STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

July 18, 2019

US Army Corps of Engineers
Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

ATTN: Mr. Andy Williams
NCDOT Coordinator

Dear Sir:

Subject: **Request for Modification to Individual Section 404 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 and B.

References: Section 404 Individual Permit issued August 7, 2012(SAW-1996- 03023)
Section 401 Water Quality Certification issued May 10, 2012 (3916)
Modification of Section 404 Individual Permit issued October 17, 2012
Modification of Section 401 Water Quality Certification issued August 28, 2012

The purpose of this letter is to submit final drawings for modification of the Clean Water Act (CWA) Section 404 Individual Permit (IP) and Section 401 Water Quality Certification for R-3421A and B. Preliminary drawings for these sections were submitted with the original phased permit application.

Included in this application package are the following: (1) this cover letter, (2) Division of Mitigation Services (DMS) confirmation letter, (3) Hydraulic Design and Permit Drawing Review Meetings (CP 4B & 4C) minutes for Sections A and B, (4) Stormwater Management Plan, (5) permit drawings, (6) utility permit drawings for Section B.

Since issuance of the original Individual Permit for R-3421, Sections A and B were re-delineated in December 2014. A field verification with Sarah Hair (USACE) was conducted in January 2015, with a Preliminary Jurisdictional Determination issued on February 27, 2015.

Information in the following tables present impact comparisons between the preliminary drawings presented in the original permit application and the current design for the project. Site numbers have remained the same between preliminary and final design, however some sites have been broken into sub-sites. These sites are denoted in **bold** in the tables under the Permit Site No. column.

This project is scheduled to Let on October 15, 2019, with a review date of July 30,2019.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
ENVIRONMENTAL ANALYSIS UNIT
1598 MAIL SERVICE CENTER
RALEIGH NC 27699-1598

Telephone: (919) 707-6000
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

Jurisdictional Impacts

Table 1. R-3421A Riparian Wetland Impacts

Permit Site No.	Wetland ID in FONSI	JD package ID	Preliminary Impacts (ac)	Final Permanent Impact (ac)
2	NA	WG	0.76	0.48
6	3	WC	0.25	<0.01
7 **(7S)**	1	WI	0.15	0.17
8	NA	WA	0.09	0.02
		Section A Total	**1.25**	**0.68***

*Total impacts due to rounding.

Table 2. R-3421B Riparian Wetland Impacts

Permit Site No.	Wetland ID in FONSI	JD package ID	Preliminary Impacts (ac)	Final Permanent Impact (ac)
1	4,5	WD,WE,WJ	0.25	0.24
3	NA	WAA	0.03	0.03
4	NA	WBB	0.09	0.07
5	NA	Site Removed	0.02	0.00
6	5A	WK	0.58	0.09
8	5B	Site Removed	0.20	0.00
9	10	WM,WL	0.42	0.12
10	7,9	WCC,WEE,WFF	1.11	0.87
11	8	Site Removed	<0.01	0.00
12	11	WN	1.92	2.38
		Section B Total	**4.62***	**3.80**

*Total impacts due to rounding.

Table 3. R-3421A Streams Impacted

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent/ Perennial	Preliminary Stream Impacts (ft) Perm/Temp	Final Stream Impacts (ft) Perm/Temp
1	2	SG	UT to PeeDee River	Perennial	364 / 0	411/10
2	3,4	SH	UT to PeeDee River	Perennial	1,097 / 0	1,011/50
3 **(3A/3B)**	5,6	SH	UT to PeeDee River	Perennial	676 / 0	617/116
4	10	SO	UT to PeeDee River	Intermittent	511 / 0	205/12
5 **(5/5A)**	8,9	SI,SM	UT to PeeDee River	Intermittent(SI) Perennial(SM)	435 / 0	445/35
7 **(7/7S/7N)**	7	SH,SK	UT to PeeDee River	Perennial (SH) Intermittent (SK)	1,247 / 100	1,130/32
8 **(8/8A)**	11	SA	UT to PeeDee River	Intermittent	187 / 0	147/0
				Section A Total	**4,517 / 100**	**3,966/255**

Table 4. R-3421B Streams Impacted

Permit Site No.	Stream ID in FONSI	JD Package ID	Stream Name	Intermittent/ Perennial	Preliminary Stream Impacts (ft) Perm/Temp	Final Stream Impacts (ft) Perm/Temp
1	No #	SQ	UT to Seaburn Branch	Intermittent	24 / 15	33/10
2	13	SAA	Seaburn Branch	Perennial	28 / 40	201/20
2A*	No #	SAA/SCC	Seaburn Branch and UT	Perennial	0/0	0/36
3	13	SAA	UT to Seaburn Branch	Perennial	759 / 37	578/21
4	No #	SW	UT to Seaburn Branch	Perennial	352 / 26	397/22
5	14	SR	UT to Cartledge Creek	Perennial	645 / 20	669/23
7	15	ST	UT to Cartledge Creek	Intermittent	610 / 20	610/34
8	16	SU	UT to Cartledge Creek	Perennial	832 / 90	703/161
10**	19,21	SV	UT to Cartledge Creek	Perennial	0/0	339/11
11	No #	SDD	UT to Cartledge Creek	Intermittent	47 / 10	81/21
				Section B Total	**3,297 / 258**	**3,611/359**

*Impacts for this site were originally attributed to Site 2.
**Previously identified as linear wetland

Explanation of Impact Changes

Impacts changed for most sites from the preliminary development to final design. In many cases impact numbers were reduced from their preliminary projection, while other sites increased slightly. These minor changes can be attributed to the refinement of the impacts once the design of the roadway was finalized.

The re-delineation of the project in December 2014 resulted in the following changes:

Section A:

- Removal of a significant portion of Site 2 due from being a previously inundated area due to beaver activity. The beavers had been removed by the time of the 2014 re-delineation.

Section B:

- Removal of Sites 5, 8 and 11, due to previously identified wetlands not exhibiting wetland function during re-delineation.
- A linear wetland at Site 10 was changed to a jurisdictional stream during the 2014 re-delineation.
- The wetland at Site 12 increased in size during the re-delineation increasing impacts.

Other notable change resulting in an increase:

Section B:

- Site 2- In the final impact drawings, Site 2 was split, adding a Site 2A. Also, it appears that

preliminary calculations of impacts along the -Y- line were incorrect and did not fully account for the true impact.

Utilities

Section A: There will be no impacts to jurisdictional resources due to relocation of utilities.

Section B: Relocation of overhead aerial lines along the intersections with -Y- lines will result in 0.48 ac. of hand clearing in wetlands.

Protected Species

As of April 2019, Schweinitz's sunflower has been added to the list of federally protected species for Richmond County. Surveys for the species have not been completed, due to the survey window not opening until late August. Once the survey window opens, the surveys will be completed. A review of the NCNHP database shows two known occurrences of the species in the county, both in the same general area, approximately nine miles from the project.

Surveys for red-cockaded woodpecker, Michaux's sumac and rough-leaved loosestrife were updated on May 16, 2019. The biological conclusions for these species remain No Effect.

Regulatory Approvals

Section 404: We are hereby requesting the modification of the USACE Individual 404 Permit signed August 7, 2012 (SAW 1992-03237) and modified on October 17, 2012, for the above-described activities. NCDOT also requests that the current permit for the project to be extended for a period of five (5) years.

Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the NCDWR issued May 10, 2012 (DWQ No. 20120240) and modified on August 28, 2012. 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 modification.

A copy of this permit modification request will be posted on the NCDOT Website at https://xfer.services.ncdot.gov/pdea/PermApps/

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Jason Dilday at 919-707-6111 or jldilday@ncdot.gov.

Sincerely,

Carla Burch

for Philip S. Harris III, P.E., C.P.M.
Environmental Analysis Unit Head

cc:

NCDOT Permit Application Standard Distribution List

Minutes for Hydraulic Design Review Meeting
R-23421A

State Project 34542.1.1
US 220 BYPASS FROM US 74 BYPASS WEST OF ROCKINGHAM AT SR 1109 (ZION CHURCH ROAD) INTERCHANGE TO 0.3 MILES SOUTH OF SR 1140 (OLD CHARLOTTE HIGHWAY), RICHMOND COUNTY, DIVISION 8

A Hydraulic Design Review Meeting was held on Wednesday, March 16, 2005 in the Location and Surveys conference room at the NCDOT Century Center Complex, Raleigh.

Team Members: Andrew Nottingham-NCDOT Hydraulics (Present)
Richard Spencer-USACOE (Present)
Brian Wrenn- NCDWQ (Present)
Travis Wilson-NCWRC (Absent, will provide comments)
Gary Jordan-USFWS (Absent)
Chris Militscher-EPA (Present)
Cathy Houser- NCDOT Roadway Design (Absent)
Elizabeth Lusk-PDEA (Present)
Rob Ayers-FHWA (Absent)
John Olinger-Division 8 (Present)

Participants: Stephen Morgan-NCDOT Hydraulics
Virginia Mabry-NCDOT Roadway Design
Michael Penney-PDEA
Carla Dagnino-PDEA
Lonnie Brooks-Structure Design
Karen Gulledge-Hydraulics

The meeting began at 9:15 a.m. with NCDOT Hydraulics giving a brief description and history of the project. The team then reviewed the plans sheet by sheet. The following items of importance were discussed.

Sheet Nos. 6, 7 and 8

- Division 8 noted that the existing roadway cut slopes along US 74 from +/- sta. 60+00 to +/- sta. 80+00 are experiencing problems with ground water seepage. Rip rap has been used to stabilize the slopes but this continues to be a maintenance problem. Division 8 noted that this problem needs to be addressed since the proposed

project will be increasing the cut slopes in these areas. USACOE noted that they wanted to make a site visit to review this area.

Sheet No. 8

- The stream right of sta. 87+00 I-73 will be piped to the culvert located on sheet no. 8 under loop B.

Sheet No. 9

- Due to the proposed new interchange the culvert under the existing US 74 ramp will be extended up and downstream and connected on the downstream extension to the existing culvert under existing US 74. The total length of the new culvert created by the extensions and connections will be +/- 1350 feet. Low flow sills will be used at the entrance of the culvert to divert flow into the middle barrel. Baffles are proposed on the new extension portions of the culvert to help retain the bed material in the culvert. DWQ asked if some of the culvert under the existing US 74 ramp could be removed. NCDOT noted that some of the culvert could possibly be remove but that it would leave only a small portion of the channel open (+/- 100 feet) and it was felt that it would be less disturbance to the stream to leave it in place.
- NCDOT noted that the rip rap at the outlet of the culvert under loop C is needed for erosion control and it is shown on the stream banks only and not in the channel. Low flow sills and baffles will be used on the culvert under loop C.

Sheet No. 11

- Low flow sills and baffles will be used on the culvert under ramp C. USACOE noted they require new stream channels to vegetate through one growing season prior to diverting flow into the channel. If temporary stream diversions required to construct the stream relocation and culvert fall outside the roadway footprint their impacts will need to be accounted for in the plans and permit. NCDOT will investigate connecting the tributary that enters the stream relocation from the east at a better angle.

Sheet 12

- The culvert under existing US 74 will be extended up and downstream and low flow sill will be used. USACOE noted that they would like to review the pond site upstream of the culvert that is proposed to be drained.

Sheet 16

- NCDOT will show channel relocation on right side from sta. +/- 134+00 to sta. +/- 135+50 due to proposed fill slope filling in the existing channel.

Sheet 10

- NCDOT will investigate shifting the junction box or possibly eliminating it on the 48” cross pipe.
- NCDOT noted that the rip rap at the outlet of the 60” cross pipes under ramp D is needed for erosion control and it is shown on the stream banks only and not in the channel.

Draft Minutes for 4C Permit Drawing Review Meeting
R3421A

State Project 34542.1.1
US 220 Bypass From US 74 Bypass West of Rockingham at SR 1109 (Zion Church Road) Interchange to 0.3 miles South of SR 1140 (Old Charlotte Highway), Richmond County, Div. 8

Purpose: The purpose of this meeting was to review the 4C Permit Drawings and resulting environmental impacts. The Drawings were reviewed, addressing each impact site sequentially. These minutes represent a summary of the items discussed during the meeting.

1. Stephen Morgan began the meeting by reviewing a timeline of the project – different sections of the project (A, B, C), project documents, Merger history, field investigation verifications, and permitting. A summary of preliminary impacts (2005) vs current impacts was also reviewed.
2. General – note areas of proposed utility activity near any JS or wetland, even if no impacts occur. Include cross sections (and details) at inlet/outlet of culverts, relocated stream.
3. Permits – a Phased Individual Permit was issued in 2012 and expires December 2017.
4. Site 1
    - Note existing rip rap at outlet of 36" pipe.
    - Show Temporary Impacts at outlet of 36" pipe.
5. Site 2
    - Show stream as a total take between proposed culvert and culvert that will have a portion removed.
6. Site 3
    - Show Bank Stabilization at outlet of culvert at Loop C.
    - Show Diversion Channel used for construction of culvert.
    - Include more Temporary Impacts for Diversion Channel.
7. Site 3A/3B
    - No Comments
8. Site 4
    - Stream has been impacted since preliminary impacts were shown by logging operations. Permanent impacts will be shown as they were in preliminary drawings until further determination. NCDOT will coordinate with DWQ and USACE for mitigation.
9. Site 5/5A
    - A smaller size Energy Dissipater Basin will be shown, decreasing the Permanent and Temporary impacts to the stream.
10. Site 7 (North & South)
    - For clarification, label stream location between the culverts.
    - Show stream cross section and detail.
11. Site 8/8A
    - Add notation for beginning of JS.
    - Note that pond has been drained.

This concluded review of R3421A permit drawings.

Subject: Draft Minutes of the Interagency Permit Drawings Review (4b) Meeting on March 16, 2005 for R-3421B, Richmond County

Participants:

Team Members:
Randy Henegar, NCDOT, Hydraulics (present)
Richard Spencer, USACE (present)
Beth Barnes, NCDWQ (not present)
Michael Penney, NCDOT, PD&EA (present)
Travis Wilson, NCWRC (not present)
Gary Jordan, USFWS (not present)
Chris Militscher, USEPA (present)
Cathy Houser, NCDOT, Roadway (not present)
Rob Ayers, FHWA (not present)
Elizabeth Lusk, ONE (present)
John Olinger, NCDOT, Division 8 (present)

Other Attendees:
Carla Dagnino, NCDOT, ONE
Virginia Mabry, NCDOT, Roadway
Paul Fisher, NCDOT, Hydraulics
Joe Dunnehoo, NCDOT, Hydraulics
Brian Wrenn, NCDWQ
Lonnie Brooks, NCDOT, Structures

This meeting commenced at approximately 11:00 A.M. Randy Henegar led the attendees in reviewing the plan sheets (sheet by sheet). Comments were as follows:

Plan Sheet 4: No comments.

Action taken: N/A

Plan Sheet 5: No comments.

Action taken: N/A

Plan Sheet 6: No comments.

Action taken: N/A

Plan Sheet 7: No comments.

Action taken: N/A

Plan Sheet 8: No comments.

Action taken: N/A

Plan Sheet 9: No comments.

Action taken: N/A

Plan Sheet 10: No comments.

Action taken: N/A

Plan Sheet 11: USACE will go to the field to look at wetlands @ -L- Sta. 226+00 +/-.

Action taken: Carla Dagnino will coordinate field visit with USACE.

Plan Sheet 12: No comments.

Action taken: N/A

Plan sheet 13: No comments.

Action taken: N/A

Plan Sheet 14: No comments

Action taken: N/A

Plan Sheet 15: No comments.

Action taken: N/A

Plan Sheet 16: Richard Spencer wanted to put diversion ditch (-L- Sta. 304+00 +/-) under roadway fill and work in dry season.

Action taken: O.N.E. will include note to this effect in the Permit write-up.

Plan Sheet 17: No comments

Action taken: N/A

Plan Sheet 18: No comments

Action taken: N/A

Plan Sheet 19: All upland wetlands should be counted as impacted wetlands. Check for 2:1 side slopes in wetland areas. USACE to look in field to see if proposed road cuts off groundwater from crossing roadway.

Action taken: Joe Dunnehoo will check plans for 2:1 side slopes. Carla Dagnino will coordinate the site visit with USACE.

Plan Sheet 20: No comments

Action taken: N/A

Plan Sheet 21: USACE was concerned about the amount of stream relocation near –Y4- & -SR 1- intersection.

Action taken: Engineering Coordination will look at design changes that could reduce the amount of stream relocation.

Plan Sheet 22: No comments

Action taken: N/A

Plan Sheet 23: Remove rip rap from pipe outlet at –Y5- Sta. 39+00 +/-.

Action taken: Done.

No further comments were recorded, and the meeting adjourned at approximately 12:30 P.M.

4C Meeting Minutes for R-3421B

PROJECT: **R-3421B**
34542.1.FR3

DESCRIPTION: **I-73/74 Bypass from South of SR 1140 (Old Charlotte Hwy)**
To Southwest of SR 1304 (Harrington Rd)

COUNTY: **Richmond - Division 8**

***NOTE: On 9/1/2015 we were notified this project was removed from the "Bond List" and that work should cease at an appropriate point and to not resume until funding becomes available. The 4C permit will be revised per comments below and then work will cease until notification is sent to the Hydraulics Unit to proceed with Draft and Final permit submittals.**

Team Members:
Andy Williams-USACE (Present, conference call)
David Wanucha- NCDWQ (Present, conference call)
Travis Wilson-NCWRC (Absent)
Gary Jordan-USFWS (Absent)
Dr. Cynthia Van Der Wiele-USEPA (Absent)
David Harris- REU(Absent)
Felix Davila-FHWA (Present)

Participants:
Galen Cail-NCDOT Hydraulics (Present)
Joe Dunnehoo-NCDOT Hydraulics (Present)
Chris Rivenbark-NES (Present)
Jason Dilday-NES (Present)
Lisa Feller-PDEA (Present)
John Olinger-Division 8 (Present)
Rekha Patel- NCDOT Roadway Design (Present)
Chris Adam-NCDOT Roadway Design (Present)
Mark Staley-Roadside (Present)
Mack Bailey-Structures (Present)
Don Proper-Utilities (Present)
Kyle Pleasant-Utilities (Present)

The 4C Meeting was held on Wednesday, August 19, 2015 in the Hydraulics Unit Conference room at the NCDOT Century Center Complex, Raleigh. Galen Cail reviewed the plan sheets with the attendees. Comments are as follows:

General Comments:

- Andy Williams noted that Bank Stabilization impacts (permanent) should be separate from the fill in stream impacts (permanent) on the Impacts Summary. This will be reviewed and verified.

- Andy Williams and Davis Wanucha requested a copy of the Impact Comparison Table. Will be attached with 4C minutes.

Site # 1 (Plan Sheet 5 & 6):

- No comments.

Site # 2 (Plan Sheet 21):

- The 66" pipe and impacts located at sta. 12+90-Y4- will be shown as Site 2A.

Site #3 (Plan Sheet 7):

- Review alignment of outlet pipes relative to downstream outfall channel.

Site #4 (Plan Sheet 8):

- Review alignment of outlet pipes relative to downstream outfall channel.

Site #5 (Plan Sheet 10):

- No comments.

Site #6 (Plan Sheet 11):

- It was discussed to continue the wetland boundary outside of proposed R/W for clarity. After the 4C meeting it was determined the wetland boundary should close just outside of proposed R/W. Therefore, this wetland will be accounted for as a total take.

Site #7 (Plan Sheet 11):

- No comments.

Site #8 (Plan Sheet 12):

- Add inlet and outlet channel detail for the culvert to the plan sheet and permit drawing.

Site #9 (Plan Sheets 16 & 22):

- No comments.

Site #10 (Plan Sheet 16):

- It was verified the JS stream does stop in the wetlands at sta. 304+60±-L- (Lt.)
- The wetlands at sta. 35+35±-Y5-(Lt.) within the ramp and mainline quadrant will be shown and accounted for as a total take as both mechanized clearing and excavation in wetlands impacts.

Site #11 (Plan Sheet 23):

- No comments.

Site #12 (Plan Sheet 19):

- The wetlands between Sta. 351+00± to sta. 354+75±-L-(Rt.) will not be shown as a total take. Also, portions of this wetland impact were accounted for on the original R-3421C permit. These impacts will be accounted for/subtracted from the final impacts in the R-3421B permit.

Surface Water Impacts Comparison Table:

- Under the "Existing Channel Impacts Permanent (ft.)" for Site No. 2, the quantity is shown as 28. This was determined to be a type-o. The correct number should have been 203 ft. This will be changed on the form.

Wetland Impacts Comparison Table:

- It was asked why there was a big difference between the Current and Preliminary Impacts at Site #10. The difference was because the wetlands were redelineated and the area was reduced.

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

July 12, 2019

Mr. Philip S. Harris, III, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

R-3421A, US 220 Bypass from US 74 Bypass West of Rockingham at SR 1109 (Zion Church Road) Interchange to South of SR 1140 (Old Charlotte Highway), Richmond County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on July 12, 2019, 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	3,966.0	0.68	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

DMS commits to implementing sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the 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 DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

Beth Harmon

James B. Stanfill
DMS Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-3421A

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
TIM BAUMGARTNER
Director

NORTH CAROLINA
Environmental Quality

August 2, 2019

Mr. Philip S. Harris, III, P.E.
Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

R-3421B, US 220 Bypass, Richmond County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on July 30, 2019, 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	3,611.0	3.80	0	0	0	0

*Some of the stream and/or wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

DMS commits to implementing sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the 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 DMS.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
DMS Asset Management Supervisor

cc: Mr. Monte Matthews, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-3421B

Revised 7/30/19

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	34542.1.FR4	**TIP No.:**	R-3421A	**County(ies):**	Richmond	**Page** 1	**of** 3

General Project Information

WBS Element:	34542.1.FR4	**TIP Number:**	R-3421A	**Project Type:**	New Location	**Date:**	7/30/2019
NCDOT Contact:	Mr. Stephen R. Morgan, PE			**Contractor / Designer:**			
Address:	1000 Birch Ridge Drive Raleigh, NC			**Address:**			
Phone:	919-707-6739			**Phone:**			
Email:	smorgan@ncdot.gov			**Email:**			
City/Town:				**County(ies):**	Richmond		
River Basin(s):	Yadkin-Pee Dee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.78	**Surrounding Land Use:**	Agricultural, Rural, Residential

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	54.4 ac.	ac.
Typical Cross Section Description:	46' Grass median, 2@12' paved inside shoulers, 2@12' lanes each direction, 12' paved outside shoulder, grass roadway ditches.	
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: Year:	Existing: Year: 2019

General Project Narrative: (Description of Minimization of Water Quality Impacts)

CSR 1 & 2 on Loop B & I73; CSR 3 Loop C; CSR 4 Ramp C; CSR 5 on L2/L2Rev (extension).

R-3421A is an interchange and bypass project (US220 Bypass From US74 Bypass West Of Rockingham at SR1109 Interchange) which will include a 46' grass median with 2@12' travel lanes in each direction. The project also includes grass lined roadway ditches. The proposed project includes 4 major drainage structures (3Culverts & extension of 2 culverts) located in the interchange, which will convey Un-named Tribs to the Pee Dee River. The culverts will include sills and utilize Low Flow Benches as well as a stream relocation between 2 culverts to maintain the low flow in one barrel of the culvert. A Rip Rapped Energy Dissipator will be utilized at the outlet of 2 60" pipes to dissipate the energy and prevent erosion to the receiving stream. There are some minor channel improvements at the inlet and outlet of a few of the culverts. Direct dischages into jurisdictional features were avoided to the maximum extent practicable. Where possible, drainage systems were released away from jurisdictional features. However, in some locations direct discahge was unavoidable due to extreme topographic constraints as well as proposed roadway profiles. In these locations no practical alternatives were present.

Waterbody Information

Surface Water Body (1):	Un-named Trib to Pee Dee River	**NCDWR Stream Index No.:**	UT to 13 - (34)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34542.1.FR4 **TIP No.:** R-3421A **County(ies):** Richmond

Revised 7/30/19

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
	See Comments Below														

Additional Comments

The design for R-3421A includes typical grassed cut ditches within the roadway footprint. These ditches are collecting runoff from the impervious roadway surfaces and transporting the runoff to inlets and pipes. The geometry of the typical cut ditches contain side slopes ranging from 4:1 to 8:1 and having mostly mild longitudinal slopes. However, no grassed swale treatment was claimed nor reqired for this portion of the project even though many aspects of the grassed swale criteria was incorporated into the design.

Revised 7/30/19

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34542.1.FR4 **TIP No.:** R-3421A **County(ies):** Richmond

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
10	-RPD- 10+32.66 (73.4' LT) 34.9524103,-79.8468202	(1)Un-named Trib to Pee	Riprap Energy Dissipator Basin	Class I			2 - 60" RCP and 1 - 36" RCP			N/A

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

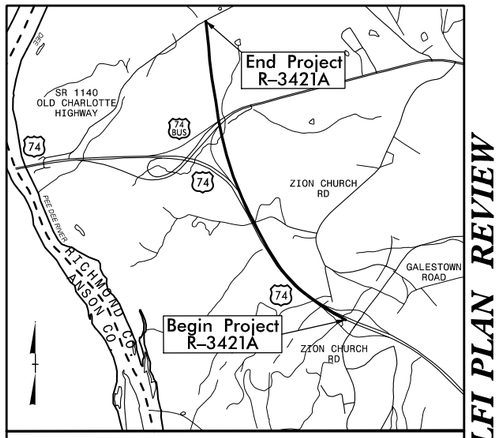
Revised 7/25/2019

09/08/99

TIP PROJECT: R-3421A

CONTRACT:

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



VICINITY MAP

PLFI PLAN REVIEW

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421A	1	

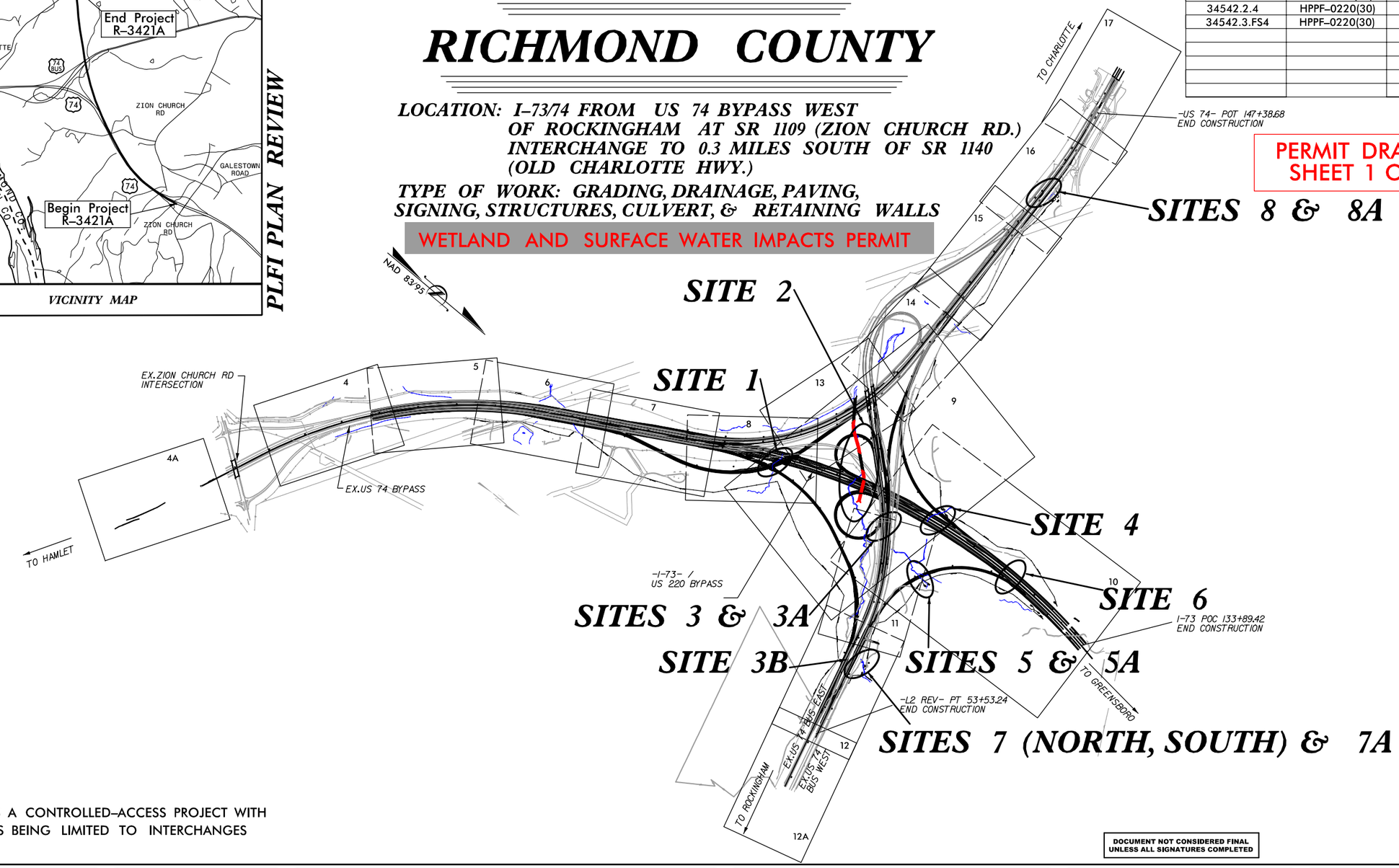
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34542.1.FR4	HPPF-0220(75)	P.E.
34542.2.4	HPPF-0220(30)	R/W, UTIL.
34542.3.FS4	HPPF-0220(30)	P.E.

LOCATION: I-73/74 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.)

TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNING, STRUCTURES, CULVERT, & RETAINING WALLS

WETLAND AND SURFACE WATER IMPACTS PERMIT

PERMIT DRAWING
SHEET 1 OF 37



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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT (2016) = 9,330-12,800
ADT (2036) = 19,900-23,800
K = 10%
D = 60%
T = 26% *
V = 70 mph
FUNC. CLASS. = INTERSTATE

* (TTST 9% + DUAL 17%)

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421A = 1.707 miles
LENGTH STRUCTURES TIP PROJECT R-3421A = 0.073 miles
TOTAL LENGTH OF TIP PROJECT R-3421A = 1.782 miles

(SB LANES WERE USED FOR LENGTH OF PROJECT)

Prepared In the Office of:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO: F-0112
FOR NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 20, 2008

LETTING DATE:
OCTOBER, 2019

MICHAEL T. MERRITT, PE
PROJECT ENGINEER
RK&K, LLP

SCOTT BLEVINS, P.E.
PROJECT DESIGN ENGINEER
RK&K, LLP

NCDOT CONTACT: GREGORY S. DAVIS, P.E.
DIVISION 8 PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

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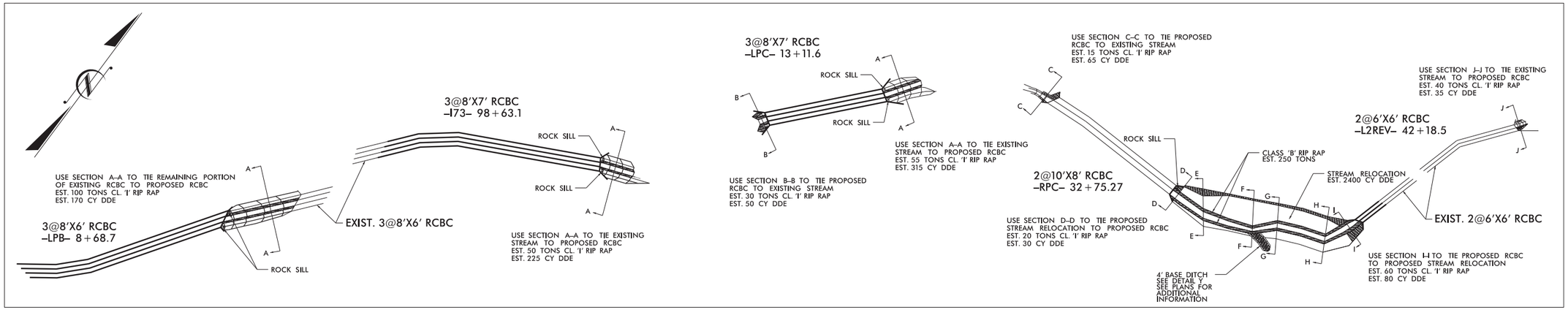
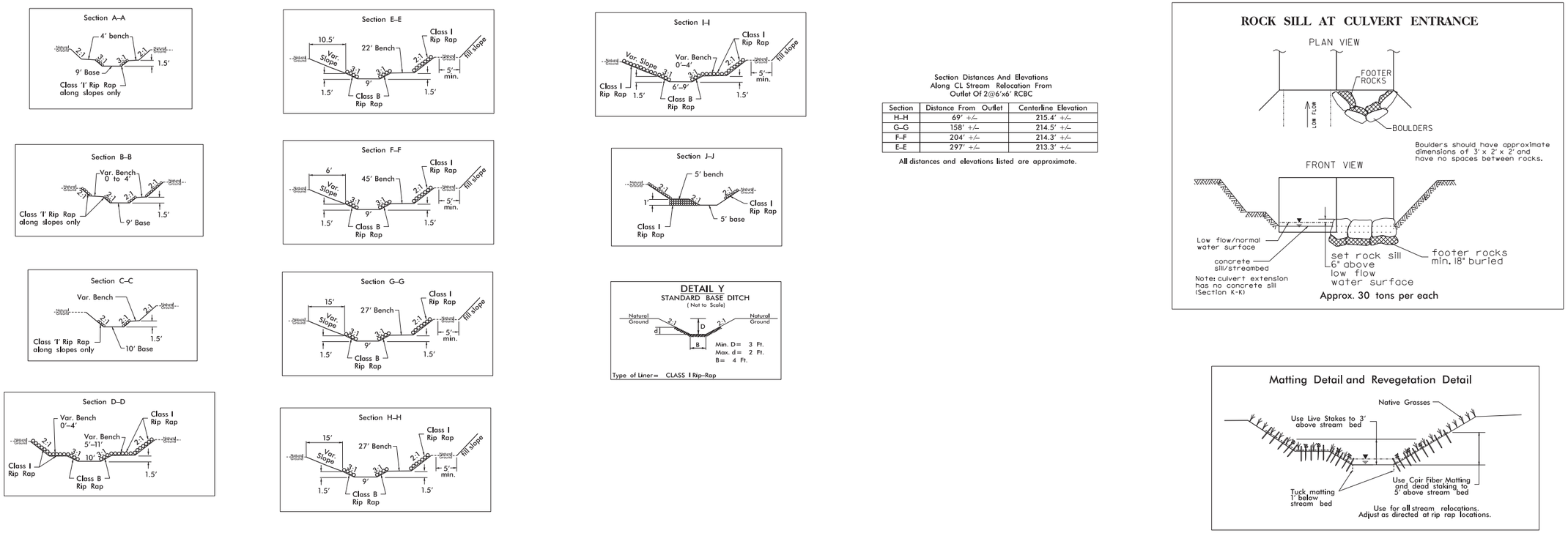
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	2D-1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

STREAM RELOCATION DETAILS

PERMIT DRAWING
SHEET 1A OF 37





Section Distances And Elevations
Along CL Stream Relocation From
Outlet Of 2@6'x6' RCBC

Section	Distance From Outlet	Centerline Elevation
H–H	69' +/–	215.4' +/–
G–G	158' +/–	214.5' +/–
F–F	204' +/–	214.3' +/–
E–E	297' +/–	213.3' +/–

All distances and elevations listed are approximate.

NOTES:
THE TYPICAL BANKFULL DEPTH FOR THE RELOCATED STREAM IS 1.5'.
BENCH WIDTHS MAY VARY FROM DIMENSIONS SHOWN DEPENDING ON FIELD CONDITIONS, THE INTENT IS TO PROVIDE FLOODPLAIN TO THE MAXIMUM EXTENT POSSIBLE BETWEEN SECTIONS D–D AND I–I.
OTHER DIMENSIONS, ELEVATIONS AND GEOMETRY MAY VARY DEPENDING ON FIELD CONDITIONS AND WITH THE ENGINEER'S APPROVAL.
ADDITIONAL INFORMATION MAY BE SHOWN ON THE PLAN SHEETS.

REVISIONS

Revised 7/25/2019

6/03/98

7/19/2019
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Revised 7/25/2019

8/17/99

REVISIONS

PERMIT DRAWING
SHEET 2 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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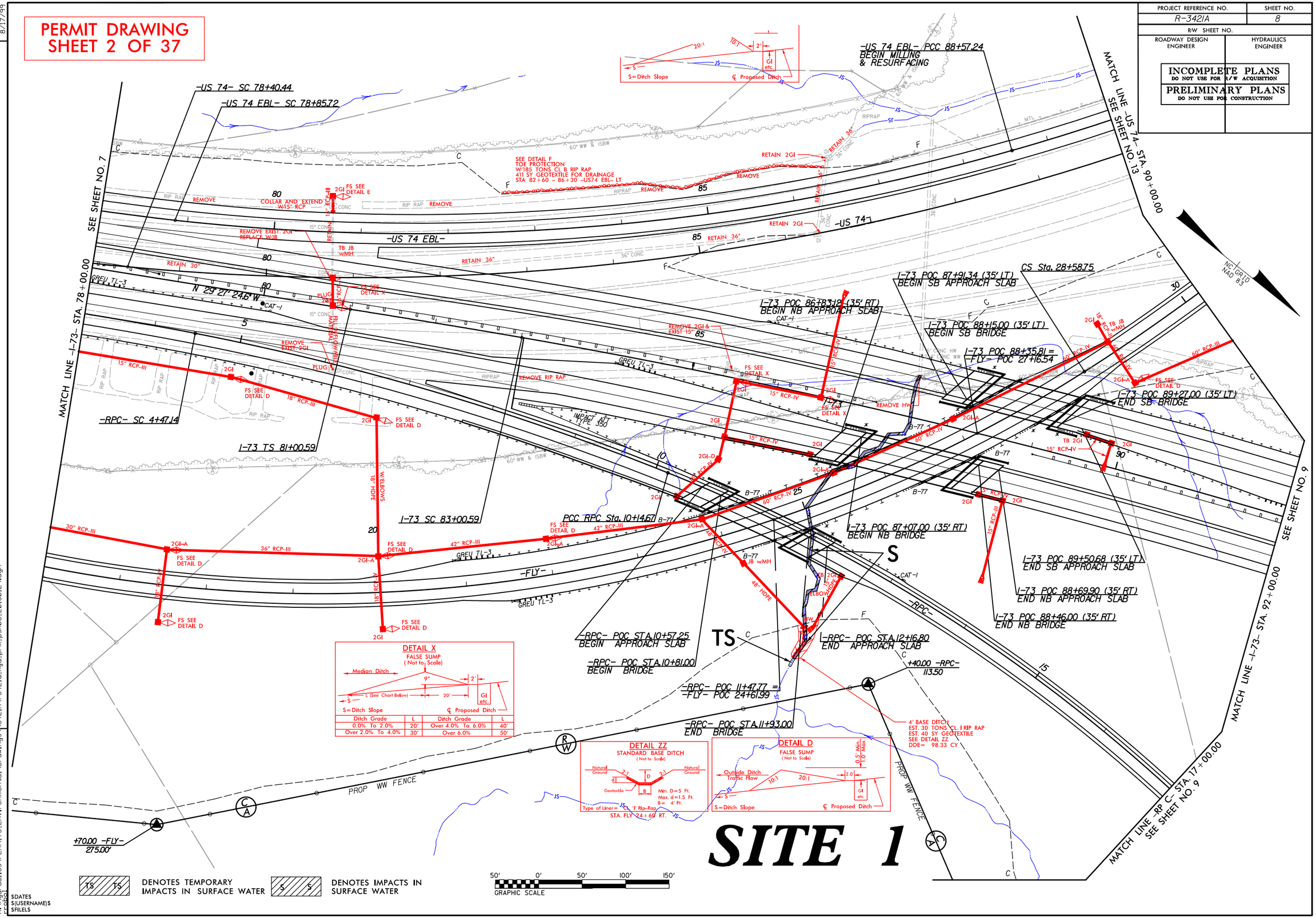
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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Revised 7/25/2019

8/17/99

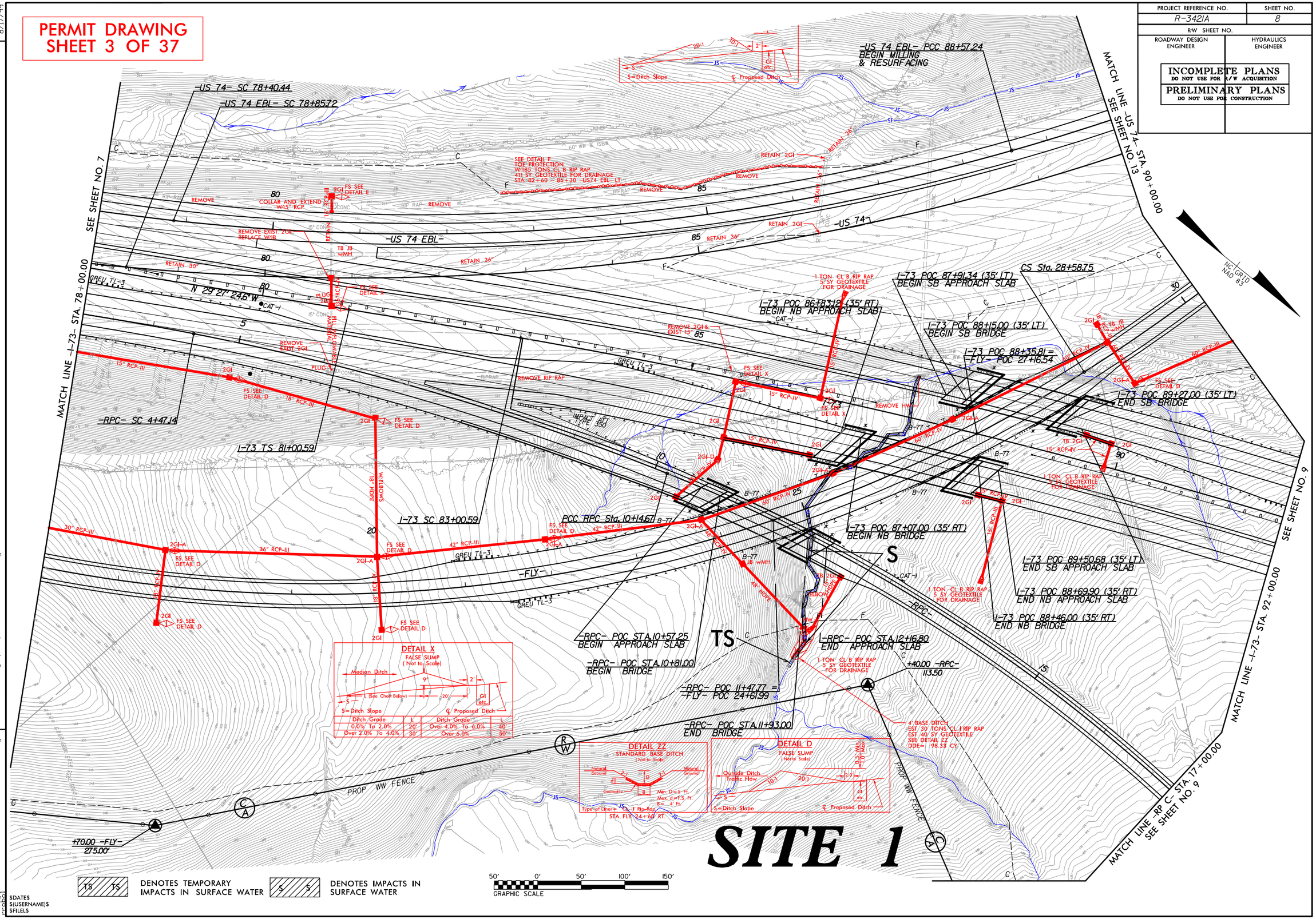
REVISIONS

PERMIT DRAWING
SHEET 3 OF 37

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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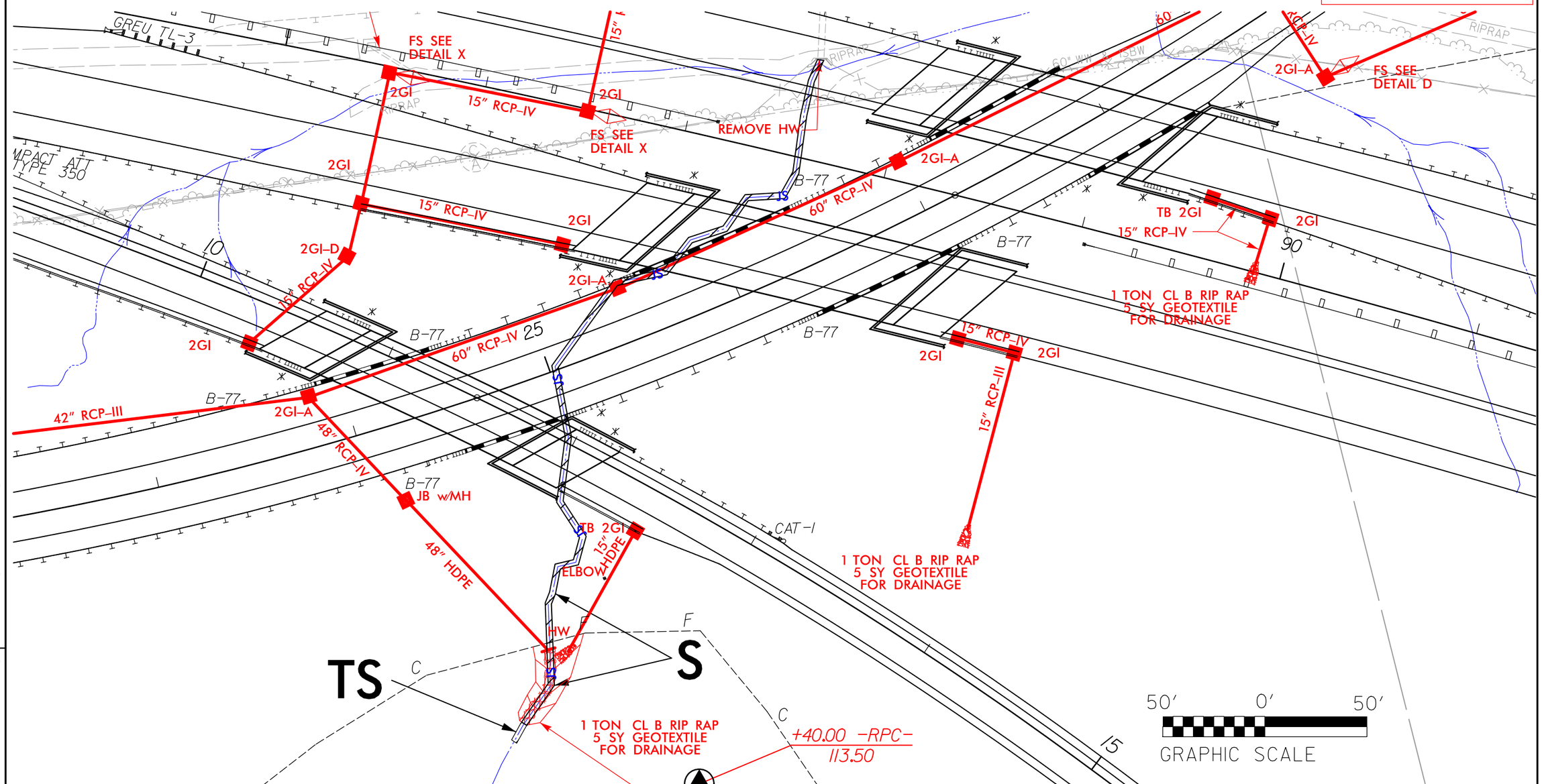
SITE 1 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 4 OF 37



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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Revised 7/25/2019

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SITE 1 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 5 OF 37

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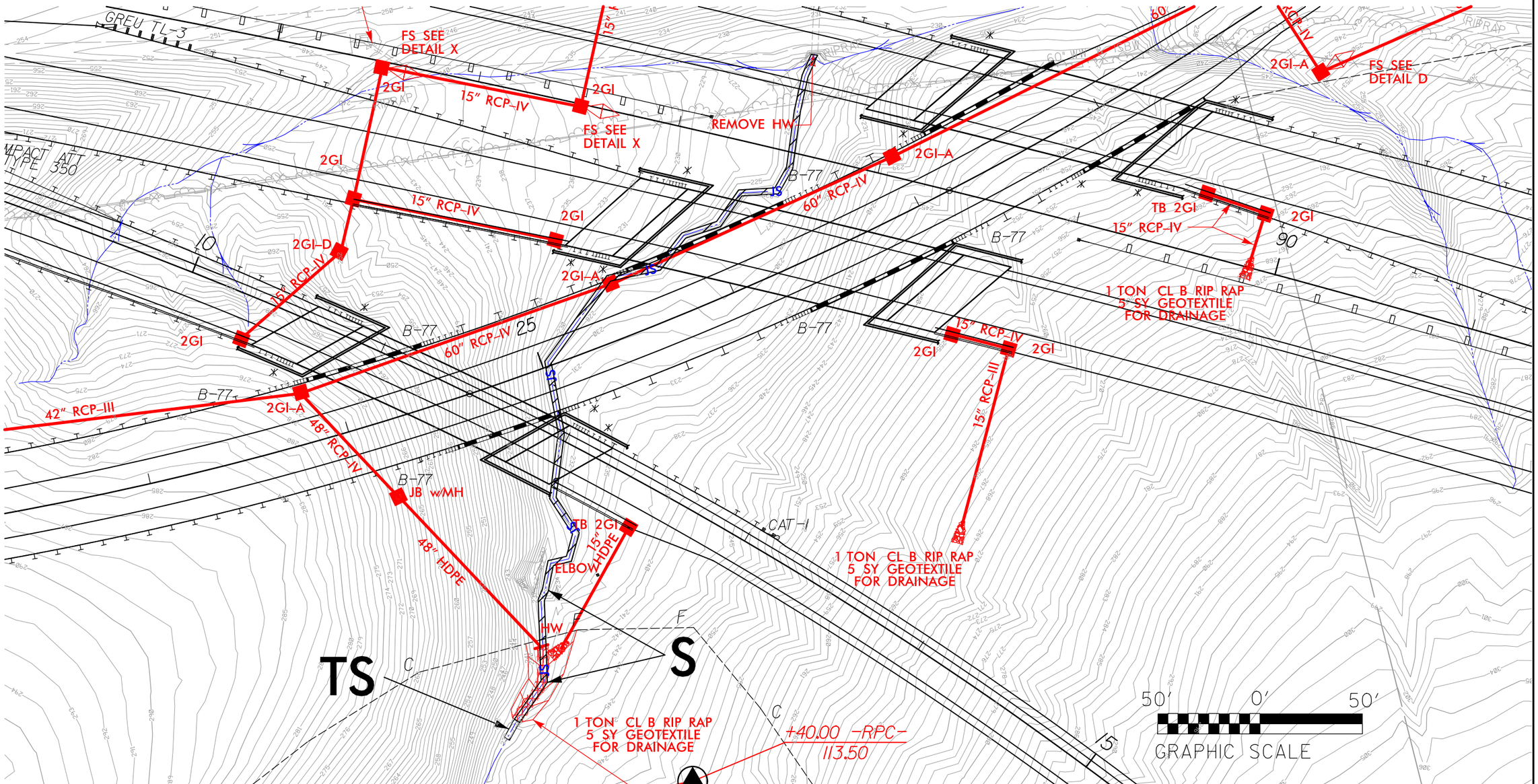

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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Revised 7/25/2019

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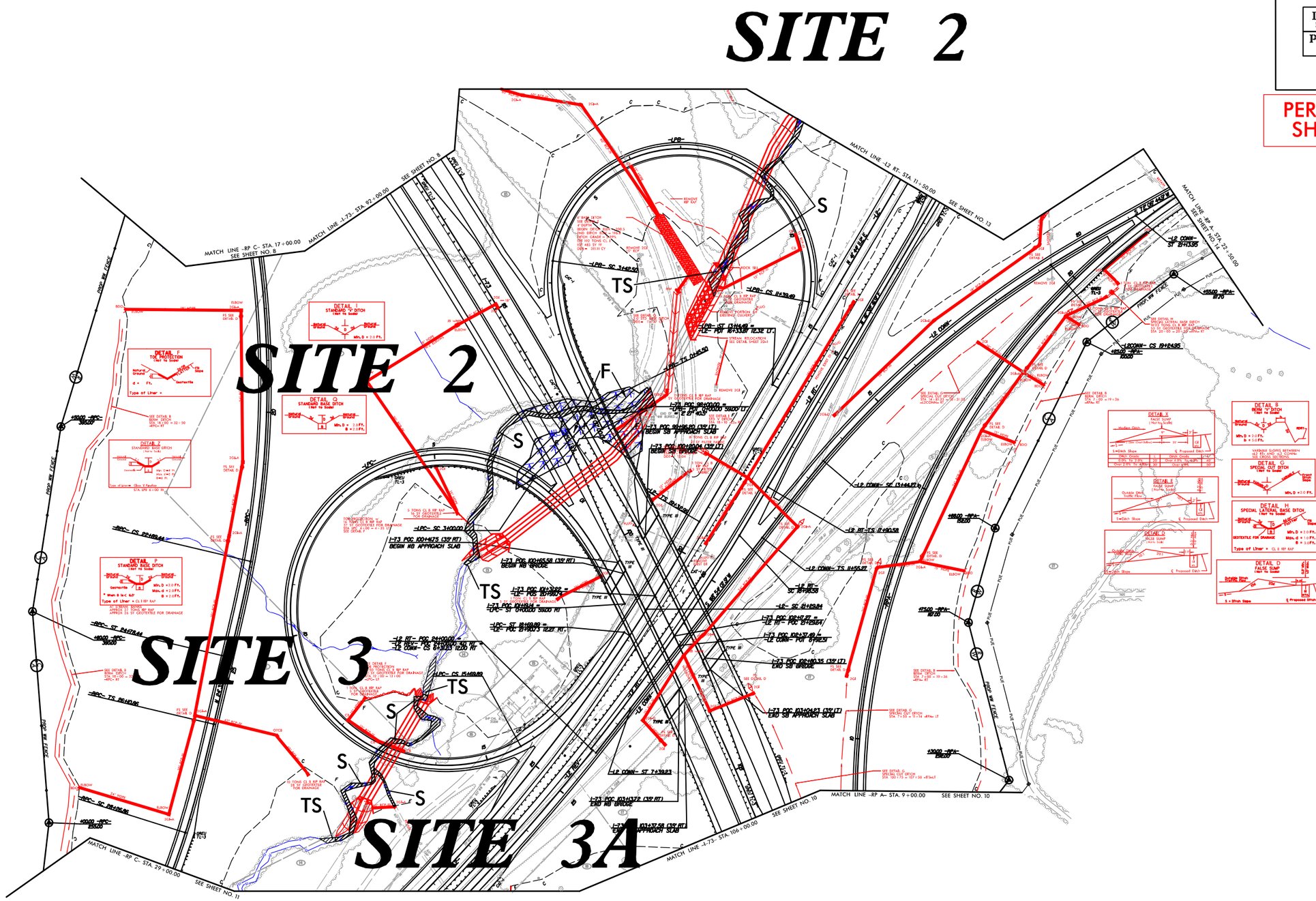
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 37

SITE 2



100′ 0′ 100′ 200′ 300′
GRAPHIC SCALE

▨ S S	DENOTES IMPACTS IN SURFACE WATER
▨ TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
▨ F F	DENOTES FILL IN WETLAND

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REVISIONS

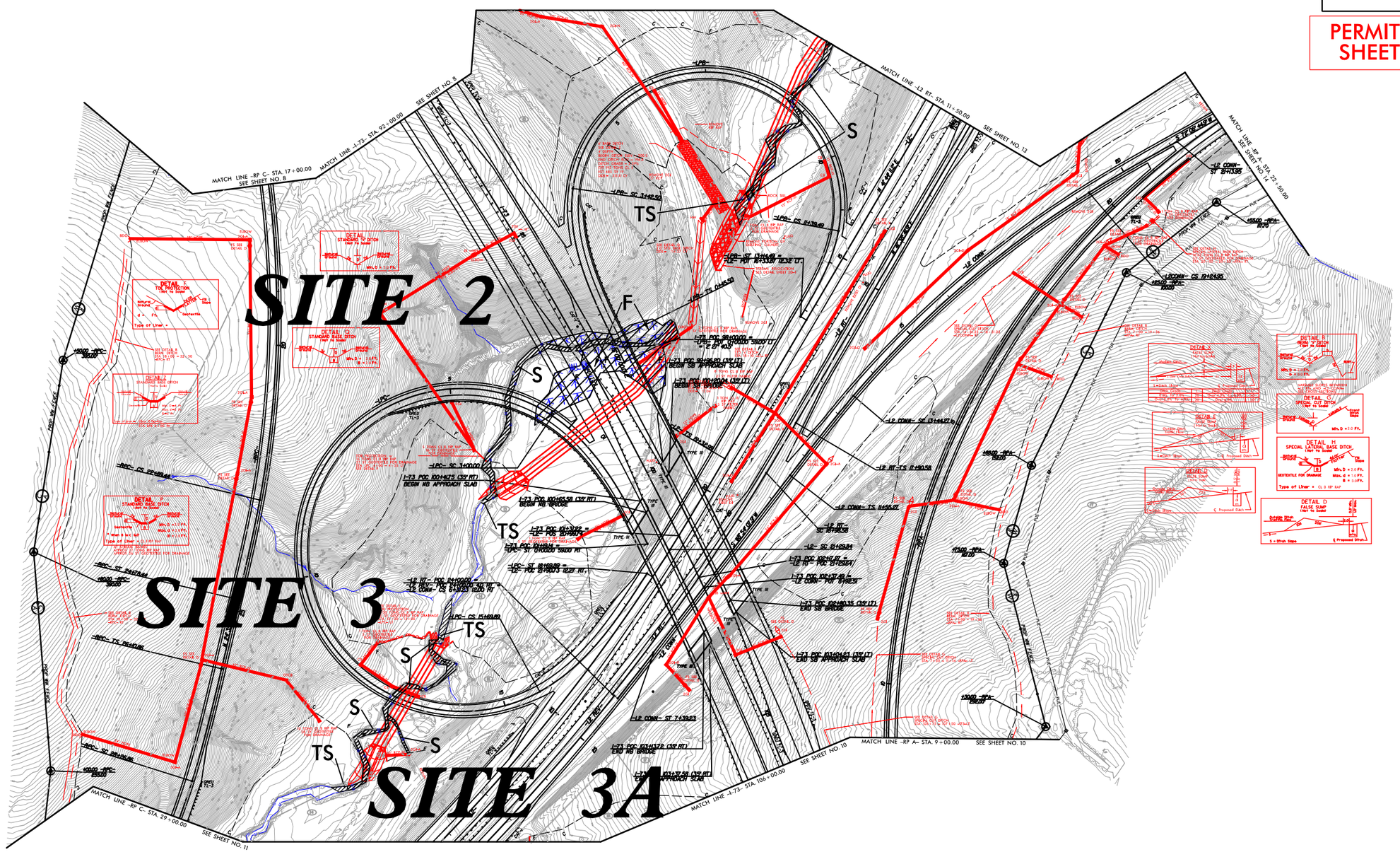
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 7 OF 37

