



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

April 12, 2013

Mr. Charles Wakild
N.C. Dept. of Environment and Natural Resources
Division of Water Quality
1650 Mail Service Center
Raleigh NC, 27699-1650

Dear Sir:

Subject: **Additional Information in Response to the N.C. Division of Water Quality's On Hold Letter for the Modification Request of the Individual Section 404 and Section 401 Water Quality Certification** for the proposed improvements to NC 24 from SR 1853 (John Nunnery Rd.) in Cumberland to US 421-701/SR 1296 (Sunset Avenue) in Sampson County. Federal Aid Project No. STPNHF-F-8-2(17), TIP No. R-2303B, C, and D.

References: Section 404 Individual Permit signed December 20, 2012 (SAW-1992- 03237) for R-2303
Section 401 Water Quality Certification issued September 24, 2012 (20120240) for R-2303
NCDOT Response dated April 2, 2013 to the N.C. Division of Water Quality's on hold letter

On March 12, 2013, NCDOT received a letter (dated March 5, 2013) from N.C. Division of Water Quality (NCDWQ) placing the permit application for the above-referenced project on-hold, until suitable responses are provided addressing a lack of necessary information. NCDOT replied in a letter on April 2, 2013 indicating we anticipated the information would be available by today's date. Original questions from your letter as well as our responses (in italics) are provided below for those questions relating to permit drawings.

R-2303C Application Comments

1. Permit Drawing 8 of 75, cross section 734+90.46 shows 6:1 slopes at this jurisdictional crossing. Your application states in the "Minimization and Avoidance" section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Slopes have been revised to 3:1.

2. Please provide cross sections for Sta. 752+00 to 766+00 (Sites 3 and 4).
Cross sections added to the permit drawings.
3. Permit drawing 16 of 75, cross section 774+00 shows 4:1 slopes at this jurisdictional crossing. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.
Slopes have been revised to 3:1.
4. Plan Sheet 8 (not permit drawing set), shows a PDE in wetlands that is not addressed in permit drawings or application. Please clarify.
This site was removed from permit drawings due to revising the location of the ditch (shifting to tract 19 instead of tract 23). The PDE on tract 23 remains on the plans because it has already been acquired. No work (impacts) should occur within the wetland.
5. Permit drawing 27/28 of 75, drainage feature below wetland at site 8 is labeled as a non jurisdictional stream. This feature is not indentified on jurisdictional resources mapping and no impacts have been noted in application. Please clarify. If feature is a ditch, please label it accordingly.
Feature was improperly labeled. Label removed.
6. Permit drawing 27/28 of 75, Site 9 shows wetlands impacts within –D7-, this was brought up at 4C and was never clarified. Please clarify. If wetlands do exist within existing –D7-, can –D7- be relocated outside of wetlands?
Per NCDOT Roadway, drive must remain to provide access to the parcel and no alternative to avoid wetland impacts are available.
7. Permit drawing 34-35 of 75. Impact summary sheet list 315 lf of stream impacts at Site 11, however the permit drawing scale indicates approximately 190 lf of stream impact. Please clarify.
The length of the “impacts in surface water (pond)” were included in the length.
8. Permit drawing 37 of 75, cross section shows 4:1 slopes at this jurisdictional crossing. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.
Slopes have been revised to 3:1.
9. Permit drawing 38/39 of 75, please label equalizer pipes and add a note that they are to be place at natural ground elevation.

Pipes already labeled. Note added to labels.

10. Permit drawing 48 of 75, cross section 980+00 shows 4:1 slopes at this jurisdictional crossing. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct..

Slopes have been revised to 3:1.

11. Permit drawing 51 of 75, shows 4:1 slopes on the outlet of this jurisdictional crossing. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Slopes have been revised to 3:1.

12. Permit drawing 62 of 74, appears that a single 24” pipe will be replaced with twin 36” pipes. The 401 will be conditioned as follows: “If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.” Provide a detail or cross section on how DOT will comply with this condition. This has been an issue on several projects that are under construction and has required field modifications.

The plan calls for twin 30” pipes (not 36”). These pipes will be buried by 6”. The current 24” pipe was under-sized and therefore needed to be replaced by the twin 30” pipes. The approximate base of the existing stream is 7’. The pipes will fit within the existing 7’ base and will not require widening of the existing channel up and downstream of the pipes. The stream will not be widened at the inlet or outlet. Inlet and outlet channel details have been added.

13. Permit drawing 70 of 75, shows 5:1 slopes extending out into jurisdictional resources at Sta. 1092+00. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Slopes have been revised to 3:1.

14. Impact summary sheet PD 73-75 of 75. The purpose of adding permanent and temporary non-mitigable impacts columns is unclear. Please remove these columns for the spreadsheet and add these impacts the appropriate “SW Impact” columns which would be consistent with B & D sections.

Impacts from “permanent non-mitigable” and “temporary non-mitigable” have been placed in the appropriate columns.

15. Table 3 in the permit application states that there was an increase of 1.92 acres of wetland impacts within Section C over the preliminary estimates provided in the original application. Please provide a summary of where and why this increase in wetlands impacts has occurred.

These wetland increases occurred at several sites due to redeliniation of the wetlands. The previous Sites 1 and 2 were combined into current Site 1 and wetland area was added. Wetland area was also added to previous Site 6, which is now Site 5. Previous Site 11/Current Site 7 included a large area of surface water impacts. This area of surface water impacts was reduced by converting much of this area to wetland impacts. All other sites varied by minimal amounts.

20. Sheet 2-J (Permit Drawing Sheet 5 of 75), Details 28, 30 & 32, please show coir fiber matting in detail as shown in Detail K on Sheet 2E in the Section D permit drawings. *Details updated to show coir fiber matting. Notes on plans updated to call for coir fiber matting including quantity.*

R-2303D Application Comments

1. Site 1, Permit drawing 5/6 of 79, no stream impacts are list for Site 1 in the impact summary sheet, Sheet 77 of 79. Please clarify.
Removed stream impact legends from Site 1. Stream impacts associated with Site 2.
2. Site 2, Permit drawing 77 of 79, provide linear feet of impact for bank stabilization in impact summary.
Updated impact summary sheet with Bank Stabilization impacts.
3. Site 4, Permit drawing 10/11 of 79, label equalizer pipes and note that pipes to be placed at natural ground elevation (not buried).
Equalizer pipes labeled. Noted in Permit Commitments and on plans not to bury equalizer pipes.
4. Site 7, Permit drawing 19 of 79, shows 4:1 slopes extending out into jurisdictional resources. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.
Side slopes have been revised to 3:1 in jurisdictional areas.
5. Site 7, Permit drawing 20 of 79, shows 4.86:1 slopes extending out into jurisdictional resources at Sta. 1197+50. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.
Side slopes have been revised to 3:1 in jurisdictional areas.
6. Site 12, Permit drawing 27/28 of 79, the permit drawing does not show rip rap bank stabilization which is depicted in Detail L for the outlet. The “TS” shown on the inlet is

not listed in the impact summary sheet. No “TS” is shown on the outlet for dewatering measures, bypass and etc. Please clarify.

Rip rap bank stabilization level had originally been turned off for clarity but it has now been turned back on. “TS” impacts updated at both inlet and outlet. Shown TS impacts to R/W line at outlet and have accounted for impacts at inlet.

7. Site 13, Permit drawing 31/32 of 75. The impacts numbers listed in the impact summary sheet do not match the scaled impacts on the permit drawings. Please clarify.

Impacts updated. Impacts erroneously accounted for impacts along original jurisdictional limits and were not updated with revised jurisdictional limits.

8. Site 13, Permit drawing 34 of 79. Shows 4:1 slopes extending out into jurisdictional resources. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Side slopes were revised to 3:1. However, due to parallel impact along stream bank and angle of outlet to receiving channel does not result in reduction of impact to stream. The 3:1 side slopes will still be located within stream bank. Prefer the outlet be in as direct alignment to receiving stream as possible to minimize potential for bank erosion/instability at outlet.

9. Sites 14/15, Permit drawing 40 of 79. Shows >3:1 slopes extending out into jurisdictional resources. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Side slopes revised to 3:1 in jurisdictional areas. Impacts updated.

10. Site 16 and 19, Permit drawing 78 of 79, typically excavation in a marginal wetland area for the purpose restoring a natural wetland elevation is considered a temporary impact and should be noted accordingly in the impact summary sheet and in Table 4 of your application. Please confirm with Corps before making this change.

Has been noted on impact summary sheet.

11. Site 18, Permit drawings 42-48, temporary impacts are proposed for a work causeway to aid in the construction of the bridge. Please provide description of this temporary fill and what measure the Department is taking to ensure that permanent impacts won’t occur at this site. If the Department is proposing temporary fill in this area please provide a restoration and monitoring ?

Anticipate placing fabric on natural ground beyond temporary toe of fill and wrapping up onto slope to silt fence posts. Anticipate backfilling soil on top of fabric but cannot

rule out rip rap backfill depending on contractor. However, backfilling with soil would seem to be more practical from both a temporary work causeway removal and expense perspective versus rip rap.

12. Site 22, Permit drawing 79 of 79, pipe removal is not considered NSD, however if agreeable with both the Corps and DWQ, the removal of 56 lf of pipe could be noted at the bottom of the impact summary sheet and used to partially offset the new impacts at this site.

Provided note on impact summary sheet.

13. Site 22, Permit drawing 66 of 79, shows 4:1 slopes extending out into jurisdictional resources. Your application states in the “Minimization and Avoidance” section states that 3:1 slopes will be used in jurisdictional areas. Please correct.

Side slopes at pipe crossing have been revised to 3:1.

14. Sites 21, Permit drawing 68/69 of 79, impacts are to a wetland; however the permit drawing as ponds labeled on the site. Please clarify.

Turned off pond label.

15. Site 24, Permit drawing 75 of 79, depicts a rip pad in the stream; however the impact summary sheet indicates fill and bank stabilization impacts. Please clarify.

The existing outfall has had instability problems. There is a blow-hole at the outlet and our recommendation is to use JB drop structures and rip rap the stream bed and banks at the outlet to stabilize for the long term.

16. Site 14 & 15, Permit drawing 38 of 79, shows bank excavation at pipe outlets rather than rip rap bank stabilization as noted in Detail J. Please clarify.

The existing banks are steeper than 3:1. Laying back the banks to 3:1 with rip rap will require excavation within wetland limits.

General Comments on Application

Stream Impact Enumeration in Impact Summary – Based on conversations with the Hydraulics Unit and NES, all permanent stream impacts beyond the culverts in this application is being list as bank stabilization. For clarification purposes and to assist DOT in potentially reducing mitigation needs, DWQ offers the following comments:

- Bank stabilization impacts should only be listed when armoring banks with a hardened material like rip rap. DWQ consider hard armoring of the banks a permanent impact and

if the length of the structure and rip rap banks is equal to or greater than 150 lf, mitigation will be required.

Comment noted.

- If the proposed work is to only lay back vertical banks and stabilize with soft armoring like coir fiber matting and you are maintaining the typical width and depth of the stream channel, the Department considers this as a temporary impact which would not require stream mitigation.

Revised impact to TS at Site 10 (inlet), Site 14 (inlet), Site 15 (inlet).

- If the proposed work requires minor widening of the stream to accommodate the opening of the structure it should be considered a permanent impact directly associated with the structure and added to the permanent impacts of the structure. If the linear foot of the channel modification and structure is equal to or greater than 150 lf, mitigation will be required.

Comment noted.

- If the proposed culvert is substantially wider than the receiving stream, DWQ requires floodplain benches and/or sills to maintain stream dimension. If this is accomplished with existing native earth material and no hard armoring is proposed, it is considered a temporary impact and should be accounted for accordingly. If hard armoring is required within the stream channel, it should be listed as a permanent impact associated with the structure.

Comment noted.

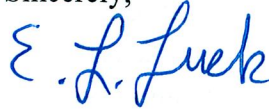
- Temporary Channel Impacts should be shown on both ends of any permanent channel impacts to allow the contractor to install BMP's to work in the dry. Some sites did not have temporary impacts on both ends of the proposed work nor were they listed in the impact summary.

Revised impacts with TS at Site 14 and Site 22.

Revised permit drawings are included with this letter. Please replace those submitted with our modification request and replace them with the attached versions. Our responses to questions pertaining to the utility drawings will be submitted to your agency as soon as they are available.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Chris Manley at 919-707-6135 or cdmanley@ncdot.gov.

Sincerely,



Gregory J. Thorpe, Ph.D., Manager

Project Development and Environmental Analysis Unit

cc:

Mr. Mason Herndon, NCDWQ Fayetteville Office

Mr. Brad Shaver, USACE Wilmington Field Office

Mr. Stoney Mathis, NCDOT Division 3 Environmental Officer

Mr. Travis Wilson, NC Wildlife Resources Commission

Mr. Chris Militscher, US Environmental Protection Agency

Mr. Gary Jordan, US Fish and Wildlife Service

Ms. Sonia Carrillo, NCDWQ Central Office



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: R-2303C

County(ies): Sampson

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General Project Information

Project No.:	R-2303C	Project Type:	New Location	Date:	10/4/2012
NCDOT Contact:	Galen Cail	Contractor / Designer:	Kimley-Horn and Associates		
Address:	NCDOT - Hydraulics Design Unit 1020 Birch Ridge Road Raleigh, NC 27610	Address:	3001 Weston Parkway Cary, NC 27513		
	Phone:		919-707-6711	Phone:	919-677-2000
	Email:		gcail@ncdot.gov	Email:	dan.robinson@kimley-horn.com
City/Town:	Autryville	County(ies):	Sampson		
River Basin(s):	Cape Fear	CAMA County?	No		
Primary Receiving Water:	Little Coharie Creek	NCDWQ Stream Index No.:	18-68-17-2		
NCDWQ Surface Water Classification for Primary Receiving Water	Primary:	Class C			
	Supplemental:	Swamp Waters (Sw)			
Other Stream Classification:					
303(d) Impairments:	None				
Buffer Rules in Effect	N/A				

Project Description

Project Length (lin. Miles or feet):	6.949 Miles	Surrounding Land Use:	Rural	
	Proposed Project		Existing Site	
Project Built-Upon Area (ac.)	76.91 ac.		21.77 ac.	
Typical Cross Section Description:	4 @ 12' lanes divided by median ditch with 6:1 slopes and 10' shoulder typical and lateral ditches with lateral "V" ditches where necessary		NC 24 - 2 @ 12' lanes with lateral "V" ditches where necessary	
Average Daily Traffic (veh/hr/day):	Design/Future: 19536	Existing:	13296	

General Project Narrative: R-2303C extends from 2.8 miles east of I-95 to I-40 in Cumberland, Sampson, and Duplin Counties. This Storm Water Management Plan pertains to Section "C" of the project and it is within Sampson County. Section "C" is broken into 5 segments. Segment C1 is from SR 1404 to approximately 3000 ft west of Little Coharie Creek, and it is new location four-lane divided bypass to the north of Roseboro. Segment C2 is existing NC 24 from approximately 3000 ft west of Little Coharie Creek to SR 1239, and is to be widened by adding two new lanes. Segment C3 is existing NC 24 from SR 1239 to just west of Snow Hill, and is to be widened by adding to new lanes. Segment C4A is a new location four-lane divided bypass to the north of Snow Hill. Segment C5 is existing NC 24 from the east end of the north Snow Hill bypass to SR 1303, and is to be widened by adding two new lanes. Two bridge replacements on FEMA regulated streams were required on this project. The existing 152' long bridge over Little Coharie Creek was replaced with two 295' long bridges. The existing 74' long bridge over Bearskin Swamp was replaced with two 145' long bridges. The proposed bridges were designed to eliminate deck drains over the streams, thereby not allowing direct discharge into the streams. BMPs and grass swale treatment were used where ever possible to minimize the effects of stormwater runoff from the project. Pipe system outfalls were strategically located to not outlet into wetlands and incorporated BMPs for treatment where practical. Grass swales were utilized for treatment prior to discharging into wetlands where practical and generally had slopes of 1% or less with the 2 year flows at a velocity of 2 ft/s or less. Please see the following sheets for a list and location of BMPs and environmental impacts.

Highway Stormwater Program
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Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
4,5	734+14 739+72	Wetland	Unknown			N/A	N/A	None	Fill/Excavation/ Clearing	N/A	
4,5	734+14 739+72	Stream	Intermittent	Unnamed Trib to Big Swamp (BS4)		N/A	N/A	None	Fill/ Stabilization	N/A	PFSH
5	741+85 744+50	Wetland	Unknown			N/A	N/A	None	Fill/Clearing	N/A	
5	741+85 744+50	Stream	Intermittent	Unnamed Trib to Big Swamp (BS5)		N/A	N/A	None	Fill/ Stabilization	N/A	
6	755+00 760+34	Open Water	Pond	Unnamed		N/A	N/A	None	Fill	N/A	PFSH
6	764+28 765+07	Stream	Intermittent	Unnamed		N/A	N/A	None	Fill	N/A	PFSH
7	769+44 777+78	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Excavation/ Clearing	N/A	
7	769+44 777+78	Open Water	Pond	Unnamed		N/A	N/A	None	Fill	N/A	
9	804+86 807+86	Stream	Intermittent	Unnamed Trib to Little Coharie Cr(LC4)		N/A	N/A	None	Fill/ Stabilization	N/A	PFSH
9	804+86 807+86	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
13,14	860+27 865+12	Stream	Perennial	Unnamed Trib to Little Coharie Cr(LC7)		N/A	N/A	None	Culvert/ Stabilization	N/A	PFSH/Rip Rap Apron
13,14	860+27 865+12	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
15	881+97 882+31	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
15	887+38 889+49	Stream	Intermittent	Unnamed Trib to Little Coharie Cr(LC8)		N/A	N/A	None	Culvert/ Stabilization	N/A	PFSH
15	887+38 889+49	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
16,17	905+77 907+41	Stream	Perennial	Unnamed Trib to Little Coharie Cr(LC9)		N/A	N/A	None	Culvert/ Stabilization	N/A	
16,17	905+77 907+41	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	

* List all stream and surface water impact locations regardless of jurisdiction or size.

Equalizer Pipes to be noted as a minimization of impacts.

All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

1 Eq. Pipe for the impacts from 755+00 to 760+34

References



North Carolina Department of Transportation

Highway Stormwater Program
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Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
17	912+92 913+67	Open Water	Pond	Unnamed		N/A	N/A	None	Fill	N/A	
17	912+92 913+67	Stream	Intermittent	Unnamed Trib to L. Coharie Cr(LC10)		N/A	N/A	None	Fill/ Stabilization	N/A	PFSH
19,20	937+08 957+49	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Excavation/ Clearing	N/A	PFSH
20	955+51 958+83	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
22	977+98 981+52	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Excavation/ Clearing	N/A	
23,24	999+64 1005+57	Stream	Perennial	Unnamed Trib to L. Coharie Cr(LC11)		N/A	N/A	None	Fill/ Stabilization	N/A	
23,24	999+64 1005+57	Open Water	Pond	Unnamed		N/A	N/A	None	Fill	N/A	
24	1005+48 1007+04	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
24	1007+77 1010+99	Open Water	Pond	Unnamed		N/A	N/A	None	Fill	N/A	
24	1007+77 1010+99	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill	N/A	
26	1035+56 1037+40	Stream	Perennial	Unnamed Trib to Bearskin Swamp(BR1)		N/A	N/A	None	Fill/ Stabilization	N/A	PFSH
26	1035+56 1037+40	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
28	1064+16 1067+96	Stream	Intermittent	Unnamed Trib to Bearskin Swamp(BR7)		N/A	N/A	None	Fill/ Stabilization	N/A	
28	1064+16 1067+96	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
29	1075+74 1080+69	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
29	1082+39 1083+15	Wetland	Unknown	Unnamed		N/A	N/A	None	Fill/Clearing	N/A	
29	1086+79 1087+86	Stream	Intermittent	Unnamed Trib to Bearskin Swamp(BR4)		N/A	N/A	None	Fill/ Stabilization	N/A	

* List all stream and surface water impact locations regardless of jurisdiction or size.

Equalizer Pipes to be noted as a minimization of impacts.

All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

4 Eq. Pipes for the impacts from 937+08 to 957+49

References



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Surface Water Impacts

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

References

References



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Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
4	734+72 -L- (LT)	PFSH	Class 'B'	3.35	Ditch	N/A	8.5	1.9
6	753+75 -L- (LT)	PFSH	Class 'B'	0.96	Pipe	18	4.5	1.5
6	761+50 -L- (LT)	PFSH	Class 'B'	0.60	Pipe	18	2.1	1.2
6	763+50 -L- (RT)	PFSH	Class 'B'	0.66	Pipe	15	3.5	1.4
7	767+00 -L- (RT)	PFSH	Class 'B'	0.51	Pipe	18	1.9	1.1
10	808+27 -L- (LT)	PFSH	Class 'B'	0.15	Pipe	15	0.9	0.9
10	811+50 -L- (LT)	PFSH	Class 'B'	0.69	Pipe	15	1.8	1.1
12	847+32 -L- (LT)	PFSH	Class 'B'	0.59	Pipe	15	3.1	1.3
12	849+17 -L- (LT)	PFSH	Class 'B'	3.72	Pipe	18	9.5	1.9
13	852+00 -L- (LT)	PFSH	Class 'B'	0.62	Pipe	18	2.7	1.3
14	865+00 -L- (LT)	PFSH	Class 'B'	1.66	Pipe	18	5.8	1.6
15	886+50 -L- (RT)	PFSH	Class 'B'	0.33	Pipe	15	0.9	0.9
19	947+75 -L- (RT)	PFSH	Class 'B'	0.73	Pipe	18	3.0	1.3
20	951+00 -L- (RT)	PFSH	Class 'B'	0.95	Pipe	18	3.9	1.4
20	954+73 -L- (RT)	PFSH	Class 'B'	3.10	Pipe	18	9.9	2.0
26	1033+00 -L- (LT)	PFSH	Class 'B'	0.61	Pipe	18	2.5	1.2
26	1039+53 -L- (LT)	PFSH	Class 'B'	0.18	Pipe	15	1.0	1.1
17	52+65 -Y33A- (LT)	PFSH	Class 'B'	0.11	Pipe	15	0.7	0.8
17	54+94 -Y33A- (LT)	PFSH	Class 'B'	1.44	Pipe	18	6.4	1.7
14	865+25 -L- (RT)	Riprap Apron / Pad	Class 'B'	8.07	Ditch	N/A	15.5	0.3

☒ YES ☐ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanation of why design criteria was not met.

Additional Comments

In addition to locations noted above, stormwater runoff receives grass swale treatment in advance of drop inlets, wetlands, and downstream of pipe outfalls throughout the project.

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, 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.

09/08/99

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SAMPSON COUNTY

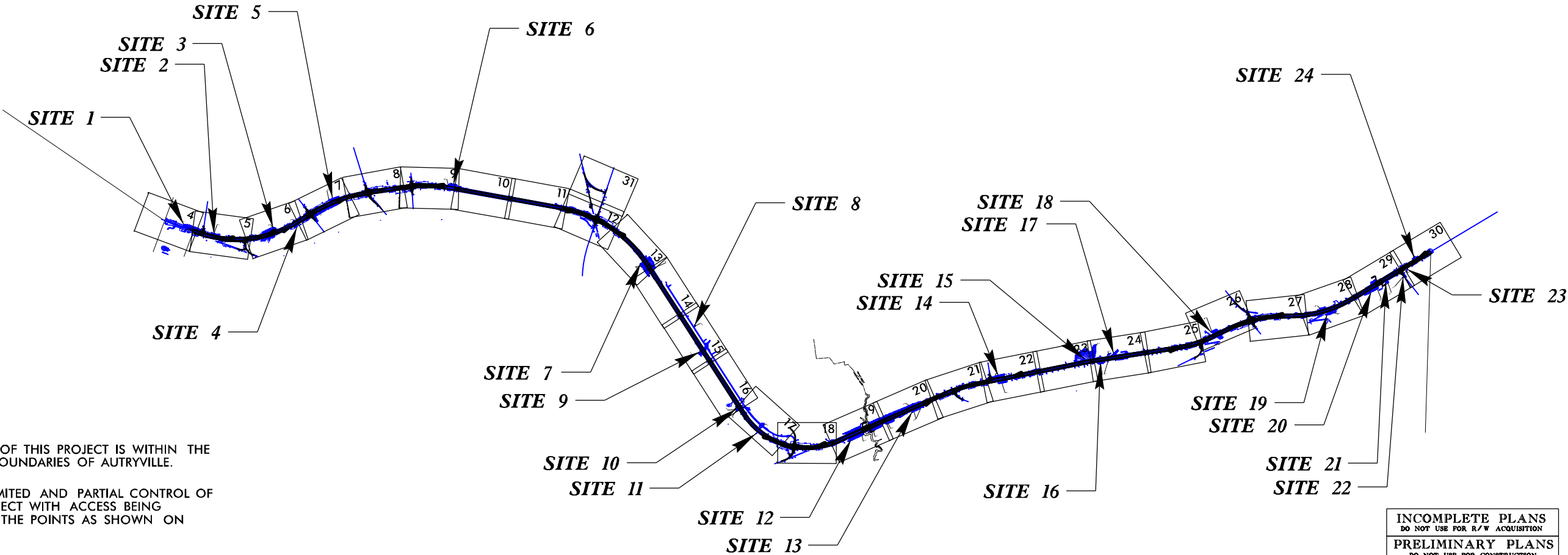
LOCATION: NC 24 FROM SR 1404 (DOWDY ROAD) TO SR 1303
(MITCHELLS LOOP ROAD)

WETLAND /STREAM PERMIT DRAWINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2302C	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34416.1.1	STPNHF-F-8-2(1	PE	

Permit Drawing Sheet 1 of 80

TIP PROJECT: R-2303C



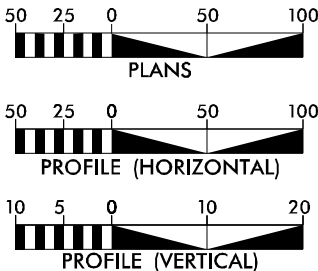
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF AUTRYVILLE.

THIS IS A LIMITED AND PARTIAL CONTROL OF ACCESS PROJECT WITH ACCESS BEING LIMITED TO THE POINTS AS SHOWN ON THE PLANS.

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

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

GRAPHIC SCALES



DESIGN DATA

ADT 2010 = 10760
ADT 2030 = 17800
DHV = 11 %
D = 55 %
T = 9 % *
V = 60 MPH
* TTST 6 DUAL 3

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R- 2303C =
LENGTH STRUCTURES TIP PROJECT R- 2303C =
TOTAL LENGTH TIP PROJECT R- 2303C =

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

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: APRIL 17, 2009

LETTING DATE: APRIL 19, 2011

BRENDA MOORE, PE
PROJECT ENGINEER

THAD DUNCAN, PE
PROJECT DESIGN ENGINEER

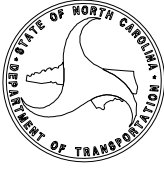
HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.

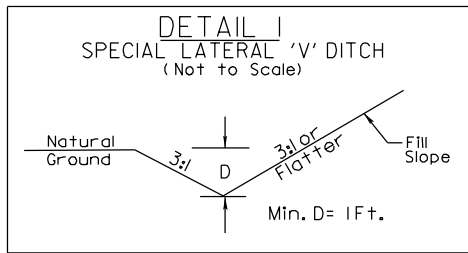
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA



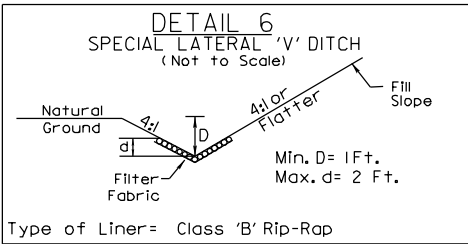
STATE HIGHWAY DESIGN ENGINEER

P.E.

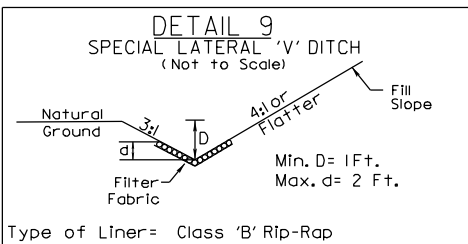
8/3/2012 K:\RAL-Roadway\01056078 (R-2303C)\Hydraulics\PERMITS_Environmental\Drawings\R2303c_prm.tsh.dgn



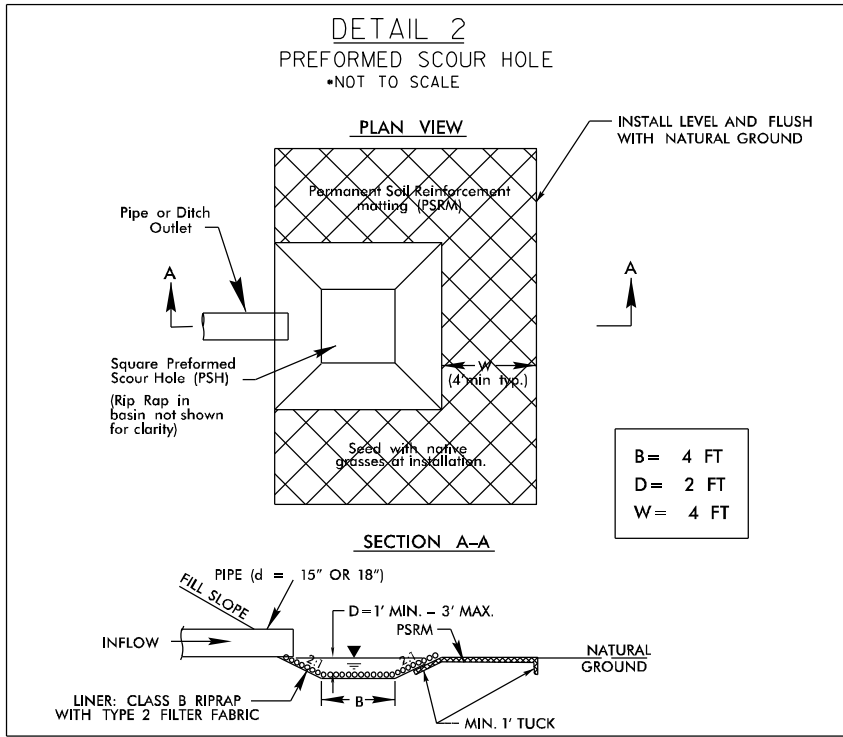
FROM STA. 730+10 TO STA. 732+36 -L- (RT)
FROM STA. 730+10 TO STA. 734+72 -L- (LT)
FROM STA. 734+78 TO STA. 741+00 -L- (RT)
FROM STA. 737+85 -L- (LT) TO STA. 17+66 -Y25- (RT)
FROM STA. 741+55 TO STA. 748+46.50 -L- (RT)
FROM STA. 746+50 TO STA. 749+50 -L- (LT)
FROM STA. 11+00 TO STA. 16+00 -Y26- (LT)
FROM STA. 15+00 -Y26- (RT) TO STA. 14+50 -Y27- (LT)
FROM STA. 11+98 TO STA. 15+87 -Y27- (RT)
FROM STA. 16+00 -Y26- (LT) TO STA. 752+00 -L- (RT)
FROM STA. 770+00 TO STA. 774+00 -L- (LT)
FROM STA. 777+80 TO STA. 778+50 -L- (LT)
FROM STA. 780+48 TO STA. 782+45 -L- (LT)
FROM STA. 786+03 TO STA. 790+44 -L- (RT)
FROM STA. 788+00 TO STA. 790+02 -L- (LT)
FROM STA. 790+02 TO STA. 792+02.31 -L- (LT)
FROM STA. 790+45 TO STA. 795+89.82 -L- (RT)
FROM STA. 797+00 TO STA. 798+00 -L- (RT)
FROM STA. 803+50 TO STA. 804+75 -L- (RT)
FROM STA. 804+86 TO STA. 810+00 -L- (RT)
FROM STA. 818+00 TO STA. 820+50 -L- (RT)
FROM STA. 820+50 TO STA. 823+00 -L- (RT)
FROM STA. 828+00 TO STA. 833+50 -L- (LT)
FROM STA. 830+00 TO STA. 835+55 -L- (RT)
FROM STA. 841+80 TO STA. 844+00 -L- (RT)
FROM STA. 846+50 TO STA. 849+16.97 -L- (RT)
FROM STA. 849+16.97 TO STA. 851+02.41 -L- (RT)
FROM STA. 853+50 TO STA. 856+50 -L- (RT)
FROM STA. 867+00 TO STA. 868+50 -L- (RT)
FROM STA. 873+50 TO STA. 876+50 -L- (RT)
FROM STA. 876+50 TO STA. 878+00 -L- (RT)
FROM STA. 879+50 TO STA. 884+08 -L- (RT)
FROM STA. 910+00 TO STA. 913+55 -L- (RT)
FROM STA. 916+00 TO STA. 923+00 -L- (RT)
FROM STA. 55+76 TO STA. 57+50 -Y33A- (LT)
FROM STA. 924+50 TO STA. 928+00 -L- (RT)
3FROM STA. 933+44 TO STA. 937+00 -L- (LT)
FROM STA. 958+50 TO STA. 967+00 -L- (LT)
FROM STA. 968+55 TO STA. 976+50 -L- (LT)
FROM STA. 978+50 TO STA. 981+00 -L- (LT)
FROM STA. 1015+50 TO STA. 1016+90 -L- (LT)
FROM STA. 1016+90 TO STA. 1028+40 -L- (LT)
FROM STA. 1041+00 TO STA. 1045+50 -L- (LT)
FROM STA. 1047+00 TO STA. 1060+00 -L- (LT)
FROM STA. 1047+00 TO STA. 1062+50 -L- (RT)
FROM STA. 1066+50 TO STA. 1068+00 -L- (LT)



FROM STA. 16+40 TO 16+85 -Y25- (LT)

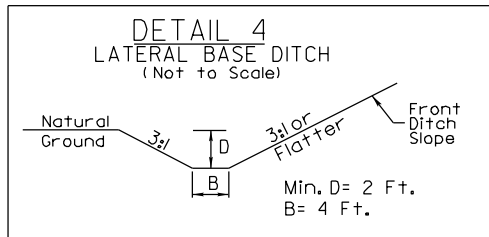


FROM STA. 856+50 TO STA. 858+00 -L- (RT)
FROM STA. 913+70 TO STA. 916+00 -L- (RT)
FROM STA. 1066+00 TO STA. 1066+50 -L- (LT)

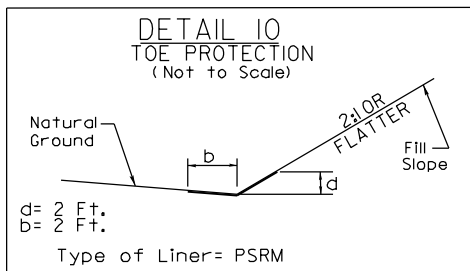


STA. 734+72 -L- (LT)
STA. 753+75 -L- (LT)
STA. 761+50 -L- (LT)
STA. 763+50 -L- (RT)
STA. 767+00 -L- (RT)
STA. 808+27 -L- (LT)
STA. 811+50 -L- (LT)
STA. 847+32 -L- (LT)
STA. 849+17 -L- (LT)

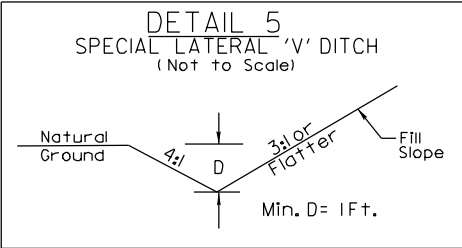
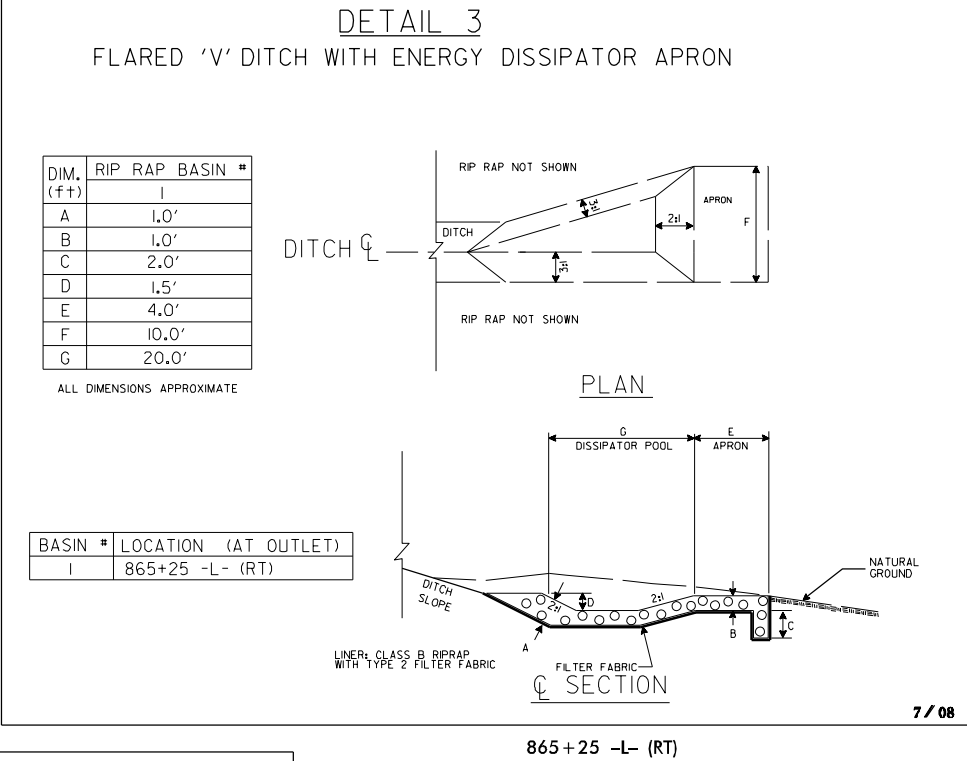
STA. 852+00 -L- (LT)
STA. 865+00 -L- (LT)
STA. 886+50 -L- (RT)
STA. 947+75 -L- (RT)
STA. 951+00 -L- (RT)
STA. 954+73 -L- (RT)
STA. 1033+00 -L- (LT)
STA. 1039+53 -L- (LT)
STA. 52+65 -Y33A- (LT)
STA. 54+94 -Y33A- (LT)



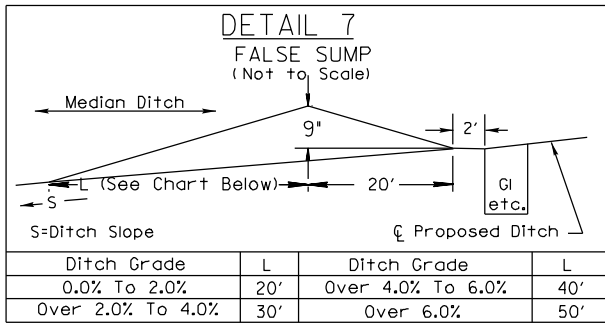
FROM STA. 735+12 TO STA. 737+85 -L- (LT)



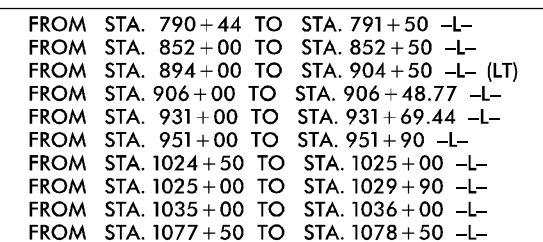
FROM STA. 746+00 TO STA. 746+15 -L- (LT)
FROM STA. 29+45 TO STA. 33+00 -Y33A- (LT)
FROM STA. 958+00 TO STA. 958+50 -L- (LT)
FROM STA. 981+20 TO STA. 982+23 -L- (LT)
FROM STA. 1009+00 TO STA. 1009+50 -L- (LT)
FROM STA. 1010+00 TO STA. 1010+50 -L- (LT)
FROM STA. 1051+00 TO STA. 1054+15 -L- (LT)
FROM STA. 1059+56 TO STA. 1059+60 -L- (LT)
FROM STA. 11+56 TO STA. 11+87 -Y38- (RT)
FROM STA. 1089+65 TO STA. 1090+35 -L- (RT)



FROM STA. 740+60 TO STA. 742+00 -L- (LT)
FROM STA. 16+40 TO STA. 16+85 -Y25- (RT)
FROM STA. 16+85 TO STA. 17+75 -Y25- (LT)
FROM STA. 17+10 TO STA. 17+66 -Y25- (RT)
FROM STA. 12+00 TO STA. 12+85 -Y28- (LT)
FROM STA. 12+85 TO STA. 14+10 -Y28- (LT)
FROM STA. 16+15 TO STA. 17+50 -Y28- (LT)
FROM STA. 22+98 TO STA. 24+04.19 -Y29- (RT)
FROM STA. 23+54.50 TO STA. 24+50 -Y29- (LT)
FROM STA. 24+04 TO STA. 27+50 -Y29- (RT)
FROM STA. 26+50 TO STA. 27+50 -Y29- (LT)
FROM STA. 14+50 TO STA. 15+65 -Y30- (RT)
FROM STA. 11+00 TO STA. 12+06.81 -Y30- (LT)
FROM STA. 14+30 TO STA. 15+50 -Y30- (LT)
FROM STA. 16+32 TO STA. 20+50 -Y31- (LT)
FROM STA. 25+50 TO STA. 27+50 -Y31- (LT)
FROM STA. 20+50 TO STA. 22+29.23 -Y32- (RT)
FROM STA. 20+50 TO STA. 22+29.23 -Y32- (LT)
FROM STA. 10+45 TO STA. 12+50 -Y32A- (RT)
FROM STA. 784+04.6 TO STA. 784+80.22 -L- (RT)
FROM STA. 875+00 TO STA. 876+50 -L- (LT)
FROM STA. 876+50 TO STA. 877+50 -L- (LT)
FROM STA. 907+00 TO STA. 908+50 -L- (LT)
FROM STA. 908+50 TO STA. 911+00 -L- (LT)
FROM STA. 911+00 TO STA. 913+58 -L- (LT)
FROM STA. 913+58 TO STA. 915+00 -L- (LT)
FROM STA. 11+65 TO STA. 13+80 -Y34- (RT)
FROM STA. 11+24 TO STA. 13+80 -Y34- (LT)
FROM STA. 12+25 TO STA. 14+00 -Y35- (RT)
FROM STA. 12+25 TO STA. 13+86 -Y35- (LT)
FROM STA. 12+00 TO STA. 13+00 -Y36- (RT)
FROM STA. 13+00 TO STA. 16+15 -Y36- (LT)
FROM STA. 14+50 TO STA. 16+15 -Y36- (RT)
FROM STA. 10+20 TO STA. 10+94.65 -Y36A- (LT)
FROM STA. 9+82 TO STA. 10+97 -Y36B- (LT)
FROM STA. 10+25 TO STA. 10+97 -Y36B- (RT)
FROM STA. 1044+32 TO STA. 1045+50 -L- (RT)
FROM STA. 12+60 TO STA. 16+00 -Y37- (RT)
FROM STA. 12+60 TO STA. 17+35 -Y37- (LT)
FROM STA. 21+14.03 TO STA. 22+50 -Y37- (RT)
FROM STA. 21+33.97 TO STA. 23+00 -Y37- (LT)
FROM STA. 1094+50 TO STA. 1096+00 -L- (LT)



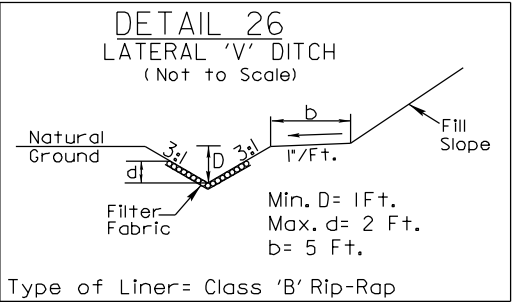
FROM STA. 741+64 TO STA. 742+04 -L-
FROM STA. 744+58 TO STA. 744+98 -L-
FROM STA. 753+33 TO STA. 753+73 -L-
FROM STA. 774+02 TO STA. 774+42 -L-
FROM STA. 807+08 TO STA. 807+48 -L-
FROM STA. 811+08 TO STA. 811+48 -L-
FROM STA. 817+58 TO STA. 817+98 -L-
FROM STA. 820+38 TO STA. 820+78 -L-
FROM STA. 831+52 TO STA. 831+92 -L-
FROM STA. 841+77 TO STA. 842+17 -L-
FROM STA. 849+19 TO STA. 849+59 -L-
FROM STA. 858+02 TO STA. 858+42 -L-
FROM STA. 861+02 TO STA. 861+42 -L-
FROM STA. 865+02 TO STA. 865+42 -L-
FROM STA. 867+77 TO STA. 868+17 -L-
FROM STA. 873+02 TO STA. 873+42 -L-
FROM STA. 876+52 TO STA. 876+92 -L-
FROM STA. 880+02 TO STA. 880+42 -L-
FROM STA. 882+67 TO STA. 883+07 -L-
FROM STA. 883+35 TO STA. 883+75 -L-
FROM STA. 886+52 TO STA. 886+92 -L-
FROM STA. 888+02 TO STA. 888+42 -L-
FROM STA. 889+27 TO STA. 889+67 -L-
FROM STA. 893+02 TO STA. 893+42 -L-
FROM STA. 900+02 TO STA. 900+42 -L-
FROM STA. 904+52 TO STA. 904+92 -L-
FROM STA. 908+08 TO STA. 908+48 -L-
FROM STA. 913+18 TO STA. 913+58 -L-
FROM STA. 917+48 TO STA. 917+98 -L-
FROM STA. 926+06 TO STA. 926+46 -L-
FROM STA. 927+52 TO STA. 928+02 -L-
FROM STA. 929+52 TO STA. 929+92 -L-
FROM STA. 937+02 TO STA. 937+42 -L-
FROM STA. 941+35 TO STA. 941+75 -L-
FROM STA. 947+77 TO STA. 948+17 -L-
FROM STA. 955+58 TO STA. 955+98 -L-
FROM STA. 958+48 TO STA. 958+98 -L-
FROM STA. 961+02 TO STA. 961+42 -L-
FROM STA. 969+58 TO STA. 969+98 -L-
FROM STA. 980+98 TO STA. 981+48 -L-
FROM STA. 984+50 TO STA. 985+00 -L-
FROM STA. 997+02 TO STA. 997+52 -L-
FROM STA. 999+02 TO STA. 999+52 -L-
FROM STA. 1001+70 TO STA. 1002+10 -L-
FROM STA. 1004+08 TO STA. 1004+48 -L-
FROM STA. 1008+34 TO STA. 1008+74 -L-
FROM STA. 1011+08 TO STA. 1011+48 -L-
FROM STA. 1015+96 TO STA. 1016+36 -L-
FROM STA. 1026+58 TO STA. 1026+98 -L-
FROM STA. 1042+02 TO STA. 1042+42 -L-
FROM STA. 1061+02 TO STA. 1066+42 -L-
FROM STA. 1065+60 TO STA. 1066+00 -L-
FROM STA. 1067+02 TO STA. 1067+42 -L-
FROM STA. 1072+52 TO STA. 1073+02 -L-
FROM STA. 1075+52 TO STA. 1075+92 -L-
FROM STA. 1081+68 TO STA. 1082+08 -L-
FROM STA. 1087+58 TO STA. 1087+98 -L-
FROM STA. 1088+98 TO STA. 1089+48 -L-
FROM STA. 1089+98 TO STA. 1090+48 -L-
FROM STA. 1092+48 TO STA. 1092+98 -L-



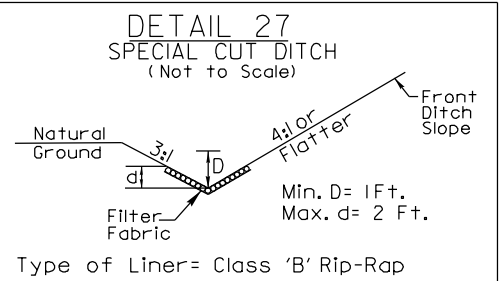
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
R-2303C	2-H
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	

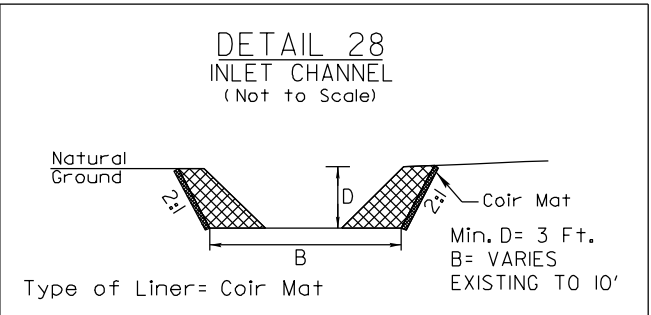
Permit Drawing Sheet 4 of 80



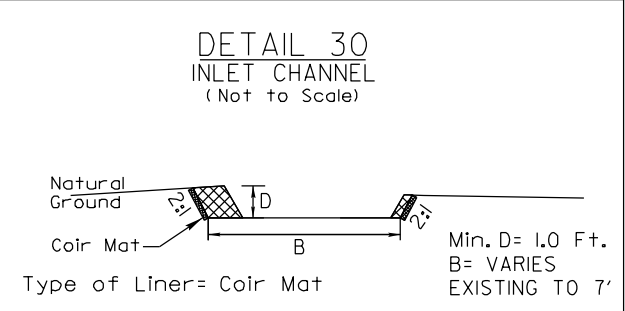
FROM STA. 865+25 TO STA. 867+00 -L- (RT)
FROM STA. 1062+50 TO STA. 1065+00 -L- (RT)



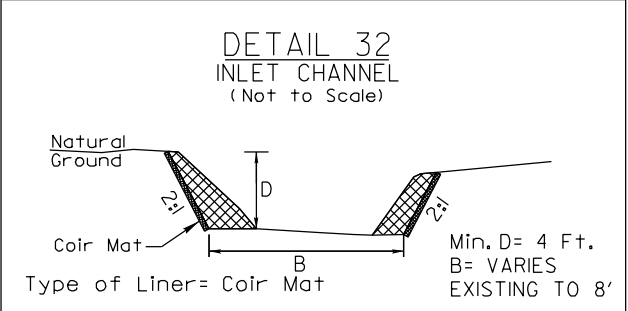
FROM STA. 928+00 TO STA. 929+50 -L- (RT)



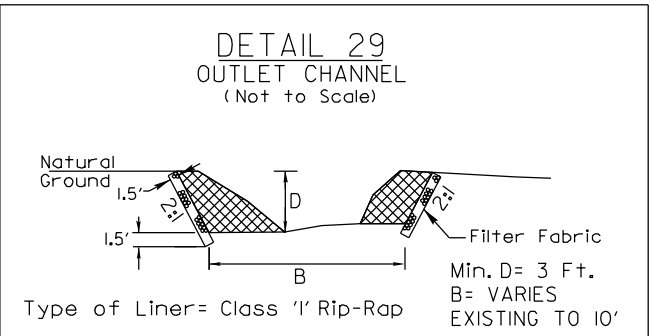
STA. 863+15 -L- (RT)



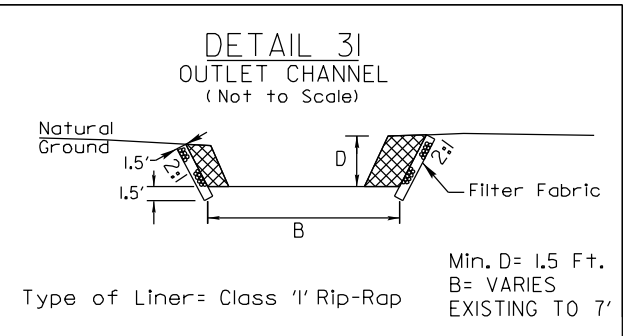
STA. 888+67 -L- (RT)



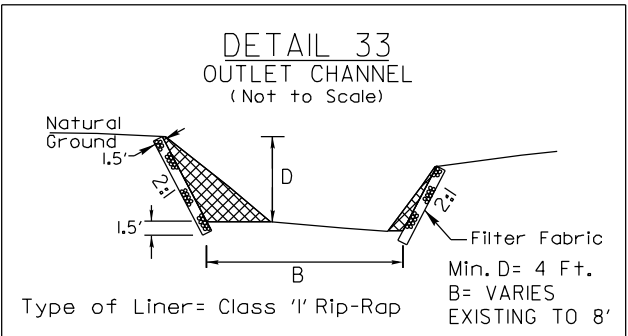
STA. 906+61 -L- (RT)



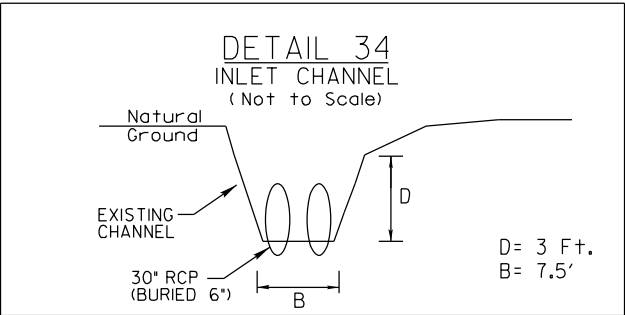
STA. 863+15 -L- (LT)



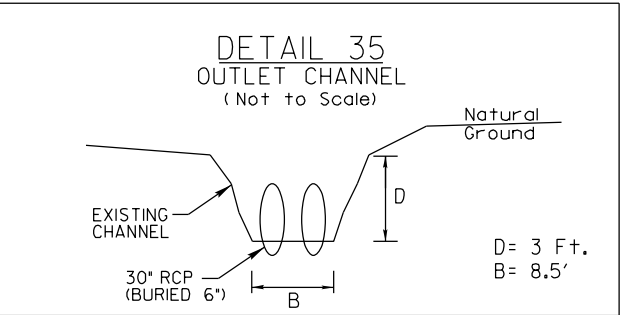
STA. 888+67 -L- (LT)



STA. 906+61 -L- (LT)

