



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

ROY COOPER  
GOVERNOR

JAMES H. TROGDON, III  
SECRETARY

November 14, 2017

U.S. Army Corps of Engineers  
Raleigh Regulatory Field Office  
Attn: Mr. James Lastinger  
3331 Heritage Trade Drive, Suite 105  
Wake Forest, NC 27587

NC Division of Water Resources  
Winston-Salem Regional Office  
Attn: Mr. Dave Wanucha  
450 Hanes Mill Road, Suite 300  
Winston-Salem, NC 27105

Subject: **Application for Individual Section 404 Permit, Section 401 Water Quality Certification, and Jordan Lake Riparian Buffer Authorization** for Macy Grove Road Improvements in Forsyth County. STIP U-4734, Division 9, Debit WBS Element 36600.1.2 in the amount of \$570.

Dear Mr. Lastinger:

The North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), proposes to extend Macy Grove Road (SR 2601) from north of SR 1005/Old US 421/East Mountain Road (where it joins project U-2800) to NC 150/North Main Street near Kernersville in Forsyth County. The project is approximately 1.7 miles long and begins on new location north of East Mountain Road heading north across Reedy Fork and an associated wetland system. The roadway then merges with SR 2036 (Smith Edwards Road), widening the existing roadway, before going back on new location, ultimately terminating at NC 150, north of the existing intersection at Smith Edwards Road and NC 150.

Please see the enclosed ENG 4345, permit drawing review minutes (4C), 4B meeting minutes, State Stormwater Management Plan (SMP), permit drawings, design plans, and mitigation acceptance letter.

Purpose and Need:

The purpose and need of the project are described in the Environmental Assessment (EA) as follows: "The purpose of the proposed project is to provide a link between I-40 Business/US 421 and NC 150 (N. Main Street) north of Kernersville, to reduce congestion in downtown Kernersville, and to provide a segment of the future Kernersville Loop Road. Currently, there is not direct roadway link between I-40 Business and NC 150 north of Kernersville. Additionally, congestion exists in downtown Kernersville.

**MAILING ADDRESS:**

NC DEPARTMENT OF TRANSPORTATION  
PROJECT DEVELOPMENT AND ENVIRONMENTAL  
ANALYSIS  
1598 MAIL SERVICE CENTER  
RALEIGH NC 27699-1598

TELEPHONE: 919-707-6000

FAX: 919-212-5785

WEBSITE: [NCDOT.GOV](http://NCDOT.GOV)

**LOCATION:**

CENTURY CENTER, BUILDING B  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC, 27610-4328

This project would provide the link between NC 150 and East Mountain Street.”

Summary of Jurisdictional Impacts:

The projected impacts for the project will be:

- 1.30 acres of permanent wetland impacts (1.24 acres of permanent fill, 0.06 acre of mechanized clearing)
- 503 linear feet (lf) of permanent stream impacts (445 lf of fill and 58 lf of bank stabilization), and 94 lf of temporary stream impacts

Summary of Mitigation:

The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, compensatory mitigation will be required for the unavoidable impacts. Mitigation is being provided via the NC Division of Mitigation Services (DMS).

### **NEPA DOCUMENT STATUS**

A Final Environmental Assessment was completed September 2010, and the Finding of No Significant Impact (FONSI) was approved June 2011. This document was written for both this project (TIP U-4734) and TIP U-2800. The U-2800 project was permitted separately in 2013 (Ref. SAW 2009902019 and DWR 2013-0352) and has been completed.

A full range of preliminary study alternatives were evaluated for the proposed action. Several preliminary alternatives were eliminated from further consideration because they did not meet the purpose and need for the project. Three build alternatives were further developed into detailed study alternatives for evaluation. The three detailed study alternatives for U-4734 all began at the U-2800 end point, varied in location near the Reedy Fork crossing, and ultimately converged, improving Smith Edwards Road before terminating at NC 150. For more details on the alternative analysis done for this project, see the Final Environmental Assessment.

In compliance with the NEPA/404 Merger Process, Concurrence Point 4B was reached on June 8, 2016. Concurrence Point 4C was reached on May 17, 2017. Please see meeting minutes for 4B and 4C attached.

### **PROJECT SCHEDULE**

Construction is anticipated to begin shortly after the receipt of environmental permits.

### **INDEPENDENT UTILITY**

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

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

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

## RESOURCE STATUS

Project U-4734 is located within the Piedmont Physiographic Province in the Roanoke (HUC 03010103) and Cape Fear River Basins (HUC 03030002) in Forsyth County. There are no designated Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply I (WS-I), or Water Supply II (WS-II) waters within 1.0 mile of the project area. One named stream, Reedy Fork, as well as two unnamed tributaries (to Reedy Fork and East Belews Creek), are located within the project area (Table 1). There are two wetlands located within the project area (Table 2).

Wetland delineations followed the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (USACE 1987) and the Eastern Mountains and Piedmont Regional Supplement (USACE 2012). Stream identification and classification followed the *Methodology for the Identification of Intermittent and Perennial Streams and Their Origins* (NC Division of Water Resources 2010 and 2005). The US Army Corps of Engineers (USACE) issued a Notification of Jurisdictional Determination for this project on October 1, 2010. Additional jurisdictional areas were surveyed in February 2016. The USACE issued a Notification of Jurisdictional Determination for these additional areas on February 9, 2016.

**Table 1 – Project Area Streams**

Stream Name	Stream Index Number	Best Usage Classification	Description
<b>Upper Dan River Subbasin (03010103)</b>			
UT to East Belews Creek	22-27-8-(1)	C	From source to Forsyth County SR 2140
<b>Haw River Subbasin (03030002)</b>			
Reedy Fork	16-11-(1)	WS-III; NSW	From source to point 0.4 mi downstream of Moores Creek
UT to Reedy Fork	16-11-(1)	WS-III; NSW	From source to point 0.4 mi downstream of Moores Creek

**Table 2 – Project Area Wetlands**

Map ID	Cowardin Classification*	Hydrologic Classification	DWR Wetland Rating	Area (acres) <sup>1</sup>
WA	PUBHh	Riparian	52	0.68
WB	PUBHh	Riparian	56	1.38

\* Classification of Wetlands and Deepwater Habitat of the United States (Cowardin et al., 1979).

<sup>1</sup> Areas provided in the JD Package are smaller than what is stated here. The areas in the JD package reflect wetlands within the original slope stakes, however wetland boundaries extend beyond slope stakes.

### 303(d) Impaired Waters:

Reedy Fork is listed as Fair on the North Carolina 2016 303(d) list of impaired streams for bioclassification of ecological/biological integrity of fish communities. East Belews Creek is not listed as impaired on the North Carolina 2016 303(d) list.

## IMPACTS TO WATERS OF THE U.S.

**Wetlands.** There will be a total of 1.30 acres of permanent riparian wetland impacts associated with this project.

**Streams.** Total stream impacts for this project are 503 lf of permanent impacts and 94 lf of temporary impacts.

**Surface Waters.** The project will not impact any open waters (ponds).

**Buffers.** The project will impact a total of 66,760 square feet (sqft) of stream buffers of the Jordan Lake Riparian Buffers. There will be 40,818 sqft of impacts occurring in buffer Zone 1 and 25,942 sqft of impacts occurring in buffer Zone 2.

The impacts are detailed in the following tables.

**Table 3 – Wetland Impacts**

Site	Wetland Number	Wetland Size (acres) <sup>1</sup>	Permanent Fill in Wetlands (acres)	Excavation (acres)	Mechanized Clearing (acres)	Temp Fill/ Hand Clearing (acres)	Impacts Requiring Mitigation (acres) <sup>3</sup>
2	WA	0.68	0.53	0	0.02	0	0.55
2	WB	1.38	0.71	0	0.04	0	0.75
<b>Total Impacts<sup>2</sup></b>			<b>1.24</b>	<b>0</b>	<b>0.06</b>	<b>0</b>	<b>1.30</b>

<sup>1</sup> Areas provided in the JD Package are smaller than what is stated here. The areas in the JD package reflect wetlands within the original slope stakes, however wetland boundaries extend beyond slope stakes.

<sup>2</sup> Values are based on rounding, due to calculating totals with actual numbers to the thousandths.

<sup>3</sup> Mitigation is proposed at a 2:1 ratio.

**Table 4 – Stream Impacts**

Site	Stream Name & Intermittent (I) or Perennial (P)	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement <sup>1</sup> (linear feet)
1	UT to Reedy Creek (P)	SC	Perm. Fill	389	0.02	USACE & DWR
			Bank Stabilization	48	<0.01	--
			Temp. Fill	24	<0.01	--
2	Reedy Fork (P)	--	Bridge Construction (Temp. Fill)	60	0.01	--
3	UT to East Belews Creek (E & I)	SA	Perm. Fill	56	<0.01	USACE & DWR
			Bank Stabilization	10	<0.01	--
			Temp. Fill	10	<0.01	--
<b>Total Temporary Impacts:</b>				<b>94</b>	<b>0.01<sup>2</sup></b>	<b>--</b>
Total Perm. Impacts (Perm. Fill + Bank Stabilization):				<b>503</b>	--	--
Permanent Impacts Requiring DWR Mitigation:				<b>389</b>	--	--
Permanent Impacts Requiring USACE Mitigation:				<b>445</b>	--	--
<b>Total Impacts Requiring Mitigation:</b>				<b>445</b>	--	<b>890</b>

<sup>1</sup> – Mitigation will be provided at a 2:1 ratio for permanent loss of water.

2 – Values are based on rounding, due to some of the individual impacts being <0.01 acre

**Permit Site 1:** The project will impact stream SC, which will flow through a new double barrel 7’x 7’ reinforced concrete box culvert (RCBC). There will be 389 lf of permanent stream impacts, 48 lf of bank stabilization, and 24 lf of temporary stream impacts associated with the installation of the culvert and temporary dewatering of the stream. Site 1 is in the Jordan Lake Riparian Buffer watershed, therefore there will be 25,417 sq ft of impacts in Zone 1 and 15,316 sq ft of impacts in Zone 2 due to road construction. All buffer impacts are allowable.

**Permit Site 2:** The project will result in 1.24 acre of permanent wetland fill, and 0.06 acre of mechanized clearing associated with the construction of a spanning bridge. Reedy Fork will not be permanently impacted at this site due to the construction of a spanning structure, though there will be 60 lf of temporary impacts due to a temporary crossing. The wetlands encompass several former fish hatchery ponds that now exhibit wetland characteristics and were delineated as such. Site 2 is in the Jordan Lake Riparian Buffer watershed, therefore there will be 15,401 sq ft of impacts in Zone 1 and 10,626 sq ft of impacts in Zone 2 due to bridge and road construction. All buffer impacts are allowable.

**Permit Site 3:** The project will impact stream SA, which will flow through a 36’ reinforced concrete pipe. There will be 56 lf of permanent fill, 10 lf of bank stabilization, and 10 lf of temporary stream impacts.

**Table 5 – Jordan Lake Riparian Buffer Impacts**

Impact Type	Zone 1 Impacts (sqft)	Zone 2 Impacts (sqft)	Buffer Impact Total (sqft)
Allowable Road Crossing Impacts	25,417	15,722	41,139
Allowable Bridge Impacts	15,401	10,220	25,621
<b>Total Allowable Impacts:</b>	<b>40,818</b>	<b>25,942</b>	<b>66,760</b>
Wetlands in Buffer Within Allowable Impacts	<b>4,194</b>	<b>10,412</b>	<b>14,606</b>

## MORATORIUM

No moratoria are required for this project.

## FEDERALLY PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended. The U.S. Fish and Wildlife Service (USFWS) lists three species for Forsyth County (Table 13, county listed updated July 24, 2015).

A Natural Resources Technical Report (NRTR) dated August 2009, was prepared for this project. Additionally, Three Oaks Engineering performed T&E species survey updates in

February 2016, July 2016, and February 2017. A summary of the findings of these reports are provided in Table 5.

**Table 5 – Federally protected species listed for Forsyth County**

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Cardamine micranthera</i>	Small-anthered bittercress	E*	No	No Effect
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	Yes	MANLAA

E – Endangered, T – Threatened, MANLAA – May Affect, Not Likely to Adversely Affect

\*Historic record

NCDOT has determined that the proposed action does not require separate consultation on the grounds that the proposed action is consistent with the final Section 4(d) rule, codified at 50 C.F.R. § 17.40(o) and effective February 16, 2016. Section 7 responsibilities are therefore considered fulfilled. NCDOT has also reviewed the USFWS Asheville Field Office website ([http://www.fws.gov/asheville/htmls/project\\_review/NLEB\\_in\\_WNC.html](http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html)) for consistency with NHP records. This project is located entirely outside of the red highlighted areas (12-digit HUC) that the USFWS Asheville Field Office has determined to be representative of an area that may require consultation. There will be 20.2 acres of tree clearing for the proposed project.

### **INDIRECT CUMULATIVE IMPACT ANALYSIS**

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4)) require the DWR determine that a project “does not result in cumulative impacts, based on past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards.”

An Indirect and Cumulative Effects (ICE) Assessment was done for this project in the September 2010 EA. This report details the potential ecological effects that may result from the proposed Macy Grove Road project and other past, present, and reasonably foreseeable future development activities in the region.

Based upon the ICE analysis, much of the project area is urban and suburban in character, and most of the area already has an established road network. The project’s individual effects on land use and natural resources are minor. The potential indirect effect identified in the EA, including increased commercial and industrial development, are minor. As indirect and direct impacts associated with this project are avoided or mitigated per the NEPA process, the potential for adverse cumulative impacts to the human environment, such as increased noise levels, view changes, and impacts to historic resources is eliminated or lessened to levels not considered to be significant. Potential for adverse cumulative impacts to the natural environment, such as impacts to streams, wetlands, floodplains, threatened and endangered species, and degradation to water quality is eliminated or lessened as well. Within the region, there are stringent buffer rules and watershed requirements in place for protecting water quality, and indirect and

direct impacts associated with this project will be avoided or mitigated per the NEPA process.

## **CULTURAL RESOURCES**

### Section 4(f) and Section 6(f) Resources:

As presented in Section 5.3 of the EA, there is one Section 4(f) resource within the Route Alternative corridors, the Triad Park. Section 5.3.4.2 of the EA states that “preliminary designs were provided to Triad Park officials on February 9, 2010. With the revisions incorporated as identified in previous coordination, the Forsyth County Parks and Recreation Department agreed by letter (dated February 9, 2010, and included in Appendix C) that the project would not adversely affect the activities, features, and attributes of the Triad Park.”

There are no 6(f) resources within the project area.

### Archaeological and Historic Architectural Resources:

The proposed Macy Grove Road is a Federally-funded project, and therefore the project must comply with Section 106 of the National Historic Preservation Act (NHPA). NHPA requires the lead Federal agency (the NCDOT on behalf of FHWA) to consult with the North Carolina State Historic Preservation Office (SHPO [on behalf of the Advisory Council on Historic Preservation]) regarding the project’s potential to impact archaeological resources eligible for or listed on the National Register of Historic Places (NRHP).

The Preferred Route would not result in an Adverse Effect to a historic property on, or eligible for listing on, the NRHP. No property would be acquired from any of the historic resources. The effects determinations are No Effect for Henry Clay Edwards House. This determination was confirmed with the SHPO on September 10, 2010.

An archaeological evaluation and inventory for the Macy Grove Road project found five resources ineligible for listing on the NRHP; therefore, the proposed action would have no effect on any archaeological resource on, or eligible for listing on, the NRHP. This was confirmed by SHPO in a letter dated May 17, 2010.

## **FEMA COMPLIANCE**

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

## **WILD AND SCENIC RIVER SYSTEM**

The project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended). Reedy Fork and East Belews Creek are not designated as a Wild and Scenic Rivers.

## **MITIGATION OPTIONS**

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

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

### Avoidance and Minimization:

Avoidance and minimization has been employed in the project area to the maximum extent practicable. The following measures were implemented for the project:

- NCDOT’s Design Standards in Sensitive Watersheds will be followed for implementing erosion and sediment control BMPs along the entire project.
- The proposed vertical alignment over the culvert was minimized to reduce the culvert length and therefore stream impacts.
- At the Reedy Fork crossing, NCDOT agreed to span the natural system and floodplain with a bridge, though hydraulically only a culvert is required, to minimize impact to Reedy Fork and the associated natural system. By bridging the system, the following impacts were avoided:
  - 190 lf of stream
  - 80 lf of bank stabilization
  - 20 lf of temporary impacts due to dewatering
  - 1.11 acre of permanent wetland fill
  - 0.11 acre of mechanized wetland clearing.

### Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable, as described above. Tables 2 through 4 summarize the wetland and stream impacts for each section of this project. This project will permanently impact 1.30 acres of wetlands, 503 linear feet of streams (445 linear feet of permanent fill and 58 linear feet of bank stabilization), and temporarily impact 0.01 acre (94 linear feet) of streams. Mitigation will be provided by DMS as noted on the attached letter.

## **REGULATORY APPROVALS**

Section 404: Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities.



Section 401: We are hereby requesting a 401 Water Quality Certification from the NC Division of Water Resources. In compliance with Section 143-215.3D (e) of the NCAC, we will provide \$570.00 to act as payment for processing the Section 401 permit application.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Amy Euliss at either [aeuliss@ncdot.gov](mailto:aeuliss@ncdot.gov) or (336) 747-7802. A copy of this permit application and its distribution list will also be posted on the NCDOT website at <https://connect.ncdot.gov/resources/Environmental/Pages>.

Sincerely,  
DocuSigned by:



CB53851D524244B...

Amy Euliss

Division 9 Environmental Officer  
North Carolina Department of Transportation

cc: NCDOT Permit Application Standard Distribution List

U.S. ARMY CORPS OF ENGINEERS  
**APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**  
33 CFR 325. The proponent agency is CECW-CO-R.

Form Approved -  
OMB No. 0710-0003  
Expires: 30-SEPTEMBER-2015

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

PRIVACY ACT STATEMENT

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

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

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

5. APPLICANT'S NAME First - Amy Middle - Last - Euliss Company - NC Department of Transportation - Division 9 E-mail Address - aeuliss@ncdot.gov	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Nancy Middle - Last - Scott Company - Three Oaks Engineering E-mail Address - nancy.scott@threeoaksengineering.com
6. APPLICANT'S ADDRESS: Address- 375 Silas Creek Parkway City - Winston Salem State - NC Zip - 27127 Country -	9. AGENT'S ADDRESS: Address- 324 Blackwell Street, Suite 1200 City - Durham State - NC Zip - 27701 Country -
7. APPLICANT'S PHONE NOs. w/AREA CODE a. Residence - b. Business c. Fax 336-747-7802	10. AGENTS PHONE NOs. w/AREA CODE a. Residence b. Business c. Fax 919-732-1300

STATEMENT OF AUTHORIZATION

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

\_\_\_\_\_  
SIGNATURE OF APPLICANT

\_\_\_\_\_  
DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) Macy Grove Road Improvements STIP U-4734		
13. NAME OF WATERBODY, IF KNOWN (if applicable) Reedy Fork (HUC 03030002) and East Belews Creek (03010103)	14. PROJECT STREET ADDRESS (if applicable) Address City - State - Zip -	
15. LOCATION OF PROJECT Latitude: -N 36.124995 Longitude: -W -80.046402		
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Forsyth County Township - Kernersville Range -		

17. DIRECTIONS TO THE SITE

Take I-40 West. Take Exit 206 for I-40 Business/US 421 N toward Kernersville/Winston-Salem Downtown. Take Exit 17 toward Macy Grove Rd, then turn Right onto Macy Grove Rd. The Road will end shortly after crossing East Mountain Street. The beginning of the project is at where Macy Grove Rd currently ends.

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

The North Carolina Department of Transportation (NCDOT), in cooperation with the Federal Highway Administration (FHWA), proposes to extend Macy Grove Road (SR 2601). The project would extend Macy Grove Road from north of SR 1005/Old US 421/East Mountain Road (where it joins project U-2800) to NC 150/North Main Street near Kernersville in Forsyth County. The project is approximately 1.7 miles long and begins on new location north of East Mountain Road heading north across Reedy Fork and an associated wetland system. The alignment then widens a portion of existing SR 2036 (Smith Edwards Road), before going back on new location, ultimately terminating at NC 150, north of the existing intersection at Smith Edwards Road and NC 150.

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

The purpose of the project is to provide a link between I-40 Business/US 421 and NC 150 (N. Main Street) north of Kernersville, to reduce congestion in downtown Kernersville, and to provide a segment of the future Kernersville Loop Road.

**USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED**

20. Reason(s) for Discharge

Impacts will result from construction of new roadway facility and associated connector roads.

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

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
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See attached cover letter & permit drawings

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

Acres See attached cover letter & permit drawings

or

Linear Feet See attached cover letter & permit drawings

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

See attached cover letter & permit drawings

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

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

a. Address- See attached property owners in permit drawing packet.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

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

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

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

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

Amy Euliss

Digitally signed by Amy Euliss  
Date: 2017.11.14 15:19:19 -0500

2017-11-14

marcy.scott@threecodengineering.com

Digitally signed by marcy.scott@threecodengineering.com  
DN: cn=marcy.scott@threecodengineering.com  
Date: 2017.11.14 15:20:11 -0500

2017-11-14

SIGNATURE OF APPLICANT

DATE

SIGNATURE OF AGENT

DATE

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

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



## **Hydraulic Permit Review 4C Meeting Minutes**

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**Project:** U-4734 Macy Grove Road Extension  
**Date:** May 17, 2017  
**Location:** NCDOT Century Center – Structure Design Conference Room C  
**Time:** 9:00 to 10:00 AM  
**Minutes Authored by:** Kyle Stoffer, ICA Engineering

**Attendees:** Trent Cormier – ICA Engineering  
Kyle Stoffer – ICA Engineering  
Galen Cail – NCDOT Hydraulics

**By Phone:** Brett Abernathy–Div. 9  
Marla Chambers – NCWRC  
Amy Euliss – Div. 9  
April Norton- DWR

Jim Mason – NCDOT-NES  
James Lastinger – USACE

Dave Wanucha- DWR  
Al Blanton- Div. 9  
Monte Matthews- USACE

Gail Cail began the meeting with introduction. Trent Cormier provided a brief description of the project and then walked through the Wetland and Surface Water Impact Drawings and then The Buffer Impact Drawings.

There are three jurisdictional features where stream or wetland impacts occur.

- Stream and Buffer Site 1 is on UT to Reedy Fork Creek is a 2@ 7' x 7' Reinforced Concrete Box Culvert
- Stream and Buffer Site 2 is on Reedy Fork Creek is a two span Prestressed Concrete Girders bridge (1 @ 100', 1 @ 80')
- Stream Site 3 is a jurisdictional stream that begins at the outlet of a 24" clay pipe.

Sites 1 and 2 have also have riparian buffer impacts since they are located in the Cape Fear River Basin above Lake Jordan. Site 3 drains to the Roanoke and is not included in the Buffer Impact Drawings. The following comments and decisions were reached.

### **Storm Water Management Plan (SMP) Sheet**

Amy Euliss asked to add a statement in the SMP regarding the 24" storm drain pipe that has a direct, untreated, connection to the RCBC on Site 1. For Site 2, she requested that within the Waterbody Information block we indicate that no deckdrains are discharging into over any water bodies.

### **Plan Sheet 4**

No wetland and surface water or buffer impacts. However, since there is a riparian buffer and a jurisdictional stream located on the sheet it will be added to the final permit impact drawings.

### **Plan Sheet 5 (Stream and Buffer Site 1)**

Marla Chambers asked why the culvert inlet and outlet channel improvements were different. Trent Cormier stated the inlet channel detail design creates a new channel that ties into the existing stream and streamlines the flow to the proposed RCBC. The outlet channel detail was designed for an improved transition back into the existing stream. Mr. Cormier also stated the 7' RCBC barrels widths and channels improvements widths match the existing channel widths upstream and downstream of the proposed RCBC.

### **Plan Sheet 6 (Stream and Buffer Site 2)**

It was stated the bridge is a commitment from a previous merger meeting as the proposed structure even though the drainage area is only 1.2 square miles. Marla Chambers asked if the significant impacts due to fill in the wetlands would create a blockage or disconnect the wetlands and if the wetlands be restored after construction. Trent Cormier said the ponds have shallow berms that will likely be breached during construction and the impacts are shown as worst case for the construction of the bridge and temporary crossing.

Ms. Chambers had a follow up question concerning how the site will be left after construction and if a commitment could be made to restore the wetlands. Ms. Euliss stated the contractor will have to stabilize the project area and the wetlands will likely reform or reconnect after construction, but no commitment would be made to restore the wetlands. The commitment to remove the fill related to the temporary stream crossing will be added to the permit application.

The Division confirmed that the sewer line will be relocated. Galen Cail and Amy Euliss stated that additional impacts may be required to accommodate the relocated sewer line.

### **Plan Sheet 11(Stream Site 3)**

Trent Cormier explained no buffers are on Stream Site 3 because the site is located in the Roanoke River basin. He said the clay pipe was being replaced because it was undersized and clay is not suitable under a proposed roadway. Dave Wanucha noted the existing scour hole located at the existing pipe.

### **Impact Summary Sheet**

Amy Euliss asked if the culvert impact length at Site 1 included the existing stream that is being filled. Trent Cormier said yes it should be included in the culvert total and he will verify it is included in the summary sheet as permanent fill and not bank stabilization.



