



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

February 6, 2012

U. S. Army Corps of Engineers
Regulatory Field Office
69 Darlington Avenue
Wilmington NC 28402-1890

ATTN: Mr. Ronnie Smith
NCDOT Coordinator

Subject: **Application for Section 404 Individual Permit and Section 401 Water Quality Certification** for widening and new lane construction from US 74 Rockingham/Hamlet Bypass to US 220 Ellerbe Bypass in Richmond County. Federal Aid Project No. NHF-0220(4), State Project No. 8.1580802, Division 8, TIP Nos. R-3421A, B and C.

Debit \$570 from WBS 34542.1.2

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes a four-lane divided, fully controlled access freeway both on new location and upgrading portions of existing US 220 for connectivity of I-73 and I-74. The total length of the project is approximately 9.9 miles. This project is split into three sections. Section A is approximately 1.8 miles from US 74 Bypass west of Rockingham at SR 1109 (Zion Church Road) to 0.3 miles south of SR 1140 (Old Charlotte Highway). Section B is approximately 4.3 miles from 0.3 miles south of SR 1140 to 0.2 miles southwest of SR 1304 (Harrington Road). Section C is approximately 3.7 miles from SR 1304 to US 220 Business/Bypass Interchange south of Ellerbe. This application includes the final design impacts for Section C and preliminary impacts for Sections A and B.

Included in this application package are the following: (1) this cover letter, (2) ENG Form 4345, (3) Ecosystem Enhancement Program (EEP) confirmation letter, (4) Hydraulic Design and Permit Drawing Review Meetings (CP 4B and 4C) minutes for Section C, (5) National Marine Fisheries Service (NMFS) e-mails, (6) State Historic Preservation Office (SHPO) concurrence letter, (7) Stormwater Management Plan, (8) permit drawings, (9) and half-size roadway plans.

Purpose and Need

This project is part of the I-73/I-74 Interstate Corridor was designated under the “National Highway System Designation Act of 1995.” In *Section 330. Identification of High Priority Corridors; Subsection (a)(iii)-Amendment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)*; Part (I) in the case of I-73 and (II) in the case of I-74; “(dd) United States Route 220 to United States Route 1 near Rockingham.” “-are hereby designated future parts of the Interstate System. The needs for the I-73/I-74 improvement project are summarized below:

- Will provide a freeway facility between two completed projects (R-512 and R-2231);
- Will improve the Intrastate Highway System in North Carolina;
- Will remove interstate traffic from the non-controlled access highway system and signalized at-grade intersections in Rockingham;
- Will reduce local congestion in Rockingham;
- Will improve safety and reduce accidents;
- Will provide a continuous through travel route for passenger vehicles and trucks; and
- Will complete a “missing link” in proposed Interstate route through North Carolina.

PROJECT SCHEDULE

For construction purposes, this project has been divided into three sections. Section C is scheduled to Let on November 20, 2012 and has a review date of October 2, 2012. Section A is scheduled to Let in October 2017 and Section B is scheduled to Let in January 2018. However, the project may be accelerated if additional funds become available. NCDOT will submit permit modification applications for R-3421A and B when final designs are complete.

NEPA DOCUMENT STATUS

The Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were approved by the Federal Highway Administration (FHWA) in March 1999 and February 2002 respectively. A Right-of-Way Consultation was completed for the project in October 2010. These documents were circulated to the appropriate agencies. Additional copies are available upon request.

INDEPENDENT UTILITY

The subject project complies with 23 CFR Part 771.111(f), which lists the FHWA characteristics of independent utility of a project:

- 1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope;

- 2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
- 3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Wetland and stream determinations, originally verified for an approved Jurisdictional Determination (JD) for all sections of R-3421 occurred in April 2005. While the USACE concurred with the jurisdictional features present at that time, no final verification was received from USACE from those site visits. NCDOT received a final JD from the USACE on June 14, 2011 for R-3421C. Wetlands were verified using field delineation methods outlined in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region. The North Carolina Division of Water Quality's (DWQ) Identification Methods for the Origins of Intermittent and Perennial Streams was used to make stream determinations. Sections A and B are currently being re-verified and NCDOT will obtain a final JD before submitting the permit modifications for these sections.

Changes made to the jurisdictional site from what was presented in the FONSI are included in the section below. The "JD Package ID" column in the tables refer to the final JD package (2011) sent to the USACE and NCDWQ for Section C.

IMPACTS TO WATER OF THE UNITED STATES

Utility Impacts: There are no anticipated impacts due to utilities for this project. Utility poles will be placed outside of jurisdictional areas so as to "bridge" these areas. The town of Ellerbe is in the process of installing a sewer line between Ellerbe and Rockingham along US 220. This work will be completed before R-3421C will start and is not influenced by the construction of the NCDOT project. A waterline currently running along US 220 will be relocated and will be completed before construction of R-3421C will begin. This project is being handled by consultant for the town of Ellerbe. The consultant for the waterline relocation states that they will directional bore the pipe under any jurisdictional resources causing no impact to these areas.

Wetlands

Wetland impacts occur in the Yadkin-PeeDee River Basin in HUC 03040201. Permanent riparian wetland impacts total 14.44 acres and non-riparian impacts total 0.09 acres for the entirety of R-3421. Tables 1, 2, and 3 list permanent impacts (fill, excavation, and mechanized clearing), for the project. Impacts are based upon final design for R-3421C presented in the May 2011 4C meeting and preliminary design for R-3421 A and B.

Table 1. R-3421C Wetland Impacts (Final)

Permit Site No.	Wetland ID in FONSI	JD package ID	Riparian or Non-riparian	Permanent Impacts (ac)
1	NA	30	Riparian	0.08
2	NA	29	Riparian	0.20
3	13	28	Riparian	0.19
4	14	27	Riparian	0.79
5	15	26	Riparian	1.45
6	15	22	Non-riparian	0.01
7	17	21	Riparian	2.66
8	18	18	Riparian	0.31
9	19	20	Riparian	0.67
10	20	16	Riparian	0.92
12	22A	15	Riparian	0.16
15**	21	11	Riparian	0.10
16	22A	12,13	Riparian	0.03
24	NA	9	Riparian	0.09
25	NA	6	Riparian	0.01
26	17	23	Riparian	0.02
28	NA	39	Non-riparian	<0.01
29	NA	36,37	Non-riparian	0.07
30	NA	35	Riparian	0.33
31	NA	34	Riparian	0.18
33	NA	31,32	Riparian	0.23
34	NA	8	Riparian	0.18
Total				8.67*

*Total impacts due to rounding.

**Does not require mitigation.

Table 2. R-3421A Wetland Impacts (Preliminary)

Permit Site No.	Wetland ID in FONSI	JD package ID	Riparian or Non-riparian	Permanent Impacts (ac)
2	NA	Will be included with the Permit Modification for R-3421A	Riparian	0.76
6	3		Riparian	0.25
7	1		Riparian	0.15
8	NA		Riparian	0.09
Section A Total				1.25

Table 3. R-3421B Wetland Impacts (Preliminary)

Permit Site No.	Wetland ID in FONSI	JD package ID	Riparian or Non-riparian	Permanent Impacts (ac)
1	4,5	Will be included with the Permit Modification for R-3421B	Riparian	0.25
3	NA		Riparian	0.03
4	NA		Riparian	0.09
5	NA		Riparian	0.02
6	5A		Riparian	0.58
8	5B		Riparian	0.20
9	10		Riparian	0.42
10	7,9		Riparian	1.11
11	8		Riparian	<0.01
12	11		Riparian	1.92
Section B Total				4.62*

*Total impacts due to rounding.

Surface Waters

Surface water impacts occur in the Yadkin-PeeDee River Basin in HUC 03040201. Permanent stream impacts for R-3421A, B and C are 12,800 linear feet. Tables 4-7 list the site number, reference number, stream name, amount of permanent impacts, and amount of mitigation required. During the 4C meeting, held on May 12, 2011 it was determined that the pond on Site 32 of Section C was not jurisdictional. Impacts are based upon final design for R-3421C and preliminary impacts for R-3421A and B.

No streams impacted are listed in the Final 2010 303(d) report. No other streams within one mile of the project are classified as ORW, HQW, WS-I or WS-II. All streams are classified as Class C.

Table 4. R-3421C Streams Impacted and Their Descriptions

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent/Perennial
5	24	SS	UT to Cartledge Creek	Perennial
8	26	SQ,SQ-A	UT to Hitchcock Creek	Perennial
9	26	SO,SP	UT to Hitchcock Creek	Perennial
12	NA	SN	UT to South Prong Cartledge Creek	Intermittent
13	27	SJ,SL	UT to South Prong Cartledge Creek	Intermittent
14	28,29	SM	UT to South Prong Cartledge Creek	Intermittent
16	NA	SY	UT to South Prong Cartledge Creek	Perennial
17A	30	SJ,SK,SL	UT to South Prong Cartledge Creek	Intermittent

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent/Perennial
17B	30	SI,SI-A	UT to South Prong Cartledge Creek	Perennial
18	31	SH	UT to South Prong Cartledge Creek	Intermittent
19	32,33	SG	UT to South Prong Cartledge Creek	Intermittent
20	34	SF	UT to South Prong Cartledge Creek	Intermittent
21	35	SD,SE	South Prong Cartledge Creek	Perennial
23	36	SC	UT to South Prong Cartledge Creek	Intermittent
24	37	SB	UT to South Prong Cartledge Creek	Perennial
26	25	SR	UT to Cartledge Creek	Perennial
27	25	SR	UT to Cartledge Creek	Perennial

Table 5. R-3421C Surface Water Impacts (Final)

Permit Site No.	Permanent Stream Impacts (ft)	Temporary Stream Impacts (ft)	Impacts Requiring Mitigation (ft)	Mitigation ¹ Ratio
5	278	20	278	2:1
8	629	10	629	2:1
9	463	20	463	2:1
12	40	10	40	1:1
13	205	20	205	1:1
14	538	10	538	1:1
16	61	0	61	2:1
17A	381	10	381	1:1
17B*	606	10	178	2:1
18**	218	17	208	2:1
19	199	22	199	1:1
20	191	24	191	1:1
21**	279	167	239	2:1
23	449	21	449	1:1
24	212	8	212	2:1
26	41	20	41	2:1
27	196	22	196	2:1
Total	4,986	411	4,508	

*It was determined by the agencies that the 428 ft. concrete-lined stream would require no mitigation.

**Impacts to stream include bank stabilization. Site 18 bank stabilization equals 10 linear ft. Site 21 bank stabilization equals 40 linear ft.

¹Ratios from USACE Final JD.

Table 6. R-3421A Streams Impacted (Preliminary) and Their Descriptions

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent /Perennial	Permanent Stream Impacts (ft)	Temporary Stream Impacts (ft)
1	2	Will be included with the Permit Modification for R-3421A	UT to PeeDee River	Perennial	364	0
2	3,4		UT to PeeDee River	Perennial	1,097	0
3	5,6		UT to PeeDee River	Perennial	676	0
4	10		UT to PeeDee River	Perennial	511	0
5	8,9		UT to PeeDee River	Perennial	435	0
7	7		UT to PeeDee River	Perennial	1,247	100
8	11		UT to PeeDee River	Perennial	187	0
Section A Total					4,517	100

Table 7. R-3421B Streams Impacted (Preliminary) and Their Descriptions

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent /Perennial	Permanent Stream Impacts (ft)	Temporary Stream Impacts (ft)
1	No #	Will be included with the Permit Modification for R-3421B	UT to Seaburn Branch	Perennial	24	15
2	No #		Seaburn Branch	Perennial	28	40
3	13		UT to Seaburn Branch	Perennial	759	37
4	No #		UT to Seaburn Branch	Perennial	352	26
5	14		UT to Cartledge Creek	Perennial	645	20
7	15		UT to Cartledge Creek	Perennial	610	20
8	16		UT to Cartledge Creek	Perennial	832	90
11	18B,19, 20,21		UT to Cartledge Creek	Perennial	47	10
Section B Total					3,297	258

PROTECTED SPECIES

The United States Fish and Wildlife Service (USFWS) list four federally protected species for Richmond County as of September 1, 2010 (Table 8).

Table 8. Federally Protected Species in Richmond County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Picoides borealis</i>	Red-cockaded woodpecker	Endangered	Yes	No Effect
<i>Acipenser brevirostrum</i>	Shortnose sturgeon	Endangered	Yes	MANLTAA*
<i>Rhus michauxii</i>	Michaux's sumac	Endangered	Yes	No Effect
<i>Lysimachia asperulaefolia</i>	Rough-leaved loosestrife	Endangered	Yes	No Effect

*May Affect, Not Likely To Adversely Affect

A letter of concurrence (Appendix B of FONSI) from the National Marine Fisheries Service (NMFS) dated July 20, 2001 concurred with the Biological Conclusion for the shortnose sturgeon. E-mail correspondence with Fritz Rhode of NMFS on September 7, 2010 clarified the extent in which the moratorium for the species would entail. From these correspondences, it has been determined that a moratorium for all in-water work will be in effect from January 1st through April 30th for the mainstems of Hitchcock Creek, and Cartledge Creek. This moratorium does not apply to any section of the project. No sections of this project will directly impact Hitchcock or Cartledge Creeks. NCDOT has committed to following High Quality Water Erosion Control Guidelines (Design Standards in Sensitive Watersheds), Stream Crossing Guidelines for Anadromous Fish Passages and Guidelines for Best Management Practices for Bridge Demolition and Removal for all streams identified in the project area. There will be no impacts to the mainstems of Hitchcock Creek or Cartledge Creek.

Concurrence from the USFWS (Appendix C of FONSI) was received on August 26, 1999 for the red-cockaded woodpecker for a Biological Conclusion of No Effect. An updated survey for the species was conducted from October 22, 2010 through February 21, 2011 which re-enforced the previous Biological Conclusion of No Effect.

All other species listed received a Biological Conclusion of No Effect. Concurrence from USFWS for these species was received on June 2, 1999 (Appendix C of FONSI).

Carolina heelsplitter has recently been removed from the USFWS list for Richmond County.

CULTURAL RESOURCES

The State Historic Preservation Office (SHPO) and NCDOT concurred that the project will have no direct effect on any known historic architectural or archaeological resources; however, archaeological sites fall within close proximity to the project right of way.

Archaeology

It was determined that no sites eligible for the National Register of Historic Places would be affected due to the construction of R-3421. Two sites were identified as eligible for listing: 31RH418 and 31RH420. It had been determined that site 31RH418 had been completely destroyed by the private landowner prior to its acquisition by NCDOT, so it is no longer eligible. Examination of the current roadway alignment plans note that site 31RH420 is located well outside of the planned construction easement, and will not be affected by the planned roadway construction. The SHPO letter, dated October 12, 2010 concerning these sites is included with this application.

Historic Architecture

There are no properties eligible/listed on the National Register of Historic Places within the Area of Potential Effects for this project. The SHPO concurred with NCDOT's finding in letter dated December 17, 1998 (Appendix B of EA).

FEMA COMPLIANCE

The project will be coordinated with appropriate state and local officials and the Federal Emergency Management Agency (FEMA) to assure compliance with FEMA, state, and local floodway regulations.

INDIRECT AND CULMULATIVE EFFECTS

An ICE Land Use Effects Study was completed for R-3421 in November 2009. The report concluded that the minor effects associated with implementation of the proposed project, in conjunction with the other transportation and infrastructure projects in the area, would not result in significant indirect or cumulative effects on notable human and/or natural features. The study analyzed growth trends and potential development in the project area for the time period between now and the year 2025. Based on the examination of probable development, construction of the largely new alignment interstate is not likely to encourage more rapid or more intense development of property in the area. Based on the very low or negative growth rates within the area, no notable shift in population is expected to occur. The project will not accelerate overall growth within the FLUSA, though there may be slight increases in development at proposed interchanges. The new roadway and proposed interchanges are expected to have only a slight influence on regional location decisions.

Richmond County experienced a loss in population between 2000 and 2007 with a decrease of 1.4 percent. In addition, the population is projected to increase by only one percent, or less, between 2010 and 2020. Development in the Future Land Use Study Area (FLUSA) has been very limited over the past five to ten years and there are currently no major developments proposed in the FLUSA. Based on the lack of sewer service, limited water service, and decreasing population, there is little if any development pressure in the FLUSA. Lack of population and employment growth are the primary factors limiting development in the FLUSA, and these factors would remain after construction of the proposed roadway. The proposed project may create a small market for traveler-oriented businesses and/or highway commercial development at some of the interchange locations.

MITIGATION OPTIONS

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

Avoidance and Minimization

All jurisdictional features were delineated, field verified and surveyed within the right of way for R-3421C. Using these survey features, preliminary designs were adjusted to avoid and/or minimize impacts to jurisdictional areas. NCDOT employs many strategies to avoid and minimize impacts to jurisdictional areas in all of its designs. Many of these strategies have been incorporated into BMP documents that have been reviewed and approved by the resource agencies and which will be followed throughout construction. All wetland areas not affected by the project will be protected from unnecessary encroachment. Individual avoidance and minimization items are as follows:

- The Recommended Alternative was designed to minimize impacts from south of SR 1140 (Old Charlotte Highway) to north of SR 1141 (Blewitt Falls Road) and in the vicinity of SR 1005 (Cartledge Creek Road).
- The half-diamond interchange at SR 1304 (Harrington Road) was eliminated and the US 220 interchange was modified. This modification resulted in moving the interchange further away from a large, continuous wetland area.
- The SR 1304 (Harrington Road) grade separation was relocated to avoid large jurisdictional impacts.
- The proposed cul-de-sac on SR 1304 was moved to avoid wetland area.
- The Recommended Alternative was shifted to avoid larger continuous wetland areas.
- The use of 2:1 fill slopes in jurisdictional areas where practicable.
- Use of Design Standards in Sensitive Watersheds throughout entire project.

Compensation

On-site mitigation opportunities have been fully evaluated and are not practicable for this project. As described above, the NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent possible. The wetland at Site 15 in Section C has been determined to be a wetland associated with the pond and does not require mitigation, per an on-site meeting with agency members on March 15, 2011. Also during this site visit, it was deemed that no mitigation was required at Site 17 in Section C for a concrete lined feature. The length of the feature requiring no mitigation is 428 linear feet. Total riparian and non-riparian wetland impacts requiring mitigation for Section C are 8.49 and 0.08 acres, respectively. Total stream impacts requiring mitigation for Section C are 4,508 linear feet. These impacts will be mitigated by the EEP. A copy of the EEP Acceptance Letter is included with this application.

Currently Sections A and B are scheduled to Let more than five years after R-3421C. A mitigation proposal will be submitted with the request for Permit Modification for Sections A and B.

REGULATORY APPROVALS

Section 404

Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities. NCDOT is requesting a phased permit to allow construction activities to commence on Section C of R-3421 as per attached plans. NCDOT will apply for a permit modification when designs are finalized and before construction commences on Sections A and B.

Section 401

Application is hereby made for a Section 401 Water Quality Certification from the N. C. Division of Water Quality. NCDOT is requesting a phased certification to allow construction activities to commence of Section C as per attached plans. NCDOT will apply for a certification modification when designs are finalized and before construction commences on Sections A and B. In compliance with Section 143-215.3D(e) of the NCAC, we will provide \$570.00 to act as payment for processing the Section 401 permit. We are providing five copies of this application to NCDWQ for their review and approval.

A copy of this permit application will be posted on the DOT website at:
<http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html>. If you have any questions or need additional information, please contact Jason Dilday at jldilday@ncdot.gov or (919) 707-6111.

Sincerely,



fw Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Unit

CC:
NCDOT Permit Application Standard Distribution List

**U.S. ARMY CORPS OF ENGINEERS
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT
(33 CFR 325)**

OMB APPROVAL NO. 0710-0003
EXPIRES: 31 AUGUST 2012

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

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

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
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(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME First - Gregory Middle - J. Last - Thorpe Company - NCDOT-PDEA E-mail Address -		8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Middle - Last - Company - E-mail Address -	
6. APPLICANT'S ADDRESS: Address- City - State - Zip - Country -		9. AGENT'S ADDRESS: Address- City - State - Zip - Country -	
7. APPLICANT'S PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax 919-707-6111		10. AGENTS PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax	

STATEMENT OF AUTHORIZATION

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

SIGNATURE OF APPLICANT

DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) R-3421	
13. NAME OF WATERBODY, IF KNOWN (if applicable) UTs to PeeDee River, Seaburn Br. , Cartledge Cr., Hitchcock Cr.	14. PROJECT STREET ADDRESS (if applicable) Address City - State- Zip-
15. LOCATION OF PROJECT Latitude: °N 35.011548 Longitude: °W -79.770319	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Township - Range -	

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter.

18. Nature of Activity (Description of project, include all features)

R-3421 proposes a four-lane divided, fully controlled access freeway both on new location and upgrading portions of existing US 220 for connectivity of I-73 and I-74.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

This project is part of the I-73/I-74 Interstate Corridor was designated under the "National Highway System Designation Act of 1995." In Section 330. Identification of High Priority Corridors; Subsection (a)(iii)-Amendment of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA); Part (I) in the case of I-73 and (II) in the case of I-74; "(dd) United States Route 220 to United States Route 1 near Rockingham." "are hereby designated future parts of the Interstate System. • Will provide a freeway facility between two completed projects (R-512 and R-2231); • Will improve the Intrastate Highway System in North Carolina;

- Will remove interstate traffic from the non-controlled access highway system and signalized at-grade intersections in Rockingham;
- Will reduce local congestion in Rockingham; • Will improve safety and reduce accidents;
- Will provide a continuous through travel route for passenger vehicles and trucks; and
- Will complete a "missing link" in proposed Interstate route through North Carolina.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**20. Reason(s) for Discharge**

Impacts will result from widening the roadway and shoulders and construction of roadway on new location.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type	Type	Type
Amount in Cubic Yards	Amount in Cubic Yards	Amount in Cubic Yards

See attached cover letter.

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See attached cover letter.

or

Linear Feet See attached cover letter.

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See attached cover letter.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attached permit drawings.

City -

State -

Zip -

b. Address-

City -

State -

Zip -

c. Address-

City -

State -

Zip -

d. Address-

City -

State -

Zip -

e. Address-

City -

State -

Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

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

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

E. L. Lusk for Gregory J. Tharp, PhD Feb 6, 2012
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

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

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



January 17, 2012

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-3421C, Rockingham Bypass – US 220 Bypass from 0.2 miles Southwest of SR 1304 (Harrington Road) to Future US 220 Business / US 220 Bypass Interchange South of Ellerbe, Richmond County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on January 12, 2012, the impacts are located in CU 03040201 of the Yadkin River basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

Yadkin 03040201 SP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	4,508	8.49	0.08	0	0	0

In accordance with the directive from the February 8, 2011 IRT meeting, non-riparian wetland impacts located in the mountains and piedmont areas of North Carolina will be accepted as requested but mitigated utilizing riparian wetland mitigation credits. EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

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

Sincerely,

Michael Ellison
EEP Deputy Director

cc: Mr. Ronnie Smith, USACE – Wilmington Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-3421C

Restoring... Enhancing... Protecting Our State



HYDRAULIC DESIGN REVIEW MEETING FOR R-3421C, RICHMOND CO.

Prepared by Paul Atkinson
March 17, 2005

I. MINUTES OF THE INTERAGENCY HYDRAULIC DESIGN REVIEW MEETING ON 3/16/05

Team Members: Richard Spencer, USACE (PRESENT)
Gary Jordan, USFWS (ABSENT)
Travis Wilson, NCWRC (ABSENT)
Brian Wrenn, NCDWQ (PRESENT)
Chris Militscher, EPA (PRESENT)
Rob Ayers, FHWA (ABSENT)
Cathy Houser, NCDOT Roadway Design (ABSENT)
Michael Penney, PDEA (PRESENT)
Elizabeth Lusk, NCDOT ONE (PRESENT)
John Olinger, NCDOT Division 8 (PRESENT)
Jay Twisdale, NCDOT Hydraulics (PRESENT)

Participants: Paul Atkinson, NCDOT Hydraulics
Brook Anderson, NCDOT Hydraulics
Virginia Mabry, NCDOT Roadway Design
Carla Dagnino, NCDOT ONE

Jay Twisdale began the meeting with a brief overview of the project, noting that although proposed drainage has been sketched out on each plan sheet, the drainage design is not finalized and is subject to change pending completion of computations. Pipe sizes and outlet velocities were not available at the meeting for most of the project. The project begins at the end of State Project R-3421B.

Chris Militscher and Richard Spencer asked if 2:1 fill slopes were being used in wetlands. Jay Twisdale replied that there are some recently-added sites currently shown with flatter fill slopes, but those will be revised to 2:1. Brian Wrenn requested that rip rap be included in impact quantities. Chris Militscher requested that pipe sizes and outlet velocities be included with the permits.

Site-specific comments made at the meeting are identified below by plan sheet number.

Sheets 4-5

No comments.

Sheet 6

Richard Spencer identified the remaining portion of the wetland to the right of Sta. 376+00 –L- as one he would need to review in the field to determine if it might be a total take. This determination would depend on if the roadway fill would cut off the hydrology to that portion of the wetland. He offered permeable fill as an alternative to avoid a total take in such situations.

Sheets 7-8

No comments.

Sheet 9

There was some discussion regarding the proposed ditch (Sta. 431+00 to Sta. 436+50 –L- Lt.) which is picking up a wetland and a jurisdictional stream at Sta. 431+00. Richard Spencer asked about the possibility of natural stream design for the portion of stream impacted. Brook Anderson stated that the jurisdictional stream at the inlet end (left) was recently added and had been non-jurisdictional when the drainage design was done. Jay Twisdale and Paul Atkinson identified the constricted topography as well as the cost for such a short length of stream as factors prohibiting natural stream design at this site. Richard Spencer stated he did not object to the ditch, but mitigation would be required for the existing stream length lost. He did request that the ditch not be lined with rip rap. Current design does not call for rip rap. Subsequent investigation reveals that the proposed ditch can be shortened by approx. 70' to reduce stream impacts.

There is also a second wetland at Sta. 437+50 –L- Lt. which is currently connected to the first wetland by an existing roadside ditch. Brian Wrenn asked whether the end of the proposed ditch at Sta. 436+50 –L- Lt. would drain the wetland. Jay Twisdale replied that this will be checked and the ditch adjusted if necessary. Draining the wetland does not appear to be a concern since the proposed ditch is approx. 2.5' higher than the existing ditch and is somewhat removed from the wetland.

Richard Spencer asked whether the proposed cross-pipe inlet should be shifted closer to the stream. Brook Anderson and Paul Atkinson replied that the current location was preferred since the pipe was picking up flow from both directions as well as matching the existing cross-pipe inlet location.

Brian Wrenn asked for confirmation that the downstream wetland delineation (Sta. 435+00 –L- Rt.) was correct in showing a closed wetland boundary. Carla Dagnino replied that this was what the current wetland delineation showed. Richard Spencer stated that he would like to review that delineation in the field.

Sheet 10

Current design shows a proposed system releasing just outside of wetlands (Sta. 449+85 –L- Rt.). The existing pipe outlets, which are more centrally-located within the wetland, are being removed. Jay Twisdale asked whether an alternate design placing the outfall closer to the existing outfall within the wetlands would be preferred; there was consensus that the current design was preferred, with the outfall just outside the wetlands and tying

to it with a short ditch. Richard Spencer stated that he did not feel this outfall shift would negatively affect the hydrology of the wetland.

Sheet 11

Richard Spencer questioned the non-jurisdictional call on the stream shown running from Sta. 5+20 –Y10LPA- Rt. and tying to the jurisdictional stream at Sta. 464+25 –L- Lt. He also questioned a call for the beginning of jurisdictional status on a stream at 14+30 –Y10RPD- (the source of this stream appears to be the pond within –Y10LPD-). He asked that these be included on the list of questionable jurisdictional calls for him to review in the field.

Sheet 12

Current design shows jurisdictional streams being picked up by a pipe (Sta. 30+50 –SR5- Rt.) at the edge of the existing pond (to be filled). All other roadway drainage in this watershed also ties onto this system and is carried to the outfall on Sheet 13. Jay Twisdale stated that NCDOT is evaluating a redesign of this system to provide a straighter pipe alignment (fewer bends in the system) for the jurisdictional flow within the system. Richard Spencer said that a design that separated the roadway drainage from the jurisdictional flow to the extent practical would be preferred.

Sheet 13

Chris Militscher requested that armoring the banks of the jurisdictional stream at the system outfall (Sta. 477+70 –L- Lt.) be considered, since so much drainage was being picked up and carried to this one point. He also asked that a pre-/post- development analysis be done. As with Sheet 12, he preferred that the stream flow be separated from the roadway drainage if possible.

Sheet 14

Richard Spencer requested that NCDOT check for erosive velocities at the existing 3'x3' box culverts (extended w/ existing 42" pipes).

Sheet 15

Jay Twisdale noted that the existing double-barrel 6'x6' box culvert will be replaced by a double-barrel 9'x9' box culvert, buried 1', with a 2' sill in one barrel to direct low flow through a single barrel. Richard Spencer asked about the slope of the proposed box culvert, which is approx. 0.004 ft./ft. The slope of the existing box culvert is approx. 0.009 ft./ft. Richard Spencer commented that a temporary diversion should be included so that the box culvert construction could be done in the dry.

Sheet 16

Jay Twisdale noted that the proposed system releases at Sta. 498+50 –L- Rt. into a jurisdictional stream that has been straightened and lined with rip rap since the original delineation. Although jurisdictional, any disturbance of the straightened portion would not contribute to stream impacts. Richard Spencer commented that he was aware that the stream realignment by the property owner was a violation. He stated that he would give NCDOT credit for restoring the stream.

Sheet 17

No comments.

Sheet 18

Chris Militscher requested that the cross-pipe at 109+50 –SR4- Lt. not discharge directly into the wetland.

Sheet 19

No comments.

Sheet 20

Jay Twisdale noted that there is an existing 18" conc. pipe under SR 1304 (Harrington Rd.) that currently connects wetlands on both sides of the existing road. Since this portion of the road will be closed and pavement removed, the drainage design calls for removal of the pipe and connectivity of the wetlands reestablished. Richard Spencer said he would give credit for the restoration.

Richard Spencer questioned the accuracy of the jurisdictional stream calls at 12+50 –Y8REV- Lt.

Sheets 21-22

No comments.

Sheet 23

Richard Spencer identified the wetland at Sta. 18+50 –SR2- as another one he would need to review in the field as a possible total take.

Sheets 24-26

No comments.

There were no further comments.

4C PERMIT DRAWING REVIEW MEETING FOR R-3421C, RICHMOND COUNTY

Prepared by Brook Anderson

May 12, 2011

I. DRAFT MINUTES OF THE INTERAGENCY PERMIT DRAWING REVIEW MEETING ON 5/11/11

Team Members: **Ronnie Smith, USACE (present)**
 Gary Jordan, USFWS (absent)
 Travis Wilson, NCWRC (absent)
 David Wainwright, NCDWQ (present)
 Chris Militscher, EPA (absent)
 Felix Davila, FHWA (present)
 David Harris, REU (absent)
 Khaled Hamidi, Roadway (absent)
 Charles Hunt, Structures (present)
 Beverly Robinson, PDEA (absent)
 Rachelle Beauregard, NEU (present)
 John Olinger, Division 8 (present)

Participants: **John W. Twisdale, Hydraulics**
 Brook Anderson, Hydraulics
 Mark Staley, REU
 Terry Farr, Roadway
 Malcolm Watson, Roadway
 Don Proper, Utilities
 Steve Cummings, Utilities
 Lisa Feller, PDEA

Jay Twisdale began the meeting and stated he would go through the project site by site and discuss the environmental impacts at each. He indicated Chris Militscher was unable to attend but had provided comments via email and those comments would be addressed at each of the applicable sites. Travis Wilson, also unable to attend, had indicated he did not have any specific concerns. Specific comments are listed below by site number.

Site 1-Chris Militscher had commented via email to consider moving the 30" csp outfall upland. Jay Twisdale responded the wetland would be a total take on that side of the roadway once the adjoining project (R-3421B) is built. Also the topography is steep and would make using a ditch instead of a pipe difficult. It was also discussed that if any portion of R-3421B is built during the

construction of R-3421C it should be permitted now. (Note: Since the meeting roadway has confirmed no portion of R-3421B will be built under this project. Impacts will stay as shown.)

Site 2-Chris Militscher commented via email that the fill slopes did not appear to be 2:1. It was verified that the fill slopes at this site are 2:1.

Site 3-Ronnie Smith asked if site 3 was necessary. Brook Anderson stated the mechanized clearing was for construction. Jay Twisdale stated it was necessary to allow for use of PDE. John Olinger stated that depending on what is there, there may not be much clearing necessary but better to show the impact. David Wainwright questioned the divide in the wetland boundary. Ronnie stated he did not look at that area.

Site 4-Ronnie Smith questioned the width of the mechanized clearing. John Olinger said there would be erosion control devices at bottom of slope. 2:1 fill slopes are used on the left of -L- from station 376+00 to 377+00. It was asked if the mechanized clearing impacts on -Y8REV- were necessary. The fill slopes on -Y8REV- were shown to be 3:1. It was stated that the NCDOT Geotechnical Unit recommended 3:1 or flatter slopes throughout the project. John Olinger stated the material used for the fill generally comes from borrow pits and is sandy and difficult to use on 2:1 slopes. It was stated that 2:1 slopes will require extra stabilization measures or reinforcement such as rock plating. Jay Twisdale stated the impact here is small.

Ronnie Smith questioned the buried pipes. Jay Twisdale stated we were required to bury equalizer pipes when the design was completed in 2005 but we are not required to do so now. There were no objections to leaving them as is. It was noted, if the pipes are buried, construction must stay within the permitted impact area when the pipes are installed.

Ronnie asked if the right-most pipe could stop before the wetland so the rip rap outlet pad would not be in wetland. Brook Anderson stated that due to proximity of fill slope to wetland, even if pipe were shorter there would still be rip rap in wetland. David Wainwright suggested the pipe crossing be more perpendicular to the roadway. Brook Anderson responded that even if pipe were shifted away from wetland, there would be very little reduction to impacts because the mechanized clearing impacts due to the roadway fill would still occur. Jay Twisdale stated it is better to outlet in the wetlands where slope is flatter rather than have an outlet where the ground is steeper and the discharge could form a gully as it re-concentrates flowing towards the wetlands.

The Environmentally Sensitive Area label was mentioned and it is believed to be an archaeological site.

Site 5-Ronnie Smith asked where the excavation impact occurred. Brook Anderson stated it was due to a small amount of cut in the median. David Wainwright asked for an enlargement to be included of the area. Ronnie asked what size the cross-pipe was. The pipe is a 54" rcp. The label was obscured by the impact hatching. Jay Twisdale said we would move the label.

Site 6-Jay Twisdale explained the existing roadway and the 18" and 24" cross-pipes will be removed and connectivity between the wetlands re-established with a base ditch.

Site 7-Ronnie Smith stated the cross section shows 4:1 slopes and he prefers 3:1 or steeper. Jay Twisdale showed the cross section has a 2:1 fill slope on the outside of the loop at the wetlands. The wide footprint is due to the fill height. The fill inside the loop is 4:1 but the entire wetland inside the loop will be impacted by the project.

Site 8-Ronnie Smith stated it looked like the pipe inlet was offset from the beginning of the stream and he preferred the pipe start at the stream instead of going through the wetland. Jay stated the pipe was placed in the low spot at the base of the fill slope. Brook Anderson stated the beginning of the stream is under the proposed fill slope. John Olinger said construction would install the pipe inlet at the low spot so there wouldn't be any ponding.

Site 9-Ronnie Smith asked for an explanation of what toe protection consist of. Jay explained the concept of placing rip rap at the toe of new fill to protect it from erosion.

Site 10-Ronnie Smith stated there was a discrepancy between the toe protection shown on the roadway plans and what is shown on the permit drawings. Jay Twisdale said this would be addressed and it may be that the roadway plans were printed with an old wetland file.

Malcolm Watson confirmed the plans were reproduced from the right of way set which was completed prior to the new wetland delineation.

Rachelle Beauregard questioned if there would be impacts in the PUE. Steve Cummings said the existing utilities would have to be moved because the area will be within controlled access. John Olinger stated the area would probably have clearing impacts. There was discussion that impacts could be minimized or avoided by either boring utilities underground or using aerial lines to keep them overhead. Utilities will provide drawings to NEU for any impacts. John Olinger stated if they have to do clearing for the utilities they need to know upfront, when we are getting the permits. Steve Cummings stated the service roads would need to be constructed first to get the utilities off the -L- line. John Olinger said they are planning to construct the service roads first.

Site 11-Jay Twisdale stated Site 11 is just the pond. Ronnie Smith asked if the small pond on the other side of the road had been accounted for. Jay stated the small pond was included in site 12. Ronnie stated there was no pond listed on the summary sheet for site 12. Jay said we would double check the impacts to make sure they were included. (Note: The impacts were included in site 12. Pond was not listed in the Structure Size/Type column on the summary sheet because site 12 includes wetland and stream impacts as well. There is a note at the bottom of the summary sheet that breaks out the non-mitigable surface water impact area due to the pond. We will look into revising the summary sheet for clarity.)

Ronnie Smith noted a “Begin JS” label on the plans. Brook Anderson stated the stream previously began at that location but with the new wetland delineation it now extended to the pond. Jay Twisdale stated we would remove the label.

Site 12-Ronnie Smith commented that the cross-sections show 4:1 slopes. Brook Anderson commented that even with steeper slopes the wetland would be a total take. Ronnie stated steeper sides would reduce stream impacts. Jay Twisdale stated steepening to 2:1 would require addition of guardrail which will widen roadway by 3'. Steepening to 3:1 may also require guardrail depending on fill height. Jay stated we would look into it.

Site 13-Sara Easterly asked to clarify where the stream impacts were coming from. Brook Anderson showed where they were.

Site 14-Ronnie Smith questioned the length of stream impacts. Brook Anderson said this sheet was at half the scale of the other sheets. The scale on sheet 11 was incorrect and the 50' should read 100'. Ronnie also asked if slopes could be steepened to reduce stream impacts. Jay said we would look into it. (Note: We have rechecked the side slopes at that location and they are 2:1 at the stream.)

Site 15-Jay Twisdale explained the site consists of impacts to a pond and some fringe wetlands, neither of which is mitigable at this site.

Site 16-Ronnie Smith asked if the stream coming out of the pond was shown being impacted. Brook Anderson said it was shown as permanent surface water impacts and included in the <0.01ac and 61ft. of impacts shown on the summary sheet for that site.

Site 17-Sara Easterly remarked the concrete ditch portion needed to be broken out. Jay Twisdale noted there was a note at the bottom of the summary sheet indicating the length of concrete ditch. Brook Anderson and Sara Easterly noted that the phrase non-mitigable had been added to that note after the summary sheets were sent out and would be included in the final version. Ronnie asked what the fill slope is at -SR- 37+00+/- (LT). It was determined that the slope is 3:1 at that station and 2:1 at 37+50 which is at the end of the pipe. John Olinger stated it was difficult for the contractor to pick up single sections that are different from the typical section.

Site 18-Rachelle Beauregard asked if the stream impacts included bank stabilization and if so, requested they be broken out on summary sheet since bank stabilization is non-mitigable. Jay Twisdale stated we would do that. Rachelle requested we also place a label pointing to any bank stabilization to make it easier to see on the plans.

Site 19-No Comments

Site 20-Ronnie Smith asked if toe protection would enter stream bed. Brook Anderson stated we would have rip rap in the stream bed at the pipe outlet. Jay Twisdale said we couldn't break that out as bank stabilization because the toe protection will extend to where the rip rap for the pipe outlet will be in the channel.

Site 21-Jay Twisdale explained we would be removing a double 6'x6' box culvert and replacing with a double 9'x9' box culvert buried 1'. Rachelle Beauregard requested if we have bank stabilization we break that out on the summary sheet. Jay Twisdale said we would look at it. Ronnie Smith noted there was no label to bury the culvert. Jay Twisdale responded it is standard procedure to bury box culverts so we don't label that. Ronnie asked were the cross-sections 2:1. Jay said they were. Mark Staley asked if the phasing was done. Jay explained we had several options. John said the service roads would be going in first and Jay said that may dictate which phasing option we use. Jay said we had been waiting to hear back from pavement or traffic if the pavement on the service roads would be able to support the traffic put on them. John stated there would be full depth pavement on the service roads and they would be built first.

Site 22-No Comments

Site 23-Rachelle Beauregard asked if there would be bank stabilization at this site. Brook Anderson said there would not be any. Jay Twisdale said the ditch leading to the outfall will be lined with PSRM. Ronnie Smith asked if fill slopes are 2:1. It was shown that the fill slopes are 4:1. Ronnie asked if we could move it in. John Olinger asked what we would gain if we pulled the slope in. Jay stated that the impact is a parallel impact so we wouldn't gain much. Brook Anderson stated that originally we were told we would not have to mitigate for this stream because it had previously been channelized by someone else. Ronnie concurred that we would gain very little by pulling the slope in.

Site 24-Ronnie Smith said he thought the fill slope was 4:1 here. Jay Twisdale said the wetland would be a total take even if we pulled the slope in. Ronnie said it would save some stream impacts. Jay pointed out guardrail would be required for 3:1 slopes. Ronnie asked how far back it could go with 3:1 slopes and Brook Anderson showed that it could be pulled in by about 25' if drainage would still work. Ronnie said he thought this area was a swamp. Looking at the wetland delineation, it did appear to continue outside of the study area boundary. Jay said we would look at it.

Site 25-Ronnie Smith said fill slopes are 4:1 and we could possibly avoid impacting the wetland if 3:1's are used and rip rap placed on higher ground. Jay said we would look at changing to 3:1.

Site 26-It was asked what the fill slope is. Mark Staley pointed out that the fill slope was 3:1 at one section, at the end of the pipe. Jay Twisdale indicated that it is 4:1 on each side of the 3:1.

John Olinger said it is hard to construct one section at 3:1, it's easy to miss in construction and get into trouble with permitting. Jay said we would look at changing from 14+00 to 15+00 to 3:1 and updating the impacts.

Site 27—Lisa Feller said area is not environmentally sensitive anymore. Rachelle Beauregard asked if bank stabilization was in stream or just on banks. Brook Anderson said both. John Olinger mentioned going to 2:1 at the pipe outlet will funnel water toward the slope and has the potential to cause erosion on and around the pipe and will need extra stabilization. Geotech needs to look at 2:1 slopes. John Olinger stated the soil in the area is poor and difficult to establish vegetation on. Roadway will talk to Geotech.

Site 28-Brook Anderson said 10' of mechanized clearing is due to construction of fill slope.

Site 29-No Comment

Site 30-No Comment

Site 31-Ronnie Smith asked where water will go from outlet of 36" pipe. Brook Anderson said the water will sheet flow to the wetland area.

Site 32-Ronnie Smith said pond is not 404.

Site 33-No Comment

Site 34-Jay Twisdale said Chris Militcher commented slopes do not appear to be 2:1. Brook Anderson stated wetland was new with the most recent delineation. When it was originally added, it had a closed boundary around it, so it appeared to be a total take and we didn't consider pulling slopes in. The boundary was opened up just before the permit drawings went out and we didn't re-look at the area until receiving Chris's comments. Jay said we will look at steeper slopes. Ronnie said he was not sure of the wetland extents. Jay said he thought the wetland continued past the study area and would not be a total take. Don Proper asked about the other side of the road previously being pulled in for utilities. Brook Anderson said those slopes had to be pulled in to stay out of the existing utility easement where there are power transmission lines.

Additional Comments-Don Proper said there is a sanitary sewer project that will be constructed soon by the Town of Ellerbe which will have some utility impacts. Jay Twisdale suggested that NCDOT Utilities should obtain the Town's permit drawings. Rachelle Beauregard said if the Town is paying for impacts to some of our sites, we should not have to pay when we impact the site. Jay said we need to obtain their permit drawings to avoid double impacts. Utilities said they will email Brook Anderson and Rachelle Beauregard with the approved drawings when they receive them.

Dilday, Jason L

From: Fritz Rohde <Fritz.Rohde@noaa.gov>
Sent: Wednesday, October 13, 2010 3:40 PM
To: Easterly, Sara E
Subject: Re: R-3421A-C Moratorium

The moratorium would not apply to the South Prong.
Fritz

Easterly, Sara E wrote:
Fritz,

Our construction engineer has ask me if the moratorium for the short nose sturgeon would apply to the South Prong of Cartledge Creek since it is a larger tributary and runs directly into Cartledge Creek. Thank you for your help with this question.

Sara

Sara Easterly
Environmental Specialist, Central Region
PDEA Natural Environment Unit
Project Management Group

N.C. Department of Transportation
Environmental Resources Center
4701 Atlantic Ave., Ste. 116
Raleigh, NC 27604

Phone: 919.431.1605

From: Fritz Rohde [<mailto:Fritz.Rohde@noaa.gov>]
Sent: Tuesday, September 07, 2010 4:14 PM
To: Easterly, Sara E
Subject: Re: R-3421A-C Moratorium

Sara:

I agree that the in-stream moratorium applies only to Hitchcock and Cartledge creeks and not to the smaller tributaries.

Fritz

Easterly, Sara E wrote:
Fritz,

We had a field meeting for this project the last week of August and there was a question regarding the below commitment in red. Our resident engineer wanted clarification for "any tributary". The reason for the desired clarification is that if work cannot take place January through April in any tributary to the Pee Dee River then we need to look at changing the LET date for the project. It was hoped that work could take place in the smaller tributaries and have the moratorium apply to work in the larger streams of Hitchcock Creek and Cartledge Creek.

As we discussed I have attaches a copy of the concurrence letter for the shortnose sturgeon dated July 20, 2001. In the concurrence letter it was concluded that the project would not adversely affect endangered and threatened species or their critical habitat if the NCDOT would follow High Quality Water Erosion Control Guidelines (Design Standards in Sensitive Watersheds); Stream Crossing Guidelines for Anadromous Fish Passages; and Guidelines for Best Management Practices for Bridge Demolition and Removal. In addition, no in-stream construction would be permitted in any tributary of the Pee Dee River during the months of January, February, March, or April.

Thank you for your help with this matter.

Sara

From: Fritz Rohde [<mailto:Fritz.Rohde@noaa.gov>]
Sent: Friday, August 20, 2010 10:57 AM
To: Easterly, Sara E
Subject: Re: R-3421A-C Shortnose Sturgeon

my pleasure

Easterly, Sara E wrote:
Fritz,

Thank you so much for your response. I really appreciate it.

Sara

From: Fritz Rohde [<mailto:Fritz.Rohde@noaa.gov>]
Sent: Friday, August 20, 2010 10:46 AM
To: Easterly, Sara E
Subject: Re: R-3421A-C Shortnose Sturgeon

Sara:

After reading the concurrence letter and NMFS Protected Resources Division's (PRD) Section 7 response, I find that nothing has changed from our initial consultation letter. PRD determined that the project would not adversely affect the shortnose sturgeon because NC DOT **had committed** (my emphasis) to the three listed guidelines and moratorium. There is no basis to eliminate these actions.

In a 31 August 2009 letter to the Federal Energy Regulatory Commission, NMFS determined that the hydroelectric project at Blewett Falls **may adversely affect** (my emphasis) the endangered shortnose sturgeon. As you know this project is upstream of yours. Shortnose sturgeon implanted with acoustic telemetry tags have been observed in the Pee Dee River in 2007 in close proximity to Blewett Falls dam by biologists from SC Department of Natural Resources. Additionally, NC DOT was fortunate to get such a narrow moratorium window. Projects on the Cape Fear River generally have a no-inwater work moratorium from Feb 1 to Sept 30.

In summary, there is no reason or evidence to change the initial consultation agreement with the restrictive guidelines and moratorium.

If you have any questions, please contact me at 252 838-0828.

Fritz Rohde
NMFS

Easterly, Sara E wrote:
Fritz,

As we discussed I have attaches a copy of the concurrence letter for the shortnose sturgeon dated July 20, 2001. In the concurrence letter it was concluded that the project would not adversely affect endangered and threatened species or their critical habitat if the NCDOT would follow High Quality Water Erosion Control Guidelines (Design Standards in Sensitive Watersheds); Stream Crossing Guidelines for Anadromous Fish Passages; and Guidelines for Best Management Practices for Bridge Demolition and Removal. In addition, no in-stream construction would be permitted in any tributary of the Pee Dee River during the months of January, February, March, or April.

The only record of the shortnose sturgeon in Richmond County occurred in 1985 and was approximately 0.3 miles from the project corridor limits. Also, an evaluation of perennial stream crossings within the project area corridors indicated that project area streams do not provide shortnose sturgeon habitat due to either being blocked by impediments downstream from the corridor or to insufficient size or depth to allow shortnose sturgeon passage. Therefore, the NCDOT would like to request that the requirement for use of High Quality Water Erosion Control Guidelines (Design Standards in Sensitive Watersheds) and the construction moratorium from January through April no longer be considered as a condition of the "will not adversely affect" biological conclusion. Please let me know if you have any questions or need any further information.

Thank you,
Sara

Sara Easterly
Environmental Specialist, Central Region
PDEA Natural Environment Unit
Project Management Group
N.C. Department of Transportation
Environmental Resources Center
4701 Atlantic Ave., Ste. 116
Raleigh, NC 27604
Phone: 919.431.1605



North Carolina Department of Cultural Resources

State Historic Preservation Office

Peter B. Sandbeck, Administrator

Beverly Faves Perdue, Governor
Linda A. Carlisle, Secretary
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

October 12, 2010

MEMORANDUM

TO: Matt Wilkerson
Office of Human Environment
NCDOT Division of Highways

FROM: Peter Sandbeck *Peter Sandbeck*

SUBJECT: I 73 – I 74 Rockingham Bypass Study Area, National Register of Historic Places Eligibility, Archaeological Sites 31RH418 and 31RH420, R-3421, Richmond County, ER 97-8978

Thank you meeting with staff archaeologist John J. Mintz on September 23, 2010, and for providing our office with the additional information regarding archaeological sites 31RH418 and 31RH420. Earlier archaeological investigations undertaken in support of this project had determined these two sites were eligible for listing in the National Register of Historic Places. If they could not be avoided by the planned construction, archaeological data recovery investigations would be initiated.

During the meeting, NCDOT staff archaeologist Dr. Gary Glover and Mr. John Mintz discussed this project and determined that site 31RH418 had been completely destroyed by the private landowner prior to its acquisition by NCDOT. This destruction was discovered by Dr. Glover during a site inspection on August 25, 2005, and noted in a memo to the SHPO dated August 31, 2005. Further examination of the current roadway alignment plans noted that site 31RH420 is located well outside of the planned construction easement, and will not be affected by the planned roadway construction. However, if at any time site 31RH420 is threatened by construction prior to the completion of this project, additional archaeological investigations may be needed to mitigate any adverse effects to the site.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and considerations. If you have any questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919.807.6579. In all future communication concerning this project, please cite the above referenced tracking number.

cc: Gary Glover, NCDOT

bc: Claggett/ Mintz
County



General Project Information

Project No.:	R-3421C	Date:	4/27/2011
City/Town:	Rockingham	Designer:	Paul Atkinson, PE
County(ies):	Richmond County	Project Manager:	John W. Twisdale, JR., PE
River Basin(s):	Yadkin-Pee Dee	CAMA County?	no
Primary Receiving Water:	South Prong to Cartledge Creek	NCDWQ Stream Index:	13-35-1
NCDWQ Surface Water Classification for Primary Receiving Water	Primary:	Class C	
Supplemental:			
Other Stream Classification:			
303(d) Stream?	no	Type(s) of Impairment:	
State Stormwater Permit Required?	no	If yes, why?	
Could the Project Impact Threatened or Endangered Species?	no		

Description: biological conclusion of "No Effect" or "not likely to adversely affect" were given for all species potentially in area.

Anadromous Fish Present? yes

Description: Anadromous fisheries are found in the upper Pee Dee River, including the project area.

Buffer Rules in Effect?

no

Buffer Rules:

Existing Site

Description of Existing Project Area:	Existing US 220 is a four-lane divided highway with intersections at several 2 lane roads including SR 1304 (Harrington Rd.), SR 1305 (Sandy Ridge Church Rd.), SR 1446 (Haywood Cemetery Rd), and others.
Average Daily Traffic (existing):	25500 ADT 2012
Existing Cross Section:	2, 12' travel lanes and total pavement width of 32'+/- in each direction with 2-5' grassed shoulder and an approximately 45' wide grassed median
Surrounding Land Use:	rural, residential and agricultural
General Comments:	

Project Description

Description of Proposed Project:	Grading, Paving, Drainage, Signing, Structures, and Culvert
Average Daily Traffic (proposed):	35300 ADT 2030
Proposed Cross-Section:	-L- consist of 46' wide total rdwy section each direction with a 40' grassed median. Service roads are 24' pvmnt width with grass shoulders (typ.).
Interchange Modification:	Median Type: grass
Terminus:	0.2 miles southwest of SR 1304 (Harrington Rd.)
Terminus:	US 220 Business/Bypass Interchange South of Ellerbe
Project Length (lin. miles/feet):	3.72 miles
General Comments:	Added Impervious Area (ac.):

The proposed project will upgrade US 220 to Interstate Standards. The road will be controlled access with access being limited to interchanges. Service roads will be constructed along both sides of US 220 to provide access to the adjacent properties. Two new interchanges will be constructed. One interchange at the intersection of the existing US220 and the proposed US220 Bypass. The other interchange is at SR 1446 (Haywood Cemetery Rd.). The -L- line will consist of 2' grassed and 10' paved outside shoulders, 2, 12' travel lanes in each direction and 4' paved and 6' grassed inside shoulders.

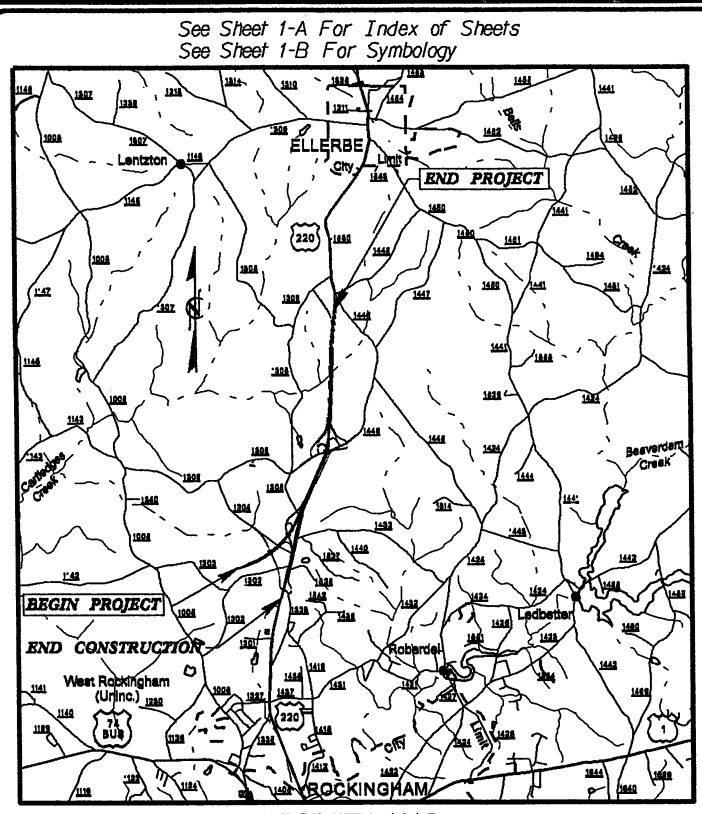
Environmental Summary

Riparian Buffer and Jurisdictional Stream Impacts and Associated SCMs

Station	Stream Name	Stream Type	Jurisdiction Stream	Buffer?	Classification?	Proposed Structure	SCM Type	Checklist Complete?	DA (ac.)	Q ₂ (ft ³ /s)	Q ₁₀ (ft ³ /s)	WQV ^c (ft ³)
See Attached Wetland and Surface Water Impact Summary Sheets for Individual Impacts												
General Comments: Stream impacts throughout project were minimized to the maximum extent practical by keeping fill slopes as steep as possible. Existing drainage patterns were maintained to the maximum extent practical. Pipes and culverts will be constructed with buried inverts as required.												

TIP PROJECT: R-3421C

CONTRACT:



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

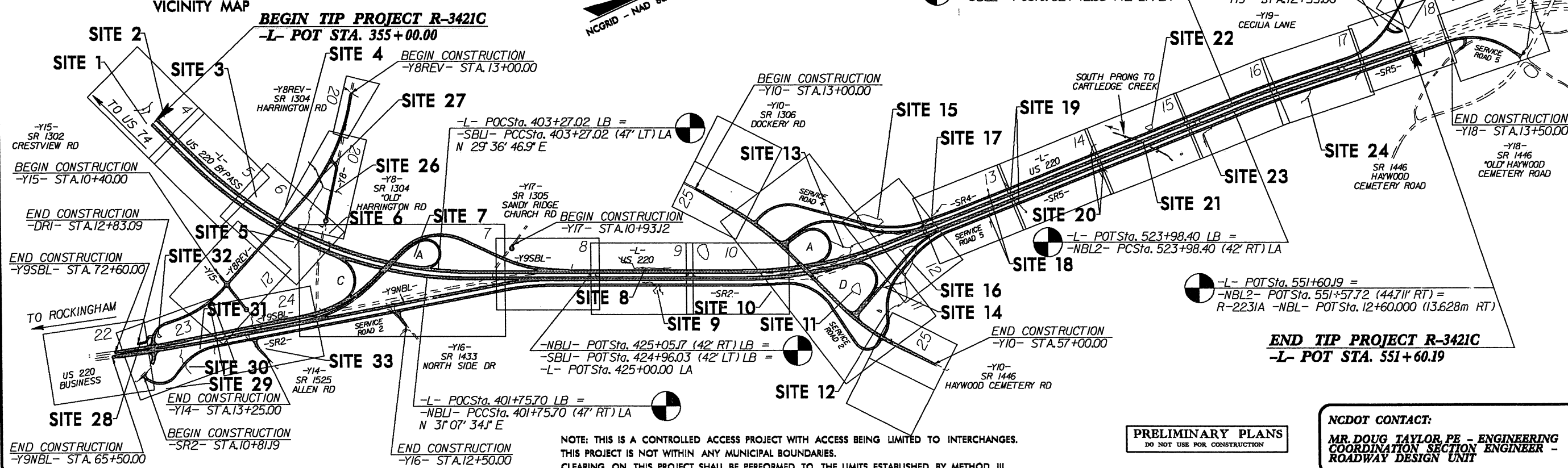
LOCATION: US 220 BYPASS FROM 0.2 MILES SOUTHWEST OF
SR 1304 (HARRINGTON RD) TO US 220 BUSINESS/BYPASS
INTERCHANGE SOUTH OF ELLERBE

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING,
STRUCTURES, AND CULVERT

WETLAND/SURFACE WATER PERMIT DRAWINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34542.1.2	NHF-0220(4)	PE	
34542.2.5	HPPNHF-0220(56)	RW & UTILITIES	

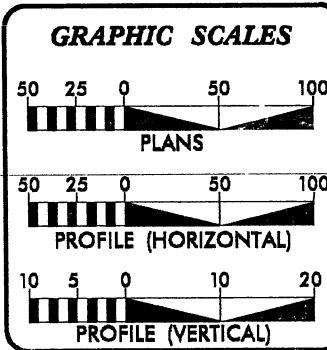
Permit Drawing
Sheet 1 of 49



NOTE: THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NCDOT CONTACT:
MR. DOUG TAYLOR, PE - ENGINEERING
COORDINATION SECTION ENGINEER -
ROADWAY DESIGN UNIT



DESIGN DATA	
ADT 2012 =	25,500
ADT 2030 =	35,300
DHV =	10 %
D =	60 %
T =	28 % *
V =	70 MPH
* TTST 18 %	DUAL 10 %
FUNC. CLASS = INTERSTATE	
STATEWIDE TIER	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-3421C	= 3.724 mi
TOTAL LENGTH TIP PROJECT R-3421C	= 3.724 mi
-L- LINE USED FOR PROJECT LENGTH	

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610
Prepared by:
MA ENGINEERING CONSULTANTS, INC.
528 E. CHATHAM STREET, SUITE 137
CARY, NORTH CAROLINA 27511
(919) 297-0220

2008 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
NOVEMBER 19, 2010
LETTING DATE:
NOVEMBER 20, 2012

R.W. PORTER JR., PE
PROJECT ENGINEER

K.S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: _____

P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

P.E.

PROJECT REFERENCE NO. R-3421C		SHEET NO. 4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
 SEE SHEET NO. 27 FOR -L- PROFILE

50' 0' 50'
 GRAPHIC SCALE

ENGLISH

Permit Drawing
 Sheet 2 of 49



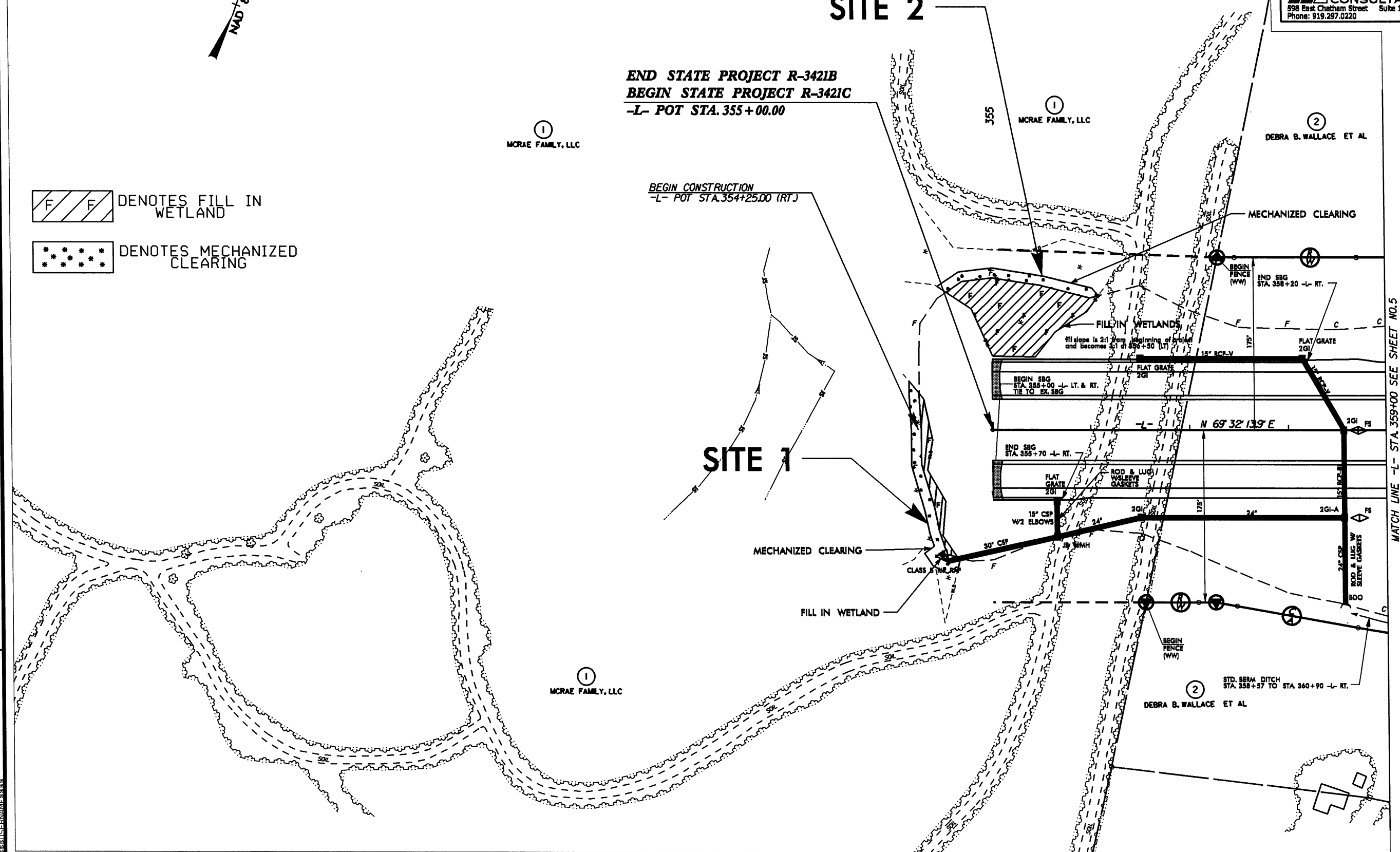
SITE 2

END STATE PROJECT R-3421B
BEGIN STATE PROJECT R-3421C
-L- POT STA. 355+00.00

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

BEGIN CONSTRUCTION
-L- POT STA. 354+25.00 (RT.)



MATCH LINE -L- STA. 359+00 SEE SHEET NO. 5

REVISIONS

8/12/95

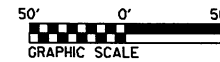
SYSTEMS ENGINEERING
 DESIGN
 USER NAME

8/21/8

SYSTEMS ENGINEERING
DESIGN
DRAWING
REVISIONS
DATE
BY
CHECKED
APPROVED
PROJECT NO.
SHEET NO.

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NO. 27 FOR -L- PROFILE



Permit Drawing
Sheet 3 of 49

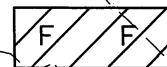
PROJECT REFERENCE NO.		SHEET NO.
R-3421C		4
RWY SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS		DO NOT USE FOR CONSTRUCTION

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

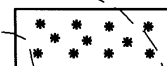
SITE 2

END STATE PROJECT R-3421B
BEGIN STATE PROJECT R-3421C
-L- POT STA. 355+00.00

BEGIN CONSTRUCTION
-L- POT STA. 354+25.00 (RT.)



DENOTES FILL IN WETLAND



DENOTES MECHANIZED CLEARING

SITE 1

MECHANIZED CLEARING

FILL IN WETLAND

FILL IN WETLAND
Fill area is 24' x 24' (approximate) of bridge and becomes 24' x 24' at STA 359+50 (RT.)

BEGIN SBG STA. 359+00 -L- RT. & RT. TIE TO EX. SBG

END SBG STA. 359+70 -L- RT.

FLAT GRATE 20"

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

15" CSP W/2 ELBOWS

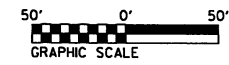
15" CSP W/2 ELBOWS

STD. BERM DITCH STA. 358+57 TO STA. 360+90 -L- RT.

DEBRA B. WALLACE ET AL

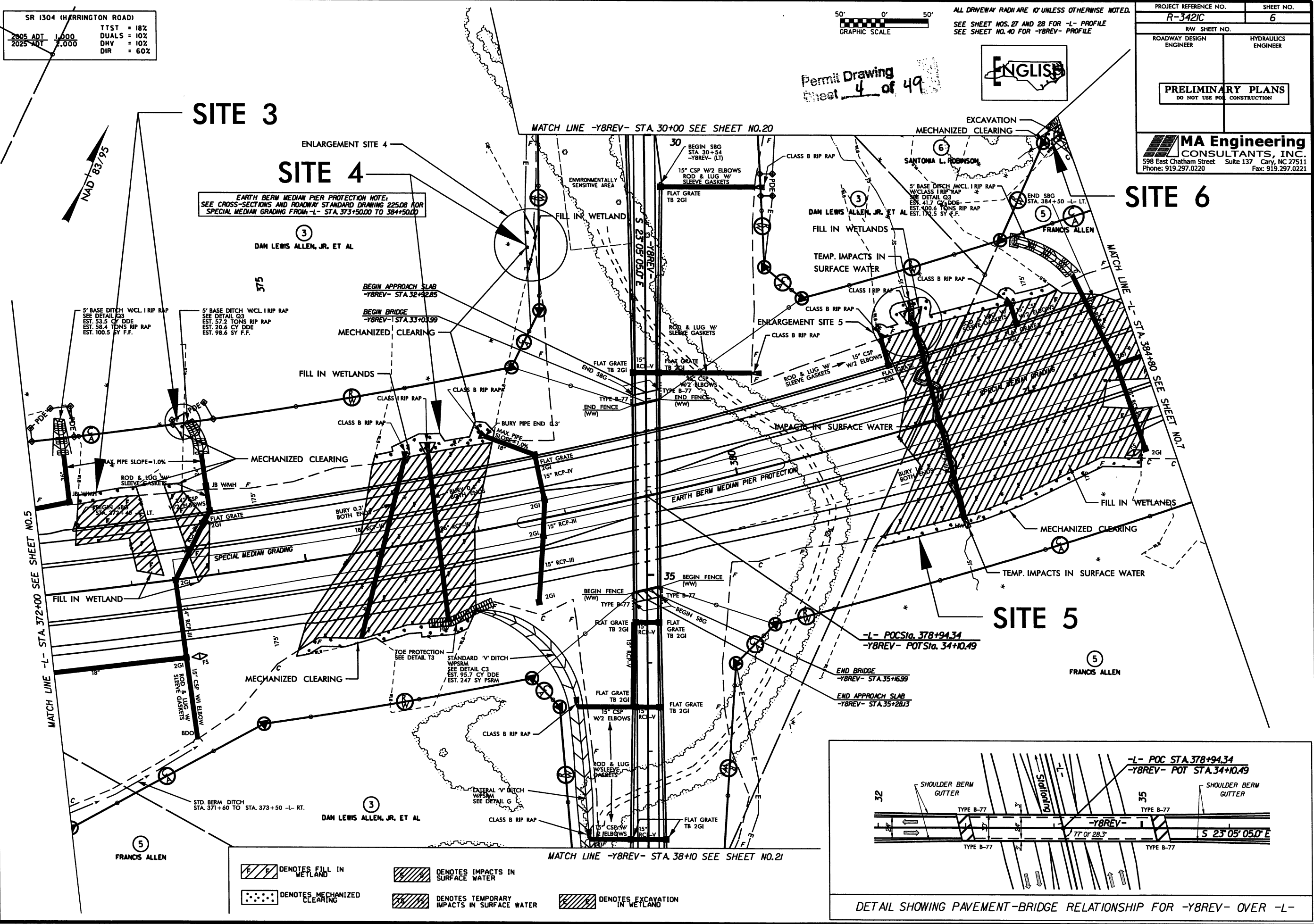
MATCH LINE -L- STA. 359+00 SEE SHEET NO. 5

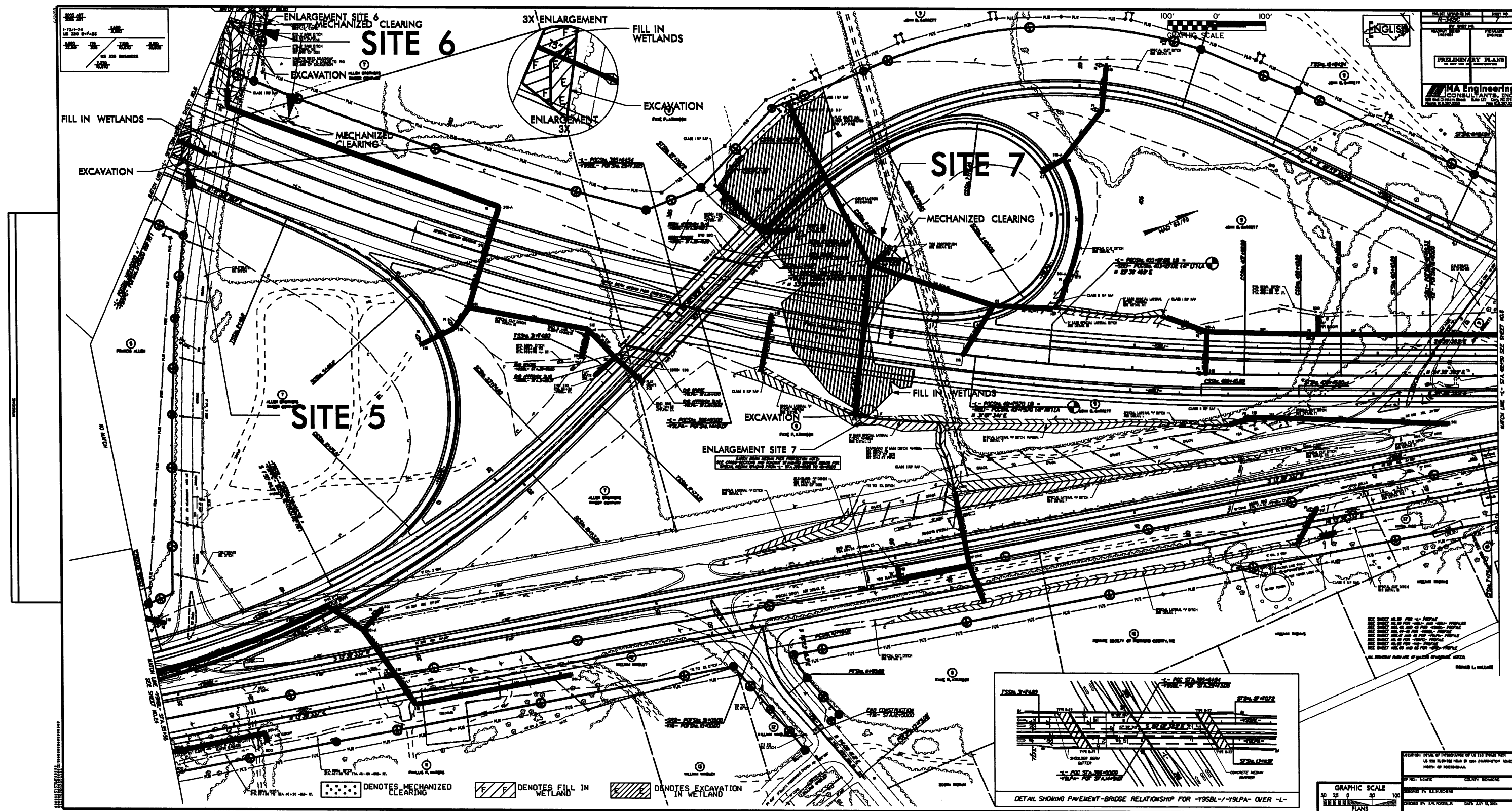
SR 1304 (HARRINGTON ROAD)		TTST = 18%
2005 ADT	1,000	DUALS = 10%
2025 ADT	2,000	DHV = 10%
		DIR = 60%

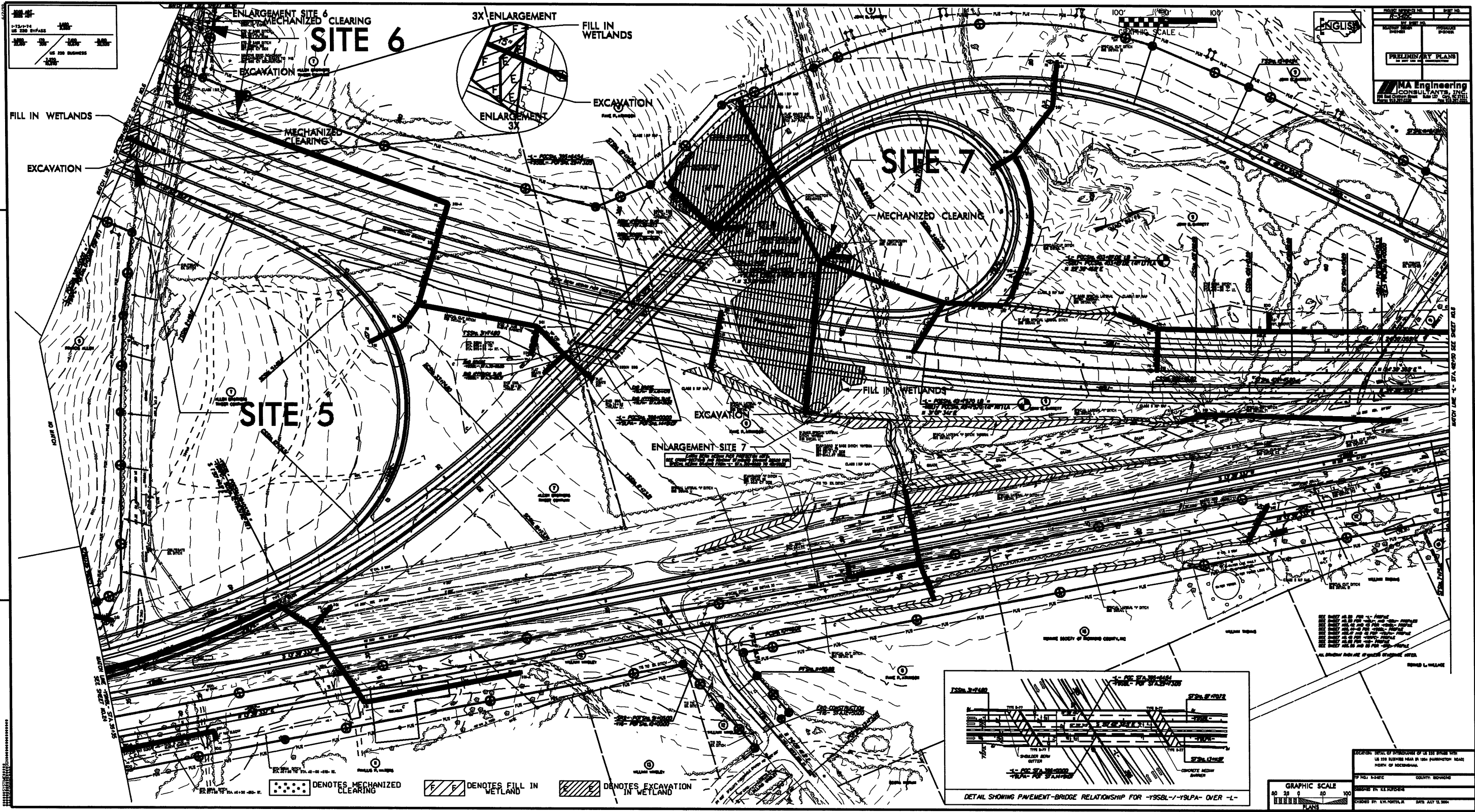


ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NOS. 27 AND 28 FOR -L- PROFILE
SEE SHEET NO. 40 FOR -YBREV- PROFILE

PROJECT REFERENCE NO. R-3421C		SHEET NO. 6	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			








SEE SHEET NOS. 30 AND 31 FOR -NBL- AND -SBU- PROFILES
SEE SHEET NO. 57 FOR -SR2- PROFILE

50' 0'



GRAPHIC SCALE

ENGLISH

NAD-83/9

EXCAVATION






IMPACTS IN SURFACE WATER

CARLYE HAYWOOD

30
TOR GOODMAN
ESTATE 440

16
MATCH LINE -L- STA. 440+00 SEE SHEET NO.10

WATCH / INF -/- STA. 426+00 SEE SHEET NO.8

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

GUY C. BRYANT

COMMUNITY INVESTMENT
NETWORK, LLC

MATTIE C. THOMAS

SITE 9

MILES NORTH

HAROLD M. HINES

SAMARITAN COLONY, INC.

Permit Drawing
Sheet 9 of 49

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 30 AND 31 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 57 FOR -SR2- PROFILE

50' 0' 50'






GRAPHIC SCALE

ENGLISH

SITE 8

WATCH LINE -I- STA. 426+00 SEE SHEET NO.8

MATCH LINE -L- STA. 440+00 SEE SHEET NO.10

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

SITE 9

TEMP. IMPACTS IN SURFACE WATER

8/12/99

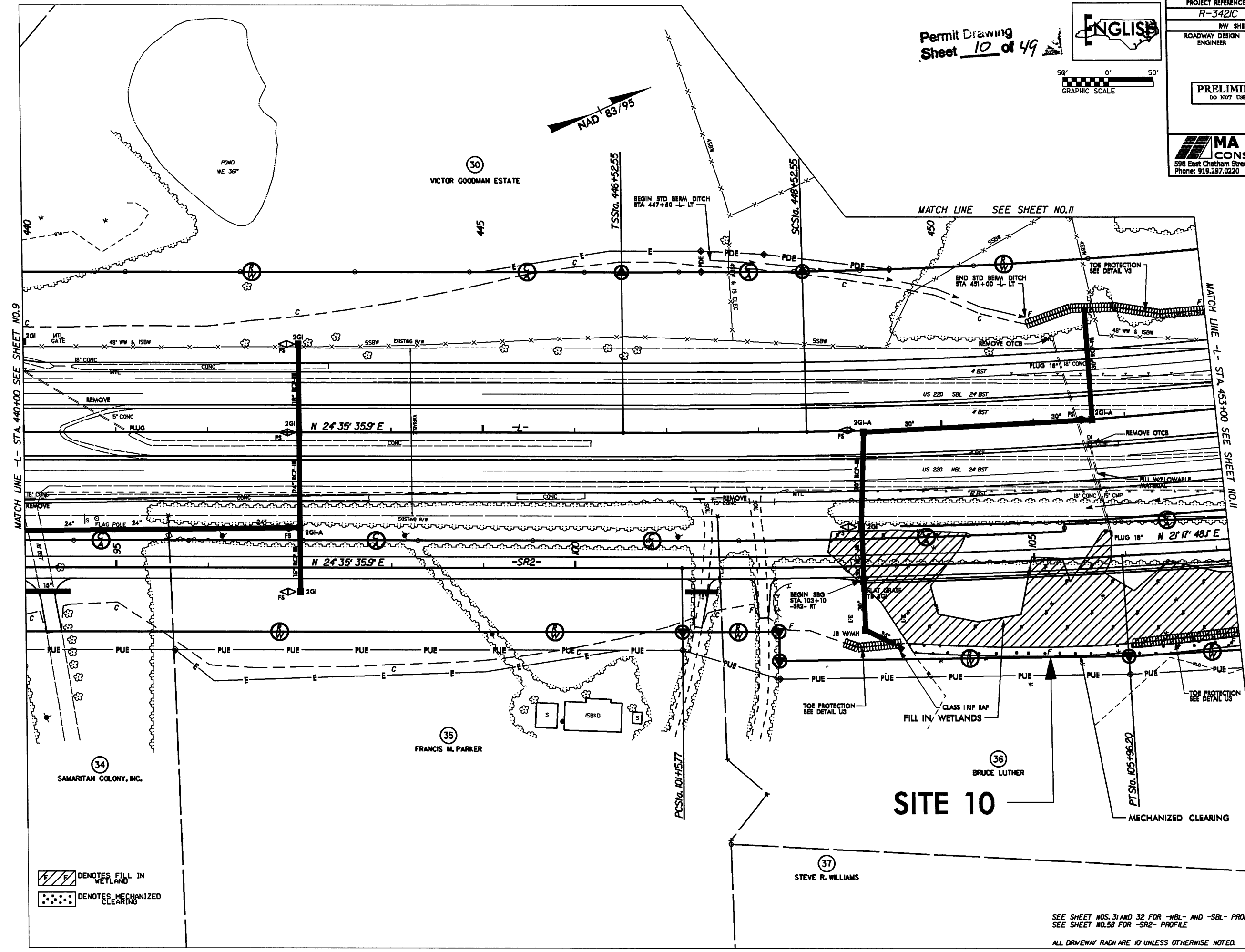
Permit Drawing
Sheet 10 of 49

ENGLISH

50' 0' 50'

GRAPHIC SCALE

PROJECT REFERENCE NO. R-3421C		SHEET NO. 10	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



/// DENOTES FILL IN WETLAND

... DENOTES MECHANIZED CLEARING

SITE 10

SEE SHEET NOS. 31 AND 32 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 58 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

8/12/1999

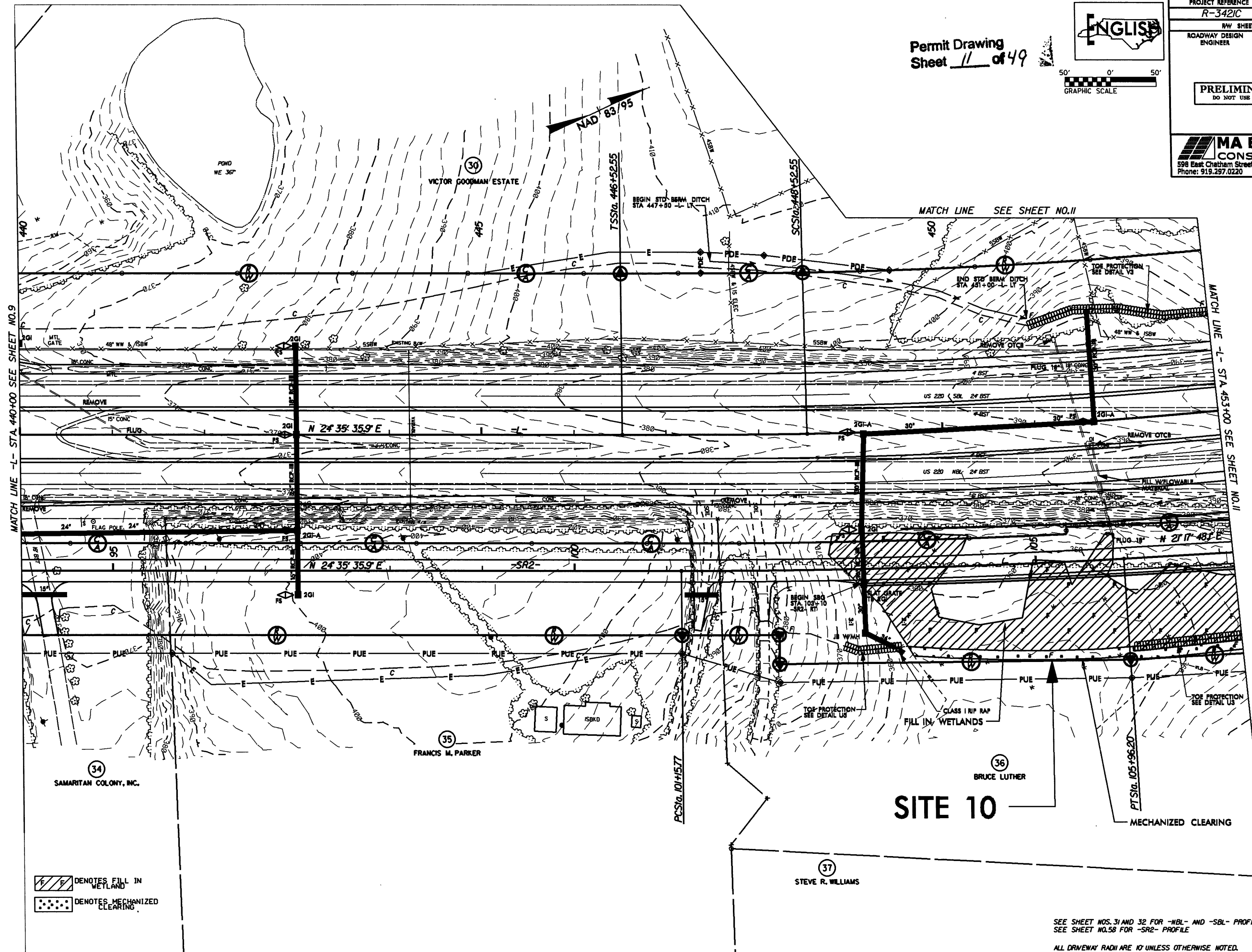
Permit Drawing
Sheet 11 of 49

ENGLISH

50' 0' 50'

GRAPHIC SCALE

PROJECT REFERENCE NO. R-3421C		SHEET NO. 10
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221		



REVISIONS

SYSTINGE
OGN
ISERNAM

SEE SHEET NOS. 31 AND 32 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 58 FOR -SR2- PROFILE
ALL DRIVEWAY RADII ARE 10 UNLESS OTHERWISE NOTED.

SITE 14

- ENLARGEMENT
- FILL IN

SITE 10

MECHANIZED CLEARING

DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y/O- OVER -L-

GRAPHIC SCALE

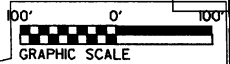
A horizontal scale bar with markings at 0, 50, and 100 feet. The bar is divided into segments: the first 25 feet are marked with vertical lines, and the remaining 75 feet are marked with diagonal lines. The text "50 FEET" is written below the bar.

LOCATION: DEAF OF RICHMOND OF US 238 TRAIL WITH
IN 1806 DOCKERY ROAD AND IN 1446 HAYWOOD
CEMETERY ROAD NORTH OF RICHMOND.

OF NO. 1-3311C COUNTY: HUNTERDON

OWNED BY: H.A. HUTCHINS

OWNED BY: A.W. NORMAN, JR DATE: JULY 16, 2004



PROJECT NUMBER	7-13-00
DATE	7-13-00
DESIGNED BY	MA Engineering
CHECKED BY	MA Engineering
IN CHARGE	MA Engineering
APPROVED BY	MA Engineering

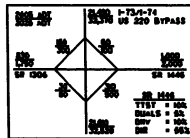
SITE 13

SITE 11

SITE 14

SITE 12

ENLARGEMENT SITE 12

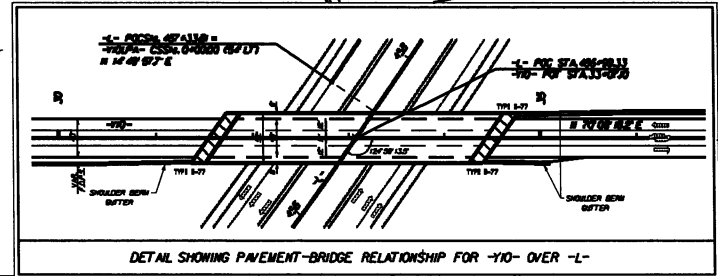


- DENOTES MECHANIZED CLEARING
- ▨ DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- ▨ DENOTES EXCAVATION IN WETLAND
- ▨ DENOTES IMPACTS IN SURFACE WATER (POND)
- ▨ DENOTES FILL IN WETLAND
- ▨ DENOTES IMPACTS IN SURFACE WATER

SITE 10

FILL IN WETLANDS

MECHANIZED CLEARING



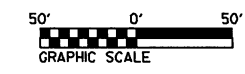
PROJECT NUMBER	7-13-00
DATE	7-13-00
DESIGNED BY	MA Engineering
CHECKED BY	MA Engineering
IN CHARGE	MA Engineering
APPROVED BY	MA Engineering

8/12/99

REVISIONS

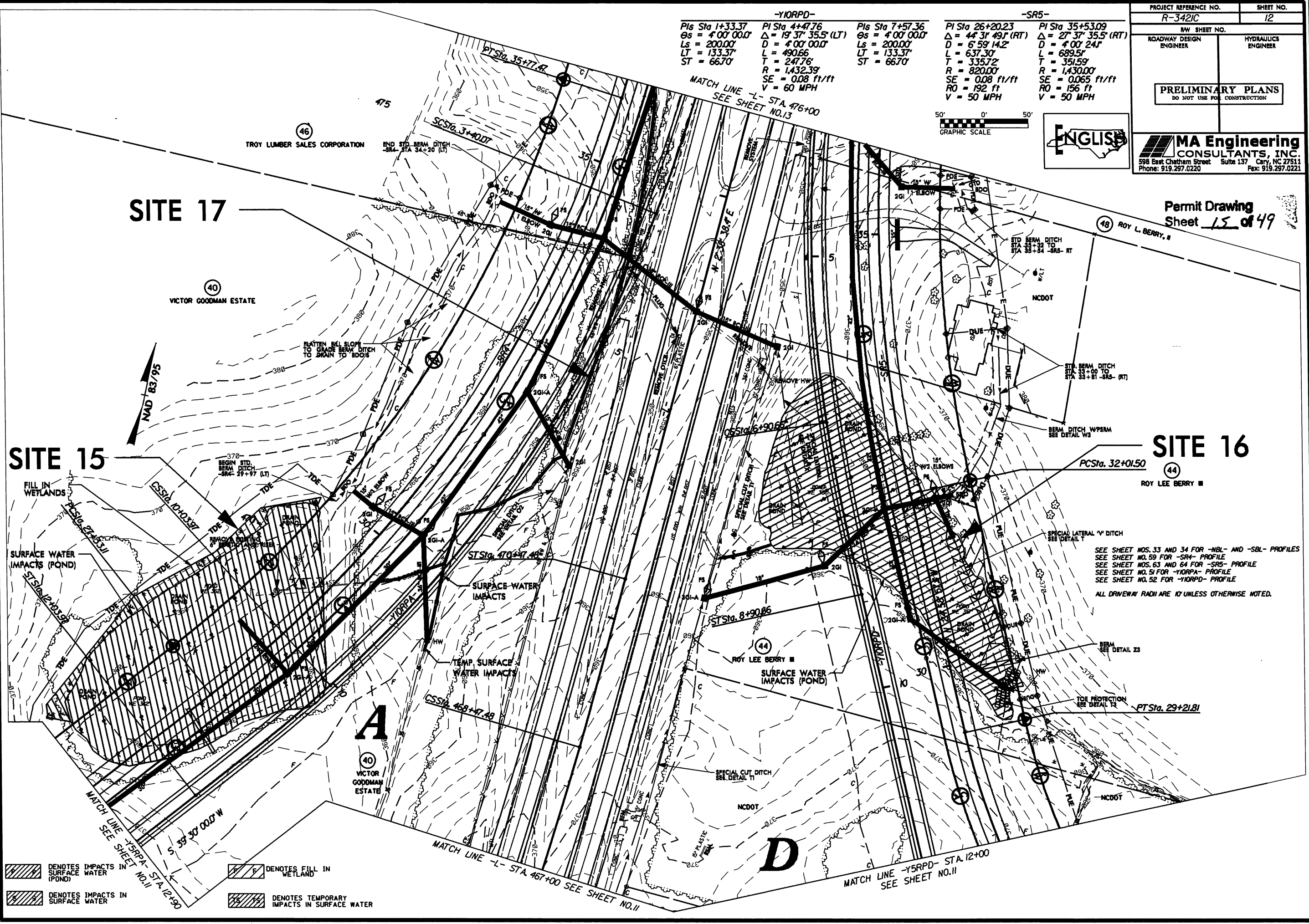
SYTIME

-YORPD-			-SR5-		
PIs Sta 1+33.37	PI Sta 4+47.76	PIs Sta 7+57.36	PI Sta 26+20.23	PI Sta 35+53.09	
Δs = 4'00'00.0"	Δ = 19'37'35.5" (LT)	Δs = 4'00'00.0"	Δ = 44'37'49" (RT)	Δ = 27'37'35.5" (RT)	
Ls = 200.00'	D = 4'00'00.0"	Ls = 200.00'	D = 6'59'14.2"	D = 4'00'24.1"	
LT = 133.37'	L = 490.66'	LT = 133.37'	L = 637.30'	L = 689.51'	
ST = 66.70'	T = 247.76'	ST = 66.70'	T = 335.72'	T = 351.59'	
	R = 1,432.39'		R = 820.00'	R = 1,430.00'	
	SE = 0.08 ft/ft		SE = 0.08 ft/ft	SE = 0.065 ft/ft	
	V = 60 MPH		RO = 192 ft	RO = 156 ft	
			V = 50 MPH	V = 50 MPH	



PROJECT REFERENCE NO. R-3421C		SHEET NO. 12
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221		

Permit Drawing
Sheet **15** of **49**

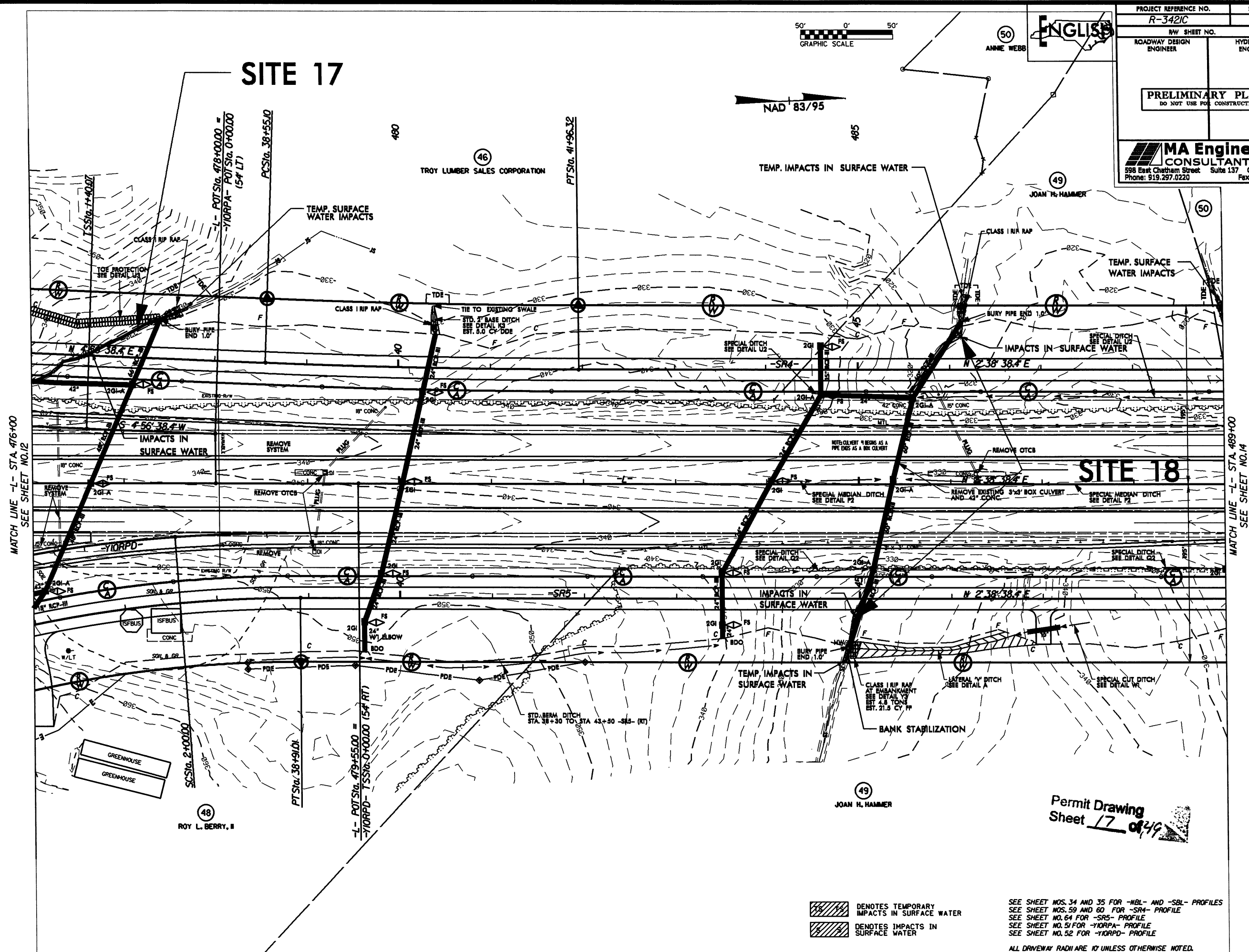


- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET NOS. 34 AND 35 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 59 AND 60 FOR -SR4- PROFILE
SEE SHEET NO. 64 FOR -SR5- PROFILE
SEE SHEET NO. 51 FOR -YORPA- PROFILE
SEE SHEET NO. 52 FOR -YORPD- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

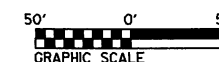
Permit Drawing
Sheet 17 of 17

SEE SHEET NOS. 34 AND 35 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 59 AND 60 FOR -SR4- PROFILE
SEE SHEET NO. 64 FOR -SR5- PROFILE
SEE SHEET NO. 51 FOR -YIORPA- PROFILE
SEE SHEET NO. 52 FOR -YIORDP- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

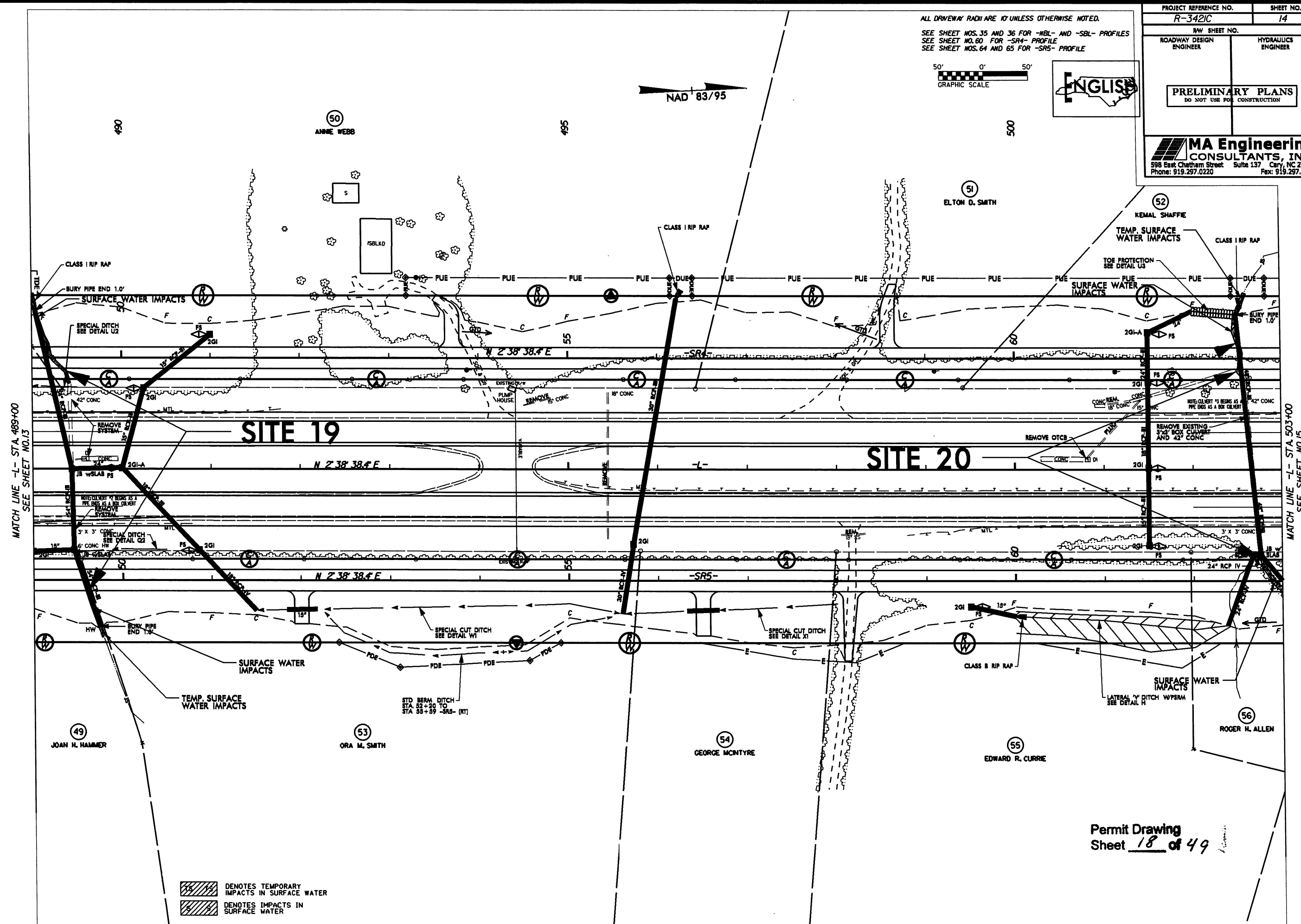
SEE SHEET NOS. 35 AND 36 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 60 FOR -SR4- PROFILE
SEE SHEET NOS. 64 AND 65 FOR -SR5- PROFILE



ENGLISH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

Permit Drawing
Sheet 18 of 49

SEE SHEET NOS. 35 AND 36 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 60 FOR -SR4- PROFILE
SEE SHEET NOS. 64 AND 65 FOR -SR5- PROFILE

ENGLISH


50' 0'


GRAPHIC SCALE

ATCH LINE -L- STA. 503+00
SEE SHEET NO. 15

SITE 20

Permit Drawing
Sheet 19 of

 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

 DENOTES IMPACTS IN SURFACE WATER


SEE SHEET NOS. 36 AND 37 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 60 AND 61 FOR -SR4- PROFILE
SEE SHEET NO. 65 FOR -SR5- PROFILE




SITE 22

MATCH LINE -L- STA. 517+00
SEE SHEET NO. 16

Permit Drawing
Sheet 20 of 39

 DENOTES IMPACTS IN SURFACE WATER

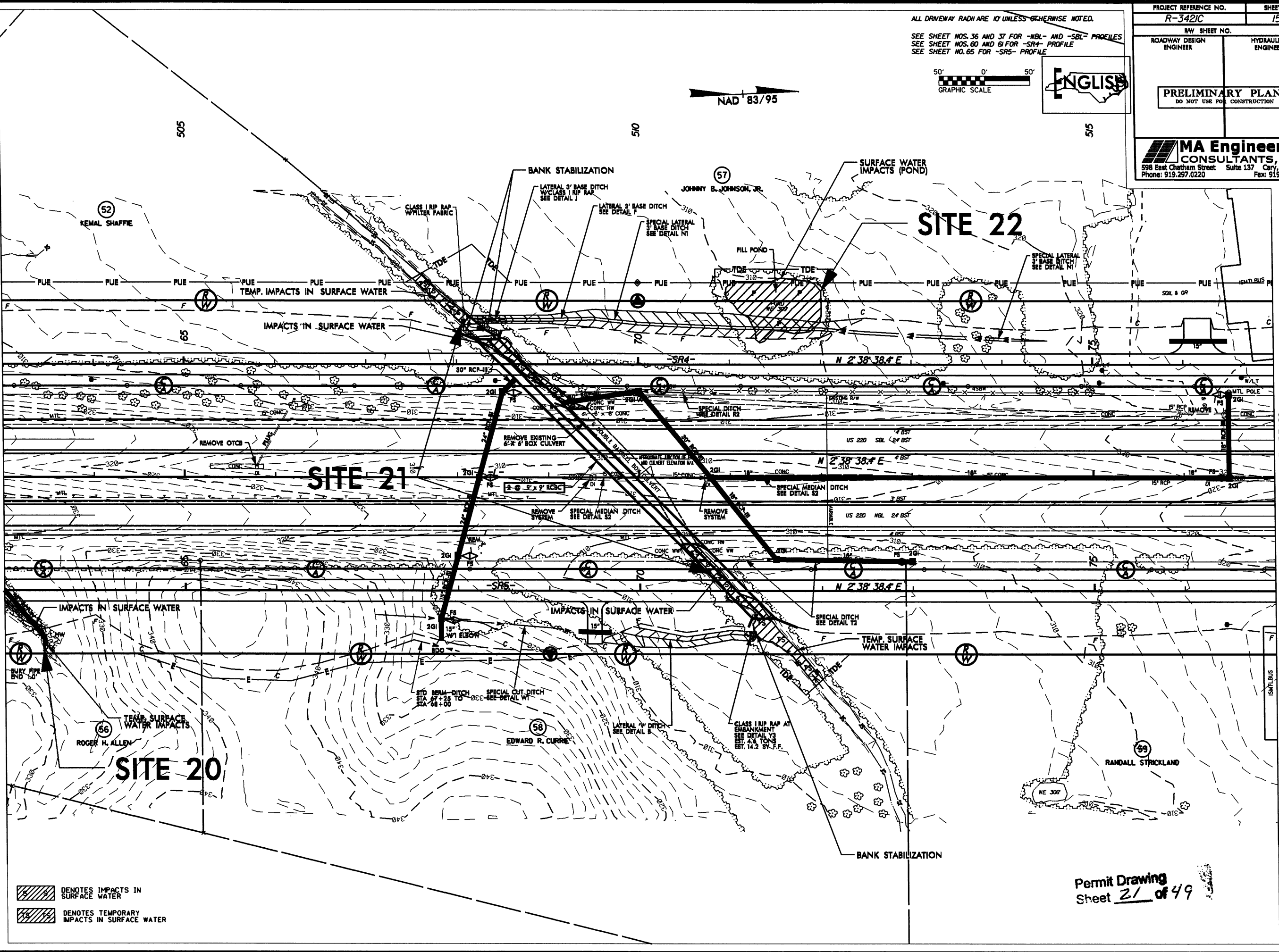
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

8/12/1999

REVISIONS

*****SYTIME*****
*****LUND*****
*****LUND*****

MATCH LINE -L- STA 503+00
SEE SHEET NO.14



ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 36 AND 37 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 60 AND 61 FOR -SR4- PROFILE
SEE SHEET NO. 65 FOR -SR5- PROFILE

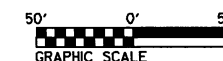
50' 0' 50'
GRAPHIC SCALE

NAD 83/95

ENGLISH

PROJECT REFERENCE NO. R-3421C		SHEET NO. 15	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

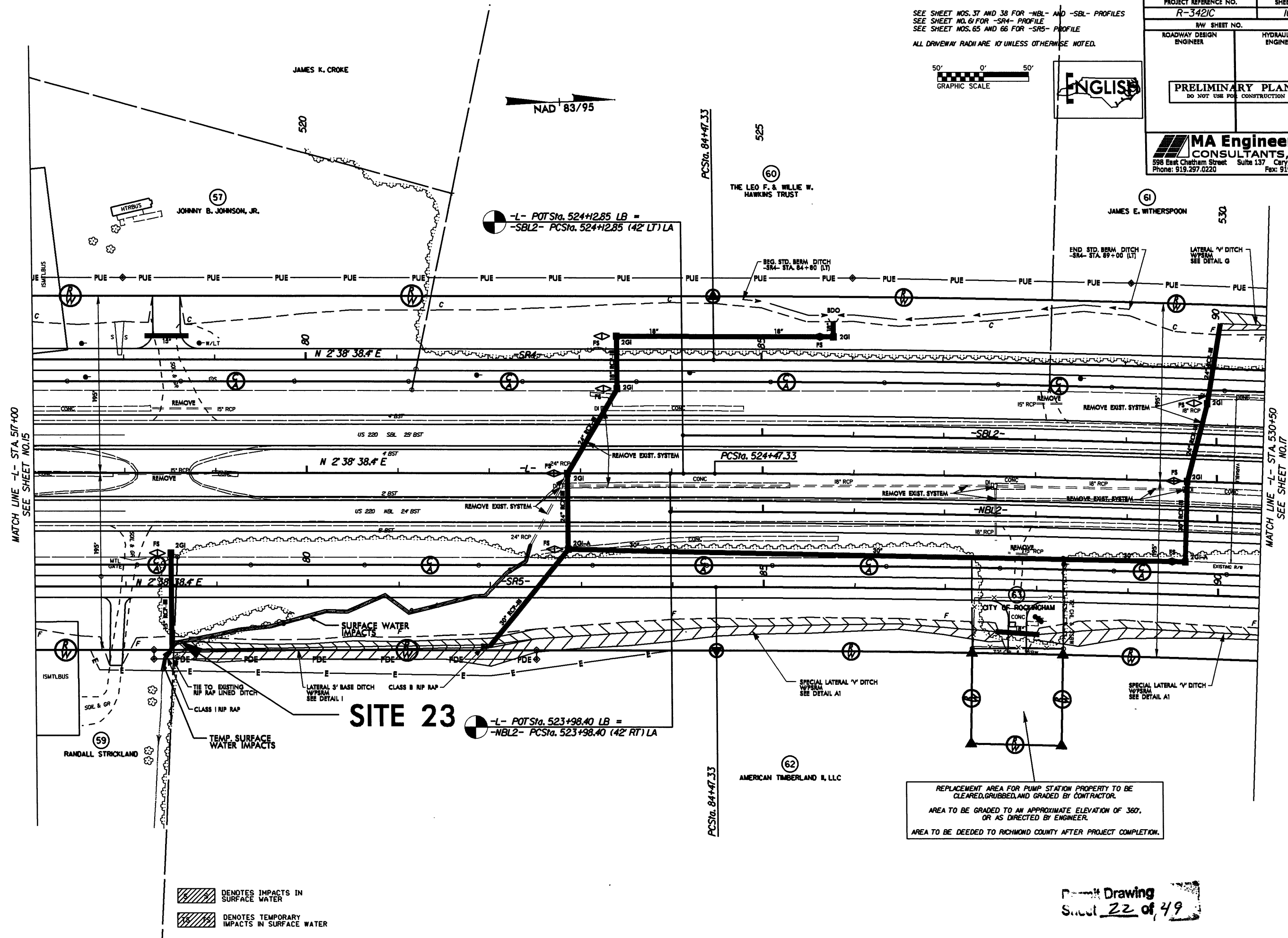
Permit Drawing
Sheet **21** of **49**



ENGLISH

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0222



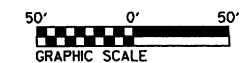
REPLACEMENT AREA FOR PUMP STATION PROPERTY TO BE
CLEARED, GRUBBED, AND GRADED BY CONTRACTOR.

AREA TO BE GRADED TO AN APPROXIMATE ELEVATION OF 360,
OR AS DIRECTED BY ENGINEER.

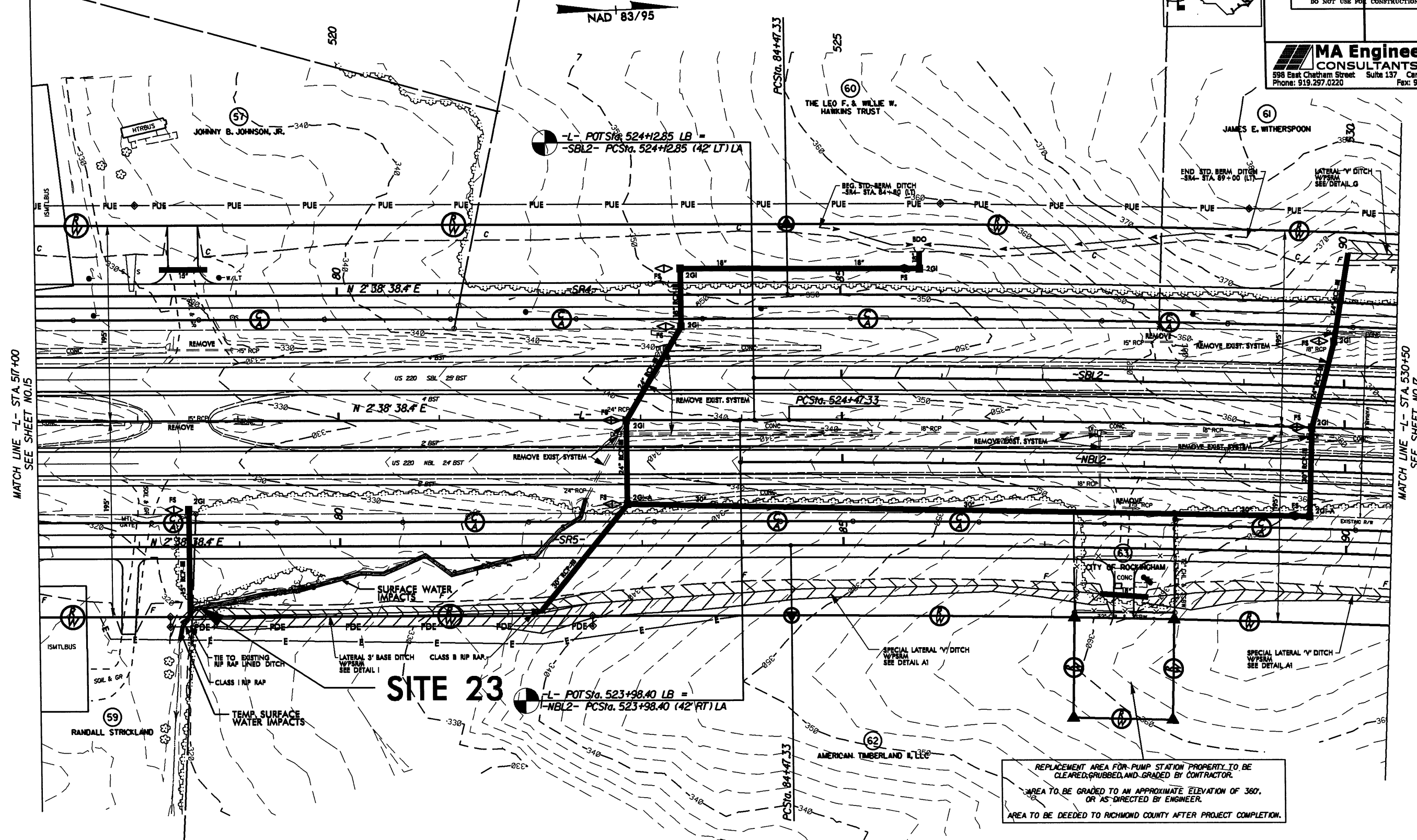
AREA TO BE DEEDED TO RICHMOND COUNTY AFTER PROJECT COMPLETION.

Permit Drawing
Sheet 22 of 49

SEE SHEET NOS. 37 AND 38 FOR -NBL- AND -SBL- PROFILES
 SEE SHEET NO. 61 FOR -SR4- PROFILE
 SEE SHEET NOS. 65 AND 66 FOR -SR5- PROFILE
 ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



PROJECT REFERENCE NO. R-3421C		SHEET NO. 16	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



MATCH LINE -L- STA. 517+00
SEE SHEET NO.15

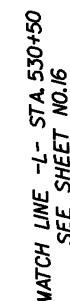
MATCH LINE -L- STA. 530+50
SEE SHEET NO.17

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REPLACEMENT AREA FOR PUMP STATION PROPERTY TO BE
 CLEARED, GRUBBED, AND GRADED BY CONTRACTOR.
 AREA TO BE GRADED TO AN APPROXIMATE ELEVATION OF 360',
 OR AS DIRECTED BY ENGINEER.
 AREA TO BE DEEDED TO RICHMOND COUNTY AFTER PROJECT COMPLETION.