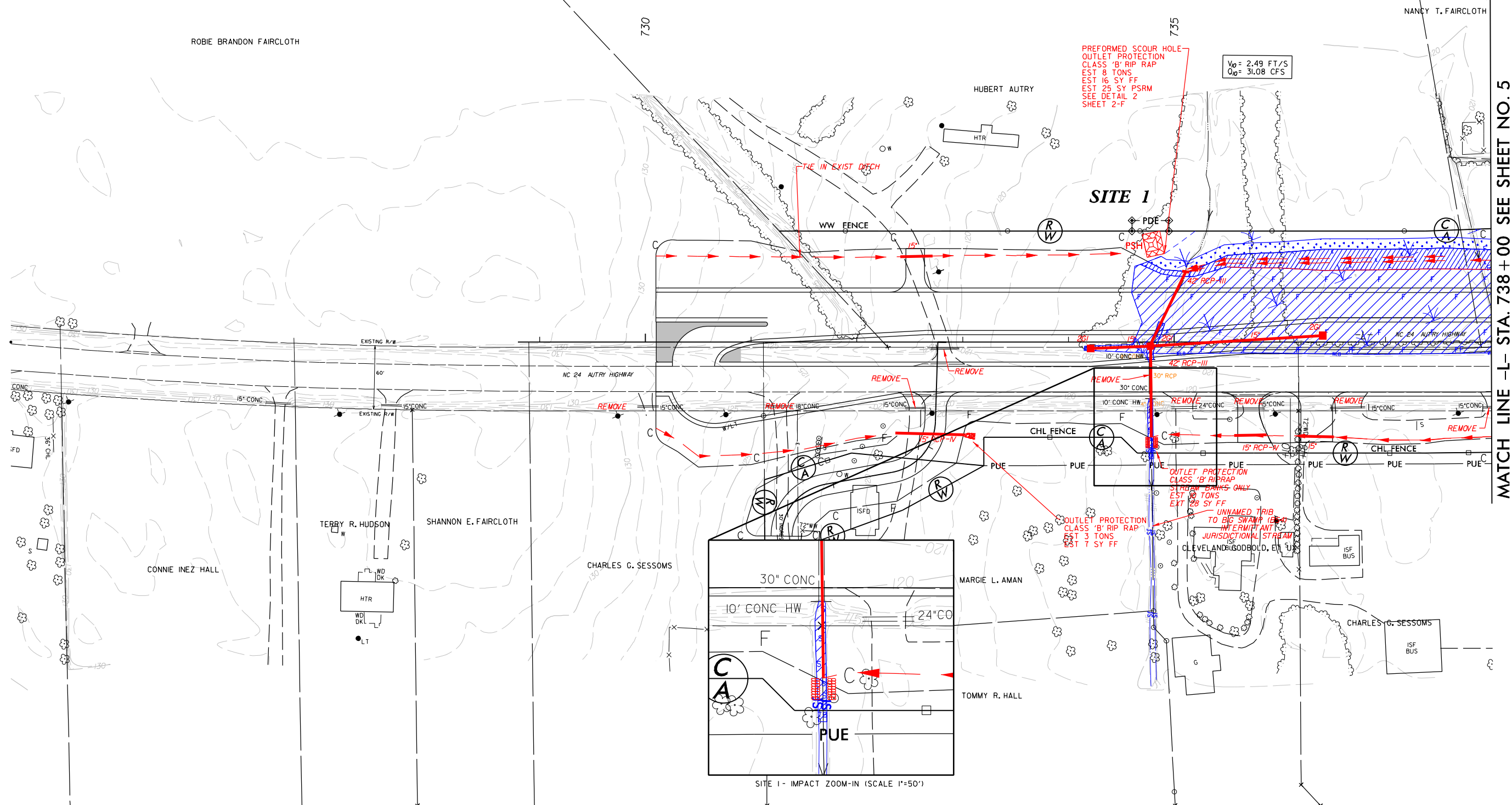


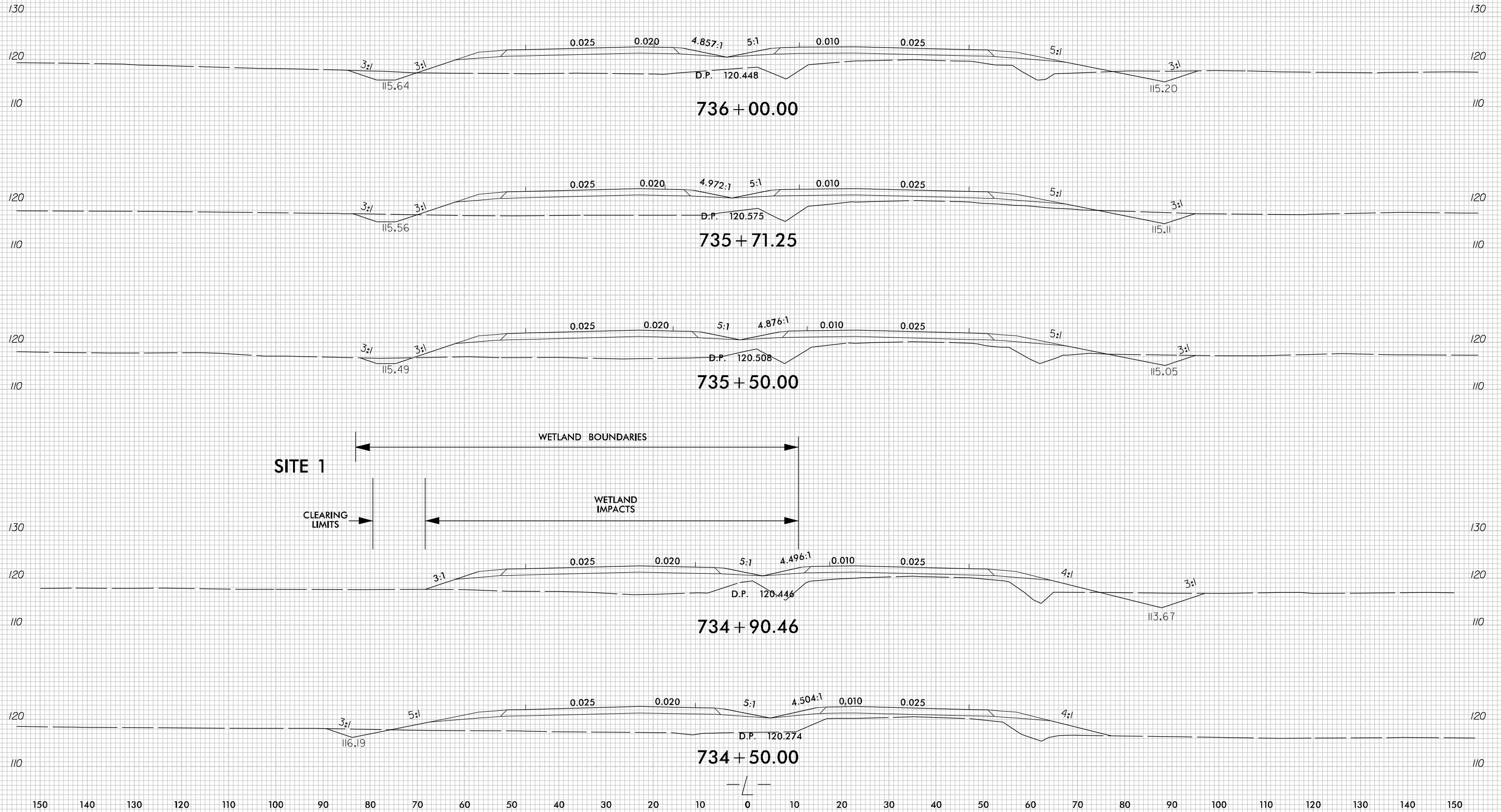
STA. 11+97 -Y38- (LT)



STA. 11+97 -Y38- (RT)

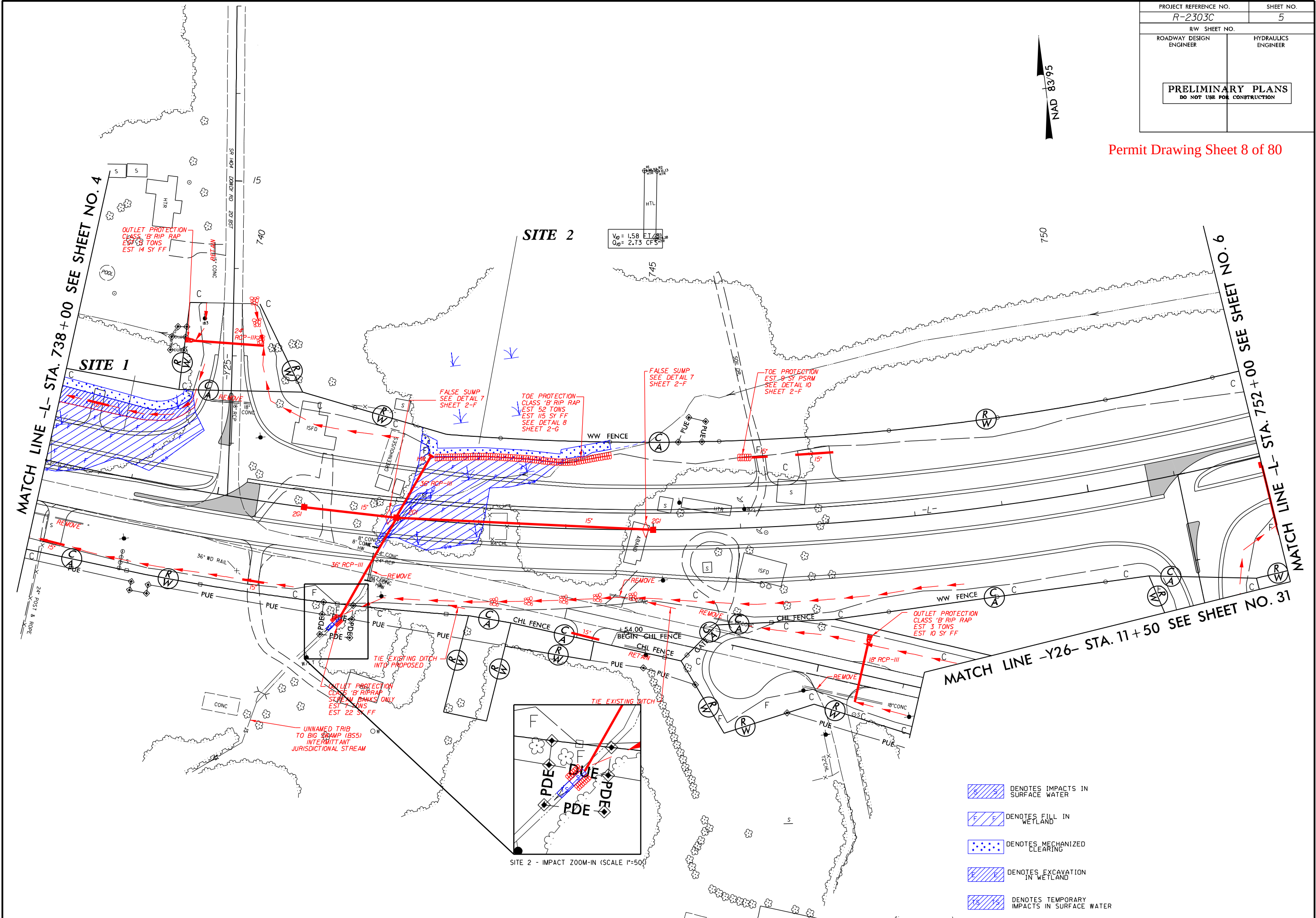
6/2/99

Permit Drawing Sheet 6 of 80



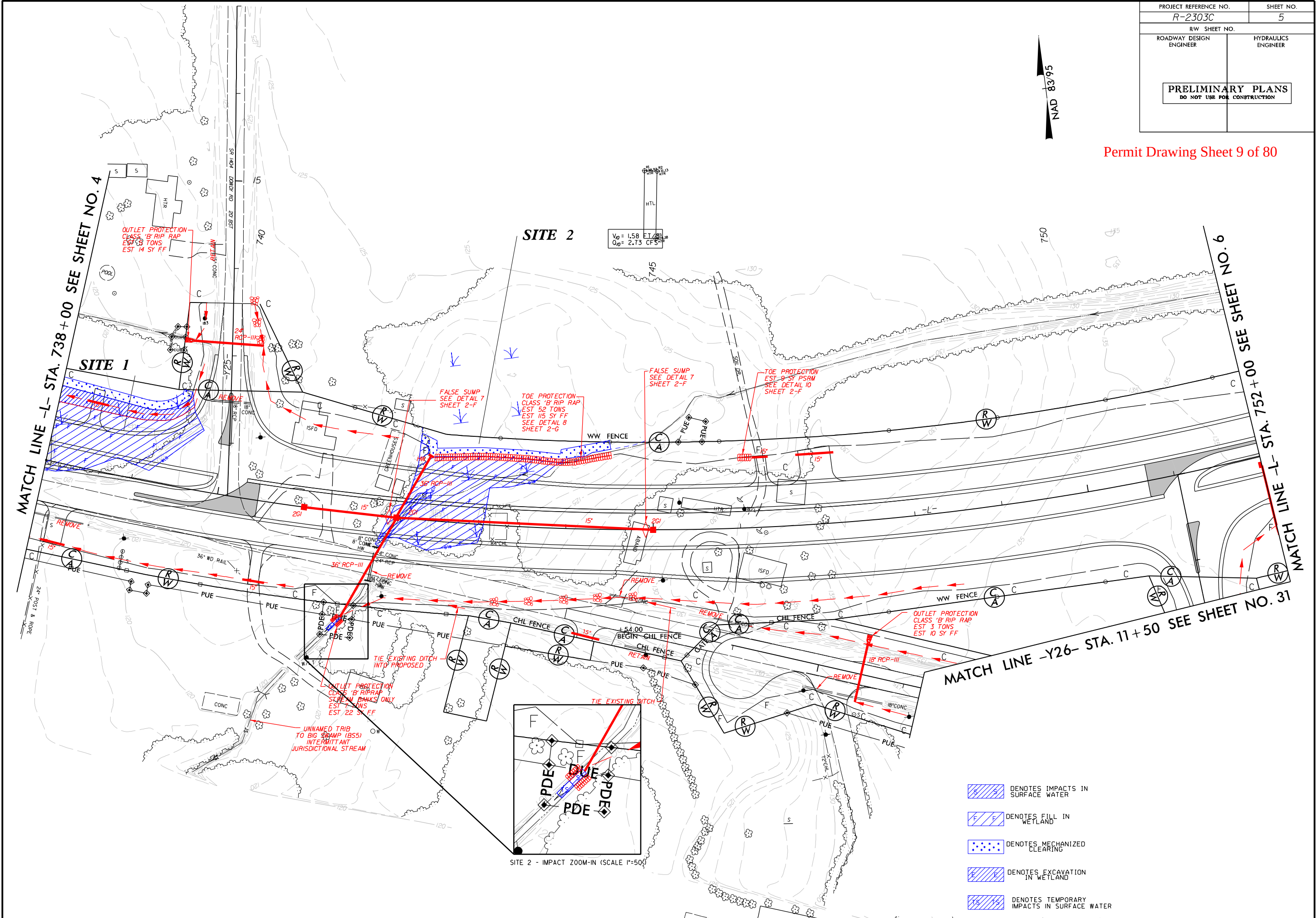
PROJECT REFERENCE NO.		SHEET NO.
R-2303C		5
R/W SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 8 of 80



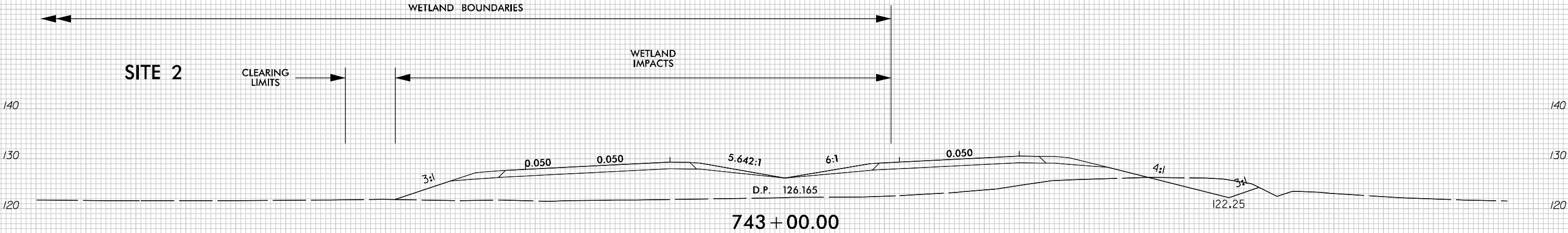
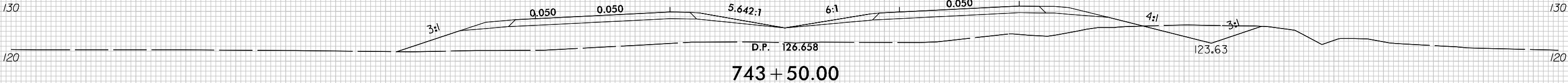
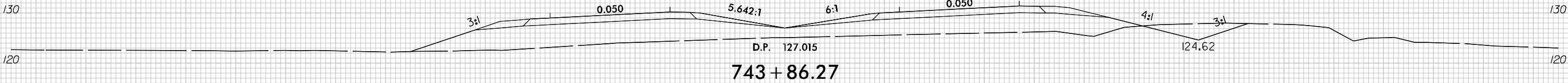
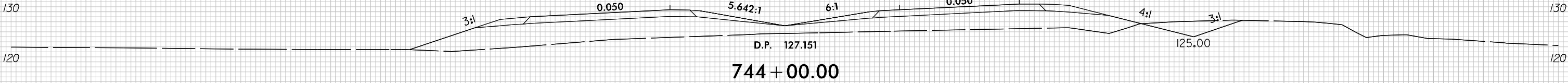
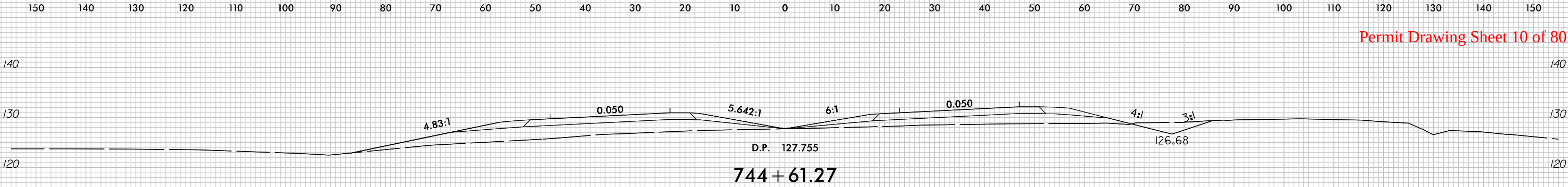
SITE 2 - IMPACT ZOOM-IN (SCALE 1"=50')

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



8/23/99

Permit Drawing Sheet 10 of 80



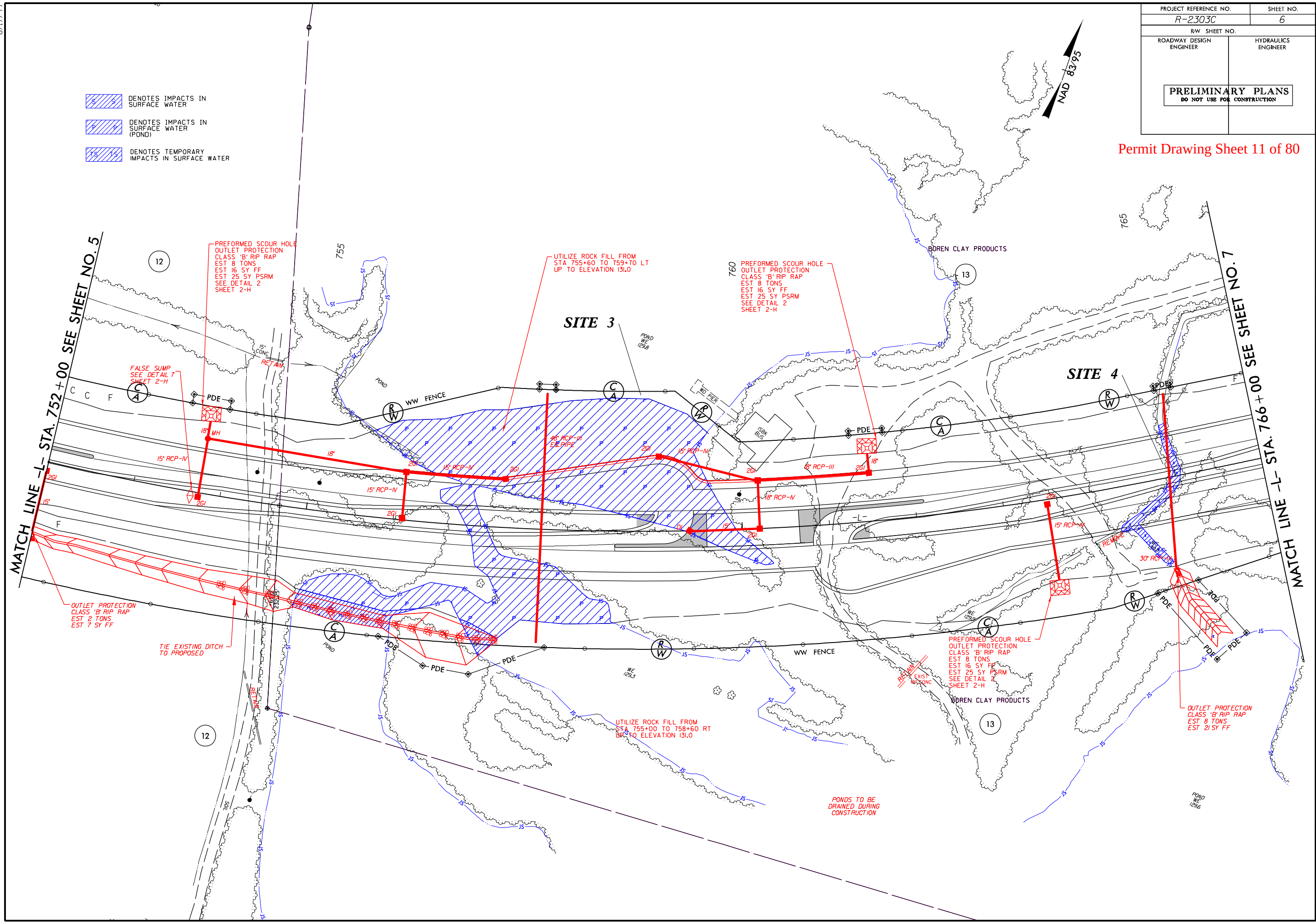
SYSTEMS
DESIGN
INC.

8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		6
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 11 of 80

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

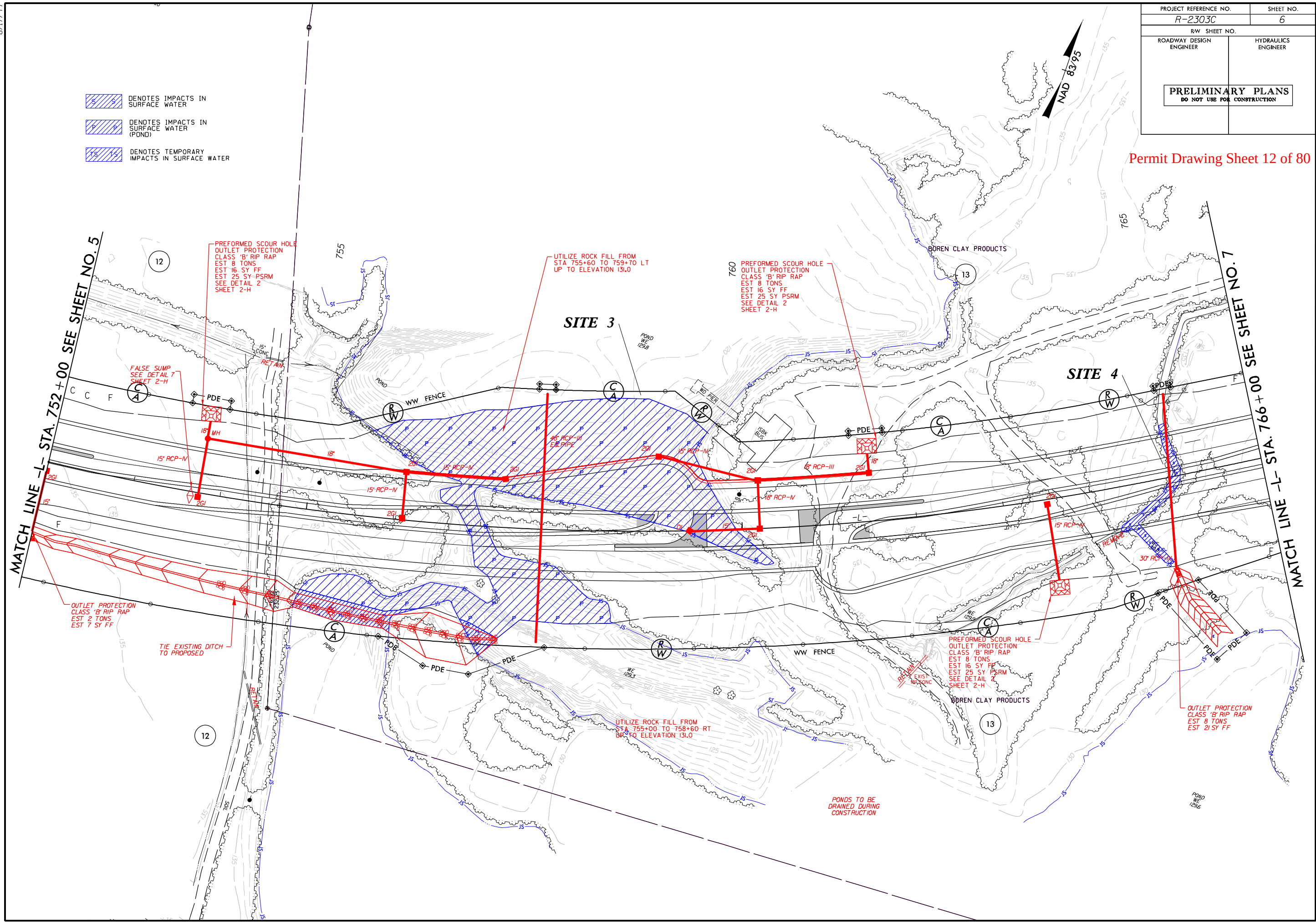


8/3/2003 Roadway\011056078 (R-2303C)\Hydraulics\PERMITS.Environmental\Drawings\2303c.prm.psh.06.dgn

8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		6
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

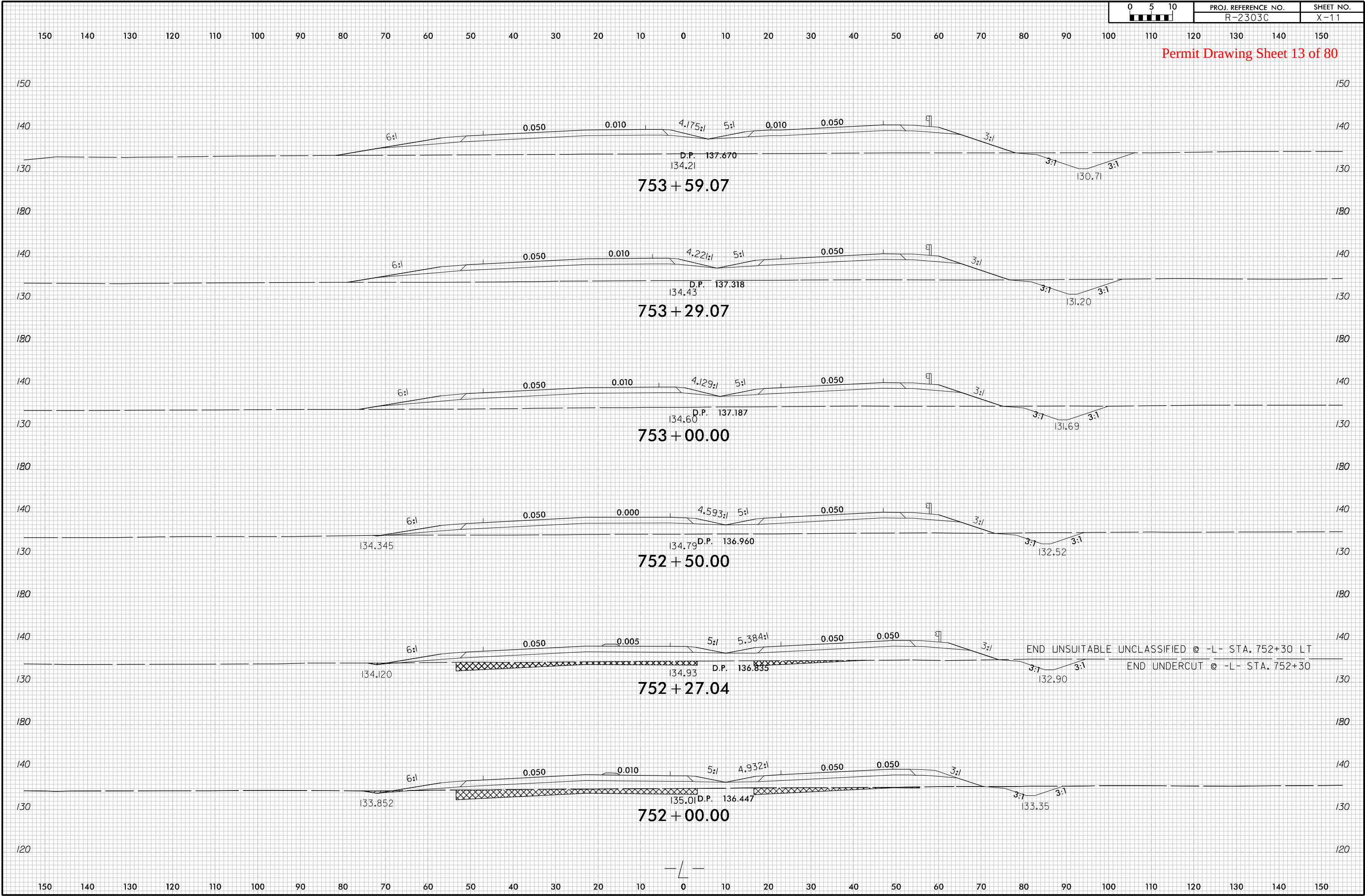
Permit Drawing Sheet 12 of 80



8/3/2012 Roadway\011056078 (R-2303C)\Hydraulics\PERMITS.Environmental\Drawings\R-2303c.prm.psh.06.dgn

