PROJECT COMMITMENTS

T.I.P. Project No. U-2579 D,E,F
Winston-Salem Northern Beltway
Forsyth County
Federal-Aid Project No. NHF-0918 (93)
WBS No. 34839.2.10

All commitments developed during the project development and design phase have been incorporated into the design. Current status, changes, or additions to the project commitments as shown in the environmental document for the project are printed in *italic black* font; for the purpose of this consultation, all commitments, which are not pertinent to U-2579 Section DEF have been grayed out.

PDEA, Roadway Design, Division 9:

1. Archaeological site 31FY570**, a historic cemetery, will require avoidance or compliance with North Carolina General Statute, Chapter 70.

   This commitment will be fulfilled at final design and during construction

2. Temporary construction easements may be needed on the historic Clayton Family Farm property. It has been determined that these temporary easements do not constitute a use under Section 4(f). No permanent right of way will be acquired from the Clayton Family Farm property. All work will be contained in temporary easements, and the encroachment on the property will be minimal. The duration of the temporary encroachment on the Clayton Family Farm property will be shorter than the timeframe for the construction of the project. The land temporarily occupied from the Clayton Family Farm will be fully restored, that is, the Clayton Family Farm property will be returned to a condition that is at least as good as that which existed prior to the project.

   Based on the preliminary plans, temporary easement is required. This commitment will be fulfilled during right of way acquisition and construction.

3. Eligibility of Site 3lFY64 is unknown because archaeologists were denied access to the property. If the site falls within the Preferred Alternative after final design, an assessment would be conducted prior to construction after it is acquired by NCDOT. Currently, the site is adjacent to non-preferred Detailed Study Alternative segment E3.

   This commitment will be fulfilled during right of way acquisition.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

4. A design noise study will be prepared for the selected alternative. The date of public knowledge for noise abatement purposes is the date the Record of Decision (ROD) is signed. Projects let for construction on or after July 13, 2011 shall be reviewed under NCDOT 2011 noise analysis criteria; however, the original date of public knowledge shall remain unchanged.

Action: *The ROD was signed in February 2008. Design Noise Reports based upon preliminary design were completed for U-2579 AB, B &C in 2009. A Revised Design Noise Report based upon final design was completed for U-2579B and approved by FHWA in 2014. A Revised Design Noise Report based upon final design will be completed for U-2579C in 2015. Revised Design Noise Reports based upon final design of U-2579AA and AB will be completed prior to Project Letting scheduled for October 2021. All Design Noise Reports are subject to approval by NCDOT and FHWA. The original Date of Public Knowledge of February 15, 2008 will remain unchanged for all sections of U-2579. A revised DNR will be prepared in 2015 for U-2579C under the NCDOT 2011 noise abatement criteria.*

Update 3/28/2017 regarding U-2579C – A DNR for U-2579C was completed in July 2016 under the 2011 NCDOT Traffic Noise Abatement Policy. An Addendum to the DNR will be prepared in 2017 to reflect additional changes that have occurred during the final design process.

The design noise study for the Project R-2247 portion of the Beltway will include an evaluation of Ronald Reagan High School.

*6. The NCDOT will develop Data Recovery Plans (DRP) for Sites 3lFY888, 31FY893**, 31FY901, 31FY902**, 31FY903, 31FY910**, 31FY911 **, 31FY9l2**, 31FY921, 31FY925**, 3lFY944, 31FY1053/l053**, all of which will be affected by the subject project, in consultation with the North Carolina SHPO.

Data Recovery Plan will be developed and implemented after design is completed and Right-of-Way is acquired.

*7. The NCDOT will ensure that each DRP is implemented after Right-of-Way is acquired or once Right-of-Entry is secured from the property owners and prior to construction activities within the site location as shown in the DRP.

Data Recovery Plan will be developed and implemented after design is completed and Right-of-Way is acquired.

*8. As they are developed, each individual DRP will be forwarded for review by the SHPO.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

This commitment will be fulfilled after the completion of the DRP.

*9. Upon completion of each Data Recovery effort, the NCDOT will prepare and forward a Management Summary to the SHPO detailing the results of the Data Recovery field investigations. The Management Summary will contain sufficient information to demonstrate that the field investigation portion of the DRP has been implemented.

This commitment will be fulfilled after the completion of each data recovery effort.

*10. Upon receipt of the Management Summary, the SHPO will respond within ten (10) days to the recommendations contained within the document.

This commitment will take place after the completion of the DRP.

*11. Upon acceptance of the recommendations contained in the Management Summary, the SHPO will issue the NCDOT documentation that the Data Recovery field investigations have been completed.

This commitment will be fulfilled after the completion of the DRP.

*12. The analysis and report preparation, detailing Sites 31FY888, 31FY893**, 31FY90l, 31FY902**, 31FY903, 31FY91O**, 31FY9ll **, 31FY9l2**, 31FY92l, 31FY925**, 31FY944, 31FY1053/l053** will be completed by the NCDOT, or their consultants, within twenty-four (24) months after completion of each site's fieldwork schedule.

This commitment will be fulfilled after the completion of the DRP.

Roadway Design, Division 9, Right of Way Branch:

*1. In the vicinity of Alexander Hege House, NCDOT in consultation with SHPO will determine the extent of control-of-access fencing, as well as its type, material, and finish. NCDOT will purchase and then install the control-of-access fencing within the NCDOT right-of-way. NCDOT will maintain the control-of-access fencing.

Roadway Design, Utility Unit, Division 9, Right of Way Branch, GeoEnvironmental:

1. NCDOT will continue to work with residents of affected communities to develop mitigation strategies for community impacts. The following options will be considered during final design to minimize impacts to communities/subdivisions: construction of noise abatement barriers landscaping or vegetative screens based on NCDOT policies and guidelines. These types of options already have been incorporated into the Project R-2247, Project U-2579, and Project U-2579A preliminary engineering designs where practicable, but will be further considered

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

during final design.

Action: The final designs are completed; the above commitments have been addressed.

2. During final design for Projects R-2247, U-2579, and U-2579A, all utility providers and railroad operators would be coordinated with to ensure that the proposed design and construction of the project would not substantially disrupt service.

   This is a standard commitment.

3. The development of this project will be further coordinated with the City of Winston Salem and Forsyth County Parks and Recreation Departments to minimize any conflicts with future parks and greenways planning. Provisions will be considered to maintain the future viability of any impacted proposed greenways.

   Action: Roadway Design coordinated with the city of Winston Salem and avoided any impacts to greenways.

4. NCDOT will coordinate with the NCDENR Division of Waste Management regarding the Reynolds Auto Junkyard and other solid waste sites along the selected alternatives for Projects R-2247, U-2579, and U-2579A. Impacted sites will be remediated as required.

   Action: The GeoEnvironmental Section of the Geotechnical Engineering Unit will coordinate with the Right of Way Branch to provide acquisition recommendations for potentially contaminated parcels. This coordination will occur prior to the parcel being acquired. Prior to construction the GeoEnvironmental Section will also coordinate with the NCDENR Division of Waste Management to address contaminated soil and ground water that may be encountered during construction.

5. NCDOT will consider wildlife crossings where appropriate in the vicinity of stream crossings, which will allow animals to cross under the Beltway.

   Action: No special wildlife crossings are proposed. Opportunities for wildlife to cross exist along streams under bridges and through culverts. Also, small wildlife can use floodplain drains which are provided in the B and C projects.

6. NCDOT will coordinate with the Town of Kernersville regarding the compatibility of the Beltway design with the proposed Big Mill Farm Road interchange at US 421. This coordination will take place once all relevant design information has been obtained regarding the design of the Big Mill Farm Road interchange.

   Action: Roadway Design coordinated and will continue to coordinate until project completion.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

7. NCDOT intends to maintain a connection from Northampton Road to Old Walkertown Road. The final design will be developed based on design constraints and cost considerations.

   Action: Current connection will be maintained.

**8. NCDOT will align the Alexander Hege House driveway opposite the new intersection ramp, so property access will be under full traffic control. This will allow NCDOT and the property owner full movement for equipment and trucks.*

Hydraulics Unit:

1. All bridges and culverts located in designated FEMA flood zones will be designed such that an increase in flood elevation would not exceed the lesser of 0.5 foot for the 100-year flood event or the elevation needed to protect structures.

   Action: This commitment has been fulfilled.

2. The Hydraulics Unit will coordinate with the NC Floodplain Mapping Program (FMP), to determine status of project with regard to applicability of NCDOT'S Memorandum of Agreement, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR).

   The Hydraulics Unit will continue coordinate with the NC Floodplain Mapping Program (FMP) until project completion.

3. NCDOT will avoid installing bridge bents in creeks to the maximum extent practicable.

   Action: This commitment has been fulfilled and no bridge bents are located in creeks.

Roadside Environmental, Division 9:

1. During design and construction, efforts will be made to minimize the impact to existing vegetative buffers and natural areas. NCDOT will prepare a post construction landscape design/corridor plan to mitigate construction impacts and integrate enhancements, while remaining sensitive to the environment and to the safety of the traveling public.

   This is standard commitment; post construction plans will be prepared.

2. NCDOT will incorporate sediment and erosion control measures according to the Design Standards in Sensitive Watersheds for all construction in high quality water (HQW) zones in compliance with 15a NCAC 04B.0124.

   Action: There are no qualifying factors present at this section.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

*3 NCDOT will provide tree protection measures along the National Register boundary lines adjoining project construction areas. NCDOT will exercise best management practices to minimize, as practicable, tree trimming and disturbance of existing plantings along the National Register boundary.

Action: NCDOT will implement this commitment as described in the concurrence form with SHPO. Properties listed are Alexander Hege House, Samuel Stauber House & Barn John Henry Kapp Farm, Clayton Family Farm Seaver's Gas Station, Hammock Family Farm And John & Charles Fries Day Farm.

Roadway, Hydraulics:

Generally, 2:1 slopes will be used where possible to minimize culvert length, and NCDOT will shorten culvert lengths where possible and daylight systems between culverts where possible in interchange areas.

Action: The current plans show side slopes near streams and wetlands are mostly 2:1 to minimize impact.

Right of Way Branch:

1. NCDOT will work with the property owner of Walker Mobile Home Park off of Bethania-Tobaccoville Road to determine the feasibility of relocating the homes to another area of the parcel.

   This commitment will take place after design is complete and during Right of Way acquisition.

2. NCDOT will contact the pastor of Mount Pleasant Holiness Church prior to the public hearing and will, if desired, meet with the pastor and members of the church to discuss the impact of Project U-2579 on the church, NCDOT relocation policies, and potential mitigation.

   Action: Since the 2004 SFEIS/SDEIS, NCDOT and consultant staff met with the Pastor and members of Mount Pleasant Holiness Church during the 2005 Public hearings. The church representatives declined to attend an Additional meeting regarding this project or impacts of the Northern Beltway on the church.

3. NCDOT will contact minority residents of North Oaks subdivision prior to the public hearing and will, if desired, meet with them to discuss the impacts of Project U-2579 on the community, NCDOT relocation policies, and potential mitigation.

   Action: NCDOT and consultant staff met with North Oaks community on

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

November 15, 2004.

Division 9, Construction Unit:

A pre-construction survey will be done in areas of possible concern regarding structural damage to assess a pre-construction condition.

This commitment will be done prior to initiation of construction.

Division 9:

1. During construction for Project U-2579AB, NCDOT will coordinate with the Forsyth County School Board to ensure the safety of those students bicycling and/or walking to Sedge Garden Elementary School. If a portion of school property is needed for a temporary construction easement, that area will be fenced to keep school children out of the construction site. The school property will be restored following construction.

   This commitment will be implemented during construction.

2. NCDOT will coordinate with local media during the construction of the project to alert the public of traffic restrictions and construction related activities.

   This commitment will be implemented during construction

3. NCDOT shall not approve any new driveway permits along the property of the historic John Henry Kapp Farm within the right of way for the Preferred Alternative. This condition shall be filed in the NCDOT Division office responsible for driveway permits.

   This commitment will be implemented as described in the concurrence form with SHPO, during construction of the project.

4. This project involves construction activities on or adjacent to FEMA-regulated stream(s). Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structure(s) and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

   This commitment will be fulfilled after the completion of the project.

PDEA-NES:

The biological conclusion for the Northern long-eared bat is Unresolved. Construction authorization will not be requested until ESA compliance is satisfied for the northern long-eared bat.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

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.*

COMMITMENTS FROM PERMITTING

Design Build Team:

401 WQC Project Specific Condition No. 3: The pond drainage plan for Site 14A provided to NCDOT by the design build team shall be forwarded to NCDWR for review prior to dewatering. [15A NCAC 02H.0506(b)(2)]

401 WQC Project Specific Condition No. 4: Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or stream beds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that equilibrium is being maintained if requested in writing by NCDWR. Table 5 below summarizes approved culvert burial practices as described in the permit modification application. [15A NCAC 02H.0506(b)(2)]

Table 5. Pipe invert burial depths for U-2579 D, E & F*.

Site	Location	Burial Depth (feet)
19	279+30-L-	1.0
27	356+07-L-	1.0

*All other pipe locations as described in the permit modification application do not require burial.

*** Commitments marked by an asterisk (*) are taken from the Memorandum of Agreement between SHPO, NCDOT, and FHWA regarding addressing the Adverse Effects to historic resources.**

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS
69 DARLINGTON AVENUE
WILMINGTON, NORTH CAROLINA 28403-1343

March 04, 2019

Regulatory Division/1200A

Action ID: SAW-2017-02112, NC DOT U-2579, D, E, & F, (to include U 2579 C, Phase 2, Sites 1-2), Winston-Salem Northern Beltway, from US 52 to US 311 (New Walkertown Road), Individual Permit issued January 22, 2018

Mr. Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head
North Carolina Department of Transportation
Division of Highways
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Reference the Department of the Army (DA) permit issued on January 22, 2018, to the North Carolina Department of Transportation, (NC DOT) for impacts associated with the new location project identified as U-2579 C, Phase 2 and U 2579 D, E, & F. The project is a 6.95 miles, six-lane, divided facility, extending east from US 52 to US 311, near Winston Salem, Forsyth County, North Carolina. Coordinates (in decimal degrees) for the site are 36.1788° N, -80.2166° W. The project area contains unnamed tributaries to Mill Creek, Mill Creek, Trick-Um Creek, unnamed tributaries to Trick-Um Creek, an unnamed tributary to Ogburn Branch, Buffalo Creek, Rough Fork, unnamed tributaries to Rough Fork, unnamed tributaries to Frazier Creek, and sixteen (16) wetland areas in the Yadkin & Roanoke River Basins (8-Digit Cataloging Units 03040101 and 03010103, respectively). Also reference the North Carolina Department of Environmental Quality Water Quality Certification # 004131, dated December 21, 2017.

Impacts authorized by the January 2018 phased standard permit included preliminary designs for U 2579 D, E & F. On January 9, 2019, the U.S. Army Corps of Engineers (Corps) received a request from NC DOT to modify the phased standard permit, SAW No. 2017-02112, to include the final design impacts for the U 2579 D, E and F segments, and to include two previous permitted sites from U 2579 C, Phase 2, within this permit modification. These sites were previously referred to as Sites 1 & 2, and they were originally permitted under SAW No. 2017-02112. These sites are now Sites 28 & 29 (for Site 1) and Site 30 (for Site 2) and have been modified (See enclosed Permit Modification Impact Sheets 80-89 of 97, dated December 18, 2018).

These modifications to the above phased standard permit are for the following impacts: 1) the permanent placement of fill material into 13,578 linear feet of jurisdictional stream channel (13,090 linear feet of permanent loss and 488 linear feet of bank stabilization/pipe removal), 608 linear feet of temporary stream impacts associated with U 2579 D, E, & F, and U 2579 C Phase 2 (Sites 1-2 or Sites 28 – 30). Permanent impacts to wetlands total 1.66 acres of fill, excavation and mechanized clearing. There are no temporary wetland impacts for the above requested modification. These final design modifications have resulted in less impacts to waters of the U.S. than originally permitted on January 22, 2018. (This modification is for 830 linear feet of permanent stream channel less than permitted and 0.22 acres of permanent wetland impact less than permitted for U 2579 DEF; and is for 231 linear feet of permanent stream channel less than permitted for U 2579 C Phase 2, Sites 1-2). In a letter dated February 5, 2018, the North Carolina Division of Mitigation Services, accepted responsibility for the compensatory mitigation for U 2579 C, Phase 2. Those mitigated impacts (streams and wetlands) will be subtracted from what is owed for U 2579D, E & F.

The Corps has completed the evaluation of your request and has determined that it is appropriate and reasonable, and no public notice is required for this modification. This decision had been transmitted to you in a letter dated February 27, 2019, however inaccurate impact amounts were reflected in the letter. Please allow this corrected correspondence to supersede the February 27th letter. As such, the permit is modified as requested and shown in the enclosed "U-2579DEF: PERMIT MODIFICATION PACKAGE," Sheets 1-97, dated December 18, 2018.

For your information, the following special conditions from the original authorization have been updated to include the new compensatory mitigation requirements and the new modified plan set (it is understood that condition 25 below has been completed):

1. Construction Plans: All work authorized by this permit must be performed in strict compliance with the attached plans, entitled: "U-2579DEF: PERMIT MODIFICATION PACKAGE," Sheets 1-97, dated December 18, 2018. Any modification to these plans must be approved by the US Army Corps of Engineers (Corps) prior to implementation.

25. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined on the most recent version of the attached Compensatory Mitigation Responsibility Transfer Form. The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

This correspondence contains a proffered modified permit for the above described project. If you object to this decision, you may request an administrative appeal under Corps regulations at 33 CFR part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this decision you must submit a completed RFA form to the following address:

District Engineer, Wilmington Regulatory Division
Attn: Nicholle Braspennickx
69 Darlington Avenue
Wilmington, North Carolina 28403

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by April 3, 2019.

It is not necessary to submit an RFA form to the Division Office if you do not object to the decision in contained in this correspondence.

All other conditions of the permit, including the permit expiration date of December 31, 2028, remain in effect as written. Should you have questions, contact Ms. Nicholle Braspennickx, Charlotte Regulatory Field Office, via email at Nicholle.M.Braspennickx@usace.army.mil or by telephone at (704) 510-0162.

FOR THE COMMANDER

Sincerely,

Robert J. Clark
Colonel, U.S. Army
District Commander

Enclosures:

1. Permit Impact Sheets 1-97, dated December 18, 2018
2. Compensatory Mitigation Responsibility Transfer Form
3. Notification of Administrative Appeal Options Process
4. Request for Appeal Form

Copies Furnished w/o enclosures:

Mr. Dave Wanucha
Transportation Permitting Unit
Division of Water Resources
North Carolina Department of
Environment and Natural Resources
450 West Hanes Mill Rd., suite 300
Winston-Salem, North Carolina 27105

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

Ms. Clair Ellwanger
U.S. Fish and Wildlife Services
Asheville Ecological Service Field Office
160 Zillicoa Street
Asheville, North Carolina 28801

Mr. Todd Bowers
Oceans, Wetlands and Streams Protection Branch
Wetlands and Streams Regulatory Section
U.S. Environmental Protection Agency-Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, Georgia 30303-8931

Ms. Marla Chambers
Division of Inland Fisheries
North Carolina Wildlife Resources Commission
7121 Mail Service Center
Raleigh, North Carolina 27699-1721

Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation **Action ID:** SAW No. 2017-02112
Project Name: U 2579D, E, F Winston-Salem Northern Beltway **County:** Forsyth

Instructions to Permittee: The Permittee must provide a copy of this form to the Mitigation Sponsor, either an approved Mitigation Bank or the North Carolina Division of Mitigation Services (NCDMS), who will then sign the form to verify the transfer of the mitigation responsibility. Once the Sponsor has signed this form, it is the Permittee's responsibility to ensure that to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

Instructions to Sponsor: The Sponsor must verify that the mitigation requirements (credits) shown below are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether or not they have received payment from the Permittee. Once the form is signed, the Sponsor must update the bank ledger and provide a copy of the signed form and the updated bank ledger to the Permittee, the USACE Project Manager, and the Wilmington District Mitigation Office (see contact information on page 2). The Sponsor must also comply with all reporting requirements established in their authorizing instrument.

Permitted Impacts and Compensatory Mitigation Requirements

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03040101, Yadkin River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
4302 l.f.				0.04 acres		

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03040101, Yadkin River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
6607 l.f.				0.08 acres		

Permitted Impacts Requiring Mitigation*: **8-digit HUC and Basin:** 03010103, Roanoke River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
7319 l.f.				1.05 acres		

*If more than one mitigation sponsor will be used for the permit, only include impacts to be mitigated by this sponsor.

Compensatory Mitigation Requirements: **8-digit HUC and Basin:** 03010103, Roanoke River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
12492 l.f.				2.10 acres		

U.S. ARMY CORPS OF ENGINEERS
Wilmington District

Mitigation Site Debited: NCDMS
(List the name of the bank to be debited. For umbrella banks, also list the specific site. For NCDMS, list NCDMS. If the NCDMS acceptance letter identifies a specific site, also list the specific site to be debited).

Permittee: North Carolina Department of Transportation **Action ID:** SAW No. 2017-02112
Project Name: U 2579D, E, F Winston-Salem Northern Beltway **County:** Forsyth

Section to be completed by the Mitigation Sponsor

Statement of Mitigation Liability Acceptance: I, the undersigned, verify that I am authorized to approve mitigation transactions for the Mitigation Sponsor shown below, and I certify that the Sponsor agrees to accept full responsibility for providing the mitigation identified in this document (see the table above), associated with the USACE Permittee and Action ID number shown. I also verify that released credits (and/or advance credits for NCDMS), as approved by the USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: NCDEQ DMS

Name of Sponsor's Authorized Representative: Beth Harmon

Beth Harmon — 02/28/2019

Signature of Sponsor's Authorized Representative **Date of Signature**

Conditions for Transfer of Compensatory Mitigation Credit:

- Once this document has been signed by the Mitigation Sponsor and the USACE is in receipt of the signed form, the Permittee is no longer responsible for providing the mitigation identified in this form, though the Permittee remains responsible for any other mitigation requirements stated in the permit conditions.
- Construction within jurisdictional areas authorized by the permit identified on page one of this form can begin only after the USACE is in receipt of a copy of this document signed by the Sponsor, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein. For authorized impacts conducted by the North Carolina Department of Transportation (NCDOT), construction within jurisdictional areas may proceed upon permit issuance; however, a copy of this form signed by the Sponsor must be provided to the USACE within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the USACE has received this form, confirming that the Sponsor has accepted responsibility for providing the mitigation requirements listed herein.
- Signed copies of this document must be retained by the Permittee, Mitigation Sponsor, and in the USACE administrative records for both the permit and the Bank/ILF Instrument. It is the Permittee's responsibility to ensure that the USACE Project Manager (address below) is provided with a signed copy of this form.
- If changes are proposed to the type, amount, or location of mitigation after this form has been signed and returned to the USACE, the Sponsor must obtain case-by-case approval from the USACE Project Manager and/or North Carolina Interagency Review Team (NCIRT). If approved, higher mitigation ratios may be applied, as per current District guidance and a new version of this form must be completed and included in the USACE administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions: This is for U 2579 D, E & F Winston-Salem Northern Beltway only.

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 3331 Heritage***

U.S. ARMY CORPS OF ENGINEERS

Wilmington District

Trade Drive, Suite 105, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil). Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Nicholle Braspennickx
USACE Field Office: US Army Corps of Engineers
c/o Asheville Regulatory Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

Email: Nicholle.M.Braspennickx@usace.army.mil

BRASPENNICKX.NICHOLLE.M.1229304590 Digitally signed by BRASPENNICKX.NICHOLLE.M.1229304590 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=BRASPENNICKX.NICHOLLE.M.1229304590 Date: 2019.02.27 11:55:54 -05'00'

USACE Project Manager Signature

February 27, 2019
Date of Signature

Current Wilmington District mitigation guidance, including information on mitigation ratios, functional assessments, and mitigation bank location and availability, and credit classifications (including stream temperature and wetland groupings) is available at http://ribits.usace.army.mil.

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

February 7, 2019

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

Subject: **Modification to 401 Water Quality Certification** Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed Winston Salem Northern Beltway from I-40 to US 52 (TIP Nos. R-2247B Phase 2, CA, CB, CD, D, EA, EB, and EC); and from US 52 to US 311 north (U-2579C Phase 2, D, E, and F); and, from I-40 Business to US 311 South (U-2579AA, and AB) in Forsyth County. Federal Aid Project No. NHP-0074(213); WBS 34839.3GV7. NCDWR Project No. 19980260 v3.

Dear Mr. Harris:

Attached hereto is a copy of Certification No. WQC004131 for TIP U-2579 Sections D, E and F with revisions to Section C-Phase 2 issued to The North Carolina Department of Transportation (NCDOT) dated February 7, 2019.

The original Certification was dated October 12, 1998. A new application was received on October 2, 2017 for a phased project. The phased permit was issued on November 14, 2017, revised on November 27, 2017 and revised again on December 21, 2017.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

Linda Culpepper, Director
Division of Water Resources

Attachments

Electronic copy only distribution:
Nicholle Braspennickx, US Army Corps of Engineers, Charlotte Field Office
Amy Euliss, Division 9 Environmental Officer
Carla Dagnino, NC Department of Transportation
Chris Militscher, US Enviro mental Protection Agency
Marella Buncick, US Fish and Wildlife Service
Marla Chambers, NC Wildlife Resources Commission
Beth Harmon, Division of Mitigation Services
File Copy

401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact an additional 1.66 acres of jurisdictional wetlands, 3.06 acres of open water (pond) and 14,186 linear feet (including permanent, temporary and bank stabilization impacts) of jurisdictional streams in Forsyth County. The project shall be constructed pursuant to the modification dated January 7, 2019. The authorized impacts are as described below:

Table 1. Stream Impacts in the Yadkin Pee Dee River Basin Section D of U-2579 D, E & F.

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
			Fill	Bank Stabilization		
15	520	15	0	0	0	0
16	152	0	361	0	20	361
17	0	0	928	0	23	928
18	161	11	0	0	0	0
19	0	0	341	0	26	341
20	0	0	35*	0	31	0
20A	0	0	0	16	21	0
20B	0	0	0	20	21	0
20C	0	0	0	0	165	0
21	0	0	133	10	10	0
22	0	0	97	0	7	0
23	0	0	348	26	21	348
24	120	10	0	0	0	0
25	294	10	0	0	0	0
26	0	0	519	24	20	519
27	0	0	328	72	20	328
32	0	0	0	172	19	0
34	0	0	0	24	11	0
Totals	**1,247**	**46**	**3,090**	**364**	**415**	**2,825**

* Pipe removal.

Table 2. Stream Impacts in the Yadkin Pee Dee and Roanoke River Basin Section E and F of U-2579 D, E & F and C-Phase 2.

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)		Temporary Fill in Perennial Stream (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
			Fill	Bank Stabilization		
6	0	0	824	0	7	824
7	266	0	0	0	0	0
8	215	0	703	0	19	703
9	154	0	632	14	0	632
10	0	0	364	0	13	364
11	0	0	615	0	0	615
12	0	0	410	0	10	410
13	0	0	337	0	22	337
14	0	0	220	0	11	0
31	57	0	0	0	0	0
33	0	0	20	0	21	0
Totals	**692**	**0**	**4,125**	**14**	**103**	**3,885**
Section F						
1	0	0	1522	20	0	1,522
2	0	0	86	0	0	0
3	0	0	120	0	0	0
4	0	0	132	0	0	0
5	0	0	642	0	10	642
Totals	**0**	**0**	**2,502**	**20**	**10**	**2,164**
Section C-Phase 2						
29	0	0	906	40	10	906
30	0	0	563	15	24	563
Totals	**0**	**0**	**1,469**	**55**	**34**	**1,469***

* Previously Site 1 in Section C-Phase 2, impacts of which were previously mitigated resulting in a surplus (refer to permit application).

Table 3. Wetland (Riverine) Impacts in the Yadkin Pee Dee and Roanoke River Basin U-2579 D, E & F and C-Phase 2.

Site	Fill (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
Section D				
15A	0.04	0	0	0.04
Total	**0.04**	**0**	**0**	**0.04**
Section E				
6A	0.11	<0.01	0.01	0.12
8A	<0.01	0	0	0.01
8B	0.51	0	0	0.51
10A	0.03	0	<0.01	0.03
10B	<0.01	0	0	0.01
11A	0.08	0	0	0.08
12A	0.08	0	0	0.08
13A	0.0	0	<0.01	0.01
Total	**0.82**	**0.01**	**0.02**	**0.85**
Section F				
1A	0.06	0	0	0.06
1B	0.07	0	0	0.07
1C	0.02	0	0	0.02
1D	<0.01	0	0	0.01
2A	0.01	0	0	0.01
5A	0.02	0	0	0.02
5B	<0.01	<0.01	0	0.01
Total	**0.19**	**<0.01**	**0**	**0.20**
Section C-Phase 2				
28*	0.26	0	0	0.26
29A*	<0.01	0	0	0.01
29B*	0.26	0.03	0.01	0.30
Total	**0.53**	**0.03**	**0.01**	**0.57**

* Previously Site 1 in Section C-Phase 2, impacts of which were previously mitigated (refer to permit application).

Table 4. Open Water (Pond) Impacts in the Yadkin Pee Dee River Basin U-2579 D, E & F.

Site	Permanent Fill in Open Waters (ac)	Temporary Fill in Open Waters (ac)
14A	3.06	0

The modification application provides adequate assurance that the discharge of fill material into the waters of the Yadkin Pee Dee and Roanoke River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your application for a modification dated January 7, 2019. All the authorized activities and conditions associated with the phased permit Water Quality Certification issued on November 14, 2017, revised on November 27, 2017 and revised again on December 21, 2017, still apply except where superseded by this certification.

Should your project change, you are required to notify NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 300 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Conditions

1. Compensatory mitigation for 10, 343 linear feet of impact to streams and 1.66 acres of wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated September 29, 2017 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the DMS Mitigation Banking Instrument signed July 28, 2010.

2. This approval is only valid for the purpose and design that you submitted in your application for a modification dated January 7, 2019. All the authorized activities and conditions associated with the phased permit Water Quality Certification issued on November 14, 2017, revised on November 27, 2017 and again on December 21, 2017, still apply except where superseded by this certification.

3. The pond drainage plan for Site 14A provided to NCDOT by the design build team shall be forwarded to NCDWR for review prior to dewatering. [15A NCAC 02H.0506(b)(2)]

4. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and downstream of the above structures. The applicant is required to provide evidence that equilibrium is being maintained if requested in writing by NCDWR. Table 5 below summarizes approved culvert burial practices as described in the permit modification application. [15A NCAC 02H.0506(b)(2)]

Table 5. Pipe invert burial depths for U-2579 D, E & F*.

Site	Location	Burial Depth (feet)
19	279+30 -L-	1.0
27	356+07 -L-	1.0

*All other pipe locations as described in the permit modification application do not require burial.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided that the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919) 431-3000, Facsimile: (919) 431-3100

A copy of the petition must also be served on DEQ as follows:

Mr. Bill F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center

This the 7th day of February 2019

DIVISION OF WATER RESOURCES

Linda Culpepper, Director

WQC No. 004131

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

NCDWR Project No.: _____ **County:** _____

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion
Upon completion of all work approved within the 401 Water Quality Certification or applicable Buffer Rules, and any subsequent modifications, the applicant is required to return this certificate to the 401 Transportation Permitting Unit, North Carolina Division of Water Resources, 1617 Mail Service Center, Raleigh, NC, 27699-1617. This form may be returned to NCDWR by the applicant, the applicant's authorized agent, **or** the project engineer. It is not necessary to send certificates from all of these.

Applicant's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date: _____

Agent's Certification

I, _____, hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

I, _____, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe (periodically, weekly, full time) the construction of the project for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the construction was observed to be built within substantial compliance and intent of the 401 Water Quality Certification and Buffer Rules, the approved plans and specifications, and other supporting materials.

Signature _____ Registration No. _____

Date _____

North Carolina Department of Environmental Quality | Division of Water Resources
512 North Salisbury Street | 1617 Mail Service Center | Raleigh, North Carolina 27699-1617
919.707.9000

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

General Project Information

WBS Element:	34839.3.GV7	**TIP Number:**	U-2579DEF	**Project Type:**	New Location
Date:	10/16/2018				

NCDOT Contact:	Craig J Lee, PE		**Contractor / Designer:**	Brian M Steffen, PE	
	Address:	1020 Birch Ridge Dr. Raleigh, NC 27610		**Address:**	555 Fayetteville St., Suite 900 Raleigh, NC 27601
	Phone:	919-707-6708		**Phone:**	919-232-6609
	Email:	cjlee@ncdot.gov		**Email:**	brian.steffen@hdrinc.com

City/Town:	Winston-Salem		**County(ies):**	Forsyth	
River Basin(s):	Yadkin-Pee Dee	Roanoke	**CAMA County?**	No	
Wetlands within Project Limits?	Yes				

Project Description

Project Length (lin. miles or feet):	6.95 miles	**Surrounding Land Use:**	Residential (Single Family)

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	189.0 ac.	43.0 ac.
Typical Cross Section Description:	6 lane divided freeway w/ an 18 foot grass median: (2) 12 foot outside paved shoulders, (3) 12 foot travel lanes, (2) 12 foot paved median shoulders - Total width of 146'	N/A - new alignment
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 60,200 Year: 2040	Existing: 34,000 Year: 2016

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

Project Description: The proposed project (U-2579DEF) is part of the future I-74 Winston-Salem Northern Beltway from west of NC 66/SR 4000 to US 311 and will construct approximately 7 miles of 6-lane divided highway in new location. The project includes 3 major interchanges: University Parkway, Germantown Rd., and Baux Mountain Rd. There are 8 proposed single barrel culvert crossings on the project at Rough Fork, Trick-um Creek, 5 Unnamed Tributaries to Mill Creek, an unnamed tributary to Frazier Creek, and one supplemented existing triple barrel culvert crossing at Mill Creek. The project includes one major bridge crossing over Mill Creek. Pipe culverts will be used to convey all other jurisdictional stream crossings through the project. Wetlands are also located throughout the length of the entire project.

Impact Minimization Efforts: Guardrail with 2:1 slopes were utilized throughout the project to minimize surface water impacts to streams and wetlands. Ditches and pipes that outlet adjacent to wetlands have been designed to have non-erosive velocities to help protect the existing wetlands.

Stormwater BMP Measures: Stormwater control measures such as dry dentention and energy dissipator basins were proposed at specific locations along the project. The Design-Build Team has designed ditches to achieve grass swale credit

Waterbody Information

Surface Water Body (1):	Rough Fork	**NCDWR Stream Index No.:**	22-25-5-2
NCDWR Surface Water Classification for Water Body	**Primary Classification:**	Class C	
	Supplemental Classification:	None	
Other Stream Classification:	None		
Impairments:	None		
Aquatic T&E Species?		Comments:	
NRTR Stream ID:	ES-S1, ES-S2, ES-S3, ES-S67, ES-S65	**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)					

WBS Element: 34839.3.GV7 **TIP No.:** U-2579DEF **County(ies):** Forsyth

Additional Waterbody Information

Surface Water Body (2):	Trick-um Creek		**NCDWR Stream Index No.:**	22-25-5-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?		Comments:				
NRTR Stream ID:	ES-S4, ES-S5, ES-S6			**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):	Ogburn Branch		**NCDWR Stream Index No.:**	12-94-7-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?		Comments:				
NRTR Stream ID:	ES-S59, ES-S60			**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 (4):	Buffalo Creek		**NCDWR Stream Index No.:**	22-25-5		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?		Comments:				
NRTR Stream ID:	ES-S7, ES-8, ES-S9, ES-S62			**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 (5):	Mill Creek		**NCDWR Stream Index No.:**	12-94-7		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?		Comments:				
NRTR Stream ID:	ES-S10, ES-S11, ES-S13, ES-S26, ES-S27, ES-S48, ES-S52, ES-S58			**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)						

WBS Element:	34839.3.GV7	TIP No.:	U-2579DEF	County(ies):	Forsyth	Page	3	of	17

Additional Waterbody Information

Surface Water Body (6):	Grassy Creek		**NCDWR Stream Index No.:**	12-94-7-3			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?		Comments:					
NRTR Stream ID:	N/A			**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 (7):	Frazier Creek		**NCDWR Stream Index No.:**	Frazier Creek			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?		Comments:					
NRTR Stream ID:	N/A			**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)							

WBS Element: 34839.3.GV7 **TIP No.:** U-2579DEF **County(ies):** Forsyth

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
5	-Y1RPD- 19+75 RT 36.204277/-80.277437	(1)Rough Fork	0.0	6.0	4.0	0.3	34	63	2.00%	0.9	1.6	1.1	1.7	No	No
5	-Y1- 22+98 RT 36.207540/-80.281904	(1)Rough Fork	0.0	6.0	6.0	0.3	34	188	1.00%	0.9	1.4	1.1	1.4	No	No
5	-Y1- 28+00 RT 36.206175/-80.281384	(1)Rough Fork	0.0	2.0	2.0	0.5	48	55	2.00%	1.2	1.9	1.6	2.0	No	No
5	-Y1- 28+20 RT 36.206175/-80.281384	(1)Rough Fork	0.0	2.0	2.0	1.1	109	515	0.24%	2.8	1.0	3.6	1.1	No	No
5	-L- 59+34 M 36.204306/-80.281710	(1)Rough Fork	0.0	6.0	6.0	0.2	15	135	0.27%	0.4	0.6	0.5	0.7	No	No
5	-L- 59+34 LT 36.204587/-80.281767	(1)Rough Fork	0.0	6.0	4.0	0.5	49	135	0.27%	1.3	0.9	1.6	1.0	No	No
5	-L- 61+00 RT 36.204104/-80.281094	(1)Rough Fork	0.0	6.0	4.0	1.1	106	301	0.60%	2.7	1.5	3.5	1.6	No	No
5	-L- 61+00 LT 36.204659/-80.281204	(1)Rough Fork	0.0	6.0	4.0	0.5	52	166	0.87%	1.3	1.4	1.7	1.5	No	No
5	-L- 61+00 LT 36.204659/-80.281204	(1)Rough Fork	0.0	6.0	4.0	0.2	23	77	2.62%	0.6	1.7	0.8	1.9	No	No
5	-L- 65+55 M 36.204597/-80.279634	(1)Rough Fork	0.0	6.0	6.0	0.3	33	226	1.64%	0.9	1.5	1.1	1.6	No	No
5	-L- 69+50 M 36.204772/-80.278339	(1)Rough Fork	0.0	6.0	6.0	0.7	71	395	1.35%	1.8	1.7	2.3	1.8	No	No
5	-L- 70+27 M 36.204807/-80.278061	(1)Rough Fork	0.0	6.0	6.0	0.9	86	472	0.23%	2.2	0.9	2.8	1.0	No	No
5	-L- 70+27 M 36.204807/-80.278061	(1)Rough Fork	0.0	6.0	6.0	0.4	42	123	0.28%	1.1	0.8	1.4	0.9	No	No
6	-Y1RPD- 18+50 LT 36.2042745/-80.276989	(1)Rough Fork	0.0	6.0	4.0	0.6	59	190	0.63%	1.5	1.3	2.0	1.4	No	No
6	-Y1RPD- 18+50 RT 36.204449/-80.277097	(1)Rough Fork	0.0	6.0	4.0	0.3	34	190	0.63%	0.9	1.1	2.3	1.1	No	No
6	-Y1RPD- 18+50 RT 36.204449/-80.277097	(1)Rough Fork	0.0	6.0	4.0	0.2	19	200	1.04%	0.5	1.2	0.6	1.3	No	No
6	-L- 71+71 RT 36.204625/-80.277505	(1)Rough Fork	0.0	6.0	4.0	0.5	52	91	0.56%	1.3	1.2	1.7	1.3	No	No
6	-L- 72+50 RT 36.204640/-80.277273	(1)Rough Fork	0.0	6.0	4.0	0.5	52	170	0.22%	1.3	0.8	1.7	0.9	No	No
6	-L- 73+00 RT 36.204661/-80.277111	(1)Rough Fork	0.0	6.0	4.0	1.0	96	170	1.44%	2.5	2.0	3.2	2.1	No	No

Additional Comments

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34839.3.GV7 **TIP No.:** U-2579DEF **County(ies):** Forsyth

Swales

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
6	-L- 71+50 M 36.204861/-80.277624	(1)Rough Fork	0.0	6.0	4.0	0.4	42	100	0.67%	1.1	1.2	1.4	1.3	No	No
6	-L- 72+50 M 36.204894/-80.277309	(1)Rough Fork	0.0	6.0	4.0	0.7	67	350	1.45%	1.7	1.8	2.2	1.9	No	No
6	-L- 80+86 M 36.204839/-80.274480	(1)Rough Fork	0.0	6.0	4.0	0.4	44	214	1.54%	1.1	1.7	1.5	1.8	No	No
6	-L- 83+00 M 36.204724/-80.273772	(1)Rough Fork	0.0	6.0	4.0	0.4	38	150	1.54%	1.0	1.6	1.3	1.7	No	No
6	-L- 72+50 LT 36.205301/-80.277362	(1)Rough Fork	0.0	2.0	2.0	0.7	71	103	0.20%	1.8	1.1	2.3	1.1	No	No
7	-Y2- 26+00 RT 36.202694/-80.271675	(1)Rough Fork	0.0	4.0	2.0	0.3	31	367	1.15%	0.7	1.5	0.9	1.6	No	No
7	-L- 84+00 M 36.204662/-80.273442	(1)Rough Fork	0.0	7.0	4.0	0.6	64	336	1.47%	1.7	1.8	2.1	1.9	No	No
7	-L- 87+36 M 36.204382/-80.272357	(1)Rough Fork	0.0	7.0	4.0	0.3	27	139	1.51%	0.7	1.4	0.9	1.5	No	No
7	-L- 88+75 M 36.204234/-80.271923	(1)Rough Fork	0.0	6.0	6.0	0.7	67	488	1.35%	1.7	1.7	2.2	1.8	No	No
7	-L- 93+63 M 36.203698/-80.270407	(1)Rough Fork	0.0	6.0	6.0	0.3	31	297	1.19%	0.8	1.3	1.0	1.4	No	No
7	-L- 88+75 RT 36.203984/-80.272052	(1)Rough Fork	0.0	6.0	4.0	0.6	59	260	1.74%	1.5	1.9	2.0	2.0	No	No
7	-L- 93+63 RT 36.203464/-80.270542	(1)Rough Fork	0.0	6.0	4.0	0.5	51	88	0.95%	1.3	1.5	1.7	1.6	No	No
7	-L- 93+63 RT 36.203464/-80.270542	(1)Rough Fork	0.0	6.0	4.0	1.1	105	297	1.22%	2.7	1.9	3.5	2.0	No	No
7	-L- 87+36 LT 36.204610/-80.272250	(1)Rough Fork	0.0	6.0	4.0	0.9	88	506	0.47%	2.3	1.3	2.9	1.4	No	No
7	-L- 93+63 LT 36.203942/-80.270274	(1)Rough Fork	0.0	6.0	4.0	0.2	23	69	2.65%	0.6	1.8	0.8	1.9	No	No
7	-L- 93+63 LT 36.203942/-80.270274	(1)Rough Fork	0.0	6.0	4.0	0.8	76	297	1.25%	2.0	1.8	2.5	1.9	No	No
8	-L- 108+05 LT 36.202327/-80.265812	(2)Trick-um Creek	0.0	2.0	2.0	0.2	18	195	2.34%	0.4	1.5	0.5	1.6	No	No
8	-L- 96+60 LT 36.203594/-80.269364	(2)Trick-um Creek	0.0	6.0	6.0	1.0	95	368	0.70%	2.5	1.5	3.1	1.6	No	No
8	-L- 108+05 LT 36.202329/-80.265811	(2)Trick-um Creek	0.0	6.0	6.0	0.3	26	105	2.81%	0.7	1.8	0.9	1.9	No	No

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8	-L- 96+60 M 36.203369/-80.269487	(2)Trick-um Creek	0.0	6.0	6.0	0.4	39	368	1.24%	1.0	1.4	1.3	1.5	No	No
8	-L- 107+00 M 36.202216/-80.266262	(2)Trick-um Creek	0.0	6.0	6.0	0.7	72	672	1.62%	1.9	1.9	2.4	2.0	No	No
8	-L- 96+60 RT 36.203139/-80.269612	(2)Trick-um Creek	0.0	6.0	6.0	1.0	96	368	0.70%	2.5	1.5	3.2	1.6	No	No
9	-L- 122+00 M 36.200549/-80.261612	(2)Trick-um Creek	0.0	6.0	6.0	0.5	53	500	3.72%	1.4	1.9	1.8	2.1	No	No
10	-L- 125+50 M 36.200157/-80.260530	(2)Trick-um Creek	0.0	6.0	6.0	0.4	37	350	1.90%	1.0	1.7	1.2	1.8	No	No
10	-L- 127+22 M 36.199967/-80.259996	(2)Trick-um Creek	0.0	6.0	6.0	0.2	17	172	0.47%	0.4	0.8	0.6	0.9	No	No
10	-L- 127+22 M 36.199967/-80.259996	(2)Trick-um Creek	0.0	6.0	6.0	0.2	23	213	0.57%	0.6	0.9	0.8	1.0	No	No
11	-Y3- 26+87 RT 36.198691/-80.254395	(2)Trick-um Creek	0.0	6.0	6.0	0.2	22	57	0.28%	0.6	0.7	0.8	0.8	No	No
11	-Y3- 27+70 RT 36.198475/-80.254491	(2)Trick-um Creek	0.0	6.0	6.0	0.2	22	140	1.88%	0.6	1.5	0.8	1.6	No	No
11	-Y3- 26+70 LT 36.198676/-80.254062	(2)Trick-um Creek	0.0	6.0	6.0	0.5	51	110	0.71%	1.1	1.2	1.4	1.3	No	No
11	-Y3- 27+70 LT 36.198403/-80.254111	(2)Trick-um Creek	0.0	6.0	6.0	0.5	51	210	0.58%	1.1	1.1	1.4	1.2	No	No
11	-Y3- 31+40 LT 36.197400/-80.254323	(2)Trick-um Creek	0.0	2.0	2.0	0.2	15	30	3.87%	0.5	1.9	0.6	2.0	No	No
11	-L- 139+00 M 36.198657/-80.256345	(2)Trick-um Creek	0.0	6.0	6.0	0.3	32	300	1.00%	0.8	1.3	1.1	1.4	No	No
11	-L- 142+00 M 36.198323/-80.255415	(2)Trick-um Creek	0.0	6.0	6.0	0.2	21	450	1.00%	0.5	1.1	0.7	1.2	No	No
11	-L- 146+50 M 36.197823/-80.254021	(4)Buffalo Creek	0.0	6.0	6.0	0.5	47	375	1.01%	1.2	1.4	1.6	1.5	No	No
11	-L- 150+25 M 36.197407/-80.252859	(4)Buffalo Creek	0.0	6.0	6.0	0.4	40	235	0.90%	1.0	1.3	1.3	1.4	No	No
11	-L- 152+60 M 36.197145/-80.252130	(4)Buffalo Creek	0.0	6.0	6.0	0.3	25	379	0.35%	0.6	0.8	0.8	0.9	No	No
11	-L- 134+50 RT 36.198898/-80.257881	(2)Trick-um Creek	0.0	6.0	4.0	0.3	33	100	1.10%	0.9	1.4	1.2	1.5	No	No

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11	-L- 142+30 RT 36.198061/-80.255447	(2)Trick-um Creek	2.0	6.0	4.0	0.8	80	270	1.00%	2.1	1.6	2.6	1.7	No	No
11	-L- 142+70 RT 36.198012/-80.255326	(2)Trick-um Creek	0.0	6.0	4.0	0.8	80	230	0.80%	2.1	1.5	2.6	1.6	No	No
11	-L- 146+60 RT 36.197574/-80.254120	(4)Buffalo Creek	0.0	6.0	4.0	0.3	25	88	2.03%	0.6	1.6	0.8	1.7	No	No
11	-L- 146+60 RT 36.197574/-80.254120	(4)Buffalo Creek	0.0	6.0	4.0	1.4	143	340	1.05%	3.1	1.9	3.9	2.0	No	No
11	-L- 152+20 RT 36.196961/-80.252379	(4)Buffalo Creek	0.0	6.0	4.0	0.9	85	380	1.04%	2.2	1.7	2.8	1.8	No	No
11	-L- 140+80 LT 36.198751/-80.255698	(2)Trick-um Creek	0.0	6.0	4.0	0.1	13	60	1.00%	0.3	1.1	0.4	1.1	No	No
11	-L- 141+40 LT 36.198617/-80.255478	(2)Trick-um Creek	0.0	6.0	4.0	1.3	129	326	0.90%	3.0	1.8	3.9	1.9	No	No
11	-L- 146+20 LT 36.198098/-80.253982	(4)Buffalo Creek	0.0	6.0	4.0	0.4	37	80	2.40%	0.9	1.9	1.1	2.0	No	No
11	-L- 146+20 LT 36.198098/-80.253982	(4)Buffalo Creek	0.0	6.0	4.0	1.0	101	330	1.06%	2.4	1.8	3.1	1.9	No	No
11	-L- 152+60 LT 36.197148/-80.252129	(4)Buffalo Creek	0.0	6.0	4.0	0.9	86	390	0.37%	2.4	1.2	3.1	1.3	No	No
11	-Y3RPA- 19+50 RT 36.197900/-80.251290	(4)Buffalo Creek	0.0	6.0	4.0	0.7	71	420	0.81%	2.0	1.5	2.5	1.6	No	No
11	-Y3RPA- 19+50 LT 36.197763/-80.251503	(4)Buffalo Creek	0.0	6.0	4.0	1.0	102	407	1.51%	1.5	1.8	2.0	1.9	No	No
11	-Y3RPD- 16+55 RT 36.196697/-80.251825	(4)Buffalo Creek	0.0	6.0	4.0	0.1	12	98	0.38%	0.2	0.6	0.2	0.7	No	No
11	-Y3RPD- 17+50 LT 36.196505/-80.252170	(4)Buffalo Creek	0.0	6.0	4.0	2.3	230	530	0.26%	4.9	1.3	6.3	1.3	No	No
12	-L- 159+00 M 36.196434/-80.250147	(4)Buffalo Creek	0.0	4.0	4.0	0.3	28	261	0.76%	0.7	1.2	0.9	1.3	No	No
12	-L- 164+00 M 36.195864/-80.248605	(4)Buffalo Creek	0.0	6.0	6.0	0.9	87	500	0.74%	2.7	1.5	3.5	1.6	No	No
12	-L- 164+00 M 36.195864/-80.248605	(4)Buffalo Creek	0.0	6.0	4.0	0.7	70	350	0.27%	2.3	1.0	2.9	1.1	No	No
12	-L- 166+00 M 36.195605/-80.248007	(4)Buffalo Creek	0.0	7.0	4.0	0.7	70	150	0.52%	2.3	1.3	2.9	1.4	No	No
12	-L- 164+00 RT 36.195609/-80.248763	(4)Buffalo Creek	0.0	6.0	4.0	0.9	88	350	0.44%	2.3	1.3	3.0	1.3	No	No

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12	-L- 167+50 RT 36.194177/-80.247737	(4)Buffalo Creek	0.0	6.0	4.0	0.6	61	250	0.49%	1.6	1.2	2.0	1.3	No	No
13	-L- 167+50 M 36.195396/-80.247570	(4)Buffalo Creek	0.0	7.0	4.0	0.9	85	450	0.52%	2.7	1.4	3.5	1.5	No	No
13	-L- 172+00 M 36.194685/-80.246323	(4)Buffalo Creek	0.0	7.0	4.0	1.0	95	500	0.52%	3.1	1.4	3.9	1.5	No	No
13	-L- 177+00 M 36.193766/-80.245066	(4)Buffalo Creek	0.0	7.0	4.0	0.8	76	400	0.49%	2.5	1.3	3.1	1.4	No	No
13	-L- 177+00 RT 36.193591/-80.245287	(4)Buffalo Creek	0.0	6.0	4.0	0.8	80	400	0.52%	2.2	1.3	2.8	1.4	No	No
13	-L- 172+25 LT 36.194878/-80.246023	(4)Buffalo Creek	0.0	4.0	4.0	0.6	55	225	0.73%	1.1	1.3	1.4	1.4	No	No
13	-L- 174+50 LT 36.194487/-80.245403	(4)Buffalo Creek	0.0	4.0	4.0	0.6	61	250	1.85%	1.2	1.9	1.5	2.0	No	No
13	-L- 175+50 LT 36.194300/-80.245151	(4)Buffalo Creek	0.0	6.0	4.0	0.6	61	150	1.19%	1.2	1.5	1.5	1.6	No	No
13	-L- 177+00 LT 36.194004/-80.244764	(4)Buffalo Creek	0.0	6.0	4.0	1.0	97	400	1.50%	1.9	1.9	2.4	2.0	No	No
13	-Y4- 33+20 LT 36.194118/-80.244612	(4)Buffalo Creek	0.0	4.0	2.0	0.1	5	90	0.52%	0.1	0.6	0.1	0.7	No	No
13	-Y4- 33+20 LT 36.194118/-80.244612	(4)Buffalo Creek	0.0	4.0	2.0	0.2	24	410	2.71%	0.3	1.7	0.4	1.8	No	No
13	-Y4- 34+20 LT 36.193899/-80.244400	(4)Buffalo Creek	0.0	4.0	2.0	0.2	24	310	1.44%	0.3	1.3	0.4	1.4	No	No
14	-L- 181+00 M 36.192941/-80.244170	(4)Buffalo Creek	0.0	7.0	4.0	1.3	132	765	0.34%	4.3	1.3	5.5	1.4	No	No
14	-L- 195+00 M 36.189723/-80.241579	(5)Mill Creek	0.0	7.0	4.0	1.0	101	635	0.37%	3.3	1.3	4.2	1.3	No	No
14	-L- 181+00 RT 36.192788/-80.244409	(4)Buffalo Creek	0.0	6.0	4.0	1.9	191	770	0.53%	3.9	1.5	4.9	1.6	No	No
14	-L- 188+70 RT 36.191053/-80.242985	(5)Mill Creek	0.0	6.0	4.0	1.2	120	630	0.65%	2.3	1.5	3.0	1.5	No	No
14	-Y4- 37+33 RT 36.193155/-80.243838	(4)Buffalo Creek	0.0	6.0	4.0	1.0	98	637	1.66%	1.9	2.0	2.4	2.1	No	No
15	-L- 205+50 M 36.187613/-80.238168	(5)Mill Creek	0.0	7.0	4.0	0.4	43	130	0.98%	1.4	1.5	1.8	1.6	No	No
15	-L- 206+32 M 36.187441/-80.238904	(5)Mill Creek	0.0	6.0	4.0	0.4	43	212	0.60%	1.3	0.9	1.7	0.9	No	No