SITE 2



100' 0' 100' 200' 300'
GRAPHIC SCALE

▨ S S	DENOTES IMPACTS IN SURFACE WATER
▨ TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
▨ F F	DENOTES FILL IN WETLAND

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REVISIONS

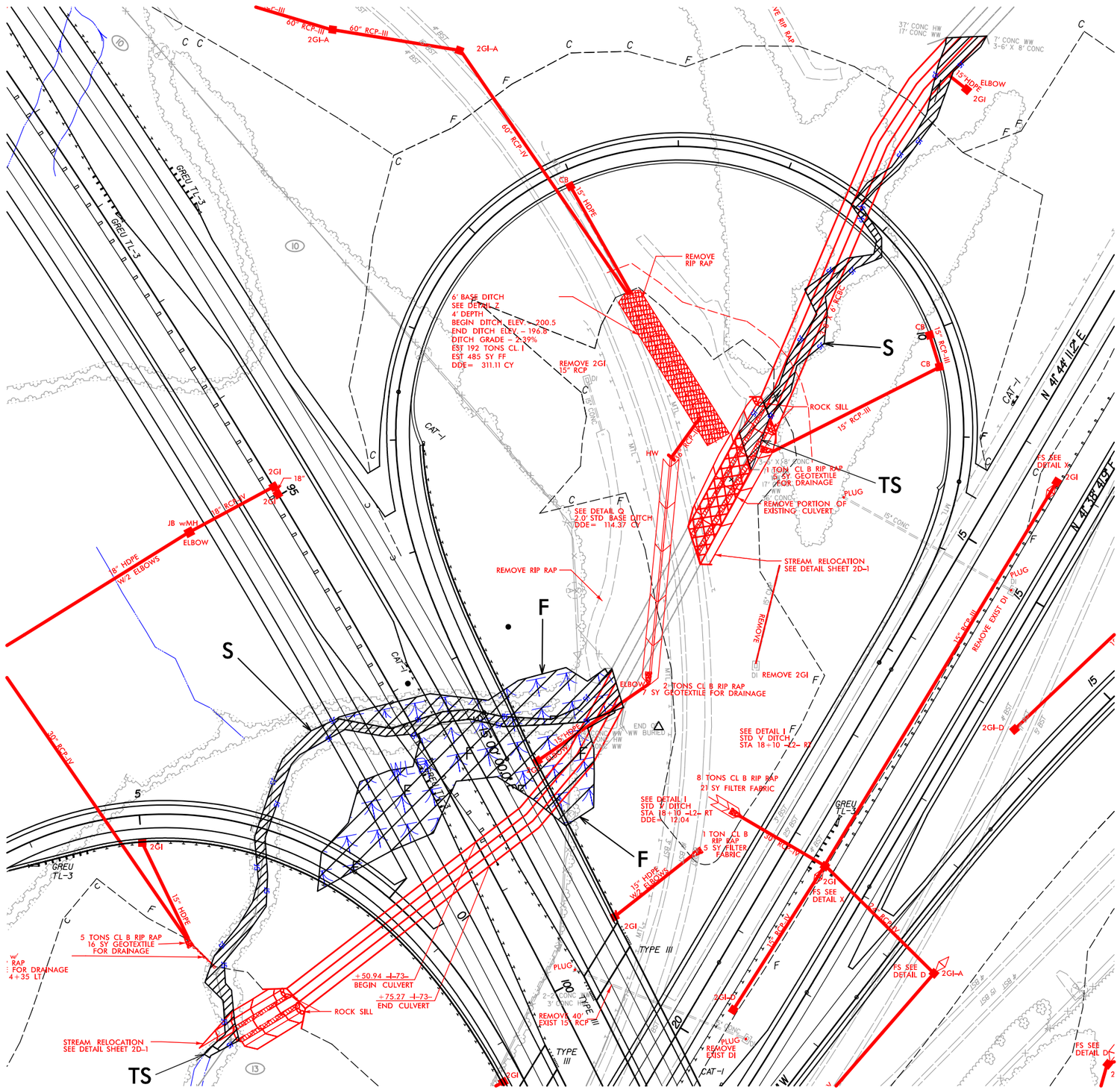
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 8 OF 37



SITE 2 ENLARGEMENT

50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

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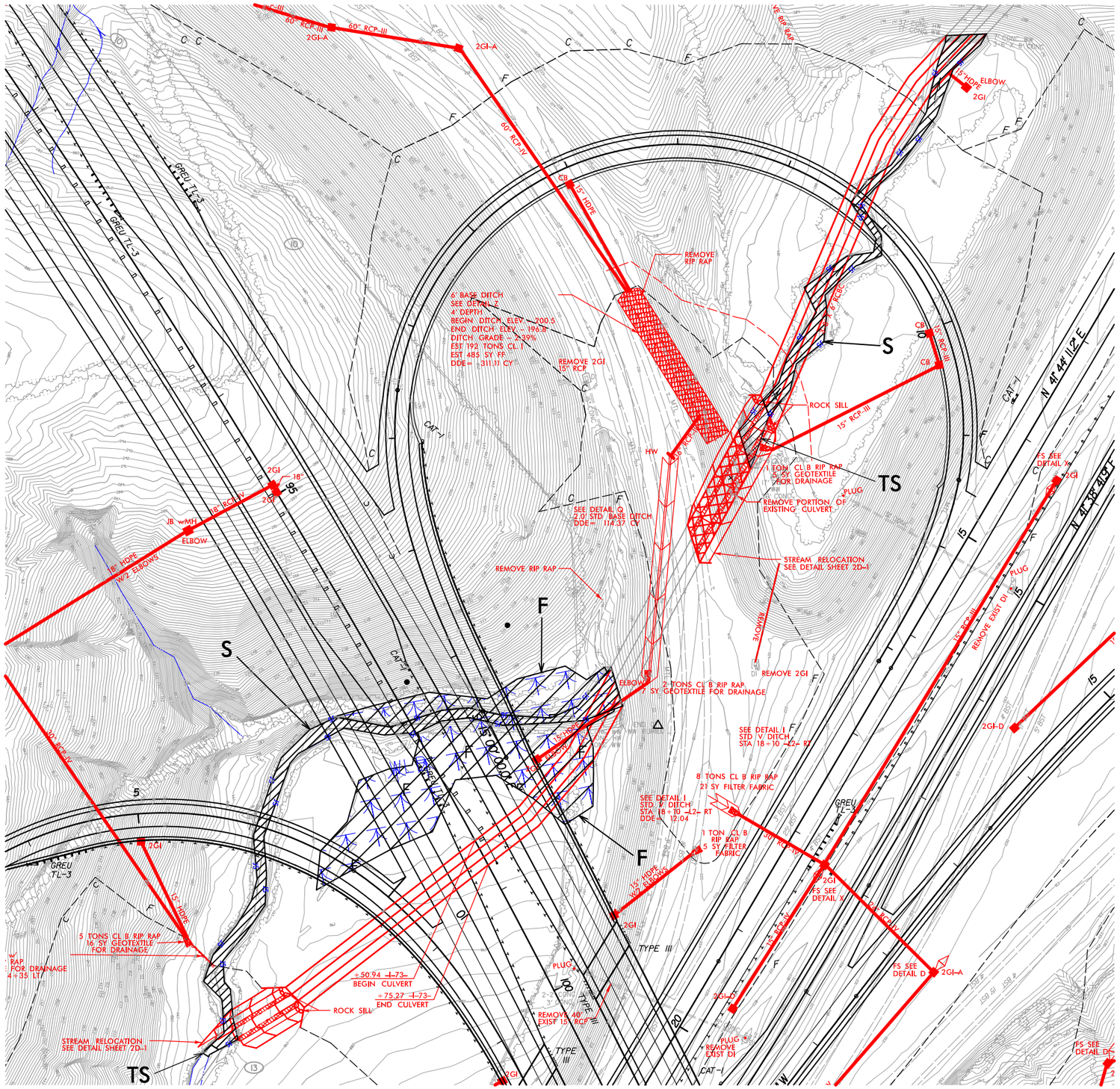
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 9 OF 37



SITE 2 ENLARGEMENT

NC GRID NAD 83

50' 0' 50'
GRAPHIC SCALE

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F — DENOTES FILL IN WETLAND

REVISIONS

8/17/99

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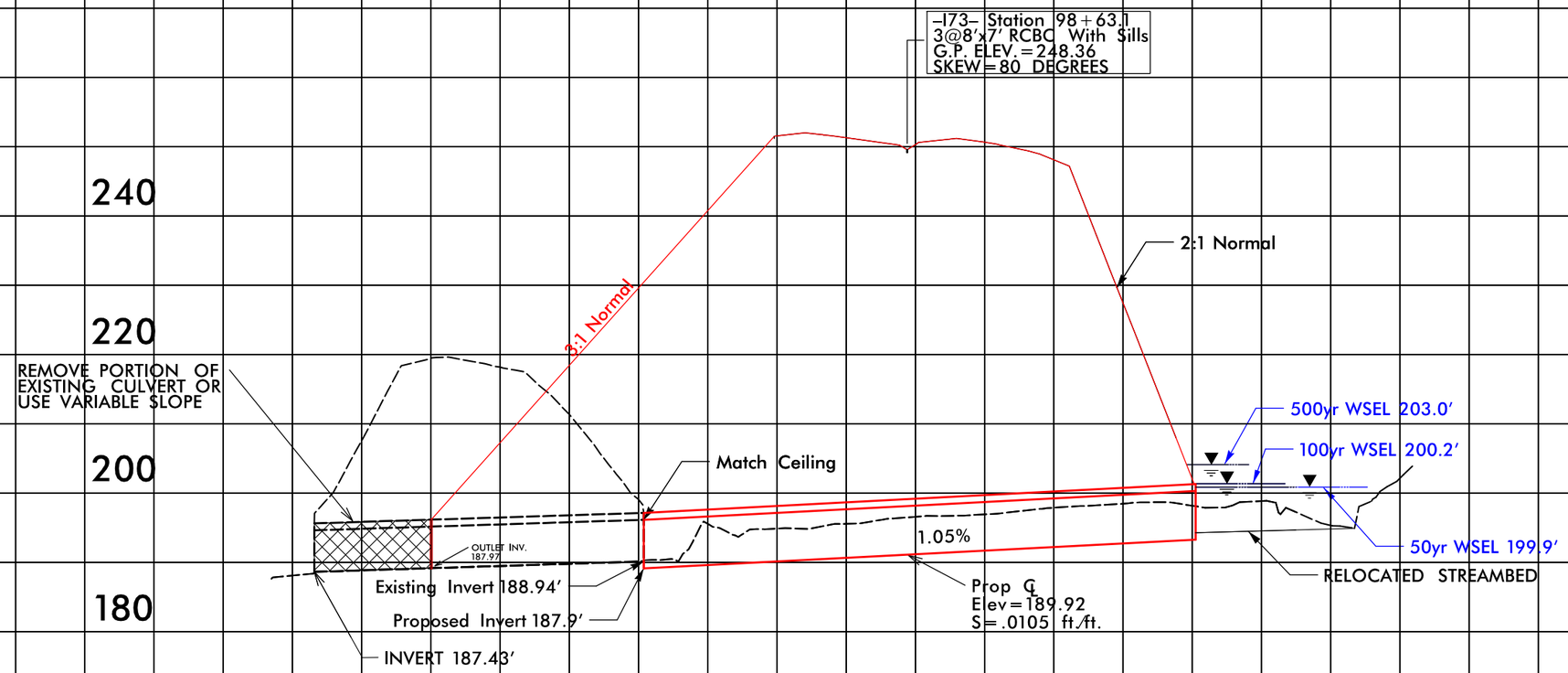
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING
SHEET 10 OF 37

SITE 2



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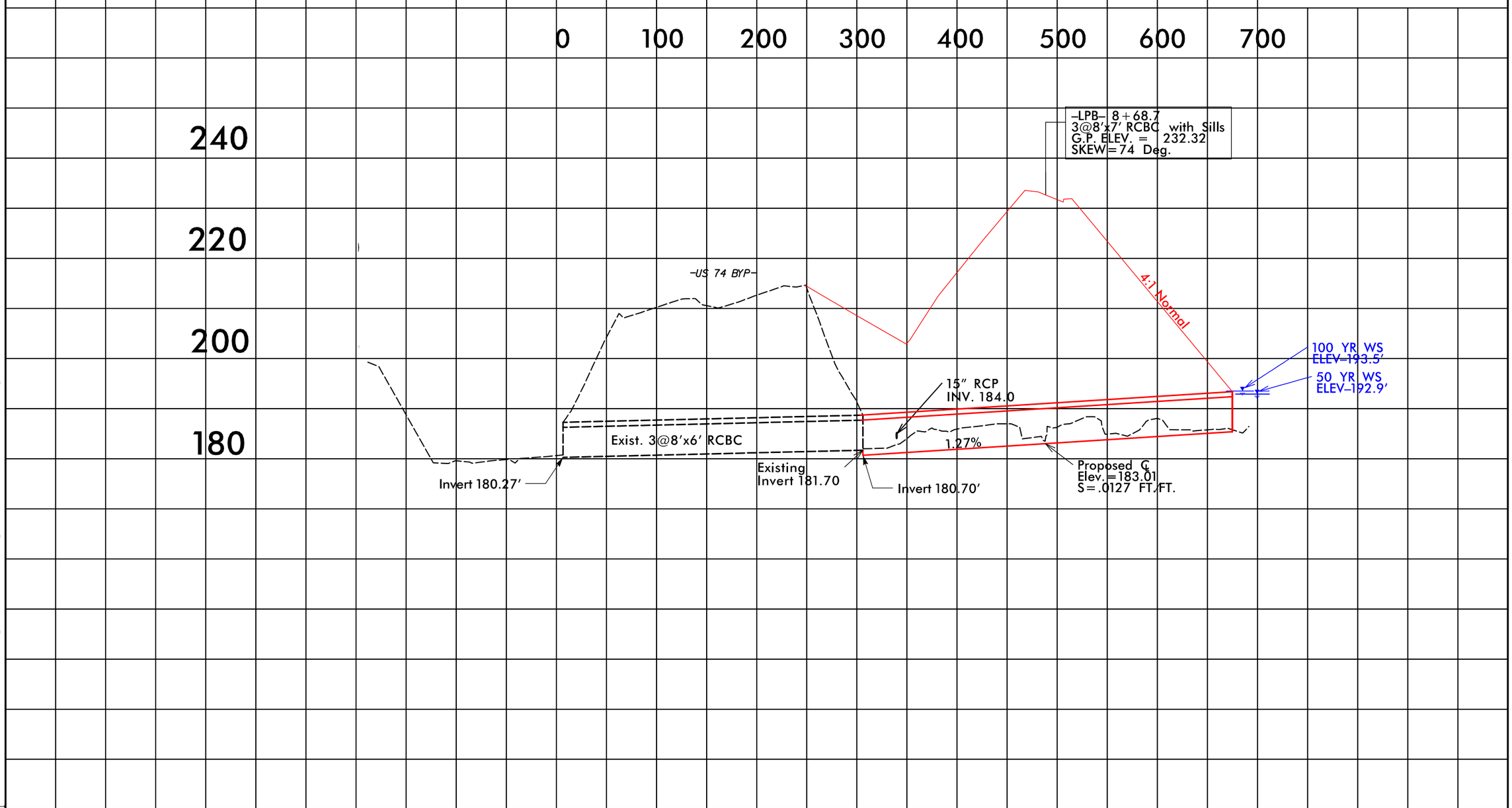
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 11 OF 37

SITE 2



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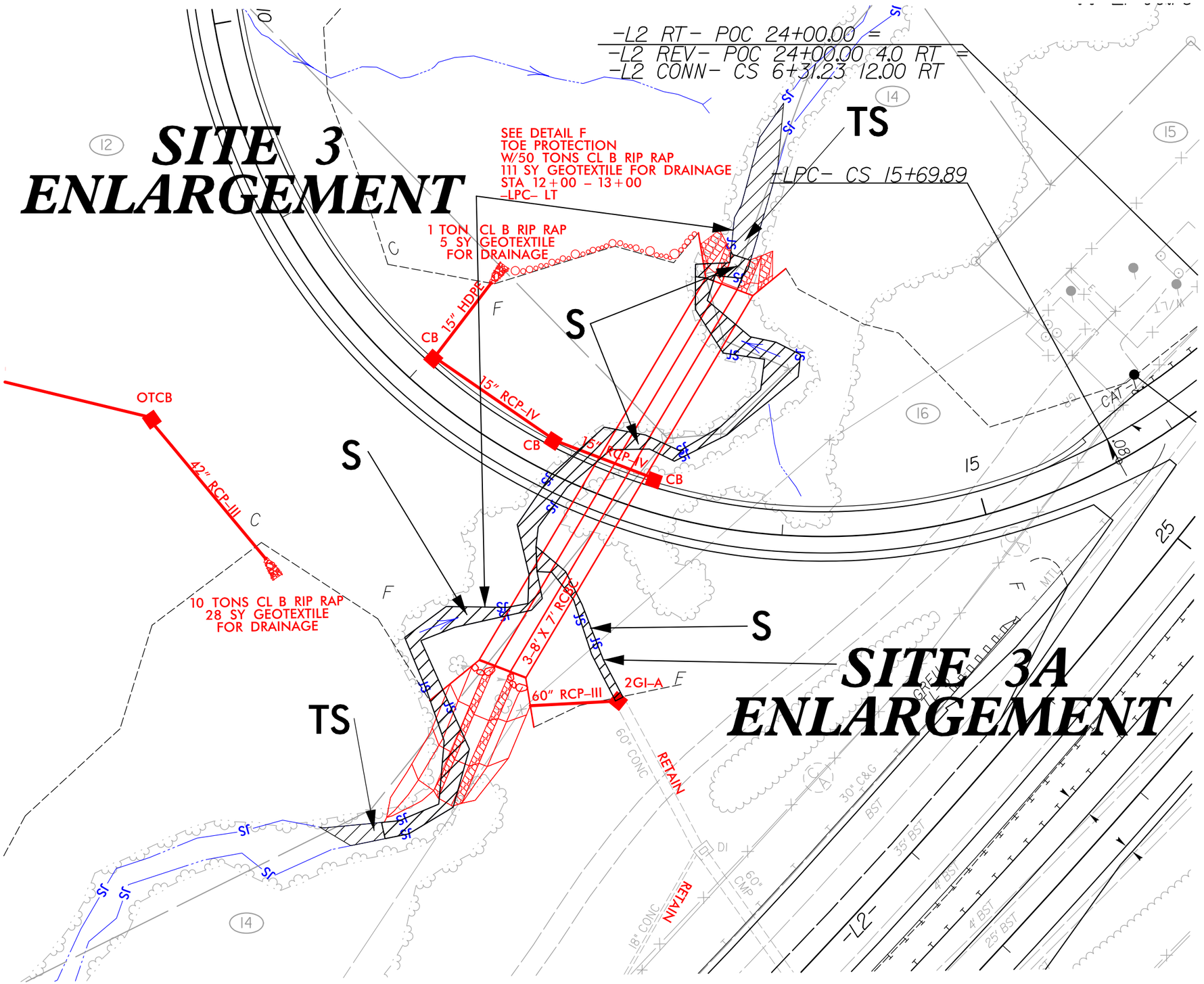
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 12 OF 37



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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REVISIONS

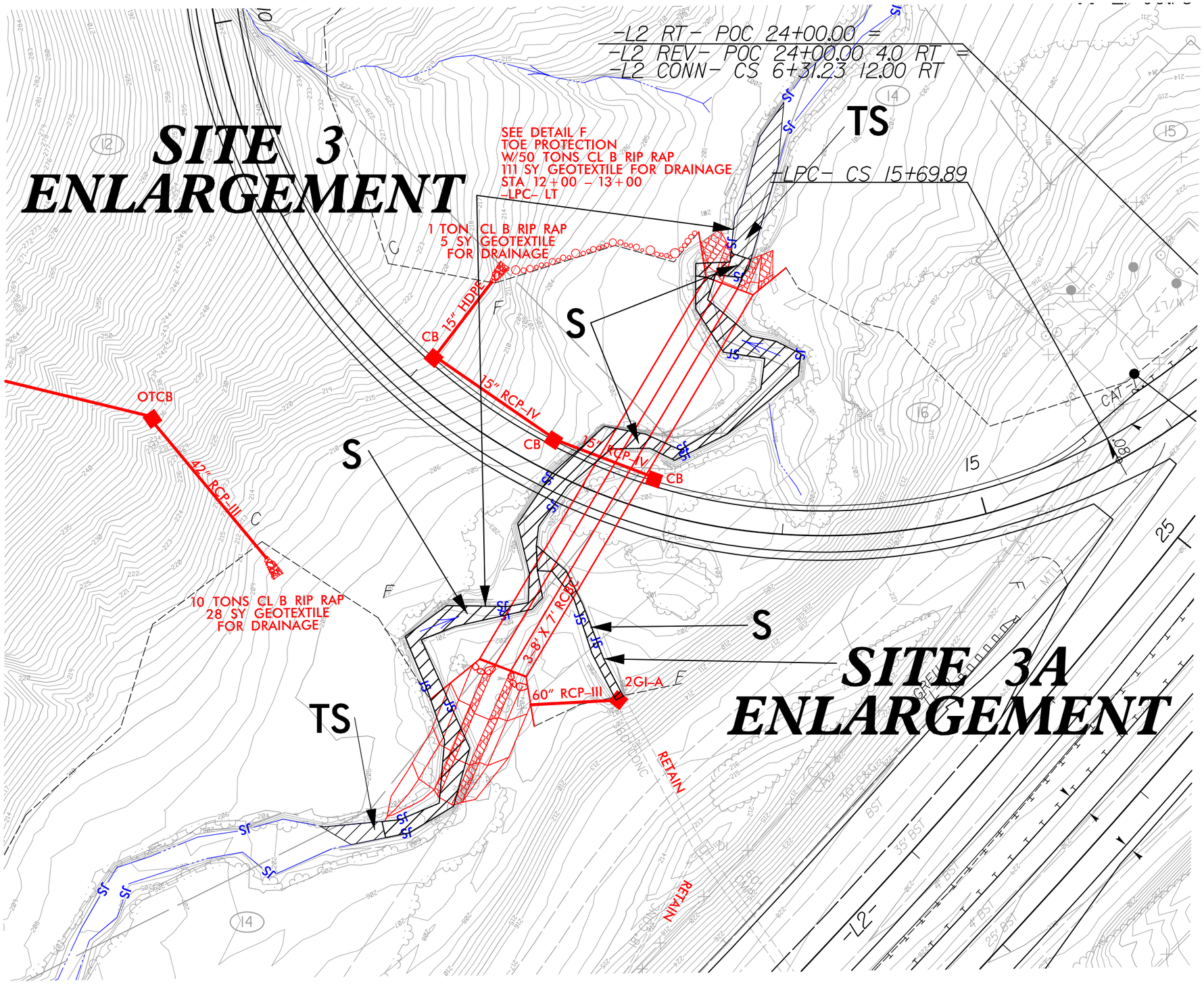
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 13 OF 37



NC 68 TD
NAD 83

50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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Revised 7/25/2019

5/14/99

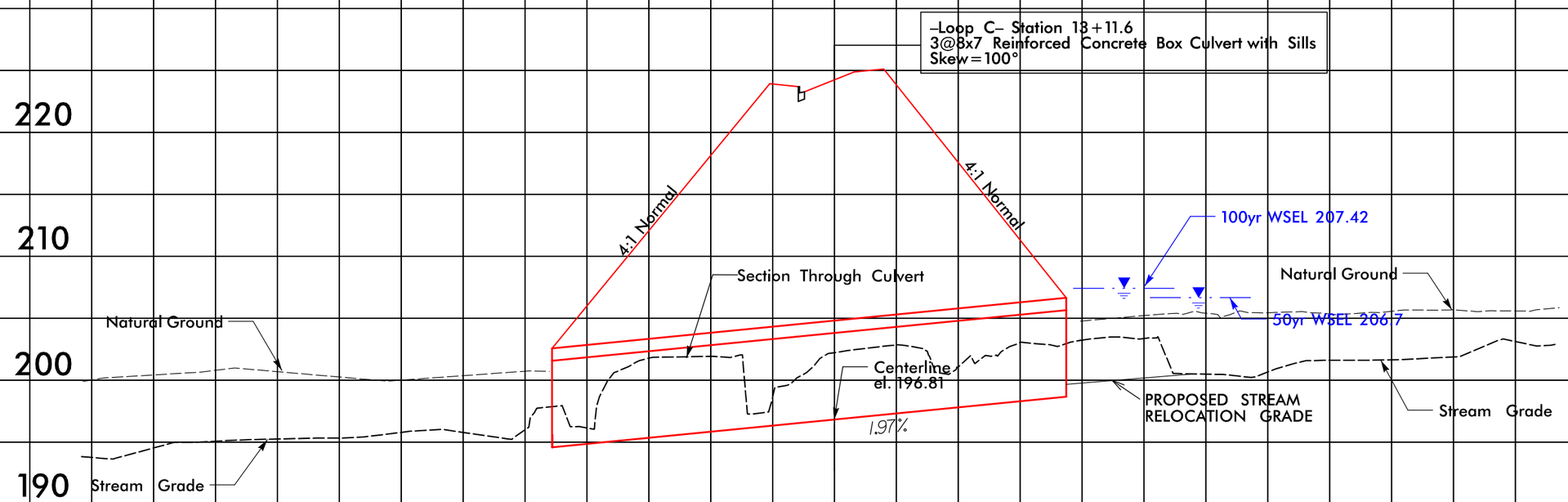
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 14 OF 37

SITE 3



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PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

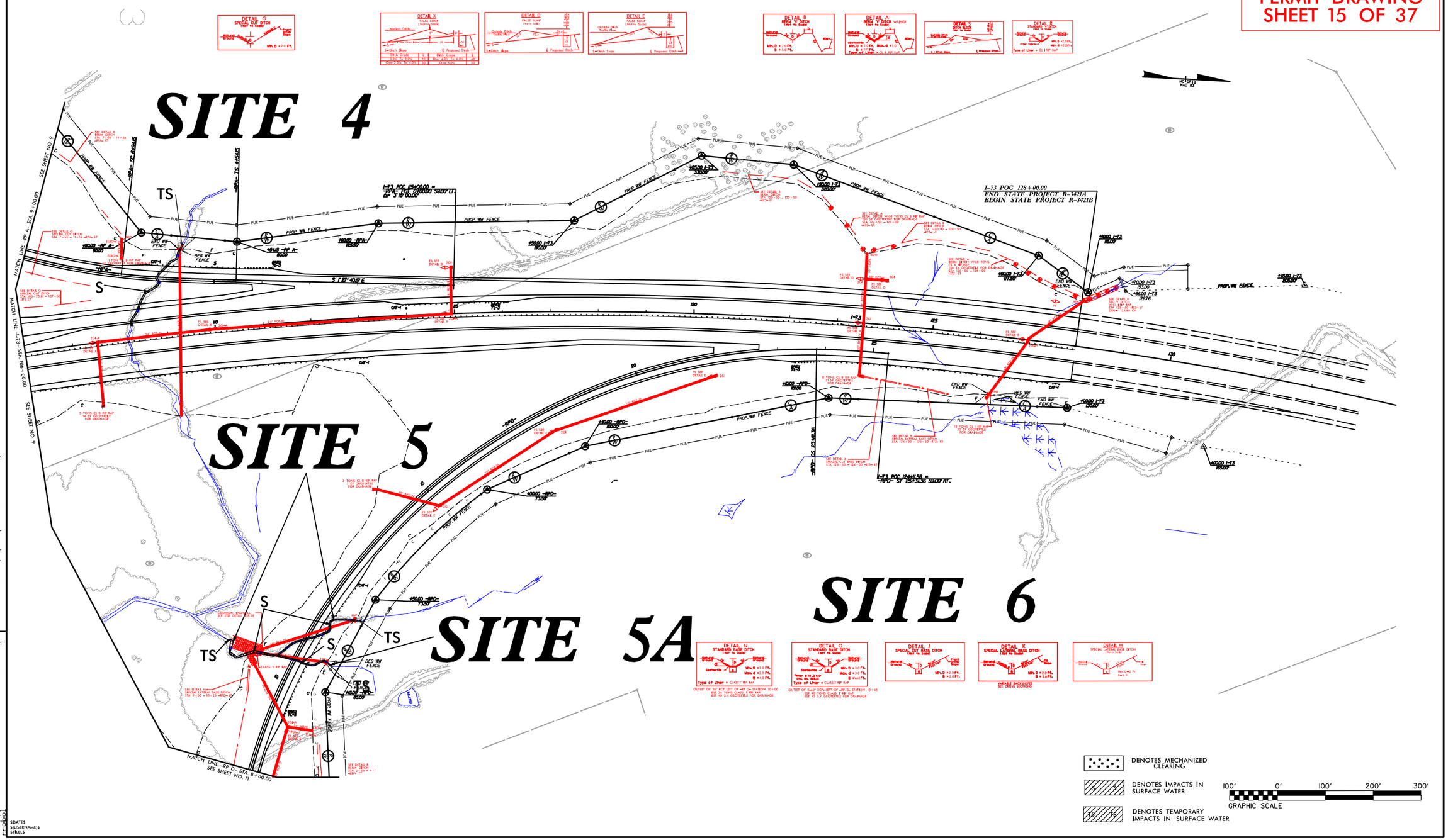
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 15 OF 37

Revised 7/25/2019

REVISIONS

8/17/99



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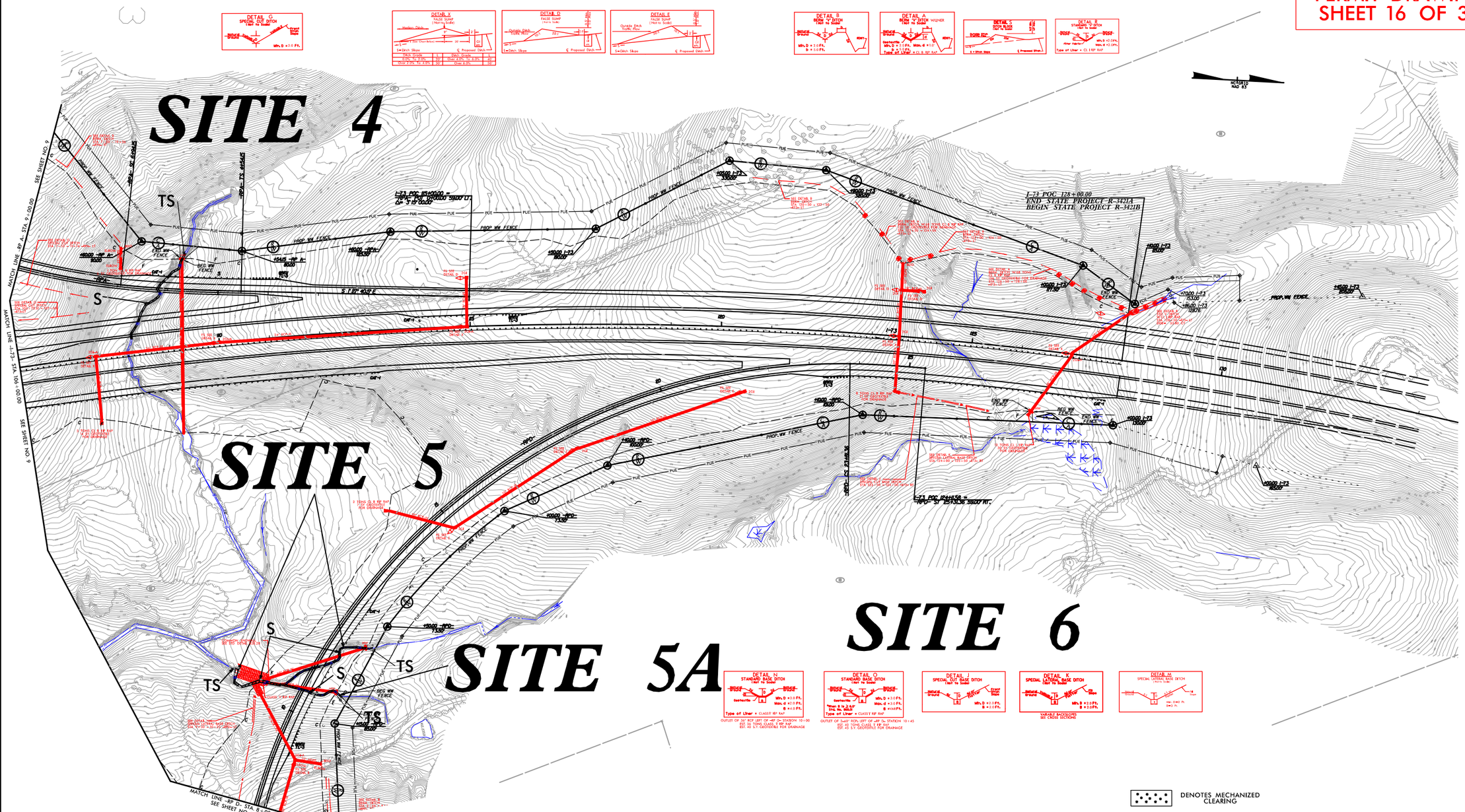
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 16 OF 37



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REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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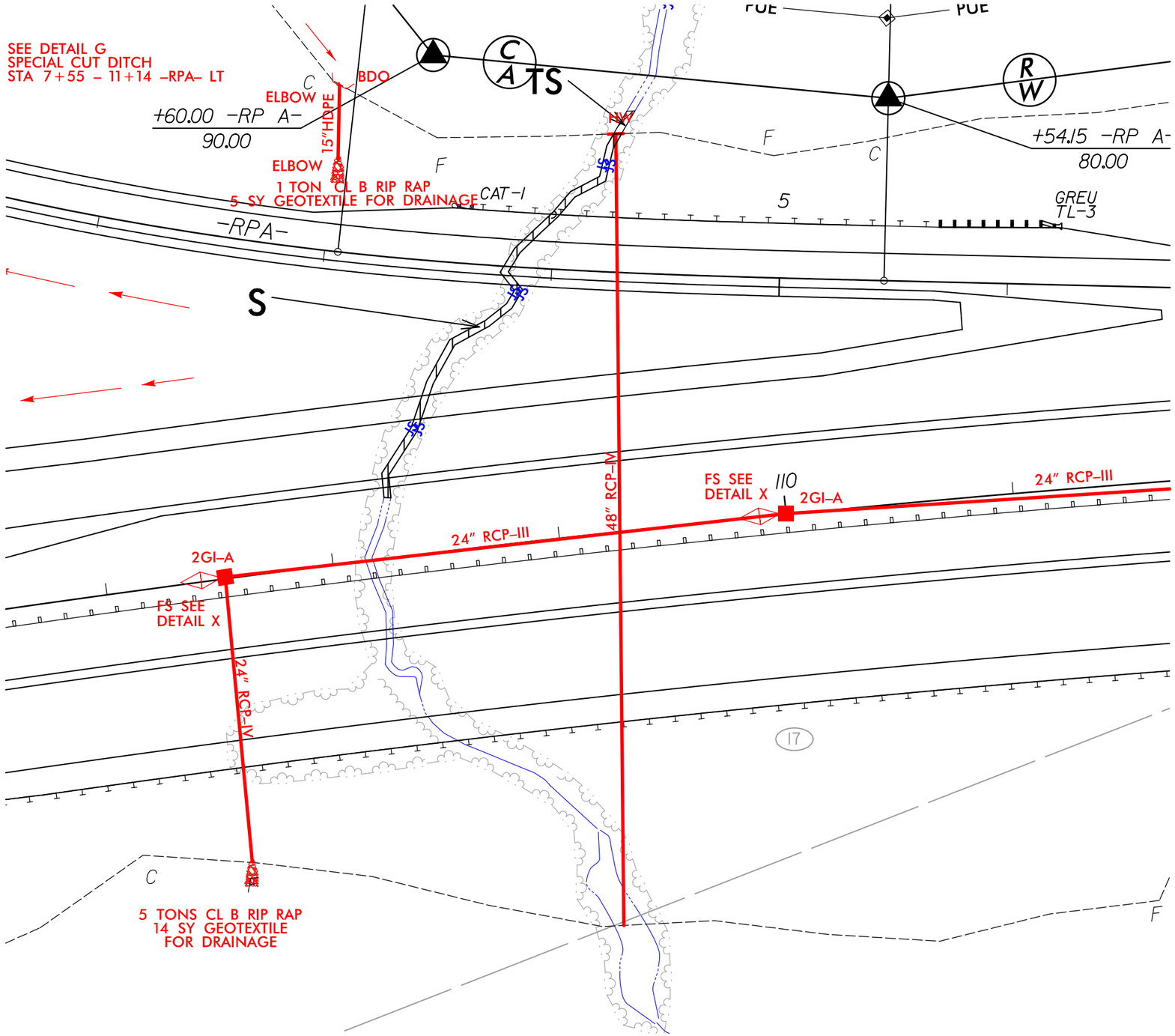
PERMIT DRAWING
SHEET 17 OF 37



NC GRID
NAD 83

SITE 4 ENLARGEMENT

50′ 0′ 50′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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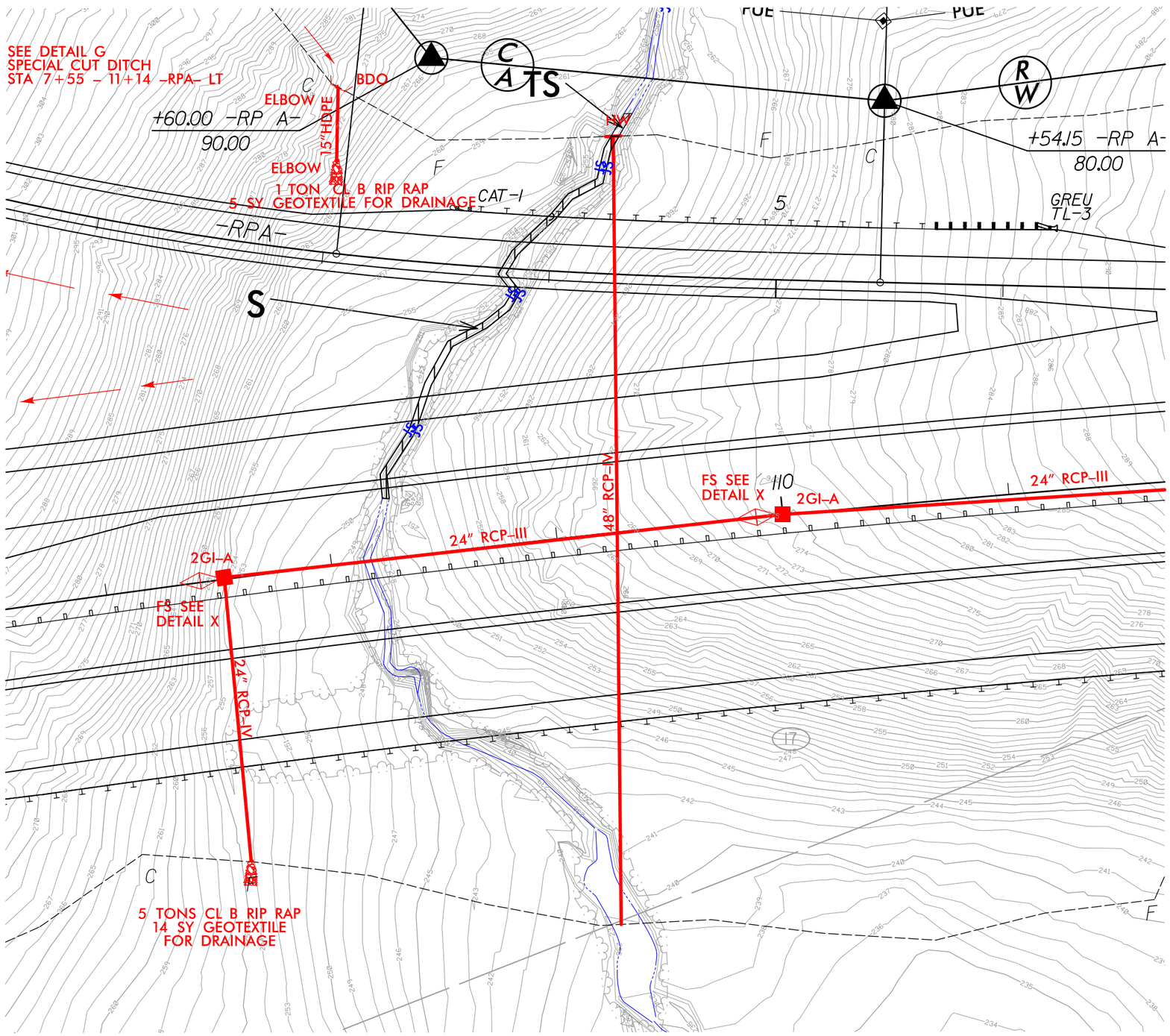
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 18 OF 37



SITE 4 ENLARGEMENT

NC GRID NAD 83

50′ 0′ 50′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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REVISIONS

8/17/99

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REVISIONS

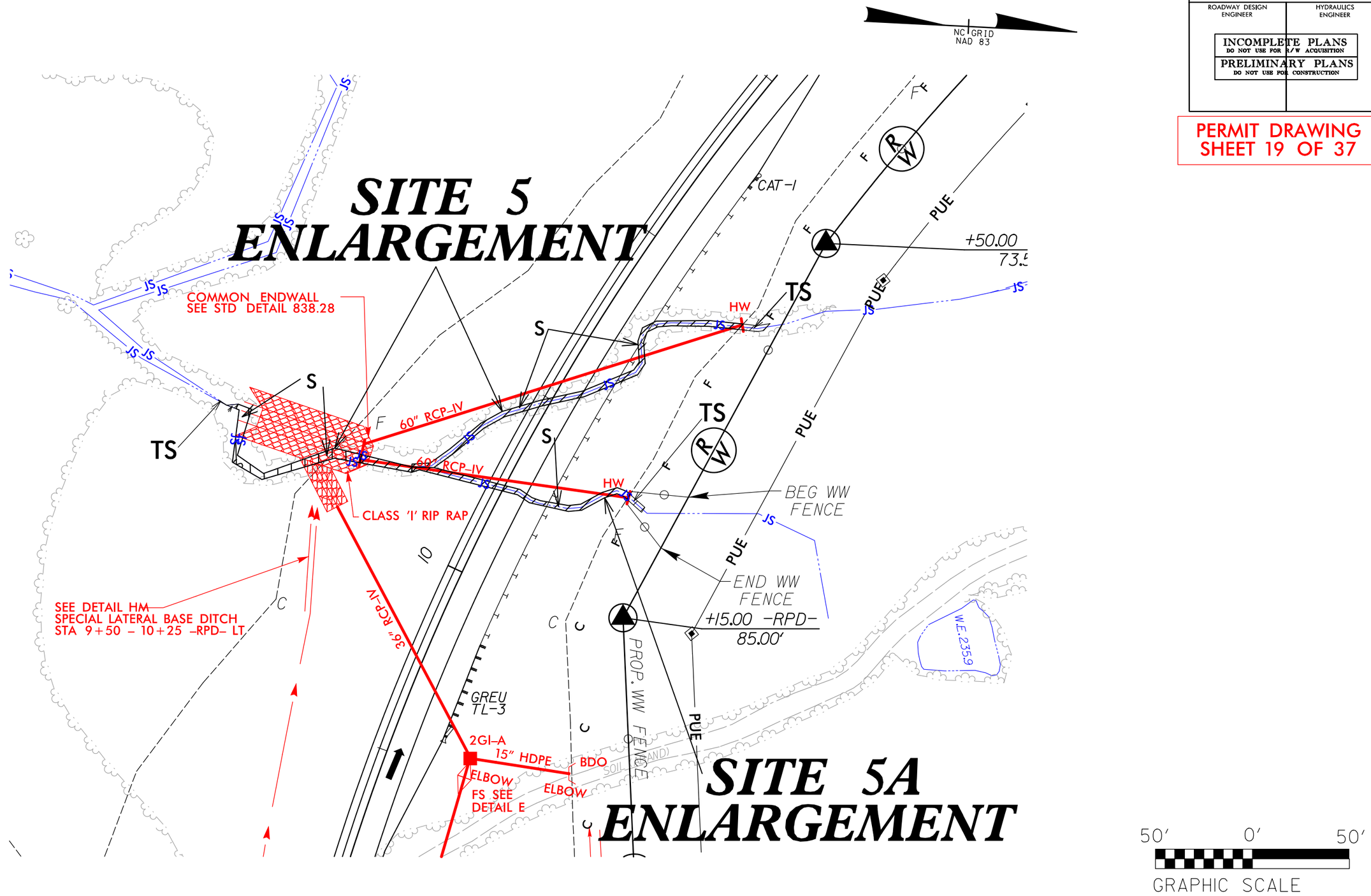
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 19 OF 37



S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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$(USERNAME)$
$FILEL$

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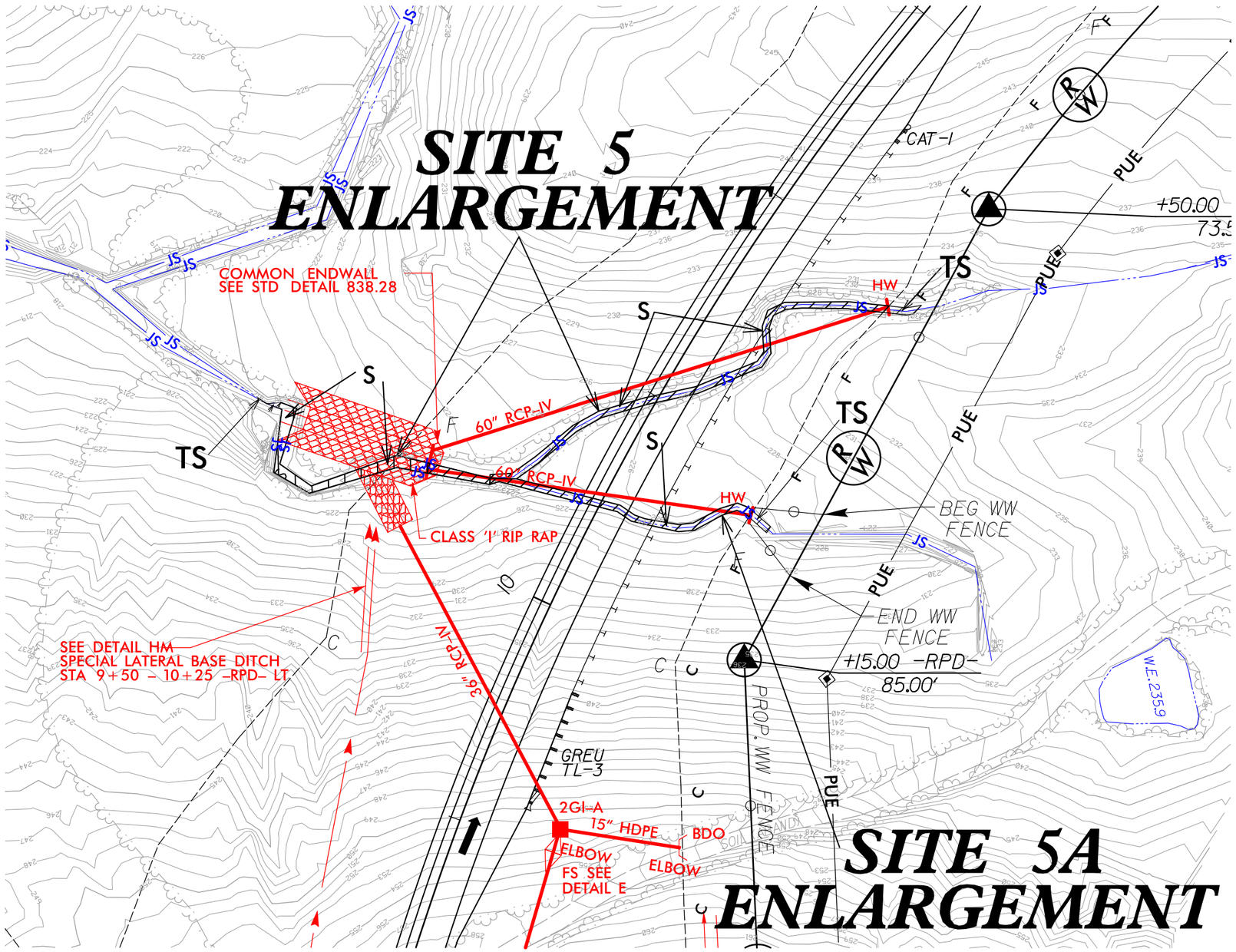
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 20 OF 37

NC GRID
NAD 83



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

$DATE$
$(USERNAME)$
$FILEL$

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REVISIONS

8/17/99

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REVISIONS

8/17/99

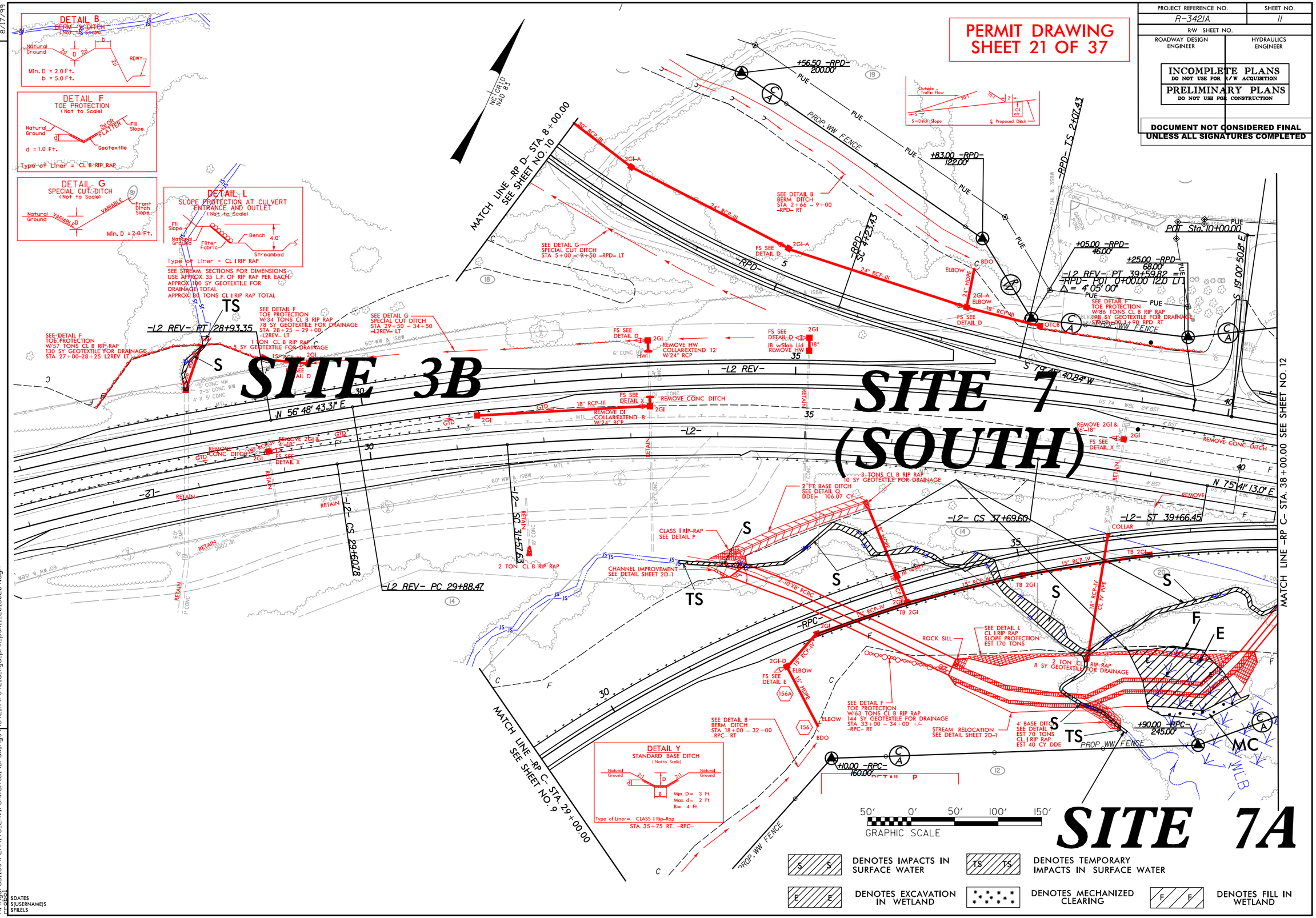
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 21 OF 37



S S	DENOTES IMPACTS IN SURFACE WATER	TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
E E	DENOTES EXCAVATION IN WETLAND		DENOTES MECHANIZED CLEARING
F F	DENOTES FILL IN WETLAND		

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$FILEL$

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REVISIONS

8/17/99

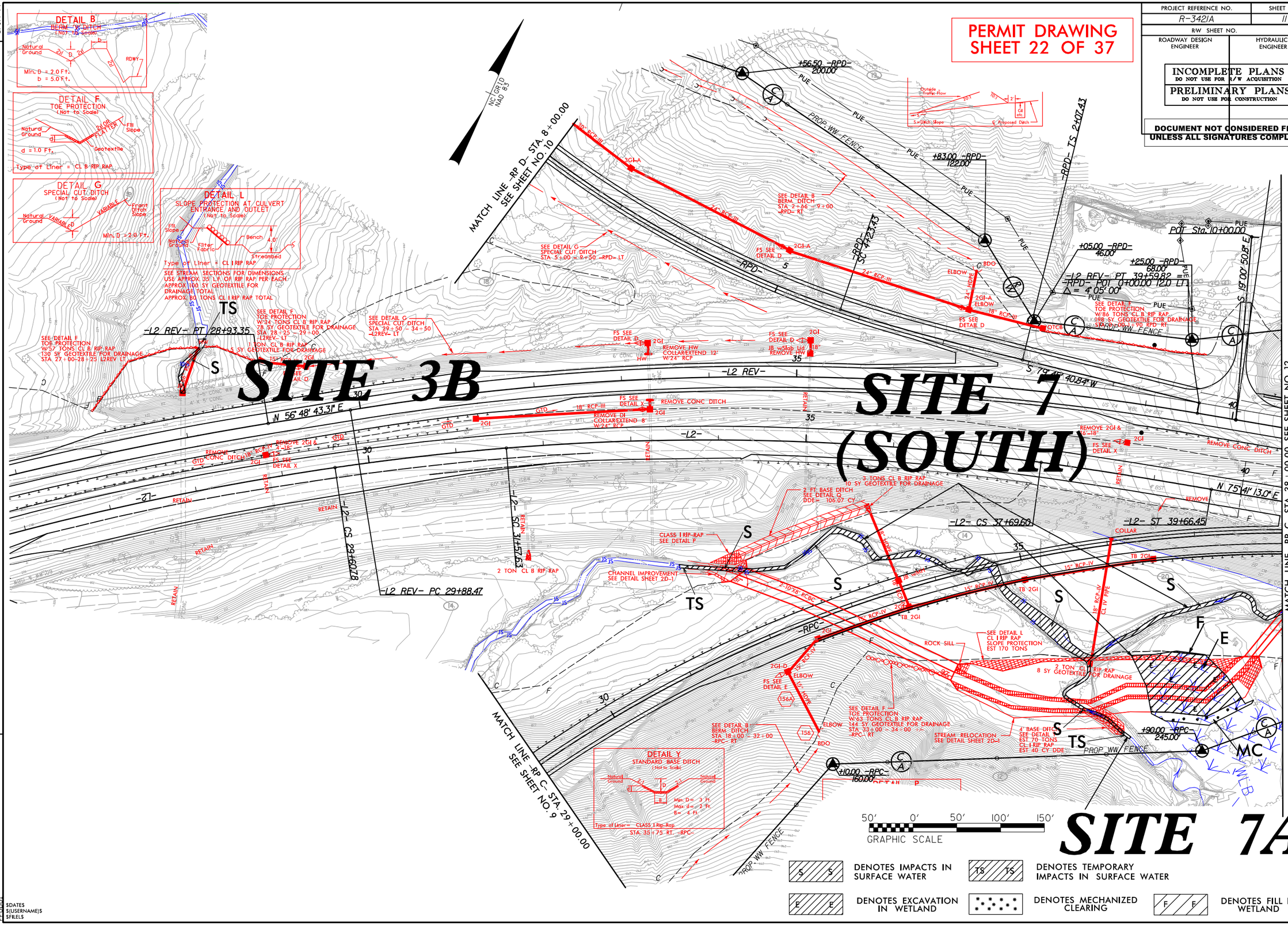
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 22 OF 37