8/23/99

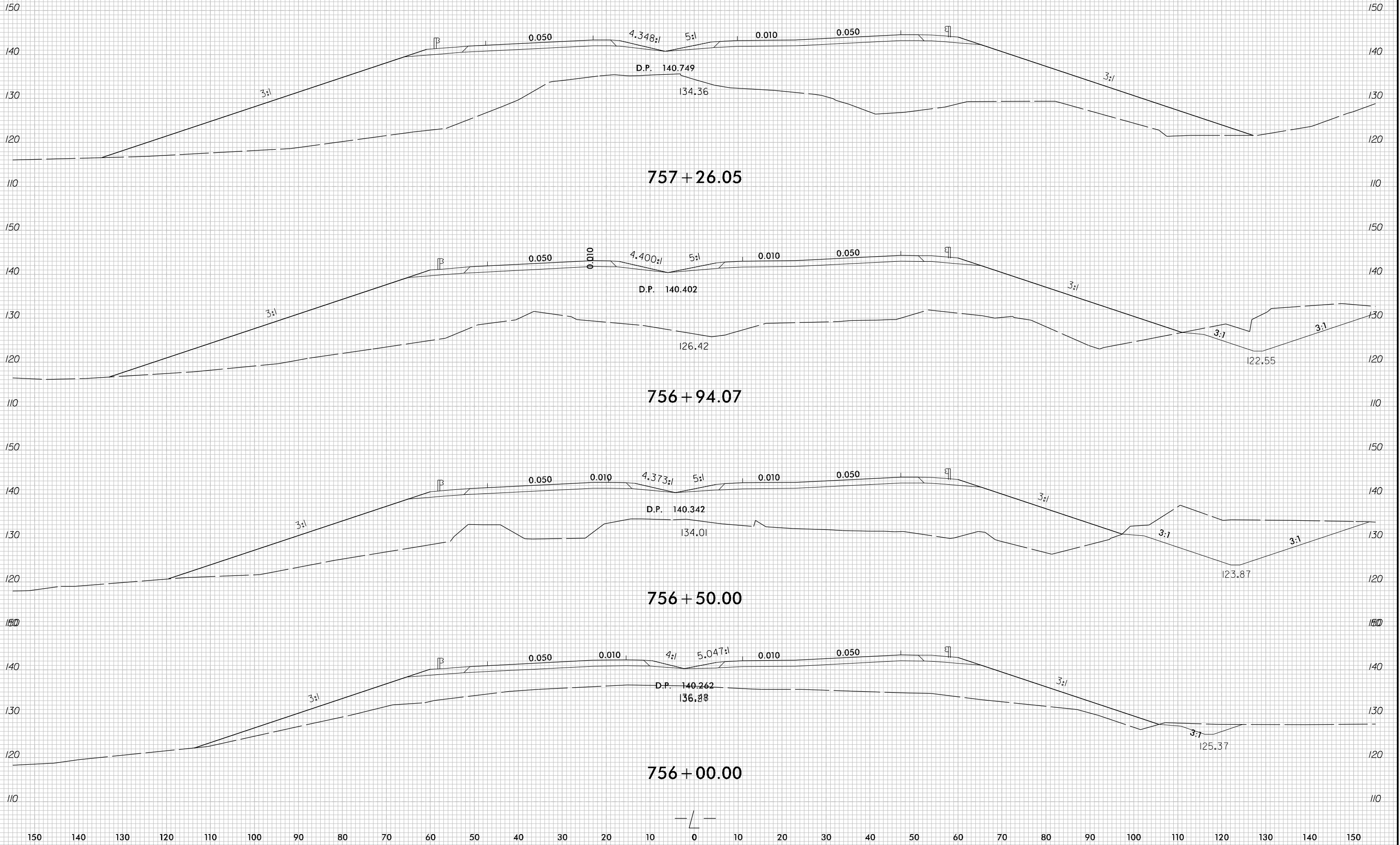
Permit Drawing Sheet 13 of 80



8/23/99

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

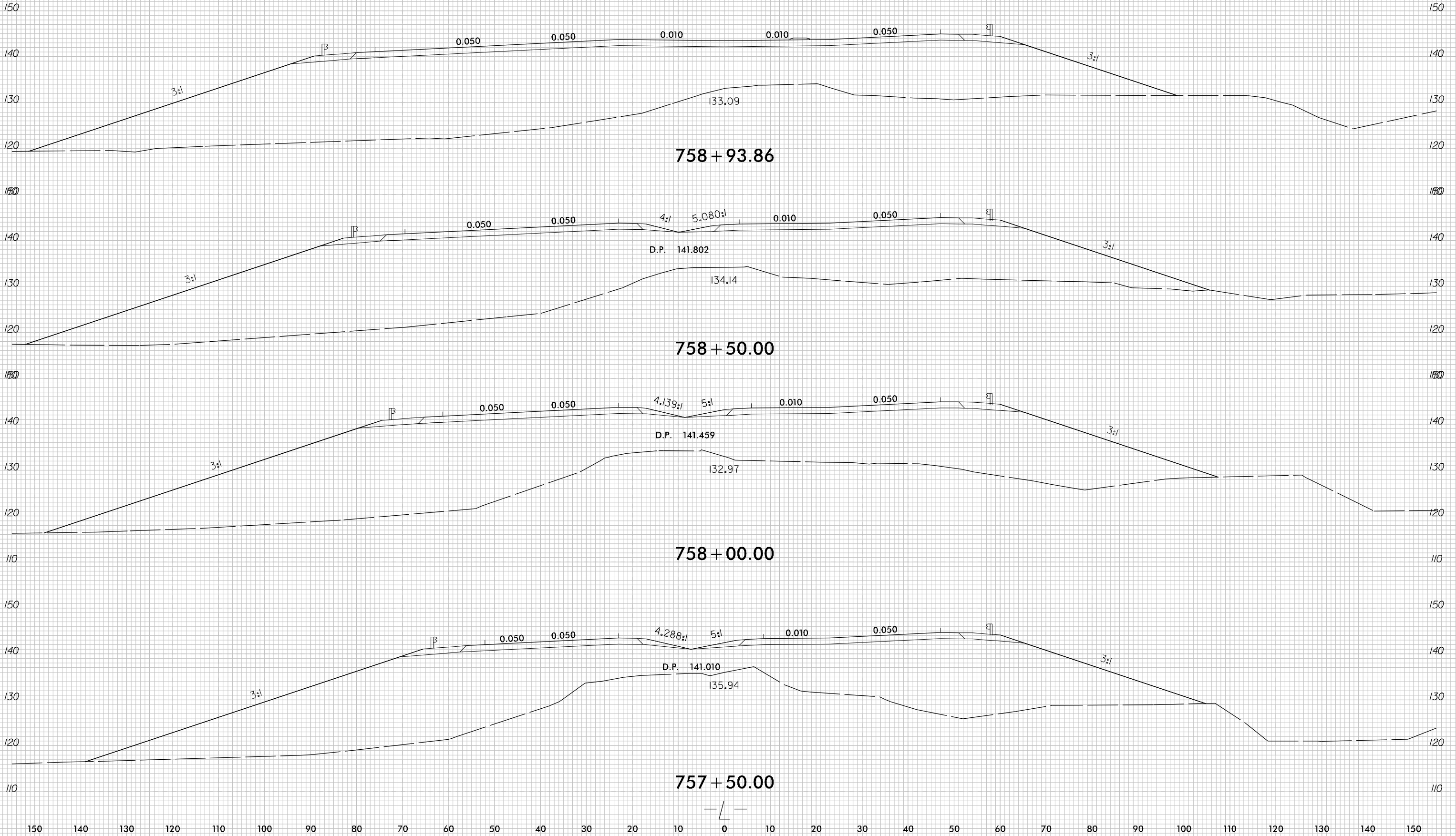
Permit Drawing Sheet 15 of 80



8/23/99

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

Permit Drawing Sheet 16 of 80

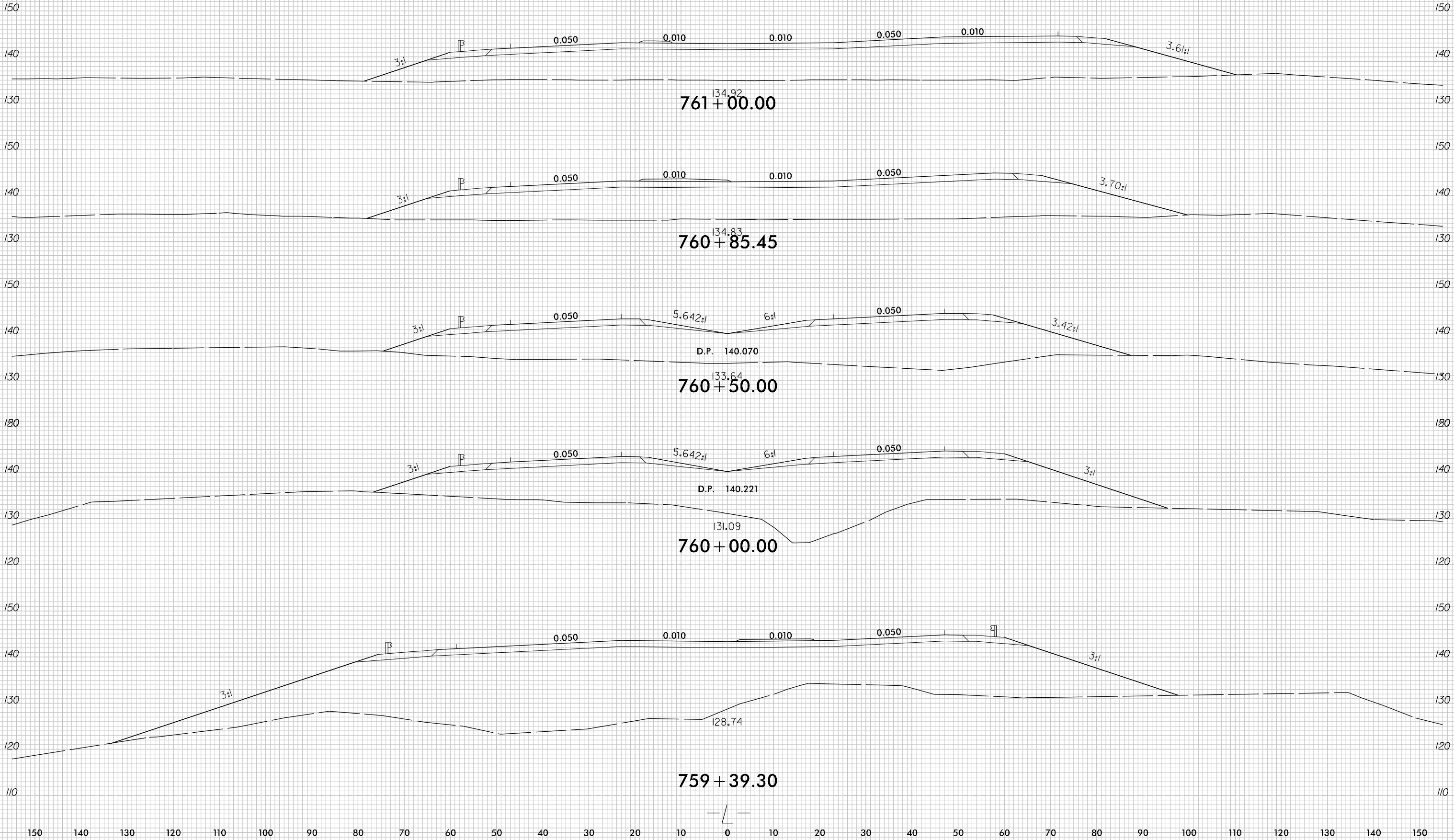


SYNTHETIC
SECTION
PLAN
VIEW
8/23/99

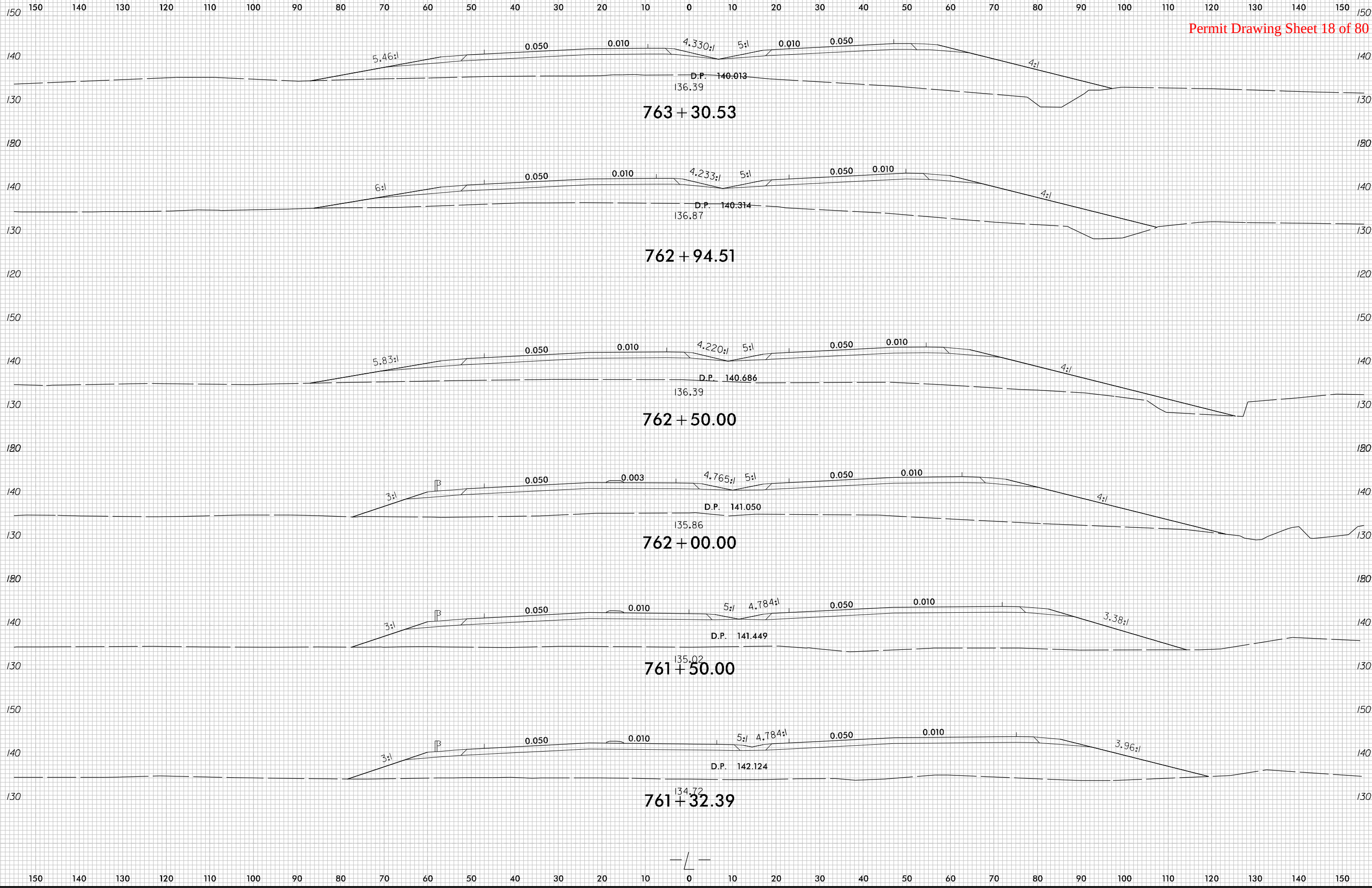
8/23/99

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

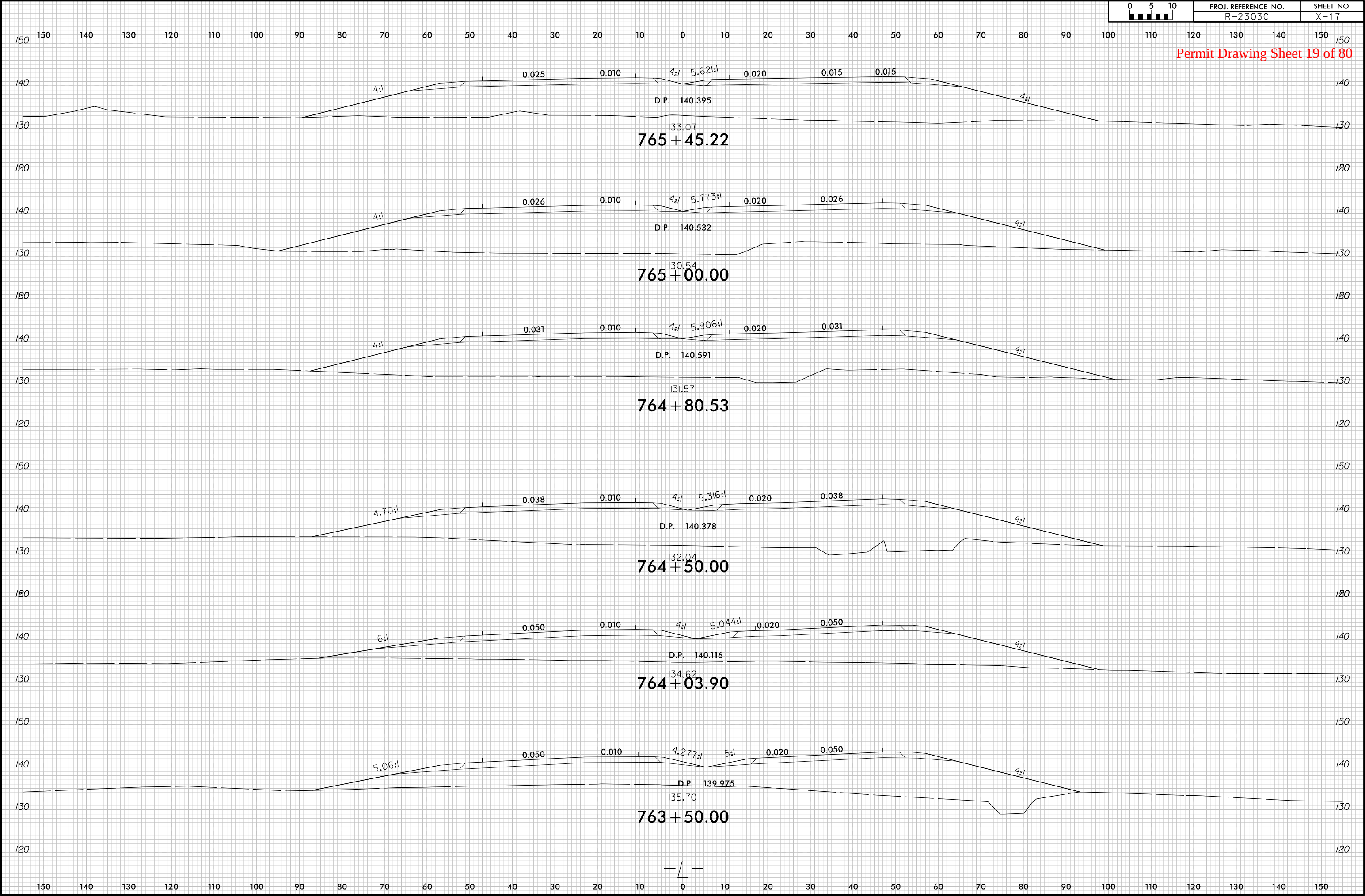
Permit Drawing Sheet 17 of 80



8/23/99

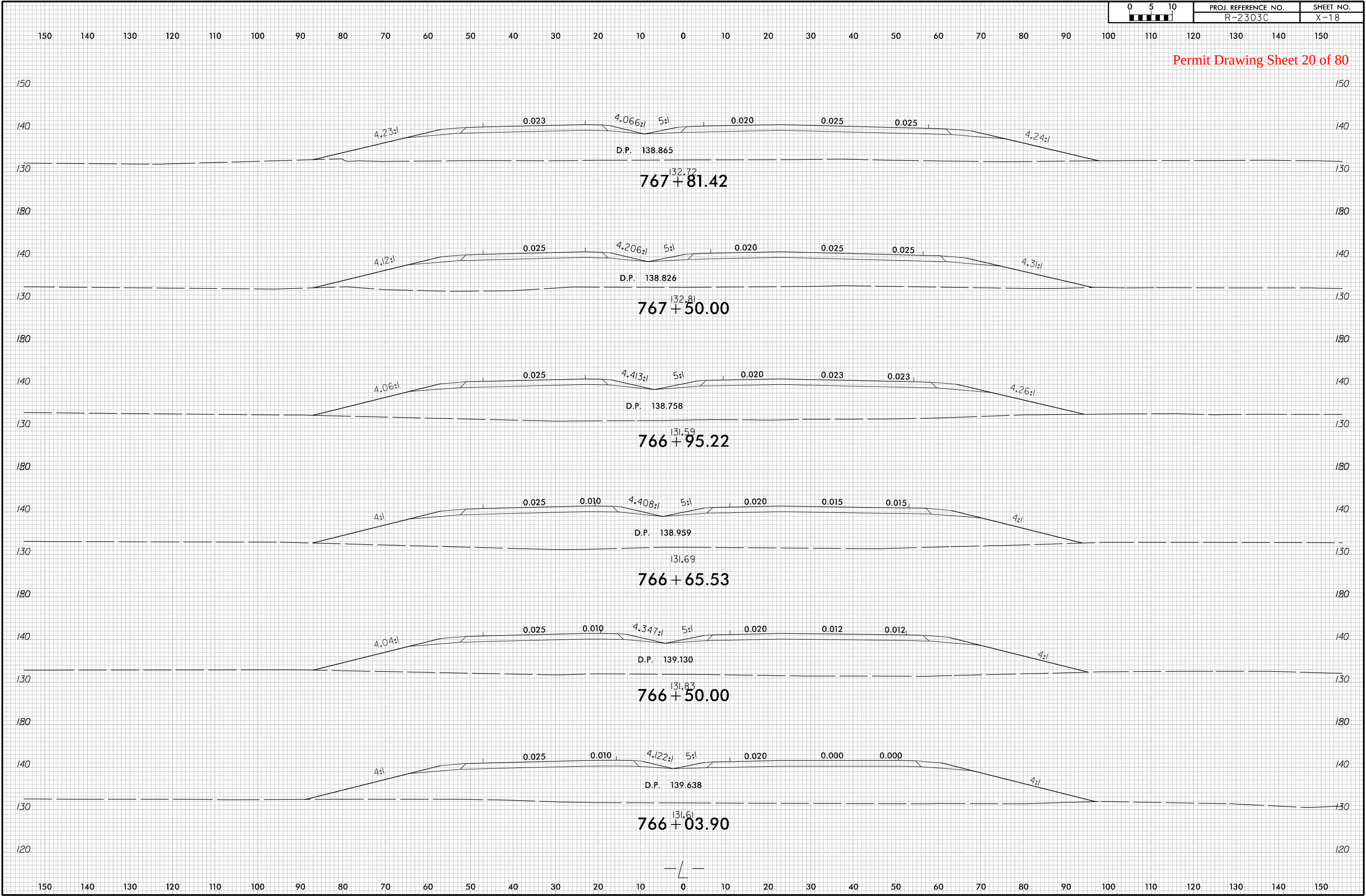


8/23/99



8/23/99

Permit Drawing Sheet 20 of 80

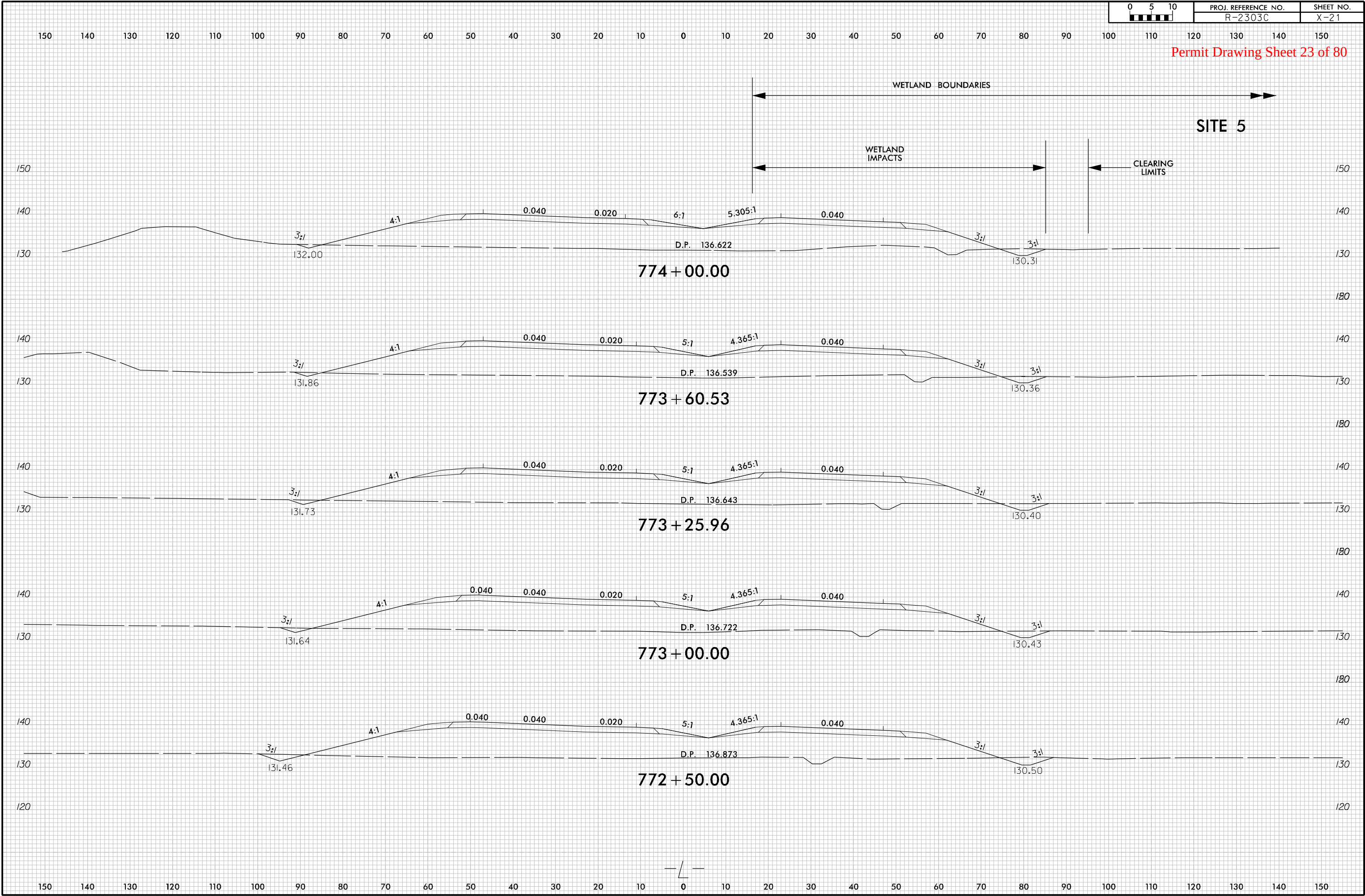


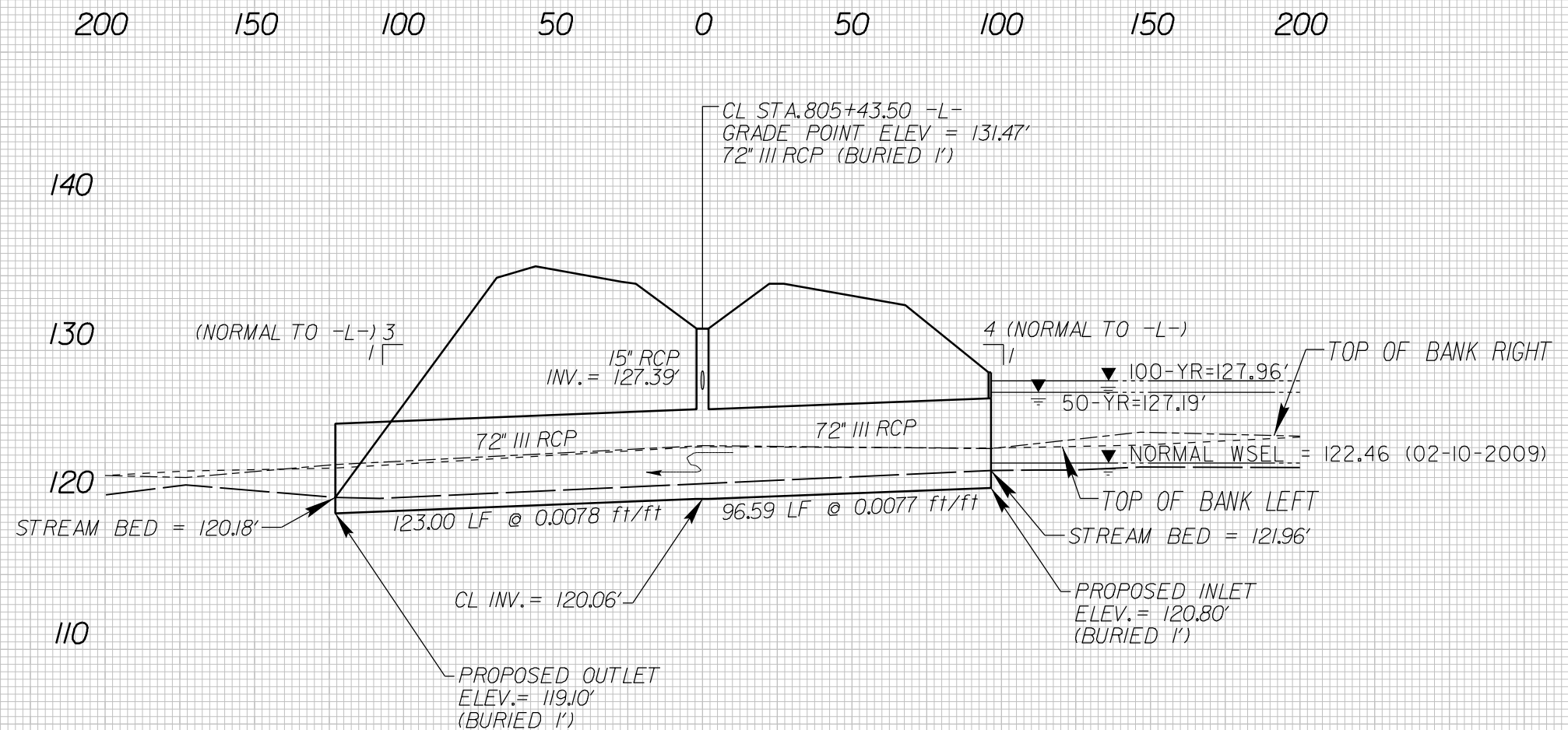


MATCH LINE -L- STA. 780+00 SEE SHEET NO. 8

8/23/99

Permit Drawing Sheet 23 of 80





SITE 6

72" CLASS III RCP AT STATION -L- 0805+43.50



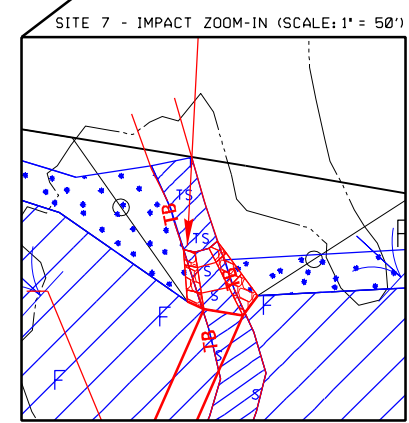
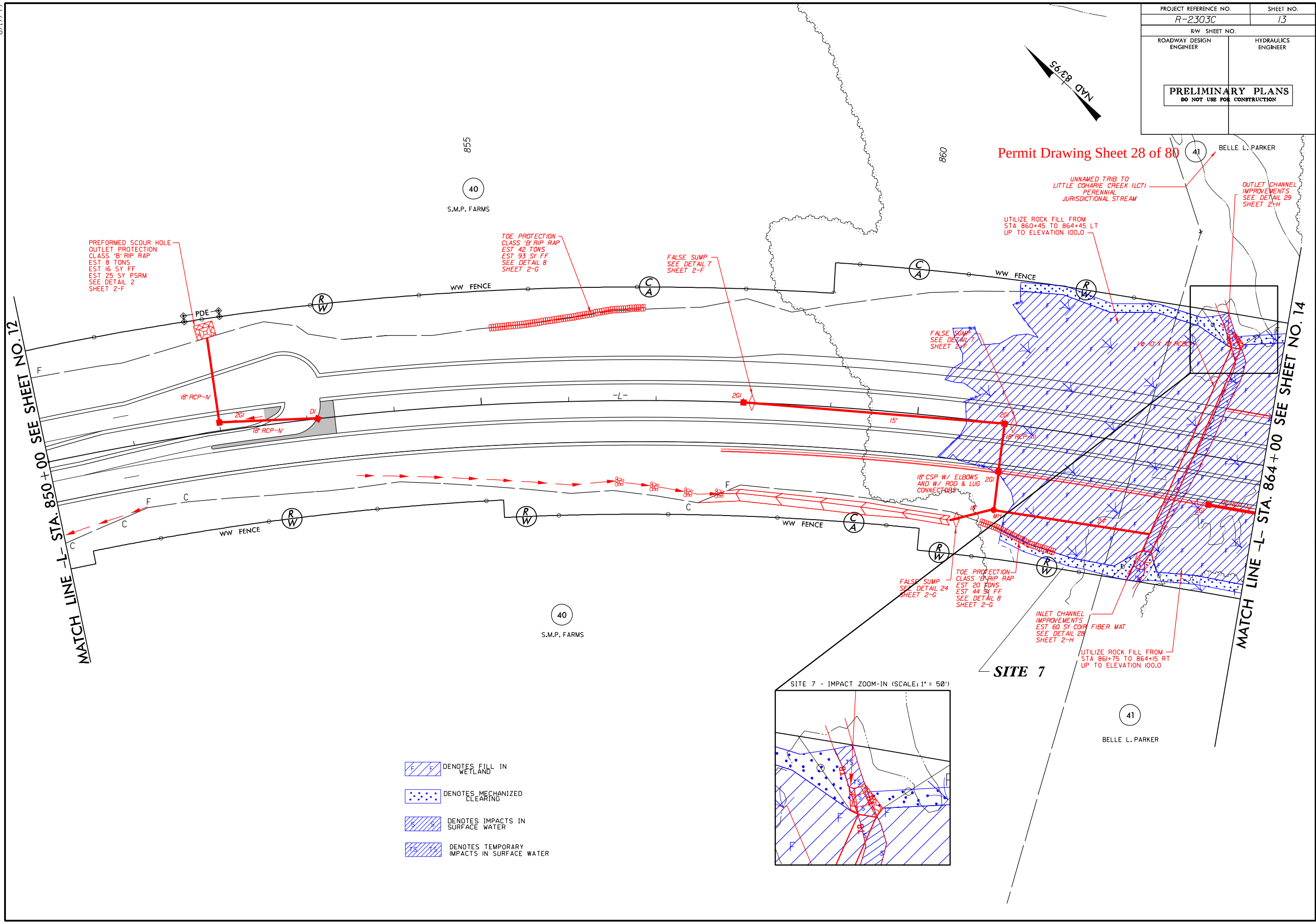
8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		13
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 28 of 80

MATCH LINE -L- STA. 850+00 SEE SHEET NO.12

MATCH LINE -L- STA. 864+00 SEE SHEET NO.14



SITE 7

41
BELLE L. PARKER

UNNAMED TRIB TO LITTLE COHARIE CREEK (LCT) PERENNIAL JURISDICTIONAL STREAM

UTILIZE ROCK FILL FROM STA 860+45 TO 864+45 LT UP TO ELEVATION 100.0

OUTLET CHANNEL IMPROVEMENTS SEE DETAIL 29 SHEET 2-H

FALSE SUMP SEE DETAIL 7 SHEET 2-F

18\" CSP W/ ELBOWS AND W/ ROD & LUG CONNECTIONS

FALSE SUMP SEE DETAIL 24 SHEET 2-G
TOE PROTECTION CLASS 'B' RIP RAP EST 20 TONS EST 44 SY FF SEE DETAIL 8 SHEET 2-G

INLET CHANNEL IMPROVEMENTS EST 60 SY COIR FIBER MAT SEE DETAIL 28 SHEET 2-H

UTILIZE ROCK FILL FROM STA 861+75 TO 864+15 RT UP TO ELEVATION 100.0

3/26/2013 Z:\Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Environmental\Drawings\R-2303c_perm_psh.13.dgn

Permit Drawing Sheet 29 of 80

UNNAMED TRIB TO
LITTLE COHARIE CREEK (LC7)
PERENNIAL
JURISDICTIONAL STREAM

OUTLET CHANNEL
IMPROVEMENTS
SEE DETAIL 29

UTILIZE ROCK FILL FROM
STA 860+45 TO 864+45 LT
UP TO ELEVATION 100.0

FALSE SUMP
SEE DETAIL 7
SHEET 2-F

18" CSP W/ ELBOWS
AND W/ ROD & LUG
CONNECTORS

FALSE SUMP CLASS
SEE DETAIL 24 EST 20
SHEET 2-G EST 44
SEE D

INLET CHANNEL
IMPROVEMENTS
EST 60 SY COIR FIBER MAT
SEE DETAIL 28
SHEET 2-H

UTILIZE ROCK FILL FROM
STA 861+75 TO 864+15
UP TO ELEVATION 100.0

SITE 7

SITE 7 - IMPACT ZOOM-IN (SCALE: 1" = 50')

 DENOTES FILL IN WETLAND

 DENOTES MECHANIZED CLEARING

 DENOTES IMPACTS IN SURFACE WATER

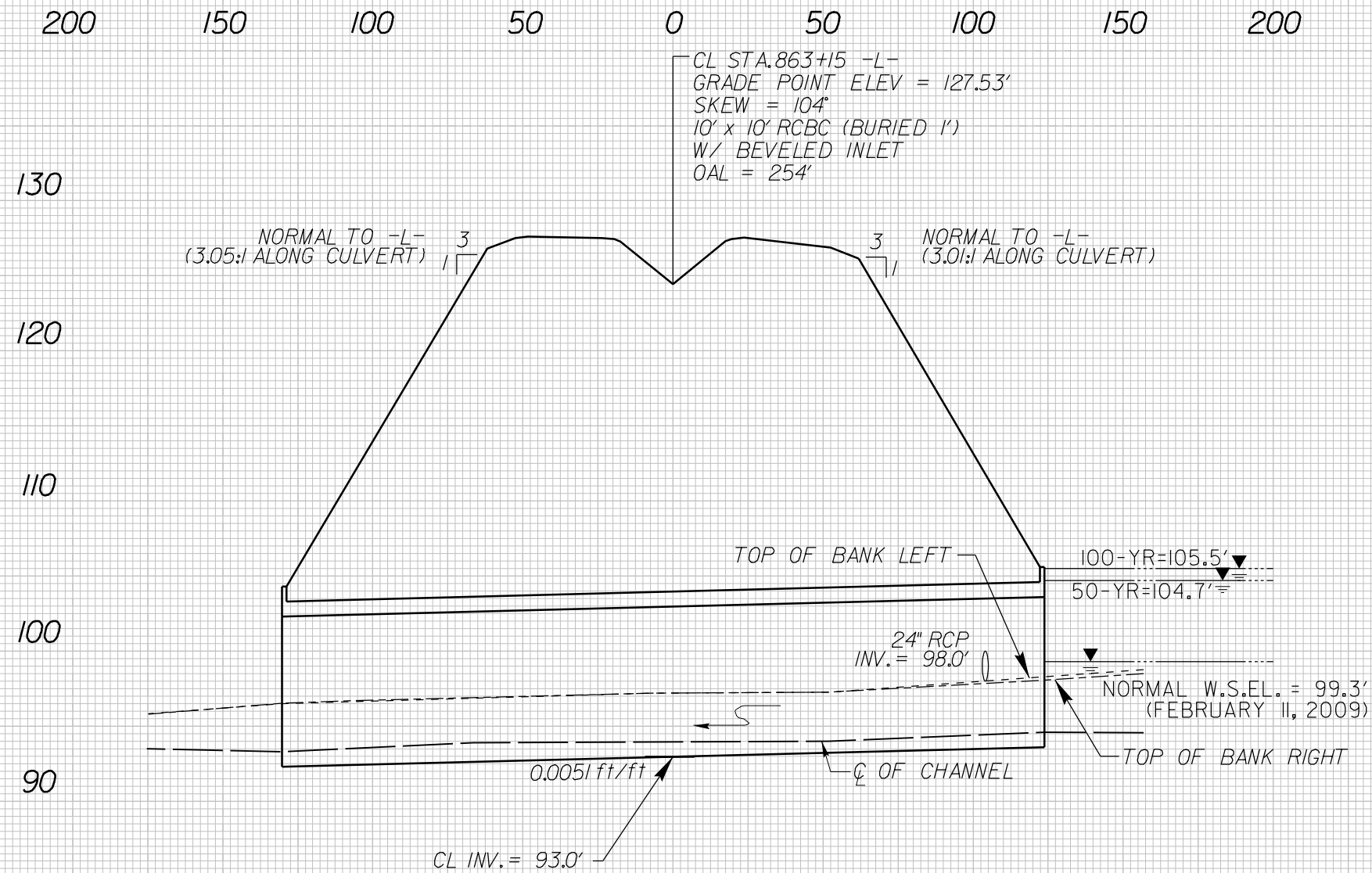
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET NO. 12

MATCH LINE -L- STA. 864 + 00 SEE SHEET NO. 14

8/17/99

3/26/2013
K:\RAL_Roadway\011056078 (R-2303C)\Hydraulics\PERMITS_Enviornmental\Drawings\r2303c_prm_psh_13.dgn



SITE 7

10' x 10' RCBC AT STATION -L- 0863+15

8/23/99

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SITE 7

Permit Drawing Sheet 31 of 80

WETLAND BOUNDARIES

CLEARING LIMITS

CLEARING LIMITS

D.P. 124.776

862 + 00.00

D.P. 124.904

861 + 45.50

D.P. 125.057

861 + 00.00

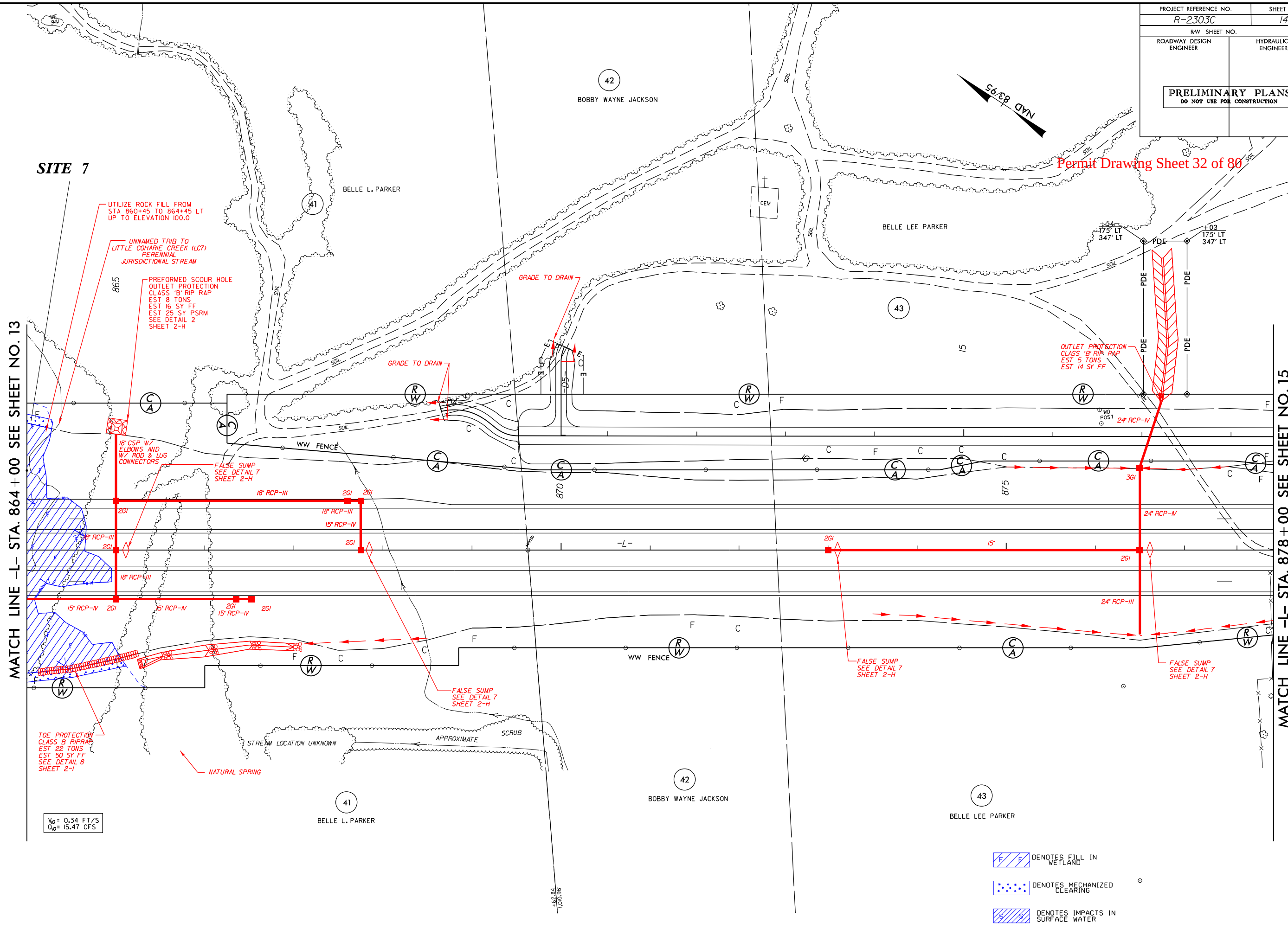
— L —

SYTIME\$\$\$\$
LINES\$\$\$\$
DO NOT REMOVE

8/17/99

K:\24\2013\Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Drawings\2303c_prm_psh_14.dgn

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		14
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		



MATCH LINE -L- STA. 864+00 SEE SHEET NO.13

MATCH LINE -L- STA. 878+00 SEE SHEET NO.15

$V_0 = 0.34 \text{ FT/S}$
 $Q_0 = 15.47 \text{ CFS}$

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

8/17/99

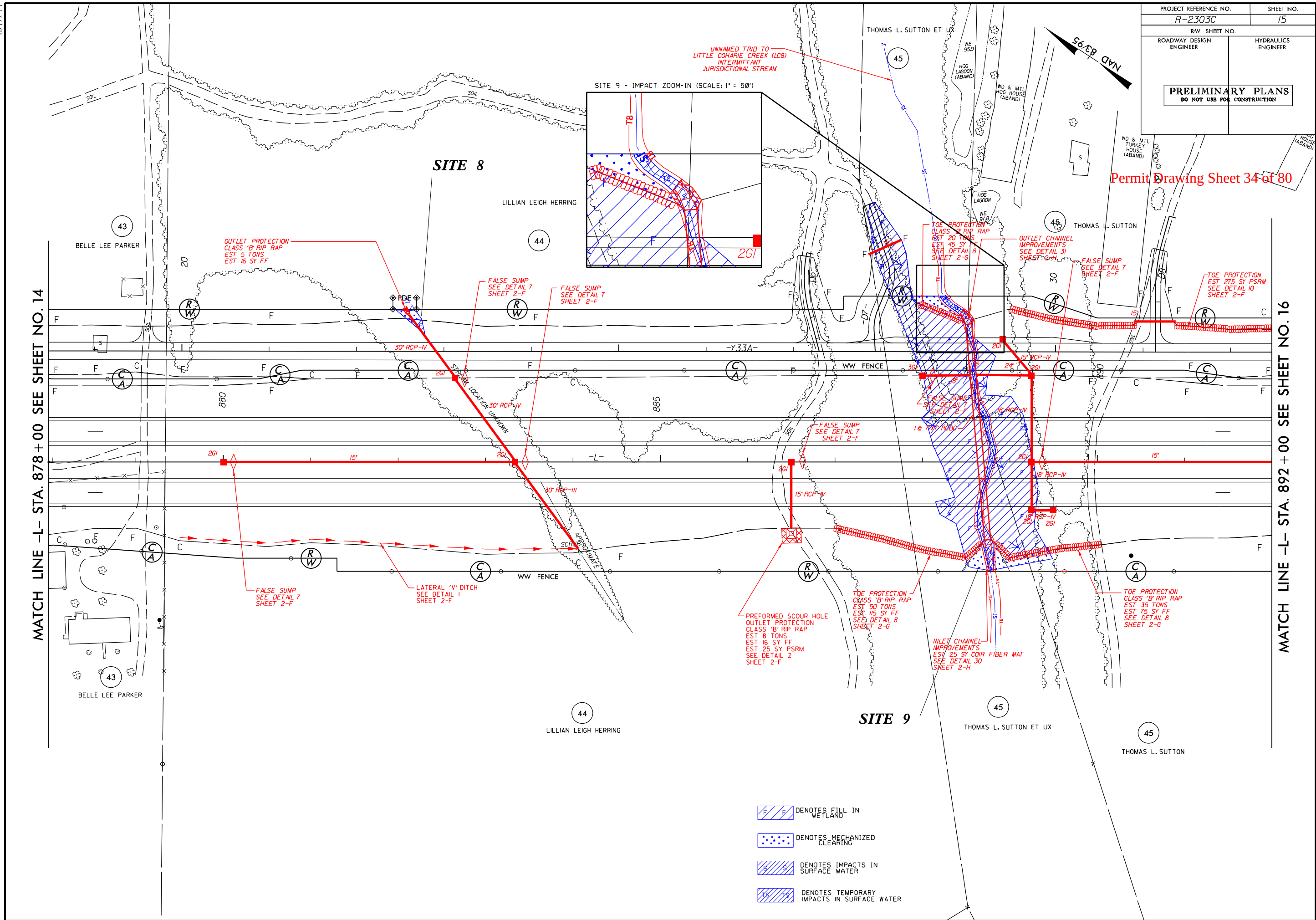
3/26/2013
Z:\Roadway\011056078 (R-2303C)\Hydraulics\PERMITS.Environmental\Drawings\R-2303c_prm_psh_15.dgn

MATCH LINE -L- STA. 878+00 SEE SHEET NO.14

MATCH LINE -L- STA. 892+00 SEE SHEET NO.16

PROJECT REFERENCE NO. <i>R-2303C</i>		SHEET NO. <i>15</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 34 of 80



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

8/17/99

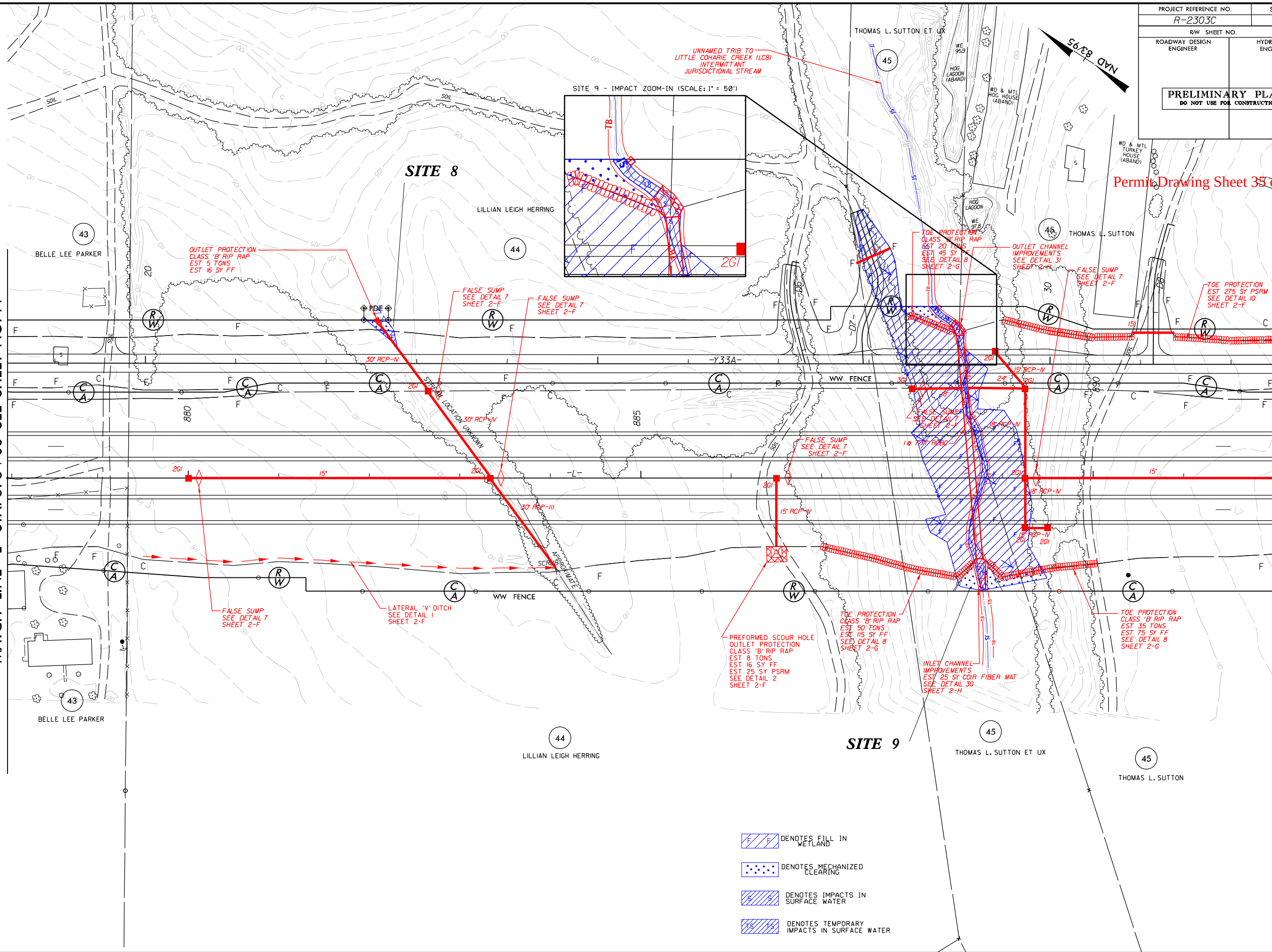
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MATCH LINE -L- STA. 878+00 SEE SHEET NO.14

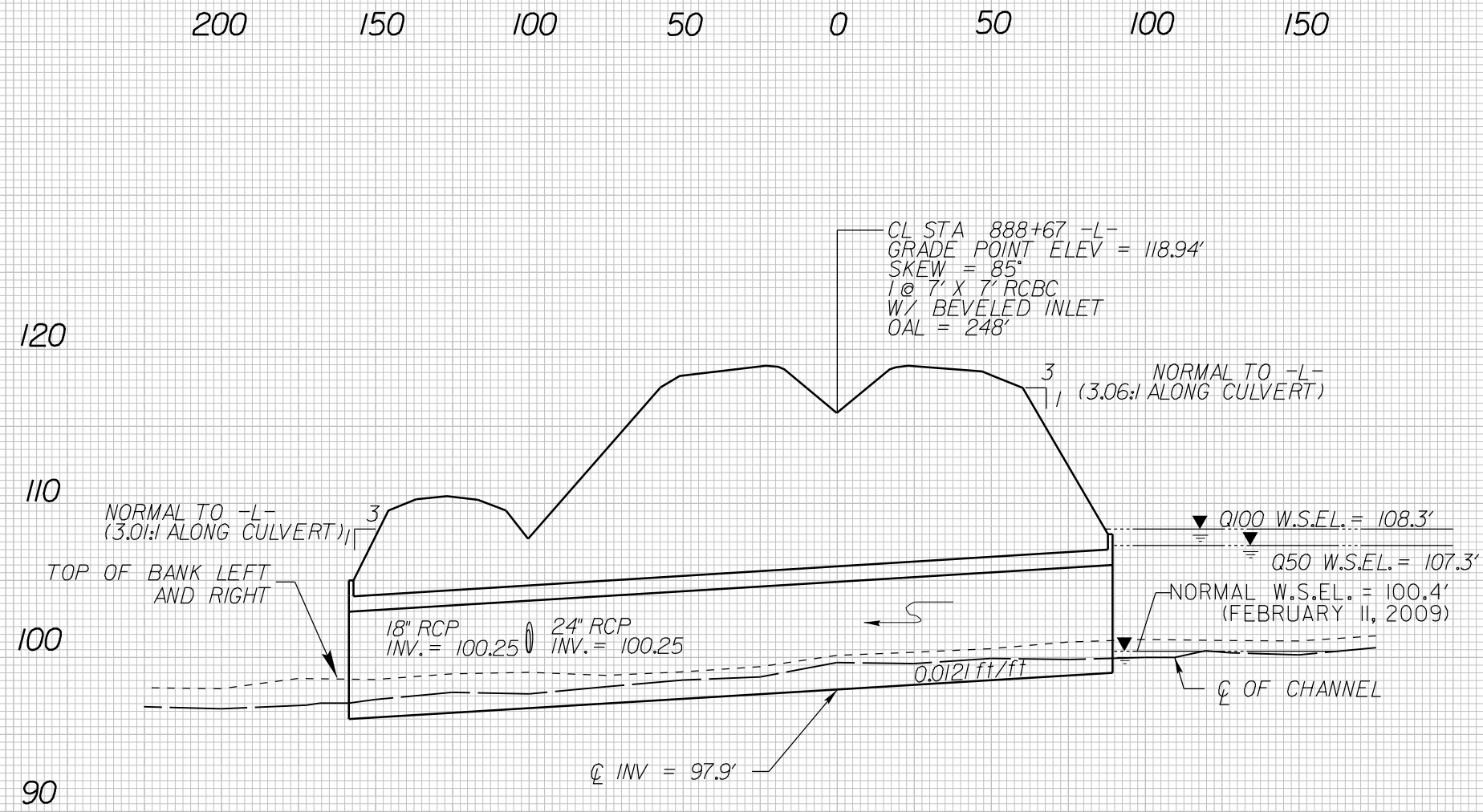
MATCH LINE -L- STA. 892+00 SEE SHEET NO.16

PROJECT REFERENCE NO. <i>R-2303C</i>		SHEET NO. <i>15</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 35 of 80



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



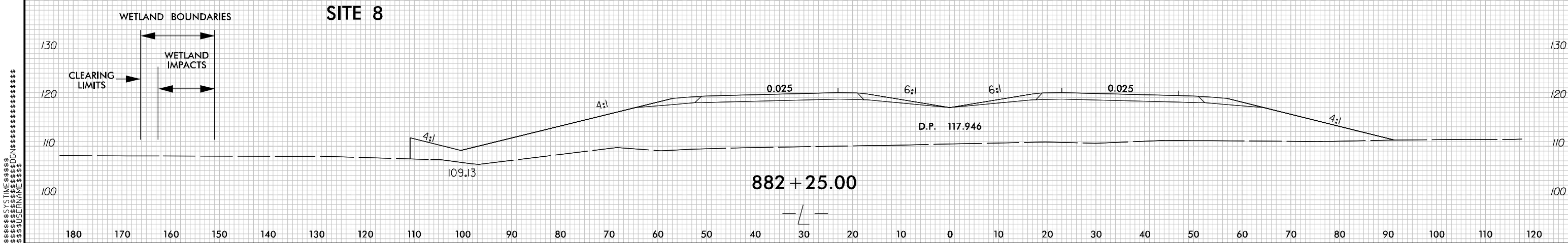
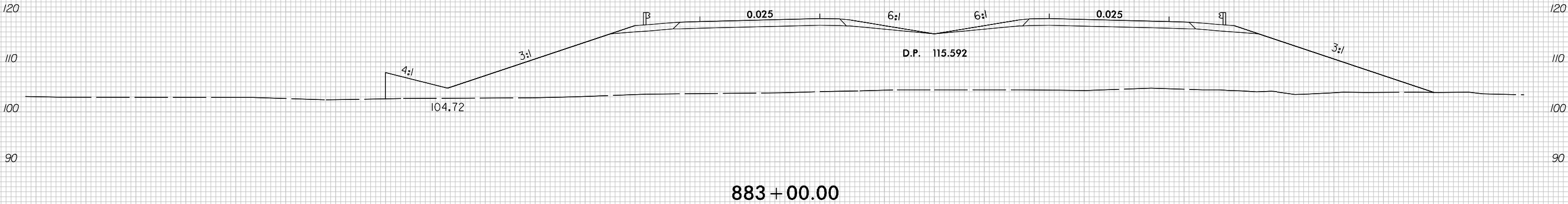
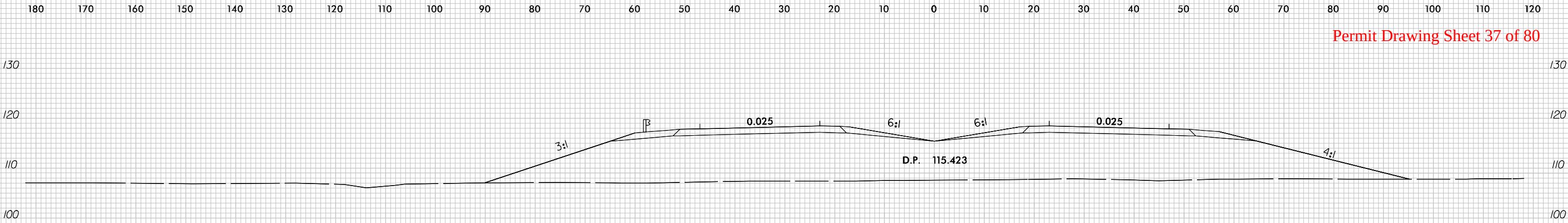
SITE 9

7' x 7' RCBC AT STATION -L- 0888+67

8/23/99

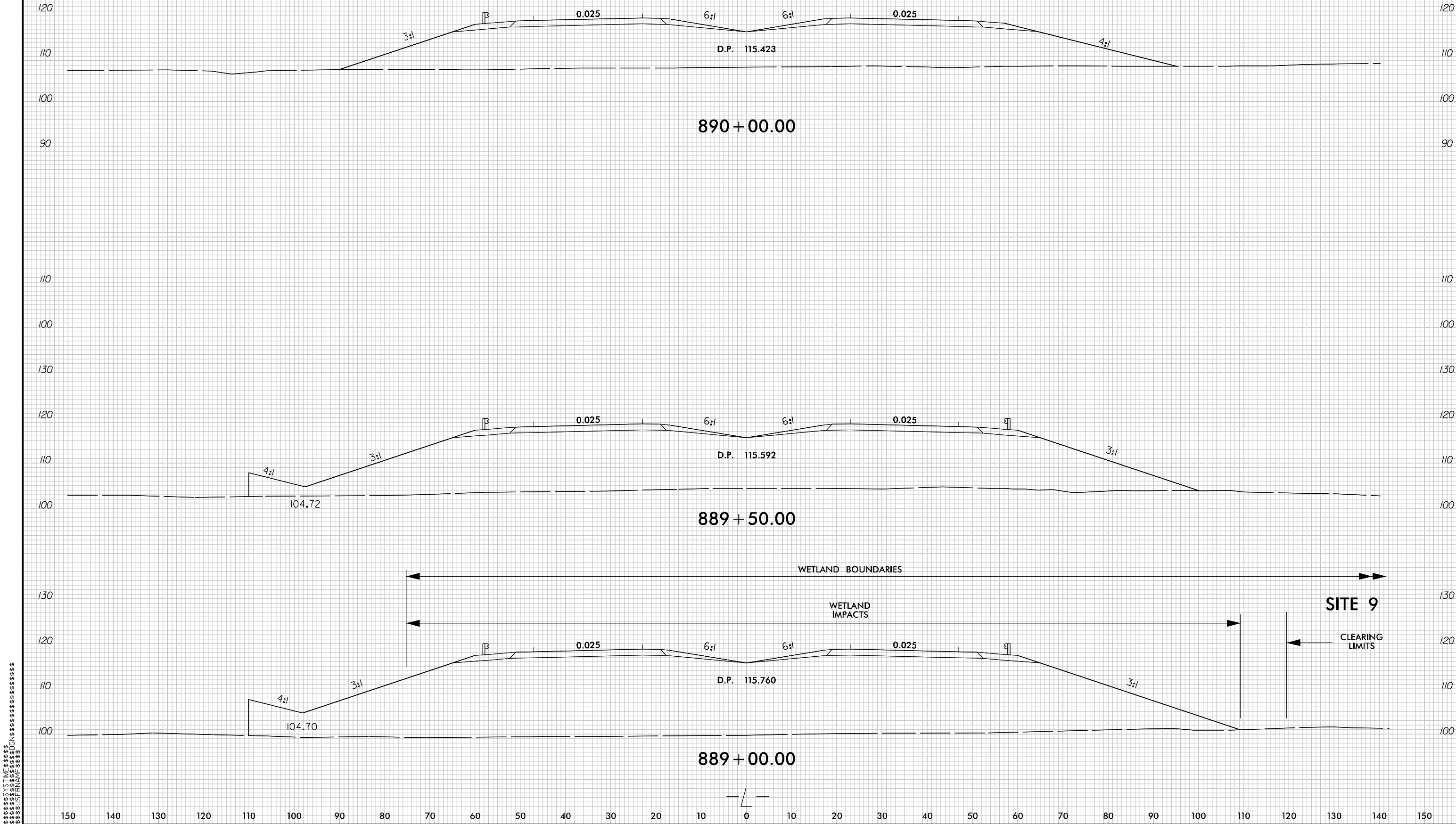
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2303C	X-60

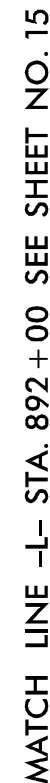
Permit Drawing Sheet 37 of 80



8/23/99

Permit Drawing Sheet 38 of 80



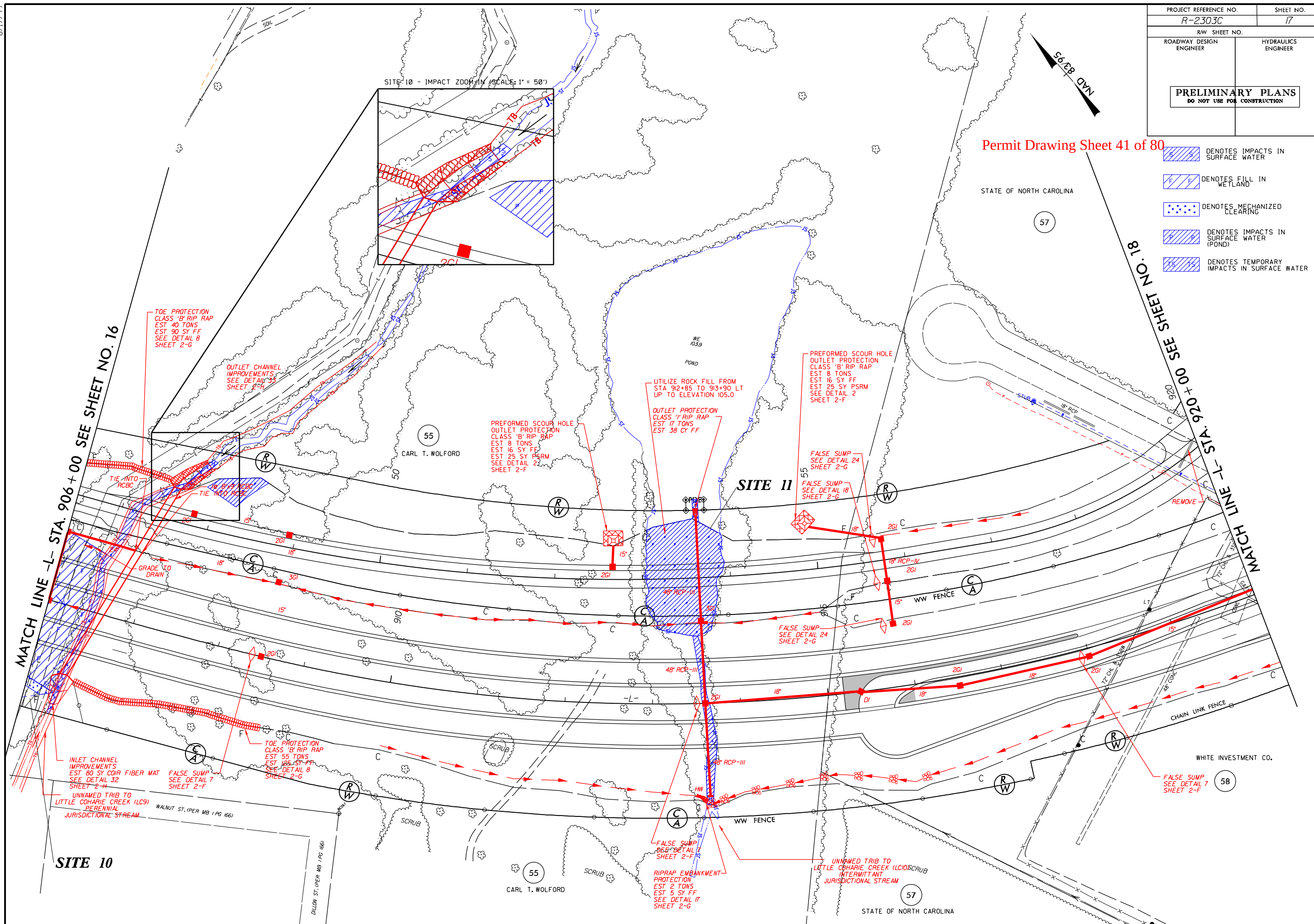
**SITE 10**

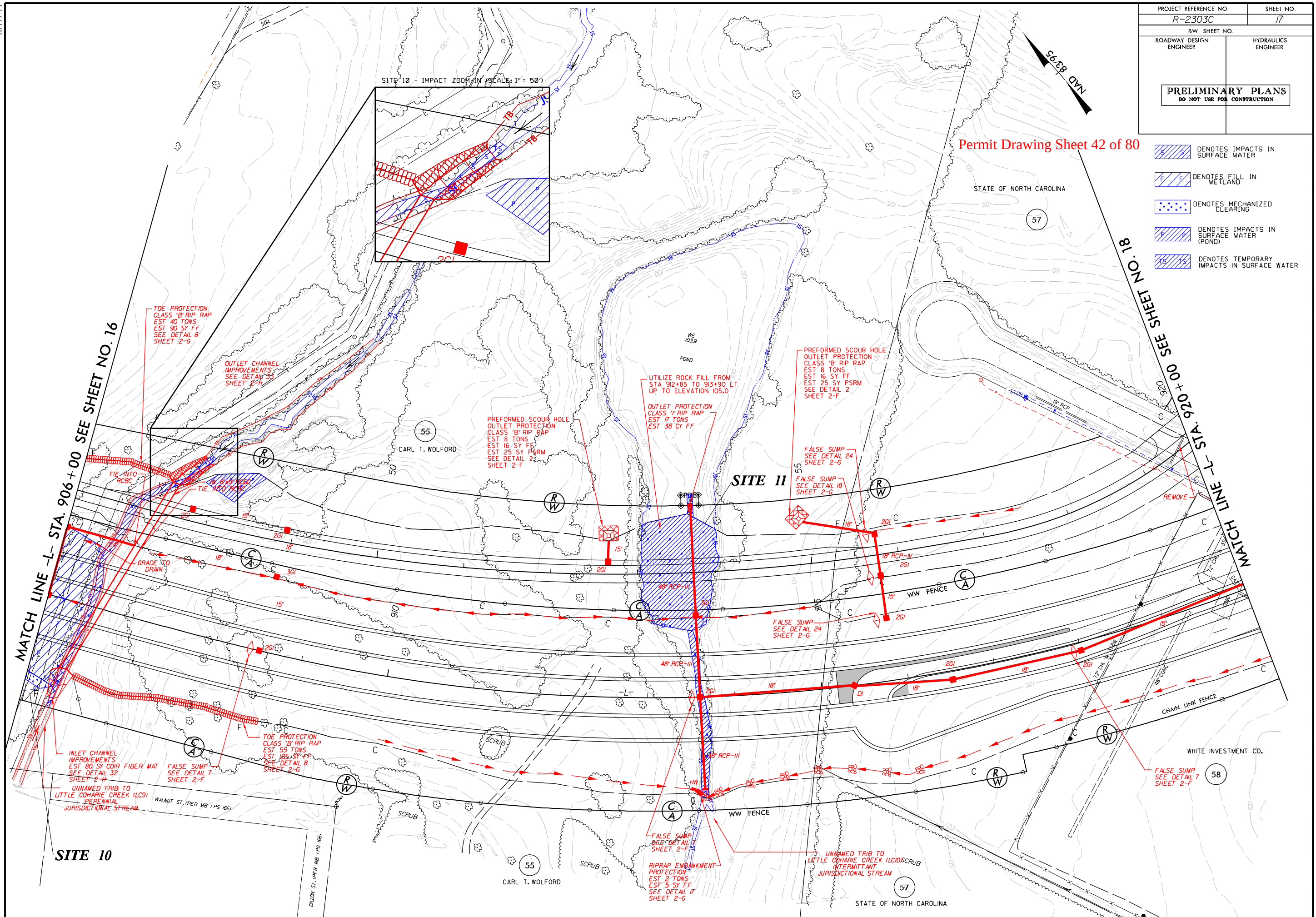
MATCH LINE -L- STA. 906+00 SEE SHEET NO. 17

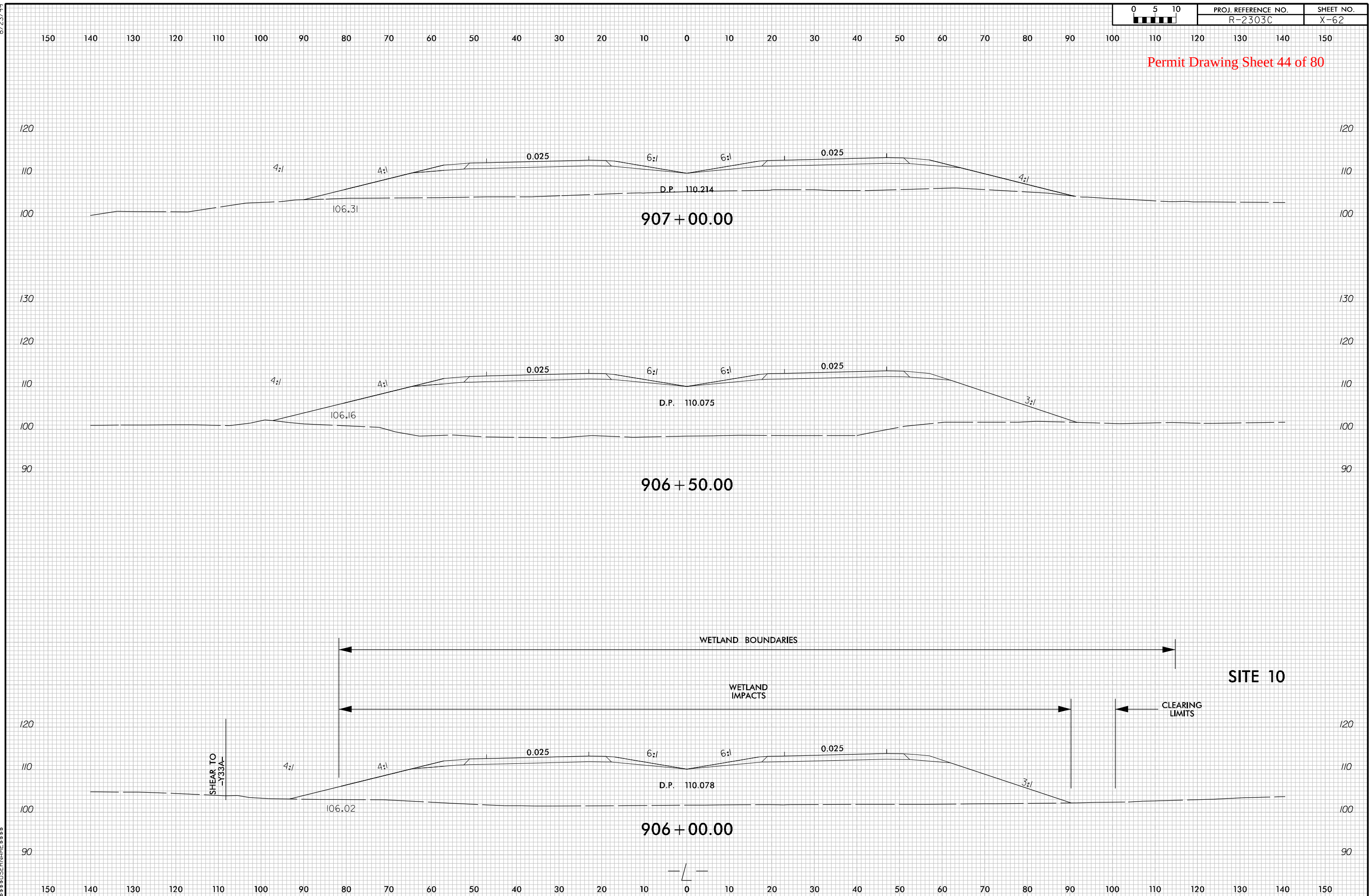
SITE 10

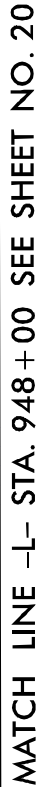
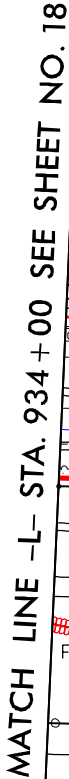
3/19/2013
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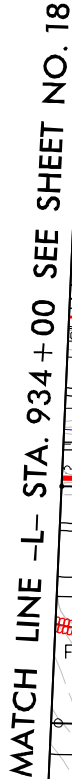
3/19/2013
K:\RAL-R











MATCH LINE -L- STA. 948+00 SEE SHEET NO. 20

940+00

941+00

942+00

943+00

944+00

945+00

PROJ. REFERENCE NO.
R-2303c

SHEET NO.

Permit Drawing Sheet 47 of 80

CL LOWPOINT
APPROX. STA = 953+65
APPROX. ELEV. = 97.02

CL STA 943+12.5 -L-
EAST BOUND LANE (-EBL-)
1 @ 90', 1 @ 105', 1 @ 100', OAL = 295'
63" MODIFIED BULB TEE
W/ SPILL THROUGH SLOPES
CL ELEV = 100.77'
90° SKEW

EXISTING BRIDGE
AND ROADWAY

LOWSTEEL @ LOWSIDE
OF 2.5% SUPERELEVATION

(-)0.3654%

50-YR=90.6'

100-YR=91.4'

NATURAL GROUND
@ CL OF BRIDGE

2' (TYP)
2:1 (TYP)
NORMAL TO
END BENT

CLASS II
RIP RAP
(TYP.)