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15	-L- 204+20 RT 36.187654/-80.239711	(5)Mill Creek	0.0	6.0	4.0	0.5	49	320	2.04%	0.8	1.4	1.1	1.5	No	No
16	-L- 206+50 M 36.187441/-80.238903	(5)Mill Creek	0.0	6.0	4.0	0.7	68	360	0.50%	2.2	1.3	2.8	1.4	No	No
16	-L- 209+00 M 36.187033/-80.238223	(5)Mill Creek	0.0	7.0	4.0	0.7	68	110	1.31%	2.2	1.8	2.8	1.9	No	No
35	-Y1A- 18+72 RT 36.208636/-80.282386	(1)Rough Fork	0.0	4.0	2.0	0.1	10	72	0.35%	0.3	0.7	0.3	0.8	No	No
35	-Y1- 21+10 RT 36.208025/-80.282102	(1)Rough Fork	0.0	6.0	6.0	0.7	66	235	1.16%	1.7	1.6	2.2	1.7	No	No
35	-Y1- 18+58 LT 36.208790/-80.282026	(1)Rough Fork	0.0	6.0	6.0	0.3	34	252	1.23%	0.9	1.4	1.1	1.5	No	No
43	-Y3- 18+70 RT 36.200852/-80.253682	(2)Trick-um Creek	0.0	6.0	4.0	0.5	51	320	1.00%	1.4	1.5	1.8	1.6	No	No
4	-L- 48+50 M 36.203914/-80.2853011	(6)Grassy Creek	0.0	6.0	6.0	0.3	26	250	2.38%	0.7	1.7	0.9	1.8	No	No
4	-L- 51+00 M 36.2039061/-80.2845716	(6)Grassy Creek	0.0	6.0	6.0	0.7	74	700	1.36%	1.9	1.8	2.3	1.9	No	

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18	-L- 236+50 M 36.184444/-80.229444	(5)Mill Creek	0.0	6.0	6.0	0.6	60	572	1.26%	2.3	1.5	3.0	1.7	No	No
18	-L- 242+22 M 36.184167/-80.22750	(5)Mill Creek	0.0	6.0	6.0	0.7	71	678	0.34%	2.7	1.0	3.5	1.1	No	No
18	-L- 236+50 RT 36.184444/-80.229444	(5)Mill Creek	0.0	6.0	6.0	1.5	146	550	1.25%	3.8	1.8	4.8	1.9	No	No
18	-L- 229+50 M 36.185000/-80.231667	(5)Mill Creek	0.0	6.0	6.0	0.6	60	700	1.67%	2.3	1.7	3.0	1.9	No	No
18	-L- 241+00 LT 36.184722/-80.227777	(5)Mill Creek	0.0	4.0	4.0	1.1	109	285	0.67%	3.1	1.5	4.0	1.6	No	No
18	-L- 244+50 LT 36.184722/-80.226944	(5)Mill Creek	0.0	6.0	4.0	1.4	144	475	0.53%	3.4	1.3	4.3	1.4	No	No
19	-L- 266+50 LT 36.182534/-80.219483	(5)Mill Creek	0.0	2.0	2.0	0.5	53	150	0.73%	1.1	1.4	1.4	1.5	No	No
19	-Y6RPB- 27+50 LT 36.184636/-80.224103	(5)Mill Creek	0.0	6.0	6.0	0.4	37	300	2.17%	0.7	1.3	0.9	1.4	No	No
19	-Y6RPB- 27+50 RT 36.184414/-80.224157	(5)Mill Creek	0.0	6.0	6.0	0.6	57	300	2.51%	1.5	1.7	1.9	1.8	No	No
19	-Y6RPA- 23+50 RT 36.183963/-80.221654	(5)Mill Creek	0.0	6.0	6.0	0.7	65	200	0.30%	1.3	0.8	1.6	0.9	No	No
19	-Y6RPA- 25+50 RT 36.184179/-80.222278	(5)Mill Creek	0.0	6.0	6.0	0.3	34	130	0.31%	0.8	0.7	1.0	0.7	No	No
19	-L- 248+90 RT 36.183435/-80.225501	(5)Mill Creek	0.0	6.0	4.0	1.2	121	240	0.97%	3.3	1.7	4.2	1.8	No	No
19	-L- 249+50 RT 36.183433/-80.22592	(5)Mill Creek	0.0	6.0	6.0	1.4	139	550	0.16%	3.9	0.9	5.0	0.9	No	No
19	-L- 249+00 M 36.183708/-80.225382	(5)Mill Creek	0.0	6.0	4.0	1.2	122	600	0.33%	4.7	1.2	6.0	1.3	No	No
19	-L- 250+50 LT 36.183850/-80.224812	(5)Mill Creek	0.0	6.0	4.0	1.0	99	450	0.58%	1.5	1.1	1.9	1.2	No	No
19	-L- 255+00 M 36.183260/-80.223425	(5)Mill Creek	0.0	6.0	4.0	0.6	57	300	0.37%	2.2	1.1	2.8	1.1	No	No
19	-L- 258+00 M 36.182982/-80.222471	(5)Mill Creek	0.0	6.0	4.0	0.5	53	300	1.40%	2.1	1.7	2.6	1.8	No	No
19	-L- 258+00 LT 36.183220/-80.222355	(5)Mill Creek	0.0	6.0	4.0	0.4	35	200	1.20%	0.6	1.1	0.7	1.1	No	No
19	-L- 267+00 RT 36.181559/-80.219966	(5)Mill Creek	0.0	6.0	4.0	0.9	85	250	1.45%	2.4	1.8	3.1	1.9	No	No

Additional Comments

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Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34839.3.GV7 **TIP No.:** U-2579DEF **County(ies):** Forsyth

Swales

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19	-L- 266+50 M 36.181976/-80.219870	(5)Mill Creek	0.0	6.0	4.0	1.3	128	525	0.46%	4.9	1.4	6.3	1.5	No	NO
19	-L- 248+00 RT 36.183284/-80.225862	(5)Mill Creek	0.0	6.0	6.0	0.6	55	300	0.32%	1.3	0.8	1.6	0.9	No	NO
19	-Y6RPC- 18+50 RT 36.183034/ -80.225436	(5)Mill Creek	0.0	6.0	6.0	0.5	52	400	2.46%	1.0	1.5	1.3	1.6	No	NO
19	-Y6RPC- 18+50 LT 36.183203/-80.225261	(5)Mill Creek	0.0	6.0	4.0	1.1	106	350	0.82%	1.9	1.4	2.4	1.5	No	NO
19	-Y6RPC- 25+00 LT 36.182281/-80.223470	(5)Mill Creek	0.0	6.0	4.0	0.6	63	50	0.72%	1.8	1.3	2.3	1.4	No	NO
20	-L- 280+80 RT 36.179370/-80.216304	(5)Mill Creek	6.0	2.0	2.0	3.4	341	30	1.67%	9.4	1.8	12.5	2.0	No	No
20	-L- 275+50 RT 36.180372/-80.217565	(5)Mill Creek	0.0	6.0	4.0	0.9	89	375	0.79%	2.6	1.5	3.3	1.6	No	No
20	-L- 274+25 LT 36.181017/-80.217485	(5)Mill Creek	0.0	6.0	4.0	0.4	38	250	0.72%	0.7	0.9	1.0	1.0	No	No
20	-L- 279+00 M 36.179981/-80.216438	(5)Mill Creek	0.0	7.0	4.0	0.8	76	400	0.65%	2.9	1.4	3.7	1.5	No	No
21	-L- 293+50 M 36.176998/-80.213202	(5)Mill Creek	0.0	6.0	4.0	1.1	114	590	2.47%	3.3	1.7	4.4	1.8	No	No
21	-L- 293+50 LT 36.177138/-80.212945	(5)Mill Creek	0.0	6.0	4.0	1.3	125	590	2.20%	1.7	1.4	2.3	1.5	No	No
22	-L- 304+00 RT 36.174373/-80.211695	(5)Mill Creek	2.0	2.0	2.0	2.1	212	50	19.38%	4.3	1.8	5.5	1.8	No	NO
22	-L- 307+00 M 36.173804/-80.210878	(5)Mill Creek	0.0	6.0	6.0	0.5	53	500	0.55%	2.1	1.2	2.6	1.2	No	NO
22	-L- 299+50 M 36.175592/-80.212136	(5)Mill Creek	0.0	4.0	6.0	0.8	82	750	0.98%	3.2	1.7	4.1	1.8	No	NO
22	-L- 307+00 RT 36.173679/-80.211145	(5)Mill Creek	0.0	4.0	6.0	1.3	128	500	0.55%	3.3	1.4	4.2	1.4	No	NO
22	-L- 299+50 RT 36.175592/-80.212137	(5)Mill Creek	0.0	4.0	6.0	1.2	124	400	1.28%	3.2	1.8	4.0	2.0	No	NO
22	-L- 307+00 LT 36.173926/-80.210609	(5)Mill Creek	0.0	4.0	6.0	1.1	108	500	0.55%	2.9	1.3	3.7	1.4	No	NO
22	-L- 305+50 LT 36.174290/-80.210853	(5)Mill Creek	0.0	4.0	6.0	0.3	31	150	0.63%	0.9	0.9	1.1	1.0	No	NO
22	-L- 299+50 LT 36.175717/-80.211869	(5)Mill Creek	0.0	4.0	6.0	0.3	31	350	0.97%	0.9	1.1	1.1	1.2	No	NO

Additional Comments

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23	-L- 316+35 LT 36.171763/-80.208897	(5)Mill Creek	2.0	2.0	2.0	1.2	115	165	12.99%	2.3	1.5	3.0	1.5	NO	NO
23	-L- 318+50 M 36.171058/-80.208945	(5)Mill Creek	0.0	6.0	6.0	0.7	68	650	0.55%	2.6	1.2	3.4	1.3	NO	NO
23	-L- 312+00 M 36.172611/-80.210037	(5)Mill Creek	0.0	6.0	6.0	0.7	69	650	0.55%	2.7	1.2	3.4	1.3	NO	NO
23	-L- 318+50 RT 36.170936/-80.209213	(5)Mill Creek	0.0	4.0	6.0	1.9	189	700	0.55%	4.7	1.5	6.0	1.6	NO	NO
23	-L- 312+00 RT 36.172488/-80.210305	(5)Mill Creek	0.0	4.0	6.0	1.3	130	350	0.51%	3.1	1.3	3.9	1.4	NO	NO
23	-L- 318+50 LT 36.171189/-80.208667	(5)Mill Creek	0.0	4.0	6.0	1.1	112	450	0.58%	2.9	1.3	3.7	1.4	NO	NO
23	-L- 312+00 LT 36.172734/-80.209770	(5)Mill Creek	0.0	4.0	6.0	0.7	67	300	0.51%	1.9	1.1	2.4	1.2	NO	NO
24	-L- 335+80 M 36.166937/-80.206028	(5)Mill Creek	0.0	4.0	11.0	0.4	39	170	2.75%	1.5	1.7	1.9	1.8	NO	NO
24	-L- 334+50 M 36.167242/-80.206259	(5)Mill Creek	0.0	4.0	32.0	0.3	30	130	2.75%	1.2	1.3	1.5	1.4	NO	NO
24	-L- 331+50 M 36.167960/-80.206762	(5)Mill Creek	0.0	4.0	6.0	0.5	46	300	2.10%	1.8	1.8	2.3	1.9	NO	NO
24	-L- 328+50 M 36.168676/-80.207268	(5)Mill Creek	0.0	4.0	6.0	0.3	32	300	0.62%	1.2	1.0	1.6	1.2	NO	NO
24	-L- 325+00 M 36.169509/-80.207855	(5)Mill Creek	0.0	6.0	6.0	0.4	37	350	0.55%	1.4	1.0	1.8	1.1	NO	NO
24	-L- 328+50 RT 36.168551/-80.207535	(5)Mill Creek	0.0	4.0	6.0	1.1	106	300	0.94%	2.4	1.5	3.0	1.6	NO	NO
24	-L- 325+50 RT 36.169267/-80.208039	(5)Mill Creek	0.0	4.0	6.0	0.8	78	300	0.55%	2.0	1.2	2.5	1.3	NO	NO
24	-L- 331+75 LT 36.168022/-80.206452	(5)Mill Creek	0.0	4.0	6.0	0.7	71	325	1.68%	2.0	1.7	2.5	1.9	NO	NO
24	-L- 328+50 LT 36.168797/-80.206999	(5)Mill Creek	0.0	4.0	6.0	0.9	89	325	0.66%	2.2	1.3	2.8	1.4	NO	NO
24	-L- 324+50 LT 36.169757/-80.207663	(5)Mill Creek	0.0	4.0	6.0	1.1	114	400	0.58%	2.8	1.3	3.6	1.4	NO	NO
25	-Y7- 22+00 LT 36.163920/-80.203053	(5)Mill Creek	0.0	2.0	2.0	0.5	48	100	1.54%	0.9	1.7	1.2	1.9	NO	NO
25	-Y7- 22+80 RT 36.163716/-80.203278	(5)Mill Creek	0.0	2.0	2.0	0.1	9	20	0.30%	0.3	0.6	0.4	0.8	NO	NO

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25	-L- 347+50 RT 36.164258/-80.203626	(5)Mill Creek	0.0	2.0	2.0	0.3	27	131	0.30%	0.7	0.9	0.9	0.9	NO	NO
25	-L- 343+50 M 36.165308/-80.204377	(5)Mill Creek	0.0	4.0	9.0	0.8	83	450	0.99%	3.2	1.6	4.1	1.7	NO	NO
25	-L- 340+75 M 36.165843/-80.205019	(5)Mill Creek	0.0	4.0	12.0	0.5	52	275	1.99%	2.0	1.6	2.6	1.7	NO	NO
25	-L- 338+00 M 36.166437/-80.205612	(5)Mill Creek	0.0	4.0	11.0	0.5	54	275	2.52%	2.1	1.8	2.7	1.9	NO	NO
25	-L- 351+50 RT 36.163836/-80.202300	(5)Mill Creek	0.0	6.0	4.0	0.9	90	375	0.73%	1.5	1.2	1.9	1.3	NO	NO
25	-L- 343+50 RT 36.165107/-80.204561	(5)Mill Creek	0.0	6.0	4.0	0.8	75	400	0.87%	1.1	1.1	1.4	1.2	NO	NO
25	-L- 343+50 LT 36.165492/-80.204166	(5)Mill Creek	0.0	6.0	4.0	1.2	123	425	0.87%	3.3	1.6	4.2	1.7	NO	NO
26	-L- 360+50 M 36.163239/-80.199291	(5)Mill Creek	0.0	4.0	6.0	0.4	37	350	2.43%	1.4	1.8	1.8	1.9	NO	NO
26	-L- 357+50 M 36.163460/-80.200270	(5)Mill Creek	0.0	4.0	7.0	0.5	49	300	1.16%	1.9	1.4	2.4	1.6	NO	NO
26	-L- 356+31 M 36.163554/-80.200656	(5)Mill Creek	0.0	4.0	10.0	0.2	20	119	0.18%	0.8	0.5	1.0	0.6	NO	NO
26	-L- 352+00 M 36.163992/-80.202011	(5)Mill Creek	0.0	4.0	9.0	1.0	95	400	1.12%	3.7	1.7	4.7	1.8	NO	NO
26	-L- 355+13 M 36.163658/-80.201035	(5)Mill Creek	0.0	4.0	8.0	0.6	60	313	1.58%	2.3	1.6	3.0	1.9	NO	NO
26	-L- 356+31 M 36.163554/-80.200656	(5)Mill Creek	0.0	4.0	8.0	0.2	21	118	0.37%	0.8	0.7	1.0	0.8	NO	NO
26	-L- 352+00 LT 36.164214/-80.201871	(5)Mill Creek	0.0	4.0	6.0	0.9	94	50	1.62%	2.3	1.9	3.0	2.0	NO	NO
26	-L- 354+50 LT 36.163952/-80.201124	(5)Mill Creek	0.0	4.0	6.0	0.5	54	250	1.64%	1.5	1.5	1.9	1.6	NO	NO
26	-L- 352+00 RT 36.163770/-80.202149	(5)Mill Creek	0.0	6.0	4.0	0.9	90	50	1.54%	1.5	1.5	1.9	1.6	NO	NO
26	-L- 355+00 RT 36.163427/-80.201185	(5)Mill Creek	0.0	6.0	4.0	1.1	110	300	1.56%	1.8	1.6	2.4	1.8	NO	NO
26	-L- 360+50 RT 36.162997/-80.199373	(5)Mill Creek	0.0	6.0	4.0	0.7	71	250	2.08%	2.0	1.8	2.5	1.9	NO	NO
27	-L- 372+50 LT 36.162585/-80.195264	(6)Mill Creek	2.0	2.0	2.0	0.9	94	250	1.69%	1.4	1.7	1.8	1.8	NO	NO

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27	-L- 370+50 LT 36.162858/-80.195888	(6)Mill Creek	2.0	2.0	2.0	0.9	94	50	0.86%	1.4	1.3	1.8	1.4	NO	NO
27	-L- 373+50 RT 36.161950/-80.195217	(6)Mill Creek	0.0	6.0	2.0	0.3	31	50	0.84%	0.7	1.0	0.9	1.1	NO	NO
27	-L- 363+00 RT 36.162816/-80.198556	(6)Mill Creek	0.0	4.0	6.0	0.7	71	100	2.21%	2.0	1.8	2.5	1.9	NO	NO
28	-Y8ADR1- 10+64 LT 36.161755/-80.194609	(6)Mill Creek	2.0	2.0	2.0	0.6	60	95	1.51%	0.9	1.4	1.2	1.5	NO	NO
28	-Y8ADR1- 10+64 LT 36.161511/-80.194693	(6)Mill Creek	0.0	2.0	2.0	0.0	2	50	9.24%	0.0	1.3	0.0	1.4	NO	NO
28	-L- 384+50 M 36.160530/-80.191988	(6)Mill Creek	0.0	5.0	6.0	0.4	42	400	1.94%	1.6	1.6	2.1	1.7	NO	NO
28	-Y8- 28+00 LT 36.161442/-80.191883	(6)Mill Creek	0.0	4.0	2.0	2.9	293	700	0.34%	6.6	1.9	8.4	2.0	NO	NO
29	-L- 396+50 LT 36.158762/-80.188513	(6)Mill Creek	2.0	2.0	2.0	2.0	202	200	7.04%	3.7	1.1	4.7	1.1	NO	NO
29	-Y9- 25+50 LT 36.160062/-80.188895	(6)Mill Creek	0.0	2.0	2.0	0.1	10	30	4.43%	0.2	1.6	0.2	1.7	NO	NO
29	-L- 388+50 M 36.159813/-80.190978	(6)Mill Creek	0.0	6.0	6.0	0.2	16	150	0.33%	0.6	0.6	0.8	0.7	NO	NO
30	-L- 408+00 LT 36.156716/-80.185568	(8)Frazier Creek	2.0	2.0	2.0	1.7	174	112	16.46%	3.1	0.7	4.0	0.7	NO	NO
30	-L- 409+00 LT 36.156597/-80.185257	(8)Frazier Creek	2.0	2.0	2.0	1.7	174	10	12.31%	3.1	0.6	4.0	0.6	NO	NO
30	-L- 409+49 LT 36.156546/-80.185102	(8)Frazier Creek	2.0	2.0	2.0	1.7	174	49	2.98%	3.1	1.9	4.0	2.0	NO	NO
30	-L- 409+00 M 36.156130/-80.185726	(8)Frazier Creek	0.0	6.0	6.0	0.5	53	500	1.19%	2.1	1.4	2.6	1.6	NO	NO
31	-L- 410+50 M 36.155983/-80.185501	(8)Frazier Creek	0.0	6.0	6.0	0.1	13	150	1.01%	0.5	0.9	0.7	1.0	NO	NO
31	-L- 411+58 RT 36.155129/-80.185583	(8)Frazier Creek	8.0	2.0	2.0	6.3	626	108	5.72%	24.2	3.5	31.0	3.8	Yes	No
52	-Y7- 23+00 LT 36.163647/-80.203085	(6)Mill Creek	0.0	2.0	2.0	0.5	48	100	1.53%	0.9	1.7	1.1	1.8	NO	NO
52	-Y7- 23+00 RT 36.163670/-80.203283	(6)Mill Creek	0.0	2.0	2.0	0.1	10	32	0.31%	0.3	0.7	0.4	0.8	NO	NO
56	-Y9- 27+00 LT 36.160199/-80.188409	(6)Mill Creek	0.0	2.0	2.0	0.1	10	150	4.43%	0.2	1.6	0.2	1.7	NO	NO

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56	-Y9- 28+00 LT 36.160264/-80.188076	(6)Mill Creek cont'd	0.0	2.0	2.0	0.1	10	50	0.80%	0.2	0.8	0.2	0.9	No	No

Additional Comments

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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?
5	-Y1C- 14+57 RT 36.207284/-80.283053	(6)Grassy Creek	Riprap Energy Dissipator Basin	Class 'B'	3.6	Pipe	24	12.0	0.7	N/A
11	-Y3RPC- 25+65 LT 36.197365/-80.255748	(2)Trick-um Creek	Riprap Energy Dissipator Basin	Class II	13.4	Pipe	36	31.0	1.0	N/A
11	-Y3RPA- 21+52 RT 36.198533/-80.251352	(2)Trick-um Creek	Riprap Energy Dissipator Basin	Class II	13.2	Pipe	42	75.0	1.2	N/A
13	-Y4- 28+75 LT 36.1952386/-80.2454770	(4)Buffalo Creek	Riprap Energy Dissipator Basin	Class I	14.6	Pipe	30	42.0	1.0	N/A
14	-Y4- 44+56 LT 36.192132/-80.241853	(4)Buffalo Creek	Riprap Energy Dissipator Basin	Class 'B'	2.8	Pipe	24	8.0	0.7	N/A
22	-L- 303+73 LT 36.174722/-80.211111	(6)Mill Creek	Riprap Energy Dissipator Basin	Class 'B'	6.1	Culvert	36	13.2	1.2	N/A
28	-Y8- 29+84 LT 36.161111/-80.191389		Riprap Energy Dissipator Basin	Class II	23.2	Culvert	42	55.6	1.1	N/A
10	-L- 127+52 RT 36.1996038/-80.2600804	(2)Trick-um Creek	Riprap Energy Dissipator Basin	Class I	25.0	Pipe	42	75.0	1.2	N/A
31	-L- 410+36 RT 36.155406/-80.185855	(7)Frazier Creek	Riprap Energy Dissipator Basin	Class II	6.3	Pipe	30	30.8	1.2	N/A

Additional Comments

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

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.08; Released April 2018)

WBS Element: 34839.3.GV7 **TIP No.:** U-2579DEF **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?
5	-Y1LPA- 15+00 LT 36.2054702/-80.2786901	(1)Rough Fork	Dry Detention Basin	21.1	4.4	0.43	1.23	No
5	-Y1LPD- 14+00 RT 36.203836/-80.279466	(1)Rough Fork	Dry Detention Basin	7.9	3.5	0.54	1.95	No
26	-L- 357+17 LT 36.163889/-80.200278	(5)Mill Creek	Dry Detention Basin	19.9	10.8	0.99	1.16	No

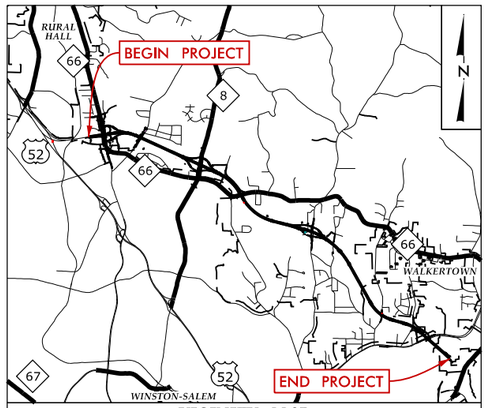
Additional Comments

09/08/99

TIP PROJECT: U-2579D,E&F

CONTRACT: C204088

See Sheet 1A-1 For Sheet Symbology

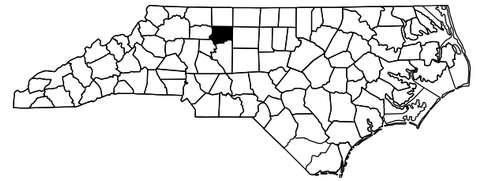


VICINITY MAP
(NOT TO SCALE)

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FORSYTH COUNTY

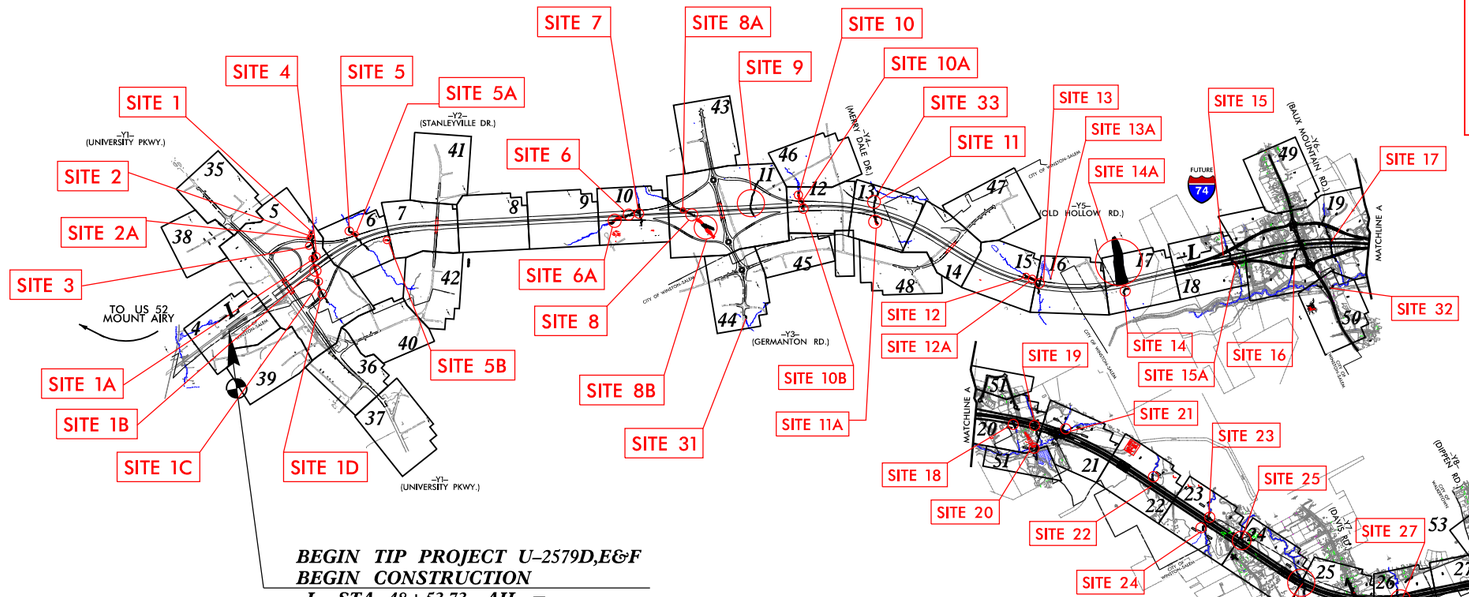
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2579D,E&F	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34839.3.GV7	NHP-0074(213)	PE, ROW, UTILITIES & CONSTR.	



LOCATION: *WINSTON-SALEM – NORTHERN BELTWAY FROM WEST OF NC 66 /SR 4000 (UNIVERSITY PARKWAY) TO US 311 (NEW WALKERTON ROAD)*

TYPE OF WORK: *DESIGN-BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS*

U-2579DEF: PERMIT MODIFICATION PACKAGE 12-18-18



BEGIN TIP PROJECT U-2579D,E&F
BEGIN CONSTRUCTION
-L- STA. 48+53.73 AH =
-L- STA. 198+37.73 BK

END PAVING
-L- STA. 447+90.00 WB

END PAVING
-L- STA. 425+12.02 EB

END TIP PROJECT U-2579D,E&F
-L- STA. 415+27.33 BK =
-L- STA. 392+50.00 AH

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

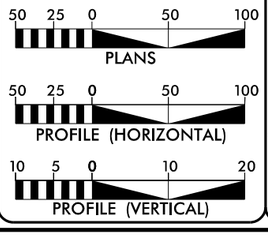
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

FLATIRON | Blythe

NOTES:
THIS IS A CONROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
A PORTION OF THIS PROJECT IS LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF THE CITIES OF WINSTON-SALEN AND WALKERTOWN.

PERMIT DRAWING SHEET 1 OF 97

GRAPHIC SCALES



DESIGN DATA

ADT 2016 = 34,000
ADT 2040 = 60,200
K = 9 %
D = 55 %
T = 15 % *
V = 70 MPH
* TTST = 10% DUAL = 5%
FUNC CLASS = INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2579DEF = 6.859 MILES
LENGTH STRUCTURES TIP PROJECT U-2579DEF = 0.087 MILES *
TOTAL LENGTH TIP PROJECT U-2579DEF = 6.946 MILES

* LENGTH BASED ON WB BRIDGES

NCDOT CONTACT: K. ZAK HAMIDI, PE
DESIGN-BUILD UNIT – PROJECT ENGINEER

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

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: MARCH 20, 2018
LETTING DATE: MARCH 20, 2018

JONATHAN HENDERSON, PE
PROJECT ENGINEER

CALVIN W. MOODY, III, PE
PROJECT DESIGN ENGINEER

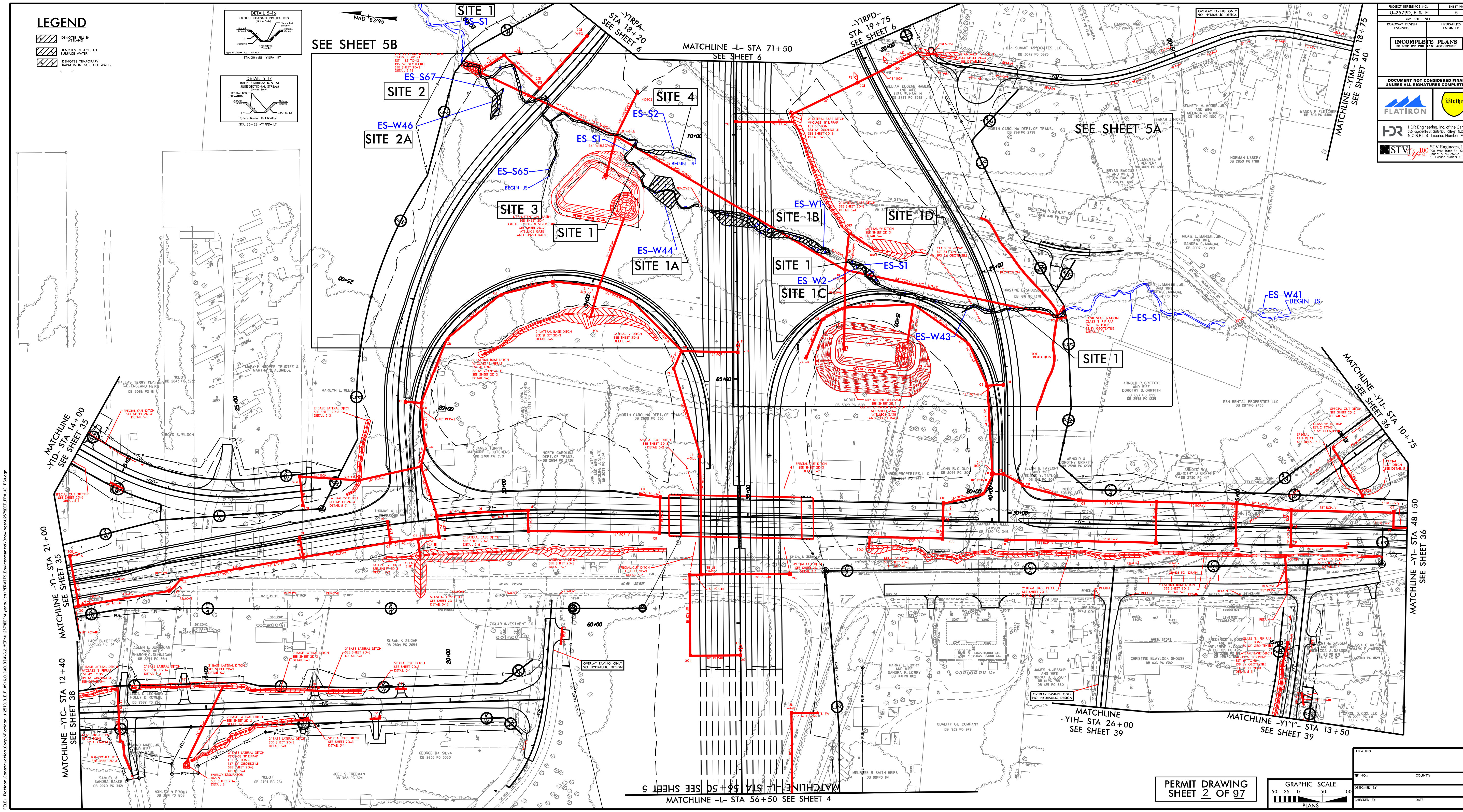
HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •



LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SEE SHEET 5B
SEE SHEET 5A
MATCHLINE -L- STA 71+50
SEE SHEET 6
SITE 1
SITE 1A
SITE 1B
SITE 1C
SITE 1D
SITE 2
SITE 2A
SITE 3
SITE 4
ES-S1
ES-S2
ES-S65
ES-S67
ES-W1
ES-W2
ES-W41
ES-W43
ES-W44
ES-W46
MATCHLINE -Y1D- STA 14+00 SEE SHEET 35
MATCHLINE -Y1- STA 21+00 SEE SHEET 35
MATCHLINE -Y1C- STA 12+40 SEE SHEET 38
MATCHLINE -L- STA 56+50 SEE SHEET 4
MATCHLINE -Y1H- STA 26+00 SEE SHEET 39
MATCHLINE -Y1"I"- STA 13+50 SEE SHEET 39
MATCHLINE -Y1- STA 48+50 SEE SHEET 36
MATCHLINE -Y1L- STA 10+75 SEE SHEET 36
MATCHLINE -Y1M- STA 18+75 SEE SHEET 40
OVERLAY PAVING ONLY NO HYDRAULIC DESIGN
PERMIT DRAWING SHEET 2 OF 97
GRAPHIC SCALE
50 25 0 50 100
PLANS
PROJECT REFERENCE NO.
U-2579D, E & F
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
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Blythe
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N.C.B.E.L.S. License Number: F-0116
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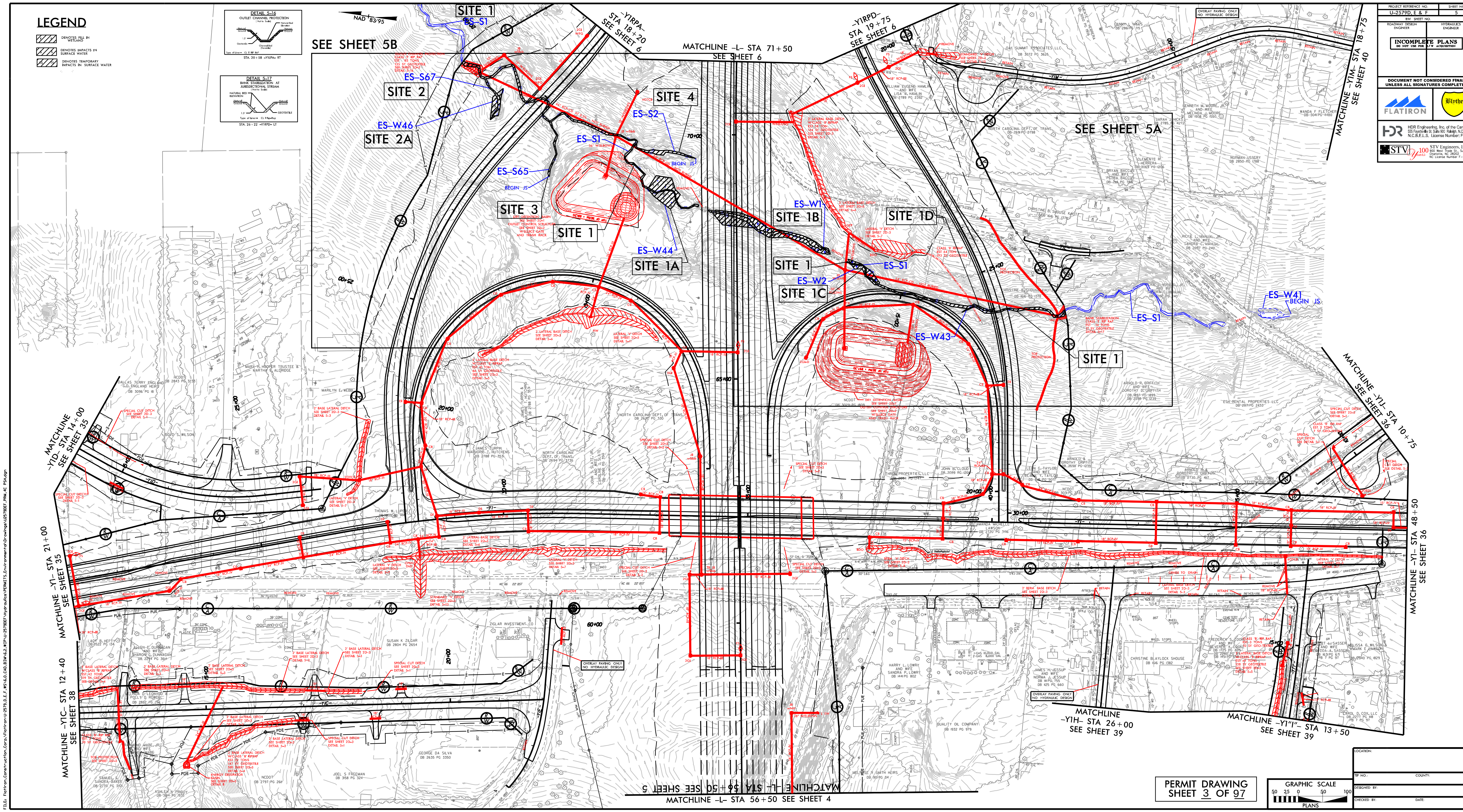
Charlotte, NC 28202
NC License Number F-0991



LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 5-16
OUTLET CHANNEL PROTECTION
DETAIL 5-17
BANK STABILIZATION AT JURISDICTIONAL STREAM
SEE SHEET 5B
SEE SHEET 5A
SITE 1
SITE 2
SITE 2A
SITE 3
SITE 4
SITE 1A
SITE 1B
SITE 1C
SITE 1D
ES-S1
ES-S2
ES-S65
ES-S67
ES-W1
ES-W2
ES-W41
ES-W43
ES-W44
ES-W46
MATCHLINE -L- STA 71+50 SEE SHEET 6
-Y1RPA- STA 18+20 SEE SHEET 6
-Y1RPD- STA 19+75 SEE SHEET 6
MATCHLINE -Y1M- STA 18+75 SEE SHEET 40
MATCHLINE -Y1L- STA 10+75 SEE SHEET 36
MATCHLINE -Y1- STA 48+50 SEE SHEET 36
MATCHLINE -Y1"I"- STA 13+50 SEE SHEET 39
MATCHLINE -Y1H- STA 26+00 SEE SHEET 39
MATCHLINE -L- STA 56+50 SEE SHEET 4
MATCHLINE -Y1C- STA 12+40 SEE SHEET 38
MATCHLINE -Y1- STA 21+00 SEE SHEET 35
MATCHLINE -Y1D- STA 14+00 SEE SHEET 35
OVERLAY PAVING ONLY NO HYDRAULIC DESIGN
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
FLATIRON
Blythe
HDR Engineering, Inc. of the Carolinas
STV Engineers, Inc.
U-2579D, E & F
PERMIT DRAWING SHEET 3 OF 97
GRAPHIC SCALE
50 25 0 50 100
PLANS

8/17/99

LEGEND

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

NAD 83/95

STV 100 Years
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Charlotte, NC 28202
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FLATIRON

Blythe

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	5A

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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N.C.B.E.L.S. License Number: F-0116

25 12.5 0 25 50
GRAPHIC SCALE

MATCHLINE -L-
STA 71+50
SEE SHEET 6

-Y1RPD-
STA 19+75
SEE SHEET 6

MATCHLINE SEE SHEET 5B

MATCHLINE -Y1M- STA 18+75
SEE SHEET 40

MATCHLINE -Y1J-
STA 10+75
SEE SHEET 36

MATCHLINE SEE SHEET 5D

OVERLAY PAVING ONLY
NO HYDRAULIC DESIGN

SITE 1B
SITE 1C
SITE 1D
SITE 1

ES-W1
ES-W2
ES-W41
ES-S1
ES-W43

2' LATERAL BASE DITCH
W/CLASS 'B' RIPRAP
EST 58 TON
164 SY GEOTEXTILE
SEE SHEET 2D-3
DETAIL 5-5

2' LATERAL BASE DITCH
SEE SHEET 2D-3
DETAIL 5-4

LATERAL 'V' DITCH
SEE SHEET 2D-3
DETAIL 5-7

STANDARD 'W' DITCH
SEE SHEET 2D-3
SEE DETAIL B-10

CLASS 'B' RIPRAP
EST 64 TON
193 SY GEOTEXTILE

TOE PROTECTION

BANK STABILIZATION
CLASS 'I' RIP RAP
EST 14 TONS
21 SY GEOTEXTILE
DETAIL 5-17

DETAIL 5-17
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
NATURAL BED ELEVATION
Natural Ground
Natural Ground
1.5'
GEOTEXTILE
Type of Liner= CL I Rip-Rap
STA. 26+22 -Y1RPD- LT

NCDOT
DB 3029 PG 1809
DRY DETENTION BASIN
SEE SHEET 2D-1

WILLIAM EUGENE HAMLIN AND WIFE LISA W. HAMLIN
DB 2789 PG 2392

NORTH CAROLINA DEPT. OF TRANS.
DB 2691PG 2798

OAK SUMMIT ASSOCIATES LLC
DB 3072 PG 3625

CLEMENTE R HERRERA
DB 3050 PG 1906

DANNY L MILLS
DB 2861PG 715

SARAH J HICKS
DB 2785 PG 4272

KENNETH M. MOORE, JR. AND WIFE MELINDA J. MOORE
DB 1908 PG 1550

WANDA F FLETCHER
DB 3041PG 4480

NORMAN USSERY
DB 2850 PG 1788

CLEMENTE R HERRERA
DB 3069 PG 1206

BRYAN BACCUS AND WIFE PETRA BACCUS
DB 2H4 PG 780

CHRISTINE B. SHOUSE KAUTZ
DB 1616 PG 1378

RICKIE L. MANUAL, JR. AND WIFE SANDRA C. MANUAL
DB 2097 PG 240

ARNOLD R. GRIFFITH AND WIFE DOROTHY D. GRIFFITH
DB 1897 PG 1899
DB 2598 PG 1239

ESH RENTAL PROPERTIES LLC
DB 2971PG 2433

CITY OF WINSTON-SALEM

PERMIT DRAWING
SHEET 4 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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FILE: Flatiron_Construction_Corp.\Flatiron-U-2579_D_E_F_WS\6.0_CAD_BIM\6.2_WIP\U-2579DEF\Hydraulics\PERMITS_Environmental\Drawings

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-8

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

U-2579DEF
PERMIT SITE 1B

WETLANDS WETLANDS

0.002 5.6:1 6:1 0.025
903.03
5:1 4.9:1
871.5
68+00.00

0.010 5.9:1 6:1 0.025
903.75
5:1 4.9:1
884.50
67+50.00

-Y1LPA- Sta:13+71.00
EL. =902.80
901.60
0.080 0.080
6:1 6:1
5.99:1 6:1 0.019 6:1 6:1 0.025
902.32 904.56
6.42:1 5.10:1
894.70
67+00.00

-Y1LPD- Sta:13+50.00
EL. =905.20
904.00
0.080 0.080
6:1

-Y1LPA- Sta:13+23.00
EL. =904.17
902.97
0.080 0.080
5.99:1 6:1 5:1 0.025 6:1 6:1 0.025 6:1 4.89:1
905.38
66+50.00

-Y1LPD- Sta:13+00.00
EL. =904.99
903.79
0.080 0.080
4:1

-Y1LPA- Sta:12+78.00
EL. =905.47
904.27
0.080 0.080
4:1 6.40:1 6:1 0.025 6:1 6:1 0.025 6:1 6.61:1
903.74 903.74
66+00.00

-Y1LPD- Sta:12+51.75
EL. =905.41
904.21
0.080 0.080
4:1

PERMIT DRAWING
SHEET 5 OF 97

-L-

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

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FILE: U2579DEF_PRM_XPL_L_HDR.dgn
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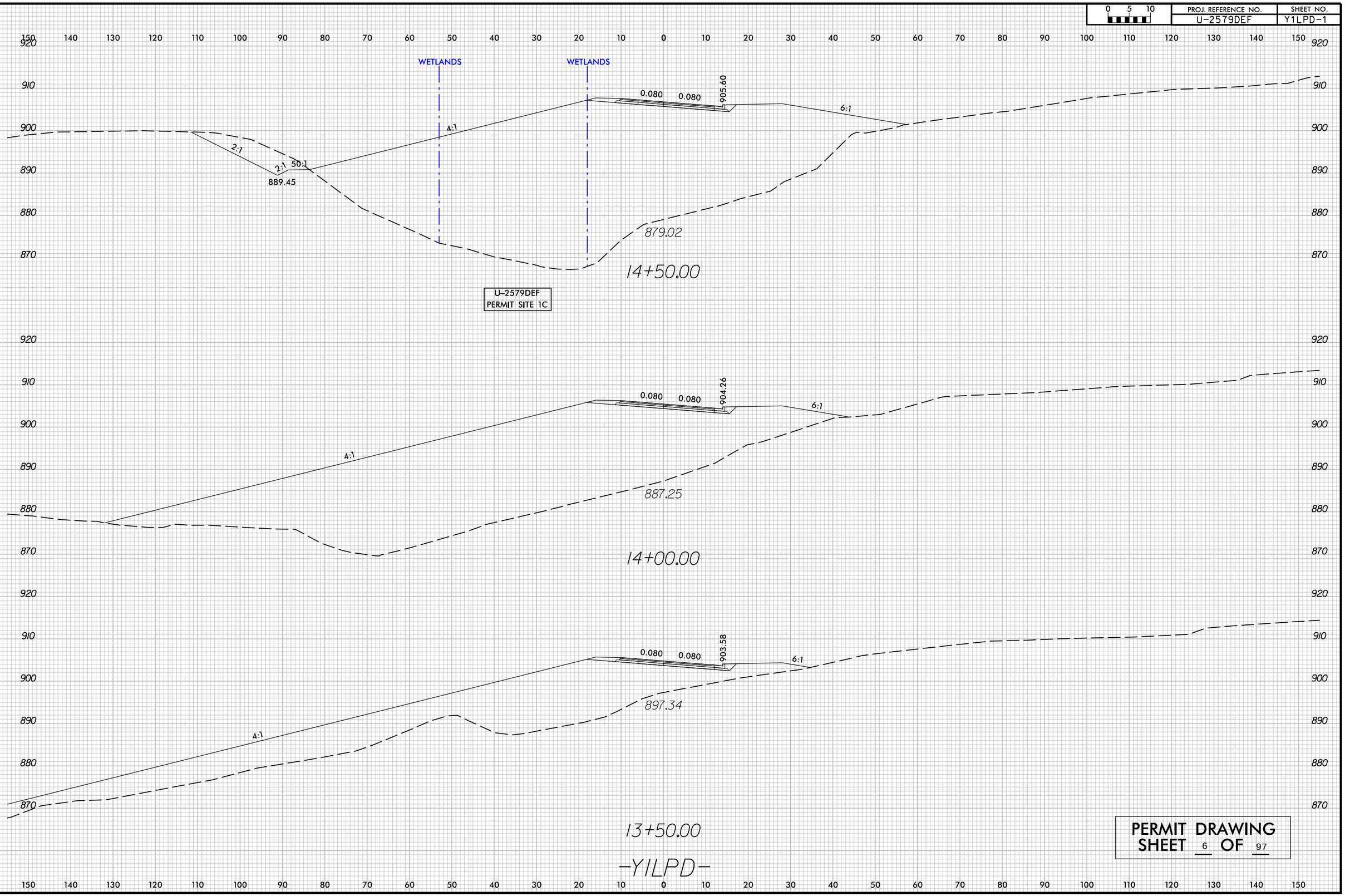
DATE: 10/17/2018
TIME: 6:10:25 PM

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	Y1LPD-1



PERMIT DRAWING
SHEET 6 OF 97

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	5B

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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NC License Number F-0991

HDR Engineering, Inc. of the Carolinas
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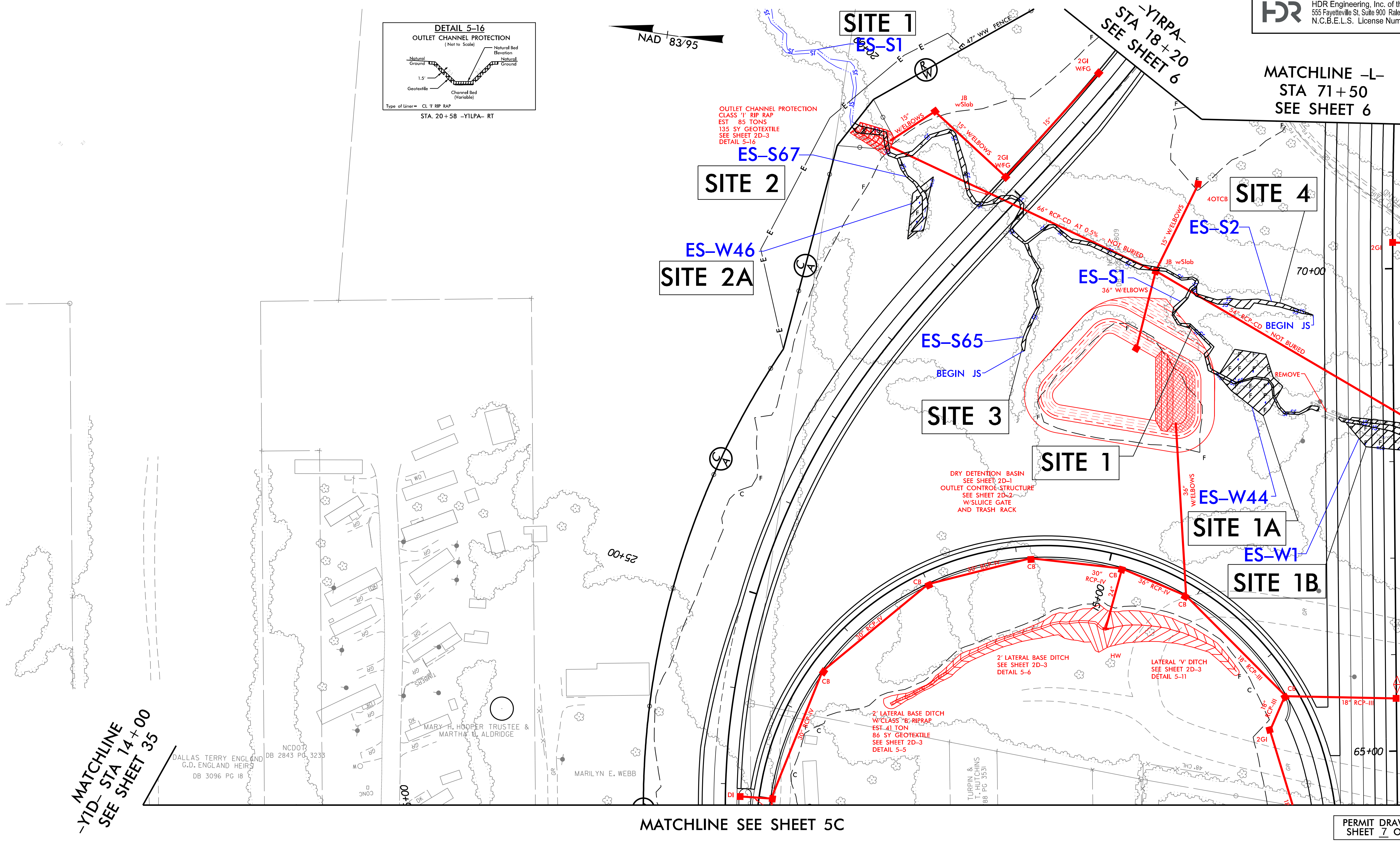
N.C.B.E.L.S. License Number: F-0116

LEGEND

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER



DETAIL 5-16
OUTLET CHANNEL PROTECTION
(Not to Scale)
STA. 20+58 -Y1LPA- RT
NAD 83/95
SITE 1
ES-S1
SITE 2
ES-S67
ES-W46
SITE 2A
SITE 3
ES-S65
BEGIN JS
SITE 4
ES-S2
SITE 1
ES-W44
SITE 1A
ES-W1
SITE 1B
OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 85 TONS
135 SY GEOTEXTILE
SEE SHEET 2D-3
DETAIL 5-16
DRY DETENTION BASIN
SEE SHEET 2D-1
OUTLET CONTROL STRUCTURE
SEE SHEET 2D-2
W/SLUICE GATE
AND TRASH RACK
2' LATERAL BASE DITCH
SEE SHEET 2D-3
DETAIL 5-6
LATERAL 'V' DITCH
SEE SHEET 2D-3
DETAIL 5-11
2' LATERAL BASE DITCH
W/CLASS 'B' RIPRAP
EST 41 TON
86 SY GEOTEXTILE
SEE SHEET 2D-3
DETAIL 5-5
-Y1RPA- STA 18+20 SEE SHEET 6
MATCHLINE -L- STA 71+50 SEE SHEET 6
MATCHLINE SEE SHEET 5A
MATCHLINE -Y1D- STA 14+00 SEE SHEET 35
MARY H. HOOPER TRUSTEE & MARTHA E. ALDRIDGE
DALLAS TERRY ENGLAND G.D. ENGLAND HEIRS DB 3096 PG 18
NCDOT DB 2843 PG 3233
MARILYN E. WEBB

MATCHLINE SEE SHEET 5C

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: BSTEFFEN DATE: 10/25/2018 TIME: 5:36:48 PM
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8/17/99

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-9

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

900 880 860 840

0.031 4.6:1 6:1 0.031 4:1 50:1 2:1
901.44 887.92
5:1
878.20

70+00.00

0.023 4.7:1 6:1 0.025 4:1 50:1 2:1
901.60 883.60
5:1
876.33

69+50.00

WETLANDS WETLANDS

0.015 5:1 6:1 0.025 4.36:1 50:1 2:1
901.96 880.80
5:1 2:1 2:1 50:1
870.89
873.08

U-2579DEF
PERMIT SITE 1A

69+00.00

0.006 5.3:1 6:1 0.025 5.33:1 50:1 2:1
902.43 880.32
5:1 2:1 2:1 50:1
875.70
870.25

68+50.00

PERMIT DRAWING
SHEET 8 OF 97

PLOT DRIVER: NCDOT.pdf.color_eng.100.plt
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PENTABLE: NCDOT_PFL_XSC.tbl
DATE: 10/17/2018
TIME: 6:10:26 PM

