSB #8

STA.267+90 - STA.270+60 LT

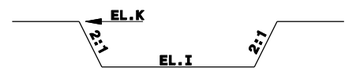


DRY DETENTION/ HSB #9

STA.278+10 - STA.280+85 LT



SECTION D-D



SECTION C-C

GENERAL NOTES:
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* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 8'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

TABLE "A"

PIPE D	"A"	BARS-X QTY.	BARS-X LENGTH	BARS-Y QTY.	BARS-Y LENGTH	"F"	TOTAL CONCRETE QUANTITIES
24"							

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin			
	Type	Span A	Wide B	Top. Ele. C	Bottom Ele. D	Inv. El. E	Dia	Dia. F	DS Inv G	Min. Rdway EOP El. H	Min. Bank Top El. K	Basin Bottom I	50Y Peak Stage J
8	3GI(A)	5'-8"	2'-0	766.60'	761.70'	765.00'	3"	36"	750.99'	773.04'	768.00'	765.00'	767.55'
9	3GI(A)	5'-8"	2'-0	749.80'	741.23'	748.00'	3"	36"	738.50'	753.31	751.18'	748.00'	750.57'

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SHEETS

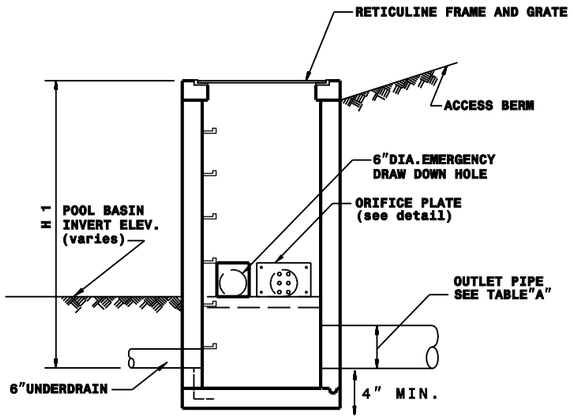
DETAIL OF OUTLET CONTROL STRUCTURE

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

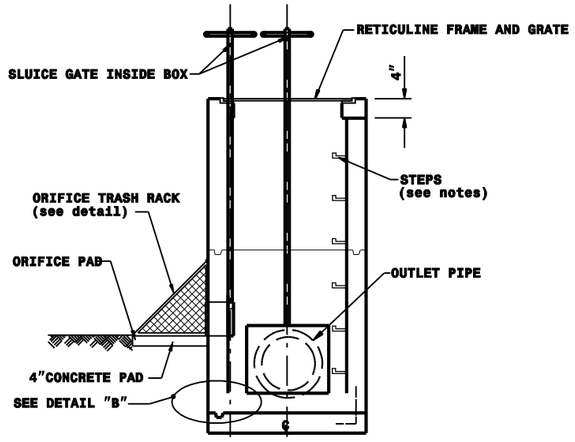
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

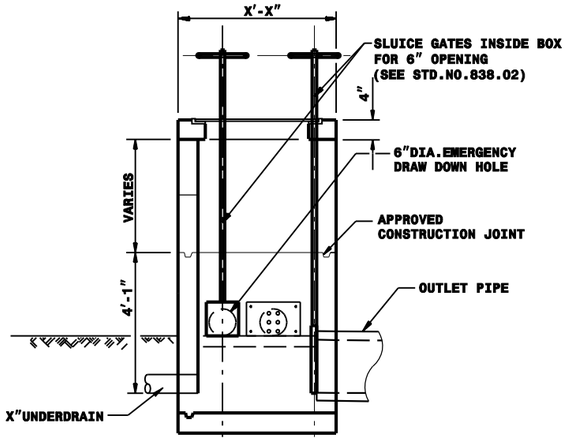
BARNHILL CONTRACTING COMPANY



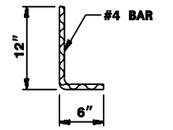
STRUCTURE SIDE 1



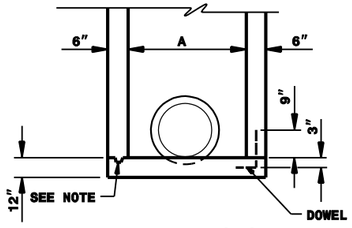
STRUCTURE SIDE 2



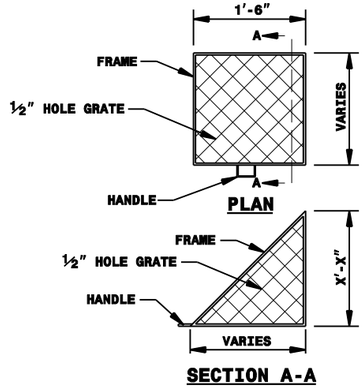
STRUCTURE SIDE 3



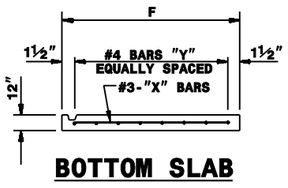
DOWEL



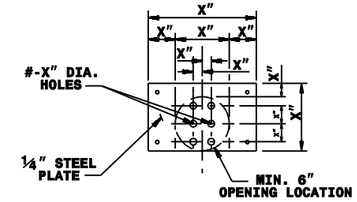
DETAIL 'B'



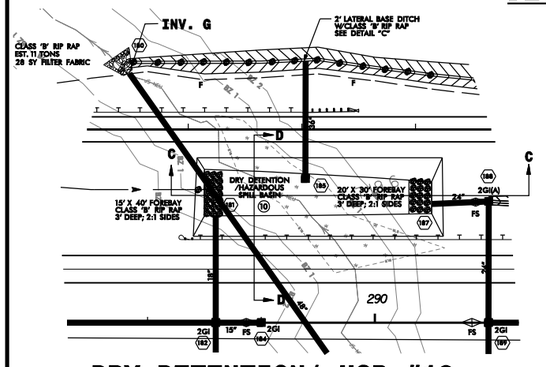
SECTION A-A



BOTTOM SLAB

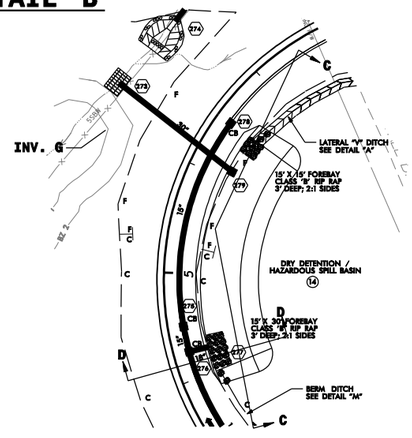


ORIFICE PLATE



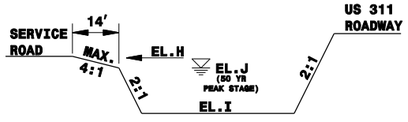
DRY DETENTION/ HSB #10

STA.288+40 - STA.290+60 LT



DRY DETENTION/ HSB #14

STA.3+90 - STA.6+50 LP3B, RT



SECTION D-D

SECTION C-C

REMOVABLE ORIFICE TRASH RACK

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF ¼" BEAD.
2. IF BOLTS ARE CHEMICALLY ANCHORED, FOLLOW STD. DWG. 862.04 FOR ANCHORING PROCEDURE.
3. REMOVABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM 153.

GENERAL NOTES:
* ALL SLOPES ON BERMS CREATED TO FROM EMBANKMENT MUST BE 3:1 SLOPES THAT ARE CUT INTO NATURAL GROUND MUST BE STABLIZED W/ AN APPROVED STABILIZATION METHOD INCLUDING BUT NOT LIMITED TO SOD.
* CHANGES IN ELEVATIONS MUST BE APPROVED BY THE ENGINEER.
* CLASS 'B' CONCRETE TO BE USED THROUGHOUT. PRECAST CONCRETE STRUCTURES TO BE SUBMITTED FOR APPROVAL.
* OPTIONAL CONSTRUCTION - MONOLITHIC POUR, 2 INCH KEYWAY, OR #4 BAR DOWELS AT 12 INCH CENTERS, AS DIRECTED BY THE ENGINEER.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* IF REINFORCED CONCRETE PIPE IS SET IN BASE SLAB OF BOX, ADD TO BASE AS SHOWN ON STANDARD 840.00.
* ALL DRAWDOWN STRUCTURES OVER 3 FEET IN DEPTH TO BE PROVIDED WITH STEPS 12 INCH ON CENTERS. STEPS SHALL BE INSTALLED IN ACCORDANCE WITH STANDARD 840.66.
* FOR 8'-0" IN HEIGHT OR LESS USE 8 INCH WALLS AND BOTTOM SLAB. OVER 8'-0" IN HEIGHT USE 12" WALLS TO 6'-0" FROM TOP OF WALL AND USE 8 INCH THICK WALLS FOR THE REMAINING 6'-0". ADJUST QUANTITIES ACCORDINGLY
* RETICULINE FRAME AND GRATE TO BE APPROVED BY THE ENGINEER..

TABLE "A"

PIPE D	"A"	BARS-X		BARS-Y		"F"	TOTAL CONCRETE QUANTITIES
		QTY.	LENGTH	QTY.	LENGTH		
24"							

HSB No.	Outlet Structure					Orifice		Outfall Pipe		Basin			
	Type	Span	Wide	Top. Ele.	Bottom Ele.	Inv. El.	Dia	Dia.	DS Inv	Min. Rdway EOP El.	Min. Bank Top El.	Basin Bottom	50Y Peak Stage
		A	B	C	D	E		F	G	H	K	I	J
10	3GI(A)	5'-8"	2'-0	756.60'	744.76'	754.00'	3"	36"	743.50'	763.28	757.70'	754.00'	757.61'
14	3GI(A)	5'-8"	2'-0	739.60'	737.00'	738.00'	3"	30"	735.50'	743.04'	743.00'	738.00'	740.44'

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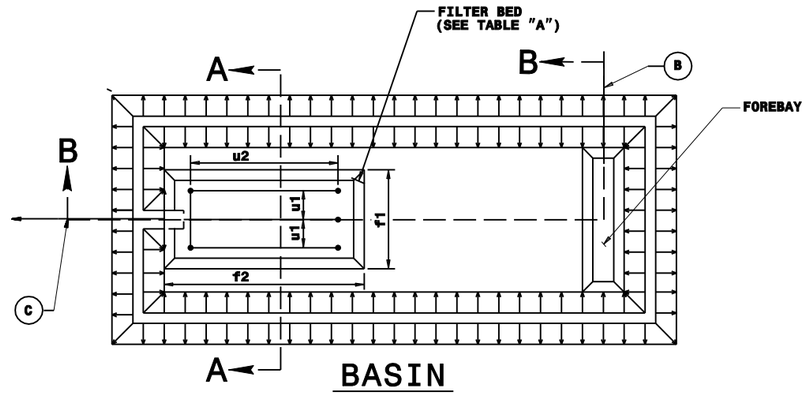
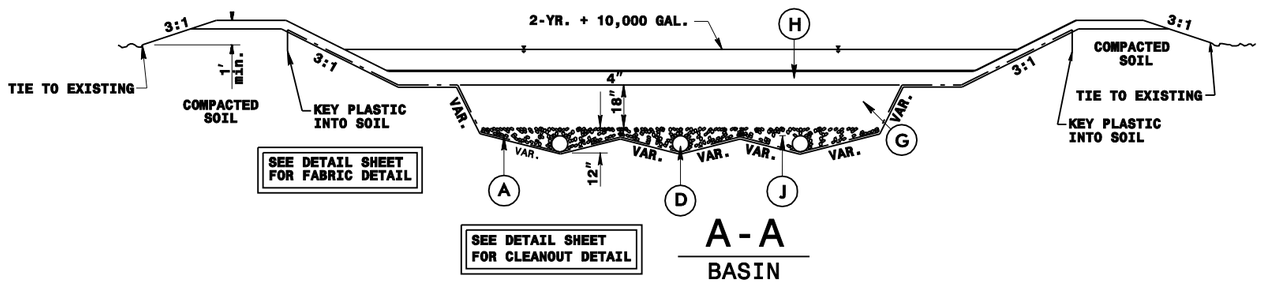
TYPICAL DETAIL OF OUTLET HAZARDOUS SPILL BASIN

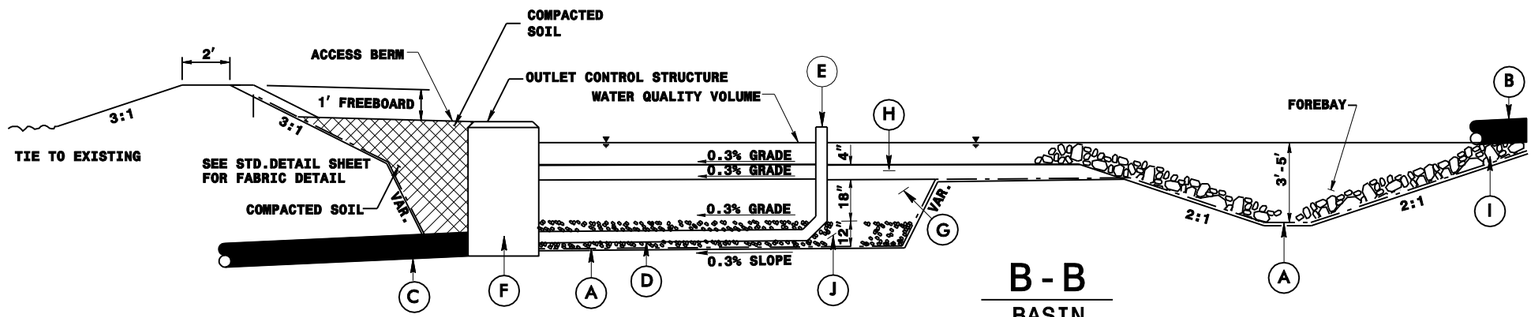
MATERIALS	
A	10MM IMPERVIOUS PLASTIC
B	INLET PIPE
C	OUTFALL PIPE
D	6" PERFORATED HDPE D/W W/ FILTER SOCK (UNDERDRAIN)
E	6" HDPE N12 D/W SOLID CLEANOUT PIPE
F	OUTLET CONTROL STRUCTURE (SEE OUTLET CONTROL STRUCTURE] STD. DETAIL)
G	WASHED CONCRETE SAND (ASTM C-33 OR AASHTO M-6)
H	SOIL REINFORCEMENT
I	CLASS B RIP RAP
J	WASH STONE NO. 57 AS PER NCDOT SPEC.



BASIN



A-A
BASIN



B-B
BASIN

*NOT TO SCALE

TABLE"A"

DIMENSIONS FOR UNDERDRAIN PIPE & FILTER BED				
BASIN	UNDERDRAIN DIMENSIONS		FILTER BED DIMENSIONS	
	SPACING(u1)	LENGTH(u2)	WIDTH(f1)	LENGTH(f2)
NORTHBOUND				
SOUTHBOUND				

TYPICAL SECTIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-0
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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3733 National Drive, Suite 207 Raleigh, N.C. 27612

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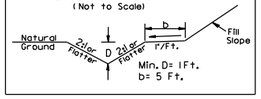
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-P
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

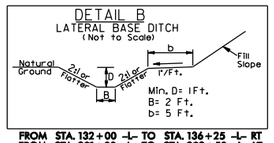
BARNHILL CONTRACTING COMPANY

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



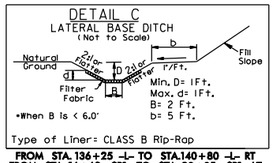
FROM STA. 132+00 -L- TO STA. 137+50 -L- LT
FROM STA. 149+50 -L- TO STA. 153+25 -L- RT
FROM STA. 176+00 -L- TO STA. 179+22 -L- RT
FROM STA. 23+15 -Y3- TO STA. 26+50 -Y3- LT
FROM STA. 18+50 -Y3- TO STA. 20+24 -Y3- RT
FROM STA. 216+50 -L- TO STA. 219+23 -L- RT
FROM STA. 29+50 -Y5- TO STA. 32+05 -Y5- LT
FROM STA. 20+50 -Y6- TO STA. 22+41 -Y6- LT
FROM STA. 21+00 -Y6- TO STA. 22+42 -Y6- RT
FROM STA. 3+20 -LP2C- TO STA. 5+44 -LP2C- RT
FROM STA. 1+80 -LP2C- TO STA. 4+00 -LP2C- LT
FROM STA. 4+50 -LP2C- TO STA. 5+50 -LP2C- LT
FROM STA. 6+50 -LP2B- TO STA. 8+50 -LP2B- RT
FROM STA. 408+00 -L- TO STA. 409+50 -L- LT
FROM STA. 411+90 -L- TO STA. 416+00 -L- LT
FROM STA. 17+00 -Y10- TO STA. 20+61 -Y10- LT
FROM STA. 23+10 -Y10- TO STA. 24+20 -Y10 RT
FROM STA. 15+00 -Y3- TO STA. 19+50 -Y3- LT
FROM STA. 29+40 -Y5- TO STA. 30+24 -Y5- RT
FROM STA. 22+41 -Y6- TO STA. 24+67 -Y6- LT
FROM STA. 24+90 -Y6- TO STA. 26+00 -Y6- LT
FROM STA. 15+81 -Y11- TO STA. 16+42 -Y11- RT
FROM STA. 14+50 -Y11- TO STA. 16+55 -Y11- LT
FROM STA. 26+00 -Y7- TO STA. 28+00 -Y7- RT
FROM STA. 82+84 -Y12- TO STA. 85+50 -Y12- RT
FROM STA. 29+50 -Y5- TO STA. 32+00 -Y5- LT
FROM STA. 29+92 -Y10- TO STA. 31+00 -Y10- LT
FROM STA. 48+59 -Y12- TO STA. 49+37 -Y12- LT
FROM STA. 11+00 -DR3- TO STA. 11+50 -DR3- LT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



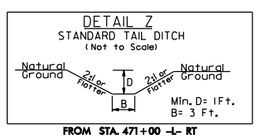
FROM STA. 132+00 -L- TO STA. 136+25 -L- RT
FROM STA. 291+00 -L- TO STA. 292+50 -L- LT
FROM STA. 345+50 -L- TO STA. 347+00 -L- RT
FROM STA. 4+00 -LP2C- TO STA. 4+50 -LP2C- LT
FROM STA. 418+50 -L- TO STA. 422+00 -L- LT
FROM STA. 21+72 -SR4- TO STA. 22+72 -SR4- RT
FROM STA. 477+15 -L- TO STA. 477+50 -L- LT
FROM STA. 34+08 -RP3C- TO STA. 37+16 -RP3C- RT
FROM STA. 27+10 -RP3CA- TO STA. 30+35 -RP3CA- LT
FROM STA. 2+00 -LP3CA- TO STA. 9+90 -LP3CA- RT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



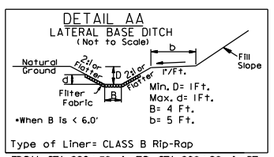
FROM STA. 136+25 -L- TO STA.140+80 -L- RT
FROM STA. 16+63 -SR1- TO STA. 20+05 -SR1- LT
FROM STA. 240+00 -L- TO STA. 241+00 -L- LT
FROM STA. 50+47 -SR2- TO STA. 55+07 -SR2- LT
FROM STA. 55+07 -SR2- TO STA. 58+00 -SR2- RT
FROM STA. 35+50 -Y5- TO STA. 38+92 -Y5- LT
FROM STA. 26+54 -RP2B- TO STA. 30+70 -RP2B- LT
FROM STA. 24+71 -SR3- TO STA. 27+30 -SR3- LT
FROM STA. 16+22 -SR4- TO STA. 18+22 -SR4- RT
FROM STA. 18+17 -SR6- TO STA. 18+67 -SR6- LT
FROM STA. 477+50 -L- TO STA. 478+50 -L- LT
FROM STA. 11+50 -RP3BD- TO STA. 14+50 -RP3BD- RT
FROM STA. 30+35 -RP3CA- TO STA. 34+00 -RP3CA- LT

DETAIL Z
STANDARD TAIL DITCH
(Not to Scale)



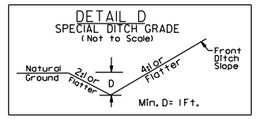
FROM STA. 471+00 -L- RT

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)



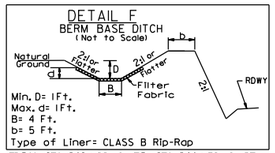
FROM STA. 228+50 -L- TO STA. 230+20 -L- RT

DETAIL D
SPECIAL DITCH GRADE
(Not to Scale)



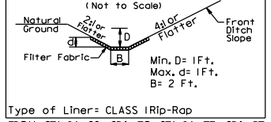
FROM STA. 140+50 -L- TO STA. 142+00 -L- LT
FROM STA. 155+00 -L- TO STA. 161+50 -L- LT
FROM STA. 155+00 -L- TO STA. 159+00 -L- MD
FROM STA. 164+24 -L- TO STA. 166+50 -L- LT
FROM STA. 172+50 -L- TO STA. 173+80 -L- LT
FROM STA. 176+00 -L- TO STA. 181+00 -L- LT
FROM STA. 199+10 -L- TO STA. 200+15 -L- LT
FROM STA. 233+00 -L- TO STA. 234+50 -L- LT
FROM STA. 232+50 -L- TO STA. 234+50 -L- MD
FROM STA. 232+00 -L- TO STA. 234+50 -L- RT
FROM STA. 249+00 -L- TO STA. 256+00 -L- LT
FROM STA. 262+00 -L- TO STA. 268+00 -L- LT
FROM STA. 271+00 -L- TO STA. 278+19 -L- LT
FROM STA. 280+50 -L- TO STA. 288+50 -L- LT
FROM STA. 304+50 -L- TO STA. 308+42 -L- LT
FROM STA. 303+00 -L- TO STA. 307+58 -L- RT
FROM STA. 13+50 -Y6- TO STA. 15+00 -Y6- RT
FROM STA. 324+00 -L- TO STA. 325+00 -L- RT
FROM STA. 351+50 -L- TO STA. 352+50 -L- LT
FROM STA. 14+88 -RP2C- TO STA. 16+30 -RP2C- LT
FROM STA. 347+00 -L- TO STA. 348+00 -L- RT
FROM STA. 334+50 -L- TO STA. 337+50 -L- LT
FROM STA. 342+00 -L- TO STA. 345+50 -L- RT
FROM STA. 21+50 -RP2B- TO STA. 21+95 -RP2B-RT
FROM STA. 378+50 -L- TO STA. 379+14 -L- LT
FROM STA. 383+50 -L- TO STA. 389+00 -L- RT
FROM STA. 27+20 -SR1- TO STA. 27+60 -SR1- LT
FROM STA. 11+50 -SR3- TO STA. 13+00 -SR3- RT
FROM STA. 403+00 -L- TO STA. 408+00 -L- LT
FROM STA. 405+50 -L- TO STA. 409+00 -L- RT
FROM STA. 10+30 -SR5- TO STA. 11+00 -SR5- LT
FROM STA. 27+22 -SR4- TO STA. 29+72 -SR4- LT
FROM STA. 418+00 -L- TO STA. 418+50 -L- LT
FROM STA. 463+10 -L- TO STA. 467+50 -L- LT
FROM STA. 463+50 -L- TO STA. 465+00 -L- RT
FROM STA. 16+17 -SR6- TO STA. 18+67 -SR6- RT
FROM STA. 14+33 -SR6- TO STA. 15+24 -SR6- LT
FROM STA. 457+50 -L- TO STA. 460+00 -L- RT
FROM STA. 478+50 -L- TO STA. 479+00 -L- LT
FROM STA. 485+50 -L- TO STA. 490+50 -L- LT
FROM STA. 487+50 -L- TO STA. 488+67 -L- RT
FROM STA. 37+16 -RP3C- TO STA. 38+80 -RP3C- RT
FROM STA. 34+08 -RP3C- TO STA. 41+57 -RP3C- LT
FROM STA. 48+00 -RP3C- TO STA. 48+50 -RP3C- LT
FROM STA. 10+00 -RP3BD- TO STA. 12+00 -RP3BD- LT
FROM STA. 50+00 -RP3C- TO STA. 54+13 -RP3C- LT
FROM STA. 48+50 -Y12- TO STA. 51+00 -Y12- RT
FROM STA. 12+70 -Y3- TO STA. 15+50 -Y3- LT
FROM STA. 26+50 -Y3- TO STA. 29+00 -Y3- LT
FROM STA. 27+25 -Y3- TO STA. 28+00 -Y3- RT
FROM STA. 19+90 -Y5- TO STA. 20+83 -Y5- LT
FROM STA. 21+08 -Y5- TO STA. 23+00 -Y5- LT
FROM STA. 28+00 -Y5- TO STA. 29+32 -Y5- LT
FROM STA. 20+00 -Y5- TO STA. 23+00 -Y5- RT
FROM STA. 22+42 -Y6- TO STA. 25+37 -Y6- RT
FROM STA. 11+00 -Y7- TO STA. 15+00 -Y7- RT
FROM STA. 11+00 -Y7- TO STA. 20+50 -Y7- LT
FROM STA. 19+50 -Y7- TO STA. 20+77 -Y7- RT
FROM STA. 10+40 -Y11- TO STA. 11+70 -Y11- RT
FROM STA. 23+50 -Y7- TO STA. 24+18 -Y7- RT
FROM STA. 16+42 -Y11- TO STA. 20+00 -Y11- RT
FROM STA. 45+50 -Y7- TO STA. 49+50 -Y7- LT
FROM STA. 43+50 -Y7- TO STA. 46+00 -Y7- RT
FROM STA. 25+00 -Y8- TO STA. 28+50 -Y8- LT
FROM STA. 13+00 -Y10- TO STA. 14+00 -Y10- RT
FROM STA. 32+50 -Y10- TO STA. 35+00 -Y10- LT
FROM STA. 31+50 -Y10- TO STA. 35+00 -Y10- RT
FROM STA. 40+00 -Y12- TO STA. 40+38 -Y12- RT
FROM STA. 71+00 -Y12- TO STA. 76+00 -Y12- LT
FROM STA. 29+30 -RP3BD- TO STA. 30+57 -RP3BD- LT
FROM STA. 12+55 -Y8- TO STA. 15+50 -Y8- LT
FROM STA. 28+00 -Y8- TO STA. 28+50 -Y8- RT
FROM STA. 33+50 -Y12- TO STA. 39+00 -Y12- RT
FROM STA. 20+30 -Y11- TO STA. 21+00 -Y11- LT
FROM STA. 14+00 -Y10- TO STA. 17+00 -Y10- LT
FROM STA. 15+00 -Y10- TO STA. 17+00 -Y10- RT
FROM STA. 31+00 -Y10- TO STA. 31+50 -Y10- LT
FROM STA. 157+00 -L- TO STA. 158+00 -L- RT
FROM STA. 28+50 -Y10- TO STA. 30+00 -Y10- RT

DETAIL F
BERM BASE DITCH
(Not to Scale)



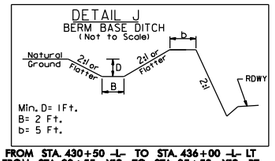
FROM STA. 263+00 -L- TO STA. 266+50 -L- RT

DETAIL H
SPECIAL CUT BASE DITCH
(Not to Scale)



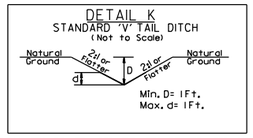
FROM STA. 14+33 -SR6- TO STA. 14+77 -SR6- RT
FROM STA. 11+50 -DRIVE3- TO STA. 12+00 -DRIVE3- RT

DETAIL J
BERM BASE DITCH
(Not to Scale)



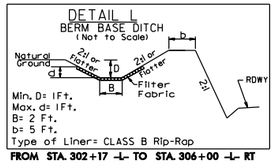
FROM STA. 430+50 -L- TO STA. 436+00 -L- LT
FROM STA. 33+55 -Y12- TO STA. 35+50 -Y12- RT

DETAIL K
STANDARD 'V' TAIL DITCH
(Not to Scale)



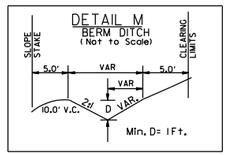
FROM STA. 55+72 -SR1- TO STA. 55+72 -SR1- LT
FROM STA. 26+80 -Y3- TO STA. 26+80 -Y3- RT

DETAIL L
BERM BASE DITCH
(Not to Scale)



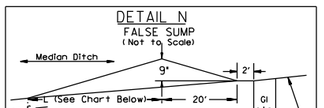
FROM STA. 302+17 -L- TO STA. 306+00 -L- RT

DETAIL M
BERM DITCH
(Not to Scale)



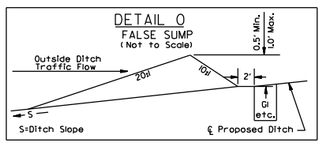
FROM STA. 205+50 -L- TO STA. 221+50 -L- LT
FROM STA. 266+50 -L- TO STA. 272+50 -L- RT
FROM STA. 301+00 -L- TO STA. 302+17 -L- RT
FROM STA. 14+40 -RP2C- TO STA. 19+00 -RP2C- RT
FROM STA. 1+94 -LP2B- TO STA. 4+00 -LP2B- LT
FROM STA. 463+05 -L- TO STA. 464+50 -L- LT
FROM STA. 461+10 -L- TO STA. 461+98 -L- LT
FROM STA. 39+50 -Y12- TO STA. 40+21 -L- RT

DETAIL N
FALSE SUMP
(Not to Scale)

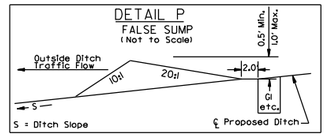


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

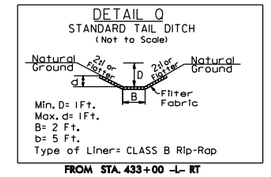
DETAIL O
FALSE SUMP
(Not to Scale)



DETAIL P
FALSE SUMP
(Not to Scale)

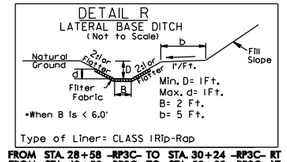


DETAIL Q
STANDARD TAIL DITCH
(Not to Scale)



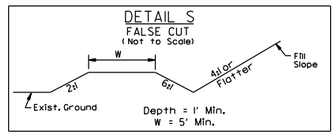
FROM STA. 433+00 -L- RT

DETAIL R
LATERAL BASE DITCH
(Not to Scale)



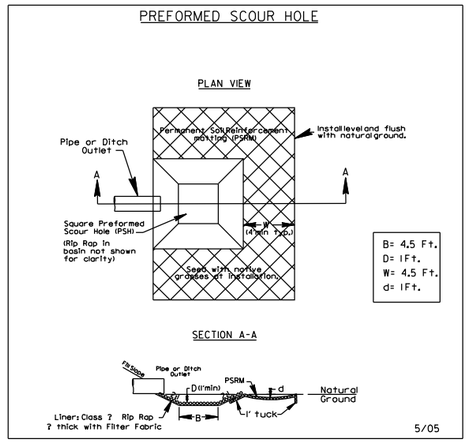
FROM STA. 28+58 -RP3C- TO STA. 30+24 -RP3C- RT
FROM STA. 48+50 -RP3C- TO STA. 50+00 -RP3C- LT
FROM STA. 14+50 -RP3BD- TO STA. 15+96 -RP3BD- RT
FROM STA. 18+84 -RP3BD- TO STA. 20+00 -RP3BD- LT
FROM STA. 48+50 -Y12- TO STA. 50+00 -Y12- RT
FROM STA. 490+50 -L- TO STA. 493+00 -L- RT

DETAIL S
FALSE CUT
(Not to Scale)

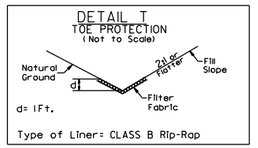


FROM STA. 250+00 -L- TO STA. 251+50 -L- RT

PREFORMED SCOUR HOLE

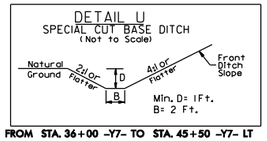


DETAIL T
TOE PROTECTION
(Not to Scale)



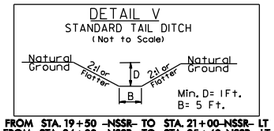
FROM STA. 158+00 -L- TO STA. 159+60 -L- RT
FROM STA. 277+30 -L- TO STA. 280+00 -L- RT
FROM STA. 370+00 -L- TO STA. 375+50 -L- LT
FROM STA. 368+00 -L- TO STA. 375+00 -L- RT
FROM STA. 374+50 -L- TO STA. 387+50 -L- LT
FROM STA. 385+00 -L- TO STA. 159+60 -L- RT
FROM STA. 425+50 -L- TO STA. 427+50 -L- LT
FROM STA. 423+00 -L- TO STA. 427+65 -L- RT
FROM STA. 444+20 -L- TO STA. 446+00 -L- RT
FROM STA. 12+00 -RP3BD- TO STA. 14+50 -RP3BD- RT

DETAIL U
SPECIAL CUT BASE DITCH
(Not to Scale)



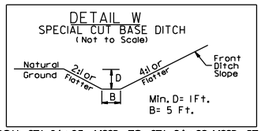
FROM STA. 36+00 -Y7- TO STA. 45+50 -Y7- LT

DETAIL V
STANDARD TAIL DITCH
(Not to Scale)



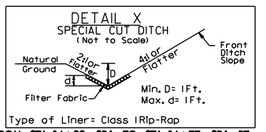
FROM STA. 19+50 -NSSR- TO STA. 21+00-NSSR- LT
FROM STA. 34+00 -NSSR- TO STA. 35+40-NSSR- LT

DETAIL W
SPECIAL CUT BASE DITCH
(Not to Scale)



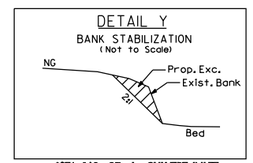
FROM STA. 14+35 -NSSR- TO STA. 26+32-NSSR- RT
FROM STA. 16+82 -NSSR- TO STA. 26+32-NSSR- LT

DETAIL X
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 14+33 -SR6- TO STA. 14+77 -SR6- RT

DETAIL Y
BANK STABILIZATION
(Not to Scale)



*STA. 163+97 -L- CULVERT INLET
(*LINED W/CL.1 RIP RAP)

STA. 230+64 -L- CULVERT INLET
STA. 238+46 -L- CULVERT INLET
STA. 450+23 -L- CULVERT INLET

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$FILE$

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-Q
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

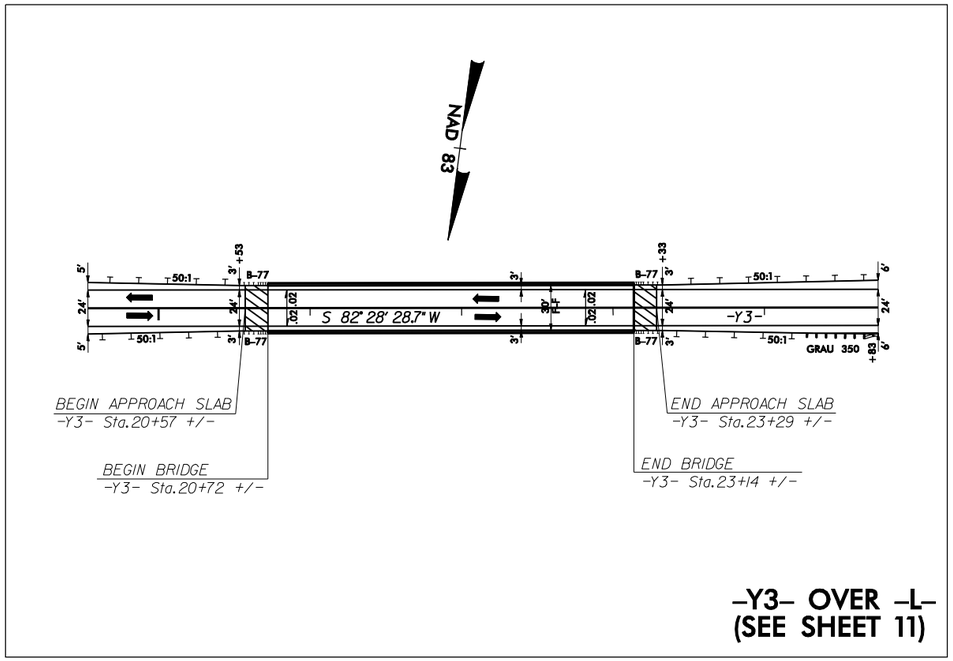
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

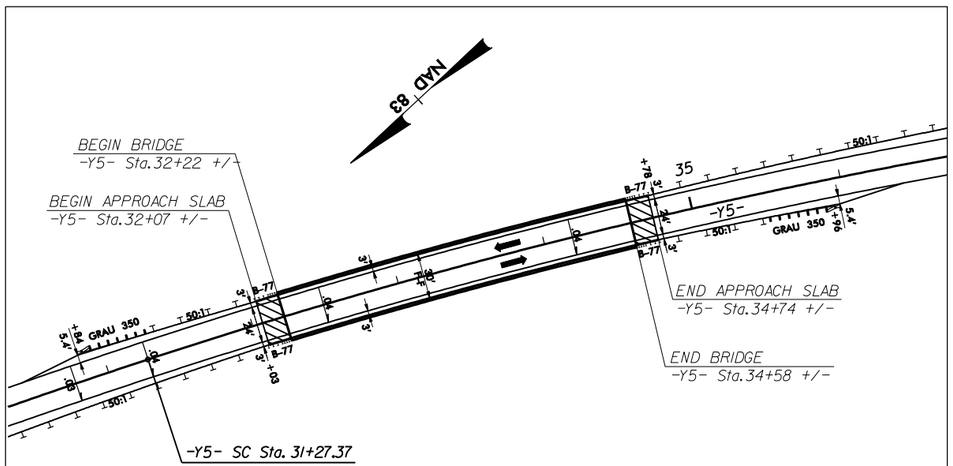
BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99



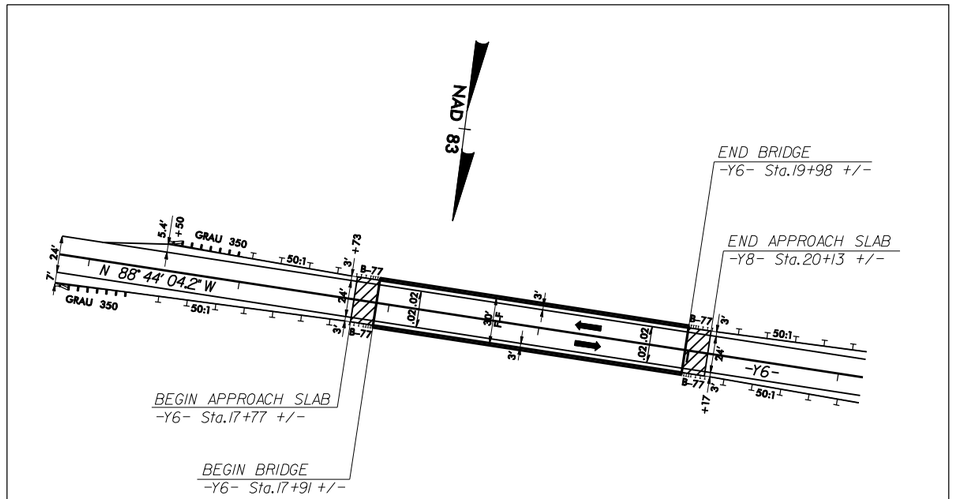
-Y3- OVER -L-
(SEE SHEET 11)



-Y5-

PIs Sta 30+60.71	PI Sta 35+49.20	PIs Sta 40+34.60
Θs = 1° 25' 56.6"	Δ = 12° 02' 24.6" (RT)	Θs = 1° 25' 56.6"
Ls = 200.00'	D = 1° 25' 56.6"	Ls = 200.00'
LT = 133.34'	L = 840.56'	LT = 133.34'
ST = 66.67'	T = 421.83'	ST = 66.67'
	R = 4,000.00'	
	DS = 60 mph	
	e = 0.04	

-Y5- OVER -L-
(SEE SHEET 19)



-Y6- OVER -L-
(SEE SHEET 20)

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-R
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

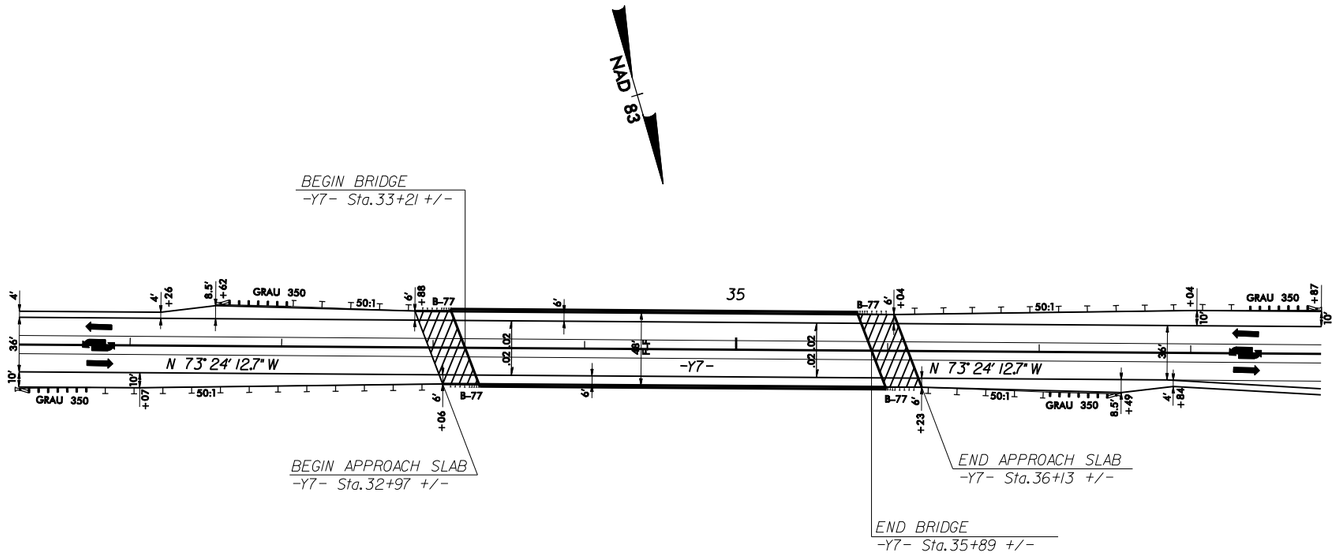
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

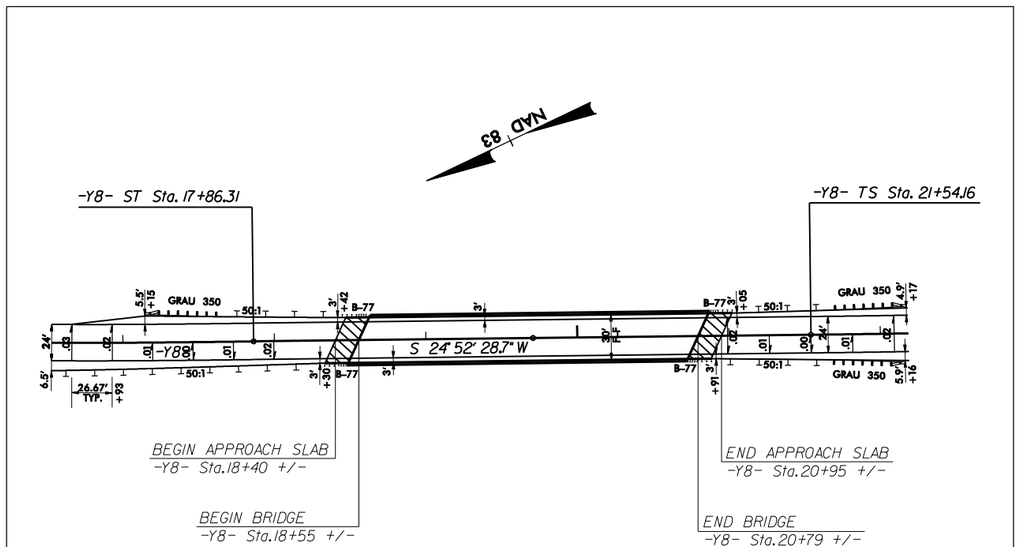
BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99



-Y7- OVER -L-
(SEE SHEET 22)



-Y8- OVER -L-
(SEE SHEET 26)

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-S
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

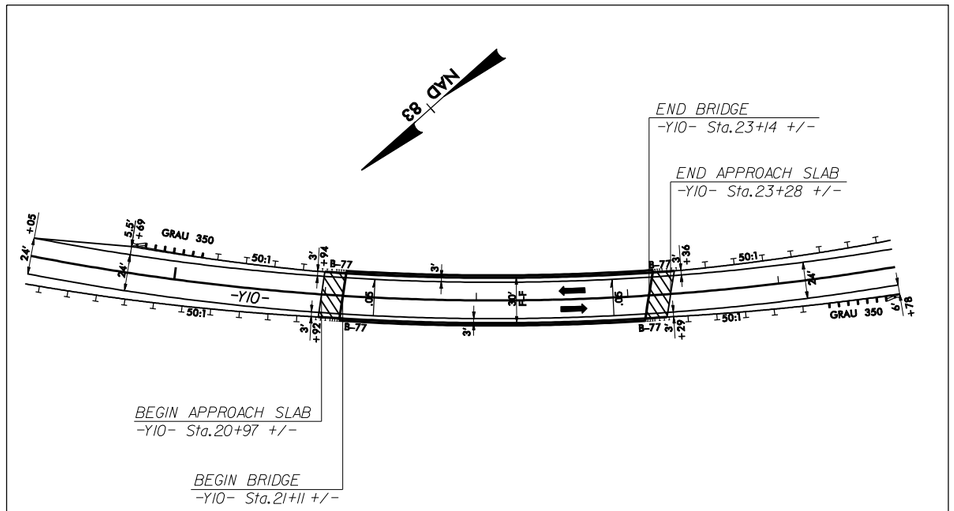
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

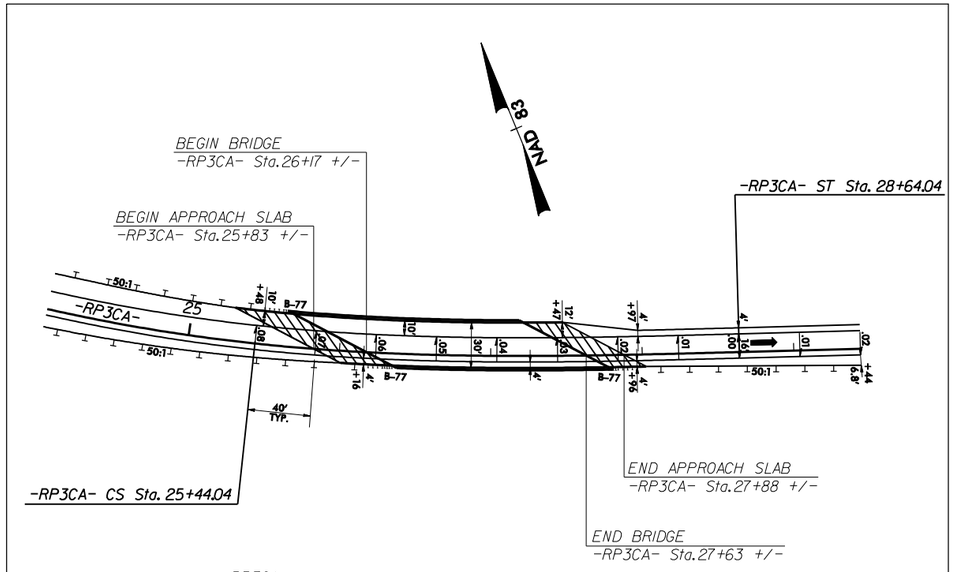
8/17/99



-Y10-

PIs Sta 14+08.38	PI Sta 24+73.51	PIs Sta 33+27.06
Θs = 3° 34' 51.6"	Δ = 6.3° 55' 59.7" (LT)	Θs = 3° 34' 51.6"
Ls = 200.00'	D = 3° 34' 51.6"	Ls = 200.00'
LT = 133.36'	L = 1,785.35'	LT = 133.36'
ST = 66.69'	T = 998.50'	ST = 66.69'
	R = 1,600.00'	
	DS = 50 mph	
	e = 0.05	

-Y10- OVER -L-
(SEE SHEET 30)



-RP3CA-

PIs Sta 21+27.85	PI Sta 23+90.04	PIs Sta 26+50.89
Θs = 7° 38' 22.0"	Δ = 14° 47' 17.7" (LT)	Θs = 7° 38' 22.0"
Ls = 320.00'	D = 4° 46' 28.7"	Ls = 320.00'
LT = 213.53'	L = 309.72'	LT = 213.53'
ST = 106.85'	T = 155.73'	ST = 106.85'
	R = 1,200.00'	
	DS = 60 mph	
	e = 0.08	

-RP3CA- OVER -L-
(SEE SHEET 32)