3.5' (TYP)
NATURAL GROUND
DOWNSTREAM

NORMAL W.S.E.L. = 85.4'
@ EXISTING BRIDGE
(DECEMBER 15, 2008)

100-YR THEORETICAL
SCOUR

500-YR THEORETICAL
SCOUR

SITE 12

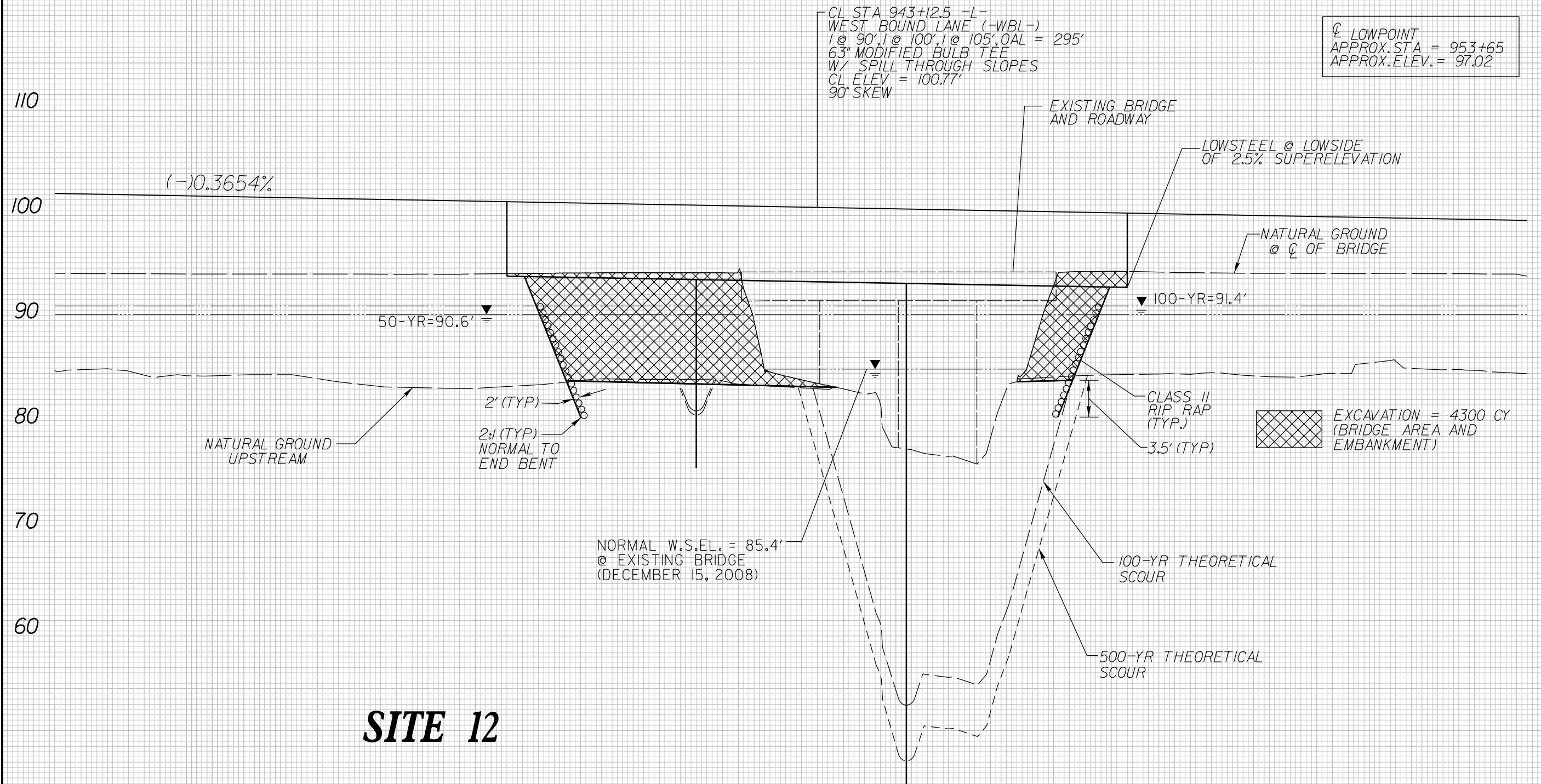
EAST BOUND LANE BRIDGE AT STATION -L- 0943+12.50

K:\RAL_Roadway\01056078 (R-2303c)\Hydraulics\PERMITS_Environment\Drawings\Profiles\0943+00_L\Title_coharie_eb_bridgedgn

8/3/2012

Permit Drawing Sheet 48 of 80

940+00 941+00 942+00 943+00 944+00 945+00 946+00



WEST BOUND LANE BRIDGE AT STATION -L- 0943+12.50

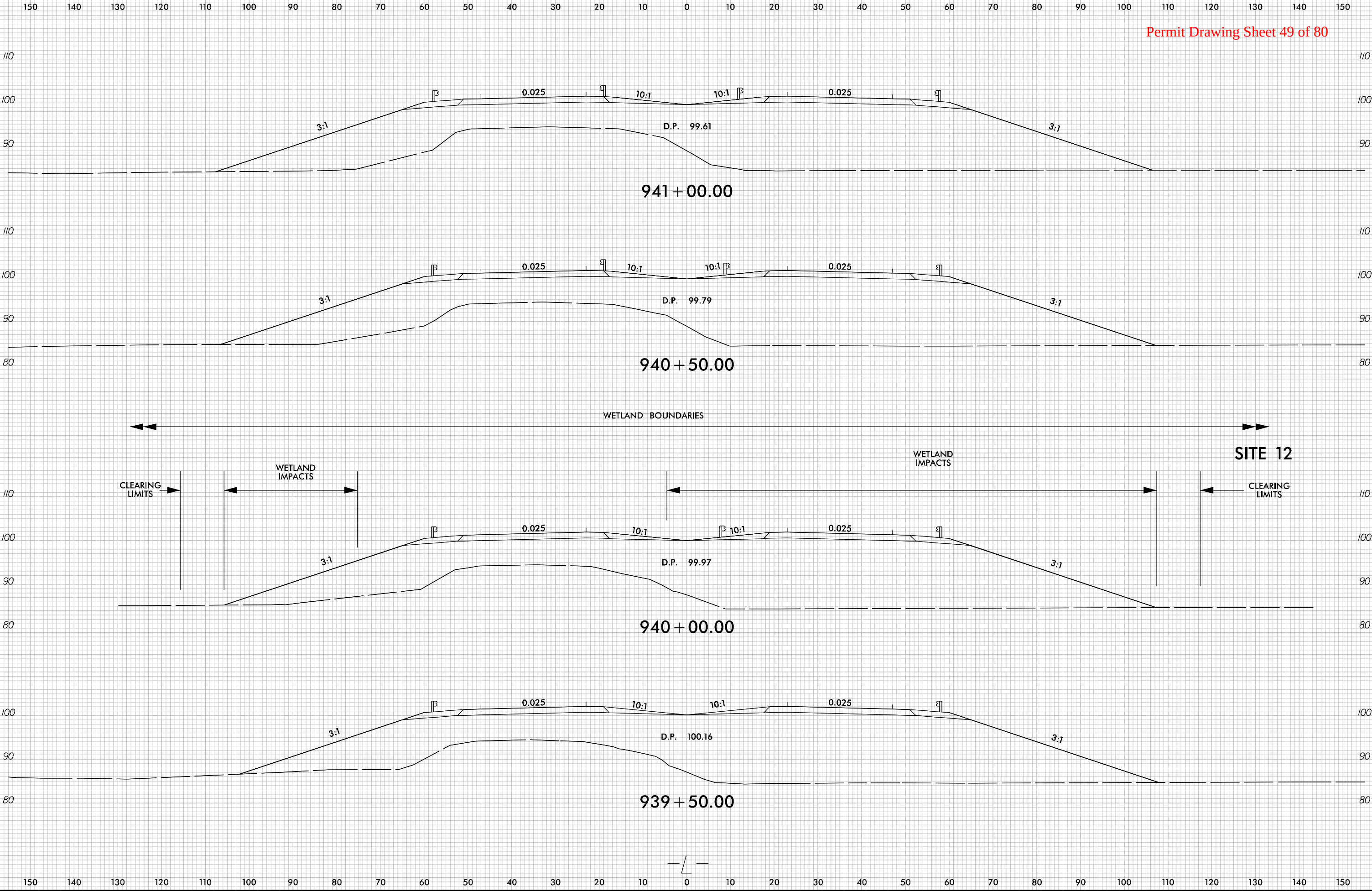
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8/3/2012

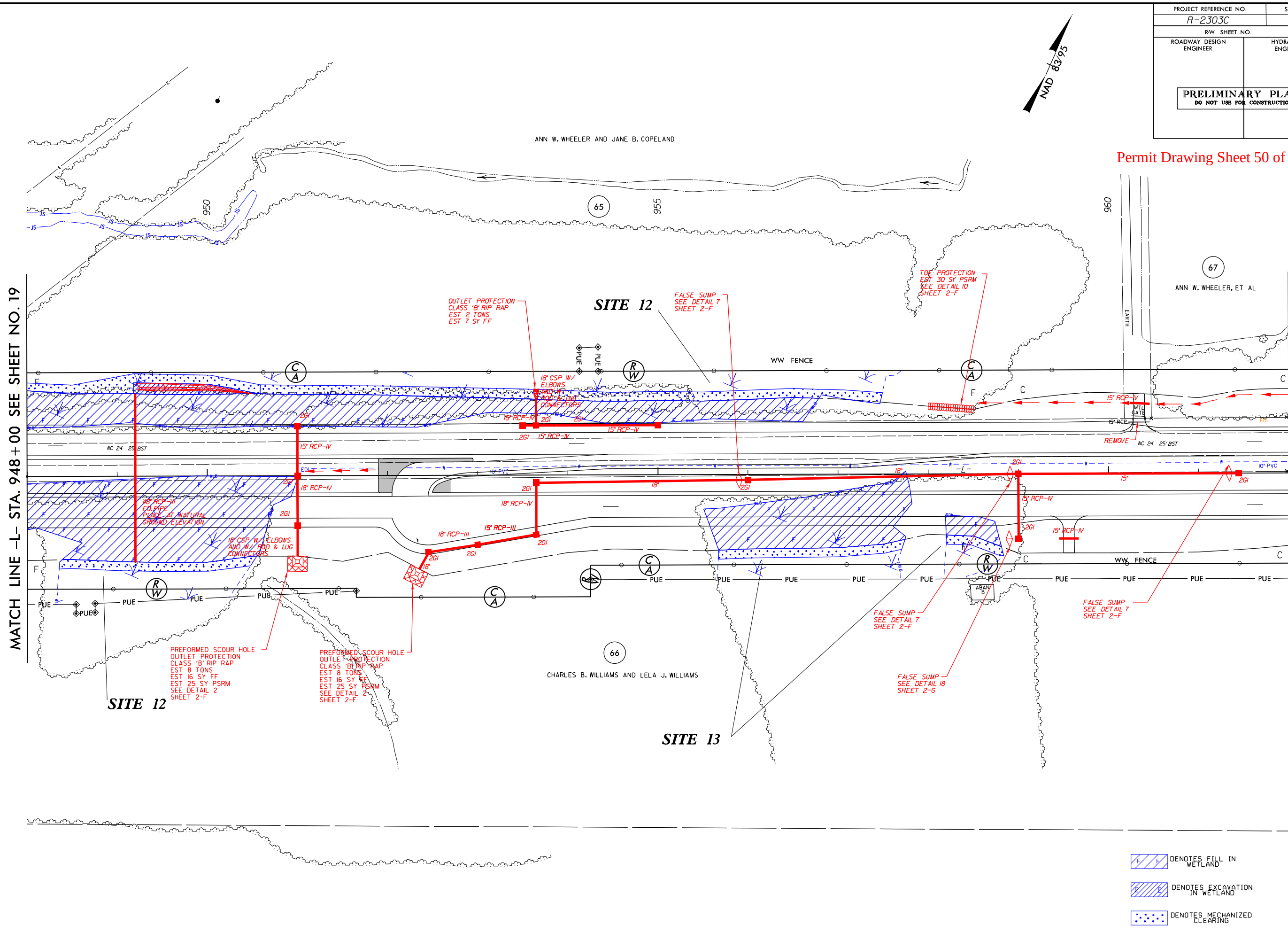
8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2303C	X-90

Permit Drawing Sheet 49 of 80



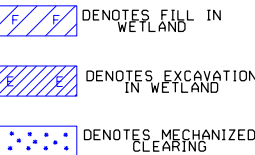
8/17/99
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PROJECT REFERENCE NO.		SHEET NO.	
R-2303C		20	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS			
DO NOT USE FOR CONSTRUCTION			

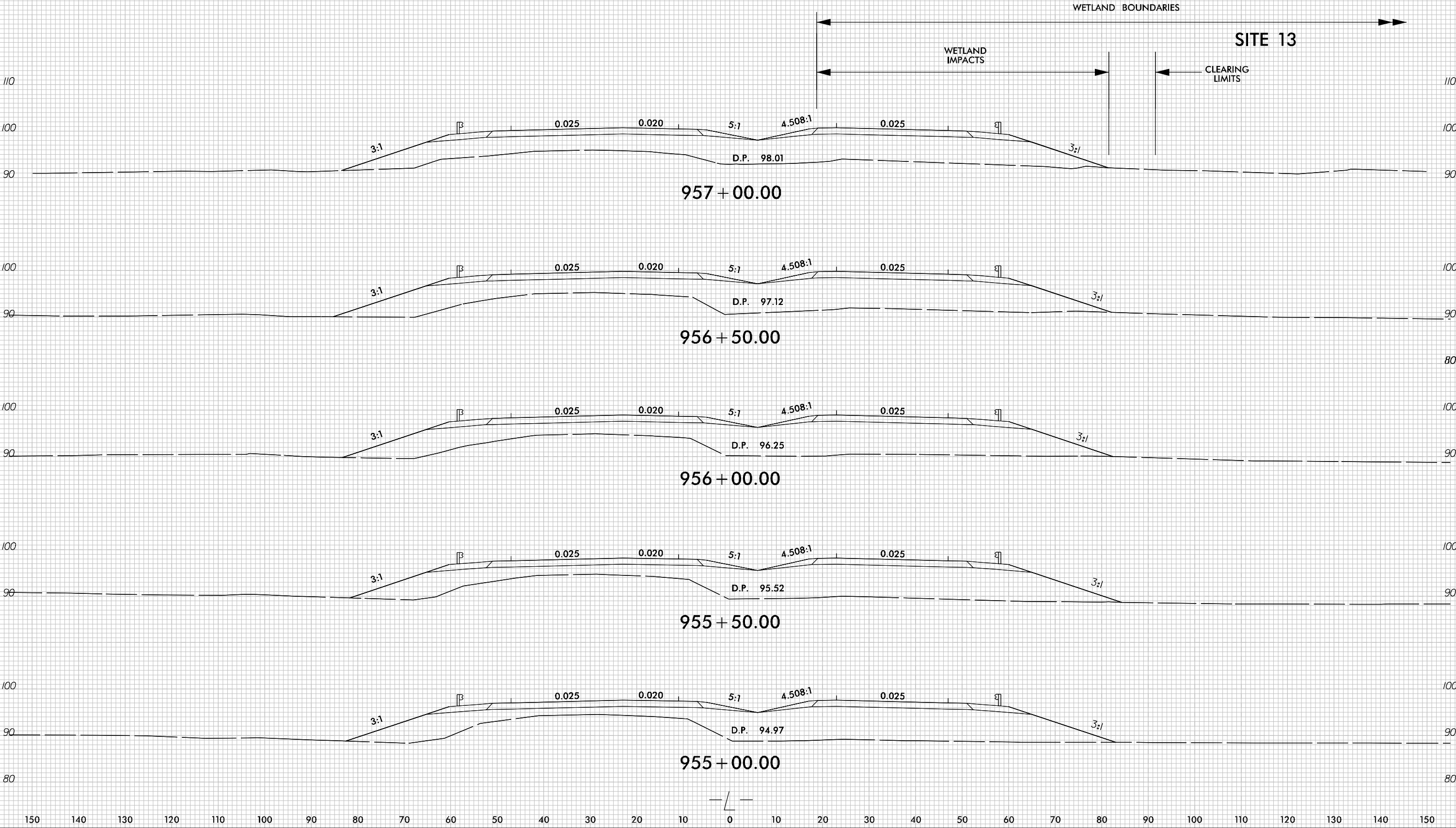
Permit Drawing Sheet 50 of 80

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



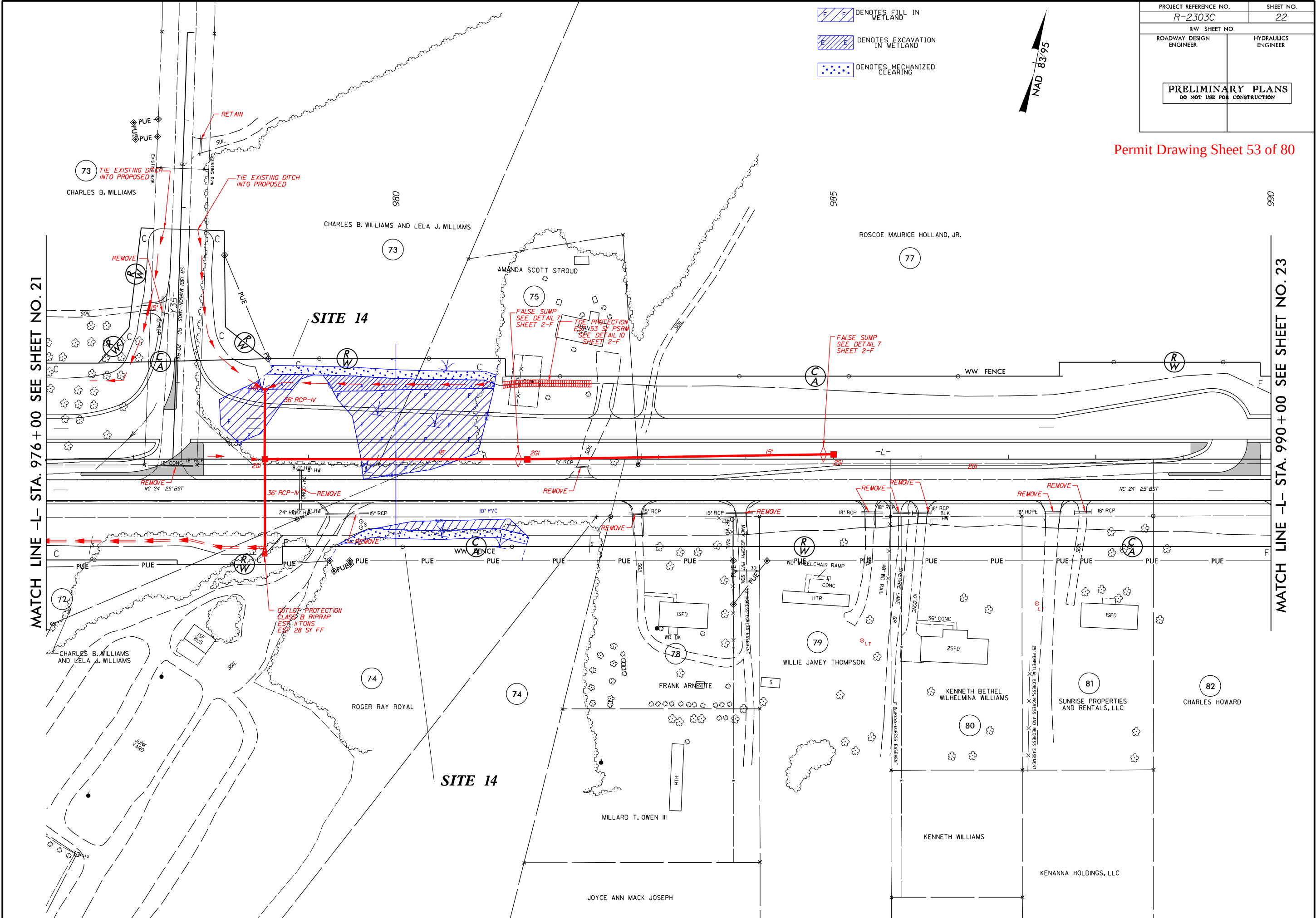
8/23/99

Permit Drawing Sheet 52 of 80



8/17/99

3/19/2013
R:\RAL_Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Drawings\2303c-prm-psn-22.dgn



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

NAD 83/95

PROJECT REFERENCE NO.		SHEET NO.	
R-2303C		22	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 53 of 80

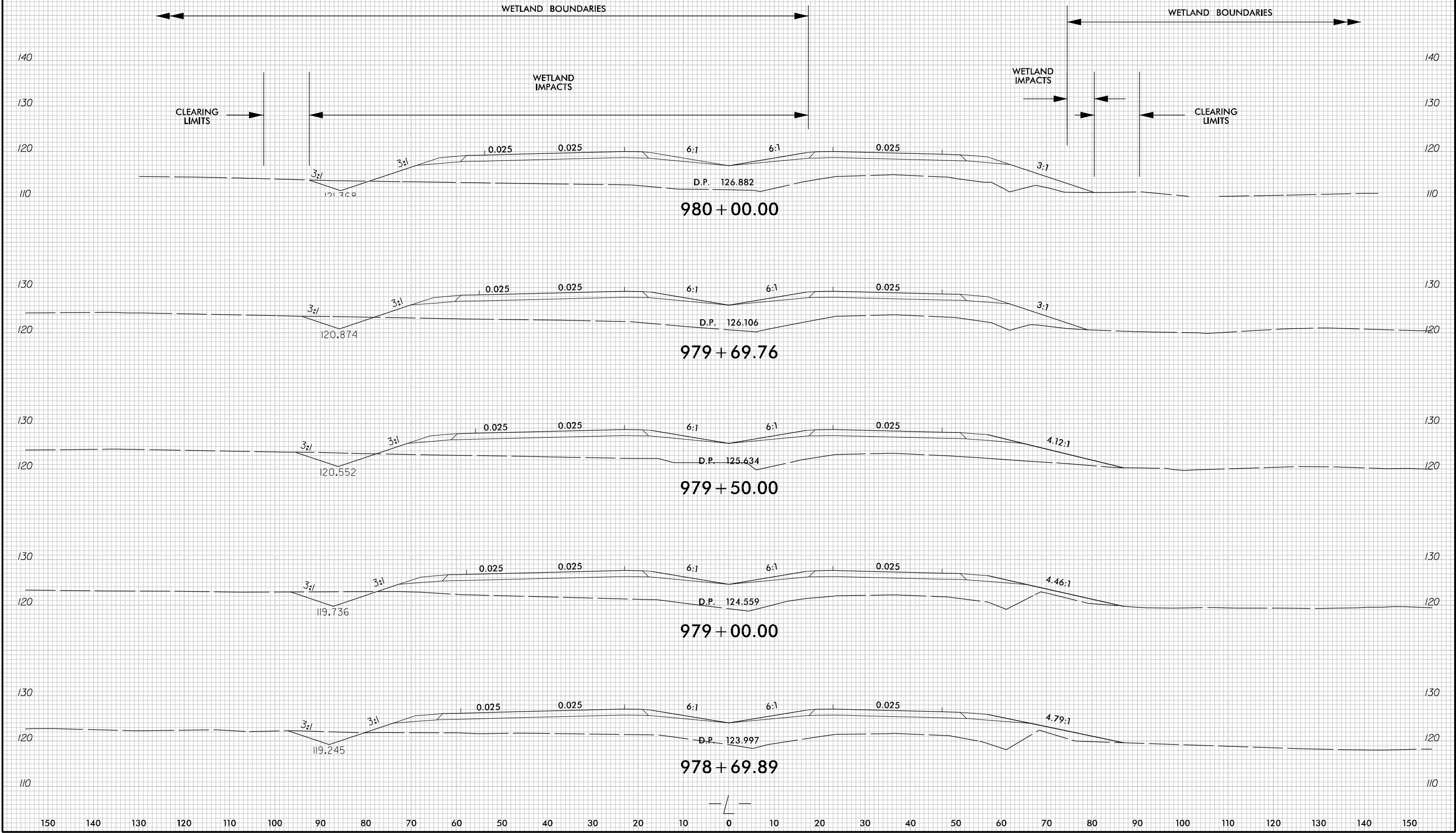
MATCH LINE -L- STA. 976+00 SEE SHEET NO. 21

MATCH LINE -L- STA. 990+00 SEE SHEET NO. 23

8/23/99

Permit Drawing Sheet 55 of 80

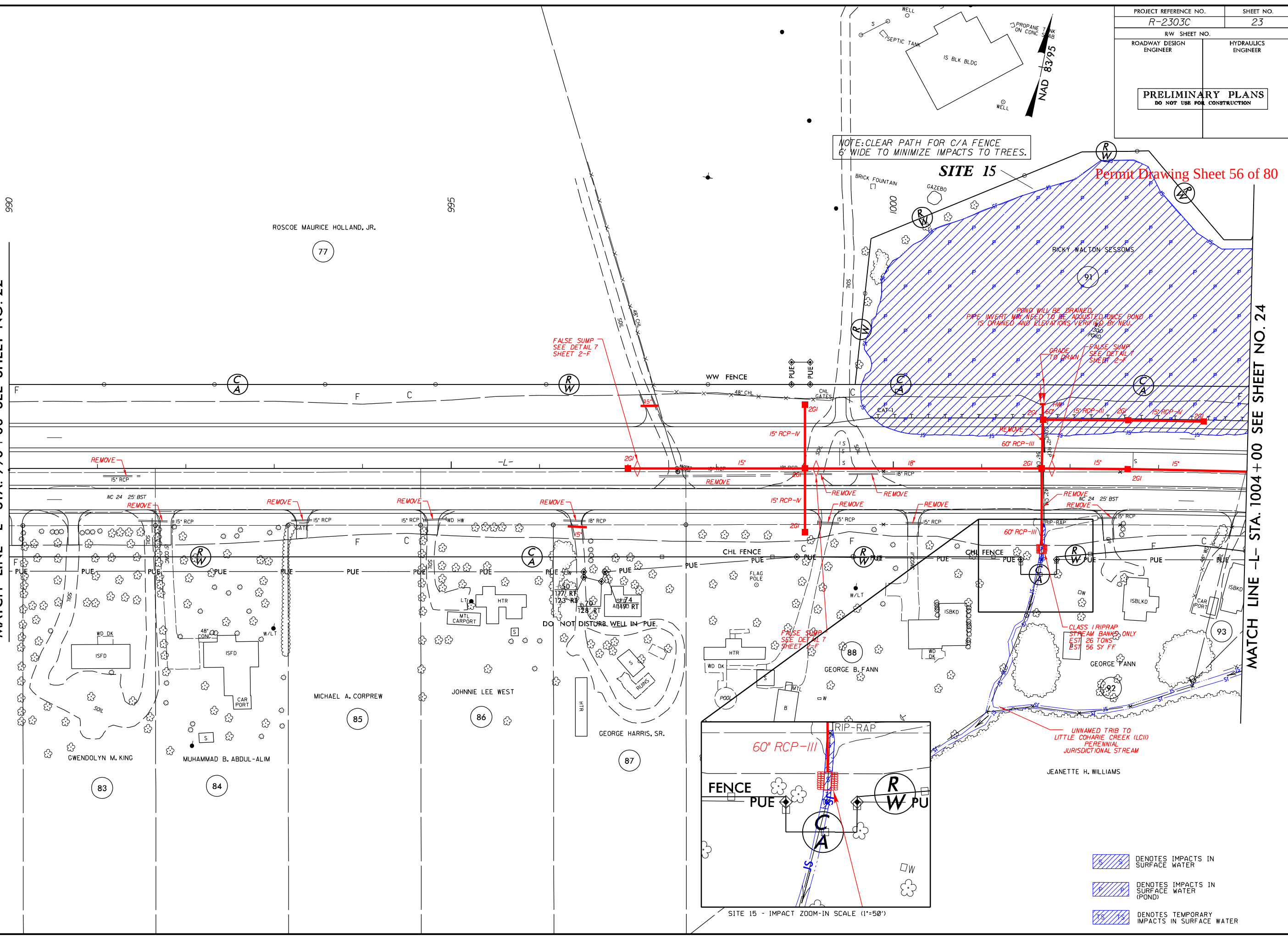
SITE 14



8/17/99

3/19/2013
K:\RAL_Roadway\01056078 (R-2303C)\Hydraulics\PERMITS\Drawings\R-2303c-prm_psh_23.dgn

MATCH LINE -L- STA. 990+00 SEE SHEET NO. 22



PROJECT REFERENCE NO. <i>R-2303C</i>		SHEET NO. <i>23</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 56 of 80

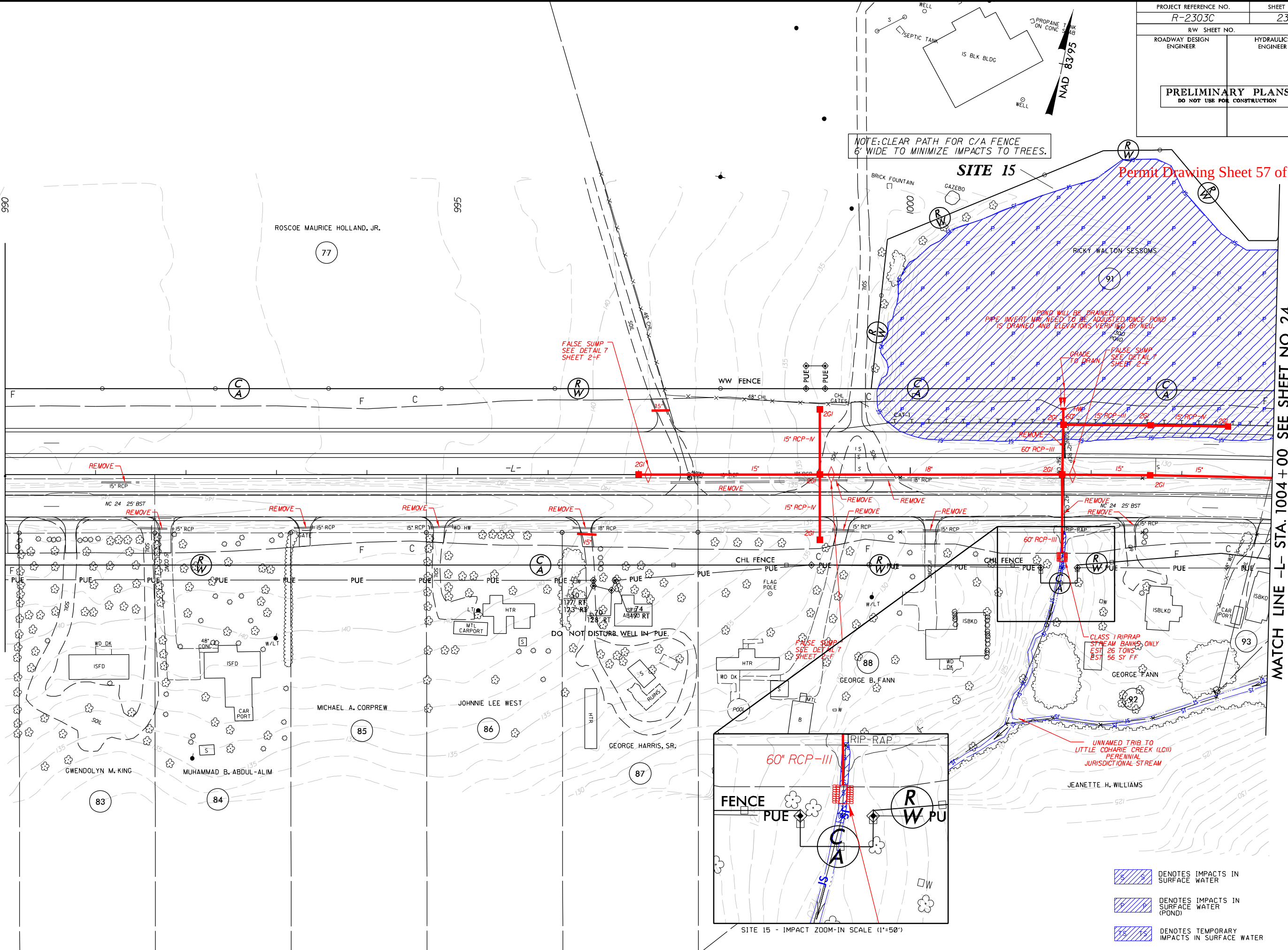
MATCH LINE -L- STA. 1004+00 SEE SHEET NO. 24

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

PROJECT REFERENCE NO.		SHEET NO.	
R-2303C		23	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

MATCH LINE -L- STA. 990+00 SEE SHEET NO. 22

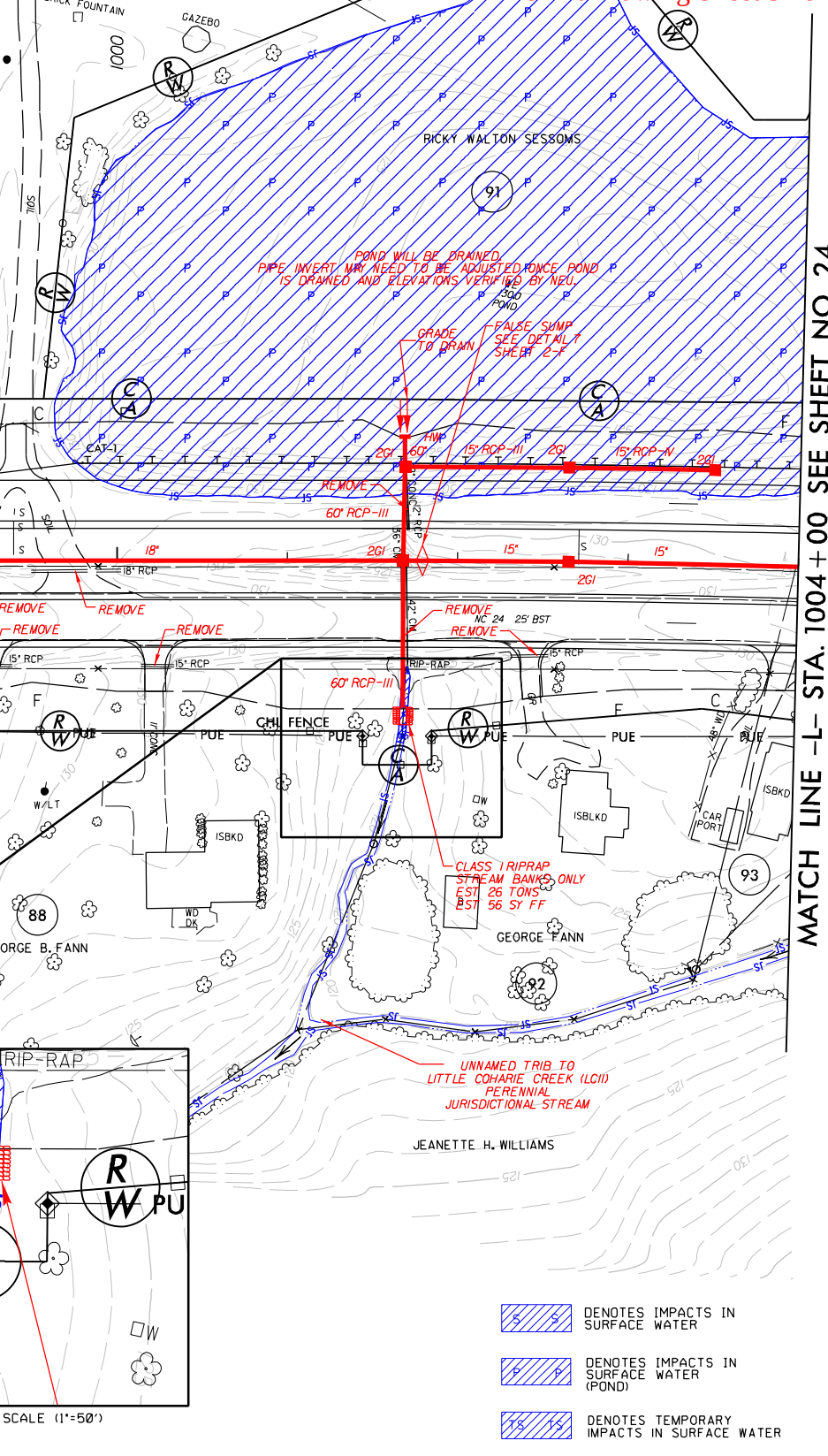
MATCH LINE -L- STA. 1004+00 SEE SHEET NO. 24



NOTE: CLEAR PATH FOR C/A FENCE 6' WIDE TO MINIMIZE IMPACTS TO TREES.

SITE 15

Permit Drawing Sheet 57 of 80



SITE 15 - IMPACT ZOOM-IN SCALE (1"=50')

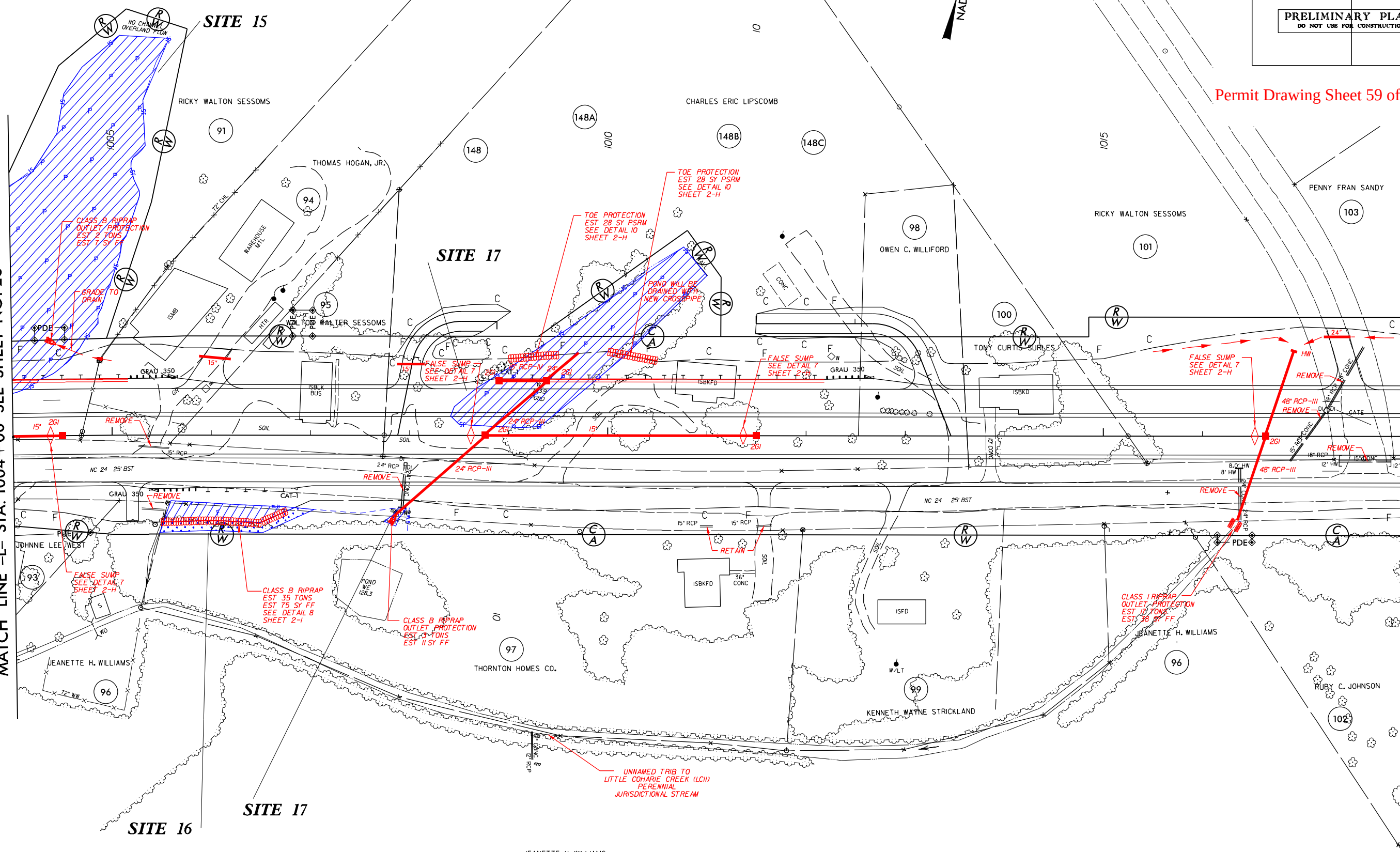
8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		24
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 59 of 80

MATCH LINE -L- STA. 1004+00 SEE SHEET NO. 23

MATCH LINE -L- STA. 1018+00 SEE SHEET NO. 25



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

8/17/2018 Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Environmental\Drawings\R-2303c.prm.psh.24.dgn

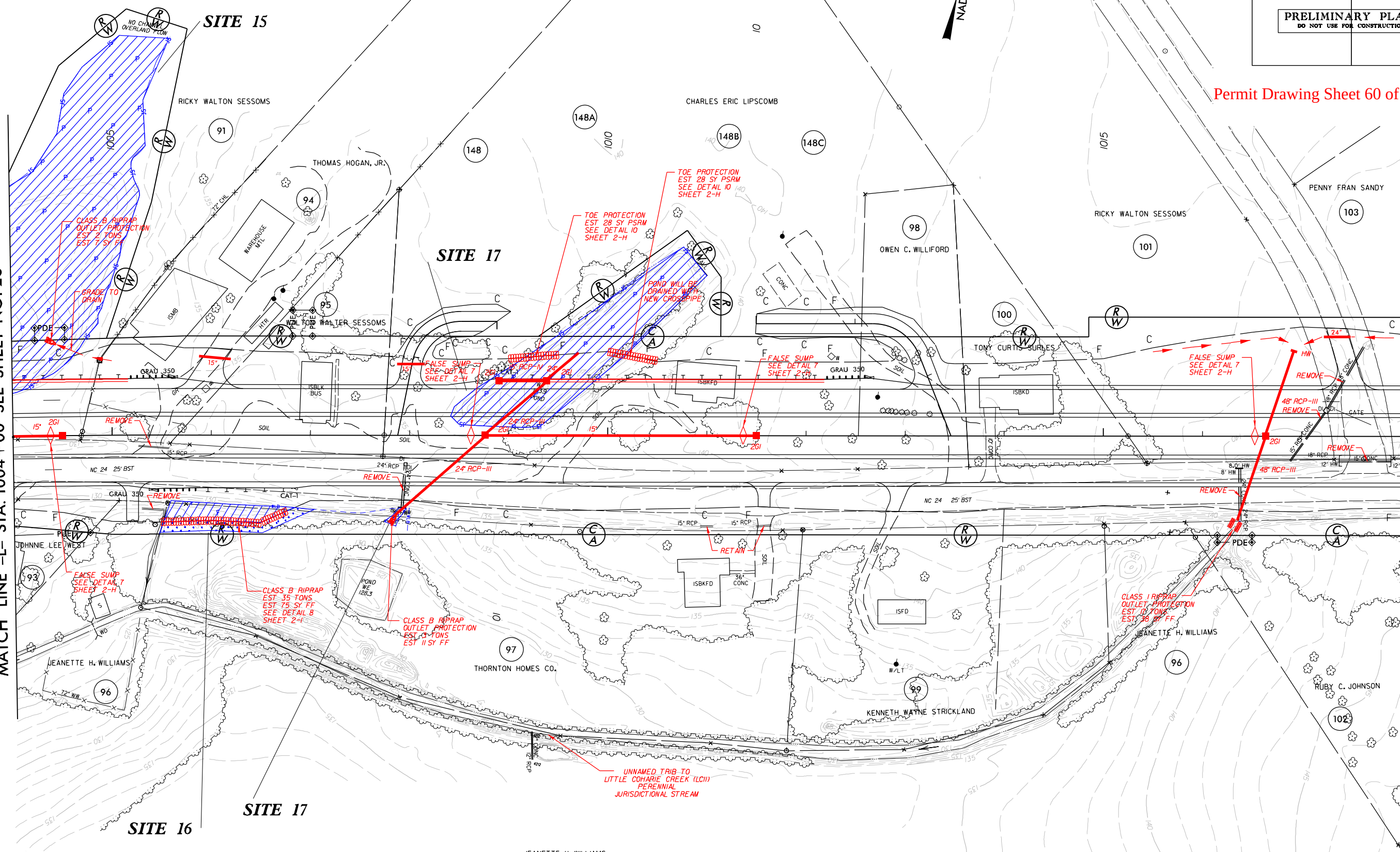
8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		24
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 60 of 80

MATCH LINE -L- STA. 1004+00 SEE SHEET NO. 23

MATCH LINE -L- STA. 1018+00 SEE SHEET NO. 25

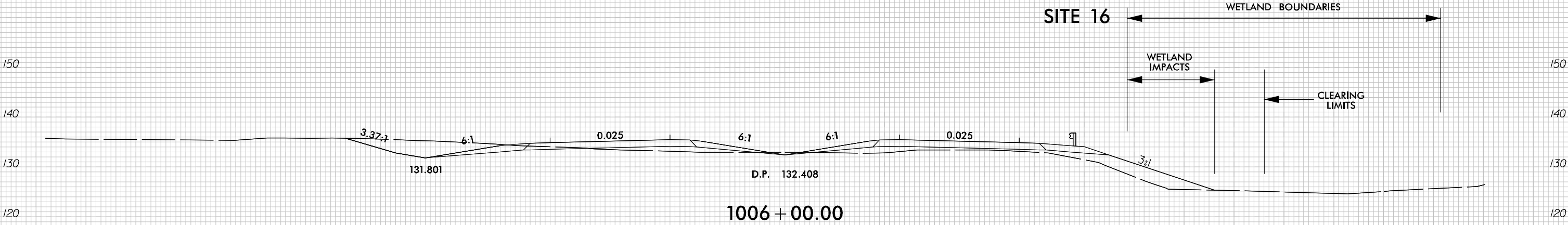
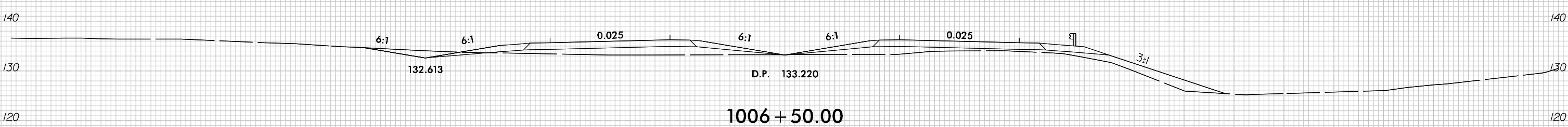
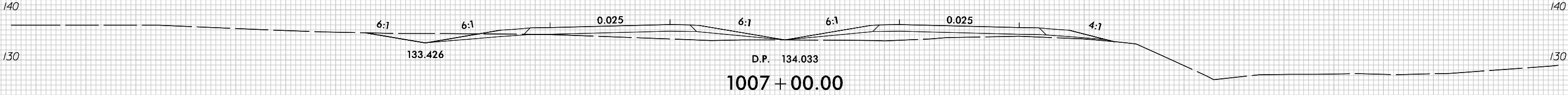
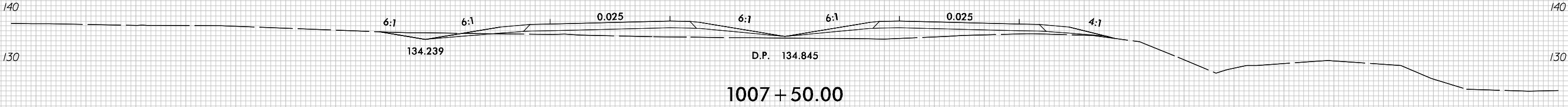
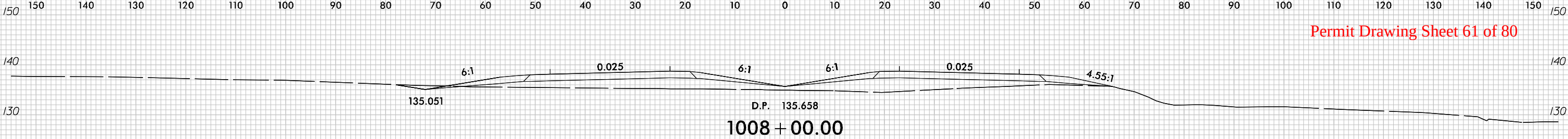


- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER (POND)

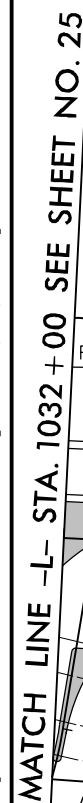
8/3/2018 Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Environmental\Drawings\2303c_prm_psh_24.dgn

8/23/99

Permit Drawing Sheet 61 of 80



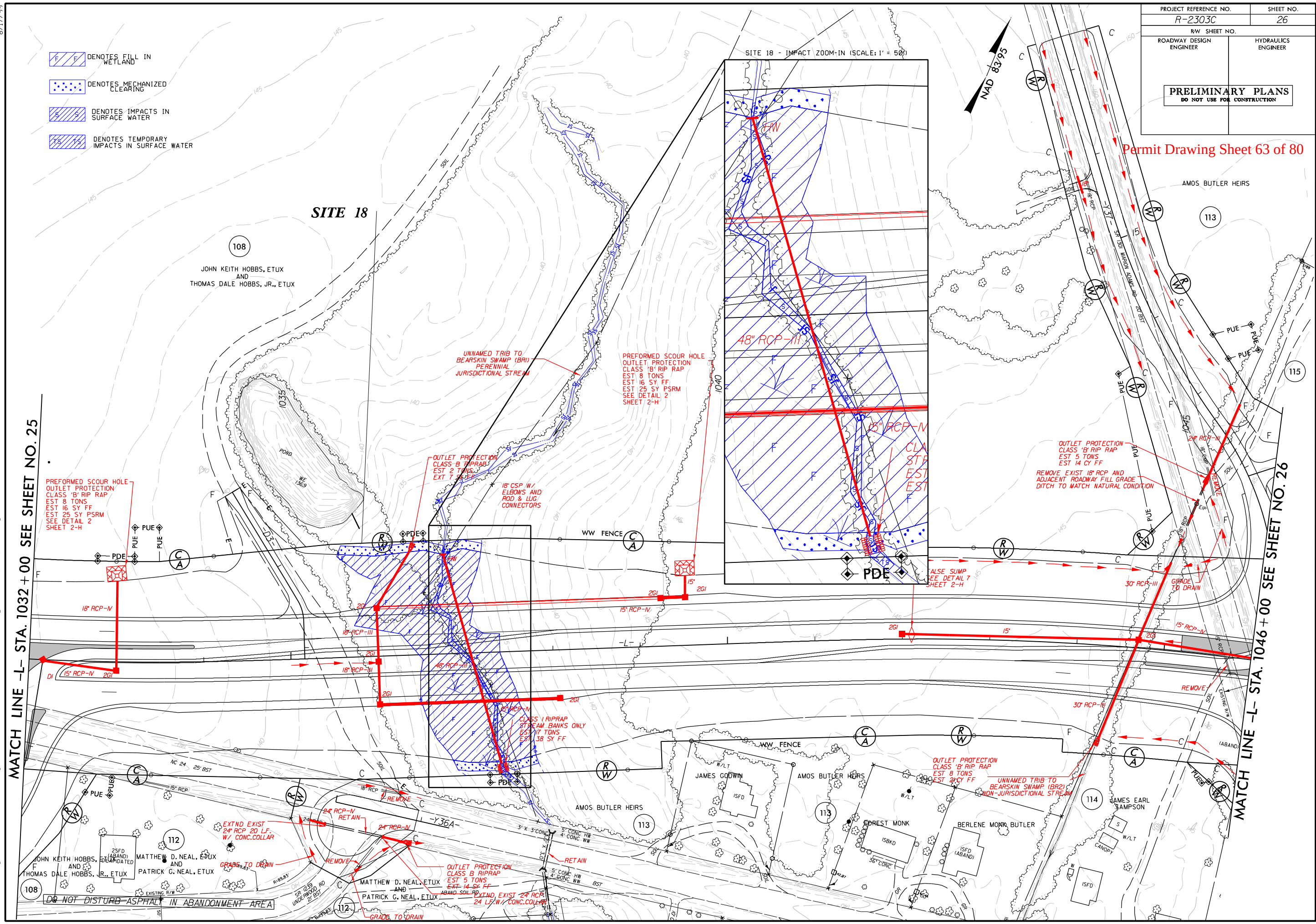
SYSTEMS
DESIGN
LIMITS



8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		26
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 63 of 80



8/17/2018 Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Environmental\Drawings\R-2303c-prm-psh-26.dgn

8/23/99

Permit Drawing Sheet 64 of 80

SITE 18

WETLAND BOUNDARIES

CLEARING LIMITS

WETLAND IMPACTS

WETLAND IMPACTS

CLEARING LIMITS

D.P. 152.025

1037 + 00.00

D.P. 151.842

1036 + 56.00

D.P. 151.400

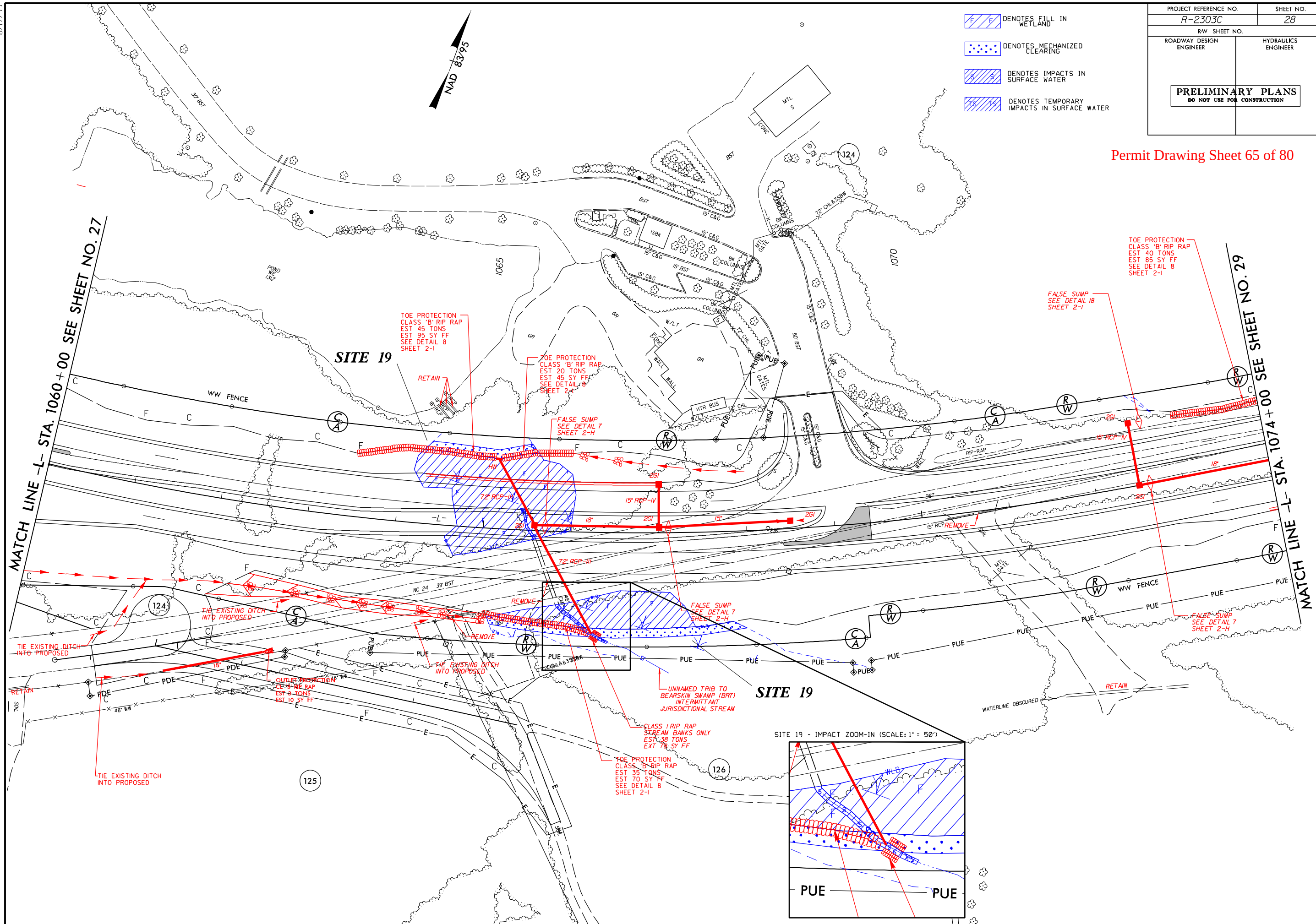
1036 + 00.00

8/23/99
SITE 18
WETLAND BOUNDARIES
WETLAND IMPACTS
CLEARING LIMITS
D.P. 152.025
1037 + 00.00
D.P. 151.842
1036 + 56.00
D.P. 151.400
1036 + 00.00



8/17/99

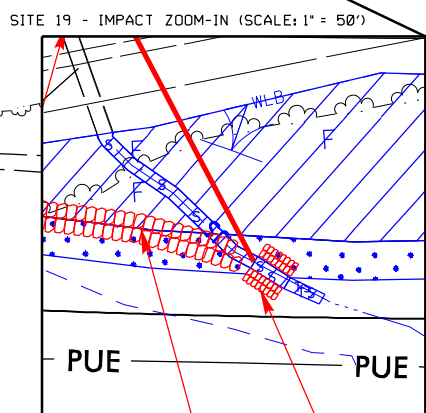
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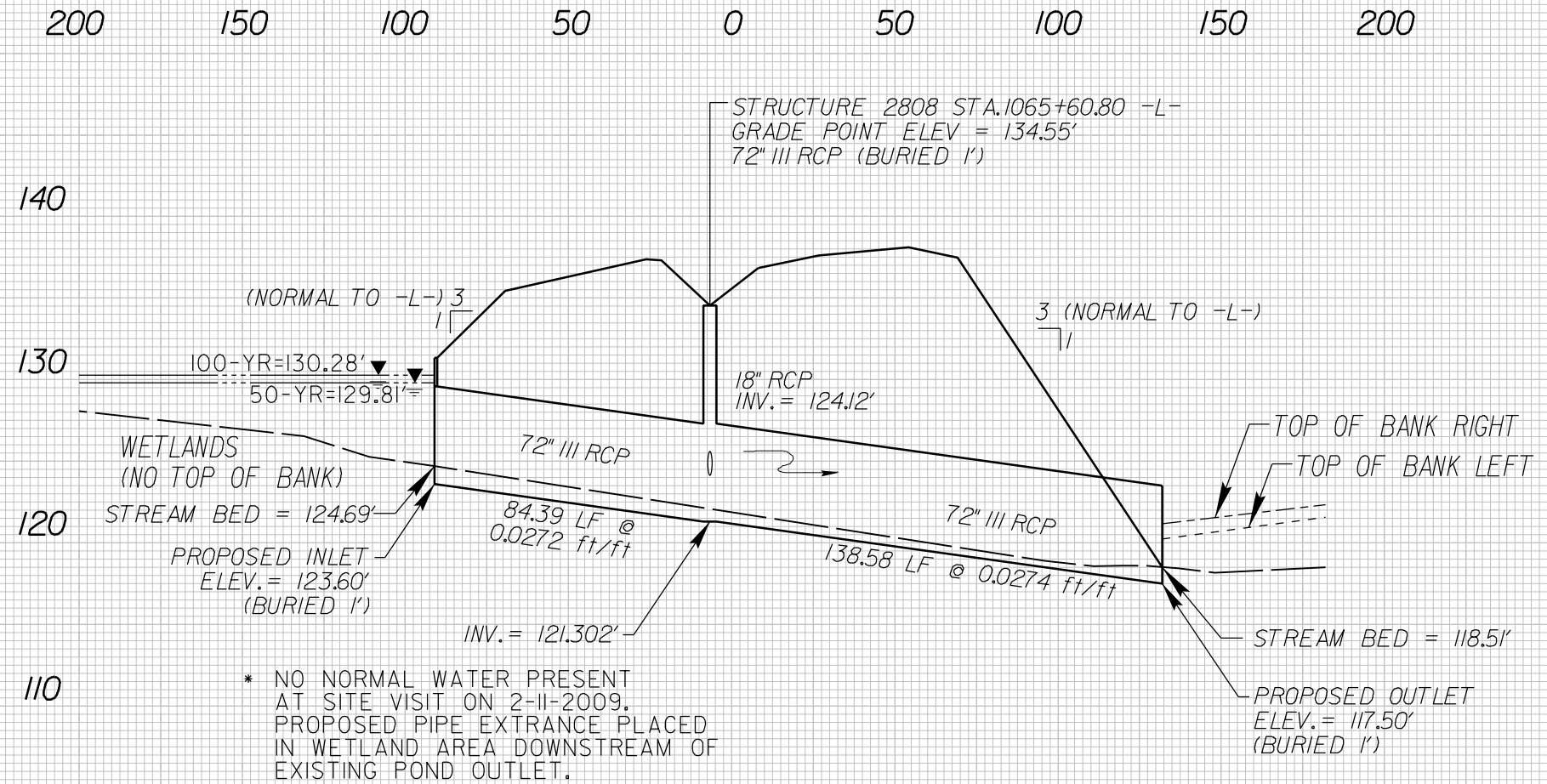


