



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

June 8, 2017

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28805

ATTN: Mr. James Lastinger
NCDOT Coordinator

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the proposed Winston-Salem Northern Beltway (Eastern Section) from US 311 to US 158 in Forsyth County, Federal Aid No. NHP-0918 (93), TIP Project No. U-2579C; Division 9. Debit \$570 from WBS 4839.1.9

Dear Mr. Lastinger:

The North Carolina Department of Transportation (NCDOT) proposes to construct the Winston-Salem Northern Beltway (Eastern Section) from US 311 to US 158 in Forsyth County. Please see the enclosed ENG 4345, the North Carolina Division of Mitigation Services (NCDMS) Acceptance Letter (dated June 2, 2017), Meeting Minutes – Concurrence Points 4B and 4C; State Stormwater Management Plan (SMP), permit drawings (Permit Drawing Sheets 1-5, 14-15, 19, 23, and 25-40 of 40), and design plans for the above referenced project.

Purpose and Need:

The purpose of the proposed project is to improve intrastate and interstate mobility, improve roadway system linkage and continuity, reduce traffic congestion and carry future traffic at a desirable level of service, enhance safety, and provide a corridor for I-74 (a congressionally designated High Priority Corridor on the National Highway System). The transportation needs of the proposed project are intended to address the following: poor intrastate and interstate linkage to the north and south, poor roadway connectivity within and through eastern Forsyth County, capacity deficiencies, above-average accident rates on area roadways and corridor for I-74.

Summary of Jurisdictional Impacts:

Proposed permanent impacts to jurisdictional areas total 0.88 acre of wetland impacts and 997 linear feet of stream impacts, of which 76 LF are bank stabilization impacts.

Summary of Utility Impacts:

There will be no impacts associated with utility relocations.

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, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Of the 997 linear feet of permanent stream impacts, 76 are for bank stabilization, which does not require mitigation, leaving 921 linear feet of permanent stream impacts requiring mitigation (see Table 2). The 0.88 acre of permanent wetland impact also requires mitigation (see Table 1). NCDOT has acquired compensatory mitigation for these unavoidable impacts from the Division of Mitigation Services (DMS).

NEPA DOCUMENT STATUS

A Draft Environmental Impact Statement (DEIS) was completed in September 1995; a Supplemental DEIS (SDEIS) was completed in October 2004; a Final Environmental Impact Statement (FEIS) was completed in January 2007; a Record of Decision (ROD) was completed in February 2008; a Right of Way Consultation was completed in July 2015; and a Construction Consultation was completed in April 2017. Copies of these documents can be found on the NCDOT Website: <https://www.ncdot.gov/projects/wsnb/>.

PROJECT SCHEDULE

The project has a Let date of October 17, 2017, and a Let Review Date of August 29, 2017. **NCDOT will need permits by August 30, 2017, in order to start the contract for this project.**

INDEPENDENT UTILITY

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

- (1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope,
- (2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
- (3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Waters within the project area are located in the Yadkin/Pee Dee River Basin (HUC 03040101). There are no Outstanding Resource Waters (ORW), High Quality Waters (HQW), Water Supply Waters (WS-I or WS-II) waters within 1.0 mile of the project area. There are two (2) named streams (Frazier Creek and Lowry Mill Creek) and their associated un-named tributaries.

An updated Preliminary Jurisdictional Determination (PJD) was obtained on August 3, 2016 for U-2579C, along with other funded portions of the Winston-Salem Northern Beltway. John Thomas/USACE and Dave Wanucha/NCDWR attended the field visits on March 3, 2016, and March 15, 2016.

303(d) Impaired Waters:

No streams within the project study area, or within one miles of the project study area, are listed on the Final 2014 303(d) list of impaired waters for turbidity or sedimentation.

IMPACTS TO WATERS OF THE U.S.

Tables 1 and 2 summarize the impacts to jurisdictional wetlands and streams, respectively. Site numbers correspond with the permit (hydraulic) drawings included in this application. The stream numbers correspond to the PJD, dated August 3, 2016, to differentiate between the several UTs to Frazier Creek. A brief description of each impact site will follow the tables.

Table 1 – U-2579C Wetland Impacts*

Permit Site	Wetland Number ^{1/}	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
7	ES-W9	0.06	<0.01	--	<0.01	0.01
7A	ES-W10	0.15	0.14	--	--	0.14
11	ES-W15	0.56	0.08	--	0.03	0.11
13	ES-W12 ^{3/}	1.06	0.57	--	0.05	0.65
Total Impacts **			0.79	0.00	0.09	0.88

* Wetlands impacted are riparian.

^{1/} Wetland number corresponds to U-2579/R-2247 PJD labeling.

^{2/} Wetland size is based on U-2579/R-2247 PJD.

^{3/} Wetland number corresponds to U-2579B PJD.

** Rounded Totals are sum of actual impacts to 1/1000th.

Table 2 – U-2579 Stream Impacts

Site	Stream Name (P / I)*	Stream Number ^{1/}	Impact Type	Permanent Impact (lf)	Temporary Impacts (lf)	Mitigation Requirement ^{2/}
6	UT to Frazier Creek (I)	ES-S30	Perm. Fill	53	--	USACE
			Channel Stabilization	15	--	USACE
7A	UT to Frazier Creek [Sh. 13 of 41] (P)	ES-S31	Perm. Fill (pipe)	205	40	USACE & DWR
			Bank Stabilization	25	--	--
9	UT to Frazier Creek [Sh. 25 of 41] (P)	ES-S31	Perm. Fill (pipe)	271	56	USACE & DWR
			Channel Stabilization	45	--	USACE & DWR
11	Frazier Creek (P)	Frazier Creek (ES-S32)	Perm. Fill (RCBC)	317	23	USACE & DWR
			Bank Stabilization	25	--	--
12	Lowry Mill Creek (P)	Lowery Mill Creek (ES-S34)	Bank Stabilization	26	--	--
			Temp. crossing	--	80	--
14	UT to Lowery Mill Creek (P)	ES-S47	Perm. Fill (pipe)	15	--	USACE
Total Temporary Impacts:				--	199	
Total Permanent Impacts (Perm. Fill + Bank Stabilization):				997		
Bank Stabilization Impacts:				76		
Permanent Impacts Requiring USACE Mitigation (Total Permanent Impacts - Bank Stabilization Impacts):				921 ^{3/}		
Permanent Impacts Requiring DWR Mitigation:				838		
Total Impacts Requiring Mitigation:				921 lf †		

*P = Perennial; I = Intermittent

^{1/} –Stream Number corresponds to U-2579/R-2247 PJD labeling.

^{2/} – Mitigation is required by DWR when permanent impacts to a single feature exceed 150 linear feet.

^{3/} – USACE stream mitigation is typically at a ratio of 2:1.

† – Final mitigation requirement will be up to the USACE and DWR. Mitigation for 921 LF of permanent stream impact (at 2:1 ratio) has been requested from DMS.

NOTE: Site 8 has been renamed as Site 7A and Site 10 has been eliminated.

Permit Site 6: There will be a total of 68 lf of permanent stream impact to Stream ES-S30, with 53 lf being impacted from the installation of a 24-inch Reinforced Concrete Pipe (RCP) to convey stormwater to this receiving stream, and 15 lf will be impacted from the installation of Channel stabilization (imbedded riprap in channel) that will be used at the outlet of the RCP to achieve post-construction stability.

Permit Site 7: There will be <.01 ac of wetland fill impact and <0.01 ac lf mechanized clearing impact to Wetland ES-W9 from the installation of toe protection at the upstream end of the 72-inch RCP at Site 7A.

Permit Site 7A: There will be a total of 230 lf of permanent impact to Stream ES-S31 and 0.14 ac of permanent fill impact to Wetland ES-W10 from roadway fill. Of the 230 lf of

permanent stream impact, 205 lf will be from the installation of a 72-inch RCP and 25 lf will be from bank stabilization at the downstream end of the RCP. The inlet invert of the RCP will not be buried in order to prevent destabilization and to limit wetland impacts at Permit Site 7. The outlet invert will be buried 1 foot, and the bank stabilization will be used to achieve post-construction stability.

Permit Site 8: Replaced with Site 7A.

Permit Site 9: There will be a total of 316 lf of permanent impact to Stream ES-S31, with 271 lf from the installation of a 78-inch CSP and 45 lf from the installation of Channel stabilization (imbedded riprap). Inverts on both ends of the CSP will not be buried in order to prevent head-cutting, and the imbedded riprap will be installed achieve post-construction stability.

Permit Site 10: This site has been eliminated.

Permit Site 11: There will be a total of 342 lf of permanent impact to Stream ES-S32 (Frazier Creek) and 0.11 ac of impacts to Wetland ES-W15. The stream impacts occur from the installation of a single barrel 8-foot X 8-foot RCBC, a 95-inch X 67-inch Corrugated Steel Pipe Arch (CSPA) and channel armoring, and 25 lf from the installation of riprap at the outlet end of the CSPA to achieve post-construction stability. Of the total of 0.11 ac of permanent wetland impacts, 0.08 ac will be from permanent fill (fill and a constructed riffle), and 0.03 ac will be from mechanized clearing adjacent to the constructed riffle.

The RCBC will be installed to convey the wetland/stream feature perpendicularly across the roadway from the left of -L- to the right of -L-. The culvert will be buried at the inlet and the outlet one foot, and sills (due to mild slope) will be utilized to aid in natural substrate retention. A constructed riffle will be employed upstream of the culvert to prevent head-cutting into the wetland to avoid further impacts. The CSPA will be used to convey the stream crossing of the service road that is adjacent to the roadway fill, immediately downstream of the RCBC. A headwall and endwall will be used to shorten the length of the CSPA, and the CSPA will be buried one foot. Bank stabilization will be used downstream of the CSPA to achieve post-construction stability.

Permit Site 12: There will be 80 linear feet of temporary impacts to Stream ES-S34 (Lowery Mill Creek) for the construction of an equipment/vehicle crossing. There will be 26 lf of bank stabilization impact to achieve post-construction stability.

Permit Site 13: Stream ES-S34 (Lowery Mill Creek) is hydraulically a culvert-sized crossing; however, NCDOT has agreed to bridge this stream. There will be a total of 1.06 ac of wetland impacts to Wetland ES-W12 (0.57 ac from permanent fill and 0.05 ac from mechanized clearing) from the construction of the bridge. As the adjacent wetland in the Lowery Mill Creek floodplain will be impacted from roadway fill, a 60-inch RCP will be set at the wetland elevation to connect the hydrology of the wetland system from the left of -L- to the right of -L-. Temporary, non-mitigable impacts will occur to a small surface water feature from construction activities.

Permit Site 14: There will be 15 lf of permanent impact to Stream ES-S47 from the replacement of a 30-inch pipe with a 42-inch RCP and riprap pad.

MORATORIUM

This project is not in a North Carolina Wildlife Resource Commission Trout county. As such, there is no trout moratorium for this project.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of July 24, 2015, the USFWS lists three federally protected species for Forsyth County (Table 3).

Summary of Species with Habitat:

Northern long-eared bat (NLEB): According to the North Carolina Natural Heritage Program (NHP) Biotics Database, most recently updated October 2015, the nearest NLEB hibernacula record is 80 miles west (EO ID 32171) and no known NLEB roost trees occur within 150 feet of the project area. EO 32171 represents Black Rock Cliffs Cave near Grandfather Mountain with multiple observations from 1986 to 2011.

NCDOT has also reviewed the USFWS Asheville Field office website for consistency with NHP records (http://www.fws.gov/asheville/htmls/project_review/NLEB_in_WNC.html). 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.

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. NCDOT may presume its determination is informed by best available information and consider Section 7 responsibilities fulfilled for NLEB. NCDOT made notification to USFWS on April 12, 2016.

Table 3 – Federally protected species listed for Cabarrus County

Scientific Name	Common Name	Federal Status*	Habitat Present	Biological Conclusion
<i>Glyptemys muhlenbergii</i>	Bog turtle	T(S/A)	N/A	Not Required
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	**	**
<i>Cardamine micranthea</i>	Small-anthered bittercress	E	No	No Effect

* T - Threatened, E - Endangered, T(S/A) Threatened due to similarity of appearance.

** NLEB is exempt due to consistency with the 4(d) rule.

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4) require that 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 Assessment (ICE) was completed for this project on July 1, 2010. Copies of this report are available upon request. This report concluded the following:

Indirect and Cumulative Effects to the Human Environment

An Indirect and Cumulative Effects (ICE) report was completed for the proposed Winston-Salem northern beltway (U-2579, U-2579A, and R-2247). The report details the potential socioeconomic, and ecological effects that may result from the proposed Winston-Salem northern beltway and other past, present, and reasonably foreseeable future development activities in the region. It was completed in June 2005 and distributed shortly thereafter. Additional copies of the ICE report are available upon request.

Based upon the ICE report, a majority of the study area is urban and suburban in character, and most of the area already has access to an established road network. The project's individual effects on land use and natural resources are minor. The potential indirect effects identified in the ICE report are consistent with all local jurisdictions' land use and transportation plans. Current land use and transportation policies contained in the local plans support the proposed project.

CULTURAL RESOURCES

In order to comply with Section 106 of the National Historic Preservation Act (1966, as amended), FHWA and NCDOT must evaluate the project's impact upon any extant architectural and archaeological resources, and determine if additional measure will be necessary to mitigate any adverse effects of the project upon any significant properties and sites.

Archaeological Resources:

Archaeological surveys identified ten archaeological sites that are located in the vicinity of the project. None of the ten sites are eligible for the National Register of Historic Places (NRHP). No further archaeological work is warranted.

Historic Architectural Resources:

Based on the last correspondence with the State Historic Preservation Office (SHPO), there are no adverse effects to historic properties.

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).

MITIGATION OPTIONS

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, and minimization measures were incorporated as part of the project design.

Avoidance and Minimization:

Existing drainage patterns and outfalls have been maintained where possible. Best Management Practices (BMPs) will be utilized during construction to attempt to reduce the stormwater impacts to receiving streams and wetlands due to erosion and runoff. Measures have been taken throughout the project to limit impacts to wetlands and surface waters. These additional measures have been taken:

- A Dry Detention basin will be utilized in the gore area between the -L- line and Ramp B. This basin will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream.
- Site 11: The CSPA will utilize a headwall and endwall to shorten the length of the CSPA to minimize stream impacts to Frazier Creek. Additionally, constructed riffle will be employed upstream of the culvert to prevent head-cutting into the wetland to avoid further impacts.
- Site 12: Lowery Mill Creek is hydraulically a culvert-sized crossing; however, NCDOT has agreed to bridge this stream as a minimization effort.
- No deck drains will be used on the Lowery Mill Creek bridge, eliminating the potential for direct roadway runoff into surface waters. A riprap energy dissipator basin will be used at storm drain system outlets, in the Lowery Mill Creek floodplain, to reduce peak flow velocities to Lower Mill Creek.
- 2:1 slopes will be used to reduce impacts to surrounding wetlands and jurisdictional streams (except on the interchange ramp/loop and Dry Retention Basin, where 4:1 slopes are used, which do not change the impact quantity as this area will be filled to elevation 940.0 for the Dry Retention Basin).

- Based on discussions at Merger Meeting 4C, several pipes will not be buried in order to prevent destabilization of streams (headcuts), as stability is the primary objective of any stream relocations. The following pipes at jurisdictional locations will not be buried:
 - Site 6: 24-inch Reinforced Concrete Pipe (RCP) outlet at Station 31+30-Y1-Rt
 - Site 7: 72-inch RCP inlet at Station 413+74-L-Lt
 - Site 9: 78-inch CSP inlet at Station 21+46-Y1RPD-Rt; 78-inch CSP outlet at Station 25+82-Y1RPD-Lt
 - Site 14: 42-inch RCP outlet at Station 42+15-Y1-Rt

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Tables 1 and 2 summarize the wetland and stream impacts for this project. NCDOT has obtained compensatory mitigation for 0.88 acres of wetland impacts and 921 linear feet of stream impact from the DMS.

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 N. C. 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 previously noted in this application (see Subject line).

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Bill Barrett at wabarrett@ncdot.gov or (919) 707-6103. A copy of this application and distribution list will also be posted on the NCDOT website at: <http://connect.ncdot.gov/resources/Environmental/Pages>.

Sincerely,



for

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

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 - Phil Middle - S Last - Harris Company - NCDOT E-mail Address - pharris@ncdot.gov	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Middle - Last - Company - E-mail Address -
6. APPLICANT'S ADDRESS: Address- 1598 Mail Service Center City - Raleigh State - NC Zip - 27699 Country - USA	9. AGENT'S ADDRESS: Address- City - State - Zip - Country -
7. APPLICANT'S PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax 919-707-6001	10. AGENTS PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

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

_____ _____
 SIGNATURE OF APPLICANT DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) U-2579C	
13. NAME OF WATERBODY, IF KNOWN (if applicable) Frazier Creek and Lowery Mill Creek and associated UTs.	14. PROJECT STREET ADDRESS (if applicable) Address City - State - Zip-
15. LOCATION OF PROJECT Latitude: °N 36.150030 Longitude: °W 80.169590	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID Municipality Section - Township - Range -	

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter.

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

U-2579C proposes to construct a section of the Winston-Salem Northern Beltway Eastern Section from US 311 to US 158 (future I-74) in Forsyth County, NC for a total of 1.989 miles.

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

The purposes of the proposed project are to improve intrastate and interstate mobility, improve roadway system linkage and continuity, reduce traffic congestion and carry future traffic at a desirable level of service, enhance safety, and provide a corridor for I-74 (a congressionally designated High Priority Corridor on the National Highway System).

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

20. Reason(s) for Discharge

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

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

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

Acres

or

Linear Feet see attached Cover Letter.

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

see attached Cover Letter.

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

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

a. Address- see attached permit drawings

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

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

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

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

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

 06-08-2017

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE
for PHILIP S. HARRIS

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.



ROY COOPER
Governor

June 2, 2017

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

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

U-2579C, Winston-Salem Northern Beltway (Eastern Section) from US 158 to US 311, Forsyth County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 2, 2017, the impacts are located in CU 03040101 of the Yadkin River basin in the Central Piedmont (CP) Eco-Region, and are as follows:

Yadkin 03040101 CP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	4,513.0	1.55	0	0	0	0

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

This mitigation acceptance letter replaces the mitigation acceptance letter issued on May 24, 2017. The 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 Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
Credit Management Supervisor

cc: Mr. James Lastinger, USACE – Raleigh Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: U-2579C Revised



**MINUTES OF INTERAGENCY 4B MEETING
MEETING FOR PROJECT U-2579C, FORSYTH COUNTY
HELD ON 11/19/2008**

Team Members:

Andrew Nottingham	Hydraulics (Present)
John Thomas	USACE (Present)
Marella Buncick	USFWS (Present)
Marla Chambers	NCWRC (Present)
Amy Euliss	NCDWQ (Present)
Chris Militscher for Kathy Matthews	EPA (Present)
Felix Davila for Donnie Brew	FHWA (Present)
David Harris	REU (Absent)
Tony Houser	Roadway (Present)
Lonnie Brooks	Structures (Present)
Derrick Weaver	PDEA (Absent)
Rachelle Beauregard	NEU (Present)
Keith Raulston	Division 9 (Present)

Participants:

Karen Gullede	Hydraulics Unit
Greg Price	NEU
Lee Moore	Roadway
John Braxton	Roadway

DOT began the meeting at 2:00 P.M. with an overview of the project.

Sheets 2F & 2G:

NCWRC inquired whether the stream features shown on these sheets were jurisdictional. NEU responded that they were not jurisdictional streams. No other comments.

Sheet 4:

No comments

Sheet 5:

NEU stated that the stream feature shown on the plans became jurisdictional near -L- Station 378+00 +/- Rt. USFWS inquired whether the drainage from the roadway was going to be discharged directly into the jurisdictional stream. Hydraulics responded that the roadway drainage would be discharged into lateral ditches prior to reaching the stream. DWQ inquired whether this stream is perennial. NEU responded that it was perennial and jurisdictional up to -L- Station 378+00 +/- Rt.

EPA inquired about the need for a spring box where the jurisdictional stream starts, what fill slopes were used, and the stability of the fill slope in that area due to the steepness of the surrounding terrain. Hydraulics responded that the fill slopes in this area were 2:1

and that a lateral ditch with Class I rip rap would be used from -L- Station 375+00 to 383+00 Rt. Hydraulics will recommend a spring box in this area.

USFWS inquired about the drainage to the proposed cross pipe near -L- Station 381+00. Hydraulics responded that all of the drainage to this pipe was from the natural lay of the land and that only a small amount of roadway drainage would be taken to the pipe via a lateral ditch.

Sheet 6:

Hydraulics stated that the proposed pipe size currently shown (pipe at 387+00) would be upgraded from a 48" to a 60" on the final plans. Hydraulics discussed the proposed design of the cross pipe at -L- Station 387+00; the pipe has a stub out from the stream to a JB because this will align it better with the existing stream at the toe of the fill slope. DWQ inquired whether the stream under the proposed roadway was a jurisdictional stream or not. NEU responded that it was a jurisdictional stream.

Hydraulics stated that the roadway drainage would be taken to lateral ditches to help avoid any erosion problems which may occur with discharging the proposed pipes to the fill slope with no ditches.

Hydraulics discussed the proposed 7'x6' RCBC located at -L- Station 397+70 +/- . Hydraulics discussed trying to daylight as much of the existing stream as possible, but because there is such a large amount of fill, this was not possible. The stream located near -RpB- Station 24+50 will be relocated to the proposed culvert inlet with a lateral base ditch. DWQ inquired about mitigation for the stream on the inlet side of the culvert. Hydraulics stated that this would not be a natural channel design due to the amount of cut required to construct this channel relocation. Hydraulics also stated that there would be no rip rap in the channel relocation. Hydraulics stated that mitigation at the outlet would be needed due to a slight relocation of the channel in order to keep the culvert outlet and stream more inline with each other.

DWQ inquired about the use of grade control structures, such as rock cross vanes, in the channel relocation. Hydraulics stated that the use of rock cross vanes would be investigated. NCWRC inquired as to the length of the channel relocation, recommended natural channel design, and that it was important for the relocation to be stable. Hydraulics stated that the length of the relocation was approximately 220 feet and that natural channel design was not practicable due to the amount of cut required. Construction stated that there had been more success with grade control devices than with natural channel design and recommended investigating grade control measures.

NCWRC inquired about the pipe system on -RpC- near the outlet of the culvert. Hydraulics stated that due to the small size of the plan sheet, it appeared that the system drained to the culvert, but it did not. The roadway drainage is taken to the other side of the ramp and discharged to a lateral ditch. Hydraulics also stated that the areas where the OTCB's were located between the -L- line and the ramps would be graded out and used for detention.

Sheet 6 and 7:

Hydraulics next discussed the proposed pipe crossing at -L- Station 414+00 +/- . DWQ inquired whether the stream feature that is parallel to the -L- line was a jurisdictional stream. NEU stated that it was not, but the stream feature from the pond was jurisdictional. Hydraulics stated that 2:1 fill slopes were going to be used along the -L- line and Ramp D in order to minimize the impacts to the wetlands and stream at this crossing. Roadway questioned this design because of the use of guardrail near the gore area on Ramp D and stated that it was a safety issue if guardrail was used in this area. After review it was determined that the use of 2:1 slopes in this area would not affect the gore area. EPA inquired whether the wetlands not affected would be counted as savings and Hydraulics stated this was correct.

Sheet 8:

EPA inquired about the pond shown on the plans and if it was drained or not. Hydraulics stated that it was drained. DWQ inquired if there were any jurisdictional streams within the area shown as a pond. NEU stated that the jurisdictional stream began below the dam of the pond.

Hydraulics stated that an 8'x8' RCBC would be utilized at this location. USFWS inquired about the slope of the proposed culvert. Hydraulics stated that it was 0.076. USFWS inquired about the outlet design. Hydraulics stated that it had not yet been designed but would likely incorporate rip rap on the banks of the channel.

Sheet 9 & 10:

EPA inquired if there were any jurisdictional streams on either of these sheets. Hydraulics stated that there were none. No other comments.

Sheet 11:

Hydraulics stated that a bridge was discussed in the 2A meeting and the proposed bridge will be approximately 240' in length. A 60" overflow pipe would also be utilized for the wetlands. DWQ inquired what fed the wetlands and NEU/USACOE stated that it was fed by drainage from the existing natural slopes along with any flood waters. NEU stated that the stream feature shown in the wetland was not jurisdictional, but the stream feature that is up stream of the proposed bridge was jurisdictional.

The meeting adjourned at 3:00 P.M.

**Minutes from the Interagency 4C Hydraulic Design Review Meeting
U-2579C - Forsyth County
February 8, 2017**

Team Members:

Monte Matthews, USACE	(present)
James Lastinger, USACE	(present)
Marella Buncick, USFWS	(present)
Marla Chambers, NCWRC	(present)
Dr. Cynthia Van Der Wiele, USEPA	(present)
Dave Wanucha, NCDWR	(not present)
Clarence Coleman, FHWA	(not present)

Participants:

Stephen Morgan, Hydraulics
Bruce Payne, Roadway Design
Josh Dalton, Sungate Design Group
Brian Elam, Sungate Design Group
Mark Staley, REU
Bill Barrett, NES
Carla Dagnino, NES
Marc Cheek, Structures
Tanga Sampson, Utilities
Ahmad Al-Sharawneh, PDEA
James Upchurch, TPB
Keith Raulston, Div. Const. Eng. (Not Present)

Minutes:

Introductions were made by all in attendance.

Josh Dalton proceeded through the permit drawing plan sheets:

General

- Upstream and downstream bank and channel stabilization lengths will be split and noted in the impact summary sheet for use in the permit application.

Permit Sheet 6: (Plan Sheet 4)

Site 1:

- Concerns about groundwater initiated discussion regarding the need for spring boxes. Since no springs were located or shown in the current plans, Stephen Morgan stated that the necessity of spring boxes would be determined in the field during construction.

Permit Sheet 9: (Plan Sheet 5)

Site 1:

- Drop structure to be added to 48” cross pipe to reduce outlet velocity.
After the meeting, hydraulics recommended increasing the 48” to 60” to facilitate future “slip-lining”, since the pipe is metal.

- Lateral 5' base ditch, at station 383+50 -L- right, to be flattened or flared to reduce velocity at JS.

Site 2:

- Upstream and downstream bank stabilization lengths will be split and noted in the impact summary sheet for use in the permit application.
- Because of the steeper slope (1.9%), USACE inquired about not burying the inlet end of the 60" cross pipe and USFWS had concerns about outlet velocity. After discussion, it was agreed that the pipe inlet would not be buried and a junction box would be used to flatten pipe slope near the pipe outlet.

Permit Sheet 13: (Plan Sheet 6)

Site 3:

- The drainage area of this crossing would allow for a large pipe, but as a minimization effort the RCBC with sills and baffles will remain as the proposed structure with a 0.5ft burial. *After the meeting, concerns were raised regarding the constructability of the 0.5 baffles and the ability to retain bed material in the culvert. The 2' meander is not sufficient to hold material to provide a low flow channel. The decision was made to remove the low/high sills in favor of one sill 0.75' tall across the culvert width. This will allow Class B rip rap to be used to supplement native bed material. The culvert will be buried 0.75'.*

Site 4:

- There was a general discussion about the reasoning for the benched lateral 4' base ditch. The 4B minutes indicated there was a desire to provide some natural stream design at that time. In the time since, the team agreed that natural stream design for such short sections is not feasible and stream stability is more critical. USACE indicated there would be no mitigation credit for the benched lateral 4' base ditch. The design will be revised to an armored open channel with embedded rip rap. The bench and rock sills will be removed from the plans.

Site 5:

- NES proposed 1:1 mitigation since stream is intermittent. No further comments.

Site 6:

- Since the proposed cross pipe has a 7.8% slope and the Jurisdictional Stream will begin at its outlet, rip rap should be used in the channel bed and impacts revised.

Site 7:

- Burial at upstream end of cross pipe to be waived to protect integrity of wetland.

Site 8:

- Cross pipe to be buried at outlet end.
- Wetland declared a total take.

Permit Sheet 25: (Plan Sheet 7)

Site 9:

- Due to a flatter grade (1.67%), the pipe will be buried one foot. To ensure stream stability, embed rip rap in channel bed upstream and downstream of cross pipe. Impacts are still to be separated in impact summary.

Permit Sheet 28: (Plan Sheet 8)

Site 10:

- Upon reviewing recent photos of the wetland an inquiry was made as to whether part of the site should be designated as open water. NES will make a determination and update as needed.

Site 11:

- Alignment -SRSA- was not shown on the plans during the 4B review. The access road was added to provide access to parcels cut off by the project. An additional stream crossing will need to be added due to this revision. The proposed structure is a 95"x67" CSPA downstream of the box culvert. Both the RCBC and CSPA will be buried 1.0' with rip rap on banks only. Both are on relatively mild grades (0.59%).

Permit Sheet 34: (Plan Sheet 11)

Site 12:

- Note to be added for temporary channel impact at bridge, indicating its intended use for temporary crossing during construction.
- Hydraulics inquired as to whether a pipe would be an allowable option for the temporary crossing. If permitted as temporary fill a pipe would be allowed per USACE, however it is not preferred versus a spanning structure. The division will be consulted regarding the question if temporary access should be permitted across the stream.

Site 13:

- The function of the 2@48" cross pipes were discussed and it was suggested that only 1 pipe was needed to maintain integrity of the wetland. It was agreed that a

single 60" RCP would be the best option and that rip rap would not be required at the outlet end. The pipe inverts will not be buried.

Permit Sheet 39: (Plan Sheet 13)

Site 14:

- No comments.

U-2579C

4C Meeting

Feb 8, 2017

<u>Name</u>	<u>Representing</u>	<u>email</u>
Stephen Morgan	NCDOT Hydraulics	smorgan@ncdot.gov
Brian Elam	Sungate Design	belam@sungatedesign.com
JOSH DALTON	SUNGATE	jdalton@sungatedesign.com
Mark Staley	NCDOT-REQ	mstaley@ncdot.gov
MARC CHEEK	STRUCTURES MANAGEMENT	mcheek@ncdot.gov
Tanya Sampson	NCDOT-Utilities	tsampson@ncdot.gov
Bruce Payne	NCDOT-Roadway	bpayne@ncdot.gov
James Upchurch	TPB-NCDOT	jupchurch@ncdot.gov
AHMAD ALSHARAWNEH	NCDOT-PDEA	AALSHARAWNEH@ncdot.gov
Carla Dagnino	NCDOT-NES	cdagnino@ncdot.gov
Bill Barrett	NCDOT-NES	wbarrett@ncdot.gov
Marla Chambers	NCWRC	marla.chambers@ncwildlife.org
CYNTHIA VANDER WIELE	USEPA	vanderwiele.cynthia@epa.gov
Marella Bunica	USFWS	marella_bunica@fws.gov
Monte Matthews	USACE	Monte.k.matthews@usace.army.mil
James Lastinger	USACE	James.C.Lastinger@usace.army.mil

February 2017

Amy Euliss, DEO comments (black)

NCDOT Response (red and green)

SMP- extra "r" in erosive under narrative

Permit site 4: If we are updating the detail to rip rap line the channel, are the rock sills still needed?

No, they would no longer be needed.