3/16/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	2-T
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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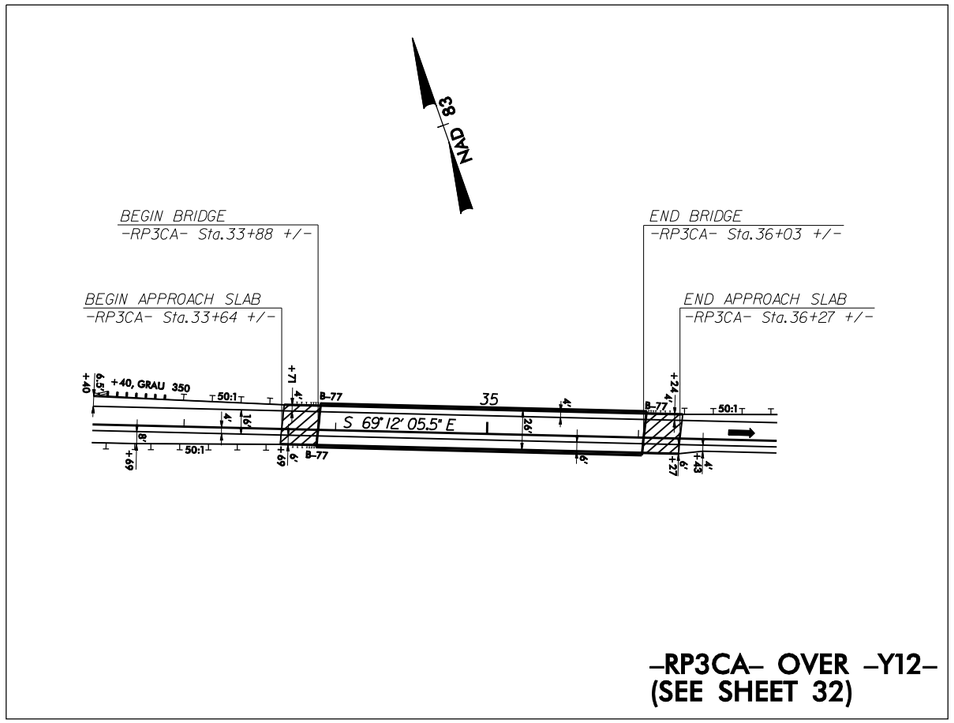
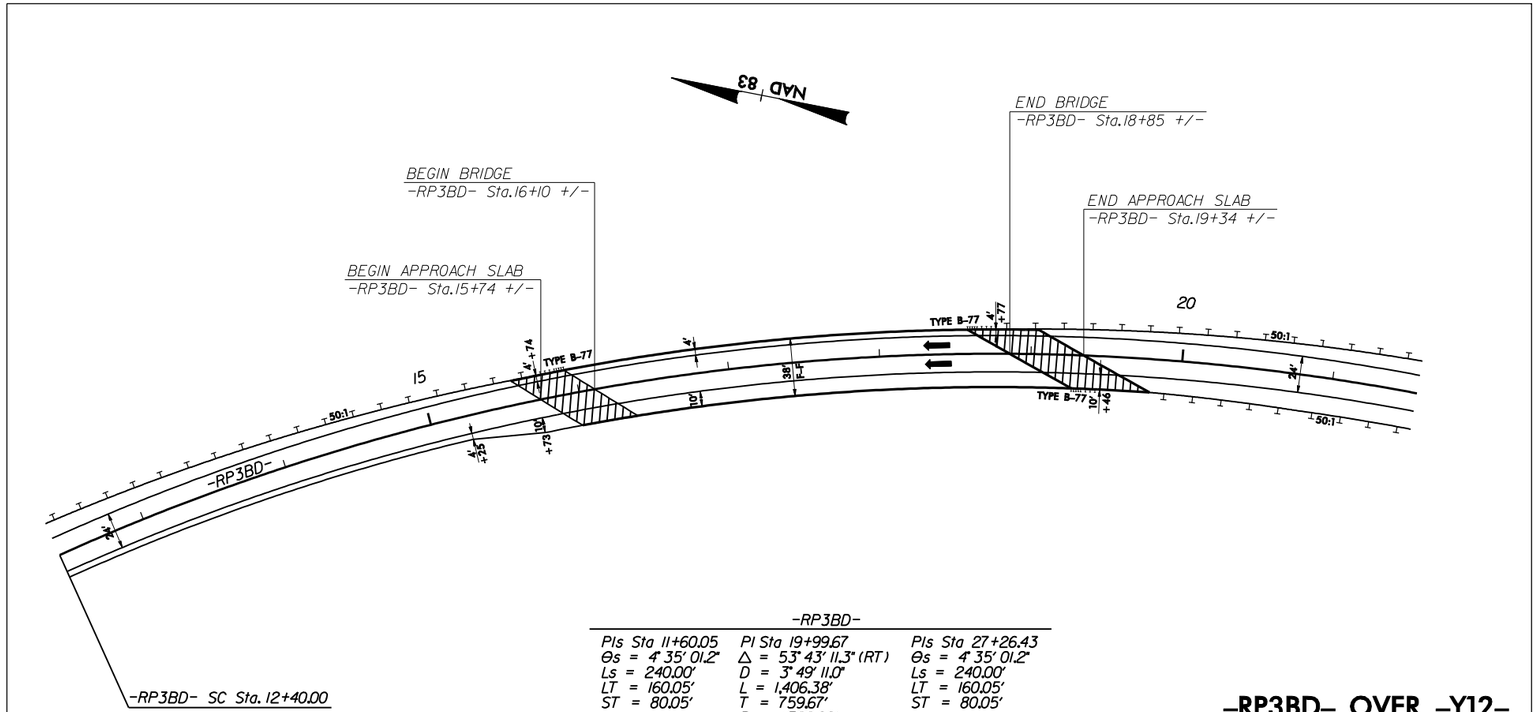
BARNHILL CONTRACTING COMPANY



-RP3CA- OVER -Y12-
(SEE SHEET 32)



-RP3BD-

PIs Sta 11+60.05	PI Sta 19+99.67	PIs Sta 27+26.43
Θs = 4° 35' 01.2"	Δ = 53° 43' 11.3" (RT)	Θs = 4° 35' 01.2"
Ls = 240.00'	D = 3° 49' 11.0"	Ls = 240.00'
LT = 160.05'	L = 1,406.38'	LT = 160.05'
ST = 80.05'	T = 759.67'	ST = 80.05'
	R = 1,500.00'	
	DS = 60 mph	
	e = 0.06	

-RP3BD- OVER -Y12-
(SEE SHEET 32)

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

MATCHLINE STA. 95+00 –L– SEE SHEET NO. 3

MATCHLINE STA. 99+00 –L– SEE SHEET NO. 5

NAD 83

EXISTING R/W LINE

EXISTING C/A LINE

-L- POT Sta. 95+00.00

S 45° 41' 51.2" E

-L-

PROP. SLOPE STAKES

BEGIN FULL DEPTH PAVING; R-2606B
GRADING TO BE PERFORMED BY OTHERS
-L- POT Sta. 97+00.00

EXISTING C/A LINE

MICAH L. MCDOWELL
DB 1501 PG 1762

JERRY R. JOYCE
DB 181 PG 644

ELIZABETH POLWELL
DB 822 PG 322

PAUL G. SEWARD
DB 1108 PG 181

ANN H. POOLE
DB 783 PG 566
DB 621 PG 264
DB 1065 PG 370

GRAND FURNITURE, INC.
DB 1082 PG 1322

CLARK O. POOLE
DB 1352 PG 1622

JAMES E. HARRELSON
DB 1060 PG 211

JANIE D. MCCRACKEN
DB 1218 PG 950

ROGER K. AIKENS
DB 1171 PG 865

DONALD R. SPELL
DB 1478 PG 1588

L. G. BOWMAN, JR.
DB 458 PG 10
DB 1151 PG 807

50' STREAM BUFFER

POND

TO US 30

ALL PROPOSED DRAINAGE STRUCTURES FROM R-2606A SHALL BE RETAINED

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS
SEE SHEET NO. 51 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NCHO 63

MATCHLINE STA. 99+00 -L- SEE SHEET NO. 4

MATCHLINE STA. 125+00 -L- SEE SHEET NO. 6

-L-
PI Sta 103+21.71
Δ = 1°37' 03.2" (LT)
D = 0°20' 50.1"
L = 465.8'
T = 232.92'
R = 16,500.00'
DS = 70 mph
e = 0.02

-RAMPA-
PIs Sta 1+53.36
Θs = 3°28' 04.4"
Ls = 230.00'
LT = 153.36'
ST = 76.69'

-RAMPA-
PI Sta 6+28.69
Δ = 63° 42' 06.2" (RT)
D = 3°00' 56.0"
L = 765.98'
T = 398.69'
R = 1,900.00'

PIs Sta 10+92.67
Θs = 3°28' 04.4"
Ls = 230.00'
LT = 153.36'
ST = 76.69'

-L-
PI Sta 111+17.24
Δ = 1°48' 53.1" (RT)
D = 0°20' 50.1"
L = 522.6'
T = 261.3'
R = 16,500.00'
DS = 70 mph
e = NC

-RAMPD-
PIs Sta 9+41.49
Θs = 2° 41' 59.3"
Ls = 180.00'
LT = 120.01'
ST = 60.01'

-RAMPD-
PI Sta 5+34.74
Δ = 37° 05' 34.7" (LT)
D = 2° 59' 59.2"
L = 701.49'
T = 364.74'
R = 1910.00'

PIs Sta 11+20.01
Θs = 2° 41' 59.3"
Ls = 180.00'
LT = 120.01'
ST = 60.01'

-RAMPD-
PIs Sta 13+81.53
Θs = 5° 23' 58.6"
Ls = 180.00'
LT = 120.06'
ST = 60.05'

-RAMPD-
PI Sta 15+90.25
Δ = 17° 42' 31.3" (RT)
D = 5° 59' 58.4"
L = 295.17'
T = 148.71'
R = 955.00'

-L- PC Sta. 100+88.79

-L- PT Sta. 105+54.60

-L- PC Sta. 110+00.00

-L- PT Sta. 119+78.52

-L- PC Sta. 114+55.91

-RAMPA- POT Sta. 17+83.01

BEGIN CONSTRUCTION R-2606B
-RAMPD- Sta. 16+89.71

BEGIN FULL DEPTH PAVING R-2606B
GRADING TO BE PERFORMED BY OTHERS
-RAMPA- POT Sta. 16+56.38

-RAMPA- ST Sta. 12+45.98

-RAMPA- CS Sta. 10+15.98

-RAMPD- SC Sta. 1+80.00

-RAMPD- ST Sta. 0+00.00 =
-L- POT Sta. 124+40.00
OFFSET 59.00' RIGHT

-RAMPD- CS Sta. 8+81.48

-RAMPD- ST Sta. 10+61.48

-RAMPD- TS Sta. 12+61.48

-RAMPD- SC Sta. 14+41.48

-RAMPD- PT Sta. 17+36.64

-RAMPD- POT Sta. 17+60.15

BEGIN CONSTRUCTION R-2606B
-RAMPD- Sta. 16+96.24

BEGIN FULL DEPTH PAVING R-2606B
GRADING TO BE PERFORMED BY OTHERS
-RAMPD- POC Sta. 16+67.00

BEGIN FULL DEPTH PAVING R-2606B
GRADING TO BE PERFORMED BY OTHERS
-L- POC Sta. 115+00.00

S 47° 18' 54.2" E

S 45° 41' 51.2" E

S 45° 30' 01.1" E

N 48° 50' 03.2" W

N 17° 26' 33.9" W

EXISTING R/W LINE

EXISTING CA LINE

EXISTING CA FENCE

PROP. GUARDRAIL & SBO

PROP. SLOPE STAKES

50' STREAM BUFFER

ELIZABETH FOLWELL DB 822 PG 322

R.J. BROWN EST. DB 376 PG 532

ALDENE BOWMAN DB 976 PG 580

JOHN S. ALLRED DB 1042 PG 758

DONALD W. BOWMAN DB 151 PG 814

ANN N. POOLE DB 1065 PG 570

CLYDE R. SPENCER DB 1037 PG 534

THOMAS S. EDMONDS DB 1337 PG 1457 PB 34 PG 88

CLYDE R. SPENCER DB 633 PG 648 DB 937 PG 534

CLYDE R. SPENCER DB 69 PG 364 DB 964 PG 21

L. G. BOWMAN, JR. DB 458 PG 61 DB 155 PG 807

EARL Y. W. BOWMAN DB 151 PG 810

THOMAS S. EDMONDS DB 1387 PG 874

WADE M. LOVE DB 1021 PG 816

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 51-52 FOR -L- PROFILE.
SEE SHEET NO. 106 FOR -RAMPA- PROFILE.
SEE SHEET NO. 107 FOR -RAMPD- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

ALL PROPOSED DRAINAGE STRUCTURES FROM R-2606A SHALL BE RETAINED

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

3/17/2020
12:42:08 PM
...\2606B_sht_plan_stk_dgn.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-RAMPA-

PIs Sta 1+53.36
Θs = 3° 28' 04.4"
Ls = 230.00'
LT = 153.36'
ST = 76.69'

PI Sta 6+28.69
Δ = 23° 42' 06.2" (RT)
D = 3° 00' 56.0'
L = 785.98'
T = 398.69'
R = 1,900.00'

PIs Sta 10+92.67
Θs = 3° 28' 04.4"
Ls = 230.00'
LT = 153.36'
ST = 76.69'

-L-

PIs Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1,700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PIs Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SRI-

PI Sta 11+33.50
Δ = 48° 23' 33.7" (LT)
D = 22° 55' 05.9"
L = 211.15'
T = 112.34'
R = 250.00'
DS = 30 mph
e = 0.04

NAD 83

417.88' TOTAL EIP TO EIP)
N04°38'24"W 402.77'

WALTER H. GRAY, JR.
DB 1016 PG 546
DB 1016 PG 38

-SRI- PC Sta. 10+21.17

BEGIN CONSTRUCTION
-SRI- Sta. 10+10.00

S 3° 29' 09.6" W

RANDALL C. SPENCER
DB 966 PG 211

CLYDE R. SPENCER
DB 651 PG 364
DB 966 PG 211

-RAMPA- SC Sta. 2+30.00

EXISTING C/A FENCE

BEGIN PROJECT: R-2606B
-L- POT Sta.132+00.00

-RAMPA- ST Sta. 0+00.00 =
-L- POT Sta. 127+80.00
OFFSET 59.00' LEFT

BEGIN GRADING

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

END OF ROADWAY MARKERS

BEGIN PROP. C/A FENCE
STATE PROJ: R-2606B
-L- +91.95
145.00' LT

-L- TS Sta. 136+50.94

-L- +50.94
145.00' LT

PROP. SLOPE STAKES

LATERAL "V" DITCH SEE DETAIL "A"

100' TYP.

+13, BEGIN PROP. DBL. FACE CBL. GUIDERAIL -L-

+88, PROP. GUIDERAIL ANCHOR

16:1 TAPER

PROP. DBL. FACE CBL. GUIDERAIL

2GI FS

2' LATERAL BASE DITCH SEE DETAIL "B"

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

-L- +30.39
160.00 RT

PROP. C/A FENCE

MATCHLINE STA. 125+00 -L- SEE SHEET NO. 5

MATCHLINE STA. 138+00 -L- SEE SHEET NO. 7

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 52 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
SEE SHEET NO. 106 FOR -RAMPA- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

ALL PROPOSED DRAINAGE STRUCTURES FROM R-2606A SHALL BE RETAINED

WADE M. LOVE
DB 1021 PG 816

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1,700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PIs Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SRI-

PI Sta 11+33.50
Δ = 48° 23' 33.7" (LT)
D = 22° 55' 05.9"
L = 211.15'
T = 112.34'
R = 250.00'
DS = 30 mph
e = 0.04

PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1,795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

NAD 83

RANDALL C. SPENCER
DB 1043 PG 223

RANDALL C. SPENCER
DB 966 PG 211

-SRI- PRC Sta. 12+32.32

BEGIN PROP. R/W
STATE PROJ: R-2606B
-SRI- +80.59
75.00' LT

PROP. R/W

R=12745'

-SRI- +00.00
75.00' LT

2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
SEE DETAIL "C"

SITE 13

-SRI- +62.00
90.00' LT

CHORD

-SRI- +50.00
75.00' LT

PROP. SLOPE STAKES

PROP. GUARDRAIL

+00, GRAU 350

-SRI-

-L- +50.94
135.00' LT

PROP. C/A FENCE

SDG
SEE DETAIL "D"

T67.107'

2GI

FS

PROP. DBL. FACE
CBL. GUIDERAIL

6.04 ft CLEARANCE

+75, PROP.
GUIDERAIL ANCHOR

+25, PROP.
GUIDERAIL ANCHOR

2GI (D)

2GI W/
FLAT
GRATE

-L-

MATCHLINE STA. 138+00 -L- SEE SHEET NO. 6

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 8

-L- SC Sta. 138+50.94

+00, GRAU 350

+50, BEGIN
SBG

BYPASS
STRUCTURE

BYPASS
CHANNEL

PROP. SHOULDER BERM GUTTER

LEVEL
SPREADER

EMERGENCY
OVERFLOW

30' DIAMETER FOREBAY
CLASS 'B' RIP RAP
2:1 SIDES
3' DEEP

DRY DETENTION /
HAZARDOUS SPILL BASIN

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

LATERAL "V" DITCH
SEE DETAIL "A"

BEGIN PROP. R/W
STATE PROJ: R-2606B
-L- +19.73
160.00' RT

-L- +58.89
219.95' RT

-L- +98.50
160.00' RT

R=12340'

R=12340'

PROP. R/W

EXISTING R/W

PROP. C/A FENCE

CLYDE R. SPENCER
DB 651 PG 364
DB 964 PG 712
DB 966 PG 211

KEVIN D. ALBERTSON
DB 1302 PG 1628

RANDALL C. SPENCER
DB 1043 PG 223

POND

SEE SHEET NO. 2-H FOR DD/HSB #1 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SRI- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 137+84.28
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 147+02.53
Δ = 7° 47' 41.2" (RT)
D = 0° 27' 30.1"
L = 1,700.56'
T = 851.59'
R = 12,500.00'
DS = 70 mph
e = 0.02

PIs Sta 156+18.17
Θs = 0° 27' 30.1"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR1-

PI Sta 21+31.39
Δ = 8° 07' 04.4" (RT)
D = 0° 27' 08.0"
L = 1,795.13'
T = 899.07'
R = 12,670.00'
DS = 50 mph
e = NC

NAD 83

SITE 14

-SR1- PT Sta. 30+27.46

-SR1- +27.46
75.00' LT

R=12745'

PROP. R/W

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

PROP. SLOPE STAKES

SDG
SEE DETAIL "D"

PROP. C/A FENCE

-L- +51.50
135.00' LT

-L- CS Sta. 155+51.50

-L- +51.50
145.00' LT

100'
TYP.

PROP. DBL. FACE
CBL. GUIDERAIL

6.0 in CLEARANCE

7.6 ft CLEARANCE

25' X 35' FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES

PROP. GUARDRAIL

DRY DETENTION /
HAZARDOUS SPILL BASIN

JAMES H. ROBERTS
DB 1382 PG 70

S 36° 47' 19.7" E

+23, CAT-1
8:1

+59
8:1

+00,
GRAU 350
GRADE TO
DRAIN

+50,
BEGIN SRG

TOE PROTECTION
SEE DETAIL "I"

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

-L- ST Sta. 157+51.50

-L- 163+97.82
GP ELEV.=732.16'
SKEW=111°
11'x9' RCBC BURIED 1'

NOTE: STABILIZE STREAM BANKS
AT CULVERT INLET, SEE DETAIL "Y"

SITE 13

-L- +77.76
103.92' RT
BEGIN C/A FENCE

-L- +40.00
160.00' RT

-L- +47.45
390.36 RT

-L- +83.31
378.18 RT

R=12340'

CHORD

-L- +51.50
160.00' RT

LATERAL "V" DITCH
SEE DETAIL "A"

PROP. SLOPE STAKES

MILFRED C. FARLOW
DB 05E PG 298

MILFORD C FARLOW & OTHERS
DB 05E PG 298

MATCHLINE STA. 151+00 -L- SEE SHEET NO. 7

MATCHLINE STA. 164+00 -L- SEE SHEET NO. 9

SEE SHEET NO. 2-L FOR DD/HSB #2 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 53 FOR -L- PROFILE.
SEE SHEET NO. 96 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
3:13:40 PM
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

MATCHLINE STA. 164+00 –L– SEE SHEET NO. 8

MATCHLINE STA. 177+00 –L– SEE SHEET NO. 10

SITE 14

SITE 15

4 JAMES H. ROBERTS DB 1382 PG 70

5 LEWIS J. LOFLIN DB 1102 PG 79

6 DANNY D. PUGH DB 188 PG 251

3A MILFORD C FARLOW & OTHERS DB 05E PG 298

EIP

PDE

–L– +59.00
245.00' LT
& 255.00' LT

–L– +03.00
245.00' LT
& 255.00' LT

CLASS 'I' RIP RAP
EST. 52 TONS
60 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL

JB w/MH

+92.5, GRAU 350

+30, GRAU 350

+00, GRAU 350

+75, GRAU 350

S 36° 47' 19.7" E

-SR1-

SDG
SEE DETAIL "D"

–L– +55.00
135.00' LT
& 145.00' LT.

–L– +85.00
135.00' LT
& 145.00' LT.

PROP. C/A FENCE

5' DIAMETER FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES +70, GRAU 350

DRY DETENTION /
HAZARDOUS SPILL BASIN

28' X 15' FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES

+77, CAT-1

+25, PROP.
GUIDERAIL ANCHOR

+75, PROP.
GUIDERAIL ANCHOR

PROP. DBL. FACE
CBL. GUIDERAIL

16:1 TAPER

+00,
BEGIN SBG

+50, GRAU 350

2GI W/
FLAT
GRATE

+75, CAT-1
END SBG

PROP. GUARDRAIL
& SBG

LATERAL "V" DITCH
SEE DETAIL "A"

–L– +20.00
160.00' RT

–L– +36.33
160.00' RT

–L– +83.03
281.66' RT

–L– +21.36
440.50' RT

S06°18'53"W 272.72'

S08°21'02"E 281.85'

S58°W

173.80'
N54°56'02"W

174.28'
N16°26'08"W

S03°52'38"W 704.58'

S03°52'38"W 368.15'

3344.04' TOTAL
S04°08'27"W

1374.07' TOTAL
N02°43'35"E

SEE SHEET NO. 2–L FOR DD/HSB #3 DETAIL.
SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 54 FOR –L– PROFILE.
SEE SHEET NO. 97 FOR –SR1– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

Pls Sta 188+67.24
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1117.72'
T = 560.05'
R = 7000.00'
DS = 70 mph
e = 0.03

Pls Sta 201+18.30
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

NAD 83

END CONSTRUCTION
-SR1- Sta. 58+17.01

-SR1- POT Sta. 59+17.01

-SR1- +17.01
75.00' LT

-L- +00.00
150.00' LT

-L- +24.98
145.00' LT

-L- +04.98
120.00' LT

-L- +33.91
150.00' LT

-L- TS Sta. 187+33.91

-L- SC Sta. 189+33.91

CHORD R=6850'

CHORD R=7160'

MATCHLINE STA. 177+00 -L- SEE SHEET NO. 9

MATCHLINE STA. 190+00 -L- SEE SHEET NO. 11

PROP. R/W

PROP. SLOPE STAKES

PROP. C/A FENCE

SDG
SEE DETAIL "D"

PROP GUARDRAIL

+66, GRAU 350

5.6 ft CLEARANCE

PROP. DBL. FACE CBL. GUIDERAIL

PROP. GUARDRAIL & SHOULDER BERM GUTTER

LATERAL "V" DITCH
SEE DETAIL "A"

STANDARD "V" TAIL DITCH
SEE DETAIL "K"
54' LENGTH @ 8.02%

S 36° 47' 19.7" E

-SR1-

-L-

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

+75, CAT-1 END SBG

2GI

2GI (A)

SITE 15

66.66' TYP.

160' R/W

7
CHARLES W. HUGHES
DB 109 PG 513
DB 109 PG 514

8
MICHAEL HUGHES
DB 2051 PG 556

5
LEWIS J. LOFLIN
DB 1102 PG 79

6
DANNY D. PUGH
DB 188 PG 251

FRANCES D. PUGH
DB 1102 PG 79

DUKE POWER TRANSMISSION LINE EASEMENT

2.581AC

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 54 FOR -L- PROFILE.
SEE SHEET NO. 97 FOR -SR1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2008
R-2606B_rdy_psh_10.dgn
3:44:21 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 188+67.24
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 194+93.96
Δ = 9° 08' 55.2" (LT)
D = 0° 49' 06.6"
L = 1,117.72'
T = 560.05'
R = 7,000.00'
DS = 70 mph
e = 0.03

PIs Sta 201+18.30
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

NAD 83

MATCHLINE STA. 18+50 -Y3-
SEE SHEET NO. 33

MATCHLINE STA. 190+00 -L-
SEE SHEET NO. 10

MATCHLINE STA. 203+00 -L-
SEE SHEET NO. 12

MATCHLINE STA. 27+00 -Y3-
SEE SHEET NO. 34

-Y3- POT Sta. 21+92.98 =
-L- POC Sta. 200+13.39

-L- ST Sta. 202+51.63
S 47° 34' 28.2" E

-L- CS Sta. 200+51.63
S 82° 26' 28.7" W

SITE 16

GARY E. DODSON
DB 1230 PG 127

FAYE B. DAVIS
DB 1069 PG 897

DONNA JACKSON
DB 05E PG 301

JANE D. MULLINS
DB 1225 PG 714
DB 1527 PG 604
PB 61 PG 6

TERRY W. JACKSON
DB 1361 PG 777

MICHAEL HUGHES
DB 2051 PG 556

PROP. SLOPE STAKES

PROP. R/W

R=6850'

R=7160'

PROP. DBL FACED CBL GUIDERAIL

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

EMERGENCY OVERFLOW

DRY DETENTION HAZARDOUS SPILL BASIN 4

20' DIAMETER KOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SLOPES

BYPASS CHANNEL

BYPASS STRUCTURE

LEVEL SPREADER

GRADE

+50, CAT-1 END SBG

+50, GRAU 350

+ORA BEDDING STONE

1.4 ft CLEARANCE

+47, PROP. GUIDERAIL ANCHOR

+79, PROP. GUIDERAIL ANCHOR

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

PROP. GUARDRAIL

LATERAL "V" DITCH
SEE DETAIL "A"

END OF ROADWAY MARKERS

SDG
SEE DETAIL "D"

2GI W/ FLAT GRATE TB

2GI W/ FLAT GRATE

PROP. SLOPE STAKES

LATERAL "V" DITCH
SEE DETAIL "A"

TAIL DITCH
SEE DETAIL "K"
50' LENGTH @ 3.20%

DECKS DRAINS REQUIRED
STA. 22+80 TO 23+04 RT.
STA. 22+62 TO 23+08 LT
@ 12 FT SPACING

-L- +45.00
220.00' LT

-L- +69.73
221.00' LT

-L- +45.00
150.00' LT

-L- +74.04
160.00' RT

-L- +77.38
104.09' LT
END C/A FENCE

-L- +03.12
83.10' LT
BEGIN C/A FENCE

-L- +51.25
104.66' RT
BEGIN C/A FENCE

-L- +62.50
160.00' RT

-L- +25.70
84.20' RT
END C/A FENCE

-L- +51.63
160.00' RT

-Y3- +50.00
60.00' LT

-Y3- +63
80' LT

-Y3- +23.22
60.00' RT

-L- +00.00
160.00' LT

-L- +51.63
160.00' RT

SEE SHEET NO. 2-H FOR DD/HSB #4 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-P FOR -Y3- BRIDGE DETAIL
SEE SHEET NO. 55 FOR -L- PROFILE.
SEE SHEET NO. 67 FOR -Y3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

-L- SEE SHEET NO. 11

MATCHLINE STA. 203+00 -L-

-L- SEE SHEET NO. 13

MATCHLINE STA. 216+00 -L-

JAMES D. DAVIS
DB 1010 PG 175

POULTRY HOUSE ABAND

15A
JAMES D. DAVIS & BETTY C.
DB 1071 PG 862

13
MICHAEL DAVIS & OTHERS
DB 05E PG 301

13A
MICHAEL DAVIS & OTHERS
DB 05E PG 301

14
TERRY W. JACKSON
DB 1381 PG 777

16
CLIFFORD W. LOFLIN
DB 1034 PG 7
DB 1034 PG 8
WB 81E-17

THE CARAWAY COMPANY
DB 1064 PG 305

-L- +00.00
160.00' LT

PROP. R/W

BERM DITCH SEE DETAIL "M"

PROP. SLOPE STAKES

PROP. DBL FACE CBL. GUIDERAIL

S 47° 34' 28.2" E 18"

+00, BEGIN SBG

+50, GRAU

GRADE TO DRAIN

66.67' TYP.

EXISTING ADDITIONAL DEBRIS PILE SITE

SITE 17

PROP. GUARDRAIL & SHOULDER BERM GUTTER

CLASS 'B' RIP RAP EST. 11 TONS
28 SY FILTER FABRIC

1.1 ft CLEARANCE

-L- +64.13
160.00' RT

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 55 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
X:\Projects\2606B_r-dy_psh_12.dgn
3:45:07 PM
DXD

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

NAD 83

13
MICHAEL DAVIS & OTHERS
DB 05E PG 301

16
CLIFFORD W. LOFLIN
DB 1034 PG 7
DB 1034 PG 8
WB 81E-17

16
CLIFFORD W. LOFLIN
DB 1034 PG 7
DB 1034 PG 8
WB 81E-17

-L- SEE SHEET NO. 12

MATCHLINE STA. 216+00 -L-

MATCHLINE STA. 229+00 -L-

-L- SEE SHEET NO. 14

PROP. R/W

+96 160' LT

+49 172' LT

+50 170' LT

+49 164' LT

+49 160' LT

TDE

BERM DITCH SEE DETAIL "M"

BDOS (107)

PROP. SLOPE STAKES

18" CD

2GI (108) FS

605.68' TOTAL S78°38'58"E

25 ELEC

+52.00 220.00' LT

+52.00 160.00' LT

35' X 17' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES (119)

2GI(D) (116) FS

C/F

F

160' R/W

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

220

PROP. DBL. FACE CBL. GUIDERAIL

225

-L-

S 47° 34' 28.2" E

2GI(A) (105) FS

2GI(A) (109) FS

2GI (114) FS

2GI (117) FS

2GI(A) (120)

24" 18" 27" 4' 10" 70' 8' 02

+00, BEGIN SBG

+50, GRAU 350

2GI (115)

GRADE TO DRAIN

2GI W/ FLAT GRATE (104)

2GI W/ FLAT GRATE (106)

2GI W/ FLAT GRATE (118)

15" 14' 8:1

LATERAL "V" DITCH SEE DETAIL "A"

28' X 16' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES (110)

DRY DETENTION / HAZARDOUS SPILL BASIN (5) (111)

BYPASS STRUCTURE (112)

BYPASS CHANNEL

EMERGENCY OVERFLOW WILL TIE TO PROPOSED CHANNEL

PROP. GUARDRAIL & SHOULDER BERM GUTTER

4' BASE DITCH WITH CLASS 'B' RIP RAP SEE DETAIL AA

SITE 17

N60°30'58"W 188.42'

259.00' S82°20'21"W

800.30' S00°42'51"W

+34.33 52 RT

+74.03 256.98 RT

+63.18 322.48 RT

+67.50 226.00' RT

+06.00 160.00' RT

+46.00 160.00' RT

+57.67 266.53 RT

+48.51 317.47 RT

+53.83 353.86 RT

BZ 1 BZ 2 E F

SEE SHEET NO. 2-I FOR DD/HSB #5 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PM

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

MATCHLINE STA. 229+00 –L– SEE SHEET NO. 13

MATCHLINE STA. 242+00 –L– SEE SHEET NO. 15

NAD 83

SITE 17

16 CLIFFORD W. LOFLIN DB 1034 PG 7 DB 1034 PG 8 WB 81E-17

16A PIEDMONT TRIAD REGIONAL WATER AUTHORITY

16 CLIFFORD W. LOFLIN DB 1034 PG 7 DB 1034 PG 8 WB 81E-17

16B CLIFFORD W. LOFLIN DB 1877 PG 1922

PROP. R/W

BYPASS STRUCTURE

BYPASS CHANNEL

DRY DETENTION / HAZARDOUS SPILL BASIN

EMERGENCY OVERFLOW

LEVEL SPREADER

CLASS 'I' RIP RAP EST. 70 TONS 75 SY FILTER FABRIC

CLASS 'I' RIP RAP EST. 95 TON$ 100 SY FILTER FABRIC

PROP. GUARDRAIL & SHOULDER BERM GUTTER

PROP. SLOPE STAKES

SDG SEE DETAIL "D"

6 in CLEARANCE w/1 ft slab

PROP. DBL FACE CBL. GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

35' X 17' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

4' BASE DITCH WITH GRASS LINING SEE DETAIL "A"

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "Y"

-L- 230+64.80
GP ELEV.=722.25'
SKEW=115°
12'x8' RCBC BURIED 1'

-L- 238+46.00
GP ELEV.=732.99'
SKEW=51°
8'x7' RCBC BURIED 1'

S 47° 34' 28.2" E

SEE SHEET NO. 2–J FOR DD/HSB #6 & #7 DETAILS.
SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 56 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 250+88.56
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 265+20.18
Δ = 22° 04' 04.2" (RT)
D = 0° 49' 06.6"
L = 2,696.09'
T = 1,364.96'
R = 7,000.00'
DS = 70 mph
e = 0.03

PIs Sta 279+17.98
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-

PI Sta 27+53.78
Δ = 23° 42' 17.5" (RT)
D = 0° 47' 56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

NAD 83

17
PERDIE H. WHITE HEIRS
DB 841 PG 238

16B
CLIFFORD W. LOFLIN
DB 1877 PG 1922

BEGIN CONSTRUCTION
-SR2- Sta.10+30.00

-SR2- POT Sta. 10+00.00
-L- POT Sta. 248+06.23
170.00' LT

-SR2- PC Sta. 12+49.04

-SR2- +43.59
80.00' LT

-SR2- +49.04
80.00' LT

-L- +06.23
160.00' LT

-L- +60.00
120.00' LT

-L- +55.22
145.00' LT

-L- +55.22
160.00' RT

PROP. R/W

PROP. SLOPE STAKES

PROP. C/A FENCE

PROP. DBL. FACE CBL. GUIDERAIL

SDG
SEE DETAIL "D"

FALSE CUT SEE DETAIL "S"

GRADE TO DRAIN

+25, CAT-END SBG

-L- SC Sta. 251+55.22

-L- TS Sta. 249+55.22

CHORD

R=7250'

R=6840'

S 47° 34' 28.2" E

MATCHLINE STA. 242+00 -L- SEE SHEET NO. 14

MATCHLINE STA. 255+00 -L- SEE SHEET NO. 16

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 57 FOR -L- PROFILE.
SEE SHEET NO. 98 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/6/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-
PIs Sta 250+88.56
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 265+20.18
Δ = 22° 04' 04.2" (RT)
D = 0° 49' 06.6"
L = 2,696.09'
T = 1,364.96'
R = 7,000.00'
DS = 70 mph
e = 0.03

PIs Sta 279+17.98
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-
PI Sta 27+53.78
Δ = 23° 42' 17.5" (RT)
D = 0° 47' 56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

-Y13-
PI Sta 12+24.39
Δ = 40° 47' 05.3" (RT)
D = 66° 04' 38.9"
L = 61.72'
T = 32.23'
R = 86.71'

POT Sta. 10+00.00

PC Sta. 11+92.16

S 13° 18' 55.2" W

NAD 83

17 PERDIE H. WHITE HEIRS DB 841 PG 238

18 MORRIS A. RICE DB 1575 PG 1672

MATCHLINE STA. 255+00 -L- SEE SHEET NO. 15

MATCHLINE STA. 268+00 -L- SEE SHEET NO. 17

PROP. R/W

PROP. SLOPE STAKES

PROP. C/A FENCE

-SR2- POC Sta. 27+10.00 = -Y13- PT Sta. 12+53.88

-SR2- +30.59 80.00' LT

-SR2- +50.00 80.00' LT

-SR2- +23.52 60.00' LT

R=7250'

R=6840'

R=6770'

-SR2-

-L-

RIP RAP @C/F TRANS. CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

+75, GRAU 350 30 8:1

SDG SEE DETAIL "D"

+83, CAT-1

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

PROP. DBL. FACE CBL. GUIDERAIL

REMOVE

PROPOSED EARTHEN NOISE BERM +/- STA.260+00 - 283+00 SEE X-SECTIONS

2' BASE BERM DITCH W/CLASS 'B' RIP RAP SEE DETAIL "F"

BERM DITCH BDO SEE DETAIL "M"

-L- +10.00 160.00' RT

-L- +10.00 230.00' RT

-L- +60.27 230.00' RT

-L- +52.19 230.00' RT

-L- +18.51 301.70' RT

-L- +48.17 302.98' RT

END OF ROADWAY MARKERS

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

TES

20' R

30' R

60.00' R/W

CLIFFORD W. LOFLIN DB 1034 PG 7 DB 1034 PG 8 WB 81E-17

ERNEST A. MILLER DB 1085 PG 1178

GENEVA S. GRAY DB 383 PG 53

MORRIS A. RICE DB 1575 PG 1672

NELSON PARK RD. (SR 1745)

EXISTING R/W

45BW ABAND

N08°48'37"W 1,270.11'

S02°23'06"W 437.80'

N87°23'57"W 2.9'

S87°23'57"E 388.84' M/L

S87°01'58"E 217.48' TOTAL

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 57 FOR -L- PROFILE.
SEE SHEET NO. 98 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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jwilson
PM

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 250+88.56
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 265+20.18
Δ = 22° 04' 04.2" (RT)
D = 0° 49' 06.6"
L = 2,696.09'
T = 1,364.96'
R = 7,000.00'
DS = 70 mph
e = 0.03

PIs Sta 279+17.98
Θs = 0° 49' 06.6"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR2-

PI Sta 27+53.78
Δ = 23° 42' 17.5" (RT)
D = 0° 47' 56.8"
L = 2,966.43'
T = 1,504.74'
R = 7,170.00'
DS = 50 mph
e = 0.02

SITE 18

-SR2- PT Sta. 42+15.47

-SR2- +15.47
80.00' LT

NAD 83

18 MORRIS A. RICE DB 1575 PG 1672

19 JOHN & WILLIAM NELSON DB 06E PG 614

20 I.A.I. PROPERTIES DB 1460 PG 881

S87°22'43"E 1280.04'

N02°37'04"E 1280.04'

EIP

PROP. R/W

R=7250'

PROP. GUARDRAIL

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

CLASS 'I' RIP RAP
EST. 26 TONS
50 SY FILTER FABRIC

+50, GRAU 350

+14, GRAU 350

+00, CAT-1

PROP. C/A FENCE

SDG
SEE DETAIL "C"

DRY DETENTION / HAZARDOUS SPILL BASIN

15' X 30' FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES

15' X 15' FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES

+50.00
135.00' LT
& 145.00' LT.

+44.00
145.00' LT

+39.00
135.00' LT

+35.00
145.00' LT

+60.00
135.00' LT

ANCHOR
18" RCP

PROP. DBL. FACE
CBL GUIDERAIL

+75, PROP.
GUIDERAIL ANCHOR

+25, PROP.
GUIDERAIL ANCHOR

18"
11.8 ft CLEARANCE

42" CL IV
METHOD

66.66'
TYP.

30'
TYP.

PROPOSED EARTHEN NOISE BERM
+/- STA.260+00 - 283+00
SEE X-SECTIONS

BERM DITCH
SEE DETAIL "M"

BDO

+50.00
230.00' RT

+50.00
242.00' RT

+00.00
232.00' RT

+00.00
242.00' RT

232' R/W

R=6768'

-L- CS Sta. 278+51.32

-L- ST Sta. 280+51.32

TOE PROTECTION
SEE DETAIL "T"

CHORD

+00
232' LT

+51.32
232.00' RT

DRAIN POND

+42
232' LT

+51.32
232.00' RT

+38
449' LT

+02
498' LT

TDE

RD PIER

POND TOE TASH

HTR

48" WW & 15BW

16" BST

MATCHLINE STA. 268+00 -L- SEE SHEET NO. 16

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

SEE SHEET NO. 2-M FOR DD/HSB #8 & #9 DETAILS.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NOS. 98-99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	18
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

NAD 83

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

SITE 19

MATCHLINE STA. 281+00 -L- SEE SHEET NO. 17

MATCHLINE -SR2- STA. 56+50 SEE SHEET NO. 35

MATCHLINE -L- STA. 294+00 SEE SHEET NO. 19

-SR2- PC Sta. 54+22.89

-SR2- +22.89 80.00' LT

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL

PROP. C/A FENCE

PROP. DBL FACE CBL. GUIDERAIL

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

2' LATERAL BASE DITCH SEE DETAIL "B"

SDG SEE DETAIL "D"

DRY DETENTION /HAZARDOUS SPILL BASIN

15' X 40' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

20' X 30' FOREBAY CLASS 'B' RIP RAP 3' DEEP; 2:1 SIDES

-L- +35.00 135.00' LT & 145.00' LT

+00, GRAU 350

+50, GRAU 350

+34, GRAU 350

+10, GRAU 350

+29, CAT-1

+00, BEGIN SRG

+50, GRAU 350

+50, CAT-1

2GI(A)

2GI(B) W/FLAT GRATE SRG

GRADE TO DRAIN

16:1 TAPER

PROPOSED EARTHEN NOISE BERM
+/- STA. 260+00 - 283+00
SEE X-SECTIONS

-L- +50.00 180.00' RT

-L- +50.00 232.00' RT

I.A.I. PROPERTIES
DB 1460 PG 881

EDWARD L. LAWRENCE
DB 985 PG 137

NCDOT
DB 1703 PG 1049

JOHN & WILLIAM NELSON
DB 06E PG 614

POND

SPRING

ISF POULTRY HOUSE

CONC

MTL

EIP

SEE SHEET NO. 2-N FOR DD/HSB #10 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 58 FOR -L- PROFILE.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	19
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

8/17/99

REVISIONS

MATCHLINE STA. 30+00 -Y5-
SEE SHEET NO. 35

MATCHLINE STA. 294+00 -L-
SEE SHEET NO. 18

MATCHLINE STA. 307+00 -L-
SEE SHEET NO. 20

MATCHLINE STA. 38+50 -Y5-
SEE SHEET NO. 36

-Y5- SC Sta. 31+27.37

-L- POT Sta. 298+20.77 =
-Y5- POC Sta. 33+41.64

-Y5-

Pls Sta 30+60.71	PI Sta 35+49.20	Pls Sta 40+34.60
Θs = 1° 25' 56.6"	Δ = 12° 02' 24.6" (RT)	Θs = 1° 25' 56.6"
Ls = 200.00'	D = 1° 25' 56.6"	Ls = 200.00'
LT = 133.34'	L = 840.56'	LT = 133.34'
ST = 66.67'	T = 421.83'	ST = 66.67'
	R = 4,000.00'	
	DS = 60 mph	
	e = 0.04	

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-P FOR -Y5- BRIDGE DETAIL.
SEE SHEET NO. 59 FOR -L- PROFILE.
SEE SHEET NOS. 68-69 FOR -Y5- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
3:47:33 PM
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-Y6-
PI Sta 13+02.61
Δ = 0° 26' 54.9" (LT)
D = 0° 34' 22.6"
L = 78.29'
T = 39.15'
R = 10,000.00'
DS = 50 mph
e = NC

-Y6- +50.00 31.15' LT
-Y6- +50.00 60.00' LT
-Y6- PT Sta. 13+41.76
BEGIN CONSTRUCTION -Y6- Sta. 13+50.00
-Y6- +65.00 60.00' LT
-L- +50.00 160.00' LT
-L- +10.00 160.00' LT
-L- +65.64 100.33' LT END C/A FENCE
-L- +95.51 86.32 LT BEGIN C/A FENCE
-L- POT Sta. 309+36.79 = -Y6- POT Sta. 18+94.70
-Y6- +20.27 28.87' RT
-Y6- +20.02 56.00' RT
-L- +78.06 86.31' RT END C/A FENCE
-L- +07.94 100.33' RT BEGIN C/A FENCE
-L- +80.00 160.00 RT
-Y8- +95.50 160.00' RT
-Y6- +00.00 60.00' LT
+75, PROP. FS GUIDERAIL ANCHOR
+00, PROP. GUIDERAIL ANCHOR
+00, CAT-1 BEGIN SBG
+50, BEGIN SBG
+00, GRAU 350
+75, GRAU 350
+10, GRAU 350

PROP. SLOPE STAKES
SDG SEE DETAIL "D"
PROP. R/W
PROP. DBL FACE CBL. GUIDERAIL
PROP. GUARDRAIL & SBG
GRADE TO DRAIN
REMOVE
CLASS 'B' RIP RAP EST. 2 TONS 7 SY FILTER FABRIC
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
LATERAL "V" DITCH SEE DETAIL "A"
DECKS DRAINS REQUIRED STA. 18+30 TO 17+94 RT. STA. 18+20 TO 17+96 LT @ 12 FT SPACING
150' TAPER
16:1 TAPER
N 88° 44' 04.2" W
S 23° 52' 10.7" E
N 23° 52' 10.7" W
S 00° 00' 03" W
N 01° 48' 23" E
N 88° 30' 06" E
S 88° 02' 04" E
N 01° 07' 56" E
N 01° 28' 14" E
N 18° 40' 21" W
S 01° 26' 16" W
N 18° 46' 53" W

28 WARREN LEE ROBINSON & ALLEN E. ROBINSON DB 1867 PG 2577 PB 89 PG 73
36 TEMICA TOOMES DB 1995 PG 1562
35 RONALD W. HIATT DB 184 PG 472
34 DELMAR DAWSON DB 1038 PG 53
33 CARROLL S. SUGGS HEIRS DB 114 PG 794
43 ROY M. CROTTS DB 966 PG 765
42 MABEL FARLOW DB 2009 PG 2085
41 OLD UNION METHODIST CHURCH DB 980 PG 413 PB 4 PG 94
40 JOYCE E. ROGERS DB 1402 PG 1010 PB 4 PG 94
39 NCDOT DB 2016 PG 2073
38 DEBORAH P. HANCOCK DB 1237 PG 1277

-L- SEE SHEET NO. 19
MATCHLINE STA. 307+00 -L-
MATCHLINE STA. 23+00 -Y6- SEE SHEET NO. 36
-L- SEE SHEET NO. 21
MATCHLINE STA. 320+00 -L-

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-P FOR -Y6- BRIDGE DETAIL.
SEE SHEET NO. 59 FOR -L- PROFILE.
SEE SHEET NO. 70 FOR -Y6- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

-L-

PIs Sta 330+57.77	PI Sta 336+88.45	PIs Sta 343+12.39
Θs = 1° 47' 25.8"	Δ = 15° 35' 01.5" (RT)	Θs = 1° 47' 25.8"
Ls = 250.00'	D = 1° 25' 56.6"	Ls = 250.00'
LT = 166.68'	L = 1,087.95'	LT = 166.68'
ST = 83.34'	T = 547.35'	ST = 83.34'
	R = 4,000.00'	
	DS = 70 mph	
	e = 0.05	

SITE 20

-L- TS Sta. 328+91.10

-L- SC Sta. 331+41.10

MATCHLINE STA. 320+00 -L- SEE SHEET NO. 20

MATCHLINE STA. 333+00 -L- SEE SHEET NO. 22

1328.06' S09°43'56"W

364.51' S00°40'43"E

J.W. COGGINS HEIRS
DB 282 PG 567

ROY M. CROTTS
DB 932 PG 515

MABEL FARLOW
DB 2009 PG 2085

PHILIP TRACY WALL FAMILY LIMITED PARTNERSHIP
DB 1562 PG 185

CLASS 'B' RIP RAP
EST. 11 TONS
28 SY FILTER FABRIC

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

2GI W/ FLAT GRATE

GRADE TO DRAIN +50, GRAU 350

+50, END SBG

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

PROP. DBL. FACE CBL. GUIDERAIL

16.0 ft CLEARANCE

+48, CAT-1 BEND SBG

EMERGENCY OVERFLOW

25' X 25' FOREBAY
CLASS 'B' RIP RAP
3' DEEP; 2:1 SIDES

DRY DETENTION / HAZARDOUS SPILL BASIN

BYPASS CHANNEL

BYPASS STR. LEVEL SPREADER

SDG SEE DETAIL "D"

CHORD

R=4160'

R=3840'

TDE

-L- +57.00
160.00' LT
& 170.00' LT

-L- +96.00
160.00' LT
& 170.00' LT

-L- +41.10
160.00' LT

-Y11- +91.10
160.00' LT

-L- +91.10
160.00' RT

-L- +41.10
160.00' RT

-L- +16.00
160.00' RT

-L- +16.00
215.00' RT

-L- +76.50
160.00' RT

-L- +76.50
215.00' RT

SEE SHEET NO. 2-K FOR DD/HSB #11 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 60 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

REVISIONS

8/17/99

3/16/2009
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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	22
RW SHEET NO.	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 38

MATCHLINE STA. 359+00 -L-
SEE SHEET NO. 23

MATCHLINE STA. 333+00 -L-
SEE SHEET NO. 21

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 39

SITE 21

CAPE FEAR/ SANDLEMAN WATERSHED

YADKIN WATERSHED

-L-
Pi Sta 330+57.77
θs = 1°47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

Pi Sta 336+88.45
Δ = 15° 35' 01.5" (RT)
D = 7° 25' 56.5"
L = 1081.95'
T = 549.39'
R = 770.00'
DS = 70 mph
e = 0.05

Pi Sta 343+12.39
θs = 1° 47' 25.8"
Ls = 250.00'
LT = 166.68'
ST = 83.34'