## Concurrence Point 4B Meeting Minutes

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Project: U-4734 Macy Grove Road Extension  
Date: June 8, 2016  
Location: NCDOT Century Center – Structure Design Conference Room  
Time: 2:30 to 3:30 PM

Minutes Authored by: Stacey Bailey, ICA Engineering

Attendees:	Trent Cormier – ICA Engineering	Mark Staley–NCDOT-REU
	Stacey Bailey – ICA Engineering	Jim Mason – NCDOT-NES
	Galen Cail – NCDOT Hydraulics	Phil Harris– NCDOT-NES
	Marella Buncick – USFWS	Andrew Henderson –USFWS
	John Thomas – USACE	Dave Wanucha- DWR
	Marla Chambers – NCWRC	Keith Raulston- Division 9
	Cynthia Van Der Wiele– USEPA	Al Blanton- Division 9
	Amy Euliss – Division 9	

Gail Cail began the meeting with introduction. Stacey Bailey and Trent Cormier provided a summary of the preliminary drainage design at each jurisdictional feature on the plans. The following comments and decisions were reached.

### **General Comments**

Amy Euliss provided guidance on breaking out the stream and the buffer impacts and how the impacts need to be reflected on the permit drawings. Review the utility plans when they are complete and confirm whether or not there will be buffer impacts for proposed utilities.

### **Plan Sheet 4**

The jurisdictional stream (S19) begins at the end of the existing 24” CMP/15” CMP at Sta. 15+00 –L- RT. The jurisdictional stream drains to the Jordan Lake Watershed; therefore buffers need to be added at this site. Also, note in the Stormwater Management Plan that the existing grass swales that drain to the inlet of the retained 24” CMP have been maintained.

### **Plan Sheet 5**

The jurisdictional stream (S17) located at Sta. 27+85 –L- is an UT to Reedy Creek. This stream is located within the Jordan Lake Watershed; therefore, buffers are required and shown on the plans. This site required a double 7’ X 7’ RCBC. Due to the bends of the existing stream at the inlet end of the culvert, channel improvements are proposed to realign the inlet channel. The existing channel will be plugged with select fill. The storm drainage system approaching from Sta. 22+00 to Sta. 27+65 –L- could not outlet outside of the buffers and receives no treatment due to the steep terrain. Therefore it was recommended to tie the

proposed drainage system into the inlet end of the live/low flow barrel of the box culvert. There was discussion on whether to tie the system into the high flow or low flow barrel but there was agreement the low flow barrel was acceptable. The storm drainage was able to outlet to a preformed scour hole just outside of buffer zone 2 at sta. 28+80 –L- Rt. No comments were made for this storm drainage system. The question was asked if native material would be used to back fill the culvert. Trent Cormier stated that the native material specification will be used and that it is noted on the CSR to backfill with native material.

### **Plan Sheet 6**

Reedy Fork Creek (S16 and W6) are within the Jordan Lake Watershed; therefore buffers are required and shown on the plans. Trent Cormier stated that a new wetland file had been received and is updated on the insert within the plan set. It was commented that the new wetland file did not show the wetlands extending to the top and bottom of the pages as the old wetland file did. ICA committed to coordinate the wetland file with the DEO to make sure the wetlands are shown correctly.

Post meeting discussions were held with Three Oaks, the consultant who did the delineations. It was determined that the wetlands extend beyond the delineation boundaries. However, these were not assessed due to a decrease in the size of the project study area. The original study area was much larger due to the need to assess multiple alternatives. Please carry the wetland boundaries to the R/W in all 4 quadrants and add a note that says wetlands extend beyond the R/W but have not been re-verified in the field to due a reduced study area. Division DDC will field survey the wetland flags in the field this winter.

The question came up of why a bridge was used at this site since the drainage area is only 1.2 sq. miles. As part of the merger process, a bridge was decided on at the CP 2A meeting as the best option for this location. It was noted that in the wetland and buffer permits that the greenway would need to be broken out separately. The impacts for the greenway will be coordinated with the DEO. There are no deck drains on the bridge and the adjacent storm drainage outlets into the wetlands. The pipes that outlet to the wetlands are at a flat grade so the water entering the wetlands will be non erosive. To achieve this at the outlet of 0603 a drop JB w/MH will need to be added upstream.

### **Plan Sheet 7**

No jurisdictional features.

### **Plan Sheet 8**

No jurisdictional features.

### **Plan Sheet 9**

No jurisdictional features.



### **Plan Sheet 10**

No jurisdictional features.

### **Plan Sheet 11**

There is an intermittent jurisdictional stream located at Sta. 20+50 –Y13- LT. The channel upstream of the 24” clay/cmp pipe is ephemeral and not jurisdictional; the stream become jurisdictional at outlet of the existing 24” clay/cmp pipe. This stream is a UT to Belews Creek which drains to the Roanoke River Basin. The Roanoke River Basin does not have buffer rules. It was commented that the outlet pipe needs to be better aligned with the stream. ICA Engineering has agreed to better align the outlet pipe to the stream and show the rip rap “on the banks only.”

### **Plan Sheet 12**

No jurisdictional features.

### **Plan Sheet 13**

No jurisdictional features.



North Carolina Department of Transportation

Highway Stormwater Program  
**STORMWATER MANAGEMENT PLAN**  
 FOR NCDOT PROJECTS



(Version 2.07; Released October 2016)

WBS Element: 36600.3.1      TIP No.: U-4734      County(ies): Forsyth      Page 1 of 3

**General Project Information**

WBS Element:	36600.3.1	TIP Number:	U-4734	Project Type:	New Location	Date:	10/19/2017
NCDOT Contact:	Matt Lauffer, PE		Contractor / Designer:	Trent Cormier, PE, CPESC, CPSWQ			
Address:	NCDOT Hydraulics Unit 1590 Mail Service Raleigh, NC 27699-1590		Address:	ICA Engineering 5121 Kingdom Way, Suite 100 Raleigh, NC 27607			
	Phone:	(919) 707-6703		Phone:	(919) 900-1608		
	Email:	mslauffer@ncdot.gov		Email:	trenton.cormier@hdrinc.com		
City/Town:	Kernersville		County(ies):	Forsyth			
River Basin(s):	Cape Fear	Roanoke	CAMA County?	No			
Wetlands within Project Limits?	Yes						

**Project Description**

Project Length (lin. miles or feet):	1.73 miles	Surrounding Land Use:	Industrial, Residential				
	<b>Proposed Project</b>			<b>Existing Site</b>			
Project Built-Upon Area (ac.)	52.3	ac.	12.4	ac.			
Typical Cross Section Description:	The proposed section for Macy Grove Rd. is a four lane divided section with curb and gutter. The grass median width is 23', the inside lanes are 12', and the outside lanes are 14'. There is a 10' grass shoulder.			Macy Grove Rd. currently has two 12-foot wide lanes with 4- to 6-foot wide grass shoulders.			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	10300	Year:	2038	Existing:	Year:	
General Project Narrative: (Description of Minimization of Water Quality Impacts)	<p>U-4734 includes extending Macy Grove Road on new location from north of Old US 421/East Mountain Street to NC 150. There are two proposed major structures involved with the construction of the Macy Grove Road extension, both of which will be constructed at new stream crossing locations. The first proposed structure, over UT to Reedy Fork Creek, is a 2@ 7' X 7' Reinforced Concrete Box Culvert (RCBC). The recommended width of the roadway is 111' shoulder point to shoulder point. A preformed scour hole was used at the edge of the buffer to diffuse flow from one of the two storm drainage systems. The other storm drainage system ties a 24" pipe directly to the culvert in order to prevent erosive velocities from the storm drainage system in the buffer zones. This pipe is a direct untreated connection to the RCBC. The second proposed structure, on Reedy Fork Creek, is a two span, dual bridge (1@100', 1@80'), 54" pre-stressed concrete girders with 4' deep caps. The storm drainage systems in the area of the bridge outlet outside of the buffer zones with non-erosive velocities into the wetlands surrounding the site. The wetlands act as a natural filtration system for the storm drainage. The third jurisdictional site along NC 150 does not require buffers. This site replaces an existing 24" clay/RCP pipe with a 36" RCP storm system pipe. These structures have been designed to have as little environmental and surface water impacts as possible.</p>						

**Waterbody Information**

Surface Water Body (1):	Reedy Fork Creek		NCDWR Stream Index No.:	16-11-(1)			
NCDWR Surface Water Classification for Water Body	Primary Classification:	Water Supply III (WS-III)					
	Supplemental Classification:	Nutrient Sensitive Waters (NSW)					
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:				Buffer Rules in Effect:	Jordan Lake		
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	Dissipator Pads Provided in Buffer?				
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							



**North Carolina Department of Transportation**  
**Highway Stormwater Program**  
**STORMWATER MANAGEMENT PLAN**  
 FOR NCDOT PROJECTS



(Version 2.07; Released October 2016)

**WBS Element:** 36600.3.1      **TIP No.:** U-4734      **County(ies):** Forsyth      **Page** 2 **of** 3

**Additional Waterbody Information**

<b>Surface Water Body (2):</b>	Beaver Creek		<b>NCDWR Stream Index No.:</b>	16-11-2	
<b>NCDWR Surface Water Classification for Water Body</b>	<b>Primary Classification:</b>		Water Supply III (WS-III)		
	<b>Supplemental Classification:</b>		Nutrient Sensitive Waters (NSW)		
<b>Other Stream Classification:</b>	None				
<b>Impairments:</b>	None				
<b>Aquatic T&amp;E Species?</b>	No	<b>Comments:</b>			
<b>NRTR Stream ID:</b>			<b>Buffer Rules in Effect:</b>		
<b>Project Includes Bridge Spanning Water Body?</b>	No	<b>Deck Drains Discharge Over Buffer?</b>	N/A	<b>Dissipator Pads Provided in Buffer?</b>	N/A
<b>Deck Drains Discharge Over Water Body?</b>	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
	(If yes, provide justification in the General Project Narrative)				
<b>Surface Water Body (3):</b>	East Belews Creek		<b>NCDWR Stream Index No.:</b>	22-27-8-(1)	
<b>NCDWR Surface Water Classification for Water Body</b>	<b>Primary Classification:</b>		Class C		
	<b>Supplemental Classification:</b>				
<b>Other Stream Classification:</b>	None				
<b>Impairments:</b>	None				
<b>Aquatic T&amp;E Species?</b>	No	<b>Comments:</b>			
<b>NRTR Stream ID:</b>			<b>Buffer Rules in Effect:</b>		
<b>Project Includes Bridge Spanning Water Body?</b>	No	<b>Deck Drains Discharge Over Buffer?</b>	N/A	<b>Dissipator Pads Provided in Buffer?</b>	N/A
<b>Deck Drains Discharge Over Water Body?</b>	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
	(If yes, provide justification in the General Project Narrative)				



North Carolina Department of Transportation  
 Highway Stormwater Program  
**STORMWATER MANAGEMENT PLAN**  
 FOR NCDOT PROJECTS



(Version 2.07; Released October 2016)

WBS Element:

TIP No.: U-4734

County(ies): Forsyth

Page 3 of 3

**Preformed Scour Holes and Energy Dissipators**

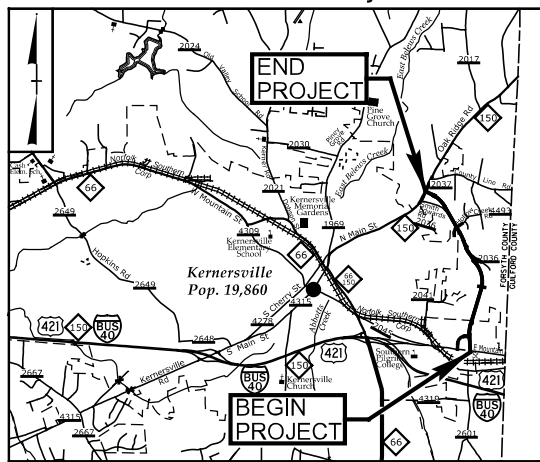
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5	-L- 28+65 RT.	(1)Reedy Fork Creek	PSH	Class 'B'	0.8	Pipe	15	3.5	0.1	Yes

Additional Comments

Blank area for additional comments.

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

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



VICINITY MAP

ROW PLANS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**FORSYTH COUNTY**

LOCATION: KERNERSVILLE - SR 2601 (MACY GROVE RD) EXTENSION  
FROM NORTH OF SR 1005 (EAST MOUNTAIN ST) TO FUTURE NC 150  
(NORTH MAIN ST)

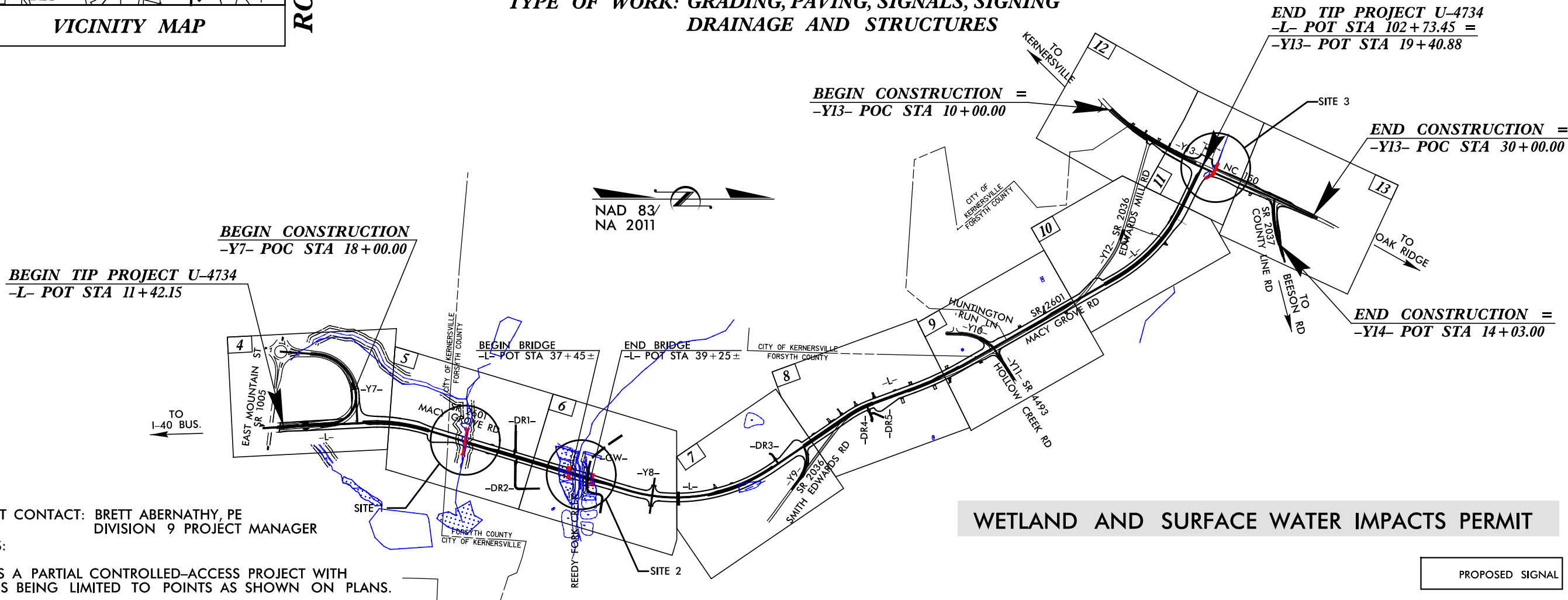
TYPE OF WORK: GRADING, PAVING, SIGNALS, SIGNING  
DRAINAGE AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4734	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
36600.1.2	STP-2601(3)	PE	
36600.2.1	STP-2601(3)	RW	
36600.3.1	STP-2601(3)	CONST	

PERMIT DRAWING  
SHEET 1 OF 19



TIP PROJECT: U-4734



NCDOT CONTACT: BRETT ABERNATHY, PE  
DIVISION 9 PROJECT MANAGER

NOTES:

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.

PORTIONS OF THIS PROJECT ARE WITHIN THE MUNICIPAL BOUNDARIES OF KERNERSVILLE.

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

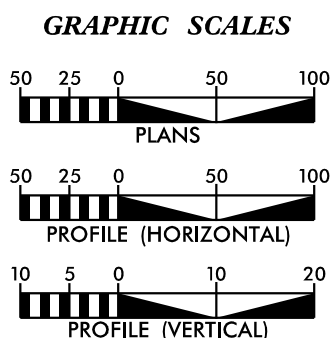
WETLAND AND SURFACE WATER IMPACTS PERMIT

PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

10/19/2017 ICA ENGINEERING, INC. R:\Hydraulics\PERMITS\Drawings\U4734\_hyd\_perm\_wet\_tsh.dgn

CONTRACT:



**DESIGN DATA**

ADT (2018) =	7,400
ADT (2038) =	10,300
K =	11 %
D =	55 %
T =	6 % *
V =	50 MPH
* TTST =	2% DUAL 4%
FUNC CLASS =	COLLECTOR REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-4734 =	1.695 MILES
LENGTH STRUCTURES TIP PROJECT U-4734 =	0.034 MILES
TOTAL LENGTH TIP PROJECT U-4734 =	1.729 MILES

Prepared for the North Carolina Department of Transportation In the office of:	<b>ICA</b> ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: JAN 20, 2017	DENA C. SNEAD, PE PROJECT ENGINEER
LETTING DATE: JUNE 19, 2018	JORDAN BOND PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.


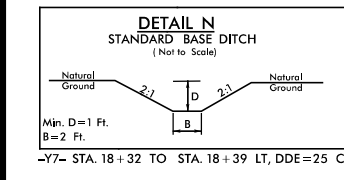
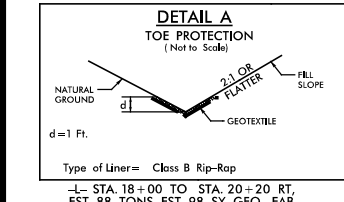
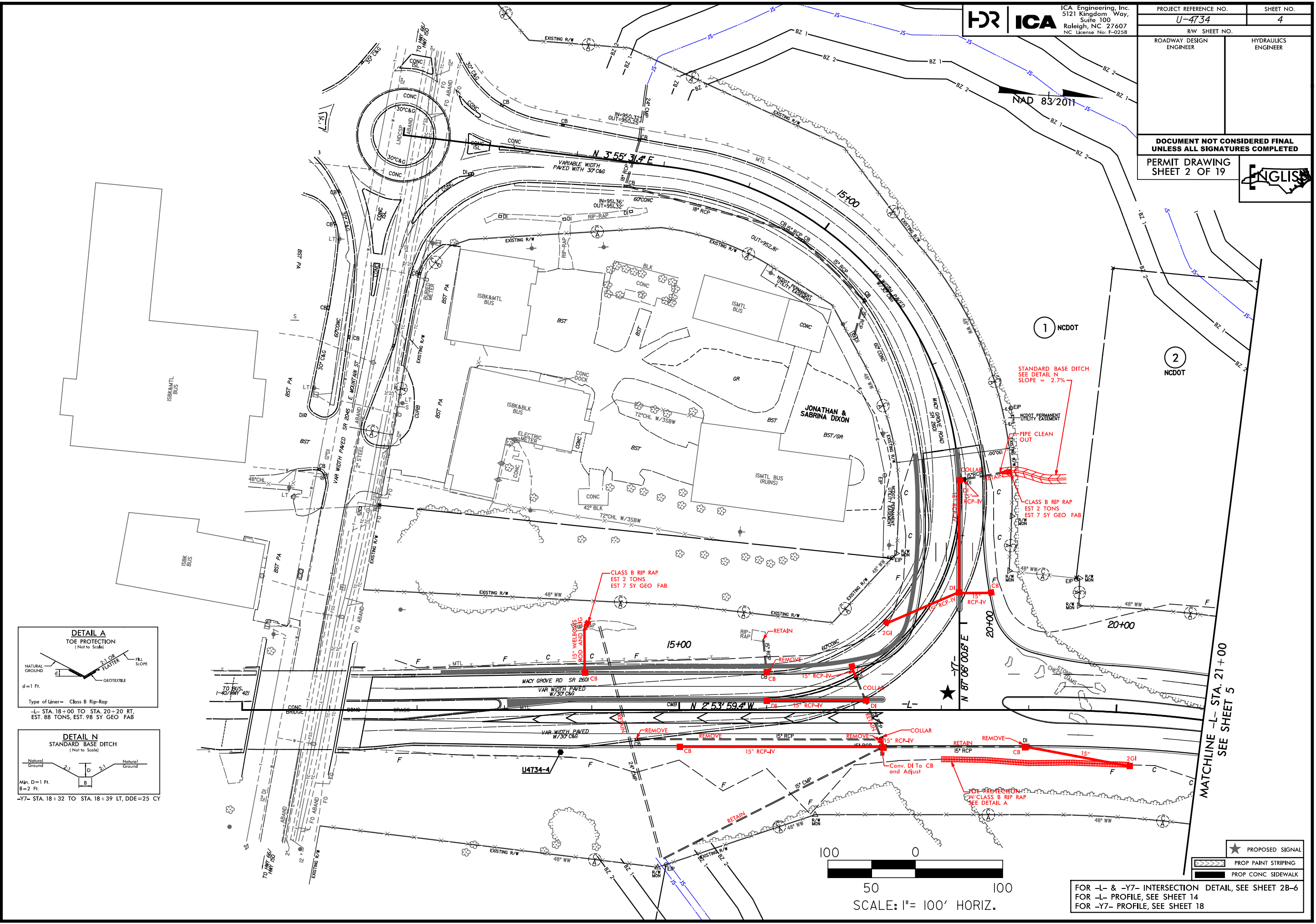
DIVISION OF HIGHWAYS

STATE OF NORTH CAROLINA

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RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	

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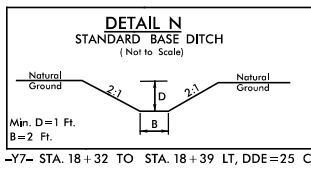
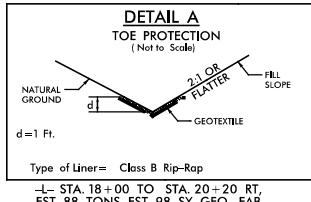
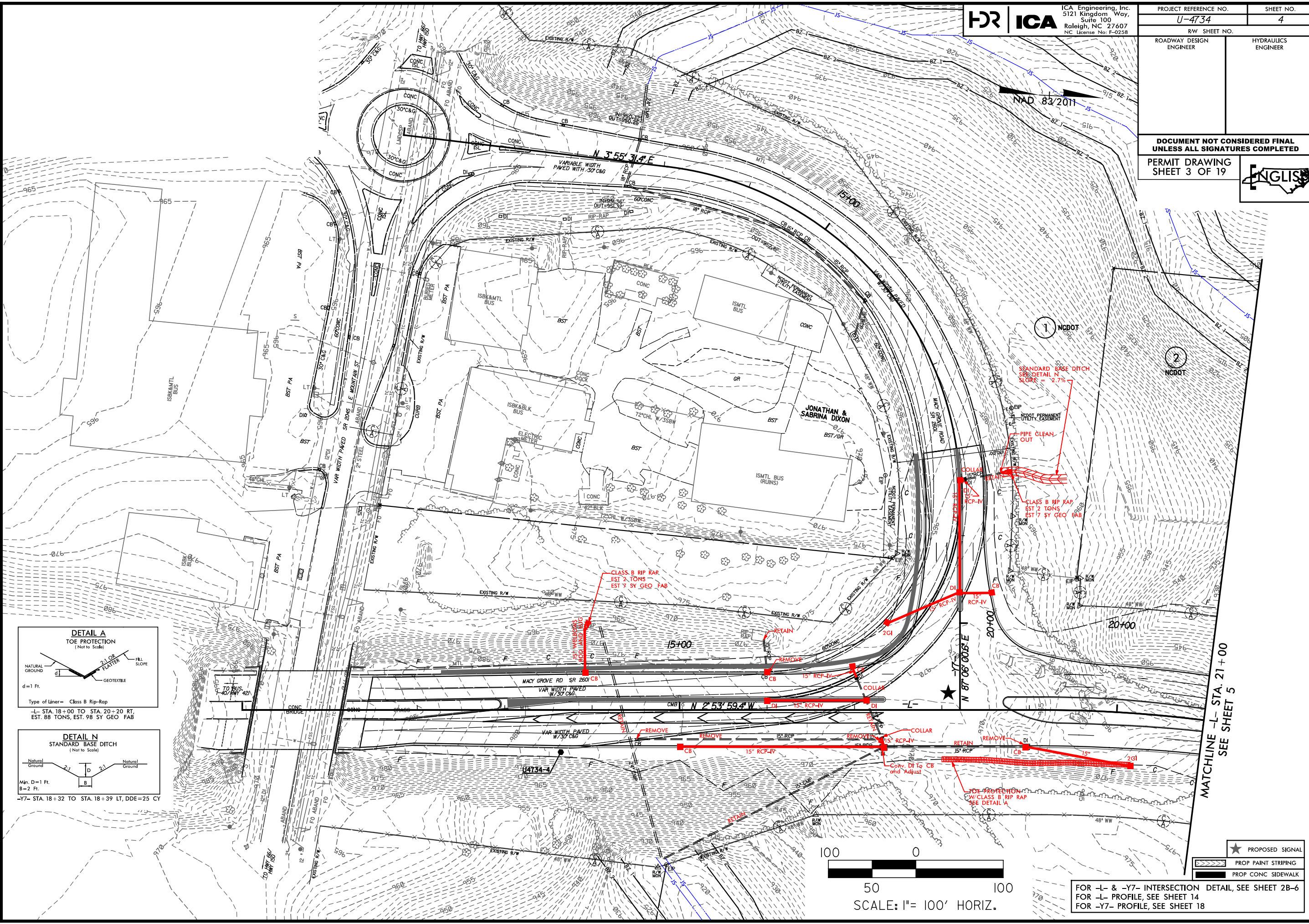
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 SHEET 2 OF 19