Permit Drawing
 Sheet **23** of 29

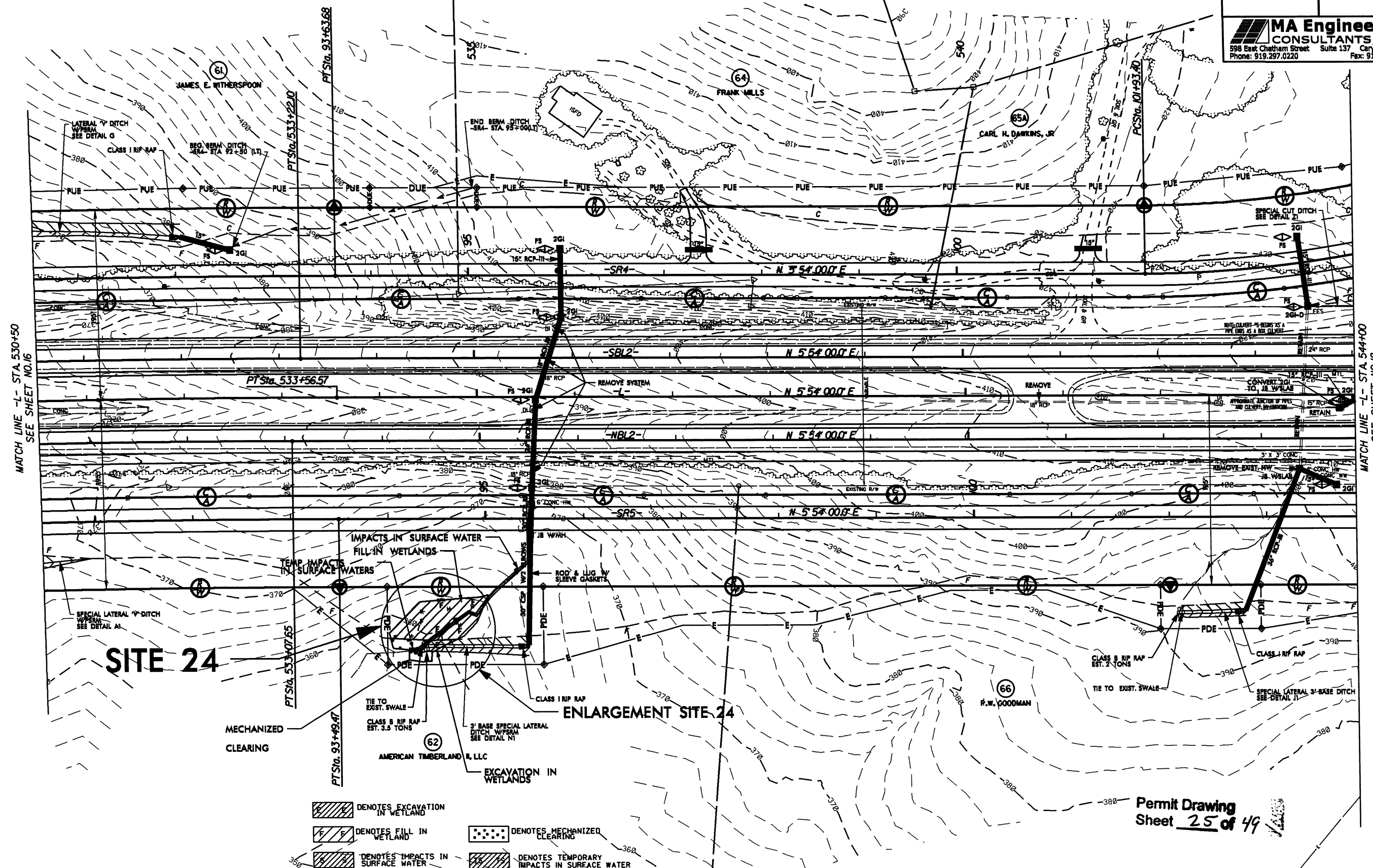
SEE SHEET NOS. 38 AND 39 FOR -HBL- AND -SBL- PROFILES
SEE SHEET NOS. 61 AND 62 FOR -SR4- PROFILE
SEE SHEET NO. 66 FOR -SR5- PROFILE



MATCH LINE -L- STA 544+00
SEE SHEET NO. 18

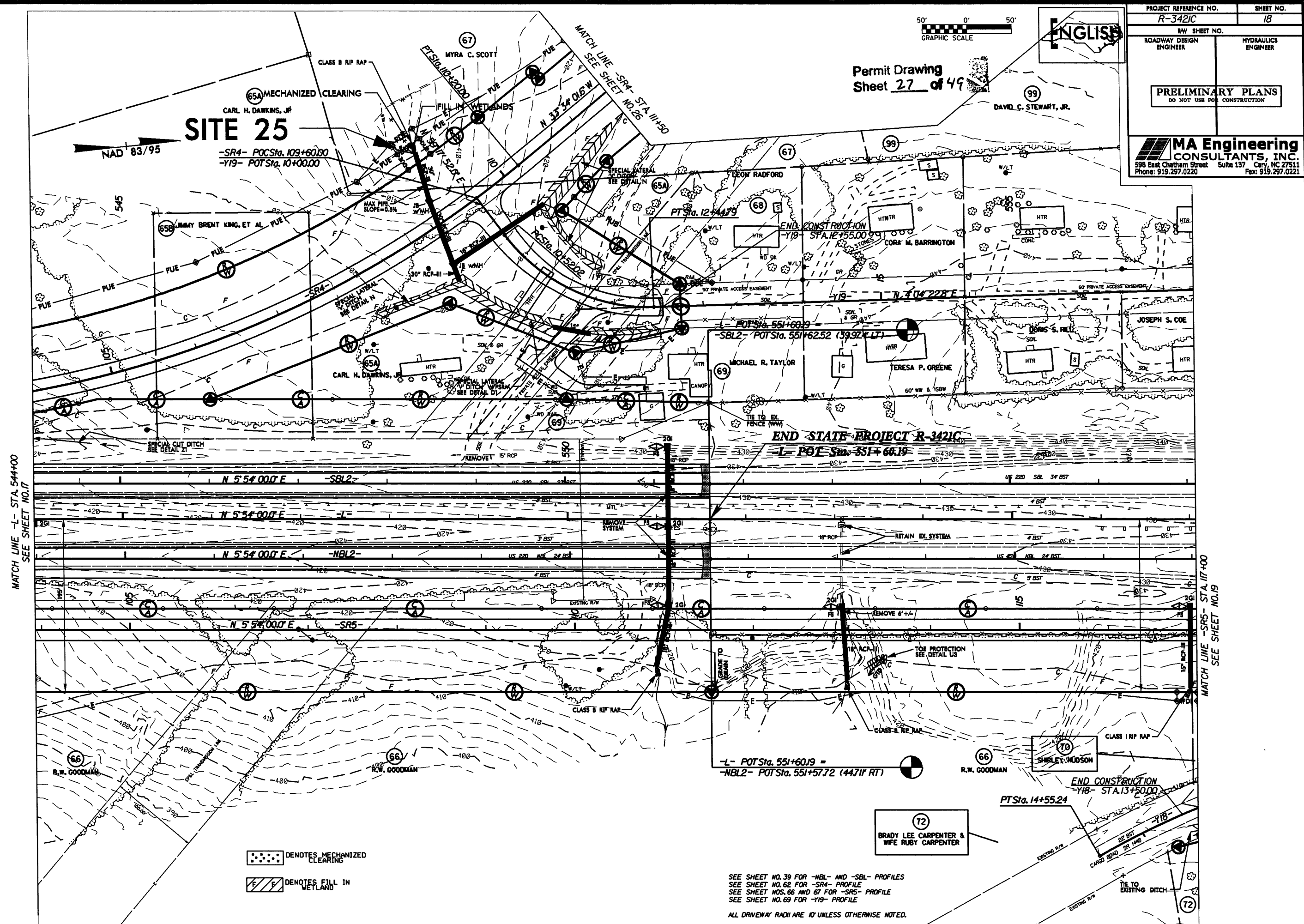
Sheet 24 of 49

SEE SHEET NOS. 38 AND 39 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 61 AND 62 FOR -SR4- PROFILE
SEE SHEET NO. 66 FOR -SR5- PROFILE

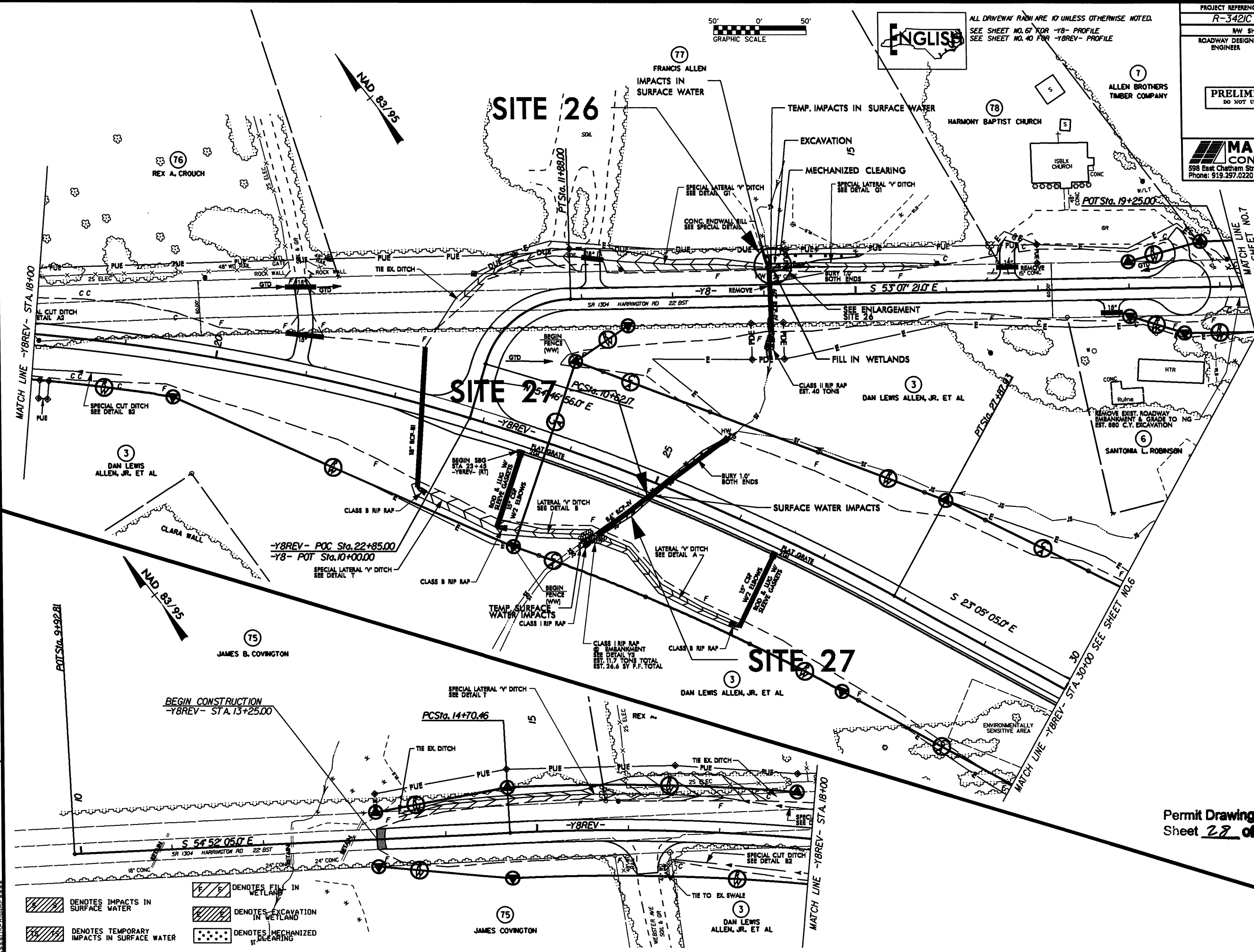




ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



PROJECT REFERENCE NO. R-3421C		SHEET NO. 20	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



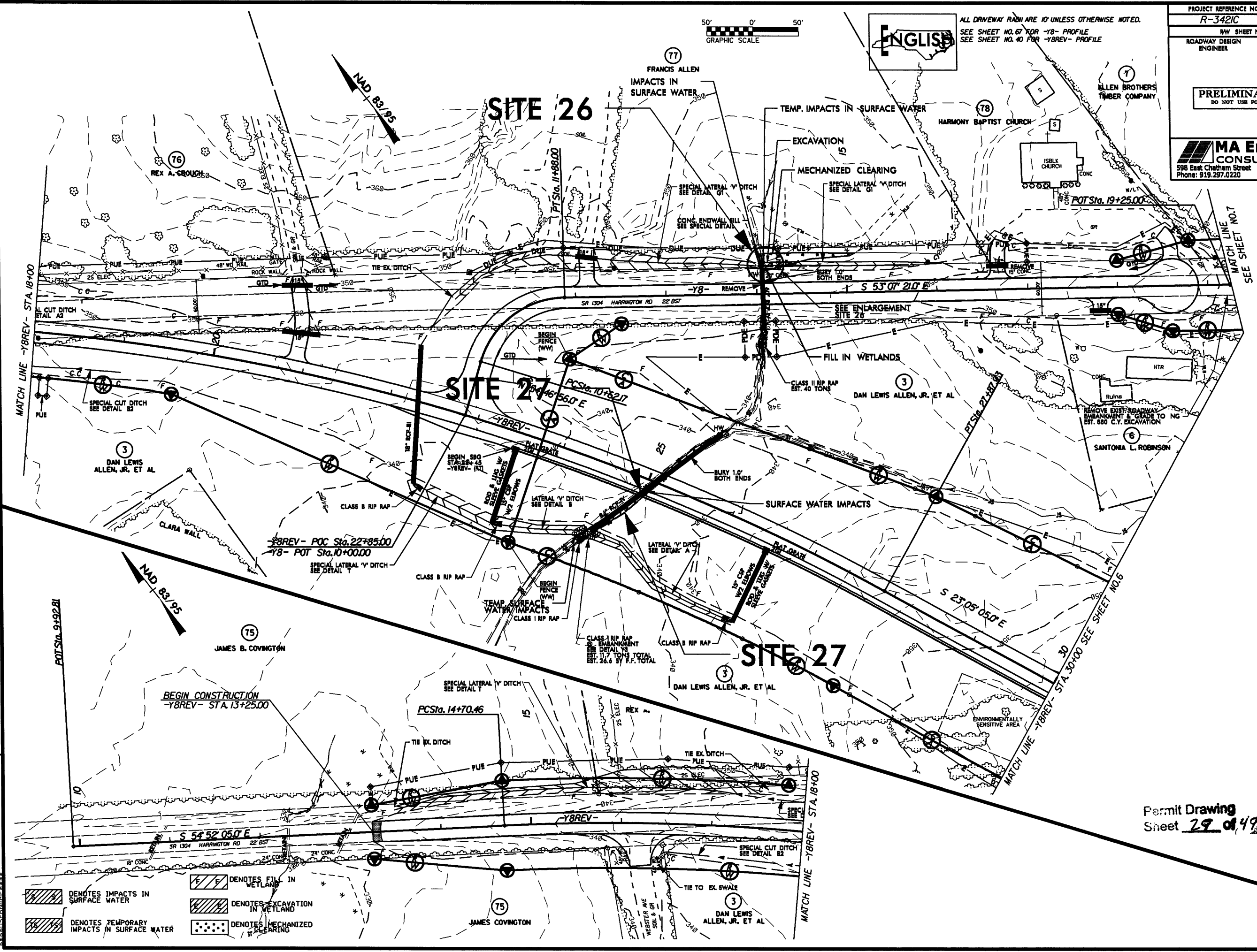
Permit Drawing
Sheet **28** of **49**

PROJECT REFERENCE NO. R-3421C		SHEET NO. 20	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



ENGLISH

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
 SEE SHEET NO. 67 FOR -Y8- PROFILE
 SEE SHEET NO. 40 FOR -Y8REV- PROFILE



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

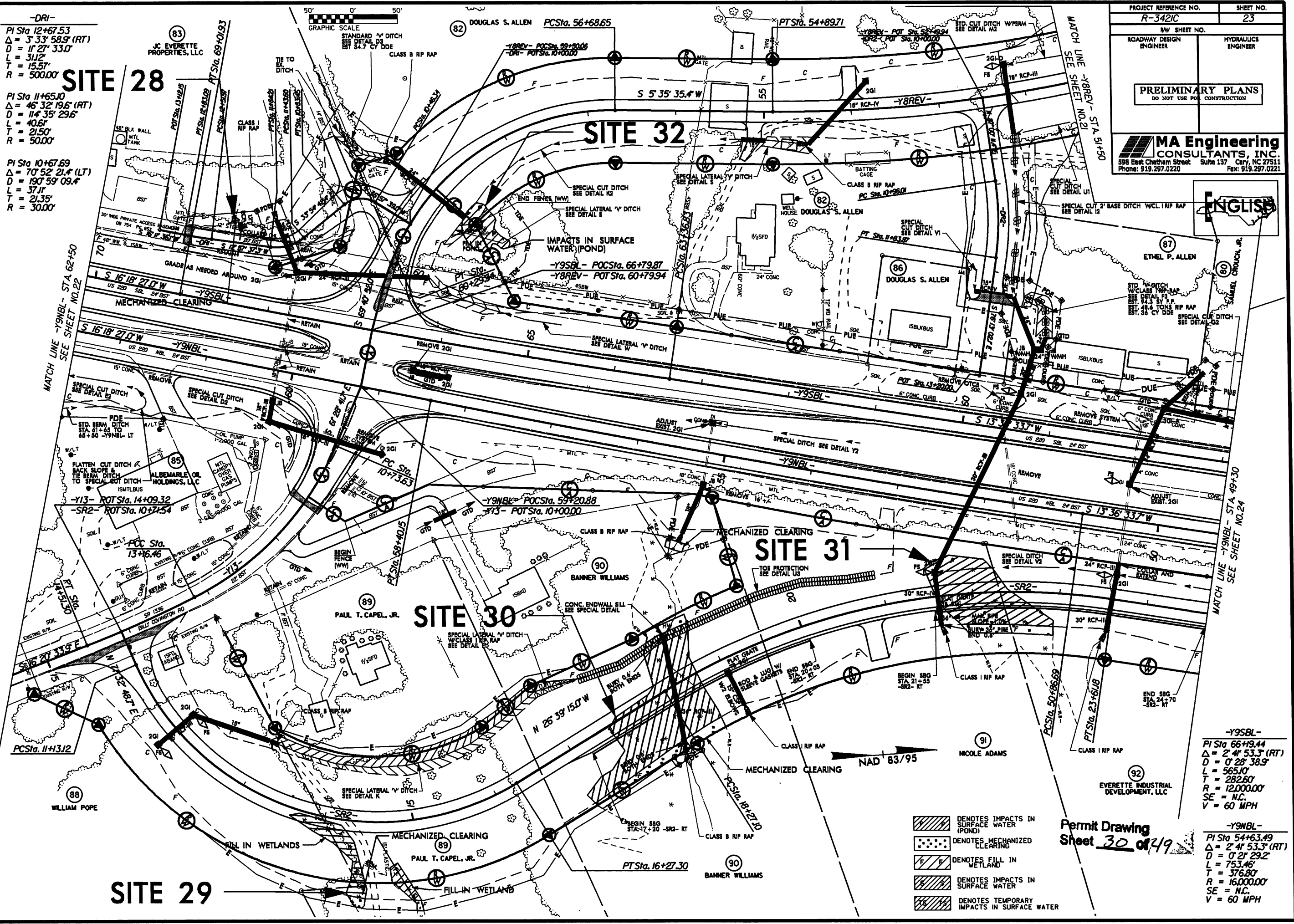
Permit Drawing
 Sheet **29 of 49**

-DRI-
PI Sta 12+67.53
 $\Delta = 3' 33" 58.9" (RT)$
 $D = 11' 21" 33.0"$
 $L = 31.2'$
 $T = 15.5'$
 $R = 500.00'$

PI Sta 11+65.10
 $\Delta = 46' 32" 19.6" (RT)$
 $D = 114' 35" 29.6"$
 $L = 40.6'$
 $T = 21.5'$
 $R = 50.00'$

PI Sta 10+67.69
 $\Delta = 70' 52" 21.4" (LT)$
 $D = 190' 59" 09.4"$
 $L = 37.1'$
 $T = 21.35'$
 $R = 30.00'$

SITE 28



PROJECT REFERENCE NO. R-3421C		SHEET NO. 23
RW SHEET NO.		HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221		



- DENOTES IMPACTS IN SURFACE WATER (POND)
- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Permit Drawing
Sheet **30 of 49**

-Y9SBL-
PI Sta 66+19.44
 $\Delta = 2' 41" 53.3" (RT)$
 $D = 0' 28" 38.9"$
 $L = 565.10'$
 $T = 282.60'$
 $R = 12,000.00'$
 $SE = N.C.$
 $V = 60 MPH$

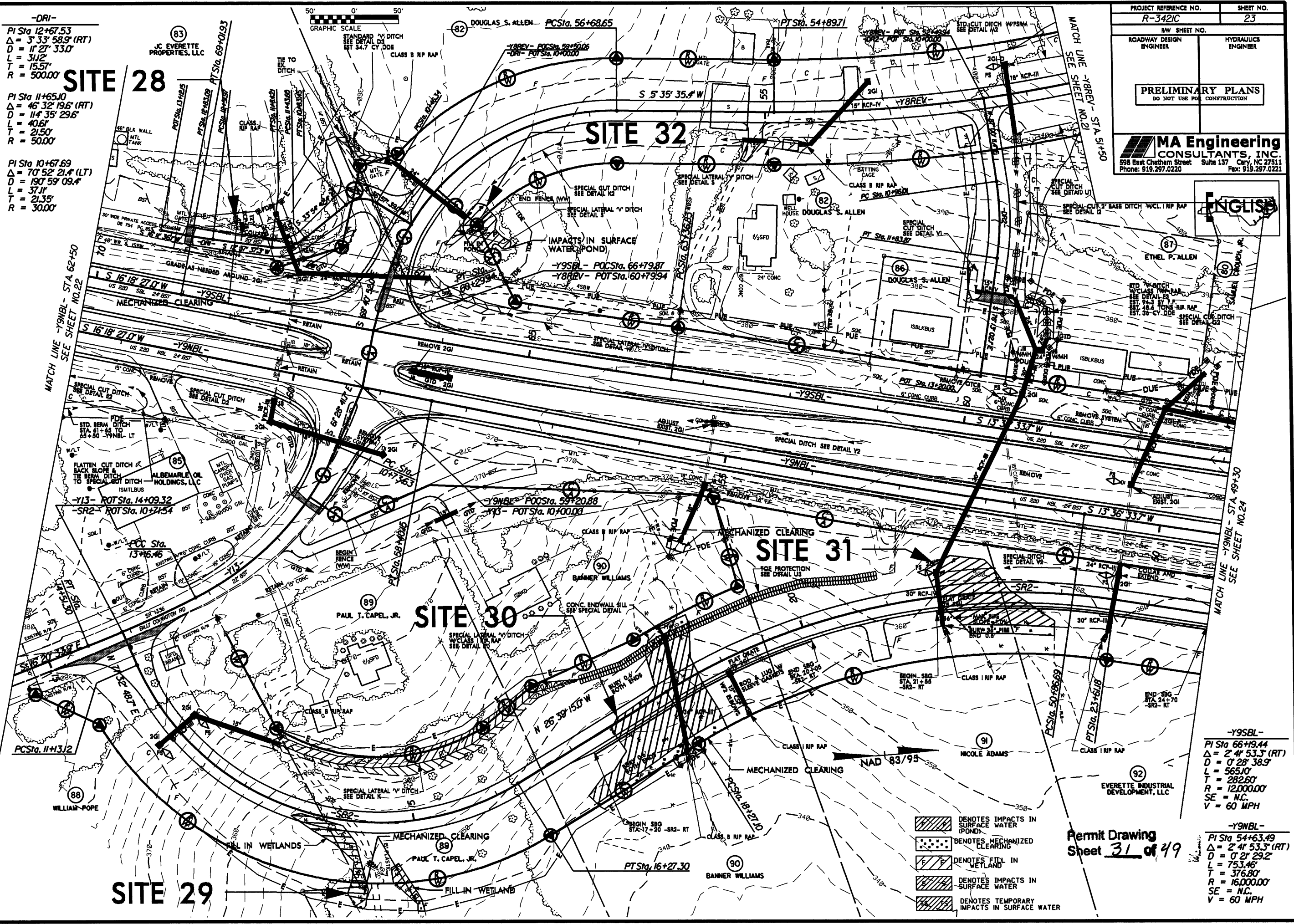
-Y9NBL-
PI Sta 54+63.49
 $\Delta = 2' 41" 53.3" (RT)$
 $D = 0' 28" 38.9"$
 $L = 753.46'$
 $T = 376.80'$
 $R = 16,000.00'$
 $SE = N.C.$
 $V = 60 MPH$

-DRI-
PI Sta 12+67.53
Δ = 3' 33" 58.9' (RT)
D = 11' 27" 33.0'
L = 3112'
T = 15.57'
R = 500.00'

PI Sta 11+65.10
Δ = 46' 32" 19.6' (RT)
D = 114' 35" 29.6'
L = 40.61'
T = 2.50'
R = 50.00'

PI Sta 10+67.69
Δ = 70' 52" 21.4' (LT)
D = 190' 59" 09.4'
L = 37.11'
T = 21.35'
R = 30.00'

SITE 28



PROJECT REFERENCE NO. R-3421C		SHEET NO. 23	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street, Suite 137, Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

ENGLISH

SITE 29

SITE 30

SITE 31

SITE 32

-Y9SBL-
PI Sta 66+19.44
Δ = 2' 41" 53.3' (RT)
D = 0' 28" 38.9'
L = 565.10'
T = 282.60'
R = 12,000.00'
SE = N.C.
V = 60 MPH


-Y9NBL-
PI Sta 54+63.49
Δ = 2' 41" 53.3' (RT)
D = 0' 28" 29.2'
L = 753.46'
T = 376.80'
R = 16,000.00'
SE = N.C.
V = 60 MPH

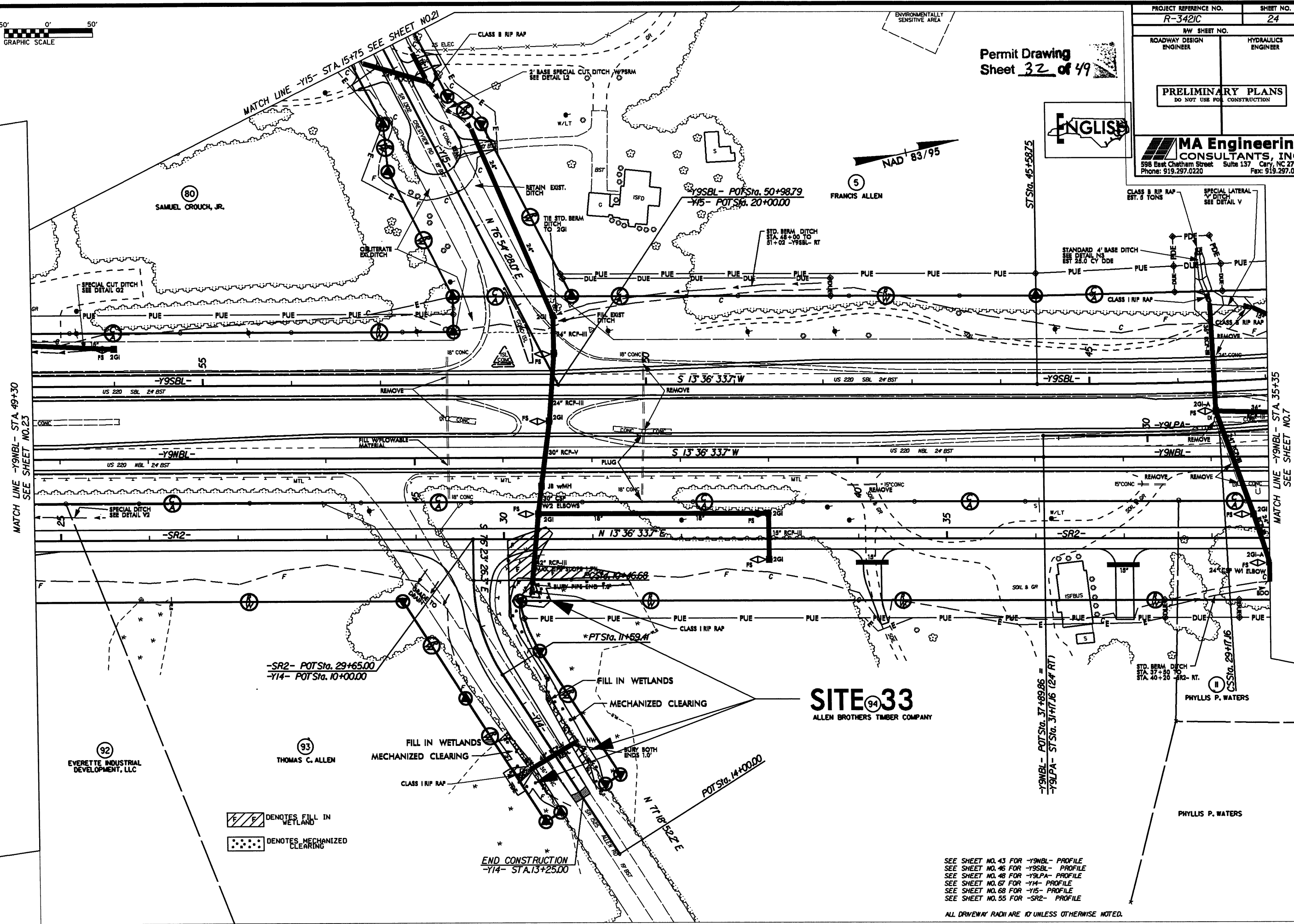
Permit Drawing
Sheet 31 of 49



Permit Drawing
Sheet 32 of 49

ENGLISH

PROJECT REFERENCE NO. <i>R-3421C</i>		SHEET NO. <i>24</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;">PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>			
<div>MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221</div>			

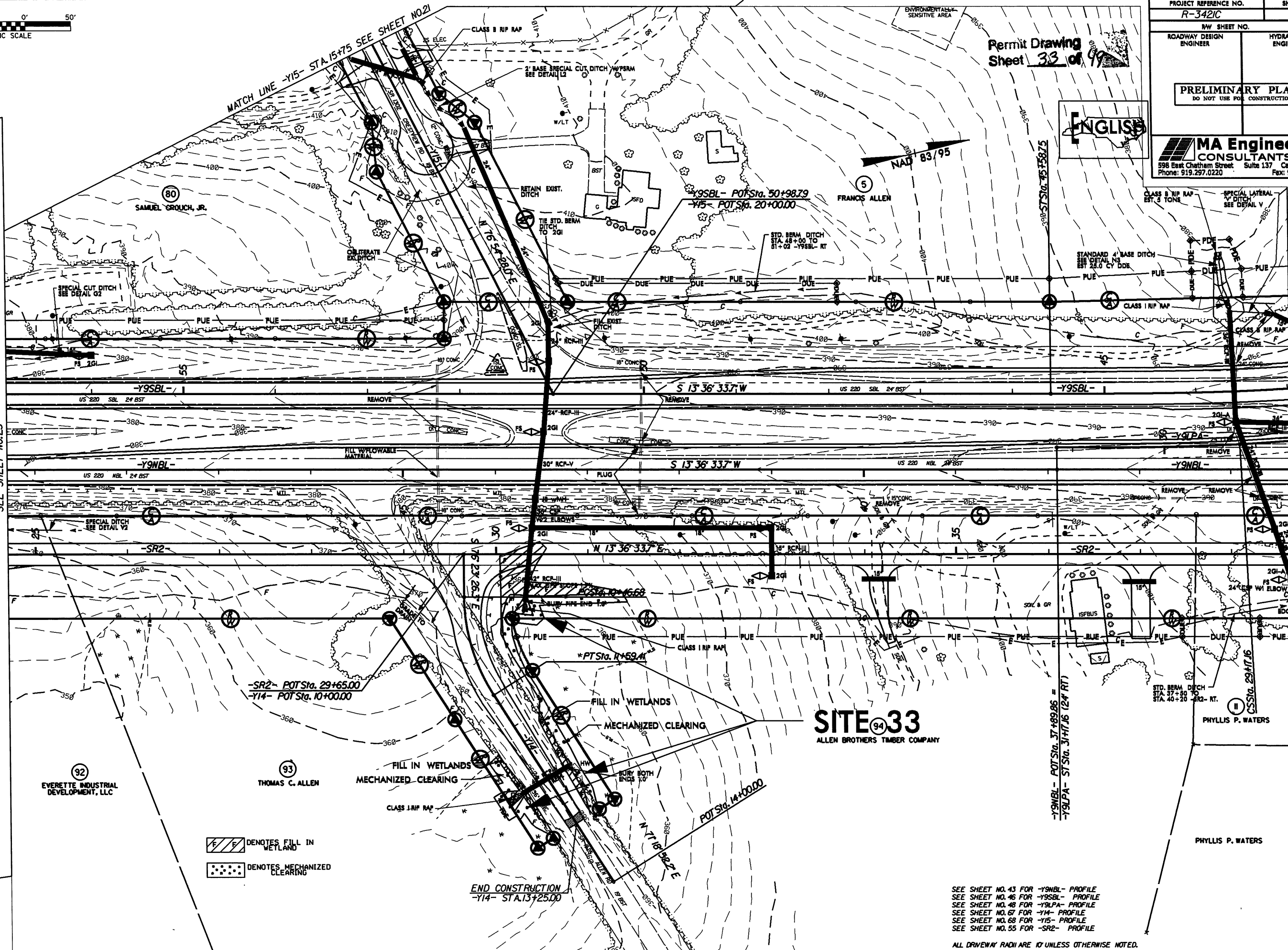


SEE SHEET NO. 43 FOR -Y9NBL- PROFILE
SEE SHEET NO. 46 FOR -Y9SBL- PROFILE
SEE SHEET NO. 48 FOR -Y9LPA- PROFILE
SEE SHEET NO. 67 FOR -Y14- PROFILE
SEE SHEET NO. 68 FOR -Y15- PROFILE
SEE SHEET NO. 55 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



MATCH LINE -Y9NBL- STA. 49+30
SEE SHEET NO. 23



Permit Drawing
Sheet 33 of 99

ENGLISH

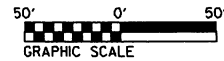
PROJECT REFERENCE NO. R-3421C		SHEET NO. 24	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

SITE 33
ALLEN BROTHERS TIMBER COMPANY


- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

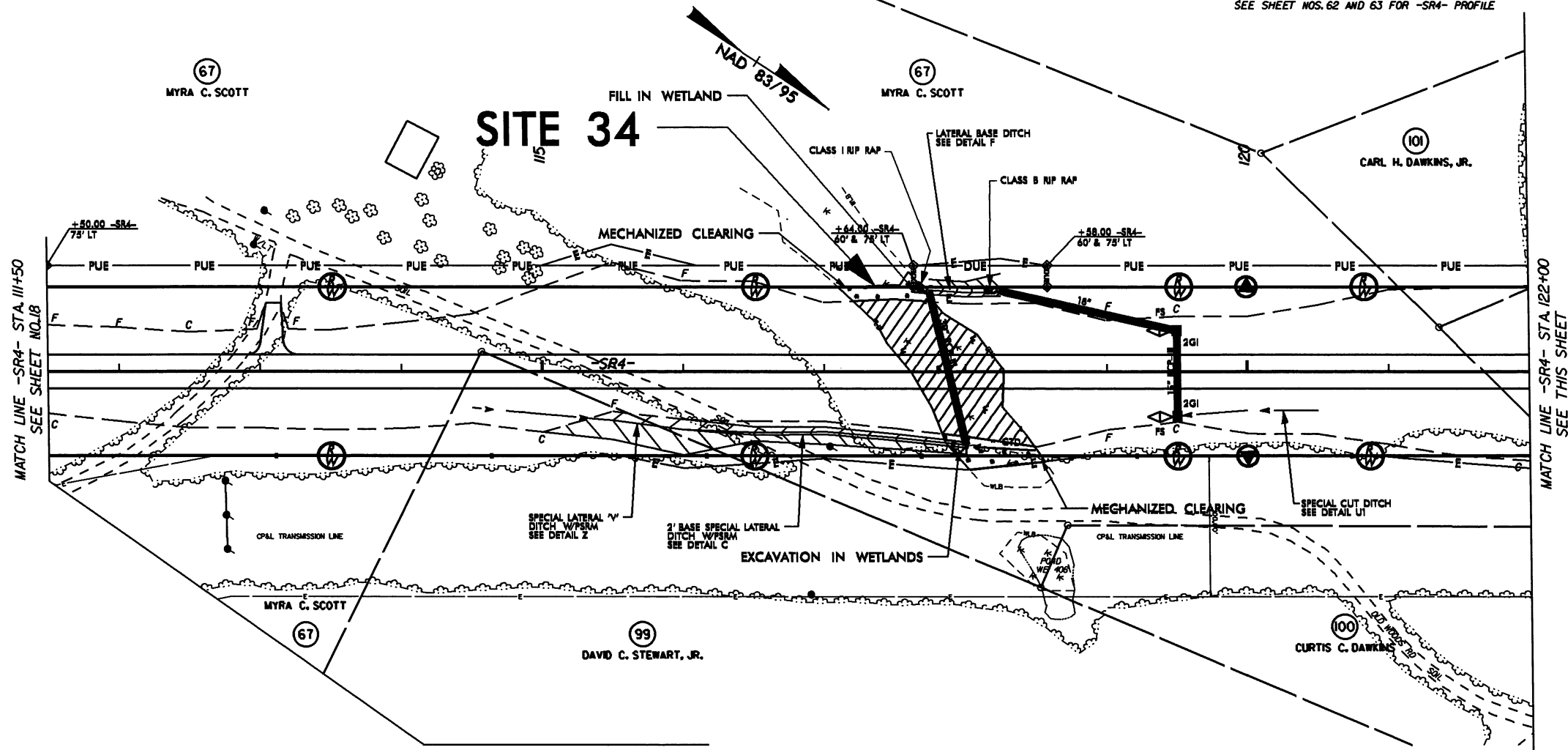
SEE SHEET NO. 43 FOR -Y9NBL- PROFILE
SEE SHEET NO. 46 FOR -Y9SBL- PROFILE
SEE SHEET NO. 48 FOR -Y9LPA- PROFILE
SEE SHEET NO. 67 FOR -Y14- PROFILE
SEE SHEET NO. 68 FOR -Y15- PROFILE
SEE SHEET NO. 55 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

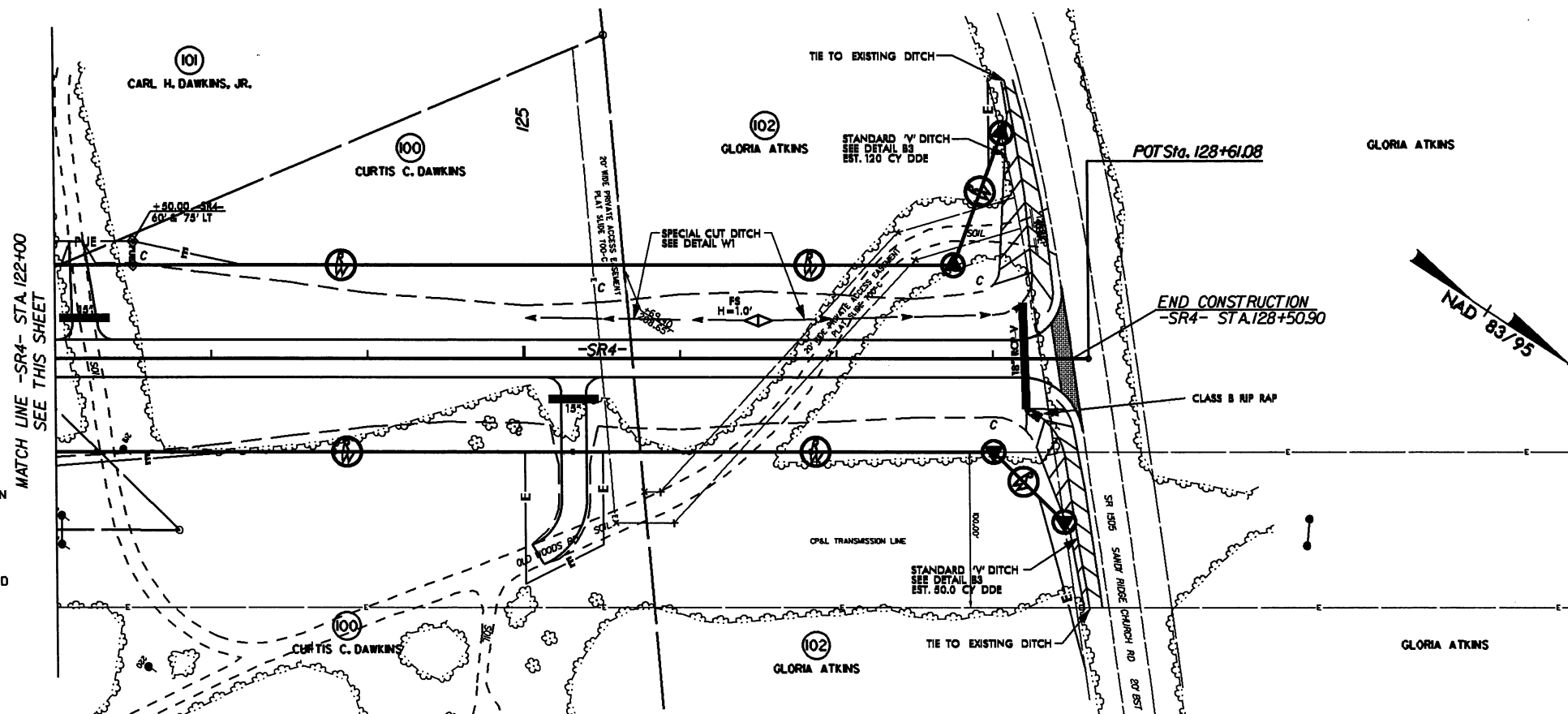


ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NOS. 62 AND 63 FOR -SR4- PROFILE

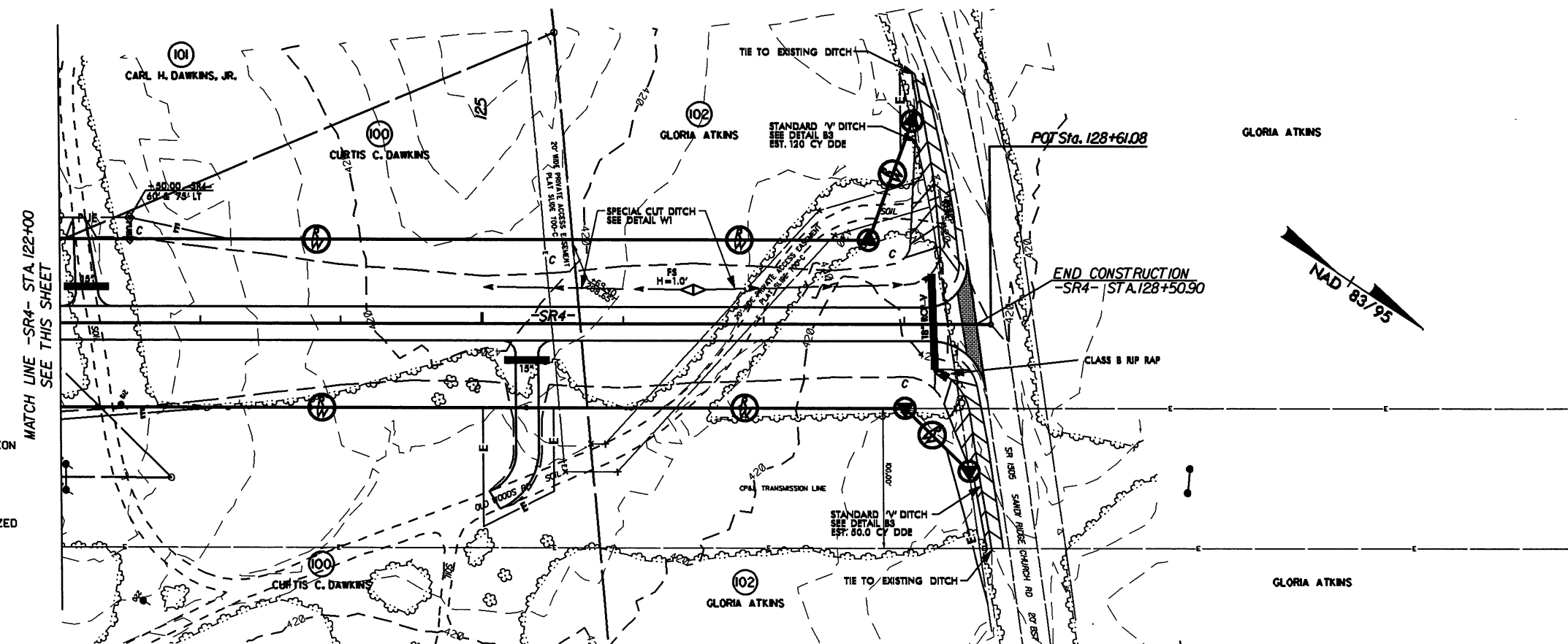
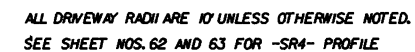
PROJECT REFERENCE NO. R-3421C		SHEET NO. 26	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;">PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>			
<div style="display: flex; align-items: center; justify-content: space-between;"><div style="text-align: left;"><p>MA Engineering CONSULTANTS, INC. 598 East Chatham Street Phone: 919.297.0220</p></div><div style="text-align: right;"><p>Suite 137 Cary, NC 27511 Fax: 919.297.0221</p></div></div>			



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



Permit Drawing
Sheet **34** of **49**

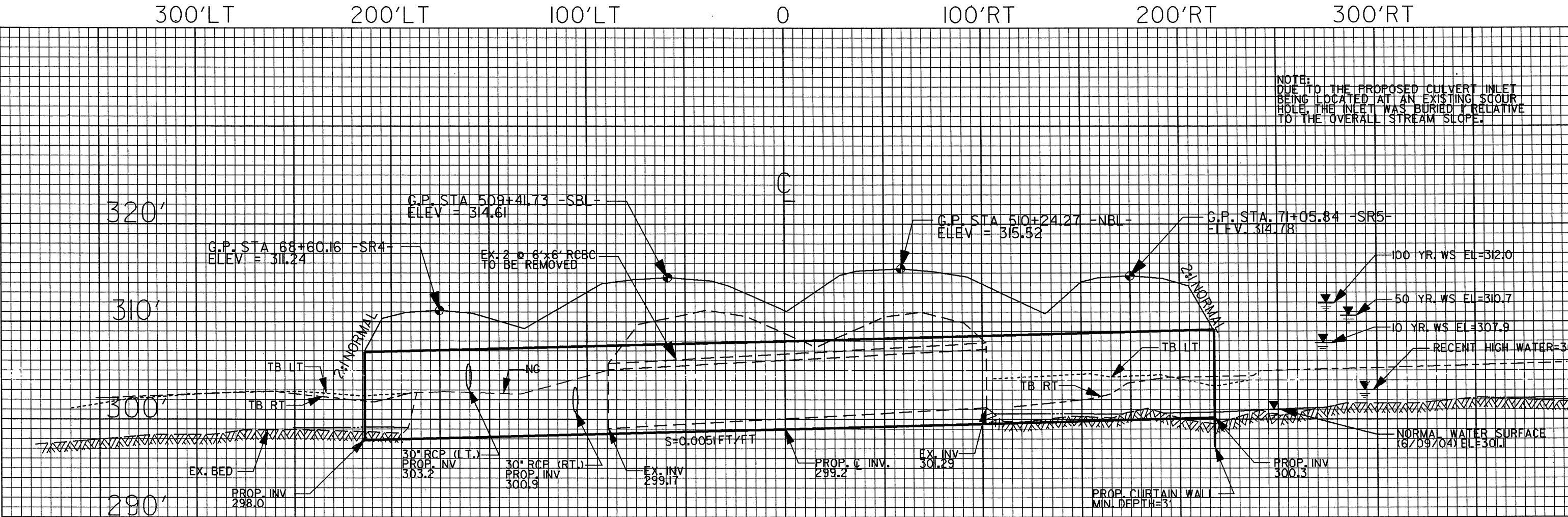
Permit Drawing
Sheet 35 of 49

CPAL TRANSMISSION LINE

PROFILE ALONG CULVERT

-L- STA. 509+83
 PROP. 2 @ 9'X9' RCBC
 SKEW: 45.5°

Permit Drawing
 Sheet 36 of 49



SCALES: 1"=50' HORZ
 1"=10' VERT.

[illegible]

Permit Drawing
Sheet 38 of 49

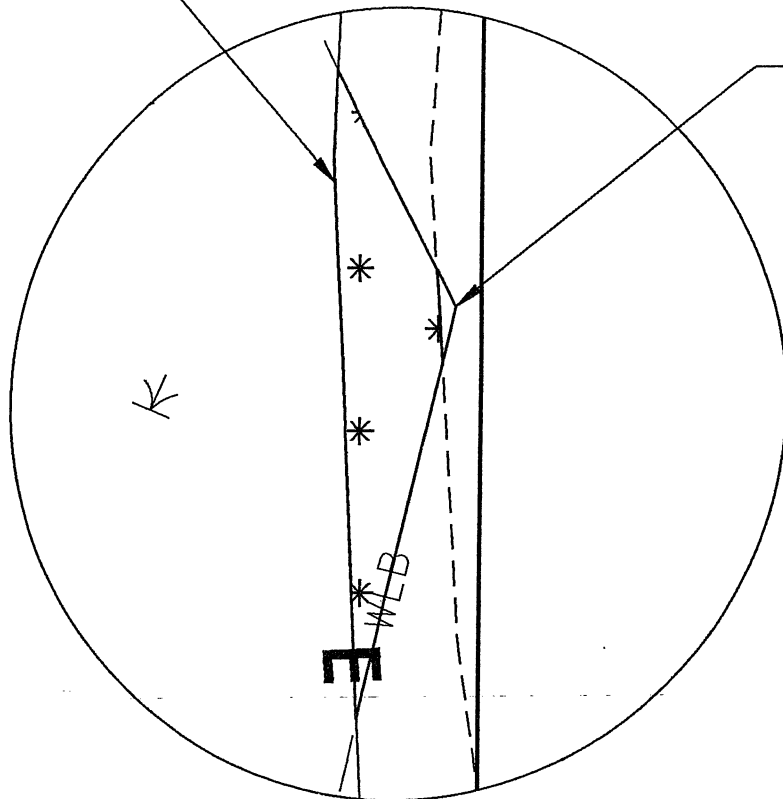
PROJECT REFERENCE NO.		SHEET NO.	
R-3421C			
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

[illegible]

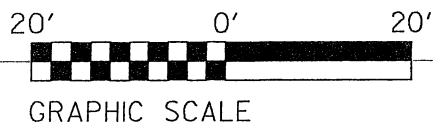
ENLARGEMENT SITE 4

MECHANIZED
CLEARING

FILL IN WETLANDS



Permit Drawing
Sheet 39 of 49



NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY

PROJECT: 34642.1.2 (R-3421C)

US220 BYPASS FROM 0.3 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE

SHEET OF

04/21/11

ENLARGEMENT SITE 5

MECHANIZED CLEARING

TEMP. SURFACE
WATER IMPACTS

FILL IN
WETLANDS

SURFACE WATER
IMPACTS

FILL IN
WETLANDS

Permit Drawing
Sheet 40 of 49

20' 0' 20'
GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 34542.12 (R-3421C)

**US220 BYPASS FROM 0.3 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE**

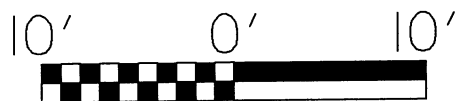
SHEET

OF

04/21/11

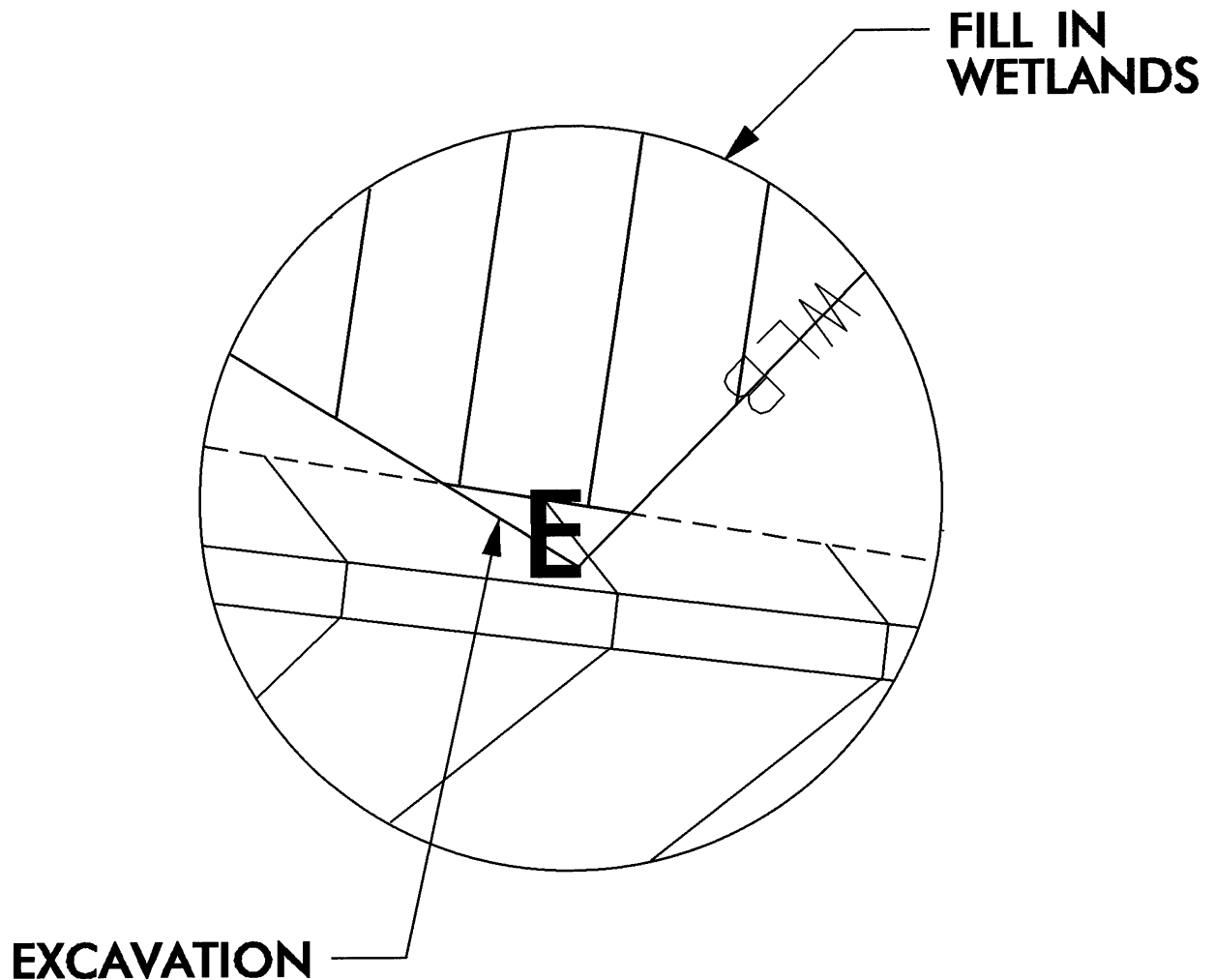
A circular diagram illustrating a proposed road layout. The diagram features several intersecting lines, including a dashed line and a solid line. A large, bold, black arrow points from the text 'MECHANIZED CLEARING' towards a specific area of the diagram. The text 'REM.' is prominently displayed in the upper left quadrant. Other labels include 'WLB' and 'VATION' (partially visible at the bottom left). The diagram also includes a small asterisk symbol and a cloud-like shape on the right side.

Permit Drawing
Sheet 41 of 49

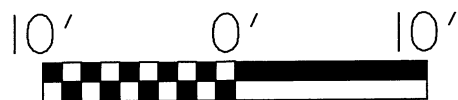


4 / 21 / 11

ENLARGEMENT SITE 7



Permit Drawing
Sheet 42 of 49



GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 34542.1.2 (R-3421C)

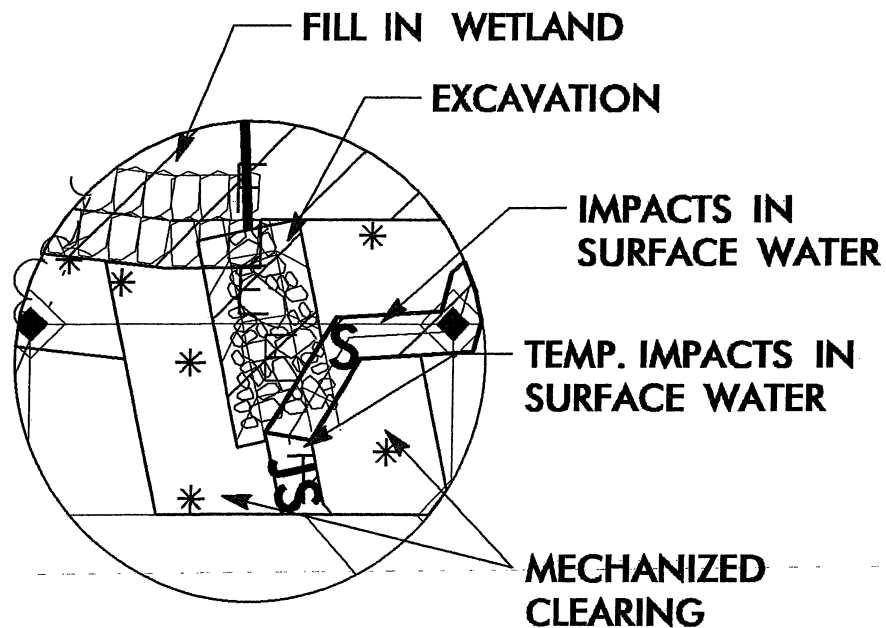
**US220 BYPASS FROM 0.2 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE**

SHEET

OF

4 / 21 / 11

ENLARGEMENT SITE 9A



Permit Drawing
Sheet 43 of 49

PLAN VIEW

20' 0' 20'



GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS
RICHMOND COUNTY

PROJECT: 34542.1.2 (R-3421C)

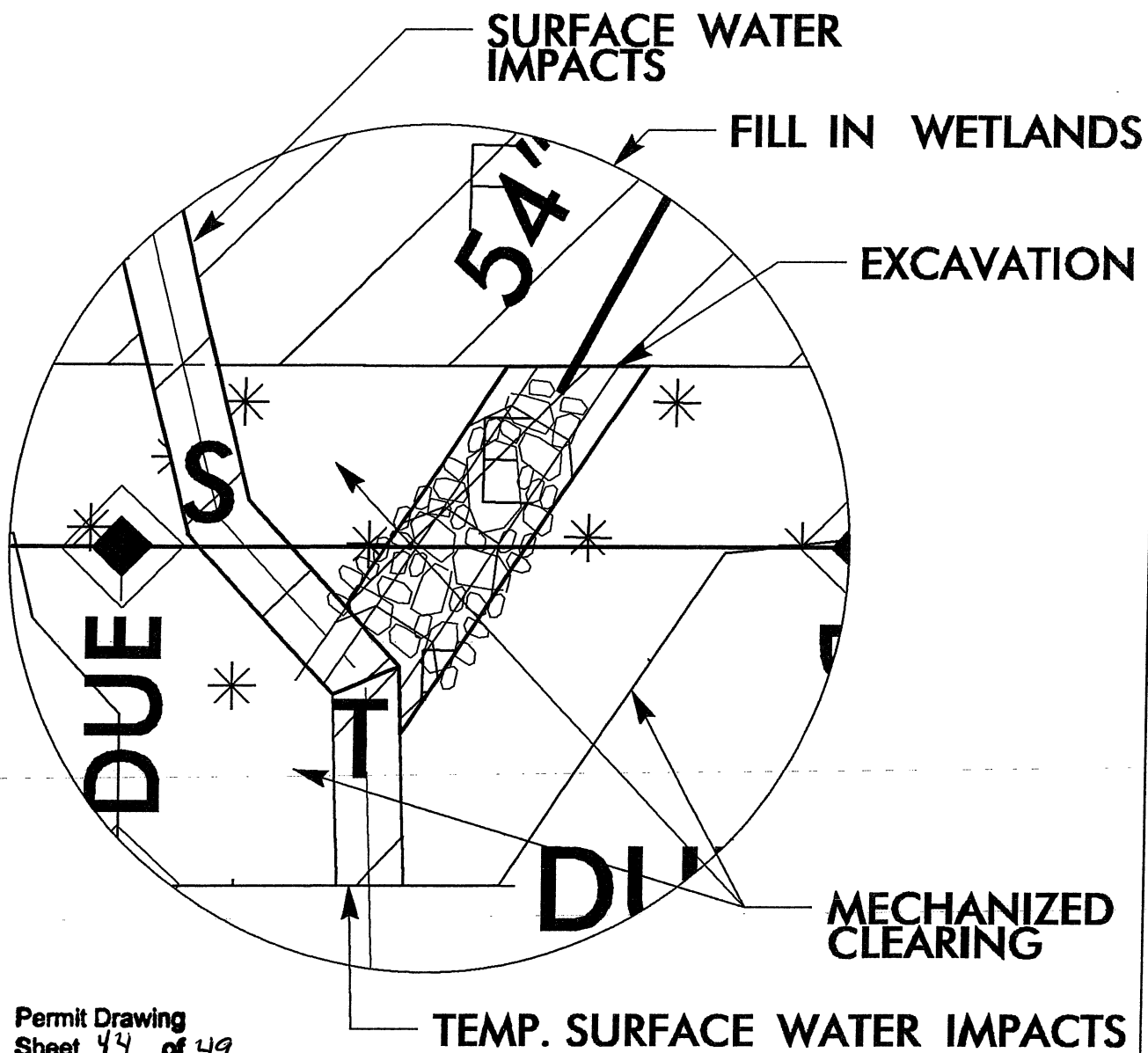
US220 BYPASS FROM 0.2 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE

SHEET

OF

04 / 21 / 11

ENLARGEMENT SITE 9B



NCDOT

**DIVISION OF HIGHWAYS
RICHMOND COUNTY**

PROJECT: 34542.1.2 (R-3421C)

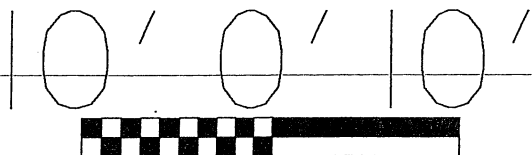
**US220 BYPASS FROM 0.2 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE**

SHEET

OF

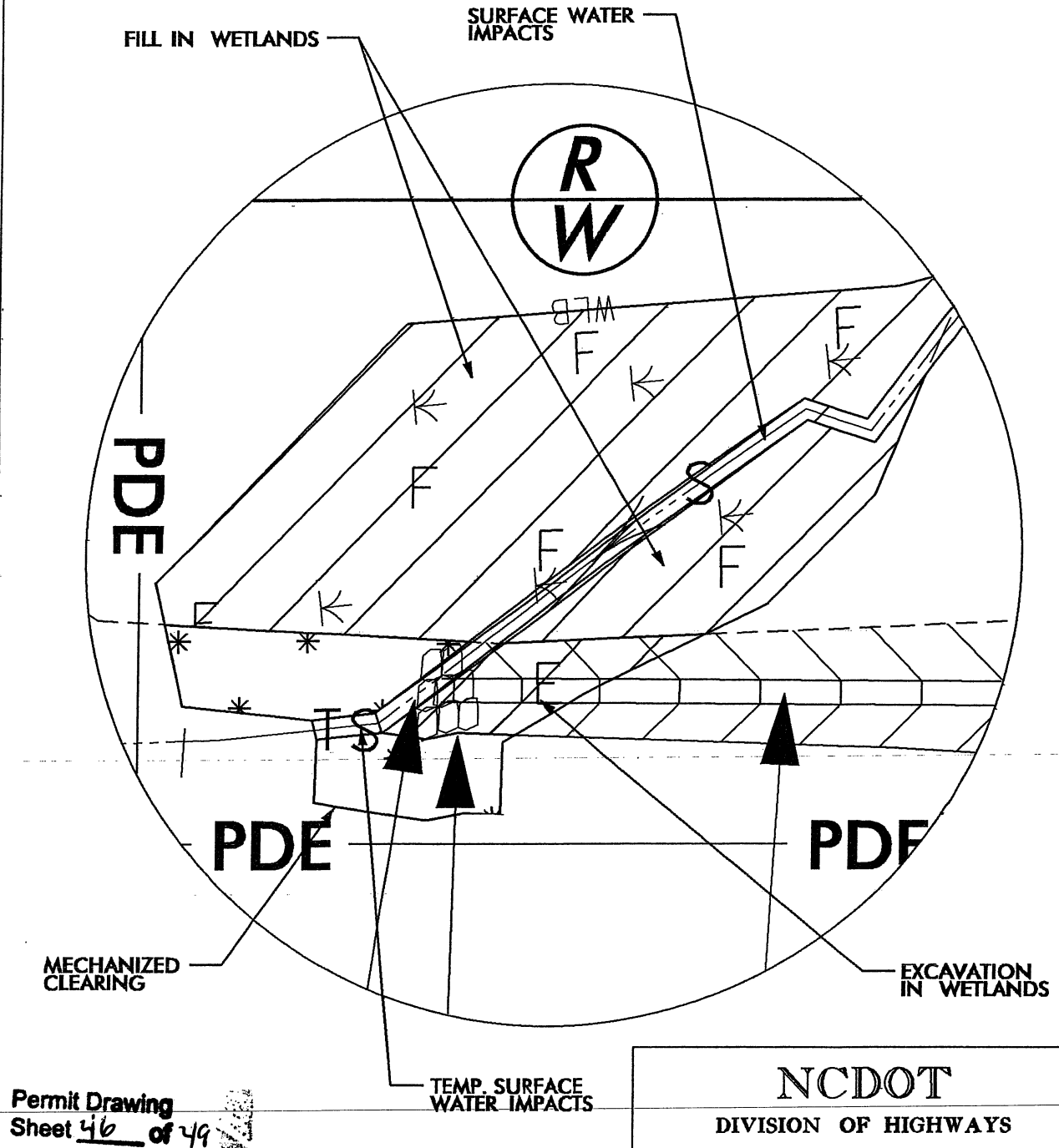
4 / 21 / 11

Permit Drawing
Sheet 45 of

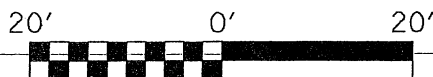


04//21//11

ENLARGEMENT SITE 24



Permit Drawing
Sheet 46 of 49



NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 34542.1.1 (R-3421C)

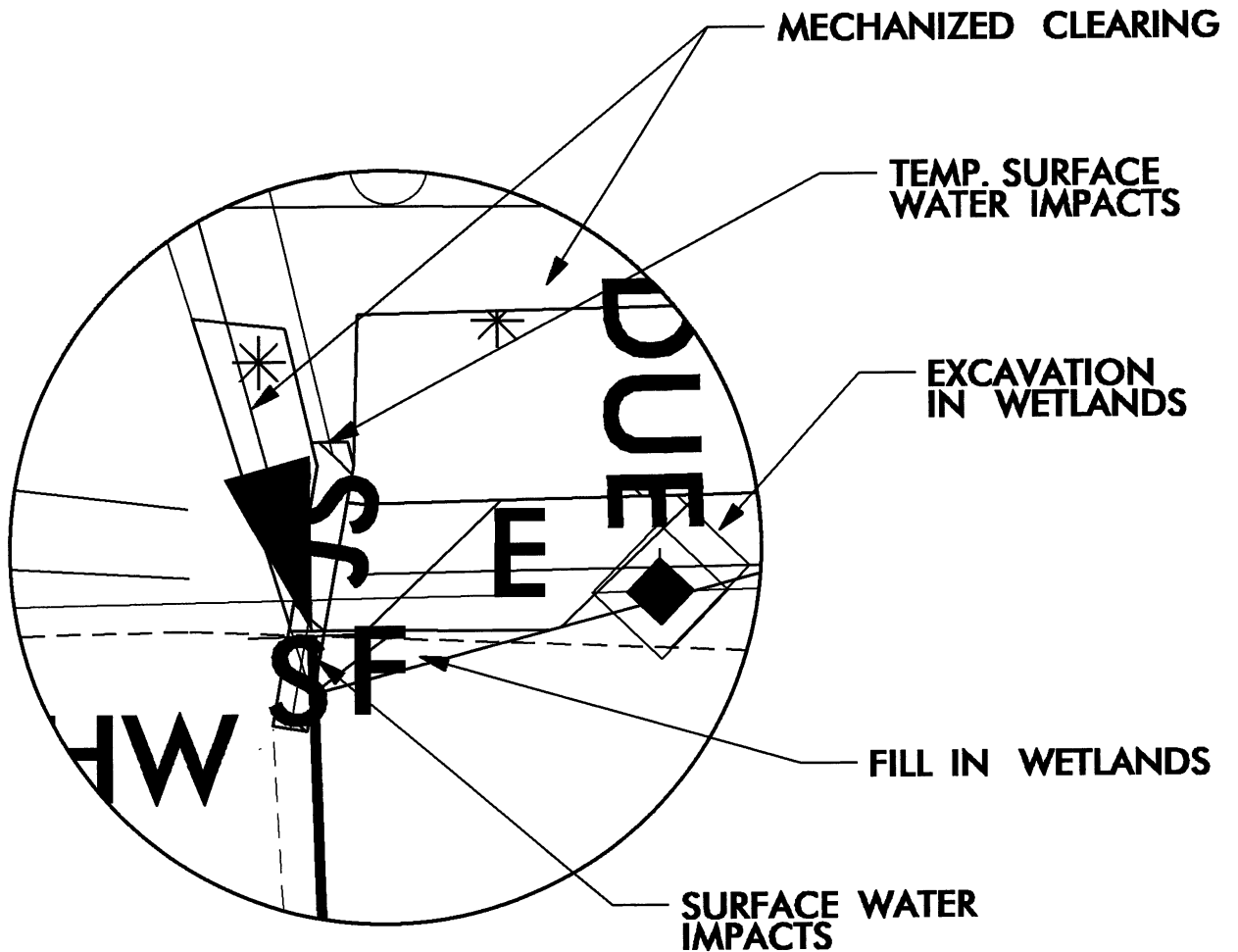
US220 BYPASS FROM 0.2 MILES SW OF
SR1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE

SHEET

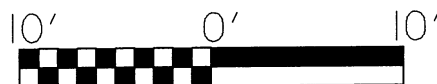
OF

4/21/11

ENLARGEMENT SITE 26



Permit Drawing
Sheet 47 of 49



NCDOT

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 34542.1.1 (R-3421C)

US220 BYPASS FROM 0.2 MILES SW OF
SR 1304 TO US220BUS/US220 BYPASS
INTERCHANGE SOUTH OF ELLERBE

SHEET

OF

04 / 21 / 11


WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 354+45		0.03			0.05						
2	-L- 355+25 (LT)		0.16			0.04						
3	-L- 373+40 (LT)		0.17			0.02						
4	-L- 376+50		0.69			0.10						
5	-L- 383+50		1.30		0.01	0.14		0.03	<0.01	278	20	
6	-L- 385+50 (LT)				<0.01	0.01						
7	-L- 398+50		2.58		<0.01	0.08						
8	-L- 435+00 (LT)		0.19		0.07	0.05		0.12	<0.01	629	10	
9	-L- 435+00 (RT)		0.59		0.01	0.07		0.05	<0.01	463	20	
10	-L- 451+00 (RT)		0.83			0.09						
11	-Y10LPD- 11+00 (RT)	POND						0.35				
12	-SR5- 23+00		0.16		<0.01			<0.01	<0.01	40	10	
12	-SR5- 23+00	POND						0.03				
13	-L- 462+70 (LT)							<0.01	<0.01	205	20	
14	-Y10RPD-14+00							0.07	<0.01	538	10	
15	-SR4- 28+00	POND	0.10					1.24				
16	-Y10RPD- 8+00	POND						0.99				
16	-Y10RPD- 8+00				0.02	0.01		<0.01		61		
17a	-L- 473+00 LT	Intermittant						0.02	<0.01	381	10	
17b	-L- 473+00 LT	Perennial						0.03	<0.01	606	10	
18	-L- 485+50							0.02	<0.01	208	17	
18	-L- 484+90 RT	Bank Stabilization						<0.01		10		
19	-L- 489+40							0.01	<0.01	199	22	
SUBTOTAL SHEET 1:			6.80		0.11	0.65		2.96	0.01	3618	149	

Site 11, 15, & 16 are non-mitigable pond impacts. Site 15 includes 0.10ac of non-mitigable fringe wetlands bordering pond.

Site 12 includes 0.0309ac of non-mitigable surface water impacts for pond impacts, and 0.0048ac of other mitigable surface water impacts for stream impacts.

Site 17b includes 428ft. non-mitigable impacts to an existing concrete lined ditch.



Permit Drawing

 Sheet **48** of **49**

N.C.D.O.T.

DIVISION OF HIGHWAYS

RICHMOND COUNTY

PROJECT: 34542.1.2 (R-3421C)

US 220 BYPASS FROM 0.2 MILES SW OF

SR1304 TO US220BUS/US220 BYPASS

INTERCHANGE SOUTH OF ELLERBE

SHEET

4/21/2011

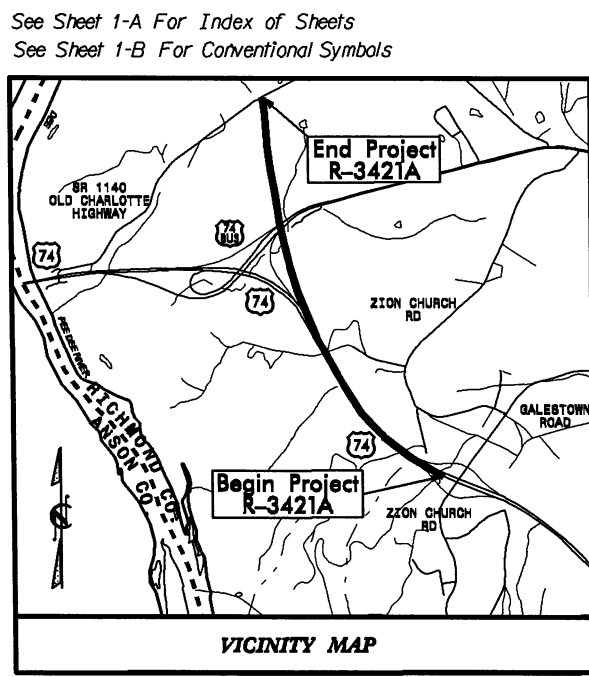
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34542.1.1	NHF-220(4)	P.E.	
34542.2.4	HPP-0220(30)	R/W, UTIL.	

Permit Drawing
Sheet 1 of 16

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

LOCATION: US 220 BYPASS FROM US 74 BYPASS WEST
OF ROCKINGHAM AT SR 1109 (ZION CHURCH RD.)
INTERCHANGE TO 0.3 MILES SOUTH OF SR 1140
(OLD CHARLOTTE HWY.)

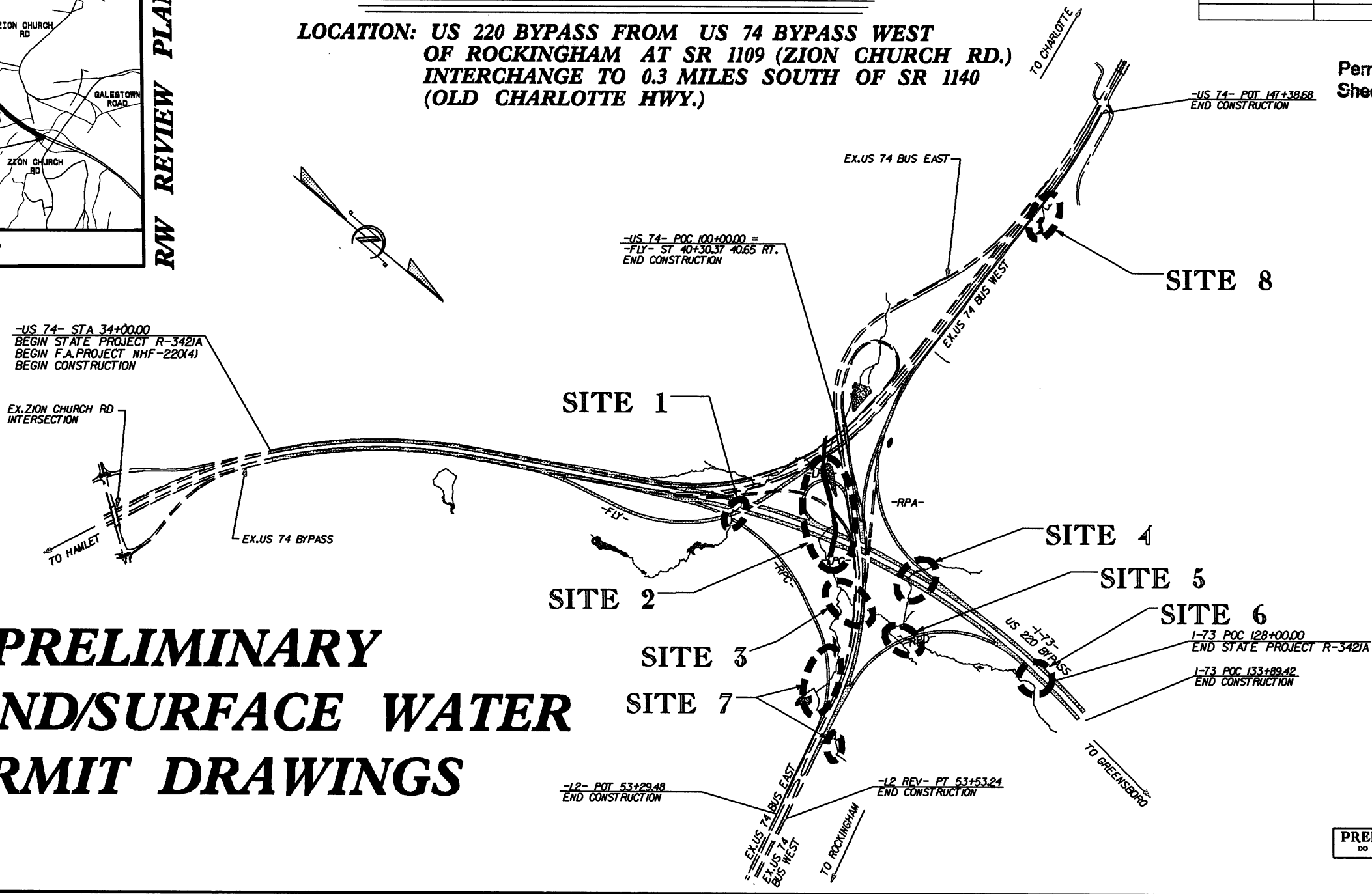


R/W REVIEW PLANS

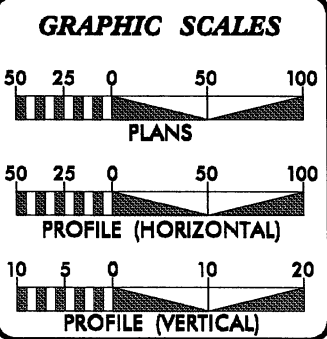
TIP PROJECT: R-3421A

CONTRACT:

**PRELIMINARY
WETLAND/SURFACE WATER
PERMIT DRAWINGS**



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DESIGN DATA	
ADT (2005)	= 10,750-17,450
ADT (2030)	= 22,815-35,640
DHV	= 10%
D	= 60%
T	= 28% *
V	= 70 mph
* (TTST 10% + DUAL 18%)	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-3421A	= 1.788 miles
LENGTH STRUCTURES TIP PROJECT R-3421A	= 0.091 miles
TOTAL LENGTH OF TIP PROJECT R-3421A	= 1.879 miles
(SB LANES WERE USED FOR LENGTH OF PROJECT)	

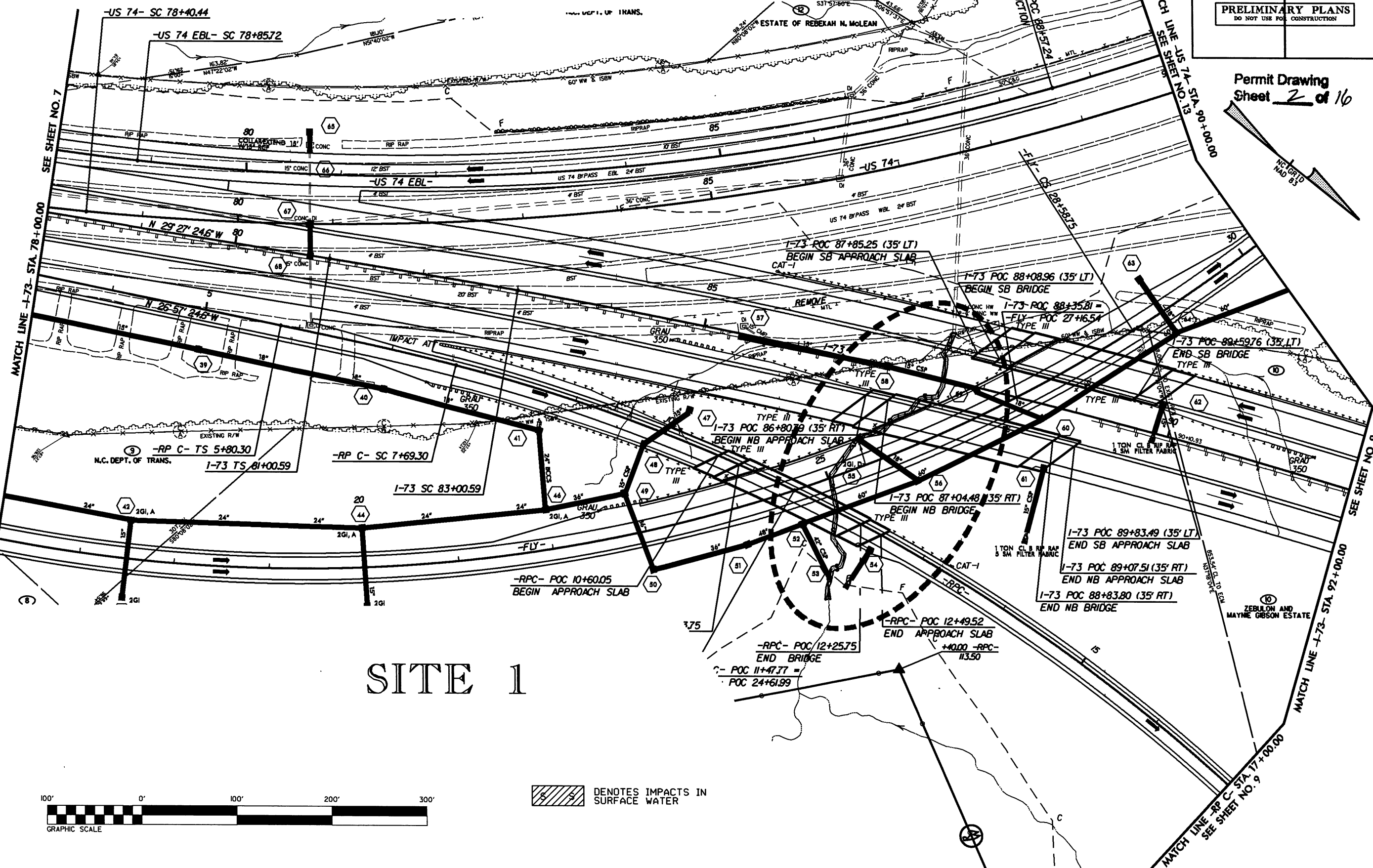
2006 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	6/20/08
LETTING DATE:	POST YEAR
NCDOT CONTACT:	CATHY HOUSER, P.E. PROJECT ENGINEER - ENGR. COORD.
D. C. KEENER, P.E. PROJECT ENGINEER GREENHORNE & O'MARA, INC.	
H. W. BARE PROJECT DESIGN ENGINEER GREENHORNE & O'MARA, INC.	

HYDRAULICS ENGINEER	
SIGNATURE:	P.E.
ROADWAY DESIGN ENGINEER	
SIGNATURE:	P.E.

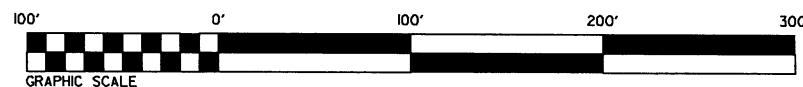
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

Permit Drawing
Sheet 2 of 16

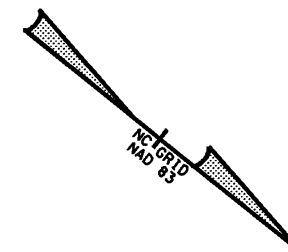


SITE 1

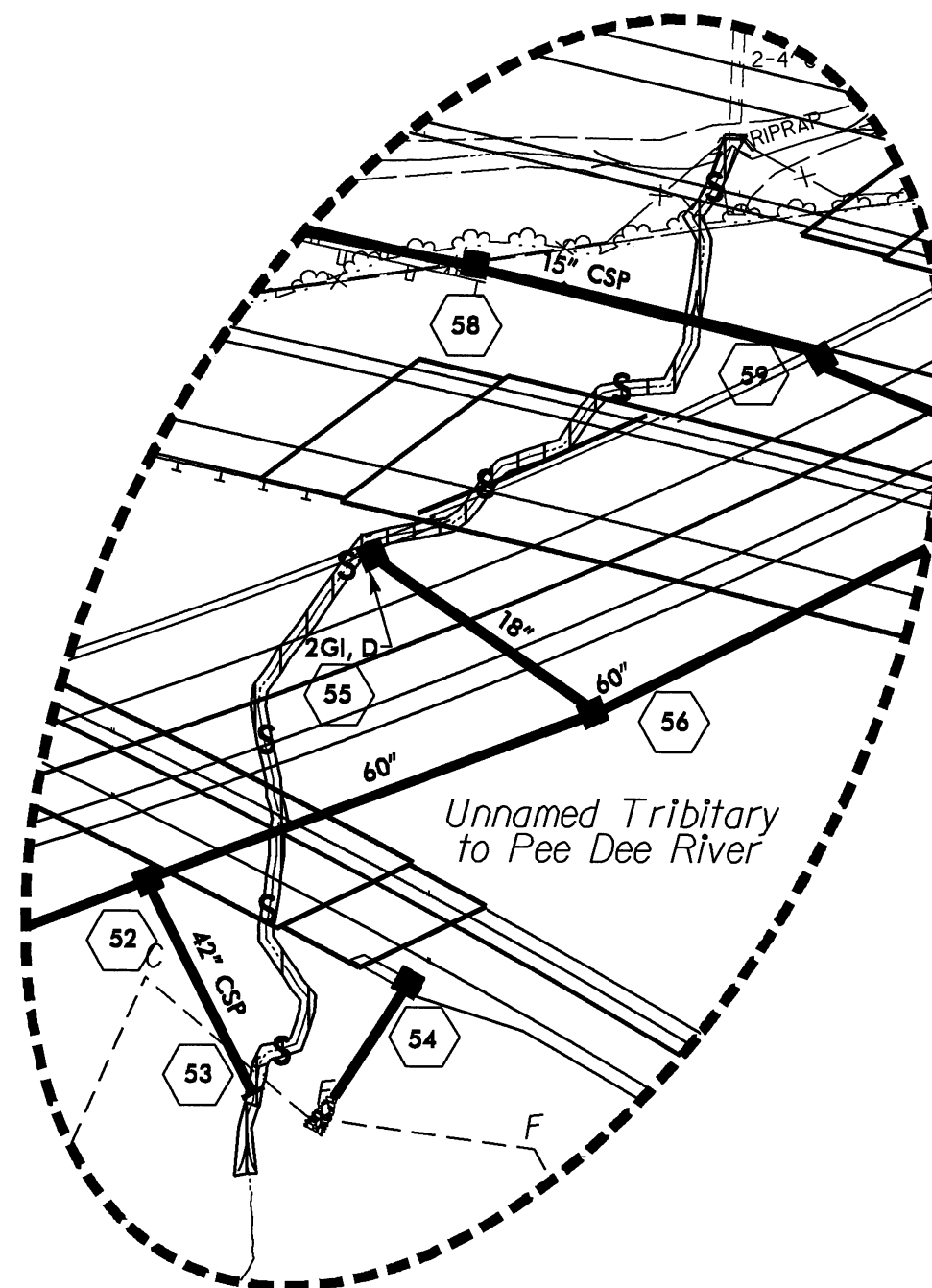


DENOTES IMPACTS IN SURFACE WATER


5/10/93



SITE 1 ENLARGEMENT DETAIL



 DENOTES IMPACTS IN
SURFACE WATER

50' 0' 50'

GRAPHIC SCALE



PROJECT NO.	8-122A	SHEET NO.	4
DATE OF SHEET		DESIGNED BY	
DATE		DRAWN BY	
PRELIMINARY PLANS			

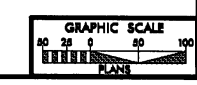
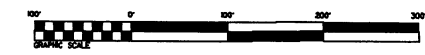


SITE 2

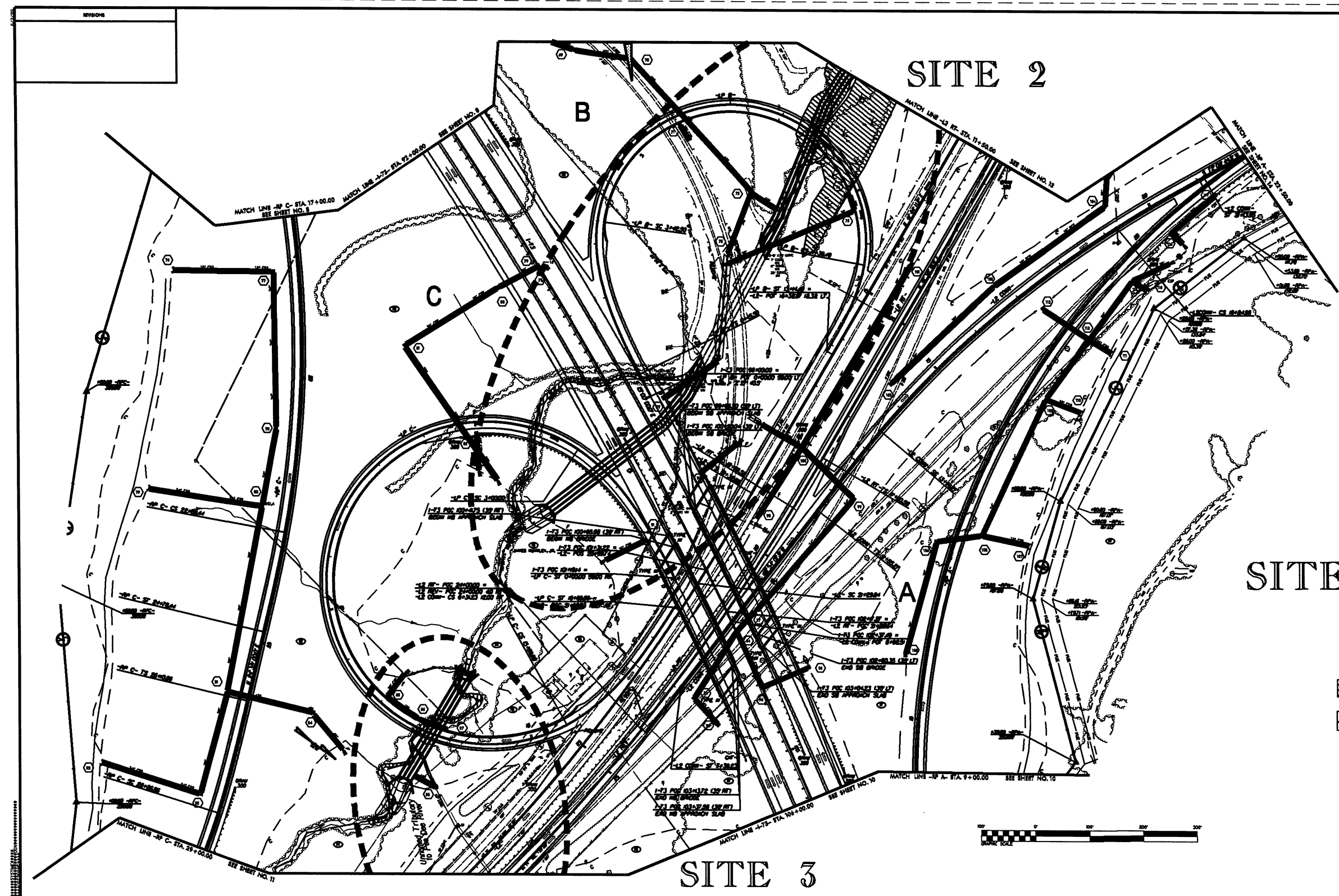
SITES 2 AND 3

SITE 3

-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES FILL IN WETLAND



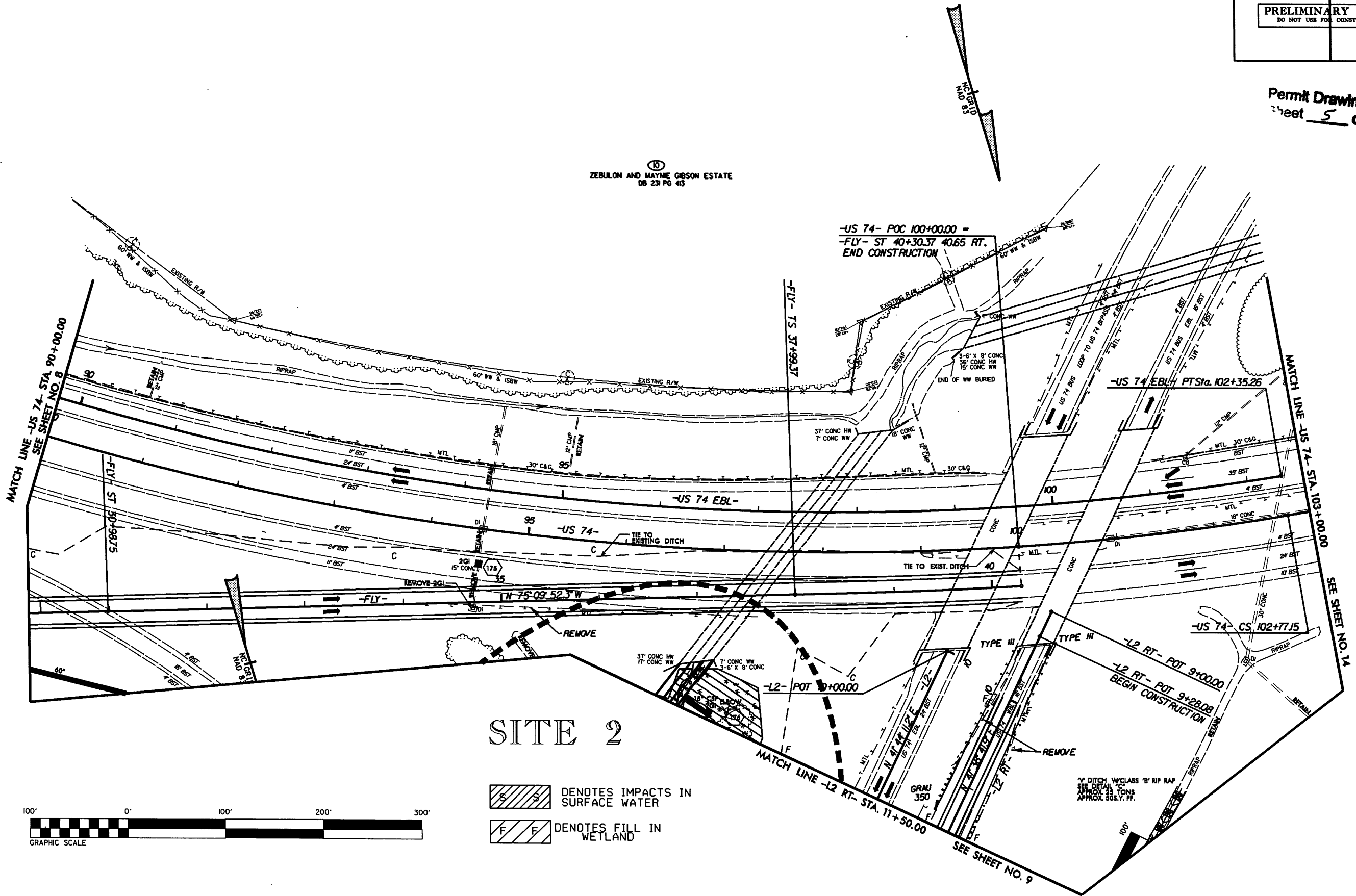
DATE	
BY	
CHECKED BY	
DATE	



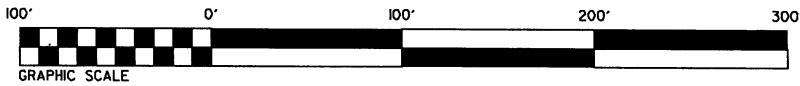
PROJECT REFERENCE NO. R-3421A	SHEET NO. 13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

Permit Drawing
Sheet **5** of 16

①
ZEBULON AND MAYNE GIBSON ESTATE
DB 23 PG 415



SITE 2



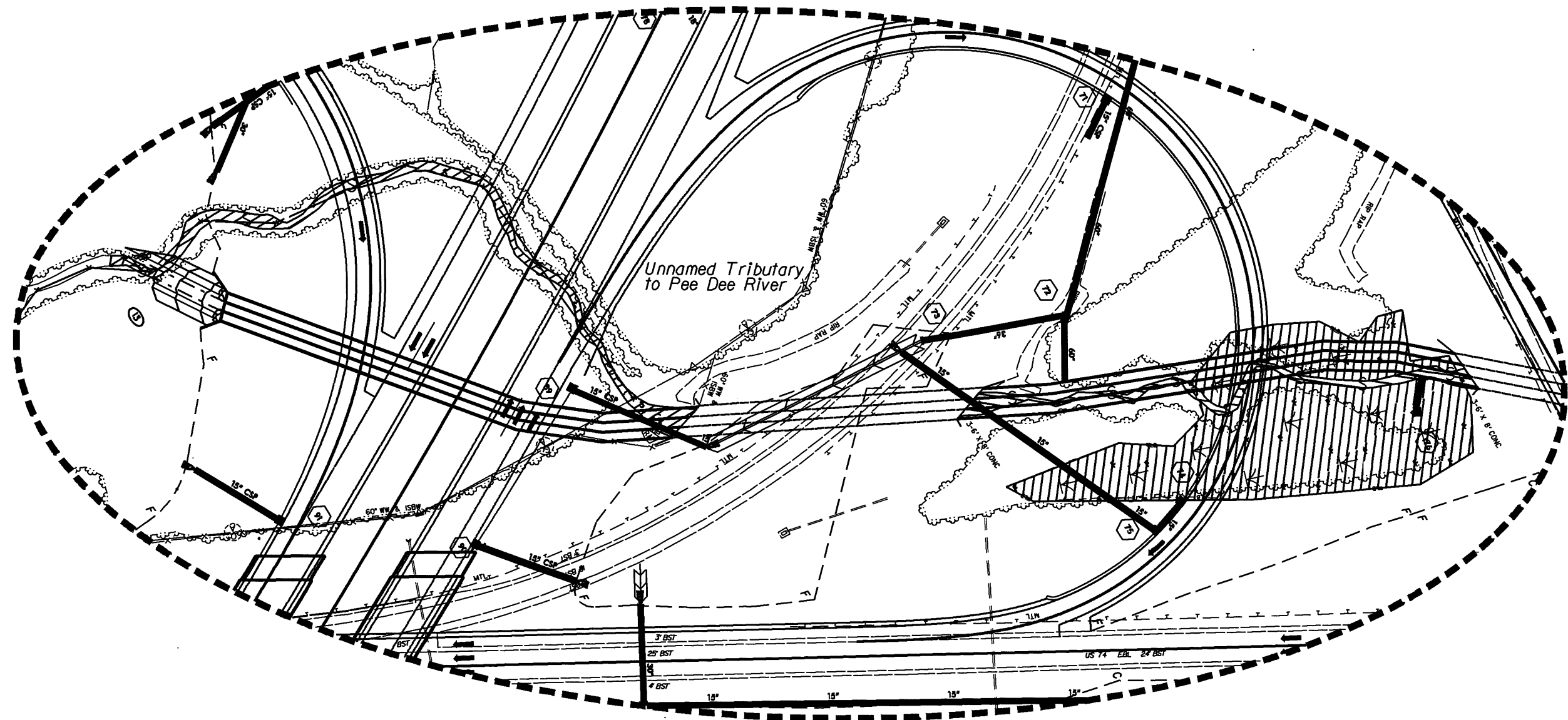
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND

REVISIONS

*****SYTIME*****
*****DATE*****
*****BY*****
*****CHECKED*****
*****APPROVED*****

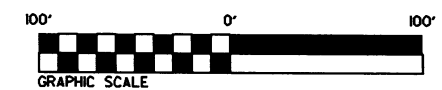
SITE 2 ENLARGEMENT DETAIL

Permit Drawing
Sheet 6 of 16



 DENOTES FILL IN
WETLAND

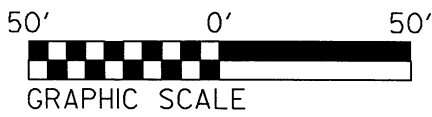
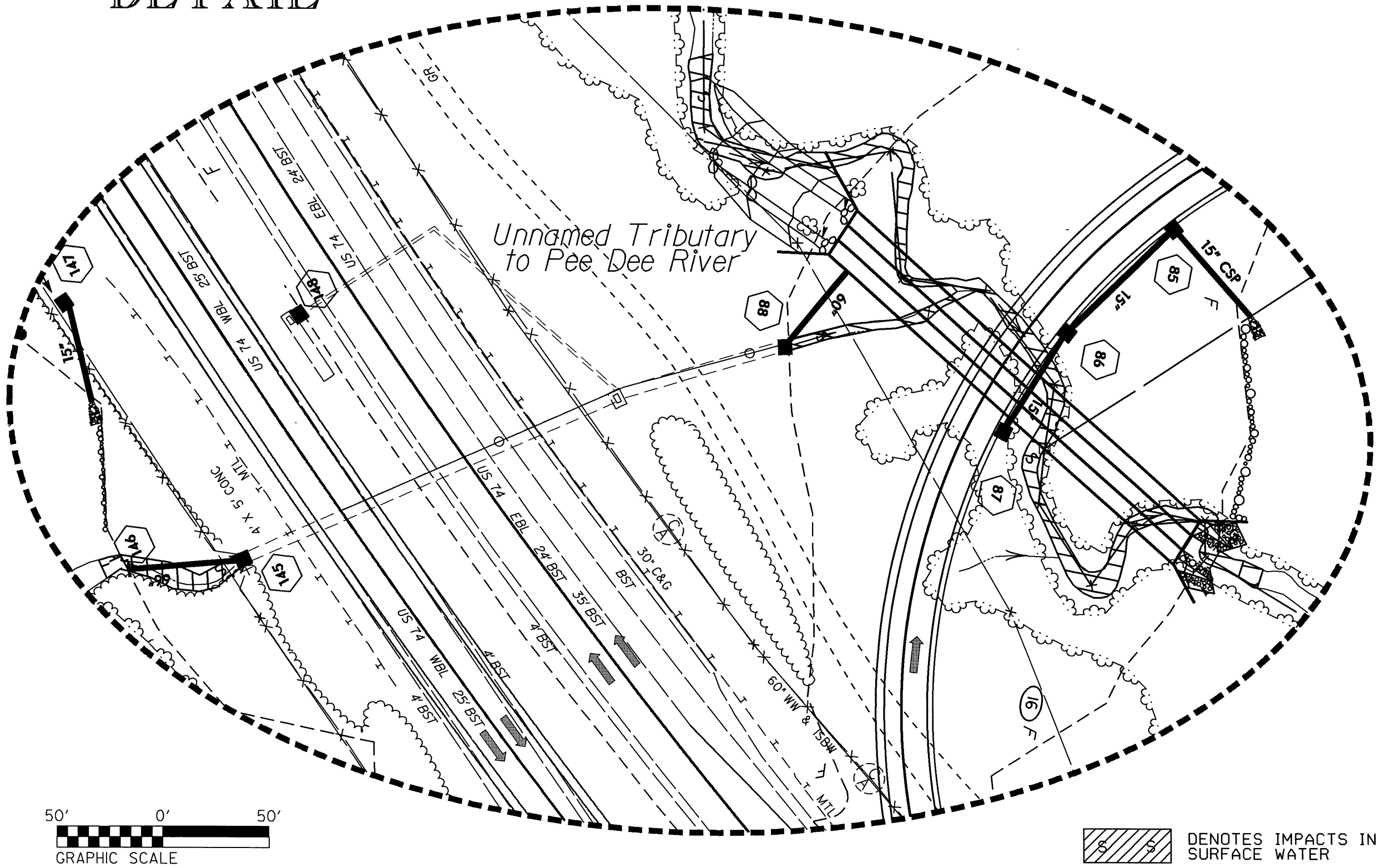
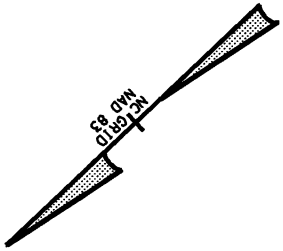
 DENOTES IMPACTS IN
SURFACE WATER



8/17/99

SITE 3 ENLARGEMENT DETAIL

Permit Drawing
Sheet 7 of 16

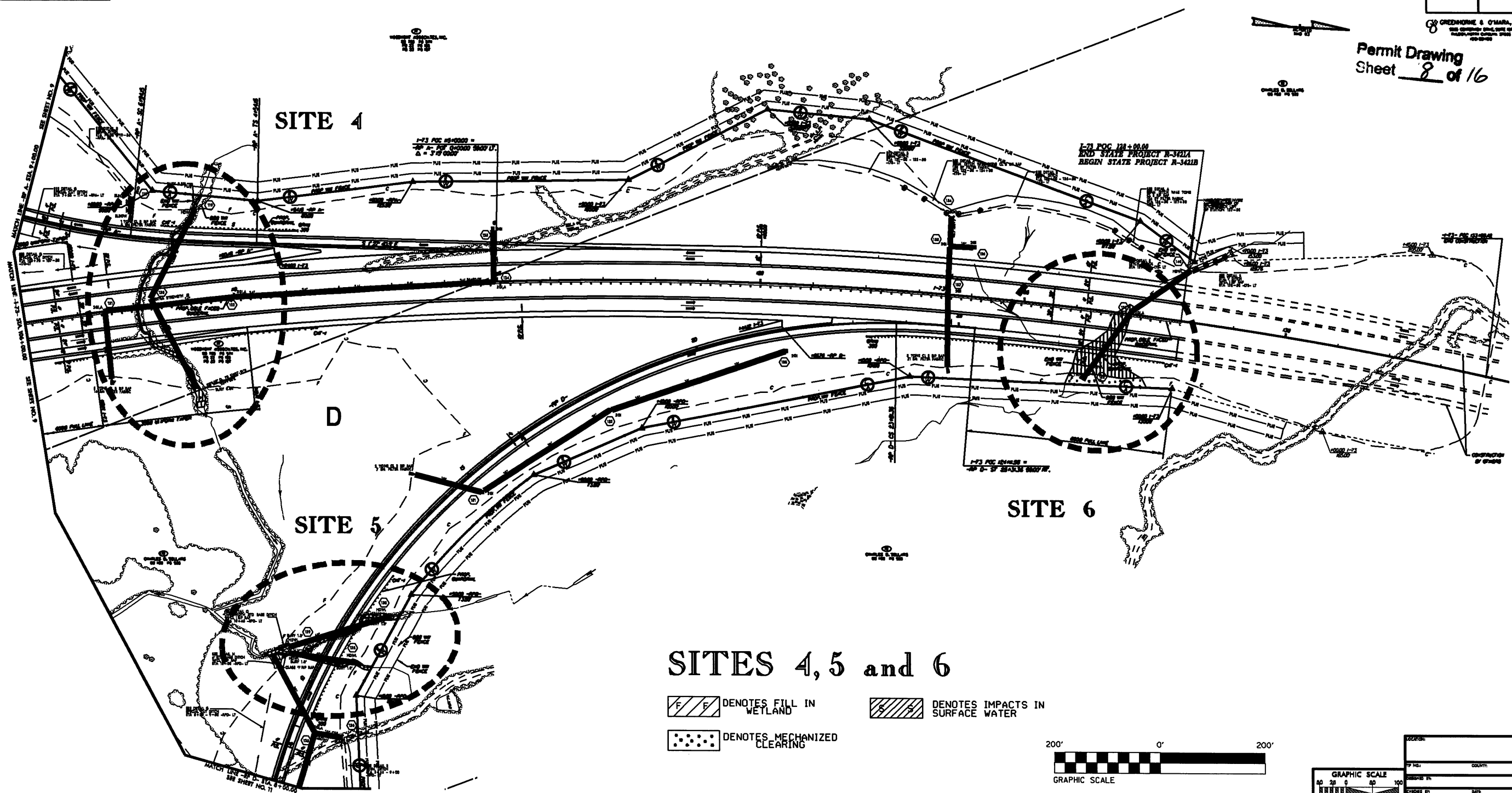


 DENOTES IMPACTS IN
SURFACE WATER

PROJECT NUMBER	8-126A
SHEET NO.	8
DATE	10/1/88
BY	W. J. O'MARA
CHECKED BY	W. J. O'MARA
APPROVED BY	W. J. O'MARA
PRELIMINARY PLANS	

W. J. O'MARA & SONS, INC.
200 WEST 10TH STREET, SUITE 100
MILWAUKEE, WISCONSIN 53233
(414) 224-1100

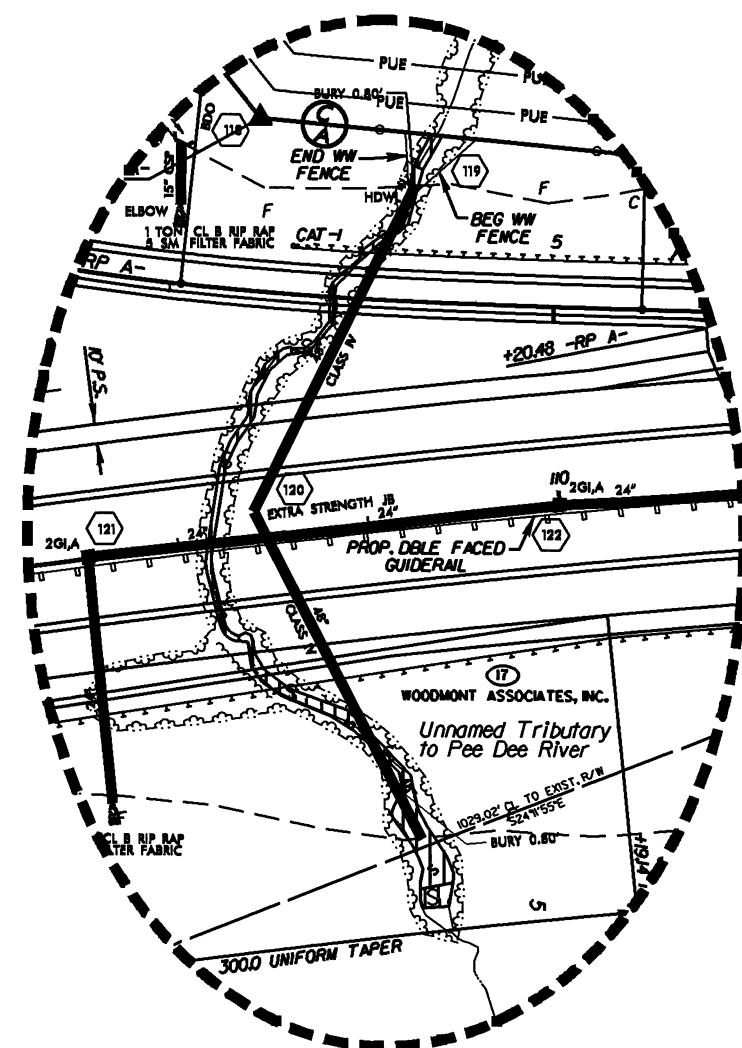
Permit Drawing
Sheet 8 of 16



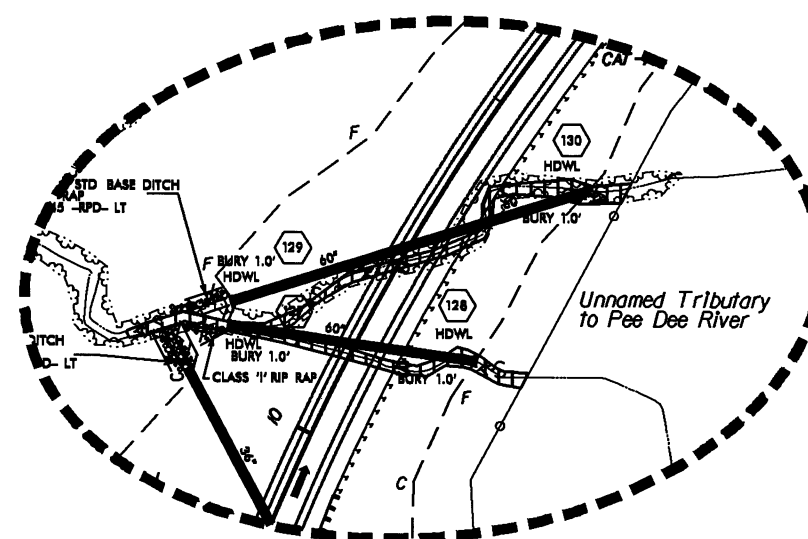
GRAPHIC SCALE
0 25 50 100
FEET

LOCATION	
TOWNSHIP	
RANGE	
SECTION	
COUNTY	
STATE	

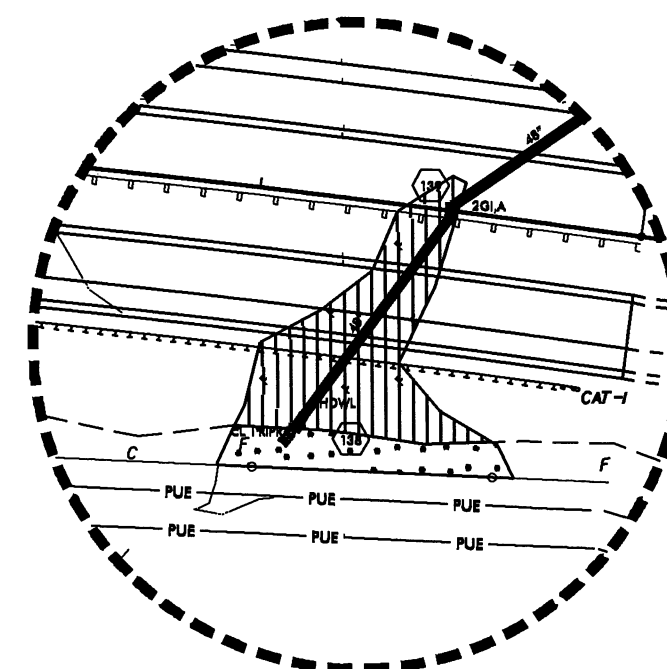
SITES 4, 5 and 6 ENLARGEMENT DETAILS



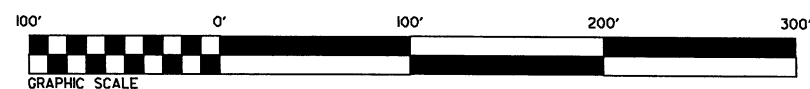
SITE 4





SITE 5



SITE 6



 DENOTES FILL IN
WETLAND


 DENOTES MECHANIZED
CLEARING


 DENOTES IMPACTS IN SURFACE WATER


SITES 3 and 7


SITE 3

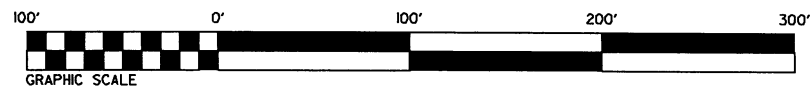
SITE 7
(SOUTH)

 DENOTES IMPACTS ON SURFACE WATER

 DENOTES FILL IN WETLAND

 DENOTES EXCAVATION IN WETLAND

 DENOTES MECHANIZED CLEARING



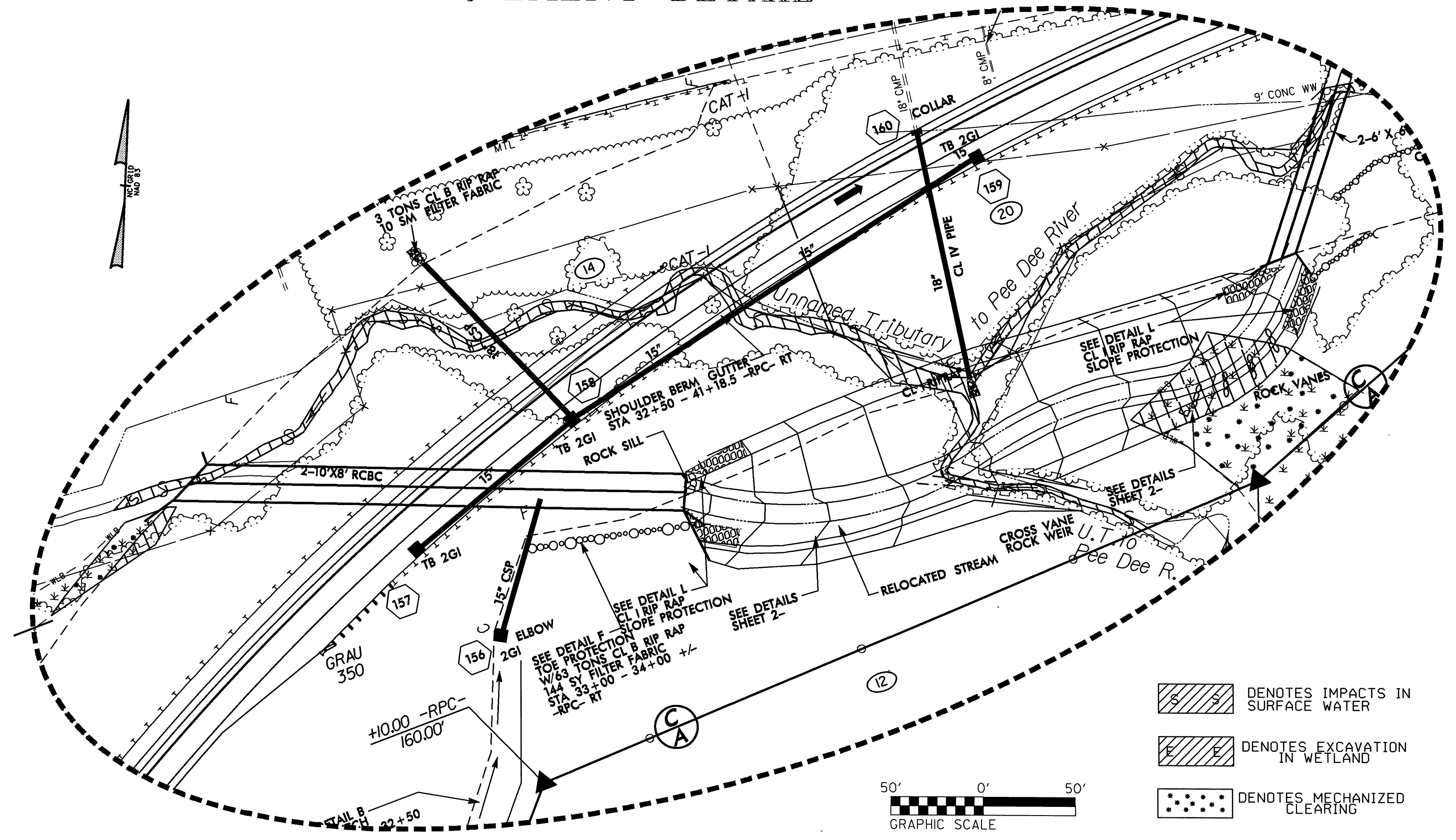
PROJECT REFERENCE NO.		SHEET NO.	
R-3421A		11	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>PRELIMINARY PLANS</p> <p>DO NOT USE FOR CONSTRUCTION</p> </div>			



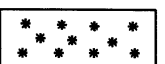
Permit Drawing
Sheet 10 of 16

MATCH LINE -RP C- STA. 38+00.00 SEE SHEET NO. 12

SITE 7 (SOUTH) ENLARGEMENT DETAIL

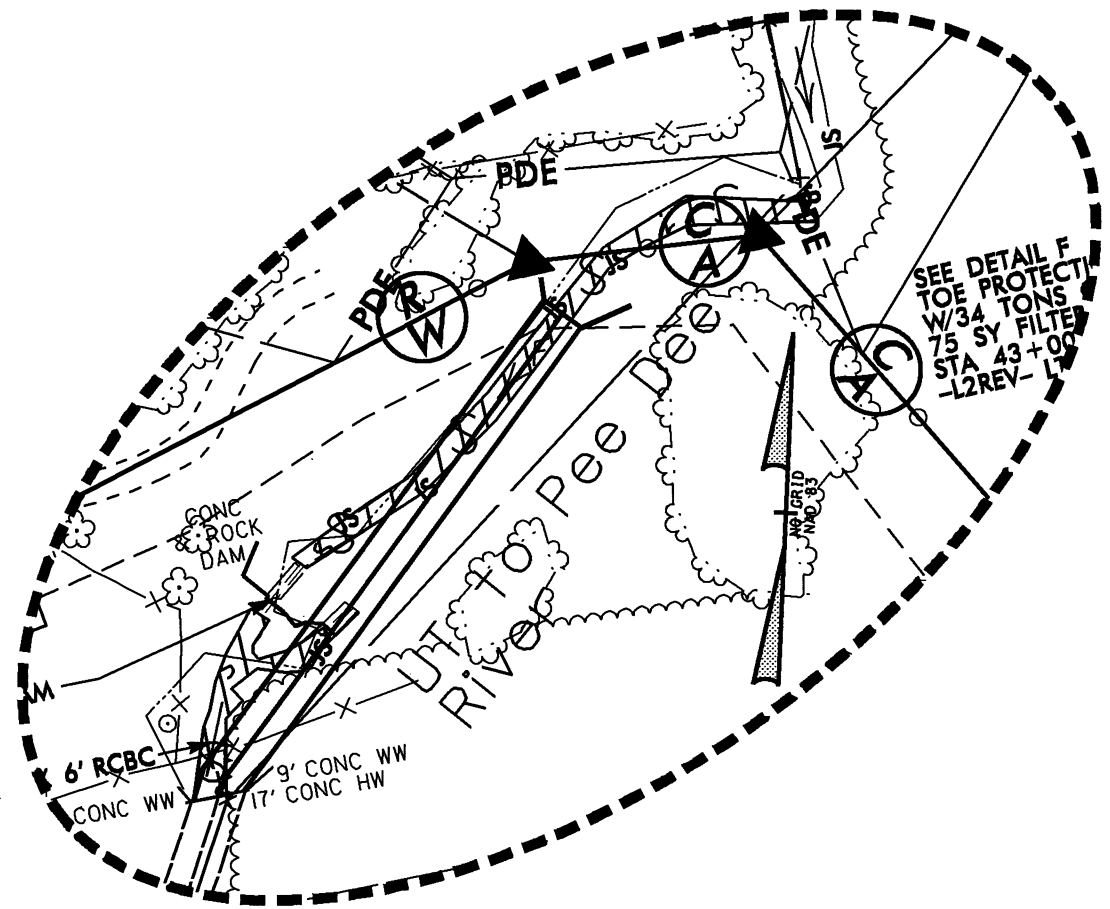
Permit Drawing
Sheet 12 of 16



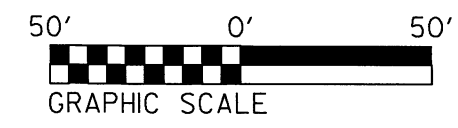
-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES EXCAVATION IN WETLAND
-  DENOTES MECHANIZED CLEARING

SITE 7 (NORTH) AND SITE 8 ENLARGEMENT DETAILS

mit Drawing
at 13 of 16



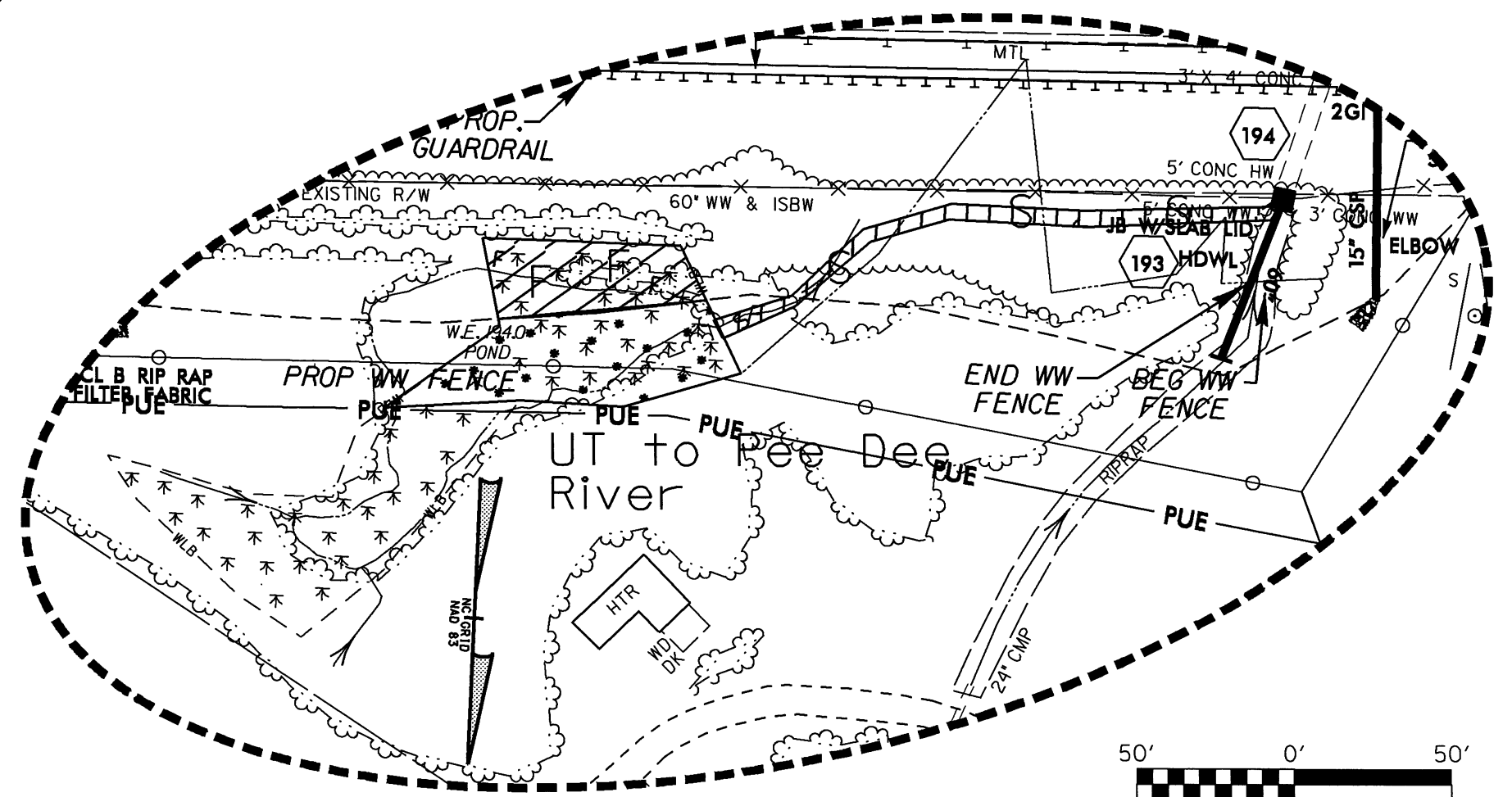
SITE 7



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES FILL IN WETLAND

- DENOTES MECHANIZED CLEARING

SITE 8



Site No.**Owner Name****Address**

1	James A. McLean	PO Box 123 Rockingham NC 28379
2	Gibson Estate c/o Michael Gibson	300 Maraschino Dr. Greenville NC
3	James Huntley Jr. Gibson Estate c/o M. Gibson Charles D. Sellars & J. F. Crawley	6605 Olive Branch Rd. Marshville NC 300 Maraschino Dr. Greenville NC 443 Old Charlotte Hwy. Rockingham NC 28379
4	Woodmont Associates Charles D. Sellars & J. F. Crawley	19825B N. Cove Rd. Cornelius NC 443 Old Charlotte Hwy. Rockingham NC 28379
5	Charles D. Sellars & J. F. Crawley	443 Old Charlotte Hwy. Rockingham NC 28379
6	Charles D. Sellars & J. F. Crawley	443 Old Charlotte Hwy. Rockingham NC 28379
7	Guy M. Coble Marian S. Savage James A. McLean Bronson & Bobbie Brim Gibson Estate c/o M. Gibson	1280 US 74 Hwy. W. Rockingham NC 28379 117 Grey Fox Run Rockingham NC 28379 PO Box 123 Rockingham NC 28379 PO Box 476 Rockingham Nc 28379 300 Maraschino Dr. Greenville NC
8	Michael & Brenda McKenzie	1282 US Hwy 74 Hwy W. Rockingham NC

Property Owners

Sheet Drawing
15 of 16

**NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS**

**RICHMOND COUNTY
WBS - 34542.1.1 (R-3421A)**

SHEET No. 6/22/11

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS						SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation In Wetlands (ac)	Mechanized Clearing In Wetlands (ac)	Hand Clearing In Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1	24+55 / 26+90 FLY	prop pipe systems							0.02		364		
2	94+45 / 98+20 I73	triple barrel culvert extensions	0.76						0.18		1097		
3	12+60 / 14+55 LPC	prop 3-barrel culvert & 60"RCP extension							0.09		676		
4	108+12 / 109+60 I73	48"RCP							0.06		511		
5	10+04 / 12+05 RPD	prop 60" RCPs							0.06		435		
6	125+90 / 127+50 I73	48" RCP	0.19			0.06							
7	33+10 / 44+51 L2REV	culvert extensions, prop culvert & stream realign.	0.01		0.05	0.09			0.15		1247	100	
8	132+75 / 135+72 US74	60" RCP extension & roadway fill	0.03			0.06			0.02		187		
TOTALS:			0.99		0.05	0.21			0.58		4517	100	

ATN Revised 3/31/05

SHEET

1/5/2012

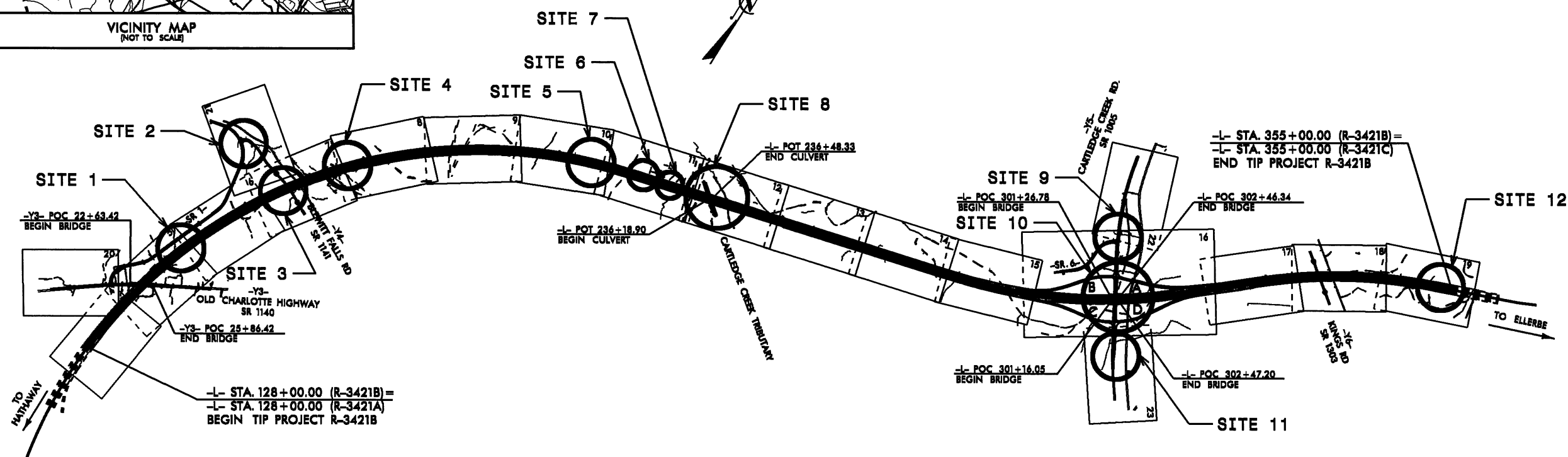
CONTRACT:

[illegible]

END STATE PROJECT

BEGIN STATE PROJECT

**VICINITY MAP
(NOT TO SCALE)**

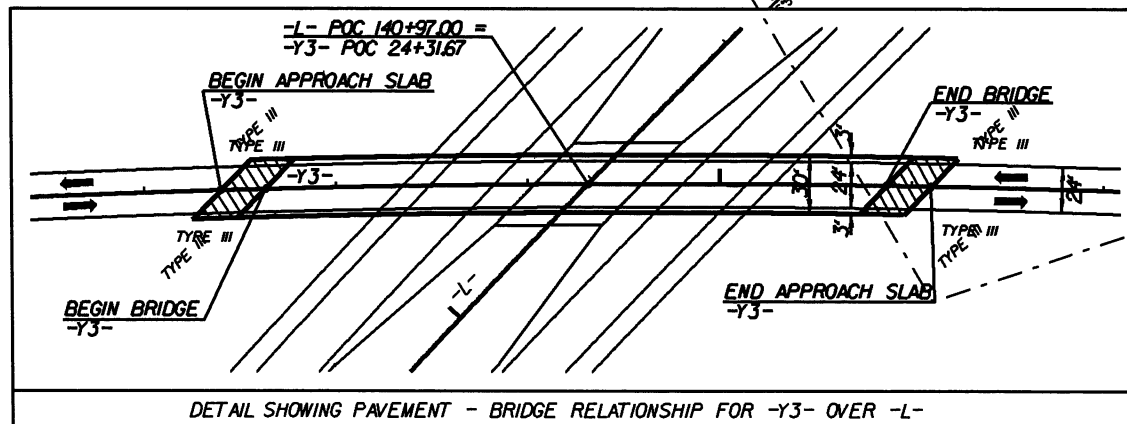


THIS PROJECT IS A CONTROLLED ACCESS PROJECT
WITH ACCESS LIMITED TO THE INTERCHANGE.

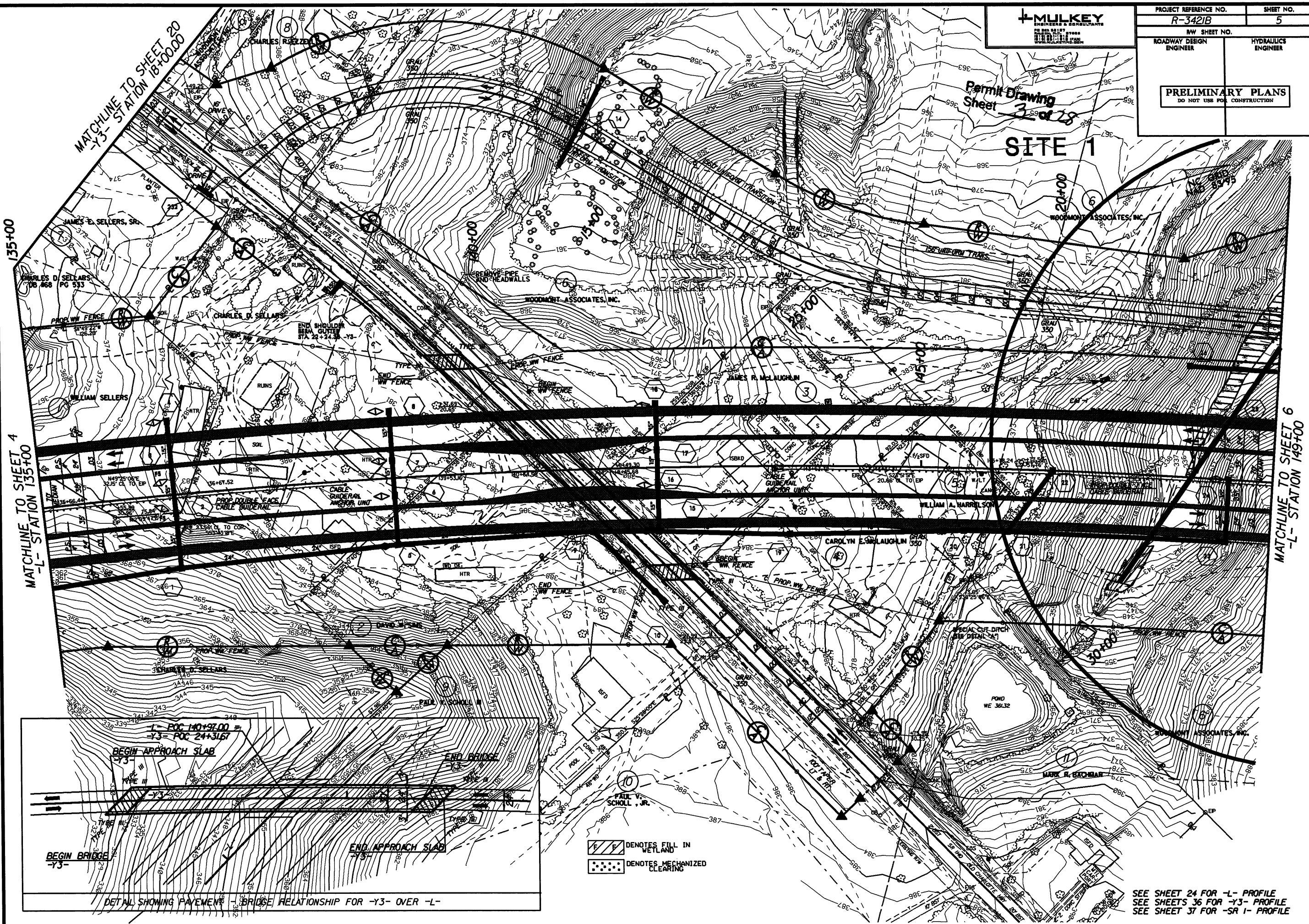
CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

STATE HIGHWAY DESIGN ENGINEER

SITE 1

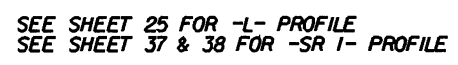


SEE SHEET 24 FOR -L- PROFILE
SEE SHEETS 36 FOR -Y3- PROFILE
SEE SHEET 37 FOR -SR 1- PROFILE



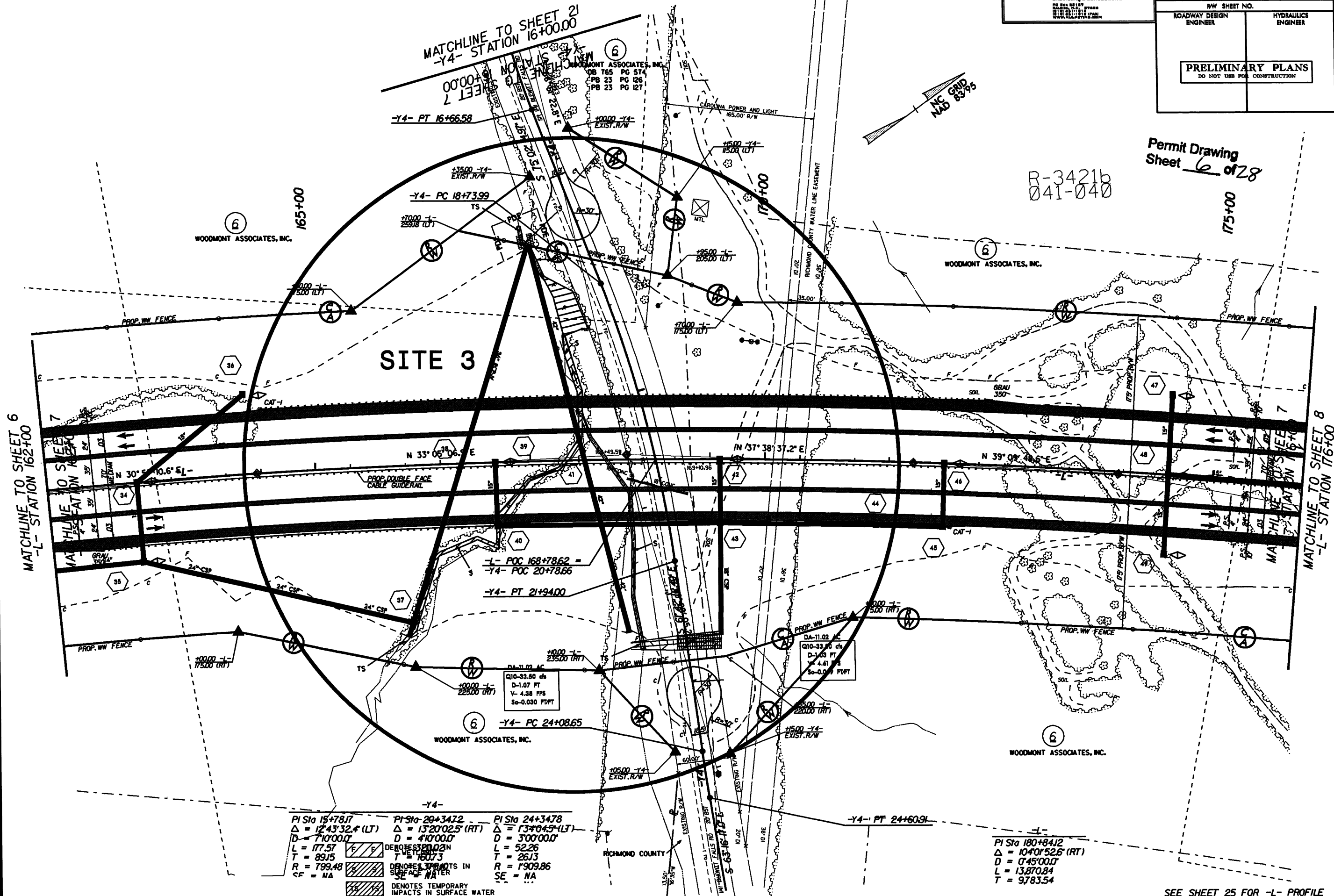
SEE SHEET 24 FOR -L- PROFILE
SEE SHEETS 36 FOR -Y3- PROFILE
SEE SHEET 37 FOR -SR I- PROFILE

MATCHLINE TO SHEET 7
-L- STATION 162+00



Permit Drawing
Sheet **6** of 28

R-3421b
041-040



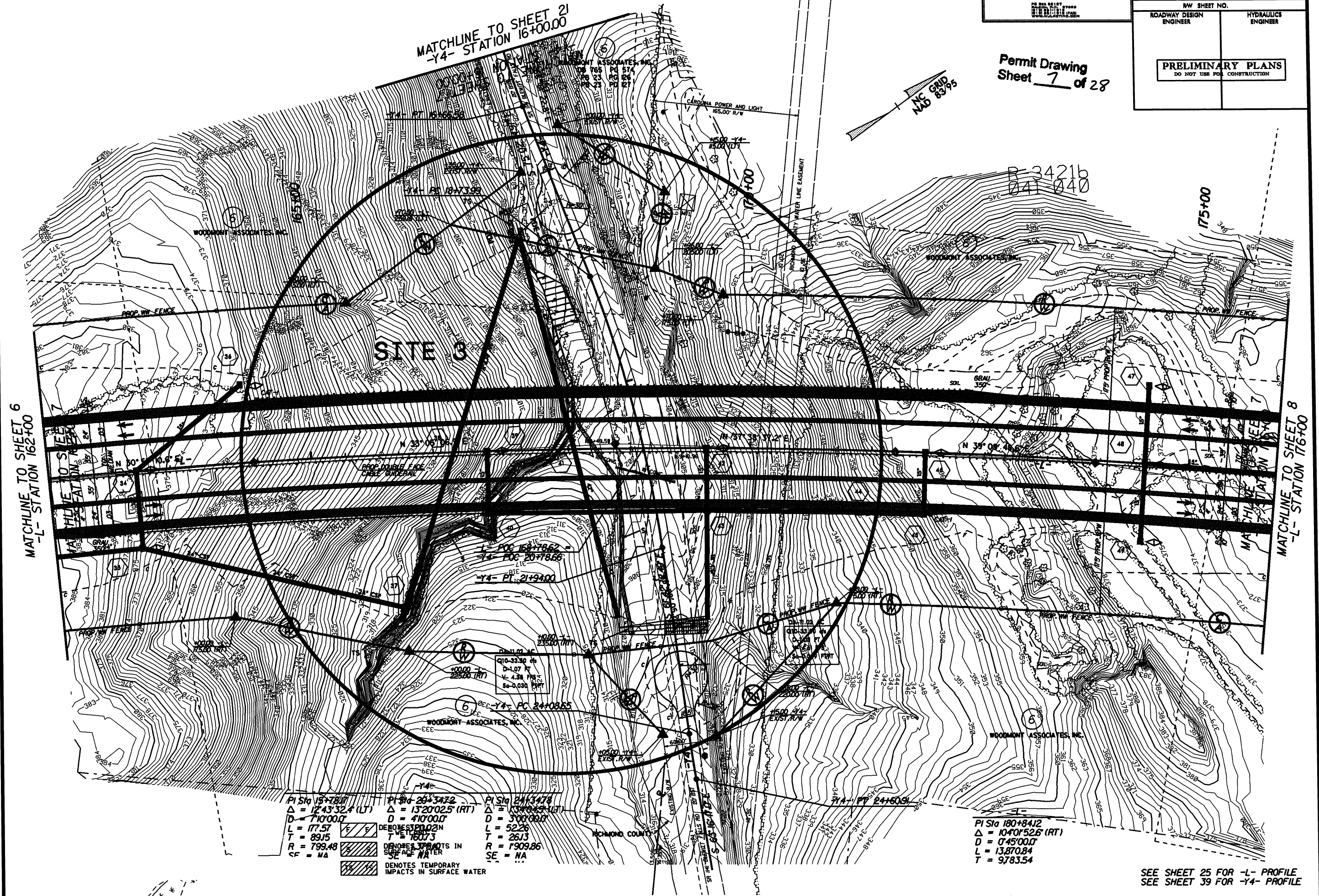
-Y4-		
PI Sta 15+78.17 Δ = 12°43'32.4" (LT) D = 710'00.0" L = 177.57 T = 89.15 R = 799.48 CF = NA	PI Sta 20+34.22 Δ = 13°20'02.5" (RT) D = 410'00.0" L = 160.73 T = 26.13 R = 1909.86 SE = NA	PI Sta 24+34.78 Δ = 13°04'45" (LT) D = 300'00.0" L = 52.26 T = 26.13 R = 1909.86 SE = NA

DENOTES 3" DIA. IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PI Sta 180+84.12
 Δ = 10°40'52.6" (RT)
 D = 0'45'00.0"
 L = 13.87084
 T = 9783.54

SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 39 FOR -Y4- PROFILE

Permit Drawing
Sheet **7** of 28



PI Sta 162+78.62 $\Delta = 1243.32^\circ$ (LT) $D = 710'00.0'$ $L = 177.57'$ $T = 89.15'$ $R = 799.48'$ $CE = NA$	PI Sta 20+78.65 $\Delta = 1320'02.5'$ (RT) $D = 410'00.0'$ $L = 177.57'$ $T = 89.15'$ $R = 799.48'$ $CE = NA$	PI Sta 24+08.65 $\Delta = 1320'02.5'$ (RT) $D = 410'00.0'$ $L = 177.57'$ $T = 89.15'$ $R = 799.48'$ $CE = NA$
--	--	--

DENOTES 37% GRADE IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PI Sta 180+84.12
 $\Delta = 1040'52.6'$ (RT)
 $D = 0'45'00.0'$
 $L = 13.870.84'$
 $T = 9783.54'$

SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 39 FOR -Y4- PROFILE

Permit Drawing
Sheet 8 of 28

R-3421b
040-030

6
WOODMONT ASSOCIATES, INC.





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84

MATCHLINE TO SHEET 9
-L- STATION 189+00

WOODMONT ASSOCIATES, INC.