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	Y1RPA-4

180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120

900
890
880
870
860

0.040 0.040

5:1

2:1 2:1 50:1

875.90

2:1

863.66

21+50.00

U-2579DEF
PERMIT SITE 2A

WETLANDS WETLANDS

0.023 0.023

5:1

2:1 2:1 50:1

870.17

2:1

861.47

21+00.00

PERMIT DRAWING
SHEET 9 OF 97

-YIRPA-

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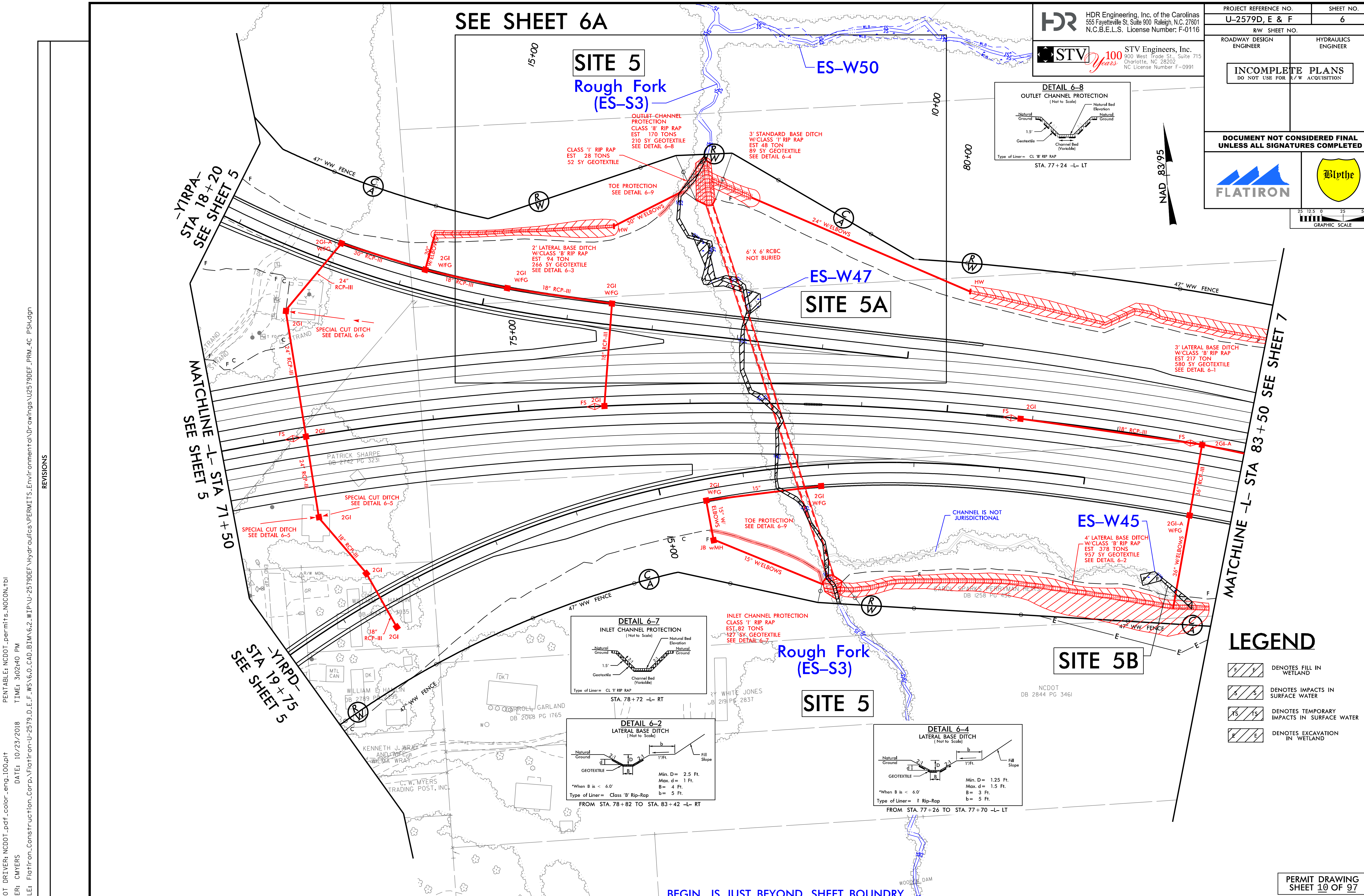
TIME: 6:11:05 PM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STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
PROJECT REFERENCE NO.
SHEET NO.
U-2579D, E & F
6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
FLATIRON
Blythe
GRAPHIC SCALE
SEE SHEET 6A
SITE 5
Rough Fork
(ES-S3)
ES-W50
ES-W47
SITE 5A
ES-W45
SITE 5B
OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 170 TONS
210 SY GEOTEXTILE
SEE DETAIL 6-8
CLASS 'I' RIP RAP
EST 28 TONS
52 SY GEOTEXTILE
TOE PROTECTION
SEE DETAIL 6-9
3' STANDARD BASE DITCH
W/CLASS 'I' RIP RAP
EST 48 TON
89 SY GEOTEXTILE
SEE DETAIL 6-4
2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 94 TON
266 SY GEOTEXTILE
SEE DETAIL 6-3
6' X 6' RCBC
NOT BURIED
SPECIAL CUT DITCH
SEE DETAIL 6-6
SPECIAL CUT DITCH
SEE DETAIL 6-5
3' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 217 TON
580 SY GEOTEXTILE
SEE DETAIL 6-1
CHANNEL IS NOT JURISDICTIONAL
4' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 378 TONS
957 SY GEOTEXTILE
SEE DETAIL 6-2
INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 82 TONS
127 SY GEOTEXTILE
SEE DETAIL 6-7
-Y1RPA- STA 18+20 SEE SHEET 5
MATCHLINE -L- STA 71+50 SEE SHEET 5
-Y1RPD- STA 19+75 SEE SHEET 5
MATCHLINE -L- STA 83+50 SEE SHEET 7
NAD 83/95
47" WW FENCE
PATRICK SHARPE
DB 2742 PG 3231
NCDOT
DB 2844 PG 3461
DETAIL 6-8
OUTLET CHANNEL PROTECTION
STA. 77+24 -L- LT
DETAIL 6-7
INLET CHANNEL PROTECTION
STA. 78+72 -L- RT
DETAIL 6-2
LATERAL BASE DITCH
Min. D= 2.5 Ft.
Max. d= 1 Ft.
B= 4 Ft.
b= 5 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM STA. 78+82 TO STA. 83+42 -L- RT
DETAIL 6-4
LATERAL BASE DITCH
Min. D= 1.25 Ft.
Max. d= 1.5 Ft.
B= 3 Ft.
b= 5 Ft.
FROM STA. 77+26 TO STA. 77+70 -L- LT
LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
BEGIN JS JUST BEYOND SHEET BOUNDRY
PERMIT DRAWING
SHEET 10 OF 97
REVISIONS
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DATE: 10/23/2018
TIME: 3:02:40 PM

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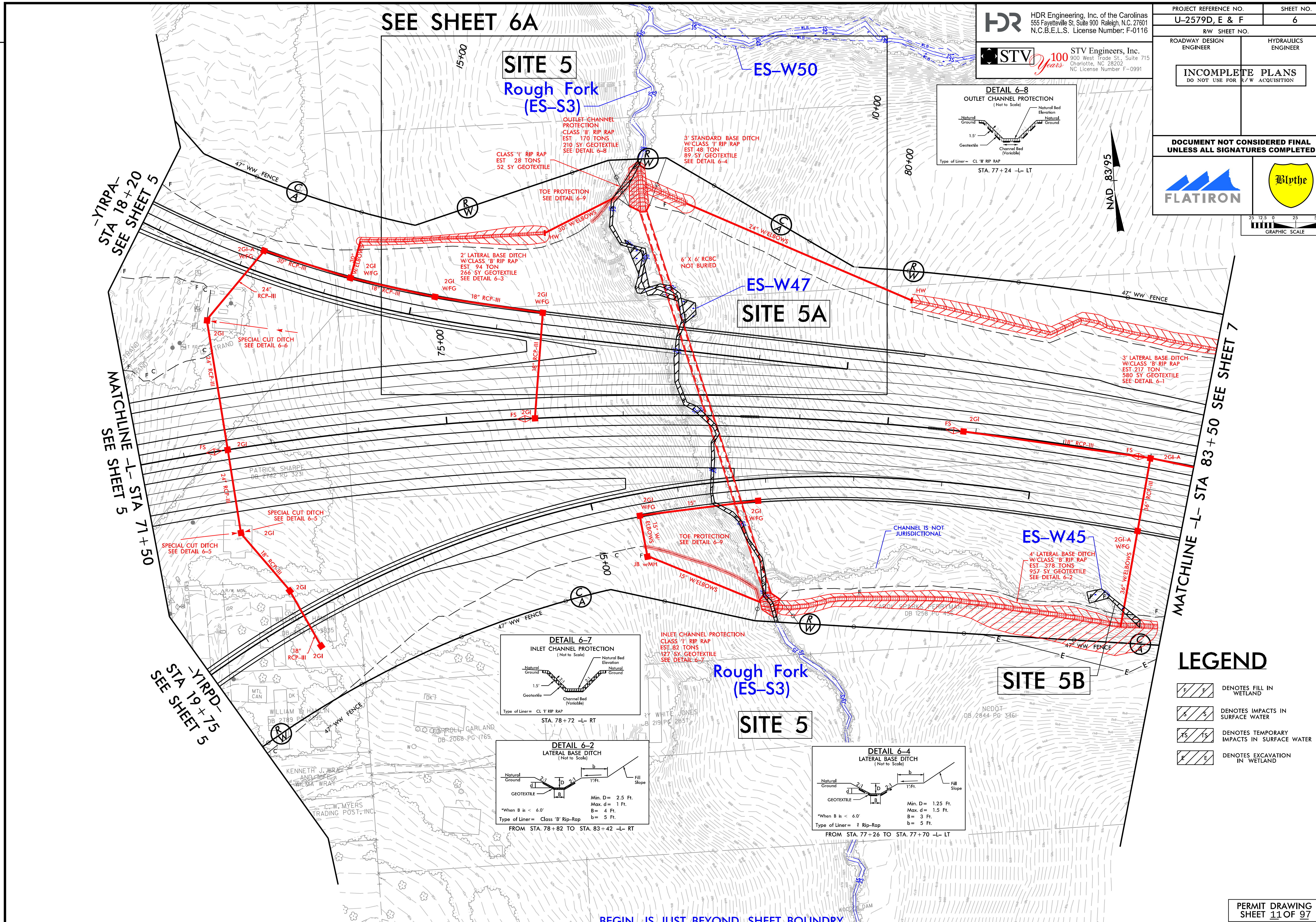
REVISIONS



PROJECT REFERENCE NO. U-2579D, E & F
SHEET NO. 6
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
FLATIRON
Blythe
GRAPHIC SCALE
NAD 83/95
SEE SHEET 6A
SITE 5
Rough Fork (ES-S3)
ES-W50
ES-W47
SITE 5A
ES-W45
SITE 5B
-Y1RPA- STA 18+20 SEE SHEET 5
MATCHLINE -L- STA 71+50 SEE SHEET 5
-Y1RPD- STA 19+75 SEE SHEET 5
MATCHLINE -L- STA 83+50 SEE SHEET 7
OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 170 TONS
210 SY GEOTEXTILE
SEE DETAIL 6-8
CLASS 'I' RIP RAP
EST 28 TONS
52 SY GEOTEXTILE
TOE PROTECTION
SEE DETAIL 6-9
3' STANDARD BASE DITCH
W/CLASS 'I' RIP RAP
EST 48 TON
89 SY GEOTEXTILE
SEE DETAIL 6-4
2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 94 TON
266 SY GEOTEXTILE
SEE DETAIL 6-3
6' X 6' RCBC
NOT BURIED
SPECIAL CUT DITCH
SEE DETAIL 6-6
SPECIAL CUT DITCH
SEE DETAIL 6-5
3' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 217 TON
580 SY GEOTEXTILE
SEE DETAIL 6-1
CHANNEL IS NOT JURISDICTIONAL
4' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 378 TONS
957 SY GEOTEXTILE
SEE DETAIL 6-2
INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 82 TONS
127 SY GEOTEXTILE
SEE DETAIL 6-7
47" WW FENCE
PATRICK SHARPE
DB 2742 PG 321
WILLIAM B HAMLIN
DB 2789 PG 295
CARROLL GARLAND
DB 2068 PG 1765
KENNETH J. WRAY AND WIFE WILMA WRAY
C.W. MYERS TRADING POST, INC
NCDOT DB 2844 PG 346
DETAIL 6-8
OUTLET CHANNEL PROTECTION
(Not to Scale)
STA. 77+24 -L- LT
DETAIL 6-7
INLET CHANNEL PROTECTION
(Not to Scale)
Type of Liner= CL 'I' RIP RAP
STA. 78+72 -L- RT
DETAIL 6-2
LATERAL BASE DITCH
(Not to Scale)
Min. D= 2.5 Ft.
Max. d= 1 Ft.
B= 4 Ft.
b= 5 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM STA. 78+82 TO STA. 83+42 -L- RT
DETAIL 6-4
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1.25 Ft.
Max. d= 1.5 Ft.
B= 3 Ft.
b= 5 Ft.
FROM STA. 77+26 TO STA. 77+70 -L- LT
LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
BEGIN JS JUST BEYOND SHEET BOUNDRY

PERMIT DRAWING
SHEET 11 OF 97

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STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

GRAPHIC SCALE 12.5 0 12.5 25

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	6A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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FLATIRON

Blythe

SITE 5

Rough Fork (ES-S3)

ES-W50

ES-W47

SITE 5A

15+00

10+00

NAD 83/95

OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 170 TONS
210 SY GEOTEXTILE
SEE DETAIL 6-8

CLASS 'I' RIP RAP
EST 28 TONS
52 SY GEOTEXTILE

3' STANDARD BASE DITCH
W/CLASS 'I' RIP RAP
EST 48 TON
89 SY GEOTEXTILE
SEE DETAIL 6-4

TOE PROTECTION
SEE DETAIL 6-9

30" W/ELBOWS

HW

24" W/ELBOWS

2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 94 TON
266 SY GEOTEXTILE
SEE DETAIL 6-3

6' X 6' RCBC
NOT BURIED

2GI W/FG

18" RCP-III

2GI W/FG

18" RCP-III

RW

CA

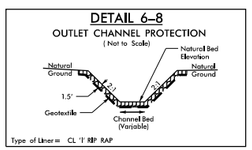
LEGEND

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 6-8
OUTLET CHANNEL PROTECTION
(Not to Scale)



STA. 77+24 -L- LT

PERMIT DRAWING
SHEET 12 OF 97

REVISIONS

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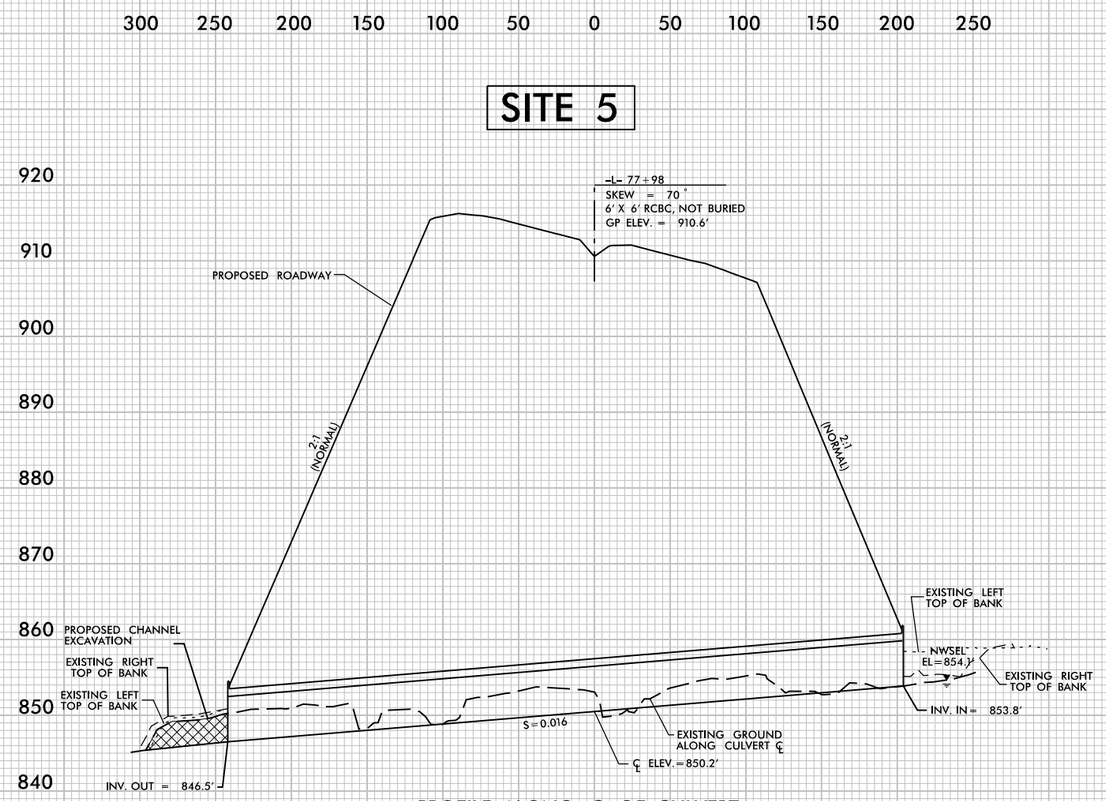
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1"=100' HORIZONTAL
1"=20' VERTICAL

SITE 5



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 13 OF 97

25826 PM
U2579D_E_PRM_CSR_PSH.dgn
$$$$USERNAME
$$$$DATE

8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-13

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

920 900 880 860 840

-Y1RPA- Sta.11+53.43
EL. =916.35
0.039 0.039 0.060 4:1 6.9:1 910.59 0.060
-Y1RPD- Sta.13+61.30
EL. =908.84
0.080 0.080
2:1 2:1
6' X 6' RCBC 6' X 6' RCBC
863.30
78+00.00

U-2579DEF
PERMIT SITE 5A

WETLANDS WETLANDS

-Y1RPA- Sta.12+04.85
EL. =915.62
0.021 0.022 0.060 4:1 6.9:1 909.82 0.060
-Y1RPD- Sta.14+10.00
EL. =907.71
0.080 0.080
2:1 2:1
860.89
77+50.00

-Y1RPA- Sta.12+56.45
EL. =914.80
0.003 0.004 0.060 4:1 6.8:1 909.05 0.060
-Y1RPD- Sta.14+58.60
EL. =906.47
0.080 0.080
2.01:1
872.40
77+00.00
-L-

PERMIT DRAWING
SHEET 14 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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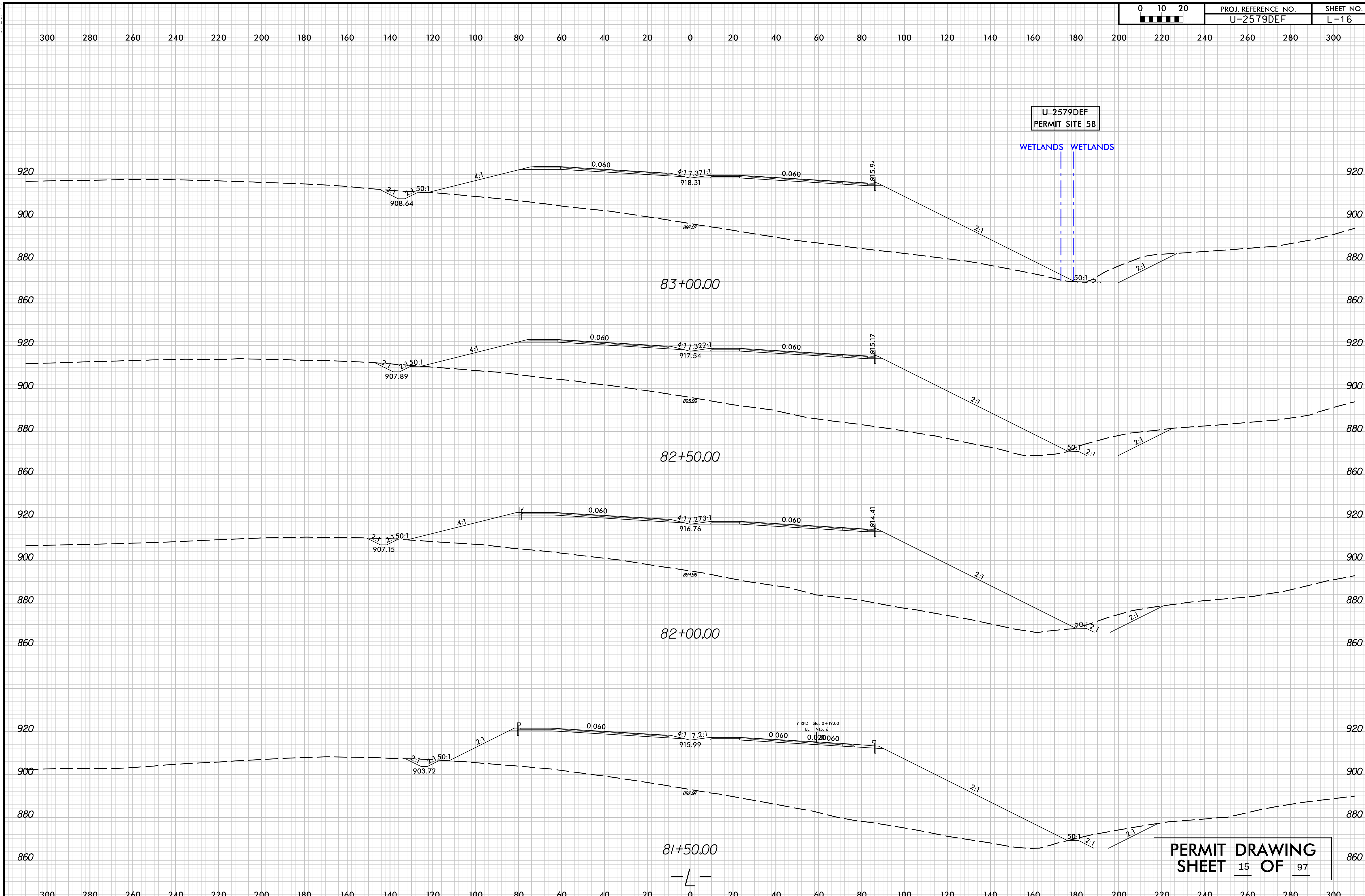

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Charlotte, NC 28202
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

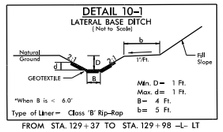
FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

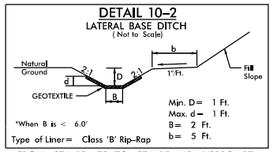
NAD 83/95

DETAIL 10-1
LATERAL BASE DITCH
(Not to Scale)



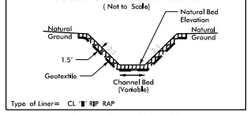
FROM STA. 129+37 TO STA. 129+98 –L– LT

DETAIL 10-2
LATERAL BASE DITCH
(Not to Scale)



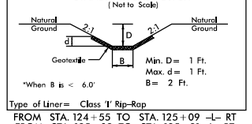
FROM STA. 12+72 TO STA. 15+45 –Y3RPC– RT

DETAIL 10-3
OUTLET CHANNEL PROTECTION
(Not to Scale)



STA. 16+36 –Y3RPB– RT
STA. 130+50 –L– RT

DETAIL 10-4
STANDARD BASE DITCH
(Not to Scale)

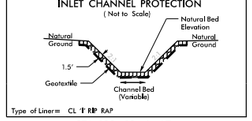


FROM STA. 124+55 TO STA. 125+09 –L– RT
FROM STA. 125+09 TO STA. 125+21 –L– RT

LEGEND

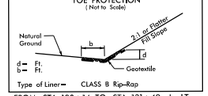
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES EXCAVATION IN WETLAND

DETAIL 10-8
INLET CHANNEL PROTECTION
(Not to Scale)



STA. 130+10 –L– LT

DETAIL 10-9
TOE PROTECTION
(Not to Scale)



FROM STA. 130+14 TO STA. 131+49 –L– LT
FROM STA. 124+63 TO STA. 127+24 –L– RT

Trick–um Creek
(ES–S4)

ES–S6

SITE 6

SITE 8

SITE 6A

SITE 7

Trib to Trick–um Creek
(ES–S5)

ES–W3

BEGIN JS

MATCHLINE –L– STA 122+50 SEE SHEET 9

MATCHLINE –L– STA 135+50 SEE SHEET 11

SEE SHEET 10

125+00

130+00

135+00

145+00

47" WW FENCE

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 100 TONS
167 SY GEOTEXTILE
SEE DETAIL 10-3

4' LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
EST 69 TONS
127 SY GEOTEXTILE.
SEE DETAIL 10-1

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 100 TONS
180 SY GEOTEXTILE
SEE DETAIL 10-3

30" W/ ELBOWS

HUBBARD REALTY OF WINSTON-SALEM, INC

TOE PROTECTION
SEE DETAIL 10-9

6' X 6' RCBC
NOT BURIED

15" RCP-III

30" RCP-III

42" RCP-IV – NOT BURIED

18" RCP-III

24" RCP-III

2GI
2GI W/FG
2GI-A W/FG
FS

2' LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
EST 54 TONS
83 SY GEOTEXTILE
SEE DETAIL 10-4

2' LATERAL BASE DITCH
W/CLASS 'I' RIP RAP
EST 11 TONS
17 SY GEOTEXTILE
SEE DETAIL 10-10

JB w/MH

PERMANENT ROCK CHECK

ENERGY DISSIPATOR BASIN
SEE SHEET 20-3
DETAIL 8

6' LATERAL BASE DITCH
W/PERMANENT ROCK CHECKS
@ 50' SPACING
CLASS 'I' RIPRAP
EST 365 TONS
915 SY GEOTEXTILE
SEE DETAIL 10-11

BACKFILL HEADCUT W/
TO NATURAL GROUND
CLASS 'II' RIP RAP
EST 110 TON
240 SY GEOTEXTILE
SEE DETAILS 10-7 AND 10-12

2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 120 TONS
340 SY GEOTEXTILE
SEE DETAIL 10-2

INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 50 TONS
95 SY GEOTEXTILE
SEE DETAIL 10-8

GLENN & TAMMY BURCHETTE

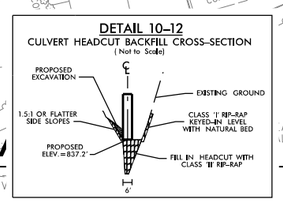
NORRIS Z. & KATHLEEN C. CLAYTON

CREST RIDGE LN

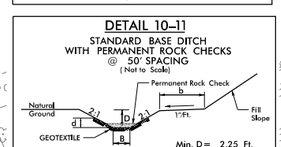
EXISTING 18" RCP

EXISTING 24" RCP

DETAIL 10-12
CULVERT HEADCUT BACKFILL CROSS-SECTION
(Not to Scale)

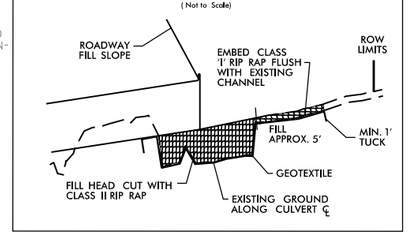


DETAIL 10-11
STANDARD BASE DITCH
WITH PERMANENT ROCK CHECKS
@ 50' SPACING
(Not to Scale)



FROM STA. 10+20 TO STA. 12+68 –Y3RPC– RT

DETAIL 10-7
CULVERT HEADCUT BACKFILL
(Not to Scale)



REVISIONS

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PERMIT DRAWING
SHEET 16 OF 97

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

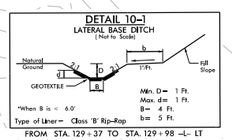
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

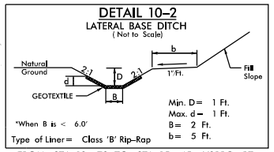
25 12.5 0 25 50
GRAPHIC SCALE

DETAIL 10-1
LATERAL BASE DITCH
(Not to Scale)



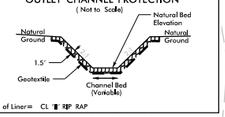
FROM STA. 129+37 TO STA. 129+98 –L– LT

DETAIL 10-2
LATERAL BASE DITCH
(Not to Scale)



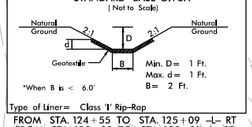
FROM STA. 12+72 TO STA. 15+45 –Y3RPC– RT

DETAIL 10-3
OUTLET CHANNEL PROTECTION
(Not to Scale)



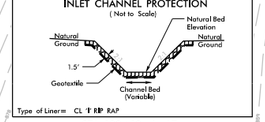
STA. 16+36 –Y3RPB– RT
STA. 130+50 –L– RT

DETAIL 10-4
STANDARD BASE DITCH
(Not to Scale)



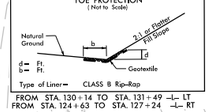
FROM STA. 124+55 TO STA. 125+09 –L– RT
FROM STA. 125+09 TO STA. 125+21 –L– RT

DETAIL 10-8
INLET CHANNEL PROTECTION
(Not to Scale)



STA. 130+10 –L– LT

DETAIL 10-9
TOE PROTECTION
(Not to Scale)



FROM STA. 130+14 TO STA. 131+49 –L– LT
FROM STA. 124+63 TO STA. 127+24 –L– RT

LEGEND

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

MATCHLINE –L– STA 122+50 SEE SHEET 9

MATCHLINE –L– STA 135+50 SEE SHEET 11

SEE SHEET 10A

Trick–um Creek (ES–S4)

ES–W3

ES–S6

Trick–um Creek (ES–S4)

Trib to Trick–um Creek (ES–S5)

SITE 6

SITE 6A

SITE 7

SITE 8

125+00

130+00

135+00

15+00

47" WW FENCE

HUBBARD REALTY OF WINSTON-SALEM, INC

GLENN & TAMMY BURCHETTE

NORRIS Z. & KATHLEEN C. CLAYTON

OUTLET CHANNEL PROTECTION CLASS 'II' RIP RAP EST 100 TONS 167 SY GEOTEXTILE SEE DETAIL 10-3

OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 100 TONS 180 SY GEOTEXTILE SEE DETAIL 10-3

30" W/ ELBOWS

4' LATERAL BASE DITCH W/CLASS 'I' RIP RAP EST 69 TONS 127 SY GEOTEXTILE SEE DETAIL 10-1

TOE PROTECTION SEE DETAIL 10-9

6' X 6' RCBC NOT BURIED

15" RCP-III

2GI W/FG

2GI-A W/FG

30" RCP-III

18" RCP-III

42" RCP-IV

42" RCP-III

24" RCP-III

2GI

FS

2' LATERAL BASE DITCH W/CLASS 'I' RIP RAP EST 54 TONS 83 SY GEOTEXTILE SEE DETAIL 10-4

TOE PROTECTION SEE DETAIL 10-9

2' LATERAL BASE DITCH W/CLASS 'I' RIP RAP EST 11 TONS 17 SY GEOTEXTILE SEE DETAIL 10-10

JB w/MH

PERMANENT ROCK CHECK

ENERGY DISSIPATOR BASIN SEE SHEET 2D-3 DETAIL B

6' LATERAL BASE DITCH W/PERMANENT ROCK CHECKS @ 50' SPACING CLASS 'I' RIPRAP EST 365 TONS 615 SY GEOTEXTILE SEE DETAIL 10-11

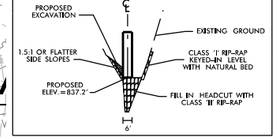
BACKFILL HEADCUT W/ TO NATURAL GROUND CLASS 'II' RIP RAP EST 110 TON 240 SY GEOTEXTILE SEE DETAILS 10-7 AND 10-12

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 120 TONS 340 SY GEOTEXTILE SEE DETAIL 10-2

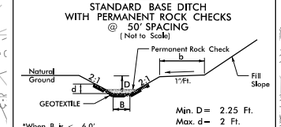
INLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 50 TONS 95 SY GEOTEXTILE SEE DETAIL 10-8

BEGIN JS

DETAIL 10-12
CULVERT HEADCUT BACKFILL CROSS-SECTION
(Not to Scale)

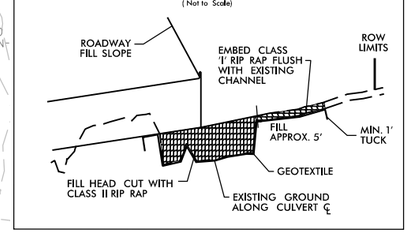


DETAIL 10-11
STANDARD BASE DITCH WITH PERMANENT ROCK CHECKS @ 50' SPACING
(Not to Scale)



FROM STA. 10+20 TO STA. 12+68 –Y3RPC– RT

DETAIL 10-7
CULVERT HEADCUT BACKFILL
(Not to Scale)



REVISIONS

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PENTABLE: NCDOT_permits_CON.tbl
DATE: 11/28/2018
TIME: 4:45:14 PM

PERMIT DRAWING
SHEET 17 OF 97

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Charlotte, NC 28202
NC License Number F-0991

12.5 0 12.5 25
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	10A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
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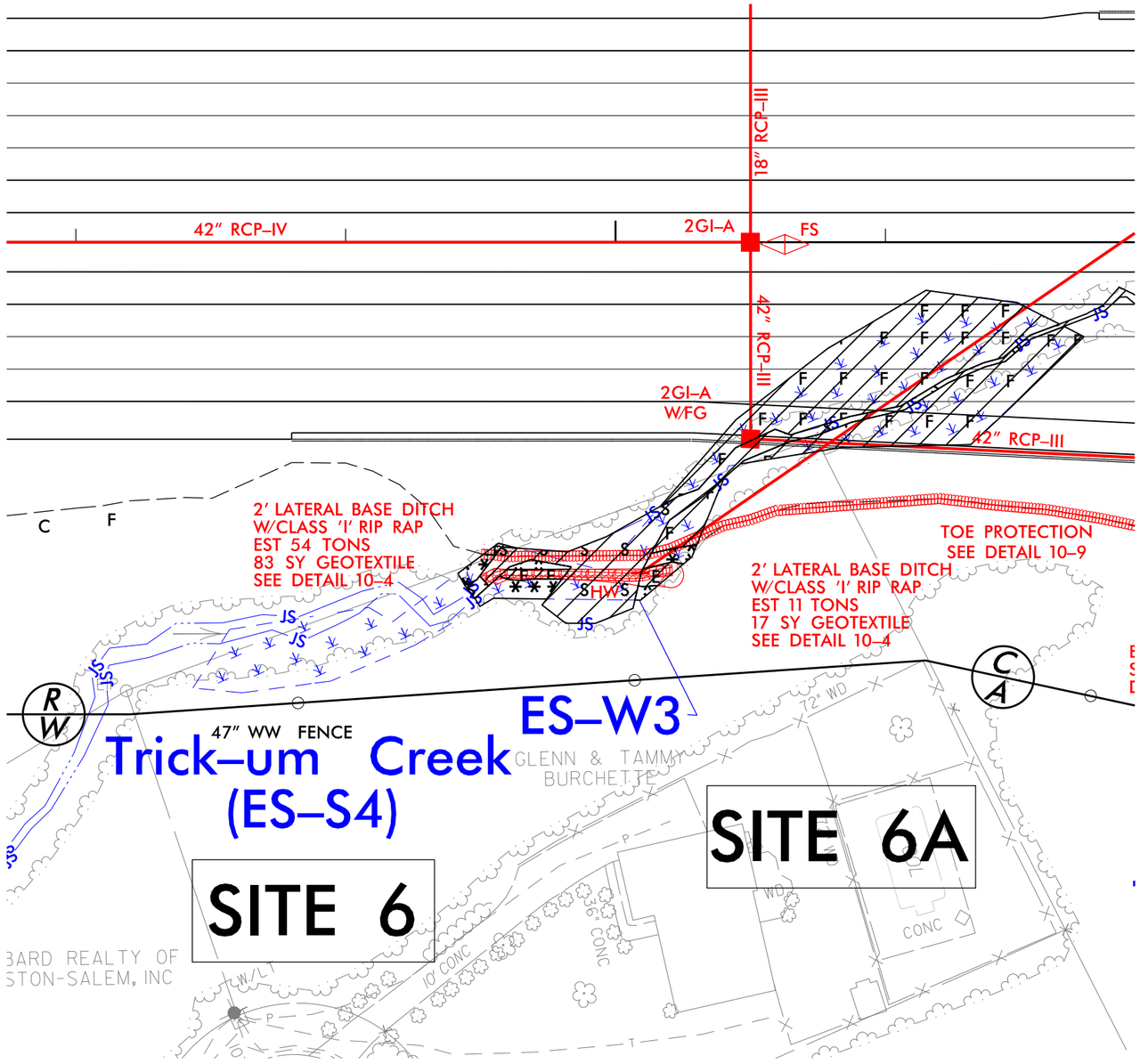
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

NAD 1983



LEGEND

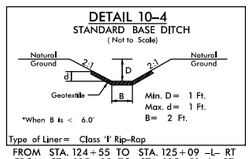
DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

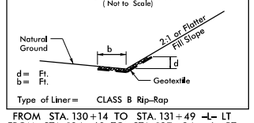
DENOTES EXCAVATION IN WETLAND

DETAIL 10-4
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap
FROM STA. 124+55 TO STA. 125+09 -L- RT
FROM STA. 125+09 TO STA. 125+21 -L- RT

DETAIL 10-9
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS B Rip-Rap
FROM STA. 130+14 TO STA. 131+49 -L- LT
FROM STA. 124+63 TO STA. 127+24 -L- RT

PERMIT DRAWING SHEET 18 OF 97

REVISIONS

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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-33

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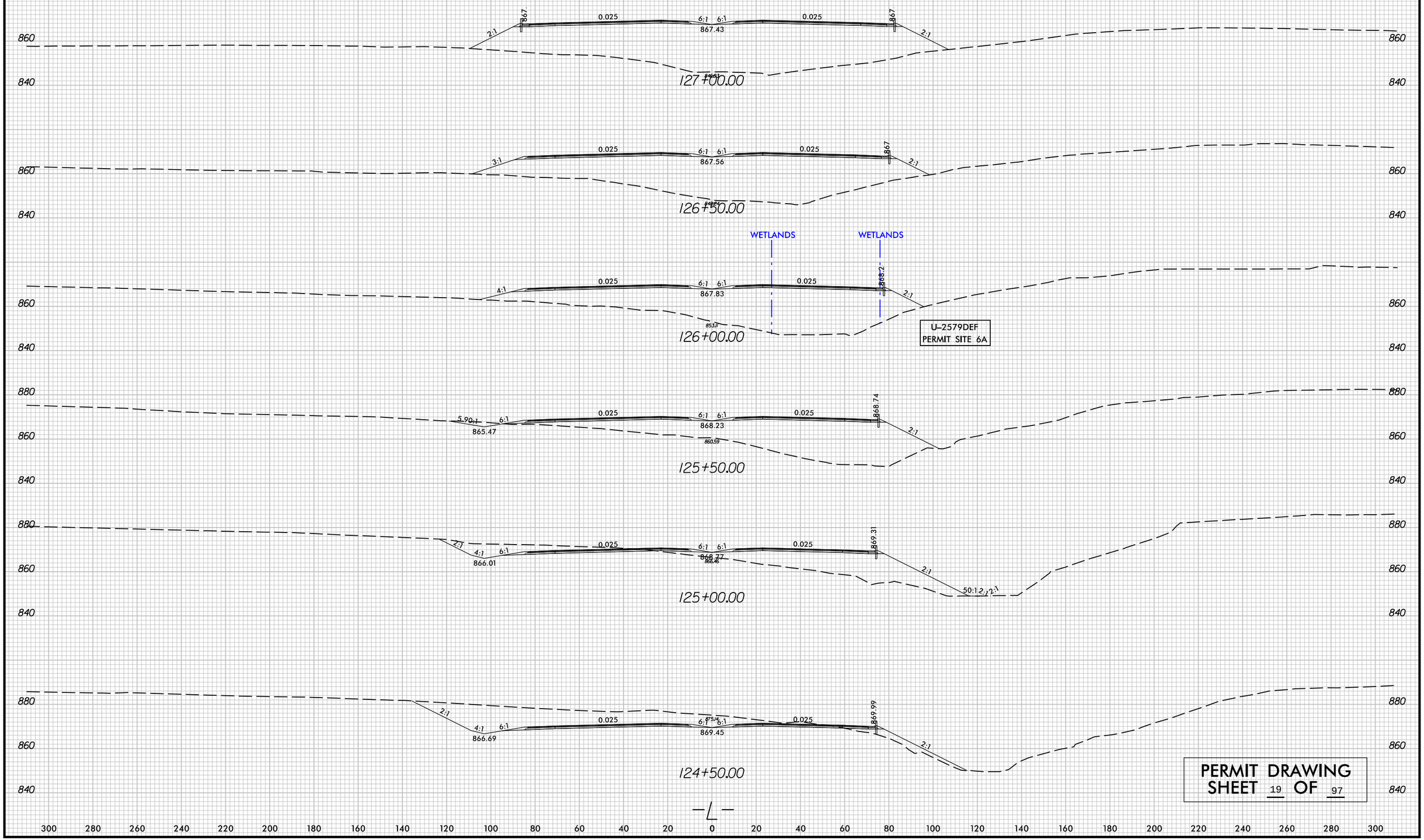

PERMIT DRAWING
SHEET 19 OF 97

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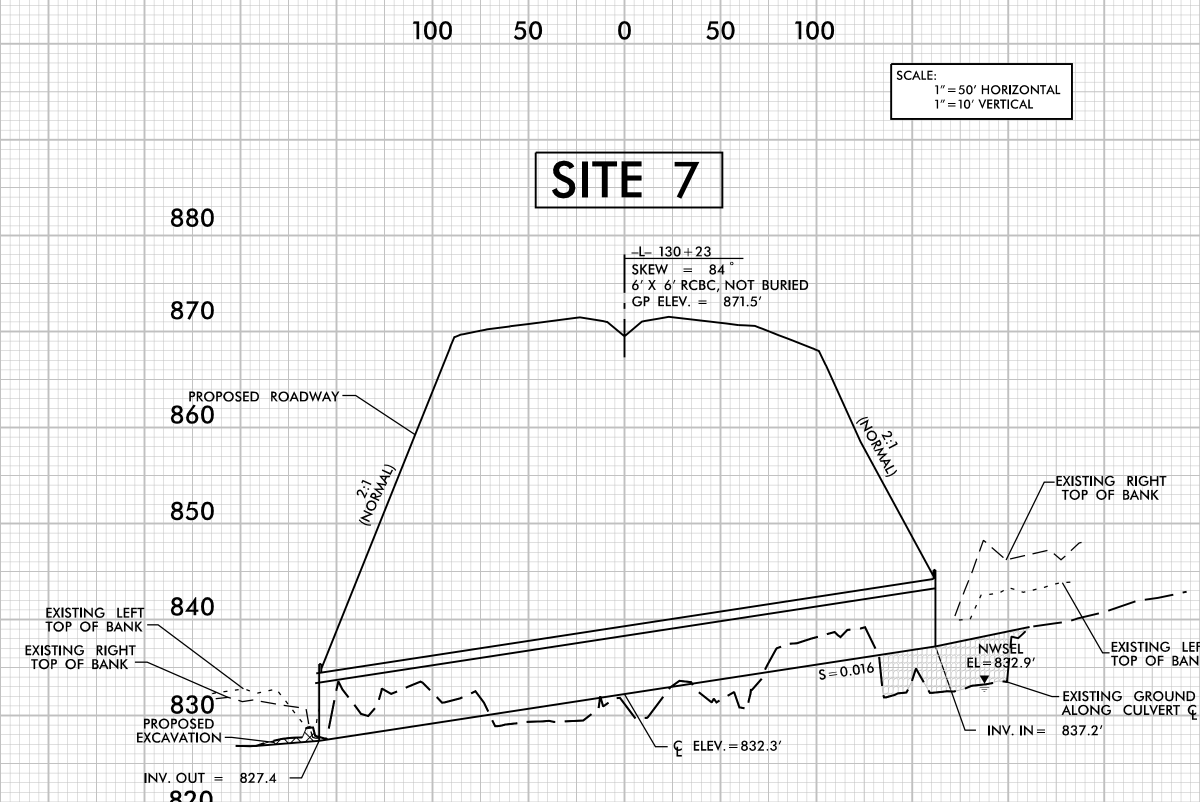
PENTABLE: NCDOT_PFL_XSC.tbl
DATE: 10/17/2018
TIME: 6:10:32 PM

PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 20 OF 97

5/14/99
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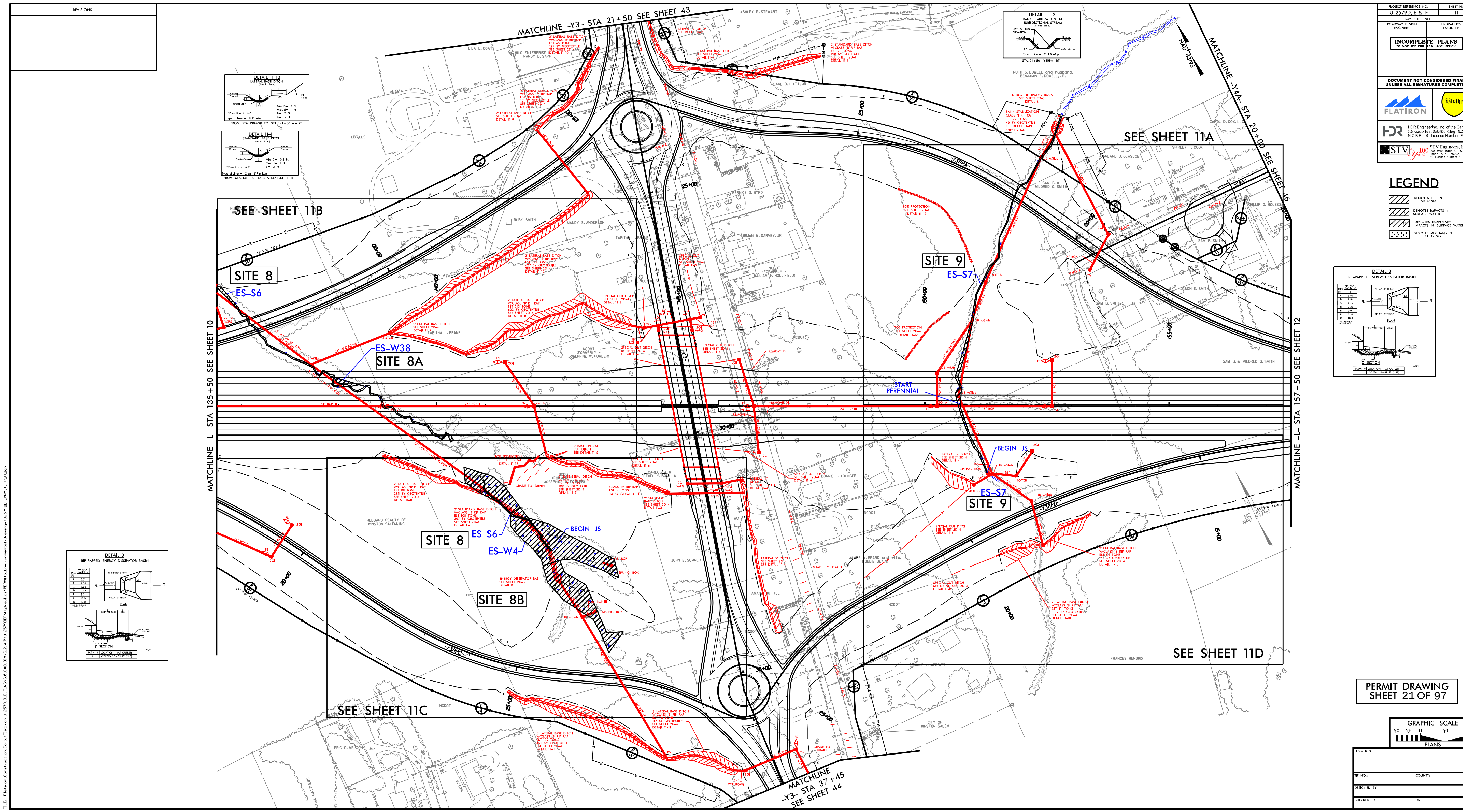

REVISIONS
MATCHLINE -Y3- STA 21+50 SEE SHEET 43
MATCHLINE -Y3- STA 37+45 SEE SHEET 44
MATCHLINE -Y4A- STA 20+00 SEE SHEET 46
MATCHLINE -L- STA 135+50 SEE SHEET 10
MATCHLINE -L- STA 157+50 SEE SHEET 12
SEE SHEET 11A
SEE SHEET 11B
SEE SHEET 11C
SEE SHEET 11D
SITE 8
SITE 8A
SITE 8B
SITE 9
ES-S6
ES-W38
ES-W4
ES-S7
BEGIN JS
START PERENNIAL
DETAIL 11-10 LATERAL BASE DITCH
DETAIL 11-1 STANDARD BASE DITCH
DETAIL 11-13 BANK STABILIZATION AT PERPENDICULAR STREAM
DETAIL 8 RIP-RAPPED ENERGY DISSIPATOR BASIN
PROJECT REFERENCE NO. U-2579D, E & F
SHEET NO. 11
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
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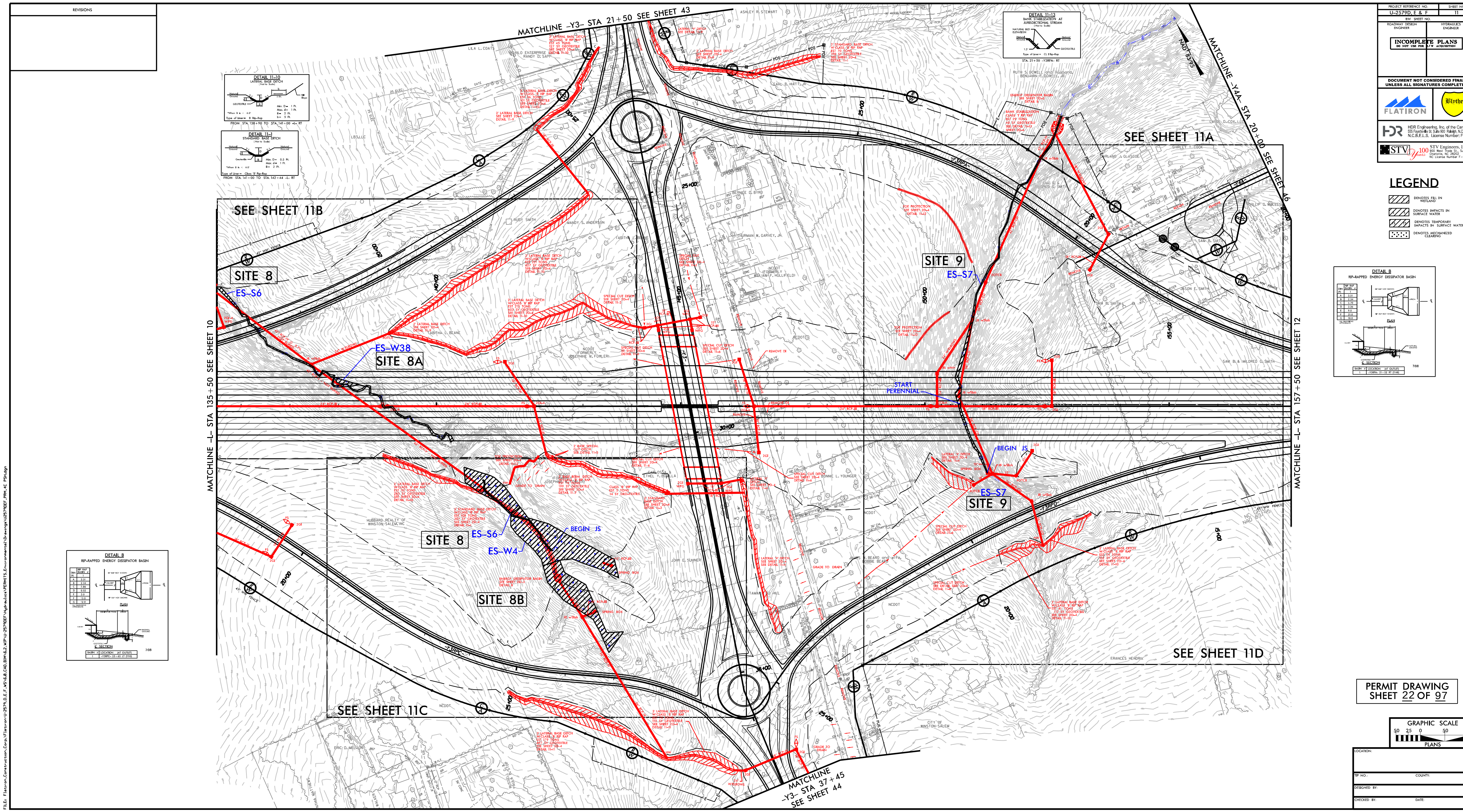
Blythe
HDR Engineering, Inc. of the Carolinas
STV Engineers, Inc.
LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
PERMIT DRAWING SHEET 21 OF 97
GRAPHIC SCALE
PLANS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MATCHLINE -Y4A- STA 20+00 SEE SHEET 46
MATCHLINE -L- STA 135+50 SEE SHEET 10
MATCHLINE -L- STA 157+50 SEE SHEET 12
MATCHLINE -Y3- STA 37+45 SEE SHEET 44
SEE SHEET 11A
SEE SHEET 11B
SEE SHEET 11C
SEE SHEET 11D
SITE 8
SITE 8A
SITE 8B
SITE 9
ES-S6
ES-W38
ES-W4
ES-S7
BEGIN JS
START PERENNIAL
LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DETAIL 11-10 LATERAL BASE DITCH
DETAIL 11-1 STANDARD BASE DITCH
DETAIL 11-13 BANK STABILIZATION AT JURISDICTIONAL STREAM
DETAIL 8 RIP-RAPPED ENERGY DISSIPATOR BASIN
U-2579D, E & F
INCOMPLETE PLANS
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FLATIRON
Blythe
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STV Engineers, Inc.
PERMIT DRAWING SHEET 22 OF 97
GRAPHIC SCALE
PLANS