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$FILEL$

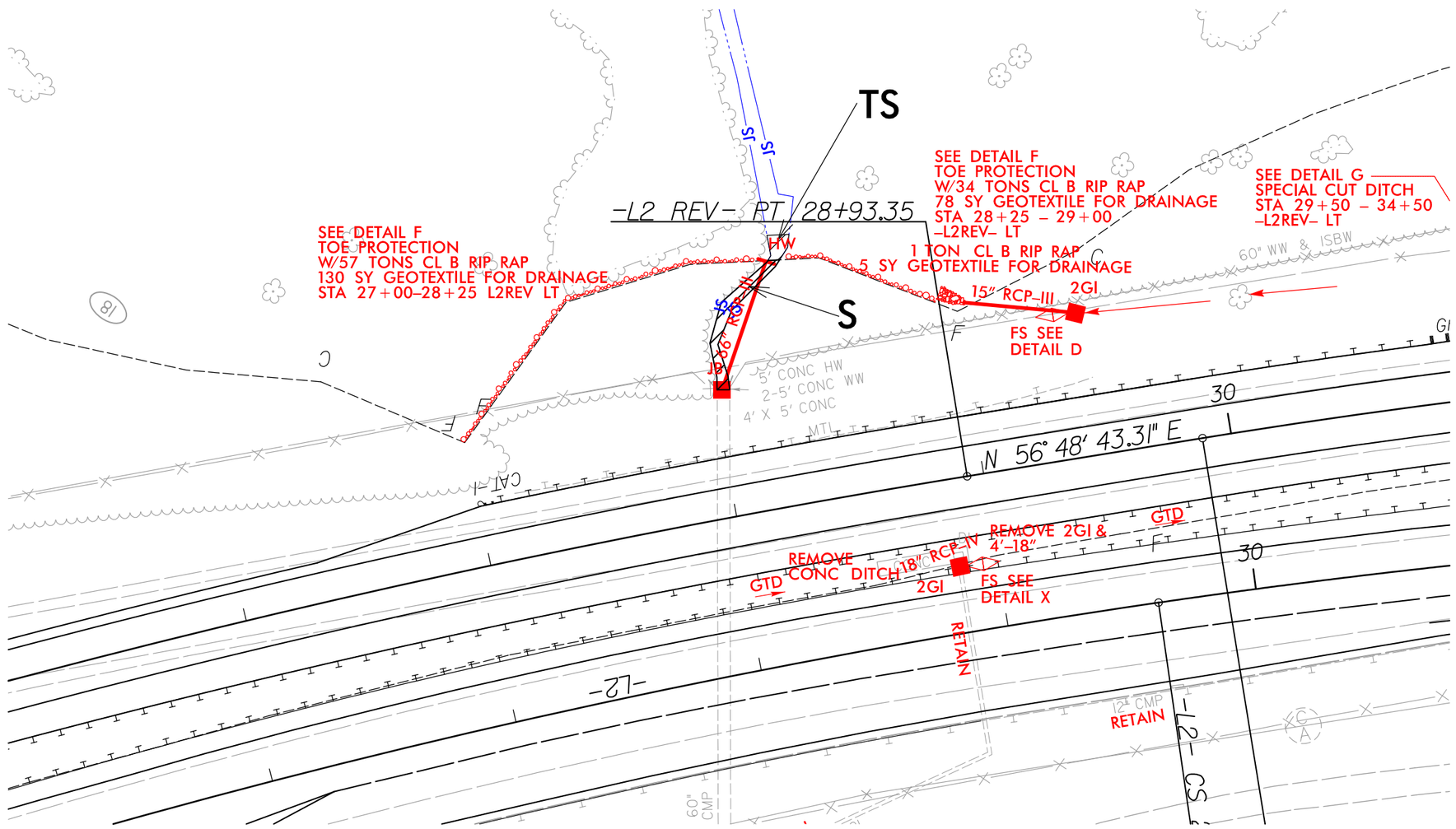
SITE 3B ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

PERMIT DRAWING
SHEET 23 OF 37

NC GRID NAD 83



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

$DATE$
$(USERNAME)$
$FILEL$

8/17/99

REVISIONS

Revised 7/25/2019

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PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

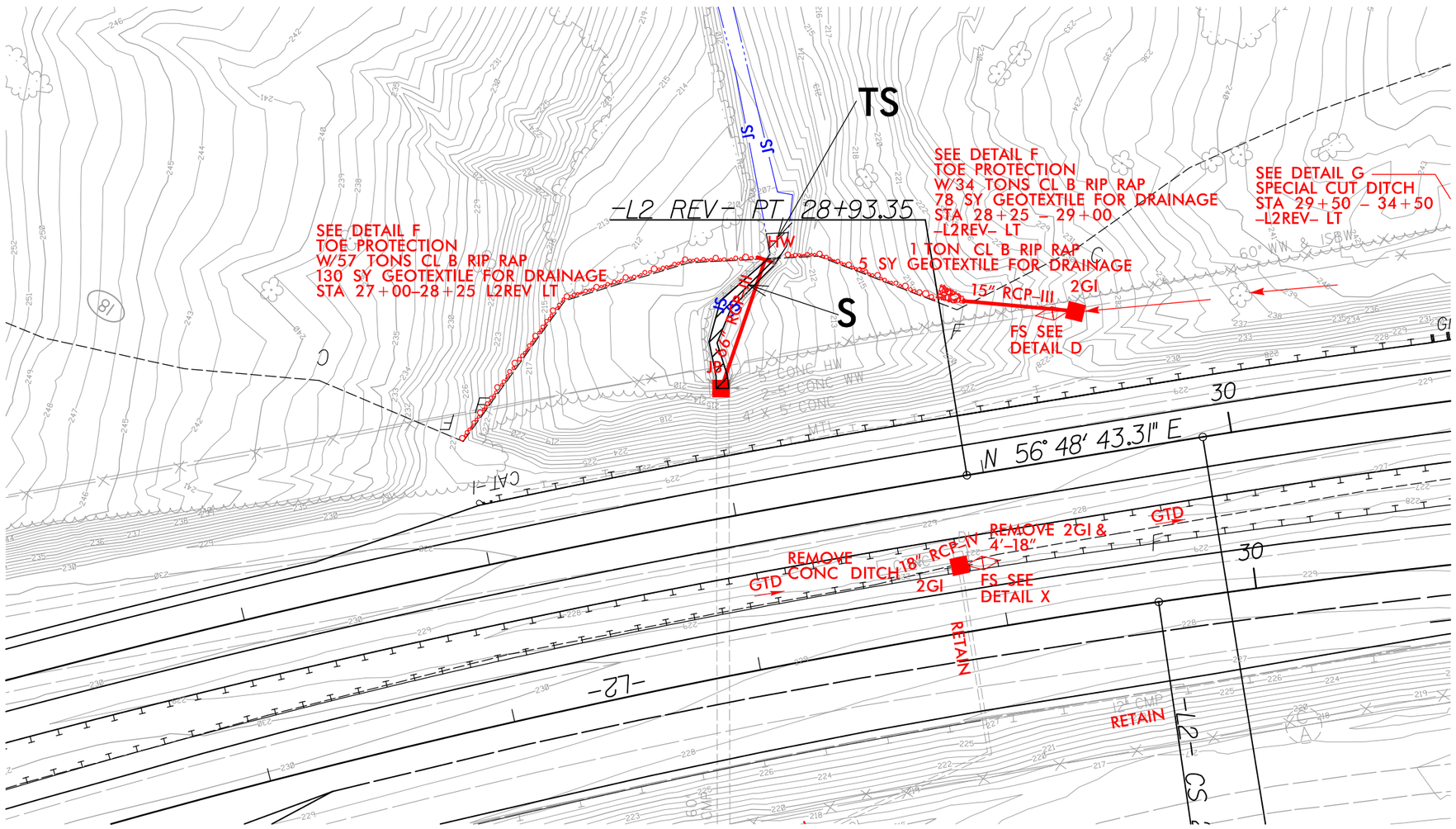
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 24 OF 37

SITE 3B ENLARGEMENT

NC GRID NAD 83



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised 7/25/2019

REVISIONS

8/17/99

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$FILEL$

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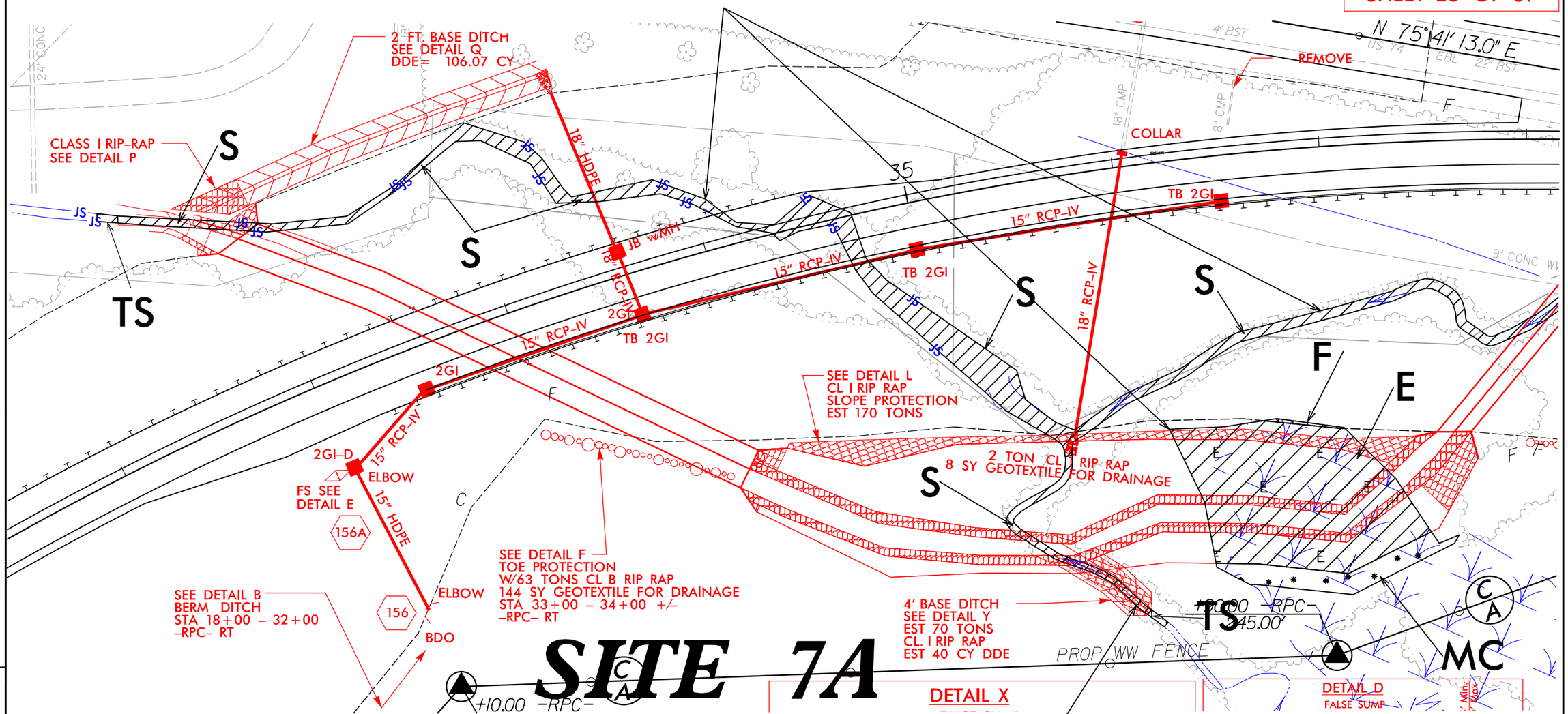
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 25 OF 37

SITE 7 (SOUTH) ENLARGEMENT



SITE 7A ENLARGEMENT

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

50' 0' 50'
GRAPHIC SCALE

$DATE$
$(USERNAME)$
$FILEL$

8/17/99

REVISIONS

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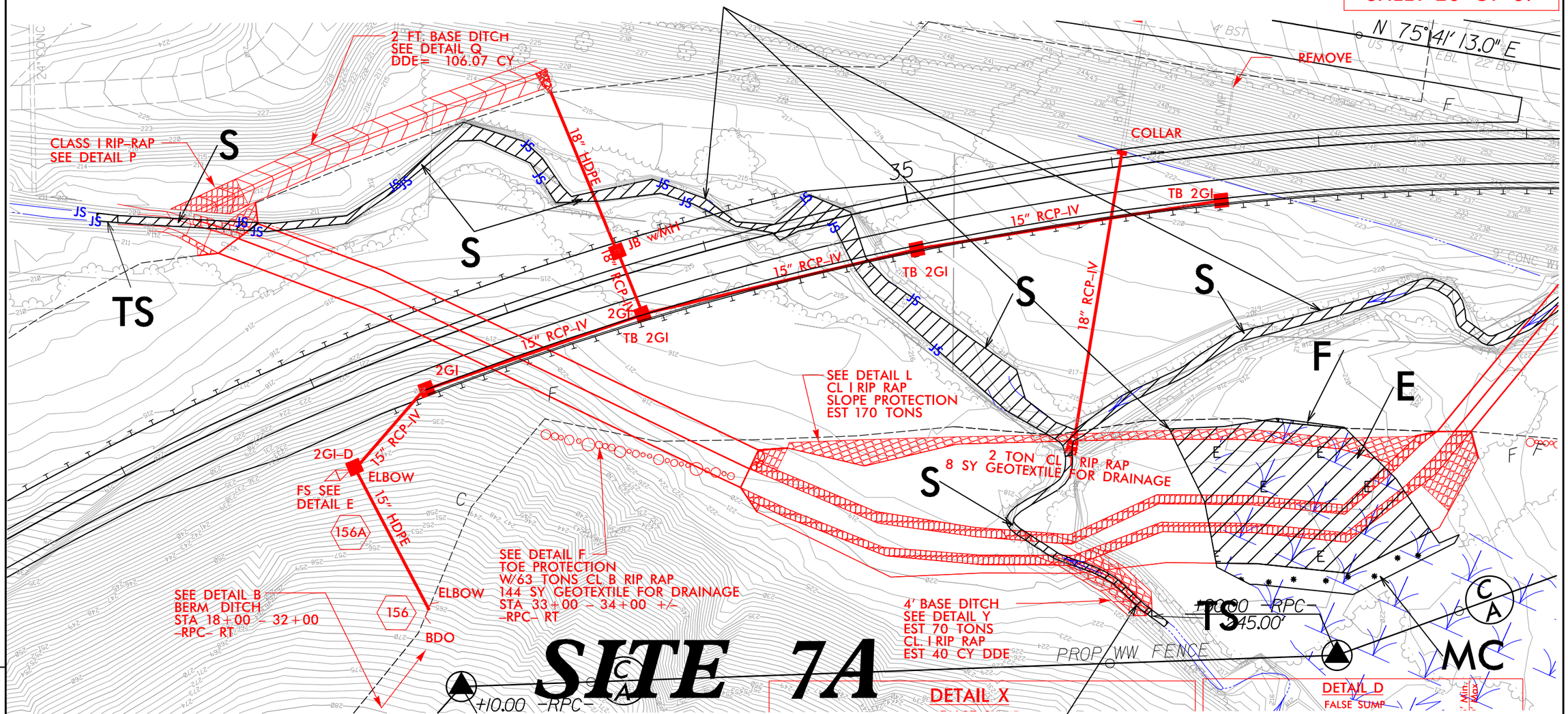
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 26 OF 37

SITE 7 (SOUTH) ENLARGEMENT



SITE 7A ENLARGEMENT

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

50' 0' 50'
GRAPHIC SCALE

$DATE$
$(USERNAME)$
$FILEL$

Revised 7/25/2019

REVISIONS

8/17/99

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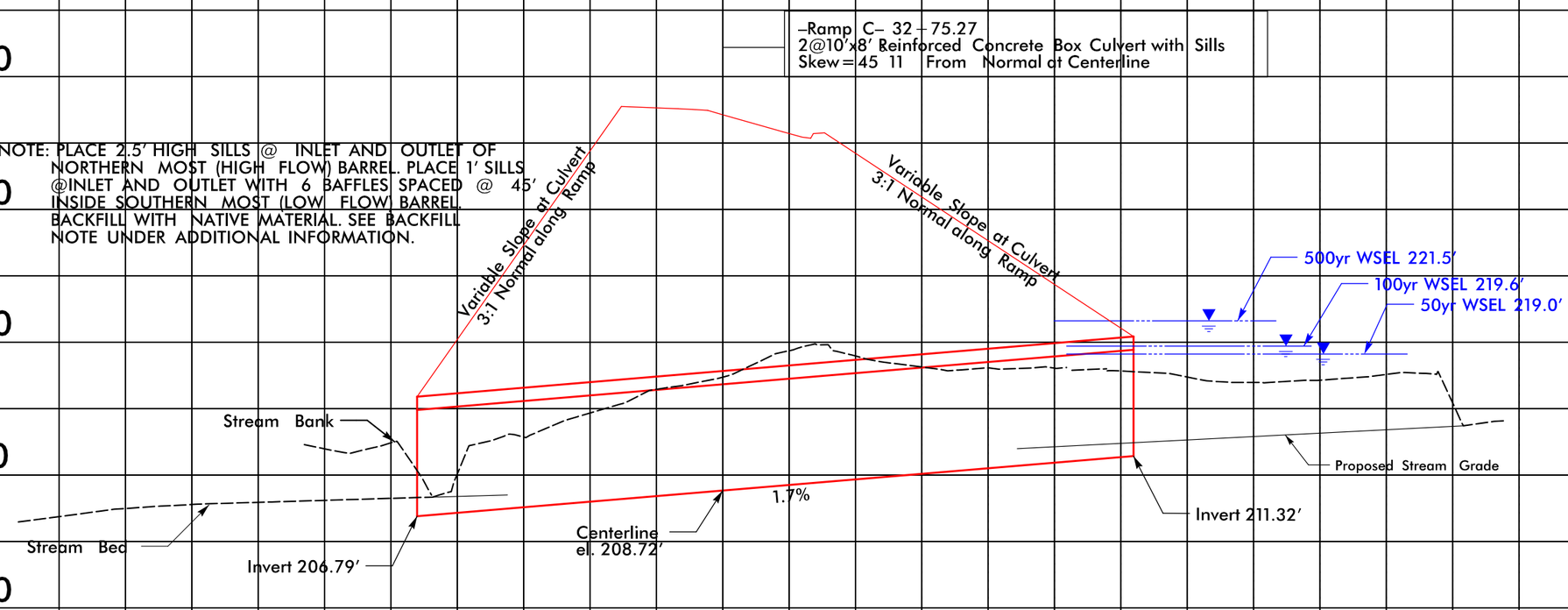
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 27 OF 37

SITE 7



Revised 7/25/2019

5/14/99

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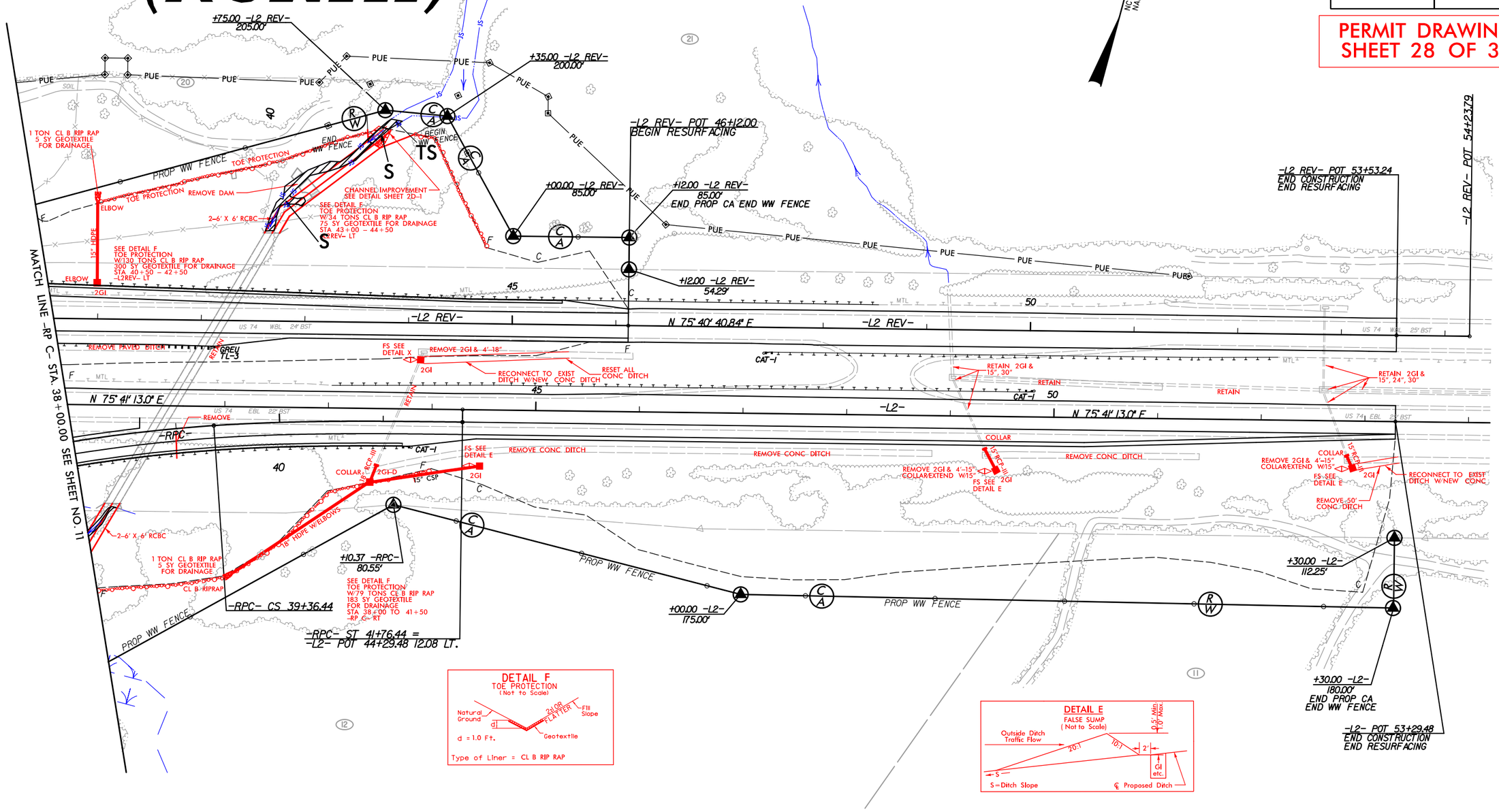
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 28 OF 37

SITE 7 (NORTH)



REVISIONS

8/17/99

Revised 7/25/2019

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$(USERNAME)$
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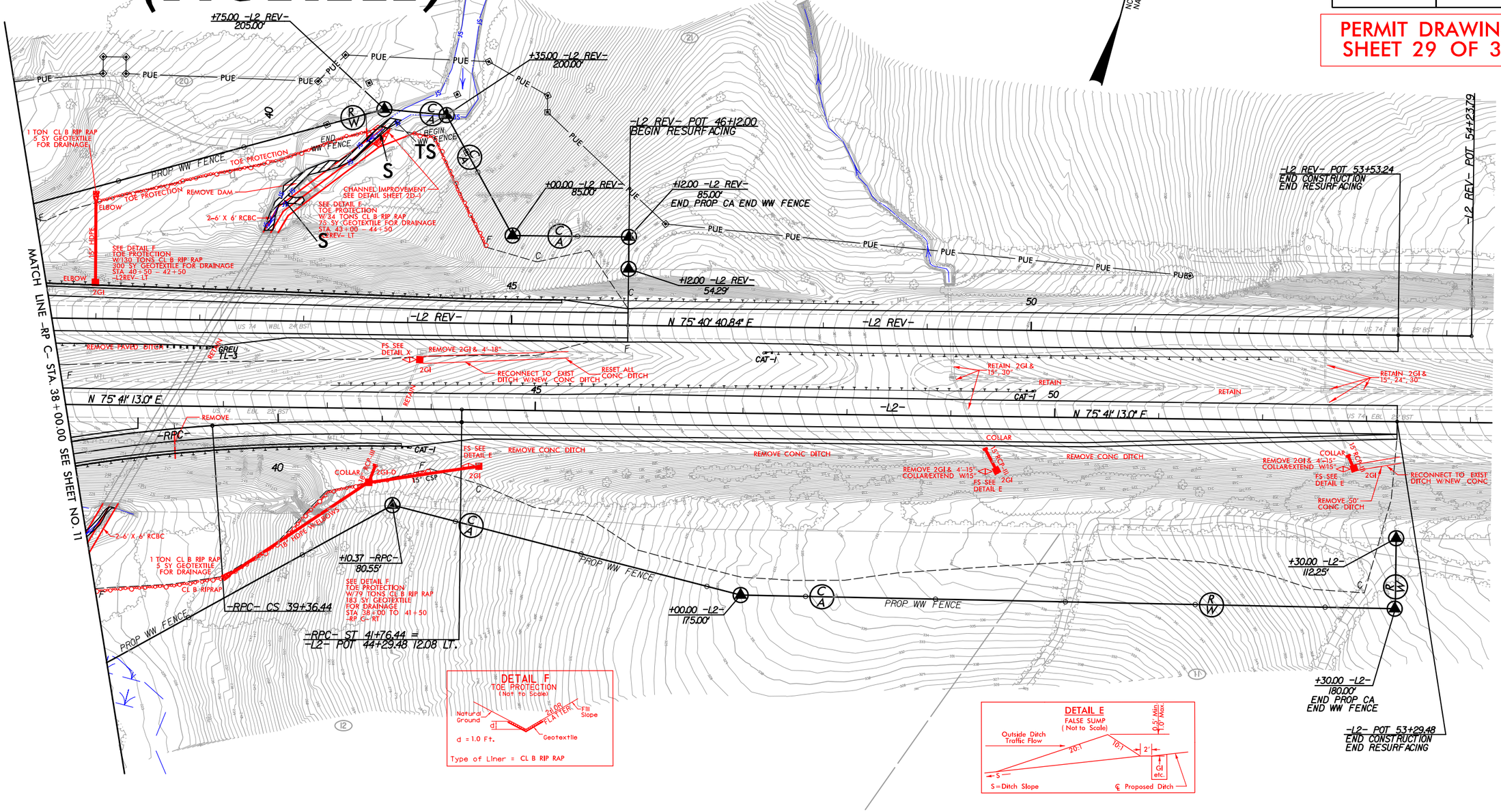
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 29 OF 37

SITE 7 (NORTH)



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

Revised 7/25/2019

REVISIONS

8/17/99

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$FILELS

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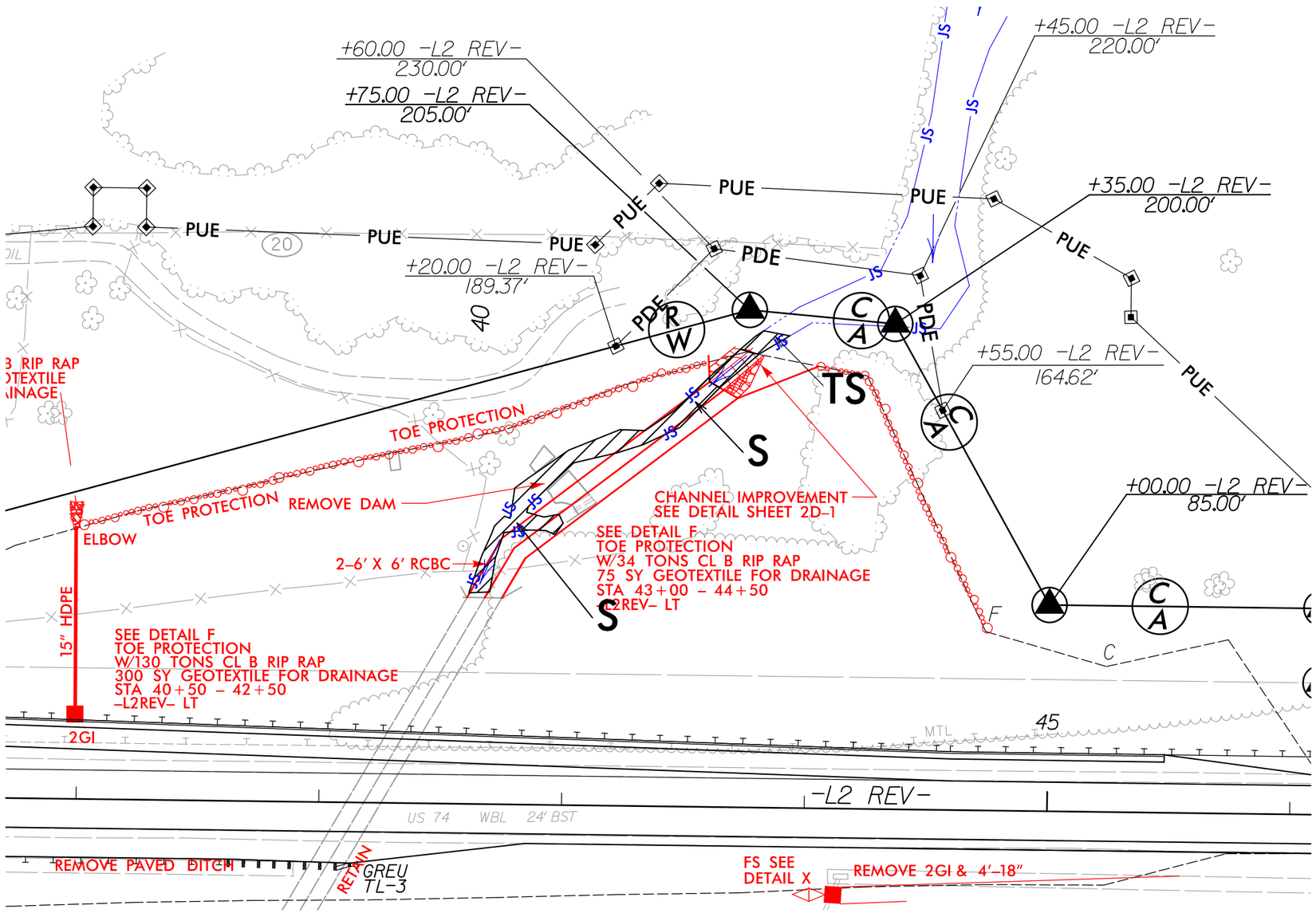
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 30 OF 37

SITE 7 (NORTH) ENLARGEMENT



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$FILEL$

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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REVISIONS

8/17/99

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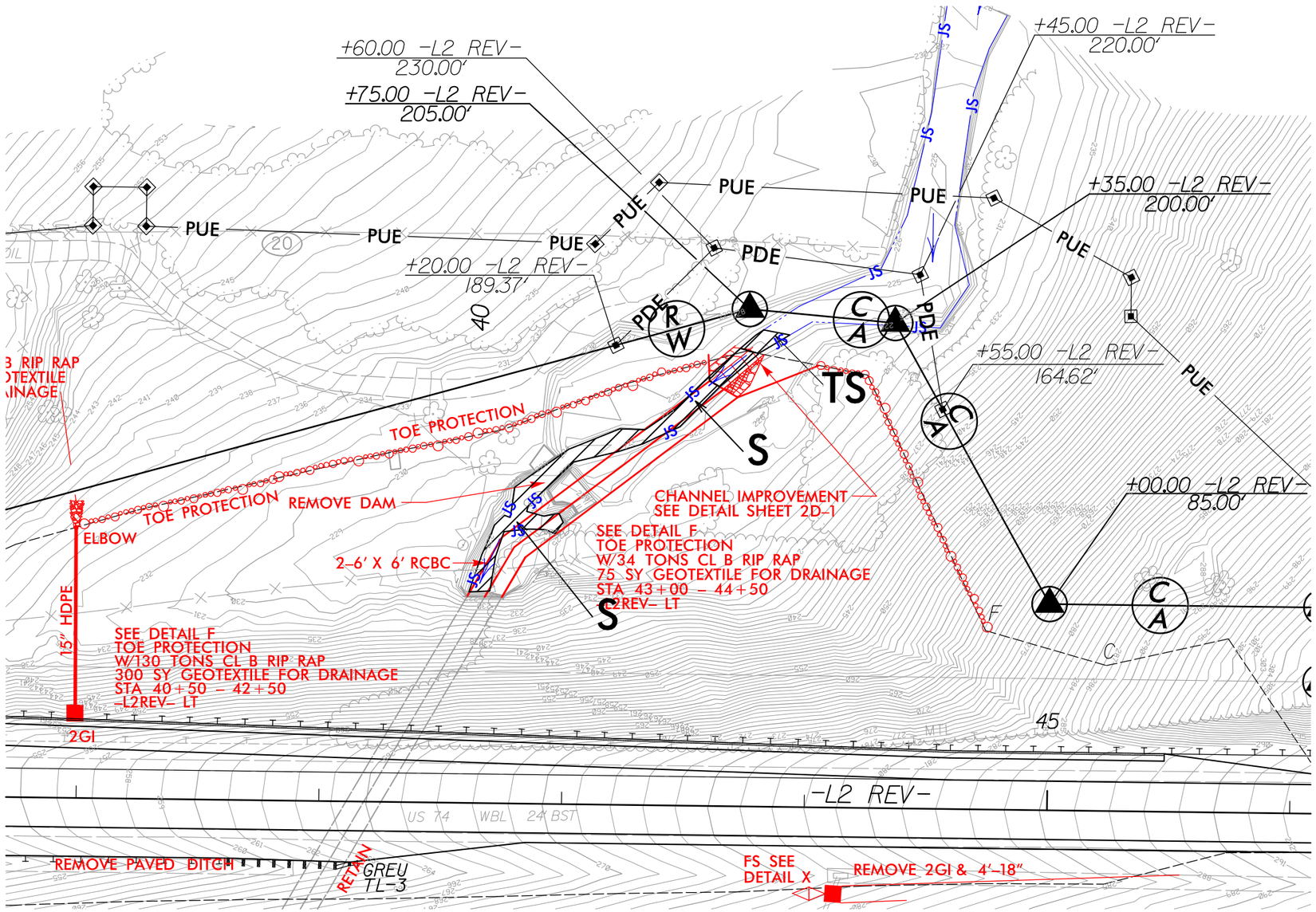
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 31 OF 37

SITE 7 (NORTH) ENLARGEMENT



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$FILEL$

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised 7/25/2019

REVISIONS

8/17/99

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5/14/99

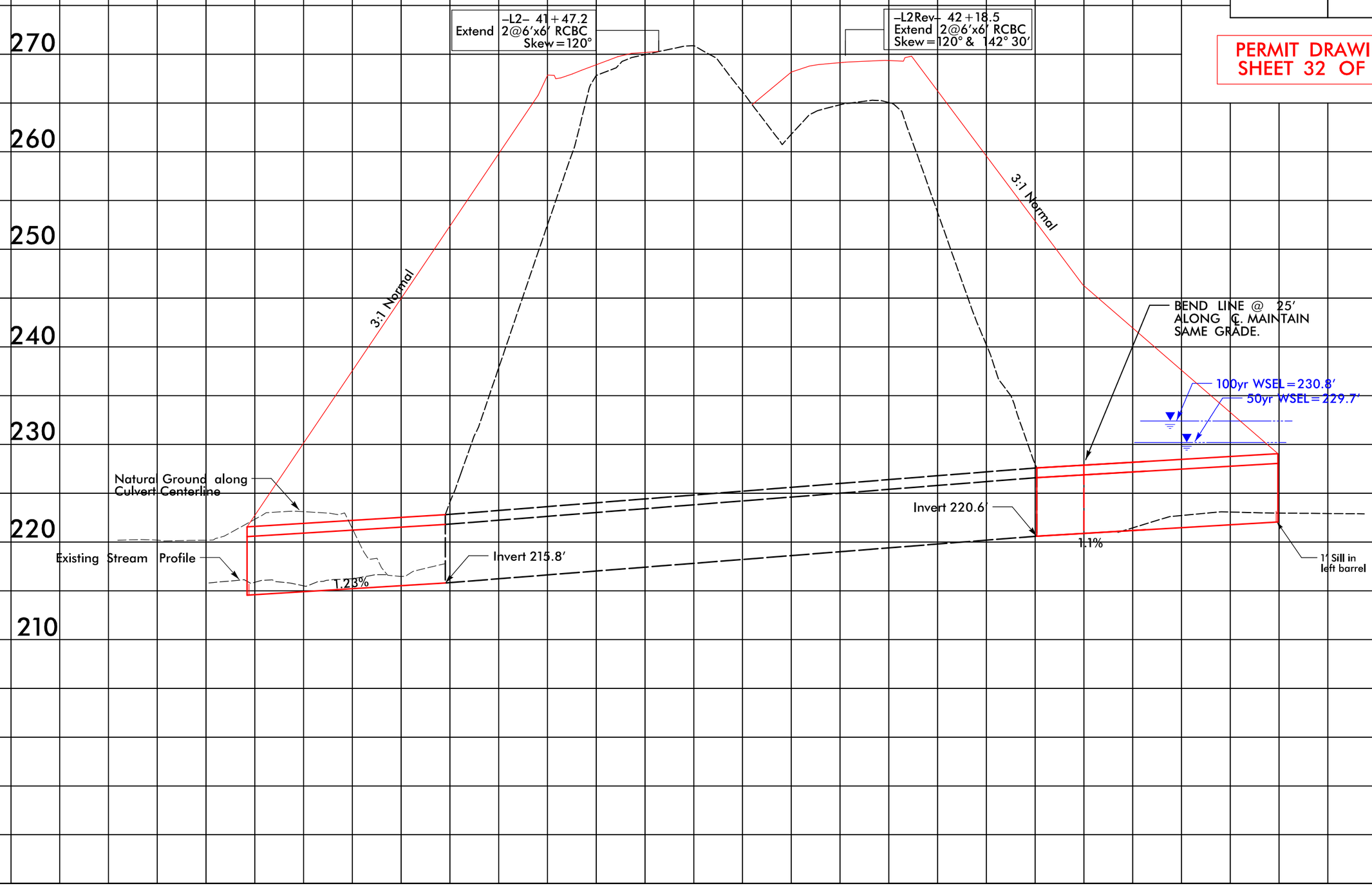
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 32 OF 37

SITE 7



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Revised 7/25/2019

REVISIONS

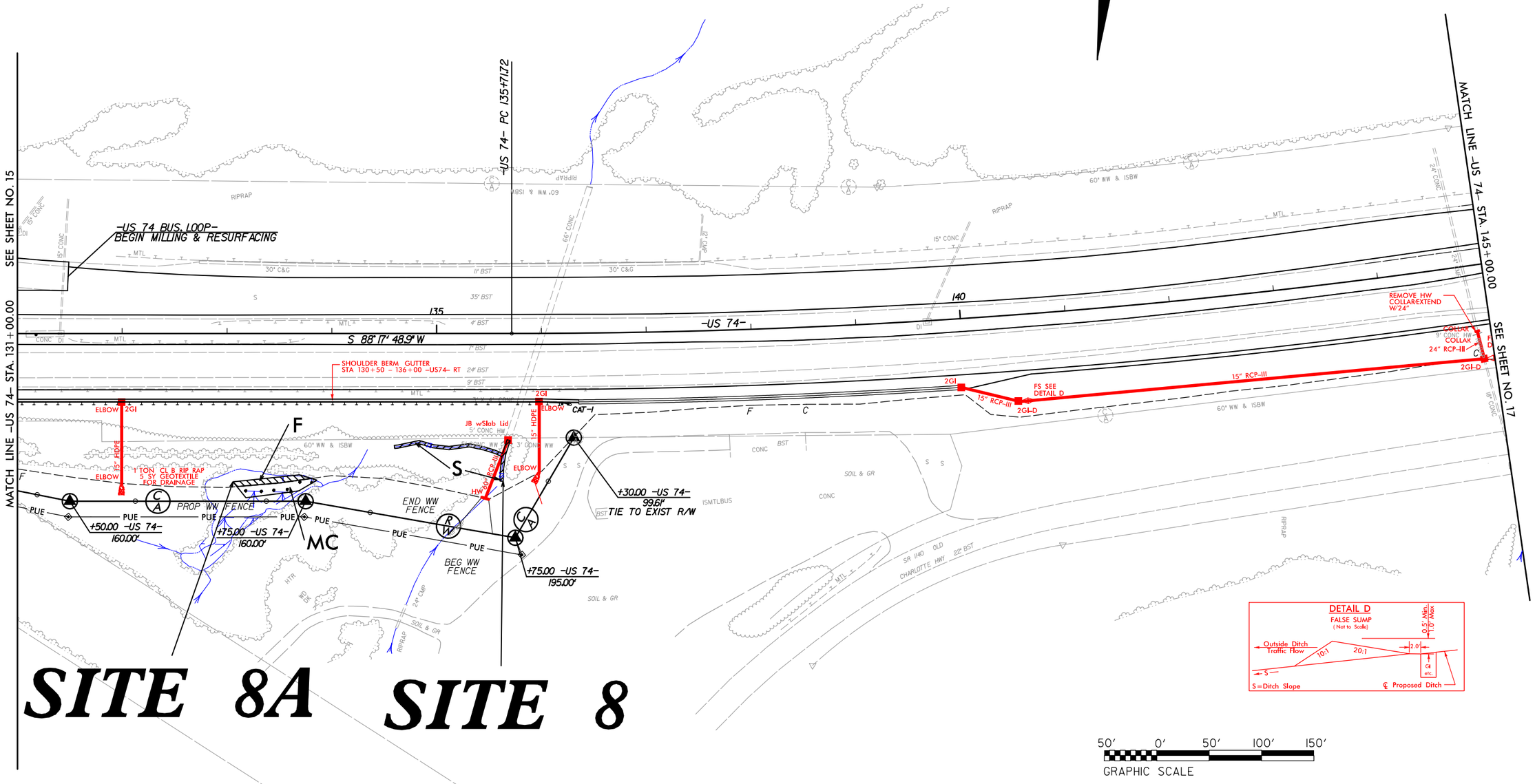
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 33 OF 37



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REVISIONS

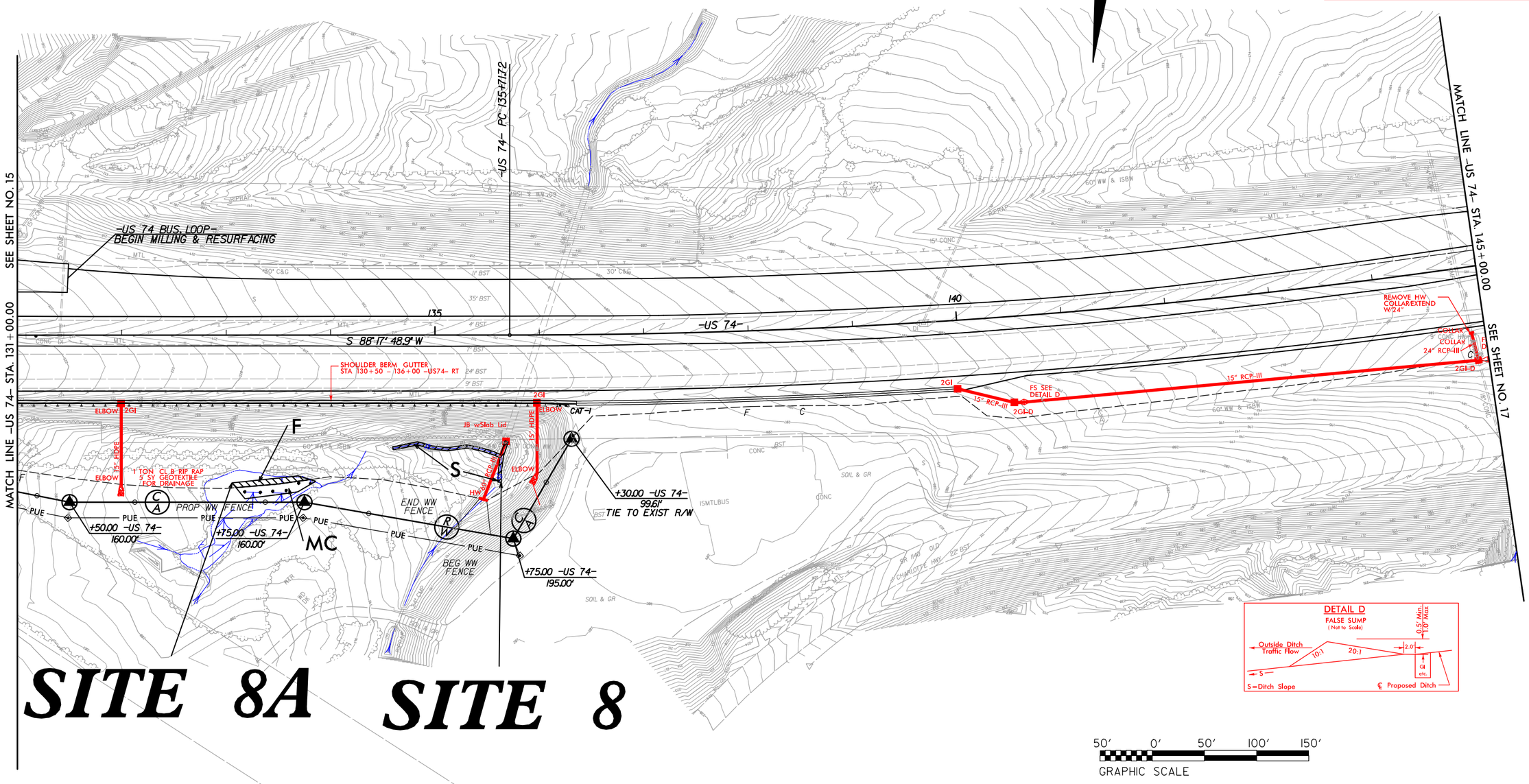
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 34 OF 37



DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

$DATES
$(USERNAME)$
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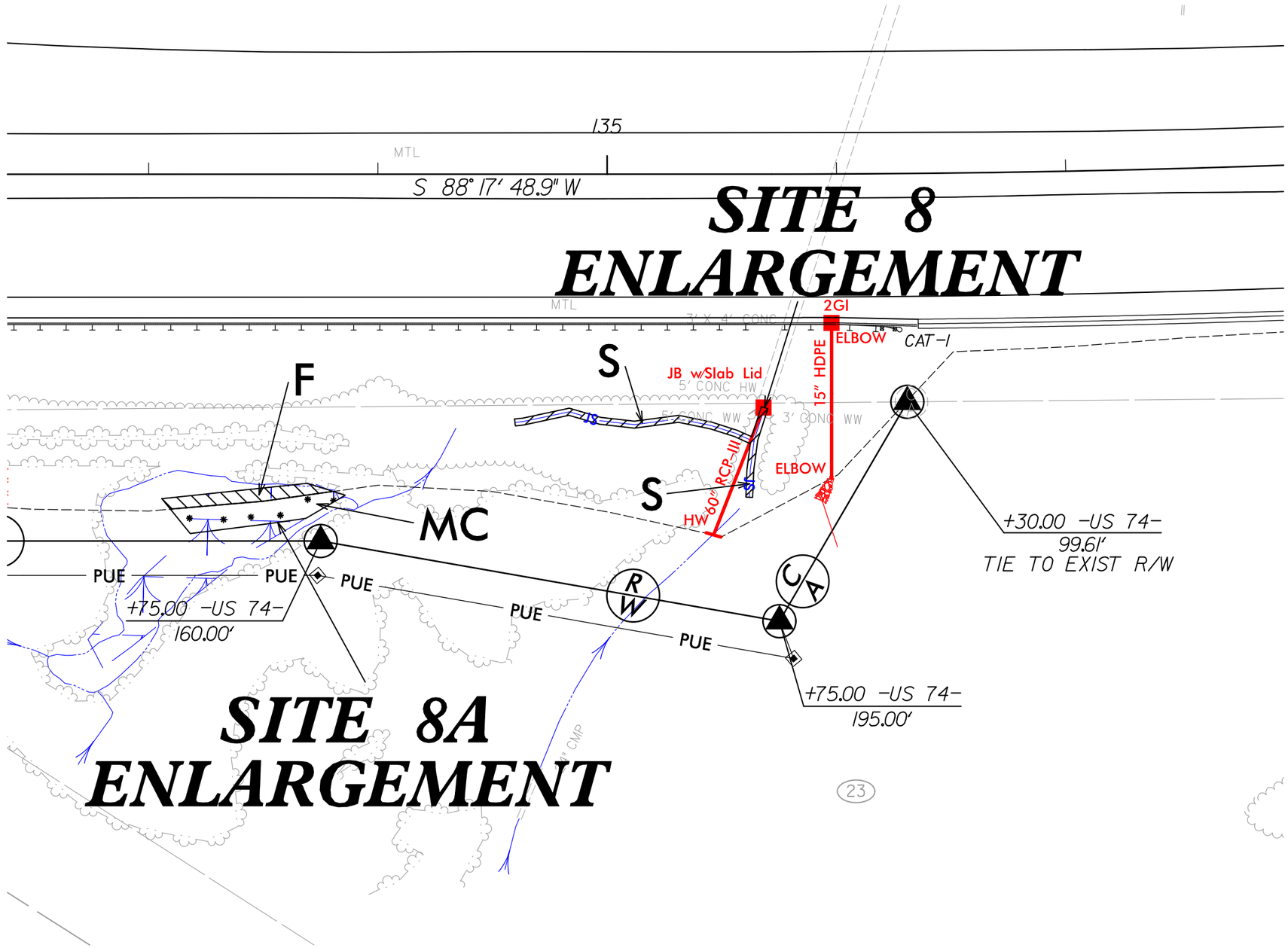
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 35 OF 37



NC GRID
NAD 83

50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

$DATE$
$(USERNAME)$
$FILEL$

8/17/99

REVISIONS

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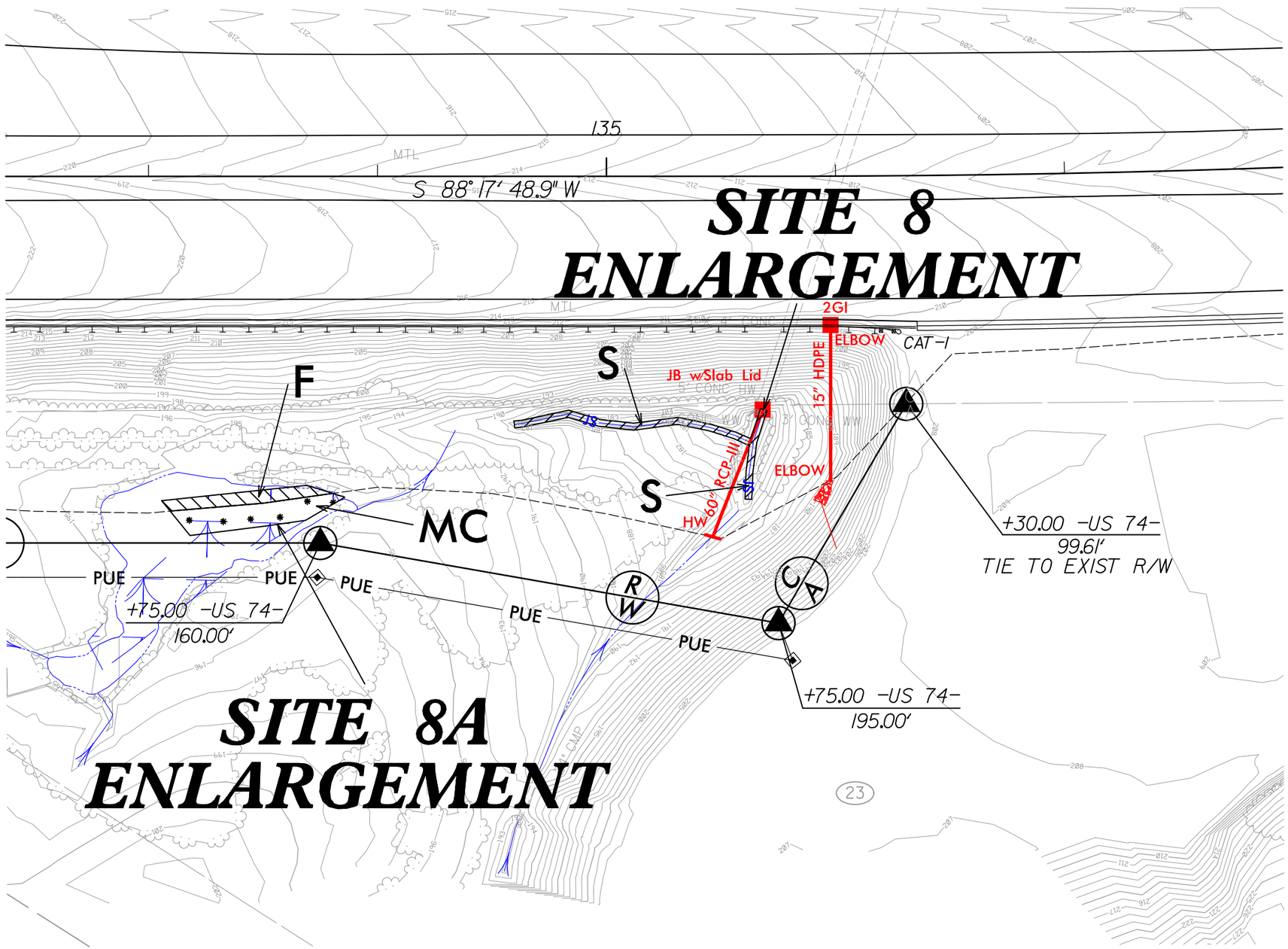
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 36 OF 37



S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

$DATE$
$(USERNAME)$
$FILEL$

8/17/99

REVISIONS

Revised 7/25/2019

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WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	24+53 / 26+88 -FLY-	PROP PIPE SYSTEM						0.03	< 0.01	411	10	
2	94+76 / 98+53 -I-73-	TRIPLE BARREL	0.48					0.25	0.02	1011	50	
		CULVERT EXTENSIONS										
3	12+62 / 14+03 -LPC-	PROP 3-BARREL CULVERTS						0.09	0.02	475	106	
3A	12+90 / 13+44 -LPC-RT	60" RCP EXTENSION						< 0.01		81		
		PROP 3-BARREL CULVERTS										
3B	28+02 / 28+38 -L2REV-	PROP 66" RCP						< 0.01	< 0.01	61	10	
4	108+56 / 109+94 -I-73-	PROP 48" RCP						0.01	< 0.01	205	12	
5	10+00 / 11+96 -RPD-	PROP 60" RCP						0.02	< 0.01	327	25	
5A	10+34 / 10+71 -RPD-	PROP 60" RCP						< 0.01	< 0.01	118	10	
6	126+44 / 126+91 -I-73-	CLEARING FOR ROADWAY FILL				< 0.01						
7A	35+17 / 35+87 -RPC-	PROP CULVERTS						< 0.01	< 0.01	127	10	
7 SOUTH	31+62 / 38+32 -RPC-	PROP CULVERTS, 18"RCP,			0.15	0.02		0.11	< 0.01	828	10	
		STREAM REALIGN										
7 NORTH	42+60 / 43+90	CULVERTS EXTENSIONS,						0.03	< 0.01	175	12	
	-L2REV-	PROP CULVERT &										
8	134+60 / 135+70 -US 74-	60" RCP EXTENSION						0.01		147		
8A	133+06 / 133+86 -US 74-	ROADWAY FILL	< 0.01			0.02						
TOTALS*:			0.48		0.15	0.05		0.58	0.05	3966	255	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5/28/2019
RICHMOND COUNTY
R-3421A
WBS 34542.1.1

Revised 2013 10 24

Revised 7/30/19

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element:	34542.1.FR3	**TIP No.:**	R-3421B	**County(ies):**	Richmond	**Page**	1	**of**	3

General Project Information

WBS Element:	34542.1.FR3	**TIP Number:**	R-3421B	**Project Type:**	New Location	**Date:**	7/30/2019
NCDOT Contact:	Mr. Galen Cail, PE	**Contractor / Designer:**					
Address:	1000 Birch Ridge Drive Raleigh, NC	**Address:**					
Phone:	919-707-6711	**Phone:**					
Email:	gcail@ncdot.gov	**Email:**					
City/Town:		**County(ies):**	Richmond				
River Basin(s):	Yadkin-Pee Dee	**CAMA County?**	No				
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	4.30	**Surrounding Land Use:**	Agricultural, Rural, Residential
	Proposed Project		**Existing Site**
Project Built-Upon Area (ac.)	52.1 ac.		N/A ac.
Typical Cross Section Description:	46' Grass median, 2@12' paved inside shoulers, 2@12' lanes each direction, 12' paved outside shoulder, grass roadway ditches.		N/A
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 19,980	Year: 2036	Existing: N/A Year: N/A
General Project Narrative: (Description of Minimization of Water Quality Impacts)	R-3421B is an interchange and bypass project (US220 Bypass, I-73/I-74) which will include a 46' grass median with 2@12' travel lanes in each direction. The project also includes grass lined roadway ditches. The proposed project includes 1 major drainage structure (3 barrel RCBC), which will convey an unnamed tributary to Cartledge Creek. The culvert will include sills and utilize Low Flow Benches to maintain low flow in two barrels. Rip Rapped Energy Dissipators will be utilized at the outlets of a 30" pipe and a 36" pipe to prevent erosion at the outlets.		

Waterbody Information

Surface Water Body (1):	Un-named Trib to Cartledge Creek	**NCDWR Stream Index No.:**	UT to 13 - 35		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C		
		Supplemental Classification:			
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

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(Version 2.08; Released April 2018)

WBS Element: 34542.1.FR3 **TIP No.:** R-3421B **County(ies):** Richmond

Revised 7/30/19

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?

Additional Comments

The design for R-3421B includes typical grassed cut ditches within the roadway footprint. These ditches are collecting runoff from the impervious roadway surfaces and transporting to inlets and pipes. The geometry of the typical cut ditches contain side slopes ranging from 2:1 to 8:1 and mild longitudinal slopes. Although no grassed swale treatment credit is claimed for this project or required many reaches of the grassed ditches/swales will meet the criteria for grassed swale treatment.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34542.1.FR3 **TIP No.:** R-3421B **County(ies):** Richmond

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
17	-L- 322+50 RT 34.9854605, -79.7994557	(1)Un-named Trib to	Riprap Energy Dissipator Basin	Class I	9.7	Pipe	30" RCP	27.5	1.1	N/A
19	-L- 347+26 LT 34.9897885, -79.7930204	(1)Un-named Trib to	Riprap Energy Dissipator Basin	Class I	13.2	Pipe	36" RCP	32.4	1.2	N/A

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

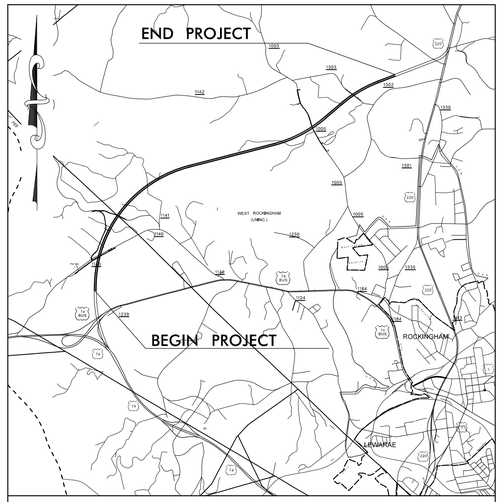
Revised 7/30/19

09/08/09

TIP PROJECT: R-3421B

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

RICHMOND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421B	1	

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
34542.1.FR3	NHF-0220(76)	P.E.
34542.2.3	NHF-0220(43)	R /W & UTIL.