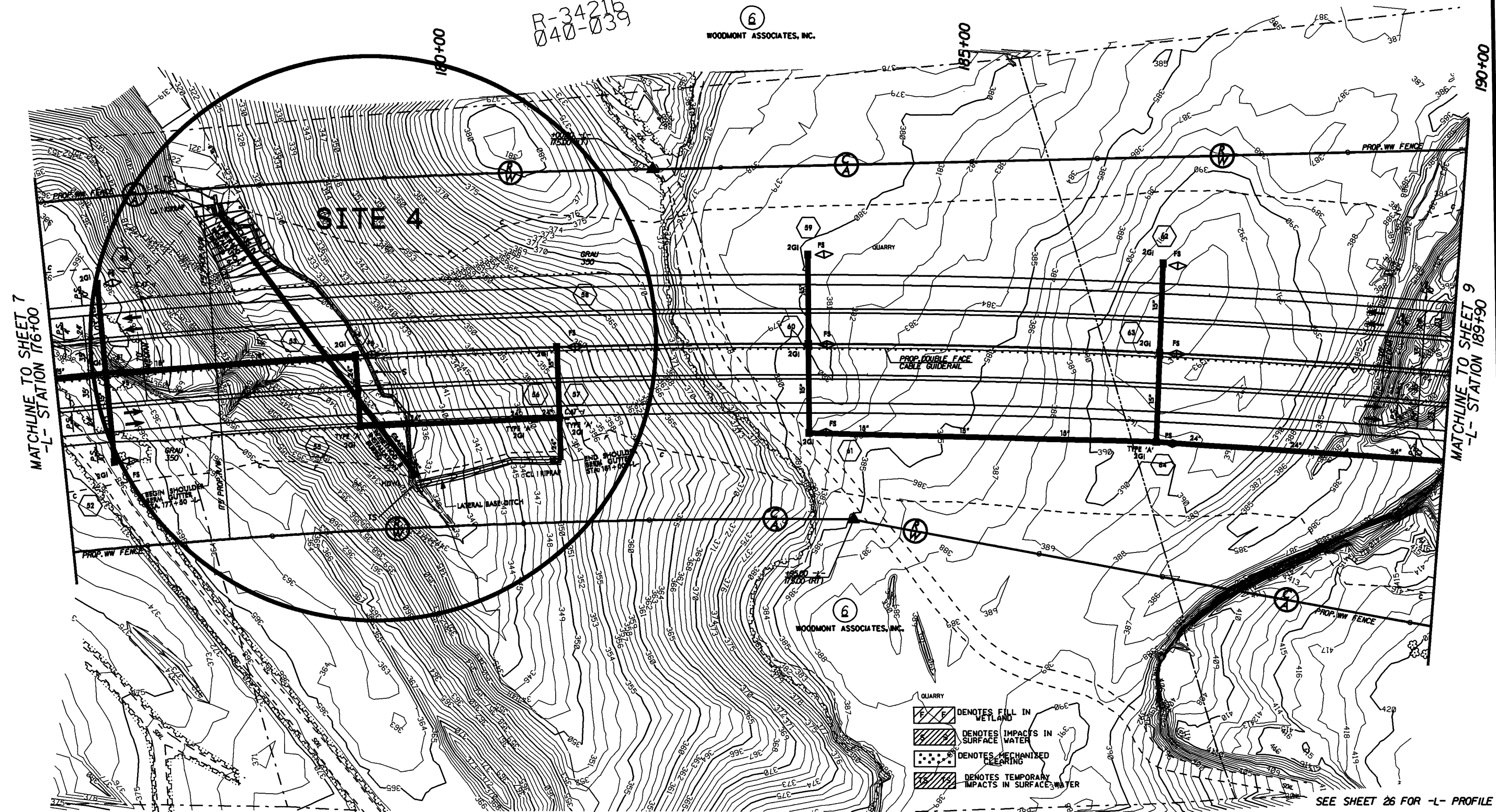
QUARRY

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

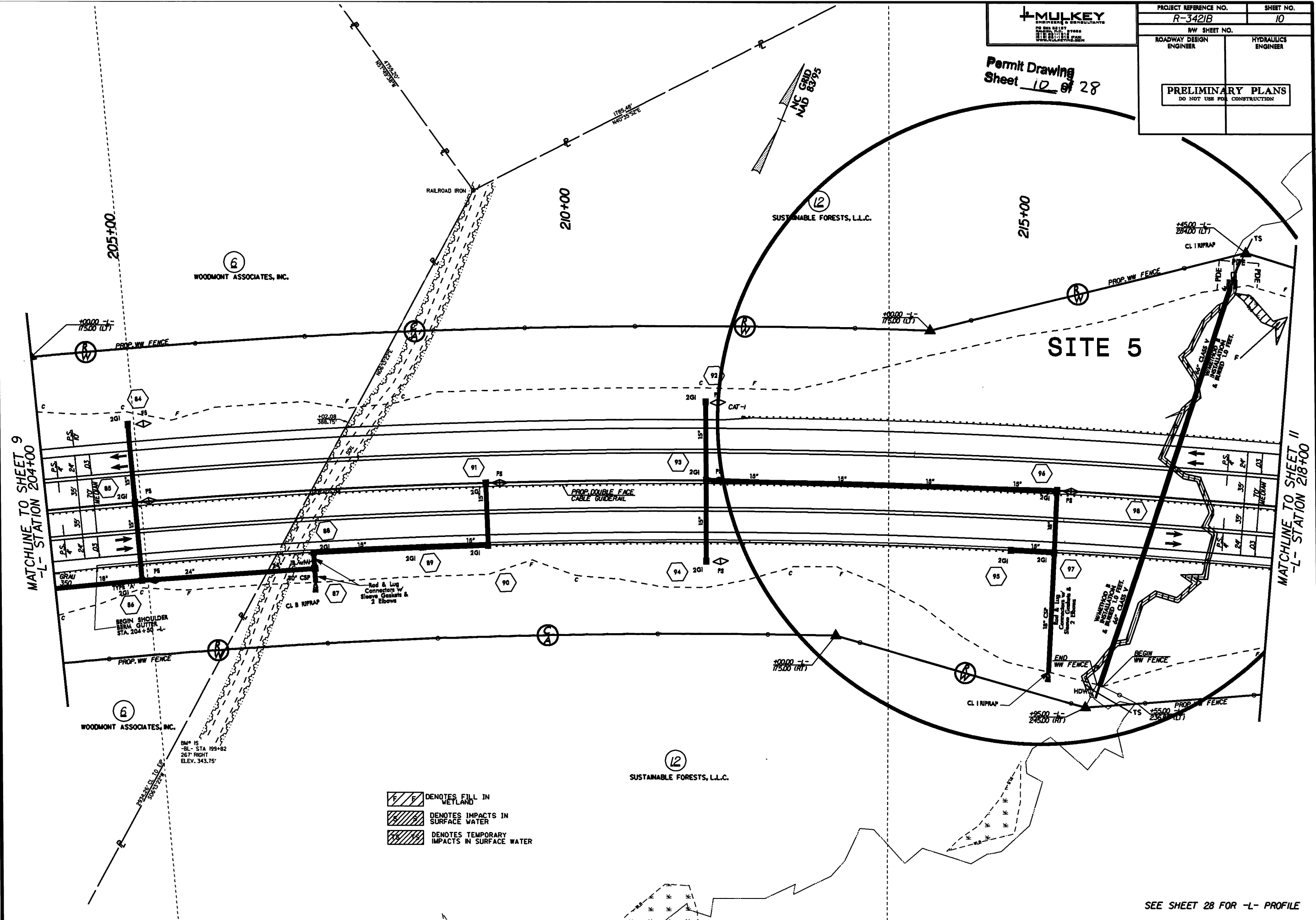
SEE SHEET 26 FOR -L- PROFILE

R-3421b
040-039

6
WOODMONT ASSOCIATES, INC.



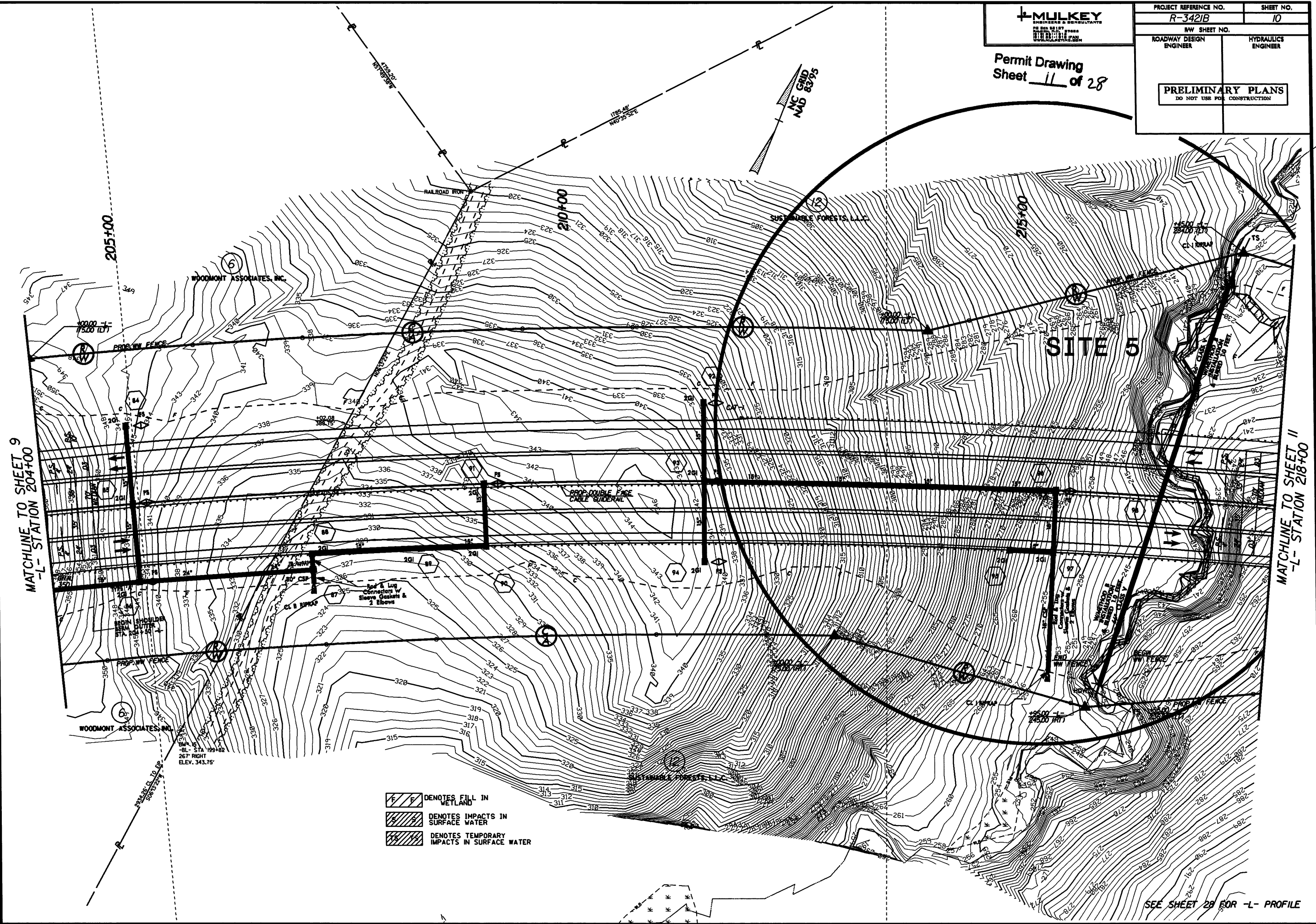
Permit Drawing
Sheet 10 of 28



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

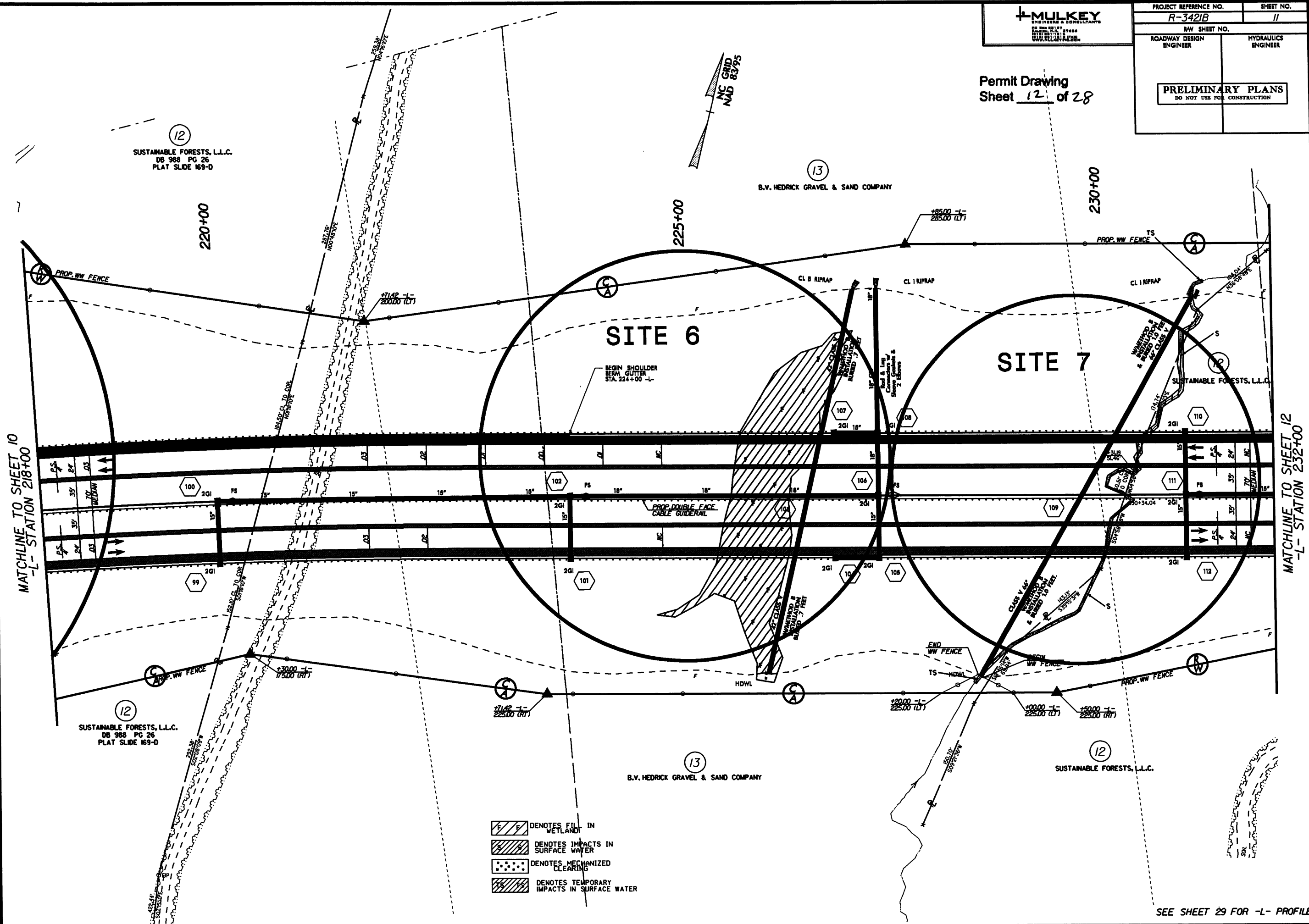
SEE SHEET 28 FOR -L- PROFILE

PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>10</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div><div>PRELIMINARY PLANS</div><div>DO NOT USE FOR CONSTRUCTION</div></div>			



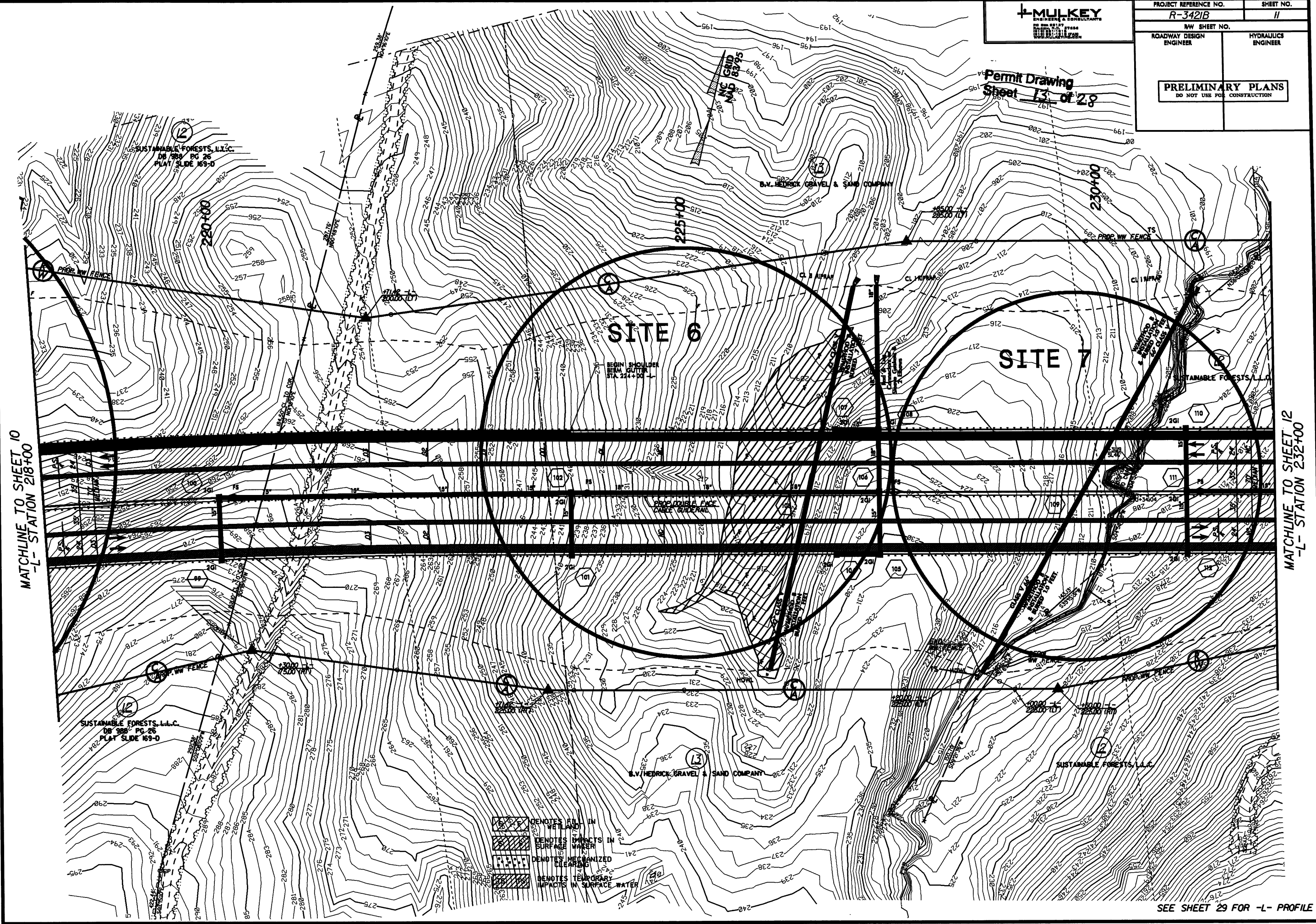
SEE SHEET 28 FOR -L- PROFILE

Permit Drawing
Sheet 12 of 28



SEE SHEET 29 FOR -L- PROFILE

Permit Drawing
Sheet **13** of **28**



MATCHLINE TO SHEET 10
-L- STATION 218+00

MATCHLINE TO SHEET 12
-L- STATION 232+00

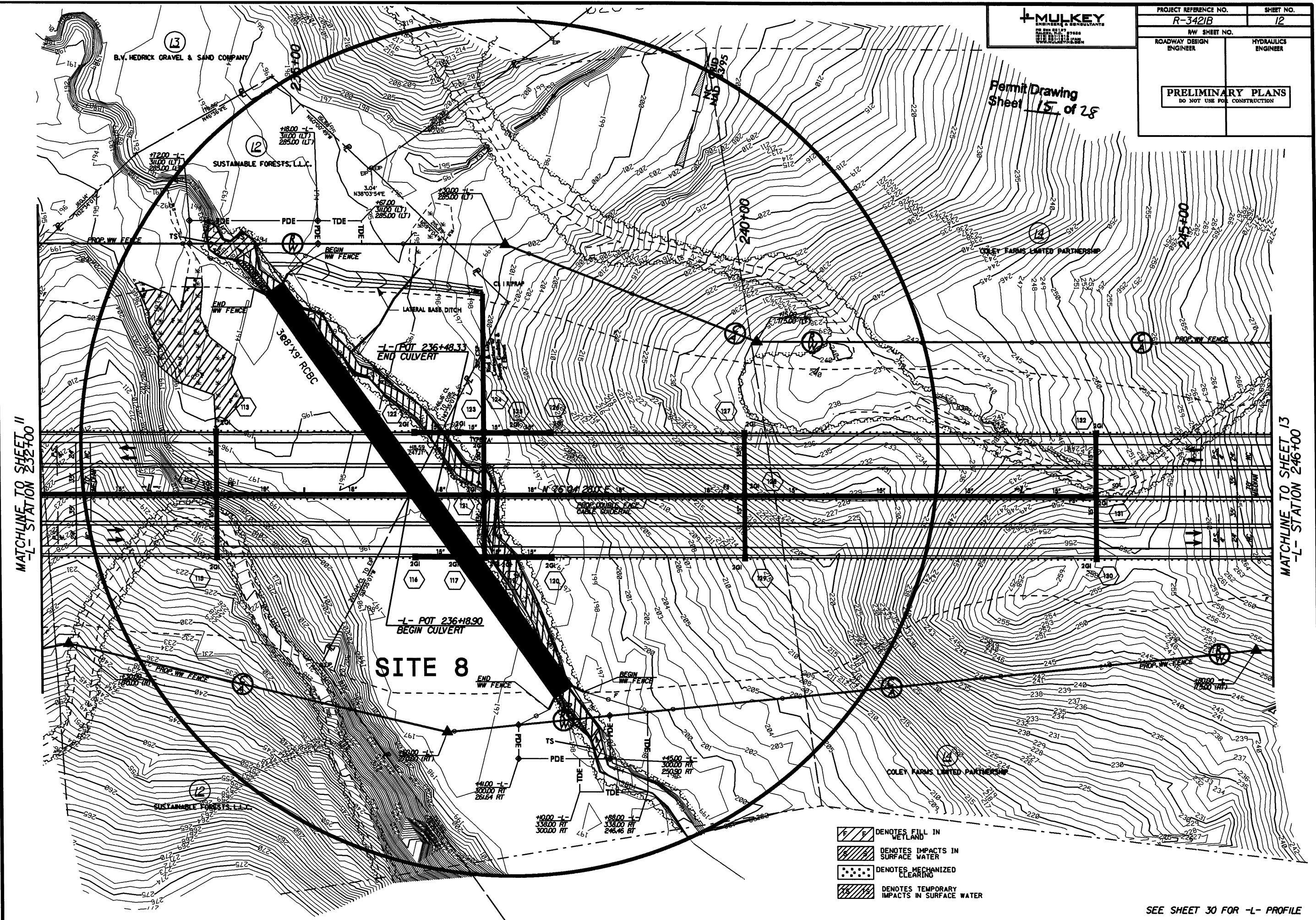
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 29 FOR -L- PROFILE

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet **15** of **28**

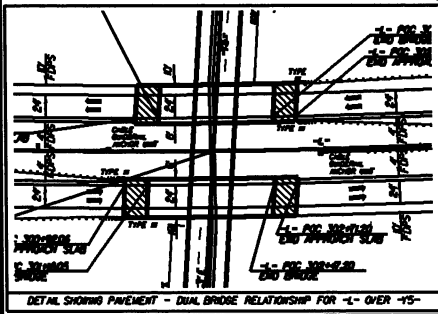
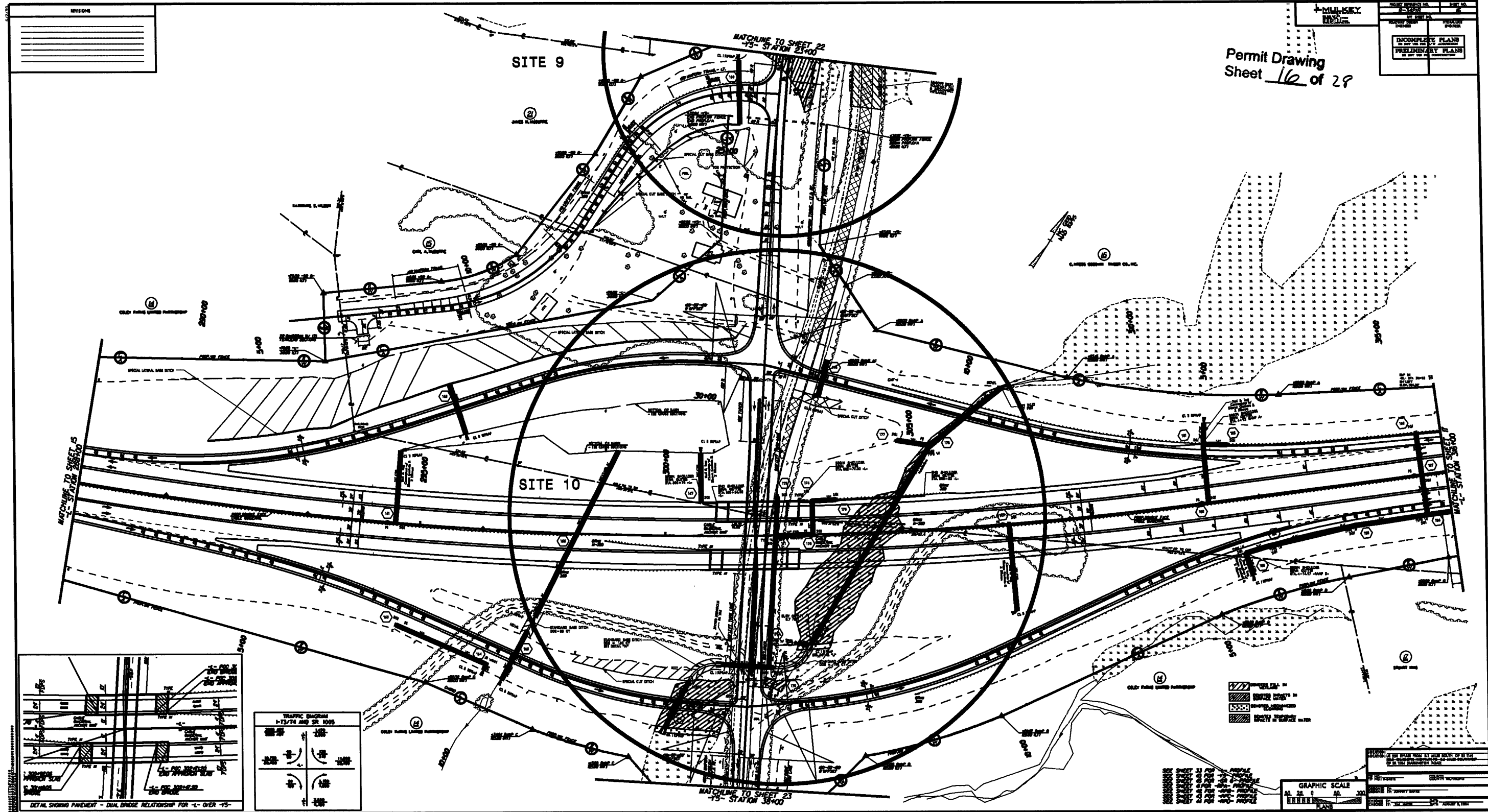


SEE SHEET 30 FOR -L- PROFILE

REVISIONS

Permit Drawing
Sheet 16 of 28

PROJECT NO. 7-107	SHEET NO. 16
DATE 10/1/75	PROJECT F-107
INCOMPLETE PLANS PRELIMINARY PLANS NO PART OF THIS DRAWING IS TO BE USED FOR CONSTRUCTION	



TRAFFIC SIGN 1-73/74 AND SR 1005			
1-73/74	1-74	1-73	1-74
1-73/74	1-74	1-73	1-74
1-73/74	1-74	1-73	1-74
1-73/74	1-74	1-73	1-74

1-73/74	1-74	1-73	1-74
1-73/74	1-74	1-73	1-74
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1-73/74	1-74	1-73	1-74

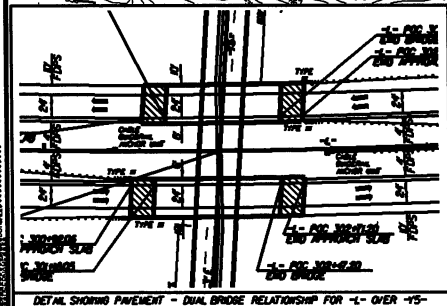
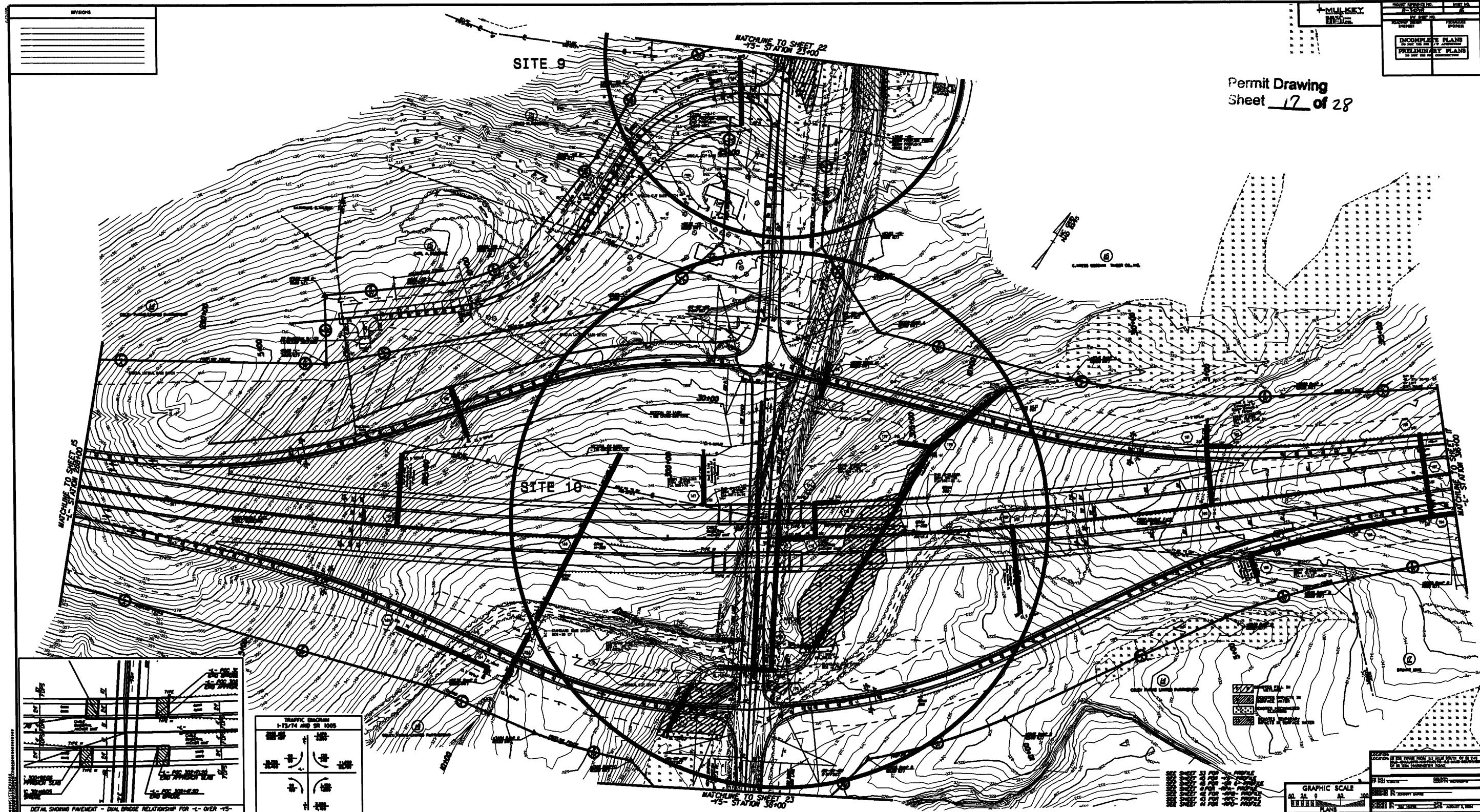
GRAPHIC SCALE	
0	100
0	100

SECTION OF THE PLAN FROM A-15-100 TO A-15-100	SECTION OF THE PLAN FROM A-15-100 TO A-15-100
SECTION OF THE PLAN FROM A-15-100 TO A-15-100	SECTION OF THE PLAN FROM A-15-100 TO A-15-100
SECTION OF THE PLAN FROM A-15-100 TO A-15-100	SECTION OF THE PLAN FROM A-15-100 TO A-15-100
SECTION OF THE PLAN FROM A-15-100 TO A-15-100	SECTION OF THE PLAN FROM A-15-100 TO A-15-100

REVISIONS	

TITLE: MILKEY BRIDGE DRAWING NO.: 7-100 SHEET NO.: 17	
DESIGNED BY: CHECKED BY: INCHARGE: 	PROJECT NO.: PROJECT NAME: LOCATION:
INCOMPLETE PLANS PRELIMINARY PLANS NO. OF SHEETS: 28	

Permit Drawing
Sheet 17 of 28

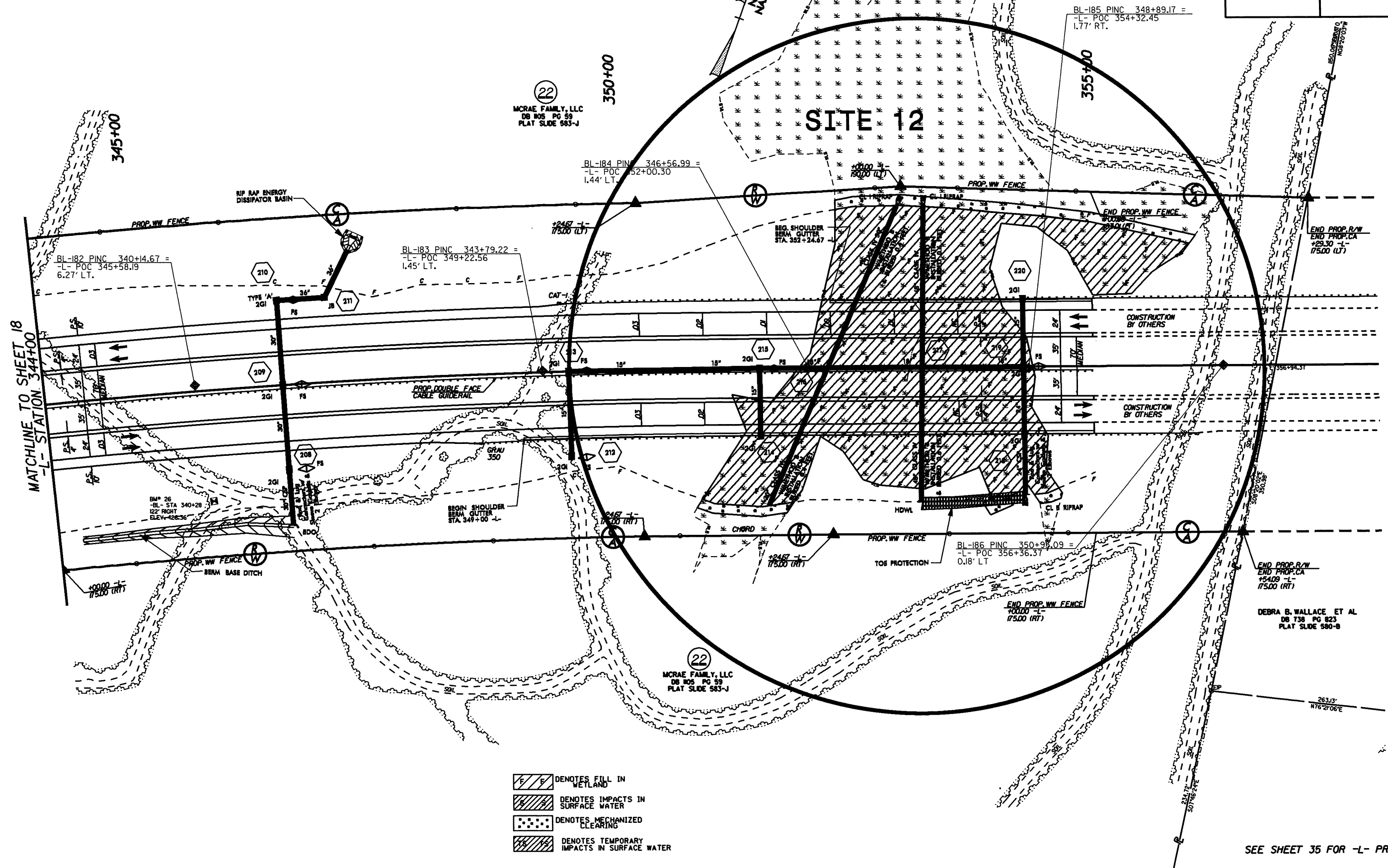


TRAFFIC SIGNAGE 1-72/74 AND 20 1005			



SECTION OF THE BRIDGE FROM 1/2 MILE SOUTH OF IS THE	
SECTION OF THE BRIDGE FROM 1/2 MILE NORTH OF IS THE	
BY: 	CHECKED BY:
DATE: 	DATE:

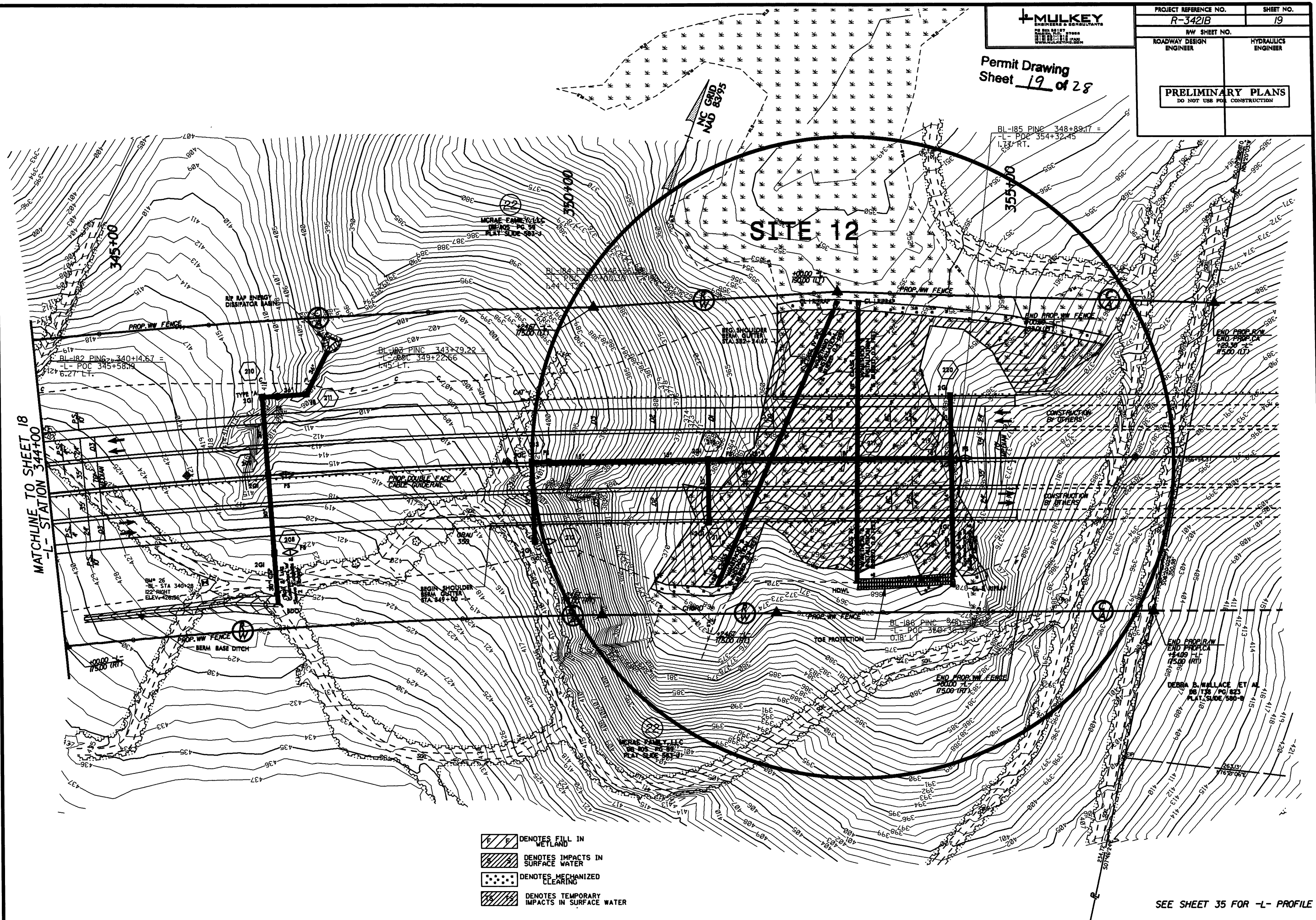
Permit Drawing
Sheet **18** of 28



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

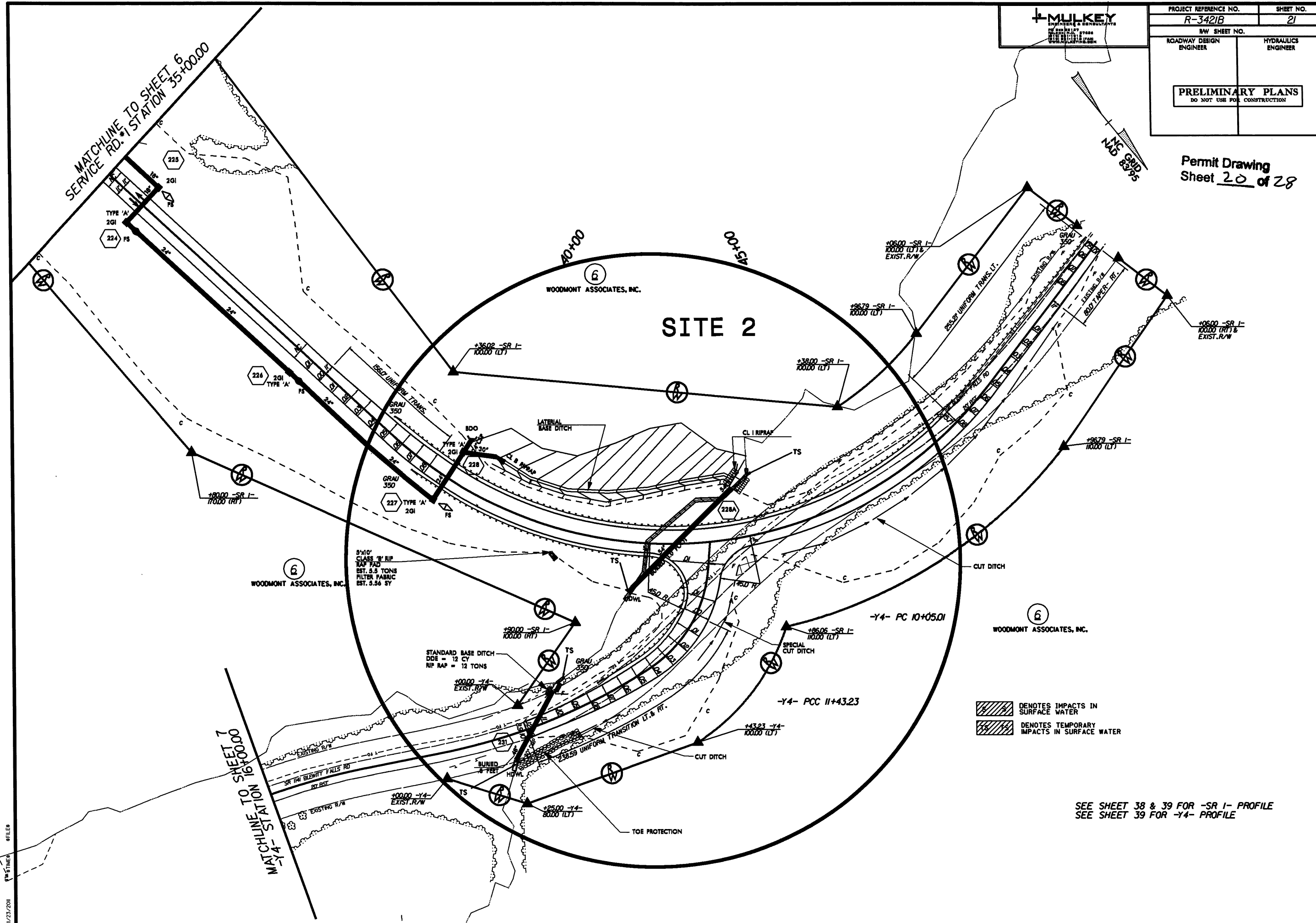
SEE SHEET 35 FOR -L- PROFILE

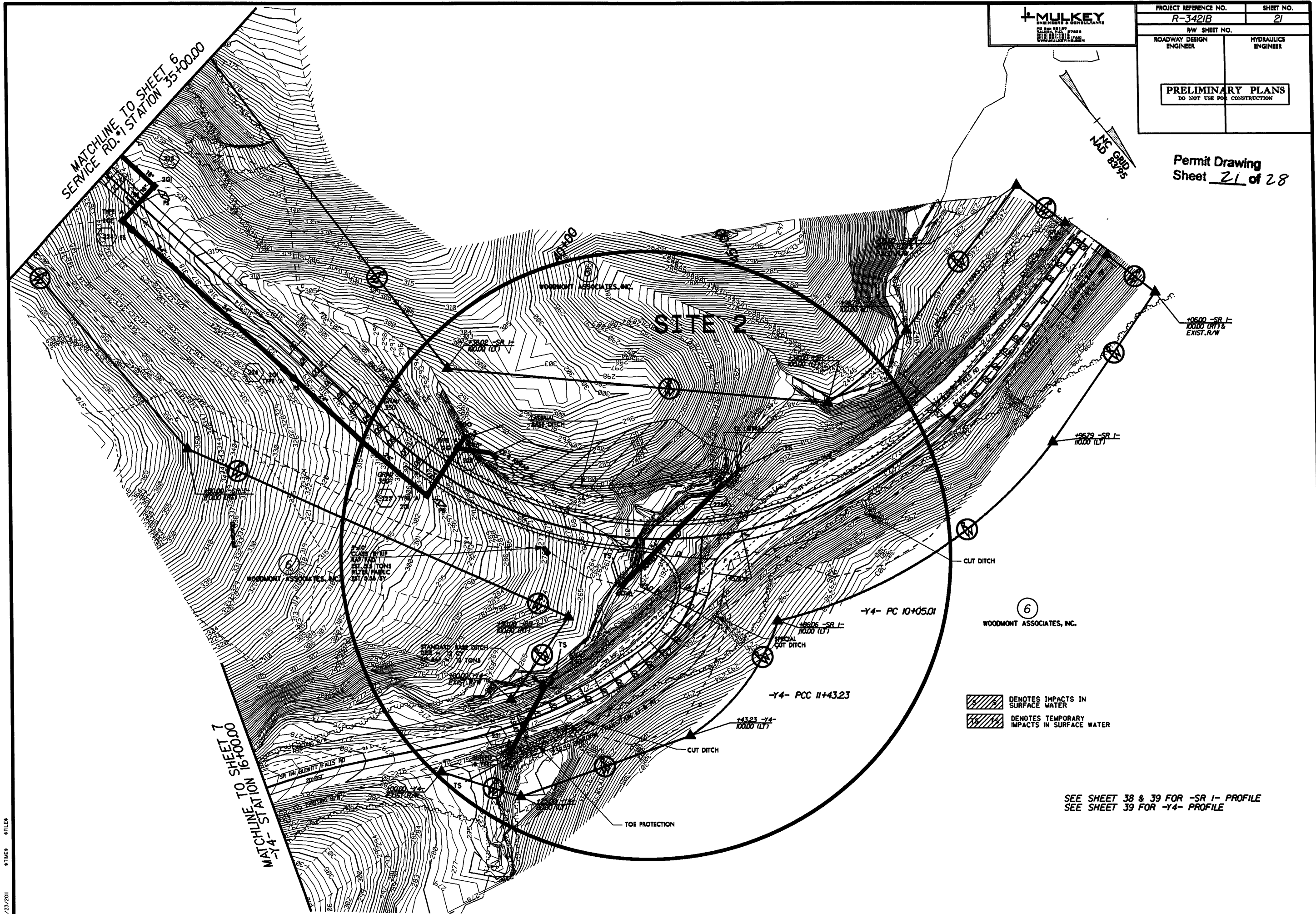
Permit Drawing
Sheet 19 of 28



SEE SHEET 35 FOR -L- PROFILE

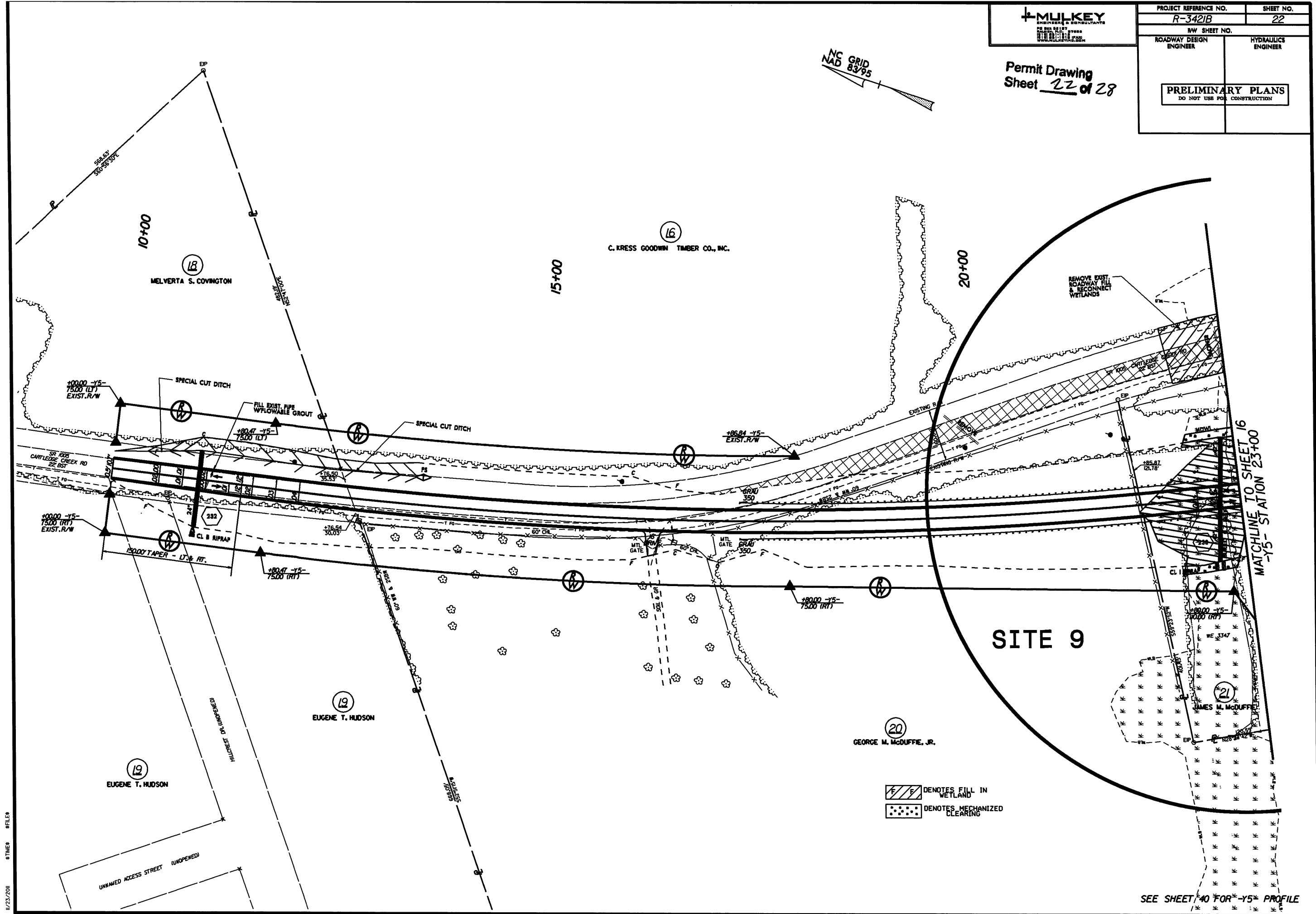
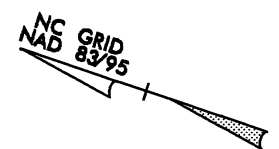
Permit Drawing
Sheet 20 of 28



Permit Drawing
Sheet 21 of 28

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	22
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

Permit Drawing
Sheet 22 of 28



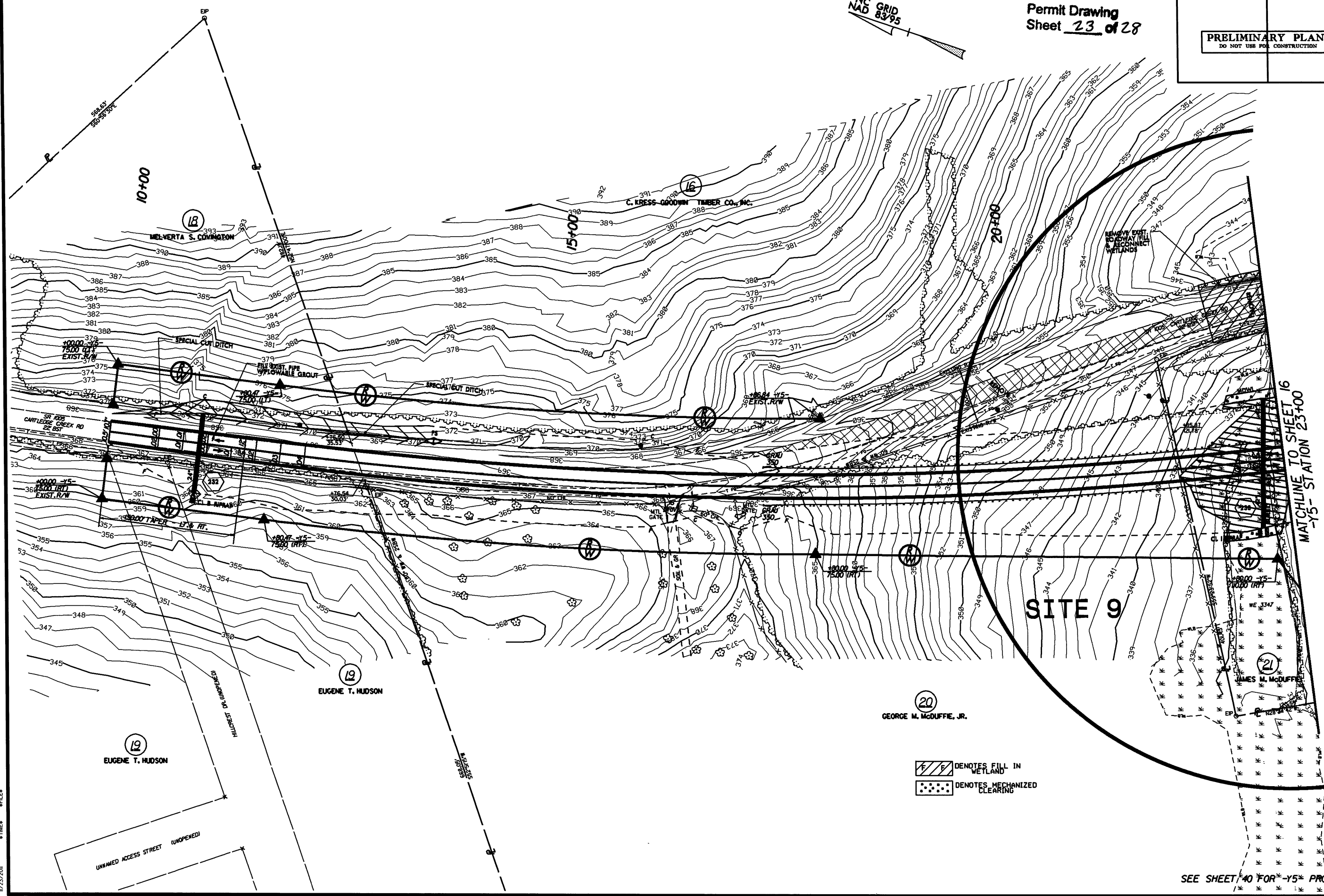
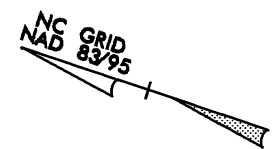
DENOTES FILL IN WETLAND
 DENOTES MECHANIZED CLEARING

SEE SHEET 40 FOR -Y5- PROFILE

11/23/2011 9:15 AM \$FILES

PROJECT REFERENCE NO. R-3421B		SHEET NO. 22	
RAW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			

Permit Drawing
Sheet **23** of **28**

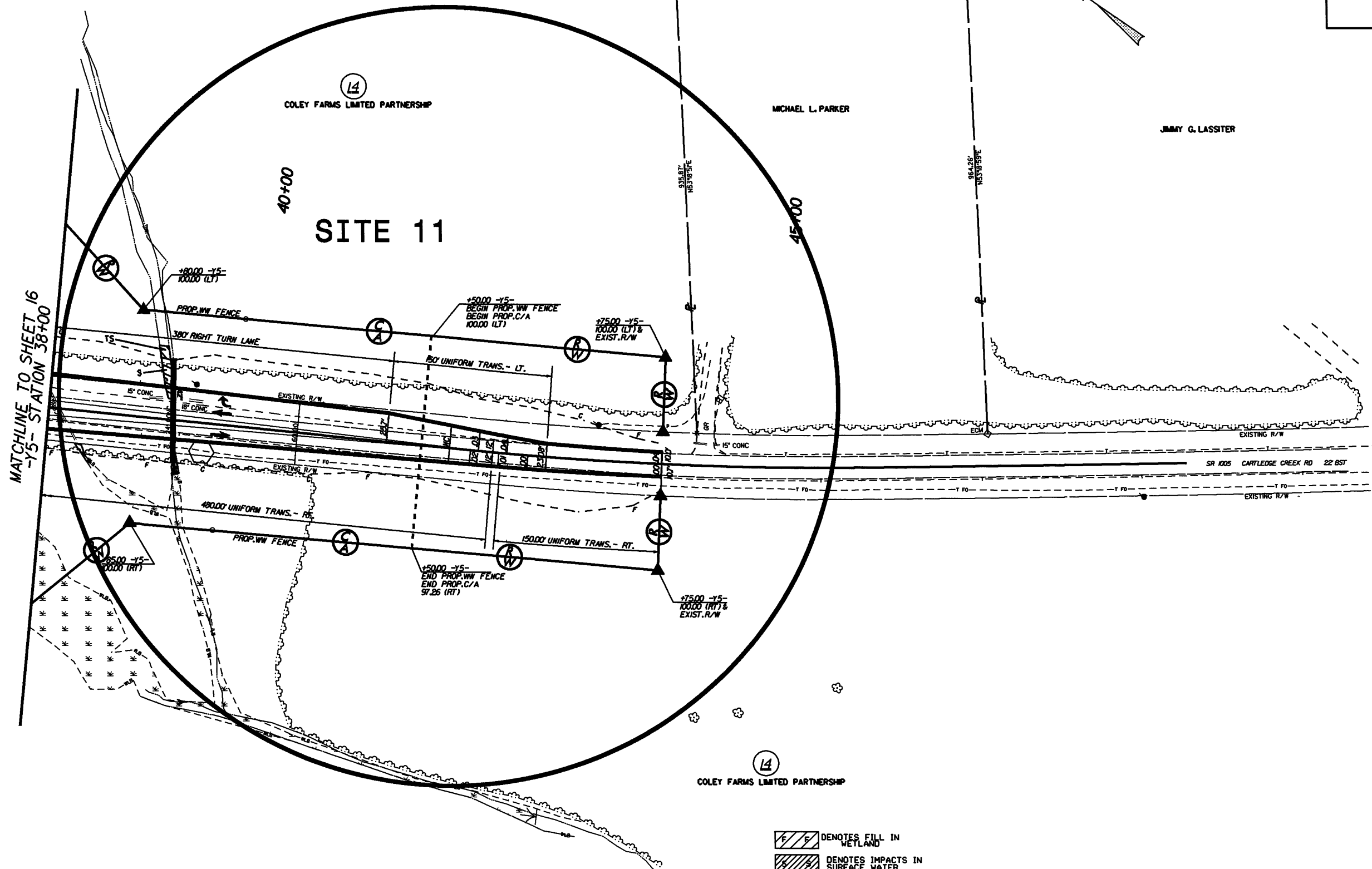


DENOTES FILL IN WETLAND
 DENOTES MECHANIZED CLEARING

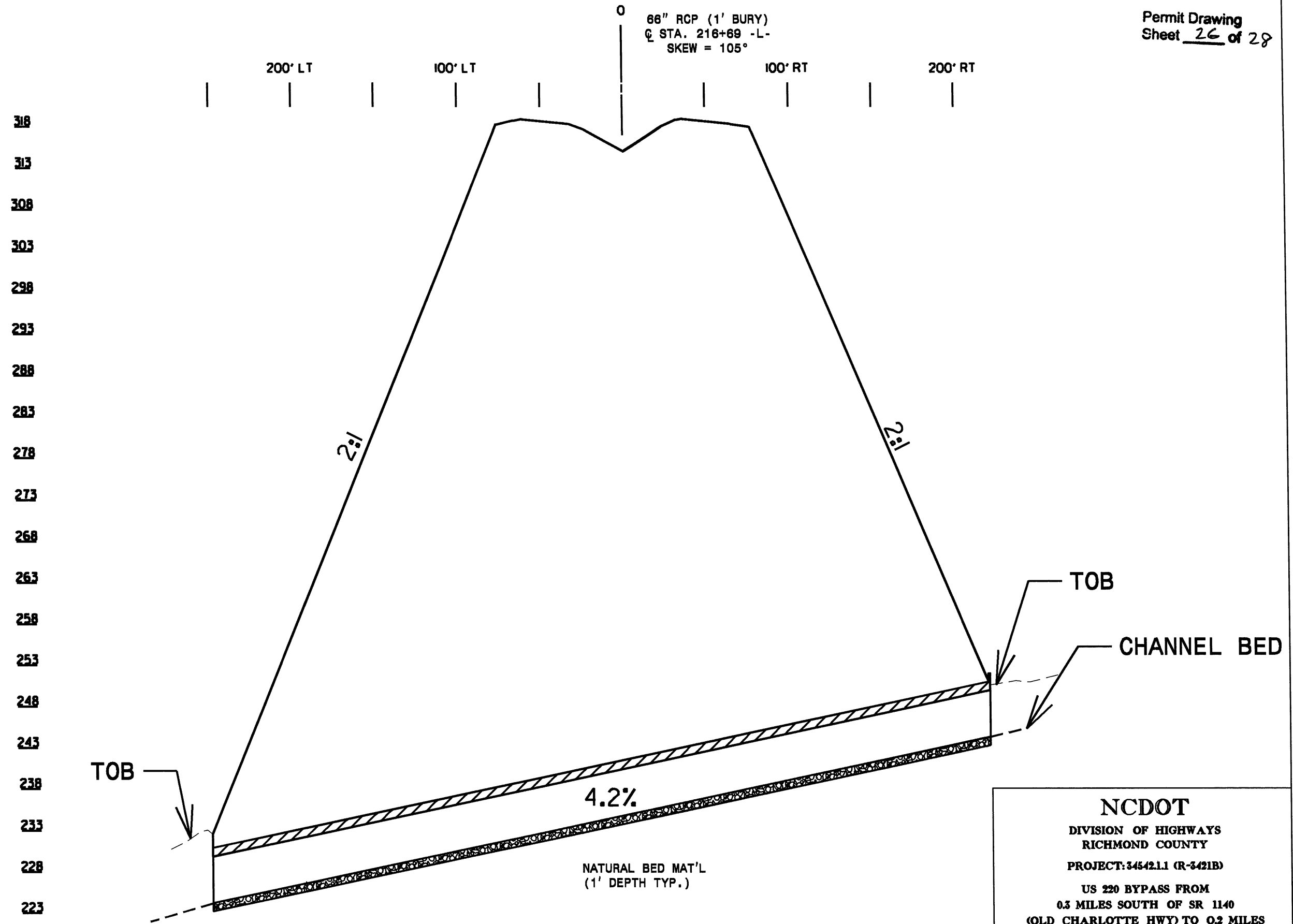
MATCHLINE TO SHEET 16
-Y5- STATION 23+00

SEE SHEET 40 FOR -Y5- PROFILE

PROJECT REFERENCE NO. R-3421B	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



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



NCDOT
DIVISION OF HIGHWAYS
RICHMOND COUNTY
PROJECT: 34542.1.1 (R-4421B)
US 220 BYPASS FROM
0.3 MILES SOUTH OF SR 1140
(OLD CHARLOTTE HWY) TO 0.2 MILES
SOUTHWEST OF SR 1304 (HARRINGTON RD)
SHEET OF 04/20/11

PROPERTY OWNERS

<u>Site</u>	<u>Last Name/Business</u>	<u>First Name</u>	<u>Address</u>	<u>City/Town</u>	<u>State</u>	<u>Zip Code</u>
1,2,3,4	Woodmont Associates, Inc.		19825 B N. Cove Rd.	Cornelius	NC	28031
5,6,7,8	Sustainable Forests, L.L.C.		15 Gum Ave.	Bolton	NC	28423
8	Coley Farms Limited Partnership		126 Commons Dr.	Spartanburg	SC	29302
9	McDuffie	James	591 Cartledge Crk. Rd.	Rockingham	NC	28379
9	McDuffie, Jr.	George	631 Cartledge Crk. Rd.	Rockingham	NC	28379
10	Coley Farms Limited Partnership		126 Commons Dr.	Spartanburg	SC	29302
10	C. Kress Timber Co., Inc.	c/o Claudia Goodwin	1041 Doster Rd.	Madison	GA	30650
11	Coley Farms Limited Partnership		126 Commons Dr.	Spartanburg	SC	29302
12	McRae Family, L.L.C.		115 Pennington Place	Durham	NC	27707

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

RICHMOND COUNTY
WBS - 34542.1.1 (R-3421B)

Permit Drawing
Sheet 27 of 28

SHEET

11/23/2011

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	148+07 & 150+96 -L-	30" & 30" RCP	0.22			0.03		<0.01	<0.01	24	15	
2	12+90 -Y4- & 42+86 SR1	48" & 54" RCP						0.02	<0.01	28	40	
3	166+62 & 168+00 -L-	36" & 42" RCP	0.03					0.07	<0.01	759	37	
4	178+71 -L-	36" RCP	0.08			0.01		0.02	<0.01	352	26	
5	216+69 -L-	66" RCP	0.02					0.08	<0.01	645	20	
6	226+70 -L-	42" RCP	0.58			<0.01						
7	229+82 -L-	66" RCP						0.05	<0.01	610	20	
8	236+34 -L-	3@8"x9" RCBC	0.20			<0.01		0.22	0.03	832	90	
9	302+79 -L-	42" RCP	0.37			0.05						
10	304+32 -L- & 13+93 -Y5RPC-	42" & 48" RCP	1.06			0.05						
11	15+33 -Y5-	42" RCP	<0.01			<0.01		<0.01	<0.01	47	10	
12	353+20 -L-	48" RCP	1.79			0.13						
TOTALS:			4.34			0.28		0.41	0.05	3297	258	

Permit Drawing
at 28 of 28

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RICHMOND COUNTY
WBS - 34542.1.1 (R-3421B)

\$SYTIME\$\$\$\$\$
\$CNAME\$\$\$\$\$
\$DGN\$\$\$\$\$

CONTRACT:

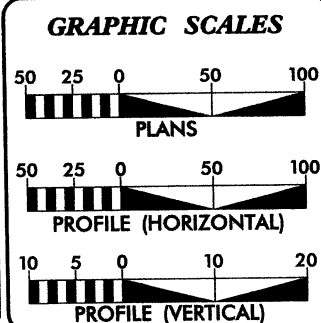
VICINITY MAP

RW REVIEW PLANS

RICHMOND COUNTY


**TYPE OF WORK: GRADING, DRAINAGE, PAVING,
STRUCTURES, & SIGNING**

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



* (TTST 10% + DUAL 18%)

LENGTH ROADWAY TIP PROJECT R-3421A = 1.788 miles
 LENGTH STRUCTURES TIP PROJECT R-3421A = 0.091 miles
 TOTAL LENGTH OF TIP PROJECT R-3421A = 1.879 miles
 (SB LANES WERE USED FOR LENGTH OF PROJECT)

 GREENHORNE & O'MARA, INC. 5565 CENTERVIEW DRIVE, SUITE 107 RALEIGH, NORTH CAROLINA 27606 (919) 851-4199	
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
2006 STANDARD SPECIFICATIONS	D. C. KEENER, P.E. PROJECT ENGINEER GREENHORNE & O'MARA, INC.
RIGHT OF WAY DATE: 6/2008	H. W. BARE PROJECT DESIGN ENGINEER GREENHORNE & O'MARA, INC.
LETTING DATE: POST YEAR	
NC DOT CONTACT:	CATHY HOUSER, P.E. PROJECT ENGINEER - ENGR. COORD.

SIGNATURE: _____ **P.E.**

**ROADWAY DESIGN
ENGINEER**

SIGNATURE: _____ **P.E.**



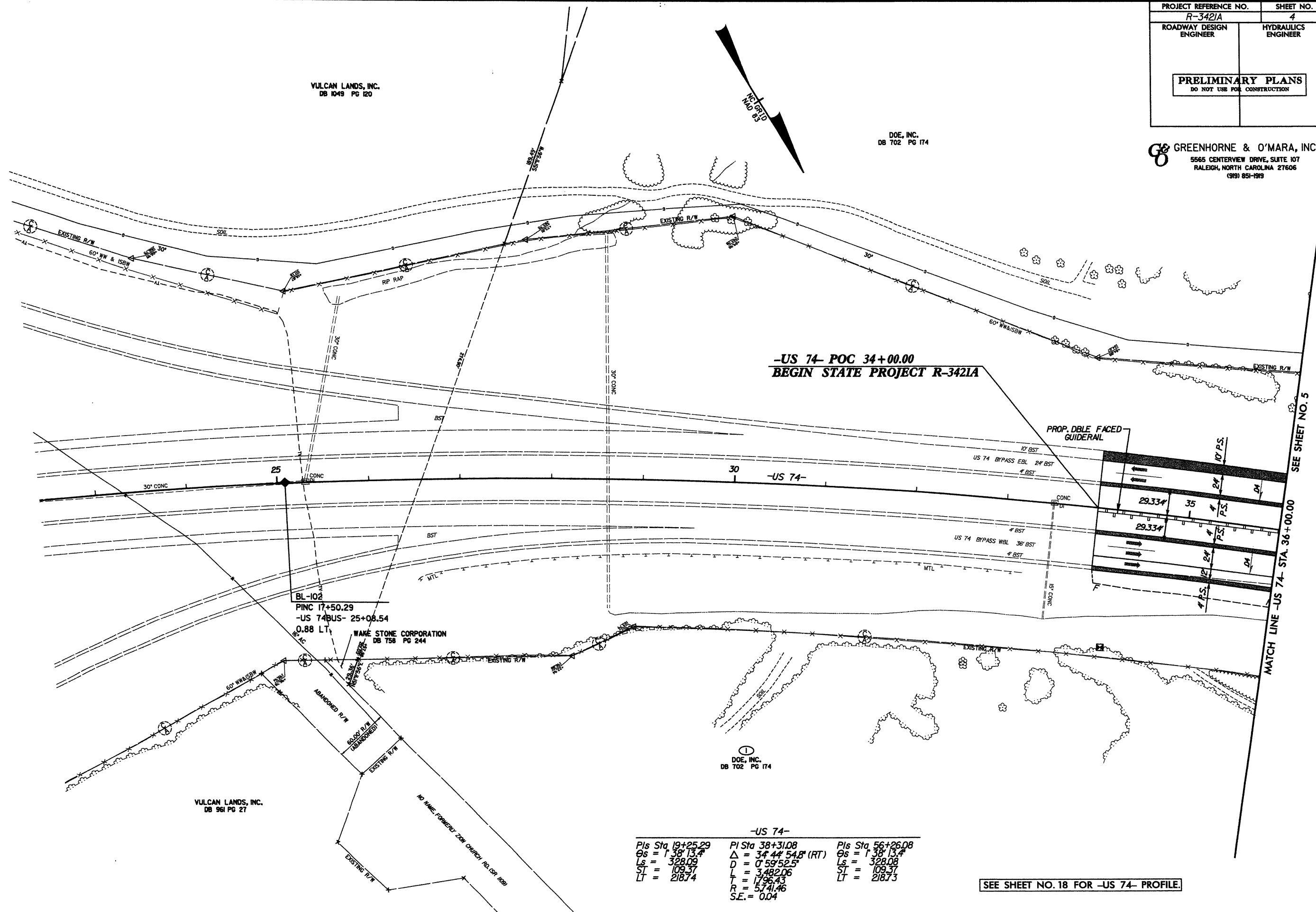
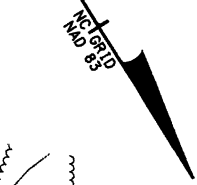
P.E.

STATE HIGHWAY DESIGN ENGINEER

GREENHORNE & O'MARA, INC.
 5565 CENTERVIEW DRIVE, SUITE 107
 RALEIGH, NORTH CAROLINA 27606
 (919) 851-1919

VULCAN LANDS, INC.
 DB 1049 PG 120

DOE, INC.
 DB 702 PG 174



**-US 74- POC 34+00.00
 BEGIN STATE PROJECT R-3421A**

MATCH LINE -US 74- STA. 36+00.00
 SEE SHEET NO. 5

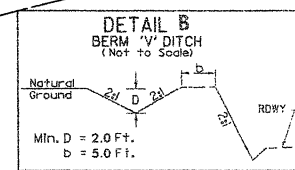
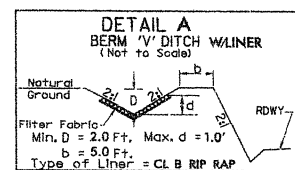
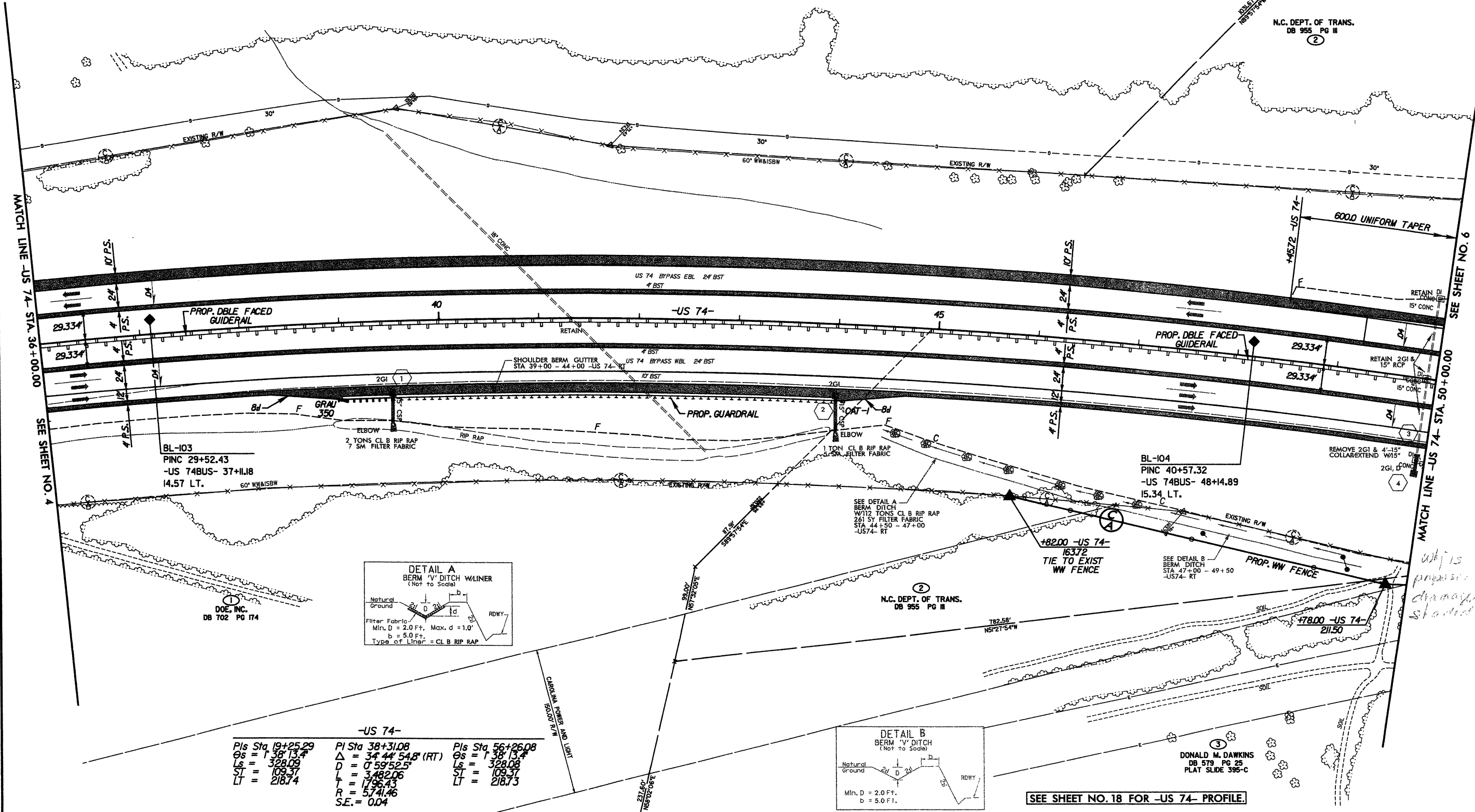
-US 74-					
PIs Sta 19+25.29	PI Sta 38+31.08	PIs Sta 56+26.08			
Os = 1° 38' 13.4"	Δ = 34° 44' 54.8" (RT)	Os = 1° 38' 13.4"			
Ls = 328.09	D = 0° 59' 52.5"	Ls = 328.08			
ST = 109.37	L = 3,482.06	ST = 109.37			
LT = 218.74	T = 1,796.43	LT = 218.73			
	R = 5,741.46				
	S.E. = 0.04				

SEE SHEET NO. 18 FOR -US 74- PROFILE

GREENHORNE & O'MARA, INC.
5565 CENTERVIEW DRIVE, SUITE 107
RALEIGH, NORTH CAROLINA 27606
(919) 851-1915

N.C. DEPT. OF TRANS.
DB 955 PG II

DOE, INC.
DB 702 PG 174



-US 74-		
Pls Sta 19+25.29	Pl Sta 38+31.08	Pls Sta 56+26.08
Os = 1 38' 13.4"	Δ = 34' 44" 54.8" (RT)	Os = 1 38' 13.4"
Ls = 328.09	D = 0' 59' 52.5"	Ls = 328.08
ST = 109.37	L = 3,482.06	ST = 109.37
LT = 218.74	L = 1,796.43	LT = 218.73
	R = 5741.46	
	S.E. = 0.04	

why is proposed drainage shown?

SEE SHEET NO. 18 FOR -US 74- PROFILE.

REVISIONS

SEE SHEET NO. 6

MATCH LINE -US 74- STA. 50+00.00

MATCH LINE -US 74- STA. 36+00.00

SEE SHEET NO. 4

CAROLINA POWER AND LIGHT
ROAD R/W

DONALD M. DAWKINS
DB 579 PG 25
PLAT SLIDE 395-C

5/02/2019

REVISIONS

10/20/08 - PARCEL #4 MOVED RW MONUMENT FROM 280' TO 278' OFFSET FROM US74

4/15/09 - PARCEL #4 REVISED RW TO MISS TOWER; REVISED PROPERTY OWNER NAME, DB, PG

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

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02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

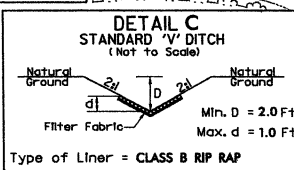
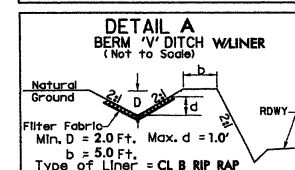
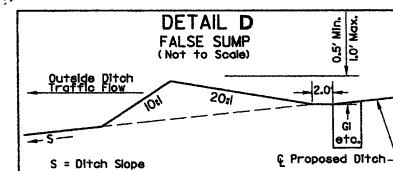
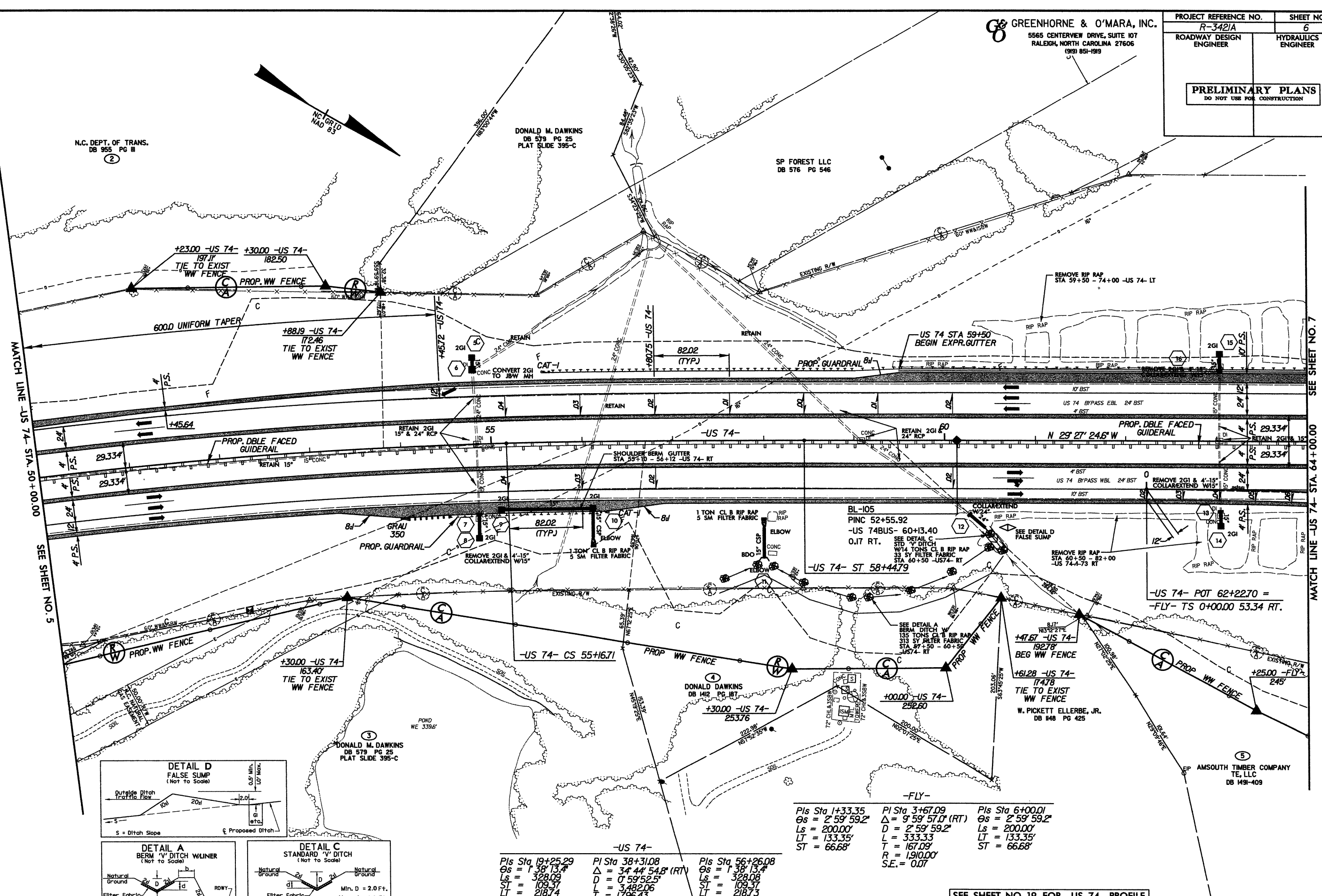
02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

02/09/11 - PARCEL #5 REVISED PROPERTY NAME, DB

GREENHORNE & O'MARA, INC.
5565 CENTERVIEW DRIVE, SUITE 107
RALEIGH, NORTH CAROLINA 27606
(919) 851-1919

PROJECT REFERENCE NO.		SHEET NO.
R-3421A		6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>		



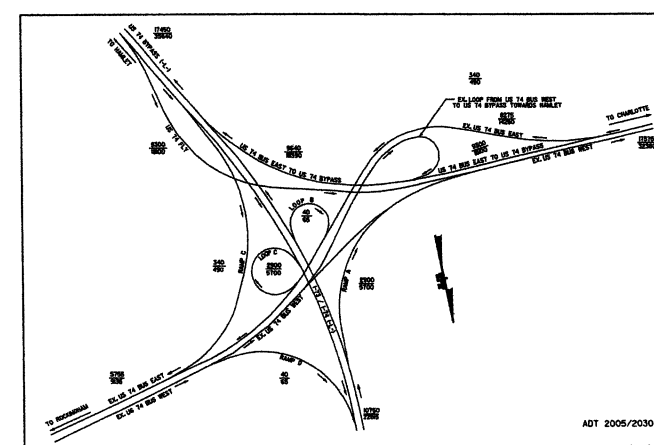
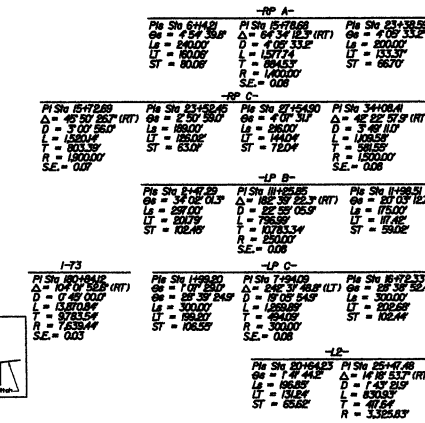
-US 74-		
Pls Sta 19+25.29	Pl Sta 38+31.08	Pls Sta 56+26.08
Os = 1' 38" 13.4	Δ = 34' 44" 54.8 (RT)	Os = 1' 38" 13.4
Ls = 328.09	D = 0' 59" 52.5	Ls = 328.08
ST = 109.37	L = 3482.06	ST = 109.37
LT = 218.74	T = 1796.43	LT = 218.73
	R = 5741.46	
	S.E. = 0.04	

-FLY-		
Pls Sta 1+33.35	Pl Sta 3+67.09	Pls Sta 6+00.01
Os = 2' 59' 59.2	Δ = 9' 59' 57.0 (RT)	Os = 2' 59' 59.2
Ls = 200.00	D = 2' 59' 59.2	Ls = 200.00
LT = 133.35	L = 333.33	LT = 133.35
ST = 66.68	T = 167.09	ST = 66.68
	R = 1910.00	
	S.E. = 0.07	

SEE SHEET NO. 19 FOR -US 74- PROFILE.
SEE SHEET NO. 27 FOR -FLY- PROFILE.

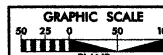
GREENHORNE & O'MARA, INC.
8000 CENTERVILLE DRIVE, SUITE 107
RALEIGH, NORTH CAROLINA 27608

GREENHORNE & O'MARA, INC.
2000 CENTURYVIEW DRIVE, SUITE 107
RALEIGH, NORTH CAROLINA 27608

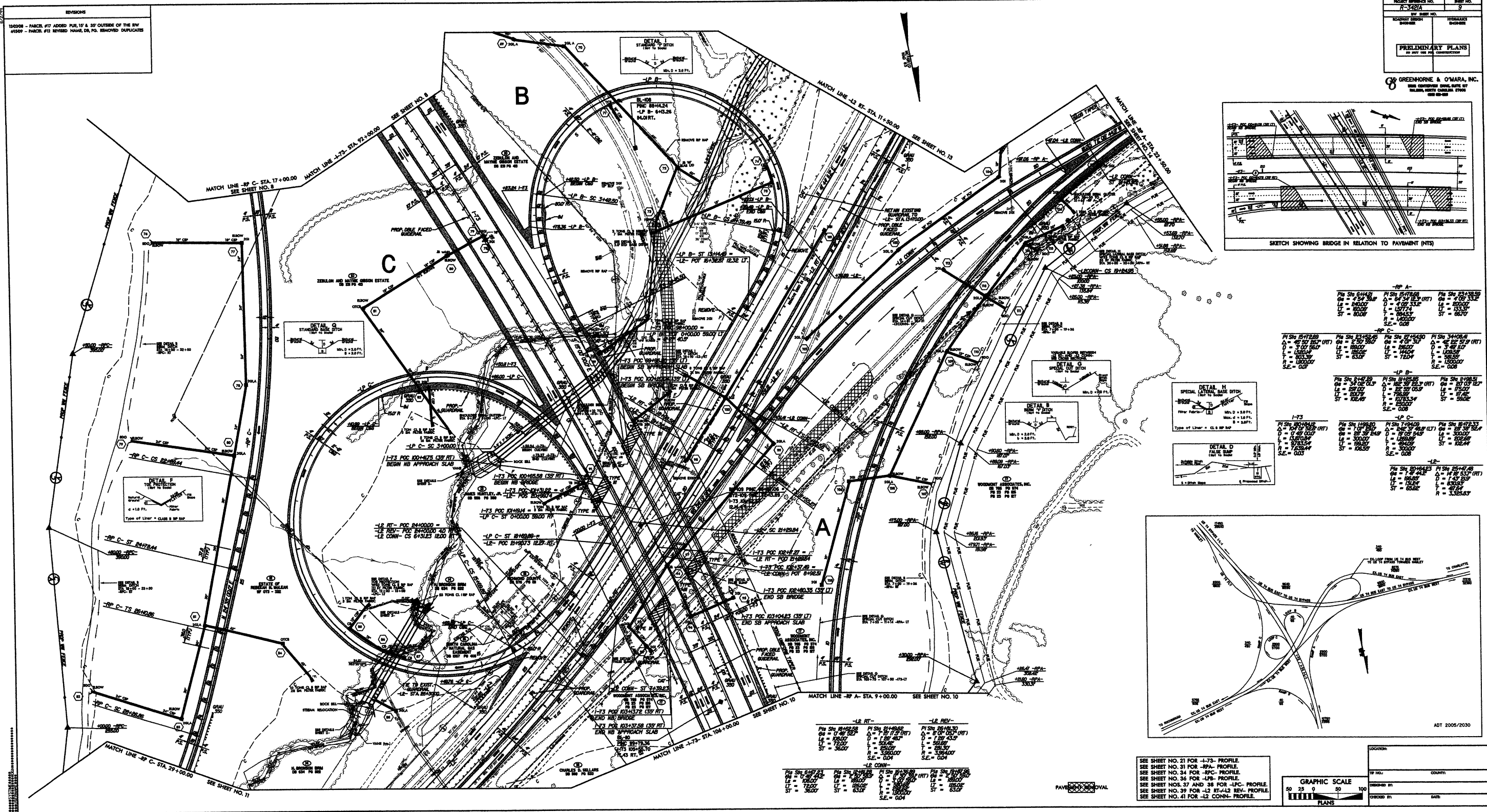


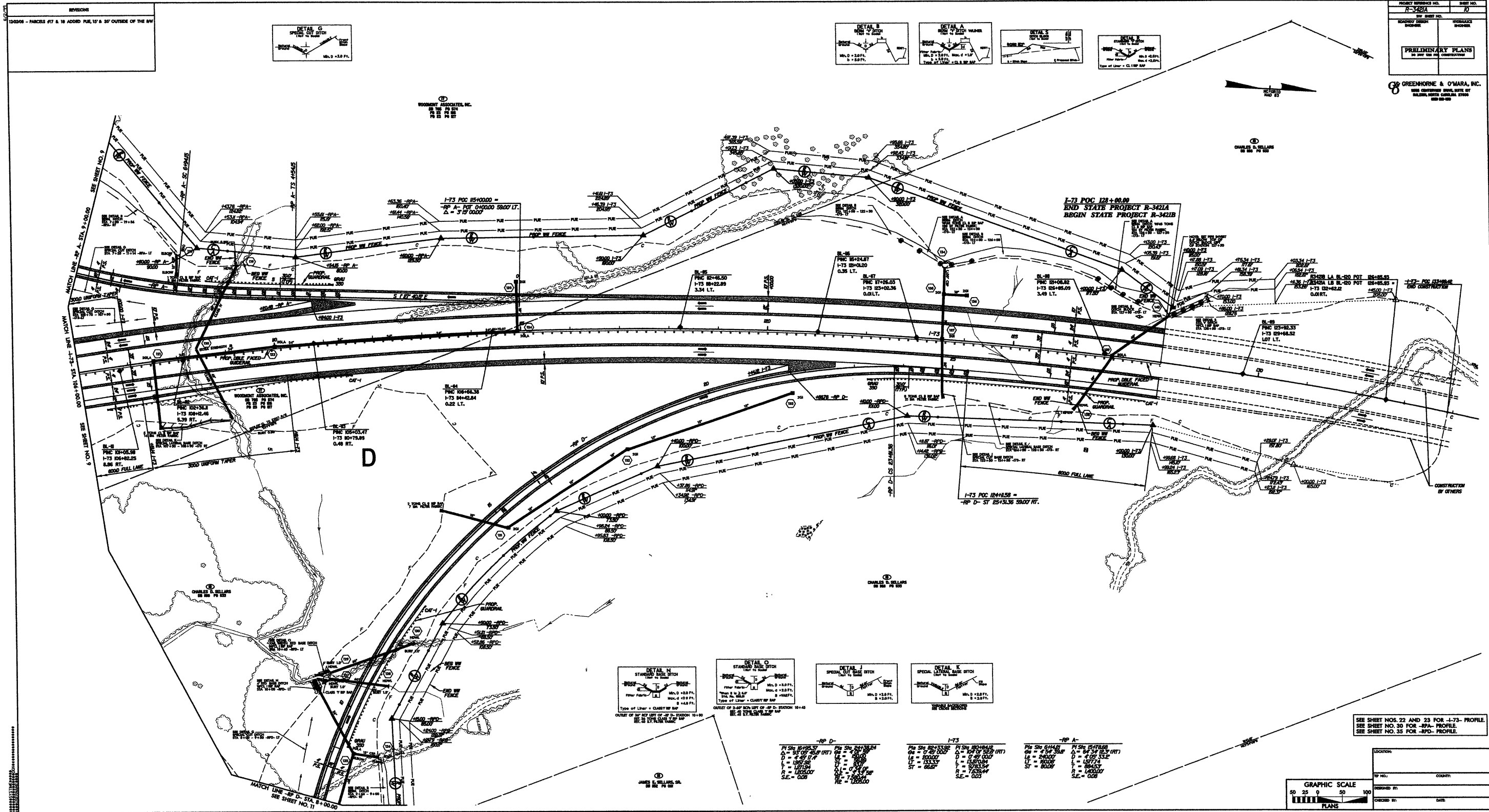
ADT 2005/2030

SEE SHEET NO. 21 FOR -L73- PROFILE.
SEE SHEET NO. 31 FOR -RPA- PROFILE.
SEE SHEET NO. 34 FOR -RPC- PROFILE.
SEE SHEET NO. 36 FOR -LPB- PROFILE.
SEE SHEET NOS. 37 AND 38 FOR -LPC- PROFILE.
SEE SHEET NO. 39 FOR -L2 RT-/L2 REV- PROFILE.
SEE SHEET NO. 41 FOR -L2 CONN- PROFILE.



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





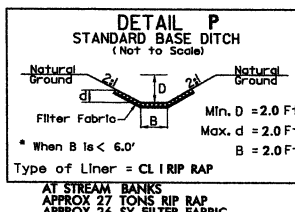
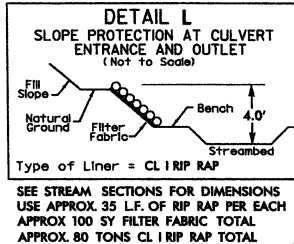
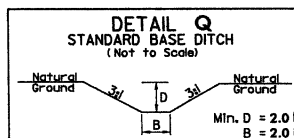
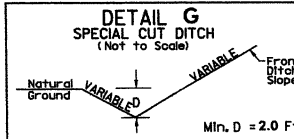
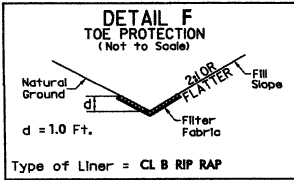
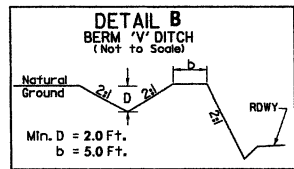
SEE SHEET NOS. 22 AND 23 FOR -L73- PROFILE.
SEE SHEET NO. 30 FOR -RPA- PROFILE.
SEE SHEET NO. 35 FOR -RPD- PROFILE.

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



PROJECT REFERENCE NO. R-342/A	SHEET NO. II
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

GREENHORNE & O'MARA, INC.
5565 CENTERVIEW DRIVE, SUITE 107
RALEIGH, NORTH CAROLINA 27606
(919) 851-1919



-L2 REV-
PI Sta 26+46.99
 $\Delta = 7' 07'' 51.2''$ (RT)
D = 1' 26' 43.5"
L = 493.35'
T = 246.99'
R = 3,964.00'
S.E. = 0.04

-RP C-
PI Sta 34+08.41
 $\Delta = 42' 22'' 57.6''$ (RT)
D = 3' 49' 11.0"
L = 1,109.58'
T = 581.55'
R = 1,500.00'
S.E. = 0.08

-L2 RT-
PI Sta 34+78.58
 $\Delta = 18' 51'' 57.5''$ (RT)
D = 1' 56' 32.0"
L = 971.36'
T = 490.11'
R = 2,950.00'
S.E. = 0.06
R'OFF = 162.0'

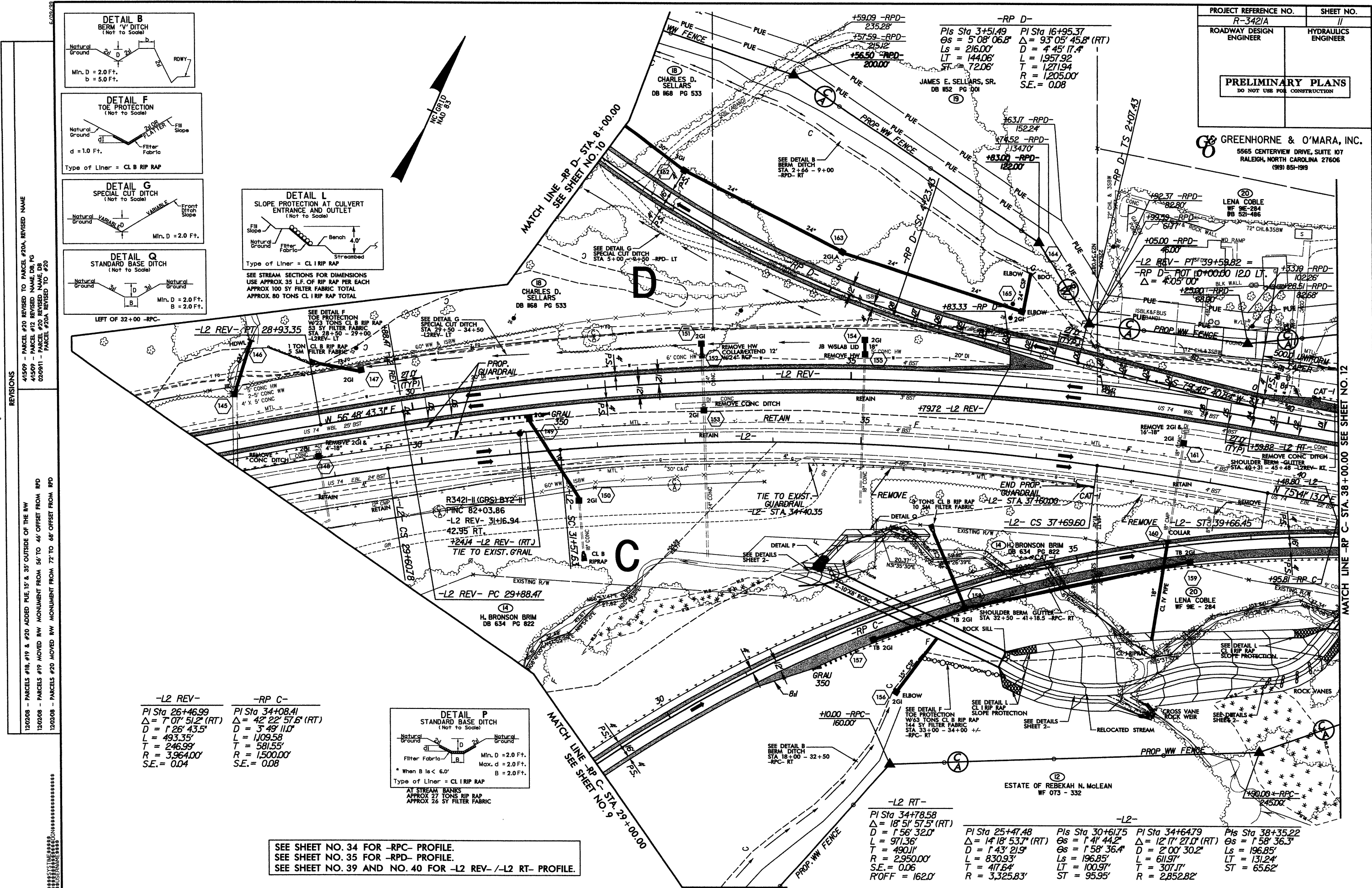
PI Sta 25+47.48
 $\Delta = 14' 18'' 53.7''$ (RT)
D = 1' 43' 21.9"
L = 830.93'
T = 417.64'
R = 3,325.83'

PI Sta 30+61.75
 $\Delta = 12' 17'' 27.0''$ (RT)
D = 2' 00' 30.2"
L = 611.97'
T = 307.17'
R = 2,852.82'

PI Sta 34+64.79
 $\Delta = 12' 17'' 27.0''$ (RT)
D = 2' 00' 30.2"
L = 611.97'
T = 307.17'
R = 2,852.82'

PI Sta 38+35.22
 $\Delta = 15' 58'' 36.3''$
D = 1' 58' 36.3"
L = 196.85'
T = 131.24'
ST = 65.62'

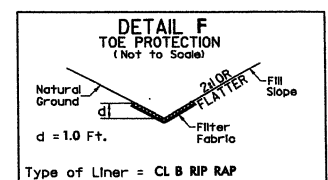
SEE SHEET NO. 34 FOR -RPC- PROFILE.
SEE SHEET NO. 35 FOR -RPD- PROFILE.
SEE SHEET NO. 39 AND NO. 40 FOR -L2 REV- / -L2 RT- PROFILE.



REVISIONS
4/15/09 - PARCEL #20 REVISED TO PARCEL #20A, REVISED NAME
4/15/09 - PARCEL #12 REVISED NAME DB, PG
02/09/11 - PARCEL #20 REVISED NAME DB, PG
12/02/08 - PARCELS #18, #19 & #20 ADDED PUE, 15' & 35' OUTSIDE OF THE RW
12/02/08 - PARCELS #19 MOVED RW MONUMENT FROM 56' TO 45' OFFSET FROM RPD
12/02/08 - PARCELS #20 MOVED RW MONUMENT FROM 72' TO 68' OFFSET FROM RPD

6/03/03

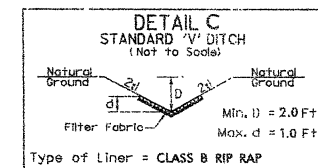
NC GRID
NAD 83



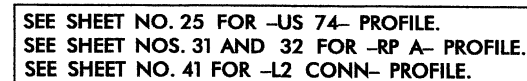
SEE SHEET NO. 34 FOR -RPC- PROFILE.
SEE SHEET NO. 40 FOR -L2 REV- PROFILE.



-FLY-		-FLY-	
Pls Sta 12+52.55	Pl Sta 21+55.94	Pls Sta 29+38.80	Pls Sta 39+53.39
Es = 4' 11" 32.5'	$\Delta = 53' 19" 18.0'$ (LT)	Es = 4' 11" 32.5'	Es = 2' 20" 16.3'
Ls = 240.00'	D = 3' 29' 37"	Ls = 240.00'	Ls = 231.00'
LT = 160.04'	L = 1526.25	LT = 160.04'	LT = 154.01'
ST = 80.04'	T = 823.43'	ST = 80.04'	ST = 77.01'
	R = 1,640.00'		
	S.E. = 0.08		



REVISIONS

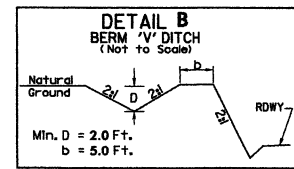


PROJECT REFERENCE NO. R-3421A	SHEET NO. 15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

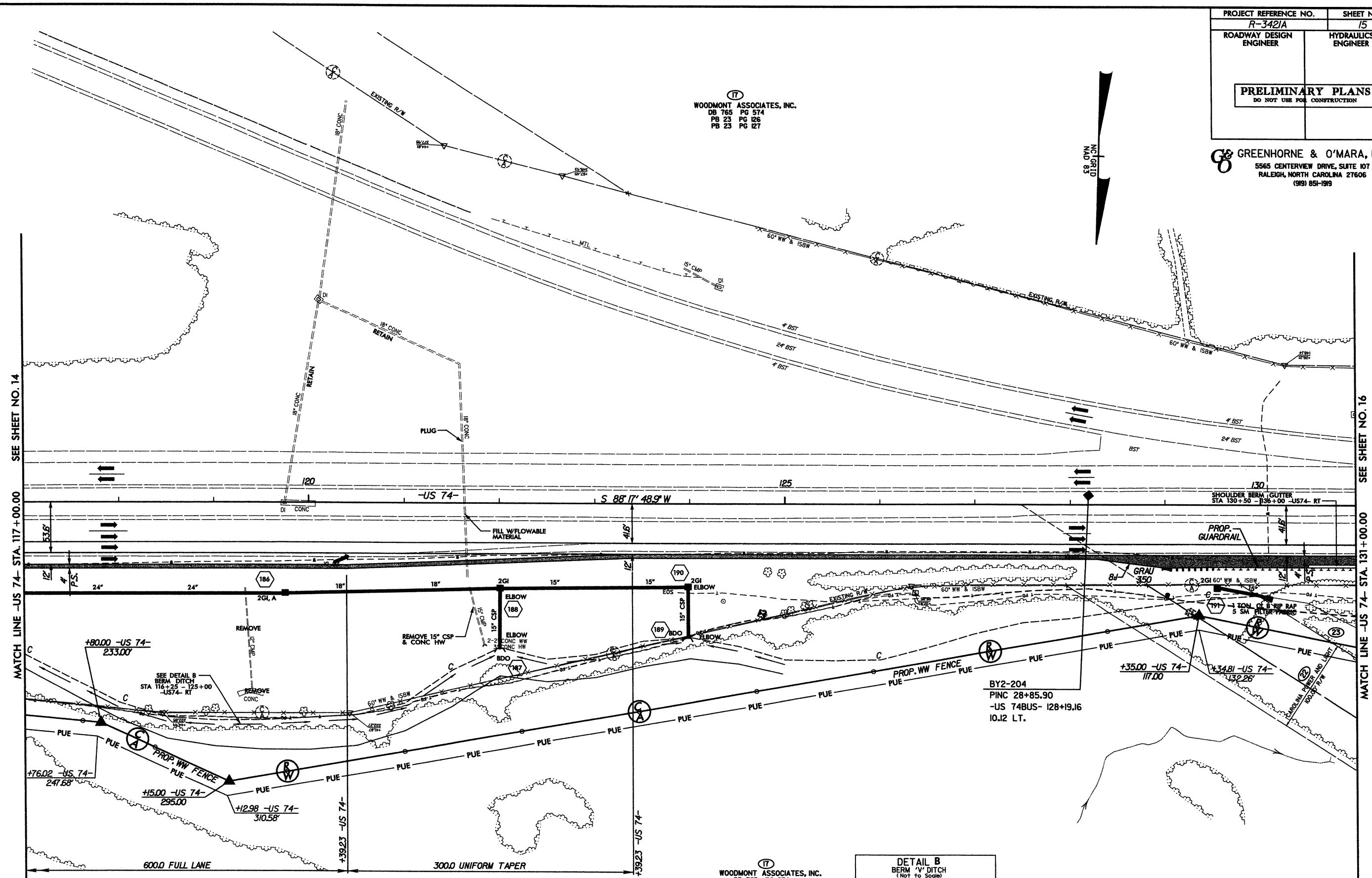
GREENHORNE & O'MARA, INC.
 5565 CENTERVIEW DRIVE, SUITE 107
 RALEIGH, NORTH CAROLINA 27606
 (919) 851-1919

WOODMONT ASSOCIATES, INC.
 DB 765 PG 574
 PB 23 PG 126
 PB 23 PG 127

WOODMONT ASSOCIATES, INC.
 DB 765 PG 574
 PB 23 PG 126
 PB 23 PG 127



SEE SHEET NO. 25 FOR -US 74- PROFILE.



REVISIONS

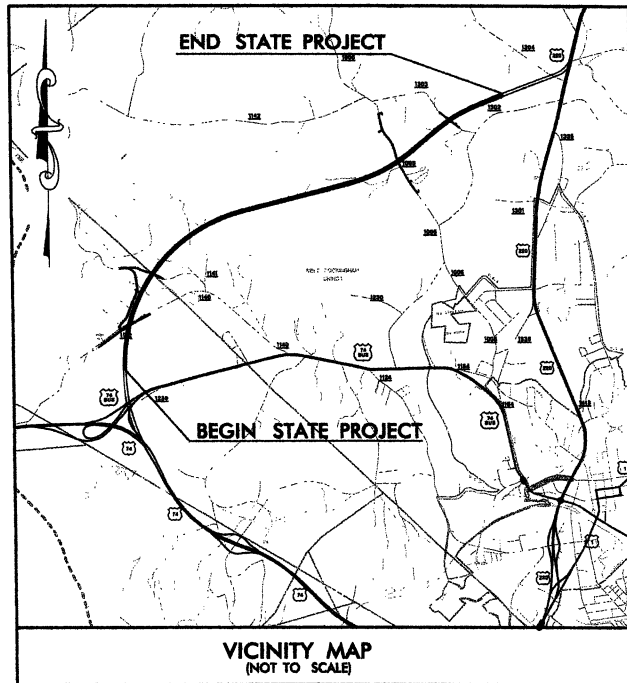
120208 - PARCEL #17 ADDED PUE, 15' & 35' OUTSIDE OF THE RW

 EXISTING
 PROPOSED
 CENTERLINE
 RIGHT OF WAY
 PROPERTY LINE
 EASEMENT
 FENCE
 DITCH
 ROAD
 RAILROAD
 WATERWAY
 POWER LINE
 TELEPHONE LINE
 CABLE
 FENCE
 DITCH
 ROAD
 RAILROAD
 WATERWAY
 POWER LINE
 TELEPHONE LINE
 CABLE

TIP: R-3421B

CONTRACT:

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

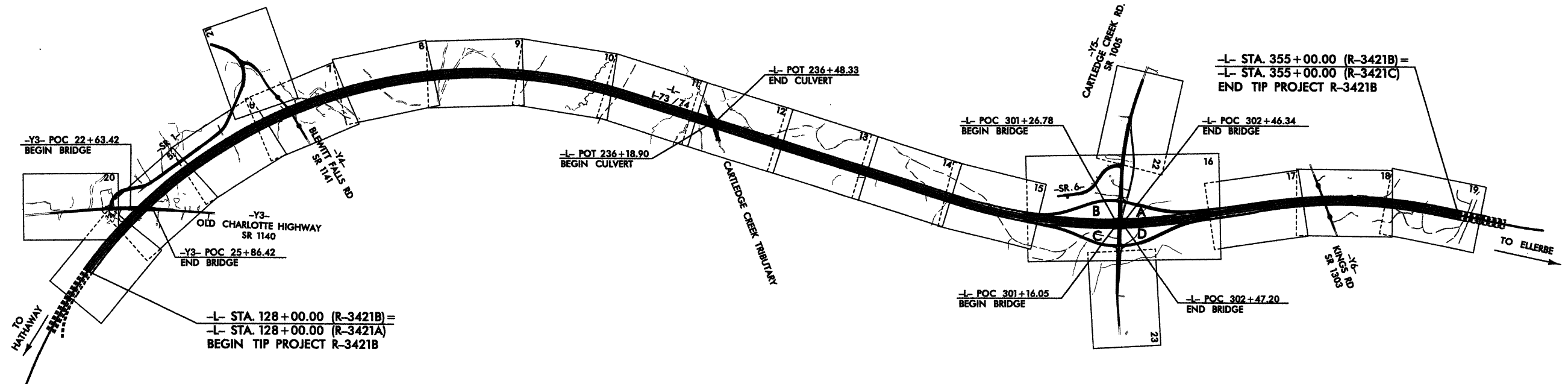


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
RICHMOND COUNTY

LOCATION: US 220 BYPASS FROM 0.3 MILES SOUTH OF SR 1140 (OLD CHARLOTTE HIGHWAY) TO 0.2 MILES SOUTHWEST OF SR 1304 (HARRINGTON ROAD)
TYPE OF WORK: GRADING, PAVING, DRAINAGE, FENCING, CULVERTS, STRUCTURES, SIGNING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421B	1	
WS NO.	F.A. PROJ. NO.	DESCRIPTION	
34542.1.1	NHF-220(4)	P.E.	
34542.2.3	NHF-0220(43)	R/W, UTL	

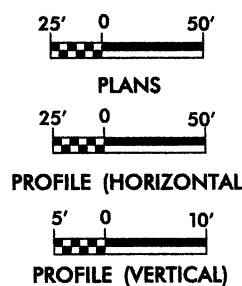
Row



MULKEY
ENGINEERS & CONSULTANTS
PO Box 52157
Charlotte, NC 28252
704.371.1515
WWW.MULKEYINC.COM

THIS PROJECT IS A CONTROLLED ACCESS PROJECT
WITH ACCESS LIMITED TO THE INTERCHANGE.
CLEARING ON THIS PROJECT SHALL BE PERFORMED
TO THE LIMITS ESTABLISHED BY METHOD III.