8/17/99

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	11A

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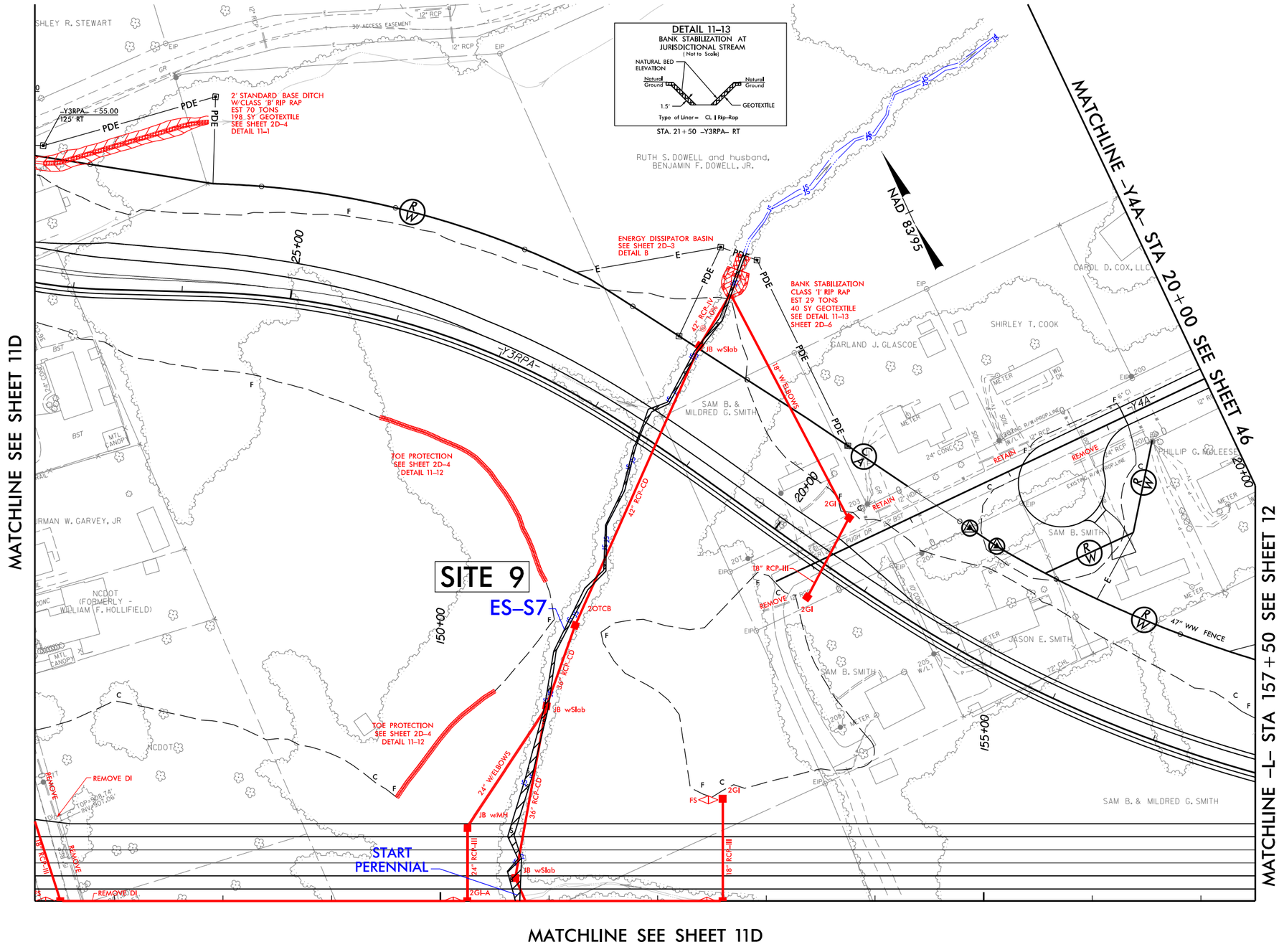
25 12.5 0 25 50
GRAPHIC SCALE



MATCHLINE SEE SHEET 11D

MATCHLINE –L– STA 157+50 SEE SHEET 12

DETAIL 11-13
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)

STA. 21+50 –Y3RPA– RT

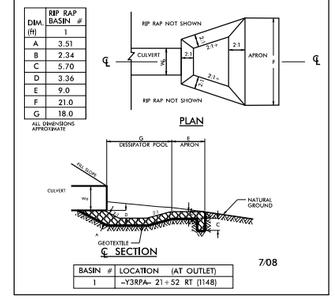
LEGEND

- DENOTES MECHANIZED CLEARING
- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL B
RIP-RAPPED ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN # 1
A	3.51
B	2.34
C	5.70
D	3.36
E	9.0
F	21.0
G	18.0

ALL DIMENSIONS APPROXIMATE



7/08

BASIN #	LOCATION (AT OUTLET)
1	–Y3RPA– 21+52 RT. (1148)

PERMIT DRAWING
SHEET 23 OF 97

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	11B

ROADWAY DESIGN ENGINEER

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25 12.5 0 25 50
GRAPHIC SCALE

NAD 83'95

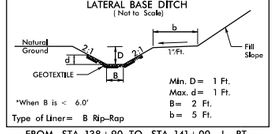
MATCHLINE –Y3– STA 21+50 SEE SHEET 43

MATCHLINE –L– STA 135+50 SEE SHEET 10

MATCHLINE SEE SHEET 11A

MATCHLINE SEE SHEET 11C

DETAIL 11–10
LATERAL BASE DITCH
(Not to Scale)



Type of Liner = B Rip–Rap

FROM STA. 138+90 TO STA. 141+00 –L– RT

LEGEND

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

SITE 8
ES–S6

SITE 8A
ES–W38

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 45 TONS 127 SY GEOTEXTILE SEE SHEET 2D–4 DETAIL 11–10

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 36 TONS 101 SY GEOTEXTILE SEE SHEET 2D–4 DETAIL 11–10

2' LATERAL BASE DITCH SEE SHEET 2D–4 DETAIL 11–9

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 221 TONS 627 SY GEOTEXTILE SEE SHEET 2D–4 DETAIL 11–10

2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 213 TONS 603 SY GEOTEXTILE SEE SHEET 2D–4 DETAIL 11–10

2' LATERAL BASE DITCH SEE SHEET 2D–4 DETAIL 11–9

LATERAL 'V' DITCH SEE DETAIL 11–9

2' LATERAL BASE DITCH SEE SHEET 2D–4 DETAIL 11–9

SPECIAL CUT DITCH SEE SHEET 2D–4 DETAIL 11–2

SPECIAL CUT DITCH SEE SHEET 2D–6 DETAIL 11–6

SPECIAL CUT DITCH SEE SHEET 2D–4 DETAIL 11–2

SPECIAL CUT DITCH SEE SHEET 2D–4 DETAIL 11–6

LILA L. COATS
OHILO ENTERPRISE
RANDY D. SAPP
LB3,LLC
HUBBARD REALTY OF WINSTON-SALEM, INC
RUBY SMITH
MANDY S. ANDERSON
TABITHA L. BEANE
BILLY U. NUCKOLLS
NCDOT (FORMERLY JOSEPHINE W. FOWLER)

20+00
25+00
40+00
145+00

PERMIT DRAWING
SHEET 24 OF 97

0 10 20

PROJ. REFERENCE NO.	SHEET NO.
U-2579DEF	L-39

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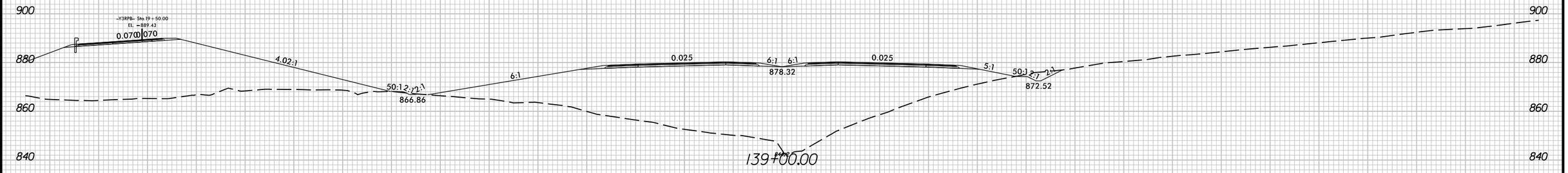

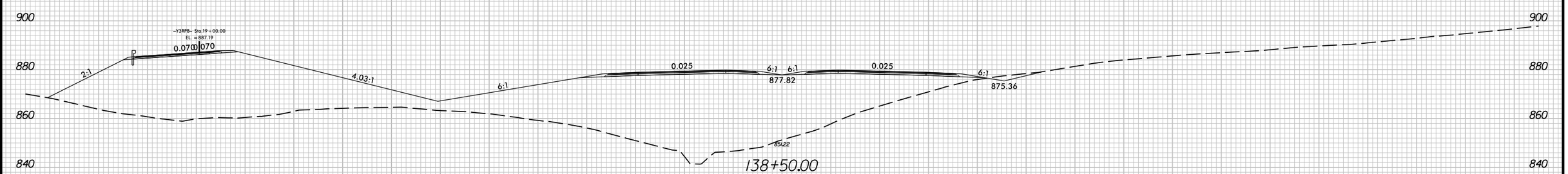

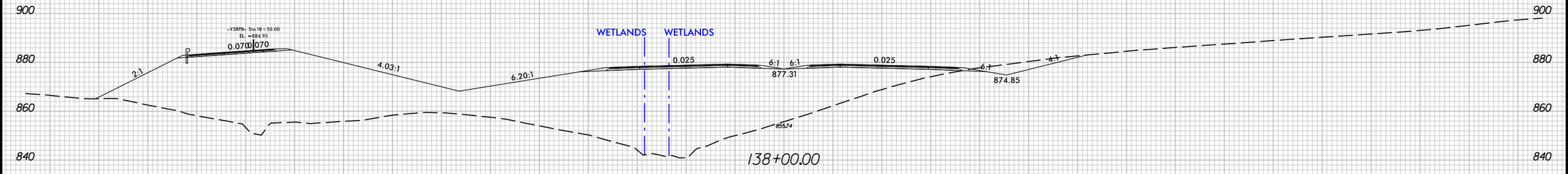

U-2579DEF
PERMIT SITE 8A

PERMIT DRAWING
SHEET 25 OF 97

-L-

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TIME: 6:10:34 PM

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	11C

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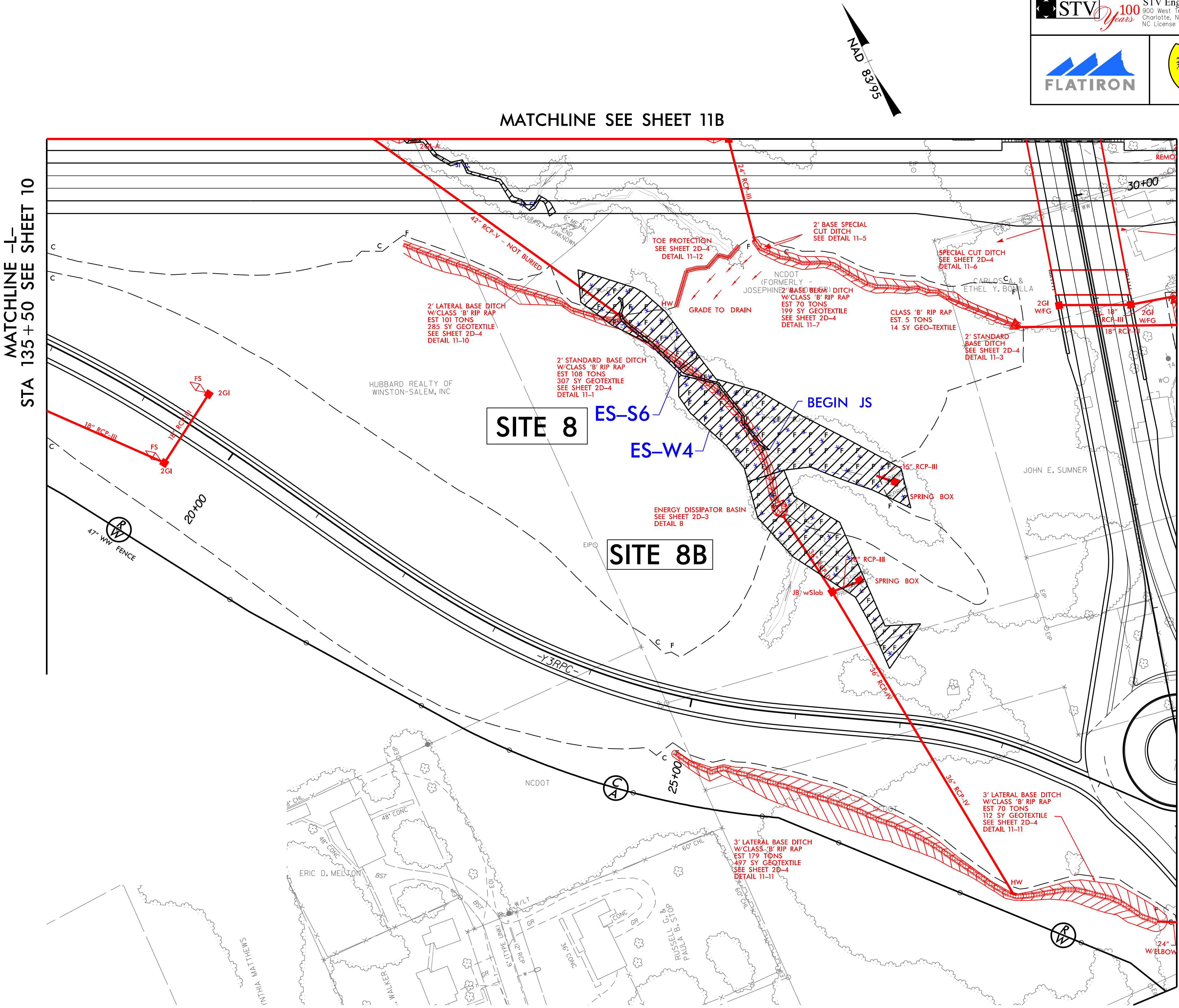
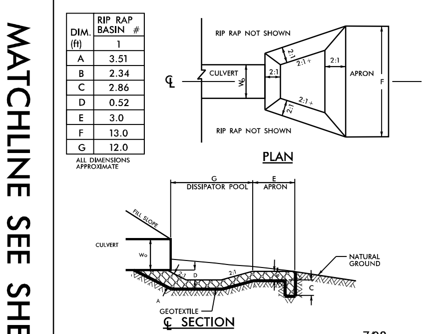
MATCHLINE SEE SHEET 11B


NAD 83/95
MATCHLINE -L- STA 135+50 SEE SHEET 10
MATCHLINE SEE SHEET 11D
GRAPHIC SCALE 25 12.5 0 25 50
SITE 8
SITE 8B
ES-S6
ES-W4
BEGIN JS
42" RCP-V - NOT BURIED
24" RCP-III
18" RCP-III
2GI
FS
20+00
25+00
30+00
-Y3RPC-
47" WW FENCE
HUBBARD REALTY OF WINSTON-SALEM, INC
NCDOT (FORMERLY JOSEPHINE BOLLA)
CARLOS A. & ETHEL Y. BOLLA
JOHN E. SUMNER
NCDOT
ERIC D. MELTON
RUSSELL G. & PAULA B. STOP
TOE PROTECTION SEE SHEET 2D-4 DETAIL 11-12
GRADE TO DRAIN
2' BASE SPECIAL CUT DITCH SEE DETAIL 11-5
SPECIAL CUT DITCH SEE SHEET 2D-4 DETAIL 11-6
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 101 TONS 285 SY GEOTEXTILE SEE SHEET 2D-4 DETAIL 11-10
2' BASE BERM DITCH W/CLASS 'B' RIP RAP EST 70 TONS 199 SY GEOTEXTILE SEE SHEET 2D-4 DETAIL 11-7
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
2' STANDARD BASE DITCH SEE SHEET 2D-4 DETAIL 11-3
2' STANDARD BASE DITCH W/CLASS 'B' RIP RAP EST 108 TONS 307 SY GEOTEXTILE SEE SHEET 2D-4 DETAIL 11-1
15" RCP-III
SPRING BOX
ENERGY DISSIPATOR BASIN SEE SHEET 2D-3 DETAIL B
JB wSlab
36" RCP-IV
3' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 70 TONS 112 SY GEOTEXTILE SEE SHEET 2D-4 DETAIL 11-11
3' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 179 TONS 497 SY GEOTEXTILE SEE SHEET 2D-4 DETAIL 11-11
HW
24" W/ELBOW
2GI W/FG
18" RCP-III

DETAIL B
RIP-RAPPED ENERGY DISSIPATOR BASIN



DIM. (ft)	RIP RAP BASIN # 1
A	3.51
B	2.34
C	2.86
D	0.52
E	3.0
F	13.0
G	12.0

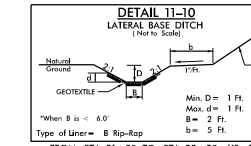
ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	-Y3RPC- 25+65 LT (1110)

LEGEND

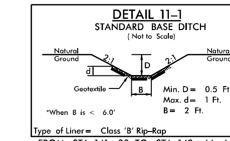
- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATER

DETAIL 11-10
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 21+90 TO STA. 22+90 -Y3- RT
FROM STA. 19+43 TO STA. 24+20 -Y3RPB- RT
FROM STA. 24+70 TO STA. 25+31 -Y3RPB- LT
FROM STA. 139+70 TO STA. 144+00 -L- LT
FROM STA. 138+90 TO STA. 141+00 -L- RT
FROM STA. 17+50 TO STA. 19+60 -Y3RPD- LT

DETAIL 11-1
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 141+00 TO STA. 142+44 -L- RT

REVISIONS

8/17/99

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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-40

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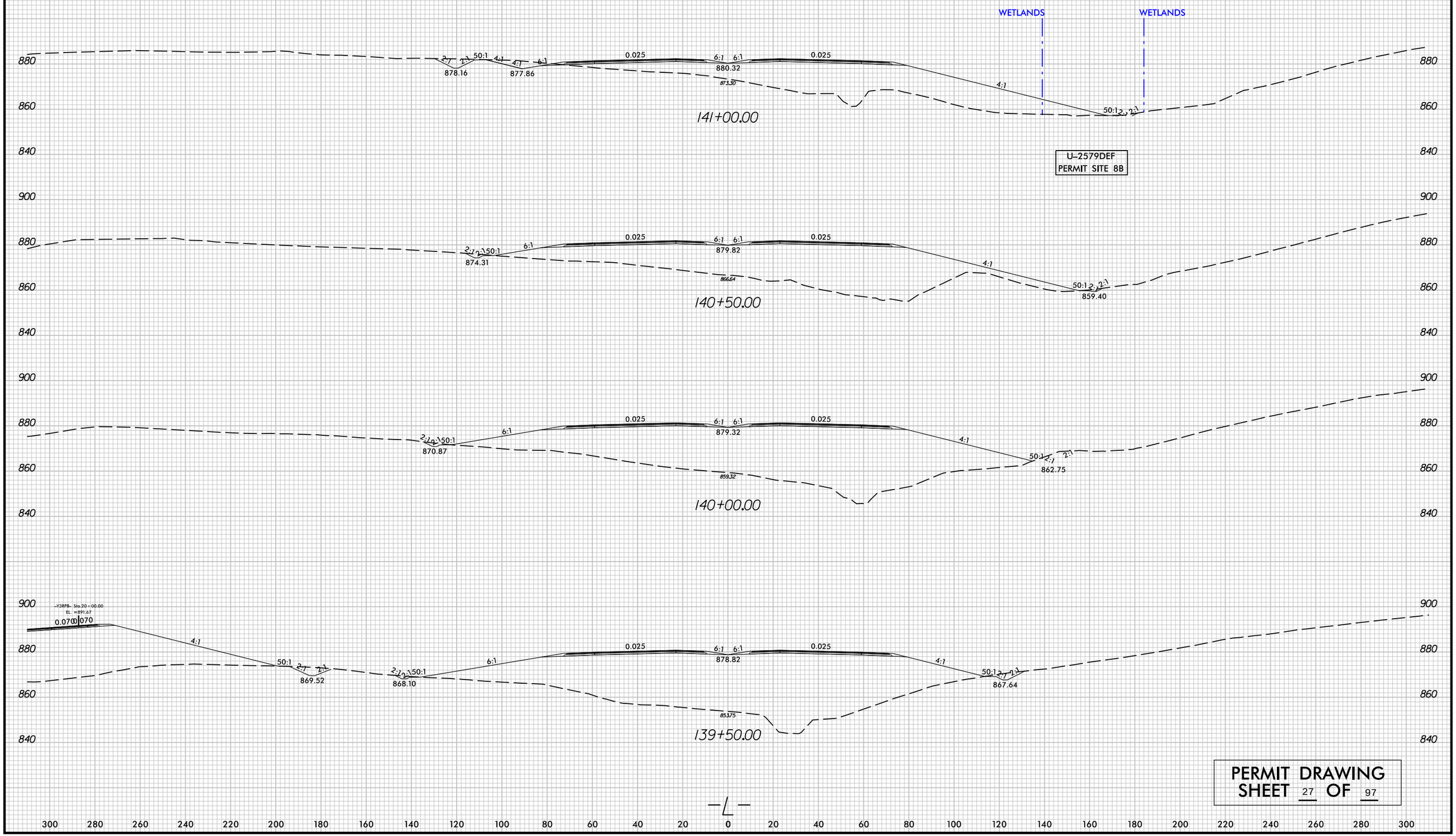

PERMIT DRAWING
SHEET 27 OF 97

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PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	11D

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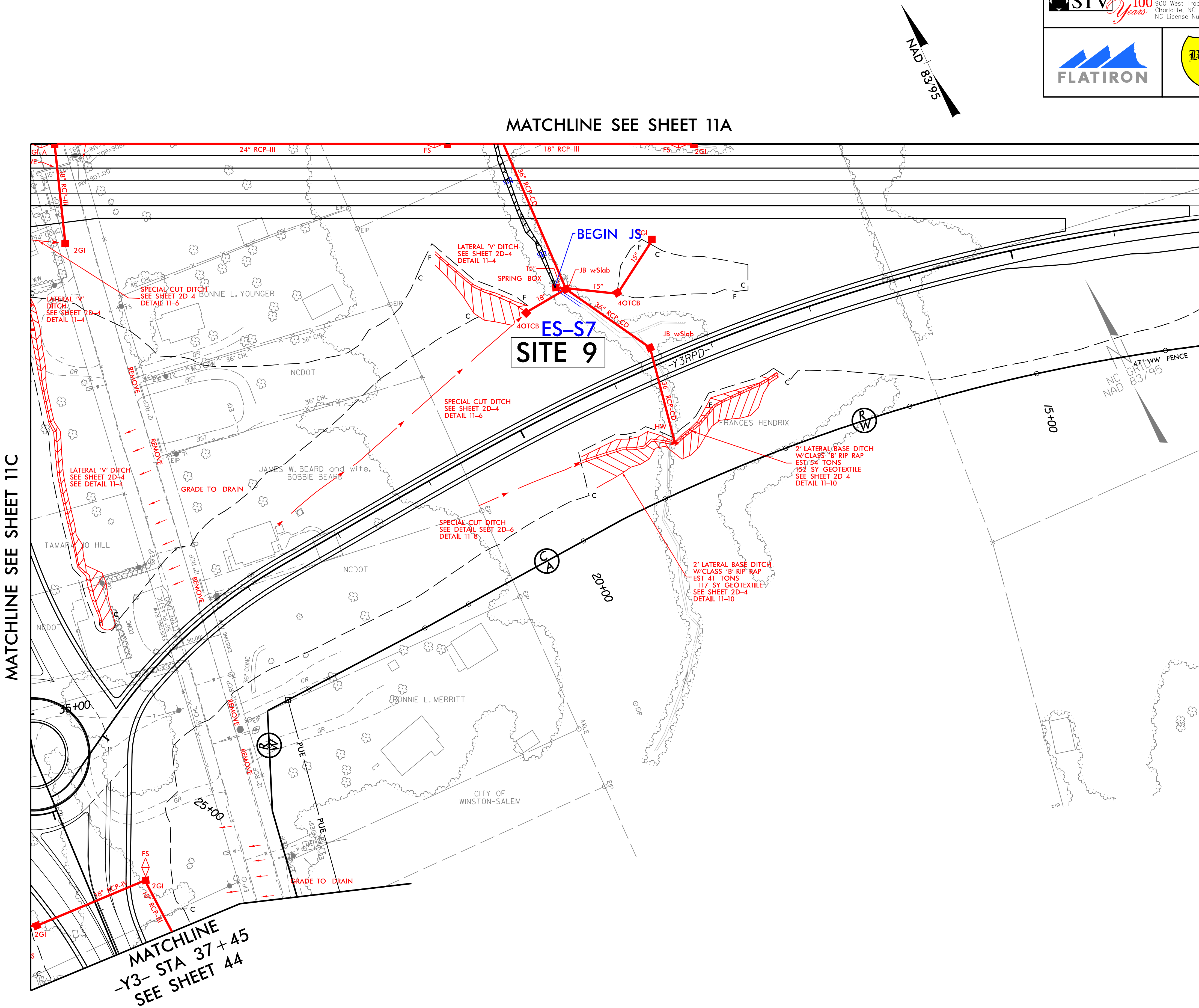
GRAPHIC SCALE 25 12.5 0 25 50



LEGEND

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 28 OF 97

8/17/99
REVISIONS
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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

-Y4-
PI Sta 24+16.98
△ = 64° 08' 16.7" (LT)
D = 10° 44' 58.8"
L = 596.65'
T = 333.95'
R = 533.00'
e = 4%
DS = 40 MPH

MATCHLINE -Y4- STA 21+50
SEE SHEET 46

SEE SHEET 12A

SITE 10

SITE 10A

SITE 10B

ES-S8

ES-W36

ES-W37

BEGIN JS

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 150 TONS
290 SY GEOTEXTILE
SEE DETAIL 12-11

PHILLIP C. McLEESE

TIMOTHY R. LAUCK

BEVERLEY GAY DEZARN

MELVIN H. COOK

FRANCES HENDRIX

MAYE A. BOLES

121

RAY E. & NANNIE S. SMITH

R.V. BOWERS

NCDOT

LOUISE B. WELBORN

ALBERTO MENDEZ

EVA NELL WOMBLE

105

NAD 83/95

SEE SHEET 11

SEE SHEET 13

MATCHLINE -L- STA 157+50
SEE SHEET 11

MATCHLINE -L- STA 169+50
SEE SHEET 13

MATCHLINE -Y4B- STA 12+50
SEE INSET SHEET 45

LATERAL 'V' DITCH
SEE DETAIL 12-6

TOE PROTECTION

DITCH BLOCK
DETAIL A
SEE SHEET 2D-3

4' LATERAL BASE DITCH
SEE DETAIL 12-2

CLASS 'B' RIP RAP
EST. 2 TONS
7 SY GEO-TEXTILE

4' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 48 TONS
131 SY GEOTEXTILE
SEE DETAIL 12-3

4' STANDARD BASE DITCH
W/CLASS 'B' RIP RAP
EST 20 TONS
54 SY GEOTEXTILE
SEE DETAIL 12-4

2' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 58 TONS
165 SY GEOTEXTILE
SEE DETAIL 12-11

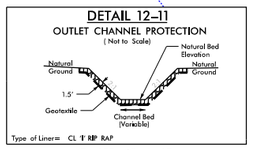
STANDARD 'V' DITCH
SEE DETAIL 12-5

SPECIAL CUT MEDIAN DITCH
SEE DETAIL 12-1

RETAIN

REMOVE

DETAIL 12-11
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 159+68 -L- LT

LEGEND

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

PERMIT DRAWING
SHEET 29 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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DATE: 10/24/2018
TIME: 4:01:20 PM

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NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

-Y4-
PI Sta 24+16.98
△ = 64° 08' 16.7" (LT)
D = 10° 44' 58.8"
L = 596.65'
T = 333.95'
R = 533.00'
e = 4%
DS = 40 MPH

MATCHLINE -Y4- STA 21+50
SEE SHEET 46

SEE SHEET 12A

SITE 10

SITE 10A

SITE 10B

ES-S8

ES-W36

ES-W37

BEGIN JS

MATCHLINE -L- STA 157+50
SEE SHEET 11

MATCHLINE -L- STA 169+50
SEE SHEET 13

MATCHLINE -Y4B- STA 12+50
SEE INSET SHEET 45

NAD 1983

LEGEND

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

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST. 150 TONS
290 SY GEOTEXTILE
SEE DETAIL 12-11

LATERAL 'V' DITCH
SEE DETAIL 12-6

TOE PROTECTION

SPECIAL CUT MEDIAN DITCH
SEE DETAIL 12-1

STANDARD 'V' DITCH
SEE DETAIL 12-5

DITCH BLOCK DETAIL A
SEE SHEET 2D-3

4' LATERAL BASE DITCH
SEE DETAIL 12-2

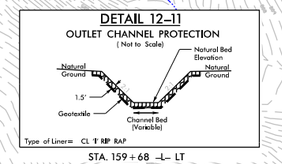
CLASS 'B' RIP RAP
EST. 2 TONS
7 SY GEO-TEXTILE

4' LATERAL BASE DITCH
W/CLASS 'B' RIP RAP
EST 48 TONS
131 SY GEOTEXTILE
SEE DETAIL 12-3

4' STANDARD BASE DITCH
W/CLASS 'B' RIP RAP
EST 20 TONS
54 SY GEOTEXTILE
SEE DETAIL 12-4

2' LATERAL BASE DITCH
W/CLASS "B" RIP RAP
EST 58 TONS
165 SY GEOTEXTILE
SEE DETAIL 12-11

DETAIL 12-11
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 159+68 -L- LT

PERMIT DRAWING
SHEET 30 OF 97

REVISIONS

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USER: BLILLY
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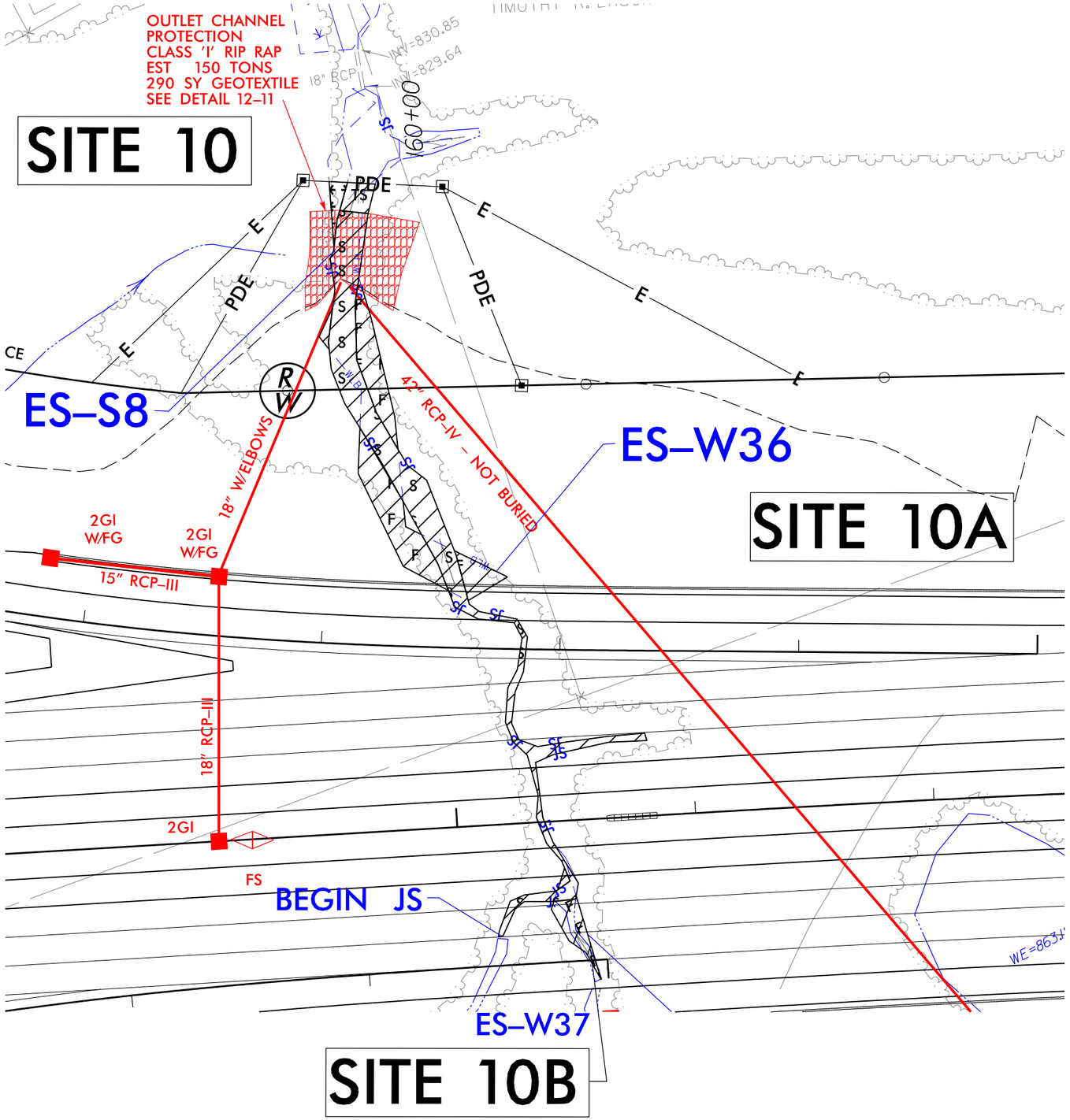

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STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

GRAPHIC SCALE 12.5 0 12.5 25

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	12A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
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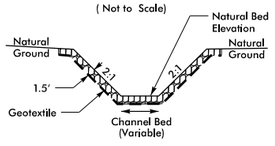
FLATIRON

Blythe

NAD 83/95

DETAIL 12–11
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 159+68 –L– LT

LEGEND

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 31 OF 97

REVISIONS

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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-49

300 280 260 240 220 200 180 160 140 120 100 80 60 40 20 0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

WETLANDS WETLANDS

-Y3RPA- Sta.12+47.48
EL. =894.08

-Y3RPD- Sta.10+59.57
EL. =893.31

0.037 0.036 0.010 6:1 6:1 0.025 0.025

892.21

2:1 2:1 50:1 2:1 2:1

866.73

849.56

160+00.00

U-2579DEF
PERMIT SITE 10A

-Y3RPA- Sta.12+97.72
EL. =893.54

-Y3RPD- Sta.11+09.58
EL. =893.44

0.056 0.055 0.002 6:1 6:1 0.025 0.038

892.36

2:1 2:1 2:1 2:1

867.18

863.87

159+50.00

-Y3RPA- Sta.13+48.11
EL. =892.90

-Y3RPD- Sta.11+59.59
EL. =893.50

0.074 0.073 0.007 6:1 6:1 0.025 0.056

892.51

2.01:1 2:1

874.58

159+00.00

900 880 860 840 820 920

PERMIT DRAWING
SHEET 32 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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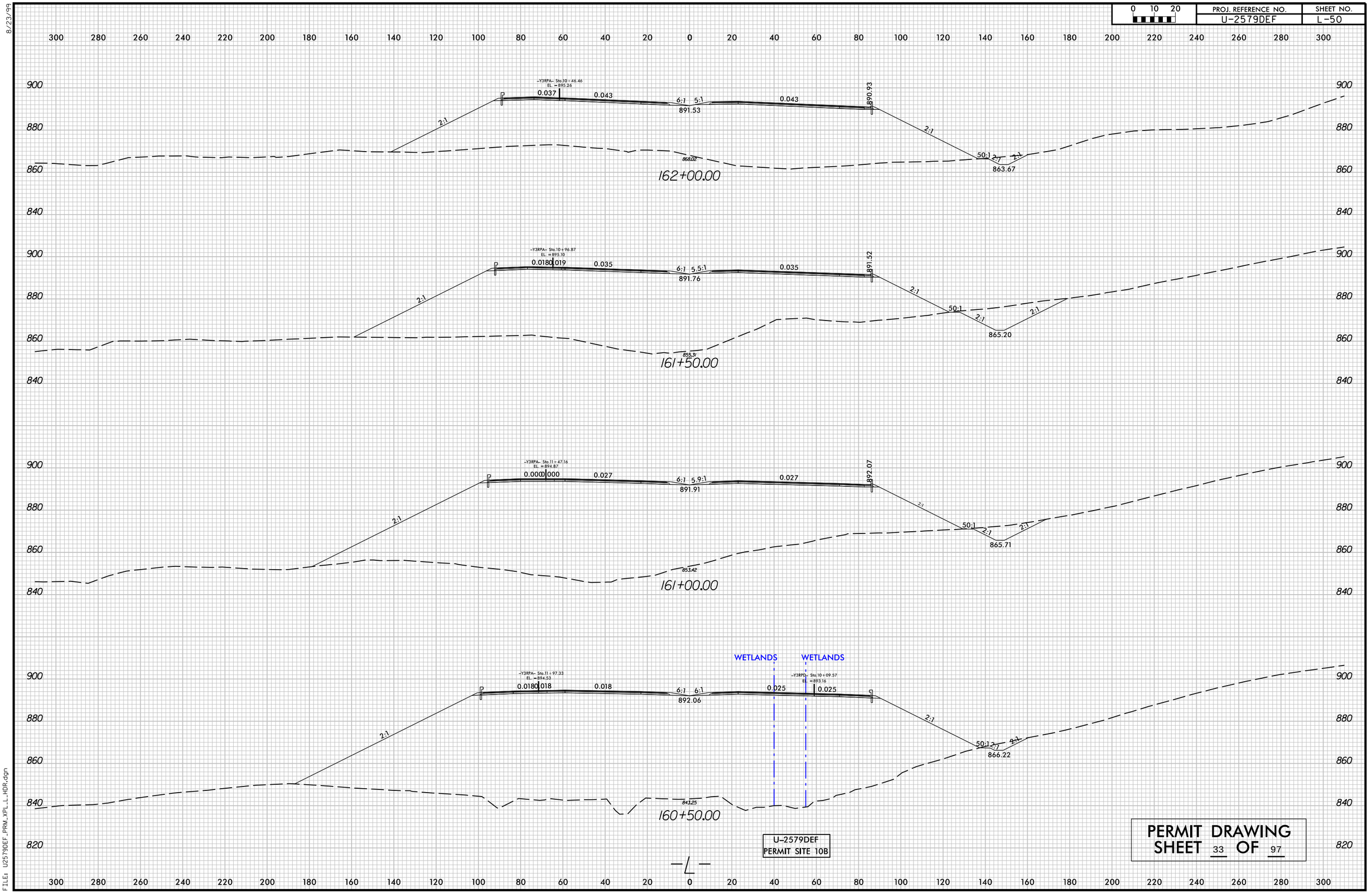

PERMIT DRAWING
SHEET 33 OF 97

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	13

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
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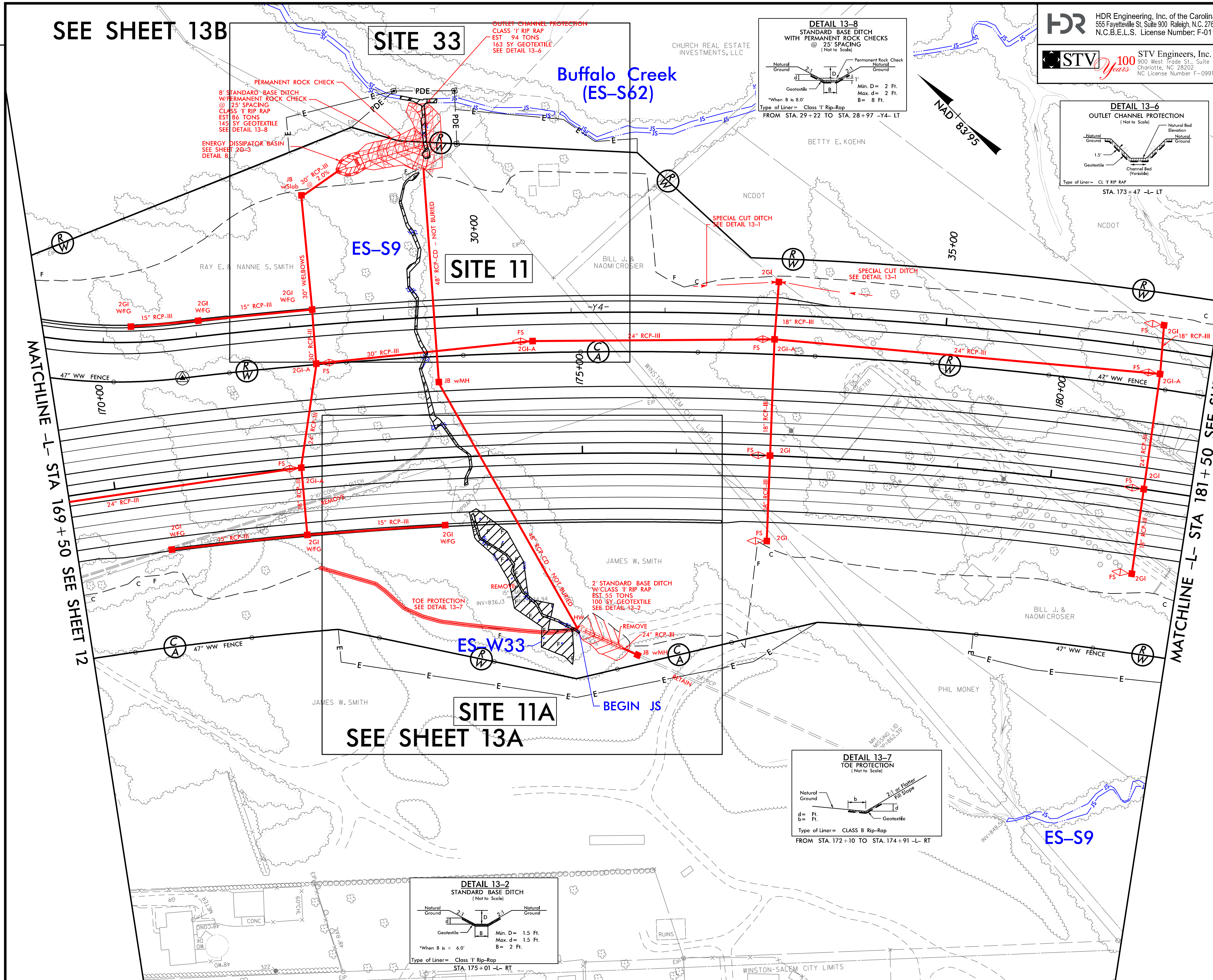
NC License Number F-0991



SEE SHEET 13B
SITE 33
SITE 11
SITE 11A
SEE SHEET 13A
Buffalo Creek (ES-S62)
ES-S9
ES-W33
BEGIN JS
MATCHLINE -L- STA 169+50 SEE SHEET 12
MATCHLINE -L- STA 181+50 SEE SHEET 14
NAD 83/95
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 94 TONS 163 SY GEOTEXTILE SEE DETAIL 13-6
PERMANENT ROCK CHECK
8' STANDARD BASE DITCH W/PERMANENT ROCK CHECK @ 25' SPACING CLASS 'I' RIP RAP EST 86 TONS 145 SY GEOTEXTILE SEE DETAIL 13-8
ENERGY DISSIPATOR BASIN SEE SHEET 2D-3 DETAIL B
SPECIAL CUT DITCH SEE DETAIL 13-1
2' STANDARD BASE DITCH W/CLASS 'I' RIP RAP EST 55 TONS 100 SY GEOTEXTILE SEE DETAIL 13-2
TOE PROTECTION SEE DETAIL 13-7
48" RCP-CD - NOT BURIED
47" WW FENCE
CHURCH REAL ESTATE INVESTMENTS, LLC
BETTY E. KOEHN
NCDOT
RAY E. & NANNIE S. SMITH
BILL J. & NAOMI CROSIER
JAMES W. SMITH
PHIL MONEY
WINSTON-SALEM CITY LIMITS
DETAIL 13-8 STANDARD BASE DITCH WITH PERMANENT ROCK CHECKS @ 25' SPACING (Not to Scale)
Min. D= 2 Ft. Max. d= 2 Ft. B= 8 Ft.
Type of Liner= Class 'I' Rip-Rap
FROM STA. 29+22 TO STA. 28+97 -Y4- LT
DETAIL 13-6 OUTLET CHANNEL PROTECTION (Not to Scale)
Type of Liner= CL 'I' RIP RAP
STA. 173+47 -L- LT
DETAIL 13-7 TOE PROTECTION (Not to Scale)
Type of Liner= CLASS B Rip-Rap
FROM STA. 172+10 TO STA. 174+91 -L- RT
DETAIL 13-2 STANDARD BASE DITCH (Not to Scale)
Min. D= 1.5 Ft. Max. d= 1.5 Ft. B= 2 Ft.
Type of Liner= Class 'I' Rip-Rap
STA. 175+01 -L- RT

LEGEND

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

GRAPHIC SCALE

REVISIONS

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PERMIT DRAWING SHEET 34 OF 97

SEE SHEET 13B

SITE 33

Buffalo Creek
(ES–S62)

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST. 94 TONS
163 SY GEOTEXTILE
SEE DETAIL 13–6

PERMANENT ROCK CHECK
8' STANDARD BASE DITCH
W/PERMANENT ROCK CHECK
@ 25' SPACING
CLASS 'I' RIP RAP
EST. 86 TONS
145 SY GEOTEXTILE
SEE DETAIL 13–8

ENERGY DISSIPATOR BASIN
SEE SHEET 20–3
DETAIL B

JB wSlab 30" RCP–III @ 1.0%

ES–S9

SITE 11

48" RCP–CD – NOT BURIED

SPECIAL CUT DITCH
SEE DETAIL 13–I

SPECIAL CUT DITCH
SEE DETAIL 13–I

30" WELDBOWS

2GI W/FG 15" RCP–III

2GI W/FG 15" RCP–III

30" RCP–III

24" RCP–III

18" RCP–III

24" RCP–III

47" WW FENCE

47" WW FENCE

2GI-A

2GI

18" RCP–III

24" RCP–III

2GI-A

2GI

2GI-A

2GI

2GI W/FG 15" RCP–III

2GI W/FG 15" RCP–III

2GI W/FG

REMOVE

48" RCP–CD – NOT BURIED

JB wMH

REMOVE

24" RCP–III

JB wMH

2' STANDARD BASE DITCH
W/CLASS 'I' RIP RAP
EST. 55 TONS
100 SY GEOTEXTILE
SEE DETAIL 13–2

TOE PROTECTION
SEE DETAIL 13–7

ES–W33

RETAIN

SITE 11A
SEE SHEET 13A

BEGIN JS

ES–S9

47" WW FENCE

47" WW FENCE

MATCHLINE –L– STA 169+50 SEE SHEET 12

MATCHLINE –L– STA 181+50 SEE SHEET 14

170+00

175+00

180+00

30+00

35+00

–Y4–

CHURCH REAL ESTATE INVESTMENTS, LLC

BETTY E. KOEHN

NCDOT

NCDOT

RAY E. & NANNIE S. SMITH

BILL J. & NAOMI CROSIER

JAMES W. SMITH

JAMES W. SMITH

BILL J. & NAOMI CROSIER

PHIL MONEY

WINSTON-SALEM CITY LIMITS

RUINS

NAD 1983

DETAIL 13–8
STANDARD BASE DITCH
WITH PERMANENT ROCK CHECKS
@ 25' SPACING
(Not to Scale)

Natural Ground, 2:1, D, 2:1, Permanent Rock Check, Natural Ground, d, 1', Geotextile, B
Min. D= 2 Ft.
Max. d= 2 Ft.
B= 8 Ft.
*When B is 8.0'
Type of Liner= Class 'I' Rip–Rap
FROM STA. 29+22 TO STA. 28+97 –Y4– LT

DETAIL 13–6
OUTLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground, 1.5', Geotextile, Channel Bed (Variable)
Type of Liner= CL 'I' RIP RAP
STA. 173+47 –L– LT

DETAIL 13–7
TOE PROTECTION
(Not to Scale)

Natural Ground, b, 2:1 or Flatter Fill Slope, d, Geotextile
d= Ft.
b= Ft.
Type of Liner= CLASS B Rip–Rap
FROM STA. 172+10 TO STA. 174+91 –L– RT

DETAIL 13–2
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, Natural Ground, d, Geotextile, B
Min. D= 1.5 Ft.
Max. d= 1.5 Ft.
B= 2 Ft.
*When B is < 6.0'
Type of Liner= Class 'I' Rip–Rap
STA. 175+01 –L– RT

LEGEND

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

HDR Engineering, Inc. of the Carolinas
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N.C.B.E.L.S. License Number: F-0116

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F–0991

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

PERMIT DRAWING
SHEET 35 OF 97

REVISIONS

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N.C.B.E.L.S. License Number: F-0116

STV 100 Years
STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	13A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

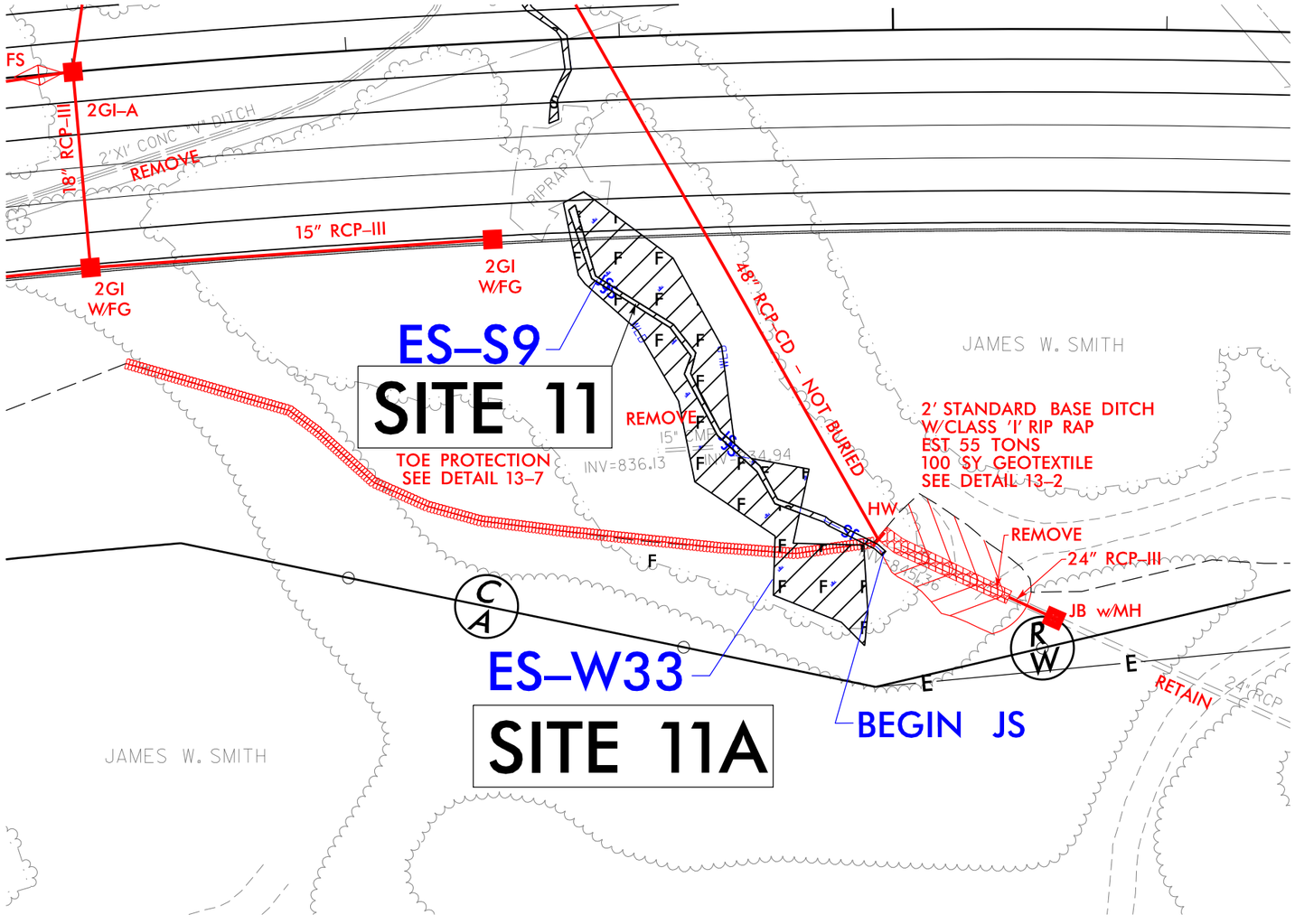
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

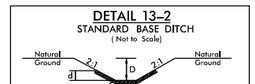
Blythe

12.5 0 12.5 25
GRAPHIC SCALE



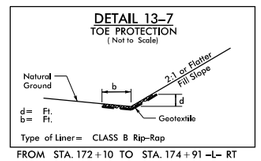
NAD 83/95

DETAIL 13-2
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap
STA. 175+01 -L- RT

DETAIL 13-7
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS B Rip-Rap
FROM STA. 172+10 TO STA. 174+91 -L- RT

LEGEND

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

PERMIT DRAWING SHEET 36 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.pit PENTABLE: NCDOT_permits_NOCON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	13B
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/95

SITE 33

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 94 TONS
163 SY GEOTEXTILE
SEE DETAIL 13-6

PERMANENT ROCK CHECK

8' STANDARD BASE DITCH
W/PERMANENT ROCK CHECK
@ 25' SPACING
CLASS 'I' RIP RAP
EST 86 TONS
145 SY GEOTEXTILE
SEE DETAIL 13-8

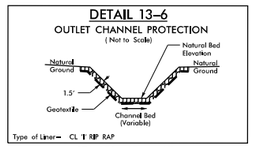
ENERGY DISSIPATOR BASIN
SEE SHEET 2D-3
DETAIL B

JB
w/Slab
30" RCP-III
@ 2.0%

Buffalo Creek (ES-S62)

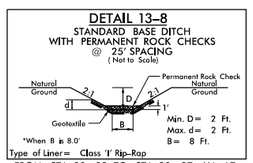
CHUR
INVI

DETAIL 13-6
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP
STA. 173+47 -L- LT

DETAIL 13-8
STANDARD BASE DITCH
WITH PERMANENT ROCK CHECKS
@ 25' SPACING
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap
FROM STA. 29+22 TO STA. 28+97 -Y4- LT

ES-S9

SITE 11

LEGEND

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S / S — DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 37 OF 97

REVISIONS

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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-56

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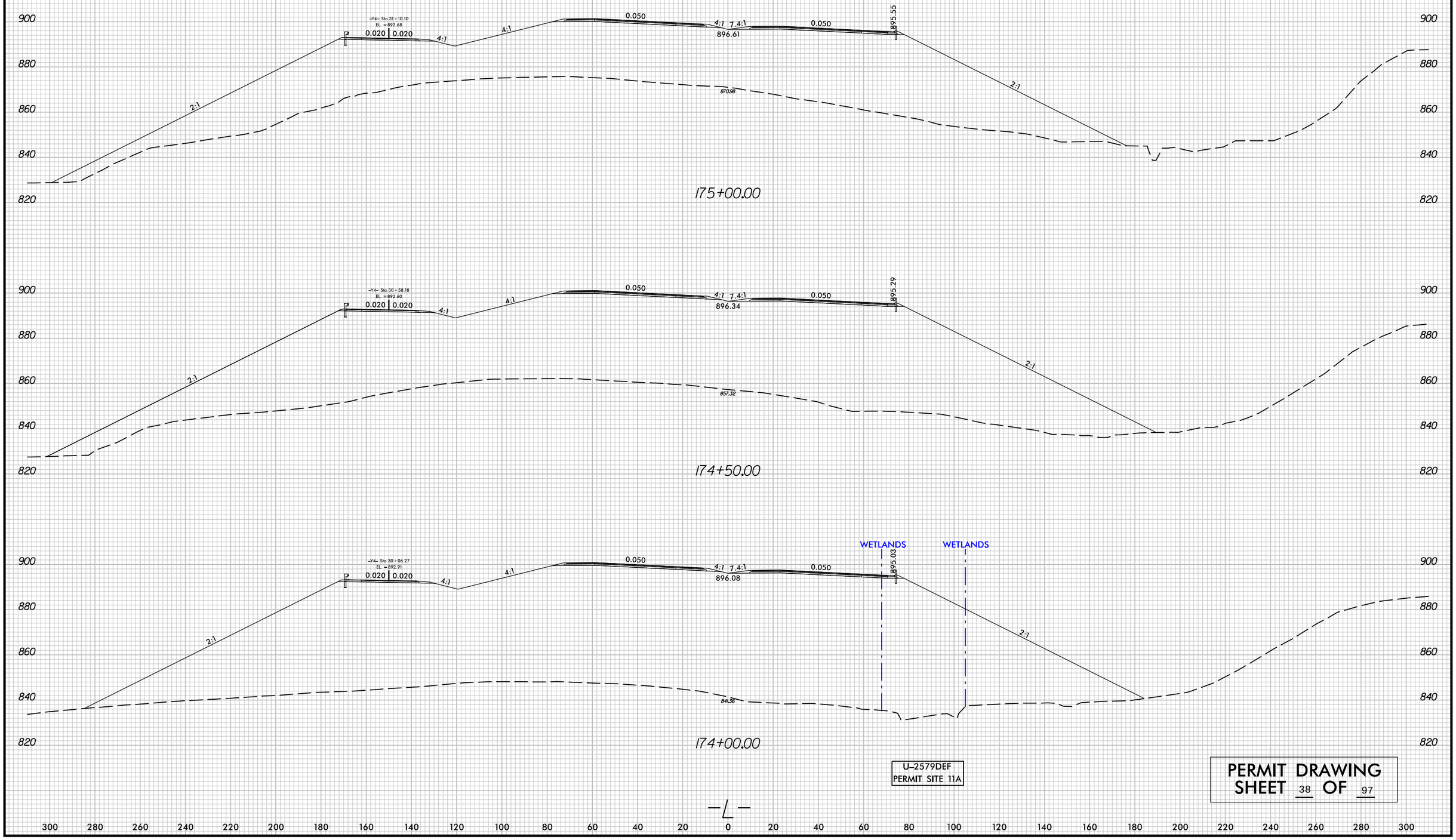

