STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

DANIEL H. JOHNSON
SECRETARY

January 22, 2026

MEMORANDUM TO: Division Environmental and Construction Units

FROM: Michael A. Turchy, ECAP Group Leader
Environmental Analysis Unit

SUBJECT: Environmental Permits for the Improvements to Interstate 485 from I-77 to US 74 in Mecklenburg County, Division 10, **TIP I-5507**

Please find enclosed the following permits for this project:

Agency	Permit Type	Permit Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Regional General Permit 50 (renewed 12/19/25) *Replaces previous 12/18/19, 11/12/20, 9/7/21, and 10/24/23 issuances*	May 25, 2030
NC Division of Water Resources Section 401 Water Quality Certification	Individual Cert. No. 008496 (renewed 12/4/25) *Replaces Previous General Certifications issued 12/2/19, 9/21/20, 10/22/21, and 10/2/23*	May 25, 2030

Work is authorized by the above referenced permit provided it is accomplished in strict accordance with the permitted plans.

The Environmental Coordination and Permitting Group or the Division Environmental Office must be consulted if any deviation from the permit(s) is required.

The General Conditions and Certifications for Nationwide and Regional Permits can be referenced at: https://xfer.services.ncdot.gov/pdea/PermIssued/_General_Conditions_and_Certifications/

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

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

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

PROJECT COMMITMENTS

T.I.P Project No. I-5507
I-485 (Charlotte Outer Loop) Express Lanes
From I-77 to US 74 (Independence Boulevard)
Mecklenburg County
WBS Element 43609.1.1

COMMITMENTS FROM PROJECT DEVELOPMENT AND DESIGN

Division 10

- There are several planned greenways (along Sugar Creek, Kings Branch, and Little Sugar Creek) under development in the project study area. NCDOT Division 10 will coordinate with Mecklenburg County Park and Recreation and the Charlotte Regional Transportation Planning Organization regarding project scheduling and/or design requirements necessary to accommodate these greenways.

- NCDOT Division 10 will coordinate with Mecklenburg County Park and Recreation prior to bridge construction over the existing McMullen Creek and McAlpine Creek Greenways regarding accommodations for greenway users during construction.

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

- NCDOT Division 10 will coordinate prior to construction with Charlotte Area Transit System (CATS) to allow for necessary planning regarding mass transit routes/schedules and commuter programs in the project area.

- Site 31MK273** (Cemetery at John Dinkins Farm) is the surviving remnant of a site listed on the National Register of Historic Places. No project activities are to take place within the limits of the cemetery, including but not limited to the staging/storage of materials and/or equipment and vehicles. If Site 31MK273** is impacted in any way, additional consultation with the State Historic Preservation Office and the Charlotte-Mecklenburg Historic Landmarks Commission will be required. The design is staying within the existing right-of-way and will not impact the Cemetery at John Dinkins Farm).

NCDOT Hydraulics Unit

- During final design, the NCDOT Hydraulics Unit will coordinate with the Charlotte-Mecklenburg Storm Water Services Department and NC Floodplain Mapping Program for approval of any Conditional Letter of Map Revision (CLOMR) and subsequent Letter of Map Revision (LOMR). (There is no CLOMR/LOMR required as part of this project).

City of Charlotte/NCDOT Local Programs Management Office

- The City of Charlotte and NCDOT LPMO will complete a municipal agreement prior to construction for additional pedestrian and bicycle accommodations on bridges to be replaced carrying arterial or local streets over or under I-485 in the project area.

COMMITMENTS FROM PERMITTING

See 404 Permit and 401 Certification for special conditions developed during permitting.

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2013-02330** County: **Mecklenburg** U.S.G.S. Quad: **NC-Weddington**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **North Carolina Department of Transportation**
attn: Ms. Erin Cheely
Address: **1598 Mail Service Road**
Raleigh, NC 27699-1598
Telephone Number: **(919) 707-6008**
E-mail: **ekcheely@ncdot.gov**

Size (acres) **N/A**
Nearest Waterway **McAlpine Creek**
USGS HUC **03050103**
Nearest Town **Charlotte**
River Basin **Lower Catawba**
Coordinates Latitude: **35.064018**
Longitude: **-80.815709**

Location description: **This project is located along the existing I-485 corridor between the I-485 interchange with I-77 and US 74 (Independence Boulevard) in City of Charlotte and Matthews, Mecklenburg County, North Carolina.**

Description of projects area and activity: **This verification authorizes the construction of NCDOT I-5507 project which includes the construction of one Managed Lane in each direction (both inner loop and outer loop) in the existing median of I 485, between I 77 and US 74 (Independence Boulevard). The project also includes the construction of at-grade ingress and egress access to the Managed Lanes, as well as direct connector ramps, and the construction of connectors to and from the Managed Lanes to local side streets. This project will include a total stream impact of 3,948 linear feet (lf) and total impact to 0.83 acres of wetland. Specifically, 1,494 lf permanent impact to streams from placement of fill/structures, placement of 1,325 lf of stream bank stabilization, maintenance of 500 lf of existing stream bank stabilization, temporary impact to 629 lf of stream channel, permanent impact to 0.56 acre of wetlands from placement of fill/structures and 0.27 acre of mechanized wetland clearing.**

Applicable Law(s): ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)

Authorization: **Regional General Permit 50 (RGP-50)**

SEE ATTACHED NWP GENERAL, REGIONAL, AND/OR SPECIAL CONDITIONS

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached Conditions, your application signed and dated 11/17/2025, and the enclosed plans Sheets 1, 18-23, 73-77, 84, 85, 88, 89 & 112-115 of 115, entitled, "NCDOT TIP Project: I-5507 Mecklenburg County" revised July 2023. Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

This verification will remain valid until the expiration date identified below unless the nationwide and/or regional general permit authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide and/or regional general permit authorization is reissued and/or modified, this verification will remain valid until the expiration date identified below, provided it complies with all requirements of the modified nationwide permit. If the nationwide and/or regional general permit authorization expires or is suspended, revoked, or is modified, such that the activity would no longer comply with the terms and conditions of the nationwide permit, activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon the nationwide and/or regional general permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide and/or regional general permit's expiration, modification or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend or revoke the authorization.

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 919-807-6300) to determine Section 401 requirements.

For activities occurring within the twenty coastal counties subject to regulation under the Coastal Area Management Act (CAMA), prior to beginning work you must contact the N.C. Division of Coastal Management **Morehead City, NC, at (252) 808-2808.**

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits. If there are any questions regarding this verification, any of the conditions of the Permit, or the Corps of Engineers regulatory program, please contact **Stephen A. Brumagin** at **(704) 798 6471**or **stephen.a.brumagin@usace.army.mil**.

Corps Regulatory Official: _____ Date: **12/19/2025**
Expiration Date of Verification: **5/25/2030**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0

Copy furnished:

July 2023 Revised plans
401 WQC
RGP 50

Agent:	**North Carolina Department of Transportation, Division 10**
	Mr. Joel Howard, PDEA Engineer
Address:	**716 West Main Street**
	Albemarle, NC 28001
Telephone Number:	**(704) 983-4400**
E-mail:	**jmhoward@ncdot.gov**

SPECIAL CONDITIONS

1. All work must be performed in strict compliance with (a) the description of work in the PCN and (b) the Wetlands and Surface Water Impact Permit Drawing(s) (Permit Plans) in the application dated April 3, 2020. Any modification to the description of work and/or the permit plans must be approved by the USACE prior to implementation.

2. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this authorization letter in the construction and maintenance of this project and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this authorization letter, all conditions, and any authorized modifications. A copy of this authorization letter, all conditions, and any authorized modifications, shall be available at the project site during construction and maintenance of this project.

Action ID Number: SAW-2013-02330 **County: Mecklenburg**

Permittee: North Carolina Department of Transportation, attn: Ms. Erin Cheely

Project Name: NCDOT I-5507 I-485 Managed Lanes Mecklenburg County

Date Verification Issued: 12/19/2025

Project Manager: Stephen A. Brumagin

Upon completion of the activity authorized by this permit and any mitigation required by the permit, sign this certification and return it to the following address:

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Stephen A. Brumagin
Charlotte Regulatory Office
U.S Army Corps of Engineers
8430 University Executive Park Drive, Suite 615
Charlotte, North Carolina 28262
or
stephen.a.brumagin@usace.army.mil

Please note that your permitted activity is subject to a compliance inspection by a U. S. Army Corps of Engineers representative. Failure to comply with any terms or conditions of this authorization may result in the Corps suspending, modifying or revoking the authorization and/or issuing a Class I administrative penalty, or initiating other appropriate legal action.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and condition of the said permit, and required mitigation was completed in accordance with the permit conditions.

_____ _____

Signature of Permittee **Date**

Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation, attn: Ms. Erin Cheely **Action ID:** SAW-2013-02330
Project Name: NCDOT I-5507 I-485 Managed Lanes Mecklenburg County **County:** Mecklenburg

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 Wilmington District 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 verifies that the mitigation requirements (credits) shown below have been released and are available at the identified site. By signing below, the Sponsor is accepting full responsibility for the identified mitigation, regardless of whether 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 ledger to the Permittee, the Project Manager who issued the permit, the Bank Project Manager, and the 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:** 03050103, Catawba River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
118						

*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:** 03050103, Catawba River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
236						

Mitigation Site Debited: _____
(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).

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 Wilmington District, 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

Elizabeth Harmon — 10/27/2023

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 District 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 District 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. When NCDMS provides mitigation 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 NCDMS must be provided to the District within 30 days of permit issuance. NCDOT remains fully responsible for the mitigation until the District 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 District 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 District, the Sponsor must obtain case-by-case approval from the District 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 District administrative records for both the permit and the Bank/ILF Instrument.

Comments/Additional Conditions: A letter from **NCDMS**, confirming they are willing and able to accept the applicant's compensatory mitigation responsibility, dated **7/27/2023** was included with the preconstruction notification.

This form is not valid unless signed below by the District 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 District Project Manager at the address below, 3) the Bank Manager listed in RIBITS, and 4) the Wilmington District Mitigation Office, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (or by email to SAWMIT@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the District Mitigation Office.

USACE Project Manager: Stephen A. Brumagin
USACE Field Office: Charlotte Regulatory Office
US Army Corps of Engineers
8430 University Executive Park Drive, Suite 615
Charlotte, North Carolina 28262
Email: stephen.a.brumagin@usace.army.mil

Digitally signed by BRUMAGIN.STEPHEN.A.1283520737
Date: 2023.10.24 08:26:22 -04'00'

USACE Project Manager Signature

10/24/2023

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.

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 4, 2025
Mecklenburg County
NCDWR Project No. 20191337 V5
I-485 Express Lanes
STIP #I-5507

APPROVAL of 401 WATER QUALITY CERTIFICATION with ADDITIONAL CONDITIONS

Ms. Erin Cheely
NCDOT
1598 Mail Service Center
Raleigh, NC 27699-1598
EKCheely@NCDOT.gov

Subject: Approval of Renewal to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for the I-485 Express Lanes in Mecklenburg County, NCDWR Project No. 20191337 V5, STIP #I-5507.

Dear Ms. Cheely

Attached hereto is a copy of Certification No. WQC008496 issued to The NCDOT dated December 4, 2025.

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Water Quality Certification. If you change your project, you must notify the Division, and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)]. This Certification does not relieve the permittee of the responsibility to obtain all other required Federal, State, or Local approvals before proceeding with the project, including those required by, but not limited to, Sediment and Erosion Control, Non-Discharge, Water Supply Watershed, and Trout Buffer regulations.

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Mary Plummer at 704-235-2193 or Mary.Plummer@deq.nc.gov if you have any questions or concerns.

Sincerely,

Signed by:
Faith Hardin
3185423002EA45E...

Richard E. Rogers, Jr., Director
Division of Water Resources

Electronic copy only distribution:
Joel Howard, NCDOT
Steve Brumagin, US Army Corps of Engineers, Charlotte Field Office
Holland Youngman, US Fish and Wildlife Service
David McHenry, NC Wildlife Resources Commission

Approval of Renewal to the 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 3,948 Linear Feet of jurisdictional streams and .83 Acres of jurisdictional wetlands in Mecklenburg County. The project shall be constructed pursuant to the application dated and received November 18, 2025. The authorized impacts are as described below:

Stream Impacts (Linear Feet) in the Catawba River Basin.
I-5507 - DWR Project No. 20191337
Stream Impacts in the Catawba River Basin

Site	Bank Stabilization	Permanent Fill in Intermittent Stream (LF)	Temporary Fill in Intermittent Stream (LF)	Permanent Fill in Perennial Stream (LF)	Temporary Fill in Perennial Stream (LF)	Total Stream Impacts (LF)	Stream Impacts Requiring Mitigation (LF)
1*	18	28	13			59	
2A	11				20	31	
3*	70			52	16	138	52
4		181				181	
5				444	10	454	444
6	48		10			58	
7	200+500**	100				800	
8		7				7	
10*	65					65	
11*	157					157	
13*	46			49	40	135	49
15*	83			165	30	278	165
15A	8				20	28	
16	36				20	56	
17	10		10			20	
18	13					13	
19	15				10	25	
20*	34			69	22	125	69
21	13				10	23	
22*	24			169	20	213	169
24*	22	6	10			38	
27	33				20	53	
28	37				20	57	
29	25				30	55	
30		13	20			33	
31*	19	4	10			33	
32	15				24	39	
33	40		10			50	
35	50		42			92	

36	17		25			42	
37	31	4	20			55	
37A	13					13	
38	32		30			62	
39	13				10	23	
40	16				24	40	
41*	33	52	42			127	
42*	20	125	12			157	
43	30		10			40	
44*	28			26	19	73	
TOTAL	1325+500**	520	264	974	365	3948	948

* Locations where there are temporary impact quantities in the same footprint as bank stabilization quantities not included in table so that impacts are not double counted.
** 500 feet of bank stabilization impacts are for stream bank maintenance.
The orange highlights signify pipe/culvert extensions that have been approved for the requested exemption from the burial requirement.
Red indicates sites with authorized modifications since 2019 permitting.

Total Stream Impacts for Project: 3,948 Linear Feet.

I-5507 - DWR Project No. 20191337
Wetland Impacts in the Catawba River Basin

Site	Fill (Ac)	Fill (temporary) (Ac)	Excavation (Ac)	Mechanized Clearing (Ac)	Hand Clearing (Ac)	Total Wetland Impacts (Ac)	Impacts Requiring Mitigation (Ac)
2	0.08			0.02		0.10	0.10
4	0.03			0.00		0.03	0.03
9A	0.05			0.05		0.10	0.10
9B	0.07			0.07		0.14	0.14
12	0.13			<0.01		0.14	0.14
14	0.10			0.00		0.10	0.10
18	<0.01			0.04		0.05	0.05
20	0.00			<0.01		<0.01	<0.01
25	0.02			0.04		0.06	0.06
26	0.00			0.01		0.01	0.01
27	<0.01			0.00		<0.01	<0.01
31	<0.01			0.00		<0.01	<0.01
32	0.02			0.00		0.02	0.02
33	<0.01			<0.01		0.01	0.01
35	<0.01			<0.01		0.01	0.01
41	0.02			0.00		0.02	0.02
42	0.03			0.00		0.03	0.03
TOTAL*	0.54	0	0	0.29	0	0.83	0.83

Wetland impacts highlighted in green are considered total takes.
Red indicates sites with authorized modifications since 2019 permitting.
* Values are based on rounding due to calculating totals with actual numbers to the thousandths.

Total Wetland Impacts for Project: .83 Acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Catawba 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 dated and received November 18, 2025. Should your project change, you are required to notify the 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.

This Water Quality Certification neither grants nor affirms any property right, license, or privilege in any lands or waters, or any right of use in any waters. This Water Quality Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and does not create any prescriptive right or any right of priority regarding any usage of water. This Water Quality Certification shall not be interposed as a defense in any action respecting the determination of riparian or littoral rights or other rights to water use. No consumptive user is deemed by virtue of this Water Quality Certification to possess any prescriptive or other right of priority with respect to any other consumptive user regardless of the quantity of the withdrawal or the date on which the withdrawal was initiated or expanded. Upon the presentation of proper credentials, the Division may inspect the property.

Condition(s) of Certification:

Project Specific Conditions

1. All the authorized activities and conditions associated with the original Water Quality Certification dated December 2, 2019, revised on September 21, 2020, October 22, 2021, September 26, 2023, and October 2, 2023, still apply except where superseded by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

2. All work in or adjacent to stream waters shall be conducted per approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual. [15A NCAC 02H.0506(b)(3) and (c)(3)]

3. Compensatory mitigation for impacts to 948 linear feet of impacts to perennial streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Services (DMS), and that the DMS has agreed to implement the mitigation for the project. DMS has indicated in a letter dated September 27, 2019, that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed July 28, 2010

4. Compensatory mitigation for impacts to .83 acres of riverine wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Division of Mitigation Services (DMS), and that the DMS has agreed to implement the mitigation for the project. DMS has indicated in a letter dated September 27, 2019, that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed July 28, 2010.

5. All stream sites except 30, 31, 32, and 33, are within a watershed with an approved TMDL for turbidity. This TMDL has maximum loading requirements for suspended solids (turbidity) to ensure water quality for human and aquatic life. To meet the loading requirements of the TMDL, which establishes protocol to help reduce waterbody impairment, erosion control measures for sensitive watersheds will be required in these areas. [15A NCAC 02H.0506(b)(2)]

6. Stream sites 30, 31, and 32 are in the 6 Mile Creek watershed which is habitat to the endangered freshwater mussel, Lasmigona decorate (Carolina Heelsplitter). For protection of a federally endangered species, sediment and erosion control measures for sensitive watersheds are required at these locations. [15A NCAC 02H.0506(b)(2)]

7. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to biological criteria exceedances (all impact sites) shall not discharge stormwater directly to surface waters. Stormwater shall be treated using appropriate best management practices (e.g., vegetated conveyances, constructed wetlands, detention ponds, etc.) prior to discharging to surface waters. [15A NCAC 02B.0200]

8. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. 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 down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWR for guidance on how to proceed and to determine whether or not a permit modification will be required. [15A NCAC 02H.0506(b)(2)]

9. Design and placement of the culverts and other structures shall be installed in such a manner that the original stream profiles are not altered (i.e., the depth of the channel must not be reduced by a widening of the streambed). Existing stream dimensions (including pattern and profile) are to be maintained above and below locations of each culvert. The structures shall be designed and installed to allow for fish and other wildlife movement as well as prevent headcutting of the stream. The applicant may be required to provide evidence that the equilibrium has been maintained if requested in writing by the NCDWR. [15A NCAC 02H.0506(b)(2)]

10. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage. [15A NCAC 02H.0506(b)(2)]

11. Riprap shall not be placed in the active thalweg channel. If placement in the streambed is approved per plans and permit, the riprap must be keyed-into the streambed in a manner that shall not preclude aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]

12. For all streams being impacted due to site dewatering activities or other temporary impacts, the site shall be graded to its preconstruction contours and revegetated with appropriate native species. [15A NCAC 02H.0506(b)(2)]

13. The stream channel shall be excavated no deeper than the natural bed material of the stream, to the maximum extent practicable. Efforts must be made to minimize impacts to the stream banks, as well as to vegetation responsible for maintaining the stream bank stability. Any applicable riparian buffer impact for access to stream channel shall be temporary and be revegetated with native riparian species. [15A NCAC 02H.0506(b)(2)].

14. The waiver for culvert burial was granted as requested. Stream bed is required to be level with the end of the culvert extension, as presented in the application. [15A NCAC 02H.0506(b)(2)]

15. Channel relocations shall be completed, stabilized, and approved on site by NCDWR staff, prior to diverting

water into the new channel. Stream banks shall be matted with coir-fiber matting. Vegetation used for bank stabilization shall be limited to native riparian vegetation, and should include establishment of a vegetated buffer on both sides of the relocated channel to the maximum extent practical. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested. Once the stream has been turned into the new channel, it may be necessary to relocate stranded fish to the new channel to prevent fish kills. [15A NCAC 02H .0506(b)(3)]

16. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species. [15A NCAC 02H .0506(b)(2)]

17. As a condition of this 401 Water Quality Certification, the bridge demolition and construction must be accomplished in strict compliance with the most recent version of NCDOT's Best Management Practices for Construction and Maintenance Activities. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

18. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. To meet the requirements of NCDOT's NPDES permit NCS0000250, please refer to the most recent version of the *North Carolina Department of Transportation Stormwater Best Management Practices Toolbox* manual for approved measures. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

19. Bridge piles and bents shall be constructed using driven piles (hammer or vibratory) or drilled shaft construction methods. More specifically, jetting or other methods of pile driving are prohibited without prior written approval from the NCDWR first. [15A NCAC 02H.0506(b)(2)]

20. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly. [15A NCAC 02H .0506(b)(3)]

21. All bridge construction shall be performed from the existing bridge, temporary work bridges, temporary causeways, or floating or sunken barges. If work conditions require barges, they shall be floated into position and then sunk. The barges shall not be sunk and then dragged into position. Under no circumstances should barges be dragged along the bottom of the surface water. [15A NCAC 02H .0506(b)(3)]

22. Pipes and culverts used exclusively to maintain equilibrium in wetlands, where aquatic life passage is not a concern, shall not be buried. These pipes shall be installed at natural ground elevation.

23. NCDOT shall be in compliance with the NCS00250 issued tp the NCDOT, including the applicable requirements of the NCG01000. Please note the extra protections for the sensitive watersheds.

24. Tall fescue shall not be used in the establishment of temporary or permanent ground cover within riparian areas. For the establishment of permanent herbaceous cover, erosion control matting shall be used in conjunction with an appropriate native seed mix on disturbed steep slopes with the following exception: Erosion control matting is not necessary if the area is contained by perimeter erosion control devices such as silt fence, temporary sediment ditches, basins, etc. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Erosion control matting placed in riparian areas shall not contain nylon mesh grid, which can impinge and entrap small animals. For the establishment of temporary groundcover within riparian areas, hydroseeding along with wood or cellulose based hydro mulch applied with a fertilizer – and limestone – free tank is allowable at the appropriate rate in conjunction with the erosion control measures. Discharging hydroseed mixtures and wood or cellulose mulch into surface waters is prohibited. Riparian areas are defined at a distance 25 feet landward from top of stream bank.

25. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to turbidity shall be designed, constructed, and operated with sediment and erosion control measures that meet Design Standards in Sensitive Watersheds (15A NCAC 4B .0124). However, due to the size of the project, NCDOT shall not be required to meet 15A NCAC 4B .01249(a) regarding the maximum amount of uncovered acres. [15A NCAC

02B.0200]

26. At the Site 5 stream relocation, Class I and Class II riprap shall be used for streambank stabilization, if banks cannot be stabilized as submitted. [15A NCAC 02H .0506(b)(2)]

27. Wetland impacts in areas where the entire wetland is not a complete take, will maintain wetland status during construction as well as after the project is completed. Any wetland area that is permanently impacted from construction activities that was not permitted to be impacted could require a permit modification and additional mitigation credits. [15A NCAC 02H .0506(b)(2)]

General Conditions

1. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills. [15A NCAC 02B.0200]

2. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S. or protected riparian buffers. [15A NCAC 02H.0506(b)(2)]

3. The dimension, pattern and profile of the stream above and below any crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions. [15A NCAC 02H.0506(b)(2)]

4. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage. [15A NCAC 02H.0506(b)(2)]

5. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

6. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water. [15A NCAC 02H.0506(b)(3)]

7. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream. [15A NCAC 02H.0506(b)(3)]

8. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. [15A NCAC 02H.0506(b)(3)]

9. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification. [15A NCAC 02H.0506(b)(3)]

10. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited. [15A NCAC 02H.0506(b)(3)]

11. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If the NCDWR determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, the NCDWR may reevaluate and modify this certification. [15A NCAC 02B.0200]

12. All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification. [15A NCAC 02H.0506(b)(2)]

13. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

14. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization, including all non-commercial borrow and waste sites associated with the project, shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification. [15A NCAC 02H.0501 and .0502]

15. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.

16. The Permittee shall report any violations of this certification to the Division of Water Resources within 24 hours of discovery. [15A NCAC 02B.0506(b)(2)]

17. Upon completion of the project (including any impacts at associated borrow or waste sites), the authorized agent shall complete and return the "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0507]

18. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction. [15A NCAC 02B.0506(b)(2)]

19. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities. [15A NCAC 02H.0506(b)(3) and (c)(3)]

20. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within jurisdictional wetlands. [15A NCAC 2H.0506; 15A NCAC 2H.0507]

21. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards [15A NCAC 02H.0506(b)(3) and (c)(3)]:

    a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
    b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
    c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
    d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act

22. Sediment and erosion control measures shall not be placed in wetlands or surface waters, or within 5 feet of the top of bank, without prior approval from DWR. [15A NCAC 02H.0506(b)(3) and (c)(3)]

23. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control

of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506{b)(3) and (c)(3) and 15A NCAC 02B .0200]

24. Design, installation, operation, and maintenance of all sediment and erosion control measures shall be equal to or exceed the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual.*

25. All devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) sites, including contractor-owned or leased borrow pits associated with the project. Sufficient materials required for stabilization and/or repair of erosion control measures and stormwater routing and treatment shall be on site at all times.

26. For borrow pit sites, the erosion and sediment control measures shall be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual.* Reclamation measures and implementation shall comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act and the Mining Act of 1971.

27. With the issuance of this 401 certification, the DWR approves the stormwater drainage and treatment designs as shown in the roadway plans and permit drawings submitted as part of the 401 application, which are incorporated by reference and are enforceable by the DWR. Significant modifications to the way stormwater is managed and conveyed, any outfalls, or stormwater control measures represented in the roadway plans or permit drawings after issuance of this 401 certification are prohibited without prior approval from the DWR.

28. In the event that discharges of sediment or other pollutants from the drainage system outfall are found by DWR to cause or contribute to a violation of surface water quality standards, DWR may take enforcement action, or NCDOT and DWR shall conduct an assessment and implement the appropriate best management practices necessary to adequately address NCDOT's contribution to the water quality standards violation. Implementation of such best management practices shall be made within a reasonable timeframe as agreed upon by NCDOT and DWR; and may require NCDOT to obtain a 404 Permit from the US Army Corps of Engineers and a 401 Certification from the DWR.

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. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

This approval and its conditions are final and binding unless contested [G.S. 143-215.5]. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) within sixty (60) calendar days. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding

requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

A party filing a Petition must serve a copy of the Petition on:

Dan Hirschman, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

If the party filing the Petition is not the permittee, then the party must also serve the recipient of the Certification in accordance with N.C.G.S 150B-23(a).

This the 4th day of December 2025

DIVISION OF WATER RESOURCES

Signed by:
Faith Hardin
3185423902EA45E...

Richard E. Rogers, Jr., Director

WQC No. WQC008496

JOSH STEIN
Governor
D. REID WILSON
Secretary
RICHARD E. ROGERS, JR.
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 _____

Completed hard copies can be emailed to kristilynn.carpenter@ncdenr.gov or mailed to:
NCDEQ Transportation Permitting
1617 Mail Service Center
Raleigh NC 27699-1617

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	I-5507	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
43609.3.2	N/A	Design–Build

BLYTHE wsp

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

LOCATION: I–485 FROM I–77 TO US 74 (INDEPENDENCE BOULEVARD) (I–5507); I–485 / WEDDINGTON ROAD INTERCHANGE (R–0211EC); AND I–485 / EAST JOHN STREET – OLD MONROE ROAD INTERCHANGE (U–4714AB)

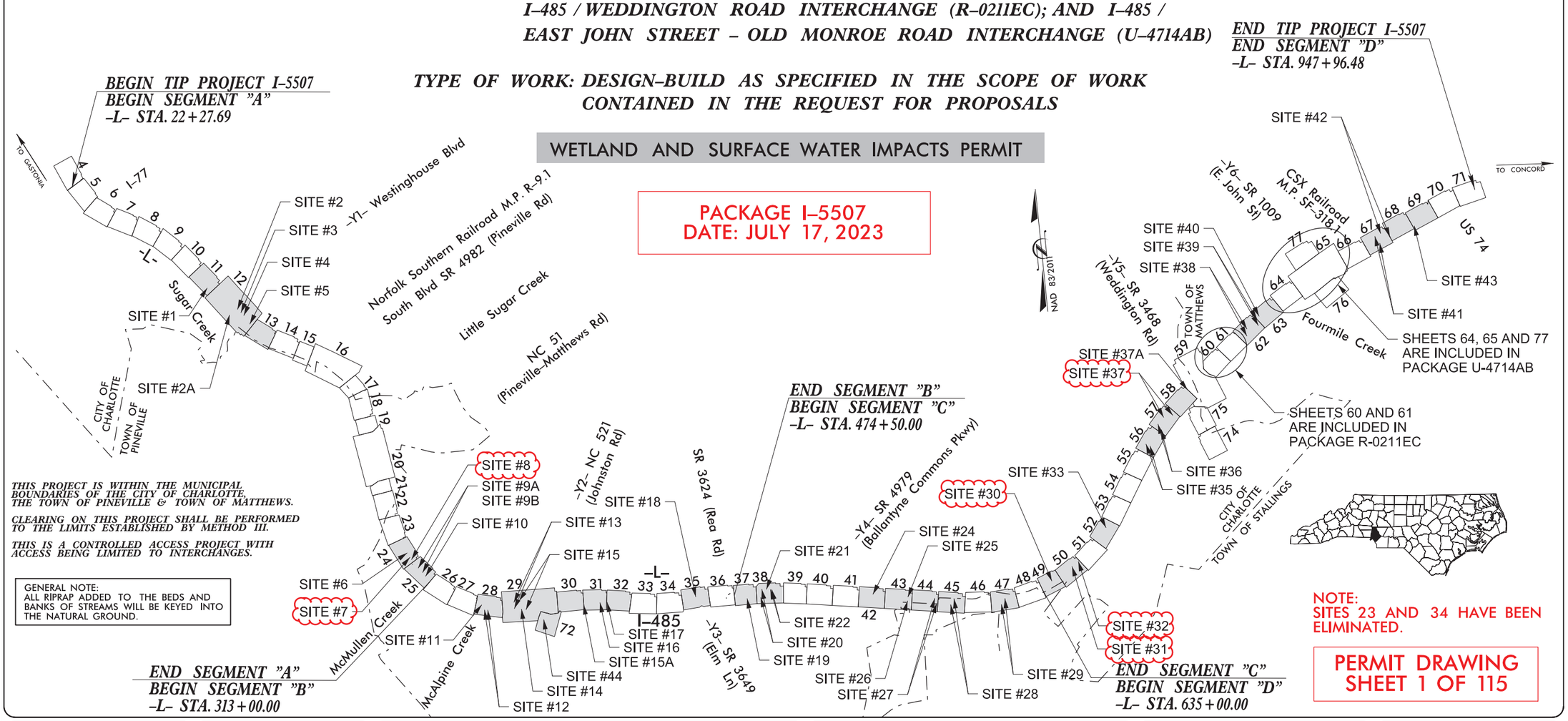
TYPE OF WORK: DESIGN–BUILD AS SPECIFIED IN THE SCOPE OF WORK CONTAINED IN THE REQUEST FOR PROPOSALS

WETLAND AND SURFACE WATER IMPACTS PERMIT

PACKAGE I–5507
DATE: JULY 17, 2023

TIP PROJECT: I–5507

CONTRACT: C203970



NOTE:
SITES 23 AND 34 HAVE BEEN ELIMINATED.

PERMIT DRAWING
SHEET 1 OF 115

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2018	=	118,400
ADT 2040	=	159,200
DHV	=	9 %
D	=	55 %
T	=	9 % *
V	=	70/75 MPH

*(TTST 4 + DUAL 5)

FUNCTIONAL CLASSIFICATION:
INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT I–5507 = 17.137 mi

LENGTH OF STRUCTURES TIP PROJECT I–5507 = 0.395 mi (BASED ON 485 WB BRIDGES)

TOTAL LENGTH OF TIP PROJECT I–5507 = 17.532 mi

NCDOT CONTACT: TIM MCFADDEN, PE
DESIGN BUILD PROJECT ENGINEER – TRANSPORTATION PROGRAM MANAGEMENT UNIT

Prepared In the Office of:
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F–0165
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY: SEPTEMBER 18, 2018

LETTING DATE: SEPTEMBER 18, 2018

DANIEL H. BRIDGES, PE
DESIGN PROJECT MANAGER

DAVID B. GOURLEY, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

10/2/2023
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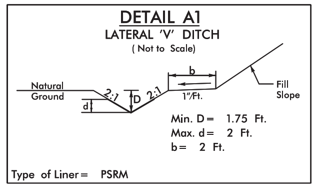
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	2D-1
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

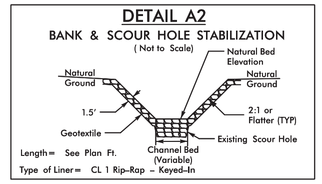
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

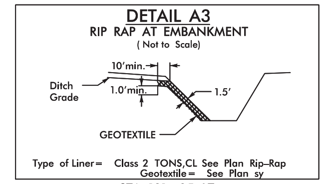
REVISIONS



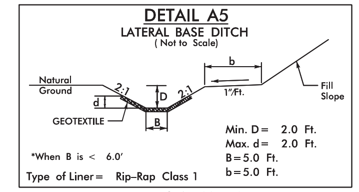
FROM STA. TO STA. 134+61 – 132+34



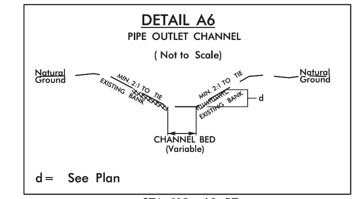
STA. 109+00 – 113+00 RT
STA 294+00 LT



STA. 131+25 LT
STA. 132+00 LT



STA. 133+50 LT



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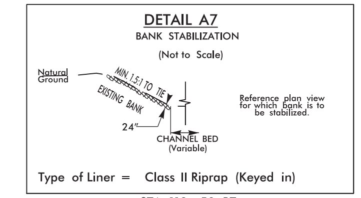

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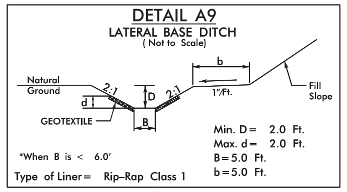
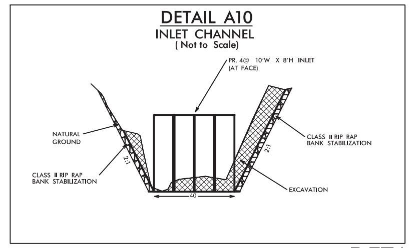
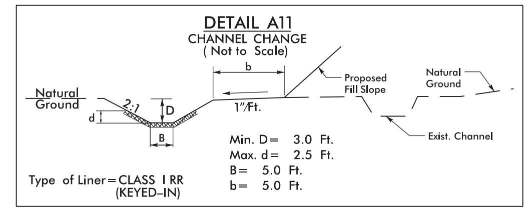


STA. 133+50 LT

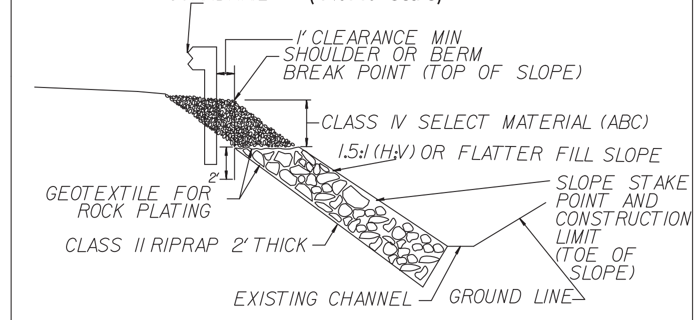


STA. 132+00



FROM STA. 142+00 LT TO STA. 137+65

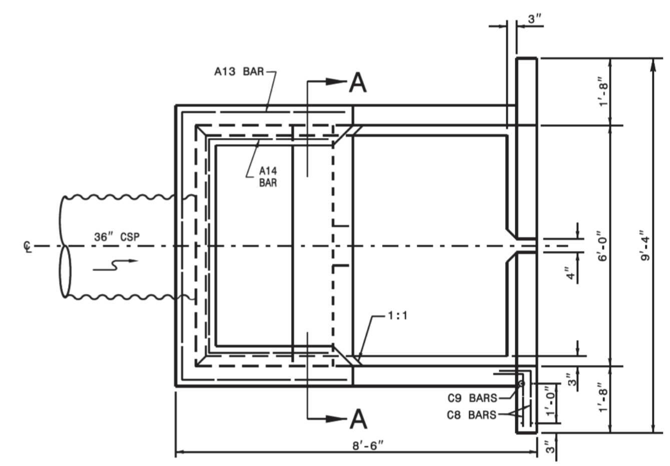
DETAIL A8
ROCK PLATING
(Not to Scale)



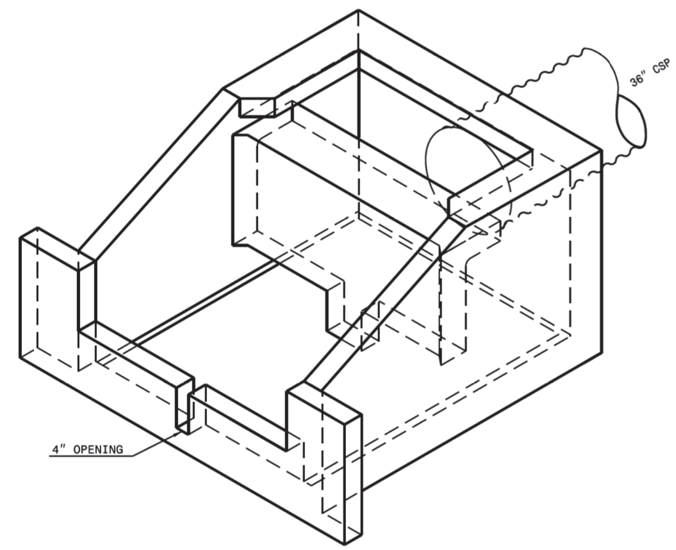
GUARDRAIL
1' CLEARANCE MIN
SHOULDER OR BERM
BREAK POINT (TOP OF SLOPE)
CLASS IV SELECT MATERIAL (ABC)
1.5:1 (H:V) OR FLATTER FILL SLOPE
GEOTEXTILE FOR ROCK PLATING
SLOPE STAKE POINT AND CONSTRUCTION LIMIT (TOE OF SLOPE)
CLASS II RIPRAP 2' THICK
EXISTING CHANNEL
GROUND LINE

DETAIL A4
ENERGY DISSIPATOR

PROJECT REFERENCE NO.	SHEET NO.



PLAN

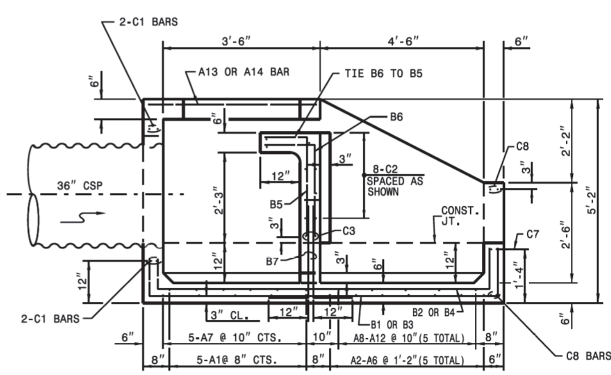


BILL OF MATERIAL

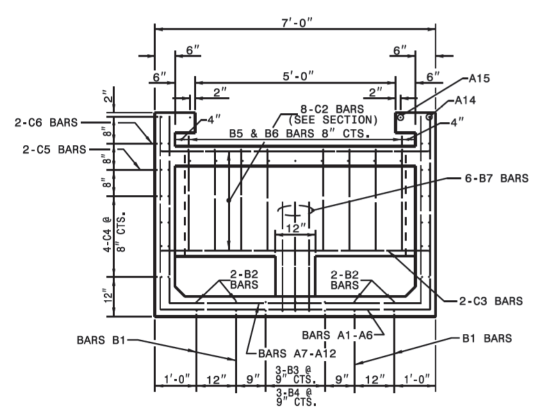
BAR	NO.	SIZE	TYPE	LENGTH	WEIGHT
A1	5	5	1	16'-2"	84.3
A2	1	5	1	16'-0"	16.7
A3	1	5	1	15'-4"	16.0
A4	1	5	1	14'-6"	15.1
A5	1	5	1	14'-0"	14.6
A6	1	5	1	11'-10"	12.3
A7	5	5	1	15'-8"	81.7
A8	1	5	1	15'-4"	16.0
A9	1	4	1	15'-9"	10.5
A10	1	4	1	13'-4"	8.9
A11	1	4	1	12'-7"	8.4
A12	1	4	1	11'-7"	7.7
A13	1	4	1	13'-5"	8.9
A14	1	4	1	11'-7"	7.7
B1	4	4	1	13'-4"	35.6
B2	4	4	1	9'-11"	26.5
B3	3	4	1	13'-4"	26.7
B4	3	4	1	9'-11"	19.9
B5	9	4	2	2'-6"	15.0
B6	9	4	2	2'-6"	15.0
B7	6	4	2	4'-0"	16.0
C1	4	4	STR	6'-8"	17.8
C2	8	8	1	8'-9"	186.9
C3	2	8	STR	6'-8"	35.6
C4	16	4	STR	8'-2"	87.3
C5	4	4	STR	4'-11"	13.1
C6	4	4	STR	6'-7"	17.6
C7	4	4	STR	2'-8"	7.1
C8	8	4	2	2'-4"	12.5
C9	8	4	STR	2'-8"	14.3
TOTAL REINF. STEEL (LBS.)					855.7
CONCRETE (CU.YDS.)					3.44

* ALL SPLICES SHALL BE 1'-6" MIN.

* ALL REINFORCING STEEL SHALL BE 2" CL. OF ANY FACE UNLESS SHOWN OTHERWISE.

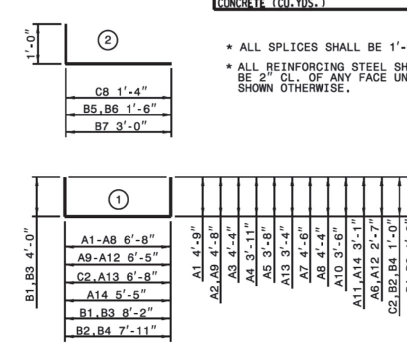


SECTION ON ℄



* SHIFT B3 & B4 BARS AS NECESSARY TO CLEAR 4" OPENING

SECTION A-A



CONTRACT STANDARDS AND DEVELOPMENT UNIT
Office 919-707-6950 FAX 919-250-4119

ENERGY DISSIPATOR

ORIGINAL BY: I.S.S. DATE: Oct.1997
MODIFIED BY: I.S.S. DATE: JULY 20, 2011
CHECKED BY: DATE:
FILE SPEC.:

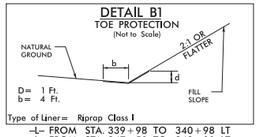
PERMIT DRAWING
SHEET 2 OF 115

PROJECT REFERENCE NO.	SHEET NO.
I–5507	2D–2
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

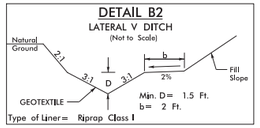
DETAIL B1
TOE PROTECTION
(Not to Scale)



Type of Liner= Riprap Class I

–L– FROM STA. 339+98 TO 340+98 LT
–L– FROM STA. 347+50 TO 349+00 LT
–L– FROM STA. 356+00 TO 357+50 LT
–L– FROM STA. 346+42 TO 346+98 RT
–L3_WEST– FROM STA. 364+25 TO 366+30 LT
–Y2DCC– FROM STA. 21+41 TO 27+26 RT
–Y2DCD– FROM STA. 29+38 TO 31+43 LT
–Y2RPB– FROM STA. 14+25 TO 16+66 LT
–Y2RPDB– FROM STA. 24+23 TO 27+27 LT
–Y3– FROM STA. 10+00 TO 11+53 LT
–Y3– FROM STA. 14+50 TO 15+72 LT
–Y3– FROM STA. 20+37 TO 24+13 LT

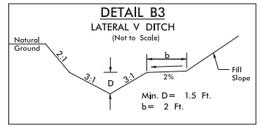
DETAIL B2
LATERAL V DITCH
(Not to Scale)



Type of Liner= Riprap Class I

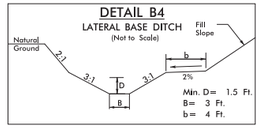
–L3_EAST– FROM STA. 358+49 TO 358+83 RT

DETAIL B3
LATERAL V DITCH
(Not to Scale)



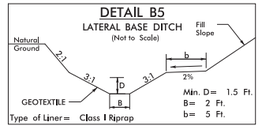
–L3_EAST– FROM STA. 358+83 TO 359+33 RT

DETAIL B4
LATERAL BASE DITCH
(Not to Scale)



–L3_EAST– FROM STA. 359+33 TO 360+22 RT

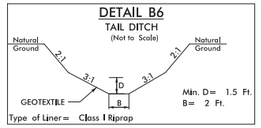
DETAIL B5
LATERAL BASE DITCH
(Not to Scale)



Type of Liner= Class I Riprap

–Y2RPDB– FROM STA. 10+10 TO 11+38 LT

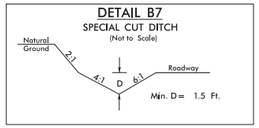
DETAIL B6
TAIL DITCH
(Not to Scale)



Type of Liner= Class I Riprap

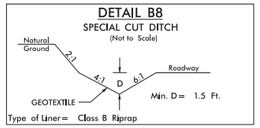
–Y2RPDB– FROM STA. 11+38 TO 12+71 LT

DETAIL B7
SPECIAL CUT DITCH
(Not to Scale)



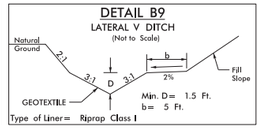
–L– FROM STA. 461+50 TO 462+00 LT
–L– FROM STA. 465+00 TO 467+50 LT
–L– FROM STA. 438+11 TO 439+00 RT
–L3_EAST– FROM STA. 347+76 TO 348+78 RT
–L3_EAST– FROM STA. 354+34 TO 357+33 RT
–Y2RPDB– FROM STA. 47+40 TO 48+40 RT
–Y23RPB– FROM STA. 16+02 TO 16+50 RT

DETAIL B8
SPECIAL CUT DITCH
(Not to Scale)



–L– FROM STA. 403+50 TO 403+78

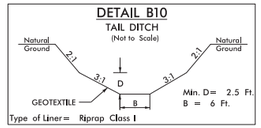
DETAIL B9
LATERAL V DITCH
(Not to Scale)



Type of Liner= Riprap Class I

–Y2RPDB– FROM STA. 17+00 TO 22+00 LT

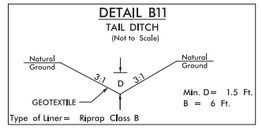
DETAIL B10
TAIL DITCH
(Not to Scale)



Type of Liner= Riprap Class I

–Y2RPDB– STA. 15+47 TO 17+00 LT

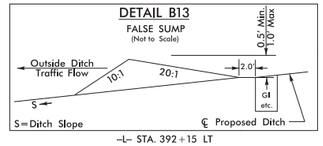
DETAIL B11
TAIL DITCH
(Not to Scale)



Type of Liner= Riprap Class B

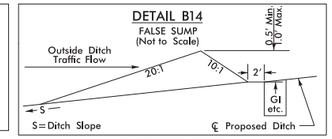
–L– STA. 336+95 RT

DETAIL B13
FALSE SUMP
(Not to Scale)



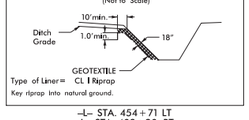
–L– STA. 392+15 LT

DETAIL B14
FALSE SUMP
(Not to Scale)



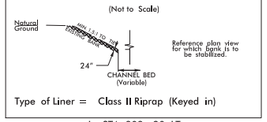
–L– STA. 754+82 RT

DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



–L– STA. 454+71 LT
–L– STA. 408+20 RT
–L– STA. 725+09 RT
–Y2DCC– STA. 28+06 RT
–Y2RPDB– STA. 12+74 LT
–Y2RPDB– STA. 15+62 LT
–Y2RPDB– STA. 36+96 LT

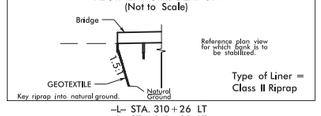
DETAIL B16
BANK STABILIZATION
(Not to Scale)



Type of Liner = Class II Riprap (Keyed in)

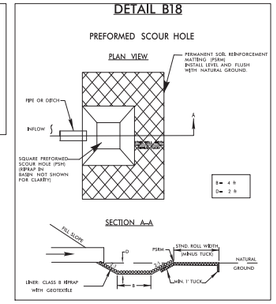
–L– STA. 309+20 LT
–L– STA. 309+60 LT
–L– STA. 342+86 LT
–L– STA. 342+86 LT
–L– STA. 343+36 LT
–L– STA. 342+28 RT
–L– STA. 342+78 RT
–Y2DCC– STA. 21+16 RT
–Y2DCC– STA. 21+46 RT
–Y2DCC– STA. 27+14 RT
–Y2DCC– STA. 27+54 RT
–Y2DCC– STA. 38+88 RT
–Y2DCC– STA. 39+25 RT
–Y2RPDB– STA. 36+70 LT
–Y2RPDB– STA. 36+80 LT

DETAIL B17
ABUTMENT STABILIZATION
(Not to Scale)



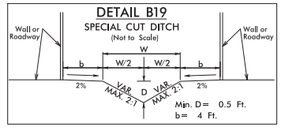
–L– STA. 310+26 LT
–L– STA. 341+95 LT
–L– STA. 344+97 LT
–L– STA. 341+30 RT
–L– STA. 344+15 RT

DETAIL B18
PREFORMED SCOUR HOLE



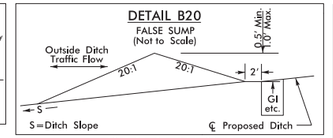
–L– STA. 400+47 RT

DETAIL B19
SPECIAL CUT DITCH
(Not to Scale)



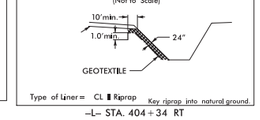
–L3_EAST– FROM STA. 359+33 TO 369+86 LT

DETAIL B20
FALSE SUMP
(Not to Scale)



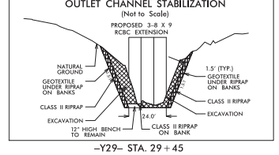
–L3_EAST– STA. 367+90 LT

DETAIL B21
RIPRAP AT EMBANKMENT
(Not to Scale)



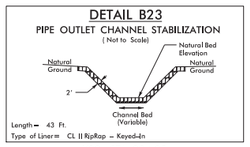
–L– STA. 404+34 RT

DETAIL B22
OUTLET CHANNEL STABILIZATION
(Not to Scale)



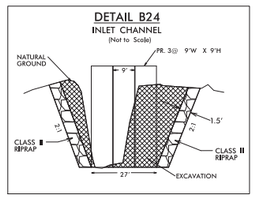
–Y29– STA. 29+45

DETAIL B23
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



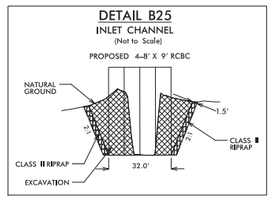
–Y29– STA. 29+85

DETAIL B24
INLET CHANNEL
(Not to Scale)



–L– STA. 360+00

DETAIL B25
INLET CHANNEL
(Not to Scale)



–L– STA. 364+22

PERMIT DRAWING
SHEET 3 OF 115

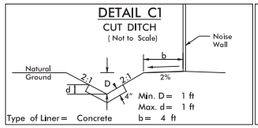
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
I–5507	2D–3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

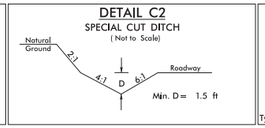
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL C1
CUT DITCH
(Not to Scale)



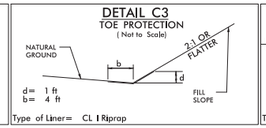
FROM –L– STA. 499+52 LT TO STA. 502+02 LT
FROM –L– STA. 511+36 LT TO STA. 523+64 LT
FROM –L– STA. 567+97 LT TO STA. 572+93 LT

DETAIL C2
SPECIAL CUT DITCH
(Not to Scale)



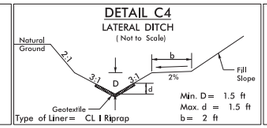
FROM –L– STA. 505+66 LT TO STA. 507+23 LT
FROM –L– STA. 568+80 LT TO STA. 570+38 LT
FROM –L– STA. 570+50 LT TO STA. 577+09 LT
FROM –L– STA. 595+50 LT TO STA. 600+00 LT
FROM –L– STA. 527+84 RT TO STA. 529+13 RT
FROM –L– STA. 575+36 RT TO STA. 576+74 RT

DETAIL C3
TOE PROTECTION
(Not to Scale)



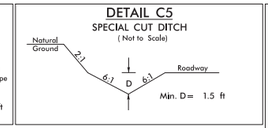
FROM –L– STA. 582+50 LT TO STA. 584+50 LT
FROM –L– STA. 592+50 LT TO STA. 593+50 LT
FROM –L– STA. 486+50 RT TO STA. 488+06 RT
FROM –L– STA. 488+15 RT TO STA. 489+22 RT

DETAIL C4
LATERAL DITCH
(Not to Scale)



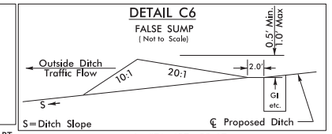
FROM –L– STA. 485+50 RT TO STA. 486+00 RT

DETAIL C5
SPECIAL CUT DITCH
(Not to Scale)



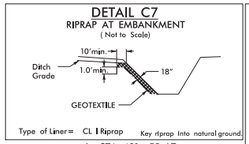
FROM –L– STA. 529+50 RT TO STA. 532+00 RT

DETAIL C6
FALSE SUMP
(Not to Scale)



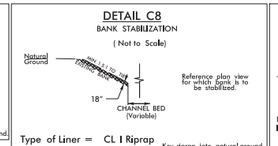
–L– STA. 497+33 LT
–L– STA. 512+55 LT
–L– STA. 517+57 LT
–L– STA. 524+12 LT
–L– STA. 530+99 LT
–L– STA. 535+00 LT
–L– STA. 553+55 LT
–L– STA. 577+25 LT

DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



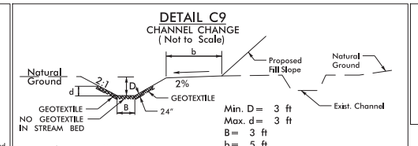
–L– STA. 491+53 LT
–L– STA. 546+23 LT
–L– STA. 578+43 LT
–L– STA. 588+21 LT
–L– STA. 480+89 RT
–L– STA. 488+11 RT
–L– STA. 496+12 RT
–L– STA. 496+43 RT
–L– STA. 579+42 RT
–L– STA. 586+77 RT

DETAIL C8
BANK STABILIZATION
(Not to Scale)



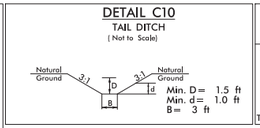
FROM –L– STA. 493+92 LT
FROM –L– STA. 540+84 LT
FROM –L– STA. 578+43 LT
FROM –L– STA. 546+23 LT

DETAIL C9
CHANNEL CHANGE
(Not to Scale)



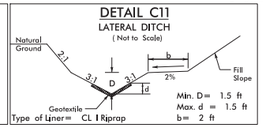
FROM –L– STA. 492+36 LT TO STA. 493+57 LT

DETAIL C10
TAIL DITCH
(Not to Scale)



–L– STA. 527+67 LT

DETAIL C11
LATERAL DITCH
(Not to Scale)



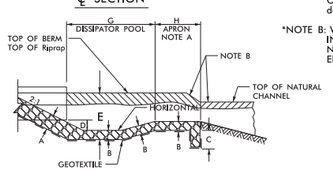
FROM –L– STA. 484+50 RT TO STA. 485+50 RT

DETAIL C12
RIPRAP ENERGY DISSIPATOR BASIN

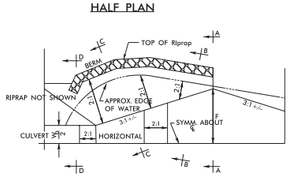
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

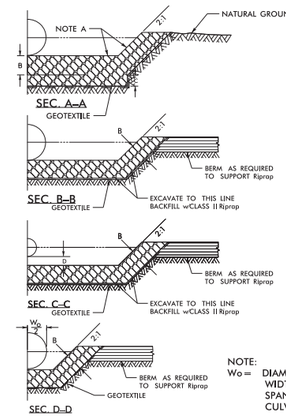
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL TOP OF Riprap IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM.	RIPRAP BASIN #							
	1	2	3	4	5	6	7	8
A	30"							
B	21"							
C	16"							
D	1.6'							
E	10.2'							
F	11.7'							
G	18.0'							
H	8.0'							

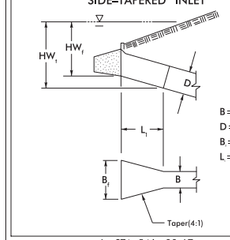
*ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	–L– STA. 488+60 LT
2	
3	
4	
5	
6	
7	
8	

NOTE:
Wo = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE–ARCH CULVERTS

5/05

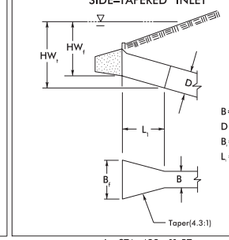
DETAIL C13
SIDE–TAPERED INLET



B=3 ft
D=3 ft
B1=5 ft
L=4 ft

–L– STA. 546+23 LT

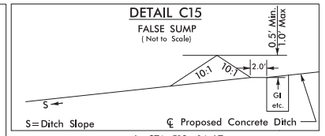
DETAIL C14
SIDE–TAPERED INLET



B=6 ft
D=5 ft
B=9.3 ft
L=7.1 ft

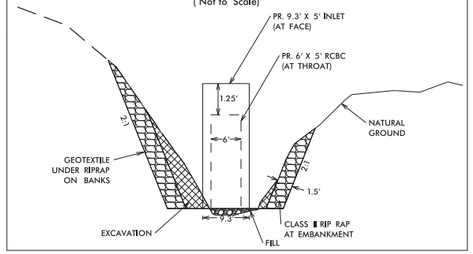
–L– STA. 488+11 RT

DETAIL C15
FALSE SUMP
(Not to Scale)



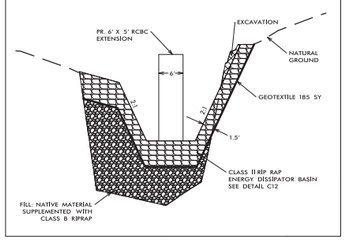
–L– STA. 513+14 LT
–L– STA. 521+00 LT
–L– STA. 523+74 LT

DETAIL C16
INLET CHANNEL
(Not to Scale)



–L– STA. 488+60

DETAIL C17
OUTLET CHANNEL
(Not to Scale)



–L– STA. 488+60

PERMIT DRAWING
SHEET 4 OF 115

9/12/2019
C:\Projects\01\ics_workingdir\308\336401.3931\I5507_Hyd_prm_wet_psh02D3.dgn
PSHWTC501$

WSP BLYTHE

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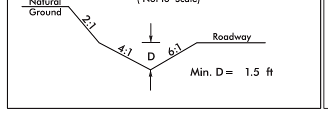
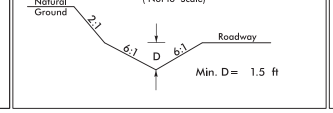
8/17/99