- [Hatched Box] DENOTES FILL IN WETLAND
- [Dotted Box] DENOTES MECHANIZED CLEARING
- [Blue Hatched Box] DENOTES IMPACTS IN SURFACE WATER
- [Blue Hatched Box] DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PROJECT REFERENCE NO. <i>R-2303C</i>		SHEET NO. <i>28</i>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 65 of 80





SITE 19

72" CLASS III RCP AT STATION -L- 1065+60.80

8/23/99

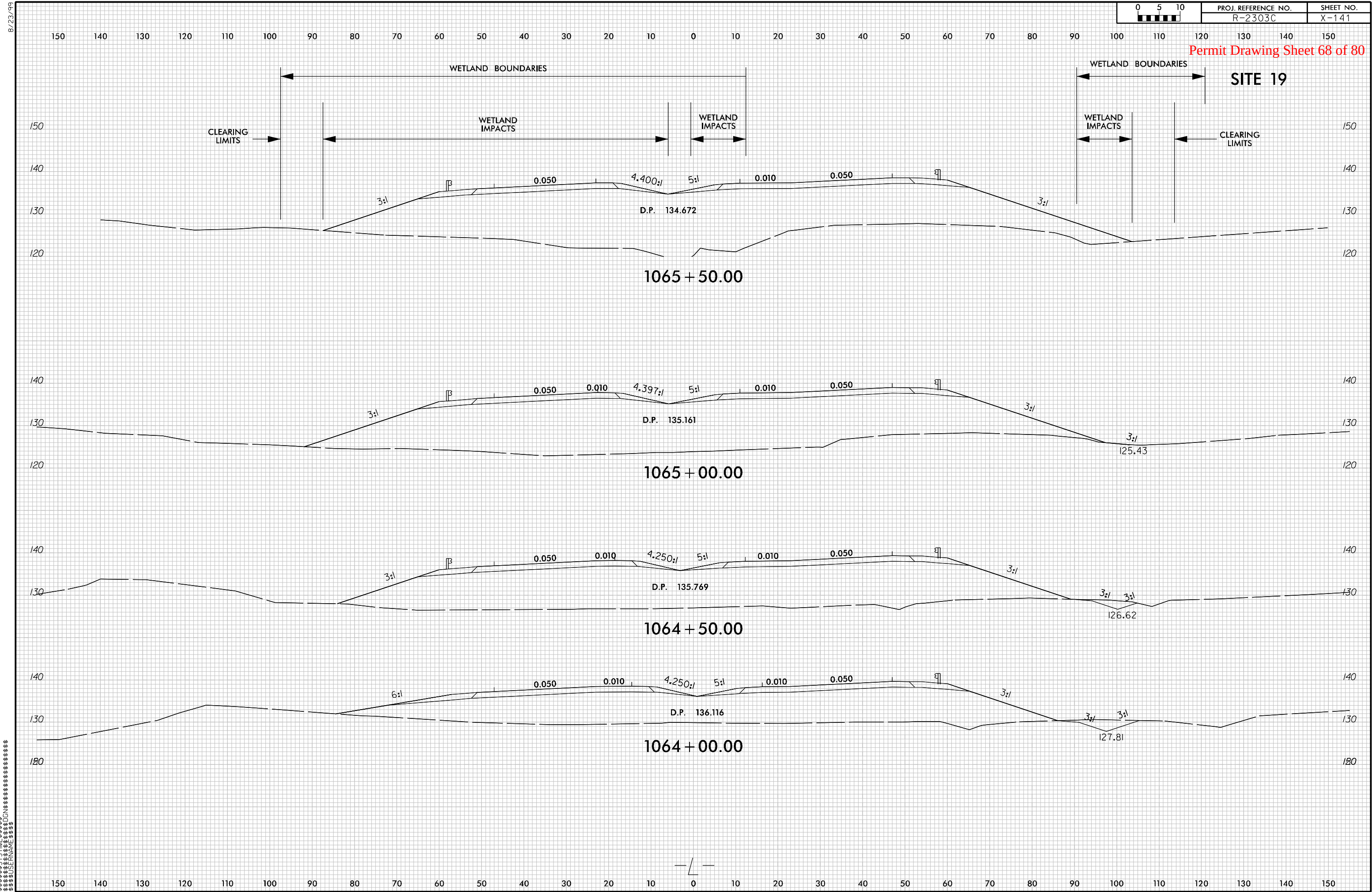


PROJ. REFERENCE NO.
R-2303C

SHEET NO.
X-141

Permit Drawing Sheet 68 of 80

SITE 19



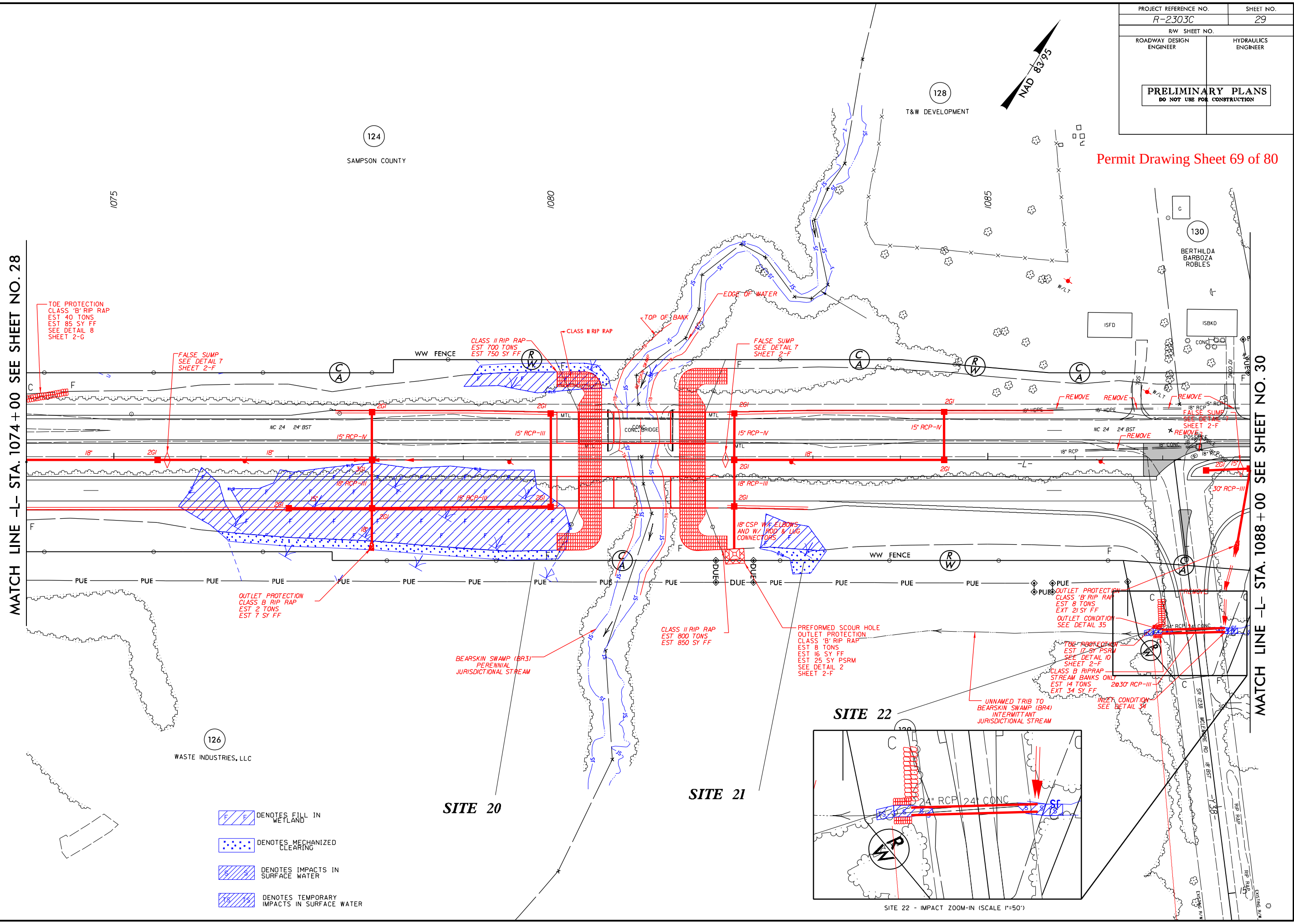
8/17/99

PROJECT REFERENCE NO.		SHEET NO.
R-2303C		29
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

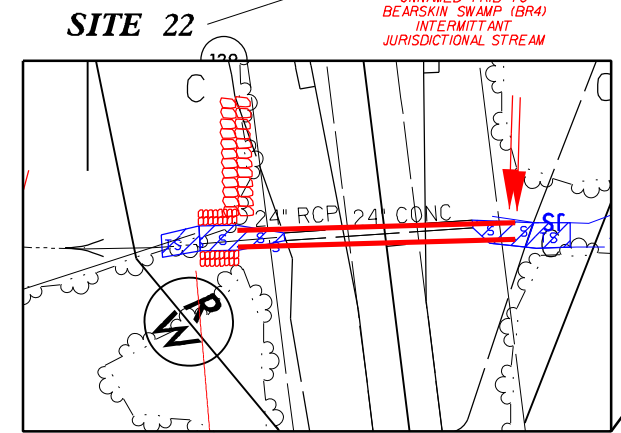
Permit Drawing Sheet 69 of 80

MATCH LINE -L- STA. 1074 + 00 SEE SHEET NO. 28

MATCH LINE -L- STA. 1088 + 00 SEE SHEET NO. 30



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



3/26/2013 Z:\Roadway\011056078 (R-2303C)\Hydraulics\PERMITS.Environmental\Drawings\R-2303c.prm.psh_29.dgn

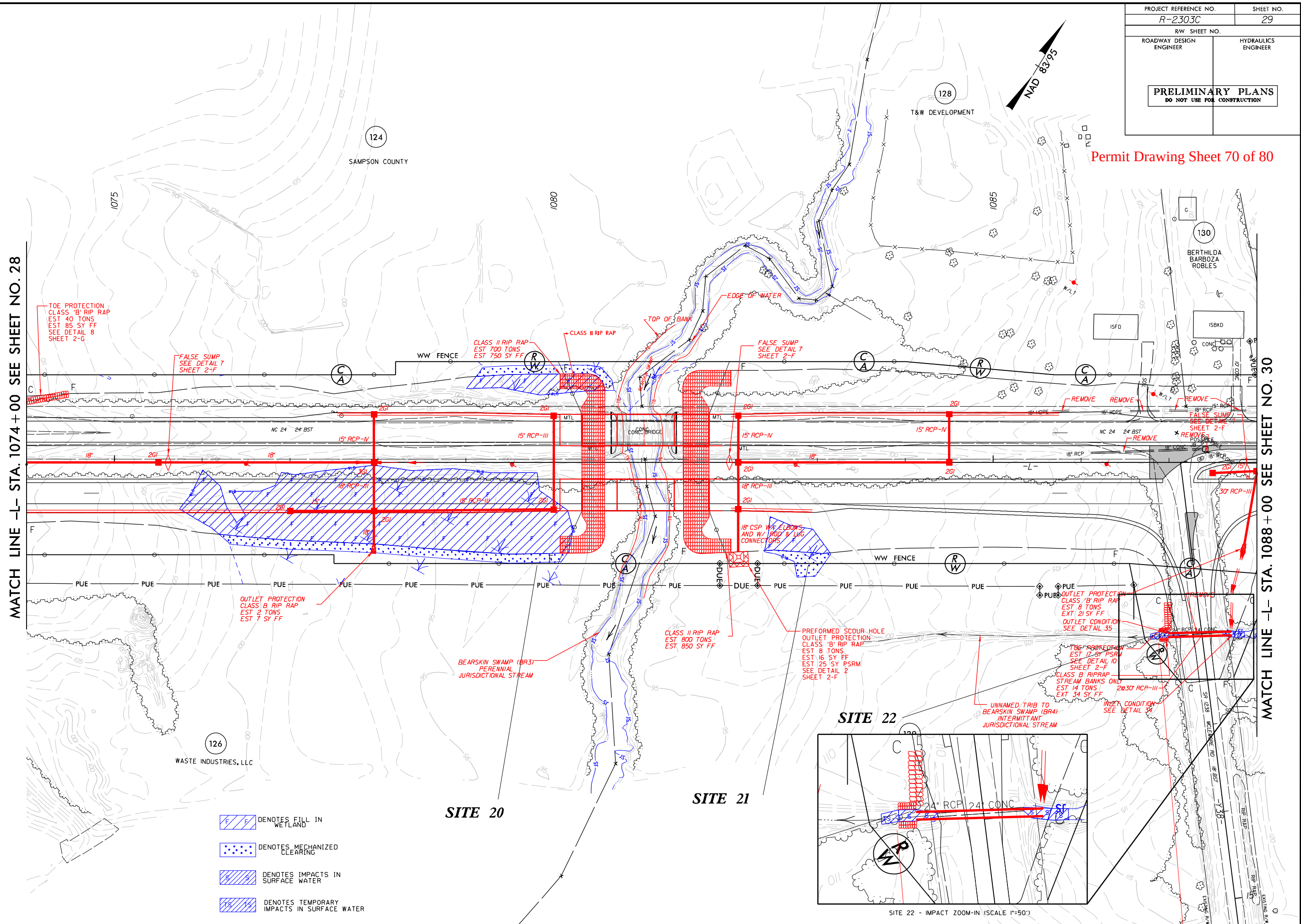
8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
R-2303C		29	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 70 of 80

MATCH LINE -L- STA. 1074 + 00 SEE SHEET NO. 28

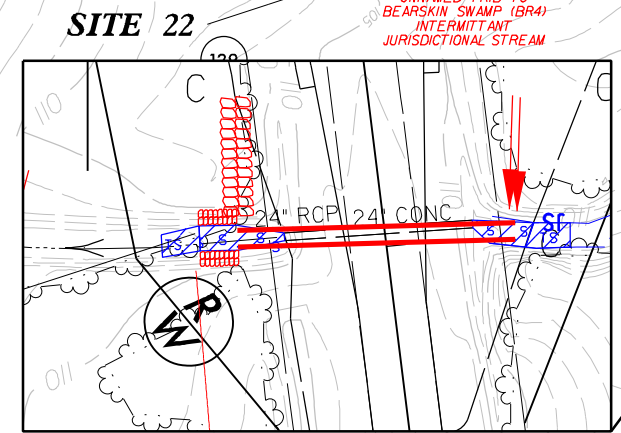
MATCH LINE -L- STA. 1088 + 00 SEE SHEET NO. 30



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

SITE 20

SITE 21



3/26/2013 Z:\Roadway\011056078 (R-2303C)\Hydraulics\PERMITS\Environmental\Drawings\R-2303c_psh_29.dgn

1078+00

1079+00

1080+00

1081+00

1082+00

1083+00

PROJ. REFERENCE NO.
R-2303c

SHEET NO.

Permit Drawing Sheet 71 of 80

130

120

110

100

90

80

LOWPOINT
APPROX. STA = 1077+95
APPROX. ELEV. = 109.20

LOWSTEEL @ LOWSIDE
OF 2.5% SUPERELEVATION

CL STA 1081+04.5 -L-
EAST BOUND LANE (-EBL-)
45" PRESTRESSED GIRDER
1 @ 40', 1 @ 65', 1 @ 40'
W/ SPILL THROUGH SLOPES
CL ELEV = 110.57'
90° SKEW

EXISTING BRIDGE
AND ROADWAY

(+)0.5055%

50-YR=99.6'

2' (TYP)

100-YR=100.4'

CLASS II
RIP RAP
(TYP.)

NATURAL GROUND
DOWNSTREAM

2:1 (TYP)
NORMAL TO
END BENT

3.5' (TYP)

NORMAL W.S. EL. = 92.4'
@ EXISTING BRIDGE
(DECEMBER 15, 2008)

100-YR THEORETICAL
SCOUR

500-YR THEORETICAL
SCOUR

SITE 20 & 21

EAST BOUND LANE BRIDGE AT STATION -L- 1081+04.50

K:\PAL_Roadway\01056078 (R-2303c)\Hydraulics\PERMITS_Environment\Drawings\Profiles\081+04.5_L_bear skin_eb_bridge.dgn

8/3/2012

1078+00

1079+00

1080+00

1081+00

1082+00

1083+00

130

120

110

100

90

80

CL LOWPOINT
APPROX. STA = 1077+95
APPROX. ELEV. = 109.20

CL STA 1081+04.5 -L-
WEST BOUND LANE (-WBL-)
45" PRESTRESSED GIRDER
1 @ 40', 1 @ 65', 1 @ 40'
W/ SPILL THROUGH SLOPES
CL ELEV = 110.57'
90° SKEW

LOWSTEEL @ LOWSIDE
OF 2.5% SUPERELEVATION

EXISTING BRIDGE
AND ROADWAY

NATURAL GROUND
@ CL OF BRIDGE

(+)0.5055%

50-YR=99.6' =
2' (TYP)

100-YR=100.4'

NATURAL GROUND
UPSTREAM

2:1 (TYP)
NORMAL TO
END BENT

CLASS II
RIP RAP
(TYP.)

3.5' (TYP)

NORMAL W.S.EL. = 92.4'
@ EXISTING BRIDGE
(DECEMBER 15, 2008)

EXCAVATION = 1100 CY
(BRIDGE AREA AND
EMBANKMENT)

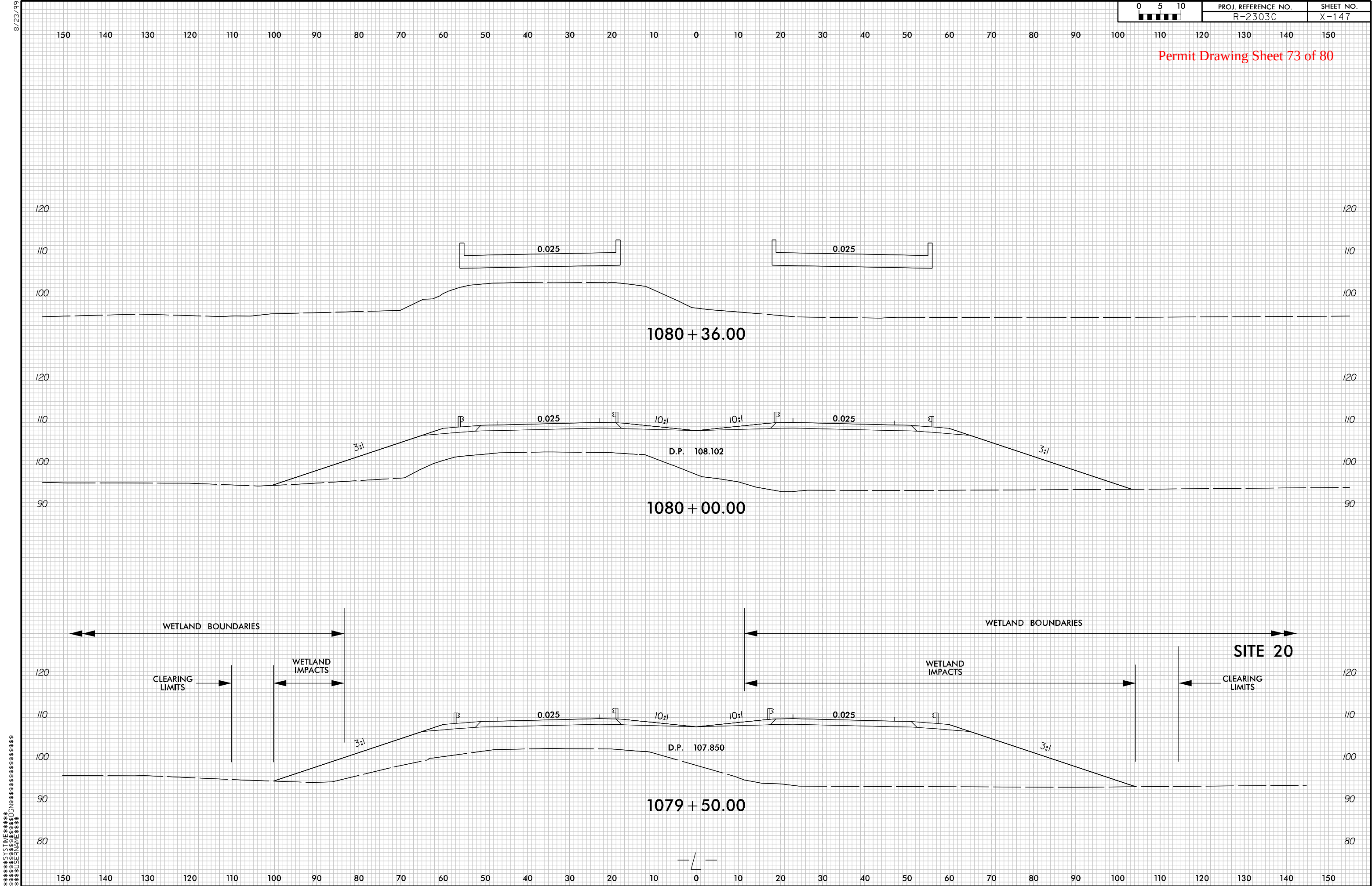
100-YR THEORETICAL
SCOUR

500-YR THEORETICAL
SCOUR

SITE 20

WEST BOUND LANE BRIDGE AT STATION -L- 1081+04.50

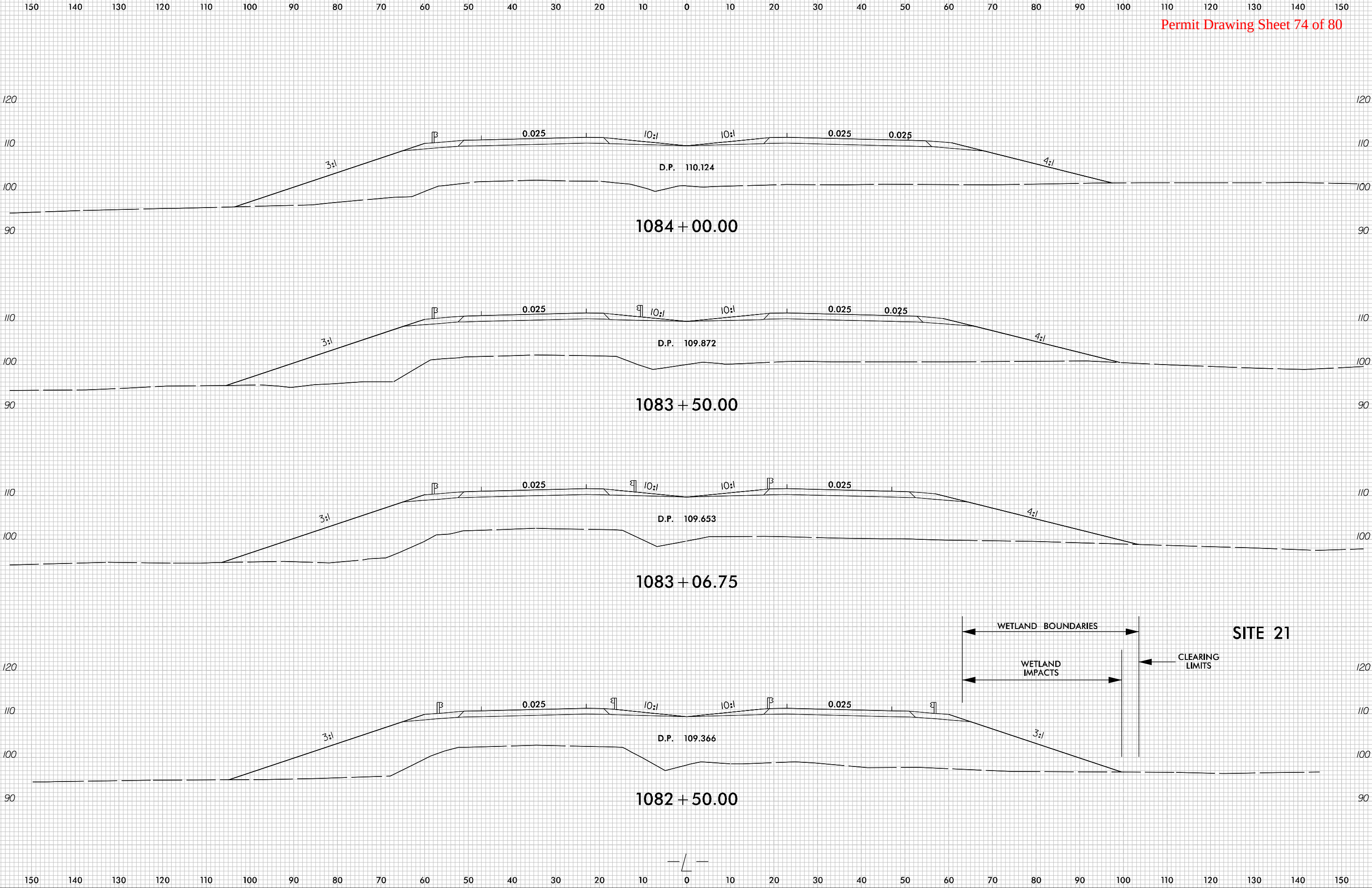
8/23/99



8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2303C	X-149

Permit Drawing Sheet 74 of 80





3/19/2013
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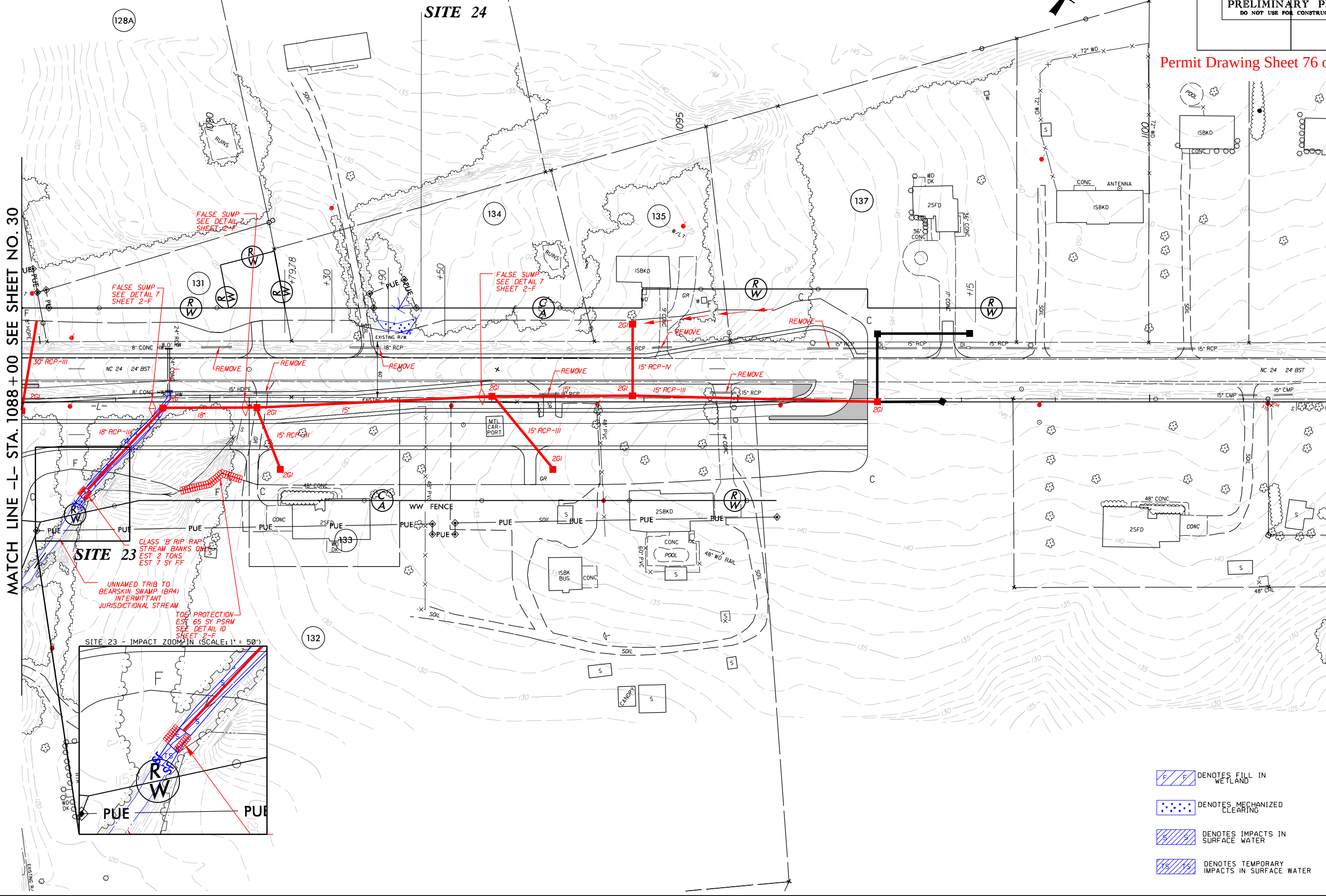
8/17/99

8/17/99

R/W REV.: REVISING THE R/W TO TIE TO R-23030. 10/20/11 TFD
3/19/2013
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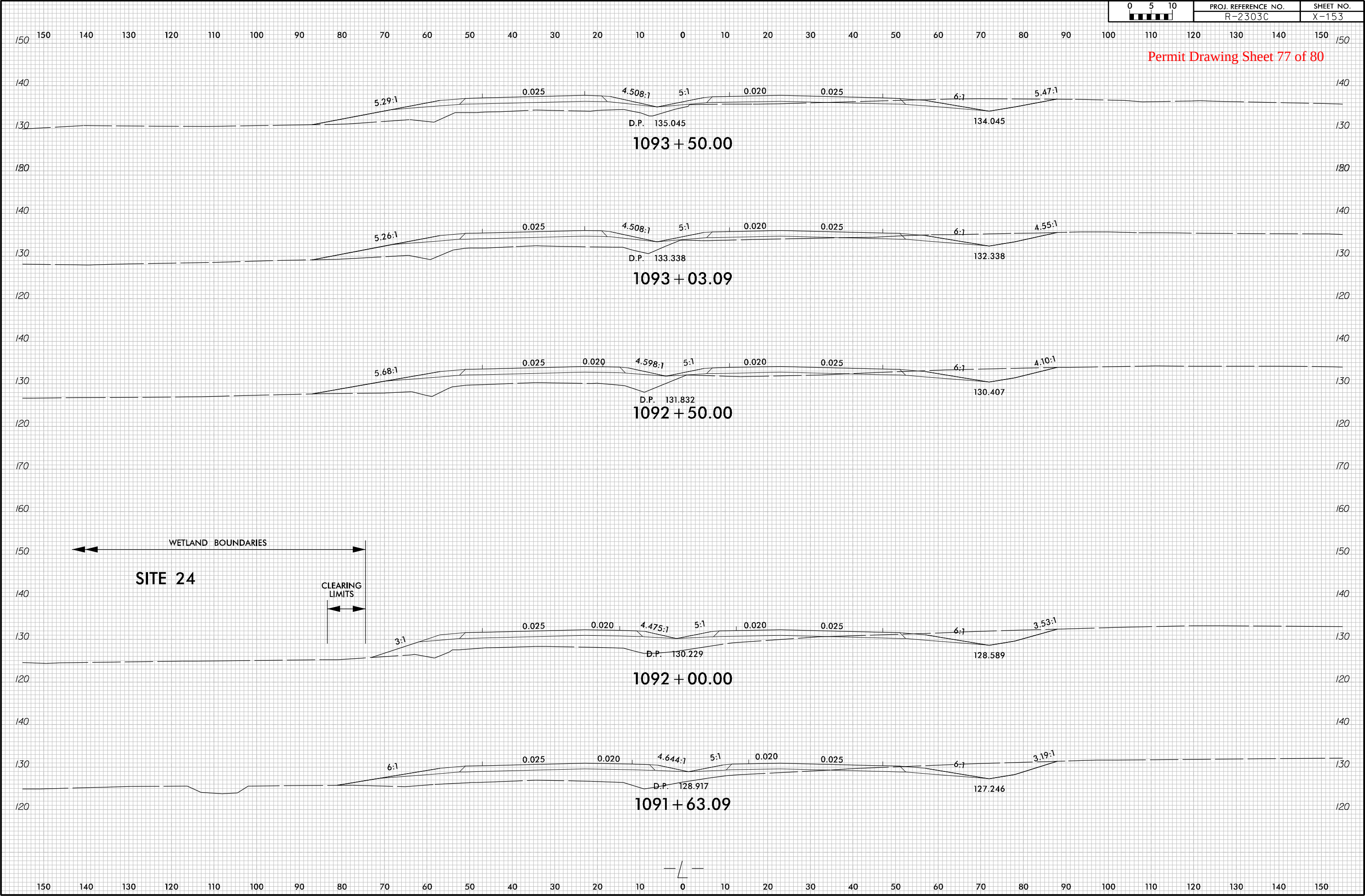
PROJECT REFERENCE NO.		SHEET NO.	
R-2303C		30	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS			
DO NOT USE FOR CONSTRUCTION			

Permit Drawing Sheet 76 of 80



8/23/99

Permit Drawing Sheet 77 of 80



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	734+14 to 739+72	42" RCP/WETLAND	0.83		0.17	0.11		0.01		74.00		
1	734+14 to 739+73	BANK STABILIZATION						<0.01	<0.01	10.00	10.00	
2	741+85 to 744+50	36" RCP/WETLAND	0.26			0.05		0.01				
2	741+85 to 744+50	BANK STABILIZATION						<0.01	<0.01			
3	755+00 to 760+34	POND						1.26	0.08			
4	764+28 to 765+07	30" RCP						0.04				
5	769+44 to 777+78	WETLAND/POND	0.86		0.12	0.19		0.45				
6	804+86 to 807+86	STREAM	0.10			0.04		0.01		213.00		
6	804+86 to 807+86	BANK STABILIZATION						<0.01	<0.01	10.00	20.00	
7	860+27 to 865+12	WETLAND/STREAM	2.34			0.17		0.08		299.00		
8	881+97 to 882+31	WETLAND	<0.01			<0.01						
9	887+38 to 889+49	WETLAND/STREAM	0.64			0.04		0.04		307.00		
SHEET TOTALS			5.04		0.29	0.60		1.90	0.09	913	71	

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)
10	905+77 to 907+41	WETLAND/STREAM	0.24			0.01		0.07	<0.01	342.00	20.00	
11	912+92 to 913+67	POND/STREAM						0.26		315.00		
11	912+92 to 913+67	BANK STABILIZATION						<0.01	<0.01	14.00	20.00	
12	937+08 to 957+49	WETLAND (BRIDGE)	3.56		0.16*	0.68	0.23					
13	955+51 to 958+83 (RT)	WETLAND	0.32			0.06						
14	977+98 to 981+52	WETLAND	0.43		0.07	0.11						
15	999+64 to 1005+57	POND/STREAM						3.22		24.00		
15	999+64 to 1005+57	BANK STABILIZATION						<0.01	<0.01	10.00	10.00	
16	1005+48 to 1007+04	WETLAND	0.05			0.03						
17	1007+77 to 1010+99	POND										
18	1035+56 to 1037+40	WETLAND/STREAM	0.60			0.06		0.02		271.00		
18	1035+56 to 1037+40	BANK STABILIZATION						<0.01	<0.01	10.00	20.00	
19	1064+16 to 1067+96	48" CMP	0.49			0.09		<0.01		90.00		
19	1064+16 to 1067+96	BANK STABILIZATION						<0.01	<0.01	10.00	10.00	
SHEET TOTALS			5.68		0.09	1.05	0.23	3.93	0.01	1086	80	

Site 12 contains 216 SF of impacts due to bents in stream
* Excavation of roadway fill around existing bridge is not required for mitigation and is not added into the total area

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
STPNHF-F-8-2(1 (R-2303C)

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)
20	1075+74 to 1080+69	WETLAND (BRIDGE)	0.82			0.13						
21	1082+39 to 1083+15	WETLAND	0.04			0.02						
22	1086+79 to 1087+86	24" RCP						<0.01		26.00		
22	1086+79 to 1087+86	BANK STABILIZATION						<0.01	<0.01	10.00	20.00	
23	1088+55 to 1089+59	18" RCP						0.02		137.00		
23	1088+55 to 1089+59	BANK STABILIZATION						<0.01	<0.01	10.00	10.00	
24	1091+76 to 1092+23	WETLAND	<0.01			<0.01						
SHEET TOTALS			0.86			0.16		0.03	<0.01	183.00	30.00	
PROJECT TOTALS			11.58		0.38	1.81	0.23	5.86	0.10	2182.00	181.00	

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GUILFORD COUNTY
STPNHF-F-8-2(1 (R-2303C)

SHEET80 of 803 / 26 / 2013

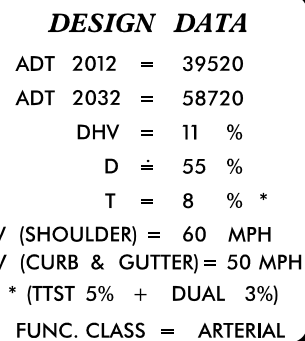
		North Carolina Department of Transportation					
		Highway Stormwater Program					
		STORMWATER MANAGEMENT PLAN					
		FOR LINEAR ROADWAY PROJECTS					
(Version 1.2; Released September 2011)							
Project/TIP No.: R-2303D		County(ies): Sampson		Page 1		of 1	
General Project Information							
Project No.:		R-2303D		Project Type:		Roadway Widening	
NCDOT Contact:		Galen Cail		Date:		10/9/2012	
		Contractor / Designer:					
		Address:		Address:			
		1020 Birch Ridge Road					
		Raleigh NC 27610					
		Phone:		Phone:			
		919-707-6711					
		Email:		Email:			
		gcail@ncdot.gov					
City/Town:		Clinton		County(ies):		Sampson	
River Basin(s):		Cape Fear		CAMA County?		No	
Primary Receiving Water:		Great Coharie Creek		NCDWQ Stream Index No.:		18-68-1	
NCDWQ Surface Water Classification for Primary Receiving Water		Primary:		Class C			
		Supplemental:		Swamp Waters (Sw)			
Other Stream Classification:							
303(d) Impairments:		None					
Buffer Rules in Effect		N/A					
Project Description							
Project Length (lin. Miles or feet):		6.7 miles		Surrounding Land Use:		Rural Farmland with Flat terrain and Sandy Soils (4.3 miles); Urban (Town of Clinton-2.4 miles)	
		Proposed Project		Existing Site			
Project Built-Upon Area (ac.)		71.10 ac.		38.80 ac.			
Typical Cross Section Description:		4 lane divided with 38 ft grass median; 12 ft lanes and 4 ft paved shoulders		Two 12 ft lanes with 2 ft paved shoulders (Rural)			
Average Daily Traffic (veh/hr/day):		Design/Future: 30144		Existing:		19264	
General Project Narrative:		This project involves the widening of NC 24 from SR 1303 (Mitchell Loop Road) to US 421/701. Grassed swales were used throughout project where practical. Grassed shoulders, median and swales will provide infiltration. The side slopes of the ditches were 4:1 or flatter for most ditches. Most of the project terrain is very flat and therefore most swales/ditches are flat. Pipes that are in jurisdictional streams are buried 20% or up to one foot. Preformed scours holes were used in 10 locations. Energy dissipaters used at 2 locations. -Improved conveyance of undersized drainage structures at stream crossings. Reduced outlet velocities. -Existing box culvert Sta 1224+46 -L- presently perched with outlet scour. Proposed culvert will be larger and buried, reducing outlet velocities and eliminating perch. -Proposed bridges will eliminate direct discharge to streams as presently discharging from existing bridge decks. -Proposed bridges over Great Coharie Creek and Overflow will increase in length from 143' and 90' to 1200' and 180', respectively, providing improved conveyance (reduced bridge opening velocities and scour potential) and wetland connectivity. -Where practical, outlets located to avoid direct discharge at streams, wetlands. -Where practical, propose drop structures to reduce outlet velocities.					
References							

		North Carolina Department of Transportation Highway Stormwater Program STORMWATER MANAGEMENT PLAN FOR LINEAR ROADWAY PROJECTS 						
(Version 1.2; Released September 2011) Project/TIP No.: R-2303DCounty(ies): SampsonPage of 1								
Preformed Scour Holes and Energy Dissipators								
Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
	12+84 -Y39- Lt	PFSH	Class 'B'	0.83	Ditch		3.3	1.5
	1106+18 -L- Rt	PFSH	Class 'B'	1.05	Ditch		5.0	1.8
	1167+68 -L- Rt	PFSH	Class 'B'	0.36	Pipe	15	2.1	0.9
	1169+20 -L- Lt	PFSH	Class 'B'	0.84	Ditch		2.2	1.2
	1170+50 -L- Rt	PFSH	Class 'B'	0.20	Pipe	15	1.2	1.0
	1176+45 -L- Rt	PFSH	Class 'B'	1.01	Ditch		4.7	0.7
	1199+10 -L- Rt	PFSH	Class 'B'	0.14	Pipe	15	0.8	0.5
	1201+90 -L- Rt	PFSH	Class 'B'	0.35	Ditch		1.7	0.7
	1205+25 -L- Rt	Riprap Energy Dissipator Basin	Class I	5.75	Pipe	24	11.9	0.8
	1220+63 -L- Rt	PFSH	Class 'B'	0.17	Pipe	15	1.0	0.9
	1329+2- -L- Lt	Riprap Energy Dissipator Basin	Class I	5.40	Pipe	30	25.0	1.0
	17+10 -SR1- Rt	PFSH	Class 'B'	1.49	Ditch		6.9	0.7
☐ YES ☐ NO		Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.						
Additional Comments								

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, 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.

TIP PROJECT: R-2303D

CONTRACT:



LENGTH ROADWAY TIP PROJECT R-2303D	=	6.35 MILES
LENGTH STRUCTURES TIP PROJECT R-2303D	=	0.26 MILES
TOTAL LENGTH TIP PROJECT R-2303D	=	6.61 MILES

WAYNE BEST
PROJECT DESIGN ENGINEER

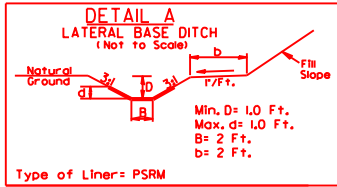
STATE HIGHWAY DESIGN ENGINEER P.E.

TO
OPLAR GROVE

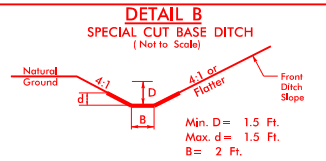
STA. 1446+25.96 -L- END TIP PROJECT R-2303D

WETLAND AND SURFACE WATER IMPACTS PERMIT

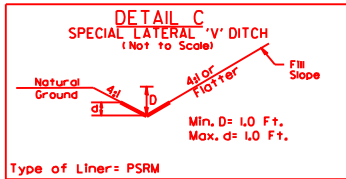
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD _____.
PORTIONS OF THIS PROJECT ARE WITHIN THE TOWN LIMITS OF BELVOIR & LITTLE COHAIRE AND CITY LIMITS OF CLINTON.
THIS IS A LIMITED AND PARTIAL CONTROL OF ACCESS PROJECT WITH ACCESS BEING LIMITED TO THE POINTS AS SHOWN ON THE PLANS.



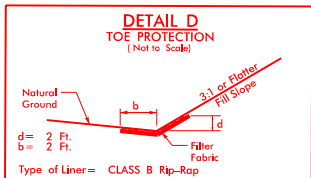
FROM STA. 1100+00 TO STA. 1106+15 -L- RT.
FROM STA. 1159+50 TO STA. 1160+46 -L- LT.
FROM STA. 1171+70 TO STA. 1174+68 -L- LT.
FROM STA. 1176+55 TO STA. 1180+50 -L- RT.
FROM STA. 1180+50 TO STA. 1186+00 -L- RT. (16+00 -Y42- RT.)
FROM STA. 16+00 TO STA. 17+88 -Y42- RT.
FROM STA. 1189+00 TO STA. 1197+50 -L- RT.
FROM STA. 1245+80 TO STA. 1248+15 -L- LT.
FROM STA. 1247+00 TO STA. 1248+72 -L- RT.
FROM STA. 1279+00 TO STA. 1285+70 -L- LT.
FROM STA. 1287+10 TO STA. 1289+00 -L- LT.
FROM STA. 9+40 TO STA. 10+85 -RPD- LT.
FROM STA. 17+15 TO STA. 20+50 -SRI- RT.
FROM STA. 15+94 TO STA. 17+19 -RPA- RT



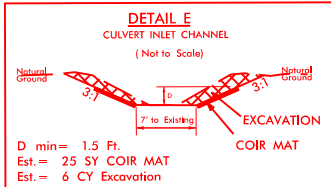
FROM STA. 11+85 TO STA. 12+45 -Y39- RT.
FROM STA. 1154+50 TO STA. 1157+70 -L- LT.
FROM STA. 18+50 TO STA. 22+00 -Y42- LT.



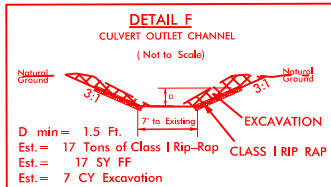
FROM STA. 1141+50 TO STA. 1142+41 -L- LT (14+20 -Y40- RT.)
FROM STA. 12+93 TO STA. 14+20 -Y40- RT.
FROM STA. 1152+00 TO STA. 1153+60 -L- LT.
FROM STA. 1160+80 TO STA. 1162+63 -L- LT.
FROM STA. 1163+10 TO STA. 1164+11 -L- LT.
FROM STA. 1164+50 TO STA. 1165+81 -L- LT.
FROM STA. 1166+20 TO STA. 1167+00 -L- LT.
FROM STA. 1168+00 TO STA. 1169+20 -L- LT.
FROM STA. 1174+68 TO STA. 1179+50 -L- LT.
FROM STA. 1197+60 TO STA. 1198+50 -L- LT.
FROM STA. 1200+05 TO STA. 1200+50 -L- LT.
FROM STA. 1201+90 TO STA. 1202+50 -L- RT.
FROM STA. 1211+00 TO STA. 1213+80 -L- LT.
FROM STA. 1297+55 TO STA. 1300+00 -L- LT.
FROM STA. 1300+40 TO STA. 1301+50 -L- RT.
FROM STA. 1302+00 TO STA. 1302+95 -L- RT.
FROM STA. 8+90 TO STA. 14+00 -RPC- LT.
FROM STA. 17+50 TO STA. 18+50 -Y52- RT.
FROM STA. 17+25 TO STA. 18+00 -Y52- LT.
FROM STA. 11+00 TO STA. 14+50 -RPA- LT.
FROM STA. 12+50 TO STA. 12+80 -Y39- RT.
FROM STA. 11+50 TO STA. 12+70 -Y44- RT.
FROM STA. 11+50 TO STA. 12+50 -Y44- LT.
FROM STA. 16+50 TO STA. 18+00 -Y44- LT.
FROM STA. 12+93 TO STA. 13+93 -Y40- LT.
FROM STA. 46+00 TO STA. 51+50 -Y52- RT.
FROM STA. 19+05 TO STA. 21+00 -SRI- LT



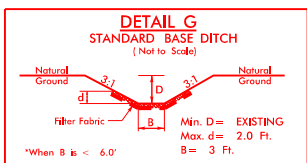
FROM STA. 1106+15 TO STA. 1108+65 -L- RT
FROM STA. 1109+00 TO STA. 1110+45 -L- RT
FROM STA. 1106+95 TO STA. 1109+50 -L- RT
FROM STA. 1109+80 TO STA. 1110+20 -L- LT
FROM STA. 1163+30 TO STA. 1167+40 -L- RT
FROM STA. 1170+00 TO STA. 1172+65 -L- LT
FROM STA. 1170+70 TO STA. 1176+00 -L- RT
FROM STA. 1197+25 TO STA. 1197+70 -L- LT
FROM STA. 1197+80 TO STA. 1198+40 -L- RT
FROM STA. 1199+30 TO STA. 1201+65 -L- RT
FROM STA. 1204+75 TO STA. 1205+15 -L- RT
FROM STA. 1207+45 TO STA. 1207+80 -L- RT
FROM STA. 1221+00 TO STA. 1224+50 -L- RT
FROM STA. 1224+80 TO STA. 1225+45 -L- RT
FROM STA. 1222+15 TO STA. 1224+10 -L- LT
FROM STA. 1224+40 TO STA. 1225+15 -L- LT
FROM STA. 1266+50 TO STA. 1269+25 -L- RT
FROM STA. 1290+60 TO STA. 1300+00 -L- RT
FROM STA. 1296+25 TO STA. 1297+40 -L- LT
FROM STA. 1301+50 TO STA. 1305+32 -L- LT
FROM STA. 1304+90 TO STA. 1305+32 -L- RT
FROM STA. 1317+82 TO STA. 1325+78 -L- LT & RT
FROM STA. 1328+10 TO STA. 1328+50 -L- RT
FROM STA. 1328+10 TO STA. 1329+05 -L- LT
FROM STA. 13+55 TO STA. 16+95 -SRI- RT
FROM STA. 14+50 TO STA. 16+50 -SRI- LT



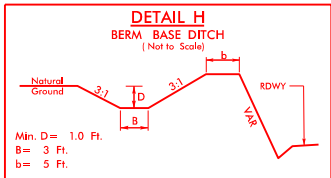
STA. 1109+60 -L- LT



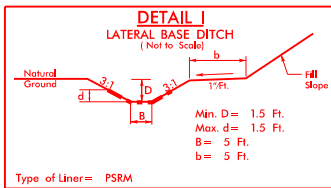
STA. 1108+85 -L- RT



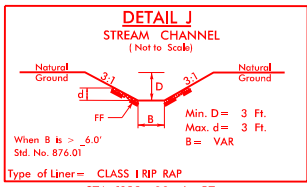
FROM STA. 1128+95 -L- LT
FROM STA. 1197+50 TO STA. 1197+90 -L- RT



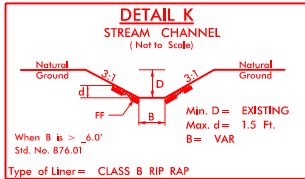
FROM STA. 1128+90 TO STA. 1132+00 -L- RT



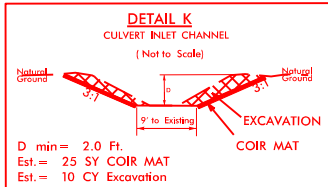
FROM STA. 1129+00 TO STA. 1131+00 -L- LT
EST. 1800 SY
FROM STA. 1248+23 TO STA. 1251+00 -L- LT.
FROM STA. 1248+87 TO STA. 1250+65 -L- RT.