FOR -L- & -Y7- INTERSECTION DETAIL, SEE SHEET 2B-6  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -Y7- PROFILE, SEE SHEET 18

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★ PROPOSED SIGNAL  
 ▨ PROP PAINT STRIPING  
 ▨ PROP CONC SIDEWALK

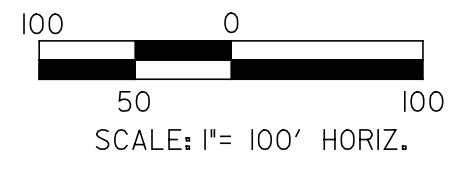
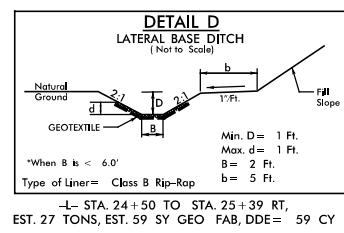
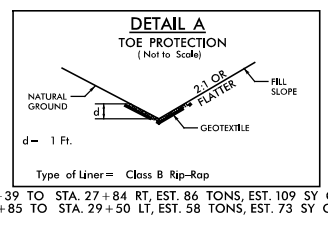
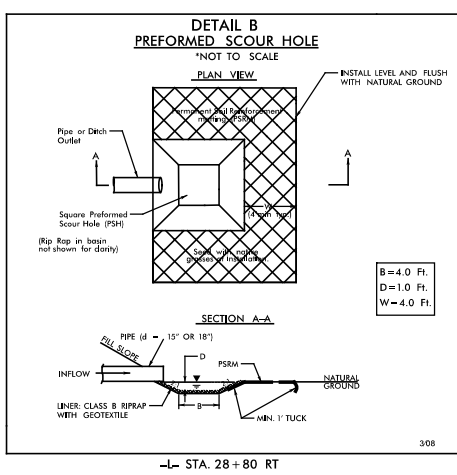
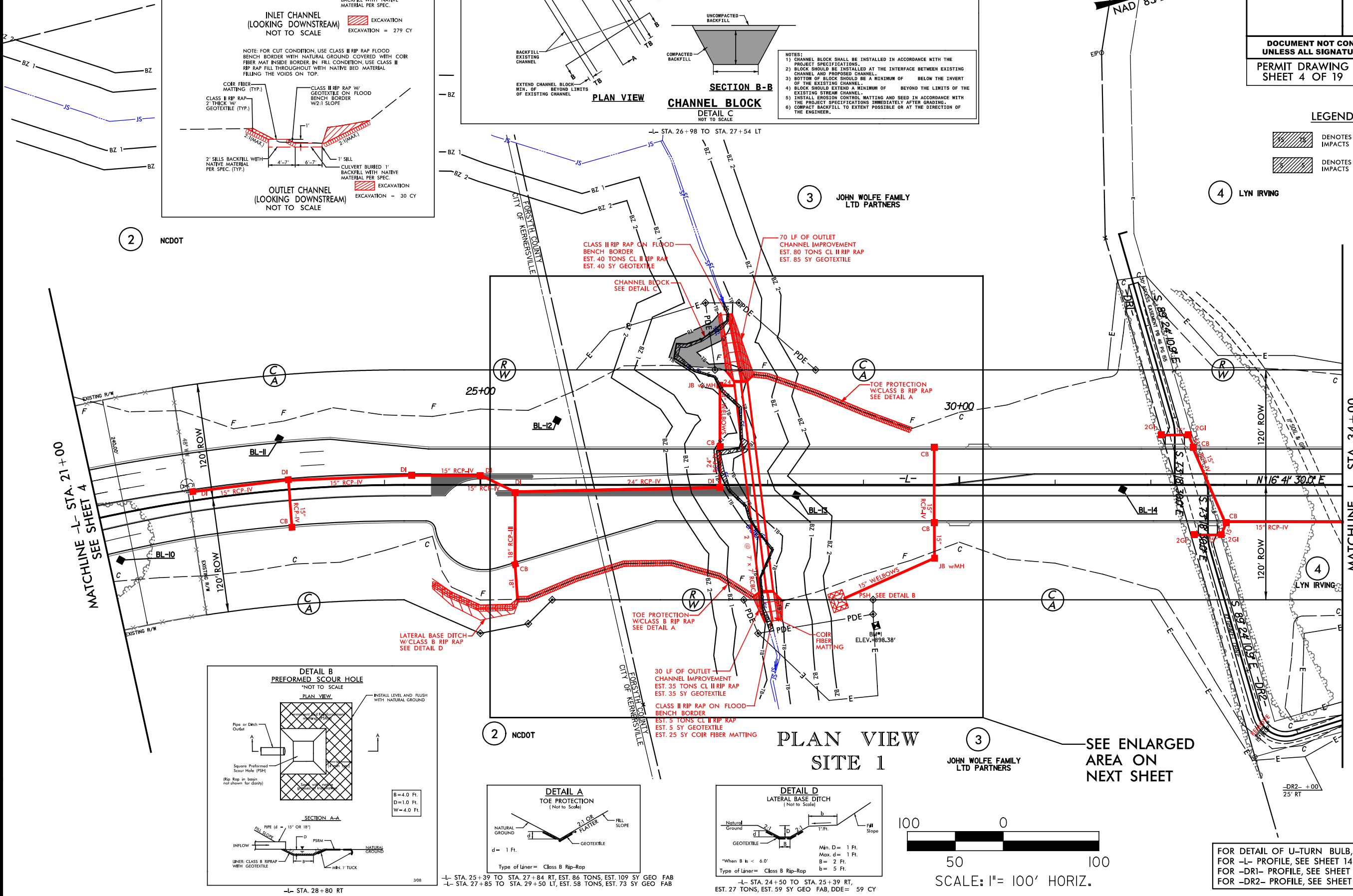
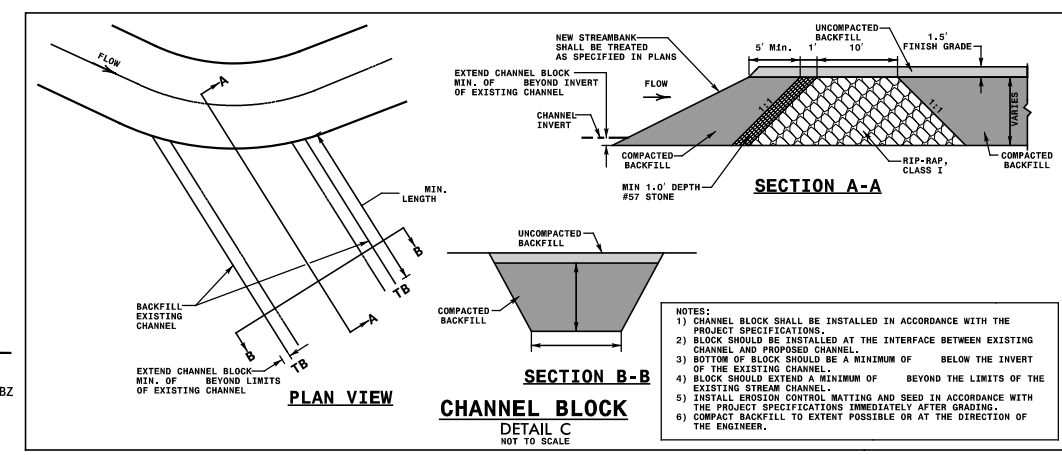
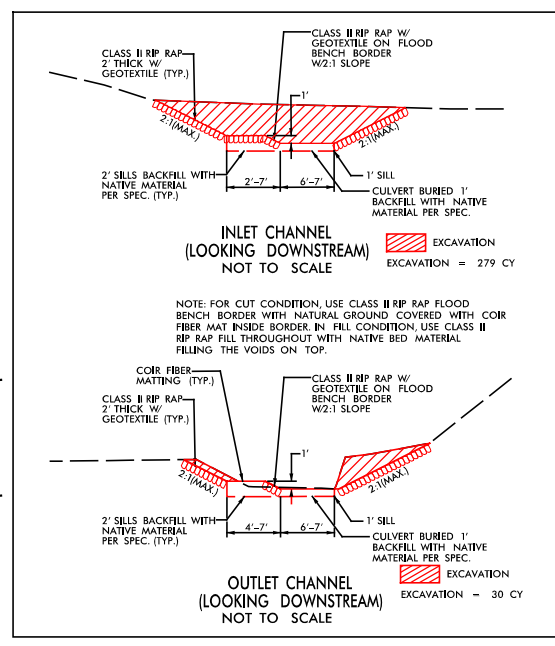
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 FOR -L- PROFILE, SEE SHEET 14  
 FOR -Y7- PROFILE, SEE SHEET 18

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**LEGEND**

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



FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DR1- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21

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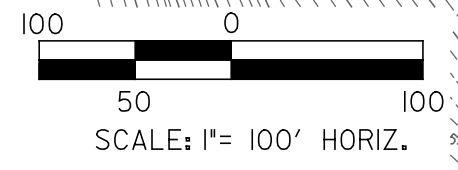
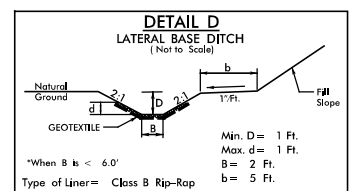
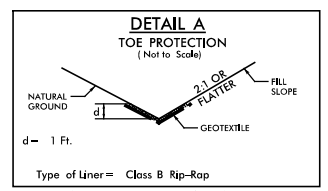
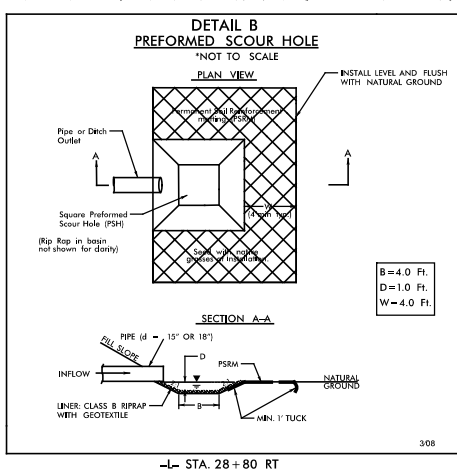
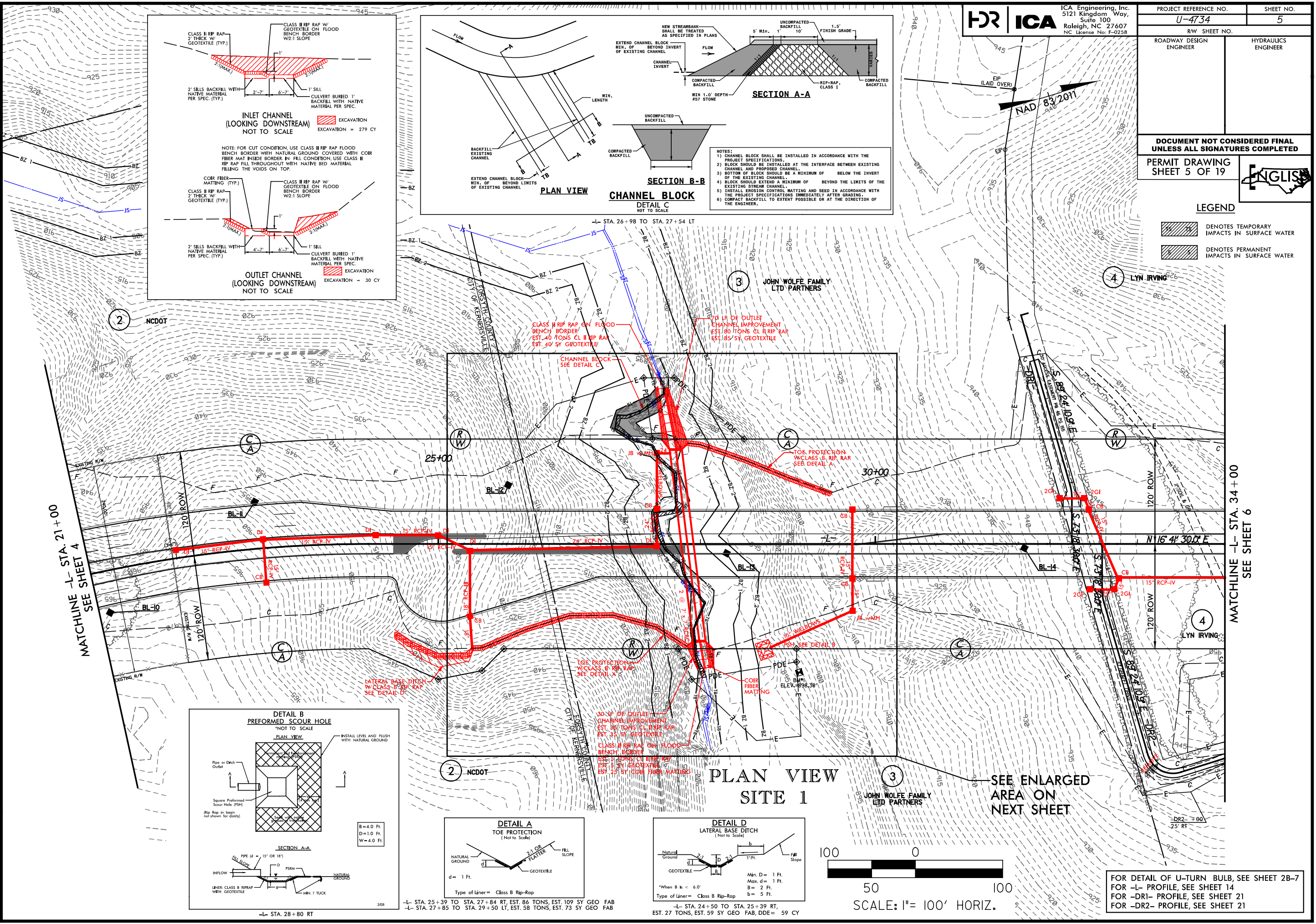
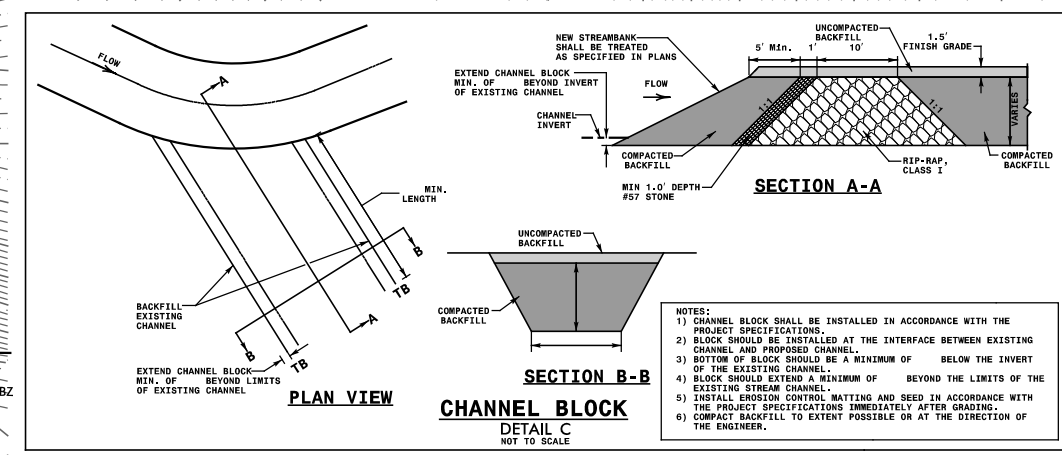
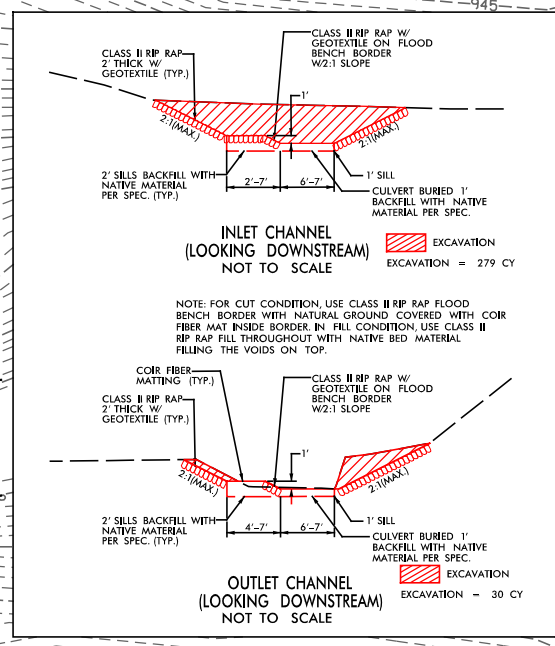
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 SHEET 5 OF 19



**LEGEND**

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



FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DRI- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21

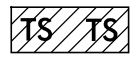

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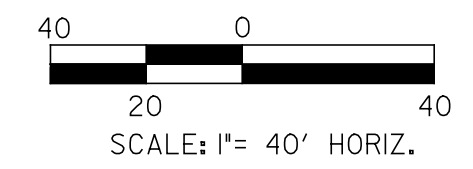
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PERMIT DRAWING  
SHEET 6 OF 19

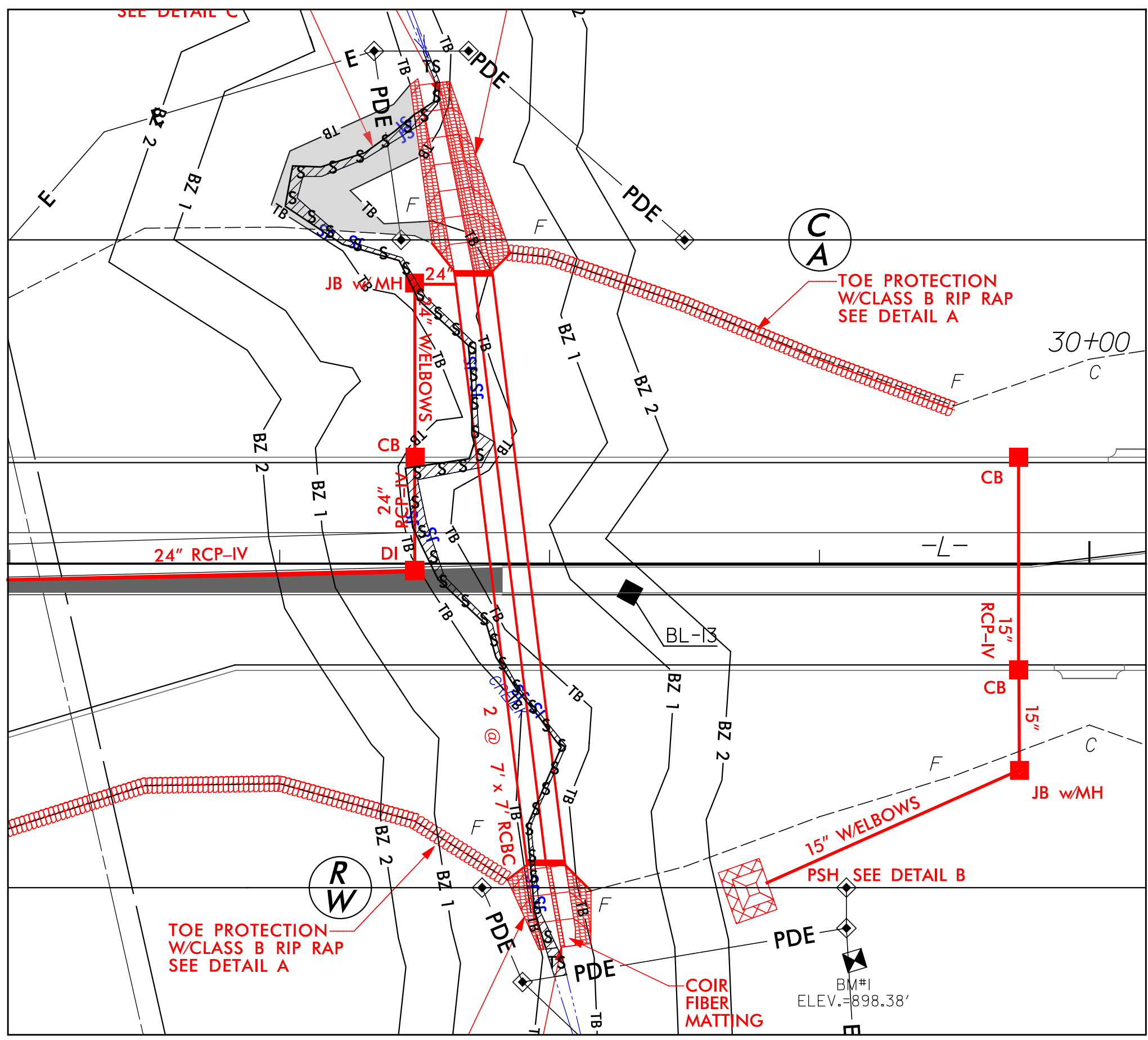


**LEGEND**

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



FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 14  
FOR -DR1- PROFILE, SEE SHEET 21  
FOR -DR2- PROFILE, SEE SHEET 21




**DETAIL SHEET FOR  
SITE 1**

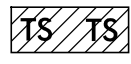

10/19/2017  
 ICA ENGINEERING, INC.  
 Environmental\Drawings\U4734\_hud\_perm\_wst\_ech\_05A.dgn

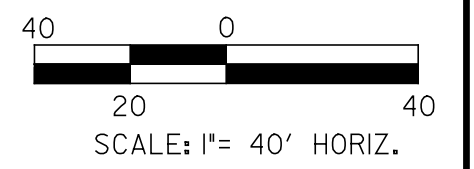
DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING  
 SHEET 7 OF 19

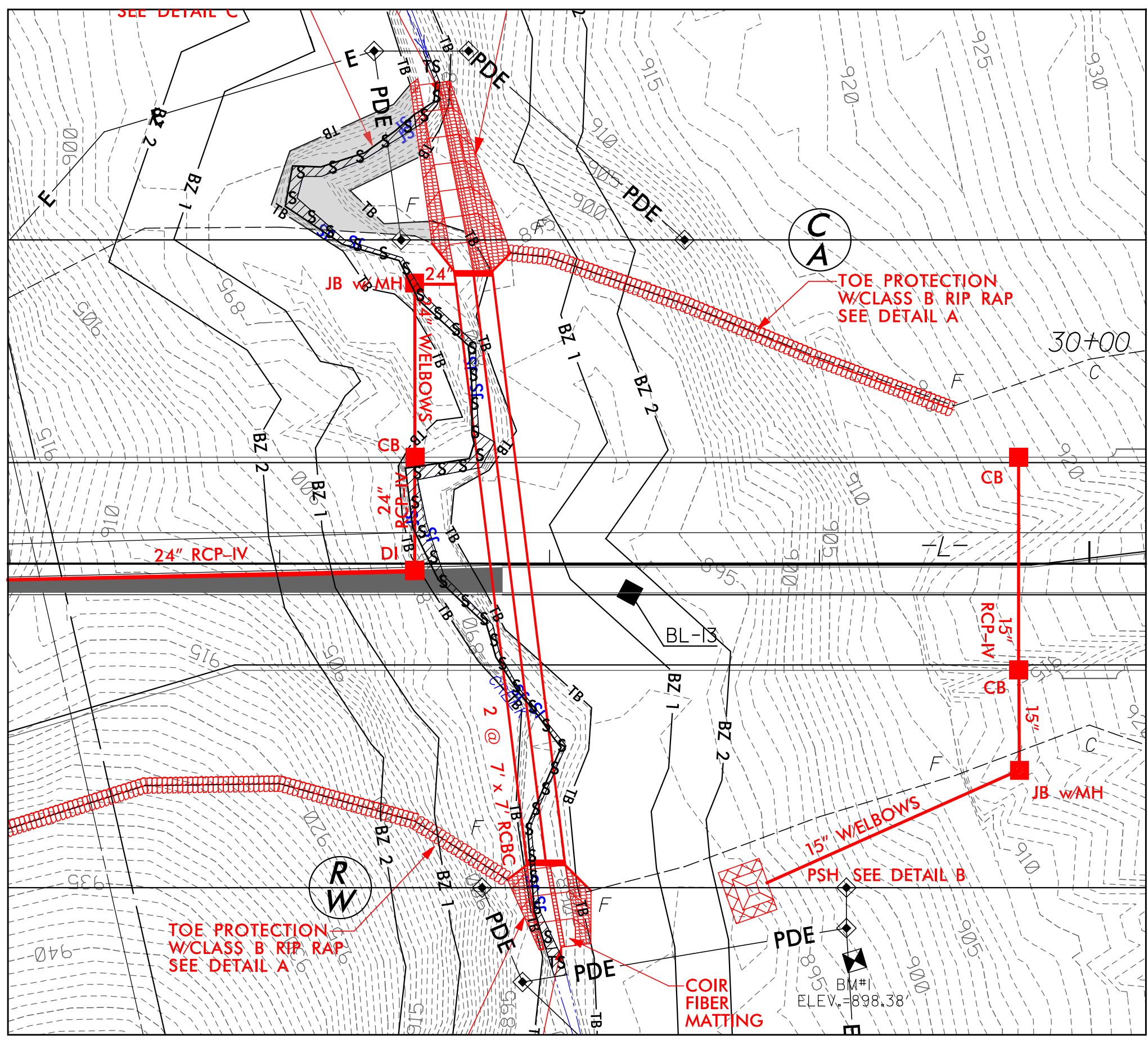



**LEGEND**

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



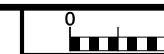
FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DR1- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21



DETAIL SHEET FOR  
 SITE 1

10/19/2017  
 ICA ENGINEERING, INC.  
 Environmental\Drawings\U4734\_hud\_perm\_wst\_ech\_05A.dwg

6/23/16



PROJ. REFERENCE NO. SHEET NO.