DETAIL D1
SPECIAL CUT DITCH
(Not to Scale)



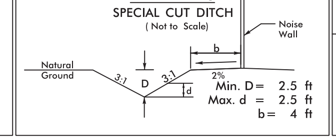
–L– FROM STA. 615+81 TO 619+50 LT
–L– FROM STA. 688+57 TO 701+37 LT
–L– FROM STA. 706+21 TO 711+00 LT
–L– FROM STA. 753+98 TO 760+32 LT
–L– FROM STA. 794+62 TO 795+50 LT
–L– FROM STA. 764+81 TO 767+50 LT
–L– FROM STA. 916+63 TO 917+50 LT
–L– FROM STA. 929+50 TO 931+50 LT
–L– FROM STA. 709+81 TO 713+00 RT
–L– FROM STA. 804+50 TO 805+50 RT
–L– FROM STA. 901+00 TO 905+17 RT
–Y5RPD– STA. FROM 24+00 TO 26+50 RT
–Y6RPC– FROM STA. 24+ +50 TO 26+50 RT

DETAIL D2
SPECIAL CUT DITCH
(Not to Scale)



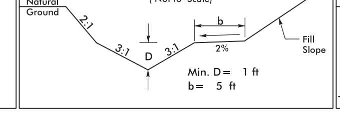
–L– FROM STA. 615+81 TO 619+50 LT

DETAIL D3
SPECIAL CUT DITCH
(Not to Scale)



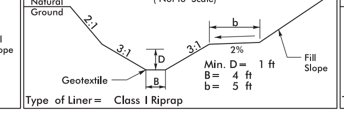
–L– FROM 628+73 TO 634+63 LT

DETAIL D4
LATERAL DITCH
(Not to Scale)



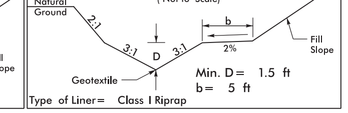
–L– FROM STA. 890+47 TO 892+50 LT
–L– FROM STA. 898+00 TO 900+00 LT
–L– FROM STA. 936+50 TO 940+50 LT
–L– FROM STA. 885+00 TO 888+19 RT
–L– FROM STA. 892+00 TO 897+09 RT

DETAIL D5
LATERAL BASE DITCH
(Not to Scale)



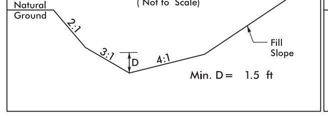
–L– FROM STA. 791+50 TO 793+50

DETAIL D6
LATERAL V DITCH
(Not to Scale)



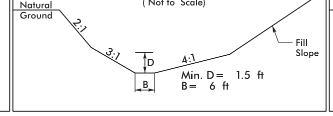
–L– FROM STA. 835+50 TO 837+27 LT
–L– FROM STA. 893+84 TO 898+00 LT
–L– FROM STA. 888+19 TO 890+77 RT
–L– FROM STA. 890+91 TO 892+00 RT
–L– FROM STA. 897+24 TO 899+50 RT

DETAIL D7
LATERAL V DITCH
(Not to Scale)



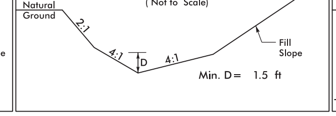
–Y5LPA– FROM STA. 14+78 TO 15+28 LT
–Y5RPA– FROM STA. 20+24 TO 22+00 LT

DETAIL D8
LATERAL V DITCH
(Not to Scale)



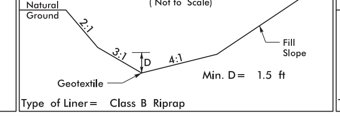
–Y5LPA– FROM STA. 15+28 TO 15+73

DETAIL D9
LATERAL V DITCH
(Not to Scale)



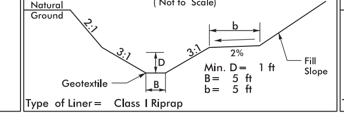
–Y5LPA– FROM STA. 15+73 TO 17+00 LT

DETAIL D10
LATERAL V DITCH
(Not to Scale)



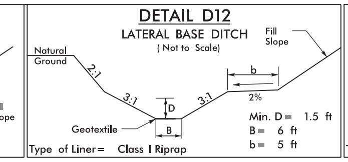
–Y5RPA– FROM STA. 19+50 TO 20+24 LT

DETAIL D11
LATERAL BASE DITCH
(Not to Scale)



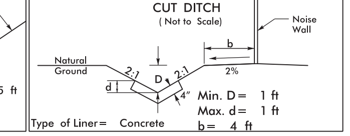
–L– FROM STA. 788+50 TO 790+00

DETAIL D12
LATERAL BASE DITCH
(Not to Scale)



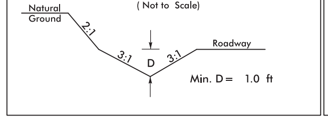
–Y6RPB– FROM 9+77 TO 11+02 LT

DETAIL D13
CUT DITCH
(Not to Scale)



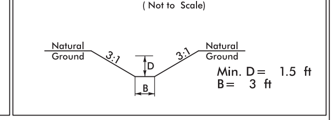
–L– FROM 706+50 TO 711+41 RT
–L– FROM 727+77 TO 729+44 RT
–Y6RPB– FROM 15+11 TO 22+63 LT

DETAIL D14
SPECIAL CUT DITCH
(Not to Scale)



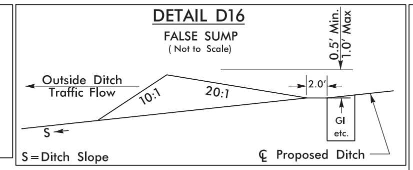
–Y6LPA– FROM 10+74 TO 11+87 LT

DETAIL D15
TAIL DITCH
(Not to Scale)



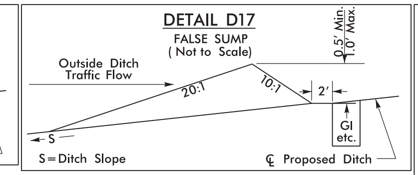
–L– STA. 777+37 LT

DETAIL D16
FALSE SUMP
(Not to Scale)



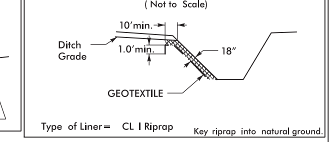
–L– STA. 794+55 LT
–L– STA. 709+74 RT
–L– STA. 760+50 RT
–L– STA. 774+58 RT
–L– STA. 827+52 RT
–Y6RPB– STA. 17+70 LT

DETAIL D17
FALSE SUMP
(Not to Scale)



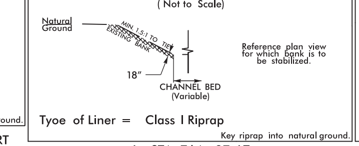
–L– STA. 701+58 LT
–L– STA. 827+52 LT
–L– STA. 835+03 LT
–L– STA. 617+94 RT
–L– STA. 795+69 RT
–L– STA. 808+22 RT
–Y5RPA– STA. 15+25 LT
–Y5RPD– STA. 21+39 LT
–Y5RPD– STA. 21+31 RT

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



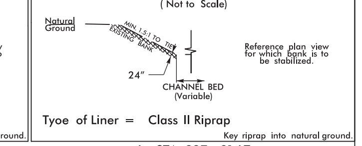
–L– STA. 615+00 LT	–L– STA. 612+67 RT
–L– STA. 654+53 LT	–L– STA. 730+00 RT
–L– STA. 654+58 LT	–L– STA. 730+04 RT
–L– STA. 658+97 LT	–L– STA. 740+42 RT
–L– STA. 683+21 LT	–L– STA. 740+45 RT
–L– STA. 729+85 LT	–L– STA. 746+32 RT
–L– STA. 730+13 LT	–L– STA. 749+98 RT
–L– STA. 741+73 LT	–L– STA. 750+09 RT
–L– STA. 746+32 LT	–L– STA. 788+69 RT
–L– STA. 791+36 LT	–L– STA. 792+60 RT
–L– STA. 808+85 LT	–L– STA. 806+28 RT
–L– STA. 816+10 LT	–L– STA. 806+46 RT
–L– STA. 818+86 LT	–L– STA. 818+46 RT
–L– STA. 890+43 LT	–L– STA. 837+46 RT
–L– STA. 893+74 LT	–L– STA. 890+82 RT
–L– STA. 893+80 LT	–L– STA. 890+86 RT
–L– STA. 910+17 LT	–L– STA. 897+08 RT
	–L– STA. 897+16 RT
	–Y6RPC– STA. 15+28 RT

DETAIL D19
BANK STABILIZATION
(Not to Scale)



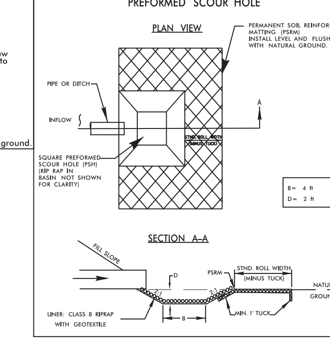
–L– STA. 764+97 LT
–L– STA. 890+34 LT
–L– STA. 893+72 LT
–Y19RPC– STA. 18+60 RT
–Y19RPC– STA. 18+64 RT

DETAIL D20
BANK STABILIZATION
(Not to Scale)



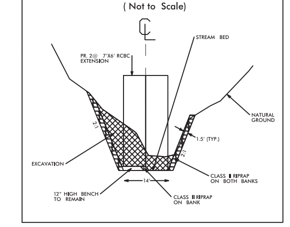
–L– STA. 837+91 LT
–L– STA. 838+91 LT
–Y6RPC– STA. 19+10 RT

DETAIL D21
PREFORMED SCOUR HOLE



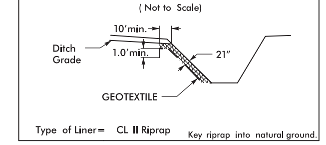
–L– STA. 790+75 LT

DETAIL D29
OUTLET CHANNEL
(Not to Scale)



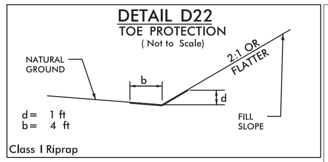
–L– STA. 837+70 LT

DETAIL D18–A
RIPRAP AT EMBANKMENT
(Not to Scale)



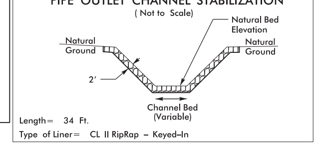
–Y6– STA. 129+88 LT

DETAIL D22
TOE PROTECTION
(Not to Scale)



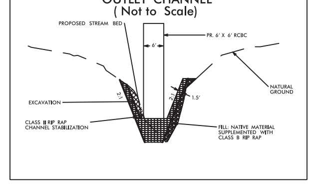
–L– FROM STA. 651+50 TO 654+49 LT
–L– FROM STA. 654+64 TO 656+50 LT
–L– FROM STA. 814+50 TO 816+04 LT
–L– FROM STA. 845+32 TO 854+00 LT
–L– FROM STA. 649+50 TO 653+10 RT
–L– FROM STA. 791+44 TO 792+52 RT
–Y5RPA– FROM STA. 21+43 TO 24+00 RT
–Y6LPC– FROM STA. 12+03 TO 13+79 RT
–Y6RPC– FROM STA. 19+26 TO 20+55 RT
–Y6RPC– FROM STA. 23+69 TO 24+87 RT

DETAIL D23
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



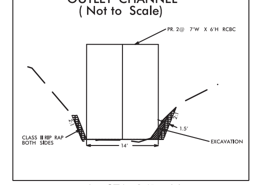
–L– STA. 790+14 LT

DETAIL D31
OUTLET CHANNEL
(Not to Scale)



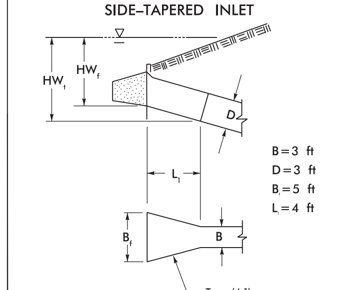
–L– STA. 789+30

DETAIL D32
OUTLET CHANNEL
(Not to Scale)



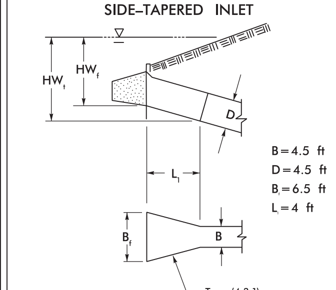
–L– STA. 841+00

DETAIL D24
SIDE–TAPERED INLET



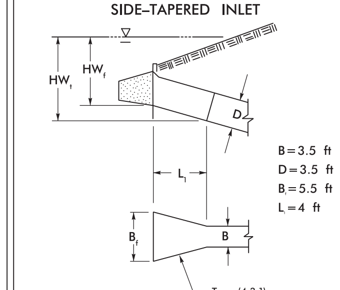
–L– STA. 641+48 LT

DETAIL D25
SIDE–TAPERED INLET



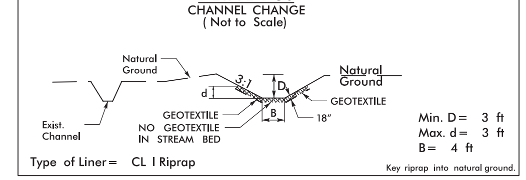
–L– STA. 749+91 RT
–Y24RPA– STA. 18+83 RT

DETAIL D26
SIDE–TAPERED INLET



–L– STA. 644+52 LT

DETAIL D30
CHANNEL CHANGE
(Not to Scale)



–L– STA. 897+13 RT

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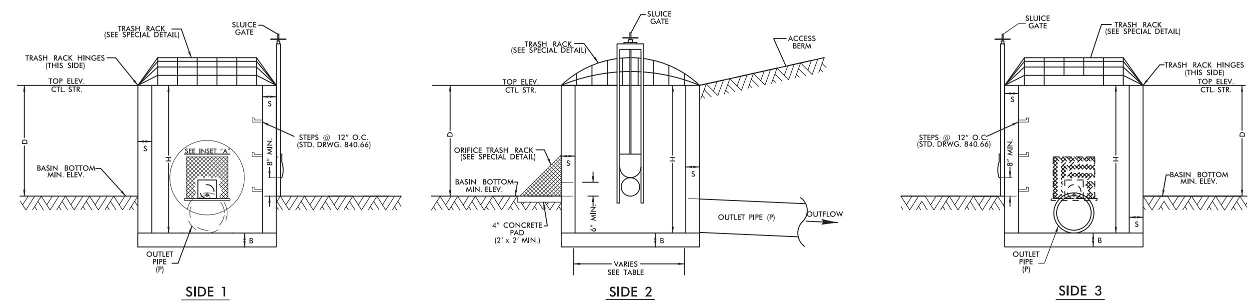
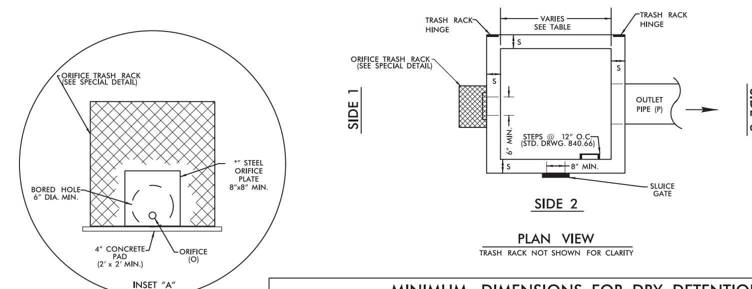
DETAIL D27

DRY DETENTION BASIN DRAWDOWN STRUCTURE

NOT TO SCALE





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

Water Quality Volume:

Treated Rainfall Depth = 1.6 inches
NBUA = 6.4 acres
WQv = 1.6 x 6.4 x 3450 = 35,328 CF
WQ Elev = 725.13

WQ Routing Results:
Peak WSE = 724.73
Peak Q = 0.26 cfs
Draw down = 52.5 hours

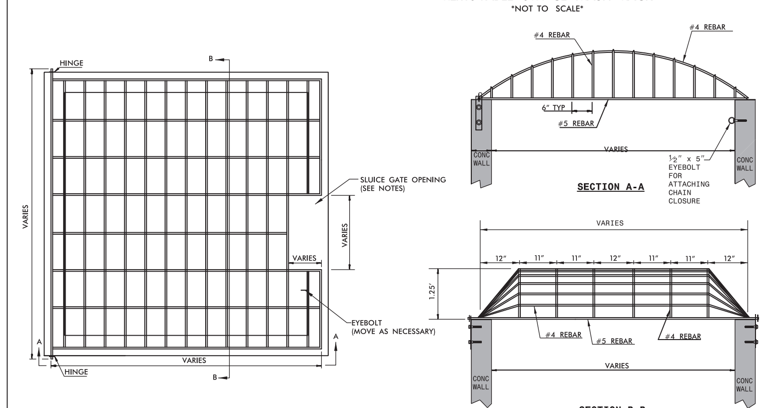
MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
Weddington Rd, Y5LPD	5997	6"	6"	723.35	730.50	7.15	720.50	4' x 4' x 10'	3"	723.35	18"

DETAIL

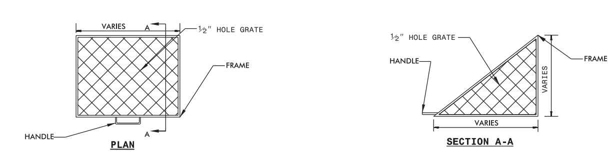
REMOVABLE ORIFICE TRASH RACK

NOT TO SCALE



REBAR TRASH RACK
NOT TO SCALE

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A–153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.



ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A *" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A–153.

PERMIT DRAWING
SHEET 6 OF 115

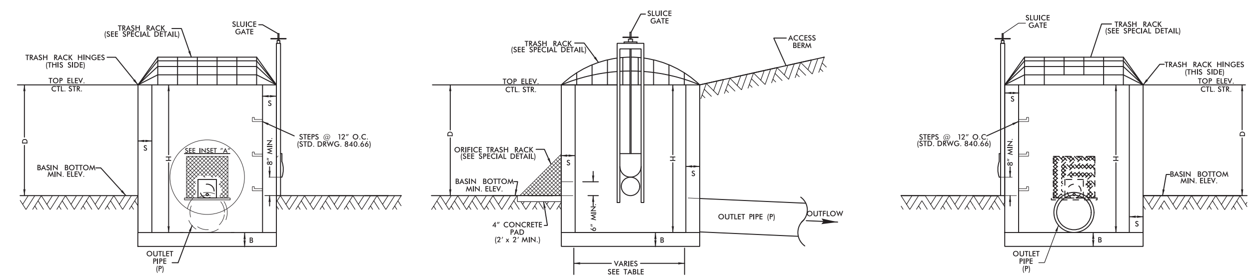
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

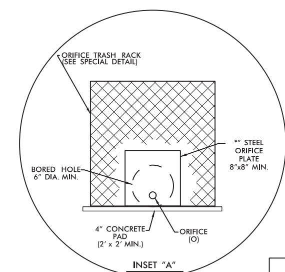
DETAIL D28

DRY DETENTION BASIN DRAWDOWN STRUCTURE

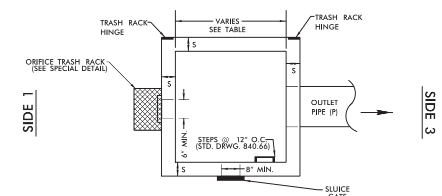
NOT TO SCALE



SIDE 1 SIDE 2 SIDE 3



INSET "A"



PLAN VIEW
TRASH RACK NOT SHOWN FOR CLARITY

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

Water Quality Volume:

Treated Rainfall Depth = 1.6 inches
NBUA = 4.5 acres
WQv = 1.6 x 4.5 x 3450 = 24,840 CF
WQ Elev = 686.09

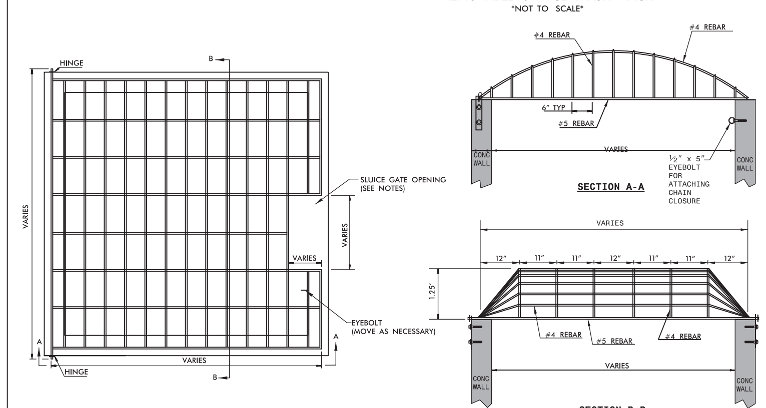
WQ Routing Results:
Peak WSE = 685.33
Peak Q = 0.26 cfs
Draw down = 35.3 hours

MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

STATION	STRUCTURE NUMBER	S (INCHES) 6" MIN.	B (INCHES) 6" MIN.	BASIN BOTTOM MINIMUM ELEV.	TOP ELEVATION CONTROL STRUCTURE	MAX. STORAGE DEPTH(D) FEET	INV. ELEV. CTL. STR.	CTL. STR. DIMENSIONS (W x L x H)	ORIFICE DIAMETER (O) INCHES	ORIFICE INV. ELEV.	OUTLET PIPE DIAMETER(P) INCHES
E. John St, Y6LPC	6545	6"	6"	684.00	690.00	6.0	681.00	4' x 4' x 9'	3"	684.00	24"
									18" W x 12" H	685.50	

DETAIL

REMOVABLE ORIFICE TRASH RACK
NOT TO SCALE



PLAN SECTION A-A SECTION B-B

REBAR TRASH RACK
NOT TO SCALE

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A 1/4" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. EYEBOLT FOR CHAIN CLOSURE SHALL BE INSTALLED BY THE SAME METHOD AS THE HINGE PLATE BOLTS.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR REBAR AND GALVANIZED IN ACCORDANCE WITH ASTM A-153.
5. PROVIDE OPENING IN TRASH RACK TO ACCOMODATE SLUICE GATE ON THE OUTLET PIPE. ENSURE TRASH RACK OPENS FREELY AND WITHOUT INTERFERENCE WITH SLUICE GATES.

PLAN SECTION A-A

ORIFICE TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A *" BEAD.
2. IF BOLTS ARE ANCHORED IN CONCRETE, FOLLOW STD. DWG. 862.03 AND 862.04 FOR ANCHORING PROCEDURE.
3. REMOVEABLE ORIFICE TRASH RACK SHALL BE ATTACHED TO CONCRETE BOX BY HINGE OR SLIDE RAIL SYSTEM.
4. RACK AND HARDWARE SHALL BE ALUMINUM OR GALVANIZED IN ACCORDANCE WITH ASTM A-153.

PERMIT DRAWING
SHEET 7 OF 115

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

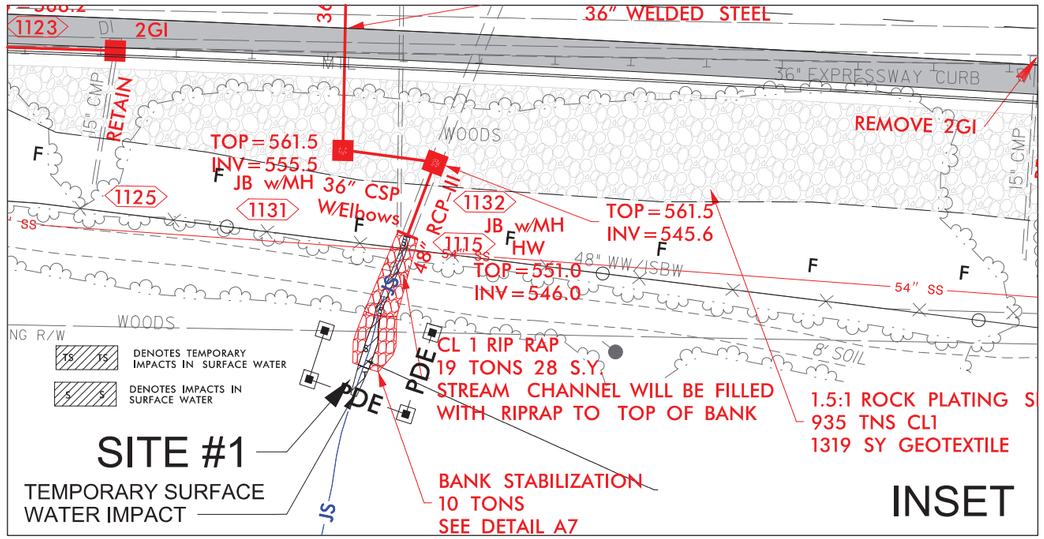
PROJECT REFERENCE NO.	SHEET NO.
I-5507	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

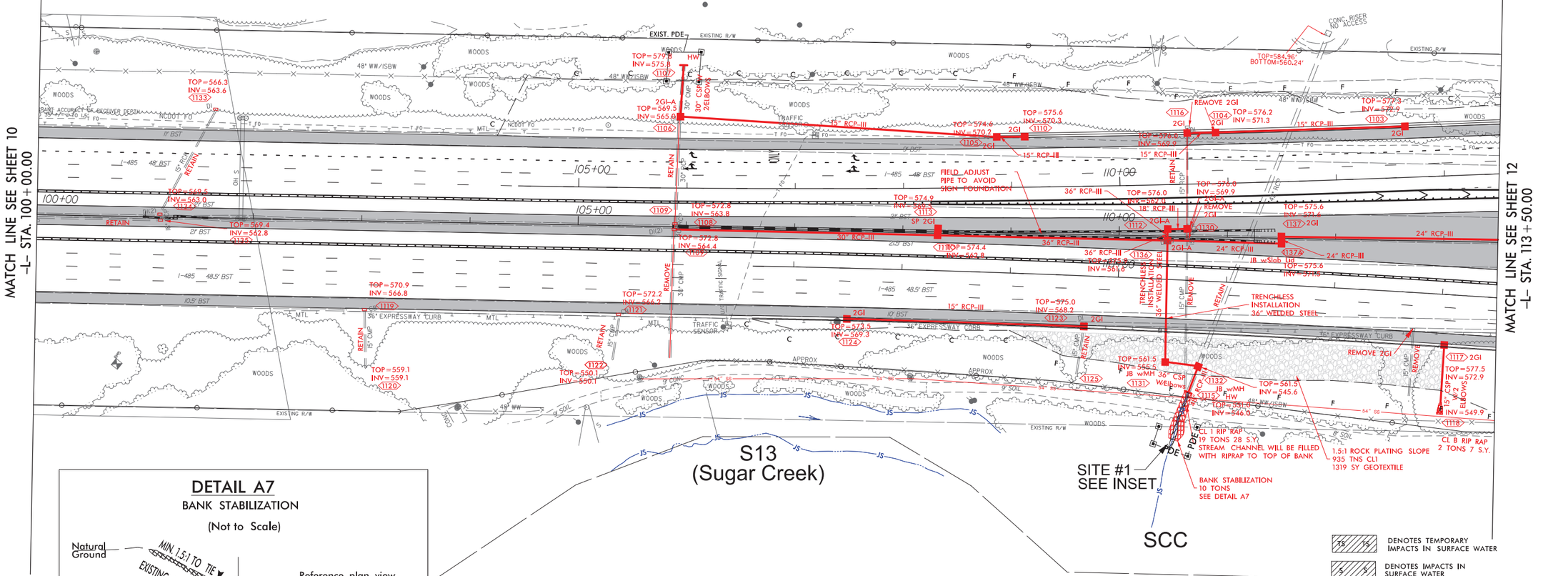
BLYTHE

8/17/99

REVISIONS

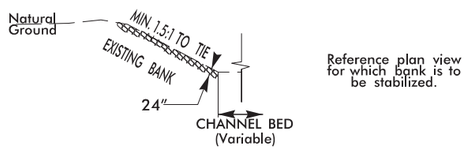
NAD 83/2011





DETAIL A7
BANK STABILIZATION

(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

100 0 100
GRAPHIC SCALE

Revised August 2021

PERMIT DRAWING
SHEET 8 OF 115

8/31/2021
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melville

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

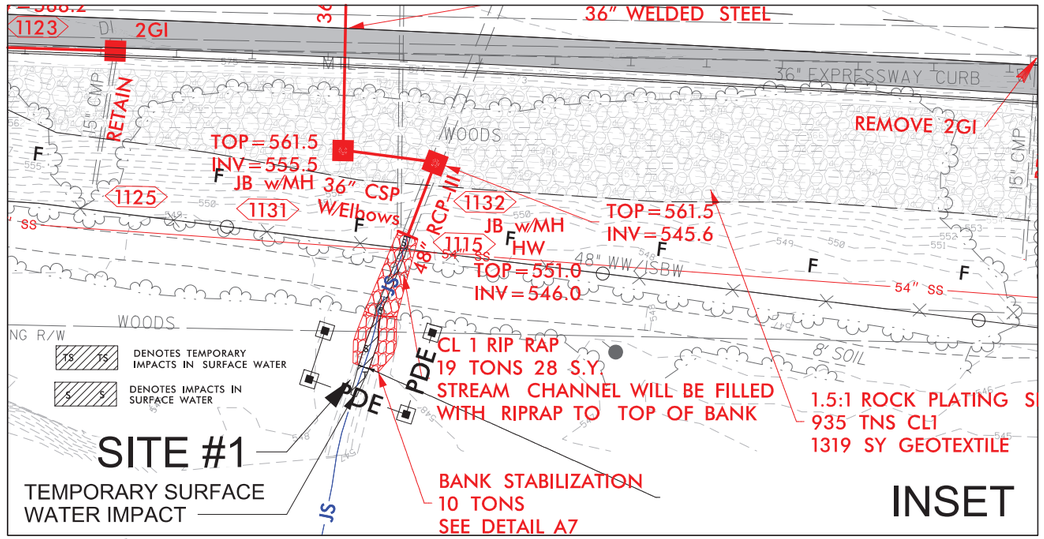
PROJECT REFERENCE NO.	SHEET NO.
I-5507	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

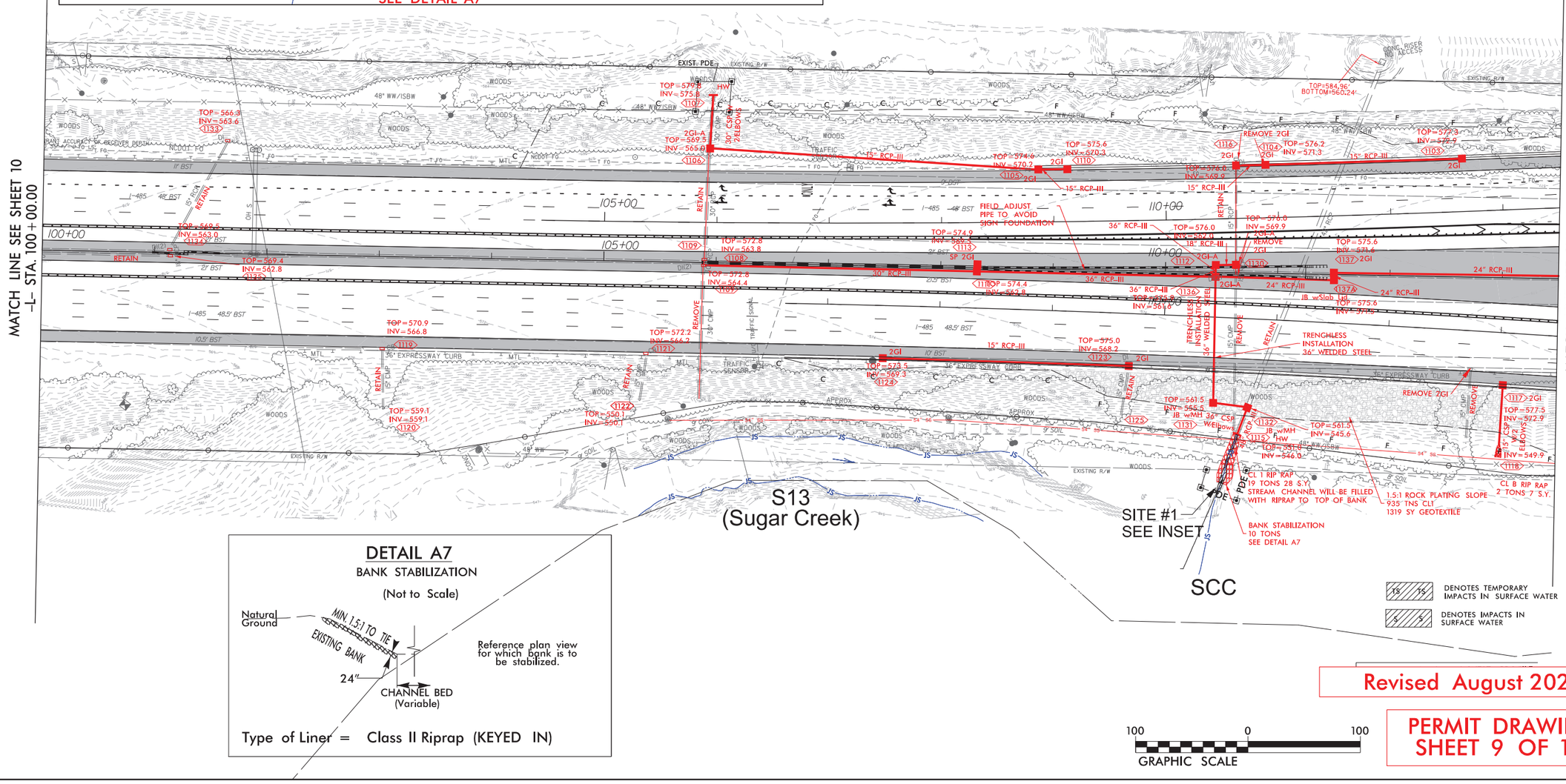
BLYTHE

8/17/99

REVISIONS

NAD 83/2011





DETAIL A7
BANK STABILIZATION

(Not to Scale)

Type of Liner = Class II Riprap (KEYED IN)

100 0 100
GRAPHIC SCALE

Revised August 2021

PERMIT DRAWING
SHEET 9 OF 115

8/31/2021
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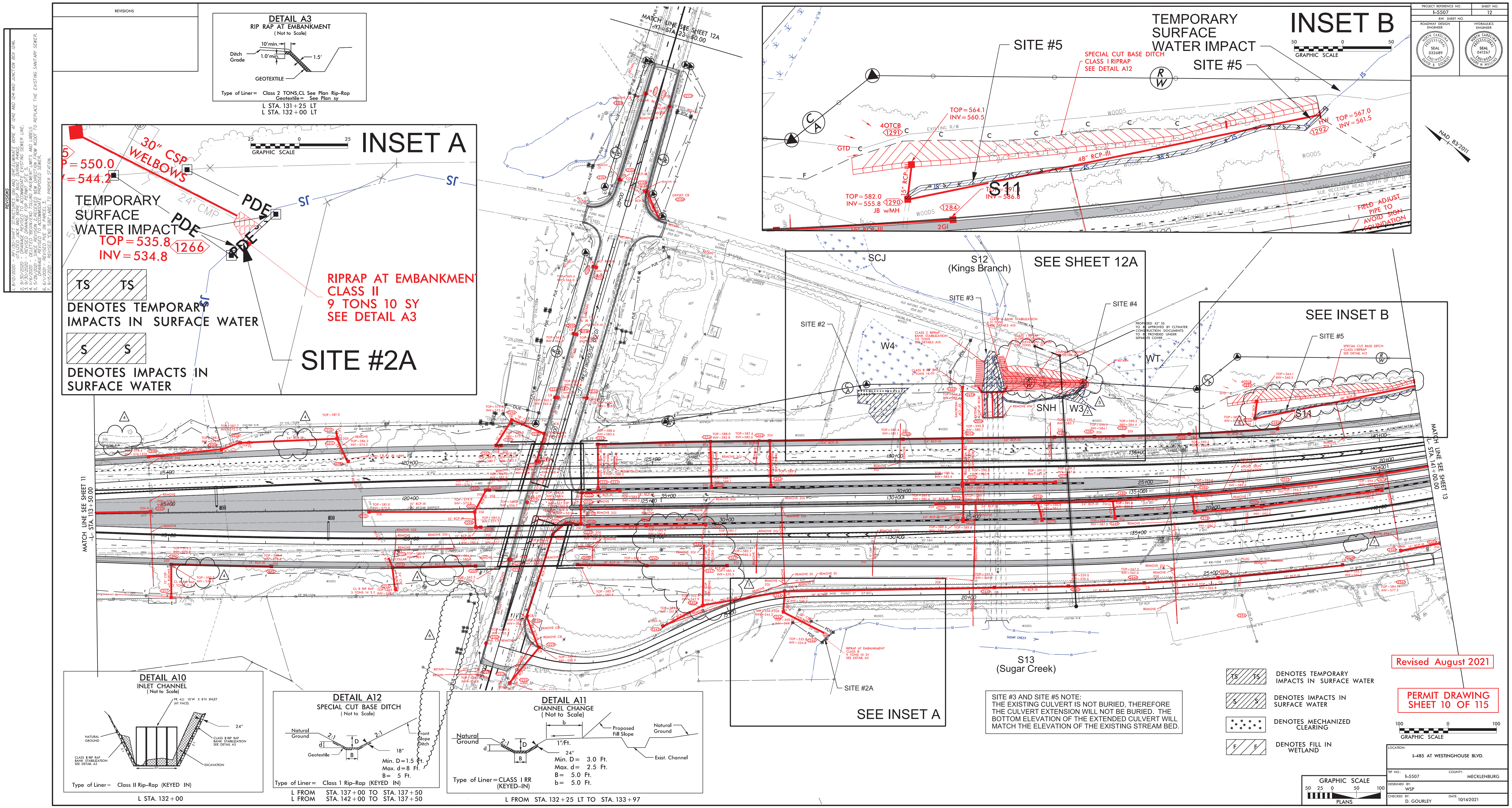
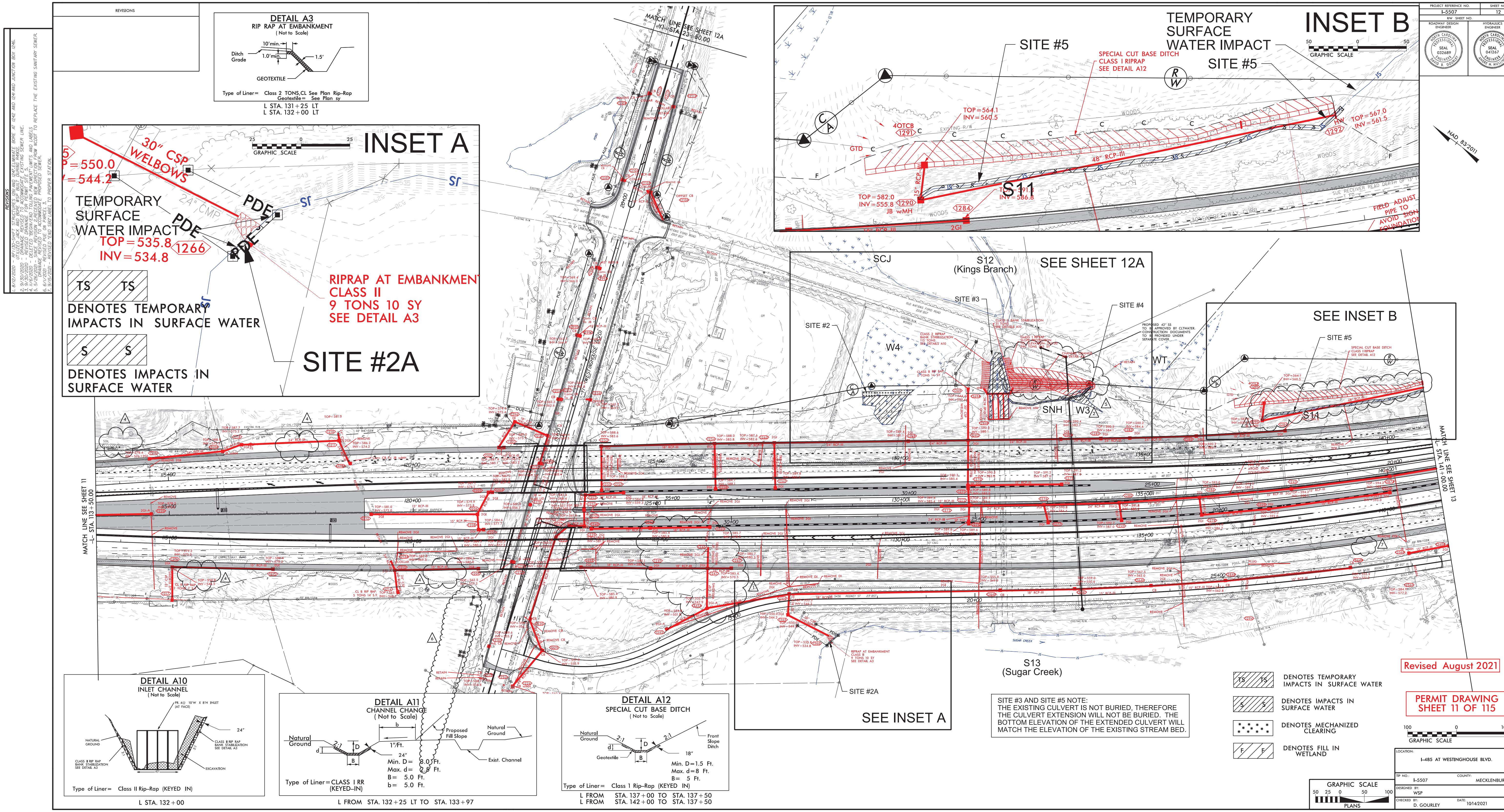
Melville


INSET A
GRAPHIC SCALE
30" CSP W/ELBOWS
24" CMP
TEMPORARY SURFACE WATER IMPACT
TOP=535.8
INV=534.8
1266
PDE
RIPRAP AT EMBANKMENT CLASS II 9 TONS 10 SY SEE DETAIL A3
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SITE #2A
INSET B
TEMPORARY SURFACE WATER IMPACT
SITE #5
SPECIAL CUT BASE DITCH CLASS I RIPRAP SEE DETAIL A12
TOP=564.1
INV=560.5
TOP=567.0
INV=561.5
TOP=582.0
INV=555.8
JB wMH
48" RCP-III
S11
SEE SHEET 12A
S12 (Kings Branch)
SCJ
SITE #2
SITE #3
SITE #4
W4
WT
SNH
W3
SEE INSET B
S14
S13 (Sugar Creek)
SEE INSET A
MATCH LINE SEE SHEET 11 -L- STA. 113+50.00
MATCH LINE SEE SHEET 13 -L- STA. 141+00.00
MATCH LINE SEE SHEET 12A -Y1- STA. 23+60.00
WEST INMAN BLVD
DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner= Class 2 TONS,CL See Plan Rip-Rap Geotextile= See Plan sy
L STA. 131+25 LT
L STA. 132+00 LT
DETAIL A10
INLET CHANNEL
(Not to Scale)
Type of Liner= Class II Rip-Rap (KEYED IN)
L STA. 132+00
DETAIL A12
SPECIAL CUT BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=8 Ft.
B= 5 Ft.
Type of Liner= Class 1 Rip-Rap (KEYED IN)
L FROM STA. 137+00 TO STA. 137+50
L FROM STA. 142+00 TO STA. 137+50
DETAIL A11
CHANNEL CHANGE
(Not to Scale)
Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
Type of Liner=CLASS I RR (KEYED-IN)
L FROM STA. 132+25 LT TO STA. 133+97
SITE #3 AND SITE #5 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
Revised August 2021
PERMIT DRAWING SHEET 10 OF 115
GRAPHIC SCALE
PLANS
PROJECT REFERENCE NO. I-5507
SHEET NO. 12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032689 ENGINEER DAVID B. GOURLEY
NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDRE' M. MULLINS
LOCATION: I-485 AT WESTINGHOUSE BLVD.
TIP NO.: I-5507
COUNTY: MECKLENBURG
DESIGNED BY: WSP
CHECKED BY: D. GOURLEY
DATE: 10/14/2021

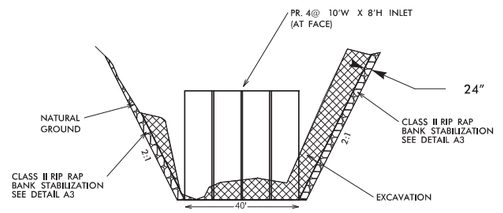


REVISIONS
DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)
GEOTEXTILE
Type of Liner = Class 2 TONS,CL See Plan Rip-Rap
Geotextile = See Plan sy
L STA. 131+25 LT
L STA. 132+00 LT
MATCH LINE SEE SHEET 12A
-Y1- STA. 23+60.00
INSET A
GRAPHIC SCALE
30" CSP W/ELBOWS
=550.0
=544.2
24" CMP
PDE
TEMPORARY SURFACE WATER IMPACT
TOP=535.8
INV=534.8
1266
RIPRAP AT EMBANKMENT
CLASS II
9 TONS 10 SY
SEE DETAIL A3
TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S
DENOTES IMPACTS IN SURFACE WATER
SITE #2A
INSET B
TEMPORARY SURFACE WATER IMPACT
SITE #5
SPECIAL CUT BASE DITCH
CLASS I RIPRAP
SEE DETAIL A12
TOP=564.1
INV=560.5
TOP=567.0
INV=561.5
48" RCP-III
TOP=582.0
INV=555.8
JB w/MH
S11
WOODS
NAD 83/2011
SCJ
S12
(Kings Branch)
SEE SHEET 12A
SITE #3
SITE #4
SITE #2
W4
WT
SNH
W3
SEE INSET B
S14
MATCH LINE SEE SHEET 11
-L- STA. 113+50.00
MATCH LINE SEE SHEET 13
-L- STA. 141+00.00
S13
(Sugar Creek)
SITE #2A
SEE INSET A
SITE #3 AND SITE #5 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DETAIL A10
INLET CHANNEL
(Not to Scale)
Type of Liner= Class II Rip-Rap (KEYED IN)
L STA. 132+00
DETAIL A11
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Proposed Fill Slope
Exist. Channel
Min. D= 8.0 Ft.
Max. d= 2.0 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
Type of Liner=CLASS I RR (KEYED-IN)
L FROM STA. 132+25 LT TO STA. 133+97
DETAIL A12
SPECIAL CUT BASE DITCH
(Not to Scale)
Natural Ground
Geotextile
Front Slope Ditch
Min. D=1.5 Ft.
Max. d=8 Ft.
B= 5 Ft.
Type of Liner= Class 1 Rip-Rap (KEYED IN)
L FROM STA. 137+00 TO STA. 137+50
L FROM STA. 142+00 TO STA. 137+50
Revised August 2021
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
PERMIT DRAWING
SHEET 11 OF 115
GRAPHIC SCALE
PLANS
PROJECT REFERENCE NO. I-5507
SHEET NO. 12
I-485 AT WESTINGHOUSE BLVD.
MECKLENBURG
WSP
D. GOURLEY
10/14/2021

8/17/99

REVISIONS

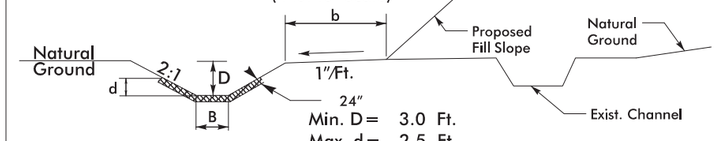
DETAIL A10
INLET CHANNEL
(Not to Scale)



Type of Liner = Class II Rip–Rap (KEYED IN)

SITE #3 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

DETAIL A11
CHANNEL CHANGE
(Not to Scale)



Min. D = 3.0 Ft.
Max. d = 2.5 Ft.
B = 5.0 Ft.
b = 5.0 Ft.

Type of Liner = CLASS I RR (KEYED–IN)

L FROM STA. 132 + 25 LT TO STA. 133 + 97

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

L STA. 132 + 00

SITE #2

SITE #3

S12
(Kings Branch)

SITE #4

OLD NATIONS FORD ROAD
22.6' BST

EXISTING R/W

WOODS

TEMPORARY SURFACE WATER IMPACT

CLASS 2 RIPRAP BANK STABILIZATION
115 TONS
SEE DETAILS A10

CLASS 2 BANK STABILIZATION
31 TONS
SEE DETAILS A10

CLASS 1 RIPRAP SLOPE PROTECTION TO ELEVATION 543.00
390 TONS 545 SY

CHANNEL CHANGE
SEE DETAIL A11

RETAIN

W4

WT

CLASS B RIP RAP
5 TONS 14 SY

HW

1269
TOP = 544.4
INV = 539.4

1269A

30" CSP WELDOWS

EXTEND 4@10'x8' RCBC
1269B

REMOVE HW

SNH

W3
NEW SANITARY SEWER LINE

TOP = 590.4
INV = 583.7

TOP = 590.3
INV = 584.1
1281
2GI

TOP = 590.2
INV = 584.4
1283
2GI

2GI
1281A

TOP = 589.4
INV = 581.1
2GI
1268

TOP = 590.3
INV = 580.1
1293

2GI

24" RCP–III

15" CMP

REMOVE

30" WELDED STEEL

TRENCHLESS INSTALLATION

REMOVE

130+00

135+00

NOTE: CH ENGINEERING DOES NOT WARRANT ACCURACY OF REC
SUE RECEIVER READ DEPTH OF 13" TO 35" +/-

30" EXPRESSWAY CURB

30" C&G

TOP = 590.3

TOP = 591.2
INV = 587.0

TOP = 591.2
INV = 587.0

589.8

Revised August 2021

PERMIT DRAWING
SHEET 12 OF 115

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 0 50
GRAPHIC SCALE

8/31/2021
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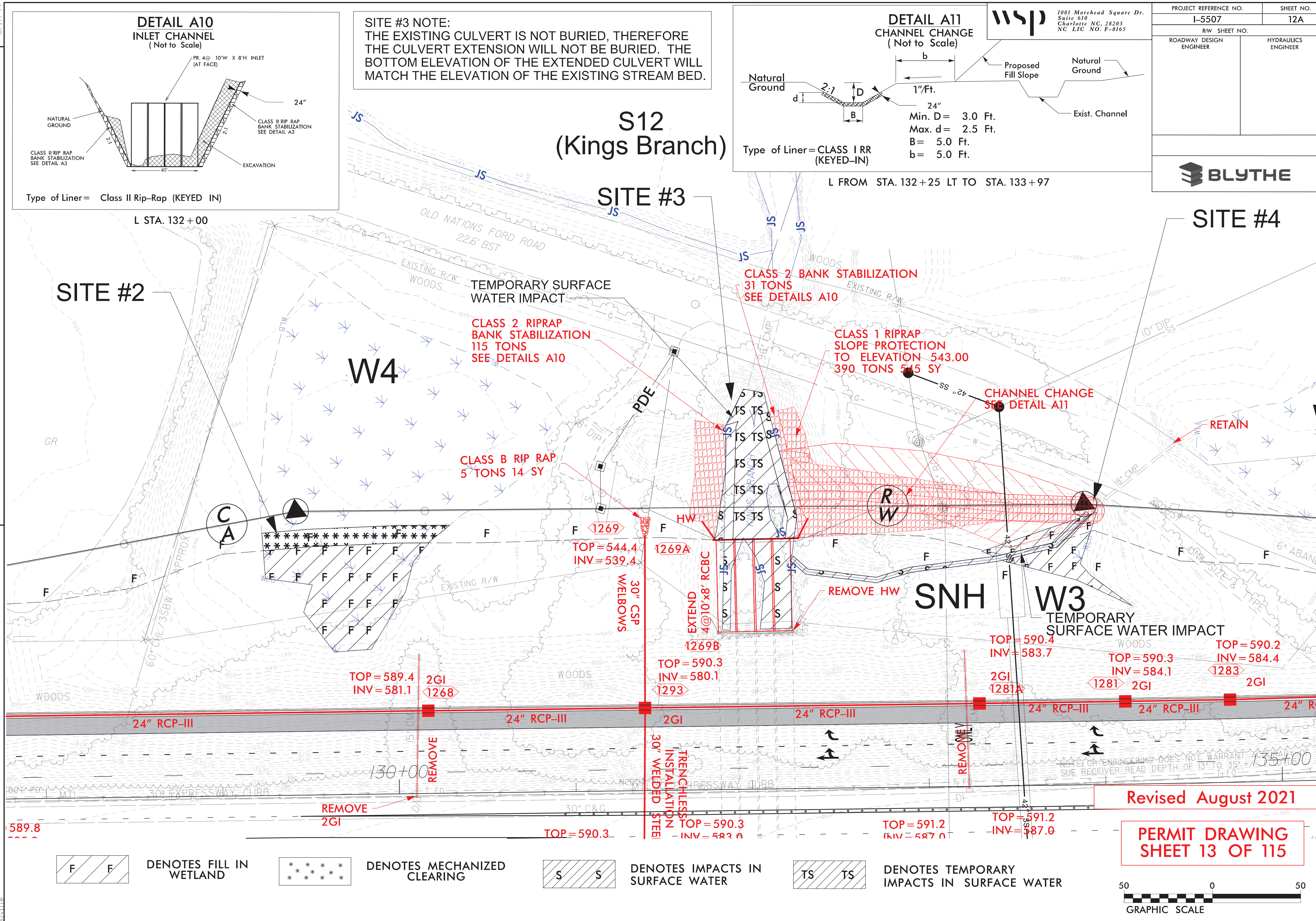
Melville


DETAIL A10
INLET CHANNEL
(Not to Scale)
PR. 4@ 10'W X 8'H INLET (AT FACE)
24"
NATURAL GROUND
CLASS II RIP RAP BANK STABILIZATION SEE DETAIL A3
CLASS II RIP RAP BANK STABILIZATION SEE DETAIL A3
EXCAVATION
40'
Type of Liner= Class II Rip-Rap (KEYED IN)
L STA. 132+00
SITE #3 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
S12
(Kings Branch)
DETAIL A11
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Proposed Fill Slope
Natural Ground
1"/Ft.
24"
Exist. Channel
Min. D= 3.0 Ft.
Max. d= 2.5 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
Type of Liner=CLASS I RR (KEYED-IN)
L FROM STA. 132+25 LT TO STA. 133+97
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
PROJECT REFERENCE NO.
I-5507
SHEET NO.
12A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
BLYTHE
REVISIONS
SITE #3
SITE #4
SITE #2
OLD NATIONS FORD ROAD
22.6' BST
EXISTING R/W
WOODS
TEMPORARY SURFACE WATER IMPACT
CLASS 2 BANK STABILIZATION
31 TONS
SEE DETAILS A10
CLASS 2 RIPRAP
BANK STABILIZATION
115 TONS
SEE DETAILS A10
CLASS 1 RIPRAP
SLOPE PROTECTION
TO ELEVATION 543.00
390 TONS 545 SY
CHANNEL CHANGE
SEE DETAIL A11
RETAIN
W4
PDE
CLASS B RIP RAP
5 TONS 14 SY
HW
1269
TOP=544.4
INV=539.4
1269A
30" CSP WELBOWS
EXTEND 4@10'x8' RCBC
1269B
REMOVE HW
SNH
W3
TEMPORARY SURFACE WATER IMPACT
TOP=590.4
INV=583.7
TOP=590.3
INV=584.1
1281
2GI
TOP=590.2
INV=584.4
1283
2GI
2GI
1281A
TOP=590.3
INV=580.1
1293
TOP=589.4
INV=581.1
2GI
1268
24" RCP-III
24" RCP-III
2GI
24" RCP-III
24" RCP-III
24" RCP-III
REMOVE
130+00
135+00
REMOVE
2GI
TRENCHLESS INSTALLATION
30" WELDED STEEL
TOP=590.3
TOP=590.3
TOP=591.2
TOP=591.2
INV=587.0
589.8
EXPRESSWAY CURB
Revised August 2021
PERMIT DRAWING
SHEET 13 OF 115
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
50
0
50
GRAPHIC SCALE
8/31/2021

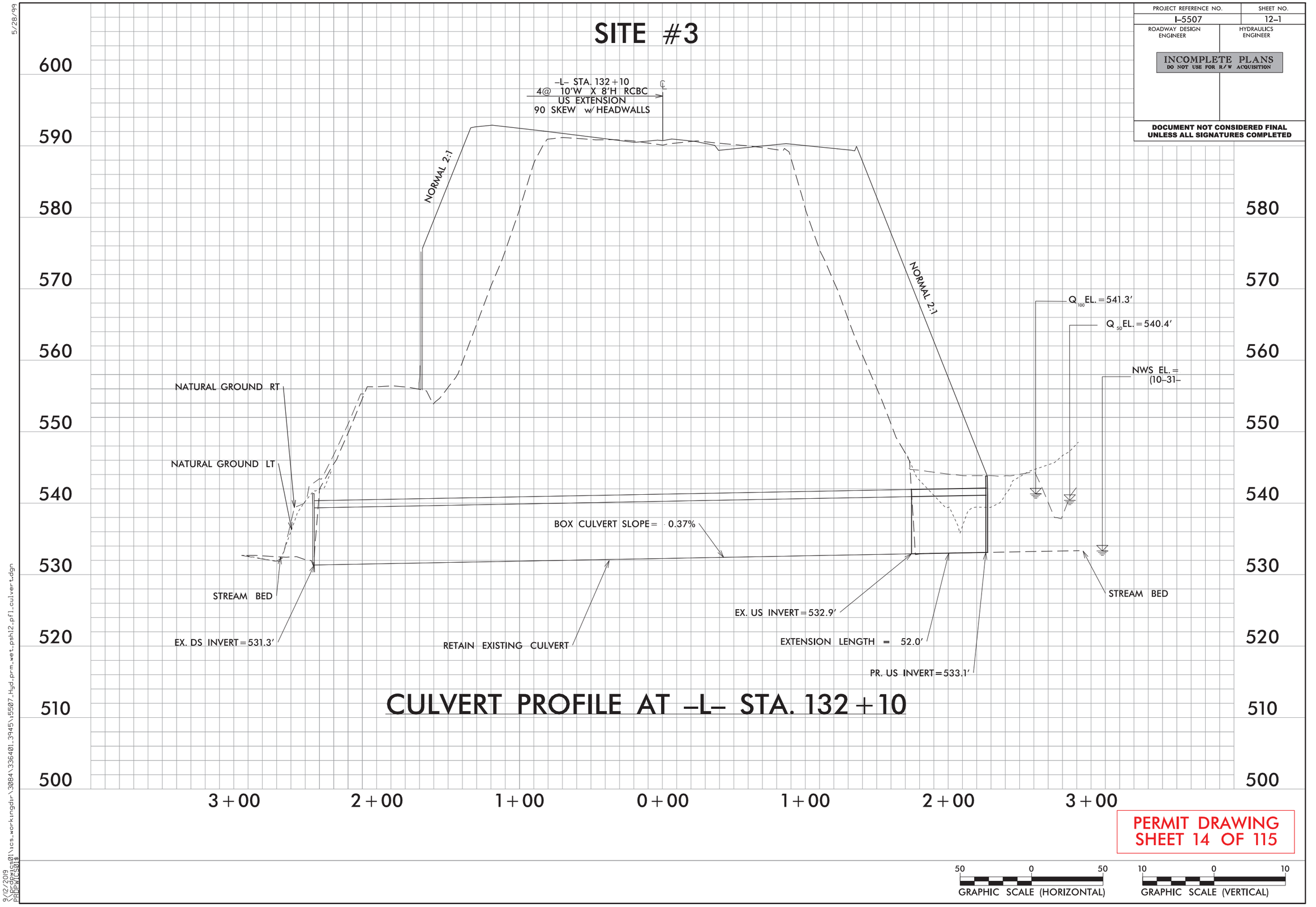
5/28/99

SITE #3

PROJECT REFERENCE NO.	SHEET NO.
I–5507	12–1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



CULVERT PROFILE AT –L– STA. 132+10

PERMIT DRAWING
SHEET 14 OF 115

50 0 50
GRAPHIC SCALE (HORIZONTAL)

10 0 10
GRAPHIC SCALE (VERTICAL)

9/12/2019
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PROWICS01$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
I-5507	12-2

0 5 10

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

600 590 580 570 560 550 540 530

WETLAND (W3)
SITE #4

545.08

1.5:1

590.26

0.020

–L2 WEST–
133+98.82
591.520054

0.011

0.017

–Y1–DCWB–
26+16.44
592.506608

0.040

591.32

134+00.00

WETLAND (W4)
SITE #2

543.42

2:1

589.18

0.020

–L2 WEST–
130+00.98
590.445019

0.020

0.020

–Y1–DCWB–
30+16.01
588.568963

588.52

Revised July 2020

PERMIT DRAWING
SHEET 15 OF 115

130+00.00

20 0 20
GRAPHIC SCALE

7/22/2020
C:\projects02\ics_workingdir\9684\336401.5020\15507_hyd_prm_wet_psh12_XS.dgn
PRDFWICS02$

PROJECT REFERENCE NO.	SHEET NO.
I–5507	13
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032689 DAVID B. GOURLEY

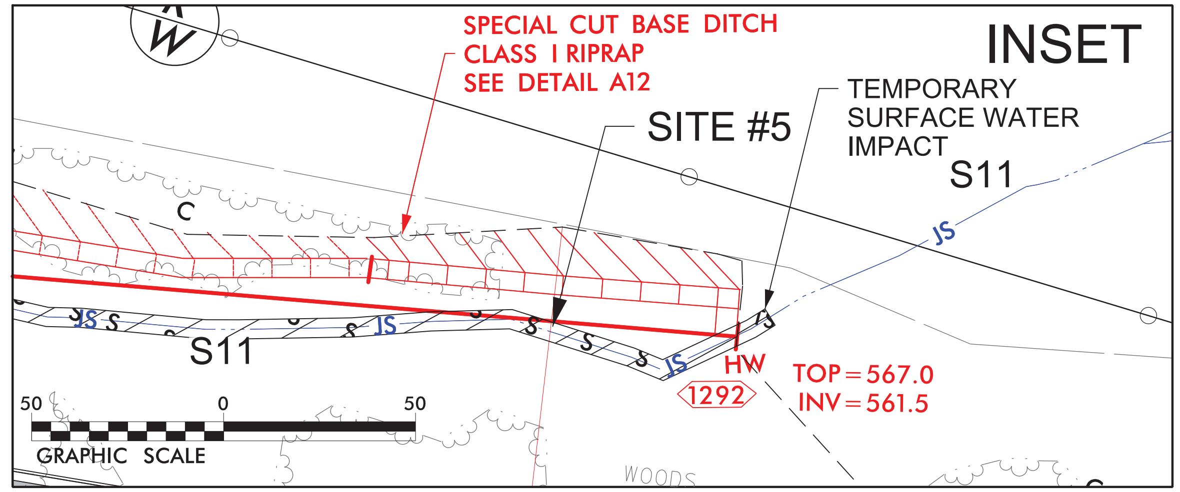
HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041267 ANDRE' M. MULLINS

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

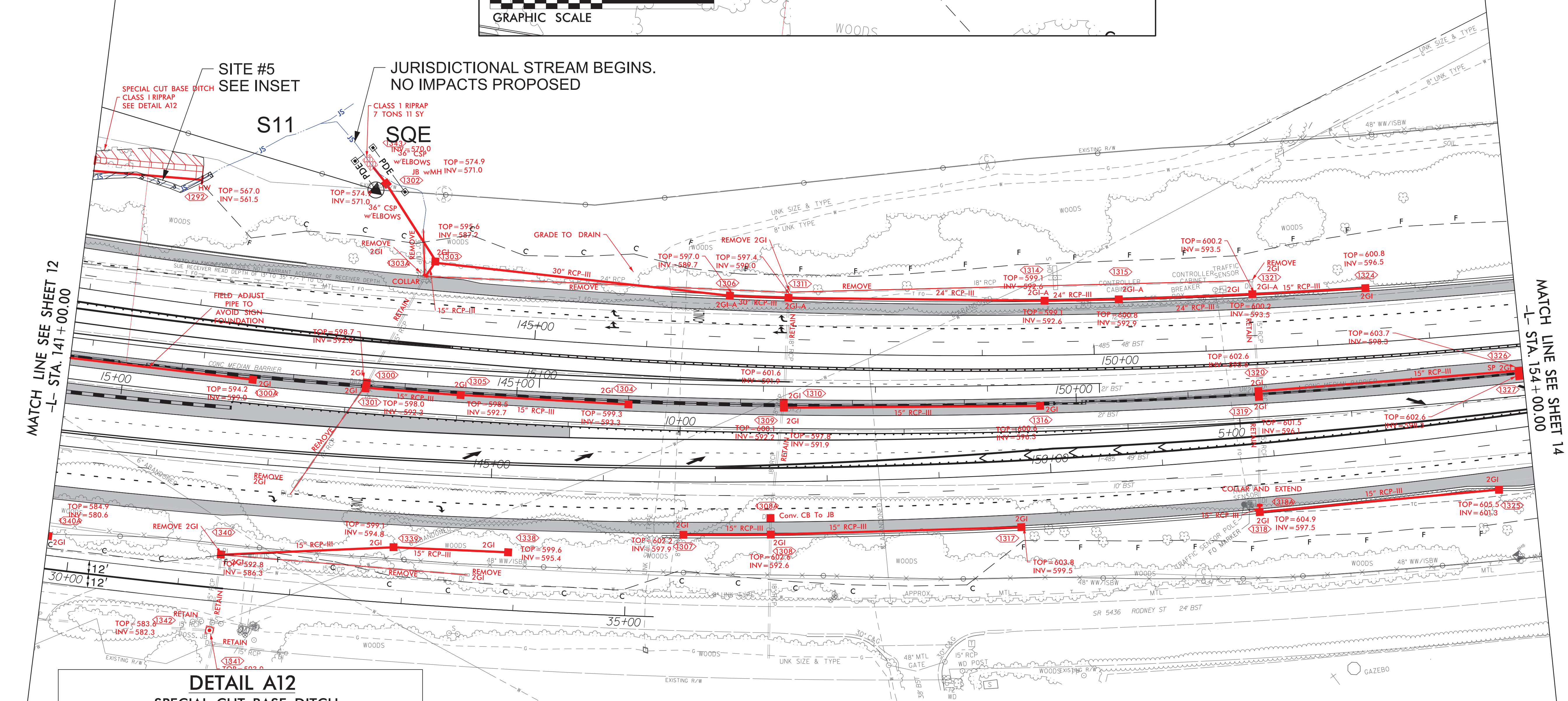
BLYTHE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



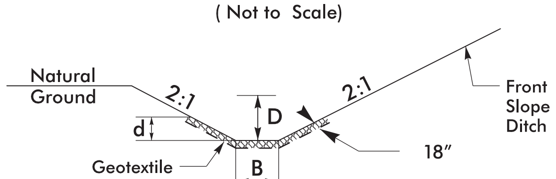
NAD 83/2011



DETAIL A12

SPECIAL CUT BASE DITCH

(Not to Scale)



Min. D = 1.5 Ft.
Max. d = 8 Ft.
B = 5 Ft.