GRAPHIC SCALE



DESIGN DATA

ADT 2009 = 8,650
ADT 2029 = 24,300

DHV = 10%
D = 60%
T = 28% *
V = 70 mph

* (Duals = 10% + TTST = 18%)
Functional Class.: Interstate

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421B = 4.269 MILES
LENGTH STRUCTURES TIP PROJECT R-3421B = 0.030 MILES
TOTAL LENGTH TIP PROJECT R-3421B = 4.299 MILES

Prepared in the Office of:
Mulkey Engineers & Consultants
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 28, 2009

LETTING DATE:

NCDOT CONTACT: **DOUG TAYLOR, P.E.**
ROADWAY DESIGN - PROJECT ENGINEER

JOHNNY BANKS
MULKEY E & C
PROJECT MANAGER

T. S. HAYES, P.E.
MULKEY E & C
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ PE
ROADWAY DESIGN

SIGNATURE: _____ PE

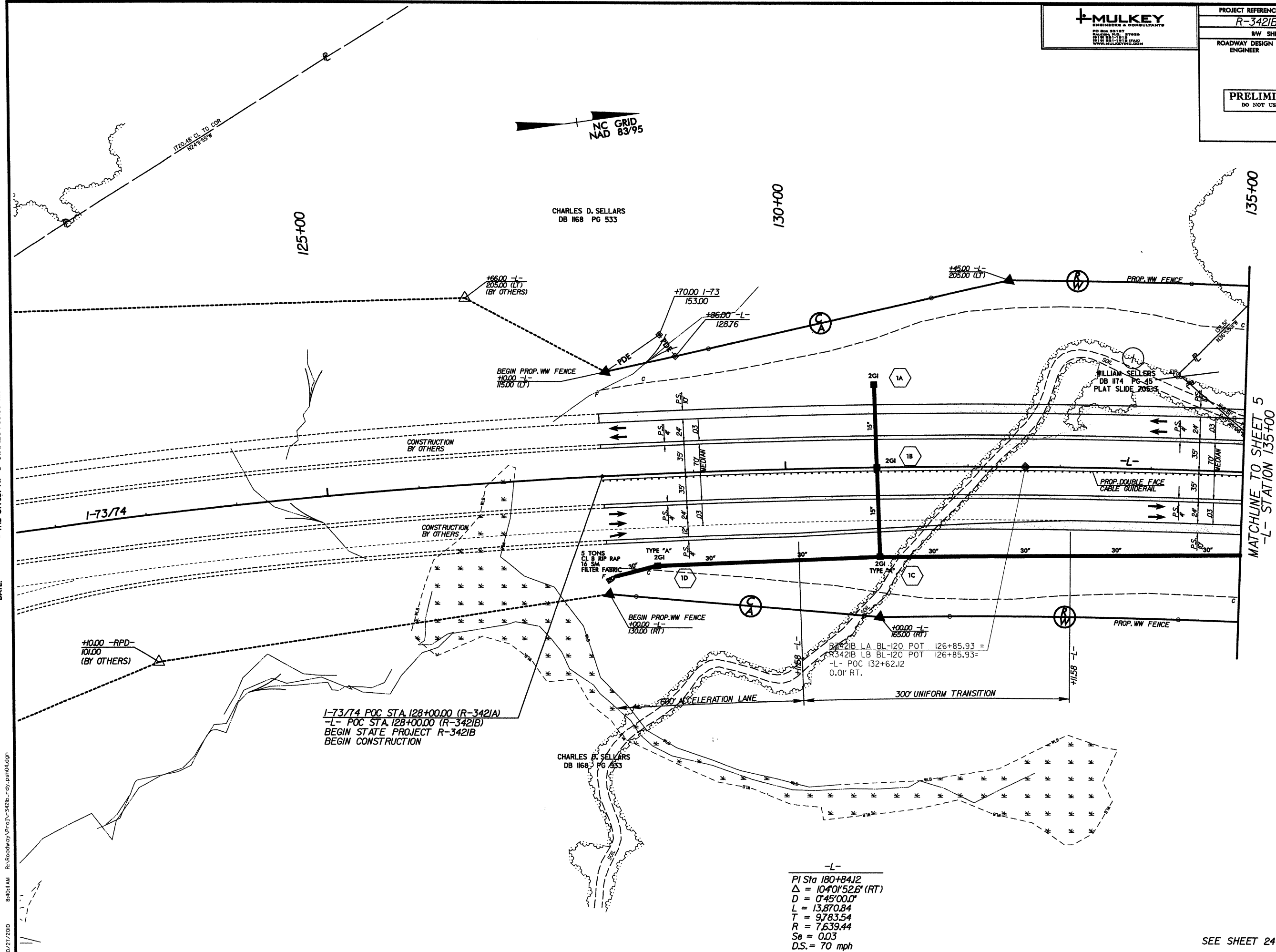
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



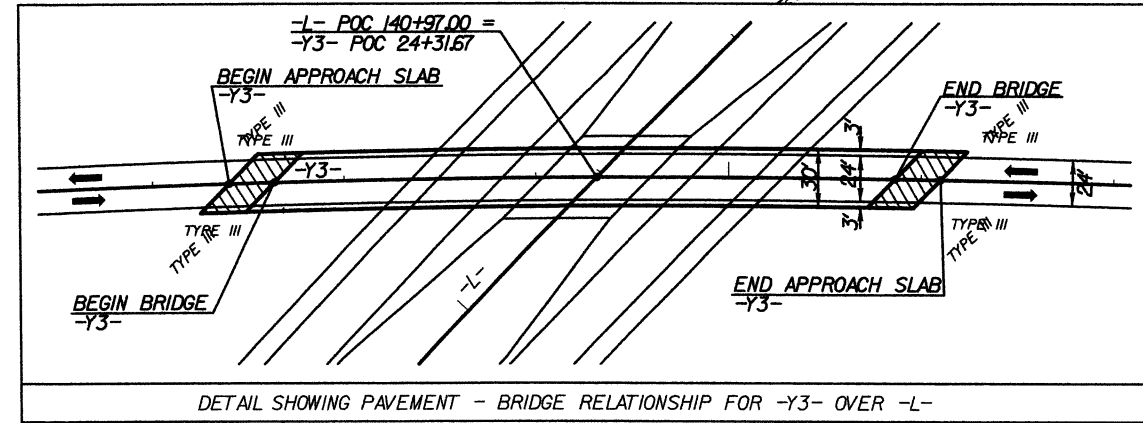
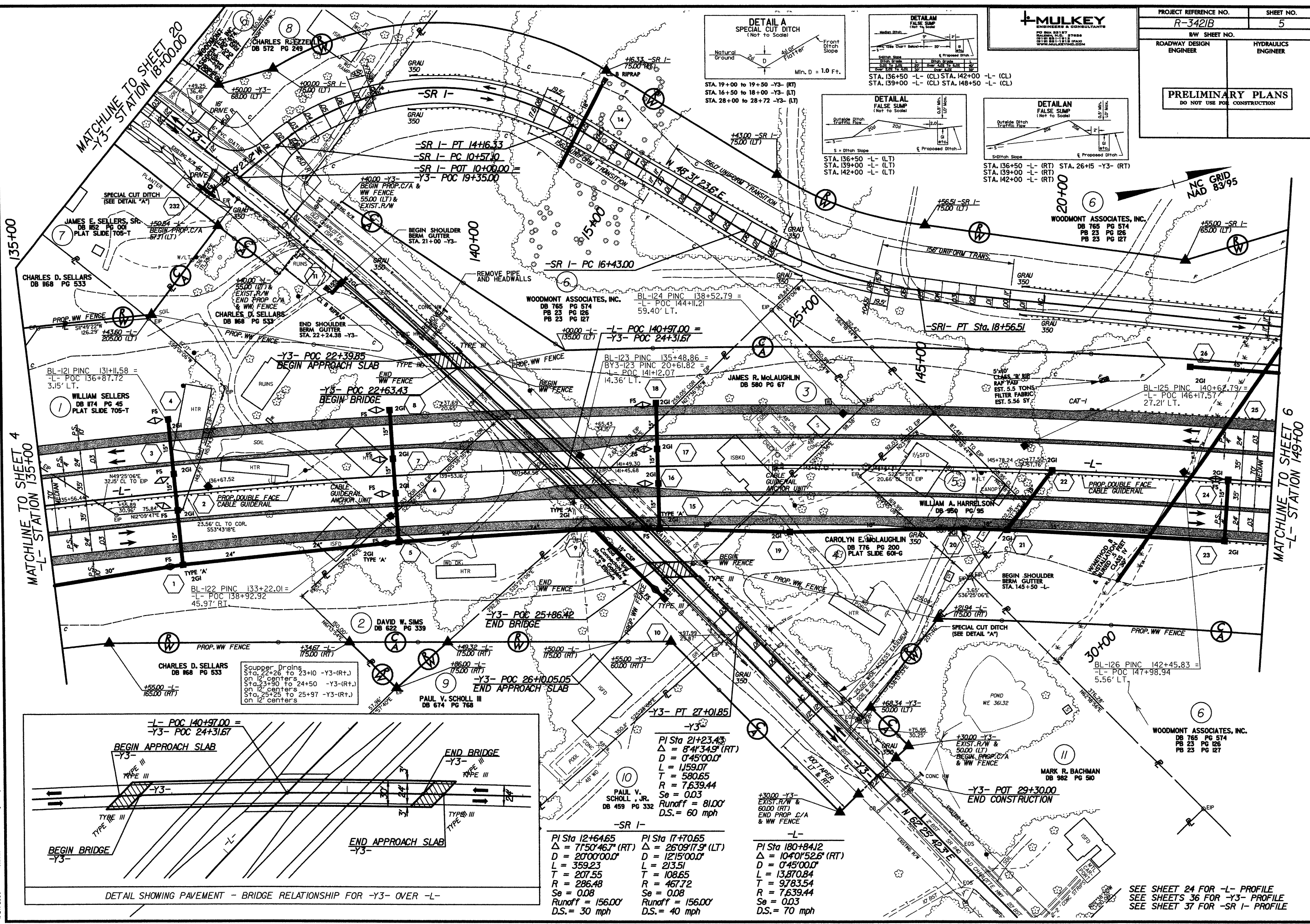
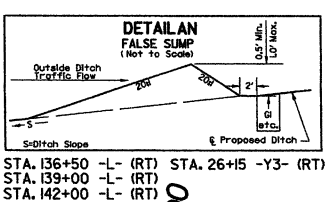
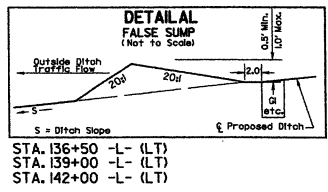
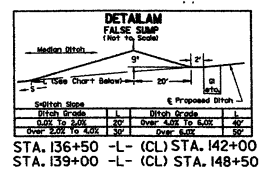
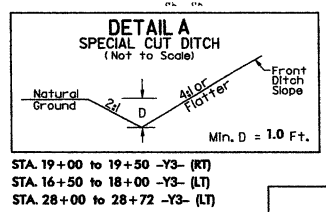
STATE HIGHWAY DESIGN ENGINEER

PROJECT REFERENCE NO. R-3421B	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

ROW REVISION - THE OFFSET AT -L- STA. 128+00.00 RT. WAS REVISED TO 130.00'
DATE:

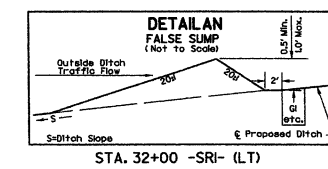
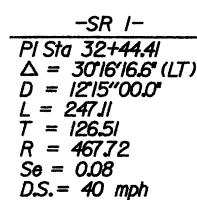
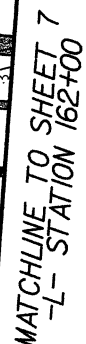


SEE SHEET 24 FOR -L- PROFILE

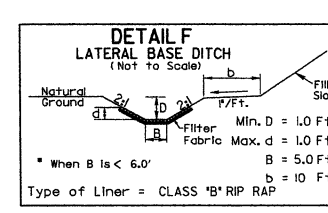
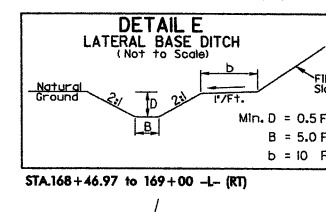
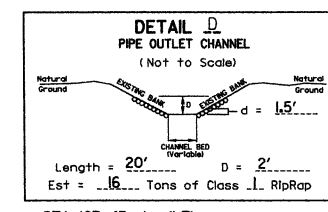
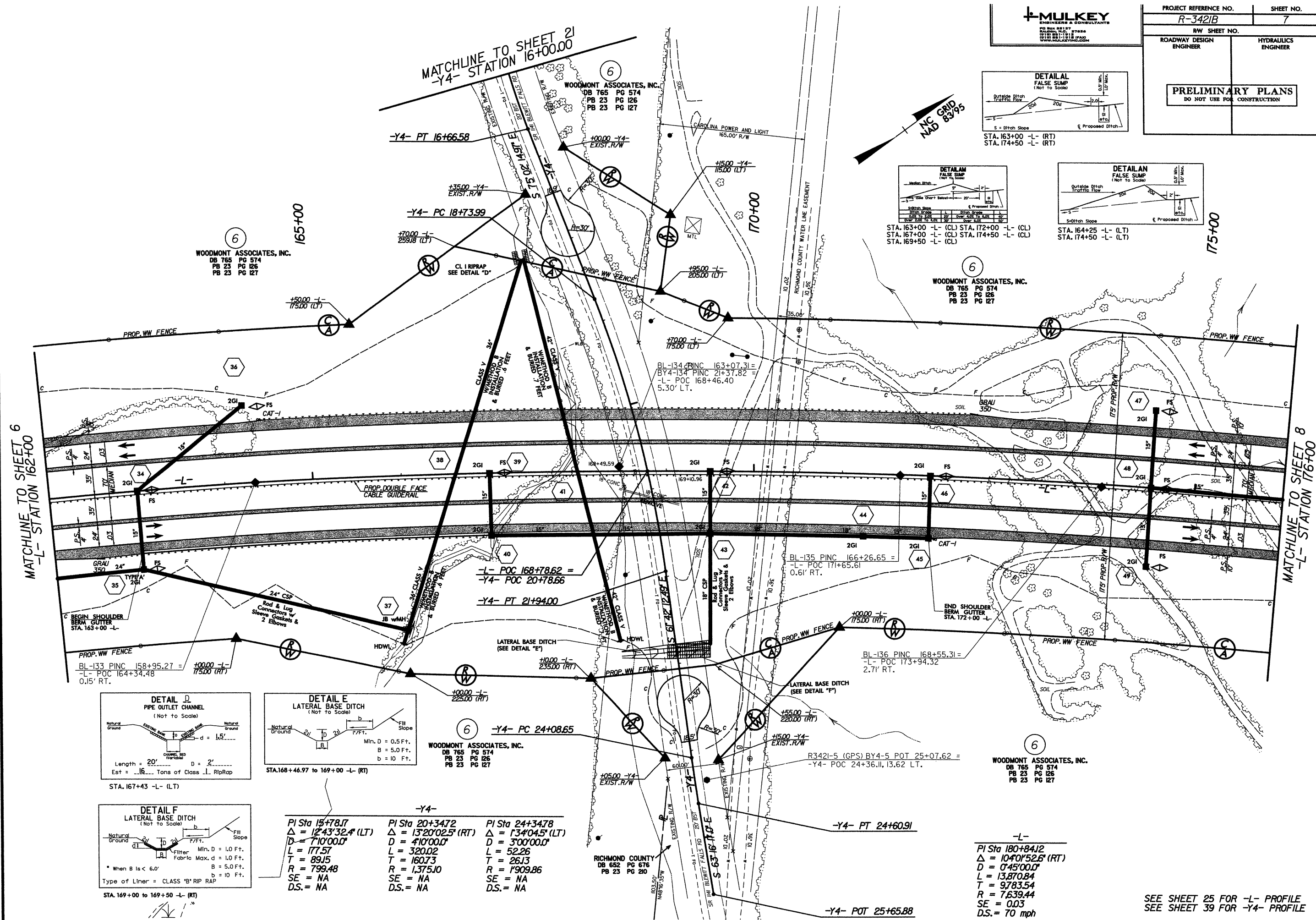
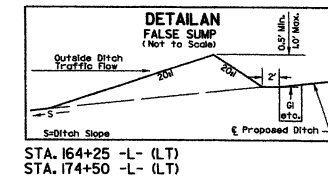
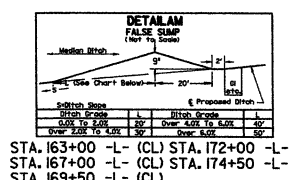
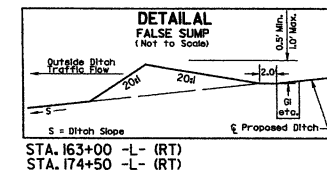


-L- PI Sta 12+64.65 $\Delta = 71'50'46.7''$ (RT) $D = 20'00'00.0''$ $L = 359.23$ $T = 207.55$ $R = 286.48$ $Se = 0.08$ Runoff = 156.00' D.S. = 30 mph	-Y3- PI Sta 17+06.55 $\Delta = 26'09'17.9''$ (LT) $D = 12'15'00.0''$ $L = 213.51$ $T = 108.65$ $R = 467.72$ $Se = 0.08$ Runoff = 156.00' D.S. = 40 mph	-L- PI Sta 180+84.12 $\Delta = 104'01'52.6''$ (RT) $D = 0'45'00.0''$ $L = 13,870.84$ $T = 9,783.54$ $R = 7,639.44$ $Se = 0.03$ D.S. = 70 mph
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SEE SHEET 24 FOR -L- PROFILE
SEE SHEETS 36 FOR -Y3- PROFILE
SEE SHEET 37 FOR -SR 1- PROFILE



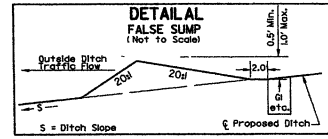
SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 37 & 38 FOR -SR I- PROFILE



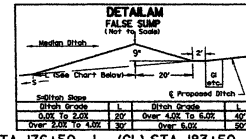
-Y4-		
PI Sta 15+78.17 Δ = 1243'32.4" (LT) D = 710'00.0" L = 177.57 T = 89.5 R = 799.48 SE = NA D.S. = NA	PI Sta 20+34.72 Δ = 1320'02.5" (RT) D = 410'00.0" L = 320.02 T = 160.73 R = 1375.10 SE = NA D.S. = NA	PI Sta 24+34.78 Δ = 1340'04.5" (LT) D = 300'00.0" L = 52.26 T = 26.13 R = 1909.86 SE = NA D.S. = NA

-L-	
PI Sta 180+84.12 Δ = 1040'52.6" (RT) D = 0'45'00.0" L = 13870.84 T = 9783.54 R = 7639.44 SE = 0.03 D.S. = 70 mph	

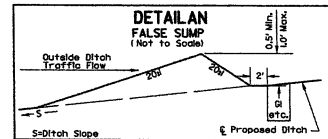
SEE SHEET 25 FOR -L- PROFILE
SEE SHEET 39 FOR -Y4- PROFILE



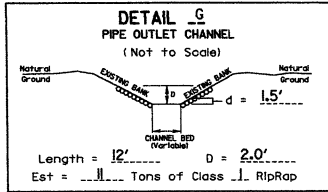
STA. 176+50 -L- (RT) STA. 190+00 -L- (RT)
STA. 183+50 -L- (RT)
STA. 187+00 -L- (RT)



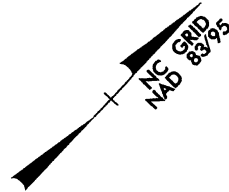
STA. 176+50 -L- (CL) STA. 183+50 -L- (CL)
STA. 179+00 -L- (CL) STA. 187+00 -L- (CL)
STA. 181+00 -L- (CL) STA. 190+00 -L- (CL)



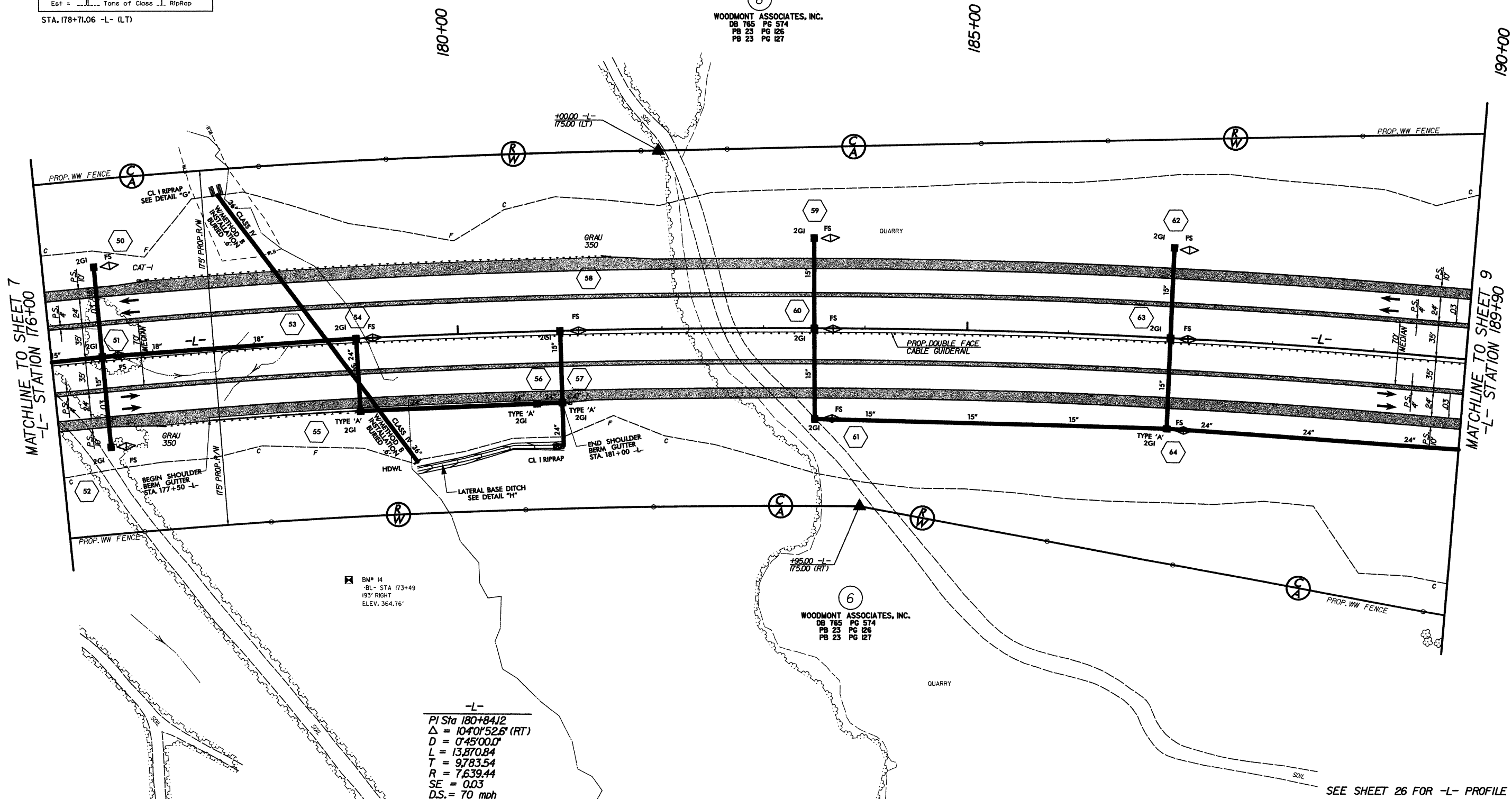
STA. 176+50 -L- (LT) STA. 190+00 -L- (LT)
STA. 183+50 -L- (LT)
STA. 187+00 -L- (LT)



STA. 178+71.06 -L- (LT)



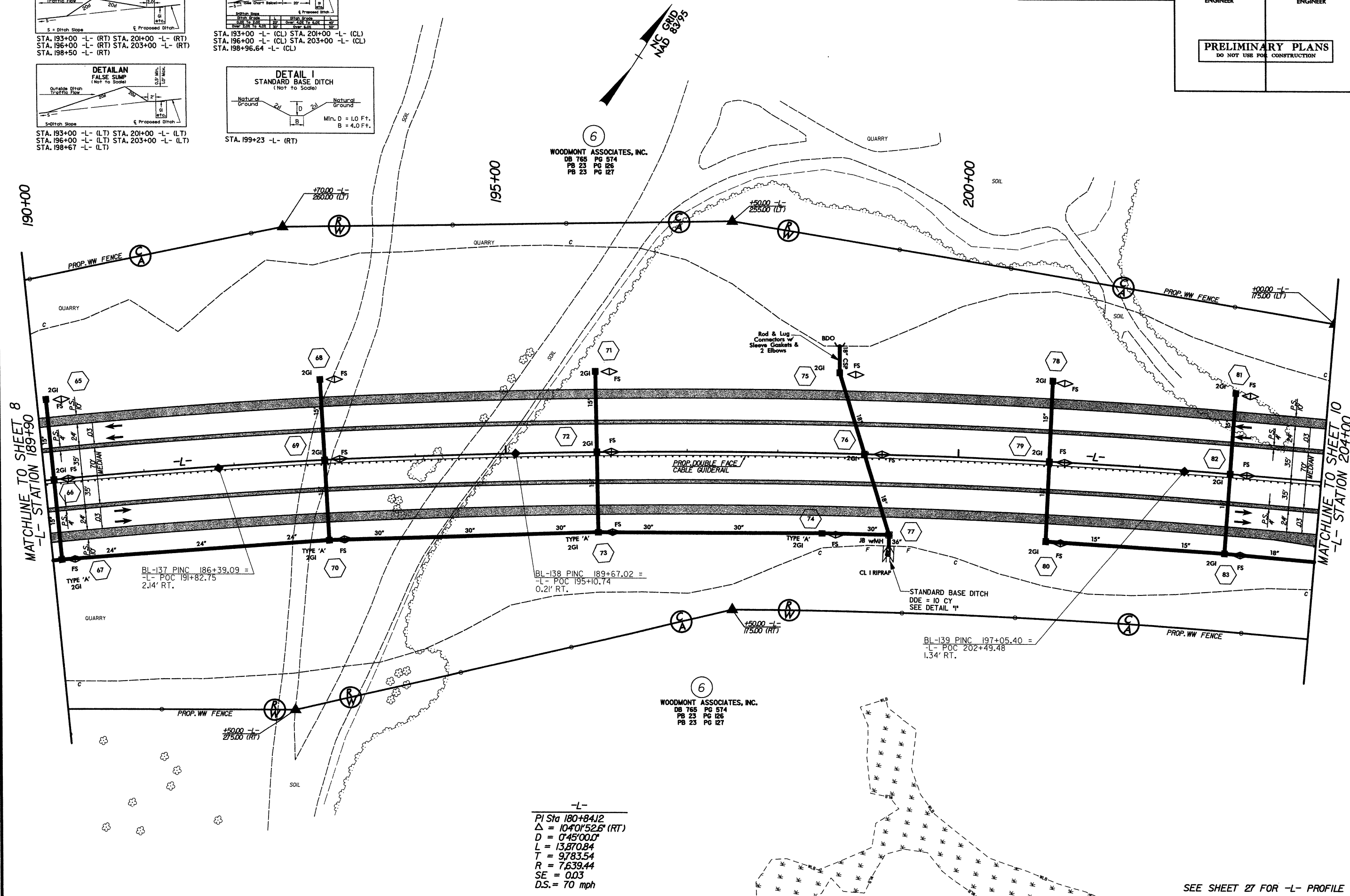
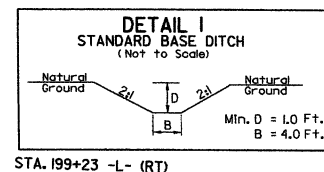
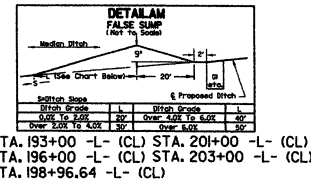
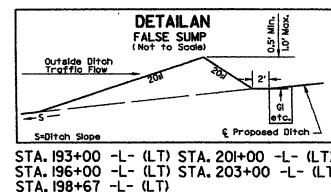
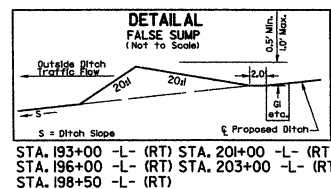
WOODMONT ASSOCIATES, INC.
DB 765 PG 574
PB 23 PG 126
PB 23 PG 127



BM# 14
BL- STA 173+49
193' RIGHT
ELEV. 364.76'

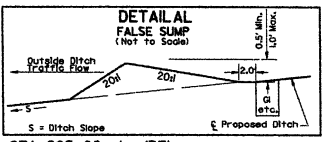
-L-
PI Sta 180+84.12
 $\Delta = 104^{\circ}01'52.6''$ (RT)
D = 0'45'00.0"
L = 13,870.84
T = 9,783.54
R = 7,639.44
SE = 0.03
D.S. = 70 mph

SEE SHEET 26 FOR -L- PROFILE

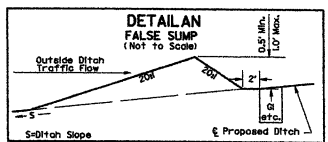


-L-
PI Sta 180+84.12
 $\Delta = 104^{\circ}01'52.6''$ (RT)
 $D = 0^{\circ}45'00.0''$
 $L = 13,870.84$
 $T = 9,783.54$
 $R = 7,639.44$
 $SE = 0.03$
 $D.S. = 70$ mph

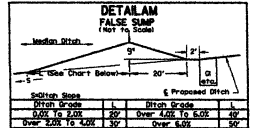
SEE SHEET 27 FOR -L- PROFILE



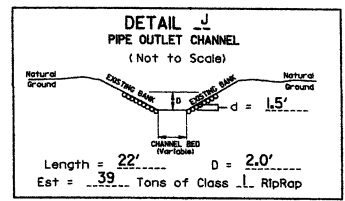
STA. 205+00 -L- (RT)
STA. 211+50 -L- (RT)



STA. 205+00 -L- (LT)
STA. 211+50 -L- (LT)



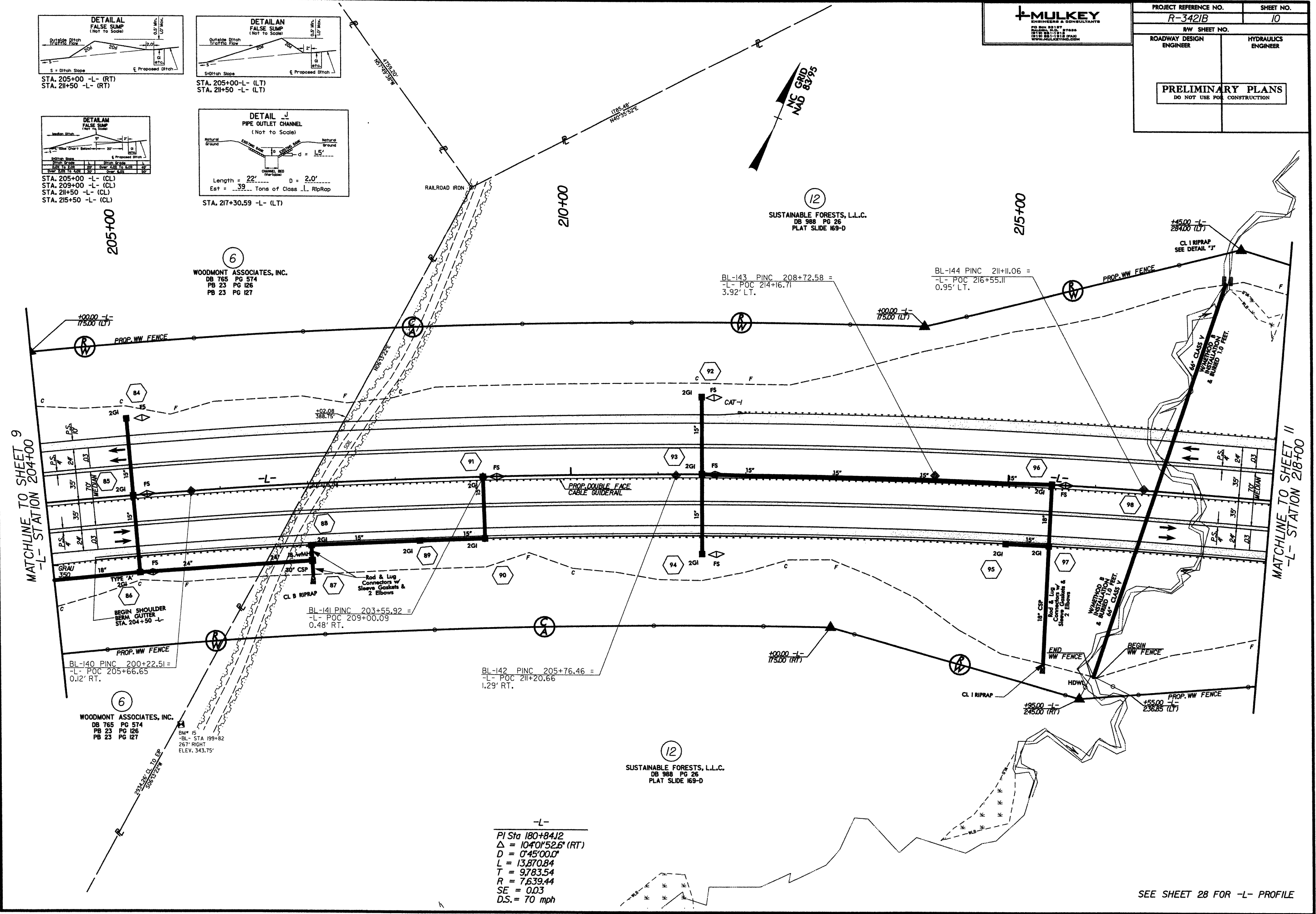
STA. 205+00 -L- (CL)
STA. 209+00 -L- (CL)
STA. 211+50 -L- (CL)
STA. 215+50 -L- (CL)



Length = 22'
Est = 39 Tons of Class L Riprap
STA. 217+30.59 -L- (LT)

MULKEY
ENGINEERS & CONSULTANTS
PO Box 22177
1515 S. 11th St.
Tulsa, OK 74116-0217
www.mulkeyinc.com

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

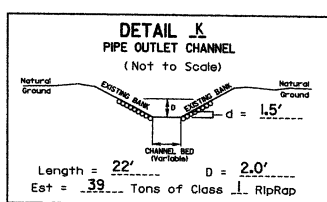


MATCHLINE TO SHEET 9
-L- STATION 204+00

MATCHLINE TO SHEET 11
-L- STATION 218+00

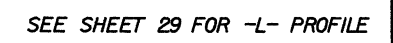
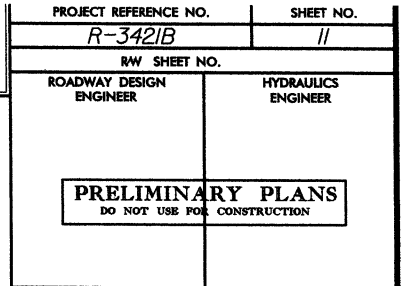
-L-
PI Sta 180+84.12
Δ = 104°01'52.6" (RT)
D = 0'45'00.0"
L = 13,870.84
T = 9783.54
R = 7,639.44
SE = 0.03
D.S. = 70 mph

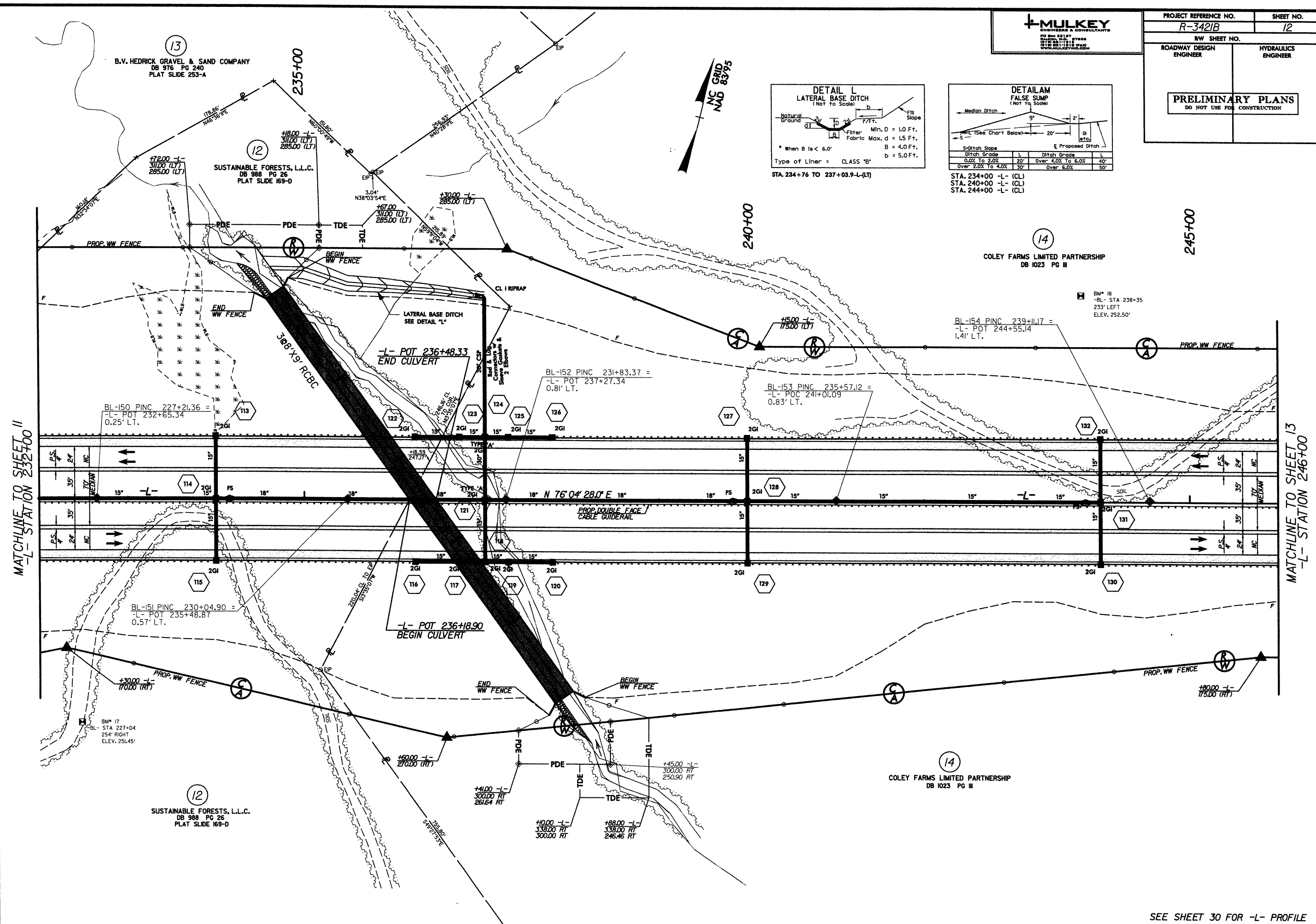
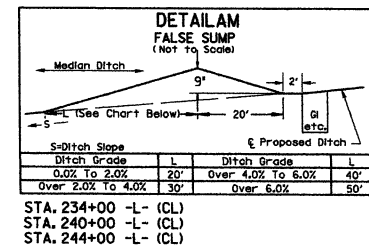
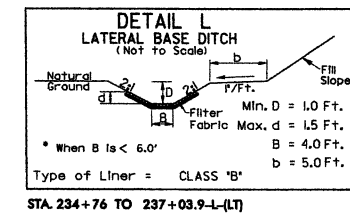
SEE SHEET 28 FOR -L- PROFILE



STA. 229+81.52 -L- (LT)

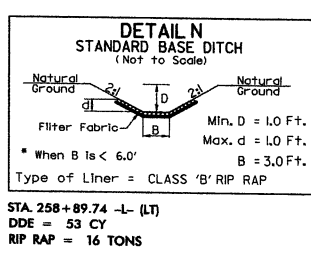
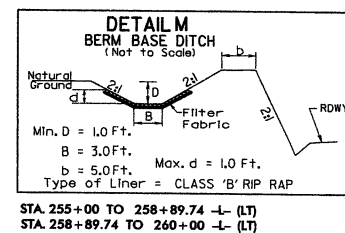
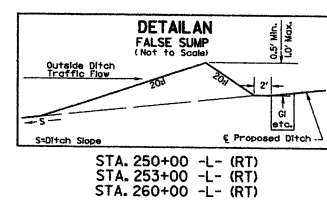
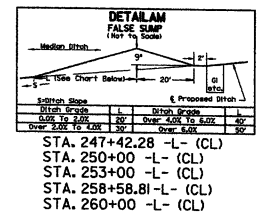
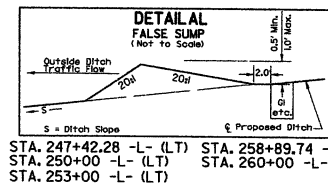
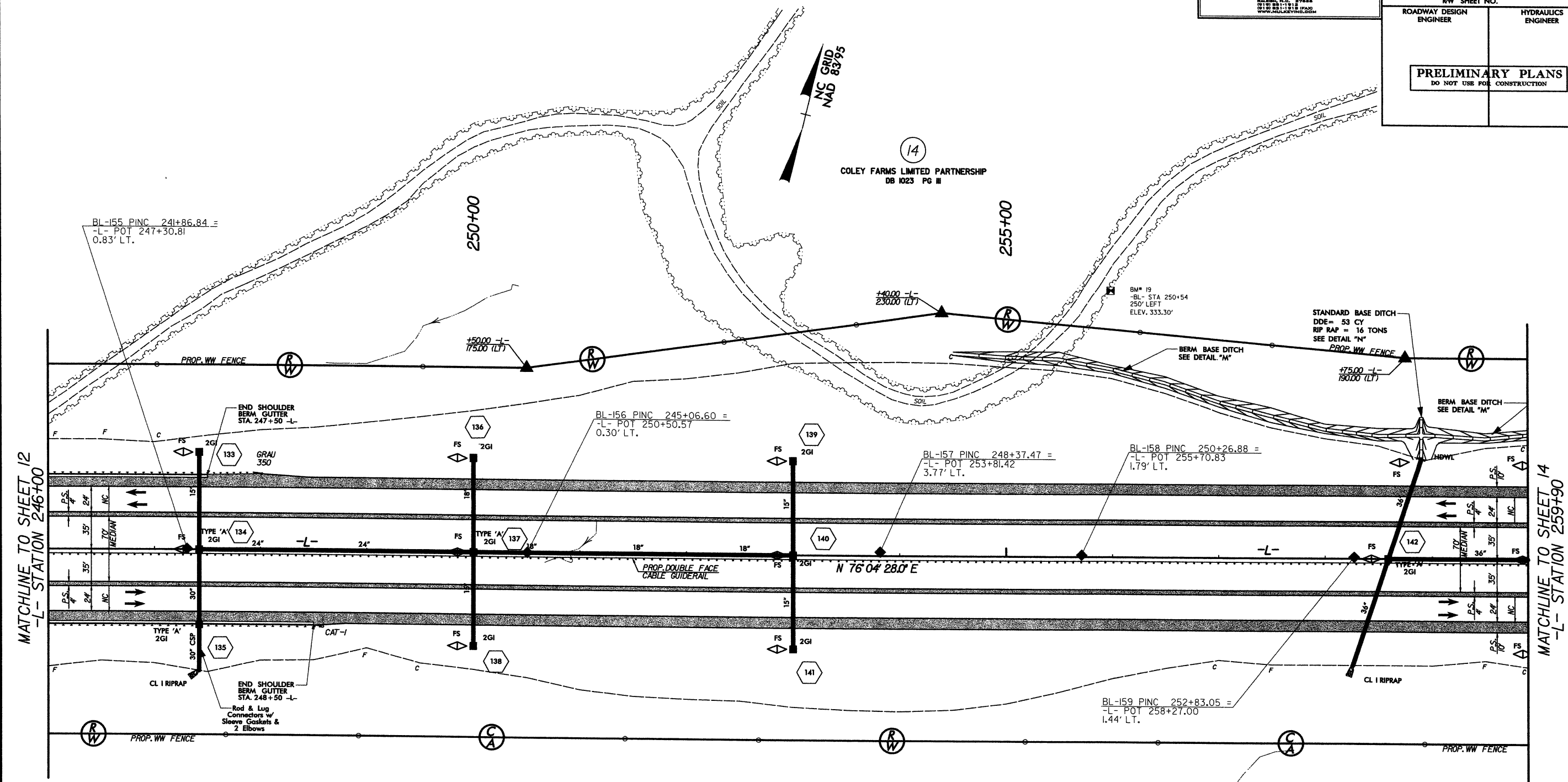
-L-	
PI Sta 180+84J2	Pls Sta 222+38.09
$\Delta = 104^{\circ}01'53''$ (RT)	$\phi_s = 0^{\circ}45'00.0''$
$D = 0^{\circ}45'00.0''$	$L_s = 200.00$
$L = 13,870.84$	$ST = 66.67$
$T = 9,783.54$	$LT = 133.33$
$R = 7,639.44$	
$SE = 0.03$	
$D.S. = 70$ mph	



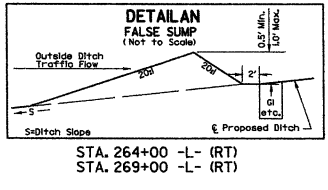
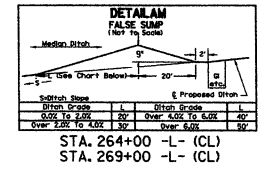
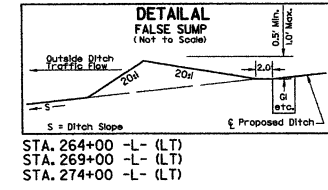
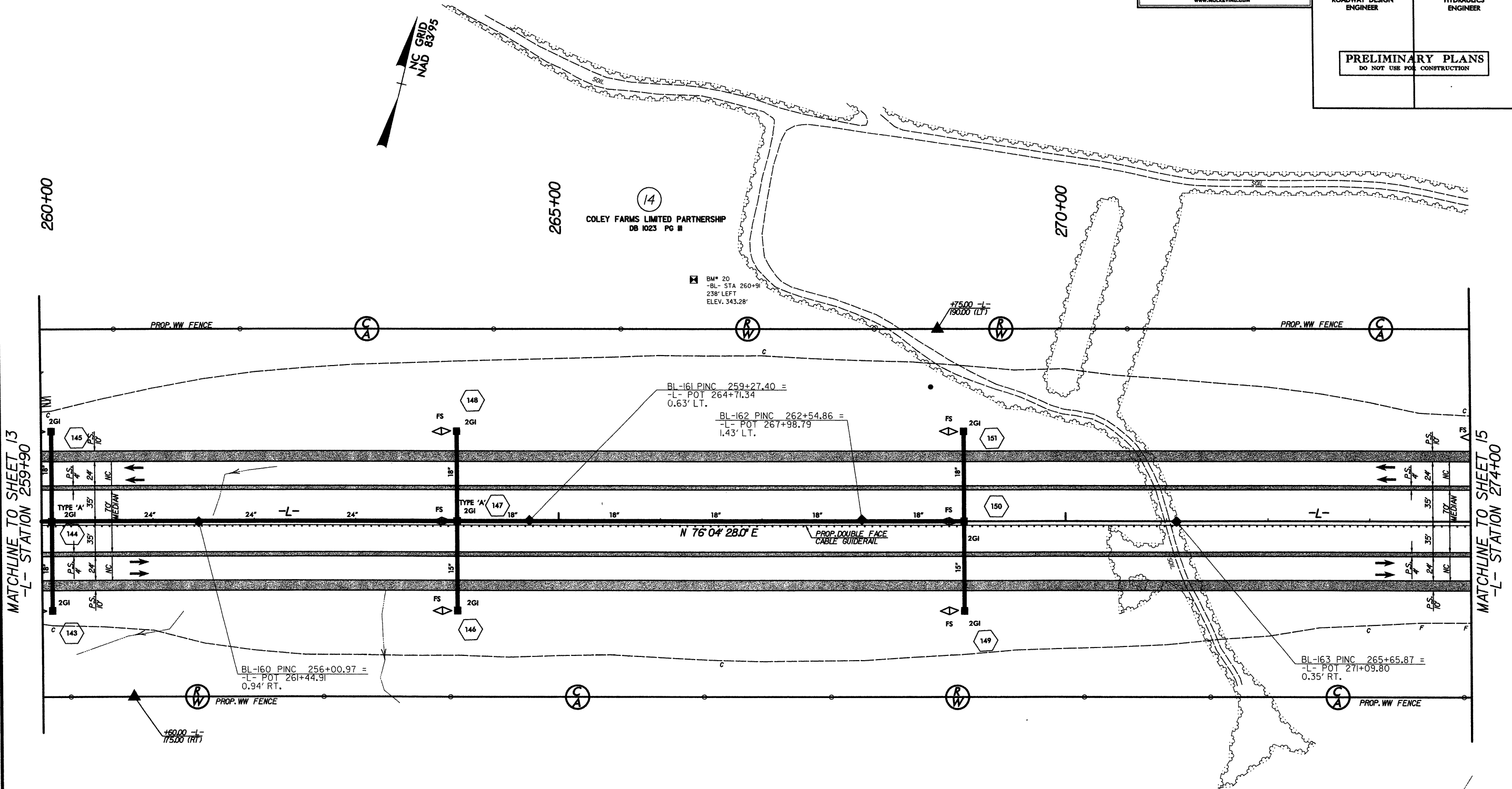


9/25/2009 T:\442 AM RA\Roadway\Proj\3421b_rdy.dwg, psh12.dgn

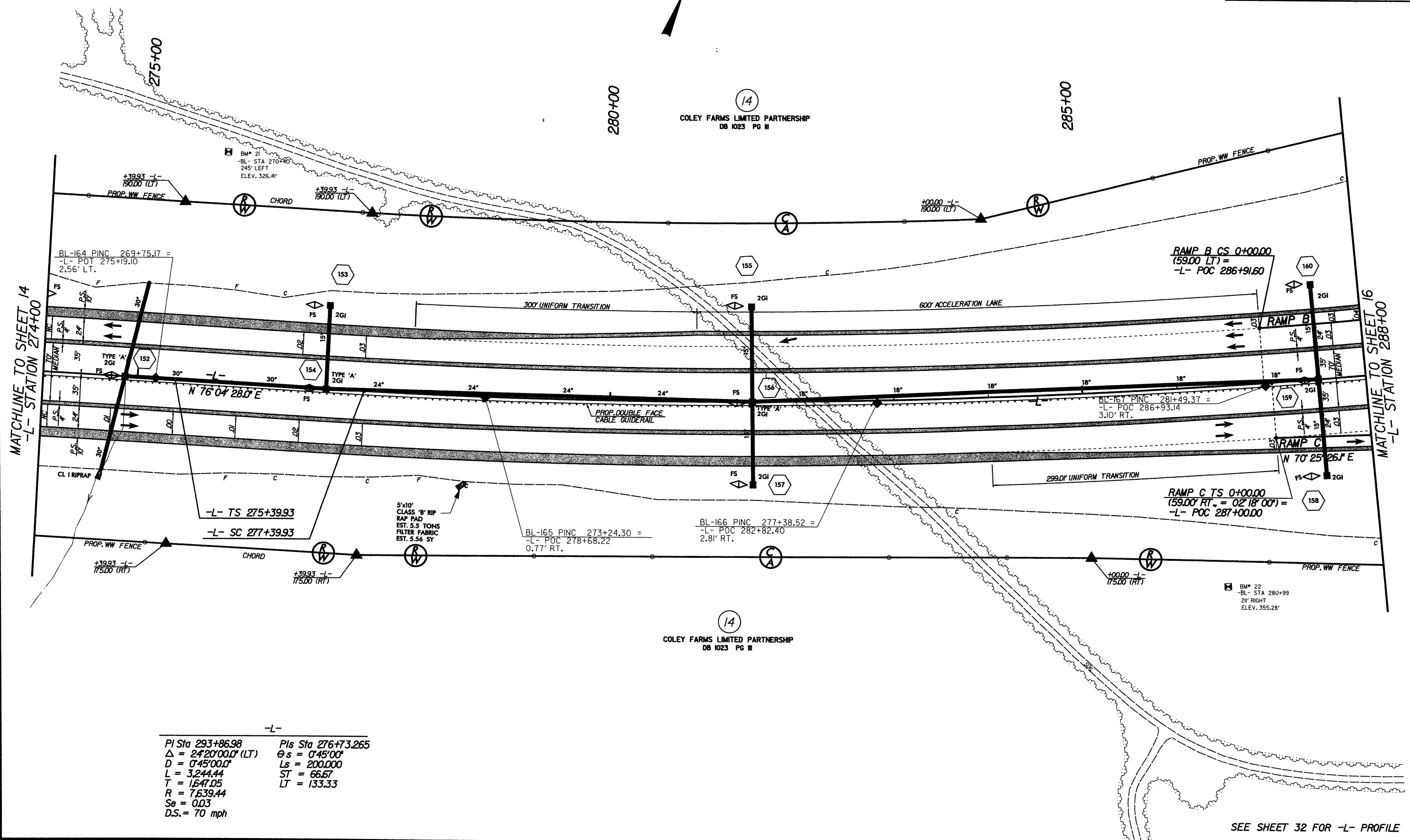
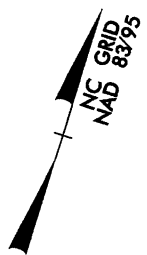
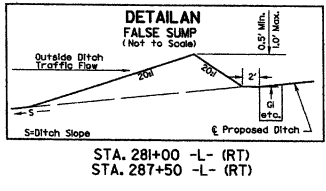
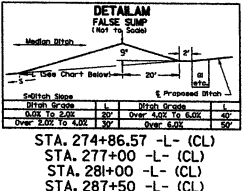
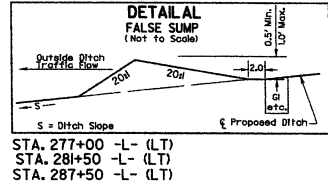
SEE SHEET 30 FOR -L- PROFILE



14
COLEY FARMS LIMITED PARTNERSHIP
DB 1023 PG III



SEE SHEET 32 FOR -L- PROFILE



-L-

PI Sta 293+86.98	PIs Sta 276+73.265
$\Delta = 24^{\circ}20'00.0\"$ (LT)	$\Theta s = 0^{\circ}45'00\"$
$D = 0^{\circ}45'00.0\"$	$Ls = 200.000$
$L = 3.244.44$	$ST = 66.67$
$T = 1.647.05$	$LT = 133.33$
$R = 7.639.44$	
$Se = 0.03$	
$D.S. = 70$ mph	

SEE SHEET 32 FOR -L- PROFILE

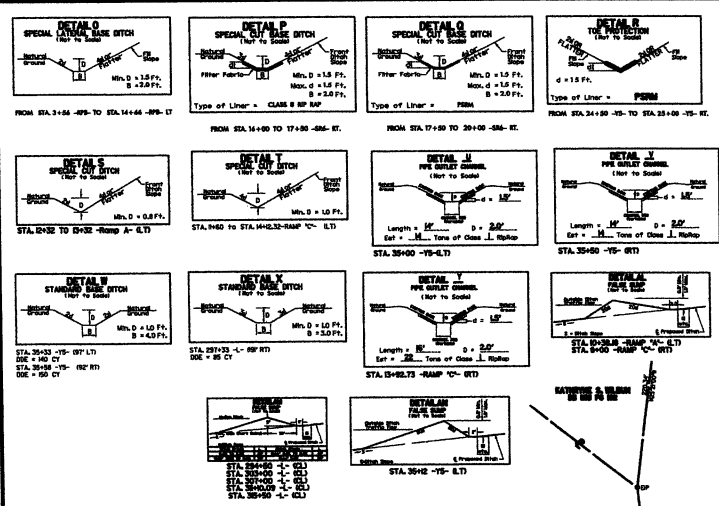
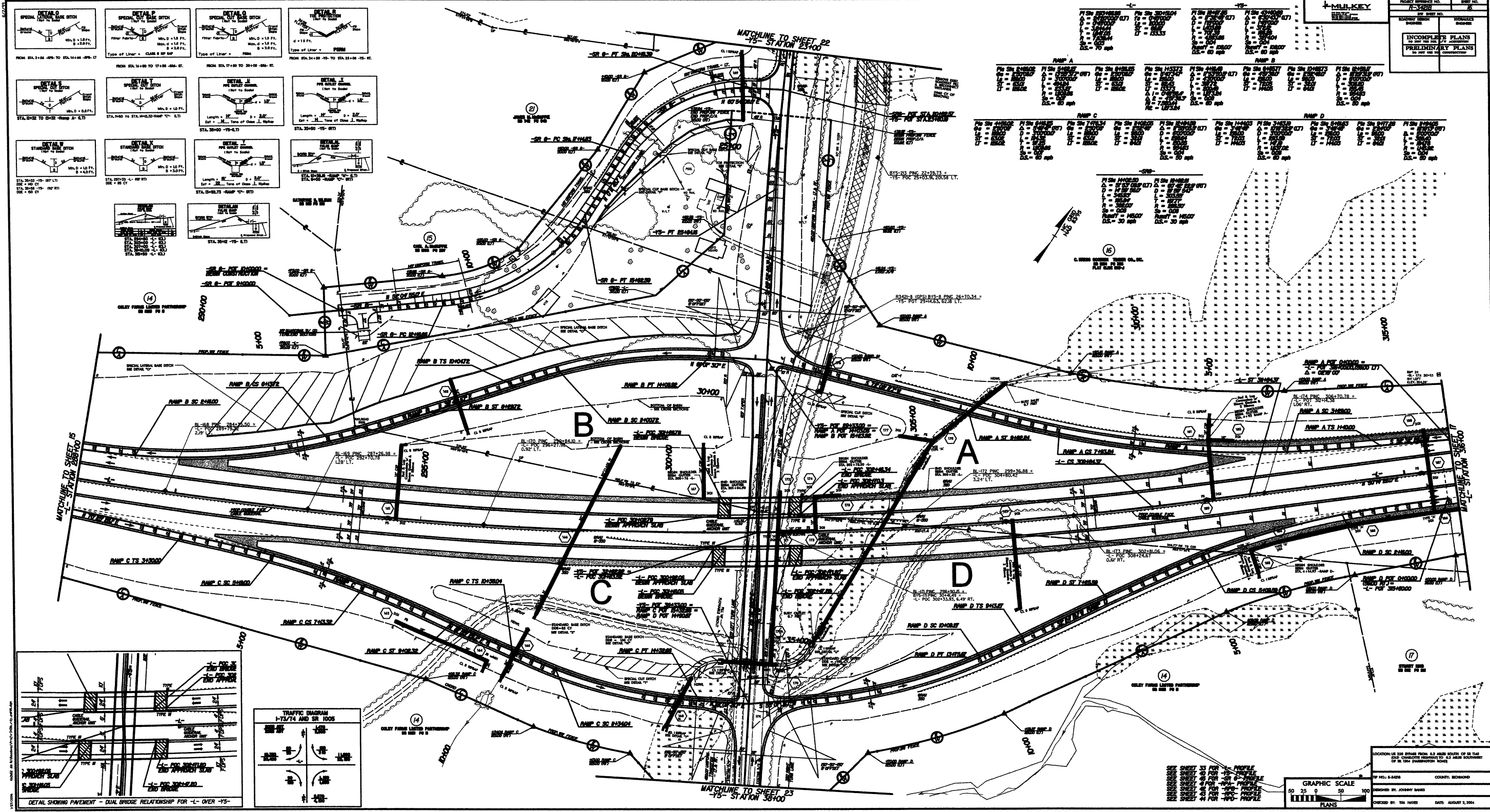
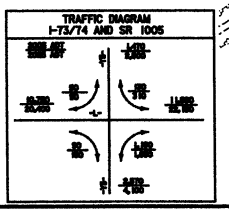
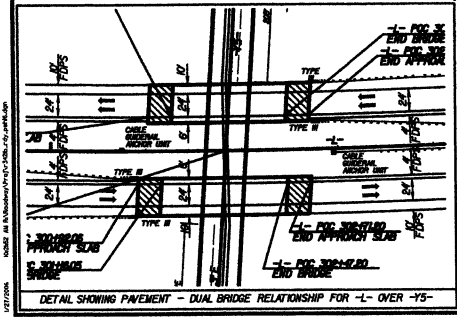


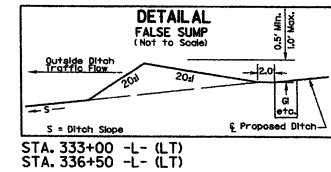
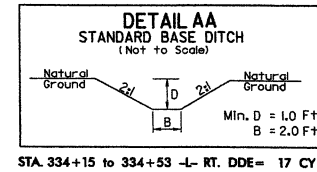
Table with 4 columns: RAMP A, RAMP B, RAMP C, RAMP D. Rows include stationing, elevations, and other technical data for each ramp.



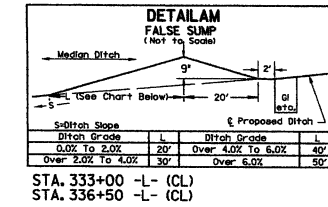
Project information block including project name, location, scale, and contact details.

-L-
PI Sta 338+47.89
 $\Delta = 17'47'45.9''$ (RT)
 $D = 0'45'00.0''$
 $L = 2,372.81$
 $T = 1,966.04$
 $R = 7,639.44$
 $SE = 0.03$
 $D.S. = 70$ mph

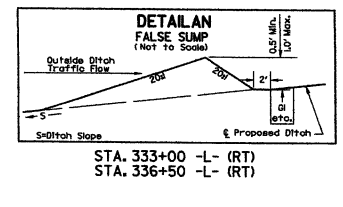
-Y6-
PI Sta 12+82.24
 $\Delta = 00'36'46.7''$ (RT)
 $D = 1'00'00.0''$
 $L = 61.30$
 $T = 30.65$
 $R = 5,729.58$
 $SE = N/A$
 $D.S. = N/A$



STA. 333+00 -L- (LT)
STA. 336+50 -L- (LT)



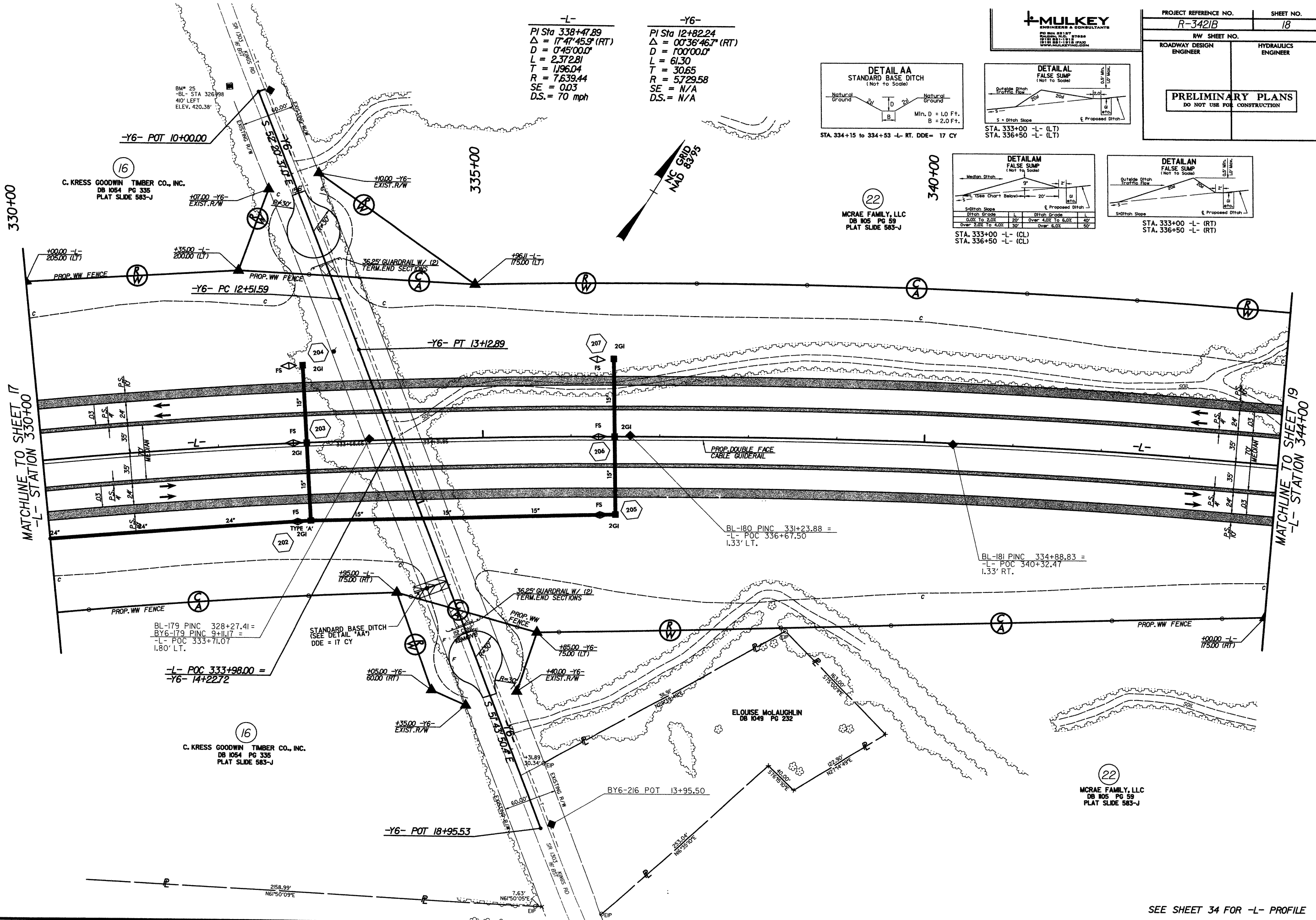
STA. 333+00 -L- (CL)
STA. 336+50 -L- (CL)



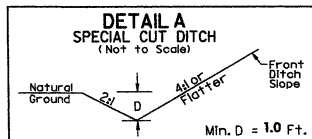
STA. 333+00 -L- (RT)
STA. 336+50 -L- (RT)

22
MCRAE FAMILY, LLC
DB 105 PG 59
PLAT SLIDE 583-J

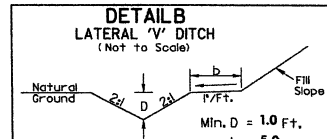
22
MCRAE FAMILY, LLC
DB 105 PG 59
PLAT SLIDE 583-J



SEE SHEET 34 FOR -L- PROFILE



STA. 19+00 to 19+50 -Y3- (RT)
 STA. 16+50 to 18+00 -Y3- (LT)
 STA. 28+00 to 28+72 -Y3- (LT)



STA. 16+84.60 to 19+00 -Y3- (RT)

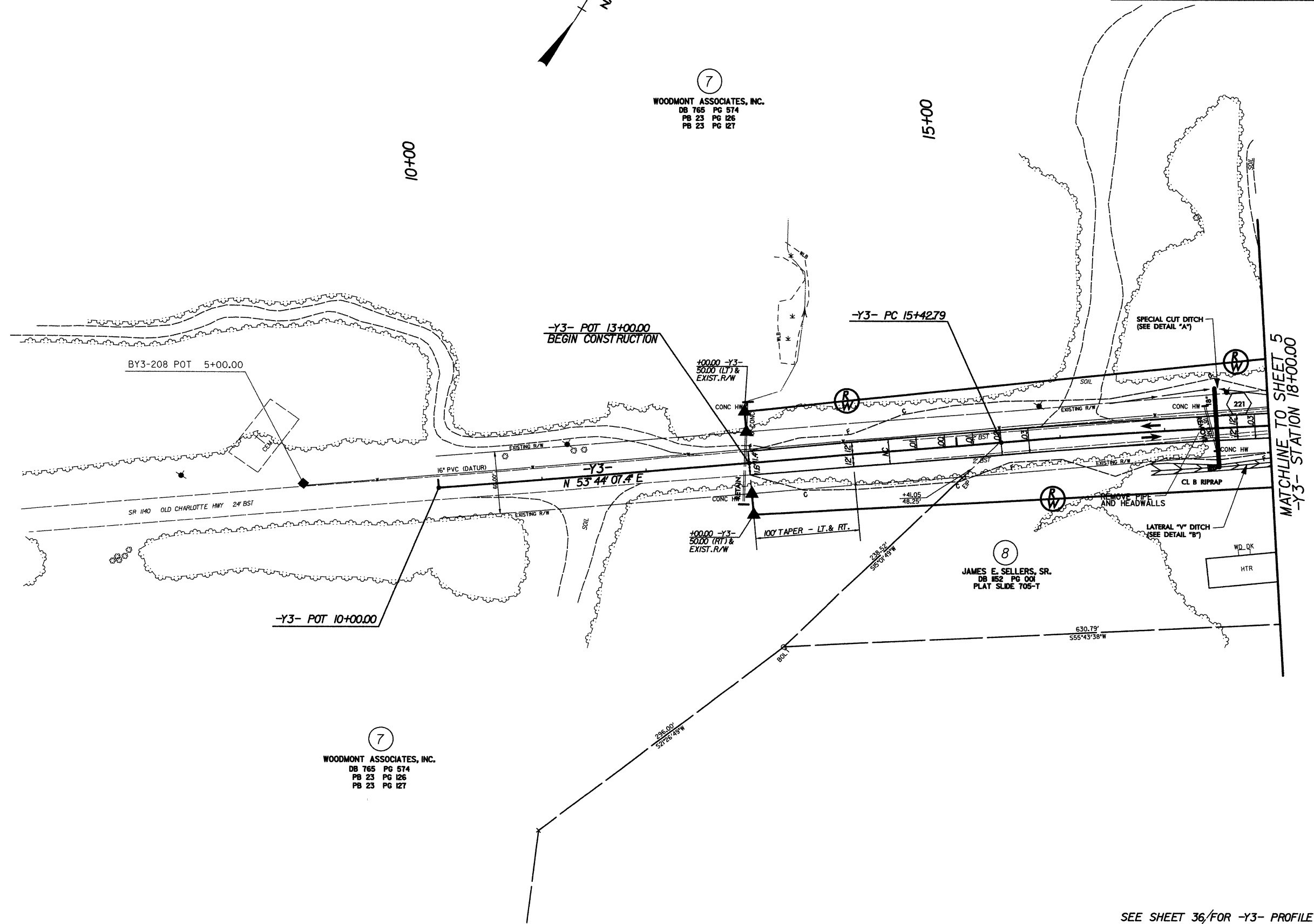
MULKEY
 ENGINEERS & CONSULTANTS
 10150 85TH AVE
 10150 85TH AVE
 10150 85TH AVE
 10150 85TH AVE

PROJECT REFERENCE NO. <i>R-3421B</i>		SHEET NO. <i>20</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			

-Y3-
 PI Sta 21+23.43
 $\Delta = 84^{\circ}34.9' (RT)$
 $D = 0^{\circ}45'00.0''$
 $L = 1,159.07$
 $T = 580.65$
 $R = 7,639.44$
 $S_e = 0.03$
 Runoff = 81.00'
 D.S. = 60 mph

NC GRID
 NAD 83/95

7
 WOODMONT ASSOCIATES, INC.
 DB 765 PG 574
 PB 23 PG 126
 PB 23 PG 127

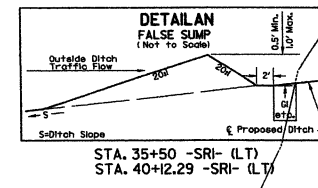


7
 WOODMONT ASSOCIATES, INC.
 DB 765 PG 574
 PB 23 PG 126
 PB 23 PG 127

8
 JAMES E. SELLERS, SR.
 DB 152 PG 001
 PLAT SLIDE 705-T

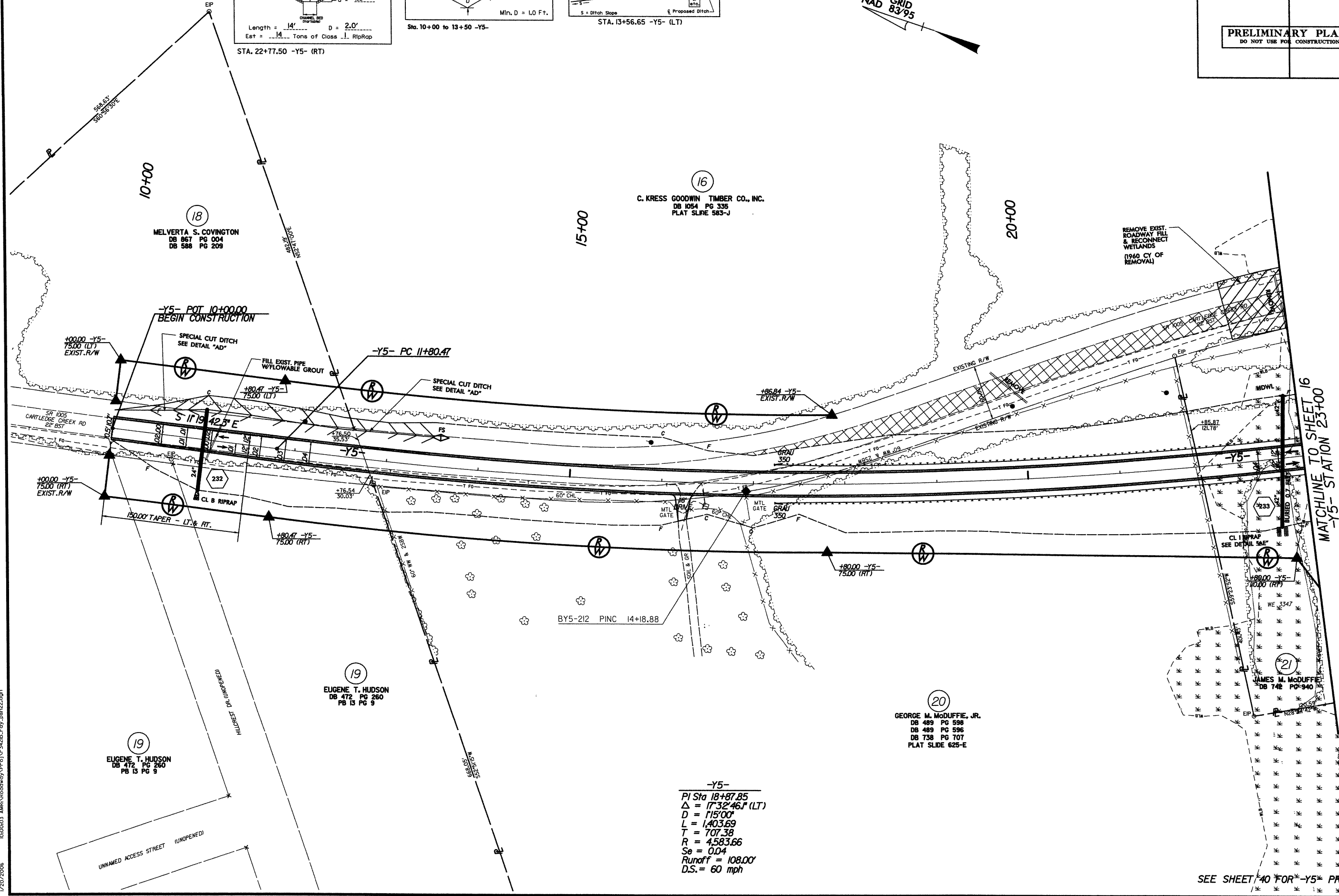
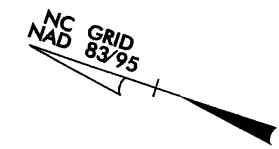
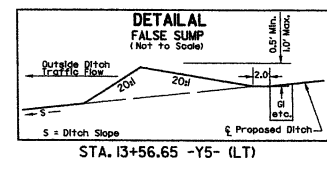
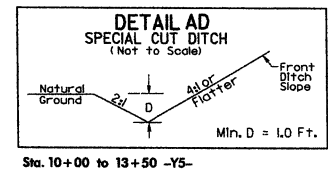
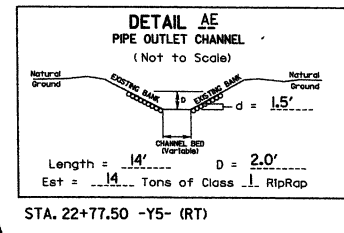
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SEE SHEET 36 FOR -Y3- PROFILE



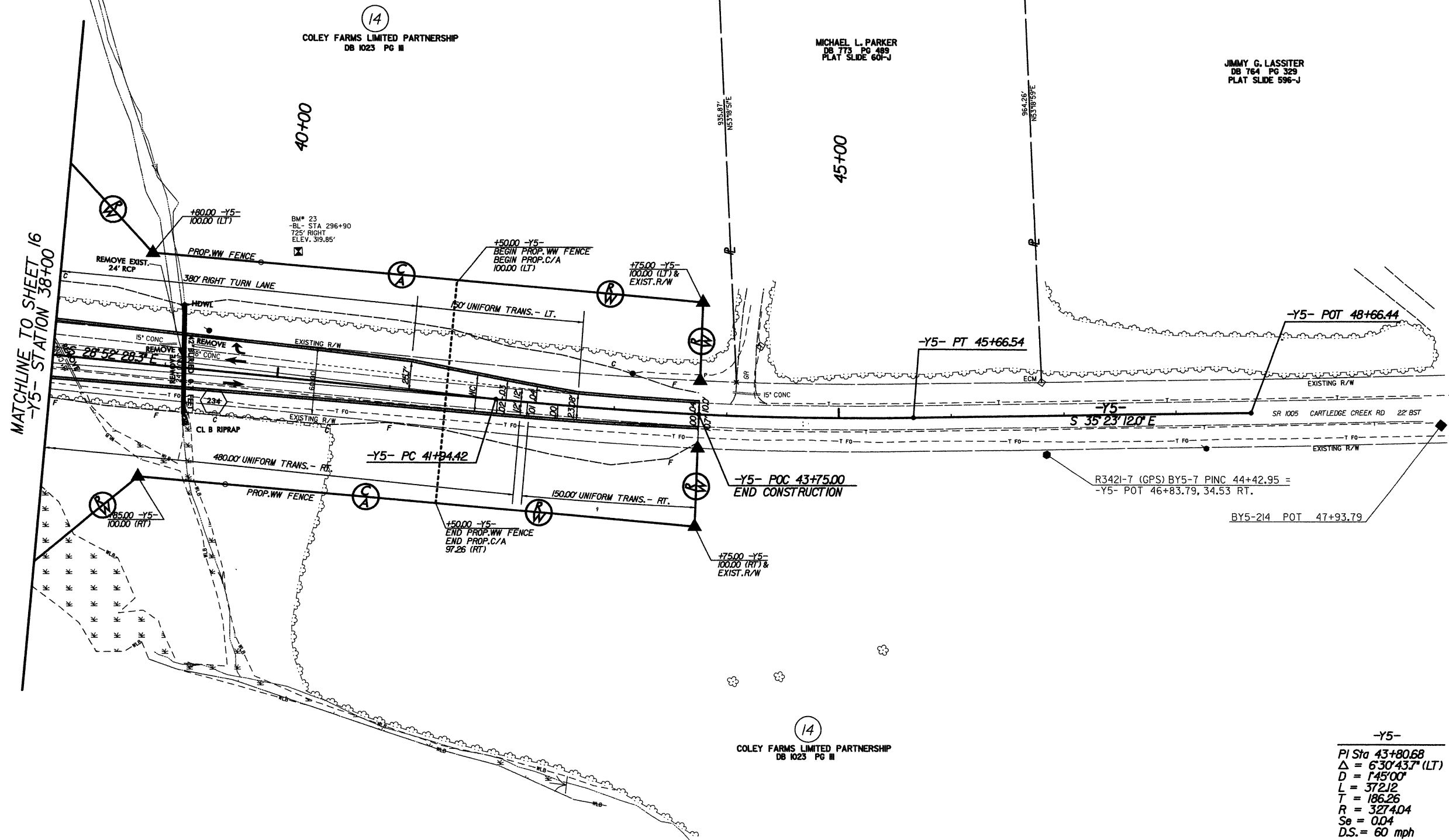
MULKEY
ENGINEERS & CONSULTANTS
PO BOX 82127
RICHMOND, VA 23282
TEL 804-781-1911 FAX 804-781-1912
WWW.MULKEYINC.COM

PROJECT REFERENCE NO. R-3421B	SHEET NO. 22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

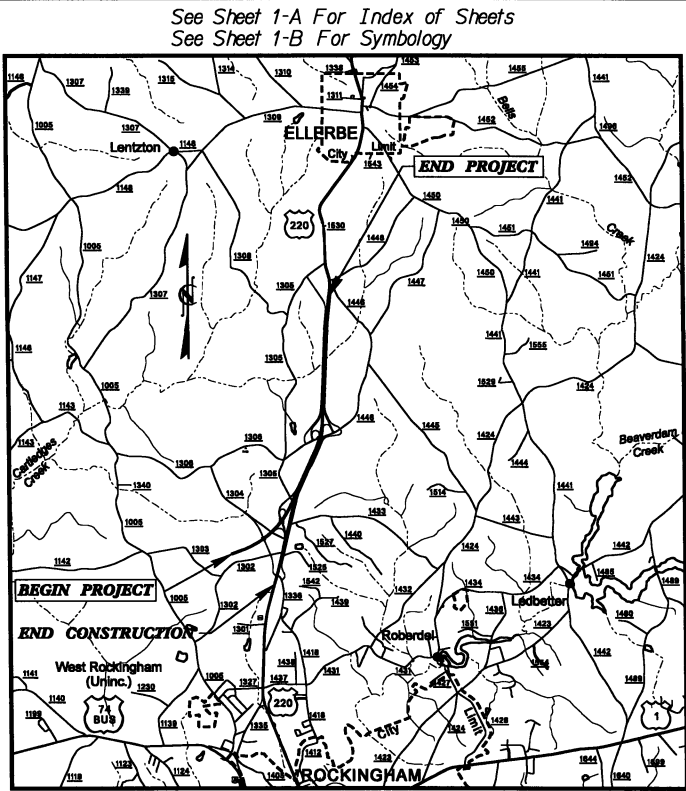


1/20/2006 10:00:03 AMR:\Roadway\Proj\N-3421B_rdy_psh22.dgn

SEE SHEET 40 FOR -Y5- PROFILE



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34542.1.2	NHF-0220(4)	PE	
34542.2.5	HPPNHF-0220(56)	RW & UTILITIES	

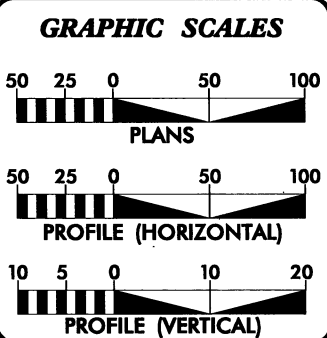
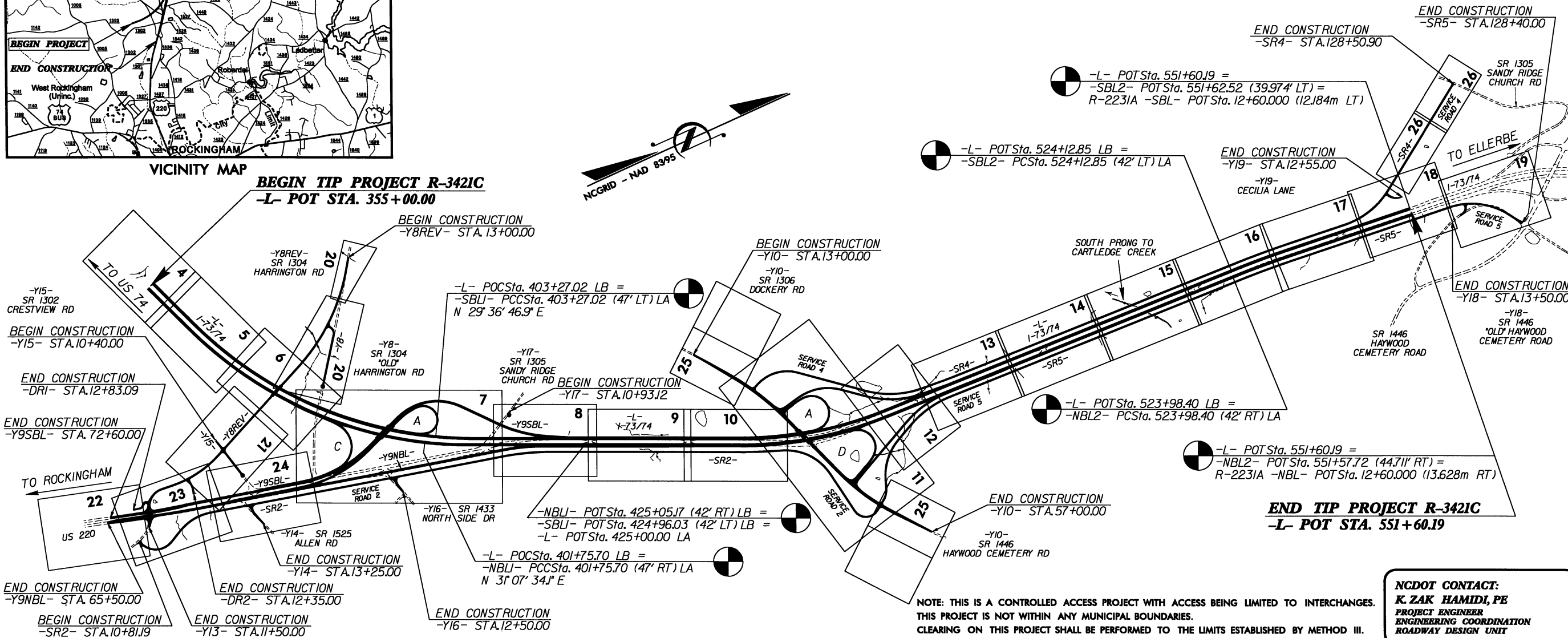


STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

LOCATION: US 220 BYPASS FROM 0.2 MILES SOUTHWEST OF SR 1304 (HARRINGTON RD) TO US 220 BUSINESS/BYPASS INTERCHANGE SOUTH OF ELLERBE

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING, STRUCTURES, AND CULVERT



DESIGN DATA	
ADT 2012 =	25,500
ADT 2030 =	35,300
DHV =	10 %
D =	60 %
T =	28 % *
V =	70 MPH
* TTST 18 %	DUAL 10 %
FUNC. CLASS =	INTERSTATE
STATEWIDE TIER	

PROJECT LENGTH	
LENGTH ROADWAY TIP PROJECT R-3421C	= 3.724 mi
TOTAL LENGTH TIP PROJECT R-3421C	= 3.724 mi
-L- LINE USED FOR PROJECT LENGTH	

Prepared for:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., NC, 27610

By:
M A Engineering Consultants, Inc.
598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

2012 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE: NOVEMBER 19, 2010
LETTING DATE: NOVEMBER 20, 2012

R.W. PORTER JR., PE
PROJECT ENGINEER

K.S. HUTCHENS
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SIGNATURE: _____ P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER

NCDOT CONTACT:
K. ZAK HAMIDI, PE
PROJECT ENGINEER
ENGINEERING COORDINATION
ROADWAY DESIGN UNIT

NOTE: THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES. THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

05/08/03

Note: Not to Scale

***S.U.E. = Subsurface Utility Engineering**

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT REFERENCE NO.
R-342C

SHEET NO.
1-B

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	-x-x-x-
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	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	-----
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	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
Existing Easement Line	----- E
Proposed Temporary Construction Easement	----- E
Proposed Temporary Drainage Easement	----- TDE
Proposed Permanent Drainage Easement	----- PDE
Proposed Permanent Drainage / Utility Easement	----- DUE
Proposed Permanent Utility Easement	----- PUE
Proposed Temporary Utility Easement	----- TUE
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

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
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	-----

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	⊕
Power Line Tower	⊗
Power Transformer	⊗
U/G Power Cable Hand Hole	⊕
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	⊕
Telephone Booth	⊕
Telephone Pedestal	⊕
Telephone Cell Tower	⊕
U/G Telephone Cable Hand Hole	⊕
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	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	----- A/G Water

TV:

TV Satellite Dish	⊕
TV Pedestal	⊕
TV Tower	⊗
U/G TV Cable Hand Hole	⊕
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:

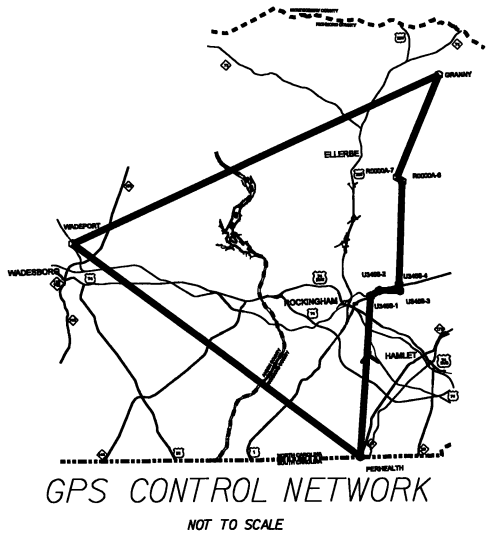
Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	----- SS
Above Ground Sanitary Sewer	----- A/G Sanitary Sewer
Recorded SS Forced Main Line	----- FSS
Designated SS Forced Main Line (S.U.E.*)	----- FSS

MISCELLANEOUS:

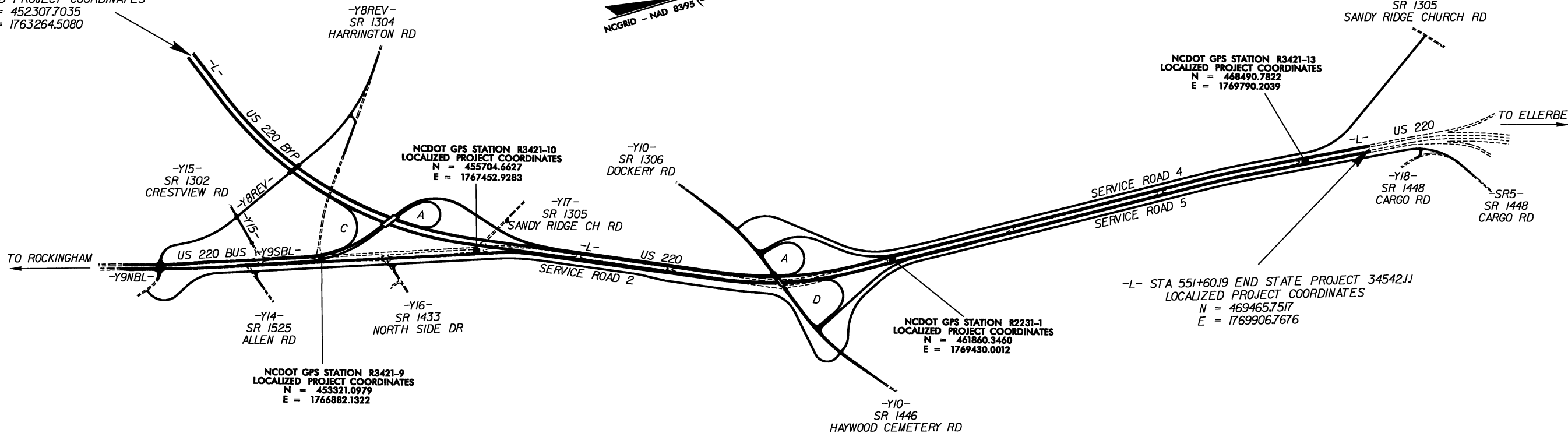
Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	⊕
Utility Unknown U/G Line	----- TUTL
U/G Tank; Water, Gas, Oil	□
AG Tank; Water, Gas, Oil	□
U/G Test Hole (S.U.E.*)	⊕
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1C	
LOCATION AND SURVEYS			

SURVEY CONTROL SHEET



-L- STA 355+00.00 BEGIN STATE PROJECT 34542.11
LOCALIZED PROJECT COORDINATES
N = 452307.7035
E = 1763264.5080



-L- STA 551+60.19 END STATE PROJECT 34542.11
LOCALIZED PROJECT COORDINATES
N = 469465.7517
E = 1769906.7676

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 438375.9441(f1) EASTING: 1746551.2575(f1)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

INDICATES CONTROL MONUMENTS SET FOR HORIZONTAL PROJECT CONTROL
BY THE NCDOT LOCATION AND SURVEYS UNIT.

PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.

SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTES

- THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK
TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK)
NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE
END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM
WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL
BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL
BASE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE
NEEDED TO REDUCE POSSIBLE ERRORS OR BIASES.
- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY
BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/)
THE FILES TO BE FOUND ARE AS FOLLOWS:
R3421A.LS.GPSCALIB_041207.HTML
R3421A.LS.WGS84_041207.TXT
R3421A.LS.LOCAL_041207.TXT
R3421A.LS.CONTROL_041207.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.

SURVEY CONTROL SHEET R-3421C

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1D	
LOCATION AND SURVEYS			

GPS CALIBRATION REPORT			
PROJECT : R3421			
TIP NUMBER	R3421C		
USER NAME	SCRANFORD	DATE & TIME	3:13:50 PM 12/16/04
COORDINATE SYSTEM	US STATE PLANE 1983(AT GROUND)	ZONE	NORTH CAROLINA 3200
HORIZONTAL DATUM	NAD 1983 (CONUS)	GEOID MODEL	GEOID99 (CONUS)
VERTICAL DATUM	NAVD88		
COORDINATE UNITS	US SURVEY FEET		
DISTANCE UNITS	US SURVEY FEET		
HEIGHT UNITS	US SURVEY FEET		

LOCAL SITE INFORMATION			
LOCALIZED AROUND			
LATITUDE	34+57'05.57766"N		
LONGITUDE	79+50'45.03914"W		
SITE SCALE FACTOR	1.0001243655		
HEIGHT	127.705SFT		

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	460127.577SFT
EASTING COORDINATE OF ROTATION CENTER	1767810.855SFT
ROTATION ABOUT THE CENTER	
POINT	0+00'00"
TRANSLATION NORTH	0.019SFT
TRANSLATION EAST	-0.006SFT
SCALE FACTOR	0.99999983

VERTICAL ADJUSTMENT PARAMETERS

NORTHING COORDINATE OF ORIGIN	472273.834SFT
POINT	
EASTING COORDINATE OF ORIGIN	1785177.898SFT
POINT	
VERTICAL SEPARATION AT ORIGIN	0.042SFT
SLOPE NORTH	2.424PPM
SLOPE EAST	-0.100PPM

GEOID MODEL DEFINITION

GEOID99 (CONUS)

RESIDUAL DIFFERENCES BETWEEN GPS (WGS84) AND LOCAL COORDINATES

SUMMARY			
	MAXIMUM ERROR	ROOT MEAN SQUARE ERROR	POINT
HORIZONTAL	0.060SFT	0.007	R0000A-7 WGS84
VERTICAL	0.065SFT	0.011	R0000A-7 WGS84
THREE-DIMENSIONAL	0.088SFT	0.013	R0000A-7 WGS84
POINT RESIDUALS			
WGS84 COORDINATES	CALCULATED POINT FOR DISPLAY ONLY		LOCAL COORDINATES
POINT R0000A-7 WGS84	NORTHING	472273.834SFT	POINT R0000A-7
LATITUDE 35+02'43.84825"N	EASTING	1785177.898SFT	NORTHING 472273.891SFT
LONGITUDE 79+43'03.98201"W	ELEVATION	406.998SFT	EASTING 1785177.880SFT
HEIGHT 304.583SFT	HORZ ERROR	0.060SFT	ELEVATION 407.063SFT
	VERT ERROR	0.065SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.088SFT	QUALITY SURVEY QUALITY
POINT GRANNY WGS84	NORTHING	504943.828SFT	POINT GRANNY
LATITUDE 35+08'07.61741"N	EASTING	1794500.656SFT	NORTHING 504943.820SFT
LONGITUDE 79+41'14.58408"W	ELEVATION	557.429SFT	EASTING 1794500.668SFT
HEIGHT 455.262SFT	HORZ ERROR	0.014SFT	ELEVATION 557.381SFT
	VERT ERROR	0.048SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.050SFT	QUALITY SURVEY QUALITY

POINT U3456-1 WGS84	NORTHING	435832.529SFT	POINT U3456-1
LATITUDE 34+56'42.56346"N	EASTING	1773381.985SFT	NORTHING 435832.521SFT
LONGITUDE 79+45'22.50410"W	ELEVATION	304.605SFT	EASTING 1773381.965SFT
HEIGHT 202.172SFT	HORZ ERROR	0.021SFT	ELEVATION 304.583SFT
	VERT ERROR	0.022SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.031SFT	QUALITY SURVEY QUALITY

POINT R3421-6 WGS84	NORTHING	444453.276SFT	POINT R3421-6
LATITUDE 34+58'05.65160"N	EASTING	1746163.486SFT	NORTHING 444453.290SFT
LONGITUDE 79+50'50.32033"W	ELEVATION	277.087SFT	EASTING 1746163.498SFT
HEIGHT 175.495SFT	HORZ ERROR	0.018SFT	ELEVATION 277.090SFT
	VERT ERROR	0.003SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.018SFT	QUALITY SURVEY QUALITY

POINT R0000A-13 WGS84	NORTHING	454623.600SFT	POINT R0000A-13
LATITUDE 34+59'46.27670"N	EASTING	1746608.032SFT	NORTHING 454623.589SFT
LONGITUDE 79+50'46.02070"W	ELEVATION	200.776SFT	EASTING 1746608.036SFT
HEIGHT 99.248SFT	HORZ ERROR	0.011SFT	ELEVATION 200.774SFT
	VERT ERROR	0.002SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.011SFT	QUALITY SURVEY QUALITY

POINT R3421-8 WGS84	NORTHING	449771.970SFT	POINT R3421-8
LATITUDE 34+58'59.28923"N	EASTING	1758721.177SFT	NORTHING 449771.958SFT
LONGITUDE 79+48'19.96025"W	ELEVATION	348.615SFT	EASTING 1758721.175SFT
HEIGHT 246.765SFT	HORZ ERROR	0.012SFT	ELEVATION 348.602SFT
	VERT ERROR	0.013SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.018SFT	QUALITY SURVEY QUALITY

POINT R2231-1 WGS84	NORTHING	461860.363SFT	POINT R2231-1
LATITUDE 35+00'59.68816"N	EASTING	1769429.995SFT	NORTHING 461860.347SFT
LONGITUDE 79+46'12.39863"W	ELEVATION	345.086SFT	EASTING 1769430.002SFT
HEIGHT 243.864SFT	HORZ ERROR	0.017SFT	ELEVATION 345.918SFT
	VERT ERROR	0.032SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.036SFT	QUALITY SURVEY QUALITY

POINT R3421-13 WGS84	NORTHING	468490.792SFT	POINT R3421-13
LATITUDE 35+02'05.29295"N	EASTING	1769790.195SFT	NORTHING 468490.784SFT
LONGITUDE 79+46'08.68585"W	ELEVATION	415.734SFT	EASTING 1769790.204SFT
HEIGHT 313.772SFT	HORZ ERROR	0.012SFT	ELEVATION 415.771SFT
	VERT ERROR	0.037SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.039SFT	QUALITY SURVEY QUALITY

POINT R3421-9 - WGS84	NORTHING	453321.090SFT	POINT R3421-9
LATITUDE 34+59'35.03521"N	EASTING	1766882.140SFT	NORTHING 453321.098SFT
LONGITUDE 79+46'42.22392"W	ELEVATION	393.458SFT	EASTING 1766882.132SFT
HEIGHT 291.417SFT	HORZ ERROR	0.011SFT	ELEVATION 393.408SFT
	VERT ERROR	0.050SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.051SFT	QUALITY SURVEY QUALITY

POINT R3421-10 WGS84	NORTHING	455704.679SFT	POINT R3421-10
LATITUDE 34+59'58.65396"N	EASTING	1767452.925SFT	NORTHING 455704.663SFT
LONGITUDE 79+46'35.58803"W	ELEVATION	423.027SFT	EASTING 1767452.929SFT
HEIGHT 320.997SFT	HORZ ERROR	0.016SFT	ELEVATION 423.025SFT
	VERT ERROR	0.002SFT	UTILIZED HORZ AND VERT
	3D ERROR	0.016SFT	QUALITY SURVEY QUALITY

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 4383759441(f) EASTING: 17465512575(f) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3421-11" TO -L- STATION 355+00.00 N 50° 11' 10.4" E 21758.37' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

NOTES

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL BASE 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.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.doh.dot.state.nc.us/preconstruct/highway/location/project/) THE FILES TO BE FOUND ARE AS FOLLOWS:
R3421A.LS.QPSCALIB_04I207.HTML
R3421A.LS.WGS84_04I207.TXT
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R3421A.LS.CONTROL_04I207.TXT
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SURVEY CONTROL SHEET R-3421C

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421C	1E	
LOCATION AND SURVEYS			

BL	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
186		BL-186	452355.5490	1763392.2070	386.61	356+36.37	0.18 LT
187		BL-187	452472.1320	1763699.0050	407.52	359+64.56	2.15 LT
188		BL-188	452642.9680	1764136.4990	435.09	364+34.32	8.10 LT
189		BL-189	452732.6480	1764349.0750	436.95	366+65.40	9.14 LT
190		BL-190	452948.4500	1764826.0330	382.25	371+88.74	9.54 RT
191		BL-191	453129.5200	1765106.2480	368.36	375+21.99	3.27 LT
192		BL-192	453317.7320	1765383.2820	370.13	378+57.17	4.32 LT
193		BL-193	453574.6600	1765734.5770	352.75	382+92.16	8.47 RT
194		BL-194	453747.3300	1765916.0690	370.87	385+42.34	1.51 LT
195		BL-195	454055.0830	1766236.2710	397.73	389+86.36	5.44 RT
196		BL-196	454251.3900	1766403.4570	403.79	392+44.05	0.47 LT
197		BL-197	454632.8720	1766715.5870	385.65	397+36.53	10.81 RT
198		BL-198	454942.4670	1766904.1780	385.51	400+98.59	4.12 LT
199		BL-199	455380.2460	1767159.0650	406.34	406+05.31	3.36 RT
10	R3421-10		455704.6627	1767452.9283	423.02	410+22.52	130.89 RT
217		BL-217	456421.1275	1767628.5108	422.94	417+47.06	7.63 LT
218		BL-218	457218.5340	1768003.1982	381.60	426+28.07	1.21 RT
219		BL-219	458517.1257	1768594.6254	365.23	440+54.99	1.45 LT
220		BL-220	460157.3050	1769388.8532	402.51	458+55.60	146.98 RT
221		R2231-1	461860.3460	1769430.0012	345.92	475+37.48	2.85 RT
222		BL-222	463794.3523	1769515.7671	339.96	494+73.39	0.69 LT
223		BL-223	465295.4238	1769566.2688	310.03	509+75.19	19.49 LT
224		BL-224	466317.9305	1769634.4837	329.98	519+99.76	1.48 RT
13	R3421-13		468490.7822	1769790.2039	415.77	541+78.40	15.73 LT
225		BL-225	469412.6799	1769905.0980	425.33	551+07.23	3.79 RT
226		BL-226	470524.2622	1770077.6004	439.81	OUTSIDE PROJECT LIMITS	

BY8	POINT	DESC.	NORTH	EAST	ELEVATION	Y8REV STATION	OFFSET
227		BY8-227	455339.1176	1763728.6852	336.26	OUTSIDE PROJECT LIMITS	
228		BY8-228	454656.6560	1764696.1819	349.83	19+05.30	38.54 LT
	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
194		BL-194	453747.3300	1765916.0690	370.87	385+42.34	1.51 LT
233		BY8-233	453575.9757	1766175.1315	383.41	386+13.62	300.36 RT
	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
9		R3421-9	453321.0979	1766882.1322	393.41	34+10.74	39.06 RT

BY9	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
229		BY9-229	450145.5186	1766051.1625	362.98	66+95.87	41.50 RT
230		BY9-230	451030.7331	1766329.6449	371.18	57+67.97	22.62 RT
231		BY9-231	452182.4745	1766612.1877	382.01	45+80.91	33.50 RT
232		BY9-232	452455.0153	1766670.0897	385.64	43+02.40	41.35 RT
9		R3421-9	453321.0979	1766882.1322	393.41	34+10.74	39.06 RT
234		BY9-234	454245.2491	1767104.1954	403.23	24+60.29	40.68 RT
10		R3421-10	455704.6627	1767452.9283	423.02	9+59.79	45.14 RT

BY10	POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
235		BY10-235	459044.4954	1767388.3661	422.22	12+22.11	13.67 LT
236		BY10-236	459767.0448	1768484.0340	419.02	25+34.43	11.21 LT
220		BL-220	460157.3050	1769388.8532	402.51	35+17.62	48.27 LT
237		BY10-237	460286.0106	1769920.2733	404.34	40+61.02	11.45 RT
238		BY10-238	460687.8433	1770681.8879	399.67	49+20.26	21.59 RT
239		BY10-239	461210.5726	1771329.5387	402.88	57+51.82	10.67 RT

BY11	POINT	DESC.	NORTH	EAST	ELEVATION	SR4 STATION	OFFSET
13		R3421-13	468490.7822	1769790.2039	415.77	101+85.51	109.27 RT
247		BY11-247	469165.6690	1769786.1110	428.04	107+84.29	202.44 RT
248		BY11-248	469510.8400	1769431.1940	426.36	112+30.14	70.59 RT
249		BY11-249	470320.3300	1768891.3410	427.82	122+03.13	68.34 RT
250		BY11-250	470892.9490	1768522.5160	417.80	128+84.18	77.63 RT

BY12	POINT	DESC.	NORTH	EAST	ELEVATION	SR5 STATION	OFFSET
226		BL-226	470524.2622	1770077.6004	439.81	121+62.32	176.57 LT
240		BY12-240	470684.6801	1770456.6819	428.60	125+04.84	7.01 RT

BY13	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
230		BY9-230	451030.7331	1766329.6449	371.18	57+67.97	22.62 RT
241		BY13-241	450405.4660	1766592.4611	380.61	62+94.38	405.03 LT

BY14	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
231		BY9-231	452182.4745	1766612.1877	382.01	45+80.91	33.50 RT
242		BY14-242	452447.2450	1767364.1895	367.39	41+46.63	635.09 LT

BY15	POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
243		BY14-243	452214.5211	1765741.1732	425.16	10+92.71	12.32 RT
244		BY15-244	452331.9474	1766249.1058	414.19	16+14.04	13.00 RT

	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
232		BY9-232	452455.0153	1766670.0897	385.64	43+02.40	41.35 RT

BY16	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
234		BY9-234	454245.2491	1767104.1954	403.23	24+60.29	40.68 RT
245		BY16-245	454476.6442	1767686.6049	418.02	20+98.35	470.93 LT

BY17	POINT	DESC.	NORTH	EAST	ELEVATION	Y17 STATION	OFFSET
246		BY17-246	456376.5771	1767037.1503	435.57	10+03.89	14.00 RT

	POINT	DESC.	NORTH	EAST	ELEVATION	Y9NBL STATION	OFFSET
10		R3421-10	455704.6627	1767452.9283	423.02	9+59.79	45.14 RT

BM29 ELEVATION = 364.84
N 450070 E 1766141
Y9NBL STATION 67+43 66 LEFT
RR SPIKE IN BASE OF 18' PINE

BM30 ELEVATION = 364.87
N 452368 E 1767265
Y9NBL STATION 42+47 557 LEFT
RR SPIKE IN BASE OF ABANDONED POWER POLE

BM31 ELEVATION = 411.00
N 454502 E 1767799
Y9NBL STATION 20+47 574 LEFT
RR SPIKE IN BASE OF POWER POLE (*529 35)

BM32 ELEVATION = 424.22
N 456464 E 1767961
L STATION 419+24 277 RIGHT
RR SPIKE IN BASE OF POWER POLE (*DH05
AJ)

BM33 ELEVATION = 373.13
N 458356 E 1768865
L STATION 440+21 311 RIGHT
RR SPIKE IN BASE OF POWER POLE (DH20 AJ)

BM34 ELEVATION = 420.23
N 459546 E 1767970
Y10 STATION 19+85 79 LEFT
RR SPIKE IN BASE OF POWER POLE (*M04 AJ)

BM35 ELEVATION = 356.72
N 462387 E 1769705
L STATION 480+76 253 RIGHT
RR SPIKE IN BASE OF 20' WHITE OAK

BM36 ELEVATION = 387.55
N 464058 E 1770062
L STATION 497+62 533 RIGHT
RR SPIKE IN BASE OF POWER POLE

BM37 ELEVATION = 320.60
N 466147 E 1770002
L STATION 518+46 376 RIGHT
RR SPIKE IN BASE OF 15' GUM TREE

BM38 ELEVATION = 416.80
N 468484 E 1769540
L STATION 541+46 264 LEFT
RR SPIKE IN BASE OF POWER POLE

BM39 ELEVATION = 427.95
N 470673 E 1770462
SR5 STATION 125+02 19 RIGHT
RR SPIKE IN BASE OF POWER POLE(*7N1322)

BM40 ELEVATION = 349.99
N 454164 E 1765436
Y8REV STATION 26+86 355 LEFT
RR SPIKE IN BASE OF POWER POLE

NOTES

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 4383759441(11) EASTING: 17465512575(11)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3421-11" TO L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK
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NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE
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7/6/2019

10/24/2011
R:\Projects\2011\11-3421c-1s-1f-SCS.dgn
13:00:41 PM

SURVEY CONTROL SHEET R-3421C

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	1-F
Location and Surveys	

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y10	13+00.00	-29.99	459104.2680	1767440.9120
Y10	13+00.00	30.02	459056.2553	1767476.8953
Y10	13+00.00	60.00	459032.2610	1767494.8778
Y10	13+00.00	-60.00	459128.2860	1767422.9112
Y10	14+33.64	60.00	459112.4085	1767601.8183
Y10	14+33.64	-60.00	459208.4335	1767529.8517
Y10	15+77.62	60.00	459196.4090	1767716.8848
Y10	15+77.62	-60.00	459294.2120	1767647.3538
Y10	19+12.71	60.00	459390.5705	1767989.9933
Y10	19+12.71	-60.00	459488.3735	1767920.4623
Y10	21+50.00	-60.00	459621.8360	1768121.1070
Y10	24+50.00	60.00	459665.7263	1768441.1153
Y10	24+50.00	-100.00	459807.8398	1768367.6050
Y10	24+50.00	100.00	459630.1980	1768459.4928
Y10	26+98.46	-100.00	459917.5368	1768597.7197
Y10	29+49.28	100.00	459824.7630	1768904.7018
Y10	50+19.91	60.00	460718.5495	1770785.4405
Y10	50+19.91	-60.00	460812.7660	1770711.1215
Y10	56+50.00	60.00	461108.7810	1771280.1498
Y10	56+50.00	-60.00	461202.9977	1771205.8308
Y10	56+85.00	30.17	461154.0959	1771289.3299
Y10	56+85.00	-29.83	461200.8678	1771251.7460

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y10RPA	19+00.00	120.00	460433.8652	1768529.7137
Y10RPA	20+15.59	120.00	460299.0673	1768528.0118
Y10RPA	22+15.59	120.00	460085.2473	1768562.3778

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y10RPD	15+50.00	-120.00	460866.0033	1770057.8145
Y10RPD	19+12.75	-120.00	460537.1925	1770211.0190

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y14	11+59.41	-50.00	452336.0605	1766908.9830
Y14	11+59.41	50.00	452241.3360	1766941.0187
Y14	13+25.00	-50.00	452389.1107	1767065.8440
Y14	13+25.00	-30.02	452370.1815	1767072.2461
Y14	13+25.00	29.98	452313.3440	1767091.4688
Y14	13+25.00	50.00	452294.3820	1767097.8820

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y15	11+00.00	-30.13	452257.5180	1765738.6583
Y15	11+00.00	29.87	452199.0775	1765752.2495
Y15	13+05.00	40.00	452235.6467	1765954.2155
Y15	14+55.00	-40.00	452347.5453	1766082.1951
Y15	16+50.00	40.00	452313.7960	1766290.2479
Y15	16+55.00	-40.00	452392.8490	1766276.9964
Y15	17+00.00	60.00	452305.6418	1766343.4788
Y15	17+00.00	-60.00	452422.5225	1766316.2963

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y16	11+50.88	-50.00	454413.4295	1767406.7800
Y16	11+50.88	50.00	454317.2250	1767434.0697
Y16	12+50.00	-50.00	454440.4790	1767502.1380
Y16	12+50.00	-29.65	454420.8978	1767507.6923
Y16	12+60.50	50.00	454347.1388	1767539.5248

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y17	10+75.00	-29.92	456334.9865	1767109.6478
Y17	11+15.00	-70.00	456318.9165	1767163.9438
Y17	12+21.29	30.57	456177.5479	1767126.1702

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y18	12+40.00	28.82	470059.1584	1770237.1067
Y18	13+70.00	-31.76	469949.2807	1770328.7632

ROW MARKER CONCRETE OR GRANITE-E				
ALIGN	STATION	OFFSET	NORTH	EAST
Y19	11+75.00	65.00	469336.3749	1769705.0534
Y19	12+75.00	-25.00	469462.1447	1769639.7934
Y19	12+75.00	25.00	469458.5933	1769689.6671

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "R3421-11"
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 438375944.1111 EASTING: 17465512575111
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99987565
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R3421-11" TO -L- STATION 355+00.00
N 50° 11' 10.4" E 21758.370
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

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0/2/20ll...a\proj\N-3421c...1a...1g...SCS.dgn
12/08/24

SURVEY CONTROL SHEET R-3421C

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	I-G
Location and Surveys	

L			
TYPE	STATION	NORTH	EAST
POT	351+00.00	452167.8637	1762889.7484
POT	355+00.00	452307.7034	1763264.5081
TS	362+34.60	452564.5184	1763952.7528
SC	364+34.60	452635.5263	1764139.7202
CS	407+28.99	455492.7226	1767210.6927
ST	409+28.99	455674.0897	1767294.9831
TS	446+52.55	459059.8687	1768844.6356
SC	448+52.55	459242.2043	1768926.8100
CS	468+47.48	461171.2685	1769394.1645
ST	470+47.48	461370.9958	1769404.5526
PC	524+47.33	466765.0924	1769653.6476
PT	533+56.57	467671.6925	1769721.3696
POT	551+60.19	469465.7517	1769906.7676
POT	562+91.56	470591.1307	1770023.0642

SR2			
TYPE	STATION	NORTH	EAST
POT	10+71.07	450577.0822	1766562.4260
PC	11+13.12	450590.3927	1766602.3153
PT	16+27.30	451009.5489	1766775.4758
PC	18+27.10	451188.1182	1766685.8437
PT	23+61.18	451707.8861	1766626.4177
PC	66+89.73	455914.9058	1767644.9303
PT	74+22.05	456605.8436	1767884.2070
PC	101+15.77	459055.1981	1769005.2632
PT	105+96.20	459497.5580	1769192.5329
PC	107+96.20	459683.9004	1769265.1724
PT	115+89.96	460158.7973	1769856.1888
PC	122+35.94	460258.3165	1770494.4587
PT	126+39.03	460568.7447	1770628.7911
POT	127+26.94	460641.3347	1770579.2022

SR4			
TYPE	STATION	NORTH	EAST
POT	9+61.16	459647.5052	1768281.7047
PC	10+66.35	459743.2964	1768238.2518
PT	17+05.35	460344.4338	1768317.9268
PC	27+33.11	461137.4774	1768971.6615
PT	35+77.47	461907.3322	1769286.1782
PC	38+55.10	462183.9316	1769310.1051
PT	41+96.32	462524.3729	1769332.6814
PC	84+47.33	466770.8587	1769528.7807
PT	93+63.68	467684.5415	1769597.0318
PC	101+93.40	468509.8711	1769682.3213
PT	110+20.00	469296.7182	1769488.5644
POT	128+61.08	470830.7810	1768470.6043

SR5			
TYPE	STATION	NORTH	EAST
POT	18+96.16	460641.3347	1770579.2022
PC	19+76.07	460707.3164	1770534.1278
PT	21+60.25	460819.1179	1770391.4110
PC	22+84.51	460862.6098	1770275.0074
PT	29+21.81	461284.4249	1769818.7277
PC	32+01.50	461537.9425	1769700.6046
PT	38+91.01	462207.8572	1769568.3314
PC	84+47.33	466759.3262	1769778.5145
PT	93+49.47	467658.8434	1769845.7075
PC	117+19.44	470016.2624	1770089.3230
PT	126+27.28	470760.7304	1770552.8482
POT	128+93.87	470902.3365	1770778.7186

Y8			
TYPE	STATION	NORTH	EAST
POT	10+00.00	454347.1159	1764927.2867
PC	10+62.17	454382.9673	1764978.0759
PT	11+88.00	454381.2627	1765095.7551
POT	19+25.00	453938.9833	1765685.2980

Y8REV			
TYPE	STATION	NORTH	EAST
POT	9+92.81	455194.7025	1763963.0745
PC	14+70.46	454919.8323	1764353.7121
PT	27+87.93	453908.7065	1765171.8160
PC	46+88.87	452159.9807	1765917.1597
PT	54+89.71	451376.6912	1766037.6604
PC	56+68.65	451198.6092	1766020.2208
PT	60+29.94	450913.9185	1766198.4192
POT	60+79.94	450896.5563	1766245.3079

Y9NBL			
TYPE	STATION	NORTH	EAST
TS	0+00.00	456604.3627	1767793.3484
SC	2+00.00	456421.6012	1767712.1432
CS	5+75.12	456067.3672	1767589.4695
ST	7+75.12	455873.5271	1767540.2549
PC	50+86.69	451683.0148	1766525.7387
PT	58+40.15	450955.1511	1766331.2741
POT	68+85.66	449951.7051	1766037.7034

Y9SBL			
TYPE	STATION	NORTH	EAST
POT	0+00.00	456943.2046	1767816.4626
TS	2+75.00	456701.7439	1767684.8506
SC	4+75.00	456527.8545	1767586.0946
CS	9+84.94	456134.0869	1767264.4591
ST	11+84.94	456002.6060	1767113.7839
TS	15+84.94	455744.9119	1766807.8529
SC	17+84.94	455609.8997	1766660.4888
CS	25+70.72	454879.6723	1766470.3971
ST	27+70.72	454689.9432	1766533.2249
TS	31+74.80	454311.9657	1766676.1188
SC	33+74.80	454123.7051	1766743.5593
CS	42+78.75	453230.5207	1766808.3645
ST	45+58.75	452956.9194	1766749.1627
PC	63+36.83	451228.7577	1766330.7776
PT	69+01.93	450682.8599	1766184.9292
POT	76+45.01	449969.6759	1765976.2782

Y10RPA			
TYPE	STATION	NORTH	EAST
POT	0+00.00	462125.2043	1769385.3238
TS	1+40.07	461985.6576	1769373.2524
SC	3+40.07	461786.8997	1769351.3892
CS	10+03.97	461177.7969	1769102.5461
ST	12+03.97	461020.5878	1768978.9825
TS	13+73.09	460890.0907	1768871.4090
SC	15+73.09	460730.1538	1768751.6138
CS	20+15.59	460307.2294	1768647.7336
ST	22+15.59	460109.9920	1768679.7984
POT	24+65.59	459865.3648	1768731.3494

Y14			
TYPE	STATION	NORTH	EAST
POT	10+00.00	452294.7536	1766768.4974
PC	10+46.68	452283.7698	1766813.8668
PT	11+59.41	452288.6960	1766925.0016
POT	14+00.00	452365.7745	1767152.9102

Y15			
TYPE	STATION	NORTH	EAST
POT	10+00.00	452205.5188	1765648.0828
POT	20+00.00	452432.0379	1766622.0898

Y16			
TYPE	STATION	NORTH	EAST
POT	10+00.00	454374.6679	1767272.0413
PC	10+48.09	454363.3513	1767318.7853
PT	11+50.88	454365.3271	1767420.4248
POT	13+75.00	454426.4886	1767636.0374

Y17			
TYPE	STATION	NORTH	EAST
POT	10+00.00	456386.6679	1767047.6048
POT	16+00.00	455859.1596	1767333.4984

Y18			
TYPE	STATION	NORTH	EAST
POT	10+00.37	470240.8100	1770139.1193
PC	10+49.32	470224.8615	1770185.3953
PT	11+56.81	470146.6429	1770251.4707
PC	12+14.07	470090.1571	1770260.8168
PT	14+55.24	469859.6839	1770329.6567

Y19			
TYPE	STATION	NORTH	EAST
POT	10+00.00	469245.9153	1769520.4759
PC	10+52.02	469272.4758	1769565.2050
PT	12+44.79	469430.2368	1769662.5846
POT	19+41.72	470125.4080	1769712.0860

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R3421-11" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF NORTHING: 4383759441(11) EASTING: 17465512575(11) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99987565 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R3421-11" TO "L- STATION 355+00.00 N 50° 11' 10.4" E 21758.370' ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAD 88

NOTE: DRAWING NOT TO SCALE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CENTERLINE COORDINATE LIST

PROJECT REFERENCE NO.	SHEET NO.
R-3421 C	1-H

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	355+00.00	452307.7034	1763264.5081
2	L	356+00.00	452342.6633	1763358.1980
3	L	357+00.00	452377.6233	1763451.8880
4	L	358+00.00	452412.5832	1763545.5779
5	L	359+00.00	452447.5431	1763639.2678
6	L	360+00.00	452482.5030	1763732.9578
7	L	361+00.00	452517.4630	1763826.6477
8	L	362+00.00	452552.4229	1763920.3376
9	L	363+00.00	452587.4209	1764014.0133
10	L	364+00.00	452622.9585	1764107.4852
11	L	365+00.00	452659.8034	1764200.4487
12	L	366+00.00	452698.2596	1764292.7573
13	L	367+00.00	452738.3208	1764384.3806
14	L	368+00.00	452779.9751	1764475.2908
15	L	369+00.00	452823.2096	1764565.4603
16	L	370+00.00	452868.0112	1764654.8614
17	L	371+00.00	452914.3662	1764743.4670
18	L	372+00.00	452962.2606	1764831.2501
19	L	373+00.00	453011.6797	1764918.1840
20	L	374+00.00	453062.6084	1765004.2422
21	L	375+00.00	453115.0313	1765089.3984
22	L	376+00.00	453168.9325	1765173.6268
23	L	377+00.00	453224.2954	1765256.9016
24	L	378+00.00	453281.1032	1765339.1975
25	L	379+00.00	453339.3386	1765420.4894
26	L	380+00.00	453398.9839	1765500.7527
27	L	381+00.00	453460.0209	1765579.9627
28	L	382+00.00	453522.4310	1765658.0954
29	L	383+00.00	453586.1952	1765735.1271
30	L	384+00.00	453651.2941	1765811.0341
31	L	385+00.00	453717.7079	1765885.7935
32	L	386+00.00	453785.4162	1765959.3824
33	L	387+00.00	453854.3985	1766031.7784
34	L	388+00.00	453924.6339	1766102.9595
35	L	389+00.00	453996.1008	1766172.9040
36	L	390+00.00	454068.7775	1766241.5905
37	L	391+00.00	454142.6419	1766308.9982
38	L	392+00.00	454217.6714	1766375.1065
39	L	393+00.00	454293.8433	1766439.8953
40	L	394+00.00	454371.1343	1766503.3449
41	L	395+00.00	454449.5209	1766565.4359
42	L	396+00.00	454528.9792	1766626.1494
43	L	397+00.00	454609.4850	1766685.4669
44	L	398+00.00	454691.0137	1766743.3703
45	L	399+00.00	454773.5406	1766799.8421
46	L	400+00.00	454857.0405	1766854.9649
47	L	401+00.00	454941.4879	1766908.4221
48	L	402+00.00	455026.8572	1766960.4974
49	L	403+00.00	455113.1224	1767011.0748
50	L	404+00.00	455200.2570	1767060.1389
51	L	405+00.00	455288.2347	1767107.6749
52	L	406+00.00	455377.0287	1767153.6683
53	L	407+00.00	455466.6117	1767198.1049
54	L	408+00.00	455556.9346	1767241.0185
55	L	409+00.00	455647.7341	1767282.9163
56	L	410+00.00	455738.6610	1767324.5370
57	L	411+00.00	455829.5895	1767366.1545
58	L	412+00.00	455920.5180	1767407.7719
59	L	413+00.00	456011.4465	1767449.3894
60	L	414+00.00	456102.3749	1767491.0068
61	L	415+00.00	456193.3034	1767532.6243
62	L	416+00.00	456284.2319	1767574.2418
63	L	417+00.00	456375.1603	1767615.8592
64	L	418+00.00	456466.0888	1767657.4767
65	L	419+00.00	456557.0173	1767699.0942
66	L	420+00.00	456647.9458	1767740.7116
67	Y8REV	18+00.00	454712.1364	1764609.2188
68	Y8REV	19+00.00	454642.3149	1764680.7972
69	Y8REV	20+00.00	454569.5423	1764749.3732
70	Y8REV	21+00.00	454493.9476	1764814.8253
71	Y8REV	22+00.00	454415.6649	1764877.0374
72	Y8REV	23+00.00	454334.8329	1764935.8991
73	Y8REV	24+00.00	454251.5949	1764991.3063
74	Y8REV	25+00.00	454166.0984	1765043.1606
75	Y8REV	26+00.00	454078.4950	1765091.3702
76	Y8REV	27+00.00	453988.9399	1765135.8496
77	Y8REV	28+00.00	453897.6039	1765176.5481
78	Y8REV	29+00.00	453805.6113	1765215.7573
79	Y8REV	30+00.00	453713.6187	1765254.9665
80	Y8REV	31+00.00	453621.6261	1765294.1757
81	Y8REV	32+00.00	453529.6335	1765333.3848

Point #	Chain	Station	Northing (Y)	Easting (X)
82	Y8REV	33+00.00	453437.6409	1765372.5940
83	Y8REV	34+00.00	453345.6483	1765411.8032
84	Y8REV	35+00.00	453253.6557	1765451.0124
85	Y8REV	36+00.00	453161.6631	1765490.2216
86	Y8REV	37+00.00	453069.6705	1765529.4308
87	Y8REV	38+00.00	452977.6778	1765568.6399
88	Y8REV	39+00.00	452885.6852	1765607.8491
89	Y8REV	40+00.00	452793.6926	1765647.0583
90	Y8REV	41+00.00	452701.7000	1765686.2675
91	Y8REV	42+00.00	452609.7074	1765725.4767
92	Y8REV	43+00.00	452517.7148	1765764.6859
93	Y8REV	44+00.00	452425.7222	1765803.8950
94	Y8REV	45+00.00	452333.7296	1765843.1042
95	Y8REV	46+00.00	452241.7370	1765882.3134
96	Y8REV	47+00.00	452149.7293	1765921.4870
97	Y8REV	48+00.00	452056.3214	1765957.1480
98	Y8REV	49+00.00	451960.8685	1765996.9053
99	Y8REV	50+00.00	451863.7434	1766010.6426
100	Y8REV	51+00.00	451765.3253	1766028.2671
101	Y8REV	52+00.00	451665.9986	1766039.7101
102	Y8REV	53+00.00	451566.1510	1766044.9268
103	Y8REV	54+00.00	451466.1726	1766043.8970
104	Y8REV	55+00.00	451366.4504	1766036.6575
105	Y8REV	56+00.00	451266.9265	1766026.9111
106	Y8REV	57+00.00	451167.2962	1766018.9485
107	Y8REV	58+00.00	451069.7936	1766008.5327
108	Y8REV	59+00.00	450985.6323	1766001.5154
109	Y8REV	60+00.00	450925.8191	1766170.9677
110	Y9SBL	0+00.00	456943.2046	1767816.4626
111	Y9SBL	0+50.00	456889.3026	1767792.5332
112	Y9SBL	1+00.00	456835.4007	1767768.6037
113	Y9SBL	1+50.00	456811.4988	1767744.6742
114	Y9SBL	2+00.00	456767.5968	1767720.7448
115	Y9SBL	2+50.00	456723.6949	1767696.8153
116	Y9SBL	3+00.00	456679.7962	1767672.8758
117	Y9SBL	3+50.00	456635.9794	1767648.7949
118	Y9SBL	4+00.00	456592.4015	1767624.2812
119	Y9SBL	4+50.00	456549.2308	1767599.0579
120	Y9SBL	5+00.00	456506.6462	1767572.8584
121	Y9SBL	5+50.00	456464.7582	1767545.5590
122	Y9SBL	6+00.00	456423.5993	1767517.1724
123	Y9SBL	6+50.00	456383.1975	1767487.7182
124	Y9SBL	7+00.00	456343.5806	1767457.2164
125	Y9SBL	7+50.00	456304.7757	1767425.6881
126	Y9SBL	8+00.00	456266.8094	1767393.1547
127	Y9SBL	8+50.00	456229.7078	1767359.6387
128	Y9SBL	9+00.00	456193.4962	1767325.1629
129	Y9SBL	9+50.00	456158.1995	1767289.7510
130	Y9SBL	10+00.00	456123.8408	1767253.4284
131	Y9SBL	10+50.00	456090.3572	1767216.2967
132	Y9SBL	11+00.00	456057.5344	1767178.5791
133	Y9SBL	11+50.00	456025.1328	1767140.4986
134	Y9SBL	12+00.00	455992.9068	1767102.2692
135	Y9SBL	12+50.00	455960.6951	1767064.0278
136	Y9SBL	13+00.00	455928.4833	1767025.7864
137	Y9SBL	13+50.00	455896.2716	1766987.5451
138	Y9SBL	14+00.00	455864.0598	1766949.3037
139	Y9SBL	14+50.00	455831.8481	1766911.0623
140	Y9SBL	15+00.00	455799.6363	1766872.8209
141	Y9SBL	15+50.00	455767.4246	1766834.5795
142	Y9SBL	16+00.00	455735.2101	1766796.3405
143	Y9SBL	16+50.00	455702.7824	1766758.2824
144	Y9SBL	17+00.00	455669.5887	1766720.8924
145	Y9SBL	17+50.00	455635.0740	1766684.7215
146	Y9SBL	18+00.00	455598.7451	1766650.3779
147	Y9SBL	18+50.00	455560.3713	1766618.3368
148	Y9SBL	19+00.00	455520.0711	1766588.7550
149	Y9SBL	19+50.00	455478.0019	1766561.7482
150	Y9SBL	20+00.00	455434.3280	1766537.4217
151	Y9SBL	20+50.00	455389.2200	1766515.8705
152	Y9SBL	21+00.00	455342.8540	1766497.1788
153	Y9SBL	21+50.00	455295.4110	1766481.4196
154	Y9SBL	22+00.00	455247.0764	1766468.6544
155	Y9SBL	22+50.00	455198.0388	1766458.9331
156	Y9SBL	23+00.00	455148.4898	1766452.2937
157	Y9SBL	23+50.00	455098.6229	1766448.7620
158	Y9SBL	24+00.00	455048.6327	1766448.3518
159	Y9SBL	24+50.00	454998.7145	1766451.0648
160	Y9SBL	25+00.00	454949.0632	1766456.8904
161	Y9SBL	25+50.00	454899.8727	1766465.8057
162	Y9SBL	26+00.00	454851.3284	1766477.7508

Point #	Chain	Station	Northing (Y)	Easting (X)
163	Y9SBL	26+50.00	454803.4842	1766492.2596
164	Y9SBL	27+00.00	454756.2190	1766508.5632
165	Y9SBL	27+50.00	454709.3242	1766525.9078
166	Y9SBL	28+00.00	454662.5515	1766543.5803
167	Y9SBL	28+50.00	454615.7821	1766561.2814
168	Y9SBL	29+00.00	454569.0126	1766578.9425
169	Y9SBL	29+50.00	454522.2432	1766596.6236
170	Y9SBL	30+00.00	454475.4738	1766614.3047
171	Y9SBL	30+50.00	454428.7044	1766631.9859
172	Y9SBL	31+00.00	454381.9350	1766649.6670
173	Y9SBL	31+50.00	454335.1656	1766667.3481
174	Y9SBL	32+00.00	454288.3937	1766685.0227
175	Y9SBL	32+50.00	454241.5615	1766702.5366
176	Y9SBL	33+00.00	454194.5595	1766719.5886
177	Y9SBL	33+50.00	454147.2847	1766735.8680
178	Y9SBL	34+00.00	454099.6517	1766751.0655
179	Y9SBL	34+50.00	454051.6392	1766765.0172
180	Y9SBL	35+00.00	454003.2779	1766777.7074
181	Y9SBL	35+50.00	453954.6009	1766789.1272
182	Y9SBL	36+00.00	453905.6417	1766799.2689
183	Y9SBL	36+50.00	453856.4338	1766808.1256
184	Y9SBL	37+00.00	453807.0110	1766815.6911
185	Y9SBL	37+50.00	453757.4070	1766821.9603
186	Y9SBL	38+00.00	453707.6559	1766826.9288
187	Y9SBL	38+50.00	453657.7918	1766830.5933
188	Y9SBL	39+00.00	453607.8488	1766832.9513
189	Y9SBL	39+50.00	453557.8613	1766834.0011
190	Y9SBL	40+00.00	453507.8634	1766833.7420
191	Y9SBL	40+50.00	453457.8894	1766832.1742
192	Y9SBL	41+00.00	453407.9736	1766829.2988
193	Y9LPA	0+00.00	454868.3243	1766791.8392
194	Y9LPA	0+50.00	454910.4939	1766818.7008
195	Y9LPA	1+00.00	454953.9218	1766843.4600
196	Y9LPA	1+50.00	454999.3693	1766864.2454
197	Y9LPA	2+00.00	455047.0983	1766878.9858
198	Y9LPA	2+50.00	455096.6025	1766885.4546
199	Y9LPA	3+00.00	455146.3333	1766881.4743
200	Y9LPA	3+50.00	455193.6216	1766865.6369
201	Y9LPA	4+00.00	455235.5216	1766838.5926
202	Y9LPA	4+50.00	455269.4282	1766802.0228
203	Y9LPA	5+00.00	455293.2332	1766758.2012
204	Y9LPA	5+50.00	455305.4565	1766709.8525
205	Y9LPA	6+00.00	455305.3382	1766659.9828
206	Y9LPA	6+50.00	455292.8855	1766611.6927
207	Y9LPA	7+00.00	455268.8728	1766567.9846
208	Y9LPA	7+50.00	455234.7931	1766531.5761
209	Y9LPA	8+00.00	455192.7838	1766504.6947
210	Y9LPA	8+50.00	455145.7685	1766487.9363
211	Y9LPA	9+00.00	455096.4679	1766479.9203
212	Y9LPA	9+50.00	455046.5115	1766478.5856
213	Y9LPA	10+00.00	454996.6167	1766481.6738
214	Y9LPA	10+50.00	454947.0209	1766487.9534
215	Y9LPA	11+00.00	454897.9187	1766497.3420
216	Y9LPA	11+50.00	454849.4893	1766509.7465
217	Y9LPA	12+00.00	454801.7515	1766524.6031
218	Y9LPA	12+50.00	454754.5649	1766541.1340
219	Y9LPA	13+00.00	454707.7087	1766558.5829
220	Y9LPA	13+50.00	454660.9386	1766576.2623
221	Y9LPA	14+00.00	454614.1692	1766593.9434
222	Y9LPA	14+50.00	454567.3998	1766611.6245
223	Y9LPA	15+00.00	454520.6304	1766629.3056
224	Y9LPA	15+50.00	454473.8609	1766646.9867
225	Y9LPA	16+00.00	454427.0915	1766664.6678
226	Y9LPA	16+50.00	454380.3221	1766682.3490
227	Y9LPA	17+00.00	454333.5527	1766700.0301
228	Y9LPA	17+50.00	454286.7833	1766717.7171
229	Y9LPA	18+00.00	454240.0109	1766735.3844
230	Y9LPA	18+50.00	454193.1750	1766752.8885
231	Y9LPA	19+00.00	454146.1678	1766769.9207
232	Y9LPA	19+50.00	454098.8809	1766786.1704
233	Y9LPA	20+00.00	454051.2356	1766801.3293
234	Y9LPA	20+50.00	454003.2115	1766815.2411
235	Y9LPA	21+00.00	453954.8396	1766827.8911
236	Y9LPA	21+50.00	453906.1532	1766839.2704
237	Y9LPA	22+00.00	453857.1856	1766849.3714
238	Y9LPA	22+50.00	453807.9703	1766858.1871
239	Y9LPA	23+00.00	453758.5412	1766865.7115
240	Y9LPA	23+50.00	453708.9320	1766871.9394
241	Y9LPA	24+00.00	453659.1768	1766876.8665
242	Y9RPC	0+00.00	453673.9429	1765925.3615

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

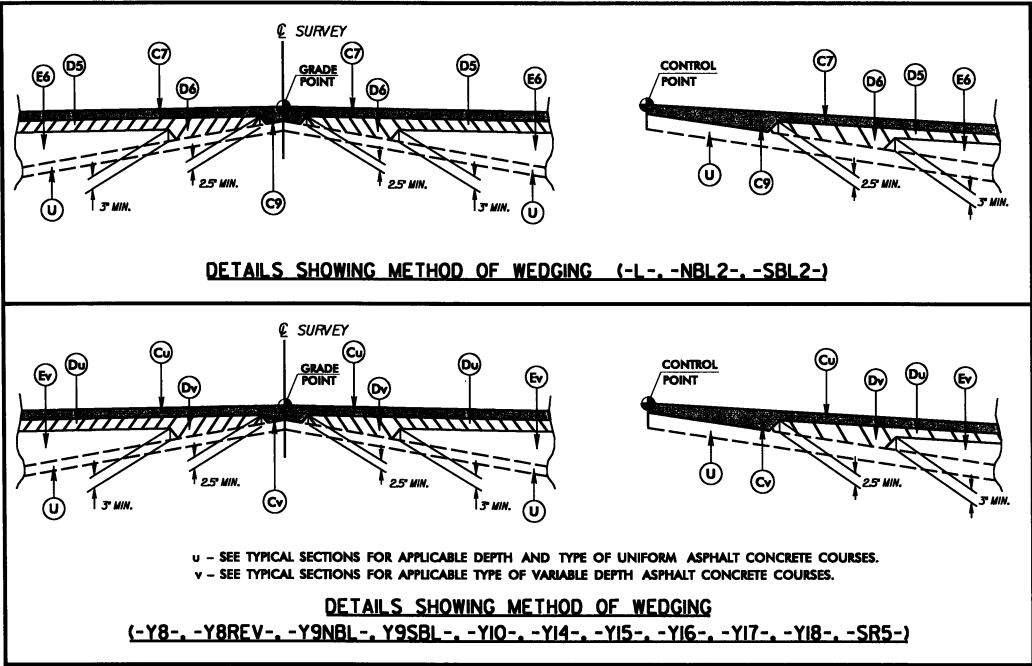
CENTERLINE COORDINATE LIST


Point #	Chain	Station	Northing (Y)	Easting (X)
403	Y10LPD	5+50.00	460916.3671	1769547.5253
404	Y10LPD	6+00.00	460937.7228	1769592.6431
405	Y10LPD	6+50.00	460949.6893	1769641.1042
406	Y10LPD	7+00.00	460951.7896	1769690.9767
407	Y10LPD	7+50.00	460943.9398	1769740.2723
408	Y10LPD	8+00.00	460926.4530	1769787.0258
409	Y10LPD	8+50.00	460900.0788	1769829.4112
410	Y10LPD	9+00.00	460866.5577	1769866.4357
411	Y10LPD	9+50.00	460827.9866	1769898.1970
412	Y10LPD	10+00.00	460786.0722	1769925.4229
413	Y10LPD	10+50.00	460742.1189	1769949.2406
414	Y10LPD	11+00.00	460697.1080	1769971.0082
415	Y10LPD	11+50.00	460651.7928	1769992.1396
416	Y10LPD	12+00.00	460606.4710	1770013.2567
417	Y10LPD	12+50.00	460561.1491	1770034.3738
418	Y10LPD	13+00.00	460515.8273	1770055.4909
419	Y10LPD	13+50.00	460470.5055	1770076.6080
420	Y10LPD	14+00.00	460425.1836	1770097.7251
421	Y10LPD	14+49.02	460380.7543	1770118.4263
422	SR2	11+00.00	450586.2394	1766589.8685
423	SR2	12+00.00	450629.3594	1766679.6256
424	SR2	13+00.00	450699.2439	1766750.5051
425	SR2	14+00.00	450788.4731	1766794.6173
426	SR2	15+00.00	450887.2242	1766807.1062
427	SR2	16+00.00	450984.6260	1766786.5967
428	SR2	17+00.00	451074.5223	1766742.8627
429	SR2	18+00.00	451163.8954	1766698.0022
430	SR2	19+00.00	451254.7357	1766656.3141
431	SR2	20+00.00	451350.0966	1766626.4497
432	SR2	21+00.00	451448.5514	1766609.3549
433	SR2	22+00.00	451548.3980	1766605.3250
434	SR2	23+00.00	451647.9102	1766614.4298
435	SR2	24+00.00	451745.6174	1766635.5524
436	SR2	25+00.00	451842.8096	1766659.0825
437	SR2	26+00.00	451940.0019	1766682.6126
438	SR2	27+00.00	452037.1941	1766706.1427
439	SR2	28+00.00	452134.3864	1766729.6728
440	SR2	29+00.00	452231.5787	1766753.2029
441	SR2	30+00.00	452328.7709	1766776.7329
442	SR2	31+00.00	452425.9632	1766800.2630
443	SR2	32+00.00	452523.1554	1766823.7931
444	SR2	33+00.00	452620.3477	1766847.3232
445	SR2	34+00.00	452717.5399	1766870.8533
446	SR2	35+00.00	452814.7322	1766894.3834
447	SR2	36+00.00	452911.9245	1766917.9135
448	SR2	37+00.00	453009.1167	1766941.4435
449	SR2	38+00.00	453106.3090	1766964.9736
450	SR2	39+00.00	453203.5012	1766988.5037
451	SR2	40+00.00	453300.6935	1767012.0338
452	SR2	41+00.00	453397.8858	1767035.5639
453	SR2	42+00.00	453495.0780	1767059.0940
454	SR2	43+00.00	453592.2703	1767082.6241
455	SR2	44+00.00	453689.4625	1767106.1541
456	SR2	45+00.00	453786.6548	1767129.6842
457	SR2	46+00.00	453883.8470	1767153.2143
458	SR2	47+00.00	453981.0393	1767176.7444
459	SR2	48+00.00	454078.2316	1767200.2745
460	SR2	49+00.00	454175.4238	1767223.8046
461	SR2	50+00.00	454272.6161	1767247.3347
462	SR2	51+00.00	454369.8083	1767270.8648
463	SR2	52+00.00	454467.0006	1767294.3948
464	SR2	53+00.00	454564.1929	1767317.9249
465	SR2	54+00.00	454661.3851	1767341.4550
466	SR2	55+00.00	454758.5774	1767364.9851
467	SR2	56+00.00	454855.7696	1767388.5152
468	SR2	57+00.00	454952.9619	1767412.0453
469	SR2	58+00.00	455050.1541	1767435.5754
470	SR2	59+00.00	455147.3464	1767459.1054
471	SR2	60+00.00	455244.5387	1767482.6355
472	SR2	61+00.00	455341.7309	1767506.1656
473	SR2	62+00.00	455438.9232	1767529.6957
474	SR2	63+00.00	455536.1154	1767553.2258
475	SR2	64+00.00	455633.3077	1767576.7559
476	SR2	65+00.00	455730.4999	1767600.2860
477	SR2	66+00.00	455827.6922	1767623.8160
478	SR2	67+00.00	455924.8812	1767647.3595
479	SR2	68+00.00	456021.8874	1767672.4193
480	SR2	69+00.00	456117.8045	1767700.0044
481	SR2	70+00.00	456213.1666	1767730.0958
482	SR2	71+00.00	456307.7084	1767762.6731
483	SR2	72+00.00	456401.3651	1767797.7139

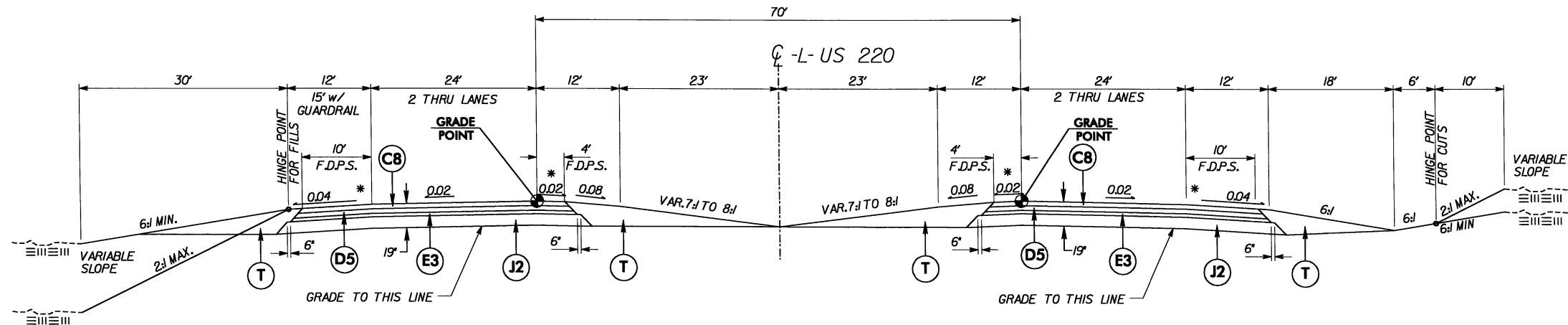
Point #	Chain	Station	Northing (Y)	Easting (X)
484	SR2	73+00.00	456494.0725	1767835.1941
485	SR2	74+00.00	456585.7671	1767875.0881
486	SR2	75+00.00	456676.7219	1767916.6476
487	SR2	76+00.00	456767.6504	1767958.2651
488	SR2	77+00.00	456858.5788	1767999.8825
489	SR2	78+00.00	456949.5073	1768041.5000
490	SR2	79+00.00	457040.4358	1768083.1175
491	SR2	80+00.00	457131.3642	1768124.7349
492	SR2	81+00.00	457222.2927	1768166.3524
493	SR2	82+00.00	457313.2212	1768207.9699
494	SR2	83+00.00	457404.1497	1768249.5873
495	SR2	84+00.00	457495.0781	1768291.2048
496	SR2	85+00.00	457586.0066	1768332.8223
497	SR2	86+00.00	457676.9351	1768374.4397
498	SR2	87+00.00	457767.8635	1768416.0572
499	SR2	88+00.00	457858.7920	1768457.6747
500	SR2	89+00.00	457949.7205	1768499.2921
501	SR2	90+00.00	458040.6489	1768540.9096
502	SR2	91+00.00	458131.5774	1768582.5270
503	SR2	92+00.00	458222.5059	1768624.1445
504	SR2	93+00.00	458313.4344	1768665.7620
505	SR2	94+00.00	458404.3628	1768707.3794
506	SR2	95+00.00	458495.2913	1768748.9969
507	SR2	96+00.00	458586.2198	1768790.6144
508	SR2	97+00.00	458677.1482	1768832.2318
509	SR2	98+00.00	458768.0767	1768873.8493
510	SR2	99+00.00	458859.0052	1768915.4668
511	SR2	100+00.00	458949.9337	1768957.0842
512	SR2	101+00.00	459040.8621	1768998.7017
513	SR2	102+00.00	459131.9661	1769039.9322
514	SR2	103+00.00	459223.5513	1769080.0824
515	SR2	104+00.00	459315.6107	1769119.1329
516	SR2	105+00.00	459408.1312	1769157.0789
517	SR2	106+00.00	459501.0992	1769193.9133
518	SR2	107+00.00	459594.2704	1769230.2331
519	SR2	108+00.00	459687.4382	1769266.5616
520	SR2	109+00.00	459777.7419	1769309.3497
521	SR2	110+00.00	459861.6513	1769353.6156
522	SR2	111+00.00	459937.7157	1769428.4214
523	SR2	112+00.00	460004.6201	1769502.6466
524	SR2	113+00.00	460061.2079	1769585.0081
525	SR2	114+00.00	460106.5007	1769674.0819
526	SR2	115+00.00	460139.7156	1769768.3281
527	SR2	116+00.00	460160.3438	1769866.1075
528	SR2	117+00.00	460175.7497	1769964.9137
529	SR2	118+00.00	460191.1556	1770063.7199
530	SR2	119+00.00	460206.5615	1770162.5260
531	SR2	120+00.00	460221.9674	1770261.3322
532	SR2	121+00.00	460237.3733	1770360.1384
533	SR2	122+00.00	460252.7792	1770458.9445
534	SR2	123+00.00	460278.0666	1770555.1072
535	SR2	124+00.00	460343.6884	1770629.1826
536	SR2	125+00.00	460436.7907	1770662.7291
537	SR2	126+00.00	460534.5786	1770647.5333
538	SR2	127+00.00	460619.0880	1770594.3997
539	SR4	10+00.00	459682.8761	1768265.6597
540	SR4	11+00.00	459774.3351	1768225.2571
541	SR4	12+00.00	459870.3226	1768197.6703
542	SR4	13+00.00	459969.6423	1768187.1707
543	SR4	14+00.00	460069.2763	1768194.0773
544	SR4	15+00.00	460166.1974	1768218.1803
545	SR4	16+00.00	460257.4605	1768258.7472
546	SR4	17+00.00	460340.2928	1768314.5456
547	SR4	18+00.00	460417.4711	1768378.1341
548	SR4	19+00.00	460494.6336	1768441.7419
549	SR4	20+00.00	460571.7960	1768505.3497
550	SR4	21+00.00	460648.9585	1768568.9579
551	SR4	22+00.00	460726.1209	1768632.5654
552	SR4	23+00.00	460803.2834	1768696.1732
553	SR4	24+00.00	460880.4458	1768759.7810
554	SR4	25+00.00	460957.6083	1768823.3888
555	SR4	26+00.00	461034.7708	1768886.9967
556	SR4	27+00.00	461111.9332	1768950.6045
557	SR4	28+00.00	461190.0924	1769012.9631
558	SR4	29+00.00	461272.2735	1769069.9019
559	SR4	30+00.00	461358.3086	1769120.8304
560	SR4	31+00.00	461447.7589	1769165.4889
561	SR4	32+00.00	461540.1684	1769203.6496
562	SR4	33+00.00	461635.0657	1769233.1180
563	SR4	34+00.00	461731.9668	1769259.7335
564	SR4	35+00.00	461830.3775	1769277.3707

Point #	Chain	Station	Northing (Y)	Easting (X)
565	SR4	36+00.00	461929.7814	1769288.1202
566	SR4	37+00.00	462029.4094	1769296.7384
567	SR4	38+00.00	462129.0373	1769305.3566
568	SR4	39+00.00	462228.6753	1769313.8566
569	SR4	40+00.00	462328.3927	1769321.3619
570	SR4	41+00.00	462428.1914	1769327.6936
571	SR4	42+00.00	462528.0577	1769332.8515
572	SR4	43+00.00	462627.9513	1769337.4645
573	SR4	44+00.00	462727.8448	1769342.0775
574	SR4	45+00.00	462827.7384	1769346.6905
575	SR4	46+00.00	462927.6319	1769351.3035
576	SR4	47+00.00	463027.5255	1769355.9166
577	SR4	48+00.00	463127.4190	1769360.5296
578	SR4	49+00.00	463227.3126	1769365.1426
579	SR4	50+00.00	463327.2061	1769369.7556
580	SR4	51+00.00	463427.0996	1769374.3686
581	SR4	52+00.00	463526.9932	1769378.9816
582	SR4	53+00.00	463626.8867	1769383.5946
583	SR4	54+00.00	463726.7803	1769388.2076
584	SR4	55+00.00	463826.6738	1769392.8206
585	SR4	56+00.00	463926.5674	1769397.4336
586	SR4	57+00.00	464026.4609	1769402.0466
587	SR4	58+00.00	464126.3545	1769406.6596
588	SR4	59+00.00	464226.2480	1769411.2726
589	SR4	60+00.00	464326.1415	1769415.8856
590	SR4	61+00.00	464426.0351	1769420.4986
591	SR4	62+00.00	464525.9286	1769425.1116
592	SR4	63+00.00	464625.8222	1769429.7246
593	SR4	64+00.00	464725.7157	1769434.3376
594	SR4	65+00.00	464825.6093	1769438.9506
595	SR4	66+00.00	464925.5028	1769443.5636
596	SR4	67+00.00	465025.3964	1769448.1766
597	SR4	68+00.00	465125.2899	1769452.7896
598	SR4	69+00.00	465225.1834	1769457.4026
599	SR4	70+00.00	465325.0770	1769462.0156
600	SR4	71+00.00	465424.9705	1769466.6286
601	SR4	72+00.00	465524.8641	1769471.2416
602	SR4	73+00.00	465624.7576	1769475.8546
603	SR4	74+00.00	465724.6512	1769480.4676
604	SR4	75+00.00	465824.5447	1769485.0806
605	SR4	76+00.00	465924.4383	1769489.6937
606	SR4	77+00.00	466024.3318	1769494.3067
607	SR4	78+00.00	466124.2253	1769498.9197
608	SR4	79+00.00	466224.1189	1769503.5327
609	SR4	80+00.00	466324.0124	1769508.1457
610	SR4	81+00.00	466423.9060	1769512.7587
611	SR4	82+00.00	466523.7995	1769517.3717
612	SR4	83+00.00	466623.6931	1769521.9847
613	SR4	84+00.00	466723.5866	1769526.5977
614	SR4	85+00.00	466823.4781	1769531.2966
615	SR4	86+00.00	466923.3371	1769536.5456
616	SR4	87+00.00	467023.1656	1769542.4138
617	SR4	88+00.00	467122.9548	1769548.9009
618	SR4	89+00.00	467222.7018	1769556.0068
619	SR4	90+00.00	467322.4029	1769563.7311
620	SR4	91+00.00	467422.0542	1769572.0735
621	SR4	92+00.00	467521.6518	1769581.0338
622	SR4	93+00.00	467621.1919	1769590.6116
623	SR4	94+00.00	467720.6749	1769600.7658
624	SR4	95+00.00	467820.1452	1769611.0450
625	SR4	96+00.00	467919.6155	1769621.3243
626	SR4	97+00.00	468019.0858	1769631.6035
627	SR4	98+00.00	468118.5560	1769641.8828
628	SR4	99+00.00	468218.0263	1769652.1621
629	SR4	100+00.00	468317.4966	1769662.4413
630	SR4	101+00.00	468416.9669	1769672.7206
631	SR4	102+00.00	468516.4390	1769682.9817
632	SR4	103+00.00	468616.2544	1769688.5579
633	SR4	104+00.00	468716.1876	1769685.8064
634	SR4	105+00.00	468815.5450	1769674.7463
635	SR4	106+00.00	468913.6370	1769655.4544
636	SR4	107+00.00	469009.7828	1769628.0646
637	SR4	108+00.00	469103.3151	1769592.7669
638	SR4	109+00.00	469193.5847	1769549.8064
639	SR4	110+00.00	469279.9652	1769499.4812
640	SR4	111+00.00	469363.3804	1769444.3292
641	SR4	112+00.00	469446.7043	1769389.0379
642	SR4	113+00.00	469530.0282	1769333.7466
643	SR4	114+00.00	469613.3520	1769278.4552
644	SR4	115+00.00	469696.6759	1769223.1639
645	SR4	116+00.00	469779.9998	1769167.8726
646	SR4	117+00.00	469863.3237	1769112.5812

PAVEMENT SCHEDULE			
C1	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 165 LBS. PER SQ. YD.	E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
C2	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 TO EXCEED 1.5" IN DEPTH.	E2	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" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
C3	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	E3	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
C4	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 TO EXCEED 2" IN DEPTH.	E4	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
C5	PROP. APPROX. 3" 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. 7" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C6	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 TO EXCEED 2" IN DEPTH.	E6	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" IN DEPTH OR GREATER THAN 5.5" IN DEPTH.
C7	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S12.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.	J1	PROP. 6" AGGREGATE BASE COURSE.
C8	PROP. APPROX. 4" ASPHALT CONCRETE SURFACE COURSE, TYPE S12.5C, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	J2	PROP. 8" AGGREGATE BASE COURSE.
C9	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S12.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R1	2'-6" CONCRETE CURB & GUTTER
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R2	5" MONOLITHIC CONCRETE ISLAND
D3	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE 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" IN DEPTH.	U	EXISTING PAVEMENT
D5	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL THIS SHEET)
D6	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE 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" IN DEPTH.	NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.	