PERMIT DRAWING SHEET 8 OF 19

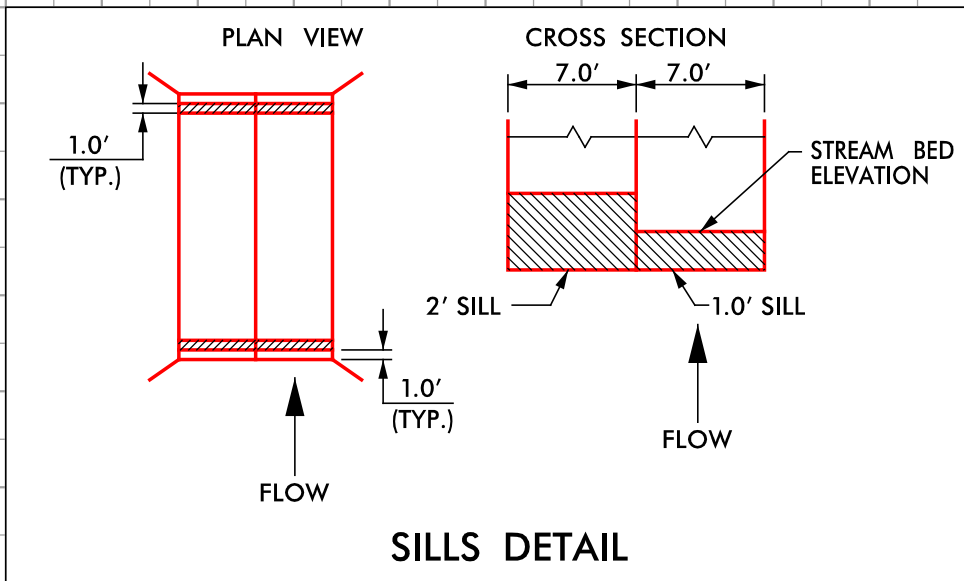


NOTE: FOR CUT CONDITION, USE CLASS II RIP RAP FLOODPLAIN BENCH BORDER WITH NATURAL GROUND COVERED WITH COIR FIBER MAT INSIDE BORDER. IN FILL CONDITION, USE CLASS II RIP RAP FILL THROUGHOUT WITH NATIVE BED MATERIAL FILLING THE VOIDS ON TOP.

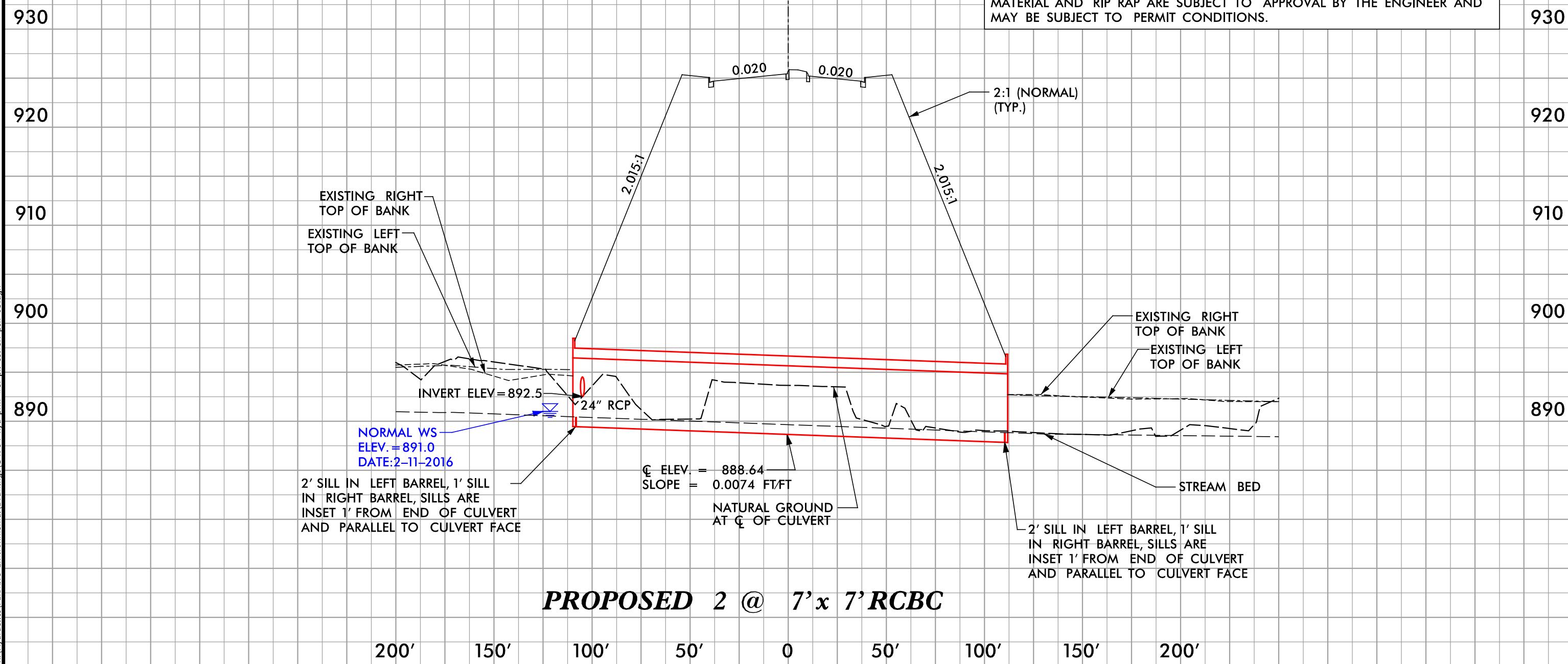
NOTE: NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE LOW FLOW CULVERT. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, THE NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FACILITATE ANIMAL PASSAGE. THE TOP SURFACE OF THE NATURAL STREAM BED MATERIAL SHALL BE PLACED AND LEVELED TO A FLAT SURFACE TO ALLOW FOR ANIMAL PASSAGE. THE HIGH FLOW BARRELS SHALL BE BACK FILLED WITH NATIVE MATERIAL AND/OR RIP RAP. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

# SITE 1

## -L- 27+85



☐ STA. 27+85 -L-  
 2 @ 7' x 7' RCBC  
 SKEW 83 DEGREES  
 GP ELEV. = 925.43



2' SILL IN LEFT BARREL, 1' SILL IN RIGHT BARREL, SILLS ARE INSET 1' FROM END OF CULVERT AND PARALLEL TO CULVERT FACE

☐ ELEV. = 888.64  
 SLOPE = 0.0074 FT/FT  
 NATURAL GROUND AT ☐ OF CULVERT

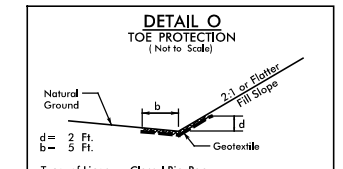
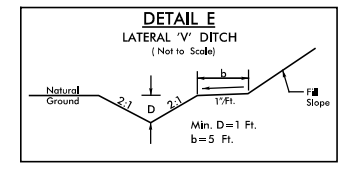
2' SILL IN LEFT BARREL, 1' SILL IN RIGHT BARREL, SILLS ARE INSET 1' FROM END OF CULVERT AND PARALLEL TO CULVERT FACE

### PROPOSED 2 @ 7' x 7' RCBC

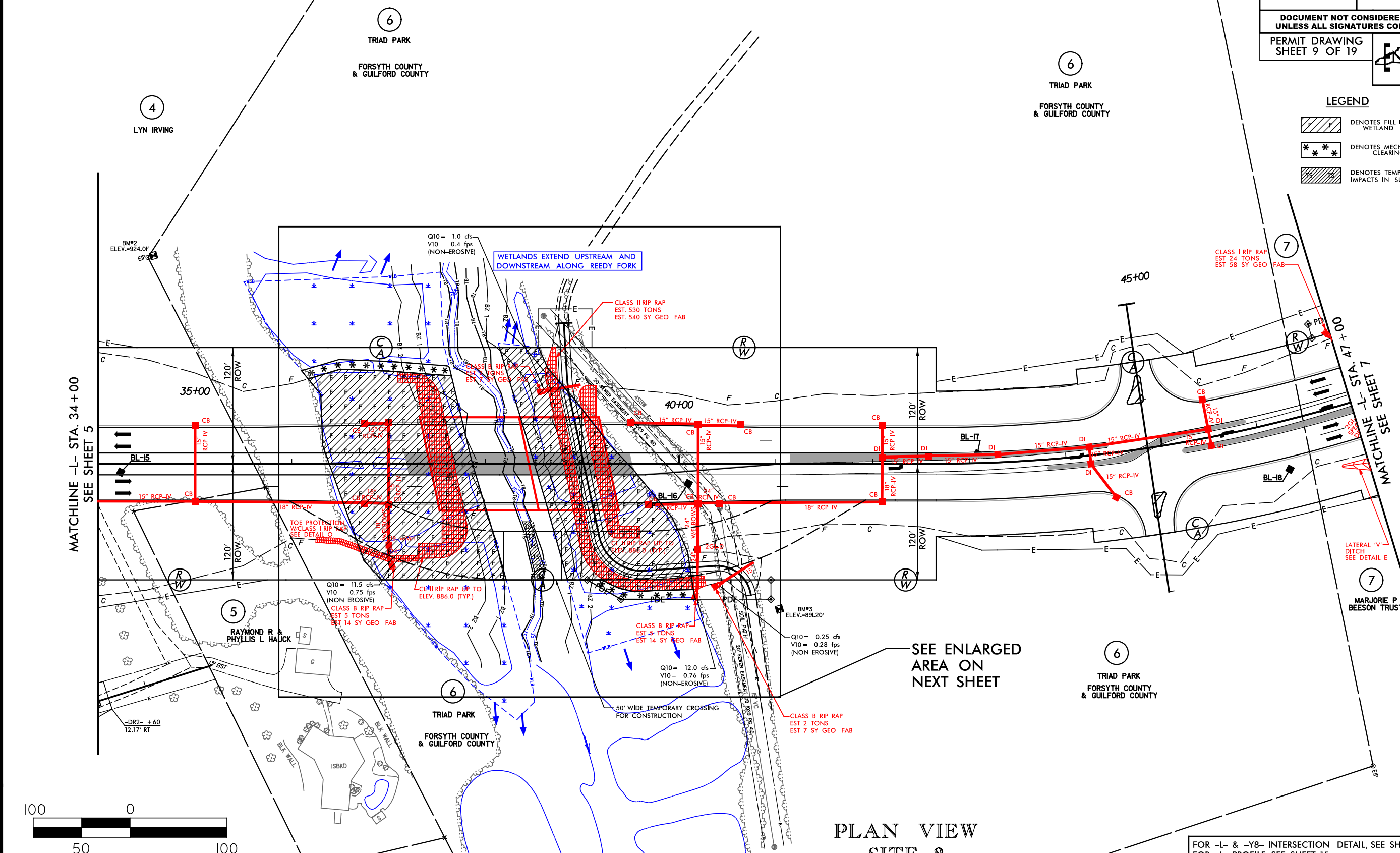
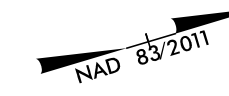
10/19/2017 ICA ENGINEERING, INC. R:\Hydraulics\PERMITS Environmental\Drawings\U4734 hyd prm wet pfl culvert psh 05.dgn

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWING  
 SHEET 9 OF 19



-L- STA. 46+75 TO STA. 47+00 RT, DDE=13 CY  
 -L- STA. 36+25 TO STA. 37+31 RT, EST. 109 TONS, EST. 106 SY GEO FAB



**LEGEND**

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

MATCHLINE -L- STA. 34+00  
 SEE SHEET 5

MATCHLINE -L- STA. 47+00  
 SEE SHEET 7

SEE ENLARGED AREA ON NEXT SHEET



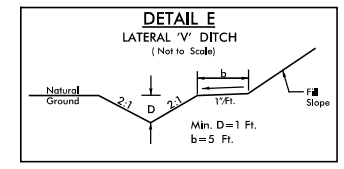
**PLAN VIEW  
 SITE 2**

FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 15  
 FOR -GW- PROFILE, SEE SHEET 21

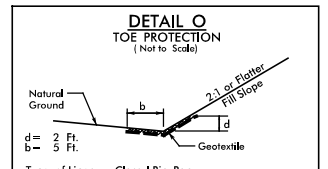
10/19/2017  
 ICA ENGINEERING, INC.  
 5121 KINGDOM WAY, SUITE 100, RALEIGH, NC 27607  
 PROJECT: U-4734, DRAWING: U-4734-PLAN-SITE-2, DATE: 10/19/2017, DRAWN BY: JCH, CHECKED BY: JCH, APPROVED BY: JCH

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWING  
 SHEET 10 OF 19



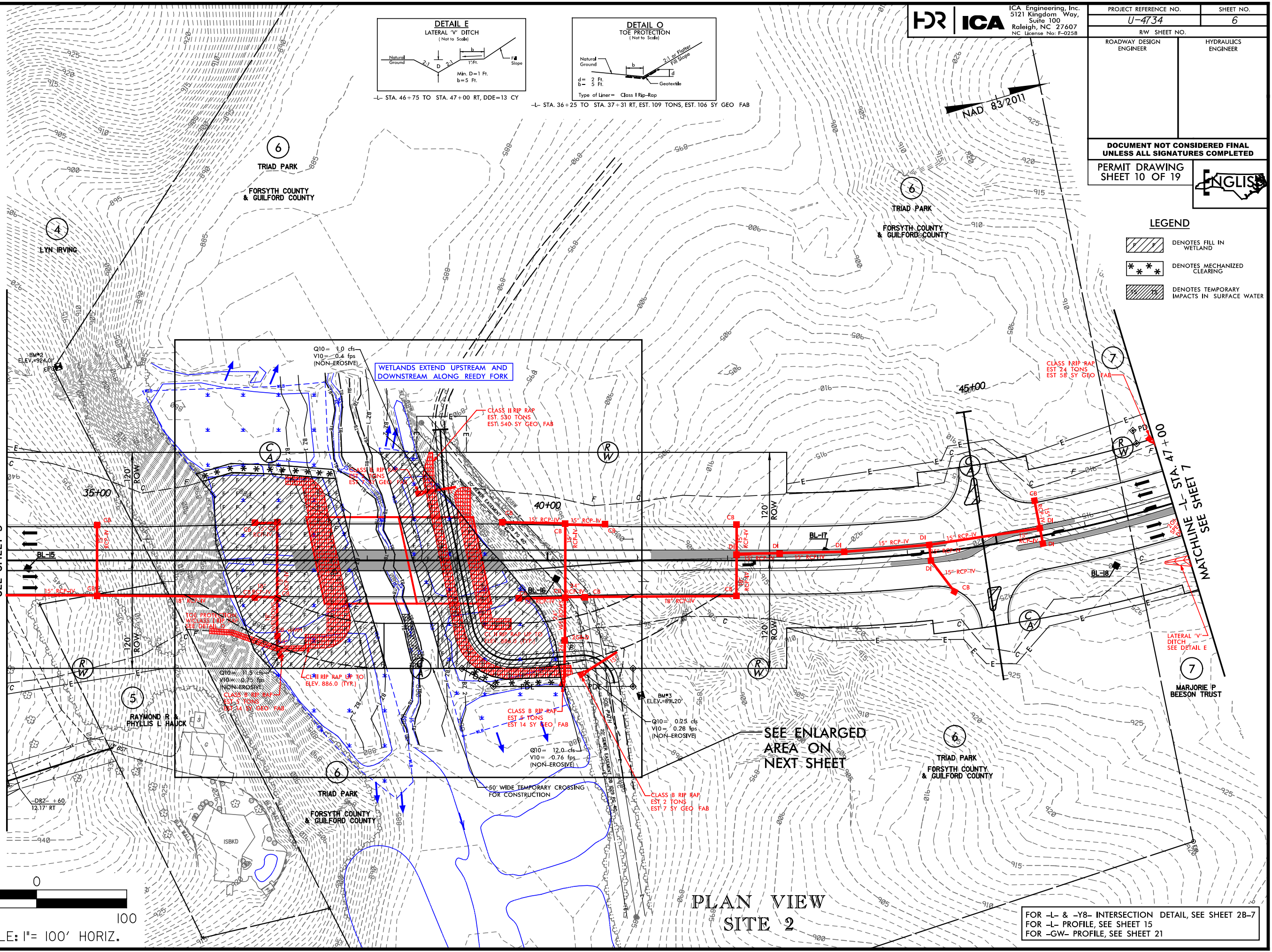
-L- STA. 46+75 TO STA. 47+00 RT, DDE=13 CY



-L- STA. 36+25 TO STA. 37+31 RT, EST. 109 TONS, EST. 106 SY GEO FAB

**LEGEND**

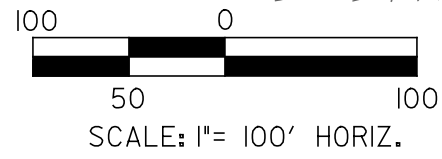
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



MATCHLINE -L- STA. 34+00  
 SEE SHEET 5

MATCHLINE -L- STA. 47+00  
 SEE SHEET 7

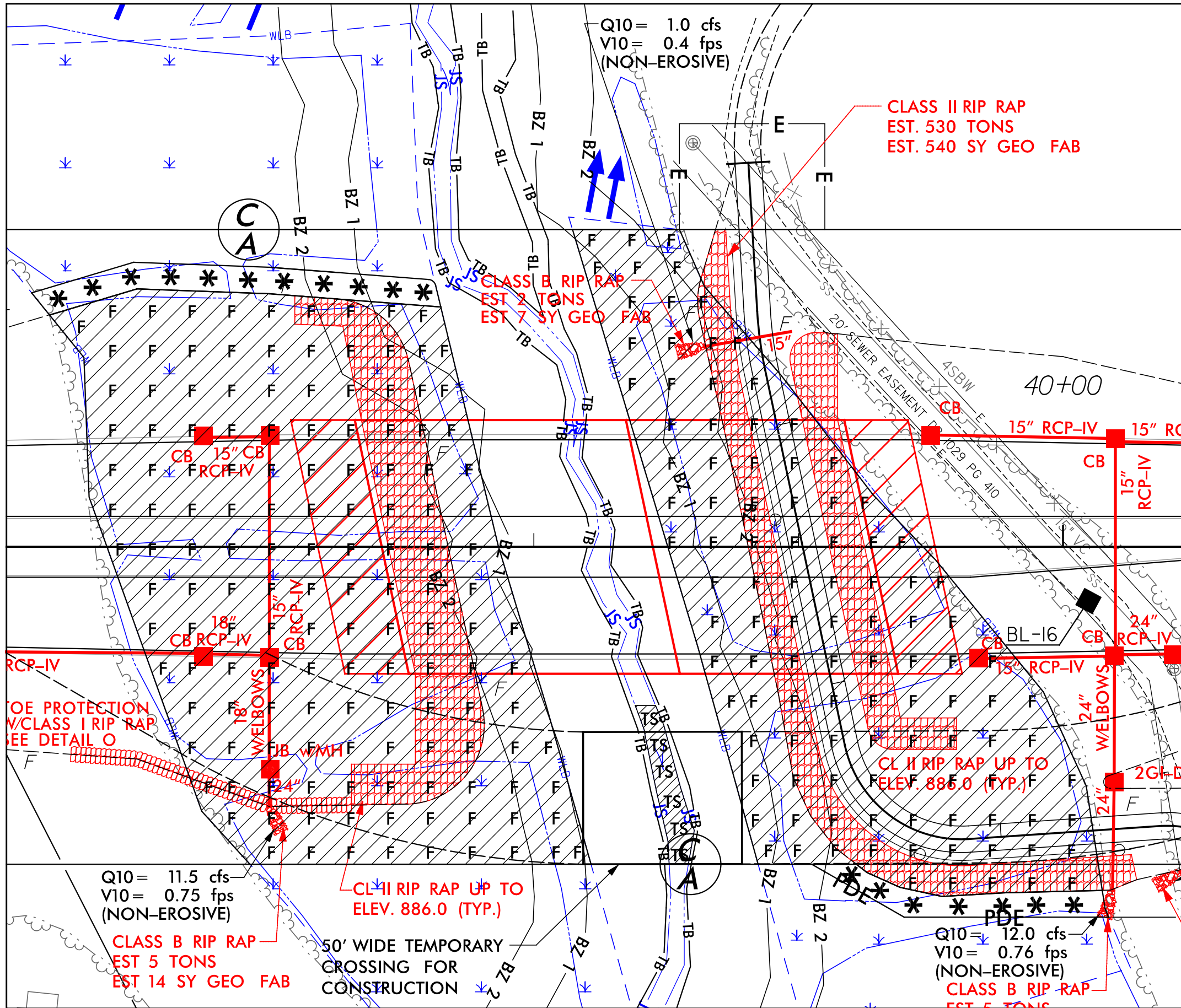
SEE ENLARGED AREA ON NEXT SHEET



PLAN VIEW  
 SITE 2

FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 15  
 FOR -GW- PROFILE, SEE SHEET 21

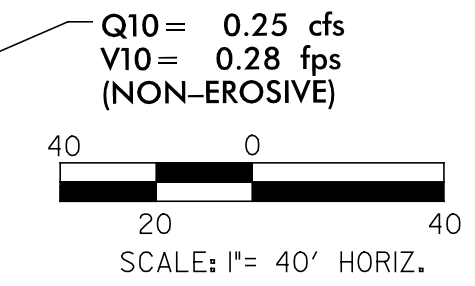
10/19/2017  
 ICA ENGINEERING, INC.  
 5121 KINGDOM WAY, SUITE 100, RALEIGH, NC 27607  
 ENVIRONMENTAL PERMITS, U4734, hnd\_perm\_wet\_est\_06.dgn



NAD 83/2011

### LEGEND

F F	DENOTES FILL IN WETLAND
***	DENOTES MECHANIZED CLEARING
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

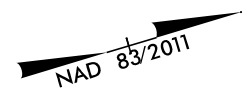


DETAIL SHEET FOR  
SITE 2

FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 15  
FOR -GW- PROFILE, SEE SHEET 21

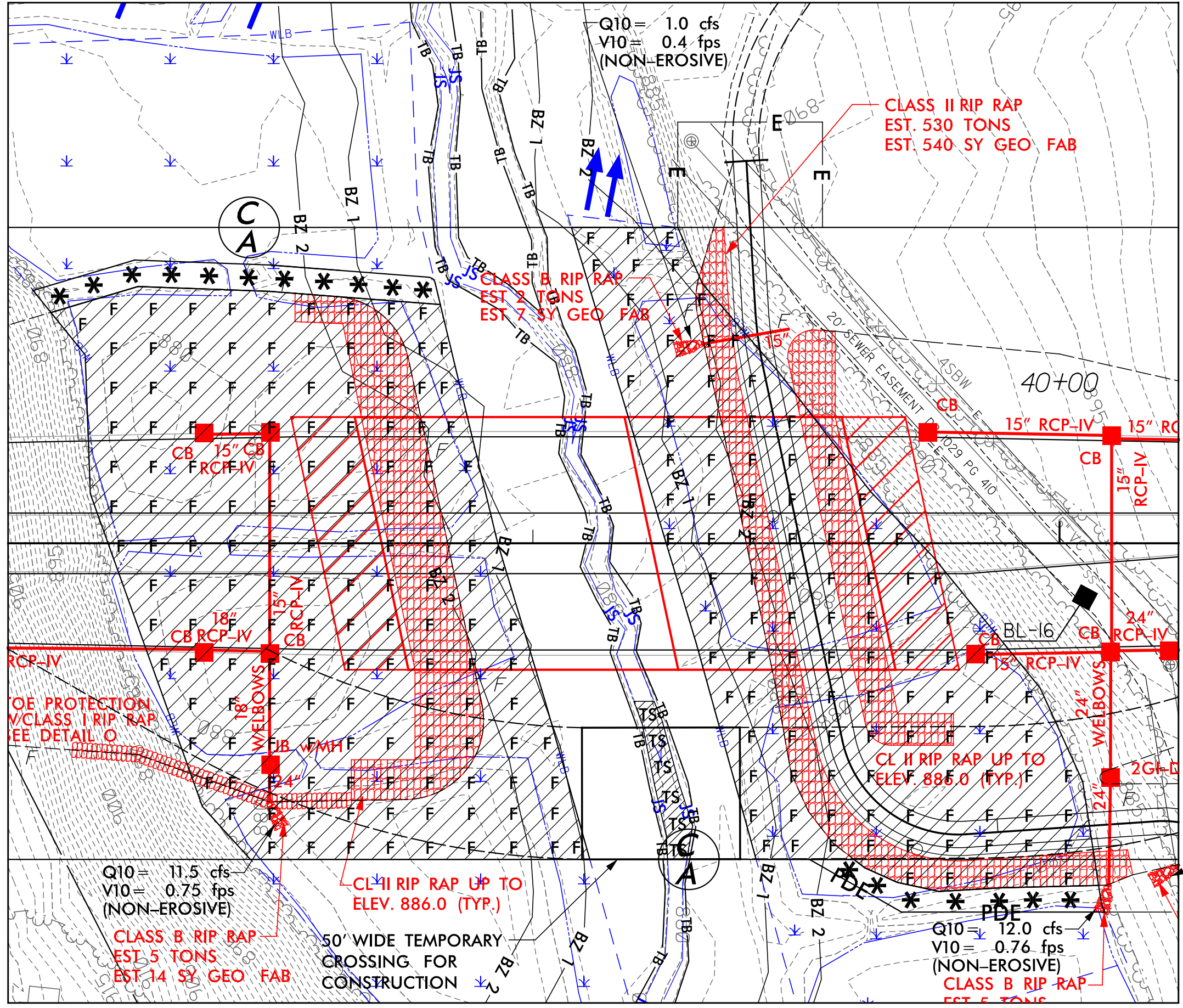
10/19/2017  
 ICA ENGINEERING, INC.  
 ENVIRONMENTAL PERMITS  
 C:\Users\mca\Documents\U-4734\_hud\_perm\_wet\_csh\_06A.dgn