Type of Liner = Class 1 Rip–Rap (KEYED IN)

L FROM STA. 137+00 TO STA. 137+50
L FROM STA. 142+00 TO STA. 137+50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2020

PERMIT DRAWING SHEET 16 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

7/22/2020
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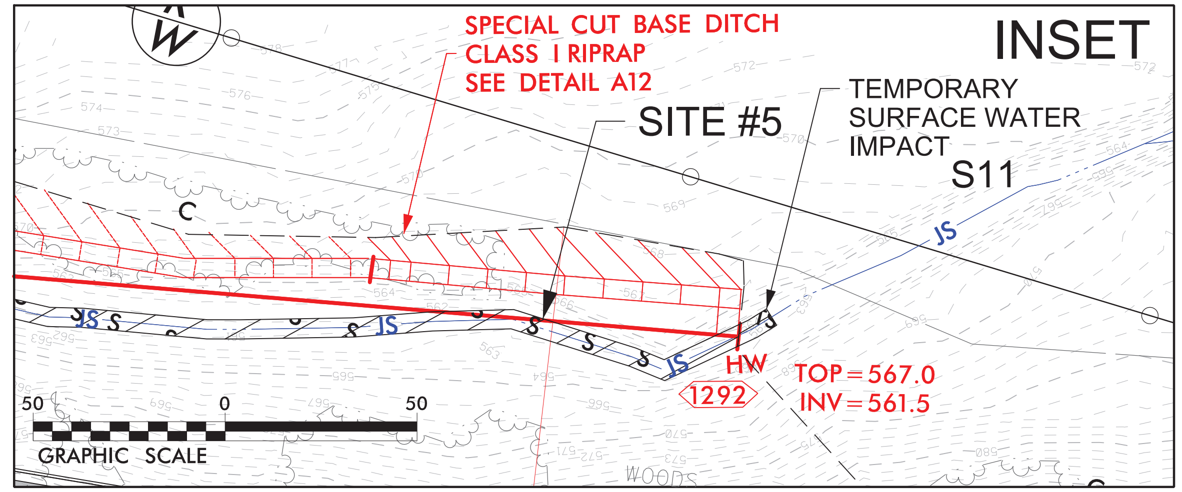
PRDPWICS02$

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

INSET



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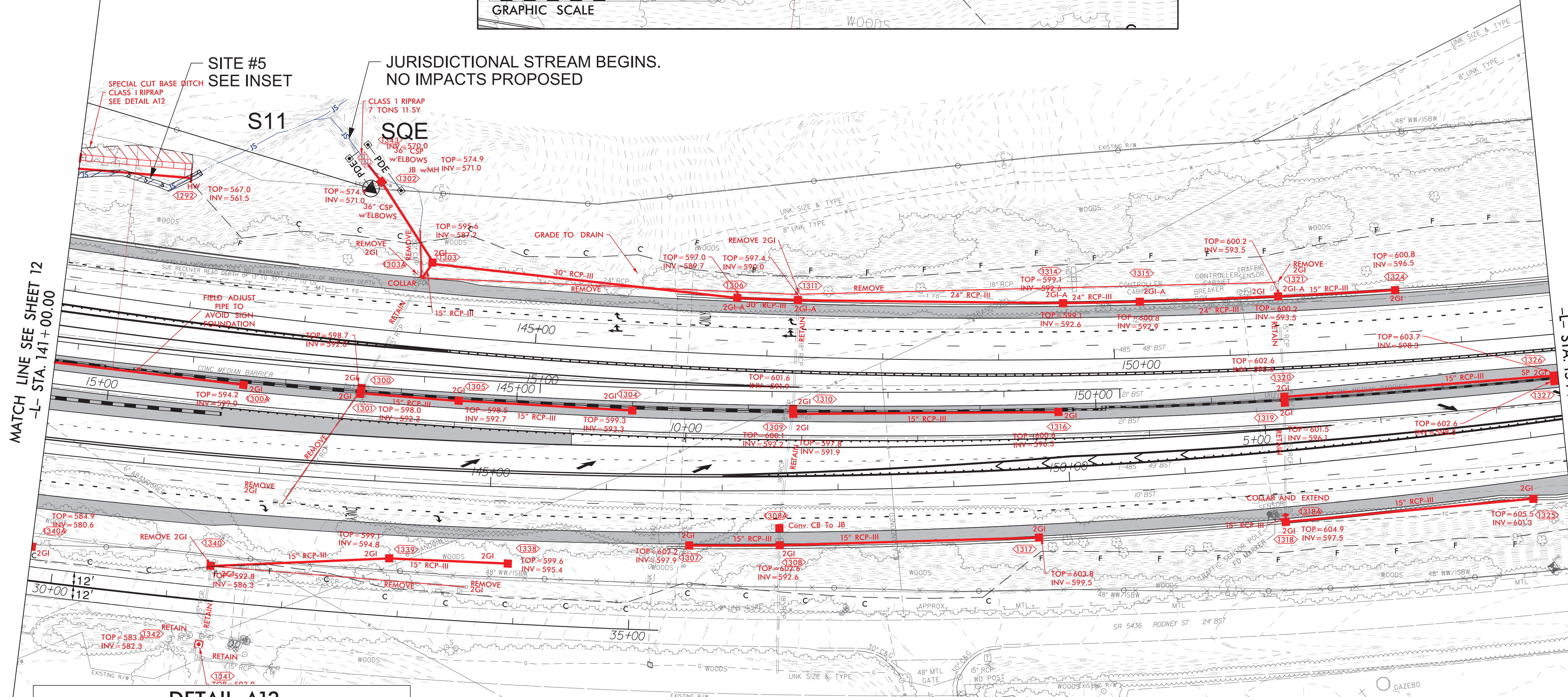
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032689 ENGINEER DAVID B. GOURLEY	NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDRE M. MULLINS

BLYTHE

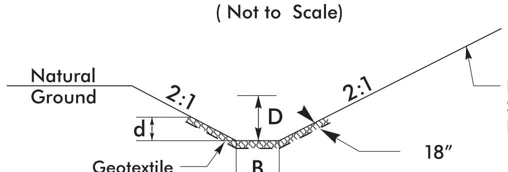
NAD 83/2011



DETAIL A12

SPECIAL CUT BASE DITCH

(Not to Scale)



Min. D = 1.5 Ft.
Max. d = 8 Ft.
B = 5 Ft.

Type of Liner = Class 1 Rip-Rap (KEYED IN)

L FROM STA. 137+00 TO STA. 137+50
L FROM STA. 142+00 TO STA. 137+50

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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PERMIT DRAWING
SHEET 17 OF 115

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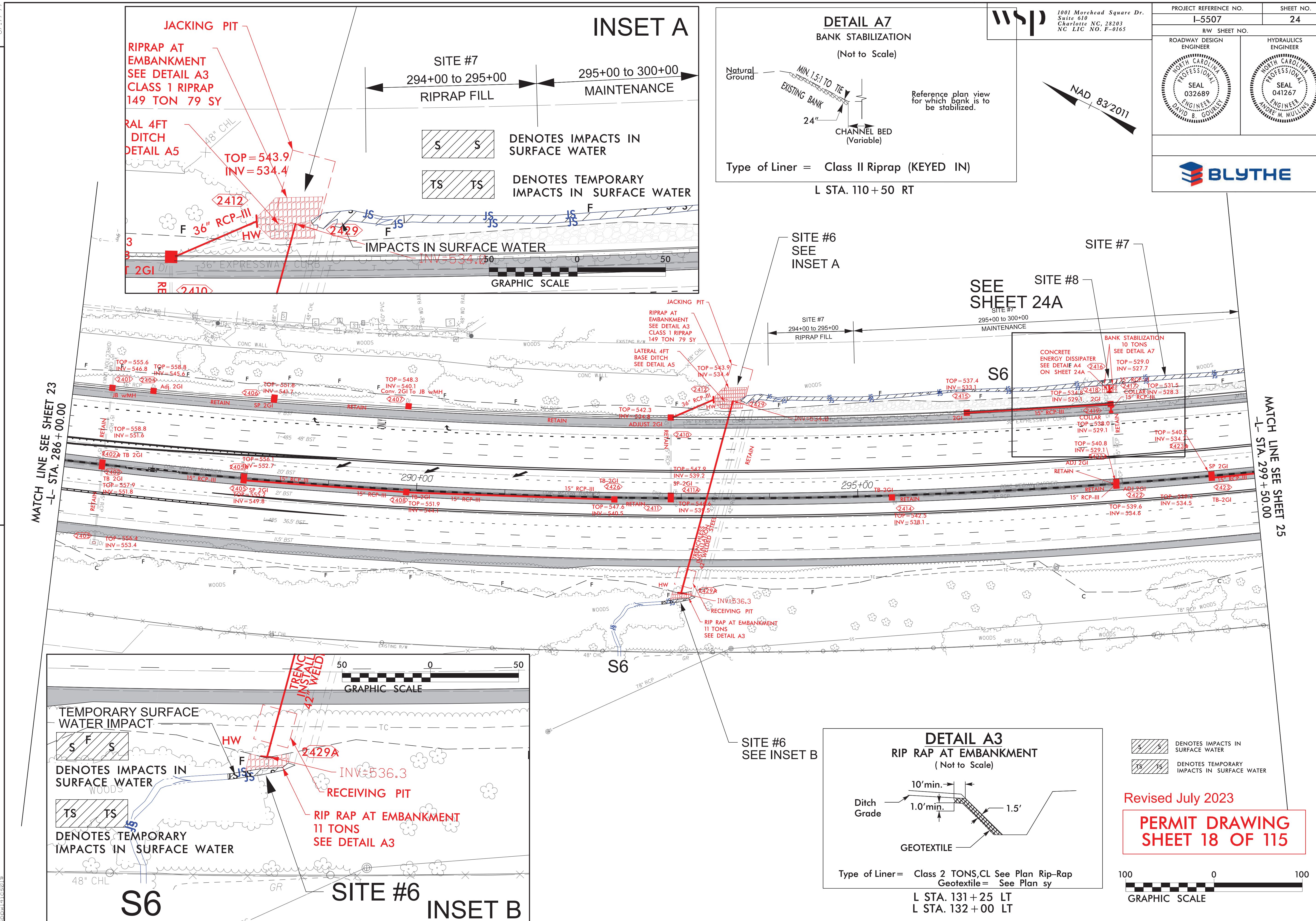
GRAPHIC SCALE

REVISIONS

8/17/99


PROJECT REFERENCE NO. I-5507
SHEET NO. 24
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032689 DAVID B. GOURLEY
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 041267 ANDRE M. MULLINS
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
INSET A
JACKING PIT
RIPRAP AT EMBANKMENT SEE DETAIL A3 CLASS 1 RIPRAP 149 TON 79 SY
LATERAL 4FT BASE DITCH SEE DETAIL A5
TOP=543.9 INV=534.4
36" RCP-III
HW
2412
2429
2410
IMPACTS IN SURFACE WATER
SITE #7
294+00 to 295+00 RIPRAP FILL
295+00 to 300+00 MAINTENANCE
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE 50 0 50
DETAIL A7
BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN 1.5:1 TO TIE
EXISTING BANK
24"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = Class II Riprap (KEYED IN)
L STA. 110+50 RT
SITE #6 SEE INSET A
SITE #7
SITE #8
SEE SHEET 24A
S6
BANK STABILIZATION 10 TONS SEE DETAIL A7
CONCRETE ENERGY DISSIPATER SEE DETAIL A4 ON SHEET 24A
MATCH LINE SEE SHEET 23 -L- STA. 286+00.00
MATCH LINE SEE SHEET 25 -L- STA. 299+50.00
290+00
295+00
RECEIVING PIT
RIP RAP AT EMBANKMENT 11 TONS SEE DETAIL A3
INV=536.3
2429A
SITE #6 SEE INSET B
INSET B
SITE #6
TEMPORARY SURFACE WATER IMPACT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TRENCHLESS INSTALL 42" WELDED STEEL
GRAPHIC SCALE 50 0 50
DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
1.5'
Ditch Grade
GEOTEXTILE
Type of Liner = Class 2 TONS,CL See Plan Rip-Rap Geotextile = See Plan sy
L STA. 131+25 LT
L STA. 132+00 LT
Revised July 2023
PERMIT DRAWING SHEET 18 OF 115
GRAPHIC SCALE 100 0 100
REVISIONS
8/17/99

8/17/99

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
I-5507	24
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032689 ENGINEER DAVID B. GOURLEY

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDREW M. MULLINS

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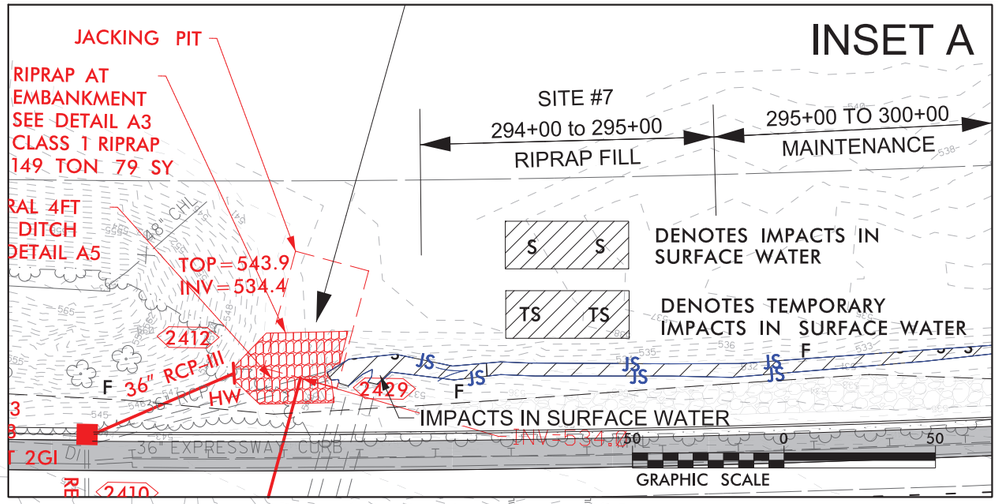
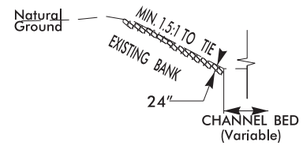
NAD 83/2011

INSET A



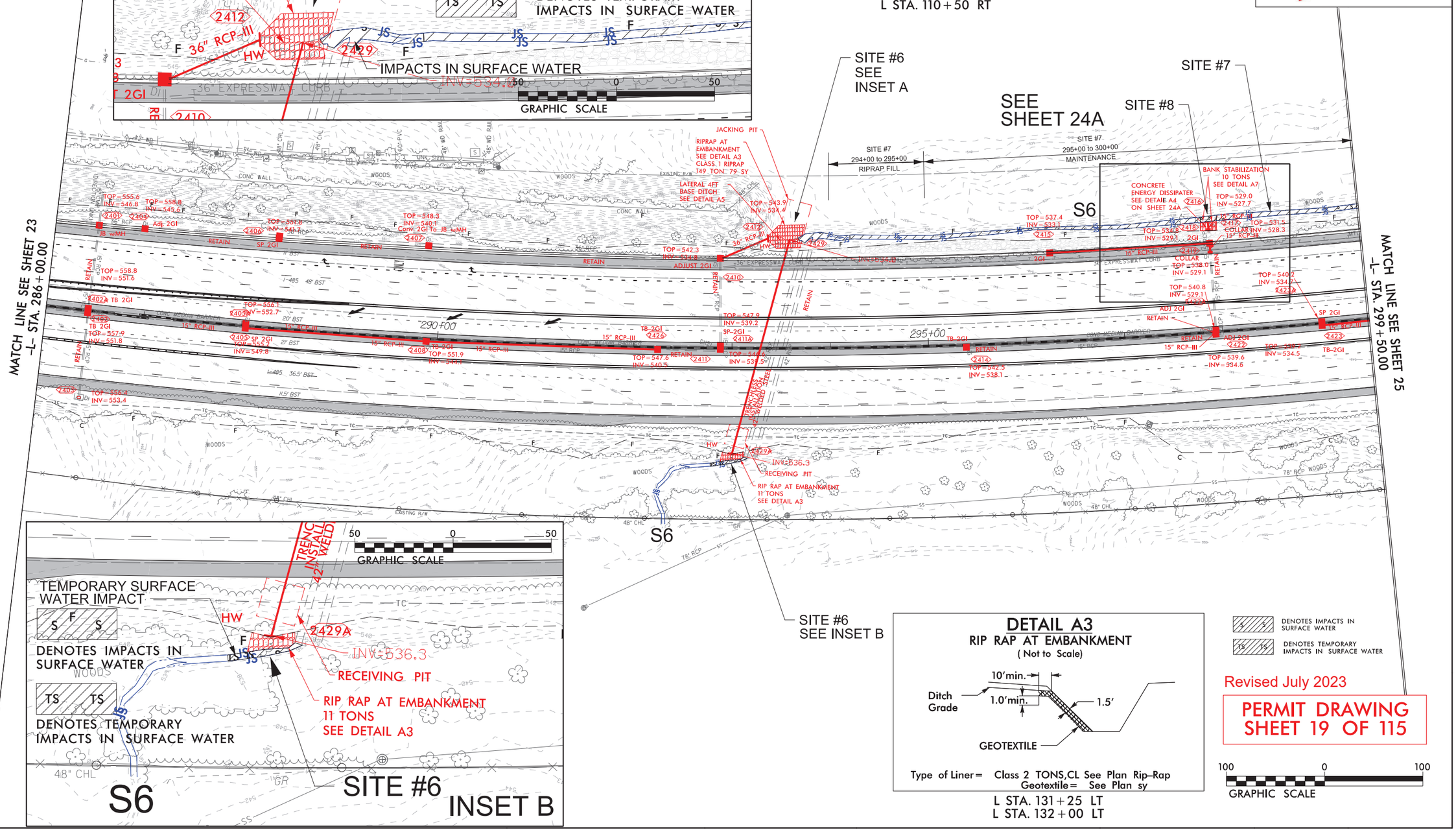
DETAIL A7
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

L STA. 110+50 RT



INSET B

DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class 2 TONS,CL See Plan Rip-Rap
Geotextile= See Plan sy

L STA. 131+25 LT
L STA. 132+00 LT

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

Revised July 2023

PERMIT DRAWING SHEET 19 OF 115

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GRAPHIC SCALE

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PROJECT REFERENCE NO.	SHEET NO.
I-5507	24A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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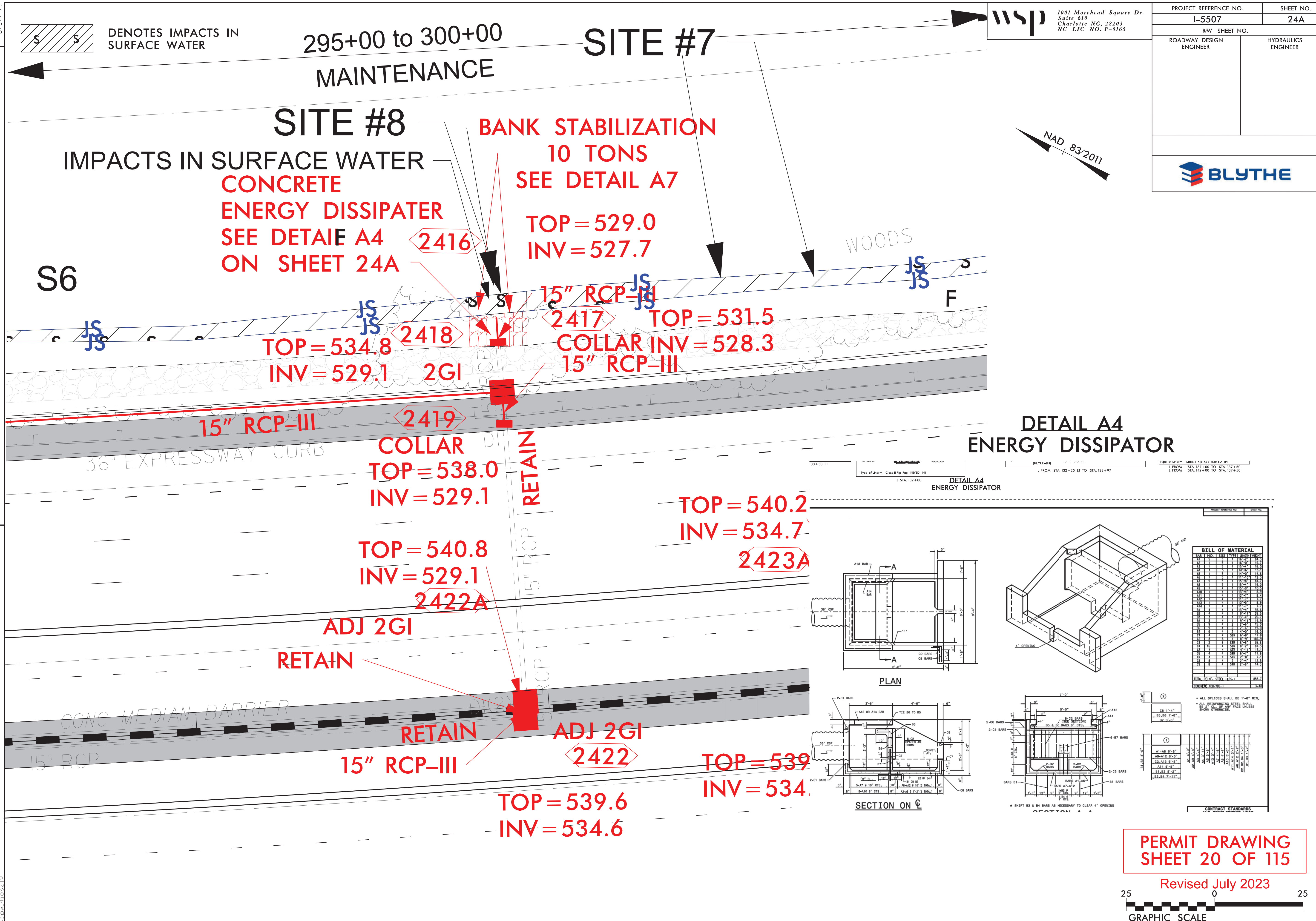
BLYTHE



DENOTES IMPACTS IN SURFACE WATER
295+00 to 300+00
MAINTENANCE
SITE #7
SITE #8
IMPACTS IN SURFACE WATER
CONCRETE ENERGY DISSIPATER SEE DETAIL A4 ON SHEET 24A
BANK STABILIZATION 10 TONS SEE DETAIL A7
2416
TOP = 529.0
INV = 527.7
NAD 83/2011
WOODS
S6
JS
F
15" RCP-III
2417
2418
TOP = 531.5
TOP = 534.8
COLLAR INV = 528.3
INV = 529.1
2GI
15" RCP-III
2419
15" RCP-III
COLLAR
36" EXPRESSWAY CURB
TOP = 538.0
INV = 529.1
RETAIN
DETAIL A4
ENERGY DISSIPATOR
TOP = 540.2
INV = 534.7
2423A
TOP = 540.8
INV = 529.1
2422A
ADJ 2GI
RETAIN
CONC MEDIAN BARRIER
RETAIN
ADJ 2GI
2422
15" RCP-III
TOP = 539
INV = 534
TOP = 539.6
INV = 534.6
PLAN
SECTION ON ℄
BILL OF MATERIAL
REVISIONS

PERMIT DRAWING
SHEET 20 OF 115

Revised July 2023

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GRAPHIC SCALE

8/17/99

REVISIONS

DENOTES IMPACTS IN SURFACE WATER

295+00 to 300+00

MAINTENANCE

SITE #7

SITE #8

IMPACTS IN SURFACE WATER

CONCRETE ENERGY DISSIPATER SEE DETAIE A4 ON SHEET 24A

2416

BANK STABILIZATION 10 TONS SEE DETAIL A7

TOP = 529.0
INV = 527.7

S6

WOODS

15" RCP–III

2417

TOP = 531.5
COLLAR INV = 528.3
15" RCP–III

TOP = 534.8
INV = 529.1 2GI

2418

15" RCP–III

2419

COLLAR
TOP = 538.0
INV = 529.1

36" EXPRESSWAY CURB

RETAIN

TOP = 540.2
INV = 534.7

2423A

TOP = 540.8
INV = 529.1

2422A

ADJ 2GI

RETAIN

CONC MEDIAN BARRIER

15" RCP

RETAIN

ADJ 2GI

2422

15" RCP–III

TOP = 539.6

TOP = 539
INV = 534

NAD 83/2011

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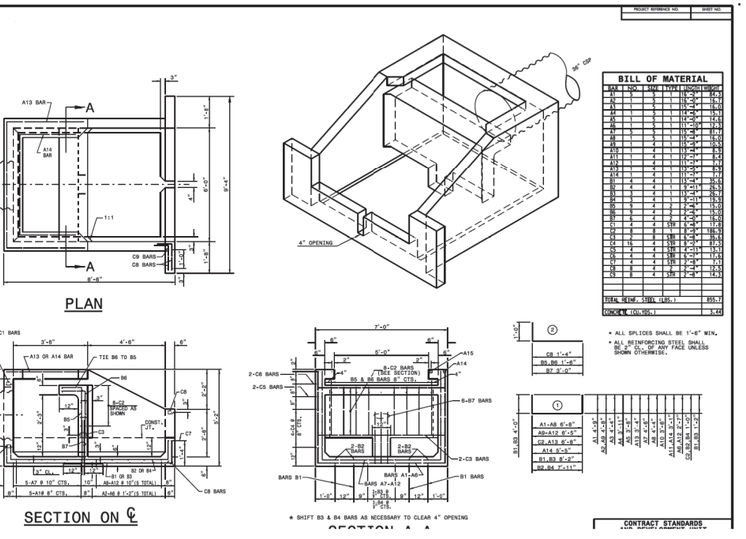
PROJECT REFERENCE NO.	SHEET NO.
I–5507	24A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

DETAIL A4
ENERGY DISSIPATOR



PERMIT DRAWING
SHEET 21 OF 115

Revised July 2023

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GRAPHIC SCALE

8/9/2023
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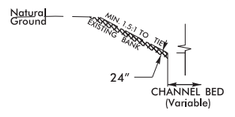
8/17/99

REVISIONS

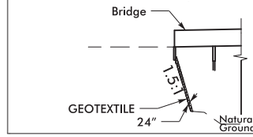
DETAIL B16
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

DETAIL B17
ABUTMENT STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

NOTE: SEE PROFILE SHEET 25-1 FOR WSE.

wsp
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Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	25
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032689 ENGINEER DAVID B. GOURLEY

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDREW M. MULLINS

BLYTHE

NAD 83/2011

S4
(McMullen Creek)

SITE #10 NOTE:
THE STREAM SHOULD NOT BE BLOCKED MORE THAN 50% AT ANY GIVEN TIME.

SEE SHEET 24A FOR DETAIL A4, CONCRETE ENERGY DISSIPATOR

TEMPORARY WORK BRIDGE (30')

SITE #7
SITE #7 295+00 to 300+00 MAINTENANCE
SITE #7 300+00 TO 302+00 STREAMBANK STABILIZATION
SITE #9A
SITE #9B
SITE #10

S6
W2b
W2a
S5
W1

MATCH LINE SEE SHEET 24 -L- STA. 299+50.00

MATCH LINE SEE SHEET 26 -L- STA. 313+00.00

GRADE AREA DOWN TO ELEVATION 523.0. GTD AND MAINTAIN EXISTING DRAINAGE PATTERN.

ABUTMENT STABILIZATION SEE DETAIL B17 87 TON 88 SY

BANK STABILIZATION SEE DETAIL B16 56 TON

CLASS II RIP RAP 51 TONS 41 SY

CL B RIP RAP 2 TONS 7 SY

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 22 OF 115

Revised July 2023

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GRAPHIC SCALE

8/9/2023
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wspx14cs02

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1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	25
RW SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 032689 ENGINEER DAVID B. GOURLEY

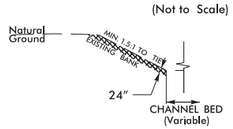
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDREW M. MULLINS

BLYTHE

8/17/99

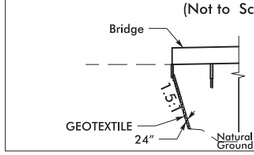
REVISIONS

DETAIL B16
BANK STABILIZATION
(Not to Scale)



Type of Liner = Class II Riprap (KEYED IN)

DETAIL B17
ABUTMENT STABILIZATION
(Not to Scale)



Type of Liner = Class II Riprap (KEYED IN)

NOTE: SEE PROFILE SHEET 25-1 FOR WSE.

NAD 83/2011

SITE #10 NOTE:
THE STREAM SHOULD NOT BE BLOCKED MORE THAN 50% AT ANY GIVEN TIME.

MATCH LINE SEE SHEET 24 –L– STA. 299+50.00

MATCH LINE SEE SHEET 26 –L– STA. 313+00.00

S6 | SITE #7 | SITE #7 295+00 to 300+00 MAINTENANCE | SITE #7 300+00 TO 302+00 STREAMBANK STABILIZATION | SEE SHEET 24A FOR DETAIL A4, CONCRETE ENERGY DISSIPATOR | W2b | SITE #9A | SITE #9B | W2a | TEMPORARY WORK BRIDGE (30') | S4 (McMullen Creek) | S5 | SITE #10

GRADE AREA DOWN TO ELEVATION 523.0. GTD, AND MAINTAIN EXISTING DRAINAGE PATTERN.

ABUTMENT STABILIZATION SEE DETAIL B17 87 TON 88 SY

BANK STABILIZATION SEE DETAIL B16 56 TON

BANK STABILIZATION SEE DETAIL B16 56 TON

CLASS II RIP RAP 51 TONS 41 SY

CL B RIP RAP 2 TONS 7 SY

W1

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

PERMIT DRAWING
SHEET 23 OF 115

Revised July 2023

100 0 100
GRAPHIC SCALE

8/9/2023
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wspw14cs02

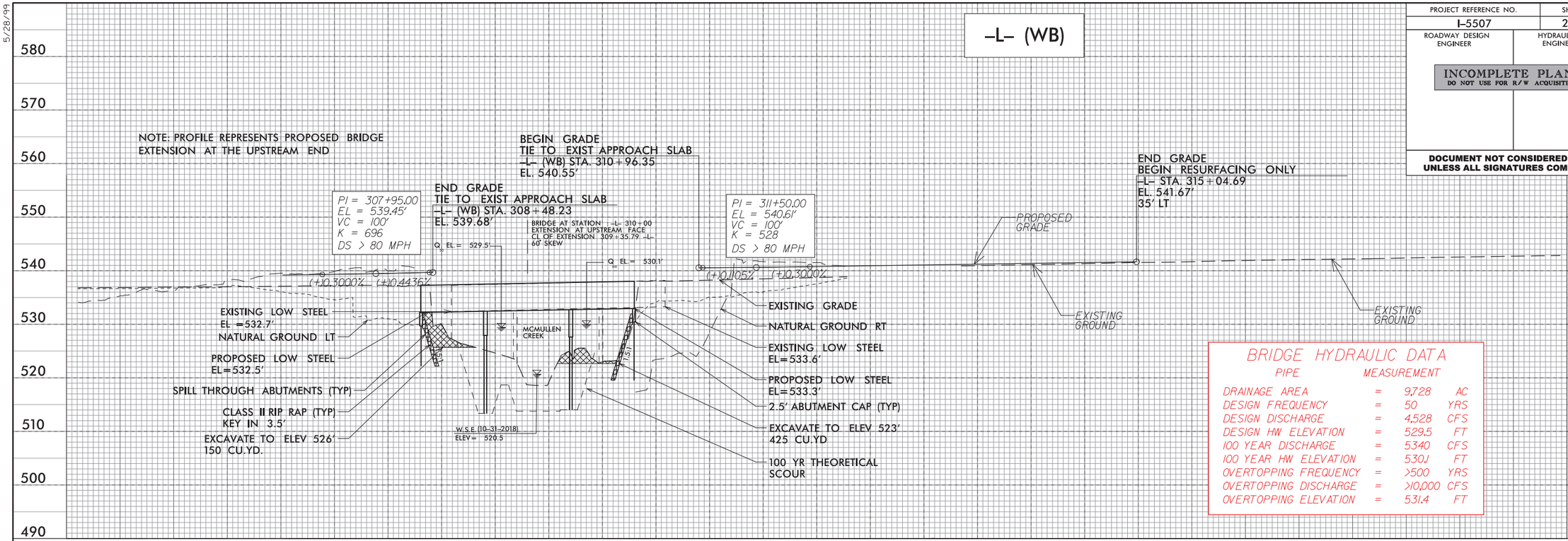
5/28/99

–L– (WB)

PROJECT REFERENCE NO.	SHEET NO.
I–5507	25–1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



BRIDGE HYDRAULIC DATA

PIPE		MEASUREMENT	
DRAINAGE AREA	=	9.728	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	4,528	CFS
DESIGN HW ELEVATION	=	529.5	FT
100 YEAR DISCHARGE	=	5340	CFS
100 YEAR HW ELEVATION	=	530.1	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	>10,000	CFS
OVERTOPPING ELEVATION	=	531.4	FT

PERMIT DRAWING
SHEET 24 OF 115

100 0 100
GRAPHIC SCALE (HORIZONTAL)

20 0 20
GRAPHIC SCALE (VERTICAL)

9/12/2019
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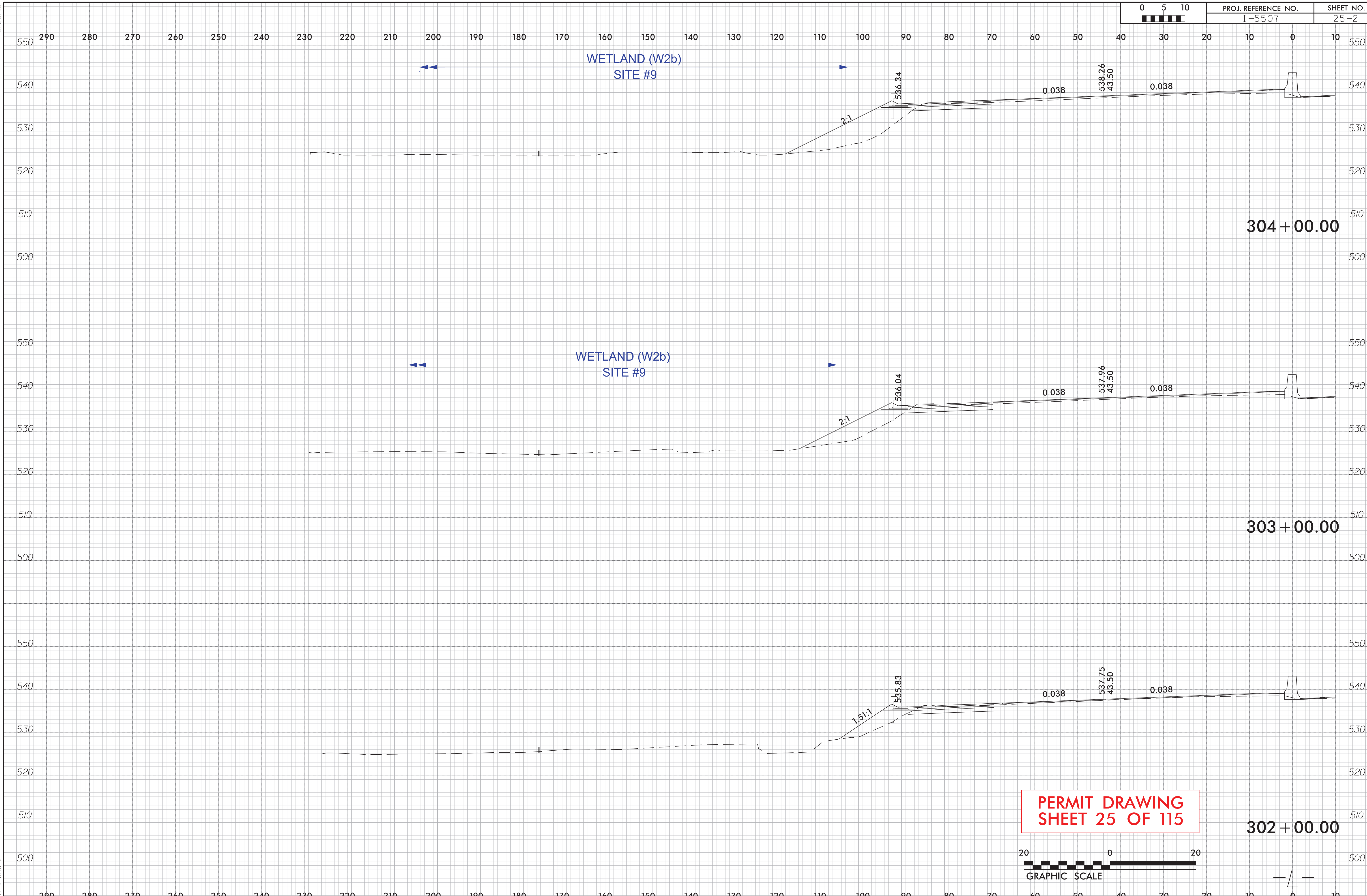
PRPWICS01$

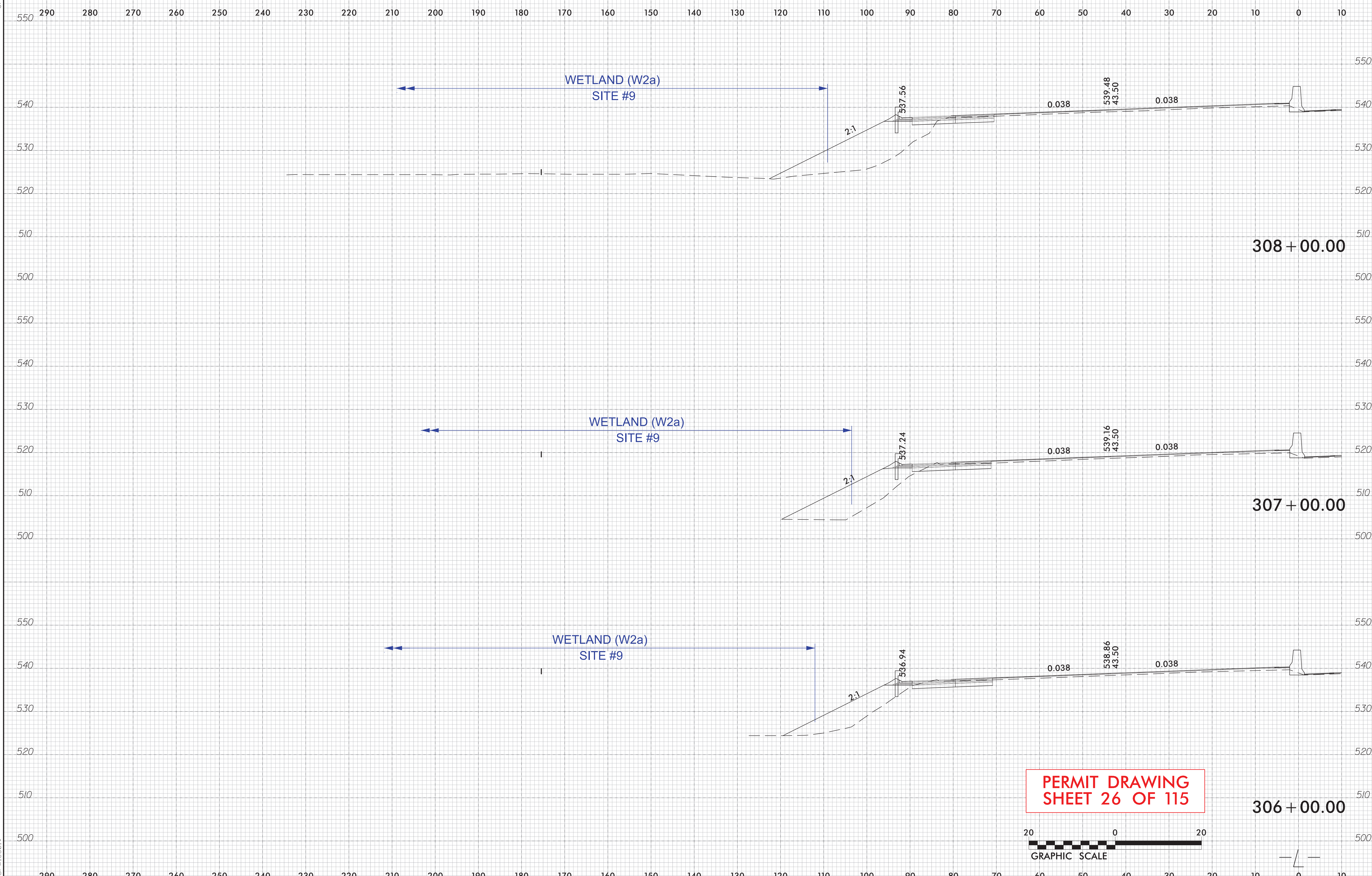


6/23/16

9/12/2019
PDFW\CS01$

6/23/16

PROJ. REFERENCE NO.	SHEET NO.
I-5507	25-3



PERMIT DRAWING
SHEET 26 OF 115

9/12/2019

8/17/99

REVISIONS

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

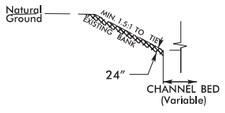
PROJECT REFERENCE NO.	SHEET NO.
I–5507	28
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 043225 ENGINEER JEAN R. MELVILLE

HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDREW M. MULLINS

BLYTHE

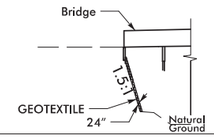
DETAIL B16
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

DETAIL B17
ABUTMENT STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

NOTE: SEE PROFILE SHEET 28-1 FOR WSE.

NAD 83/2011

SITE #11 NOTE:
THE STREAM SHOULD NOT BE BLOCKED MORE THAN 50% AT ANY GIVEN TIME.

SITE #11

TEMPORARY WORK BRIDGE (30')

S3
(McAlpine Creek)

MATCH LINE SEE SHEET 27 -L- STA. 340+00.00

MATCH LINE SEE SHEET 29 -L- STA. 354+00.00

TOE PROTECTION SEE DETAIL B1

LINE W/CL I RIPRAP 71 TON 64 SY

ABUTMENT STABILIZATION SEE DETAIL B17 187 TON

BANK STABILIZATION SEE DETAIL B16 51 TON

BANK STABILIZATION SEE DETAIL B16 54 TON

ABUTMENT STABILIZATION SEE DETAIL B17 200 TON

LATERAL V DITCH SEE DETAIL 177 TON 748 SY SEE DETAIL B26

PLUG AND FILL

SPECIAL CUT DITCH SEE DETAIL B7

BANK STABILIZATION SEE DETAIL B16 120 TON

ABUTMENT STABILIZATION SEE DETAIL B17 448 TON

LAY BACK BANK AT 1.5:1 SLOPE MIN. CL II RIPRAP

ABUTMENT STABILIZATION SEE DETAIL B17 434 TON

CL B RIPRAP 1 TON 5 SY

TEMPORARY WORK BRIDGE (30')

BANK STABILIZATION SEE DETAIL B16 23 TON

WY

PDE

SITE #11

SITE #12

WX

WD(2)

POND

BIRD HOUSE (BLUEBIRD)

PUMP HOUSE

Duke Energy Progress capacity unknown

RETAIN 18" HDPE

RETAIN 30" HDPE

TOE PROTECTION SEE DETAIL B1

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised August 2021

PERMIT DRAWING SHEET 27 OF 115

100 0 100
GRAPHIC SCALE

8/31/2021
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melville

8/17/99

REVISIONS

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	28
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

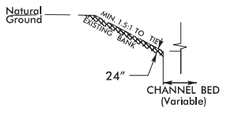
NORTH CAROLINA PROFESSIONAL SEAL 043225 ENGINEER JEAN R. MELVILLE

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 041267 ENGINEER ANDREW M. MULLINS

BLYTHE

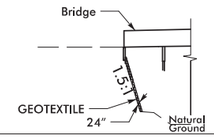
DETAIL B16
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

DETAIL B17
ABUTMENT STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (KEYED IN)

NOTE: SEE PROFILE SHEET 28-1 FOR WSE.

NAD 83/2011

SITE #11 NOTE:
THE STREAM SHOULD NOT BE BLOCKED MORE THAN 50% AT ANY GIVEN TIME.