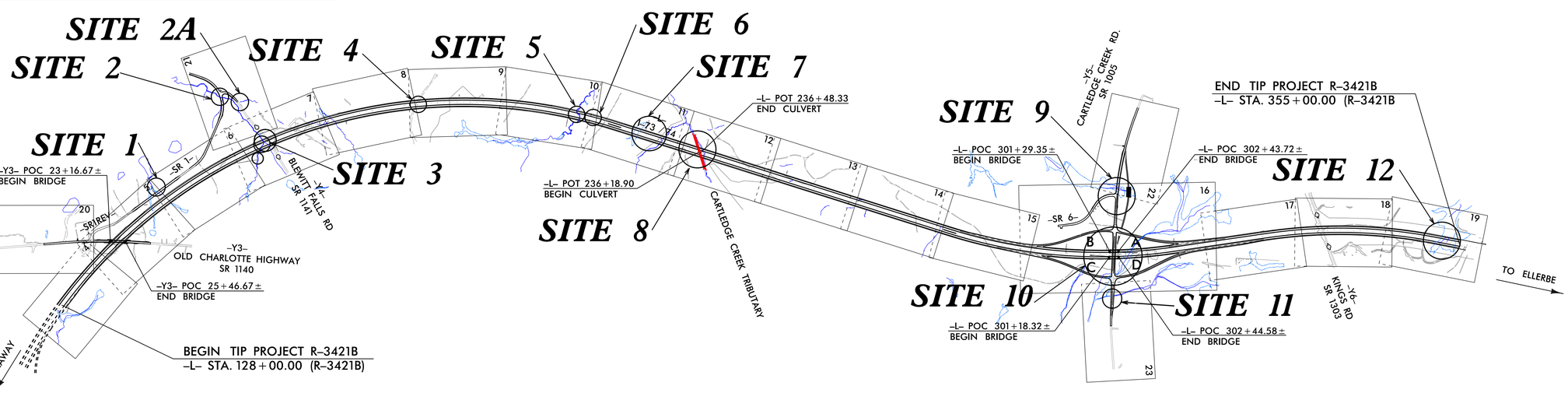
PERMIT DRAWING
SHEET 1 OF 71

LOCATION: I-73/74 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, CULVERTS, STRUCTURES, MSE RETAINING WALLS, AND SIGNING

WETLAND AND SURFACE WATER IMPACTS PERMIT

NC GRID NAD 83/95



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

MULKEY
ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

GRAPHIC SCALES

25′ 0 50′
PLANS

25′ 0 50′
PROFILE (HORIZONTAL)

5′ 0 10′
PROFILE (VERTICAL)

DESIGN DATA

ADT 2016 = 10,400
ADT 2036 = 19,980

K = 10%
D = 60%
T = 26% *
V = 70 mph

* (Duals = 9% + TTST = 17%)

Functional Class.: Interstate statewide ties

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421B = 4.270 MILES

LENGTH STRUCTURES TIP PROJECT R-3421B = 0.029 MILES

TOTAL LENGTH TIP PROJECT R-3421B = 4.299 MILES

-L- LINE USED FOR PROJECT LENGTH

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

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 23, 2009

LETTING DATE:
FEB 16, 2016
(PRODUCTION)

JOHNNY BANKS
MULKEY E & C
PROJECT MANAGER

STEVE BROWDE, PE
MULKEY E & C
PROJECT DESIGN ENGINEER

NCDOT CONTACT: REKHA PATEL, PE
ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

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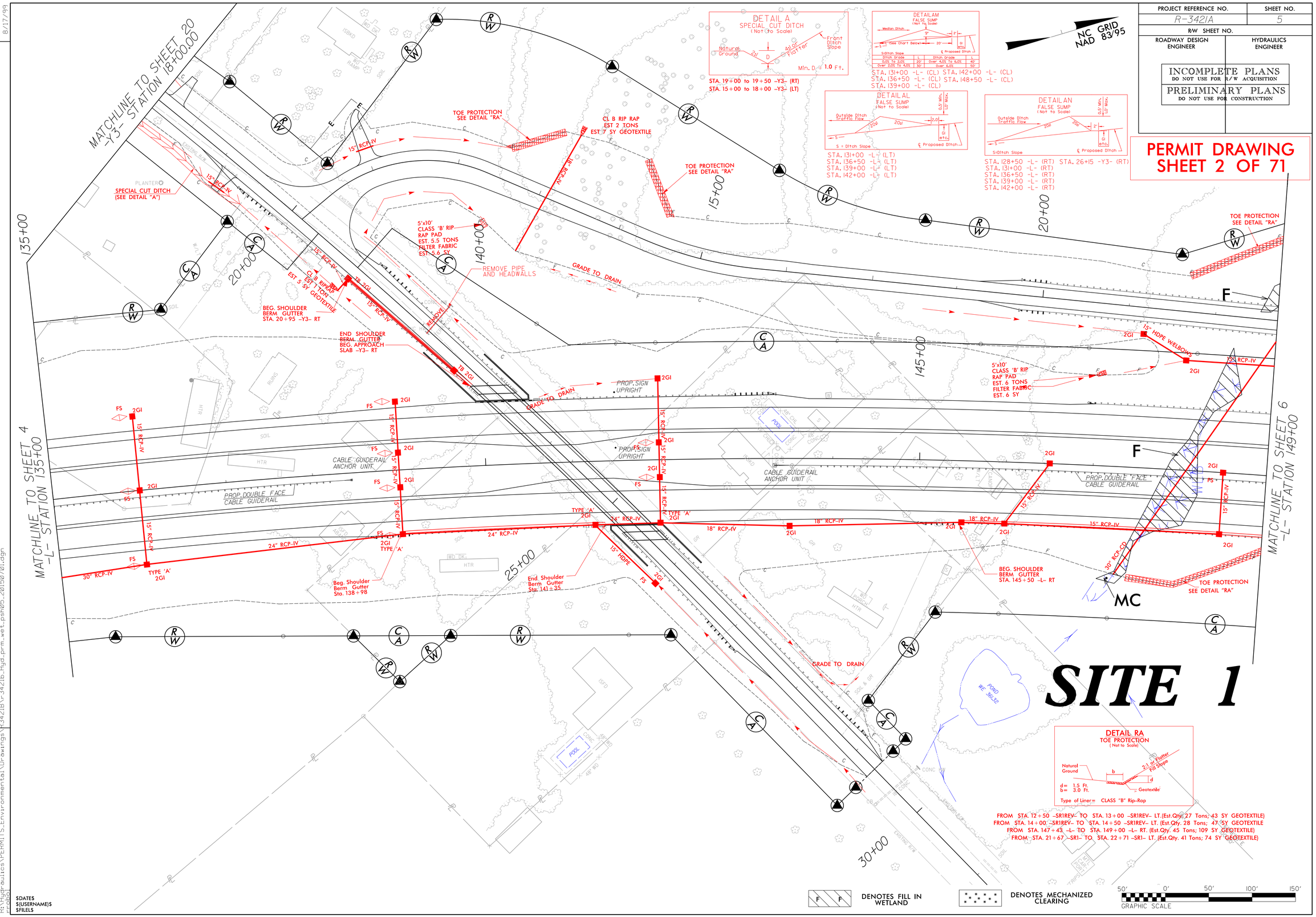
PROJECT REFERENCE NO.	SHEET NO.
R-3421A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 2 OF 71

NC GRID
NAD 83/95



REVISIONS

8/17/99

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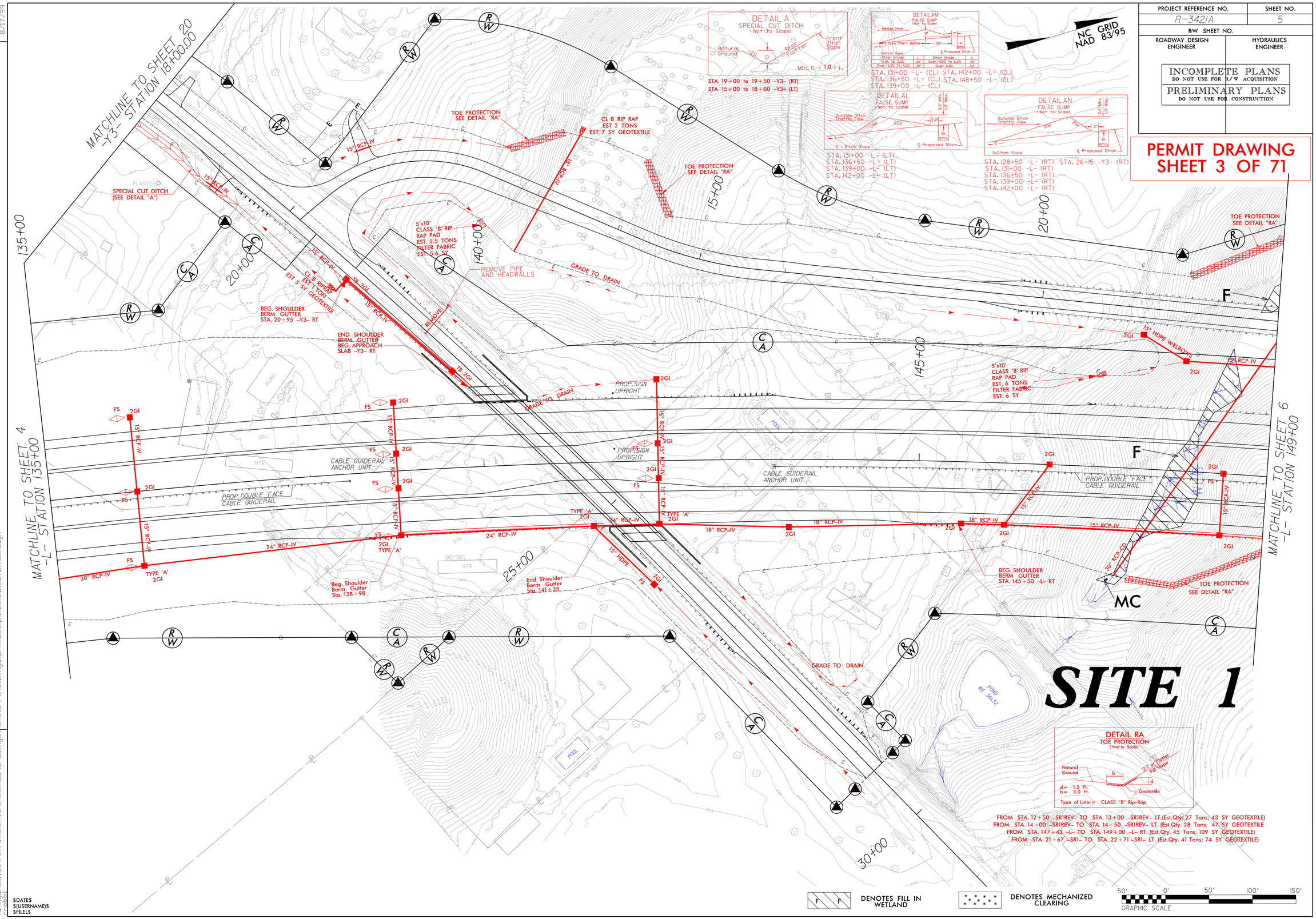
R-3421A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 3 OF 71

NC GRID NAD 83/95



REVISIONS

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PERMIT DRAWING
SHEET 4 OF 71

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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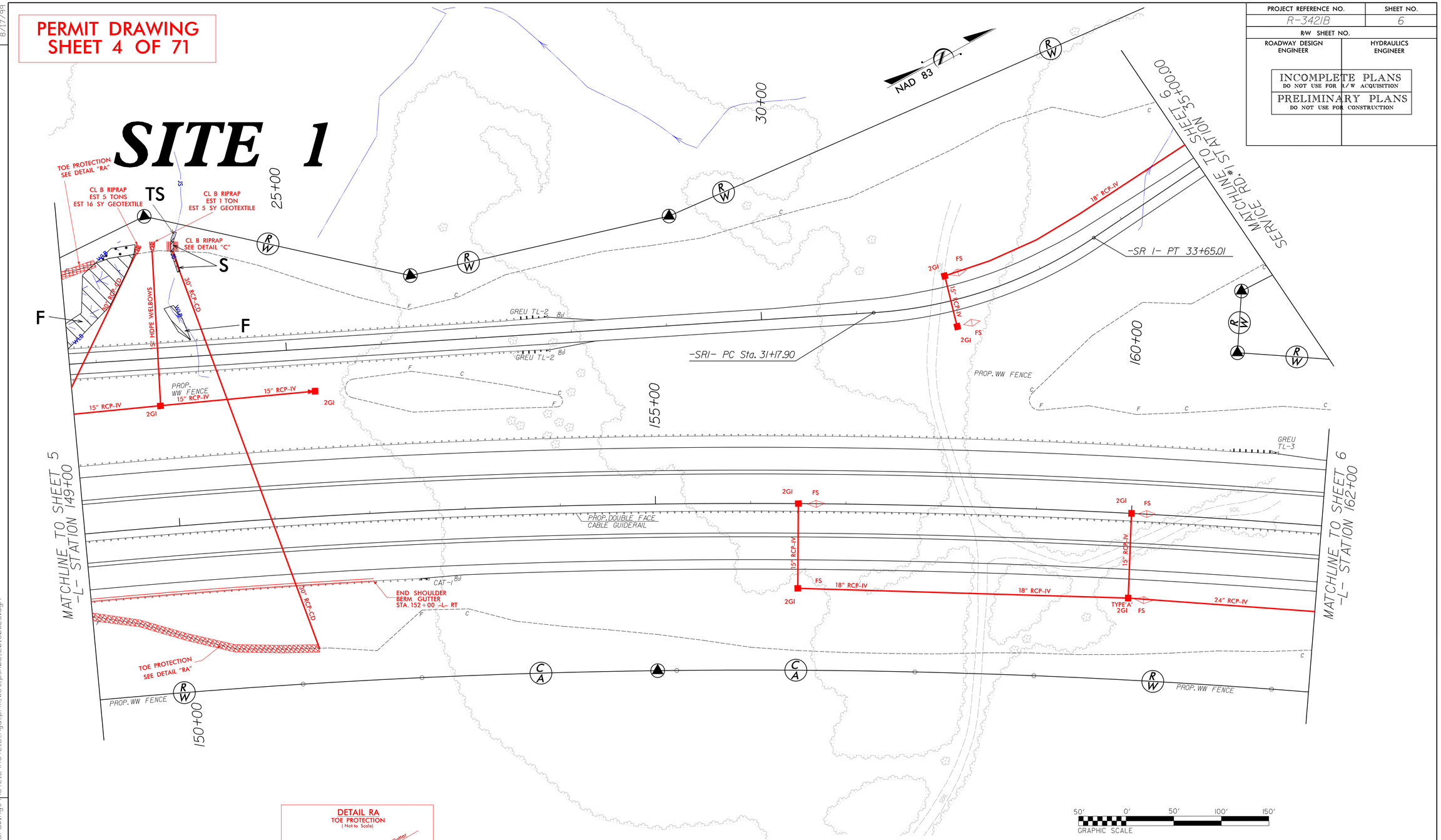
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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TOE PROTECTION
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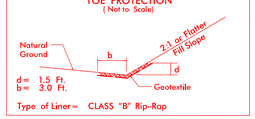
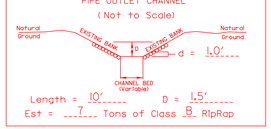


d = 1.5 Ft.
b = 3.0 Ft.
Type of Liner = CLASS "B" Rip-Rap

FROM STA. 149+00 -L- TO STA. 151+35 -L- RT.
(Est.Qty. 70 Tons; 161 SY GEOTEXTILE)
FROM STA. 22+71 -SR1- TO STA. 23+05 -SR1- LT.
(Est.Qty. 41 Tons; 24 SY GEOTEXTILE)

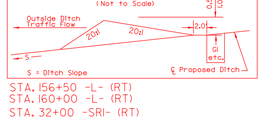
DETAIL C
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 10'
D = 1.5'
Est = 7 Tons of Class B RipRap

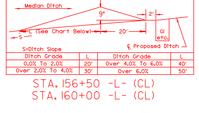
STA. 150+95.58 -L- (LT)

DETAIL AL
FALSE SUMP
(Not to Scale)



STA. 156+50 -L- (RT)
STA. 160+00 -L- (RT)
STA. 32+00 -SR1- (RT)

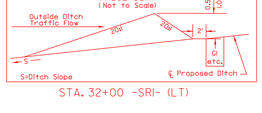
DETAIL AM
FALSE SUMP
(Not To Scale)



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

STA. 156+50 -L- (CL)
STA. 160+00 -L- (CL)

DETAIL AN
FALSE SUMP
(Not to Scale)



STA. 32+00 -SR1- (LT)

50' 0' 50' 100' 150'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

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PERMIT DRAWING
SHEET 5 OF 71

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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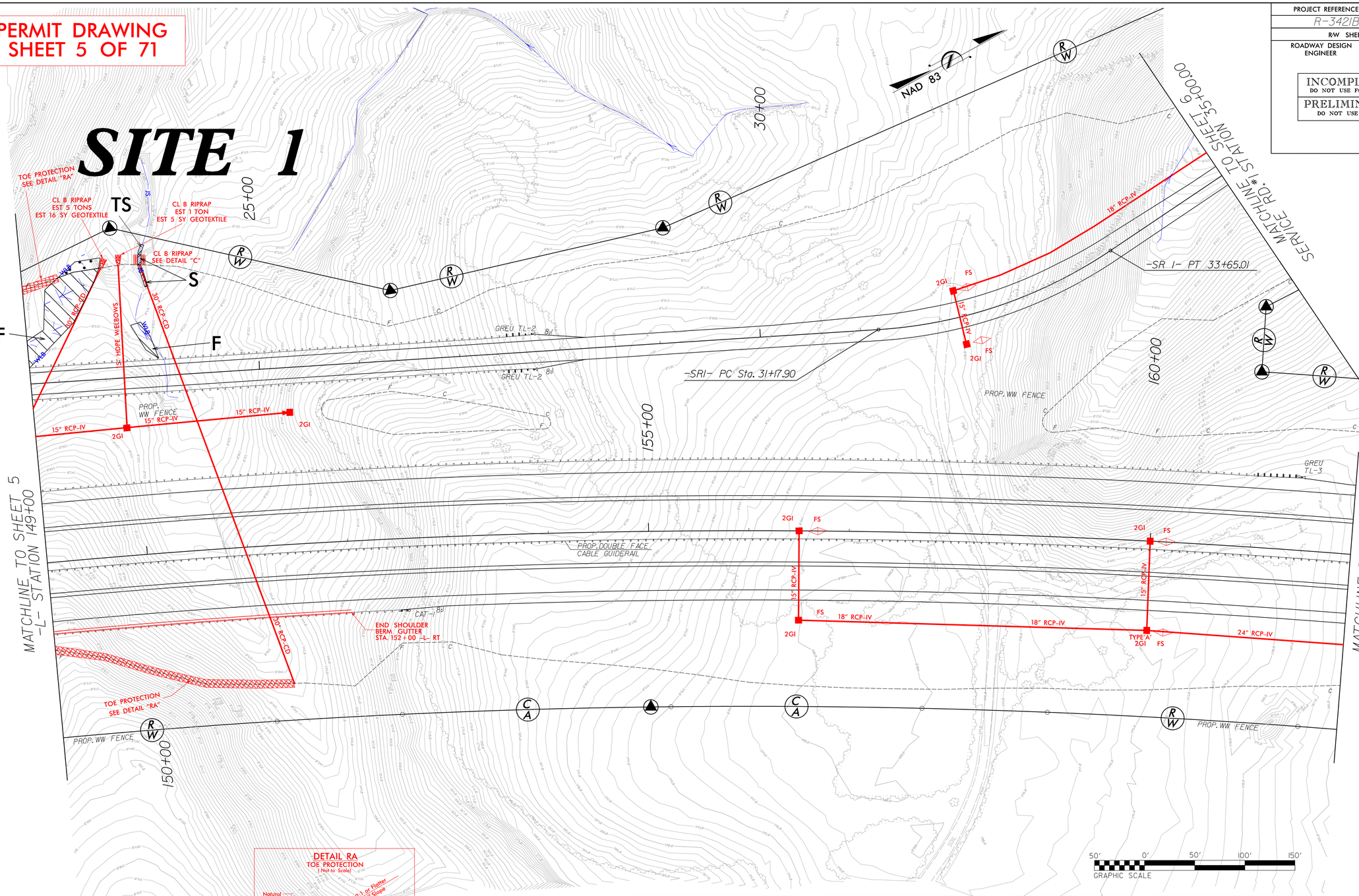
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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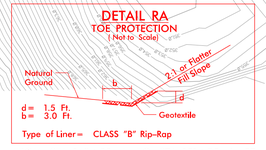
TOE PROTECTION
(Not to Scale)



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b = 3.0 Ft.

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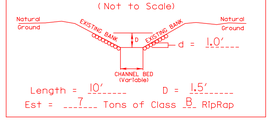
FROM STA. 149+00 -L- TO STA. 151+35 -L- RT.
(Est.Qty. 70 Tons; 161 SY GEOTEXTILE)
FROM STA. 22+71 -SR1- TO STA. 23+05 -SR1- LT.
(Est.Qty. 41 Tons; 24 SY GEOTEXTILE)

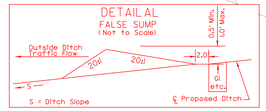
DETAIL C
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 10'
D = 1.5'
Est = 7 Tons of Class B RipRap

STA. 150+95.58 -L- (LT)

DETAIL AL
FALSE SUMP
(Not to Scale)



STA. 156+50 -L- (RT)
STA. 160+00 -L- (RT)
STA. 32+00 -SRI- (RT)

DETAIL AM
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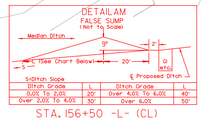
(Not to Scale)



S=Ditch Slope		Ditch Grade	L
Ditch Grade	L	Over 4.00 To 6.00	40'
0.00 To 2.00	20'	Over 6.00	50'
Over 2.00 To 4.00	30'		

STA. 156+50 -L- (CL)
STA. 160+00 -L- (CL)

DETAIL AN
FALSE SUMP
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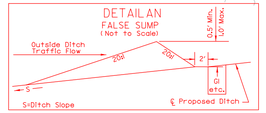

STA. 32+00 -SRI- (LT)

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-3421B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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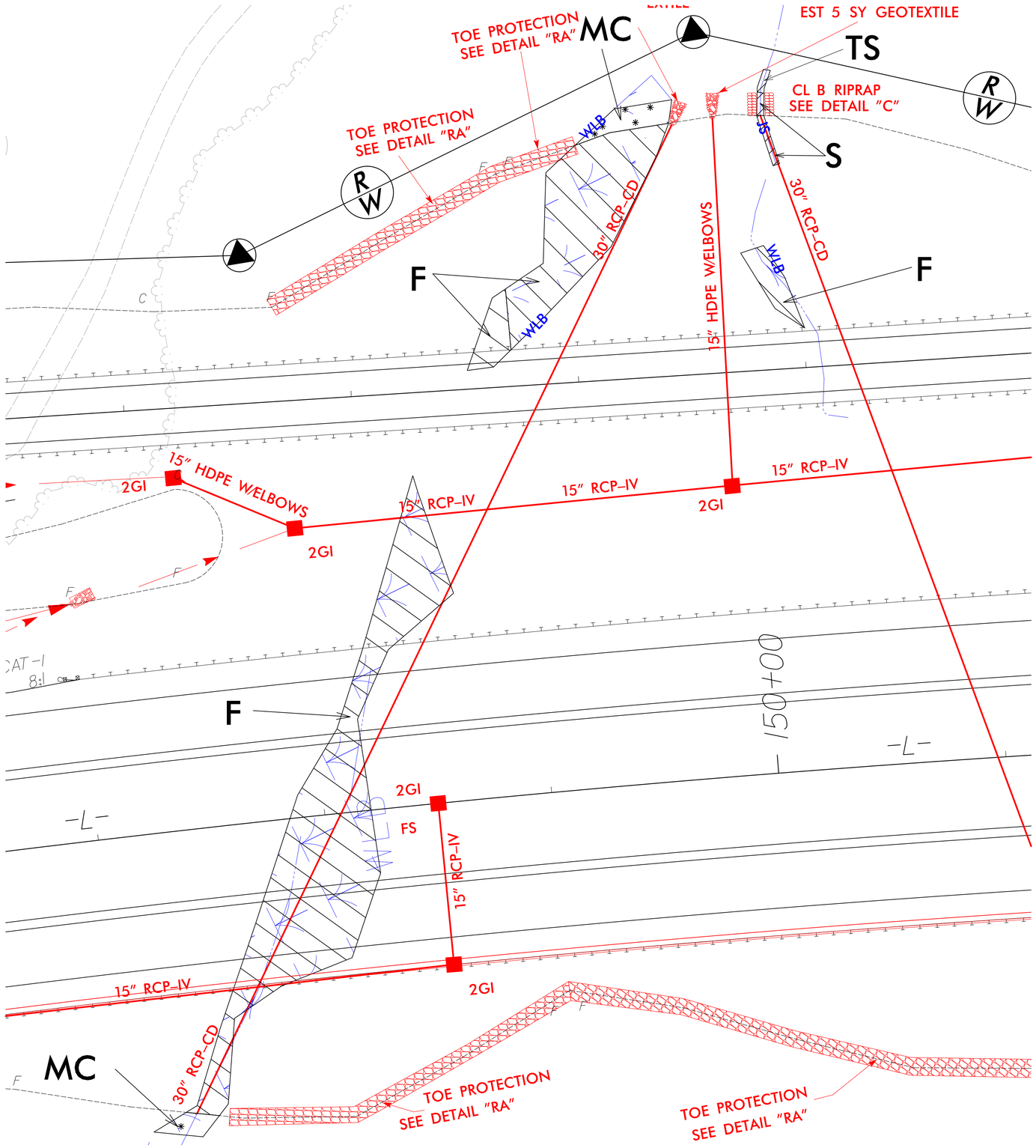
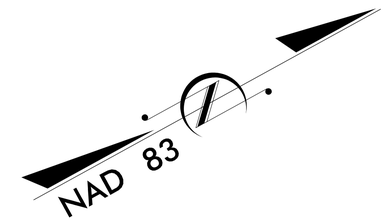
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 71





SITE 1 ENLARGEMENT

50' 0' 50'
GRAPHIC SCALE

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

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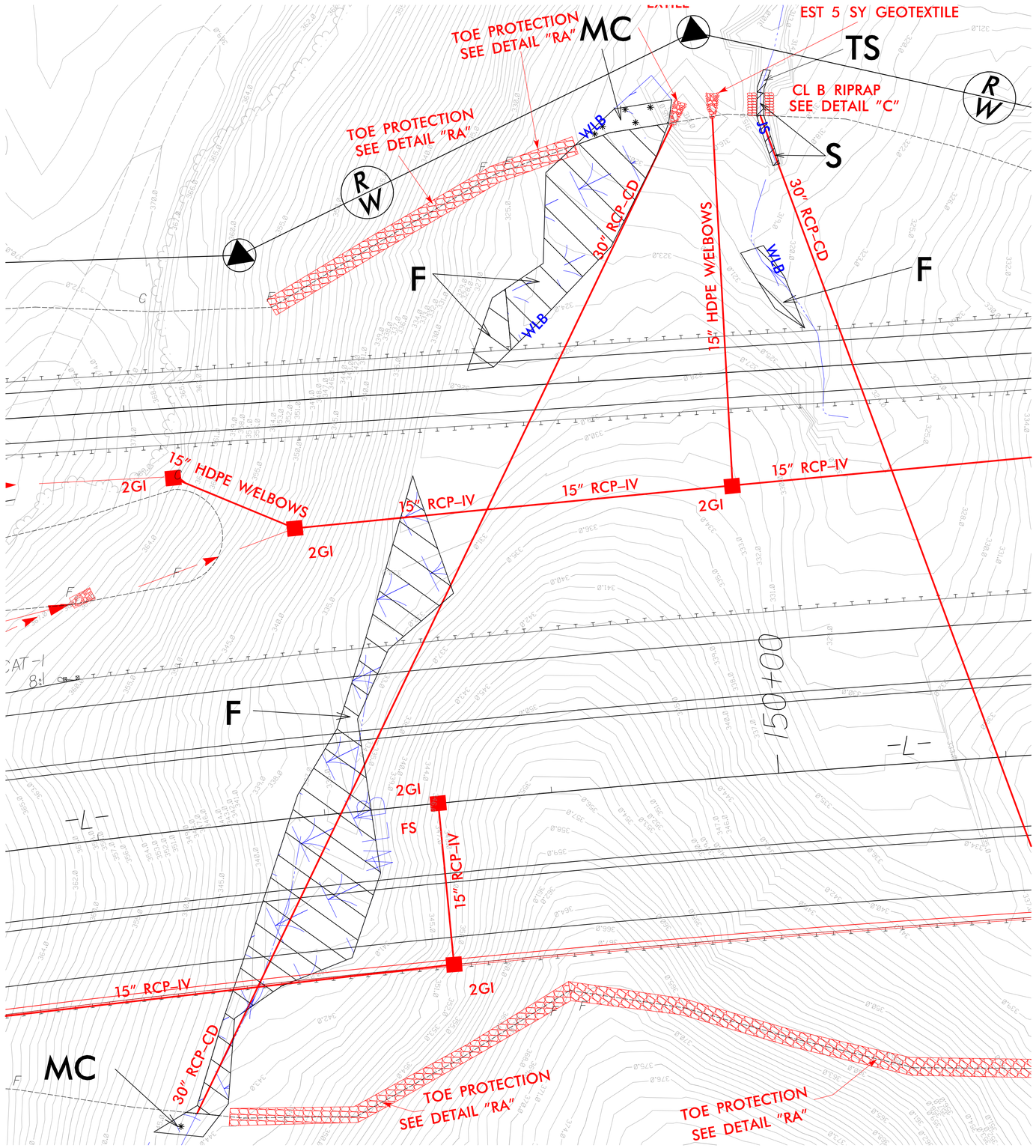
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 7 OF 71



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SITE 1 ENLARGEMENT

50' 0' 50'
GRAPHIC SCALE

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

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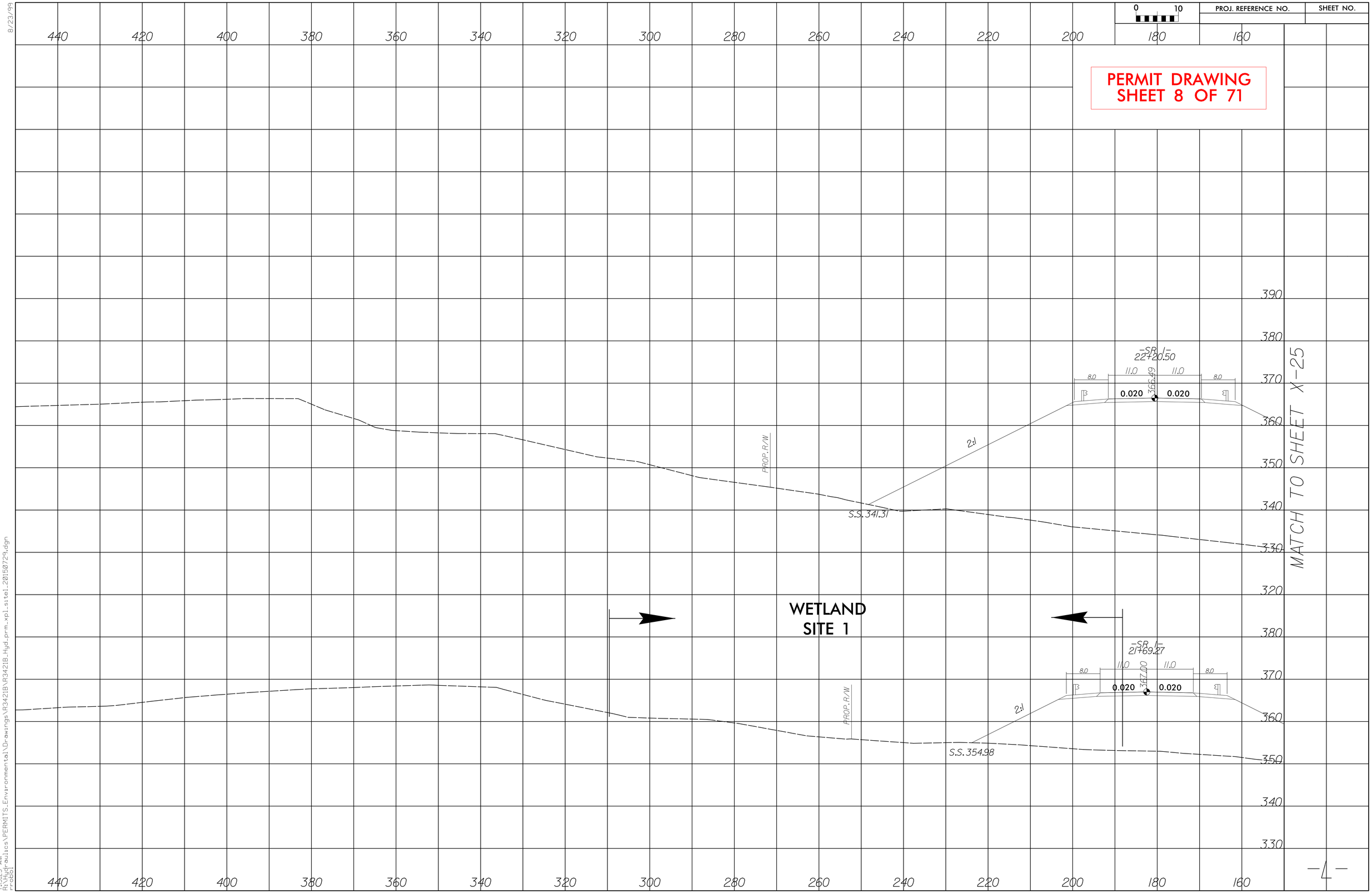

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R-3421B	X-25

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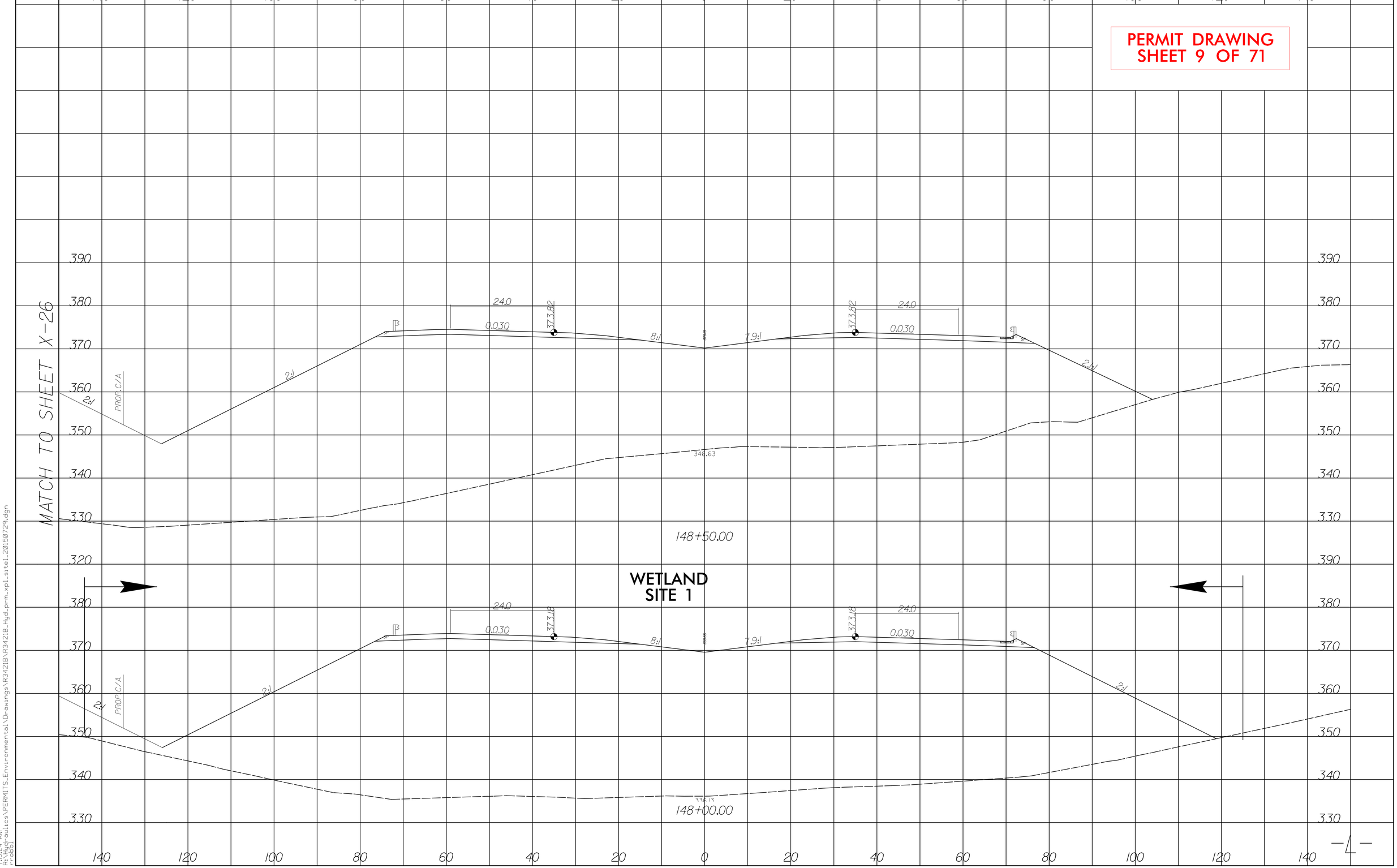
SHEET 9 OF 71



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Revised 8/6/19

REVISIONS

8/17/99

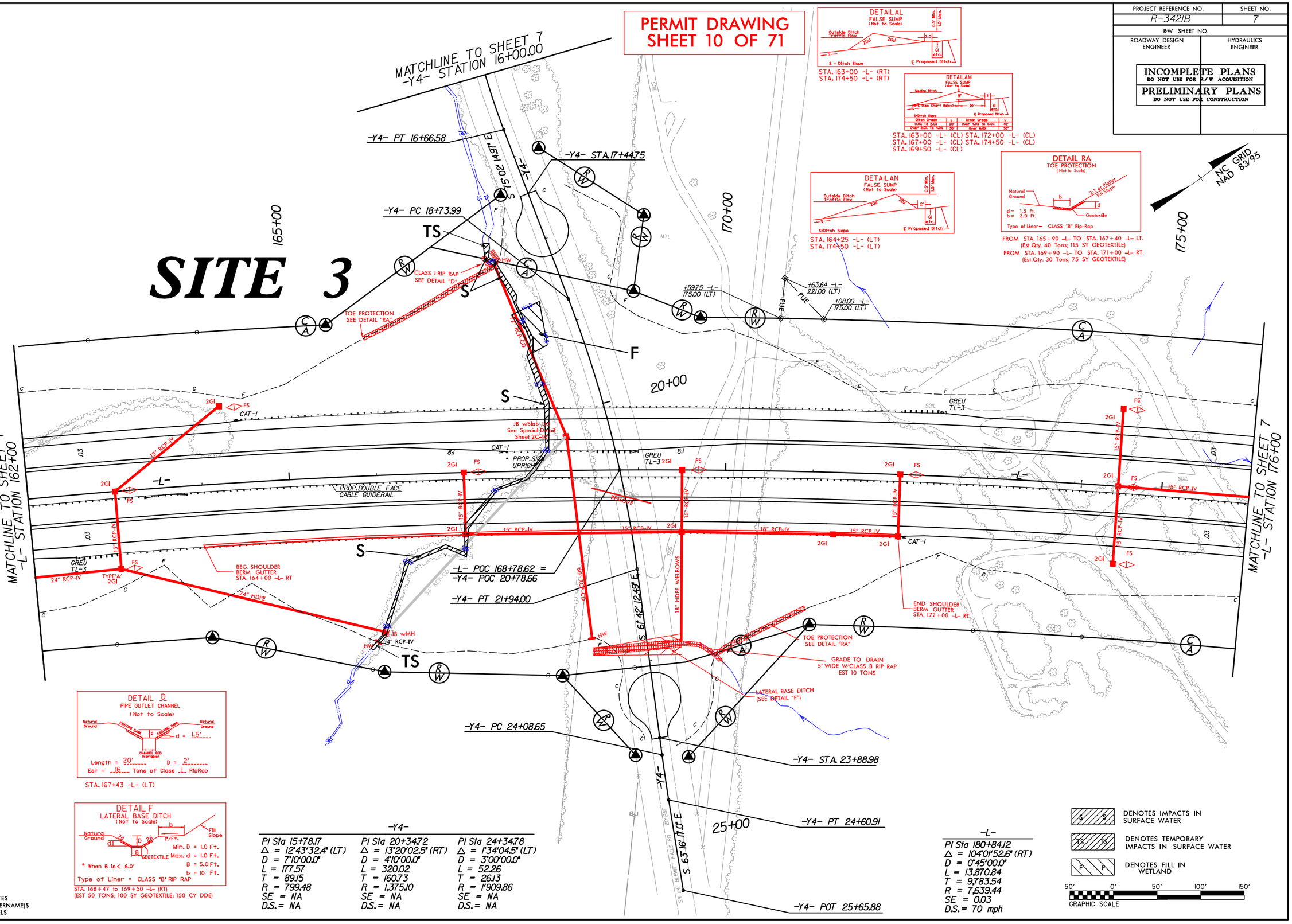
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 10 OF 71

SITE 3



DETAIL AL
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow; 20ft; 20ft; 2.0'; 0.5' Min.; 1.0' Max.; 6' Min.; S = Ditch Slope; ℄ Proposed Ditch

STA. 163+00 -L- (RT)
STA. 174+50 -L- (RT)

DETAIL AM
FALSE SUMP
(Not to Scale)

Median Ditch; 9'; 2'; 20'; 6' Min.; See Chart Below; ℄ Proposed Ditch

S=Ditch Slope

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

STA. 163+00 -L- (CL) STA. 172+00 -L- (CL)
STA. 167+00 -L- (CL) STA. 174+50 -L- (CL)
STA. 169+50 -L- (CL)

DETAIL AN
FALSE SUMP
(Not to Scale)

Outside Ditch Traffic Flow; 20ft; 20ft; 2'; 0.5' Min.; 1.0' Max.; 6' Min.; S=Ditch Slope; ℄ Proposed Ditch

STA. 164+25 -L- (LT)
STA. 174+50 -L- (LT)

DETAIL RA
TOE PROTECTION
(Not to Scale)

Natural Ground; b; d; 2:1 or Flatter Fill Slope; Geotextile

d= 1.5 Ft.
b= 3.0 Ft.

Type of Liner- CLASS "B" Rip-Rap

FROM STA. 165+90 -L- TO STA. 167+40 -L- LT.
(Est.Qty. 40 Tons; 115 SY GEOTEXTILE)
FROM STA. 169+90 -L- TO STA. 171+00 -L- RT.
(Est.Qty. 30 Tons; 75 SY GEOTEXTILE)

DETAIL D
PIPE OUTLET CHANNEL
(Not to Scale)

Natural Ground; EXISTING BANK; D; d = 1.5'; CHANNEL BED (Variable)

Length = 20' D = 2'
Est = 16 Tons of Class I RipRap

STA. 167+43 -L- (LT)

DETAIL F
LATERAL BASE DITCH
(Not to Scale)

Natural Ground; 2%; d; D; 2%; B; GEOTEXTILE; b; 1'/Ft.; Fill Slope

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 5.0 Ft.
b = 10 Ft.

* When B is < 6.0'

Type of Liner = CLASS "B" RIP RAP

STA. 168+47 to 169+50 -L- (RT)
(EST 50 TONS; 100 SY GEOTEXTILE; 150 CY DDE)

-Y4-

PI Sta 15+78.17	PI Sta 20+34.72	PI Sta 24+34.78
Δ = 12°43'32.4" (LT)	Δ = 13°20'02.5" (RT)	Δ = 1°34'04.5" (LT)
D = 7°10'00.0"	D = 4°10'00.0"	D = 3°00'00.0"
L = 177.57	L = 320.02	L = 52.26
T = 89.15	T = 160.73	T = 26.13
R = 799.48	R = 1,375.10	R = 1'909.86
SE = NA	SE = NA	SE = NA
D.S. = NA	D.S. = NA	D.S. = NA

-L-

PI Sta 180+84.12
Δ = 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

S S — DENOTES IMPACTS IN SURFACE WATER
TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND

50' 0' 50' 100' 150'
GRAPHIC SCALE

$DATES
$(USERNAME)$
$FILEL$

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sg jones

Revised 8/6/19

REVISIONS

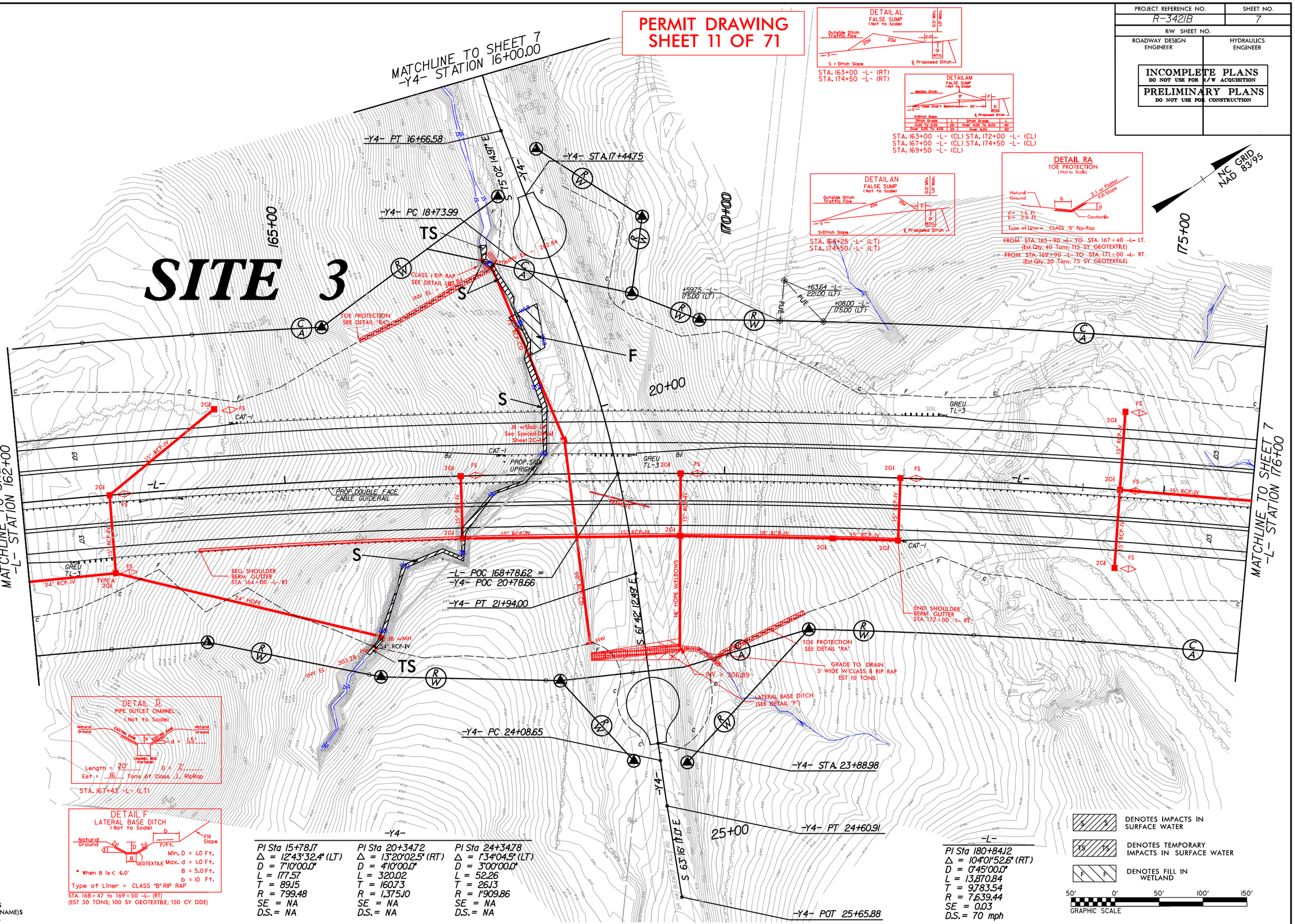
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 11 OF 71



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Revised 8/6/19

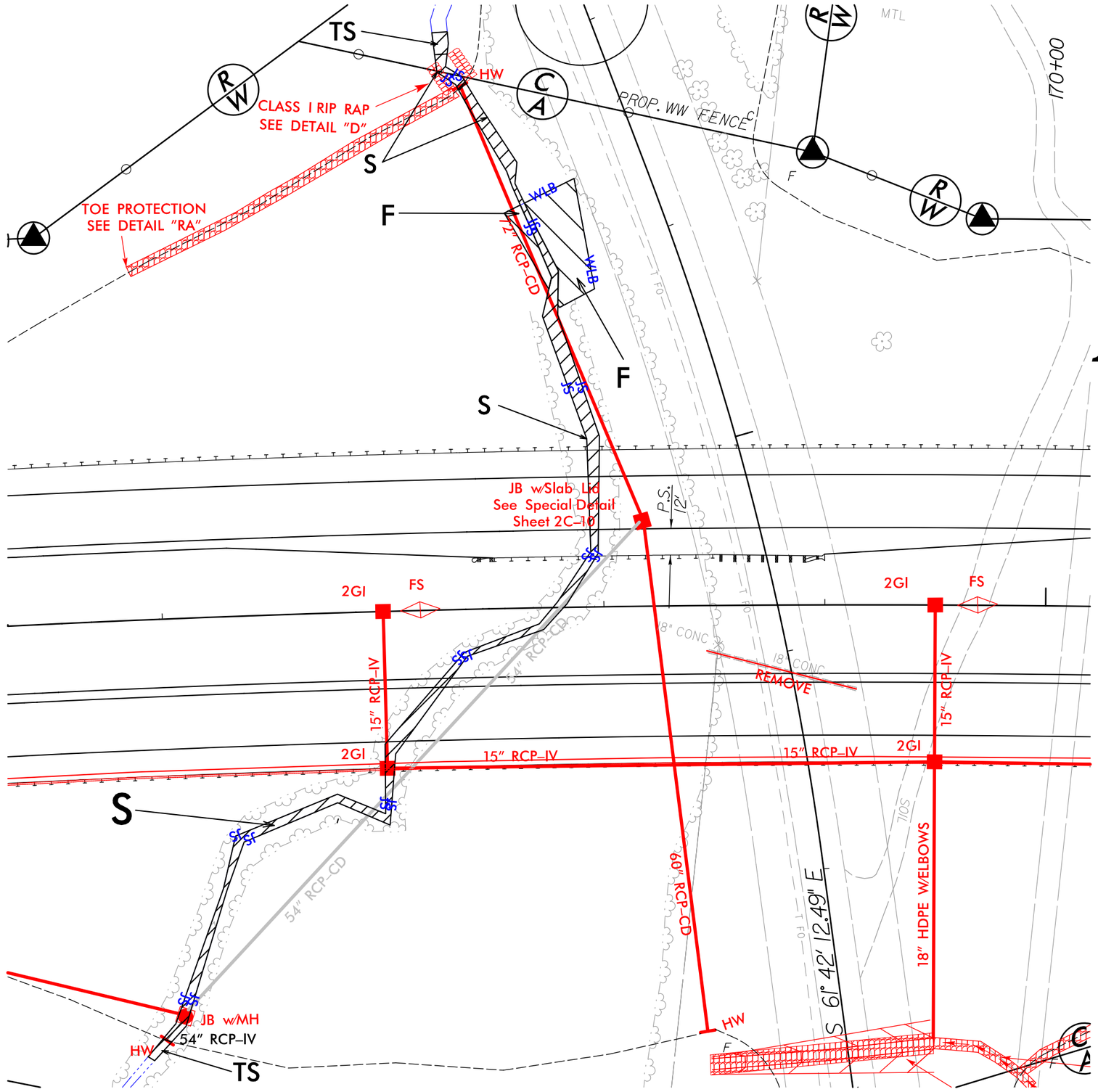
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 12 OF 71

SITE 3 ENLARGEMENT



REVISIONS

8/17/99

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Revised 8/6/19

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

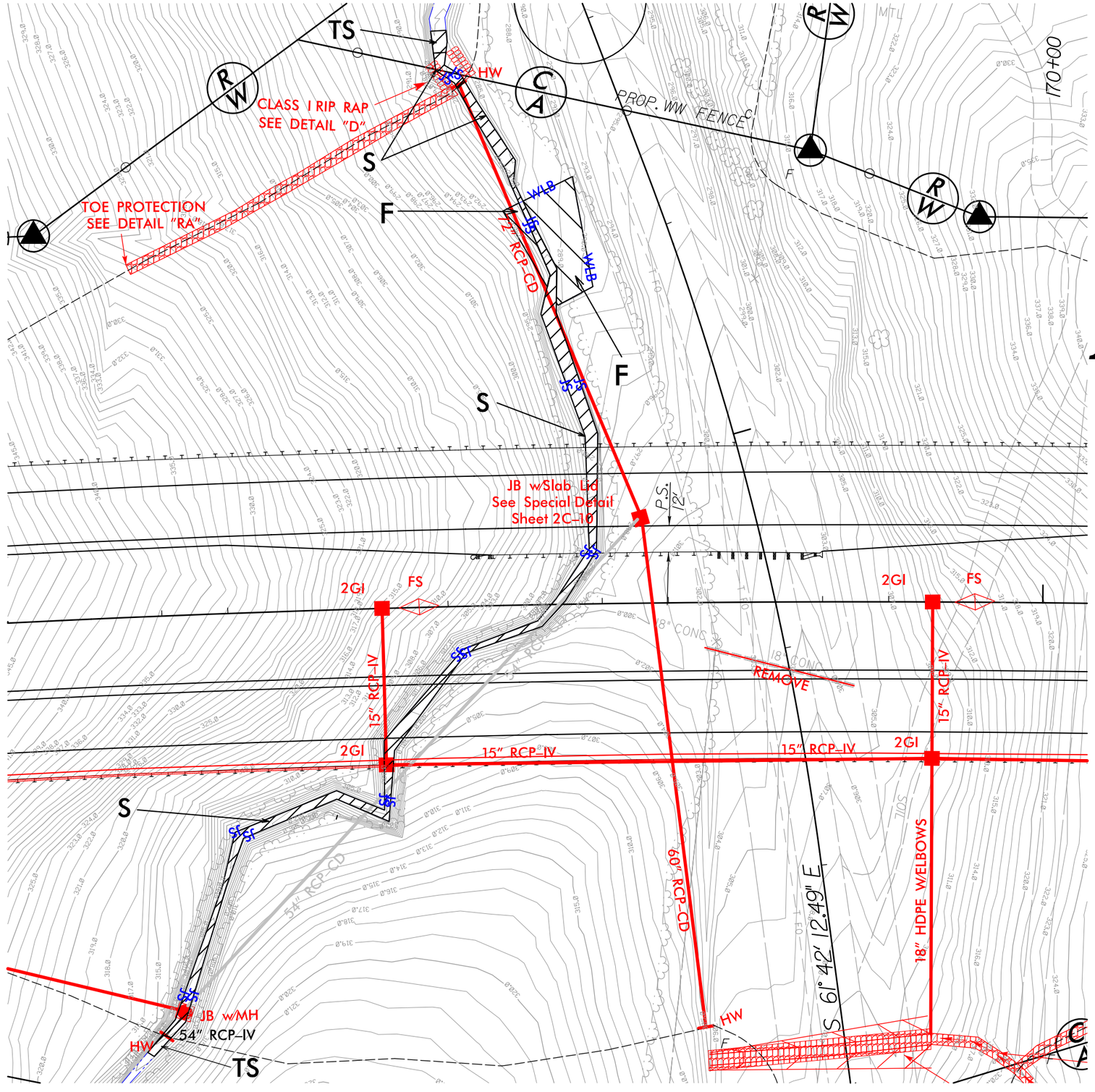
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 13 OF 71

NAD 83

SITE 3 ENLARGEMENT



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

REVISIONS

8/17/99

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sg jones

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8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-63

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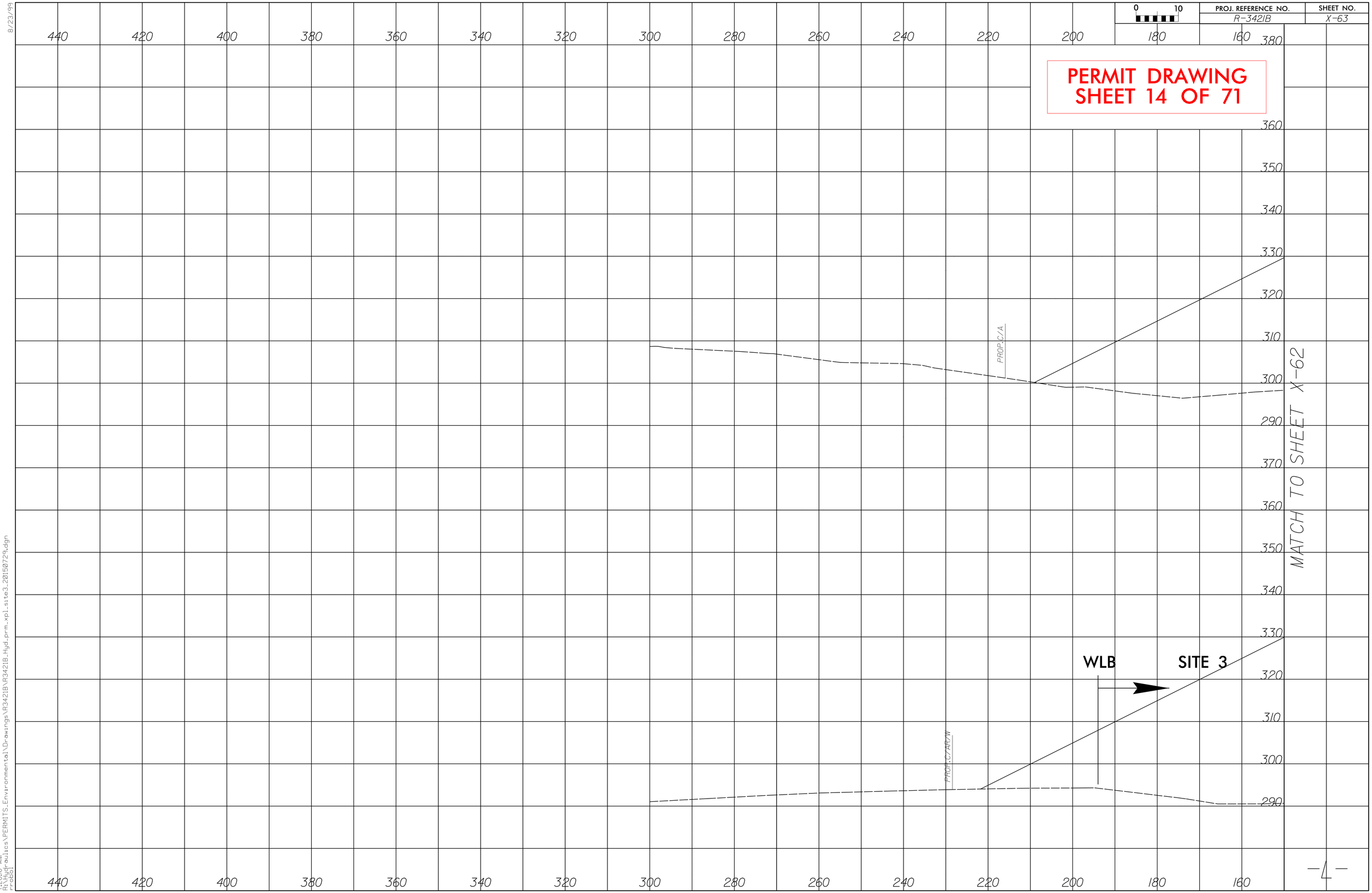
PERMIT DRAWING
SHEET 14 OF 71