Permit site 3: I have some concerns about the current pipe burial/sill and backfill proposed for site 3. On our current beltway project a lot of the material in the culverts migrates downstream especially what's placed immediately downstream of the sill. The sills are activating more like cross vanes, and creating scour pools behind them. **Can you send some pictures?** Not sure if that's really a problem. I think the bigger problem is that the material moves downstream. We've had more success with a mixture of class b rock and 'natural' material. In this particular culvert, since we're notching the sills, at 6" and 1' class B is too big to be in front or behind the 6" sills. What are your thoughts on rewriting the detail to use a mix of class A and natural material. **That's no problem.** Class A is small enough to fit the 6" sill height. Just curious what the low flow channel width is up and downstream of the culvert, and if it warrants notched sills. **Upstream is 3', downstream is 4'.** Backfilling the entire culvert would be easier if the sills were the same height. Below is language we've had success with permitting in the past in a 2/3 barrel situation. Could be tweaked to this site. **We propose to go with 9" sills and baffles, no notches.**

"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, 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." **We can use this same language.**

Permit site 7: Add detail to connect pipe inlet to wetland, unless there's a natural conveyance already present. **We may move the inlet slightly to align with the lowest point at the upstream end. See photo below.**



February 2017

Permit site 7 & 8 should be the same. It's confusing in the field to have different site numbers at inlet and outlet of same pipe. **We can renumber.**

Permit site 8: if the inlet isn't buried and the outlet is buried, what's the slope of the pipe going to be? **2.05%** I'd rather not bury either end. Not sure what the rationale is to just bury the outlet end. **To buy time against the outlet end being perched and to have some accumulation of sediment in the pipe. We don't need to bury either end if not preferred by Division.**

Permit site 9: Why are there no sills? If this is an aluminum pipe they can be fabricated. Also, was backfilling discussed? We haven't backfilled them in the past, but have been told we'd be held accountable if they didn't fill in. Please clearly state the intent in the permit application. **This is a steel pipe. It may be appropriate to backfill with Class A stone and native material, per the spec for site 3. Also this pipe does not have to be buried.**

After discussion with Division DEO, this pipe will not be buried. Use constructed riffle upstream and downstream on crossing for stream stabilization.

Permit site 9: Question about comments...Is the referenced embedded rip rap going to be a 'loss' of water? Why are we putting it in the stream bed? I'm ok with it, just curious why it was decided. I think it's a good idea to embed rip rap (like a constructed riffle) anytime we bury a pipe to help alleviate headcutting. **That's the reason, to act as grade control. The COE counts this as loss of water. Although the pipe may be backfilled with Class A and native material, the grade control should be more robust, perhaps Class I.**

Permit site 11: why are we burying the pipe if there is a wetland? Should be laid at grade. **We will evaluate the need for sills and baffles in the culvert so that it can be buried and backfilled while providing a sill at the wetland boundary. After discussion with Division DEO, this culvert will not be buried. Because the stream source begins downstream of the culvert, no sills, baffles or backfilling will be used either.**



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.07; Released October 2016)

WBS Element: 34839.1.9 TIP No.: U-2579C County(ies): Forsyth Page 1 of 4

General Project Information

WBS Element:	34839.1.9	TIP Number:	U-2579C	Project Type:	New Location	Date:	1/14/2017
NCDOT Contact:	Stephen Morgan, PE		Contractor / Designer:	Sungate Design Group			
Address:	Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699-1590		Address:	905 Jones Franklin Rd Raleigh, NC 27606			
	Phone:	(919) 707-6739		Phone:	(919) 859-2243		
	Email:	smorgan@ncdot.gov		Email:	belam@sungatedesign.com		
City/Town:	Winston Salem		County(ies):	Forsyth			
River Basin(s):	Yadkin-Pee Dee		CAMA County?	No			
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.99	Surrounding Land Use:	Residential, Agricultural, Rural					
Project Built-Upon Area (ac.)	Proposed Project			Existing Site				
	43.6	ac.	5.8	ac.				
Typical Cross Section Description:	Three 12ft lanes with 14ft outside shoulders (12ft paved) and 12ft paved inside shoulders in each direction with a 22ft grassed median.			N/A				
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	81,670	Year:	2037	Existing:	65,592	Year:	2017
General Project Narrative: (Description of Minimization of Water Quality Impacts)	I-74 Winston-Salem Northern Beltway from East of US 311 to US 158: Measures have been taken throughout the project to limit impacts to wetlands and surface waters. Two Dry Detention basins will be utilized in the gore areas between the -L- line and Ramps B and C. These basins will serve to attenuate peak stormwater flows, promote settlement of suspended solids and reduce erosive velocities downstream. Further, no deck drains will be used on the Lowery Mill Creek bridge, eliminating potential for direct roadway runoff into surface waters. A rip rap energy dissipator basin will be used at storm drain system outlet, in the Lowery Mill Creek floodplain, to reduce peak flow velocities to Lowery Mill Creek. 2:1 slopes will be used in fill areas to reduce impacts to surrounding wetlands and jurisdictional streams.							

Waterbody Information

Surface Water Body (1):	Lowery Mill Creek		NCDWR Stream Index No.:	12-94-12-3-(0.5)				
NCDWR Surface Water Classification for Water Body	Primary Classification:		Water Supply III (WS-III)					
	Supplemental Classification:							
Other Stream Classification:								
Impairments:	None							
Aquatic T&E Species?	No	Comments:						
NRTR Stream ID:						Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	Yes	Deck Drains Discharge Over Buffer?	No	Dissipator Pads Provided in Buffer?				N/A
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: 34839.1.9 TIP No.: U-2579C County(ies): Forsyth Page 2 of 4

Additional Waterbody Information

Surface Water Body (2):	Frazier Creek		NCDWR Stream Index No.:	12-94-12-6-1	
NCDWR Surface Water Classification for Water Body	Primary Classification:	Class C			
	Supplemental Classification:				
Other Stream Classification:					
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:				Buffer Rules in Effect:	N/A
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (3):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body	Primary Classification:				
	Supplemental Classification:				
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				Buffer Rules in Effect:	
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(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)					

Surface Water Body (4):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body	Primary Classification:				
	Supplemental Classification:				
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				Buffer Rules in Effect:	
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(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)					

Surface Water Body (5):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body	Primary Classification:				
	Supplemental Classification:				
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?		Comments:			
NRTR Stream ID:				Buffer Rules in Effect:	
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(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-2579C County(ies): Forsyth Page 3 of 4

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
11	473+00 -L- RT 36.146976, -78.578803	(1)Lowery Mill Creek	Riprap Energy Dissipator Basin	Class I	20.7	Pipe	36	56.1	23.9	N/A

Additional Comments

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



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



(Version 2.07; Released October 2016)

WBS Element: 34839.1.9

TIP No.: U-2579C

County(ies): Forsyth

Other Best Management Practices

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
6	400+00 -L- RT 36.153435, -80.182593	(2)Frazier Creek	Dry Detention Basin	13.4	3.9	1.37	4.44	No
6	400+00 -L- LT 36.154528, -80.181637	(2)Frazier Creek	Dry Detention Basin	7.4	2.0	0.63	3.98	No

Additional Comments

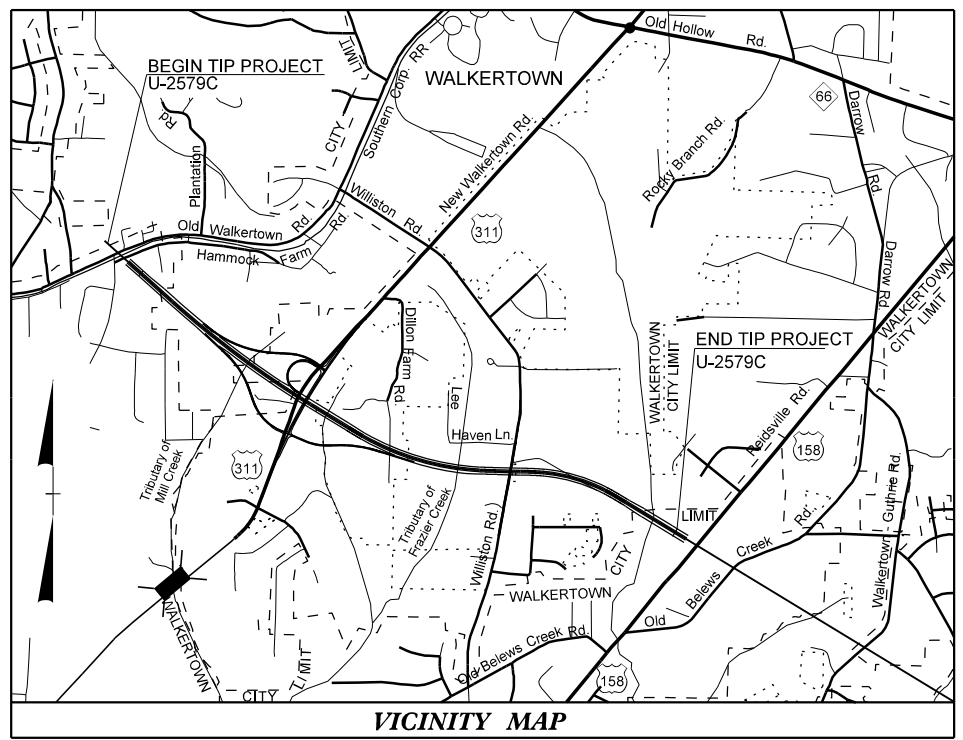
09/08/19

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

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS FORSYTH COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34839.1.9	N/A	PE	
34839.2.6	N/A	RW	
34839.2.GV18	N/A	RW	
34839.2.16	N/A	UTIL	
34839.3.GV6	NHP-0918(062)	CONSTR.	

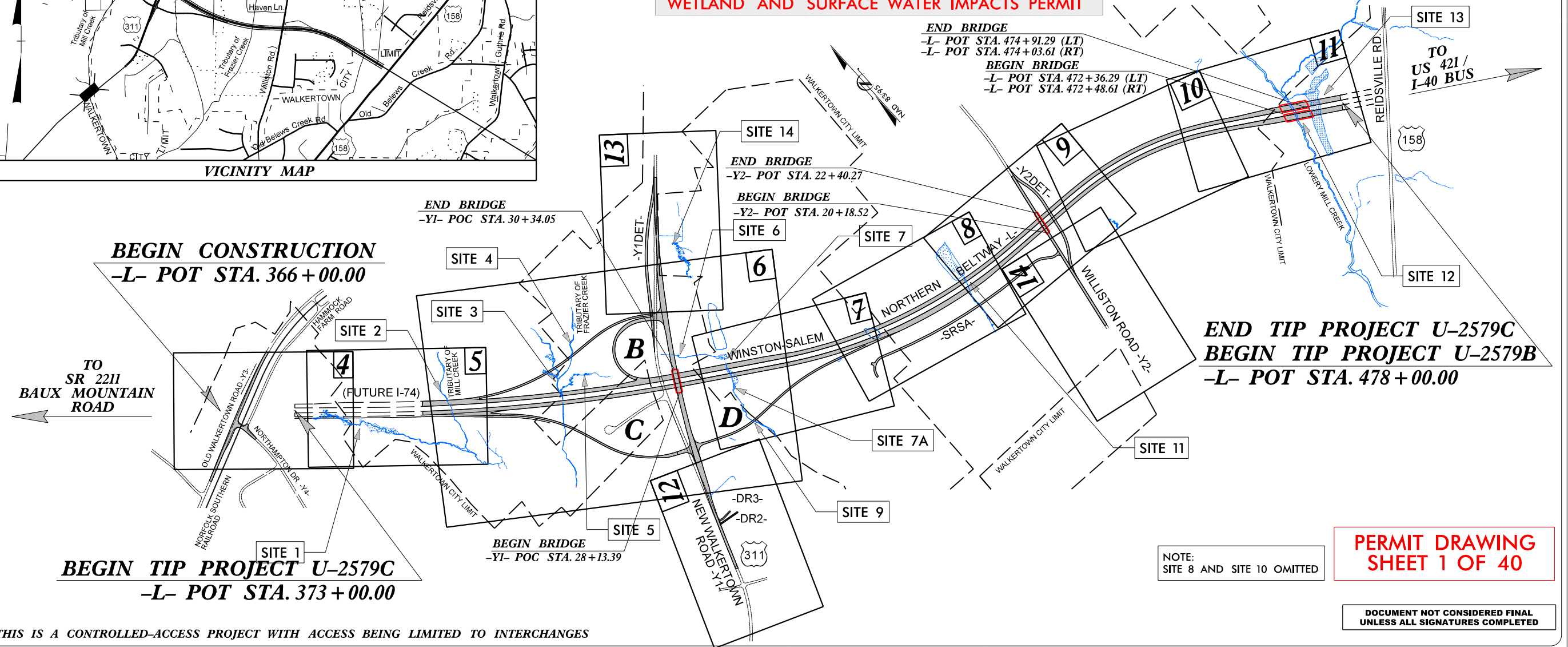
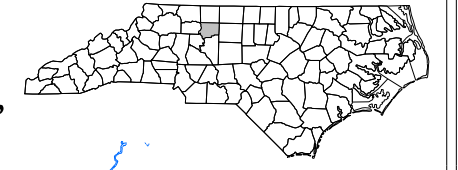
TIP PROJECT: U-2579C



**LOCATION: WINSTON - SALEM NORTHERN BELTWAY (EASTERN SECTION)
FROM US 311 TO US 158 (FUTURE I-74)**

**TYPE OF WORK: WIDENING, GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS,
ITS, CULVERTS AND STRUCTURES.**

WETLAND AND SURFACE WATER IMPACTS PERMIT

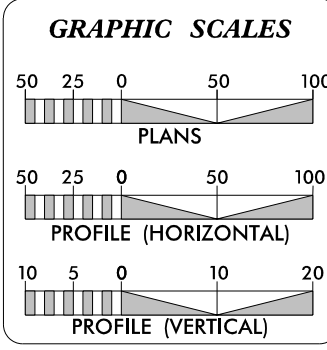


NOTE:
SITE 8 AND SITE 10 OMITTED

**PERMIT DRAWING
SHEET 1 OF 40**

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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



DESIGN DATA

ADT 2017 =	65,592
ADT 2037 =	93,112
K =	10 %
D =	60 %
T =	18 % *
V =	70 MPH
*(TTST=12% + DUAL=6%)	
FUNC CLASS =	INTERSTATE

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-2579C	=	1.989 Miles
LENGTH OF STRUCTURE PROJECT U-2579C	=	0.040 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C	=	1.949 Miles

PLANS PREPARED BY:
&
8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 28, 2015

LETTING DATE:
OCTOBER 17, 2017

JASON TALLEY, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

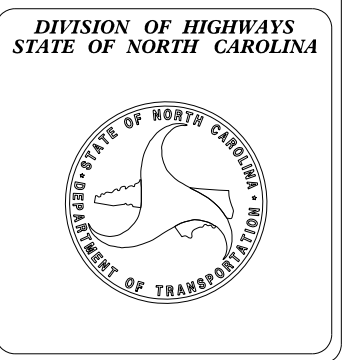
TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS ENGINEER

ROADWAY DESIGN ENGINEER

SIGNATURE: _____

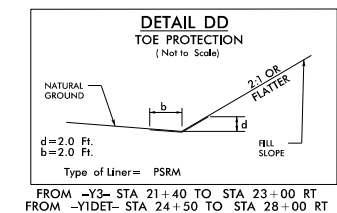
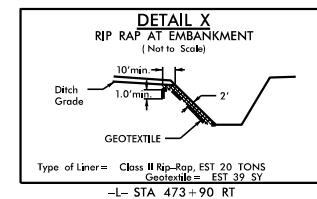
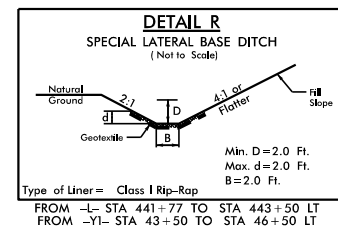
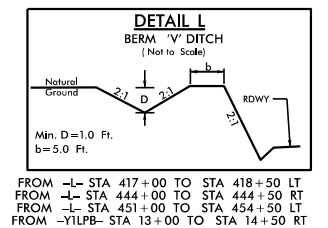
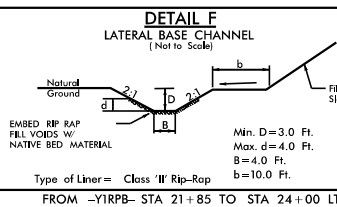
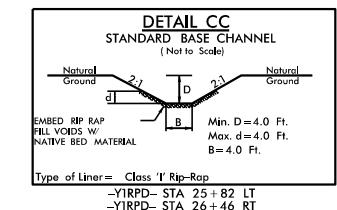
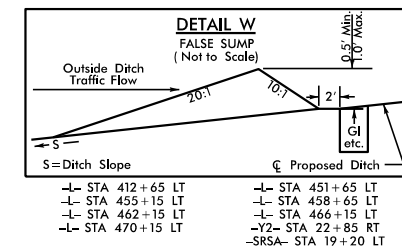
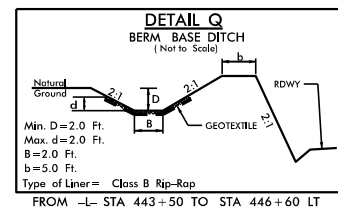
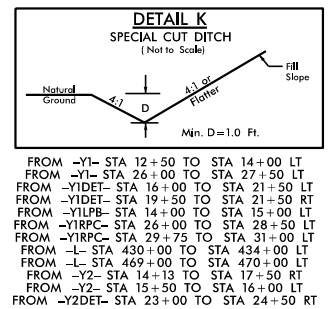
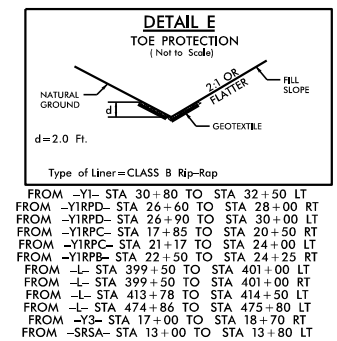
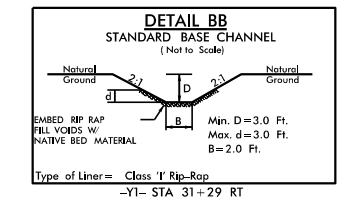
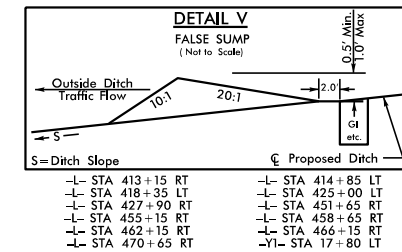
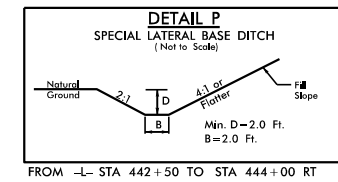
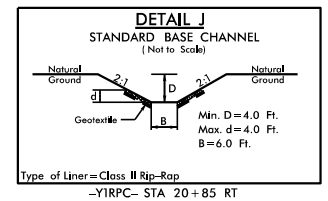
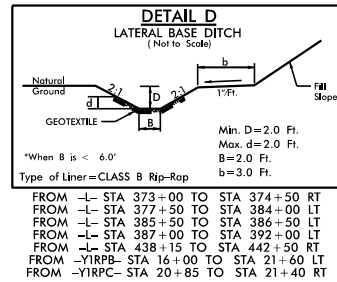
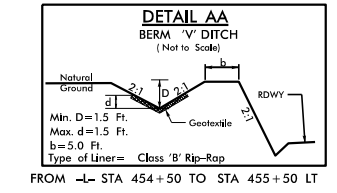
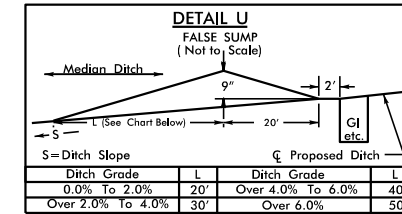
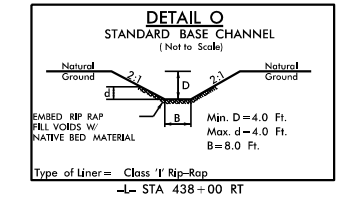
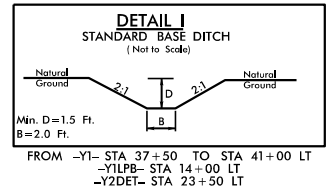
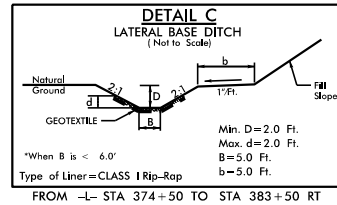
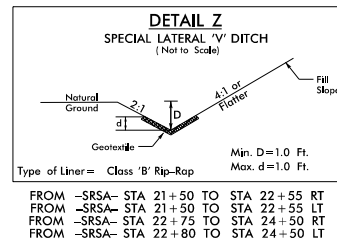
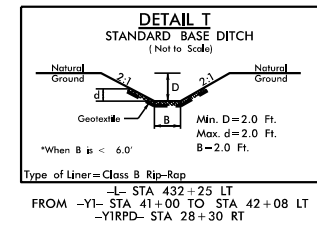
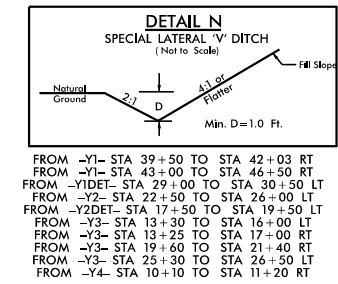
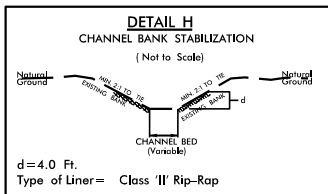
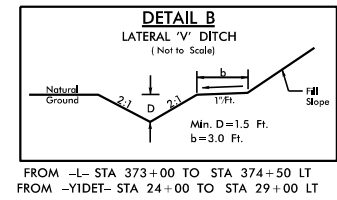
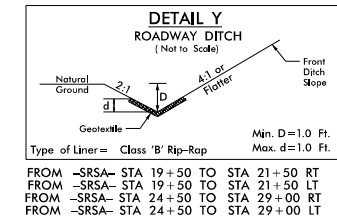
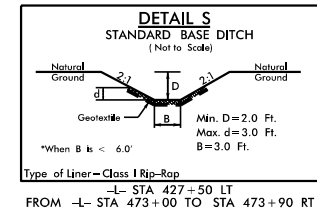
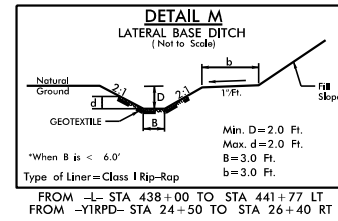
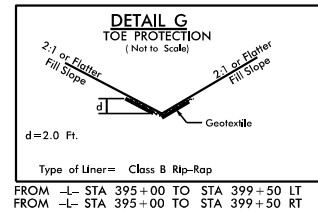
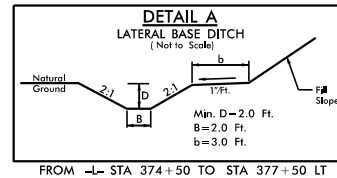
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CONTRACT:

PERMIT DRAWING
SHEET 2 OF 40



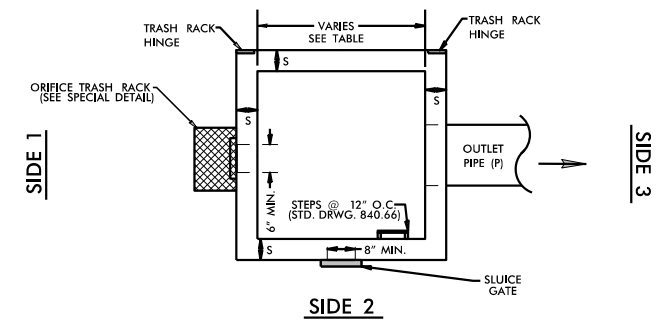
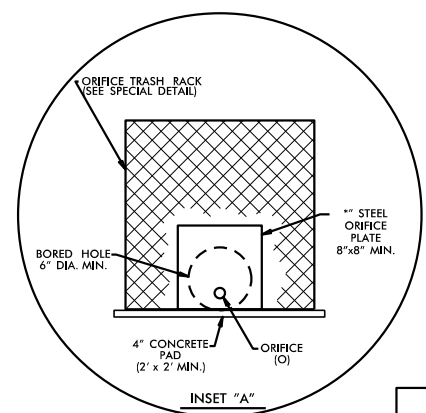
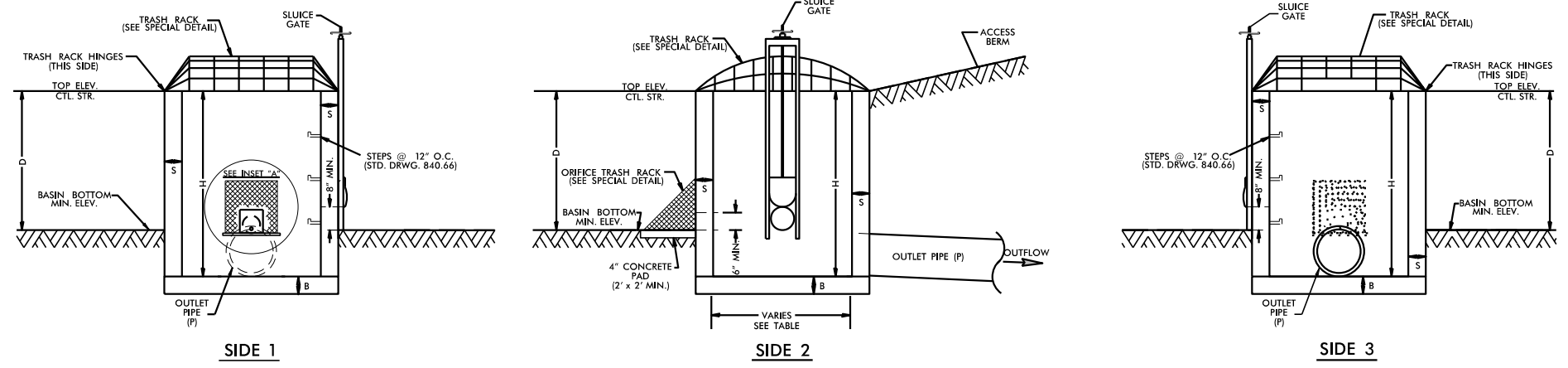
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PROJECT REFERENCE NO. U-2579C	SHEET NO. 2D-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 3 OF 40

DETAIL EE
DRY DETENTION BASIN DRAWDOWN STRUCTURE
NOT TO SCALE



PLAN VIEW
TRASH RACK NOT SHOWN FOR CLARITY

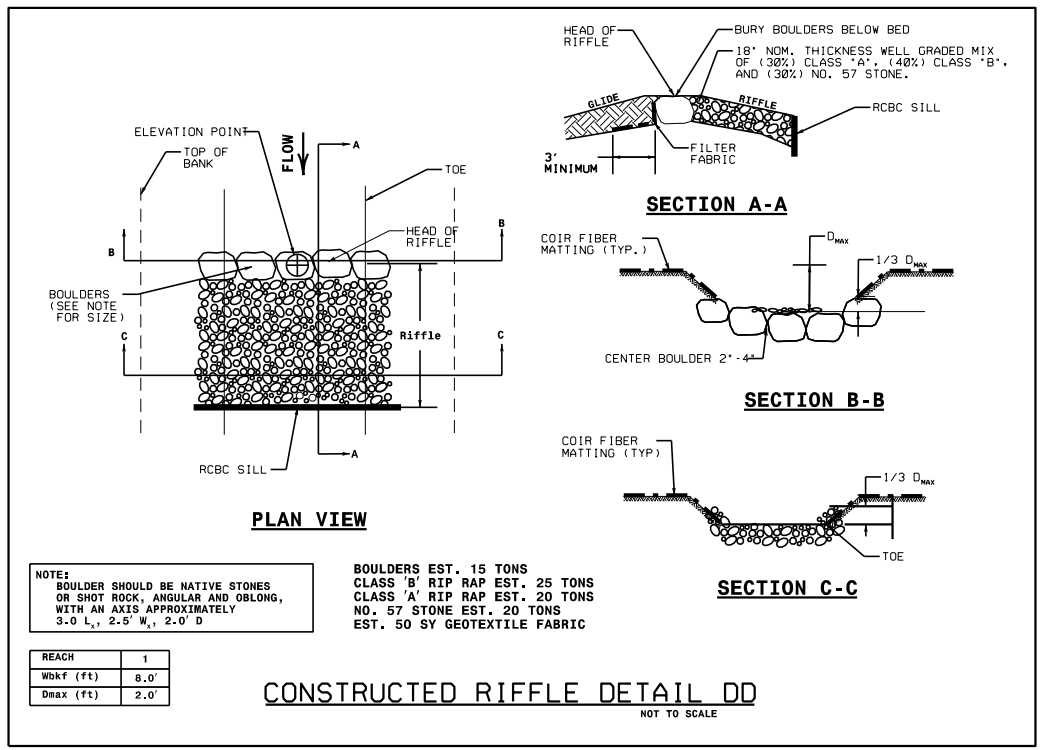
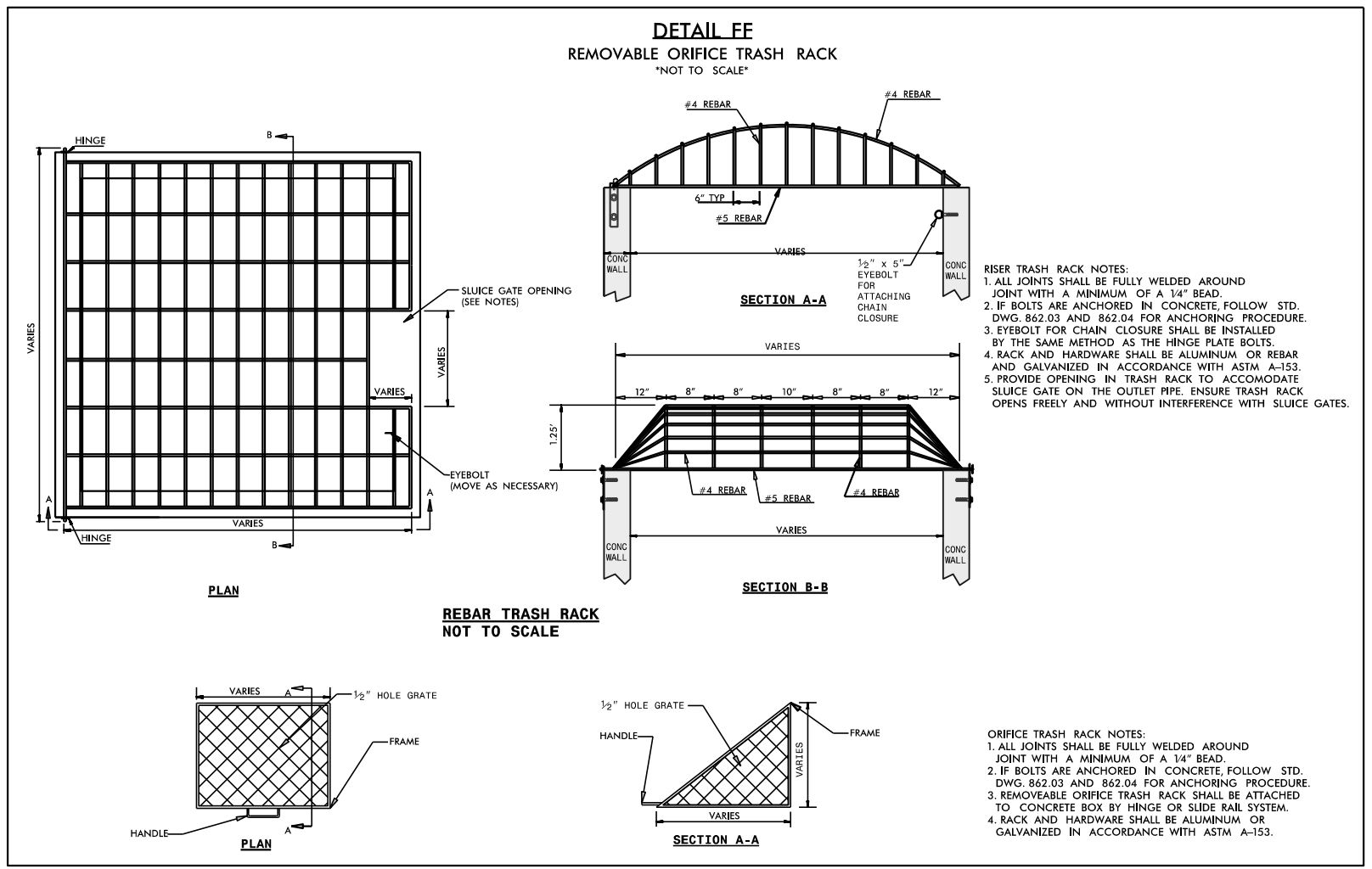
- NOTES:**
1. TOP ELEVATION OF CONTROL STRUCTURE (WEIR ELEVATION) SHOULD BE SET AT THE WQV ELEVATION.
 2. 15" MINIMUM DIAMETER FOR OUTLET PIPE.
 3. 2" MINIMUM DIAMETER ORIFICE. IF ORIFICE IS GREATER THAN 6", A STEEL PLATE IS NOT REQUIRED.
 4. NO BEDDING MATERIAL TO BE USED. THEREFORE, DO NOT FOLLOW STANDARD DRAWINGS FOR METHOD OF PIPE INSTALLATION FOR OUTLET PIPE THROUGH EMBANKMENT.
 5. SLUICE GATE IS FOR MAINTENANCE AND SHOULD REMAIN CLOSED DURING NORMAL OPERATION. A GATE VALVE MAY BE USED IN LIEU OF THE 8" SLUICE GATE.
 6. SLUICE GATE SHALL PROVIDE WATERTIGHT SEAL. PROVIDE ADEQUATE CLEARANCE FOR GATE OPERATION AND FOR PROPER SEATING OF GATE OVER PIPE.
 7. SELECT BOX STANDARD AS REQUIRED TO ACCOMMODATE SLUICE GATE AND ORIFICE TRASH RACK WIDTH.
 8. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATE.
 9. ADJUST FOOTER DIMENSIONS AS NEEDED FOR ANTI-FLOTATION.