PROJECT REFERENCE NO. <b>U-4734</b>	SHEET NO. <b>6A</b>
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PERMIT DRAWING SHEET 12 OF 19	



**LEGEND**

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



FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 15  
FOR -GW- PROFILE, SEE SHEET 21

**DETAIL SHEET FOR  
SITE 2**

10/19/2017  
ICA ENGINEERING, INC.  
Environmental/Drainage/Utility/4734\_hud\_perm\_wet\_csh\_06A.dgn

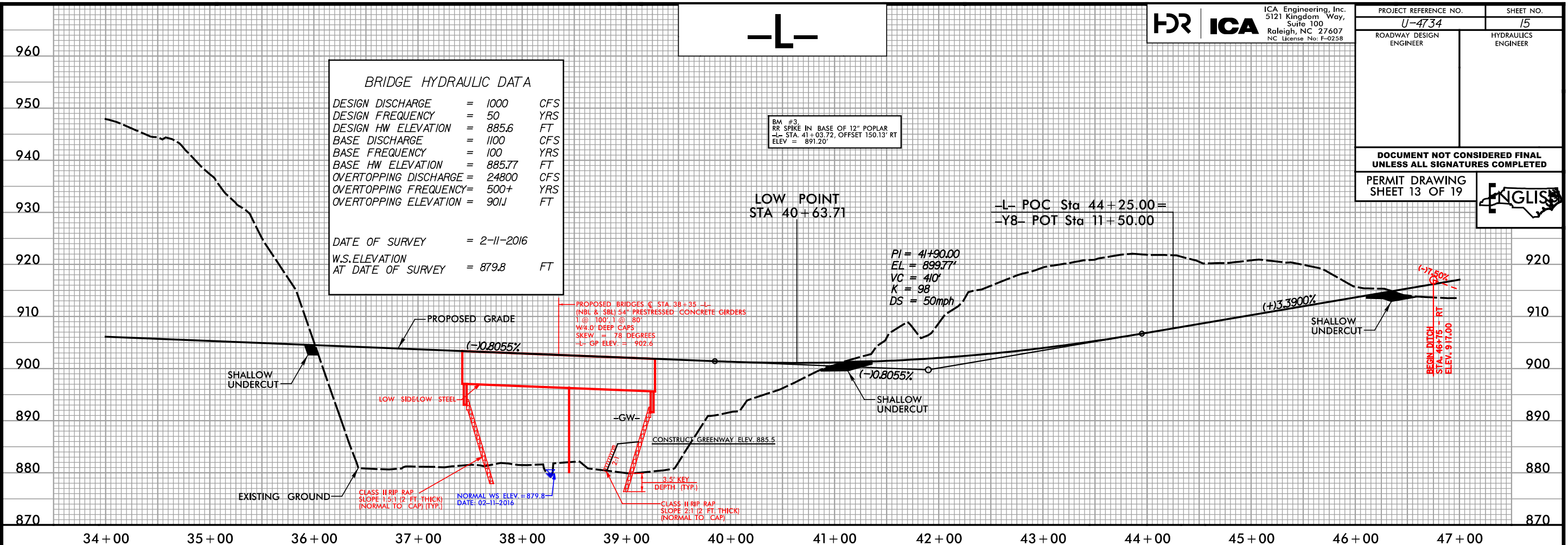


**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 1000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 885.6	FT
BASE DISCHARGE	= 1100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 885.77	FT
OVERTOPPING DISCHARGE	= 24800	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 901.1	FT

DATE OF SURVEY = 2-11-2016  
W.S. ELEVATION AT DATE OF SURVEY = 879.8 FT

BM #3  
RR SPIKE IN BASE OF 12" POPLAR  
-L- STA. 41+03.72, OFFSET 150.13' RT  
ELEV = 891.20'



**PIPE HYDRAULIC DATA**

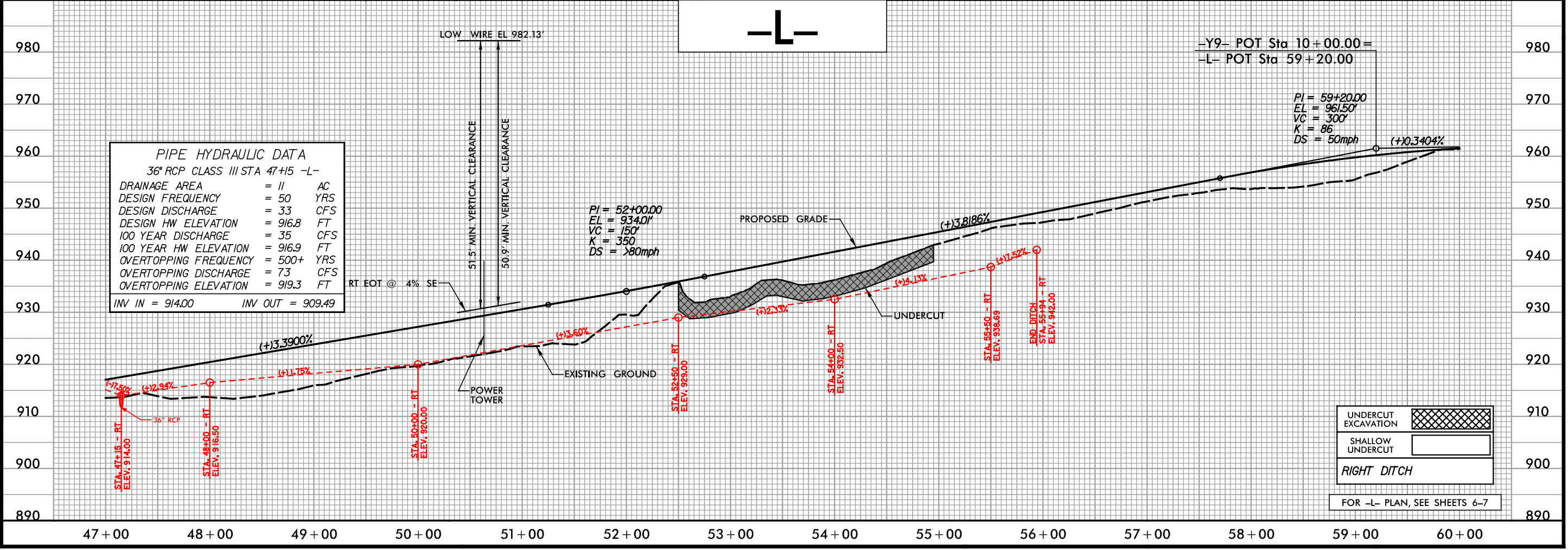
36" RCP CLASS III STA 47+15 -L-

DRAINAGE AREA	= 11	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 33	CFS
DESIGN HW ELEVATION	= 916.8	FT
100 YEAR DISCHARGE	= 35	CFS
100 YEAR HW ELEVATION	= 916.9	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 73	CFS
OVERTOPPING ELEVATION	= 919.3	FT

INV IN = 914.00    INV OUT = 909.49

PI = 52+00.00  
EL = 934.01'  
VC = 150'  
K = 350  
DS = >80mph

PI = 59+20.00  
EL = 961.50'  
VC = 300'  
K = 86  
DS = 50mph



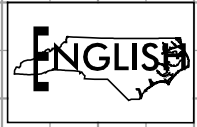
UNDERCUT EXCAVATION	
SHALLOW UNDERCUT	
RIGHT DITCH	

FOR -L- PLAN, SEE SHEETS 6-7

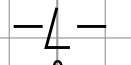
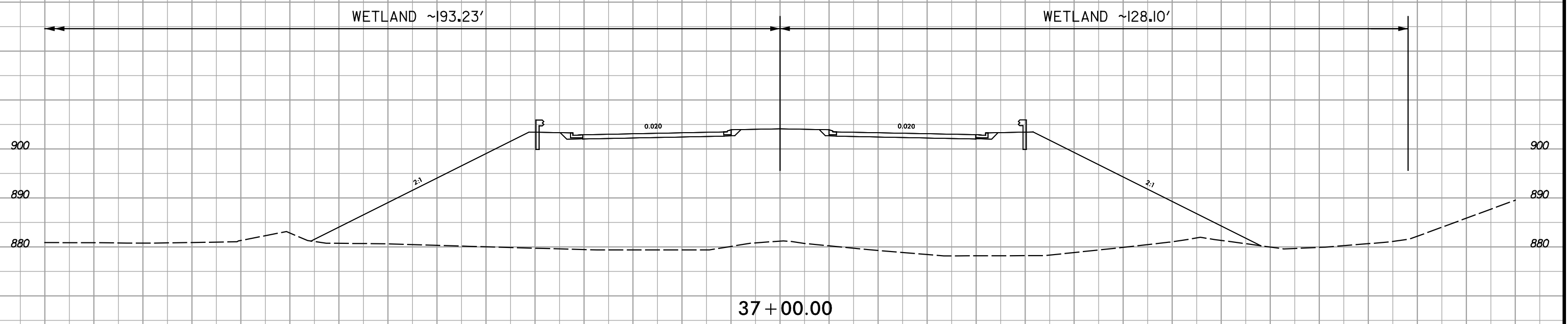
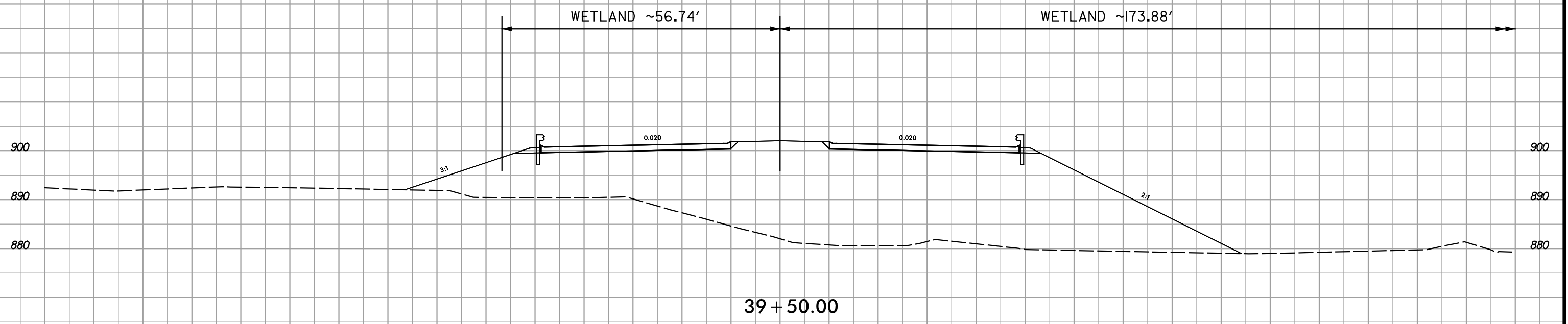
10/19/2017 ICA ENGINEERING, INC. PROJECT: PERMITS, ENVIRONMENTAL, HYDROLOGICAL, WETLANDS, ETC. U-4734, HYD. PROJ. WETLANDS, ETC. 06.dwg

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 2



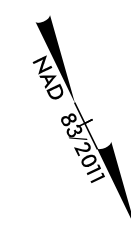
PERMIT DRAWING  
SHEET 14 OF 19



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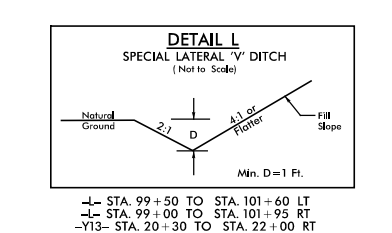
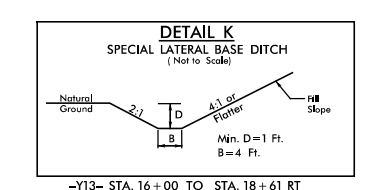
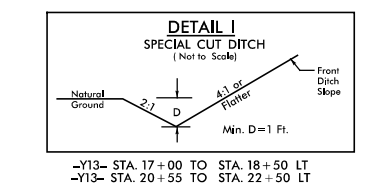
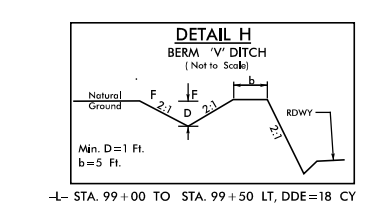
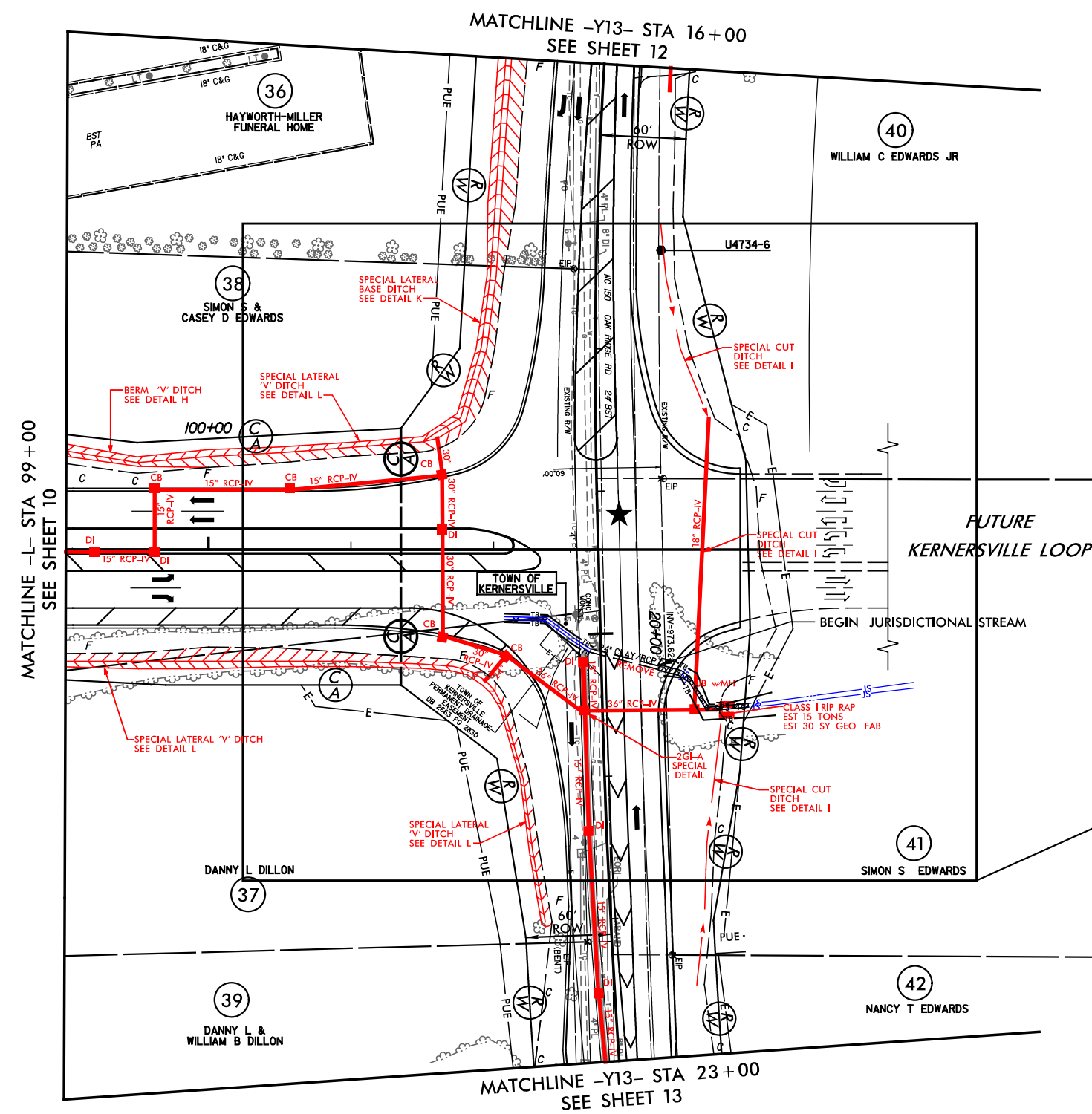
**LEGEND**

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

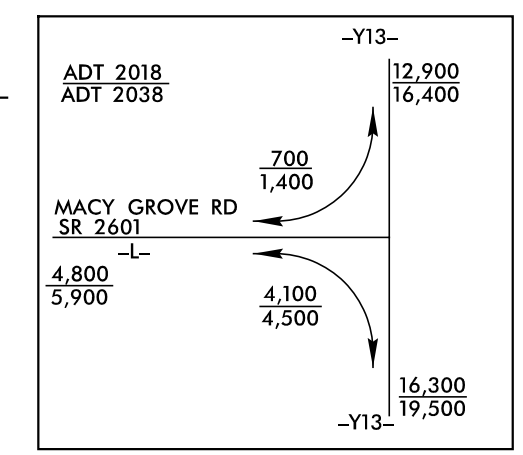


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWING  
SHEET 15 OF 19



SEE ENLARGED AREA ON NEXT SHEET



FOR -L- & -Y13- INTERSECTION DETAIL, SEE SHEET 2B-10  
FOR -L- PROFILE, SEE SHEET 17  
FOR -Y13- PROFILE, SEE SHEET 20



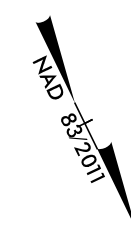
**PLAN VIEW  
SITE 3**

10/19/2017  
 ICA ENGINEERING, INC.  
 5121 KINGDOM WAY, SUITE 100  
 RALEIGH, NC 27607  
 ENVIRONMENTAL PERMITS

- PROPOSED SIGNAL
- PROP PAINT STRIPING

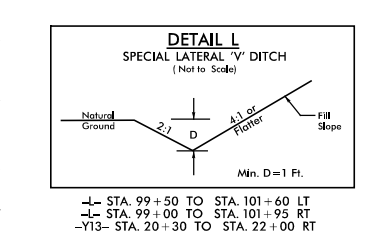
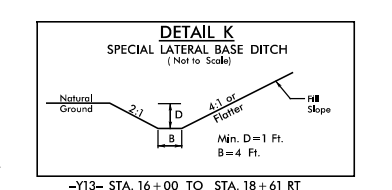
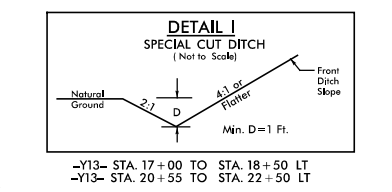
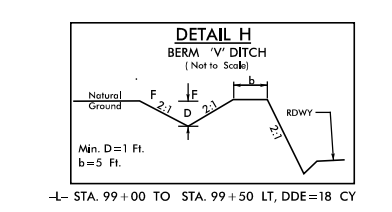
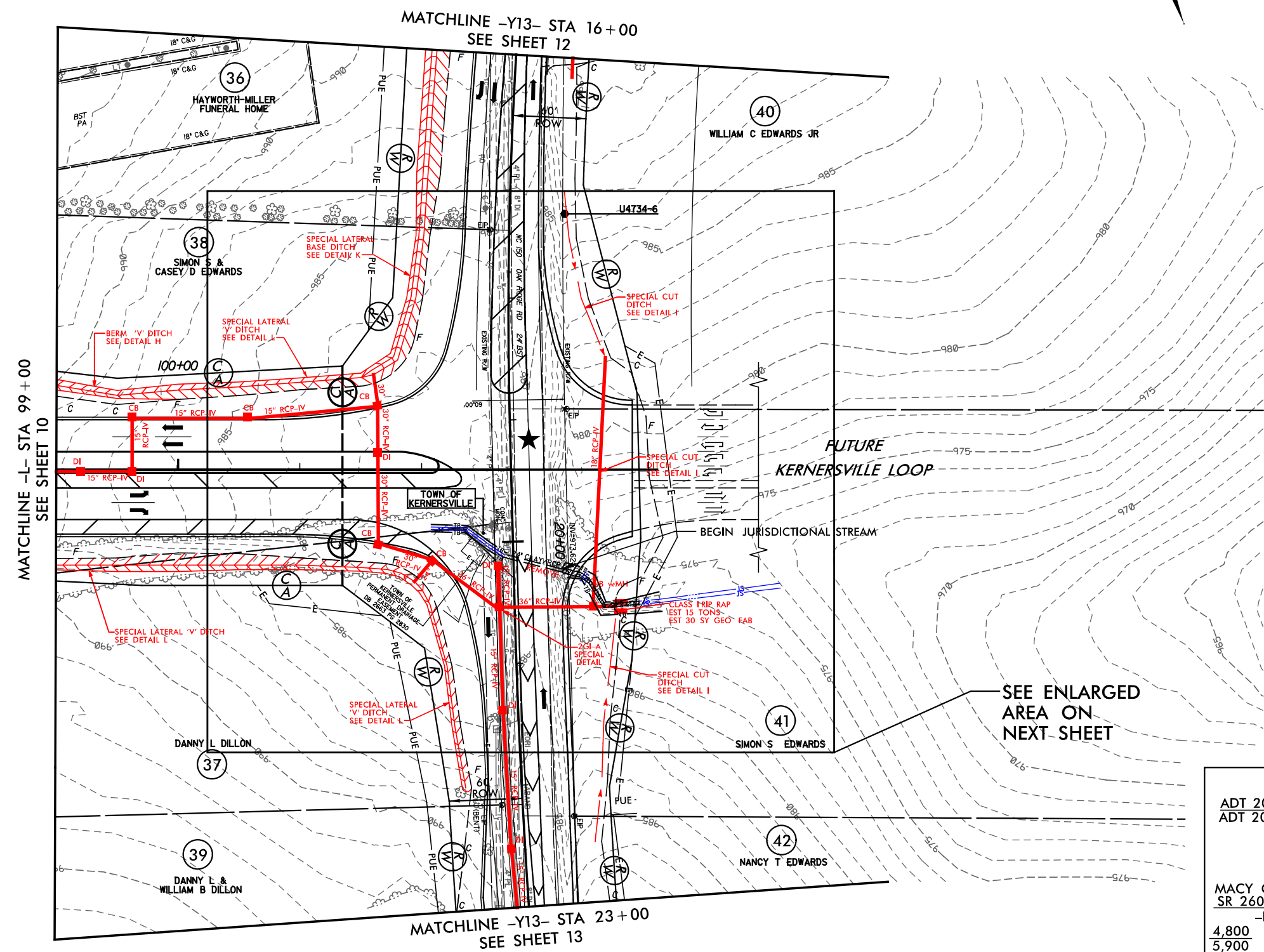
**LEGEND**