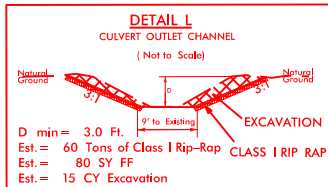
STA. 1198+00 -L- RT
EST 55 TONS; EST 70 SY FF; EST 20 CY EXCAV
STA. 1278+55 -L- LT
EST 35 TONS; EST 40 SY FF; EST 35 CY EXCAV
STA. 1281+30 -L- RT
EST 40 TONS; EST 40 SY FF; EST 25 CY EXCAV
STA. 1291+75 -L- RT
EST 40 TONS; EST 50 SY FF; EST 10 CY EXCAV
STA. 16+40 -Y44- LT
EST 35 TONS; EST 40 SY FF; EST 60 CY EXCAV
STA. 16+75 -Y44- RT
EST 70 TONS; EST 80 SY FF; EST 100 CY EXCAV
STA. 1294+70 -L- RT
EST 40 TONS; EST 40 SY FF; EST 30 CY EXCAV



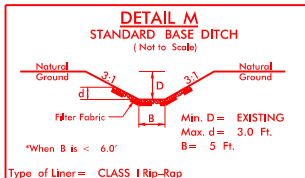
STA. 1200+10 -L- RT
EST 55 TONS; EST 70 SY FF; EST 20 CY EXCAV



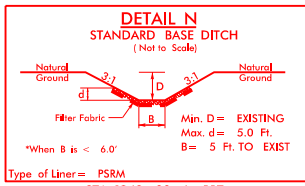
STA. 1224+30 -L- LT



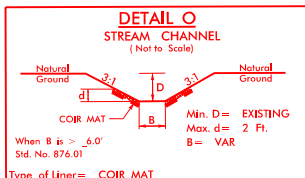
STA. 1224+60 -L- RT



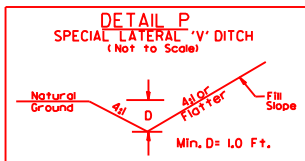
STA. 1248+19 -L- LT
EST 80 TONS; EST 100 SY FF; EST 60 CY EXCAV
STA. 1248+79 -L- RT
EST 80 TONS; EST 100 SY FF; EST 60 CY EXCAV
STA. 1347+60 -L- LT
EST 110 TONS; EST 140 SY FF; EST 110 CY EXCAV



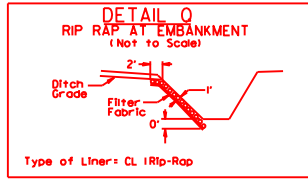
STA. 1249+00 -L- RRT



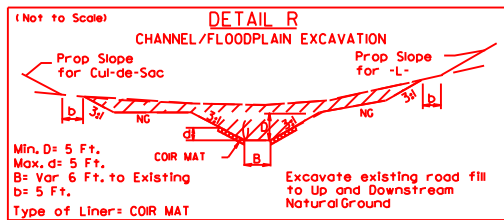
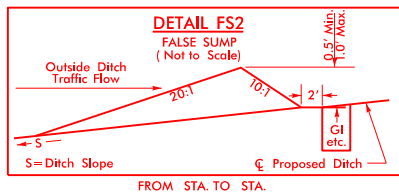
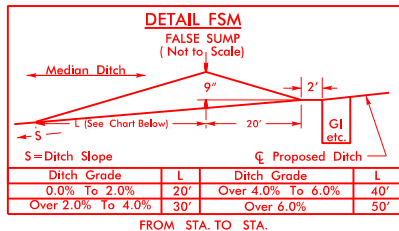
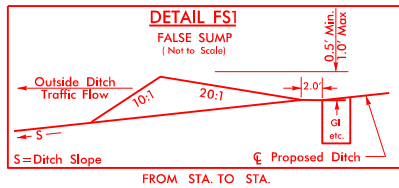
STA. 1290+05 -L- LT
EST 75 SY COIR MAT; EST 25 CY EXCAV
STA. 1294+50 -L- LT
EST 70 SY COIR MAT; EST 30 CY EXCAV



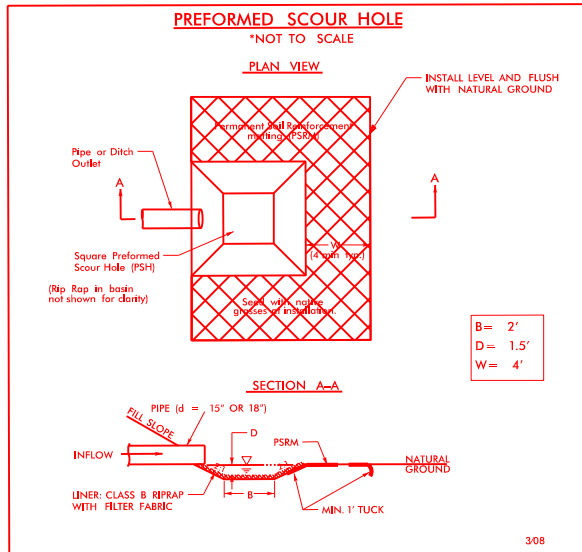
FROM STA. 1131+00 TO STA. 1139+75 -L- LT
FROM STA. 5+84 TO STA. 10+00 -RPC- RT
FROM STA. 10+00 TO STA. 15+00 -RPA- RT



STA. 12+34 -Y53- LT 3 TONS; 6 SY FF
STA. 12+54 -Y53- LT 3 TONS; 6 SY FF
STA. 12+57 -Y53- RT 3 TONS; 6 SY FF
STA. 12+77 -Y53- RT 3 TONS; 6 SY FF



FROM STA. 1444+10 TO STA. 1445+40 -L- LT
EST EXCAV = 530 CY
EST COIR MAT = 400 SY



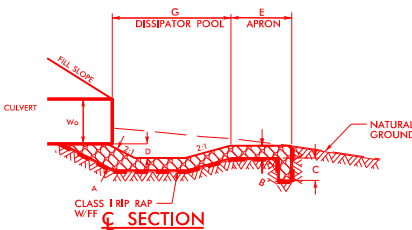
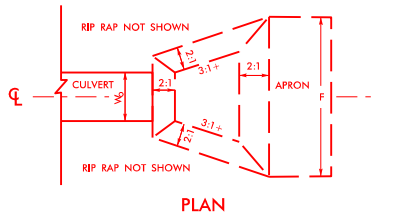
STA. 12+84 -Y39- LT
STA. 1106+18 -L- RT
STA. 1167+68 -L- RT
STA. 1169+20 -L- LT
STA. 1176+45 -L- RT
STA. 1199+10 -L- RT
STA. 1201+90 -L- RT
STA. 1220+63 -L- RT
STA. 17+10 -SRI- RT

DETAIL S
RIP-RAPPED ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN #	#1	#2	#3
A	2.0'	2.0'	?	?
B	2.0'	2.0'	?	?
C	1.5'	1.5'	?	?
D	1.5'	1.5'	?	?
E	5'	5'	?	?
F	16'	16'	?	?
G	15'	15'	?	?

ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
#1	STA. 1205+25 -L- RT
#2	STA. 1329+20 -L- LT
?	?



FROM STA. TO STA.

SITE 2



MATCH LINE -L- STA 1107 + 50 SEE SHEET 5

FROM -L- STA. 1095+47.50 LT
TO -L- STA. 1098+58.46 LT
THE R/W WILL BE PURCHASED
UNDER R-2303C

STA. 1097+00.00 - BEGIN TIP PROJECT R-2303D

GRASS SWALE DATA
 DA = 4.6ac (2.8p; 3.8g)
 SLOPE = 0.012-0.038
 PRO. = ?
 Q10 = 5.0 cts
 Q10 = 2.1-3.2 FTS
 Q10 = 0.6'
 STA. 1129+00 -L- LT

 DENOTES FILL IN WETLAND

 DENOTES MECHANIZED CLEARING

REVISIONS

4/22/2013
amkeeper
R:\Hydraulics\PERMITS_Environmental\Drawings\R2303D_Hyd_prm_wet_psh4.dgn
November 28, 2011
r2303d_hyd_prm_wet_psh4.dgn
amkeeper

SITE 2

FROM -L- STA. 1095+47.50 LT
TO -L- STA. 1098+58.46 LT
THE RW WILL BE PURCHASED
UNDER R-2303C

~~STA. 1097+00.00 -I- BEGIN TIP PROJECT R-2303D~~



GRASS SWALE DATA
QA = 4.6pc (2.8g; 3.8g)
SLOPE = 0.012-0.038
PRO. = ?
Q10 = 5.0 cfs
Q10 = 2.1-3.2 FTS
Q10 = 0.6'
STA. 1129+00 CL- LT

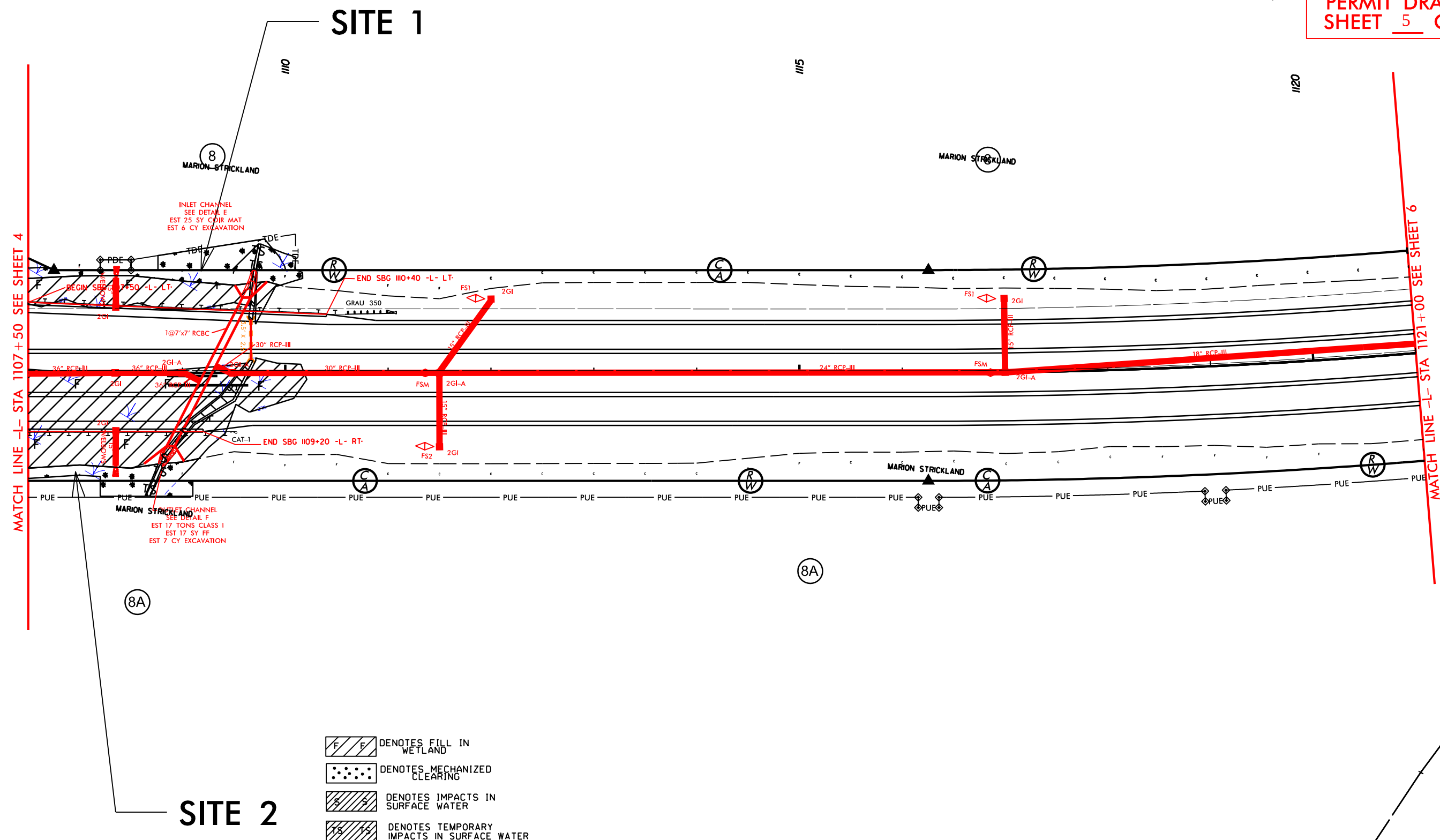
50' 0' 50' 100' 150'

SCALE = 1" = 50'

REVISIONS

4/22/2013
 R:\Hydraulics\PERMITS_Environmental Drawings\R2303D_Hyd_prm_wet_psh4.dgn
 November 28, 2011
 2303D_hyd_prm_wet.psh4.dgn

PERMIT DRAWING
SHEET 5 OF 75



50' 0' 50' 100' 150'

SCALE = 1"=50'

REVISIONS

452013
amkleele
R:\Hydraulics\PERMITS_Environmental\Drawings\R2303D_Hyd_prm_wet_psh5.dgn
November 28, 2011
2303d.hyd-prm-wet.psh5.dgn

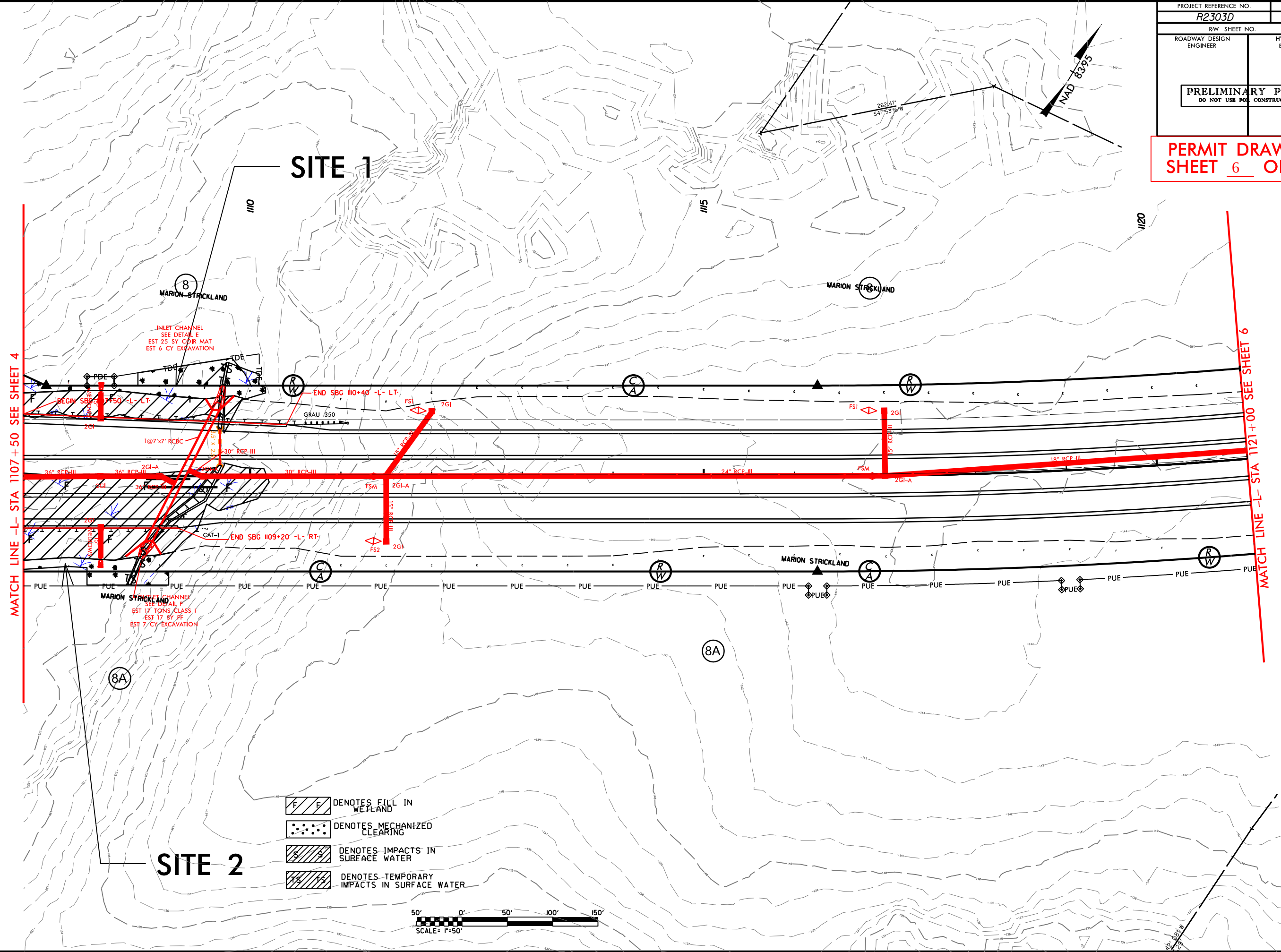
REVISIONS

4/5/2013
antleater
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November 28, 2011
R2303D_Hyd_prm_wet.psd.dgn

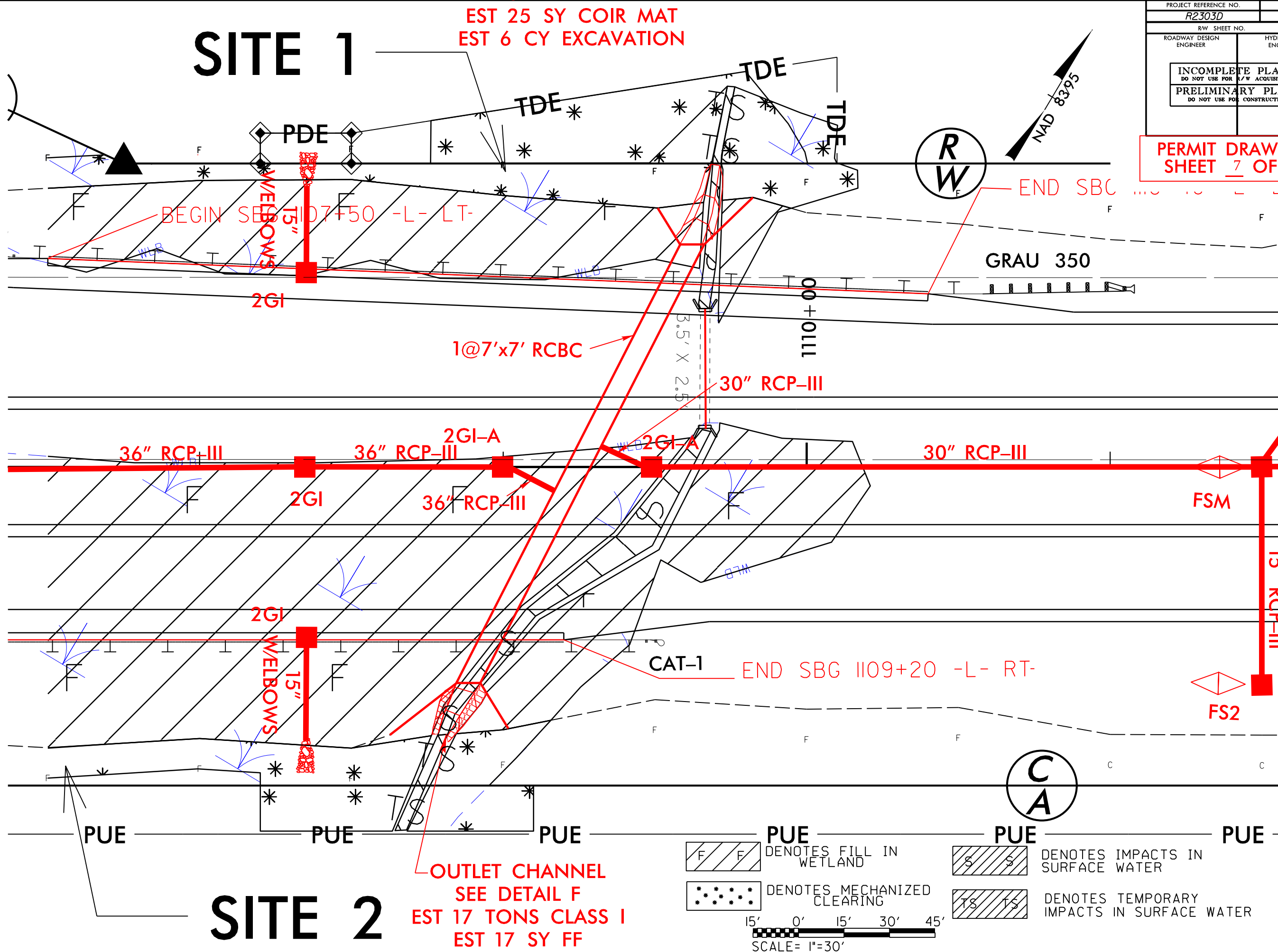
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R2303D	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 6 OF 75



PERMIT DRAWING
SHEET 7 OF 75



5/14/99

PROJECT REFERENCE NO.
R2303D

SHEET NO.
5_PFL

ROADWAY DESIGN
ENGINEER

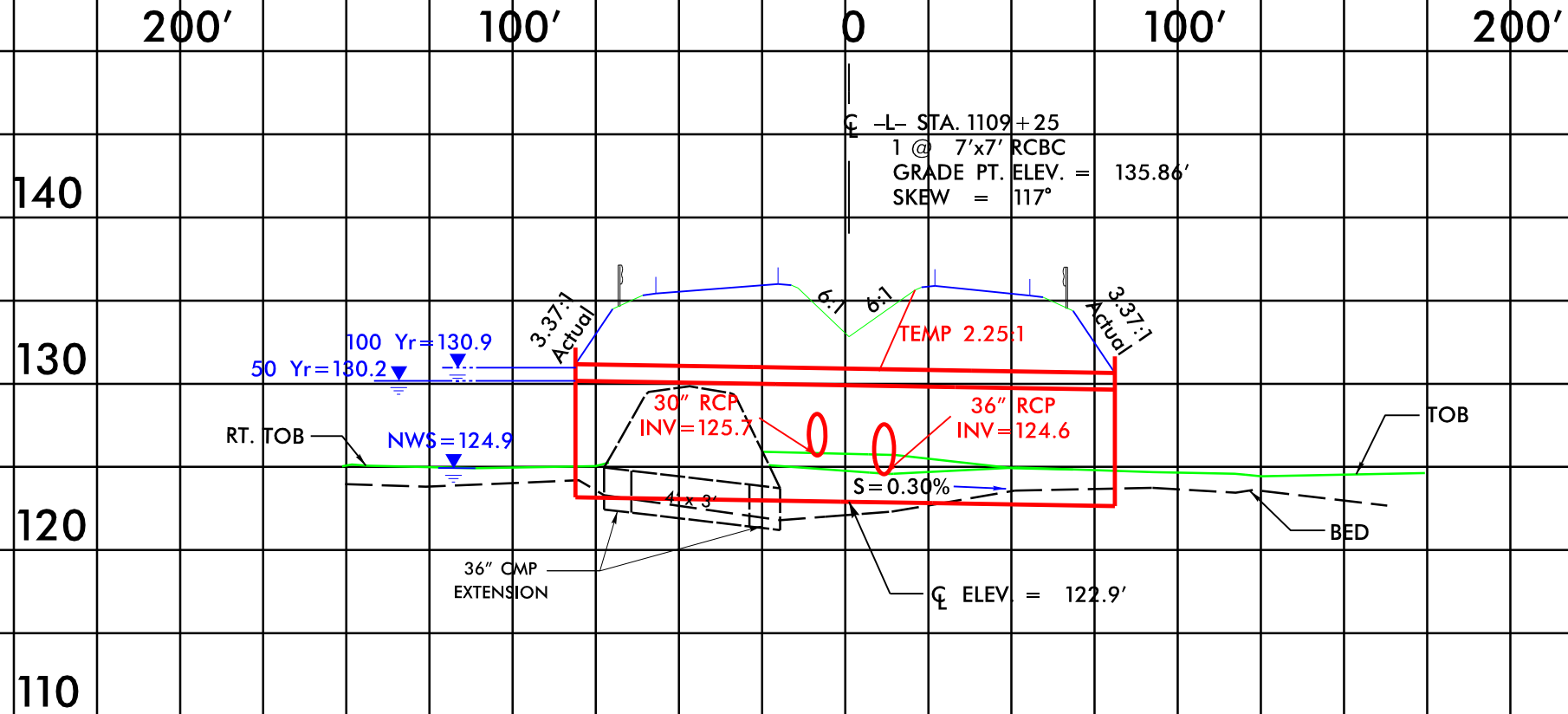
HYDRAULICS
ENGINEER

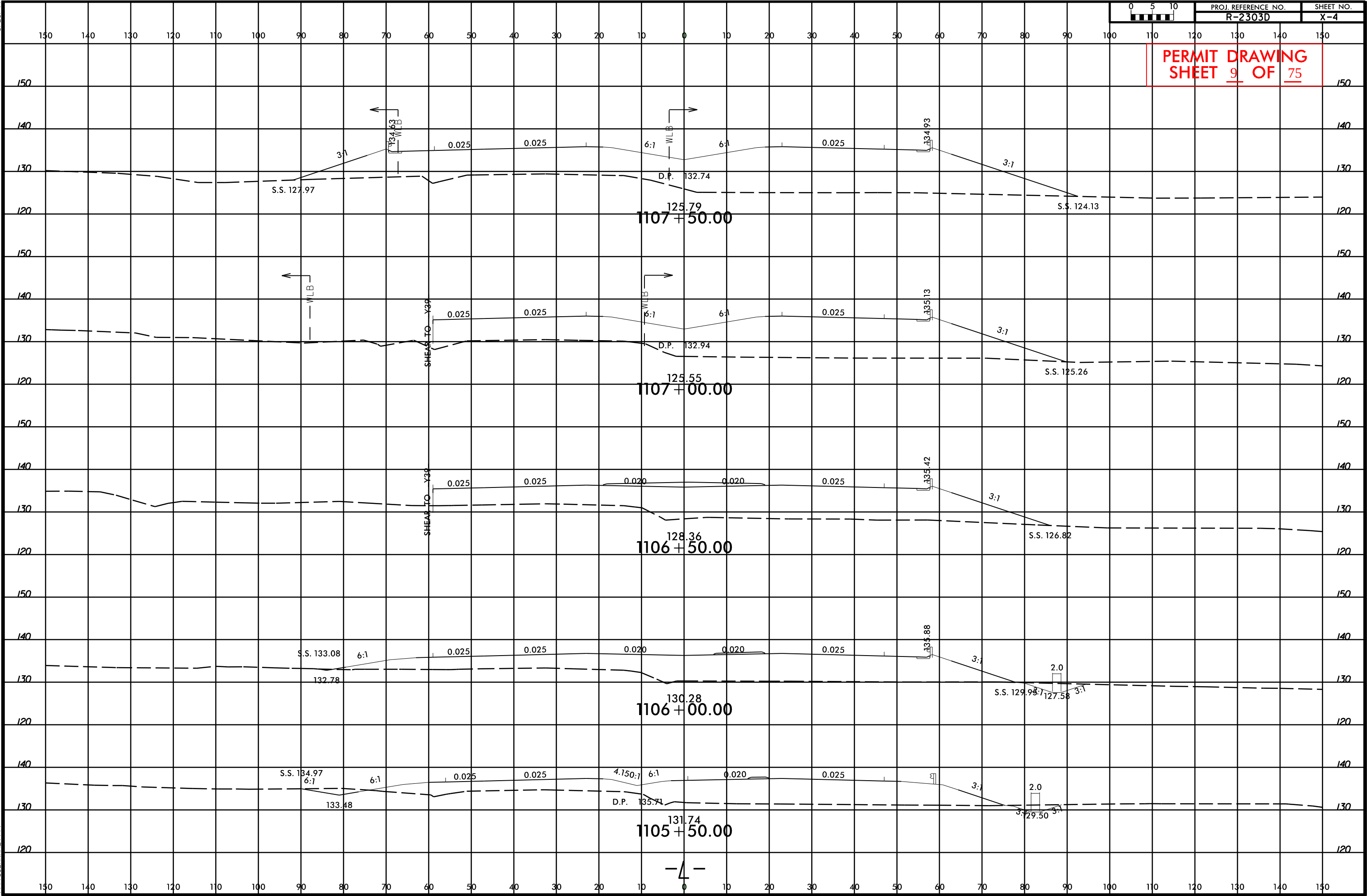
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

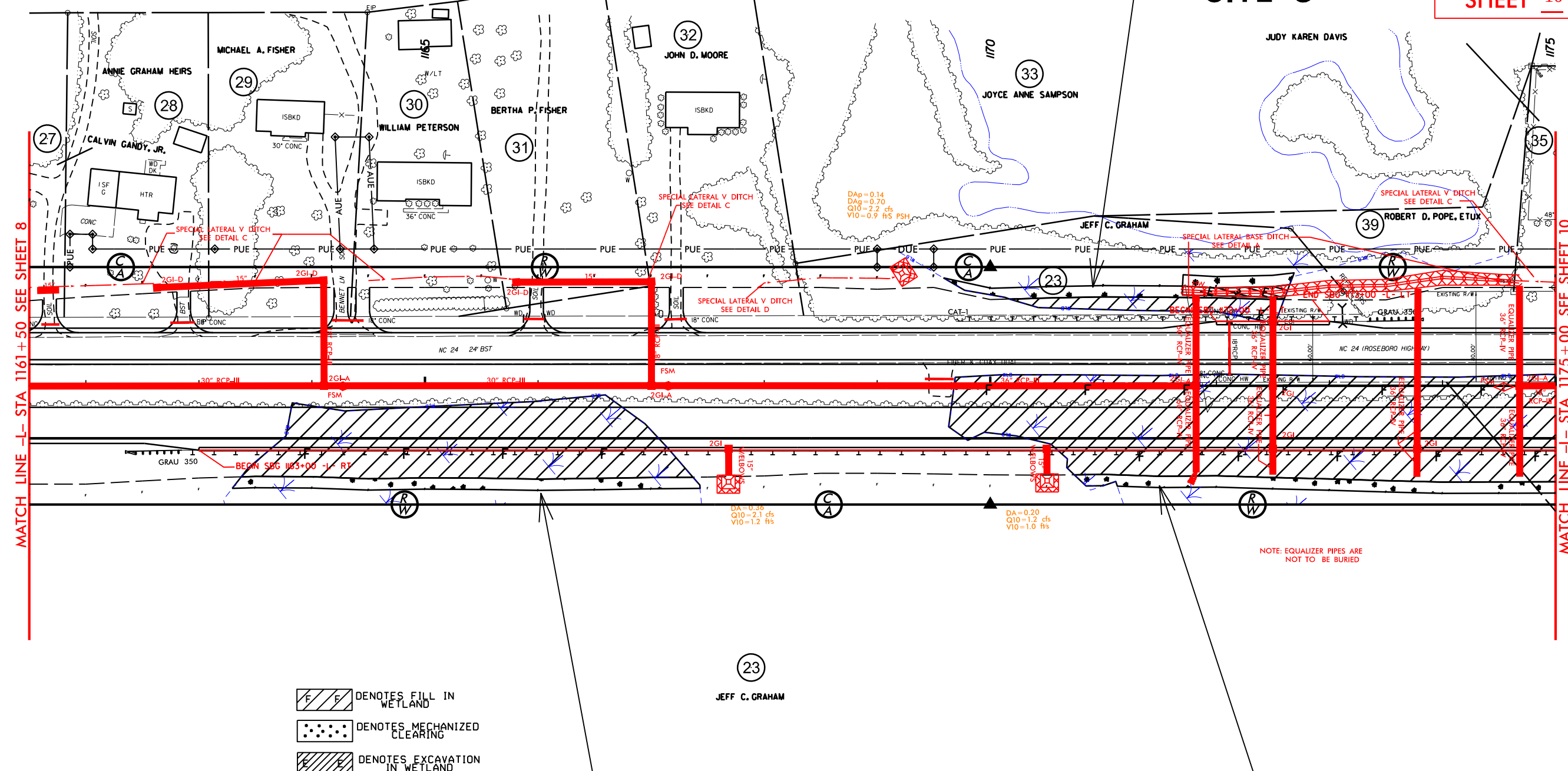
PERMIT DRAWING

SHEET 8 OF 75





PERMIT SHEET 10 OF 75



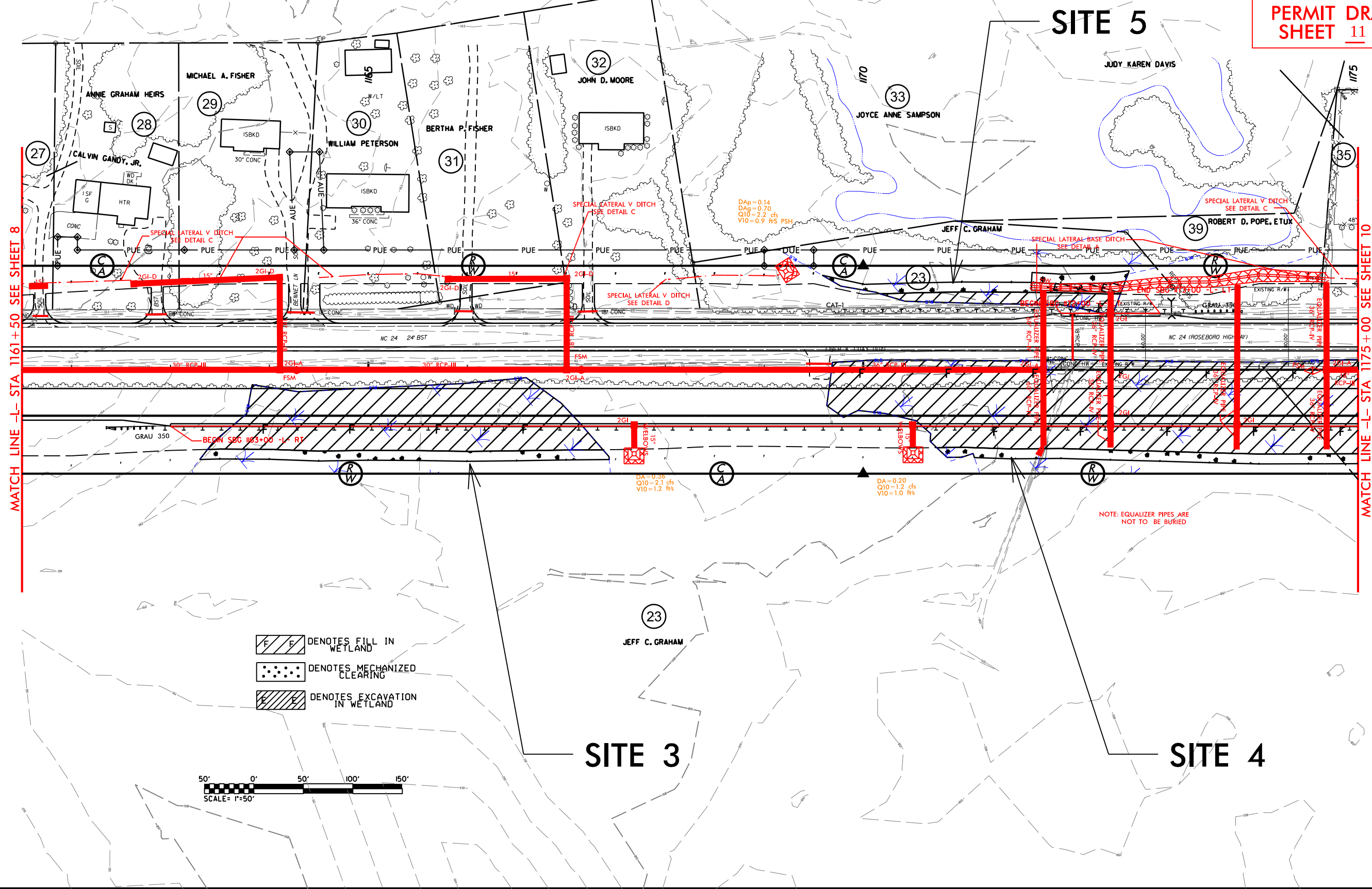
8/17/99

REVISIONS

4/1/2013
amlester
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November 28, 2011
R2303D_Hyd_perm_wet_psf9.dgn

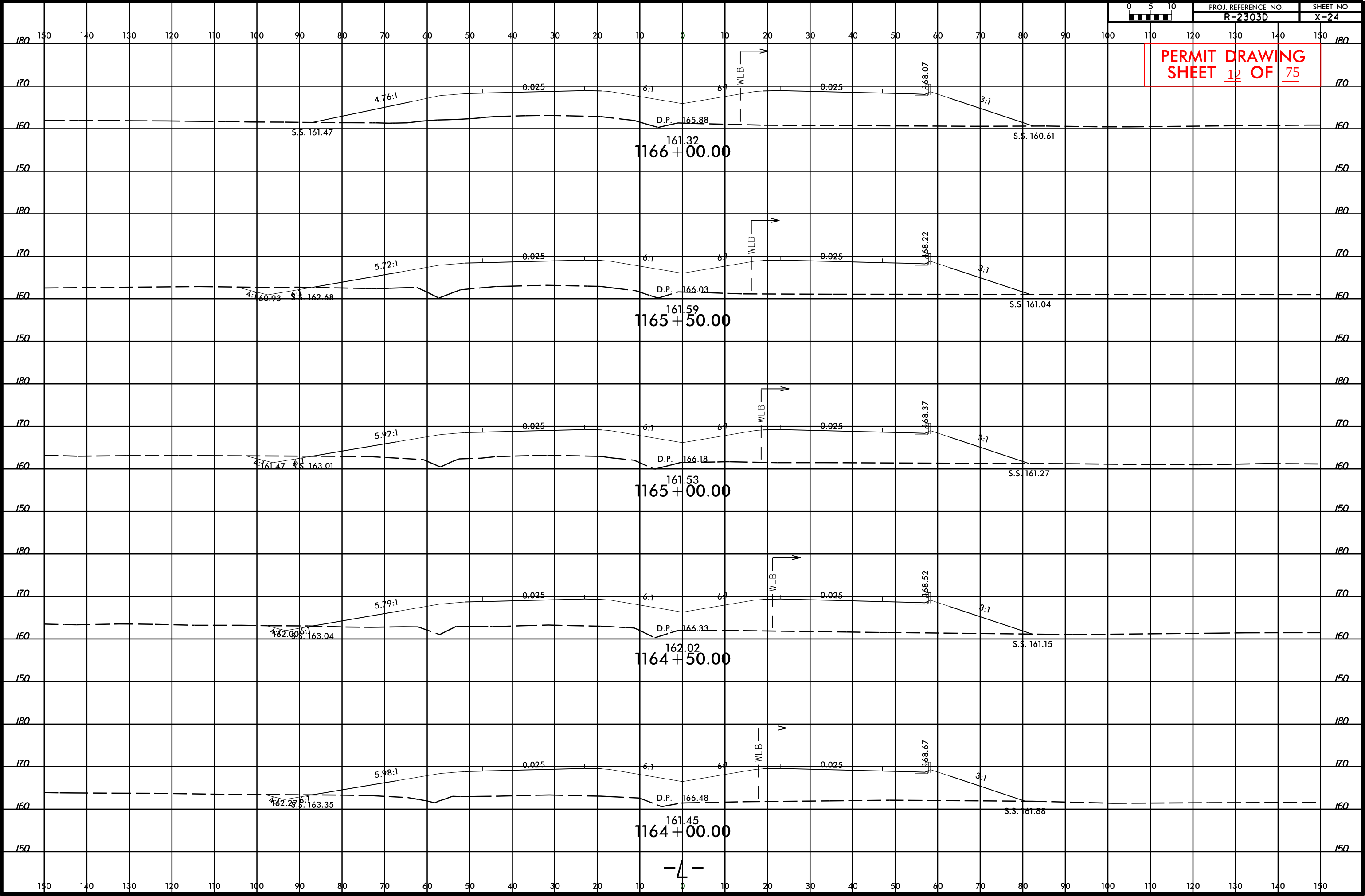
PROJECT REFERENCE NO.	SHEET NO.
R2303D	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 11 OF 75



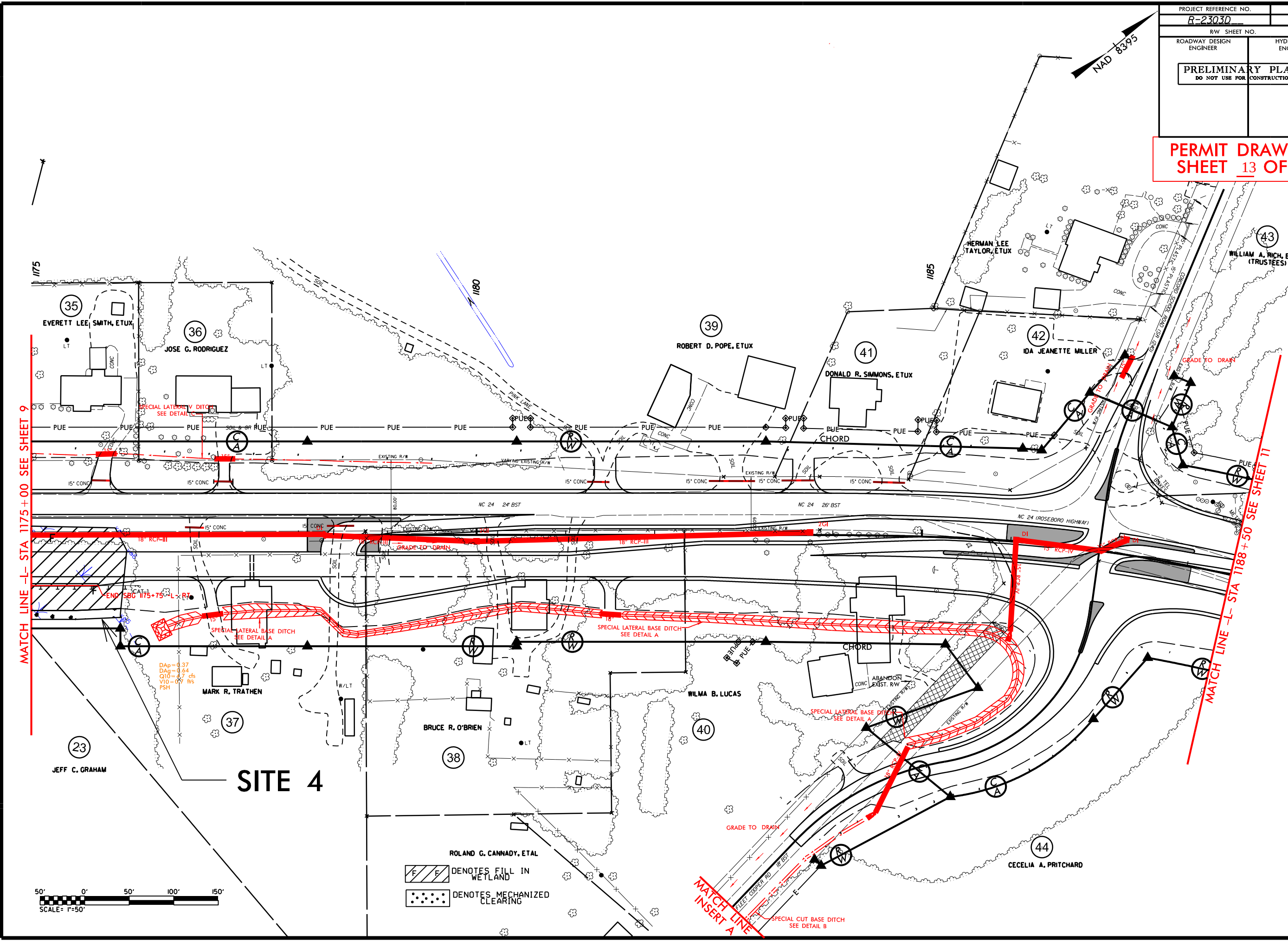
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND

50' 0' 50' 100' 150'
SCALE= 1"=50'



PROJECT REFERENCE NO.	SHEET NO.
R-2303D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 13 OF 75



MATCH LINE -L- STA 1175+00 SEE SHEET 9

MATCH LINE -L- STA 1188+50 SEE SHEET 11

SITE 4

- ROLAND G. CANNADY, ETAL
- Denotes FILL IN WETLAND
 - Denotes MECHANIZED CLEARING

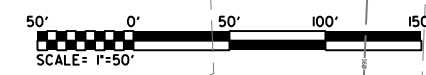
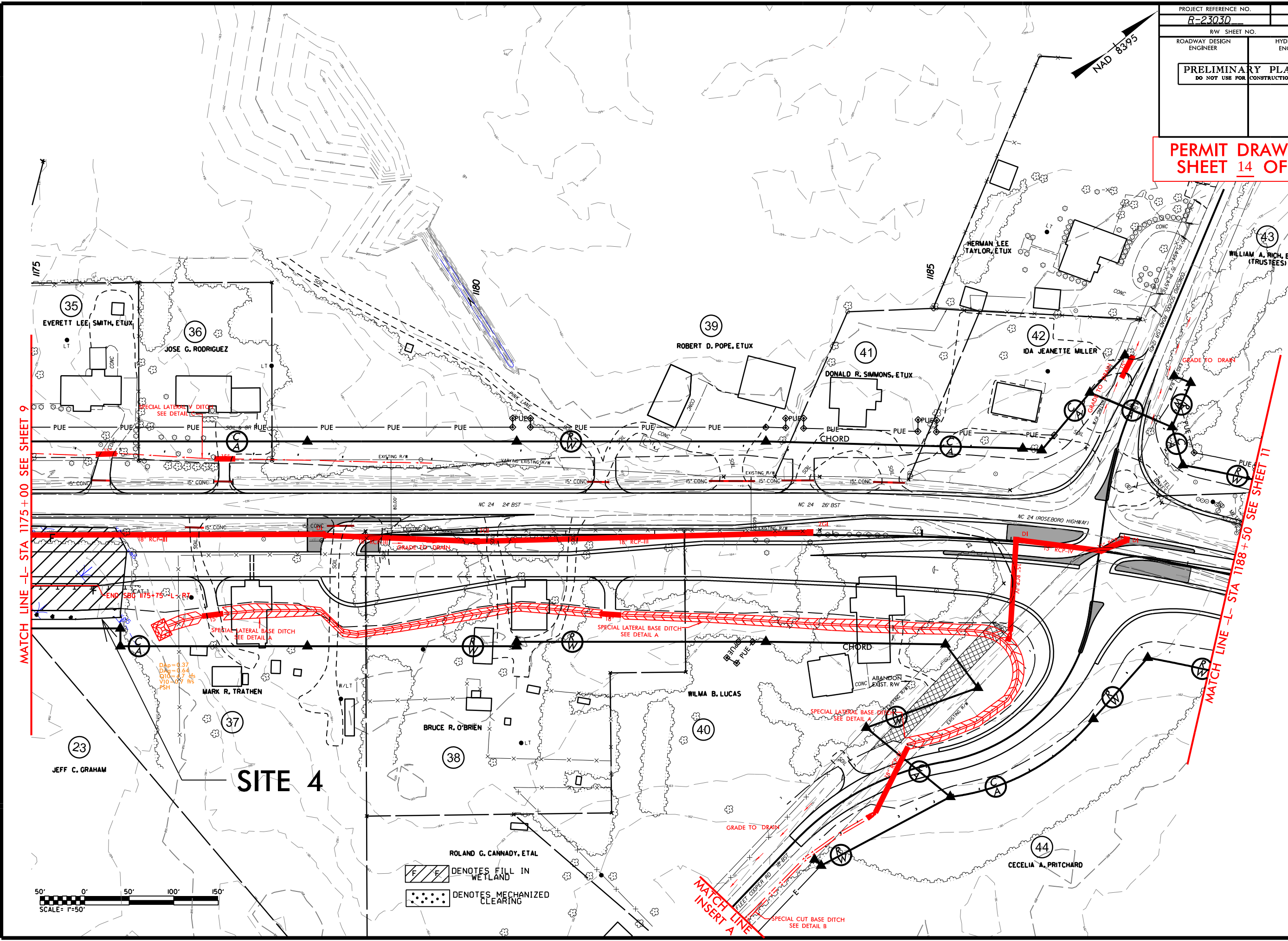


REVISIONS

4/5/2013
R:\Hydraulics\PERMITS Environmental Drawings\R2303D_Hyd_arm_wet_pah10.dgn
\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DATE\$\$\$\$\$
\$\$\$\$\$DRAWN\$\$\$\$\$
\$\$\$\$\$CHECKED\$\$\$\$\$
\$\$\$\$\$APPVED\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-2303D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 14 OF 75



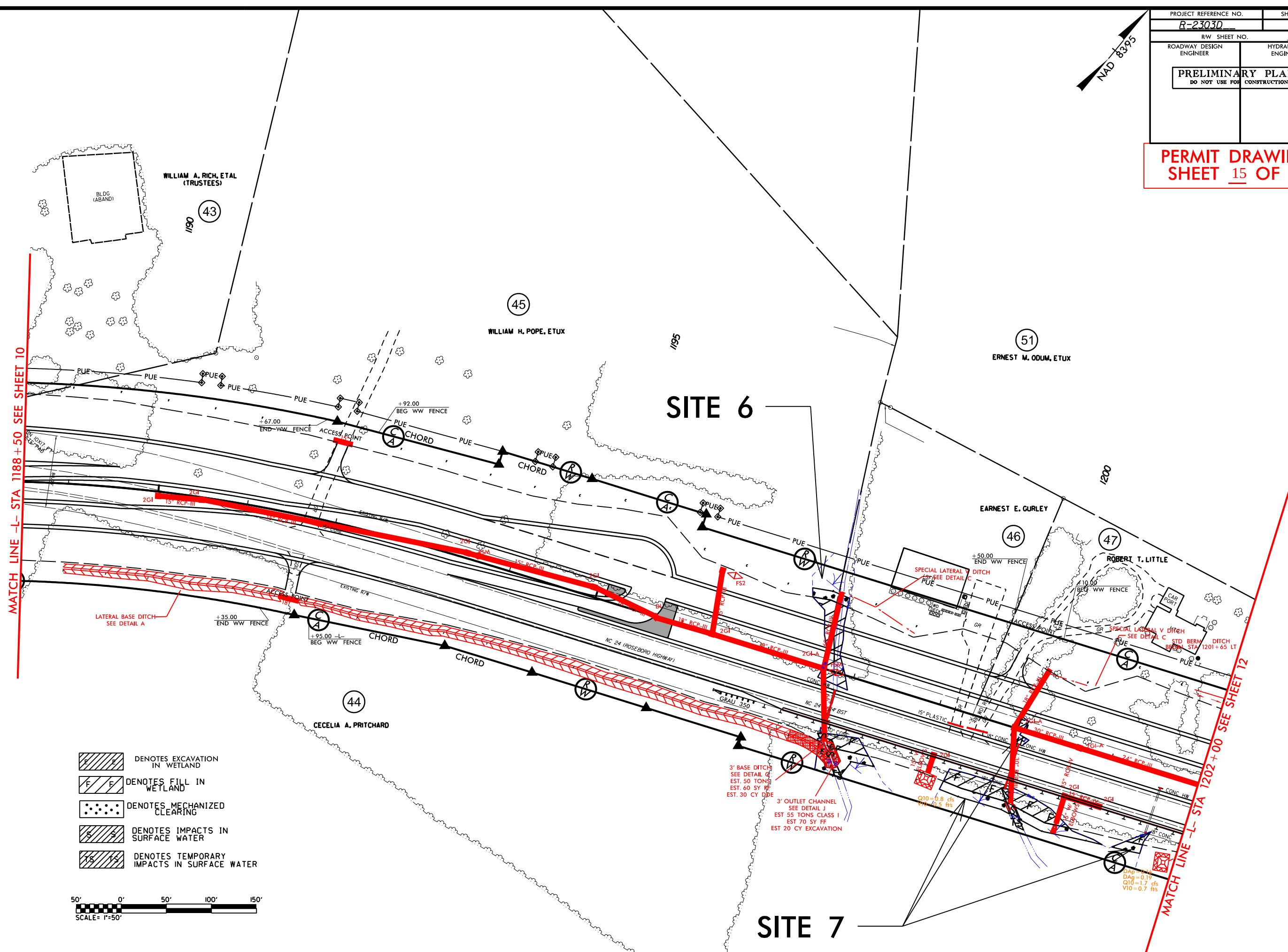
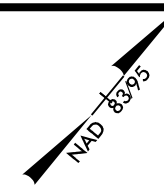
- ROLAND G. CANNADY, ETAL
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING

REVISIONS

452013
R:\Hydraulics\PERMITS Environmental Drawings\R2303D_Hyd_arm_wat_pah10.dgn
\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DATE\$\$\$\$\$
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\$\$\$\$\$CHECKED\$\$\$\$\$
\$\$\$\$\$APPVED\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-2303D	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 15 OF 75



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

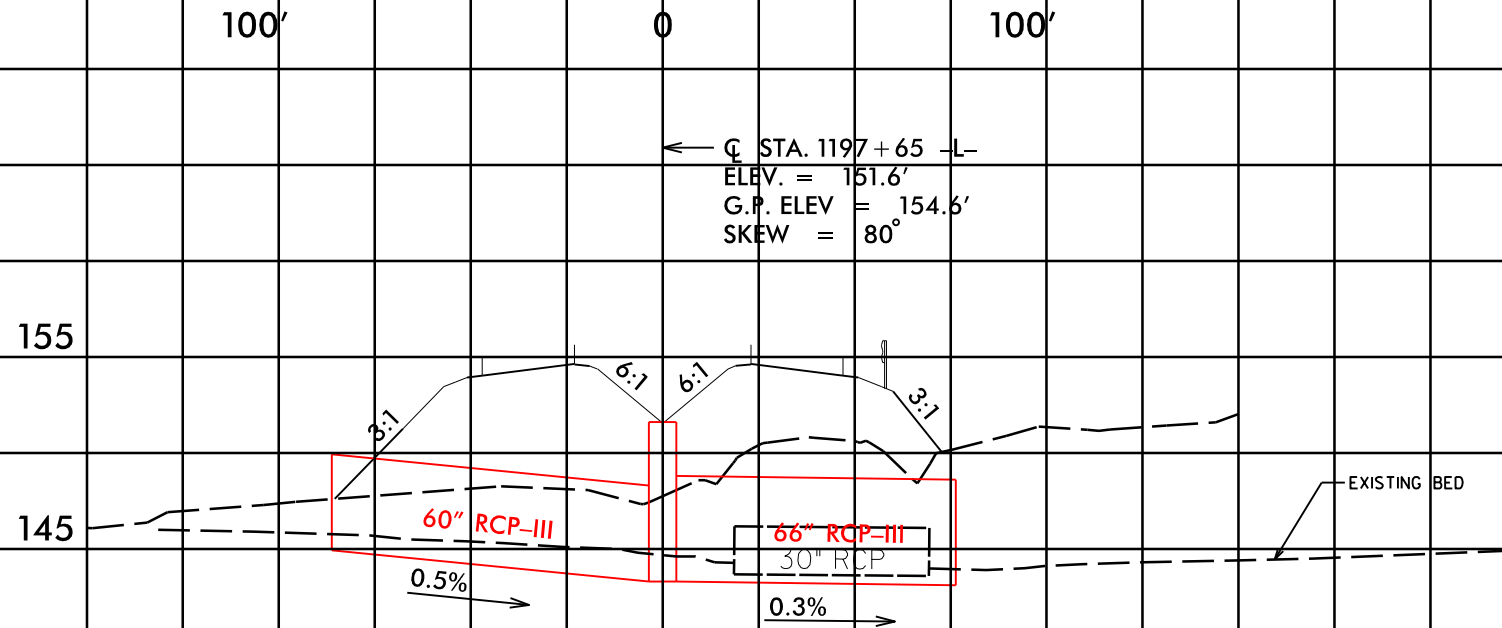


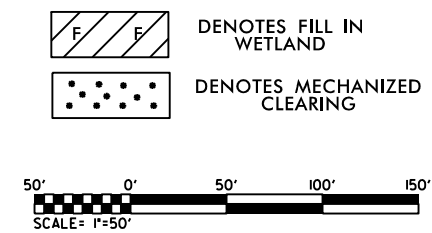
SITE 7

REVISIONS

4/5/2013
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\$\$\$\$\$DRAWN\$\$\$\$\$
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\$\$\$\$\$APPROVED\$\$\$\$\$

PROJECT REFERENCE NO. R2303D		SHEET NO. 11_PFL	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
PERMIT DRAWING SHEET <u>18</u> OF <u>75</u>			





SITE 8

MATCH LINE -L- STA 1202+00 SEE SHEET 11

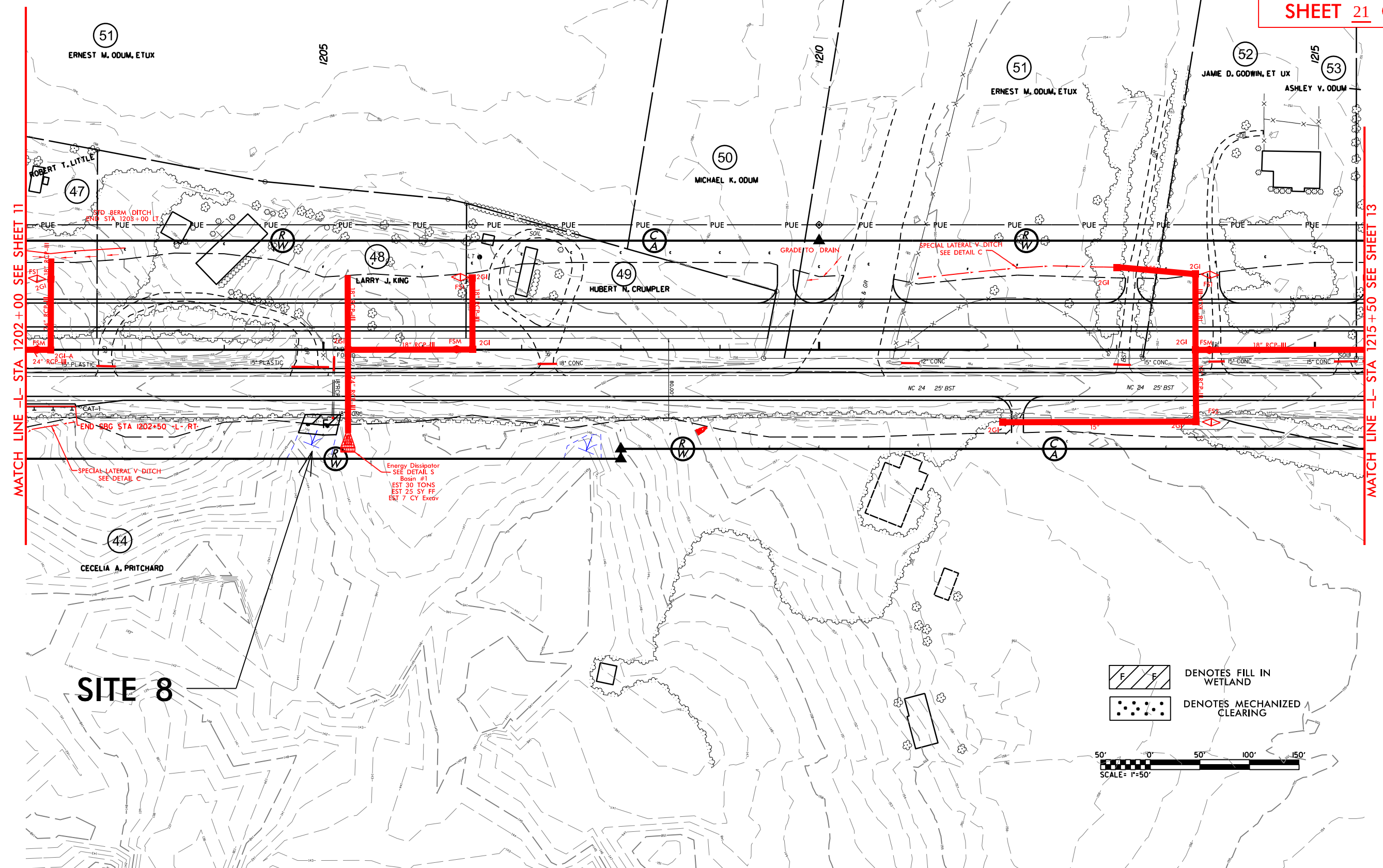
MATCH LINE - STA 1215+50 SEE SHEET 13

REVISIONS

452013
amkester
R: Hydraulics PERMITS Environmental Drawings R2303D_Hyd_perm_wet_psh12.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2303D	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 21 OF 75



MATCH LINE -L- STA 1202+00 SEE SHEET 11

MATCH LINE -L- STA 1215+50 SEE SHEET 13

F

F

DENOTES FILL IN WETLAND

.