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE											
STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
400+00 -L- LT	0623	6"	18"	940.0	944.0	4.0	938.0	5' X 5' X 6'	6"	940.0	24
400+08 -L- RT	0609	6"	15"	947.0	950.0	3.0	945.0	5' x 5' x 5'	6"	947.0	24

PROJECT REFERENCE NO. U-2579C	SHEET NO. 2D-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

**PERMIT DRAWING
SHEET 4 OF 40**



5/14/99

U2579C.dwg, pr-m, wet, psh, 03b.dgn
5/18/2017
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**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

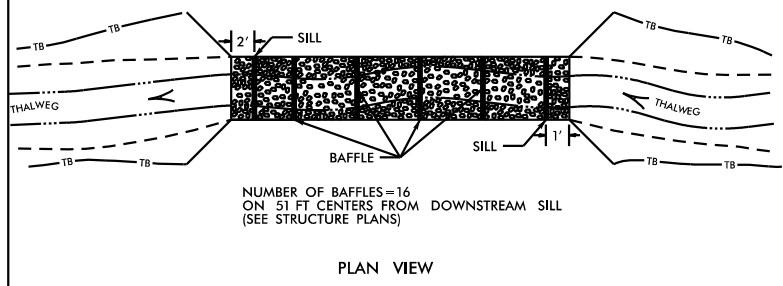
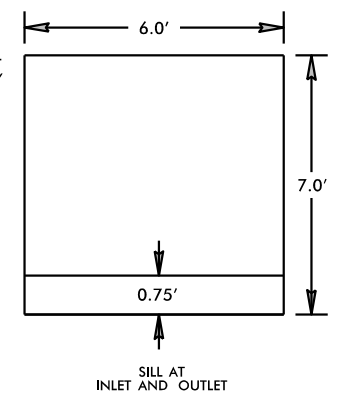
**PERMIT DRAWING
SHEET 5 OF 40**

DETAIL HH (NOT TO SCALE)

SINGLE BARREL CULVERT W/SILLS AND BAFFLES

*NOTES:

- 1) NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE 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, 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. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
- 2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.
- 3) TOP OF SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)
- 4) DO NOT SET ELEVATION OF SILLS/BAFFLES ABOVE BANK FULL.
- 5) NUMBER OF SILLS/BAFFLES DETERMINED BY THE ENGINEER.



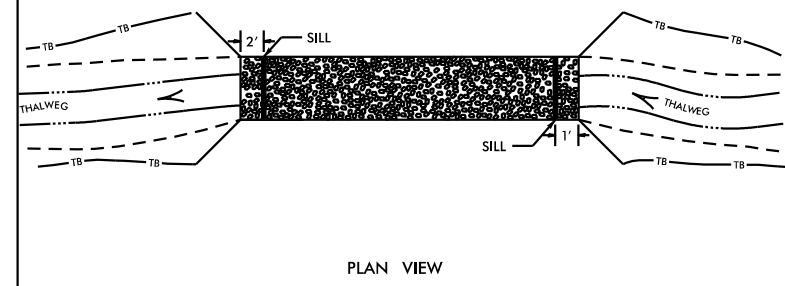
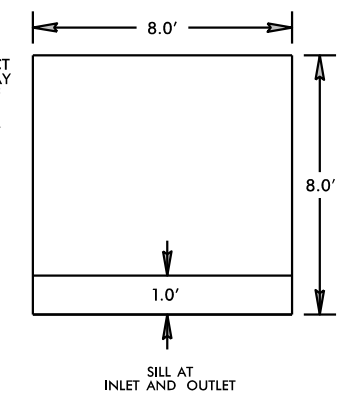
6' X 7' RCBC AT -L- STA 397+73

DETAIL II (NOT TO SCALE)

SINGLE BARREL CULVERT W/SILLS

*NOTES:

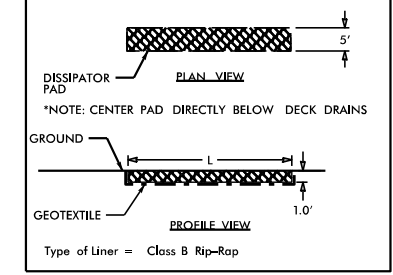
- 1) NATIVE BED MATERIAL SHALL BE PLACED BETWEEN THE SILLS IN THE CULVERT. NATIVE MATERIALS CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL. IF RIP RAP IS USED, NATIVE MATERIAL 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. NATIVE MATERIAL AND RIP RAP ARE SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.
- 2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.
- 3) TOP OF SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)
- 4) DO NOT SET ELEVATION OF SILLS/BAFFLES ABOVE BANK FULL.



8' X 8' RCBC AT -L- STA 437+97

DETAIL JJ (Not to Scale)

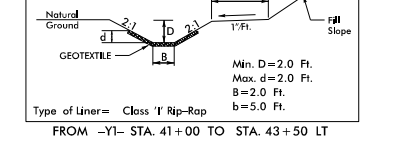
DECK DRAIN DISSIPATOR PAD



FROM -L- STA 472+52 TO STA 472+74 LT
FROM -L- STA 472+96 TO STA 473+08 RT
FROM -L- STA 473+85 TO STA 474+43 LT
FROM -L- STA 474+29 TO STA 474+90 RT

DETAIL LL (Not to Scale)

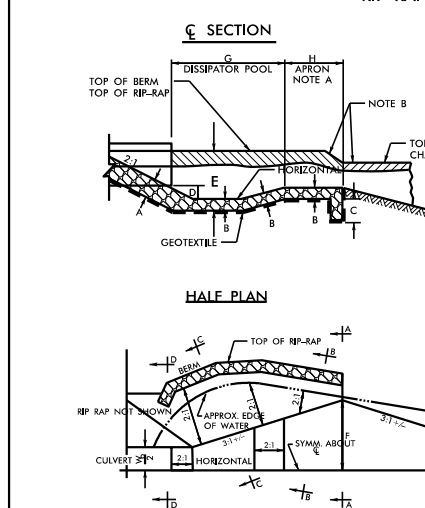
LATERAL BASE DITCH



DETAIL KK

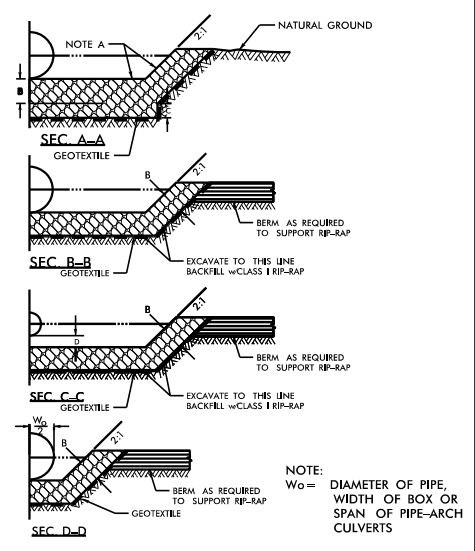
RIP-RAPPED ENERGY DISSIPATOR BASIN

- *NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT $Q_{des} / (\text{CROSS SECTION AREA AT SEC. A-A}) = \text{SPECIFIED VELOCITY}$.
- *NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



DIM.	1	2	3	4	5	6	7	8
A	2'							
B	2'							
C	2'							
D	2'							
E	7'							
F	12'							
G	20'							
H	10'							

CLASS 'Y' RIP RAP
EST. 105 TONS
EST. 190 SY GEOTEXTILE FABRIC



*ALL DIMENSIONS APPROXIMATE IN FEET

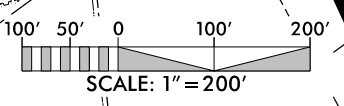
-L- STA 472+75 RT

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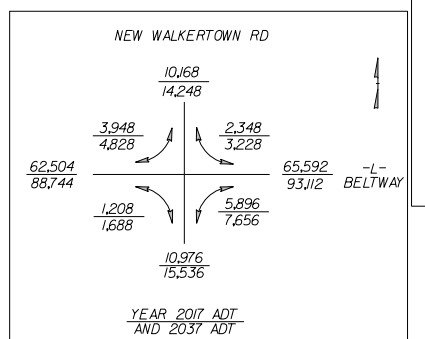
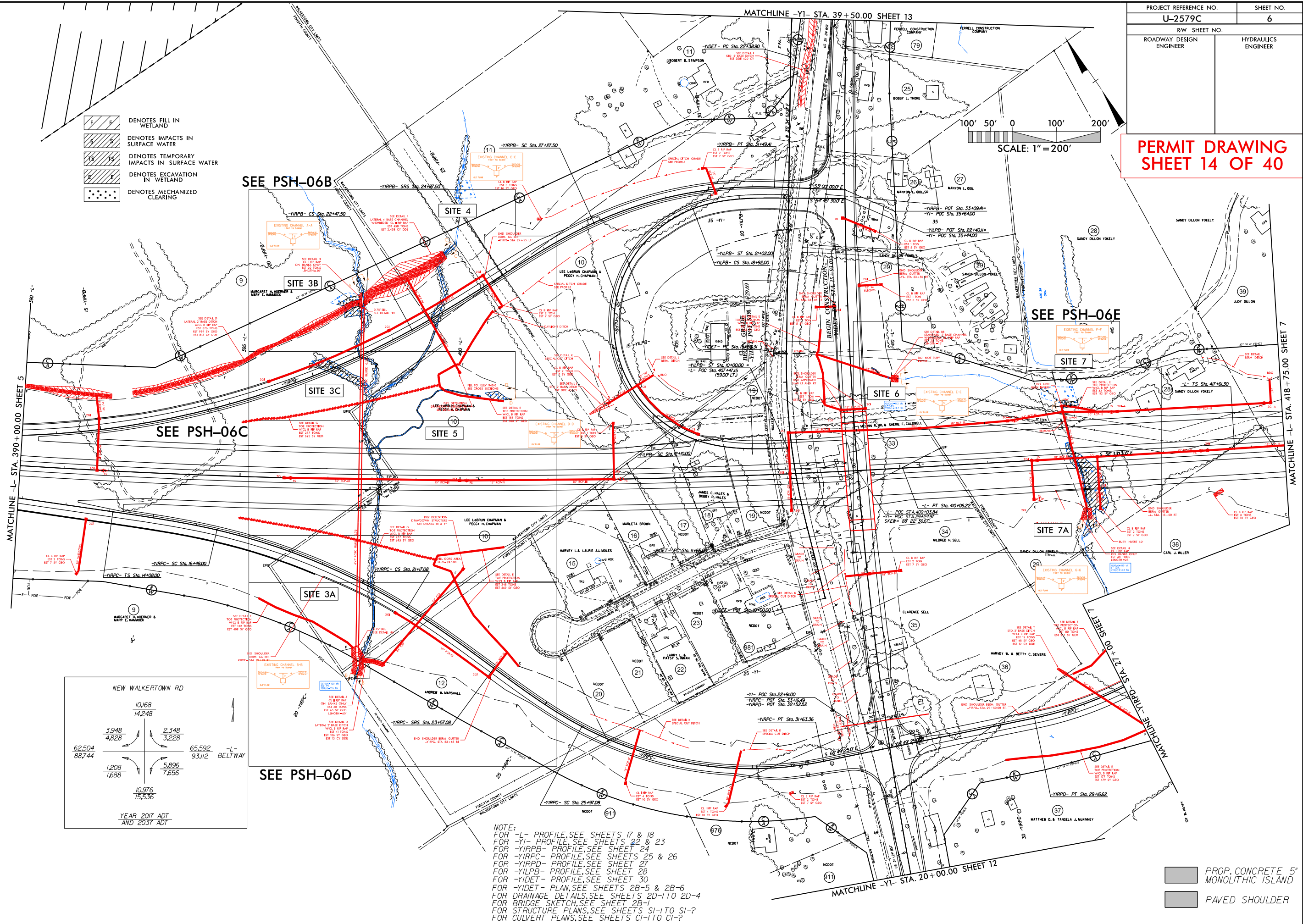
U2579C.dwg, pr-m, wet, psh, 03c.dgn

PROJECT REFERENCE NO.		SHEET NO.	
U-2579C		6	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

**PERMIT DRAWING
SHEET 14 OF 40**



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



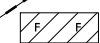
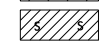

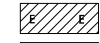

NOTE:
 FOR -L- PROFILE, SEE SHEETS 17 & 18
 FOR -YI- PROFILE, SEE SHEETS 22 & 23
 FOR -YIRPB- PROFILE, SEE SHEET 24
 FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
 FOR -YIRPD- PROFILE, SEE SHEET 27
 FOR -YILPB- PROFILE, SEE SHEET 28
 FOR -YIDET- PROFILE, SEE SHEET 30
 FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
 FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
 FOR BRIDGE SKETCH, SEE SHEET 2B-1
 FOR STRUCTURE PLANS, SEE SHEETS SI-1 TO SI-7
 FOR CULVERT PLANS, SEE SHEETS CI-1 TO CI-7

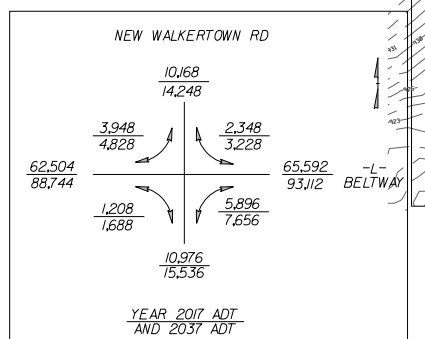
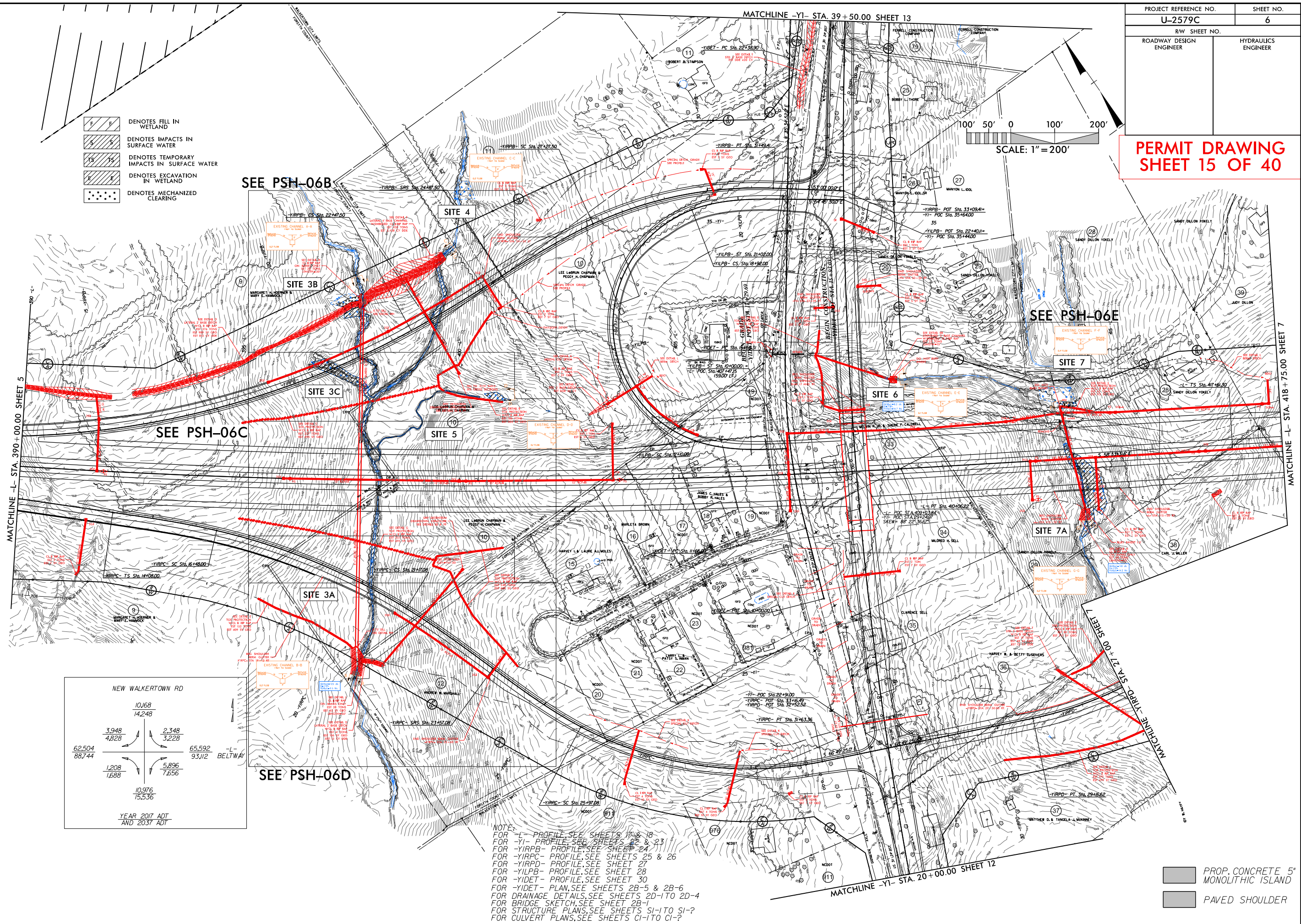
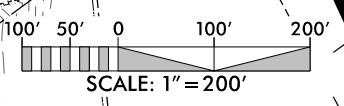
- PROP. CONCRETE 5' MONOLITHIC ISLAND
- PAVED SHOULDER

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6/5/2017_Hyd_prm_wet_psh_06.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**PERMIT DRAWING
SHEET 15 OF 40**

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

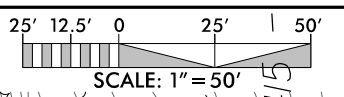


NOTE:
 FOR -L- PROFILE, SEE SHEETS 17 & 18
 FOR -Y1- PROFILE, SEE SHEETS 22 & 23
 FOR -YIRPB- PROFILE, SEE SHEETS 24
 FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
 FOR -YIRPD- PROFILE, SEE SHEET 27
 FOR -YILPB- PROFILE, SEE SHEET 28
 FOR -YIDET- PROFILE, SEE SHEET 30
 FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
 FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
 FOR BRIDGE SKETCH, SEE SHEET 2B-1
 FOR STRUCTURE PLANS, SEE SHEETS S1-1 TO S1-7
 FOR CULVERT PLANS, SEE SHEETS C1-1 TO C1-7

-  PROP. CONCRETE 5' MONOLITHIC ISLAND
-  PAVED SHOULDER

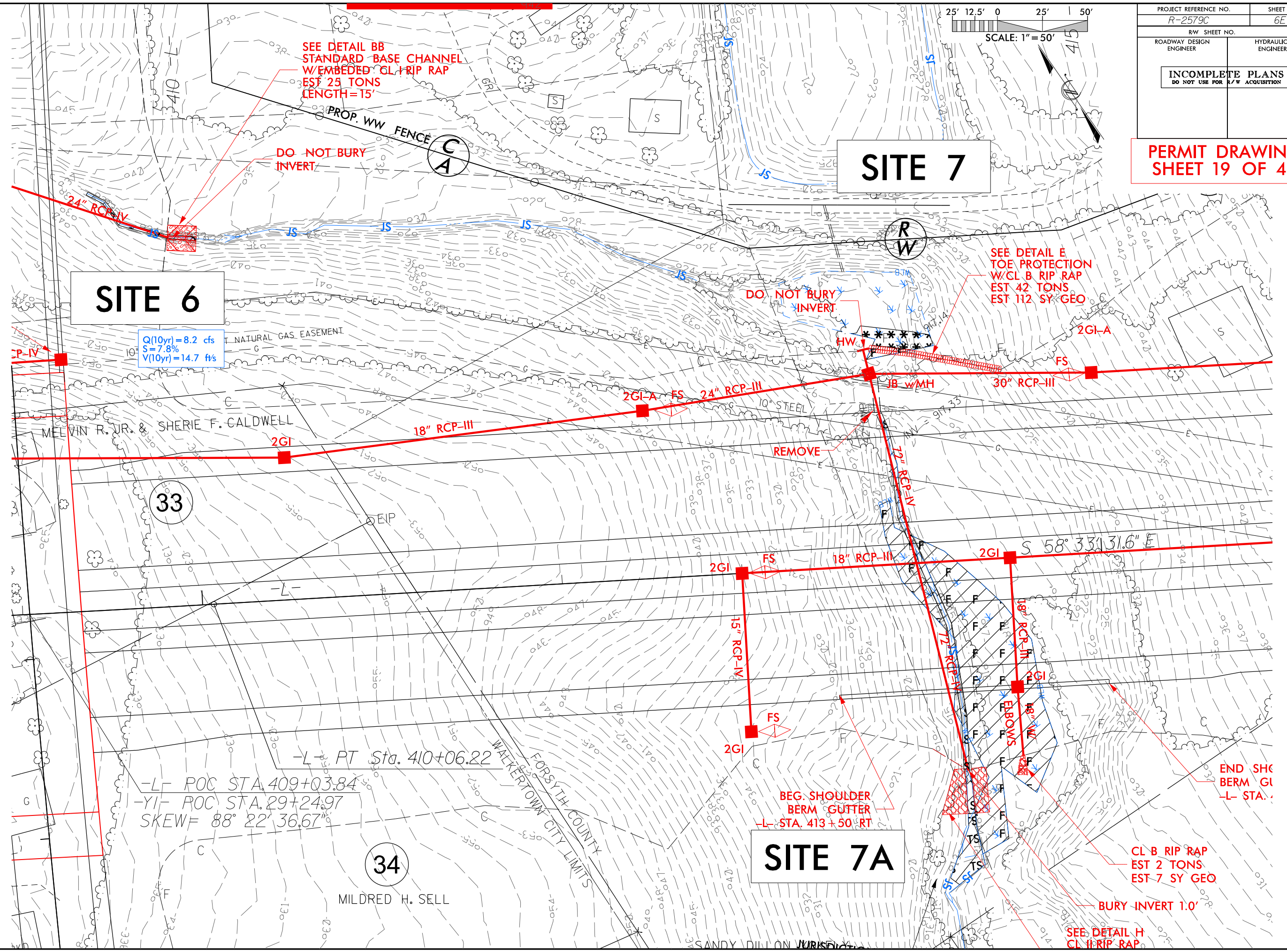
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8/17/99



PROJECT REFERENCE NO. R-2579C	SHEET NO. 6E
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR A/W ACQUISITION	

PERMIT DRAWING
SHEET 19 OF 40



SITE 6

Q(10yr) = 8.2 cfs
S = 7.8%
V(10yr) = 14.7 ft/s

SITE 7

SITE 7A

-L- RT Sta. 410+06.22

-L- ROC STA. 409+03.84
-YI- ROC STA. 29+24.97
SKEW = 88° 22' 36.67"

34
MILDRED H. SELL

CL B RIP RAP
EST 2 TONS
EST 7 SY GEO

BURY INVERT 1.0'

SEE DETAIL H
CL B RIP RAP

SEE DETAIL E
TOE PROTECTION
W/CL B RIP RAP
EST 42 TONS
EST 112 SY GEO

SEE DETAIL BB
STANDARD BASE CHANNEL
W/EMBEDDED GL RIP RAP
EST 25 TONS
LENGTH = 15'

DO NOT BURY
INVERT

DO NOT BURY
INVERT

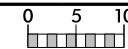
REMOVE

END SHO
BERM GI
-L- STA.

REVISIONS

5/11/2017 Hyd.prm...ket.psh_06e.dgn

6/23/16



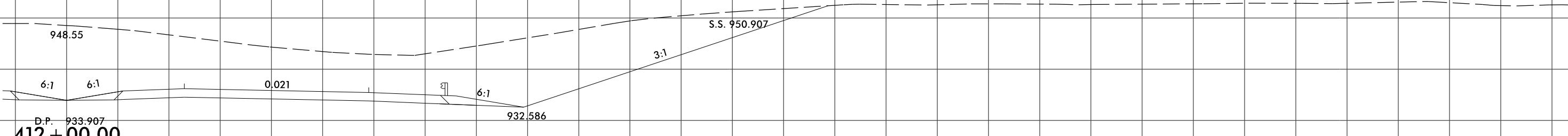
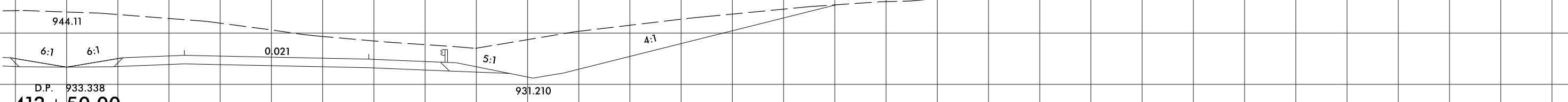
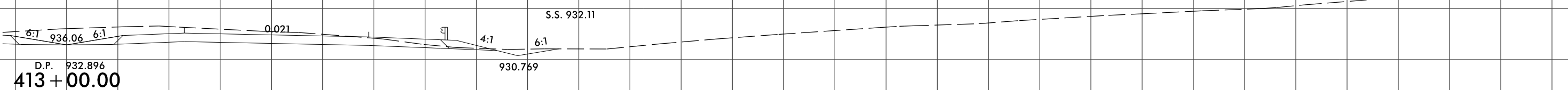
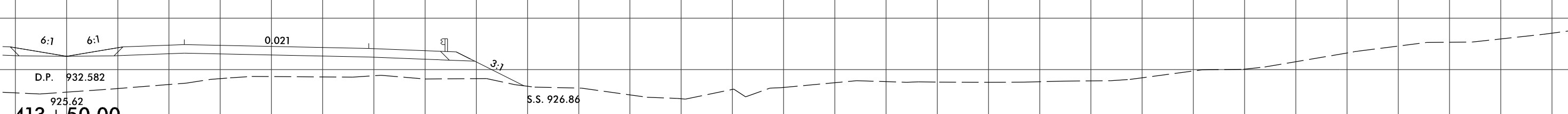
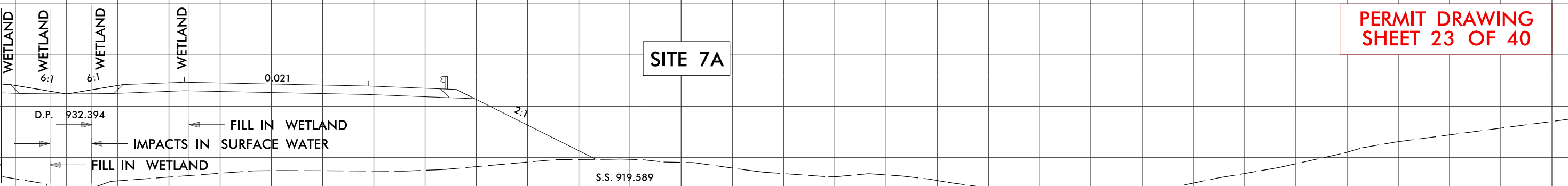
PROJ. REFERENCE NO.
U-2579C