-LP2B-
Pi Sta 1+34.47
θs = 22° 55' 05.5"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pi Sta 9+64.64
Δ = 143° 47' 22.5" (RT)
D = 22° 55' 05.5"
L = 627.40'
T = 764.64'
R = 250.00'
DS = 30 mph
e = 0.08

Pi Sta 8+95.10
θs = 22° 55' 05.5"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

-RP2B-
Pi Sta 10+66.67
θs = 1° 24' 41.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

Pi Sta 14+16.97
θs = 3° 18' 38.0"
Ls = 325.00'
LT = 216.59'
ST = 108.51'

Pi Sta 16+65.28
Δ = 15° 58' 13.6" (LT)
D = 5° 43' 46.5"
L = 278.7.4'
T = 140.28'
R = 1,000.00'
DS = 50 mph
e = 0.08

Pi Sta 18+70.47
θs = 5° 43' 46.5"
Ls = 200.00'
LT = 133.40'
ST = 66.73'

Pi Sta 21+37.18
θs = 7° 09' 43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

Pi Sta 24+69.02
Δ = 36° 41' 28.8" (RT)
D = 7° 09' 43.1"
L = 512.31'
T = 265.28'
R = 800.00'
DS = 50 mph
e = 0.08

Pi Sta 27+82.81
θs = 7° 09' 43.1"
Ls = 200.00'
LT = 133.44'
ST = 66.77'

US 311
6700
9600
3450
4200
300
400
US 311 BY-PASS
US 311 BY-PASS
12500
27400
450
800
1700
2400
11000
25200
5400
18200
2008 ADT
2030 ADT
US 311

-RP2C-
Pi Sta 10+21.76
Δ = 17° 37' 57.7" (RT)
D = 1° 27' 13.8"
L = 413.2'
T = 211.6'
R = 3,941.00'

Pi Sta 11+73.20
θs = 1° 35' 51.6"
Ls = 220.00'
LT = 129.68'
ST = 90.51'

Pi Sta 15+86.83
Δ = 30° 09' 29.3" (RT)
D = 4° 46' 28.7"
L = 631.5'
T = 323.3'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pi Sta 19+68.54
θs = 5° 15' 07.6"
Ls = 220.00'
LT = 146.71'
ST = 73.39'

-LP2B-
Pi Sta 8+27.40
-LP2B- CS Sta. 8+27.40

Pi Sta 10+27.40
-LP2B- ST Sta. 10+27.40

Pi Sta 12+00.75 = -Y7- POT Sta. 28+93.87
-LP2B- POT Sta. 12+00.75 = -Y7- POT Sta. 28+93.87

Pi Sta 0+00.00 = -L- POT Sta. 352+46.52 OFFSET 59.00' LEFT
-LP2B- ST Sta. 0+00.00

-LP2B- SC Sta. 2+00.00

Pi Sta 27+16.04
-RP2B- CS Sta. 27+16.04

Pi Sta 29+16.04
-RP2B- ST Sta. 29+16.04

Pi Sta 22+03.74
-RP2B- SC Sta. 22+03.74

Pi Sta 20+03.74
-RP2B- SRS Sta. 20+03.74

Pi Sta 18+03.74
-RP2B- CS Sta. 18+03.74

Pi Sta 15+25.00
-RP2B- SC Sta. 15+25.00

Pi Sta 12+00.00
-RP2B- SRS Sta. 12+00.00

Pi Sta 10+00.00 = -L- POC Sta. 335+31.14 OFFSET 59.00' LEFT
-RP2B- ST Sta. 10+00.00

Pi Sta 0+00.00 = -L- POT Sta. 350+38.79 OFFSET 59.00' RIGHT
-LP2C- ST Sta. 0+00.00

-LP2C- SC Sta. 2+00.00

Pi Sta 6+46.81
-LP2C- CS Sta. 6+46.81

Pi Sta 8+46.81
-LP2C- ST Sta. 8+46.81

Pi Sta 7+70.00
-Y7- TS Sta. 38+52.70

Pi Sta 34+55.24 = -L- POT Sta. 352+55.04
-Y7- POT Sta. 34+55.24

Pi Sta 32+80.86
-NSRR- SC Sta. 32+80.86

Pi Sta 32+18.86
-NSRR- TS Sta. 32+18.86

Pi Sta 28+04.41 = -L- POT Sta. 353+46.27
-NSRR- POT Sta. 28+04.41

Pi Sta 12+15.95
-RP2C- PC Sta. 10+00.00 = -L- POC Sta. 334+00.00 OFFSET 59.00' RIGHT

Pi Sta 18+95.15
-RP2C- CS Sta. 18+95.15

Pi Sta 21+15.15
-RP2C- ST Sta. 21+15.15

Pi Sta 41+32.70
-Y7- SC Sta. 41+32.70

Pi Sta 41+56.41 = -Y7- POT Sta. 9+65.95
-LP2C- POT Sta. 9+65.95

Pi Sta 41+82.47 = -Y7- POT Sta. 26+93.62
-RP2C- POT Sta. 26+93.62

-Y7-
Pi Sta 40+39.45
θs = 5° 20' 51.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

Pi Sta 43+09.60
Δ = 13° 27' 07.3" (RT)
D = 5° 49' 11.0"
L = 352.11'
T = 176.90'
R = 1,500.00'
DS = 60 mph
e = 0.08

Pi Sta 45+78.28
θs = 5° 20' 51.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

-NSRR-
Pi Sta 32+60.19
θs = 17° 55' 47.6"
Ls = 620.00'
LT = 413.33'
ST = 207.67'

Pi Sta 35+93.11
Δ = 18° 34' 08.3" (RT)
D = 5° 00' 00.0"
L = 618.97'
T = 312.26'
R = 1,910.08'

Pi Sta 39+20.49
θs = 17° 55' 47.6"
Ls = 620.00'
LT = 413.33'
ST = 207.67'

-LP2C-
Pi Sta 1+34.47
θs = 22° 55' 05.5"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

Pi Sta 5+10.95
Δ = 102° 24' 05.3" (LT)
D = 22° 55' 05.5"
L = 446.8'
T = 310.95'
R = 250.00'
DS = 30 mph
e = 0.08

Pi Sta 7+14.51
θs = 22° 55' 05.5"
Ls = 200.00'
LT = 134.47'
ST = 67.70'

DETAIL 2
RIP-RAPPED ENERGY DISSIPATOR BASIN

SEE SHEET NO. 2-K FOR DD/HSB #12 DETAIL.
SEE SHEET NO. 2-I FOR DD/HSB #13 DETAIL.
SEE SHEET NO. 2-N FOR DD/HSB #14 DETAIL.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-Q FOR -Y7- BRIDGE DETAIL
SEE SHEET NOS. 60-61 FOR -L- PROFILE.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 93 FOR -LP2B- PROFILE.
SEE SHEET NO. 94 FOR -LP2C- PROFILE.
SEE SHEET NO. 85 FOR -RP2B- PROFILE.
SEE SHEET NO. 86 FOR -RP2C- PROFILE.
SEE SHEET NOS. 71-72 FOR -Y7- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

LOCATION:	
TIP NO.:	COUNTY:
	DESIGNED BY:
	CHECKED BY: DATE:

GRAPHIC SCALE
50 25 0 50 100
PLANS

3/17/2020
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	23
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

PIs Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

NAD 83

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 1185
PB 39 PG 87

MATCHLINE STA. 359+00 -L- SEE SHEET NO. 22

MATCHLINE STA. 372+00 -L- SEE SHEET NO. 24

PROP. RW
PROP. SLOPE STAKES
-L- +00.00 200.00' LT
-L- +00.00 160.00' LT
-L- +12.97 160.00' LT
-L- +62.97 160.00' LT
-L- TS Sta. 368+12.97
-L- SC Sta. 370+62.97
CHORD
R=4515'
TOE PROTECTION SEE DETAIL "T"
2GI (290)
2GI (291)
2GI (292)
2GI(A) (293)
2GI (294)
2GI (295)
2GI(A) (296)
FS
S 4° 42' 17.6" E
PROP. DBL FACE CBL. GUIDERAIL
+75, PROP. GUIDERAIL ANCHOR
+25, PROP. GUIDERAIL ANCHOR
+50, GRAU 350
PROP. GUARDRAIL
200' RW
160' RW
R=4875'
-L- +12.97 200.00' RT
-L- +62.97 200.00' RT
SOIL & GP

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 61 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 1185
PB 39 PG 87

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	24
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

PIs Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

NAD 83

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 1185
PB 39 PG 87

SITE 23

SITE 24

MATCHLINE STA. 372+00 -L- SEE SHEET NO. 23

MATCHLINE STA. 385+00 -L- SEE SHEET NO. 25

PROP. R/W

R=4515'

PROP. SLOPE STAKES

TOE PROTECTION SEE DETAIL "T"

PSH

HW

+00, CAT-1 BEGIN SBG

PROP. GUARDRAIL & SBG

2GI W/ FLAT GRATE

+00, GRAU 350

+50, END SBG

SDG SEE DETAIL "D"

+50, CAT-1 BEGIN SBG

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

2GI(A)

2GI

FS

375

380

385

PROP. DBL. FACE CBL. GUIDERAIL

60" CL IV WASHED B INSTALLATION

24" CSP W/2 ELBOWS

JB W/MH

+00, CAT-1

+00, GRAU 350

PROP. GUARDRAIL

CLASS 'I' RIP RAP EST. 40 TONS 73 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

-SR3- PT Sta. 34+23.73

-SR3-

-L- +00.00 110.00' RT

-L- +00.00 200.00 RT

+45, CAT-1

20' R

END CONSTRUCTION
-SR3- Sta. 28+82.00

R=4875'

200' R/W

160' R/W

48
ACE/AVENT REAL PROPERTY COMPANY
DB 1988 PG 1185
PB 39 PG 87

49
ANNIE M. CRAVEN
DB 1915 PG 1237
PB 94 PG 2

-SR3-
PI Sta 25+90.96
Δ = 19° 53' 55.3" (RT)
D = 1° 10' 57.3"
L = 1,682.66'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	25
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-L-

PIs Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

PIs Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

NAD 83

SITE 24

-L- CS Sta. 396+91.26

-L- +91.26
160.00' LT

-L- +91.26
110.00' RT

-SR3- +00.00
120.00' LT

-SR3- +85.65
60.00' LT

-SR3- +41.07
120.00' LT

-SR3- PRC Sta. 17+41.07

-SR3- PC Sta. 14+85.65

MATCHLINE STA. 385+00 -L- SEE SHEET NO. 24

MATCHLINE STA. 398+00 -L- SEE SHEET NO. 26

-SR3-

PI Sta 25+90.96
Δ = 19° 53' 55.3" (RT)
D = 1° 10' 57.3"
L = 1,682.66'
T = 849.89'
R = 4,845.00'
DS = 40 mph
e = NC

PI Sta 16+14.46
Δ = 18° 17' 36.8" (LT)
D = 7° 09' 43.1"
L = 255.43'
T = 128.81'
R = 800.00'
DS = 40 mph
e = NC

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 62 FOR -L- PROFILE.
SEE SHEET NO. 100 FOR -SR3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	26
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

MATCHLINE STA. 15+00 –Y8– SEE SHEET NO. 40

–SR5– POT Sta. 10+00.00 =
–Y8– POC Sta. 15+70.93

–SR5–
PI Sta 11+56.31
Δ = 55° 25' 07.8" (RT)
D = 22° 55' 05.9"
L = 241.81'
T = 131.31'
R = 250.00'
DS = 30 mph
e = 0.04

PI Sta 14+61.28
Δ = 43° 41' 57.0" (LT)
D = 11° 48' 48.8"
L = 369.91'
T = 194.47'
R = 485.00'
DS = 40 mph
e = 0.06

–L–
PIs Sta 369+79.64
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

PI Sta 384+12.85
Δ = 32° 12' 42.3" (LT)
D = 1° 13' 32.1"
L = 2,628.29'
T = 1,349.89'
R = 4,675.00'
DS = 70 mph
e = 0.05

PIs Sta 397+74.59
Θs = 1° 31' 55.1"
Ls = 250.00'
LT = 166.67'
ST = 83.34'

–Y8–
PIs Sta 13+88.59
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

PI Sta 15+20.80
Δ = 3° 07' 44.3" (LT)
D = 2° 23' 14.4"
L = 131.07'
T = 65.55'
R = 2,400.00'
DS = 60 mph
e = 0.06

PIs Sta 16+52.99
Θs = 2° 23' 14.4"
Ls = 200.00'
LT = 133.35'
ST = 66.68'

–SR5– PC Sta. 10+25.00
–Y8– CS Sta. 15+86.31
–SR5– PRC Sta. 12+66.81
–SR5– PT Sta. 16+36.72
–Y8– ST Sta. 17+86.31
–SR5– POT Sta. 19+99.44
–SR5– POT Sta. 20+91.00
–Y8– POT Sta. 19+70.71 =
–L– POT Sta. 400+22.09

SITE 25

END CONSTRUCTION

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

SDG SEE DETAIL "D"

PROP. SLOPE STAKES

PROP. R/W

TOE PROTECTION SEE DETAIL "T"

DECKS DRAINS REQUIRED
STA. 18+54 TO 18+90 RT.
STA. 20+72 TO 20+36 RT.
STA. 18+70 TO 19+06 LT
STA 20+74 TO 20+50 LT.
@ 12 FT SPACING

–L– +91.46 104.10' LT BEGIN C/A FENCE

–L– +85.00 160.00' LT

–L– +55.00 104.10' LT END C/A FENCE

–L– +80.00 130.00' LT

–L– +00.00 130.00' LT

–L– +91.00 75.00' LT

–L– +50.00 160.00' LT

–L– +00.00 122.00' LT

–Y8– +55.00 39.48' RT

–SR5– +66.81 60.00' LT

–SR5– +36.72 75.00' LT

–SR3– +77.10 60.00' LT

–Y8– +14.00 107.00' RT

–SR4– +50.00 80.00' RT

–L– +86.63 98.67' RT BEGIN C/A FENCE

–L– +50.18 98.67' RT END C/A FENCE

–L– +15.00 120.00' RT

–L– +41.26 110.00' RT

LATERAL "V" DITCH SEE DETAIL "A"

2' LATERAL BASE DITCH W/CLASS B RIP RAP SEE DETAIL "C"

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PROP. DBL. FACE CBL. GUIDERAIL

+57, PROP. GUIDERAIL ANCHOR

+83, PROP. GUIDERAIL ANCHOR

+00, GRAU 350

+85, GRAU 350

+92, GRAU 350

+15, GRAU 350

+16, GRAU 350

+18, GRAU 350

S 51° 42' 00.9" E

S 39° 58' 50.1" E

S 24° 52' 28.7" W

N 66° 05' 03.8" W

S 66° 05' 03.8" E

N 17° 15' 03.4" W

–SR3– PC Sta. 10+64.03

–SR3– PT Sta. 12+77.10

–SR4– PC Sta. 10+90.87

–SR4– PT Sta. 13+18.67

–Y8– TS Sta. 21+54.16

–Y8– SC Sta. 23+74.16

–L– ST Sta. 399+41.26

–SR3– POT Sta. 10+00.00 =
–SR4– POT Sta. 10+00.00 =
–Y8– POS Sta. 22+59.27

–SR3–
PI Sta 11+77.52
Δ = 48° 50' 00.4" (RT)
D = 22° 55' 05.9"
L = 213.08'
T = 113.49'
R = 250.00'
DS = 30 mph
e = 0.04

–Y8–
PIs Sta 23+00.88
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

PI Sta 24+76.36
Δ = 8° 39' 32.4" (LT)
D = 4° 14' 38.9"
L = 204.02'
T = 102.21'
R = 1,350.00'
DS = 60 mph
e = 0.08

PIs Sta 26+51.56
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

–SR4–
PI Sta 12+06.78
Δ = 26° 06' 13.7" (RT)
D = 11° 27' 33.0"
L = 227.80'
T = 115.91'
R = 500.00'
DS = 30 mph
e = NC

SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2–Q FOR –Y8– BRIDGE DETAIL.
SEE SHEET NO. 63 FOR –L– PROFILE.
SEE SHEET NO. 74 FOR –Y8– PROFILE.
SEE SHEET NO. 100 FOR –SR3– PROFILE.
SEE SHEET NO. 101 FOR –SR4– PROFILE.
SEE SHEET NO. 102 FOR –SR5– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

MATCHLINE STA. 24+00 –Y8– SEE SHEET NO. 41

MATCHLINE STA. 398+00 –L– SEE SHEET NO. 25

MATCHLINE STA. 411+00 –L– SEE SHEET NO. 27

NAD 83

58 BLANCHE POWELL (LE) DB 1203 PG 282

59 RANDALL B. MATTHEWS DB 1210 PG 196

59A RANDALL MATHEWS DB 1874 PG 505

59B BLANCHE POWELL (LE) DB 1203 PG 282

62 KATHERINE ANN MCDOWELL DB 1125 PG 541

63 WILL A. CULLER DB 1582 PG 1388 PB 61 PG 21

57 EUGENE RICH DB 550 PG 367

56 INA R. NELSON DB 1301 PG 839 DB 1301 PG 836 LARRY NEWMAN DB 1985

64

57A DONNA RAY RICH DB 1829 PG 1869

3/16/2009
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jmcdonald
Pxl

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	27
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

MATCHLINE STA. 411+00 –L– SEE SHEET NO. 26

MATCHLINE STA. 425+00 –L– SEE SHEET NO. 28

NAD 83

SITE 25

ROBERT G. POWELL
DB 1044 PG 102

CHAMP R. COOPER
DB 1078 PG 938
PB 23 PG 88

LEWIS MICHAEL LINTHICUM
DB 1125 PG 838

DAVID LEE JOHNSON
DB 1068 PG 1255
PB 23 PG 88

JUNE H. HILL
DB 1144 PG 6

JAMES PATRICK LINTHICUM
DB 1125 PG 543

JANET SUE LINTHICUM
DB 1125 PG 537

WILL A CULLER
DB 1682 PG 1499
PB 61 PG 20

TO US 30

EXISTING R/W

SR 1913 OLD COURTHOUSE RD 20' BST

OLD COURTHOUSE RD (SR 1913)

LATERAL "V" DITCH SEE DETAIL "A"

PROP. R/W

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

+00, GRAU 350

+50, END SBG

2GI W/ FLAT GRATE

2' LATERAL BASE DITCH SEE DETAIL "B"

PROP. C/A FENCE

SDG SEE DETAIL "D"

–L– +67.63 214.16' LT

–L– +09.00 160.00' LT

PROP. 25' GUARDRAIL WITH TERMINAL END SECTIONS

END OF ROADWAY MARKERS

–L– +64.81 190.00' LT

–L– +80.93 160.00' LT

PROP. DBL. FACE CBL. GUIDERAIL

+25, PROP. GUIDERAIL ANCHOR

+75, PROP. GUIDERAIL ANCHOR

–L– S 39° 58' 50.1" E

N58°05'9"W 835.5' TOTAL

+50, CAT-1 END SBG

+50, BEGIN SBG

+00, GRAU 350

JB W/ MH

CLASS 'I' RIP RAP EST. 26 TONS 49 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

–SR4– S 39° 58' 50.1" E

+70, GRAU 350

+20, GRAU 350

–SR4– +00.00 80.00' RT & 103.67' RT

–SR4– PC Sta. 31+34.98

–SR4– +34.98 80.00' RT

R=170'

END CONSTRUCTION
–SR4– POC Sta. 33+83.99
–SR4– +93.97 80.00' RT

–SR4– PT Sta. 33+93.97
–SR4– +93.97 30.22' RT

S 19° 22' 30.0" W

–SR4– POT Sta. 34+36.65

TOE PROTECTION SEE DETAIL "T"

–L– +30.00 120.00' RT

–L– +01.20 135.68' RT

–SR4–
PI Sta 32+77.45
Δ = 59° 21' 20.1" (RT)
D = 22° 55' 05.9"
L = 258.99'
T = 142.47'
R = 250.00'
DS = 30 mph
e = 0.04

SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 63 FOR –L– PROFILE.
SEE SHEET NO. 101 FOR –SR4– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	28
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
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BARNHILL CONTRACTING COMPANY

NAD 83

SITE 26

MATCHLINE STA. 425+00 –L–

SEE SHEET NO. 27

MATCHLINE STA. 439+00 –L–

SEE SHEET NO. 29

–L– +05.00 322.00' LT

–L– +10.00 190.00' LT

–L– +18.00 190.00' LT

–L– +93.25 200.00' RT

TDE

68A JUNE H. HILL DB 1144 PG 6

68 JUNE H. HILL DB 1141 PG 596

71 TED L. HOLLINGSWORTH DB 1473 PG 1061 PB 47 PG 58

69 CHAMP R. COOPER DB 1078 PG 938

70 KENNETH RAY HOLLINGSWORTH DB 47 PG 58 PB 47 PG 58

POND DRAIN POND

PROP. SLOPE STAKES

TOE PROTECTION SEE DETAIL "T"

PROP. GUARDRAIL & SBG

+50, CAT-1 BEGIN SBG

+05, END SBG

2GI W/ FLAT GRATE

+00, GRAU 350

PROP. RW

2' BASE BERM DITCH SEE DETAIL "J"

2' BASE BERM DITCH SEE DEATIL "J"

BDOS

2 ELBOWS

2GI

FS

PROP. DBL. FACE CBL. GUIDERAIL

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

S 39° 58' 50" E

–L–

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

PSH

2' BASE TAIL DITCH W/CLASS 'B' RIP RAP SEE DETAIL "Q" 42' LENGTH @ 7.43%

+00, CAT-1 END SBG

CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC

PROP. C/A FENCE

PROP. RW

PROP. SLOPE STAKES

SEE CLV INSTALLATION

SEE DETAIL "A"

SEE DETAIL "B"

SEE DETAIL "C"

SEE DETAIL "D"

SEE DETAIL "E"

SEE DETAIL "F"

SEE DETAIL "G"

SEE DETAIL "H"

SEE DETAIL "I"

SEE DETAIL "K"

SEE DETAIL "L"

SEE DETAIL "M"

SEE DETAIL "N"

SEE DETAIL "O"

SEE DETAIL "P"

SEE DETAIL "R"

SEE DETAIL "S"

SEE DETAIL "U"

SEE DETAIL "V"

SEE DETAIL "W"

SEE DETAIL "X"

SEE DETAIL "Y"

SEE DETAIL "Z"

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 64 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

REVISIONS

8/17/99

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	29
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

71
TED L. HOLLINGSWORTH
DB 1473 PG 1061
PB 47 PG 58

70
KENNETH RAY HOLLINGSWORTH
DB 47 PG 58
PB 47 PG 58

72
ELIZABETH H. BULLINS
DB 1473 PG 1063
PB 47 PG 58

73
MILDRED FREEMAN
DB 899 PG 120

NAD 83

–L– SEE SHEET NO. 28

–L– SEE SHEET NO. 30

MATCHLINE STA. 439+00 –L–

MATCHLINE STA. 453+00 –L–

PROP. RW

PROP. SLOPE STAKES

NOTE: STABILIZE STREAM BANKS AT CULVERT INLET, SEE DETAIL "Y"

–L– +75.00
190.00' LT

–L– +90.00
190.00' LT

PSH
F
409B

–L– +14.95
147.32' LT
END C/A FENCE

–L– +41.42
148.12' LT
BEGIN C/A FENCE

PROP. GUARDRAIL & SBG

2GI W/ FLAT GRATE

+50, CAT-1
BEGIN SBG

2GI
FS
398

2GI W/ FLAT GRATE
401

403

407

412

440

445

450

PROP. DBL. FACE CBL. GUIDERAIL

393

2GI(A)
FS
396

+75, PROP. GUIDERAIL ANCHOR

+25, PROP. GUIDERAIL ANCHOR

399

2GI
406

14.4 ft CLEARANCE

2GI S 39° 58' 50.1" E

408

10'x7' RCBC

413

+50, BEGIN SBG

+00, GRAU

350
2GI
394
FS

2GI W/ FLAT GRATE
397

2GI(A) W/ FLAT GRATE
400

402

30" CSP

PROP. GUARDRAIL & SBG

409

411

18" CSP

414

PROP. SLOPE STAKES

TOE PROTECTION F
SEE DETAIL "T"

405

404

CLASS 'B' RIP RAP
EST. 8 TONS
21 SY FILTER FABRIC

CLASS 'I' RIP RAP
EST. 40 TONS
45 SY FILTER FABRIC

410
PSH

–L– +70.00
200.00' RT

–L– +50.00
200.00' RT

–L– +10.83
161.08' RT
END C/A FENCE

–L– +20.89
161.43' RT
BEGIN C/A FENCE

–L– +00.00
200.00' RT

–L– 450+23.00
GP ELEV.=706.58'
SKEW=91°
10'x7' RCBC BURIED 1'

SITE 27

S64°57'44"W
1283.08' TOTAL

S80°38'36"W
613.80'

N84°40'55"W
1082.52' TOTAL

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 64 FOR –L– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	30
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
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BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

MATCHLINE STA. 17+50 -Y10-
SEE SHEET NO. 42

NAD 83

-Y10-

PIs Sta 14+08.38
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI Sta 24+73.51
Δ = 63° 55' 59.7" (LT)
D = 3° 34' 51.6"
L = 1,785.35'
T = 998.50'
R = 1,600.00'
DS = 50 mph
e = 0.05

PIs Sta 33+27.06
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

-RP3C-

PIs Sta 11+33.33
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 16+49.19
Δ = 2° 34' 23.6" (RT)
D = 0° 17' 11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 70 mph
e = NC

PIs Sta 21+64.89
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

-SR6-

PI Sta 14+76.97
Δ = 28° 33' 35.4" (LT)
D = 9° 32' 57.5"
L = 299.08'
T = 152.71'
R = 600.00'
DS = 40 mph
e = 0.02

PI Sta 11+33.59
Δ = 44° 39' 28.0" (RT)
D = 22° 55' 05.9"
L = 194.86'
T = 102.68'
R = 250.00'
DS = 30 mph
e = 0.04

-Y10- POC Sta.22+12.45 =
-L- POT Sta.462+61.47

-RP3C- ST Sta. 10+00.00 =
-L- POT Sta.458+91.82
OFFSET 35.00' RIGHT

-L- SEE SHEET NO. 29

MATCHLINE STA. 453+00 -L-

MATCHLINE STA. 467+00 -L-

-L- SEE SHEET NO. 31

-RP3C- SC Sta. 12+00.00

-SR6- PC Sta. 10+30.91

-SR6- POT Sta. 10+00.00 =
-Y10- POC Sta.25+24.10

-SR6- PT Sta. 16+23.33

-SR6- PC Sta. 13+24.26

-SR6- PT Sta. 12+25.76

-SR6- POT Sta. 20+50.00

END CONSTRUCTION
-SR6- Sta. 19+68.82

SITE 27

MATCHLINE STA. 26+50 -Y10-
SEE SHEET NO. 43

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2-R FOR -Y10- BRIDGE DETAIL.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 103 FOR -SR6- PROFILE.
SEE SHEET NO. 75 FOR -Y10- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	31
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
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BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-RP3B-

PIs Sta 11+46.73
Θs = 5° 15' 07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

PI Sta 26+62.62
Δ = 100° 29' 28.5" (LT)
D = 4° 46' 28.7"
L = 2,104.68'
T = 1,442.62'
R = 1,200.00'
DS = 60 mph
e = 0.08

PIs Sta 33+98.08
Θs = 5° 15' 07.6"
Ls = 220.00'
LT = 146.73'
ST = 73.39'

NAD 83

SITE 28

-RP3B- ST Sta. 10+00.00 =
-L- POT Sta. 479+80.13
59.00' LT

-L- +80.13
180.00' LT

CHORD

PROP. R/W

2' LATERAL BASE DITCH SEE DETAIL "B"

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

PROP. SLOPE STAKES

PROP. GUARDRAIL & SBG

SDG SEE DETAIL "D"

+00, CAT-1 BEGIN SBG

+00, END SBG

+50, GRAU 350

+50, END SBG

+00, GRAU 350

+50, BEGIN SBG

+00, CAT-1 END SBG

2GI W/ FLAT GRATE

2GI

FS

HW

PROP. DBL. FACE CBL. GUIDERAIL

+00, PROP. GUIDERAIL ANCHOR

36" CL IV W/METHOD 'A' INSTALLATION

36" CLASS IV W/ METHOD 'A' INSTALLATION

-RP3CA- POT Sta. 10+00.00 =
-RP3C- POT Sta. 25+69.93

-RP3C- CS Sta. 20+98.22

-RP3C- ST Sta. 22+98.22

-RP3C- +98.22
140.00' RT

-RP3C- +25
150 RT

-RP3C- +63
150 RT

3' BASE TAIL DITCH SEE DETAIL "Z"

CLASS 'B' RIP RAP EST. 14 TONS 38 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

CLASS 'B' RIP RAP EST. 11 TONS 28 SY FILTER FABRIC

15" CSP WELDOWED

TDE

R=19860'

S 39° 58' 50.1" E

S 39° 08' 03.9" E

S 36° 50' 03.9" E

-RP3CA-

-RP3C-

-L- SEE SHEET NO. 30

MATCHLINE STA. 467+00 -L-

MATCHLINE STA. 481+00 -L-

-L- SEE SHEET NO. 32

91 RAYMOND GARNER DB 905 PG 178

85 JOHN M. LAMB DB 965 PG 53

92 ALFRED A. THOMAS DB 1117 PG 182

84 PRISCILLA STEELE DB 982 PG 414

83 RUBY WALL DB 881 PG 408

93 VAN H. LEDBETTER DB 1325 PG 878

STONE

HTR ABAND

POULTRY HOUSE

RUINS

EIP

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 65 FOR -L- PROFILE.
SEE SHEET NO. 87 FOR -RP3B- PROFILE.
SEE SHEET NO. 90 FOR -RP3C- PROFILE.
SEE SHEET NO. 92 FOR -RP3CA- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

-RP3C-

PIs Sta 11+33.33
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

PI Sta 16+49.19
Δ = 2° 34' 23.6" (RT)
D = 0° 17' 11.3"
L = 898.22'
T = 449.19'
R = 20,000.00'
DS = 60 mph
e = NC

PIs Sta 21+64.89
Θs = 0° 17' 11.3"
Ls = 200.00'
LT = 133.33'
ST = 66.67'

3/16/2009
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REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	32
RW SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

MATCHLINE STA. 481+00 –L– SEE SHEET NO. 31

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 46

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 46

MATCHLINE STA. 24+50 –RP3BD– SEE SHEET NO. 47

MATCHLINE STA. 64+50 –Y12– SEE SHEET NO. 47

SITE 30

SITE 29

–RP3B–

Pi's Sta 11+46.73	Pi Sta 28+62.62	Pi's Sta 33+98.08
Bs = 5°15' 01.6"	Δ = 100° 09' 28.5" (LT)	Bs = 5°15' 01.6"
Ls = 200.00'	D = 4° 46' 28.7"	Ls = 200.00'
LT = 146.73'	L = 2,014.68'	LT = 146.73'
ST = 73.39'	T = 1,442.62'	ST = 73.39'
	R = 1,200.00'	
	DS = 60 mph	
	e = 0.08	

–RP3CA–

Pi's Sta 21+21.85	Pi Sta 23+90.04	Pi's Sta 26+50.89
Bs = 7° 38' 22.0"	Δ = 14° 41' 17.7" (LT)	Bs = 7° 38' 22.0"
Ls = 320.00'	D = 4° 46' 28.7"	Ls = 320.00'
LT = 213.53'	L = 359.72'	LT = 213.53'
ST = 106.85'	T = 155.73'	ST = 106.85'
	R = 1,200.00'	
	DS = 60 mph	
	e = 0.08	

–L–

Pi's Sta 1+34.41	Pi Sta 7+82.90	Pi's Sta 12+58.63
Bs = 22° 55' 05.9"	Δ = 226° 25' 14.8" (RT)	Bs = 0° 59' 59.6"
Ls = 200.00'	D = 22° 55' 05.9"	Bs = 22° 55' 42.8"
LT = 134.41'	L = 981.91'	Ls = 200.00'
ST = 67.70'	T = 582.92'	LT = 131.81'
	R = 250.00'	ST = 70.66'
	DS = 30 mph	
	e = 0.08	

–Y12–

Pi's Sta 5+15.31	Pi Sta 67+18.29	Pi's Sta 82+50.67
Bs = 0° 59' 59.7"	Δ = 30° 0' 05.7" (LT)	Bs = 0° 59' 59.7"
Ls = 200.00'	D = 0° 59' 59.7"	Ls = 200.00'
LT = 133.34'	L = 1,000.01'	LT = 133.34'
ST = 66.81'	T = 513.36'	ST = 66.81'
	R = 5,730.00'	
	DS = 70 mph	
	e = 0.04	

–RP3C–

Pi's Sta 46+89.12	Pi Sta 51+43.54	Pi's Sta 55+79.77	Pi's Sta 59+26.26
Bs = 7° 38' 22.0"	Δ = 32° 20' 25.0" (RT)	Bs = 7° 38' 22.0"	Bs = 0° 59' 23.7"
Ls = 320.00'	D = 4° 46' 28.7"	Ls = 320.00'	Ls = 200.00'
LT = 213.53'	L = 677.33'	LT = 213.53'	LT = 133.34'
ST = 106.85'	T = 347.95'	ST = 106.85'	ST = 66.67'
	R = 1,200.00'		
	DS = 60 mph		
	e = 0.08		

–RP3BD–

Pi's Sta 11+60.05	Pi Sta 19+99.67	Pi's Sta 27+28.43	Pi's Sta 30+46.45	Pi's Sta 32+89.55	Pi's Sta 36+11.09	Pi's Sta 38+24.30
Bs = 4° 35' 01.2"	Δ = 53° 43' 11.3" (RT)	Bs = 4° 35' 01.2"	Bs = 5° 01' 10.4"	Δ = 13° 59' 18.1" (LT)	Bs = 7°12' 43.5"	Δ = 2° 41' 26.4" (LT)
Ls = 240.00'	D = 3° 49' 11.0"	Ls = 240.00'	Ls = 240.00'	D = 4° 18' 28.6"	Ls = 240.00'	D = 1° 00' 36.5"
LT = 160.05'	L = 1,406.38'	LT = 160.05'	LT = 160.01'	L = 324.01'	LT = 160.00'	L = 266.36'
ST = 80.05'	T = 759.67'	ST = 80.05'	ST = 80.06'	T = 163.17'	ST = 80.00'	T = 133.21'
	R = 1,500.00'			R = 1,330.00'		R = 5,672.00'
	DS = 60 mph			DS = 60 mph		DS = 60 mph
	e = 0.06			e = 0.06		e = 0.04

SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 2–R FOR –RP3CA– OVER –L– BRIDGE DETAIL.
SEE SHEET NO. 2–S FOR –RP3CA– OVER –Y12– BRIDGE DETAIL.
SEE SHEET NO. 2–S FOR –RP3BD– BRIDGE DETAIL.
SEE SHEET NO. 66 FOR –L– PROFILE.
SEE SHEET NO. 95 FOR –LP3CA– PROFILE.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NO. 88 FOR –RP3BD– PROFILE.
SEE SHEET NOS. 90–91 FOR –RP3C– PROFILE.
SEE SHEET NO. 92 FOR –RP3CA– PROFILE.
SEE SHEET NOS. 78,79,82 FOR –Y12– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:	
TIP NO.:	COUNTY:
DESIGNED BY:	
CHECKED BY:	DATE:

3/17/2020
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	33
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

-Y3-
PI Sta 12+01.43
△ = 9° 08' 18.5" (RT)
D = 6° 44' 26.4"
L = 135.57'
T = 67.93'
R = 850.00'
DS = 50 mph
e = 0.06

BEGIN CONSTRUCTION
-Y3- Sta. 12+70.00

-Y3- POT Sta.16+50.00 =
-DRIVE1- POT Sta. 10+00.00

-DRIVE1- PC Sta. 10+12.11

-DRIVE1- PT Sta. 10+82.21

-DRIVE1- POT Sta. 12+02.59

-Y3- POT Sta. 10+00.00

-Y3- PC Sta. 11+33.50

-Y3- PT Sta. 12+69.08

-DRIVE1-
PI Sta 10+54.31
△ = 80° 19' 19.0" (LT)
D = 114° 35' 29.6"
L = 70.09'
T = 42.19'
R = 50.00'

MATCHLINE STA. 18+50 -Y3-
SEE SHEET NO. 11

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 67 FOR -Y3- PROFILE.
SEE SHEET NO. 104 FOR -DRIVE1- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	34
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

8/17/99

REVISIONS

-Y3-
PI Sta 29+00.98
Δ = 9°17' 51.5" (RT)
D = 6°11' 38.9"
L = 150.10'
T = 75.22'
R = 925.00'
DS = 50 mph
e = 0.06

-Y3- POT Sta. 31+99.46

END CONSTRUCTION
-Y3- Sta. 29+25.00

-Y3- PC Sta. 28+25.76

-Y3- PT Sta. 29+75.86

MATCHLINE STA. 27+00 -Y3-
SEE SHEET NO. 11

PROP. R/W

-Y3- +25.76
60.00' LT

PROP. SLOPE STAKES

-Y3- +25.00
30.35' LT

-Y3- +25.00
29.66' RT

-Y3- +25.76
60.00' RT

SDG C
SEE DETAIL "D"

SDG
SEE DETAIL "D"

130' TAPER

24' TYP.

REMOVE

S 82° 28' 28.7" W

N 88° 13' 39.8" W

SR 1931 BANNER-WHITEHEAD RD 20'BST

TO US 311

EXISTING R/W

48"WW&ISBW

5SBW

ISFD

13B
MICHAEL F. DAVIS
DB 05E PG 301

12
GREGORY BURKHART &
MELISSA D
DB 116 PG 72

10
FAYE B. DAVIS
DB 2069 PG 897

8
MICHAEL HUGHES
DB 2051 PG 556

39
791.406

42
793.372

654.38'
S02°01'37"W

623.15'
S05°04'40"W

627.63'
S05°04'40"W

627.29'
S05°04'40"W

460.43'
S06°15'33"W

44.27'
S06°28'32"W

3344.04' TOTAL
S04°08'27"W

1375.74'
S02°55'42"W

275.85'
S86°28'05"W

217.84'
N88°02'28"W

225.17'
N88°52'33"W

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 67 FOR -Y3- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	35
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS
8/17/99

-Y5-
PIs Sta 12+79.96
Θs = 3° 57' 05.2"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

PI Sta 16+15.88
Δ = 21° 02' 30.1" (LT)
D = 3° 57' 05.2"
L = 532.51'
T = 269.29'
R = 1,450.00'
DS = 60 mph
e = 0.06

PIs Sta 19+45.80
Θs = 3° 57' 05.2"
Ls = 200.00'
LT = 133.37'
ST = 66.70'

-SR2-
PI Sta 56+17.65
Δ = 42° 33' 50.5" (LT)
D = 11° 27' 33.0"
L = 371.44'
T = 194.76'
R = 500.00'
DS = 30 mph
e = 0.05

NAD 83

CHARLOTTE CHRISTOPHER
DB 1246 PG 884
PB 36 PG 12

GEORGE A. YANCY
DB 1500 PG 1126
PB 36 PG 12

RUSSELL E. WEIDMAN
DB 1260 PG 728
PB 36 PG 12

26
TIMOTHY C. HANEY
DB 1250 PG 281
PB 36 PG 12

25
JEFFREY CAULDER & DEBRA B
DB 1897 PG 2211
PB 36 PG 13

24
JAMES R. SHORT
DB 980 PG 352

20
I.A.I. PROPERTIES
DB 1460 PG 881

21
EDWARD L. LAWRENCE
DB 985 PG 137

-Y5- ST Sta. 20+79.10
-Y5- +70.00 60.00' LT
-Y5- +70.00 30.08' LT
20 CHORD
-Y5- +79.10 60.00' LT
PROP. SLOPE STAKES
PROP. R/W
SDG SEE DETAIL "D"
-Y5- CS Sta. 18+79.10
BEGIN CONSTRUCTION -Y5- Sta.19+70.00
CLASS 'B' RIP RAP EST. 5 TONS 14 SY FILTER FABRIC
RETAIN
REMOVE
110' TAPER
30' TYP.
S 23° 33' 58.8" W -Y5-
LATERAL "V" DITCH SEE DETAIL "A"
-Y5- TS Sta. 29+27.37
-Y5- +27.37 60.00' LT
-SR2- POT Sta. 58+41.53 = -Y5- POT Sta.29+00.00
40' TYP.
S 66° 26' 01.2" E
CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC
-SR2- +57.79 80.00' LT
2' BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"
-SR2- PT. Sta. 57+94.33
R=420'
-SR2-
-Y5-
MATCHLINE STA. 30+00 -Y5- SEE SHEET NO. 19
MATCHLINE STA. 56+50 -SR2- SEE SHEET NO. 18

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 99 FOR -SR2- PROFILE.
SEE SHEET NO. 68 FOR -Y5- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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REVISIONS

MATCHLINE STA. 23+00 -Y6-
SEE SHEET NO. 20

MATCHLINE STA. 38+50 -Y5-
SEE SHEET NO. 19

-Y5-

PIs Sta 30+60.71 Θs = 1° 25' 56.6" Ls = 200.00' LT = 133.34' ST = 66.67'	PI Sta 35+49.20 Δ = 12° 02' 24.6" (RT) D = 1° 25' 56.6" L = 840.56' T = 421.83' R = 4,000.00' DS = 60 mph e = 0.04	PIs Sta 40+34.60 Θs = 1° 25' 56.6" Ls = 200.00' LT = 133.34' ST = 66.67'

-Y6-

PIs Sta 25+30.47 Θs = 5° 12' 31.3" Ls = 200.00' LT = 133.39' ST = 66.72'	PI Sta 26+96.40 Δ = 10° 19' 04.3" (RT) D = 5° 12' 31.3" L = 198.09' T = 99.31' R = 1,100.00' DS = 50 mph e = 0.06	PIs Sta 28+61.89 Θs = 5° 12' 31.3" Ls = 200.00' LT = 133.39' ST = 66.72'

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	36
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 69 FOR -Y5- PROFILE.
SEE SHEET NO. 70 FOR -Y6- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	37
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-Y7-

PIs Sta 12+31.53	PI Sta 16+21.12	PIs Sta 20+06.73
Θs = 2° 26' 17.2"	Δ = 15° 38' 58.3" (LT)	Θs = 2° 26' 17.2"
Ls = 200.00'	D = 2° 26' 17.2"	Ls = 200.00'
LT = 133.35'	L = 641.87'	LT = 133.35'
ST = 66.68'	T = 322.94'	ST = 66.68'
	R = 2,350.00'	
	DS = 60 mph	
	e = 0.06	

-NSRR-

PIs Sta 10+64.33	PI Sta 12+05.75	PIs Sta 13+46.98
Θs = 0° 41' 50.8"	Δ = 5° 25' 46.3" (LT)	Θs = 0° 41' 50.8"
Ls = 62.00'	D = 2° 15' 00.0"	Ls = 62.00'
LT = 41.33'	L = 241.31'	LT = 41.33'
ST = 20.67'	T = 120.75'	ST = 20.67'
	R = 2,546.64'	

CRANFORD IRON AND METAL COMPANY
DB 966 PG 780

LAWRENCE B. CRANFORD
DB 1345 PG 862

NAD 83

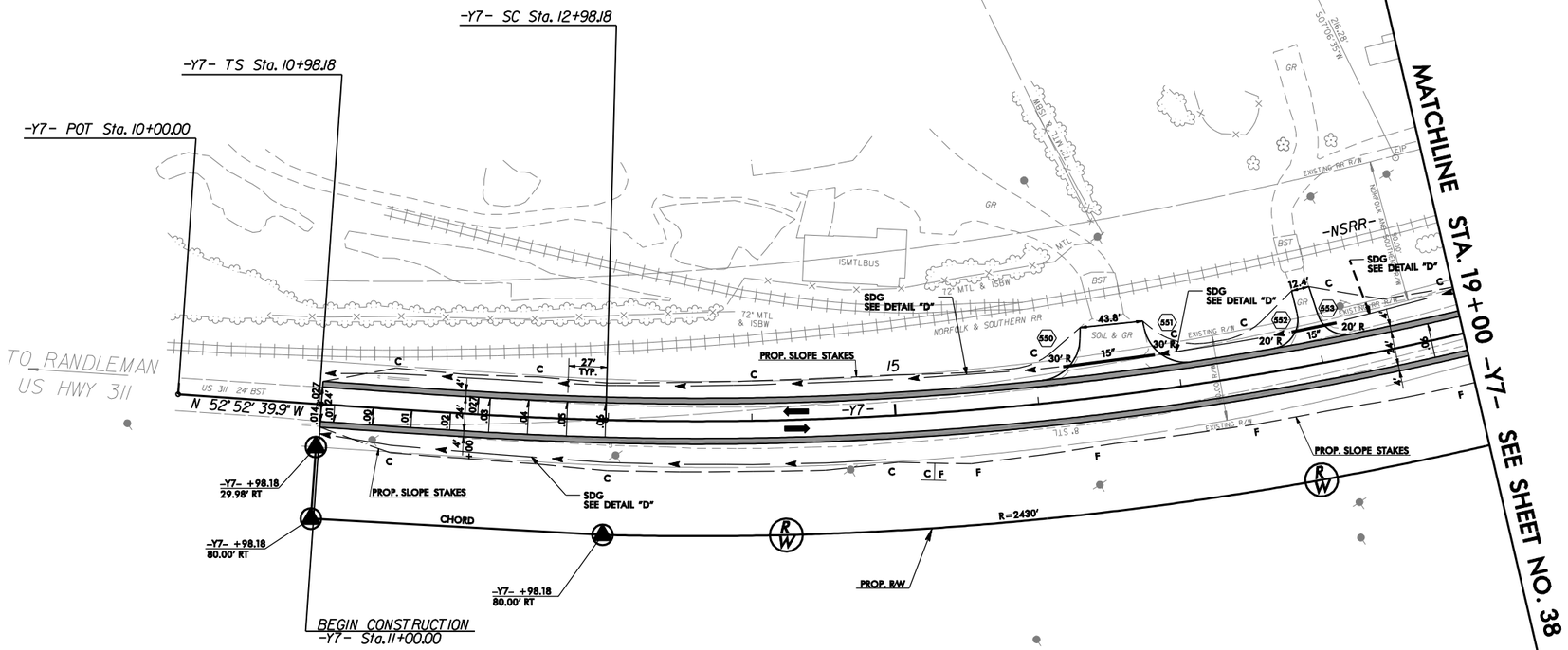
-Y7- SC Sta. 12+98.18

-Y7- TS Sta. 10+98.18

-Y7- POT Sta. 10+00.00

TO RANDLEMAN
US HWY 311

MATCHLINE STA. 19+00 -Y7- SEE SHEET NO. 38



44
PHILIP TRACY WALL FAMILY LIMITED PARTNERSHIP
DB 1562 PG 185

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 71 FOR -Y7- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

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8/17/99

REVISIONS

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.
SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 71 FOR -Y7- PROFILE.
SEE SHEET NO. 76 FOR -Y11- PROFILE.