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rrobel

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-62

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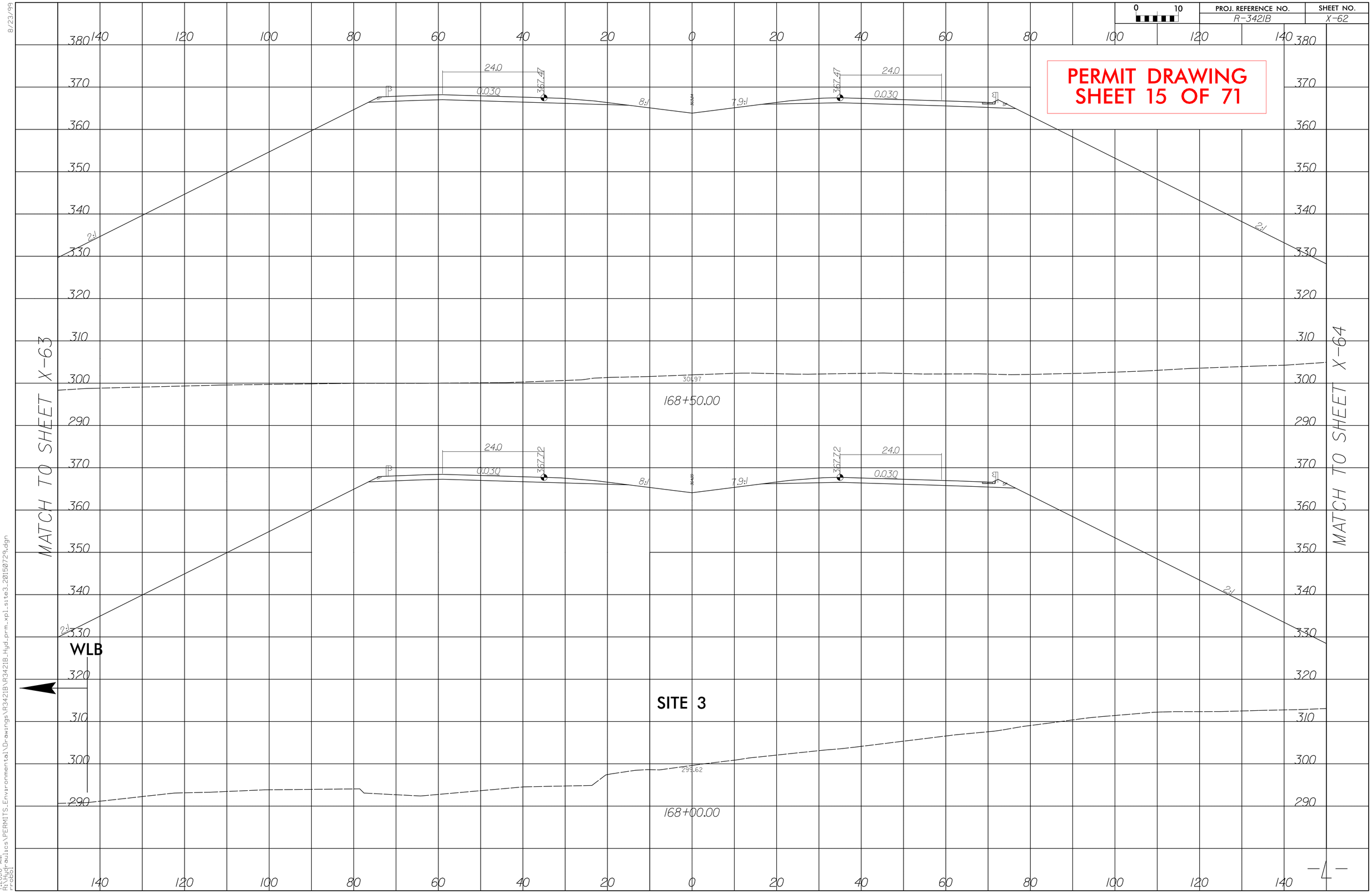
PERMIT DRAWING
SHEET 15 OF 71



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R-3421B	X-64

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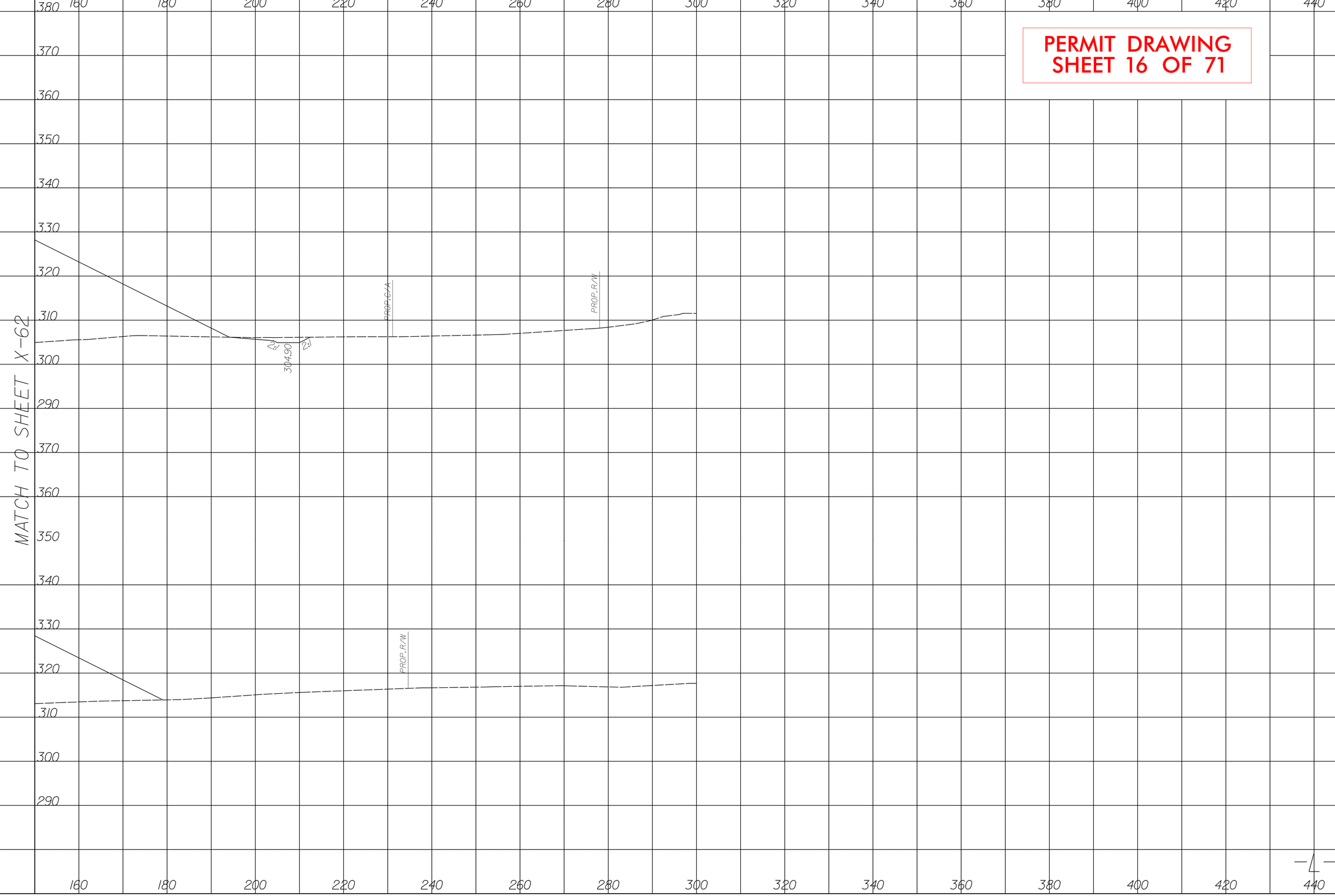
PERMIT DRAWING
SHEET 16 OF 71



8/23/99

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rrebel

Revised 8/6/19

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

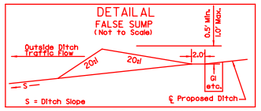
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 17 OF 71

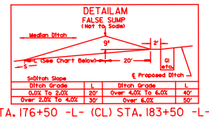
NC GRID NAD 83/95

DETAIL AL
FALSE SUMP
(Not to Scale)



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

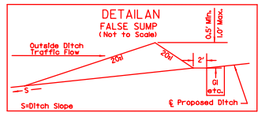
DETAIL AM
FALSE SUMP
(Not To Scale)



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

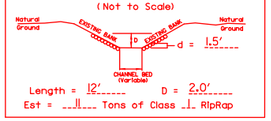
STA. 176+50 -L- (CL) STA. 183+50 -L- (CL)
STA. 179+00 -L- (CL) STA. 187+00 -L- (CL)
STA. 181+00 -L- (CL) STA. 190+00 -L- (CL)

DETAIL AN
FALSE SUMP
(Not to Scale)



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

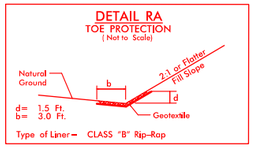
DETAIL G
PIPE OUTLET CHANNEL
(Not to Scale)



Length = 12'
D = 2.0'
Est = 11 Tons of Class I RipRap

STA. 178+71.06 -L- (LT)
STA. 179+59 -L- (RT) -(25' long)

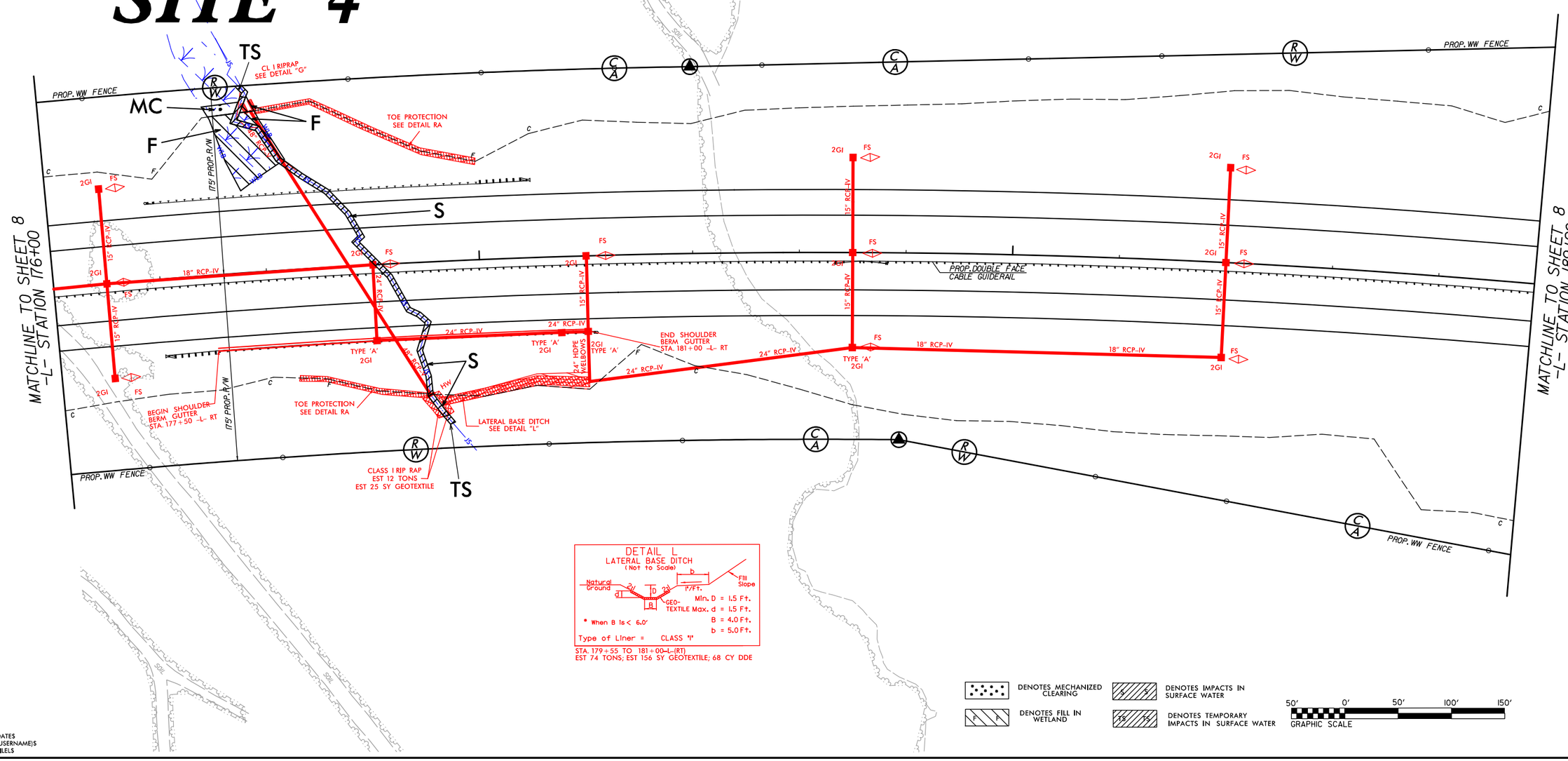
DETAIL RA
TOE PROTECTION
(Not to Scale)



d= 1.5 Ft.
b= 3.0 Ft.
Type of Liner- CLASS "B" Rip-Rap

FROM STA. 178+00 -L- TO STA. 180+00 -L- LT.
(Est.Qty. 70 Tons; 147 SY GEOTEXTILE)
FROM STA. 178+25 -L- TO STA. 179+45 -L- RT.
(Est.Qty. 30 Tons; 84 SY GEOTEXTILE)

SITE 4



DETAIL L
LATERAL BASE DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 4.0 Ft.
b = 5.0 Ft.

* When B is < 6.0'

Type of Liner = CLASS "I"

STA. 179+55 TO 181+00-L-(RT)
EST 74 TONS; EST 156 SY GEOTEXTILE; 68 CY DDE

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

50' 0' 50' 100' 150'
GRAPHIC SCALE

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Revised 8/6/19

REVISIONS

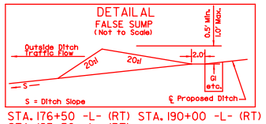
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

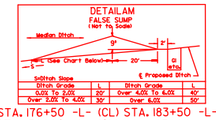
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

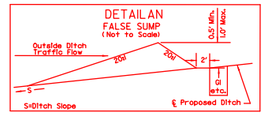
PERMIT DRAWING
SHEET 18 OF 71



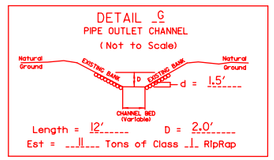
STA. 176+50 -L- (RT) STA. 190+00 -L- (RT)
STA. 183+50 -L- (RT)
STA. 187+00 -L- (RT)



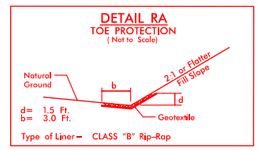
STA. 176+50 -L- (CL) STA. 183+50 -L- (CL)
STA. 179+00 -L- (CL) STA. 187+00 -L- (CL)
STA. 181+00 -L- (CL) STA. 190+00 -L- (CL)



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)
STA. 179+59 -L- (RT) -(25' long)



FROM STA. 178+00 -L- TO STA. 180+00 -L- LT.
(Est.Qty. 70 Tons; 147 SY GEOTEXTILE)
FROM STA. 178+25 -L- TO STA. 179+45 -L- RT.
(Est.Qty. 30 Tons; 84 SY GEOTEXTILE)

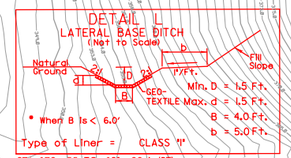
NC GRID NAD 83/95

SITE 4

180+00

185+00

TS
CL I RIPRAP SEE DETAIL "G"
MC
F
TOE PROTECTION SEE DETAIL RA
PROP. WW FENCE
175' PROP. R/W
S
2GI
FS
15" RCP-IV
18" RCP-IV
24" RCP-IV
24" HDPE
TYPE 'A' 2GI
PROP. DOUBLE FACE CABLE GUIDERAIL
END SHOULDER BERM GUTTER STA. 181+00 -L- RT
BEGIN SHOULDER BERM GUTTER STA. 177+50 -L- RT
LATERAL BASE DITCH SEE DETAIL "L"
CLASS I RIP RAP EST 12 TONS EST 25 SY GEOTEXTILE
MATCHLINE TO SHEET 8 -L- STATION 176+00
MATCHLINE TO SHEET 8 -L- STATION 189+90



STA. 179+55 TO 181+00-L-(RT)
EST 74 TONS; EST 156 SY GEOTEXTILE; 68 CY DDE

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

50' 0' 50' 100' 150'
GRAPHIC SCALE

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SITE 4 ENLARGEMENT

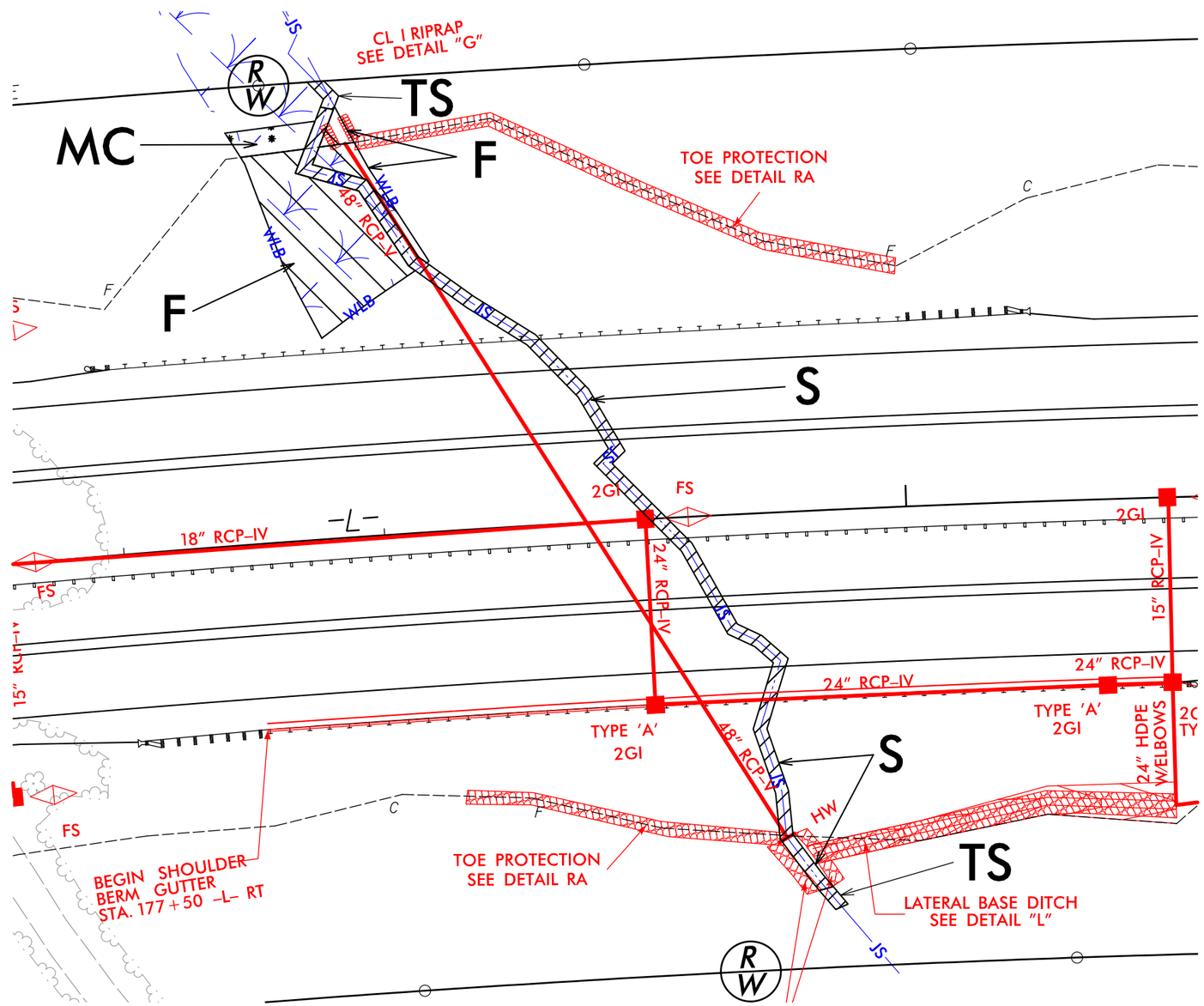
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 19 OF 71

NC GRID NAD 83/95



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

F F DENOTES FILL IN WETLAND

Revised 8/6/19

REVISIONS

8/17/99

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SITE 4 ENLARGEMENT

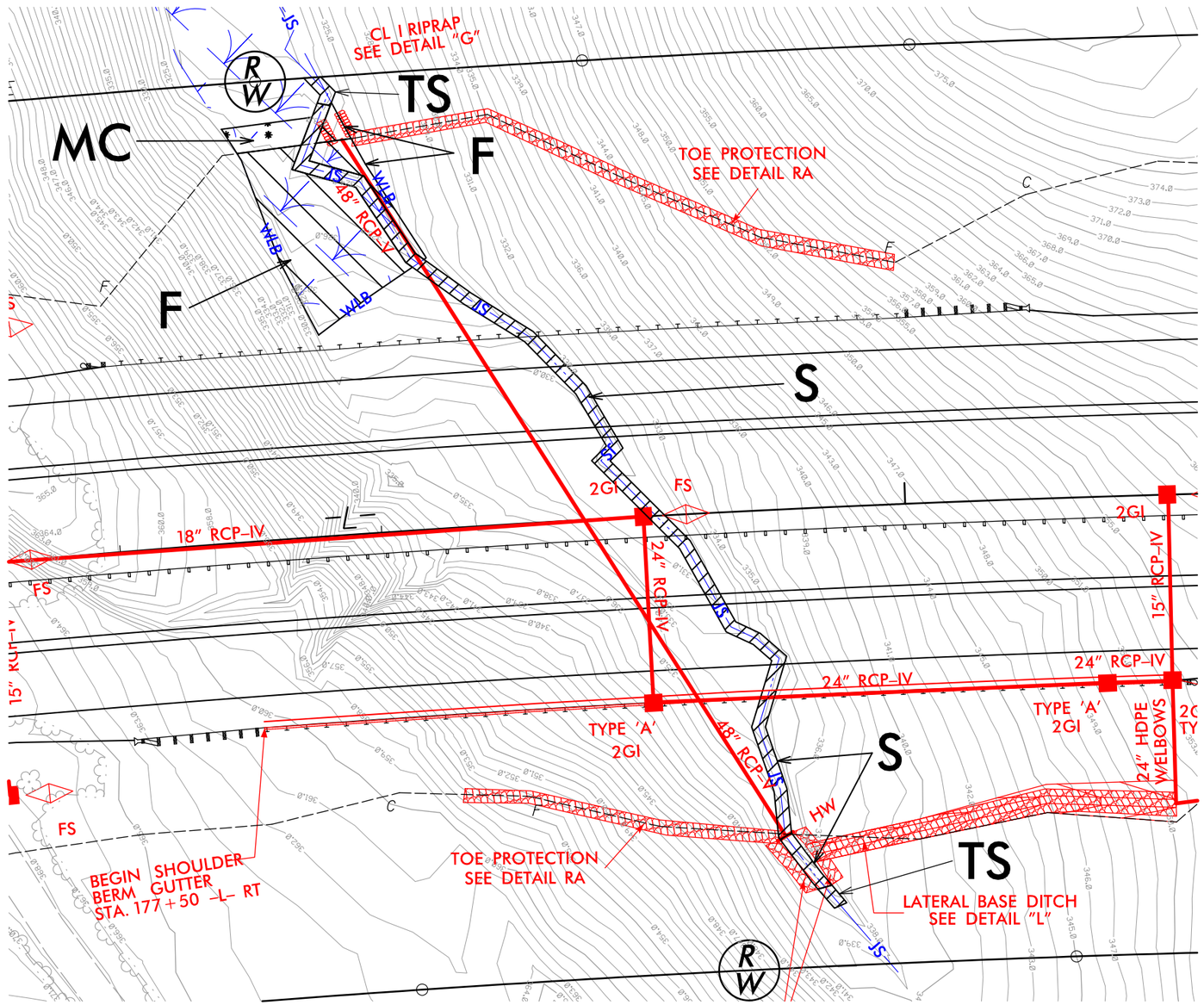
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 20 OF 71

NC GRID NAD 83/95



50' 0' 50'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

Revised 8/6/19

REVISIONS

8/17/99

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PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-73

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PERMIT DRAWING
SHEET 21 OF 71

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-72

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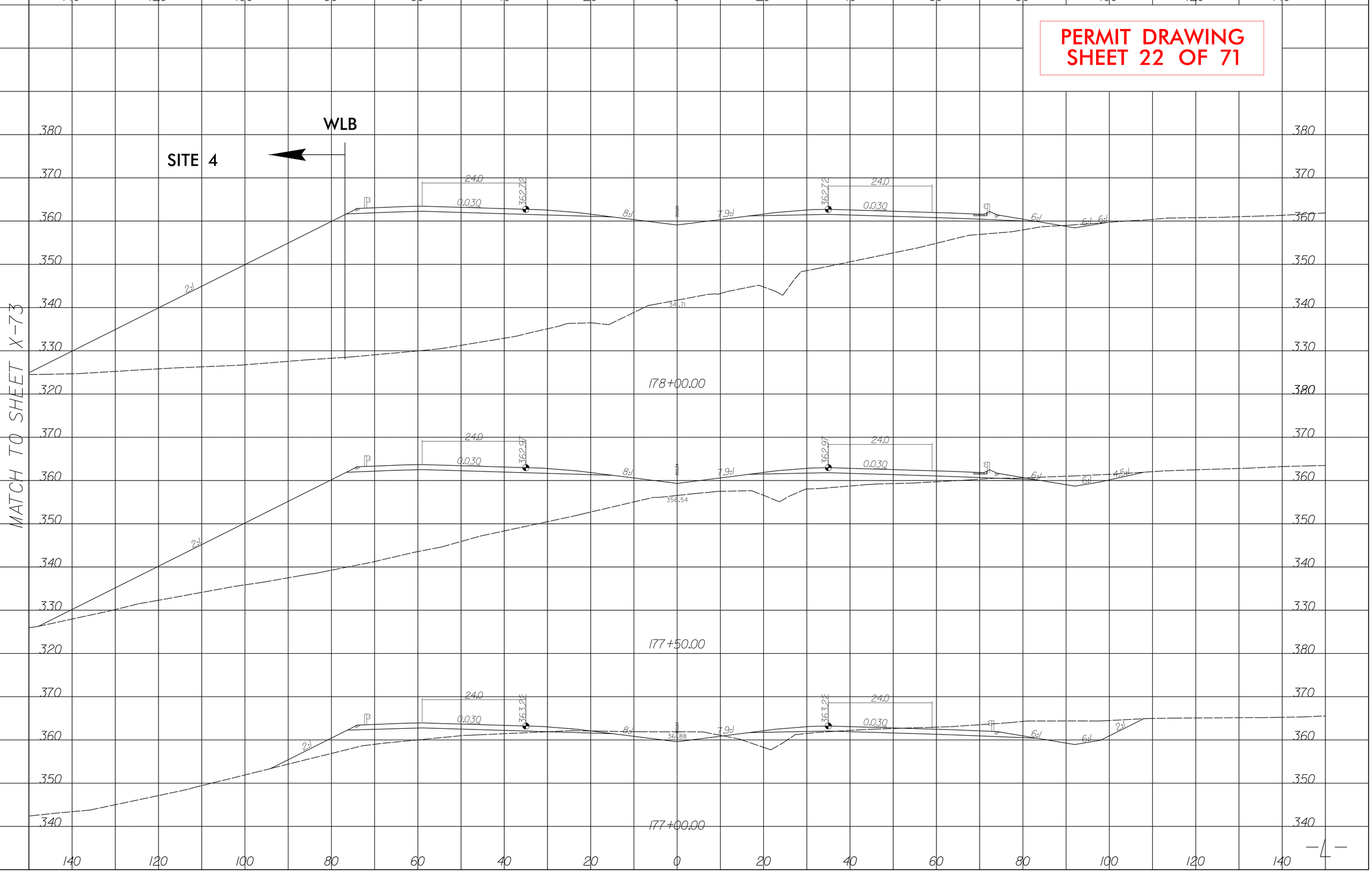
PERMIT DRAWING
SHEET 22 OF 71

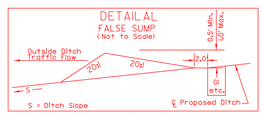


PROJECT REFERENCE NO.	SHEET NO.
R-3421B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

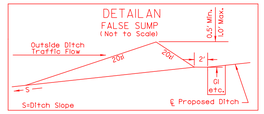
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

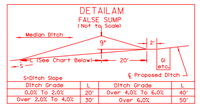
PERMIT DRAWING
SHEET 23 OF 71



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

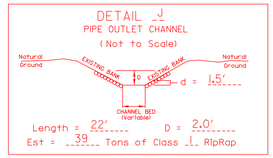


STA. 205+00-L- (LT)
STA. 211+50 -L- (LT)

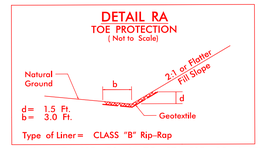


S=Ditch Slope		Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

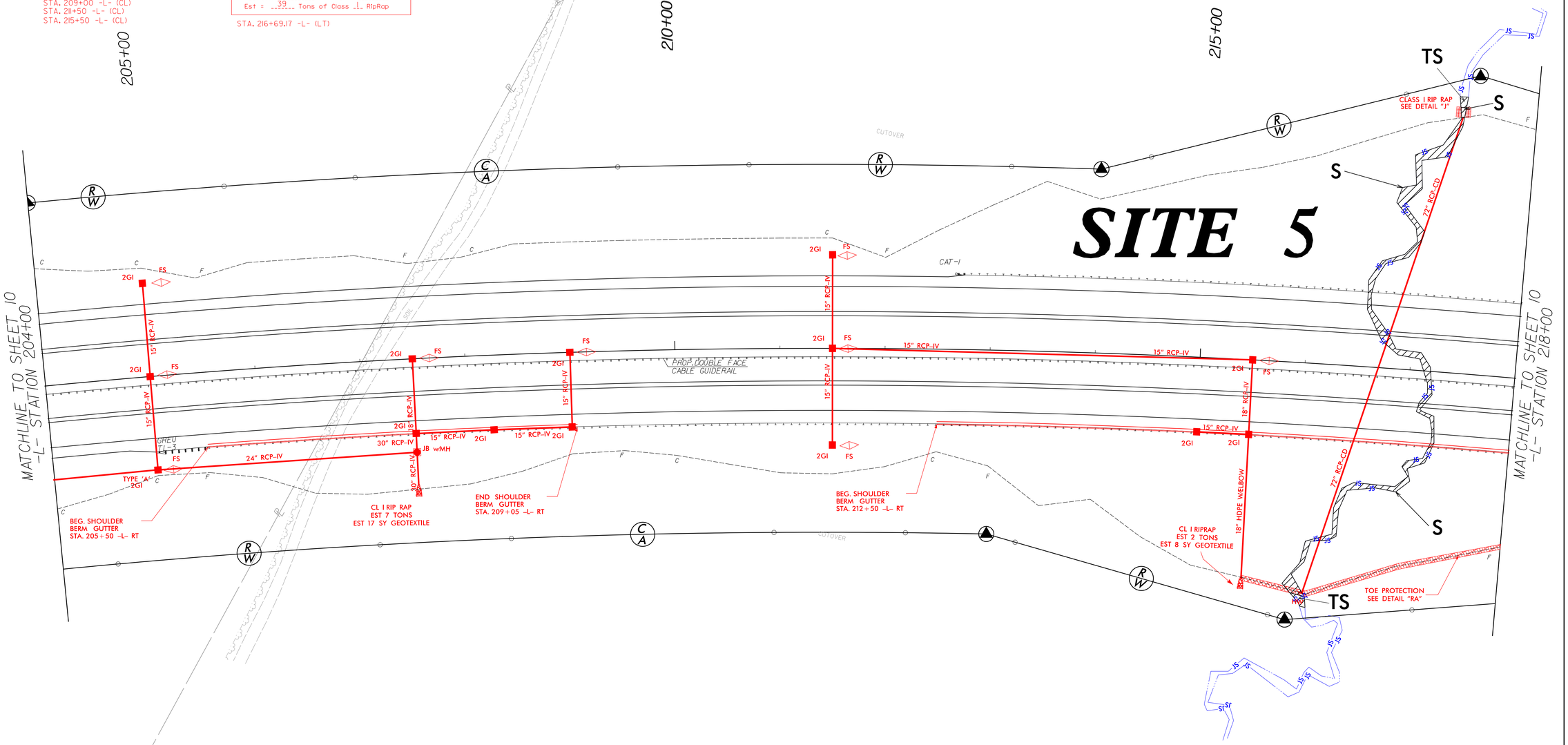
STA. 205+00 -L- (CL)
STA. 209+00 -L- (CL)
STA. 211+50 -L- (CL)
STA. 215+50 -L- (CL)



STA. 216+69.17 -L- (LT)



FROM STA. 215+50 -L- TO STA. 218+00 -L- RT.
(Est.Qty. 70 Tons; 170 SY GEOTEXTILE)



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

REVISIONS

8/17/99

$DATES
$(USERNAME)$
$FILEL$

7:42:04 AM
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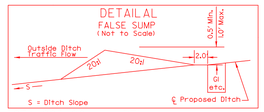
rrobb

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

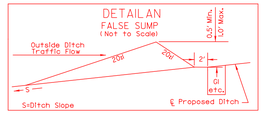
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

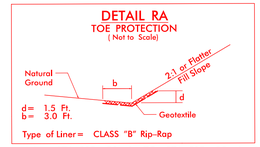
PERMIT DRAWING
SHEET 24 OF 71



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

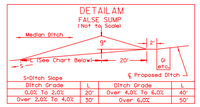


STA. 205+00-L- (LT)
STA. 211+50 -L- (LT)



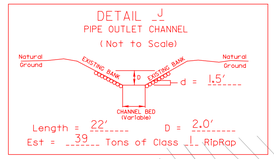
Type of Liner= CLASS "B" Rip-Rap

FROM STA. 215+50 -L- TO STA. 218+00 -L- RT.
(Est.Qty. 70 Tons; 170 SY GEOTEXTILE)



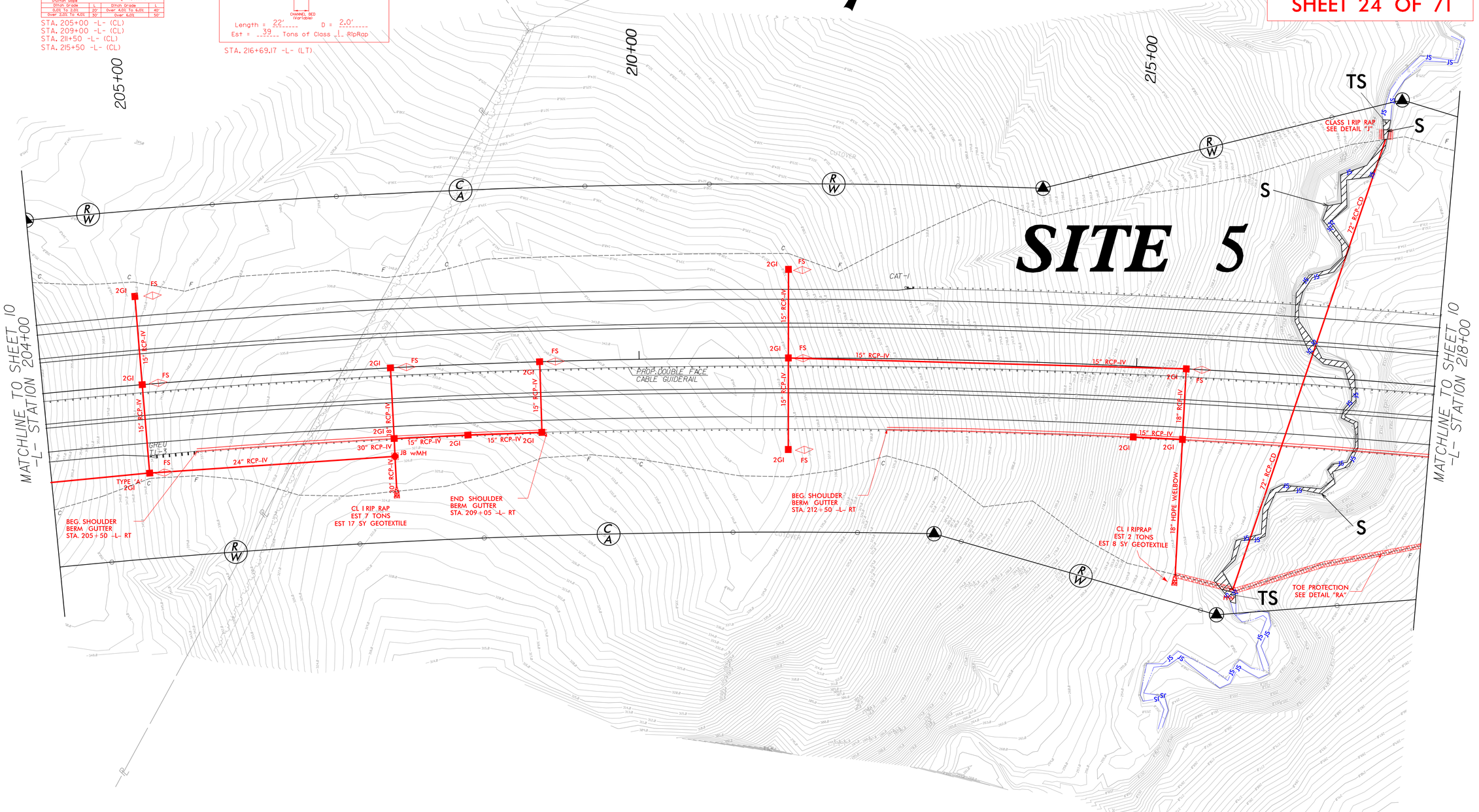
Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

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



Length = 22' D = 2.0'
Est = 39 Tons of Class I RipRap

STA. 216+69.17 -L- (LT)



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

REVISIONS

8/17/99

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rcrobb

$DATES
$(USERNAME)$
$FILEL$

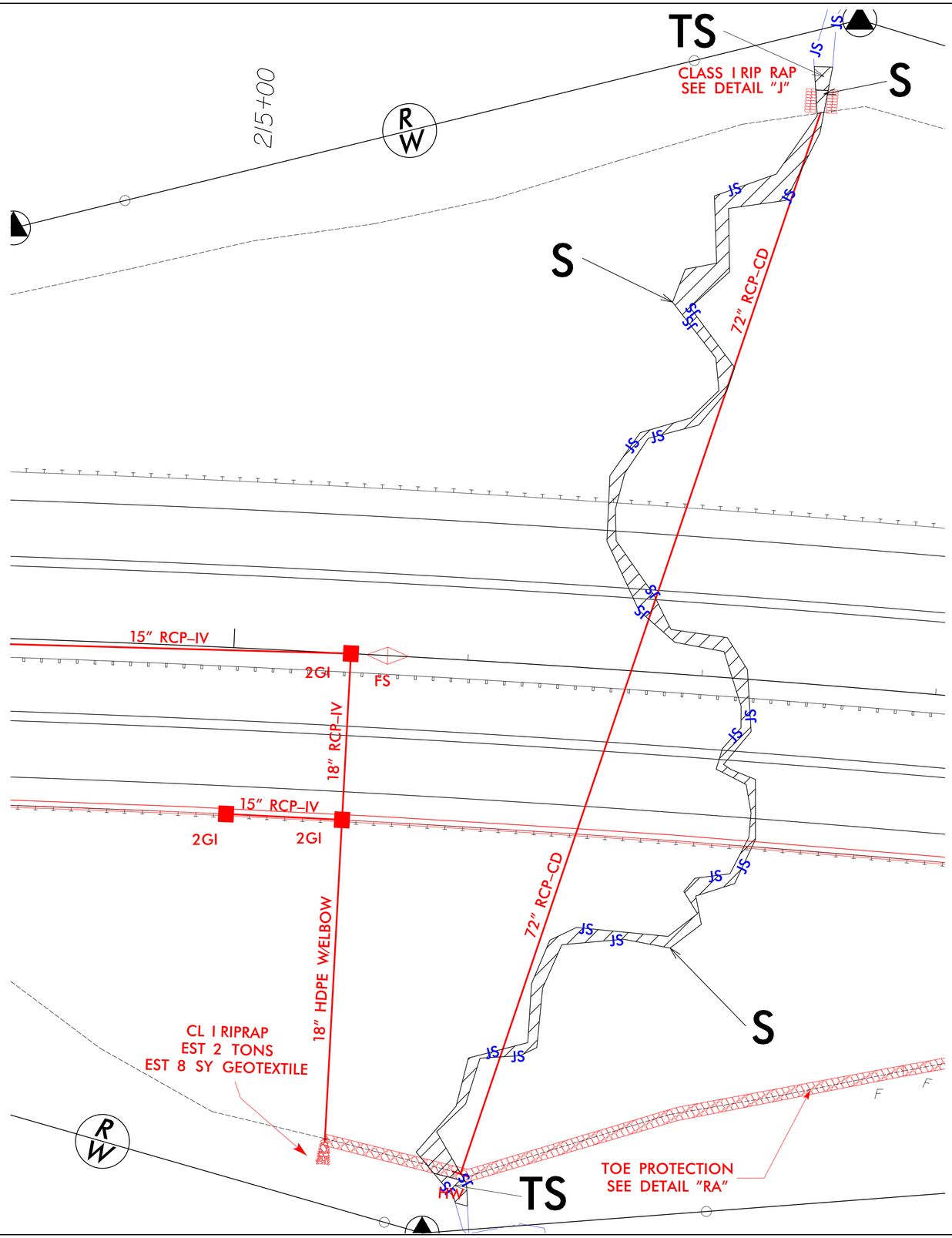
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 25 OF 71

SITE 5 ENLARGEMENT



NC GRID NAD 83/95

50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

$DATE$
$(USERNAME)$
$FILEL$

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PROJECT REFERENCE NO.	SHEET NO.
R-3421B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

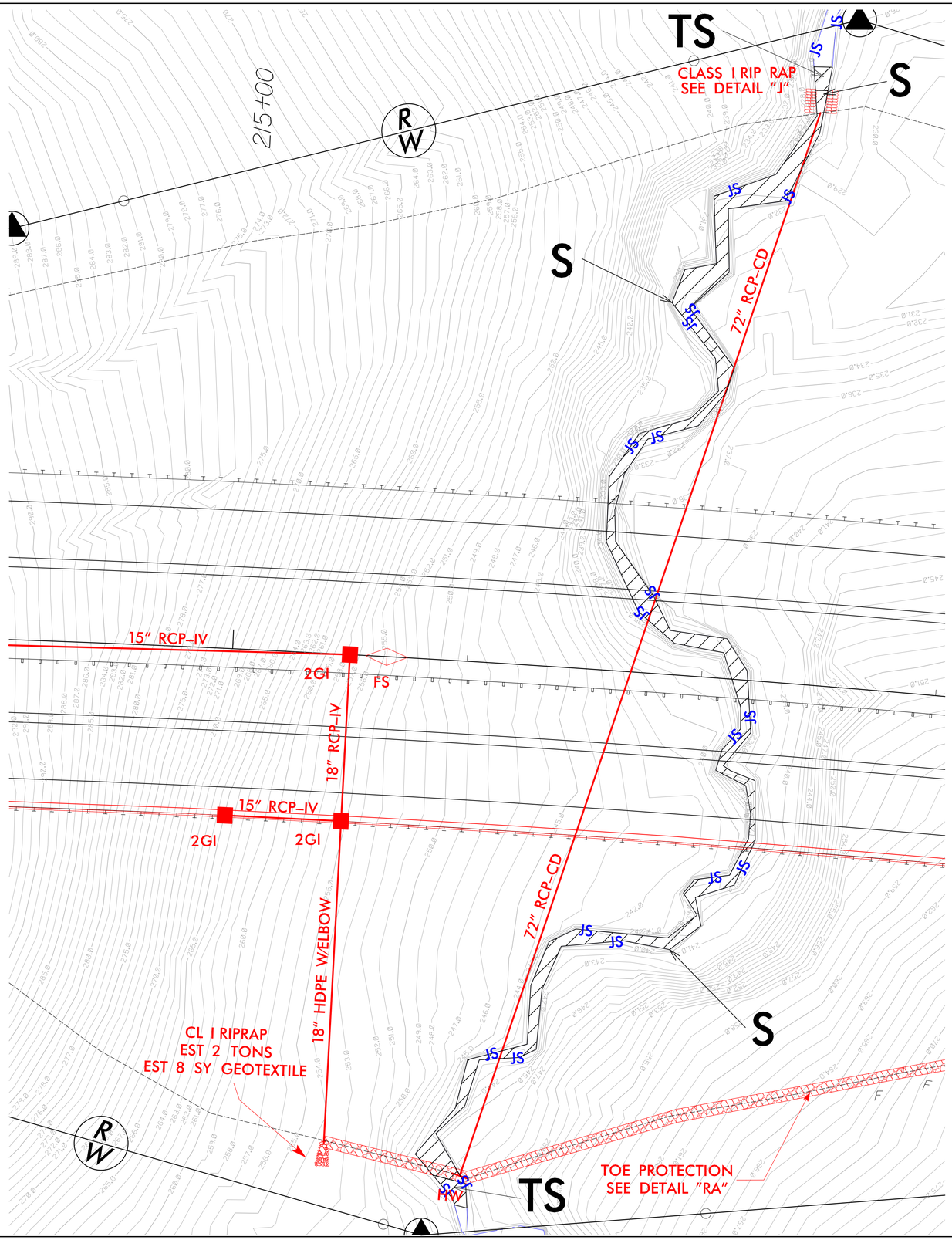
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 26 OF 71

NC GRID NAD 83/95

SITE 5 ENLARGEMENT



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

$DATE$
$(USERNAME)$
$FILEL$

7:42:17 AM
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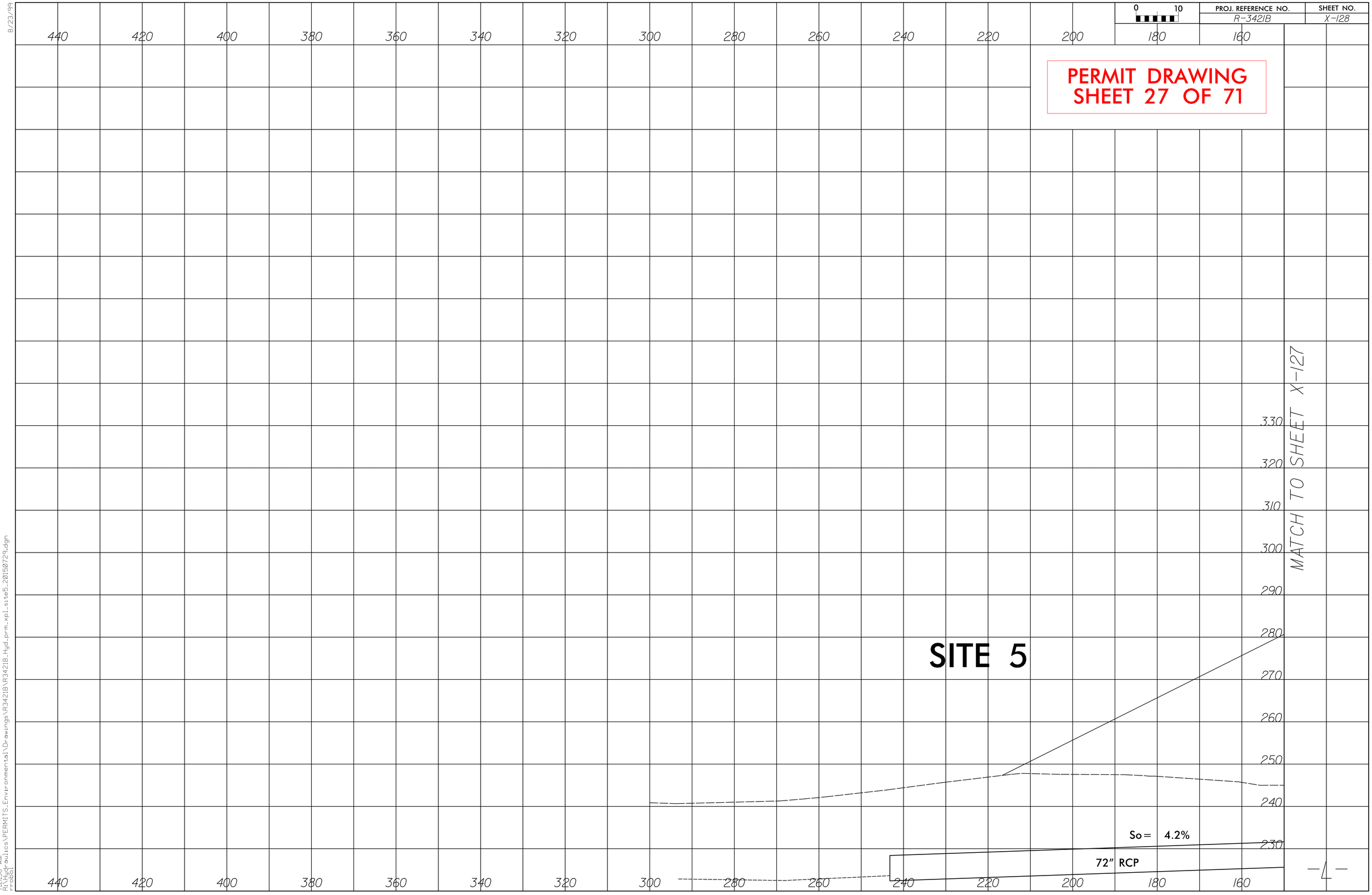

8/23/99

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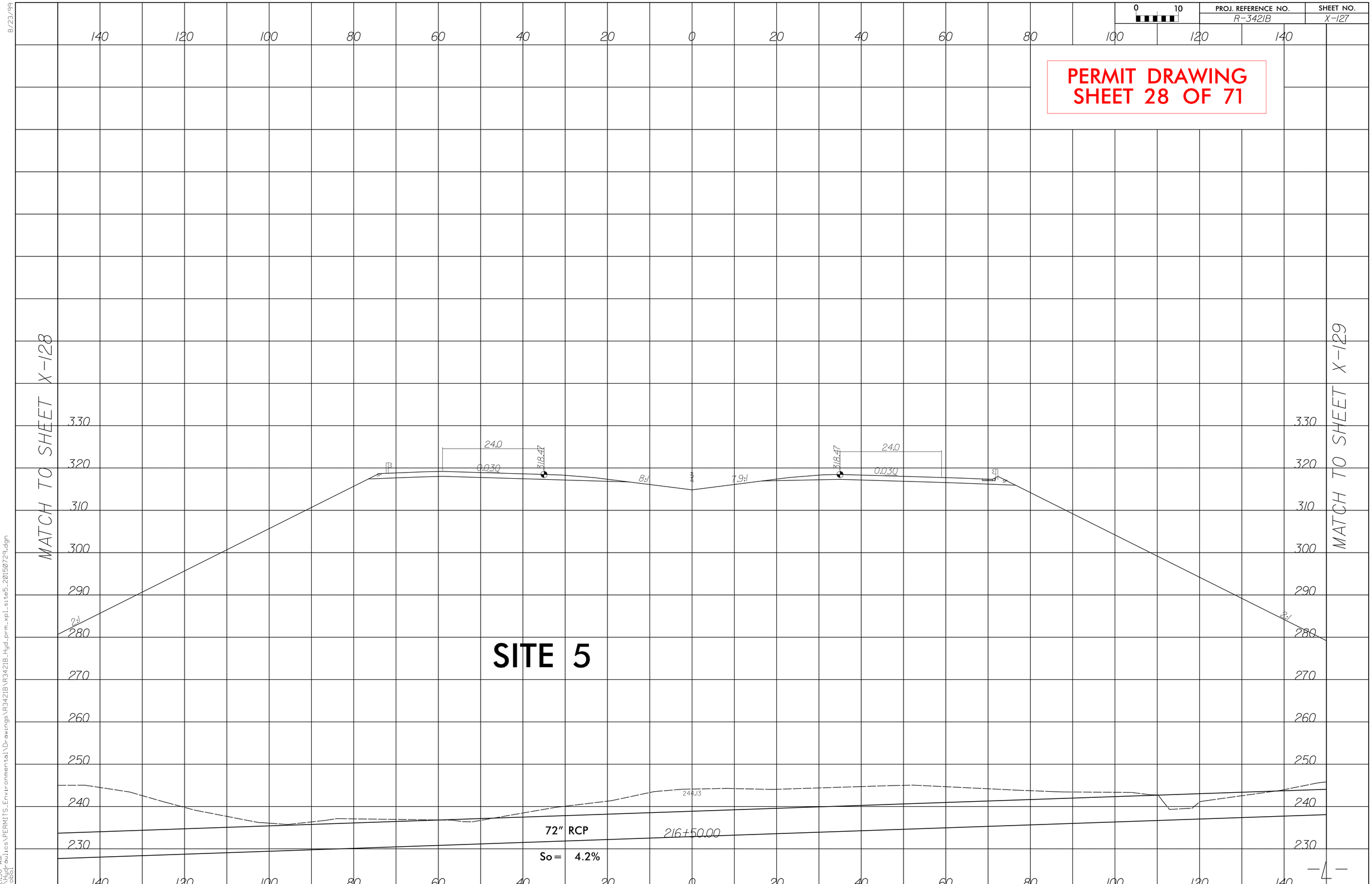
rrobol

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-127

0 10

PERMIT DRAWING
SHEET 28 OF 71



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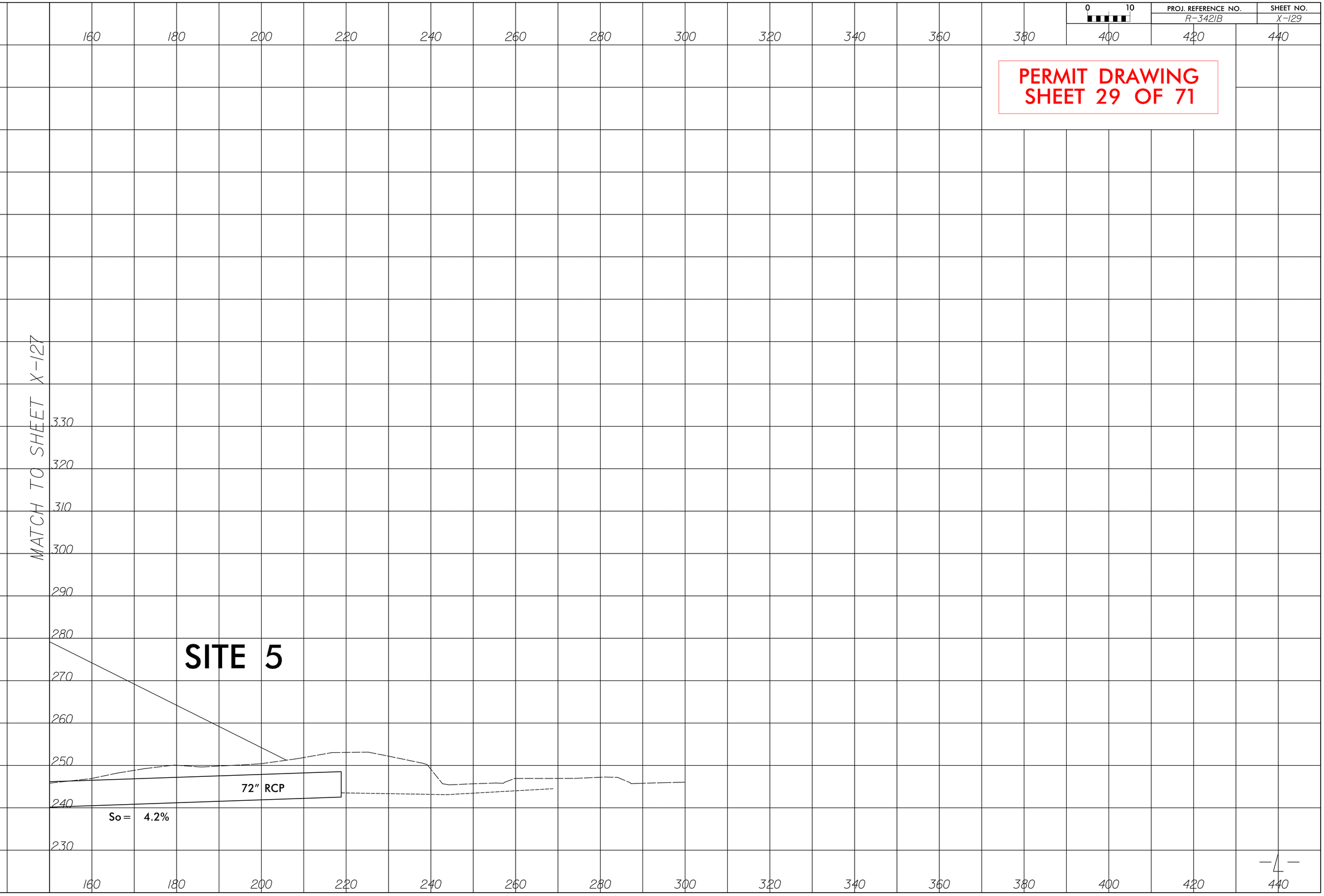
rrobbi