SITE #11

TEMPORARY WORK BRIDGE (30')

S3
(McAlpine Creek)

MATCH LINE SEE SHEET 27 -L- STA. 340+00.00

MATCH LINE SEE SHEET 29 -L- STA. 354+00.00

TEMPORARY WORK BRIDGE (30')

SITE #11

SITE #12

WD(2)

WY

WX

Revised August 2021

PERMIT DRAWING SHEET 28 OF 115

100 0 100
GRAPHIC SCALE

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

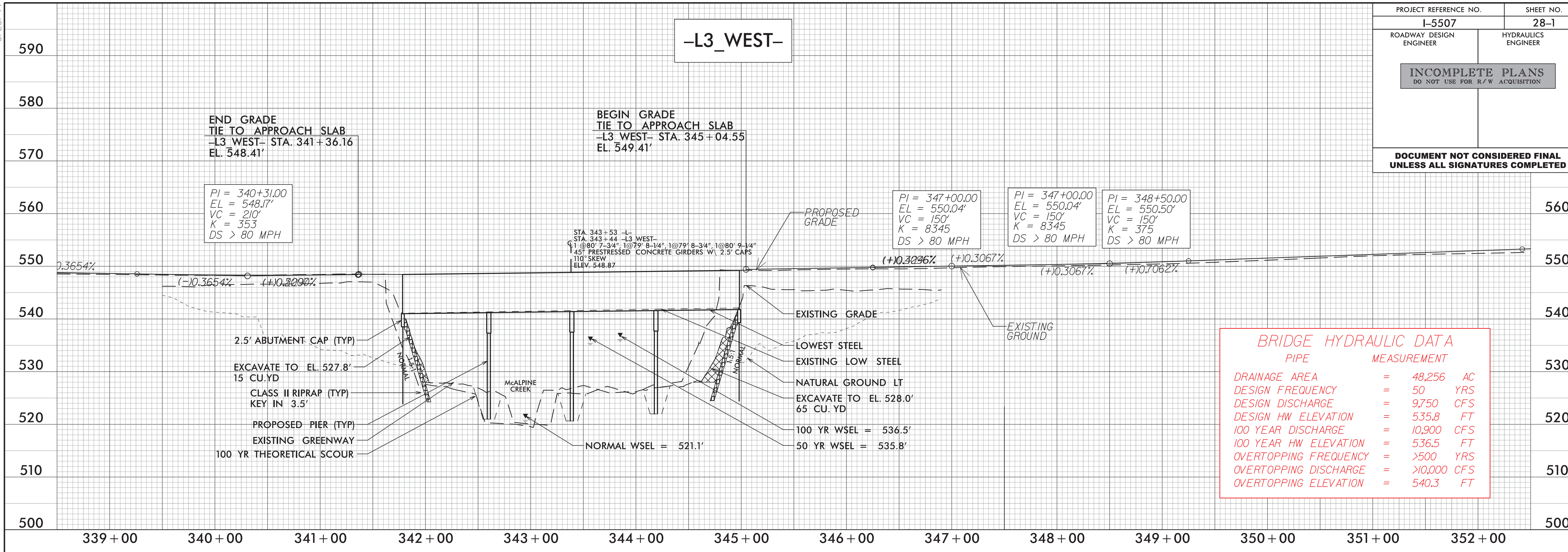
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

8/31/2021
C:\projectwise\pb\projectwise\melville\d03392751\I5507_Hyd_prm_wet_psh28_cont.dgn
melville

PROJECT REFERENCE NO.	SHEET NO.
I-5507	28-1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

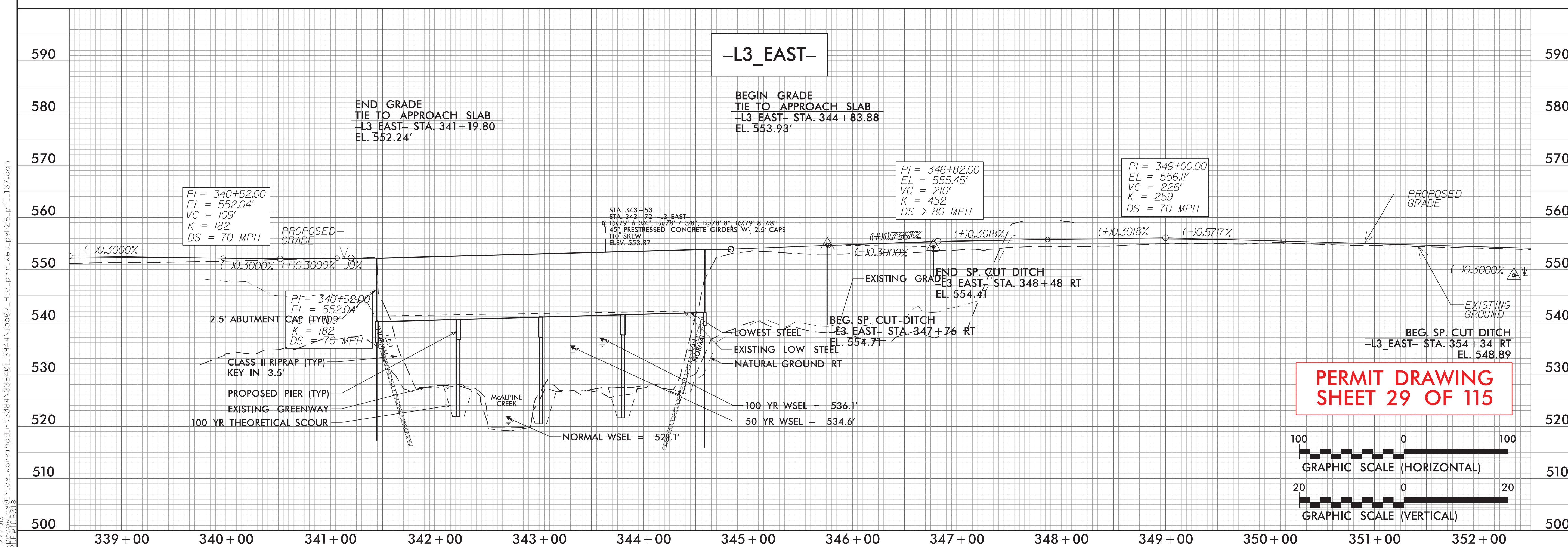
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



–L3_WEST–
END GRADE
TIE TO APPROACH SLAB
–L3_WEST– STA. 341+36.16
EL. 548.41'
BEGIN GRADE
TIE TO APPROACH SLAB
–L3_WEST– STA. 345+04.55
EL. 549.41'
PI = 340+31.00
EL = 548.17'
VC = 210'
K = 353
DS > 80 MPH
STA. 343+53 –L–
STA. 343+44 –L3_WEST–
1 @80' 7-3/4", 1@79' 8-1/4", 1@79' 8-3/4", 1@80' 9-1/4"
45" PRESTRESSED CONCRETE GIRDERS W\ 2.5' CAPS
110° SKEW
ELEV. 548.87
PROPOSED GRADE
PI = 347+00.00
EL = 550.04'
VC = 150'
K = 8345
DS > 80 MPH
PI = 347+00.00
EL = 550.04'
VC = 150'
K = 8345
DS > 80 MPH
PI = 348+50.00
EL = 550.50'
VC = 150'
K = 375
DS > 80 MPH
0.3654%
(–)0.3654%
(+)0.3090%
(+)0.3096%
(+)0.3067%
(+)0.3067%
(+)0.7062%
EXISTING GROUND
EXISTING GRADE
LOWEST STEEL
EXISTING LOW STEEL
NATURAL GROUND LT
EXCAVATE TO EL. 528.0'
65 CU. YD
100 YR WSEL = 536.5'
50 YR WSEL = 535.8'
2.5' ABUTMENT CAP (TYP)
EXCAVATE TO EL. 527.8'
15 CU.YD
CLASS II RIPRAP (TYP)
KEY IN 3.5'
PROPOSED PIER (TYP)
EXISTING GREENWAY
100 YR THEORETICAL SCOUR
NORMAL WSEL = 521.1'
McALPINE CREEK
NORMAL
590
580
570
560
550
540
530
520
510
500
339+00
340+00
341+00
342+00
343+00
344+00
345+00
346+00
347+00
348+00
349+00
350+00
351+00
352+00

BRIDGE HYDRAULIC DATA

PIPE		MEASUREMENT	
DRAINAGE AREA	=	48,256	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	9,750	CFS
DESIGN HW ELEVATION	=	535.8	FT
100 YEAR DISCHARGE	=	10,900	CFS
100 YEAR HW ELEVATION	=	536.5	FT
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING DISCHARGE	=	>10,000	CFS
OVERTOPPING ELEVATION	=	540.3	FT



–L3_EAST–
END GRADE
TIE TO APPROACH SLAB
–L3_EAST– STA. 341+19.80
EL. 552.24'
BEGIN GRADE
TIE TO APPROACH SLAB
–L3_EAST– STA. 344+83.88
EL. 553.93'
PI = 340+52.00
EL = 552.04'
VC = 109'
K = 182
DS = 70 MPH
PROPOSED GRADE
STA. 343+53 –L–
STA. 343+72 –L3_EAST–
1@79' 6-3/4", 1@78' 7-3/8", 1@78' 8", 1@79' 8-7/8"
45" PRESTRESSED CONCRETE GIRDERS W\ 2.5' CAPS
110° SKEW
ELEV. 553.87
PI = 346+82.00
EL = 555.45'
VC = 210'
K = 452
DS > 80 MPH
PI = 349+00.00
EL = 556.11'
VC = 226'
K = 259
DS = 70 MPH
PROPOSED GRADE
(–)0.3000%
(–)0.3000%
(+)0.3000%
(+)0.3018%
(–)0.3600%
(+)0.3018%
(–)0.5717%
(–)0.3000%
EXISTING GRADE
END SP. CUT DITCH
–L3_EAST– STA. 348+48 RT
EL. 554.41
BEG. SP. CUT DITCH
–L3_EAST– STA. 347+76 RT
EL. 554.71
EXISTING GROUND
BEG. SP. CUT DITCH
–L3_EAST– STA. 354+34 RT
EL. 548.89
2.5' ABUTMENT CAP (TYP)
CLASS II RIPRAP (TYP)
KEY IN 3.5'
PROPOSED PIER (TYP)
EXISTING GREENWAY
100 YR THEORETICAL SCOUR
McALPINE CREEK
NORMAL WSEL = 521.1'
LOWEST STEEL
EXISTING LOW STEEL
NATURAL GROUND RT
100 YR WSEL = 536.1'
50 YR WSEL = 534.6'
NORMAL
590
580
570
560
550
540
530
520
510
500
339+00
340+00
341+00
342+00
343+00
344+00
345+00
346+00
347+00
348+00
349+00
350+00
351+00
352+00

PERMIT DRAWING
SHEET 29 OF 115

100 0 100
GRAPHIC SCALE (HORIZONTAL)

20 0 20
GRAPHIC SCALE (VERTICAL)

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	28-2

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

570 560 550 540 530 520 510 500

WETLAND (WX)
SITE #12

–L3_EAST–
346+22.99
554.98

0.060

0.060

2:1

527.02

346+00.00

WETLAND (WY)
SITE #12

L–EB–Y2
19+86.32

0.058

0.058

0.058

1.85

2:1

S.S. 527.40

345+00.00

PERMIT DRAWING
SHEET 30 OF 115

20 0 20
GRAPHIC SCALE

9/12/2019
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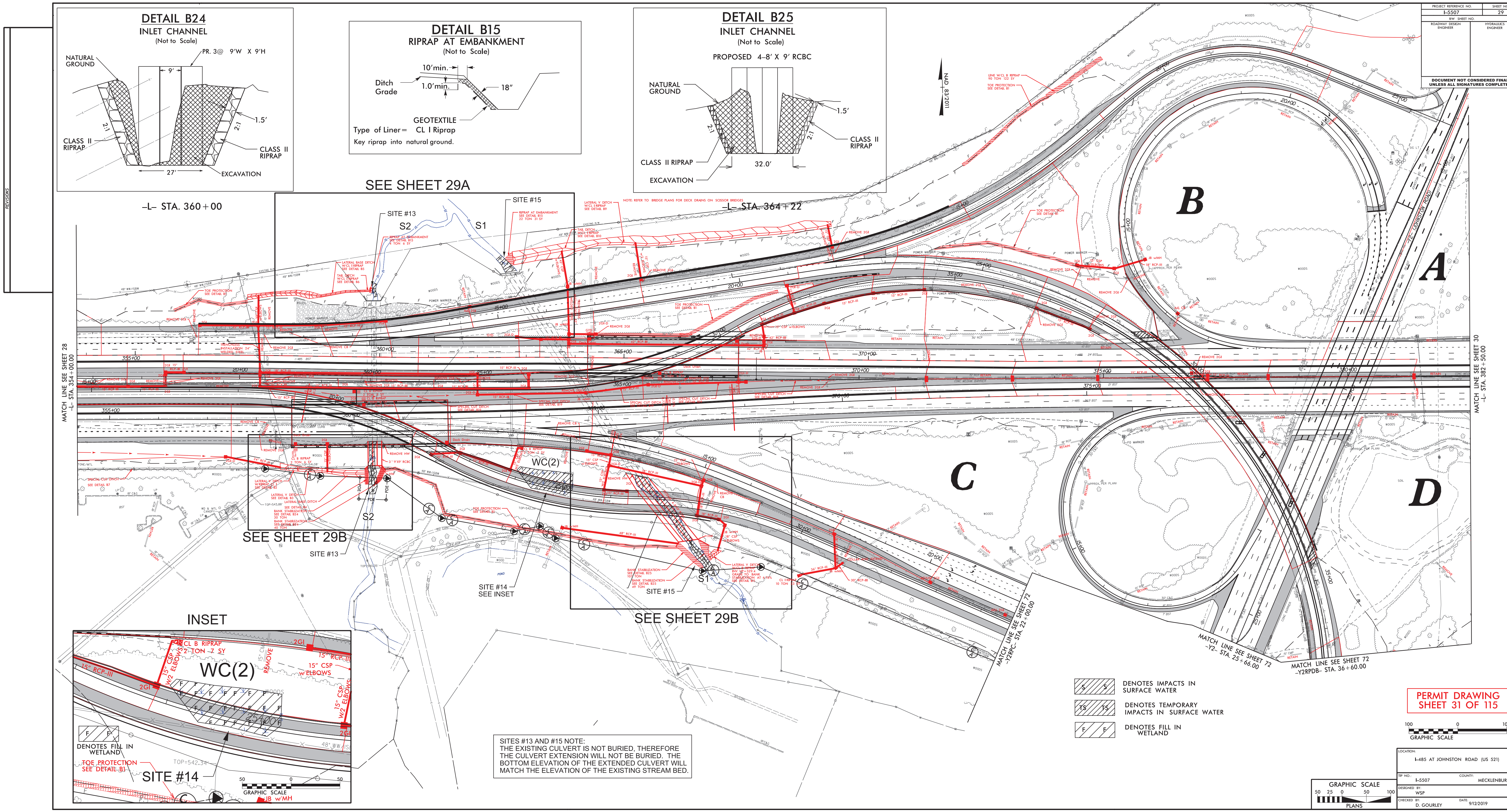
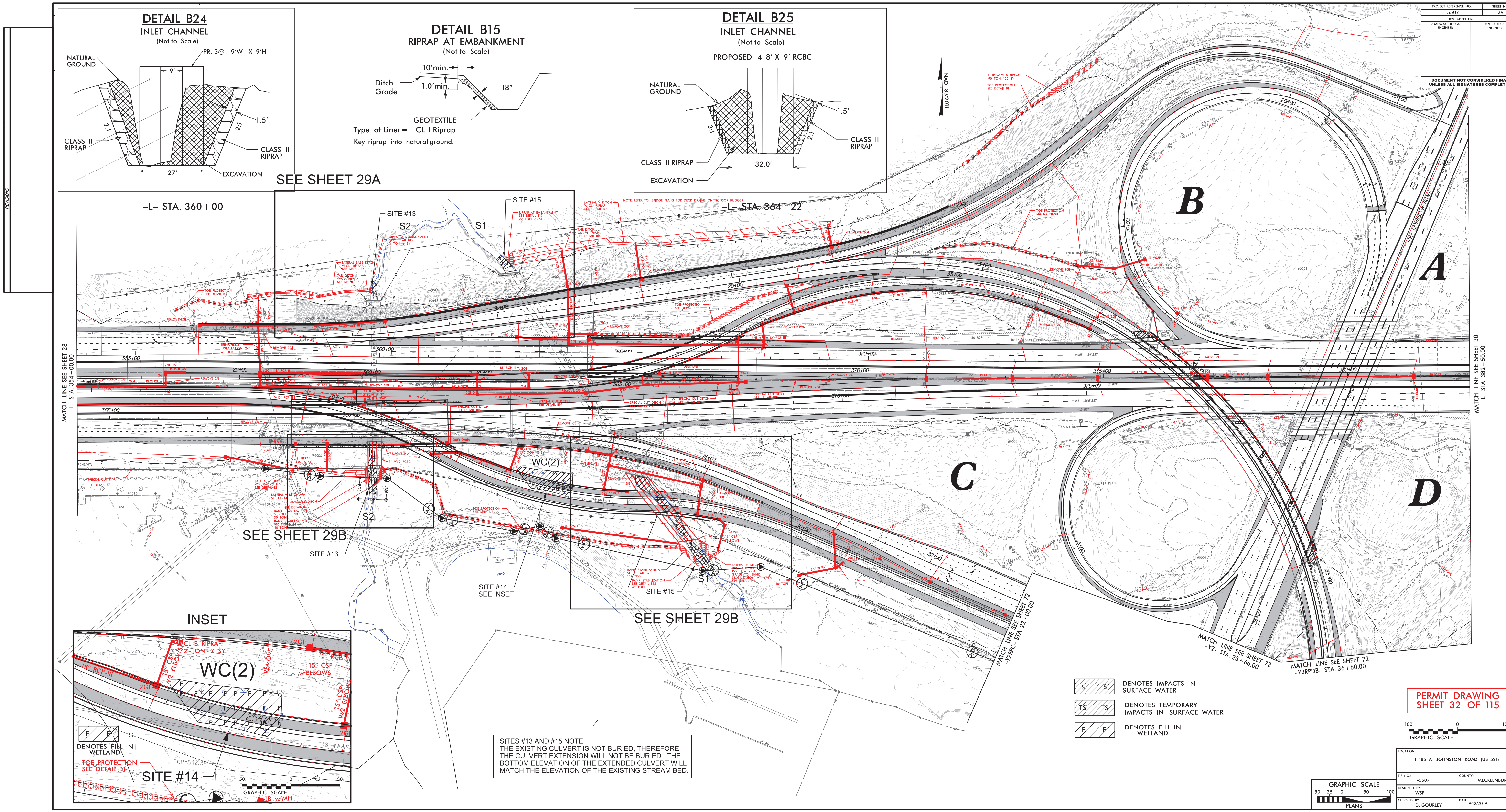
PRDFWICS01$



DETAIL B24
INLET CHANNEL
(Not to Scale)
NATURAL GROUND
PR. 3@ 9'W X 9'H
9'
1.5'
2:1
CLASS II RIPRAP
27'
EXCAVATION
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DETAIL B25
INLET CHANNEL
(Not to Scale)
PROPOSED 4-8' X 9' RCBC
NATURAL GROUND
1.5'
2:1
CLASS II RIPRAP
32.0'
EXCAVATION
NAD 83/2011
-L- STA. 360+00
-L- STA. 364+22
SEE SHEET 29A
SITE #13
SITE #15
S1
S2
A
B
C
D
WC(2)
SEE SHEET 29B
SITE #13
SITE #14 SEE INSET
SITE #15
MATCH LINE SEE SHEET 28 -L- STA. 354+00.00
MATCH LINE SEE SHEET 30 -L- STA. 382+50.00
MATCH LINE SEE SHEET 72 -Y2RPC- STA. 22+00.00
MATCH LINE SEE SHEET 72 -Y2- STA. 25+66.00
MATCH LINE SEE SHEET 72 -Y2RPDB- STA. 36+60.00
INSET
WC(2)
CL B RIPRAP 32 TON 7 SY
15" RCP-III
15" CSP w/ ELBOWS
2GI
DENOTES FILL IN WETLAND
TOE PROTECTION SEE DETAIL B1
SITE #14
TOP=542.34
GRAPHIC SCALE
50 0 50
JB w/MH
SITES #13 AND #15 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
PERMIT DRAWING SHEET 31 OF 115
GRAPHIC SCALE
100 0 100
PROJECT REFERENCE NO. I-5507
SHEET NO. 29
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
LOCATION: I-485 AT JOHNSTON ROAD (US 521)
TIP NO.: I-5507
COUNTY: MECKLENBURG
DESIGNED BY: WSP
CHECKED BY: D. GOURLEY
DATE: 9/12/2019
GRAPHIC SCALE
50 25 0 50 100
PLANS
REVISIONS


DETAIL B24
INLET CHANNEL
(Not to Scale)
PR. 3@ 9'W X 9'H
NATURAL GROUND
9'
1.5'
2:1
CLASS II RIPRAP
27'
EXCAVATION
-L- STA. 360+00
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DETAIL B25
INLET CHANNEL
(Not to Scale)
PROPOSED 4-8' X 9' RCBC
NATURAL GROUND
1.5'
2:1
CLASS II RIPRAP
32.0'
EXCAVATION
-L- STA. 364+22
NAD 83/2011
SEE SHEET 29A
SITE #13
SITE #15
S1
S2
B
A
C
D
WC(2)
SEE SHEET 29B
SITE #13
SITE #14 SEE INSET
SITE #15
MATCH LINE SEE SHEET 28 -L- STA. 354+00.00
MATCH LINE SEE SHEET 30 -L- STA. 382+50.00
MATCH LINE SEE SHEET 72 -Y2RPC- STA. 22+00.00
MATCH LINE SEE SHEET 72 -Y2- STA. 25+66.00
MATCH LINE SEE SHEET 72 -Y2RPDB- STA. 36+60.00
INSET
WC(2)
CL B RIPRAP 32 TON 7 SY
15" CSP W/2 ELBOWS
15" RCP-III
2GI
REMOVE
DENOTES FILL IN WETLAND
TOE PROTECTION SEE DETAIL B1
SITE #14
GRAPHIC SCALE
SITES #13 AND #15 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
PERMIT DRAWING SHEET 32 OF 115
GRAPHIC SCALE
PLANS
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
I-5507
29
LOCATION: I-485 AT JOHNSTON ROAD (US 521)
TIP NO.: I-5507
COUNTY: MECKLENBURG
DESIGNED BY: WSP
CHECKED BY: D. GOURLEY
DATE: 9/12/2019

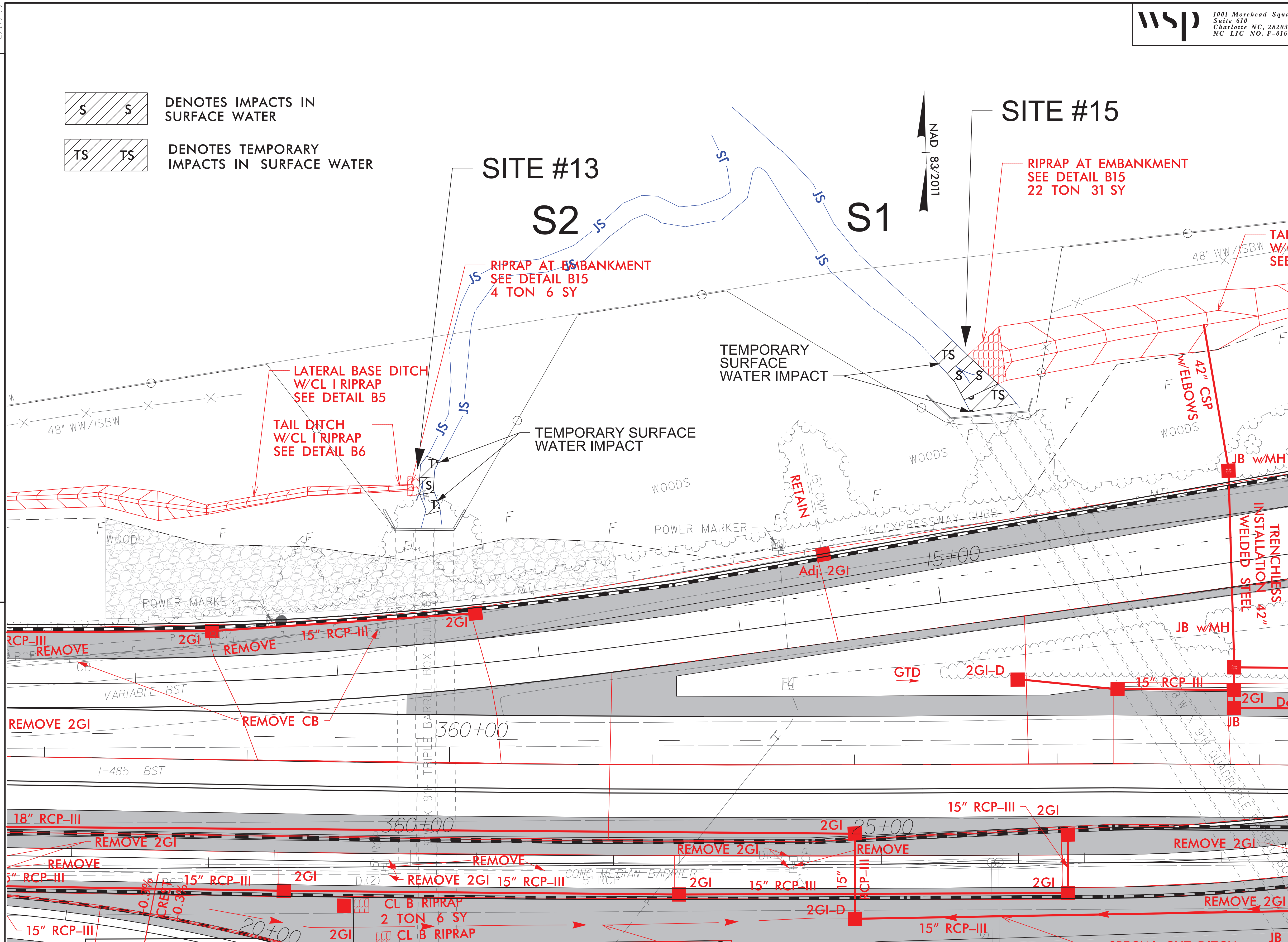
WSP 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE #13
S2
SITE #15
S1
NAD 83/2011
RIPRAP AT EMBANKMENT
SEE DETAIL B15
4 TON 6 SY
RIPRAP AT EMBANKMENT
SEE DETAIL B15
22 TON 31 SY
LATERAL BASE DITCH
W/CL I RIPRAP
SEE DETAIL B5
TAIL DITCH
W/CL I RIPRAP
SEE DETAIL B6
TEMPORARY SURFACE WATER IMPACT
TEMPORARY SURFACE WATER IMPACT
42" CSP W/ELBOWS
TRENCHLESS INSTALLATION 42" WELDED STEEL
JB w/MH
WOODS
POWER MARKER
RETAIN
15" CMP
36" EXPRESSWAY CURB
Adj. 2GI
15+00
360+00
I-485 BST
VARIABLE BST
REMOVE 2GI
REMOVE CB
15" RCP-III
18" RCP-III
2GI
2GI-D
GTD
CL B RIPRAP
2 TON 6 SY
CONC MEDIAN BARRIER
SPECIAL CUT DITCH
25+00
20+00

PERMIT DRAWING
SHEET 33 OF 115

50 0 50
GRAPHIC SCALE

8/17/99
9/12/2019

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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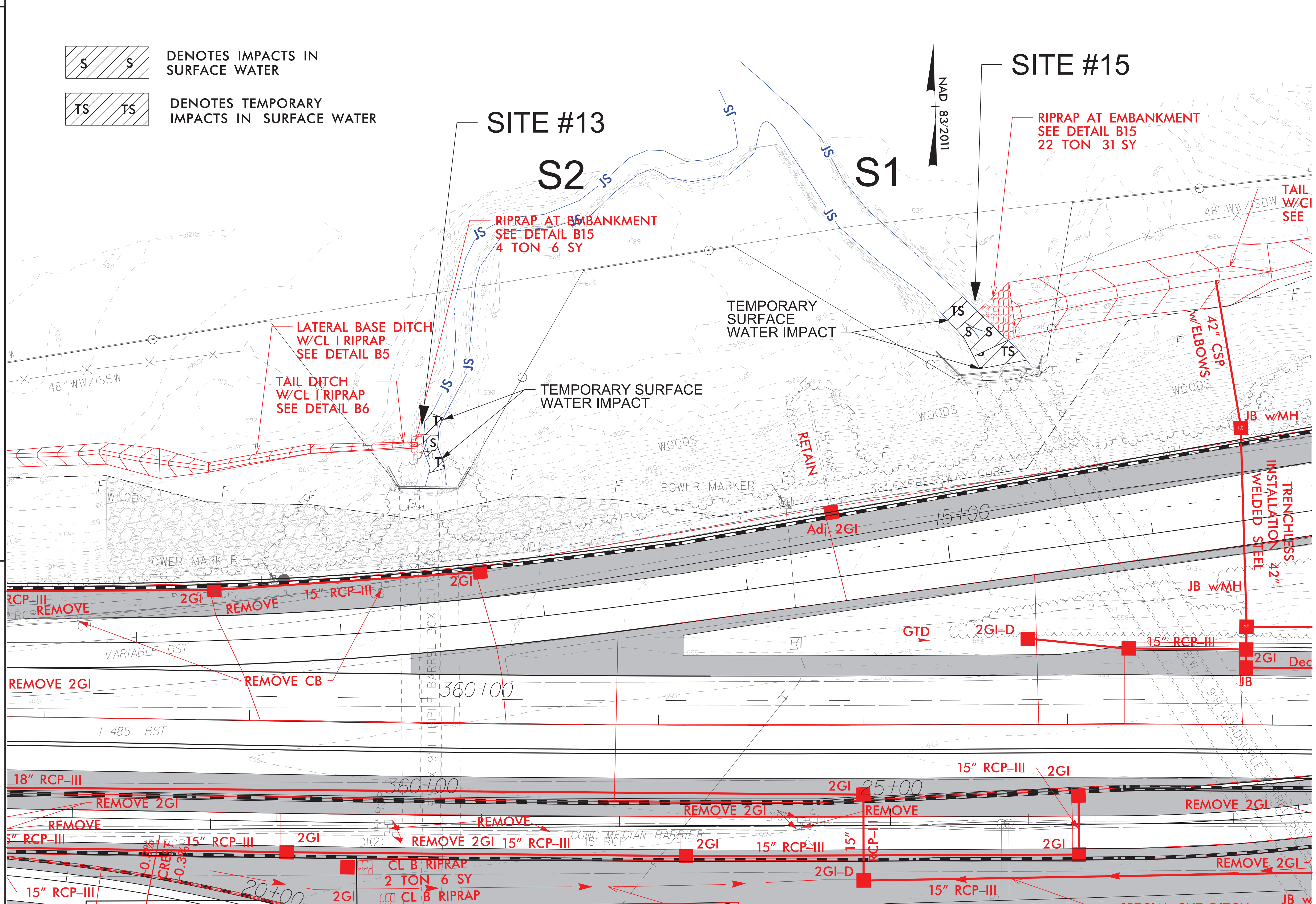
REVISIONS

8/17/99



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SITE #13
S2
SITE #15
S1
NAD 83/2011
RIPRAP AT EMBANKMENT
SEE DETAIL B15
4 TON 6 SY
RIPRAP AT EMBANKMENT
SEE DETAIL B15
22 TON 31 SY
LATERAL BASE DITCH
W/CL I RIPRAP
SEE DETAIL B5
TAIL DITCH
W/CL I RIPRAP
SEE DETAIL B6
TEMPORARY SURFACE WATER IMPACT
TEMPORARY SURFACE WATER IMPACT
48" WW/ISBW
WOODS
POWER MARKER
RETAIN
15" CMP
36" EXPRESSWAY CURB
Adj. 2GI
15+00
42" CSP W/ELBOWS
JB w/MH
TRENCHLESS INSTALLATION 42" WELDED STEEL
REMOVE
REMOVE CB
REMOVE 2GI
15" RCP-III
2GI
VARIABLE BST
360+00
I-485 BST
18" RCP-III
GTD
2GI-D
JB
25+00
20+00
CONC MEDIAN BARRIER
CL B RIPRAP
2 TON 6 SY
SPECIAL CUT DITCH
TRIPLE BARREL BOX CULVERT

PERMIT DRAWING
SHEET 34 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
\3084\336401.3962\5507_Hyd_prm_wet_psh29A_cont.dgn

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

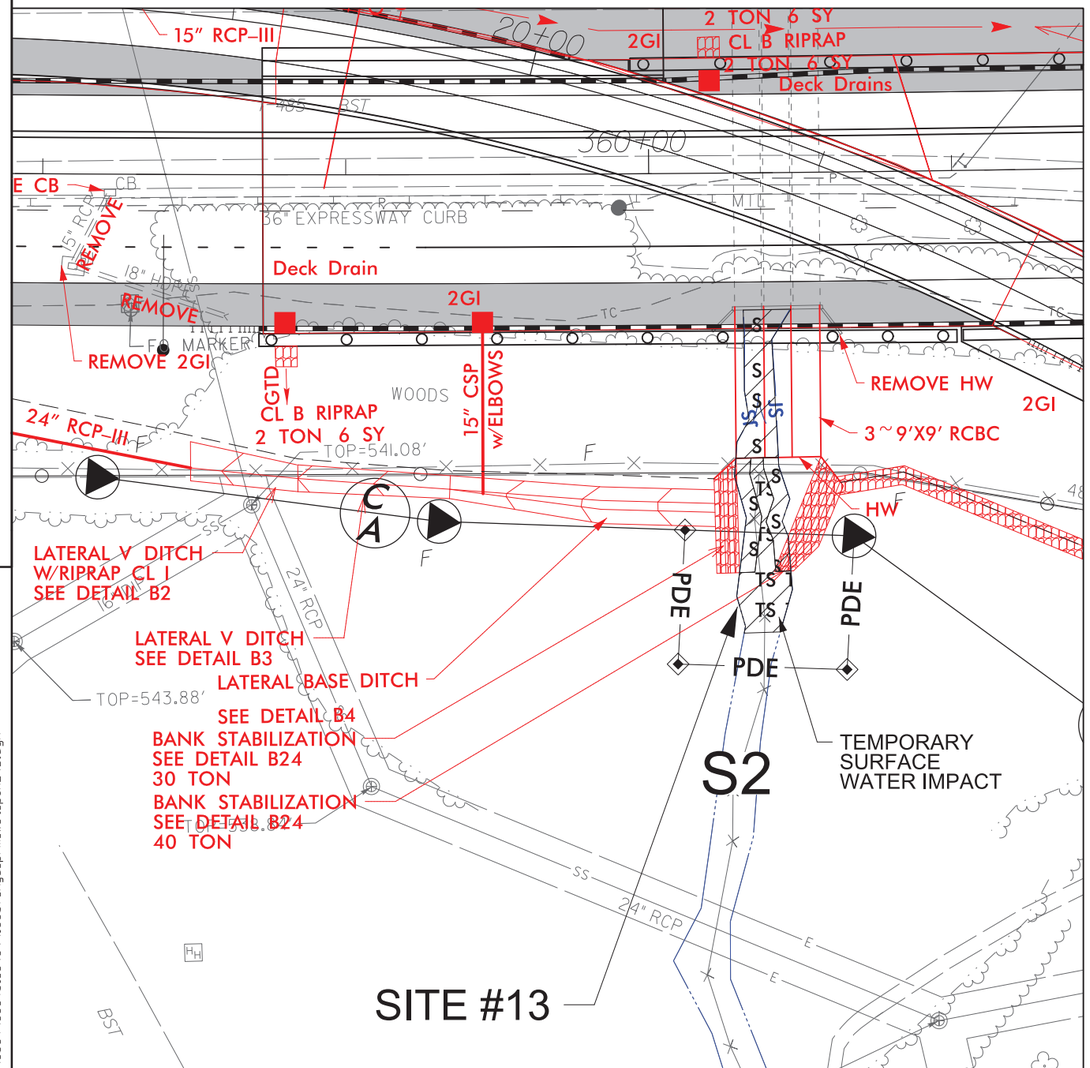
NAD 83/2011

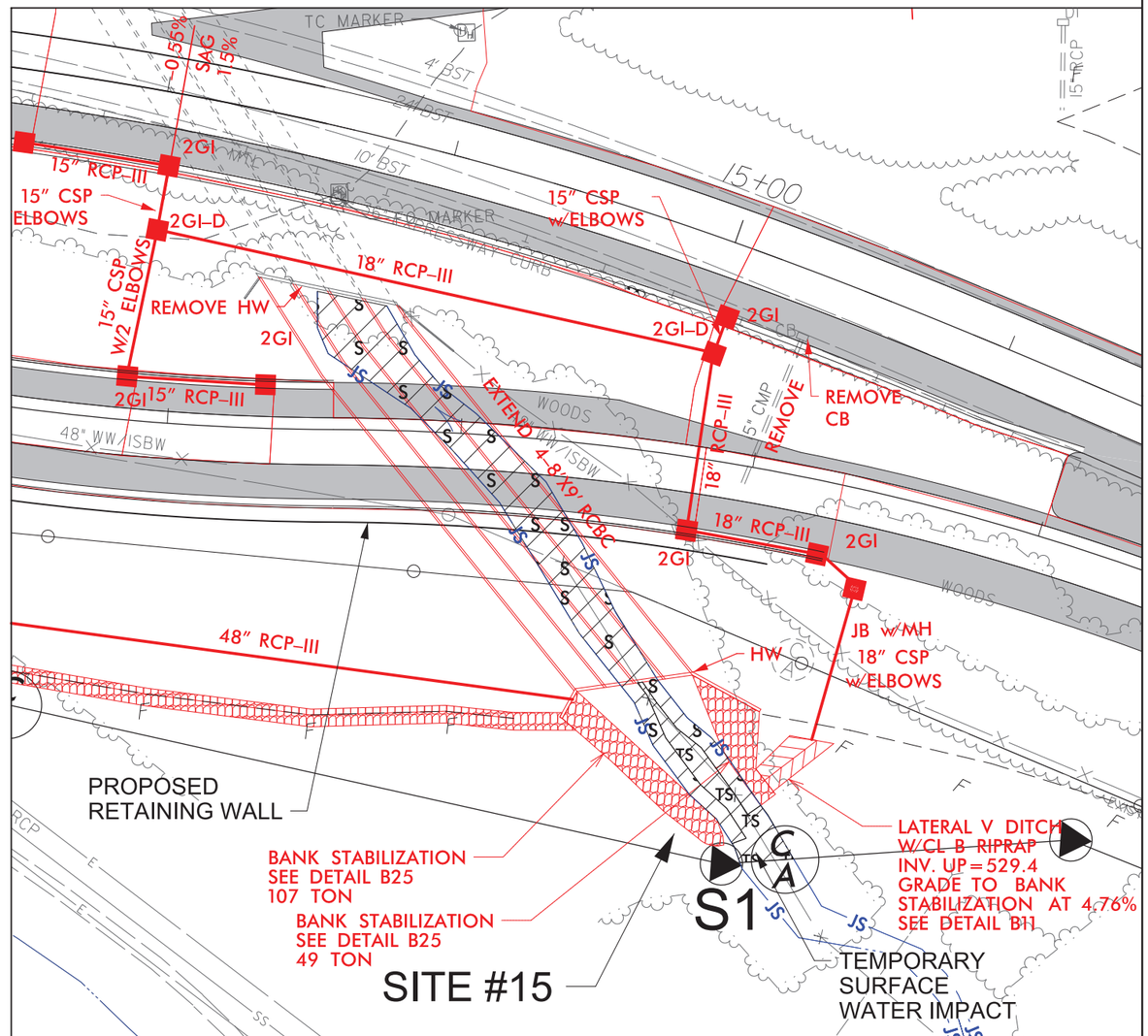
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	29B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE





SITES #13 AND #15 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

PERMIT DRAWING SHEET 35 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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RDPW/ICS01$

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

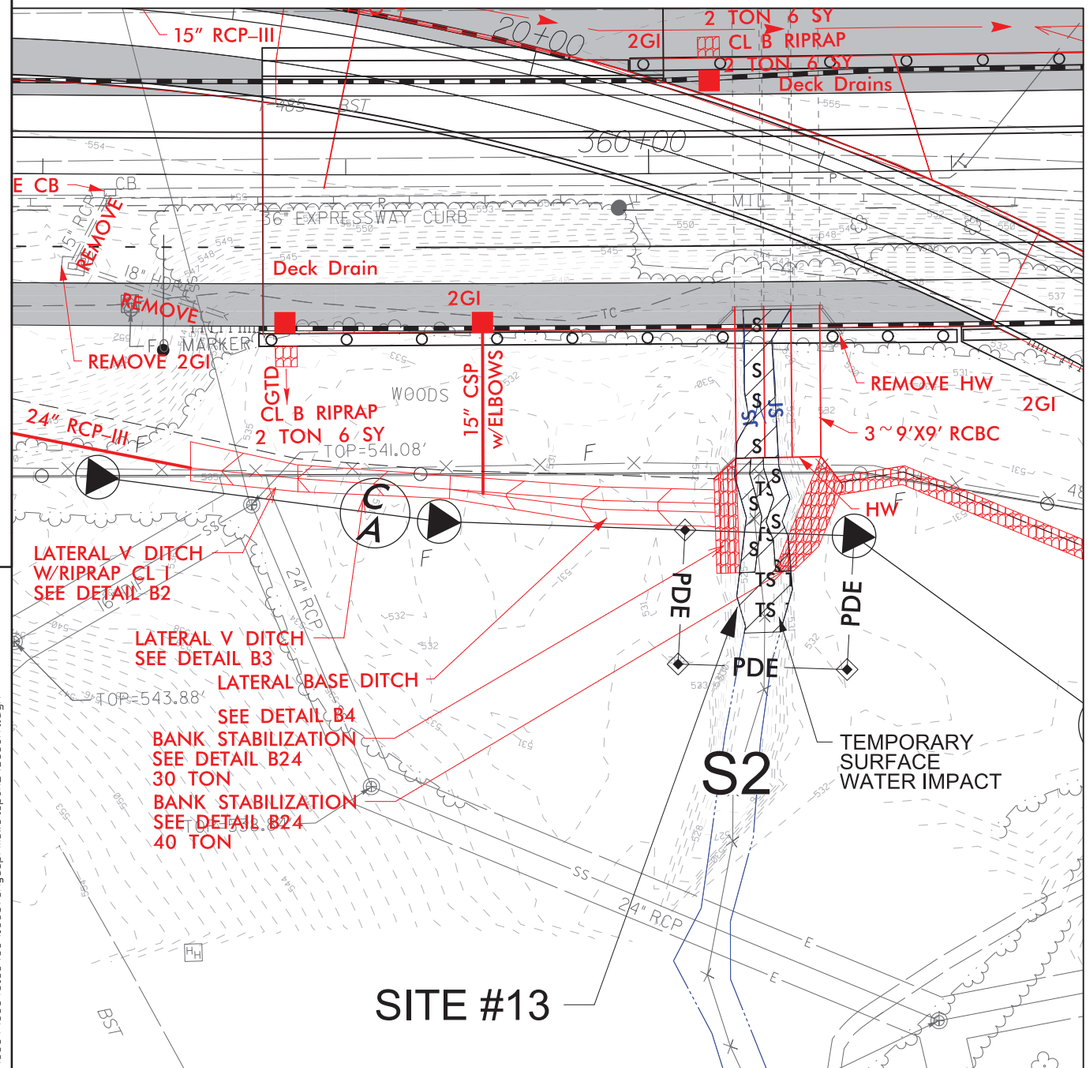
NAD 83/2011

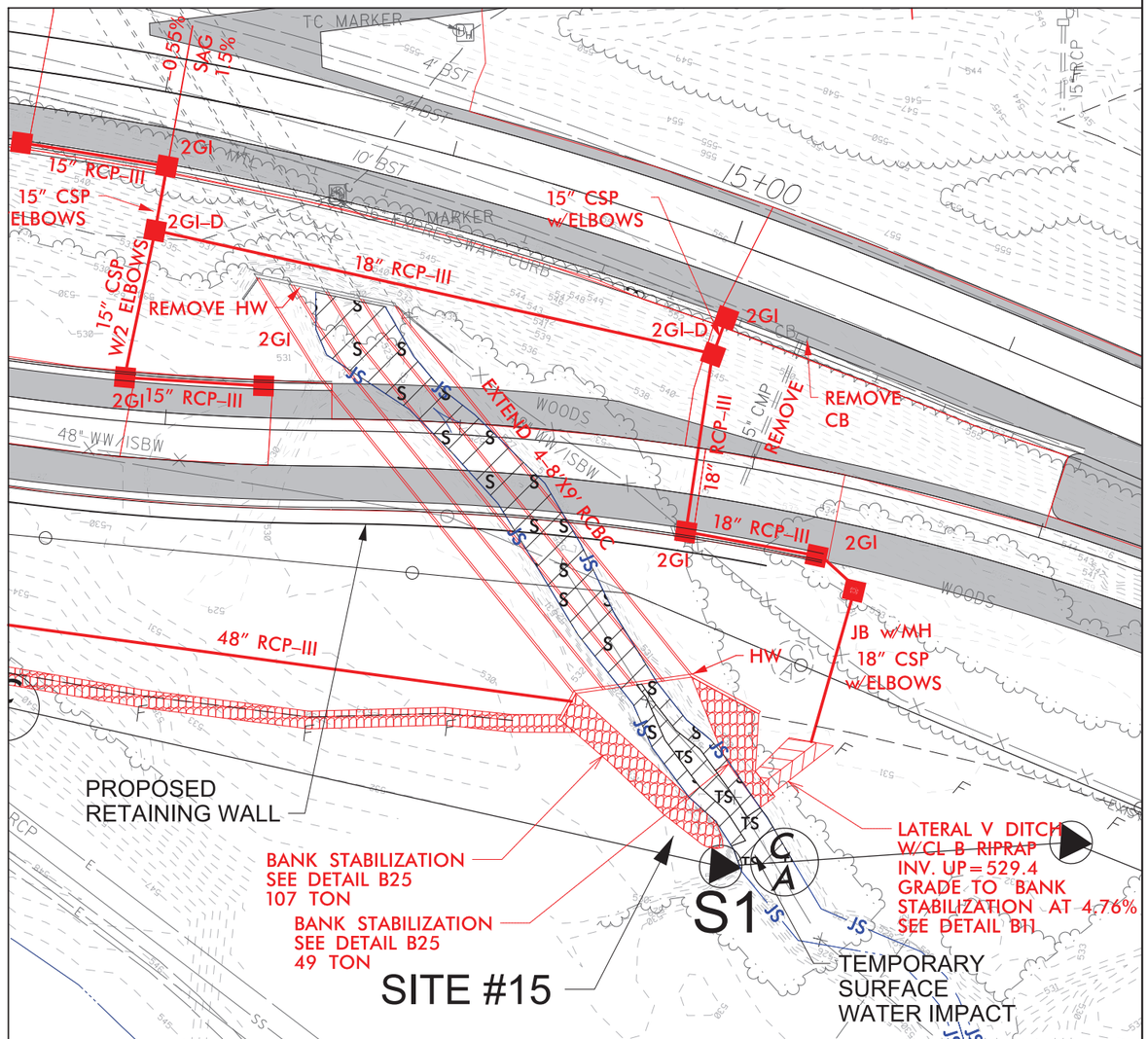
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE





SITES #13 AND #15 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

PERMIT DRAWING SHEET 36 OF 115

50 0 50
GRAPHIC SCALE

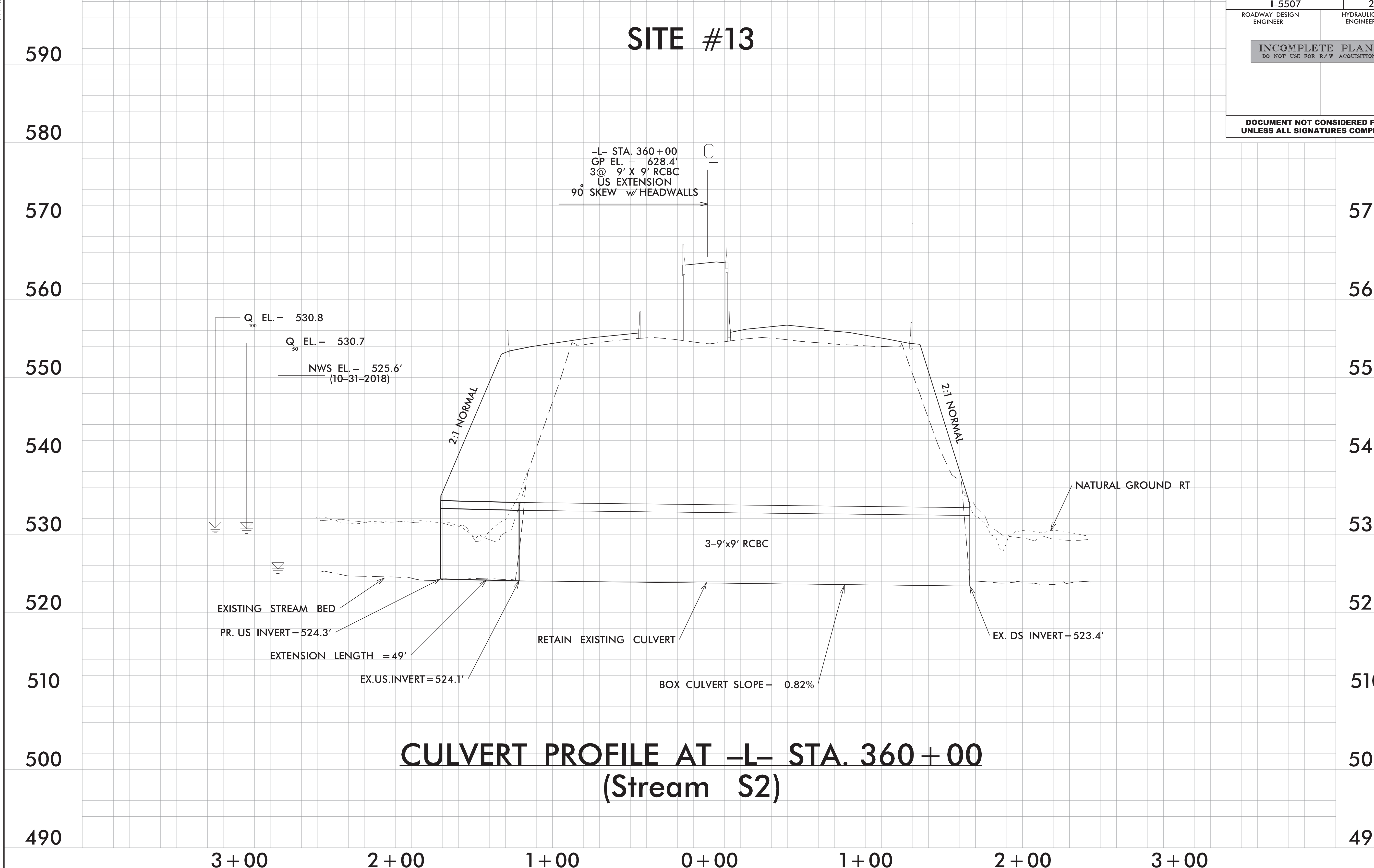
9/12/2019
C:\pprojects01\ics_workingdir\3084\336401.3963\i5507_Hyd_prm_wet_psh29B_cont.dgn
RDP#ICS01$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29-1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE #13



590
580
570
560
550
540
530
520
510
500
490
-L- STA. 360+00
GP EL. = 628.4'
3@ 9' X 9' RCBC
US EXTENSION
90° SKEW w/ HEADWALLS
Q100 EL. = 530.8
Q50 EL. = 530.7
NWS EL. = 525.6' (10-31-2018)
2:1 NORMAL
2:1 NORMAL
NATURAL GROUND RT
3-9'x9' RCBC
EXISTING STREAM BED
PR. US INVERT=524.3'
EXTENSION LENGTH =49'
EX.US.INVERT=524.1'
RETAIN EXISTING CULVERT
BOX CULVERT SLOPE= 0.82%
EX. DS INVERT=523.4'
3+00
2+00
1+00
0+00
1+00
2+00
3+00

CULVERT PROFILE AT -L- STA. 360+00
(Stream S2)

PERMIT DRAWING
SHEET 37 OF 115

50 0 50
GRAPHIC SCALE (HORIZONTAL)

10 0 10
GRAPHIC SCALE (VERTICAL)

5/28/99

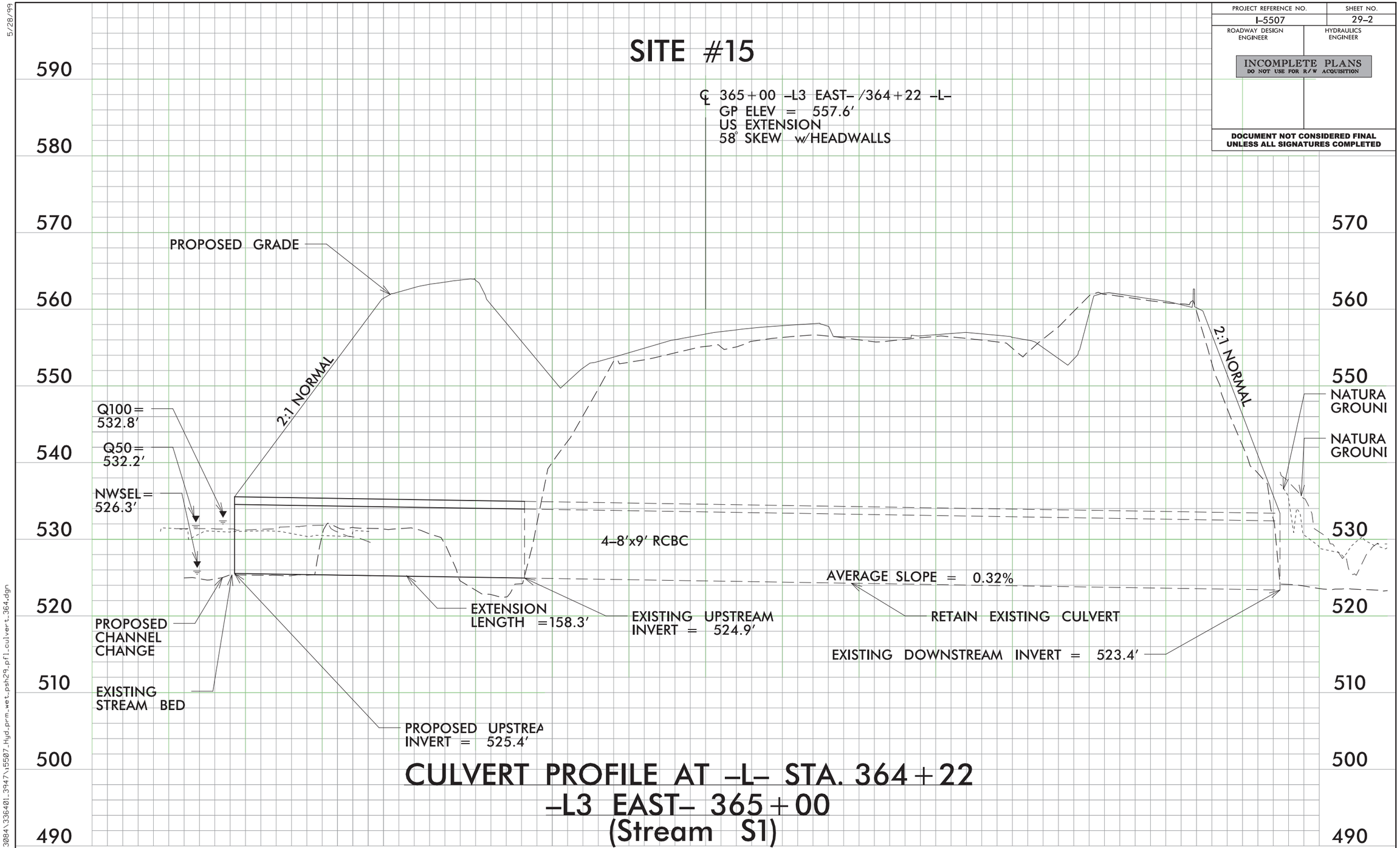
PROJECT REFERENCE NO.	SHEET NO.
I–5507	29–2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE #15

℄ 365+00 –L3 EAST– /364+22 –L–
GP ELEV = 557.6′
US EXTENSION
58° SKEW w/HEADWALLS



CULVERT PROFILE AT –L– STA. 364+22
–L3 EAST– 365+00
(Stream S1)

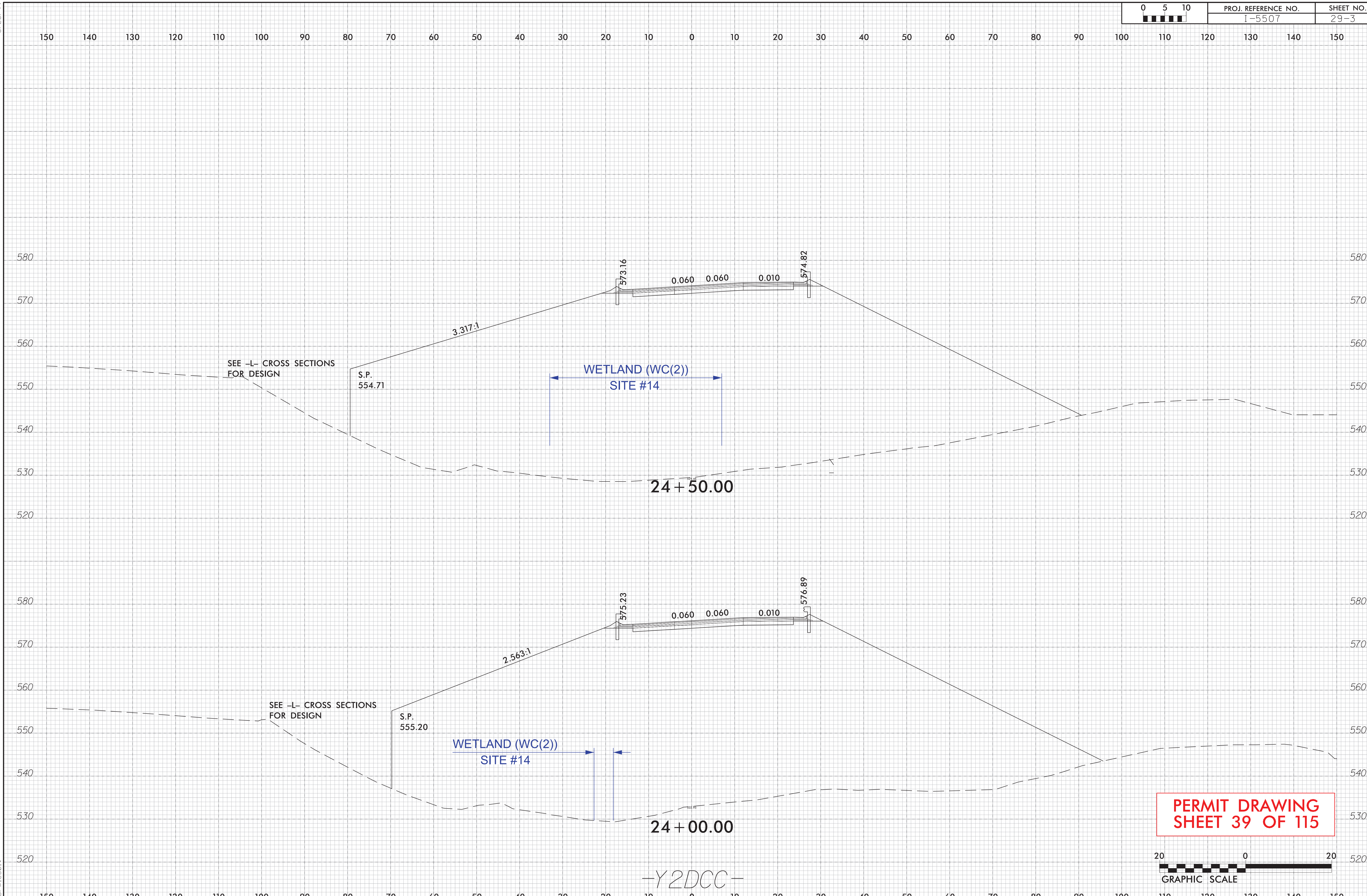
PERMIT DRAWING
SHEET 38 OF 115

50 0 50
GRAPHIC SCALE (HORIZONTAL)

10 0 10
GRAPHIC SCALE (VERTICAL)

9/12/2019
\\Prodnts01\tcs_workingdir\3084\336401.3947\I5507_Hyd_prm_wet_psh29_pfl_culvert_364.dgn
PDF WICS01$

PROJ. REFERENCE NO.	SHEET NO.
I-5507	29-3



PERMIT DRAWING
SHEET 39 OF 115

9/12/2019
PRDPWLC501$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	30
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
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Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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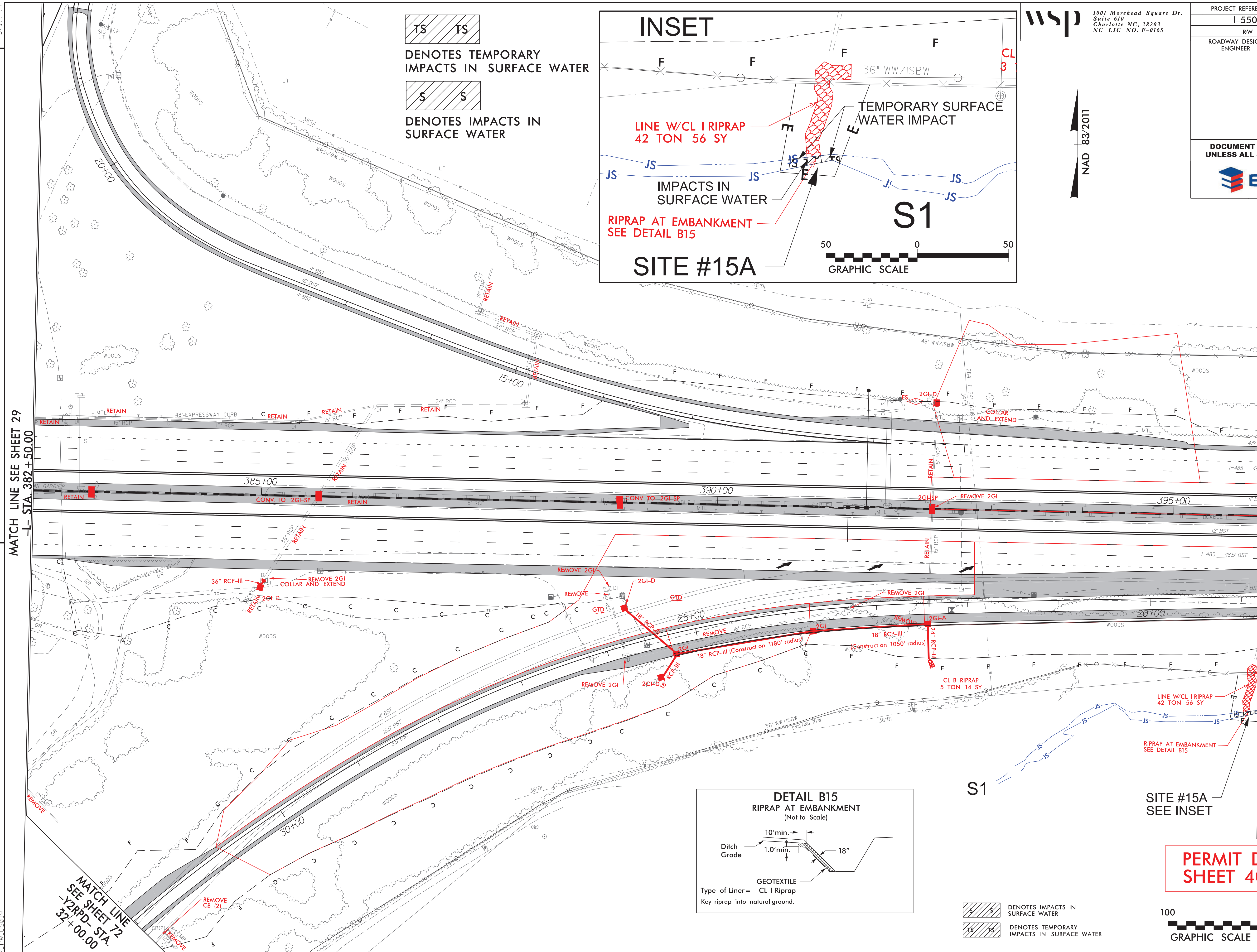

TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S
DENOTES IMPACTS IN SURFACE WATER
INSET
TEMPORARY SURFACE WATER IMPACT
LINE W/CL I RIPRAP
42 TON 56 SY
IMPACTS IN SURFACE WATER
RIPRAP AT EMBANKMENT
SEE DETAIL B15
SITE #15A
S1
GRAPHIC SCALE
NAD 83/2011
MATCH LINE SEE SHEET 29
-L- STA. 382+50.00
MATCH LINE SEE SHEET 31
-L- STA. 396+00.00
MATCH LINE SEE SHEET 72
-Y2RPD- STA. 32+00.00
385+00
390+00
395+00
20+00
25+00
30+00
15+00
REMOVE 2GI
CONV. TO 2GI-SP
RETAIN
COLLAR AND EXTEND
18" RCP-III (Construct on 1180' radius)
18" RCP-III (Construct on 1050' radius)
CL B RIPRAP
5 TON 14 SY
SITE #15A
SEE INSET
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
REVISIONS

PERMIT DRAWING
SHEET 40 OF 115

100 0 100
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	30

RW SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Charlotte NC, 28203
NC LIC NO. F-0165