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

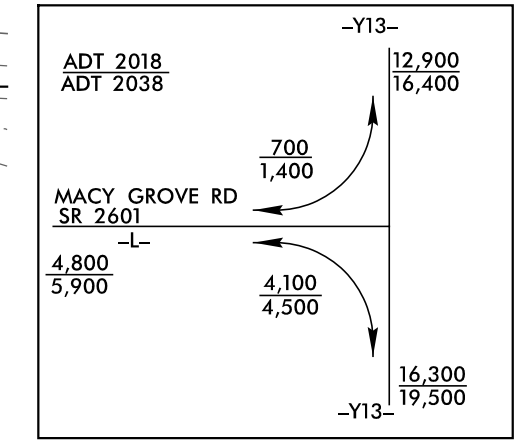


**DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED**

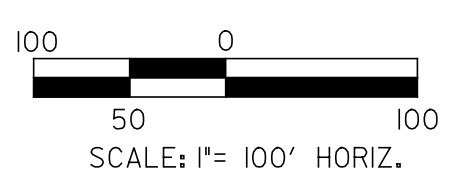
PERMIT DRAWING  
SHEET 16 OF 19



SEE ENLARGED AREA ON NEXT SHEET



FOR -L- & -Y13- INTERSECTION DETAIL, SEE SHEET 28-10  
FOR -L- PROFILE, SEE SHEET 17  
FOR -Y13- PROFILE, SEE SHEET 20

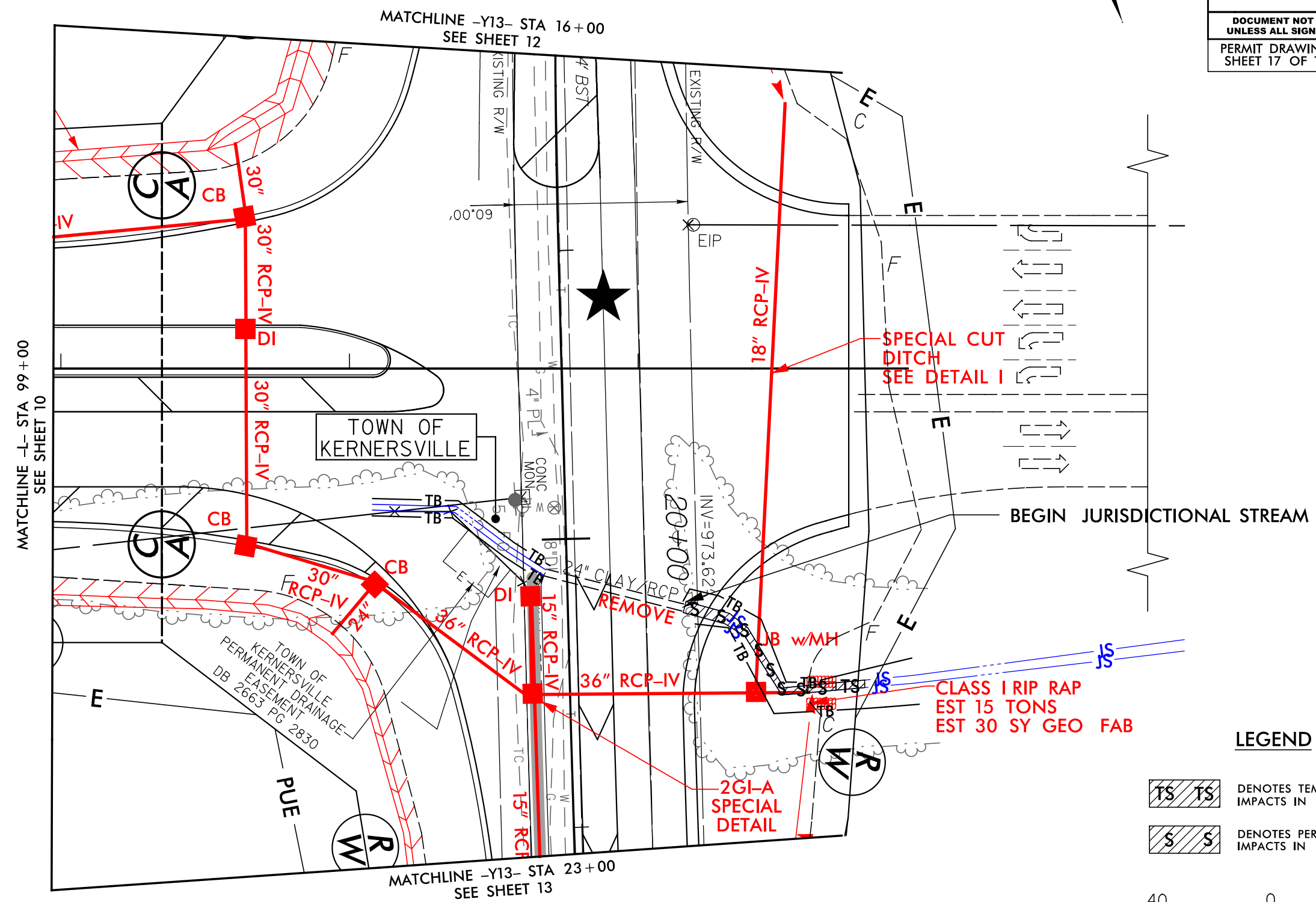
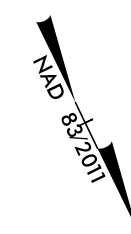


**PLAN VIEW  
SITE 3**

10/19/2017  
ICA ENGINEERING, INC.  
C:\Users\ludon\Documents\Drawings\U4734\_bud\_perm\_wet\_esh\_11.dwg

- PROPOSED SIGNAL
- PROP PAINT STRIPING

PROJECT REFERENCE NO. U-4734	SHEET NO. IIA
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PERMIT DRAWING SHEET 17 OF 19	



**LEGEND**

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



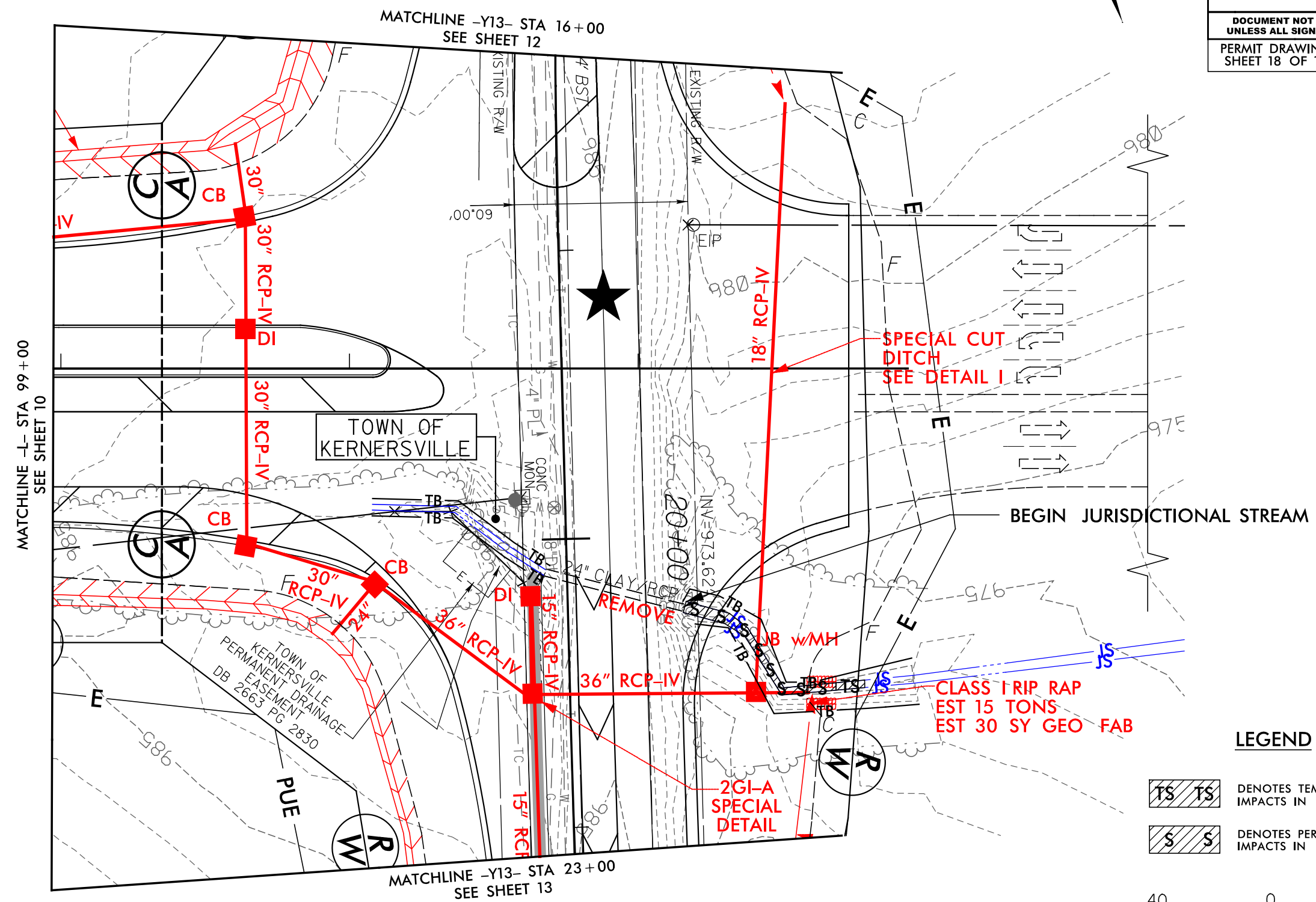
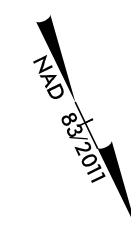
FOR -L- & -Y13- INTERSECTION DETAIL, SEE SHEET 28-10  
FOR -L- PROFILE, SEE SHEET 17  
FOR -Y13- PROFILE, SEE SHEET 20

**DETAIL SHEET FOR  
SITE 3**

- PROPOSED SIGNAL
- PROP PAINT STRIPING

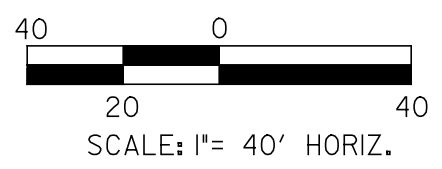
10/19/2017 ICA\_ENGINEERING, INC. Environmental\Drawings\U4734\_hud\_perm\_wet\_est\_11A.dgn

PROJECT REFERENCE NO. U-4734	SHEET NO. IIA
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
PERMIT DRAWING SHEET 18 OF 19	



**LEGEND**

	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES PERMANENT IMPACTS IN SURFACE WATER



**DETAIL SHEET FOR  
SITE 3**

FOR -L- & -Y13- INTERSECTION DETAIL, SEE SHEET 2B-10  
 FOR -L- PROFILE, SEE SHEET 17  
 FOR -Y13- PROFILE, SEE SHEET 20

10/19/2017  
 ICA\_ENGINEERING, INC.  
 Environmental\Drawings\U4734\_hud\_perm\_wet\_est\_11A.dwg

- PROPOSED SIGNAL
- PROP PAINT STRIPING

**WETLAND PERMIT IMPACT SUMMARY**

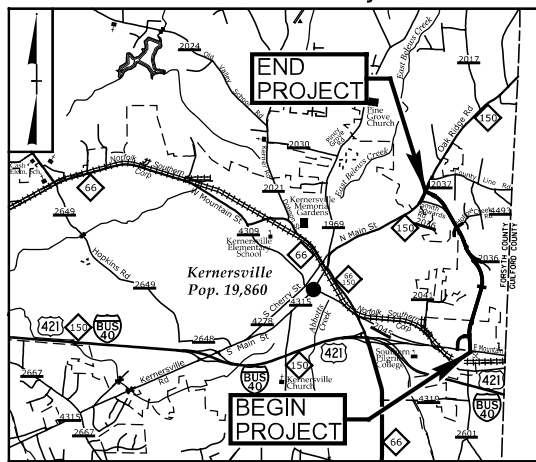
Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1	FROM 27+02 TO 28+06 -L-	2 @ 7' X 7' RCBC							0.02		389		
1	FROM 27+50 TO 28+06 -L-	BANK STABILIZATION							< 0.01	< 0.01	48	24	
2	FROM 36+17 TO 40+15 -L-	BRIDGE CONSTRUCTION	1.24							0.01		60	
2	FROM 36+10 TO 40+17 -L-	MECHANIZED CLEARING				0.06							
3	FROM 102+08 TO 103+79 -L-	ROAD CROSSING							< 0.01	< 0.01	56	10	
3	FROM 103+58 TO 103+69 -L-	BANK STABILIZATION							< 0.01		10		
<b>TOTALS*:</b>			1.24			0.06			0.03	0.01	503	94	0

\*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 OCTOBER 19, 2017  
 FORSYTH  
 U-4734  
 36600.1.2  
 SHEET 19 OF 19

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



VICINITY MAP

ROW PLANS

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**FORSYTH COUNTY**

LOCATION: KERNERSVILLE - SR 2601 (MACY GROVE RD) EXTENSION  
FROM NORTH OF SR 1005 (EAST MOUNTAIN ST) TO FUTURE NC 150  
(NORTH MAIN ST)

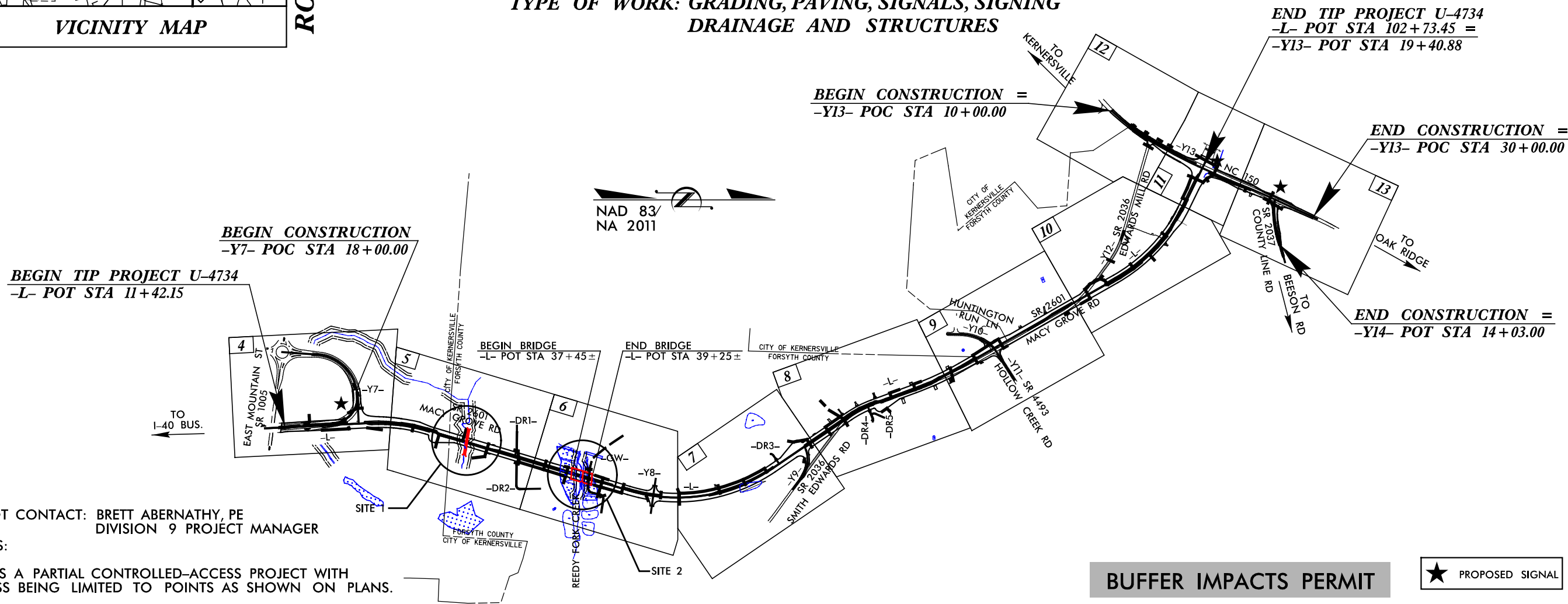
TYPE OF WORK: GRADING, PAVING, SIGNALS, SIGNING  
DRAINAGE AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4734	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
36600.1.2	STP-2601(3)	PE	
36600.2.1	STP-2601(3)	RW	
36600.3.1	STP-2601(3)	CONST	

BUFFER DRAWING  
SHEET 1 OF 13



TIP PROJECT: U-4734



NCDOT CONTACT: BRETT ABERNATHY, PE  
DIVISION 9 PROJECT MANAGER

NOTES:

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON PLANS.

PORTIONS OF THIS PROJECT ARE WITHIN THE MUNICIPAL BOUNDARIES OF KERNERSVILLE.

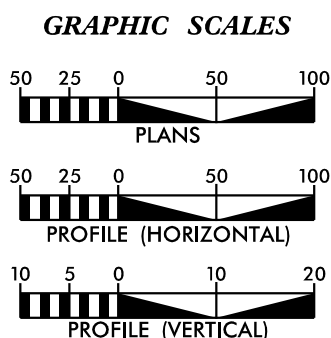
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

**BUFFER IMPACTS PERMIT** ★ PROPOSED SIGNAL

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

10/19/2017 ICA ENGINEERING, INC. R:\Hydraulics\PERMITS\Drawings\U4734\_hyd\_perm\_buf\_tsh.dgn

CONTRACT:



**DESIGN DATA**

ADT (2018) =	7,400
ADT (2038) =	10,300
K =	11 %
D =	55 %
T =	6 % *
V =	50 MPH
* TTST =	2% DUAL 4%
FUNC CLASS =	COLLECTOR REGIONAL TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-4734 =	1.695 MILES
LENGTH STRUCTURES TIP PROJECT U-4734 =	0.034 MILES
TOTAL LENGTH TIP PROJECT U-4734 =	1.729 MILES

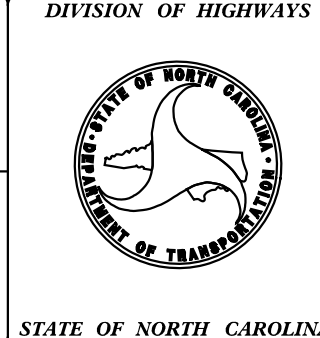
Prepared for the North Carolina Department of Transportation in the office of:	ICA Engineering, Inc. 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258
2012 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE:	JAN 20, 2017
LETTING DATE:	JUNE 19, 2018
	DENA C. SNEAD, PE PROJECT ENGINEER
	JORDAN BOND PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.


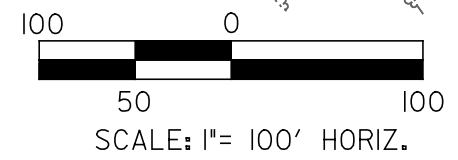
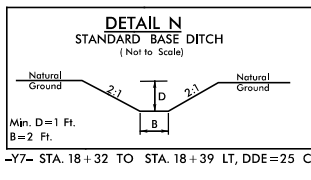
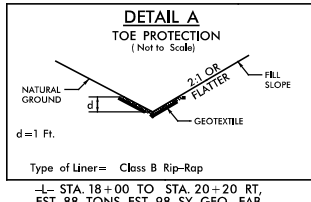
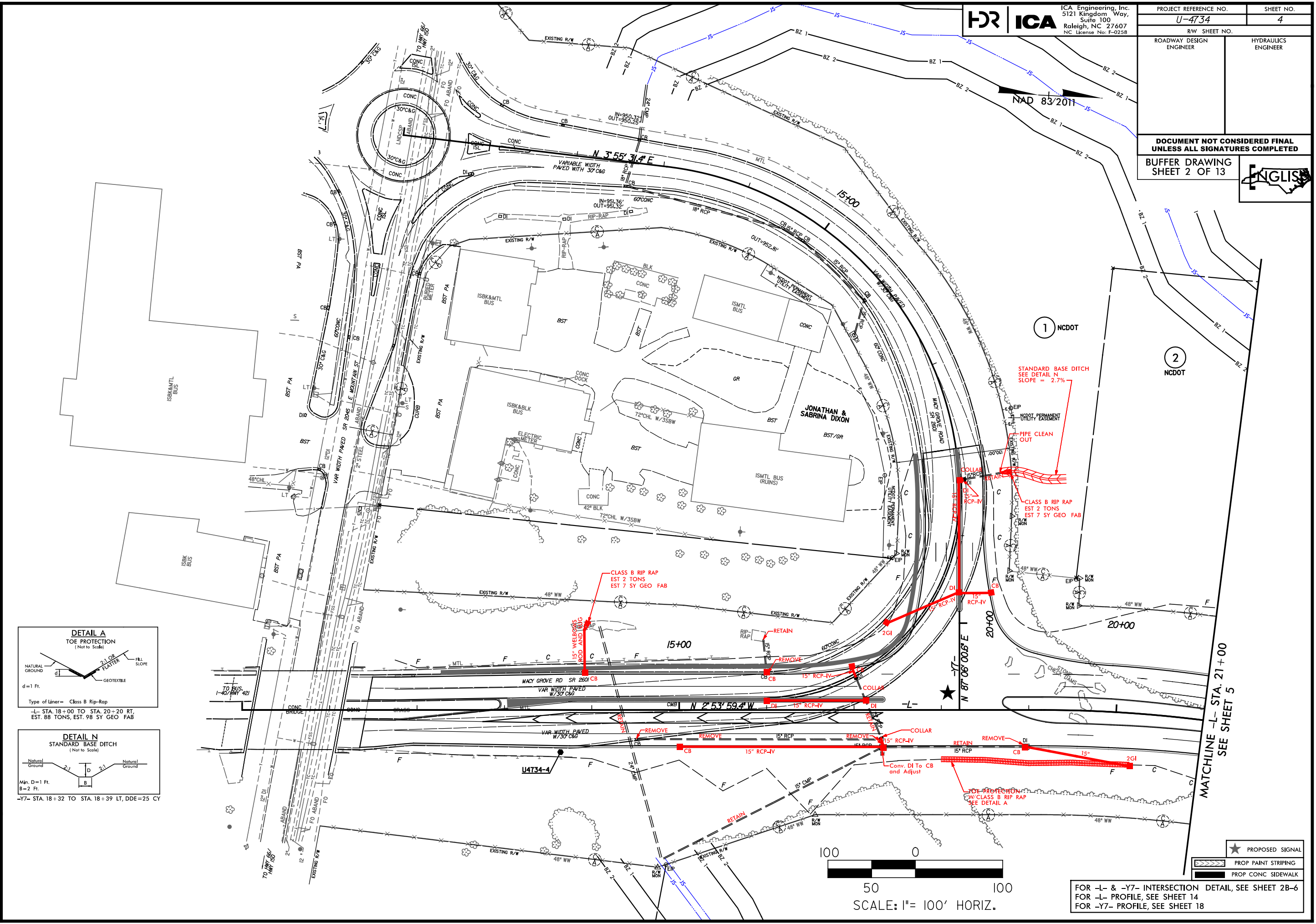




PROJECT REFERENCE NO. <b>U-4734</b>	SHEET NO. <b>4</b>
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

BUFFER DRAWING  
 SHEET 2 OF 13

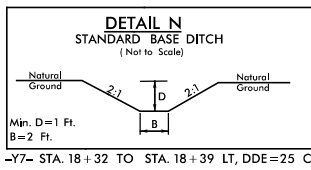
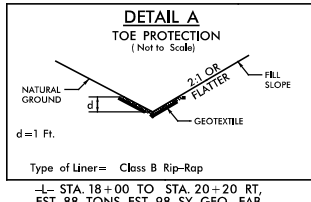
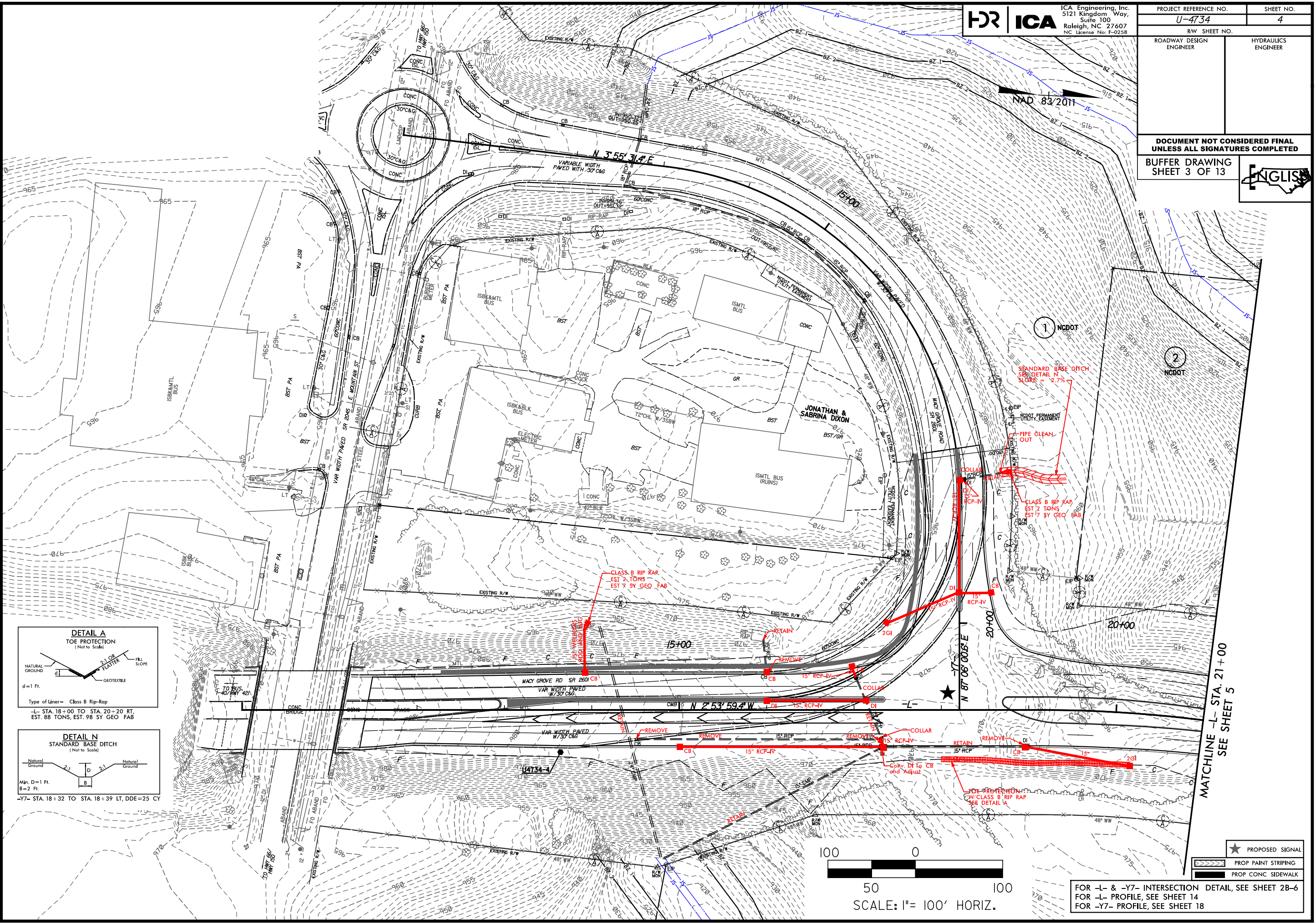
FOR -L- & -Y7- INTERSECTION DETAIL, SEE SHEET 2B-6  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -Y7- PROFILE, SEE SHEET 18