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	38
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

-Y7-

PIs Sta 12+31.53	PI Sta 16+21.12	PIs Sta 20+06.73
Θs = 2° 26' 17.2"	Δ = 15° 38' 58.3" (LT)	Θs = 2° 26' 17.2"
Ls = 200.00'	D = 2° 26' 17.2"	Ls = 200.00'
LT = 133.35'	L = 641.87'	LT = 133.35'
ST = 66.68'	T = 322.94'	ST = 66.68'
	R = 2,350.00'	
	DS = 60 mph	
	e = .06	

-NSRR-

PIs Sta 10+64.33	PI Sta 12+05.75	PIs Sta 13+46.98
Θs = 0° 41' 50.8"	Δ = 5° 25' 46.3" (LT)	Θs = 0° 41' 50.8"
Ls = 62.00'	D = 2° 15' 00.0"	Ls = 62.00'
LT = 41.33'	L = 241.31'	LT = 41.33'
ST = 20.67'	T = 120.75'	ST = 20.67'
	R = 2,546.64'	

-Y11-

PI Sta 19+93.89	PI Sta 12+33.68
Δ = 100° 09' 14.9" (RT)	Δ = 48° 50' 58.6" (LT)
D = 16° 22' 12.8"	D = 16° 22' 12.8"
L = 611.81'	L = 298.41'
T = 418.26'	T = 158.95'
R = 350.00'	R = 350.00'
DS = 35 mph	DS = 35 mph
e = 0.06	e = 0.06

NAD 83

MATCHLINE STA. 19+00 -Y7- SEE SHEET NO. 37

-Y7- CS Sta. 19+40.05

-Y7- +40.05
80.00' RT

PROP. SLOPE STAKES

-Y11- +47.00
80.00' RT

CHORD

-Y11- POT Sta. 10+00.00 =
-Y7- POT Sta. 21+04.22

SDG
SEE DETAIL "D"

-Y11- PT Sta. 13+73.13

-Y11- +73.13
60.00' RT

N 14° 56' 51.1" E

-Y11- PC Sta. 15+75.64

-Y11- +75.64
60.00' RT

LATERAL "V" DITCH
SEE DETAIL "A"

N 33° 54' 07.5" W

-Y11- PT Sta. 21+87.44

-Y11- +87.44
60.00' RT

PROP. R/W

PROP. SLOPE STAKES

SDG
SEE DETAIL "D"

-Y11- +70.00
31.41' RT

-Y11- +70.00
50.00' RT

-Y11- POT Sta. 22+79.53

END CONSTRUCTION
-Y11- POT Sta. 22+60.49
FEATHER PAVEMENT DOWN
TO EXISTING GRAVEL

-Y11- +70.00
28.59' LT

-Y11- +70.00
50.00' LT

N 66° 15' 07.4" E

-Y11- +87.44
50.00' LT

SDG
SEE DETAIL "D"

-Y11- +50.65
50.00' LT

-Y11- +25.12
60.00' LT

PROP. R/W

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

-Y11- +75.64
60.00' LT

LATERAL "V" DITCH
SEE DETAIL "A"

-Y11- PC Sta. 10+74.73

-Y11- +74.73
72.96' LT

-Y11- +73.13
60.00' LT

PROP. SLOPE STAKES

SDG
SEE DETAIL "D"

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

PROP. R/W

-Y7- +00.00
76.71' RT
BEGIN C/A FENCE

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

-Y7- +48
78' LT
& 88' LT

LATERAL "V" DITCH
SEE DETAIL "A"

MATCHLINE STA. 27+00 -Y7-
SEE SHEET NO. 22

-NSRR- ST Sta. 13+88.31
BEGIN CONSTRUCTION

PROP. SLOPE STAKES

-Y7- +40.05
55.07' LT

-Y7- ST Sta. 21+40.05

-Y7- +00.00
55.00' LT

5' BASE SDG
SEE DETAIL "W"

REMOVE

PROP. SLOPE STAKES

5' BASE SDG
SEE DETAIL "W"

REMOVE EXISTING
RAIL AND TIES

-Y7- +00.00
55.00' LT
BEGIN C/A FENCE

GRADE
TO
DRAIN

5' BASE SDG
SEE DETAIL "W"

5' BASE TAIL
DITCH SEE
DETAIL "Y"
192' LENGTH
@ 1.04%

300' LANE TAPER

360' TRANSITION

TDE

44
PHILIP TRACY WALL FAMILY LIMITED PARTNERSHIP
DB 1562 PG 185

48
ELEANOR J. HARTLEY
DB 1377 PG 13
PB 38 PG 87

NORMAN P. HALL
DB 1047 PG 641

JAMES A. HALL
DB 1526 737

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	39
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-NSRR-

PIs Sta 32+60.19
Θs = 0° 55' 47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

PI Sta 35+93.12
Δ = 18° 34' 08.3" (RT)
D = 3° 00' 00.0"
L = 618.97'
T = 312.26'
R = 1,910.08'

PIs Sta 39+20.49
Θs = 0° 55' 47.6"
Ls = 62.00'
LT = 41.33'
ST = 20.67'

-Y7-

PIs Sta 40+39.45
Θs = 5° 20' 51.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

PI Sta 43+09.60
Δ = 13° 27' 07.3" (RT)
D = 3° 49' 11.0"
L = 352.17'
T = 176.90'
R = 1,500.00'
DS = 60 mph
e = 0.08

PIs Sta 45+78.28
Θs = 5° 20' 51.4"
Ls = 280.00'
LT = 186.75'
ST = 93.41'

NAD 83

SOPHIA BAPTIST CHURCH
DB 1385 PG 115
DB 1081 PG 878
DB 1310 PG 466

-NSRR- ST Sta. 39+61.82
END CONSTRUCTION

END CONSTRUCTION
-Y7- Sta. 49+53.09

-Y7- POT Sta. 49+91.04

-NSRR- CS Sta. 38+99.82

DEAD END

SR 1522 MILLIKAN RD (FBST)

SR 3109 PIEDMONT DAIRY RD

SR 1524 BECKERDITE RD

W.A. JOHNSON HEIRS
DB 117 PG 301

ISBKCH SOPHIA BAPTIST CHURCH

NORFOLK SOUTHERN RAILWAY COMPANY
DB 64 PG 130

MATCHLINE STA. 43+00 -Y7-
SEE SHEET NO. 22

REMOVE EXISTING RAIL AND TIES

CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

2' BASE SDG SEE DETAIL "U"

-Y7- +50.00
40.00' LT
END C/A FENCE

-Y7- +91.91
37.04' LT

-NSRR-

SDG SEE DETAIL "D"

PROP. SLOPE STAKES

R=1540'

R=1420'

PROP. R/W

CHORD

-Y7- ST Sta. 47+64.87

-Y7- CS Sta. 44+84.87

-Y7- +50.00
80.00' RT
END C/A FENCE

-Y7- +83.00
80.00' RT

N 49° 15' 22.6" W

CLASS 'B' RIP RAP EST. 3 TONS 10 SY FILTER FABRIC

CHARLES & SPENCER HARTLEY
DB 04E PG 328

DOROTHY P. BOWLES
DB 1217 PG 121

AZEL MILLIKAN
DB 185 PG 838

JOSEPH B. MILLIKAN
DB 1517 PG 74

ROBERT S. CASHWELL
DB 1046 PG 632

STEPHEN A. MEREDITH
DB 1223 PG 312
DB 983 PG 881

VIRGINIA C. ANDREWS
DB 1212 PG 2148

OLD PLANK RD. (SR 1748)

TO GLENOLA

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 73 FOR -NSRR- PROFILE.
SEE SHEET NO. 72 FOR -Y7- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	40
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

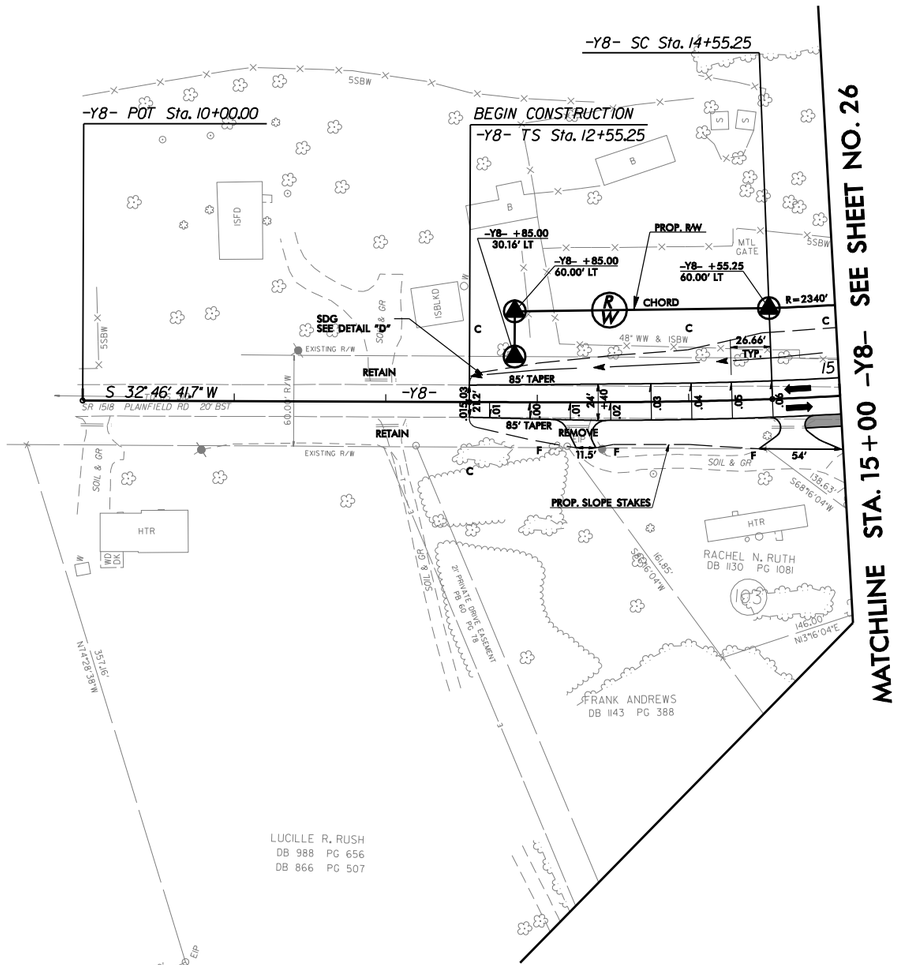
BARNHILL CONTRACTING COMPANY

NAD 83

-Y8-

PIs Sta 13+88.59	PI Sta 15+20.80	PIs Sta 16+52.99
Θs = 2° 23' 14.4"	Δ = 3° 07' 44.3" (LT)	Θs = 2° 23' 14.4"
Ls = 200.00'	D = 2° 23' 14.4"	Ls = 200.00'
LT = 133.35'	L = 131.07'	LT = 133.35'
ST = 66.68'	T = 65.55'	ST = 66.68'
	R = 2,400.00'	
	DS = 60 mph	
	e = 0.06	

58
BLANCHE POWELL (LE)
DB 1203 PG 282



SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 74 FOR -Y8- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	41
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

NAD 83

-Y8-
PIs Sta 23+00.88
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

-Y8-
PI Sta 24+76.36
Δ = 8° 39' 32.4" (LT)
D = 4° 14' 38.9"
L = 204.02'
T = 102.21'
R = 1,350.00'
DS = 60 mph
e = 0.08

-Y8-
PIs Sta 26+51.56
Θs = 4° 40' 06.8"
Ls = 220.00'
LT = 146.72'
ST = 73.38'

REVISIONS

8/17/99

SEE SHEET NO. 26

MATCHLINE STA. 24+00 -Y8-

-Y8- CS Sta. 25+78.18

-Y8- ST Sta. 27+98.18

-Y8- POT Sta. 32+24.09

PROP. SLOPE STAKES

-Y8- +00.00
60.00' LT

-Y8- +78.18
60.00' LT

-Y8- +88.22
60.00' LT

-Y8- +27.65
29.24' LT

-Y8- +49.93
30.63' RT

-Y8- +49.93
49.47' RT

-Y8- +50.00
50.00' RT

SDG SEE DETAIL "D"

PROP. R/W

CHORD

EXISTING R/W

RETAIN

REMOVE

REMOVE 14' D/W

27.5' TYP.

SR 1518 PLAINFIELD RD 20' BST

TO SPEED RD

S 6° 52' 42.7" W

58 BLANCHE POWELL (LE) DB 1203 PG 282

59B BLANCHE POWELL (LE) DB 1203 PG 282

62 KATHERINE ANN MCDOWELL DB 125 PG 541

63 WILL A. CULLER DB 1582 PG 1388 PB 61 PG 21

64 WILL A CULLER DB 1682 PG 1499 PB 61 PG 20

60 DON R. RICH DB 1058 PG 616

61 JERRY LEE RICH DB 1058 PG 617

102A CHARLES WAYNE RICH DB 1058 PG 617

LINDA COBLE DB 1058 PG 614

EUGENE RICH DB 1058 PG 615

102 CHARLES RICH DB 1829 PG 1875 PB 85 PG 18

57A DONNA RAY RICH DB 1829 PG 1869

END CONSTRUCTION
-Y8- Sta. 28+50.00

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 74 FOR -Y8- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	42
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

8/17/99

REVISIONS

-Y10-

PIs Sta 14+08.38	PI Sta 24+73.51	PIs Sta 33+27.06
Θs = 3° 34' 51.6"	Δ = 63° 55' 59.7" (LT)	Θs = 3° 34' 51.6"
Ls = 200.00'	D = 3° 34' 51.6"	Ls = 200.00'
LT = 133.36'	L = 1,785.35'	LT = 133.36'
ST = 66.69'	T = 998.50'	ST = 66.69'
	R = 1,600.00'	
	DS = 50 mph	
	e = 0.05	

NAD 83

-Y10- POT Sta. 10+00.00

-Y10- TS Sta. 12+75.02

BEGIN CONSTRUCTION
-Y10- Sta. 12+65.00

-Y10- SC Sta. 14+75.02

MATCHLINE STA. 17+50 -Y10- SEE SHEET NO. 30

RAYMOND DYSON
DB 1536 PG 628
PB 27 PG 32

TOMMY GARNER
DB 1122 PG 862

91 RAYMOND GARNER
DB 880 PG 350

90 HOBERT WILSON
DB 801 PG 135

81 CAROL ANN DAVIS WILLIAMS
DB 1971 PG 1628

82 WADE DAVIS
DB 857 PG 528

D & L MANAGEMENT
DB 1413 PG 188

80 EUGENE HEATH
DB 973 PG 3

S 71° 45' 49.5" W
TO US 310
SR 1511 HEATH DIARY RD
EXISTING R/W
RETAIN
REMOVE
PROP. R/W
PROP. SLOPE STAKES
SDG SEE DETAIL "D"
LATERAL "V" DITCH SEE DETAIL "A"
CHORD
R=1550'
R=1660'
-Y10- +49.72 35.00' LT
-Y10- +47.03 30.08' LT
-Y10- +75.02 50.00' LT
-Y10- +74.24 50.00' LT
-Y10- +79.96 60.00' LT
-Y10- +28.93 29.86' RT
-Y10- +27.19 60.00' RT
-Y10- +75.02 60.00' RT
-Y10- +32.41 60.00' RT
36" BK WALL
48" CONC
20' CONC
174.08' N71°16'25"E
306.86' N01°38'27"E
385.30' N08°46'09"E
398.83' N00°36'57"W
234.00' N00°56'34"W
234.78' N00°56'34"W
168.34' N00°18'14"W
228.43' N88°21'45"E
178.84' N70°51'56"E
750.00' S88°14'00"W
178.05' S04°49'00"E
221.16' S14°51'04"E
420.07' S14°51'04"E
462.62' S14°51'04"E

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 75 FOR -Y10- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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jkeller
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	43
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

-DRIVE 3-
PI Sta 11+28.94
Δ = 44° 02' 05.2" (LT)
D = 30° 09' 20.4"
L = 146.02'
T = 76.83'
R = 190.00'

-Y10-
PIs Sta 14+08.38
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

PI Sta 24+73.51
Δ = 63° 55' 59.7" (LT)
D = 3° 34' 51.6"
L = 1,785.35'
T = 998.50'
R = 1,600.00'
DS = 50 mph
e = 0.05

PIs Sta 33+27.06
Θs = 3° 34' 51.6"
Ls = 200.00'
LT = 133.36'
ST = 66.69'

MATCHLINE STA. 26+50 -Y10-
SEE SHEET NO. 30

-DRIVE3- POT Sta. 12+29.05
N 66° 36' 39.0" E
-DRIVE3- PT Sta. 11+98.13
-Y10- +31.11
272.02' LT
-Y10- +30.00
195.00' LT
-Y10- +50.00
130.00' LT
-Y10- +78.66
130.00' LT
-DRIVE3- PC Sta. 10+52.10
-DRIVE3- POT Sta. 10+00.00
-Y10- POC Sta. 29+26.41
-Y10- CS Sta. 32+60.37
-Y10- ST Sta. 34+60.37
-Y10- POT Sta. 36+79.68
-Y10- +60.37
55.00' LT
-Y10- +00.00
55.00' LT
-Y10- +00.00
30.48' LT
-Y10- +00.00
29.52' RT
-Y10- +00.00
80.00' RT
-Y10- +60.37
80.00' RT
-Y10- +60.37
55.00' LT
-Y10- +75.00
55.00' LT
-Y10- +60.37
80.00' RT
-Y10- +97.22
79.67' RT
-Y10- +50.21
80.00' RT
-Y10- +39.17
92.56' RT
-Y10- +39.65
98.90' RT
-Y10- +52.39
113.17' RT
-DRIVE2- PT Sta. 12+65.74
-DRIVE2- POT Sta. 10+00.00
-Y10- POC Sta. 29+75.00
-DRIVE2- PCC Sta. 10+76.54
-DRIVE2- POT Sta. 13+73.05
END CONSTRUCTION
-Y10- Sta. 35+00.00
-DRIVE2- PC Sta. 10+11.12

-DRIVE2-
PI Sta 10+51.14
Δ = 83° 17' 16.1" (RT)
D = 127° 19' 26.2"
L = 65.41'
T = 40.01'
R = 45.00'

PI Sta 11+71.61
Δ = 13° 59' 15.4" (RT)
D = 7° 23' 34.8"
L = 189.20'
T = 95.07'
R = 775.00'

PRISCILLA STEELE
DB 982 PG 44
JOHN M. LAMB
DB 965 PG 53
RUBY M. WALL
DB 881 PG 408
MARY POSEY
DB 723 PG 315
PB 42 PG 30
DEWEY HEATH
DB 1314 PG 230
DEWEY HEATH
DB 1128 PG 1032
RUBY M. WALL
DB 954 PG 672
DB 181 PG 872

POULTRY HOUSE
POULTRY HOUSE
TO SPERO RD
SR 1511 HEATH DAIRY RD 20' BST
TURNER DAIRY RD (SR 1411) SR 1512 TURNER DAIRY RD 25' GR
EXISTING R/W
60.00' R/W

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 104 FOR -DRIVE2- PROFILE.
SEE SHEET NO. 104 FOR -DRIVE3- PROFILE.
SEE SHEET NO. 75 FOR -Y10- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/6/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	44
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-Y12-
PI Sta 17+88.83
Δ = 15° 37' 22.9" (RT)
D = 0° 59' 47.2"
L = 1,567.87'
T = 788.83'
R = 5,750.00'
DS = 70 mph
e = 0.04

PIs Sta 26+34.54
Θs = 0° 59' 47.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

NAD 83

J. & R. VENTURES, INC.
DB 1381 PG 860

TIMKEN COMPANY
DB 1217 PG 1275
DB 1217 PG 1268

EXISTING R/W
RANDLEMAN CITY LIMITS
48" WW & ISBW
PIEDMONT NATURAL GAS EASEMENT
DB 1488 PG 1286
RIPRAP
11.8 X 0.6 CONC HW
8.6 X 0.6 CONC HW
4' BST EOP
16' BST EOT
4' BST EOP
20' BST EOT
US 220 NBL 24' BST EOT
4' BST EOP
US 220 SBL 23' BST EOT
18' BST EOP
15' BST EOT
CONC CURB
36" CONC
CONC
RETAIN
CB
BEGIN CONSTRUCTION
-Y12NB- Sta.18+31.22
PROP. SLOPE STAKES
-Y12NB-
-Y12-
-Y12- PC Sta. 10+00.00
VARIABLE R/W
EIP
N38°23'28"W 422.88'
RONALD L. MYERS
DB 1152 PG 162
60' POWER LINE R/W
DUKE POWER COMPANY
SDRL
MTL

MATCHLINE STA. 22+00 -Y12- SEE SHEET NO. 45

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 77 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
R-2606B_rdy_psh_44.dgn
jlee

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	45
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

-Y12-

PI Sta 17+88.83
Δ = 15° 37' 22.9" (RT)
D = 0° 59' 47.2"
L = 1,567.87'
T = 788.83'
R = 5,750.00'
DS = 70 mph
e = 0.04

Pls Sta 26+34.54
θs = 0° 59' 47.2"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

NAD 83

TIMKEN COMPANY
DB 1217 PG 1275
DB 1217 PG 1268

68' POWER LINE R/W
DUKE POWER COMPANY

PIEDMONT NATURAL GAS EASEMENT
DB 1488 PG 1286

48" WW & 15BW

EXISTING R/W

MATCHLINE STA. 22+00 -Y12- SEE SHEET NO. 44

MATCHLINE STA. 35+50 -Y12- SEE SHEET NO. 46

PROP. SLOPE STAKES

CLASS 'B' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC

PROP. GUARDRAIL & SBG

COLLAR & EXTEND

2GI W/FLAT GRATE

+00, CAT-1 & BEGIN SBG

+50, END SBG

-Y12NB-

-Y12SB-

-Y12-

S 26° 43' 26.2" W

Adj. 2GI

50' TYP.

+50, BEGIN SBG

+00, GRAU 350

+50, CAT-1 END SBG

JB W/ SLAB

15" CSP W/2 ELBOWS

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC

OPEN END

SDG
SEE DETAIL "D"

2' BASE BERM DITCH
SEE DETAIL "J"

BEGIN CONSTRUCTION
-Y12SB- Sta.22+50.00

-Y12- CS Sta. 25+67.87

-Y12- ST Sta. 27+67.87

RONALD L. MYERS
DB 1152 PG 162

JAMIE A. HAYES
DB 1345 PG 766
PB 28 PG 80

BOBBIE BROWN
BRUCE HUGGINS
DB 1959 PG 87
PB 29 PG 80

96

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 77,81 FOR -L- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2008
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	46
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

MATCHLINE STA. 35+50 –Y12– SEE SHEET NO. 45

MATCHLINE STA. 49+00 –Y12– SEE SHEET NO. 32

MATCHLINE STA. 25+00 –RP3B– SEE SHEET NO. 32

NAD 83

PIEDMONT NATURAL GAS EASEMENT DB 4688 PG 0686

RANDLEMAN CITY LIMITS

DUKE POWER COMPANY DB 1108 PG 127

TIMKEN COMPANY
DB 1217 PG 1275
DB 1217 PG 1268

BACK CREEK CORP.
DB 1322 PG 278

48" WW & ISBW

EXISTING R/W

PROP. SLOPE STAKES

2GI W/FLAT GRATE +00, GRAU 350 +16

REMOVE COLLAR & EXTEND

SDG SEE DETAIL "D"

CLASS 'B' RIP RAP EST. 8 TONS 21 SY FILTER FABRIC

-Y12NB-

-Y12SB-

-Y12-

-RP3B-

S 26° 43' 26.2" W

N 29° 01' 26.2" E

Adj. 2GI +23, TIE TO EXISTING GUIDERAIL

2GI(D)

FS

CLASS 'B' RIP RAP EST. 2 TONS 7 SY FILTER FABRIC

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP SEE DETAIL "C"

BERM DITCH SEE DETAIL "M"

BDO

-RP3B- +09.35
135.00' LT
END C/A FENCE

CHORD

-RP3B- ST Sta. 35+44.68

-RP3B- POT Sta.36+44.68 =
-Y12- POT Sta.36+05.60
OFFSET 58.00' RIGHT

-RP3B- +24.68
170.00' LT

-RP3B- CS Sta. 33+24.68

PROP. R/W

R=1030'

SITE 30

JOHN L. DUNLAP
DB 1322 PG 436

+74 BEGIN SBG

+50 END CAT 1 SBG

CLASS 'B' RIP RAP EST. 15 TONS 37 SY FILTER FABRIC

PROP. GUARDRAIL & SBG

BOBBIE BROWN
BRUCE HUGGINS
DB 1959 PG 87
PB 29 PG 80

STONE

EIP

-RP3B-

PIs Sta 11+46.73	PI Sta 26+62.62	PIs Sta 33+98.08
Θs = 5° 15' 07.6"	Δ = 100° 29' 28.5" (LT)	Θs = 5° 15' 07.6"
Ls = 220.00'	D = 4° 46' 28.7"	Ls = 220.00'
LT = 146.73'	L = 2,104.68'	LT = 146.73'
ST = 73.39'	T = 1,442.62'	ST = 73.39'
	R = 1,200.00'	
	DS = 60 mph	
	e = 0.08	

SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NO. 87 FOR –RP3B– PROFILE.
SEE SHEET NOS. 78,81,82 FOR –Y12– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	47
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

-RP3BD-

Pls Sta 11+60.05
Θs = 4° 35' 01.2"
Ls = 240.00'
LT = 160.05'
ST = 80.05'

PI Sta 19+99.67
△ = 53° 43' 11.3" (RT)
D = 3° 49' 11.0"
L = 1,406.38'
T = 759.67'
R = 1,500.00'
DS = 60 mph
e = 0.06

Pls Sta 27+26.43
Θs = 4° 35' 01.2"
Ls = 240.00'
LT = 160.05'
ST = 80.05'

Pls Sta 30+46.45
Θs = 5° 10' 10.4"
Ls = 240.00'
LT = 160.07'
ST = 80.06'

PI Sta 32+89.55
△ = 13° 59' 18.1" (LT)
D = 4° 18' 28.6"
L = 324.71'
T = 163.17'
R = 1,330.00'
DS = 60 mph
e = 0.06

Pls Sta 36+11.09
Θs = 1° 12' 43.9"
Ls = 240.00'
LT = 160.00'
ST = 80.00'

PI Sta 38+24.30
△ = 2° 41' 26.4" (LT)
D = 1° 00' 36.5"
L = 266.36'
T = 133.21'
R = 5,672.00'
DS = 60 mph
e = 0.04

-Y12-

Pls Sta 51+15.31
Θs = 0° 59' 59.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

PI Sta 67+18.29
△ = 30° 01' 05.0" (LT)
D = 0° 59' 59.7"
L = 3,002.03'
T = 1,536.32'
R = 5,730.00'
DS = 70 mph
e = 0.04

Pls Sta 82+50.67
Θs = 0° 59' 59.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

100
JACQUELINE LEDBETTER
DB 977 PG 631
PB 46 PG 90

CHARLES L. HEATH
DB 1450 PG 486
PB 46 PG 90

450.63'
N81°51'10"W

MATCHLINE STA. 24+50 -RP3BD- SEE SHEET NO. 32

MATCHLINE STA. 64+50 -Y12- SEE SHEET NO. 32

MATCHLINE STA. 77+00 -Y12- SEE SHEET NO. 48

-RP3BD- CS Sta. 26+46.38
-RP3BD- +46.38
140.00' LT
-RP3BD- SRS Sta. 28+86.38
-RP3BD- +86.38
140.00' LT
-RP3BD- SC Sta. 31+26.38
-RP3BD- +26.38
140.00' LT
-RP3BD- +15.54
95.97' LT
END C/A FENCE
-RP3BD- CS Sta. 34+51.09

R=1640'
CHORD
PROP. R/W
PROP. SLOPE STAKES
SDG SEE DETAIL "D"
48" WW & ISBW
PROP. SLOPE STAKES
+10, CAT-1 & BEGIN SBG
CLASS 'B' RIP RAP
EST. 3 TONS
10 SY FILTER FABRIC
2GI W/FLAT GRATE
40' TYP.
8:1
-RP3BD-
-Y12NB-
-Y12-
-Y12SB-
-RP3C-
EOP
EOT
4' BST
20' BST
US 220 NBL 24' BST
US 220 SBL 24' BST
RETAIN
Adj. 2GI
COLLAR & EXTEND 1.4' CSP
CLASS 'B' RIP RAP
EST. 2 TONS
7 SY FILTER FABRIC
CLASS 'I' RIP RAP
EST. 5 TONS
14 SY FILTER FABRIC
2' BASE DITCH
W/CLASS 'I' RIP RAP
SEE DETAIL "R"
PROP. SLOPE STAKES
48" WW & ISBW
MTL. F

-RP3C- SRS Sta. 57+92.92

-RP3C- ST Sta. 59+92.92 =
-Y12- POC Sta.67+75.00
OFFSET 58.00' RIGHT

-RP3C-

Pls Sta 46+89.12
Θs = 7° 38' 22.0"
Ls = 320.00'
LT = 213.53'
ST = 106.85'

PI Sta 51+43.54
△ = 32° 20' 25.0" (RT)
D = 4° 46' 28.7"
L = 677.33'
T = 347.95'
R = 1,200.00'
DS = 60 mph
e = 0.08

Pls Sta 55+79.77
Θs = 7° 38' 22.0"
Ls = 320.00'
LT = 213.53'
ST = 106.85'

Pls Sta 59+26.26
Θs = 0° 59' 23.7"
Ls = 200.00'
LT = 133.34'
ST = 66.67'

94
ROBERT REID LEDBETTER
DB 1325 PG 876

1048.17'
N86°50'55"W

DEWEY HEATH
DB 1450 PG 503

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NO. 88 FOR -RP3BD- PROFILE.
SEE SHEET NO. 91 FOR -RP3C- PROFILE.
SEE SHEET NOS. 79,82,83 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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3:56:51 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	48
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

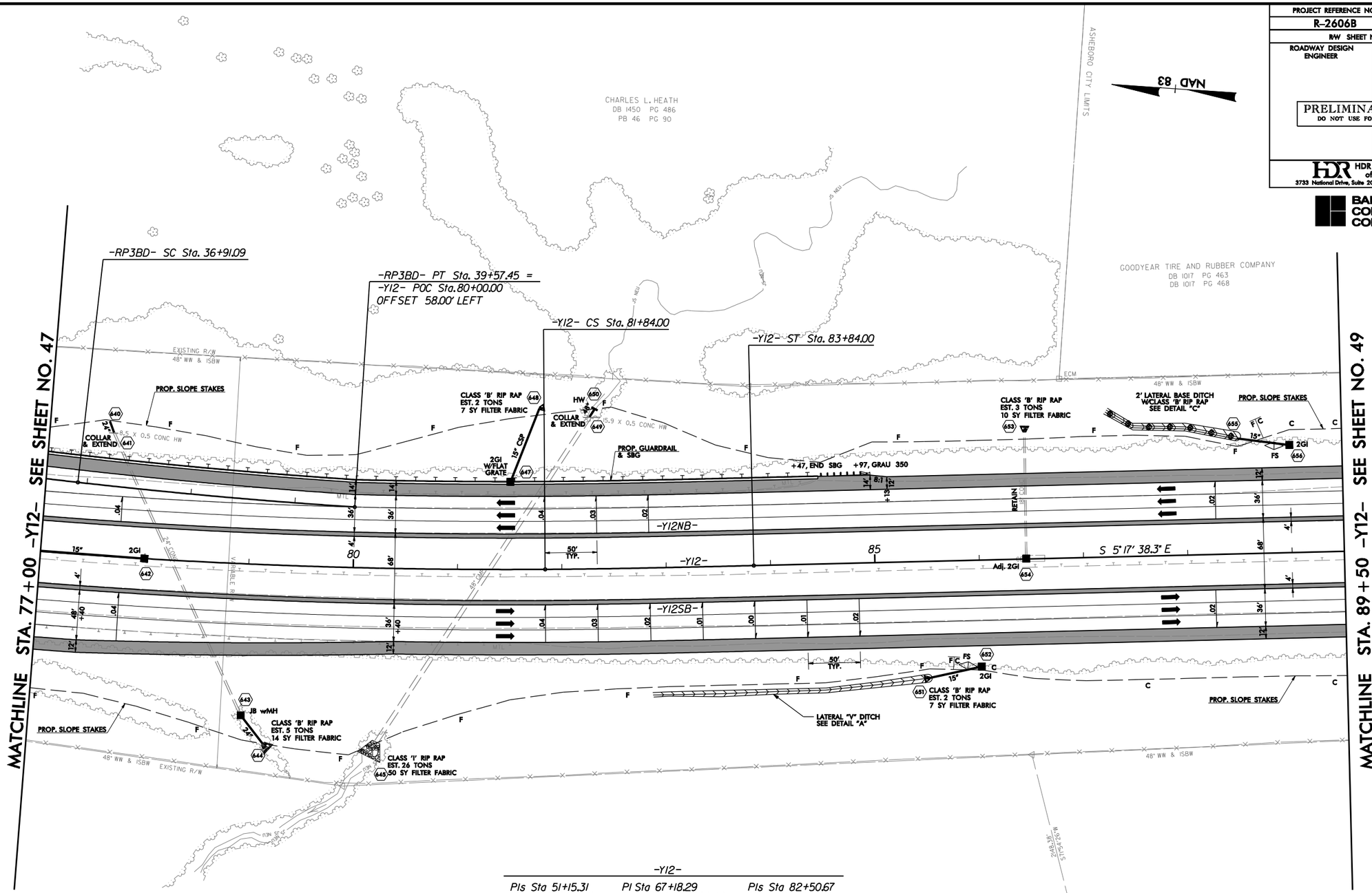
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83



-Y12-

PIs Sta 51+15.31 Θs = 0° 59' 59.7" Ls = 200.00' LT = 133.34' ST = 66.67'	PI Sta 67+18.29 Δ = 30° 01' 05.0" (LT) D = 0° 59' 59.7" L = 3,002.03' T = 1,536.32' R = 5,730.00' DS = 70 mph e = 0.04	PIs Sta 82+50.67 Θs = 0° 59' 59.7" Ls = 200.00' LT = 133.34' ST = 66.67'

-RP3BD-

PIs Sta 11+60.05 Θs = 4° 35' 01.2" Ls = 240.00' LT = 160.05' ST = 80.05'	PI Sta 19+99.67 Δ = 5.3° 43' 11.3" (RT) D = 3° 49' 11.0" L = 1,406.38' T = 759.67' R = 1,500.00' DS = 60 mph e = 0.06	PIs Sta 27+26.43 Θs = 4° 35' 01.2" Ls = 240.00' LT = 160.05' ST = 80.05'	PIs Sta 30+46.45 Θs = 5° 10' 10.4" Ls = 240.00' LT = 160.07' ST = 80.06'	PI Sta 32+89.55 Δ = 13° 59' 18.1" (LT) D = 4° 18' 28.6" L = 324.71' T = 163.17' R = 1,330.00' DS = 60 mph e = 0.06	PIs Sta 36+11.09 Θs = 1° 12' 43.9" Ls = 240.00' LT = 160.00' ST = 80.00'	PI Sta 38+24.30 Δ = 2° 41' 26.4" (LT) D = 1° 00' 36.5" L = 266.36' T = 133.21' R = 5,672.00' DS = 60 mph e = 0.04

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 88,89 FOR -RP3BD- PROFILE.
SEE SHEET NOS. 79,83 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	49
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS 8/17/99

NAD 83

GOODYEAR TIRE AND RUBBER COMPANY
DB 1017 PG 463
DB 1017 PG 468

MATCHLINE STA. 89+50 –Y12– SEE SHEET NO. 48

MATCHLINE STA. 102+00 –Y12– SEE SHEET NO. 50

END CONSTRUCTION
–Y12NB– Sta. 94+50.00

ASHEBORO CITY LIMITS

EXISTING R/W

PROP. SLOPE STAKES

48" WW & ISBW

18" CONC

30" CONC

RETAIN

CB

–Y12NB–

–Y12–

MARABLE RD

S 5°17' 38.3" E

–Y12SB–

CF

END CONSTRUCTION
–Y12SB– Sta. 99+49.26

W.E. KIRBY
DB 507 PG 74

176.58'
S88°40'24"W

EIP

156.54'
S01°05'36"E

264.42'
S88°38'25"W

CHARLES L. HEATH
DB 1450 PG 486

SEE SHEET NO. 2–O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 79,80,83,84 FOR –Y12– PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/6/2009
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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	50
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612

BARNHILL CONTRACTING COMPANY

REVISIONS

8/17/99

NAD 83

MATCHLINE STA. 102+00 -Y12- SEE SHEET NO. 49

ASHEBORO CITY LIMITS

48" WW & ISBW

EXISTING R/W

36" CONC

45 NEU

MTL

4' BST EOP EOT

15' BST EOT EOP

4' BST EOP

-Y12- POT Sta. 108+69.49

60" CONC

6" CONC CURB

EOP

18' BST

EOT

US 220 BYP 24' BST

EOT

4' BST EOP

60" CONC

-Y12-

105

S 5° 17' 38.3" E

TO ASHEBORO

ECB

4' BST EOP EOT

US 220 BYP 24' BST EOT

18' BST EOP

BST

15" CONC

MTL

4' BST EOP

18' BST EOT

4' BST EOT EOP

MTL

48" CONC

48" WW & ISBW

EXISTING R/W

45 NEU

POND

W.E.65U82

48" WW & ISBW

ISW SF

W.E. KIRBY
DB 507 PG 74

SEE SHEET NO. 2-O FOR DRAINAGE DETAILS.
SEE SHEET NOS. 80,84 FOR -Y12- PROFILE.
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED
DO NOT PLACE ROCK IN BED OF JURISDICTIONAL STREAM.