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-129

PERMIT DRAWING
SHEET 29 OF 71

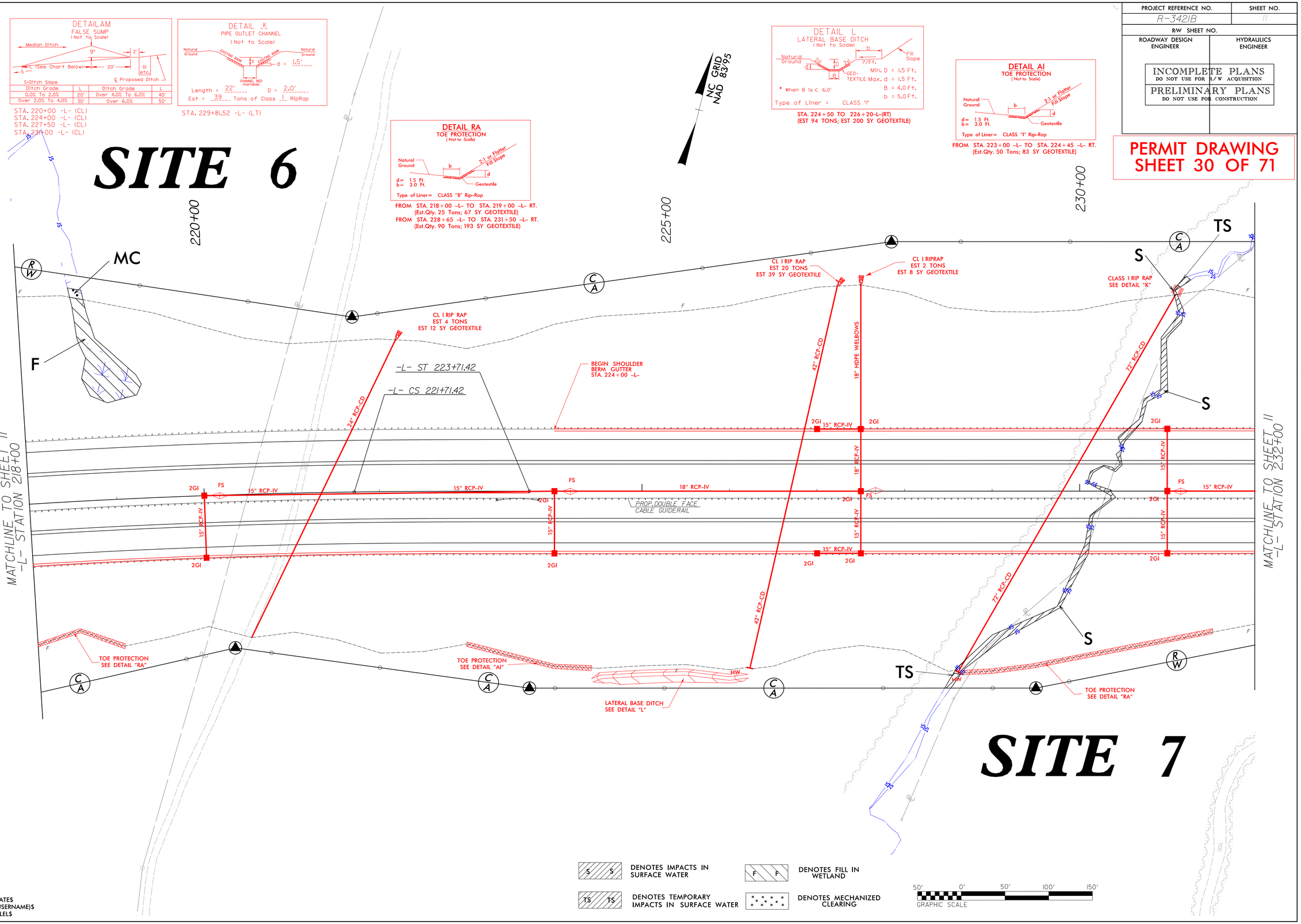


PROJECT REFERENCE NO.	SHEET NO.
R-3421B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 30 OF 71



REVISIONS

8/17/99

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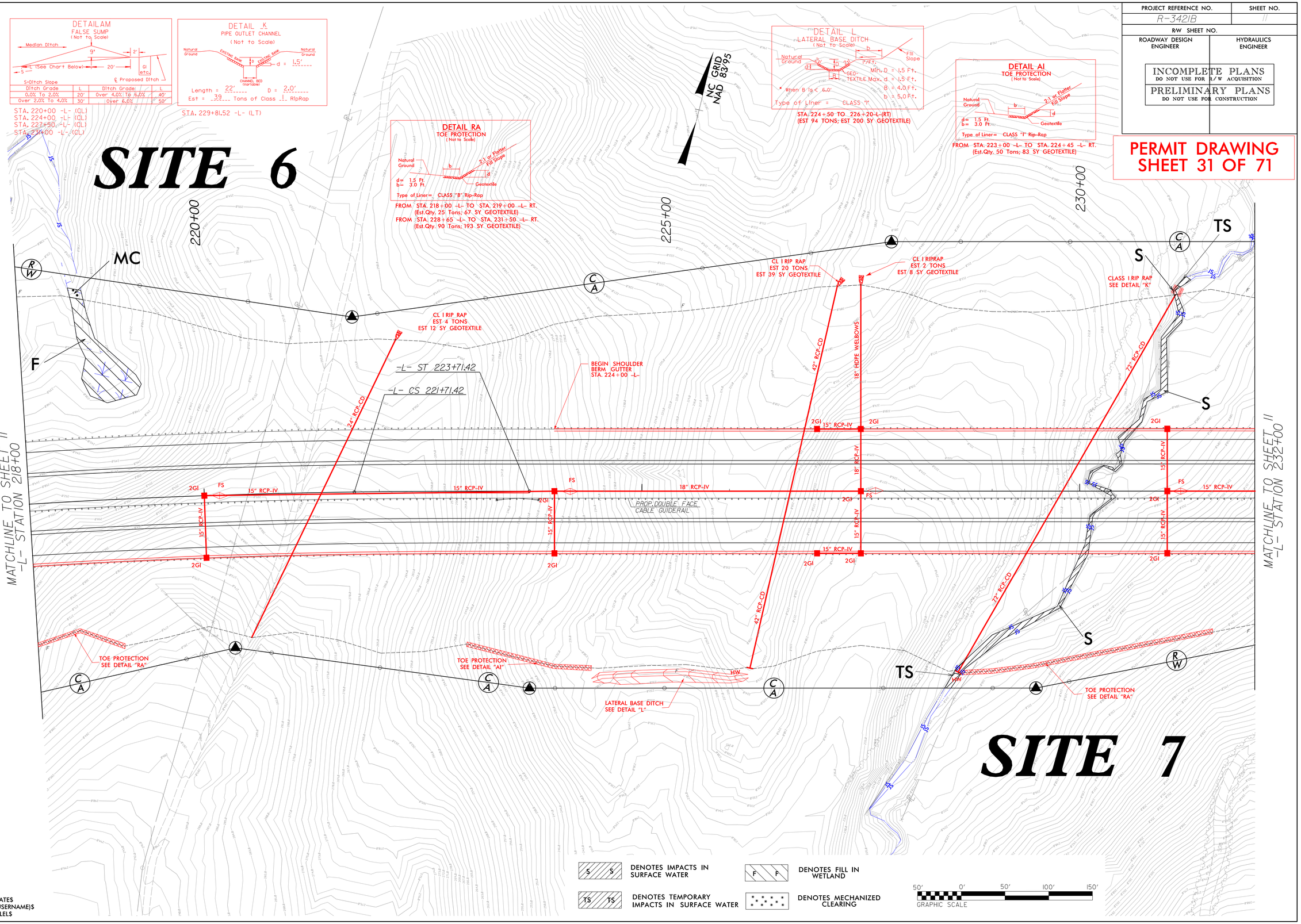
rrcobb

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 31 OF 71



REVISIONS

8/17/99

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PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-140

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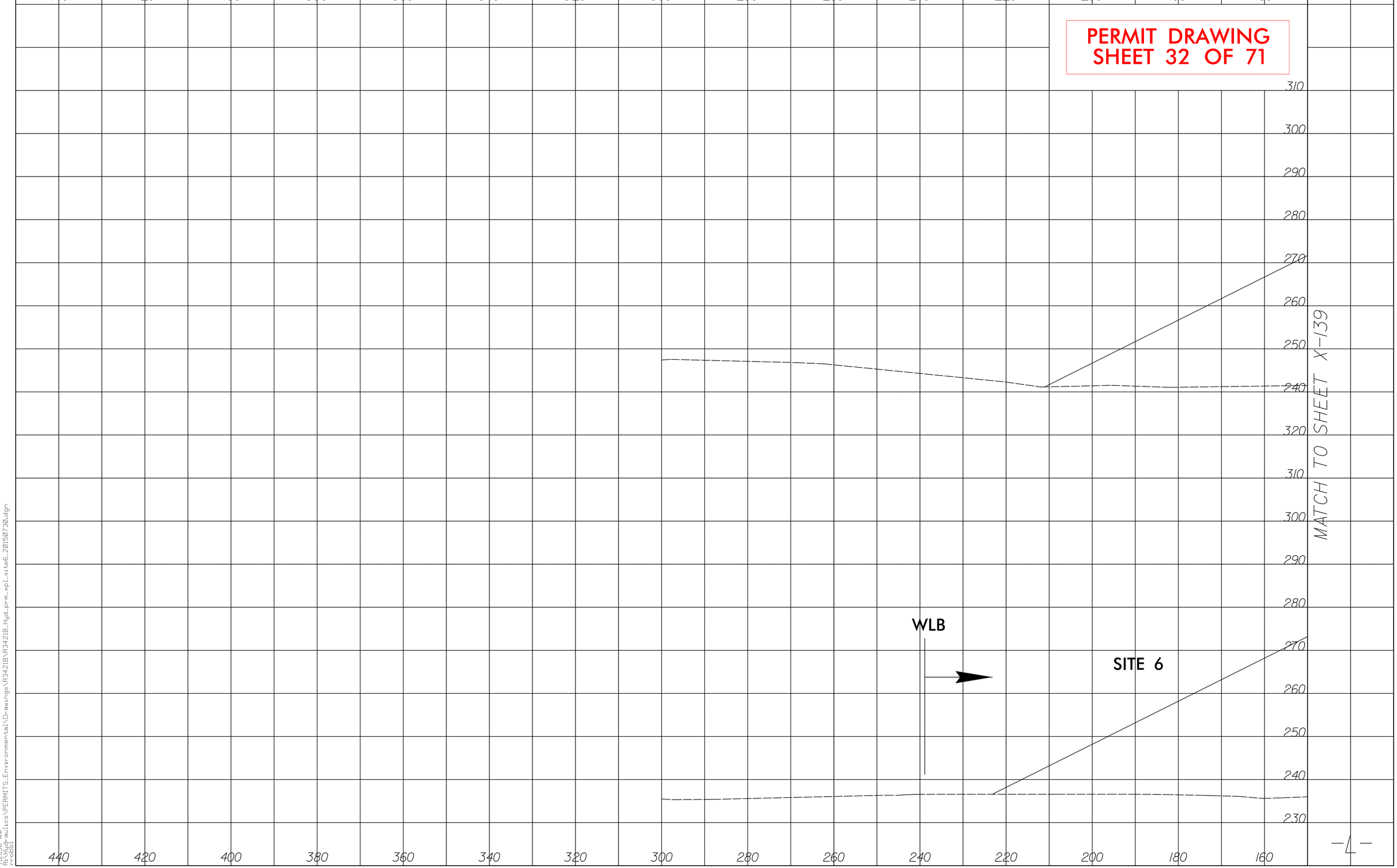
PERMIT DRAWING
SHEET 32 OF 71



8/23/99

SDATE
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SFILES

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rrobol

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-139

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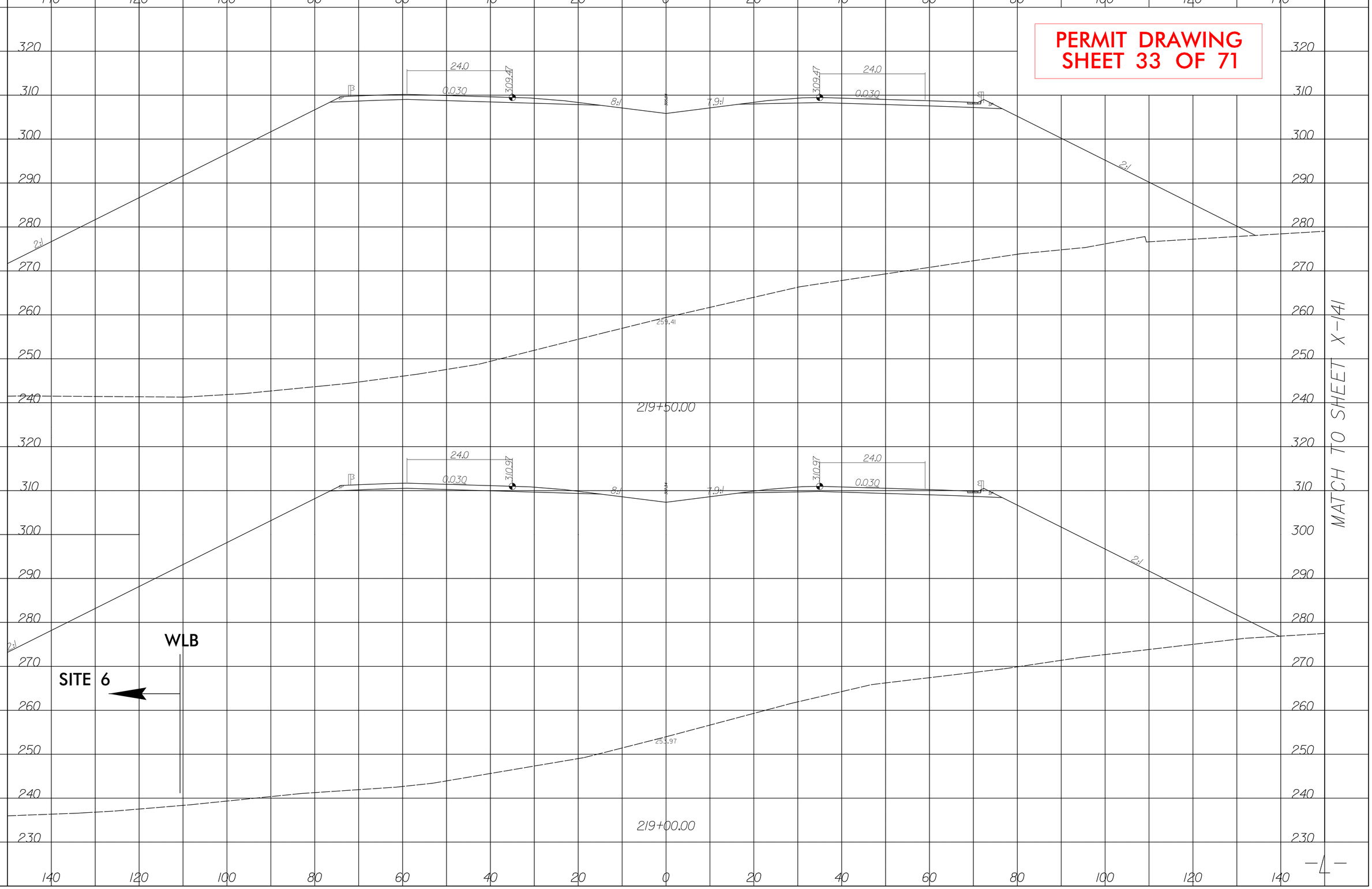
PERMIT DRAWING
SHEET 33 OF 71



PROJECT REFERENCE NO.	SHEET NO.
R-3421B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

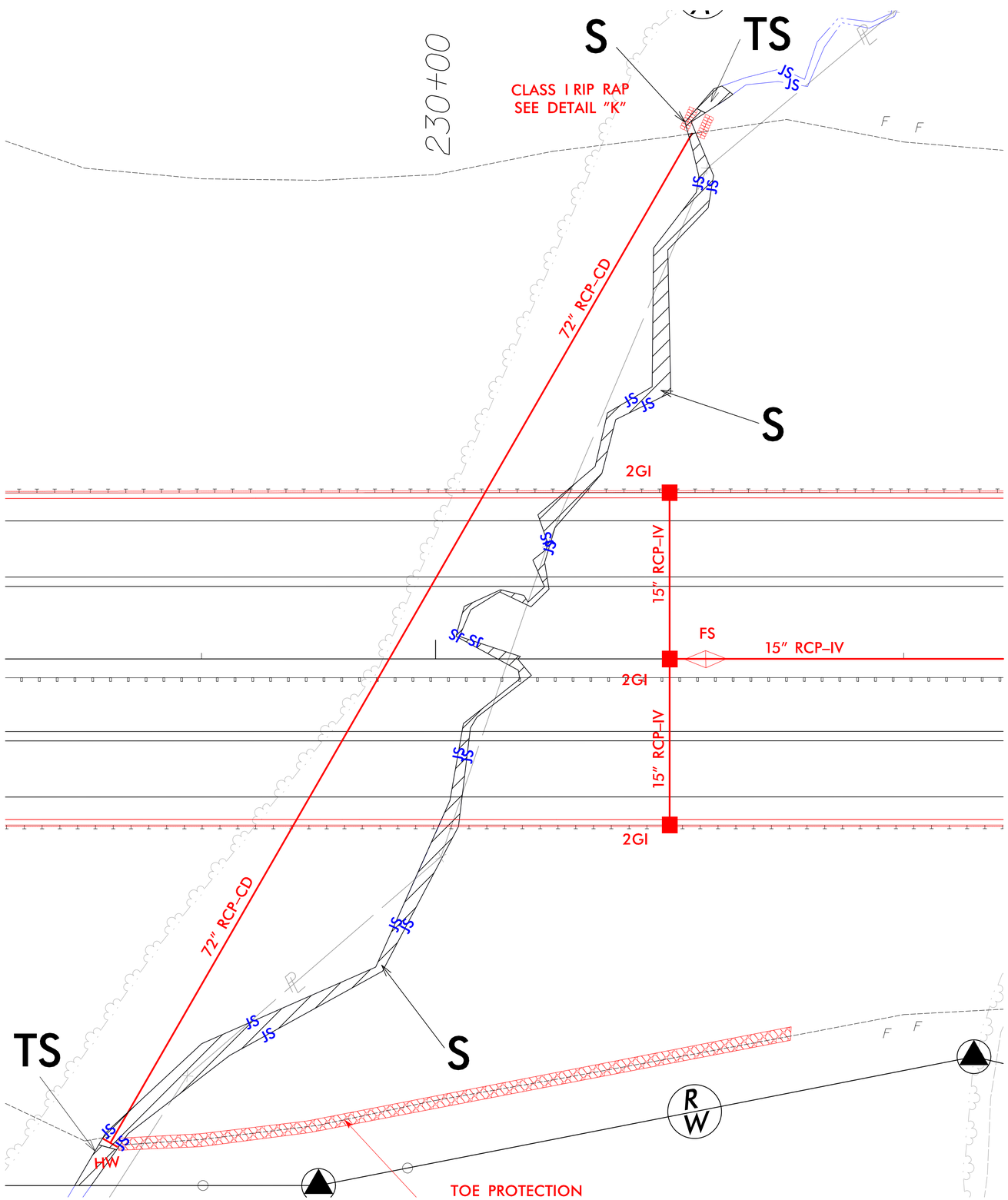
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 34 OF 71

NC GRID NAD 83/95

SITE 7 ENLARGEMENT



50' 0' 50'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3421B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

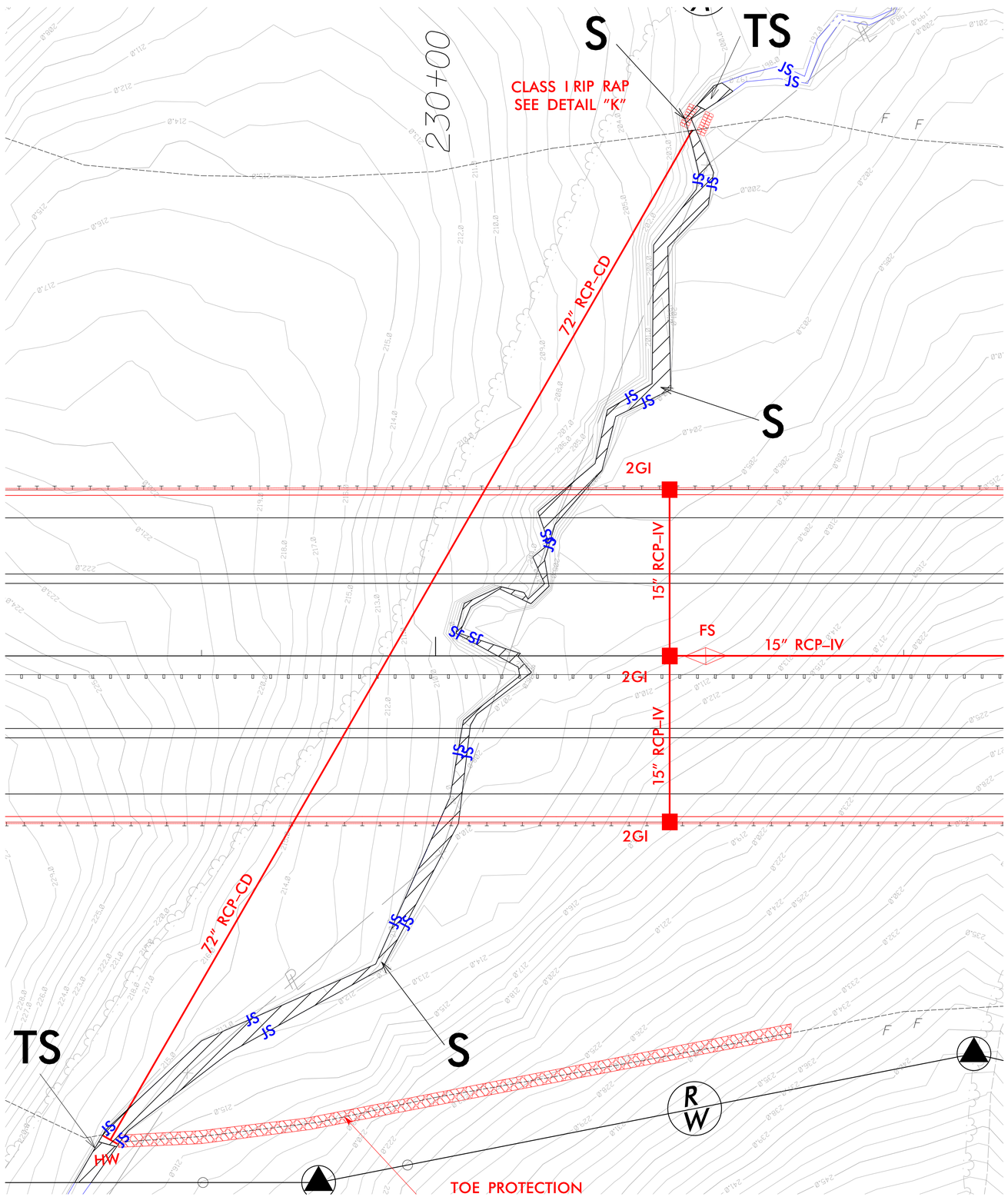
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 35 OF 71

NC GRID NAD 83/95

SITE 7 ENLARGEMENT



50′ 0′ 50′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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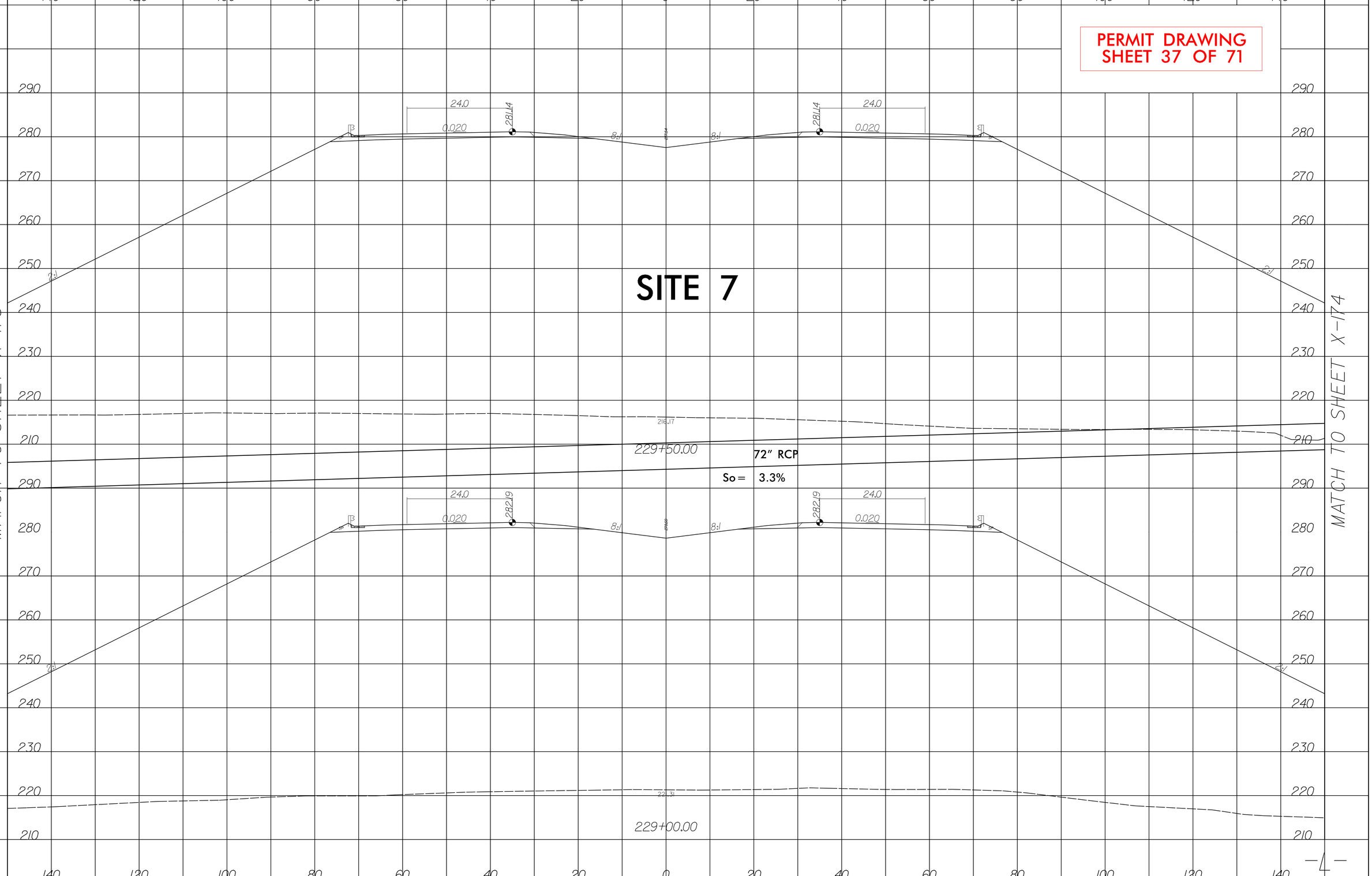
PERMIT DRAWING
SHEET 36 OF 71

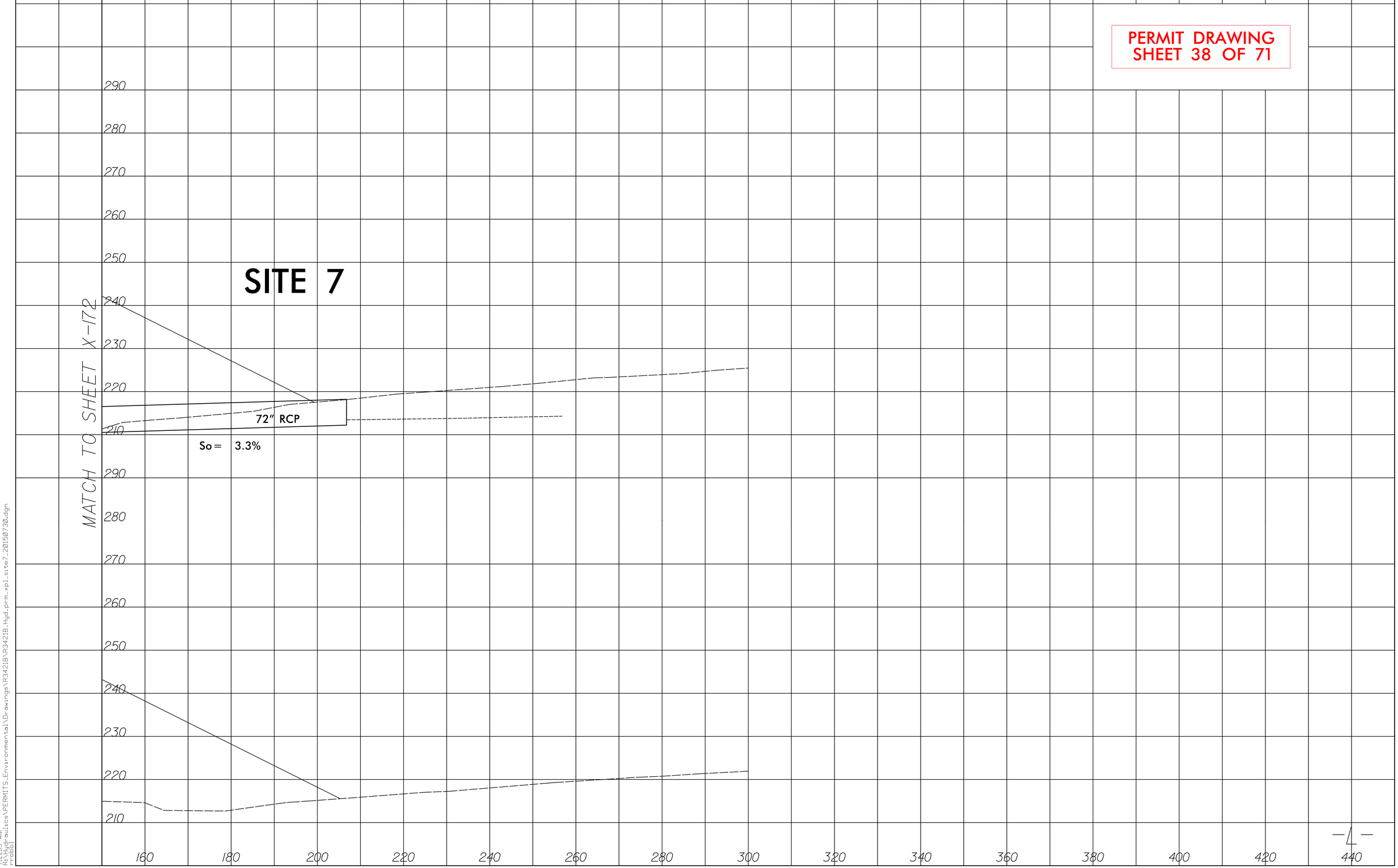
PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-172

PERMIT DRAWING
SHEET 37 OF 71



PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-174

PERMIT DRAWING
SHEET 38 OF 71



Revised 8/6/19

REVISIONS

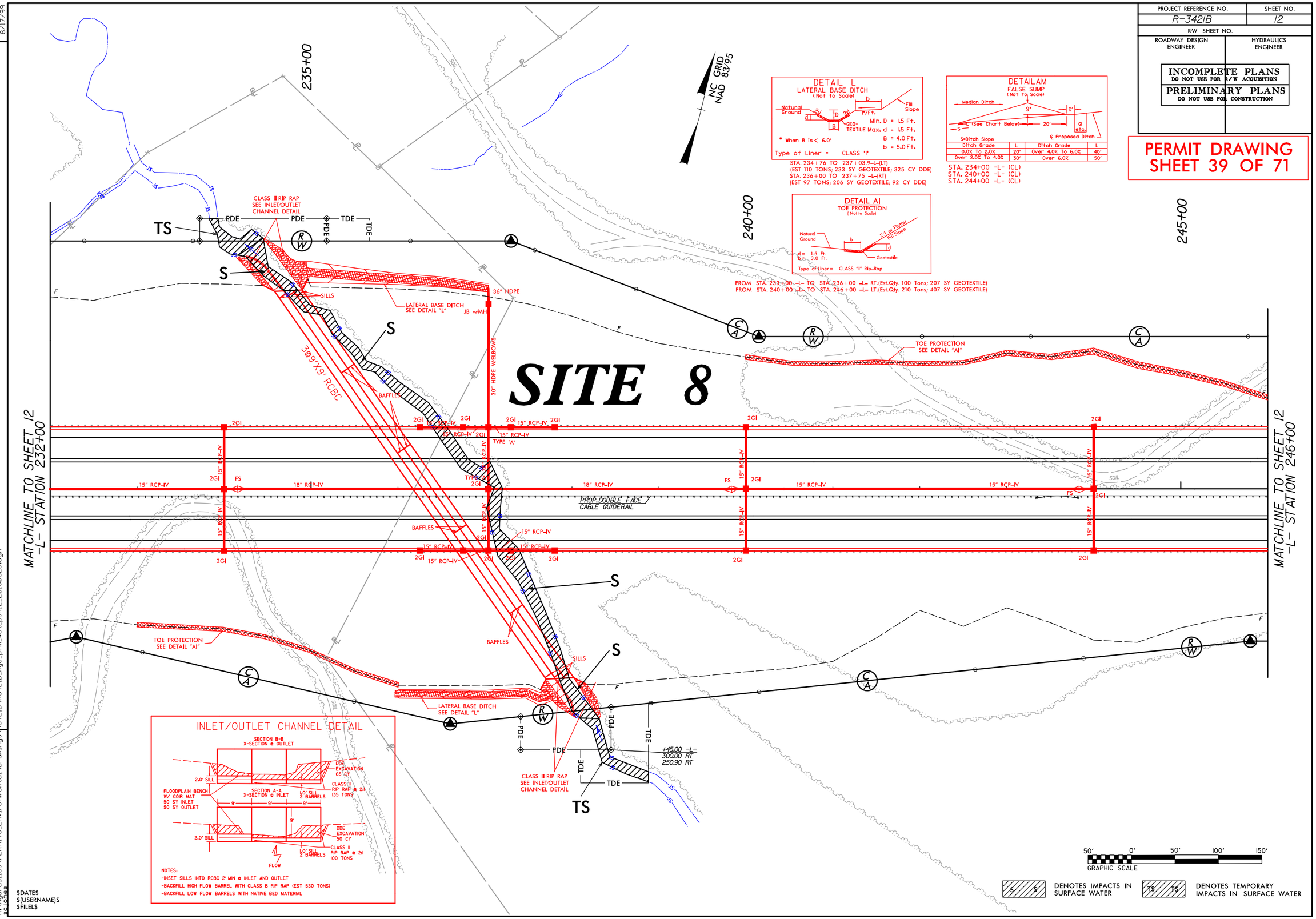
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 39 OF 71



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$DATE$
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$FILE$

Revised 8/6/19

REVISIONS

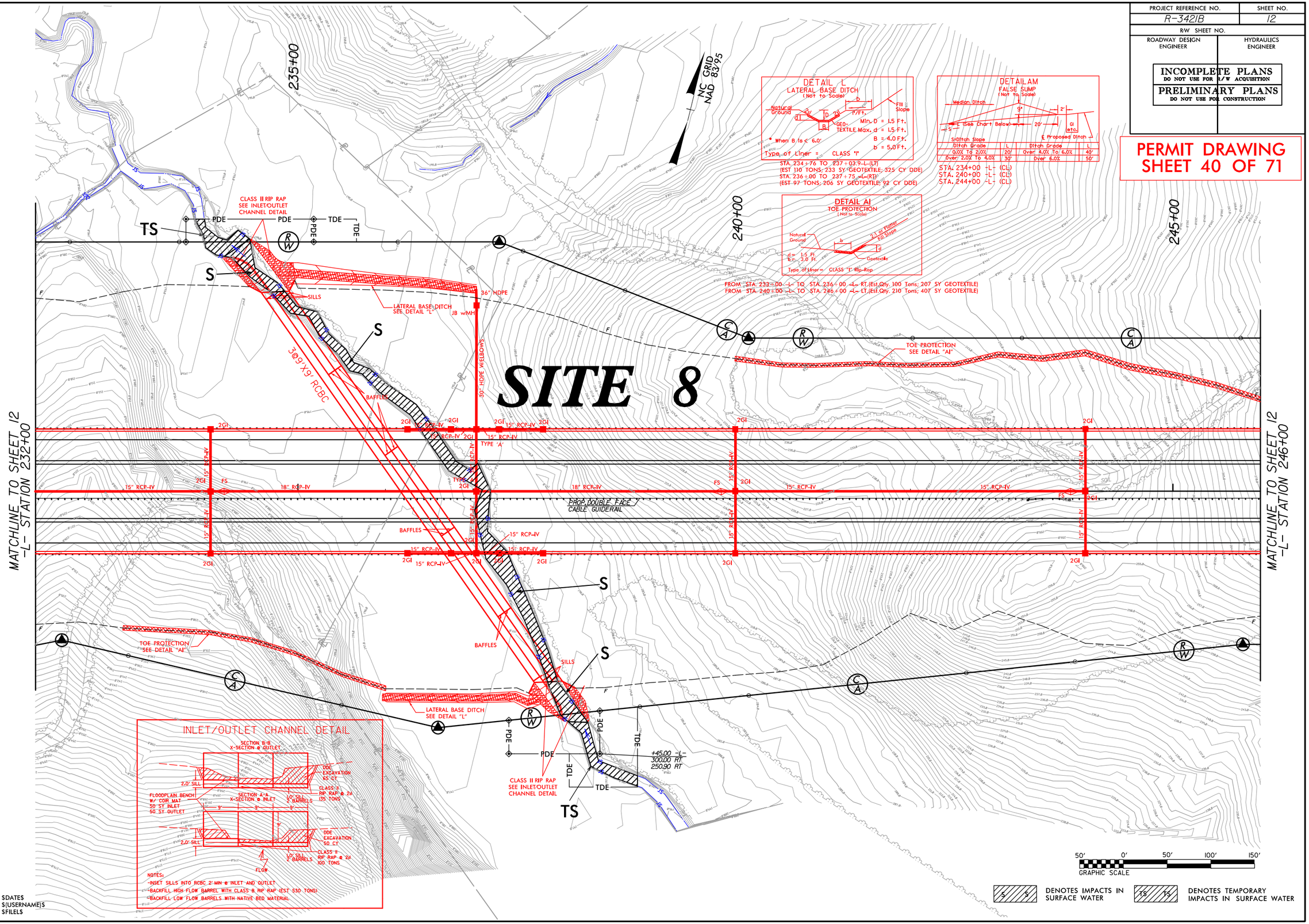
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 40 OF 71



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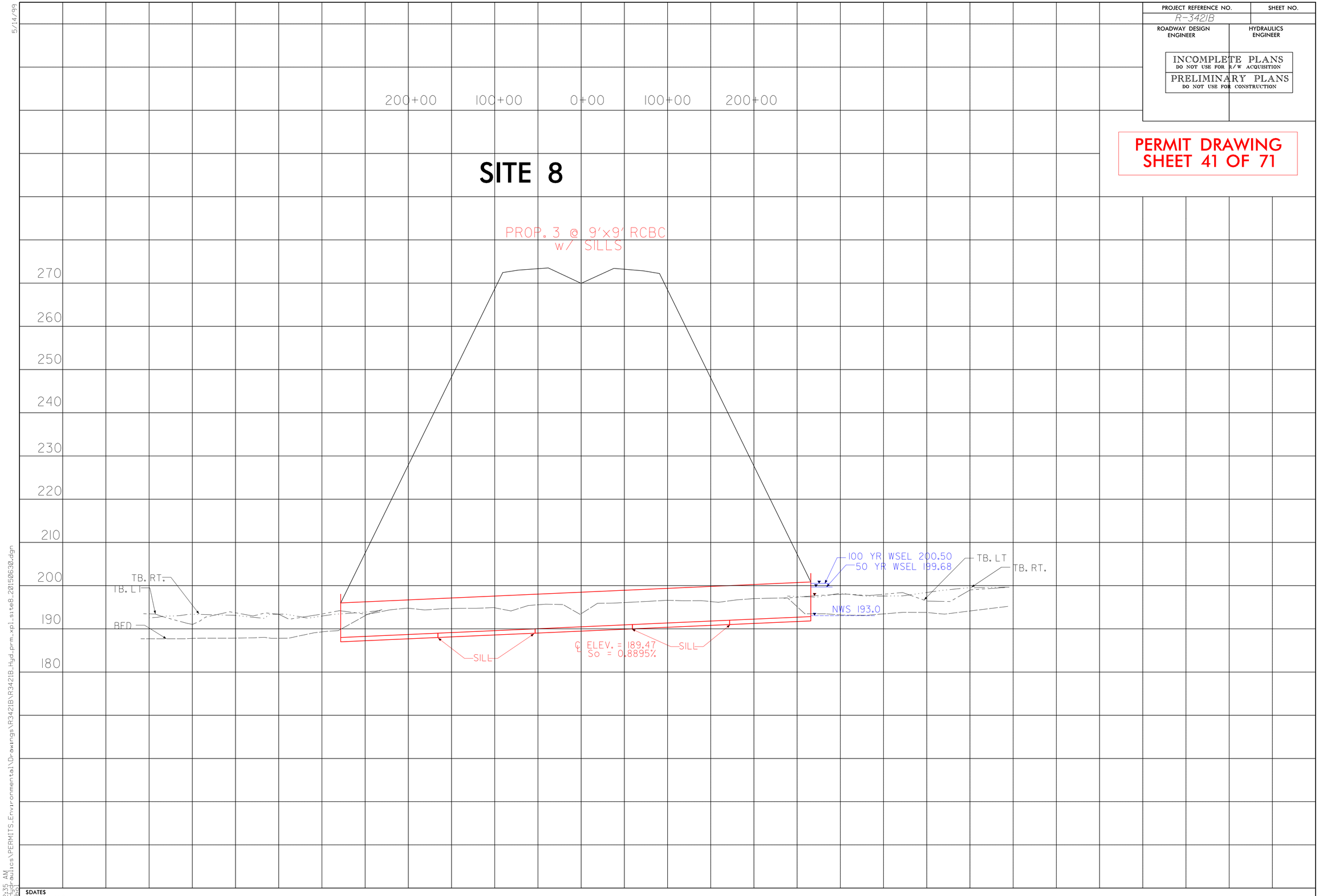
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 41 OF 71

SITE 8



5/14/99

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$FILEL$

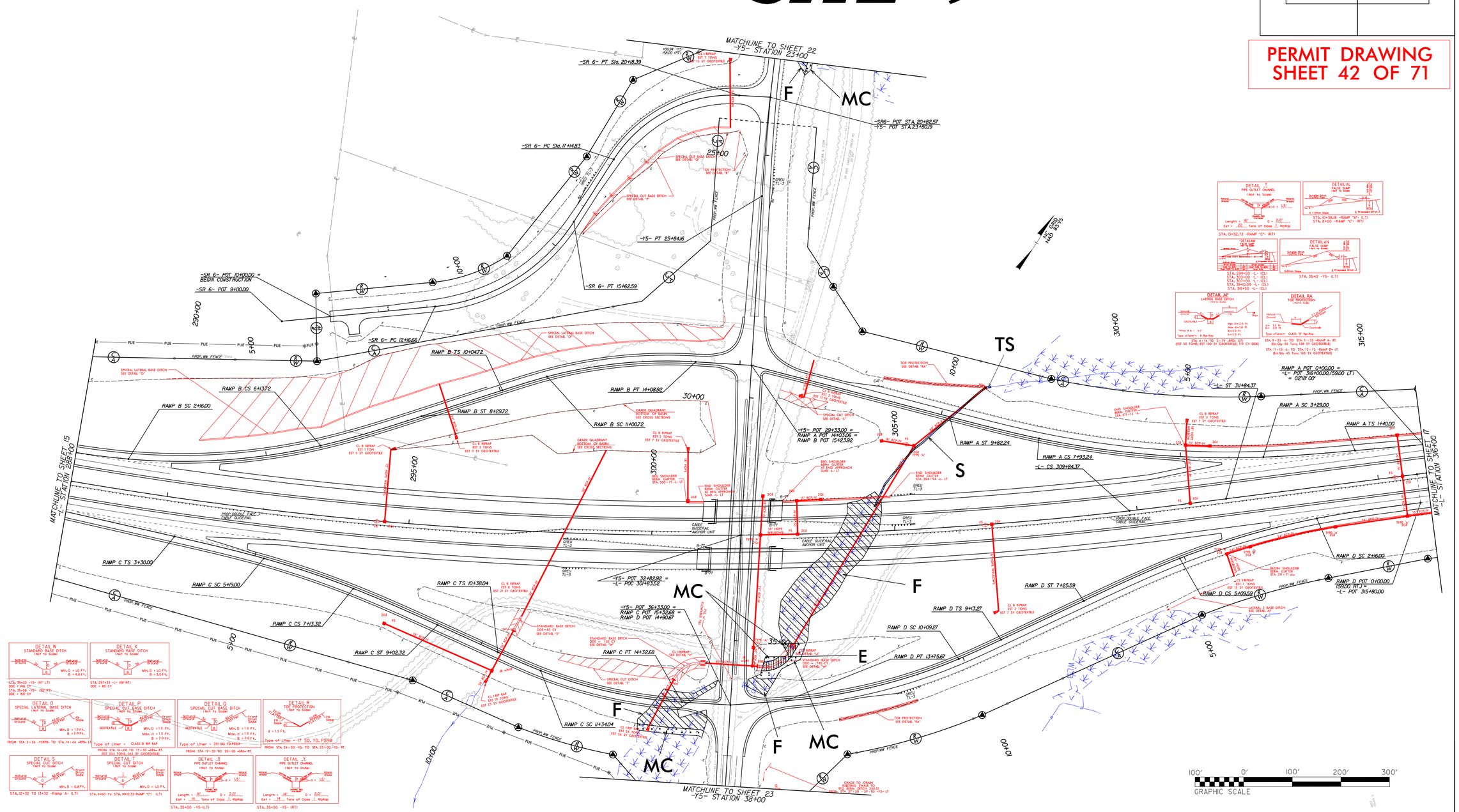
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 42 OF 71

SITE 9



SITE 10

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND

REVISIONS

8/17/99

7:22:49 AM
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(rcobb)

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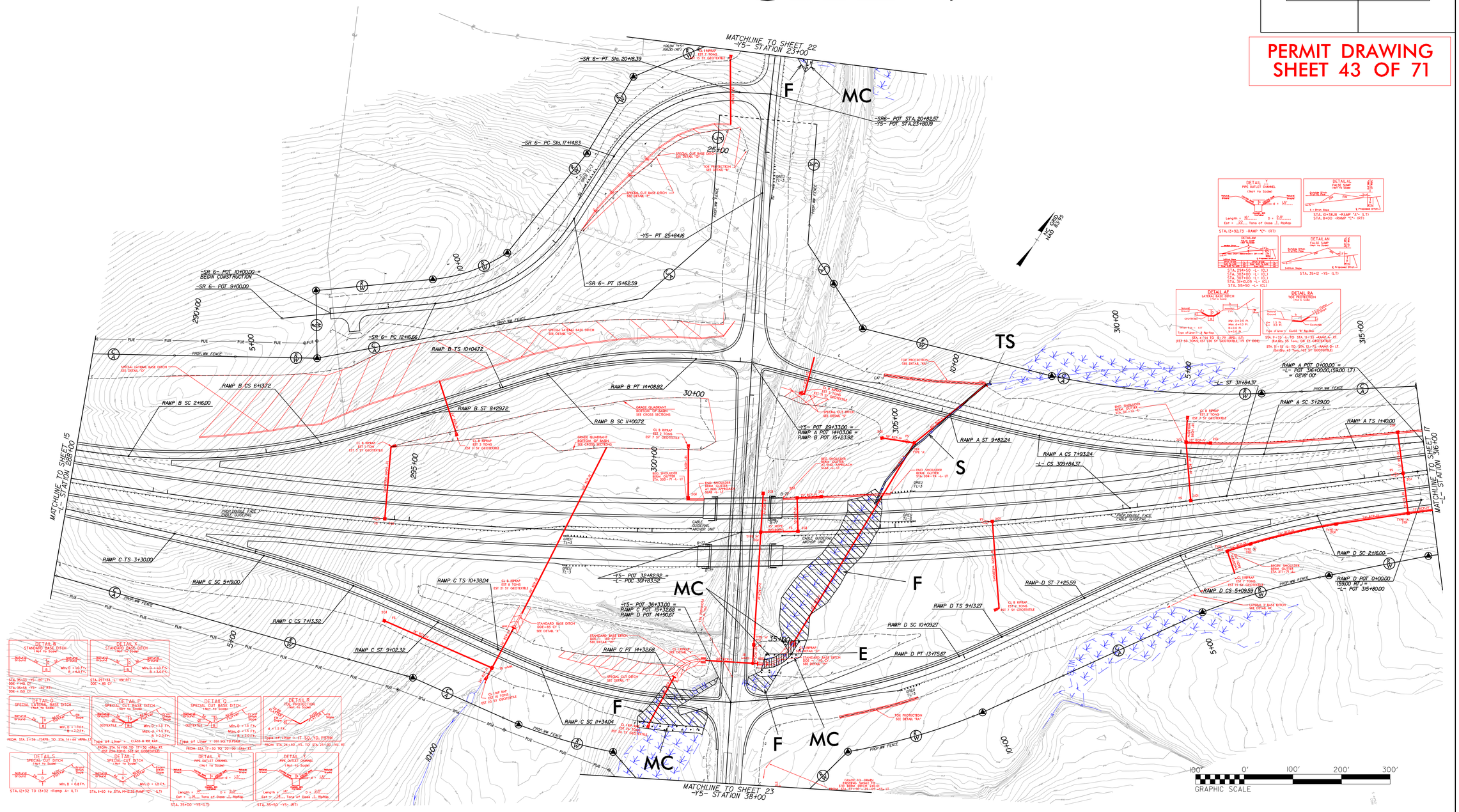
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 43 OF 71

SITE 9



SITE 10

S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND

REVISIONS

8/17/99

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rcobb

$DATE$
$(USERNAME)$
$FILEL$

SITE 9 ENLARGEMENT

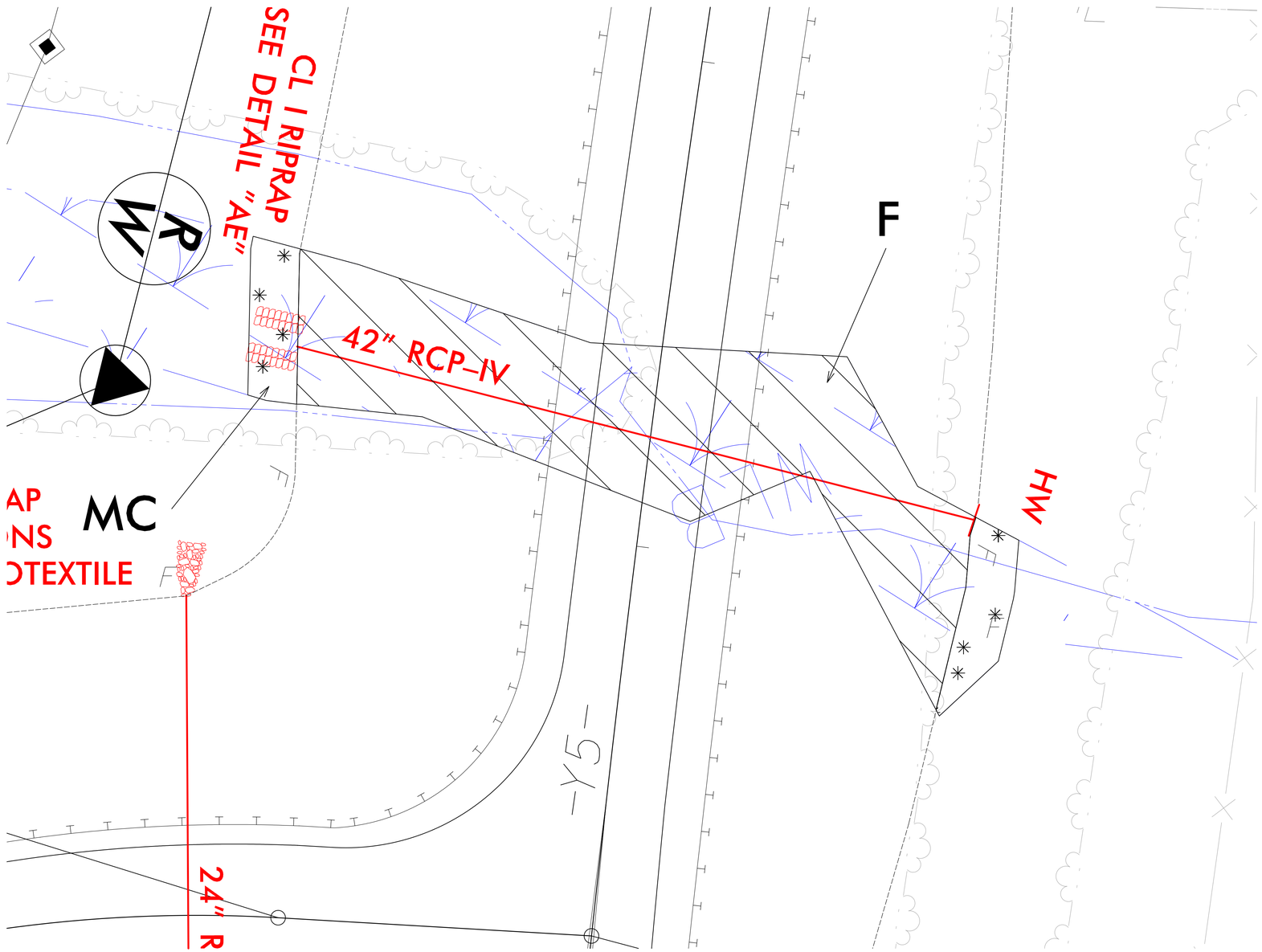
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 44 OF 71

NC GRID
NAD 83/95



25′ 0′ 25′
GRAPHIC SCALE

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

$DATE$
$(USERNAME)$
$FILEL$

REVISIONS

8/17/99

7:23:00 AM
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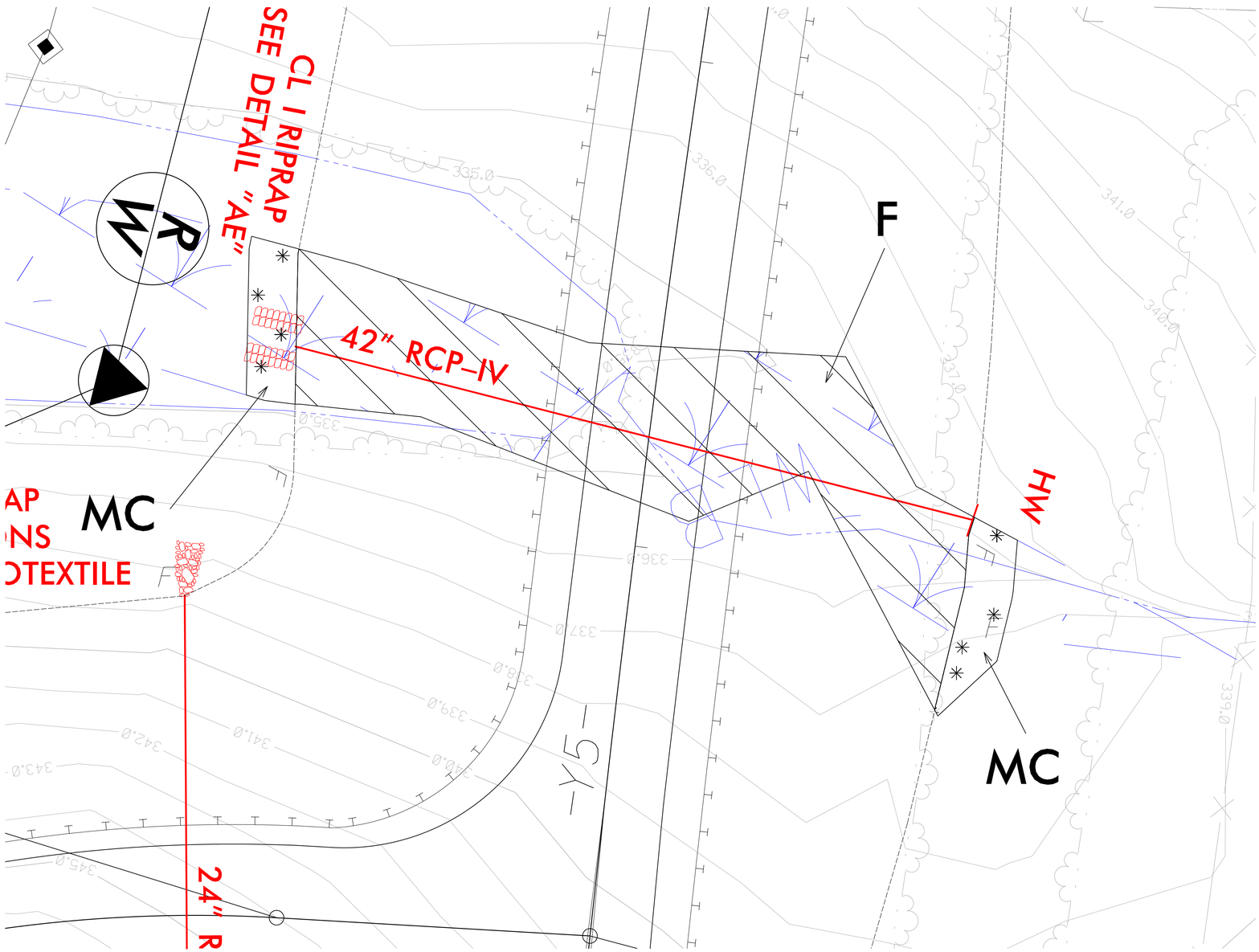
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 45 OF 71

SITE 9 ENLARGEMENT



F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

7:23:05 AM
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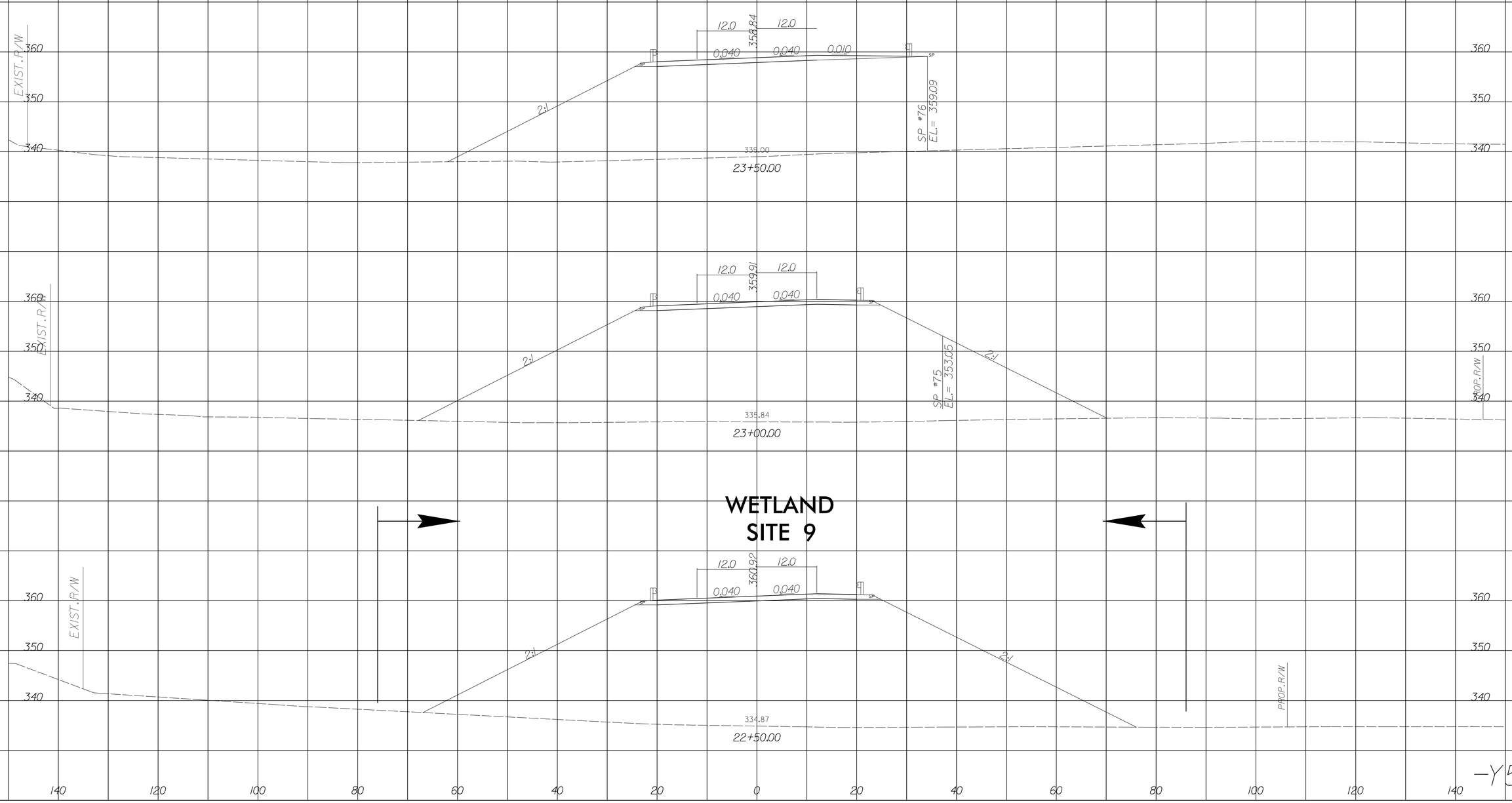
$DATE$
$(USERNAME)$
$FILEL$

PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-422

PERMIT DRAWING
SHEET 46 OF 71



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rrobol

SITE 10 ENLARGEMENT

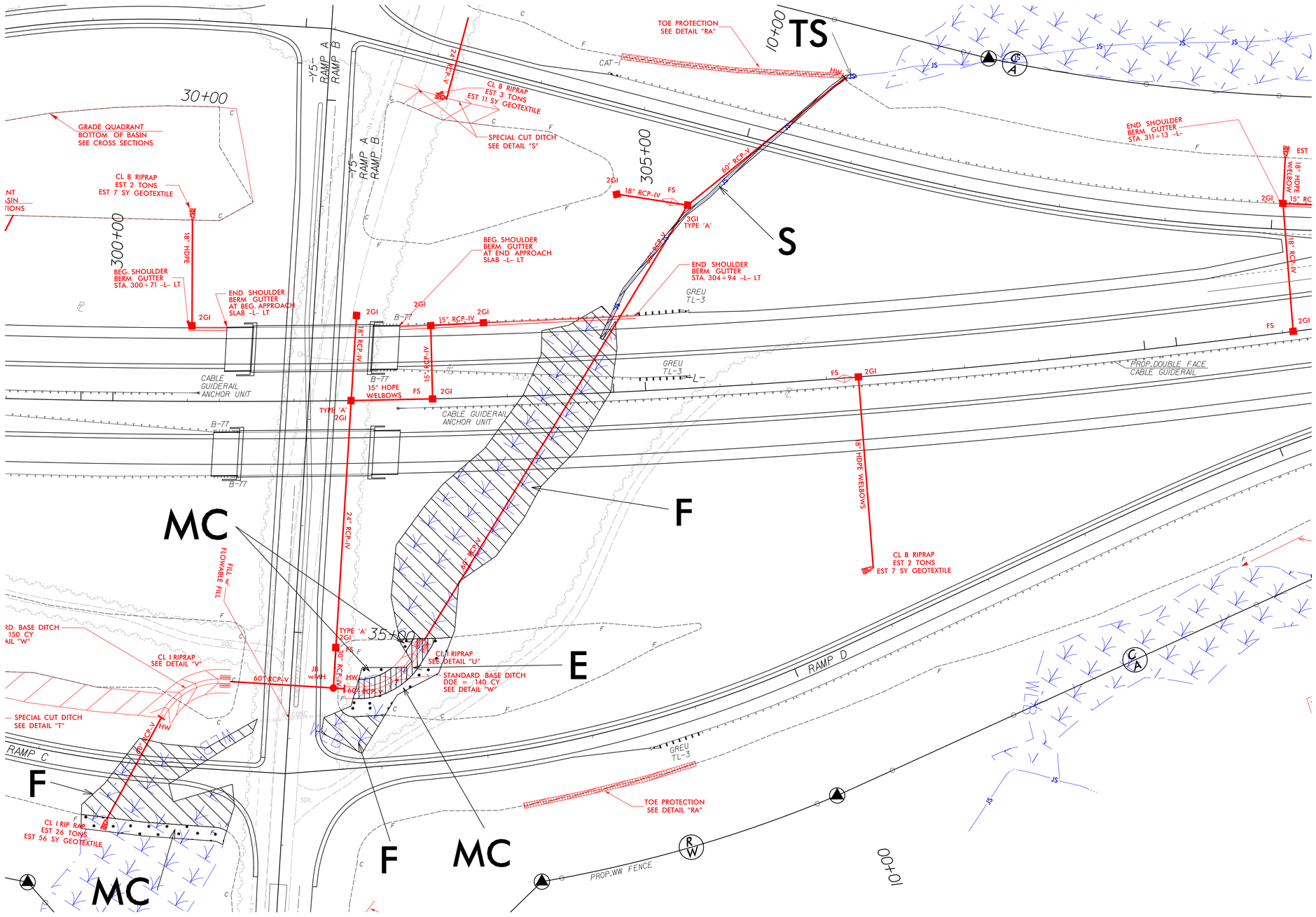
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 47 OF 71

NC GRID NAD 83/95



S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND

100' 0' 100'
GRAPHIC SCALE

REVISIONS

8/17/99

$DATES
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$FILEL$

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SITE 10 ENLARGEMENT

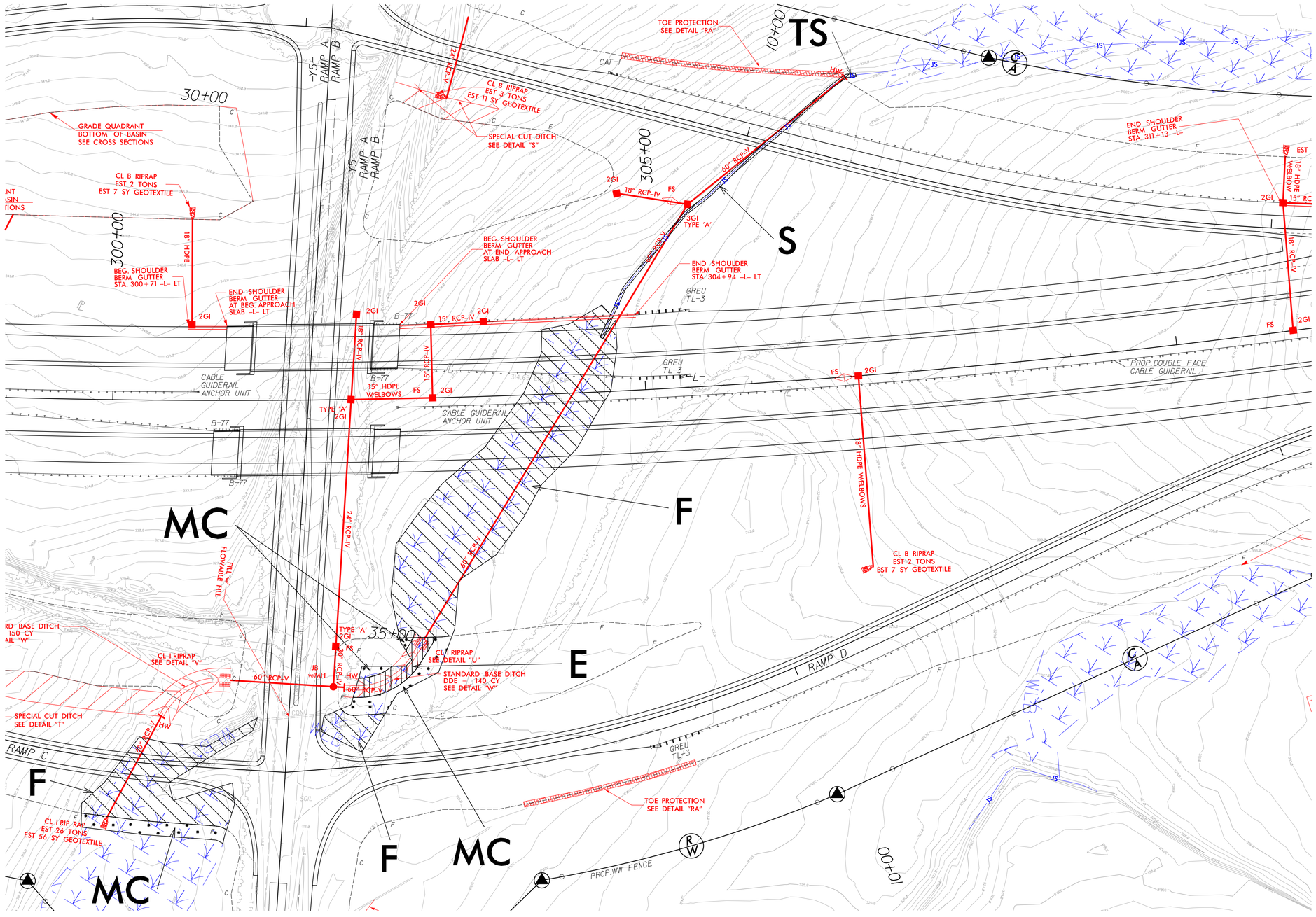
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 48 OF 71

NC GRID NAD 83/95



S S	DENOTES IMPACTS IN SURFACE WATER
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
E E	DENOTES EXCAVATION IN WETLAND

100' 0' 100'
GRAPHIC SCALE

REVISIONS

8/17/99

$DATES
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$FILEL$

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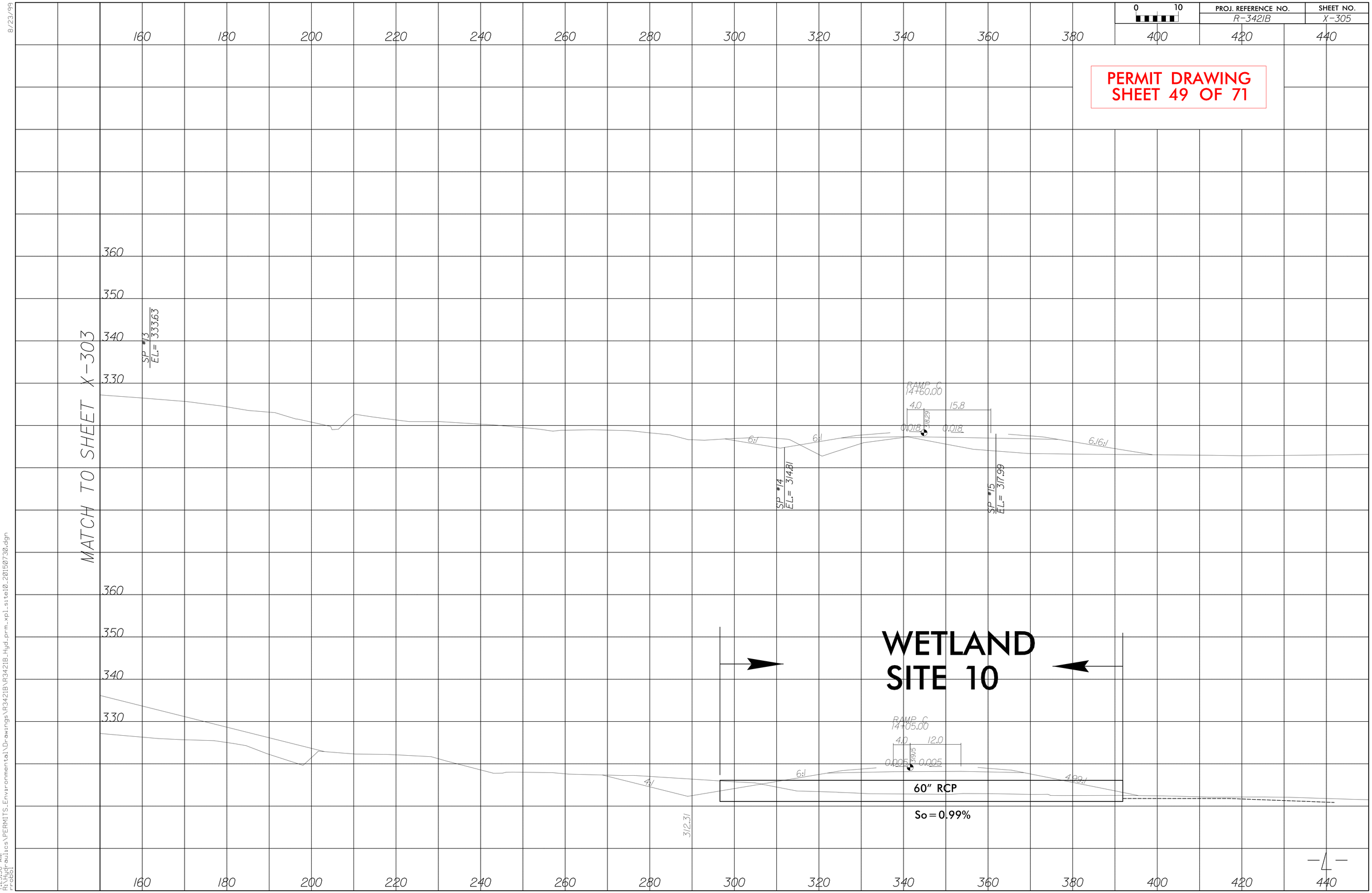
PERMIT DRAWING
SHEET 49 OF 71



PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-316

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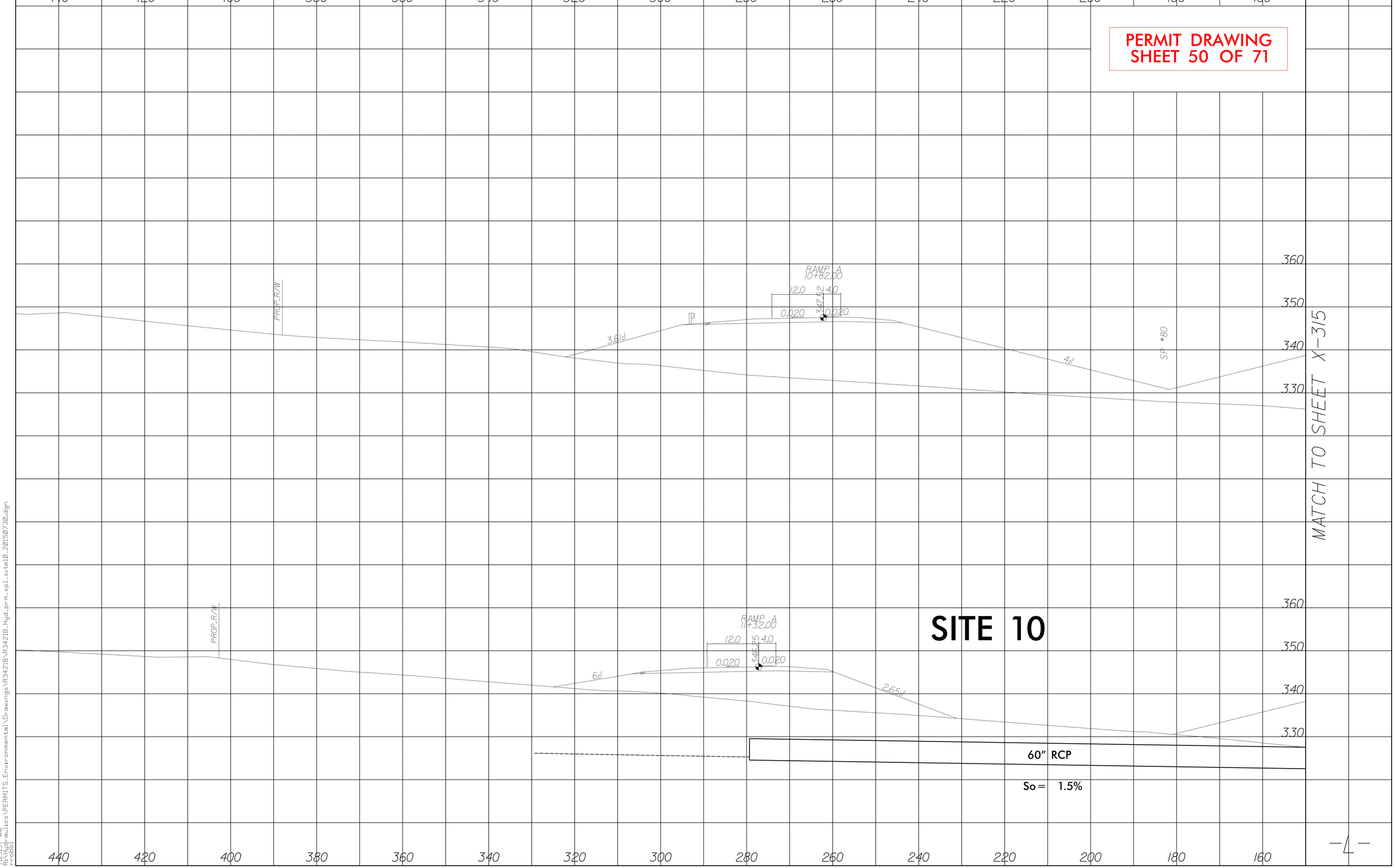
PERMIT DRAWING
SHEET 50 OF 71



PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-315

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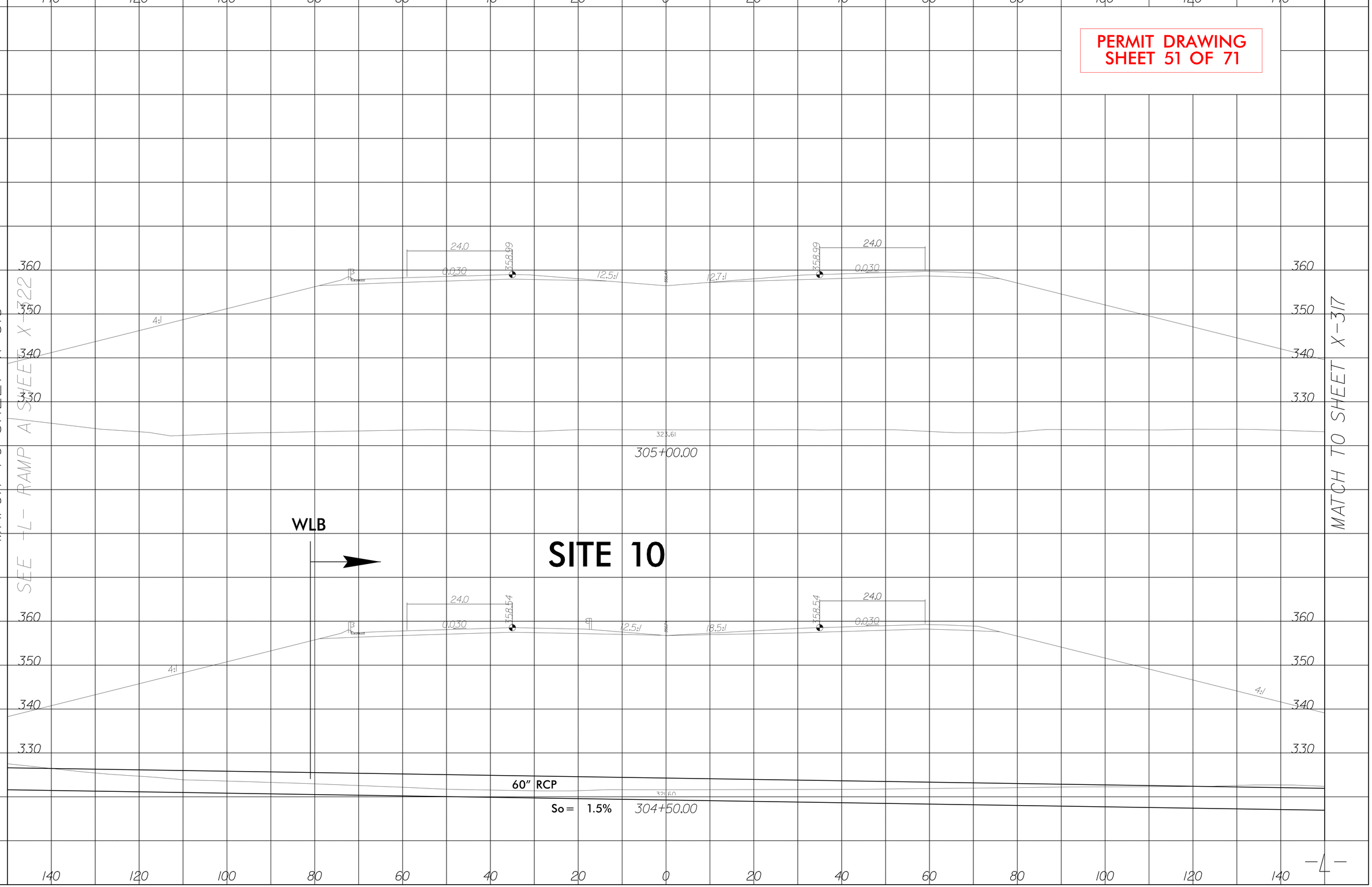
PERMIT DRAWING
SHEET 51 OF 71



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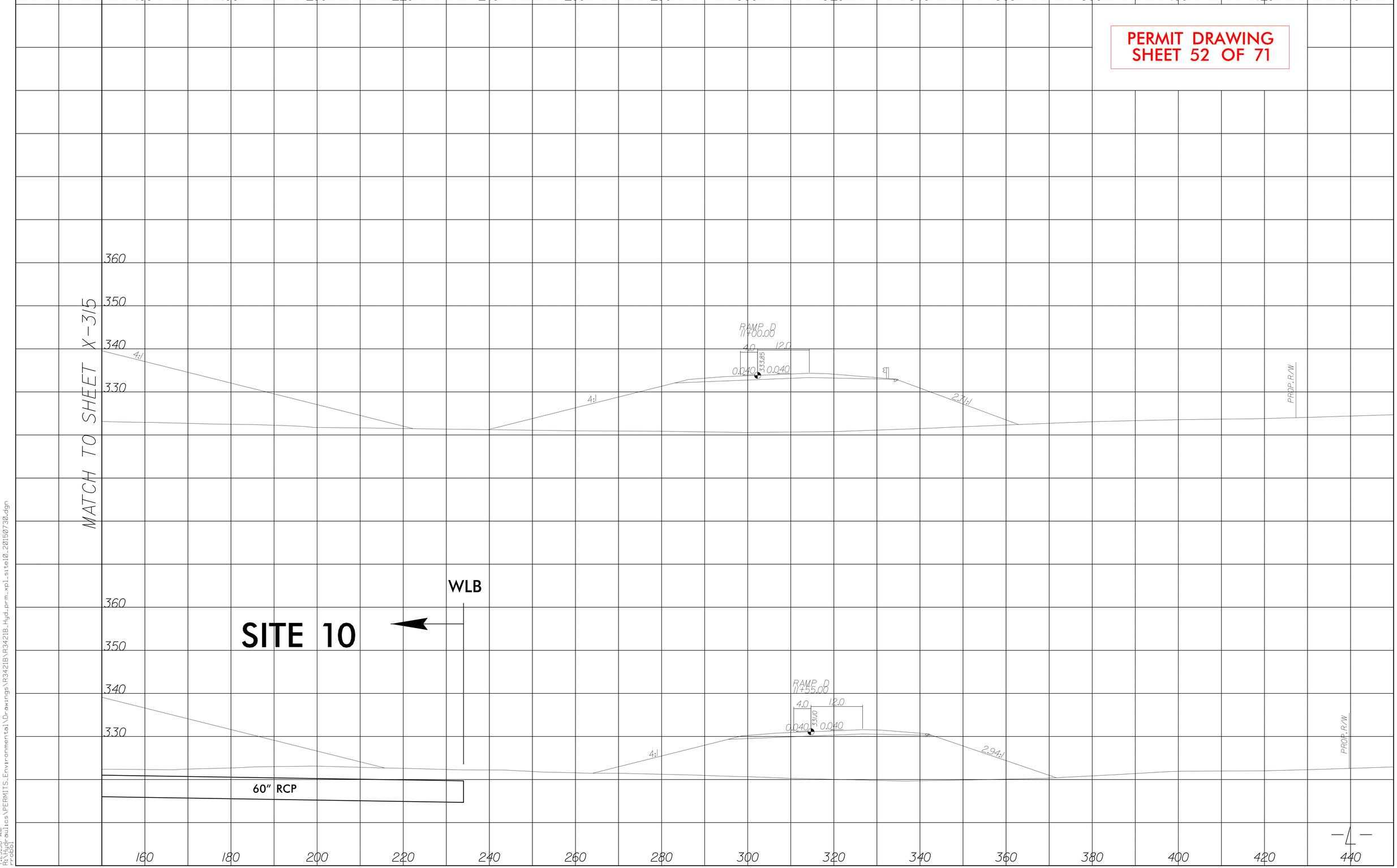
R-3421B	X-317

PERMIT DRAWING
SHEET 52 OF 71



8/23/99

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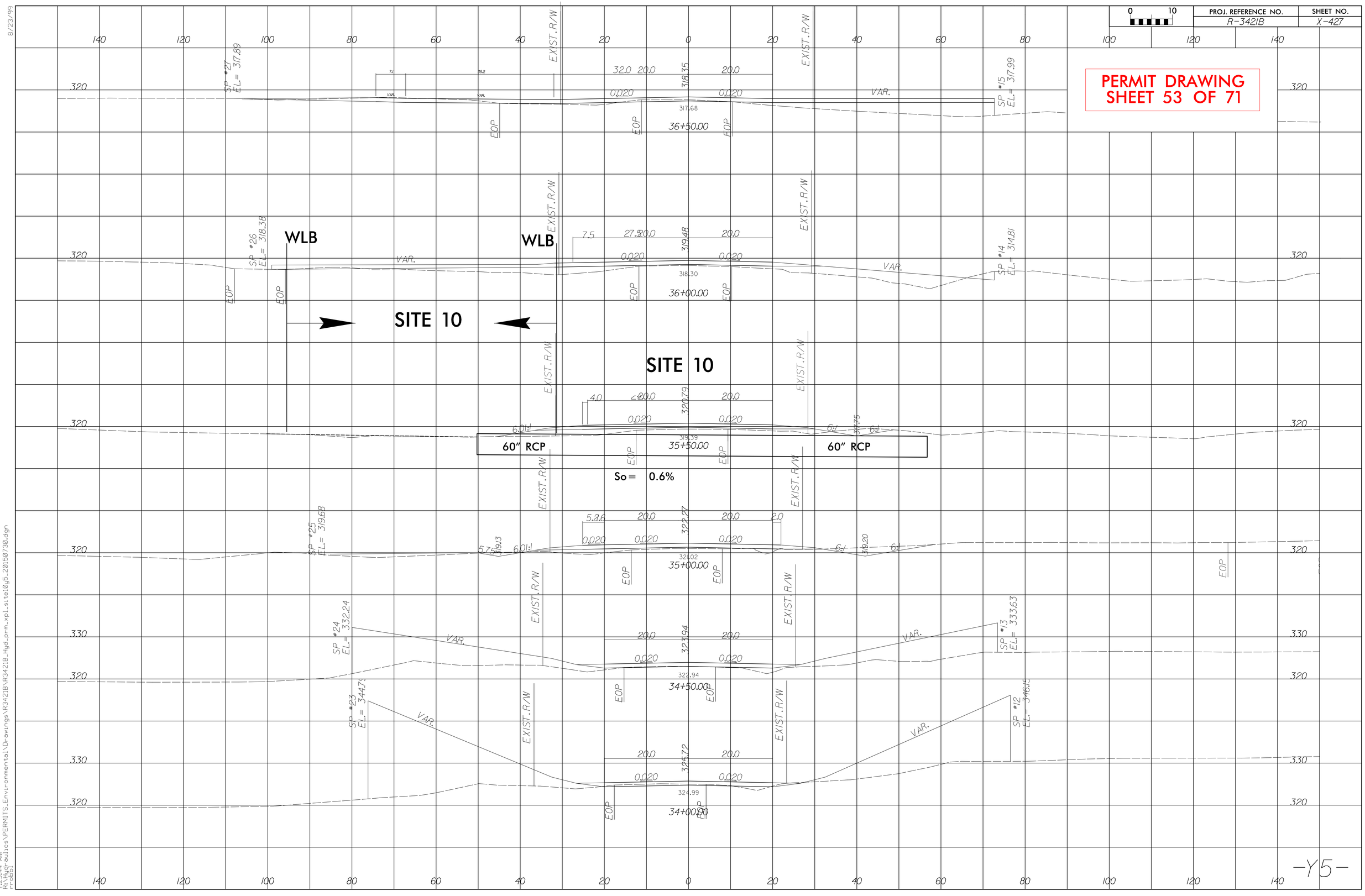
rrobbi

PERMIT DRAWING
SHEET 53 OF 71



-Y5-

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

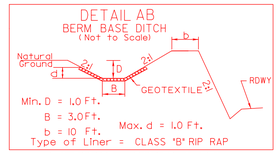
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

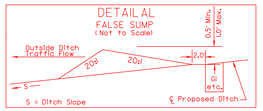
PERMIT DRAWING
SHEET 54 OF 71

SITE 12

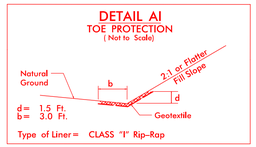
NC GRID NAD 83/95



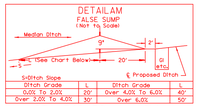
STA. 344+25 to 346+50 -L- (RT.)
(EST 77 TONS; 172 SY GEOTEXTILE; 200 CY DDE)



STA. 346+50 -L- (RT)
STA. 349+50 -L- (RT)

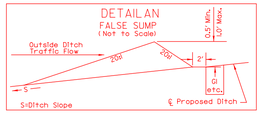


FROM STA. 350+68 -L- TO STA. 354+65 -L- RT.(Est.Qty. 130 Tons; 267 SY GEOTEXTILE)
FROM STA. 352+30 -L- TO STA. 355+90 -L- LT.(Est.Qty. 125 Tons; 245 SY GEOTEXTILE)

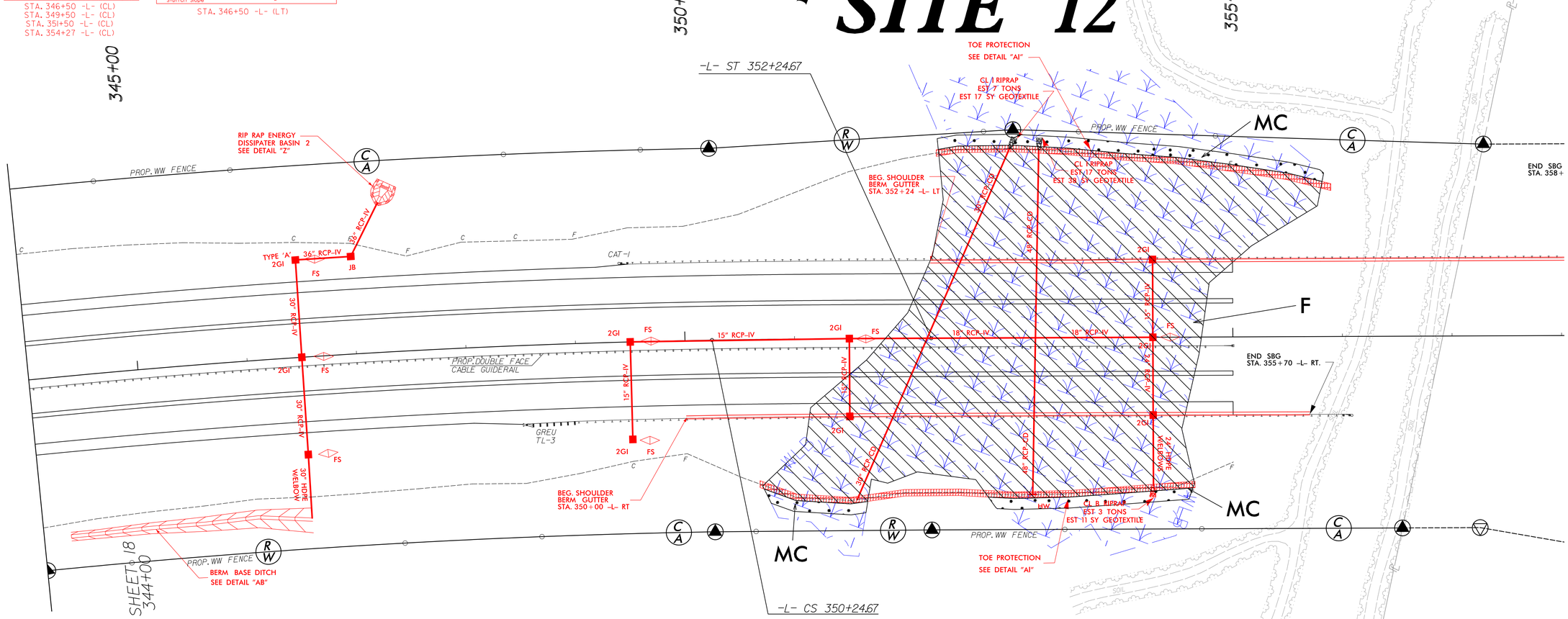


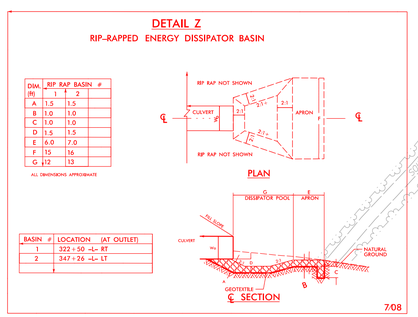
S=Ditch Slope			
Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

STA. 346+50 -L- (CL)
STA. 349+50 -L- (CL)
STA. 351+50 -L- (CL)
STA. 354+27 -L- (CL)



STA. 346+50 -L- (LT)





DIM. (ft)	RIP RAP BASIN # 1	2	
A	1.5	1.5	
B	1.0	1.0	
C	1.0	1.0	
D	1.5	1.5	
E	6.0	7.0	
F	15	16	
G	12	13	

ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	322+50 -L- RT
2	347+26 -L- LT

STA. 347+26 -L- RT
(EST 15 TONS CLASS I RIP RAP; 27 SY GEOTEXTILE; 23 CY DDE)

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

7:23:56 AM
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rrsebo1

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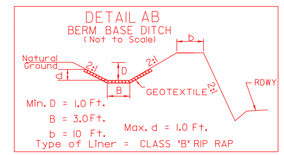
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

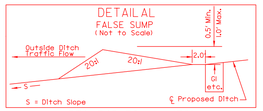
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

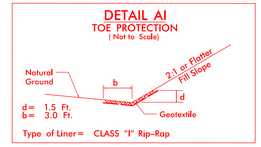
PERMIT DRAWING
SHEET 55 OF 71



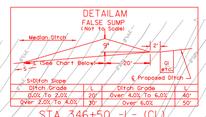
STA. 344+25 to 346+50 -L- (RT.)
(EST 77 TONS; 172 SY GEOTEXTILE; 200 CY DDE)



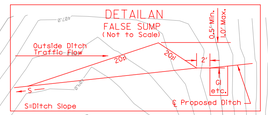
STA. 346+50 -L- (RT)
STA. 349+50 -L- (RT)



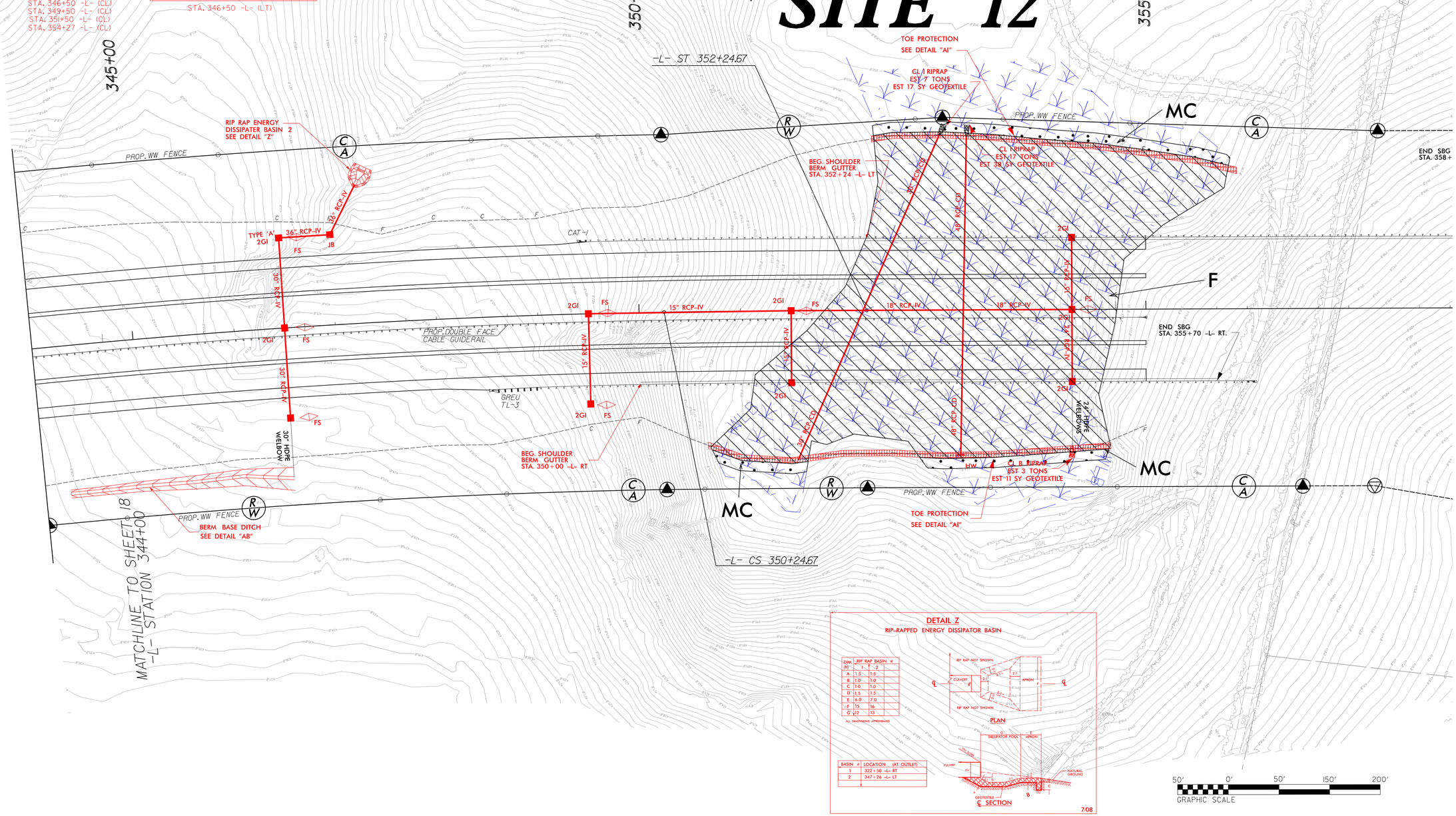
FROM STA. 350+68 -L- TO STA. 354+65 -L- RT.(Est.Qty. 130 Tons; 267 SY GEOTEXTILE)
FROM STA. 352+30 -L- TO STA. 355+90 -L- LT.(Est.Qty. 125 Tons; 245 SY GEOTEXTILE)



STA. 346+50 -L- (CL)
STA. 349+50 -L- (CL)
STA. 351+50 -L- (CL)
STA. 354+27 -L- (CL)



STA. 346+50 -L- (LT)



DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

8/17/99

7:24:04 AM
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rrsebo1

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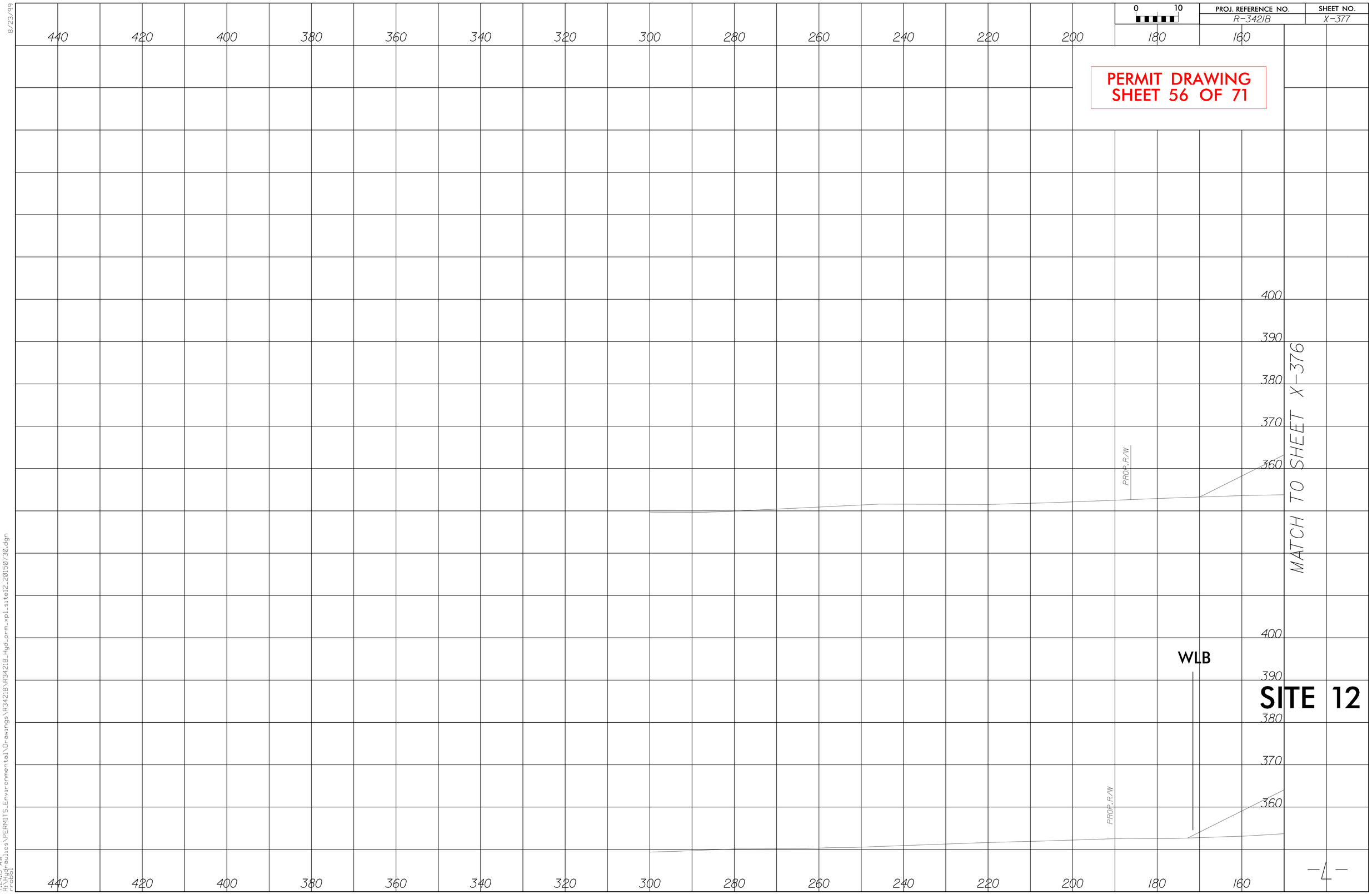
PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-377

0 10

PERMIT DRAWING
SHEET 56 OF 71



PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-376

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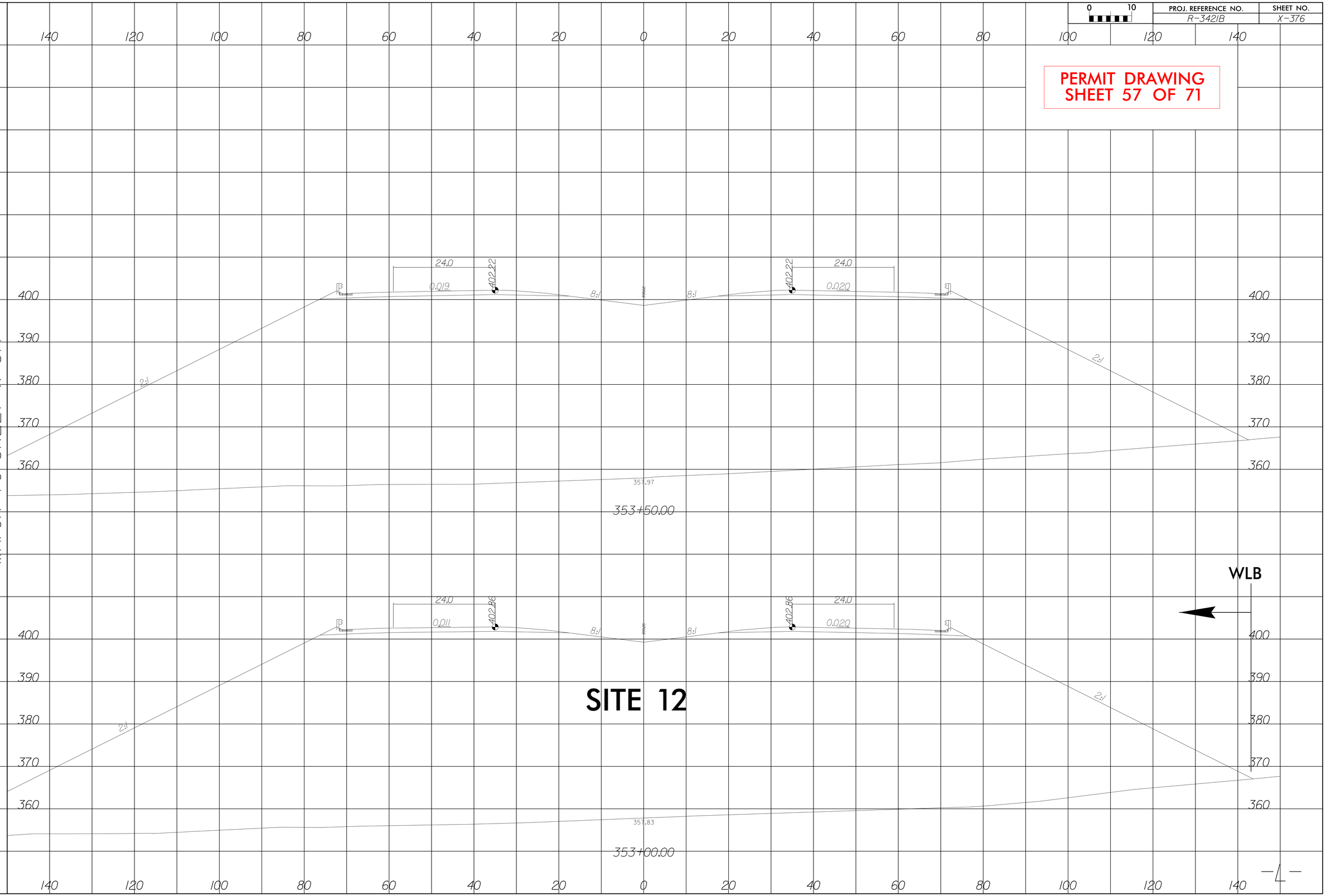
PERMIT DRAWING
SHEET 57 OF 71

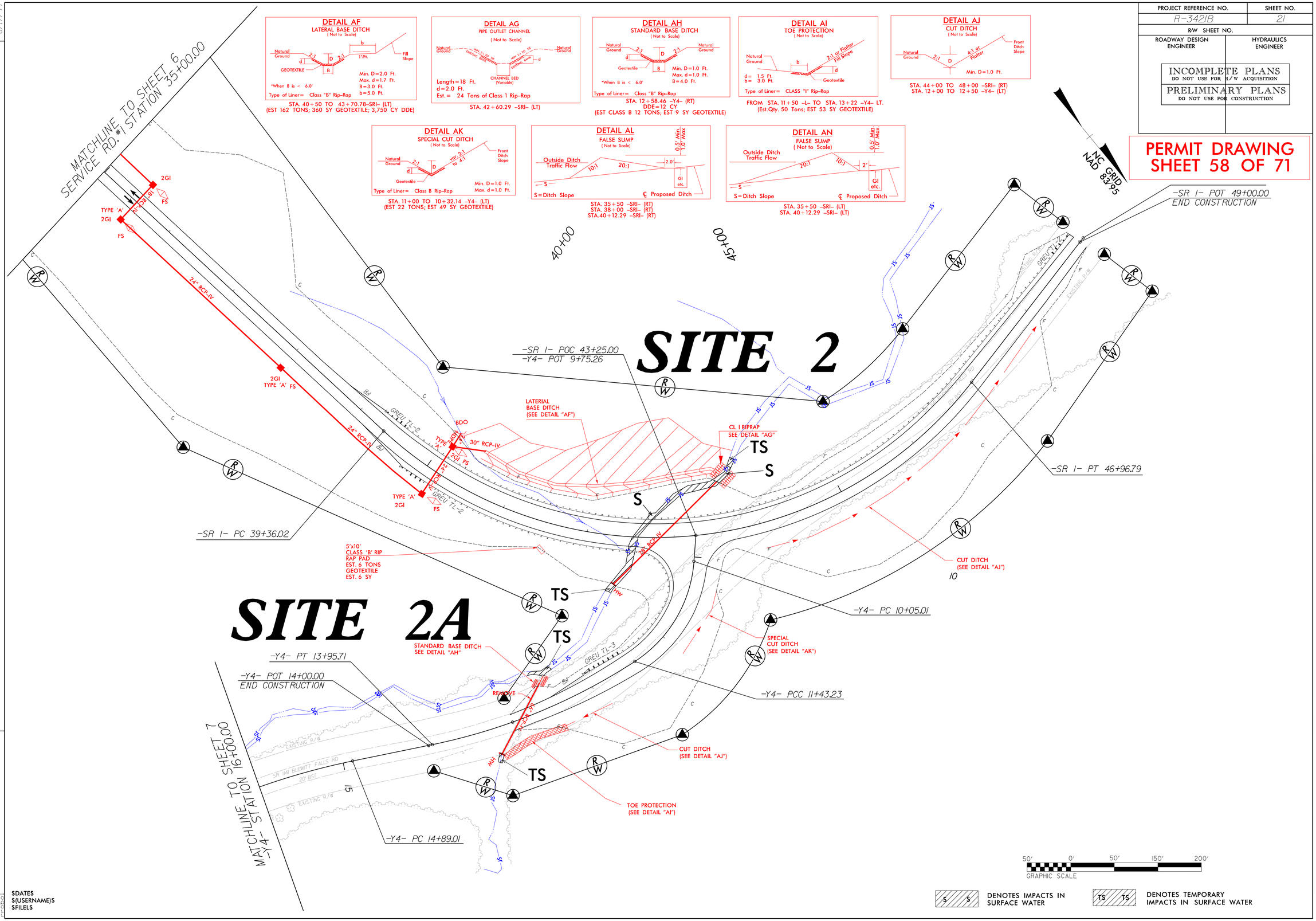


PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 58 OF 71



REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

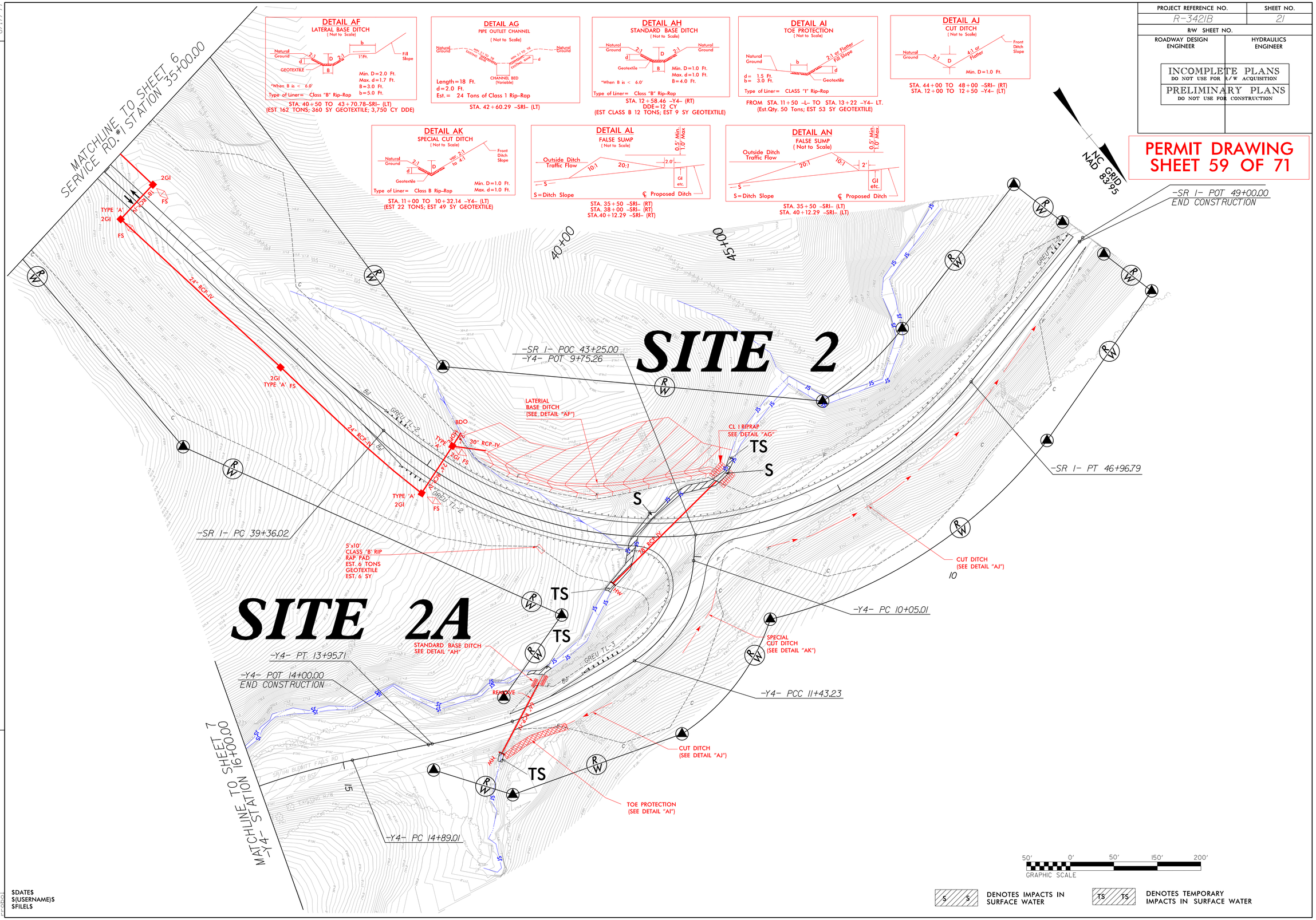
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 59 OF 71

REVISIONS

8/17/99



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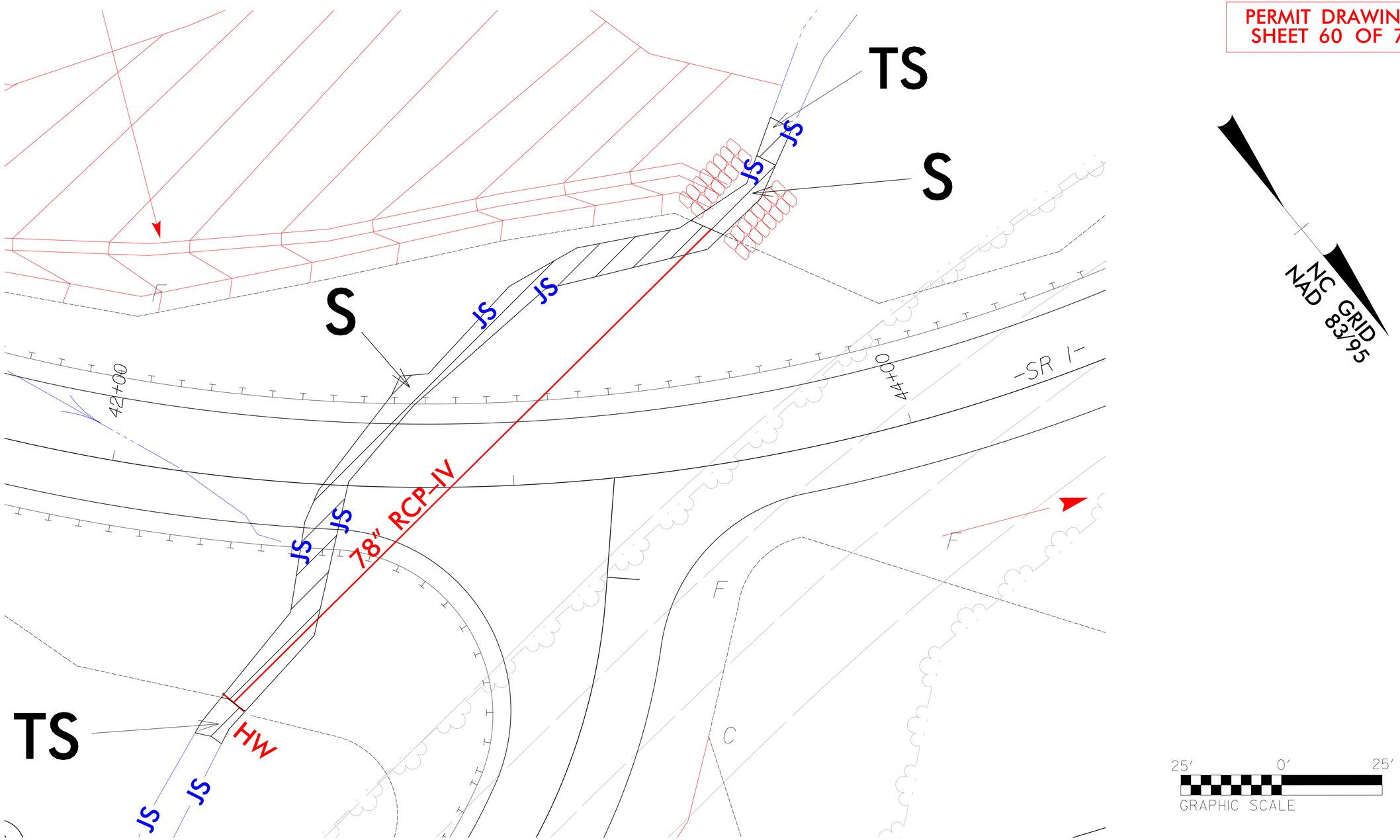
SITE 2 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 60 OF 71