PROJECT REFERENCE NO. R-3421C		SHEET NO. 2	
ROADWAY DESIGN ENGINEER		PAVEMENT DESIGN ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>			
<div>MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221</div>			



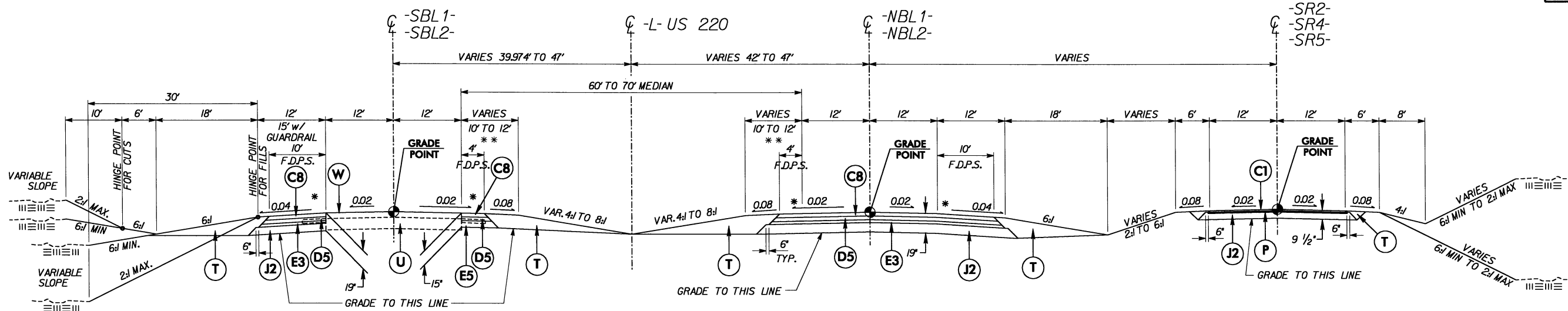
TYPICAL SECTION #1

USE TYPICAL SECTION NO. 1:

FROM -L- STA. 355+00.00 LT TO STA. 403+27.02 LT
FROM -L- STA. 355+00.00 RT TO STA. 401+75.70 RT

NOTES:

- * RUMBLE STRIPS REQUIRED. SEE ROADWAY STD. 665.01
- ** TRANSITION 12' MEDIAN SHOULDER TO 10' MEDIAN SHOULDER:
FROM -SBL1- STA. 403+27.02 TO STA. 404+27.02
FROM -NBL1- STA. 401+75.70 TO STA. 402+75.70
- REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12' WEDGING. THESE AREAS INCLUDE US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.
- USE SERVICE ROAD TYPICAL ON RIGHT OR LEFT SIDE OF US 220 AS NECESSARY.
- THE NEW PAVEMENT AND WEDGING / WIDENING PAVEMENT TYPICALS CAN BE USED ON EITHER SIDE OF THE TYPICAL SECTION AS SHOWN IN THE STATION RANGE OR THE CHART.
- SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINE AND SERVICE ROADS.



TYPICAL SECTION #2

USE TYPICAL SECTION NO. 2:

FROM -SBL1- STA. 403+27.02 TO STA. 424+96.03 (NEW PAVEMENT)
FROM -NBL1- STA. 401+75.70 TO STA. 425+05.17 (NEW PAVEMENT)
FROM -SBL2- STA. 524+12.85 TO STA. 551+62.52 (SEE CHART)
FROM -NBL2- STA. 523+98.40 TO STA. 551+57.72 (SEE CHART)
FROM -SR2- STA. 69+03.61 TO STA. 79+00.61
FROM -SR4- STA. 84+12.85 TO STA. 103+55.00
FROM -SR5- STA. 83+98.40 TO STA. 111+53.08

FOR NARROW WIDENING LESS THAN 6', USE 15' ASPHALT PAVEMENT DESIGN,
OTHERWISE USE 19' ASPHALT/ABC PAVEMENT DESIGN.

-SBL2- (-L- LEFT)

NEW PAVEMENT	WEDGING / WIDENING
524+12.85 TO 532+00.00	532+00.00 TO 534+25.00
534+25.00 TO 551+62.52	

-NBL2- (-L- RIGHT)

NEW PAVEMENT	WEDGING / WIDENING
523+98.40 TO 533+45.00	533+45.00 TO 535+50.00
535+50.00 TO 541+95.00	541+95.00 TO 551+57.72

PROJECT REFERENCE NO.
R-3421C

ROADWAY DESIGN ENGINEER

SHEET NO.
2-A

PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS

DO NOT USE FOR CONSTRUCTION

MA Engineering

CONSULTANTS, INC.

598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PAVEMENT SCHEDULE

C1	1.5" SF9.5A
C3	3.0" S9.5B
C5	3.0" S9.5C
C7	2.0" S12.5C
C8	4.0" S12.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D5	4.0" I19.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

PROJECT REFERENCE NO.
R-3421C

ROADWAY DESIGN ENGINEER

SHEET NO.
2-B

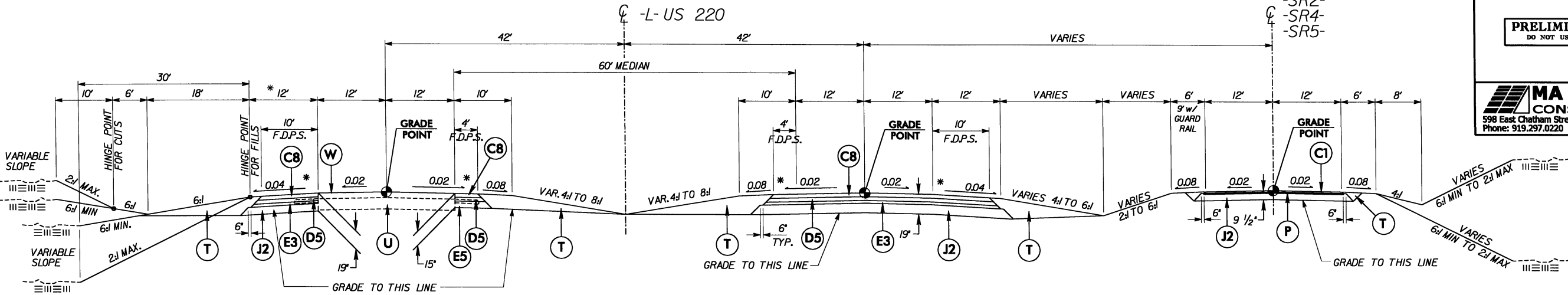
PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PAVEMENT SCHEDULE	
C1	1.5" SP9.5A
C3	3.0" S9.5B
C5	3.0" S9.5C
C7	2.0" S12.5C
C8	4.0" S12.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D5	4.0" I19.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION #3

USE TYPICAL SECTION NO. 3:
FROM -L- STA. 425+00 LT TO STA. 524+12.85 LT (SEE CHART)
FROM -L- STA. 425+00 RT TO STA. 523+98.40 RT (SEE CHART)
FROM -SR2- STA. 79+00.61 TO STA. 110+41.00
FROM -SR4- STA. 33+50.00 TO STA. 84+12.85
FROM -SR5- STA. 35+84.00 TO STA. 83+98.40

FOR NARROW WIDENING LESS THAN 6', USE 15' ASPHALT PAVEMENT DESIGN,
OTHERWISE USE 19' ASPHALT/ABC PAVEMENT DESIGN.

-L- LEFT (SOUTHBOUND LANES)		-L- RIGHT (NORTHBOUND LANES)	
NEW PAVEMENT	WEDGING / WIDENING	NEW PAVEMENT	WEDGING / WIDENING
425+00.00 TO 438+50.00	438+50.00 TO 452+50.00	425+00.00 TO 438+00.00	438+00.00 TO 453+50.00
452+50.00 TO 466+50.00	466+50.00 TO 505+50.00	453+50.00 TO 464+50.00	464+50.00 TO 469+50.00
505+50.00 TO 515+00.00	515+00.00 TO 523+00.00	469+50.00 TO 474+50.00	474+50.00 TO 492+50.00
523+00.00 TO 524+12.85		492+50.00 TO 515+00.00	515+00.00 TO 522+00.00
		522+00.00 TO 523+98.40	

NOTES:

* RUMBLE STRIPS REQUIRED. SEE ROADWAY STD. 665.01

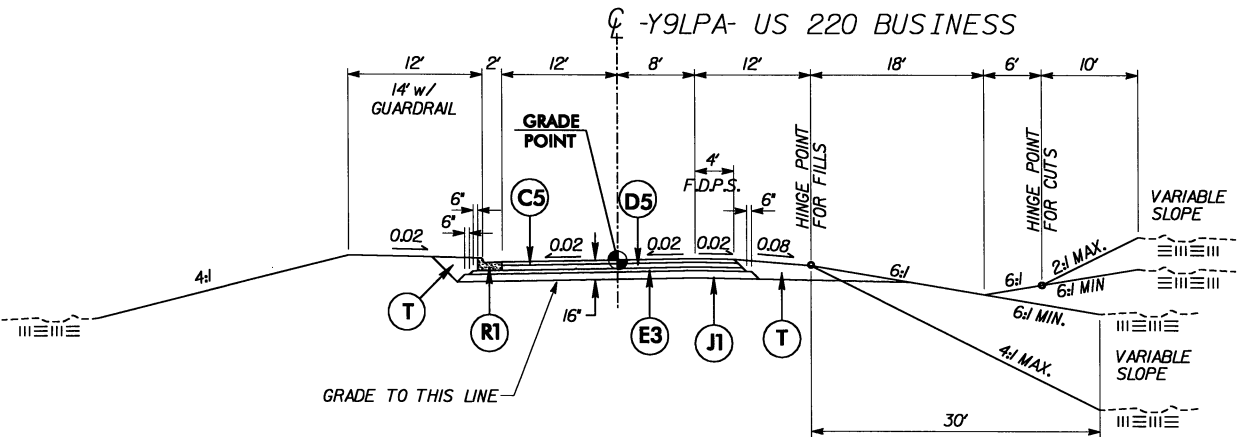
** TRANSITION 12' MEDIAN SHOULDER TO 10' MEDIAN SHOULDER:
FROM -SBLI- STA. 403+27.02 TO STA. 404+27.02
FROM -NBLI- STA. 401+75.70 TO STA. 402+75.70

REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

USE SERVICE ROAD TYPICAL ON RIGHT OR LEFT SIDE OF US 220 AS NECESSARY.

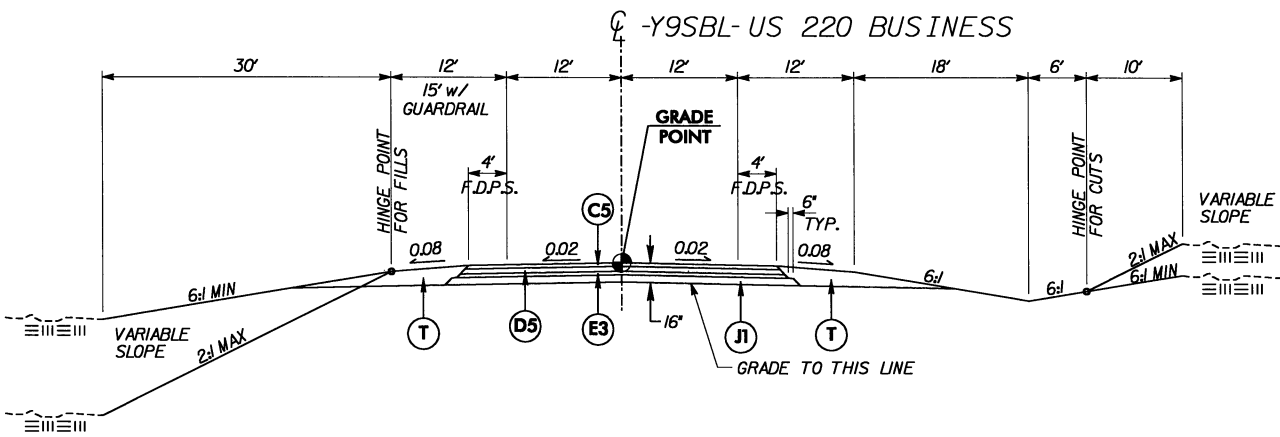
THE NEW PAVEMENT AND WEDGING / WIDENING PAVEMENT TYPICALS CAN BE USED ON EITHER SIDE OF THE TYPICAL SECTION AS SHOWN IN THE STATION RANGE OR THE CHART.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINE AND SERVICE ROADS.



TYPICAL SECTION #4

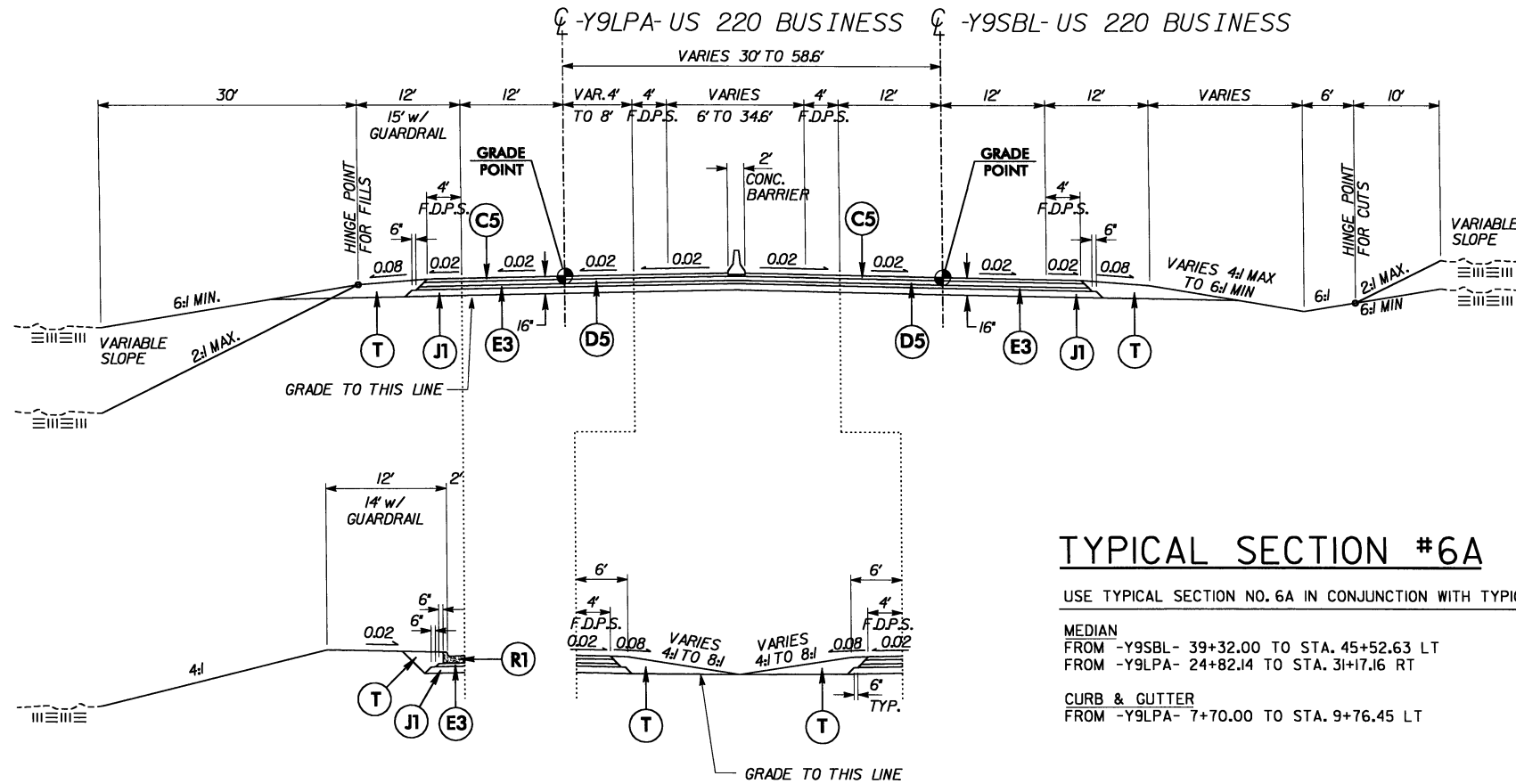
USE TYPICAL SECTION NO. 4:
FROM -Y9LPA- STA. 2+31.65 TO STA. 7+70.00



TYPICAL SECTION #5

USE TYPICAL SECTION NO. 5:
FROM -Y9SBL- STA. 5+31.17 TO STA. 22+10.00

PROJECT REFERENCE NO. R-3421C		SHEET NO. 2-C	
ROADWAY DESIGN ENGINEER		PAVEMENT DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



TYPICAL SECTION #6

USE TYPICAL SECTION NO. 6:

FROM -Y9SBL- STA. 22+10.00 TO STA. 28+40.55 (BEGIN BRIDGE)
 FROM -Y9SBL- STA. 30+96.55 (END BRIDGE) TO STA. 45+52.63
 FROM -Y9LPA- STA. 7+70.00 TO STA. 13+58.70 (BEGIN BRIDGE)
 FROM -Y9LPA- STA. 16+14.70 (END BRIDGE) TO STA. 31+17.16

TYPICAL SECTION #6A

USE TYPICAL SECTION NO. 6A IN CONJUNCTION WITH TYPICAL SECTION #6:

MEDIAN
 FROM -Y9SBL- 39+32.00 TO STA. 45+52.63 LT
 FROM -Y9LPA- 24+82.14 TO STA. 31+17.16 RT

CURB & GUTTER
 FROM -Y9LPA- 7+70.00 TO STA. 9+76.45 LT

NOTES:

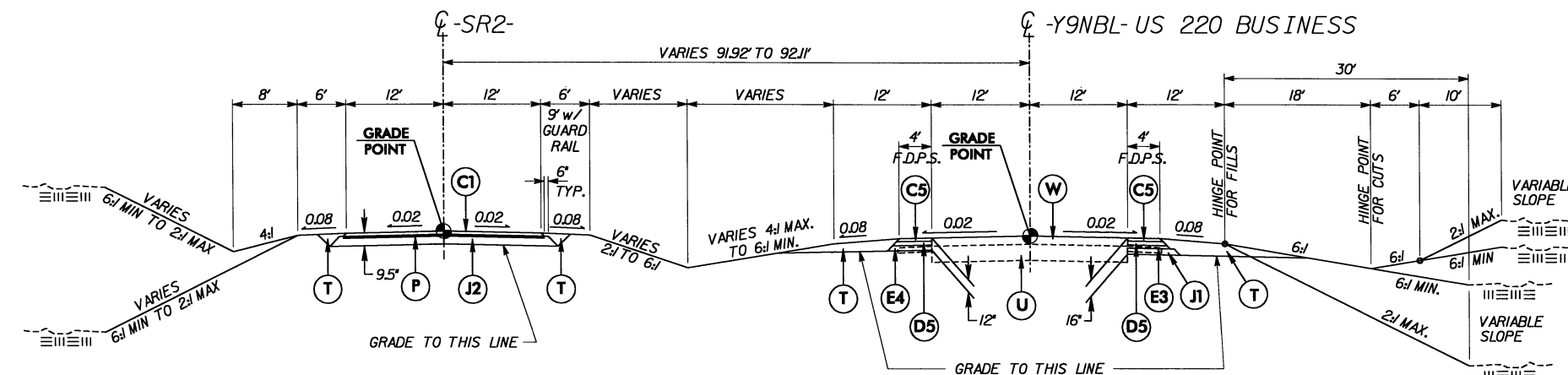
REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINE AND SERVICE ROADS.

PAVEMENT SCHEDULE

C1	1.5" SP9.5A
C3	3.0" S9.5B
C5	3.0" S9.5C
C7	2.0" S12.5C
C8	4.0" S12.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D5	4.0" I19.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION #7

USE TYPICAL SECTION NO. 7:

FROM -Y9NBL- STA. 4+90.74 TO STA. 37+89.86
 FROM -SR2- STA. 36+10.15 TO STA. 69+03.61

SEE TYPICAL SECTION #5 FOR 16" FULL DEPTH PAVEMENT DESIGN AND PLACE NEW PAVEMENT: FROM -Y9NBL- 4+90.74 TO 12+30.00.

FOR NARROW WIDENING LESS THAN 6', USE 12" ASPHALT PAVEMENT DESIGN, OTHERWISE USE 16" ASPHALT/ABC PAVEMENT DESIGN.

PROJECT REFERENCE NO.
R-3421C

ROADWAY DESIGN ENGINEER

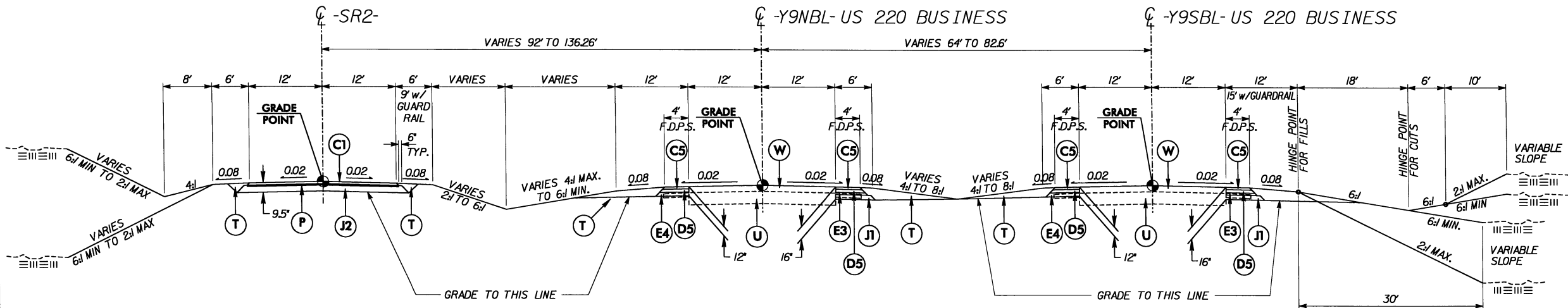
SHEET NO.
2-D

PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PAVEMENT SCHEDULE	
C1	1.5" SF9.5A
C3	3.0" S9.5B
C5	3.0" S9.5C
C7	2.0" S12.5C
C8	4.0" S12.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D5	4.0" I19.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.	



TYPICAL SECTION #8

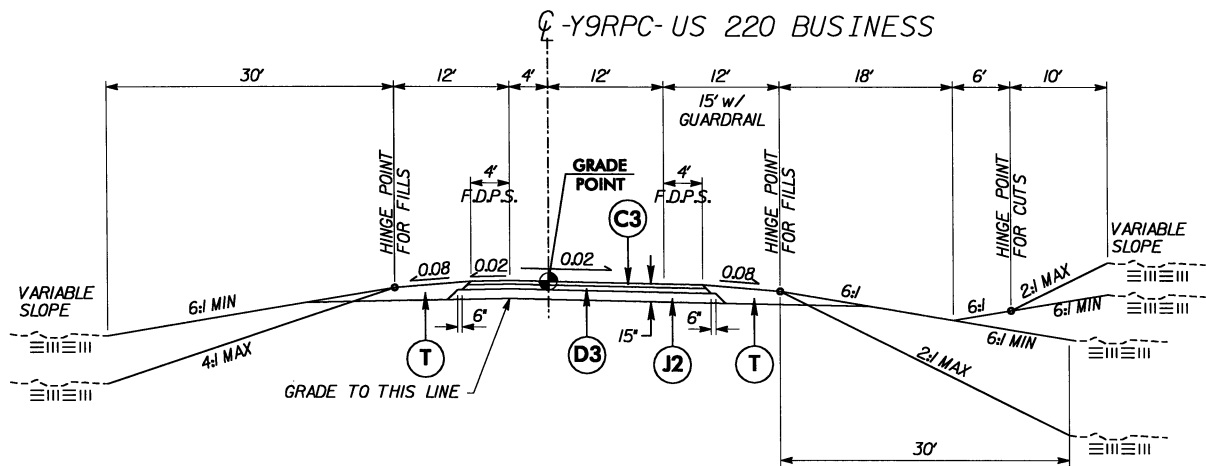
USE TYPICAL SECTION NO. 8:
FROM -Y9SBL- STA. 45+52.63 TO STA. 72+60.00
FROM -Y9NBL- STA. 37+89.86 TO STA. 65+50.00
FROM -SR2- STA. 21+15.00 TO STA. 36+10.15

FOR NARROW WIDENING LESS THAN 6', USE 12" ASPHALT PAVEMENT DESIGN,
OTHERWISE USE 16" ASPHALT/ABC PAVEMENT DESIGN.

NOTES:

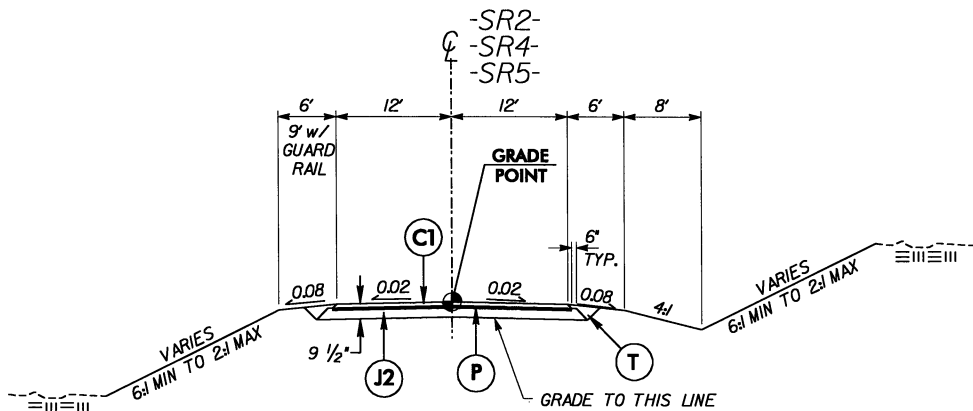
REMOVE ANY PARTIAL DEPTH PAVED SHOULDERS THAT ARE TO BECOME FUTURE TRAVEL LANES EXCEPT IN AREAS REQUIRING AT LEAST 12" WEDGING. THESE AREAS INCLUDE US 220 AND Y9NBL BETWEEN STATIONS 13+00 AND 45+00.

SEE CROSS SECTIONS FOR SLOPE INTERACTIONS BETWEEN MAINLINE AND SERVICE ROADS.



TYPICAL SECTION #9

USE TYPICAL SECTION NO. 9:
FROM -Y9RPC- STA. 4+82.38 TO STA. 10+45.87



TYPICAL SECTION #10

USE TYPICAL SECTION NO. 10:
FROM -SR2- STA. 10+81.82 TO STA. 21+15.00
FROM -SR2- STA. 110+41.00 TO STA. 111+83.00
FROM -SR2- STA. 115+26.00 TO STA. 127+06.94

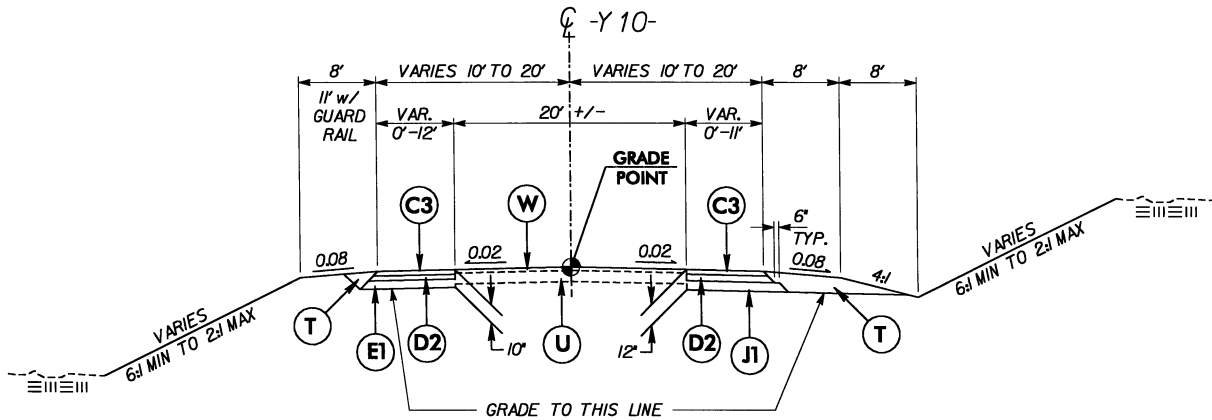
USE IN CONJUNCTION WITH -Y10- (SEE TYPICAL 12):
FROM -SR2- STA. 111+83.00 TO STA. 115+26.00

FROM -SR4- STA. 9+81.25 TO STA. 21+84.00
FROM -SR4- STA. 103+55.00 TO STA. 128+50.90

USE IN CONJUNCTION WITH -Y10RPA- (SEE TYPICAL 13):
FROM -SR4- STA. 21+84.00 TO STA. 33+50.00

FROM -SR5- STA. 19+16.16 TO STA. 26+40.00
FROM -SR5- STA. 111+53.08 TO STA. 126+80.00

USE IN CONJUNCTION WITH -Y10RPD- (SEE TYPICAL 14):
FROM -SR5- STA. 26+40.00 TO STA. 35+84.00

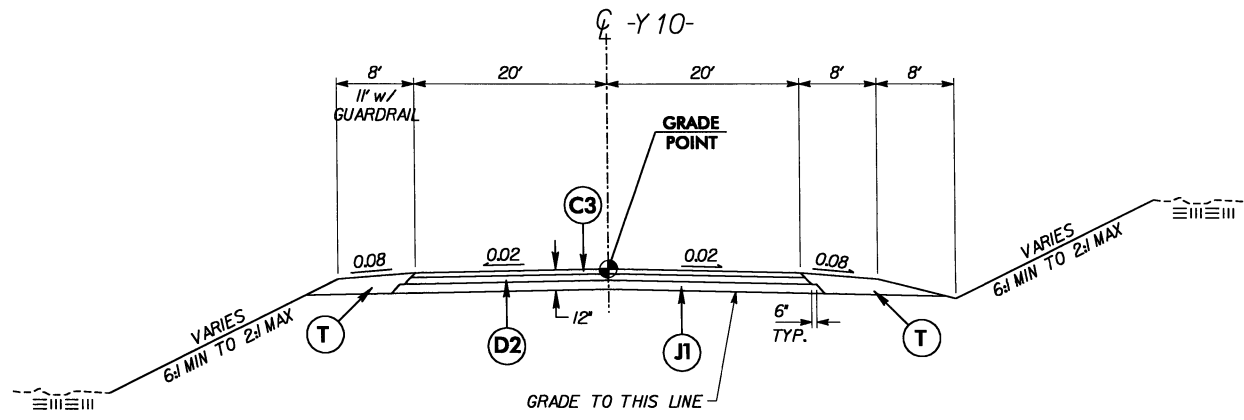


TYPICAL SECTION #11

USE TYPICAL SECTION NO. 11:

FROM -Y10- STA. 13+00.00 TO STA. 20+50.00
FROM -Y10- STA. 44+00.00 TO STA. 56+50.00

FOR NARROW WIDENING LESS THAN 6', USE 10' ASPHALT PAVEMENT DESIGN,
OTHERWISE USE 12' ASPHALT/ABC PAVEMENT DESIGN.



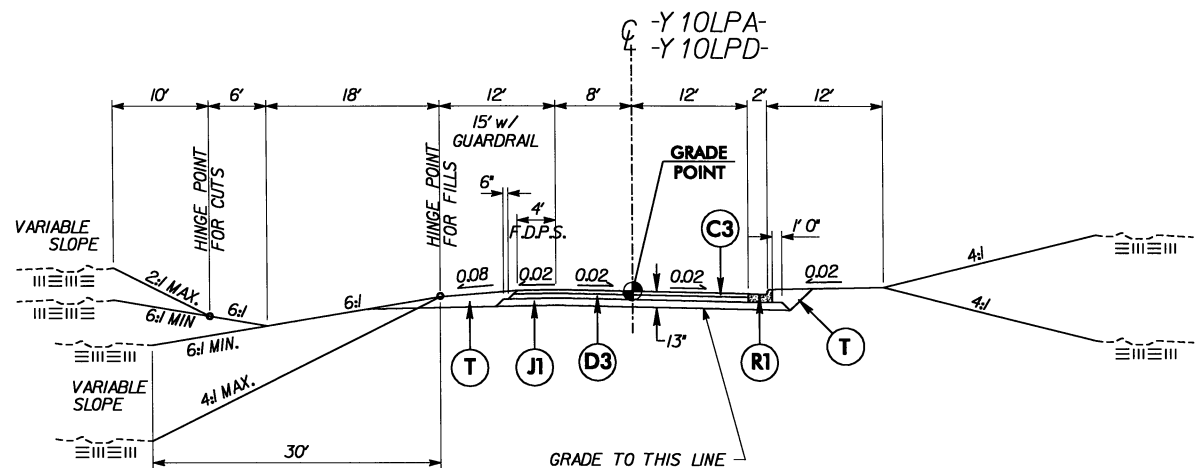
TYPICAL SECTION #12

USE TYPICAL SECTION NO. 12:

FROM -Y10- STA. 20+50.00 TO STA. 31+73.10 (BEGIN BRIDGE)
FROM -Y10- STA. 34+41.10 (END BRIDGE) TO STA. 44+00.00

USE TYPICAL SECTION NO. 12 IN CONJUNCTION WITH TYPICAL SECTION NO. 10 AND
SEE CROSS SECTIONS FOR SLOPE INTERACTION BETWEEN TYPICALS:

FROM -Y10- STA. 35+44.00 & -SR2- STA. 111+83.00 TO -Y10 STA. 38+99.00 & -SR2- STA. 115+26.00



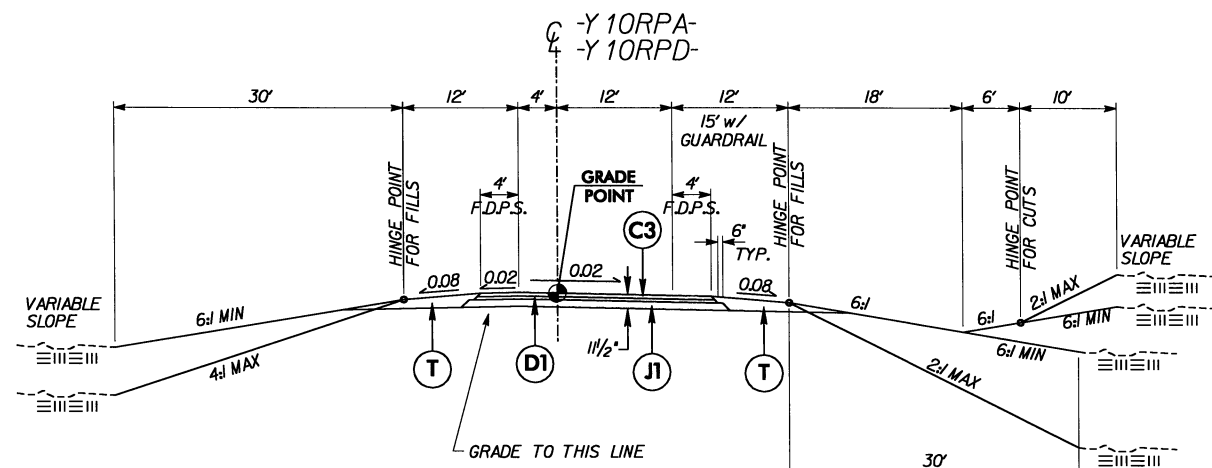
TYPICAL SECTION #13

USE TYPICAL SECTION NO. 13:

FROM -Y10LPA- STA. 2+50.53 TO STA. 11+95.22 (MIRROR TYPICAL)
FROM -Y10LPD- STA. 4+27.72 TO STA. 11+19.21

USE TYPICAL SECTION NO. 13 IN CONJUNCTION WITH TYPICAL SECTION NO. 10 AND
SEE CROSS SECTIONS FOR SLOPE INTERACTION BETWEEN TYPICALS:

FROM -Y10RPA- STA. 4+66.30 & -SR4- STA. 33+50.00 TO -Y10RPA- STA. 16+55.00 & -SR4- STA. 21+84.00



TYPICAL SECTION #14

USE TYPICAL SECTION NO. 14:

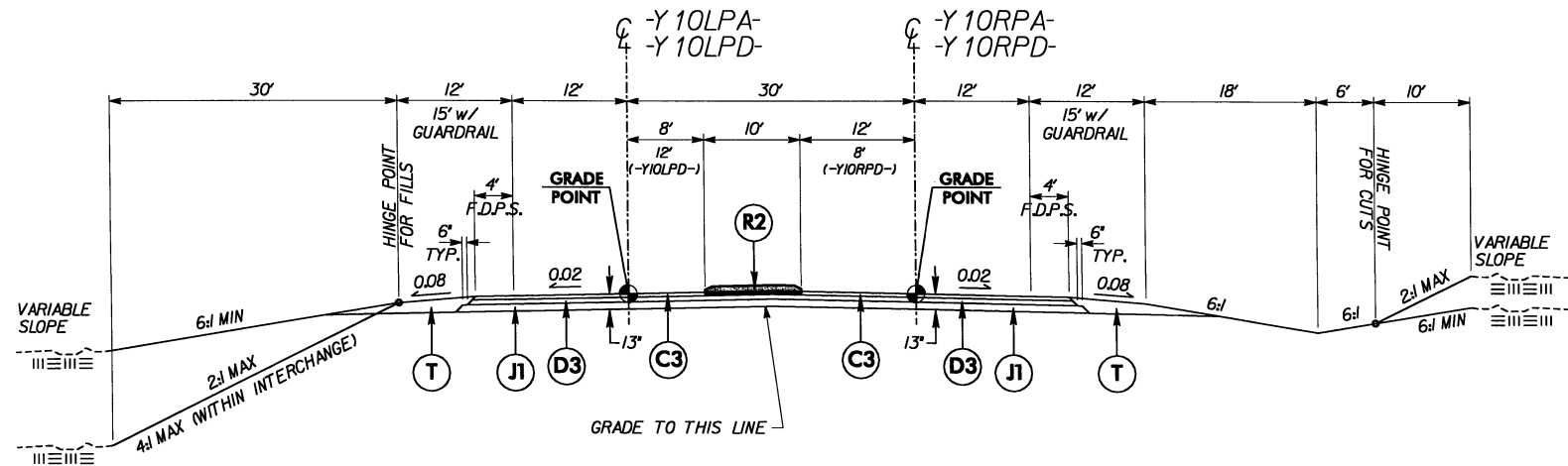
FROM -Y10RPA- STA. 4+66.30 TO STA. 22+53.87
FROM -Y10RPD- STA. 2+91.64 TO STA. 17+10.43 (MIRROR TYPICAL)

USE TYPICAL SECTION NO. 14 IN CONJUNCTION WITH TYPICAL SECTION NO. 10 AND
SEE CROSS SECTIONS FOR SLOPE INTERACTION BETWEEN TYPICALS:

FROM -Y10RPD- STA. 3+87.10 & -SR5- STA. 35+84.00 TO -Y10RPD- STA. 13+61.00 & -SR5- STA. 26+40.00

PROJECT REFERENCE NO. R-3421C	SHEET NO. 2-E
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

PAVEMENT SCHEDULE	
C1	1.5" SF9.5A
C3	3.0" \$9.5B
C5	3.0" \$9.5C
C7	2.0" \$12.5C
C8	4.0" \$12.5C
D1	2.5" 119.0B
D2	3.0" 119.0B
D3	4.0" 119.0B
D5	4.0" 119.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.	

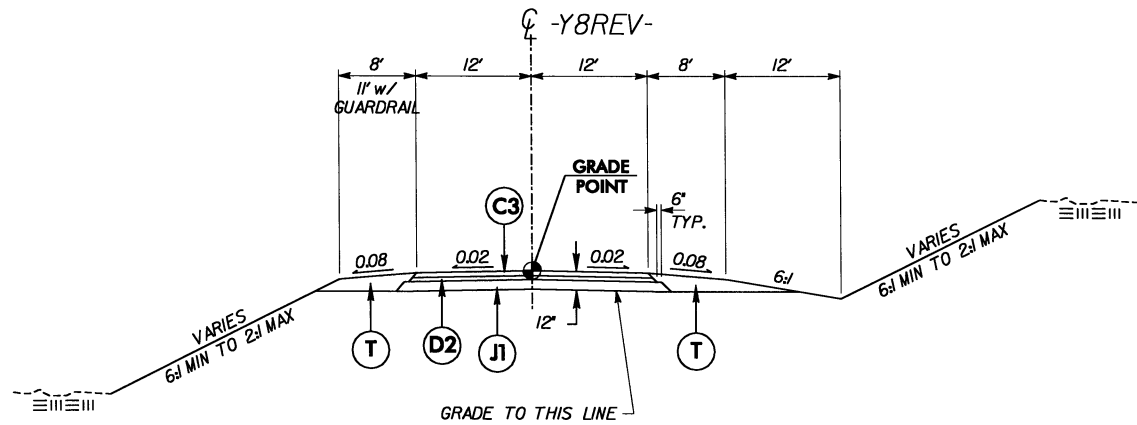


TYPICAL SECTION #15

USE TYPICAL SECTION NO.15:

FROM -Y10RPA- STA. 22+53.87 TO STA. 24+45.27
FROM -Y10LPA- STA. 11+95.22 TO STA. 13+95.15
FROM -Y10RPD- STA. 17+10.43 TO STA. 19+95.51
FROM -Y10LPD- STA. 11+19.21 TO STA. 14+29.01

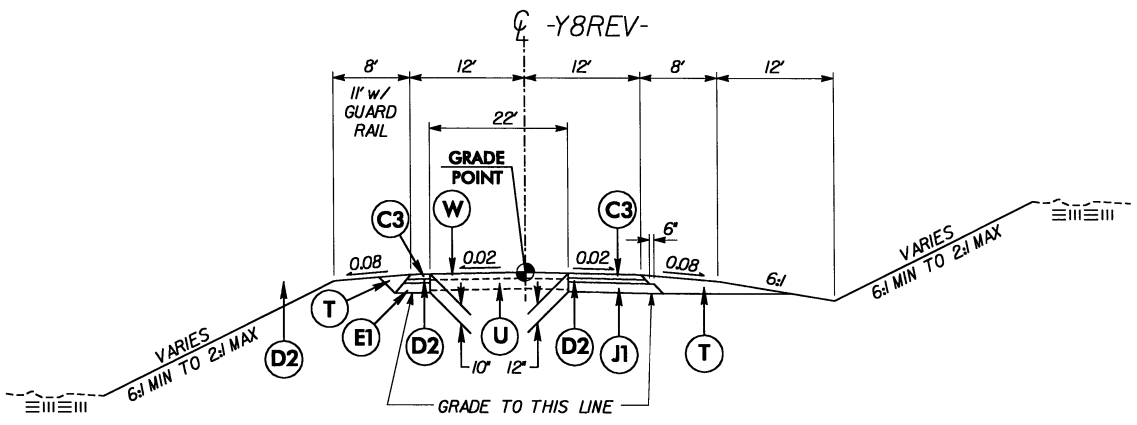
(MIRROR TYPICAL FOR -Y10RPD- & -Y10LPD-)



TYPICAL SECTION #16

USE TYPICAL SECTION NO. 16:

FROM -Y8REV- STA. 18+00.00 TO STA. 33+03.99 (BEGIN BRIDGE)
FROM -Y8REV- STA. 35+16.99 (END BRIDGE) TO STA. 60+60.39



TYPICAL SECTION #17

USE TYPICAL SECTION NO. 17:

FROM -Y8REV- STA. 13+25.00 TO STA. 18+00.00

FOR NARROW WIDENING LESS THAN 6', USE 10' ASPHALT PAVEMENT DESIGN,
OTHERWISE USE 12' ASPHALT/ABC PAVEMENT DESIGN.

PROJECT REFERENCE NO. R-3421C		SHEET NO. 2-F	
ROADWAY DESIGN ENGINEER		PAVEMENT DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

PAVEMENT SCHEDULE

C1	1.5" SF9.5A
C3	3.0" S9.5B
C5	3.0" S9.5C
C7	2.0" S12.5C
C8	4.0" S12.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D5	4.0" I19.0C
E1	4.0" B25.0B
E3	3.0" B25.0C
E4	5.0" B25.0C
E5	7.0" B25.0C
J1	6" ABC
J2	8" ABC
P	0.35 PRIME COAT
R1	2'-6" CURB & GUTTER
R2	5" MONOLITHIC CONCRETE ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING (SEE SHT. 2)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

PROJECT REFERENCE NO.
R-3421C


SHEET NO.
2-G

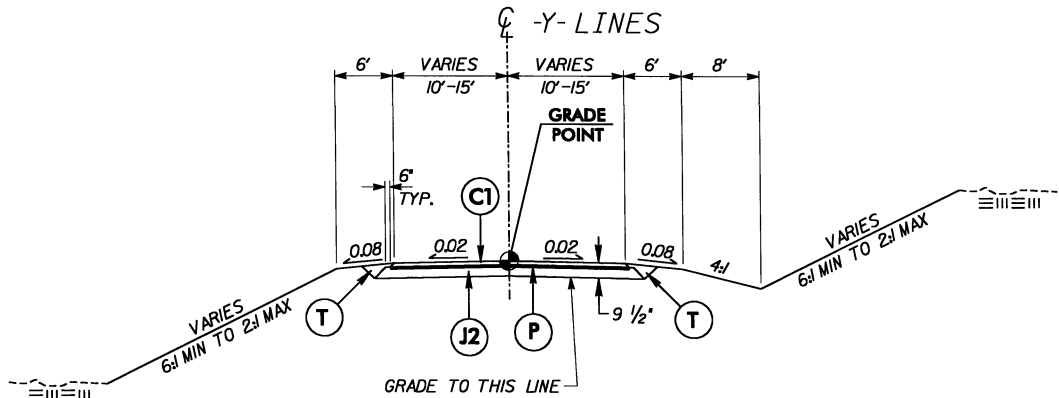
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS

DO NOT USE FOR CONSTRUCTION

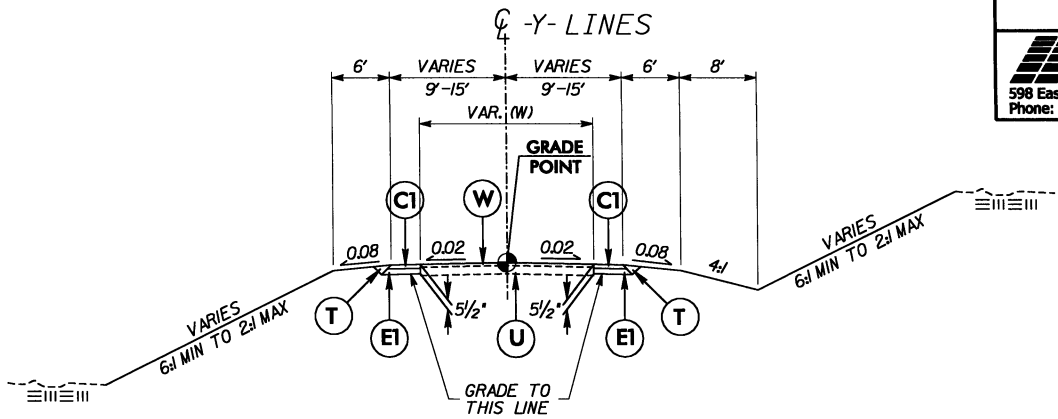
**MA Engineering CONSULTANTS, INC.**
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



TYPICAL SECTION #18

USE TYPICAL SECTION NO. 18:

FROM -Y8- STA. 10+12.00 TO STA. 15+75.00
FROM -Y16- STA. 10+12.00 TO STA. 11+00.00
FROM -Y18- STA. 10+12.37 TO STA. 11+50.00
FROM -Y19- STA. 10+12.00 TO STA. 12+55.00



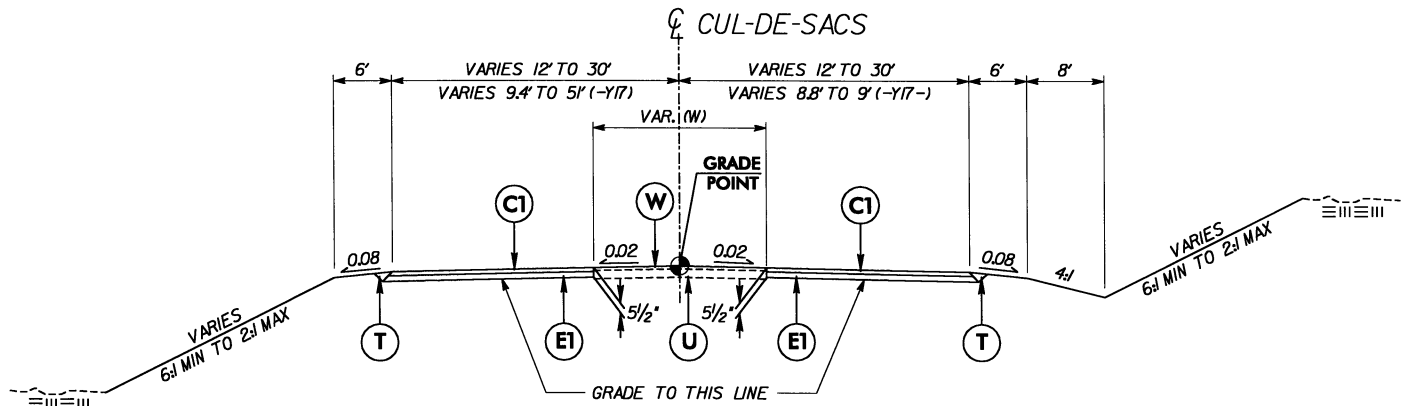
TYPICAL SECTION #19

USE TYPICAL SECTION NO. 19:

FROM -SR5- STA. 126+80.00 TO STA. 128+40.00 (W=21.7' TO 44.2')
FROM -Y8- STA. 15+75.00 TO STA. 18+17.15 (W=22')
FROM -Y14- STA. 10+12.00 TO STA. 13+25.00 (W=19')
FROM -Y15- STA. 10+75.00 TO STA. 16+57.15 (W=18')
FROM -Y16- STA. 11+00.00 TO STA. 12+50.00 (W=22')
FROM -Y18- STA. 11+50.00 TO STA. 12+00.00 (W=23')

PAVEMENT SCHEDULE		
C1	1.5"	SP9.5A
C3	3.0"	SP9.5B
C5	3.0"	SP9.5C
C7	2.0"	SP12.5C
C8	4.0"	SP12.5C
D1	2.5"	SP19.0B
D2	3.0"	SP19.0B
D3	4.0"	SP19.0B
D5	4.0"	SP19.0C
E1	4.0"	B25.0B
E3	3.0"	B25.0C
E4	5.0"	B25.0C
E5	7.0"	B25.0C
J1	6"	ABC
J2	8"	ABC
P	0.35	PRIME COAT
R1	2'-6"	CURB & GUTTER
R2	5"	MONOLITHIC CONCRETE ISLAND
T		EARTH MATERIAL
U		EXISTING PAVEMENT
W		WEDGING (SEE SHT. 2)

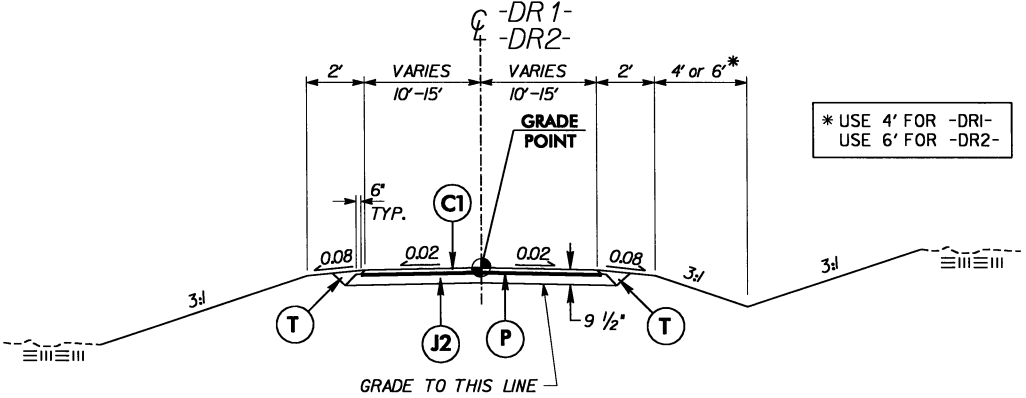
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



TYPICAL SECTION #20

USE TYPICAL SECTION NO. 20:

FROM -Y8- STA. 18+17.15 TO STA. 18+90.00 (W=22')
FROM -Y15- STA. 16+57.15 TO STA. 17+30.00 (W=18')
FROM -Y17- STA. 10+93.12 TO STA. 11+75.00 (W=18.2')

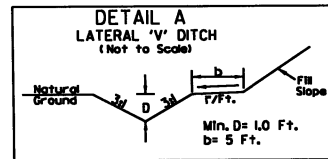


TYPICAL SECTION #21

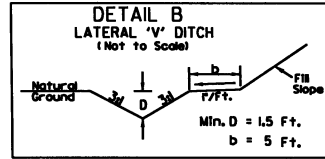
USE TYPICAL SECTION NO. 21:

FROM -DRI- STA. 10+16.78 TO STA. 12+83.09
FROM -DR2- STA. 10+12.00 TO STA. 12+35.00

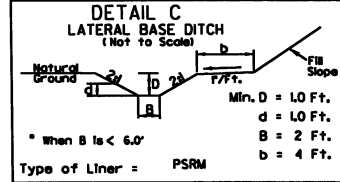
LATERAL DITCH DETAILS



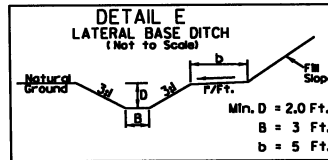
-SR5- STA. 27+00 TO STA. 27+34 (RT)
-SR5- STA. 44+95 TO STA. 47+00 (RT)
-YBREV- STA. 24+65 TO STA. 26+50 (RT)
-YBREV- STA. 38+00 TO STA. 40+00 (RT)



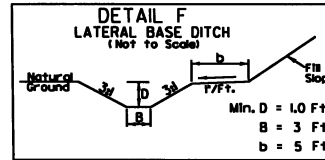
-SR5- STA. 70+00 TO STA. 71+25 (RT)
-YBREV- STA. 24+00 TO STA. 24+50 (RT)



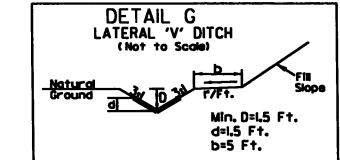
-SR4- STA. 16+50 TO STA. 18+00 (RT)



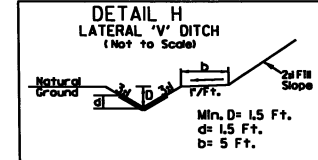
-L- STA. 431+72 TO STA. 433+00 (LT)



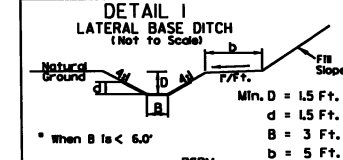
-L- STA. 433+00 TO STA. 435+68 (LT)
-SR4- STA. 68+55 TO STA. 69+50 (LT)
-SR4- STA. 17+75 TO STA. 18+25 (LT)



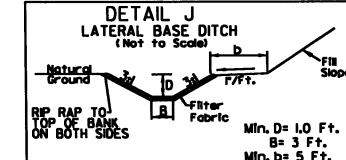
Type of Liner = PSRM
-YBREV- STA. 36+50 TO STA. 38+00 (RT)
-SR4- STA. 90+04 TO STA. 92+06 (LT)



Type of Liner = PSRM
-SR5- STA. 60+00 TO STA. 62+47 (RT)

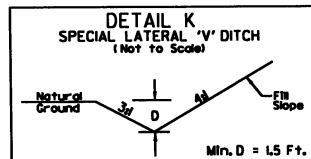


-SR5- STA. 78+50 TO STA. 82+00 (RT)

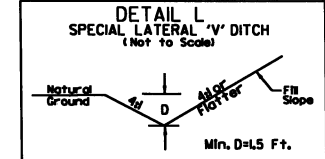


-SR4- STA. 68+20 TO STA. 68+55 (LT)

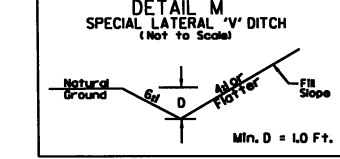
SPECIAL LATERAL DITCH DETAILS



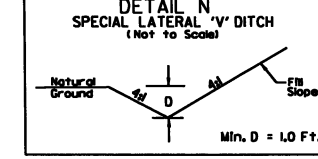
-SR2- STA. 13+00 TO STA. 17+00 (LT)



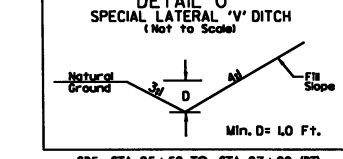
-SR2- STA. 53+50 TO STA. 62+87 (RT)
-NBL- STA. 405+03 TO STA. 407+04 (RT)



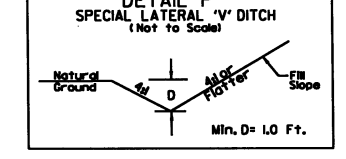
-SR4- STA. 10+00 TO STA. 15+50 (RT)
-YIO- STA. 23+50 TO STA. 27+50 (LT)



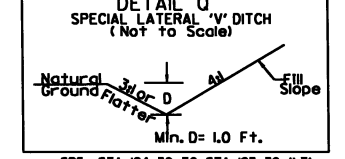
-YIO- STA. 39+50 TO STA. 42+00 (RT)
-YIOLPA- STA. 10+56 TO STA. 11+55 (LT)
-YIS- STA. 12+63 TO STA. 14+50 (LT)
-YIS- STA. 10+50 TO STA. 11+75 (LT)
-SR2- STA. 17+20 TO STA. 122+50 (LT)
-SR4- STA. 108+00 TO STA. 108+92 (RT)
-SR4- STA. 10+44 TO STA. 11+50 (RT)



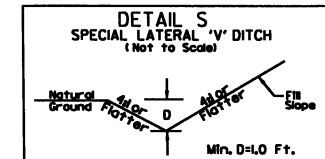
-SR5- STA. 25+50 TO STA. 27+00 (RT)



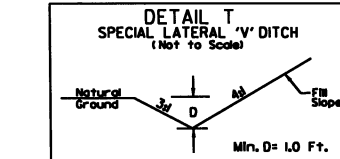
-Y9NBL- STA. 12+30 TO STA. 18+55 (RT)
-YIS- STA. 10+58 TO STA. 12+00 (LT)



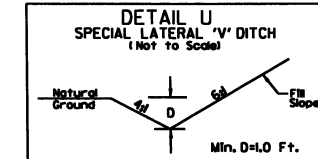
-SR5- STA. 124+30 TO STA. 127+30 (LT)



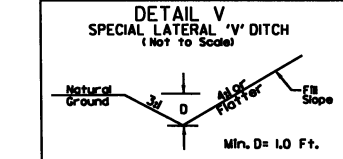
-YBREV- STA. 54+50 TO STA. 55+50 (LT)
-YBREV- STA. 59+00 TO STA. 59+50 (LT)
-SR5- STA. 19+97 TO STA. 122+80 (RT)



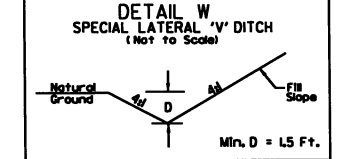
-YBREV- STA. 13+50 TO STA. 17+00 (LT)
-SR5- STA. 30+20 TO STA. 34+40 (RT)
-YBREV- STA. 22+50 TO STA. 24+00 (RT)
-YBREV- STA. 41+00 TO STA. 44+50 (RT)



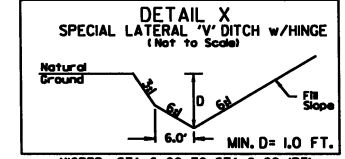
-Y9NBL- STA. 21+00 TO STA. 23+00 (RT)



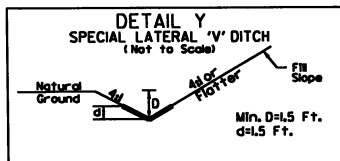
-Y9SBL- STA. 43+08 TO STA. 43+60 (RT)



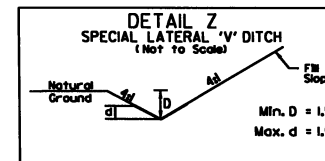
-Y9SBL- STA. 64+60 TO STA. 66+25 (RT)



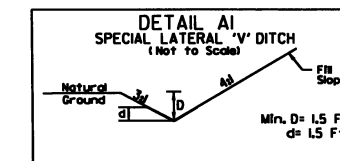
-YIORPD- STA. 6+00 TO STA. 8+00 (RT)



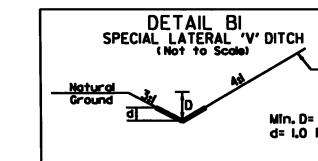
Type of Liner = PSRM
-L- STA. 397+50 TO STA. 399+50 (RT)
-L- STA. 401+20 (RT) TO -NBL- STA. 405+03 (RT)



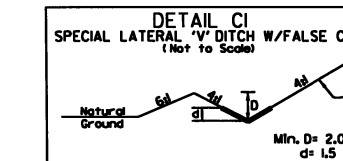
Type of Liner = PSRM
-SR4- STA. 14+50 TO STA. 16+50 (RT)



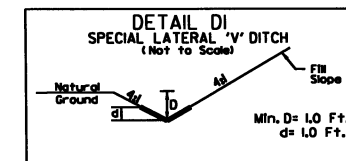
Type of Liner = PSRM
-SR5- STA. 82+00 TO STA. 90+45 (RT)



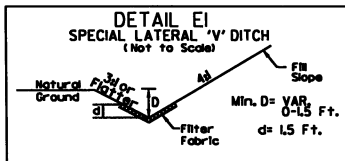
Type of Liner = PSRM
-YIOLPA- STA. 5+16 TO STA. 7+95 (RT)



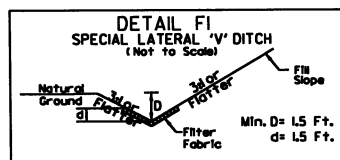
Type of Liner = PSRM
-YIS- STA. 10+72 TO STA. 11+75 (LT)



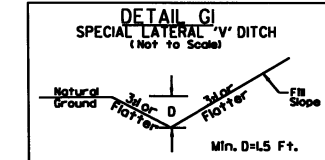
Type of Liner = PSRM
-YIS- STA. 10+60 TO STA. 12+50 (RT)
-YIOLPA- STA. 4+50 TO STA. 5+16 (RT)



Type of Liner = Class IRip-Rap
-SR2- STA. 17+00 TO STA. 17+50 (LT)



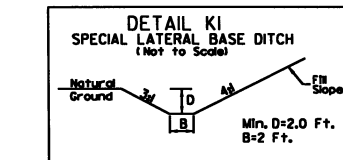
Type of Liner = Class B Rip-Rap
-SR5- STA. 19+50 TO STA. 23+34.5 (RT)



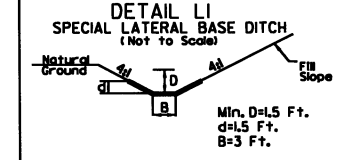
-YB- STA. 14+00 TO STA. 14+00 (LT)
-YB- STA. 14+10 TO STA. 16+00 (LT)



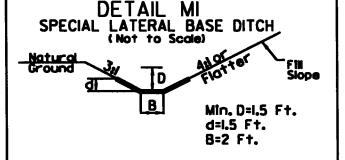
-SR5- STA. 102+29 TO STA. 102+77 (RT)



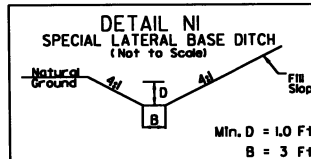
-Y9LPA- STA. 3+26 TO STA. 3+50 (RT)



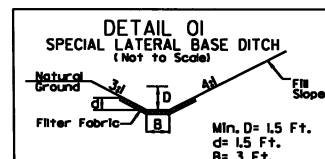
Type of Liner = PSRM
-L- STA. 399+50 TO STA. 401+20 (RT)



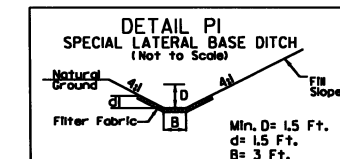
Type of Liner = PSRM
-L- STA. 403+24 (LT) TO -SBL- STA. 405+65 (LT)



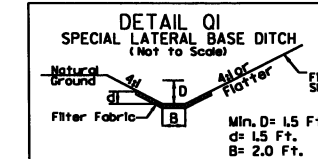
-SR4- STA. 69+50 TO STA. 74+00 (LT)
-SR5- STA. 94+36 TO STA. 95+43 (RT)



Type of Liner = Class IRip-Rap
-L- STA. 426+63 TO STA. 427+87 (LT)



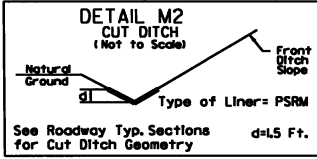
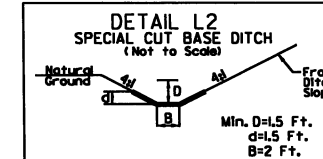
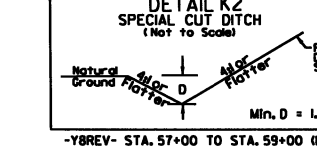
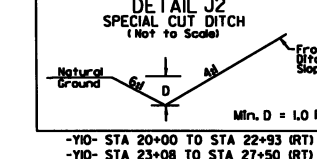
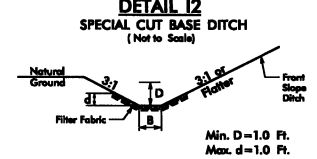
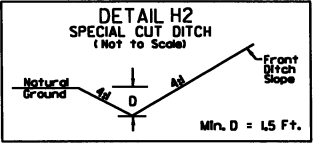
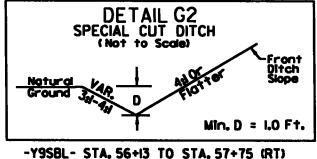
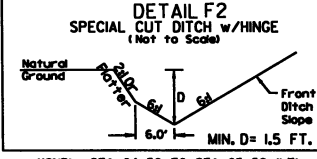
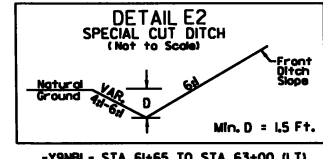
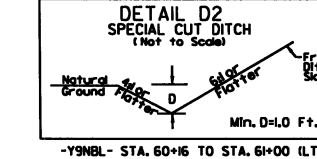
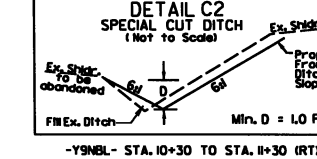
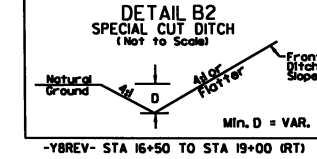
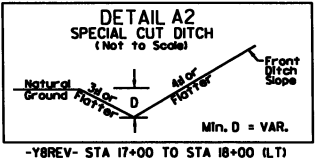
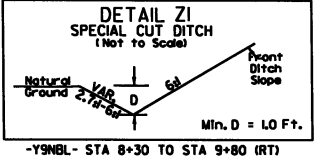
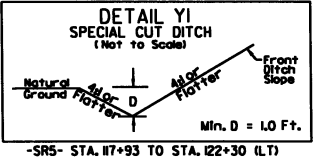
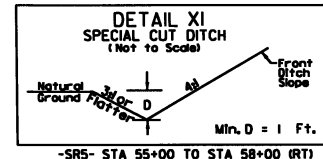
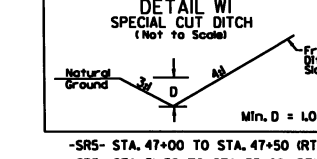
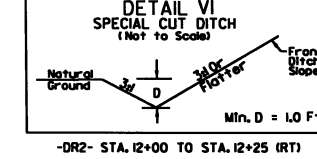
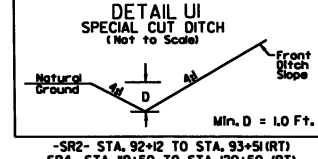
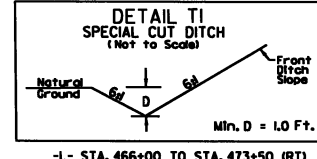
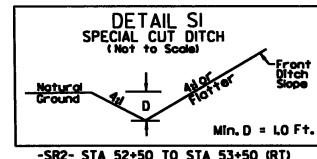
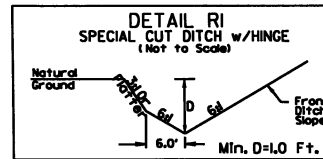
Type of Liner = Class IRip-Rap
-SR5- STA. 19+50 TO STA. 22+70 (LT)
-YIOLPD- STA. 9+11 TO STA. 11+33 (RT)



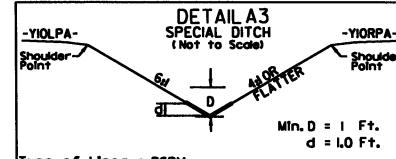
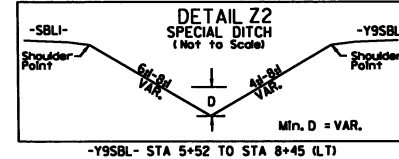
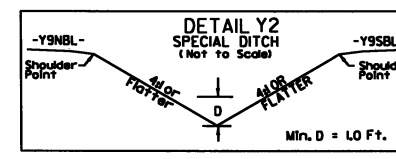
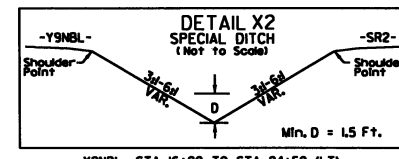
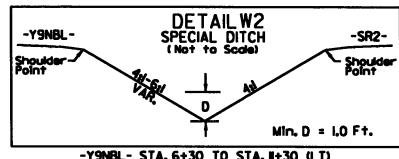
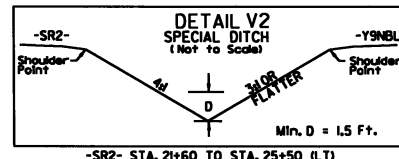
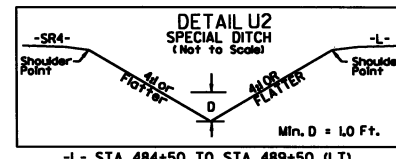
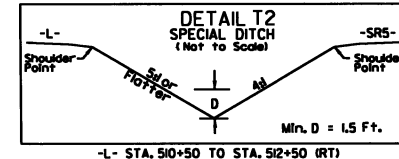
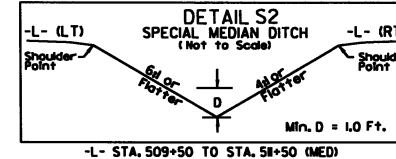
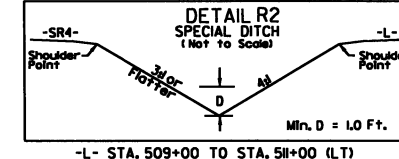
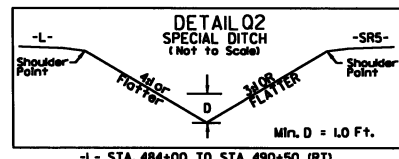
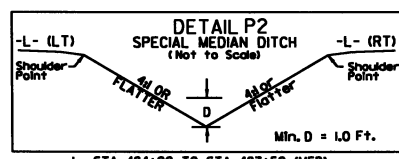
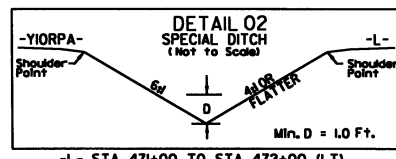
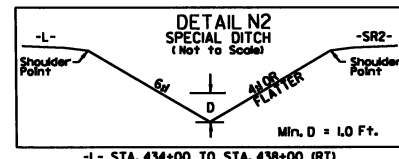
Type of Liner = Class B Rip-Rap
-YIO- STA. 41+00 TO STA. 42+00 (LT)
-YIOLPD- STA. 11+33 TO STA. 13+76 (RT)

PROJECT REFERENCE NO. R-3421C	SHEET NO. 2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>	

SPECIAL CUT DITCH DETAILS

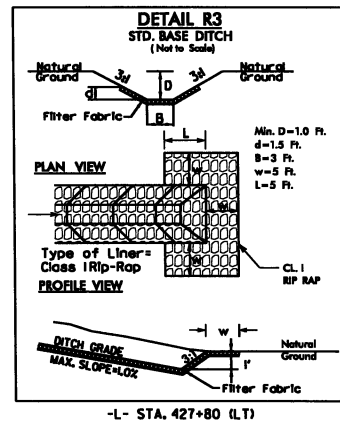
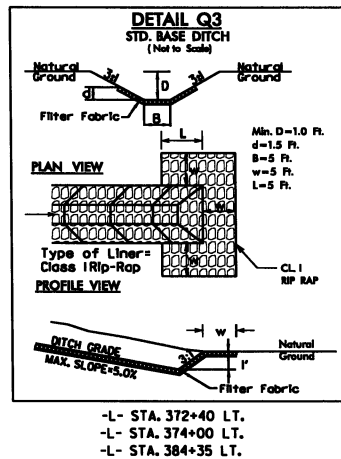
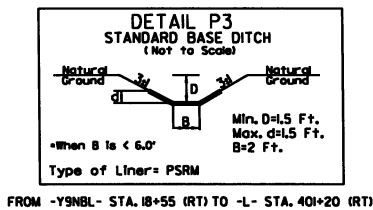
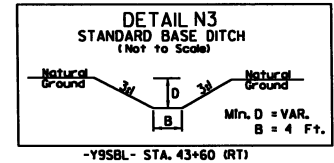
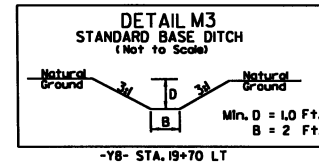
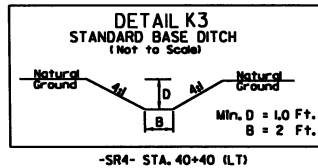
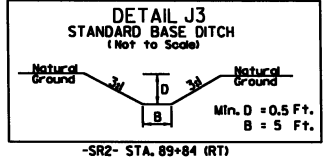
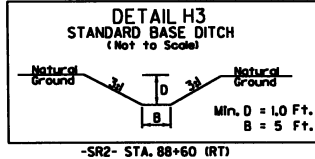
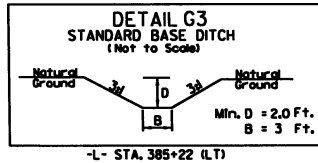
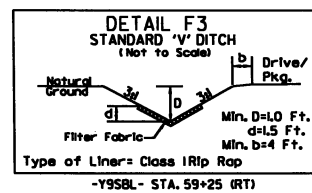
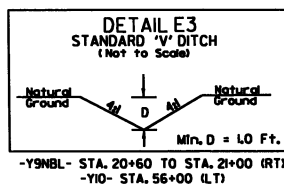
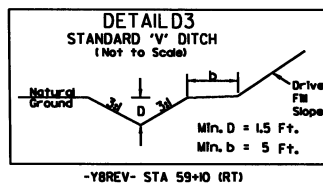
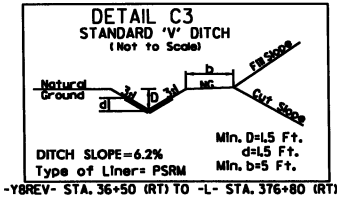
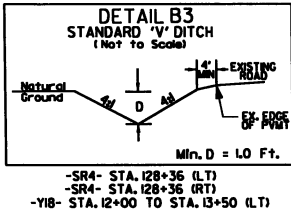


SPECIAL DITCH DETAILS

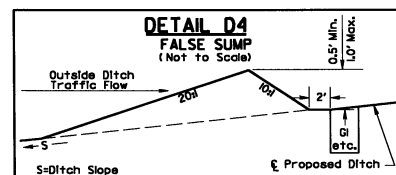
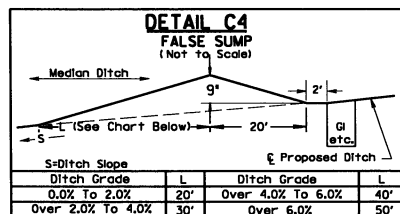
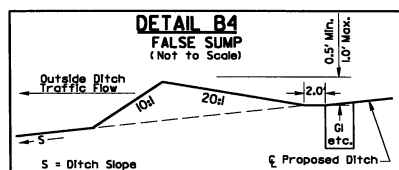
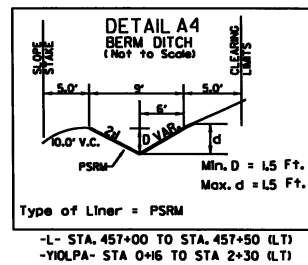
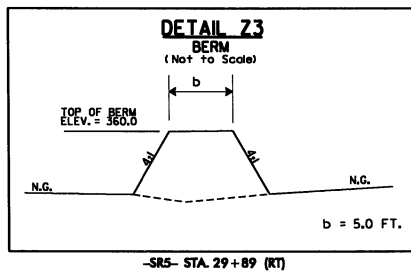
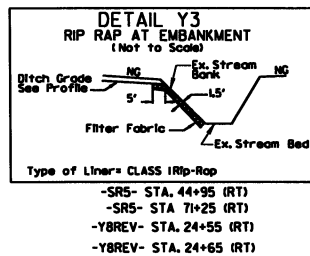
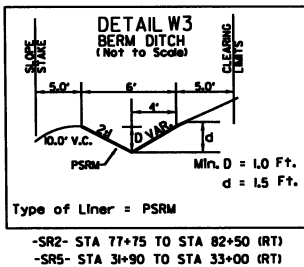
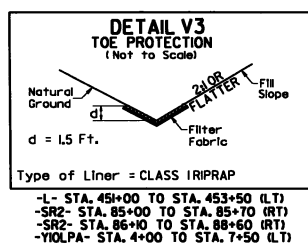
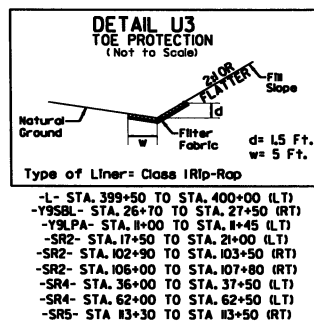
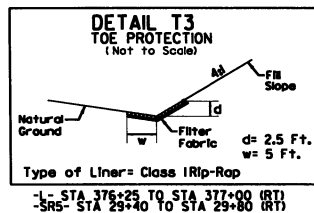


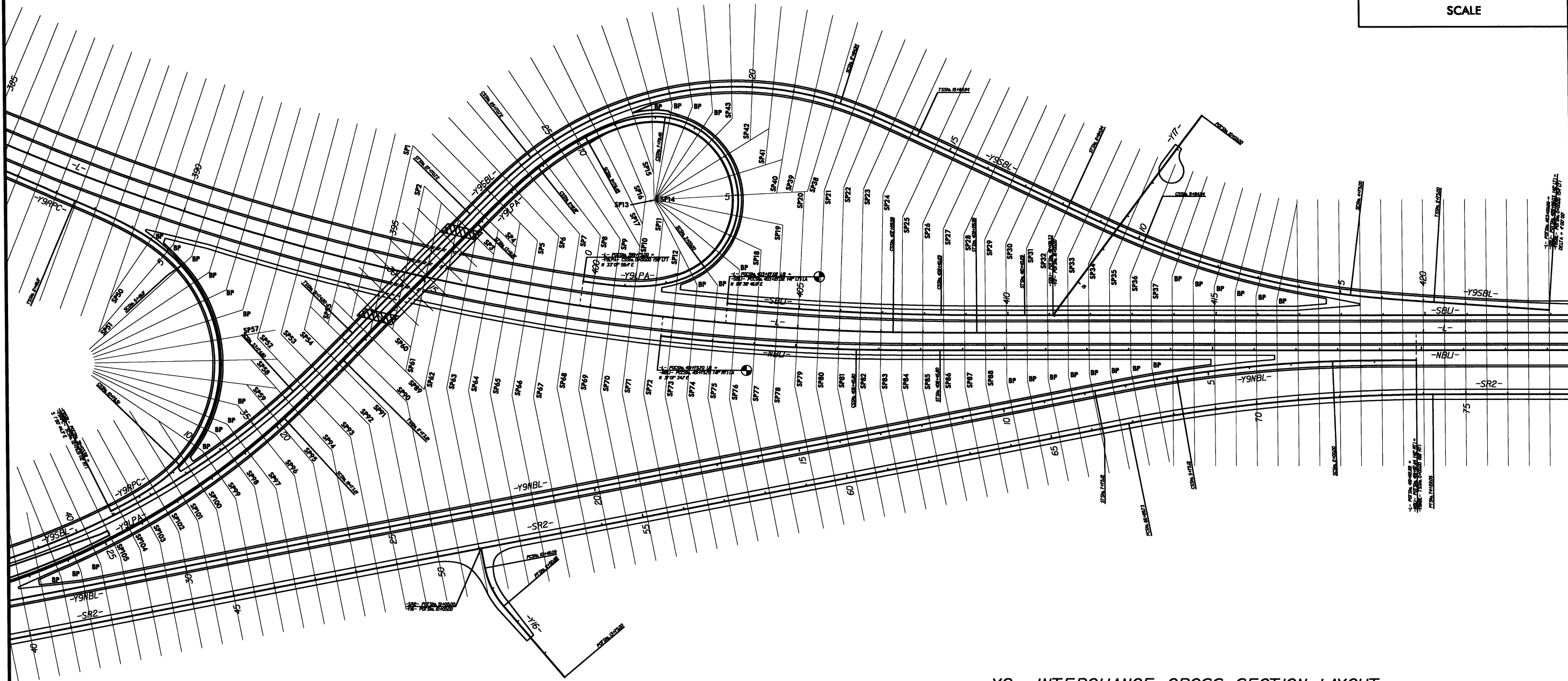
STANDARD DITCH DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-3421C	2-J
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



OTHER





-Y9- INTERCHANGE CROSS-SECTION LAYOUT

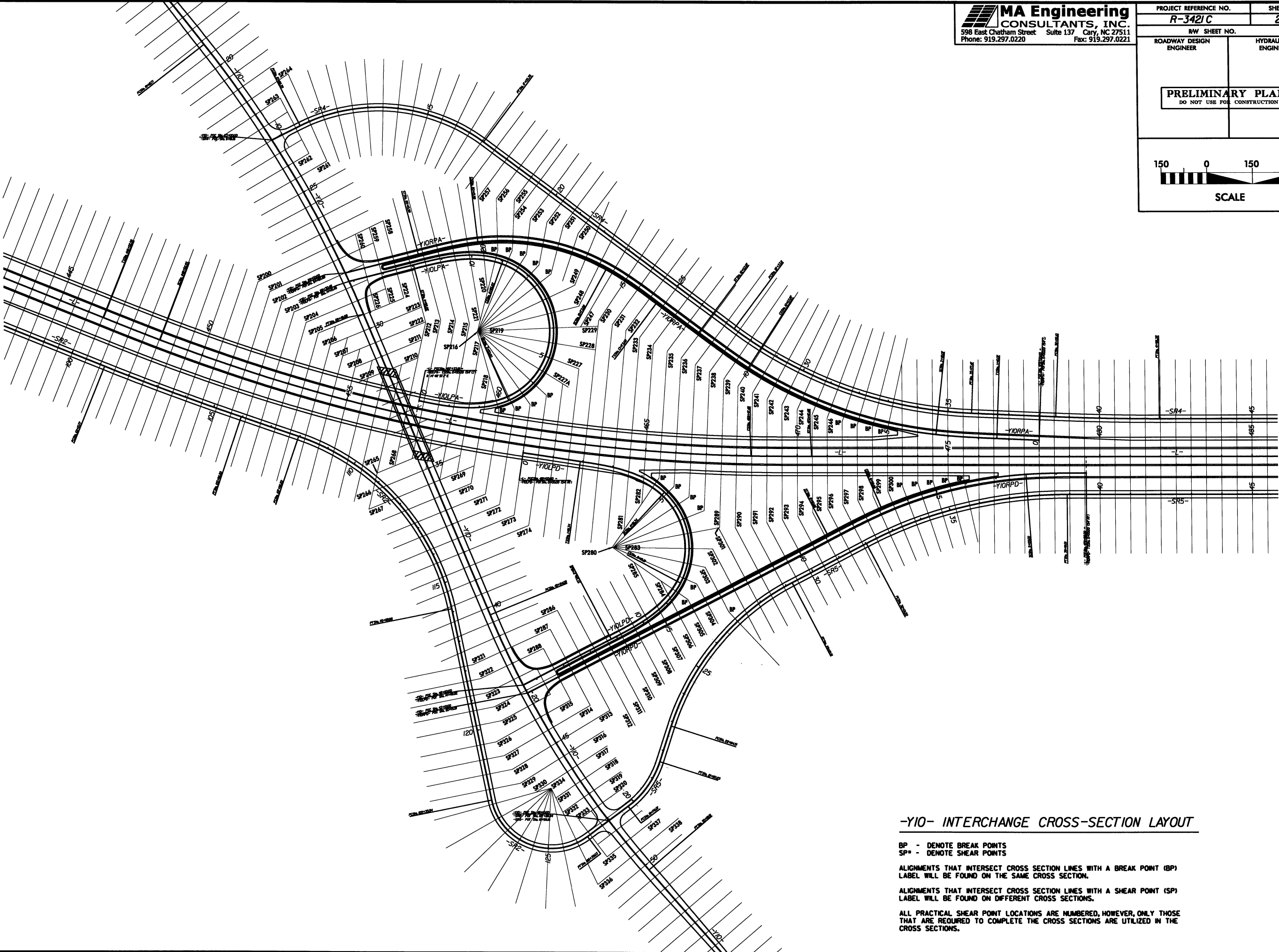
BP - DENOTE BREAK POINTS
SP - DENOTE SHEAR POINTS

ALIGNMENTS THAT INTERSECT CROSS SECTION LINES WITH A BREAK POINT (BP) LABEL WILL BE FOUND ON THE SAME CROSS SECTION.

ALIGNMENTS THAT INTERSECT CROSS SECTION LINES WITH A SHEAR POINT (SP) LABEL WILL BE FOUND ON DIFFERENT CROSS SECTIONS.

ALL PRACTICAL SHEAR POINT LOCATIONS ARE NUMBERED, HOWEVER, ONLY THOSE THAT ARE REQUIRED TO COMPLETE THE CROSS SECTIONS ARE UTILIZED IN THE CROSS SECTIONS.

PROJECT REFERENCE NO. R-3421C		SHEET NO. 2-L	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 5px; text-align: center;">PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>			
<div style="text-align: center;"> SCALE</div>			



-YIO- INTERCHANGE CROSS-SECTION LAYOUT

BP - DENOTE BREAK POINTS
SP - DENOTE SHEAR POINTS

ALIGNMENTS THAT INTERSECT CROSS SECTION LINES WITH A BREAK POINT (BP) LABEL WILL BE FOUND ON THE SAME CROSS SECTION.

ALIGNMENTS THAT INTERSECT CROSS SECTION LINES WITH A SHEAR POINT (SP) LABEL WILL BE FOUND ON DIFFERENT CROSS SECTIONS.

ALL PRACTICAL SHEAR POINT LOCATIONS ARE NUMBERED, HOWEVER, ONLY THOSE THAT ARE REQUIRED TO COMPLETE THE CROSS SECTIONS ARE UTILIZED IN THE CROSS SECTIONS.

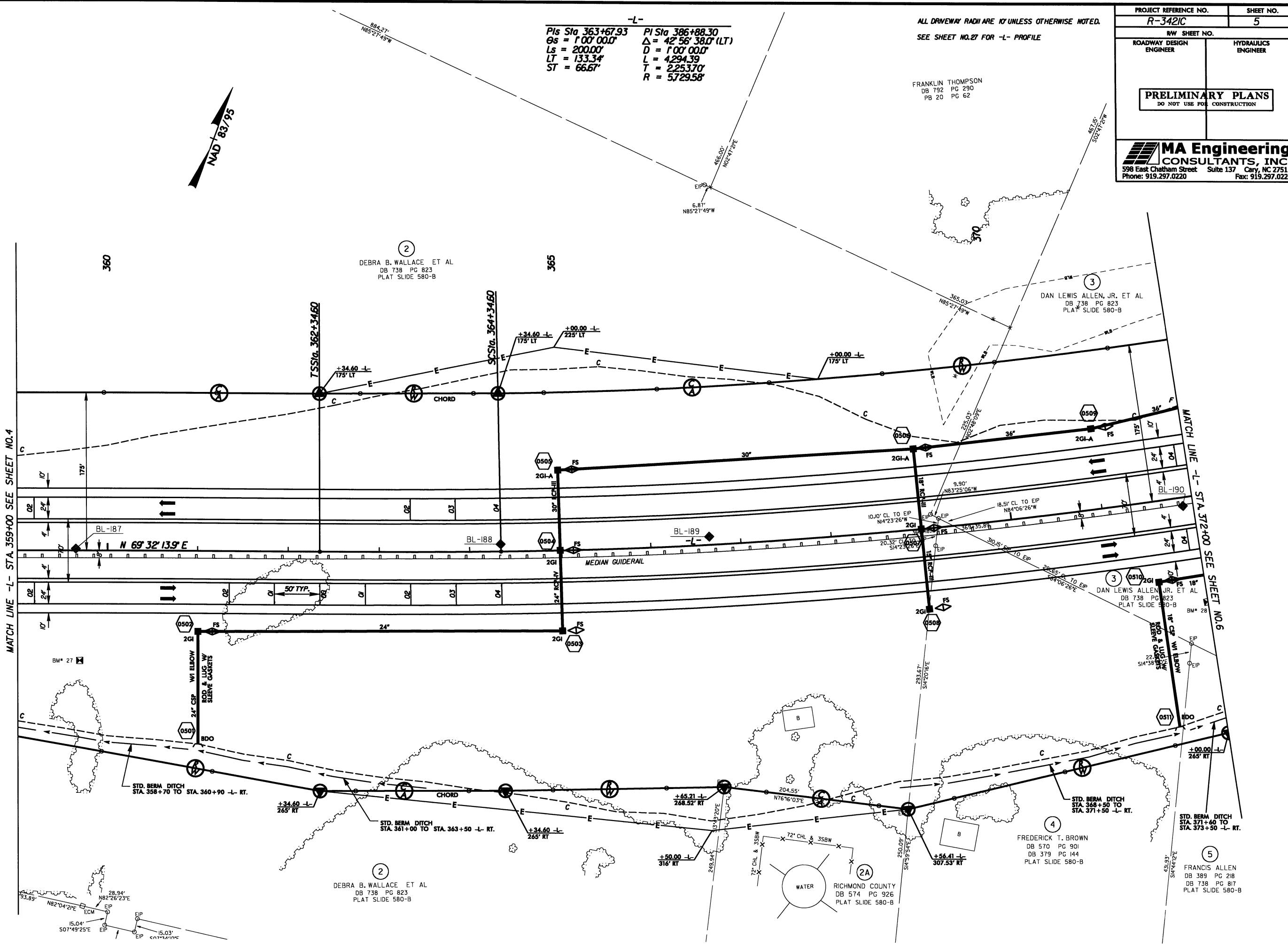
PROJ. REFERENCE NO.	SHEET NO.
R-3421C	3-ZZ

[illegible]

8/12/1999

10/21/2011
C:\cogdkey\p-r-o-j\342\c-r-dy-psh05.dgn
5:58:31 AM

REVISIONS



PROJECT REFERENCE NO. R-3421C		SHEET NO. 5	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			

TTST = 18%
DUALS = 10%
DHV = 10%
DIR = 60%

$PI Sta\ 386+88.30$
 $\Delta = 42^\circ 56' 38.0'' (LT)$
 $D = 1^\circ 00' 00.0''$
 $L = 4,294.39$
 $T = 2,253.70'$
 $R = 5,729.58'$

SEE SHEET NOS. 27 AND 28 FOR -L- PROFILE
SEE SHEET NO. 40 FOR -YBREV- PROFILE

6

HYDRAULICS

DO NOT USE FOR CONSTRUCTION

 **MA Engineering**
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

**EARTH BERM MEDIAN PIER PROTECTION NOTE:
SEE CROSS-SECTIONS AND ROADWAY STANDARD DRAWING 225.08 FOR
SPECIAL MEDIAN GRADING FROM: -L- STA. 373+50.00 TO 384+50.00**

DAN LEWIS ALLEN, JR. ET AL
DB 738 PG 823
PLAT SLIDE 580-B

MATCH LINE -Y8REV- STA. 30+00 SEE SHEET NO.20

FRANCIS ALLEN
DB 389 PG 218
DB 738 PG 817
PLAT SLIDE 580-F

~~-L- POCSta. 378+94.34 -~~
~~-Y8REV- POTSta. 34+10.49~~

BRIDGE
REV- STA.35+16.99

APPROACH SLAB
REV- STA.35+28.13

-L- POC STA.378+94.34
-Y8REV- POT STA.34+10.49

Diagram illustrating the plan view of a bridge deck section, showing lane markings, shoulder berrms, and gutter. The diagram includes stationing 32 and 35, lane widths of 24' and 30', and a cross-slope of 2.33% (23'0" 28.3").

DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y8REV- OVER -L-

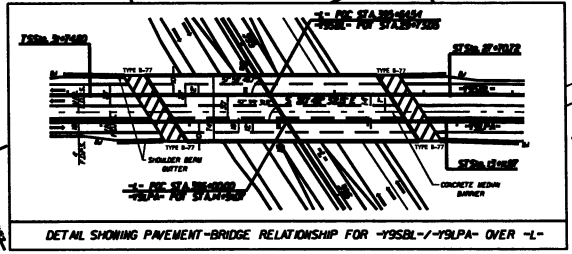
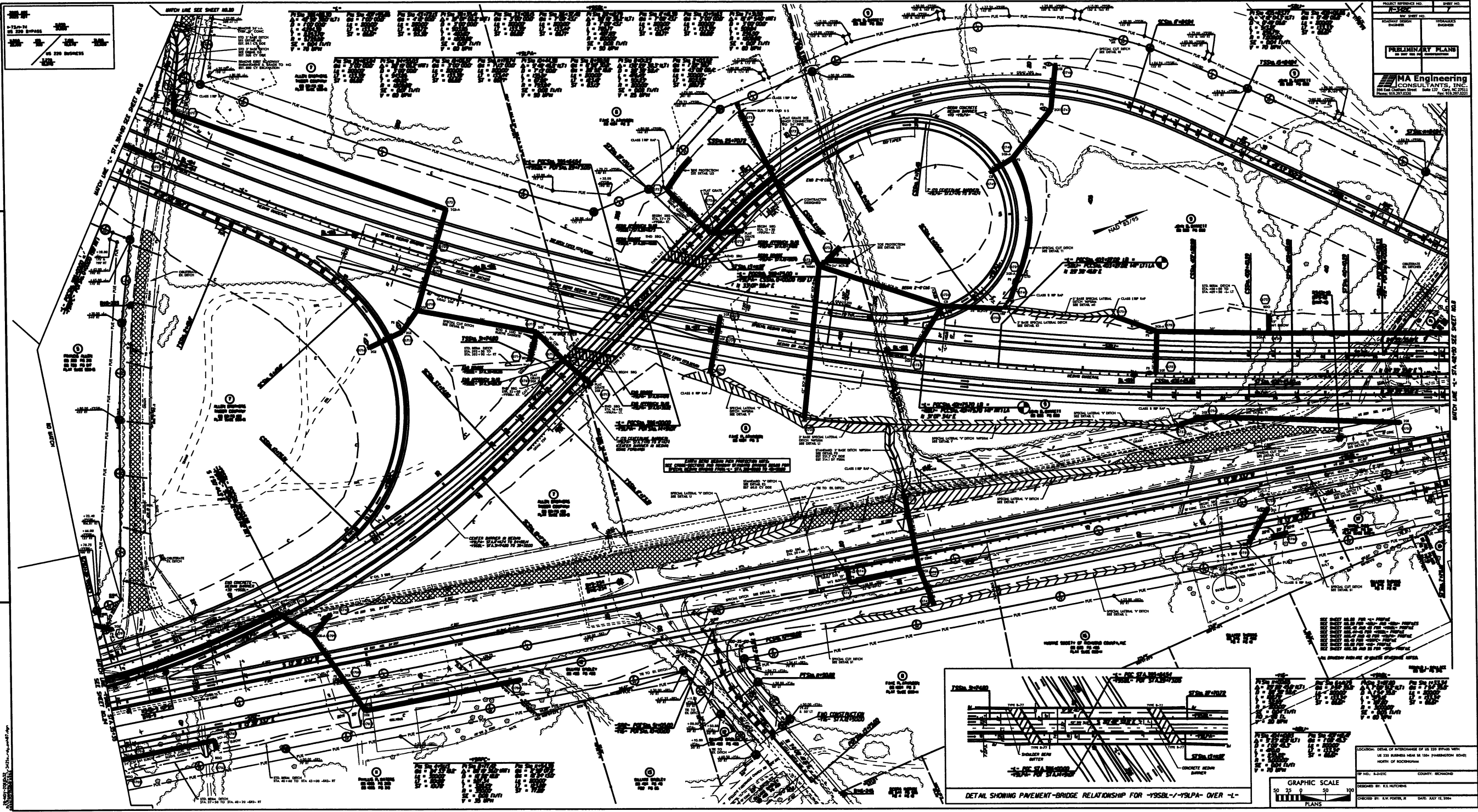
REVISIONS

2/1 REVISION 10/20/2011 RHP PROPERTY OWNER NAME & DEED BOOK CHANGED ON PARCEL 6.

10/21/2011
r:\roadway\proj\3421c-rdy-psh\06.dgn

PROJECT NO. 15-000-0000
SHEET NO. 15-000-0000
DATE 12/12/2014

PROJECT REFERENCE NO. 15-000-0000
SHEET NO. 15-000-0000
DATE 12/12/2014
PRELIMINARY PLANS
MA Engineering
CONSULTANTS, INC.
100 East 12th Street, Suite 100
Chicago, IL 60605
Tel: 312.329.1234
Fax: 312.329.1235

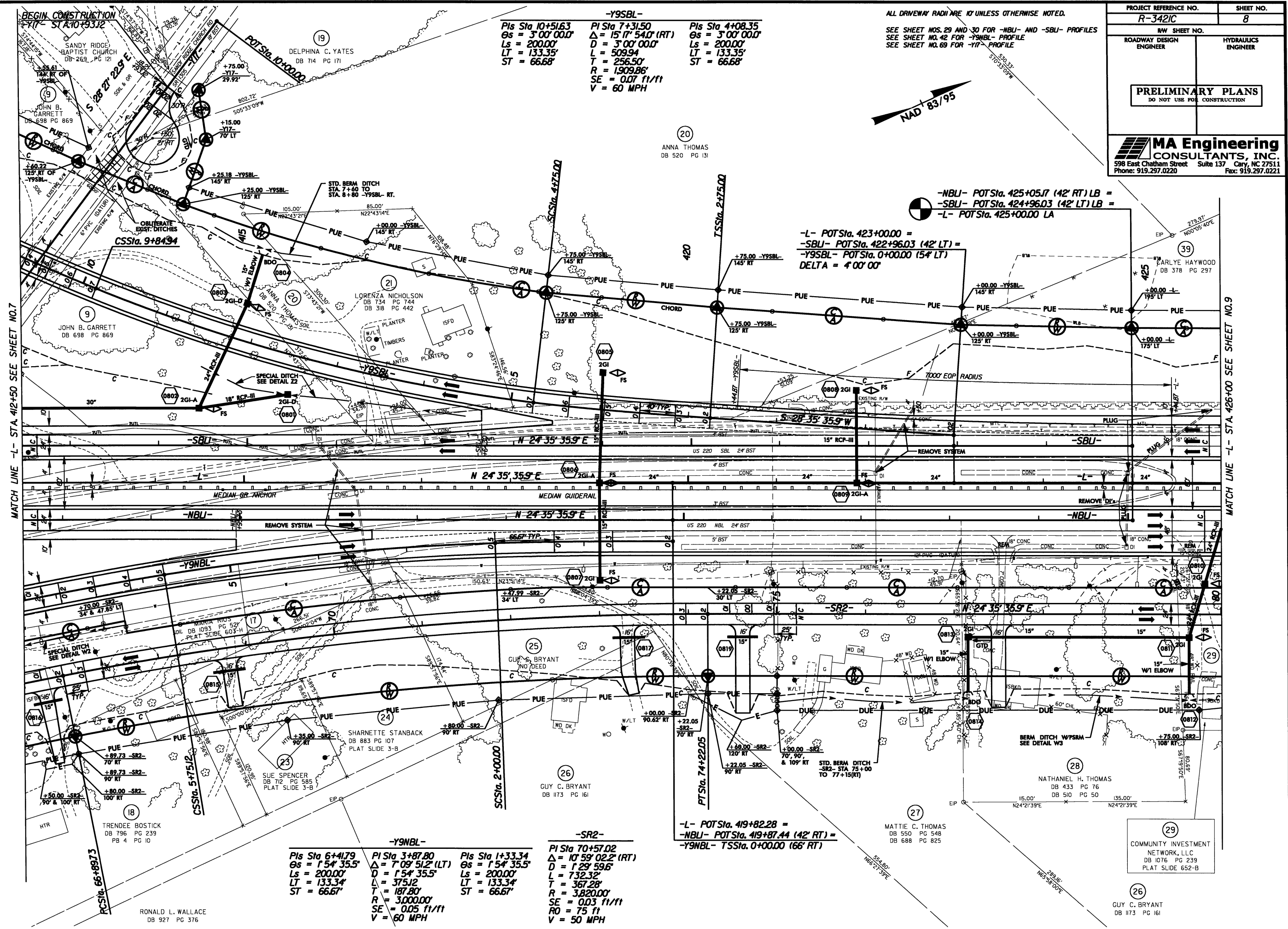


GRAPHIC SCALE
0 25 50 100
FEET
PLANS

LOCATION: DETAIL OF INTERCHANGE OF US 225 BYPASS WITH
US 225 BUSINESS NEAR SR 1504 (HARRISON ROAD)
NORTH OF ROCKFORD

SP NO. 15-000-0000 COUNTY: ROCKFORD

DESIGNED BY: K.E. HUTTONS
CHECKED BY: K.W. PORTER, R. DATE: JULY 12, 2014



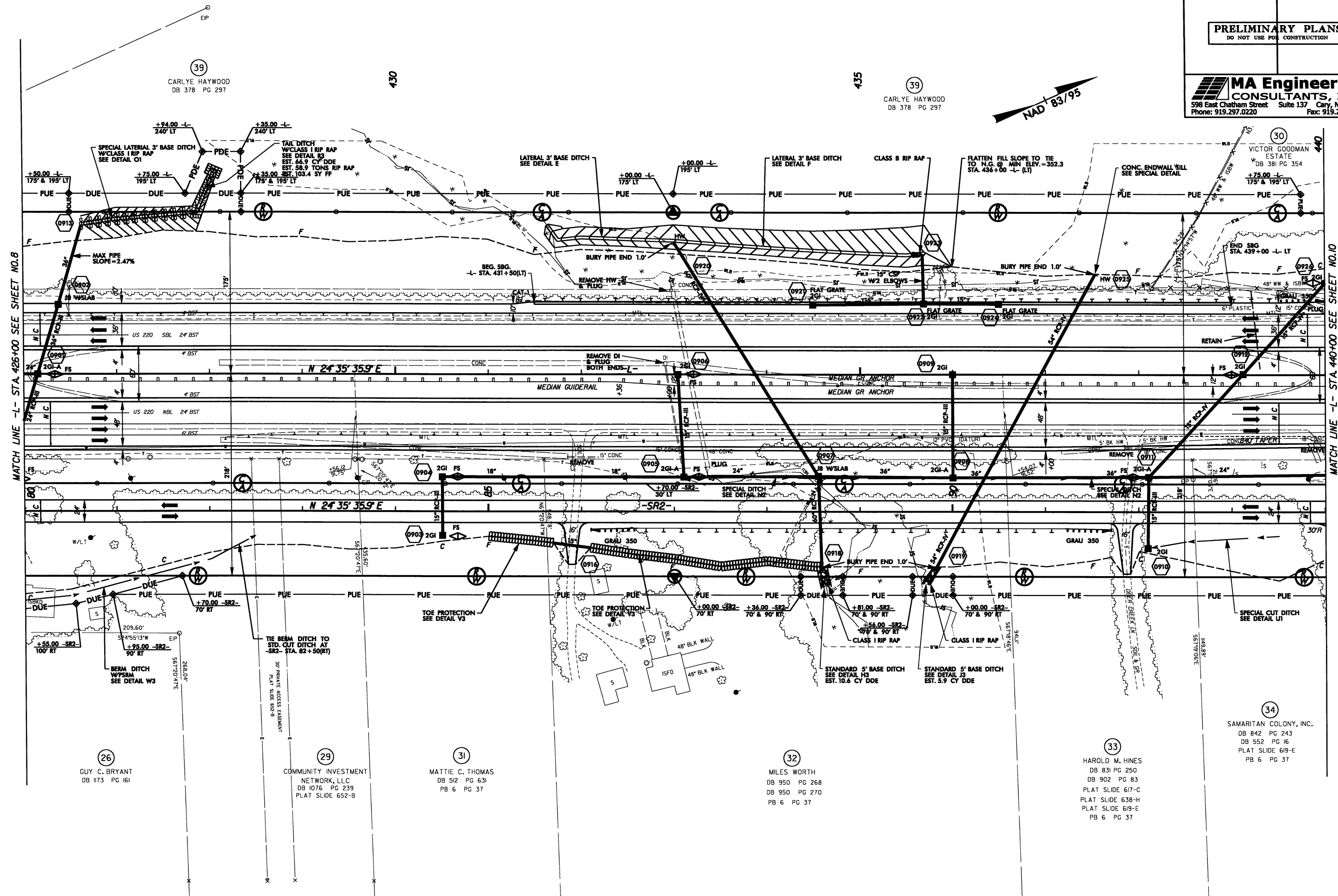
REVISIONS

DATE	DESCRIPTION	BY	APP'D BY
06/27/2018	ADD A SECOND STATION/OFFSET LABEL PERIOD TO SHOW STATION AND OFFSET VALUES OF -1958.1 MFT AT EX DPT. OLD PAPER 22 QUARTER PANELS COMBINED WITH PAPER 39 CHARLIE HANCOCK.		

0/21/2011
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ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NOS. 30 AND 31 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 57 FOR -SR2- PROFILE

PROJECT REFERENCE NO. R-3421C		SHEET NO. 9	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER			
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



REVISIONS

R/W REVISION 09/02/2009 R/W OLD PARCEL 22 WALTER PARKETZ OWNED WITH PARCEL 39 CARLYE HAYWOOD.

I:\021\2010\0902\0902\proj\N-3421c-rdy-psb\09.dgn
5/15/2010 10:55:08 AM

MATCH LINE -L- STA. 426+00 SEE SHEET NO. 8

MATCH LINE -L- STA. 440+00 SEE SHEET NO. 10

(26) GUY C. BRYANT
DB 1173 PG 161

(29) COMMUNITY INVESTMENT
NETWORK, LLC
DB 1076 PG 239
PLAT SLIDE 652-B

(31) MATTIE C. THOMAS
DB 512 PG 631
PB 6 PG 37

(32) MILES WORTH
DB 950 PG 268
DB 950 PG 270
PB 6 PG 37

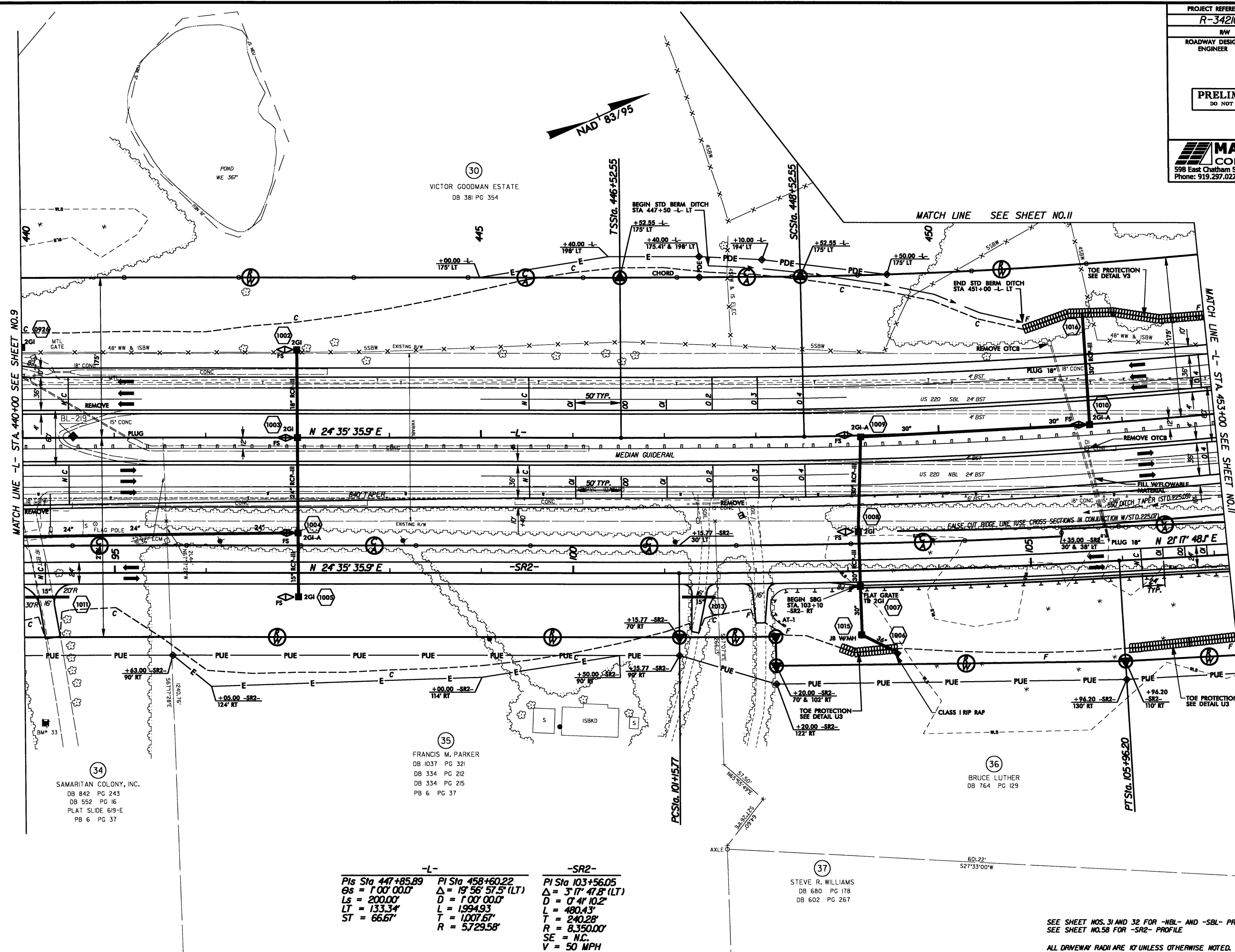
(33) HAROLD M. HINES
DB 831 PG 250
DB 902 PG 83
PLAT SLIDE 617-C
PLAT SLIDE 638-H
PLAT SLIDE 619-E
PB 6 PG 37

(34) SAMARITAN COLONY, INC.
DB 842 PG 243
DB 552 PG 16
PLAT SLIDE 619-E
PB 6 PG 37

(39) CARLYE HAYWOOD
DB 378 PG 297

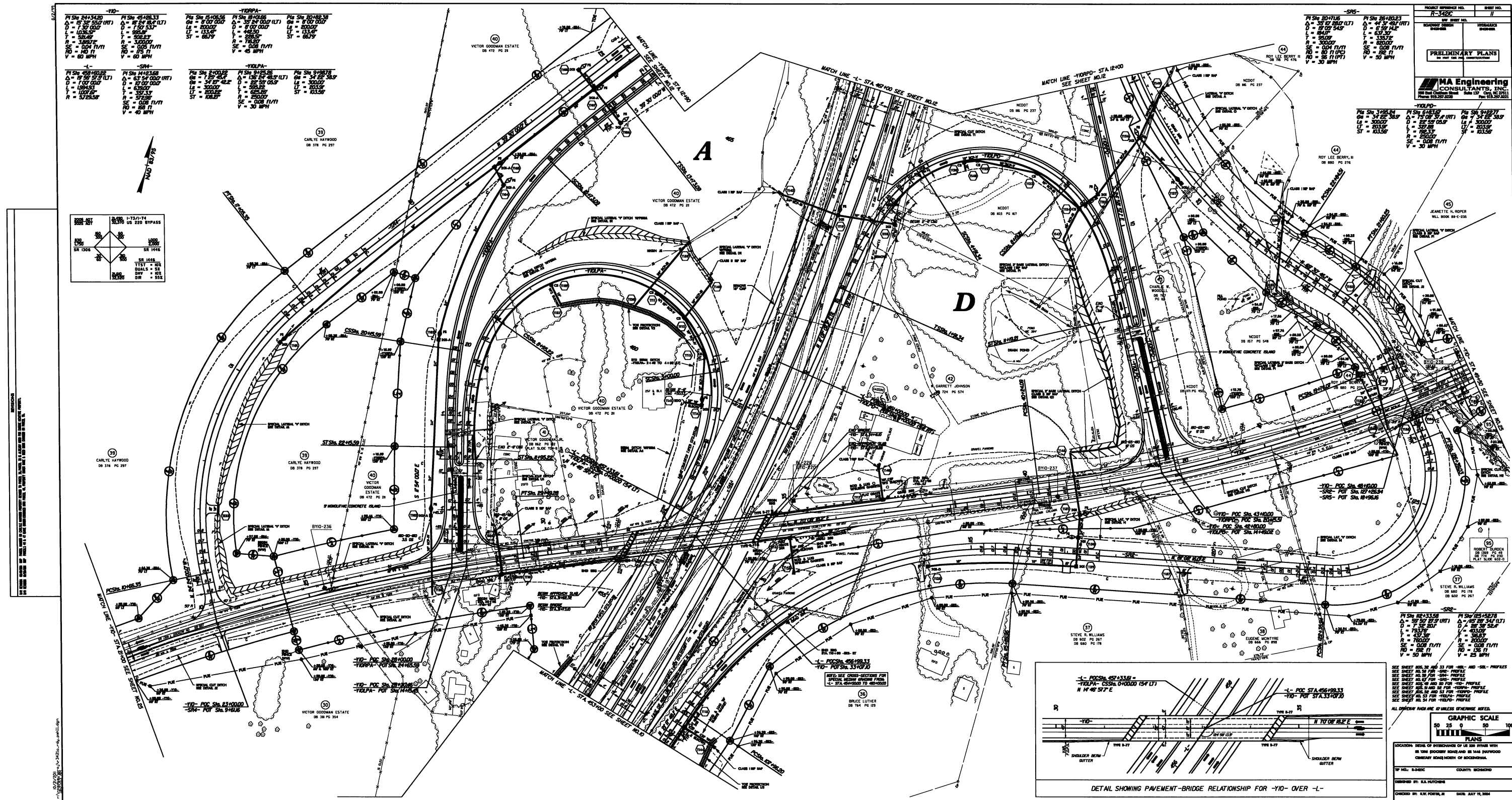
(39) CARLYE HAYWOOD
DB 378 PG 297

(30) VICTOR GOODMAN
ESTATE
DB 381 PG 354




-L-		-SR2-
Pls Sta 447+85.89	PI Sta 458+60.22	PI Sta 103+56.05
Os = 1'00' 00.0"	Δs = 19' 56' 57.5" (LT)	Δs = 3' 17' 47.8" (LT)
Ls = 200.00'	D = 1'00' 00.0"	D = 0' 4' 10.2"
LT = 133.34'	L = 1.99493	L = 480.43'
ST = 66.67'	T = 1.007.67'	T = 240.28'
	R = 5729.58'	R = 8350.00'
		SE = N.C.
		V = 50 MPH

SEE SHEET NOS. 31 AND 32 FOR -NBL- AND -SBL- PROFILES
 SEE SHEET NO. 58 FOR -SR2- PROFILE
 ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

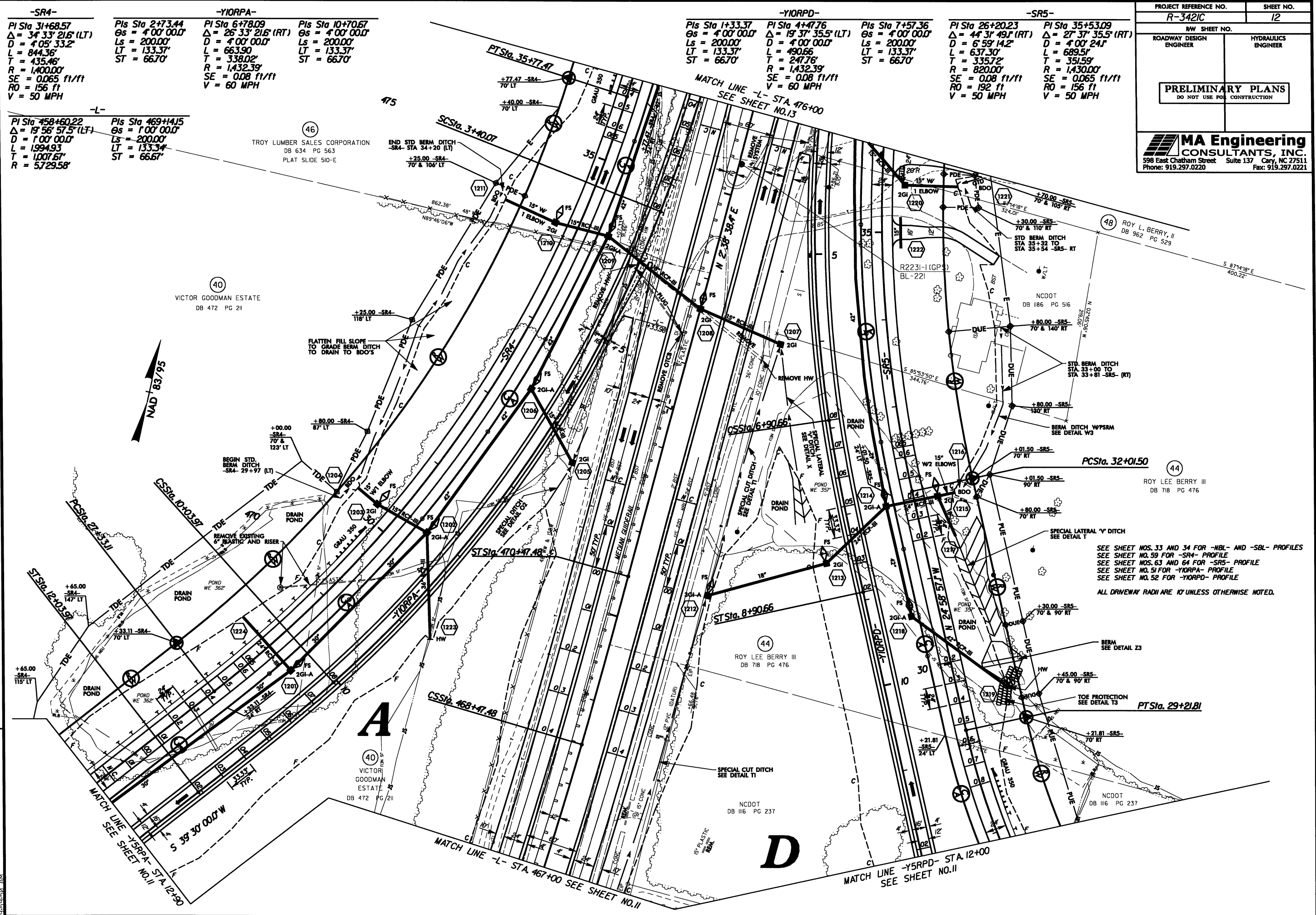


-SR5-

PI Sta 35+53.09
 $\Delta = 27^\circ 37' 35.5''$ (RT)
 $D = 4' 00'' 24.5''$
 $L = 689.5'$
 $T = 351.59'$
 $R = 1,430.00'$
 $SE = 0.065 \text{ ft/ft}$
 $RO = 156 \text{ ft}$
 $V = 50 \text{ MPH}$

PROJECT REFERENCE NO.		SHEET NO.	
R-3421C		12	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 10px; text-align: center;">PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>			
<div style="text-align: center;">MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221</div>			

10/21/2011
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9:59:50 AM



PROJECT REFERENCE NO.
R-3421C

SHEET NO.
13

R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

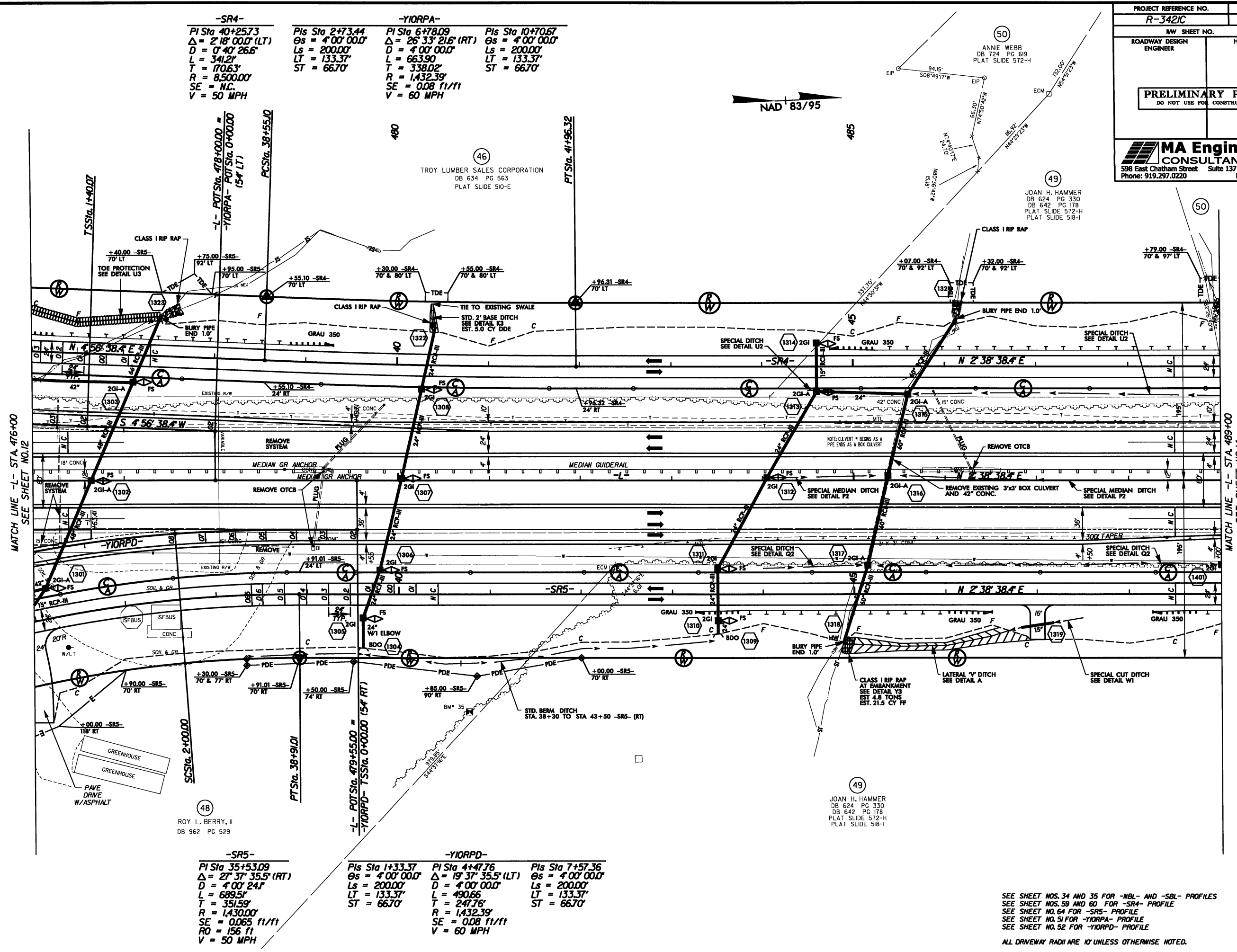
PRELIMINARY PLANS

DO NOT USE FOR CONSTRUCTION

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CONSULTANTS, INC.