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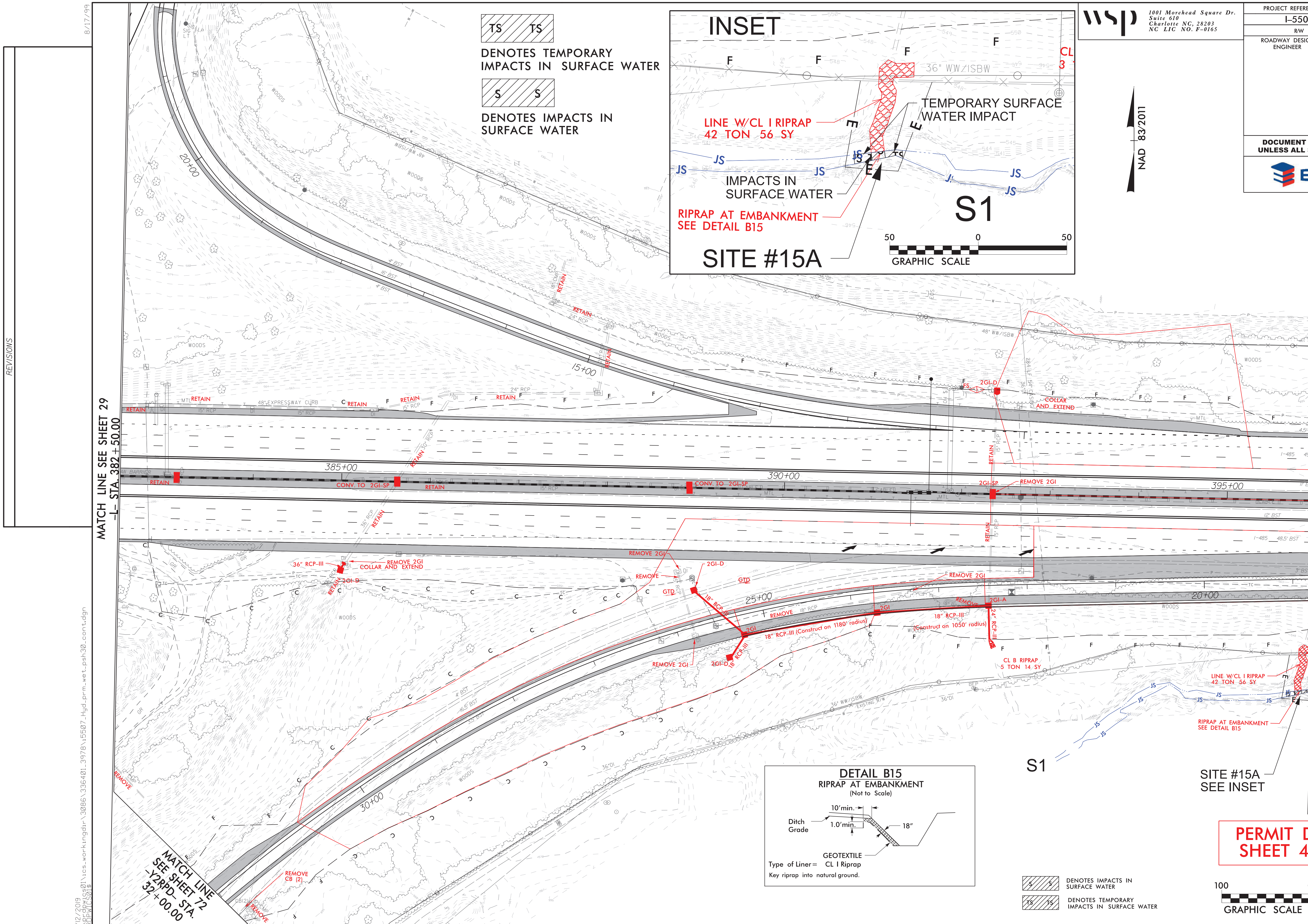

TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S
DENOTES IMPACTS IN SURFACE WATER
INSET
TEMPORARY SURFACE WATER IMPACT
LINE W/CL I RIPRAP 42 TON 56 SY
IMPACTS IN SURFACE WATER
RIPRAP AT EMBANKMENT SEE DETAIL B15
SITE #15A
S1
GRAPHIC SCALE
50 0 50
NAD 83/2011
MATCH LINE SEE SHEET 29 -L- STA. 382+50.00
MATCH LINE SEE SHEET 31 -L- STA. 396+00.00
MATCH LINE SEE SHEET 72 -Y2RPD- STA. 32+00.00
385+00
390+00
395+00
20+00
25+00
30+00
15+00
REMOVE 2GI
CONV. TO 2GI-SP
RETAIN
CL B RIPRAP 5 TON 14 SY
SITE #15A SEE INSET
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
REVISIONS

PERMIT DRAWING SHEET 41 OF 115

GRAPHIC SCALE
100 0 100

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
I-5507	31
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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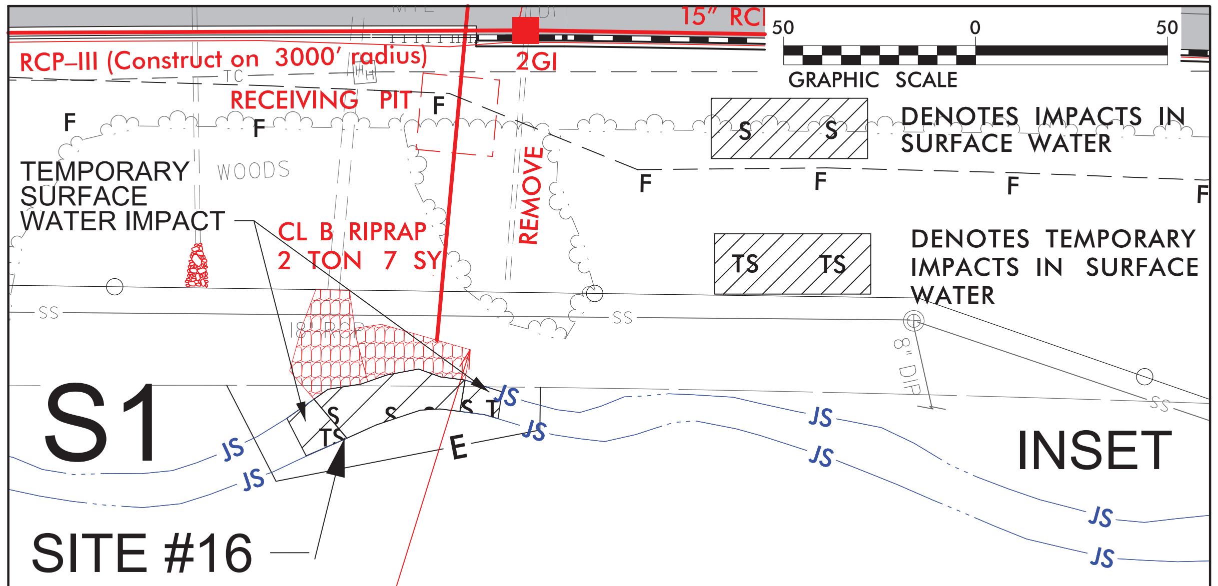
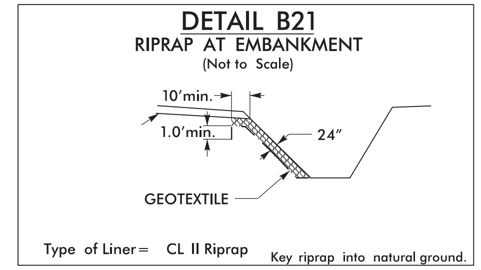
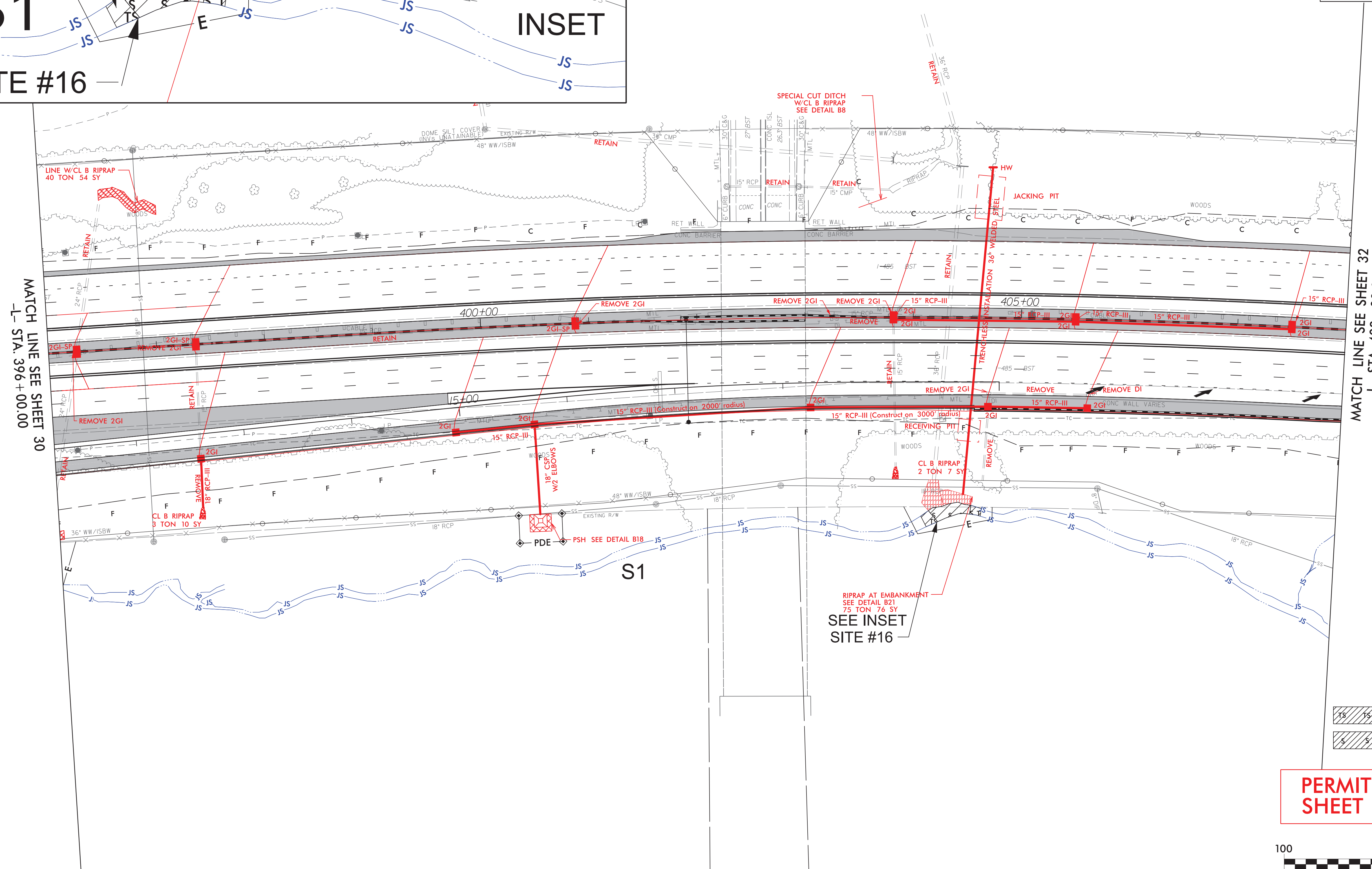




NAD 83/2011


MATCH LINE SEE SHEET 30 -L- STA. 396+00.00
MATCH LINE SEE SHEET 32 -L- STA. 408+00.00
SPECIAL CUT DITCH W/CL B RIPRAP SEE DETAIL B8
LINE W/CL B RIPRAP 40 TON 54 SY
RETAIN
REMOVE 2GI
2GI-SP
400+00
405+00
15" RCP-III
HW
JACKING PIT
36" WELDED STEEL
TRENCHLESS INSTALLATION
REMOVE DI
15" RCP-III (Construct on 2000' radius)
15" RCP-III (Construct on 3000' radius)
RECEIVING PIT
CL B RIPRAP 2 TON 7 SY
CL B RIPRAP 3 TON 10 SY
18" RCP-III
18" CSP W/2 ELBOWS
PDE
PSH SEE DETAIL B18
WOODS
S1
RIPRAP AT EMBANKMENT SEE DETAIL B21 75 TON 76 SY
SEE INSET SITE #16

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

PERMIT DRAWING
SHEET 42 OF 115

100 0 100
GRAPHIC SCALE

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PROJECT REFERENCE NO.	SHEET NO.
I-5507	31
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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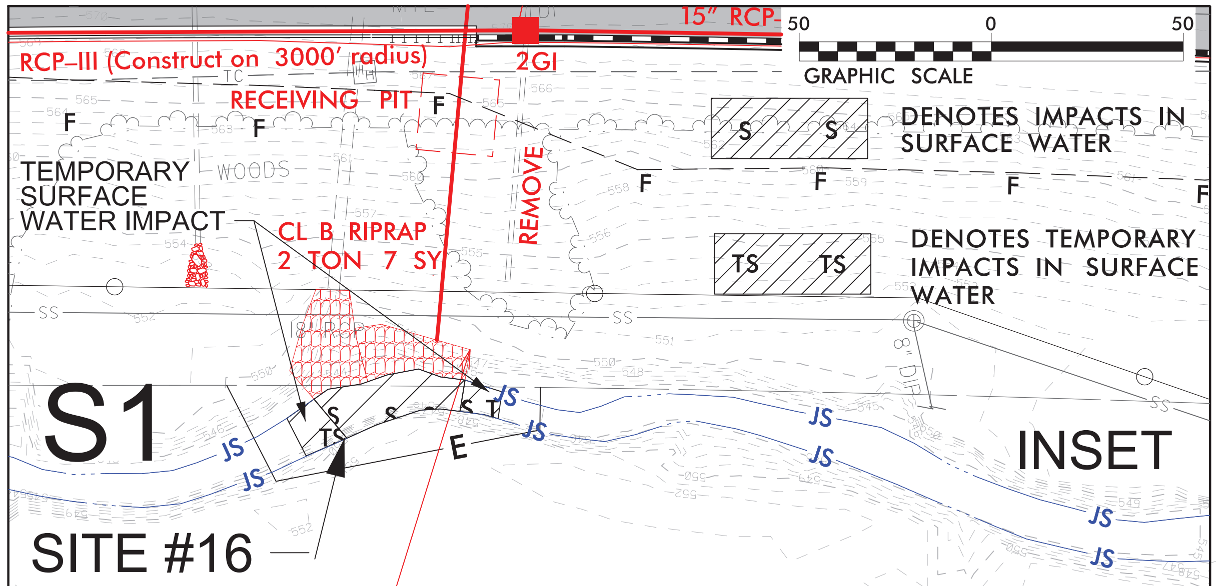
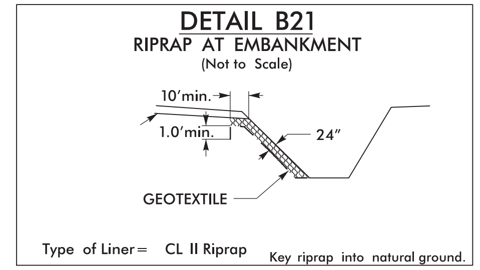
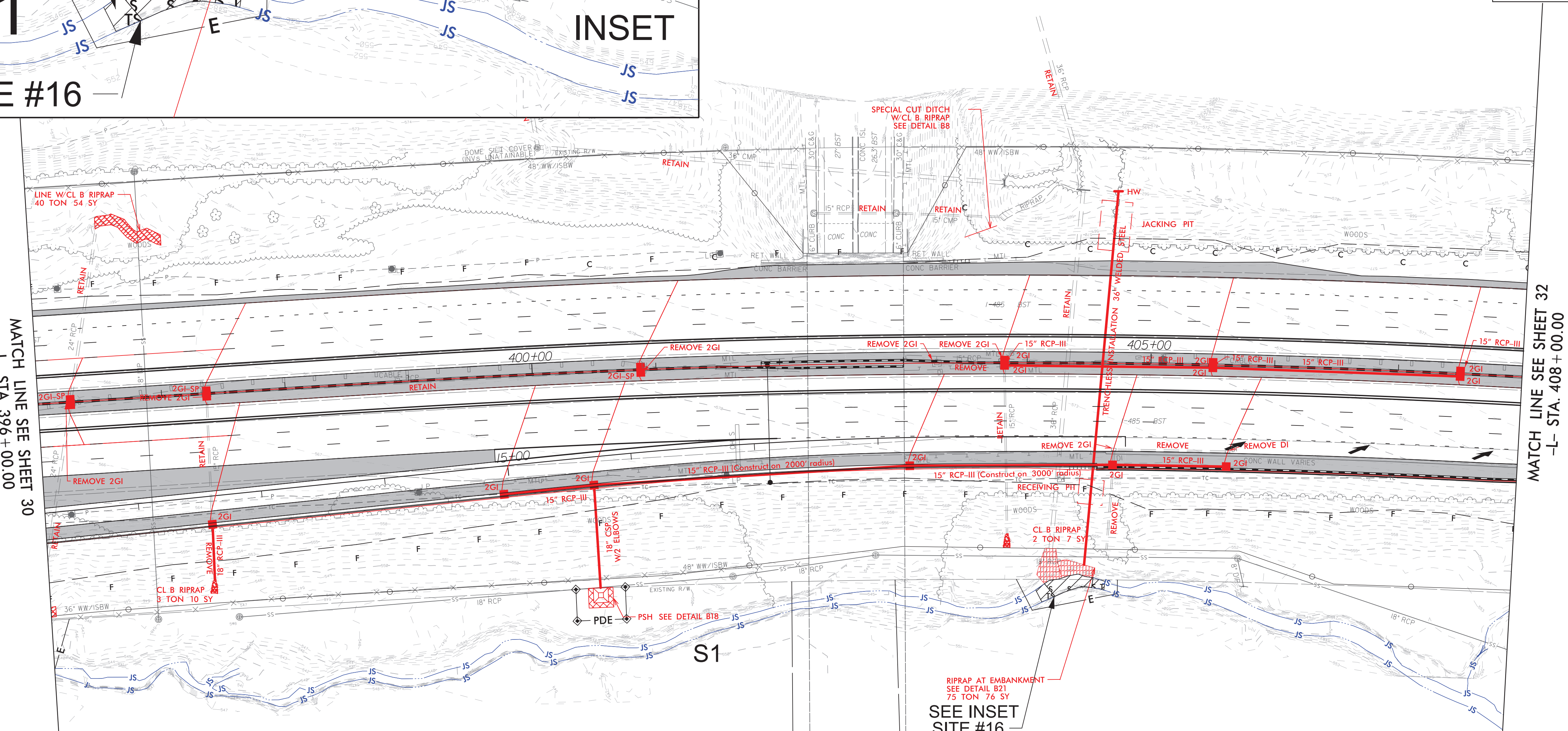
BLYTHE





NAD 83/2011


MATCH LINE SEE SHEET 30 -L- STA. 396+00.00
MATCH LINE SEE SHEET 32 -L- STA. 408+00.00
LINE W/CL B RIPRAP 40 TON 54 SY
SPECIAL CUT DITCH W/CL B RIPRAP SEE DETAIL 88
JACKING PIT
HW
36" WELDED STEEL
TRENCHLESS INSTALLATION
400+00
405+00
REMOVE 2GI
15" RCP–III (Construct on 2000' radius)
15" RCP–III (Construct on 3000' radius)
RECEIVING PIT
CL B RIPRAP 2 TON 7 SY
CL B RIPRAP 3 TON 10 SY
18" CSP W/2 ELBOWS
PDE
PSH SEE DETAIL 818
RIPRAP AT EMBANKMENT SEE DETAIL B21 75 TON 76 SY
SEE INSET SITE #16
S1
RETAIN
REMOVE DI

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 43 OF 115

GRAPHIC SCALE

100 0 100

REVISIONS

8/17/99

9/12/2019

PROJECT REFERENCE NO.	SHEET NO.
I-5507	32
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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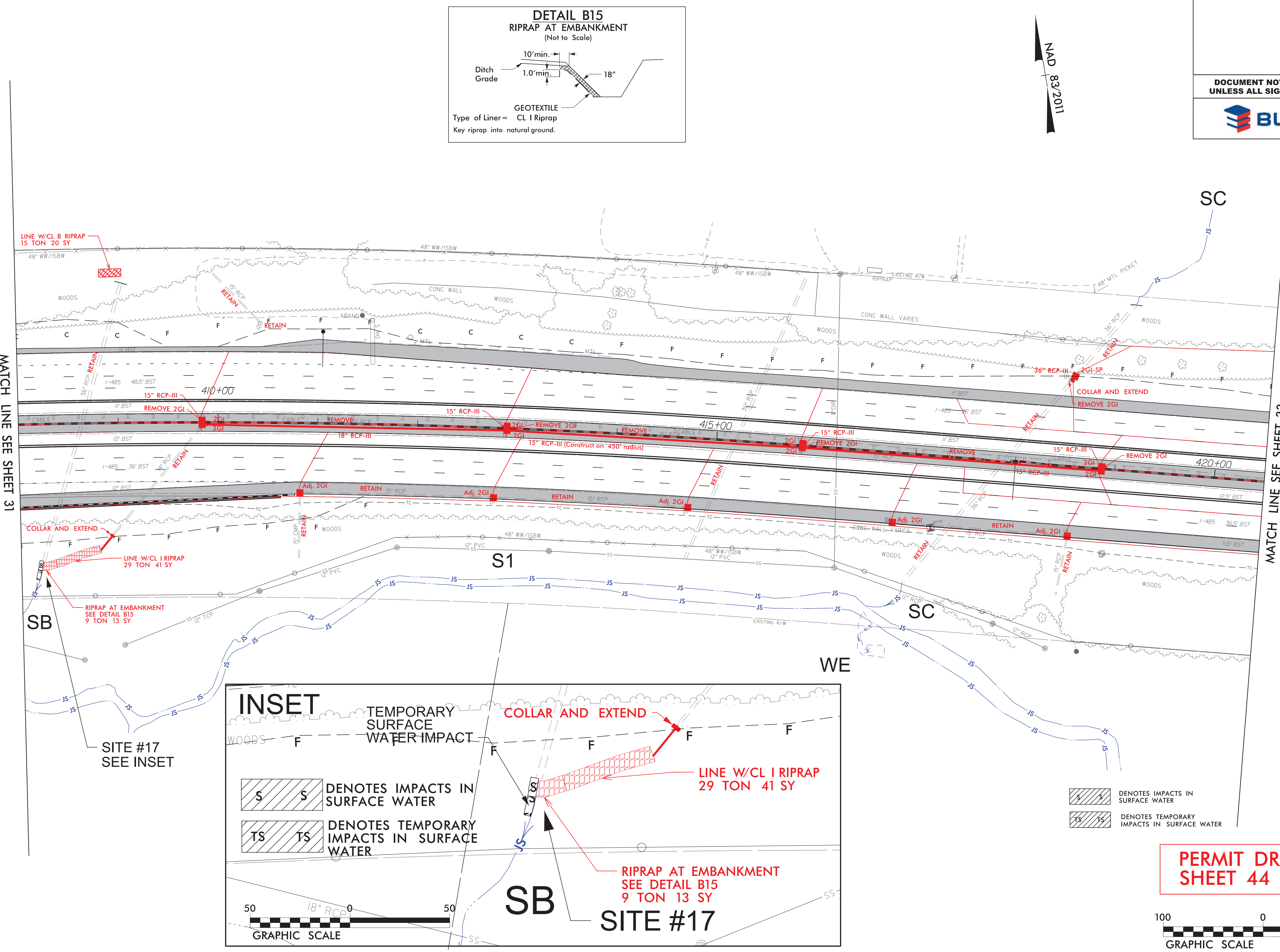
REVISIONS

8/17/99



DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
NAD 83/2011
MATCH LINE SEE SHEET 31 -L- STA. 408+00.00
MATCH LINE SEE SHEET 33 -L- STA. 420+50.00
LINE W/CL B RIPRAP 15 TON 20 SY
COLLAR AND EXTEND
LINE W/CL I RIPRAP 29 TON 41 SY
RIPRAP AT EMBANKMENT SEE DETAIL B15 9 TON 13 SY
410+00
415+00
420+00
15" RCP-III
REMOVE 2GI
18" RCP-III
15" RCP-III (Construct on 450' radius)
36" RCP-III
2GI-SP
Adj. 2GI
RETAIN
REMOVE
SC
SB
S1
WE
SITE #17 SEE INSET
INSET
TEMPORARY SURFACE WATER IMPACT
COLLAR AND EXTEND
LINE W/CL I RIPRAP 29 TON 41 SY
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
RIPRAP AT EMBANKMENT SEE DETAIL B15 9 TON 13 SY
SB
SITE #17
50 0 50
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 44 OF 115

100 0 100

GRAPHIC SCALE

9/12/2019 ...\ics_workingdir\3086\336401.3967\5507_Hyd_prm_wet_psh32.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-5507	32
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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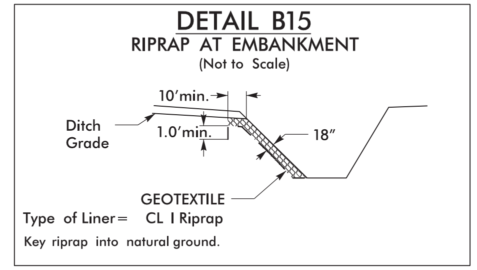
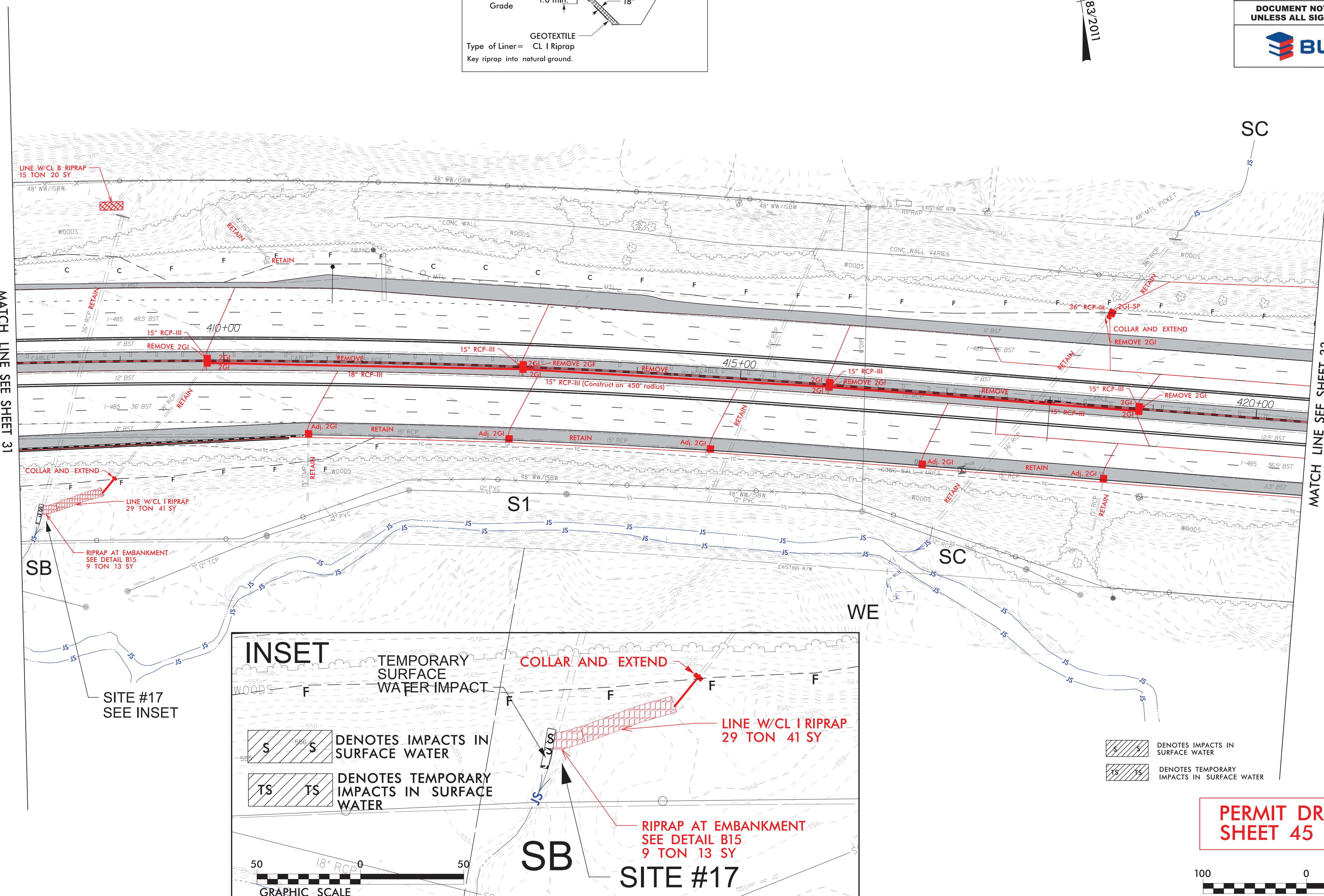



NAD 83/2011
SC
LINE W/CL B RIPRAP
15 TON 20 SY
RETAIN
410+00
415+00
420+00
15" RCP-III
REMOVE 2GI
2GI
18" RCP-III
15" RCP-III (Construct on 450' radius)
REMOVE
36" RCP-III
2GI-SP
COLLAR AND EXTEND
Adj. 2GI
MATCH LINE SEE SHEET 31
-L- STA. 408+00.00
MATCH LINE SEE SHEET 33
-L- STA. 420+50.00
COLLAR AND EXTEND
LINE W/CL I RIPRAP
29 TON 41 SY
RIPRAP AT EMBANKMENT
SEE DETAIL B15
9 TON 13 SY
S1
SB
SC
WE
SITE #17
SEE INSET
INSET
TEMPORARY SURFACE WATER IMPACT
COLLAR AND EXTEND
LINE W/CL I RIPRAP
29 TON 41 SY
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
RIPRAP AT EMBANKMENT
SEE DETAIL B15
9 TON 13 SY
SB
SITE #17
50 0 50
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

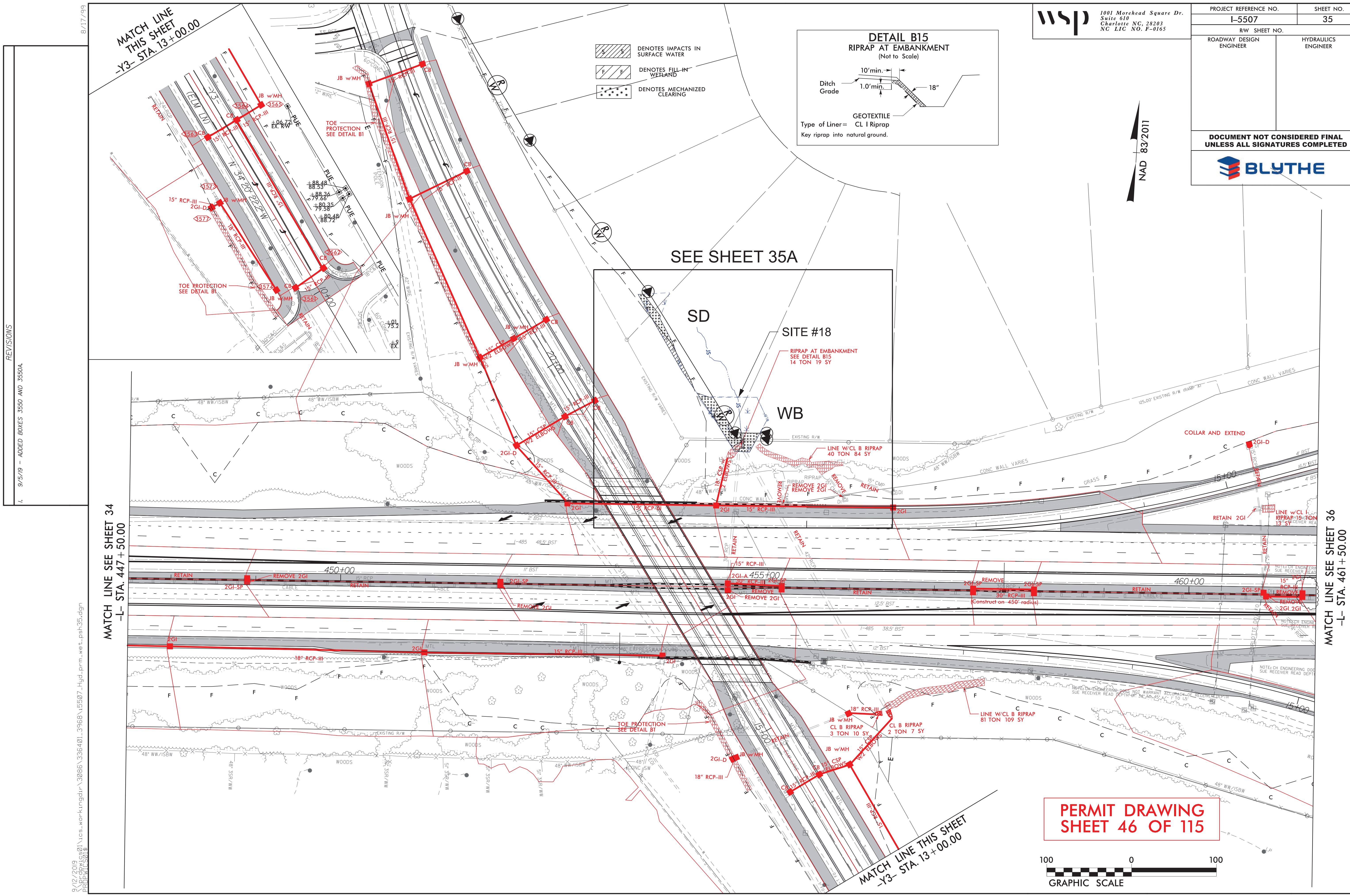
PERMIT DRAWING SHEET 45 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019



PROJECT REFERENCE NO. I-5507
SHEET NO. 35
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
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wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
NAD 83/2011
SEE SHEET 35A
SD
SITE #18
WB
RIPRAP AT EMBANKMENT SEE DETAIL B15 14 TON 19 SY
LINE W/CL B RIPRAP 40 TON 84 SY
LINE W/CL B RIPRAP 81 TON 109 SY
CL B RIPRAP 3 TON 10 SY
CL B RIPRAP 2 TON 7 SY
COLLAR AND EXTEND
RETAIN 2GI
TOE PROTECTION SEE DETAIL B1
MATCH LINE THIS SHEET -Y3- STA. 13+00.00
MATCH LINE SEE SHEET 34 -L- STA. 447+50.00
MATCH LINE SEE SHEET 36 -L- STA. 461+50.00
450+00
455+00
460+00
REVISIONS
1. 9/5/19 - ADDED BOXES 3550 AND 3550A
PERMIT DRAWING SHEET 46 OF 115
100 0 100
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	35
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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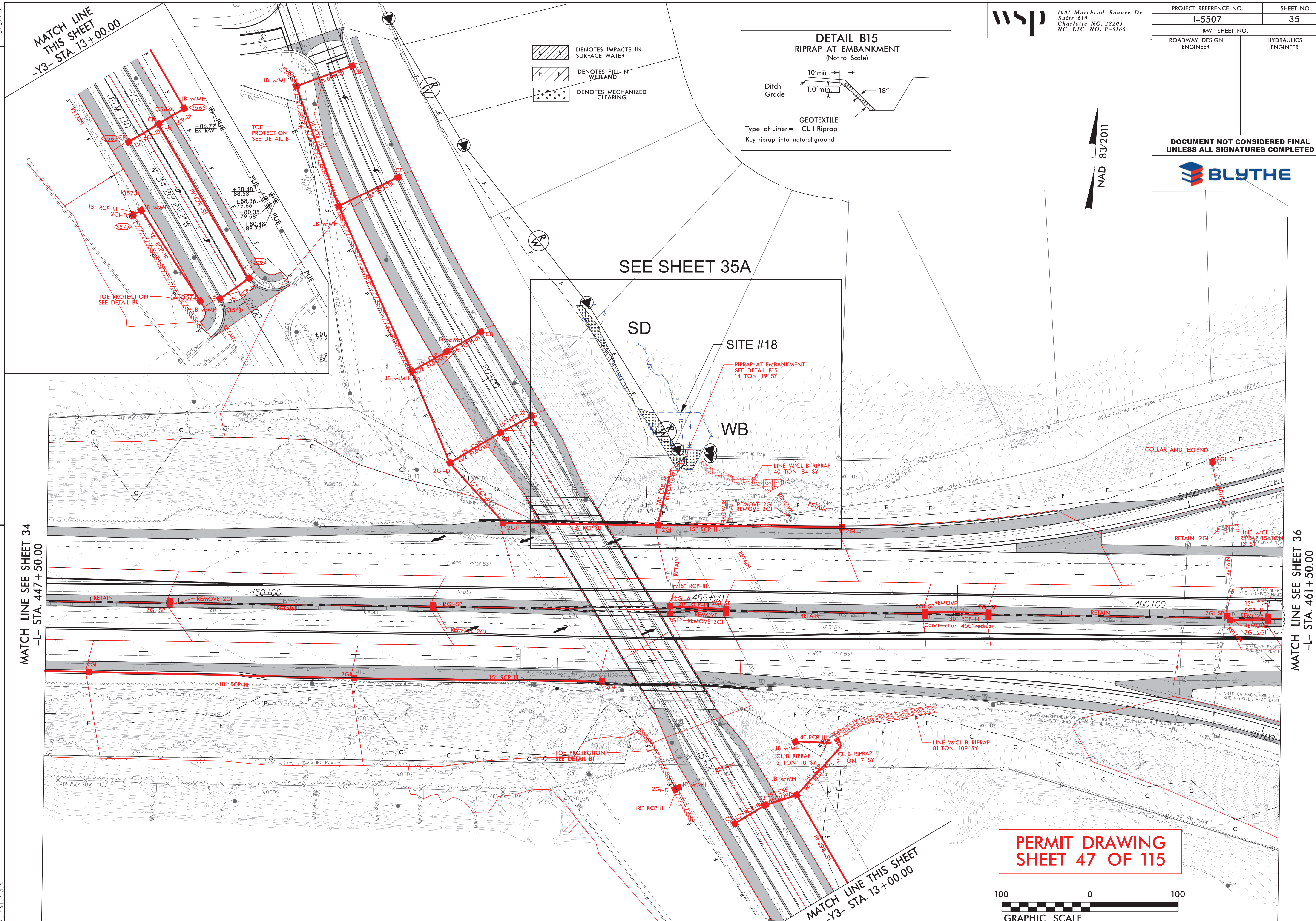

MATCH LINE THIS SHEET -Y3- STA. 13+00.00
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
Ditch Grade
18"
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
NAD 83/2011
SEE SHEET 35A
SD
SITE #18
WB
RIPRAP AT EMBANKMENT SEE DETAIL B15 14 TON 19 SY
LINE W/CL B RIPRAP 40 TON 84 SY
TOE PROTECTION SEE DETAIL B1
COLLAR AND EXTEND
LINE W/CL I RIPRAP 15 TON 13 SY
LINE W/CL B RIPRAP 81 TON 109 SY
CL B RIPRAP 3 TON 10 SY
CL B RIPRAP 2 TON 7 SY
30" RCP-III (Construct on 450' radius)
450+00
455+00
460+00
MATCH LINE SEE SHEET 34 -L- STA. 447+50.00
MATCH LINE SEE SHEET 36 -L- STA. 461+50.00
MATCH LINE THIS SHEET -Y3- STA. 13+00.00
PERMIT DRAWING SHEET 47 OF 115
100 0 100
GRAPHIC SCALE
REVISIONS
1. 9/5/19 - ADDED BOXES 3550 AND 3550A.

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PROJECT REFERENCE NO.	SHEET NO.
I-5507	35A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

SD

SITE #18

RIPRAP AT EMBANKMENT
SEE DETAIL B15
14 TON 19 SY

JS

WB

JS

RVL

EXISTING R/W VARIES

EXISTING R/W

CB

ELM LANE

WOODS

LINE W/CL B RIPRAP
40 TON 84 SY

18" CSP w/ 2 ELBOWS

48" WW/ISBW

RIPRAP

REMOVE 2GI
REMOVE 2GI

15" CMP

REMOVE

PERMIT DRAWING
SHEET 48 OF 115

25 0 25
GRAPHIC SCALE

9/12/2019
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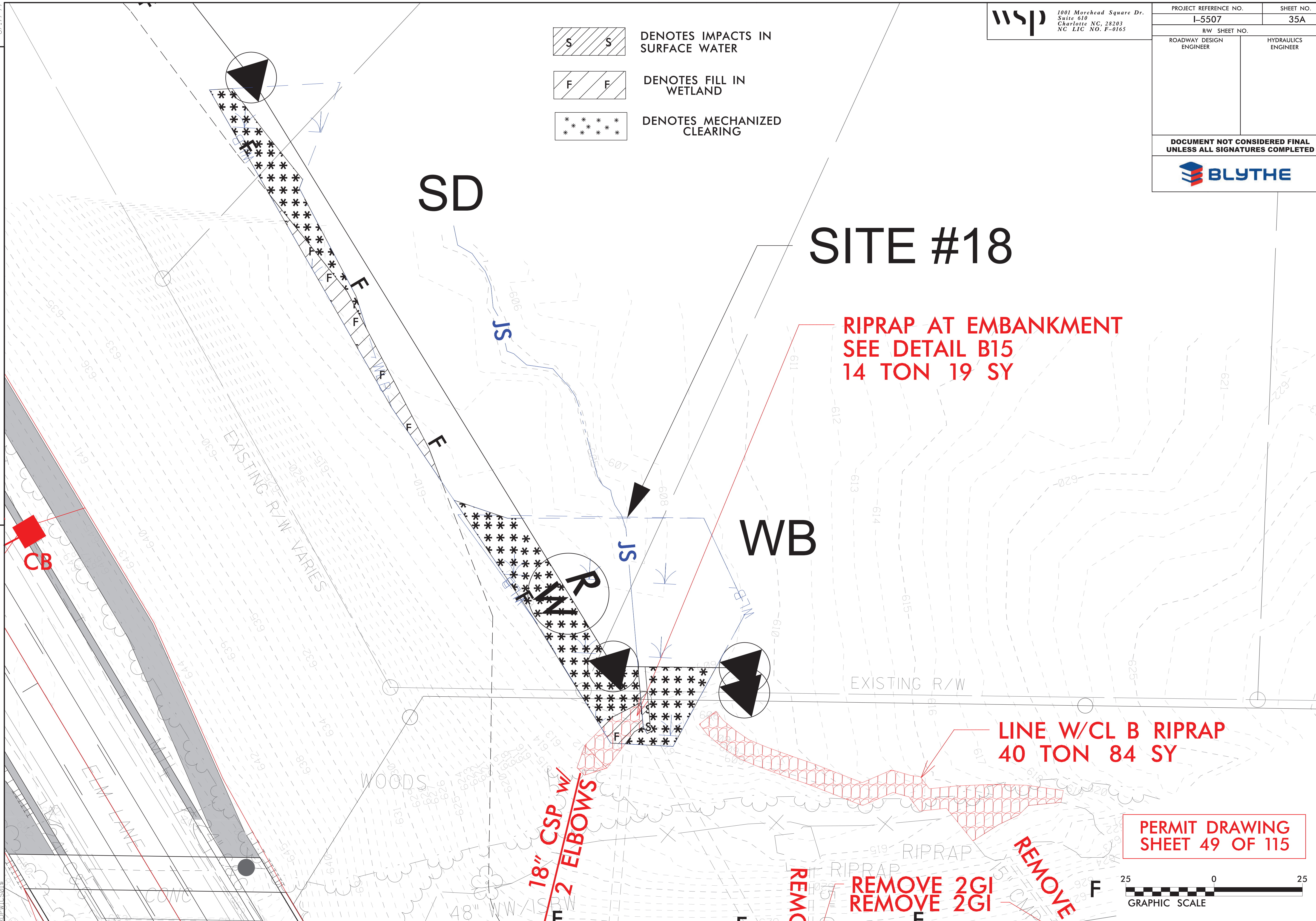
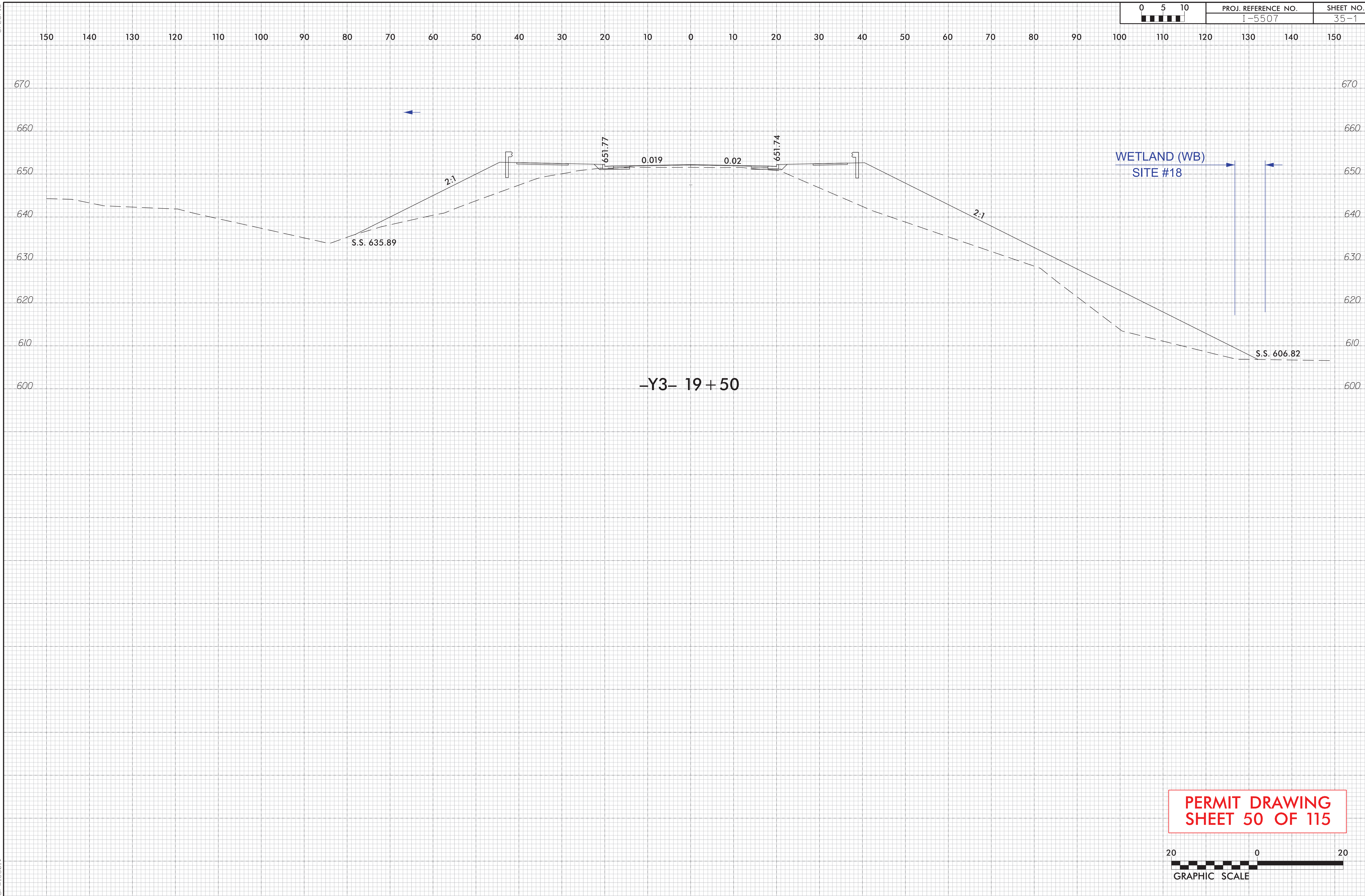
RIPWETCS01$



wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
PROJECT REFERENCE NO. I-5507
SHEET NO. 35A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
SD
SITE #18
WB
RIPRAP AT EMBANKMENT
SEE DETAIL B15
14 TON 19 SY
LINE W/CL B RIPRAP
40 TON 84 SY
18" CSP W/ 2 ELBOWS
REMOVE 2GI
REMOVE 2GI
REMOVE
CB
EXISTING R/W VARIES
EXISTING R/W
WOODS
RIPRAP
PERMIT DRAWING
SHEET 49 OF 115
GRAPHIC SCALE
25 0 25
REVISIONS

PROJ. REFERENCE NO.	SHEET NO.
I-5507	35-1



PERMIT DRAWING
SHEET 50 OF 115

6/23/16

9/12/2019
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PRDPWICS01$

RW SHEET NO.

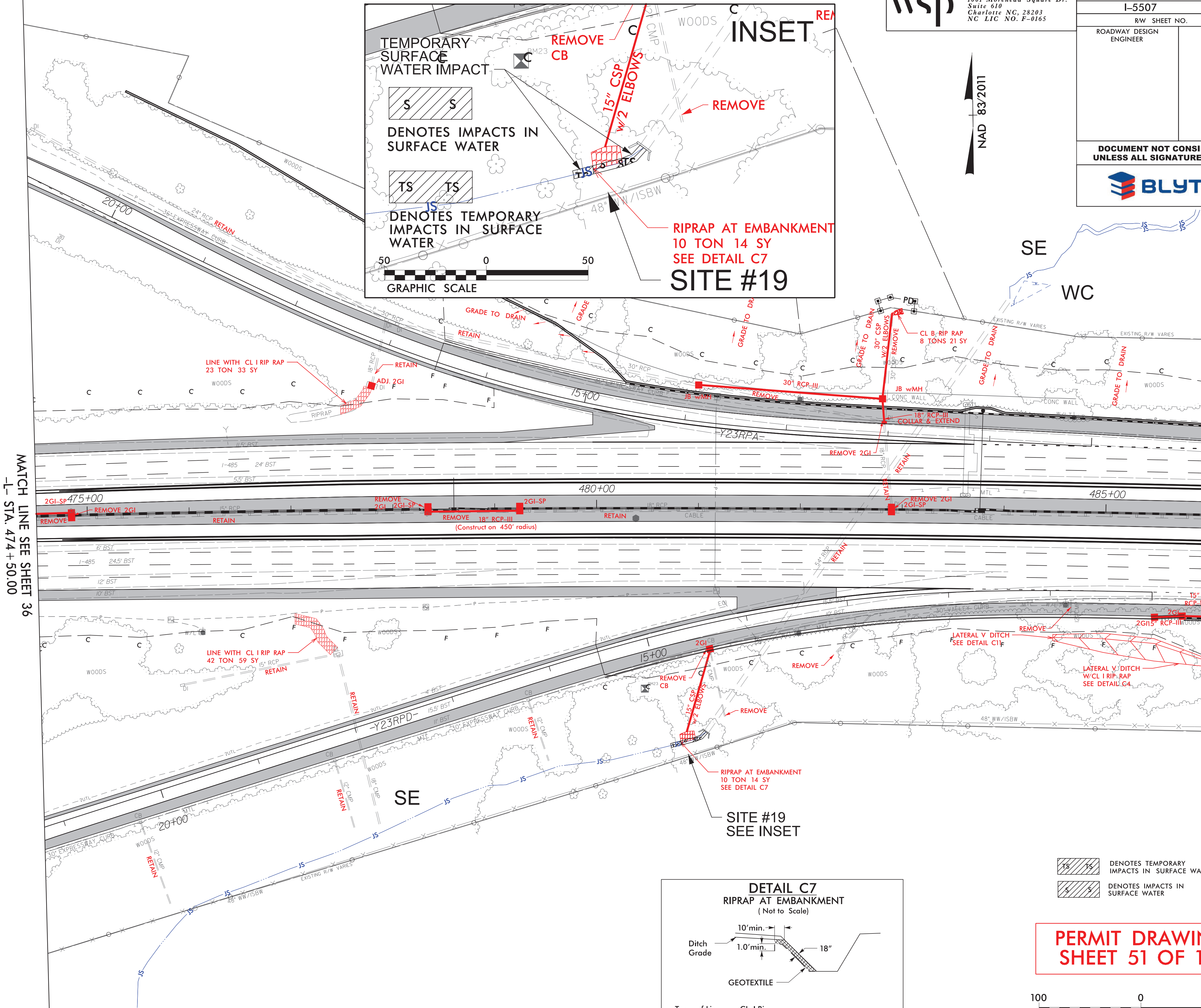
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

BLYTHE

NAD 83/2011


INSET
TEMPORARY SURFACE WATER IMPACT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
REMOVE CB
15" CSP w/2 ELBOWS
REMOVE
RIPRAP AT EMBANKMENT
10 TON 14 SY
SEE DETAIL C7
SITE #19
GRAPHIC SCALE
50 0 50
SE
WC
MATCH LINE SEE SHEET 36 -L- STA. 474+50.00
MATCH LINE SEE SHEET 38 -L- STA. 486+00.00
LINE WITH CL I RIP RAP 23 TON 33 SY
LINE WITH CL I RIP RAP 42 TON 59 SY
CL B RIP RAP 8 TONS 21 SY
30" CSP w/2 ELBOWS
30" RCP-III
JB w/MH
18" RCP-III COLLAR & EXTEND
REMOVE 2GI
18" RCP-III (Construct on 450' radius)
LATERAL V DITCH SEE DETAIL C11
LATERAL V DITCH W/CL I RIP RAP SEE DETAIL C4
GRADE TO DRAIN
RETAIN
-Y23RPA-
-Y23RPD-
475+00
480+00
485+00
15+00
20+00
SITE #19 SEE INSET
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 51 OF 115

GRAPHIC SCALE
100 0 100

REVISIONS

8/17/99

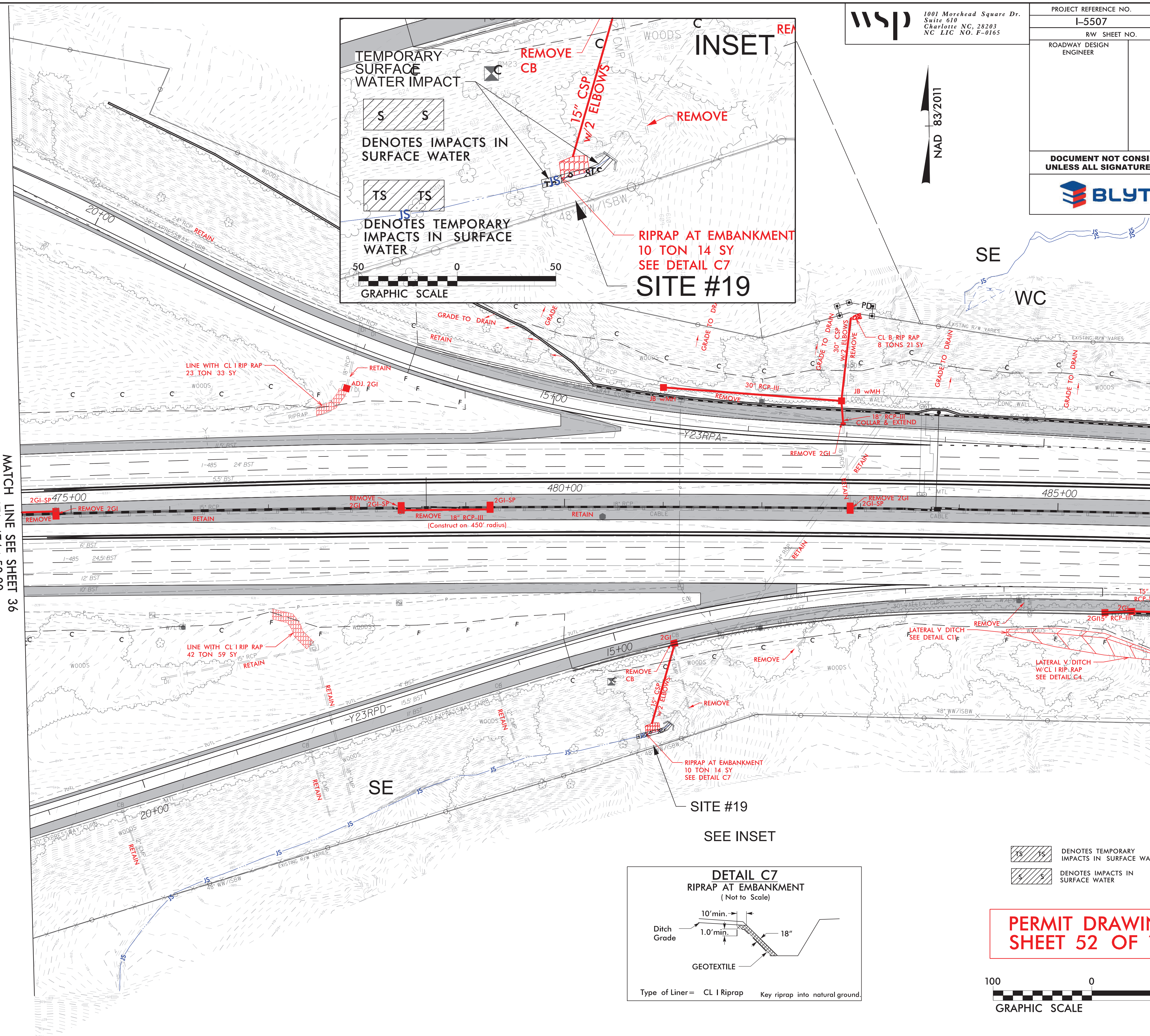
9/12/2019
...\ics_workingdir\3086\336401_3969\i5507_Hyd_prm_wet_psh37.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-5507	37
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

BLYTHE



INSET
TEMPORARY SURFACE WATER IMPACT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
REMOVE CB
15" CSP w/2 ELBOWS
REMOVE
RIPRAP AT EMBANKMENT
10 TON 14 SY
SEE DETAIL C7
SITE #19
50 0 50
GRAPHIC SCALE
NAD 83/2011
SE
WC
MATCH LINE SEE SHEET 36 -L- STA. 474+50.00
MATCH LINE SEE SHEET 38 -L- STA. 486+00.00
LINE WITH CL I RIP RAP 23 TON 33 SY
LINE WITH CL I RIP RAP 42 TON 59 SY
CL B RIP RAP 8 TONS 21 SY
30" RCP-III
JB w/MH
18" RCP-III COLLAR & EXTEND
REMOVE 2GI
18" RCP-III (Construct on 450' radius)
LATERAL V DITCH SEE DETAIL C11
LATERAL V DITCH W/CL I RIP RAP SEE DETAIL C4
-Y23RPA-
-Y23RPD-
475+00
480+00
485+00
15+00
20+00
RIPRAP AT EMBANKMENT 10 TON 14 SY SEE DETAIL C7
SITE #19
SEE INSET
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 52 OF 115

100 0 100
GRAPHIC SCALE

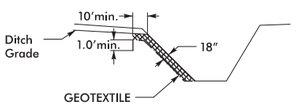
REVISIONS

8/17/99

8/17/99

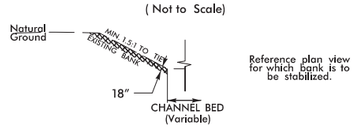
REVISIONS
1. 10/19/20 - 8" DIP SANITARY SEWER CONFLICT WITH PIPE 3825

DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



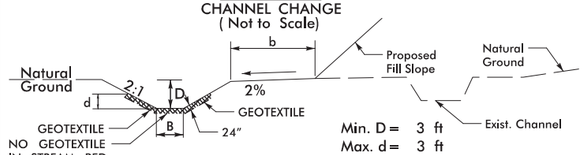
Type of Liner= Class I Riprap (KEYED IN)

DETAIL C8
BANK STABILIZATION
(Not to Scale)



Type of Liner = Class I Riprap (KEYED IN)

DETAIL C9
CHANNEL CHANGE
(Not to Scale)



Min. D = 3 ft
Max. d = 3 ft
B = 3 ft
b = 5 ft

Type of Liner= Class II Riprap (KEYED IN)

SITES #20 AND #22 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

NAD 83/2011

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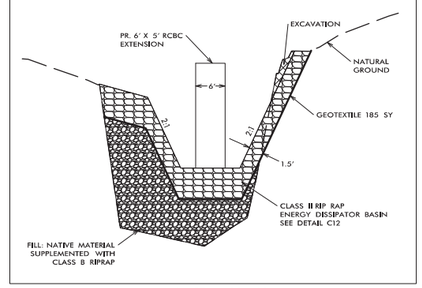
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

DETAIL C17
OUTLET CHANNEL
(Not to Scale)



–L– STA. 488+60

SF

SEE SHEET 38A

SITE #20

SITE #21

SITE #22

SG

OUTLET CHANNEL SEE DETAIL C17

RIP RAP ENERGY DISSIPATOR BASIN #1
CL II RIP RAP
183 TON 185 SY
SEE DETAIL C12

CULVERT EXTENSION

RIPRAP AT EMBANKMENT SEE DETAIL C7
CL I RIPRAP
4 TONS 7 SY

BANK STABILIZATION SEE DETAIL C8
3 TONS

BANK STABILIZATION SEE DETAIL C8
4 TONS

CHANNEL CHANGE W/CL II RIP RAP SEE DETAIL C9

LINE WITH CL I RIP RAP
153 TON

LINE WITH CL I RIP RAP
20 TON 29 SY

CUT DITCH CONCRETE SEE DETAIL C1

PDE

15" CSP W/2 ELBOWS

REMOVE

REMOVE 2GI

48" RCP-III COLLAR & EXTEND

42" RCP-III

30" RCP-III

TOP=628.5
INV=615.5

TOP=625.6
INV=613.7

TOP=627.6
INV=613.2

TOP=625.0
INV=612.6

42"RCP-III (FIELD ADJUST PIPE TO AVOID CONFLICT WITH SIGN POST)

TB-2GI-SP

RETAIN

MATCH LINE SEE SHEET 37
–L– STA. 486+00.00

MATCH LINE SEE SHEET 39
–L– STA. 500+00.00

490+00

495+00

500+00

SEE SHEET 38B

SEE SHEET 38B

LINE WITH CL I RIP RAP
35 TON 49 SY

TOE PROTECTION SEE DETAIL C3

REMOVE EXISTING TAPER, EXTEND CULVERT AND CONSTRUCT NEW TAPER

TAPERED INLET SEE DETAIL C14
INLET CHANNEL SEE DETAIL C16

RIPRAP AT EMBANKMENT
CL I RIPRAP
5 TON 7 SY
SEE DETAIL C7

EXTEND 6'X5' RCBC

LINE WITH CL I RIP RAP
127 TON

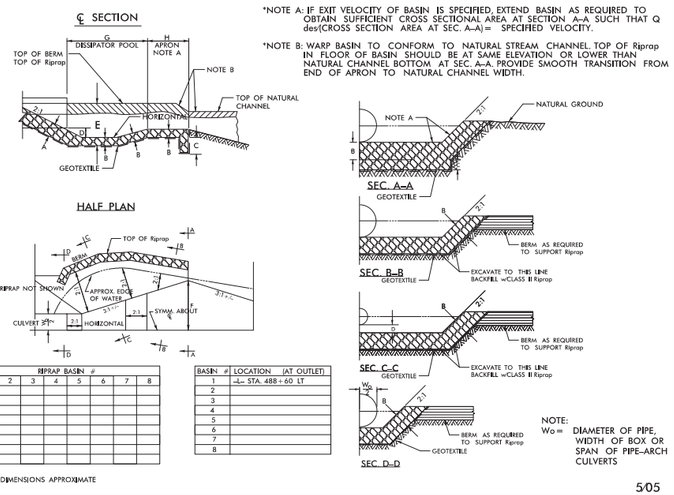
RIPRAP AT EMBANKMENT
26 TON 37 SY
SEE DETAIL C7

WD

DETAIL C12
RIPRAP ENERGY DISSIPATOR BASIN

*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des(CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF Riprap IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.