SHEET NO.
X-58

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

**PERMIT DRAWING
SHEET 23 OF 40**

SITE 7A



10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

5/19/2017
125742_Hyd_prm_wet_psh_06.dgn

300 200 100 0 100 200 300

413+97 -L-

PERMIT DRAWING
SHEET 25 OF 40

950

940

930

920

910

SITE 7

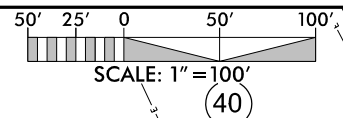
SITE 7A

INV IN=916.0

72" RCP
SLOPE=1.45%

INV OUT=911.5
BURY 1 FT

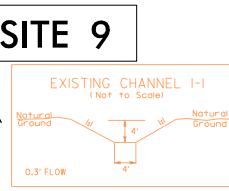
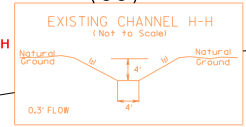
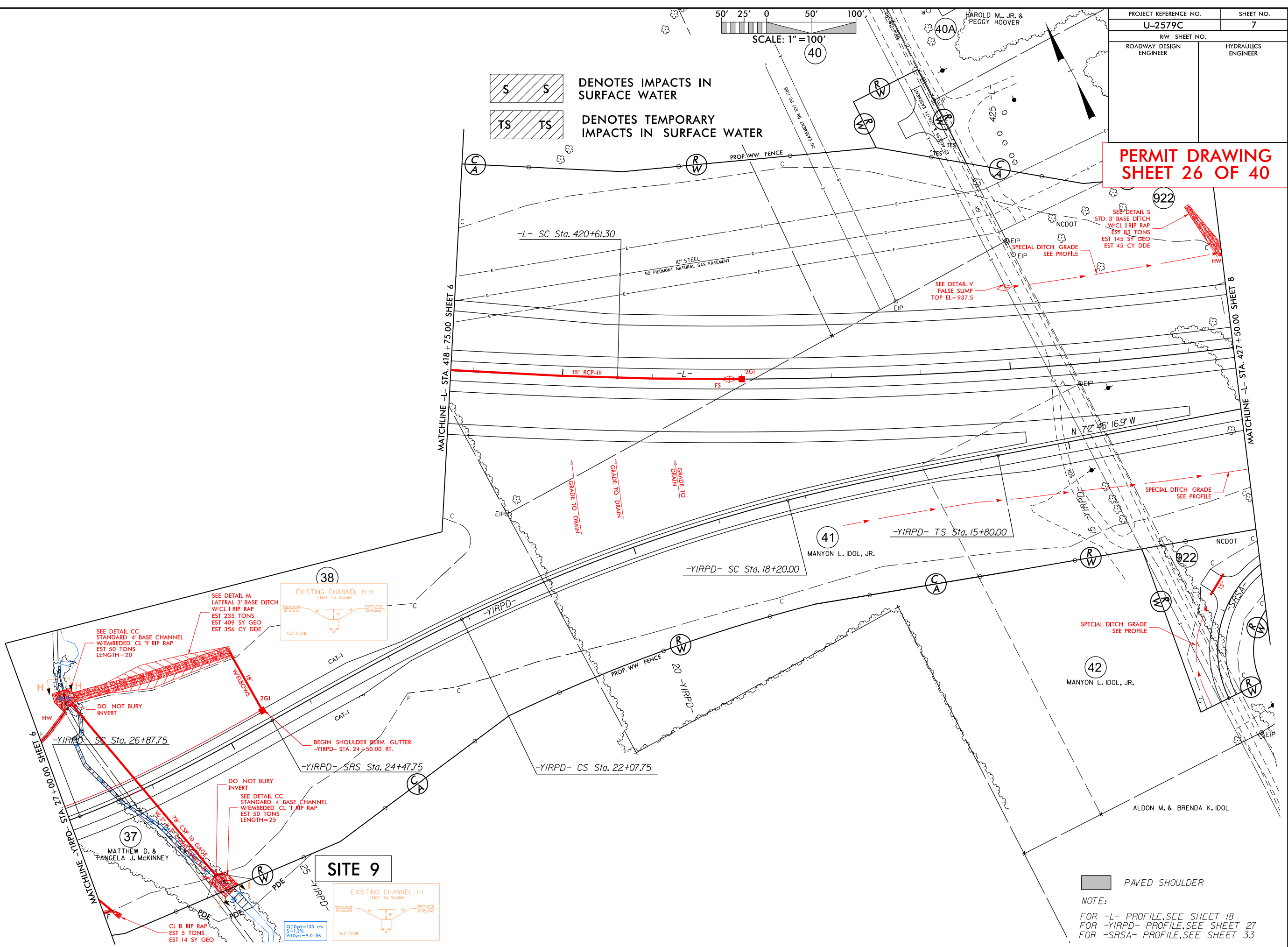
8/17/99



PROJECT REFERENCE NO. U-2579C	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**PERMIT DRAWING
SHEET 26 OF 40**

S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE DETAIL M LATERAL 3' BASE DITCH W/CL 1' RIP RAP EST 235 TONS EST 409 SY GEO EST 356 CY DDE

SEE DETAIL CC STANDARD 4' BASE CHANNEL W/EMBEDDED CL 1' RIP RAP EST 50 TONS LENGTH=20'

DO NOT BURY INVERT

SEE DETAIL CC STANDARD 4' BASE CHANNEL W/EMBEDDED CL 1' RIP RAP EST 50 TONS LENGTH=25'

DO NOT BURY INVERT

CL 8 RIP RAP EST 5 TONS EST 14 SY GEO

Q(10yr)=135 cfs
S=1.2%
V(10yr)=9.0 f/s

PAVED SHOULDER

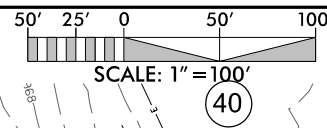
NOTE:
FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -SRS- PROFILE, SEE SHEET 33

E:\1\207_Hyd.prm...wet_psh_07.dgn

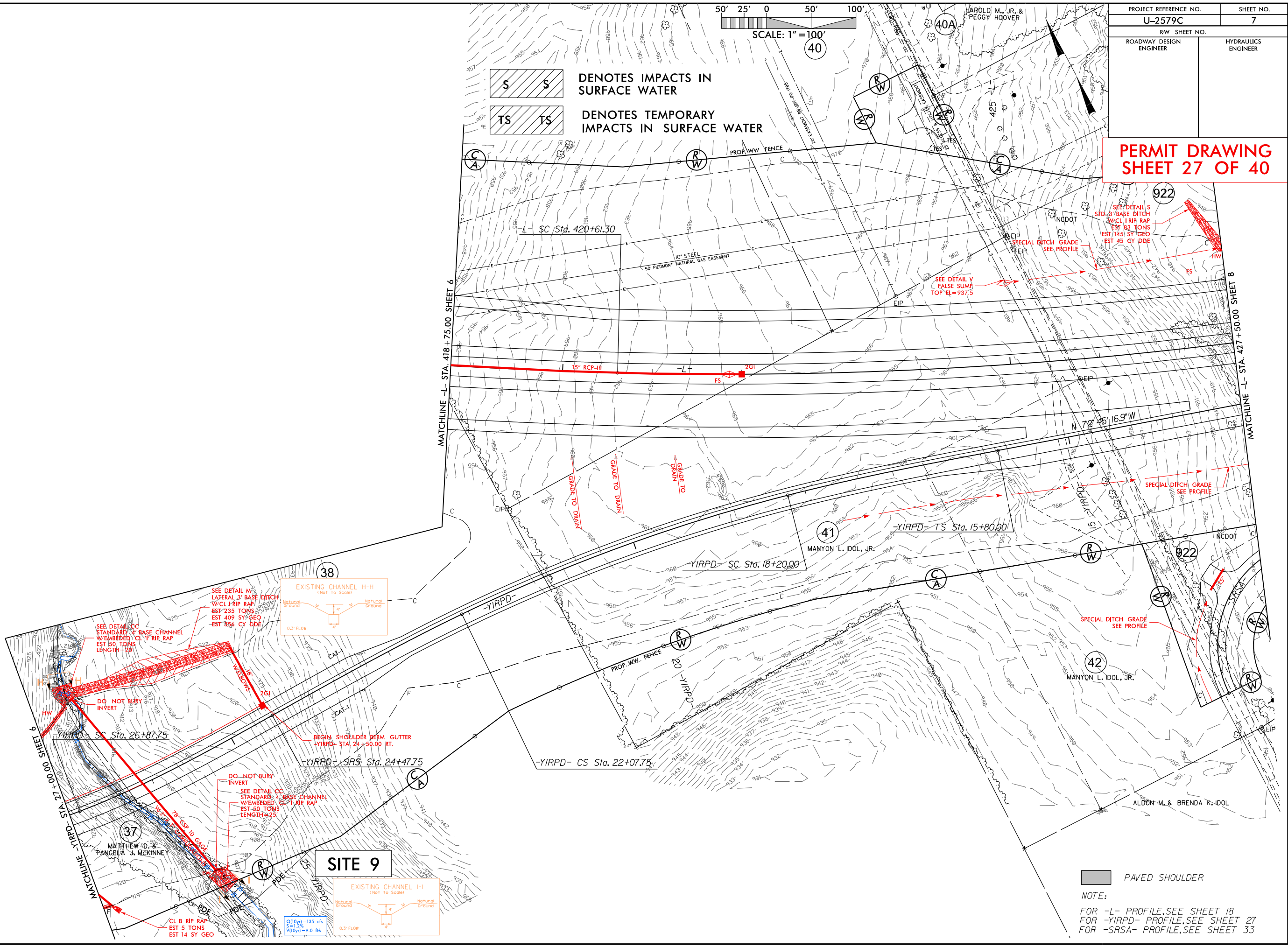
8/17/99

PROJECT REFERENCE NO. U-2579C	SHEET NO. 7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

**PERMIT DRAWING
SHEET 27 OF 40**



S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



EXISTING CHANNEL H-H
(Not to Scale)

SEE DETAIL M LATERAL 3" BASE DITCH W/CL 1 RIP RAP EST 235 TONS EST 409 SY GEO EST 356 CY DDE

SEE DETAIL CC STANDARD 4" BASE CHANNEL W/EMBEDDED CL 1 RIP RAP EST 50 TONS LENGTH=20'

DO NOT BURY INVERT

EXISTING CHANNEL I-I
(Not to Scale)

SEE DETAIL CC STANDARD 4" BASE CHANNEL W/EMBEDDED CL 1 RIP RAP EST 50 TONS LENGTH=25'

DO NOT BURY INVERT

CL 8 RIP RAP EST 5 TONS EST 14 SY GEO

Q1(0) = 135 cfs
S = 1.2%
V1(0) = 9.0 f/s

SITE 9

PAVED SHOULDER

NOTE:
FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -SRS- PROFILE, SEE SHEET 33

5/11/2017 Hyd_prm_wet_psh_07.dgn
 11:25:30
 11/25/2017

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-2579C	7B

**PERMIT DRAWING
SHEET 28 OF 40**

300 200 100 0 100 200 300

STA 26+11 -YIRPD-

960

950

940

930

920

910

900

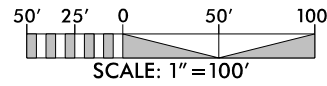
SITE 9

INV IN=907.5

78" CSP
SLOPE=1.4%

INV OUT=904.0

5/11/2017
U2579C_Hyd_prm_wet_psh_07b.dgn
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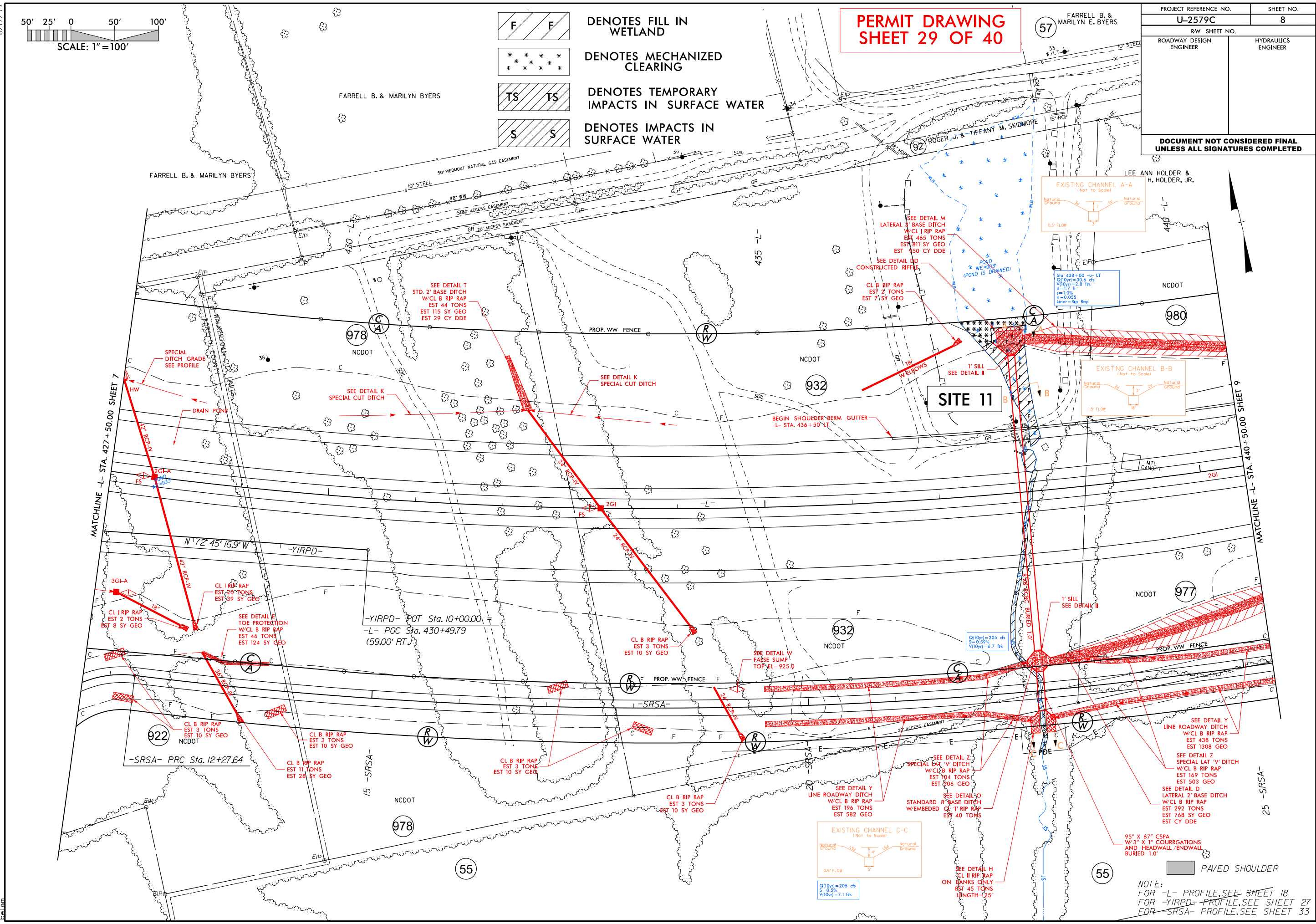


- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER

**PERMIT DRAWING
SHEET 29 OF 40**

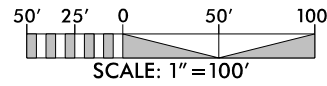
PROJECT REFERENCE NO. U-2579C	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

RIGHT OF WAY REVISION 5/3/17 - REVISED C/A FROM -L- STA. 436+00.00 TO STA. 440+00.00 RT. ON PARCELS 932 AND 977; ADDED RAW ON PARCELS 55, 922, 932, 977, AND 978; ADDED TCE ON PARCELS 55 AND 932; ADDED PDE ON PARCEL 55. JMB



5/19/2017 10:25:40 C:\hyd_prm_wet_psh_08.dgn

NOTE:
FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -SRSA- PROFILE, SEE SHEET 33

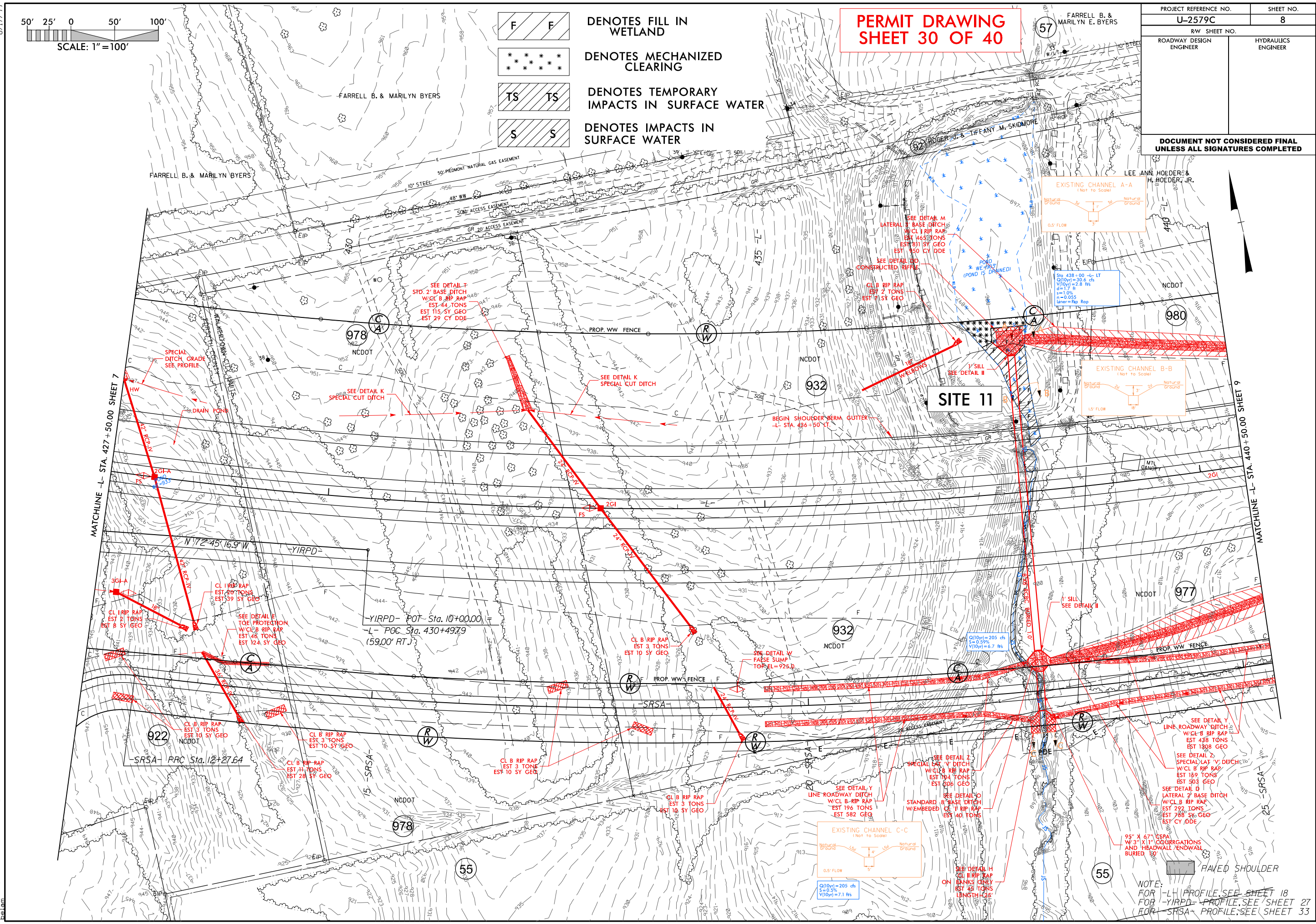


- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES IMPACTS IN SURFACE WATER

**PERMIT DRAWING
SHEET 30 OF 40**

PROJECT REFERENCE NO. U-2579C	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

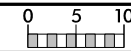
RIGHT OF WAY REVISION 5/3/17 - REVISED C/A FROM -L- STA. 436+00.00 TO STA. 440+00.00 RT. ON PARCELS 932 AND 977; ADDED RAW ON PARCELS 55, 922, 932, 977, AND 978; ADDED TCE ON PARCELS 55 AND 932; ADDED PDE ON PARCEL 55. JMB
 5/19/2017 Hyd.prm...wet.psh.08a.dgn



NOTE:
 FOR -LH- PROFILE, SEE SHEET 18
 FOR -YIRPD- PROFILE, SEE SHEET 27
 FOR -SRSA- PROFILE, SEE SHEET 33

6/23/16

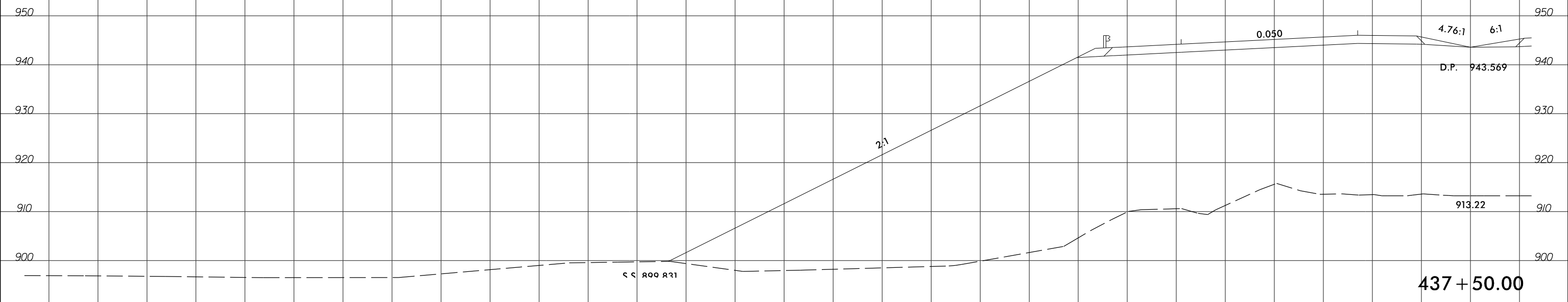
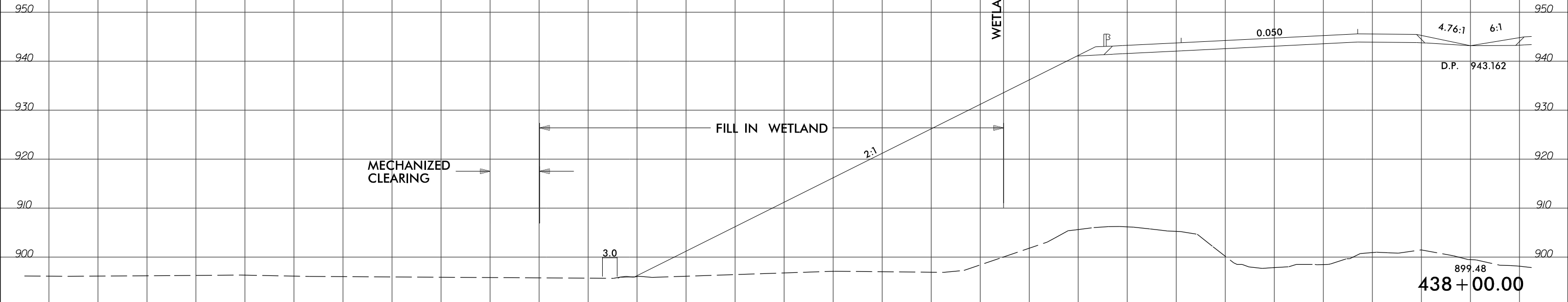
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PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-149

PERMIT DRAWING
SHEET 31 OF 40

SITE 11



5/19/2017
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290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10

6/23/16



PROJ. REFERENCE NO.
U-2579C

SHEET NO.
8E

300 200 100 0 100 200 300

437+98 -L-

22+71.06 -SRSA-

PERMIT DRAWING
SHEET 32 OF 40

960

950

940

930

920

910

900

890

SITE 11

INV IN=894.5
BURY 1 FT

8'x8' RCBC
SLOPE=0.59%

INV OUT=892.5
BURY 1 FT

INV IN=892.2
BURY 1 FT

95'x67" CSPA
SLOPE=0.89%

INV OUT=891.8
BURY 1 FT

5/11/2017
U2579C_Hyd.prm_wet_psh_08e.dgn
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5/21/2017 F:\21\2017_Hyd.prm_wet_psh_11.dgn

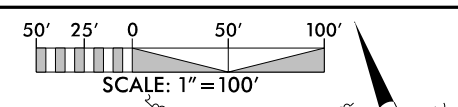
F F DENOTES FILL IN WETLAND

*** * * * *** DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

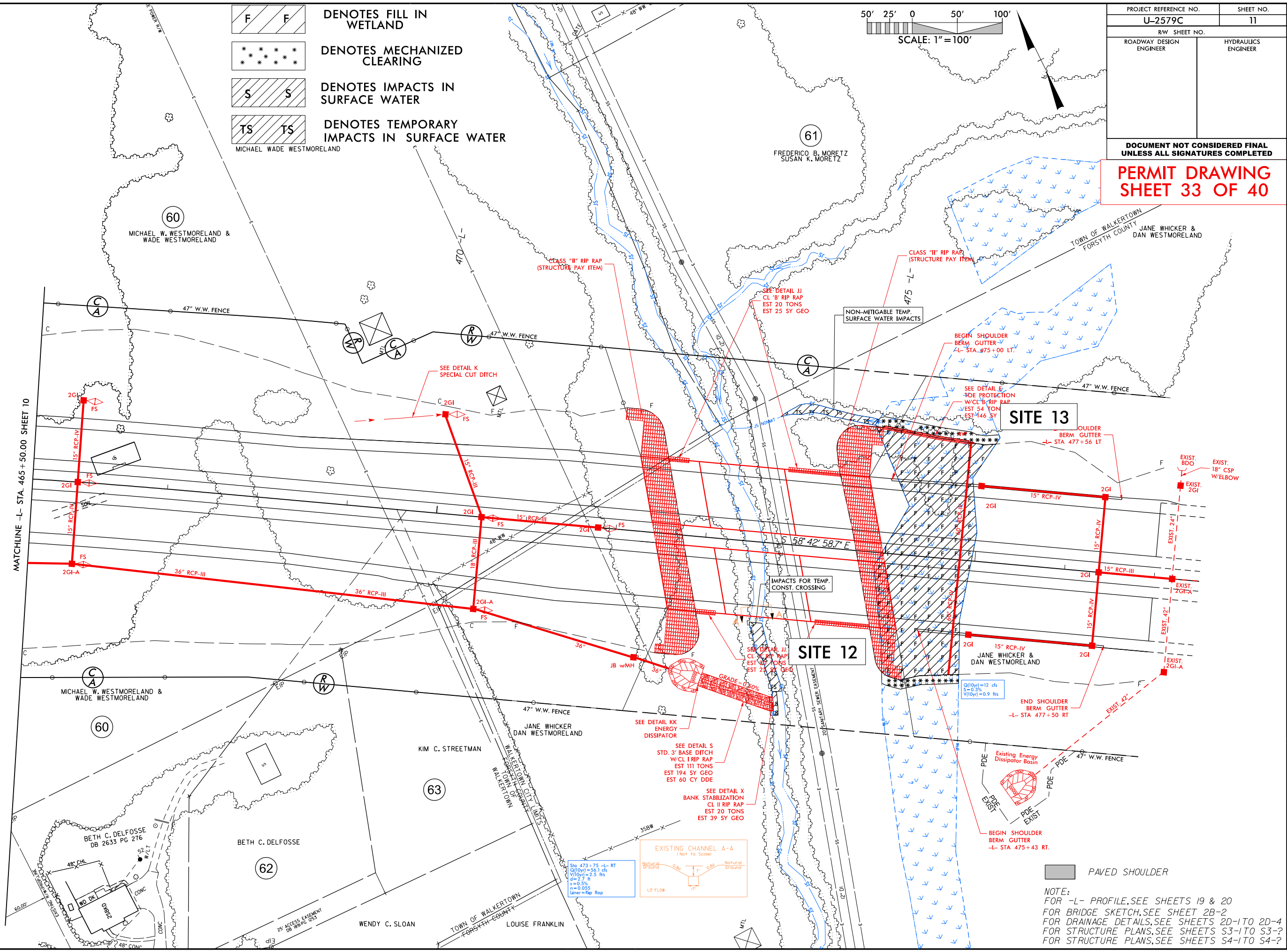
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MICHAEL WADE WESTMORELAND



PROJECT REFERENCE NO. U-2579C	SHEET NO. 11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	





PERMIT DRAWING
SHEET 33 OF 40

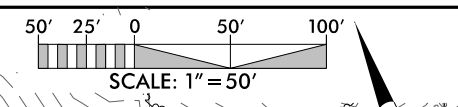


PAVED SHOULDER

NOTE:
FOR -L- PROFILE, SEE SHEETS 19 & 20
FOR BRIDGE SKETCH, SEE SHEET 2B-2
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR STRUCTURE PLANS, SEE SHEETS S3-1 TO S3-?
FOR STRUCTURE PLANS, SEE SHEETS S4-1 TO S4-?