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$(USERNAME)$
$FILEL$

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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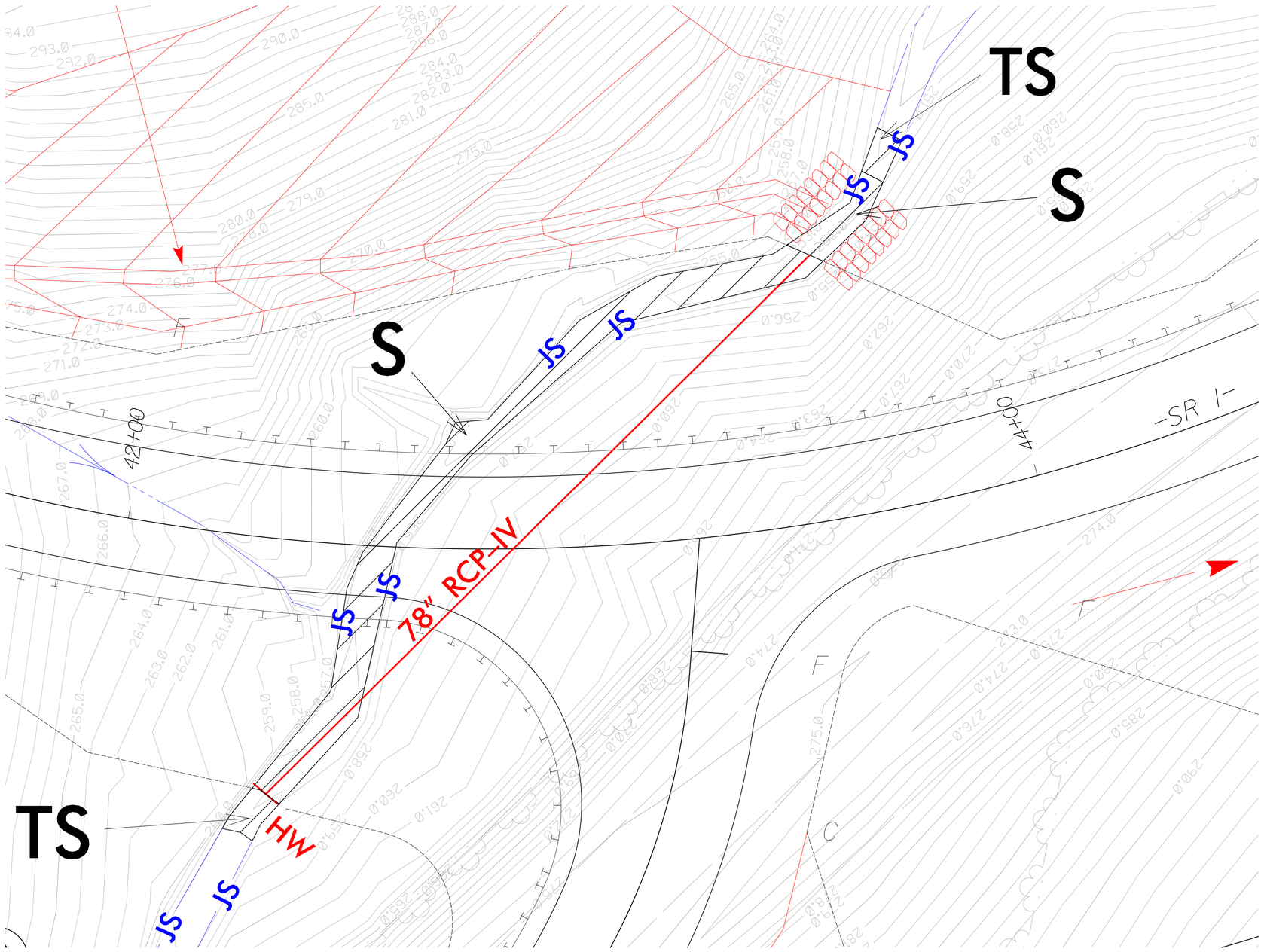
SITE 2 ENLARGEMENT

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 61 OF 71



NC GRID
NAD 83/95

25' 0' 25'
GRAPHIC SCALE

$DATE$
$(USERNAME)$
$FILEL$

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

7:24:34 AM
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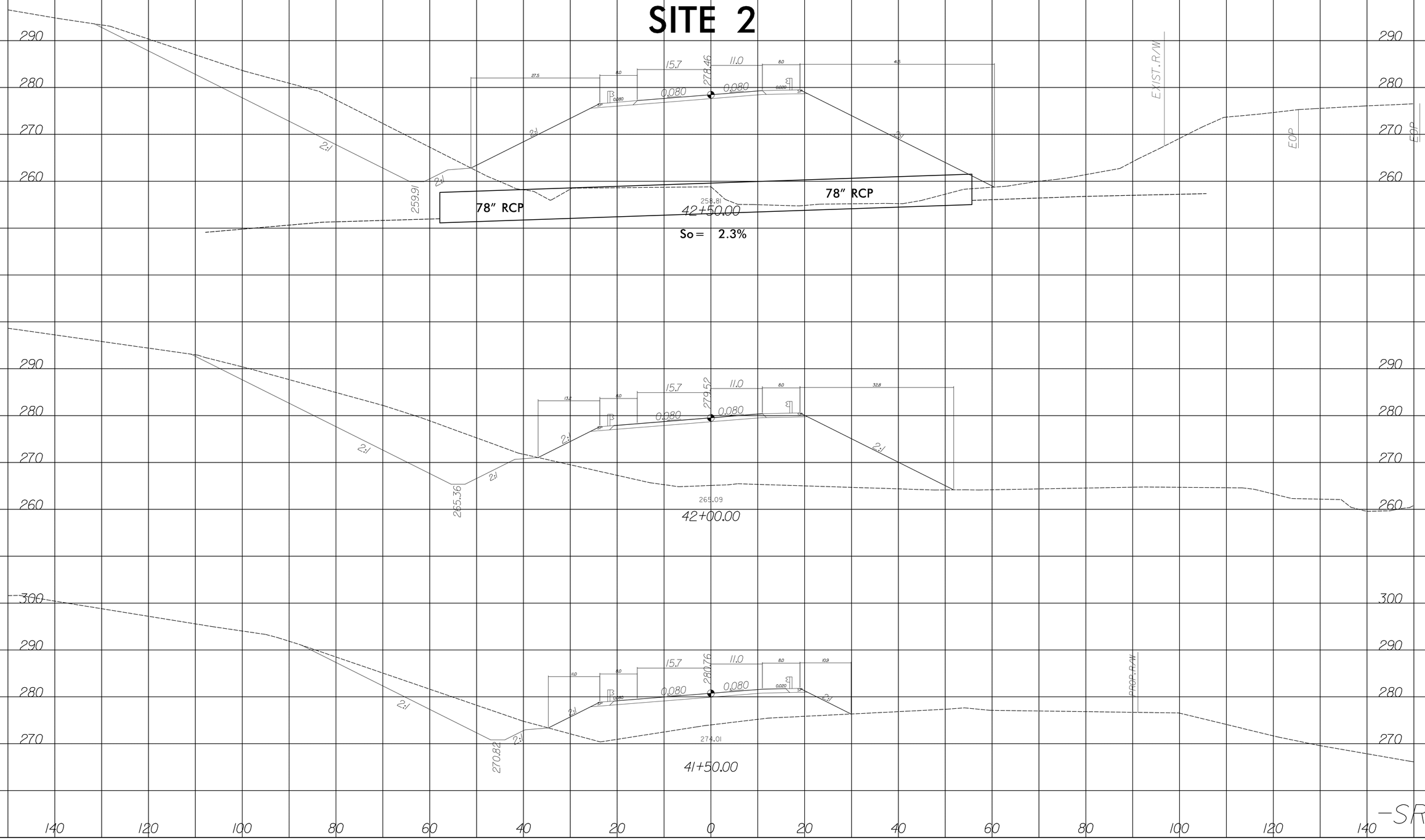
PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-399

PERMIT DRAWING
SHEET 62 OF 71

SITE 2



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8/23/99

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rrobbi

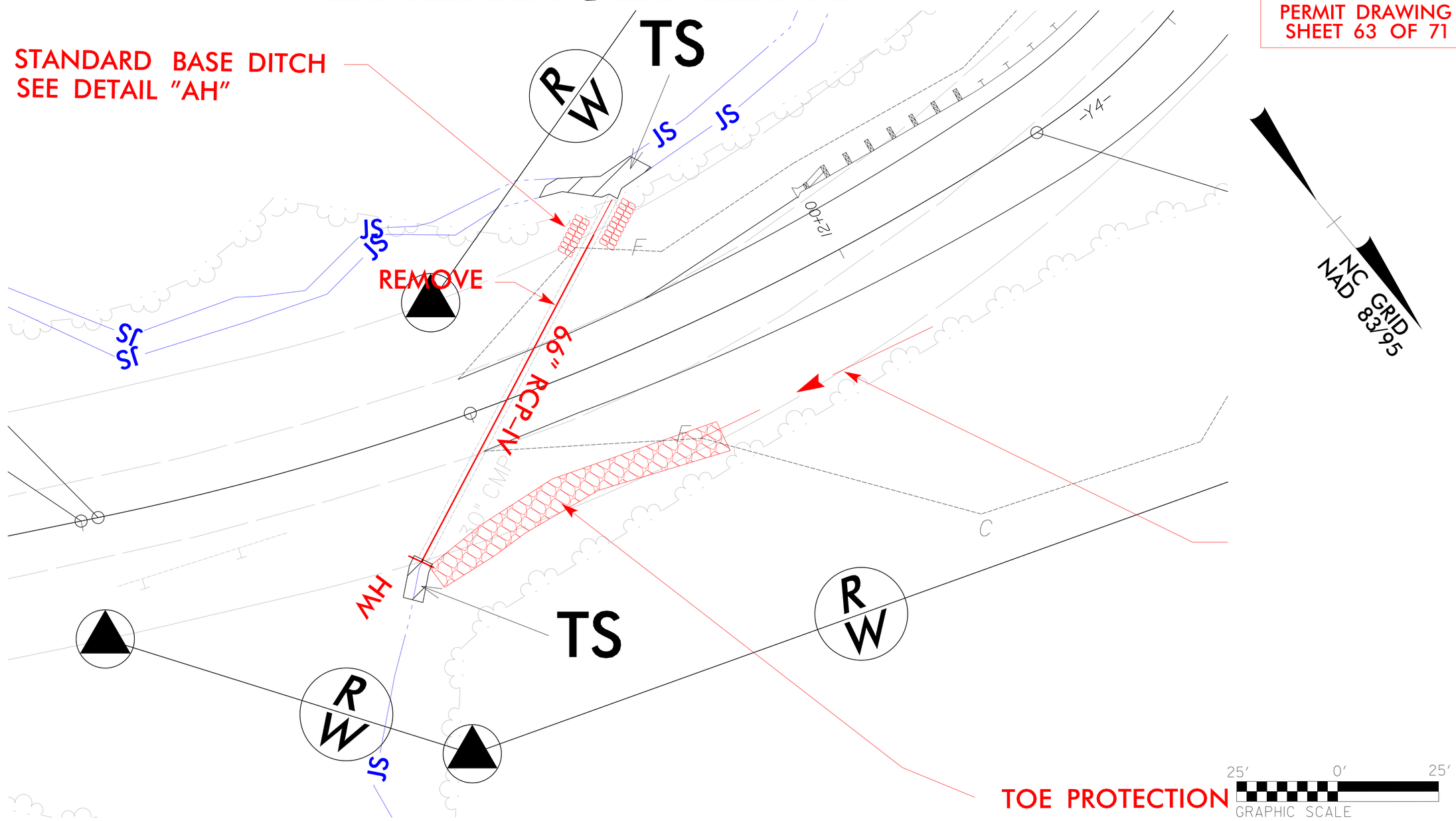
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 63 OF 71

SITE 2A ENLARGEMENT



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

$DATE$
$(USERNAME)$
$FILEL$

REVISIONS

8/17/99

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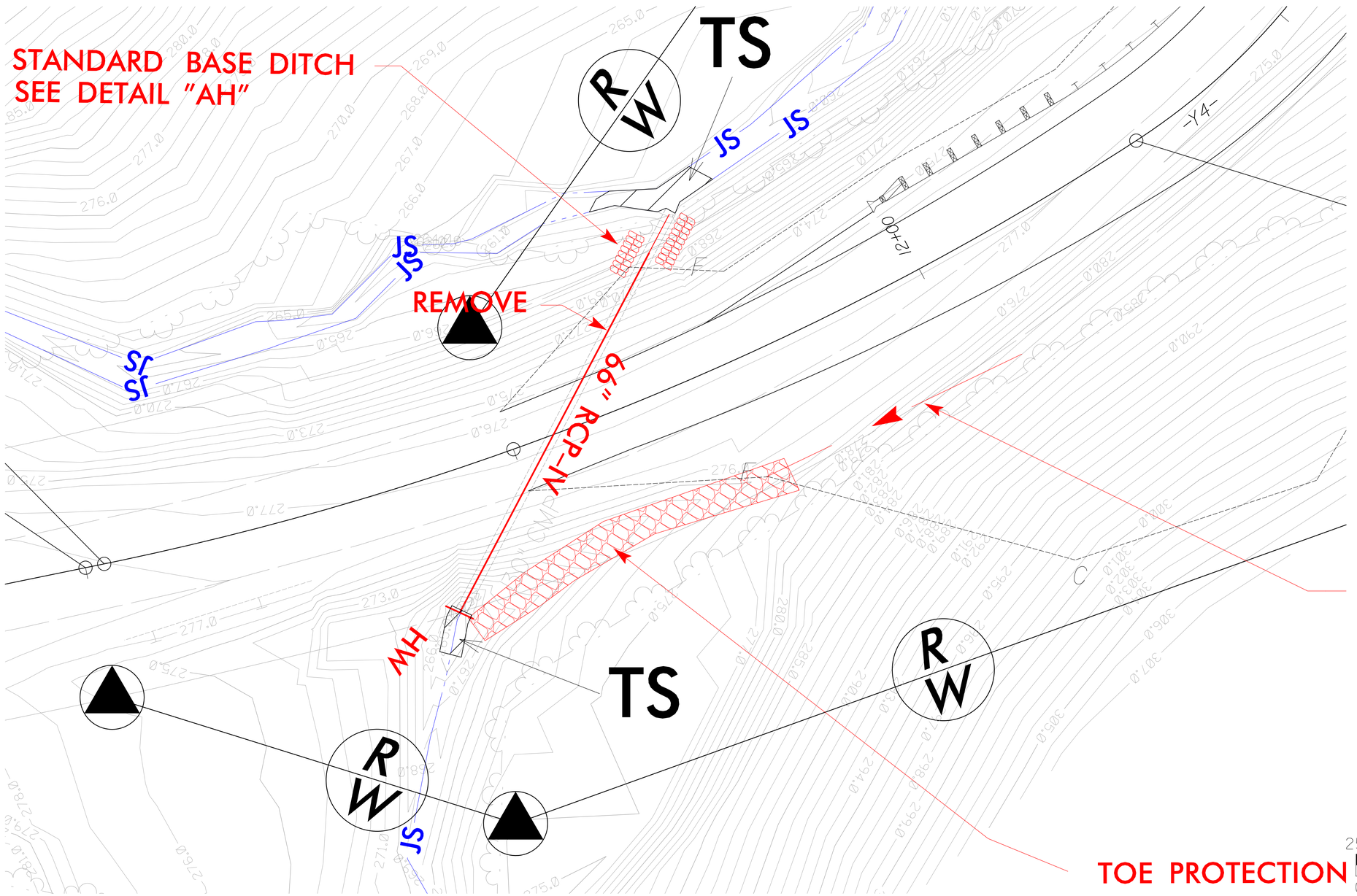
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 64 OF 71

SITE 2A ENLARGEMENT



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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$(USERNAME)$
$FILEL$

8/17/99

REVISIONS

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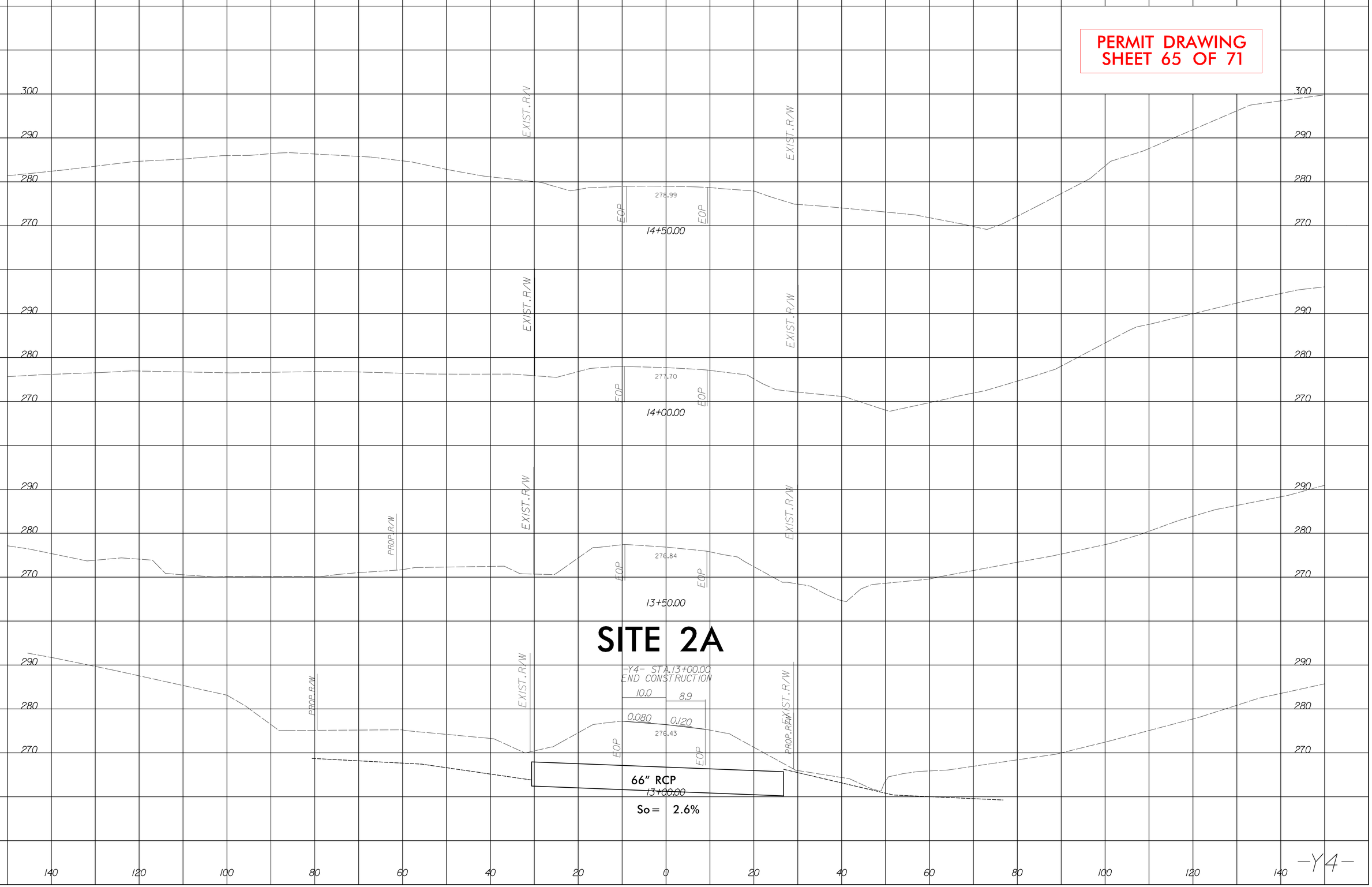
PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-408

0 10

PERMIT DRAWING
SHEET 65 OF 71



PROJECT REFERENCE NO.	SHEET NO.
R-3421B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

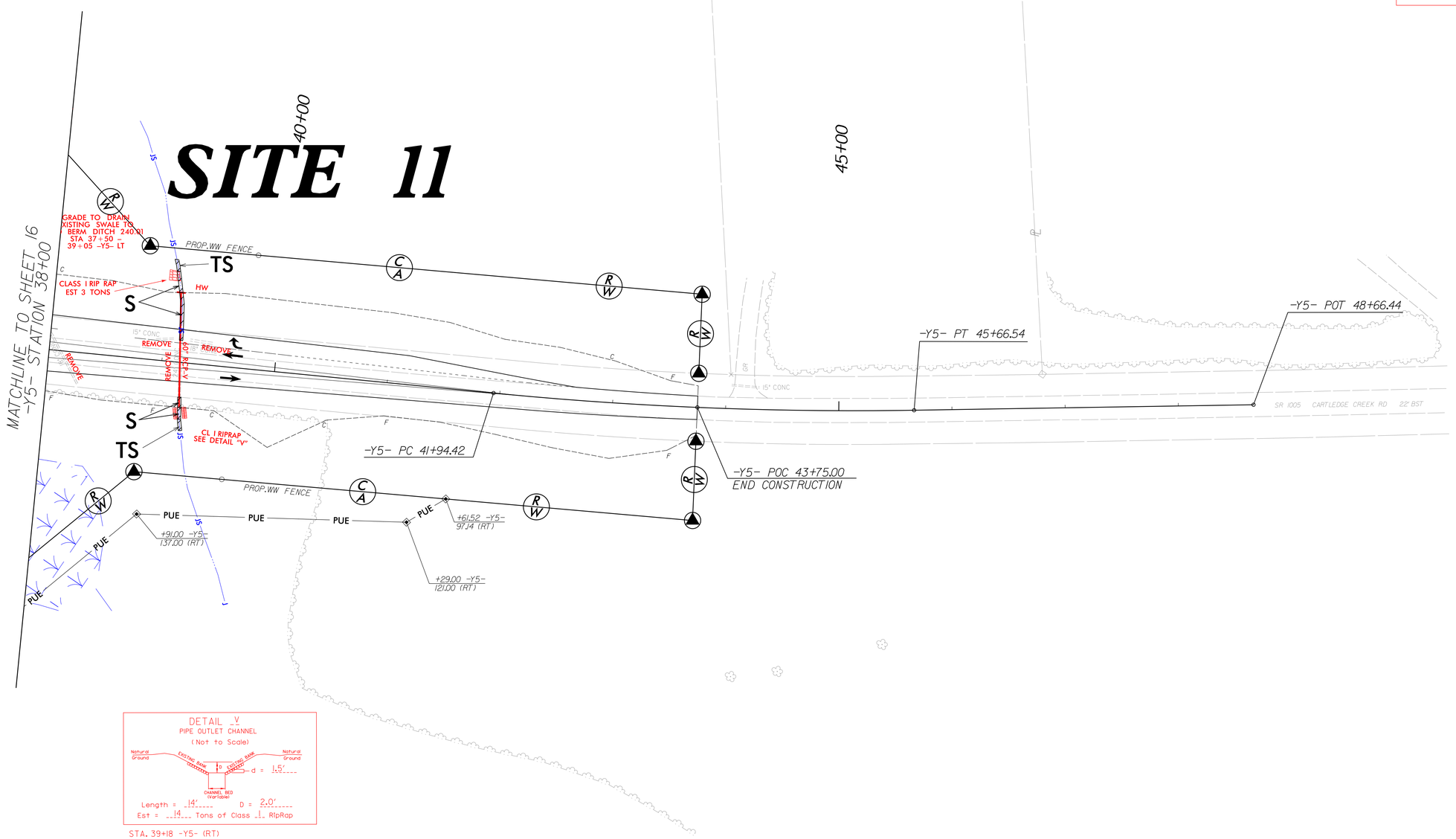
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 66 OF 71

NC GRID
NAD 83/95

SITE 11



S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 150' 200'
GRAPHIC SCALE

REVISIONS

8/17/99

7:25:03 AM
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[rrobb]

$DATE$
$(USERNAME)$
$FILEL$

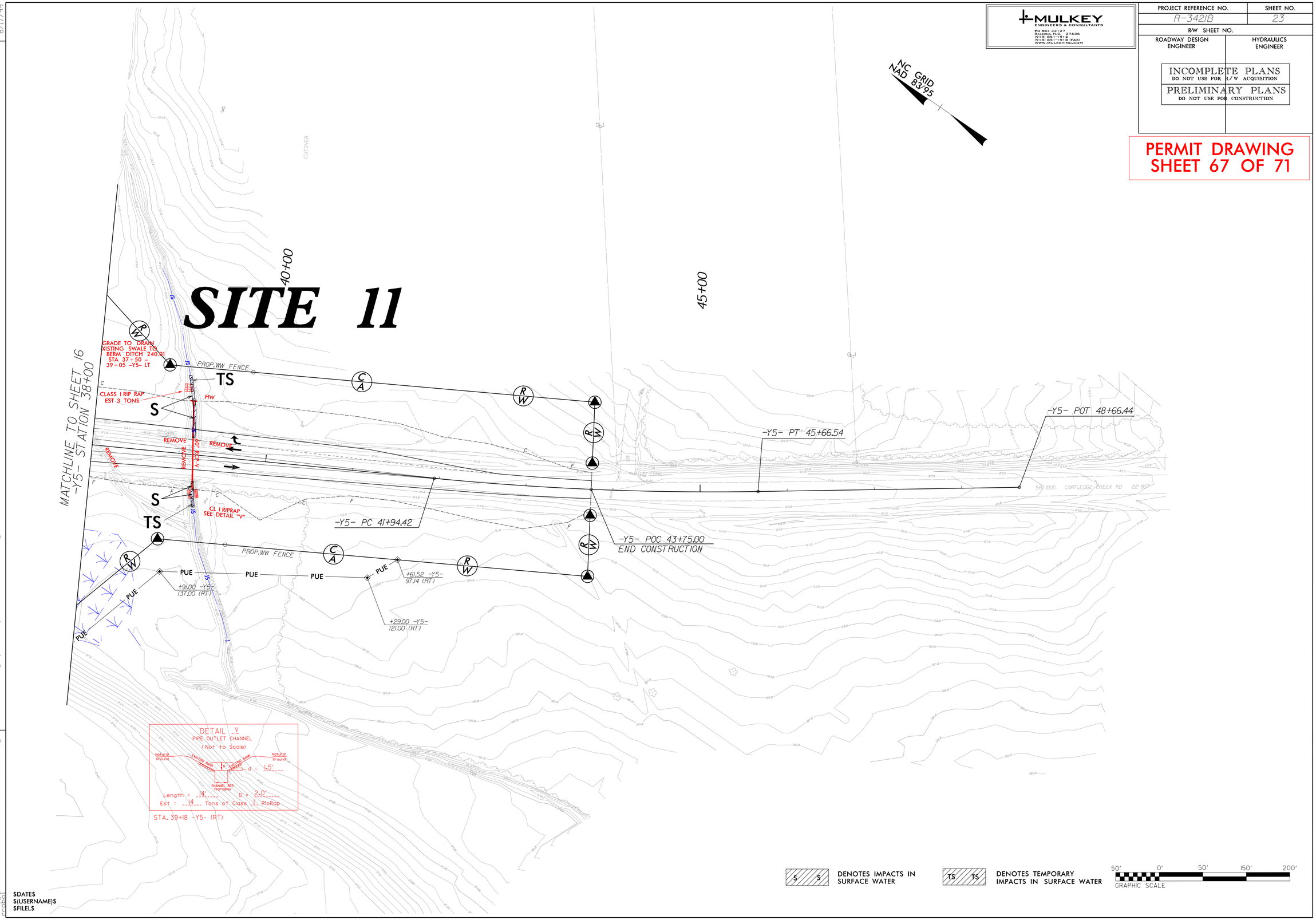
MULKEY ENGINEERS & CONSULTANTS
PO Box 33127
Raleigh, N.C. 27636
(919) 851-1912
(919) 851-1918 (FAX)
WWW.MULKEYINC.COM

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 67 OF 71



REVISIONS

8/17/99

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proj61

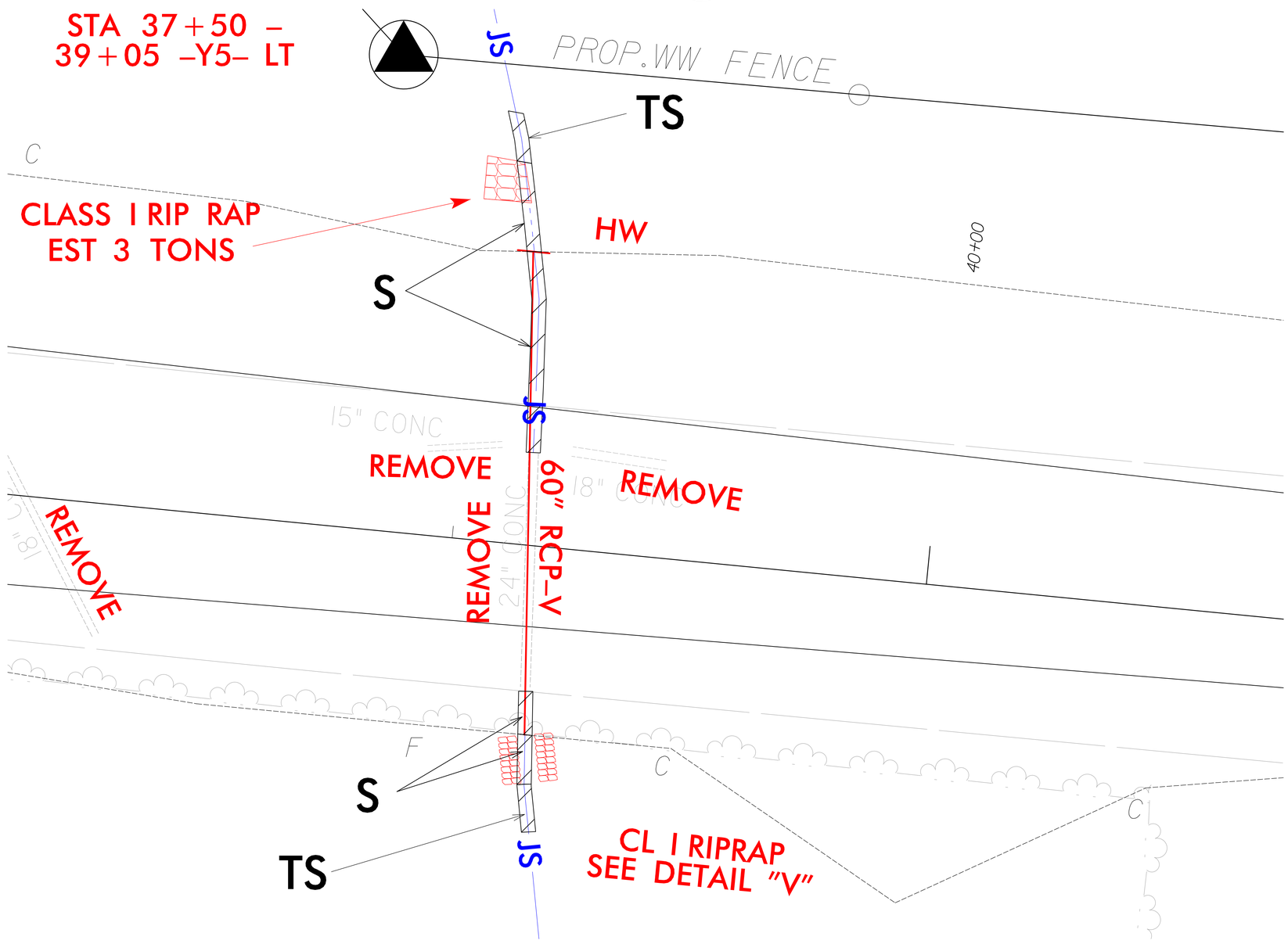
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 68 OF 71

SITE 11 ENLARGEMENT



25′ 0′ 25′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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(rcbb)

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$(USERNAME)$
$FILEL$

SITE 11 ENLARGEMENT

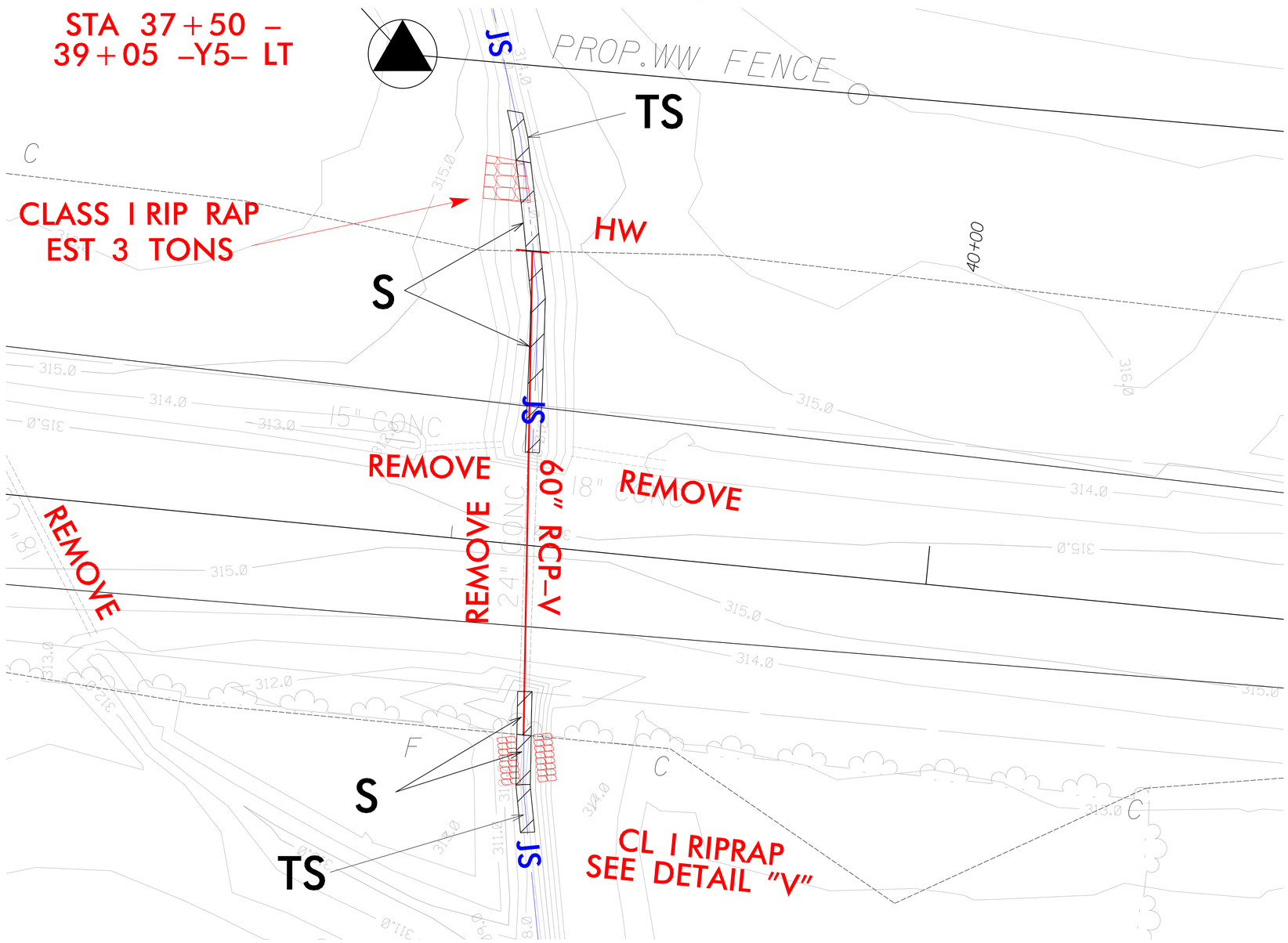
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 69 OF 71

NC GRID
NAD 83/95



25′ 0′ 25′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

8/17/99

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(rcbb)

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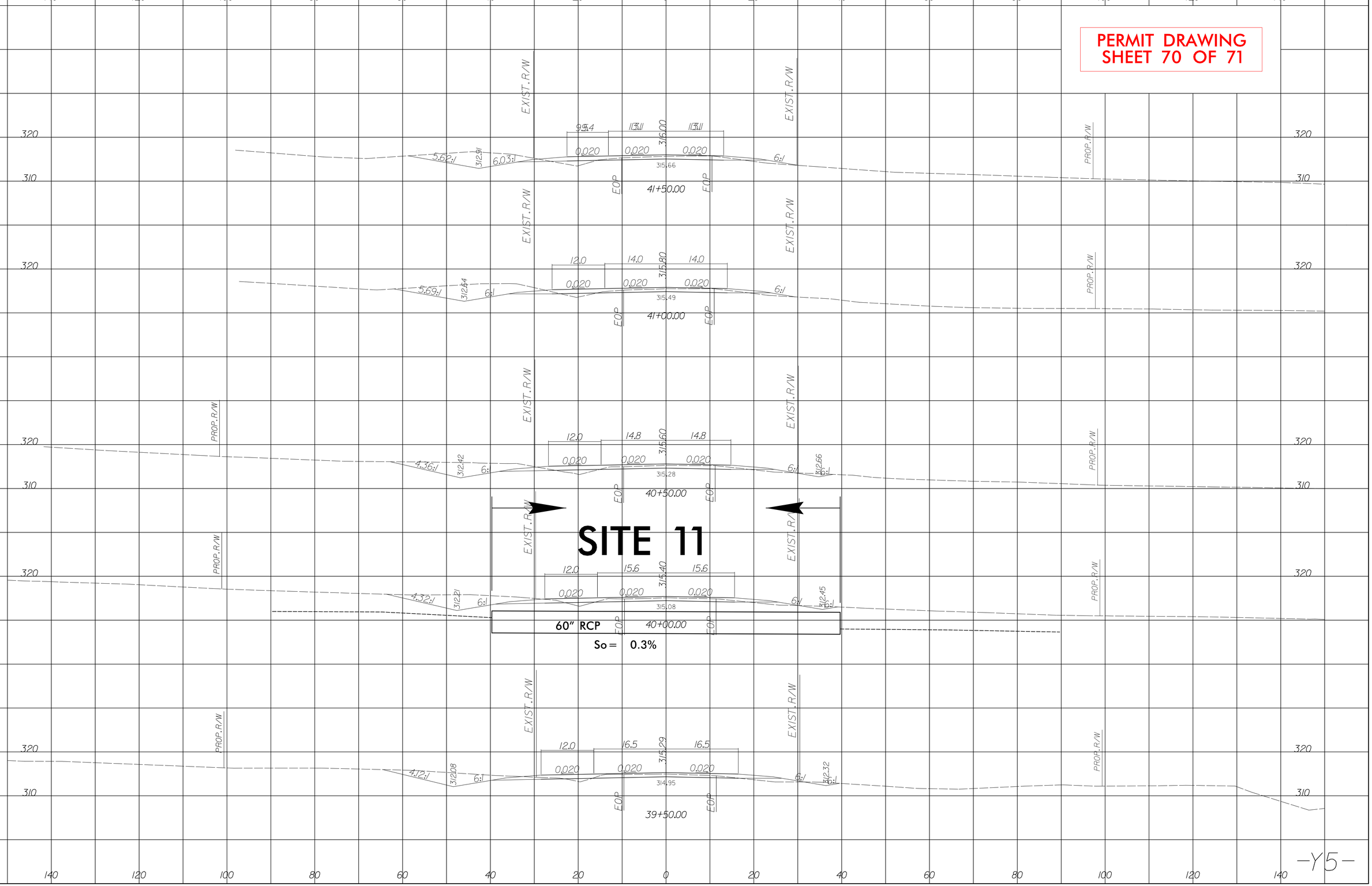
PROJ. REFERENCE NO.	SHEET NO.
R-3421B	X-429

0 10

PERMIT DRAWING
SHEET 70 OF 71



-Y5-

Revised 8/6/19

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	147+09 / 150+26 -L-	PROP 30" RCP	0.23			0.01		< 0.01	< 0.01	23	10	
	150+12 / 150+21 -L-	BANK STABILIZATION						< 0.01		10		
2	42+28 / 43+89 -SR1-	PROP 78" RCP						0.03	< 0.01	178	20	
	43+54 / 43+81 -SR1-	BANK STABILIZATION						< 0.01		23		
2A	12+29 / 13+29 -Y4-	PROP 66" RCP							< 0.01		36	
3	165+85 / 167+99 -L-	PROP PIPE SYSTEM	0.03					0.05	< 0.01	560	21	
	167+30 / 167+43 -L-	BANK STABILIZATION						< 0.01		18		
4	177+50 / 179+71 -L-	PROP 48" RCP	0.06			< 0.01		0.04	< 0.01	372	22	
	179+46 / 179+65 -L-	BANK STABILIZATION						< 0.01		25		
5	215+90 / 217+35 -L-	PROP 72" RCP						0.08	< 0.01	659	23	
	217+29 / 217+34 -L-	BANK STABILIZATION						< 0.01		10		
6	218+57 / 219+34 -L-	ROADWAY FILL	0.09			< 0.01						
7	228+51 / 231+25 -L-	PROP 72" RCP						0.07	< 0.01	598	34	
	231+07 / 231+15 -L-	BANK STABILIZATION						< 0.01		12		
8	233+83 / 238+88 -L-	PROP 3@9'X9' RCBC						0.17	0.05	578	161	
	234+16 / 238+31 -L-	BANK STABILIZATION						0.05		125		
9	22+48 / 23+27 -Y5-	PROP 42" RCP	0.10			0.01						
10	299+77 / 310+33 -L-	PROP PIPE SYSTEM	0.76		0.03	0.08		0.02	< 0.01	339	11	
11	39+03 / 39+23 -Y5-	PROP 60" RCP						< 0.01	< 0.01	51	21	
	39+05 / 39+22 -Y5-	BANK STABILIZATION						< 0.01		30		
12	350+69 / 355+83 -L-	ROADWAY FILL & RIP RAP PADS	2.25			0.14						
TOTALS*:			3.51		0.03	0.26		0.53	0.07	3611	359	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
7/30/2019
RICHMOND COUNTY
R-3421B

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

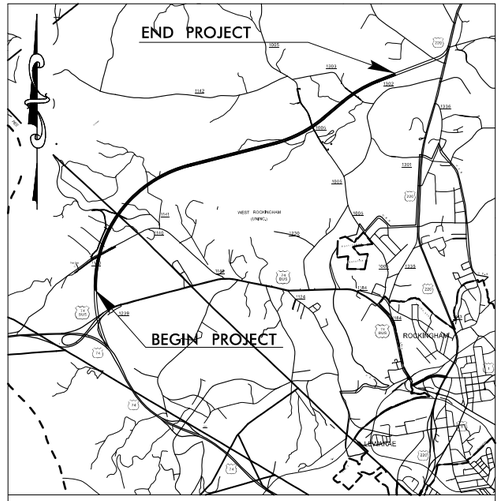
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3421B	1	5

WBS NO.	F.A. PROJ. NO.	DESCRIPTION
34542.1.FR3	NHF-0220(76)	P.E.
34542.2.3	NHF-0220(43)	R /W & UTIL.
34542.3.7	NHF-0220(43)	CONST.

RICHMOND COUNTY

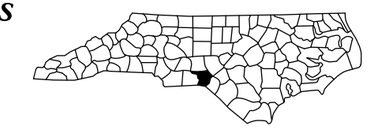
LOCATION: I-73/74 FROM 0.3 MILES SOUTH OF SR 1140 (OLD CHARLOTTE HIGHWAY) TO 0.2 MILES SOUTHWEST OF SR 1304 (HARRINGTON ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS & STRUCTURES

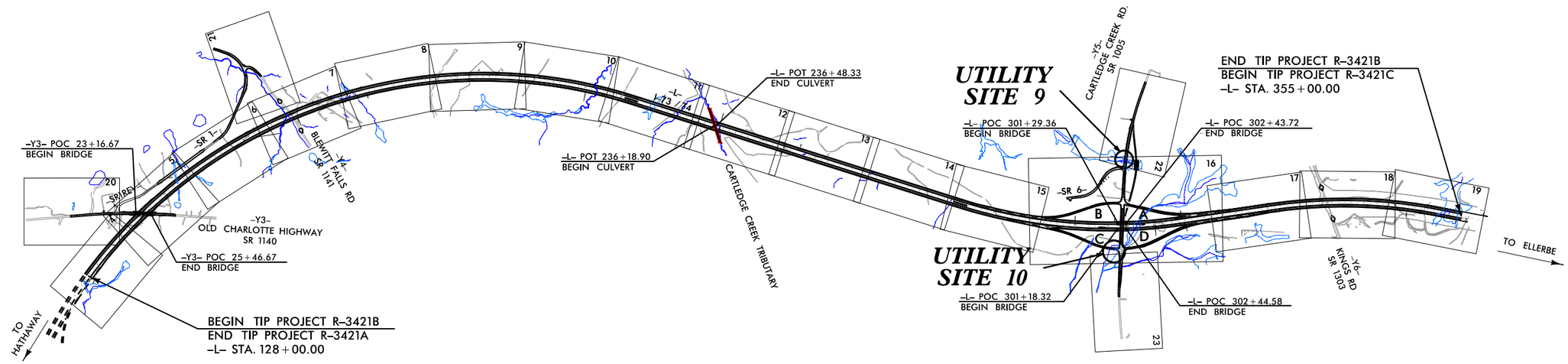


VICINITY MAP

WETLAND AND SURFACE WATER UTILITY IMPACTS PERMIT



NC GRID NAD 83/95



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

TIP PROJECT: R-3421B

CONTRACT: C204368

09/08/99

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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2019 = 11,850
ADT 2040 = 21,900
K = 10 %
D = 60 %
T = 26 % *
V = 70 MPH
* 17% TTST + 9% DUAL
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3421B	=	4.270 MILES
LENGTH STRUCTURES TIP PROJECT R-3421B	=	0.029 MILES
TOTAL LENGTH TIP PROJECT R-3421B	=	4.299 MILES

Prepared in the Office of:
CALYX ENGINEERS + CONSULTANTS
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 23, 2009

LETTING DATE:
OCTOBER 2019

JOHNNY BANKS
CALYX E & C PROJECT MANAGER

STEPHEN C. BROWDE, PE
CALYX E & C PROJECT DESIGN ENGINEER

NCDOT CONTACT: GREGORY S. DAVIS, PE
PROJECT MANAGER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

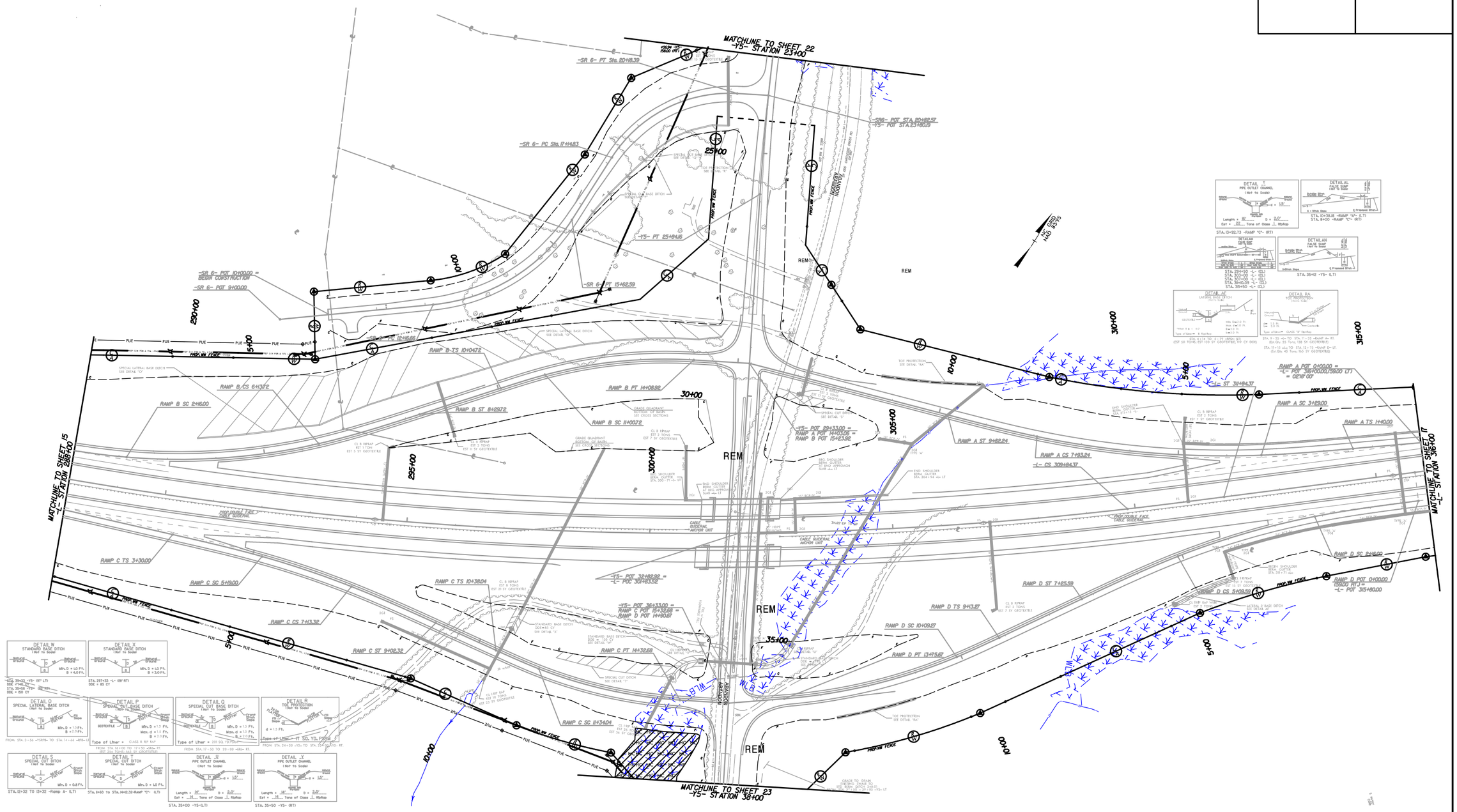
ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
R-3421B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WETLAND AND SURFACE WATER UTILITY IMPACTS
SHEET 2 OF 5



SITE 10

SEE PSH 23 FOR CONTINUATION OF SITE 10

$DATE$
$(USERNAME)$
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HC HC DENOTES HAND CLEARING

REVISIONS

8/17/99

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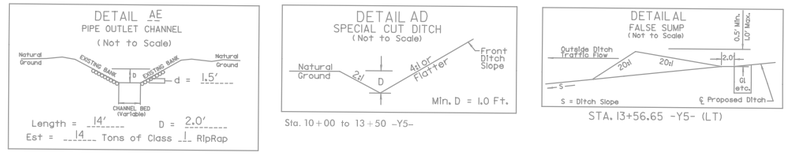
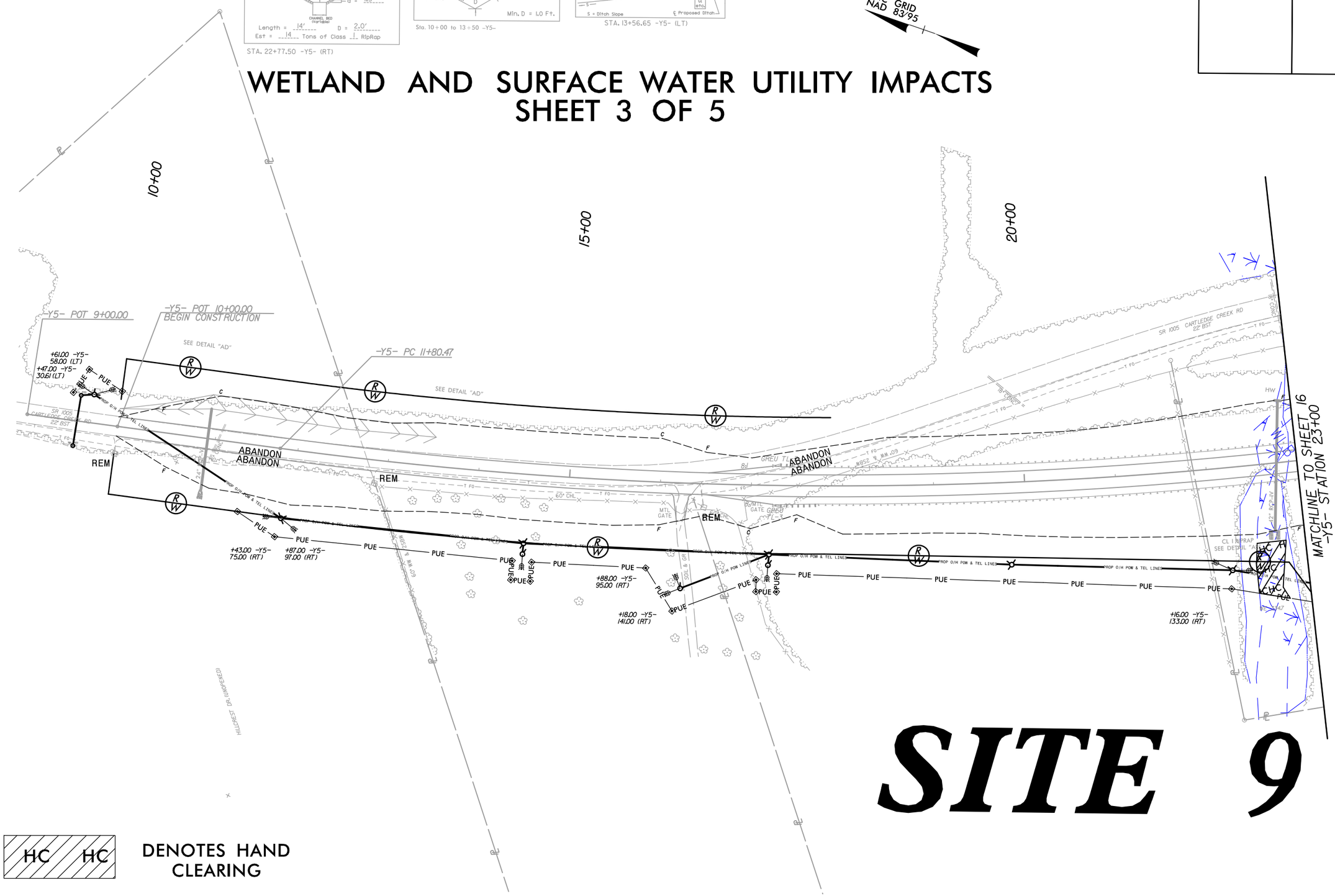
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



WETLAND AND SURFACE WATER UTILITY IMPACTS
SHEET 3 OF 5



HC HC DENOTES HAND CLEARING

REVISIONS

8/17/99

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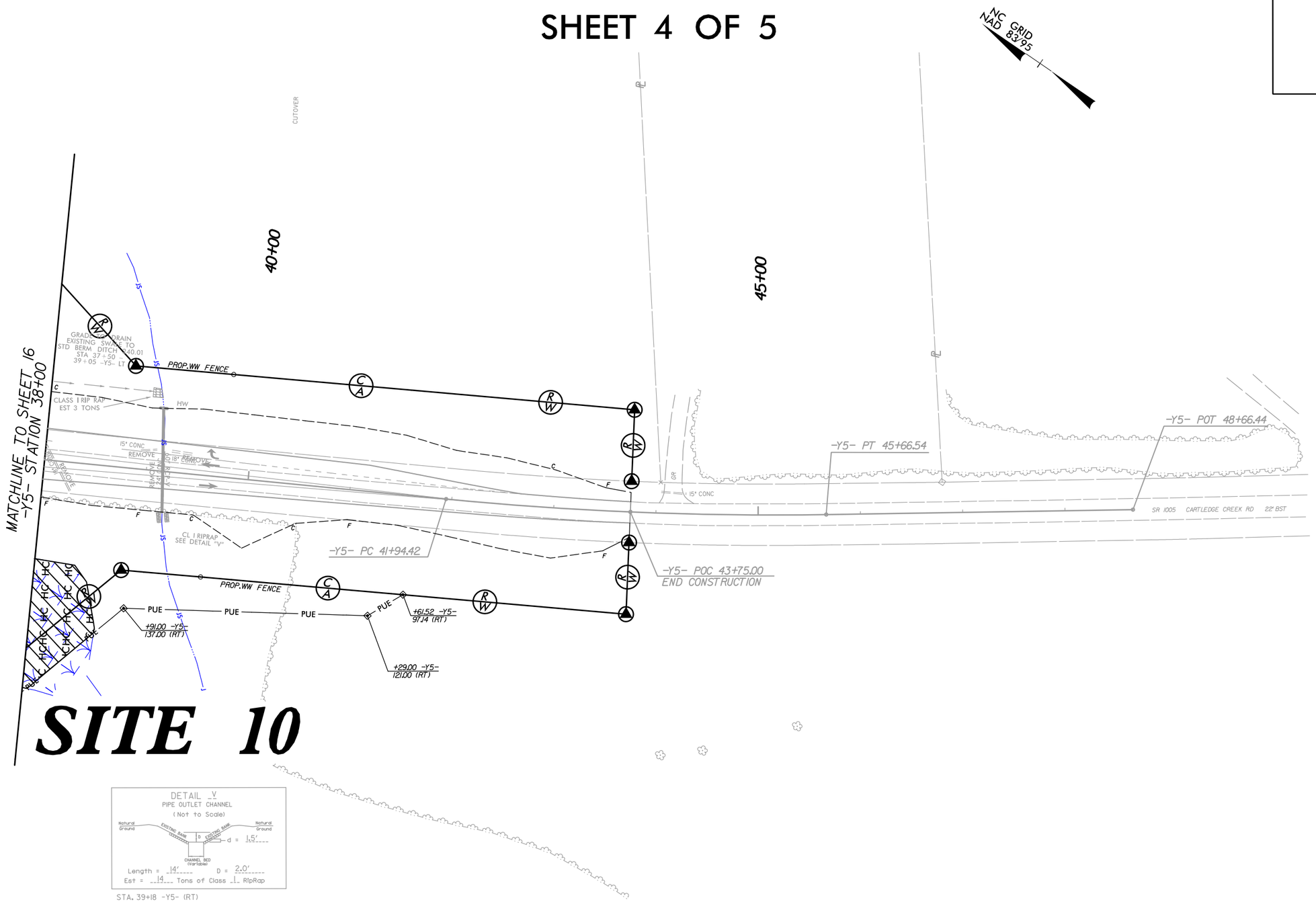
PROJECT REFERENCE NO.	SHEET NO.
R-3421B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WETLAND AND SURFACE WATER UTILITY IMPACTS
SHEET 4 OF 5



HC HC DENOTES HAND CLEARING

REVISIONS

8/17/99

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WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
9	22+48/22+79 -Y5-						0.04					
10	299+40/301+03 -L-						0.44					
TOTALS*:							0.48			0	0	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
7/16/2019
RICHMOND
R-3421B
34542.2.3
SHEET 5 OF 5

Revised 2018 Feb