10/19/2017  
 ICA ENGINEERING, INC.  
 Environmental\Drawings\U4734\_bud\_perm\_buf\_esh\_04.dgn

PROJECT REFERENCE NO. U-4734	SHEET NO. 4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

BUFFER DRAWING  
 SHEET 3 OF 13



★ PROPOSED SIGNAL

PROP PAINT STRIPING

PROP CONC SIDEWALK

FOR -L- & -Y7- INTERSECTION DETAIL, SEE SHEET 2B-6  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -Y7- PROFILE, SEE SHEET 18

10/19/2017  
 ICA\_ENGINEERING, INC.  
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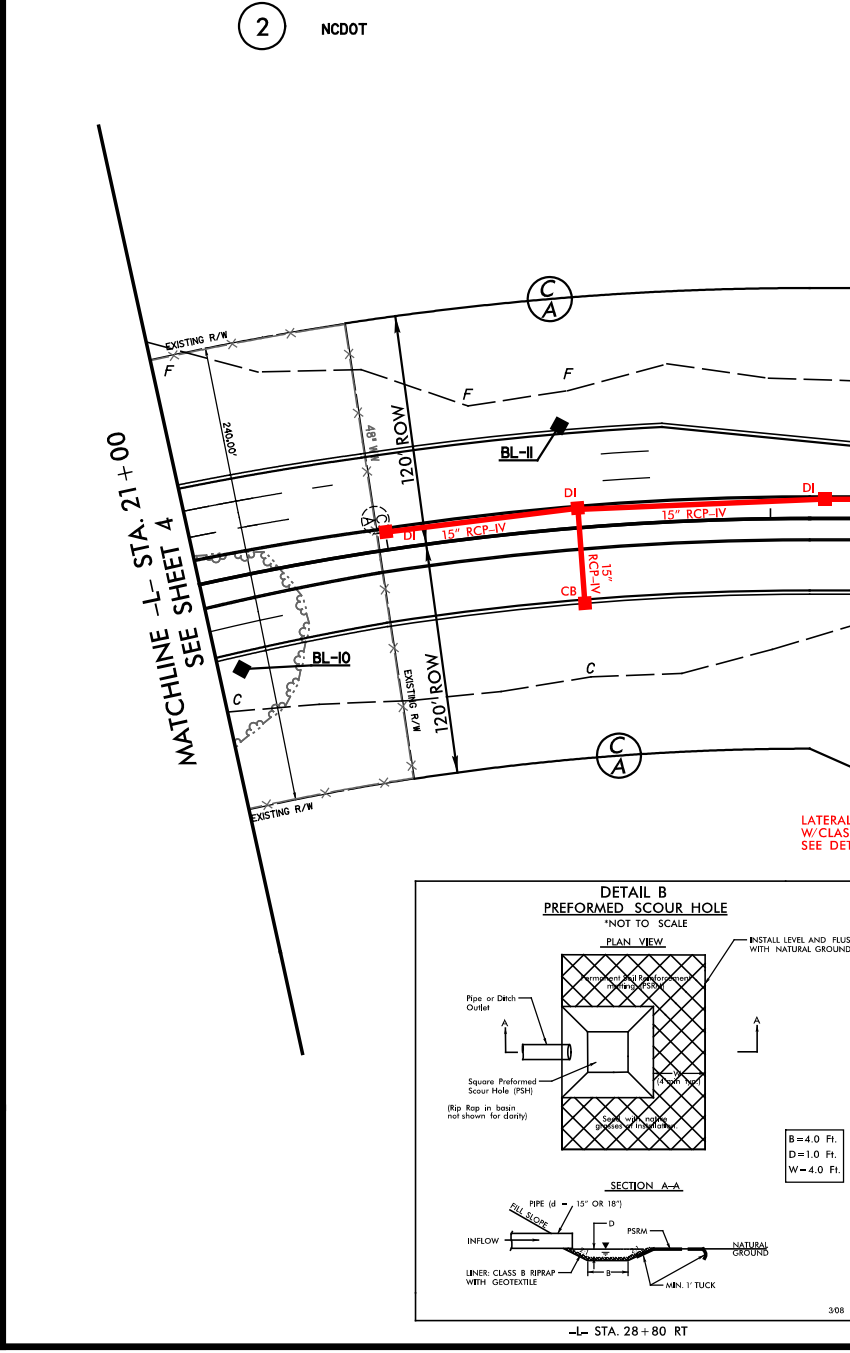
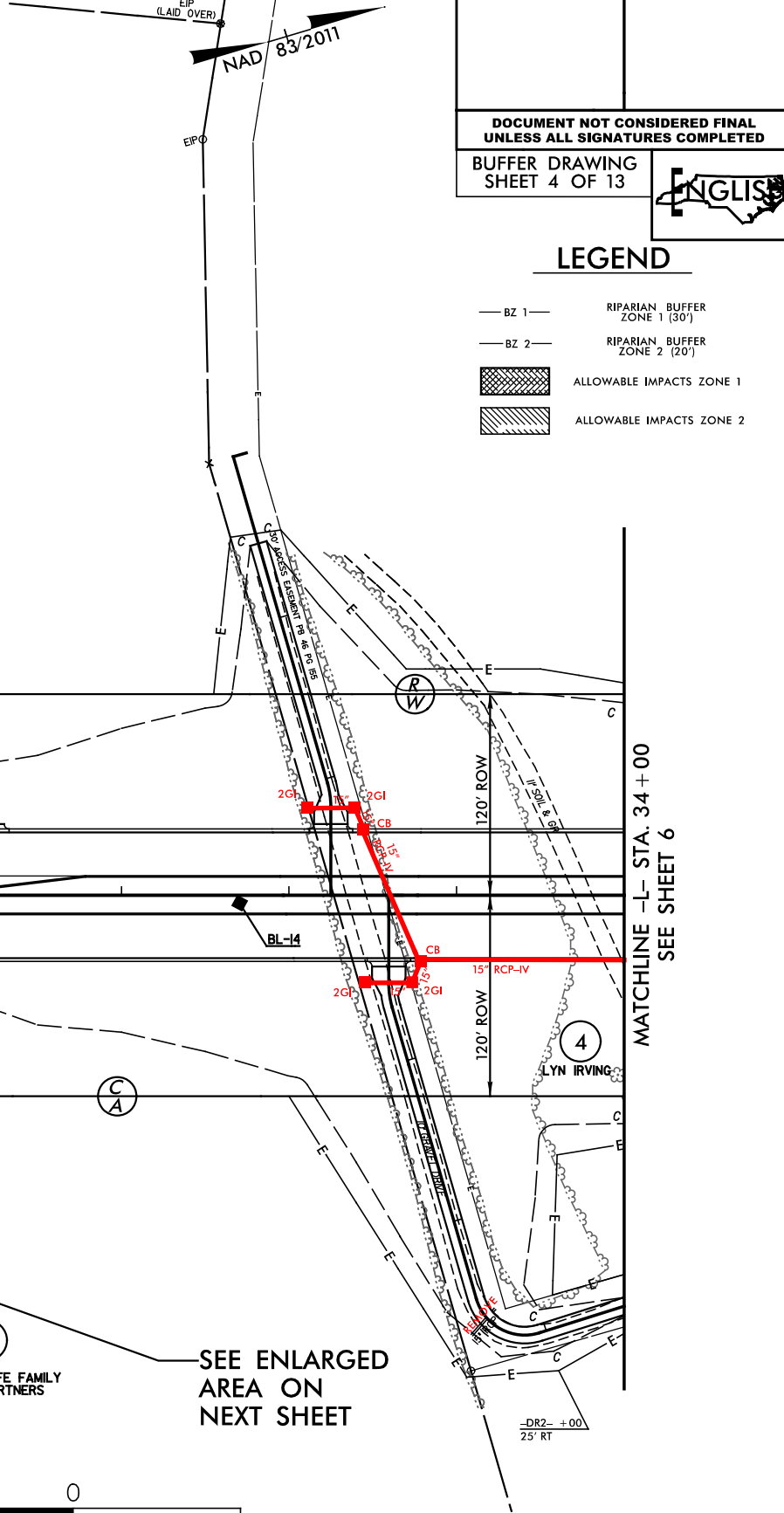
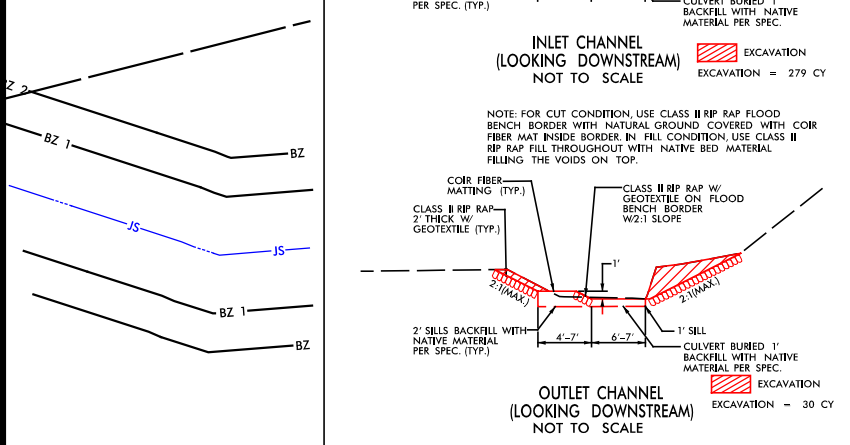
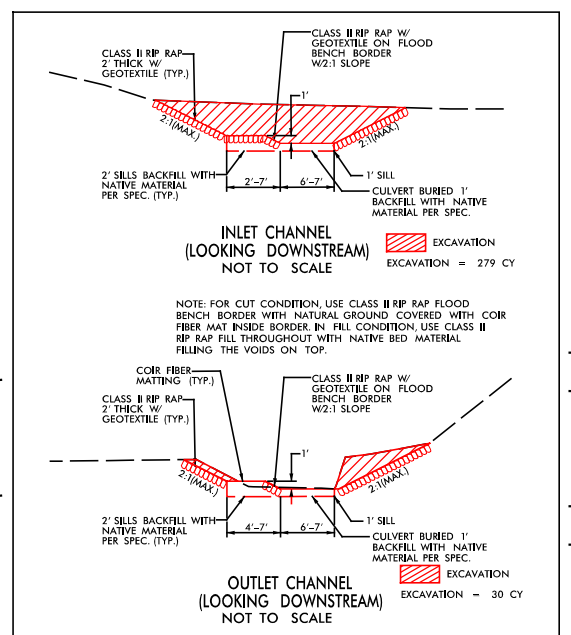
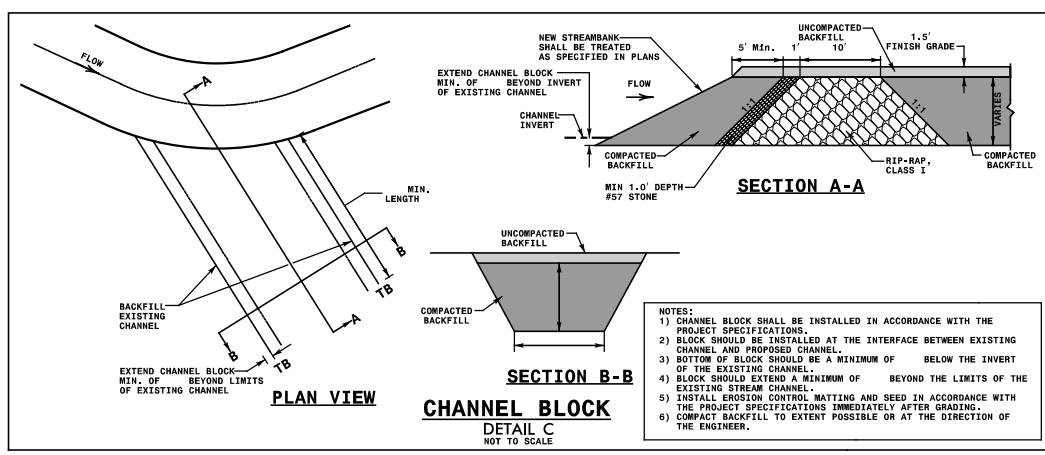
PROJECT REFERENCE NO.	SHEET NO.
U-4734	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ICA Engineering, Inc.  
5121 Kingdom Way,  
Suite 100  
Raleigh, NC 27607  
NC License No: F-0258

DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED

LEGEND

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- [Cross-hatched box] ALLOWABLE IMPACTS ZONE 1
- [Diagonal hatched box] ALLOWABLE IMPACTS ZONE 2



10/19/2017 ICA ENGINEERING, INC. Environmental\Drawings\U4734\_bud\_perm\_bur\_esch\_05.dgn

FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 14  
FOR -DR1- PROFILE, SEE SHEET 21  
FOR -DR2- PROFILE, SEE SHEET 21



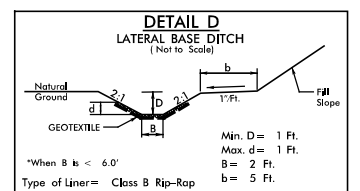
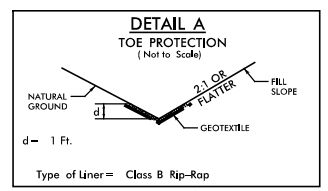
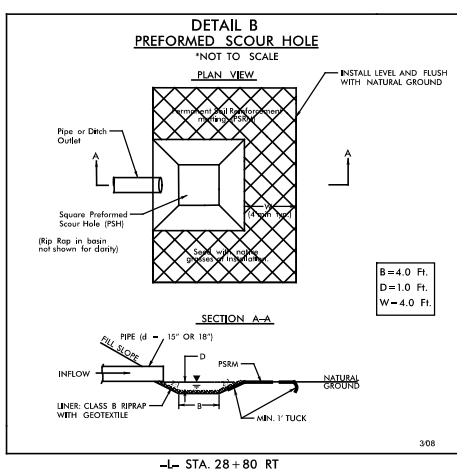
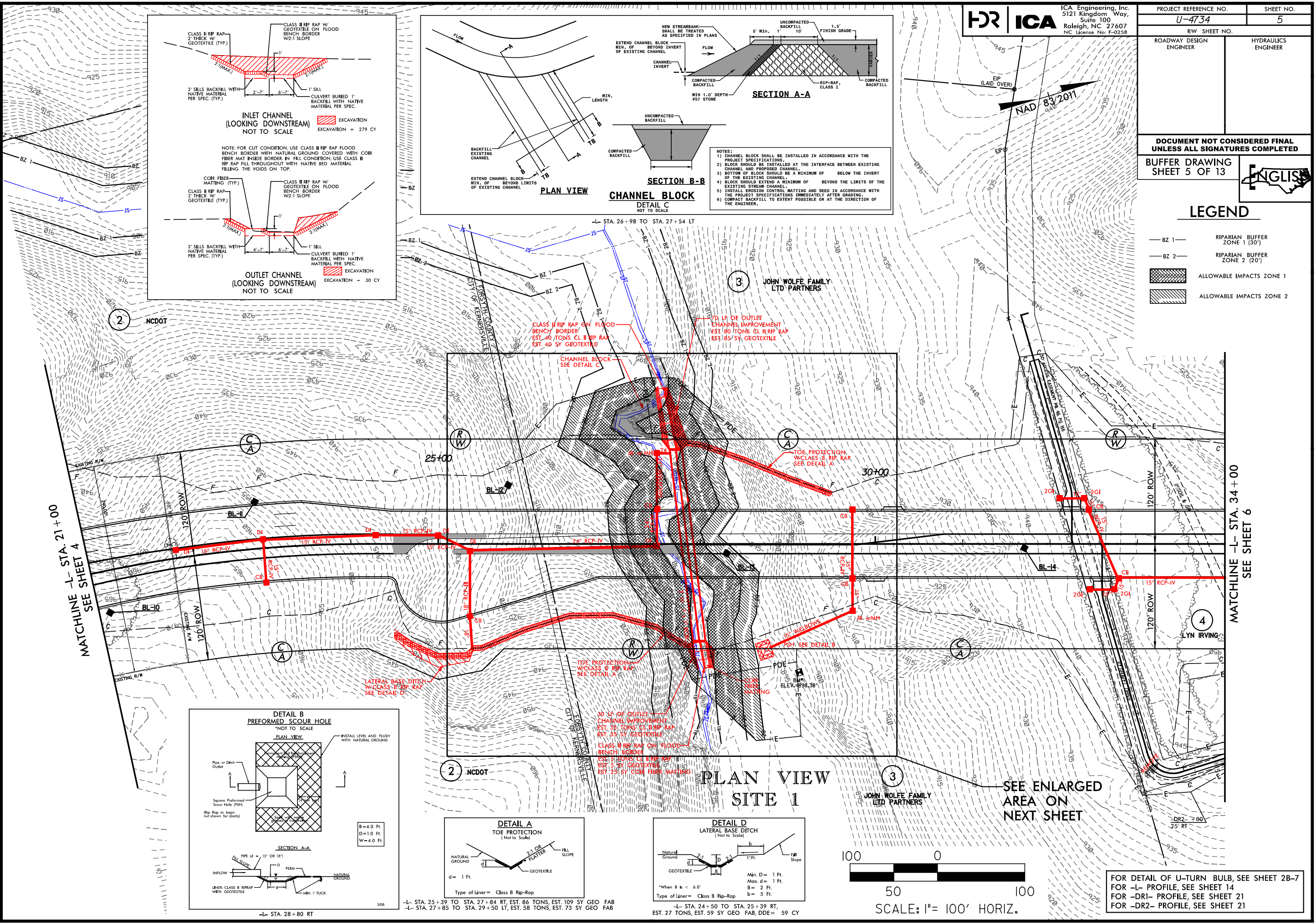
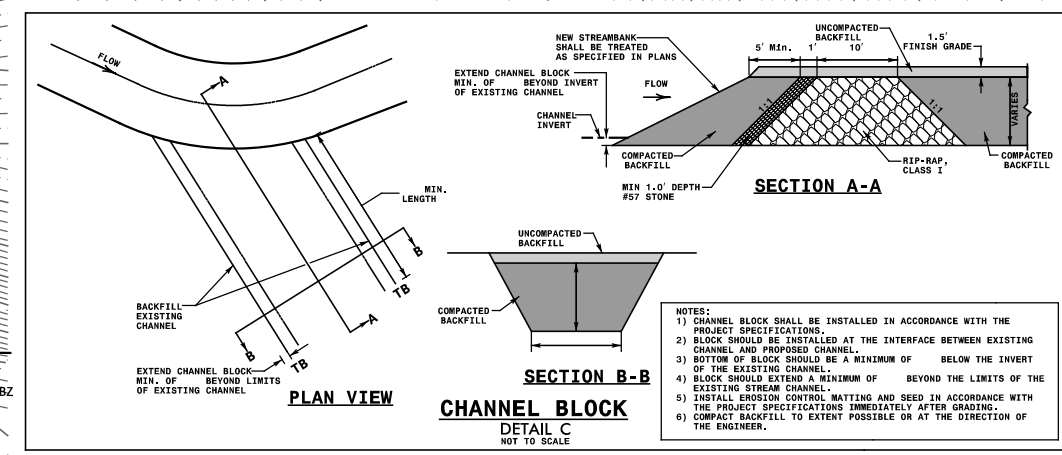
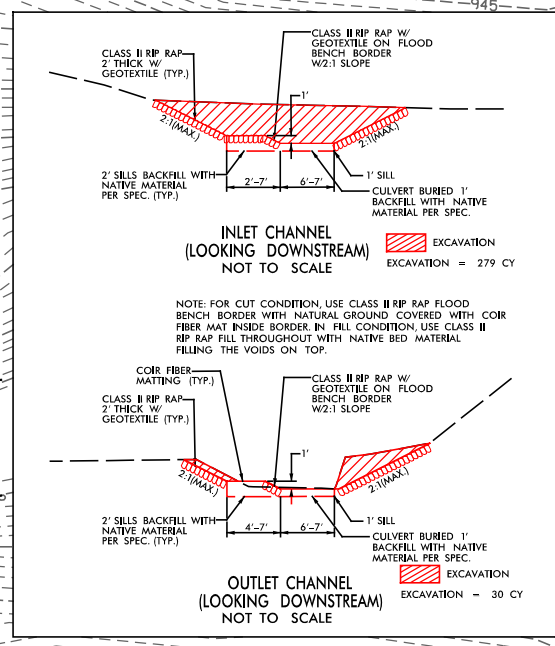
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RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

BUFFER DRAWING  
 SHEET 5 OF 13

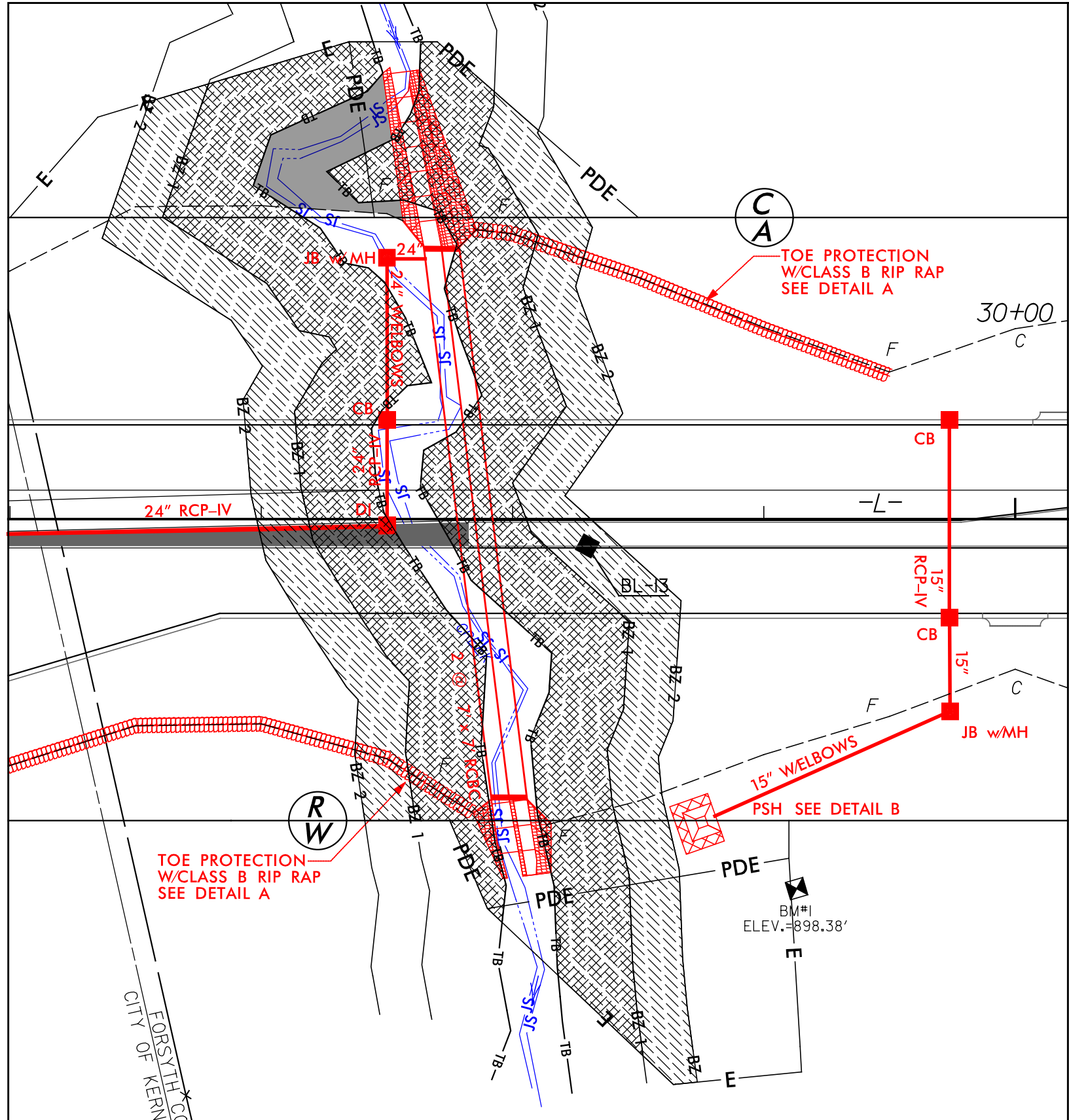
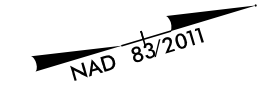
**LEGEND**