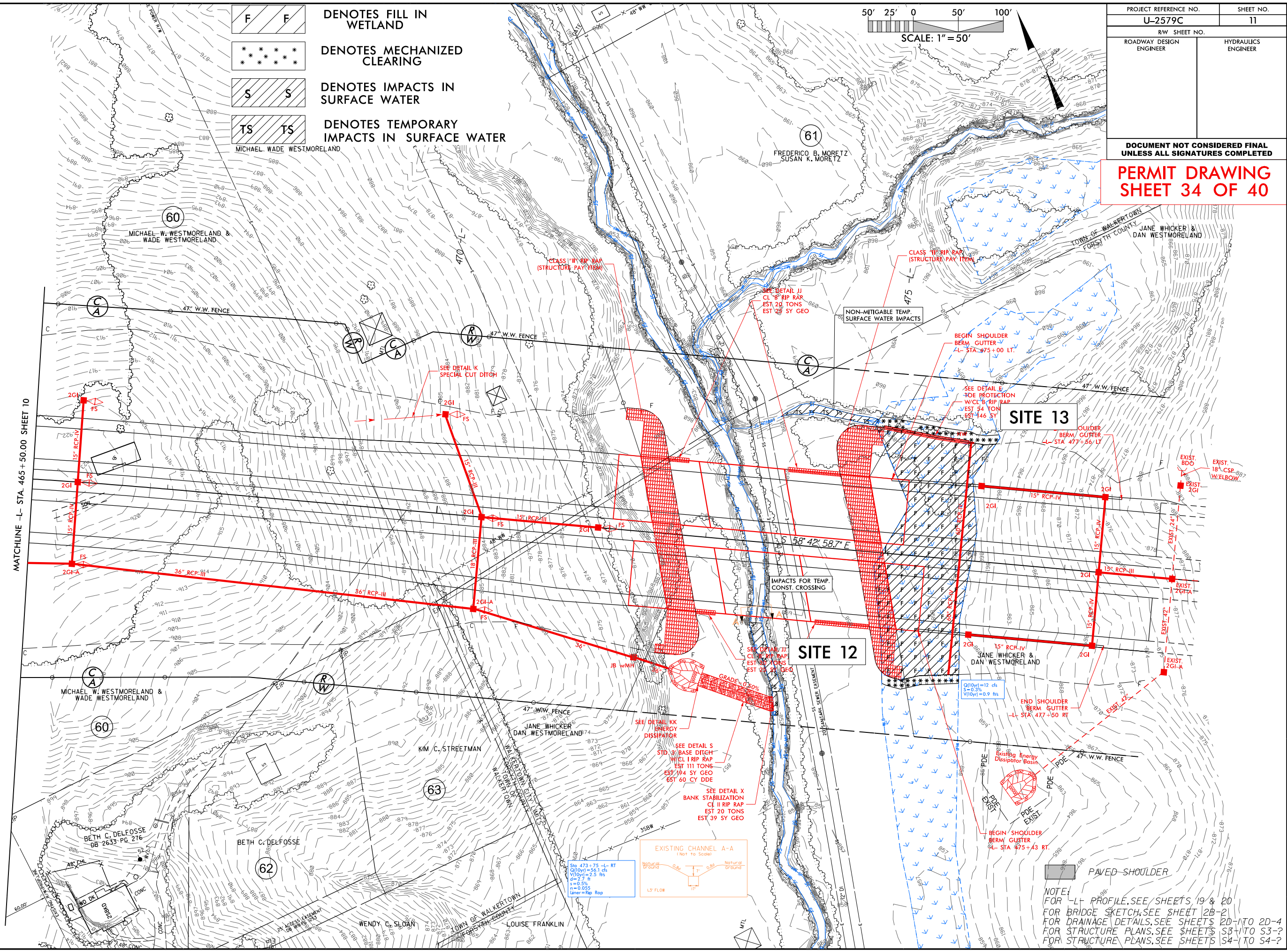
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-  DENOTES FILL IN WETLAND
-  DENOTES MECHANIZED CLEARING
-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES TEMPORARY IMPACTS IN SURFACE WATER



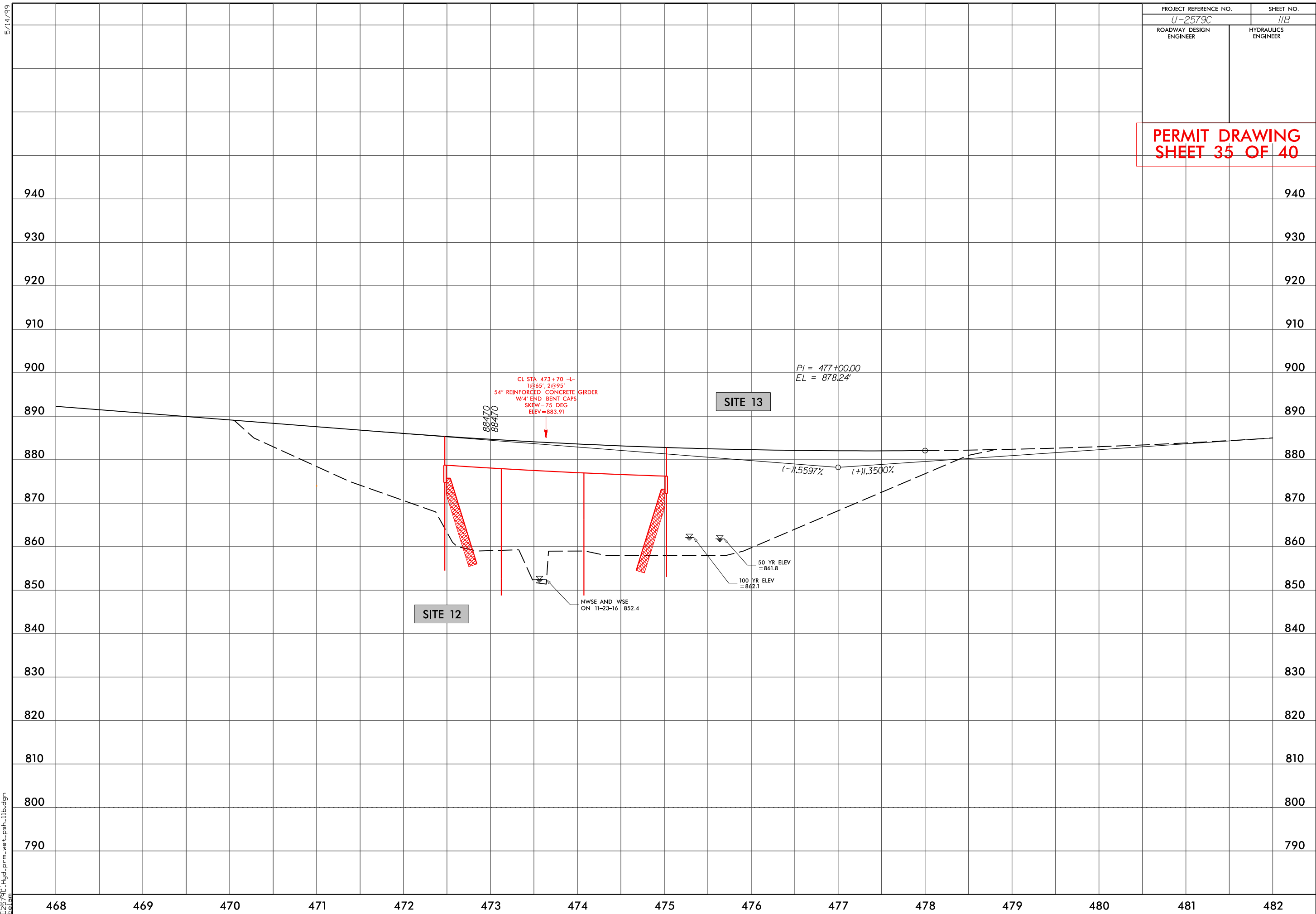
PROJECT REFERENCE NO. U-2579C	SHEET NO. 11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

PERMIT DRAWING SHEET 34 OF 40



NOTE:
FOR 'L' PROFILE, SEE SHEETS 19 & 20
FOR BRIDGE SKETCH, SEE SHEET 2B-21
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR STRUCTURE PLANS, SEE SHEETS S3-1 TO S3-2
FOR STRUCTURE PLANS, SEE SHEETS S4-1 TO S4-2

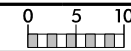
**PERMIT DRAWING
SHEET 35 OF 40**



5/14/99

5/14/99 7 Hyd-prm-wet-psh-11b.dgn
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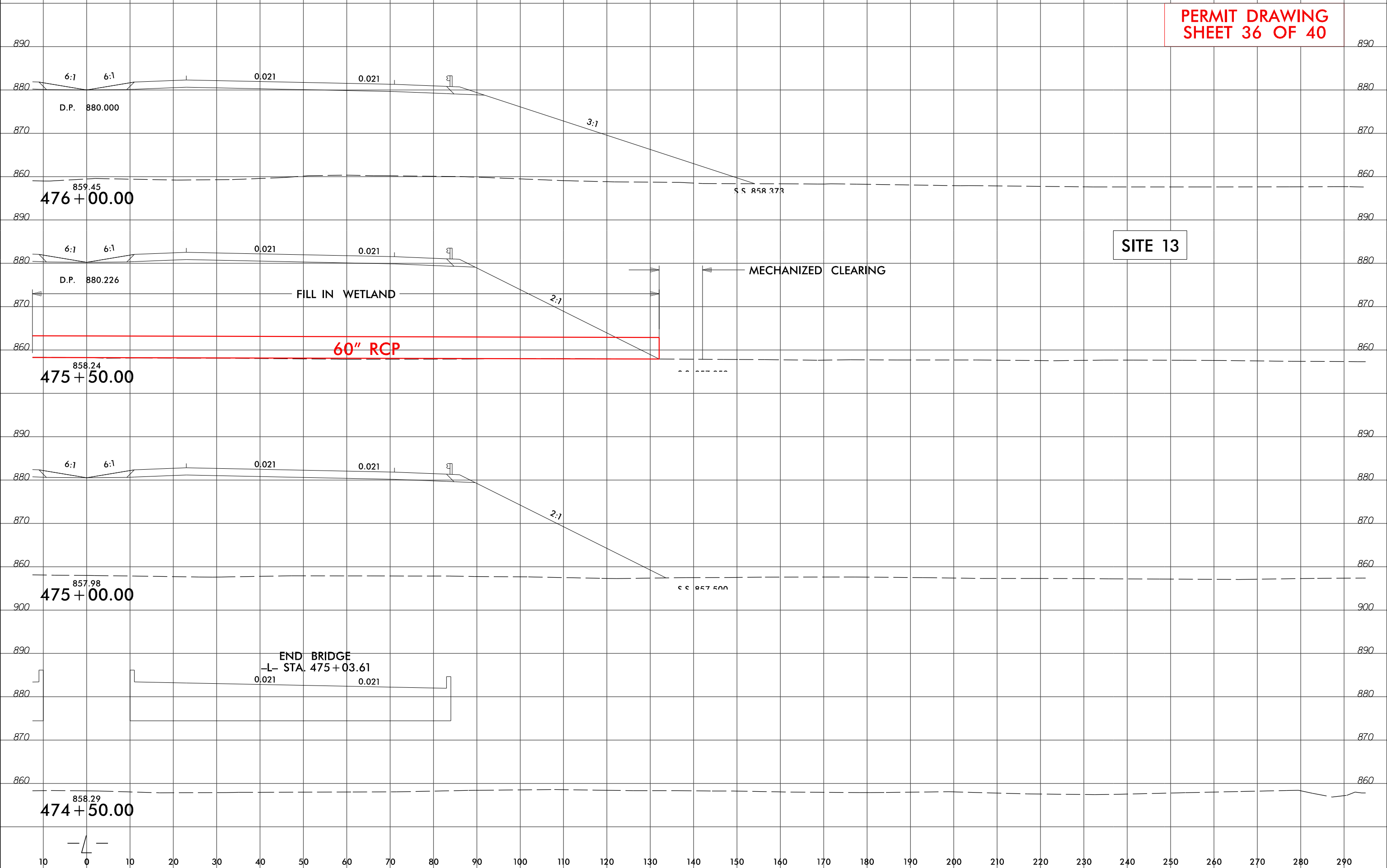
6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-96

10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290

**PERMIT DRAWING
SHEET 36 OF 40**



SITE 13

FILL IN WETLAND

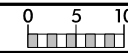
MECHANIZED CLEARING

60" RCP

END BRIDGE
-L- STA. 475 + 03.61

5/31/2017
U2579C_Hyd_prm_wet_psh_11c.dgn
dellam

6/23/16



PROJ. REFERENCE NO.	SHEET NO.
U-2579C	X-172

890 290 280 270 260 250 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 890

**PERMIT DRAWING
SHEET 37 OF 40**

WETLAND

SITE 13

MECHANIZED CLEARING

FILL IN WETLAND

60" RCP

S.S. 859.593

858.24
475 + 50.00

S.S. 858.882

857.98
475 + 00.00

END BRIDGE
-L- STA. 474 + 91.29

858.29
474 + 50.00

859.19
474 + 00.00

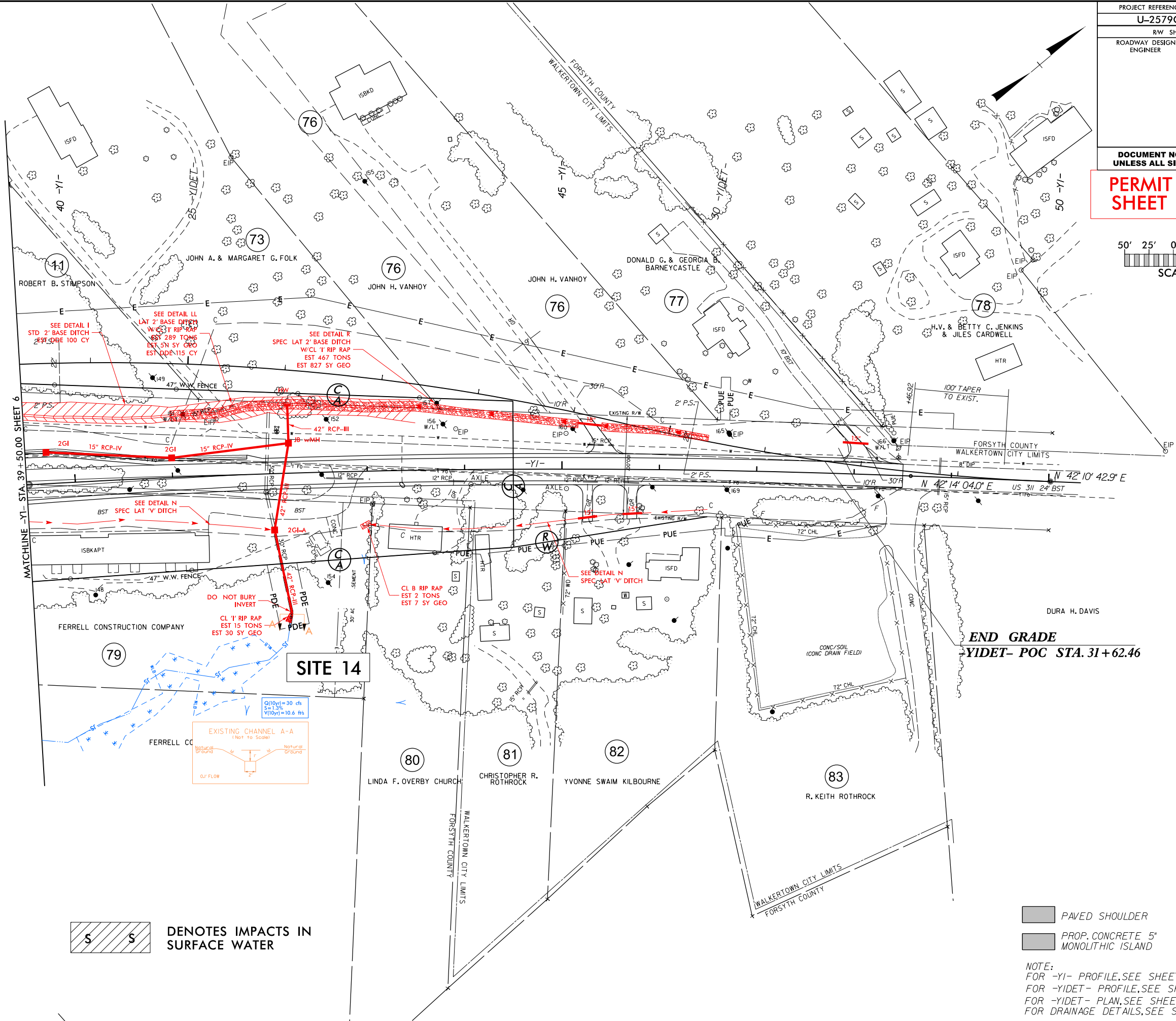
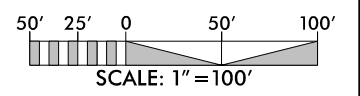
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5/19/2017
U2579C_Hyd_prm_wet_psh_11.dgn
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PROJECT REFERENCE NO.	SHEET NO.
U-2579C	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

**PERMIT DRAWING
SHEET 38 OF 40**



DENOTES IMPACTS IN SURFACE WATER

PAVED SHOULDER
 PROP. CONCRETE 5' MONOLITHIC ISLAND

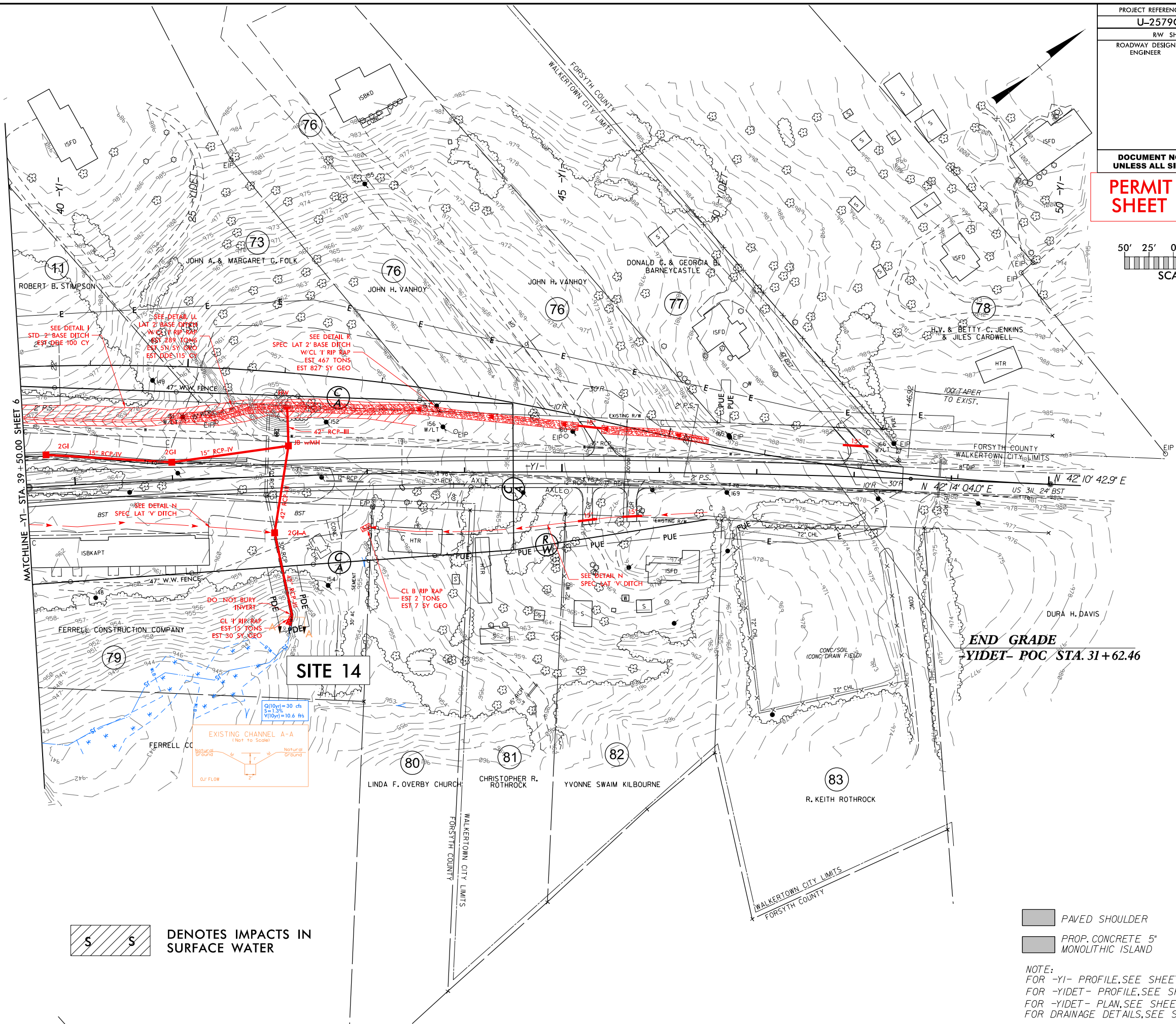
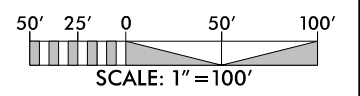
NOTE:
FOR -YI- PROFILE, SEE SHEET 23
FOR -YDET- PROFILE, SEE SHEET 30
FOR -YDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

8/17/99



PROJECT REFERENCE NO. U-2579C	SHEET NO. 13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

**PERMIT DRAWING
SHEET 39 OF 40**



 DENOTES IMPACTS IN SURFACE WATER

-  PAVED SHOULDER
-  PROP. CONCRETE 5' MONOLITHIC ISLAND

NOTE:
 FOR -YI- PROFILE, SEE SHEET 23
 FOR -YIDET- PROFILE, SEE SHEET 30
 FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
 FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4

5/21/2017 Hyd.prm...wet.psh_13a.dgn
 10:25:40
 belam

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)	
6	31+27-31+55 -Y1- RT	ROADWAY FILL							< 0.01		53		
		CHANNEL STABILIZATION (Downstream)							< 0.01		15		
7	412+70-413+13 -L- LT	ROADWAY FILL	< 0.01				< 0.01						
7A	412+78-413+69 -L- RT	72" RCP	0.14						0.01	< 0.01	205	40	
		BANK STABILIZATION (Downstream)							< 0.01		25		
9	25+72-26+61 -Y1RPD-	78" CSP							0.02	< 0.01	271	56	
		CHANNEL STABILIZATION							< 0.01		45		
11	437+58-238+22 -L-	8'x8' RCBC / 95" x 67" CSP	0.08				0.03		0.04	< 0.01	317	23	
		BANK STABILIZATION (Downstream)							< 0.01		25		
12	473+37-473+94 -L- RT	BRIDGE (Temp. Const. Crossing)								0.02		80	
		BANK STABILIZATION							< 0.01		26		
13	474+89-476+00 -L-	ROADWAY FILL	0.57				0.05						
14	42+15 -Y1-	42" RCP CHANNEL STABILIZATION							< 0.01		15		
TOTALS*:			0.79				0.09		0.10	0.04	997	199	0

*Rounded totals are sum of actual impacts

NOTES:

- Site 8 Omitted
- Site 9: Upstream Channel Stabilization = 0.003 AC / 20 LF, Downstream Channel Stabilization = 0.004 AC / 25 LF
- Site 10 Omitted
- Site 13: Non-Mitigable Temporary Surface Water Impacts = 0.019 AC / 110 LF

NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 May 11, 2017
 FORSYTH
 U-2579C
 34839.3.6
 SHEET 40 OF 40

09/08/19

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

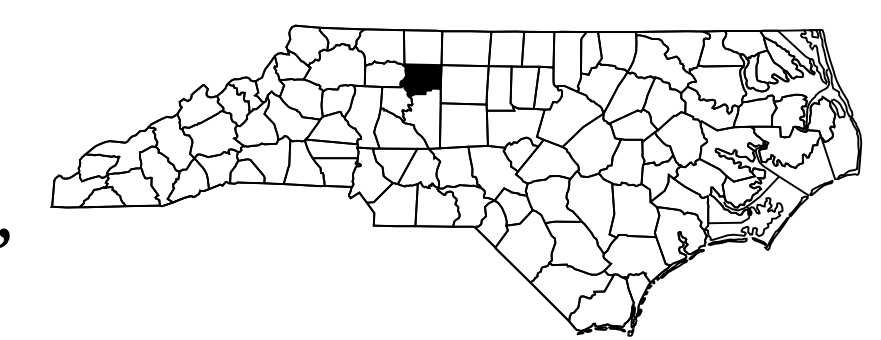
STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34839.1.9	N/A	PE	
34839.2.6	N/A	R/W	
34839.2.GV18	N/A	R/W	
34839.2.16	N/A	UTIL	
34839.3.GV6	NHP-0918(062)	CONSTR.	

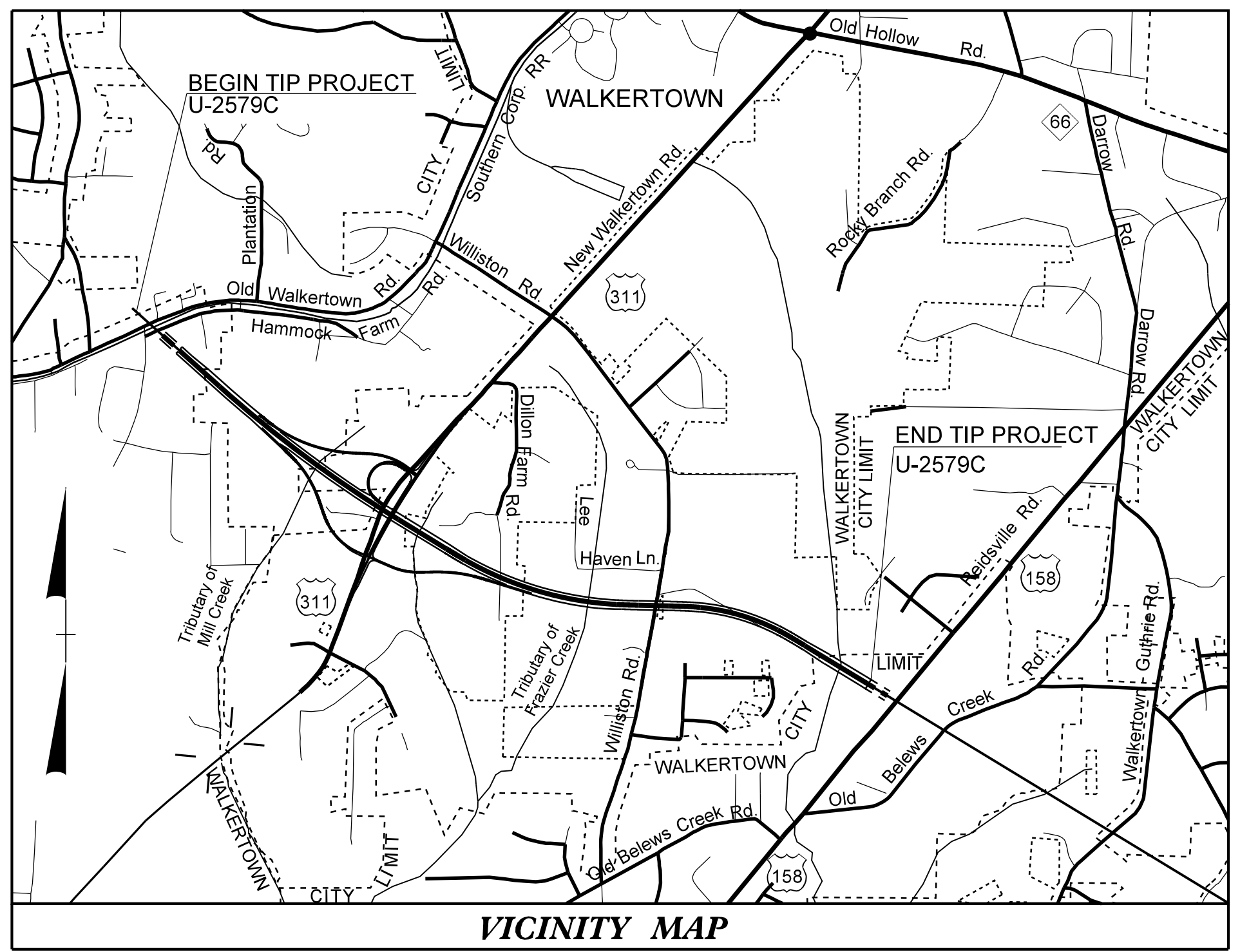
FORSYTH COUNTY

LOCATION: WINSTON - SALEM NORTHERN BELTWAY (EASTERN SECTION)
FROM US 311 TO US 158 (FUTURE I-74)

TYPE OF WORK: WIDENING, GRADING, PAVING, DRAINAGE, SIGNING, SIGNALS, ITS, CULVERTS AND STRUCTURES.



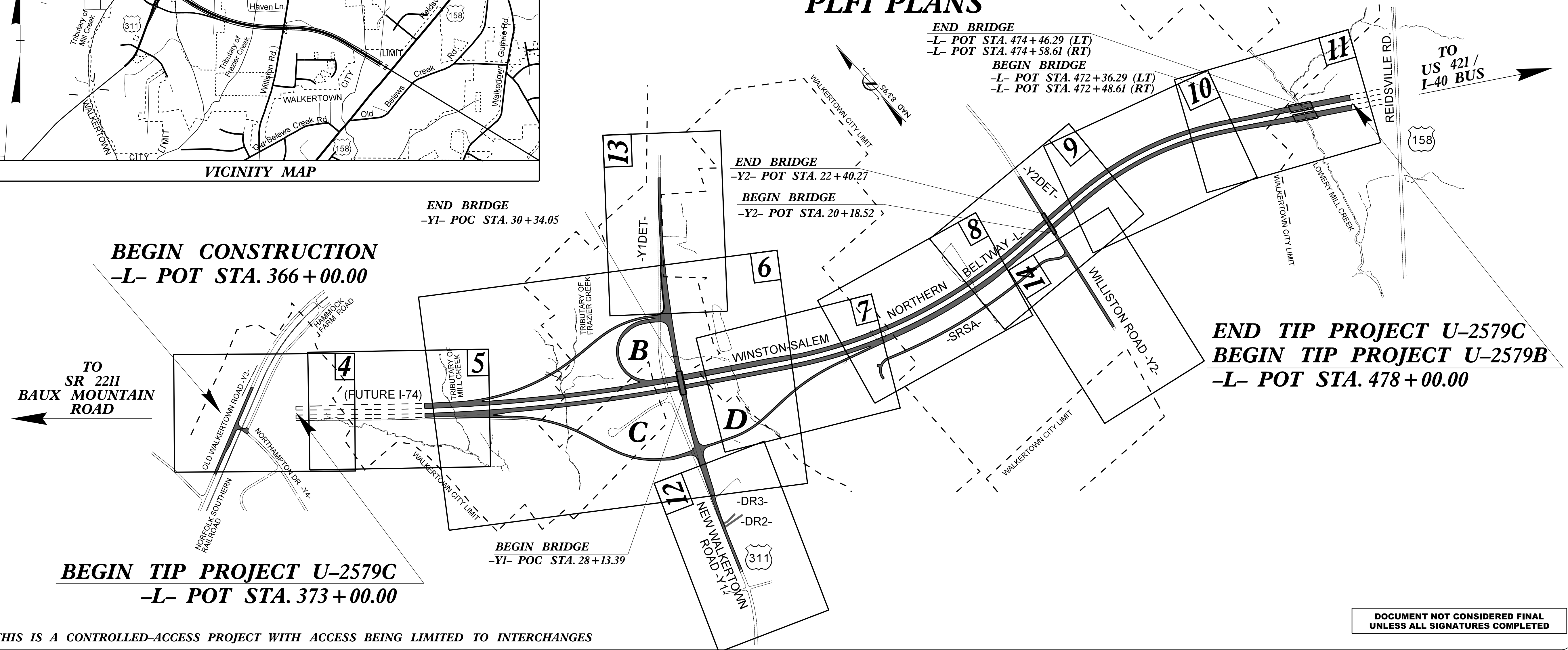
TIP PROJECT: U-2579C



PLFI PLANS

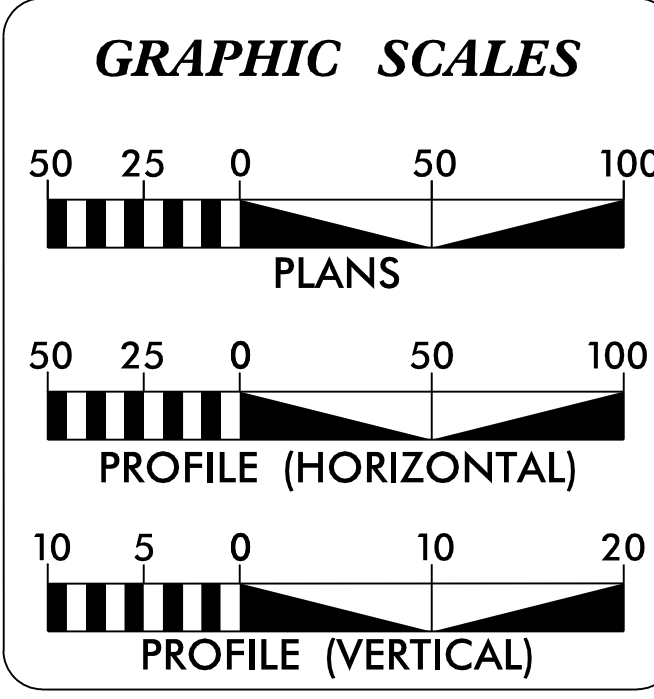
END BRIDGE
-L- POT STA. 474+46.29 (LT)
-L- POT STA. 474+58.61 (RT)

BEGIN BRIDGE
-L- POT STA. 472+36.29 (LT)
-L- POT STA. 472+48.61 (RT)



CONTRACT:

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



DESIGN DATA

ADT 2017 =	65,592
ADT 2037 =	93,112
DHV =	10 %
D =	60 %
T =	18 % *
V =	70 MPH
* TTST 12 %	DUAL 6 %

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT U-2579C	=	1.989 Miles
LENGTH OF STRUCTURE PROJECT U-2579C	=	0.040 Mile
TOTAL LENGTH OF TIP PROJECT U-2579C	=	1.949 Miles

PLANS PREPARED BY:

RS&H & 8601 SIX FORKS RD, SUITE 260
RALEIGH, NC 27615
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
OCTOBER 28, 2015

LETTING DATE:
OCTOBER 17, 2017

JASON TALLEY, PE
PROJECT ENGINEER

JARED BOND, PE
PROJECT DESIGN ENGINEER

TATIA L. WHITE, PE, PLS
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: _____

ROADWAY DESIGN ENGINEER

SIGNATURE: _____

**DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA**

13-MAR-2017 18:40
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\$\$\$\$\$SERNAME\$\$\$\$\$

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale *S.U.E. = *Subsurface Utility Engineering*

04/06/15

BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○ EIP
Property Corner	-----
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-WLB-
Proposed Wetland Boundary	-WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	-----
Potential Contamination Area: Soil	-----
Known Contamination Area: Water	-----
Potential Contamination Area: Water	-----
Contaminated Site: Known or Potential	☠ ?