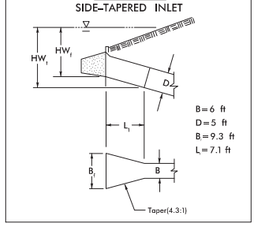
DIM.	RIPRAP BASIN # 1	2	3	4	5	6	7	8
A	30"							
B	21'							
C	16'							
D	1.6'							
E	10.2'							
F	11.7'							
G	18.0'							
H	8.0'							

*ALL DIMENSIONS APPROXIMATE

BASIN #	LOCATION (AT OUTLET)
1	–L– STA. 488+60 LT
2	
3	
4	
5	
6	
7	
8	

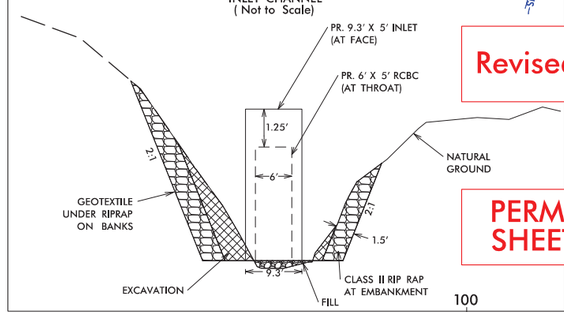
5/05

DETAIL C14
SIDE-TAPERED INLET



B=6 ft
D=5 ft
B=9.3 ft
L=7.1 ft

DETAIL C16
INLET CHANNEL
(Not to Scale)



–L– STA. 488+60

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

Revised August 2021

PERMIT DRAWING
SHEET 53 OF 115

100 0 100
GRAPHIC SCALE

8/31/2021
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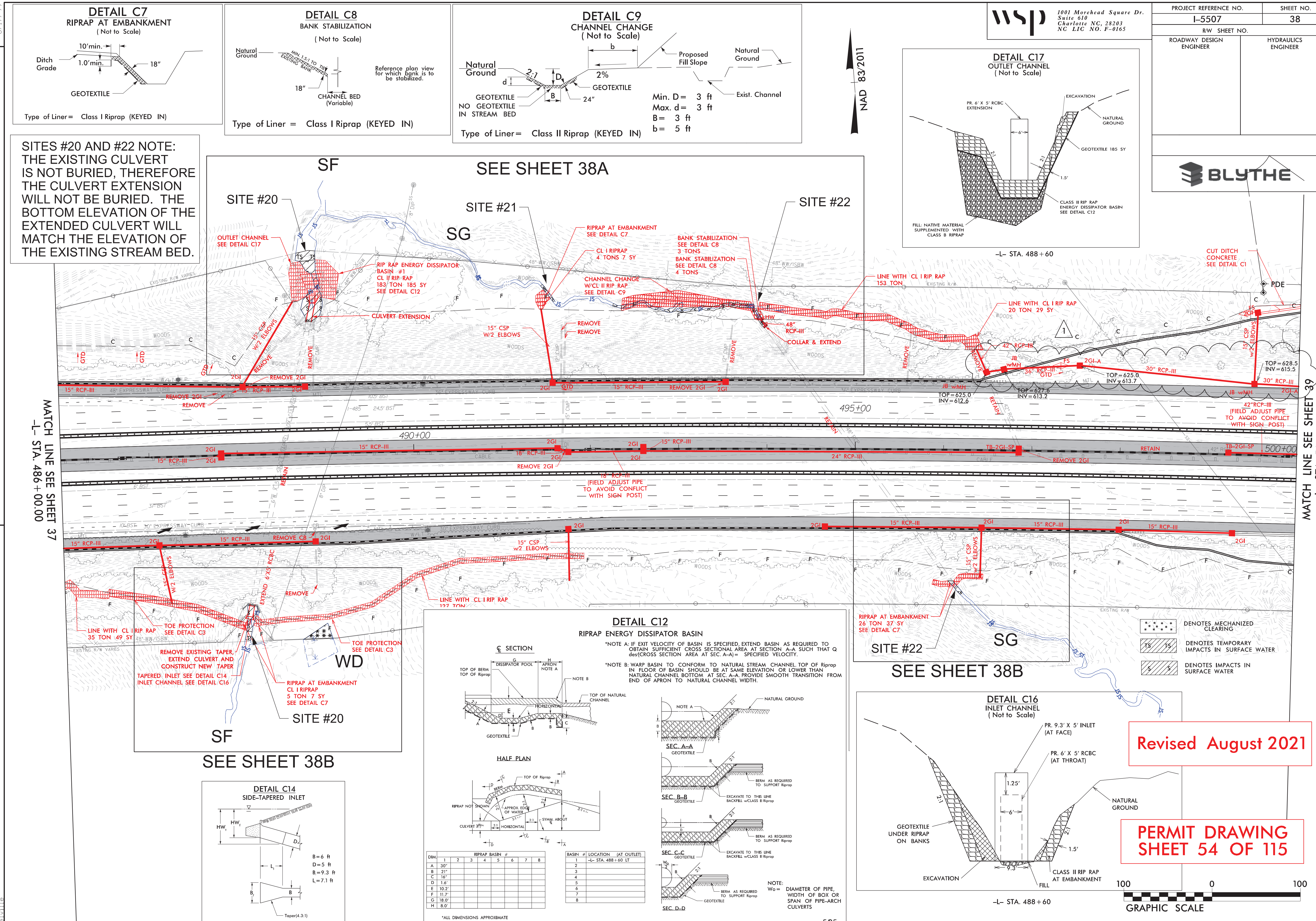
Melville

REVISIONS
1, 10/19/20 - 8" DIP SANITARY SEWER CONFLICT WITH PIPE 3825
8/17/99


DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
10'min.
1.0'min.
18"
GEOTEXTILE
Type of Liner = Class I Riprap (KEYED IN)
DETAIL C8
BANK STABILIZATION
(Not to Scale)
Natural Ground
Reference plan view for which bank is to be stabilized.
18"
CHANNEL BED (Variable)
Type of Liner = Class I Riprap (KEYED IN)
DETAIL C9
CHANNEL CHANGE
(Not to Scale)
Natural Ground
GEOTEXTILE
NO GEOTEXTILE IN STREAM BED
24"
2%
Proposed Fill Slope
Natural Ground
Exist. Channel
Min. D = 3 ft
Max. d = 3 ft
B = 3 ft
b = 5 ft
Type of Liner = Class II Riprap (KEYED IN)
NAD 83/2011
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
PROJECT REFERENCE NO.
I-5507
SHEET NO.
38
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
BLYTHE
SITES #20 AND #22 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DETAIL C17
OUTLET CHANNEL
(Not to Scale)
EXCAVATION
NATURAL GROUND
GEOTEXTILE 185 SY
CLASS II RIP RAP ENERGY DISSIPATOR BASIN SEE DETAIL C12
FILL: NATIVE MATERIAL SUPPLEMENTED WITH CLASS B RIPRAP
-L- STA. 488+60
SEE SHEET 38A
SITE #20
SITE #21
SITE #22
SF
SG
OUTLET CHANNEL SEE DETAIL C17
RIP RAP ENERGY DISSIPATOR BASIN #1
CL II RIP RAP 183 TON 185 SY
SEE DETAIL C12
CULVERT EXTENSION
RIPRAP AT EMBANKMENT SEE DETAIL C7
CL I RIPRAP 4 TONS 7 SY
CHANNEL CHANGE W/CL II RIP RAP SEE DETAIL C9
BANK STABILIZATION SEE DETAIL C8 3 TONS
BANK STABILIZATION SEE DETAIL C8 4 TONS
15" CSP W/2 ELBOWS
48" RCP-III
COLLAR & EXTEND
LINE WITH CL I RIP RAP 153 TON
LINE WITH CL I RIP RAP 20 TON 29 SY
CUT DITCH CONCRETE SEE DETAIL C1
PDE
TOP = 628.5 INV = 615.5
TOP = 625.0 INV = 613.7
TOP = 627.6 INV = 613.2
TOP = 625.0 INV = 612.6
30" RCP-III
42" RCP-III
36" RCP-III
42" RCP-III (FIELD ADJUST PIPE TO AVOID CONFLICT WITH SIGN POST)
18" RCP-III (FIELD ADJUST PIPE TO AVOID CONFLICT WITH SIGN POST)
15" RCP-III
24" RCP-III
495+00
490+00
500+00
MATCH LINE SEE SHEET 37 -L- STA. 486+00.00
MATCH LINE SEE SHEET 39 -L- STA. 500+00.00
REMOVE
REMOVE 2GI
RETAIN
LINE WITH CL I RIP RAP 35 TON 49 SY
TOE PROTECTION SEE DETAIL C3
REMOVE EXISTING TAPER, EXTEND CULVERT AND CONSTRUCT NEW TAPER
TAPERED INLET SEE DETAIL C14
INLET CHANNEL SEE DETAIL C16
RIPRAP AT EMBANKMENT CL I RIPRAP 5 TON 7 SY SEE DETAIL C7
LINE WITH CL I RIP RAP 127 TON
WD
SEE SHEET 38B
RIPRAP AT EMBANKMENT 26 TON 37 SY SEE DETAIL C7
DETAIL C12
RIPRAP ENERGY DISSIPATOR BASIN
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des(CROSS SECTION AREA AT SEC. A-A) = SPECIFIED VELOCITY.
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF Riprap IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.
℄ SECTION
HALF PLAN
SEC. A-A
SEC. B-B
SEC. C-C
SEC. D-D
NOTE: Wo = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS
*ALL DIMENSIONS APPROXIMATE
RIPRAP BASIN #
A 30"
B 21"
C 16"
D 1.6'
E 10.2'
F 11.7'
G 18.0'
H 8.0'
BASIN # LOCATION (AT OUTLET)
1 -L- STA. 488+60 LT
DETAIL C14
SIDE-TAPERED INLET
B=6 ft
D=5 ft
B=9.3 ft
L=7.1 ft
DETAIL C16
INLET CHANNEL
(Not to Scale)
PR. 9.3' X 5' INLET (AT FACE)
PR. 6' X 5' RCBC (AT THROAT)
NATURAL GROUND
GEOTEXTILE UNDER RIPRAP ON BANKS
EXCAVATION
FILL
CLASS II RIP RAP AT EMBANKMENT
-L- STA. 488+60
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
Revised August 2021
PERMIT DRAWING SHEET 54 OF 115
100 0 100
GRAPHIC SCALE

8/31/2021
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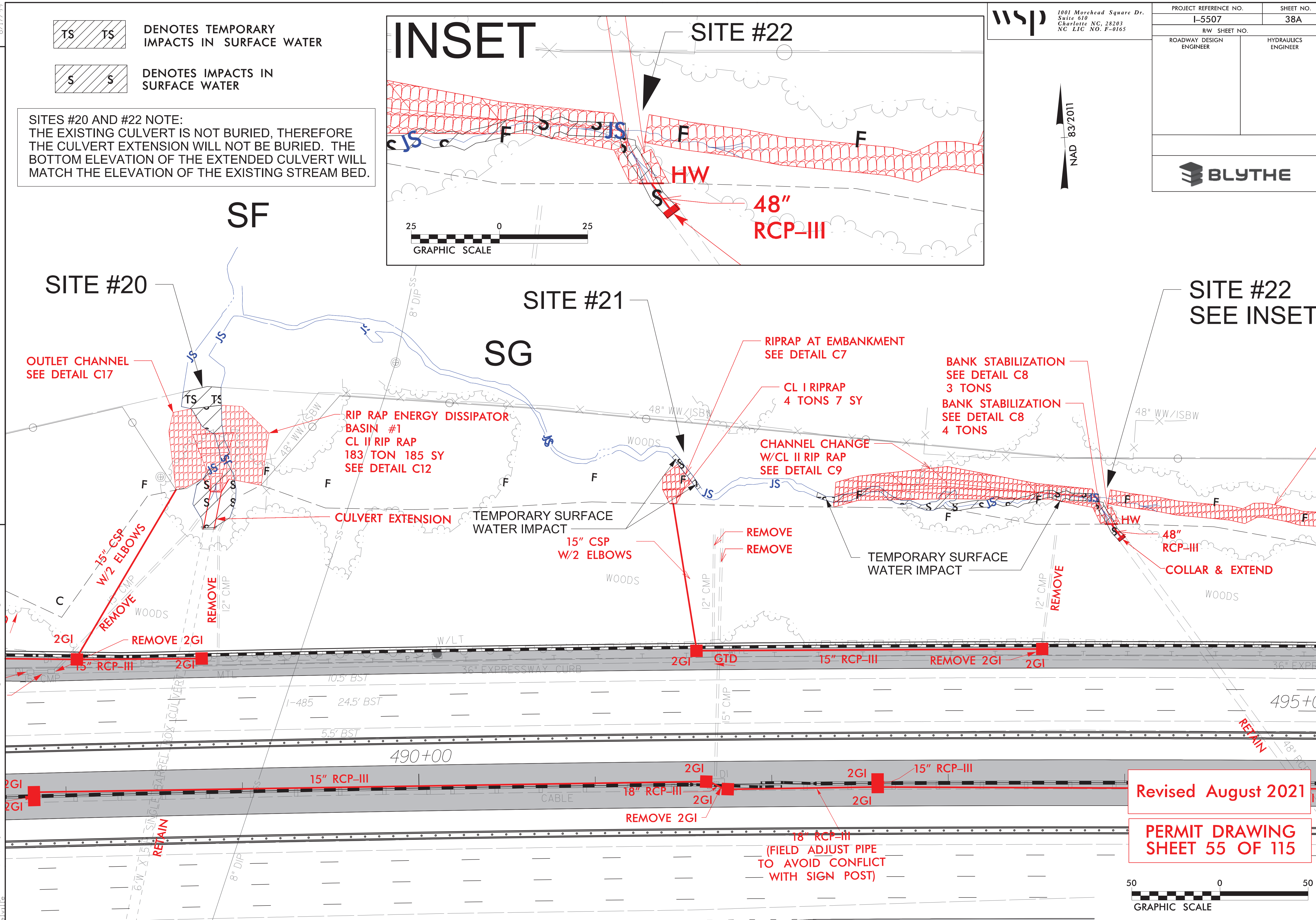
Melville


DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SITES #20 AND #22 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
INSET
SITE #22
HW
48" RCP-III
GRAPHIC SCALE
PROJECT REFERENCE NO.
I-5507
SHEET NO.
38A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
SF
SG
SITE #20
SITE #21
SITE #22 SEE INSET
OUTLET CHANNEL SEE DETAIL C17
RIP RAP ENERGY DISSIPATOR BASIN #1 CL II RIP RAP 183 TON 185 SY SEE DETAIL C12
CULVERT EXTENSION
TEMPORARY SURFACE WATER IMPACT
15" CSP W/2 ELBOWS
RIPRAP AT EMBANKMENT SEE DETAIL C7
CL I RIPRAP 4 TONS 7 SY
CHANNEL CHANGE W/CL II RIP RAP SEE DETAIL C9
BANK STABILIZATION SEE DETAIL C8 3 TONS
BANK STABILIZATION SEE DETAIL C8 4 TONS
REMOVE
REMOVE
TEMPORARY SURFACE WATER IMPACT
HW
48" RCP-III
COLLAR & EXTEND
2GI
REMOVE 2GI
15" RCP-III
GTD
REMOVE 2GI
495+00
490+00
15" RCP-III
18" RCP-III
REMOVE 2GI
18" RCP-III (FIELD ADJUST PIPE TO AVOID CONFLICT WITH SIGN POST)
RETAIN
Revised August 2021
PERMIT DRAWING SHEET 55 OF 115
GRAPHIC SCALE

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	38A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

NAD 83/2011

8/17/99

REVISIONS

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

SITES #20 AND #22 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

INSET

SITE #22

HW

48" RCP-III

25 0 25
GRAPHIC SCALE

SF

SG

SITE #20

SITE #21

SITE #22
SEE INSET

OUTLET CHANNEL
SEE DETAIL C17

RIP RAP ENERGY DISSIPATOR
BASIN #1
CL II RIP RAP
183 TON 185 SY
SEE DETAIL C12

CULVERT EXTENSION

TEMPORARY SURFACE
WATER IMPACT

RIPRAP AT EMBANKMENT
SEE DETAIL C7

CL I RIPRAP
4 TONS 7 SY

CHANNEL CHANGE
W/CL II RIP RAP
SEE DETAIL C9

BANK STABILIZATION
SEE DETAIL C8
3 TONS

BANK STABILIZATION
SEE DETAIL C8
4 TONS

TEMPORARY SURFACE
WATER IMPACT

15" CSP
W/2 ELBOWS

REMOVE

REMOVE 2GI

15" RCP-III

18" RCP-III
(FIELD ADJUST PIPE
TO AVOID CONFLICT
WITH SIGN POST)

48" RCP-III

COLLAR & EXTEND

RETAIN

Revised August 2021

PERMIT DRAWING
SHEET 56 OF 115

50 0 50
GRAPHIC SCALE

8/31/2021
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Melville

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	38B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

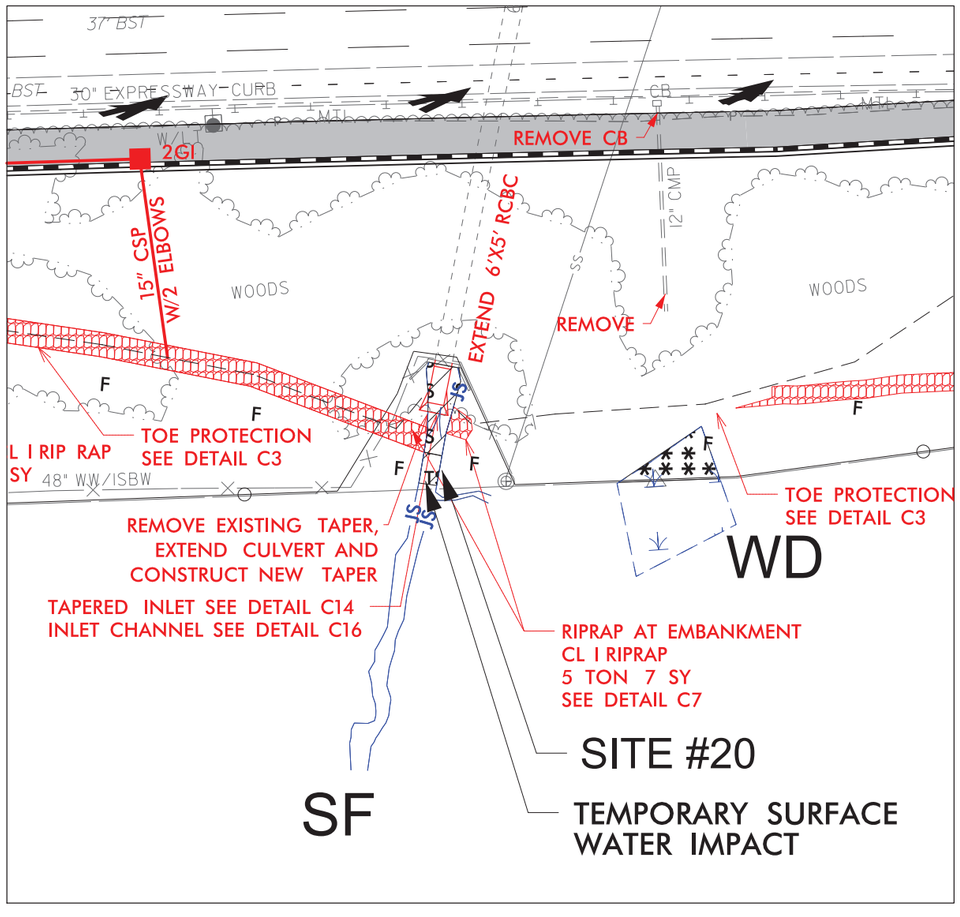
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

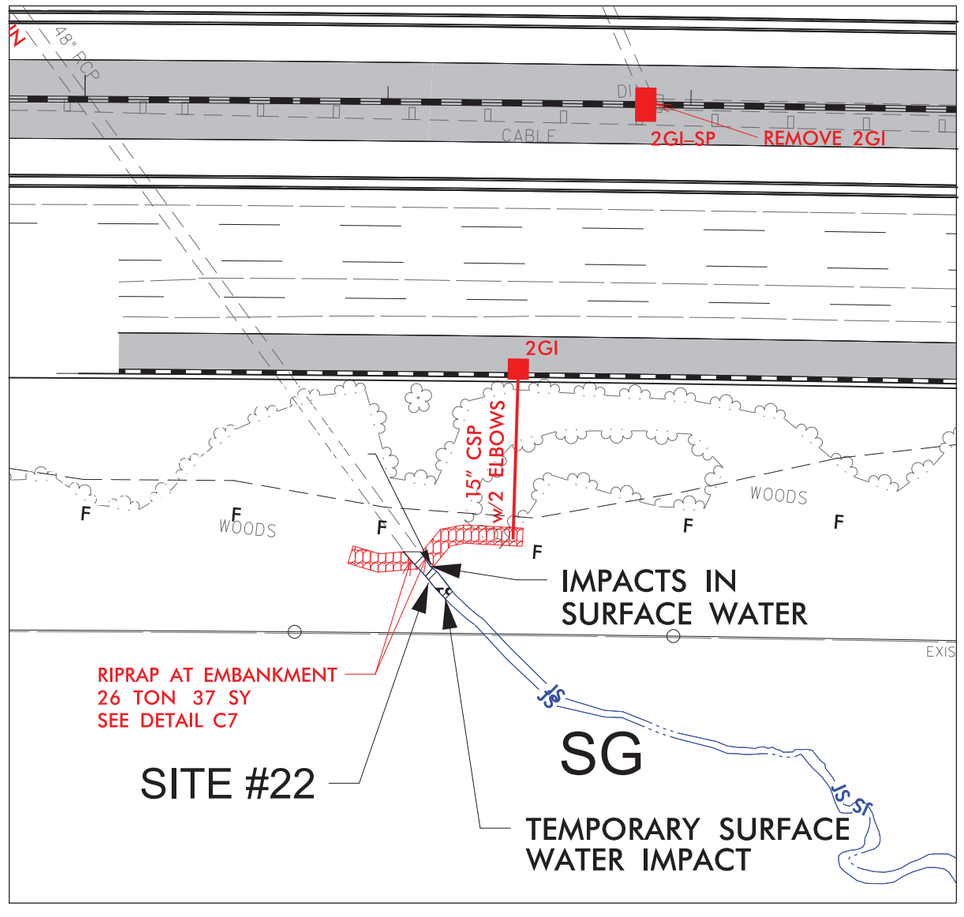
BLYTHE

NAD 83/2011

8/17/99

REVISIONS





S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

PERMIT DRAWING
SHEET 57 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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PRP WICS01$

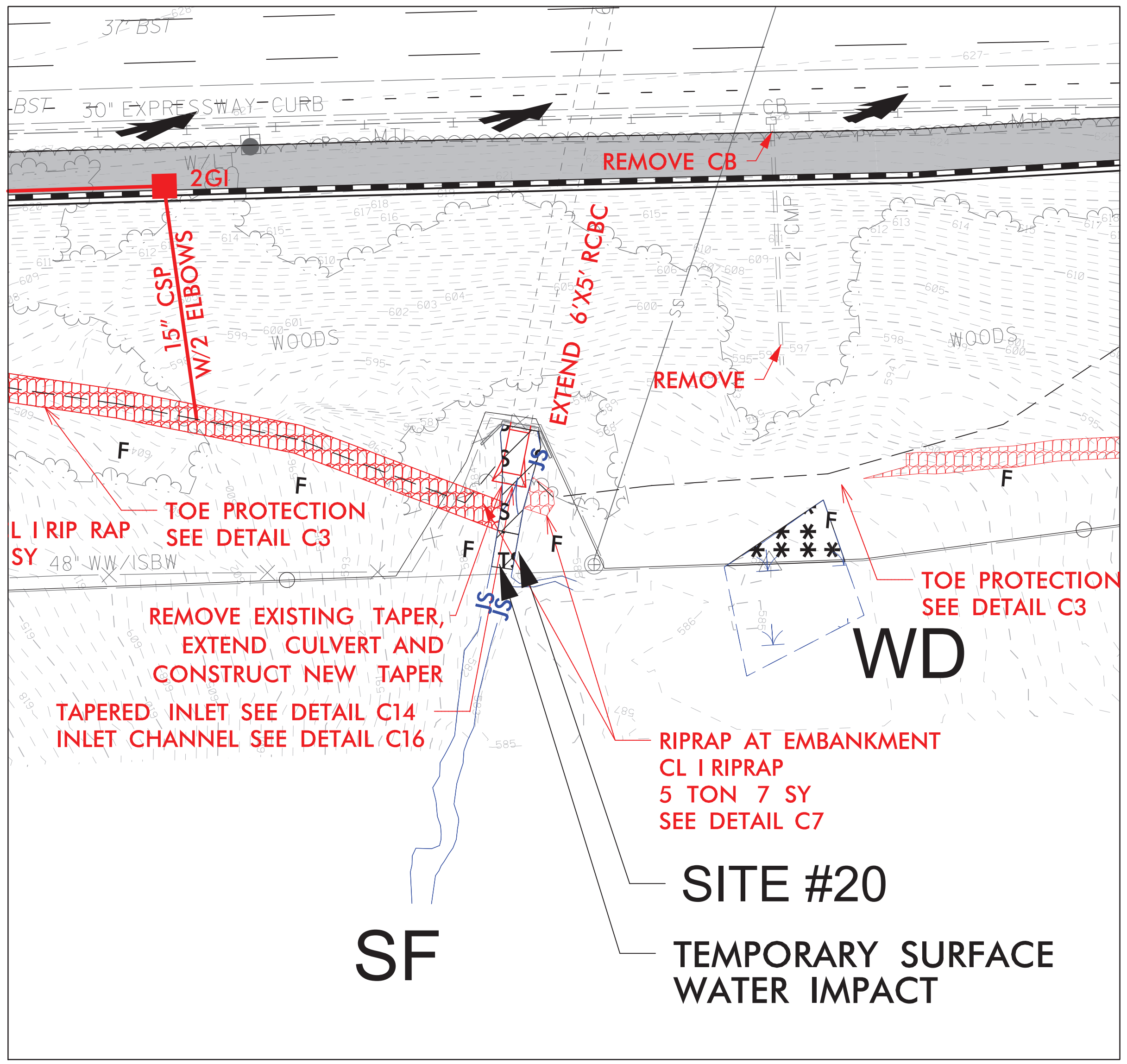
PROJECT REFERENCE NO.	SHEET NO.
I-5507	38B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

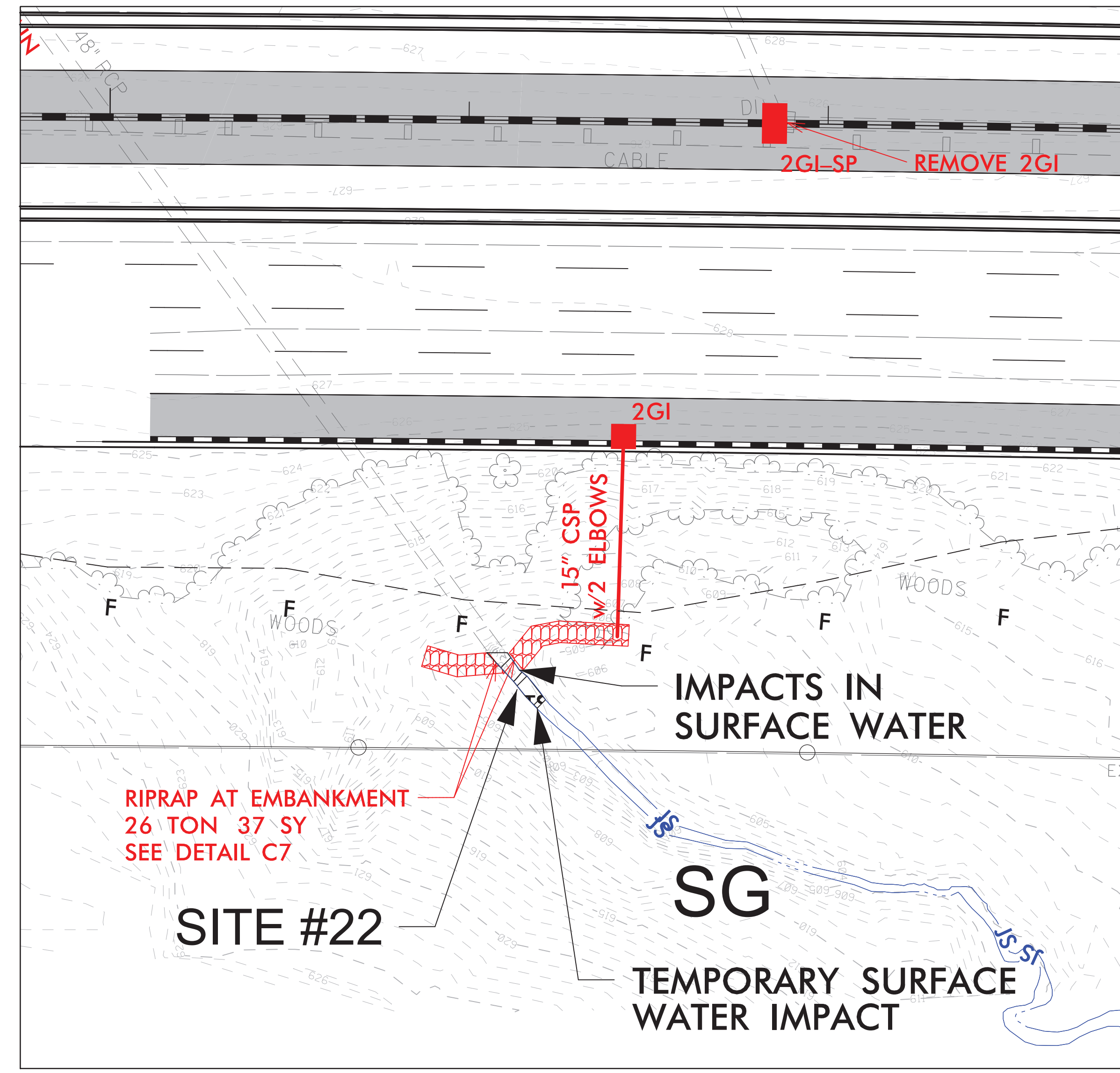
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011



30" EXPRESSWAY CURB
2GI
REMOVE CB
15" CSP W/2 ELBOWS
EXTEND 6'X5' RCBC
12" CMP
WOODS
REMOVE
TOE PROTECTION SEE DETAIL C3
L I RIP RAP SY
48" WW/ISBW
REMOVE EXISTING TAPER, EXTEND CULVERT AND CONSTRUCT NEW TAPER
TAPERED INLET SEE DETAIL C14
INLET CHANNEL SEE DETAIL C16
RIPRAP AT EMBANKMENT CL I RIPRAP 5 TON 7 SY SEE DETAIL C7
WD
SITE #20
SF
TEMPORARY SURFACE WATER IMPACT



DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

PERMIT DRAWING SHEET 58 OF 115

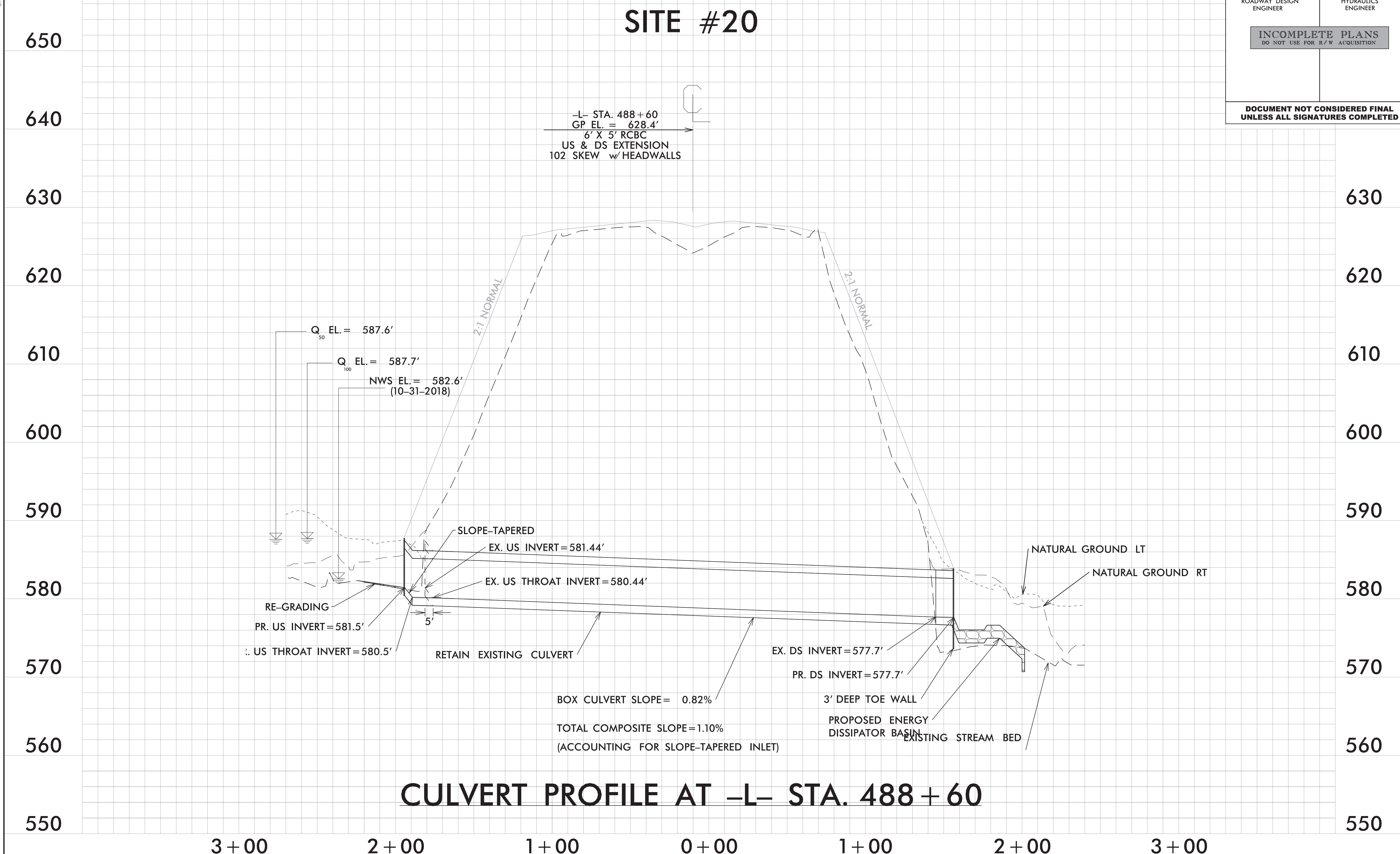
50 0 50
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019
...\3086\33640\1.3976\5507_Hyd_prm_wet_psh38B_cont.dgn

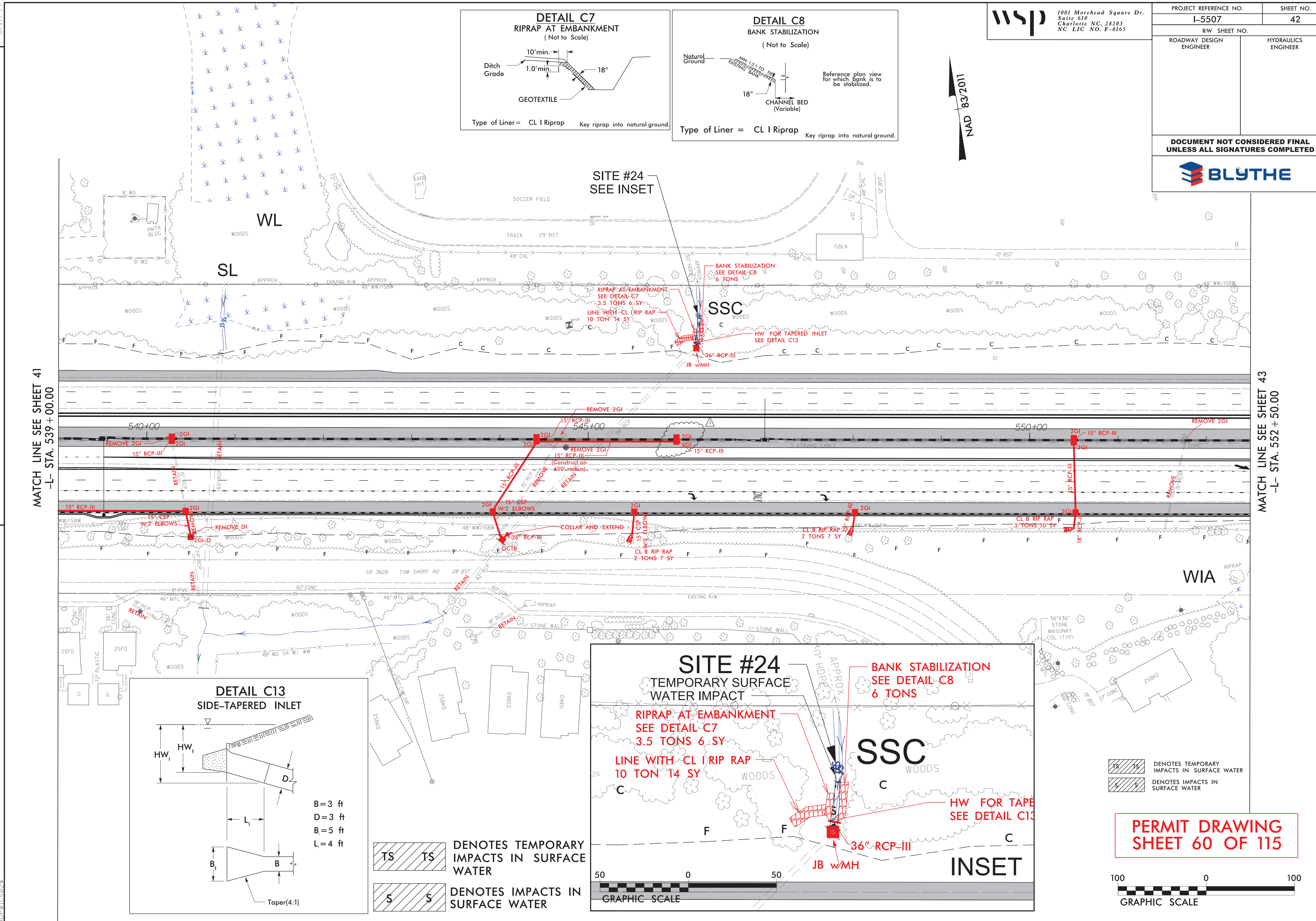
SITE #20



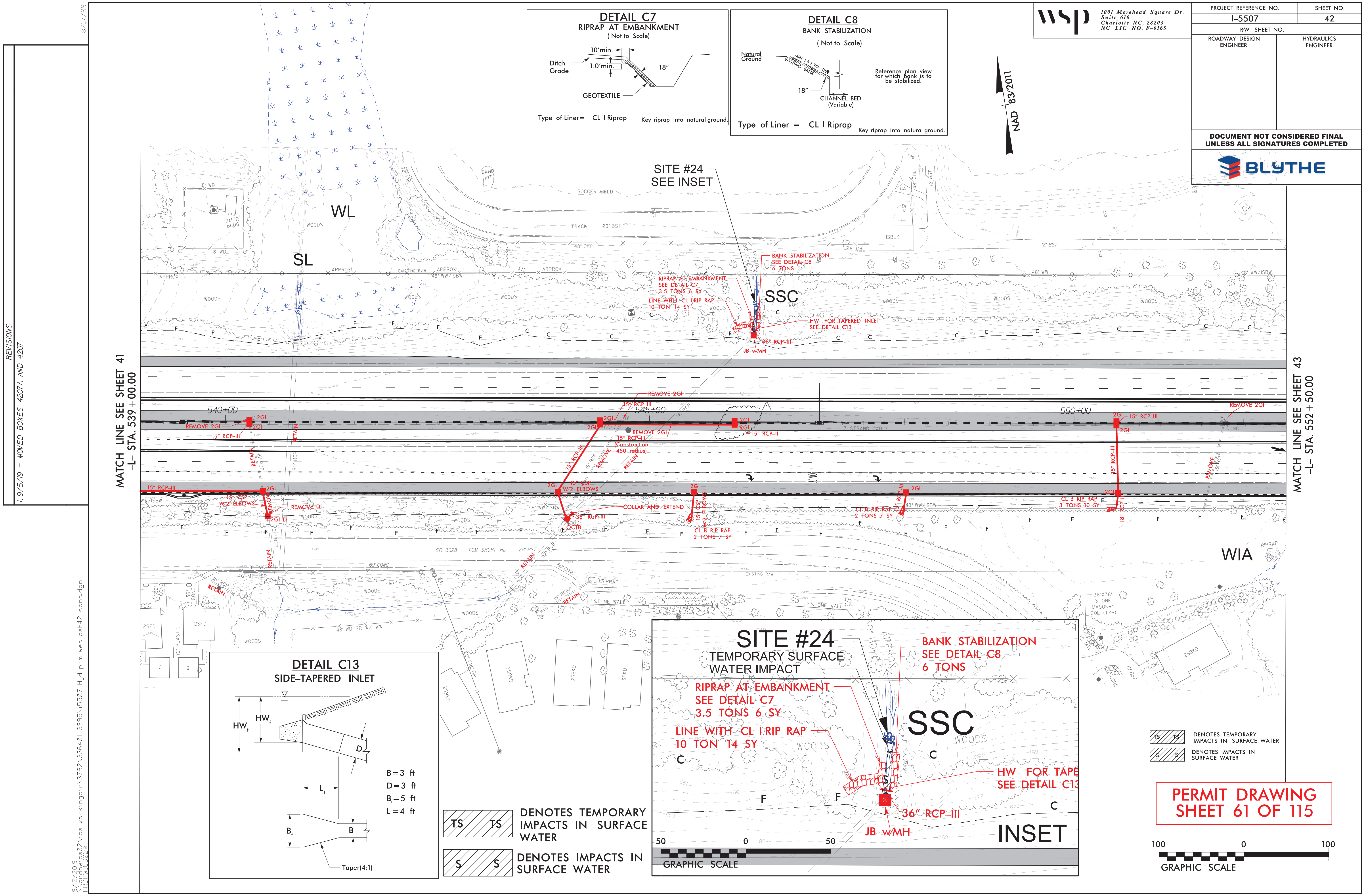
CULVERT PROFILE AT -L- STA. 488+60

50 0 50
GRAPHIC SCALE (HORIZONTAL)

10 0 10
GRAPHIC SCALE (VERTICAL)



PROJECT REFERENCE NO. I-5507
SHEET NO. 42
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
Ditch Grade
18"
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
DETAIL C8
BANK STABILIZATION
(Not to Scale)
Natural Ground
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = CL I Riprap
Key riprap into natural ground.
NAD 83/2011
SITE #24 SEE INSET
WL
SL
SSC
WIA
BANK STABILIZATION SEE DETAIL C8 6 TONS
RIPRAP AT EMBANKMENT SEE DETAIL C7 3.5 TONS 6 SY
LINE WITH CL I RIP RAP 10 TON 14 SY
HW FOR TAPERED INLET SEE DETAIL C13
36" RCP-III
JB w/MH
REMOVE 2GI
15" RCP-III
540+00
545+00
550+00
COLLAR AND EXTEND
CL B RIP RAP 2 TONS 7 SY
CL B RIP RAP 3 TONS 10 SY
SR 3628 TOM SHORT RD
MATCH LINE SEE SHEET 41 -L- STA. 539+00.00
MATCH LINE SEE SHEET 43 -L- STA. 552+50.00
DETAIL C13
SIDE-TAPERED INLET
B=3 ft
D=3 ft
B$_f$=5 ft
L$_t$=4 ft
Taper(4:1)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SITE #24
TEMPORARY SURFACE WATER IMPACT
INSET
GRAPHIC SCALE
PERMIT DRAWING SHEET 60 OF 115
REVISIONS
1. 9/5/19 - MOVED BOXES 4207A AND 4207
8/17/99


PROJECT REFERENCE NO.
I-5507
SHEET NO.
42
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
WSP
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
DETAIL C8
BANK STABILIZATION
(Not to Scale)
Natural Ground
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = CL I Riprap
Key riprap into natural ground.
SITE #24
SEE INSET
WL
SL
SSC
WIA
BANK STABILIZATION SEE DETAIL C8 6 TONS
RIPRAP AT EMBANKMENT SEE DETAIL C7 3.5 TONS 6 SY
LINE WITH CL I RIP RAP 10 TON 14 SY
HW FOR TAPERED INLET SEE DETAIL C13
36" RCP-III
JB w/MH
540+00
545+00
550+00
REMOVE 2GI
15" RCP-III
RETAIN
COLLAR AND EXTEND
CL B RIP RAP 2 TONS 7 SY
CL B RIP RAP 3 TONS 10 SY
SR 3628 TOM SHORT RD
MATCH LINE SEE SHEET 41 -L- STA. 539+00.00
MATCH LINE SEE SHEET 43 -L- STA. 552+50.00
REVISIONS
1. 9/5/19 - MOVED BOXES 4207A AND 4207
DETAIL C13
SIDE-TAPERED INLET
B=3 ft
D=3 ft
B_f=5 ft
L_t=4 ft
Taper(4:1)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SITE #24
TEMPORARY SURFACE WATER IMPACT
SSC
BANK STABILIZATION SEE DETAIL C8 6 TONS
RIPRAP AT EMBANKMENT SEE DETAIL C7 3.5 TONS 6 SY
LINE WITH CL I RIP RAP 10 TON 14 SY
HW FOR TAPE SEE DETAIL C13
36" RCP-III
JB w/MH
INSET
50 0 50
GRAPHIC SCALE
100 0 100
GRAPHIC SCALE
PERMIT DRAWING SHEET 61 OF 115

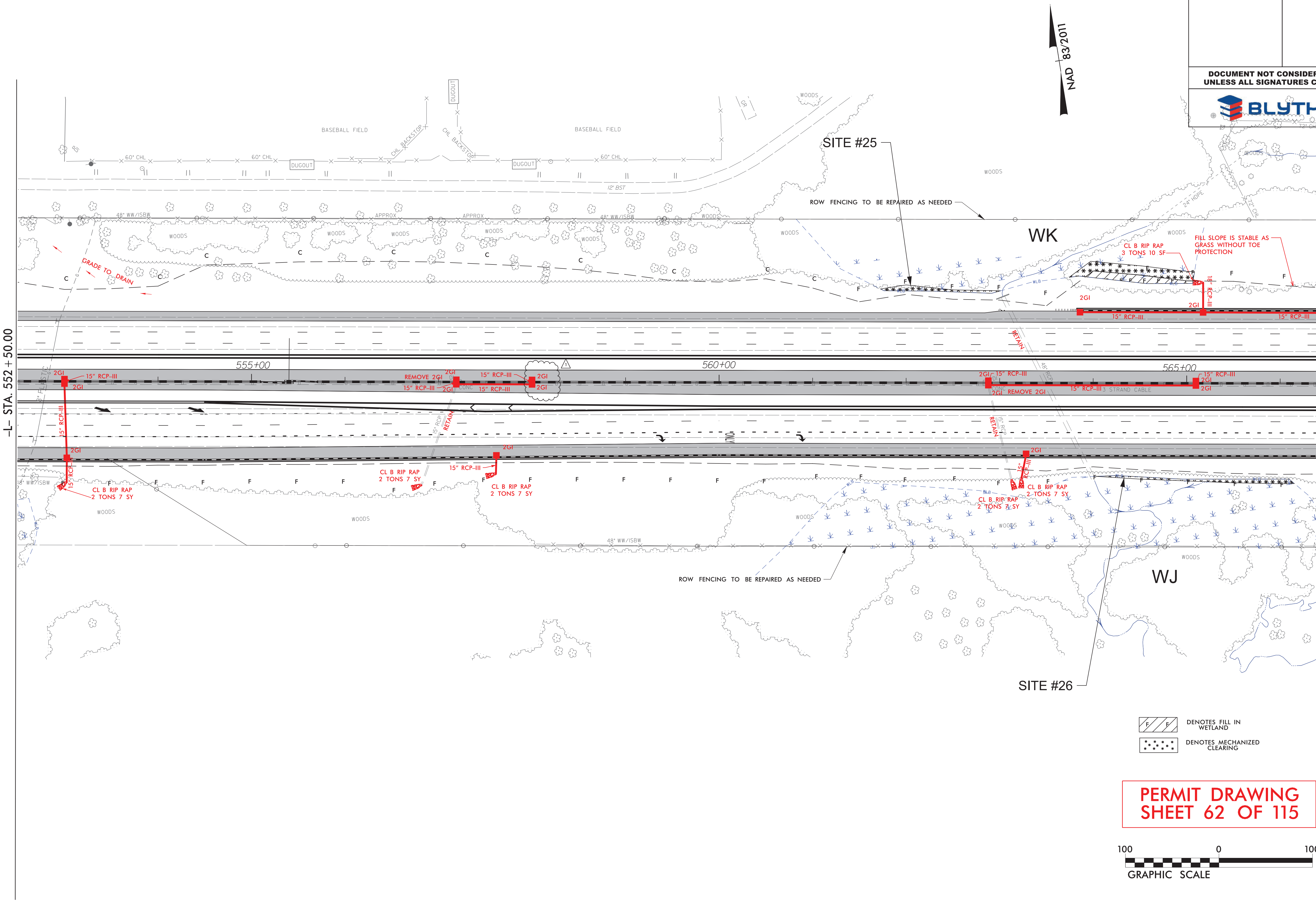
WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	43
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS
1. 9/5/19 – ADDED BOXES 43l5a AND 43l5.



DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

PERMIT DRAWING
SHEET 62 OF 115

100 0 100
GRAPHIC SCALE

8/17/99

9/12/2019
...\5507_Hyd_prm_wet_psh43.dgn

WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

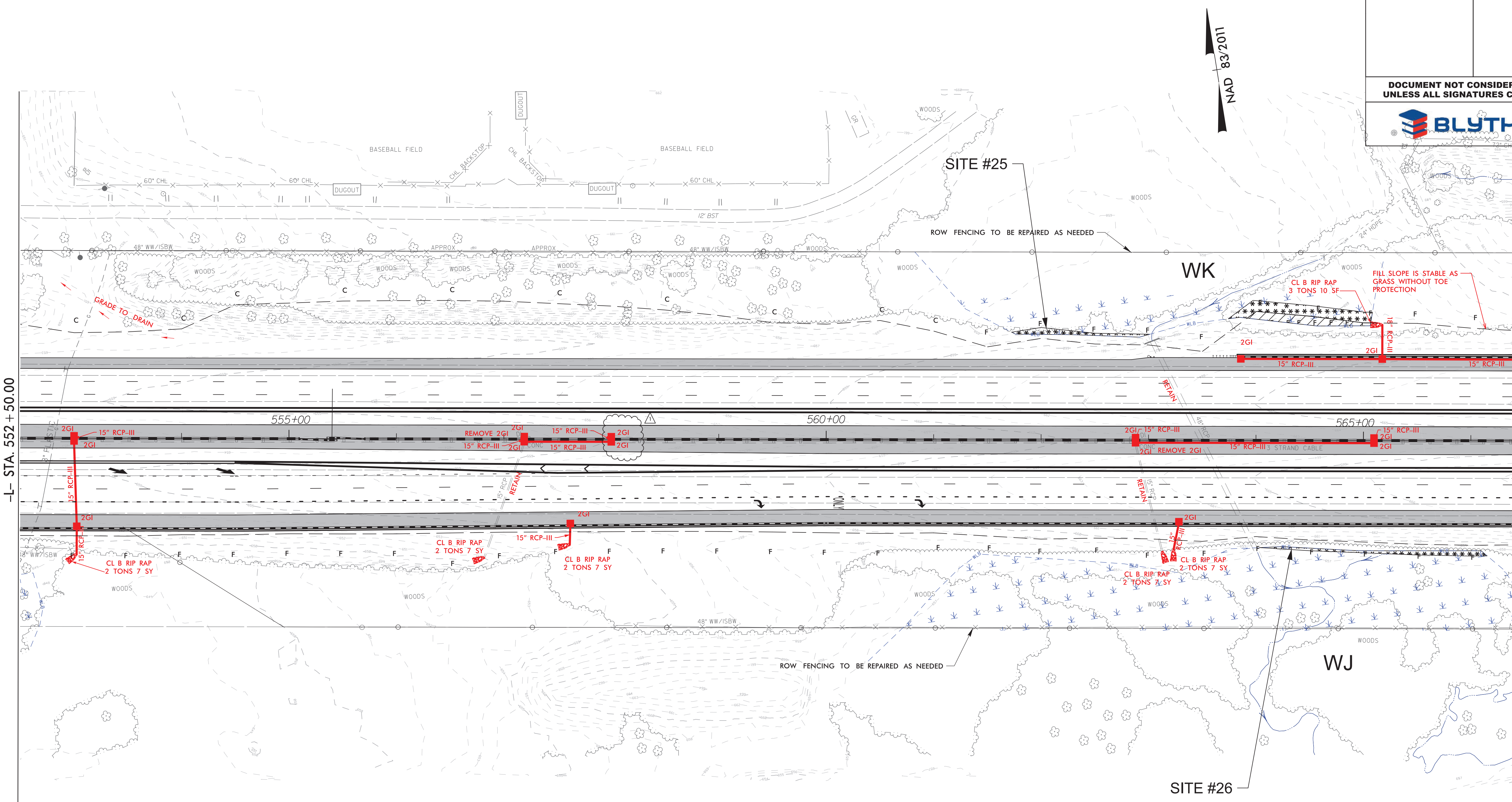
PROJECT REFERENCE NO.	SHEET NO.
I-5507	43
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS
1. 9/5/19 - ADDED BOXES 4315a AND 4315.