U-2579DEF
PERMIT SITE 11A

PERMIT DRAWING
SHEET 38 OF 97

PLOT DRIVER: NCDOT.pdf.color_eng.100.plt
USER: _USERNAME_
FILE: U2579DEF_PRM_XPL_L_HDR.dgn
PENTABLE: NCDOT_PFL_XSC.tbl
DATE: 10/17/2018
TIME: 6:10:41 PM

HDR Engineering, Inc. of the Carolinas
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STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	15
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

NAD 83/95

SEE SHEET 15A

ES-P9

BEGIN JS

ES-W29

ES-W30

ES-S58

ES-W31

SITE 12A

SITE 12

4' BASE STREAM RELOCATION
W/CLASS I RIP-RAP
EST 266 TONS
471 SY GEOTEXTILE
SEE DETAIL 15-1

CHANNEL BLOCK
SEE DETAIL A
SHEET 2D-5

4' BASE DITCH
CLASS 'B' RIPRAP
EST 119 TONS
EST 325 SY GEOTEXTILE
SEE DETAIL 15-5

MATCHLINE -L- STA 194+50 SEE SHEET 14

MATCHLINE -L- STA 206+50 SEE SHEET 16

195+00

200+00

205+00

RANDY L. & SANDRA N. SMITH

AVERY L. & BARBARA N. CHEEK

MILDRED B. TUTTLE

NCDOT

CARL A. & MARY E. BROWN

DANNY L. & DARLA S. LOFLIN

SARAH S. ROBERTS

47" WW FENCE

18" RCP-III

24" RCP-III

30" RCP-III

36" W ELBOWS

18" W ELBOWS

2GI-A

2GI

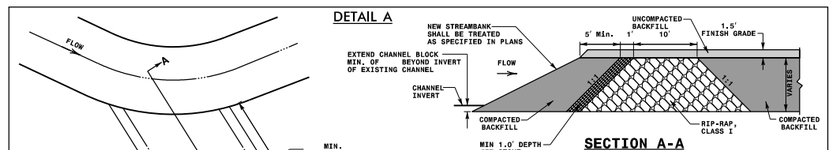
FS

BDO

LEGEND

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

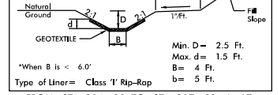
DETAIL A



NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

STA. 204+27 -L- LT

DETAIL 15-1
LATERAL BASE DITCH
(Not to Scale)



Min. D = 2.5 Ft.
Max. d = 1.5 Ft.
B = 4 Ft.
b = 5 Ft.
*When B is < 6.0'
Type of Liner = Class 'I' Rip-Rap

FROM STA. 204+20 TO STA. 207+32 -L- LT

PERMIT DRAWING
SHEET 39 OF 97

REVISIONS

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STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

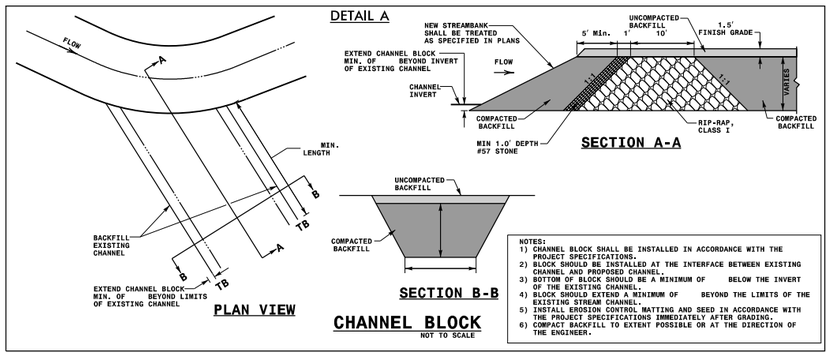
NAD 83/95

LEGEND

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

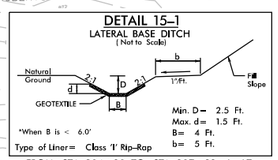
ES-P9
BEGIN JS
ES-W29
ES-W30
ES-S58
ES-W31
SITE 12A
SITE 12
SEE SHEET 15A
195+00
200+00
205+00
MATCHLINE -L- STA 194+50 SEE SHEET 14
MATCHLINE -L- STA 206+50 SEE SHEET 16
RANDY L. & SANDRA N. SMITH
AVERY L. & BARBARA N. CHEEK
MILDRED B. TUTTLE
CARL A. & MARY E. BROWN
JIMMY L. & DARLA S. LOFLIN
SARAH S. ROBERTS
NCDOT
47" WW FENCE
4' BASE STREAM RELOCATION W/CLASS I RIP-RAP EST 266 TONS 471 SY GEOTEXTILE SEE DETAIL 15-1
CHANNEL BLOCK SEE DETAIL A SHEET 2D-5
4' BASE DITCH CLASS 'B' RIPRAP EST 119 TONS EST 325 SY GEOTEXTILE SEE DETAIL 15-5
2GI-A
2GI
FS
18" RCP-III
24" RCP-III
30" RCP-III
36" W ELBOWS
18" W ELBOWS
STA. 204+27 -L- LT

DETAIL A



NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

DETAIL 15-1
LATERAL BASE DITCH
(Not to Scale)



Min. D = 2.5 Ft.
Max. d = 1.5 Ft.
B = 4 Ft.
b = 5 Ft.
*When B is < 6.0'
Type of Liner = Class 'I' Rip-Rap

FROM STA. 204+20 TO STA. 207+32 -L- LT

PERMIT DRAWING
SHEET 40 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	15A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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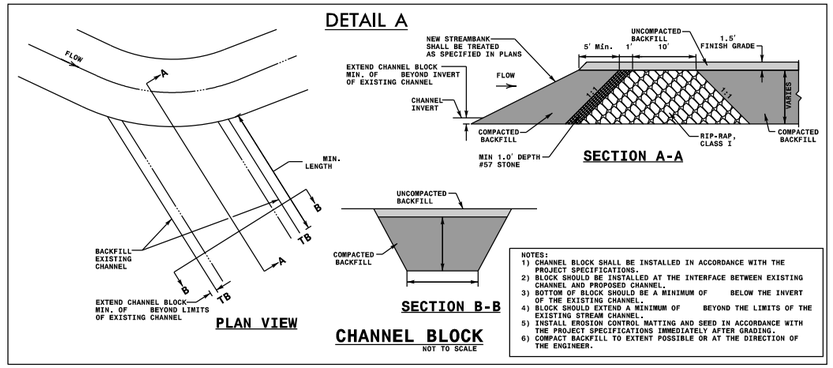
FLATIRON

Blythe

12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/95

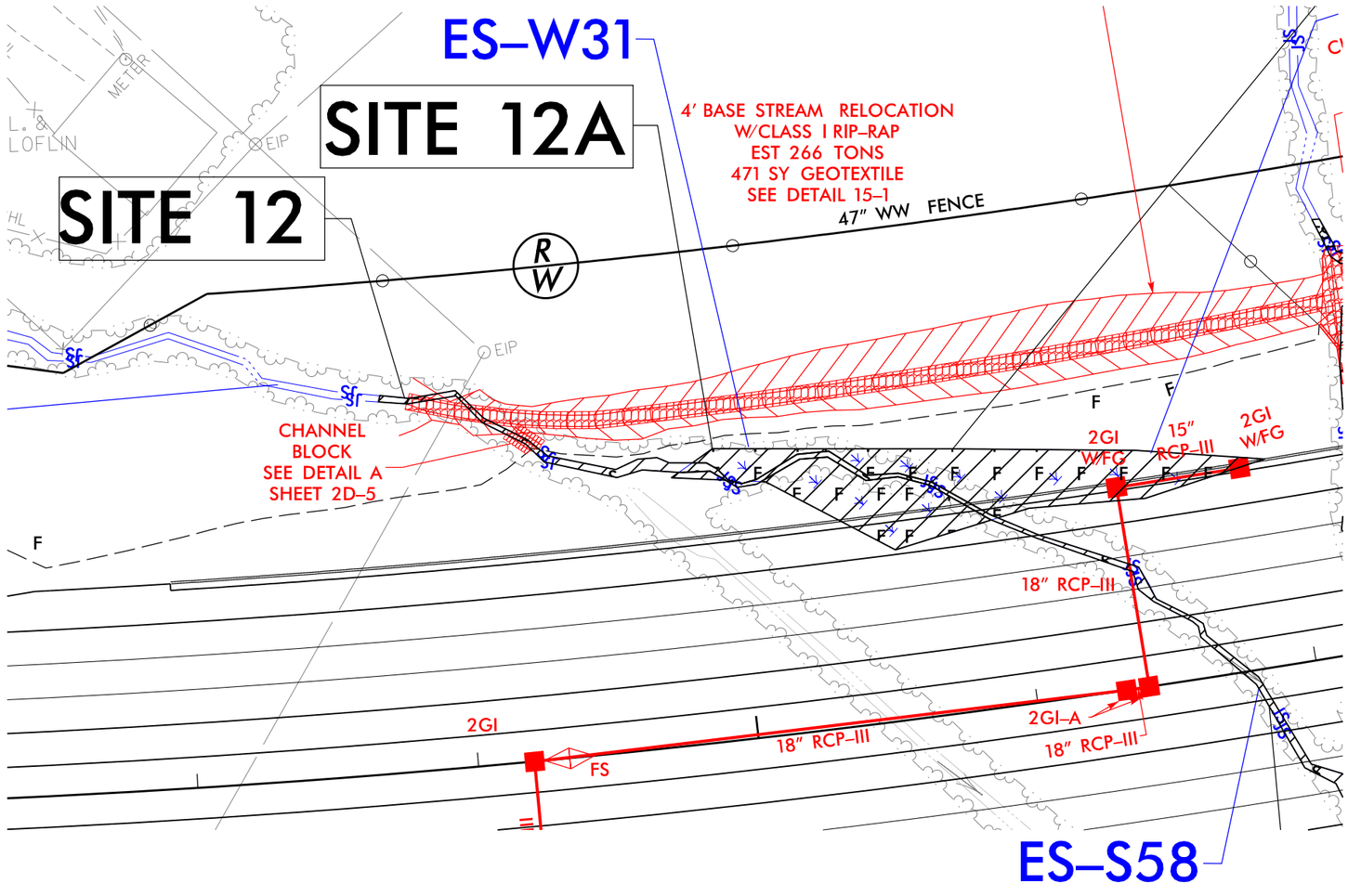
DETAIL A



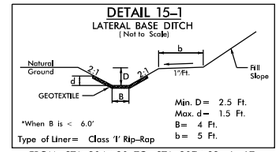
CHANNEL BLOCK
NOT TO SCALE

NOTES:
1) CHANNEL BLOCK SHALL BE INSTALLED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.
2) BLOCK SHOULD BE INSTALLED AT THE INTERFACE BETWEEN EXISTING CHANNEL AND PROPOSED CHANNEL.
3) BOTTOM OF BLOCK SHOULD BE A MINIMUM OF BELOW THE INVERT OF THE EXISTING CHANNEL.
4) BLOCK SHOULD EXTEND A MINIMUM OF BEYOND THE LIMITS OF THE EXISTING STREAM CHANNEL.
5) INSTALL EROSION CONTROL MATTING AND SEED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS IMMEDIATELY AFTER GRADING.
6) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

STA. 11+30 –Y3RPD– LT
STA. 204+27 –L– LT



DETAIL 15–1
LATERAL BASE DITCH
(Not to Scale)



FROM STA. 204+20 TO STA. 207+32 –L– LT

LEGEND

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

PERMIT DRAWING SHEET 41 OF 97

REVISIONS

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8/23/99

0 10 20	PROJ. REFERENCE NO.	SHEET NO.
	U-2579DEF	L-69

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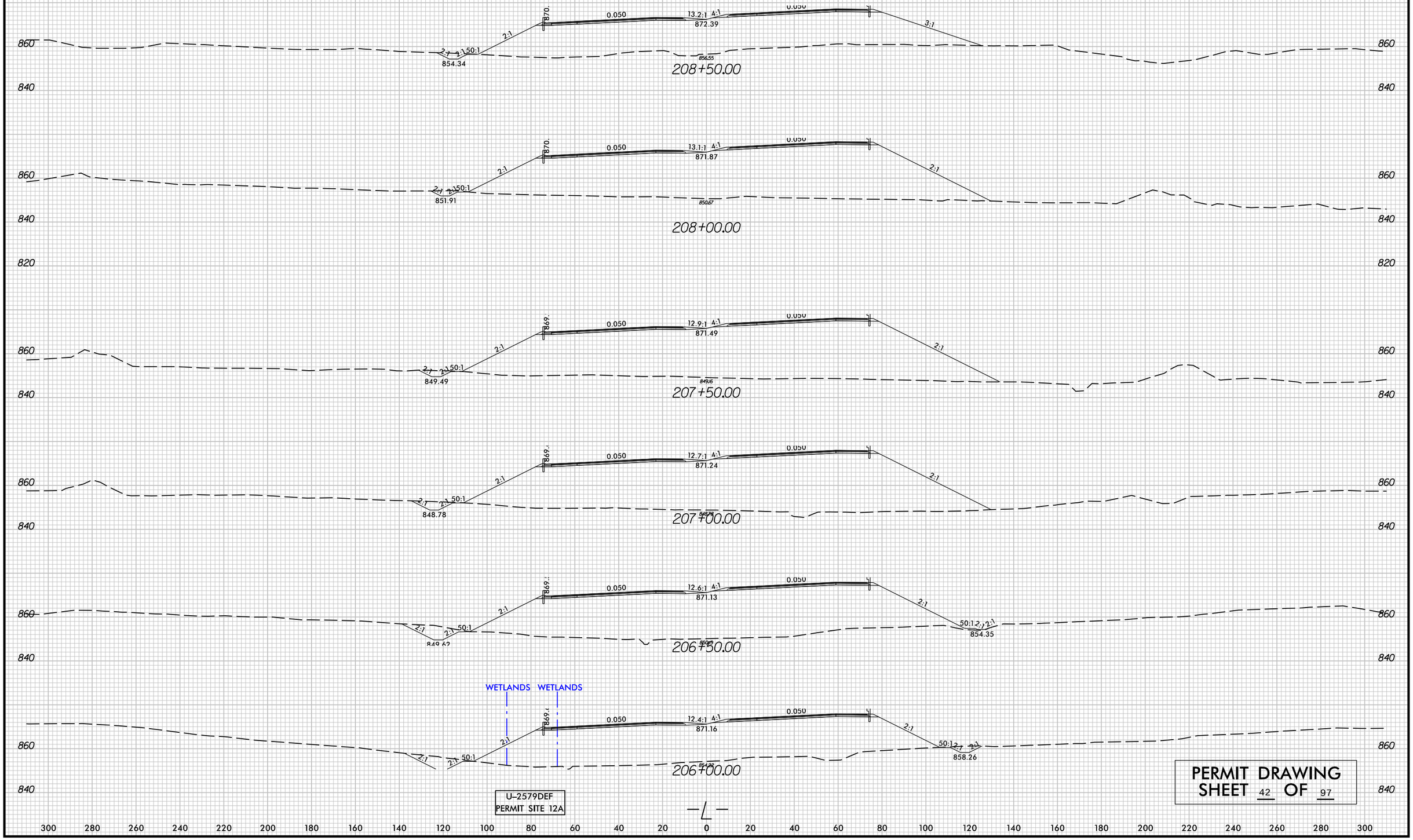

U-2579DEF
PERMIT SITE 12A

PERMIT DRAWING
SHEET 42 OF 97

PLOT DRIVER: NCDOT.pdf_color_eng.100.plt
USER: .USERNAME.
FILE: U2579DEF_PRM_XPL_L_HDR.dgn
PENTABLE: NCDOT_PFL_XSC.tbl
DATE: 10/17/2018
TIME: 6:10:43 PM

LEGEND

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

DETAIL 16–13
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground; Geotextile; B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 3 Ft.
*When B is < 6.0'

Type of Liner= CLASS B Rip-Rap
FROM STA. 208+84 TO STA. 209+90 –L– LT

DETAIL 16–5
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground; Geotextile; B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 2 Ft.
*When B is < 6.0'

Type of Liner= Class 'I' Rip-Rap
STA. 207+30 –L– LT

DETAIL 16–11
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground; Geotextile; B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 4 Ft.
*When B is < 6.0'

Type of Liner= CLASS B Rip-Rap
FROM STA. 207+40 TO STA. 208+84 –L– LT

DETAIL 16–9
OUTLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground; 1.5'; Geotextile; Channel Bed (Variable)

Type of Liner= CL 'I' RIP RAP
STA. 207+24 –L– RT

DETAIL 16–10
INLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground; 1.5'; Geotextile; Channel Bed (Variable)

Type of Liner= CL 'I' RIP RAP
STA. 207+30 –L– LT

NAD 83'95

ES–W51
4' BASE STREAM RELOCATION W/CLASS I RIP-RAP EST 268 TONS 471 SY GEOTEXTILE SEE DETAIL 15–1
ES–S10
SITE 12A
CHANNEL CHANGE CLASS 'I' RIP RAP EST 85 TONS 150 SY GEOTEXTILE SEE DETAIL 16–5
INLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 58 TONS 98 SY GEOTEXTILE SEE DETAIL 16–10
4' LATERAL BASE DITCH CLASS 'I' RIP RAP EST 138 TONS 254 SY GEOTEXTILE SEE DETAIL 16–11
2' LATERAL BASE DITCH SEE DETAIL 16–1
3' LATERAL BASE DITCH CLASS 'I' RIP RAP EST 93 TONS 175 SY GEOTEXTILE SEE DETAIL 16–13
SITE 13A
SITE 13
ES–W31
15" RCP–III
2GI W/FG
24" RCP–III
2GI–A
18" RCP–III
2GI
5' X 6' RCBC NOT BURIED
JB wSlab
18" W/ELBOWS
CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO–TEXTILE
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 60 TONS 105 SY GEOTEXTILE SEE DETAIL 16–9
BEGIN JS
ES–S11
SITE 12
ES–S10
SPECIAL CUT DITCH SEE DETAIL 16–3
SPECIAL 'V' DITCH SEE DETAIL 16–12
GRADE TO DRAIN
BDO
REMOVE
RETAIN
47" WW FENCE
MATCHLINE –L– STA 206+50 SEE SHEET 15
MATCHLINE –L– STA 219+50 SEE SHEET 17
210+00
215+00
JOHNNIE F. RICHARDS
RICKY L. PHILLIPS
ARLYSS K. SMITH
KANDA K. MUNSON
MARIA SISCOE
ALBERTA D. HAYES
HIRAM MCCANTS, JR. & JANE S. MCCANTS
CARL H. & ARLENE H. ALLMAN
NCDOT
WINSTON-SALEM CITY LIMITS
PROVIDENCE MORAVIAN CHURCH
CHESTNUT VIEW LN
CHAMPION RIDGE RD

HDR Engineering, Inc. of the Carolinas
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STV 100 Years
STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	16
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
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FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

REVISIONS

PERMIT DRAWING
SHEET 43 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: BSTEFFEN DATE: 10/25/2018 TIME: 5:52:40 PM
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LEGEND

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

DETAIL 16–13
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground, Geotextile, B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 3 Ft.
*When B is < 6.0'

Type of Liner= CLASS B Rip-Rap
FROM STA. 208+84 TO STA. 209+90 –L– LT

DETAIL 16–5
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground, Geotextile, B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 2 Ft.
*When B is < 6.0'

Type of Liner= Class 'I' Rip-Rap
STA. 207+30 –L– LT

NAD 83/95

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STV 100 Years
STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

JOHNNIE F. RICHARDS
RICKY L. PHILLIPS
ARLYSS K. SMITH
KANDA K. MUNSON
MARIA SISCOE
ALBERTA D. HAYES
HIRAM MCCANTS, JR. & JANE S. MCCANTS
CARL H. & ARLENE H. ALLMAN
PROVIDENCE MORAVIAN CHURCH
NCDOT
WINSTON-SALEM CITY LIMITS

ES–W51
4' BASE STREAM RELOCATION W/CLASS I RIP-RAP
EST. 268 TONS
471 SY GEOTEXTILE
SEE DETAIL 15–1

ES–S10

SITE 12A

CHANNEL CHANGE
CLASS 'I' RIP RAP
EST 85 TONS
150 SY GEOTEXTILE
SEE DETAIL 16–5

INLET CHANNEL PROTECTION
CLASS 'I' RIP-RAP
EST 58 TONS
98 SY GEOTEXTILE
SEE DETAIL 16–10

4' LATERAL BASE DITCH
CLASS 'I' RIP RAP
EST 138 TONS
254 SY GEOTEXTILE
SEE DETAIL 16–11

2' LATERAL BASE DITCH
SEE DETAIL 16–1

3' LATERAL BASE DITCH
CLASS 'I' RIP RAP
EST 93 TONS
175 SY GEOTEXTILE
SEE DETAIL 16–13

SITE 13A

210+00

215+00

47" WW FENCE

SPECIAL CUT DITCH
SEE DETAIL 16–3

SPECIAL 'V' DITCH
SEE DETAIL 16–12

18" W/ELBOWS

GRADE TO DRAIN

REMOVE

RETAIN

MATCHLINE –L– STA 206+50 SEE SHEET 15

MATCHLINE –L– STA 219+50 SEE SHEET 17

SITE 13

ES–W31

15" RCP–III

2GI W/FG

24" RCP–III

18" RCP–III

2GI–A

2GI

FS

5' X 6' RCBC NOT BURIED

JB w/Slab

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY GEO–TEXTILE

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 60 TONS
105 SY GEOTEXTILE
SEE DETAIL 16–9

BEGIN JS

SITE 12

ES–S11

ES–S10

DETAIL 16–11
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground, Geotextile, B

Min. D= 1 Ft.
Max. d= 1 Ft.
B= 4 Ft.
*When B is < 6.0'

Type of Liner= CLASS B Rip-Rap
FROM STA. 207+40 TO STA. 208+84 –L– LT

DETAIL 16–9
OUTLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground, 1.5', Geotextile, Channel Bed (Variable)

Type of Liner= CL 'I' RIP RAP
STA. 207+24 –L– RT

DETAIL 16–10
INLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, Natural Ground, 1.5', Geotextile, Channel Bed (Variable)

Type of Liner= CL 'I' RIP RAP
STA. 207+30 –L– LT

PERMIT DRAWING
SHEET 44 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color-eng-100.plt PENTABLE: NCDOT_permits_CON.tbl
USER: BSTEFFEN DATE: 10/25/2018 TIME: 5:53:16 PM
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	

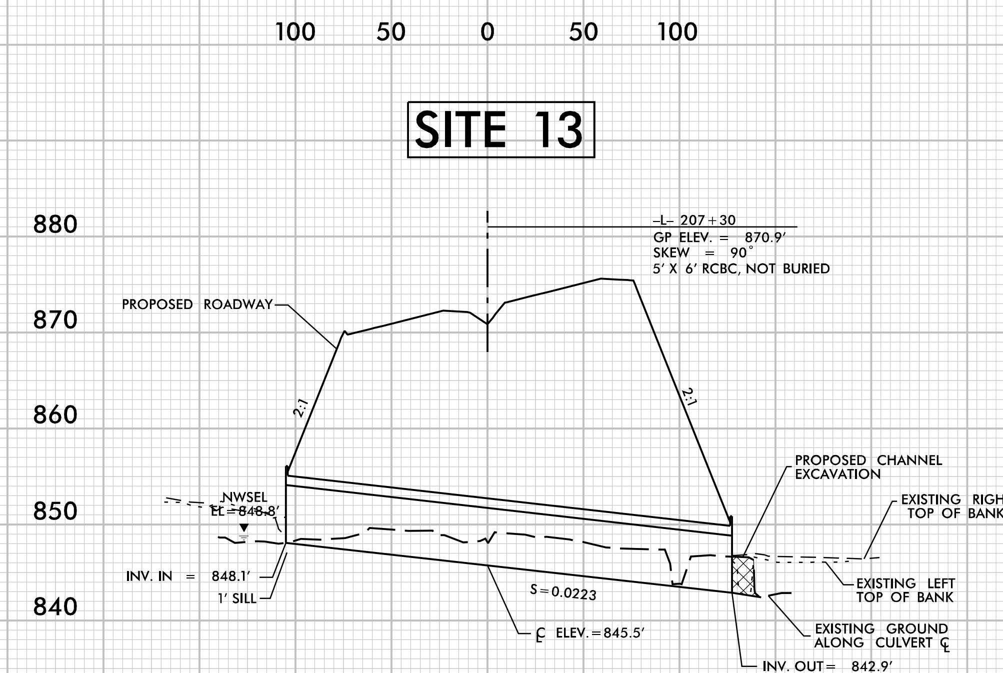
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 13



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 45 OF 97

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

INCOMPLETE PLANS
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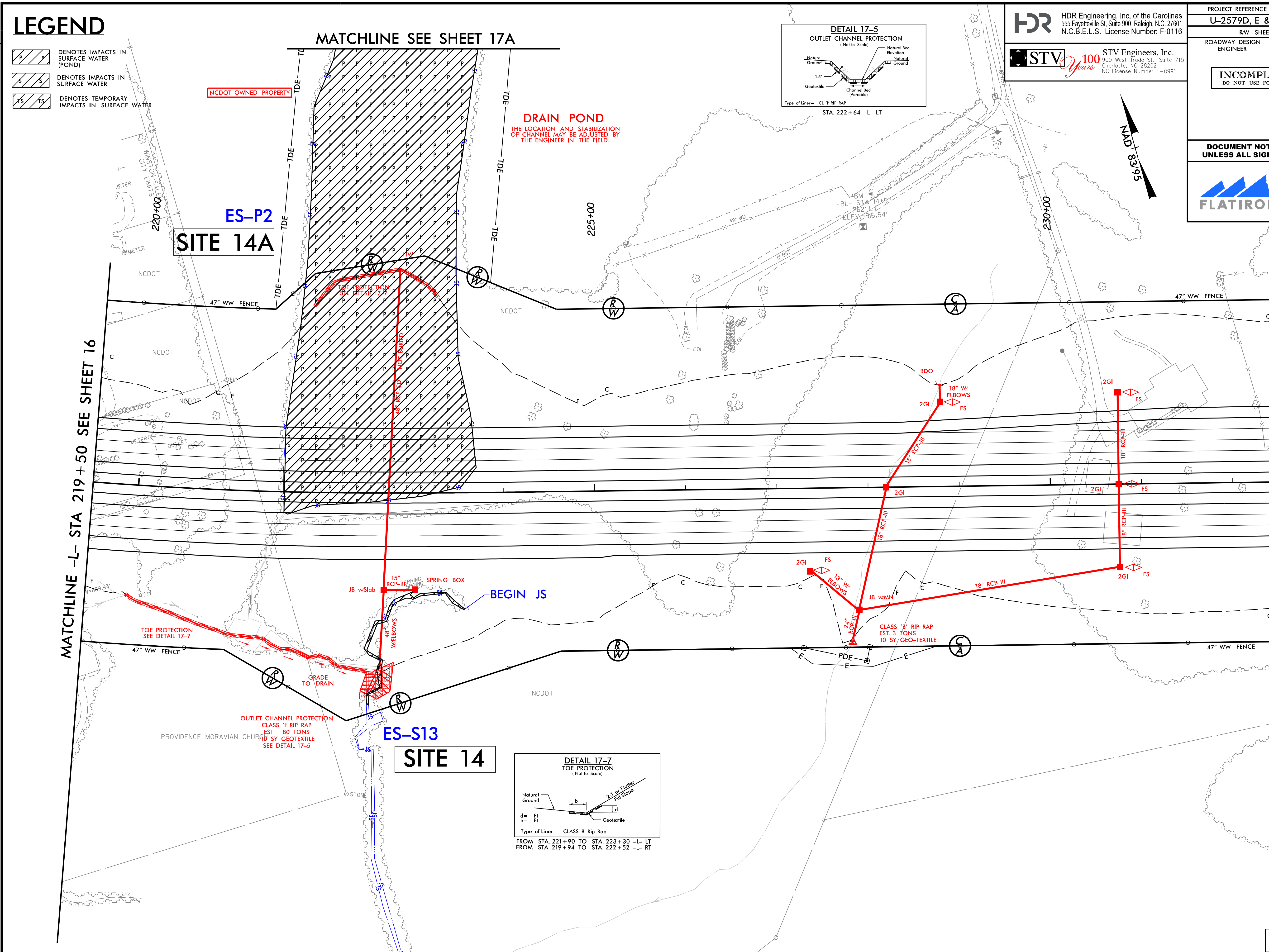
FLATIRON

Blythe



LEGEND
DENOTES IMPACTS IN SURFACE WATER (POND)
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
MATCHLINE SEE SHEET 17A
NCDOT OWNED PROPERTY
DRAIN POND
THE LOCATION AND STABILIZATION OF CHANNEL MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD.
ES-P2
SITE 14A
ES-S13
SITE 14
MATCHLINE -L- STA 219+50 SEE SHEET 16
MATCHLINE -L- STA 232+50 SEE SHEET 18
TOE PROTECTION SEE DETAIL 17-7
BEGIN JS
SPRING BOX
JB wSlab
GRADE TO DRAIN
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 80 TONS 110 SY GEOTEXTILE SEE DETAIL 17-5
PROVIDENCE MORAVIAN CHURCH
CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE
47" WW FENCE
NAD 83/95
DETAIL 17-5
OUTLET CHANNEL PROTECTION
(Not to Scale)
STA. 222+64 -L- LT
DETAIL 17-7
TOE PROTECTION
(Not to Scale)
Type of Liner= CLASS B Rip-Rap
FROM STA. 221+90 TO STA. 223+30 -L- LT
FROM STA. 219+94 TO STA. 222+52 -L- RT
GRAPHIC SCALE

REVISIONS

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LEGEND

- P P — DENOTES IMPACTS IN SURFACE WATER (POND)
- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE SEE SHEET 17A

MATCHLINE –L– STA 219+50 SEE SHEET 16

MATCHLINE –L– STA 232+50 SEE SHEET 18

NCDOT OWNED PROPERTY

DRAIN POND
THE LOCATION AND STABILIZATION OF CHANNEL MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD.

ES–P2
SITE 14A

ES–S13
SITE 14

TOE PROTECTION SEE DETAIL 17-7

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 80 TONS
110 SY GEOTEXTILE
SEE DETAIL 17-5

GRADE TO DRAIN

BEGIN JS

JB w/Slab

15" RCP-III

SPRING BOX

48" W ELBOWS

JB w/MH

18" RCP-III

24" RCP-III

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY GEO-TEXTILE

BDO

18" W/ ELBOWS

2GI

FS

PDE

47" WW FENCE

NCDOT

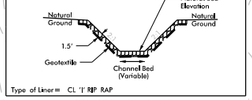
PROVIDENCE MORAVIAN CHURCH

WINSTON-SALEM CITY LIMITS

TBM #1
–BL– STA 14+57
262' LT
ELEV=916.54'

NAD 83/95

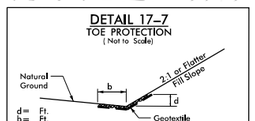
DETAIL 17–5
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 222+64 –L– LT

DETAIL 17–7
TOE PROTECTION
(Not to Scale)



d= Ft.
b= Ft.

Type of Liner= CLASS B Rip-Rap

FROM STA. 221+90 TO STA. 223+30 –L– LT
FROM STA. 219+94 TO STA. 222+52 –L– RT

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STV 100 Years
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

PERMIT DRAWING
SHEET 47 OF 97

REVISIONS

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GRAPHIC SCALE 12.5 0 12.5 25

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	17A
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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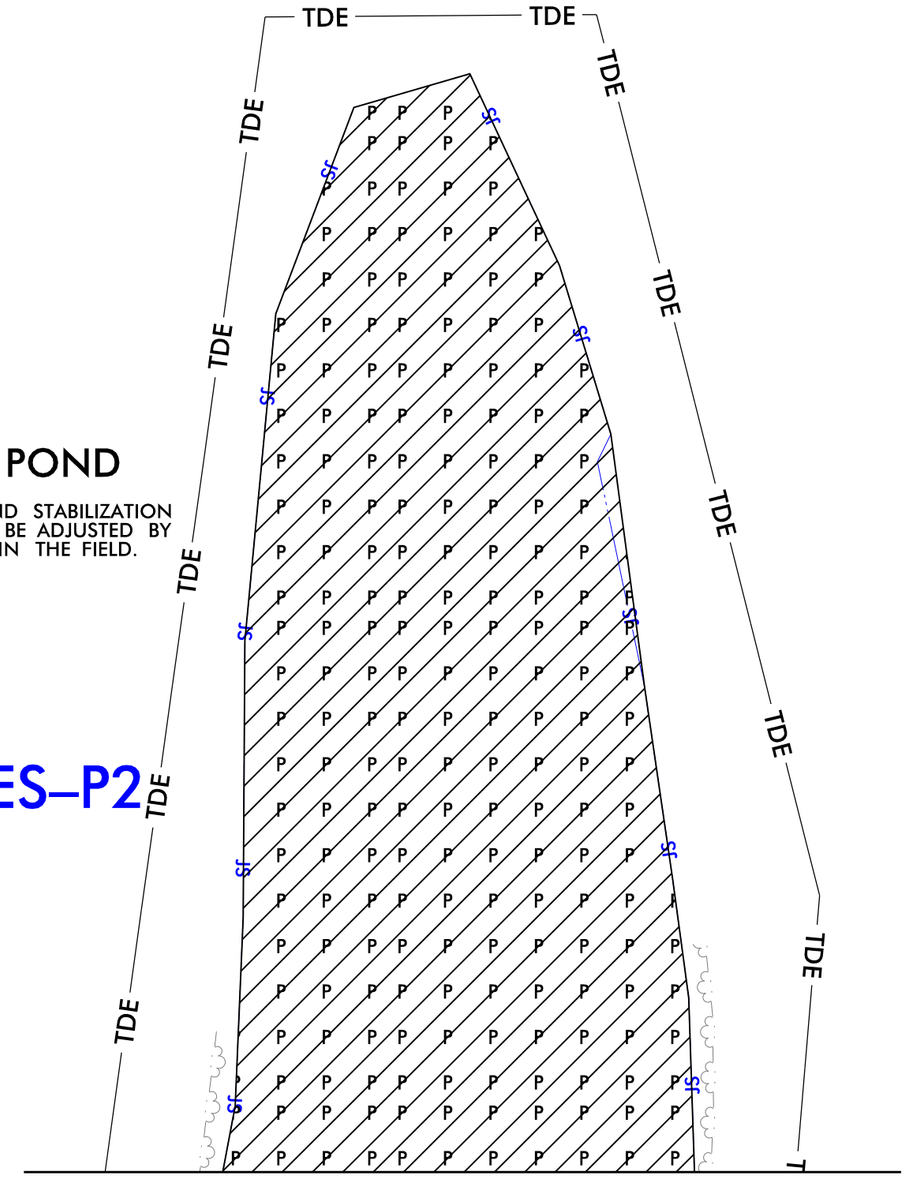
FLATIRON

Blythe

NAD 83/95



DRAIN POND

THE LOCATION AND STABILIZATION OF CHANNEL MAY BE ADJUSTED BY THE ENGINEER IN THE FIELD.

ES–P2

LEGEND

P P — DENOTES IMPACTS IN SURFACE WATER (POND)

MATCHLINE SEE SHEET 17

PERMIT DRAWING SHEET 48 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	17A

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

12.5 0 12.5 25
GRAPHIC SCALE

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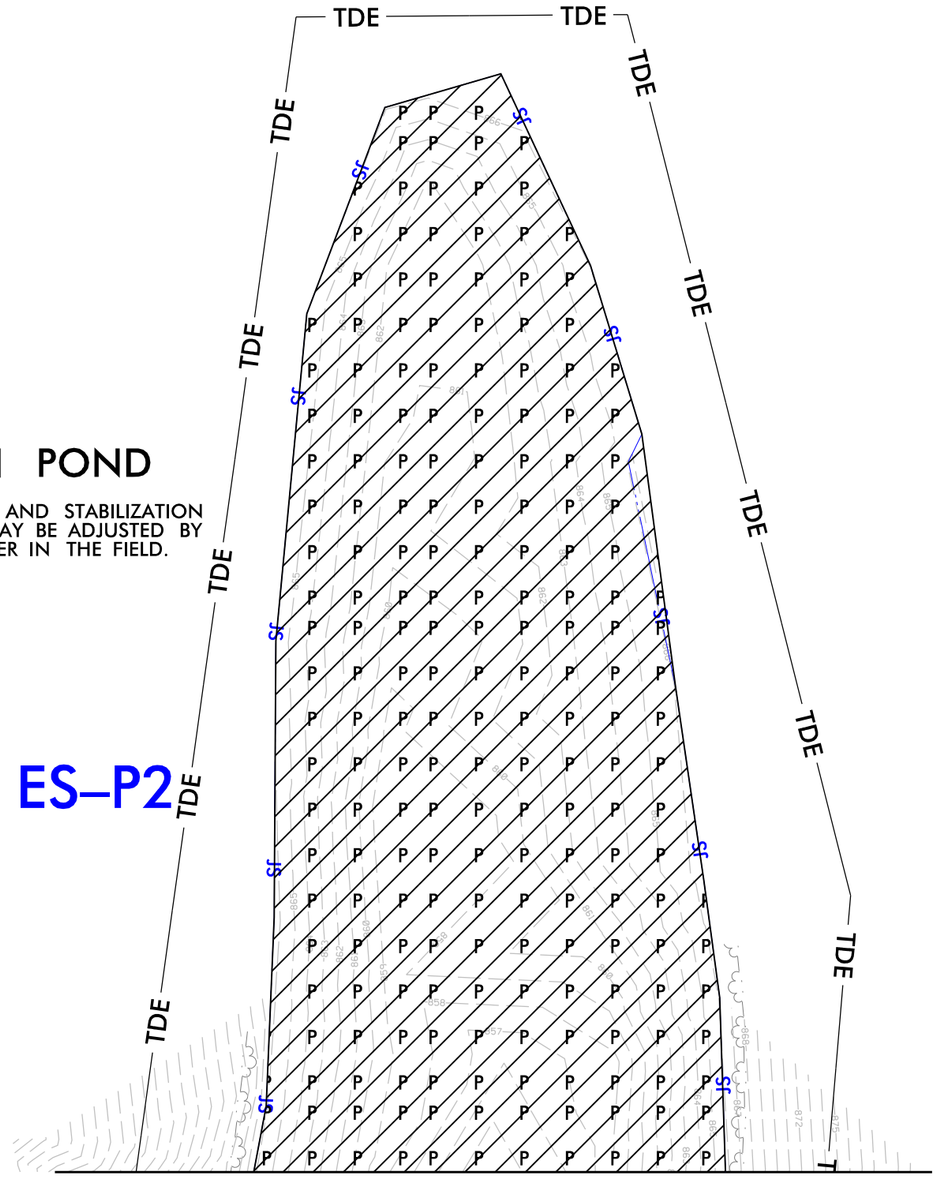
Blythe

NAD 83/95

DRAIN POND

THE LOCATION AND STABILIZATION
OF CHANNEL MAY BE ADJUSTED BY
THE ENGINEER IN THE FIELD.



MATCHLINE SEE SHEET 17

LEGEND

▨ DENOTES IMPACTS IN SURFACE WATER (POND)

PERMIT DRAWING
SHEET 49 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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25 12.5 0 25 50
GRAPHIC SCALE

DETAIL 18–2
STANDARD BASE DITCH
(Not to Scale)

Type of Liner= Class 'B' Rip-Rap
FROM –L– STA. 240+85 TO STA. 242+85 LT

DETAIL 18–3
LATERAL BASE DITCH
(Not to Scale)

Type of Liner= Class 'B' Rip-Rap
FROM –L– STA. 243+35 TO STA. 244+05 RT

DETAIL 18–9
STANDARD BASE DITCH
(Not to Scale)

Type of Liner= Class 'I' Rip-Rap
FROM –L– STA. 244+09 TO STA. 244+18 RT

DETAIL 18–9
STANDARD BASE DITCH
(Not to Scale)

Type of Liner= Class 'II' Rip-Rap
FROM –L– STA. 244+09 TO STA. 244+19 RT

DETAIL 18–7
OUTLET CHANNEL PROTECTION
(Not to Scale)

Type of Liner= CL 'II' RIP RAP
STA. 244+10 –L– RT

DETAIL 18–8
INLET CHANNEL PROTECTION
(Not to Scale)

Type of Liner= CL 'I' RIP RAP
STA. 243+10 –L– LT

LEGEND:

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

SITE 15

SITE 15A

ES–S14

ES–W28

INLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 65 TONS 109 SY GEOTEXTILE SEE DETAIL 18–8

4' BASE DITCH CLASS 'B' RIPRAP EST 111 TONS 267 SY GEO–TEXTILE SEE DETAIL 18–2

CHANNEL BLOCK SEE DETAIL 18–4

BERM DITCH SEE DETAIL 18–1

4' LATERAL BASE DITCH CLASS 'B' RIPRAP EST 22 TONS 53 SY GEO–TEXTILE SEE DETAIL 18–3

OUTLET CHANNEL PROTECTION CLASS 'II' RIP RAP EST 39 TONS 66 SY GEOTEXTILE SEE DETAIL 18–7

5' STANDARD BASE DITCH CLASS 'II' RIPRAP EST 19 TONS 32 SY GEO–TEXTILE SEE DETAIL 18–9

MATCHLINE –L– STA 232+50 SEE SHEET 17

MATCHLINE –L– STA 246+00 SEE SHEET 19

–Y6RPB– STA 20+00 SEE SHEET 19

–Y6RPC– STA 14+50 SEE SHEET 19

PERMIT DRAWING SHEET 50 OF 97

REVISIONS

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STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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Blythe

25 12.5 0 25 50
GRAPHIC SCALE

DETAIL 18-2
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, d, B, Geotextile

Min. D= 2.0Ft.
Max. d= 2.0Ft.
B= 4.0Ft.

*When B is < 6.0'

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 240+85 TO STA. 242+85 LT

DETAIL 18-3
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, d, B, b, 1':1Ft., F# Slope, GEOTEXTILE

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

*When B is < 6.0'

Type of Liner= Class 'B' Rip-Rap

FROM -L- STA. 243+35 TO STA. 244+05 RT

DETAIL 18-9
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, d, B, Geotextile

Min. D= 3.0Ft.
Max. d= 3.0Ft.
B= 5.0Ft.

*When B is < 6.0'

Type of Liner= Class 'I' Rip-Rap

FROM -L- STA. 244+09 TO STA. 244+18 RT

DETAIL 18-9
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, d, B, Geotextile

Min. D= 3.0Ft.
Max. d= 3.0Ft.
B= 5.0Ft.

*When B is < 6.0'

Type of Liner= Class 'II' Rip-Rap

FROM -L- STA. 244+09 TO STA. 244+19 RT

NAD 83/95

SITE 15

ES-S14

INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 65 TONS
109 SY GEOTEXTILE
SEE DETAIL 18-8

4' BASE DITCH
CLASS 'B' RIPRAP
EST 111 TONS
267 SY GEO-TEXTILE
SEE DETAIL 18-2

CHANNEL BLOCK
SEE DETAIL 18-4

BERM DITCH
SEE DETAIL 18-1

-Y6RPB- STA 20+00
SEE SHEET 19

MATCHLINE -L- STA 232+50
SEE SHEET 17

MATCHLINE -L- STA 246+00
SEE SHEET 19

-Y6RPC- STA 14+50
SEE SHEET 19

ES-W28

SITE 15A

ES-S14

SITE 15

4' LATERAL BASE DITCH
CLASS 'B' RIPRAP
EST 22 TONS
53 SY GEO-TEXTILE
SEE DETAIL 18-3

OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 39 TONS
66 SY GEOTEXTILE
SEE DETAIL 18-7

5' STANDARD BASE DITCH
CLASS 'II' RIPRAP
EST 19 TONS
32 SY GEO-TEXTILE
SEE DETAIL 18-9

DETAIL 18-7
OUTLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, 1.5', Geotextile, Channel Bed (Variable)

Type of Liner= CL II RIP RAP

STA. 244+10 -L- RT

DETAIL 18-8
INLET CHANNEL PROTECTION
(Not to Scale)

Natural Ground, Natural Bed Elevation, 1.5', Geotextile, Channel Bed (Variable)

Type of Liner= CL I RIP RAP

STA. 243+10 -L- LT

LEGEND:

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

PERMIT DRAWING
SHEET 51 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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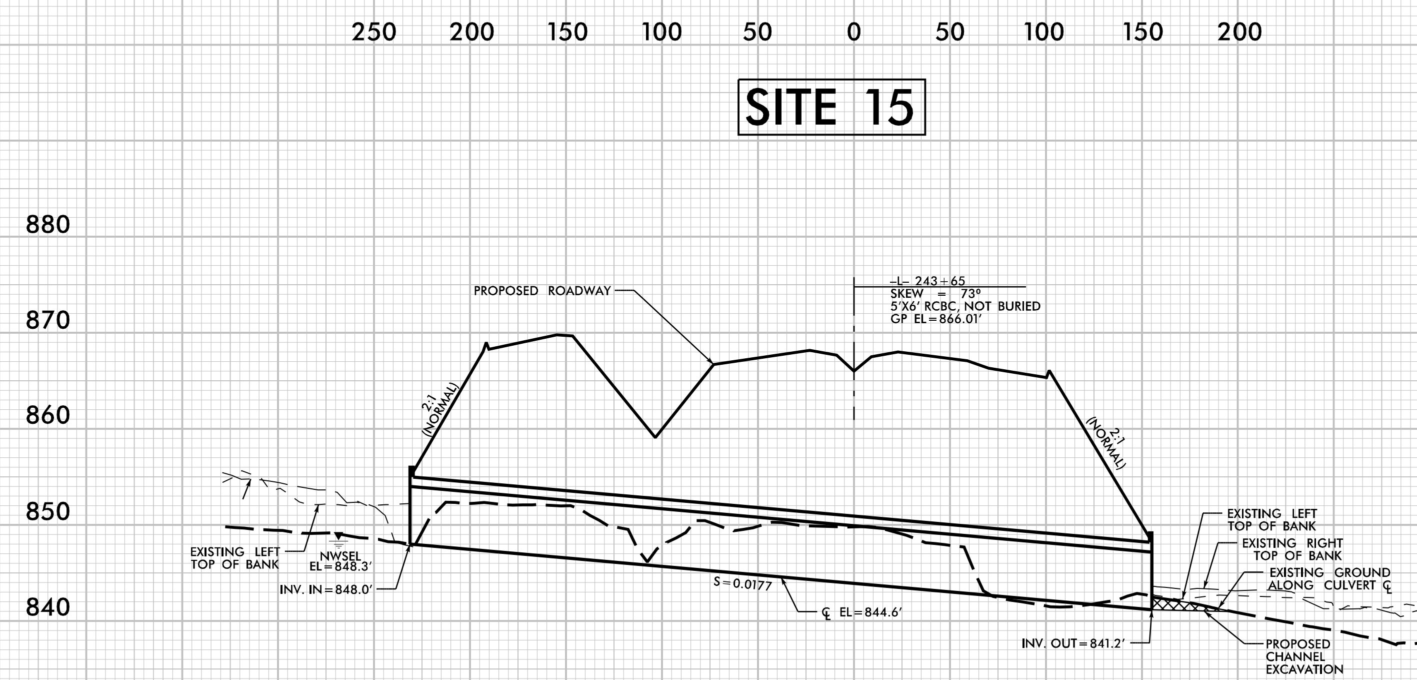
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 15



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 52 OF 97

5/14/99

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$$$$USERNAME$$$$

6/23/16

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	U-2579D, E & F	L-86

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900 880 860

2.16:1 4:1 6:1 0.025 875.62 5.022:6:1 866.56 0.025 0.043 0.048 6:1 4:1 2:1 862.02

–ATC–Y6RPC–
STA. 14+18.88

245+50.00

2.18:1 4:1 6:1 0.025 872.87 5.112:16:1 866.41 0.025 0.055 0.028 6:1 6:1 862.06 864.21

–ATC–Y6RPC–
STA. 13+68.68

245+00.00

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–ATC–Y6RPC–
STA. 13+18.55

244+50.00

WETLANDS

4:1 0.025 5.304:6:1 866.11 0.025 0.07 0.025 865.22 2:1 854.93

–ATC–Y6RPC–
STA. 12+68.42

WETLANDS

U–2579DEF
PERMIT SITE 15A

2:1 2:1 841.56

244+00.00

2:12:1 2:1 868.23 0.044 4:1 4:1 0.025 5.405:6:1 865.96 0.025 0.071 0.025 865.30 2:1 854.79 859.04 849.14

–ATC–Y6RPB–
STA. 18+85.42

WETLANDS WETLANDS

–ATC–Y6RPC–
STA. 12+18.30

U–2579DEF
PERMIT SITE 15A

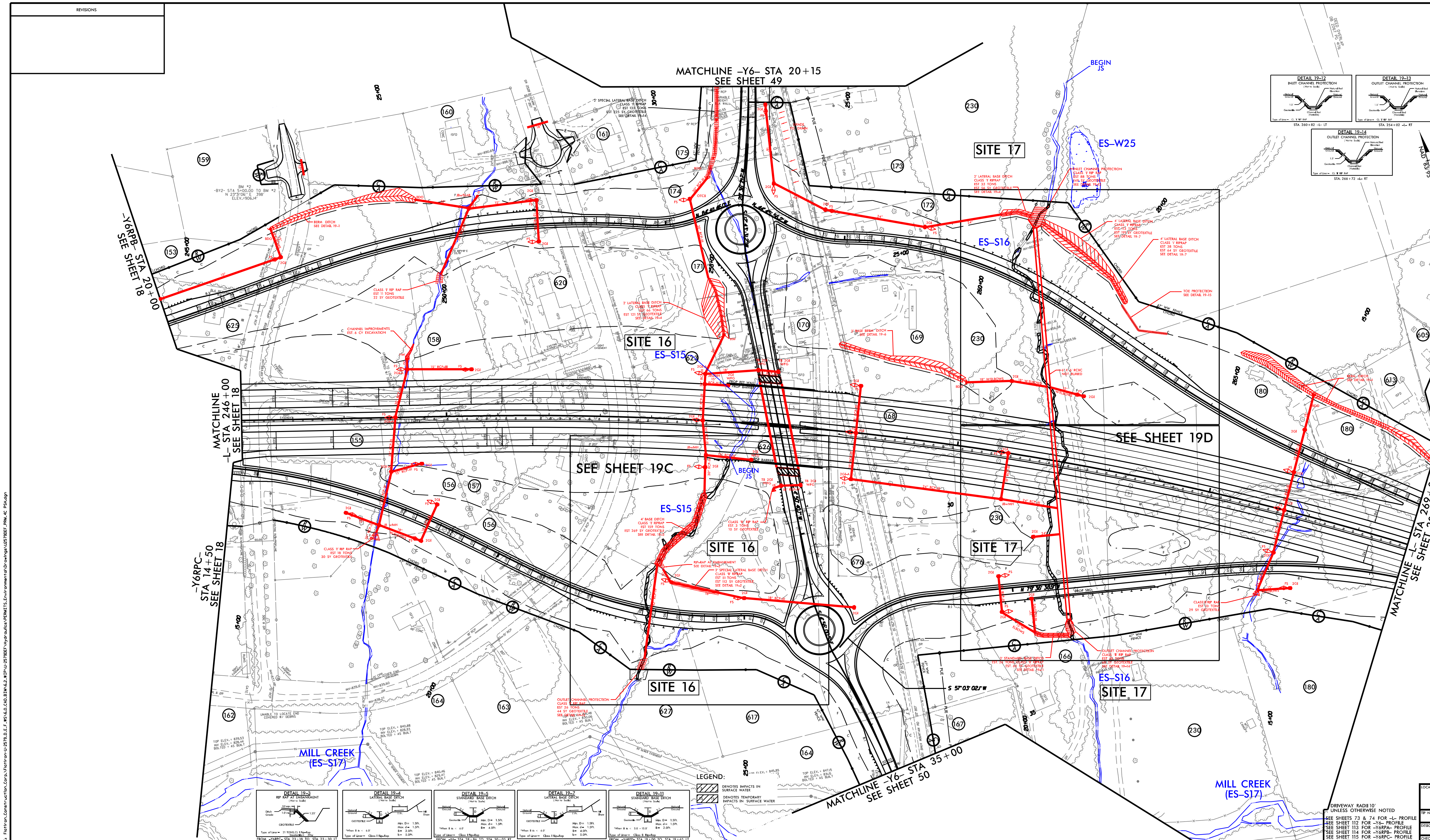
2:1 2:1 842.20

243+50.00

PERMIT DRAWING
SHEET 53 OF 97

8/27/2018
R:\Roadway\Xsc\U2579_RDY_XPL_L.dgn
tassima

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	19

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
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NC License Number F-0991

DRIVEWAY RADII 10'
UNLESS OTHERWISE NOTED

SEE SHEETS 73 & 74 FOR -L- PROFILE
SEE SHEET 112 FOR -Y6- PROFILE
SEE SHEET 113 FOR -Y6RPA- PROFILE
SEE SHEET 114 FOR -Y6RPB- PROFILE
SEE SHEET 115 FOR -Y6RPC- PROFILE
SEE SHEET 116 FOR -Y6RPD- PROFILE