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
Small Mine	⋈
Foundation	□
Area Outline	□
Cemetery	□
Building	□
School	□
Church	□
Dam	□

HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	-----
Jurisdictional Stream	-JS-
Buffer Zone 1	-BZ 1-
Buffer Zone 2	-BZ 2-
Flow Arrow	←
Disappearing Stream	→
Spring	○
Wetland	-----
Proposed Lateral, Tail, Head Ditch	-----
False Sump	-----

RAILROADS:

Standard Gauge	-----
RR Signal Milepost	○ MILEPOST 35
Switch	□ SWITCH
RR Abandoned	-----
RR Dismantled	-----

RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	-----
Proposed Right of Way Line with Iron Pin and Cap Marker	-----
Proposed Right of Way Line with Concrete or Granite RW Marker	-----
Proposed Control of Access Line with Concrete C/A Marker	-----
Existing Control of Access	-----
Proposed Control of Access	-----
Existing Easement Line	-----
Proposed Temporary Construction Easement	-----
Proposed Temporary Drainage Easement	-----
Proposed Permanent Drainage Easement	-----
Proposed Permanent Drainage / Utility Easement	-----
Proposed Permanent Utility Easement	-----
Proposed Temporary Utility Easement	-----
Proposed Aerial Utility Easement	-----
Proposed Permanent Easement with Iron Pin and Cap Marker	-----

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	-----

VEGETATION:

Single Tree	○
Single Shrub	○
Hedge	-----
Woods Line	-----

Orchard	-----
Vineyard	-----

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	-----
Bridge Wing Wall, Head Wall and End Wall	-----
MINOR:	
Head and End Wall	-----
Pipe Culvert	-----
Footbridge	-----
Drainage Box: Catch Basin, DI or JB	-----
Paved Ditch Gutter	-----
Storm Sewer Manhole	-----
Storm Sewer	-----

UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	○
Power Line Tower	□
Power Transformer	□
U/G Power Cable Hand Hole	-----
H-Frame Pole	●
U/G Power Line LOS B (S.U.E.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	○
Telephone Pedestal	□
Telephone Cell Tower	□
U/G Telephone Cable Hand Hole	-----
U/G Telephone Cable LOS B (S.U.E.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

WATER:

Water Manhole	○
Water Meter	○
Water Valve	⊗
Water Hydrant	○
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

TV:

TV Pedestal	□
TV Tower	⊗
U/G TV Cable Hand Hole	-----
U/G TV Cable LOS B (S.U.E.*)	-----
U/G TV Cable LOS C (S.U.E.*)	-----
U/G TV Cable LOS D (S.U.E.*)	-----
U/G Fiber Optic Cable LOS B (S.U.E.*)	-----
U/G Fiber Optic Cable LOS C (S.U.E.*)	-----
U/G Fiber Optic Cable LOS D (S.U.E.*)	-----

GAS:

Gas Valve	◇
Gas Meter	◇
U/G Gas Line LOS B (S.U.E.*)	-----
U/G Gas Line LOS C (S.U.E.*)	-----
U/G Gas Line LOS D (S.U.E.*)	-----
Above Ground Gas Line	-----

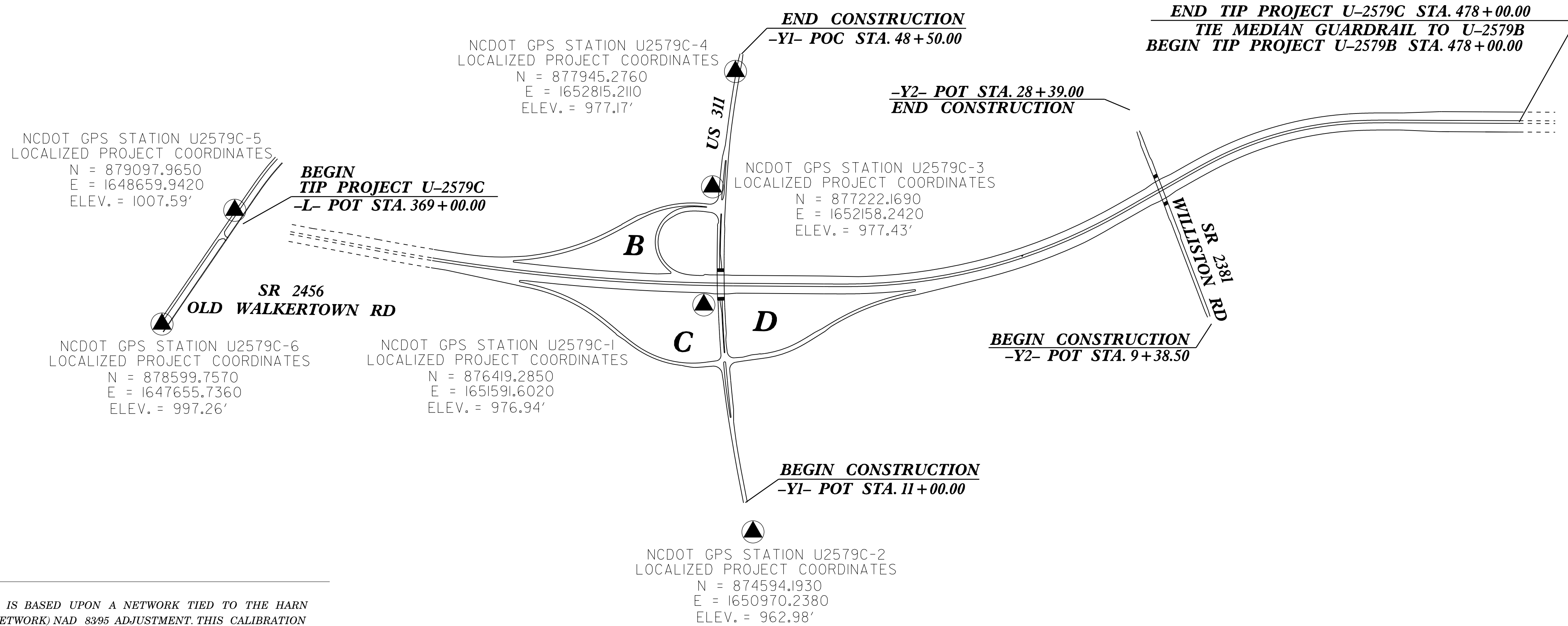
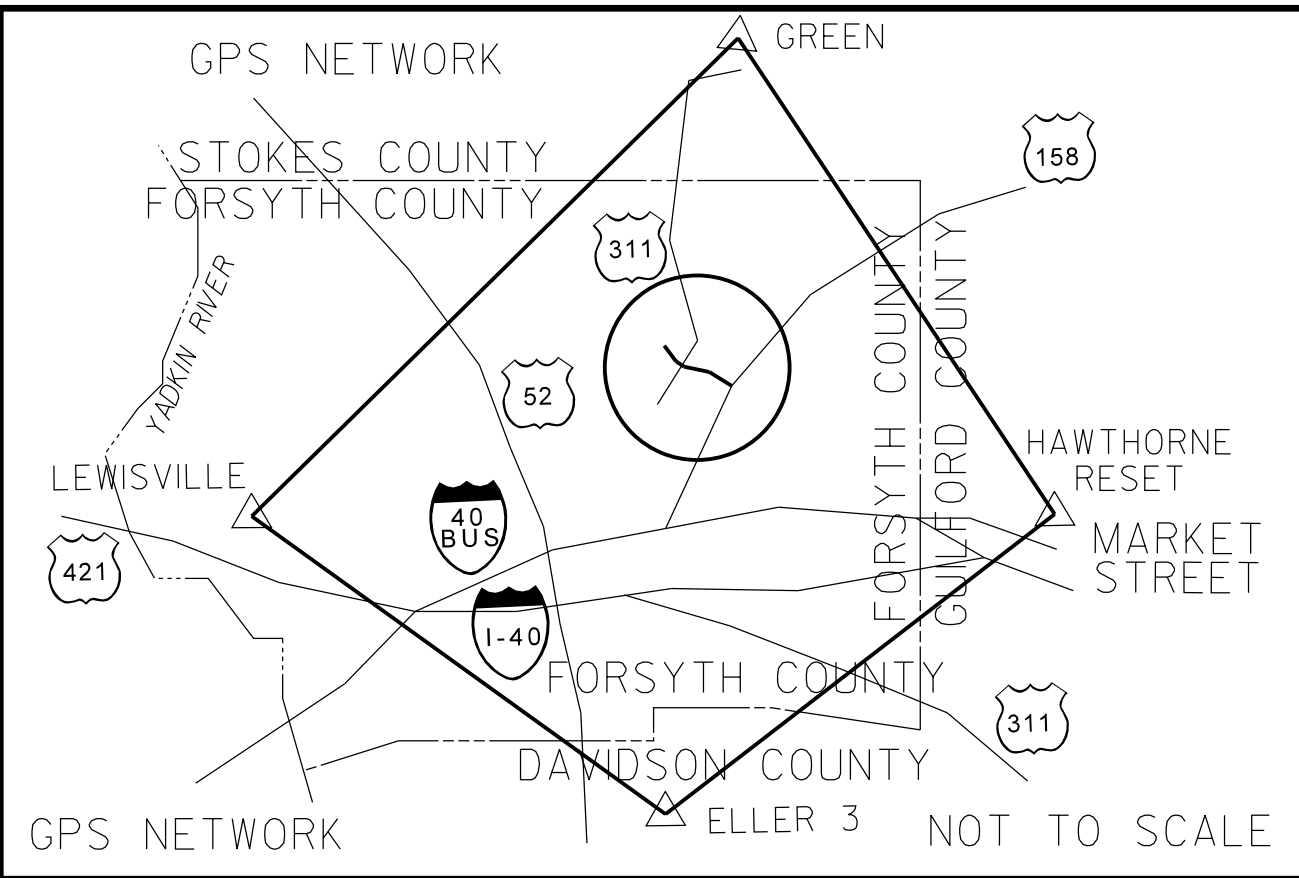
SANITARY SEWER:

Sanitary Sewer Manhole	⊕
Sanitary Sewer Cleanout	⊕
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
SS Forced Main Line LOS B (S.U.E.*)	-----
SS Forced Main Line LOS C (S.U.E.*)	-----
SS Forced Main Line LOS D (S.U.E.*)	-----

MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	□
Utility Located Object	○
Utility Traffic Signal Box	□
Utility Unknown U/G Line LOS B (S.U.E.*)	-----
U/G Tank; Water, Gas, Oil	-----
Underground Storage Tank, Approx. Loc.	-----
A/G Tank; Water, Gas, Oil	-----
Geoenvironmental Boring	○
U/G Test Hole LOS A (S.U.E.*)	○
Abandoned According to Utility Records	-----
End of Information	-----

SURVEY CONTROL SHEET U-2579C



NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 ADJUSTMENT. THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
U2579C_LS_GPSCALIB.HTML
U2579C_LS_WGS84.TXT
U2579C_LS_LOCAL.TXT
U2579C_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

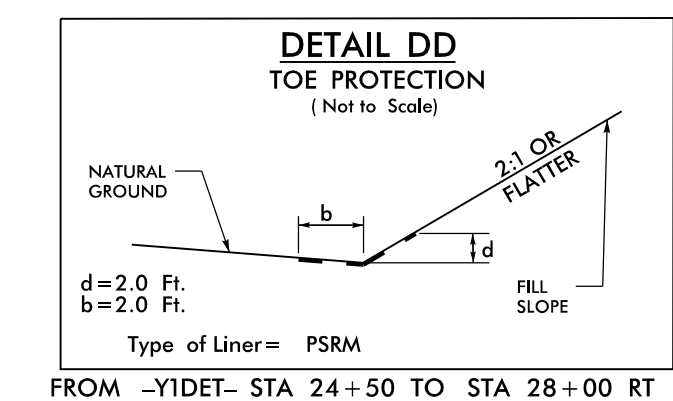
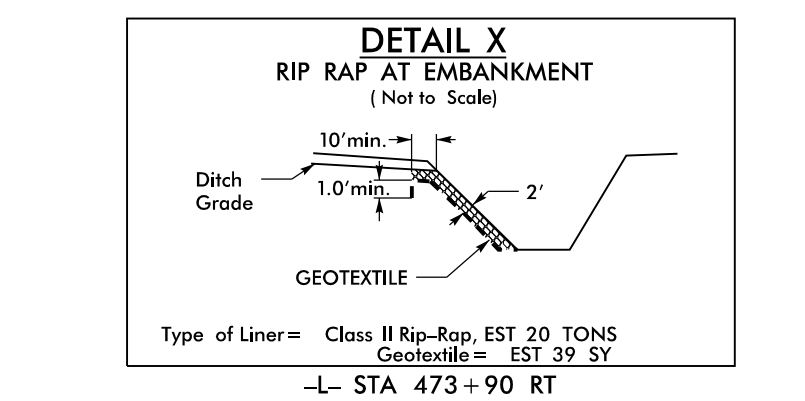
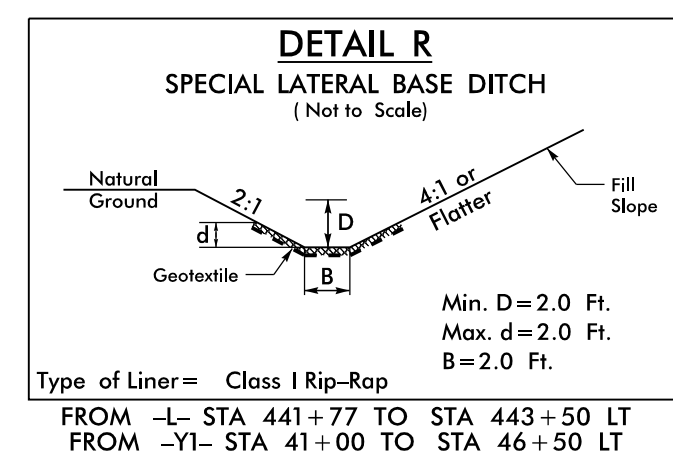
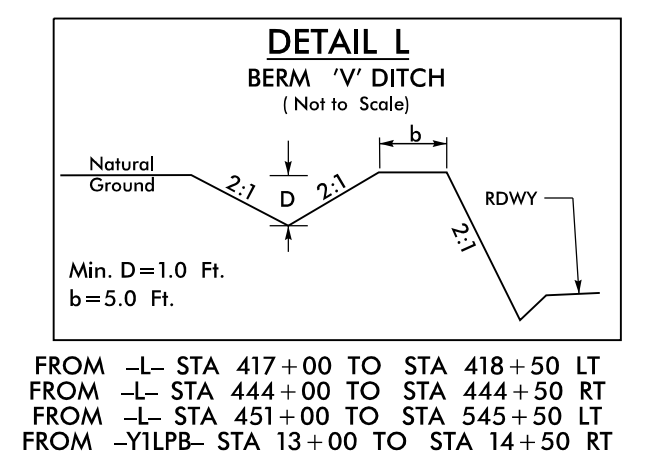
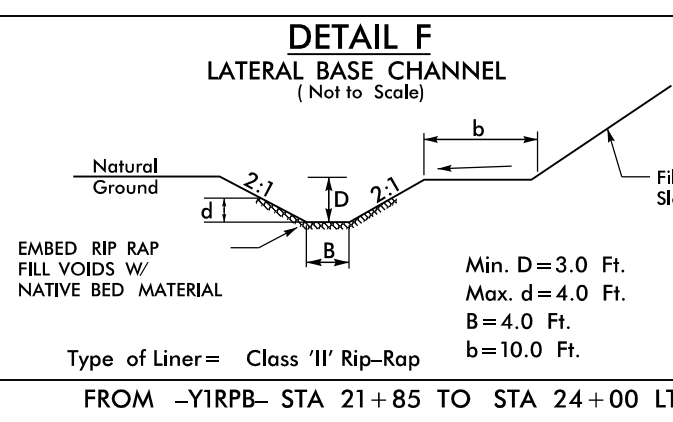
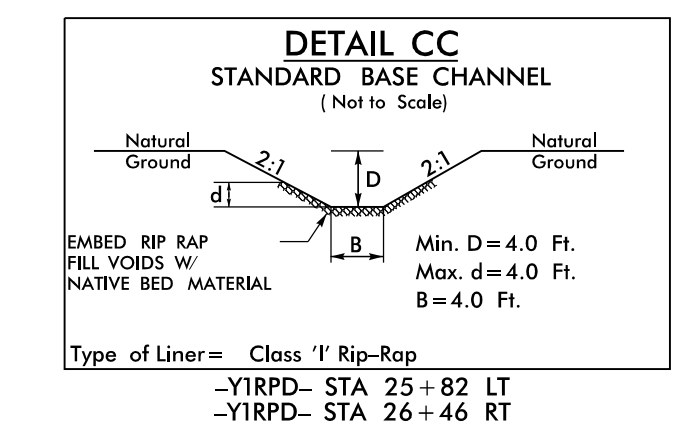
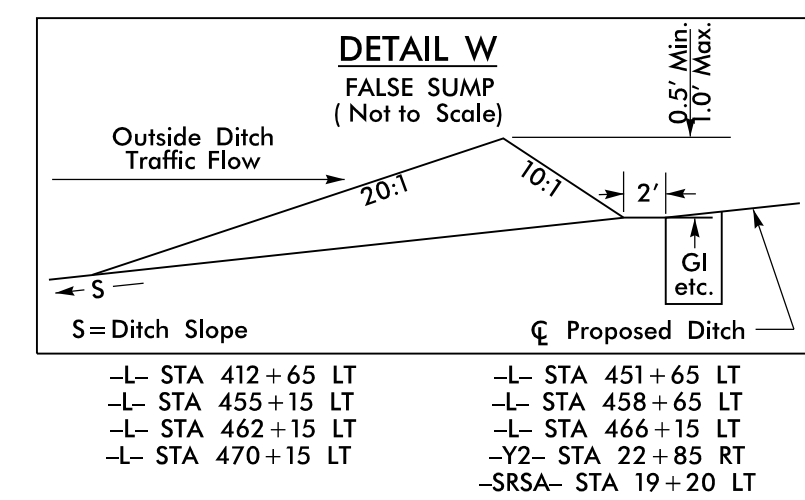
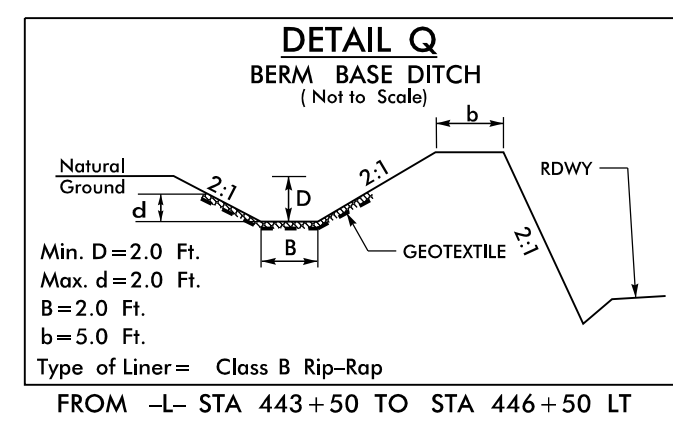
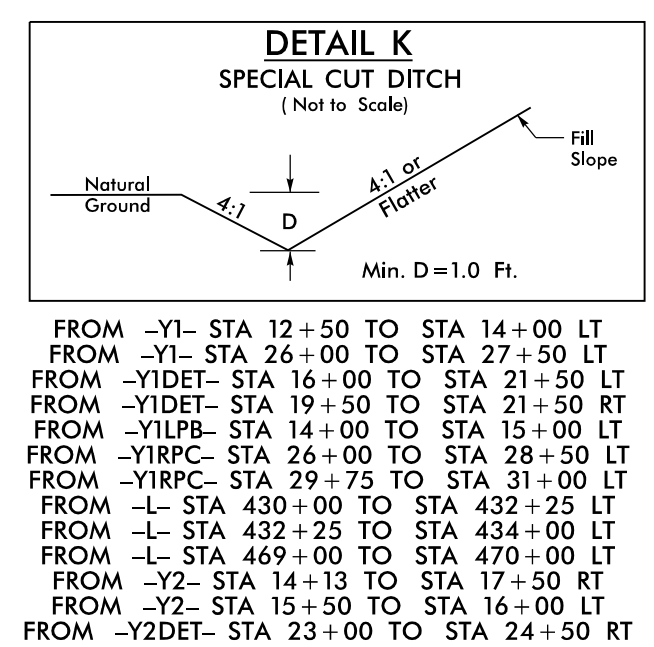
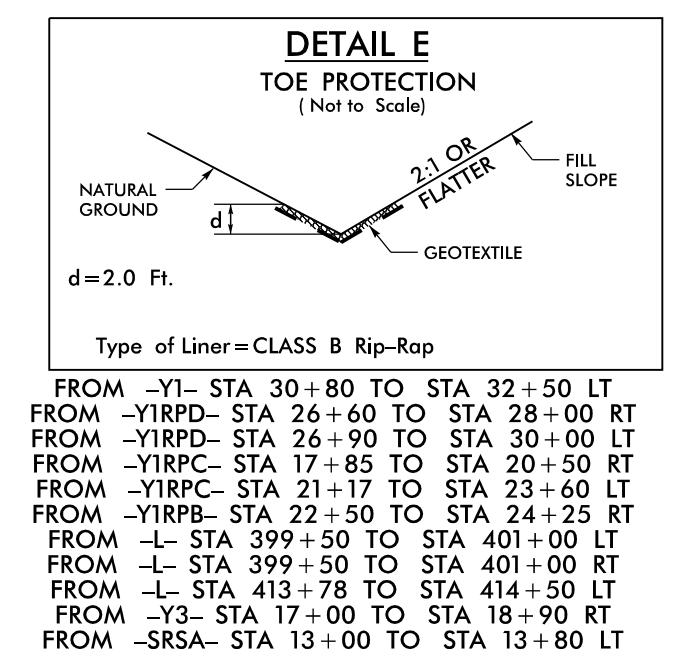
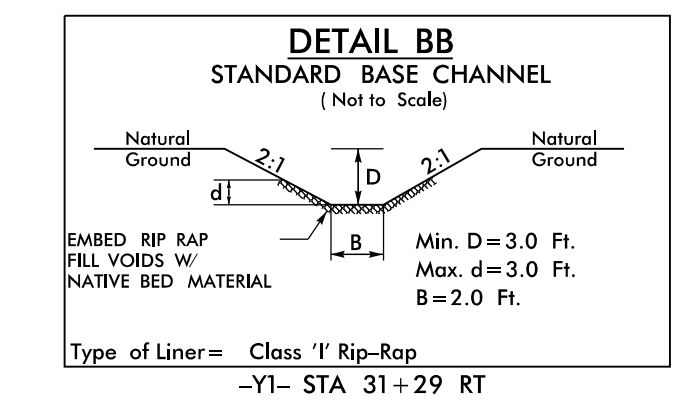
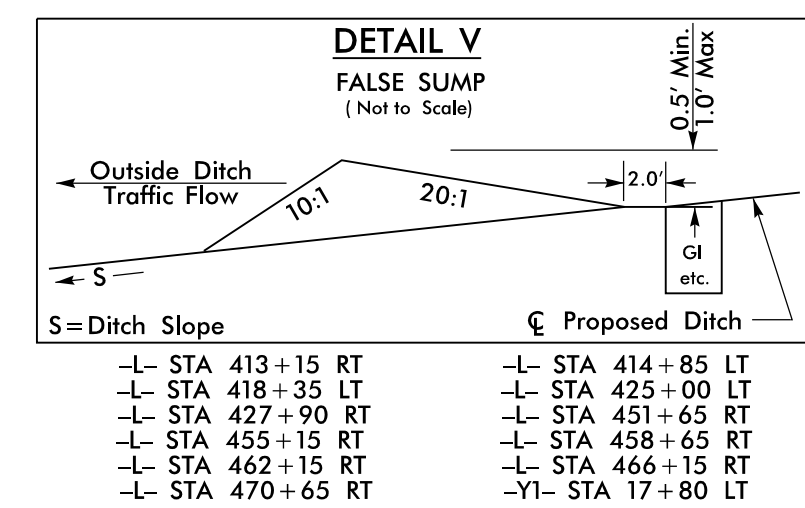
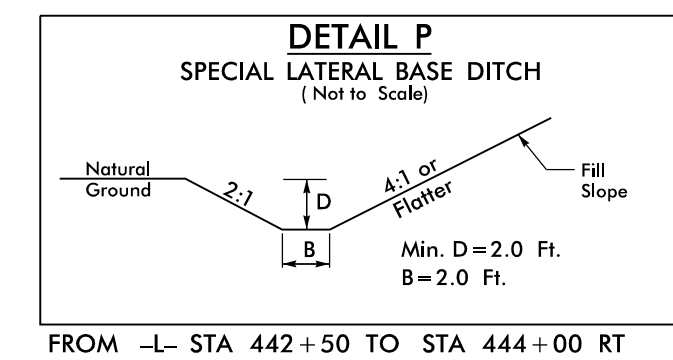
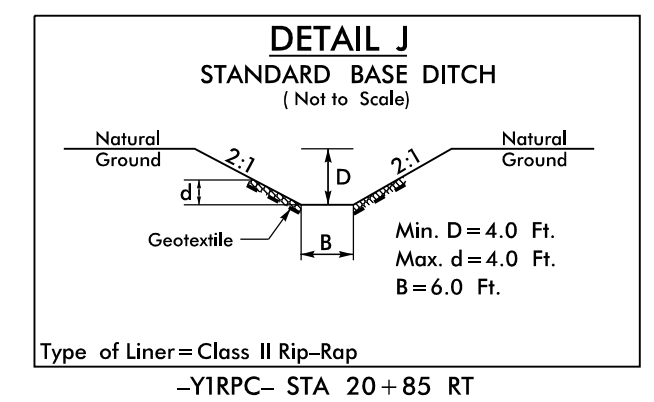
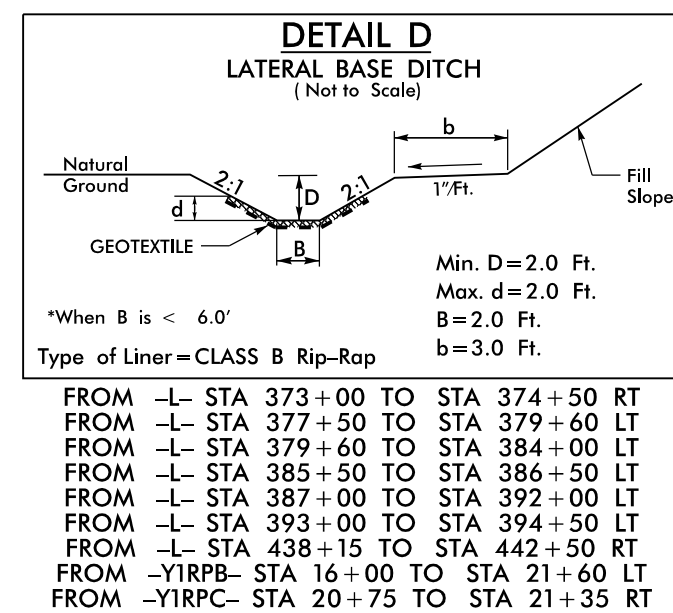
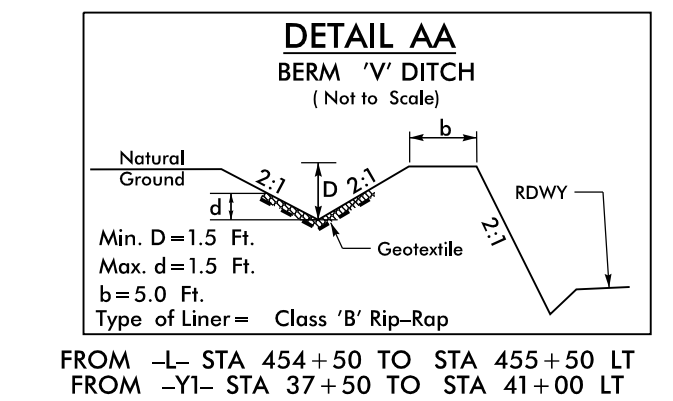
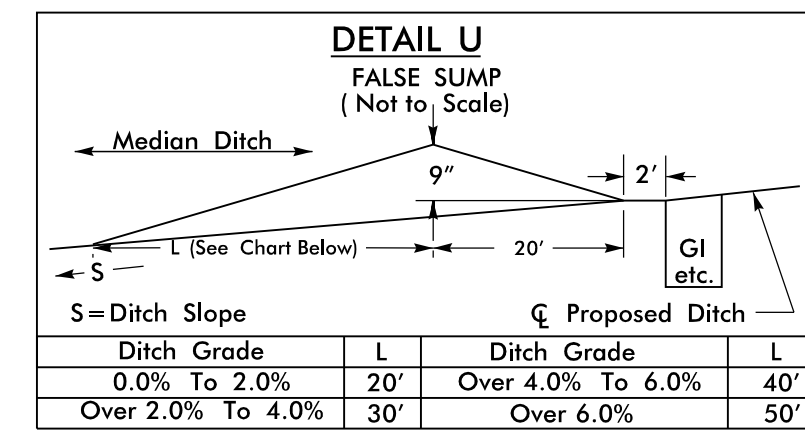
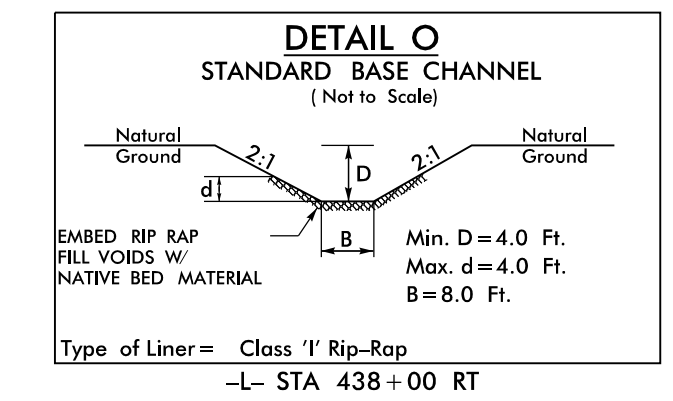
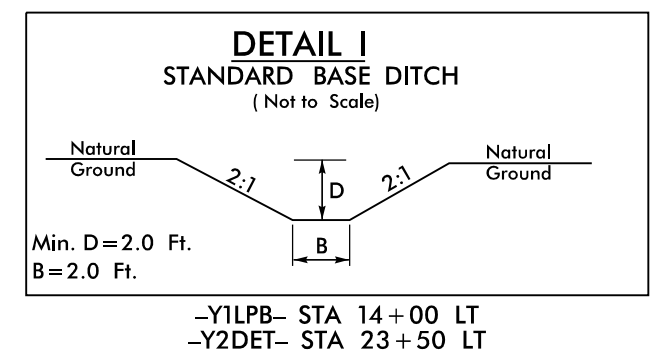
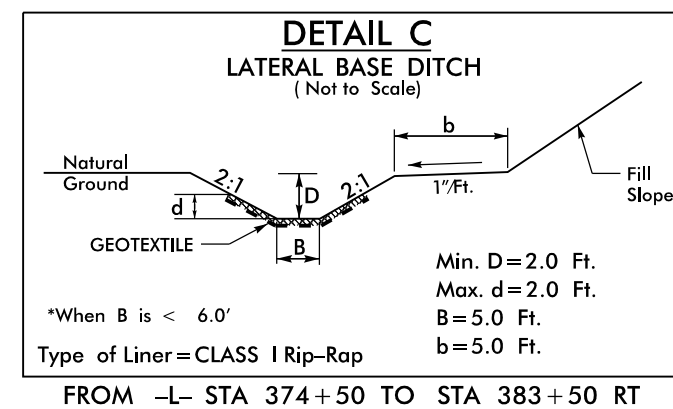
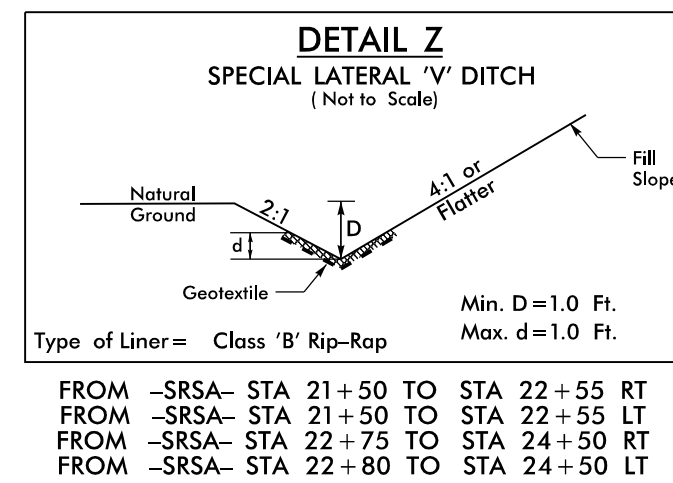
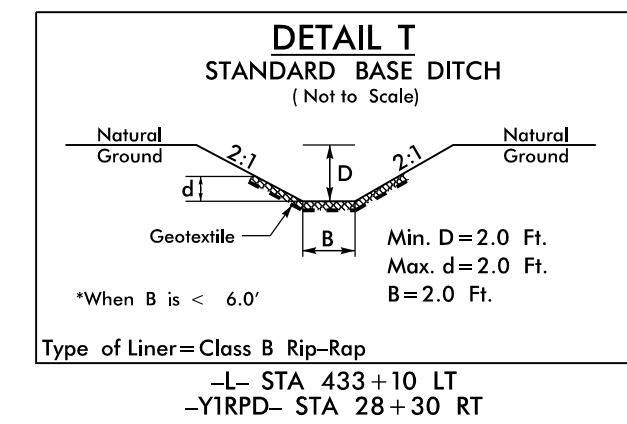
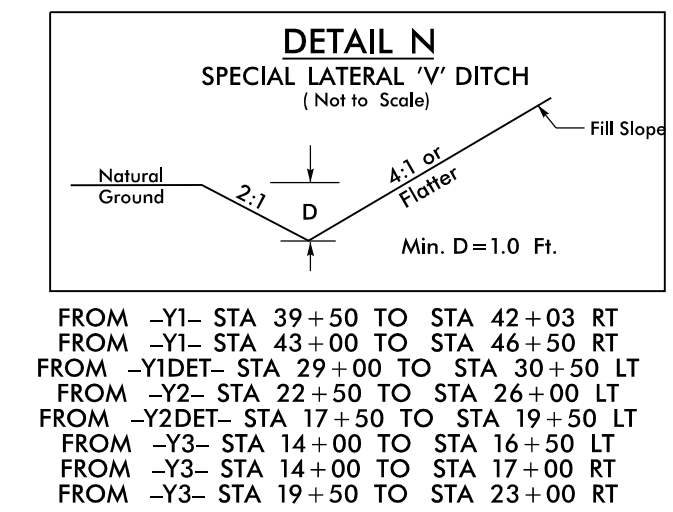
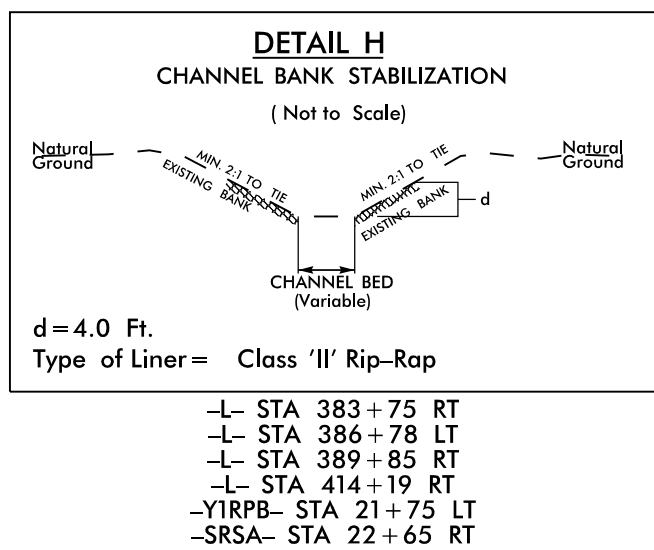
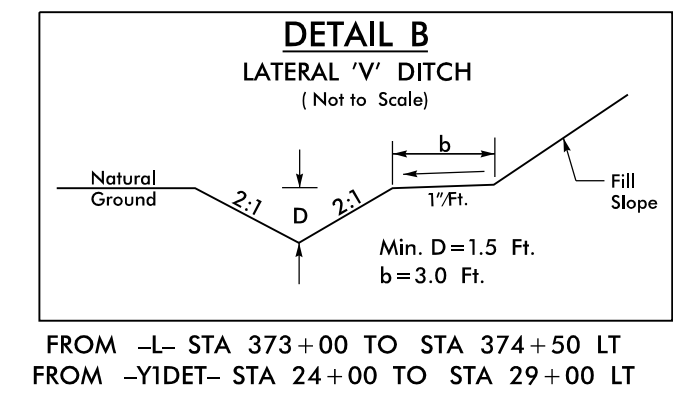
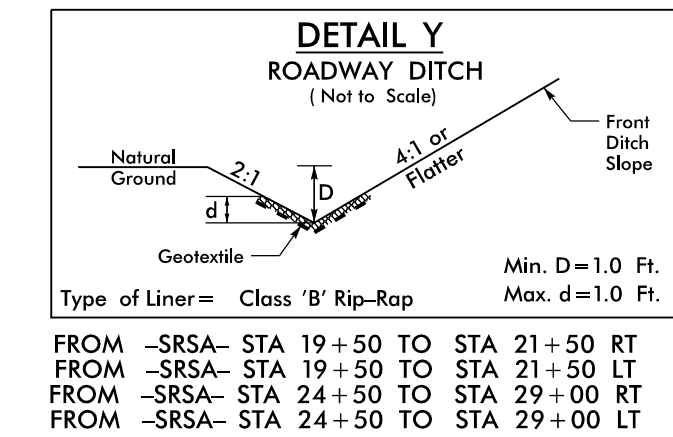
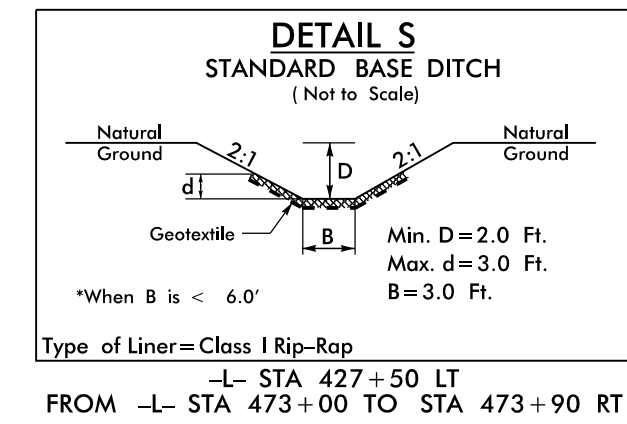
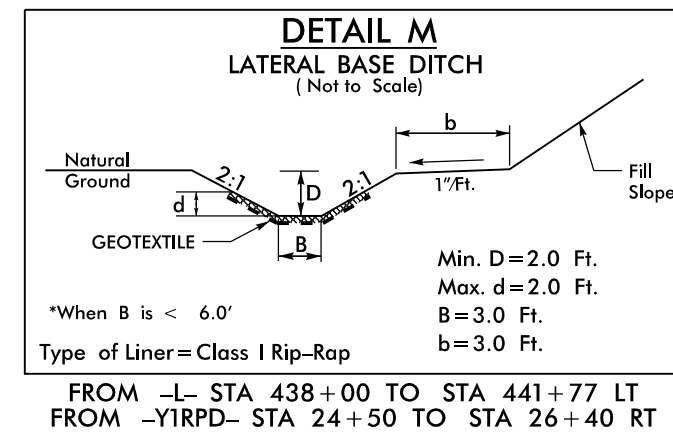
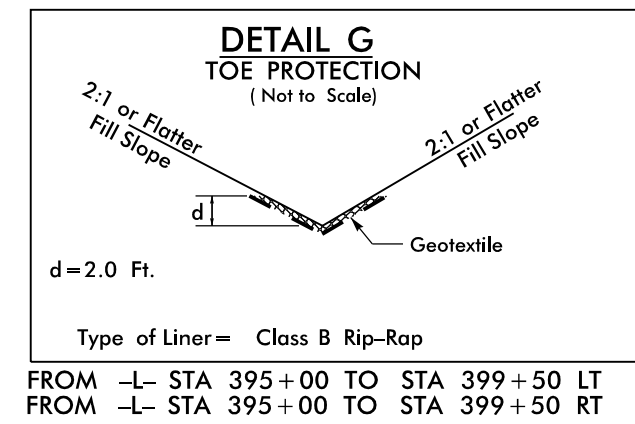
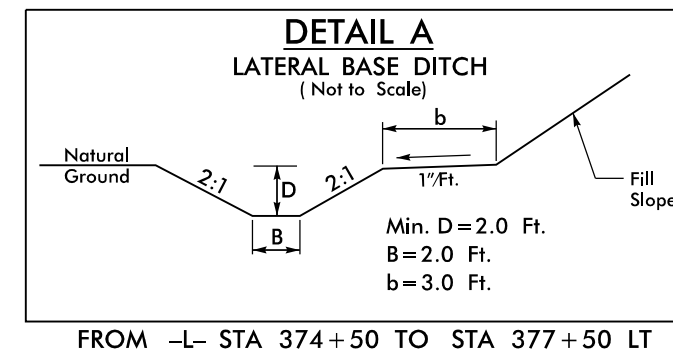
▲ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "U2579C-1" WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 876419.285(++) EASTING: 1651591.602(++)
ELEVATION: 976.94(++)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99995453
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U2579C-1" TO -L- STATION 390+00.00 IS
N 49°00'53.54" 3884.0262'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