8/17/99



NAD 83/2011
MATCH LINE SEE SHEET 42 -L- STA. 552+50.00
MATCH LINE SEE SHEET 44 -L- STA. 566+50.00
BASEBALL FIELD
BASEBALL FIELD
DUGOUT
DUGOUT
DUGOUT
CHL BACKSTOP
CHL BACKSTOP
60' CHL
12' BST
48" WW/ISBW
WOODS
GRADE TO DRAIN
SITE #25
ROW FENCING TO BE REPAIRED AS NEEDED
WK
CL B RIP RAP 3 TONS 10 SF
FILL SLOPE IS STABLE AS GRASS WITHOUT TOE PROTECTION
18" RCP-III
2GI
15" RCP-III
555+00
560+00
565+00
REMOVE 2GI
RETAIN
5 STRAND CABLE
CL B RIP RAP 2 TONS 7 SY
ROW FENCING TO BE REPAIRED AS NEEDED
WJ
SITE #26

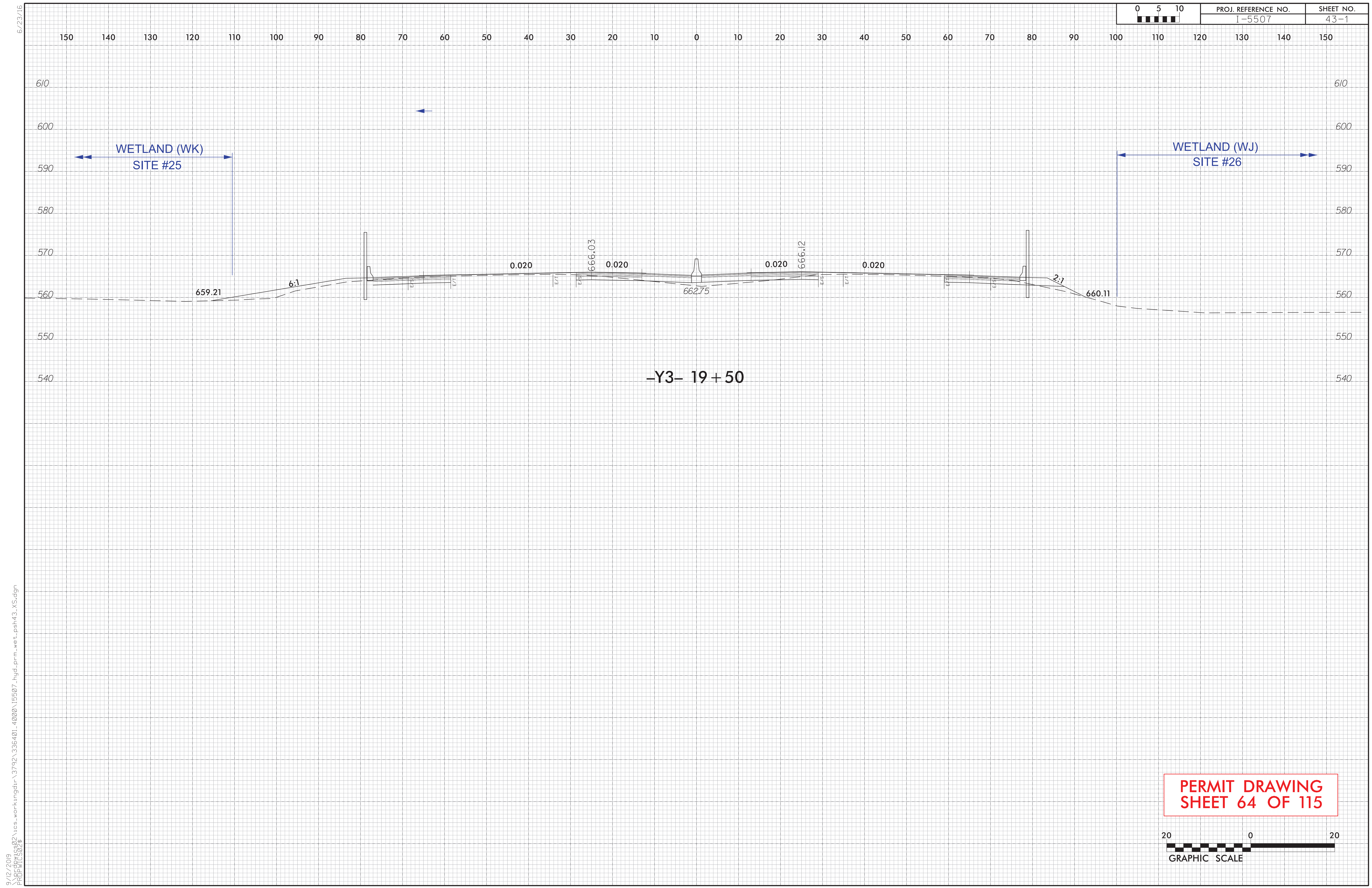
DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

PERMIT DRAWING
SHEET 63 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
r:\hydraulics\...\5507_Hyd_prm_wet_psh43_cont.dgn



PROJ. REFERENCE NO.
I-5507
SHEET NO.
43-1
WETLAND (WK)
SITE #25
WETLAND (WJ)
SITE #26
659.21
6:1
0.020
666.03
0.020
662.75
0.020
666.12
0.020
2:1
660.11
-Y3- 19+50
PERMIT DRAWING
SHEET 64 OF 115
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	44
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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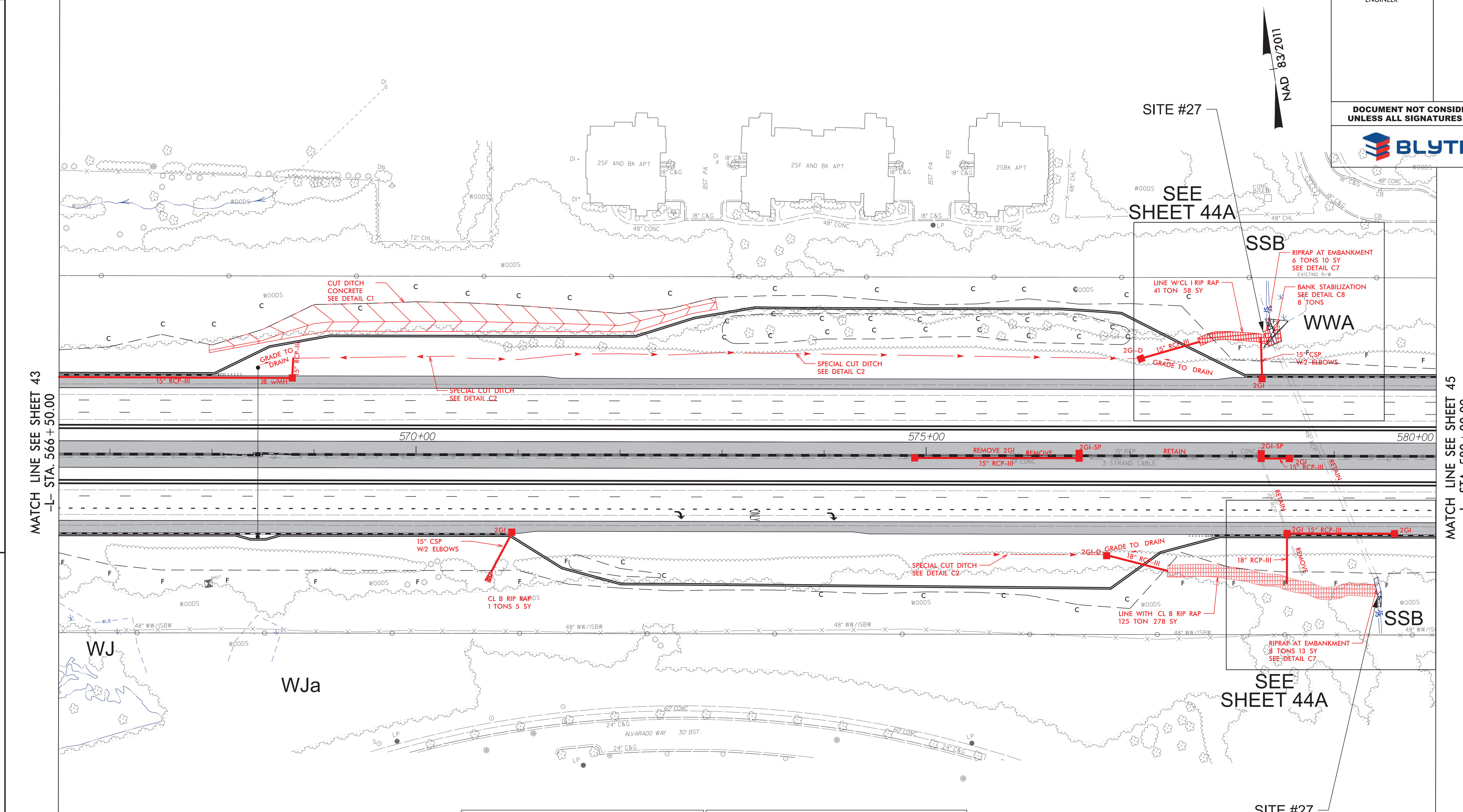
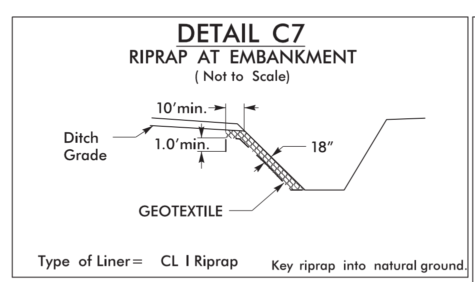
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

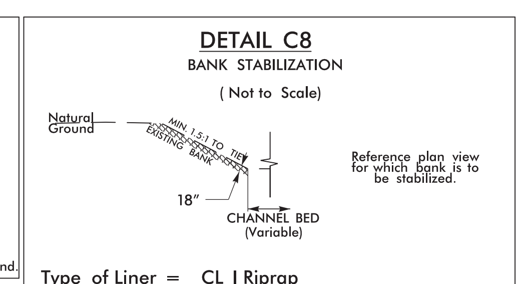
BLYTHE

REVISIONS



NAD 83/2011
SITE #27
SEE SHEET 44A
SSB
WWA
WJ
WJa
MATCH LINE SEE SHEET 43 -L- STA. 566+50.00
MATCH LINE SEE SHEET 45 -L- STA. 580+00.00
570+00
575+00
580+00
CUT DITCH CONCRETE SEE DETAIL C1
SPECIAL CUT DITCH SEE DETAIL C2
GRADE TO DRAIN
RIPRAP AT EMBANKMENT 6 TONS 10 SY SEE DETAIL C7
BANK STABILIZATION SEE DETAIL C8 8 TONS
LINE W/CL I RIP RAP 41 TON 58 SY
15" CSP W2 ELBOWS
CL B RIP RAP 1 TONS 5 SY
LINE WITH CL B RIP RAP 125 TON 278 SY
RIPRAP AT EMBANKMENT 8 TONS 13 SY SEE DETAIL C7
REMOVE
RETAIN





DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

PERMIT DRAWING SHEET 65 OF 115

100 0 100 GRAPHIC SCALE

8/17/99

9/12/2019

wsp

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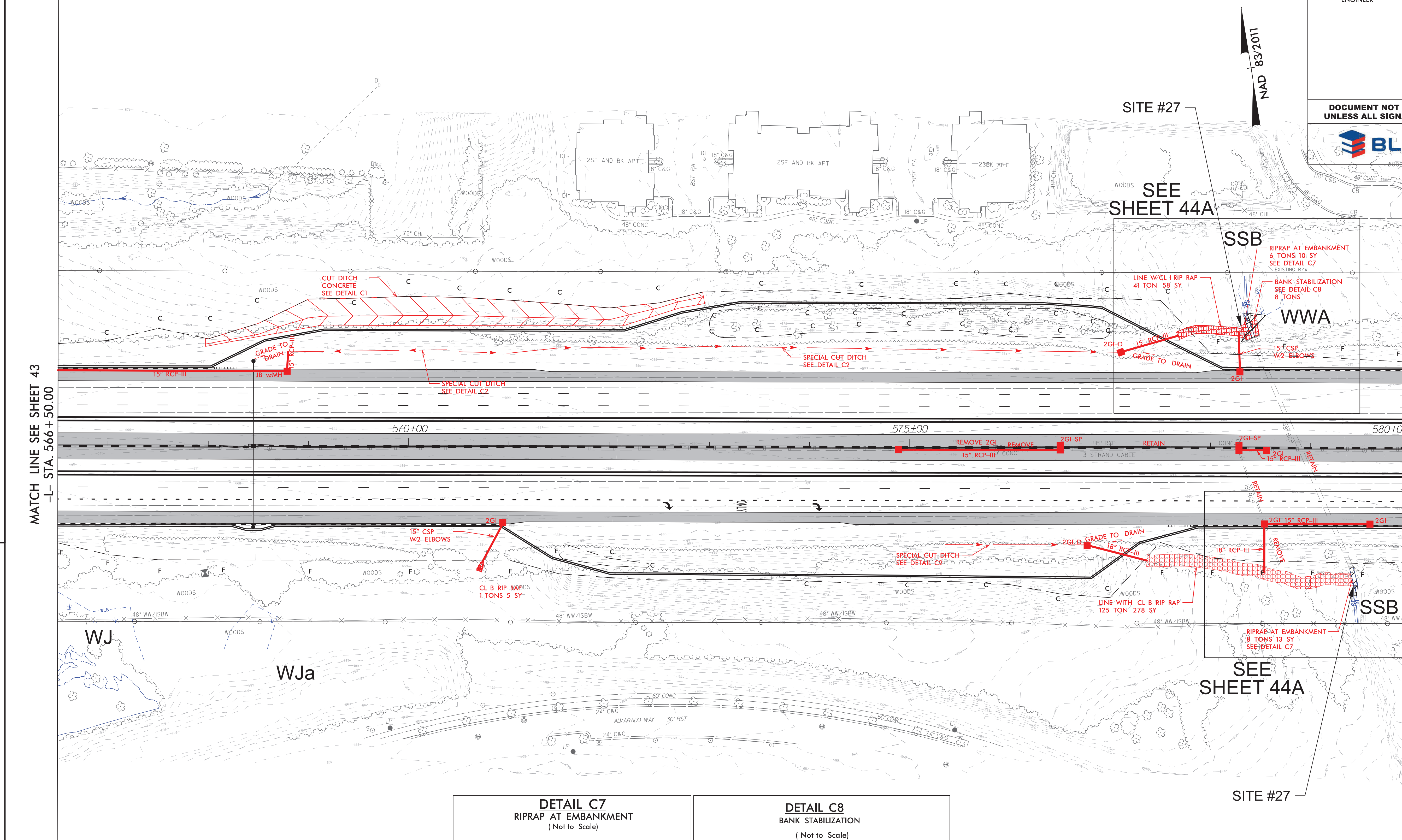
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

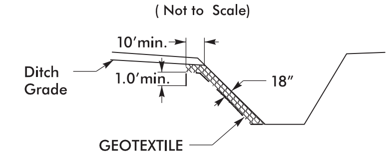
REVISIONS



DETAIL C7

RIPRAP AT EMBANKMENT

(Not to Scale)



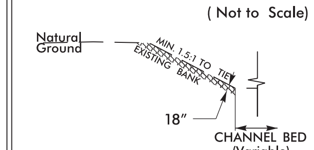
Type of Liner = CL I Riprap

Key riprap into natural ground.

DETAIL C8

BANK STABILIZATION

(Not to Scale)



Reference plan view for which bank is to be stabilized.

Type of Liner = CL I Riprap

Key riprap into natural ground.

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

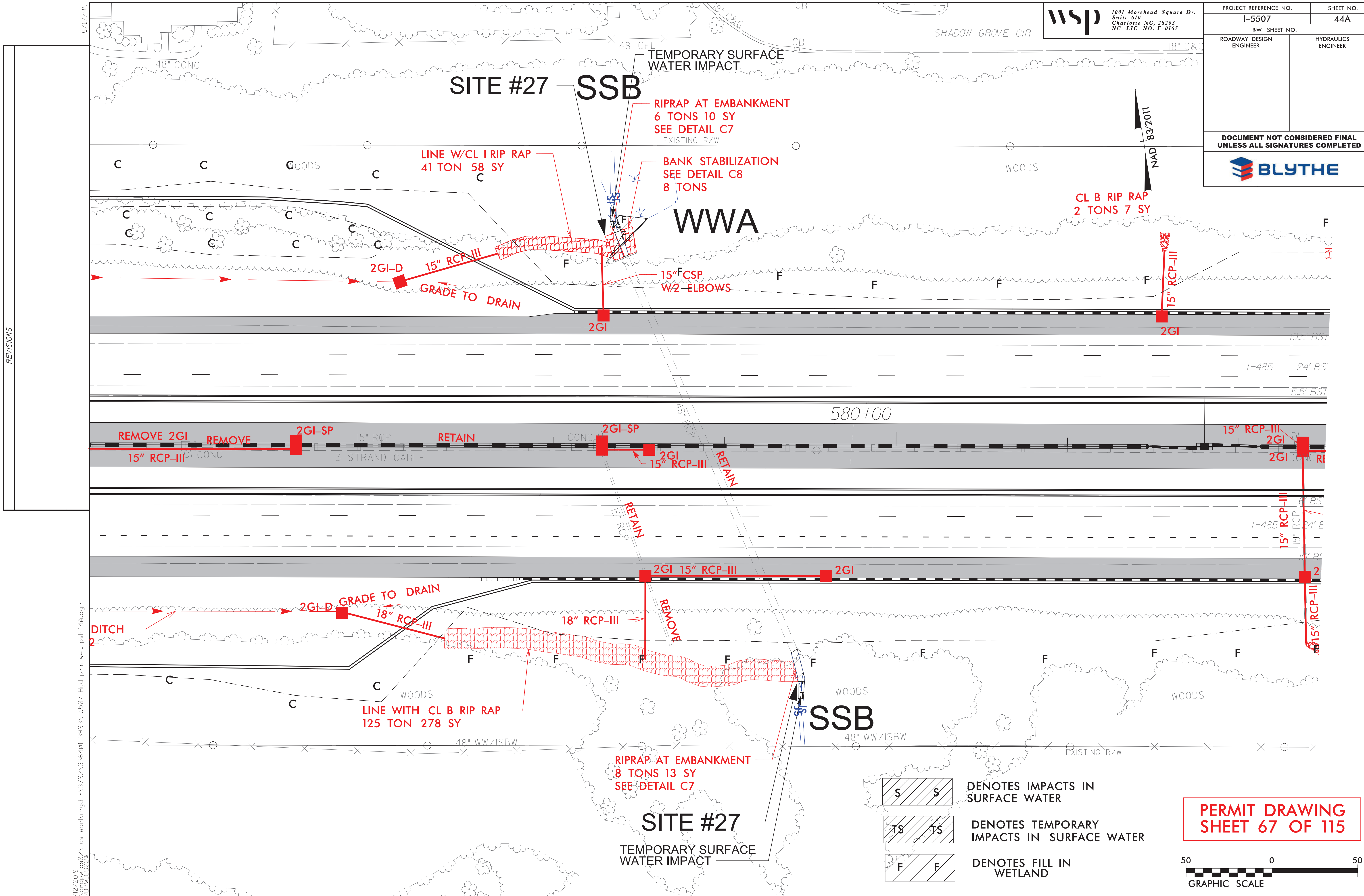
PERMIT DRAWING
SHEET 66 OF 115

100 0 100

GRAPHIC SCALE

8/17/99

9/12/2019



PROJECT REFERENCE NO.
I-5507
SHEET NO.
44A
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
SHADOW GROVE CIR
NAD 83/2011
SITE #27
SSB
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT 6 TONS 10 SY SEE DETAIL C7
EXISTING R/W
BANK STABILIZATION SEE DETAIL C8 8 TONS
LINE W/CL I RIP RAP 41 TON 58 SY
WWA
CL B RIP RAP 2 TONS 7 SY
WOODS
2GI-D
15" RCP-III
GRADE TO DRAIN
15" CSP W/2 ELBOWS
2GI
I-485
580+00
REMOVE 2GI
REMOVE
2GI-SP
RETAIN
15" RCP-III
3 STRAND CABLE
RETAIN
2GI 15" RCP-III
2GI-D
GRADE TO DRAIN
18" RCP-III
DITCH
REMOVE
LINE WITH CL B RIP RAP 125 TON 278 SY
48" WW/ISBW
SSB
RIPRAP AT EMBANKMENT 8 TONS 13 SY SEE DETAIL C7
SITE #27
TEMPORARY SURFACE WATER IMPACT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
PERMIT DRAWING SHEET 67 OF 115
50 0 50
GRAPHIC SCALE
REVISIONS
8/17/99
9/12/2019

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	44A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

NAD 83/2011

SHADOW GROVE CIR

48" CONC

48" CHL

TEMPORARY SURFACE WATER IMPACT

SITE #27 SSB

RIPRAP AT EMBANKMENT
6 TONS 10 SY
SEE DETAIL C7

EXISTING R/W

LINE W/CL I RIP RAP
41 TON 58 SY

BANK STABILIZATION
SEE DETAIL C8
8 TONS

WWA

CL B RIP RAP
2 TONS 7 SY

WOODS

2GI-D

15" RCP-III

GRADE TO DRAIN

15" CSP
W/2 ELBOWS

2GI

15" RCP-III

2GI

10.5' BST

I-485 24' BST

5.5' BST

580+00

REMOVE 2GI
15" RCP-III

REMOVE
15" RCP CONC

2GI-SP

15" RCP
3 STRAND CABLE

RETAIN

2GI-SP

CONC

2GI
15" RCP-III

48" RCP

RETAIN

15" RCP

RETAIN

15" RCP-III
2GI

2GI CONC

15" RCP-III

6' BS

I-485 24' B

2GI 15" RCP-III 2GI

2GI-D GRADE TO DRAIN

18" RCP-III

DITCH

18" RCP-III

REMOVE

15" RCP-III

WOODS

LINE WITH CL B RIP RAP
125 TON 278 SY

48" WW/ISBW

RIPRAP AT EMBANKMENT
8 TONS 13 SY
SEE DETAIL C7

SITE #27

TEMPORARY SURFACE WATER IMPACT

SSB

48" WW/ISBW

EXISTING R/W

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 68 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
...\Projects02\ics_workingdir\3792\336401.3994\I5507_Hyd_prm_wet_psh44A_cont.dgn
PDPWICS02$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	45
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

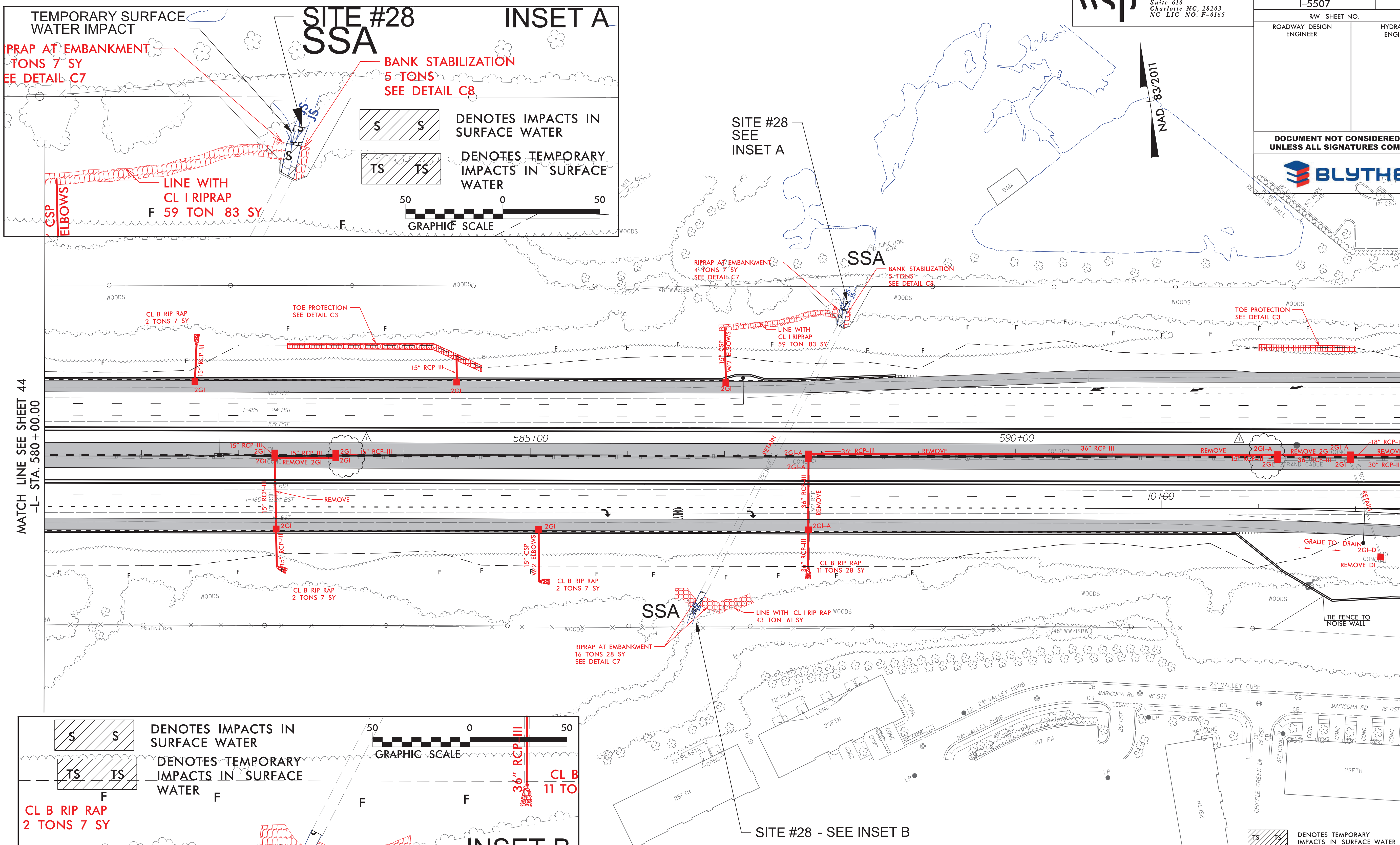
WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS
1. 9/5/19 - ADDED BOXES 4520A,4520,4530A,AND 4530.

8/17/99



DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)

10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.

DETAIL C8
BANK STABILIZATION
(Not to Scale)

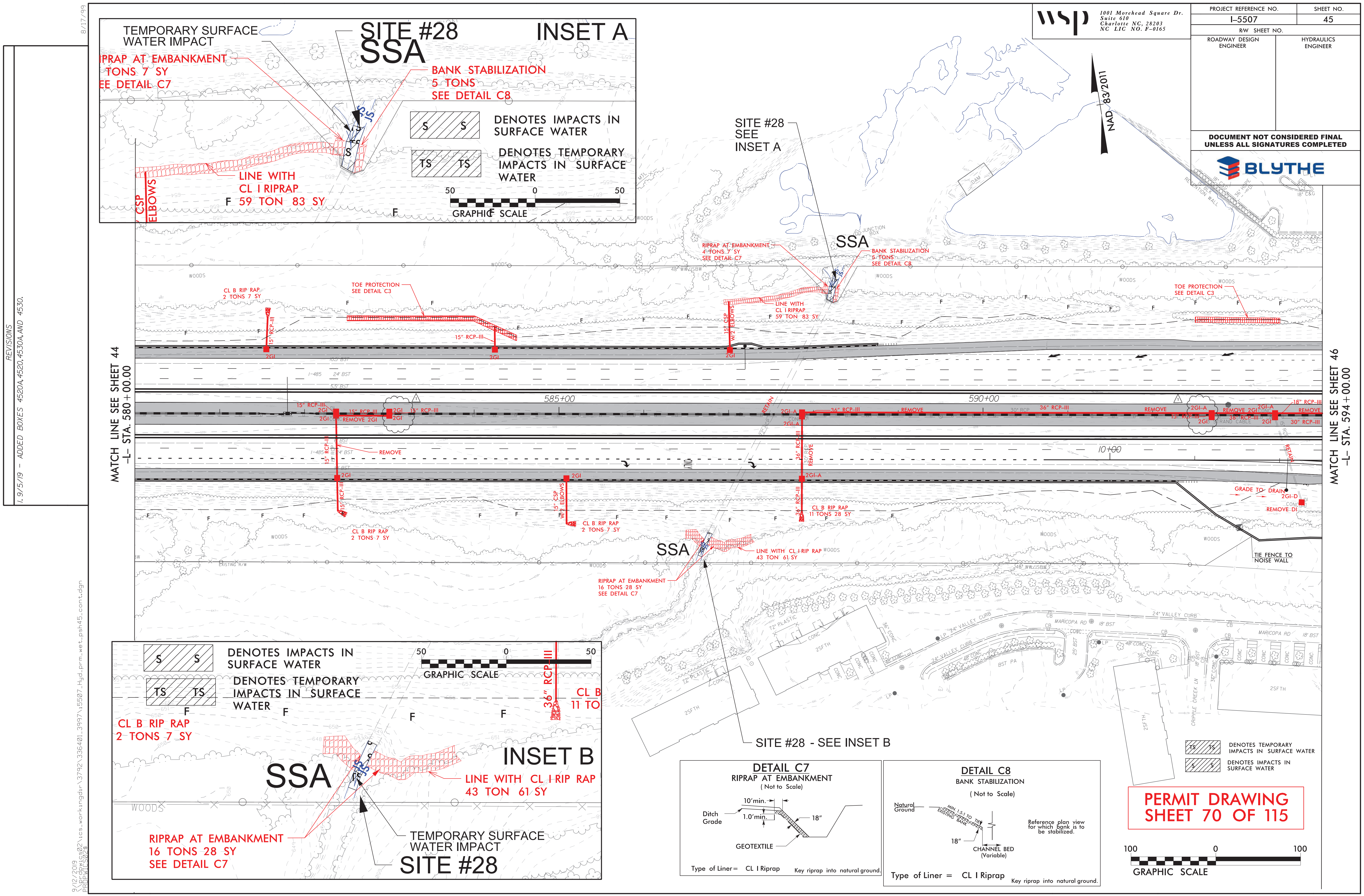
Natural Ground
MIN. 1.5:1 TO TOP EXISTING BANK
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = CL I Riprap
Key riprap into natural ground.

DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER

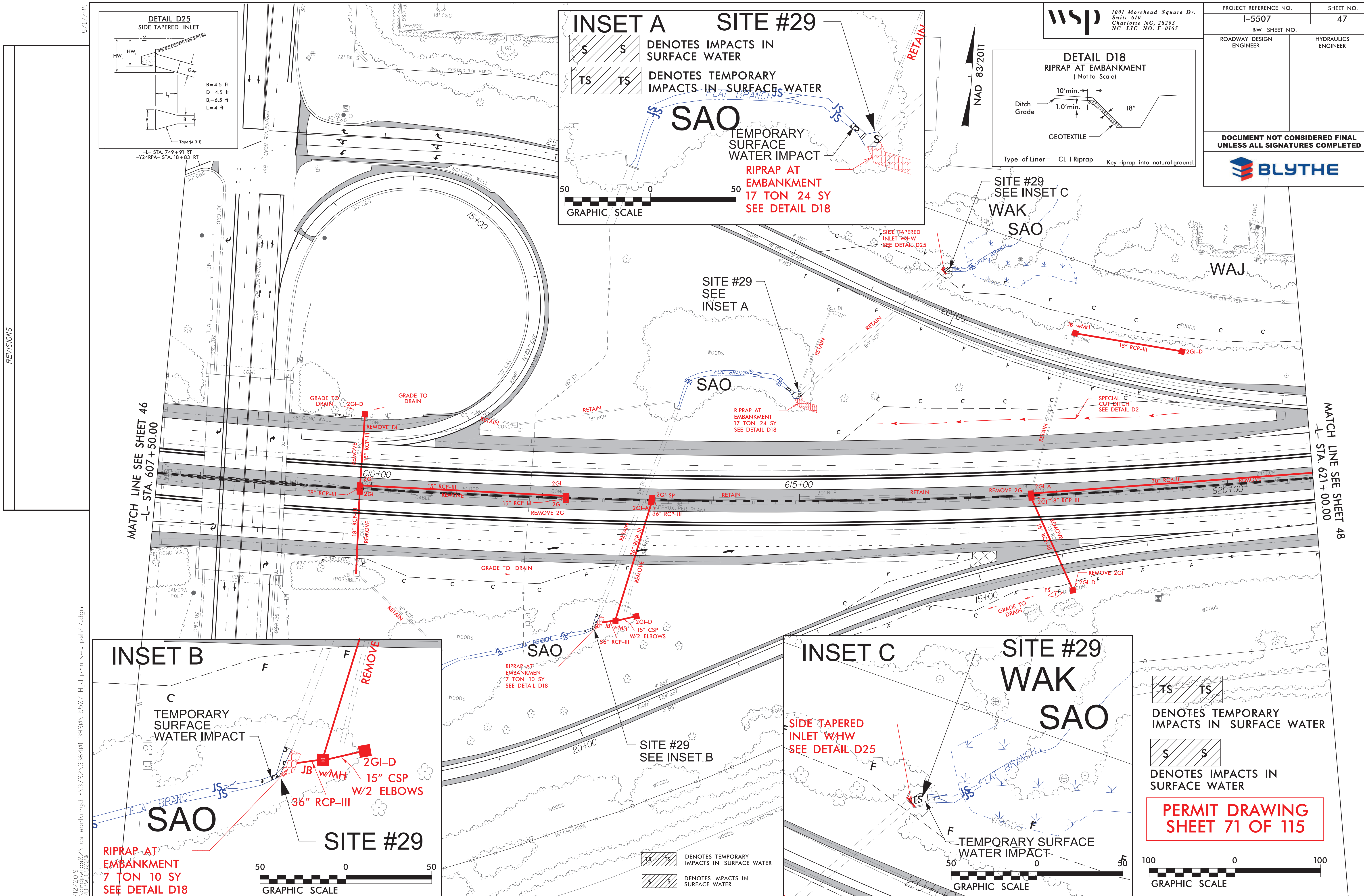
PERMIT DRAWING SHEET 69 OF 115

GRAPHIC SCALE
100 0 100

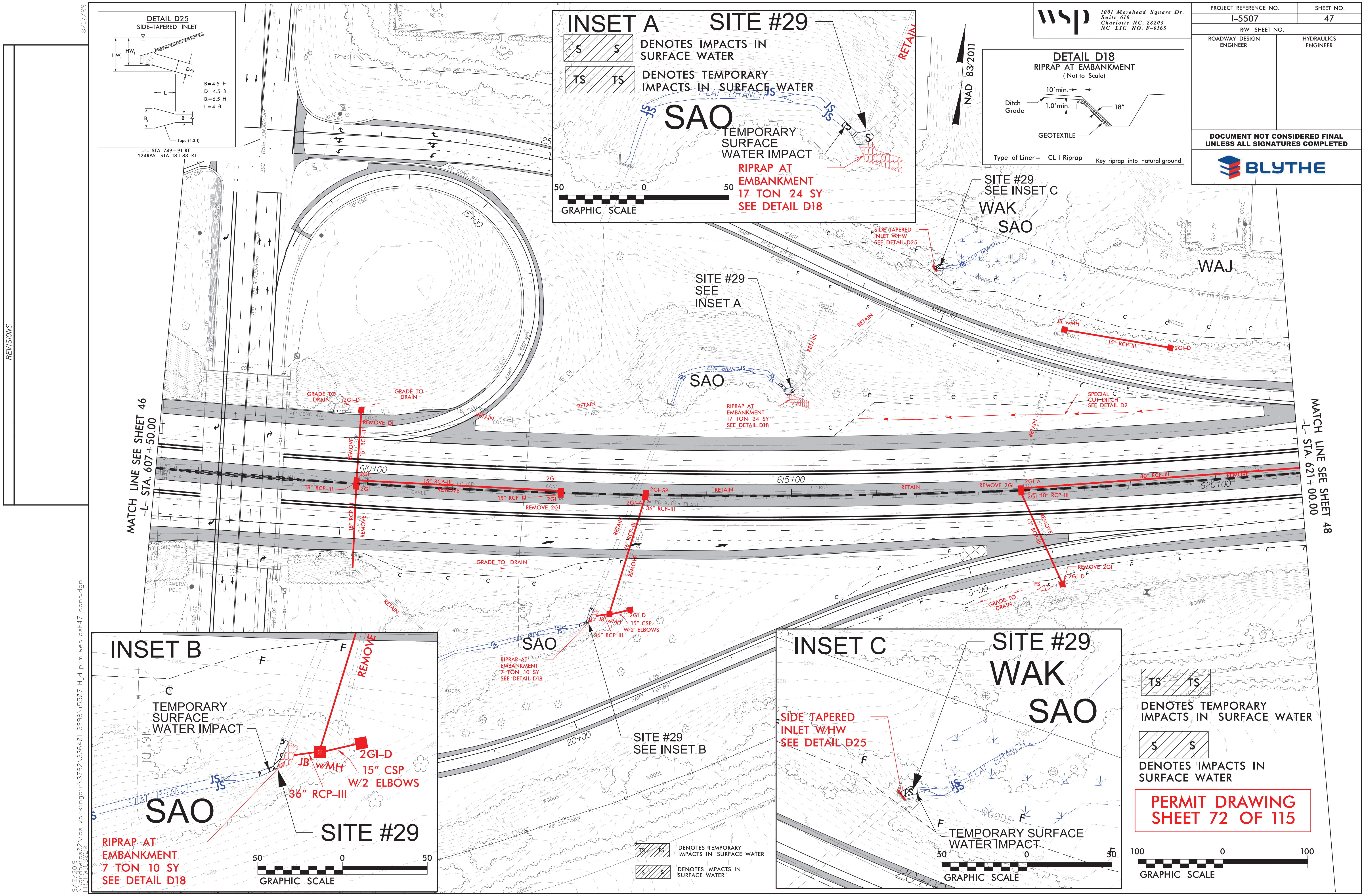
9/12/2019



REVISIONS
1. 9/5/19 - ADDED BOXES 4520A,4520,4530A, AND 4530.
WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165
PROJECT REFERENCE NO.
I-5507
SHEET NO.
45
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
NAD 83/2011
INSET A
SITE #28
SSA
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
4 TONS 7 SY
SEE DETAIL C7
BANK STABILIZATION
5 TONS
SEE DETAIL C8
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
LINE WITH
CL I RIPRAP
59 TON 83 SY
15" CSP ELBOWS
GRAPHIC SCALE
SITE #28 SEE INSET A
TOE PROTECTION
SEE DETAIL C3
CL B RIP RAP
2 TONS 7 SY
15" RCP-III
2GI
REMOVE
36" RCP-III
30" RCP-III
18" RCP-III
585+00
590+00
10+00
MATCH LINE SEE SHEET 44 -L- STA. 580+00.00
MATCH LINE SEE SHEET 46 -L- STA. 594+00.00
CL B RIP RAP
11 TONS 28 SY
GRADE TO DRAIN
TIE FENCE TO NOISE WALL
LINE WITH CL I RIP RAP
43 TON 61 SY
RIPRAP AT EMBANKMENT
16 TONS 28 SY
SEE DETAIL C7
WOODS
SITE #28 - SEE INSET B
INSET B
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
DETAIL C8
BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN. 1.5:1 TO EXISTING BANK
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = CL I Riprap
Key riprap into natural ground.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 70 OF 115
100 0 100
GRAPHIC SCALE



PROJECT REFERENCE NO. I-5507
SHEET NO. 47
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
DETAIL D25
SIDE-TAPERED INLET
B=4.5 ft
D=4.5 ft
B=6.5 ft
L=4 ft
-L- STA. 749+91 RT
-Y24RPA- STA. 18+83 RT
INSET A
SITE #29
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
FLAT BRANCH
SAO
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
17 TON 24 SY
SEE DETAIL D18
GRAPHIC SCALE
SITE #29
SEE INSET C
WAK
SAO
WAJ
SITE #29
SEE INSET A
SIDE TAPERED INLET W/HW SEE DETAIL D25
SPECIAL CUT DITCH SEE DETAIL D2
MATCH LINE SEE SHEET 46
-L- STA. 607+50.00
MATCH LINE SEE SHEET 48
-L- STA. 621+00.00
610+00
615+00
620+00
15+00
20+00
RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18
SITE #29
SEE INSET B
INSET B
TEMPORARY SURFACE WATER IMPACT
JB W/MH
2GI-D
15" CSP W/2 ELBOWS
36" RCP-III
SAO
SITE #29
RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18
GRAPHIC SCALE
INSET C
SITE #29
WAK
SAO
SIDE TAPERED INLET W/HW
SEE DETAIL D25
TEMPORARY SURFACE WATER IMPACT
GRAPHIC SCALE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 71 OF 115
REVISIONS



PROJECT REFERENCE NO. I-5507
SHEET NO. 47
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
REVISIONS
DETAIL D25
SIDE-TAPERED INLET
B=4.5 ft
D=4.5 ft
B=6.5 ft
L=4 ft
-L- STA. 749+91 RT
-Y24RPA- STA. 18+83 RT
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
10'min.
1.0'min.
18"
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
INSET A
SITE #29
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
SAO
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
17 TON 24 SY
SEE DETAIL D18
GRAPHIC SCALE
SITE #29 SEE INSET C
WAK
SAO
WAJ
SIDE TAPERED INLET W/HW SEE DETAIL D25
SITE #29 SEE INSET A
SAO
RIPRAP AT EMBANKMENT 17 TON 24 SY SEE DETAIL D18
SPECIAL CUT DITCH SEE DETAIL D2
MATCH LINE SEE SHEET 46 -L- STA. 607+50.00
MATCH LINE SEE SHEET 48 -L- STA. 621+00.00
610+00
615+00
620+00
15+00
20+00
REMOVE DI
GRADE TO DRAIN
2GI-D
2GI
2GI-SP
2GI-A
REMOVE 2GI
15" RCP-III
18" RCP-III
30" RCP-III
36" RCP-III
RETAIN
REMOVE
SAO
RIPRAP AT EMBANKMENT 7 TON 10 SY SEE DETAIL D18
JB W/MH
15" CSP W/2 ELBOWS
SITE #29 SEE INSET B
INSET B
TEMPORARY SURFACE WATER IMPACT
JB W/MH
2GI-D
15" CSP W/2 ELBOWS
36" RCP-III
SAO
SITE #29
RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18
GRAPHIC SCALE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
INSET C
SITE #29
WAK
SAO
SIDE TAPERED INLET W/HW
SEE DETAIL D25
FLAT BRANCH
TEMPORARY SURFACE WATER IMPACT
GRAPHIC SCALE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 72 OF 115
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	49
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
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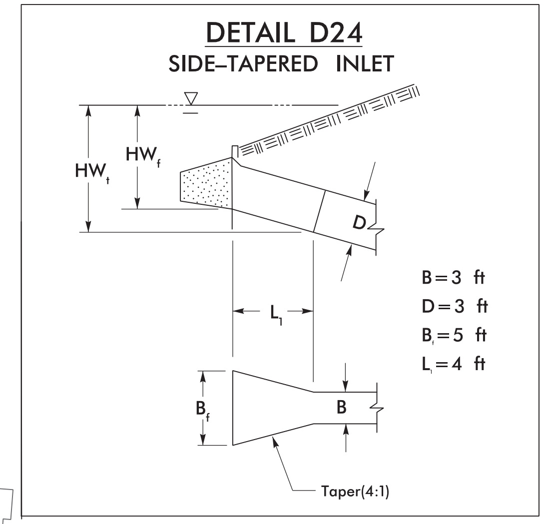
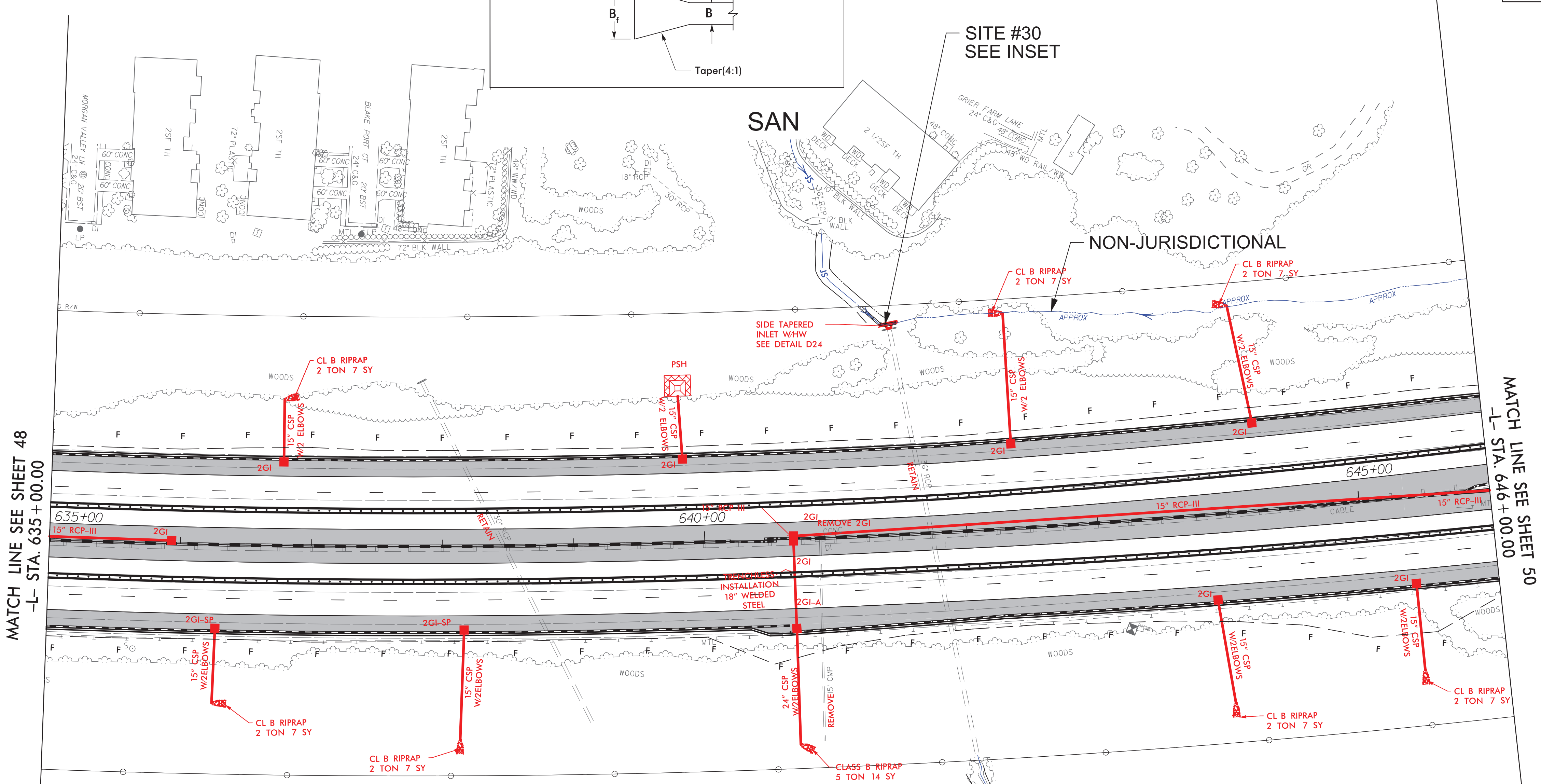
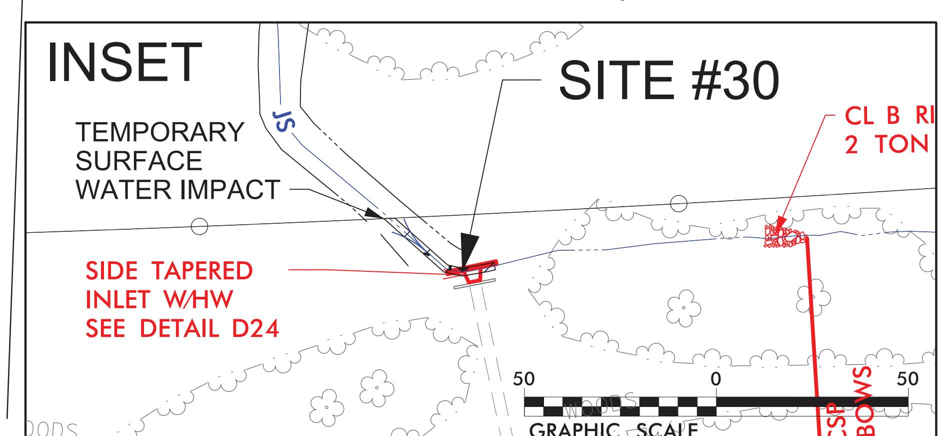
Charlotte NC, 28203
NC LIC NO. F-0165

BLYTHE




NAD 83/2011
SITE #30
SEE INSET
SAN
NON-JURISDICTIONAL
SIDE TAPERED INLET W/HW SEE DETAIL D24
CL B RIPRAP 2 TON 7 SY
PSH
15" CSP W/2 ELBOWS
2GI
635+00
640+00
645+00
15" RCP-III
REMOVE 2GI
2GI-A
2GI-SP
INSTALLATION 18" WELDED STEEL
24" CSP W/2ELBOWS
CLASS B RIPRAP 5 TON 14 SY
WOODS
MATCH LINE SEE SHEET 48 -L- STA. 635+00.00
MATCH LINE SEE SHEET 50 -L- STA. 646+00.00



DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2023

PERMIT DRAWING
SHEET 73 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
I-5507	49
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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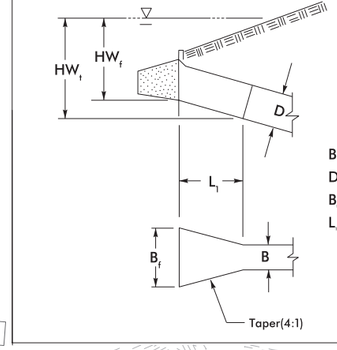
8/17/99

REVISIONS

DETAIL D24
SIDE-TAPERED INLET



B=3 ft
D=3 ft
B_f=5 ft
L_t=4 ft

NAD 83/2011

SITE #30
SEE INSET

NON-JURISDICTIONAL

MATCH LINE SEE SHEET 48
-L- STA. 635+00.00

MATCH LINE SEE SHEET 50
-L- STA. 646+00.00

SIDE TAPERED INLET W/HW SEE DETAIL D24

CL B RIPRAP 2 TON 7 SY

15" CSP W/2 ELBOWS

2GI

2GI-SP

15" RCP-III

24" CSP W/2 ELBOWS

REMOVE 2GI

INSTALLATION 18" WELDED STEEL

REMOVE 15" CMP

CLASS B RIPRAP 5 TON 14 SY

635+00

640+00

645+00

INSET

SITE #30

TEMPORARY SURFACE WATER IMPACT

SIDE TAPERED INLET W/HW SEE DETAIL D24

50 0 50
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2023

PERMIT DRAWING
SHEET 74 OF 115

100 0 100
GRAPHIC SCALE

8/9/2023
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PROJECT REFERENCE NO.	SHEET NO.
I–5507	50
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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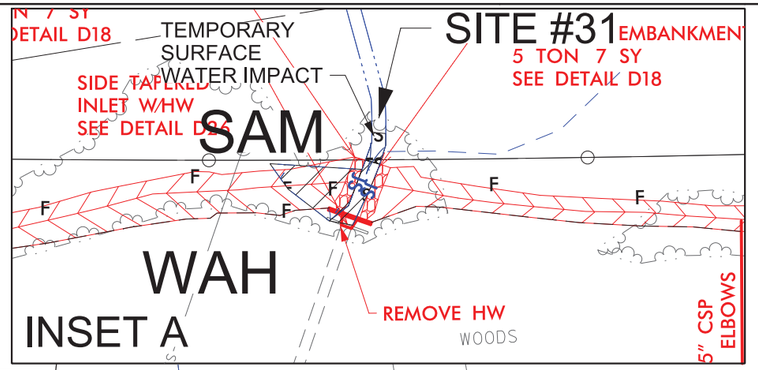
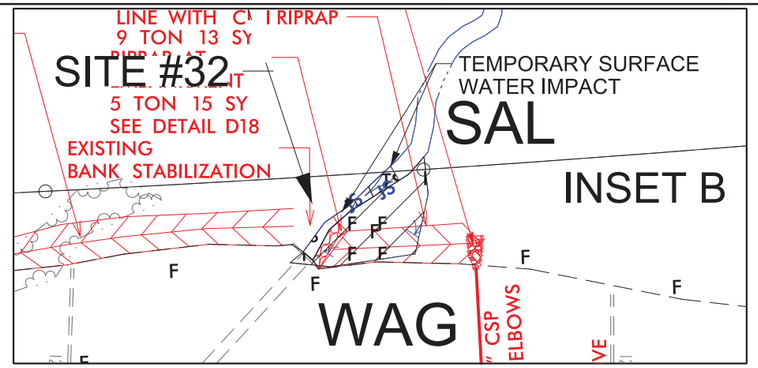
BLYTHE

NAD 83/2011



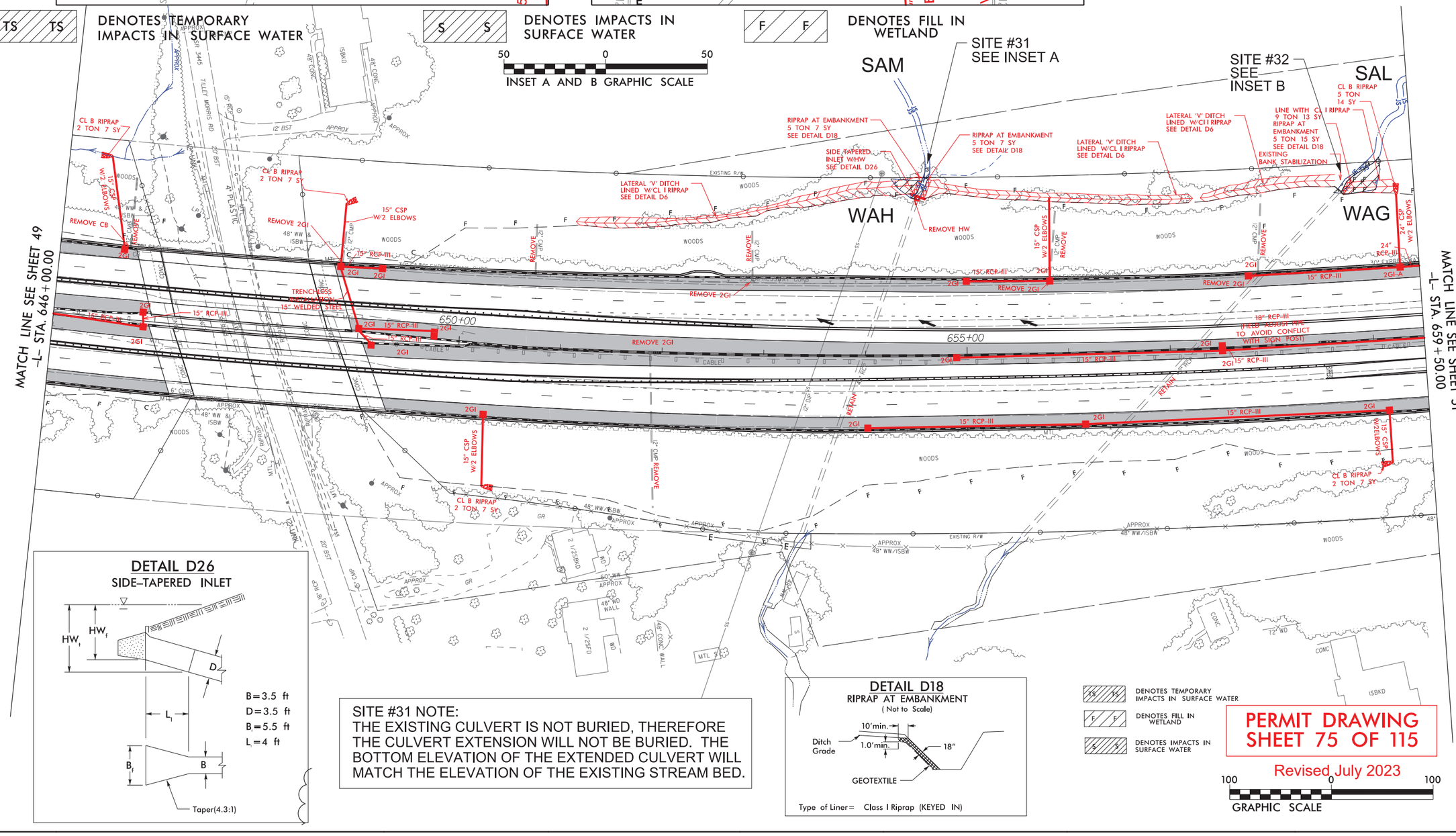


TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

50 0 50
INSET A AND B GRAPHIC SCALE



DETAIL D26
SIDE–TAPERED INLET

B=3.5 ft
D=3.5 ft
B_t=5.5 ft
L_t=4 ft

SITE #31 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class I Riprap (KEYED IN)

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 75 OF 115

Revised July 2023

100 0 100
GRAPHIC SCALE

8/9/2023
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Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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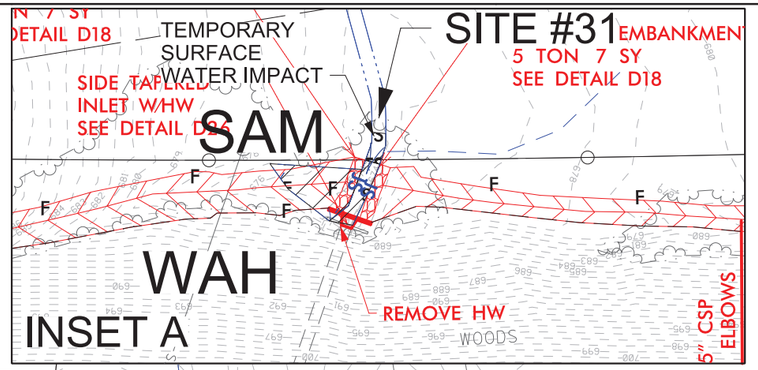
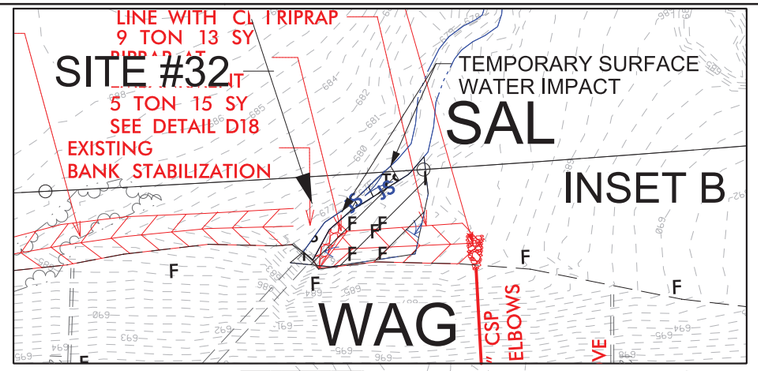
BLYTHE

NAD 83/2011

8/17/99

REVISIONS



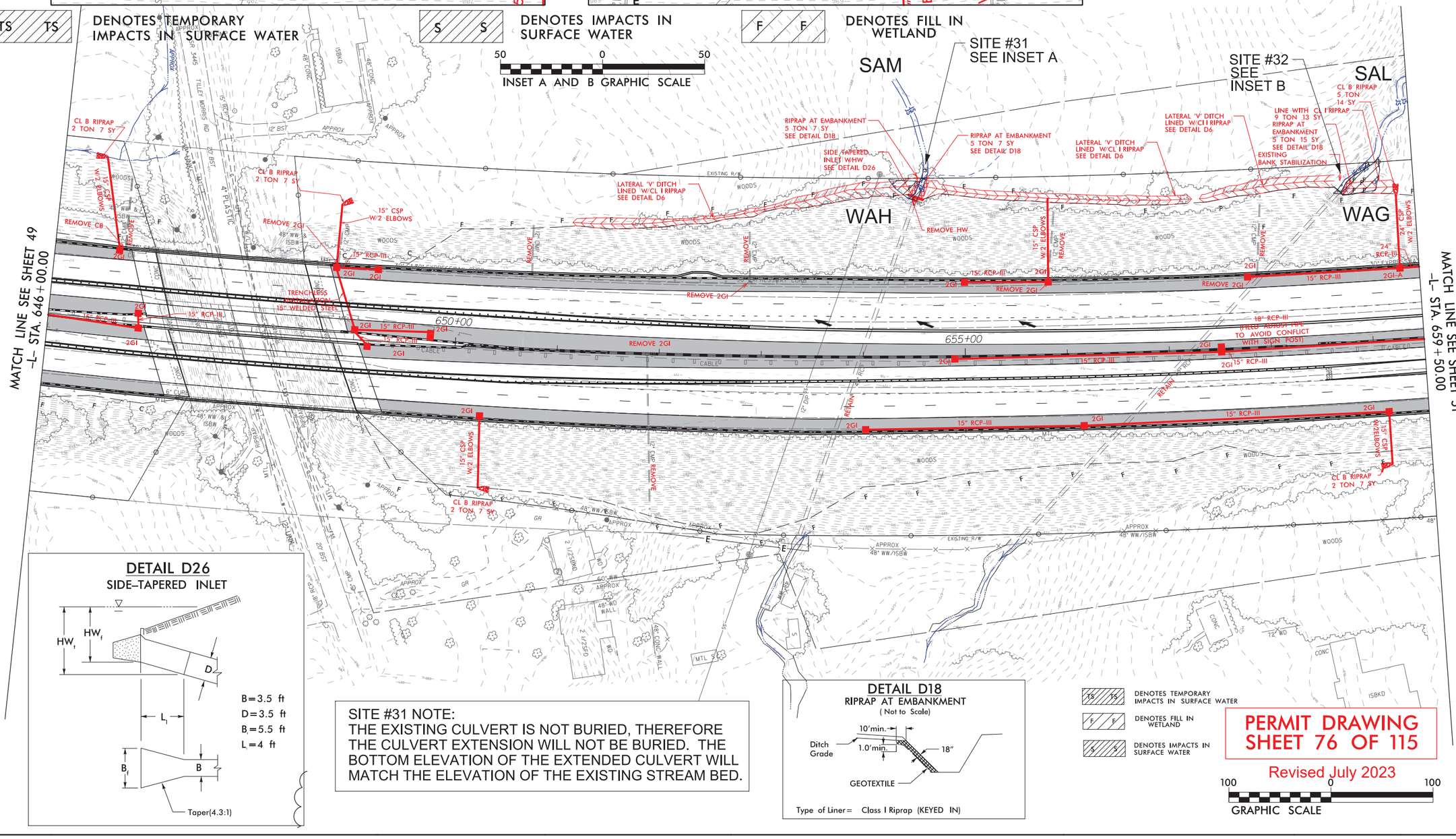


TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

50 0 50
INSET A AND B GRAPHIC SCALE



DETAIL D26
SIDE-TAPERED INLET

B=3.5 ft
D=3.5 ft
B_t=5.5 ft
L_t=4 ft

SITE #31 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)

Type of Liner= Class I Riprap (KEYED IN)