3/16/2008
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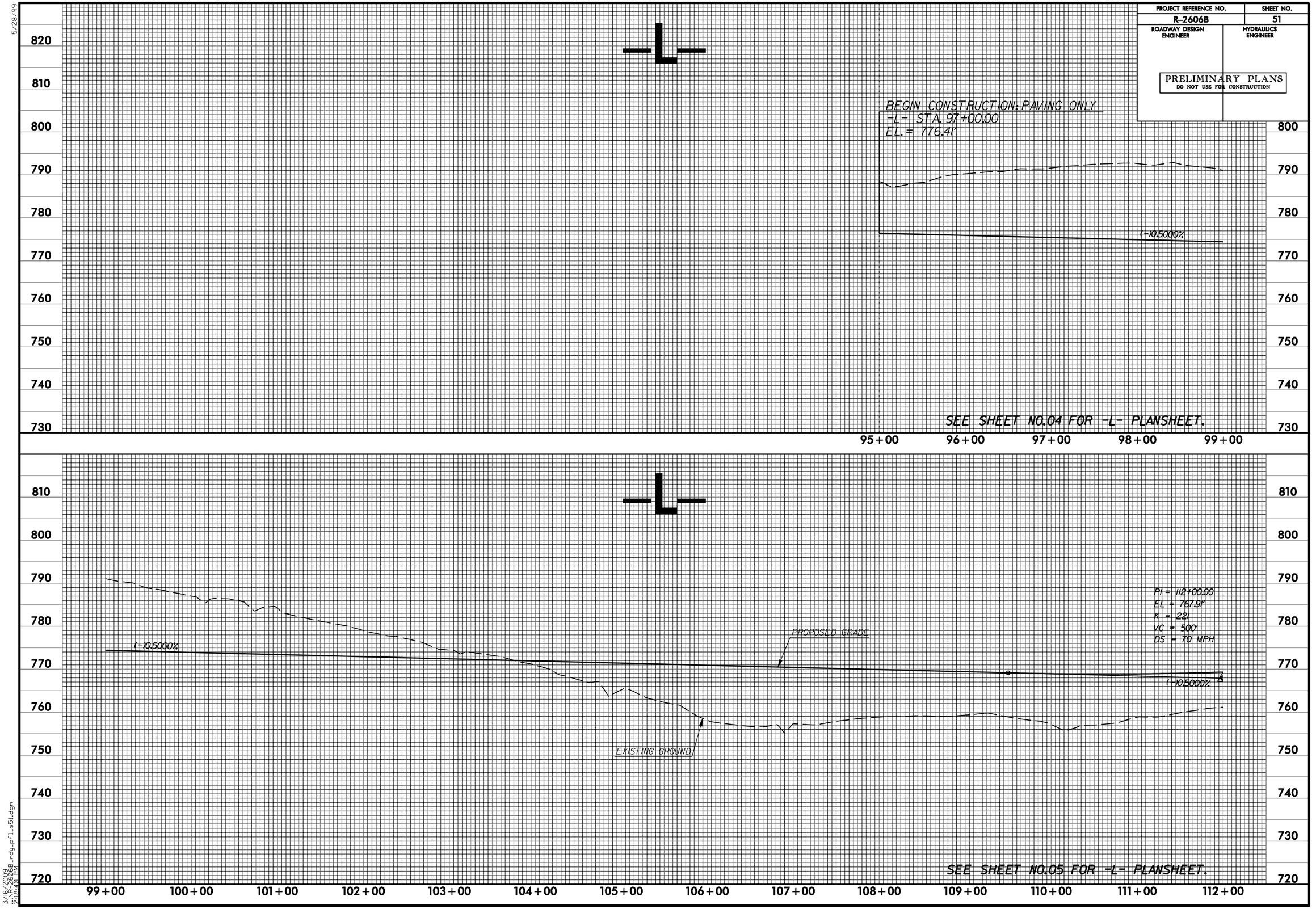
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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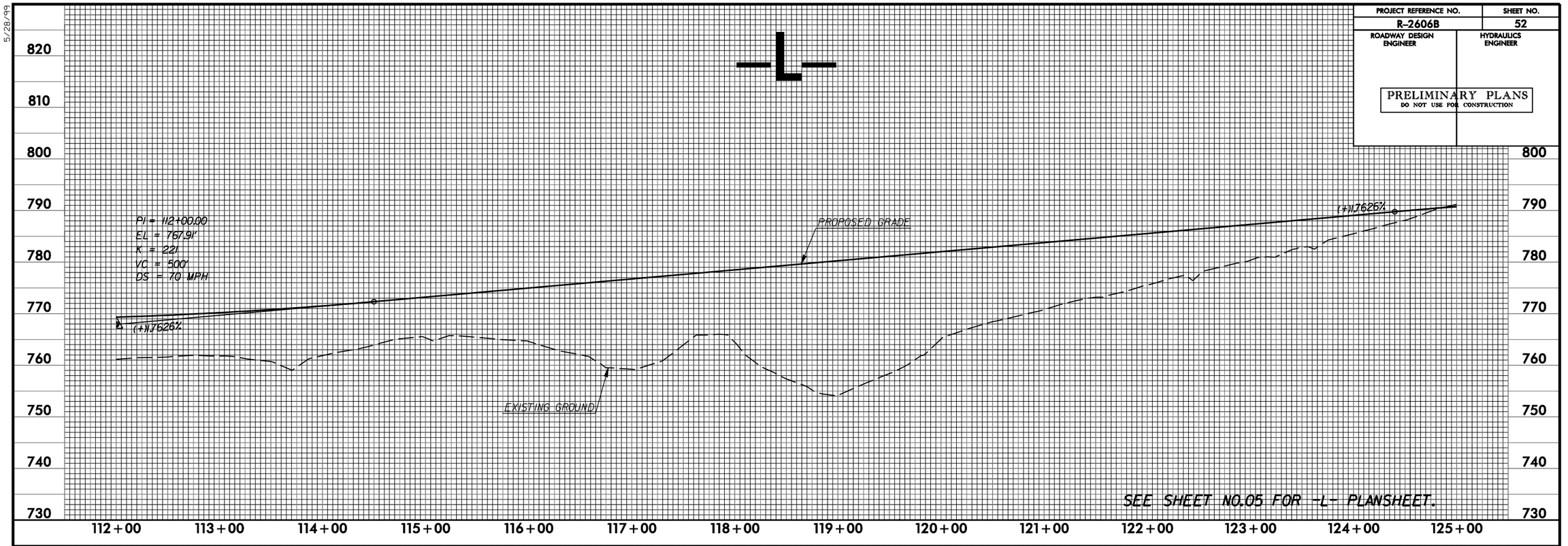
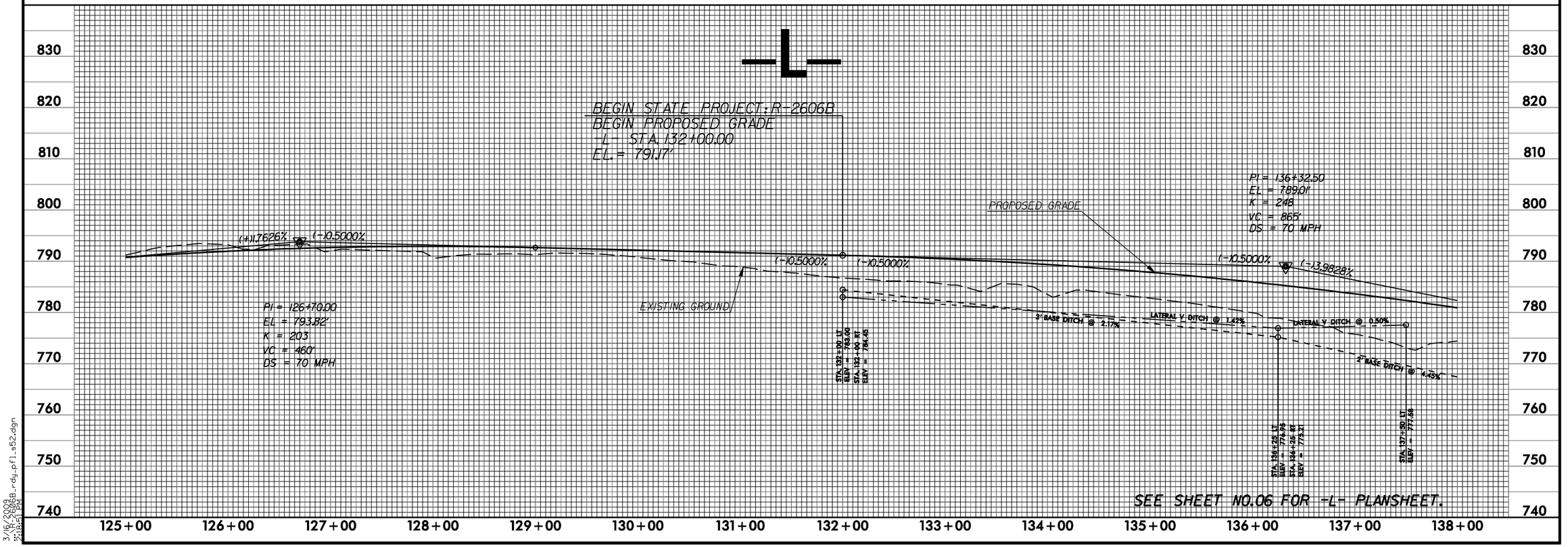
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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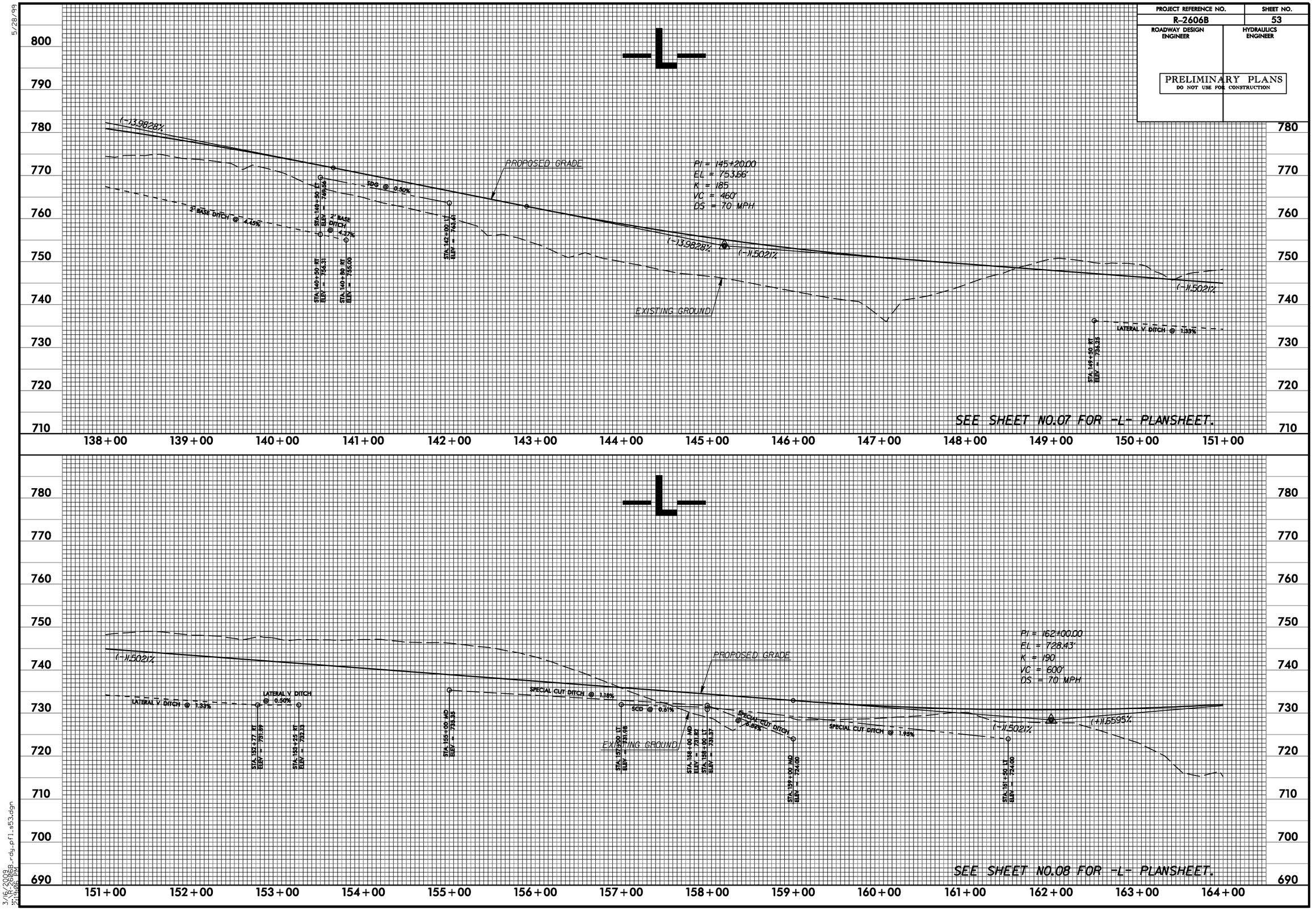
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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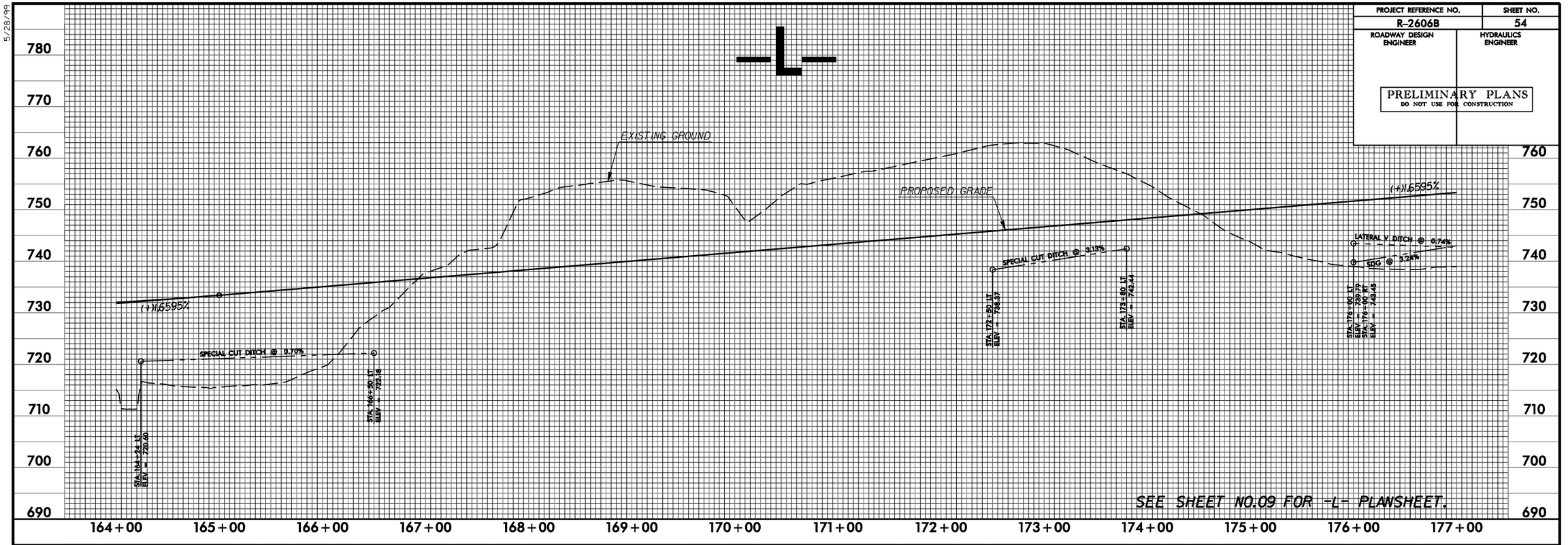
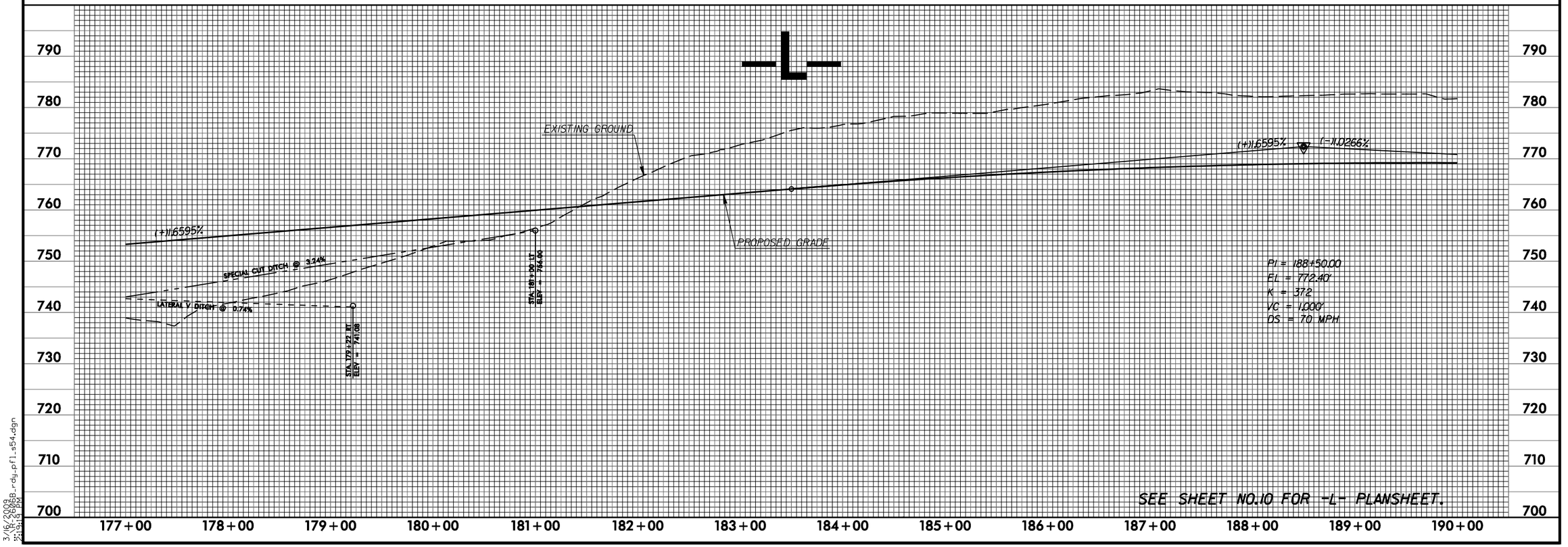
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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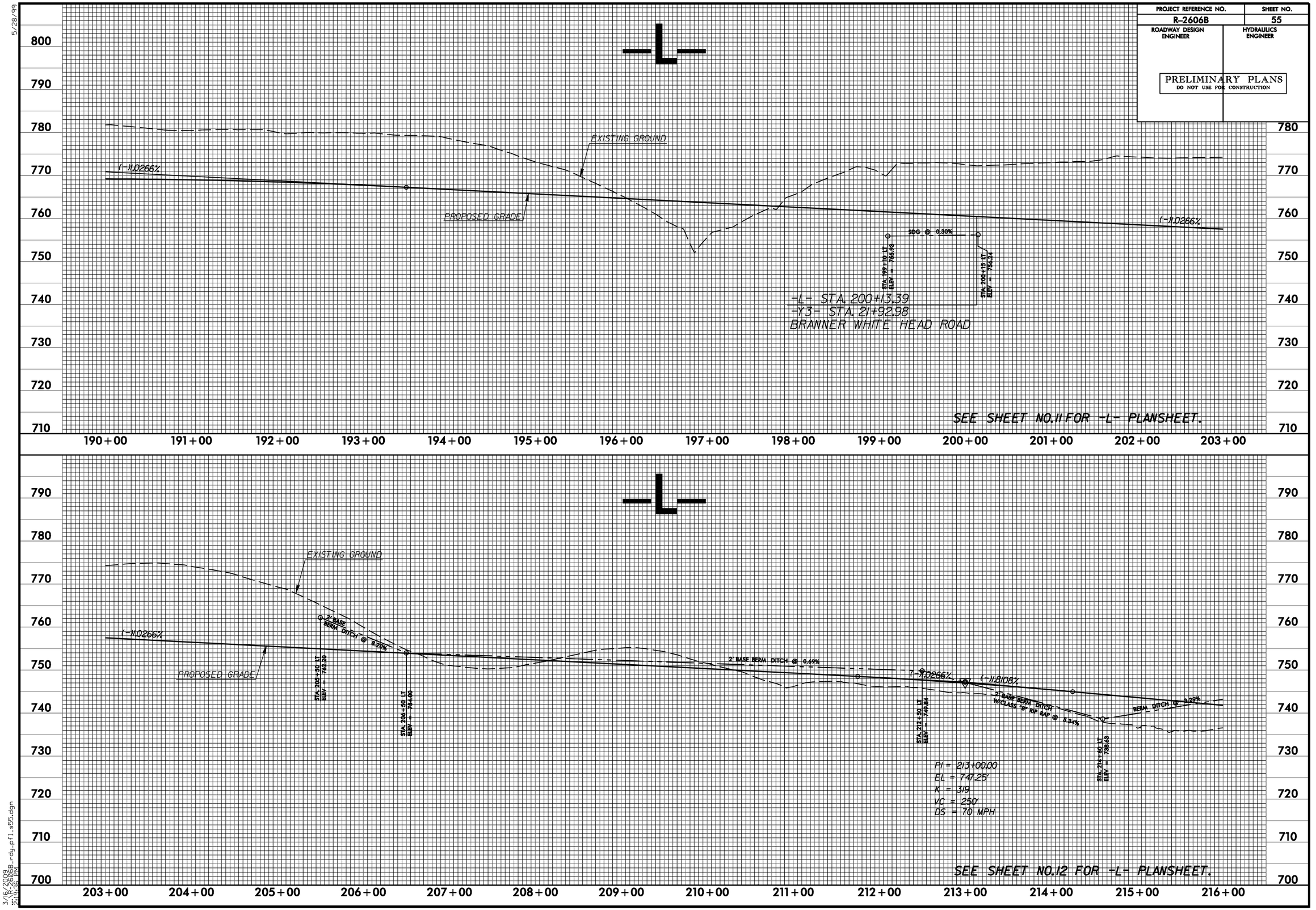
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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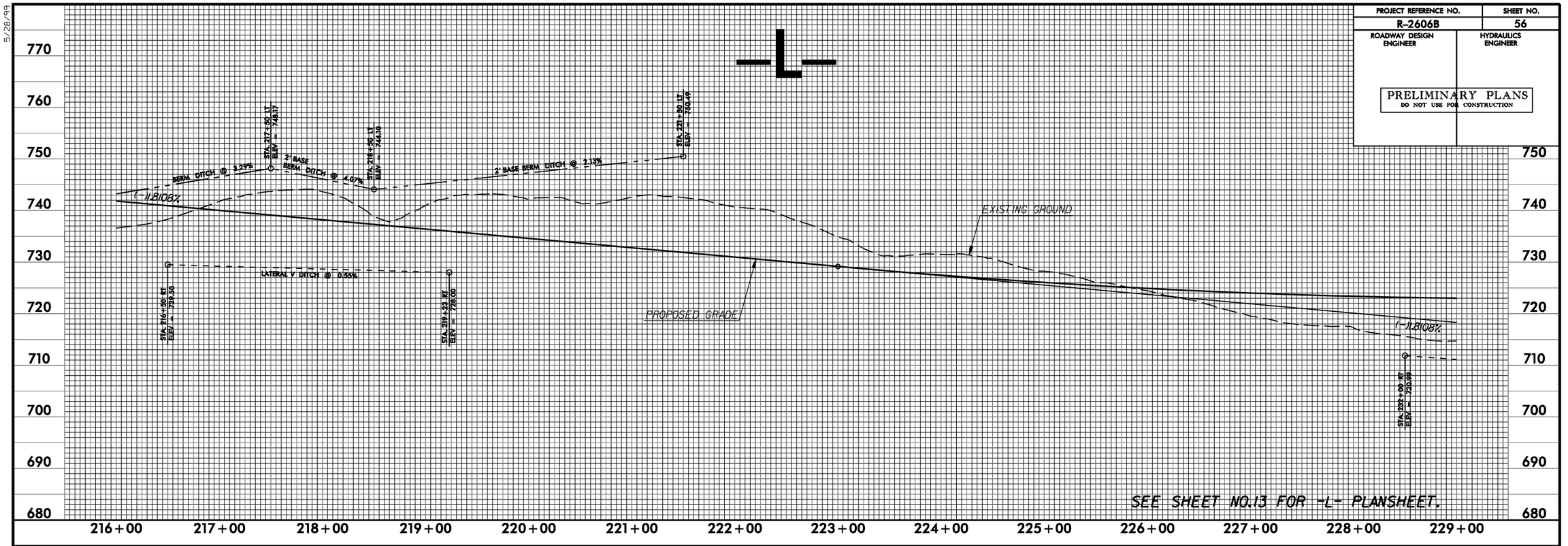
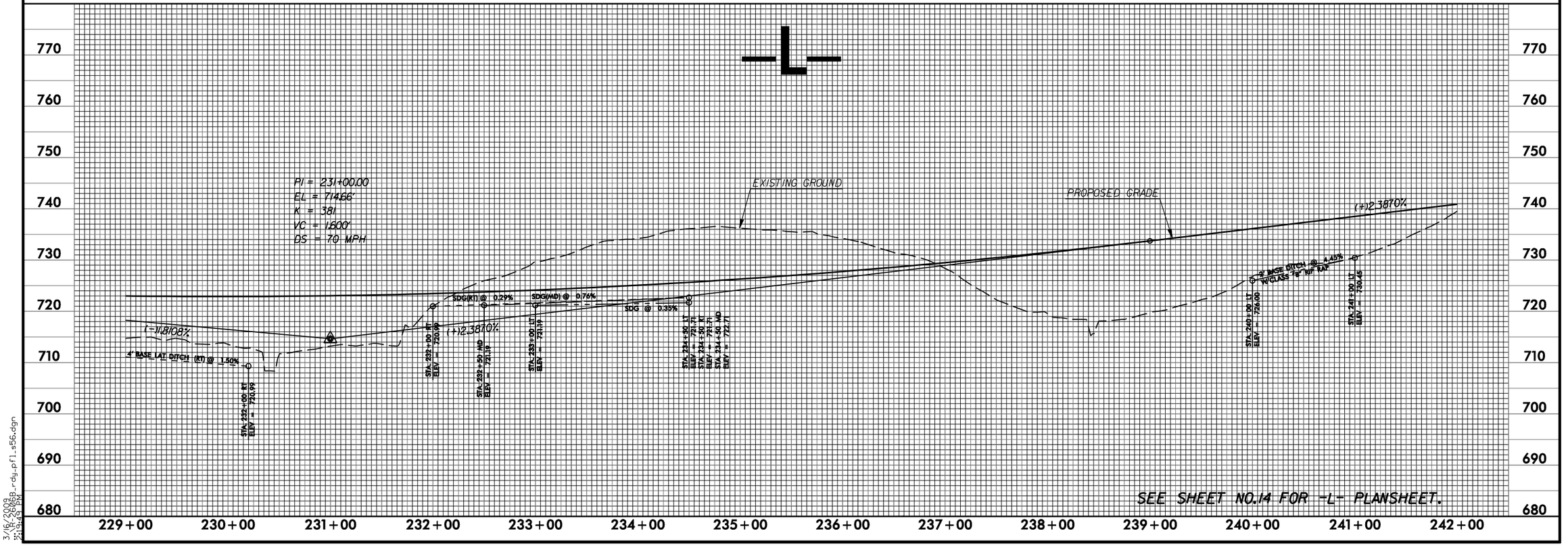
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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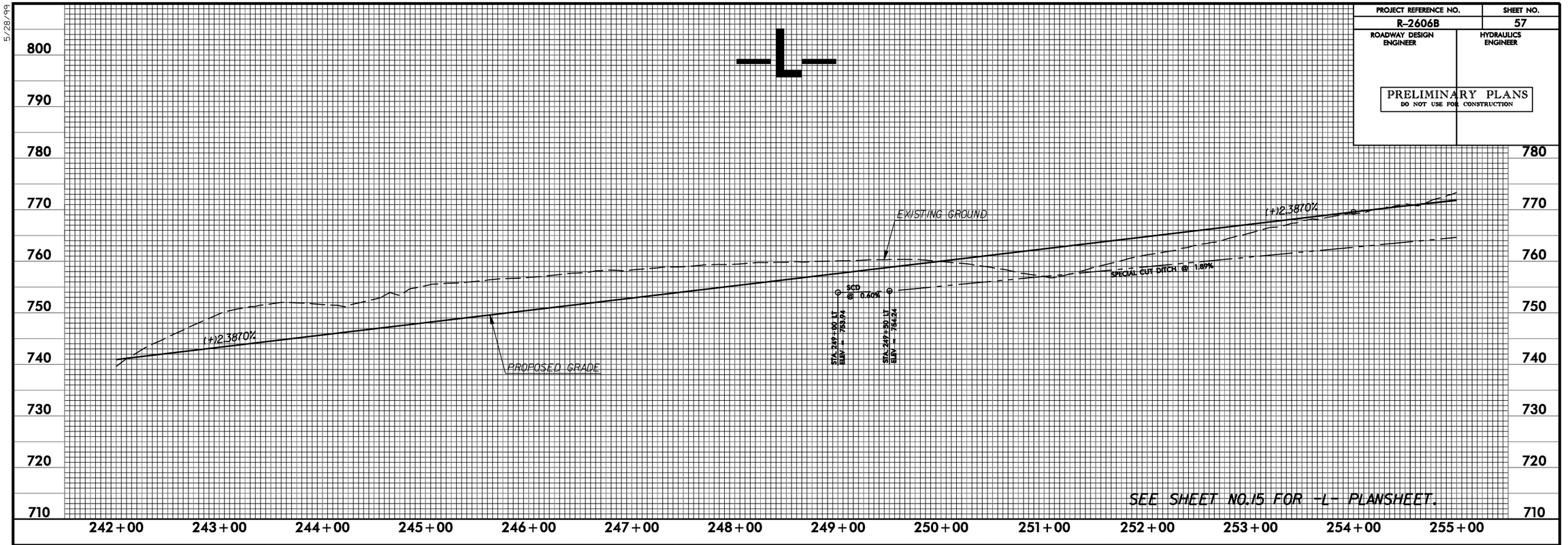
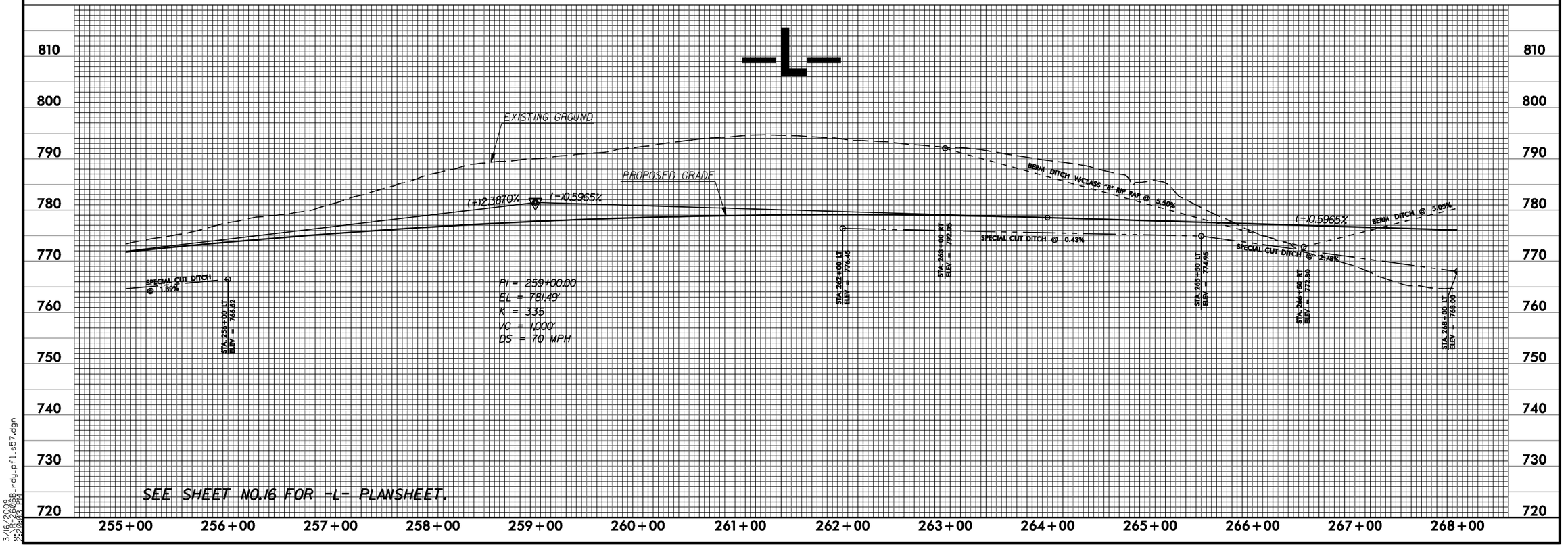
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	57
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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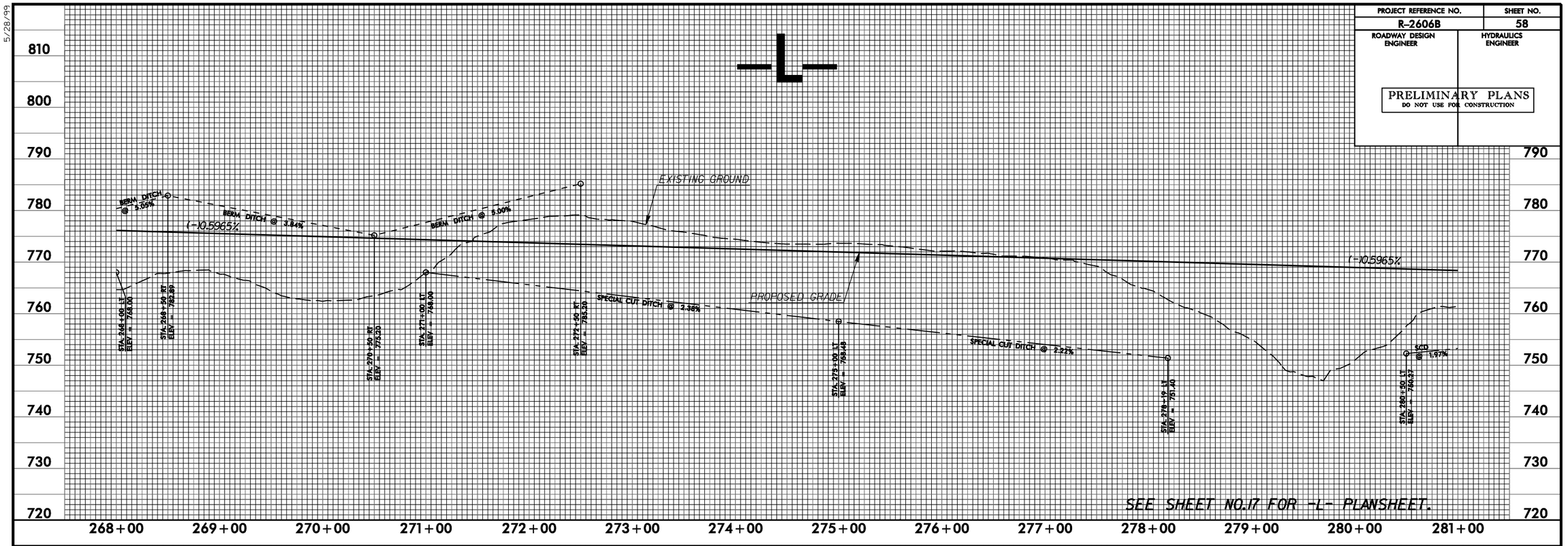
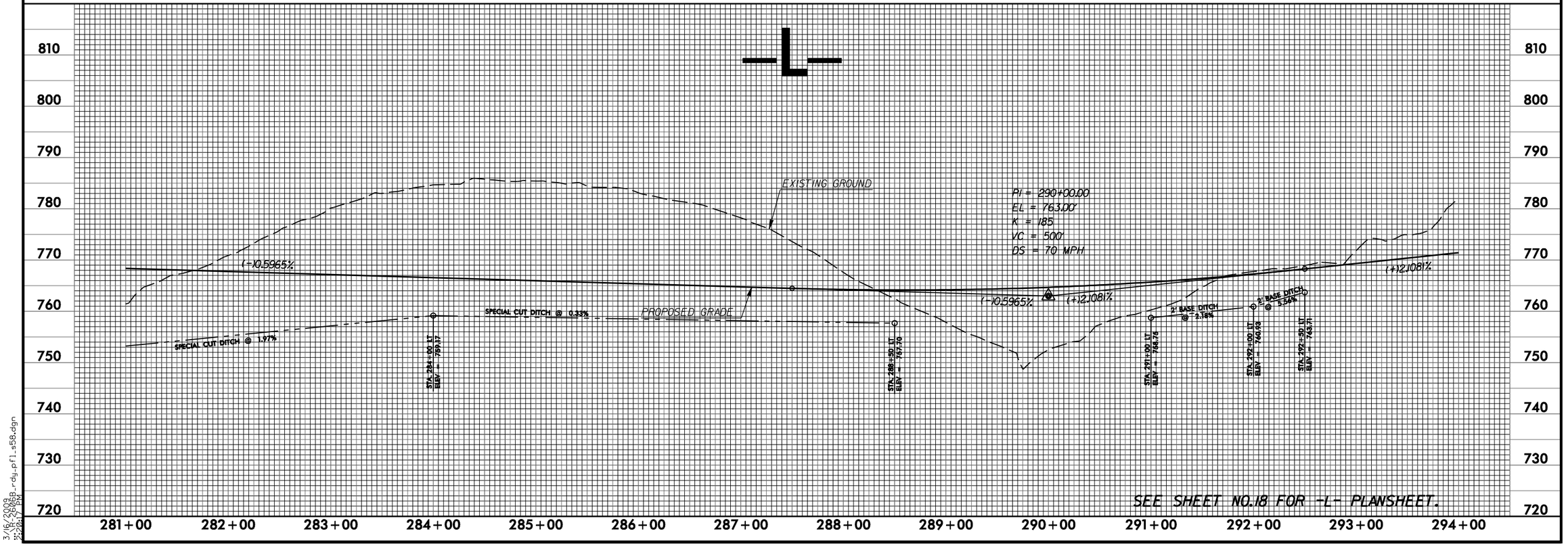
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	58
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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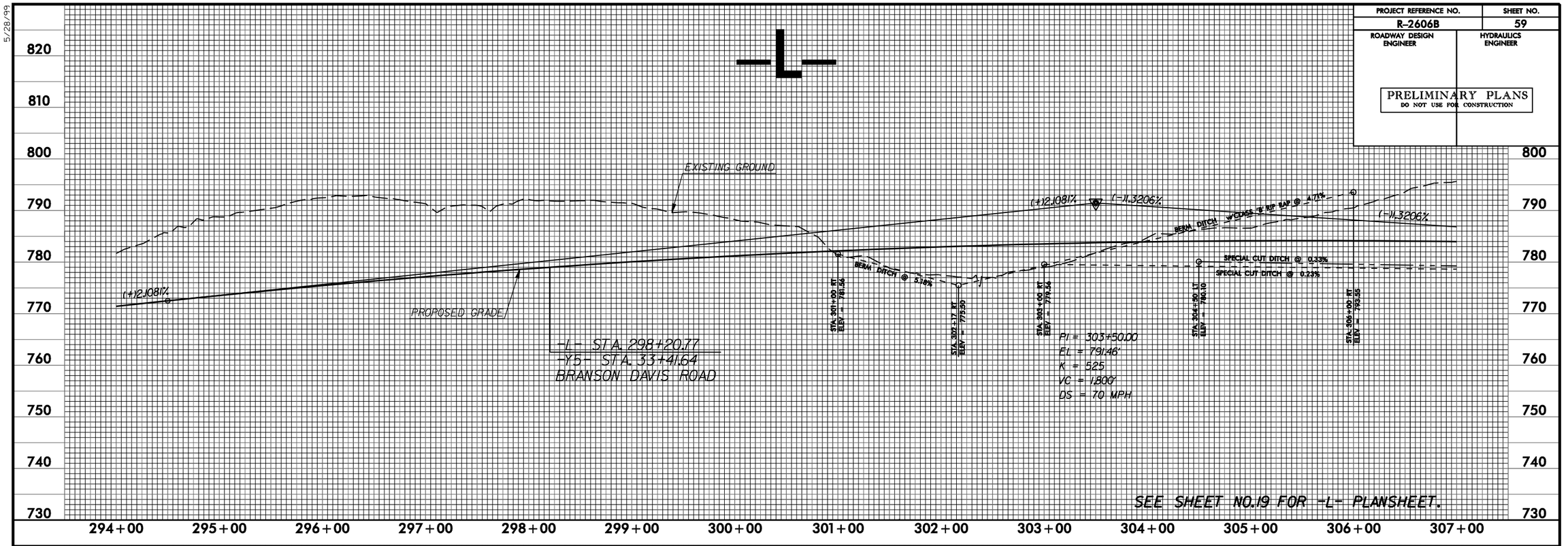
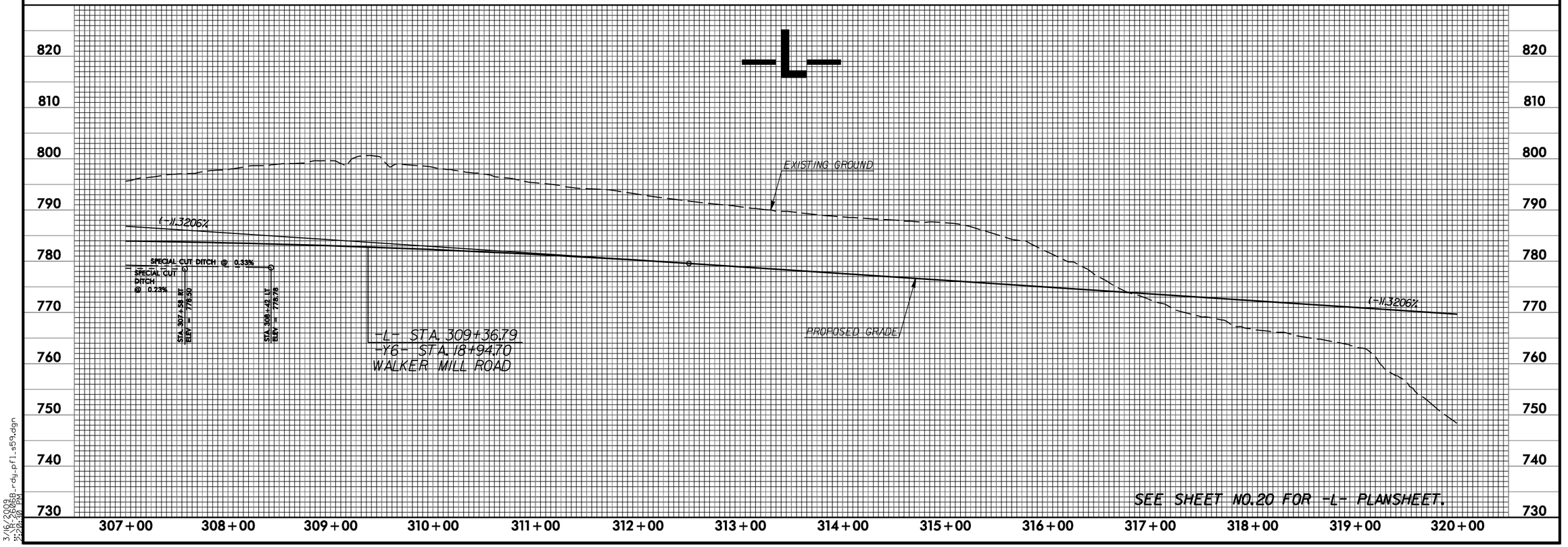
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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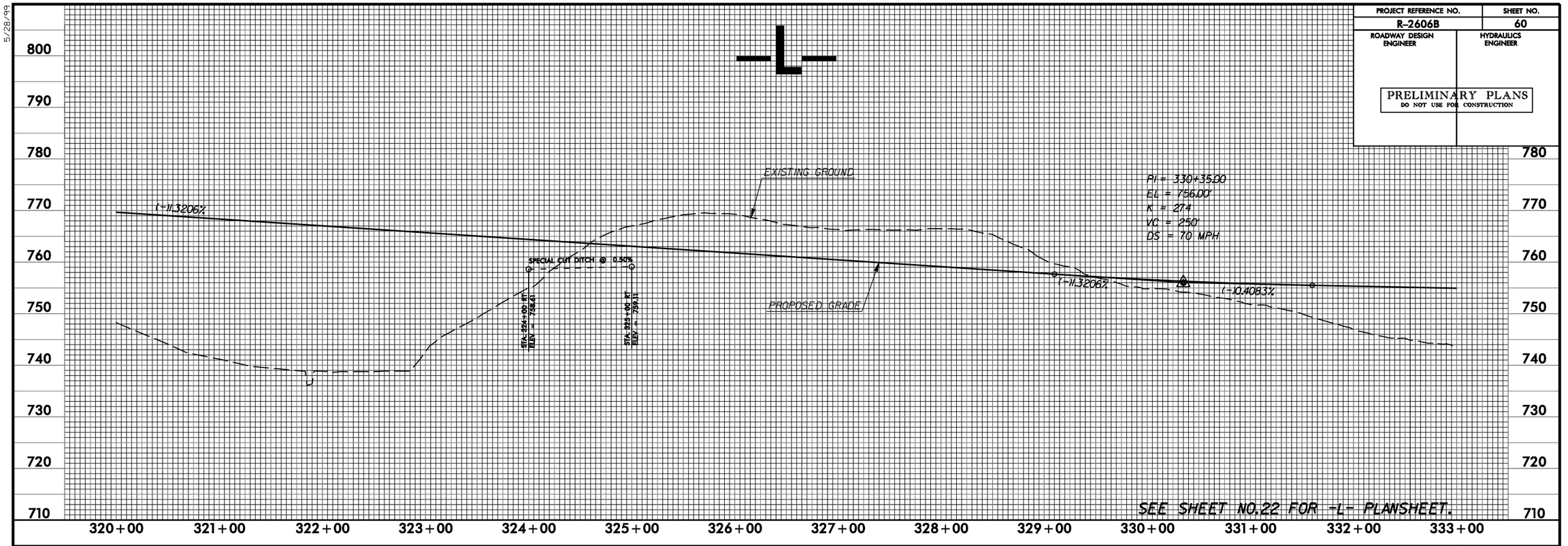
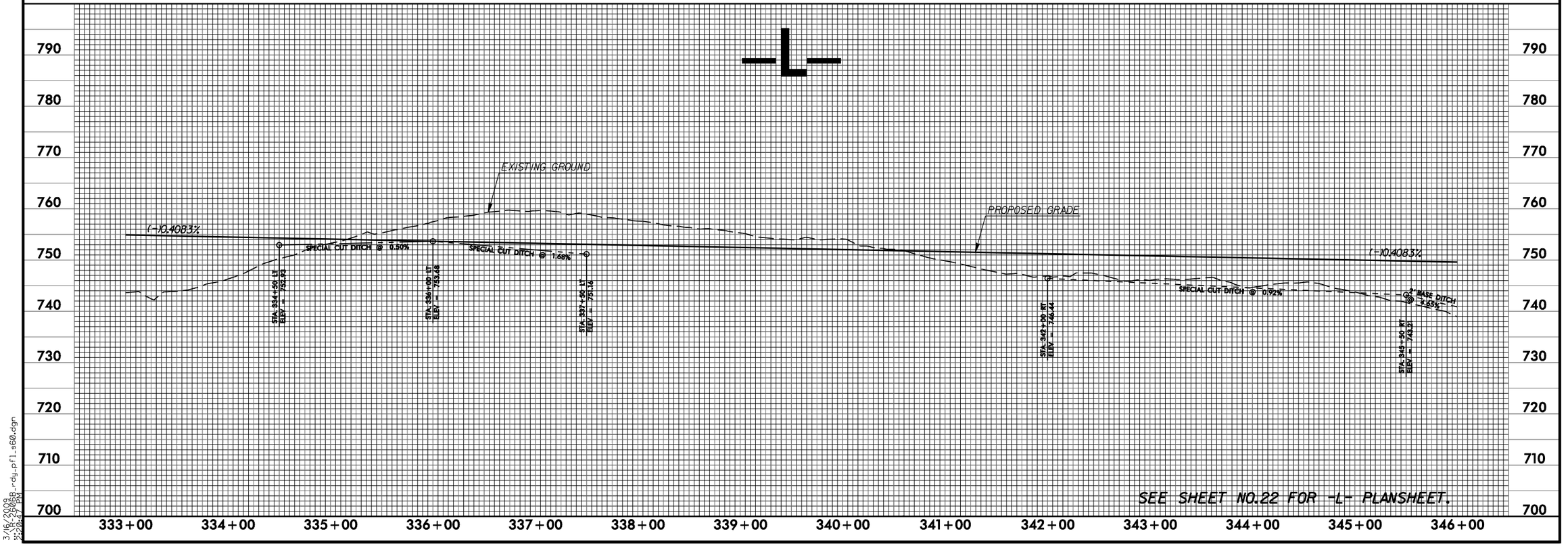
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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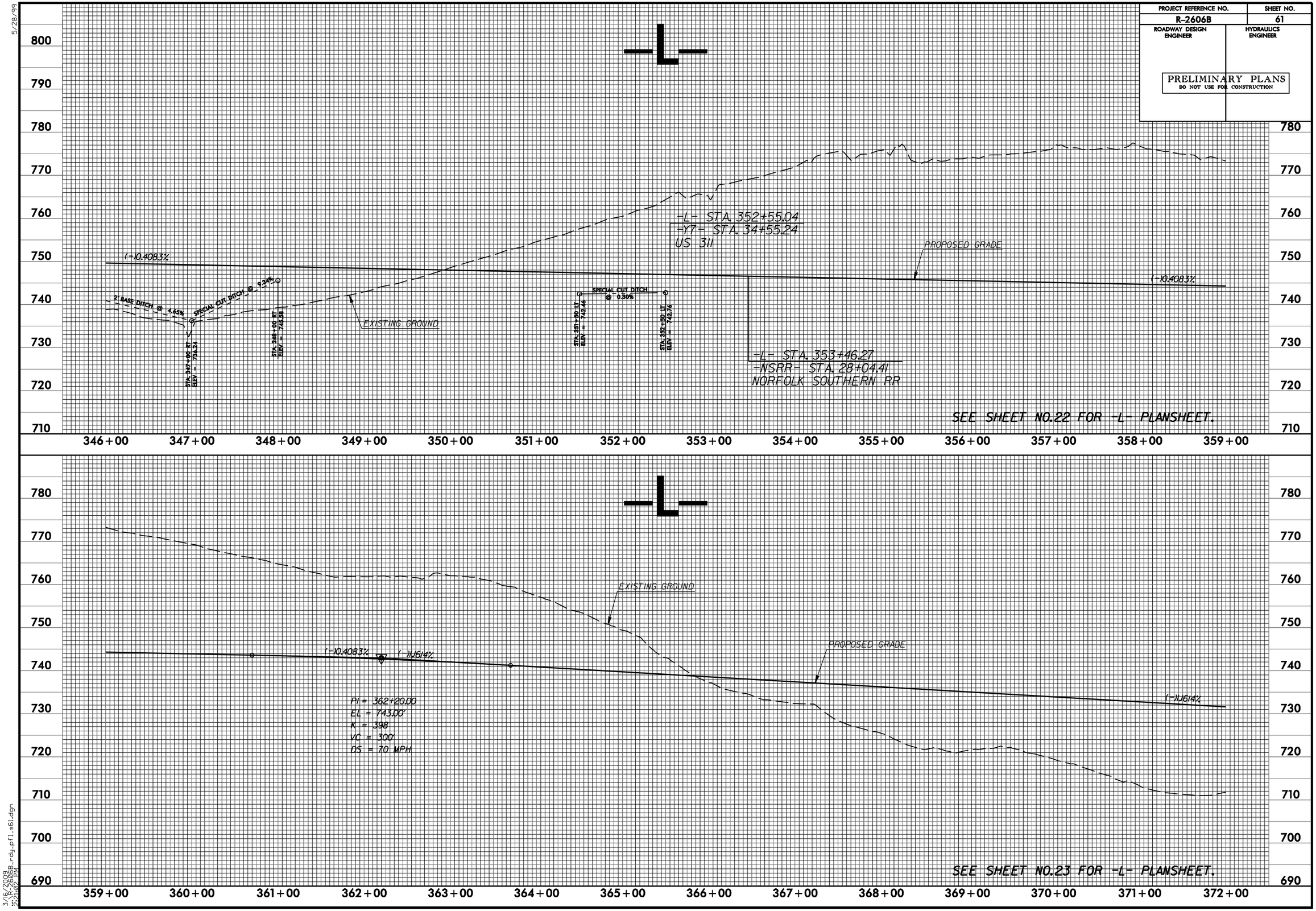
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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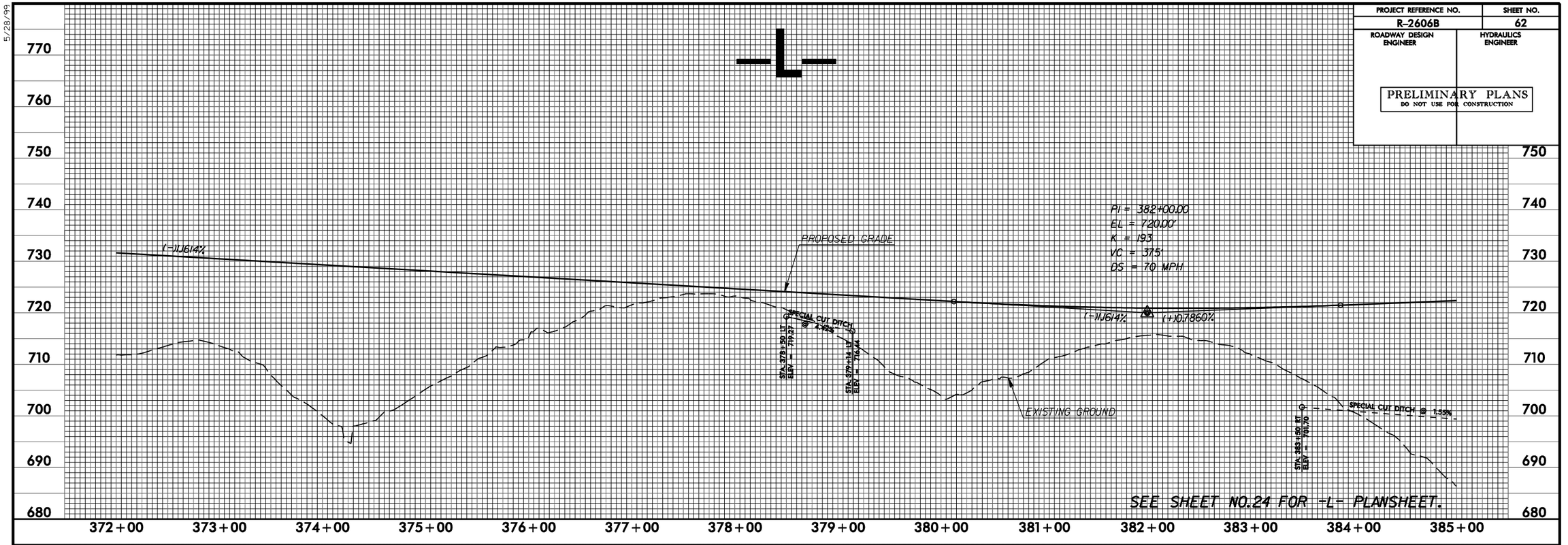
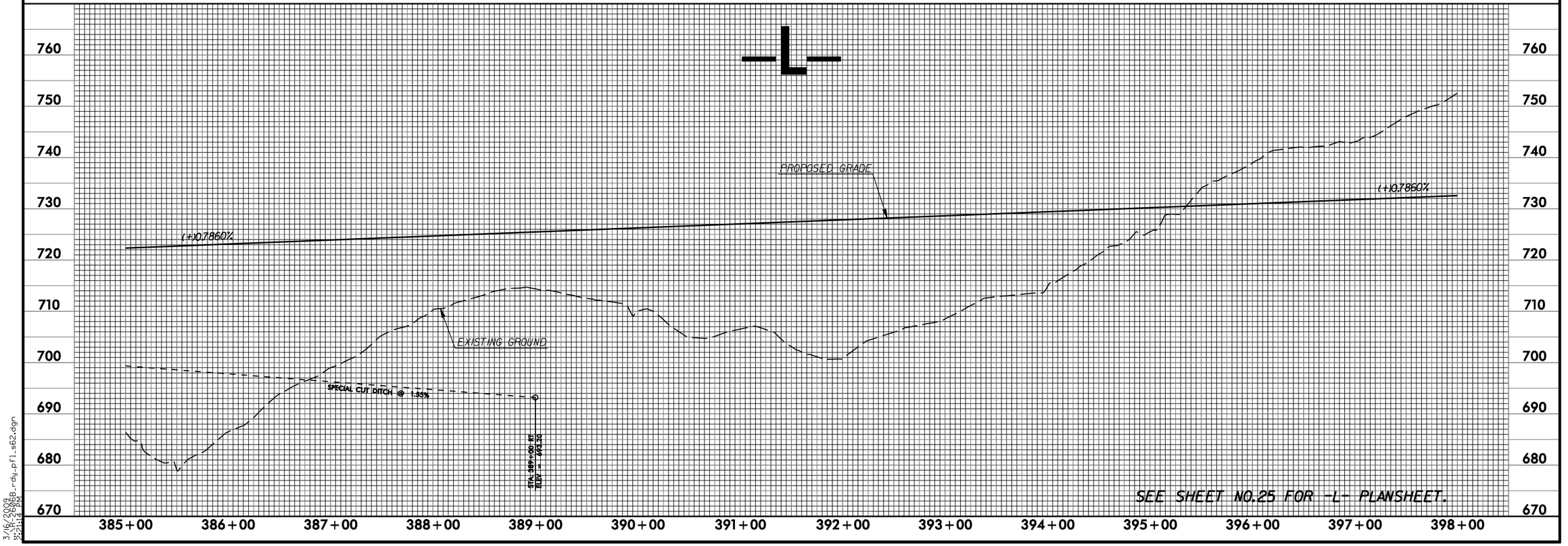
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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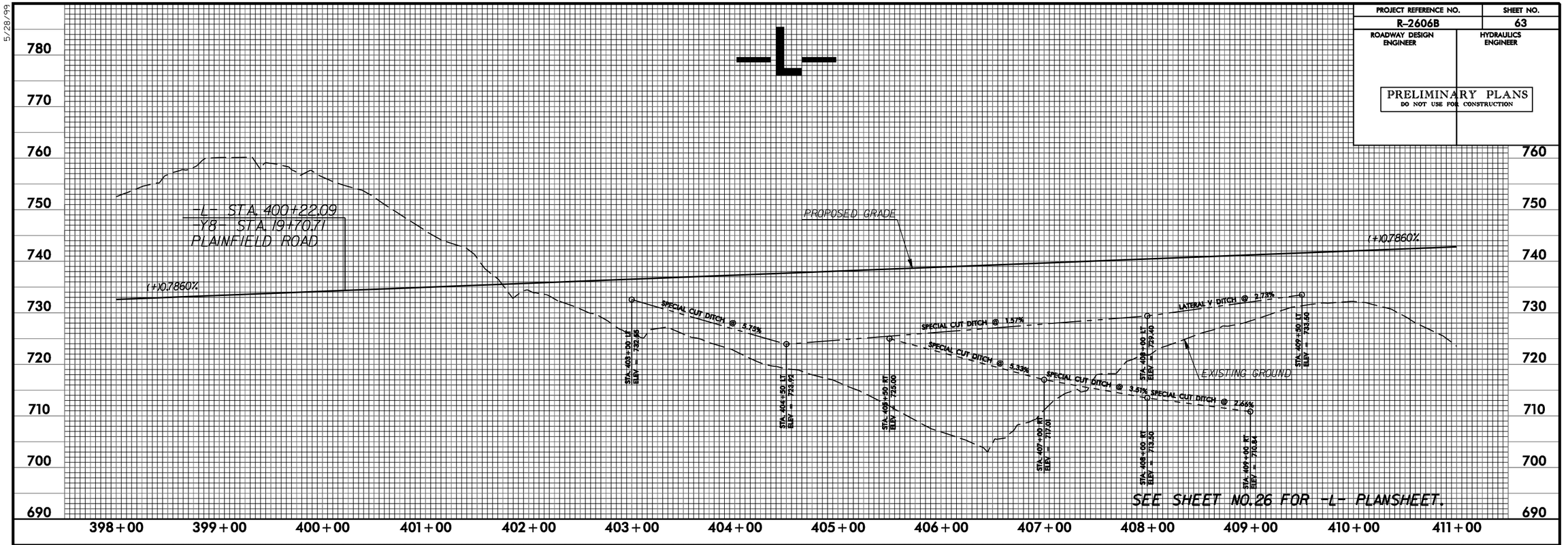
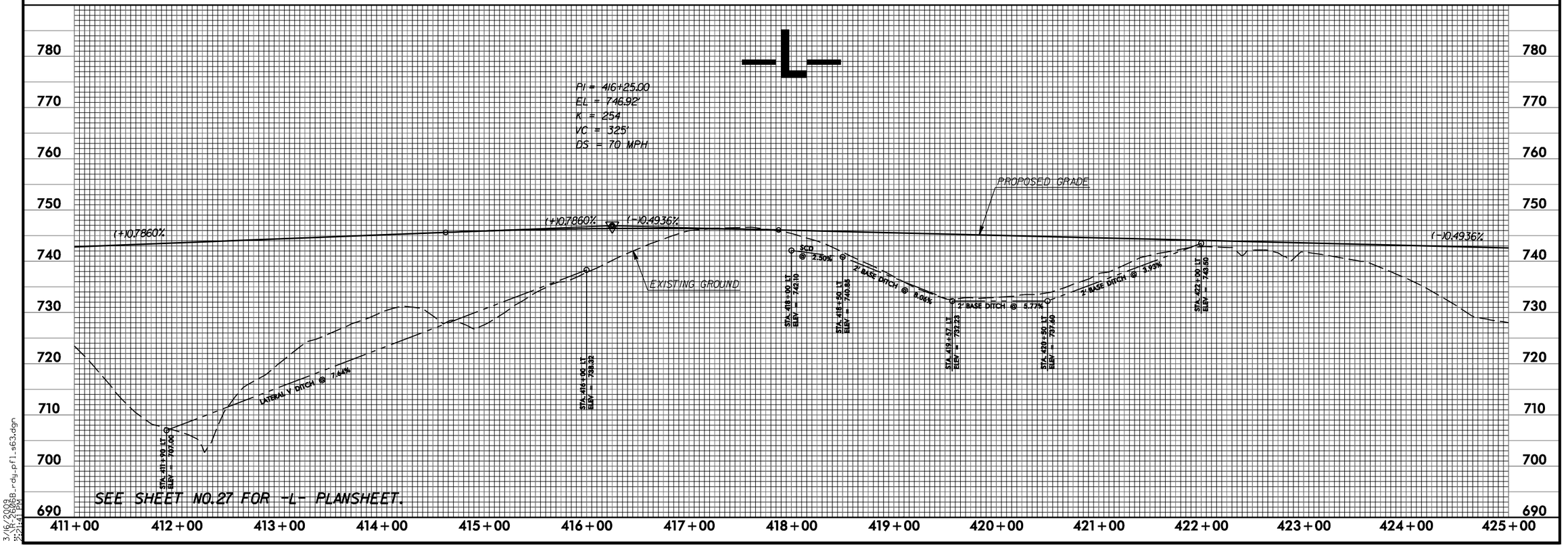
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEET NO.26 FOR -L- PLANSHEET.