PERMIT DRAWING
SHEET 54 OF 97

GRAPHIC SCALE
50 25 0 50 100
PLANS

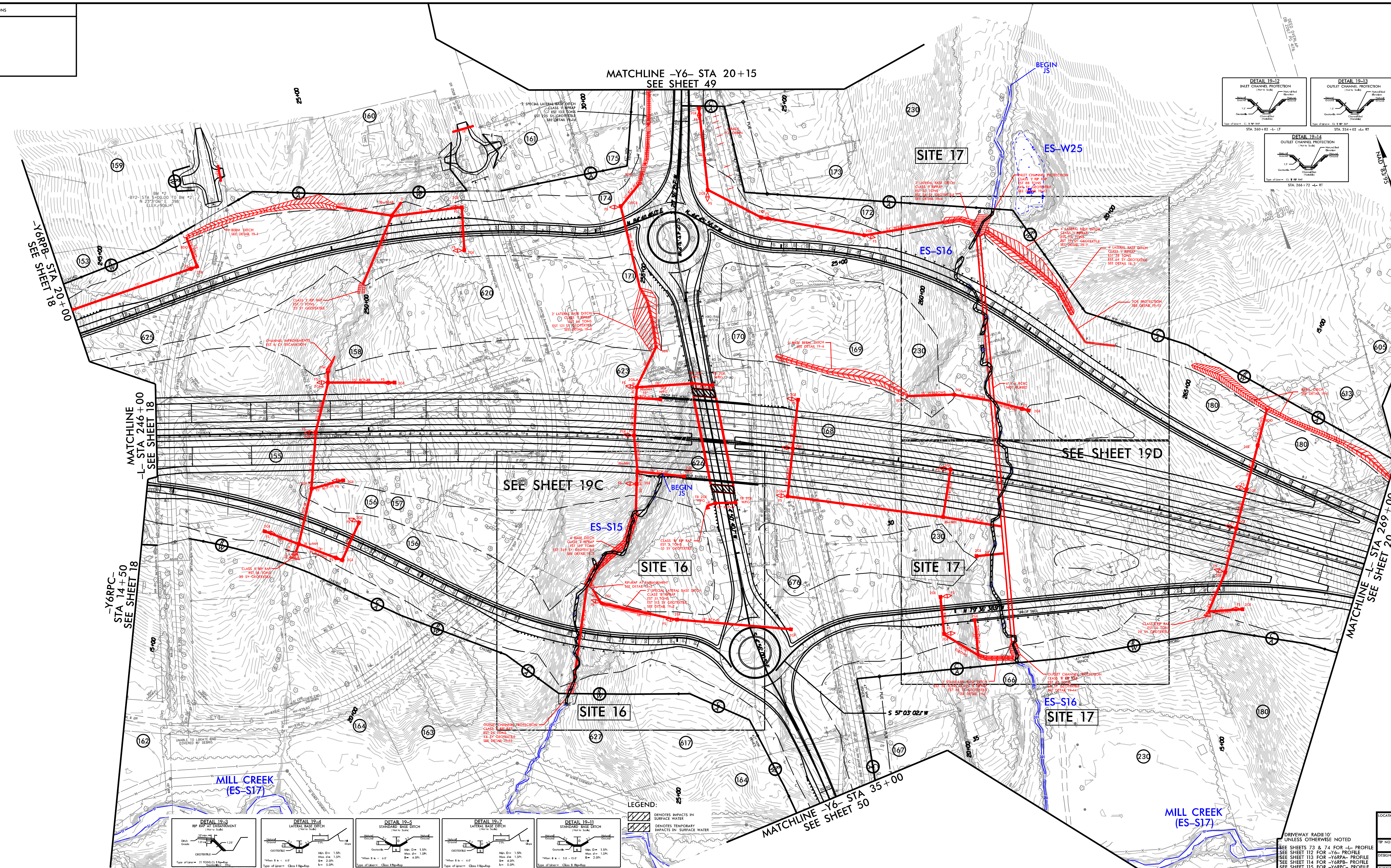
LOCATION:

TIP NO.: U-2579D, E & F
COUNTY: FORSYTH

DESIGNED BY: EPW

CHECKED BY: JAF
DATE: 06/04/18

REVISIONS



PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	19

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 55 OF 97

GRAPHIC SCALE
50 25 0 50 100
PLANS

DRIVEWAY RADII 10'
UNLESS OTHERWISE NOTED

SEE SHEETS 73 & 74 FOR -L- PROFILE
SEE SHEET 112 FOR -Y6- PROFILE
SEE SHEET 113 FOR -Y6RPA- PROFILE
SEE SHEET 114 FOR -Y6RPB- PROFILE
SEE SHEET 115 FOR -Y6RPC- PROFILE
SEE SHEET 116 FOR -Y6RPD- PROFILE

LOCATION:	
TIP NO.: U-2579D, E & F	COUNTY: FORSYTH
DESIGNED BY: EPW	
CHECKED BY: JAF	DATE: 06/04/18

STV 100 Years
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Charlotte, NC 28202
NC License Number F-0991

FLATIRON

Blythe

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	19A

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
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N.C.B.E.L.S. License Number: F-0116

25 12.5 0 25 50
GRAPHIC SCALE

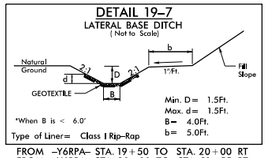
NAD 83/95

LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

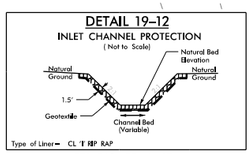
DETAIL 19-7
LATERAL BASE DITCH
(Not to Scale)



*When B is < 6.0'
Min. D = 1.5Ft.
Max. d = 1.5Ft.
B = 4.0Ft.
b = 5.0Ft.
Type of Liner = Class I Rip-Rap

FROM -Y6RPA- STA. 19+50 TO STA. 20+00 RT
FROM -Y6RPA- STA. 20+00 TO STA. 21+55 RT

DETAIL 19-12
INLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner = CL 'I' RIP RAP

STA. 260+82 -L- LT

MATCHLINE -Y6- STA 20+15
SEE SHEET 49

MATCHLINE SEE SHEET 19B

MATCHLINE SEE SHEET 51

MATCHLINE SEE SHEET 19D

SITE 17

ES-W25

ES-S16

BEGIN JS

2' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 33 TONS
EST 56 SY GEOTEXTILE
SEE DETAIL 19-4

INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 88 TONS
149 SY GEOTEXTILE
SEE DETAIL 19-12

4' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 113 TONS
EST 191 SY GEOTEXTILE
SEE DETAIL 19-7

4' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 38 TONS
EST 64 SY GEOTEXTILE
SEE DETAIL 19-7

TOE PROTECTION
SEE DETAIL 19-15

2' BASE BERM DITCH
SEE DETAIL 19-6

6' X 6' RCBC
NOT BURIED

BERM DITCH
SEE DETAIL 19-11

DEED OVERLAP
DB 2261 PG 4176

NC GRID
NAD 83/95

PERMIT DRAWING
SHEET 56 OF 97

REVISIONS

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DATE: 10/26/2018
TIME: 10:07:11 AM
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8/17/99

STV 100 Years
STV Engineers, Inc.
900 West Trade St., Suite 715
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NC License Number F-0991

FLATIRON

Blythe

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	19C

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NAD 1983

25 12.5 0 25 50
GRAPHIC SCALE

MATCHLINE SEE SHEET 19B

MATCHLINE
-L- STA 246+00
SEE SHEET 18

-Y6RPC-
STA 14+50
SEE SHEET 18

MATCHLINE SEE SHEET 19D

ES-S15

SITE 16

SITE 16

MILL CREEK
(ES-S17)

BEGIN JS

4' BASE DITCH
CLASS 'I' RIPRAP
EST 159 TONS
EST 269 SY GEOTEXTILE
SEE DETAIL 19-5

CLASS 'B' RIP RAP
EST. 3 TONS
10 SY GEOTEXTILE

RIP-RAP AT EMBANKMENT
SEE DETAIL 19-3

2' SPECIAL LATERAL BASE DITCH
CLASS 'B' RIPRAP
EST 51 TONS
EST 112 SY GEOTEXTILE
SEE DETAIL 19-2

CLASS 'I' RIP RAP
EST 18 TONS
30 SY GEOTEXTILE

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 26 TONS
44 SY GEOTEXTILE
SEE DETAIL 19-13

CREST STA. 25+3
ELEV = 87

TOE

UNABLE TO LOCATE END
COVERED W/ DEBRIS

15" CPP OTHER END UNKNOWN

LEGEND:

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

DETAIL 19-3
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= 21 TONS,CL I Rip-Rap
Geotextile= 39sy
FROM -Y6RPC- STA. 23+18 TO STA. 23+30 LT
FROM -L- STA. 255+08 TO STA. 255+10 RT

DETAIL 19-5
STANDARD BASE DITCH
(Not to Scale)

Min. D= 1.5Ft.
Max. d= 1.5Ft.
B= 4.0Ft.
*When B is < 6.0'
Type of Liner= Class I Rip-Rap
FROM -Y6- STA. 28+86 TO STA. 30+05 RT

DETAIL 19-14
OUTLET CHANNEL PROTECTION
(Not to Scale)

Type of Liner= CL 'I' RIP RAP
STA. 266+72 -L- RT

PERMIT DRAWING
SHEET 57 OF 97

REVISIONS

8/17/99

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DATE: 10/26/2018
TIME: 10:07:23 AM

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	19D

ROADWAY DESIGN ENGINEER

STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

FLATIRON

Blythe

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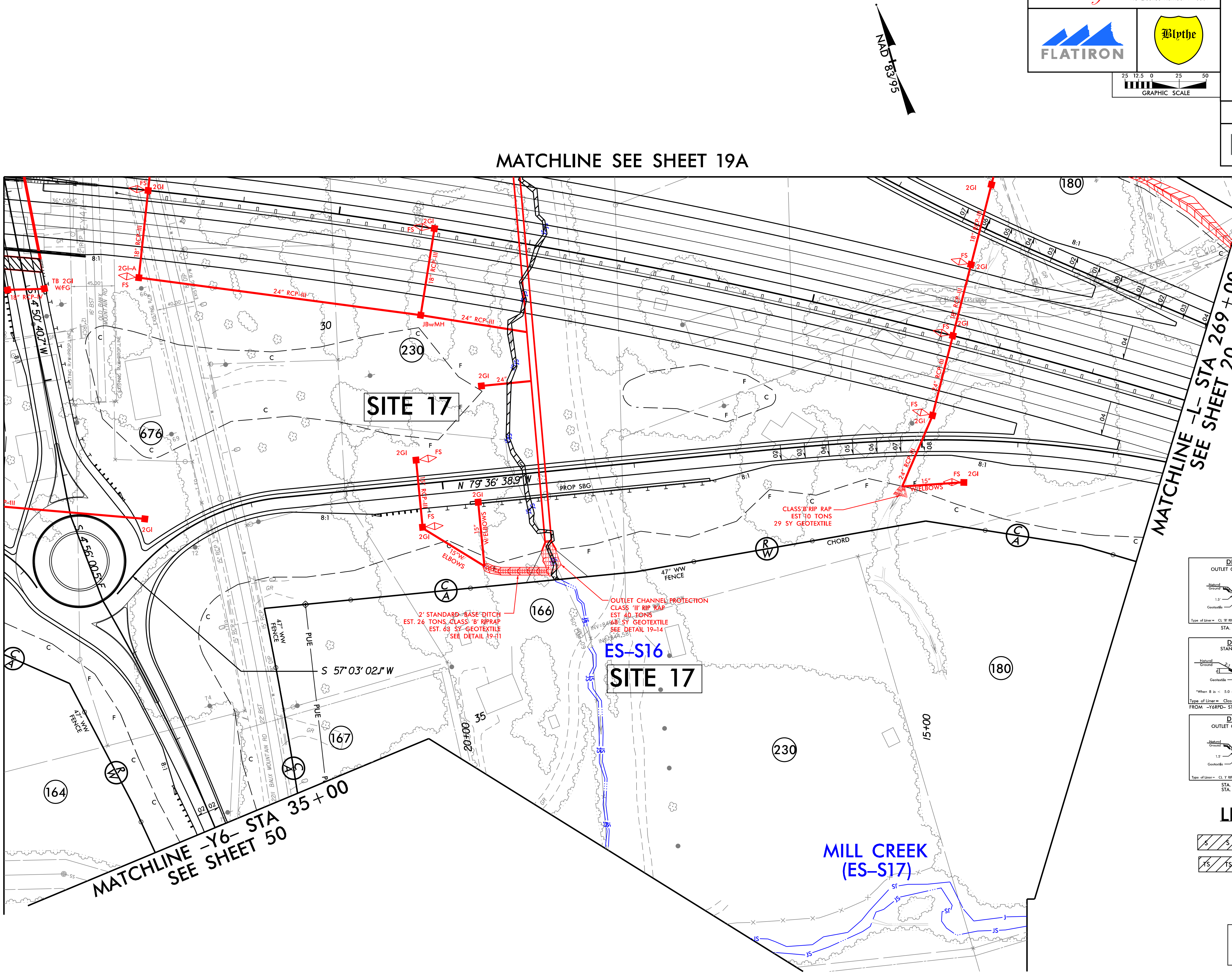
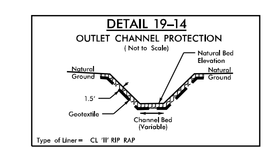
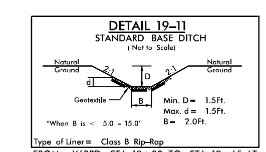
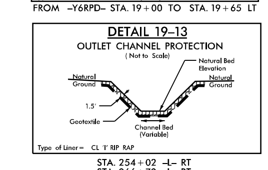


NAD 83/95
GRAPHIC SCALE
MATCHLINE SEE SHEET 19A
MATCHLINE SEE SHEET 19C
MATCHLINE -L- STA 269+00 SEE SHEET 20
MATCHLINE -Y6- STA 35+00 SEE SHEET 50
SITE 17
ES-S16
MILL CREEK (ES-S17)
N 79° 36' 38.9" W
S 57° 03' 02.1" W
PROP SBG
CHORD
47" WW FENCE
2' STANDARD BASE DITCH
EST. 26 TONS CLASS 'B' RIPRAP
EST. 63 SY GEOTEXTILE
SEE DETAIL 19-11
OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 40 TONS
68 SY GEOTEXTILE
SEE DETAIL 19-14
CLASS'B'RIP RAP
EST 10 TONS
29 SY GEOTEXTILE
24" RCP-III
18" RCP-III
15" W ELBOWS
2GI
FS
JBwMH
PUE
20+00
15+00
180
230
676
166
167
164







LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 58 OF 97

REVISIONS

8/17/99

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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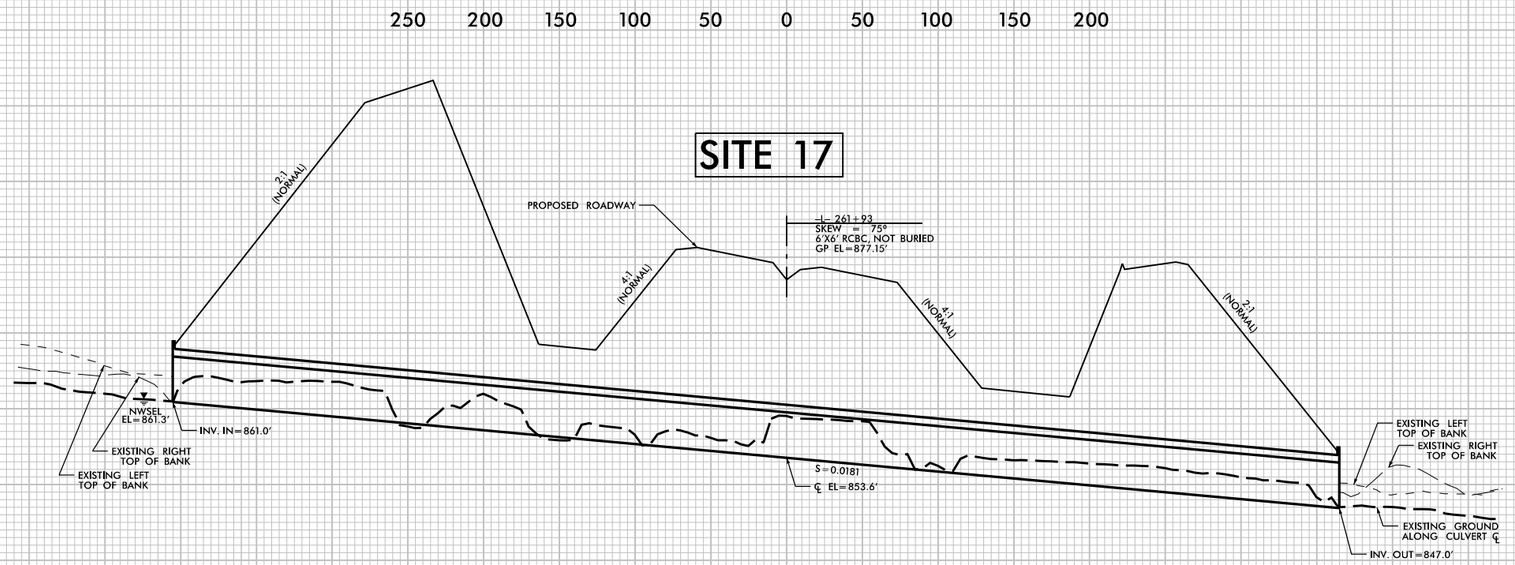
SCALE:
1"=50' HORIZONTAL
1"=10' VERTICAL



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 59 OF 97

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	20

R/W SHEET NO.

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

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STV Engineers, Inc.
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INCOMPLETE PLANS
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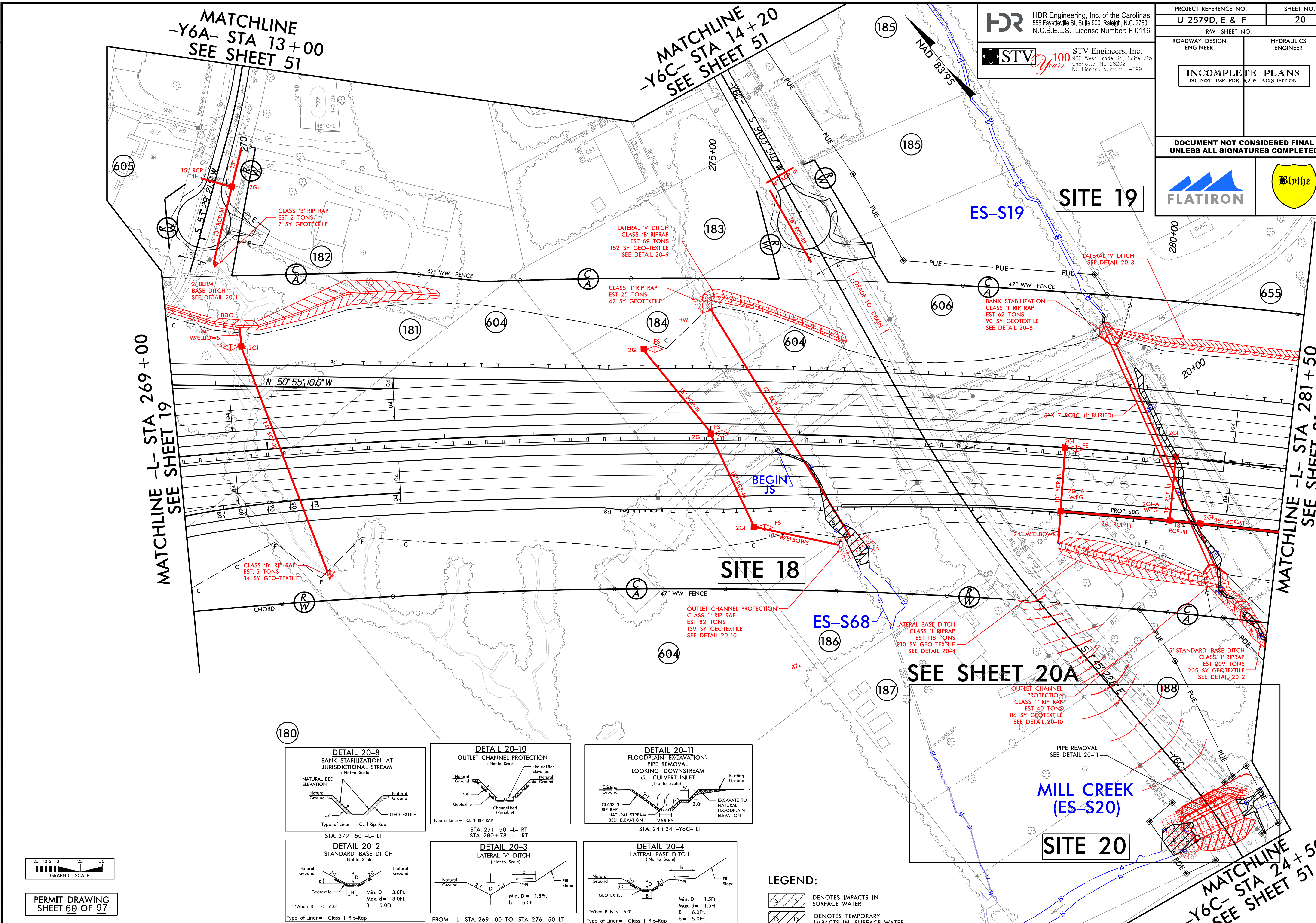
FLATIRON — Blythe



MATCHLINE -Y6A- STA 13+00 SEE SHEET 51
MATCHLINE -Y6C- STA 14+20 SEE SHEET 51
MATCHLINE -L- STA 269+00 SEE SHEET 19
MATCHLINE -L- STA 281+50 SEE SHEET 21
MATCHLINE -Y6C- STA 24+50 SEE SHEET 51
NAD 83/95
SITE 19
ES-S19
SITE 18
ES-S68
BEGIN JS
SEE SHEET 20A
MILL CREEK (ES-S20)
SITE 20
N 50°55'10.0" W
47" WW FENCE
CLASS 'B' RIP RAP
EST 2 TONS
7 SY GEOTEXTILE
2' BERM BASE DITCH SEE DETAIL 20-1
LATERAL 'V' DITCH CLASS 'B' RIPRAP EST 69 TONS 152 SY GEO-TEXTILE SEE DETAIL 20-9
CLASS 'I' RIP RAP EST 25 TONS 42 SY GEOTEXTILE
LATERAL 'V' DITCH SEE DETAIL 20-3
BANK STABILIZATION CLASS 'I' RIP RAP EST 62 TONS 90 SY GEOTEXTILE SEE DETAIL 20-8
5' X 7' RCBC (1' BURIED)
CLASS 'B' RIP-RAP EST. 5 TONS 14 SY GEO-TEXTILE
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 82 TONS 139 SY GEOTEXTILE SEE DETAIL 20-10
LATERAL BASE DITCH CLASS 'I' RIPRAP EST 118 TONS 210 SY GEO-TEXTILE SEE DETAIL 20-4
5' STANDARD BASE DITCH CLASS 'I' RIPRAP EST 209 TONS 205 SY GEOTEXTILE SEE DETAIL 20-2
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 40 TONS 86 SY GEOTEXTILE SEE DETAIL 20-10
PIPE REMOVAL SEE DETAIL 20-11
DETAIL 20-8 BANK STABILIZATION AT JURISDICTIONAL STREAM (Not to Scale)
Type of Liner= CL I Rip-Rap
STA. 279+50 -L- LT
DETAIL 20-10 OUTLET CHANNEL PROTECTION (Not to Scale)
STA. 271+50 -L- RT
STA. 280+78 -L- RT
DETAIL 20-11 FLOODPLAIN EXCAVATION PIPE REMOVAL LOOKING DOWNSTREAM @ CULVERT INLET (Not to Scale)
STA. 24+34 -Y6C- LT
DETAIL 20-2 STANDARD BASE DITCH (Not to Scale)
Min. D= 3.0Ft. Max. d= 3.0Ft. B= 5.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 280+78 TO STA. 281+50 RT
DETAIL 20-3 LATERAL 'V' DITCH (Not to Scale)
Min. D= 1.5Ft. b= 5.0Ft.
FROM -L- STA. 269+00 TO STA. 276+50 LT
FROM -L- STA. 279+50 TO STA. 281+50 LT
DETAIL 20-4 LATERAL BASE DITCH (Not to Scale)
Min. D= 1.5Ft. Max. d= 1.5Ft. B= 6.0Ft. b= 5.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 279+00 TO STA. 280+80 RT
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE

PERMIT DRAWING SHEET 60 OF 97

REVISIONS

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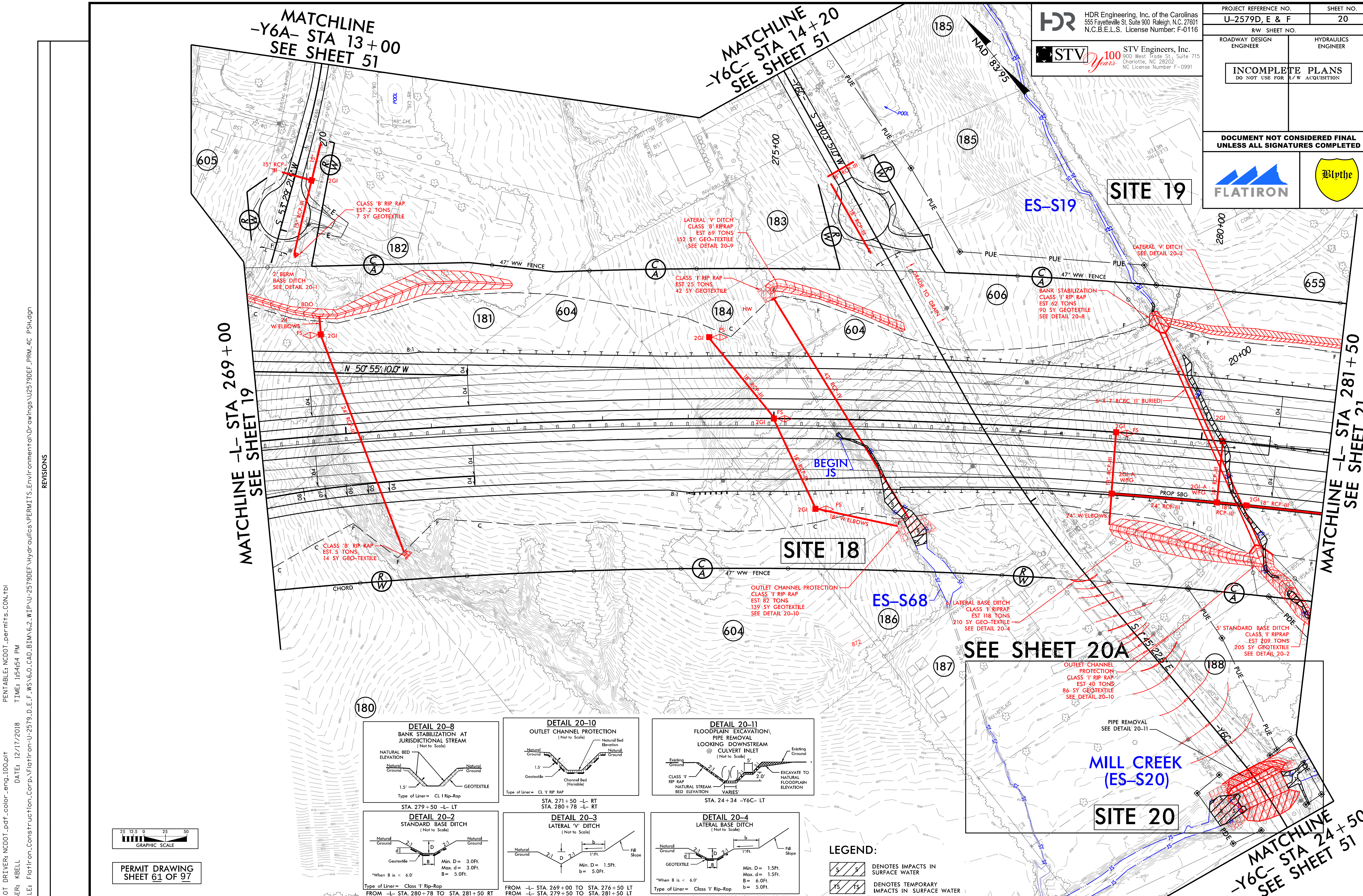
PROJECT REFERENCE NO.
U-2579D, E & F
SHEET NO.
20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991
FLATIRON
Blythe
MATCHLINE -Y6A- STA 13+00 SEE SHEET 51
MATCHLINE -Y6C- STA 14+20 SEE SHEET 51
MATCHLINE -L- STA 269+00 SEE SHEET 19
MATCHLINE -L- STA 281+50 SEE SHEET 21
MATCHLINE -Y6C- STA 24+50 SEE SHEET 51
NAD 83/95
SITE 18
SITE 19
SITE 20
ES-S19
ES-S68
MILL CREEK (ES-S20)
BEGIN JS
SEE SHEET 20A
CLASS 'B' RIP RAP EST 2 TONS 7 SY GEOTEXTILE
2' BERM BASE DITCH SEE DETAIL 20-1
LATERAL 'V' DITCH CLASS 'B' RIPRAP EST 69 TONS 152 SY GEO-TEXTILE SEE DETAIL 20-9
CLASS 'I' RIP RAP EST 25 TONS 42 SY GEOTEXTILE
LATERAL 'V' DITCH SEE DETAIL 20-3
BANK STABILIZATION CLASS 'I' RIP RAP EST 62 TONS 90 SY GEOTEXTILE SEE DETAIL 20-8
5' X 7' RCBC (1' BURIED)
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 82 TONS 139 SY GEOTEXTILE SEE DETAIL 20-10
LATERAL BASE DITCH CLASS 'I' RIPRAP EST 118 TONS 210 SY GEO-TEXTILE SEE DETAIL 20-4
5' STANDARD BASE DITCH CLASS 'I' RIPRAP EST 209 TONS 205 SY GEOTEXTILE SEE DETAIL 20-2
OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST 40 TONS 86 SY GEOTEXTILE SEE DETAIL 20-10
PIPE REMOVAL SEE DETAIL 20-11
GRADE TO DRAIN
N 50°55'10.0" W
47" WW FENCE
PROP SBG
DETAIL 20-8
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
Type of Liner= CL I Rip-Rap
STA. 279+50 -L- LT
DETAIL 20-10
OUTLET CHANNEL PROTECTION
(Not to Scale)
Type of Liner= CL 'I' RIP RAP
STA. 271+50 -L- RT
STA. 280+78 -L- RT
DETAIL 20-11
FLOODPLAIN EXCAVATION\ PIPE REMOVAL LOOKING DOWNSTREAM @ CULVERT INLET
(Not to Scale)
STA. 24+34 -Y6C- LT
DETAIL 20-2
STANDARD BASE DITCH
(Not to Scale)
Min. D= 3.0Ft. Max. d= 3.0Ft. B= 5.0Ft.
*When B is < 6.0'
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 280+78 TO STA. 281+50 RT
DETAIL 20-3
LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1.5Ft. b= 5.0Ft.
FROM -L- STA. 269+00 TO STA. 276+50 LT
FROM -L- STA. 279+50 TO STA. 281+50 LT
DETAIL 20-4
LATERAL BASE DITCH
(Not to Scale)
Min. D= 1.5Ft. Max. d= 1.5Ft. B= 6.0Ft. b= 5.0Ft.
*When B is < 6.0'
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 279+00 TO STA. 280+80 RT
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
PERMIT DRAWING SHEET 61 OF 97
REVISIONS
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	20A

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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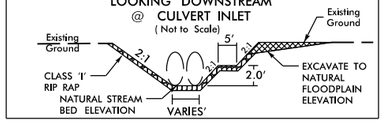
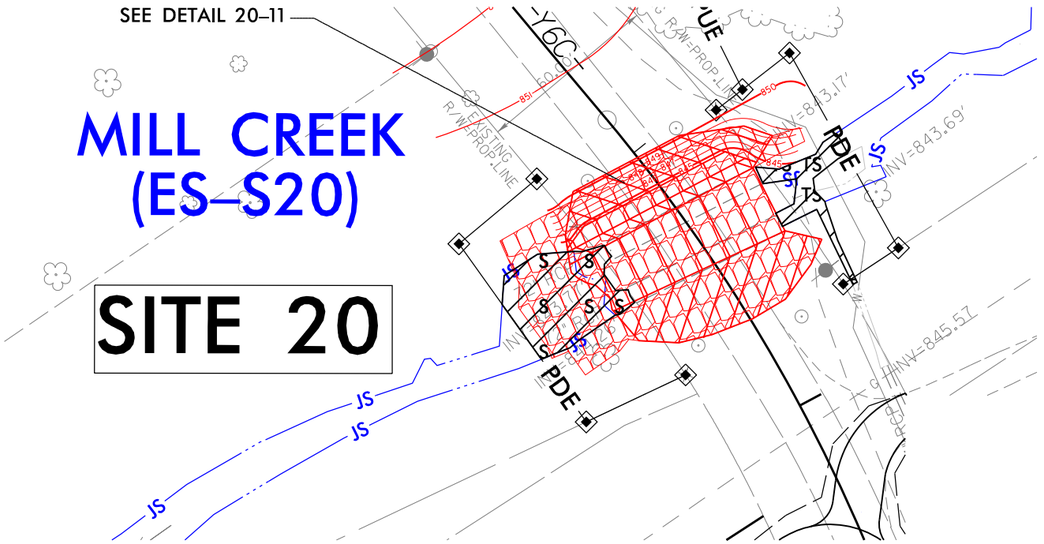
12.5 0 12.5 25
GRAPHIC SCALE

NAD 83/95

DETAIL 20-11
FLOODPLAIN EXCAVATION\
PIPE REMOVAL
LOOKING DOWNSTREAM
@ CULVERT INLET
(Not to Scale)



STA. 24+34 -Y6C- LT



LEGEND

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

PERMIT DRAWING
SHEET 62 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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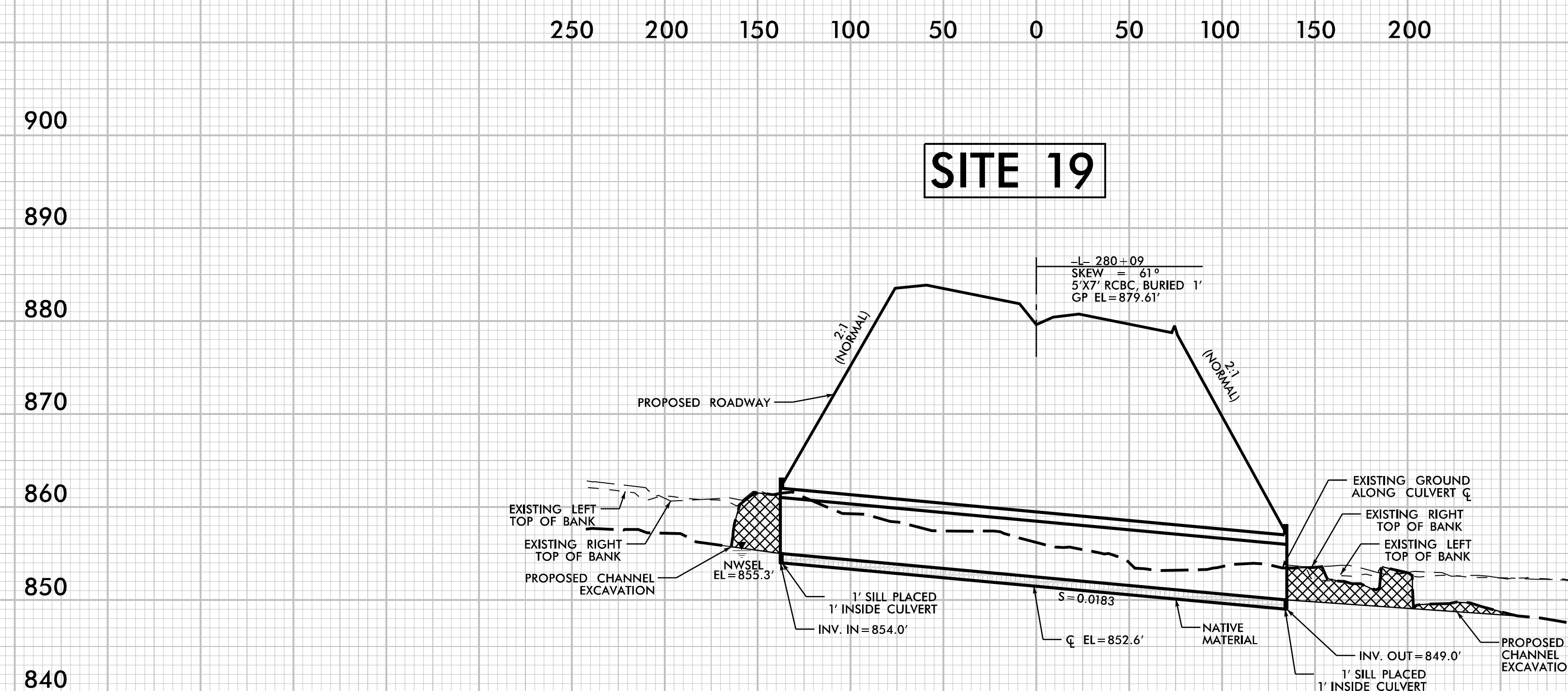
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 19



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 63 OF 97

5/14/99

11:12:45 AM
U2579DEF_PRM_CSR_PSH.dgn
$$$$USERNAME$$$$

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STV Engineers, Inc.
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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	21
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
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FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

NAD 1983/95

MILL CREEK (ES-S20)

SITE 21

ES-S53

SITE 20A

SITE 20B

SITE 20C

TEMP WORK PAD
NOTE: TEMP PIPES WILL BE LAID TO CONVEY FLOW OF CREEK TO MAINTAIN 50% FLOW WIDTH.

BANK STABILIZATION CLASS 'B' RIP RAP EST 7 TONS 15 SY GEOTEXTILE SEE DETAIL 21-12

4' STANDARD BASE DITCH SEE DETAIL 21-3

BANK STABILIZATION / RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST 16 TONS 31 SY GEOTEXTILE SEE DETAIL 21-5

STANDARD 'V' DITCH SEE DETAIL 21-2

LATERAL 'V' DITCH SEE DETAIL 21-1

PROPOSED CHANNEL CHANGE CLASS 'I' RIP RAP EST 137 TONS 232 SY GEOTEXTILE SEE DETAIL 21-10

CLASS 'B' RIP RAP EST 8 TONS 21 SY GEOTEXTILE

BANK STABILIZATION CLASS 'B' RIP RAP EST 7 TONS 15 SY GEOTEXTILE SEE DETAIL 21-12

CLASS II RIP RAP TO ELEV. 857.5'

5' STANDARD BASE DITCH CLASS 'I' RIPRAP EST 11 TONS 16 SY GEOTEXTILE SEE DETAIL 21-11

TOE PROTECTION EST 50 TONS 96 SY GEO-TEXTILE SEE DETAIL 21-4

2' BERM BASE DITCH SEE DETAIL 21-9

47" WW FENCE

PUE

-L- STA 281+50 SEE SHEET 20

MATCHLINE -L- STA 295+50 SEE SHEET 22

MATCHLINE SEE SHEET 51

285+00

290+00

295+00

655

704

188

188

704

JB wSLAB

18" RCP-III

24" RCP-III

15" RCP-III

PROP SBG

2GI W/FG

2GI-A

15" W/ELBOWS

BDO

FS

50' PIEDMONT NATURAL GAS R/W

12" STEEL

12" CMC

72" CHL

WINSTON-SALEM CITY LIMITS

DETAIL 21-10
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, Geotextile

Min. D = 3.0Ft.
Max. d = 3.0Ft.
B = 3.0Ft.
*When B is < 6.0'

Type of Liner = Class 'I' Rip-Rap

FROM -L- STA. 285+20 TO STA. 285+65 LT

DETAIL 21-11
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, Geotextile

Min. D = 3.0Ft.
Max. d = 3.0Ft.
B = 5.0Ft.
*When B is < 6.0'

Type of Liner = Class 'I' Rip-Rap

FROM -L- STA. 281+50 TO STA. 281+58 RT

DETAIL 21-12
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)

NATURAL BED ELEVATION, Natural Ground, 1.5', GEOTEXTILE

Type of Liner = CL I Rip-Rap

FROM -L- STA. 285+00 -L- LT

DETAIL 21-2
STANDARD 'V' DITCH
(Not to Scale)

Natural Ground, 2:1, D

Min. D = 1.5Ft.

FROM -L- STA. 283+00 TO STA. 285+15 LT

DETAIL 21-3
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, B

Min. D = 1.5Ft.
B = 4.0Ft.

FROM -L- STA. 286+75 TO STA. 287+50 LT

DETAIL 21-5
RIP RAP AT EMBANKMENT
(Not to Scale)

10' min., Ditch Grade, 1.0' min., 1.0', GEOTEXTILE

Type of Liner = 16 TONS,CL 'B' Rip-Rap
Geotextile = 31sy

FROM -L- STA. 286+65 TO STA. 286+75 LT

LEGEND:

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 64 OF 97

REVISIONS

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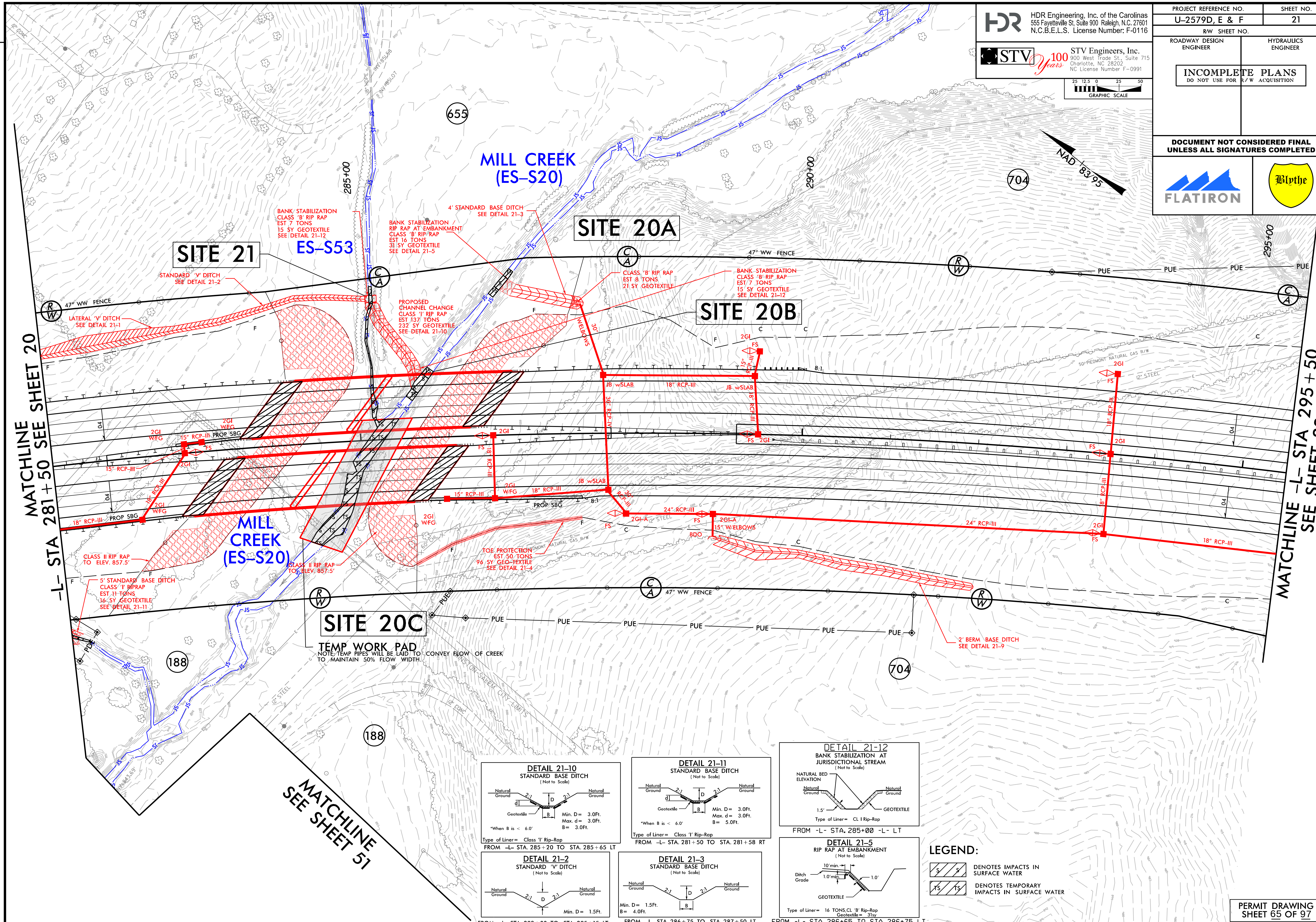

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
PROJECT REFERENCE NO.
U-2579D, E & F
SHEET NO.
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
FLATIRON
Blythe
GRAPHIC SCALE
NAD 83/95
SITE 21
SITE 20A
SITE 20B
SITE 20C
MILL CREEK (ES-S20)
ES-S53
MILL CREEK (ES-S20)
MATCHLINE -L- STA 281+50 SEE SHEET 20
MATCHLINE -L- STA 295+50 SEE SHEET 22
MATCHLINE SEE SHEET 51
BANK STABILIZATION CLASS 'B' RIP RAP EST 7 TONS 15 SY GEOTEXTILE SEE DETAIL 21-12
BANK STABILIZATION / RIP RAP AT EMBANKMENT CLASS 'B' RIP RAP EST 16 TONS 31 SY GEOTEXTILE SEE DETAIL 21-5
4' STANDARD BASE DITCH SEE DETAIL 21-3
STANDARD 'V' DITCH SEE DETAIL 21-2
LATERAL 'V' DITCH SEE DETAIL 21-1
PROPOSED CHANNEL CHANGE CLASS 'I' RIP RAP EST 137 TONS 232 SY GEOTEXTILE SEE DETAIL 21-10
CLASS 'B' RIP RAP EST 8 TONS 21 SY GEOTEXTILE
BANK STABILIZATION CLASS 'B' RIP RAP EST 7 TONS 15 SY GEOTEXTILE SEE DETAIL 21-12
TOE PROTECTION EST 50 TONS 96 SY GEO-TEXTILE SEE DETAIL 21-4
CLASS II RIP RAP TO ELEV. 857.5'
CLASS II RIP RAP TO ELEV. 857.5'
5' STANDARD BASE DITCH CLASS 'I' RIPRAP EST 11 TONS 36 SY GEOTEXTILE SEE DETAIL 21-11
2' BERM BASE DITCH SEE DETAIL 21-9
TEMP WORK PAD
NOTE: TEMP PIPES WILL BE LAID TO CONVEY FLOW OF CREEK TO MAINTAIN 50% FLOW WIDTH.
47" WW FENCE
PUE
285+00
290+00
295+00
DETAIL 21-10
STANDARD BASE DITCH (Not to Scale)
Min. D= 3.0Ft. Max. d= 3.0Ft. B= 3.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 285+20 TO STA. 285+65 LT
DETAIL 21-11
STANDARD BASE DITCH (Not to Scale)
Min. D= 3.0Ft. Max. d= 3.0Ft. B= 5.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 281+50 TO STA. 281+58 RT
DETAIL 21-12
BANK STABILIZATION AT JURISDICTIONAL STREAM (Not to Scale)
Type of Liner= CL I Rip-Rap
FROM -L- STA. 285+00 -L- LT
DETAIL 21-2
STANDARD 'V' DITCH (Not to Scale)
Min. D= 1.5Ft.
FROM -L- STA. 283+00 TO STA. 285+15 LT
DETAIL 21-3
STANDARD BASE DITCH (Not to Scale)
Min. D= 1.5Ft. B= 4.0Ft.
FROM -L- STA. 286+75 TO STA. 287+50 LT
DETAIL 21-5
RIP RAP AT EMBANKMENT (Not to Scale)
Type of Liner= 16 TONS CL 'B' Rip-Rap Geotextile= 31sy
FROM -L- STA. 286+65 TO STA. 286+75 LT
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 65 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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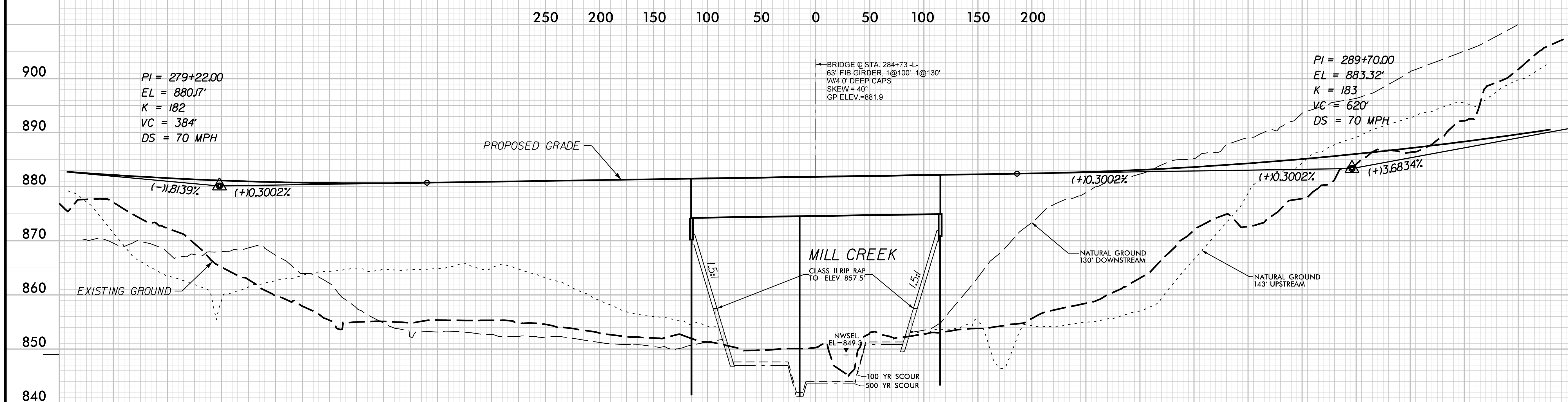
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 20 & 21



250 200 150 100 50 0 50 100 150 200
900
890
880
870
860
850
840
PI = 279+22.00
EL = 880.17'
K = 182
VC = 384'
DS = 70 MPH
PROPOSED GRADE
(−)1.8139%
(+)0.3002%
EXISTING GROUND
BRIDGE ℄ STA. 284+73 -L-
63" FIB GIRDER, 1@100', 1@130'
W/4.0' DEEP CAPS
SKEW = 40°
GP ELEV.=881.9
MILL CREEK
1.5:1
CLASS II RIP RAP
TO ELEV. 857.5'
NWSEL.
EL=849.3
100 YR SCOUR
500 YR SCOUR
(+)0.3002%
NATURAL GROUND
130' DOWNSTREAM
NATURAL GROUND
143' UPSTREAM
PI = 289+70.00
EL = 883.32'
K = 183
VC = 620'
DS = 70 MPH
(+)0.3002%
(+)3.6834%

℄ PROFILE – PROPOSED BRIDGE

PERMIT DRAWING
SHEET 66 OF 97

5/14/99

4:30:48 PM
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PENTABLE: NCDOT_permits_NOCON.tbl
DATE: 10/26/2018
TIME: 10:08:28 AM

REVISIONS

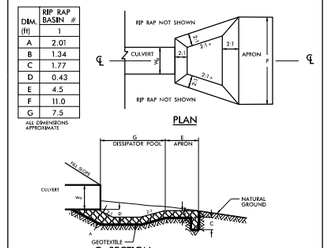
LEGEND:

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

DETAIL B
RIP-RAPPED ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN #
A	2.01
B	1.34
C	1.77
D	0.43
E	4.5
F	11.0
G	7.5

ALL DIMENSIONS APPROXIMATE



BASIN #	LOCATION (AT OUTLET)
1	-L- 303+67 LT (2207)

7/08

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STV 100 Years
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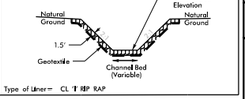
GRAPHIC SCALE 25 12.5 0 25 50

DETAIL 22-7
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 303+56 -L- LT

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

NAD 83/95

704

300+00

305+00

SITE 22

ES-S52

MATCHLINE -L- STA 295+50
SEE SHEET 21

MATCHLINE -L- STA 309+50
SEE SHEET 23

PUE

CHORD

47" WW FENCE

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 29 TONS
49 SY GEOTEXTILE
SEE DETAIL 22-7

ENERGY DISSIPATOR BASIN
SEE DETAIL SHEET 2D-3
DETAIL B

BEGIN JS

24" RCP-III
30" RCP-III
18" RCP-III
30" W/ELBOWS
24" W/ELBOWS
15" W/ELBOWS
JBw/MH
FS 2GI-A
FS 2GI
2GI W/FG
PROP SBG
8:1
16:1 TAPER
S 29° 00' 58.0" E
HW
15"
F
C

BERM DITCH
CLASS 'I' RIPRAP
EST 150 TONS
254 SY GEOTEXTILE
SEE DETAIL 22-1

INLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 61 TONS
103 SY GEOTEXTILE
SEE DETAIL 22-5

2' LATERAL BASE DITCH
CLASS 'B' RIPRAP
EST 78 TONS
173 SY GEOTEXTILE
SEE DETAIL 22-2

BERM DITCH
CLASS 'I' RIPRAP
EST 99 TONS
220 SY GEOTEXTILE
SEE DETAIL 22-1

PERMIT DRAWING
SHEET 67 OF 97

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	22
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

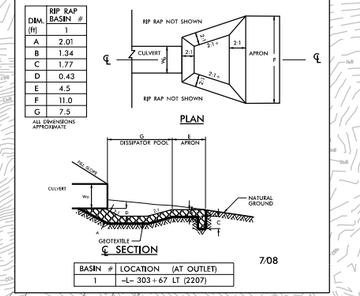
LEGEND:

- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL B
RIP-RAPPED ENERGY DISSIPATOR BASIN

DIM. (ft)	RIP RAP BASIN #
1	
A	2.01
B	1.34
C	1.77
D	0.43
E	4.5
F	11.0
G	7.5

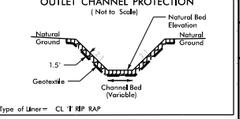
ALL DIMENSIONS APPROXIMATE



7/08

BASIN #	LOCATION (AT OUTLET)
1	-L- 303+67 LT (2207)

DETAIL 22-7
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP

STA. 303+56 -L- LT

NAD 1983/95

704

300+00

305+00

SITE 22
ES-S52

PUE

CHORD

47" WW FENCE

OUTLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST. 39 TONS 49 SY GEOTEXTILE SEE DETAIL 22-7