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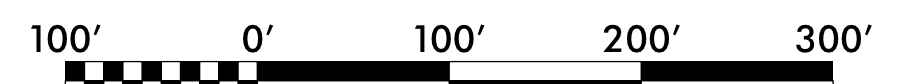


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PROJECT REFERENCE NO.		SHEET NO.	
U-2579C		6	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

APPROXIMATE HISTORIC BOUNDARY
FOR THE HAMMOCK
FAMILY FARM

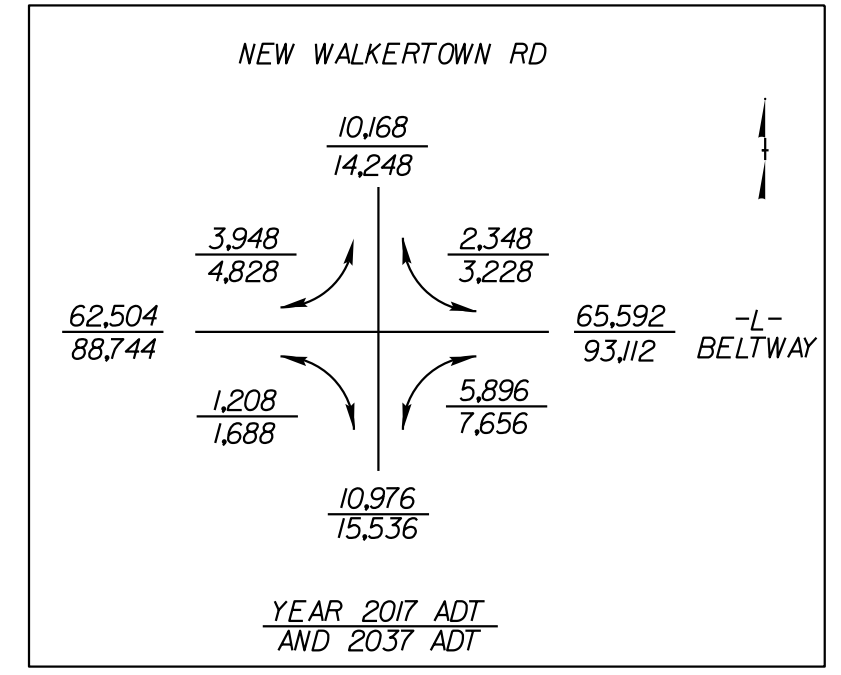
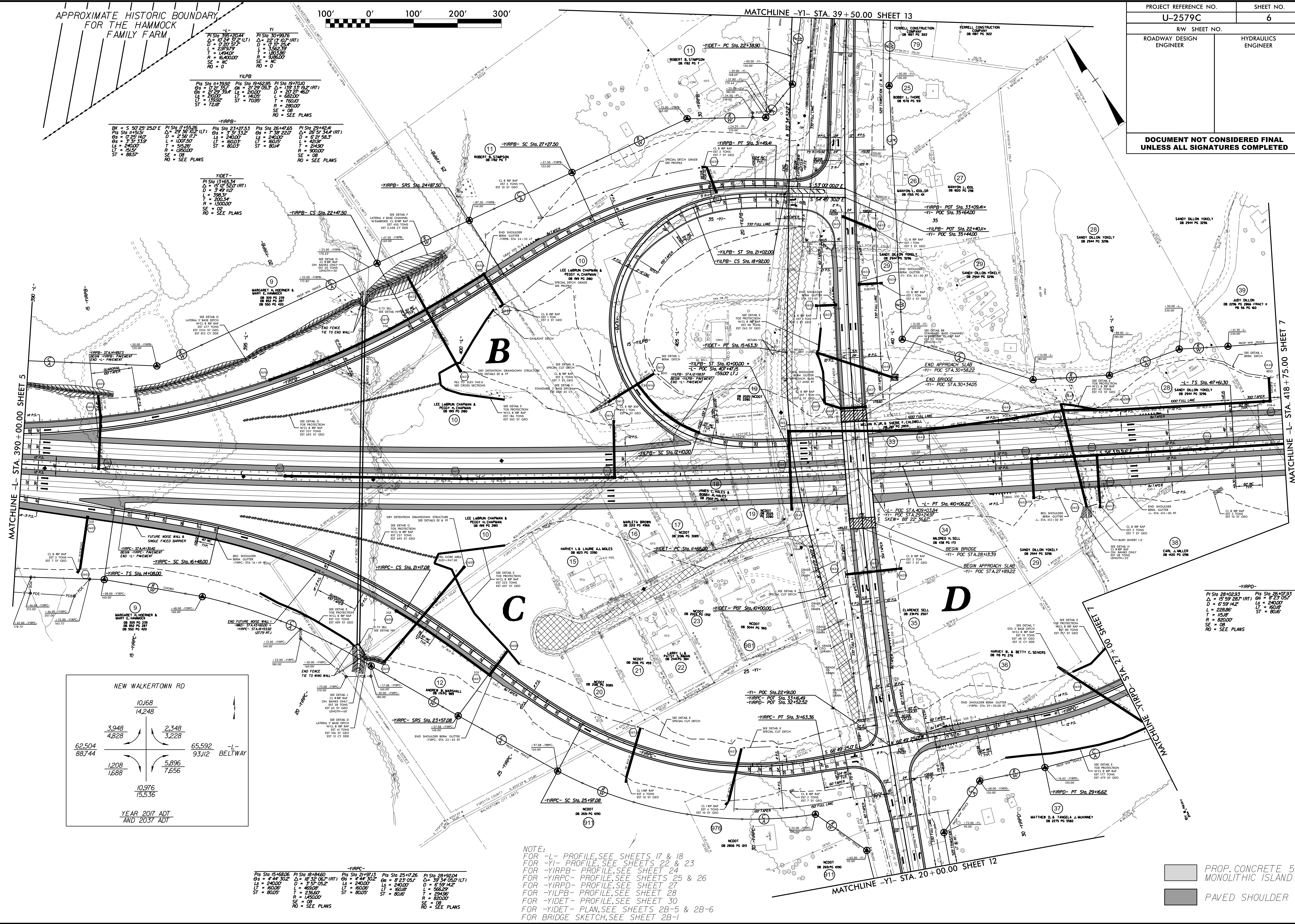


MATCHLINE -YI- STA. 39+50.00 SHEET 13

YI		YILPB	
PI Sta 30+490.76	PI Sta 30+490.76	PI Sta 19+429.5	PI Sta 19+429.5
Δ = 2° 19' 40" (RT)	Δ = 2° 19' 40" (RT)	Δ = 2° 27' 03" (RT)	Δ = 2° 27' 03" (RT)
D = 373.57'	D = 373.57'	D = 207.27'	D = 207.27'
L = 3,362.3'	L = 3,362.3'	L = 6,823.0'	L = 6,823.0'
T = 1,203.96'	T = 1,203.96'	T = 1,600.5'	T = 1,600.5'
R = 9,000.00'	R = 9,000.00'	R = 280.00'	R = 280.00'
SE = 0°	SE = 0°	SE = 0°	SE = 0°
RO = 0	RO = 0	RO = 0	RO = 0

YIRPB		YIRPB	
PI Sta 11+399.2	PI Sta 11+399.2	PI Sta 23+275.3	PI Sta 23+275.3
Δ = 0° 29' 57" (LT)	Δ = 0° 29' 57" (LT)	Δ = 2° 58' 17" (RT)	Δ = 2° 58' 17" (RT)
D = 2,400.0'	D = 2,400.0'	D = 2,400.0'	D = 2,400.0'
L = 3,319.7'	L = 3,319.7'	L = 1,600.3'	L = 1,600.3'
T = 1,932.2'	T = 1,932.2'	T = 525.26'	T = 525.26'
R = 16,000.00'	R = 16,000.00'	R = 800.0'	R = 800.0'
SE = 0°	SE = 0°	SE = 0°	SE = 0°
RO = 0	RO = 0	RO = 0	RO = 0

YIDET	
PI Sta 13+66.34	PI Sta 13+66.34
Δ = 0° 12' 52" (RT)	Δ = 0° 12' 52" (RT)
D = 379.3'	D = 379.3'
L = 2,003.4'	L = 2,003.4'
T = 1,500.00'	T = 1,500.00'
R = 1,500.00'	R = 1,500.00'
SE = 0°	SE = 0°
RO = 0	RO = 0



YIRPC		YIRPC	
PI Sta 15+680.0	PI Sta 15+680.0	PI Sta 21+497.3	PI Sta 21+497.3
Δ = 4° 44' 30.2" (RT)	Δ = 4° 44' 30.2" (RT)	Δ = 4° 44' 30.2" (RT)	Δ = 4° 44' 30.2" (RT)
D = 2,400.0'	D = 2,400.0'	D = 2,400.0'	D = 2,400.0'
L = 1,600.0'	L = 1,600.0'	L = 1,600.0'	L = 1,600.0'
T = 800.0'	T = 800.0'	T = 800.0'	T = 800.0'
R = 14,500.00'	R = 14,500.00'	R = 14,500.00'	R = 14,500.00'
SE = 0°	SE = 0°	SE = 0°	SE = 0°
RO = 0	RO = 0	RO = 0	RO = 0

NOTE:
FOR -L- PROFILE, SEE SHEETS 17 & 18
FOR -YI- PROFILE, SEE SHEETS 22 & 23
FOR -YIRPB- PROFILE, SEE SHEET 24
FOR -YIRPC- PROFILE, SEE SHEETS 25 & 26
FOR -YIRPD- PROFILE, SEE SHEET 27
FOR -YILPB- PROFILE, SEE SHEET 28
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEETS 2B-5 & 2B-6
FOR BRIDGE SKETCH, SEE SHEET 2B-1



REVISIONS
 RIGHT OF WAY REVISION 3/17/17 - UPDATED PROPERTY LINE ON PARCEL 39. JMB
 RIGHT OF WAY REVISION 3/29/17 - ADDED PIPE ON PARCEL 11. JMB
 RIGHT OF WAY REVISION 5/31/17 - ADDED TCE ON PARCEL 9. JMB

03-MAY-2017 09:40 - 2579C.psh_b.dgn
 9:54 AM - 2579C.psh_b.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

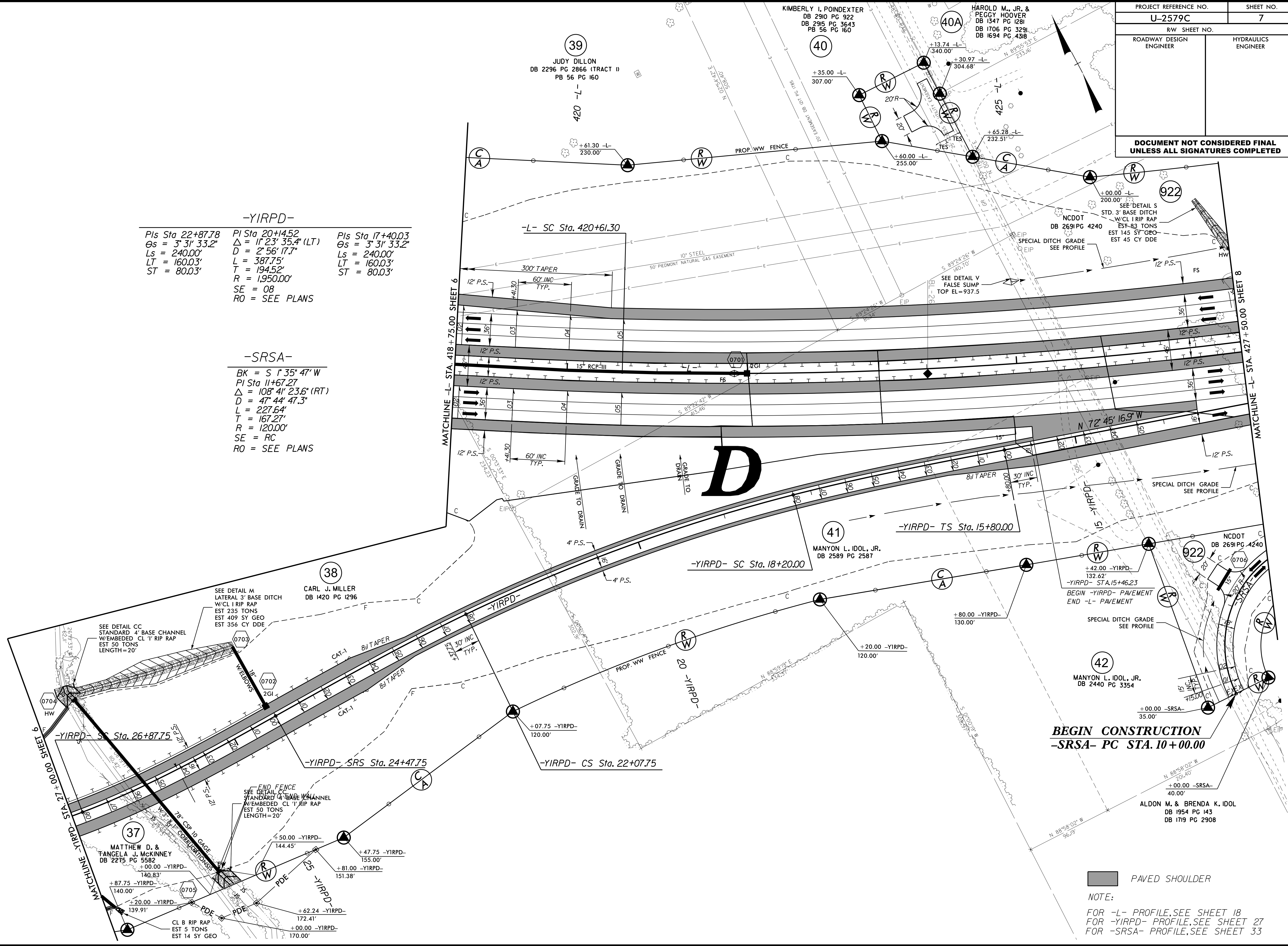
REVISIONS
 RIGHT OF WAY REVISION 3/7/17 - SHIFTED PROPERTY LINE BETWEEN PARCELS 39 AND 40; UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 40; JMB
 RIGHT OF WAY REVISION 5/3/17 - ADDED PDE ON PARCEL 37; REVISED PDE ON PARCEL 38; REVISED R/W ON PARCELS 42 AND 922; JMB

-YIRPD-

Pls Sta 22+87.78 θs = 3° 31' 33.2" Ls = 240.00' LT = 160.03' ST = 80.03'	Pls Sta 20+14.52 Δ = 11° 23' 35.4" (LT) D = 2° 56' 17.7" L = 387.75' T = 194.52' R = 1,950.00' SE = 08 RO = SEE PLANS	Pls Sta 17+40.03 θs = 3° 31' 33.2" Ls = 240.00' LT = 160.03' ST = 80.03'
--	--	--

-SRSA-

BK = S 1° 35' 47" W
 PI Sta 11+67.27
 Δ = 108° 41' 23.6" (RT)
 D = 47° 44' 47.3"
 L = 227.64'
 T = 167.27'
 R = 120.00'
 SE = RC
 RO = SEE PLANS



BEGIN CONSTRUCTION
-SRSA- PC STA. 10+00.00

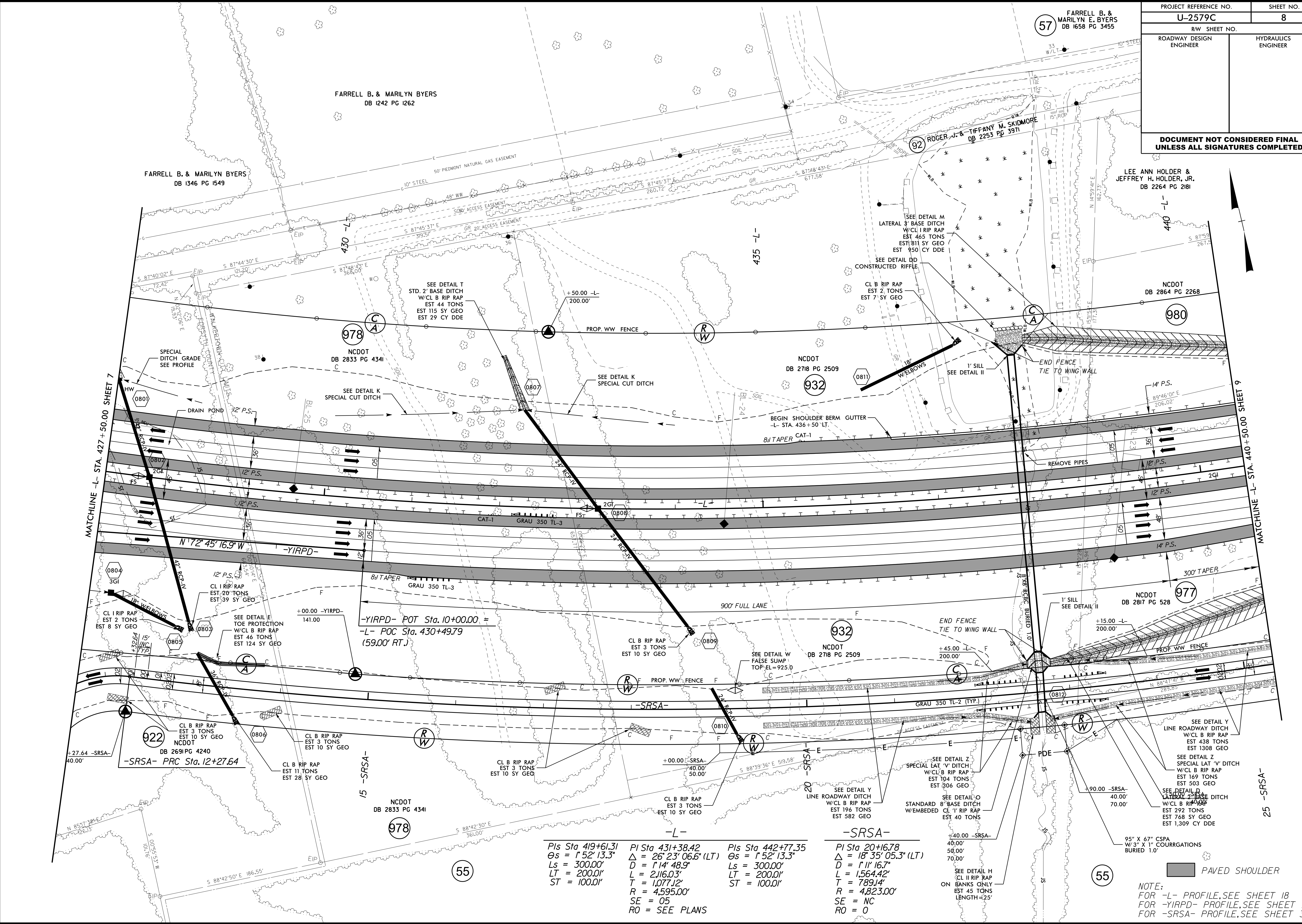
PAVED SHOULDER
 NOTE:
 FOR -L- PROFILE, SEE SHEET 18
 FOR -YIRPD- PROFILE, SEE SHEET 27
 FOR -SRSA- PROFILE, SEE SHEET 33

03 MAY 2017 09:41
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PROJECT REFERENCE NO.	SHEET NO.
U-2579C	8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

REVISIONS
 RIGHT OF WAY REVISION 5/3/17 - REVISED C/A FROM -L- STA. 436+00.00 TO STA. 440+00.00 RT. ON PARCELS 932 AND 977; ADDED RW ON PARCELS 55, 922, 932, 977, AND 978; ADDED TCE ON PARCELS 55 AND 932; ADDED PDE ON PARCEL 55. JMB