SEE SHEET NO.27 FOR -L- PLANSHEET.

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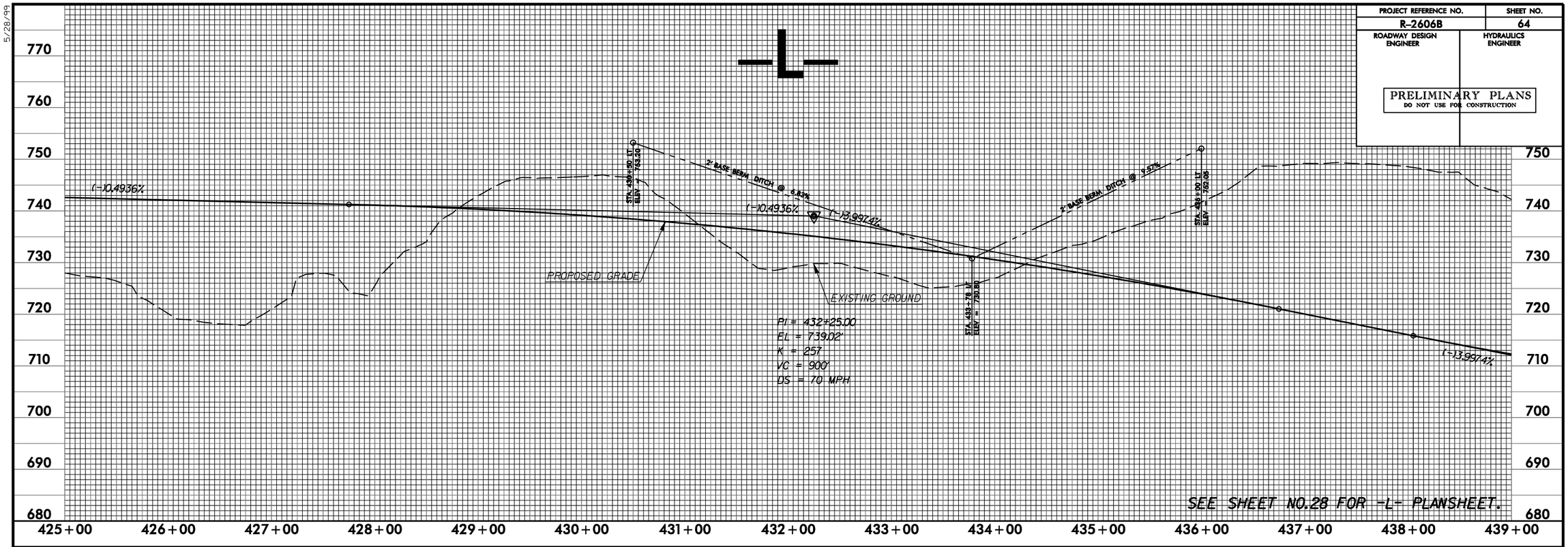
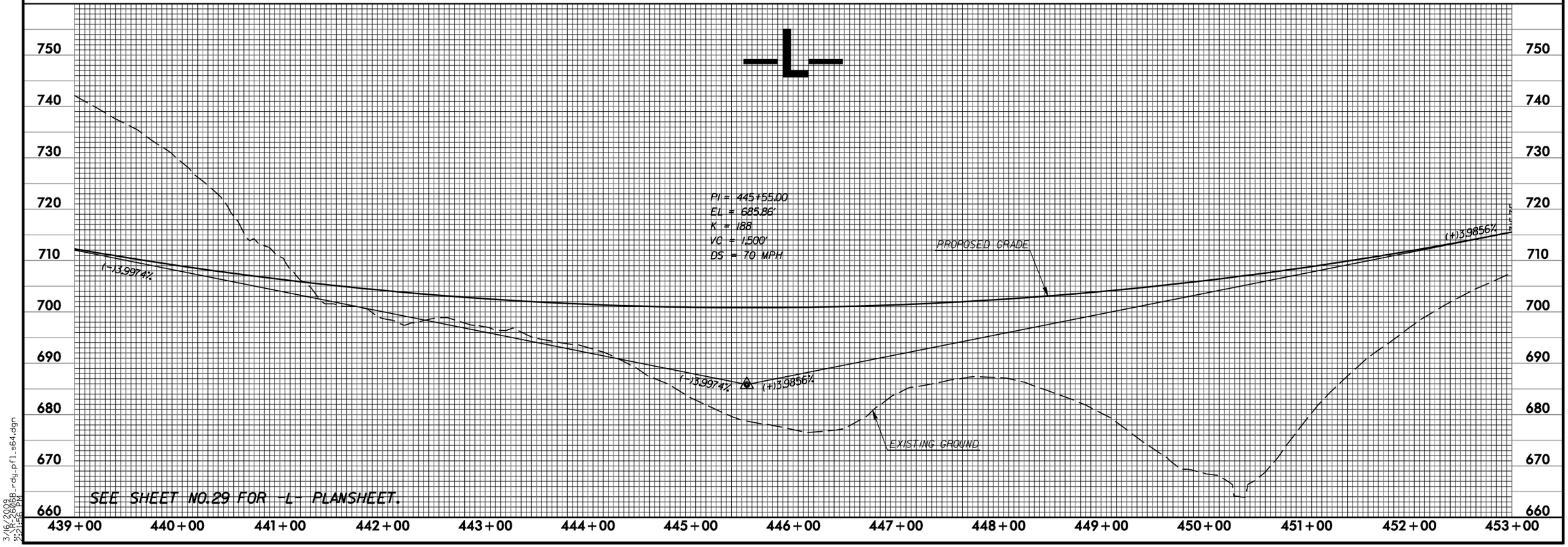
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





5/28/99

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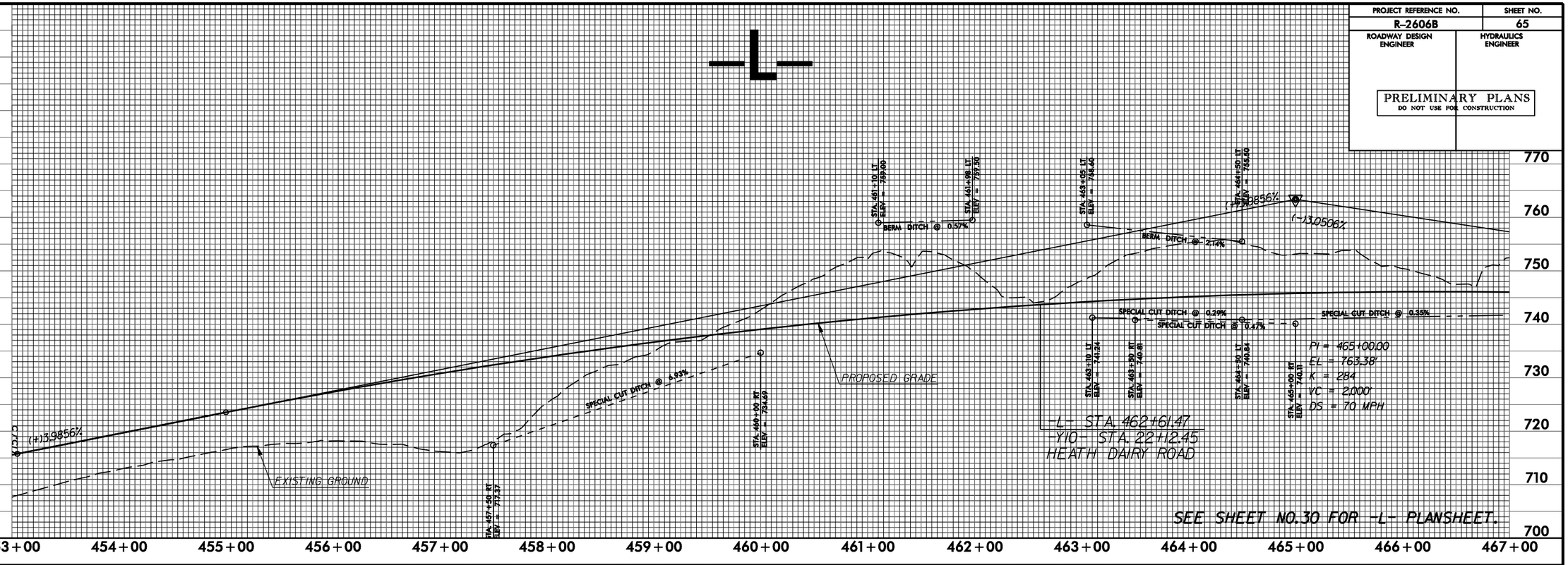
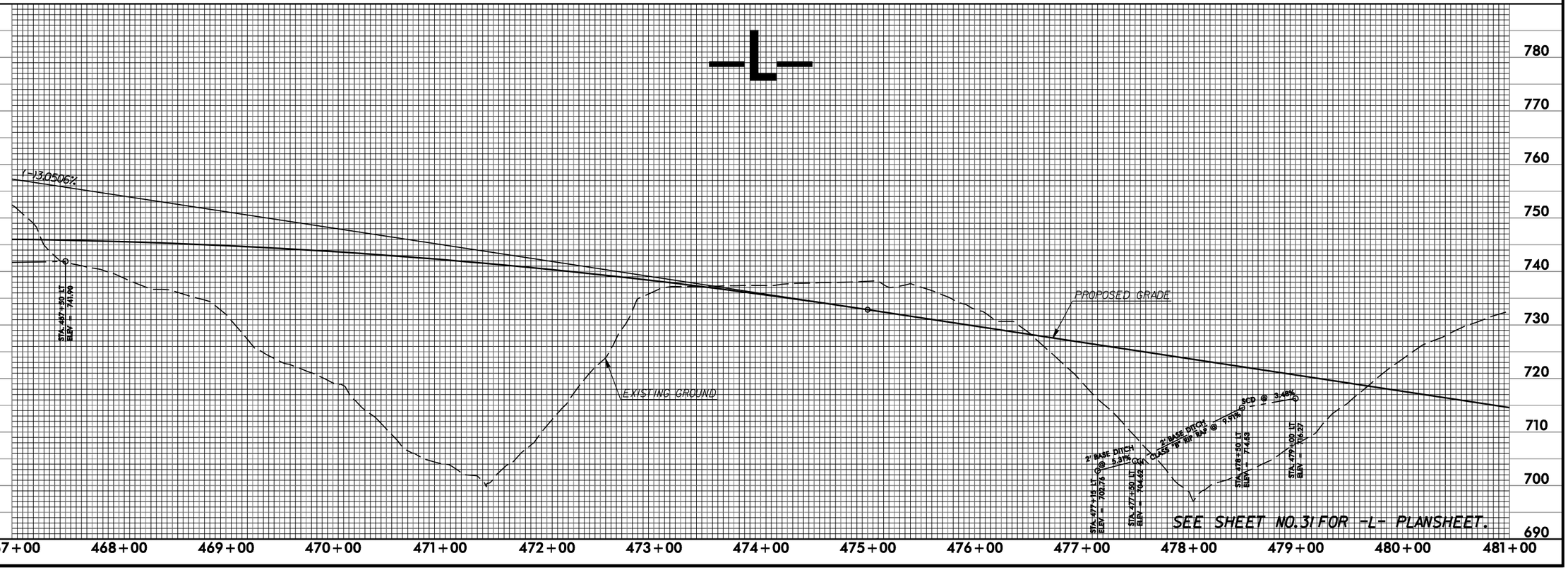
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	65
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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rdy_pfl_s65.dgn

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

760
750
740
730
720
710
700
690
680
670

EXISTING GROUND

PI = 487+60.00
EL = 694.44'
K = 182
VC = 500'
DS = 70 MPH

PROPOSED GRADE

END PROPOSED GRADE
-L- STA. 493+75.00
EL. = 692.59'

(-)3.0506%

(-)0.3000%

SPECIAL CUT DITCH @ 2.88%

SPECIAL CUT DITCH @ 1.04%

SPECIAL CUT DITCH @ 0.37%

STA. 485+50 LT
ELEV. = 694.47

STA. 487+50 LT
ELEV. = 688.77

STA. 487+50 RT
ELEV. = 692.73

STA. 488+47 RT
ELEV. = 693.97

STA. 490+50 LT
ELEV. = 689.61

SEE SHEET NO.32 FOR -L- PLANSHEET.

481+00 482+00 483+00 484+00 485+00 486+00 487+00 488+00 489+00 490+00 491+00 492+00 493+00

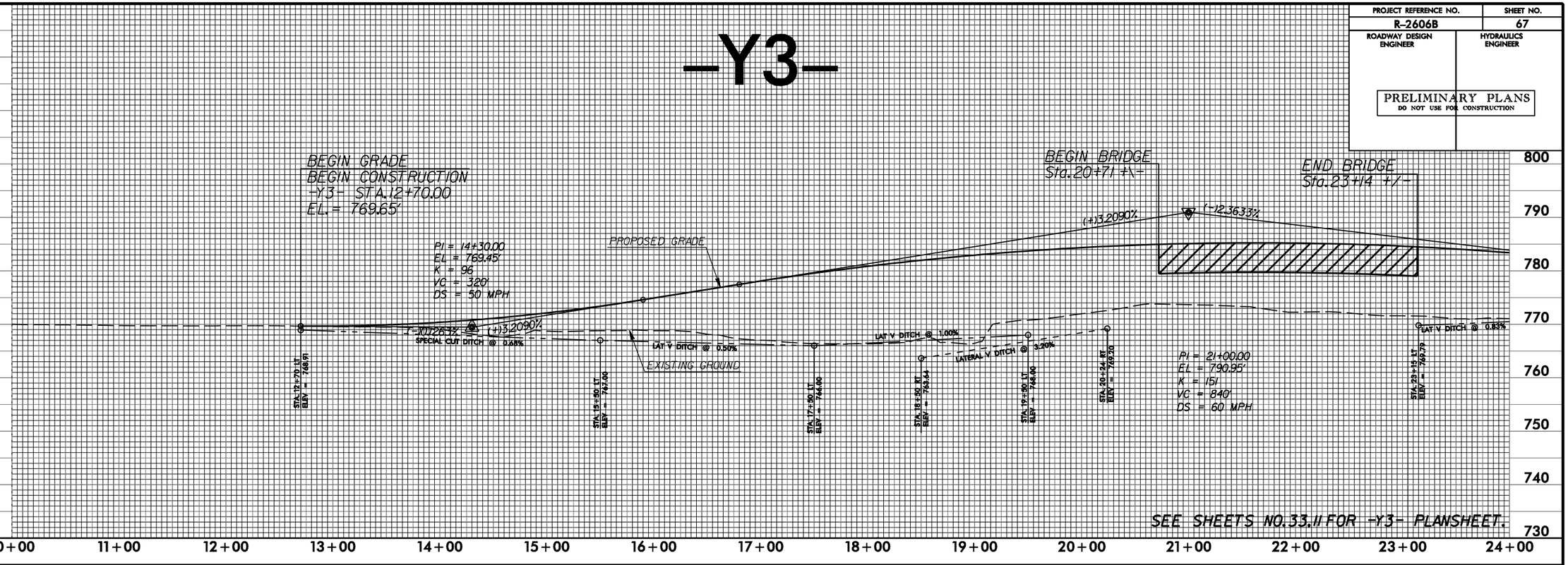
3/16/2008
2:22:25 PM
R2606B_rdy_pfl_s66.dgn

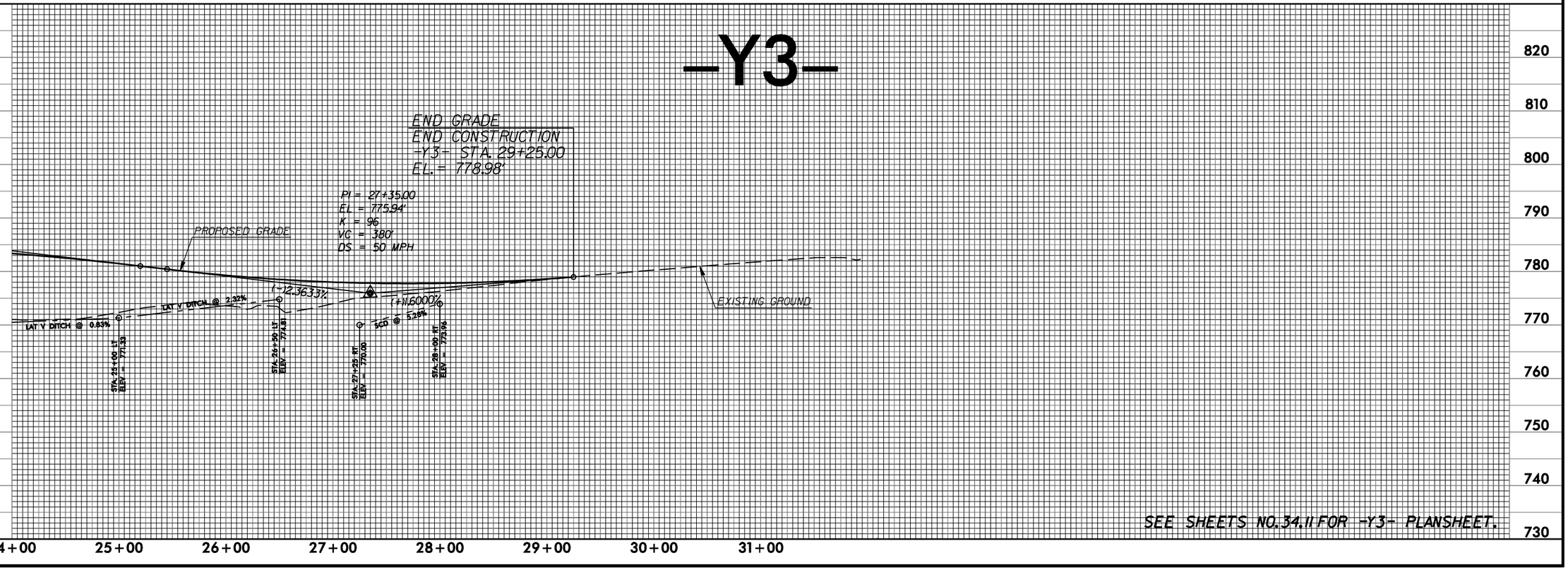
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y3-





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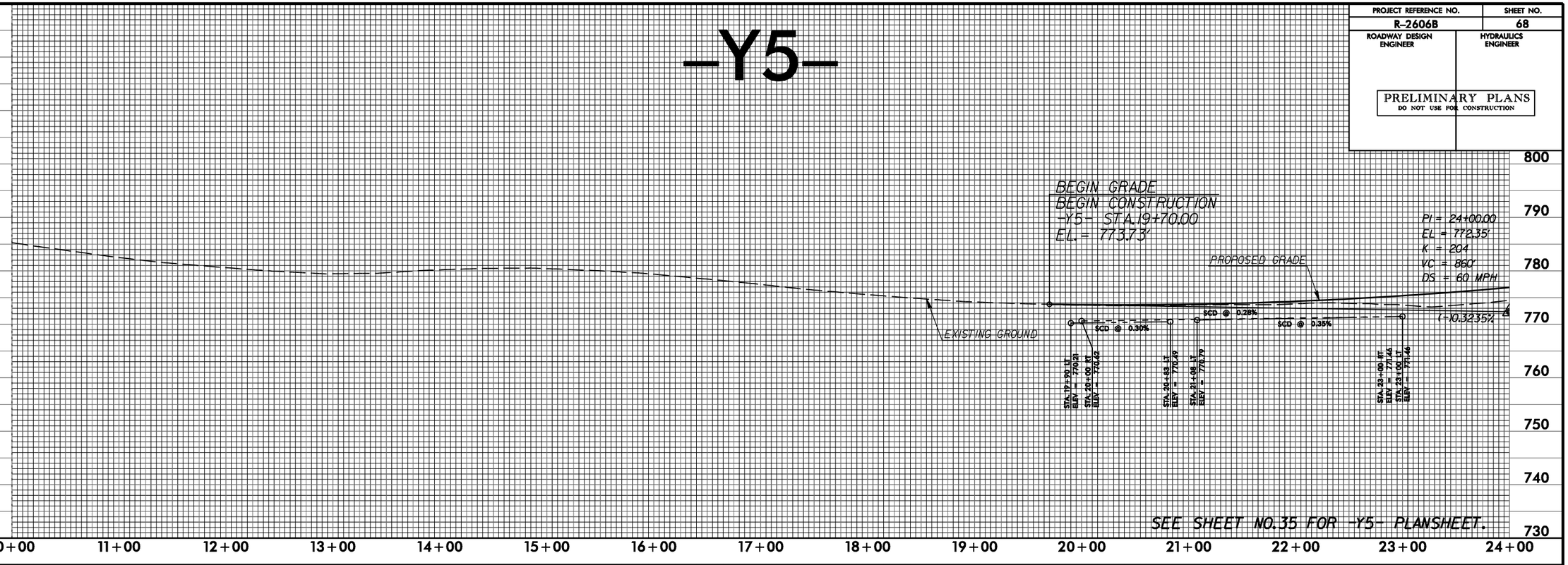
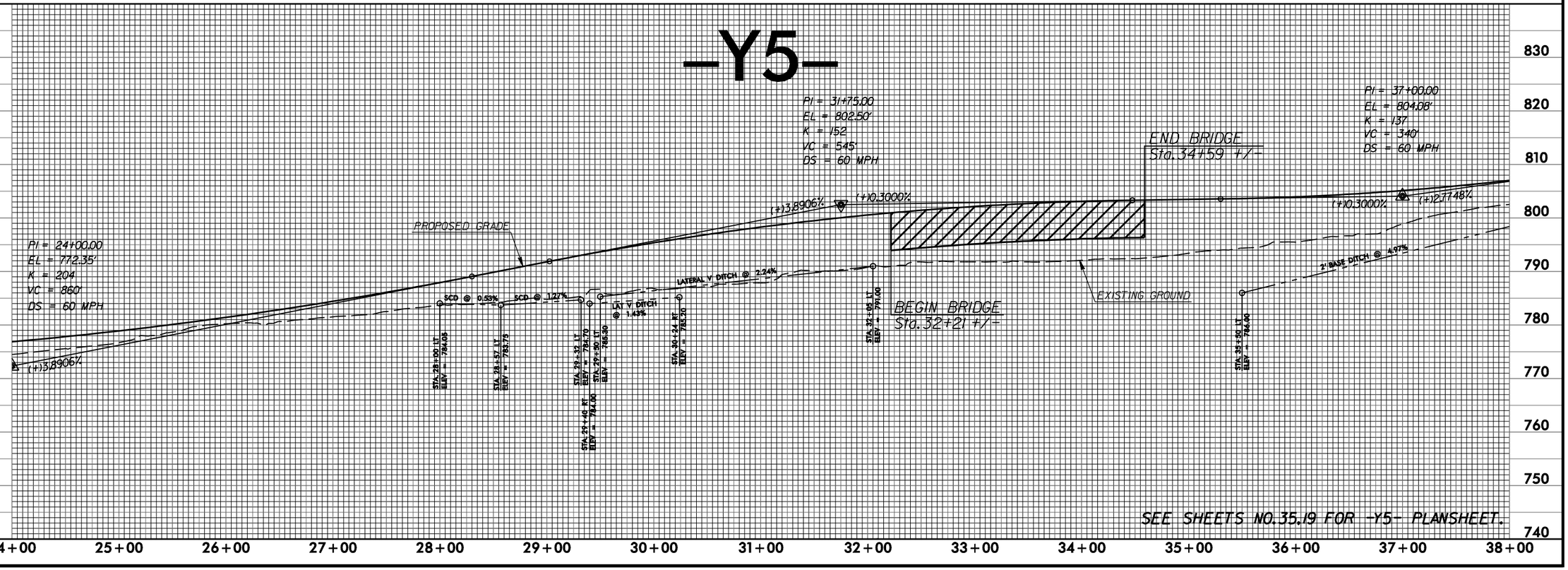
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y5-





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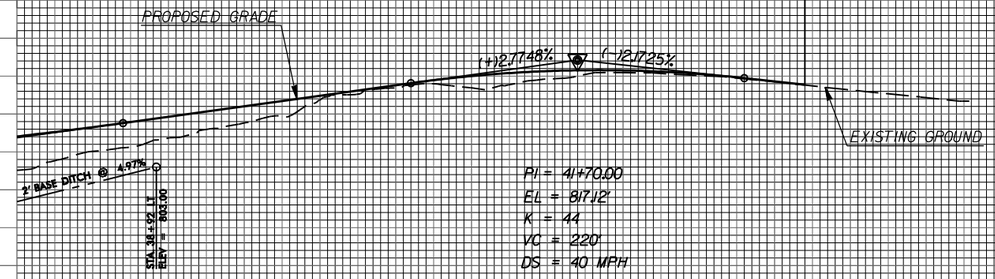
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	69
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y5-

END GRADE
END CONSTRUCTION
-Y5- STA. 43+20.00
EL. = 813.86'



SEE SHEETS NO.35,36 FOR -Y5- PLANSHEET.

850 840 830 820 810 800 790 780 770 760

38+00 39+00 40+00 41+00 42+00 43+00 44+00

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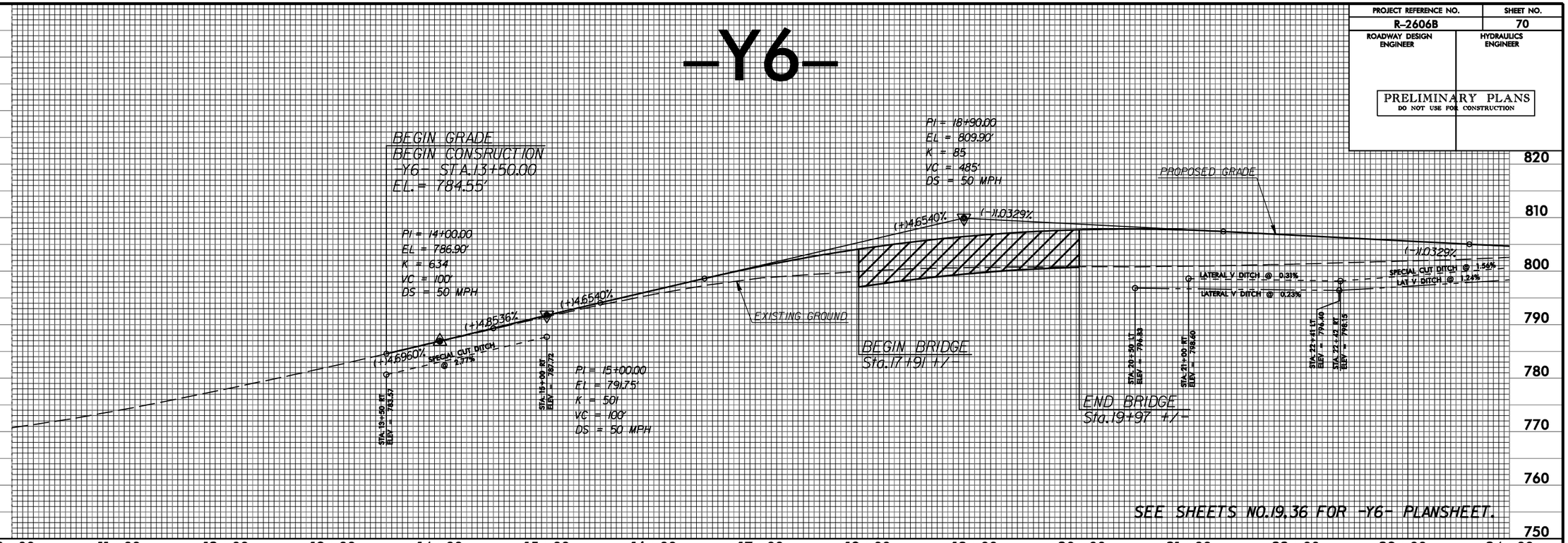
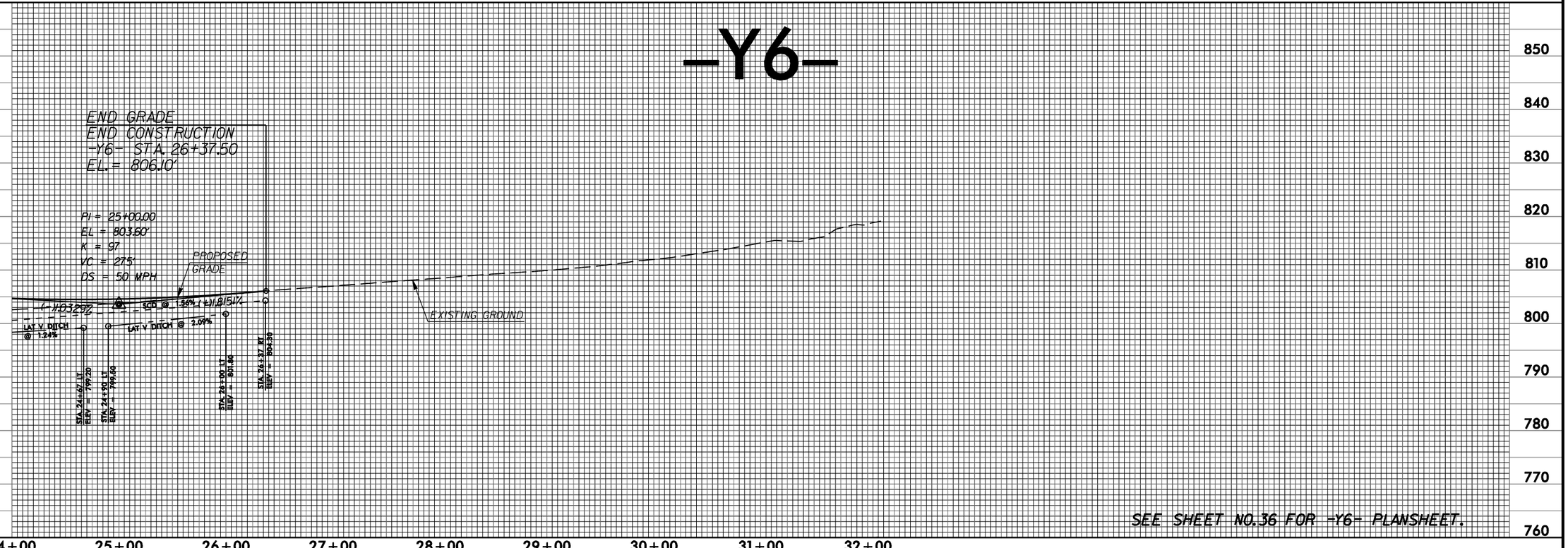
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	70
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y6-





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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	71
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y7-

BEGIN GRADE
BEGIN CONSTRUCTION
-Y7- STA. 11+00.00
EL. = 774.22'

PI = 12+00.00
EL = 774.48'
K = 208.3
VC = 200'
DS = 60 MPH

PI = 14+60.00
EL = 775.40'
K = 161
VC = 105'
DS = 60 MPH

PI = 16+00.00
EL = 774.98'
K = 27.0
VC = 175'
DS = 60 MPH

PI = 20+15.00
EL = 776.42'
K = 15.2
VC = 265'
DS = 60 MPH

-Y11- STA. 10+00.00
-Y7- STA. 21+04.22

PROPOSED GRADE
EXISTING GROUND

(+)0.2568%
(-)0.3528%
(-)0.3008%
(+)0.3528%
(-)0.3008%
(+)0.3479%
(+)0.3479%
(-)1.3953%
(-)1.3953%

SPECIAL CUT DITCH @ 0.13%
SPECIAL CUT DITCH @ 0.10%
SPECIAL CUT DITCH @ 0.10%
SPECIAL CUT DITCH @ 0.47%
SCD @ 0.94%
SCD @ 0.29%

STA. 11+00 RT ELEV = 772.65
STA. 11+00 LT ELEV = 771.96
STA. 14+00 RT ELEV = 773.17
STA. 19+60 LT ELEV = 777.83
STA. 19+50 RT ELEV = 773.45
STA. 20+50 LT ELEV = 771.87
STA. 20+77 RT ELEV = 772.96
STA. 23+50 RT ELEV = 768.74

SEE SHEETS NO.37.38 FOR -Y7- PLANSHEET.

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

720 730 740 750 760 770 780 790 800 810

-Y7-

BEGIN BRIDGE
Sta. 33+17 +/-

END BRIDGE
Sta. 35+92 +/-

PI = 25+25.00
EL = 769.30'
K = 32.5
VC = 155'
DS = 60 MPH

PI = 32+25.00
EL = 775.80'
K = 153
VC = 250'
DS = 60 MPH

PI = 37+75.00
EL = 771.91'
K = 14.3
VC = 225'
DS = 60 MPH

PROPOSED GRADE
EXISTING GROUND

(-)1.5953%
(+)0.9280%
(+)0.9280%
(-)0.7067%
(-)0.7067%
(+)0.8699%

SCD @ 3.29%
SCD @ 0.25%
2' BASE SCD @ 0.50%
2' BASE SCD @ 1.05%

STA. 24+15 RT ELEV = 766.50
STA. 26+00 RT ELEV = 765.50
STA. 28+00 RT ELEV = 762.00
STA. 36+00 LT ELEV = 764.92
STA. 37+00 LT ELEV = 764.42

SEE SHEETS NO.38.22 FOR -Y7- PLANSHEET.

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

720 730 740 750 760 770 780 790 800 810

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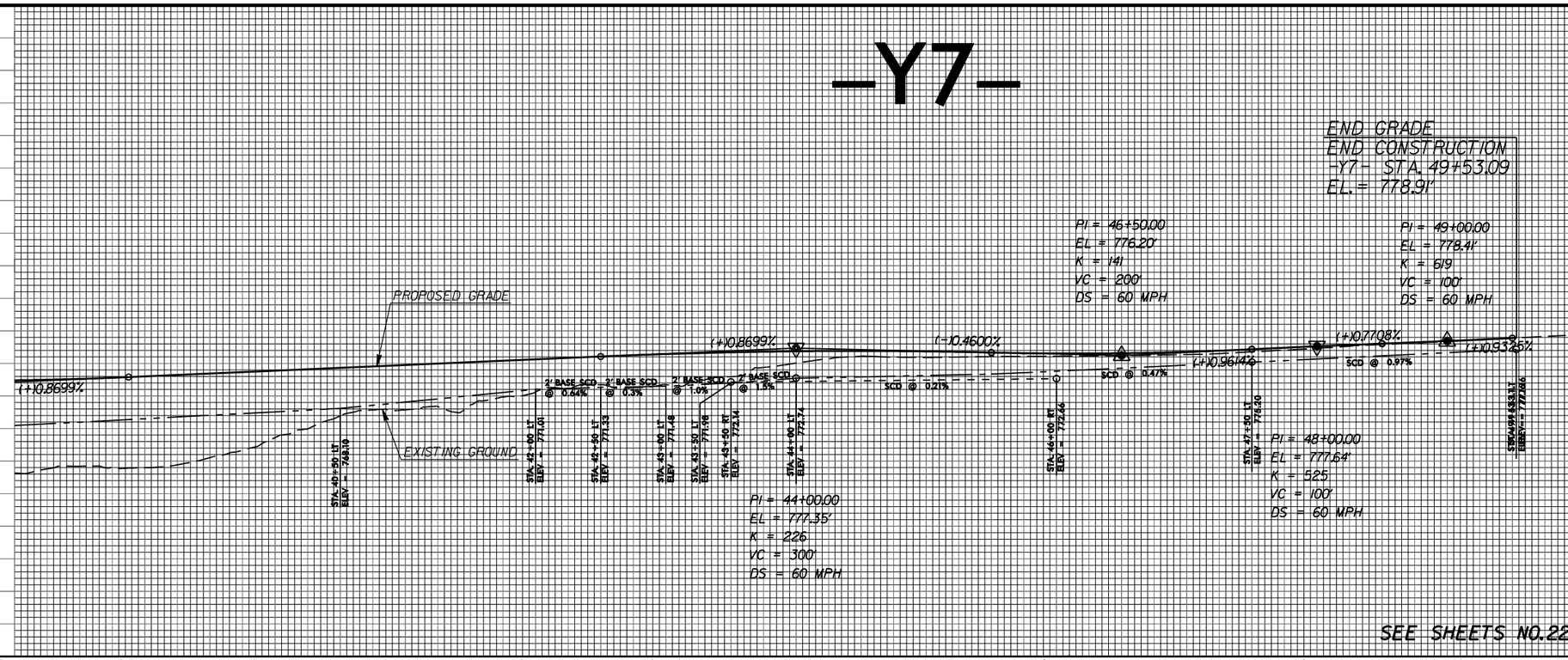
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	72
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y7-



SEE SHEETS NO.22,39 FOR -Y7- PLANSHEET.

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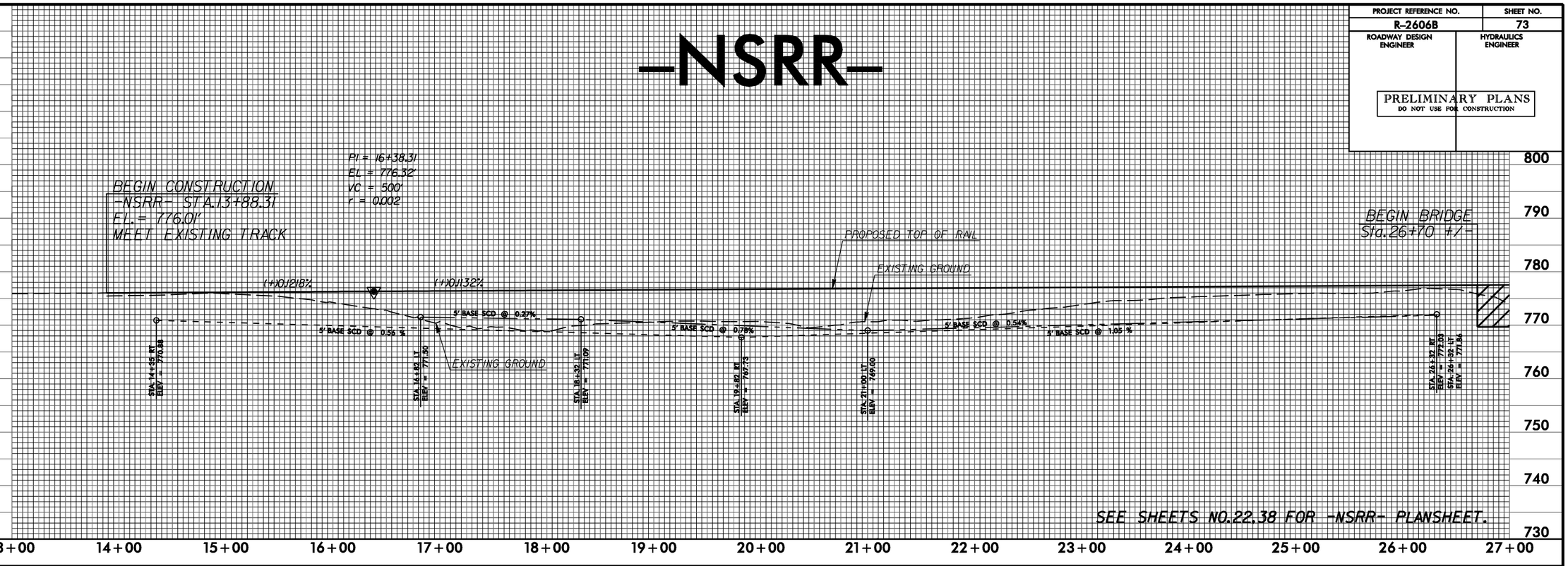
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	73
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-NSRR-



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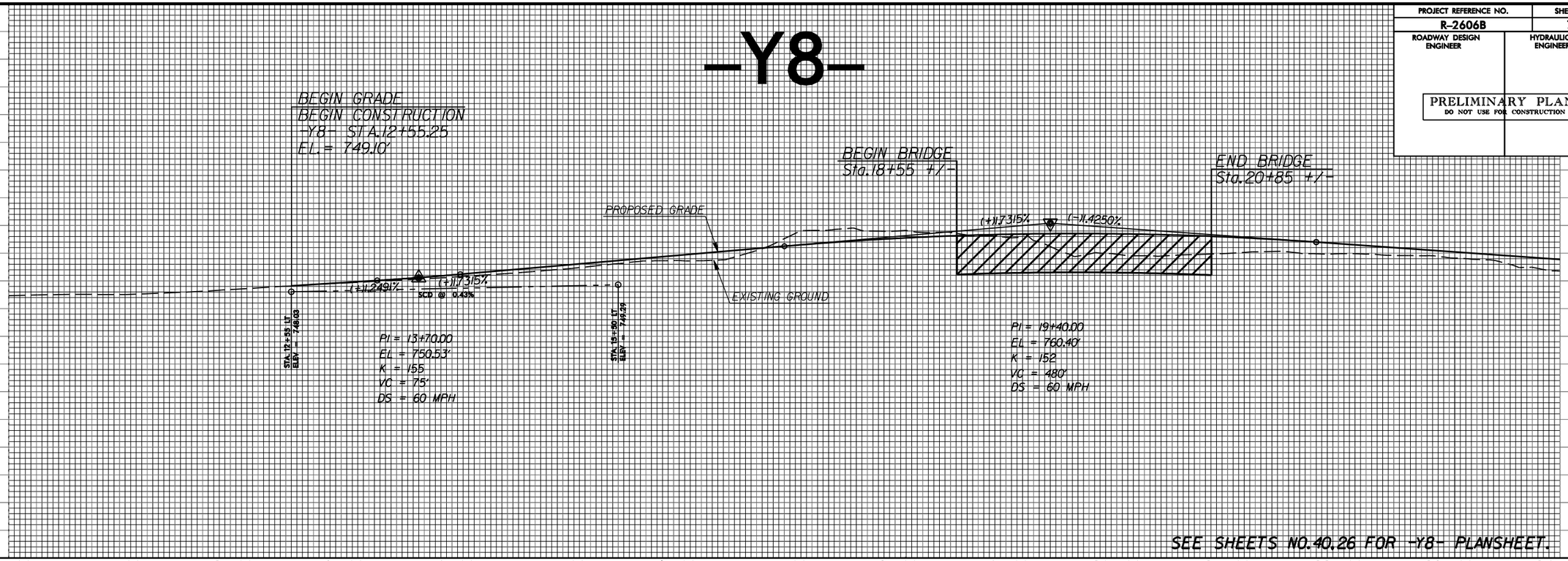
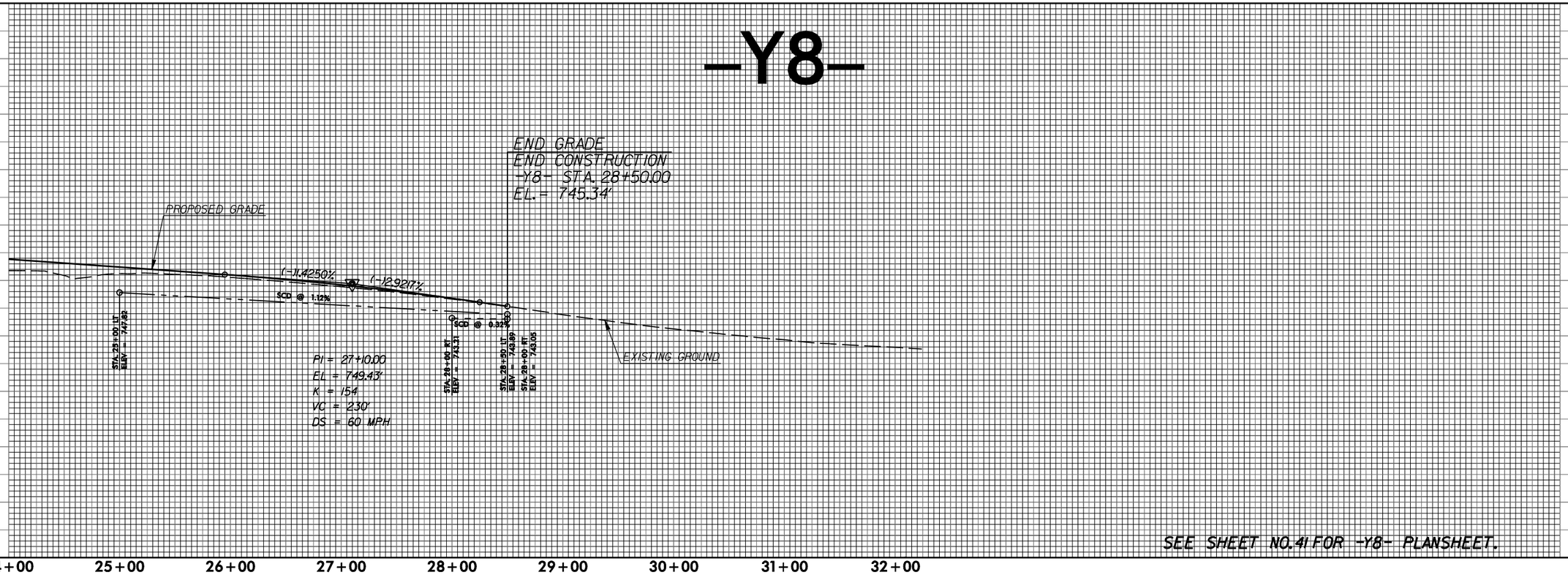
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	74
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y8-



SEE SHEETS NO.40,26 FOR -Y8- PLANSHEET.



SEE SHEET NO.41 FOR -Y8- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	75
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y10-

BEGIN GRADE
BEGIN CONSTRUCTION
-Y10- STA. 12+65.00
EL. = 783.37'

(+)3.0109% (-)3.0349%

SDG @ 0.97%

SPECIAL CUT DITCH @ 2.32%

SPECIAL CUT DITCH @ 0.57%

SDG @ 5.10%

PROPOSED GRADE

BEGIN BRIDGE
Sta. 21+11 +/-

END BRIDGE
Sta. 23+14 +/-

LATERAL V DITCH @ 5.32%

(-)3.0349%

STA. 13+00 RT
ELEV = 783.43

STA. 14+00 RT
ELEV = 784.39

STA. 14+00 LT
ELEV = 783.99

STA. 15+00 RT
ELEV = 785.35'

PI = 15+05.00
EL = 790.60'
K = 61
VC = 370'
DS = 45 MPH

STA. 16+50 LT
ELEV = 781.77

STA. 16+50 RT
ELEV = 781.97

STA. 17+00 LT
ELEV = 777.62

STA. 17+00 RT
ELEV = 779.32

STA. 20+00 LT
ELEV = 758.60

EXISTING GROUND

LAT V DITCH @ 1.64%

STA. 23+10 RT
ELEV = 746.80

SEE SHEETS NO. 42, 30 FOR -Y10- PLANSHEET.

-Y10-

END GRADE
END CONSTRUCTION
-Y10- STA. 35+00.00
EL. = 749.50'

(-)3.0349%

PROPOSED GRADE

PI = 30+70.00
EL = 743.10'
K = 64
VC = 380'
DS = 35 MPH

(+)2.9257% (-)1.6556%

SPECIAL CUT DITCH @ 0.37%

SPECIAL CUT DITCH @ 0.66%

(-)3.0349% (+)2.9257%

LAT V DITCH @ 5.74%

SDG @ 5.74%

LAT V DITCH @ 1.64%

STA. 24+20 RT
ELEV = 737.00

STA. 29+92 LT
ELEV = 732.96

STA. 31+00 LT
ELEV = 739.16

STA. 31+50 LT
ELEV = 737.15

STA. 31+50 RT
ELEV = 744.68

STA. 32+50 LT
ELEV = 744.19

PI = 33+65.00
EL = 751.73'
K = 46
VC = 210'
DS = 40 MPH

STA. 35+00 RT
ELEV = 745.82

STA. 35+00 LT
ELEV = 745.82

EXISTING GROUND

SEE SHEETS NO. 43, 30 FOR -Y10- PLANSHEET.