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Phone: 919.297.0220

Suite 137
Cary, NC 27511
Fax: 919.297.0221



-SR4-	-YIORPA-	-YIORPA-	-YIORPA-
PI Sta 40+25.73	PI Sta 2+73.44	PI Sta 6+78.09	PI Sta 10+70.67
$\Delta = 218^{\circ} 00' 00''$ (LT)	$\Delta = 400^{\circ} 00' 00''$	$\Delta = 26^{\circ} 33' 21.6''$ (RT)	$\Delta = 400^{\circ} 00' 00''$
D = 0' 40' 26.6"	Ls = 200.00'	D = 400' 00.0'	Ls = 200.00'
L = 341.21'	LT = 133.37'	L = 663.90'	LT = 133.37'
T = 170.63'	ST = 66.70'	T = 338.02'	ST = 66.70'
R = 8,500.00'		R = 1,432.39'	
SE = N.C.		SE = 0.08 f1/f1	
V = 50 MPH		V = 60 MPH	

-SR5-	-YIORPD-	-YIORPD-	-YIORPD-
PI Sta 35+53.09	PI Sta 1+33.37	PI Sta 4+47.76	PI Sta 7+57.36
$\Delta = 27^{\circ} 37' 35.5''$ (RT)	$\Delta = 400^{\circ} 00' 00''$	$\Delta = 19^{\circ} 37' 35.5''$ (LT)	$\Delta = 400^{\circ} 00' 00''$
D = 400' 24.1'	Ls = 200.00'	D = 400' 00.0'	Ls = 200.00'
L = 689.51'	LT = 133.37'	L = 490.66'	LT = 133.37'
T = 351.59'	ST = 66.70'	T = 247.76'	ST = 66.70'
R = 1,430.00'		R = 1,432.39'	
SE = 0.065 f1/f1		SE = 0.08 f1/f1	
RO = 156 f1		V = 60 MPH	
V = 50 MPH			

SEE SHEET NOS. 34 AND 35 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 59 AND 60 FOR -SR4- PROFILE
SEE SHEET NO. 64 FOR -SR5- PROFILE
SEE SHEET NO. 51 FOR -YIORPA- PROFILE
SEE SHEET NO. 52 FOR -YIORPD- PROFILE
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

REVISIONS

DATE REVISION BY/TO/DATE R/W PROPERTY OWNER NAME & REED BOX CHANGED ON PARCEL 42

10/2/2011
C:\csd\proj\proj\3421c\rdy-psh13.dgn
12:00:00 PM

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NOS. 35 AND 36 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 60 FOR -SR4- PROFILE
SEE SHEET NOS. 64 AND 65 FOR -SR5- PROFILE

PROJECT REFERENCE NO.
R-3421C

SHEET NO.
14

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS

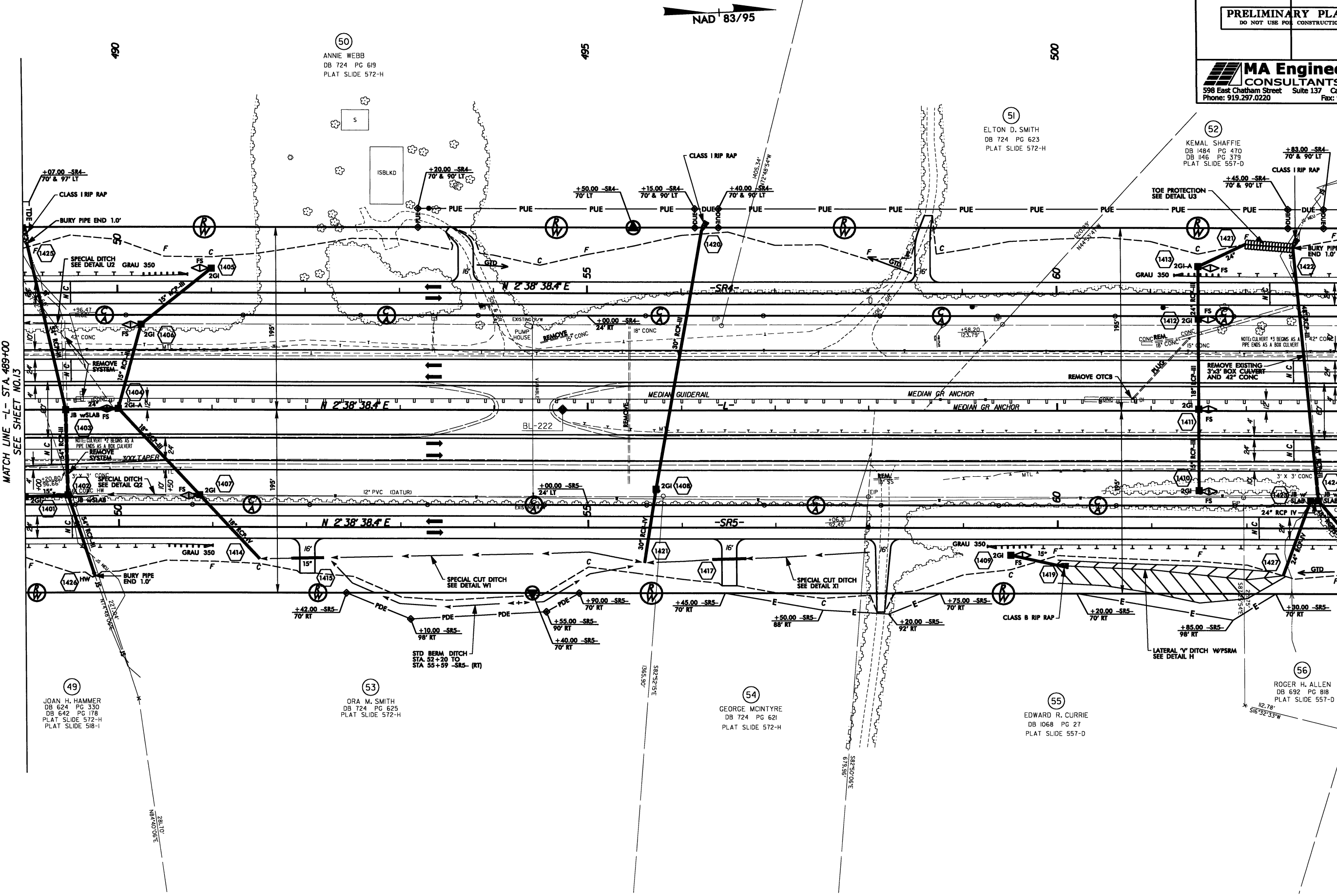
DO NOT USE FOR CONSTRUCTION

MA Engineering

CONSULTANTS, INC.

598 East Chatham Street Suite 137 Cary, NC 27511

Phone: 919.297.0220 Fax: 919.297.0221



REVISIONS

R/W RETURN 10/20/2010 R/W PROPERTY OWNER NAME & DEED BOX CHANGED ON PARCELS 49, 52, & 53.

I:\021\2010\ma\proj\3421C\rdy_pah14.dgn
10/20/2010 10:08:55 AM

PROJECT REFERENCE NO.		SHEET NO.	
R-342IC		15	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<div style="border: 1px solid black; padding: 5px; text-align: center;"> PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION </div>			

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MATCH LINE -L- STA 503+00
SEE SHEET NO.14

MATCH LINE -L- STA. 517+00
SEE SHEET NO.16

R/W REVISION 10/20/2011 R/W PROPERTY OWNER NAME & DEED BOOK CHANGED ON PARCEL 52.

0/21/2011
C:\Program Files\Autodesk\Roadway\proje\3421c_rdy_psh15.dgn


SEE SHEET NOS. 37 AND 38 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NO. 61 FOR -SR4- PROFILE
SEE SHEET NOS. 65 AND 66 FOR -SR5- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

<u>-L-</u>	<u>-SBL2-</u>	<u>-SR4-</u>
PI Sta 529+02.07	PI Sta 528+67.60	PI Sta 89+05.63
Δ = 3°15' 21.6" (RT)	Δ = 3°15' 21.6" (RT)	Δ = 3°15' 21.6" (RT)
D = 0°2' 29.2"	D = 0°2' 29.2"	D = 0°2' 19.2"
L = 909.25'	L = 909.25'	L = 916.35'
T = 45.475'	T = 45.475'	T = 458.30'
R = 16,000.00'	R = 16,000.00'	R = 16,250.00'
SE = N.C.	SE = N.C.	SE = N.C.
V = 70 MPH	V = 70 MPH	V = 50 MPH

JAMES K. CROKE
DB 963 PG 118
PLAT SLIDE 580-H

NAD 83/95

 -L- POT Sta. 524+12.85 LB =
-SBL2- PCS Sta. 524+12.85 (42' LT) LA


THE LEO F. & WILLIE W
HAWKINS TRUST
DB 951 PG 252
PLAT SLIDE 516-H

JAMES E. WITHERSPOON
DB 646 PG 420
PLAT SLIDE 516-H

530

MATCH LINE -L- STA. 517+00
SEE SHEET NO.15

ATCH LINE -L- STA. 530+50
SEE SHEET NO. 17

 -L- POTSta. 523+98.40 LB =
-NBL2- PCSta. 523+98.40 (42' RT) LA

REPLACEMENT AREA FOR PUMP STATION PROPERTY TO BE
CLEARED, GRUBBED, AND GRADED BY CONTRACTOR.

AREA TO BE GRADED TO AN APPROXIMATE ELEVATION OF 360'.
OR AS DIRECTED BY ENGINEER.

AREA TO BE DEEDED TO RICHMOND COUNTY AFTER PROJECT COMPLETION.

<u>-NBL2-</u>	<u>-SR5-</u>
<i>PI Sta 528+53.15</i>	<i>PI Sta 88+98.52</i>
$\Delta = 3' 15" 216' (RT)$	$\Delta = 3' 15" 216' (RT)$
$D = 0' 2' 29.2"$	$D = 0' 2' 39.3"$
$L = 909.25'$	$L = 902.14'$
$T = 45.475'$	$T = 45.19'$
$R = 16,000.00'$	$R = 15,875.00'$
$SE = N.C.$	$SE = N.C.$
$V = 70 \text{ MPH}$	$V = 50 \text{ MPH}$

REVISIONS

0/21/2011
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-L-
PI Sta 529+02.07
 $\Delta = 3' 15' 21.6''$ (RT)
D = 0' 2' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'

-SBL2-
PI Sta 528+67.60
 $\Delta = 3' 15' 21.6''$ (RT)
D = 0' 2' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'
SE = N.C.
V = 70 MPH

-SR4-
PI Sta 89+05.63
 $\Delta = 3' 15' 21.6''$ (RT)
D = 0' 2' 19.2"
L = 916.35'
T = 458.30'
R = 16,125.00'
SE = N.C.
V = 50 MPH

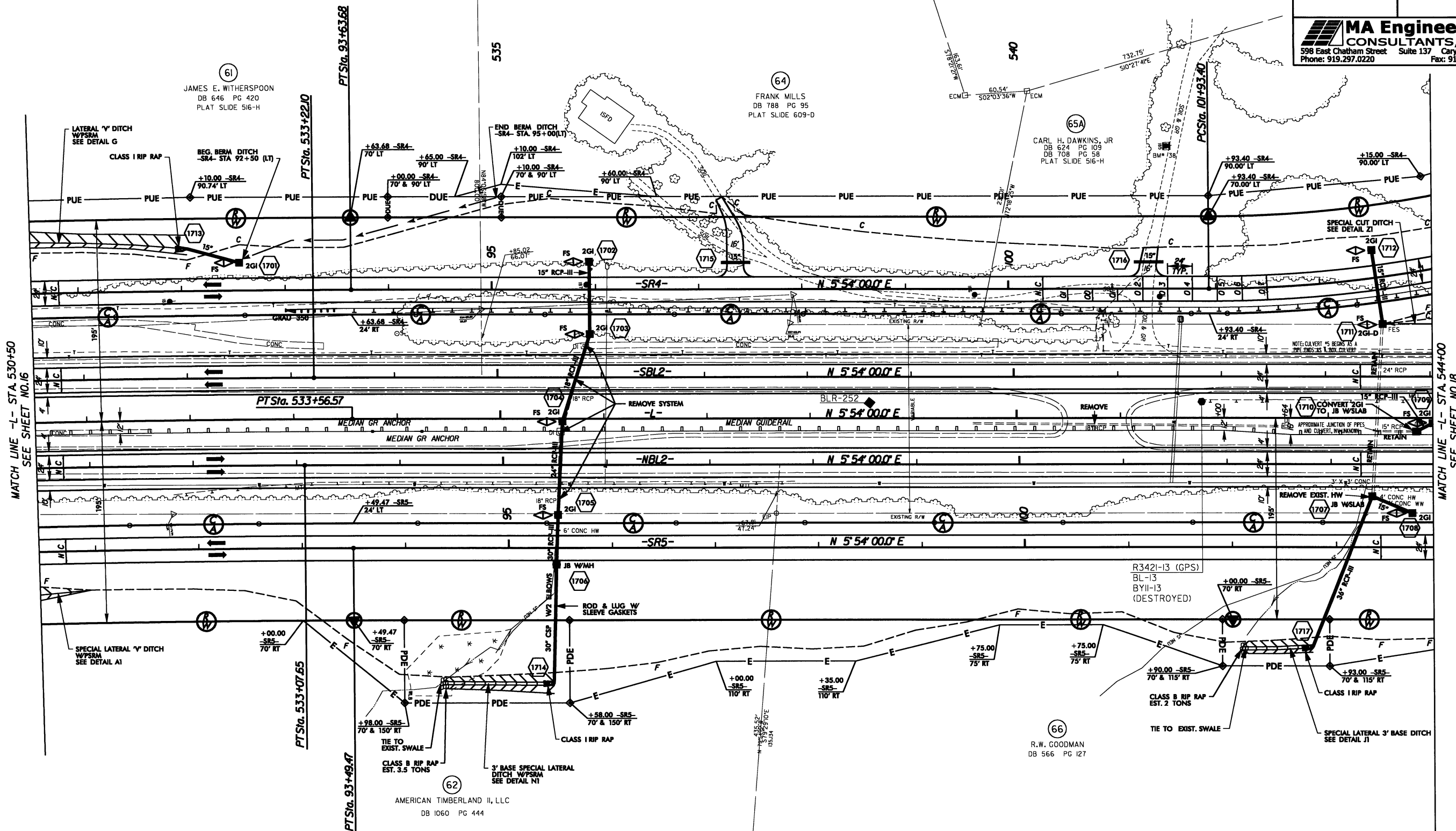
PI Sta 106+23.86
 $\Delta = 39' 28' 01.6''$ (LT)
D = 4' 46' 28.7"
L = 826.60'
T = 430.46'
R = 1,200.00'
SE = 0.07 f1/f1
RO = 168 ft
V = 50 MPH

ALL DRIVEWAY RADI ARE 10' UNLESS OTHERWISE NOTED.

SEE SHEET NOS. 38 AND 39 FOR -NBL- AND -SBL- PROFILES
SEE SHEET NOS. 61 AND 62 FOR -SR4- PROFILE
SEE SHEET NO. 66 FOR -SR5- PROFILE

PROJECT REFERENCE NO. R-3421C	SHEET NO. 17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

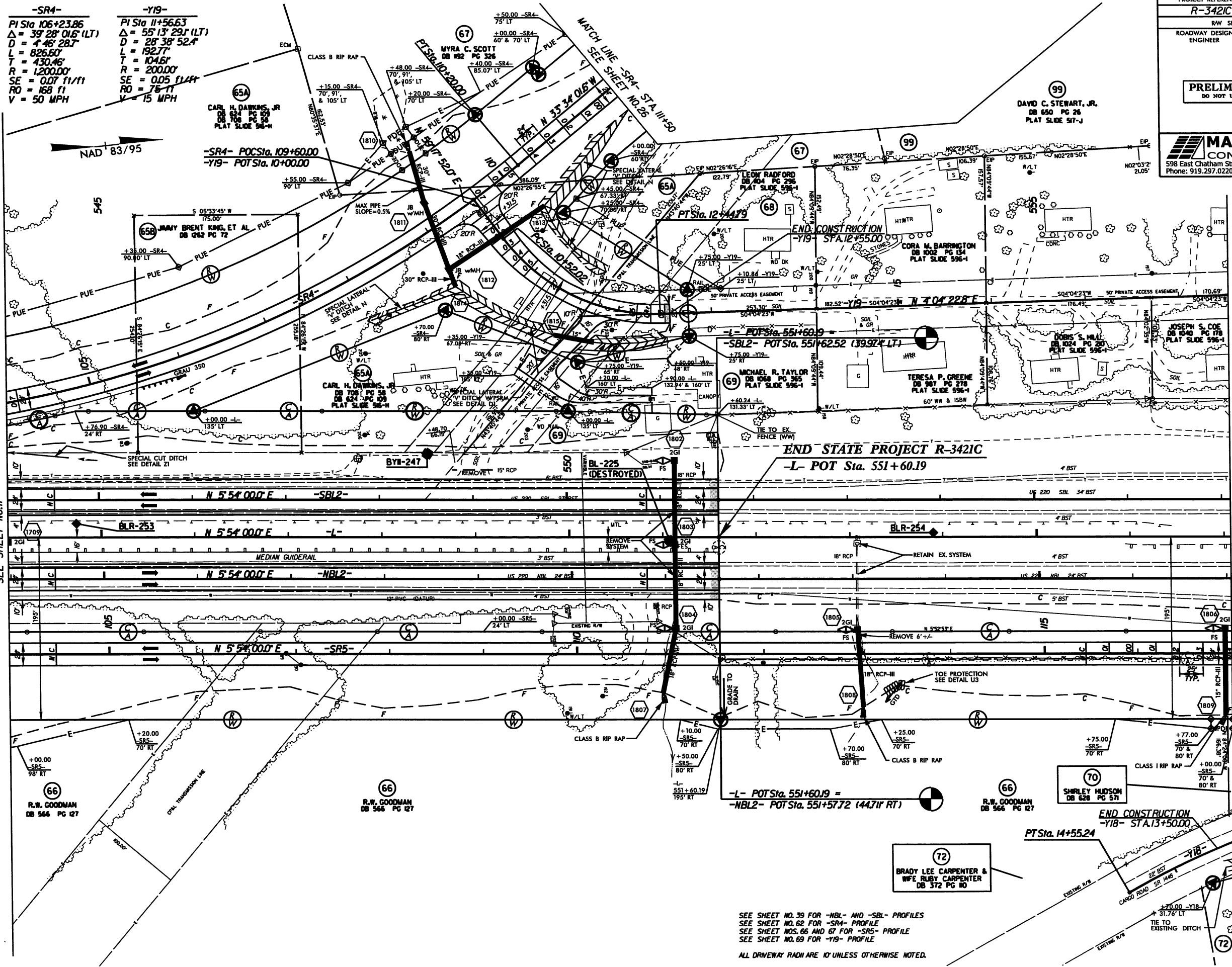
MA Engineering
CONSULTANTS, INC.
598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221



-NBL2-
PI Sta 528+53.15
 $\Delta = 3' 15' 21.6''$ (RT)
D = 0' 2' 29.2"
L = 909.25'
T = 454.75'
R = 16,000.00'
SE = N.C.
V = 70 MPH

-SR5-
PI Sta 88+98.52
 $\Delta = 3' 15' 21.6''$ (RT)
D = 0' 2' 39.3"
L = 902.14'
T = 451.19'
R = 15,875.00'
SE = N.C.
V = 50 MPH

PROJECT REFERENCE NO. R-3421C		SHEET NO. 18	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



REVISIONS

1. 05/20/2011 RHP R/W STATION/OFFSET LABEL REVISED TO SHOW OFFSET VALUE ON -Y18- AT EX. R/W. PERMANENT DRAINAGE & TEMPORARY CONSTRUCTION EASEMENT REVISED ON PARCEL 67.

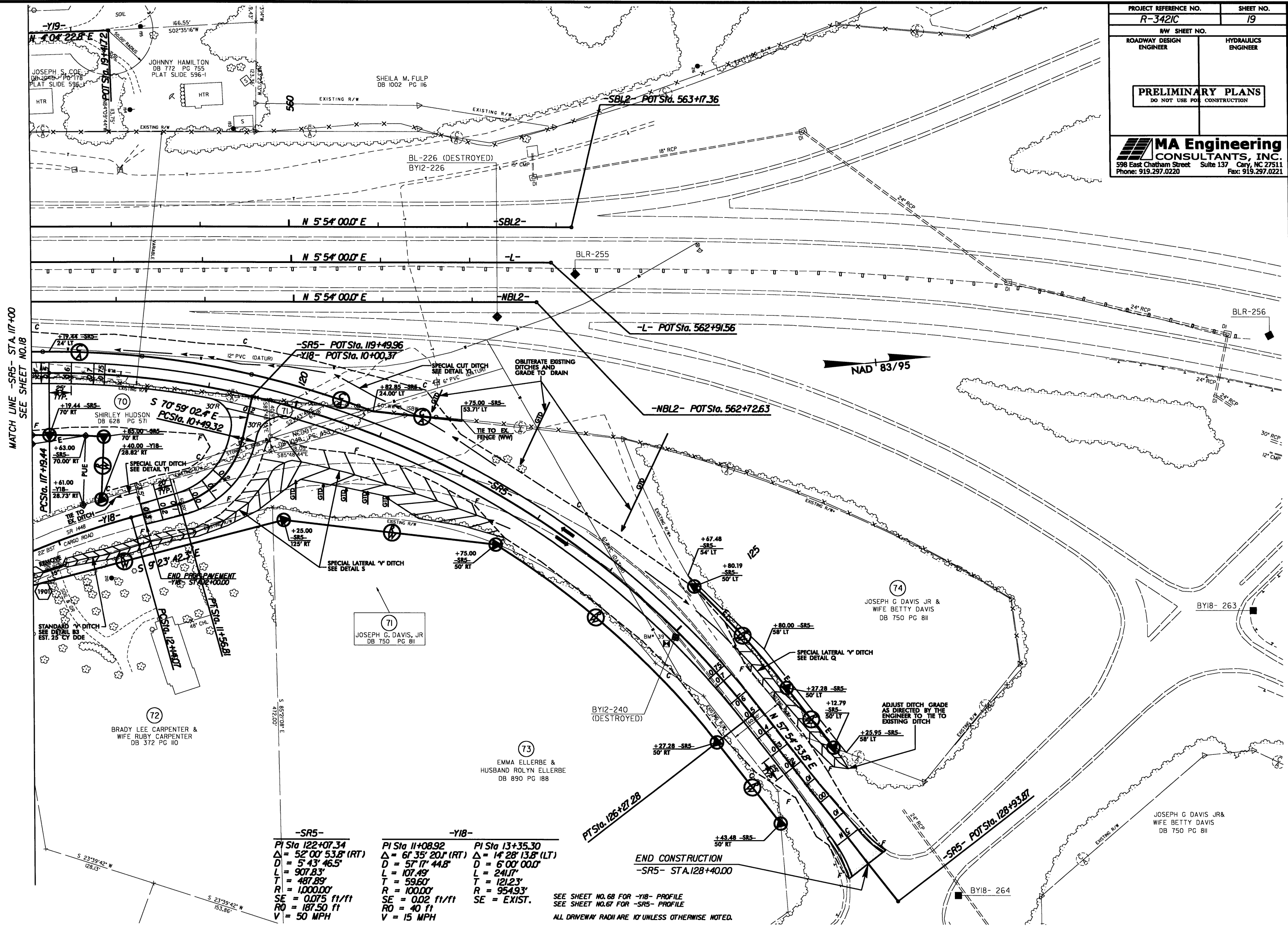
2. 05/20/2011 RHP R/W STATION/OFFSET LABEL REVISED TO SHOW OFFSET VALUE ON -Y18- AT EX. R/W. PERMANENT DRAINAGE & TEMPORARY CONSTRUCTION EASEMENT REVISED ON PARCEL 67.

3. 05/20/2011 RHP R/W STATION/OFFSET LABEL REVISED TO SHOW OFFSET VALUE ON -Y18- AT EX. R/W. PERMANENT DRAINAGE & TEMPORARY CONSTRUCTION EASEMENT REVISED ON PARCEL 67.

4. 05/20/2011 RHP R/W STATION/OFFSET LABEL REVISED TO SHOW OFFSET VALUE ON -Y18- AT EX. R/W. PERMANENT DRAINAGE & TEMPORARY CONSTRUCTION EASEMENT REVISED ON PARCEL 67.

SEE SHEET NO. 39 FOR -NBL- AND -SBL- PROFILES
 SEE SHEET NO. 62 FOR -SR4- PROFILE
 SEE SHEET NOS. 66 AND 67 FOR -SR5- PROFILE
 SEE SHEET NO. 69 FOR -Y19- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



REVISIONS

R/W & EASEMENT STATION/OFFSET LABELS REVERSED TO SHOW STATION AND OFFSET VALUES ON -YB- & -SOS- AT EX.D/L.

10/21/2011
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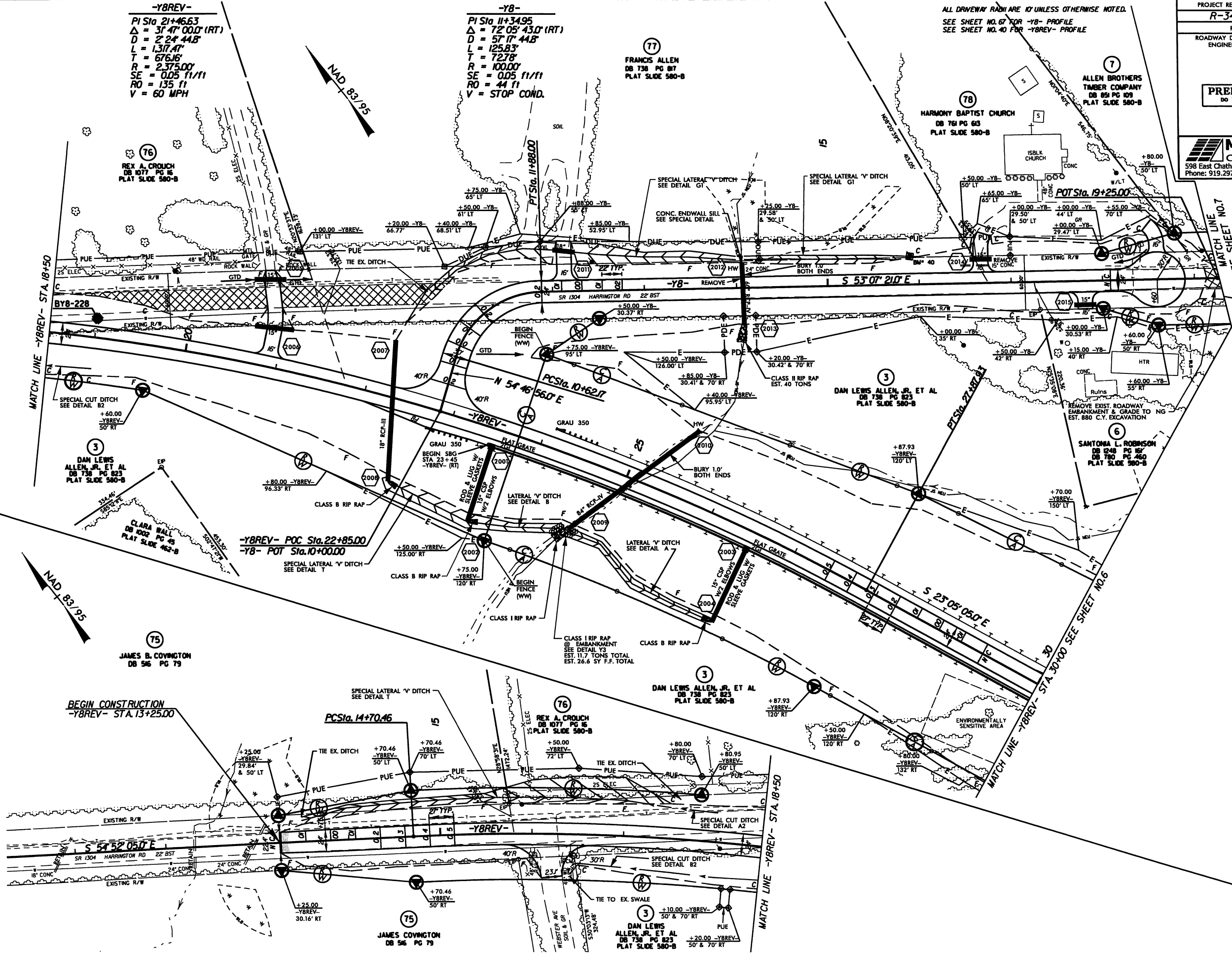
8/12/2009

-Y8REV-
PI Sta 21+46.63
 $\Delta = 31' 47" 00.0'$ (RT)
D = 2' 24' 44.8"
L = 1317.47'
T = 676.16'
R = 2375.00'
SE = 0.05 11/11
RO = 135 ft
V = 60 MPH

-Y8-
PI Sta 11+34.95
 $\Delta = 72' 05' 43.0'$ (RT)
D = 57' 17' 44.8"
L = 125.83'
T = 72.78'
R = 100.00'
SE = 0.05 11/11
RO = 44 ft
V = STOP COND.

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.
SEE SHEET NO. 67 FOR -Y8- PROFILE
SEE SHEET NO. 40 FOR -Y8REV- PROFILE

PROJECT REFERENCE NO. R-3421C		SHEET NO. 20	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
MA Engineering CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221			



REVISIONS

1. 08/12/2009 RHP R/W & EASEMENT STATION/offset labels revised to show station and offset values on -Y8- & -Y8REV- at EX. R/W.
2. 08/12/2009 RHP R/W PROPERTY OWNER NAME & DEED BOOK CHANGED ON PARCEL 6.
3. 08/12/2009 RHP PERMANENT UTILITY EASEMENT ADDED ON PARCEL 3. MATCHLINE REVISED TO -Y8REV- B-H/L.

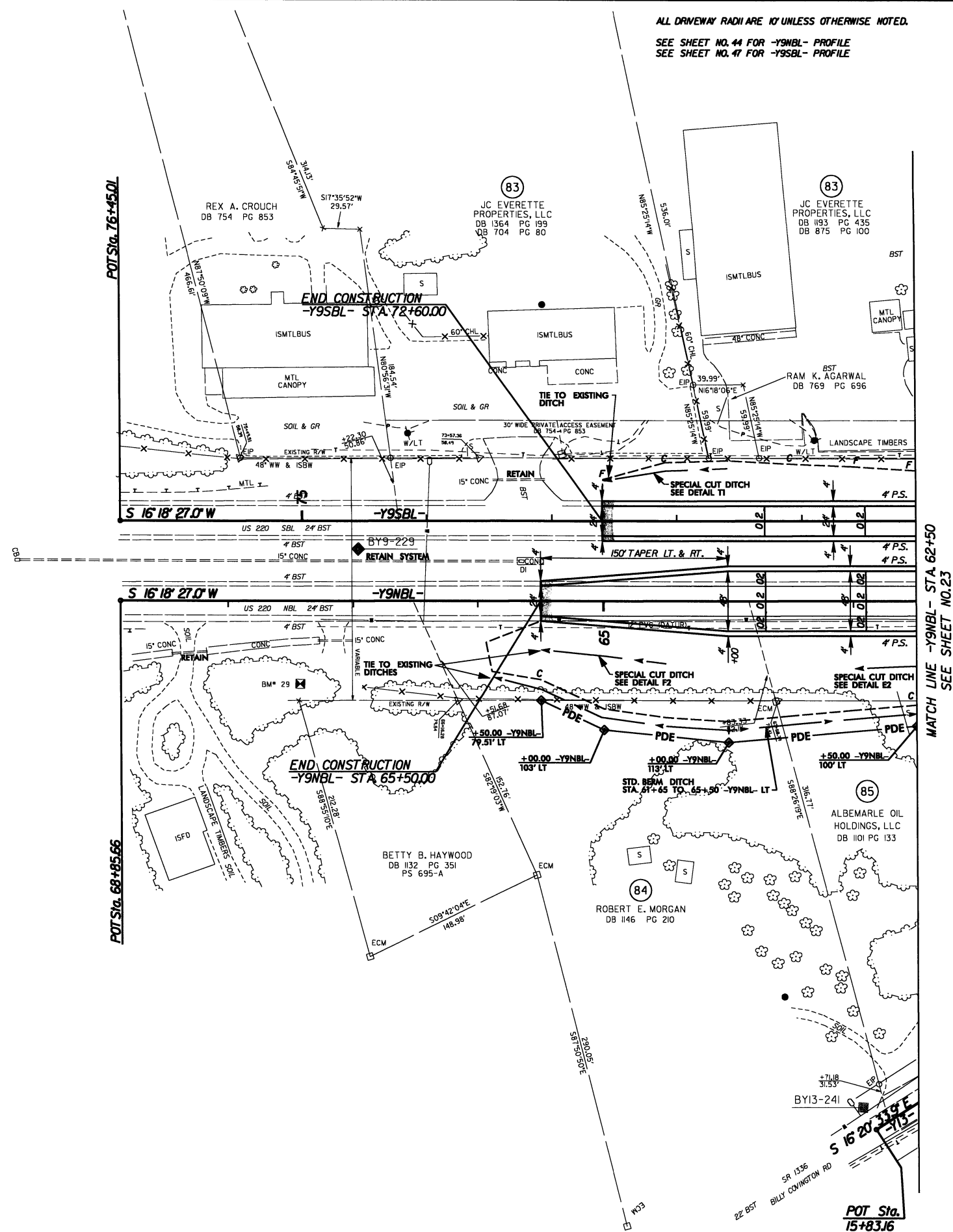
28-NOV-2011 10:33
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2/22/2011
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5:42:27 PM

REVISIONS

6660/KZ/8



PROJECT REFERENCE NO.	SHEET NO.
<i>R-3421C</i>	<i>22</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<div style="border: 1px solid black; padding: 10px; text-align: center;"> PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION </div>	
 <div style="display: inline-block; vertical-align: middle;"> MA Engineering CONSULTANTS, INC. 598 East Chatham Street Phone: 919.297.0220 </div> <div style="display: inline-block; vertical-align: middle; margin-left: 20px;"> Suite 137 Cary, NC 27511 Fax: 919.297.0221 </div>	

**= N.C.
60 MPH**

PROJECT REFERENCE NO.
R-3421C

SHEET NO.
24

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

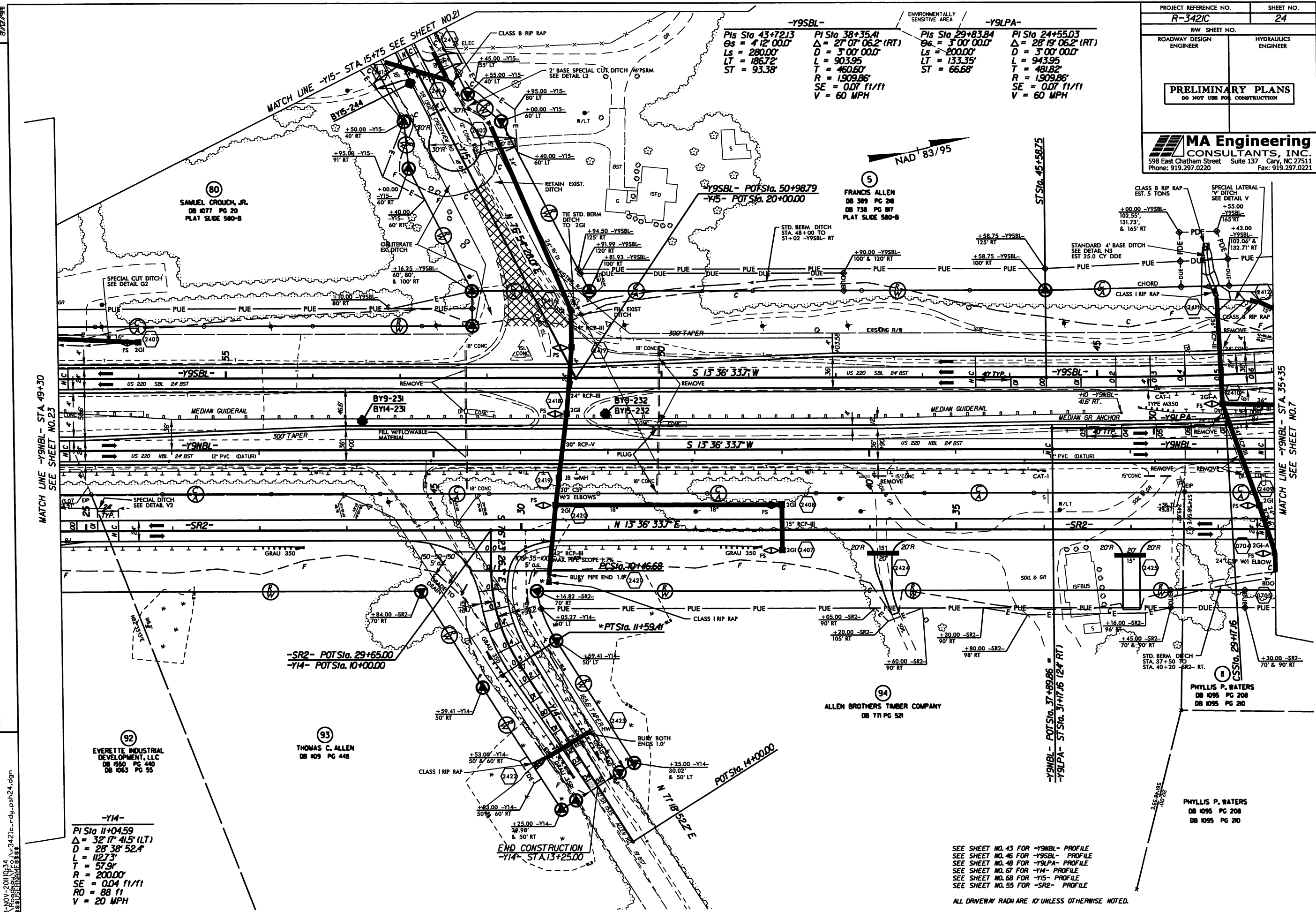
HYDRAULICS ENGINEER

PRELIMINARY PLANS

DO NOT USE FOR CONSTRUCTION

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Phone: 919.297.0220 Fax: 919.297.0221



REVISIONS

06/27/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION

06/27/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION

06/27/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION
07/20/2008 RWP R/W STAT/offset LINES REVISED TO SHOW OFFSET VALUES ON -YH- AT ELEVATION

-Y14-
PI Sta 11+04.59
Δ = 32° 17' 41.5" (LT)
D = 28° 38' 52.4"
L = 112.73'
T = 57.9'
R = 200.00'
SE = 0.04 f1/f1
RO = 88 f1
V = 20 MPH

SEE SHEET NO. 43 FOR -Y9NBL- PROFILE
SEE SHEET NO. 46 FOR -Y9SBL- PROFILE
SEE SHEET NO. 48 FOR -Y9LPA- PROFILE
SEE SHEET NO. 67 FOR -Y14- PROFILE
SEE SHEET NO. 68 FOR -Y15- PROFILE
SEE SHEET NO. 55 FOR -SR2- PROFILE

ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.
R-342/C

SHEET NO.
25

R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

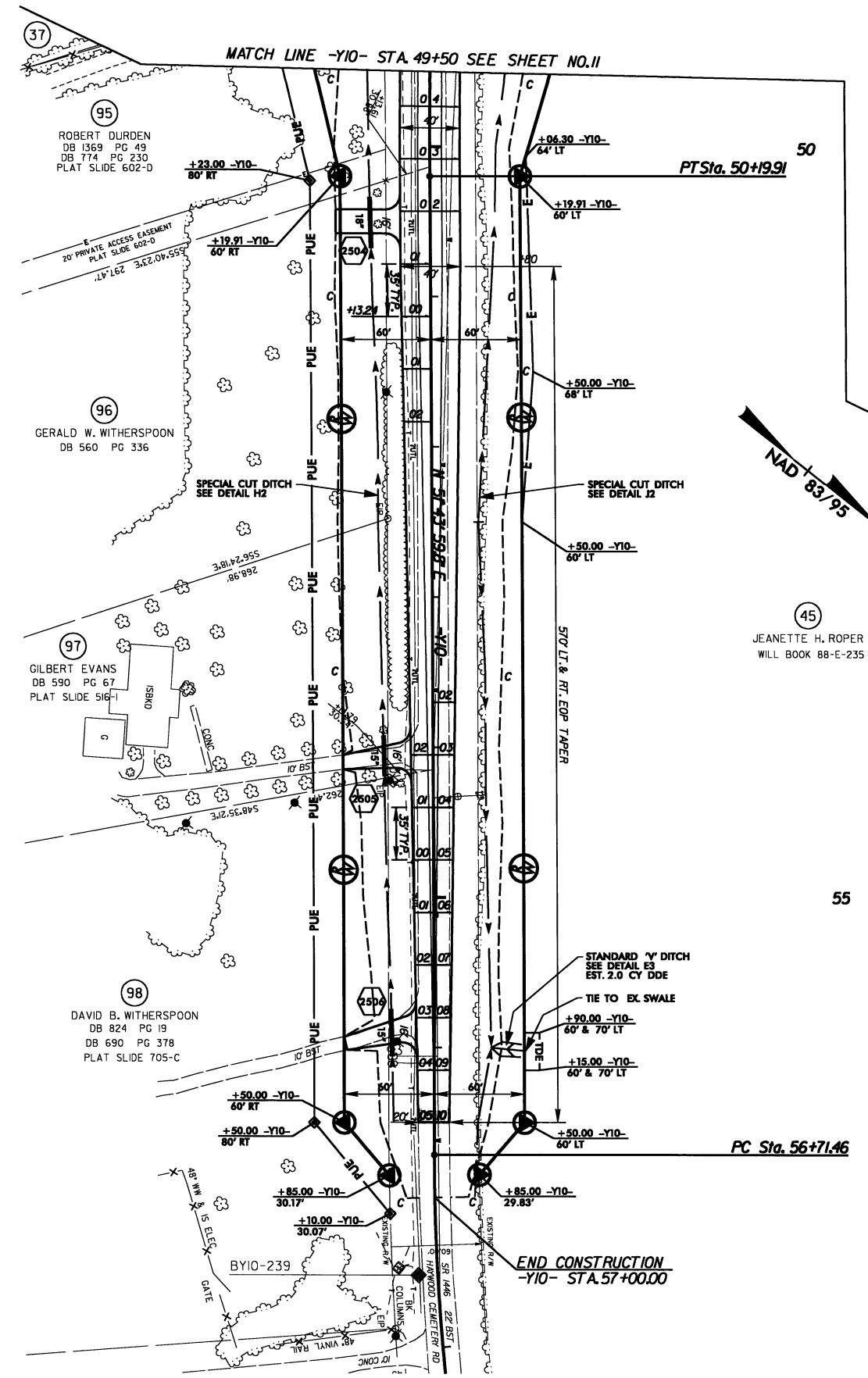
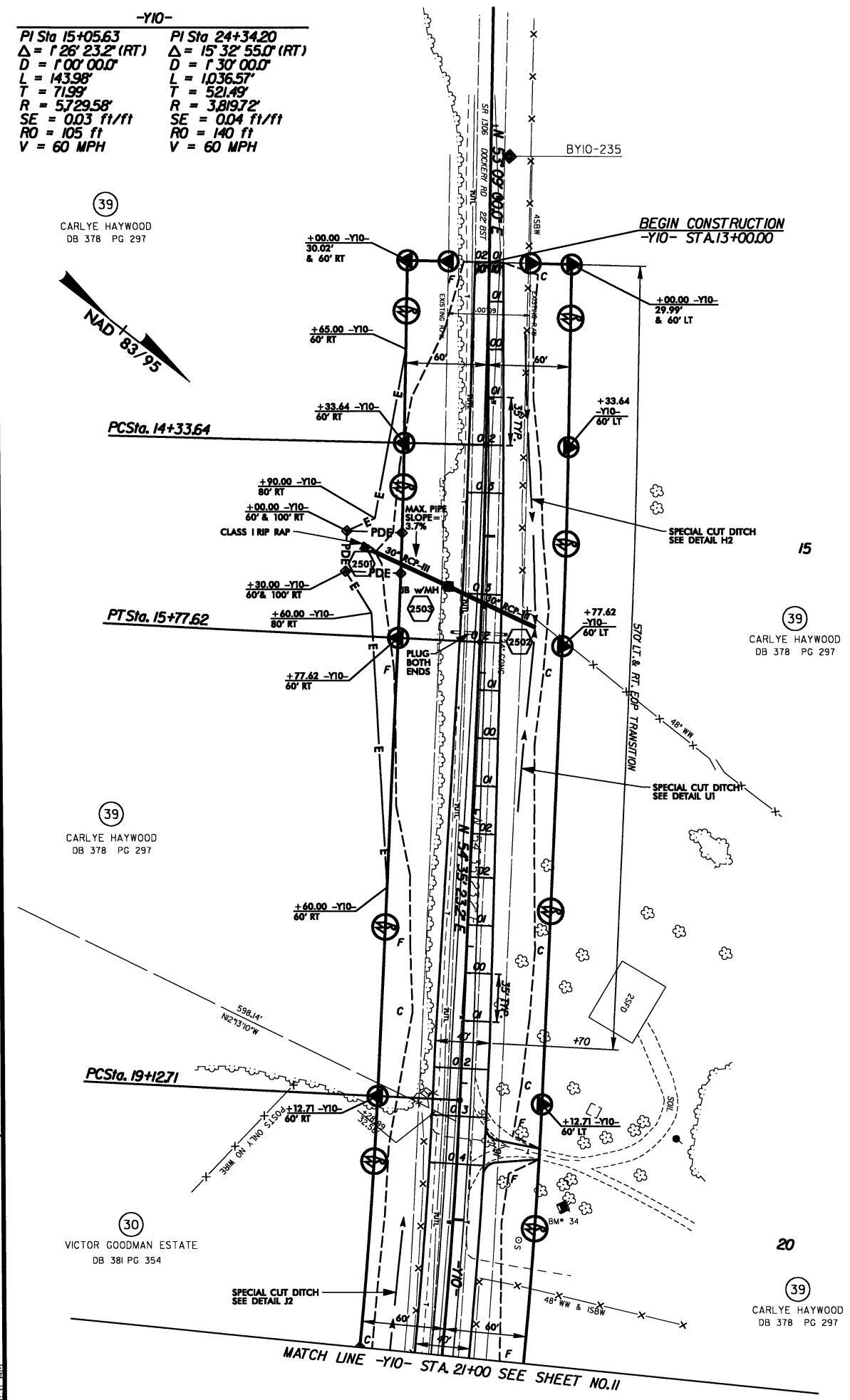
HYDRAULICS
ENGINEER

PRELIMINARY PLANS

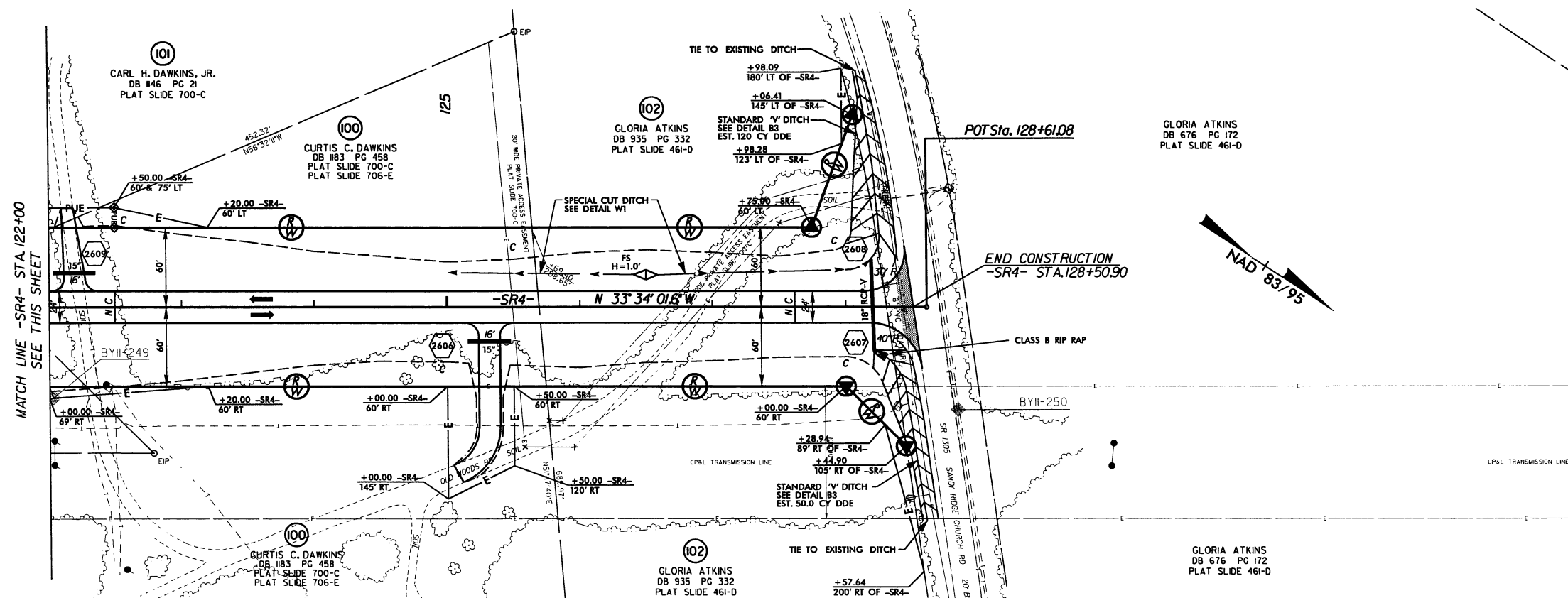
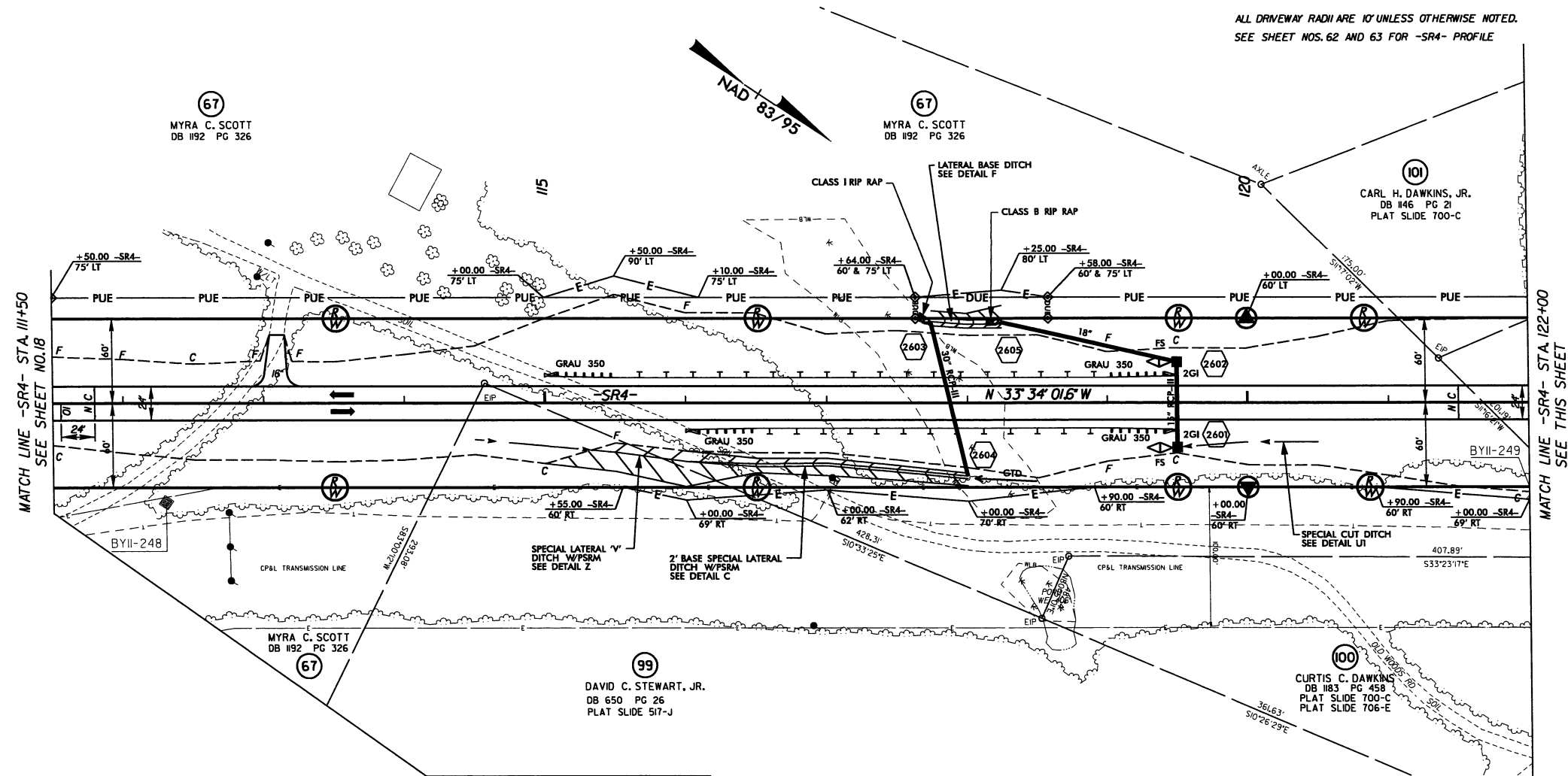
DO NOT USE FOR CONSTRUCTION

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Phone: 919.297.0220 Fax: 919.297.0221



SEE SHEET NOS. 49-51 FOR -Y10- PROFILE
ALL DRIVEWAY RADII ARE 10' UNLESS OTHERWISE NOTED.



DATE REVISION	BY	REASON	REVISIONS
09/02/2017	RMP	RUN & USUALLY STATEMENT/SPEC LABELS REVISED TO SHOW STATION VALUES ON -SR#- AT POINT A 12.6-M/M PERMANENT FRAMEWORK & TEMPORARY CONSTRUCTION EASEMENT REVISED ON PARCEL 67 DUE TO SLOPE AND DRAINAGE CHANGES (-5.84' -M470) - M495, L1/L2, PERMANENT FRAMEWORK EASEMENTS ADDED TO PARCELS 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 8	

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**MA Engineering**
CONSULTANTS, INC.
598 East Chatham Street
Phone: 919.297.0220

Suite 137
Cary, NC 27511
Fax: 919.297.0221

PROJECT REFERENCE NO.
R-342/C

SHEET NO.
27

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM* 27
-L- STA 359+68.44 (1217' RT)
ELEV. 421.54

BEGIN TIP PROJECT R-342/C
END TIP PROJECT R-342/B
BEGIN GRADE
-L- STA 355+00.00 (35' LT. & RT.)
EL. 400.30

PROPOSED GRADE BY OTHERS
(FOR STATE PROJECT R-342/B)

(-11.2781%)

(-11.2781%)

EXISTING GROUND PROFILE, ALONG -L- CENTERLINE.

355

356

357

358

359

360

361

362

-L- LEFT & RIGHT

BM* 28
-L- STA 371+99.31 (118.24' RT)
ELEV. 410.51

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 0633		
DRAINAGE AREA	= 1.0	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 3.8	CFS
DESIGN HW ELEVATION	= 368.3	FT
100 YEAR DISCHARGE	= 41	CFS
100 YEAR HW ELEVATION	= 368.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 57+	CFS
OVERTOPPING ELEVATION	= 370.0	FT

(-11.2781%)

EXISTING GROUND PROFILE, ALONG -L- CENTERLINE.

362

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PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 0635

DRAINAGE AREA = 157 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 30 CFS
DESIGN HW ELEVATION = 370.2 FT
100 YEAR DISCHARGE = 34 CFS
100 YEAR HW ELEVATION = 370.6 FT
OVERTOPPING FREQUENCY = 25+ YRS
OVERTOPPING DISCHARGE = 28 CFS
OVERTOPPING ELEVATION = 370.0 FT

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO. 0637

DRAINAGE AREA = 55.0 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 93 CFS
DESIGN HW ELEVATION = 356.9 FT
100 YEAR DISCHARGE = 110 CFS
100 YEAR HW ELEVATION = 357.6 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 160+ CFS
OVERTOPPING ELEVATION = 367.2 FT

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PROJECT REFERENCE NO.

R-3421C

SHEET NO.

28

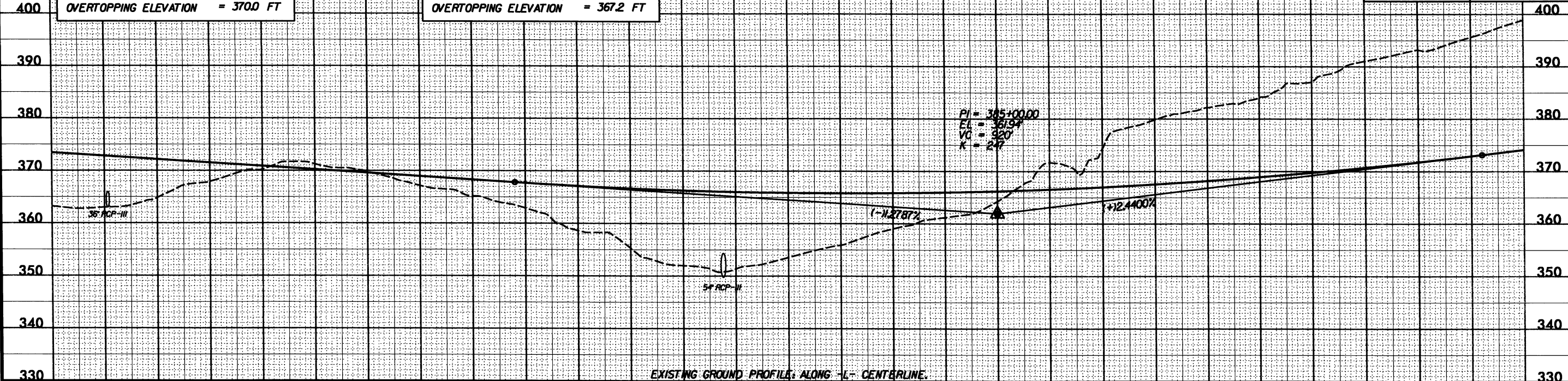
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

PRELIMINARY PLANS

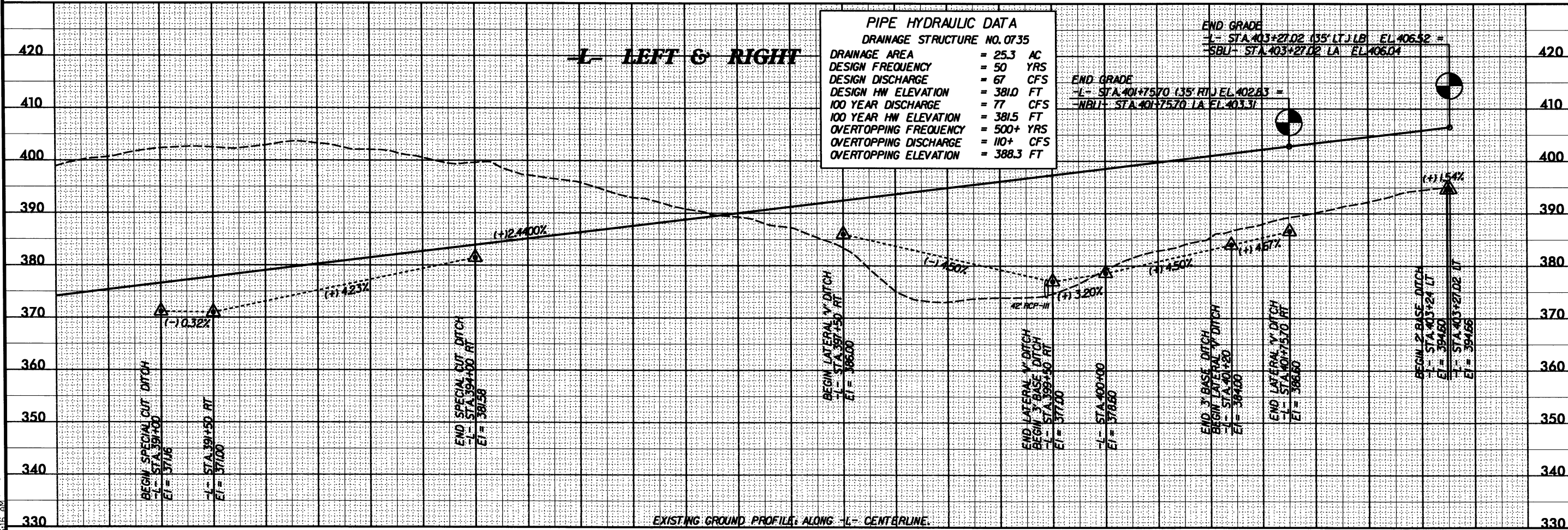
DO NOT USE FOR CONSTRUCTION

L- LEFT & RIGHT



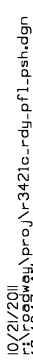
EXISTING GROUND PROFILE: ALONG -L- CENTERLINE.

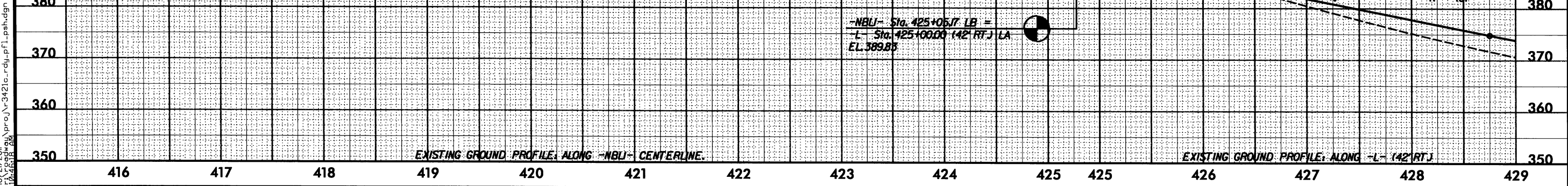
L- LEFT & RIGHT



EXISTING GROUND PROFILE: ALONG -L- CENTERLINE.

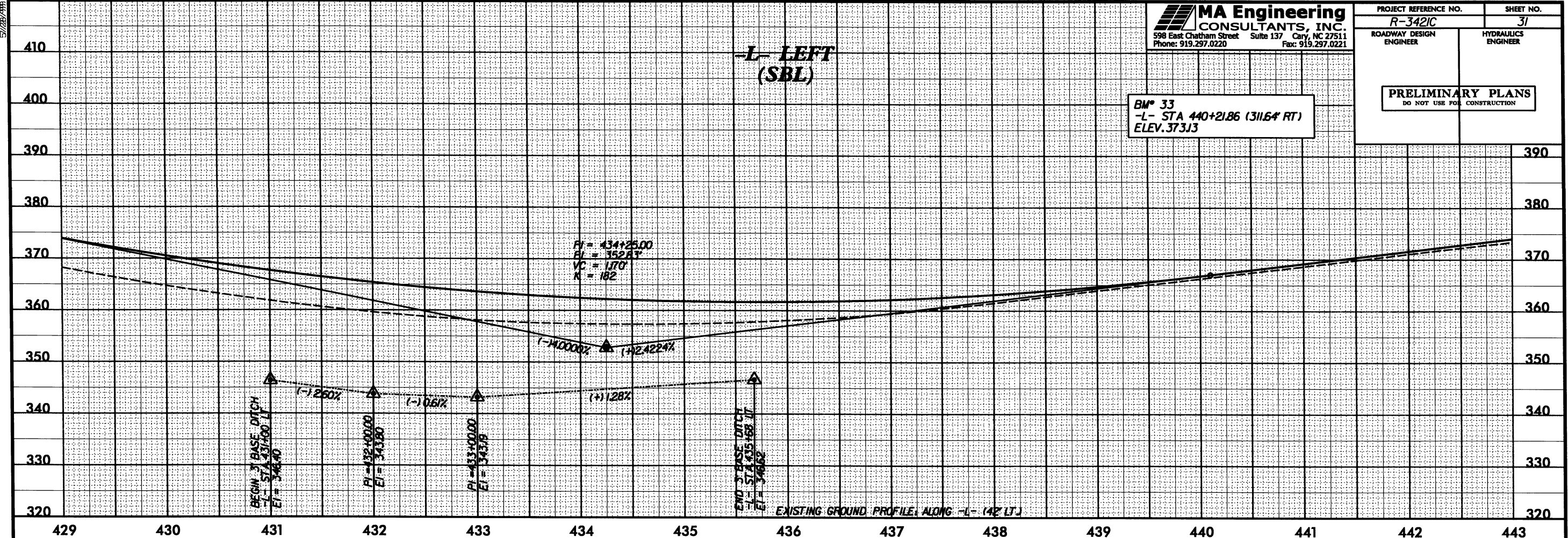
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BM# 33
-L- STA 440+21.86 (311.64' RT)
ELEV. 373.13

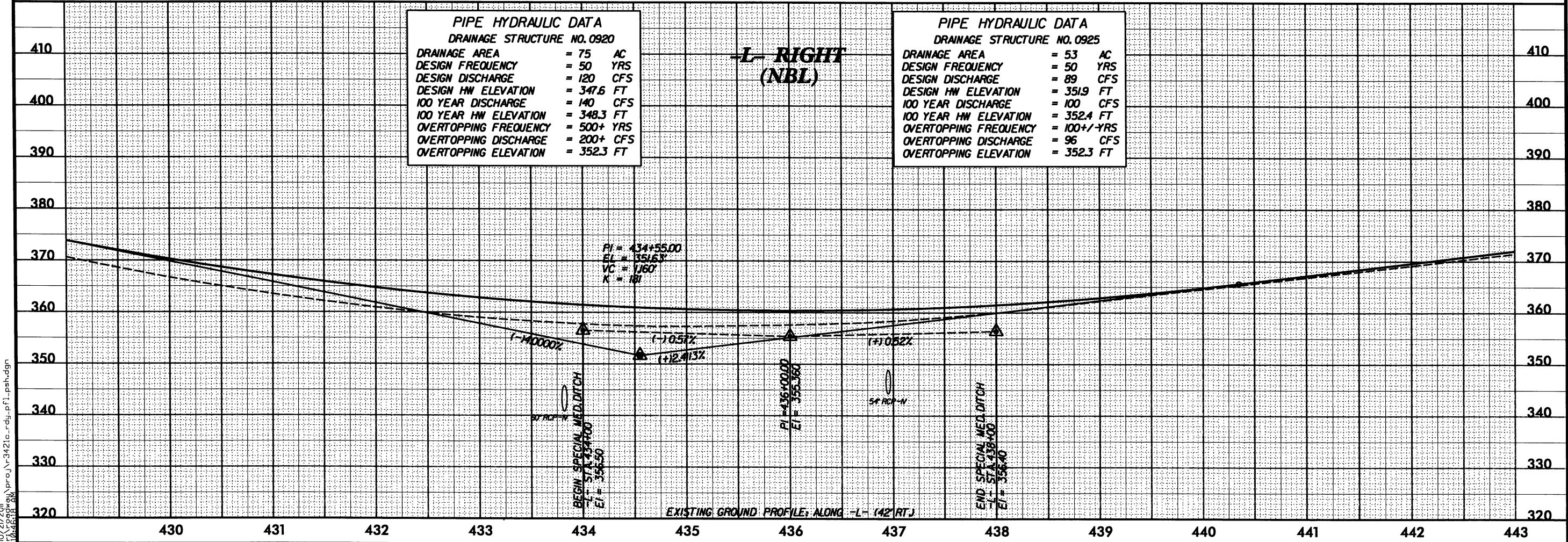


PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0920

DRAINAGE AREA	= 75	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 120	CFS
DESIGN HW ELEVATION	= 347.6	FT
100 YEAR DISCHARGE	= 140	CFS
100 YEAR HW ELEVATION	= 348.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 200+	CFS
OVERTOPPING ELEVATION	= 352.3	FT

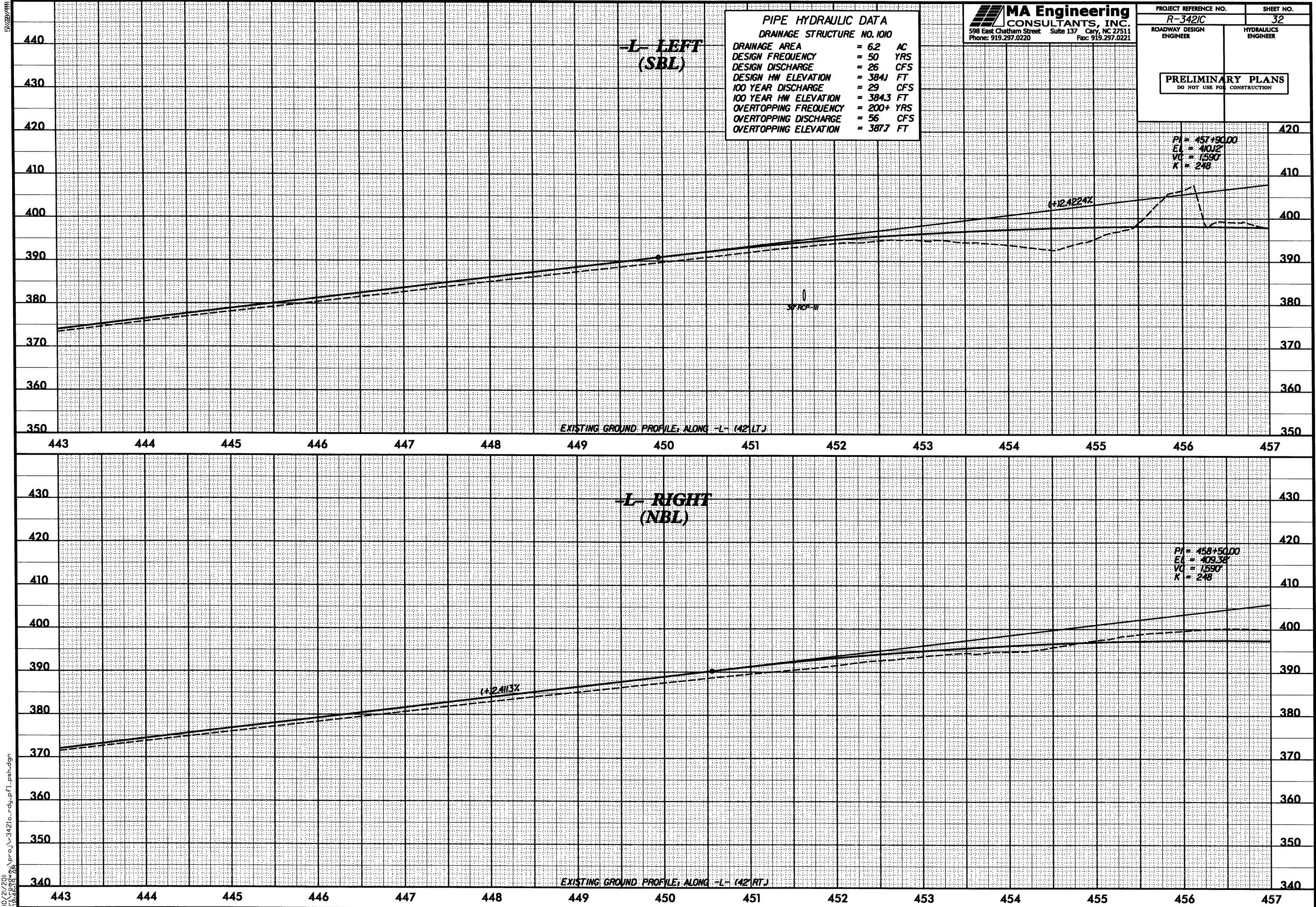
PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 0925

DRAINAGE AREA	= 53	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 89	CFS
DESIGN HW ELEVATION	= 351.9	FT
100 YEAR DISCHARGE	= 100	CFS
100 YEAR HW ELEVATION	= 352.4	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 96	CFS
OVERTOPPING ELEVATION	= 352.3	FT



5/28/19H

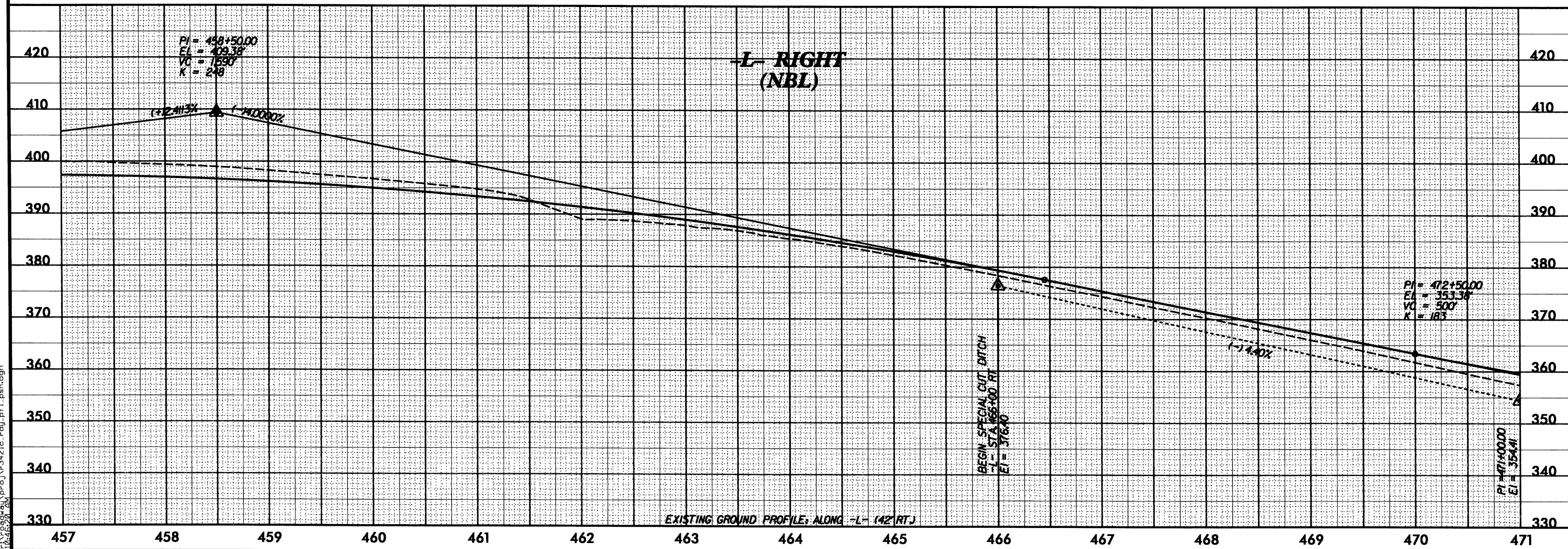
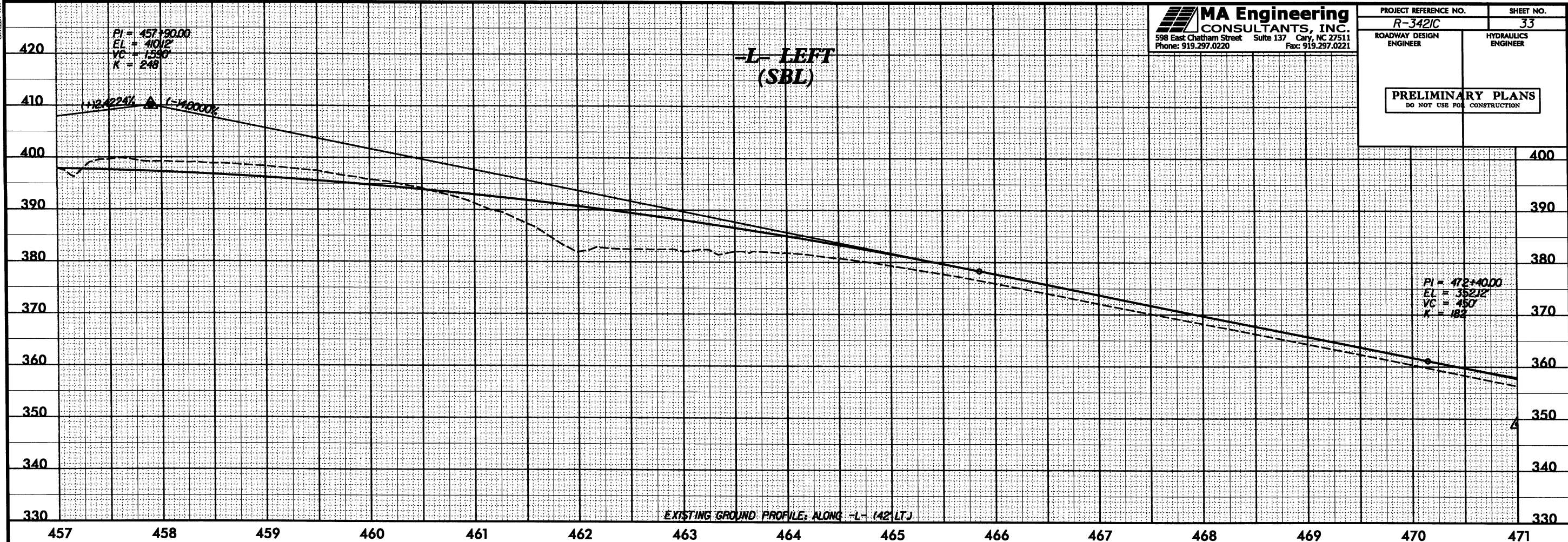
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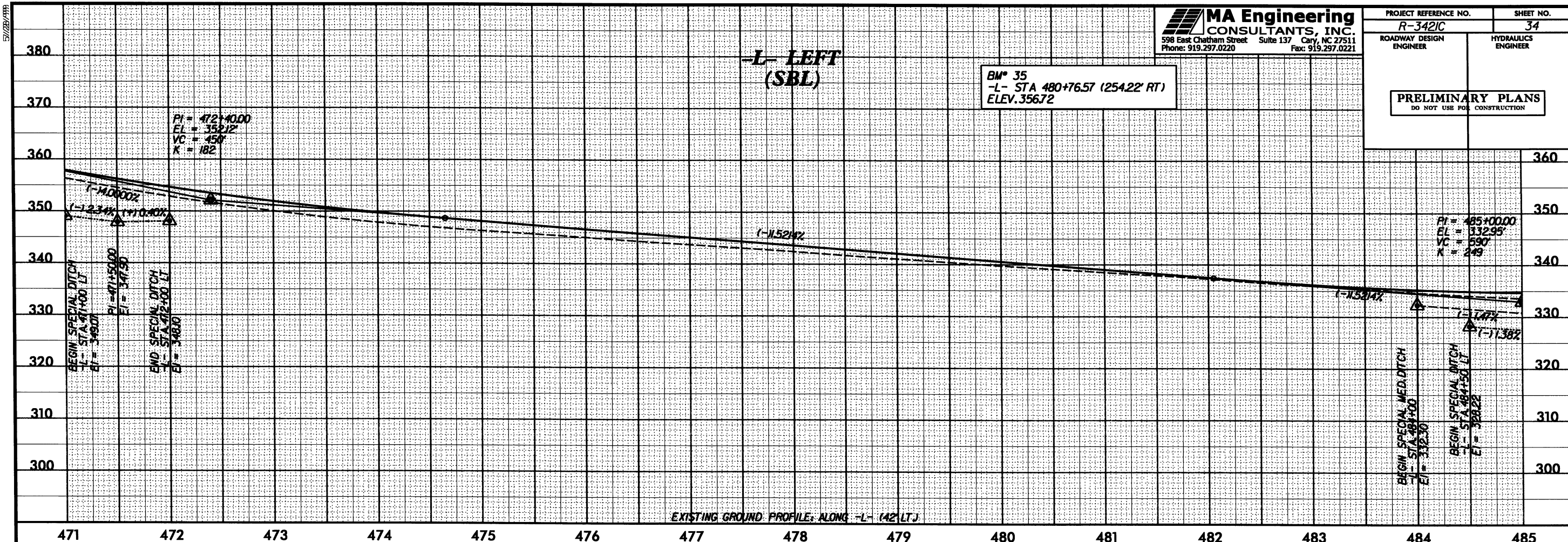
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598 East Chatham Street Suite 137 Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO. R-342C		SHEET NO. 33	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



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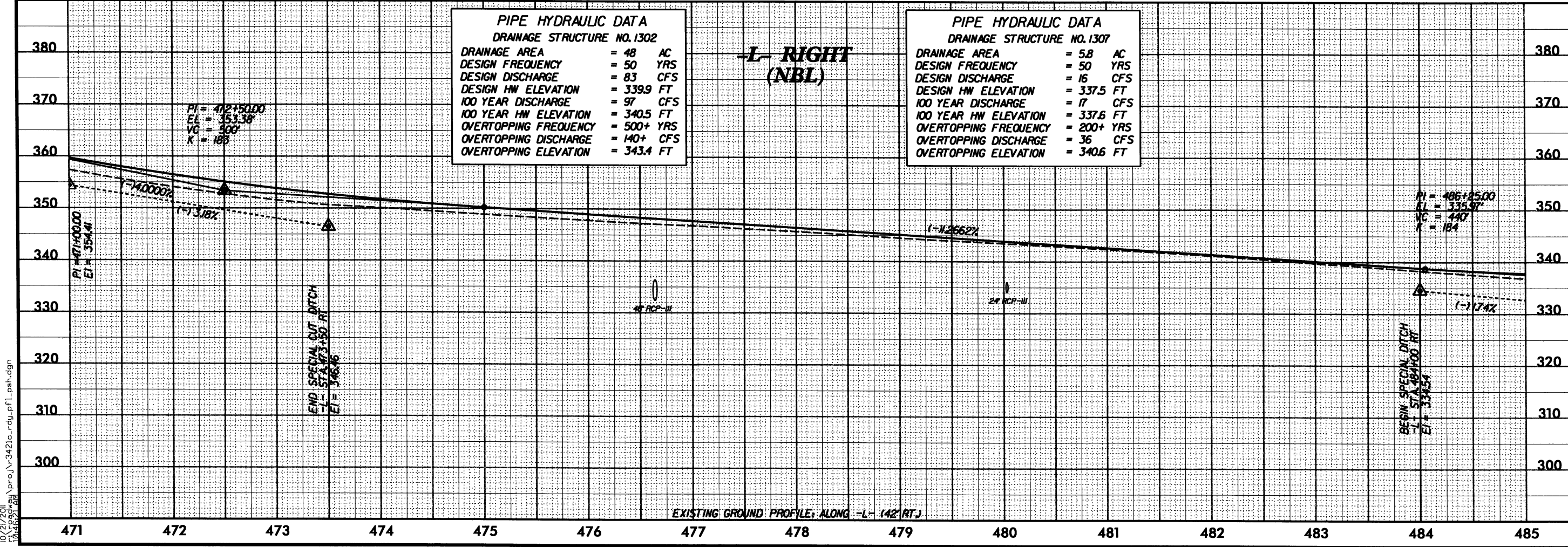


PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1302

DRAINAGE AREA	= 48	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 83	CFS
DESIGN HW ELEVATION	= 339.9	FT
100 YEAR DISCHARGE	= 97	CFS
100 YEAR HW ELEVATION	= 340.5	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 140+	CFS
OVERTOPPING ELEVATION	= 343.4	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1307

DRAINAGE AREA	= 5.8	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 16	CFS
DESIGN HW ELEVATION	= 337.5	FT
100 YEAR DISCHARGE	= 17	CFS
100 YEAR HW ELEVATION	= 337.6	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 36	CFS
OVERTOPPING ELEVATION	= 340.6	FT



5/28/99

BM# 36
-L- STA 497+62.98 (533.66' RT)
ELEV. 387.55

PI = 497+80.00
EI = 343.82
VC = 1200'
K = 304

(+0.8492%) (-13.0992%)

PI = 485+00.00
EI = 332.95
VC = 590'
K = 249

(-1.1414%) (-1.1382%)

PI = 485+37.00
EI = 330.250
PI = 485+60.00
EI = 325.70

END SPECIAL MED. DITCH
-L- STA 487+50
EI = 331.82

END SPECIAL DITCH
-L- STA 489+50 LT
EI = 330.85

(+0.8492%)

(+1.062%)

(+1.074%)

EXISTING GROUND PROFILE: ALONG -L- (42' LT.)

485 486 487 488 489 490 491 492 493 494 495 496 497 498 499

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1316

DRAINAGE AREA = 75 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 126 CFS
DESIGN HW ELEVATION = 325.2 FT
100 YEAR DISCHARGE = 146 CFS
100 YEAR HW ELEVATION = 326.2 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 211+ CFS
OVERTOPPING ELEVATION = 334.3 FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1403

DRAINAGE AREA = 53.4 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 89 CFS
DESIGN HW ELEVATION = 328.2 FT
100 YEAR DISCHARGE = 103 CFS
100 YEAR HW ELEVATION = 328.8 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 149+ CFS
OVERTOPPING ELEVATION = 334.3 FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1408

DRAINAGE AREA = 4.5 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 23 CFS
DESIGN HW ELEVATION = 339.0 FT
100 YEAR DISCHARGE = 25 CFS
100 YEAR HW ELEVATION = 339.2 FT
OVERTOPPING FREQUENCY = 100+/- YRS
OVERTOPPING DISCHARGE = 26 CFS
OVERTOPPING ELEVATION = 342J FT

-L- RIGHT
(NBL)

PI = 497+50.00
EI = 348.68
VC = 1480'
K = 331

(+0.236%) (-13.0846%)

PI = 486+25.00
EI = 335.91
VC = 440'
K = 184

(-1.2662%) (-1.11298%)

PI = 485+15.00
EI = 332.54
60' RCP III

PI = 488+00.00
EI = 334.34

PI = 489+00.00
EI = 333.74
54' RCP III

END SPECIAL DITCH
-L- STA 490+50 RT
EI = 335.9

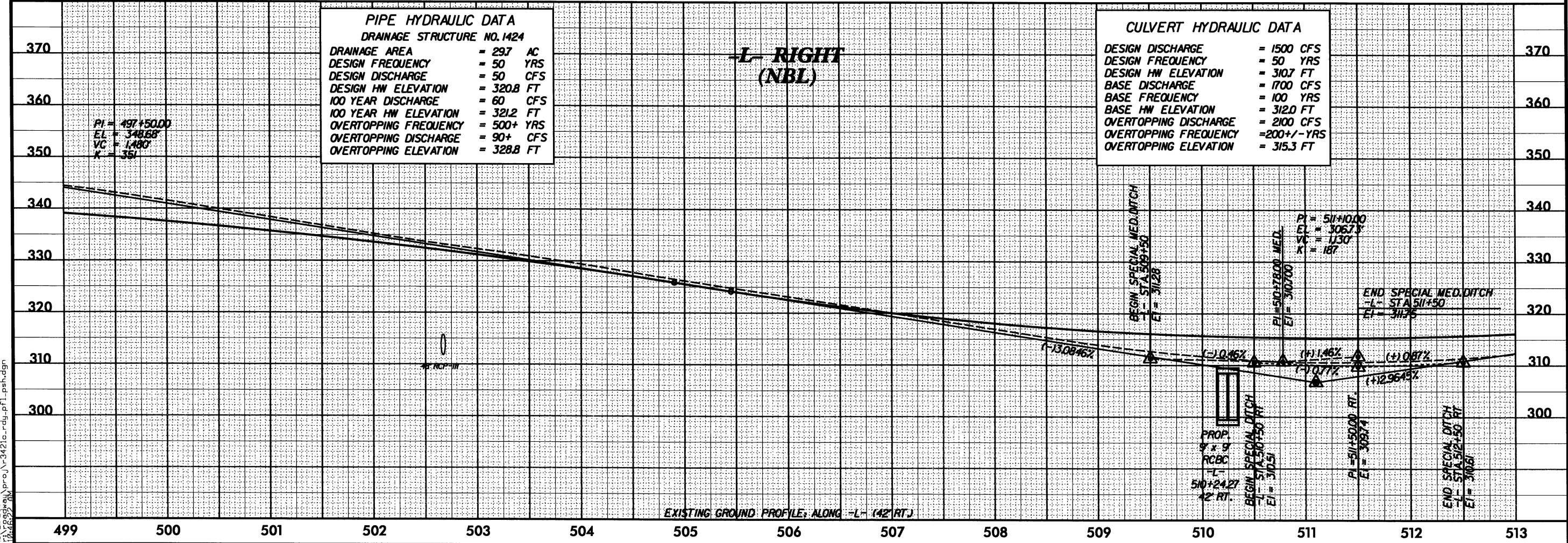
(-1.060%)

(+1.145%)

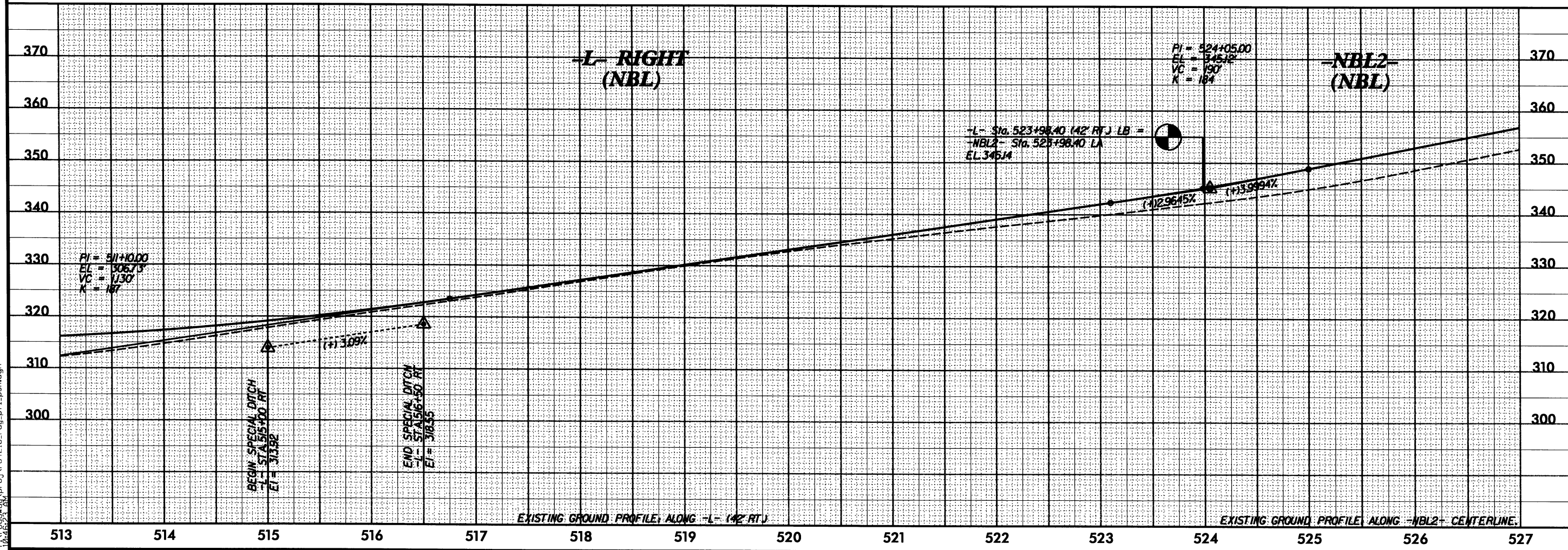
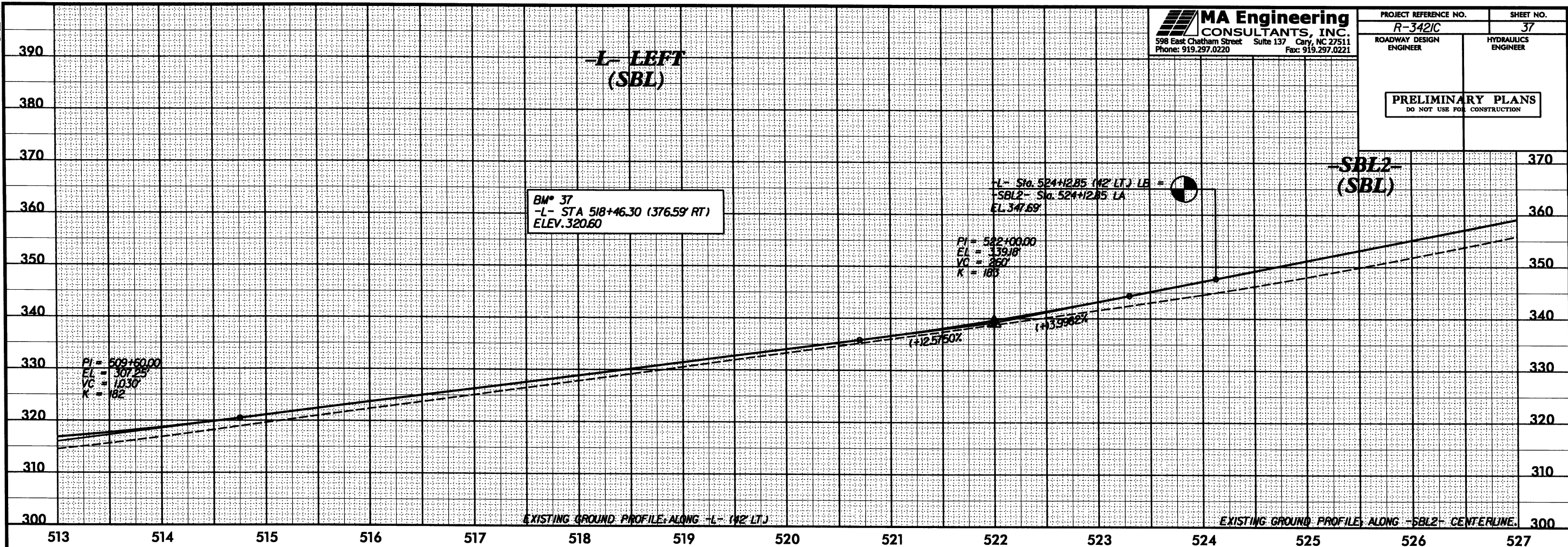
(+1.063%)

EXISTING GROUND PROFILE: ALONG -L- (42' RT.)

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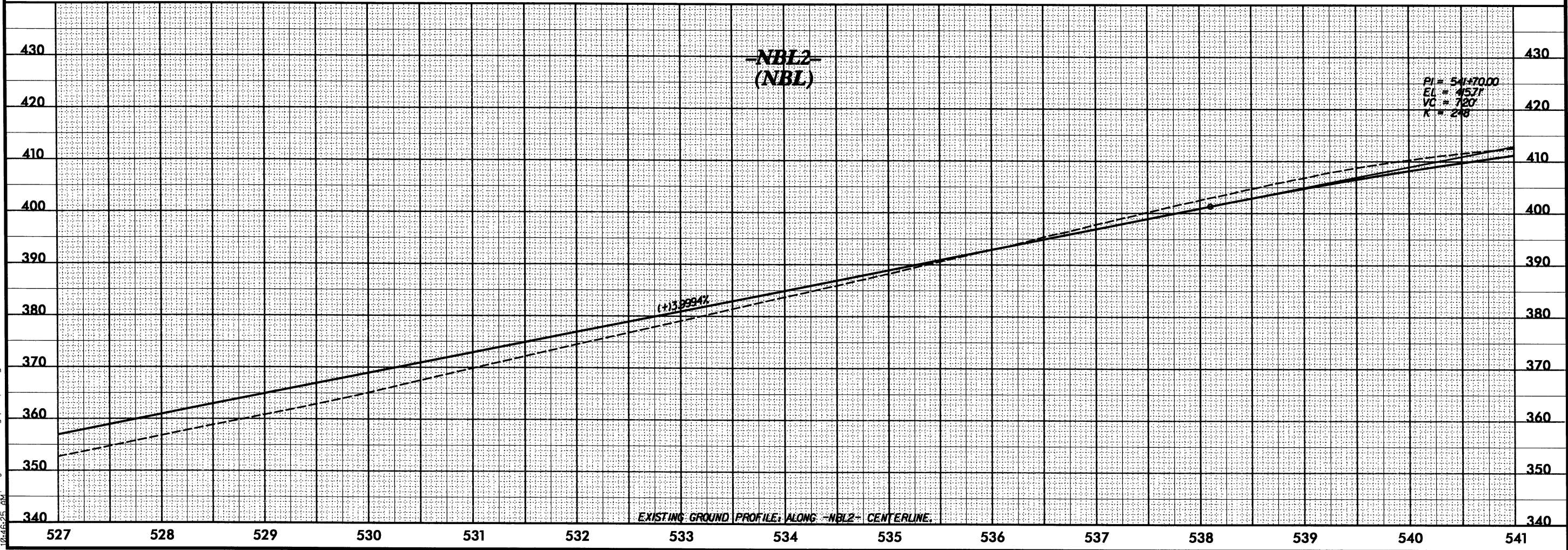
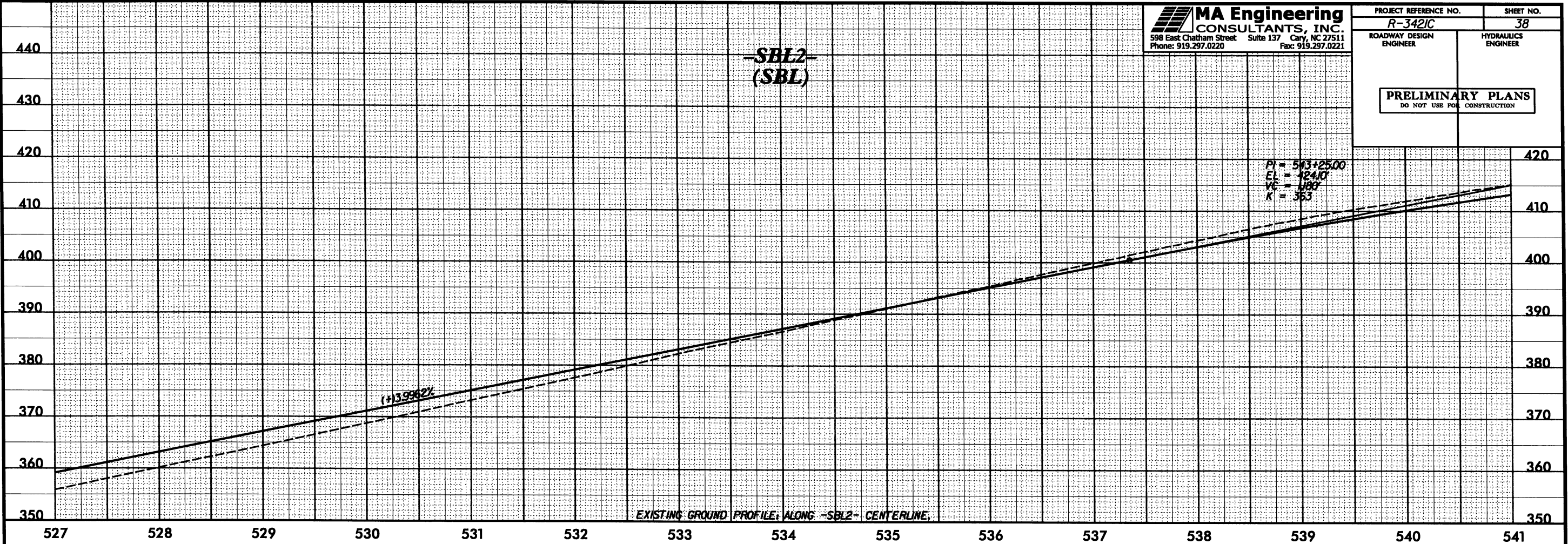
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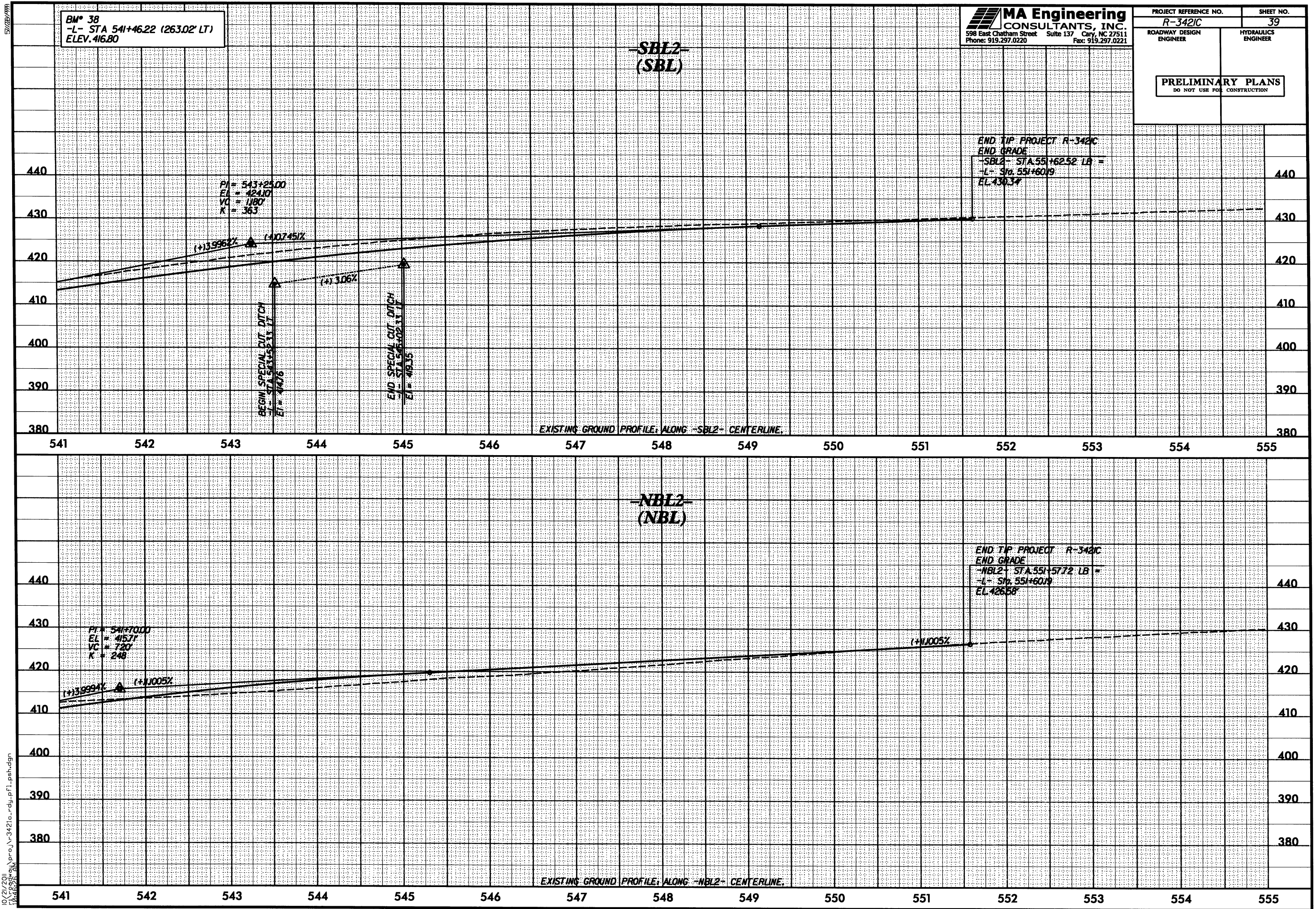
598 East Chatham Street Suite 137 Cary, NC 27511

Phone: 919.297.0220 Fax: 919.297.0221

PROJECT REFERENCE NO.		SHEET NO.
R-3421C		38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		

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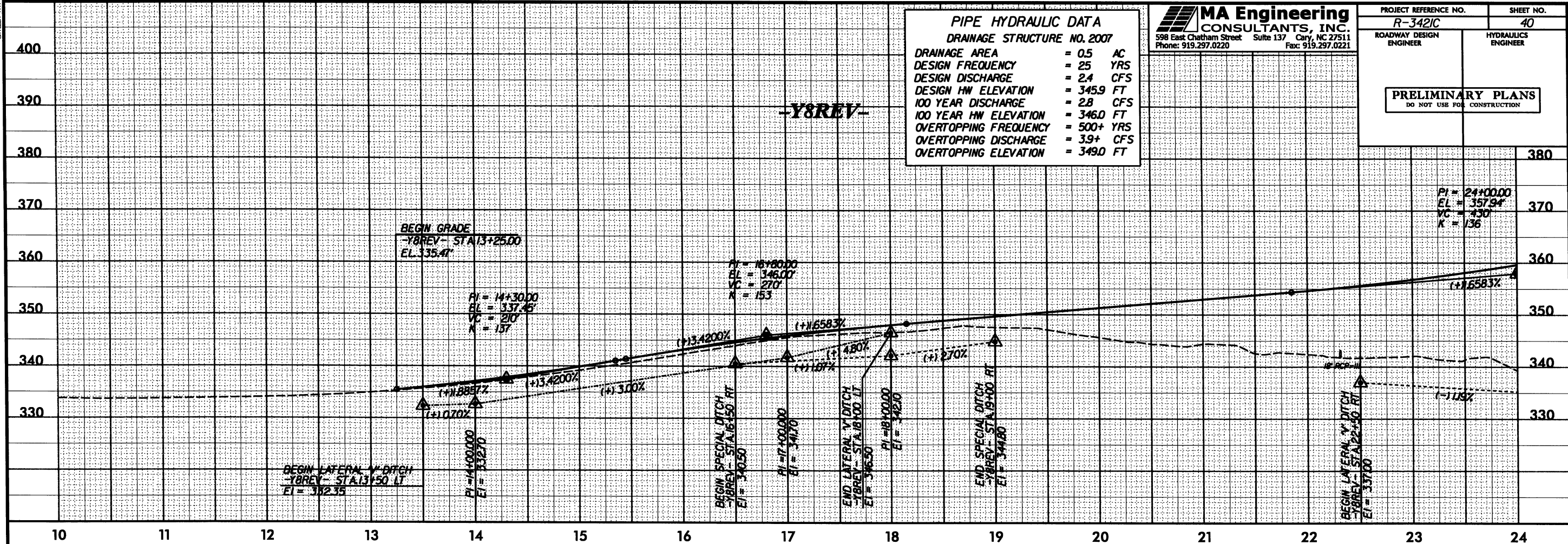
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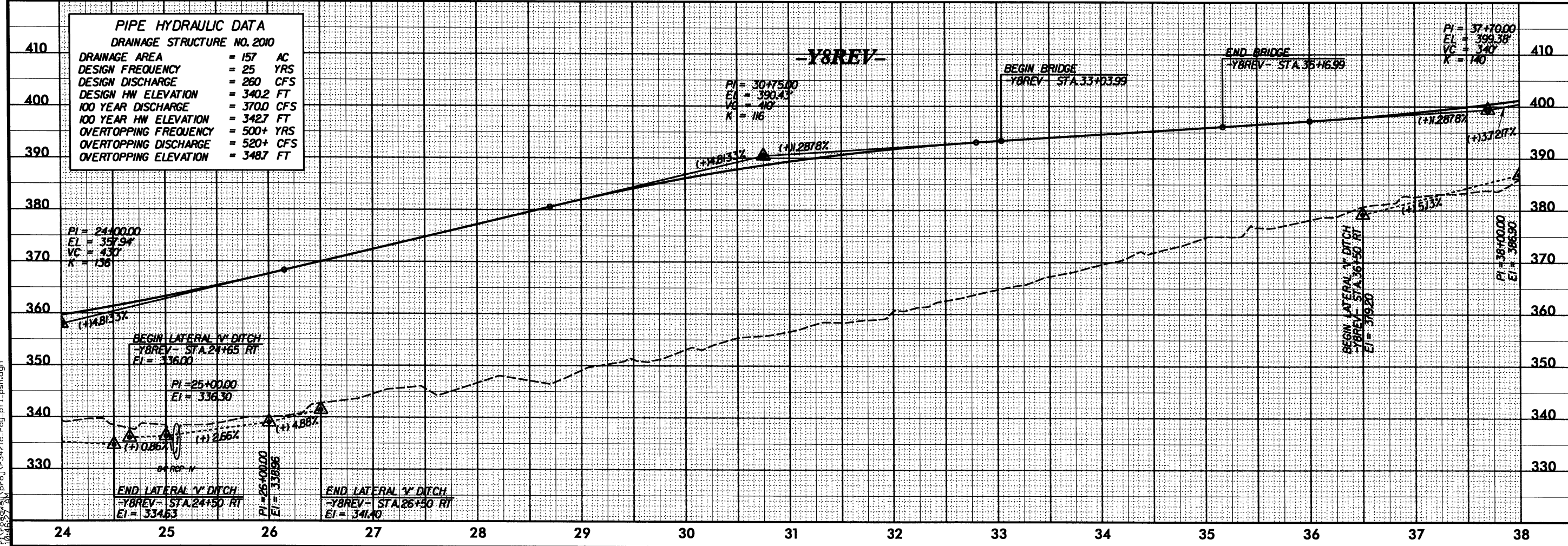
PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 2007	
DRAINAGE AREA	= 0.5 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 2.4 CFS
DESIGN HW ELEVATION	= 345.9 FT
100 YEAR DISCHARGE	= 2.8 CFS
100 YEAR HW ELEVATION	= 346.0 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 39+ CFS
OVERTOPPING ELEVATION	= 349.0 FT

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PROJECT REFERENCE NO.		SHEET NO.
R-3421C		40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 2010	
DRAINAGE AREA	= 157 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 260 CFS
DESIGN HW ELEVATION	= 340.2 FT
100 YEAR DISCHARGE	= 370.0 CFS
100 YEAR HW ELEVATION	= 342.7 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 520+ CFS
OVERTOPPING ELEVATION	= 348.7 FT

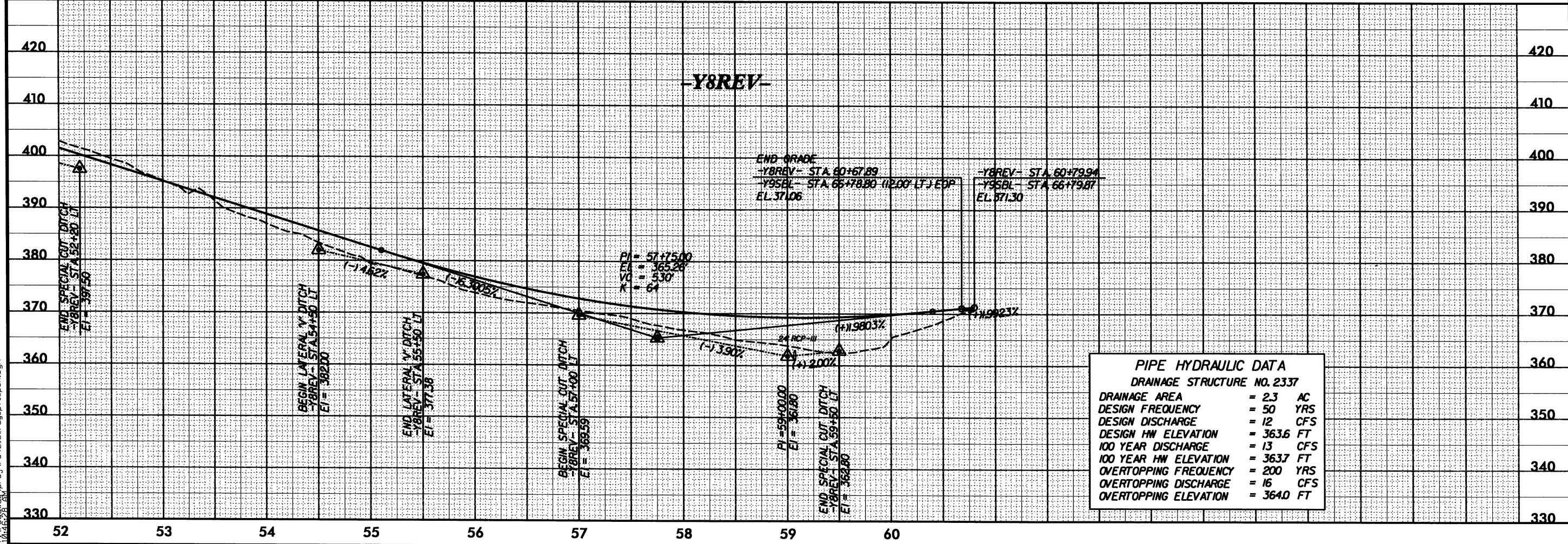
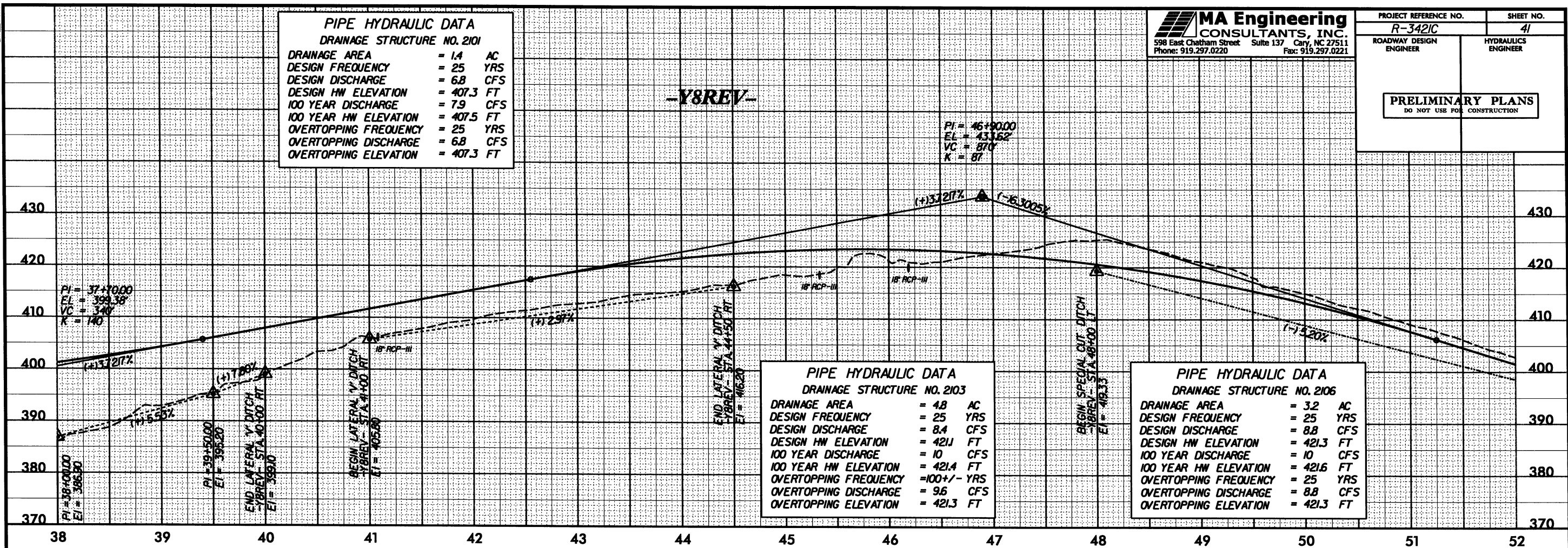


PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 2101	
DRAINAGE AREA	= 1.4 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 6.8 CFS
DESIGN HW ELEVATION	= 407.3 FT
100 YEAR DISCHARGE	= 7.9 CFS
100 YEAR HW ELEVATION	= 407.5 FT
OVERTOPPING FREQUENCY	= 25 YRS
OVERTOPPING DISCHARGE	= 6.8 CFS
OVERTOPPING ELEVATION	= 407.3 FT

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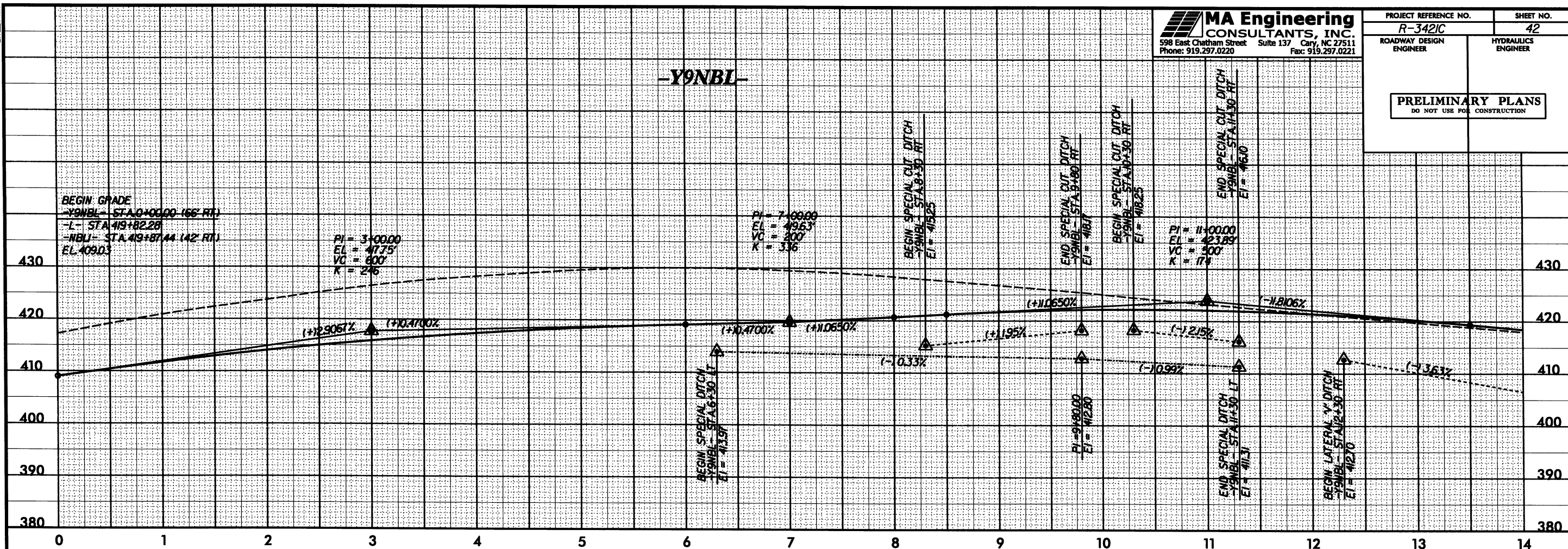
PROJECT REFERENCE NO. R-3421C	SHEET NO. 41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

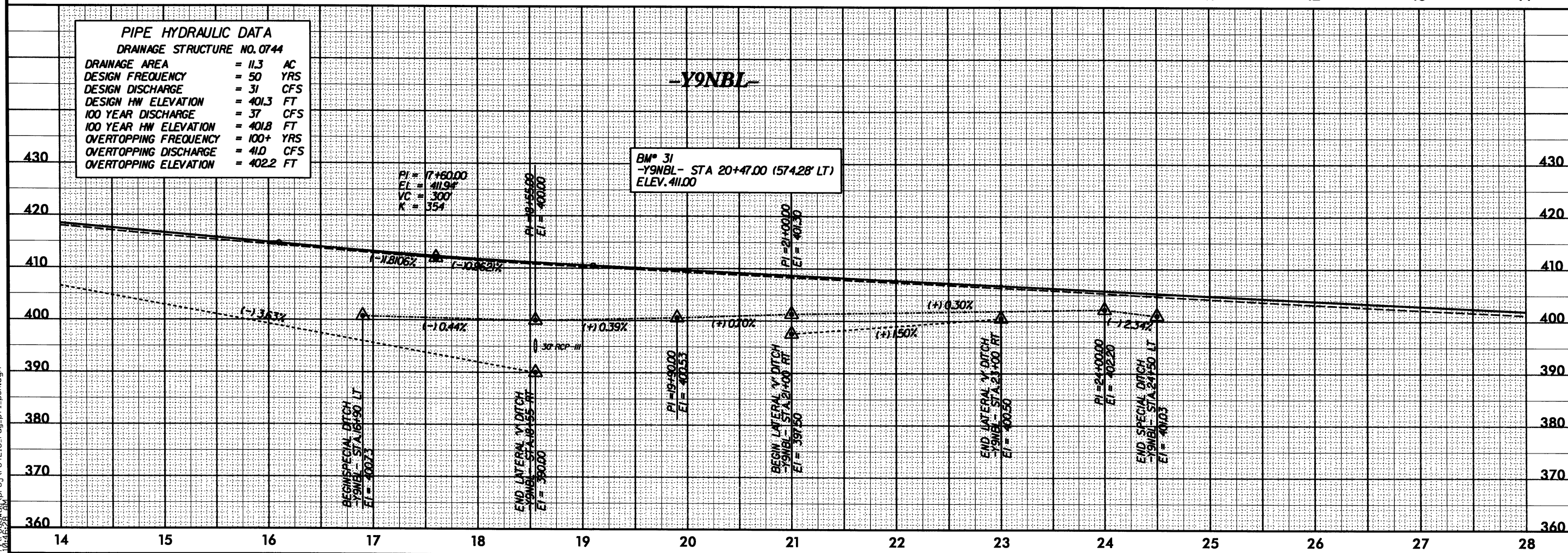


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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



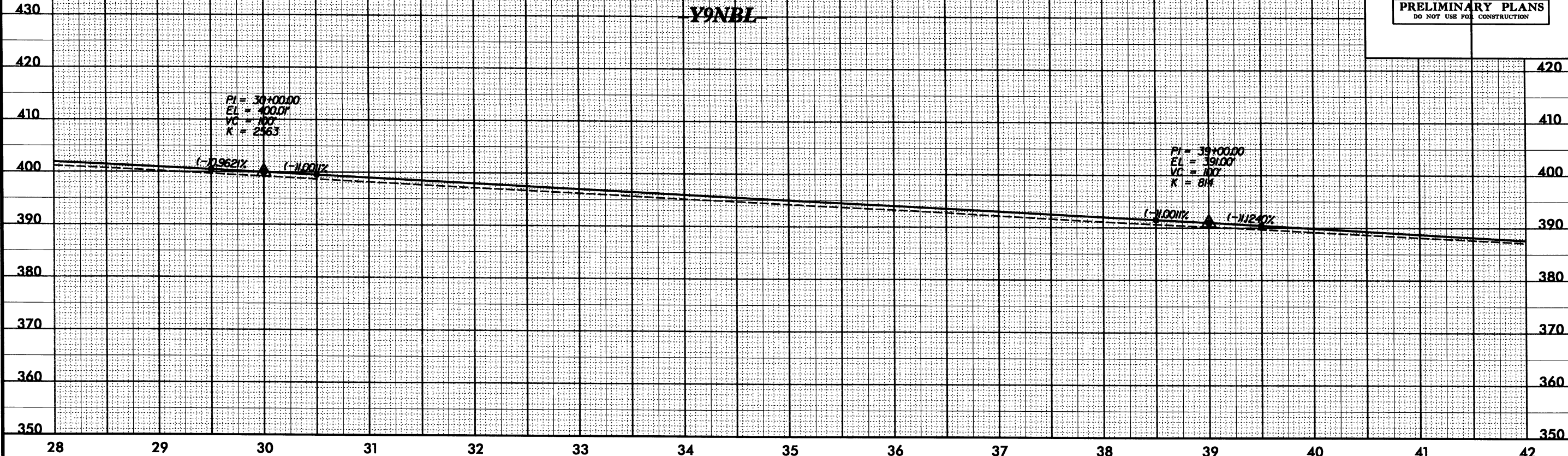
PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 0744		
DRAINAGE AREA	= 11.3	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 31	CFS
DESIGN HW ELEVATION	= 401.3	FT
100 YEAR DISCHARGE	= 37	CFS
100 YEAR HW ELEVATION	= 401.8	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 41.0	CFS
OVERTOPPING ELEVATION	= 402.2	FT



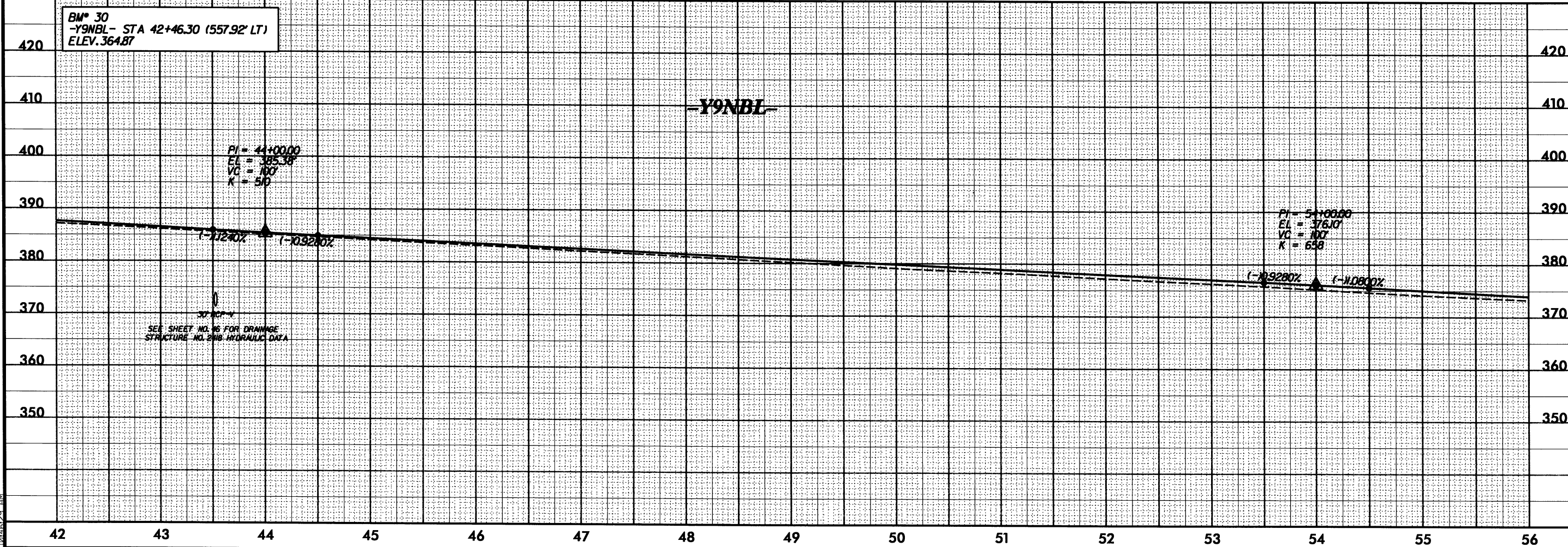
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5/28/2011

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BM* 30
-Y9NBL- STA 42+46.30 (557.92' LT)
ELEV. 364.87

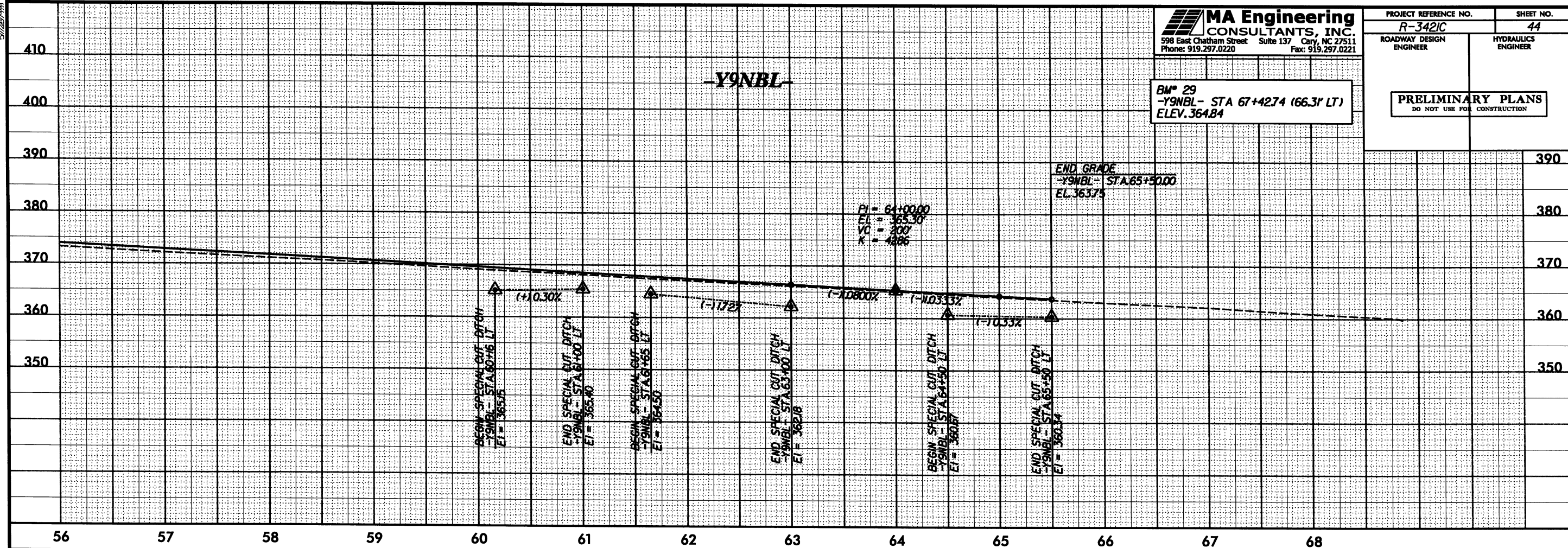


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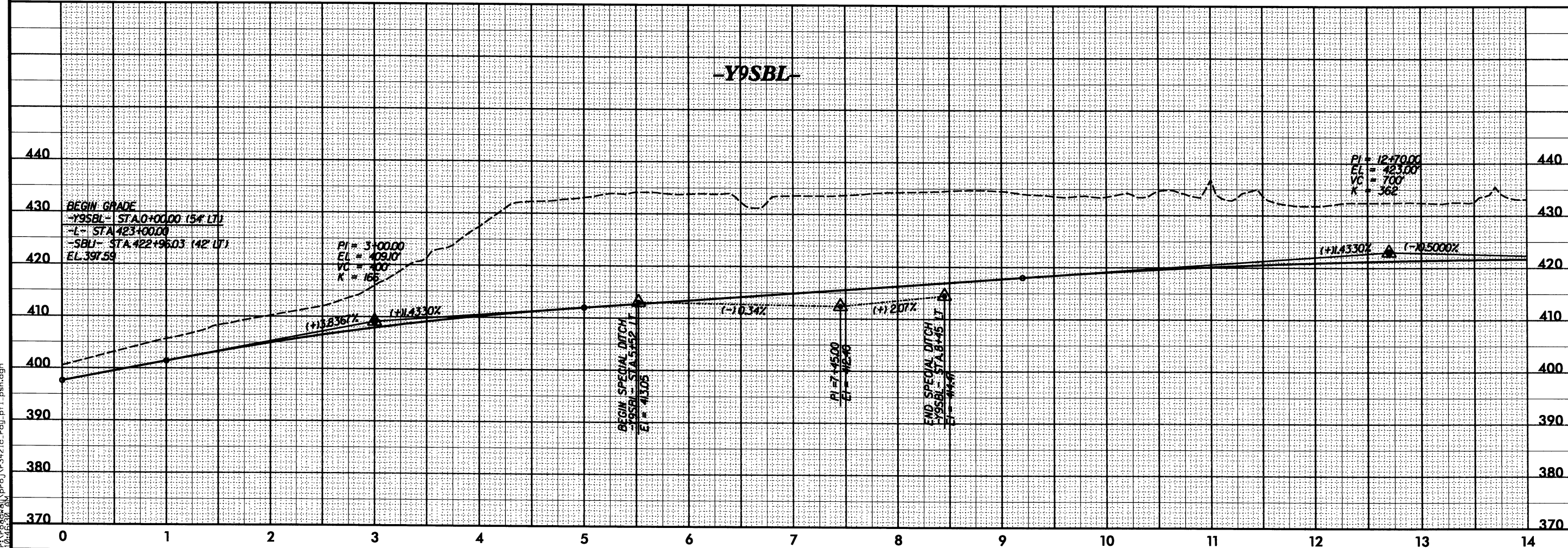
5/28/99