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2



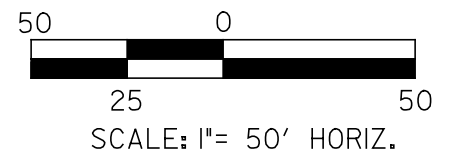
FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DR1- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21

10/19/2017  
 ICA ENGINEERING, INC.  
 Environmental PERMITS  
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### LEGEND

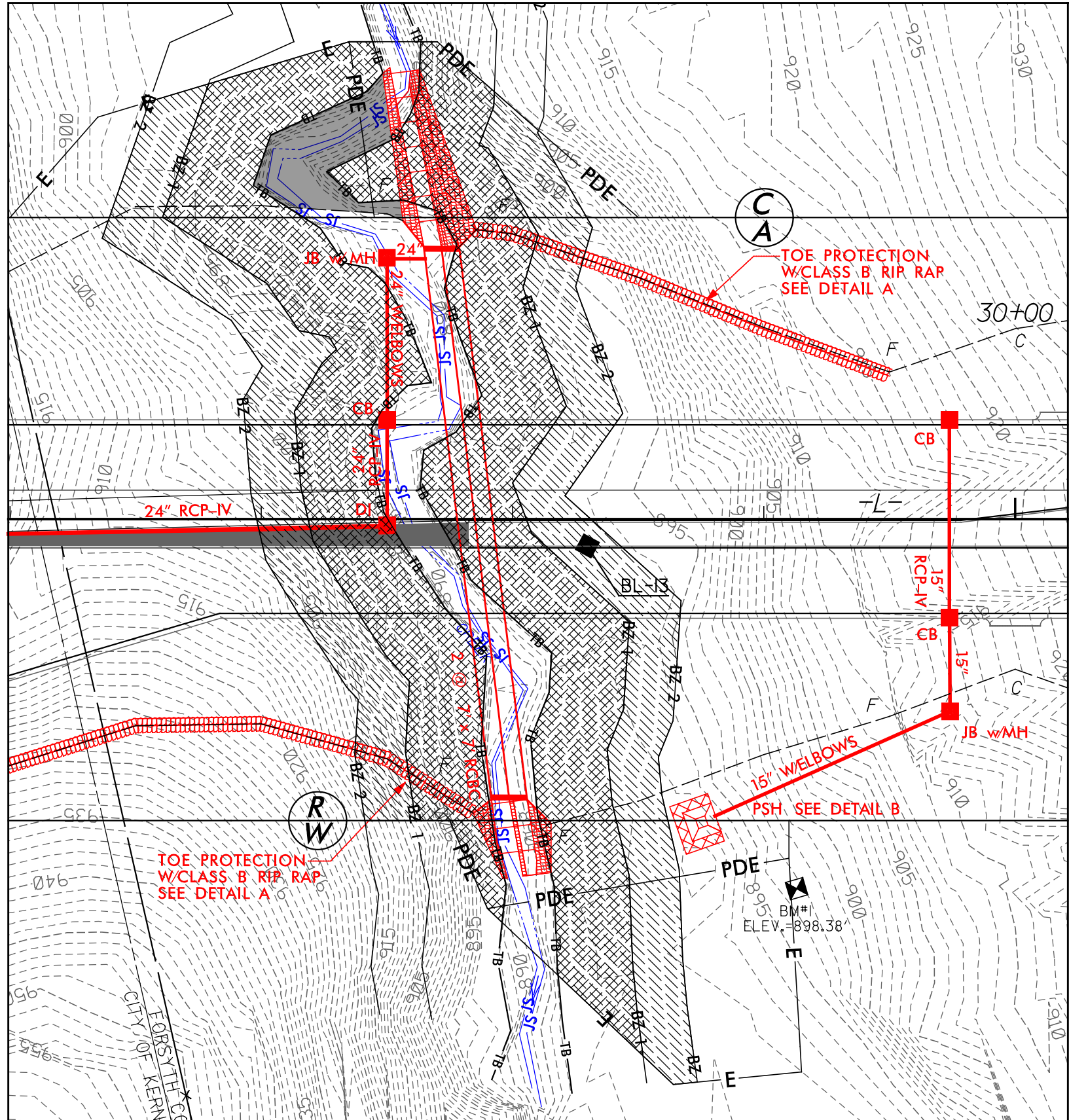
- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2



DETAIL SHEET FOR  
SITE 1

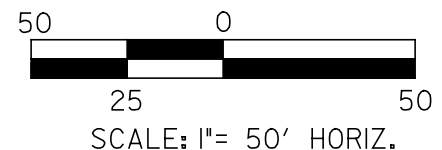
FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DR1- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21

10/19/2017  
 ICA ENGINEERING, INC.  
 R:\Hydraulics PERMITS\_Environmental\Drawings\U4734\_hyd-prm-buf\_psh\_05A.dgn



### LEGEND

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- ALLOWABLE IMPACTS ZONE 1
- ALLOWABLE IMPACTS ZONE 2



## DETAIL SHEET FOR SITE 1

FOR DETAIL OF U-TURN BULB, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 14  
 FOR -DR1- PROFILE, SEE SHEET 21  
 FOR -DR2- PROFILE, SEE SHEET 21

10/19/2017  
 ICA ENGINEERING, INC.  
 R:\Hydraulics PERMITS\_Environmental\Drawings\U4734\_hyd-prm-buf\_psh\_05A.dgn

RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

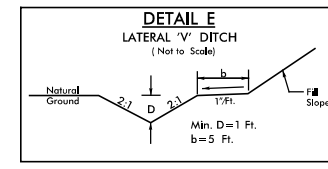
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UNLESS ALL SIGNATURES COMPLETED

BUFFER DRAWING  
SHEET 8 OF 13

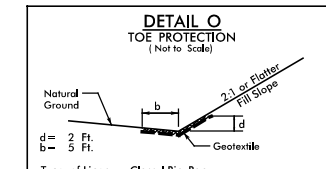


**LEGEND**

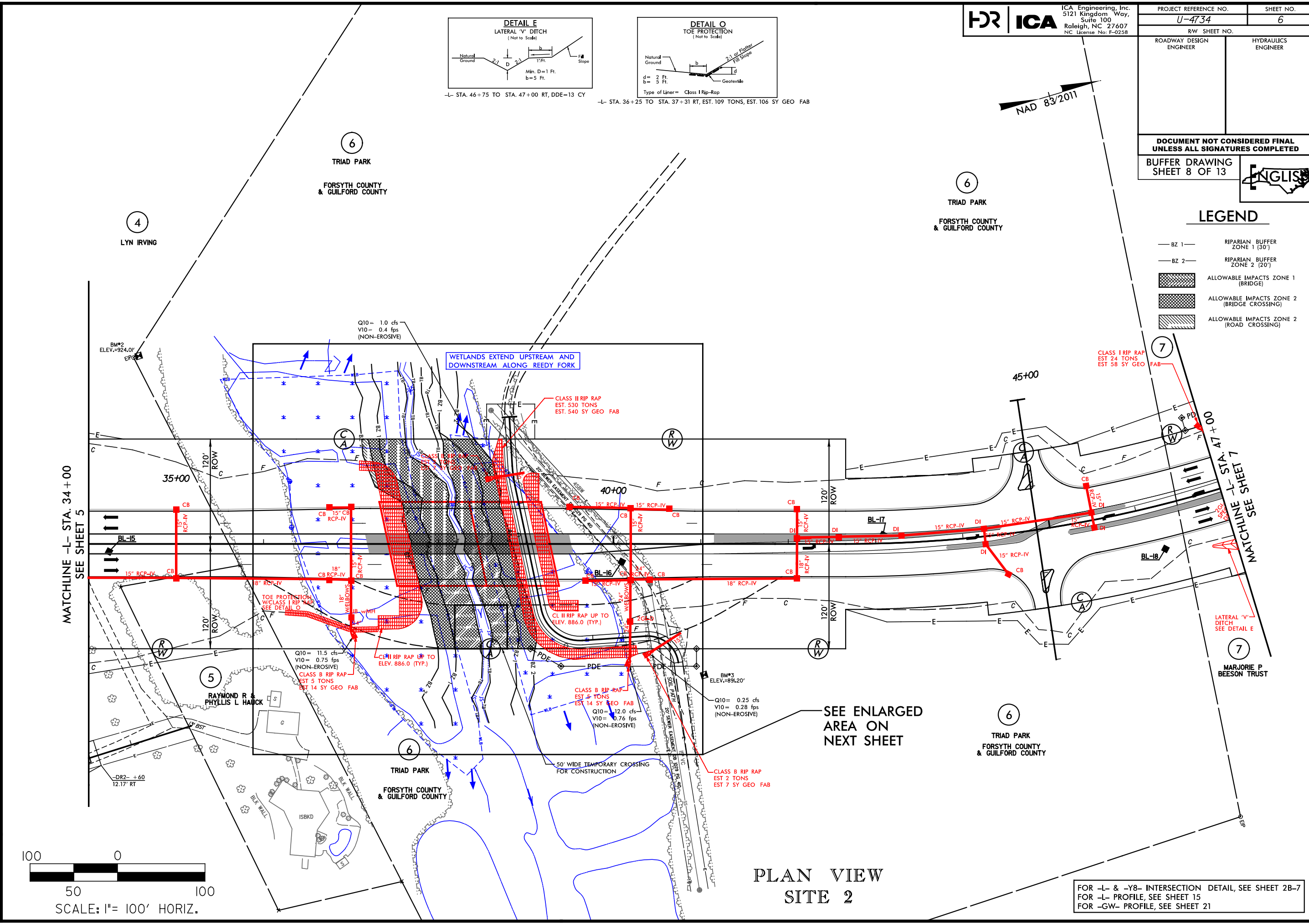
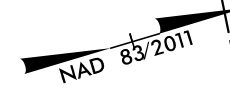
- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- [Hatched Box] ALLOWABLE IMPACTS ZONE 1 (BRIDGE)
- [Hatched Box] ALLOWABLE IMPACTS ZONE 2 (BRIDGE CROSSING)
- [Hatched Box] ALLOWABLE IMPACTS ZONE 2 (ROAD CROSSING)



-L- STA. 46+75 TO STA. 47+00 RT, DDE=13 CY



-L- STA. 36+25 TO STA. 37+31 RT, EST. 109 TONS, EST. 106 SY GEO FAB



**PLAN VIEW  
SITE 2**


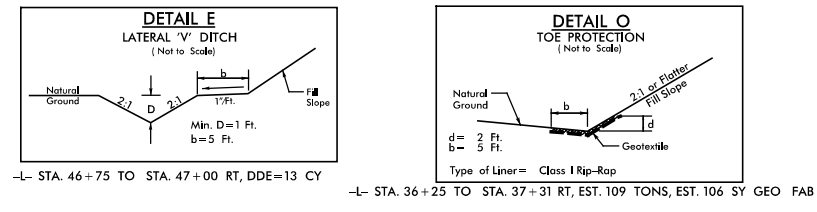
FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 15  
FOR -GW- PROFILE, SEE SHEET 21

10/19/2017 ICA ENGINEERING, INC. Environmental\Drawings\U4734\_bud\_perm\_buf\_esth\_06.dgn

PROJECT REFERENCE NO. <b>U-4734</b>	SHEET NO. <b>6</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

BUFFER DRAWING  
 SHEET 9 OF 13

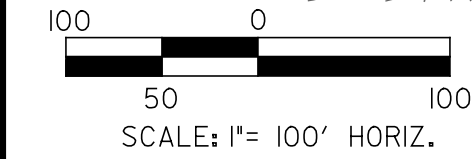



**LEGEND**

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- [Hatched Box] ALLOWABLE IMPACTS ZONE 1 (BRIDGE)
- [Hatched Box] ALLOWABLE IMPACTS ZONE 2 (BRIDGE CROSSING)
- [Hatched Box] ALLOWABLE IMPACTS ZONE 2 (ROAD CROSSING)

MATCHLINE -L- STA. 34+00  
SEE SHEET 5

MATCHLINE -L- STA. 47+00  
SEE SHEET 7



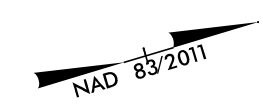
**PLAN VIEW  
 SITE 2**

FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
 FOR -L- PROFILE, SEE SHEET 15  
 FOR -GW- PROFILE, SEE SHEET 21

10/19/2017  
 ICA ENGINEERING, INC.  
 Environmental\Drawings\U4734\_bud\_perm\_buf\_esth\_06.dgn

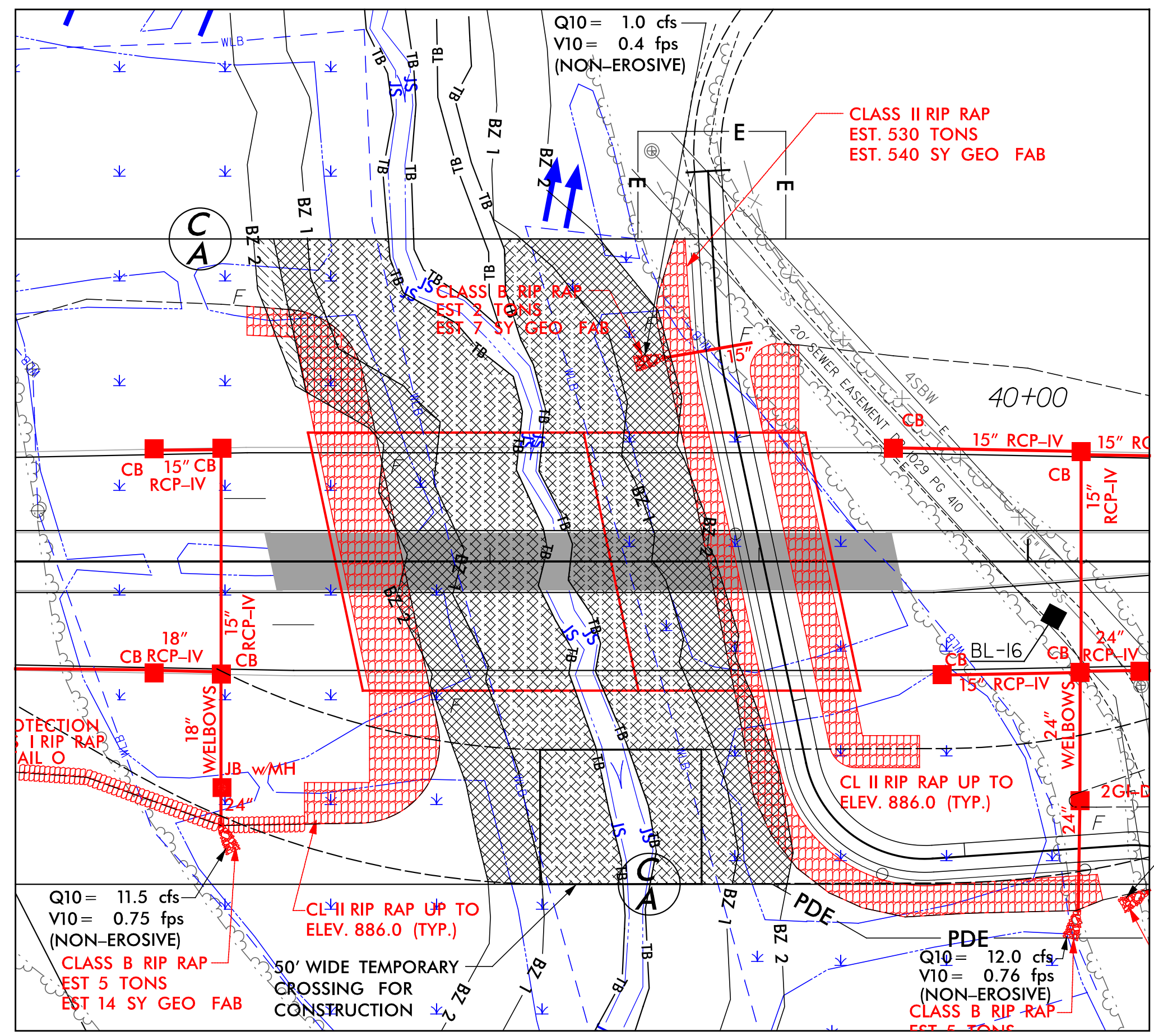


PROJECT REFERENCE NO. <b>U-4734</b>	SHEET NO. <b>6A</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
BUFFER DRAWING SHEET 10 OF 13	



**LEGEND**

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- ALLOWABLE IMPACTS ZONE 1 (BRIDGE)
- ALLOWABLE IMPACTS ZONE 2 (BRIDGE CROSSING)
- ALLOWABLE IMPACTS ZONE 2 (ROAD CROSSING)



Q10 = 0.25 cfs  
V10 = 0.28 fps  
(NON-EROSIVE)

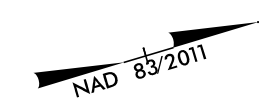


FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 15  
FOR -GW- PROFILE, SEE SHEET 21

**DETAIL SHEET FOR  
SITE 2**

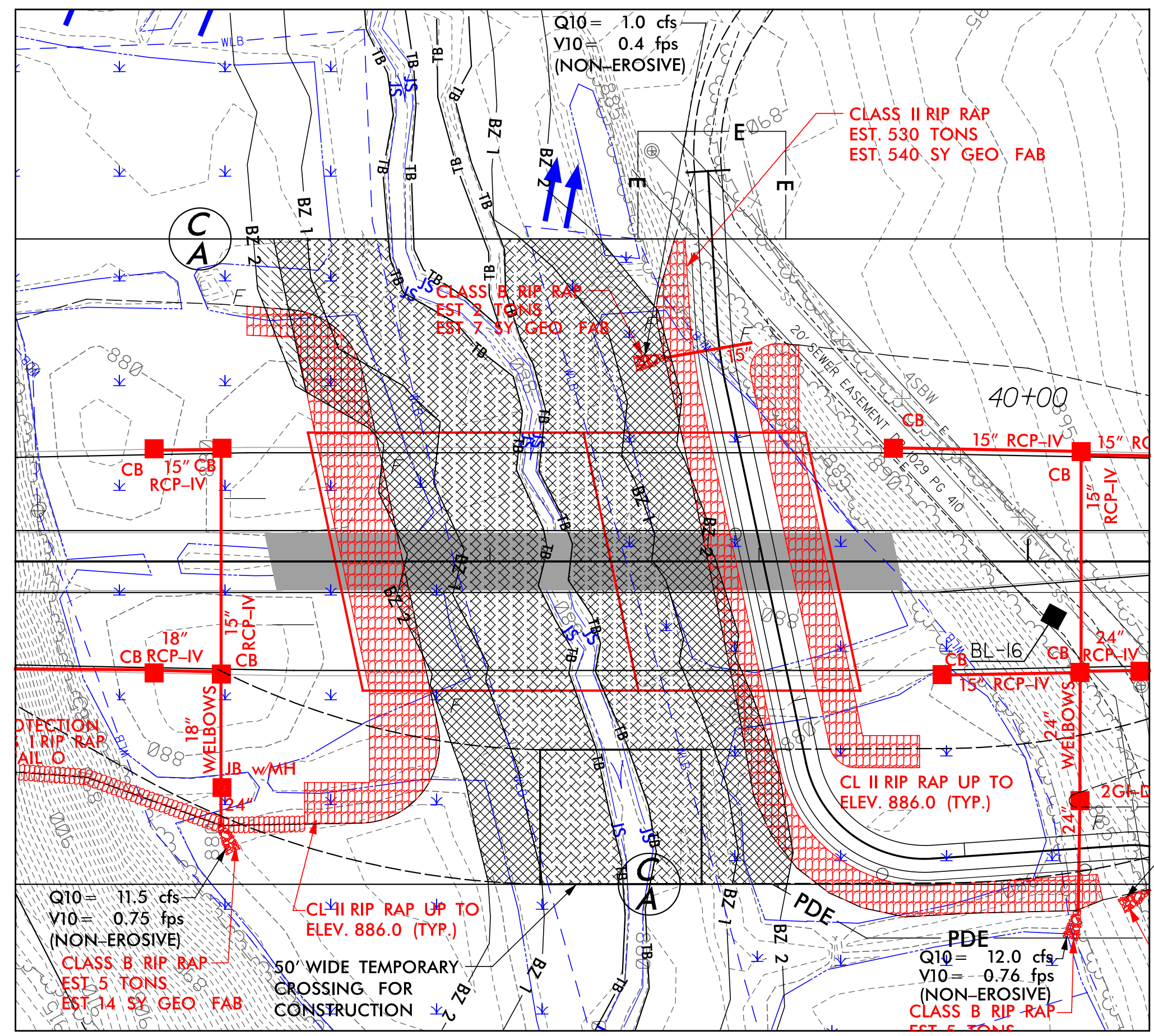
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 ICA ENGINEERING, INC.  
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PROJECT REFERENCE NO. <b>U-4734</b>	SHEET NO. <b>6A</b>
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
BUFFER DRAWING SHEET 11 OF 13	



**LEGEND**

- BZ 1 — RIPARIAN BUFFER ZONE 1 (30')
- BZ 2 — RIPARIAN BUFFER ZONE 2 (20')
- ALLOWABLE IMPACTS ZONE 1 (BRIDGE)
- ALLOWABLE IMPACTS ZONE 2 (BRIDGE CROSSING)
- ALLOWABLE IMPACTS ZONE 2 (ROAD CROSSING)



Q10 = 0.25 cfs  
V10 = 0.28 fps  
(NON-EROSIVE)



FOR -L- & -Y8- INTERSECTION DETAIL, SEE SHEET 2B-7  
FOR -L- PROFILE, SEE SHEET 15  
FOR -GW- PROFILE, SEE SHEET 21

**DETAIL SHEET FOR  
SITE 2**

10/19/2017  
ICA ENGINEERING, INC.  
Environmental/Development/4734\_hud\_perm\_buf\_csb\_06a.dgn

### BUFFER IMPACTS SUMMARY

SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE			ZONE 1 (ft <sup>2</sup> )	ZONE 2 (ft <sup>2</sup> )
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft <sup>2</sup> )	ZONE 2 (ft <sup>2</sup> )	TOTAL (ft <sup>2</sup> )	ZONE 1 (ft <sup>2</sup> )	ZONE 2 (ft <sup>2</sup> )	TOTAL (ft <sup>2</sup> )		
1	2@7'x7' RCBC 54" prestressed concrete girders 1@100', 1@80' w/ 4.0' Deep Caps	STA. 27+85 -L-	X			25417	15316	40733					
2	54" prestressed concrete girders 1@100', 1@80' w/ 4.0' Deep Caps	STA. 38+35 -L-		X		15401	10220	25621					
2	54" prestressed concrete girders 1@100', 1@80' w/ 4.0' Deep Caps	STA. 38+35 -L-	X				406	406					
<b>TOTAL:</b>						40818	25942	66760	0	0	0		

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
  
 FORSYTH COUNTY  
 PROJECT: U-4734  
  
 10/19/2017  
 SHEET 12 OF 13

## WETLANDS IN BUFFER IMPACTS SUMMARY

SITE NO.	STATION (FROM/TO)	WETLANDS IN BUFFERS	
		ZONE 1 (ft <sup>2</sup> )	ZONE 2 (ft <sup>2</sup> )
2	-L- 38+35	4194	10412
<b>TOTAL:</b>		4194	10412

N.C. DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
  
 FORSYTH COUNTY  
 PROJECT: U-4734  
  
 10/19/2017  
 SHEET 13 OF 13



Environmental Quality

ROY COOPER  
Governor

November 3, 2017

Ms. Amy Euliss  
NCDOT Division 9 Environmental Officer  
North Carolina Department of Transportation  
375 Silas Creek Parkway  
Winston-Salem, North Carolina 27127

Dear Ms. Euliss:

Subject: Mitigation Acceptance Letter:

Division 9 Project, TIP Number U-4734, Kernersville – Macy Grove Road Extension from SR 1005 (East Mountain Street) to NC 150 (North Main Street), Forsyth County, WBS No 36600.1.2

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the stream and wetland mitigation for the subject project. Based on the information supplied by you on October 30, 2017, the stream and wetland impacts are located in CU 03030002 of the Cape Fear River basin and 03010103 of the Roanoke River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Stream & Wetlands	River Basin	CU Location	Eco-Region	Stream			Wetlands		
				Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh
Impacts	Cape Fear	03030002	CP	0	0	389.0	1.40	0	0
Impacts	Roanoke	03010103	CP	0	0	56.0	0	0	0

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

These impacts and associated mitigation needs were under projected by the NCDOT in the 2017 impact data. DMS will commit to implement sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from DMS.

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

Sincerely,

  
James B. Stanfill  
DMS Credit Management Supervisor

Cc: Mr. James Lastinger, USACE – Raleigh Regulatory Field Office  
Ms. Amy Chapman, NC Division of Water Resources – Raleigh  
File: U-4734 – Division 9