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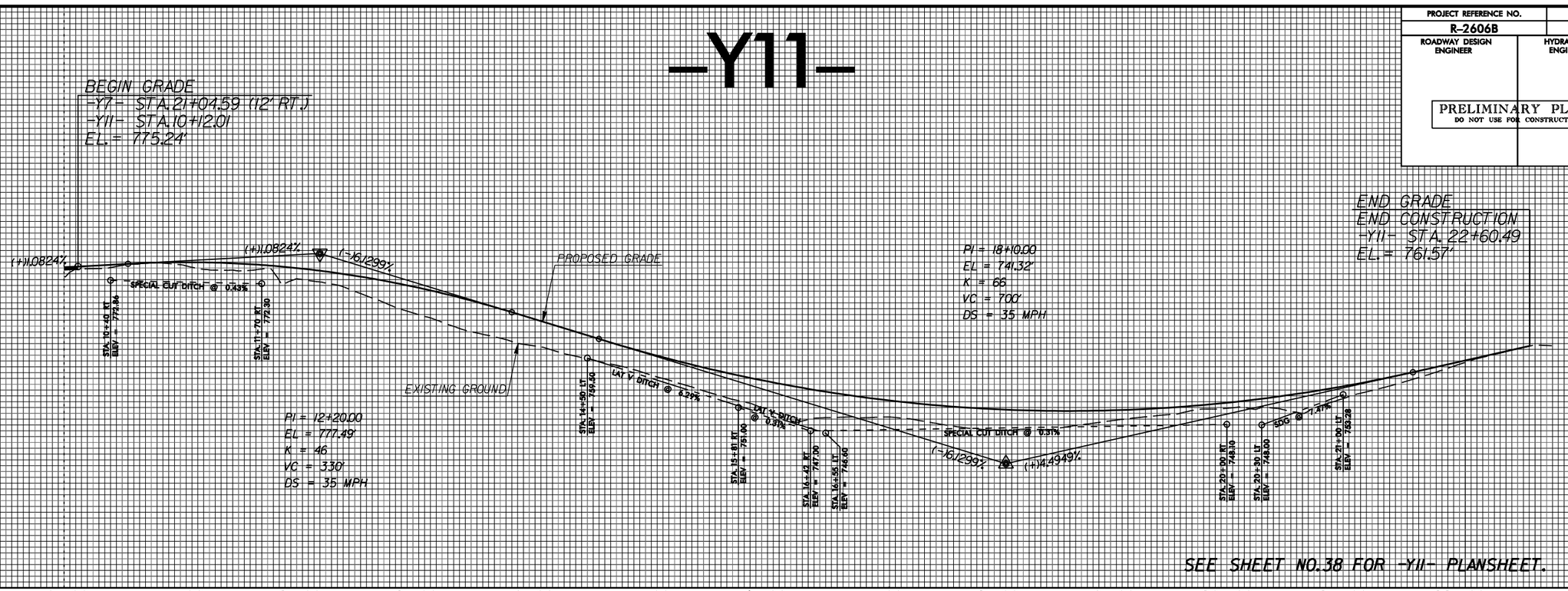
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	76
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y11-

BEGIN GRADE
-Y7- STA. 21+04.59 (12' RT.)
-Y11- STA. 10+12.01
EL. = 775.24'



SEE SHEET NO.38 FOR -Y11- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	77
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12NBL-

760 750 740 730 720 710 700 690 680 670

BEGIN GRADE
BEGIN CONSTRUCTION
-Y12NBL- STA. 18+31.22
EL. = 718.75'

PI = 18+70.00
EL = 718.18'
K = 193
VC = 70'
DS = 70 MPH

(-)1.1162%
(-)1.4797%
(-)1.1162%
(-)1.5667%

PROPOSED GRADE
EXISTING GROUND

PI = 19+80.00
EL = 716.95'
K = 333
VC = 150'
DS = 70 MPH

SEE SHEET NO.44 FOR -Y12- PLANSHEET.

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

-Y12NBL-

740 730 720 710 700 690 680 670 660 650

(-)1.5667%

PROPOSED GRADE
EXISTING GROUND

(-)1.5667%

SEE SHEETS NO.45,46 FOR -Y12- PLANSHEET.

22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00

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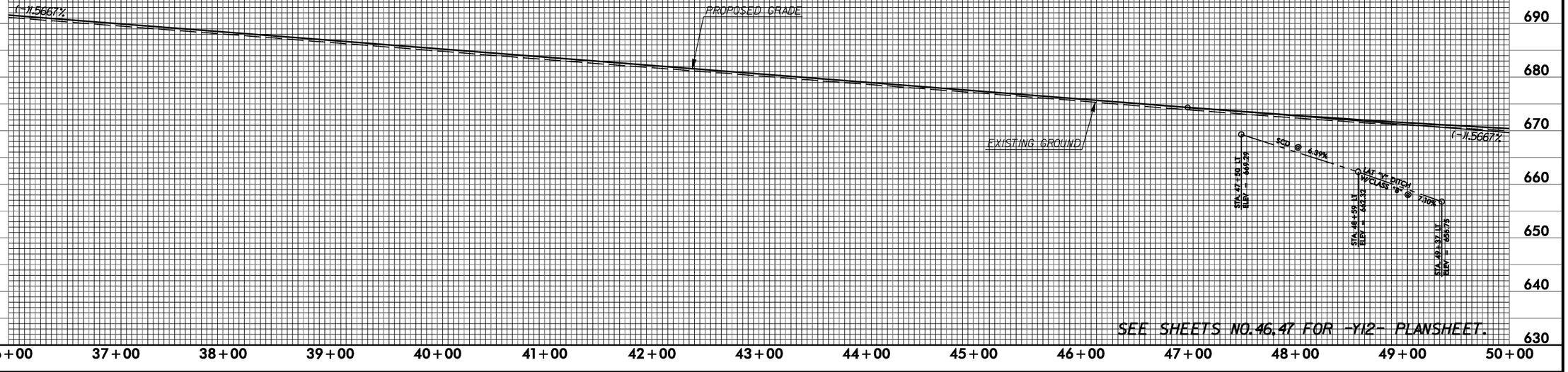
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	78
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

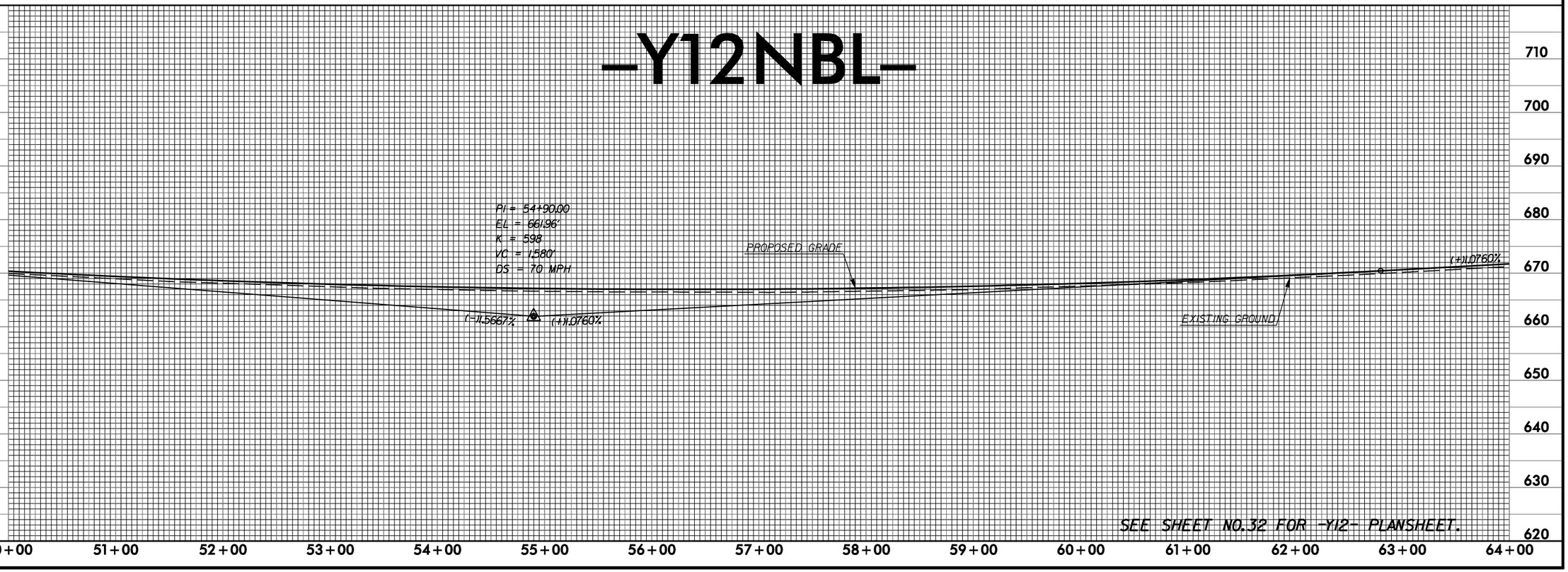
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12NBL-



SEE SHEETS NO.46,47 FOR -Y12- PLANSHEET.

-Y12NBL-



SEE SHEET NO.32 FOR -Y12- PLANSHEET.

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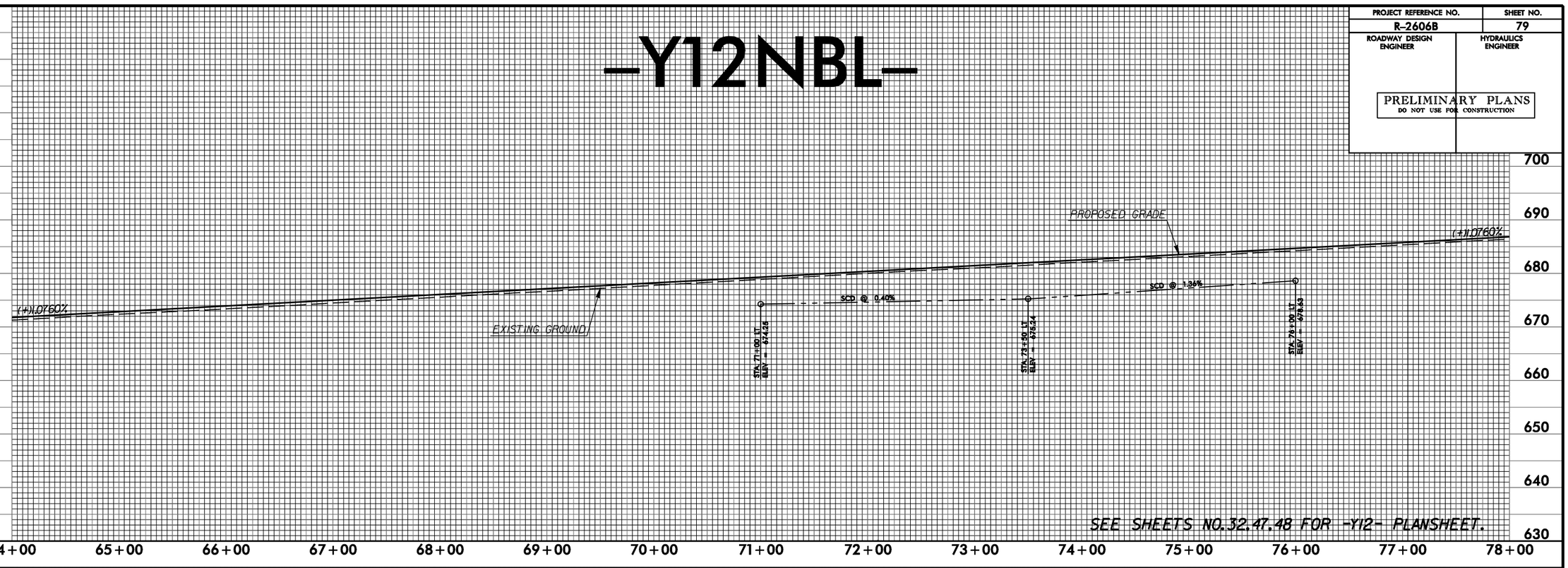
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	79
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12NBL-



SEE SHEETS NO.32,47,48 FOR -Y12- PLANSHEET.

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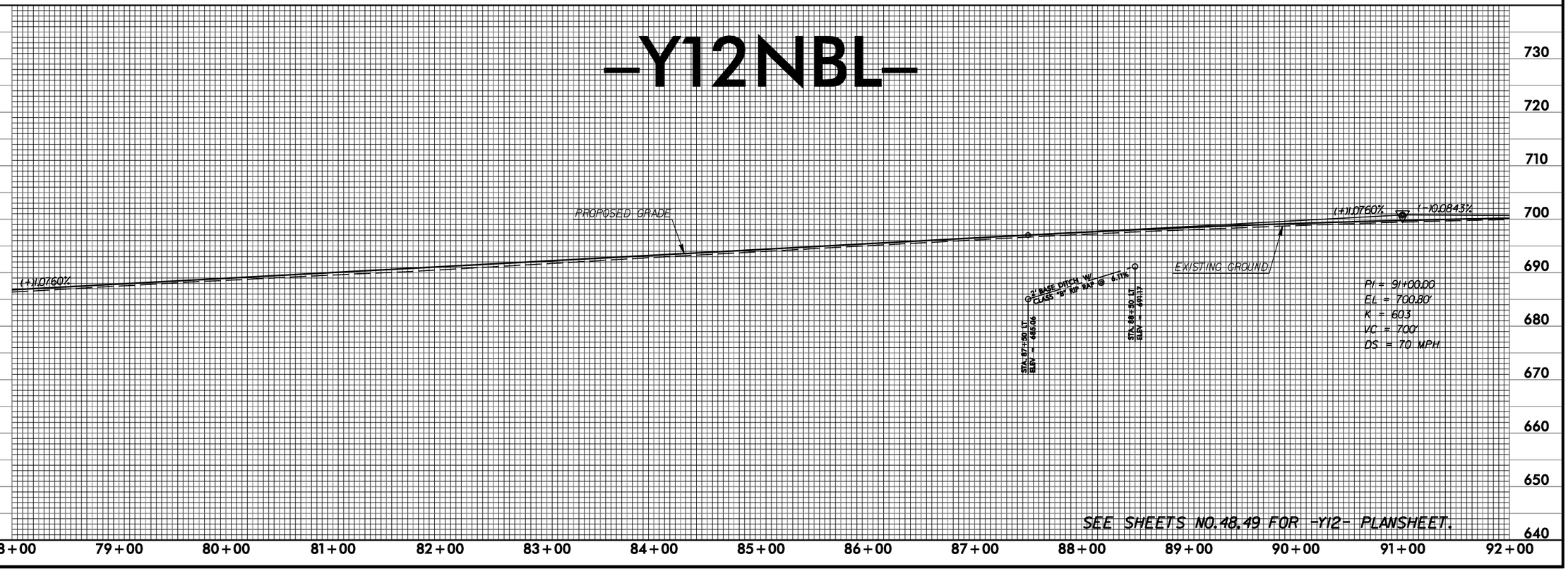

SEE SHEETS NO.48,49 FOR -Y12- PLANSHEET.

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	80
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12NBL-

END GRADE
END CONSTRUCTION
-Y12NBL- STA. 94+50.00
EL. = 700.5'

(-)0.0843%

PROPOSED GRADE

EXISTING GROUND

SEE SHEET NO. 49 FOR -Y12- PLANSHEET.

730 720 710 700 690 680 670 660 650 640

92+00 93+00 94+00 95+00 96+00 97+00 98+00 99+00 100+00 101+00 102+00 103+00 104+00 105+00 106+00

-Y12NBL-

EXISTING GROUND

730 720 710 700 690 680 670 660 650 640

106+00 107+00 108+00

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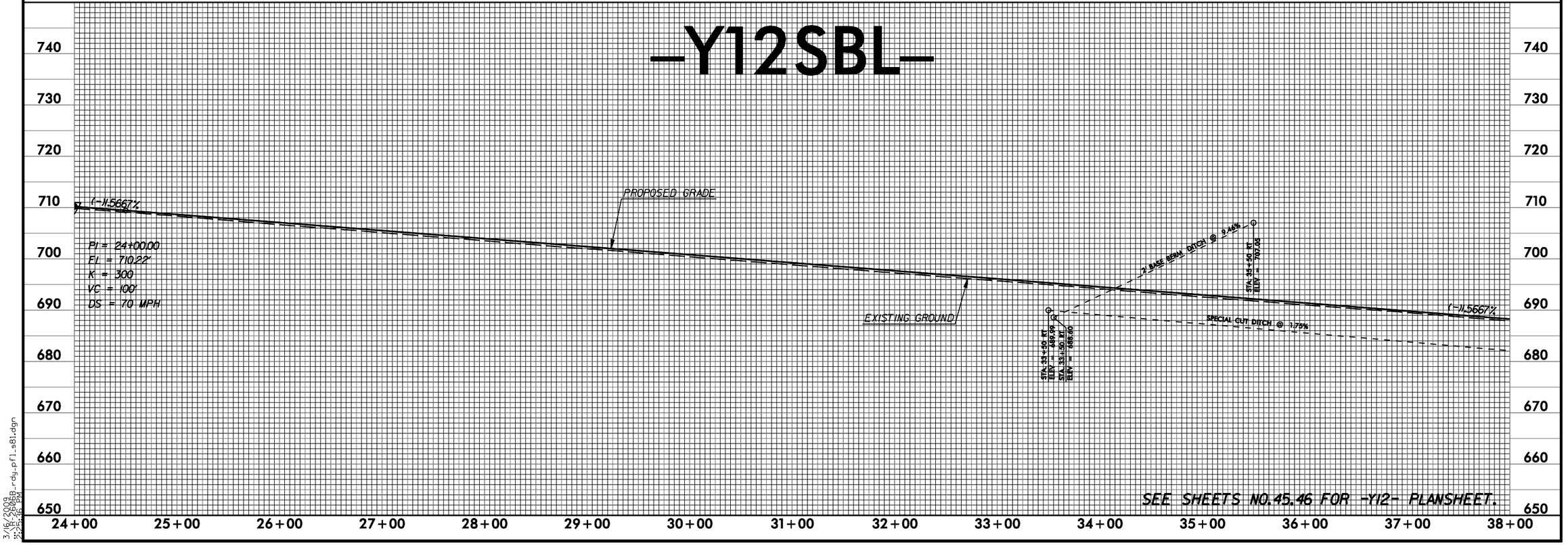
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	81
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12SBL-

-Y12SBL-



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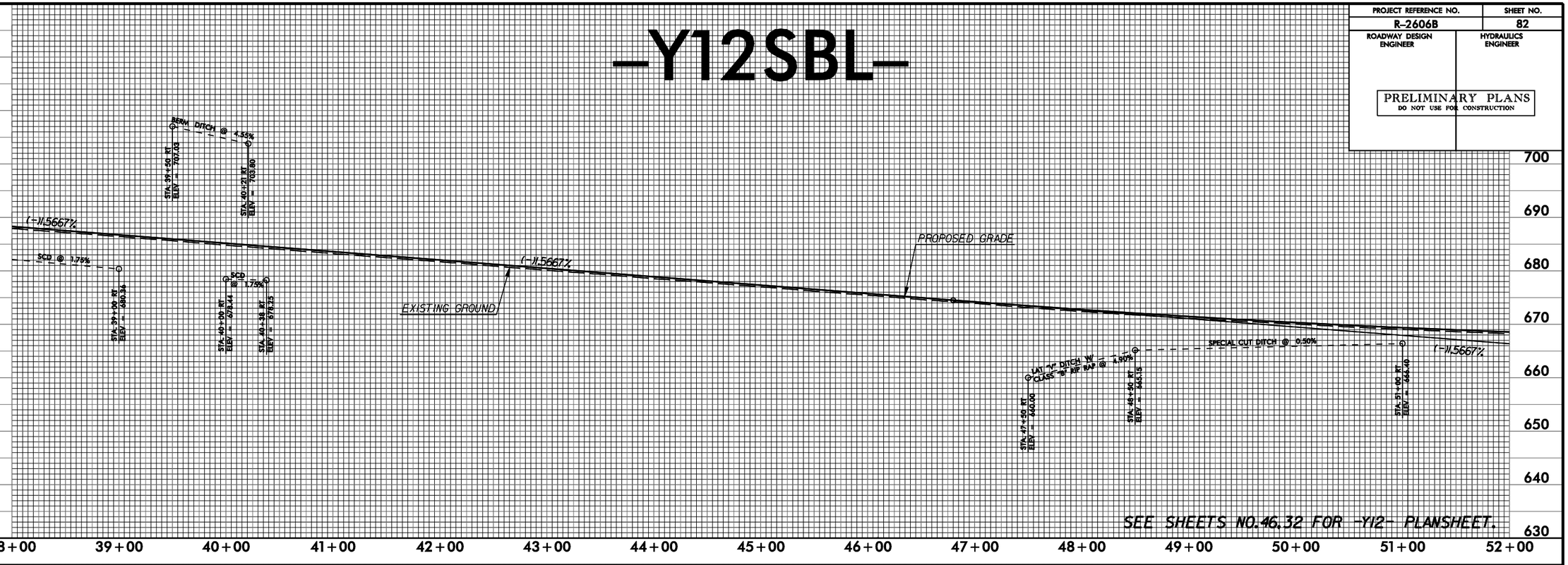
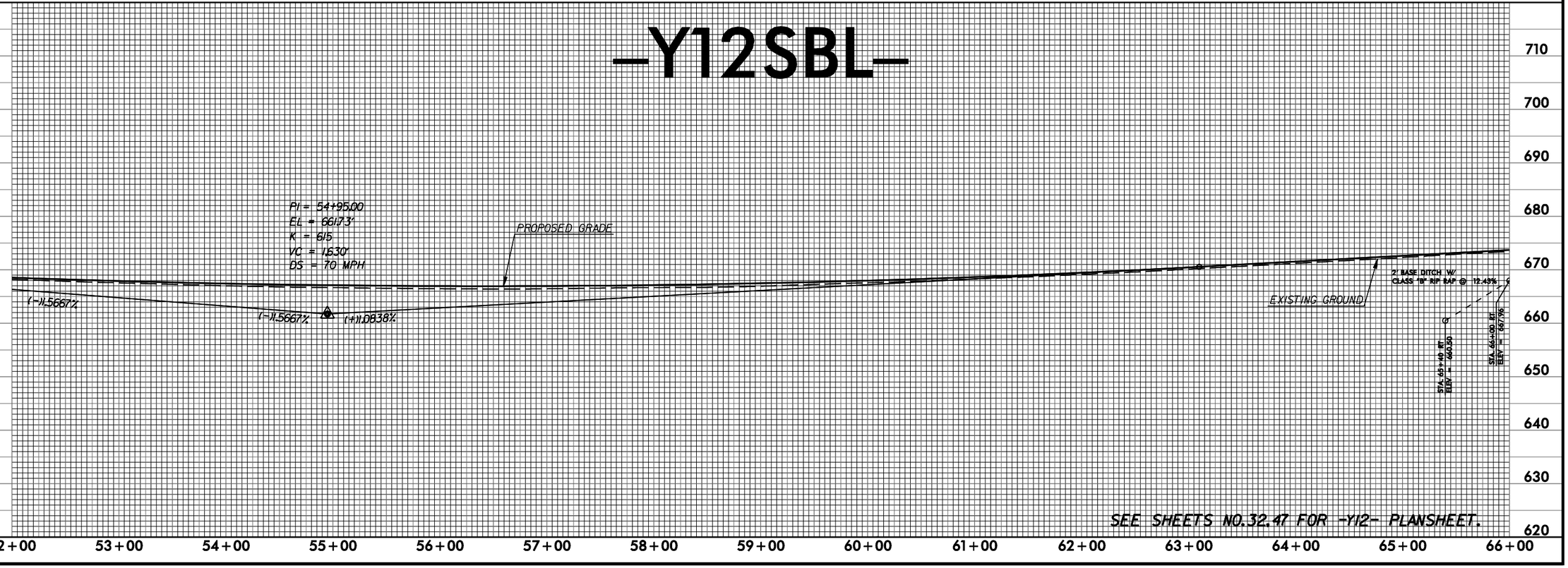
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	82
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12SBL-



-Y12SBL-



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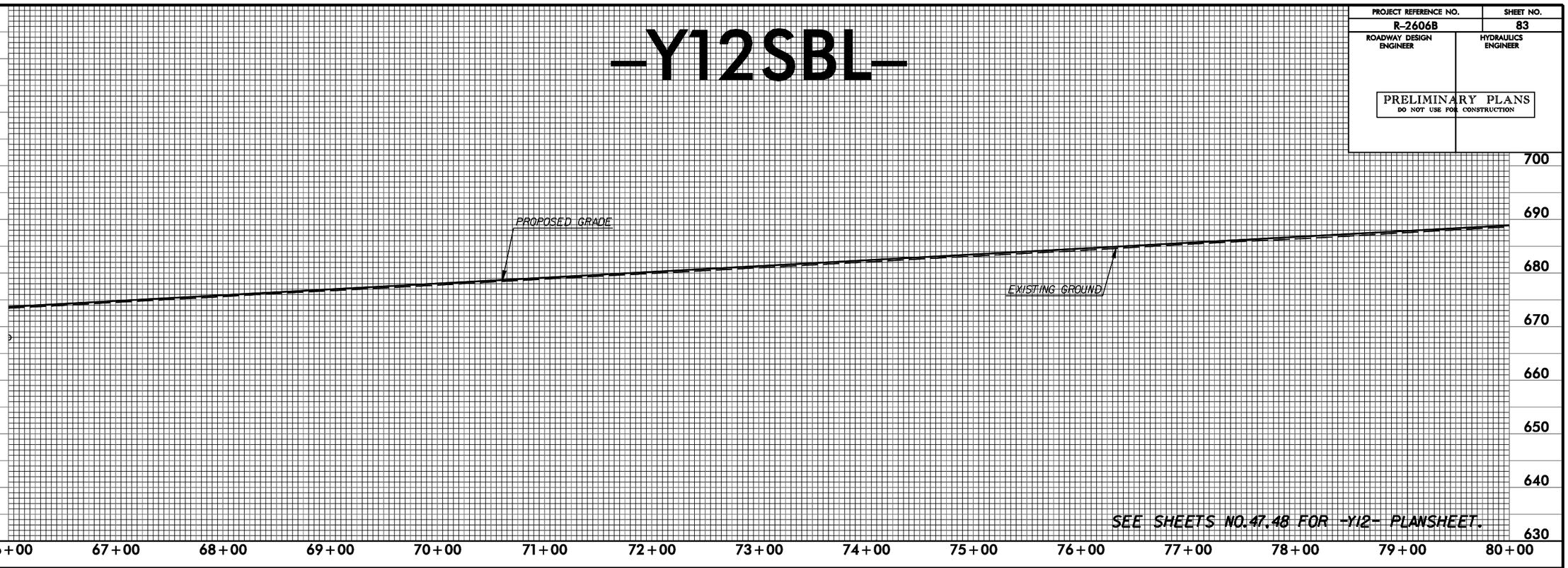
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	83
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

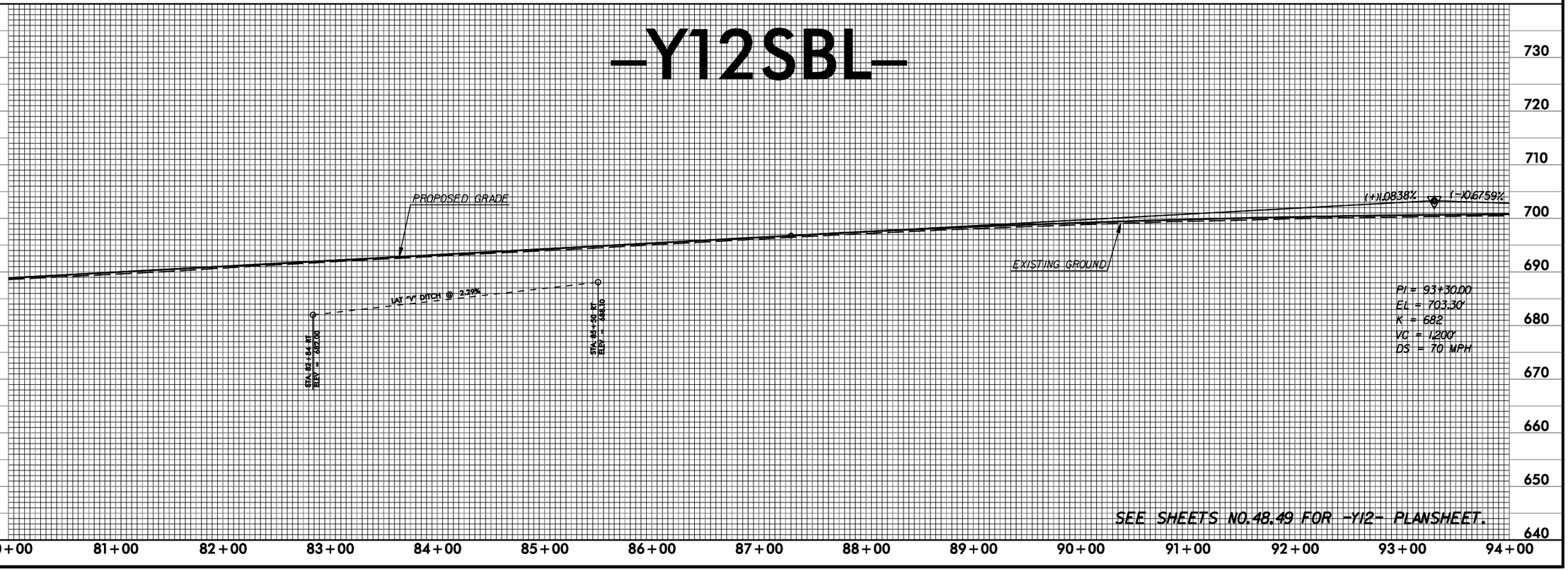
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12SBL-



SEE SHEETS NO.47,48 FOR -Y12- PLANSHEET.

-Y12SBL-



SEE SHEETS NO.48,49 FOR -Y12- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	84
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y12SBL-

END GRADE
END CONSTRUCTION
-Y12SBL- STA. 99+49.26
EL. = 699.11'

(-)0.675%

PROPOSED GRADE

EXISTING GROUND

SEE SHEETS NO.49 FOR -Y12- PLANSHEET.

740 730 720 710 700 690 680 670 660 650

94+00 95+00 96+00 97+00 98+00 99+00 100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00

-Y12SBL-

740 730 720 710 700 690 680 670 660 650

108+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	85
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP2B-

BEGIN GRADE
-RP2B- STA. 10+00.00
-L- STA. 335+31.14
EL. = 755.17'

(-)0.4083%
(-)0.3362%
(-)0.3362%
(-)0.5352%
(-)0.5352%
(-)2.7005%
(-)2.7005%
(+)5.0000%

PI = 10+75.00
EL = 754.86'
K = 2080
VC = 150'
DS = 50 MPH

PI = 12+90.00
EL = 754.14'
K = 1105
VC = 220'
DS = 50 MPH

PI = 15+20.00
EL = 752.91'
K = 111
VC = 240'
DS = 50 MPH

PI = 22+50.00
EL = 733.20'
K = 97
VC = 750'
DS = 50 MPH

PROPOSED GRADE
EXISTING GROUND
SCD @ 0.27%
STA. 21+90 RT
ELEV = 735.67
STA. 21+90 RT
ELEV = 735.67

SEE SHEETS NO.22 FOR -RP2C- PLANSHEET.

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

790 780 770 760 750 740 730 720 710 700

-RP2B-

END GRADE
-RP2B- STA. 30+93.71
-Y7- STA. 28+71.04
EL. = 772.43'

(+)1.8498%
(+)1.8498%
(+)5.0000%
(+)5.0000%

PROPOSED GRADE
EXISTING GROUND
2' BASE DITCH W/CLASS "A" RIP RAP @ 4.45%
STA. 26+54 LT
ELEV = 744.00
STA. 30+70 LT
ELEV = 762.50

PI = 30+00.00
EL = 770.70'
K = 59
VC = 185'
DS = 40 MPH

SEE SHEETS NO.22 FOR -RP2C- PLANSHEET.

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00

800 790 780 770 760 750 740 730 720 710

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	86
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP2C-

BEGIN GRADE
-RP2C- STA. 10+00.00
-L- STA. 334+00.00
EL. = 753.31'

EXISTING GROUND

PROPOSED GRADE

(-)0.4100%

(-)0.7264%

(-)0.7264%

(-)0.8431%

BERM DITCH @ 1.60%

SDG @ 1.68%

BERM DITCH @ 1.93%

(-)0.8431%

(+)5.0000%

PI = 10+25.00
EL = 753.21'
K = 158
VC = 50'
DS = 50 MPH

PI = 12+05.00
EL = 751.90'
K = 1515
VC = 177'
DS = 50 MPH

STA. 14+40 RT
ELEV = 755.40

STA. 14+68.1 LT
ELEV = 747.86

STA. 15+20 LT
ELEV = 745.48

STA. 17+63 RT
ELEV = 751.20

STA. 19+20 RT
ELEV = 756.50

PI = 20+85.00
EL = 744.48'
K = 149
VC = 870'
DS = 50 MPH

SEE SHEETS NO.22 FOR -RP2C- PLANSHEET.

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

-RP2C-

END GRADE
-RP2C- STA. 26+75.59
-Y7- STA. 41+81.45
EL. = 774.01'

PROPOSED GRADE

(+)5.0000%

(+)8.0420%

EXISTING GROUND

SEE SHEETS NO.22 FOR -RP2C- PLANSHEET.

23+00 24+00 25+00 26+00 27+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	87
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3B-

BEGIN GRADE
-RP3B- STA. 10+00.00
EL. = 717.71'

PI = 11+75.00
EL = 712.37'
K = 254
VC = 200'
DS = 60 MPH

(-)3.0500%

(-)3.8381%

PI = 15+25.00
EL = 698.94'
K = 190
VC = 500'
DS = 60 MPH

(-)3.8381%

(-)1.2040%

EXISTING GROUND

PROPOSED GRADE

SEE SHEETS NO. 31, 32 FOR -RP3B- PLANSHEET.

750 740 730 720 710 700 690 680 670 660

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

-RP3B-

END GRADE
-RP3B- STA. 36+44.68
EL. = 690.85'

PI = 31+00.00
EL = 679.98'
K = 137
VC = 455'
DS = 60 MPH

PROPOSED GRADE

(-)1.2040%

(+)2.1166%

(+)2.1166%

(+)1.5700%

SDG @ 0.61%

SDG @ 2.11%

SDG @ 0.44%

STA. 27+00 LT
ELEV = 679.84

STA. 30+05 RT
ELEV = 678.92

STA. 30+37 LT
ELEV = 677.50

STA. 30+87 RT
ELEV = 677.19

STA. 32+00 LT
ELEV = 678.26

PI = 35+25.00
EL = 688.97'
K = 274
VC = 150'
DS = 60 MPH

EXISTING GROUND

730 720 710 700 690 680 670 660 650 640

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00

SEE SHEETS NO. 32, 46 FOR -RP3B- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	88
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3BD-

BEGIN GRADE
-RP3BD- STA.10+00.00
EL.= 692.59'

PI = 11+25.00
EL = 692.22'
K = 237
VC = 250'
DS = 60 MPH

PROPOSED GRADE

BEGIN BRIDGE
Sta.16+10 +/-

PI = 18+00.00
EL = 697.32'
K = 457
VC = 1,100'
DS = 60 MPH

(+)0.7557%

(-)1.651/7%

(-)0.3000%

(+)0.7557%

SPECIAL CUT DITCH
@ 1.05%

STA. 10+00 LT
ELEV = 690.10

STA. 11+50 RT
ELEV = 687.38

STA. 12+00 LT
ELEV = 689.00

2' BASE DITCH W/CLASS 1" RIP RAP @ 5.21%

STA. 14+50 RT
ELEV = 671.00

2' BASE DITCH W/CLASS 1" RIP RAP @ 10.38%

STA. 15+95 RT
ELEV = 655.19

EXISTING GROUND

END BRIDGE
Sta.18+85 +/-

2' BASE DITCH
W/CLASS 1" RIP RAP
@ 10.37%

STA. 20+00 LT
ELEV = 644.32

2' BASE DITCH
W/CLASS 1" RIP RAP
@ 10.33%

STA. 19+50 LT
ELEV = 642.09

STA. 19+65 LT
ELEV = 642.64

2' BASE DITCH
W/CLASS 1" RIP RAP
@ 4.91%

STA 18+84 LT
ELEV = 638.85

SEE SHEET NO.32 FOR -RP3BD- PLANSHEET.

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

720 710 700 690 680 670 660 650 640 630

-RP3BD-

EXISTING GROUND

PROPOSED GRADE

PI = 30+50.00
EL = 676.67'
K = 138
VC = 400'
DS = 60 MPH

(-)1.651/7%

(+)1.2483%

SCD @ 0.49%

STA. 29+30 LT
ELEV = 674.87

STA. 30+97.1
ELEV = 674.26

SEE SHEETS NO.32,47,48 FOR -RP3BD- PLANSHEET.

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

730 720 710 700 690 680 670 660 650 640

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-RP3BD-

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	89
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

730
720
710
700
690
680
670
660
650
640

END GRADE
-RP3BD- STA. 39+57.45
EL. = 688.00'

(+)1.24834'

SEE SHEETS NO.48 FOR -RP3BD- PLANSHEET.

38+00 39+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	90
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3C-

BEGIN GRADE
-RP3C- STA. 10+00.00
EL. = 736.44'

(+)2.5100%

(-)11.529%

PROPOSED GRADE

(-)11.529%

PI = 15+25.00
EL = 750.14'
K = 27.9
VC = 1,050'
DS = 60 MPH

EXISTING GROUND

SEE SHEETS NO. 30, 31 FOR -RP3C- PLANSHEET.

780 770 760 750 740 730 720 710 700 690

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

-RP3C-

(-)11.529%

PROPOSED GRADE

EXISTING GROUND

STA. 28+59 RT
ELEV = 717.57

2' BASE DITCH W/ CLASS 'A' RIP-RAP @ 17.29%

STA. 30+24 RT
ELEV = 689.00

STA. 34+08 RT
ELEV = 724.107
STA. 34+08.17
ELEV = 727.24

2' BASE DITCH @ 8.43%

SPECIAL CUT DITCH @ 3.08%

2' BASE DITCH @ 1.95%

STA. 35+45 RT
ELEV = 710.80

SPECIAL CUT DITCH @ 0.30%

STA. 37+10 RT
ELEV = 710.72

(-)11.529%

PI = 38+00.00
EL = 723.9'
K = 21.0
VC = 700'
DS = 60 MPH

SEE SHEETS NO. 31, 32 FOR -RP3C- PLANSHEET.

770 760 750 740 730 720 710 700 690 680

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	91
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3C-

(-)4.4859%

SPECIAL CUT DITCH @ 0.30%

SPECIAL CUT DITCH @ 3.08%

STA. 38+00 RT
ELEV. = 714.22

STA. 41+57 LT
ELEV. = 704.17

PROPOSED GRADE

EXISTING GROUND

PI = 38+00.00
EL = 723.91'
K = 210
VC = 700'
DS = 60 MPH

PI = 51+00.00
EL = 665.60'
K = 146
VC = 850'
DS = 60 MPH

STA. 48+00 LT
ELEV. = 676.48

STA. 48+50 LT
ELEV. = 671.94

SDG @ 8.94%

2'-6" BASE DITCH W/ CLASS "A" RR RAP @ 11.12%

(-)4.4859%

(+)1.3455%

SDG @ 1.72%

SDG @ 2.20%

STA. 50+00.00 LT
ELEV. = 666.19

STA. 50+76 LT
ELEV. = 664.46

SEE SHEET NO.32 FOR -RP3C- PLANSHEET.

38+00 39+00 40+00 41+00 42+00 43+00 44+00 45+00 46+00 47+00 48+00 49+00 50+00 51+00 52+00

720 710 700 690 680 670 660 650 640 630

-RP3C-

END GRADE
-RP3C- STA. 59+92.92
EL. = 676.56'

PROPOSED GRADE

(+)1.3455%

(+)1.0600%

SDG @ 5.25%

SDG @ 2.20%

STA. 52+60 LT
ELEV. = 640.68

STA. 54+13 RT
ELEV. = 668.18

EXISTING GROUND

PI = 56+25.00
EL = 672.66'
K = 701
VC = 200'
DS = 60 MPH

SEE SHEETS NO.32,47 FOR -RP3C- PLANSHEET.

52+00 53+00 54+00 55+00 56+00 57+00 58+00 59+00

720 710 700 690 680 670 660 650 640 630

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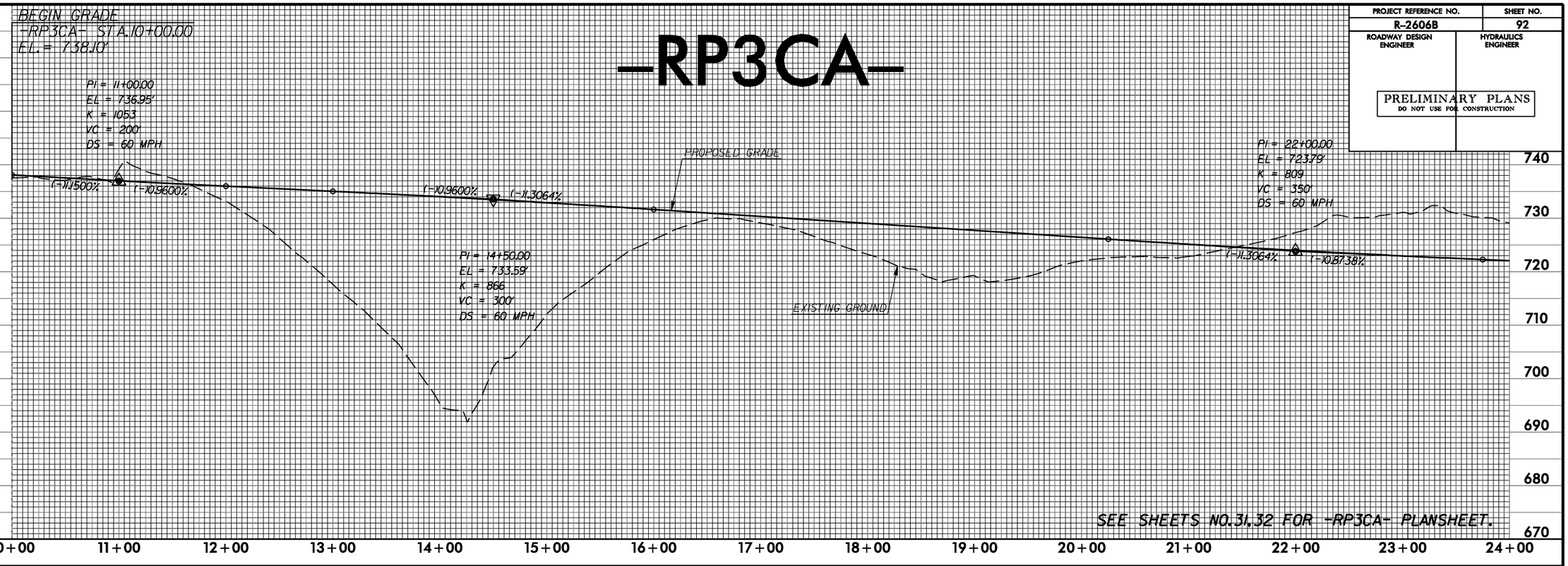
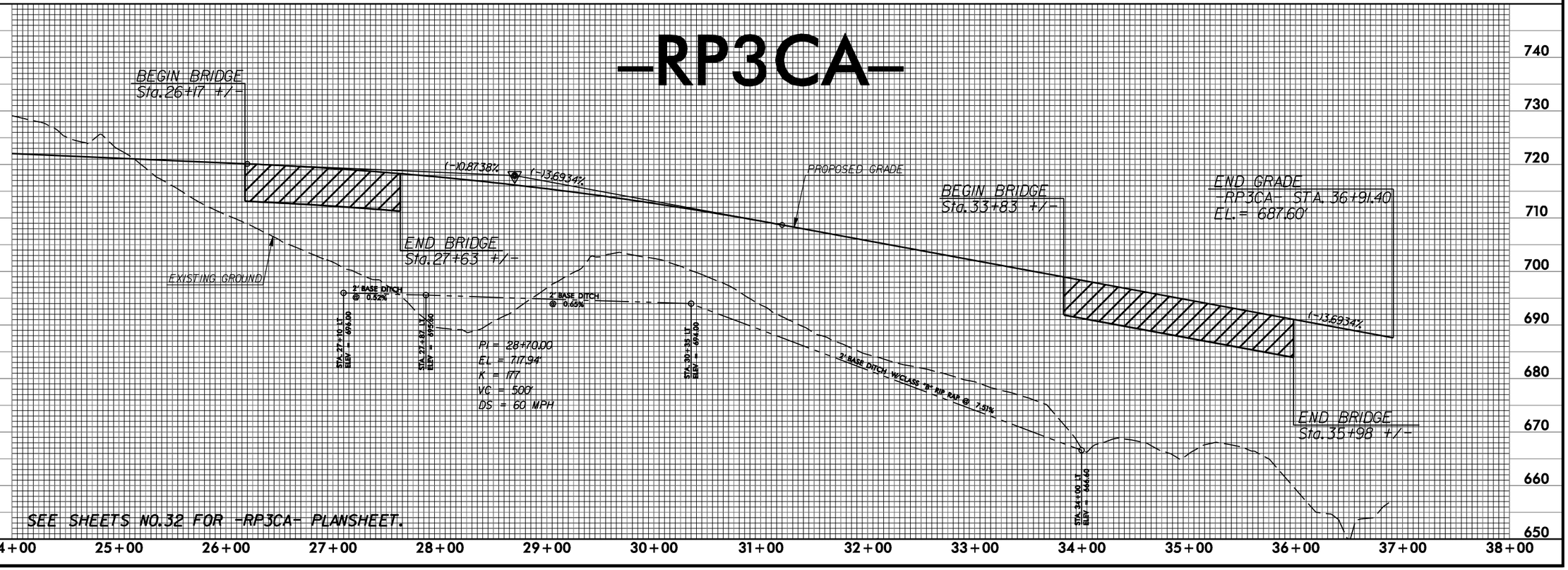
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	92
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RP3CA-





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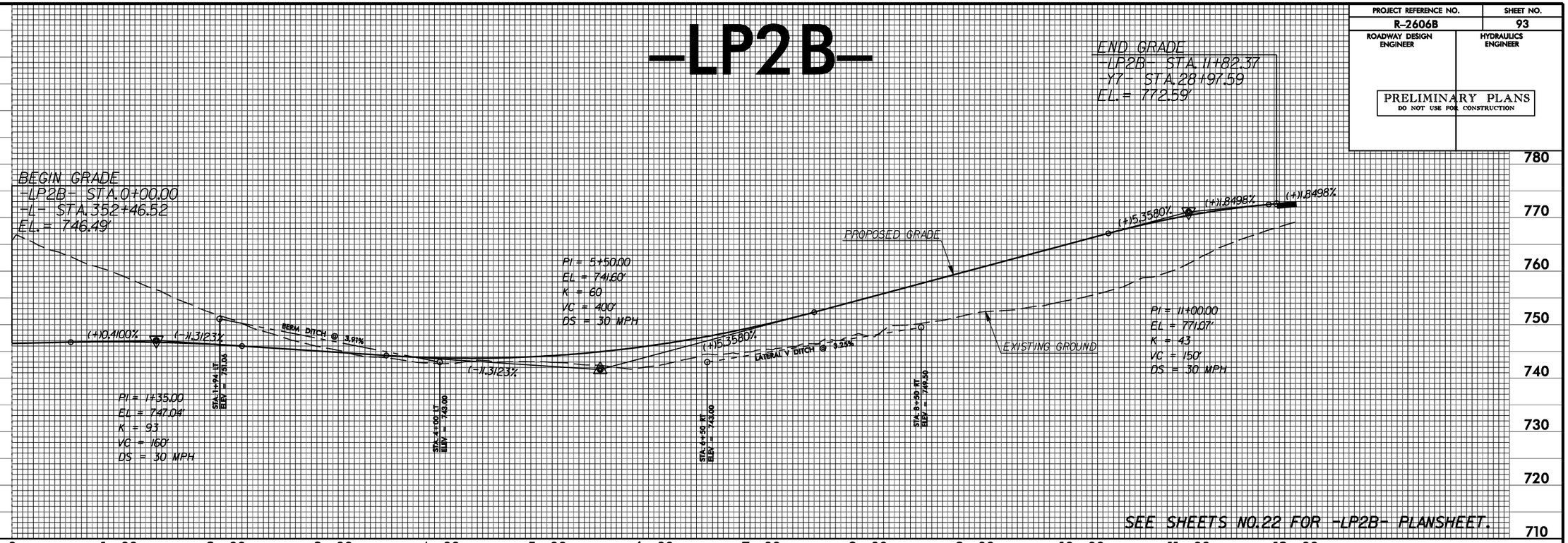
-LP2B-

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	93
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEETS NO.22 FOR -LP2B- PLANSHEET.

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-LP2C-

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	94
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BEGIN GRADE
-LP2C- STA.0+00.00
-L- STA.350+38.79
EL.= 747.34'

END GRADE
-LP2C- STA.9+47.90
-L- STA.41+55.07
EL.= 773.78'

PROPOSED GRADE

EXISTING GROUND

PI = 3+65.00
EL = 744.63'
K = 49
VC = 310'
DS = 35 MPH

PI = 1+30.00
EL = 747.87'
K = 89
VC = 160'
DS = 50 MPH

(+)0.4100%
(-)1.3779%
(-)1.3779%
(+)5.0000%
(+)8.0323%

LATERAL V DITCH @ 1.35%
LATERAL V DITCH @ 1.81%
2' BASE DITCH @ 0.26%
LAT V DITCH @ 2.24%

STA. 1+60 LT ELEV = 739.80
STA. 3+20 RT ELEV = 736.24
STA. 4+07 LT ELEV = 736.83
STA. 4+50 LT ELEV = 734.76
STA. 5+44 RT ELEV = 740.29
STA. 5+50 LT ELEV = 739.94

SEE SHEETS NO.22 FOR -LP2C- PLANSHEET.