ENERGY DISSIPATOR BASIN SEE DETAIL SHEET 20-3 DETAIL B

BEGIN JS

24" W/ELBOWS

30" W/ELBOWS

15" W/ELBOWS

2GI W/FG

JBw/MH

24" RCP-III

30" RCP-III

18" RCP-III

FS 2GI-A

FS 2GI

16:1 TAPER

PROP SBG

8:1

S 29° 00' 58.0" E

15" HW

BERM DITCH CLASS 'I' RIPRAP EST. 150 TONS 254 SY GEOTEXTILE SEE DETAIL 22-1

INLET CHANNEL PROTECTION CLASS 'I' RIP RAP EST. 61 TONS 103 SY GEOTEXTILE SEE DETAIL 22-5

2' LATERAL BASE DITCH CLASS 'B' RIPRAP EST. 78 TONS 173 SY GEOTEXTILE SEE DETAIL 22-2

BERM DITCH CLASS 'I' RIPRAP EST. 99 TONS 220 SY GEOTEXTILE SEE DETAIL 22-1

MATCHLINE -L- STA 295+50
SEE SHEET 21

MATCHLINE -L- STA 309+50
SEE SHEET 23

REVISIONS

PERMIT DRAWING
SHEET 68 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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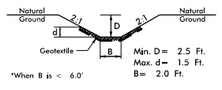
FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

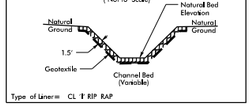
NAD 83/95

DETAIL 23-1
PROPOSED CHANNEL CHANGE
(Not to Scale)



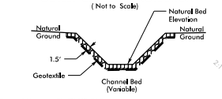
Type of Liner= CL 'I' Rip-Rap
FROM -L- STA. 316+98 TO STA. 317+30 RT

DETAIL 23-6
OUTLET CHANNEL PROTECTION
(Not to Scale)



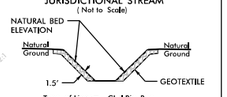
Type of Liner= CL 'I' RIP RAP
STA. 323+42 -L- LT

DETAIL 23-8
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'II' RIP RAP
STA. 316+32 -L- LT

DETAIL 23-7
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)



Type of Liner= CL 1 Rip-Rap
STA. 317+28 -L- RT

LEGEND:

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE -L- STA 309+50
SEE SHEET 22

MATCHLINE -L- STA 323+50
SEE SHEET 24

310+00

315+00

320+00

704

BM #7
-BL- STA 111+40
28' LT.
ELEV.= 937.69

SITE 23

ES-S21

OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 38 TONS
64 SY GEOTEXTILE
SEE DETAIL 23-8

47" WW FENCE

TDE

LATERAL 'V' DITCH
CLASS 'B' RIP RAP
EST 15 TONS
35 SY GEOTEXTILE
SEE DETAIL 23-9

TOE PROTECTION
SEE DETAIL 23-8

ES-S23

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 12 TONS
20 SY GEOTEXTILE
SEE DETAIL 23-6

SITE 25

24" RCP-III
18" RCP-III
15" RCP-III
18" w/ELBOWS
2GI
2GI W/FG
PROP SBG
6' X 6' RCBC NOT BURIED
FS
8:1

S 29° 00' 58.0" E

BDO

BERM DITCH SEE DETAIL 23-2

GRADE TO DRAIN

BANK STABILIZATION
CLASS 'I' RIP RAP
EST 19 TONS
33 SY GEOTEXTILE
SEE DETAIL 23-7

PROPOSED CHANNEL CHANGE W/CLASS 'I' RIP RAP
SEE DETAIL 23-1

ES-S22

SITE 24

SITE 23

ES-S21

47" WW FENCE

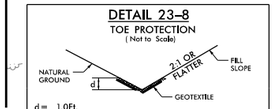
WINSTON-SALEM CITY LIMITS

SR 2215 - NORTHWEST DR

SR 2215 - NORTHWEST DR

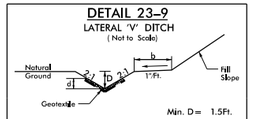
EXISTING R/W

DETAIL 23-8
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 316+39 TO STA. 319+50 LT

DETAIL 23-9
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= CL-B Rip-Rap
FROM -L- STA. 315+95 TO STA. 316+00 LT

JS BEGINS JUST BEYOND THIS SHEET

PERMIT DRAWING
SHEET 69 OF 97

REVISIONS

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DATE: 12/17/2018
TIME: 2:53:32 PM

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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	23
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

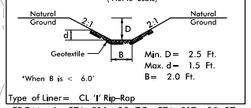
FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

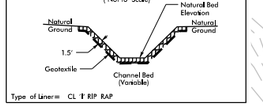
NAD 83/95

DETAIL 23-1
PROPOSED CHANNEL CHANGE
(Not to Scale)



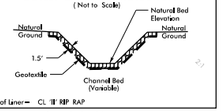
Type of Liner= CL 'I' Rip-Rap
FROM –L– STA. 316+98 TO STA. 317+30 RT

DETAIL 23-6
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP
STA. 323+42 –L– LT

DETAIL 23-8
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'II' RIP RAP
STA. 316+32 –L– LT

DETAIL 23-7
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)

Type of Liner= CL 1 Rip-Rap
STA. 317+28 –L– RT

LEGEND:

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE –L– STA 309+50
SEE SHEET 22

MATCHLINE –L– STA 323+50
SEE SHEET 24

310+00

315+00

320+00

704

BM #7
-BL- STA 111+40
287' LT.
ELEV.= 937.69

SITE 23

ES–S21

OUTLET CHANNEL PROTECTION
CLASS 'II' RIP RAP
EST 38 TONS
64 SY GEOTEXTILE
SEE DETAIL 23-8

47" WW FENCE

TDE

LATERAL 'V' DITCH
CLASS 'B' RIP RAP
EST 15 TONS
35 SY GEOTEXTILE
SEE DETAIL 23-9

TOE PROTECTION
SEE DETAIL 23-8

18" W/ELBOWS

2GI W/FG

PROP SBG

15" RCP-III

6' X 6' RCBC
NOT BURIED

S 29° 00' 58.0" E

24" RCP-III

2GI-A

8" RCP-III

2GI

18" ELBOWS

BDO

BERM DITCH
SEE DETAIL 23-2

GRADE TO DRAIN

BANK STABILIZATION
CLASS 'I' RIP RAP
EST 19 TONS
33 SY GEOTEXTILE
SEE DETAIL 23-7

PROPOSED CHANNEL CHANGE
W/CLASS 'I' RIP RAP
SEE DETAIL 23-1

ES–S23

OUTLET CHANNEL PROTECTION
CLASS 'I' RIP RAP
EST 12 TONS
20 SY GEOTEXTILE
SEE DETAIL 23-6

24"

SITE 25

ES–S22

SITE 24

SITE 23

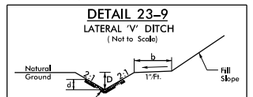
WINSTON-SALEM CITY LIMITS

JS BEGINS JUST BEYOND THIS SHEET

DETAIL 23-8
TOE PROTECTION
(Not to Scale)

Type of Liner= Class 'I' Rip-Rap
FROM –L– STA. 316+39 TO STA. 319+50 LT

DETAIL 23-9
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= CL-B Rip-Rap
FROM –L– STA. 315+95 TO STA. 316+00 LT

PERMIT DRAWING
SHEET 70 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	

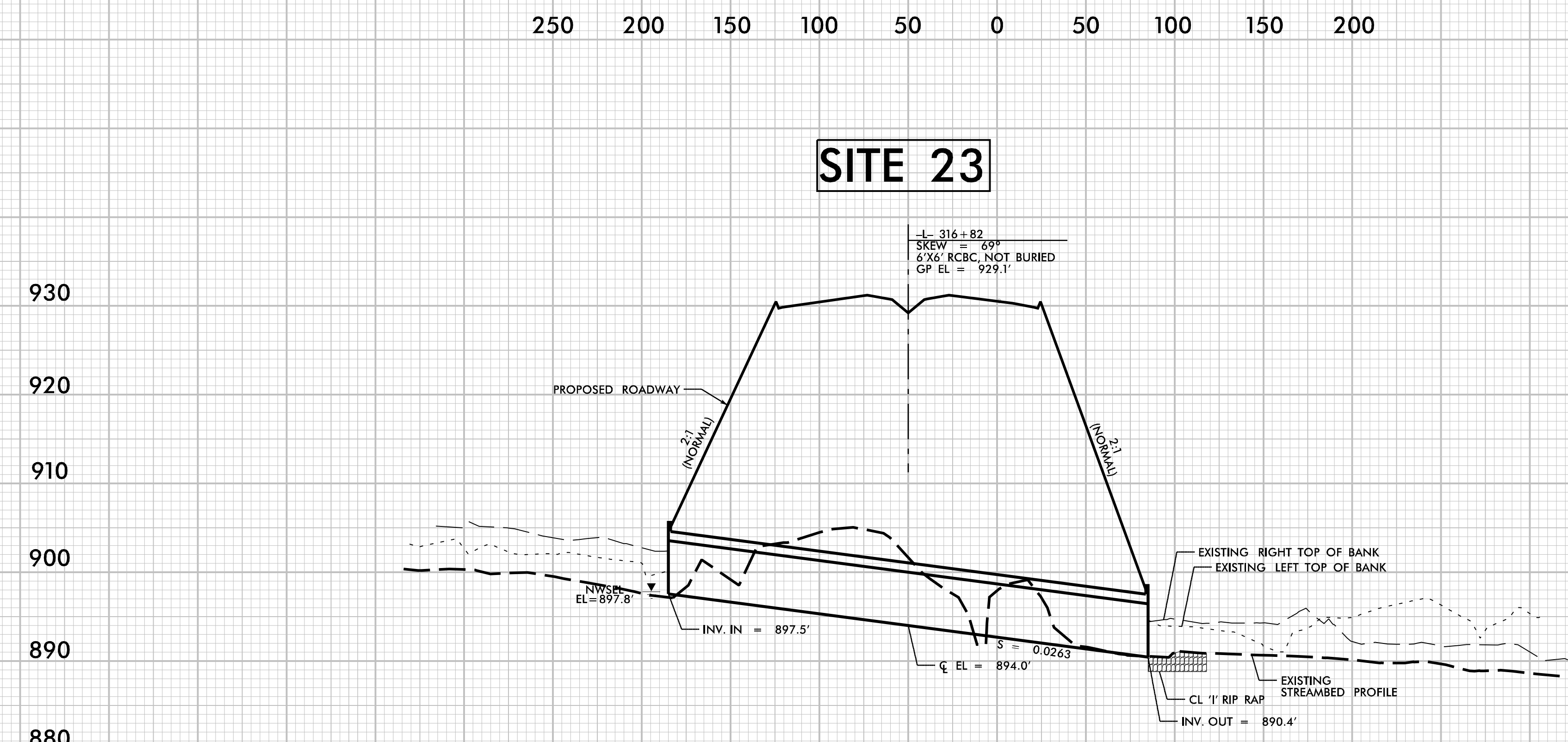
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 23



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 71 OF 97

5/14/99

3:21:04 PM
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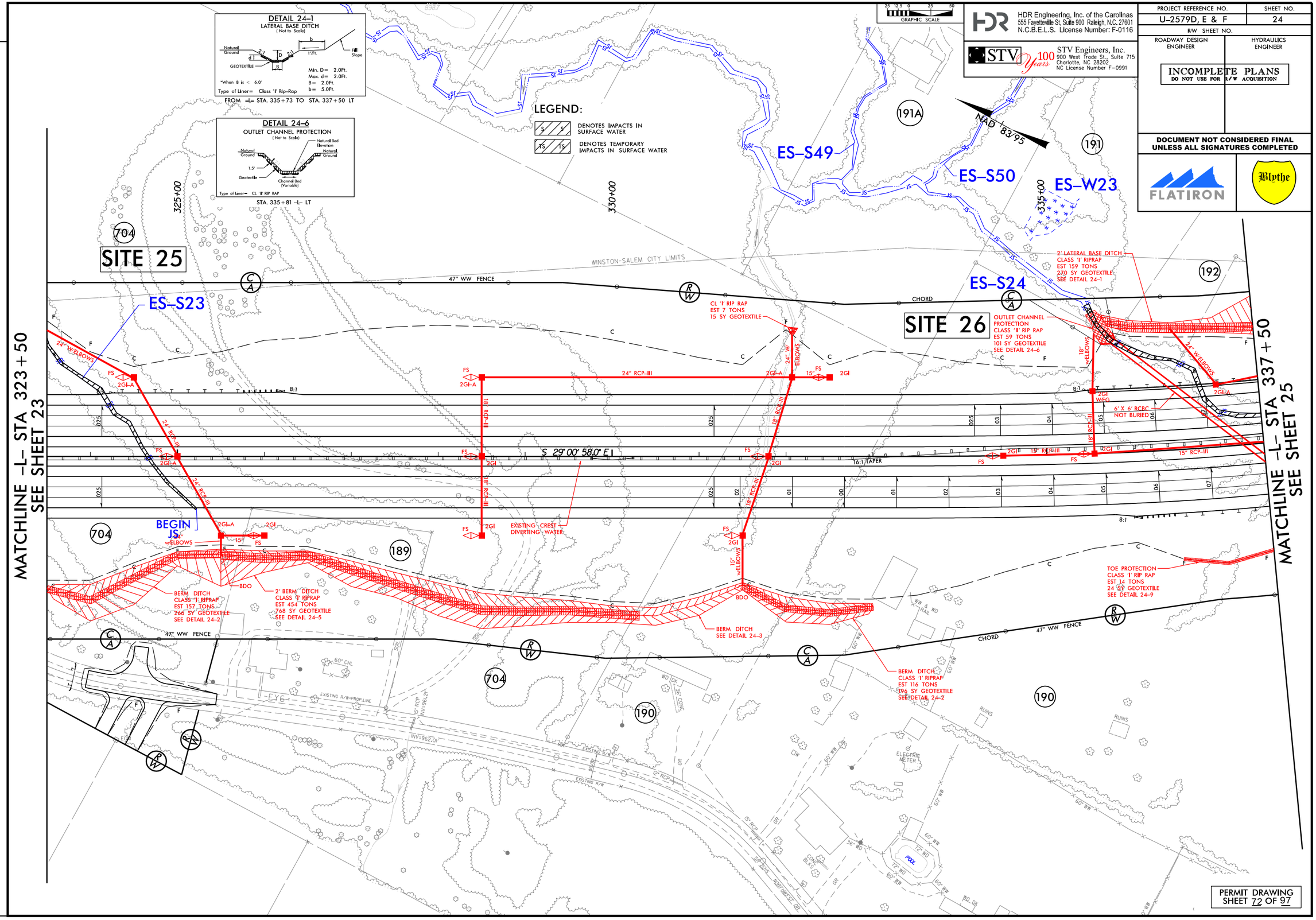

REVISIONS

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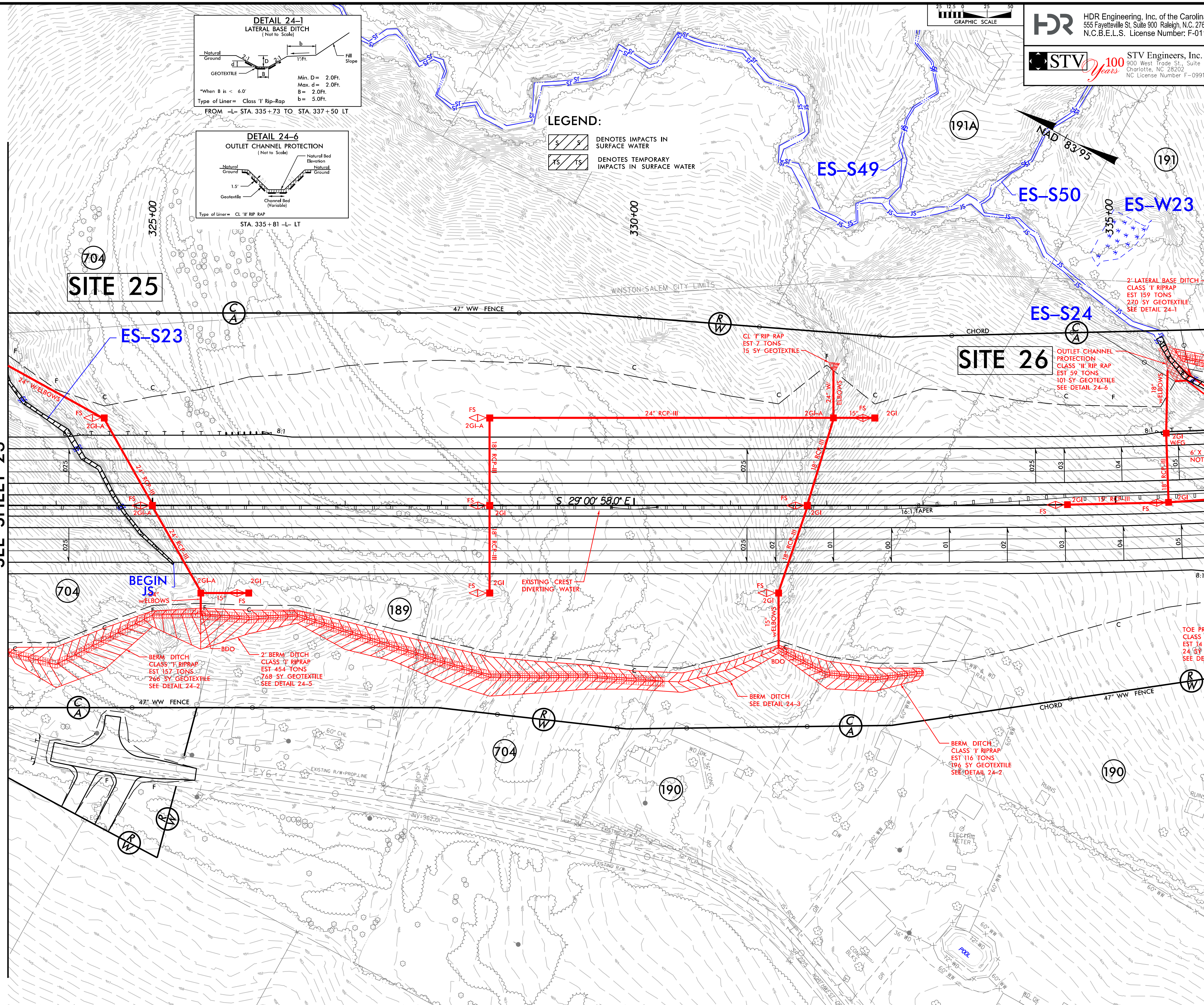
DETAIL 24-1
LATERAL BASE DITCH
(Not to Scale)
Min. D= 2.0Ft.
Max. d= 2.0Ft.
B= 2.0Ft.
b= 5.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 335+73 TO STA. 337+50 LT
DETAIL 24-6
OUTLET CHANNEL PROTECTION
(Not to Scale)
Type of Liner= CL 'II' RIP RAP
STA. 335+81 -L- LT
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
SITE 25
SITE 26
ES-S23
ES-S24
ES-S49
ES-S50
ES-W23
BEGIN JS
NAD 83/95
MATCHLINE -L- STA 323+50 SEE SHEET 23
MATCHLINE -L- STA 337+50 SEE SHEET 25
47" WW FENCE
CHORD
WINSTON-SALEM CITY LIMITS
S 29° 00' 58.0" E
24" RCP-III
18" RCP-III
15" RCP-III
6' X 6' RCBC NOT BURIED
EXISTING CREST DIVERTING WATER
CL 'I' RIP RAP EST 7 TONS 15 SY GEOTEXTILE
OUTLET CHANNEL PROTECTION CLASS 'II' RIP RAP EST 59 TONS 101 SY GEOTEXTILE SEE DETAIL 24-6
2' LATERAL BASE DITCH CLASS 'I' RIPRAP EST 159 TONS 270 SY GEOTEXTILE SEE DETAIL 24-1
BERM DITCH CLASS 'I' RIPRAP EST 157 TONS 266 SY GEOTEXTILE SEE DETAIL 24-2
2' BERM DITCH CLASS 'I' RIPRAP EST 454 TONS 768 SY GEOTEXTILE SEE DETAIL 24-5
BERM DITCH SEE DETAIL 24-3
BERM DITCH CLASS 'I' RIPRAP EST 116 TONS 196 SY GEOTEXTILE SEE DETAIL 24-2
TOE PROTECTION CLASS 'I' RIP RAP EST 14 TONS 24 SY GEOTEXTILE SEE DETAIL 24-9
704
189
190
191
191A
192
325+00
330+00
335+00

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Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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FLATIRON
Blythe

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
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PERMIT DRAWING
SHEET 73 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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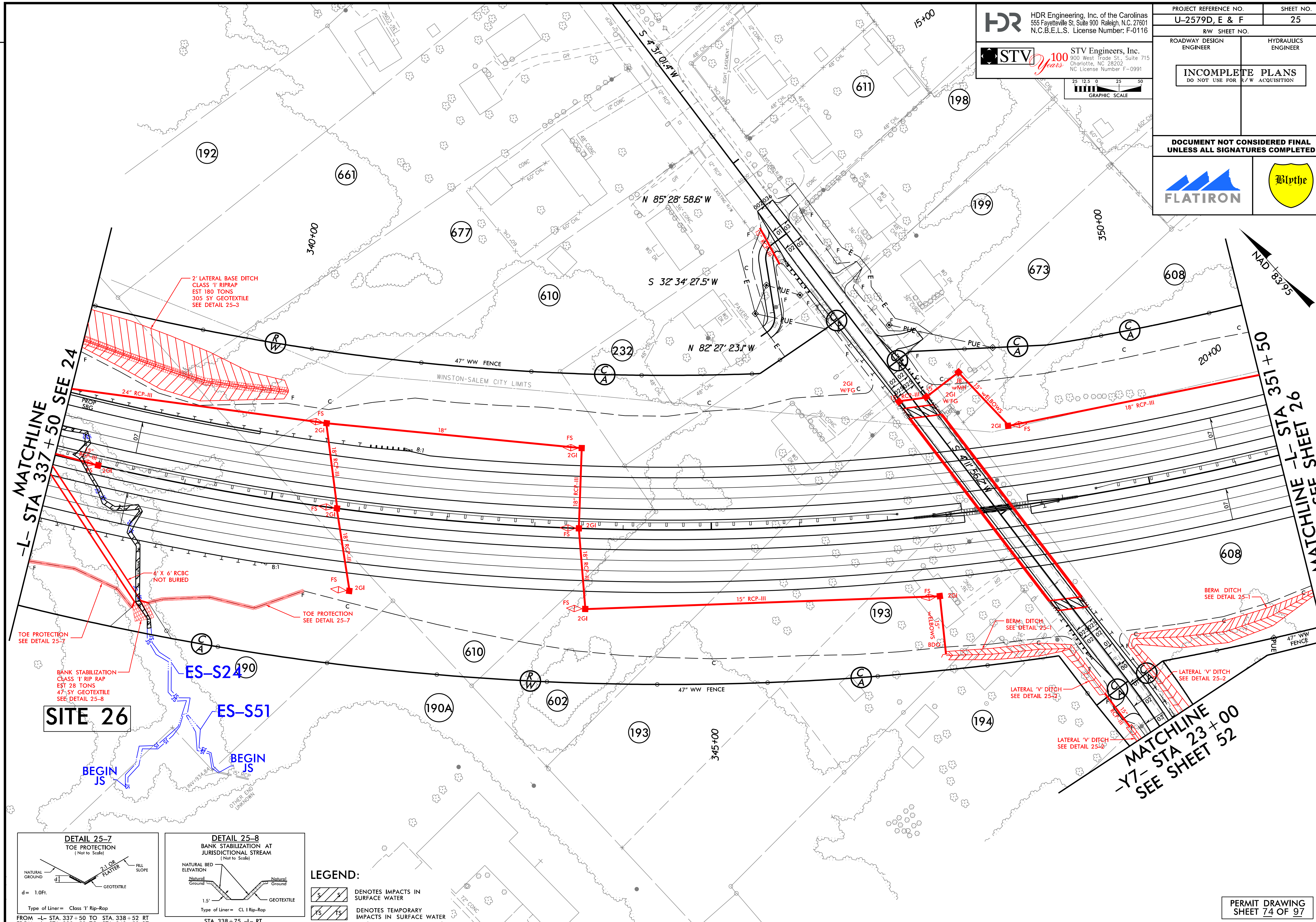
REVISIONS



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Charlotte, NC 28202
NC License Number F-0991
PROJECT REFERENCE NO. U-2579D, E & F
SHEET NO. 25
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
GRAPHIC SCALE
FLATIRON
Blythe
NAD 83/95
SITE 26
MATCHLINE -L- STA 337+50 SEE 24
MATCHLINE -L- STA 351+50 SEE SHEET 26
MATCHLINE -Y7- STA 23+00 SEE SHEET 52
2' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 180 TONS
305 SY GEOTEXTILE
SEE DETAIL 25-3
TOE PROTECTION
SEE DETAIL 25-7
6' X 6' RCBC
NOT BURIED
BANK STABILIZATION
CLASS 'I' RIP RAP
EST 28 TONS
47 SY GEOTEXTILE
SEE DETAIL 25-8
BERM DITCH
SEE DETAIL 25-1
LATERAL 'V' DITCH
SEE DETAIL 25-2
ES-S24
ES-S51
BEGIN JS
47" WW FENCE
WINSTON-SALEM CITY LIMITS
N 85° 28' 58.6" W
S 32° 34' 27.5" W
N 82° 27' 23.1" W
S 4° 31' 01.4" W
24" RCP-III
18" RCP-III
15" RCP-III
2GI
FS
340+00
345+00
350+00
15+00
20+00
DETAIL 25-7
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
FILL SLOPE
2:1 OR FLATTER
GEOTEXTILE
d= 1.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 337+50 TO STA. 338+52 RT
FROM -L- STA. 338+53 TO STA. 340+50 RT
DETAIL 25-8
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
NATURAL BED ELEVATION
Natural Ground
GEOTEXTILE
Type of Liner= CL I Rip-Rap
STA. 338+75 -L- RT
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 74 OF 97

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STV 100 Years
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

NAD 83/95

-L- STA 337+50 SEE SHEET 24

-L- STA 351+50 SEE SHEET 26

-Y7- MATCHLINE STA 23+00 SEE SHEET 52

S 41° 31' 01.4" W

N 85° 28' 58.6" W

S 32° 34' 27.5" W

N 82° 27' 23.1" W

S 41° 36' 36.2" W

340+00

345+00

350+00

20+00

192 661 677 610 232 611 198 199 673 608 190 190A 602 193 194

2' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 180 TONS
305 SY GEOTEXTILE
SEE DETAIL 25-3

47" WW FENCE

WINSTON-SALEM CITY LIMITS

24" RCP-III

18" RCP-III

15" RCP-III

8:1

6' X 6' RCBC
NOT BURIED

TOE PROTECTION
SEE DETAIL 25-7

BANK STABILIZATION
CLASS 'I' RIP RAP
EST 28 TONS
47 SY GEOTEXTILE
SEE DETAIL 25-8

ES-S24

ES-S51

BEGIN JS

SITE 26

2GI W/FG

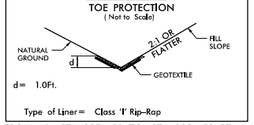
15" W/ELBOWS

BDO

BERM DITCH
SEE DETAIL 25-1

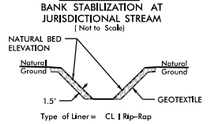
LATERAL 'V' DITCH
SEE DETAIL 25-2

DETAIL 25-7
TOE PROTECTION
(Not to Scale)



d= 1.0Ft.
Type of Liner= Class 'I' Rip-Rap

DETAIL 25-8
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)



Type of Liner= CL I Rip-Rap

STA. 338+75 -L- RT

FROM -L- STA. 337+50 TO STA. 338+52 RT
FROM -L- STA. 338+53 TO STA. 340+50 RT

LEGEND:

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 75 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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DATE: 10/26/2018
TIME: 10:15:32 AM
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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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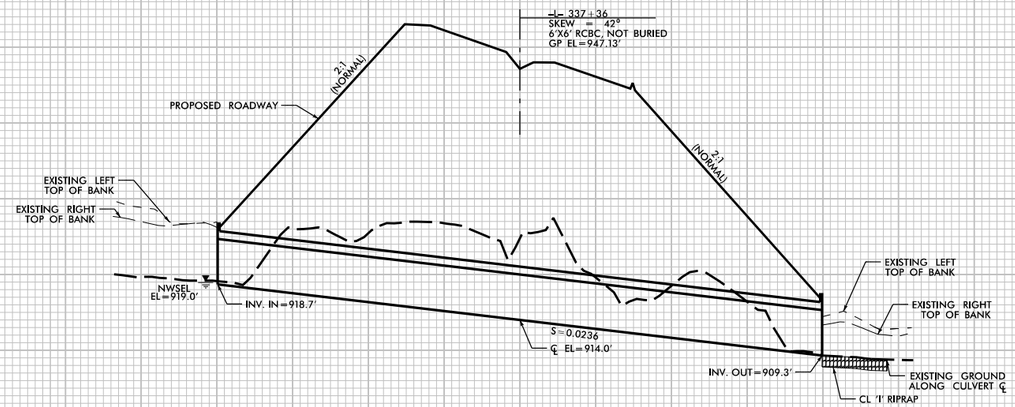
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

250 200 150 100 50 0 50 100 150 200

SITE 26

960
950
940
930
920
910



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 76 OF 97

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	26

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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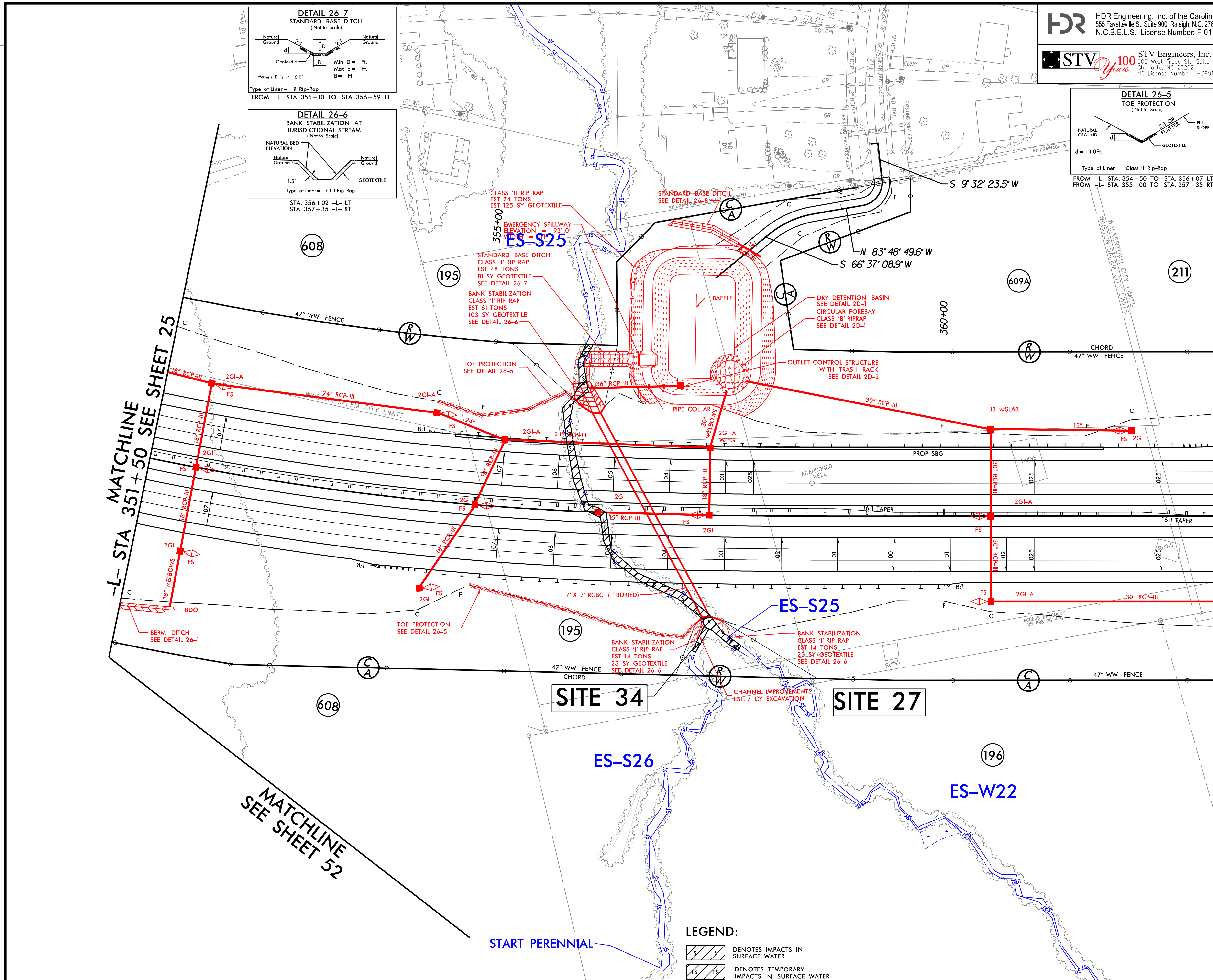
FLATIRON

Blythe



DETAIL 26-7
STANDARD BASE DITCH
(Not to Scale)
Type of Liner = 'I' Rip-Rap
FROM -L- STA. 356+10 TO STA. 356+59 LT
DETAIL 26-6
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
Type of Liner = CL I Rip-Rap
STA. 356+02 -L- LT
STA. 357+35 -L- RT
DETAIL 26-5
TOE PROTECTION
(Not to Scale)
Type of Liner = Class 'I' Rip-Rap
FROM -L- STA. 354+50 TO STA. 356+07 LT
FROM -L- STA. 355+00 TO STA. 357+35 RT
GRAPHIC SCALE
NAD 83/95
S 9° 32' 23.5" W
N 83° 48' 49.6" W
S 66° 37' 08.9" W
ES-S25
ES-S26
ES-W22
CLASS 'II' RIP RAP
EST 74 TONS
EST 125 SY GEOTEXTILE
EMERGENCY SPILLWAY
ELEVATION = 931.0'
STANDARD BASE DITCH
SEE DETAIL 26-8
STANDARD BASE DITCH
CLASS 'I' RIP RAP
EST 48 TONS
81 SY GEOTEXTILE
SEE DETAIL 26-7
BANK STABILIZATION
CLASS 'I' RIP RAP
EST 61 TONS
103 SY GEOTEXTILE
SEE DETAIL 26-6
BAFFLE
DRY DETENTION BASIN
SEE DETAIL 2D-1
CIRCULAR FOREBAY
CLASS 'B' RIPRAP
SEE DETAIL 2D-1
OUTLET CONTROL STRUCTURE
WITH TRASH RACK
SEE DETAIL 2D-2
TOE PROTECTION
SEE DETAIL 26-5
PIPE COLLAR
30" RCP-III
JB wSLAB
PROP SBG
16:1 TAPER
7' X 7' RCBC (1' BURIED)
BERM DITCH
SEE DETAIL 26-1
BANK STABILIZATION
CLASS 'I' RIP RAP
EST 14 TONS
23 SY GEOTEXTILE
SEE DETAIL 26-6
CHANNEL IMPROVEMENTS
EST. 7 CY EXCAVATION
SITE 34
SITE 27
47" WW FENCE
CHORD
MATCHLINE -L- STA 351+50 SEE SHEET 25
MATCHLINE -L- STA 363+00 SEE SHEET 27
MATCHLINE SEE SHEET 52
START PERENNIAL
WINSTON-SALEM CITY LIMITS
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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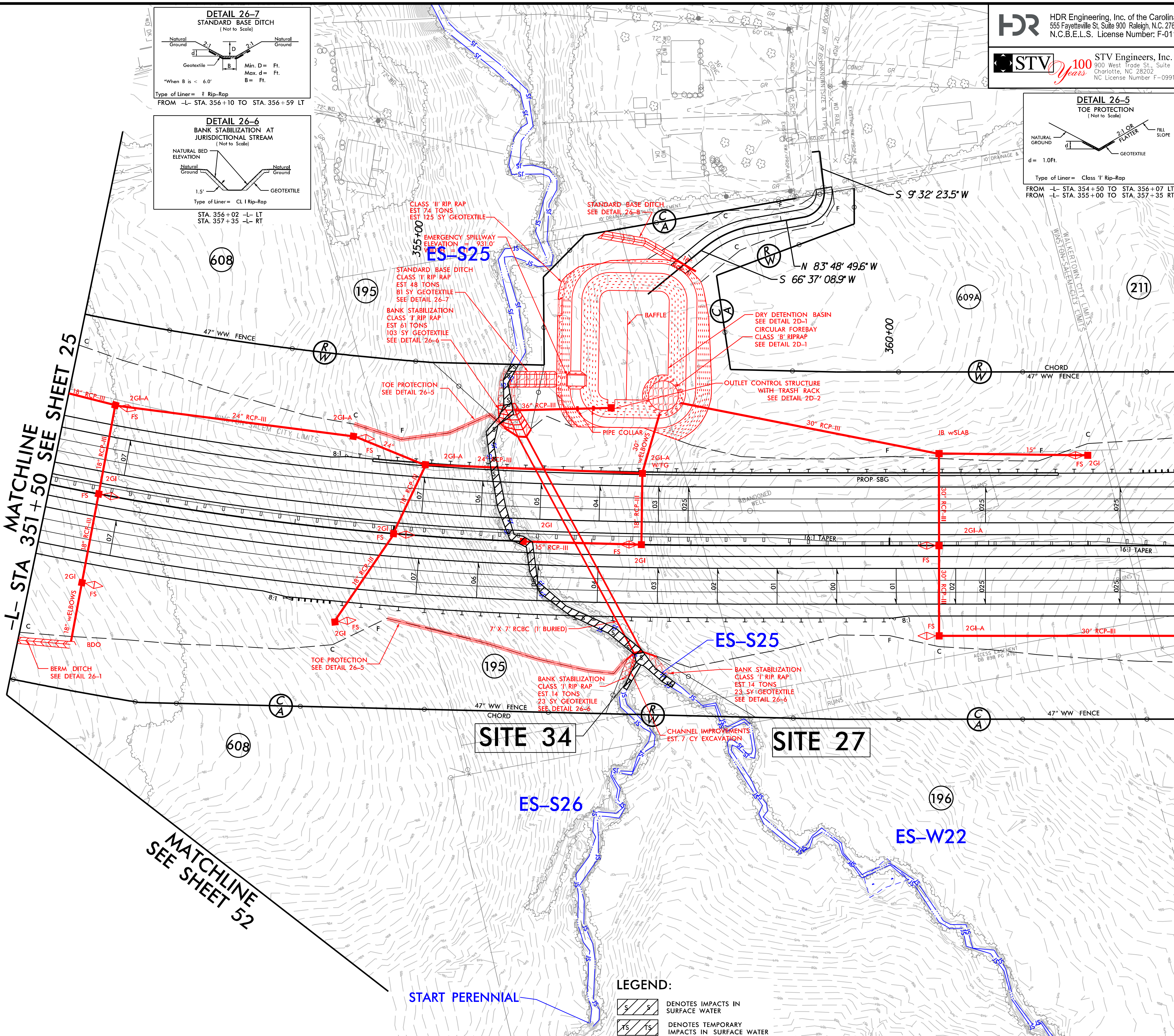
GRAPHIC SCALE



DETAIL 26-7
STANDARD BASE DITCH
(Not to Scale)
Type of Liner = 'I' Rip-Rap
FROM -L- STA. 356+10 TO STA. 356+59 LT
DETAIL 26-6
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
Type of Liner = CL I Rip-Rap
STA. 356+02 -L- LT
STA. 357+35 -L- RT
DETAIL 26-5
TOE PROTECTION
(Not to Scale)
Type of Liner = Class 'I' Rip-Rap
FROM -L- STA. 354+50 TO STA. 356+07 LT
FROM -L- STA. 355+00 TO STA. 357+35 RT
MATCHLINE -L- STA 351+50 SEE SHEET 25
MATCHLINE -L- STA 363+00 SEE SHEET 27
MATCHLINE SEE SHEET 52
ES-S25
ES-S26
ES-W22
SITE 34
SITE 27
DRY DETENTION BASIN SEE DETAIL 2D-1
CIRCULAR FOREBAY CLASS 'B' RIPRAP SEE DETAIL 2D-1
OUTLET CONTROL STRUCTURE WITH TRASH RACK SEE DETAIL 2D-2
EMERGENCY SPILLWAY ELEVATION = 931.0'
CHANNEL IMPROVEMENTS EST. 7 CY EXCAVATION
7' X 7' RCBC (1' BURIED)
START PERENNIAL
NAD 83/95
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 78 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_CON.tbl
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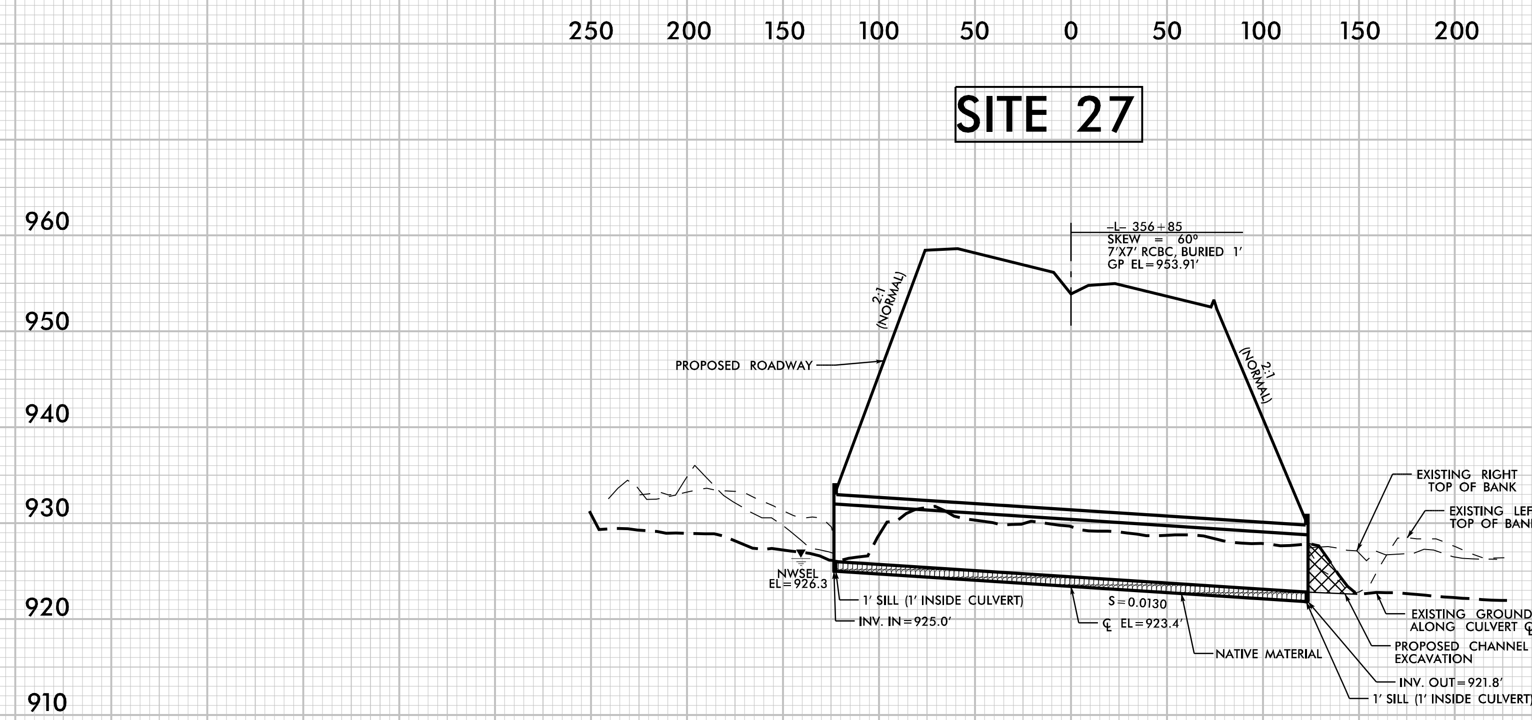
PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 27



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 79 OF 97

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3:21:46 PM
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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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FLATIRON

Blythe

GRAPHIC SCALE 25 12.5 0 25 50

NAD 83/95

MATCHLINE -Y8- STA 31+15 SEE SHEET 28

MATCHLINE -Y9- STA 25+50 SEE SHEET 56

MATCHLINE -L- STA 386+00 SEE SHEET 28

MATCHLINE -L- STA 399+00 SEE SHEET 30

MATCHLINE -Y9- STA 17+00 SEE SHEET 55

SITE 29

SITE 28

ES-S48 BEGIN JS

ES-W6

S 24°34'03.6" E

S 66°04'44.8" W

S 48°08'54.4" E

S 77°56'51.0" W

N 5°49'12.0" W

N 65°25'56.4" E

LATERAL 'V' DITCH
CLASS 'B' RIPRAP
EST 78 TONS
172 SY GEOTEXTILE
SEE DETAIL 29-7

LATERAL 'V' DITCH
CLASS 'B' RIPRAP
EST 149 TONS
330 SY GEOTEXTILE
SEE DETAIL 29-7

2' LATERAL BASE DITCH
CLASS 'B' RIPRAP
EST 193 TONS
428 SY GEOTEXTILE
SEE DETAIL 29-4

2' LATERAL BASE DITCH
SEE DETAIL 29-5

5' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 486 TONS
824 SY GEOTEXTILE
SEE DETAIL 29-2

8' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 244 TONS
414 SY GEOTEXTILE
SEE DETAIL 29-3

2' LATERAL BASE DITCH
SEE DETAIL 29-6

2' LATERAL BASE DITCH
EST 996 CY DDE
SEE DETAIL 29-1

CL 'I' RIP RAP
EST 4 TONS
10 SY GEOTEXTILE

CL 'I' RIP RAP
EST 3 TONS
7 SY GEOTEXTILE

CL 'I' RIP RAP
EST 4 TONS
10 SY GEOTEXTILE

47" WW FENCE

PROP SBG 18" RCP-III

15" RCP-III

18" RCP-III

24" RCP-CD

18" x ELBOWS

GRADE TO DRAIN

JB w/SLAB

JULIA S. ELLIS
DB 2833
PG 581

OAK GROVE MORAVIAN CHURCH TRUSTEES

MT. PLEASANT HOLINESS CHURCH

JOHN & PAULINE STYERS

JASON A. & JESSICA M. BEESON

MBK INVESTMENTS LLC

JOHN H. MAYFIELD, JR.

CLARENCE E. & DILLIE M. FARABEE

LINDA R. SHAW

SIGIFREDO & ROSALBA ALPARO

WALKERTOWN
WINSTON-SALEM CITY LIMITS
FORSYTH COUNTY

LEGEND:

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 80 OF 97

REVISIONS

PLOT DRIVER: NCDOT_pdf_color-eng-100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: CMYERS DATE: 10/26/2018 TIME: 10:09:33 AM
FILE: Flatiron_Construction_Corp.\Flatiron-U-2579_D_E_F_WS\6.0_CAD_BIM\6.2_WIP\U-2579DEF\Hydraulics\PERMITS_Environmental\Drawings\U2579DEF_PRM_4C_PSH.dgn

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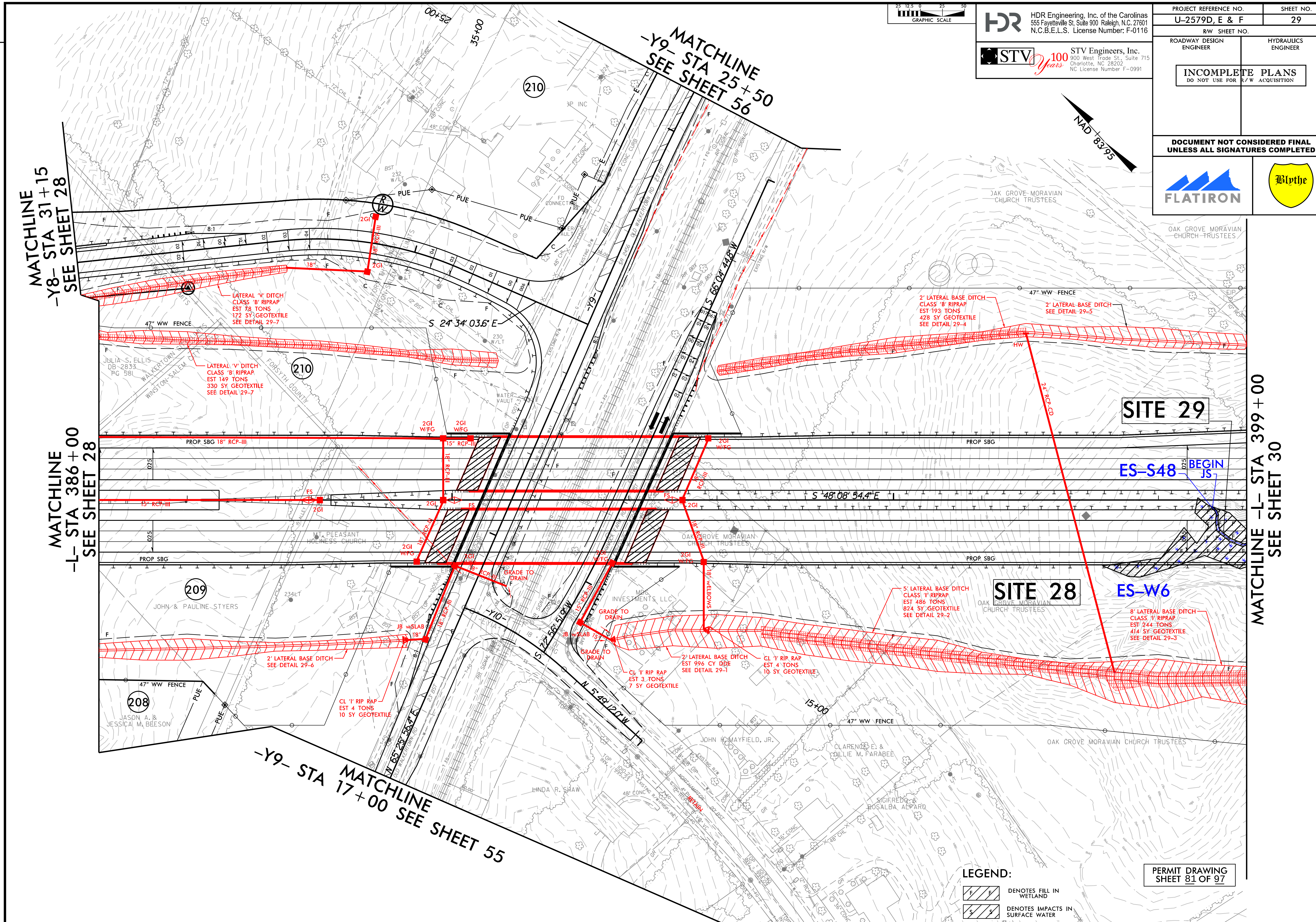
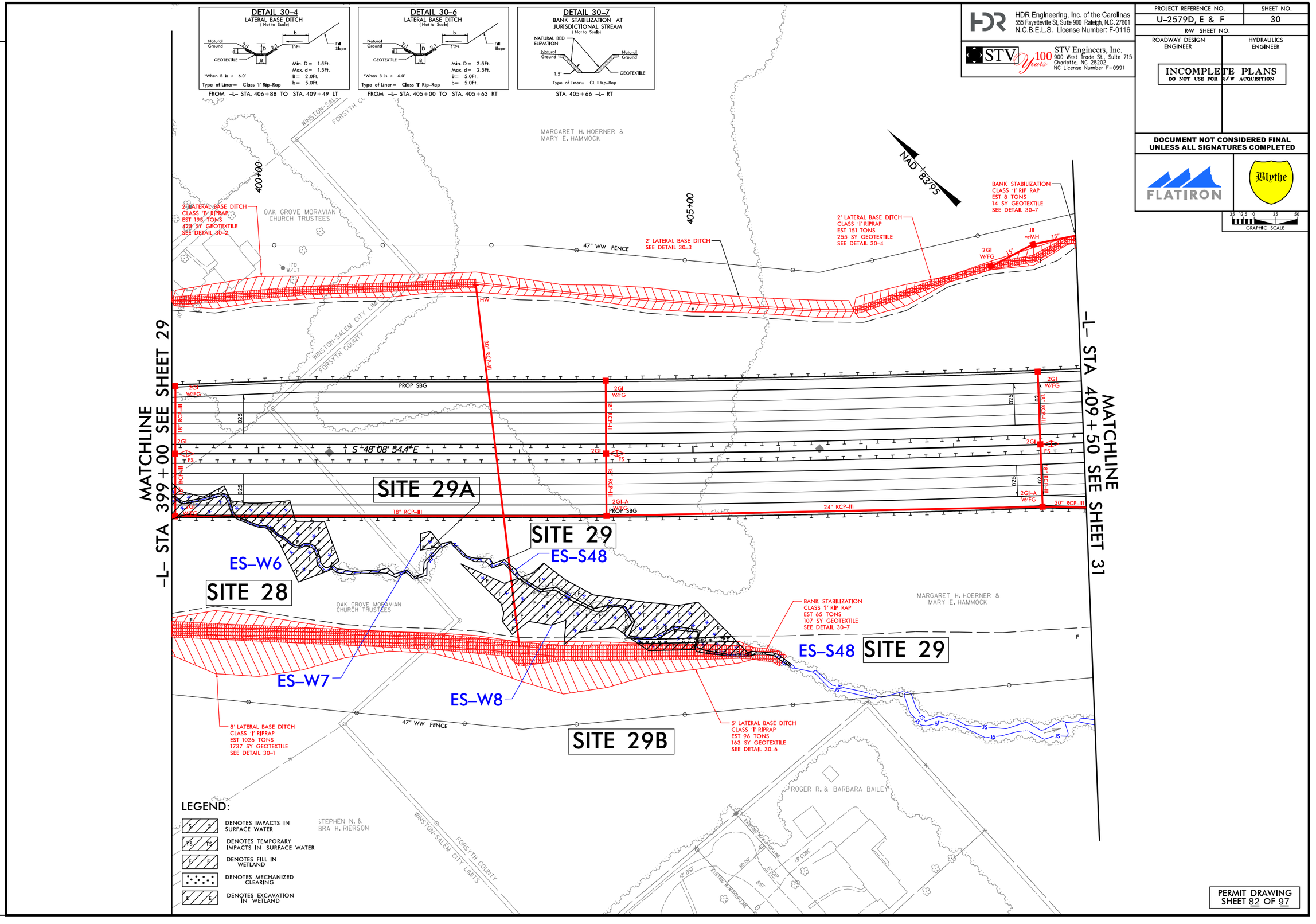
REVISIONS