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.

.

.

DENOTES MECHANIZED CLEARING

50' 100' 150'

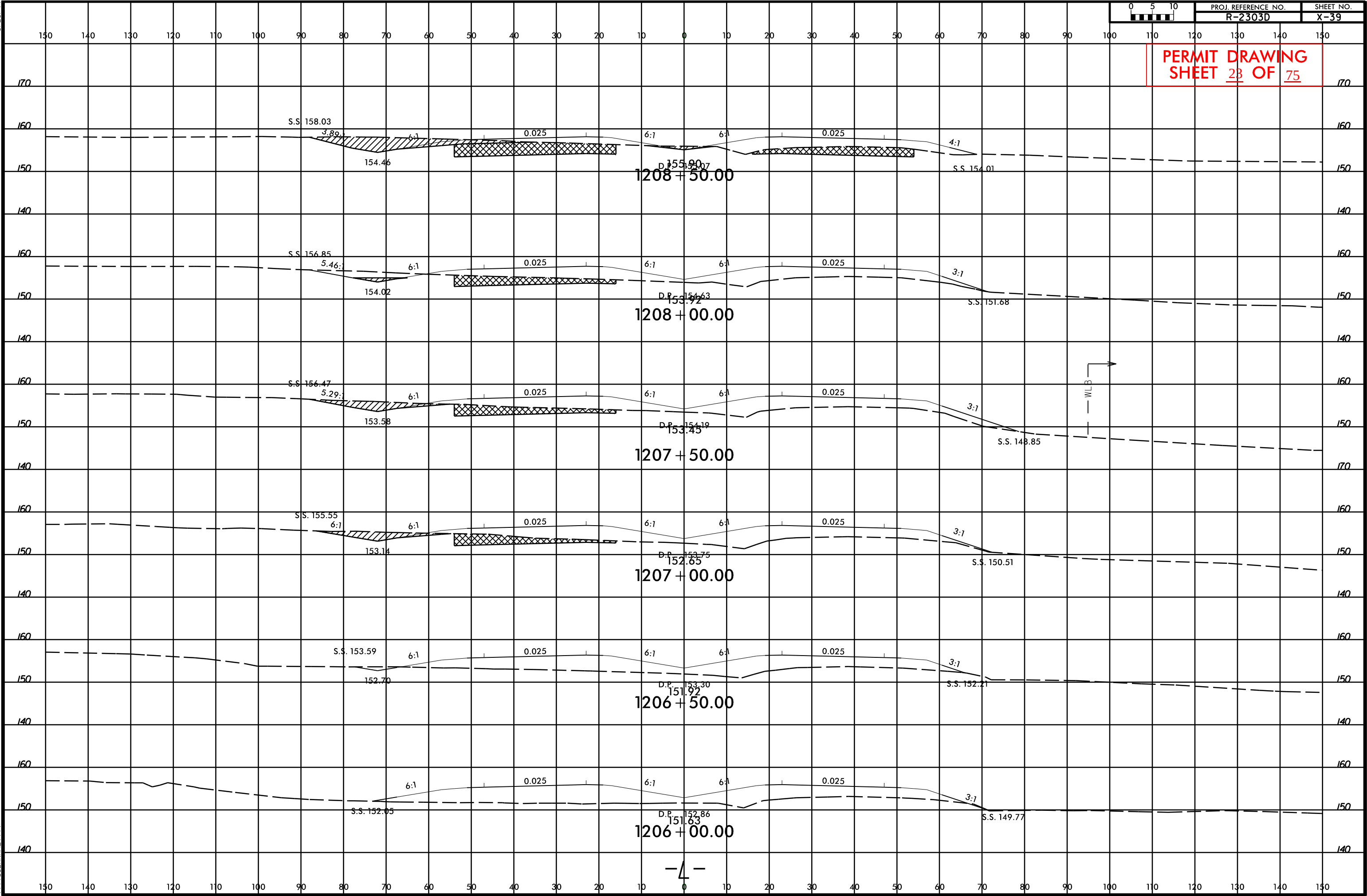
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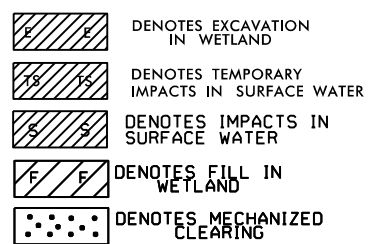
5/14/99

REVISIONS

452013
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\$\$\$\$\$APPROVED\$\$\$\$\$

PERMIT DRAWING
SHEET 23 OF 75





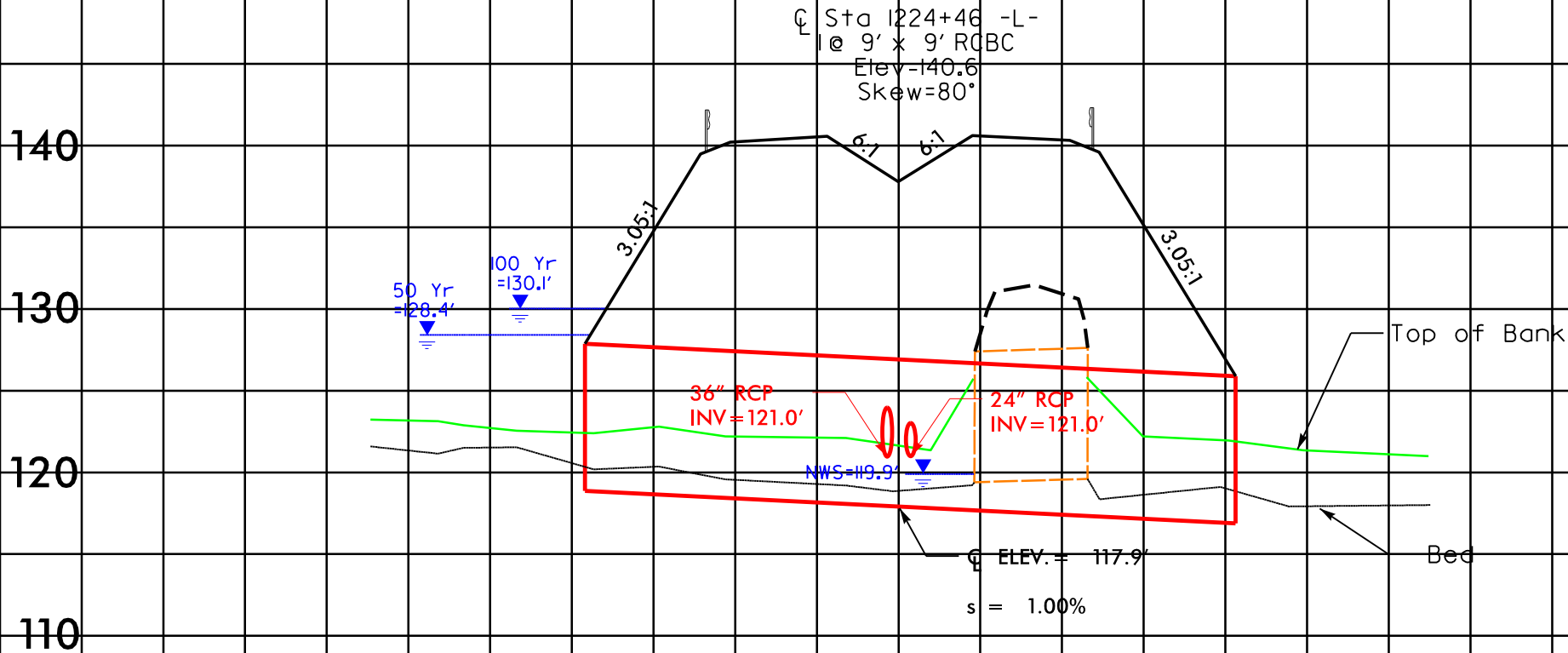


5/14/99

PROJECT REFERENCE NO.		SHEET NO.	
R2303D		13_PFL	
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 75

200' 100' 0' 100' 200'

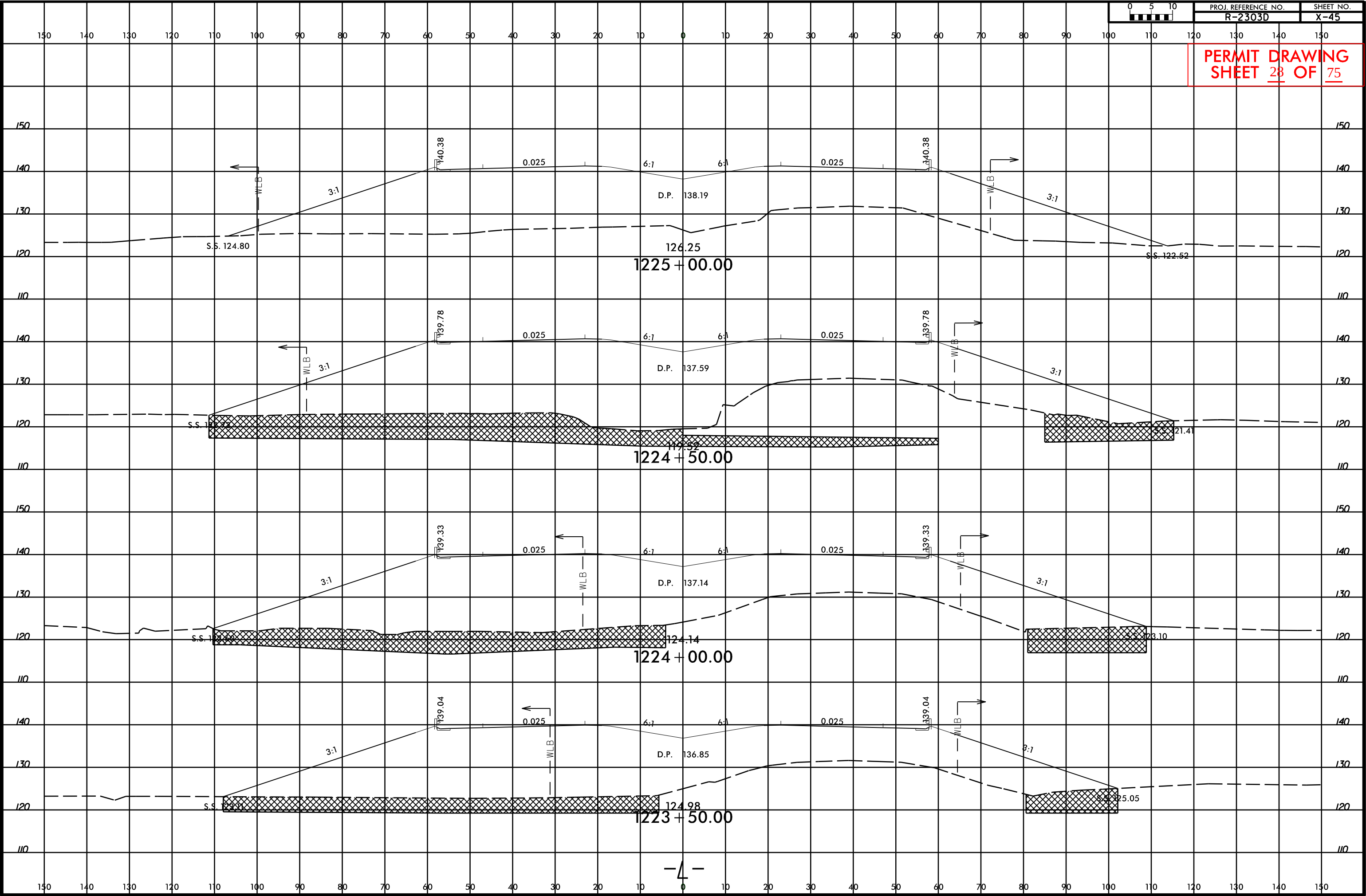


SITE 12

4/3/2013
anikaeter
R:\projects\2303d\2303d_hyd_xpl_prm_wat_psh13.dgn
\$\$\$\$\$USERNAME\$\$\$\$\$

8/23/99

PERMIT DRAWING
SHEET 28 OF 75



PERMIT DRAWING
SHEET 29 OF 75

 DENOTES IMPACTS IN SURFACE WATER

 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'

SCALE = 1"=50'

MATCH LINE -L- STA 1269+50 SEE SHEET 16

WATCH LINE - STA 1283+00 SEE SHEET 18

REVISIONS

4/17/2013
umkeeter
PERMITS, Environmental Drawings\I2303D_Hyd_prm_wel_psh12.dgn

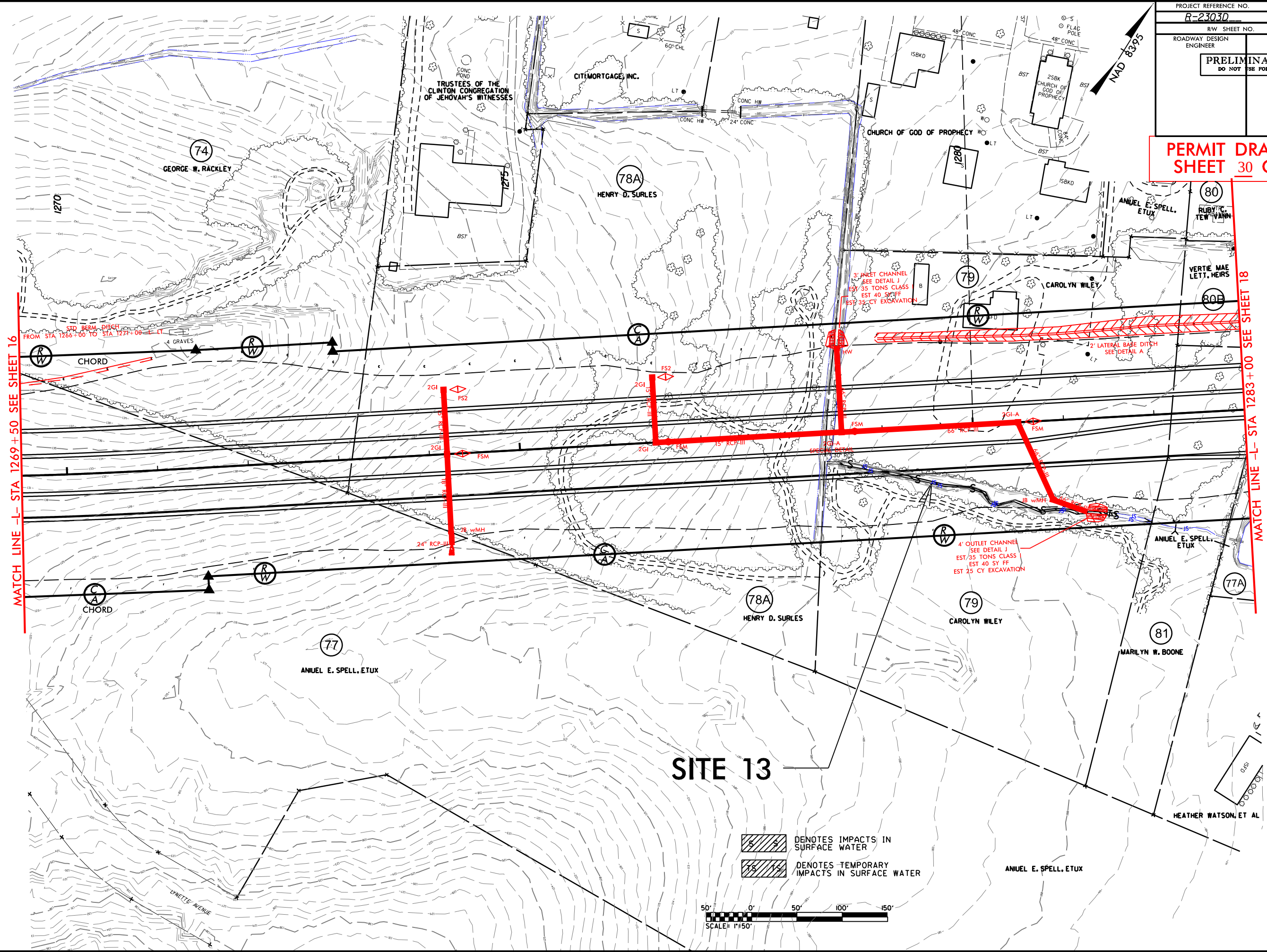
5/14/99

REVISIONS

4/12/2012
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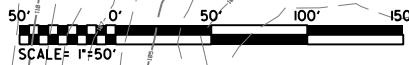
PROJECT REFERENCE NO.	SHEET NO.
R-2303D	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 30 OF 75



SITE 13

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



8/23/99

SITE 13

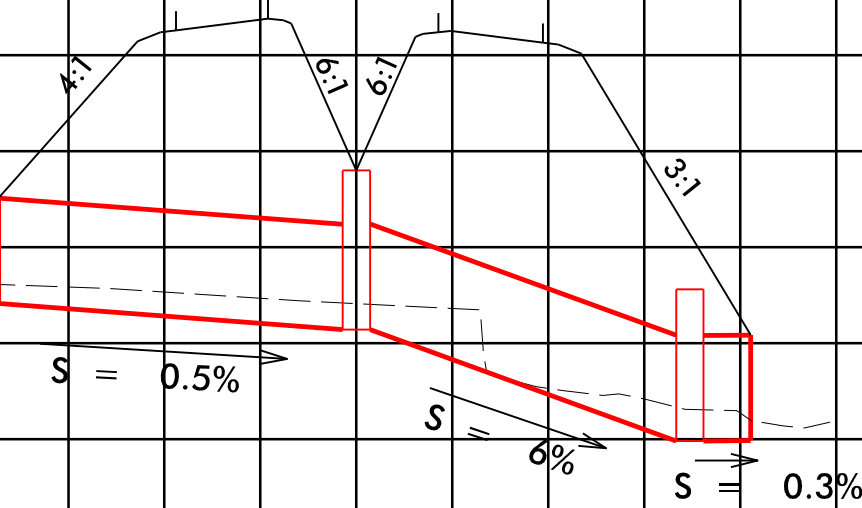
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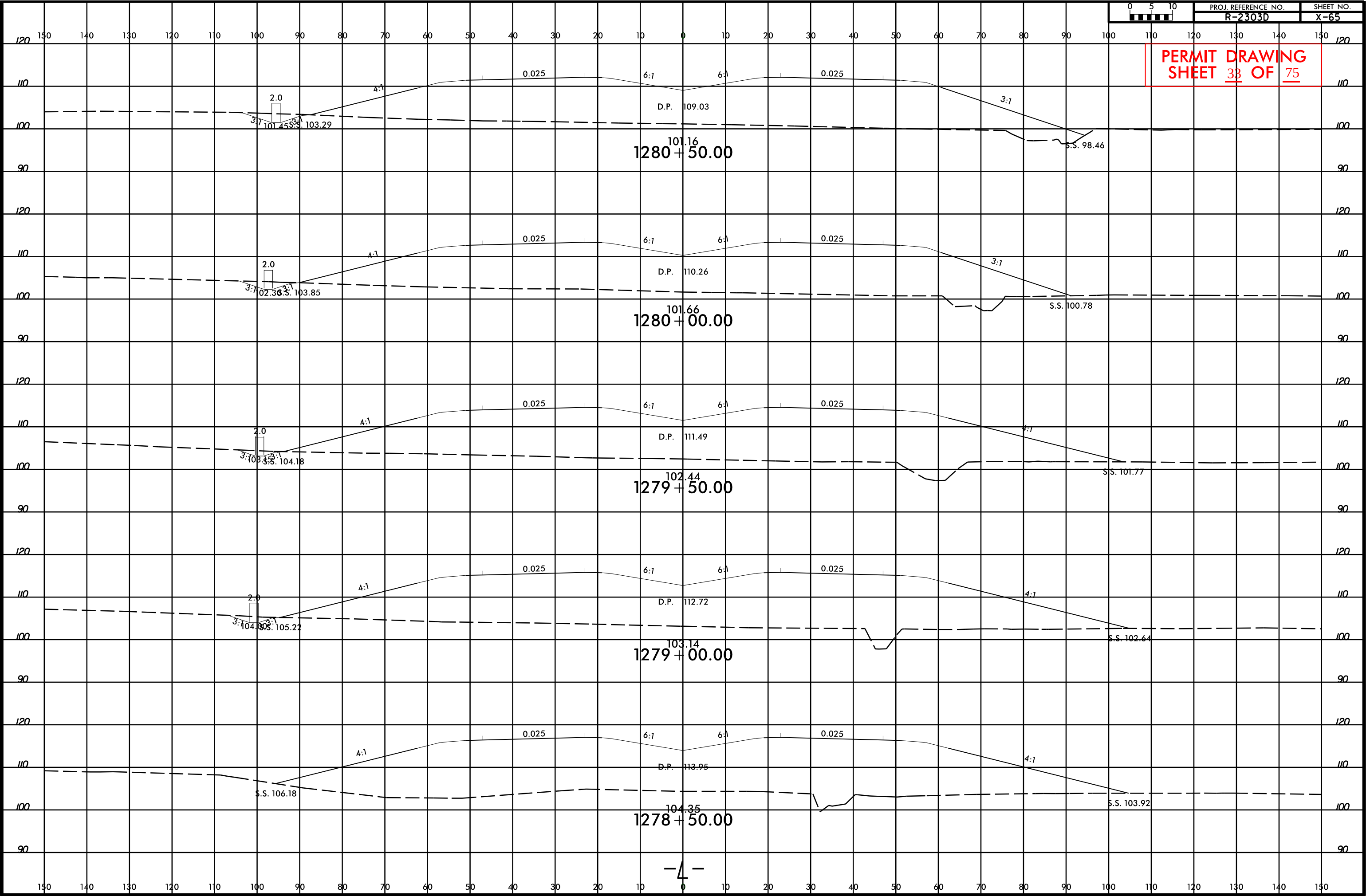
STA. 1278+55 -L-
66" RCP-TYPE III

110

100

90



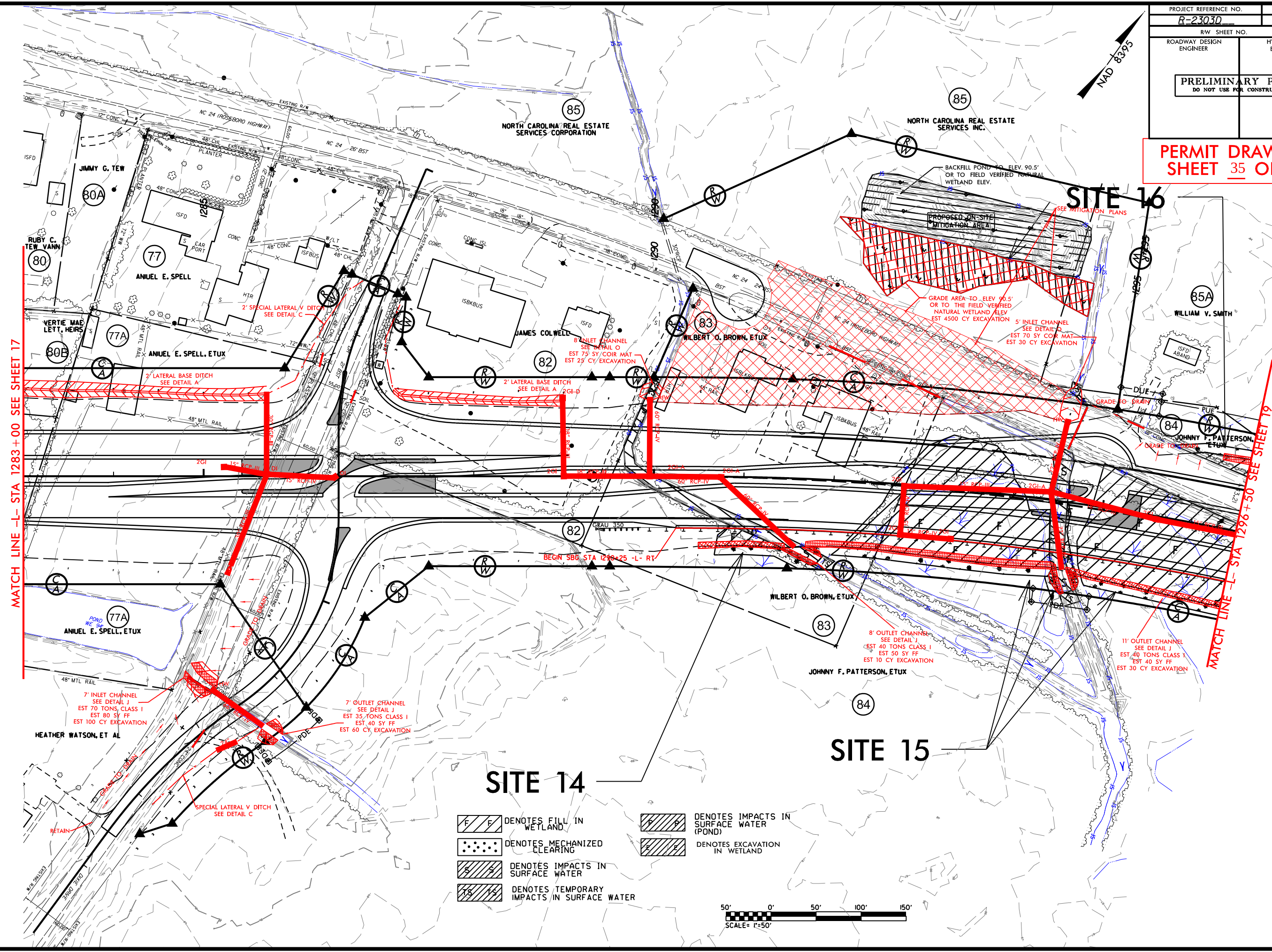




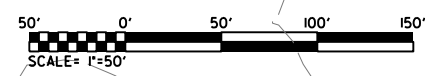
SITE 16

SITE 15

SITE 14

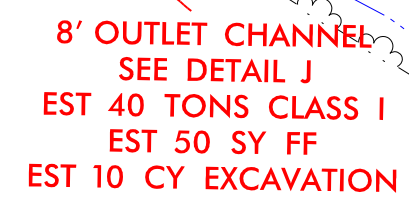


- | | |
|--|---|
|  DENOTES FILL IN WETLAND |  DENOTES IMPACTS IN SURFACE WATER (POND) |
|  DENOTES MECHANIZED CLEARING |  DENOTES EXCAVATION IN WETLAND |
|  DENOTES IMPACTS IN SURFACE WATER | |
|  DENOTES TEMPORARY IMPACTS IN SURFACE WATER | |



REVISIONS

4/1/2013
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\$\$\$\$\$DON\$\$\$\$\$
\$\$\$\$\$NAME\$\$\$\$\$



20' 0' 20' 40' 60'

SCALE = 1" = 40'

SITE 15

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

ANNEL
LO
DIR MAT -
AVATION

EST 70 SY COIR
EST 30 CY EXCAV,

GRADE

350

0+25 -1- RT.

NAD 83/95

83

REVISIONS

11/1/2013
amkester
R:\Hvdraulics\PERMITS Environmental\Drawinas\R2303D Hvd
prm wet PSH18b.dgn

5/14/99

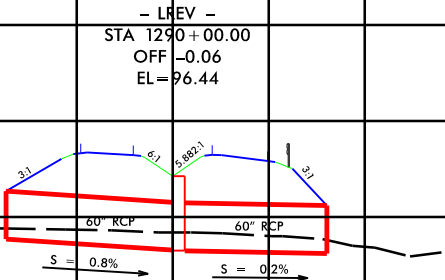
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R2303D		18_PRL	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

PERMIT DRAWING
SHEET 37 OF 75

100 0 100

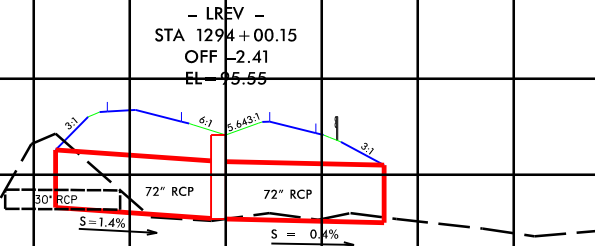
SITE 14

100
90
80



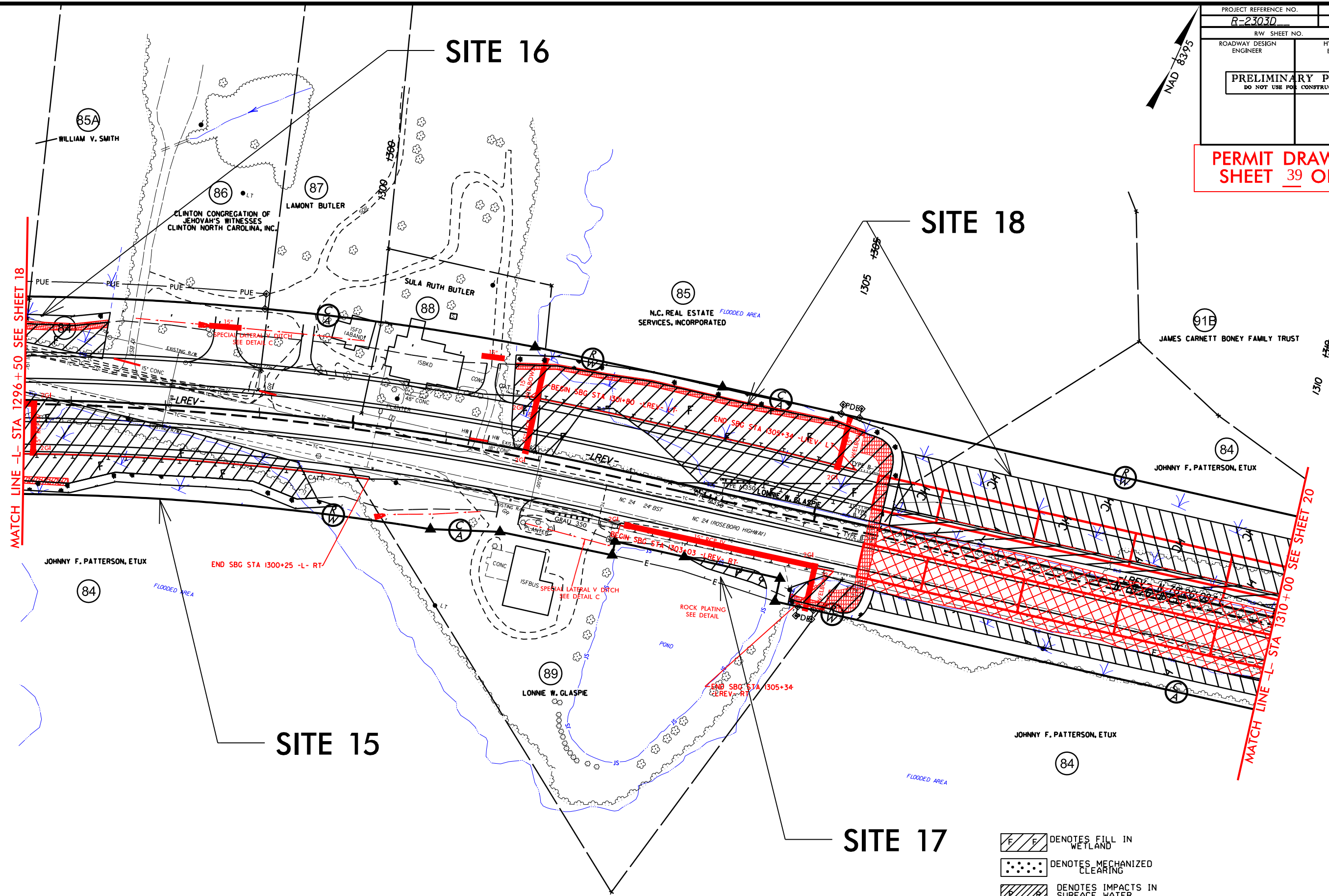
SITE 15

100
90
80



PROJECT REFERENCE NO.	SHEET NO.
R-2303D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 39 OF 75



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

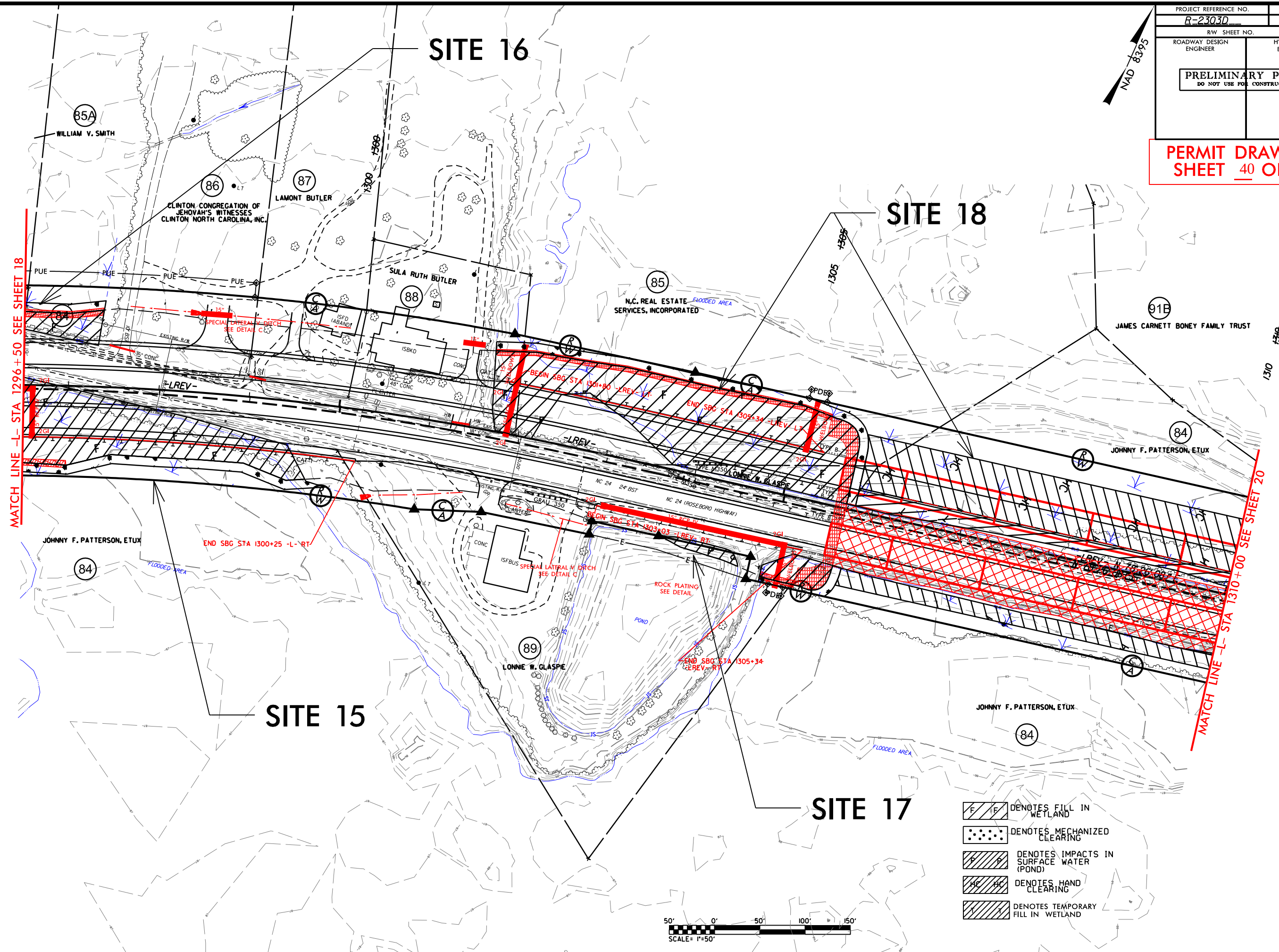


REVISIONS

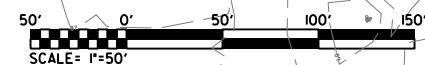
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\$\$\$\$\$DATE\$\$\$\$\$
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\$\$\$\$\$CHECKED\$\$\$\$\$
\$\$\$\$\$APPVED\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-2303D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 40 OF 75



- [Hatched pattern] DENOTES FILL IN WETLAND
- [Dotted pattern] DENOTES MECHANIZED CLEARING
- [Hatched pattern] DENOTES IMPACTS IN SURFACE WATER (POND)
- [Hatched pattern] DENOTES HAND CLEARING
- [Hatched pattern] DENOTES TEMPORARY FILL IN WETLAND



REVISIONS

452013
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\$\$\$\$\$APPROVED\$\$\$\$\$

5/14/99

PROJECT REFERENCE NO.
R2303D

SHEET NO.
19_PRL

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR A/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

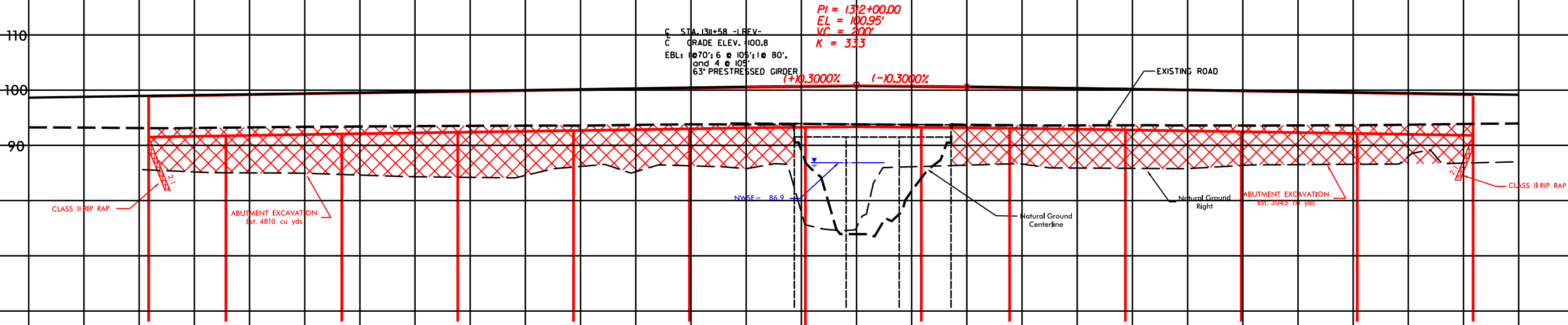
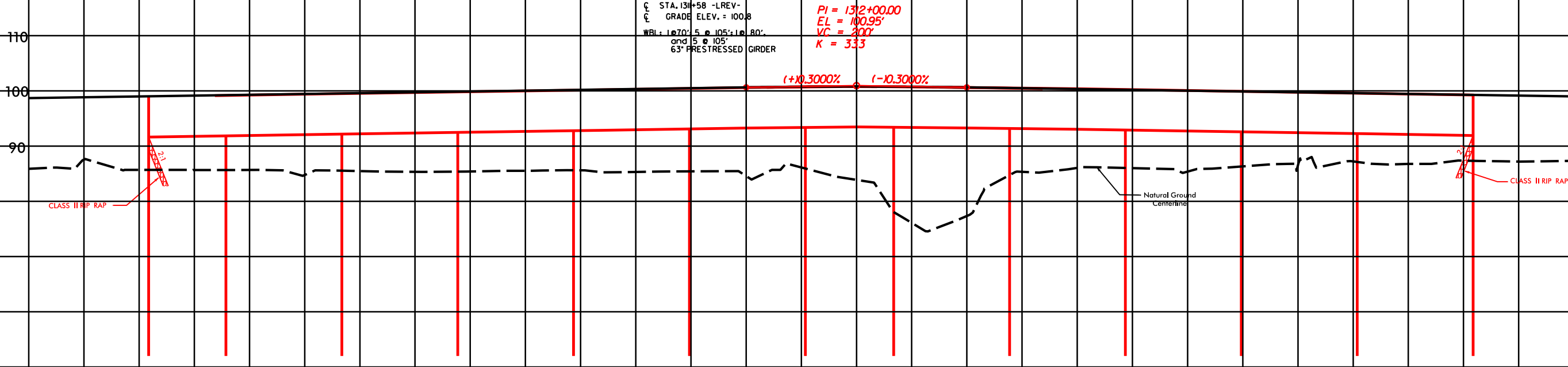
SITE 18

PERMIT DRAWING
SHEET 41 OF 75

1305+00

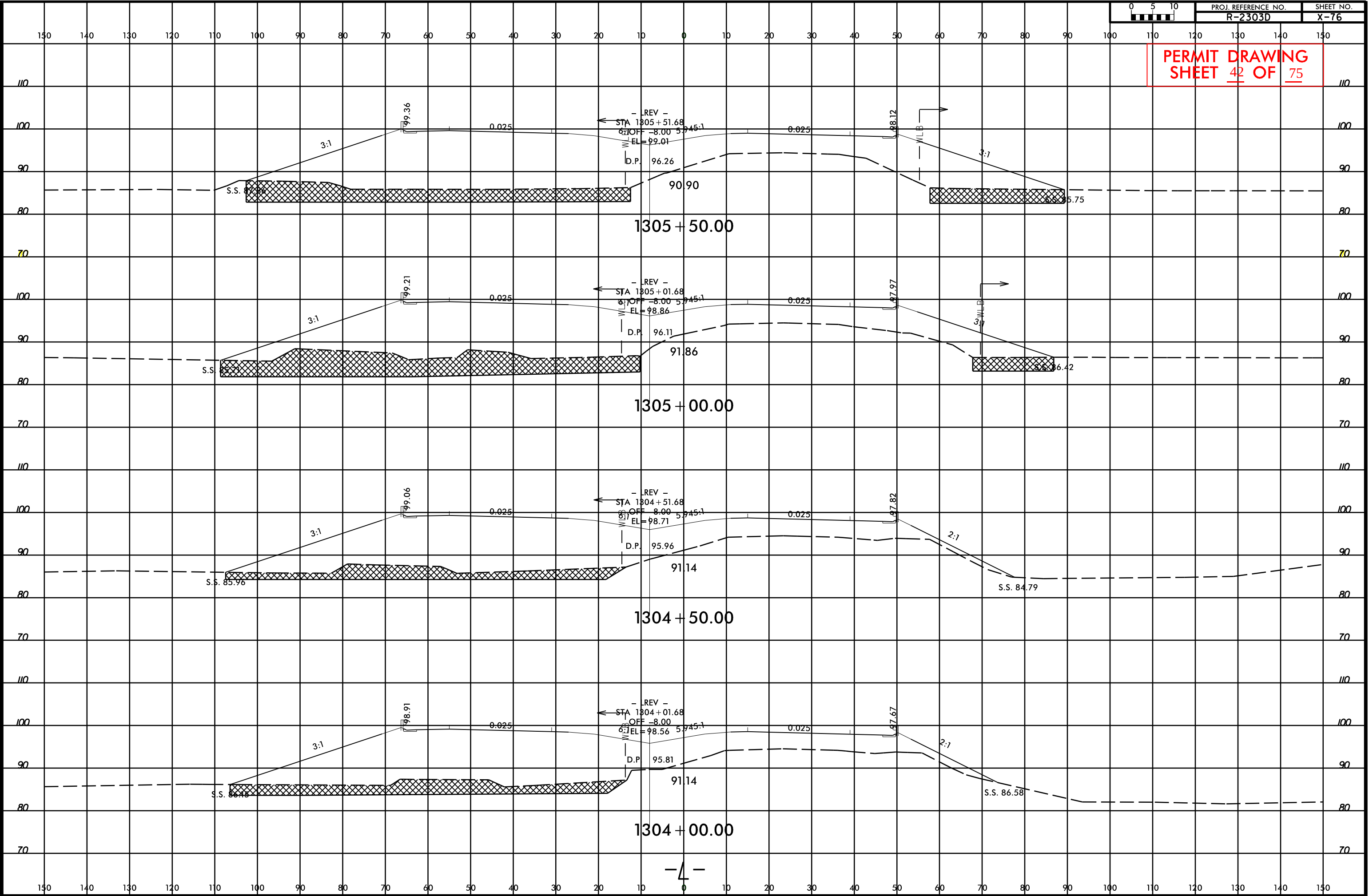
1310+00

1315+00



45203
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\$\$\$\$\$CDN\$\$\$\$\$
\$\$\$\$\$PERMITS\$\$\$\$\$

PERMIT DRAWING
SHEET 42 OF 75



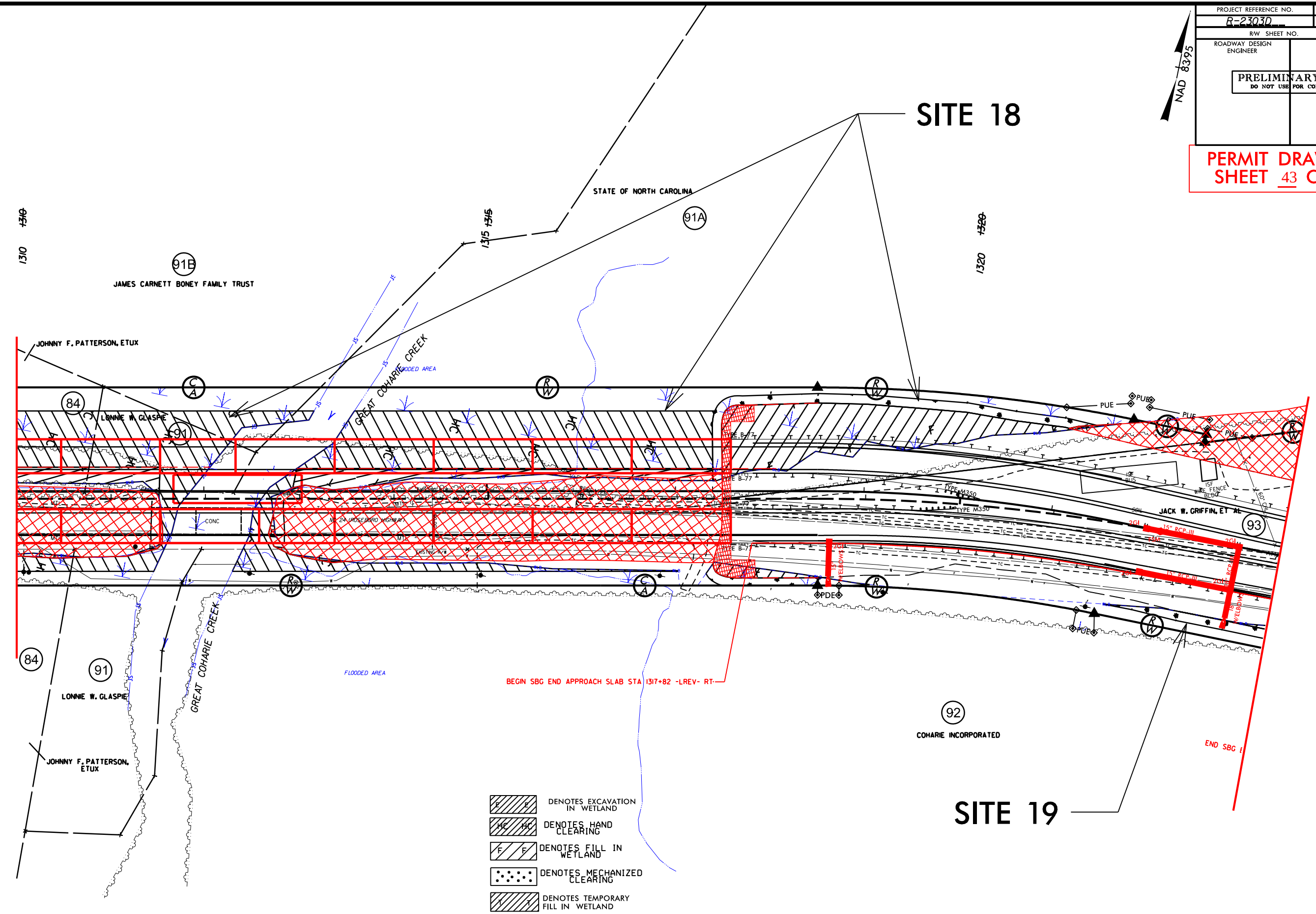
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R-2303D	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 43 OF 75

NAD 83 95

SITE 18

SITE 19



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



REVISIONS

4/9/2013
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\$\$\$\$\$APPROVED\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-2303D	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 44 OF 75

NAD 83 95

SITE 18

STATE OF NORTH CAROLINA

JAMES CARNETT BONEY FAMILY TRUST

JOHNNY F. PATTERSON, ETUX

LONNIE W. GLASPIE

JACK W. GRIFFIN, ET AL

LONNIE W. GLASPIE

JOHNNY F. PATTERSON, ETUX

COHARIE INCORPORATED

SITE 19

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



REVISIONS

4/9/2013
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\$\$\$\$\$APPVED\$\$\$\$\$

4/5/2013
anikeeler
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\$\$\$\$\$USERNAME\$\$\$\$\$

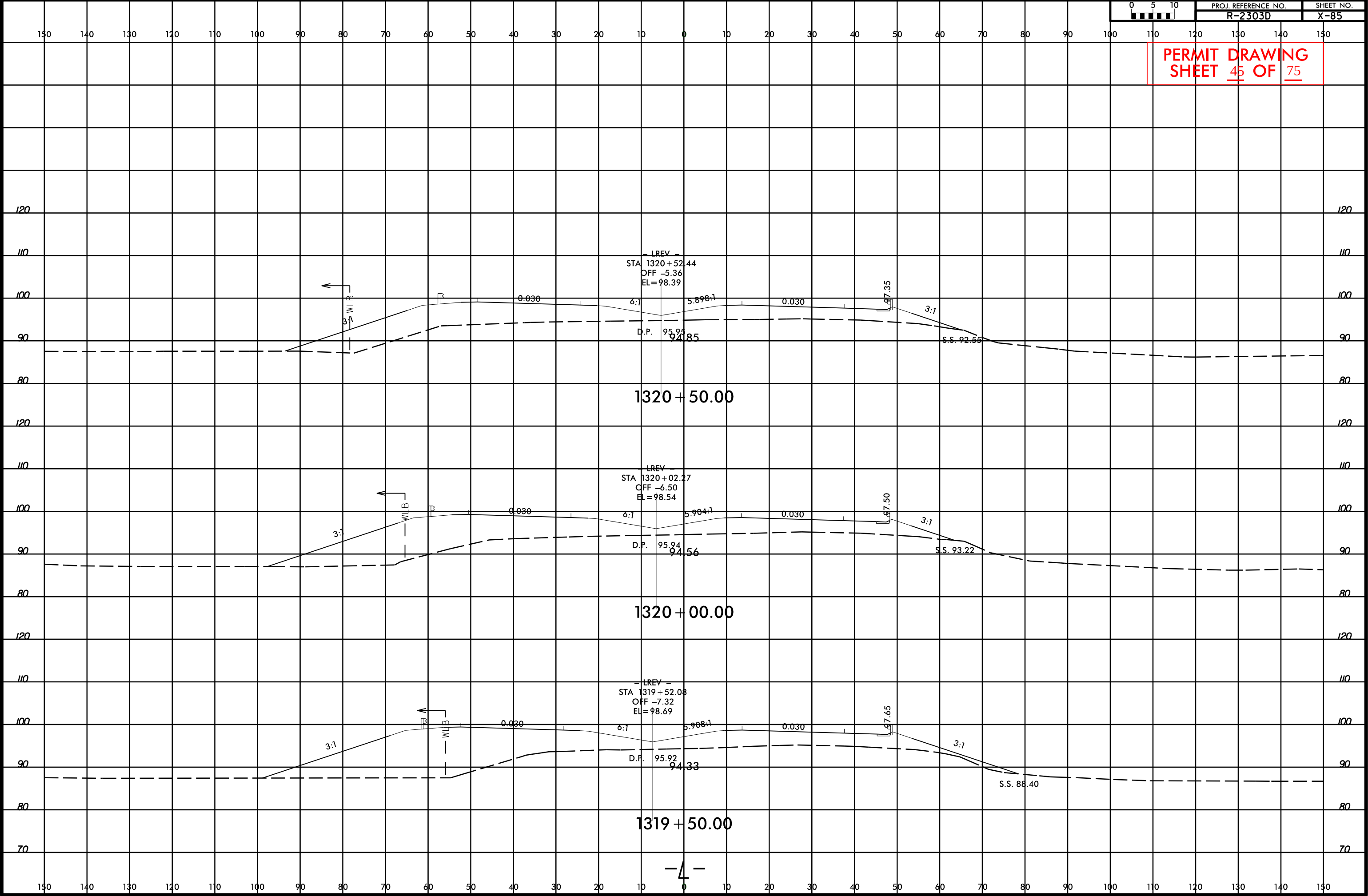
8/23/99

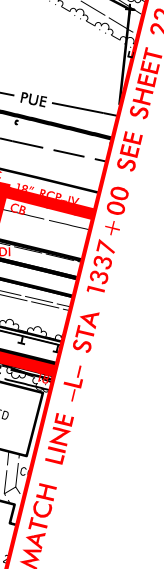


PROJ. REFERENCE NO.
R-2303D

SHEET NO.
X-85

PERMIT DRAWING
SHEET 45 OF 75



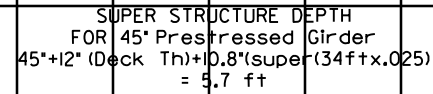


50' 0' 50' 100' 150'

SCALE = 1"=50'



PERMIT DRAWING
SHEET 48 OF 75



MAXIMUM SPREAD ON	BRIDGE
DA = 0.10 Ac	
Q = 0.24 cfs	
s(a) = 0.3%	
Spread = 4.7 ft.	
Shoulder Width: WBL = 4 ft. EBL = 10 ft.	