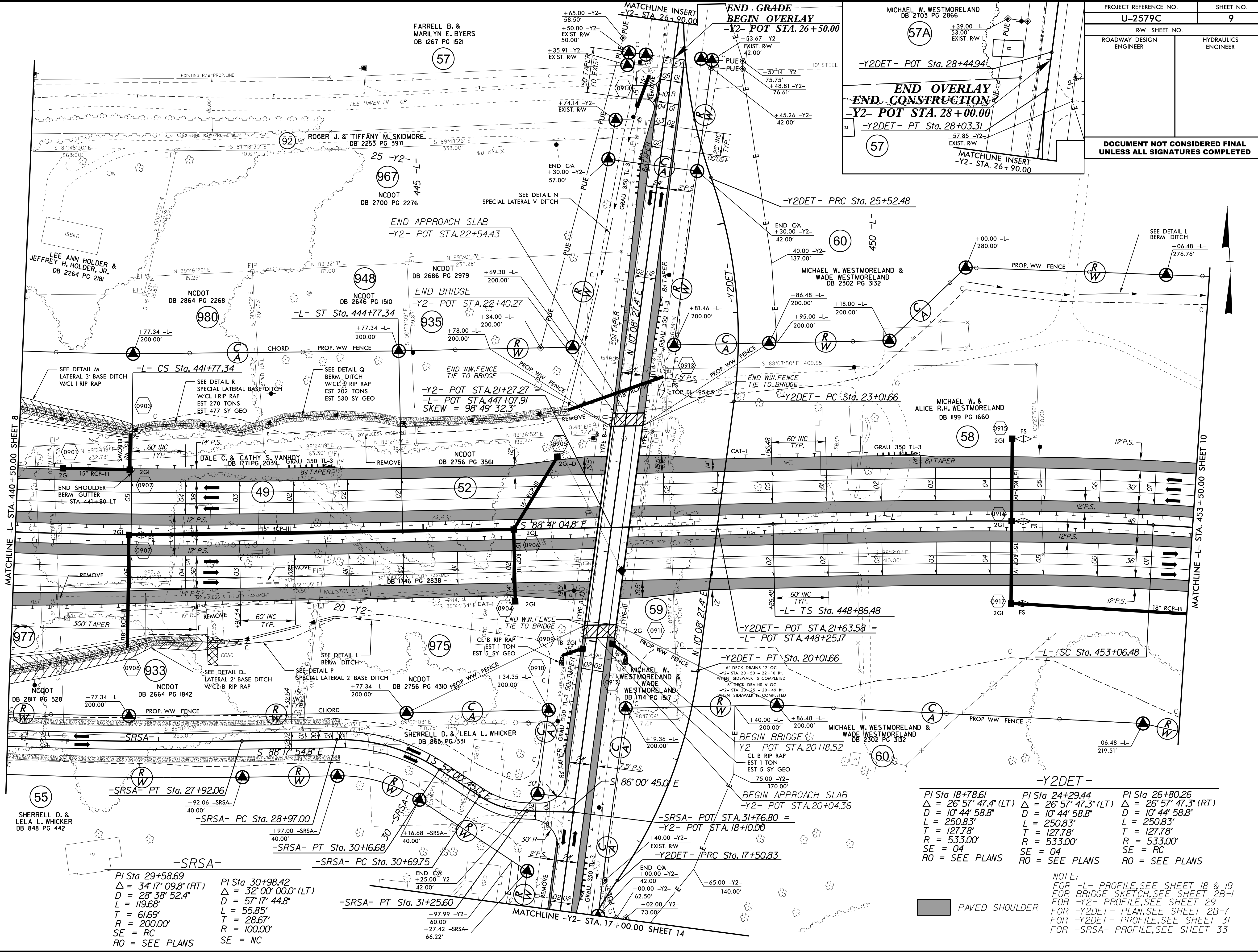
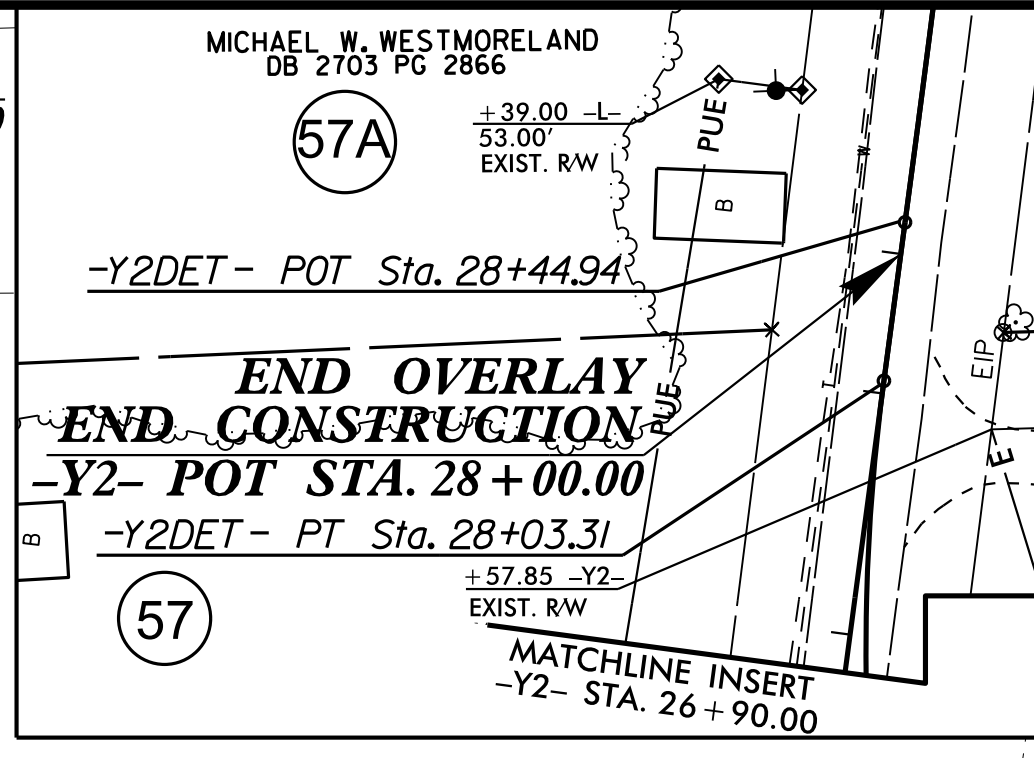
93 MAY 2017 09:46 U-2579C.psh.8.dgn
 8/17/99



<p>Pls Sta 419+61.31 $\Delta s = 1' 52' 13.3''$ $D = 300.00'$ $L = 2,116.03'$ $T = 1,077.12'$ $R = 4,595.00'$ $SE = 05$ $RO = \text{SEE PLANS}$</p>	<p>Pls Sta 431+38.42 $\Delta = 26' 23' 06.6'' (LT)$ $D = 1' 14' 48.9''$ $L = 2,116.03'$ $T = 1,077.12'$ $R = 4,595.00'$ $SE = 05$ $RO = \text{SEE PLANS}$</p>	<p>Pls Sta 442+77.35 $\Delta s = 1' 52' 13.3''$ $D = 300.00'$ $L = 2,116.03'$ $T = 1,077.12'$ $R = 4,595.00'$ $SE = 05$ $RO = \text{SEE PLANS}$</p>	<p>Pls Sta 20+16.78 $\Delta = 18' 35' 05.3'' (LT)$ $D = 1' 11' 16.7''$ $L = 1,564.42'$ $T = 789.14'$ $R = 4,823.00'$ $SE = NC$ $RO = 0$</p>
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NOTE:
 FOR -L- PROFILE, SEE SHEET 18
 FOR -YIRPD- PROFILE, SEE SHEET 27
 FOR -SRSA- PROFILE, SEE SHEET 33





RIGHT OF WAY REVISION 12/2/16 - ADDED PARCEL 057A (MICHAEL WESTMORELAND) ABOVE PROPERTY LINE OF PARCEL 57 (FERRELL) ON INSET. JMB
 RIGHT OF WAY REVISION 5/3/17 - REMOVED REFERENCE TO PARCEL 54 BECAUSE IT IS A TRACT OF PARCEL 55; ADDED R/W ON PARCELS 933, 975, AND 977;
 REVISED R/W ON PARCEL 55; REMOVED PUE AND REVISED TCE ON PARCEL 60. JMB

REVISIONS

8/17/99

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PI Sta 29+58.69
 $\Delta = 34' 17'' 09.8''$ (RT)
 $D = 28' 38'' 52.4''$
 $L = 119.68'$
 $T = 61.69'$
 $R = 200.00'$
 $SE = RC$
 $RO = SEE PLANS$

PI Sta 30+98.42
 $\Delta = 32' 00'' 00.0''$ (LT)
 $D = 57' 17'' 44.8''$
 $L = 55.85'$
 $T = 28.67'$
 $R = 100.00'$
 $SE = NC$

PI Sta 18+78.61 $\Delta = 26' 57'' 47.4''$ (LT) $D = 10' 44'' 58.8''$ $L = 250.83'$ $T = 127.78'$ $R = 533.00'$ $SE = 04$ $RO = SEE PLANS$	PI Sta 24+29.44 $\Delta = 26' 57'' 47.3''$ (LT) $D = 10' 44'' 58.8''$ $L = 250.83'$ $T = 127.78'$ $R = 533.00'$ $SE = 04$ $RO = SEE PLANS$	PI Sta 26+80.26 $\Delta = 26' 57'' 47.3''$ (RT) $D = 10' 44'' 58.8''$ $L = 250.83'$ $T = 127.78'$ $R = 533.00'$ $SE = RC$ $RO = SEE PLANS$
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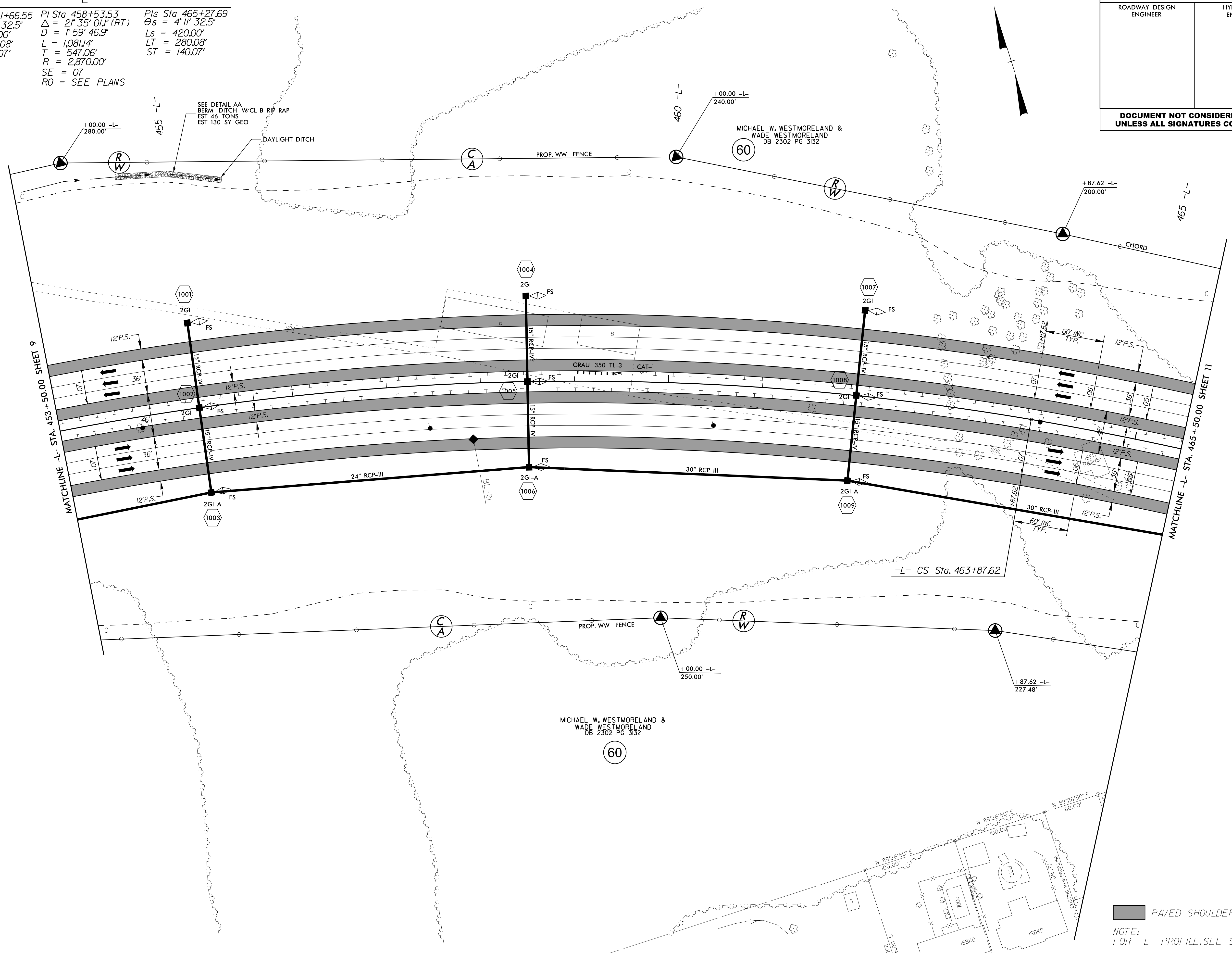
NOTE:
 FOR -L- PROFILE, SEE SHEET 18 & 19
 FOR BRIDGE SKETCH, SEE SHEET 2B-1
 FOR -Y2- PROFILE, SEE SHEET 29
 FOR -Y2DET- PLAN, SEE SHEET 2B-7
 FOR -Y2DET- PROFILE, SEE SHEET 31
 FOR -SRSA- PROFILE, SEE SHEET 33

PAVED SHOULDER

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

-L-

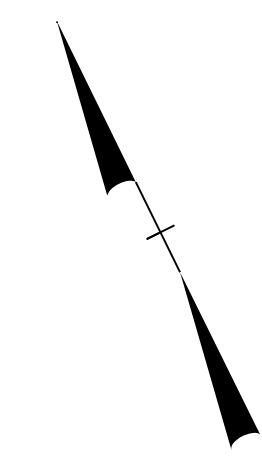
PIs Sta 451+66.55	PI Sta 458+53.53	PIs Sta 465+27.69
$\Delta = 4' 11" 32.5"$	$\Delta = 2' 35" 01.1" (RT)$	$\Delta = 4' 11" 32.5"$
$Ls = 420.00'$	$D = 1' 59" 46.9"$	$Ls = 420.00'$
$LT = 280.08'$	$L = 1,081.14'$	$LT = 280.08'$
$ST = 140.07'$	$T = 547.06'$	$ST = 140.07'$
	$R = 2,870.00'$	
	$SE = 07$	
	$RO = SEE PLANS$	



■ PAVED SHOULDER
NOTE: FOR -L- PROFILE, SEE SHEET 19

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\$\$\$\$\$DISPERM\$\$\$\$\$

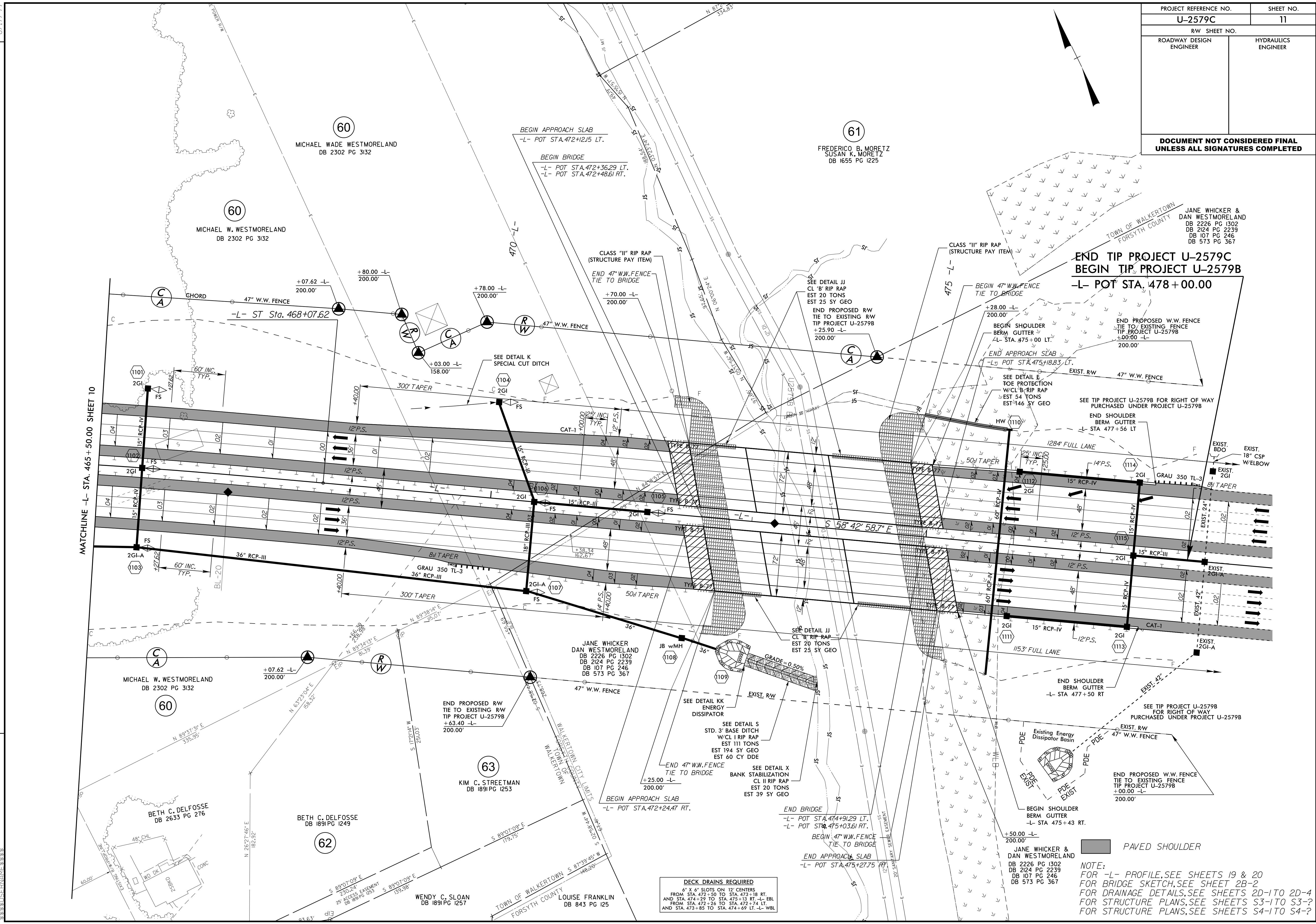
PROJECT REFERENCE NO.	SHEET NO.
U-2579C	11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



**END TIP PROJECT U-2579C
BEGIN TIP PROJECT U-2579B**
-L- POT STA. 478+00.00

JANE WHICKER &
DAN WESTMORELAND
DB 2226 PG 1302
DB 2124 PG 2239
DB 107 PG 246
DB 573 PG 367

REVISIONS



MATCHLINE -L- STA. 465+50.00 SHEET 10

DECK DRAINS REQUIRED
4" X 6" SLOTS ON 12' CENTERS
FROM STA. 472+50 TO STA. 473+18 RT.
AND STA. 474+29 TO STA. 475+13 RT. -L- EBL
FROM STA. 472+28 TO STA. 472+74 LT.
AND STA. 473+85 TO STA. 474+69 LT. -L- WBL

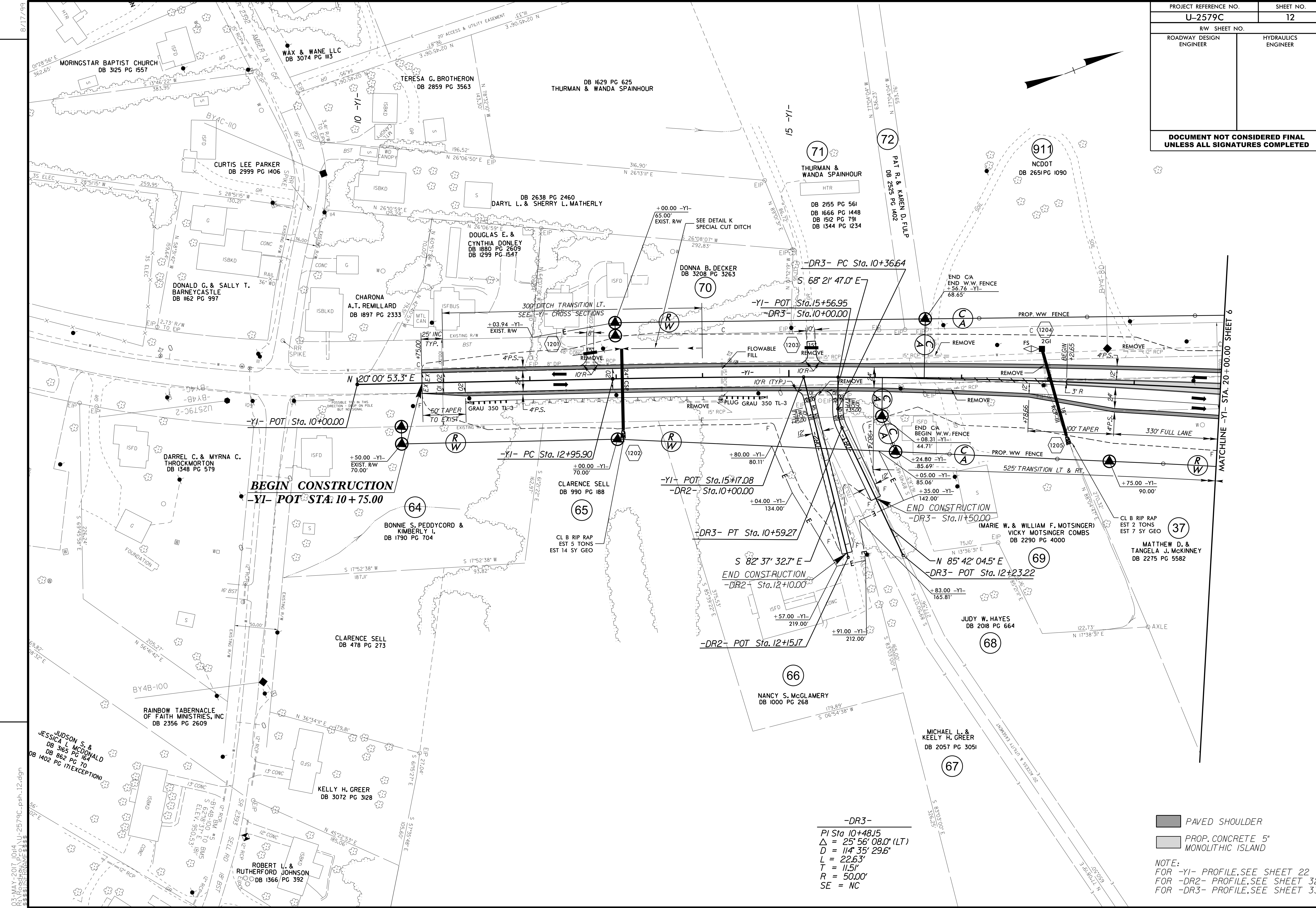
NOTE:
FOR -L- PROFILE, SEE SHEETS 19 & 20
FOR BRIDGE SKETCH, SEE SHEET 2B-2
FOR DRAINAGE DETAILS, SEE SHEETS 2D-1 TO 2D-4
FOR STRUCTURE PLANS, SEE SHEETS S3-1 TO S3-2
FOR STRUCTURE PLANS, SEE SHEETS S4-1 TO S4-2

24-MAY-2017 10:44
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JANIS RAMSEY

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

RIGHT OF WAY REVISION 5/3/17 - REVISED TCE ON PARCEL 67; ADDED TCE ON PARCEL 68. JMB



-DR3-
 PI Sta 10+48.15
 $\Delta = 25^{\circ} 56' 08.0''$ (LT)
 $D = 114' 35'' 29.6''$
 $L = 226.3'$
 $T = 11.5'$
 $R = 50.00'$
 $SE = NC$

PAVED SHOULDER
 PROP. CONCRETE 5' MONOLITHIC ISLAND

NOTE:
 FOR -YI- PROFILE, SEE SHEET 22
 FOR -DR2- PROFILE, SEE SHEET 32
 FOR -DR3- PROFILE, SEE SHEET 33

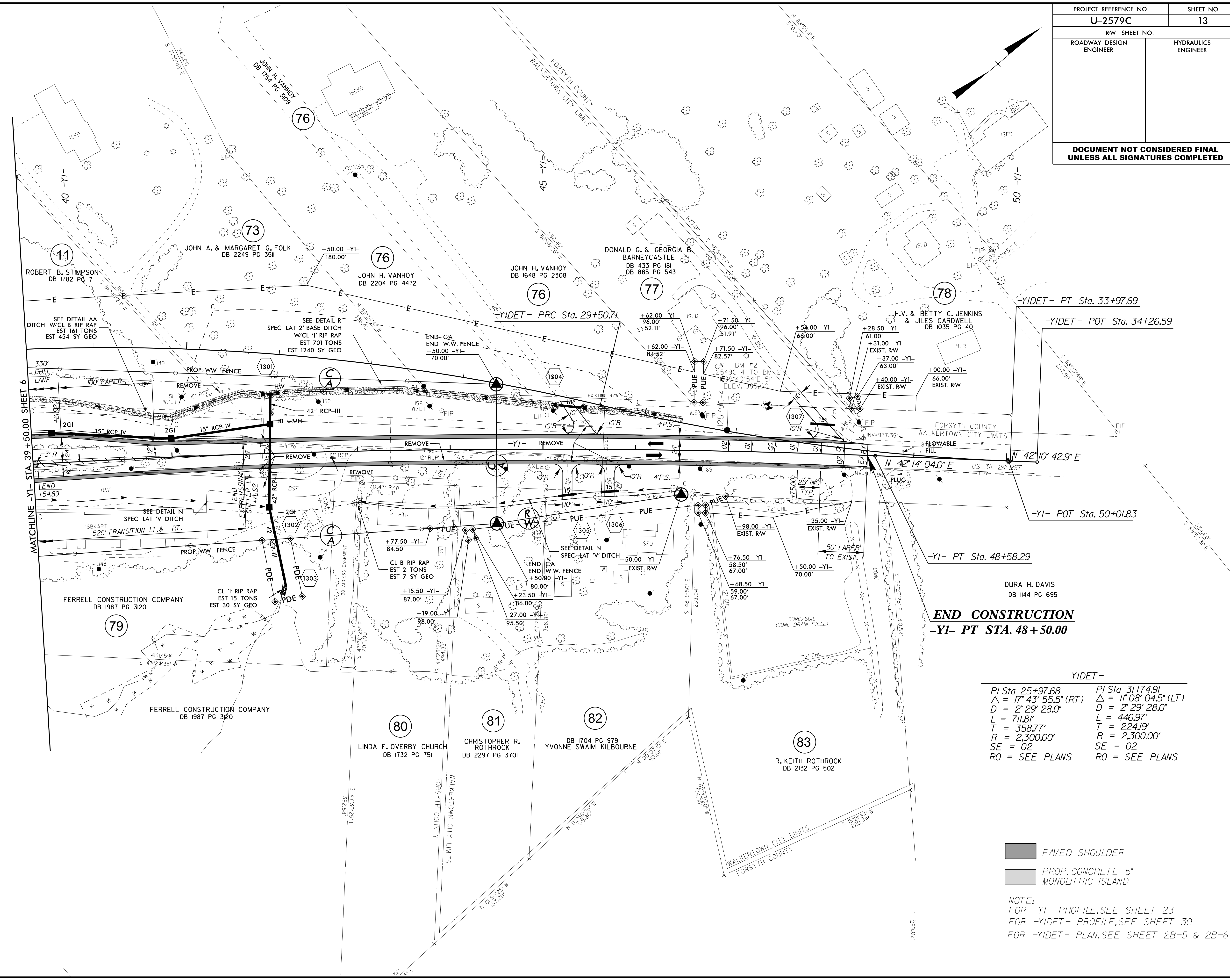
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 3:38:58 PM JMB

PROJECT REFERENCE NO.	SHEET NO.
U-2579C	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

RIGHT OF WAY REVISION 7/26/2016 - COMBINED PARCELS 74, 75, AND 76 INTO ONE PARCEL 76. ADDED OWNER NAME TO PARCEL EAST OF PARCEL 79. JMB

REVISIONS

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END CONSTRUCTION
-YI- PT STA. 48+50.00

YIDET -	
PI Sta 25+97.68	PI Sta 31+74.91
$\Delta = 17^{\circ} 43' 55.5''$ (RT)	$\Delta = 1^{\circ} 08' 04.5''$ (LT)
D = 2' 29' 28.0"	D = 2' 29' 28.0"
L = 711.8'	L = 446.9'
T = 358.77'	T = 224.19'
R = 2,300.00'	R = 2,300.00'
SE = 02	SE = 02
RO = SEE PLANS	RO = SEE PLANS

- PAVED SHOULDER
- PROP. CONCRETE 5' MONOLITHIC ISLAND

NOTE:
FOR -YI- PROFILE, SEE SHEET 23
FOR -YIDET- PROFILE, SEE SHEET 30
FOR -YIDET- PLAN, SEE SHEET 2B-5 & 2B-6

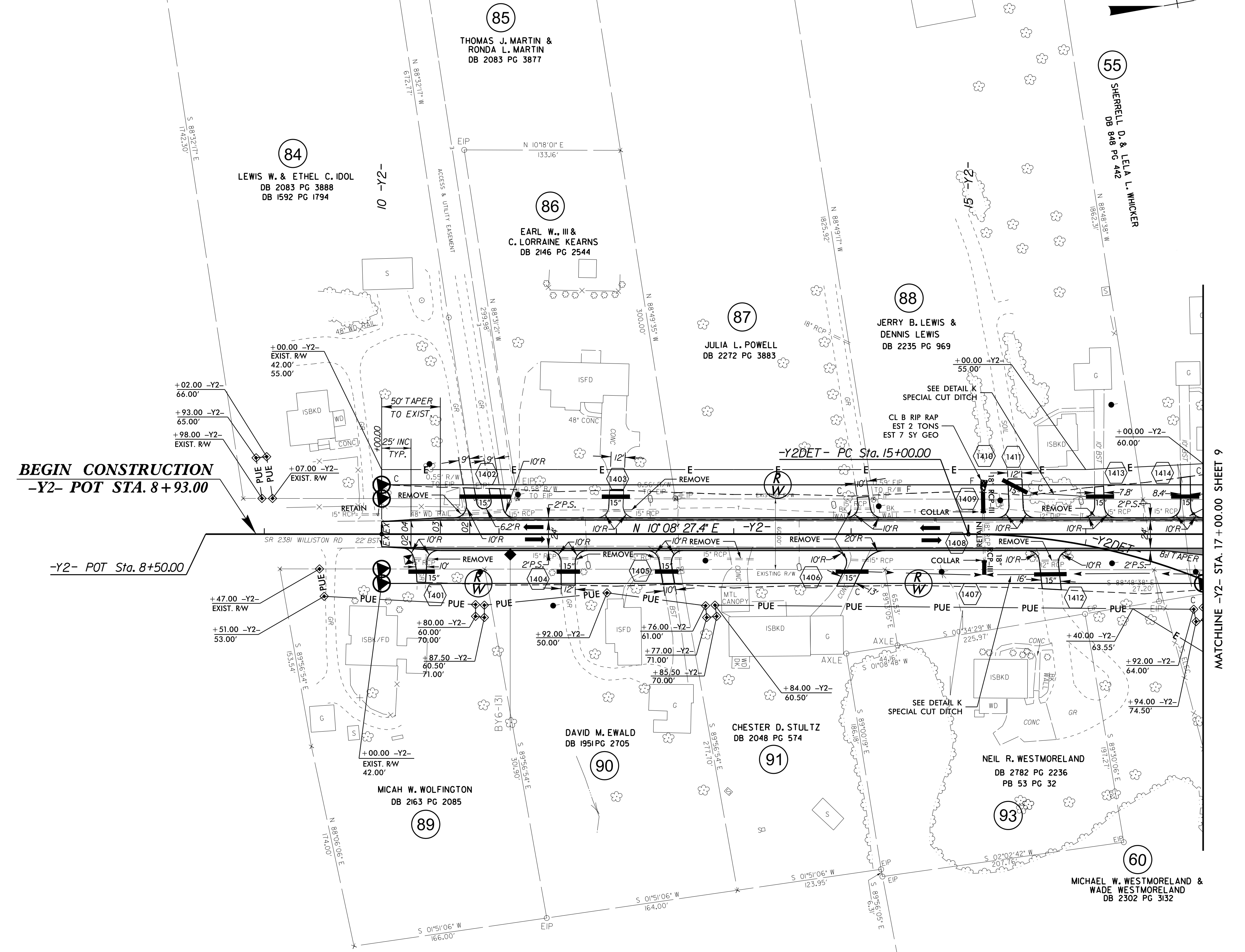
PROJECT REFERENCE NO.	SHEET NO.
U-2579C	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

8/17/99

REVISIONS

RIGHT OF WAY REVISION 5/3/17 - ADDED TCE ON PARCEL 60, JMB
RIGHT OF WAY REVISION 5/8/17 - REVISED PUE ON PARCEL 84, JMB

08-MAY-2017 09:24
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-Y2DET-
PI Sta 16+27.78
 $\Delta = 26' 57' 47.4" (RT)$
 $D = 10' 44' 58.8"$
 $L = 250.83'$
 $T = 127.78'$
 $R = 533.00'$
 $SE = RC$

PAVED SHOULDER

NOTE:
FOR -Y2- PROFILE, SEE SHEET 29
FOR -Y2DET- PLAN, SEE SHEET 2B-7
FOR -Y2DET- PROFILE, SEE SHEET 31