PROJECT REFERENCE NO.
SHEET NO.
U-2579D, E & F
29
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
FLATIRON
Blythe
GRAPHIC SCALE
NAD 83/95
MATCHLINE -Y9- STA 25+50 SEE SHEET 56
MATCHLINE -Y8- STA 31+15 SEE SHEET 28
MATCHLINE -L- STA 386+00 SEE SHEET 28
MATCHLINE -L- STA 399+00 SEE SHEET 30
MATCHLINE -Y9- STA 17+00 SEE SHEET 55
SITE 29
SITE 28
ES-S48
BEGIN JS
ES-W6
LATERAL 'V' DITCH
CLASS 'B' RIPRAP
EST 78 TONS
172 SY GEOTEXTILE
SEE DETAIL 29-7
LATERAL 'V' DITCH
CLASS 'B' RIPRAP
EST 149 TONS
330 SY GEOTEXTILE
SEE DETAIL 29-7
2' LATERAL BASE DITCH
CLASS 'B' RIPRAP
EST 193 TONS
428 SY GEOTEXTILE
SEE DETAIL 29-4
2' LATERAL BASE DITCH
SEE DETAIL 29-5
5' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 486 TONS
824 SY GEOTEXTILE
SEE DETAIL 29-2
8' LATERAL BASE DITCH
CLASS 'I' RIPRAP
EST 244 TONS
414 SY GEOTEXTILE
SEE DETAIL 29-3
2' LATERAL BASE DITCH
SEE DETAIL 29-6
2' LATERAL BASE DITCH
EST 996 CY DDE
SEE DETAIL 29-1
CL 'I' RIP RAP
EST 3 TONS
7 SY GEOTEXTILE
CL 'I' RIP RAP
EST 4 TONS
10 SY GEOTEXTILE
CL 'I' RIP RAP
EST 4 TONS
10 SY GEOTEXTILE
GRADE TO DRAIN
PROP SBG 18" RCP-III
PROP SBG
15" RCP-III
18" RCP-III
24" RCP-CD
2GI
2GI W/FG
JB w/SLAB
FS
S 24°34'03.6" E
S 48°08'54.4" E
S 66°04'44.8" W
N 65°25'56.4" E
S 72°56'51.9" W
N 5°49'12.0" W
47" WW FENCE
PUE
210
209
208
JULIA S. ELLIS DB 2833 PG 581
WALKERTOWN
WINSTON-SALEM
FORSYTH COUNTY
MT. PLEASANT HOLINESS CHURCH
OAK GROVE MORAVIAN CHURCH TRUSTEES
JOHN & PAULINE STYERS
JASON A. & JESSICA M. BEESON
JOHN H. MAYFIELD, JR.
CLARENCE E. & BILLIE M. FARABEE
LINDA R. SHAW
SIGIFREDO & ROSALBA ALFARO
MDC INVESTMENTS LLC
-Y9-
-Y10-
25+00
35+00
15+00
LEGEND:
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 81 OF 97



HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U–2579D, E & F	30
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

Blythe

25 12.5 0 25 50
GRAPHIC SCALE

REVISIONS

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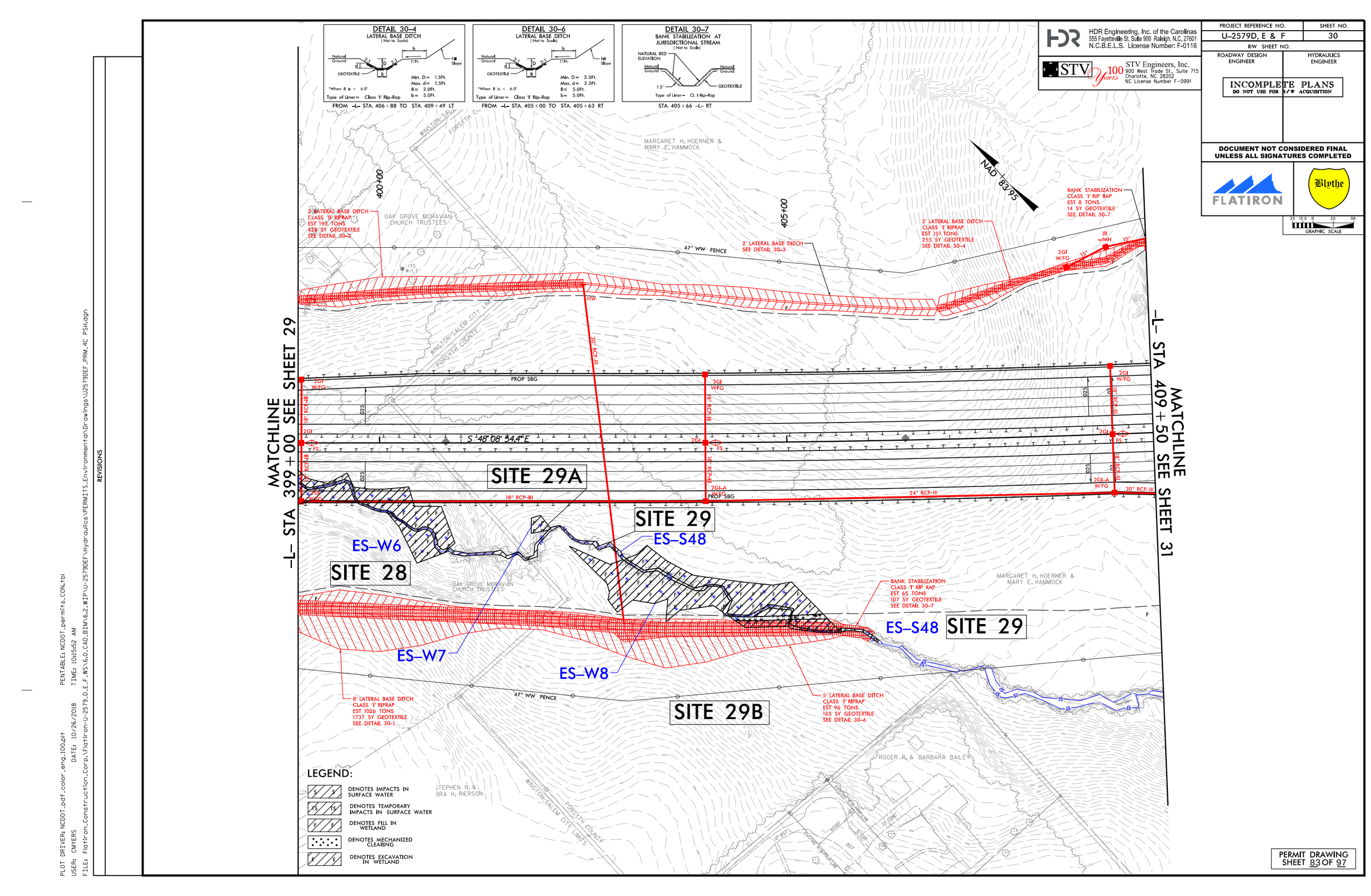
PERMIT DRAWING
SHEET 82 OF 97



REVISIONS

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6/23/16

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	U-2579D, E & F	L-151

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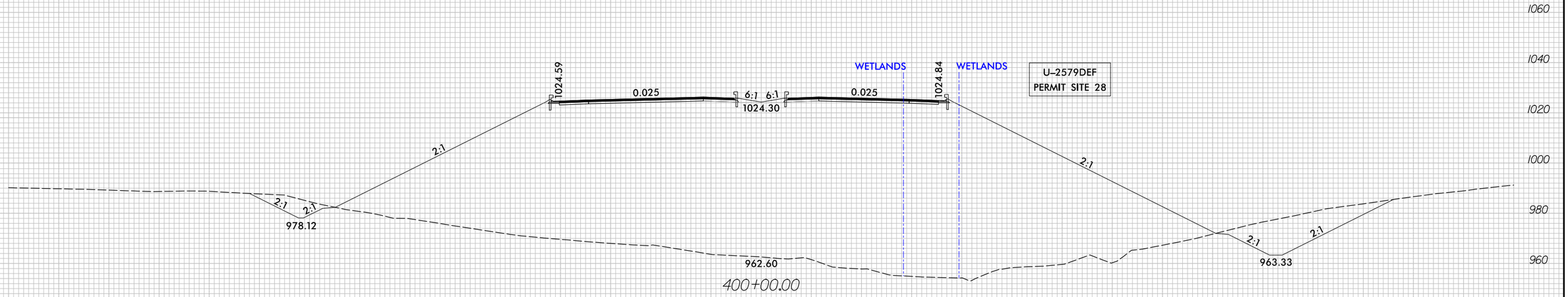
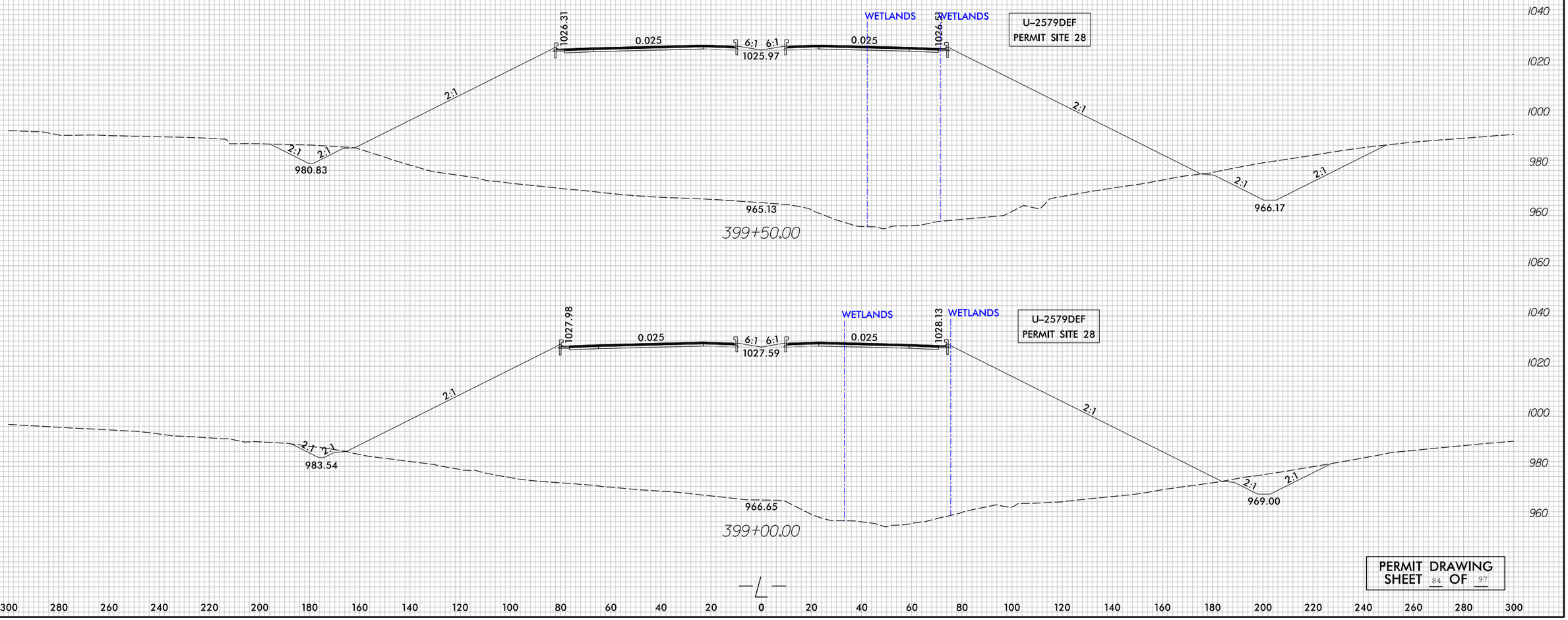
1060 1040 1020 1000 980 960





PERMIT DRAWING
SHEET 84 OF 97

8/27/2018
R:\Roadway\Xsc\U2579_RDY_XPL_L.dgn
tassitme

6/23/16

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	U-2579D, E & F	L-154

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2:1 2:1 968.96 2:1 960.09 2:1 2:1 938.55

WETLANDS WETLANDS

U-2579DEF
PERMIT SITE 29B

404+50.00

1012.06 | 0.025 | 6:1 6:1 1011.82 | 0.025 | 1012.36

2:1 2:1 967.86 2:1 958.24 2:1 2:1 939.68

WETLANDS WETLANDS

U-2579DEF
PERMIT SITE 29B

404+00.00

1013.32 | 0.025 | 6:1 6:1 1013.08 | 0.025 | 1013.62

2:1 2:1 966.76 2:1 956.95 2:1 2:1 940.80

WETLANDS WETLANDS

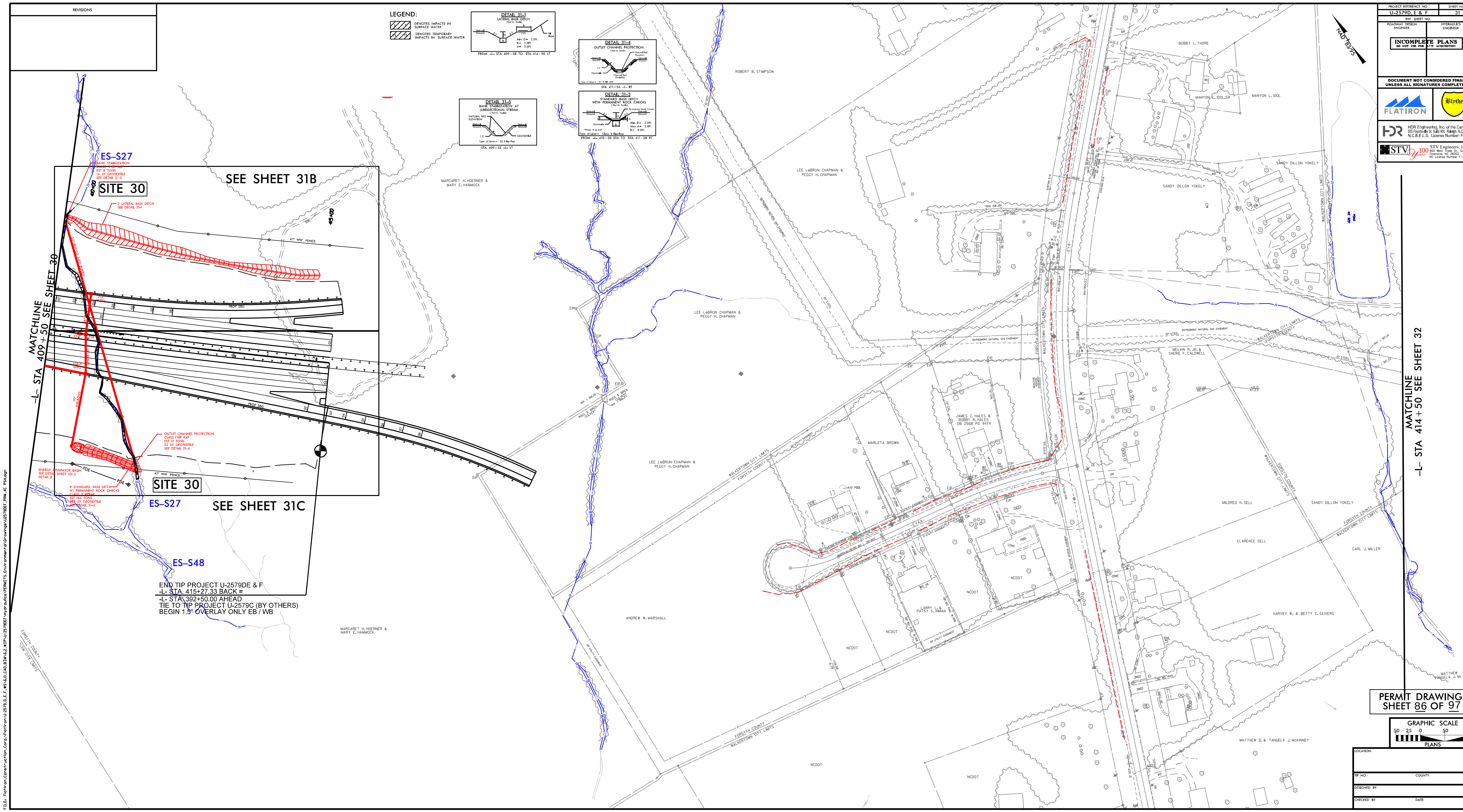
U-2579DEF
PERMIT SITE 29B

403+50.00

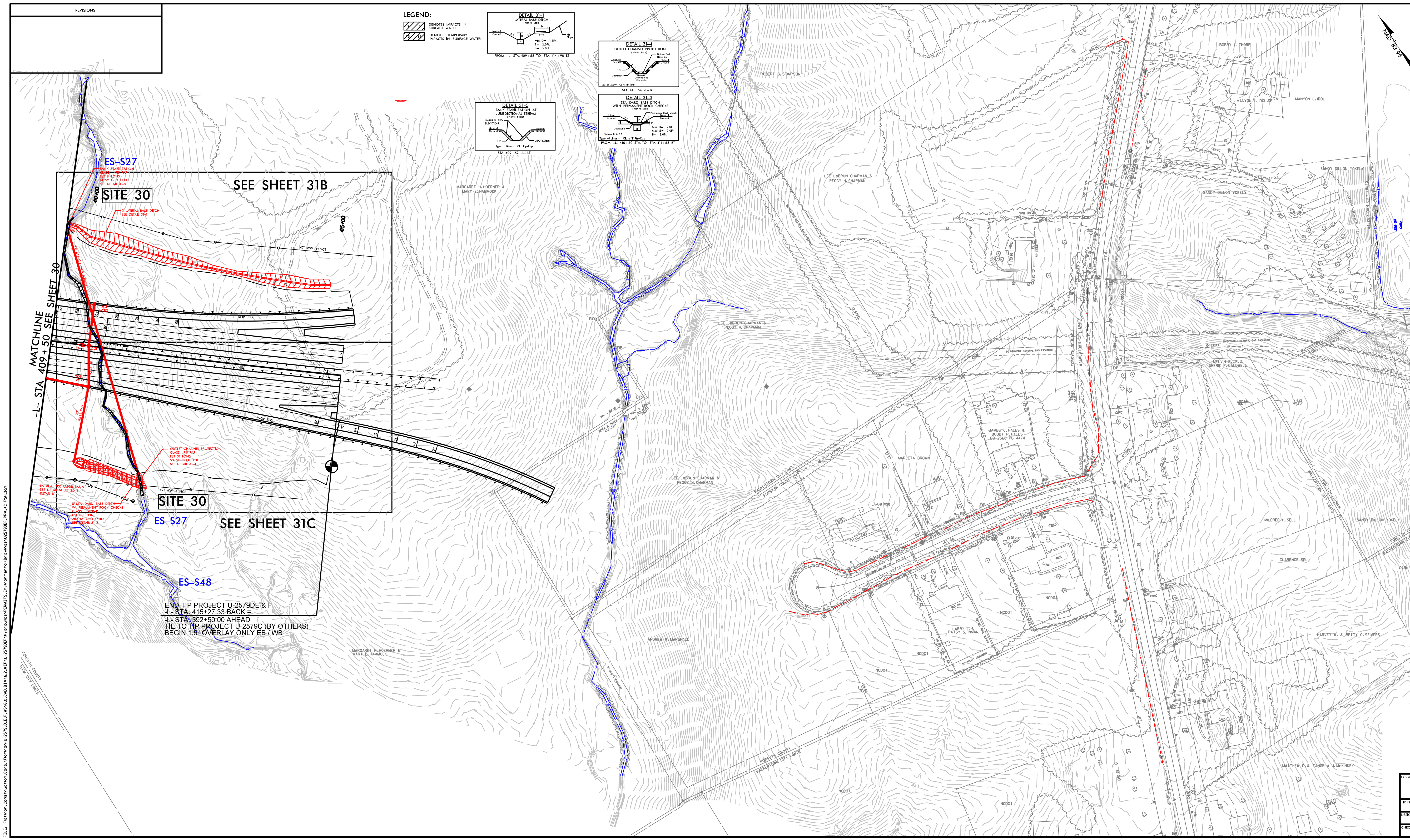
—L—

PERMIT DRAWING
SHEET 85 OF 97

8/27/2018
R:\Roadway\Xsc\U2579_RDY_XPL_L.dgn
tassins



REVISIONS
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 31-1
LATERAL BASE DITCH
DETAIL 31-4
OUTLET CHANNEL PROTECTION
DETAIL 31-5
BANK STABILIZATION AT JURISDICTIONAL STREAM
DETAIL 31-3
STANDARD BASE DITCH WITH PERMANENT ROCK CHECKS
ES-S27
SITE 30
SEE SHEET 31B
SEE SHEET 31C
MATCHLINE -L- STA 409+50 SEE SHEET 30
ES-S48
END TIP PROJECT U-2579DE & F
-L- STA. 415+27.33 BACK =
-L- STA. 392+50.00 AHEAD
TIE TO TIP PROJECT U-2579C (BY OTHERS)
BEGIN 1.5" OVERLAY ONLY EB / WB
MARGARET H. HOERNER & MARY E. HAMMOCK
ROBERT B. STIMPSON
LEE LeBRUN CHAPMAN & PEGGY H. CHAPMAN
ANDREW M. MARSHALL
MARLETA BROWN
JAMES C. HALES & BOBBY R. HALES
LARRY L. & PATSY S. INMAN
NCDOT
BOBBY L. THORE
MANYON L. IDOL
SANDY DILLON YOKELY
MELVIN R. JR. & SHERE F. CALDWELL
MILDRED H. SELL
CLARENCE SELL
CARL J. MILLER
HARVEY M. & BETTY C. SEIVERS
MATTHEW D. & TANGELA J. McKINNEY
MATCHLINE -L- STA 414+50 SEE SHEET 32
PROJECT REFERENCE NO.
SHEET NO.
U-2579D, E & F
31
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
FLATIRON
Blythe
HDR Engineering, Inc. of the Carolinas
STV Engineers, Inc.
PERMIT DRAWING
SHEET 86 OF 97
GRAPHIC SCALE
PLANS
LOCATION:
TIP NO.:
COUNTY:
DESIGNED BY:
CHECKED BY:
DATE:


REVISIONS
LEGEND:
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 31-1
LATERAL BASE DITCH
(Not to Scale)
Natural Ground
Fill Slope
Min. D= 1.5Ft.
B= 2.0Ft.
b= 5.0Ft.
FROM -L- STA. 409+58 TO STA. 414+90 LT
DETAIL 31-4
OUTLET CHANNEL PROTECTION
(Not to Scale)
Natural Bed Elevation
Geotextile
Channel Bed (Variable)
Type of Liner= CL 'I' RIP RAP
STA. 411+54 -L- RT
DETAIL 31-5
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)
NATURAL BED ELEVATION
GEOTEXTILE
Type of Liner= CL I Rip-Rap
STA. 409+52 -L- LT
DETAIL 31-3
STANDARD BASE DITCH WITH PERMANENT ROCK CHECKS
(Not to Scale)
Permanent Rock Check
Geotextile
*When B is 8.0'
Min. D= 2.0Ft.
Max. d= 2.0Ft.
B= 8.0Ft.
Type of Liner= Class 'I' Rip-Rap
FROM -L- 410+50 STA. TO STA. 411+58 RT
ES-S27
SITE 30
SEE SHEET 31B
SEE SHEET 31C
MATCHLINE -L- STA 409+50 SEE SHEET 30
MATCHLINE -L- STA 414+50 SEE SHEET 32
ES-S48
END TIP PROJECT U-2579DE & F
-L- STA. 415+27.33 BACK =
-L- STA. 392+50.00 AHEAD
TIE TO TIP PROJECT U-2579C (BY OTHERS)
BEGIN 1.5" OVERLAY ONLY EB / WB
MARGARET H. HOERNER & MARY E. HAMMOCK
LEE LeBRUN CHAPMAN & PEGGY H. CHAPMAN
MARCETA BROWN
ANDREW M. MARSHALL
MILDRED H. SELL
CLARENCE SELL
SANDY DILLON YOKELY
NCDOT
NAD 83/95
PERMIT DRAWING
SHEET 87 OF 97
GRAPHIC SCALE
50 25 0 50 100
PLANS

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	31

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

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

8/17/99

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	31-B

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

25 12.5 0 25 50
GRAPHIC SCALE

NAD 1983/95

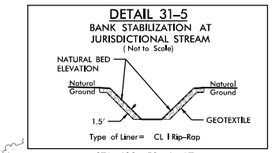
LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

END TIP PROJECT U-2579DE & F
-L- STA. 415+27.33 BACK =
-L- STA. 392+50.00 AHEAD
TIE TO TIP PROJECT U-2579C (BY OTHERS)
BEGIN 1.5" OVERLAY ONLY EB / WB

DETAIL 31-5
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)



Type of Liner= CL I Rip-Rap

STA. 409+52 -L- LT

ES-S27
BANK STABILIZATION
CLASS 'I' RIP RAP
EST 8 TONS
14 SY GEOTEXTILE
SEE DETAIL 31-5

SITE 30

SITE 30

2' LATERAL BASE DITCH
SEE DETAIL 31-1

54" RCP CD NOT BURIED

47" WW FENCE

PROP SBG

2GI W/FG

2GI

2GI-A W/FG

30° ELBOWS

-L- STA 409+50 SEE SHEET 30

410+00

415+00

MARGARET H. HOERNER &
MARY E. HAMMOCK

LEE LeBRUN CHAPMAN &
PEGGY H. CHAPMAN

EIP

EIP

EIP

INV = 916.9'

ROCK & BRICK CHIMNEY

INV = 916.7'

MATCHLINE SEE SHEET 31C

REVISIONS

PERMIT DRAWING
SHEET 88 OF 97

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
USER: CMYERS DATE: 10/26/2018 TIME: 10:10:18 AM
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STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2759D, E & F	31-C

ROADWAY DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

NAD 83/95

25 12.5 0 25 50
GRAPHIC SCALE

LEGEND

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCHLINE SEE SHEET 31B

OUTLET CHANNEL PROTECTION
CLASS I RIP RAP
EST 31 TONS
53 SY GEOTEXTILE
SEE DETAIL 31-4

ENERGY DISSIPATOR BASIN
SEE DETAIL SHEET 2D-3
DETAIL B

8' STANDARD BASE DITCH
W\ PERMANENT ROCK CHECKS
CLASS 'I' RIPRAP
EST 166 TONS
282 SY GEOTEXTILE
SEE DETAIL 31-3

PDE

47" WW FENCE

SITE 30

ES-S27

ES-S48

END TIP PROJECT U-2579DE & F
-L- STA. 415+27.33 BACK =
-L- STA. 392+50.00 AHEAD
TIE TO TIP PROJECT U-2579C (BY OTHERS)
BEGIN 1.5" OVERLAY ONLY EB / WB

ROCK & BRICK CULVERT

LEE LeBRUN CHAPMAN &
PEGGY H. CHAPMAN

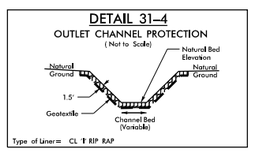
ANDREW W. MARSHALL

MARGARET H. HOERNER &
MARY E. HAMMOCK

FORSYTH COUNTY
WINSTON-SALEM CITY LIMITS

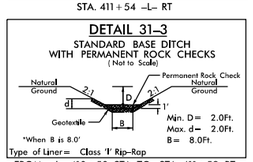
20' UTILITY EASEMENT

DETAIL 31-4
OUTLET CHANNEL PROTECTION
(Not to Scale)



Type of Liner= CL 'I' RIP RAP
STA. 411+54 -L- RT

DETAIL 31-3
STANDARD BASE DITCH
WITH PERMANENT ROCK CHECKS
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap
FROM -L- 410+50 STA. TO STA. 411+58 RT

PERMIT DRAWING
SHEET 89 OF 97

8/17/99

REVISIONS

PLOT DRIVER: NCDOT_pdf_color-eng-100.plt PENTABLE: NCDOT_permits.NOCON.tbl
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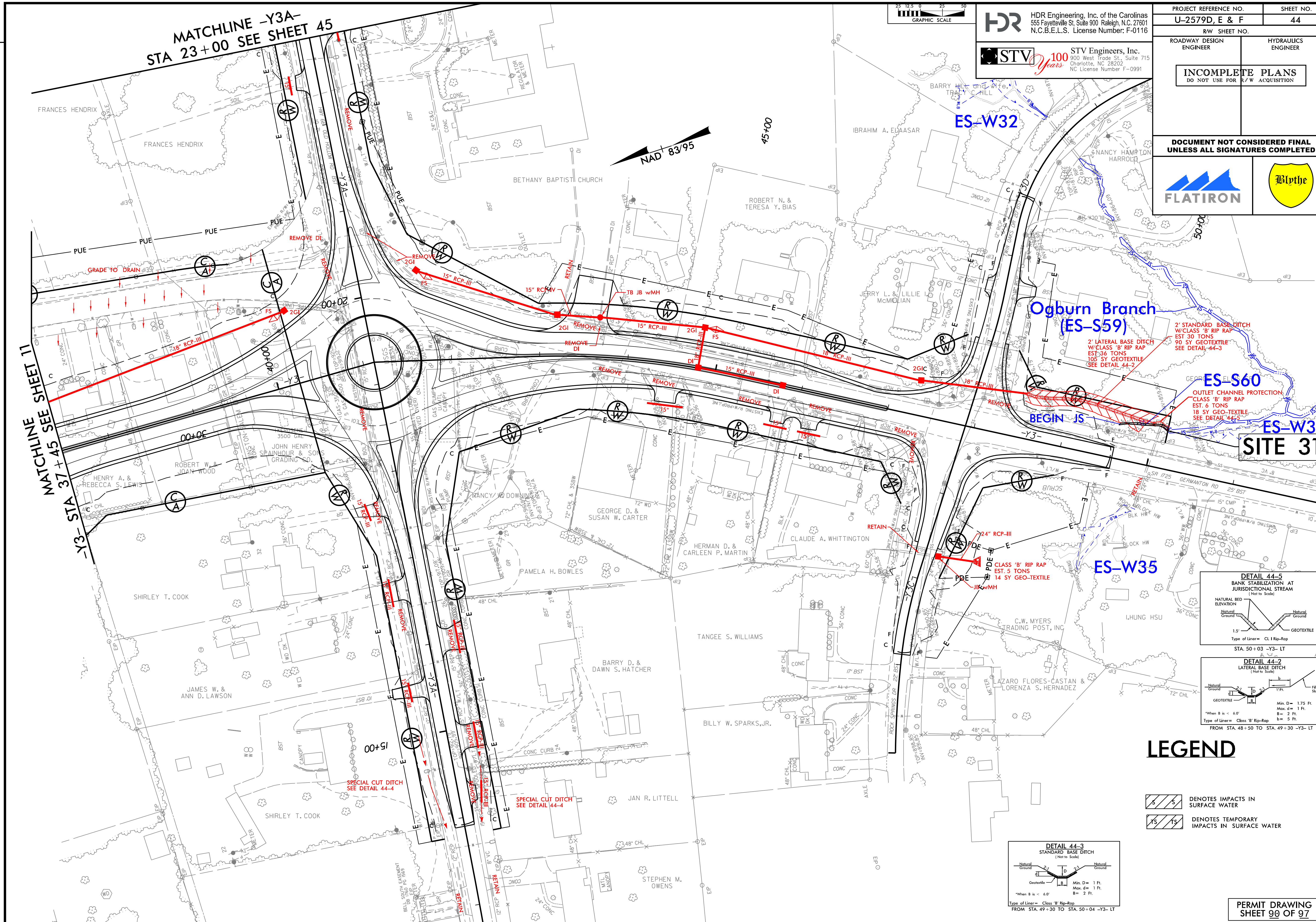
PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



MATCHLINE -Y3A- STA 23+00 SEE SHEET 45
MATCHLINE -Y3- STA 37+45 SEE SHEET 11
GRAPHIC SCALE
NAD 83/95
FRANCES HENDRIX
BETHANY BAPTIST CHURCH
ROBERT N. & TERESA Y. BIAS
IBRAHIM A. ELHAASAR
BARRY HILL and wife, TRACY C. HILL
NANCY HAMPTON HARROLD
JERRY L. & LILLIE I. McMILLAN
Ogburn Branch (ES-S59)
ES-W32
ES-S60
ES-W34
ES-W35
SITE 31
BEGIN JS
2' STANDARD BASE DITCH W/CLASS 'B' RIP RAP EST 30 TONS 90 SY GEOTEXTILE SEE DETAIL 44-3
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 36 TONS 105 SY GEOTEXTILE SEE DETAIL 44-2
OUTLET CHANNEL PROTECTION CLASS 'B' RIP RAP EST. 6 TONS 18 SY GEO-TEXTILE SEE DETAIL 44-5
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
GRADE TO DRAIN
18" RCP-III
15" RCP-III
24" RCP-III
REMOVE
RETAIN
SPECIAL CUT DITCH SEE DETAIL 44-4
JOHN HENRY SPAINHOUR & SONS GRADING CO.
ROBERT W. & JOAN WOOD
HENRY A. & REBECCA S. LEWIS
NANCY W. DOWNING
GEORGE D. & SUSAN W. CARTER
HERMAN D. & CARLEEN P. MARTIN
CLAUDE A. WHITTINGTON
PAMELA H. BOWLES
SHIRLEY T. COOK
TANGEE S. WILLIAMS
BARRY D. & DAWN S. HATCHER
JAMES W. & ANN D. LAWSON
BILLY W. SPARKS, JR.
JAN R. LITTELL
STEPHEN M. OWENS
C.W. MYERS TRADING POST, INC
I.HUNG HSU
LAZARO FLORES-CASTAN & LORENZA S. HERNADEZ
GERMANTON RD
DETAIL 44-5 BANK STABILIZATION AT JURISDICTIONAL STREAM (Not to Scale)
STA. 50+03 -Y3- LT
DETAIL 44-2 LATERAL BASE DITCH (Not to Scale)
FROM STA. 48+50 TO STA. 49+30 -Y3- LT
DETAIL 44-3 STANDARD BASE DITCH (Not to Scale)
FROM STA. 49+30 TO STA. 50+04 -Y3- LT

LEGEND

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

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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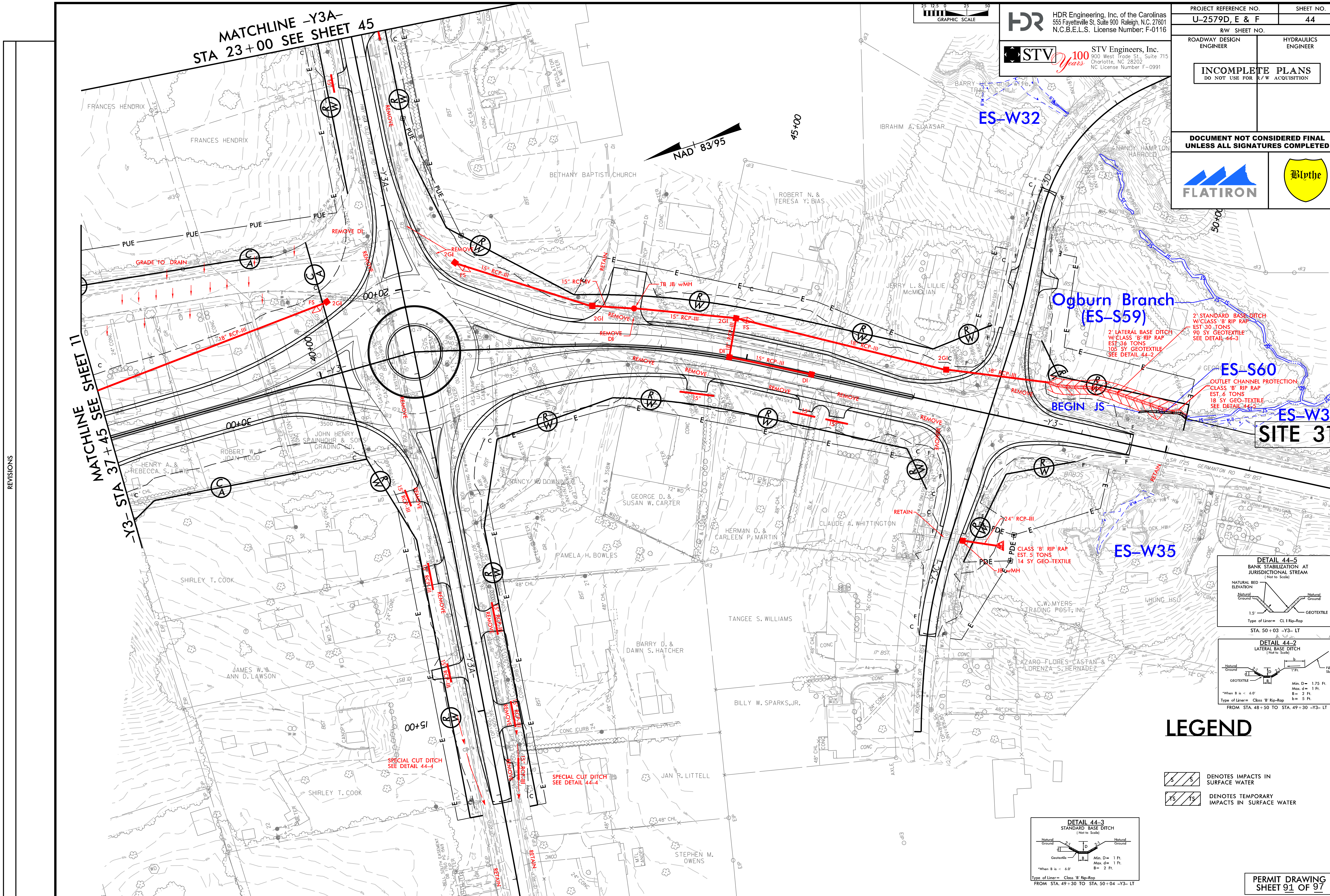

PROJECT REFERENCE NO. U-2579D, E & F
SHEET NO. 44
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116
STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
FLATIRON
Blythe
GRAPHIC SCALE
MATCHLINE -Y3A- STA 23+00 SEE SHEET 45
MATCHLINE -Y3- STA 37+45 SEE SHEET 11
NAD 83/95
Ogburn Branch (ES-S59)
ES-W32
ES-S60
ES-W34
ES-W35
SITE 31
BEGIN JS
BETHANY BAPTIST CHURCH
FRANCES HENDRIX
ROBERT N. & TERESA Y. BIAS
JERRY L. & LILLIE MCMILLIAN
IBRAHIM A. ELMASAR
GEORGE D. & SUSAN W. CARTER
HERMAN D. & CARLEEN P. MARTIN
CLAUDE A. WHITTINGTON
PAMELA H. BOWLES
TANGEE S. WILLIAMS
BARRY D. & DAWN S. HATCHER
BILLY W. SPARKS, JR.
JAN R. LITTELL
STEPHEN M. OWENS
SHIRLEY T. COOK
JAMES W. & ANN D. LAWSON
HENRY A. & REBECCA S. LEWIS
ROBERT W. & JOAN WOOD
JOHN HENRY SPAINHOUR & SONS GRADING CO.
C.W. MYERS TRADING POST, INC
LAZARO FLORES CASTAN & LORENZA S. HERNADEZ
I HUNG HSU
GERMANTON RD
2' STANDARD BASE DITCH W/CLASS 'B' RIP RAP EST 30 TONS 90 SY GEOTEXTILE SEE DETAIL 44-3
2' LATERAL BASE DITCH W/CLASS 'B' RIP RAP EST 36 TONS 105 SY GEOTEXTILE SEE DETAIL 44-2
OUTLET CHANNEL PROTECTION CLASS 'B' RIP RAP EST. 6 TONS 18 SY GEO-TEXTILE SEE DETAIL 44-5
CLASS 'B' RIP RAP EST. 5 TONS 14 SY GEO-TEXTILE
SPECIAL CUT DITCH SEE DETAIL 44-4
GRADE TO DRAIN
DETAIL 44-5 BANK STABILIZATION AT JURISDICTIONAL STREAM (Not to Scale)
STA. 50+03 -Y3- LT
DETAIL 44-2 LATERAL BASE DITCH (Not to Scale)
FROM STA. 48+50 TO STA. 49+30 -Y3- LT
DETAIL 44-3 STANDARD BASE DITCH (Not to Scale)
FROM STA. 49+30 TO STA. 50+04 -Y3- LT
LEGEND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 91 OF 97
REVISIONS

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

STV Engineers, Inc.
900 West Trade St., Suite 715
Charlotte, NC 28202
NC License Number F-0991

PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FLATIRON

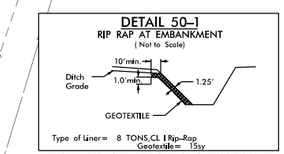
Blythe

25 12.5 0 25 50
GRAPHIC SCALE

NAD 83/95

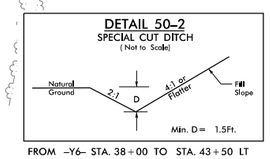
ES-S16
166
MILL CREEK
(ES-S17)
165
164
167
SITE 32
WINSTON-SALEM CITY LIMITS
40+00
45+00
MATCHLINE -Y6- STA 35+00
SEE SHEET 19
S 8° 29' 45.1" W
COIR FIBER MATTING (TYP.)
CULVERT INLET BANK STABILIZATION EST. 175 SY EXCAVATION SEE DETAIL 50-3
BANK STABILIZATION SEE DETAIL 50-1
CLASS 'I' RIP RAP EST 44 TONS 72 SY GEOTEXTILE
CULVERTS TO BE CLEANED OUT UNTIL 1' OF SEDIMENT REMAINS
SPECIAL LATERAL 'V' DITCH SEE DETAIL 50-2
COIR FIBER MATTING (TYP.)
CLASS 'I' RIP RAP EST 80 TONS 125 SY GEOTEXTILE
CULVERT OUTLET BANK STABILIZATION EST. 300 SY EXCAVATION SEE DETAIL 50-3
MILL CREEK
(ES-S17)

DETAIL 50-1
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= 8 TONS,CL I Rip-Rap
Geotextile= 15sy
FROM -Y6- STA. 37+60 TO STA. 38+00 LT

DETAIL 50-2
SPECIAL CUT DITCH
(Not to Scale)



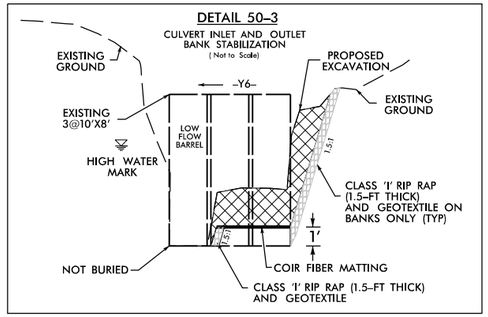
Min. D= 1.5Ft.
FROM -Y6- STA. 38+00 TO STA. 43+50 LT

LEGEND:

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 50-3
CULVERT INLET AND OUTLET BANK STABILIZATION
(Not to Scale)



PERMIT DRAWING
SHEET 92 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D, E & F	50
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

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INCOMPLETE PLANS
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FLATIRON

Blythe

GRAPHIC SCALE 25 12.5 0 25 50

NAD 83/95

ES-S16

MILL CREEK (ES-S17)

SITE 32

WINSTON-SALEM CITY/LIMITS

MATCHLINE -Y6- STA 35+00 SEE SHEET 19

S 8° 29' 45.1" W

COIR FIBER MATTING (TYP.)

CLASS 'I' RIP RAP EST 44 TONS 72 SY GEOTEXTILE

CULVERT INLET BANK STABILIZATION EST 175 SY EXCAVATION SEE DETAIL 50-3

BANK STABILIZATION SEE DETAIL 50-1

CULVERTS TO BE CLEANED OUT UNTIL 1' OF SEDIMENT REMAINS

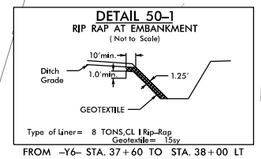
SPECIAL LATERAL 'V' DITCH SEE DETAIL 50-2

COIR FIBER MATTING (TYP.)

CLASS 'I' RIP RAP EST 80 TONS 125 SY GEOTEXTILE

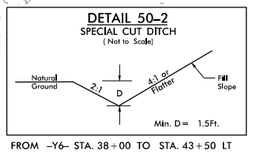
CULVERT OUTLET BANK STABILIZATION EST. 300 SY EXCAVATION SEE DETAIL 50-3

DETAIL 50-1
RIP RAP AT EMBANKMENT
(Not to Scale)



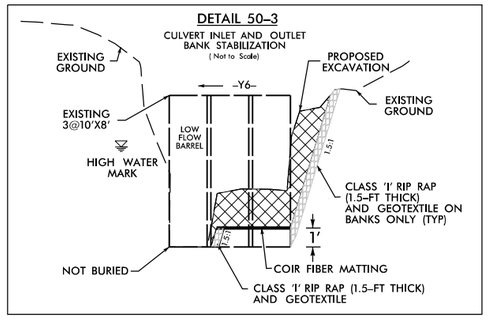
FROM -Y6- STA. 37+60 TO STA. 38+00 LT

DETAIL 50-2
SPECIAL CUT DITCH
(Not to Scale)



FROM -Y6- STA. 38+00 TO STA. 43+50 LT

DETAIL 50-3
CULVERT INLET AND OUTLET BANK STABILIZATION
(Not to Scale)



LEGEND:

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 93 OF 97

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2579D,E & F	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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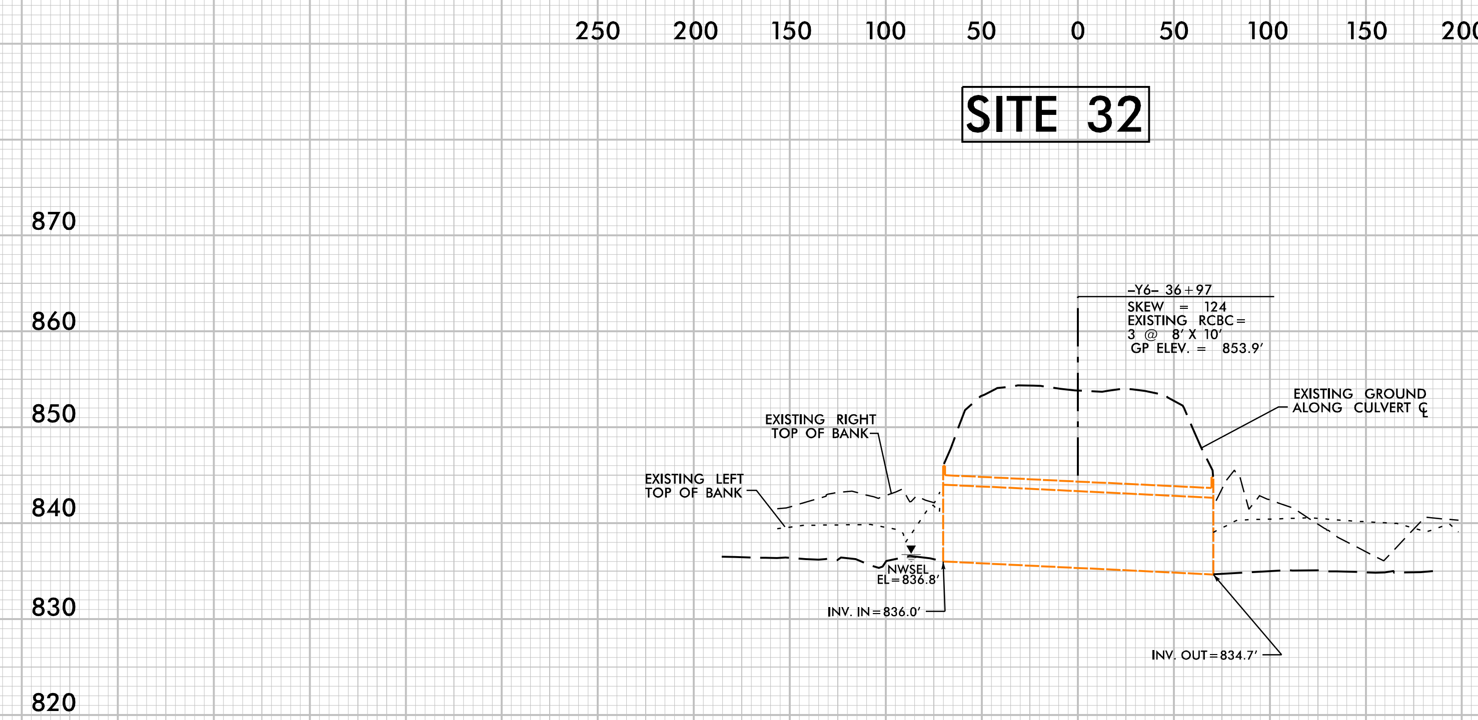
SCALE:
1" = 50' HORIZONTAL
1" = 10' VERTICAL

SITE 32



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 94 OF 97

5/14/99

5:39:20 PM
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$$$$USERNAME$$$$

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	68+33 -L-	54" RCP						0.13		1522		
1	26+22 -Y1RPD LT	BANK STABILIZATION						< 0.01		20		
1A	68+85 -L- LT	ROADWAY FILL/ 54" RCP	0.06									
1B	68+33 -L-	ROADWAY FILL / 54" RCP	0.07									
1C	14+35 - Y1LPD- LT	ROADWAY FILL / 54" RCP	0.02									
1D	25+73 - Y1RPD- RT	ROADWAY FILL / 54" RCP	< 0.01									
2	20+56 - 20+97 -Y1RPA- RT	ROADWAY FILL / 66" RCP						< 0.01		86		
2A	20+79 -Y1RPA- RT	ROADWAY FILL / 66" RCP	0.01									
3	20+32 - 21+17 -Y1RPA- LT	ROADWAY FILL / 66" RCP						< 0.01		120		
4	69+66 -L- LT	ROADWAY FILL / 54" RCP						0.01		132		
5	77+90 -L-	6x6 RCBC						0.06	< 0.01	642	10	
5A	12+39 -Y1RPA- RT	6x6 RCBC	0.02									
5B	82+90 -L- LT	ROADWAY FILL / 36" RCP	< 0.01		< 0.01							
6	124+45 - 130+16 -L-	42" RCP						0.08	< 0.01	824	7	
6A	125+65 -L- RT	42" RCP	0.11		< 0.01	0.01						
7	130+19 -L-	6x6 RCBC						0.02		266		
8	137+73 -L-	42" RCP						0.06	< 0.01	918	19	
8A	138+12 -L- RT	42" RCP	< 0.01									
8B**	142+04 -L- RT	42" RCP/2' BASE DITCH	0.51									
9	150+71 -L-	36" RCP / 42" RCP						0.06		786		
9	21+60 -Y3RPA- RT	BANK STABILIZATION						< 0.01		14		
10	160+35 -L-	42" RCP						0.06	< 0.01	364	13	
10A	159+72 -L- LT	42" RCP	0.03			< 0.01						
10B	160+46 -L- RT	ROADWAY FILL	< 0.01									
TOTALS SHEET 1*:			0.87		< 0.01	0.01		0.49	< 0.01	5694	49	0

*Rounded totals are sum of actual impacts

NOTES:
**Wetland ES-W4 is a total take
- SITE 12 IS A CHANNEL RELOCATION
- SITE 21 IS A CHANNEL RELOCATION

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NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
10/29/2018
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U-2579D, E & F
34839.3.GV7
SHEET 95 OF 97

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
11	173+80 -L-	48" RCP						0.04		615		
11A**	174+23 -L- RT	48" RCP	0.08									
12	203+75 - 207+10 -L- RT	ROADWAY FILL						0.02	< 0.01	410	10	
12A	205+69 -L- RT	FILL IN WETLAND	0.08									
13	207+24 -L-	5x6 CULVERT						0.03	< 0.01	337	22	
13A	209+14 -L- LT	4' BASE DITCH				< 0.01						
14	222+50 - 223+56 -L- RT	48" RCP						0.01	< 0.01	220	11	
14A	222+65 -L- LT	POND						3.06				
15	242+86/244+20 -L-	5'x6' RCBC						0.05	< 0.01	520	15	
15A	243+60/244+00 -L-	5'x6' RCBC	0.04									
16	253+92/255+58 -L-	42" RCP AND DITCH						0.05	< 0.01	513	20	
17	261+02/262+96 -L-	6'x6' RCBC						0.08	< 0.01	928	23	
18	275+75/276+78 -L-	42" RCP						0.03	< 0.01	161	11	
19	279+30/280+86 -L-	5'x7' RCBC						0.04	< 0.01	250	11	
19	280+86/281+71 -L-	5' STANDARD BASE DITCH						< 0.01	< 0.01	91	15	
20	280+61/281+66 -L-	REMOVE 2 - 72" CMP						0.02	< 0.01	35	31	
20A	286+51/286+74 -L-	BANK STABILIZATION						< 0.01	< 0.01	16	21	
20B	285+56/285+81 -L-	BANK STABILIZATION						< 0.01	< 0.01	20	21	
20C	285+19/285+65 -L-	TEMPORARY WORK PAD							0.06		165	
21	285+19/285+65 -L-	CHANNEL CHANGE						< 0.01		133		
21	285+19 -L-	BANK STABILIZATION						< 0.01	< 0.01	10	10	
22	303+57/304+09 -L-	30" RCP/ 36" RCP						< 0.01	< 0.01	97	7	
23	316+25/317+41 -L-	6'x6' RCBC						0.04	< 0.01	348	11	
23	317+40/317+49 -L-	BANK STABILIZATION						< 0.01	< 0.01	26	10	
TOTALS SHEET 2*:			0.20			< 0.01		3.50	0.09	4730	414	0

*Rounded totals are sum of actual impacts

NOTES:
-**Wetland ES-W33 is total take
-Site 24 is a Channel Relocation

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NC DEPARTMENT OF TRANSPORTATION
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10/29/2018
FORSYTH
U-2579D, E & F
34839.3.GV7
SHEET 96 OF 97

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
24	316+84/317+01 -L-	CHANNEL CHANGE						< 0.01	< 0.01	120	10	
25	323+23/325+22 -L-	24" RCP						0.02	< 0.01	294	10	
26	335+66/338+74 -L-	6'x6' RCBC						0.05	< 0.01	519	10	
26	338+82 -L-	BANK STABILIZATION						< 0.01	< 0.01	24	10	
27	356+07/357+64 -L-	7'x7' RCBC						0.05		328		
27	356+07 -L- LT	BANK STABILIZATION						< 0.01	< 0.01	35	8	
27	357+63 -L- RT	BANK STABILIZATION						< 0.01	< 0.01	37	12	
28**	397+37/400+85 -L-	ROADWAY FILL	0.26									
29**	398+61/405+73 -L-	ROADWAY FILL / 5' BASE DITCH						0.06		906		
29**	398+61/405+73 -L-	BANK STABILIZATION						< 0.01	< 0.01	40	10	
29A**	401+96 -L-	ROADWAY FILL	< 0.01									
29B**	402+33/405+59 -L-	ROADWAY FILL / 5' BASE DITCH	0.26		0.03	0.01						
30***	409+52/411+61 -L-	54" RCP						0.05	< 0.01	563	14	
30***	409+53 -L-	BANK STABILIZATION						< 0.01	< 0.01	15	10	
31	49+59 - 50+28 -Y3- LT	2' BASE DITCH						< 0.01		57		
32	35+68/37+32 -Y6-	BANK STABILIZATION						0.03	< 0.01	172	19	
33	173+50 -L- LT	CHANNEL IMPROVEMENT TIE-IN						0.03	< 0.01	20	21	
34	357+38/357+49 -L-	BANK STABILIZATION						< 0.01	< 0.01	24	11	
		TOTAL SHEET 1	0.87		< 0.01	0.01		0.49	< 0.01	5694	49	
		TOTAL SHEET 2	0.20			< 0.01		3.50	0.09	4730	414	
		TOTAL SHEET 3	0.53		0.03	0.01		0.30	0.02	3154	145	
TOTALS ALL SHEETS*:			1.60	0.00	0.03	0.03	0.00	4.30	0.11	13578	608	

*Rounded totals are sum of actual impacts

** SITE 28, 29, 29A, AND 29B - SITE 1 IN U-2579C PHASE 2 PERMIT

*** SITE 30 - SITE 2 IN U-2579C PHASE 2 PERMIT

NOTES
- ISOLATED WETLANDS SITE
- SITE 24 IS A CHANNEL RELOCATION

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SHEET 97 OF 97

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