800	790	780	770	760	750	740	730	720	710

0	1+00	2+00	3+00	4+00	5+00	6+00	7+00	8+00	9+00

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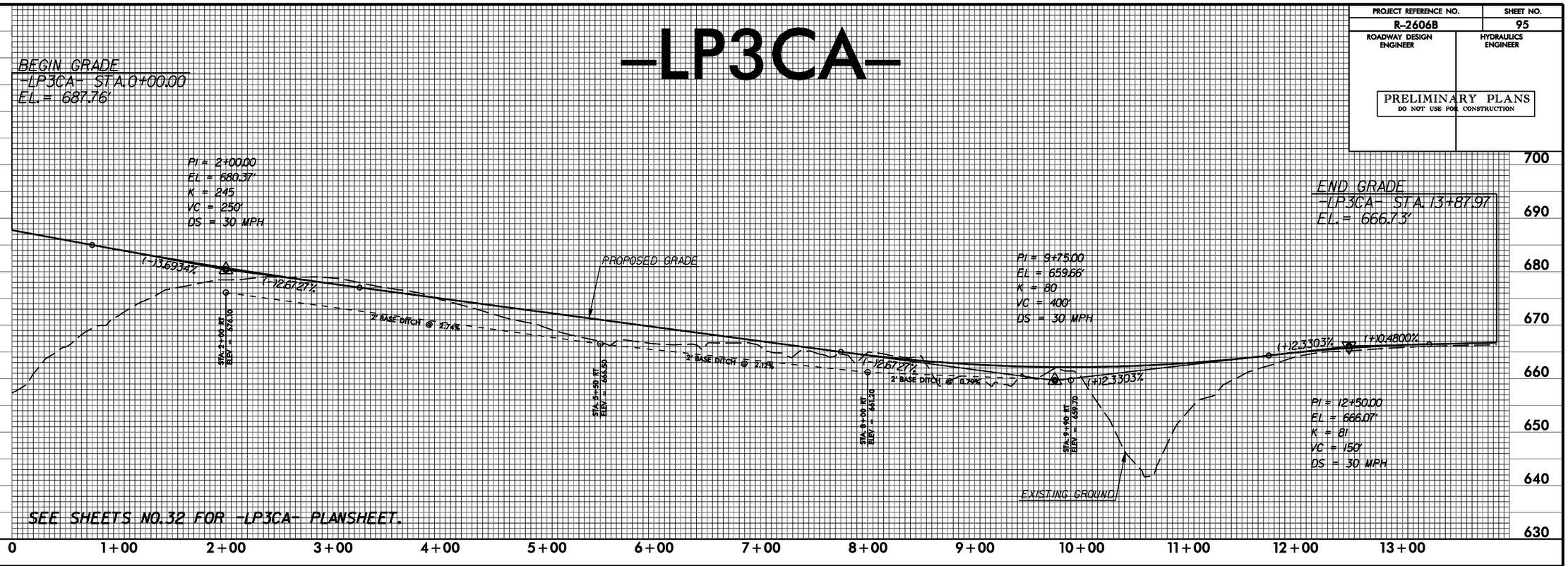
-LP3CA-

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	95
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEETS NO.32 FOR -LP3CA- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	96
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR1-

BEGIN GRADE
BEGIN CONSTRUCTION
-SR1- STA. 10+10.00
EL. = 782.07'

PI = 13+50.00
EL = 772.57'
K = 204
VC = 300'
DS = 50 MPH

(-)2.7917%
(-)1.3202%
PROPOSED GRADE
EXISTING GROUND
(-)1.3202%

STA. 16+63 LT
ELEV = 753.80

2' BASE DITCH W/CLASS 'B' RIP RAP @ 3.41%

STA. 20+05 LT
ELEV = 749.14

PI = 24+00.00
EL = 758.71'
K = 436
VC = 750'
DS = 50 MPH

SEE SHEETS NO.06.07 FOR -SR1- PLANSHEET.

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

810 800 790 780 770 760 750 740 730 720

-SR1-

(-)3.0422%

PI = 24+00.00
EL = 758.71'
K = 436
VC = 750'
DS = 50 MPH

STA. 27+20 LT
ELEV = 744.37

STA. 27+60 LT
ELEV = 744.00

PROPOSED GRADE
EXISTING GROUND

PI = 37+50.00
EL = 717.64'
K = 110
VC = 625'
DS = 50 MPH

(-)3.0422%
(-)2.6403%

SEE SHEETS NO.07.08.09 FOR -SR1- PLANSHEET.

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00 34+00 35+00 36+00 37+00 38+00

780 770 760 750 740 730 720 710 700 690

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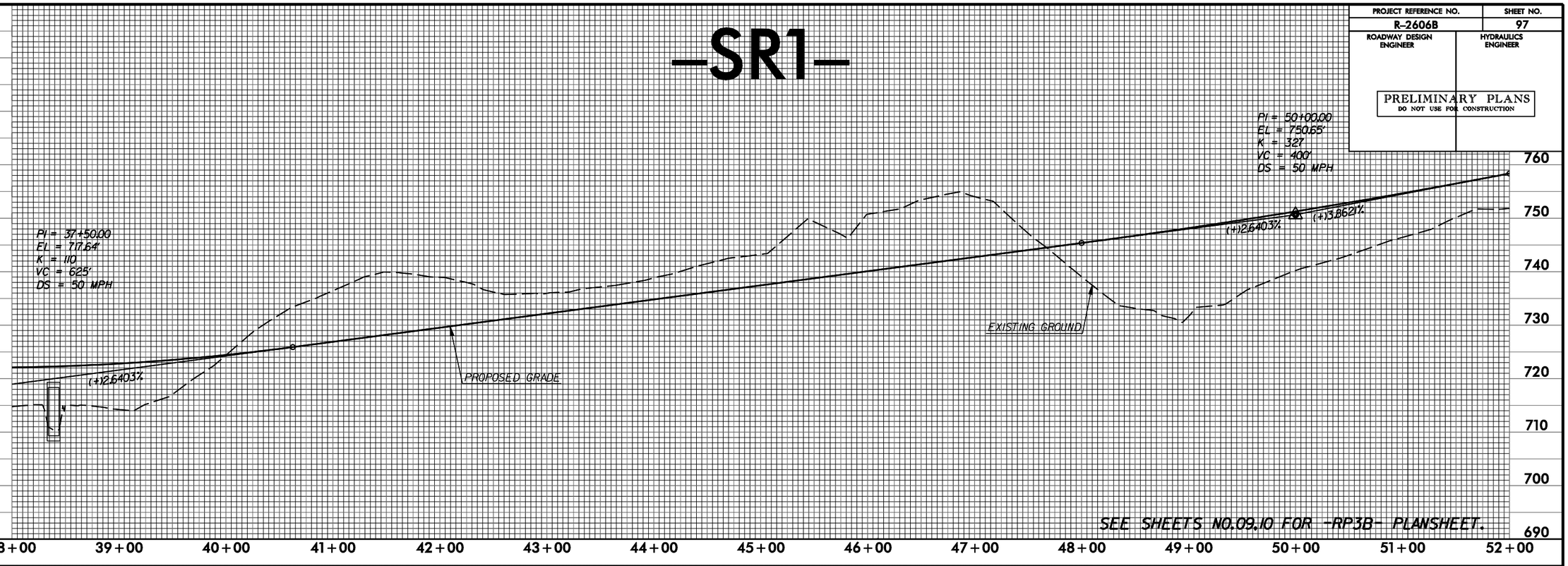
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	97
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

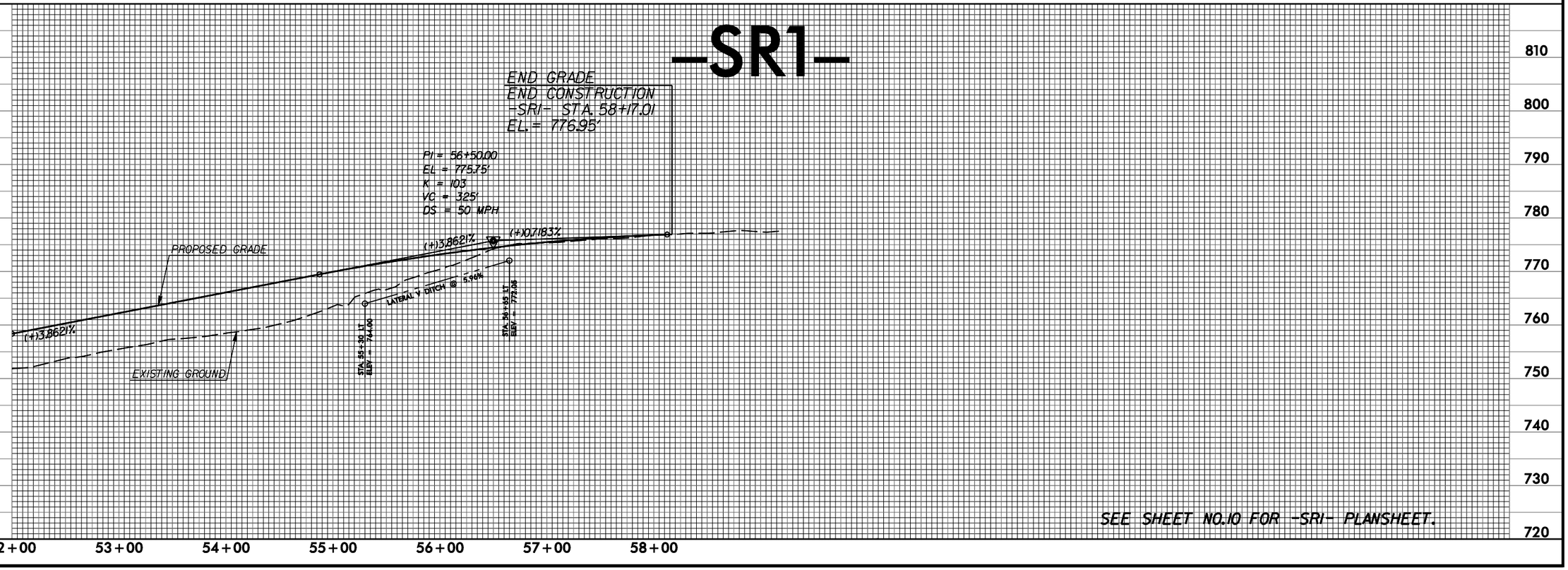
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR1-



SEE SHEETS NO.09,10 FOR -RP3B- PLANSHEET.

-SR1-



SEE SHEET NO.10 FOR -SR1- PLANSHEET.

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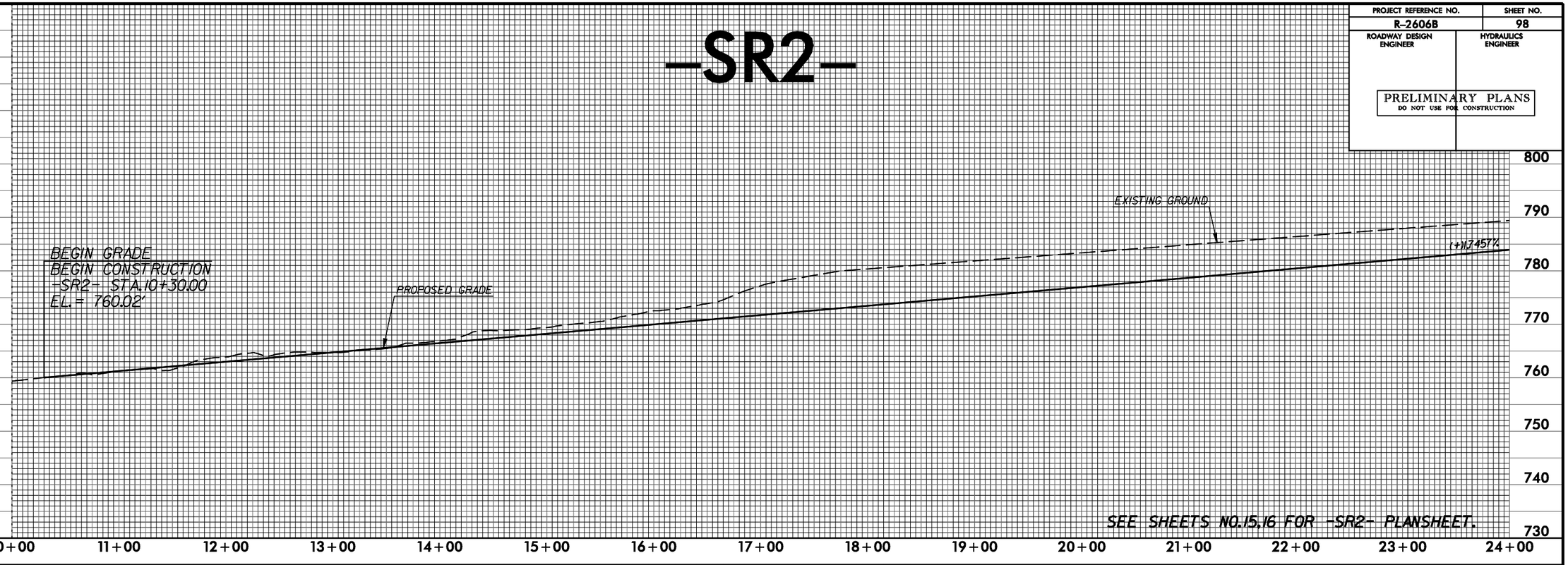
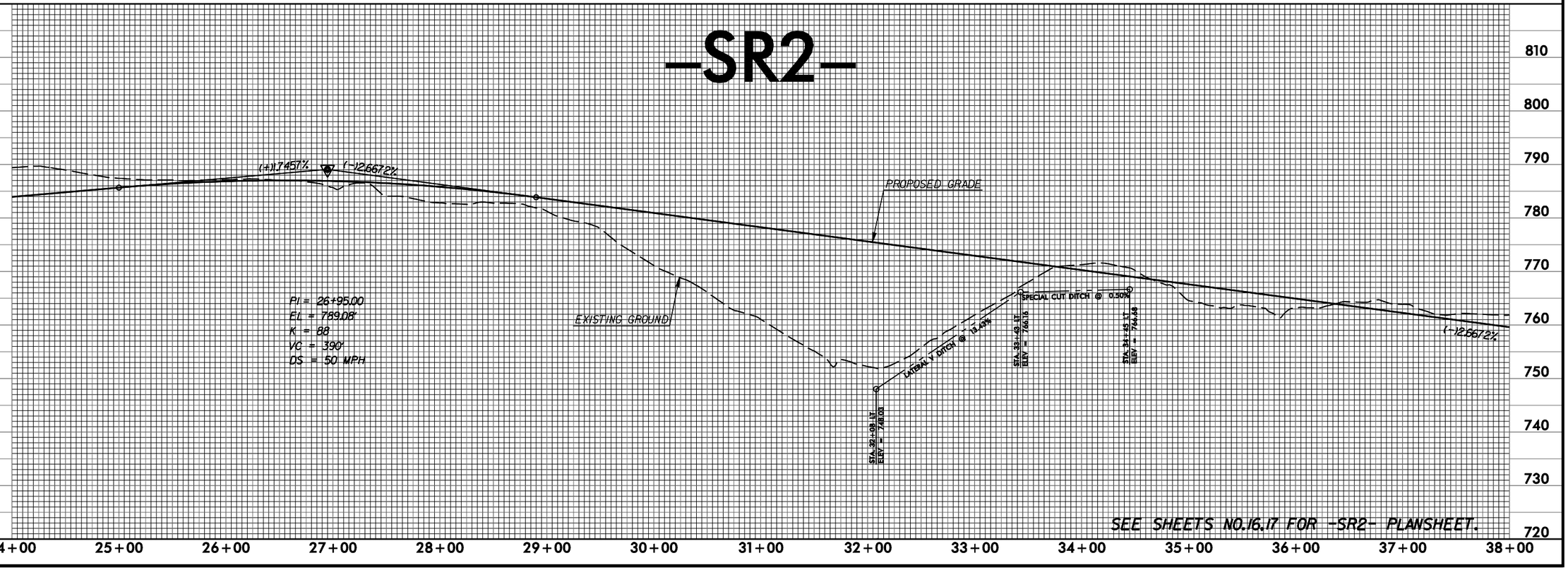
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	98
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR2-



-SR2-



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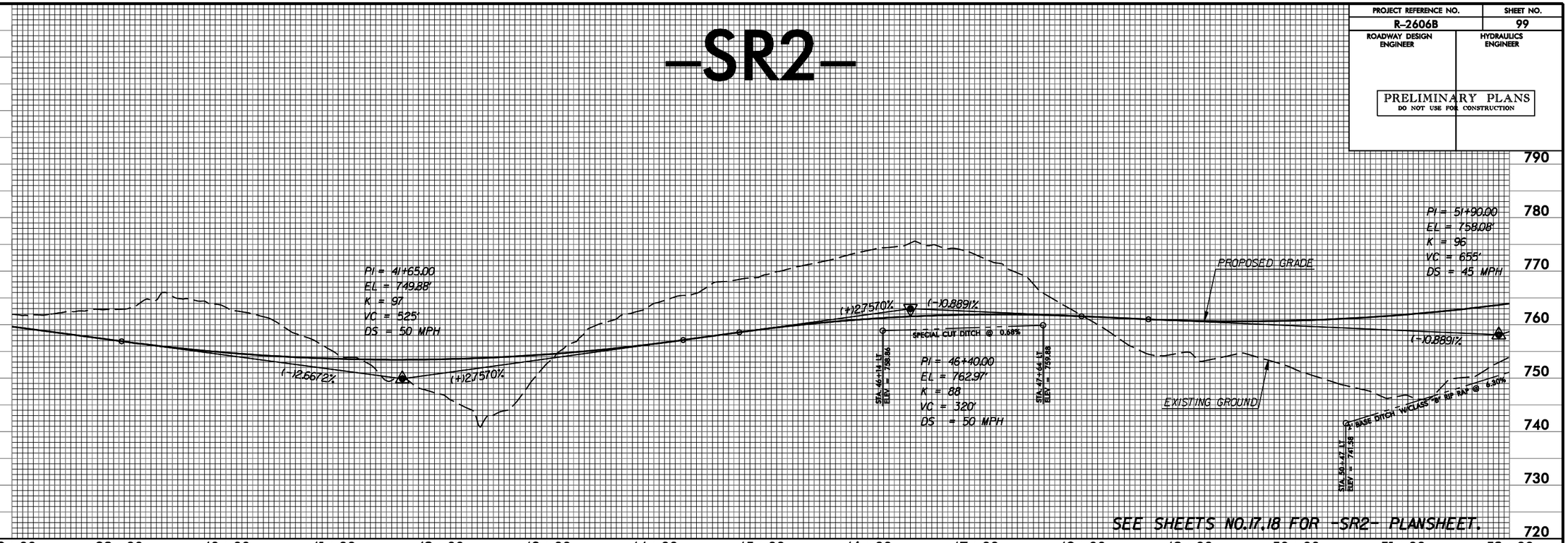
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	99
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

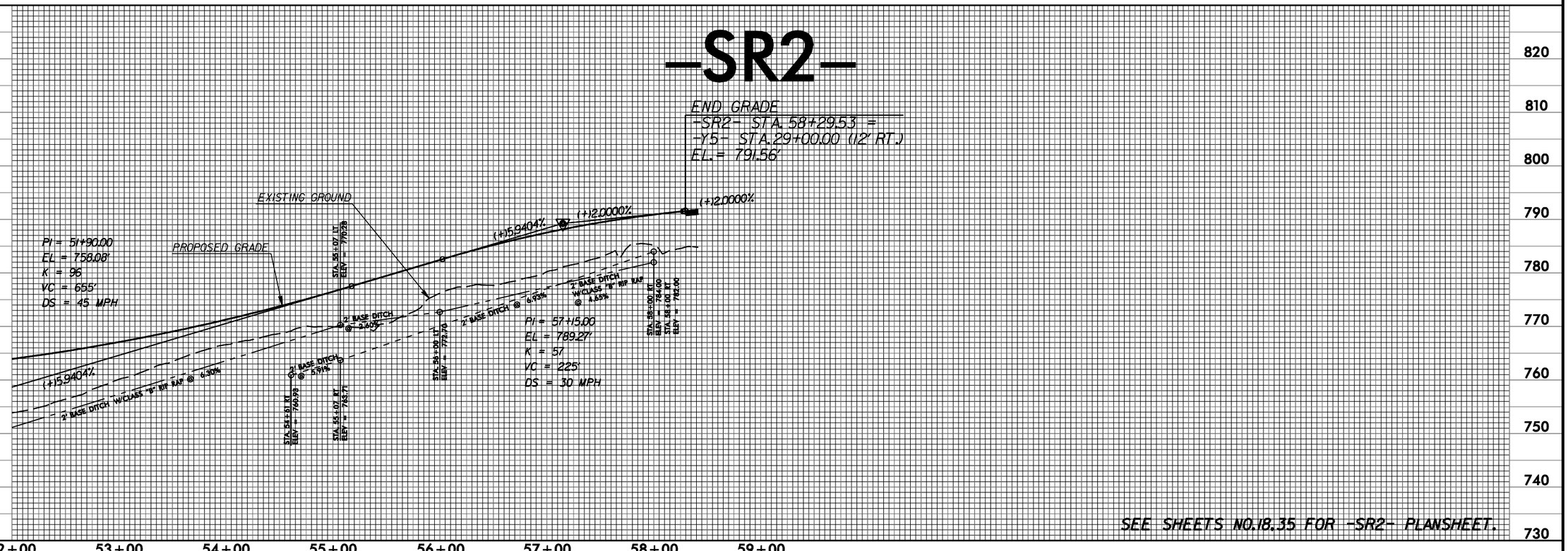
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR2-



SEE SHEETS NO.17.18 FOR -SR2- PLANSHEET.

-SR2-



SEE SHEETS NO.18.35 FOR -SR2- PLANSHEET.

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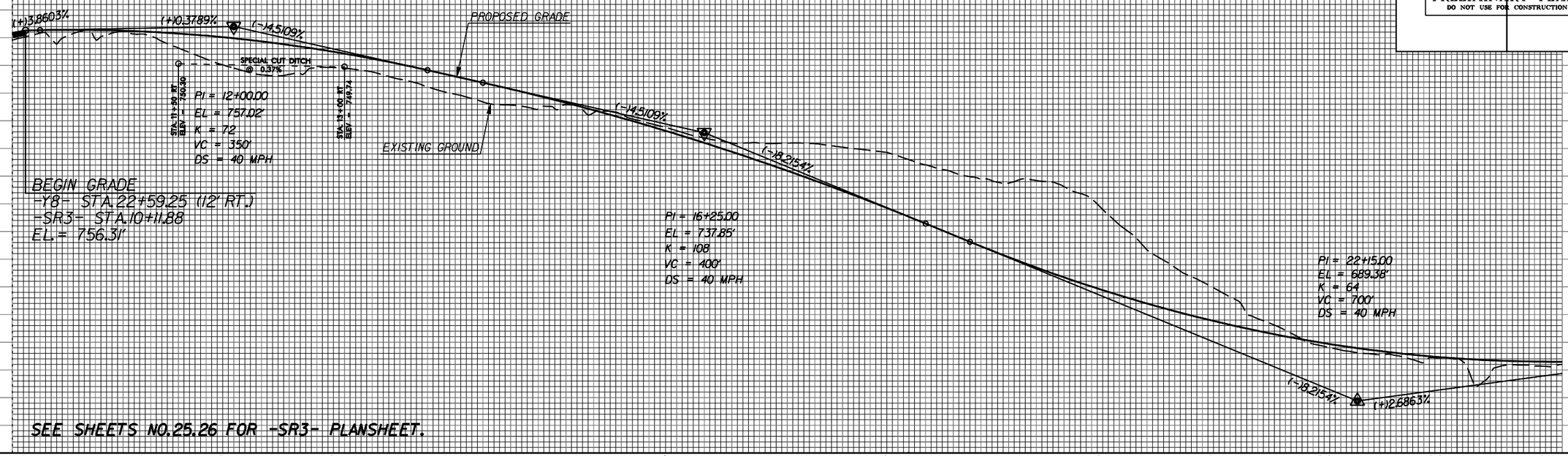
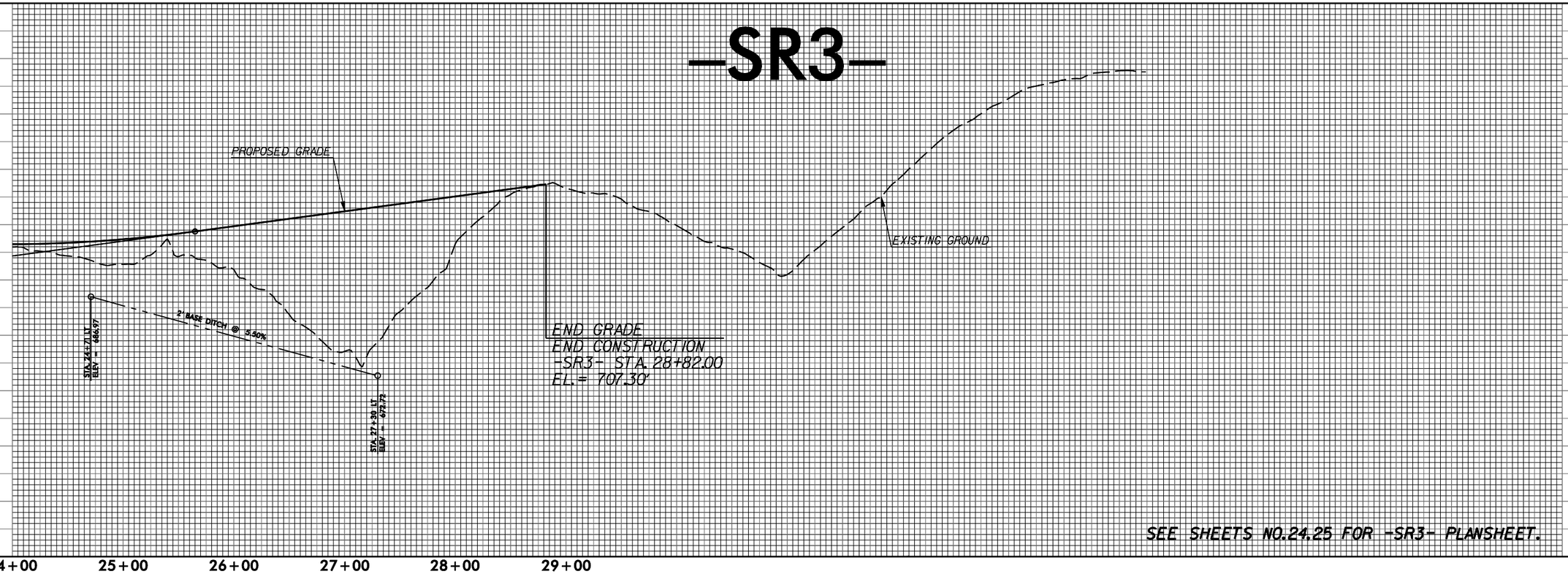
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	100
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR3-



-SR3-



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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	101
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR4-

BEGIN GRADE
-Y8- STA. 22+59.27 (12' LT.)
-SR4- STA. 10+12.12
EL. = 755.39'

(-)3.7871%
(-)3.7871%
(-)6.4740%
PI = 11+10.00
EL = 751.68'
K = 65
VC = 175'
DS = 40 MPH
EXISTING GROUND
PROPOSED GRADE
STA. 16+22 RT
ELEV = 706.15
2' BASE DITCH W/ CLASS "B" RIP RAP @ 4.18%
STA. 18+22 RT
ELEV = 697.80
(-)6.4740%
(+)4.8442%
PI = 19+50.00
EL = 697.30'
K = 77
VC = 87.5'
DS = 40 MPH
2' BASE DITCH @ 19.47%
STA. 23+72 RT
ELEV = 711.38
STA. 24+22 LT
ELEV = 710.06
SCD @ 4.43%
SEE SHEETS NO.26,27 FOR -SR4- PLANSHEET.

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

780 770 760 750 740 730 720 710 700 690

-SR4-

END GRADE
END CONSTRUCTION
-SR4- STA. 33+83.99
EL. = 737.11'

(+)4.8442%
(-)10.7103%
SPECIAL CUT DITCH @ 4.43%
EXISTING GROUND
STA. 27+22 LT
ELEV = 730.79
SPECIAL CUT DITCH @ 0.61%
SPECIAL CUT DITCH @ 6.16%
STA. 28+72 LT
ELEV = 729.87
STA. 29+72 LT
ELEV = 726.03
PROPOSED GRADE
PI = 28+50.00
EL = 740.90'
K = 108
VC = 600'
DS = 40 MPH
SEE SHEET NO.27 FOR -SR4- PLANSHEET.

24+00 25+00 26+00 27+00 28+00 29+00 30+00 31+00 32+00 33+00

770 760 750 740 730 720 710 700 690 680

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	102
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR5-

790 780 770 760 750 740 730 720 710 700

BEGIN GRADE
-Y8- STA. 15+73.21 (12' LT.)
-SR5- STA. 10+12.21
EL. = 753.33'

(-)5.25% @ 0.71%

(-)3.8905%

STA. 10+30 LT
ELEV. = 748.80

STA. 11+00 LT
ELEV. = 749.30

PROPOSED GRADE

PI = 16+50.00
EL = 728.52'
K = 70
VC = 450'
DS = 40 MPH

END GRADE
END CONSTRUCTION
-SR5- STA. 19+99.44
EL. = 736.56'

(-)3.8905%

(+)2.5177%

(+)1.5024%

EXISTING GROUND

PI = 19+25.00
EL = 735.44'
K = 98
VC = 100'
DS = 40 MPH

SEE SHEET NO.26 FOR -SR5- PLANSHEET.

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2606B	103
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-SR6-

770 760 750 740 730 720 710 700 690 680

10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00

(+)4.59%

(+)10.68%

(-)8.67%

PI = 11+90.00
EL = 761.39'
K = 30
VC = 280'
DS = 35 MPH

BEGIN GRADE
-Y10- STA. 25+23.41 (12' RT.)
-SR6- STA. 10+12.02
EL. = 760.17'

PROPOSED GRADE

STA. 14+33 LT
ELEV = 737.60

STA. 14+33 RT.
ELEV = 738.40

STA. 14+77 RT.
ELEV = 737.76

STA. 15+24 LT
ELEV = 729.89

STA. 15+12 RT.
ELEV = 717.37'

PI = 18+10.00
EL = 707.64'
K = 159
VC = 150'
DS = 40 MPH

(-)8.67%

SPECIAL CUT DITCH @ 6.28%

(-)12.78%

EXISTING GROUND

STA. 18+67 RT.
ELEV = 701.46

STA. 18+17 LT
ELEV = 689.97

2' BASE DITCH W/ CLASS 'B' RIP RAP @ 5.94%

STA. 18+67 LT
ELEV = 687.00

END GRADE
END CONSTRUCTION
-SR6- STA. 19+68.82
EL. = 695.36'

SEE SHEET NO. 30 FOR -SR6- PLANSHEET.

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PROJECT REFERENCE NO.	SHEET NO.
R-2606B	104
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DRIVE1-

BEGIN GRADE
-Y3- STA.16+50.00 (12' RT.)
-DRIVE1- STA.10+12.00
EL. = 775.62'

PI = 11+15.00
EL. = 768.59'
K = 17
VC = 120'

END GRADE
END CONSTRUCTION
-DRIVE1- STA.11+75.00
EL. = 768.84'

(-)2.0000%
(-)6.8231%
(+)0.4118%

SEE SHEET NO.33 FOR -DRIVE1- PLANSHEET.

-DRIVE2-

BEGIN GRADE
-Y10- STA.29+75.00 (12' RT.)
-DRIVE2- STA.10+12.00
EL. = 747.29'

END GRADE
END CONSTRUCTION
-DRIVE2- STA.12+00.00
EL. = 736.34'

PI = 11+60.00
EL. = 736.62'
K = 9
VC = 80'

(+)5.0000%
(+)0.3000%
(-)9.8035%
(-)0.7071%

PI = 10+50.00
EL. = 747.40'
K = 7
VC = 70'

SEE SHEET NO.43 FOR -DRIVE2- PLANSHEET.

-DRIVE3-

BEGIN GRADE
-Y10- STA.29+27.32 (12' LT.)
-DRIVE3- STA.10+12.04
EL. = 747.13'

PI = 10+30.00
EL. = 745.66'
K = 2
VC = 30'

(-)14.1665%
(-)18.1605%
(-)12.5000%
(-)0.7349%

PI = 11+65.00
EL. = 711.91'
K = 5
VC = 100'

END GRADE
END CONSTRUCTION
-DRIVE3- STA.12+26.00
EL. = 709.20'

STA. 11+00 LT
ELEV. = 713.74
STA. 11+50 LT
ELEV. = 710.38
STA. 11+50 RT
ELEV. = 711.46
STA. 12+00 RT
ELEV. = 708.39

SEE SHEET NO.43 FOR -DRIVE3- PLANSHEET.

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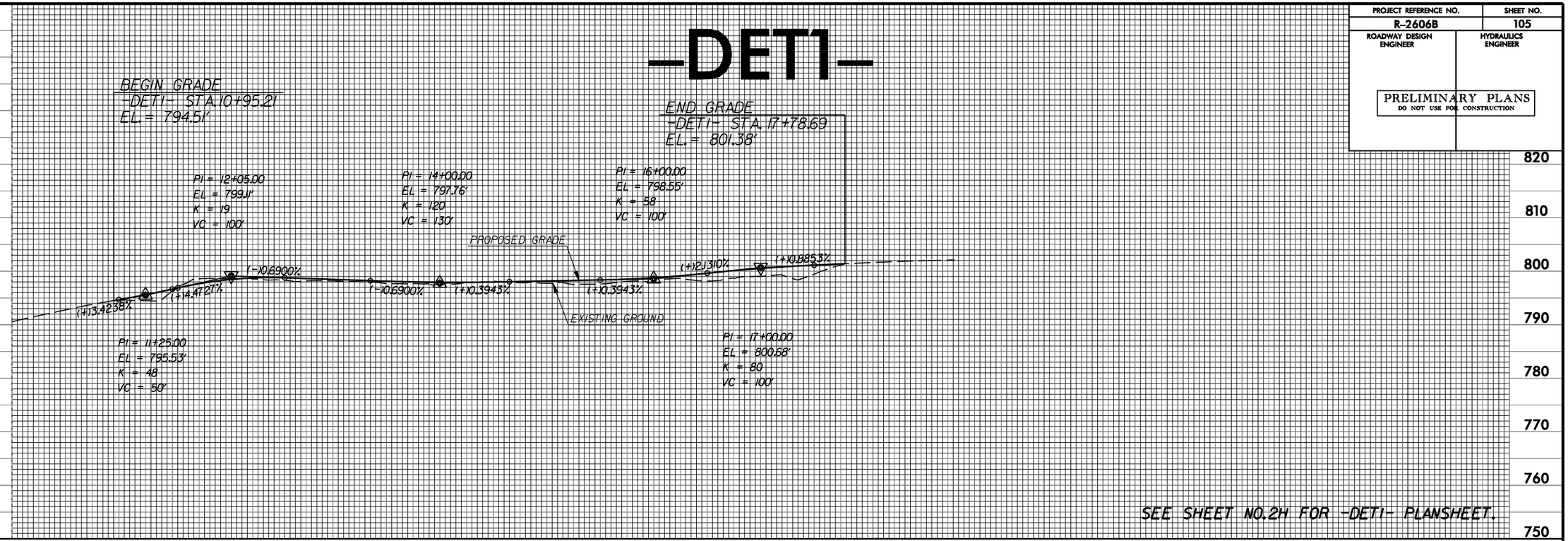
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	105
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

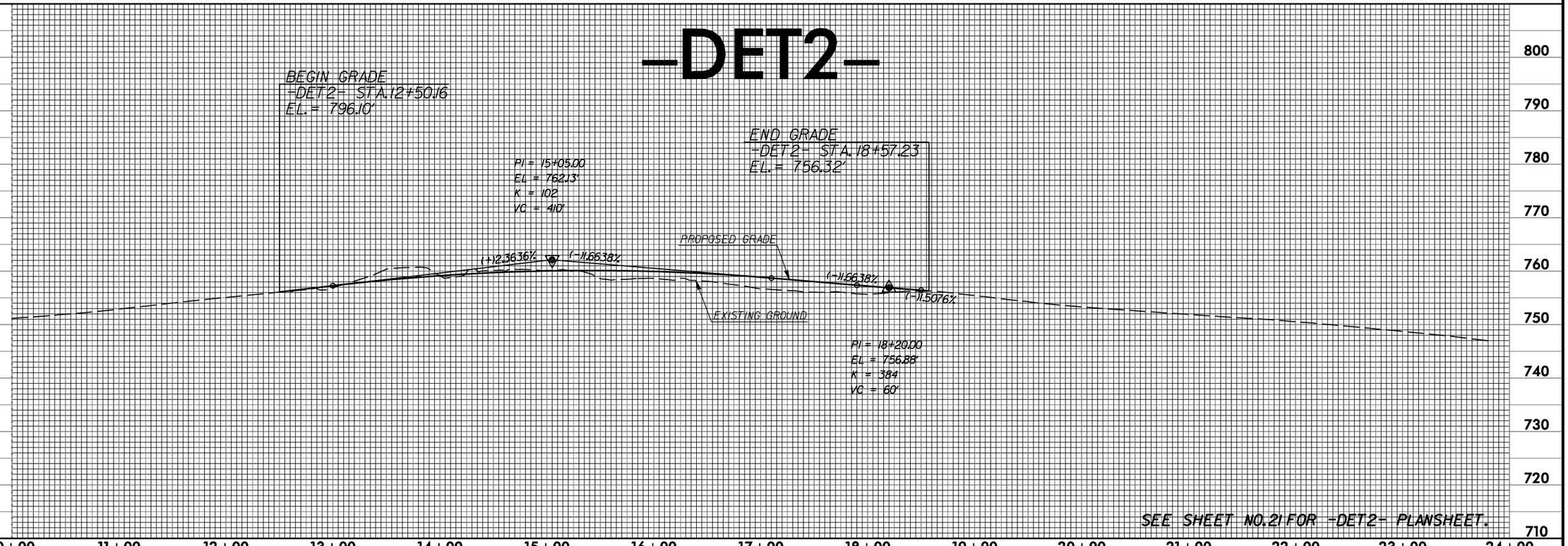
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-DET1-



SEE SHEET NO.2H FOR -DET1- PLANSHEET.

-DET2-



SEE SHEET NO.2I FOR -DET2- PLANSHEET.

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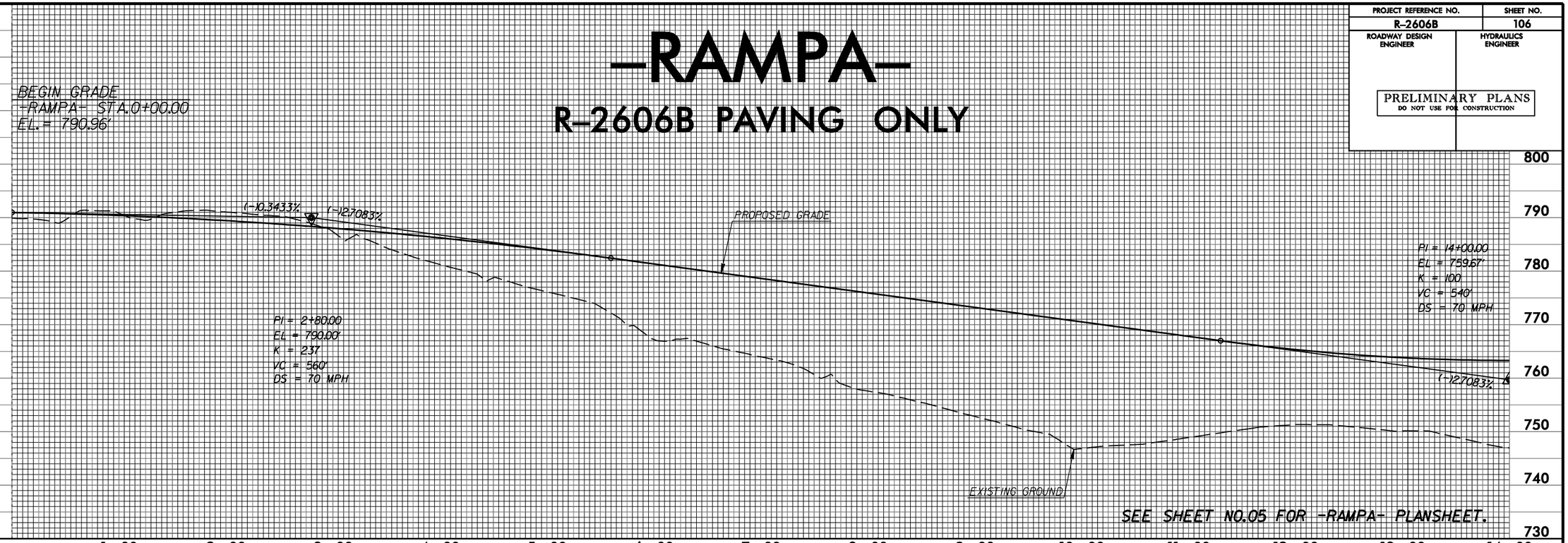
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	106
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-RAMPA-

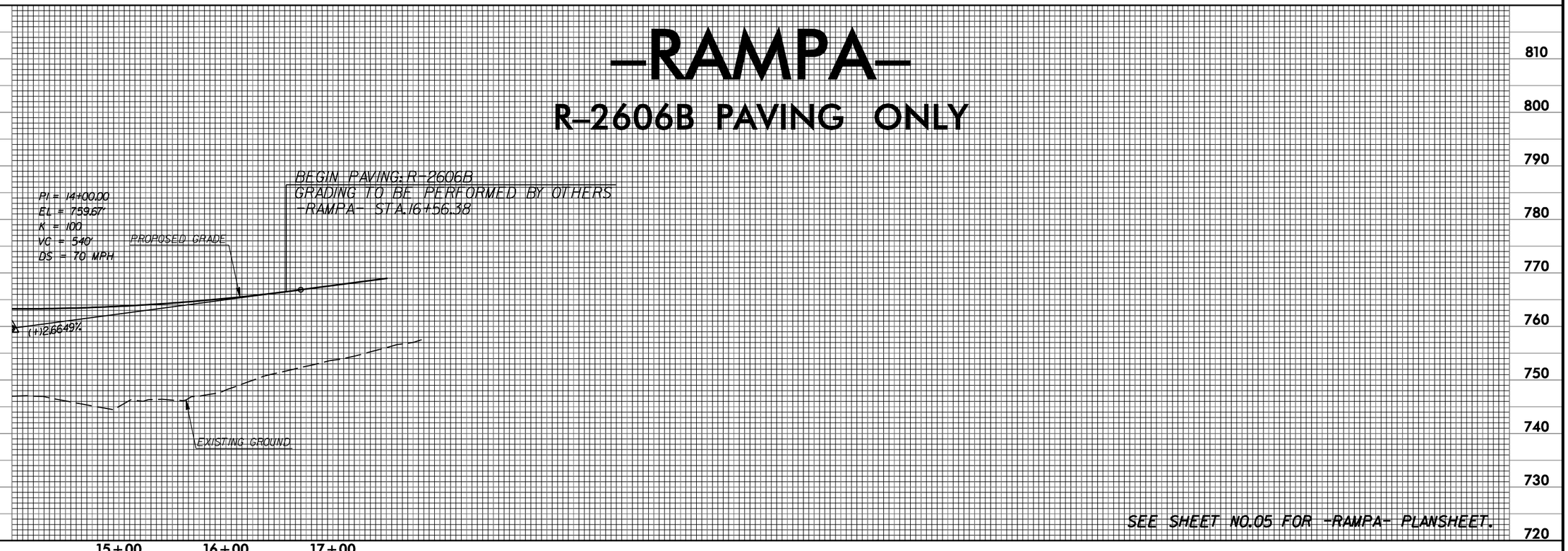
R-2606B PAVING ONLY



SEE SHEET NO.05 FOR -RAMPA- PLANSHEET.

-RAMPA-

R-2606B PAVING ONLY



SEE SHEET NO.05 FOR -RAMPA- PLANSHEET.

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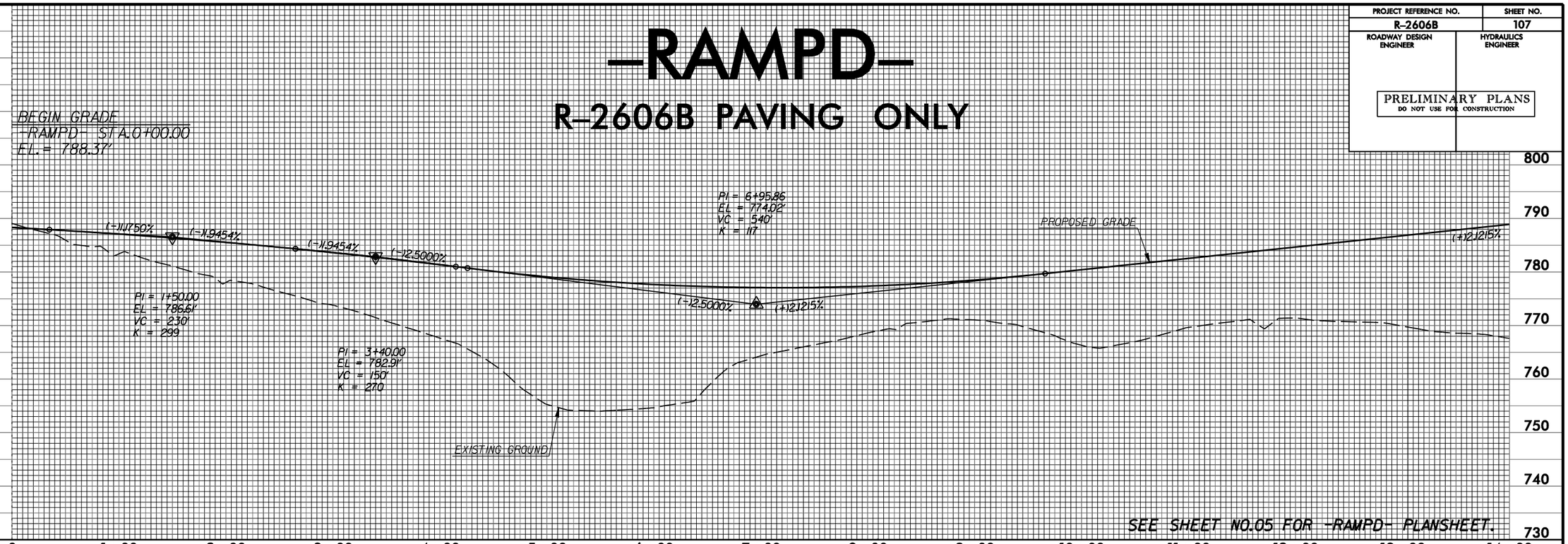
PROJECT REFERENCE NO.	SHEET NO.
R-2606B	107
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

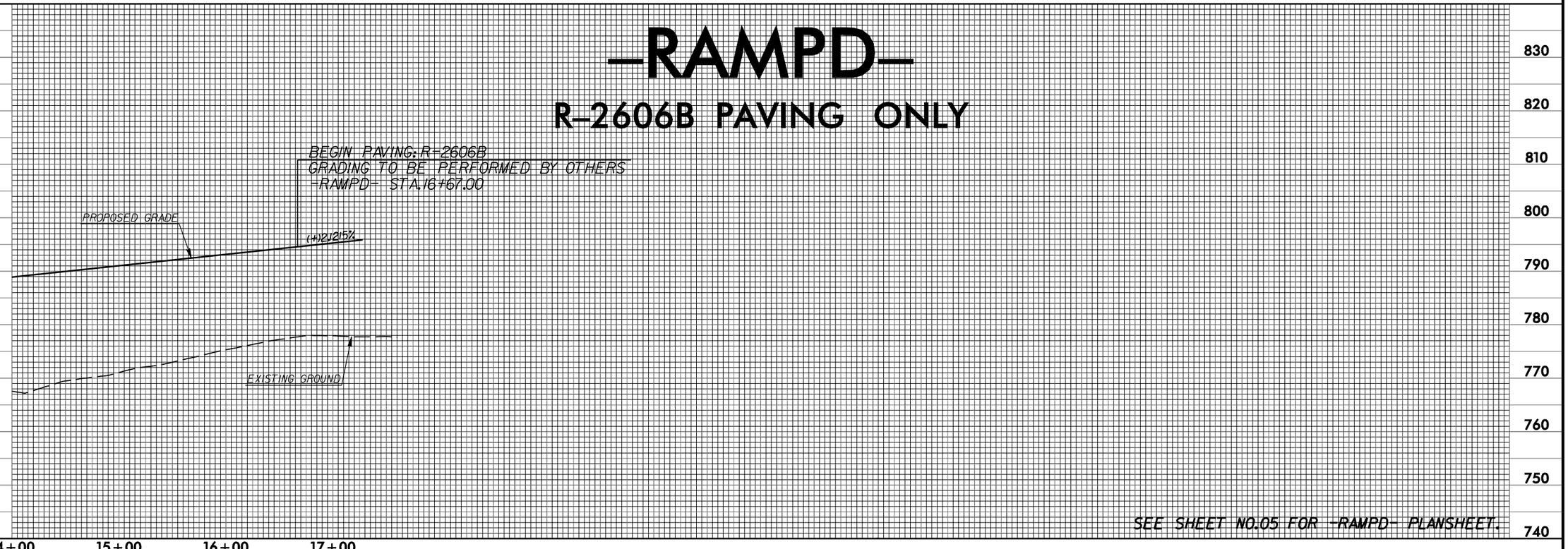
-RAMPD-

R-2606B PAVING ONLY



-RAMPD-

R-2606B PAVING ONLY



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