	Deck Drains Use 6" Scuppers on 15 ft. centers	
	East and West Bound Lane Sta. 1326 +04 to 1326 +35 and 1327 +10 to 1327 +84 -L- Rf.	
	Ave Q @ each deck drain =	0.04 cfs

STA. 1326+94 -L-
GRADE ELEV. = 98.8
WBL: 2 @ 65' and 1 @ 50'
45' PRESTRESSED GIRDER

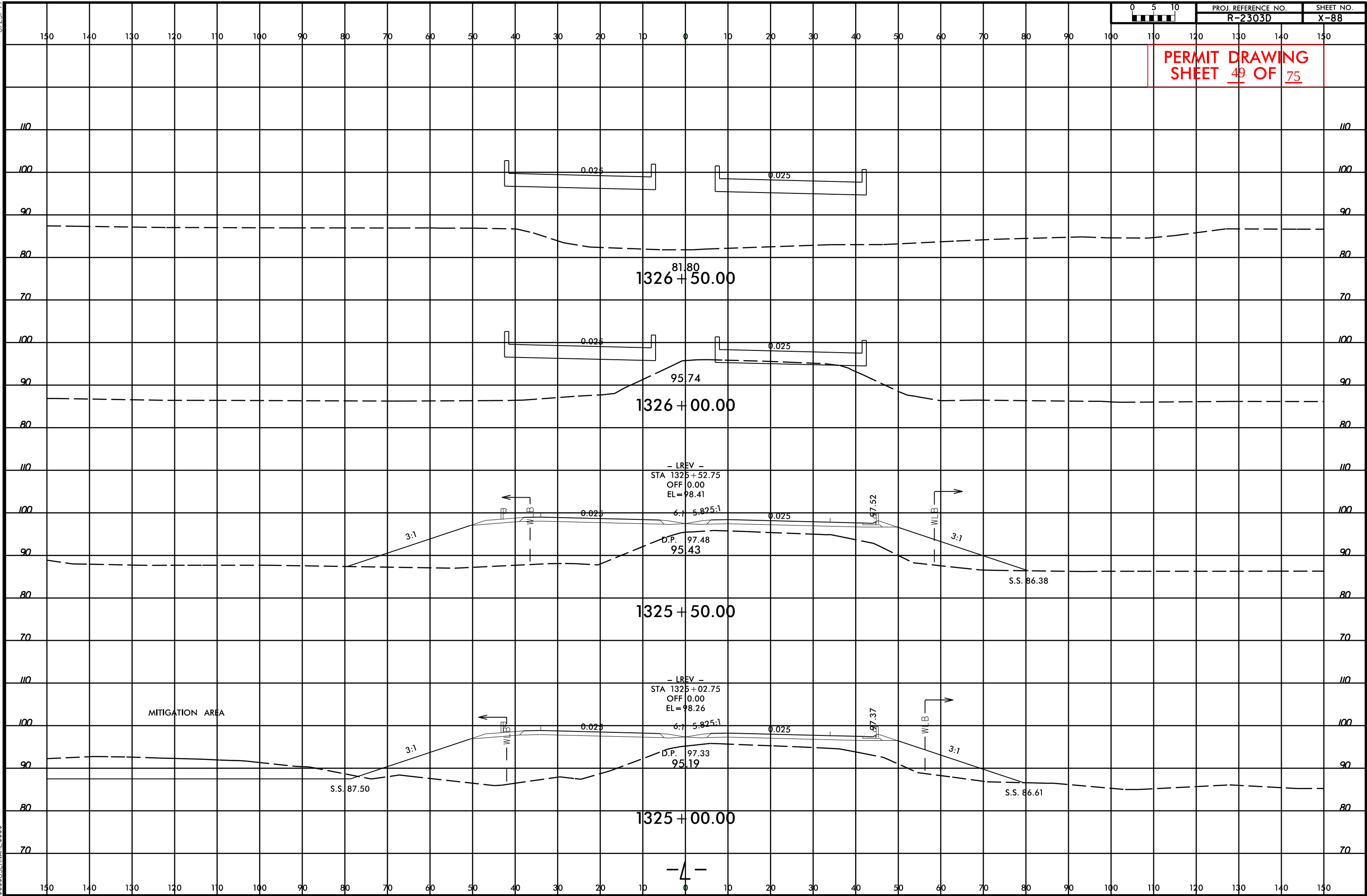
STA. 1326+94 -L-
GRADE ELEV. = 98.8
WBL: 2 @ 65' and 1 @ 50'
45" PRESTRESSED GIRDER

ABUTMENT EXCAVATION
Est. 110 cu yds

ABUTMENT EXCAVATION
Est. 450 cu yds

— EXISTING ROAD

PERMIT DRAWING
SHEET 49 OF 75



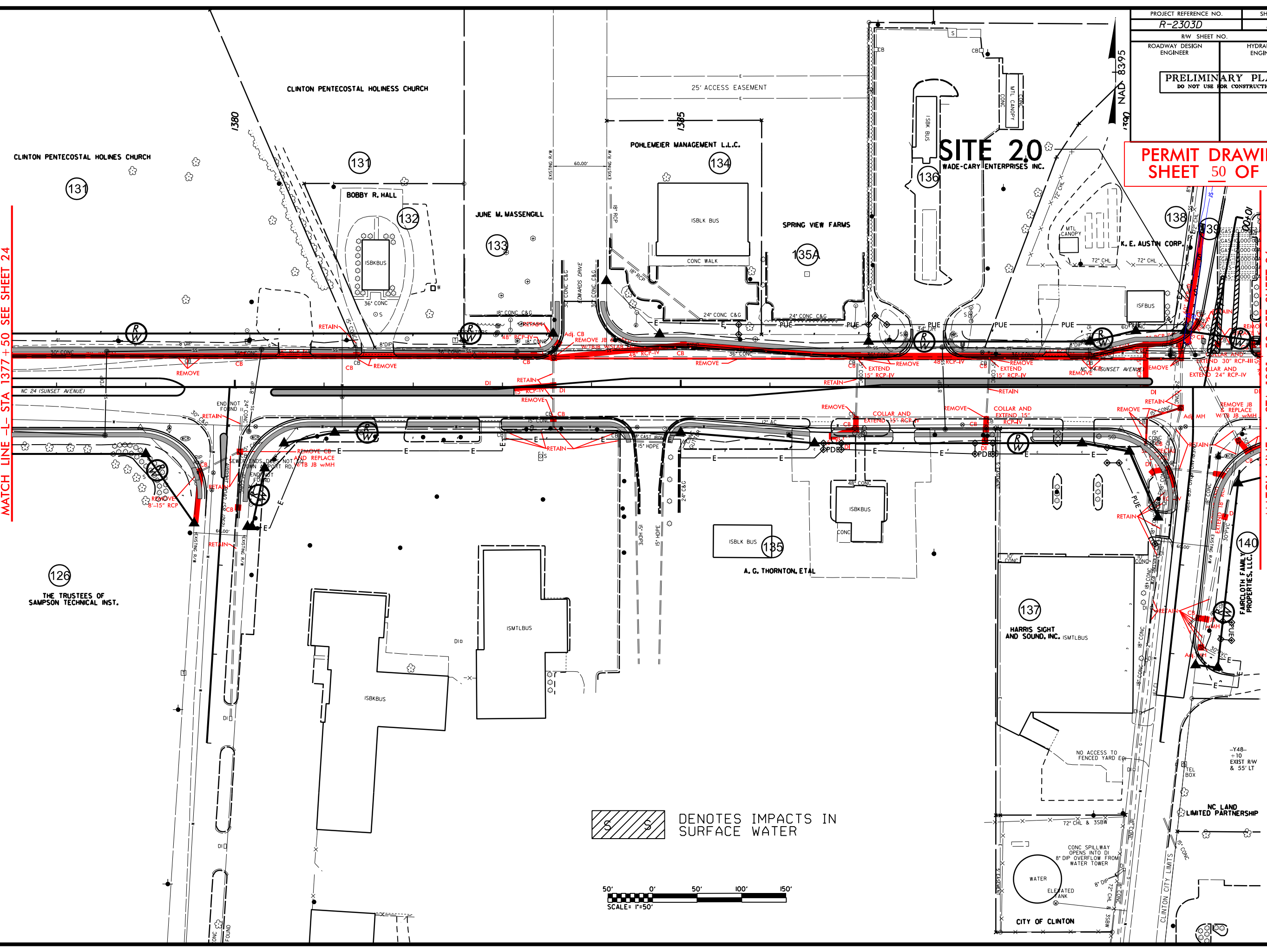
PROJECT REFERENCE NO.	SHEET NO.
R-2303D	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

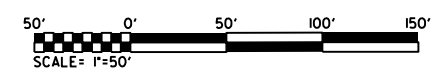
PERMIT DRAWING
SHEET 50 OF 75

MATCH LINE -L- STA 1377 + 50 SEE SHEET 24

MATCH LINE -L- STA 1391 + 50 SEE SHEET 26



Denotes Impacts in Surface Water



REVISIONS

4/5/2013
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\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DATE\$\$\$\$\$
\$\$\$\$\$NAME\$\$\$\$\$

5/14/99

REVISIONS

4/5/2013
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\$\$\$\$\$DATE\$\$\$\$\$
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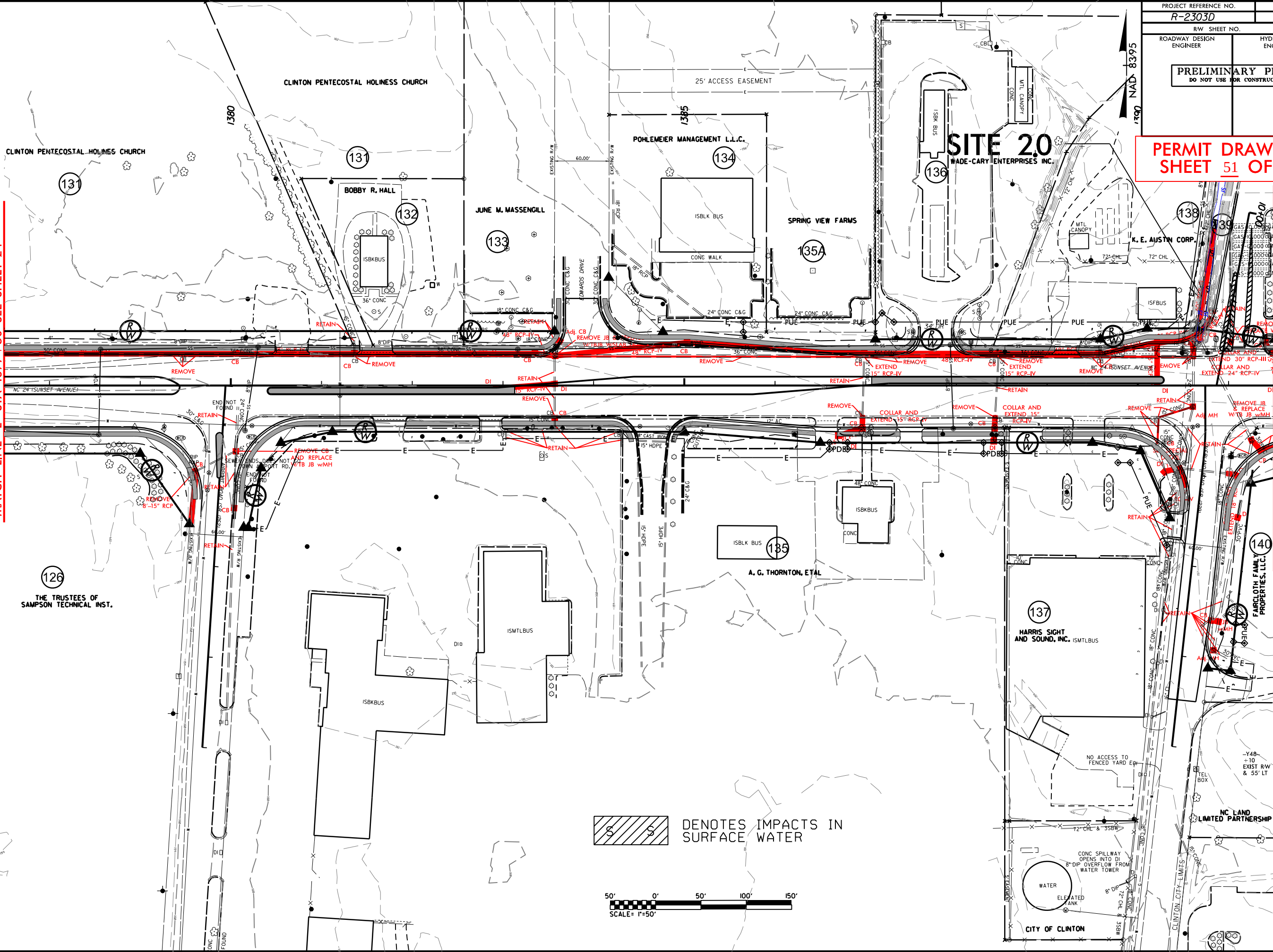
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R-2303D	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

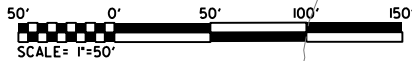
PERMIT DRAWING
SHEET 51 OF 75

MATCH LINE -L- STA 1377 + 50 SEE SHEET 24

MATCH LINE -L- STA 1391 + 50 SEE SHEET 26



Denotes IMPACTS IN SURFACE WATER

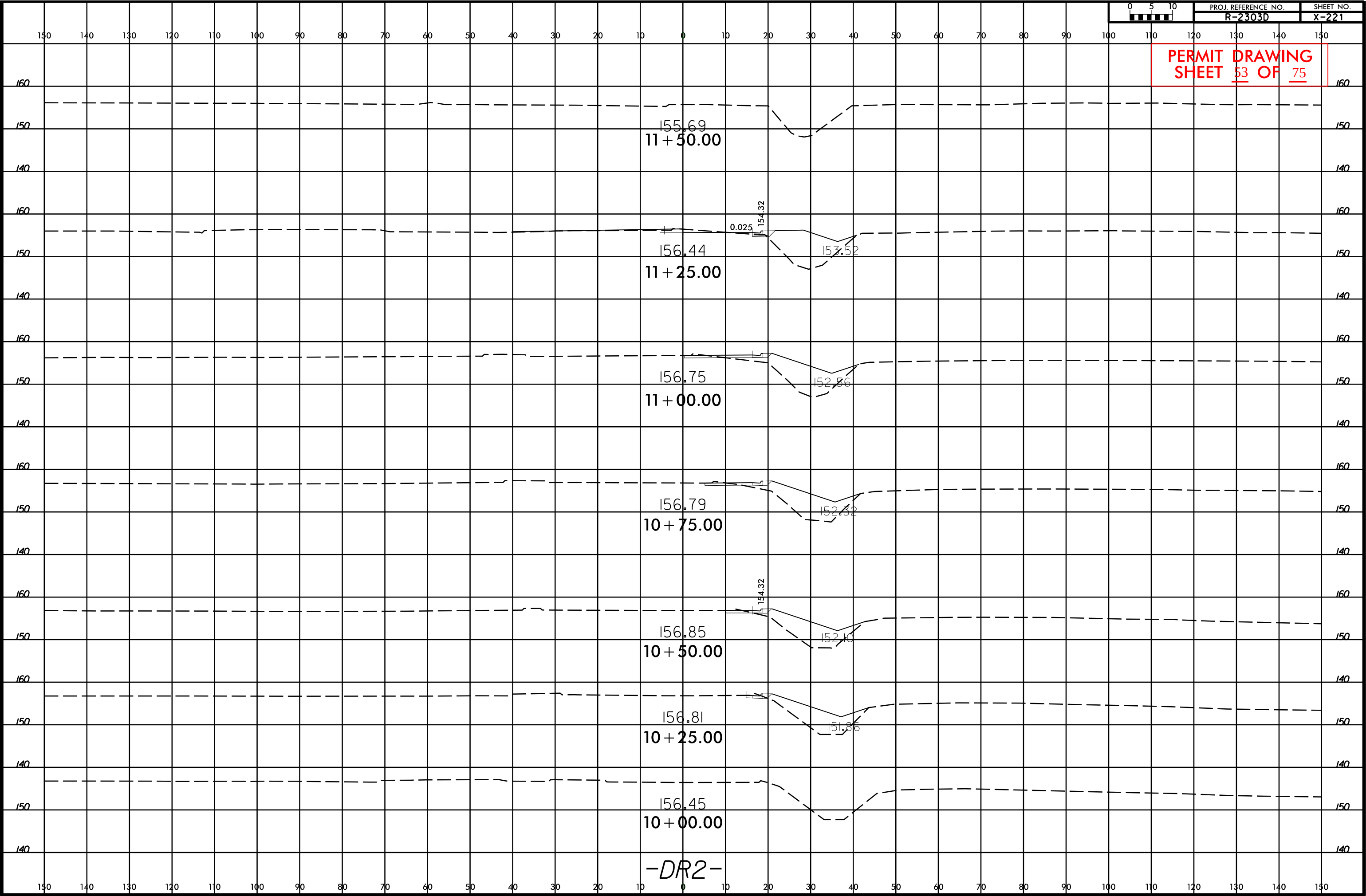




NAD 83/95

REVISIONS

5/5/2013 3:30 PM
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50' 0' 50' 100' 150'

SCALE = 1" = 50'

REVISIONS

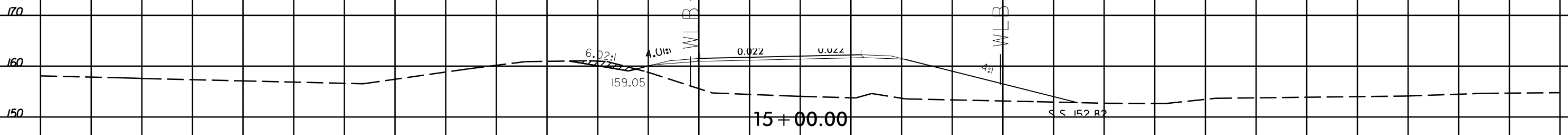
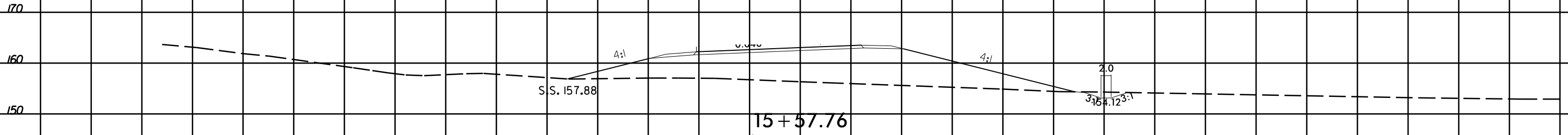
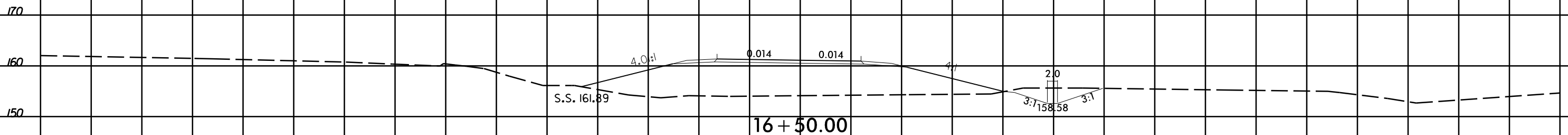
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amkeeler
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8/17/99

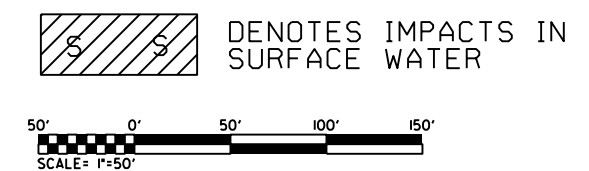


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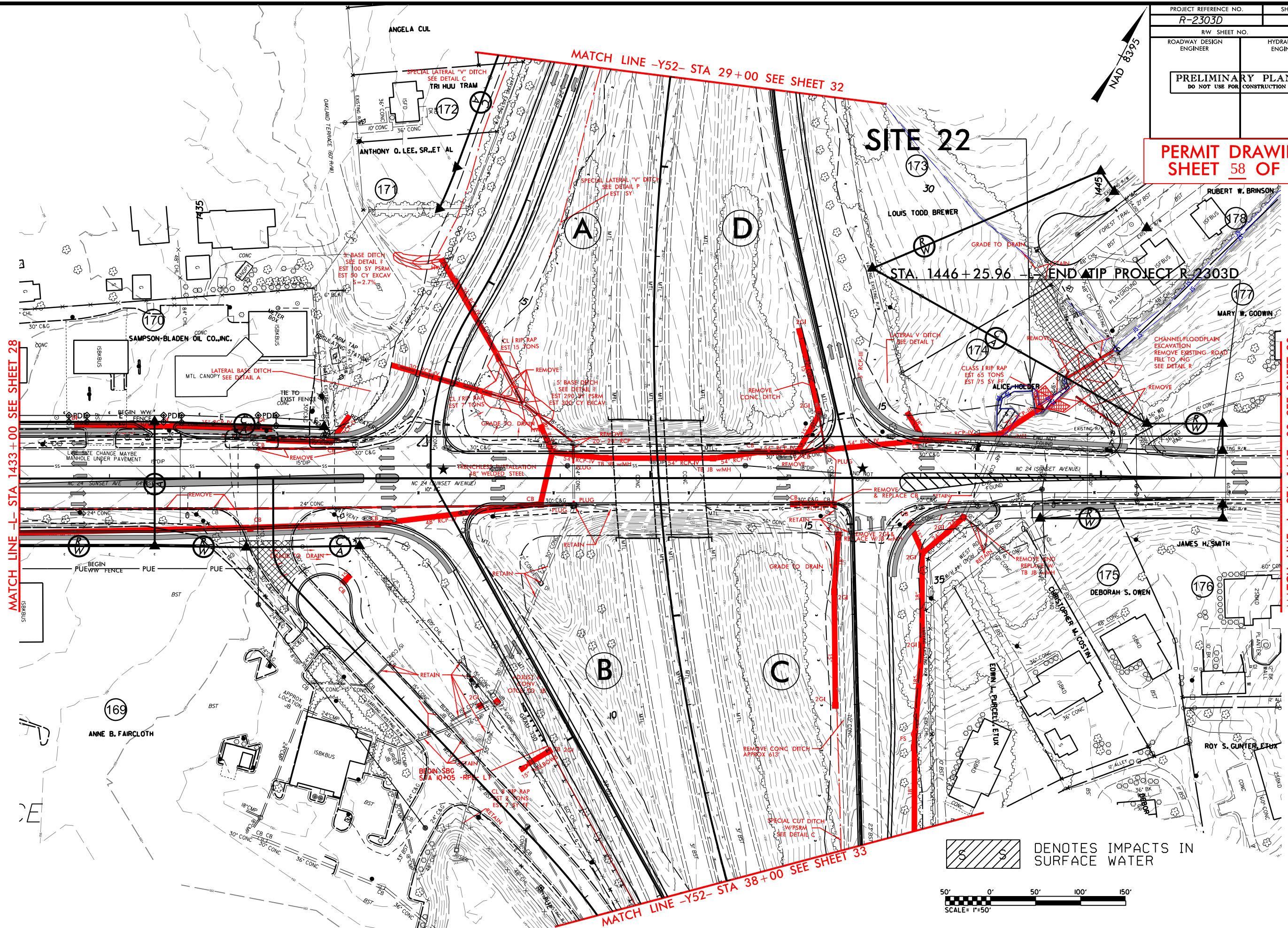
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-SRI-



PERMIT DRAWING
SHEET 58 OF 75

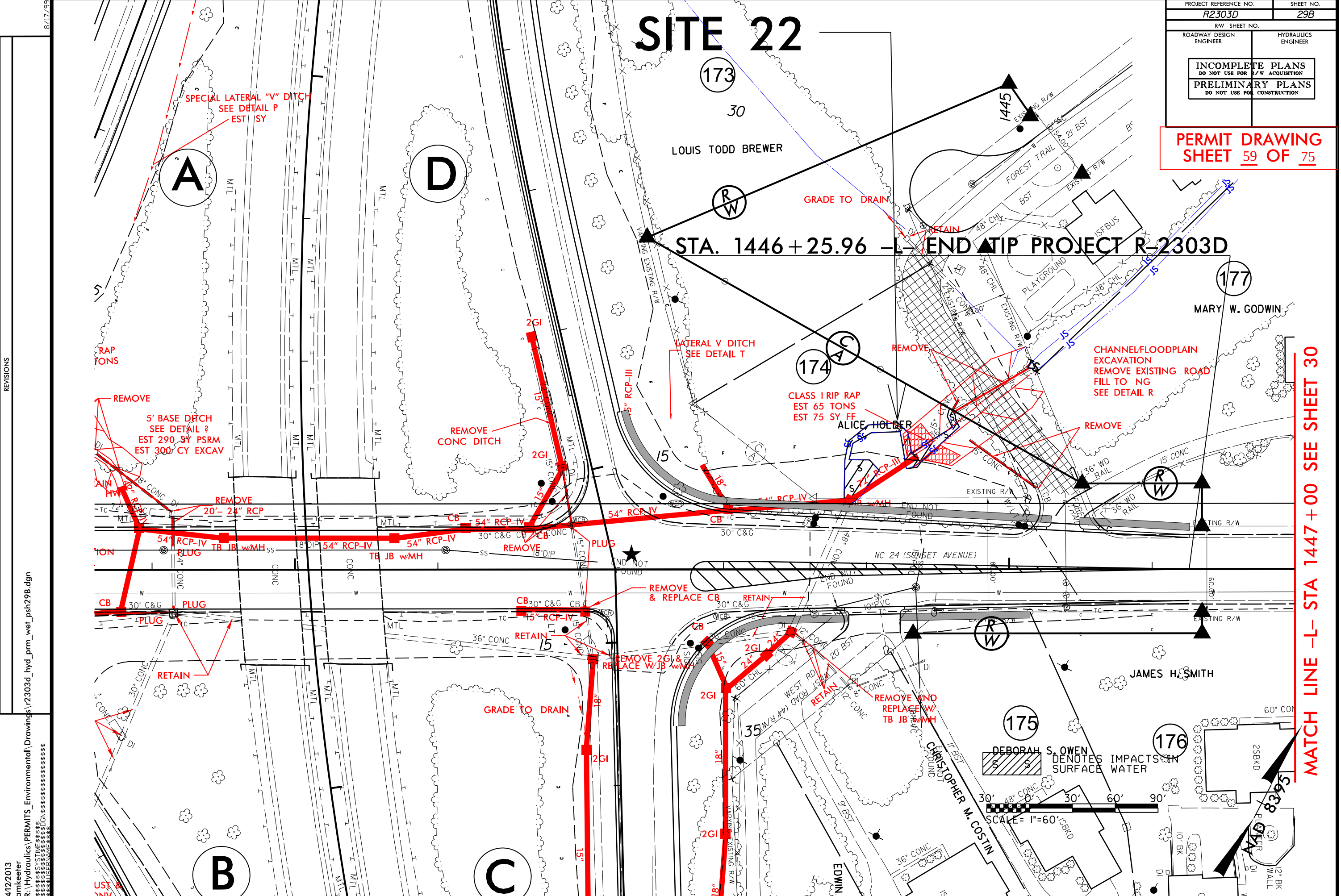


DENOTES IMPACTS IN SURFACE WATER



REVISIONS

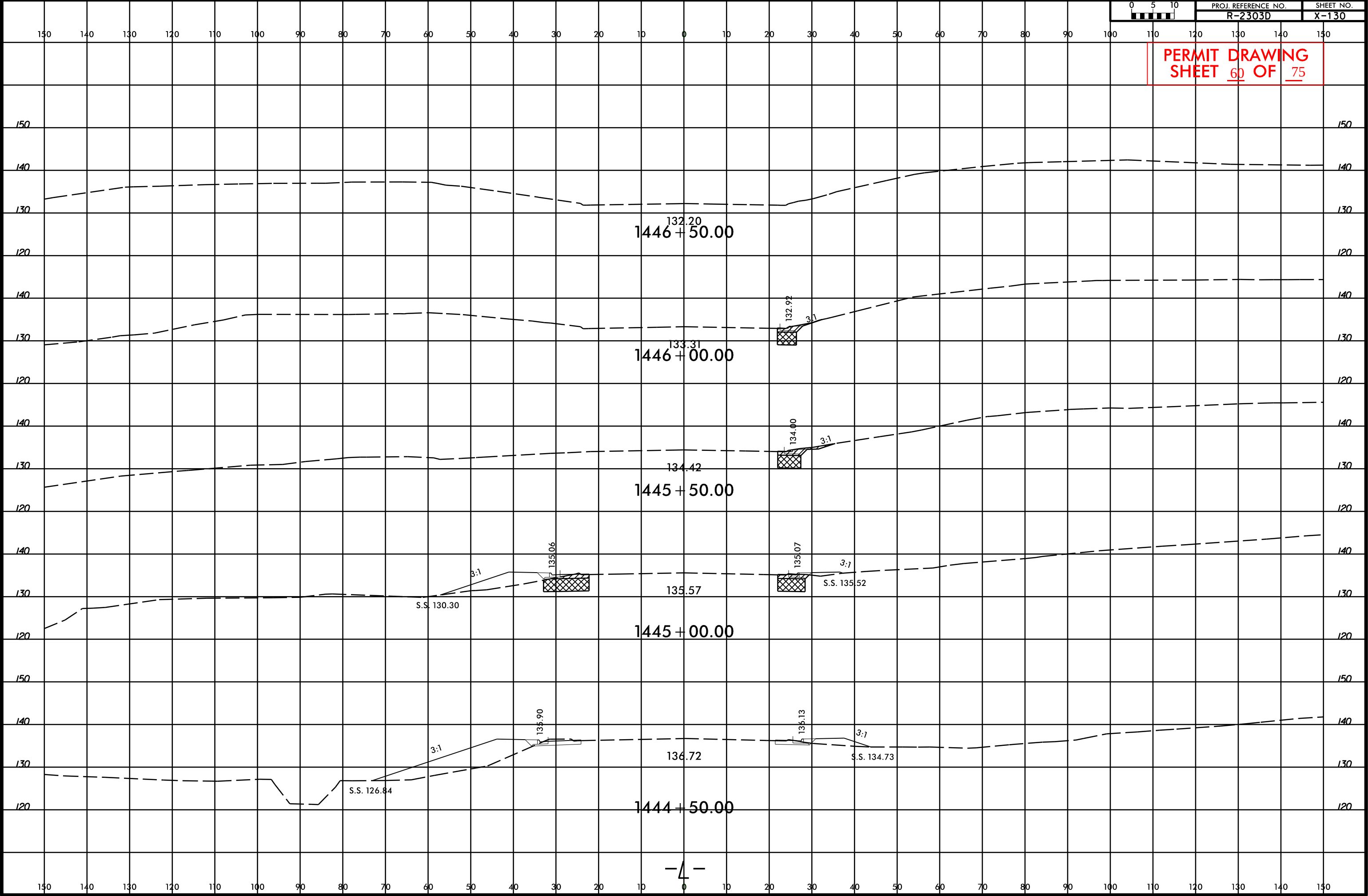
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\$\$\$\$\$DONOR\$\$\$\$\$
\$\$\$\$\$NAME\$\$\$\$\$



PROJECT REFERENCE NO. R2303D		SHEET NO. 29B	
RW SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR A/CQUISITION		PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
PERMIT DRAWING SHEET 59 OF 75			

4/12/2013
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ankeeeter
REVISIONS
8/17/99

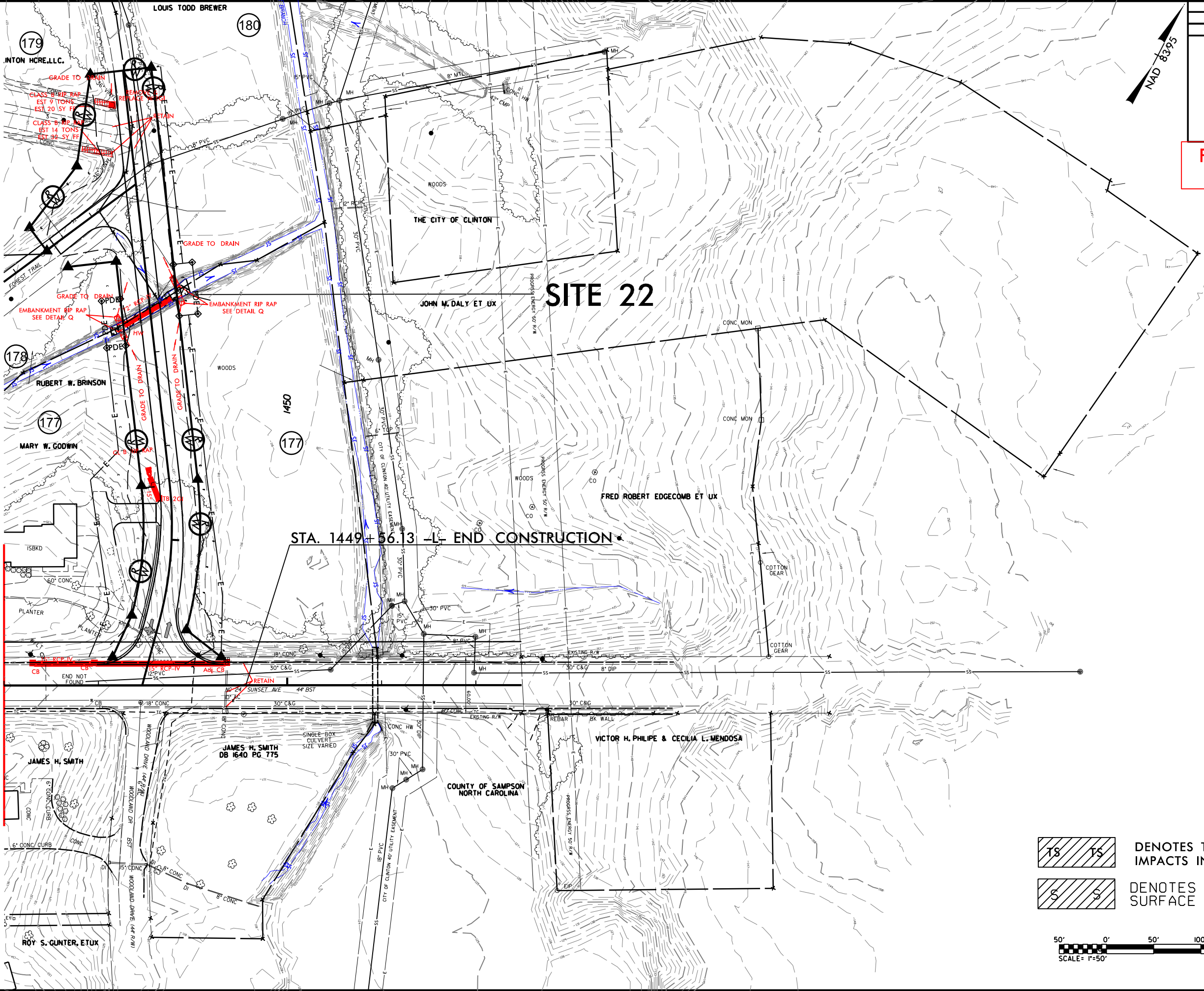
MATCH LINE -L- STA 1447+00 SEE SHEET 30



5/14/99

REVISIONS

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\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$DATE\$\$\$\$\$
\$\$\$\$\$NAME\$\$\$\$\$



PROJECT REFERENCE NO.	SHEET NO.
R-2303D	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PERMIT DRAWING
SHEET 62 OF 75

TS

TS

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

S

S

DENOTES IMPACTS IN
SURFACE WATER

50'

0'

50'

100'

150'

SCALE= 1"=50'

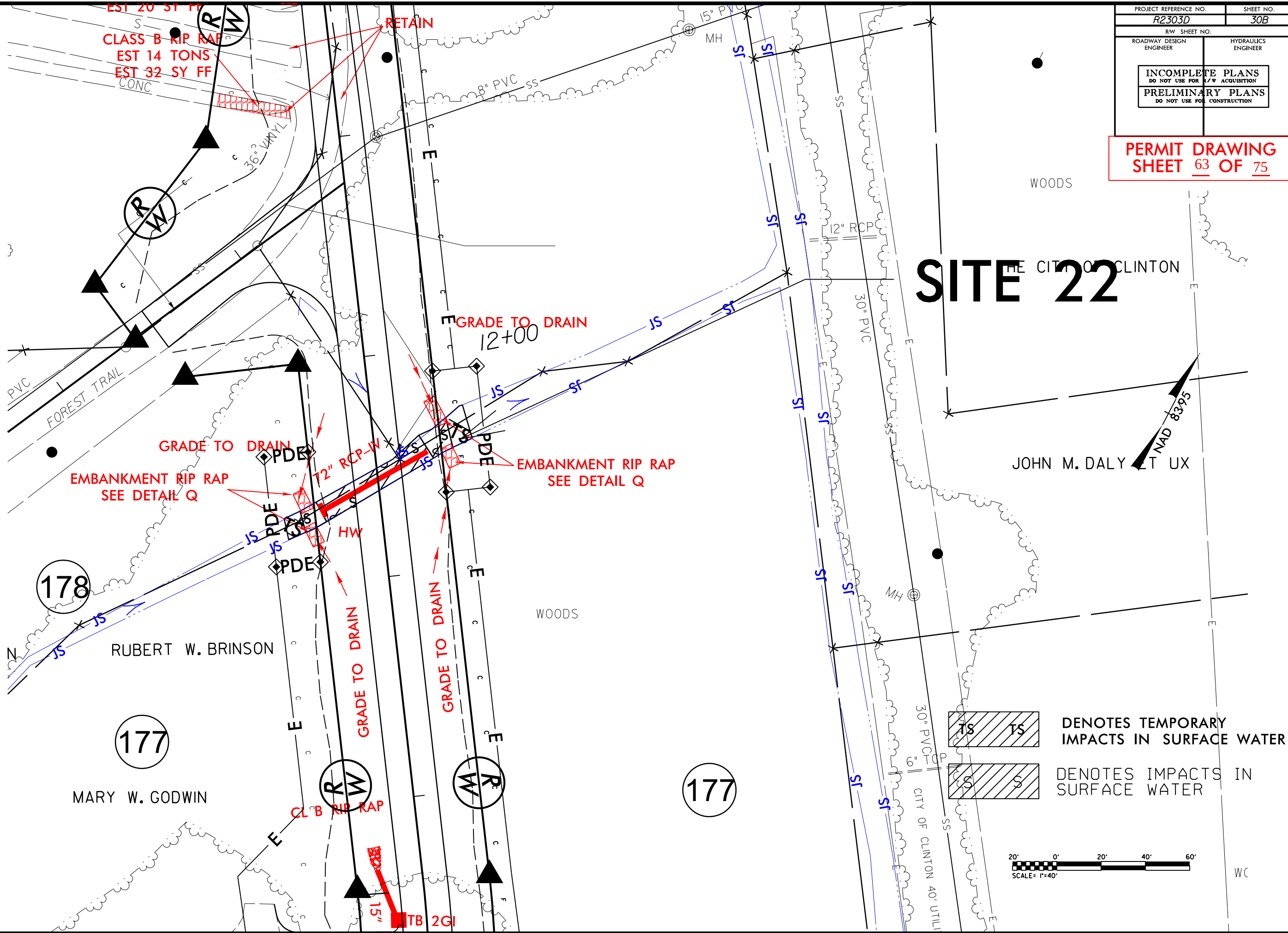
NAD 83 95

REVISIONS

REVISIONS

4/12/2013
ankeeeler
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\$\$\$\$\$PRG\$\$\$\$\$

8/17/99



PROJECT REFERENCE NO.	SHEET NO.
R2303D	30B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 63 OF 75

SITE 22

JOHN M. DALY ET UX

DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN
SURFACE WATER

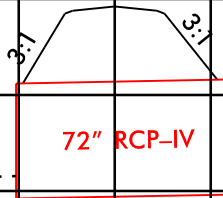


PROJECT REFERENCE NO. R2303D		SHEET NO. 30_PFL	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			
PERMIT DRAWING SHEET <u>64</u> OF <u>75</u>			

100' 0 100'

← C STA. 12 + 55 -Y53-
ELEV. = 119.7'
SKEW = 65°

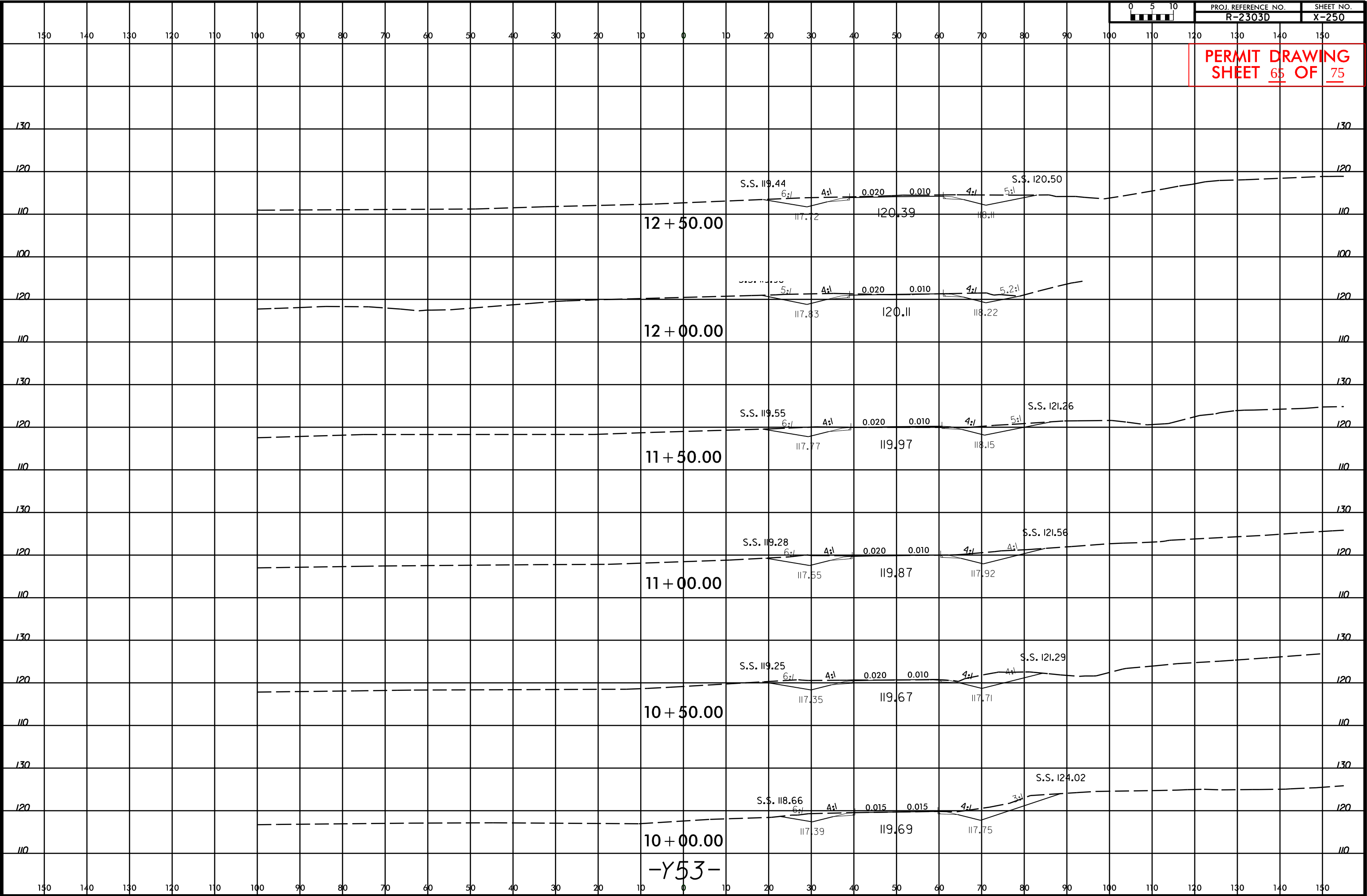
120



110

100

SITE 22



180

MATCH LINE -Y52- STA 15+00 SEE SHEET 31

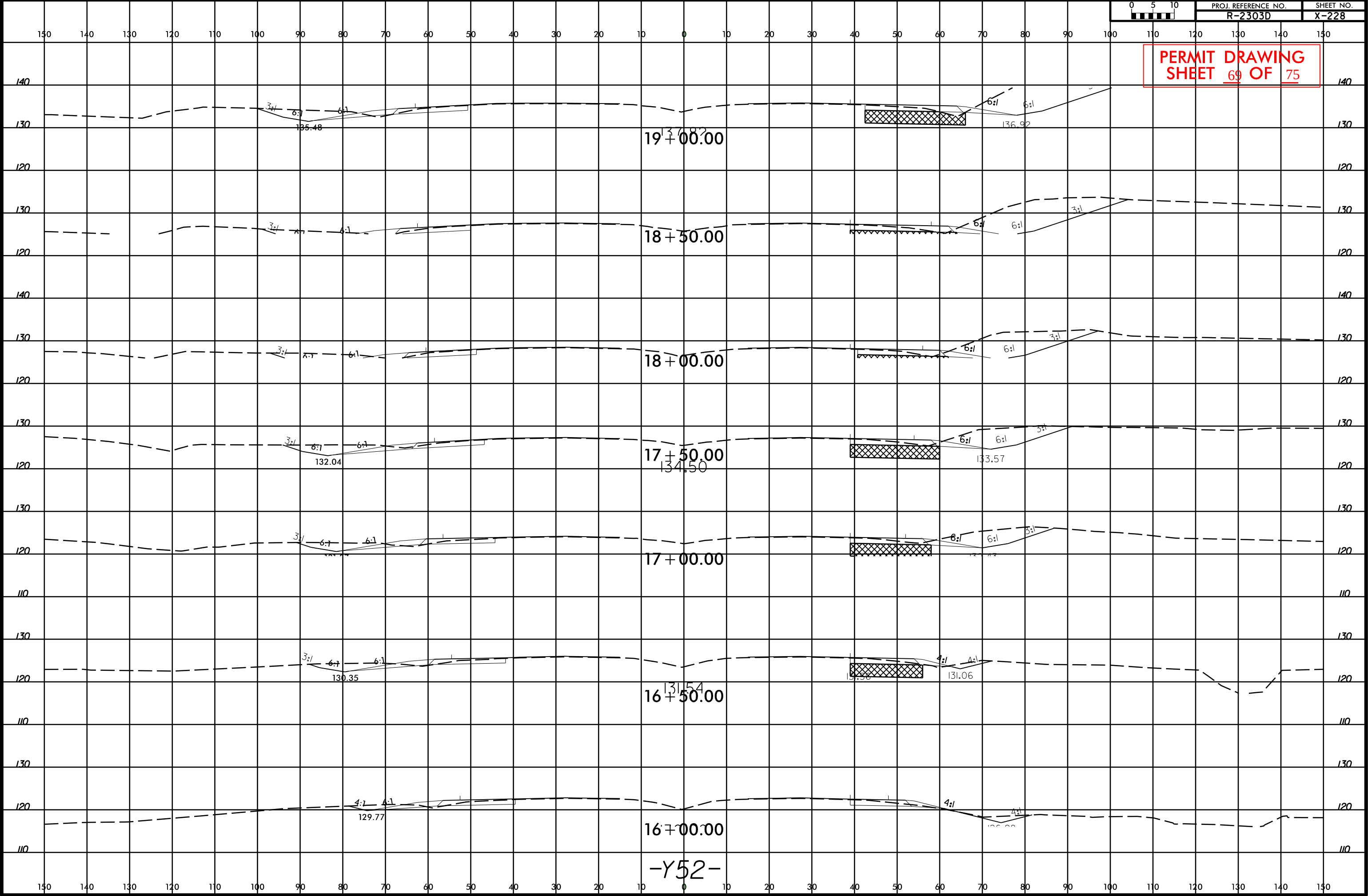
WATCH LINE -Y5Z- 50-

100' 0' 100'

SCALE 1"=50'

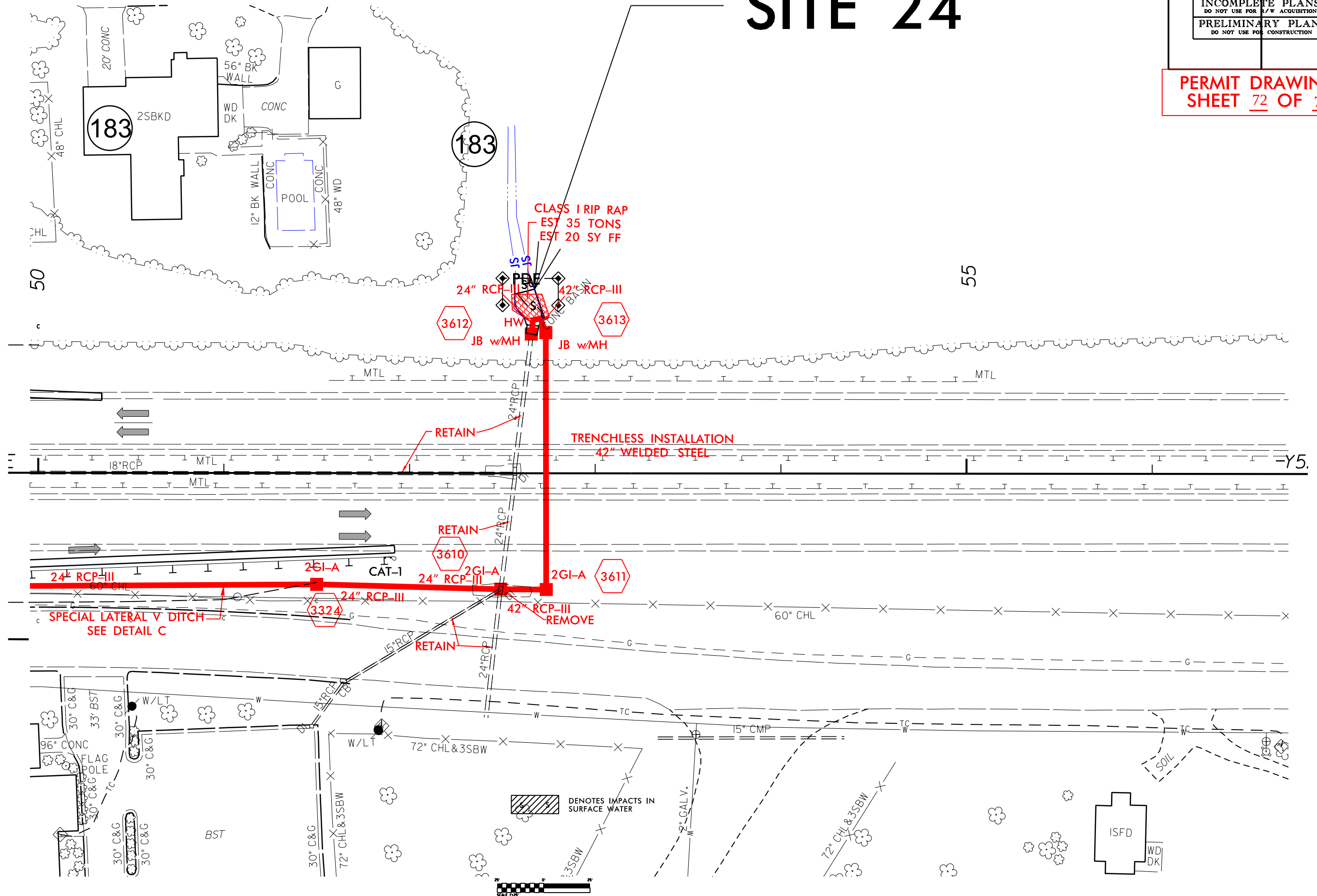
15





SITE 24

PERMIT DRAWING
SHEET 72 OF 75



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	1106+95 to 1110+17-L-LT	Fill	0.15			0.10						
2	1106+68 to 1110+21-L-	Fill / RCBC	0.63			0.10		0.02		183.00		
		Bank Stabilization						<0.01	<0.01	19.00	60.00	
3	1163+26 to 1167+43-L-RT	Fill	0.51			0.09						
4	1169+69 to 1176+07-L-RT	Fill	1.25			0.12						
5	1169+59 to 1172+52-L-LT	Fill	0.06		0.02	0.07						
6	1197+30 to 1197+97-L-LT	Fill	0.06		0.01	0.03		<0.01	0.01	35.00	11.00	
7	1199+32 to 1201+65-L-RT	Fill	0.06		0.01	0.04		<0.01	<0.01	33.00	16.00	
8	1204+71 to 1205+18-L-RT	Fill	0.01			0.01						
ELIMINATED SITE 9 ON 4/2/2013												
10	1222+18 to 1225+09-L-LT	Fill	0.32			0.08						
11	1221+04 to 1225+66-L-RT	Fill	0.29			0.13						
TOTALS:			3.36		0.04	0.75		0.03	0.01	270.00	87.00	

SITE 4 - EQUALIZER PIPES PLACED AT NATURAL GROUND ELEVATION. NOT TO BE BURIED.

NC DEPARTMENT OF TRANSPORTATION
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CUMBERLAND / SAMPSON COUNTY
WBS - XXXXX.1.1 (R-2303D)

WETLAND PERMIT IMPACT SUMMARY												
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
12	1224+08 to 1224+64-L-	RCBC			0.02			0.04	0.01	306.00		
		Bank Stabilization						0.01	0.01	42.00	60.00	
13	1278+32 to 1281+53-L-	66" RCP						0.03		286.00		
		Bank Stabilization						<0.01	<0.01	21.00	10.00	
14	1289+68 to 1291+91-L-	Fill / 60" RCP	0.02		<0.01	0.03		0.08		283.00		
		Bank Stabilization						0.01	0.01	30.00	30.00	
15	1292+13 to 1299+88-L-RT	Fill / 72" RCP	1.30		0.01	0.17		0.06		151.00		
		Bank Stabilization				0.02		0.01	<0.01	32.00	20.00	
16	1295+68 to 1297+37-L-LT	Fill	0.07			0.04						
*	1292+00 to 1294+59-L-LT	Fill			0.25			0.35				
17	1303+81 to 1304+67-L-RT	Pond						0.02				
18	1301+67 to 1321+13-L-	Bridge	1.16	0.33	0.01	0.27	2.00					
TOTALS:			2.54	0.33	0.29	0.51	2.00	0.61	0.04	1151.00	120.00	

SITE 16* EXCAVATION IN WETLANDS IS PART OF A MITIGATION SITE AND IS CONSIDERED TEMPORARY IMPACT.

SITE 18 Bridge: Total Impacts due to Piers = 18sq.ft.

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WETLAND PERMIT IMPACT SUMMARY												
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
19	1321+64 to 1329+01-L-	Bridge	0.41		0.01	0.20	0.20					
*	1324+00 to 1325+65-L-LT	Fill			0.10							
20	1391+00-L-LT	RCP						0.02		129.00		
		Bank Stabilization						<0.01		10.00		
21	SR1	Fill	0.36			0.08						
22	1444+00-L-LT	72" RCP						0.02		108.00		
		Bank Stabilization						<0.01	<0.01	46.00	5.00	
*	12+22 to 12+69-Y53-LT	72" RCP						0.01		55.00		56.00
		Bank Stabilization						<0.01	<0.01	24.00	20.00	
23	17+40-Y52-LT	36" RCP						<0.01		9.00		
		Bank Stabilization						<0.01	<0.01	10.00	8.00	
24	52+66-Y52-LT	42" STEEL						<0.01		17.00		
		Bank Stabilization						<0.01		9.00		
TOTALS:			0.77		0.11	0.28	0.20	0.05	<0.01	417.00	33.00	56.00

GRAND TOTAL	6.67	0.33	0.44	1.54	2.2	0.69	0.05	1838	240	56
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SITE 19* EXCAVATION IN WETLANDS IS PART OF A MITIGATION SITE AND IS CONSIDERED TEMPORARY IMPACT.
 SITE 19 Bridge: Total Impact due to piers = 33sq.ft.
 SITE 22* -Y53- 56' OF PIPE TO BE REMOVED AND REPLACED WITH OPEN CHANNEL.
 SITE 24 IS LOCATED +/- 500' OUTSIDE OF PROJECT LIMITS.

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