BM# 29
-Y9NBL- STA 67+42.74 (66.31' LT)
ELEV. 364.84

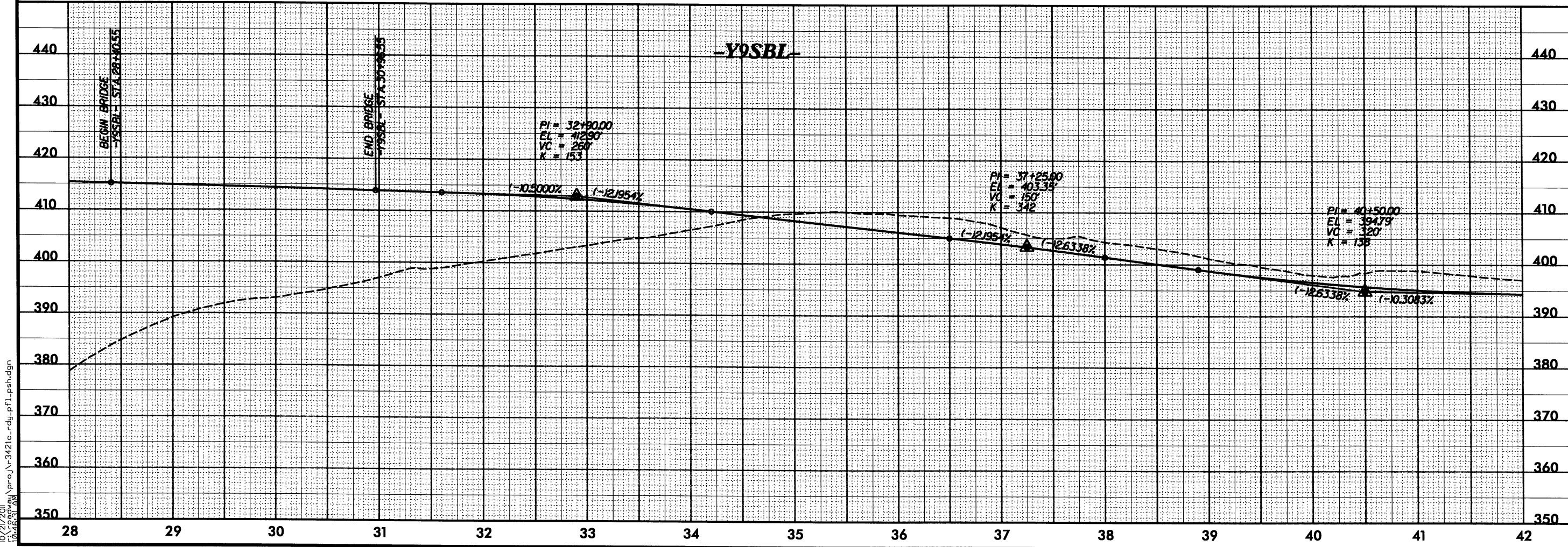
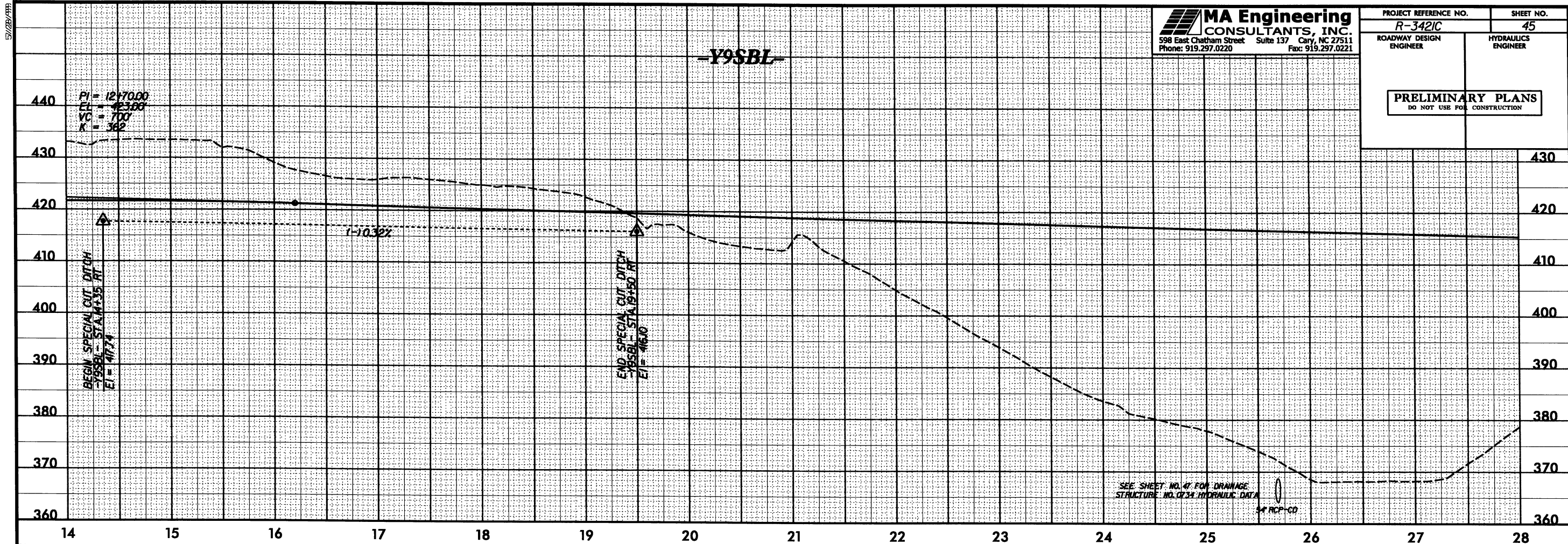
PRELIMINARY PLANS
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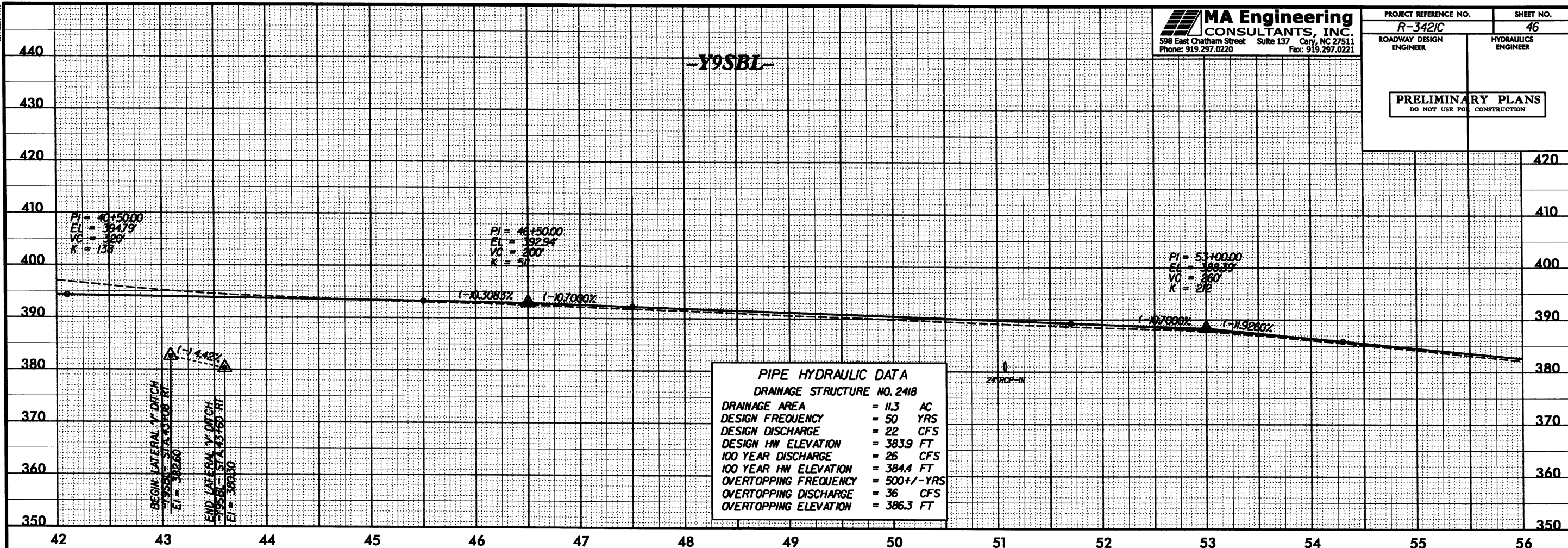


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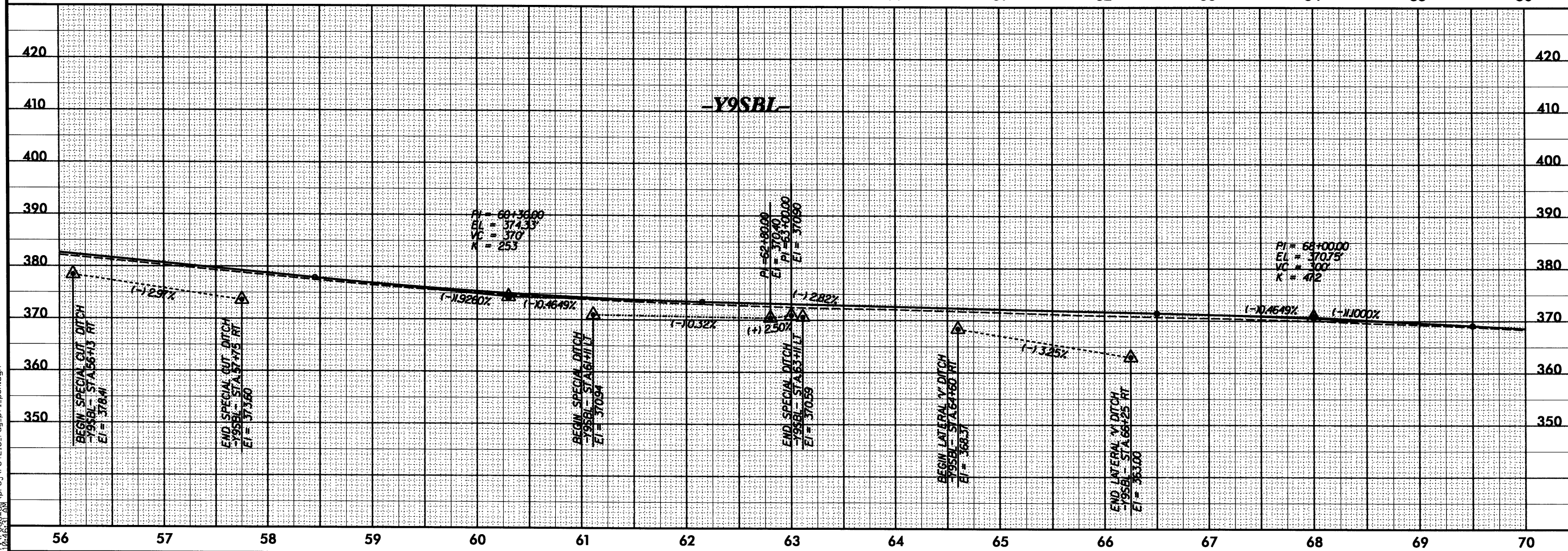


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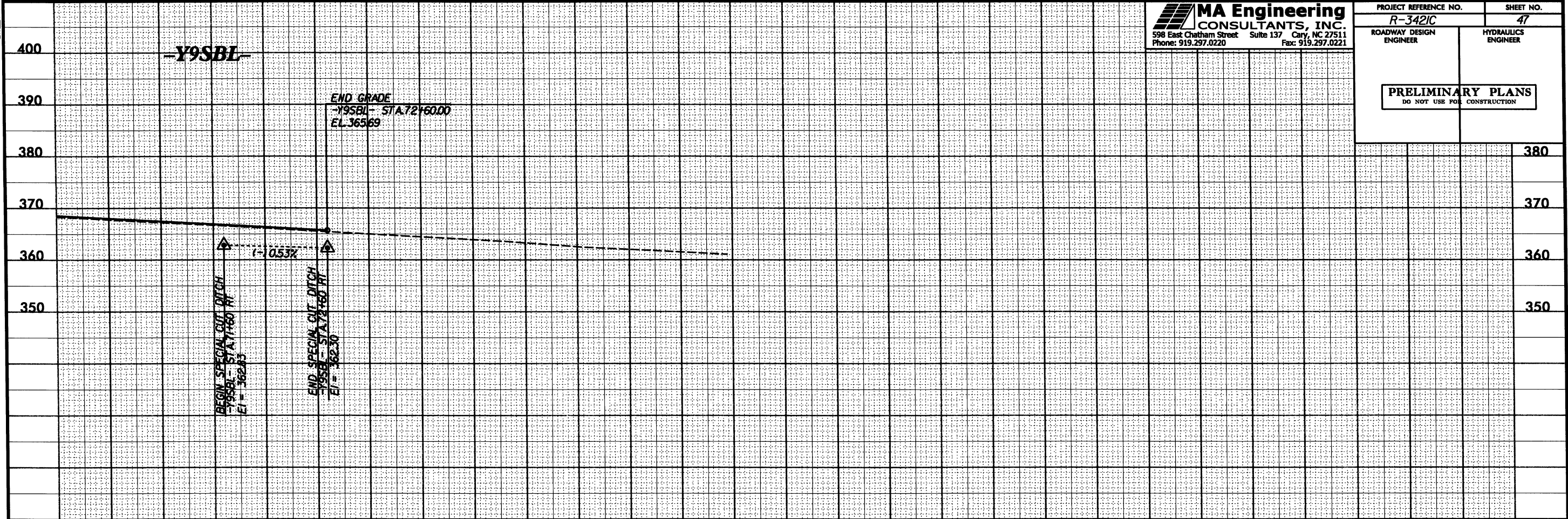
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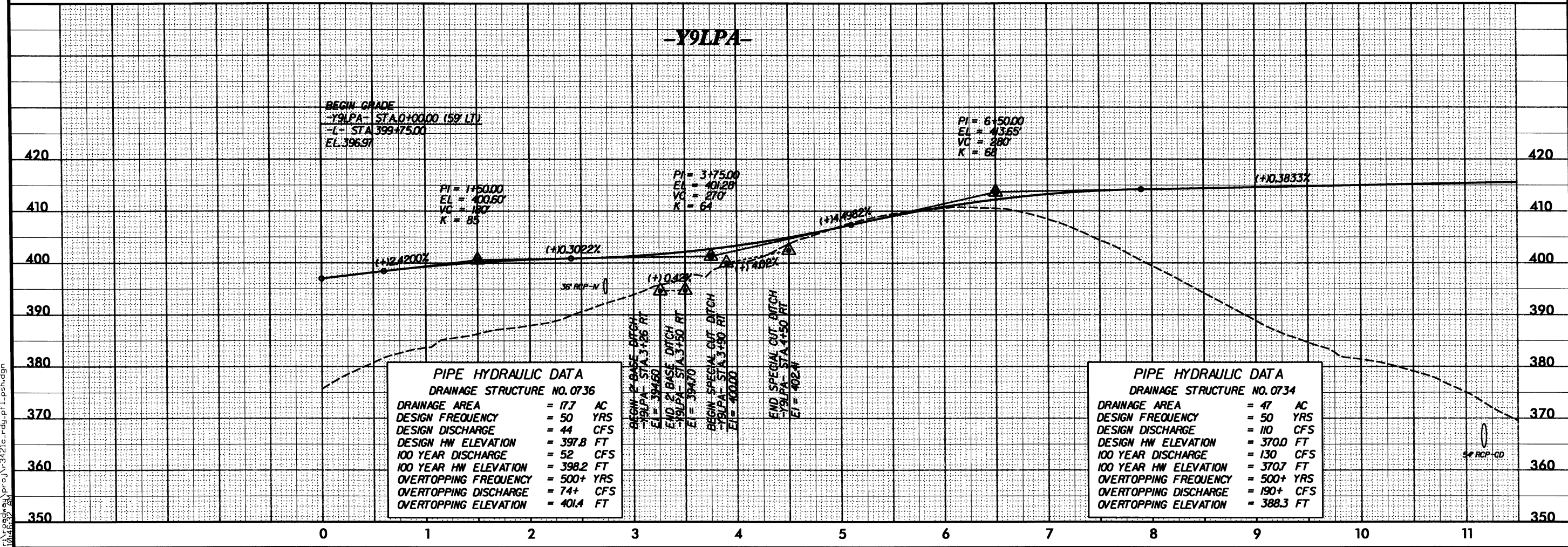
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5/28/99



10/2/2001
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10/16/99

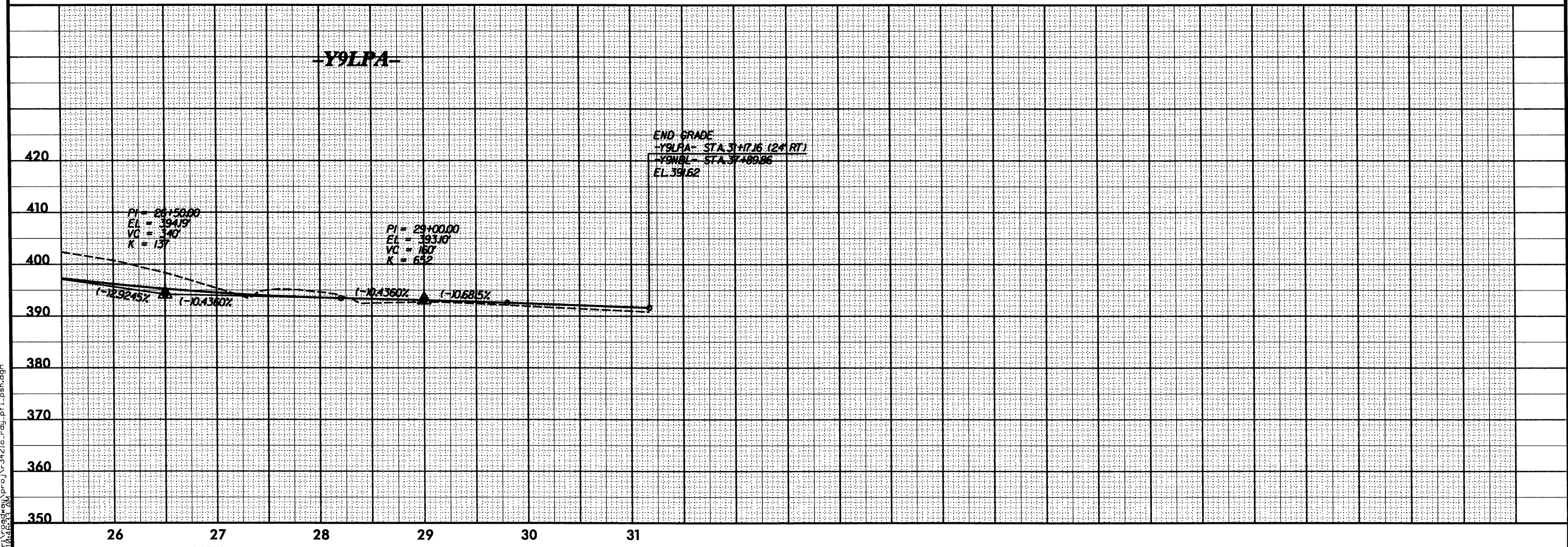
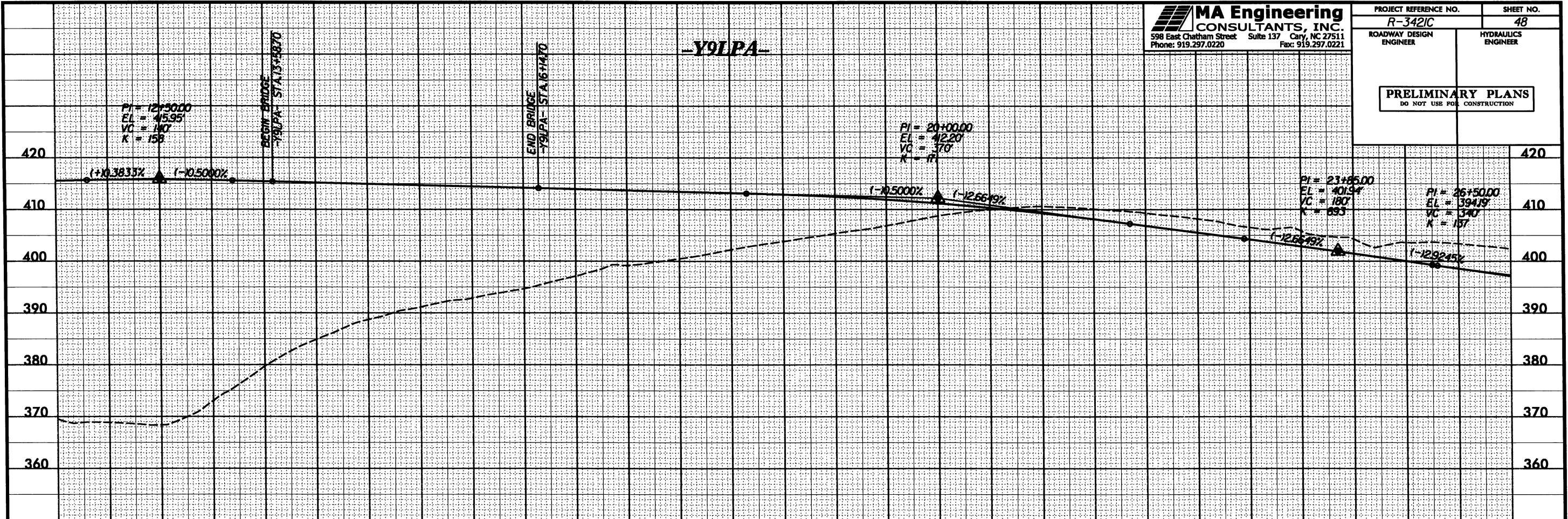


PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 0736	
DRAINAGE AREA	= 17.7 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 44 CFS
DESIGN HW ELEVATION	= 397.8 FT
100 YEAR DISCHARGE	= 52 CFS
100 YEAR HW ELEVATION	= 398.2 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 74+ CFS
OVERTOPPING ELEVATION	= 401.4 FT

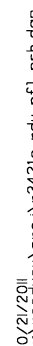
PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 0734	
DRAINAGE AREA	= 47 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 110 CFS
DESIGN HW ELEVATION	= 370.0 FT
100 YEAR DISCHARGE	= 130 CFS
100 YEAR HW ELEVATION	= 370.7 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 190+ CFS
OVERTOPPING ELEVATION	= 388.3 FT

5/12/2011

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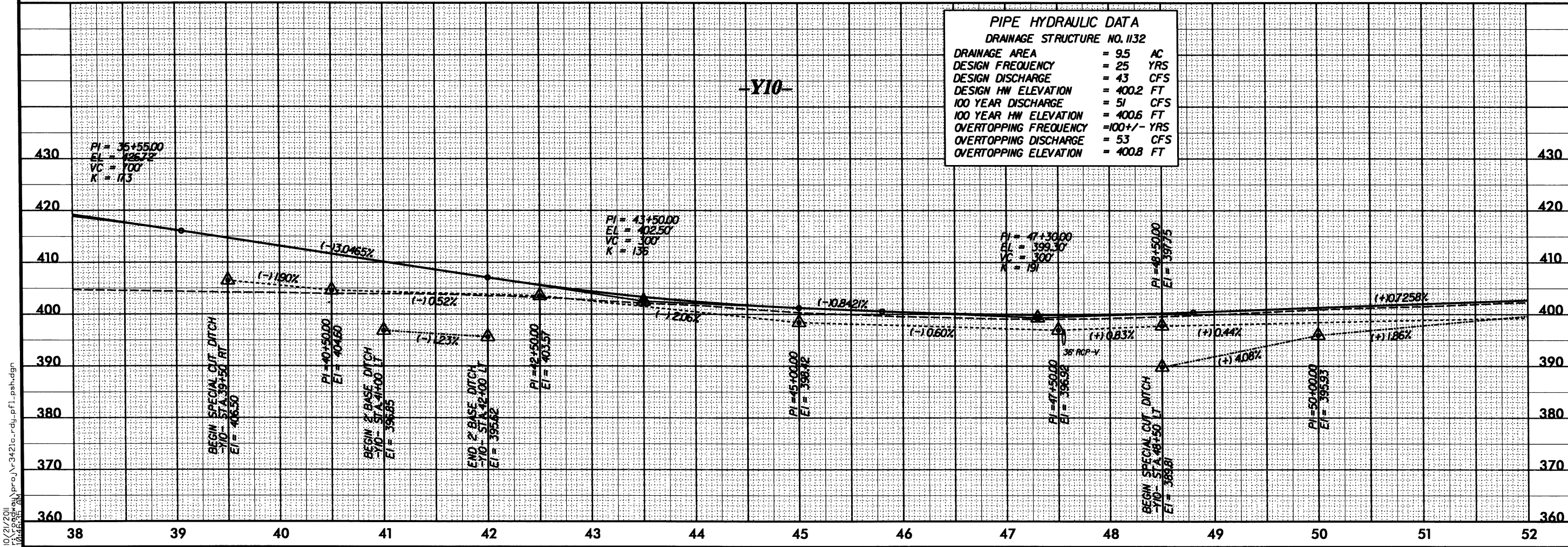


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PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1132	
DRAINAGE AREA	= 95 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 43 CFS
DESIGN HW ELEVATION	= 400.2 FT
100 YEAR DISCHARGE	= 51 CFS
100 YEAR HW ELEVATION	= 400.6 FT
OVERTOPPING FREQUENCY	= 100+/- YRS
OVERTOPPING DISCHARGE	= 53 CFS
OVERTOPPING ELEVATION	= 400.8 FT



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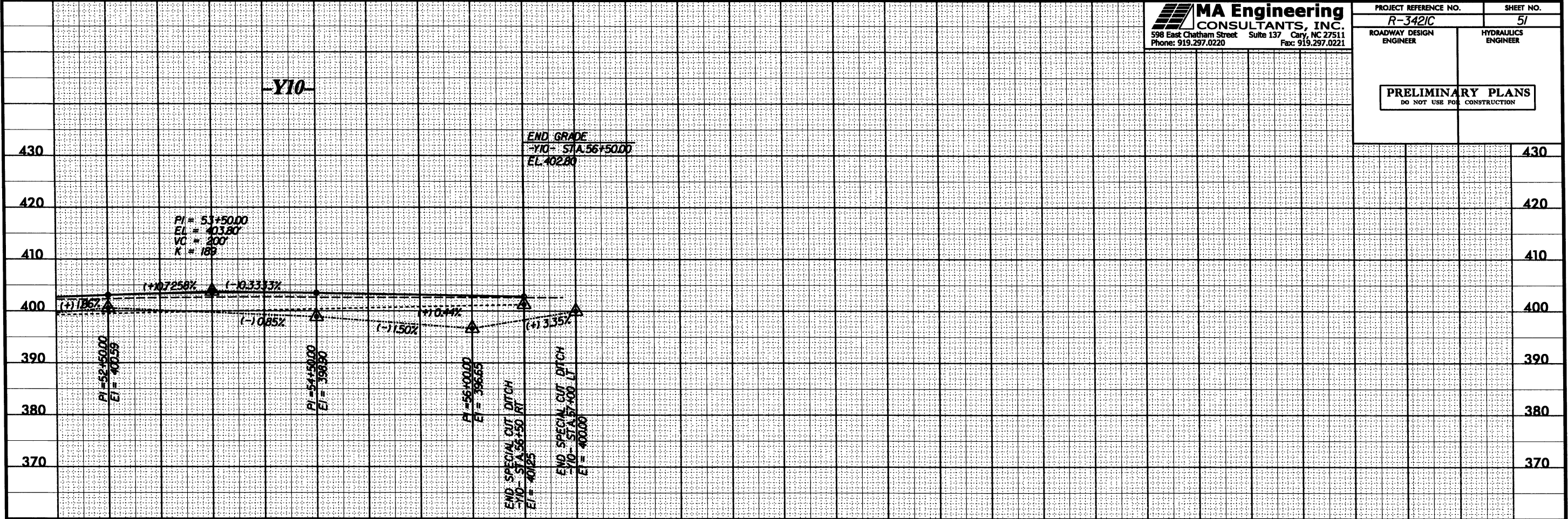
PROJECT REFERENCE NO.
R-3421C

SHEET NO.
51

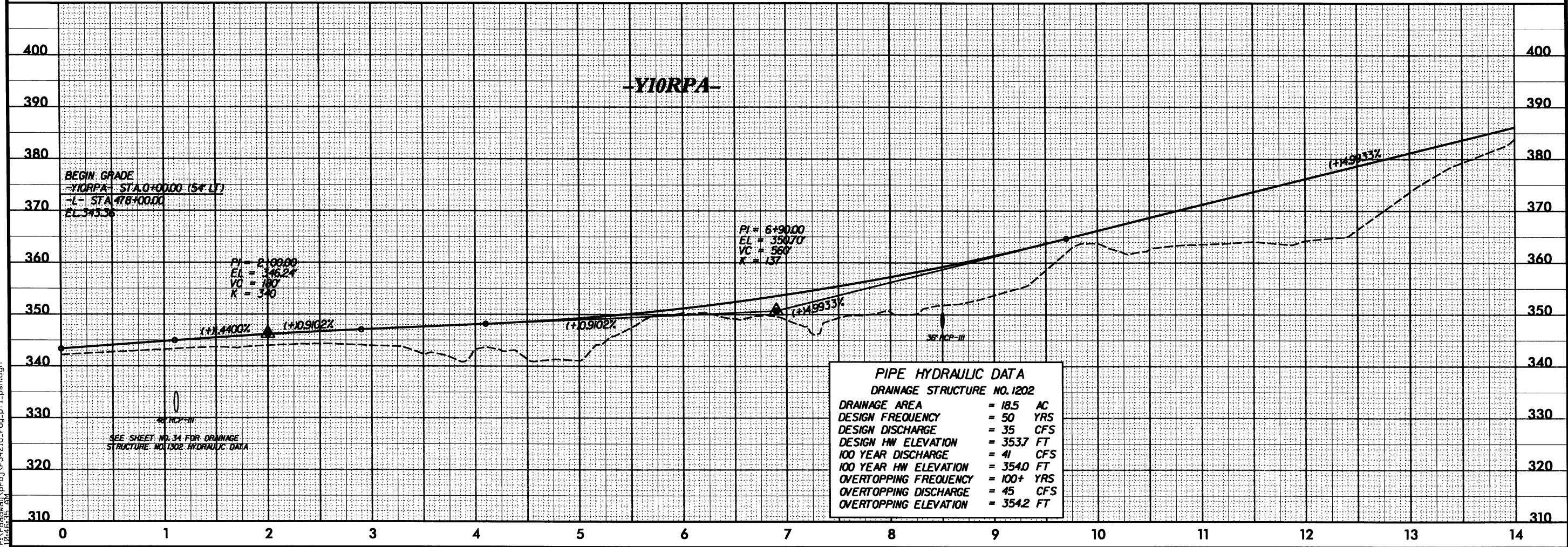
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

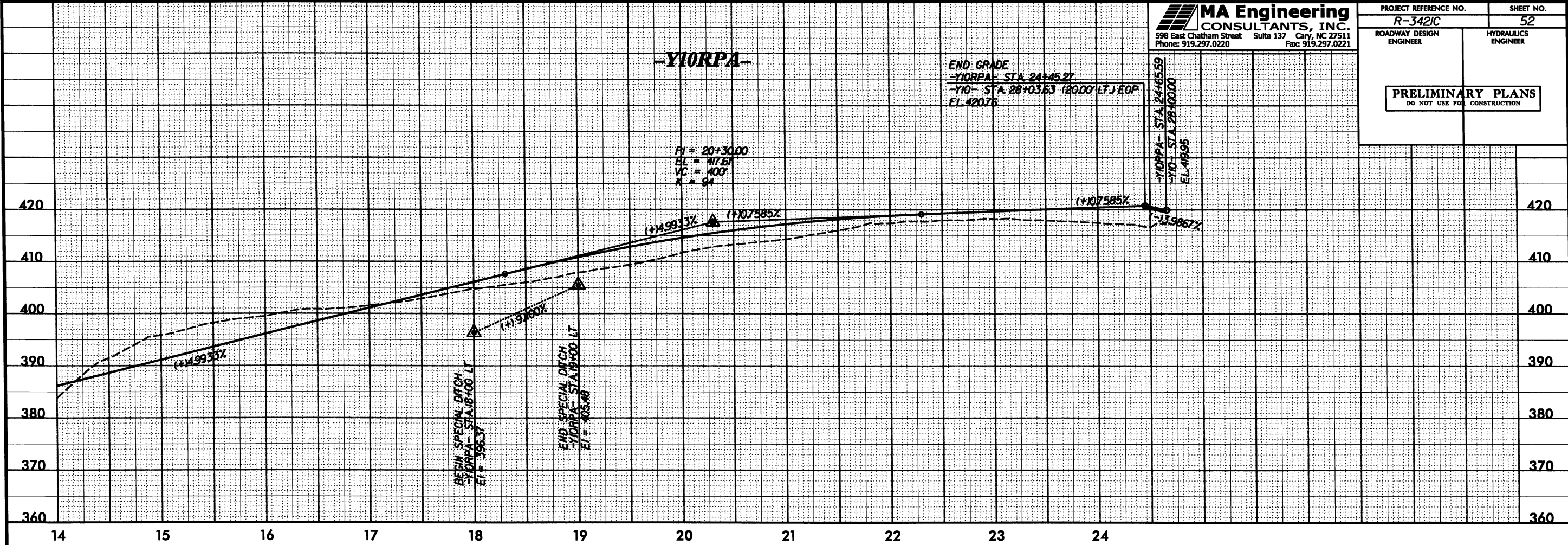
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DO NOT USE FOR CONSTRUCTION



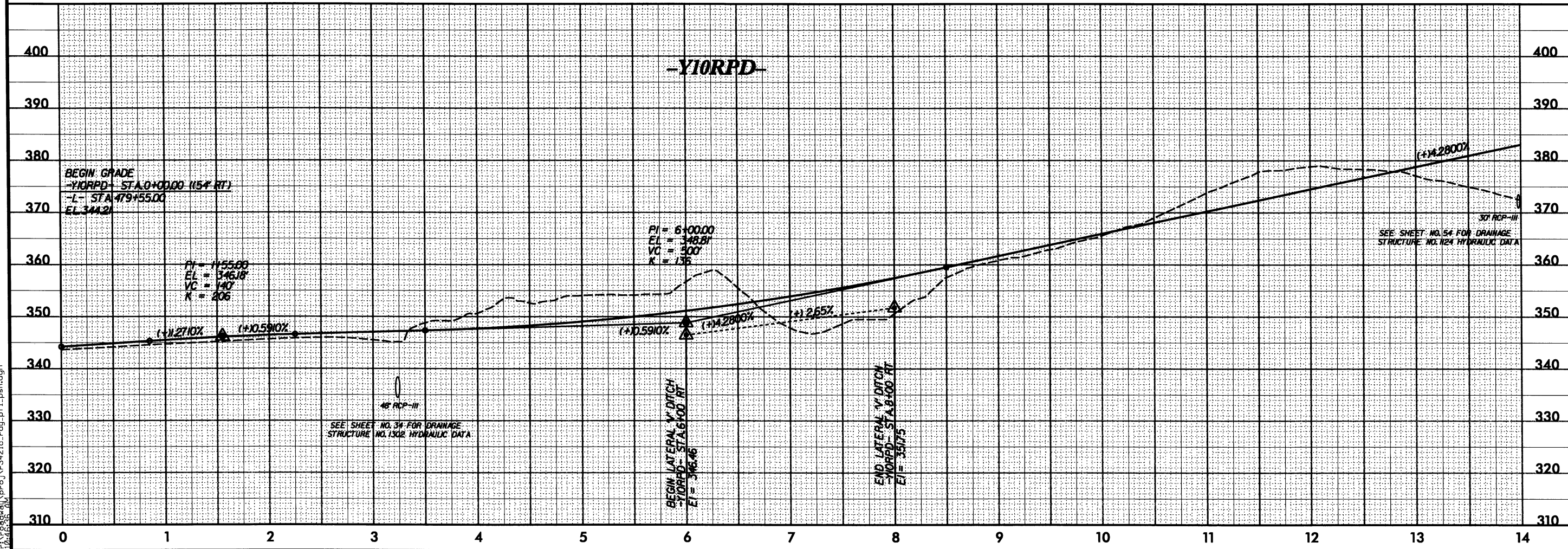
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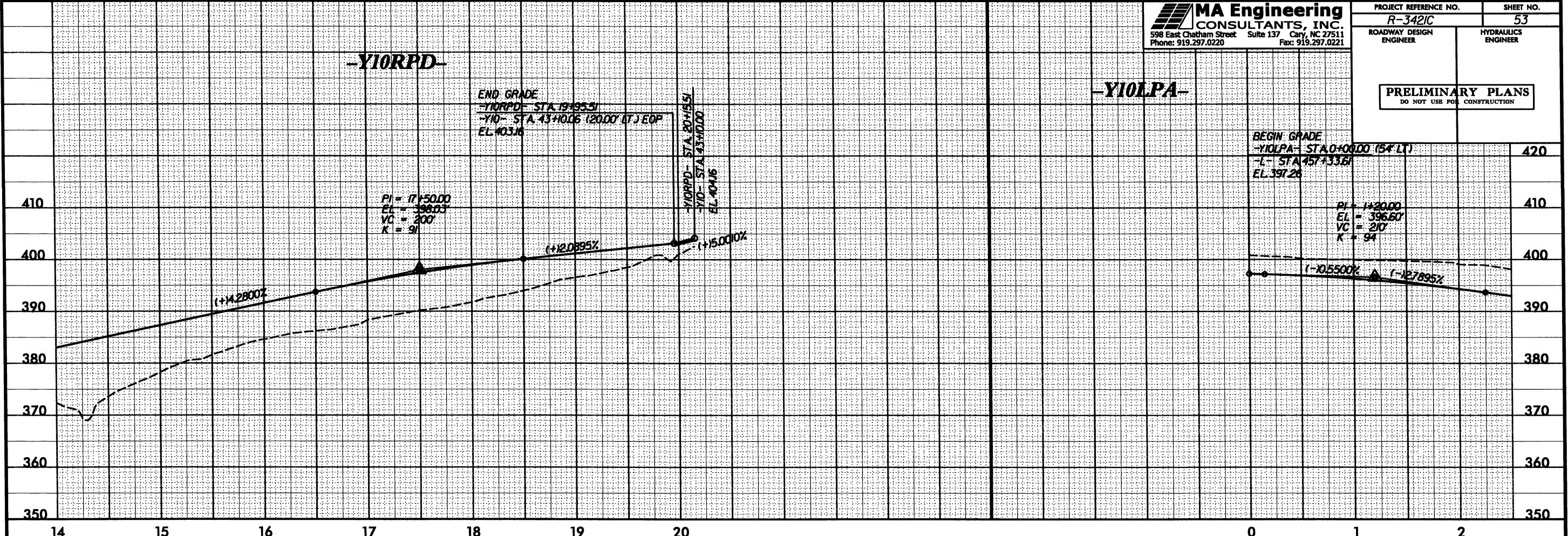
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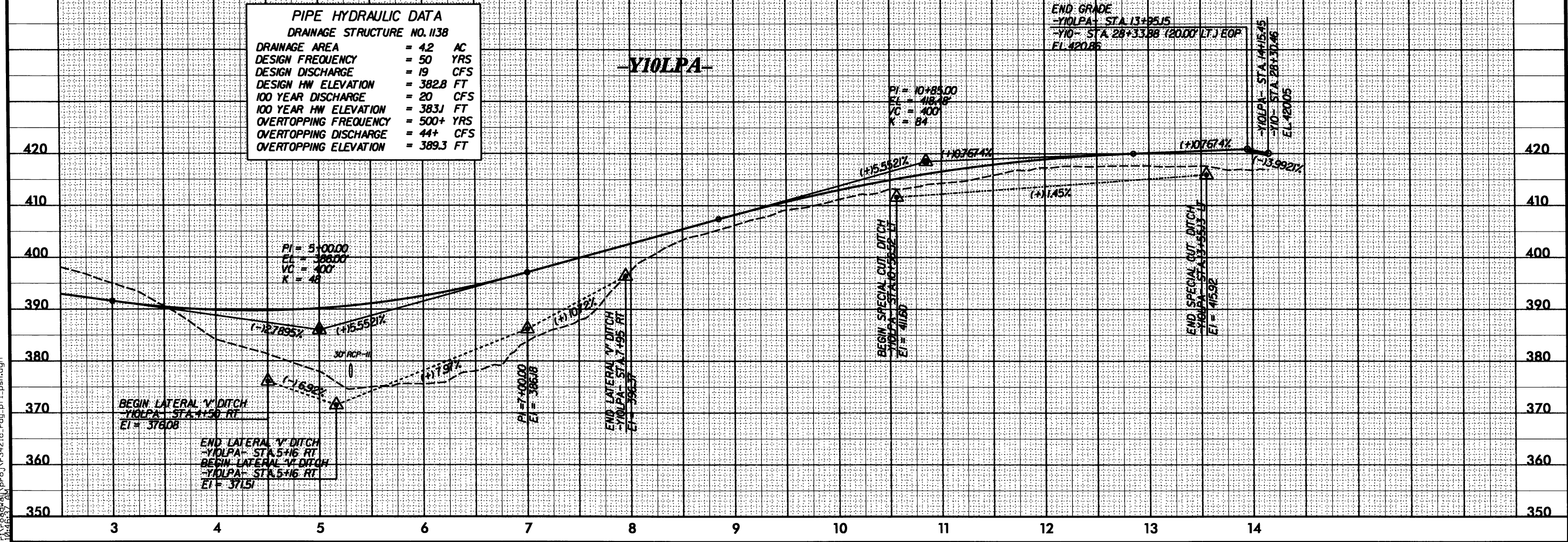
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5/12/2011



PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1138	
DRAINAGE AREA	= 4.2 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 19 CFS
DESIGN HW ELEVATION	= 382.8 FT
100 YEAR DISCHARGE	= 20 CFS
100 YEAR HW ELEVATION	= 383.1 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 44+ CFS
OVERTOPPING ELEVATION	= 389.3 FT



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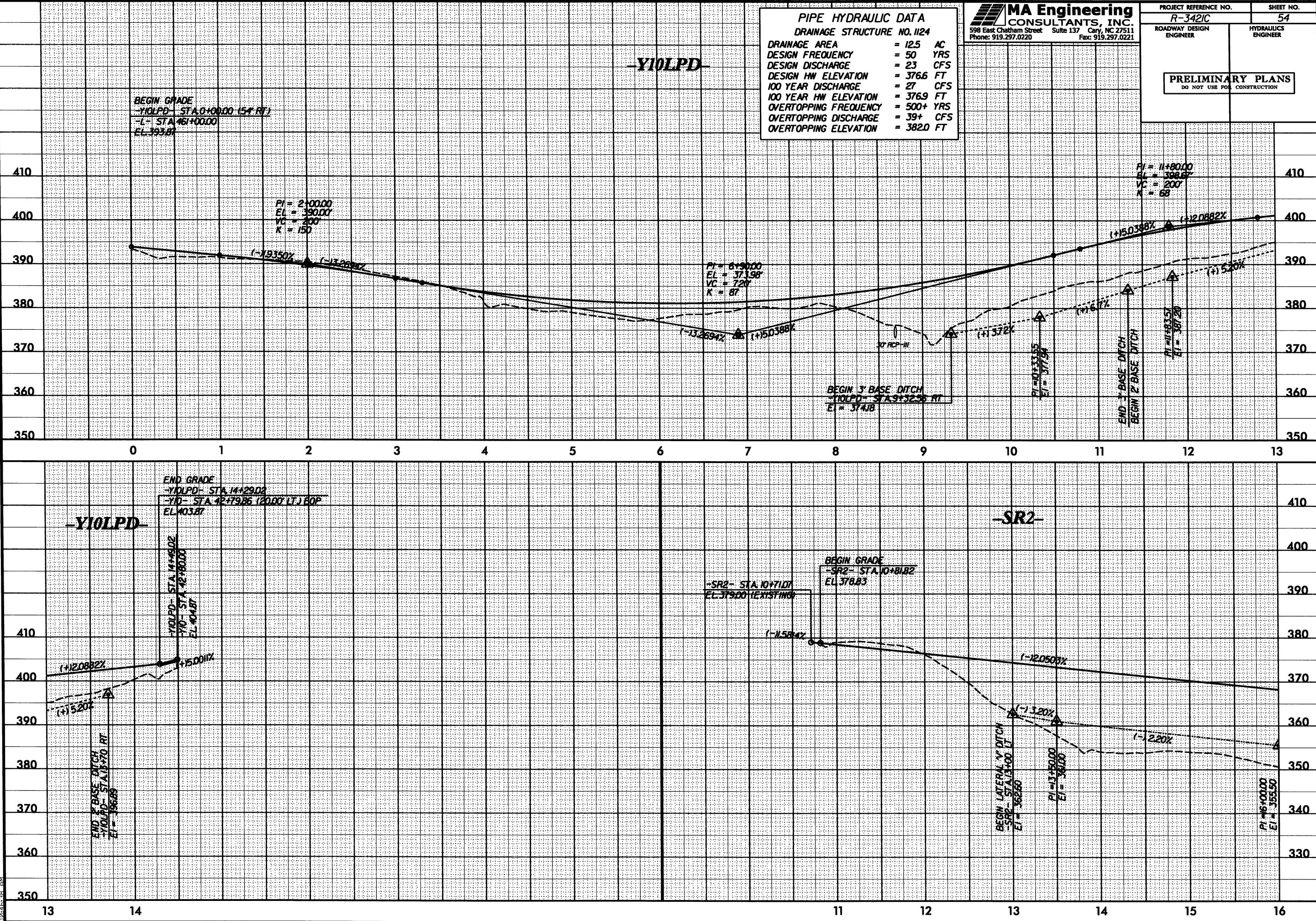
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PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1124	
DRAINAGE AREA	= 125 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 23 CFS
DESIGN HW ELEVATION	= 376.6 FT
100 YEAR DISCHARGE	= 27 CFS
100 YEAR HW ELEVATION	= 376.9 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 39+ CFS
OVERTOPPING ELEVATION	= 382.0 FT

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PROJECT REFERENCE NO.		SHEET NO.
R-3421C		54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS</div> <div>DO NOT USE FOR CONSTRUCTION</div>		



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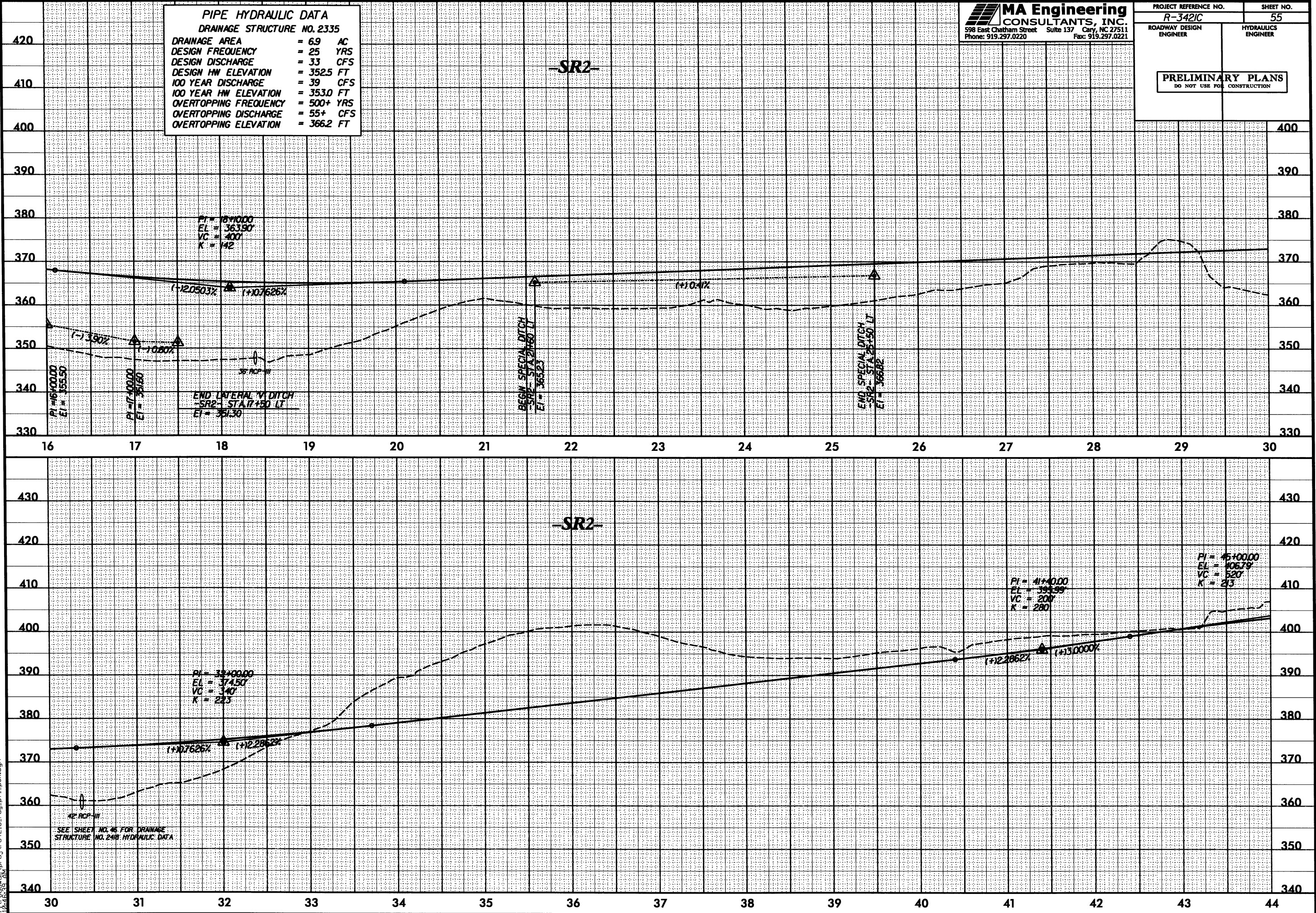
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DRAINAGE STRUCTURE NO. 2335	
DRAINAGE AREA	= 6.9 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 33 CFS
DESIGN HW ELEVATION	= 352.5 FT
100 YEAR DISCHARGE	= 39 CFS
100 YEAR HW ELEVATION	= 353.0 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 55+ CFS
OVERTOPPING ELEVATION	= 366.2 FT

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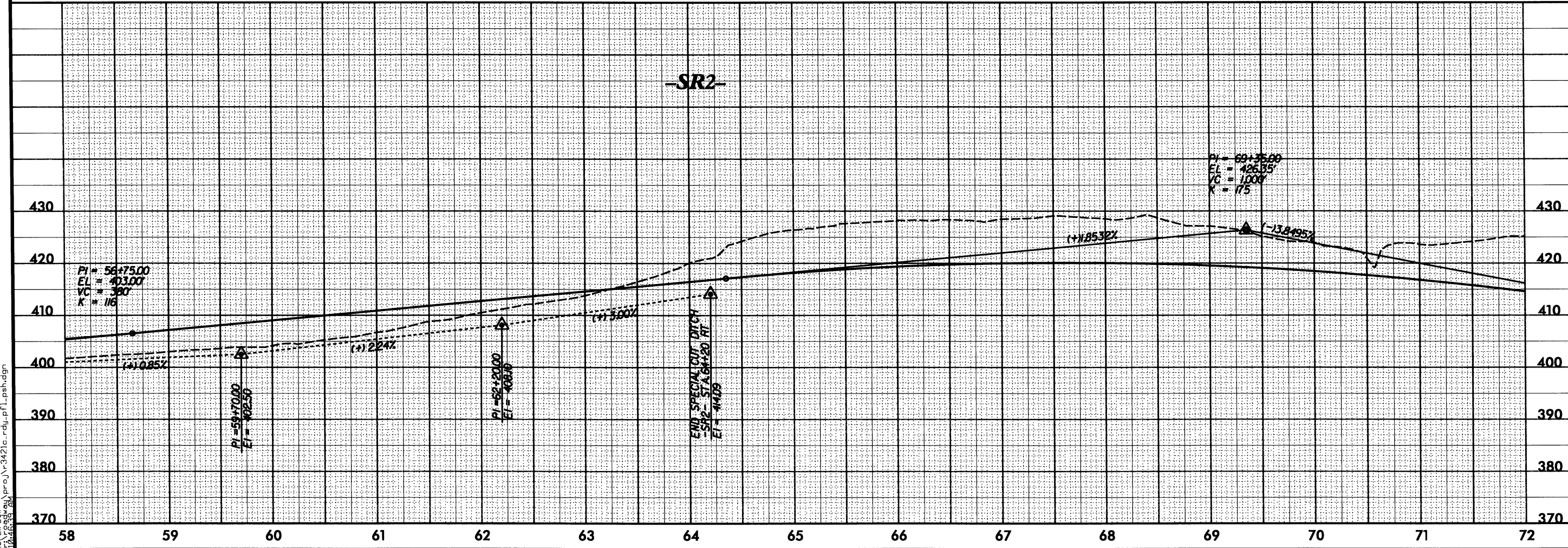
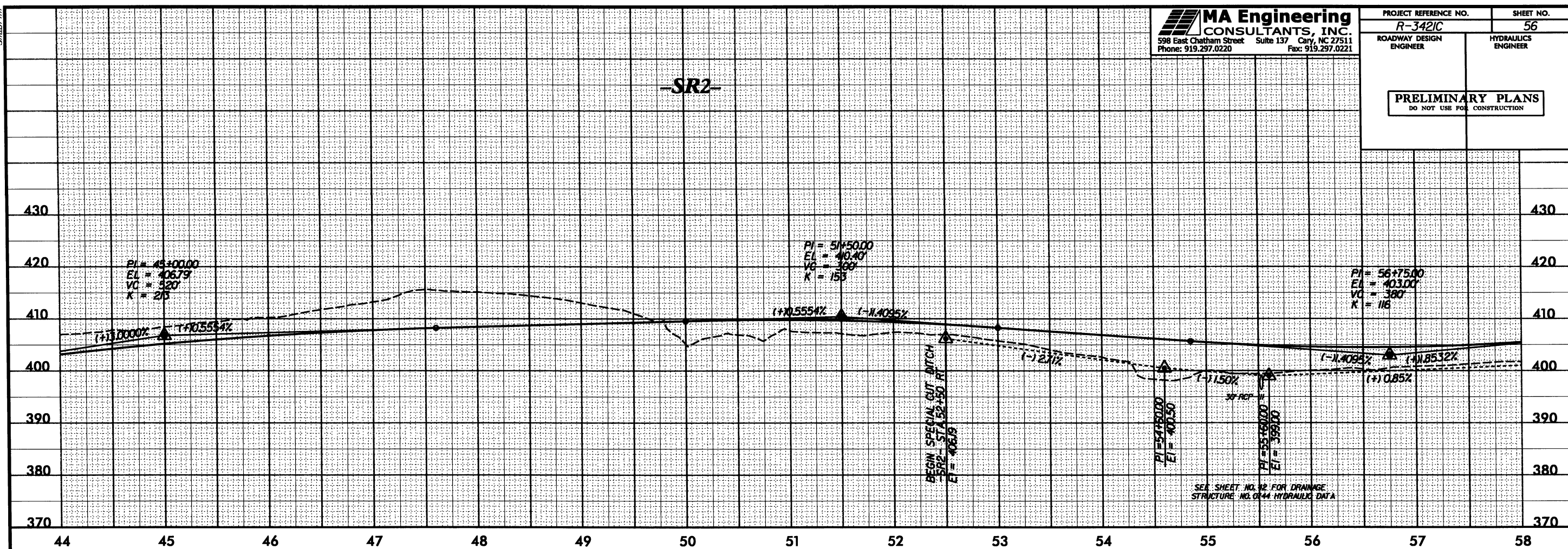
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R-3421C
ROADWAY DESIGN
ENGINEER

SHEET NO.
55
HYDRAULICS
ENGINEER

PRELIMINARY PLANS
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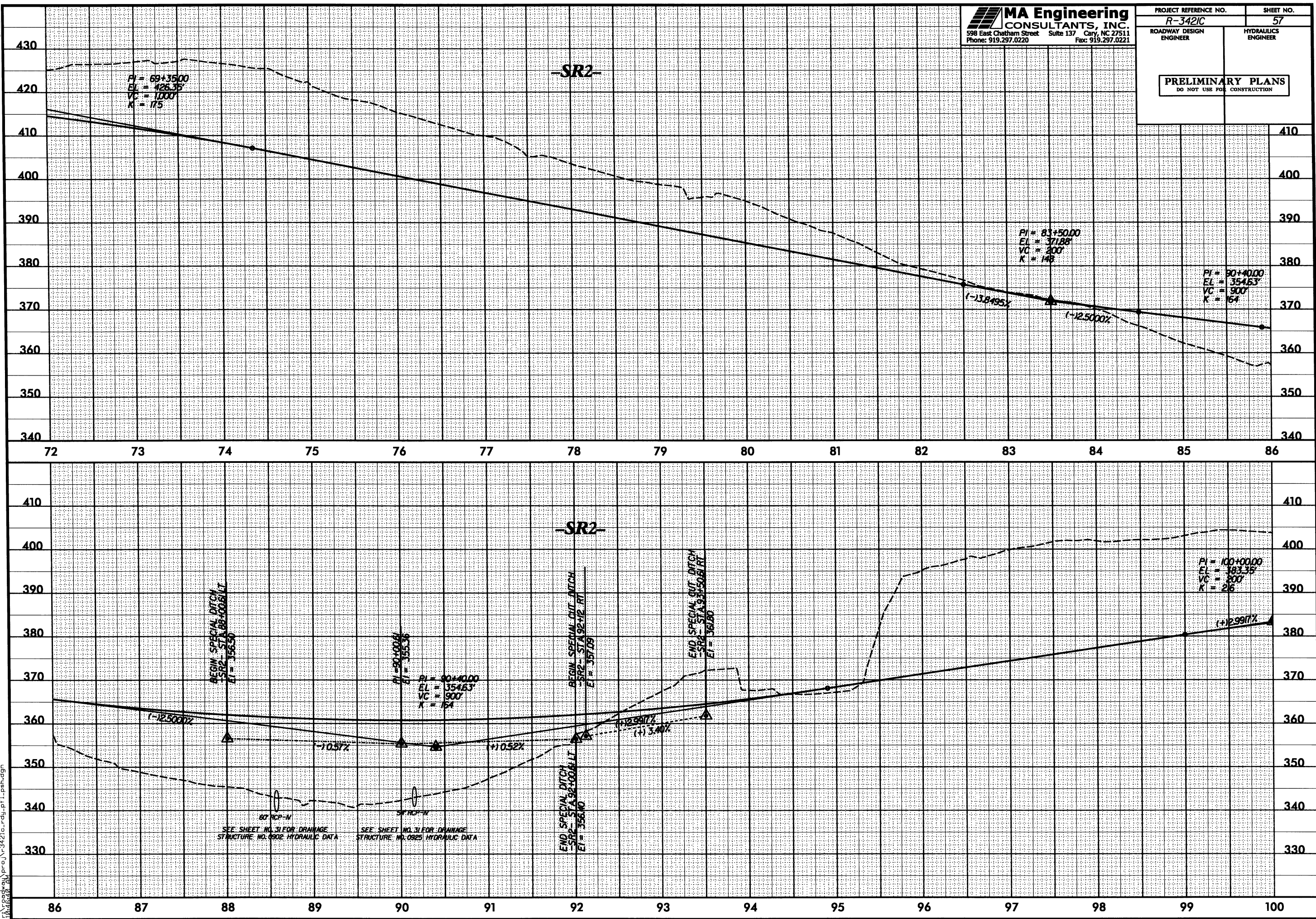


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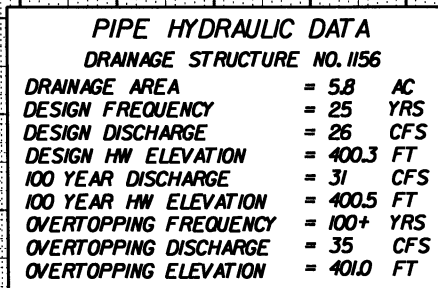


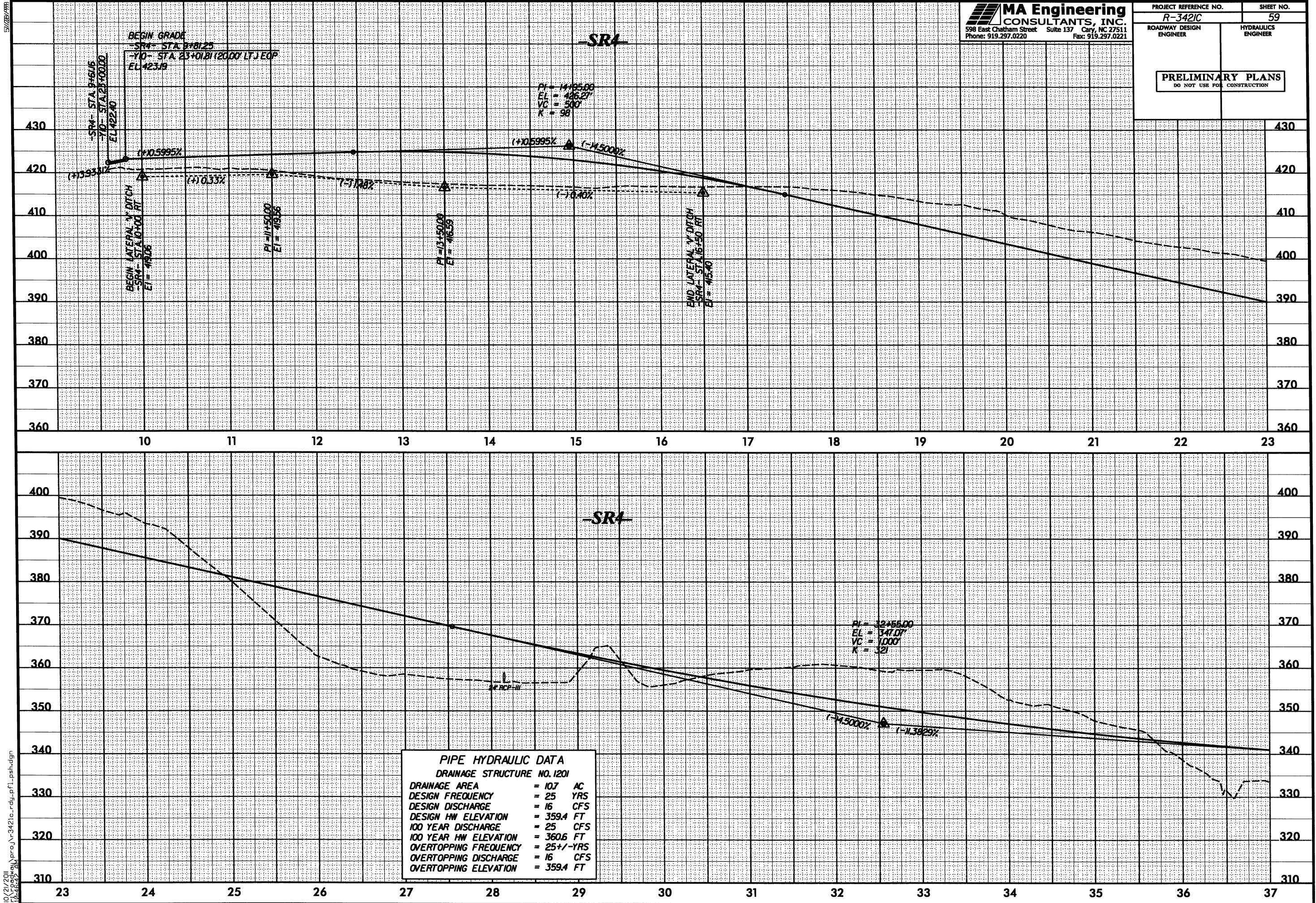
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PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO. 1303		
DRAINAGE AREA	= 97	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 140	CFS
DESIGN HW ELEVATION	= 335.0	FT
100 YEAR DISCHARGE	= 160	CFS
100 YEAR HW ELEVATION	= 335.6	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 240	CFS
OVERTOPPING ELEVATION	= 337.7	FT

PI = 32+55.00
EL = 347.07
VC = 1000'
K = 321

66" RCP-III

24" RCP-III
SEE SHEET NO. 34 FOR DRAINAGE
STRUCTURE NO. 1307 HYDRAULIC DATA

PI = 45+45.00
EL = 349.23
VC = 400'
K = 139

1+1.3829%

1+1.5019%

60" RCP-III
SEE SHEET NO. 35 FOR DRAINAGE
STRUCTURE NO. 1316 HYDRAULIC DATA

24" RCP-III
SEE SHEET NO. 35 FOR DRAINAGE
STRUCTURE NO. 1303 HYDRAULIC DATA

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SHEET NO.

60

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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~~SR4~~

~~SR4~~

PI = 54+50.00
EL = 342.82
VC = 350'
K = 89

1+1.5019%

1-2.4452%

48" RCP-III
SEE SHEET NO. 36 FOR DRAINAGE
STRUCTURE NO. 1424 HYDRAULIC DATA

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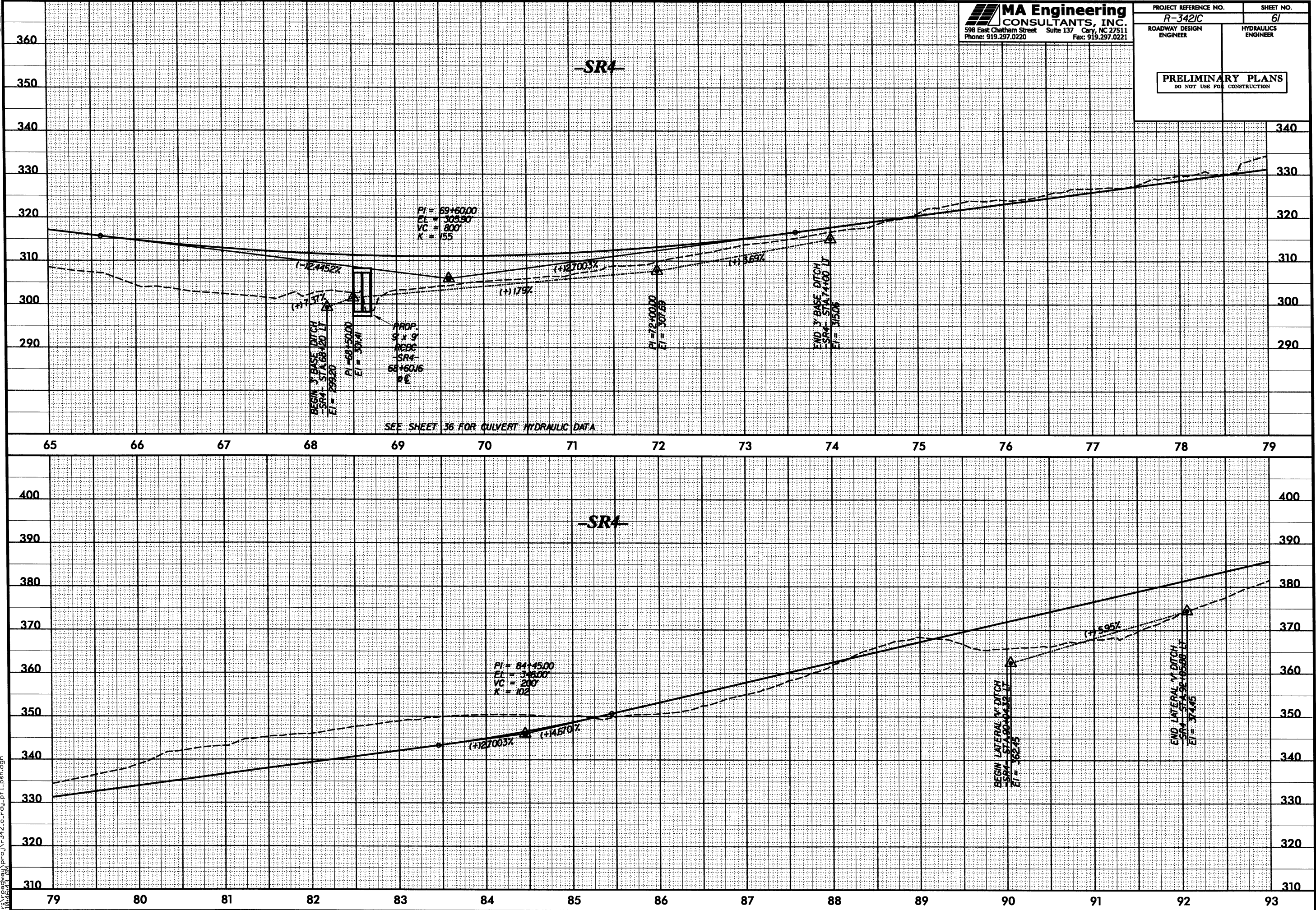
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R-3421C

SHEET NO.
61

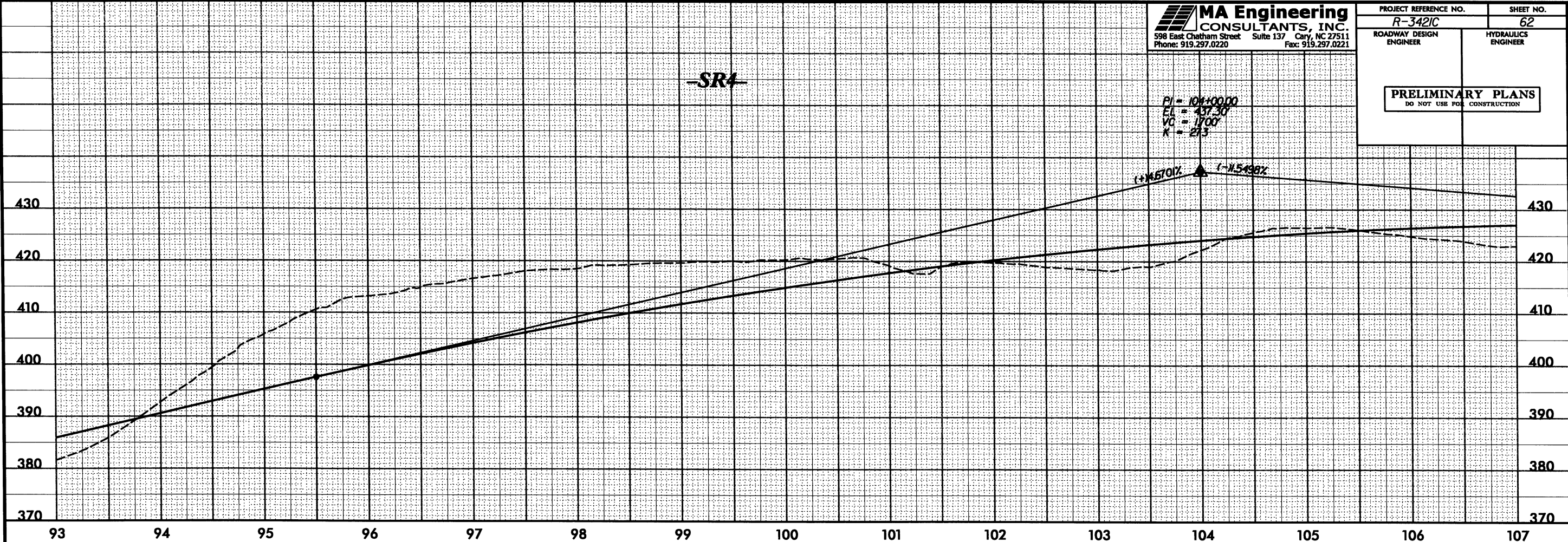
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

PRELIMINARY PLANS
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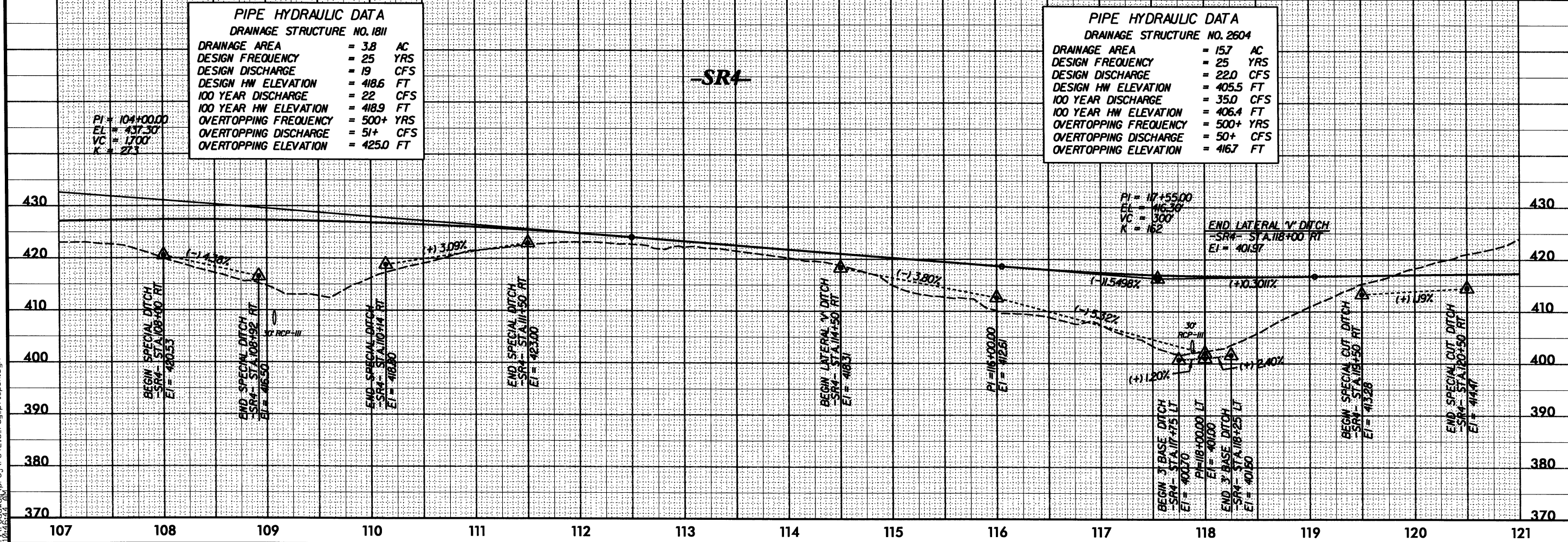


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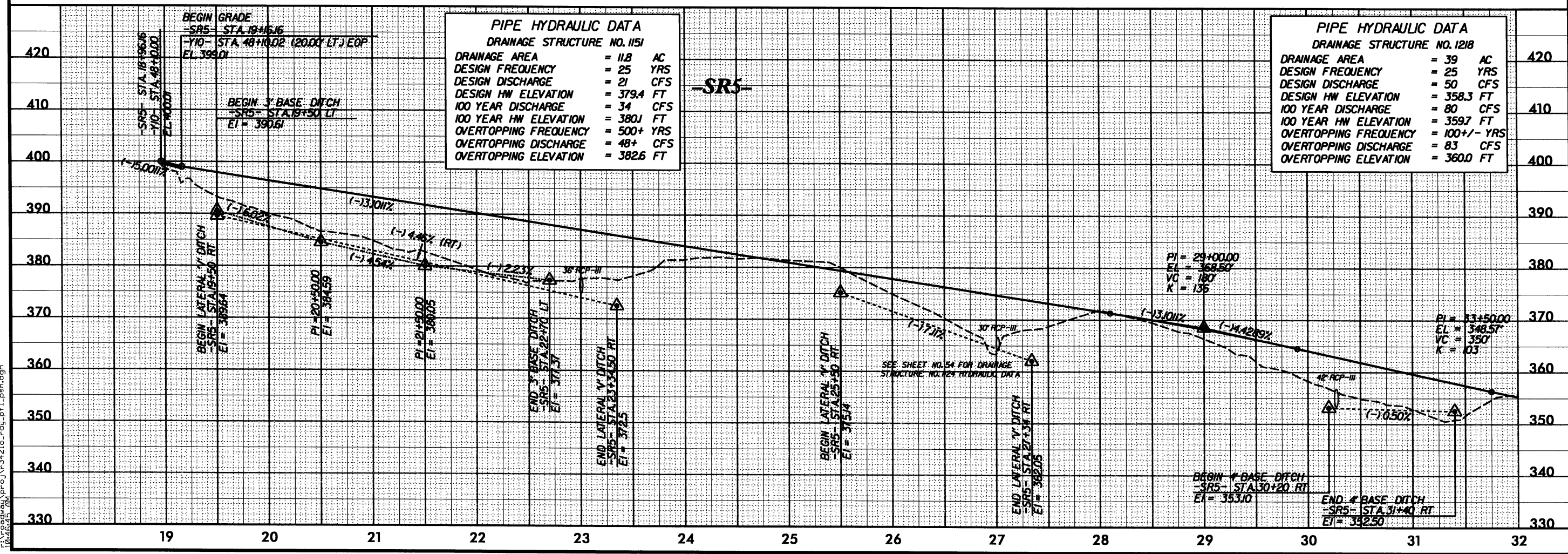
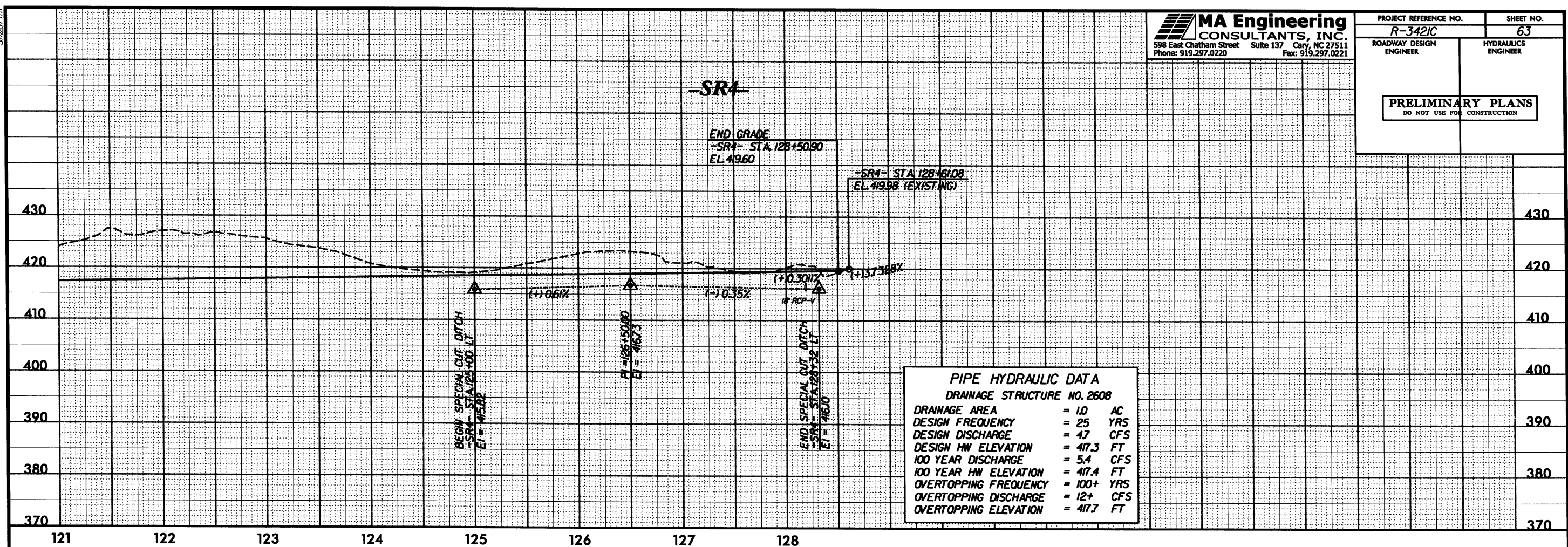


PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1811	
DRAINAGE AREA	= 3.8 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 19 CFS
DESIGN HW ELEVATION	= 418.6 FT
100 YEAR DISCHARGE	= 22 CFS
100 YEAR HW ELEVATION	= 418.9 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 51+ CFS
OVERTOPPING ELEVATION	= 425.0 FT

PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 2604	
DRAINAGE AREA	= 157 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 22.0 CFS
DESIGN HW ELEVATION	= 405.5 FT
100 YEAR DISCHARGE	= 35.0 CFS
100 YEAR HW ELEVATION	= 406.4 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 50+ CFS
OVERTOPPING ELEVATION	= 416.7 FT



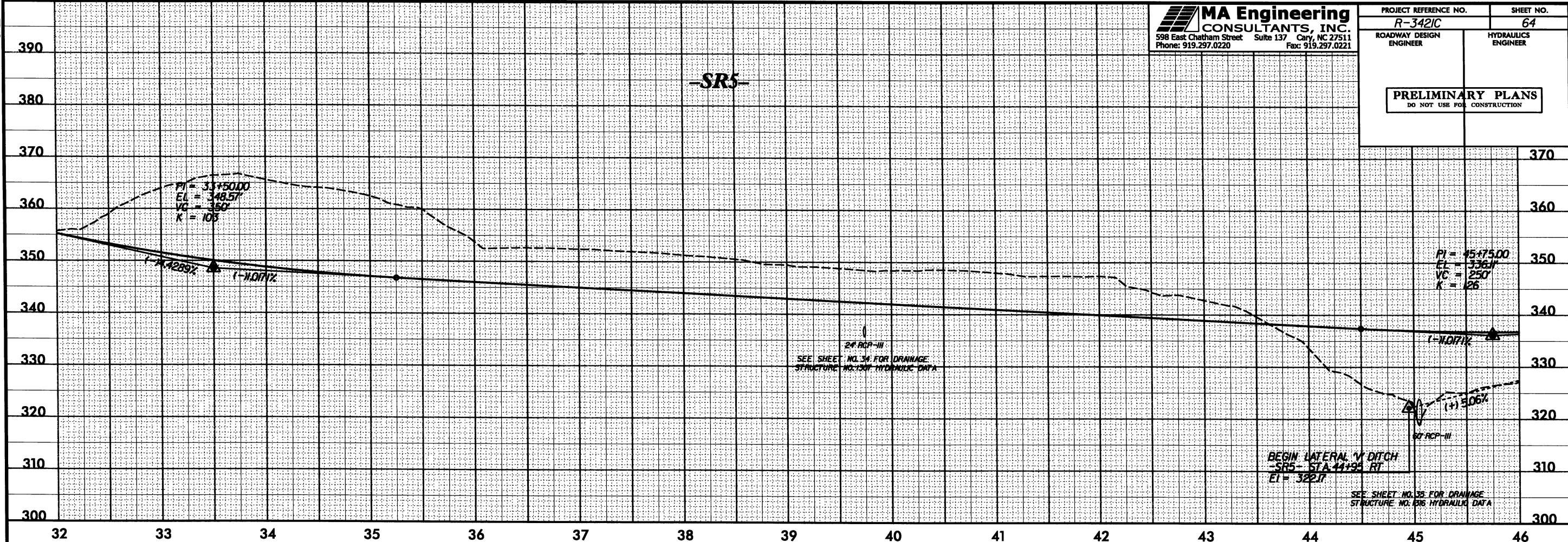
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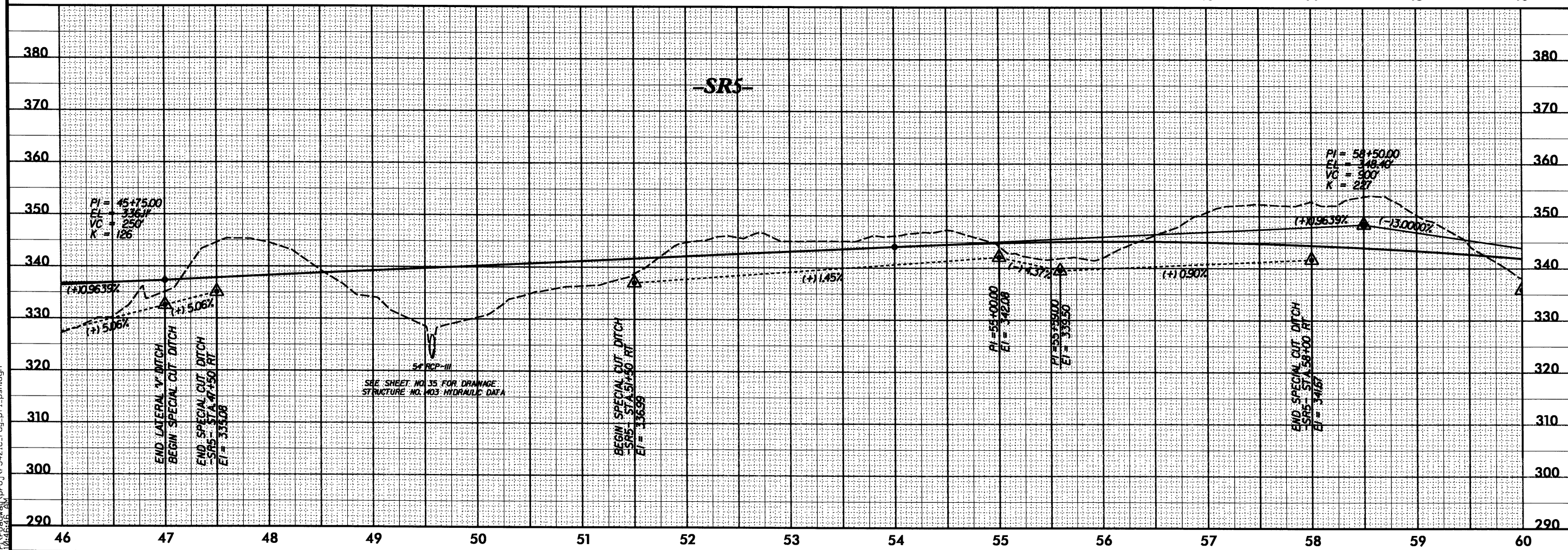
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PROJECT REFERENCE NO. R-342C		SHEET NO. 64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		



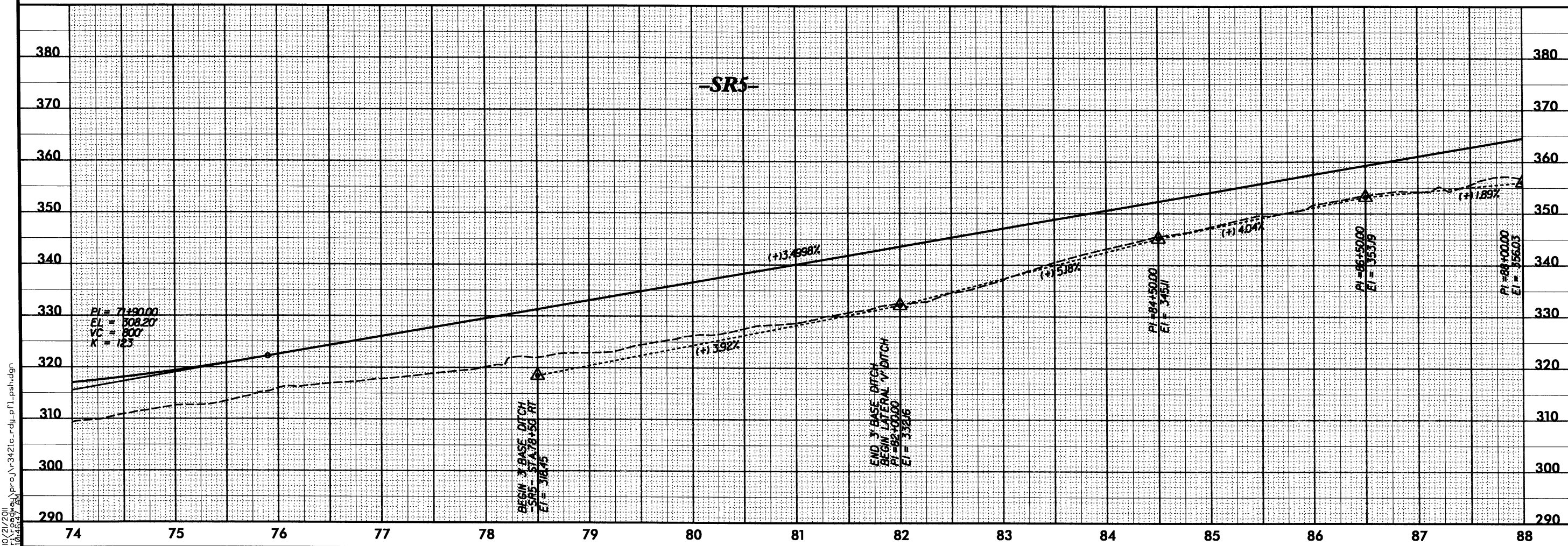
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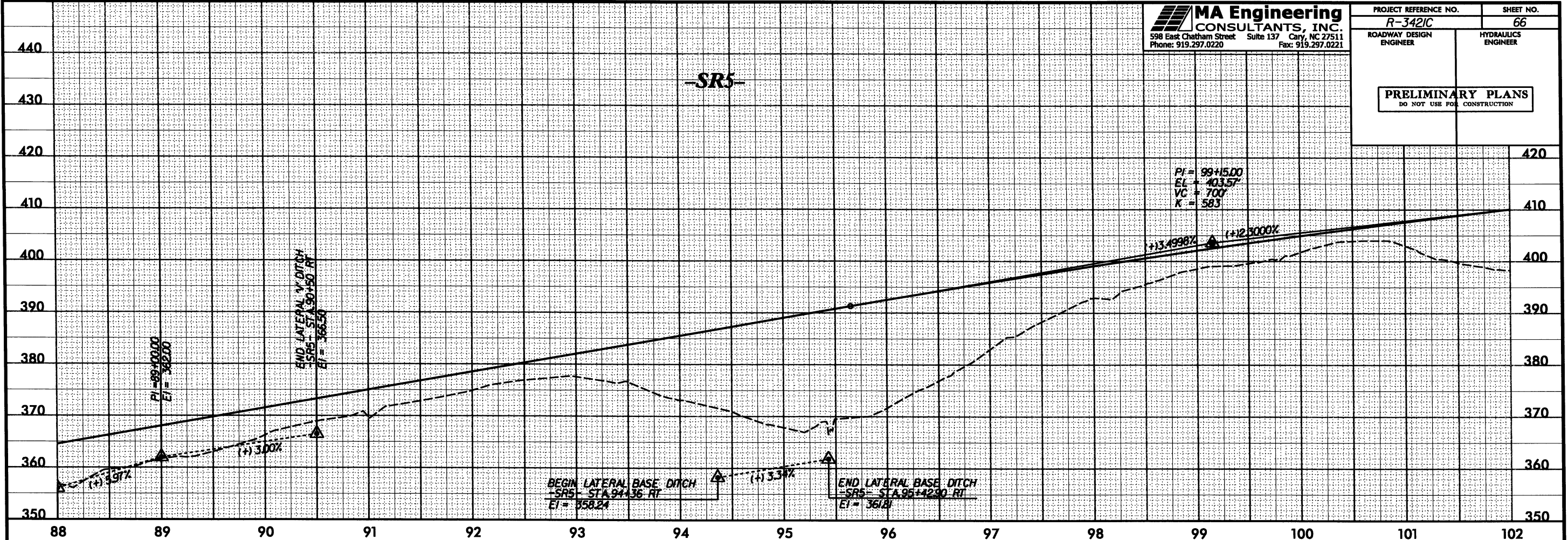
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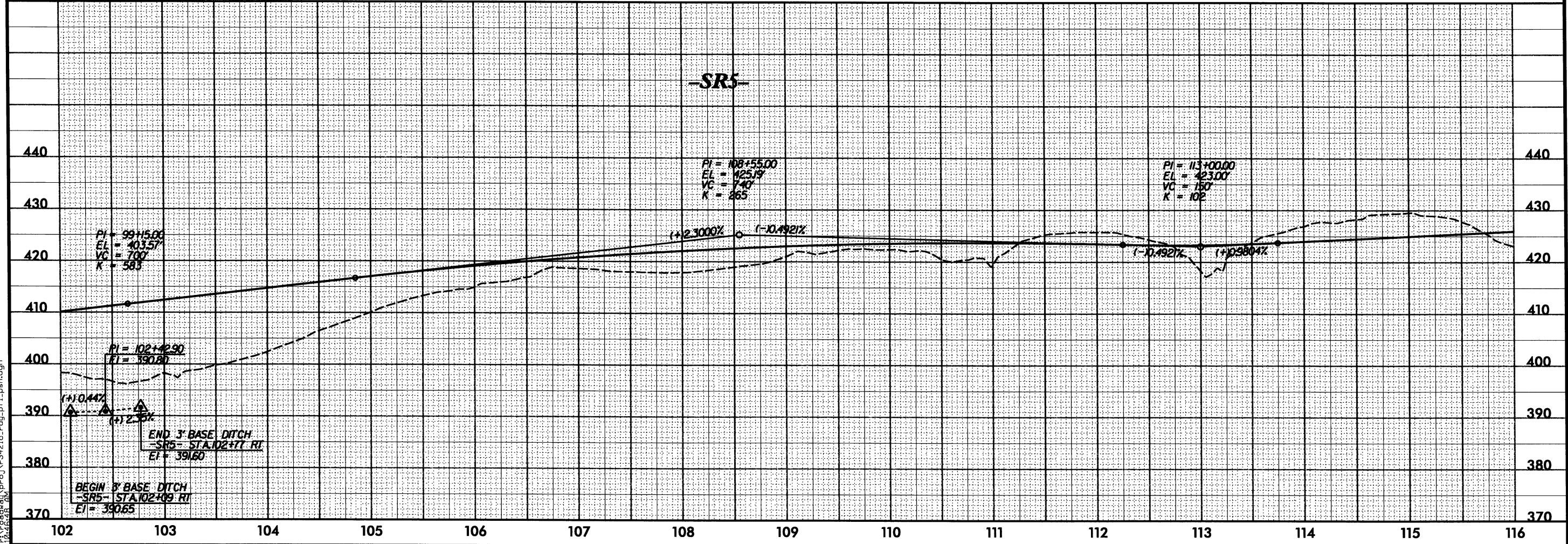
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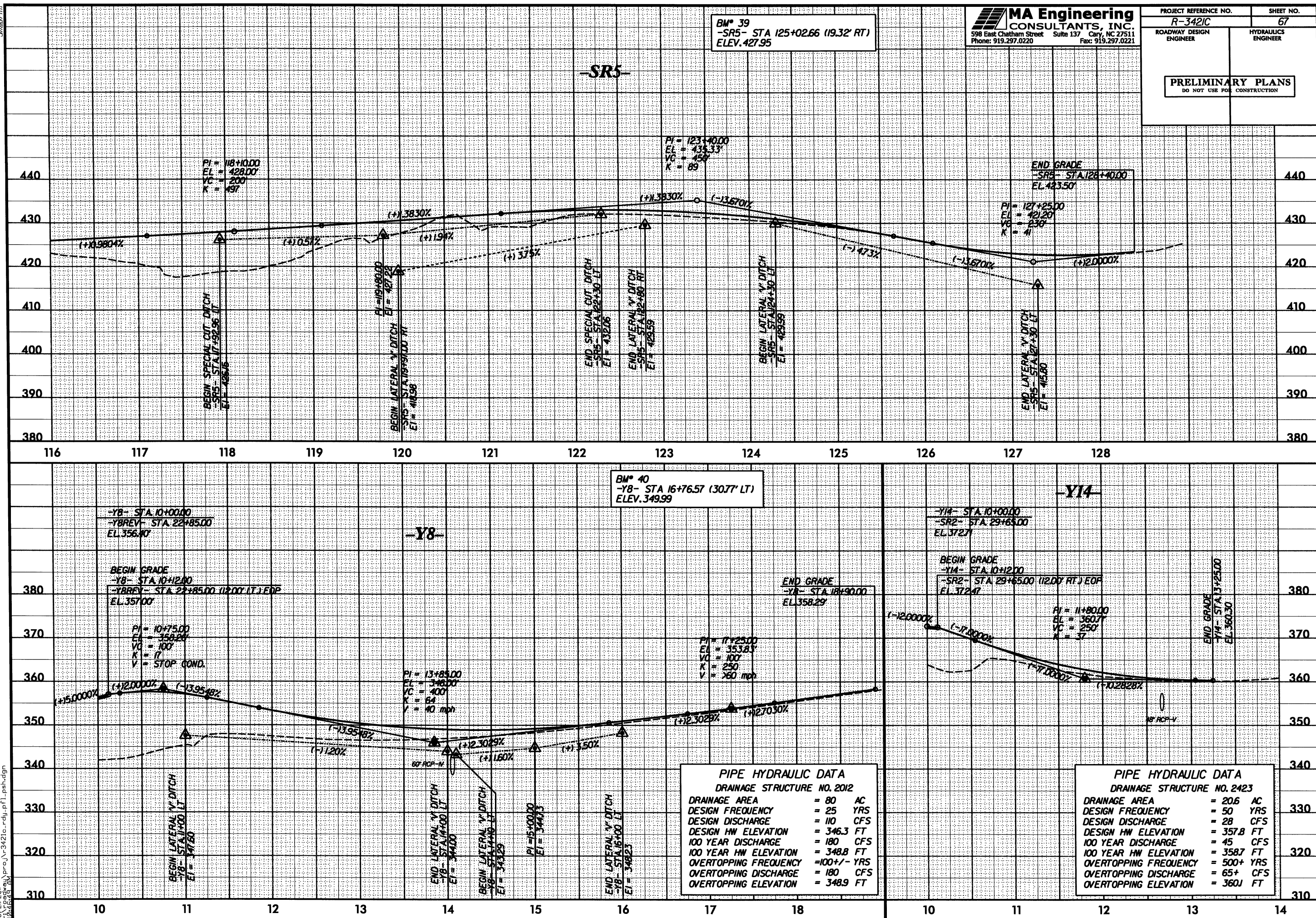


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END GRADE
-Y15- STA 12+21.03
-Y8REV- STA 45+80.53 (12.00' RT) EOP
EL 423.20

-Y15- STA 12+33.21
-Y8REV- STA 45+81.95
EL 423.44

BEGIN GRADE
-Y15- STA 12+45.40
-Y8REV- STA 45+84.06 (12.00' LT) EOP
EL 423.40

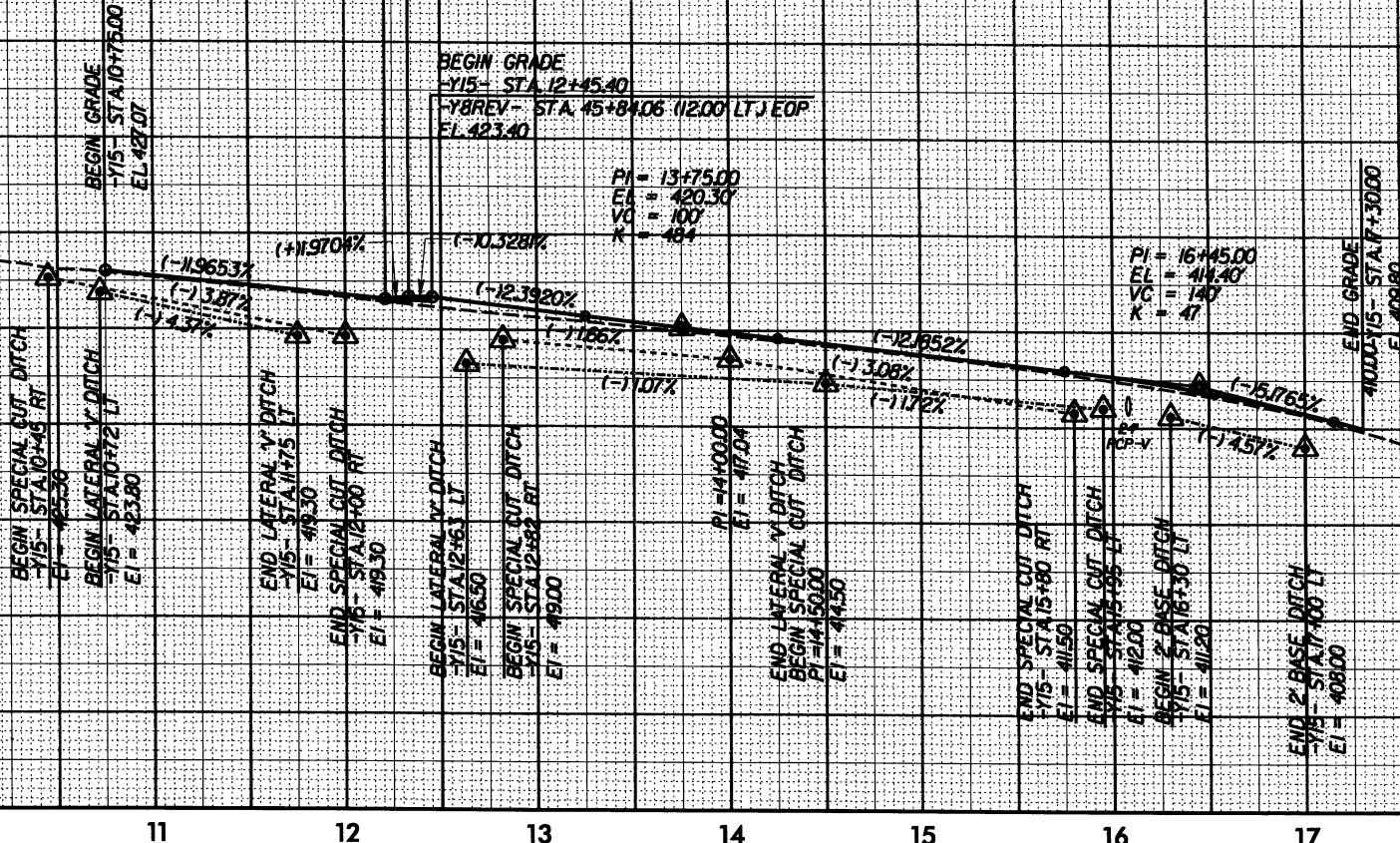
PI = 13+75.00
EL = 420.30
VC = 100
K = 484

PI = 16+45.00
EL = 418.40
VC = 140
K = 47

PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 2415	
DRAINAGE AREA	= 3.7 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 10 CFS
DESIGN HW ELEVATION	= 413J FT
100 YEAR DISCHARGE	= 12 CFS
100 YEAR HW ELEVATION	= 413.3 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 17+ CFS
OVERTOPPING ELEVATION	= 414.2 FT

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R-3421C		68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
<div>PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION</div>		



-Y16-

-Y17-

-Y16- STA 10+00.00
-SR2- STA 51+05.00
EL 409.79

BEGIN GRADE
-Y16- STA 10+12.00
-SR2- STA 51+05.00 (12.00' RT) EOP
EL 409.55

PI = 11+50.00
EL = 415.75
VC = 180
K = 62

PI = 10+37.00
EL = 409.93
VC = 40
K = 11

END GRADE
-Y16- STA 12+50.00
EL 418.00

BEGIN GRADE
-Y17- STA 10+93J2
EL 437.05

END GRADE
-Y17- STA 11+75.00
EL 437.15

PI = 11+50.00
EL = 437.60
VC = 50

(+15.504%) (+12.2500%) (-2.0000%) (+1.5280%)

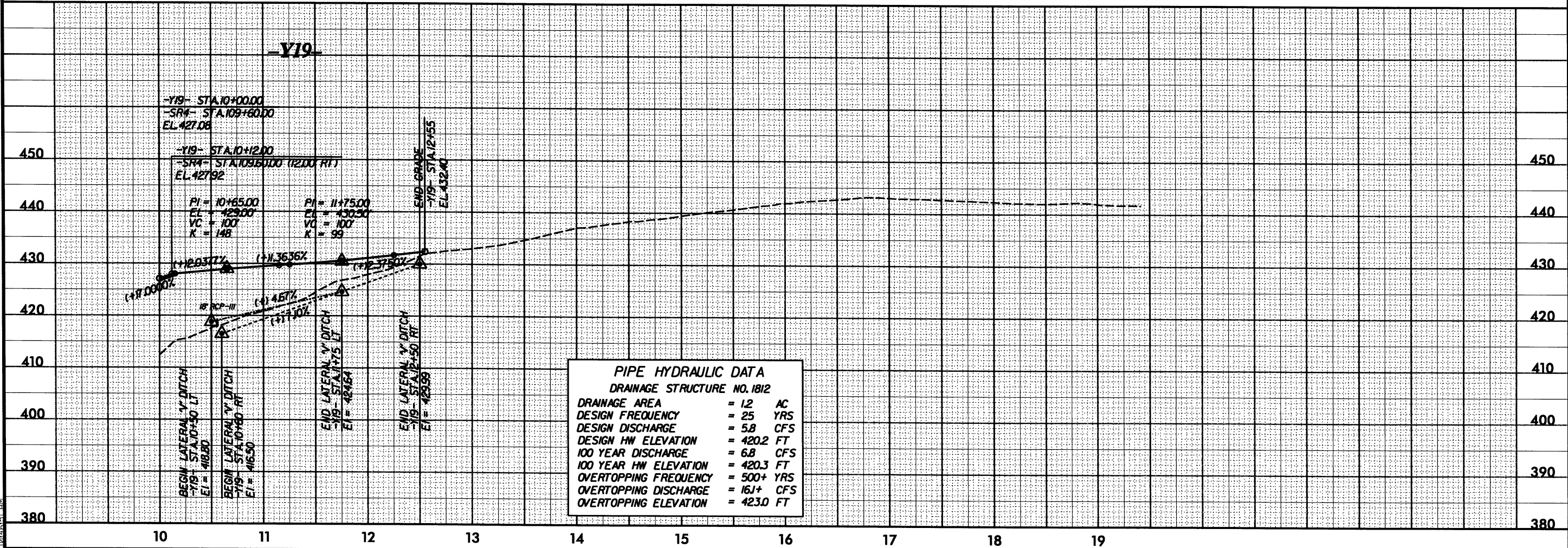
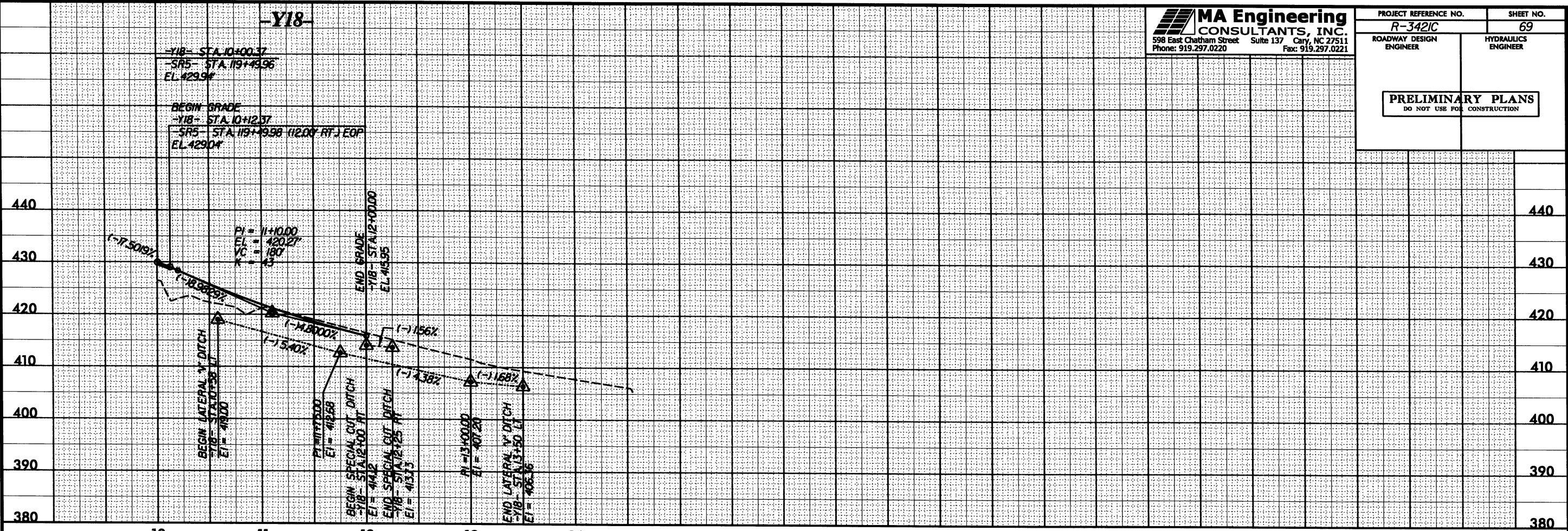
(+10.7911%) (-1.4000%)

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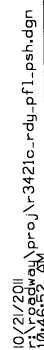
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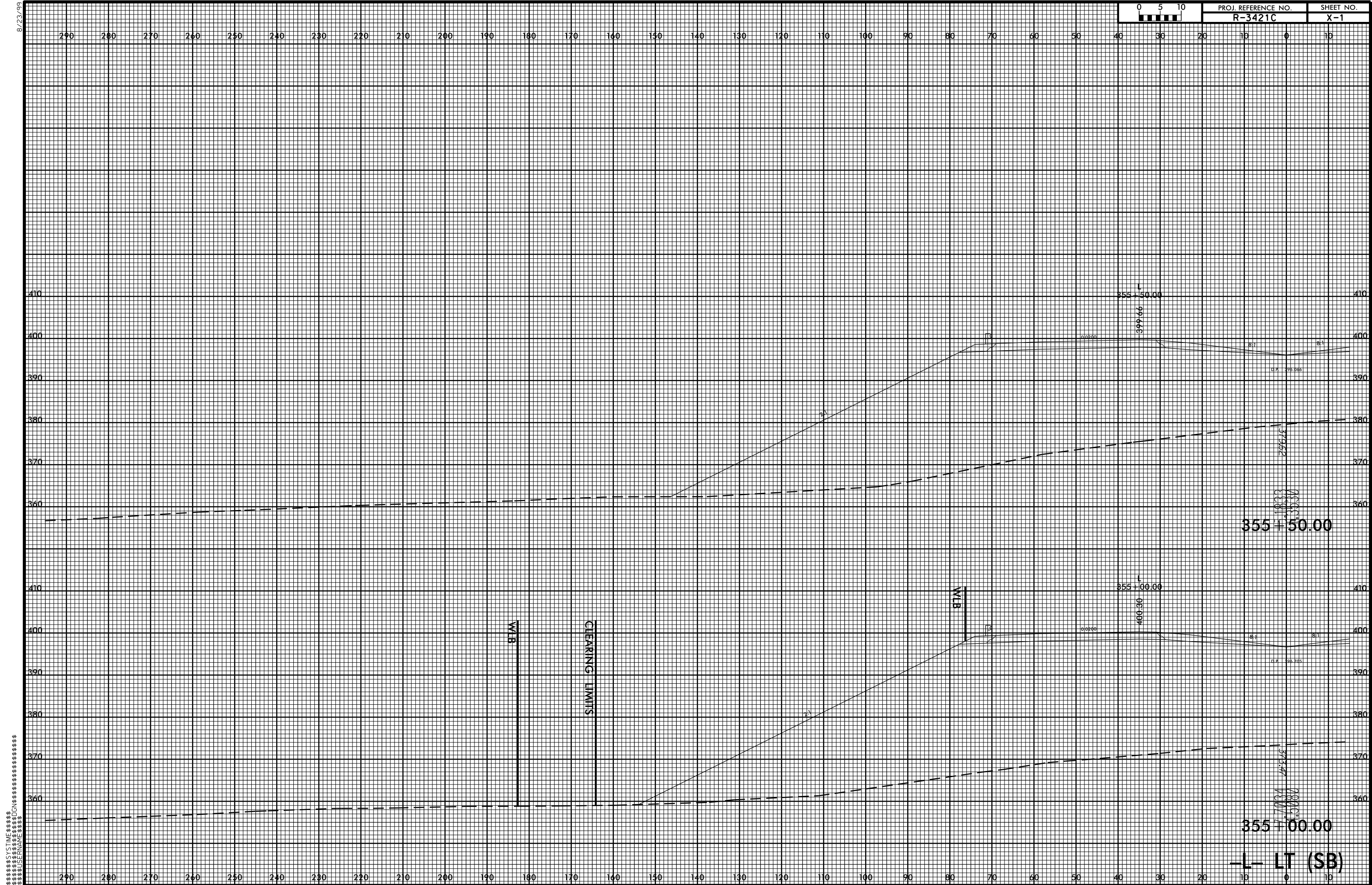
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PRELIMINARY PLANS
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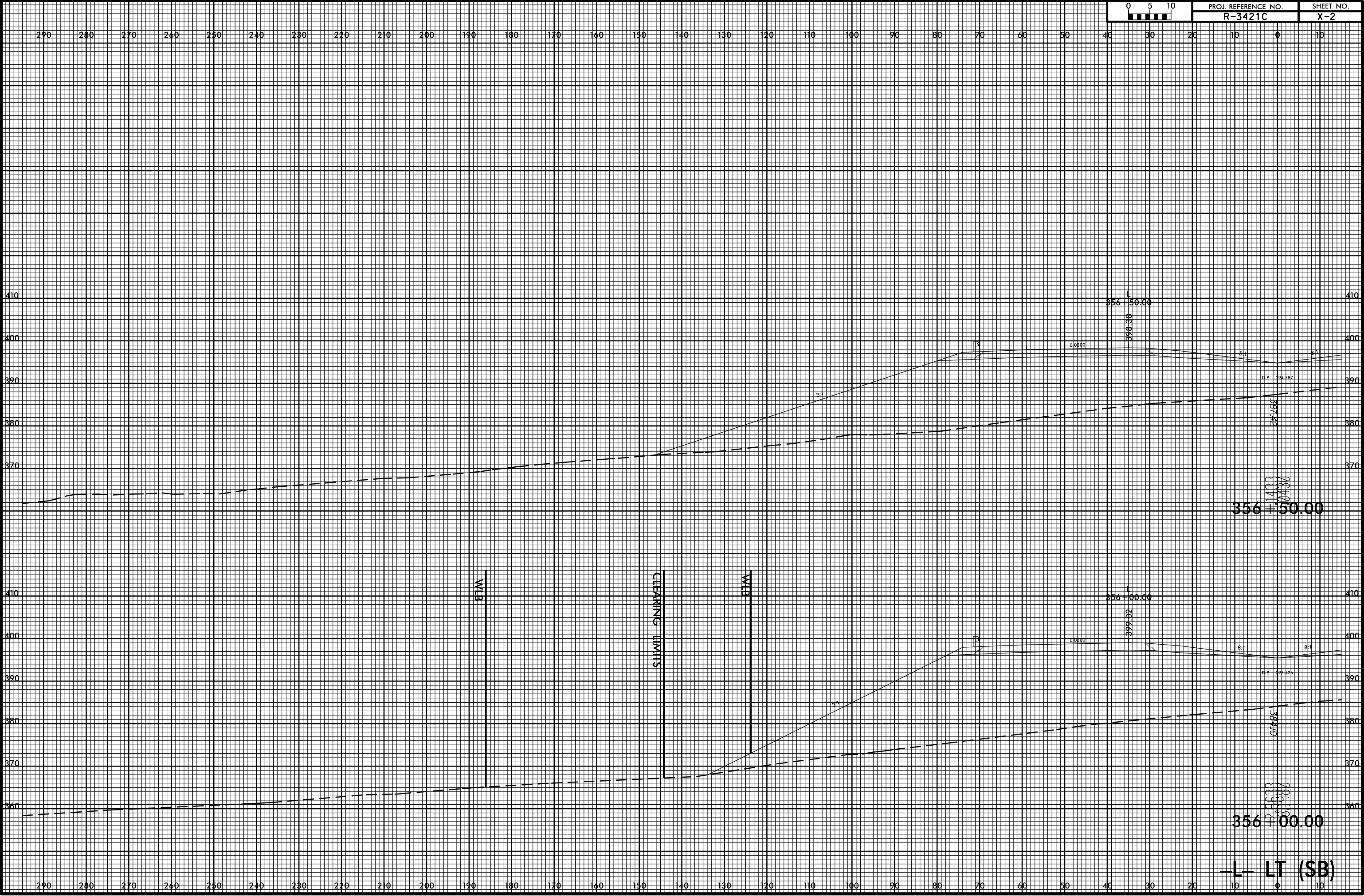


PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1812	
DRAINAGE AREA	= 12 AC
DESIGN FREQUENCY	= 25 YRS
DESIGN DISCHARGE	= 5.8 CFS
DESIGN HW ELEVATION	= 420.2 FT
100 YEAR DISCHARGE	= 6.8 CFS
100 YEAR HW ELEVATION	= 420.3 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 16.1+ CFS
OVERTOPPING ELEVATION	= 423.0 FT

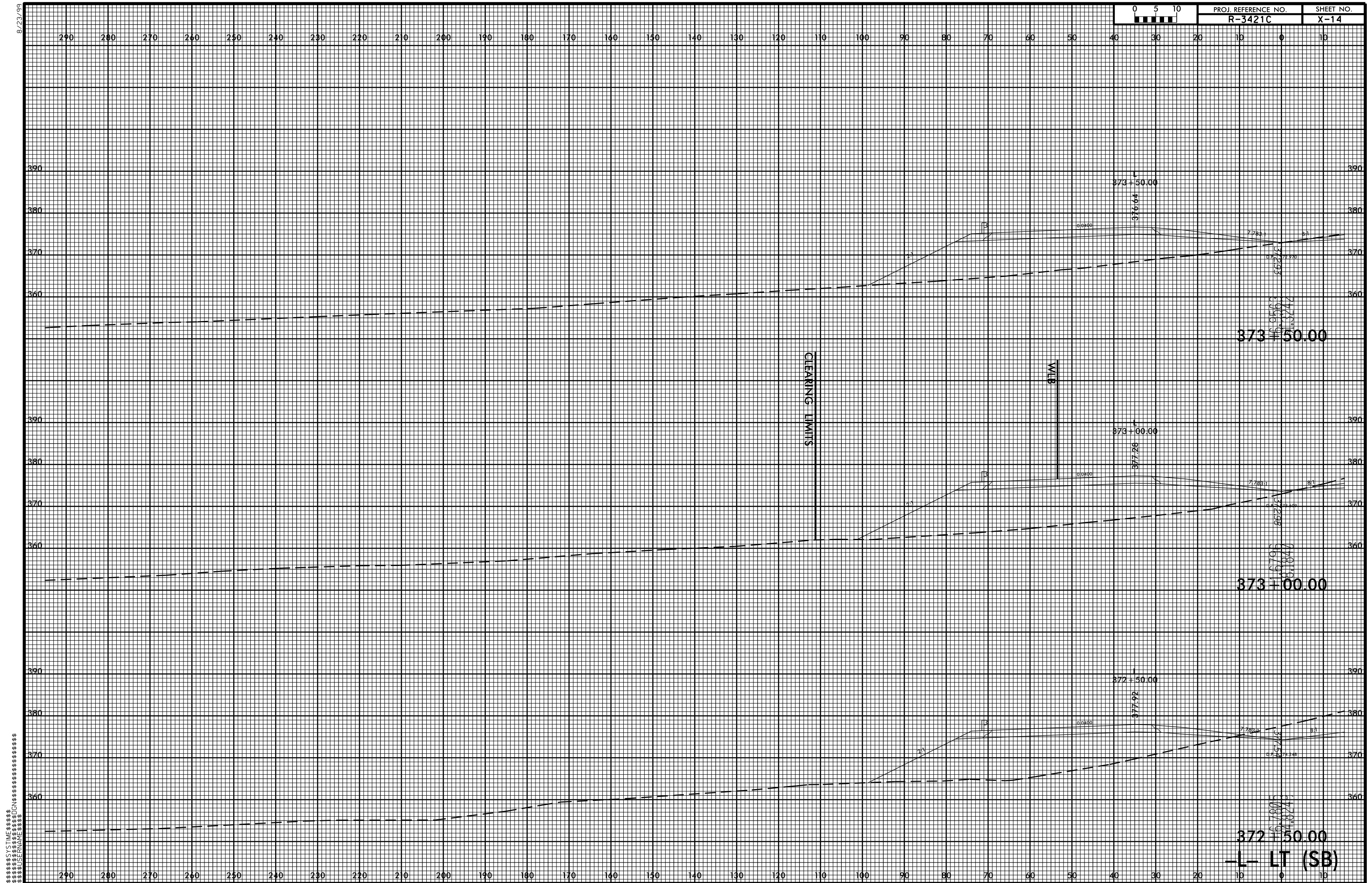




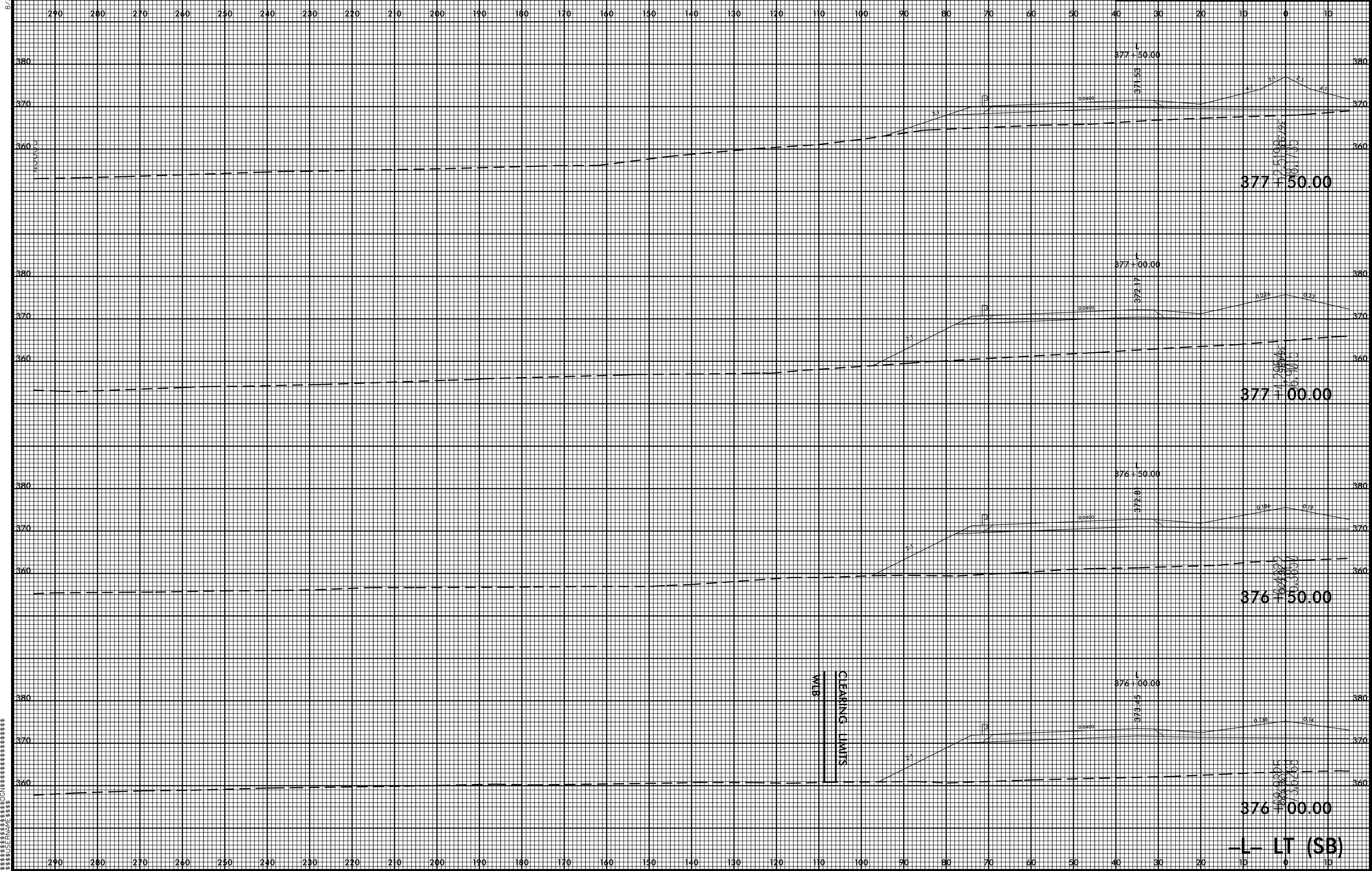
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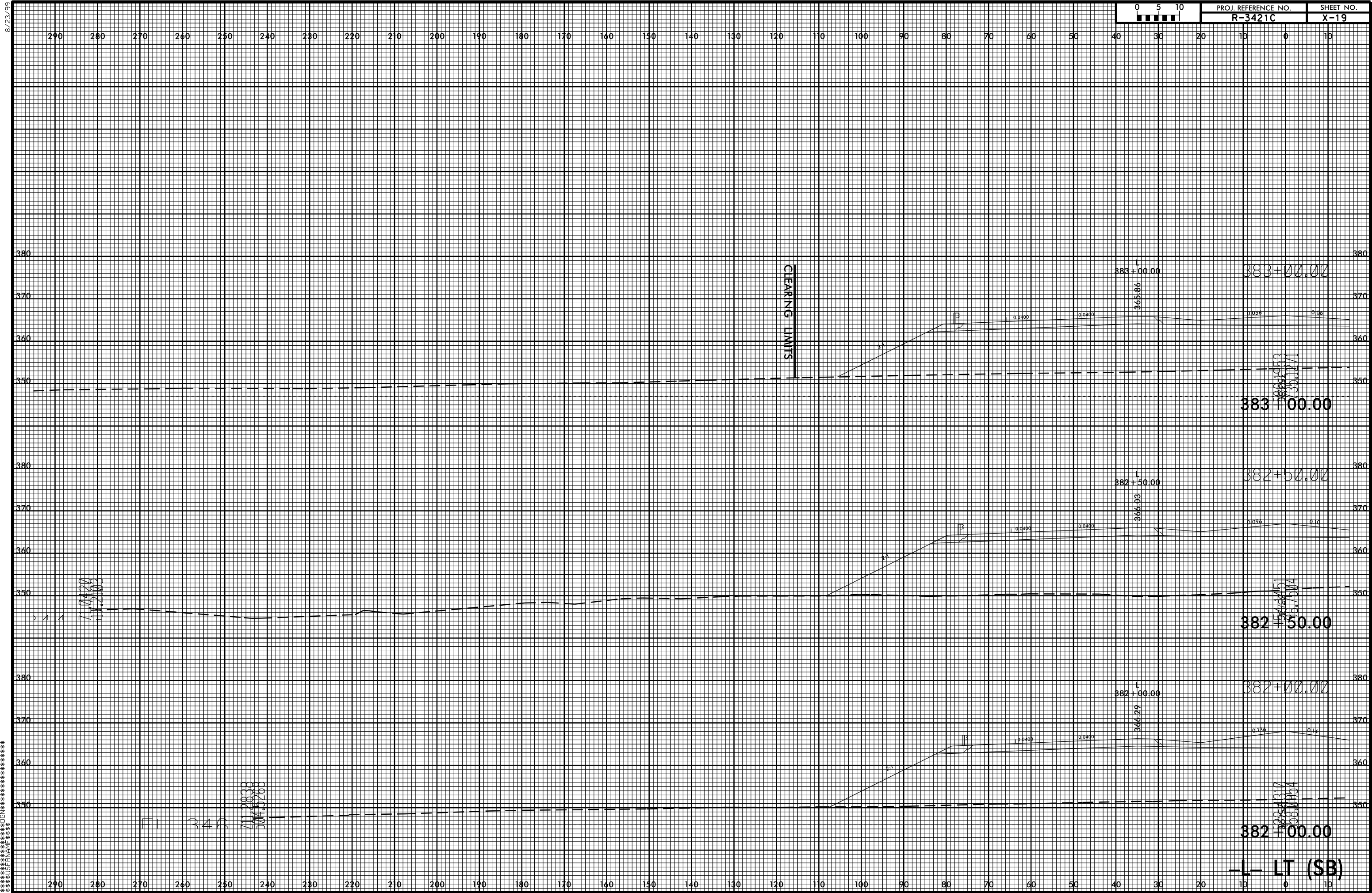


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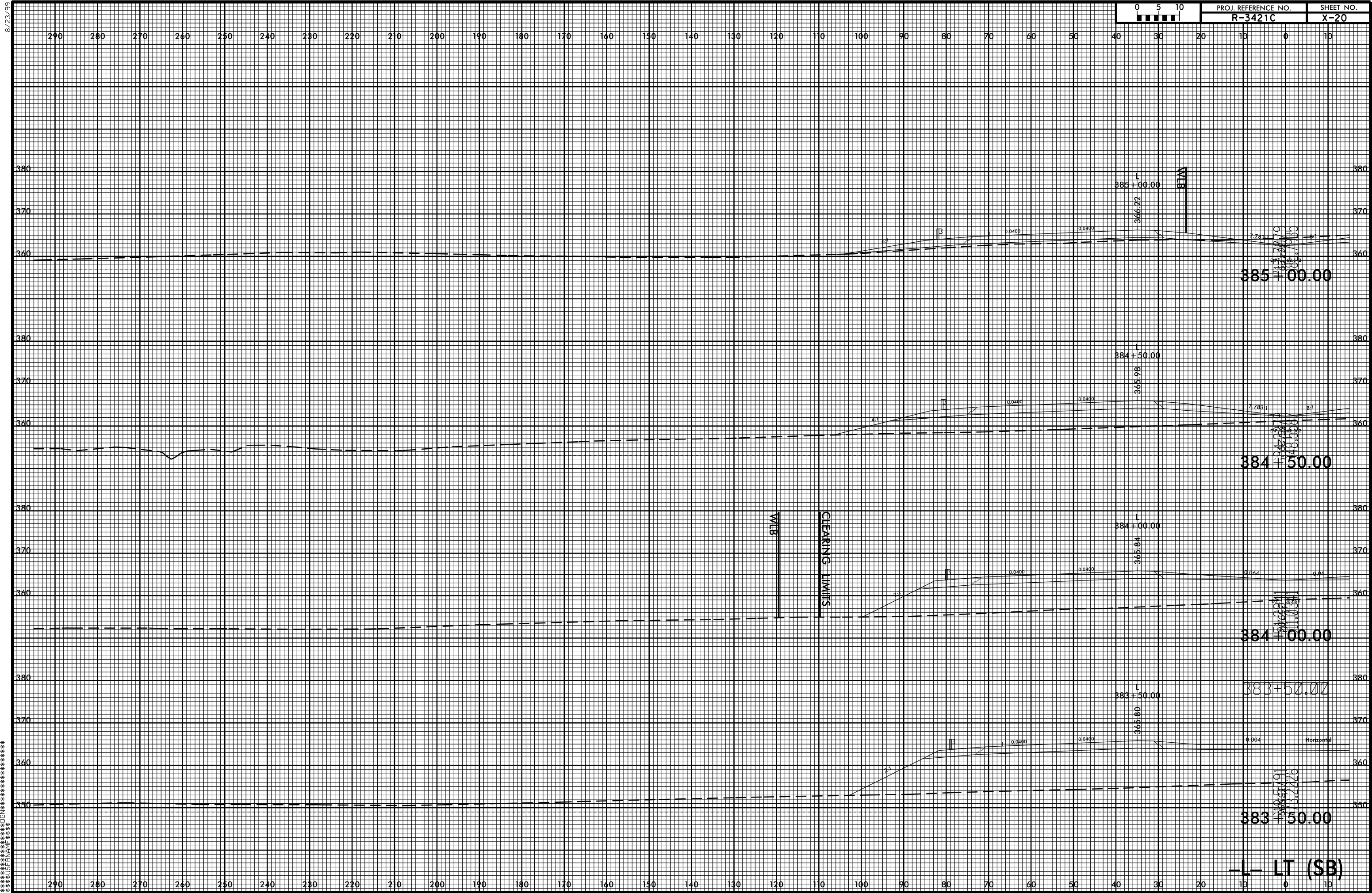


8/23/99



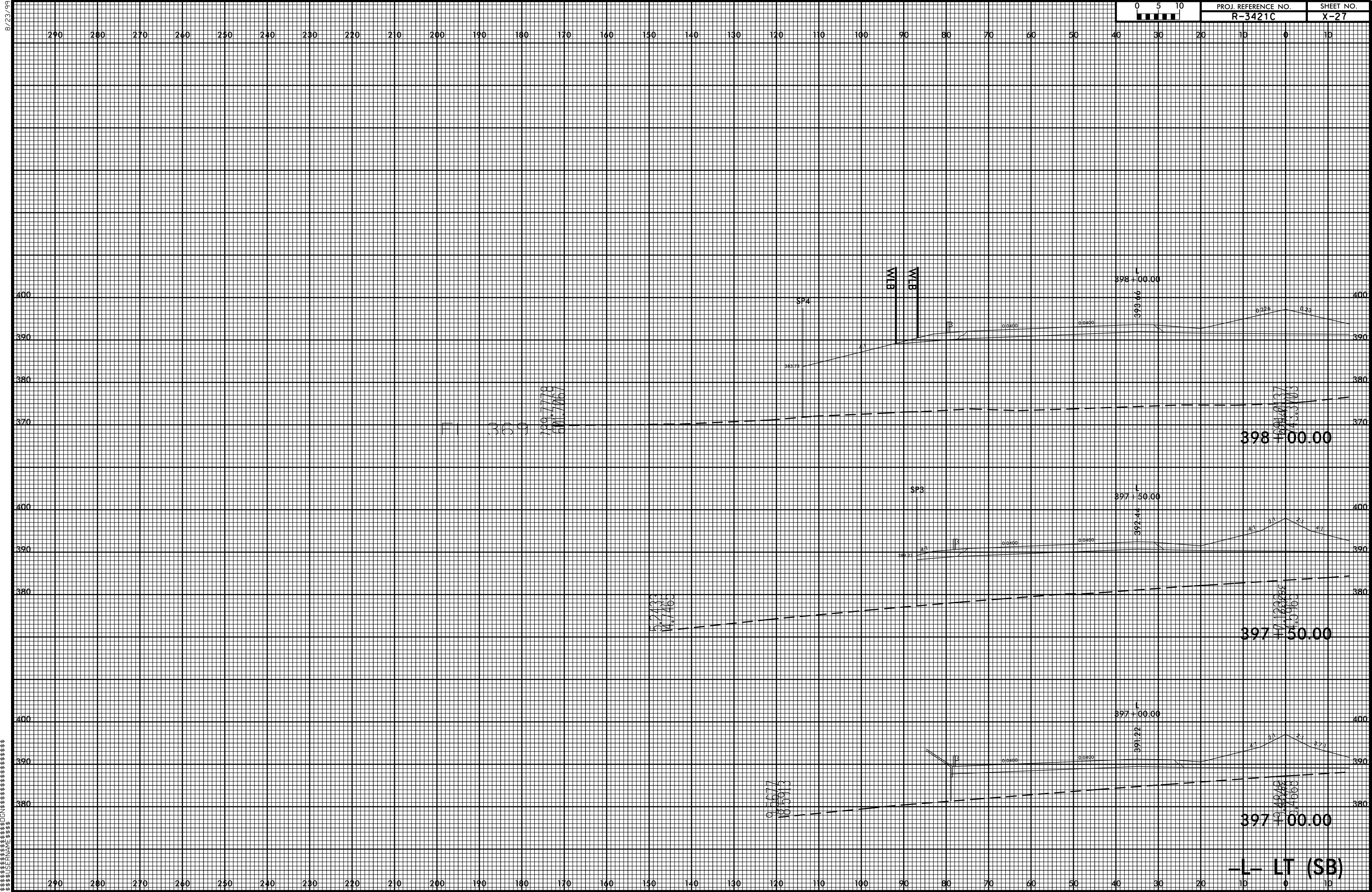


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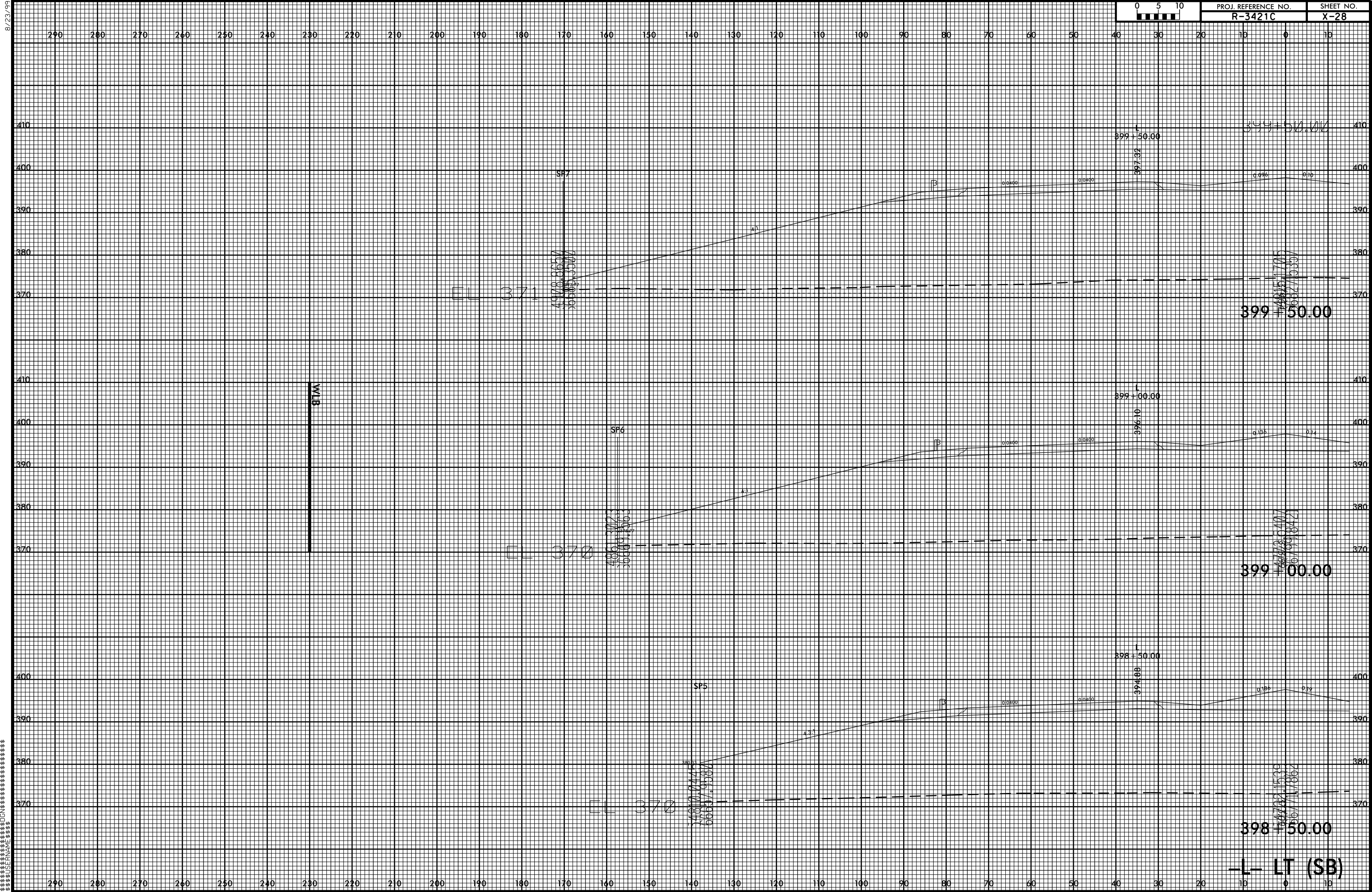
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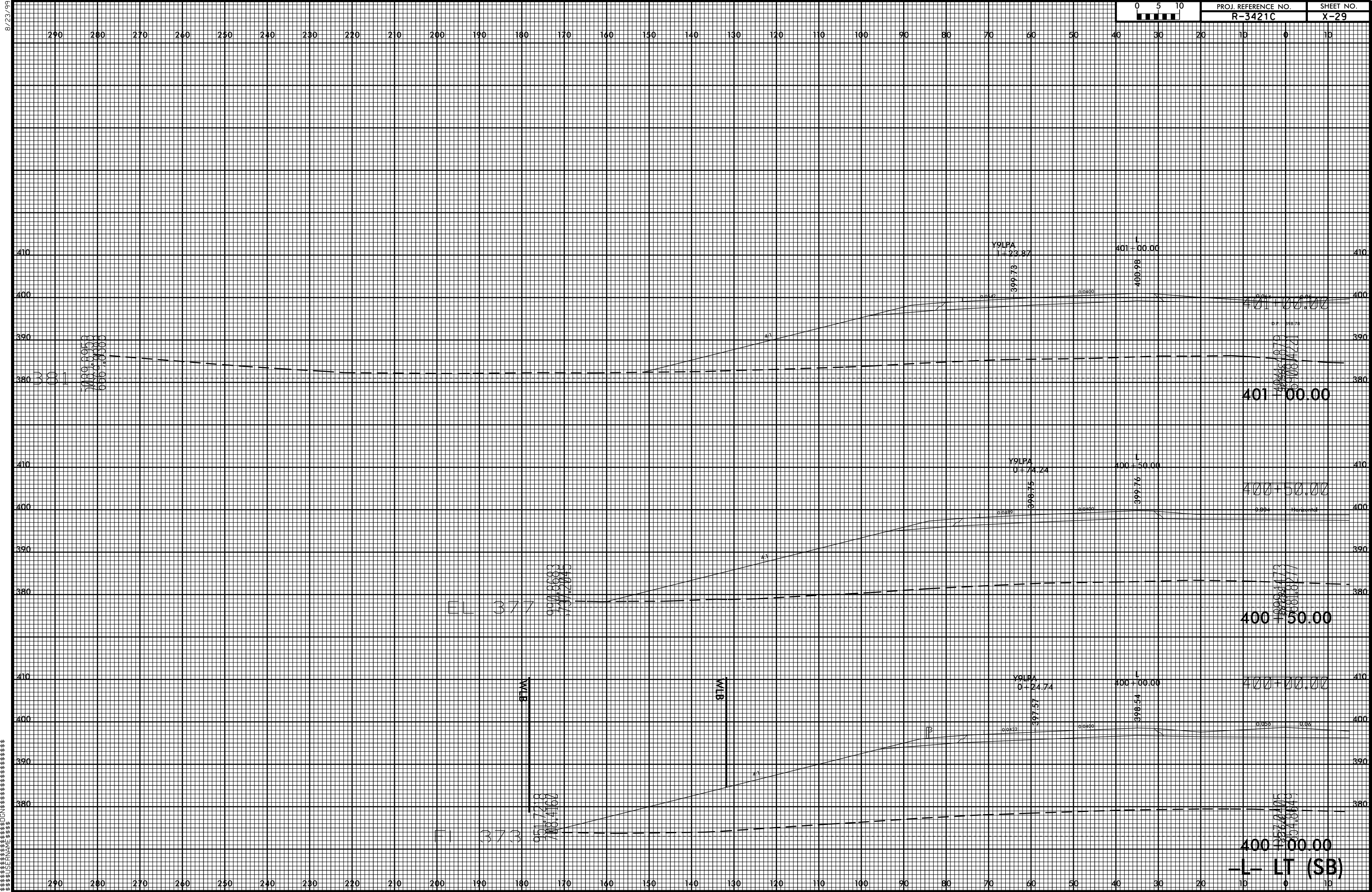


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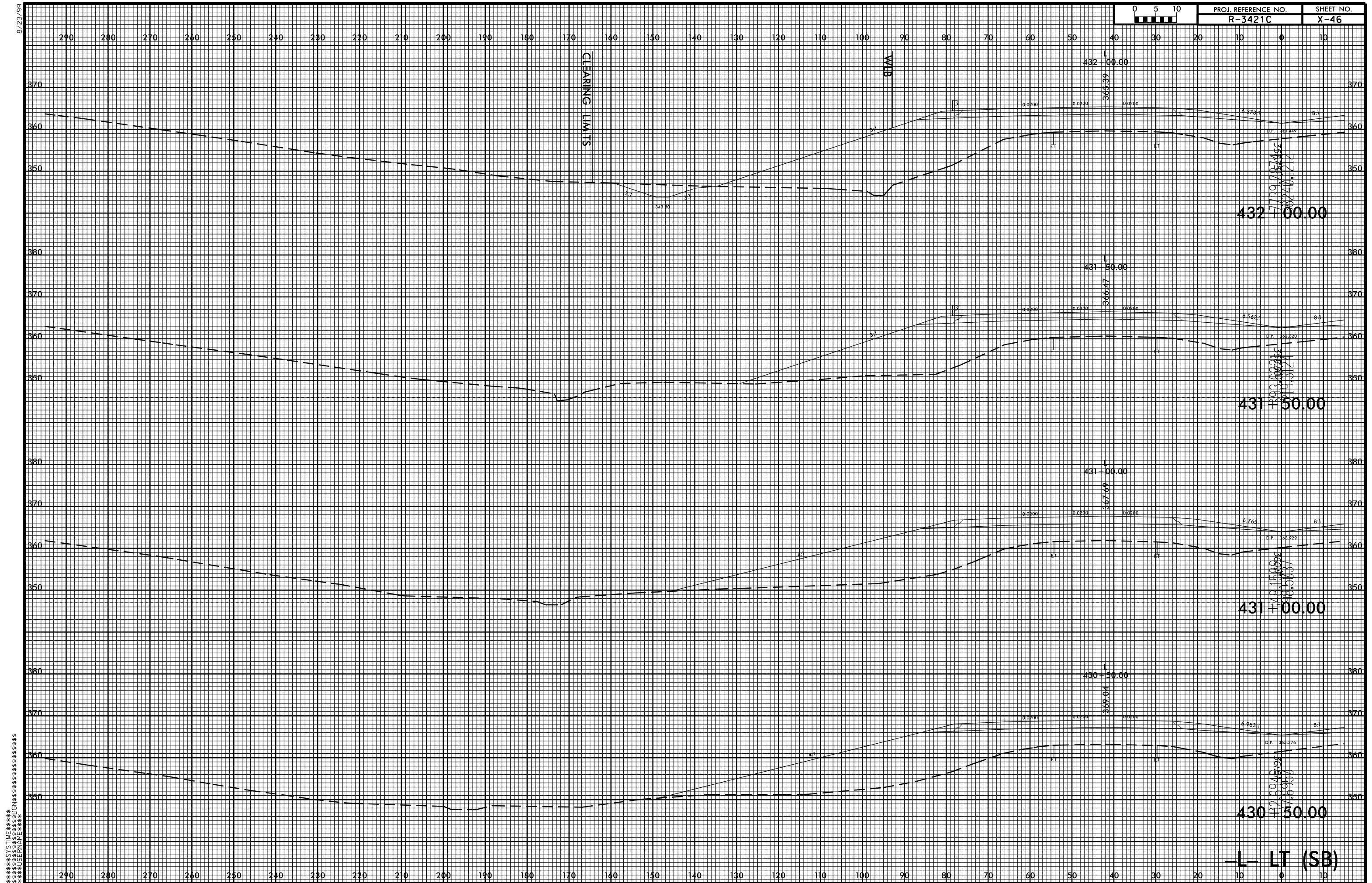
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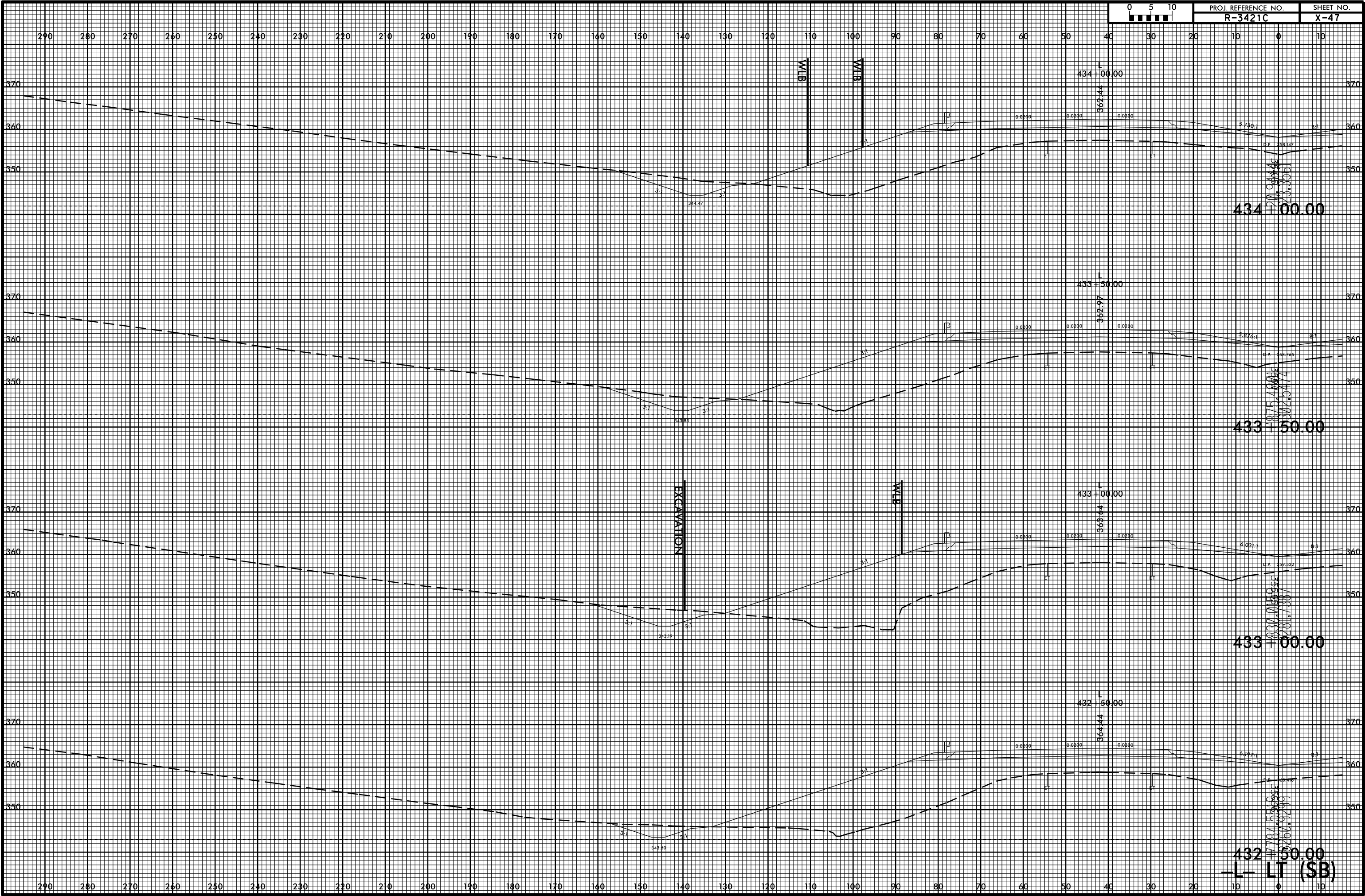
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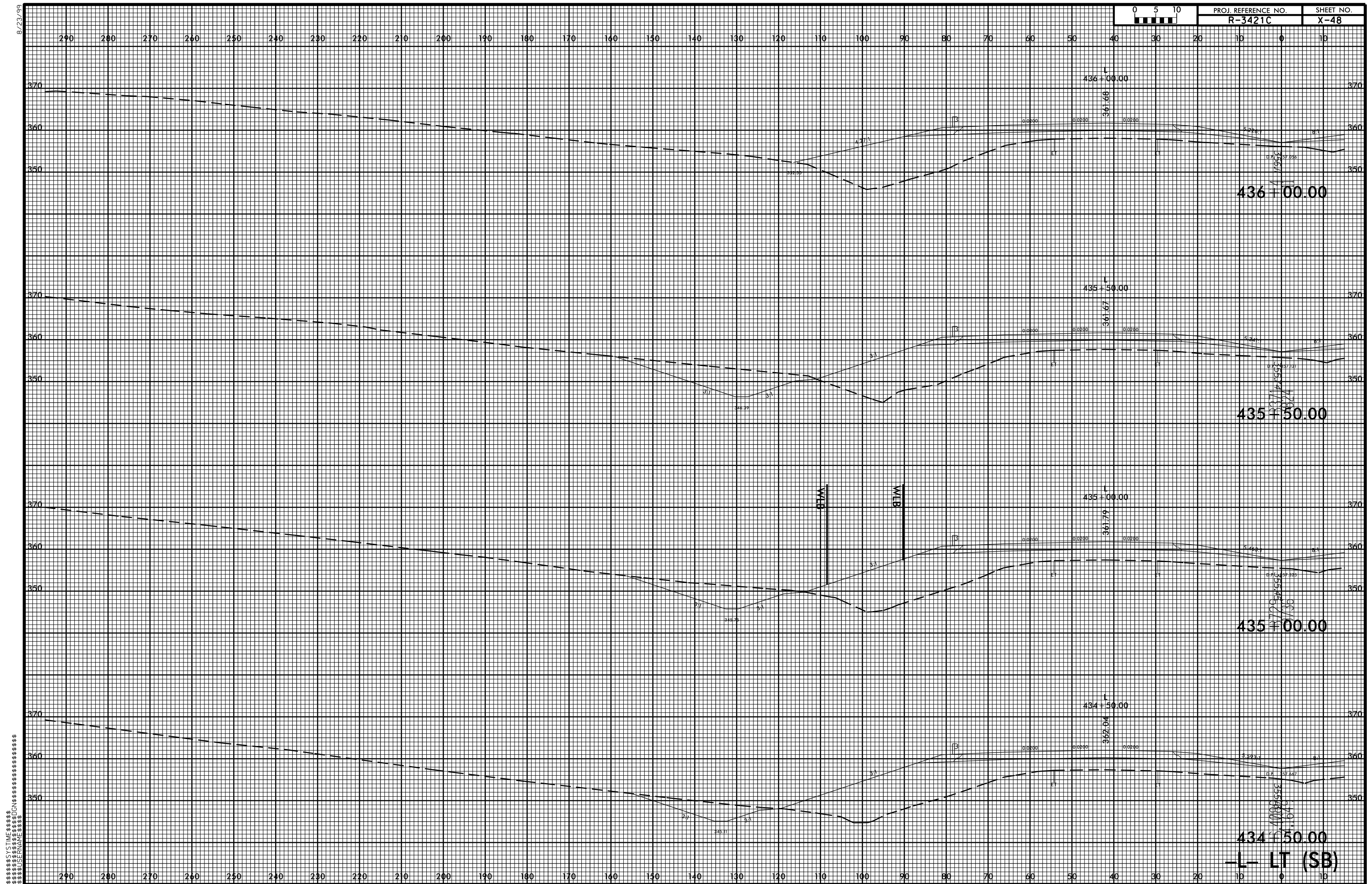
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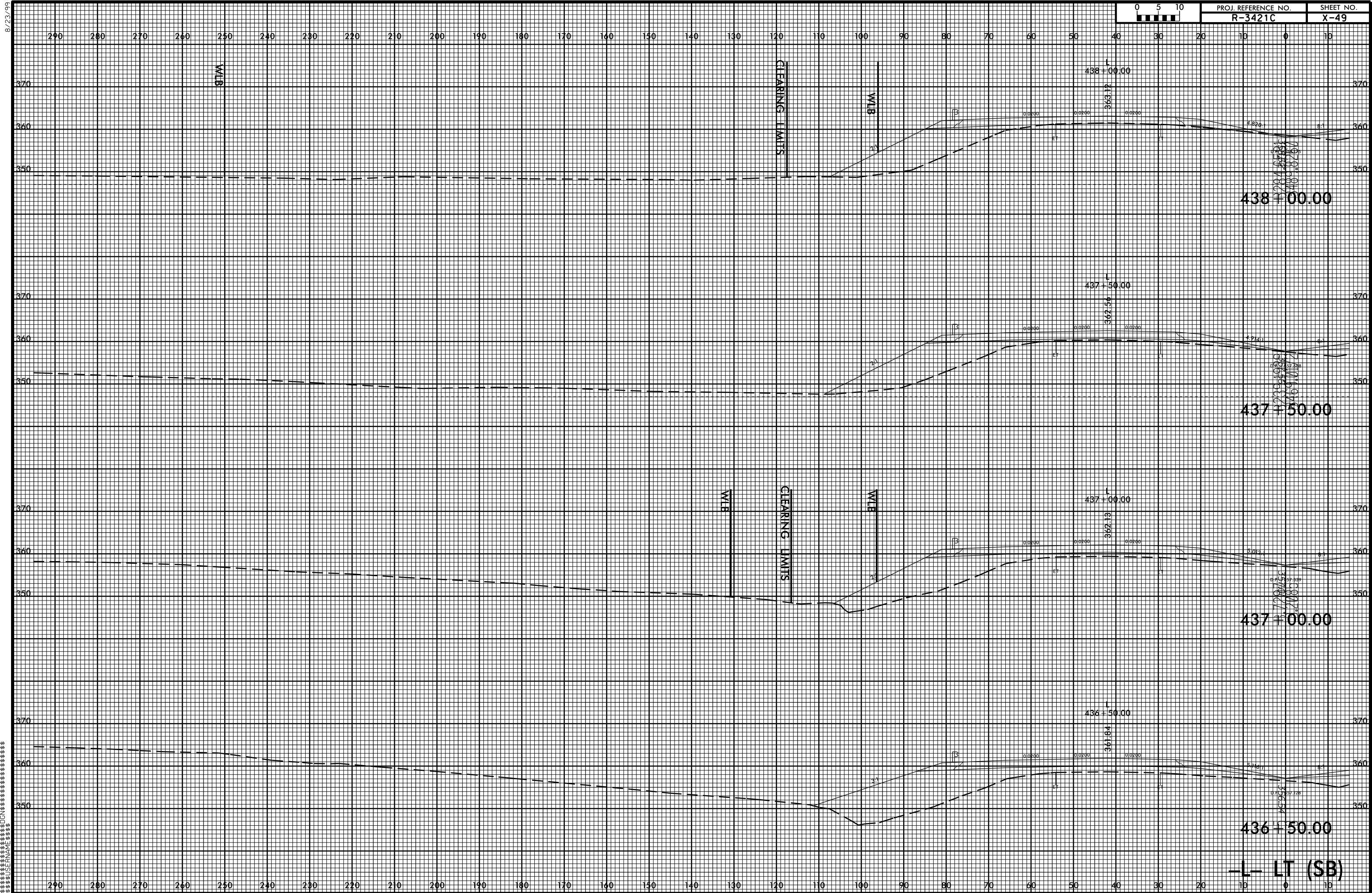
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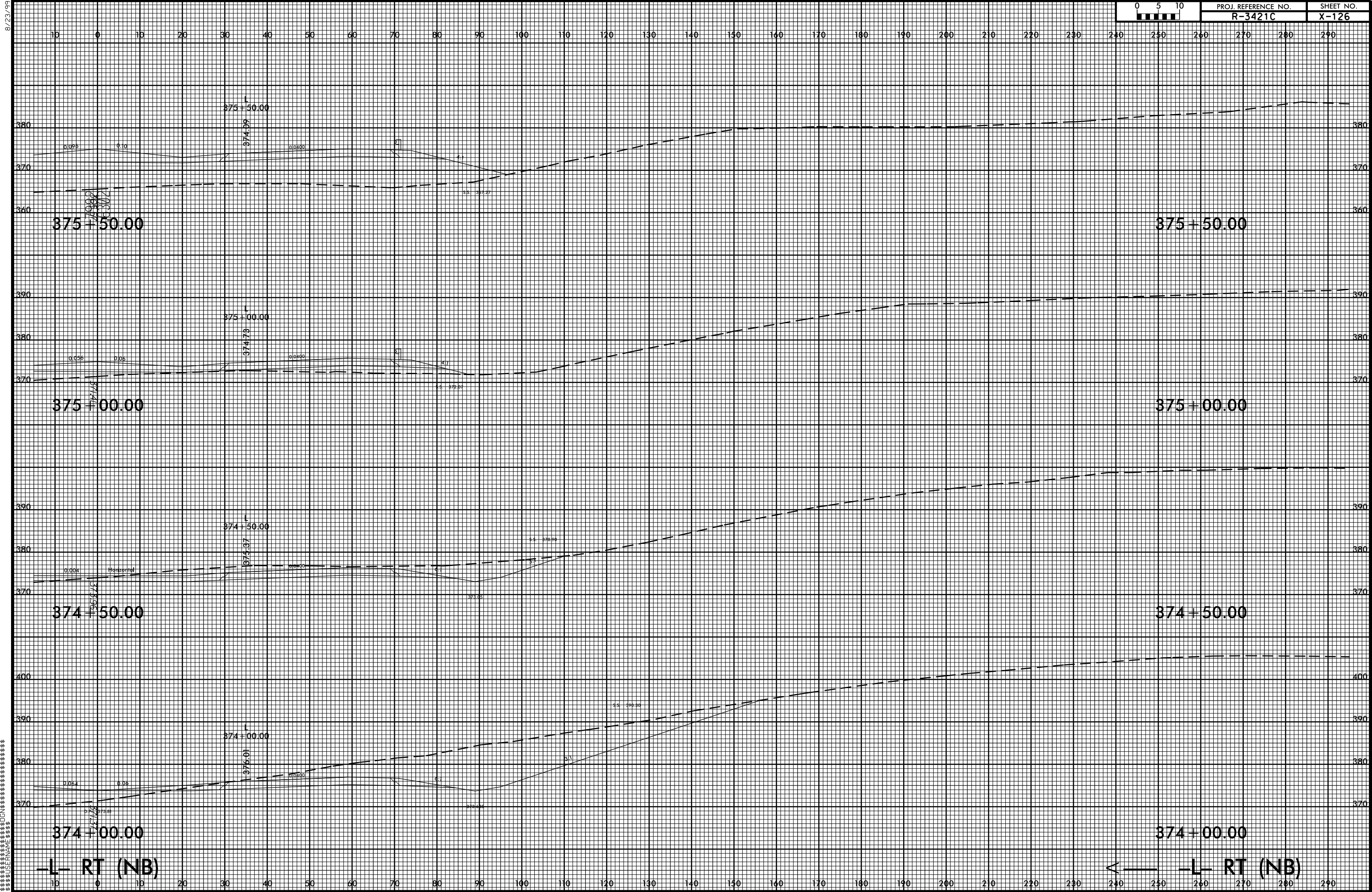


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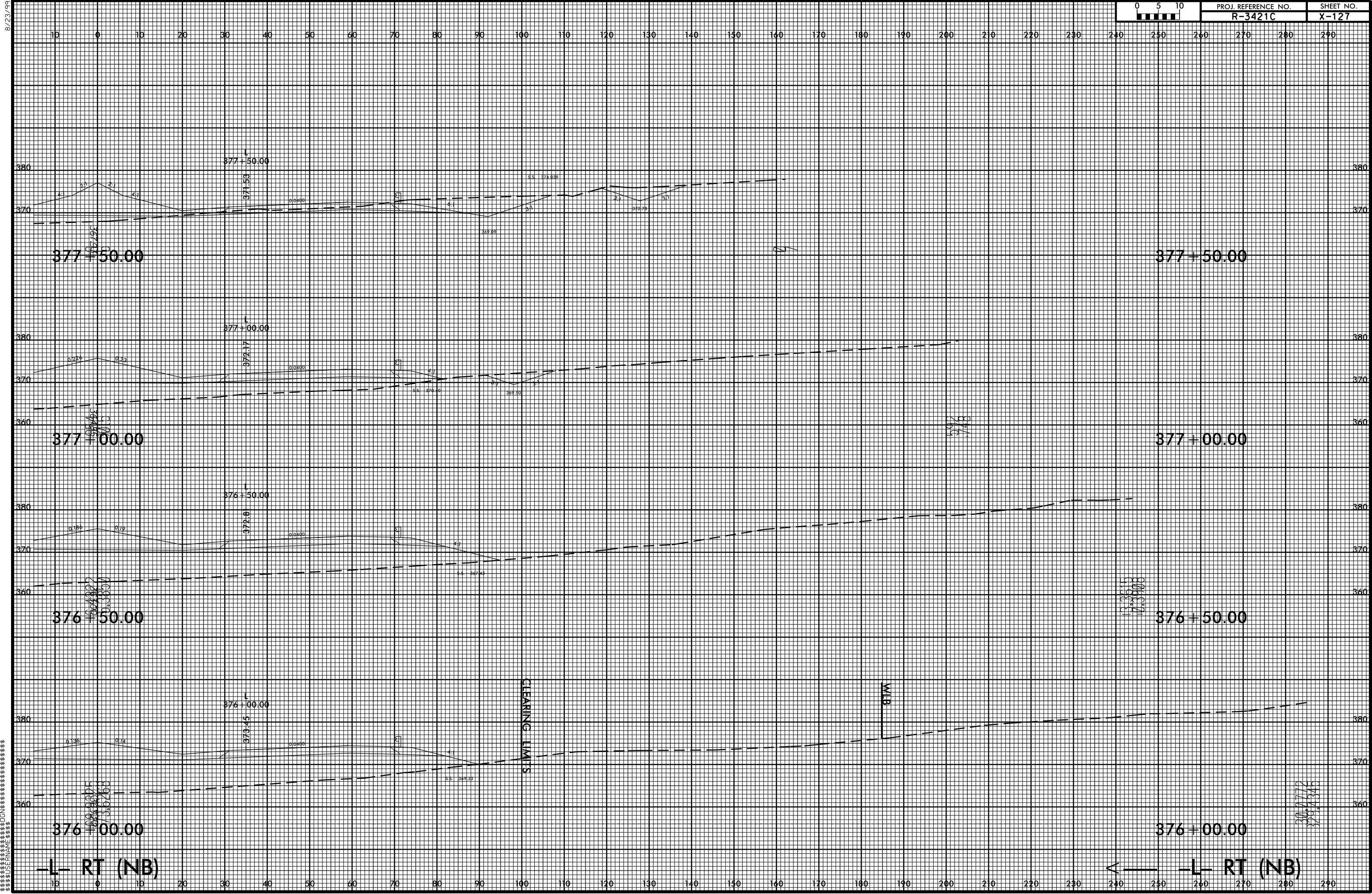
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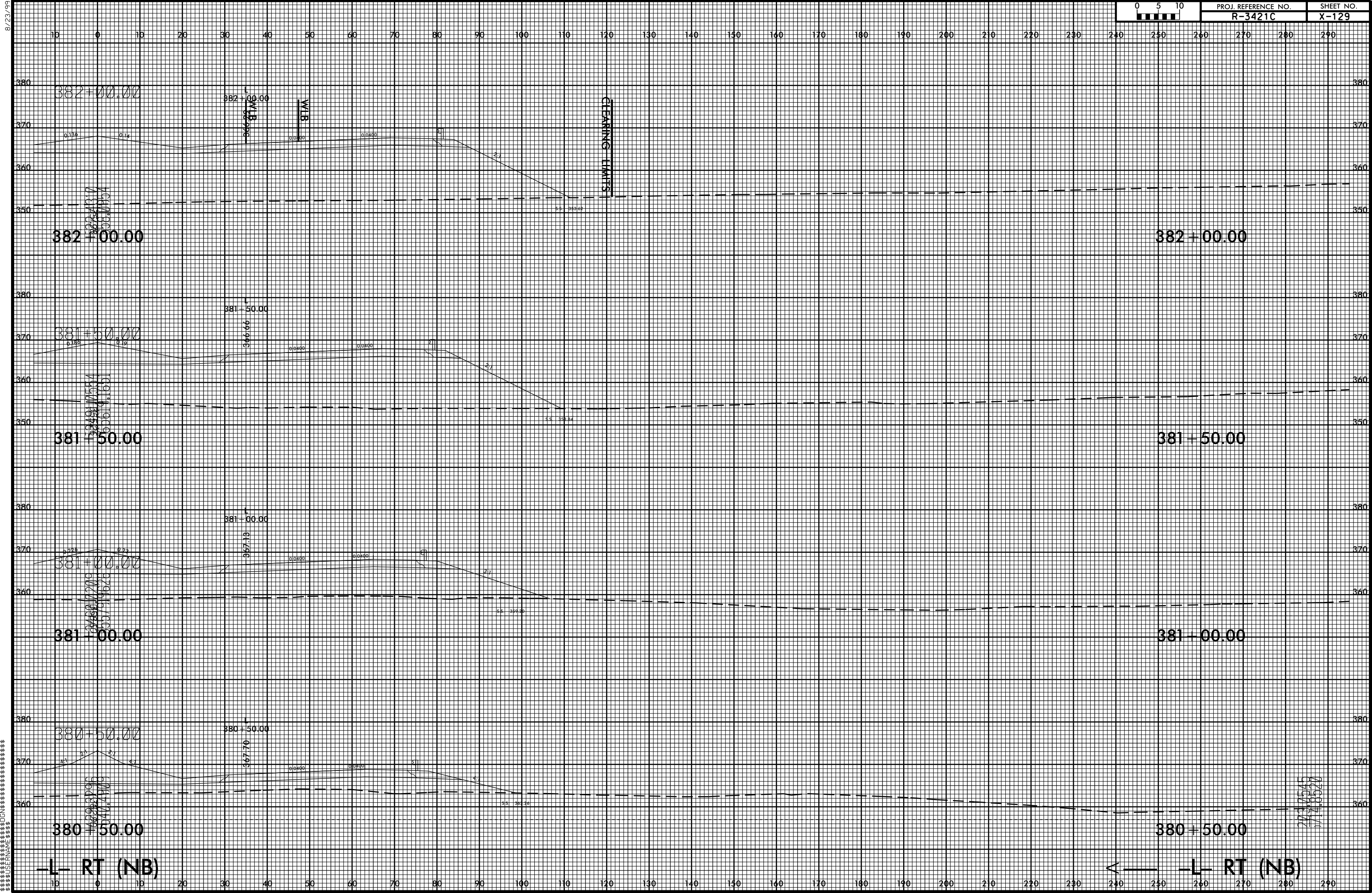
8/23/99



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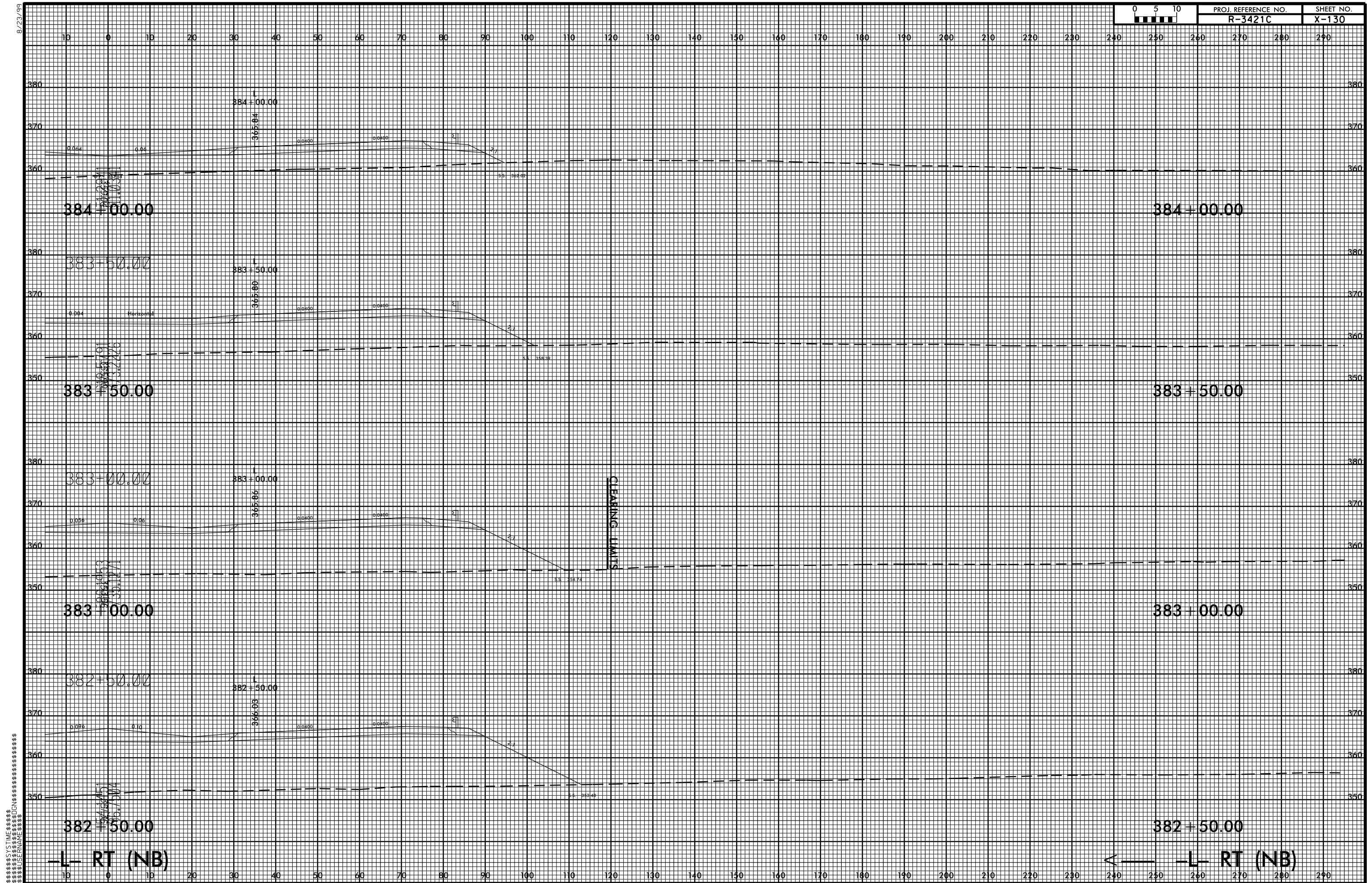
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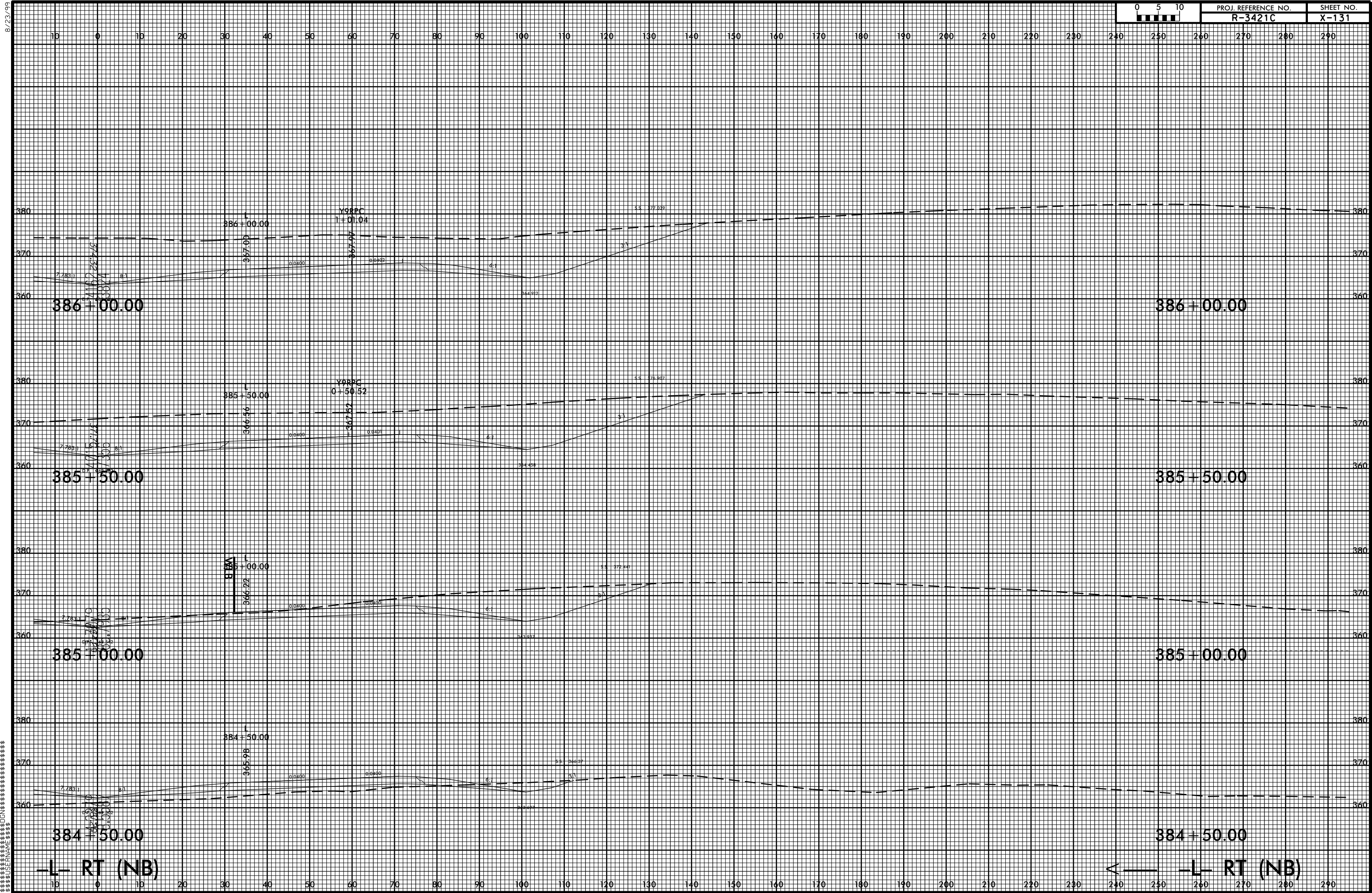


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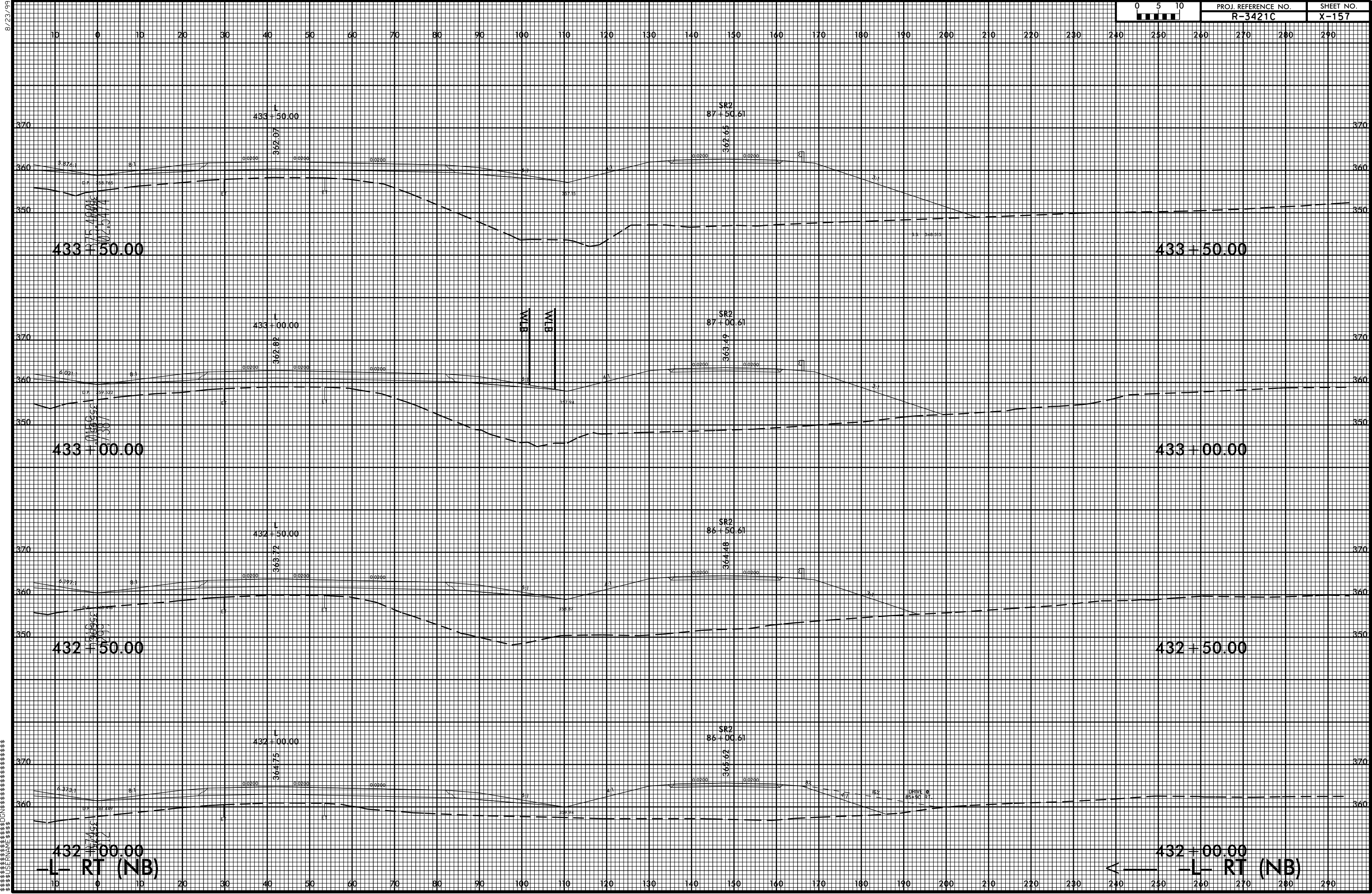
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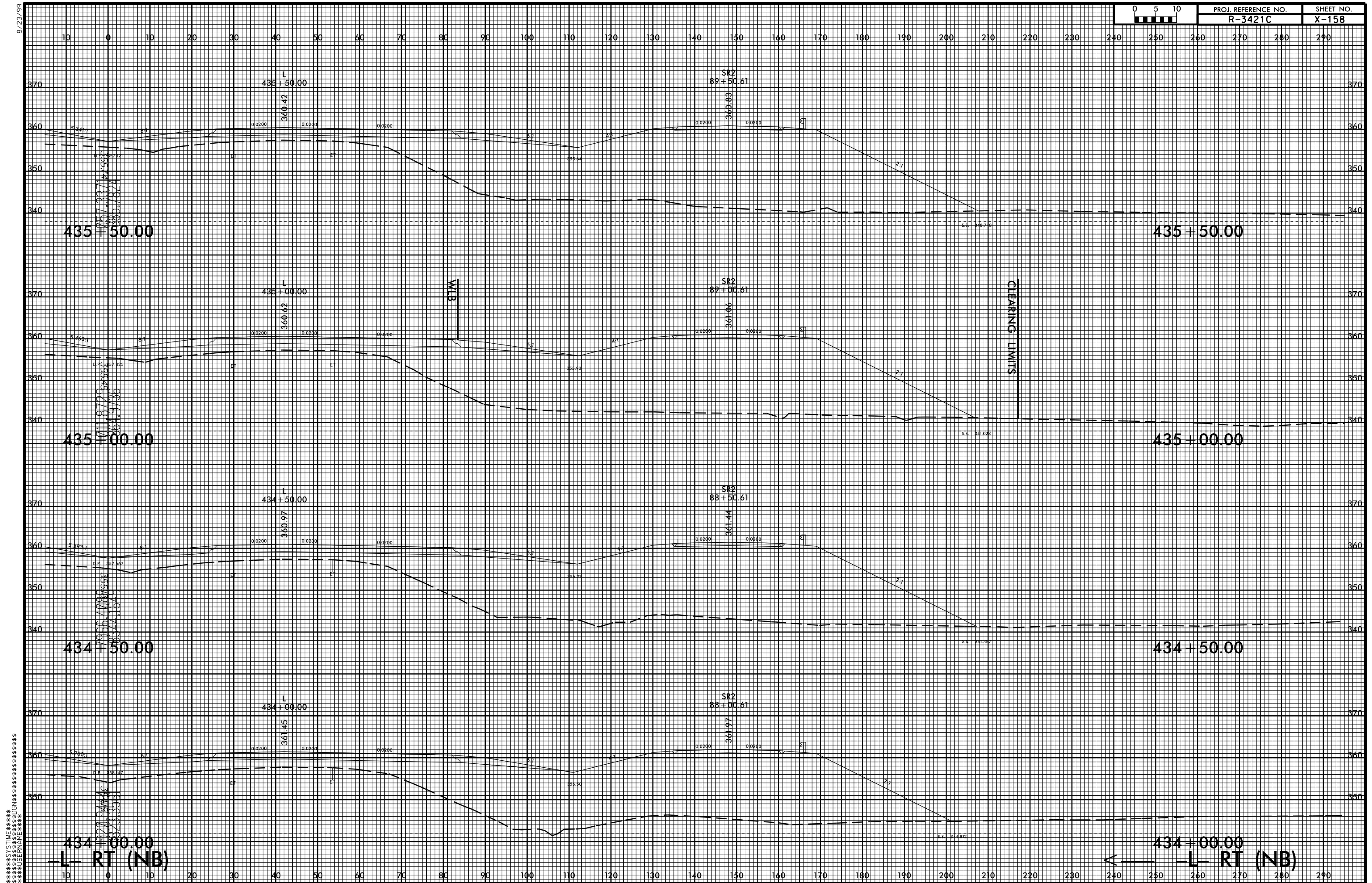


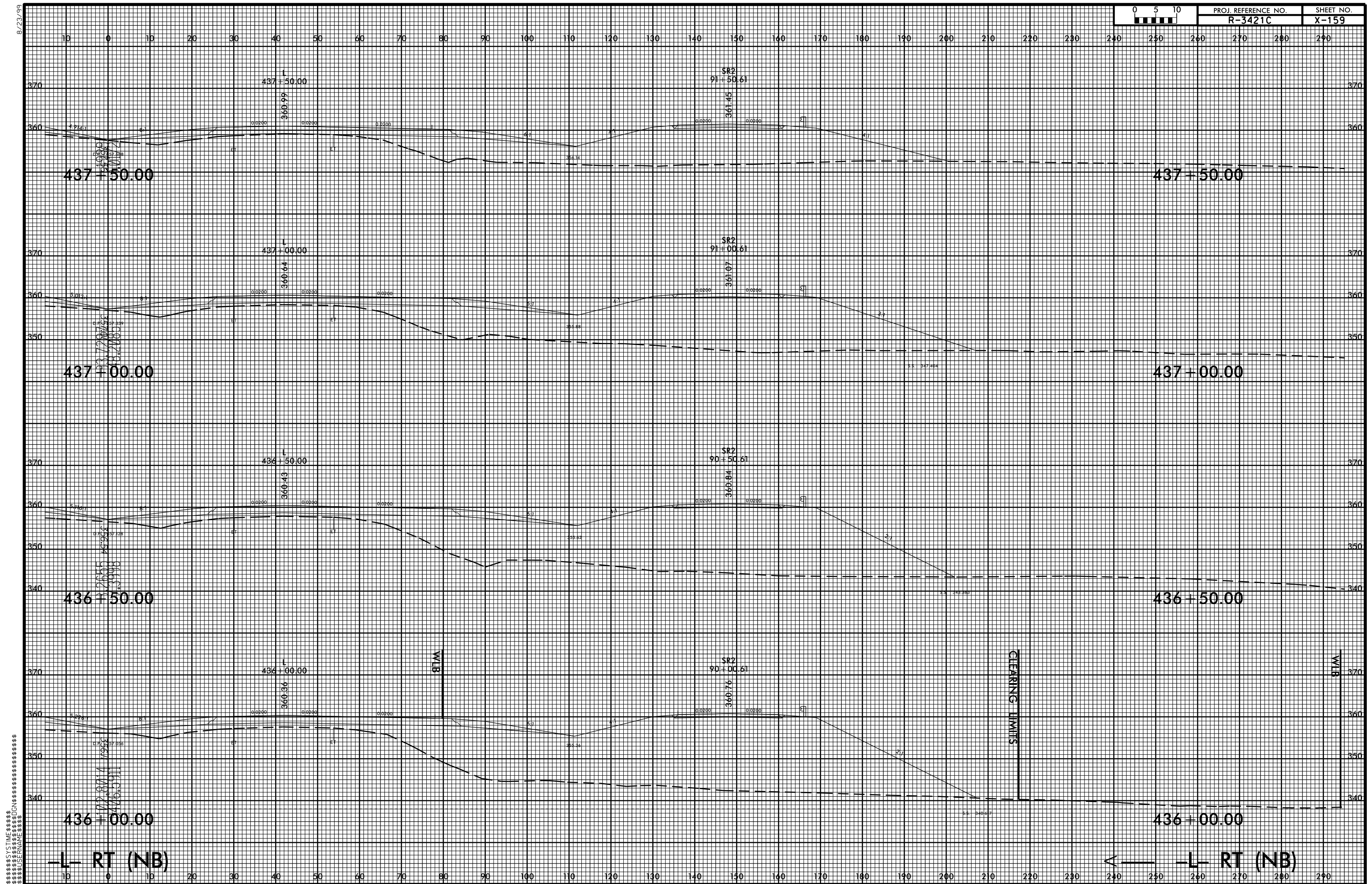
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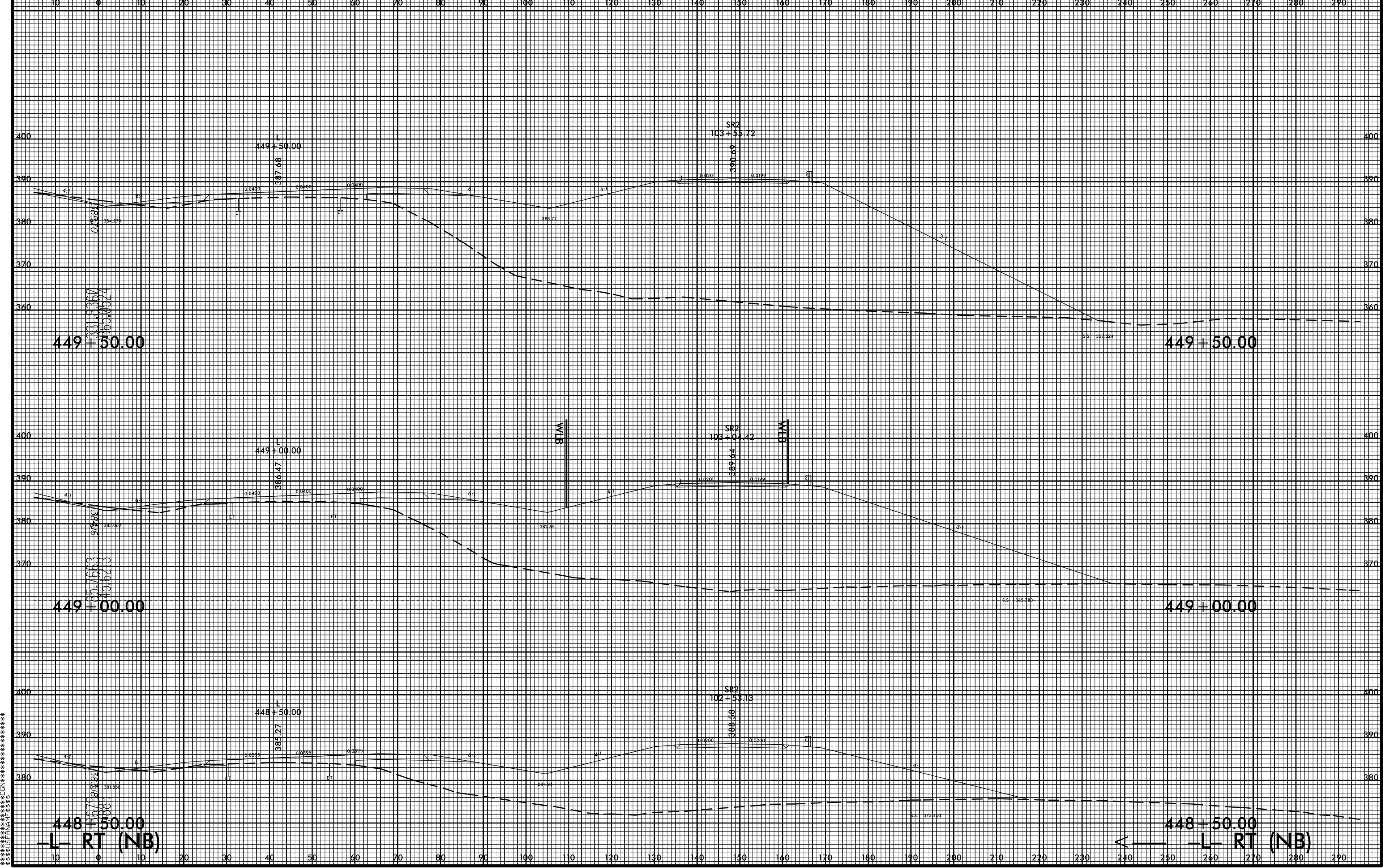


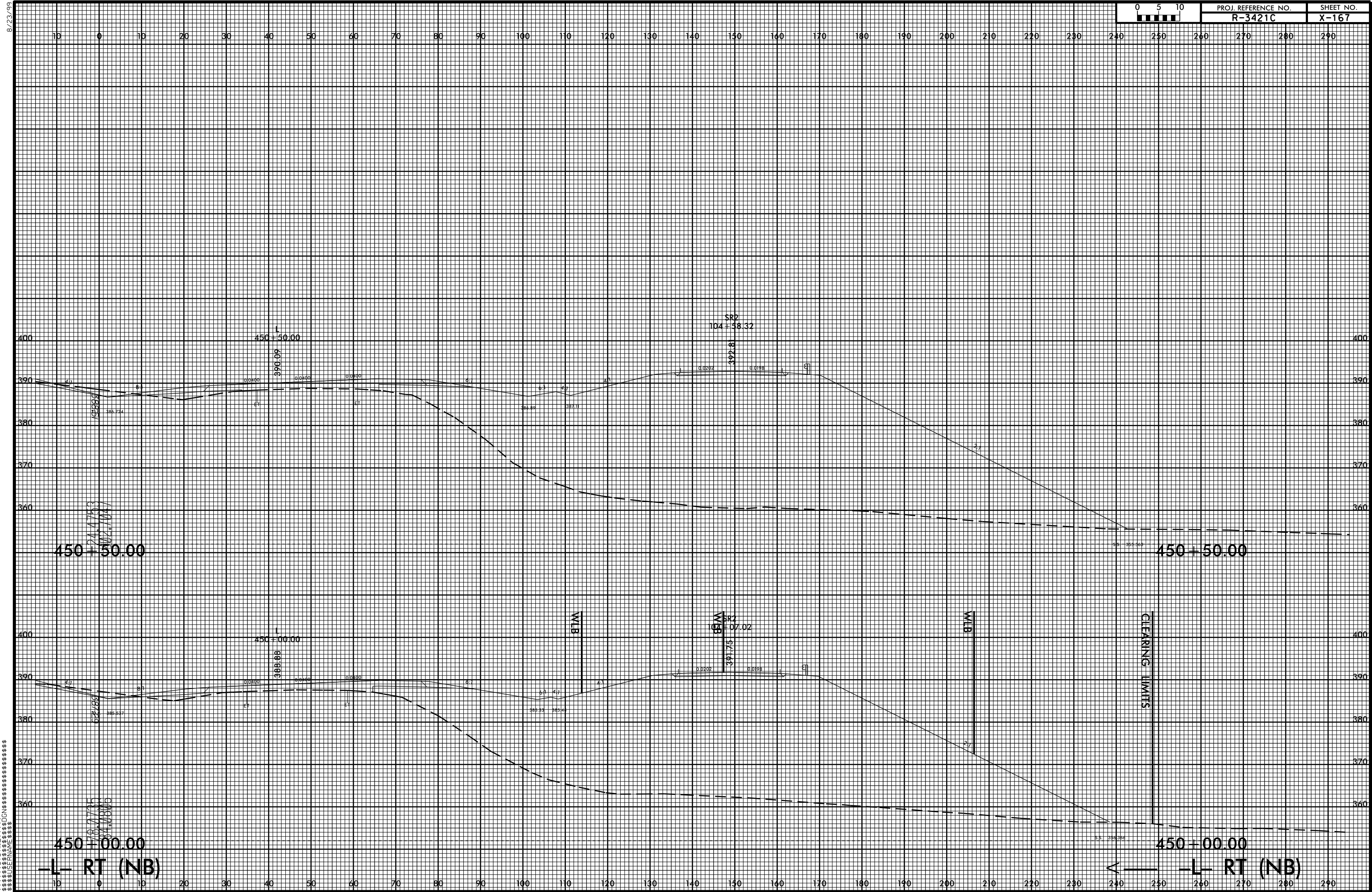
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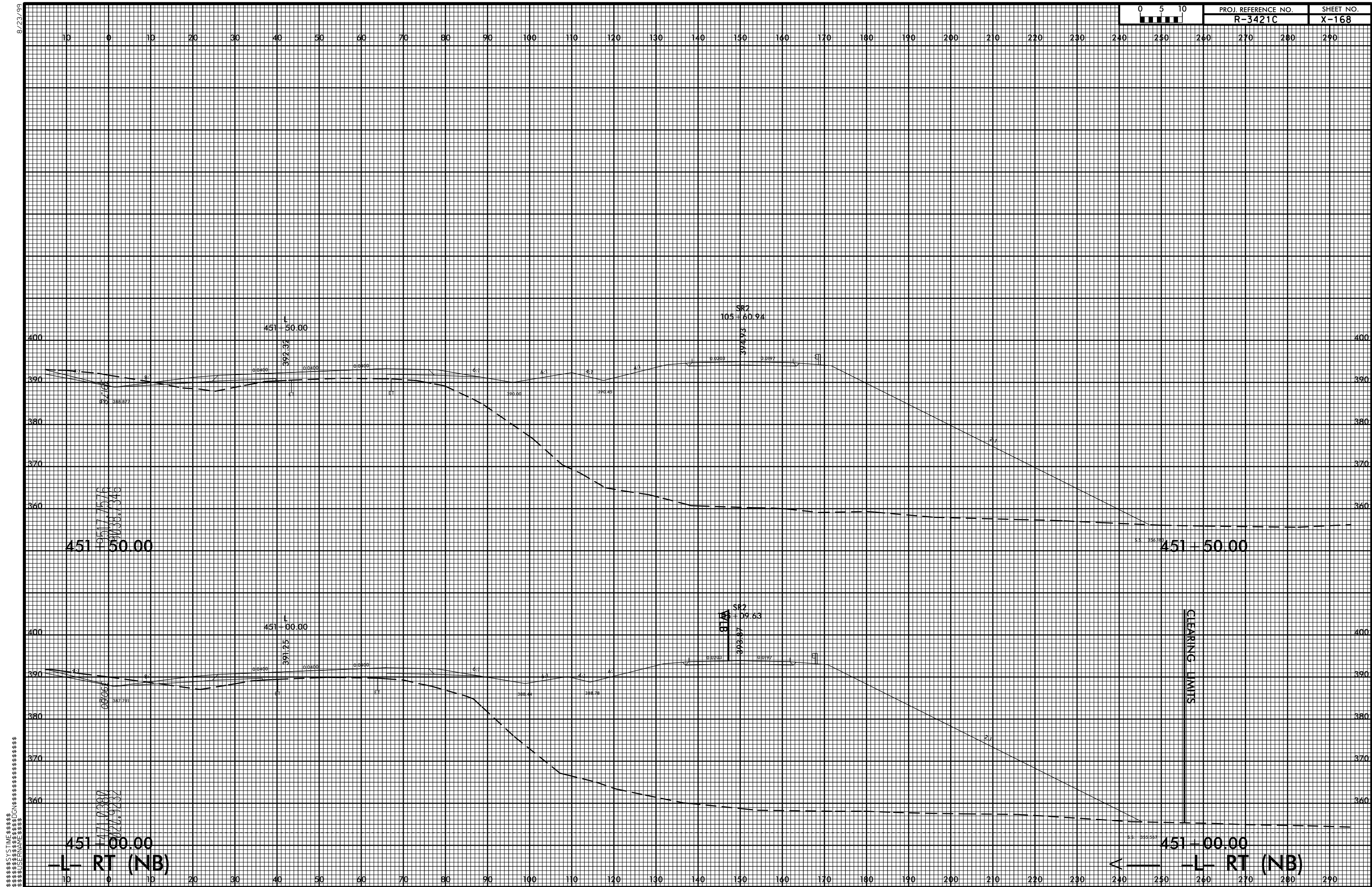


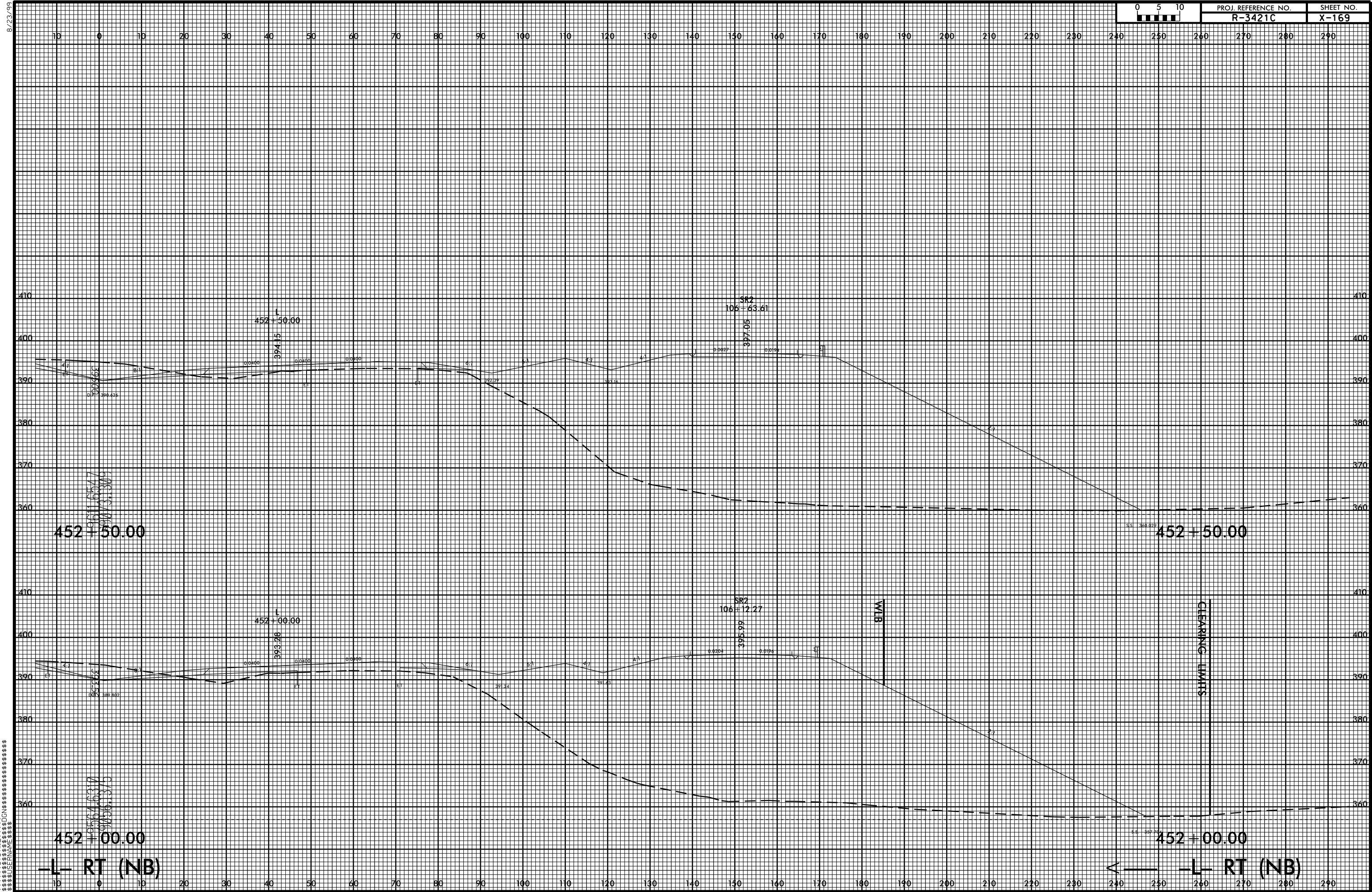
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SHEET NO.
X-166









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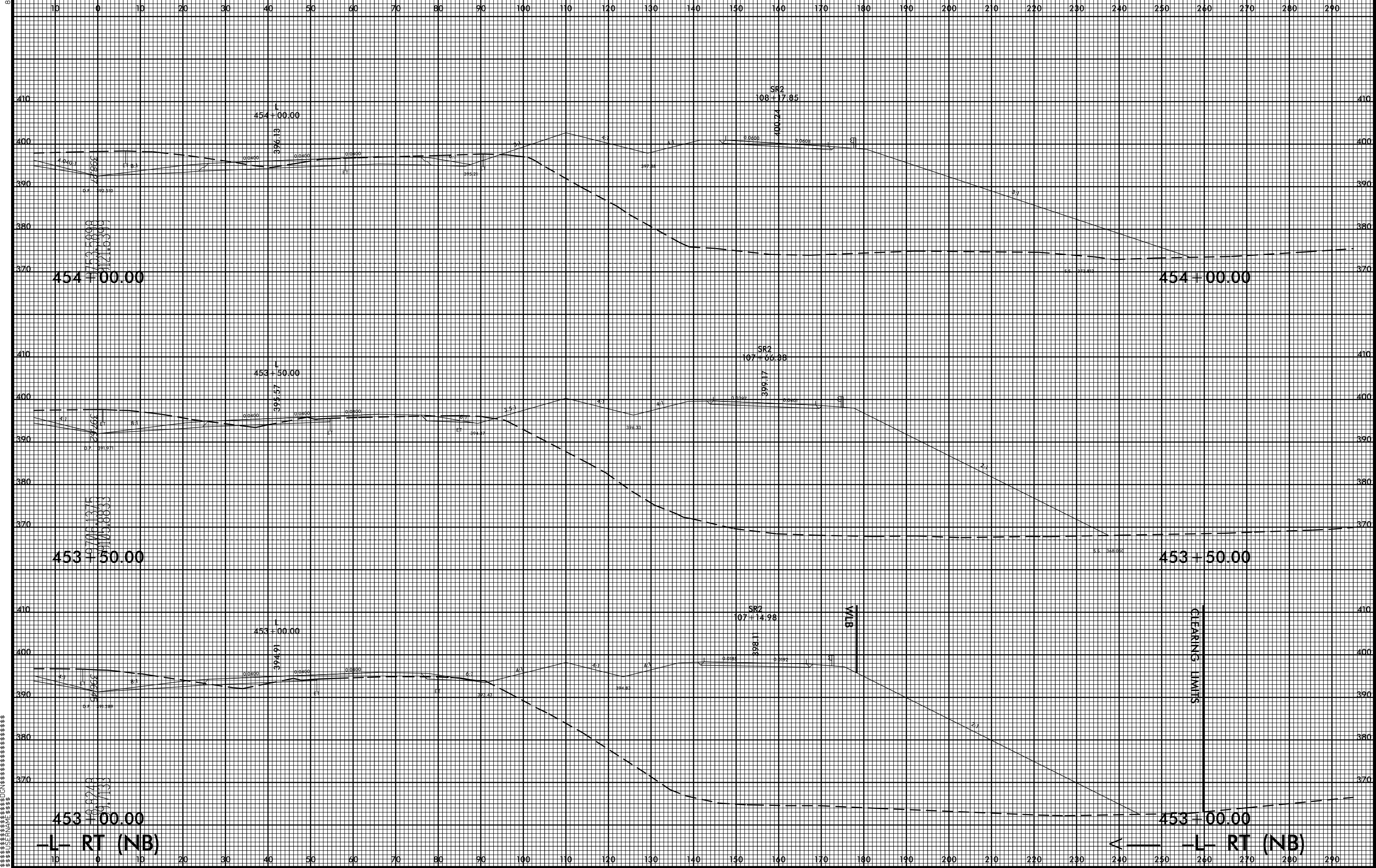


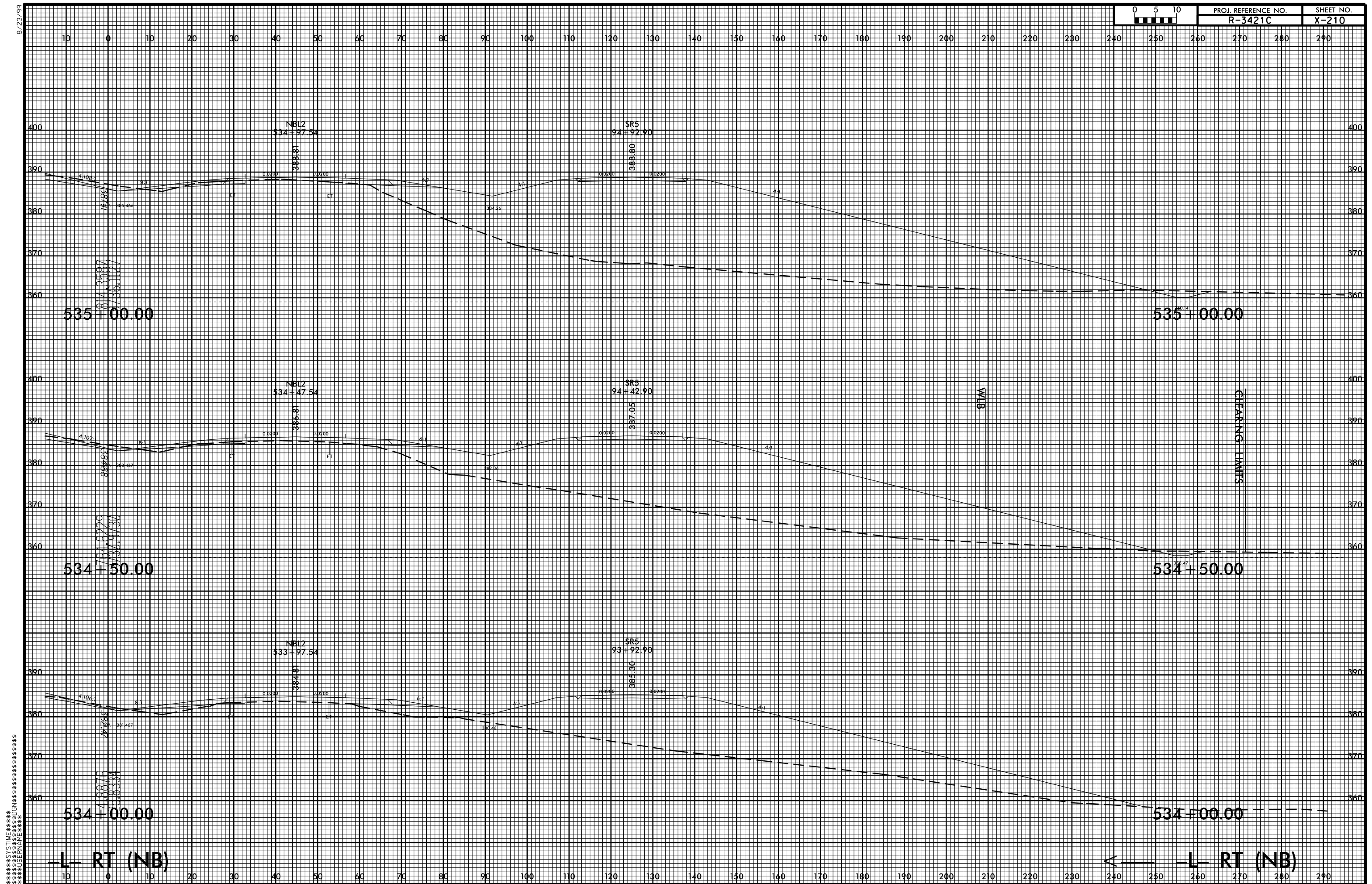
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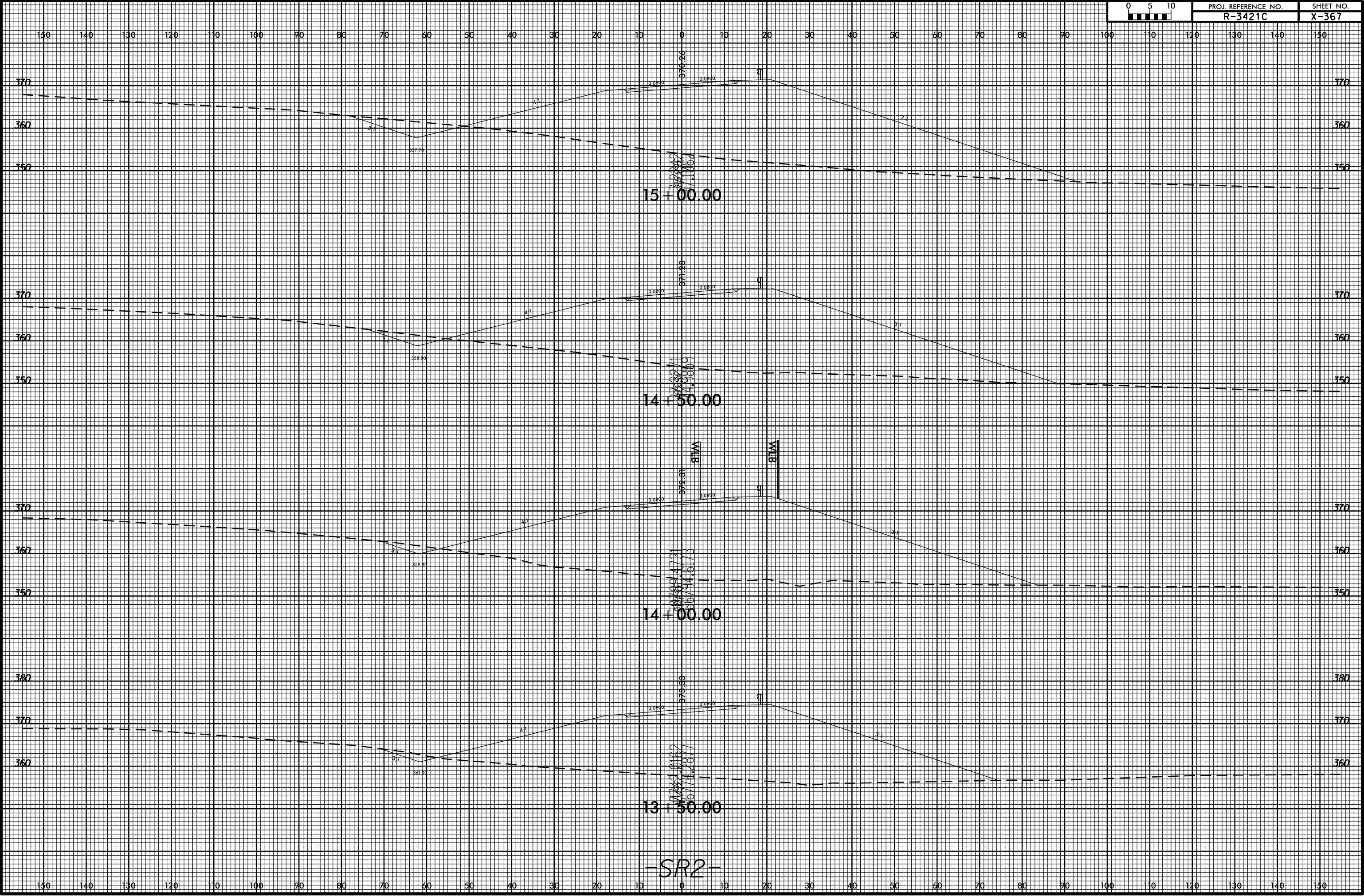
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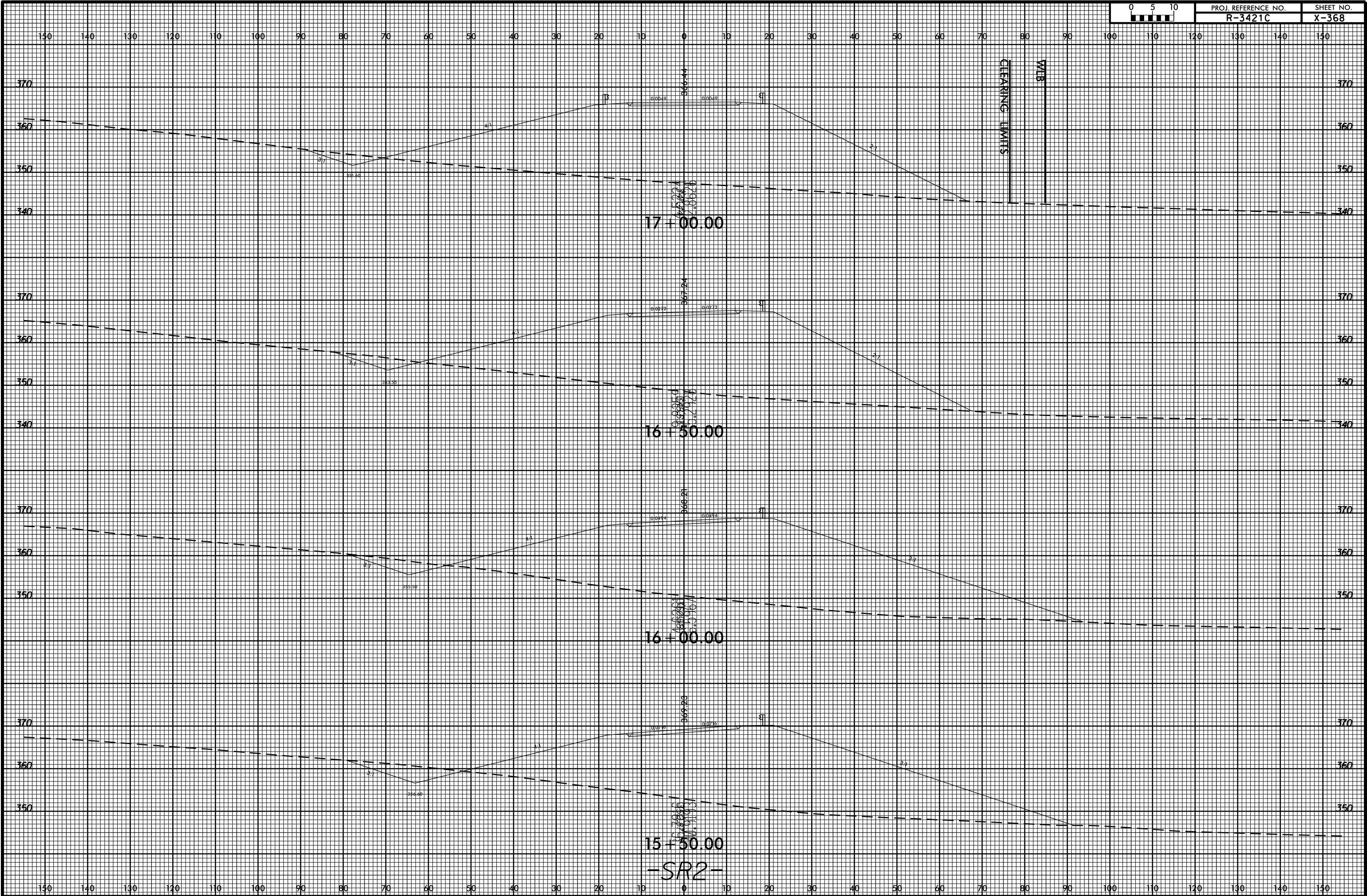




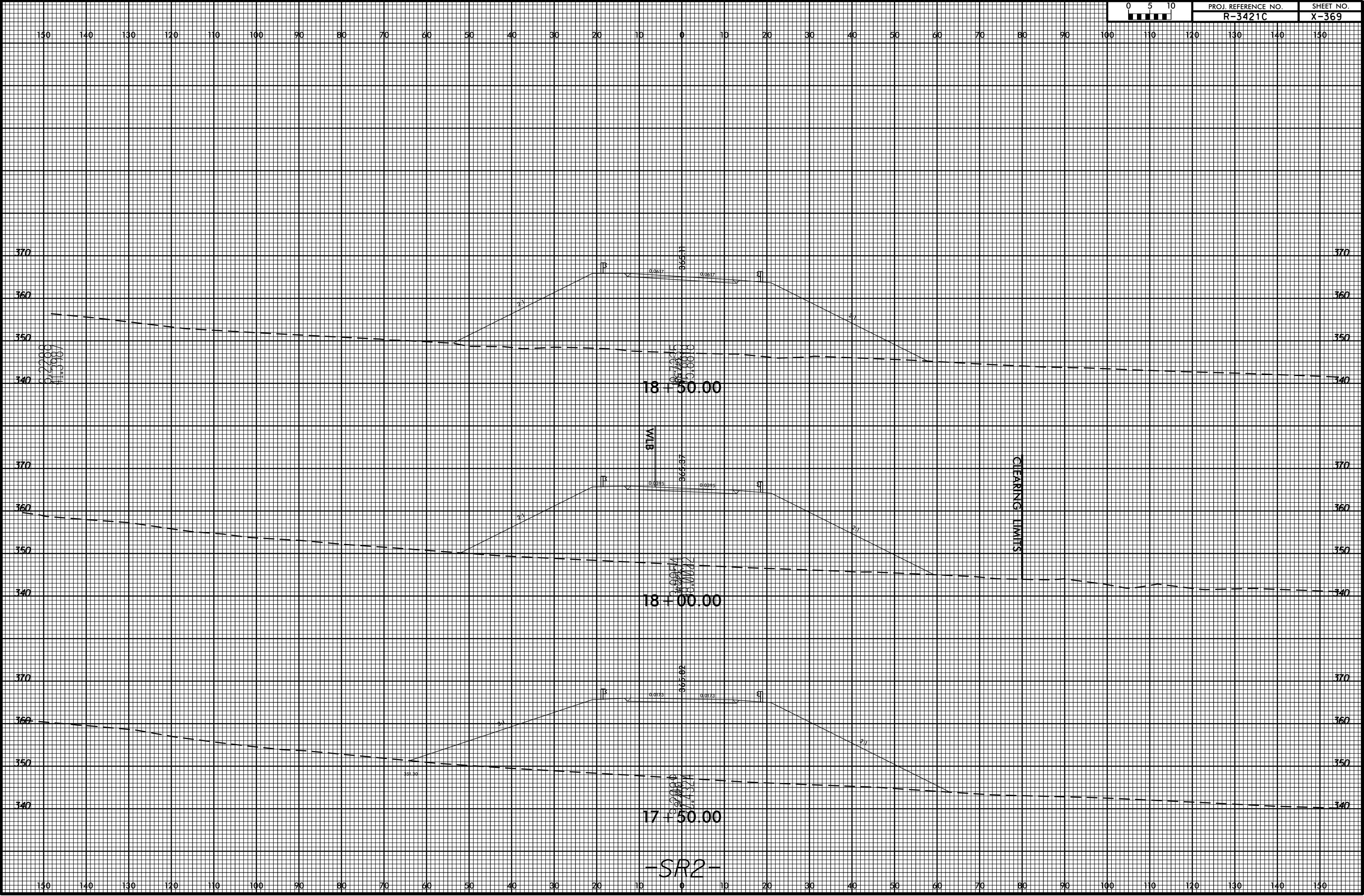
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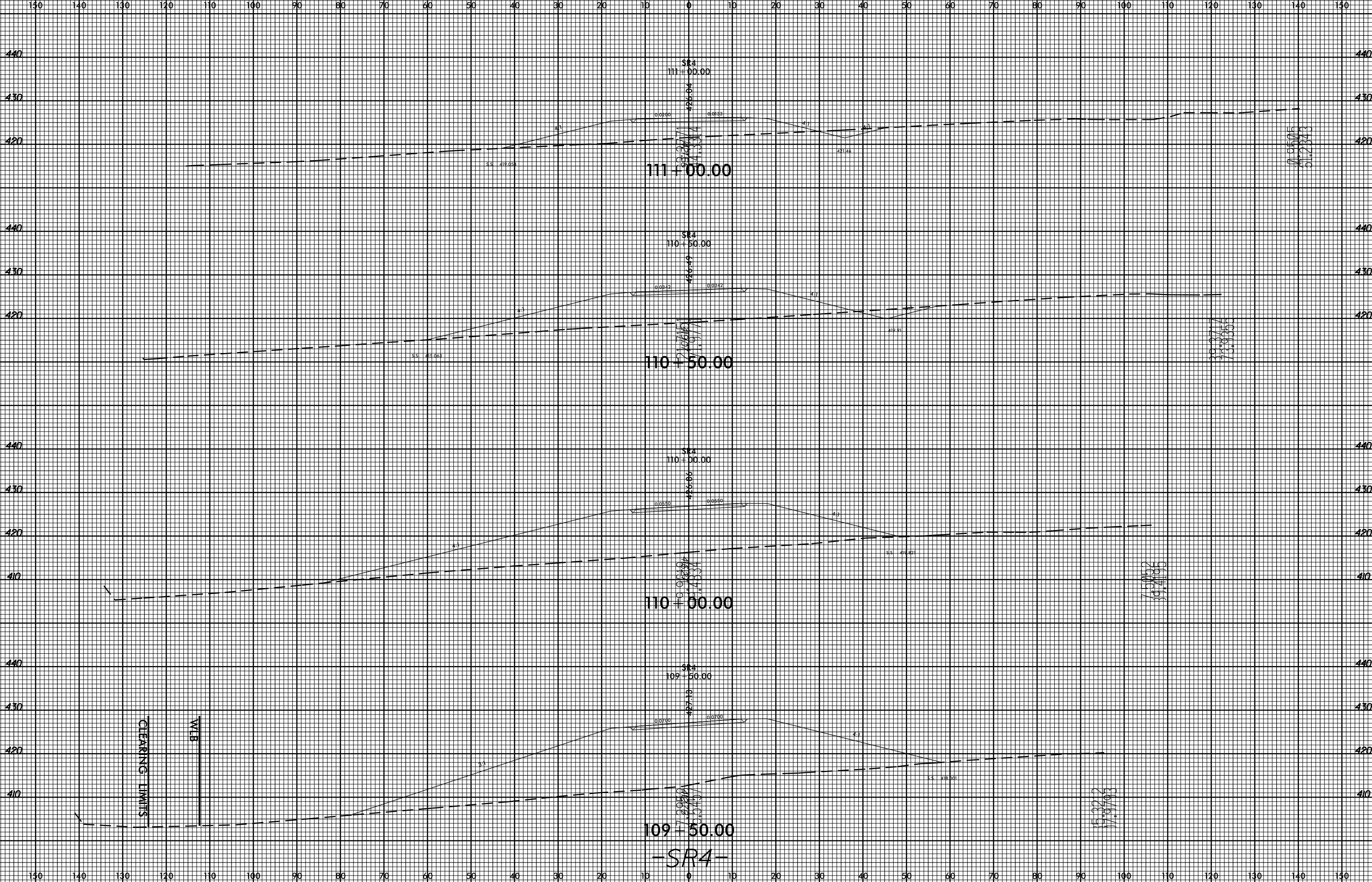
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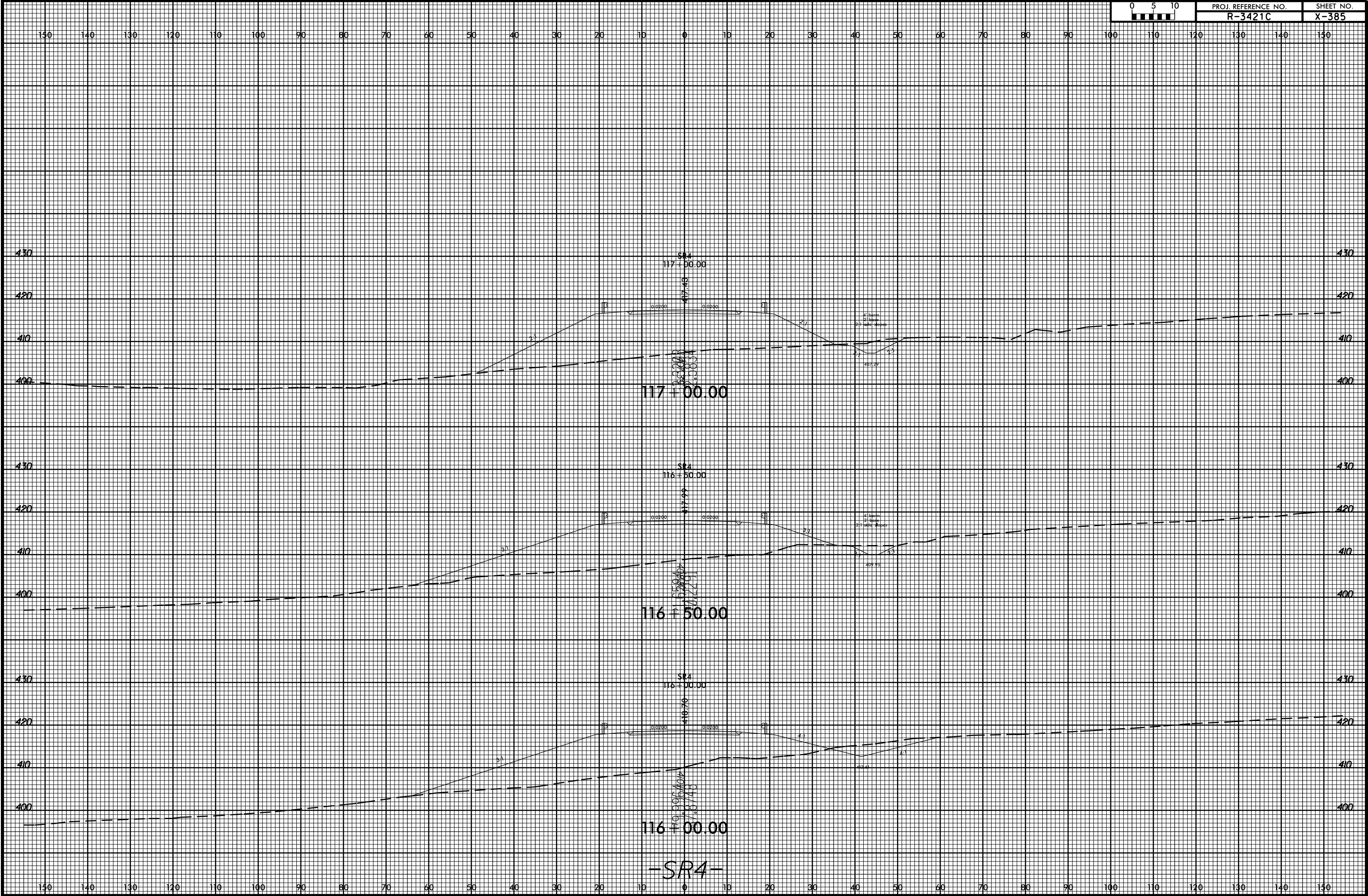


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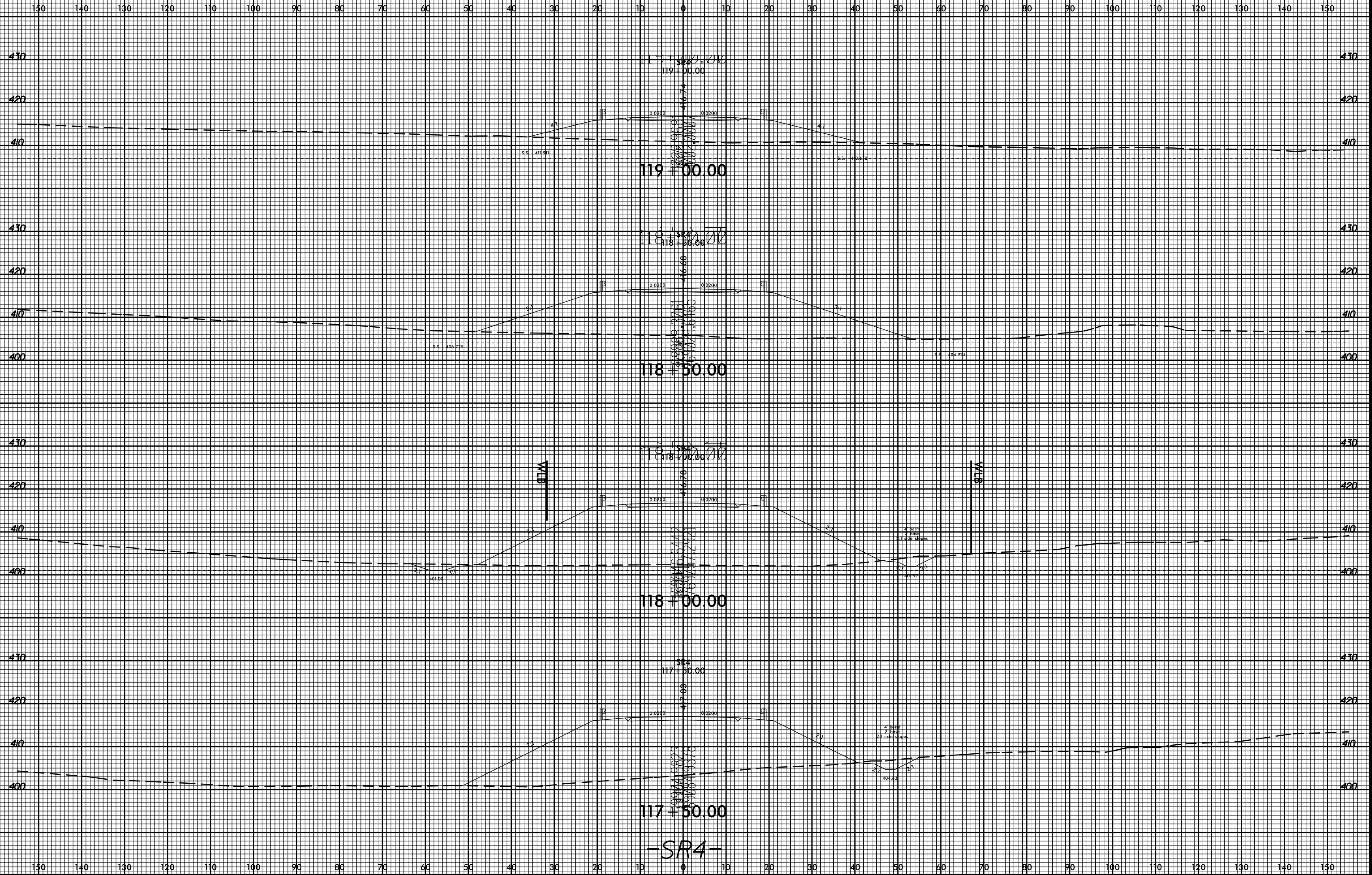


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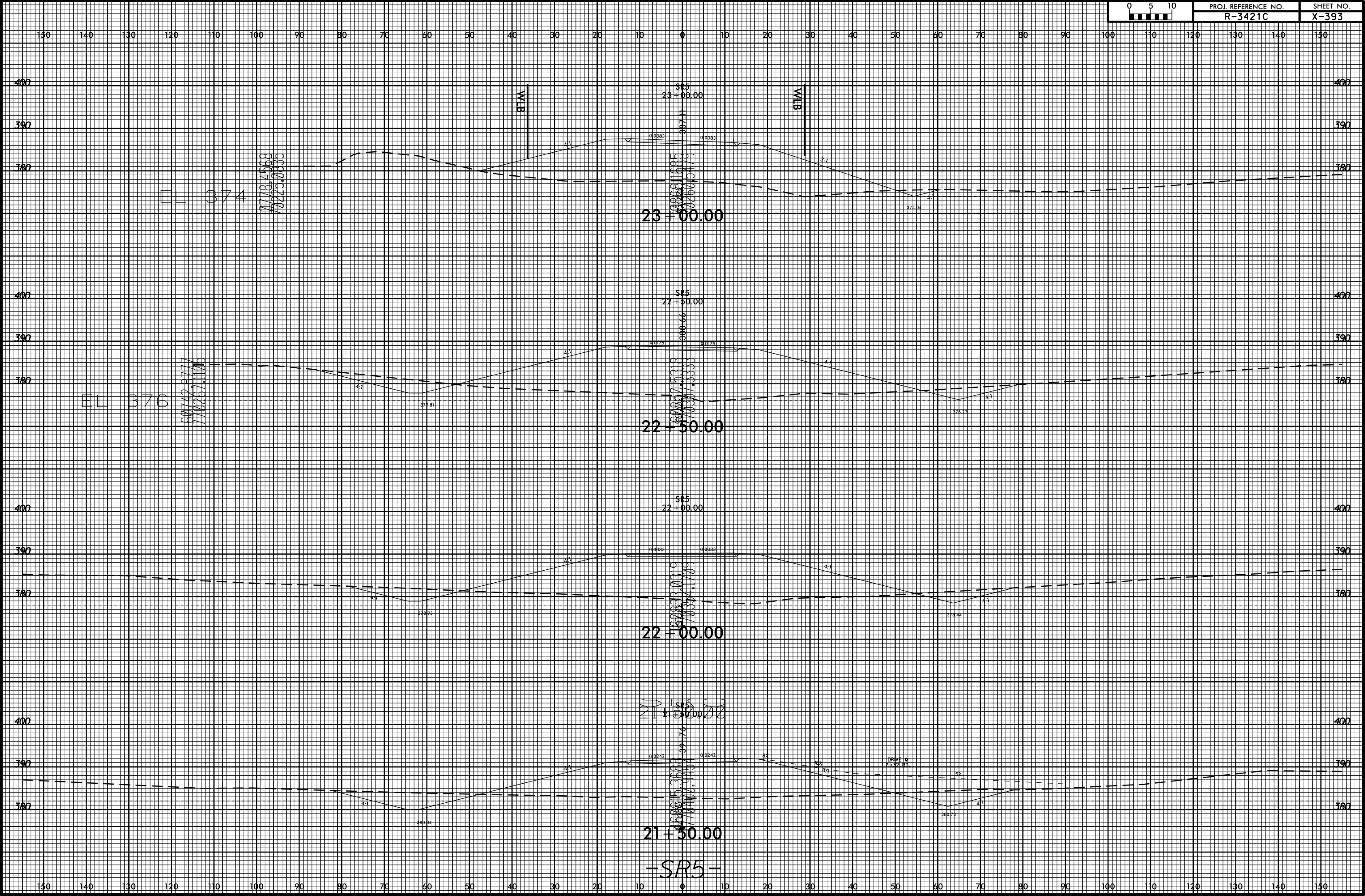
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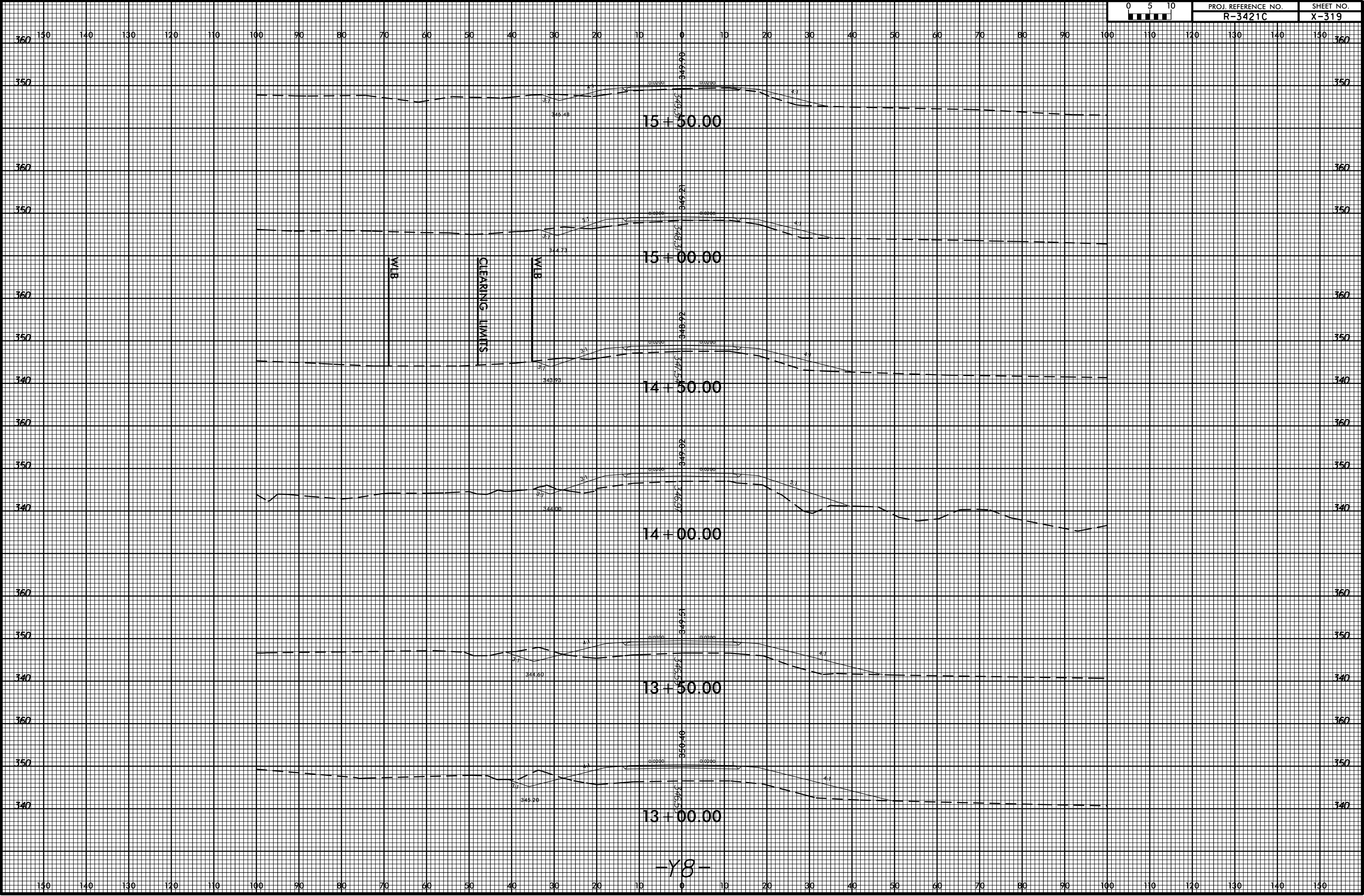
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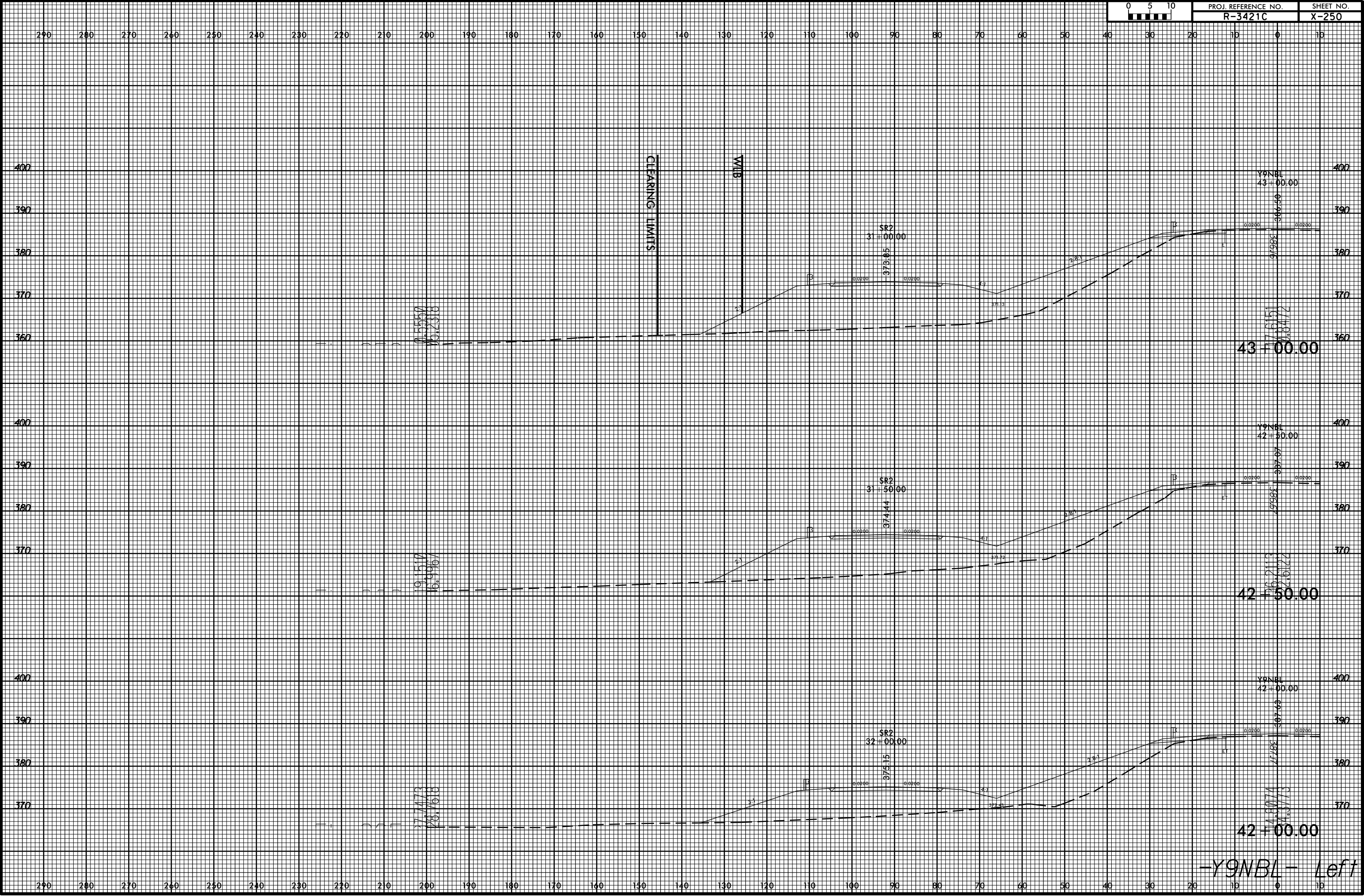
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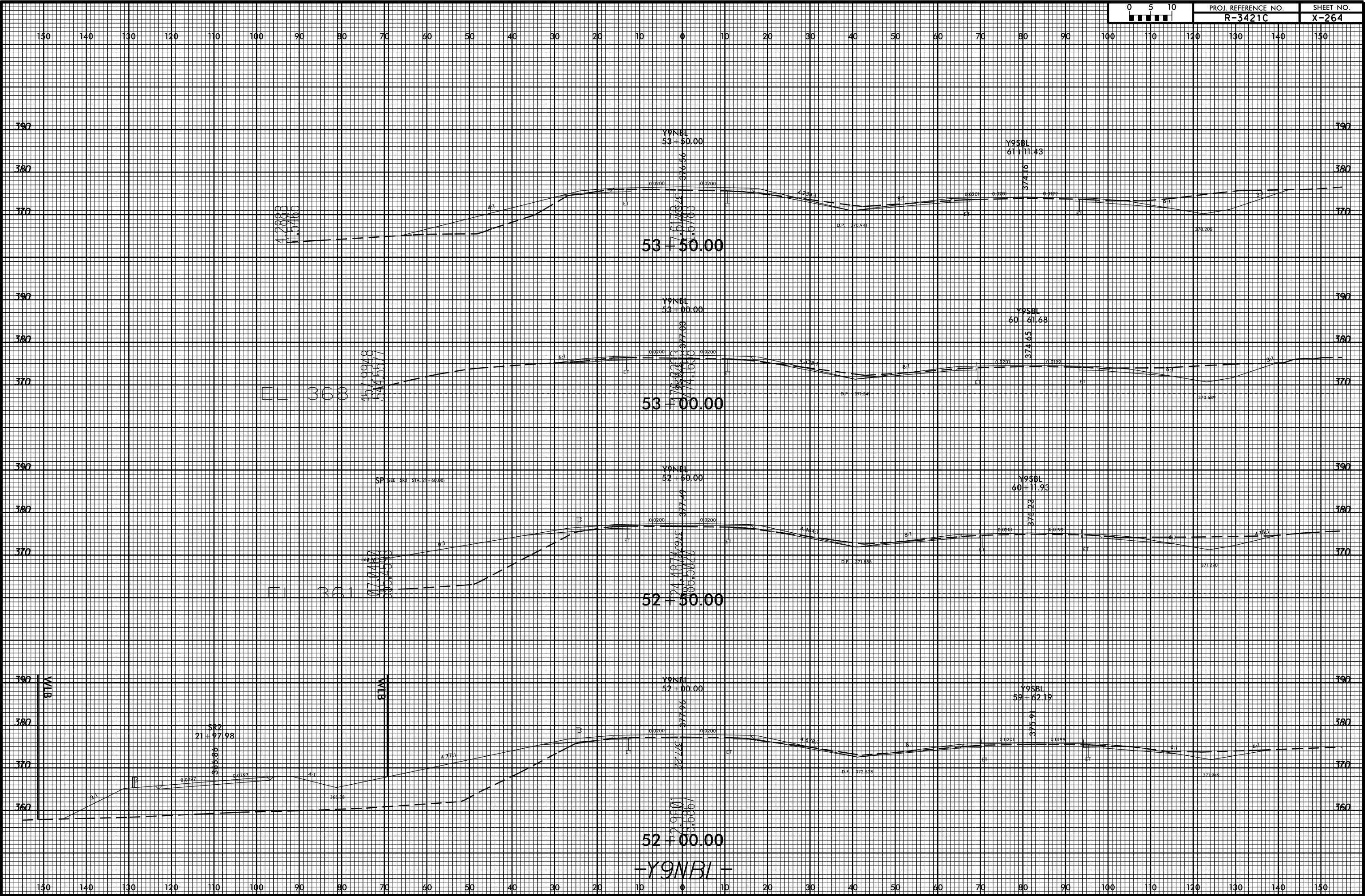


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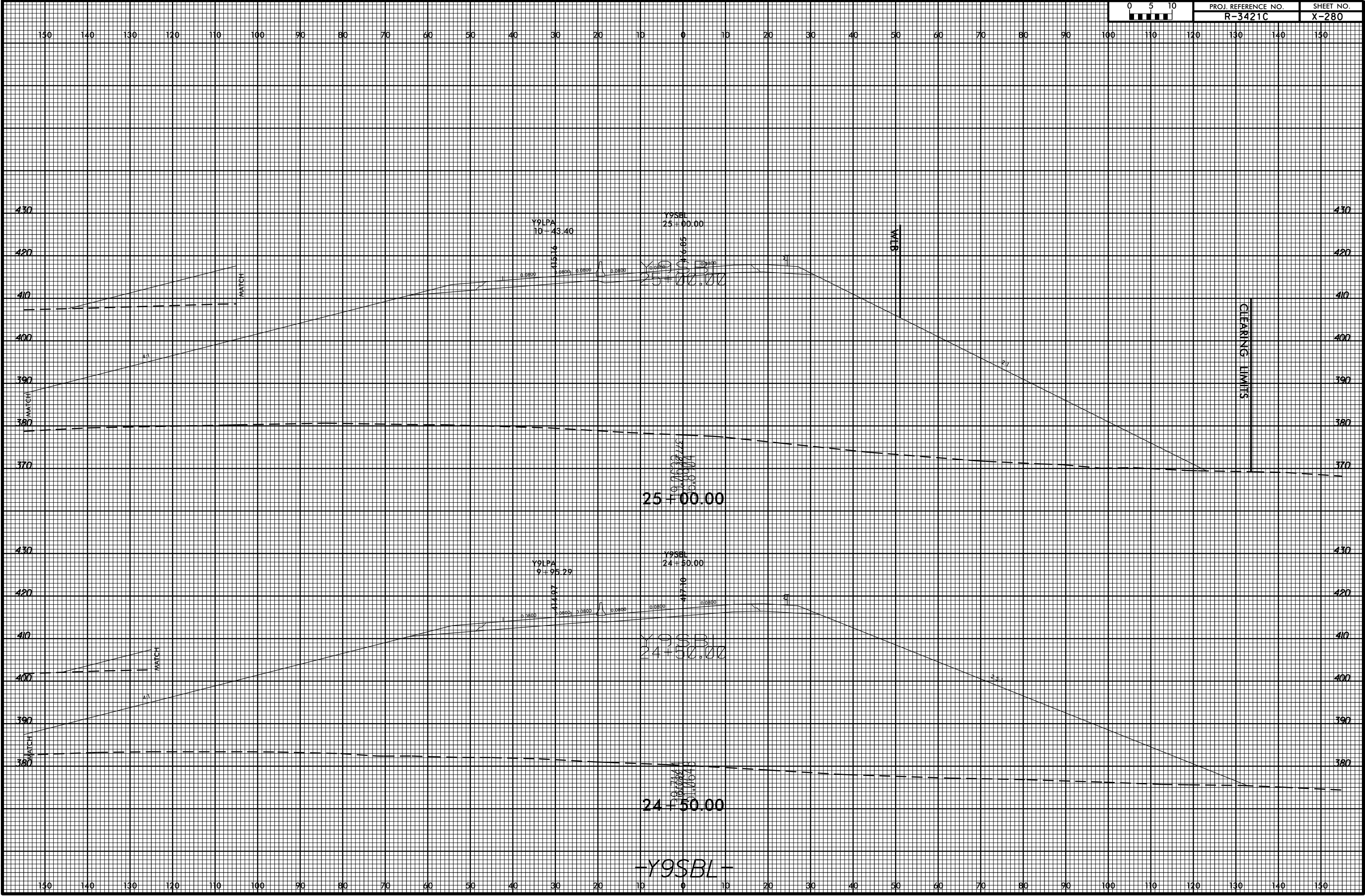


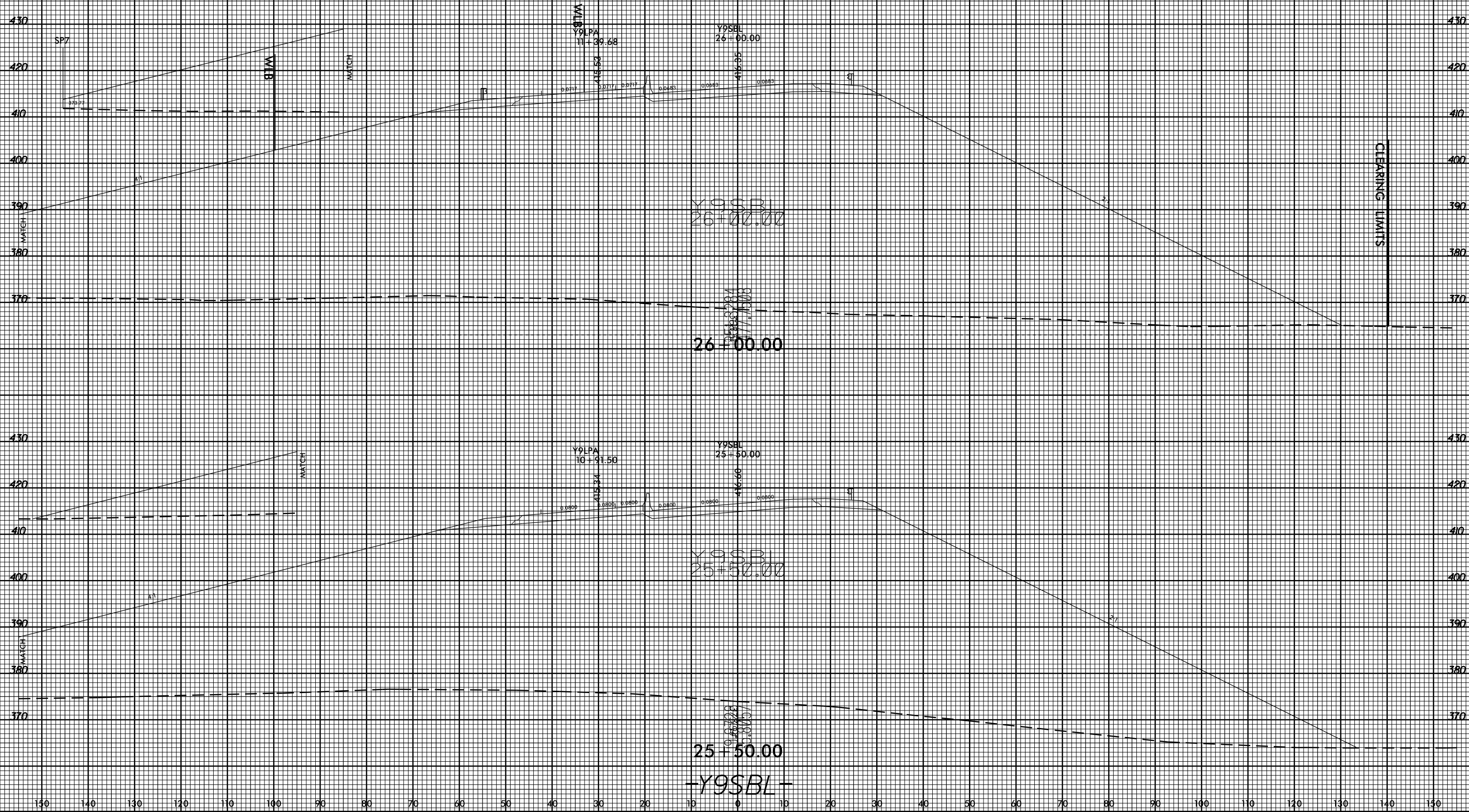
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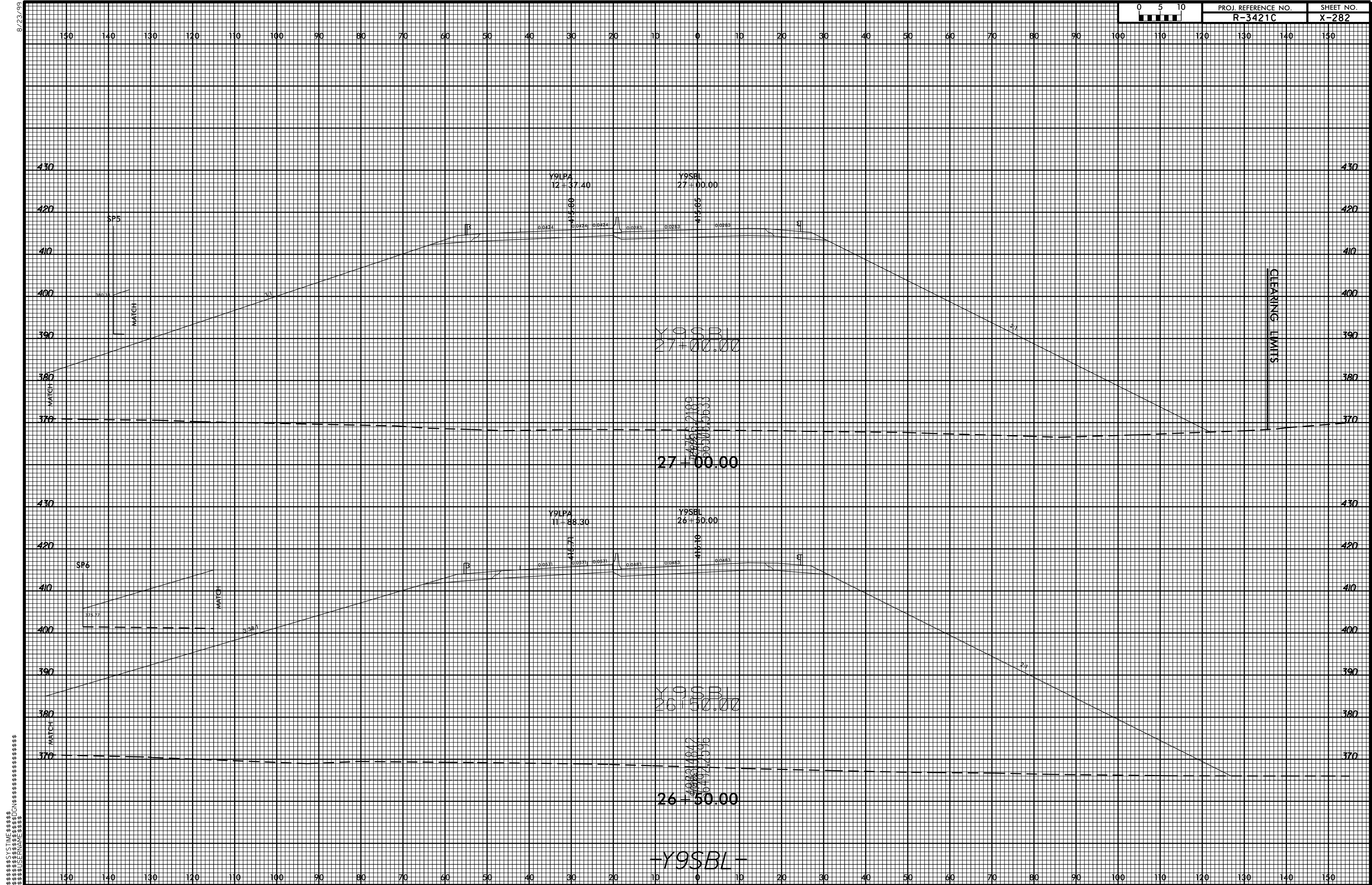
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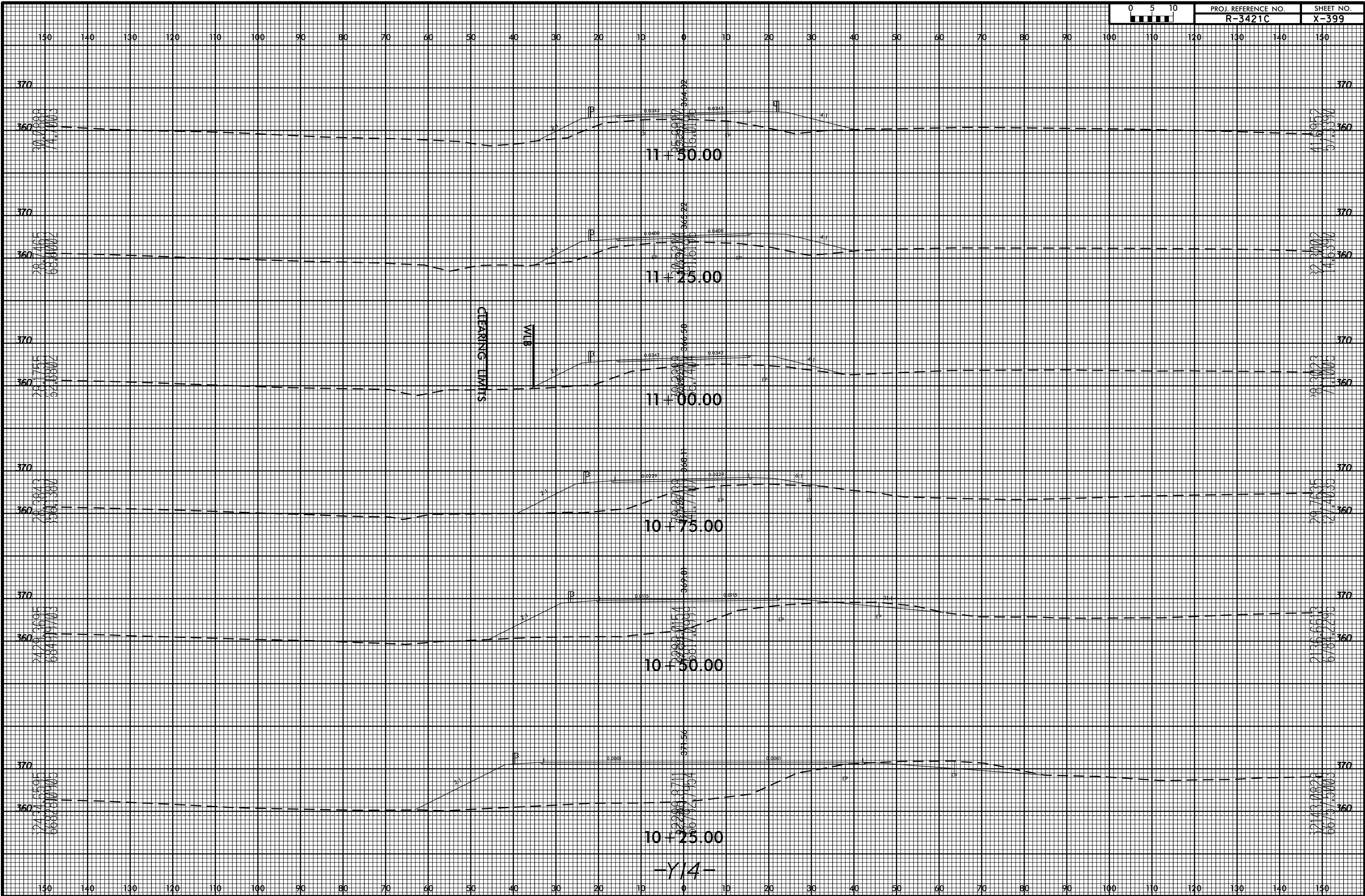


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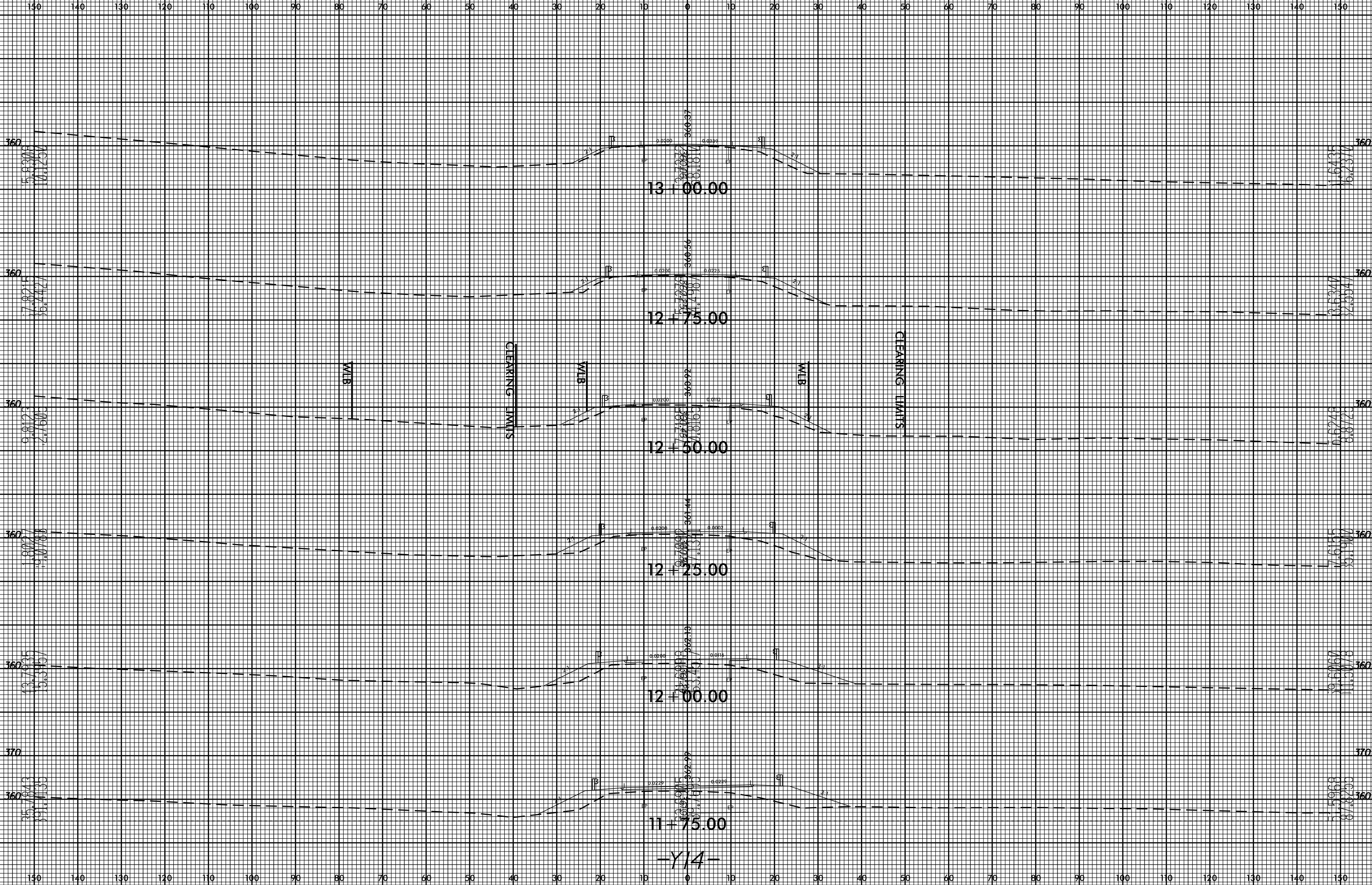


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