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 76 OF 115

Revised July 2023

100 0 100
GRAPHIC SCALE

8/9/2023
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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	50-1

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

730 720 710 700 690 680 670 660 650

WETLAND (WAG)
SITE #32

678.68

2:1

0.031

717.58
21.00

0.031

714.33

659+00.00

WETLAND (WAH)
SITE #31

675.71

2:1 3:1

674.40

675.10

2:1

0.031

719.53
24.65

0.031

716.29

Revised July 2023

PERMIT DRAWING
SHEET 77 OF 115

654+50.00

20 0 20
GRAPHIC SCALE

8/9/2023
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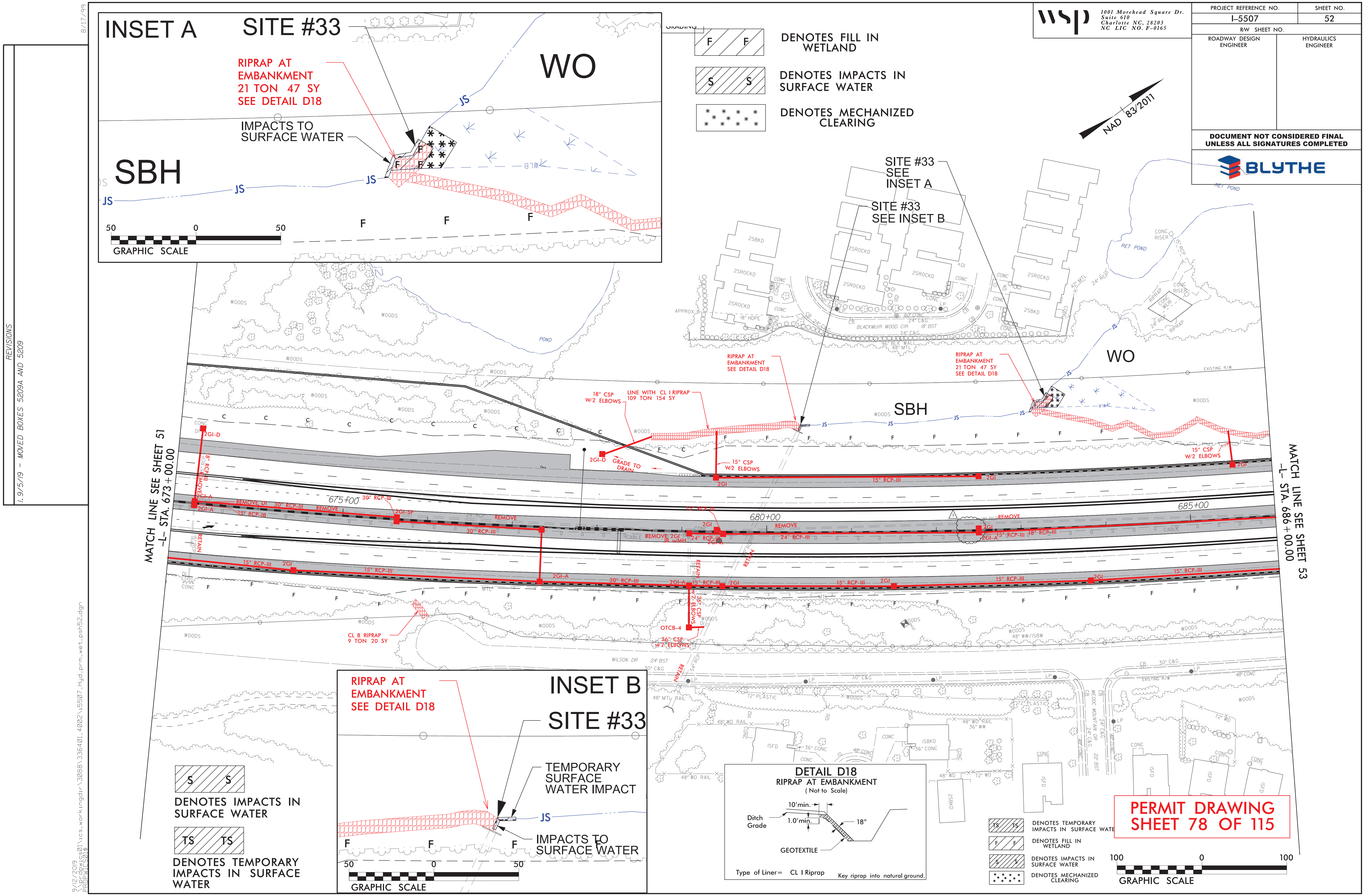

PROJECT REFERENCE NO.
I-5507
SHEET NO.
52
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
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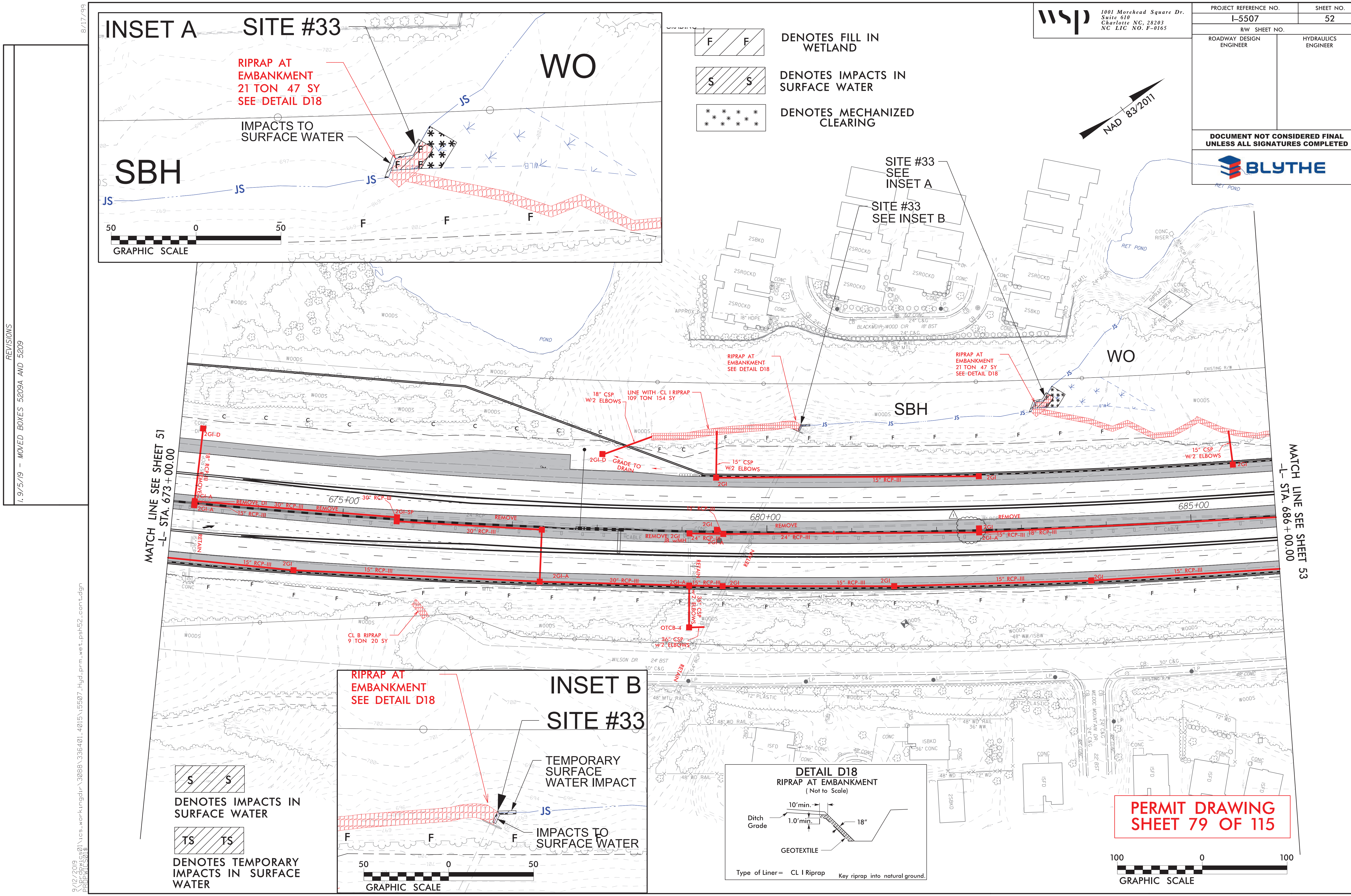
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
NAD 83/2011
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
INSET A
SITE #33
WO
SBH
RIPRAP AT EMBANKMENT 21 TON 47 SY SEE DETAIL D18
IMPACTS TO SURFACE WATER
GRAPHIC SCALE
SITE #33 SEE INSET A
SITE #33 SEE INSET B
RIPRAP AT EMBANKMENT SEE DETAIL D18
LINE WITH CL I RIPRAP 109 TON 154 SY
18" CSP W/2 ELBOWS
15" CSP W/2 ELBOWS
CL B RIPRAP 9 TON 20 SY
36" CSP W/2 ELBOWS
MATCH LINE SEE SHEET 51 -L- STA. 673+00.00
MATCH LINE SEE SHEET 53 -L- STA. 686+00.00
675+00
680+00
685+00
INSET B
SITE #33
RIPRAP AT EMBANKMENT SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
IMPACTS TO SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
10'min.
1.0'min.
18"
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
PERMIT DRAWING SHEET 78 OF 115
REVISIONS
1. 9/5/19 - MOVED BOXES 5209A AND 5209



PROJECT REFERENCE NO.
I-5507
SHEET NO.
52
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
REVISIONS
1. 9/5/19 - MOVED BOXES 5209A AND 5209
F F DENOTES FILL IN WETLAND
S S DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
NAD 83/2011
INSET A
SITE #33
RIPRAP AT EMBANKMENT 21 TON 47 SY SEE DETAIL D18
IMPACTS TO SURFACE WATER
WO
SBH
JS
GRAPHIC SCALE
SITE #33 SEE INSET A
SITE #33 SEE INSET B
RIPRAP AT EMBANKMENT SEE DETAIL D18
RIPRAP AT EMBANKMENT 21 TON 47 SY SEE DETAIL D18
18" CSP W/2 ELBOWS
LINE WITH CL I RIPRAP 109 TON 154 SY
15" CSP W/2 ELBOWS
GRADE TO DRAIN
CL B RIPRAP 9 TON 20 SY
36" CSP W/2 ELBOWS
MATCH LINE SEE SHEET 51 -L- STA. 673+00.00
MATCH LINE SEE SHEET 53 -L- STA. 686+00.00
675+00
680+00
685+00
INSET B
SITE #33
RIPRAP AT EMBANKMENT SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
IMPACTS TO SURFACE WATER
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PERMIT DRAWING SHEET 79 OF 115
100 0 100
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56

RW SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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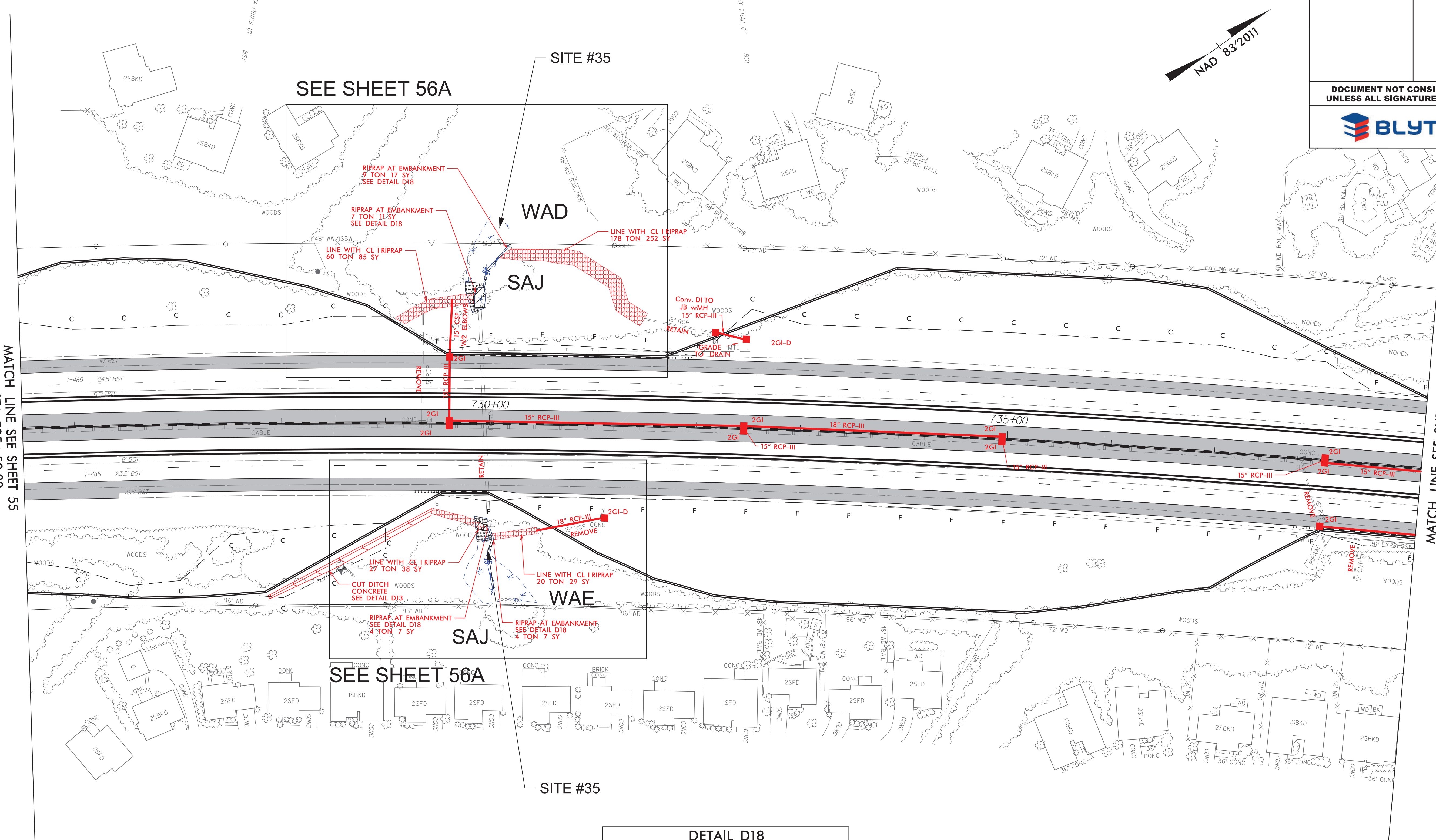
SEE SHEET 56A
SITE #35
WAD
SAJ
WAE
NAD 83/2011
MATCH LINE SEE SHEET 55 -L- STA. 725+50.00
MATCH LINE SEE SHEET 57 -L- STA. 739+00.00
RIPRAP AT EMBANKMENT 9 TON 17 SY SEE DETAIL D18
RIPRAP AT EMBANKMENT 7 TON 11 SY SEE DETAIL D18
LINE WITH CL I RIPRAP 60 TON 85 SY
LINE WITH CL I RIPRAP 178 TON 252 SY
Conv. DI TO JB w/MH 15" RCP-III
GRADE TO DRAIN
2GI-D
730+00
735+00
15" RCP-III
18" RCP-III
2GI
REMOVE
RETAIN
LINE WITH CL I RIPRAP 27 TON 38 SY
CUT DITCH CONCRETE SEE DETAIL D13
LINE WITH CL I RIPRAP 20 TON 29 SY
RIPRAP AT EMBANKMENT SEE DETAIL D18 4 TON 7 SY
RIPRAP AT EMBANKMENT SEE DETAIL D18 4 TON 7 SY

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)

Type of Liner= CL I Riprap

Key riprap into natural ground.

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 80 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019

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1001 Morehead Square Dr.
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PROJECT REFERENCE NO.	SHEET NO.
I–5507	56
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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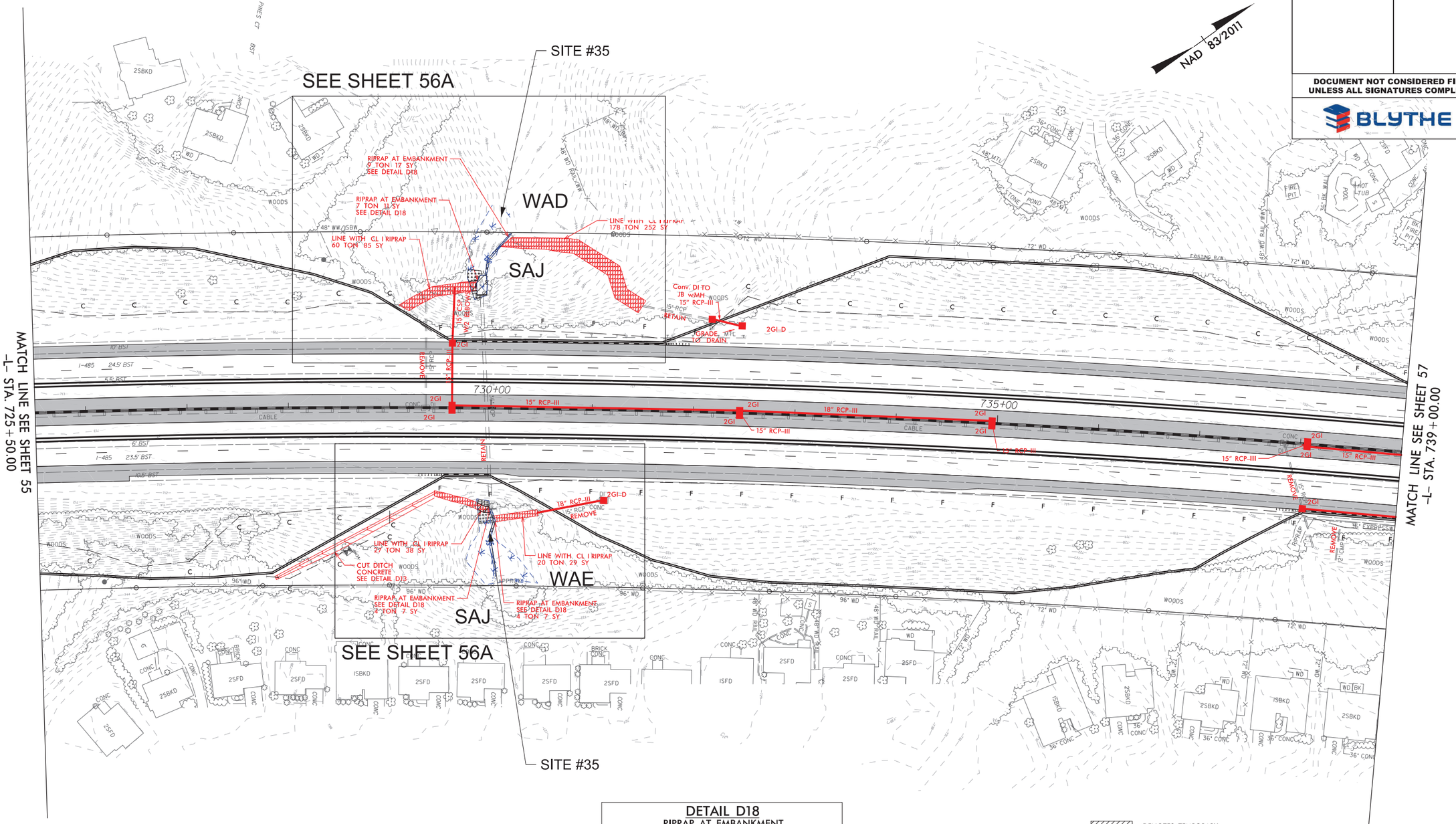
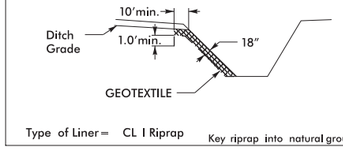
REVISIONS



DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL I Riprap Key riprap into natural ground.

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

PERMIT DRAWING SHEET 81 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
C:\pwworking\jcs01\jcs_workingdir\3088\336401_4009\I5507_Hyd_prm_wet_psh56_cont.dgn
PADPWCS01$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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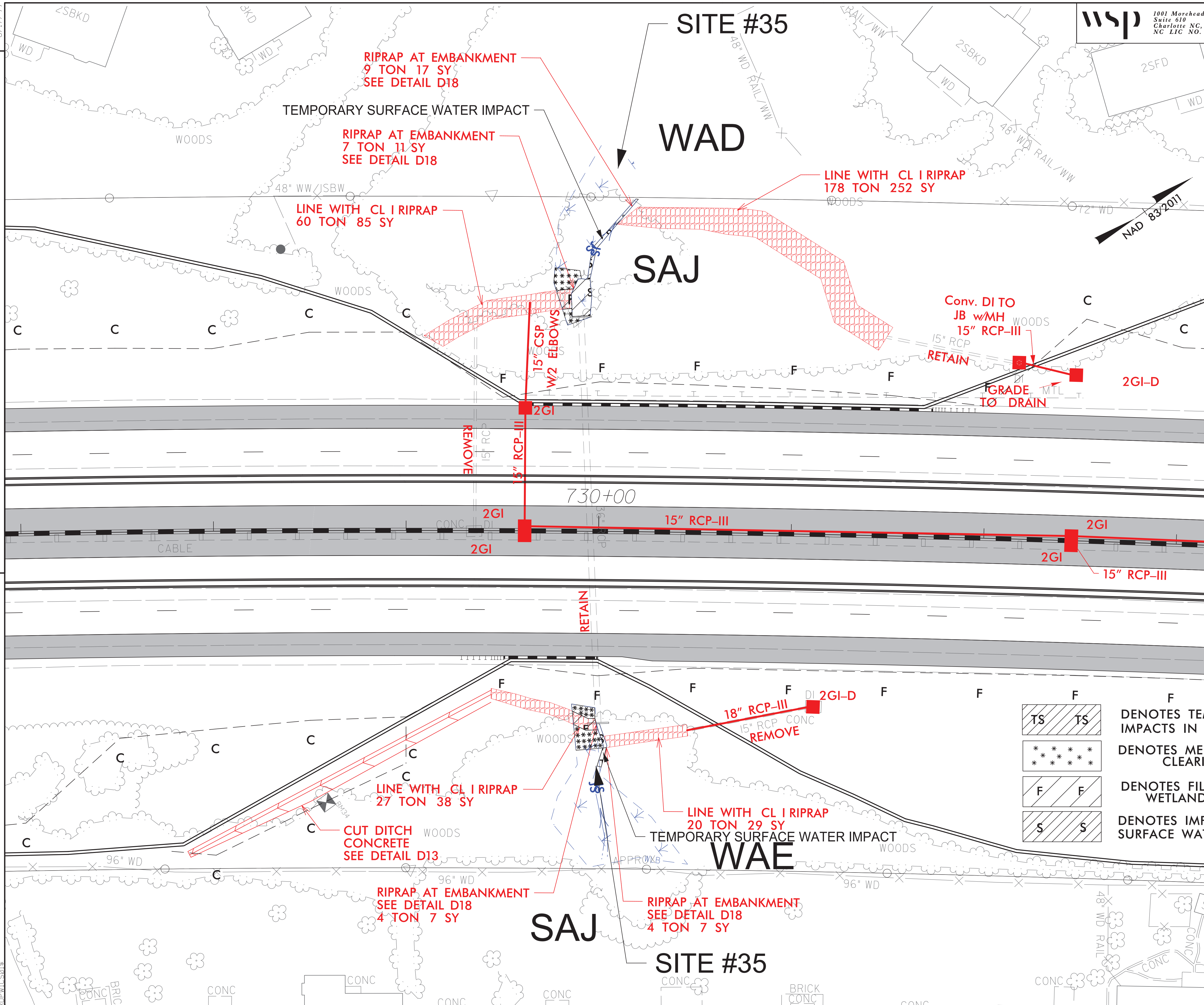

SITE #35
WAD
SAJ
RIPRAP AT EMBANKMENT
9 TON 17 SY
SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
7 TON 11 SY
SEE DETAIL D18
LINE WITH CL I RIPRAP
60 TON 85 SY
LINE WITH CL I RIPRAP
178 TON 252 SY
NAD 83/2011
Conv. DI TO
JB w/MH
15" RCP-III
RETAIN
GRADE TO DRAIN
2GI-D
15" CSP W/2 ELBOWS
2GI
REMOVE
15" RCP-III
730+00
15" RCP-III
2GI
2GI
2GI
2GI
15" RCP-III
RETAIN
18" RCP-III
2GI-D
REMOVE
LINE WITH CL I RIPRAP
27 TON 38 SY
CUT DITCH
CONCRETE
SEE DETAIL D13
LINE WITH CL I RIPRAP
20 TON 29 SY
TEMPORARY SURFACE WATER IMPACT
WAE
RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY
RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY
SAJ
SITE #35
WOODS
CABLE

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 82 OF 115

50 0 50
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NC LIC NO. F-0165

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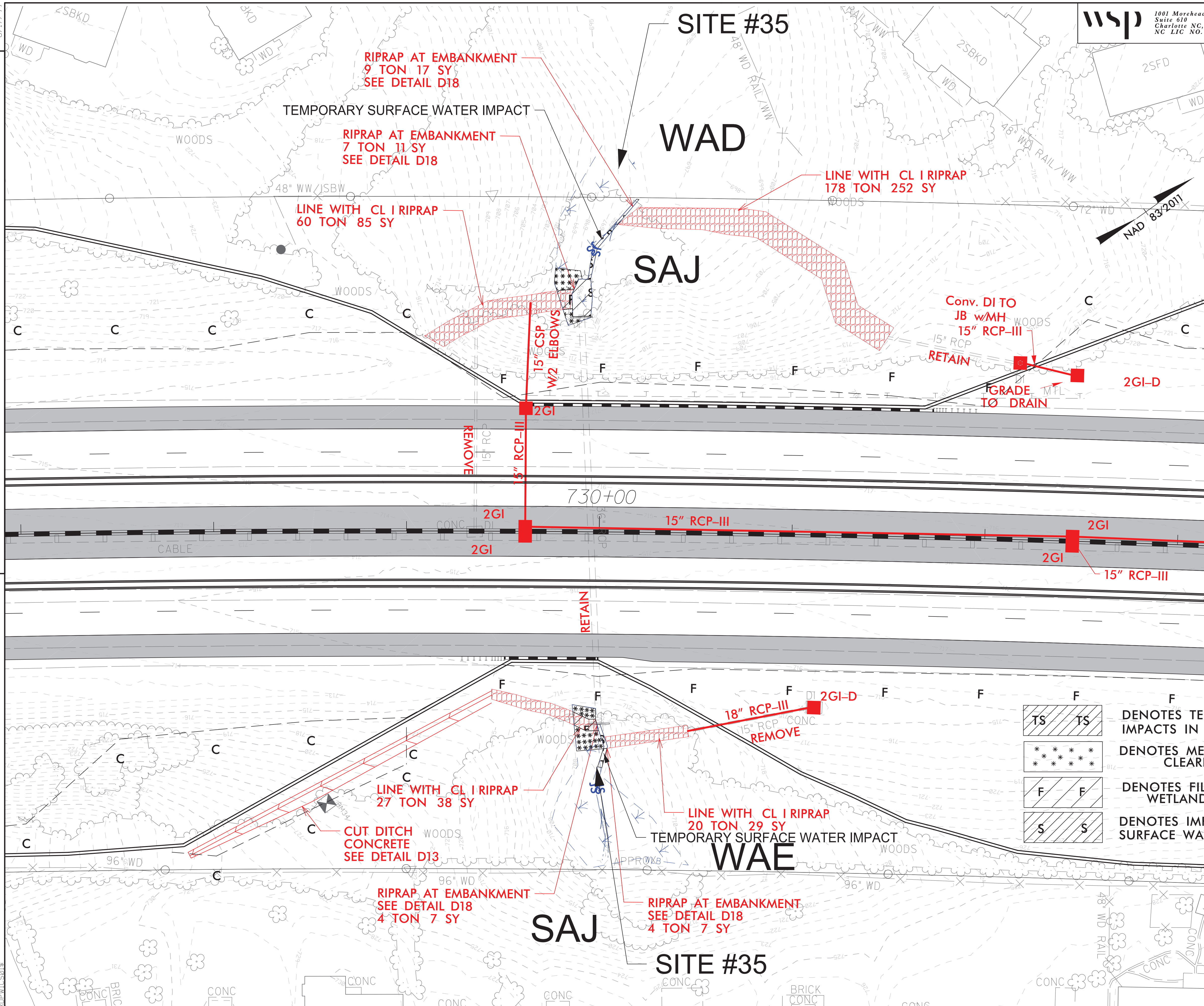

SITE #35
RIPRAP AT EMBANKMENT
9 TON 17 SY
SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
7 TON 11 SY
SEE DETAIL D18
WAD
LINE WITH CL I RIPRAP
178 TON 252 SY
LINE WITH CL I RIPRAP
60 TON 85 SY
SAJ
NAD 83/2011
Conv. DI TO
JB w/MH
15" RCP-III
RETAIN
15" CSP
W/2 ELBOWS
2GI-D
GRADE
TO DRAIN
2GI
REMOVE
15" RCP-III
730+00
2GI
15" RCP-III
2GI
2GI
2GI
15" RCP-III
CABLE
RETAIN
2GI-D
18" RCP-III
REMOVE
LINE WITH CL I RIPRAP
27 TON 38 SY
CUT DITCH
CONCRETE
SEE DETAIL D13
LINE WITH CL I RIPRAP
20 TON 29 SY
TEMPORARY SURFACE WATER IMPACT
WAE
RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY
RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY
SAJ
SITE #35
WOODS
REVISIONS

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 83 OF 115

50 0 50
GRAPHIC SCALE

8/17/99

REVISIONS

wsp
1001 Morehead Square Dr.
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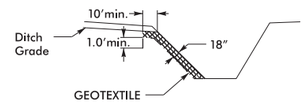
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	57
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

NAD 83/2011

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = Class I Riprap (KEYED IN)

MATCH LINE SEE SHEET 56 -L- STA. 739+00.00

MATCH LINE SEE SHEET 58 -L- STA. 752+00.00

SITE #36

SEE SHEET 57A

SITE #37

SEE SHEET 57B

SM

SBG

NON-JURISDICTIONAL

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 20 TON 26 SY

LINE WITH CL I RIPRAP 31 TON 43 SY

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 90 TON 127 SY

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 256 TON 361 SY

LINE WITH CL I RIPRAP 31 TON 44 SY

LINE WITH CL I RIPRAP 33 TON 47 SY

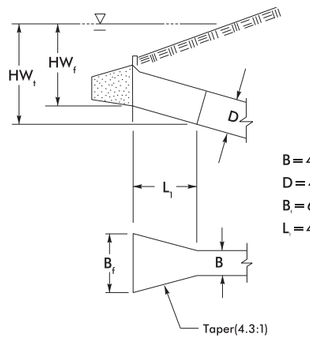
SIDE TAPERED INLET WHW SEE DETAIL D25

CL B RIPRAP 2 TON 7 SY

740+00 745+00 750+00

I-485 24' BST 6' BST 23.5' BST

DETAIL D25
SIDE-TAPERED INLET



B=4.5 ft
D=4.5 ft
B_t=6.5 ft
L_t=4 ft

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2023

PERMIT DRAWING SHEET 84 OF 115

100 0 100
GRAPHIC SCALE

8/9/2023
\\wspw14cs01\ics_pdf_work_dir\135943\335941_9774\I5507_Hyd_prm_wet_psh57.dgn
wspw14cs01$

8/17/99

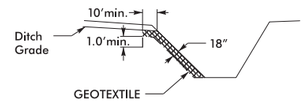
REVISIONS

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	57
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = Class I Riprap (KEYED IN)

NAD 83/2011

MATCH LINE SEE SHEET 56 -L- STA. 739+00.00

MATCH LINE SEE SHEET 58 -L- STA. 752+00.00

SITE #36

SITE #37

SEE SHEET 57A

SEE SHEET 57B

SM

SBG

NON-JURISDICTIONAL

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 20 TON 26 SY

LINE WITH CL I RIPRAP 31 TON 43 SY

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 90 TON 127 SY

LINE WITH CL I RIPRAP 256 TON 361 SY

CL B RIPRAP 2 TON 7 SY

LINE WITH CL I RIPRAP 31 TON 44 SY

SIDE TAPERED INLET W/HW SEE DETAIL D25

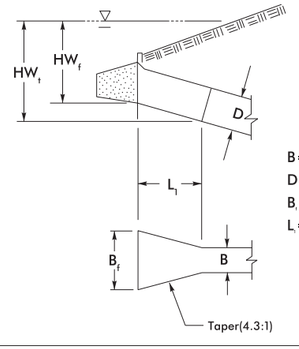
LINE WITH CL I RIPRAP 33 TON 47 SY

740+00

745+00

750+00

DETAIL D25
SIDE-TAPERED INLET



B=4.5 ft
D=4.5 ft
B_t=6.5 ft
L_t=4 ft

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2023

PERMIT DRAWING SHEET 85 OF 115

100 0 100
GRAPHIC SCALE

8/9/2023
\\wspw14lcs01\ICS_pdf_work_dir\135944\335941_9777\I5507_Hyd_prm_wet_psh57_cont.dgn
wspw14lcs02$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	57A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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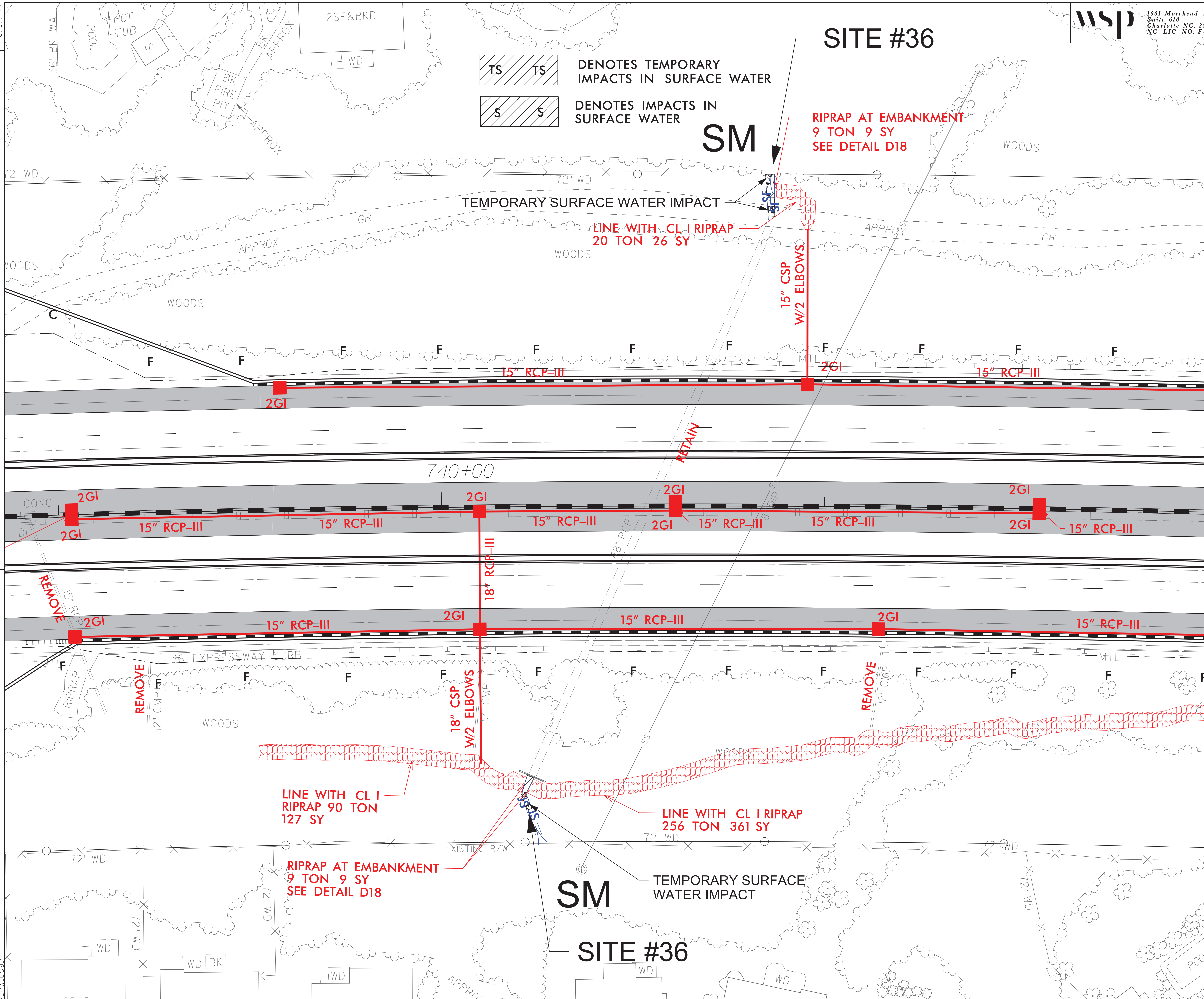


SITE #36
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
SM
RIPRAP AT EMBANKMENT
9 TON 9 SY
SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
LINE WITH CL I RIPRAP
20 TON 26 SY
15" CSP W/2 ELBOWS
15" RCP–III
2GI
RETAIN
740+00
18" RCP–III
REMOVE
18" CSP W/2 ELBOWS
WOODS
LINE WITH CL I
RIPRAP 90 TON
127 SY
LINE WITH CL I RIPRAP
256 TON 361 SY
RIPRAP AT EMBANKMENT
9 TON 9 SY
SEE DETAIL D18
TEMPORARY SURFACE WATER IMPACT
SM
SITE #36

PERMIT DRAWING
SHEET 86 OF 115

50 0 50
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	57A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

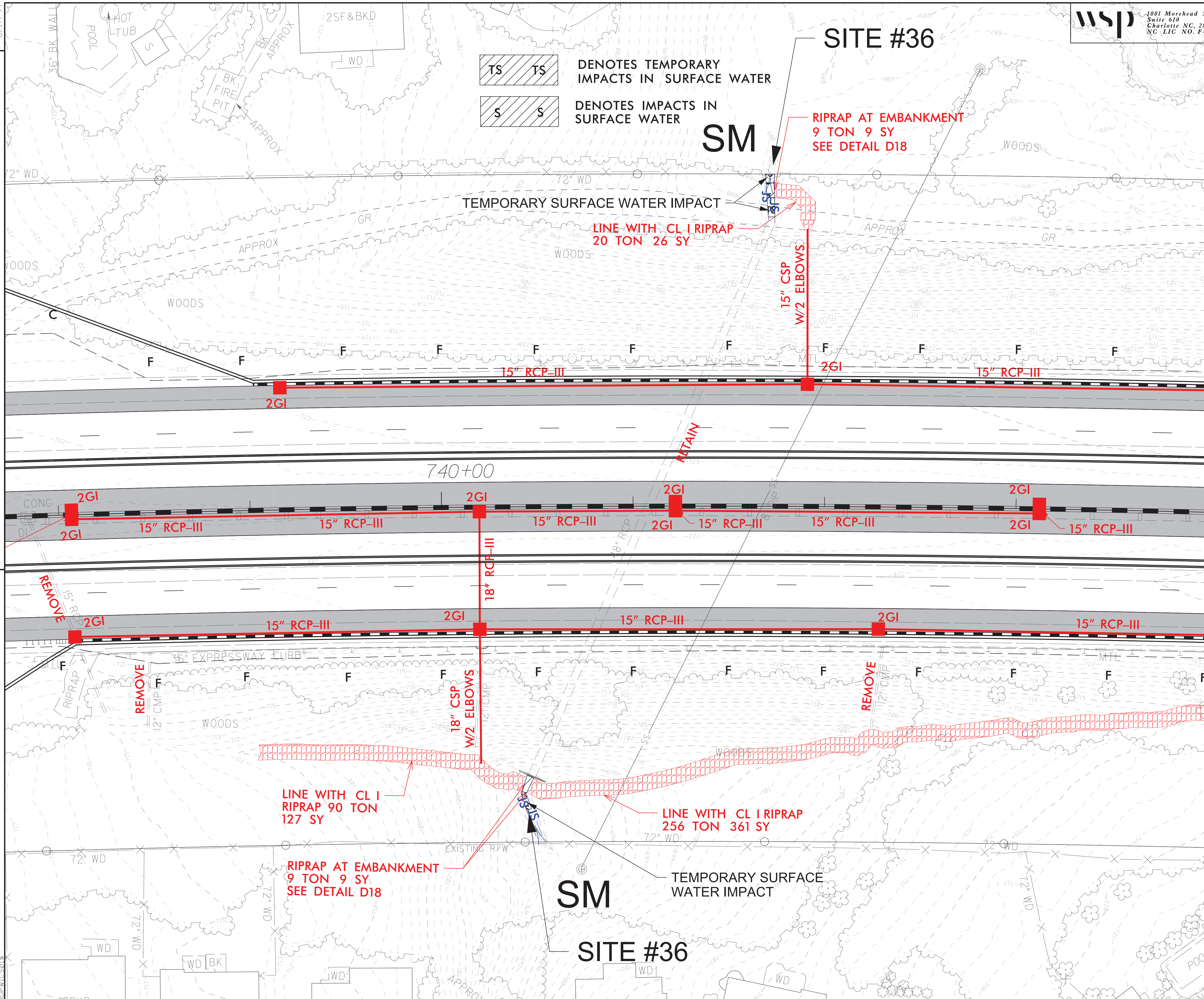
WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



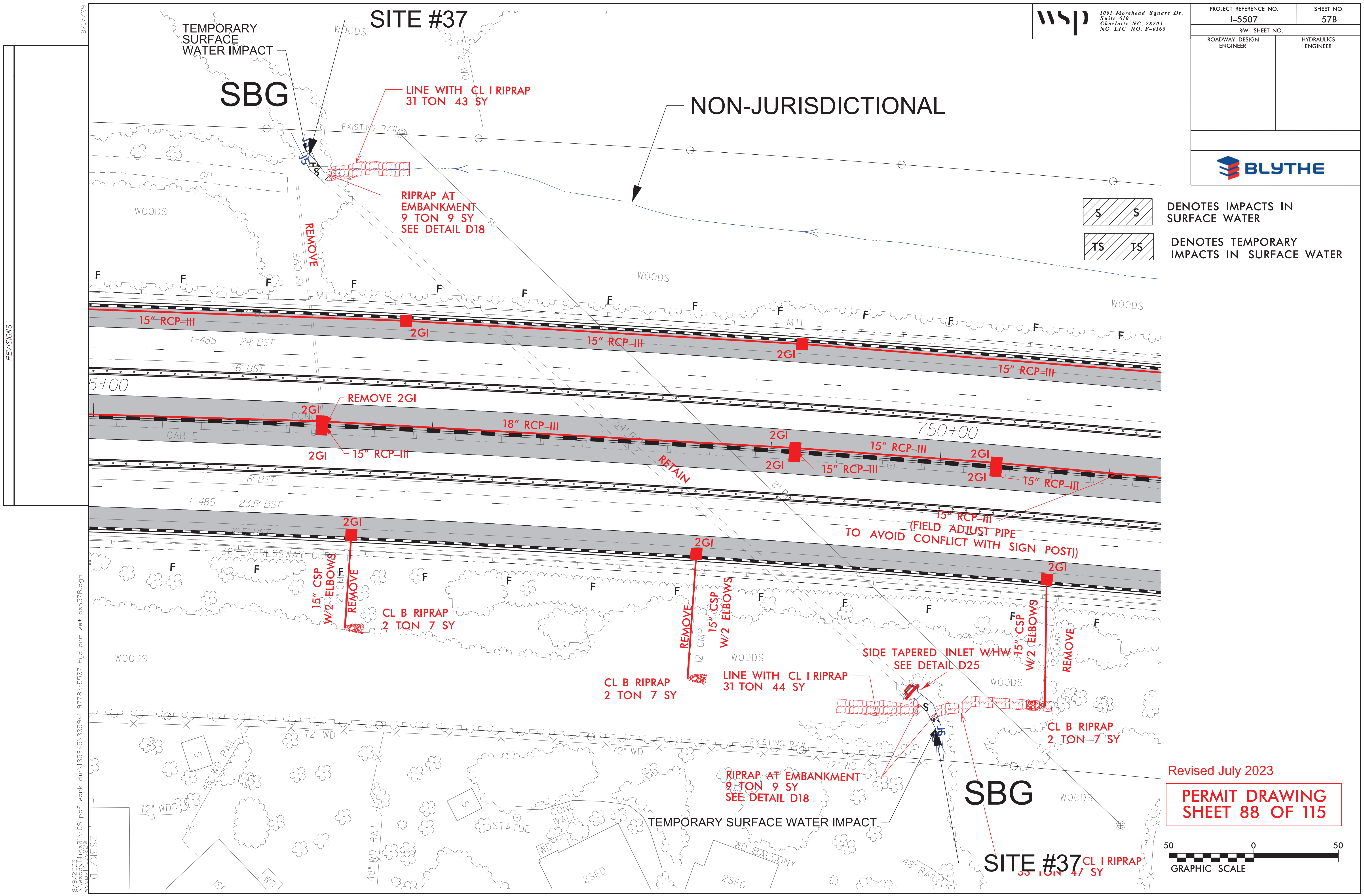
PERMIT DRAWING
SHEET 87 OF 115

50 0 50
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019



SITE #37
TEMPORARY SURFACE WATER IMPACT
SBG
LINE WITH CL I RIPRAP
31 TON 43 SY
NON-JURISDICTIONAL
RIPRAP AT EMBANKMENT
9 TON 9 SY
SEE DETAIL D18
EXISTING R/W
WOODS
GR
REMOVE
15" CMP
72" WD
MTL
15" RCP–III
2GI
I–485
24' BST
6' BST
5+00
REMOVE 2GI
18" RCP–III
CABLE
CONC
RETAIN
54" RCP
750+00
8" DIP
23.5' BST
10.5' BST
36" EXPRESSWAY CURB
(FIELD ADJUST PIPE
TO AVOID CONFLICT WITH SIGN POST))
15" CSP
W/2 ELBOWS
12" CMP
CL B RIPRAP
2 TON 7 SY
LINE WITH CL I RIPRAP
31 TON 44 SY
SIDE TAPERED INLET W/HW
SEE DETAIL D25
CL I RIPRAP
48" WD RAIL
48" RAIL
STATUE
CONC WALL
WD BALCONY
2SFD
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165
PROJECT REFERENCE NO.
I–5507
SHEET NO.
57B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
BLYTHE
REVISIONS
Revised July 2023
PERMIT DRAWING
SHEET 88 OF 115
50
0
50
GRAPHIC SCALE
8/9/2023

8/17/99

REVISIONS

SITE #37

TEMPORARY SURFACE WATER IMPACT

SBG

LINE WITH CL I RIPRAP 31 TON 43 SY

NON-JURISDICTIONAL

EXISTING R/W

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

REMOVE 15" CMP

15" RCP-III

2GI

I-485 24' BST

6' BST

5+00

REMOVE 2GI

18" RCP-III

CABLE

CONC

750+00

RETAIN

15" RCP-III (FIELD ADJUST PIPE TO AVOID CONFLICT WITH SIGN POST))

I-485 23.5' BST

10.5' BST

36" EXPRESSWAY CURB

15" CSP W/2 ELBOWS

12" CMP

CL B RIPRAP 2 TON 7 SY

SIDE TAPERED INLET W/HW SEE DETAIL D25

LINE WITH CL I RIPRAP 31 TON 44 SY

72" WD

48" WD RAIL

STATUE

CONC WALL

WD BALCONY

2SFD

2SBK/FD

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

Revised July 2023

PERMIT DRAWING SHEET 89 OF 115

GRAPHIC SCALE 50 0 50

8/9/2023
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PROJECT REFERENCE NO.	SHEET NO.
I-5507	57B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	58

RW SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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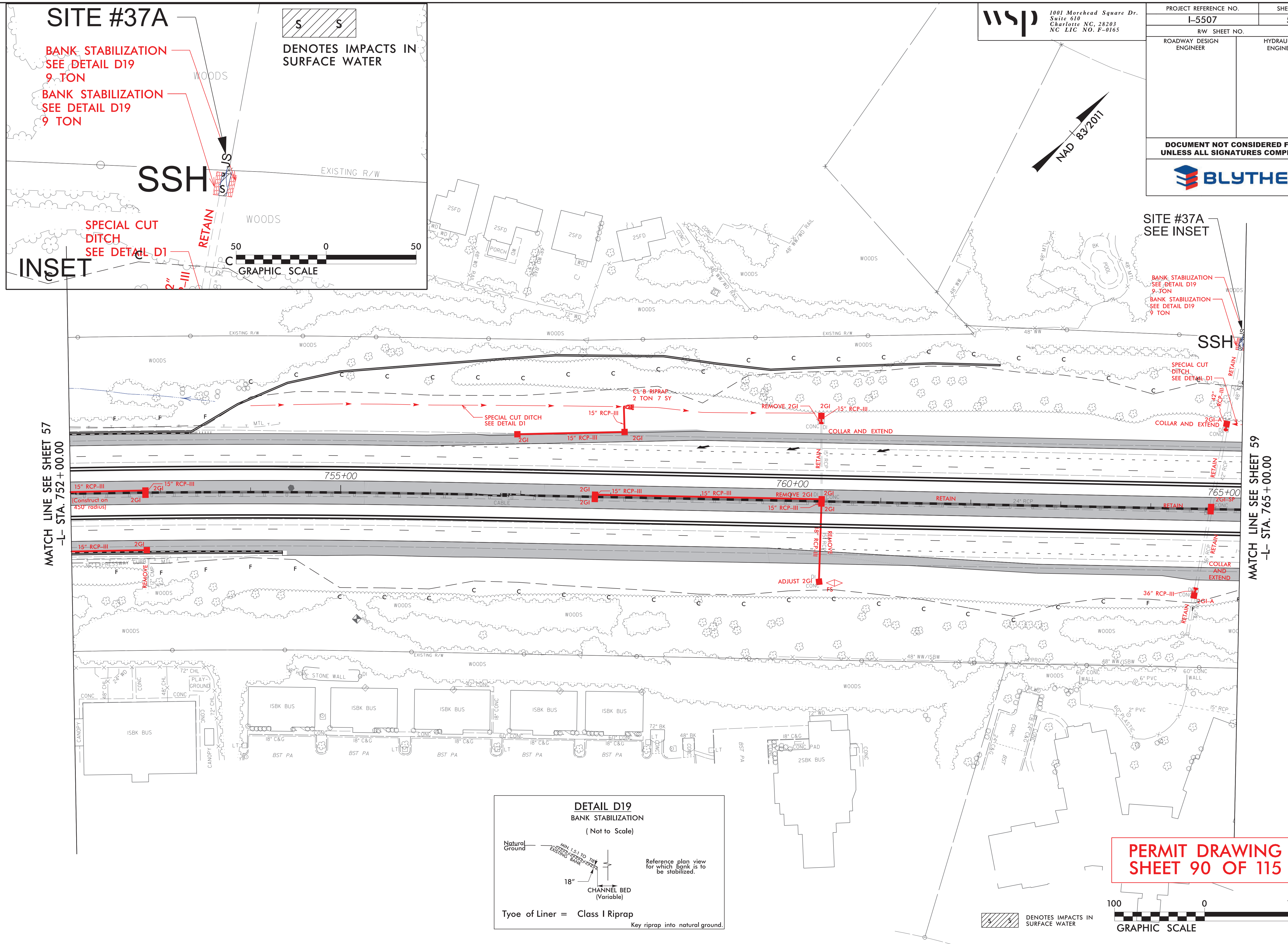
NC LIC NO. F-0165


SITE #37A
BANK STABILIZATION
SEE DETAIL D19
9 TON
BANK STABILIZATION
SEE DETAIL D19
9 TON
DENOTES IMPACTS IN SURFACE WATER
SSH
EXISTING R/W
WOODS
SPECIAL CUT DITCH
SEE DETAIL D1
RETAIN
50 0 50
GRAPHIC SCALE
INSET
NAD 83/2011
SITE #37A SEE INSET
MATCH LINE SEE SHEET 57 -L- STA. 752+00.00
MATCH LINE SEE SHEET 59 -L- STA. 765+00.00
755+00
760+00
765+00
CL B RIPRAP 2 TON 7 SY
SPECIAL CUT DITCH SEE DETAIL D1
15" RCP-III
2GI
REMOVE 2GI
COLLAR AND EXTEND
ADJUST 2GI
36" RCP-III
2GI-A
RETAIN
(Construct on 450' radius)
ISBK BUS
STONE WALL
DETAIL D19
BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN 1.5:1 TO TIE EXISTING BANK
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Tyoe of Liner = Class I Riprap
Key riprap into natural ground.
DENOTES IMPACTS IN SURFACE WATER
100 0 100
GRAPHIC SCALE

REVISIONS

PERMIT DRAWING
SHEET 90 OF 115

8/17/99

9/12/2019

PROJECT REFERENCE NO.	SHEET NO.
I-5507	58
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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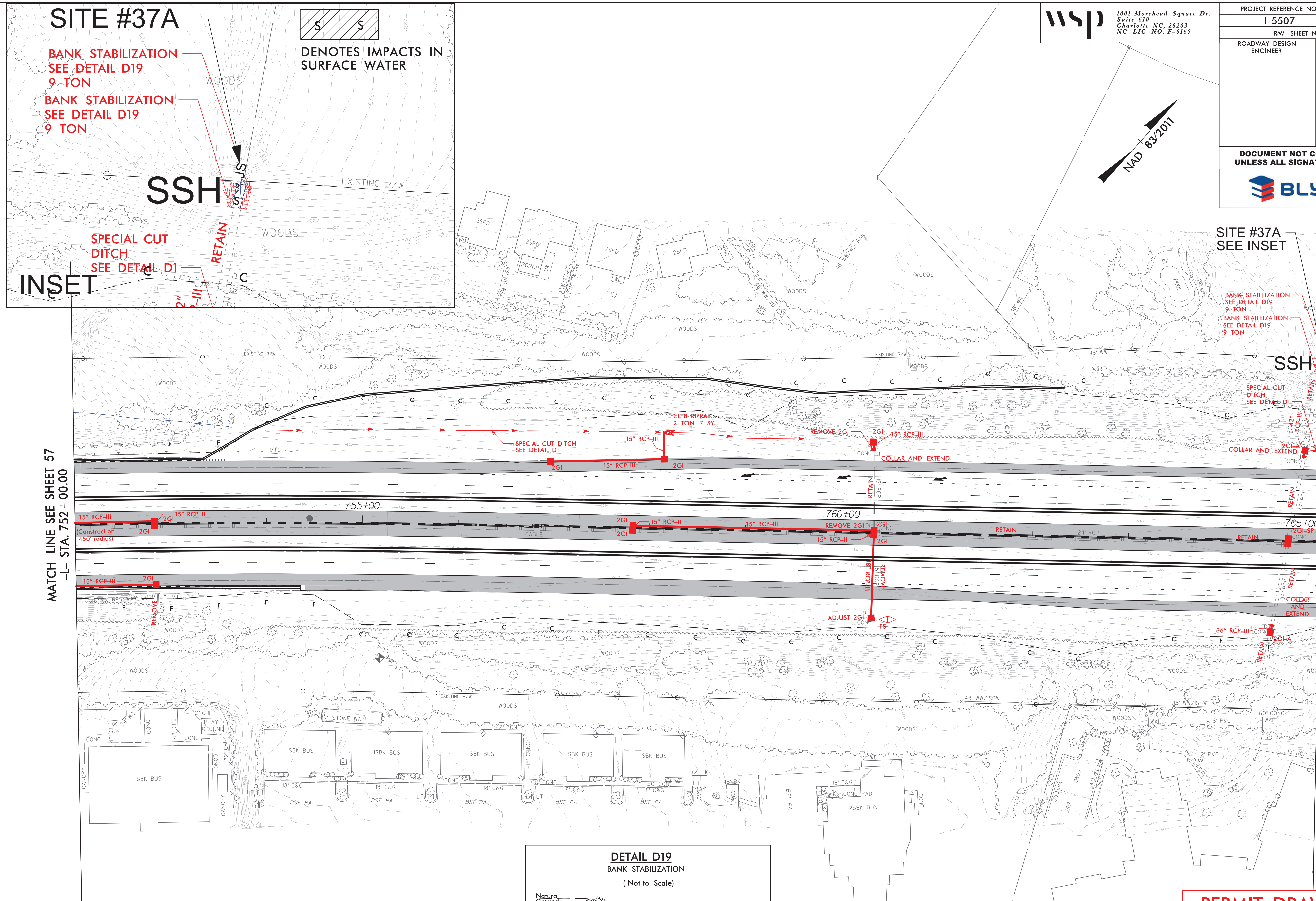
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

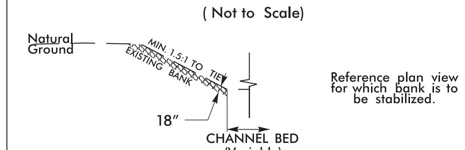
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE



SITE #37A
BANK STABILIZATION SEE DETAIL D19 9 TON
BANK STABILIZATION SEE DETAIL D19 9 TON
SSH
SPECIAL CUT DITCH SEE DETAIL D1
RETAIN
EXISTING R/W
WOODS
INSET
DENOTES IMPACTS IN SURFACE WATER
NAD 83/2011
SITE #37A SEE INSET
CL B RIPRAP 2 TON 7 SY
SPECIAL CUT DITCH SEE DETAIL D1
15" RCP-III
2GI
REMOVE 2GI
COLLAR AND EXTEND
ADJUST 2GI
36" RCP-III
2GI-A
755+00
760+00
765+00
MATCH LINE SEE SHEET 57 -L- STA. 752+00.00
MATCH LINE SEE SHEET 59 -L- STA. 765+00.00
ISBK BUS
2SBK BUS
STONE WALL

DETAIL D19
BANK STABILIZATION
(Not to Scale)



Tyoe of Liner = Class I Riprap

Key riprap into natural ground.

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 91 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019
...\3088\336401.4016\I5507_Hyd_prm_wet_psh58_cont.dgn

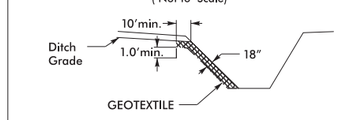
8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap Key riprap into natural ground.

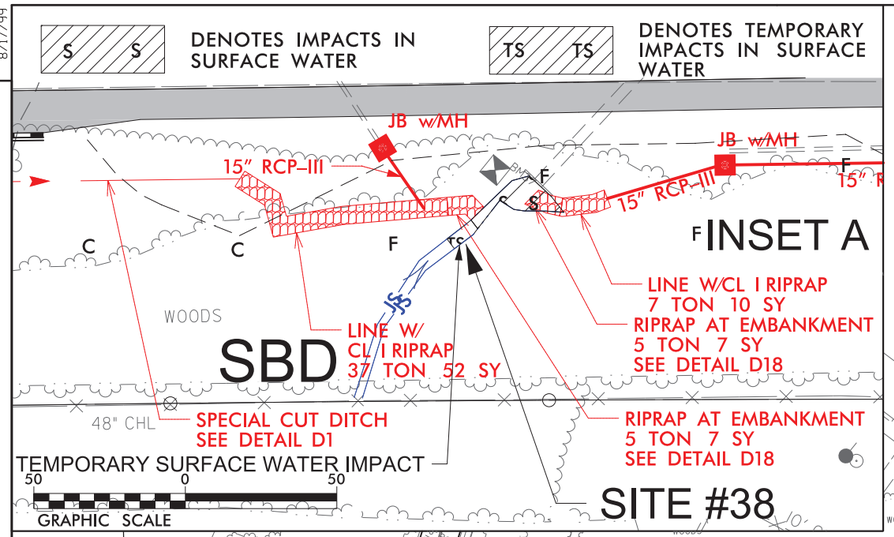
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

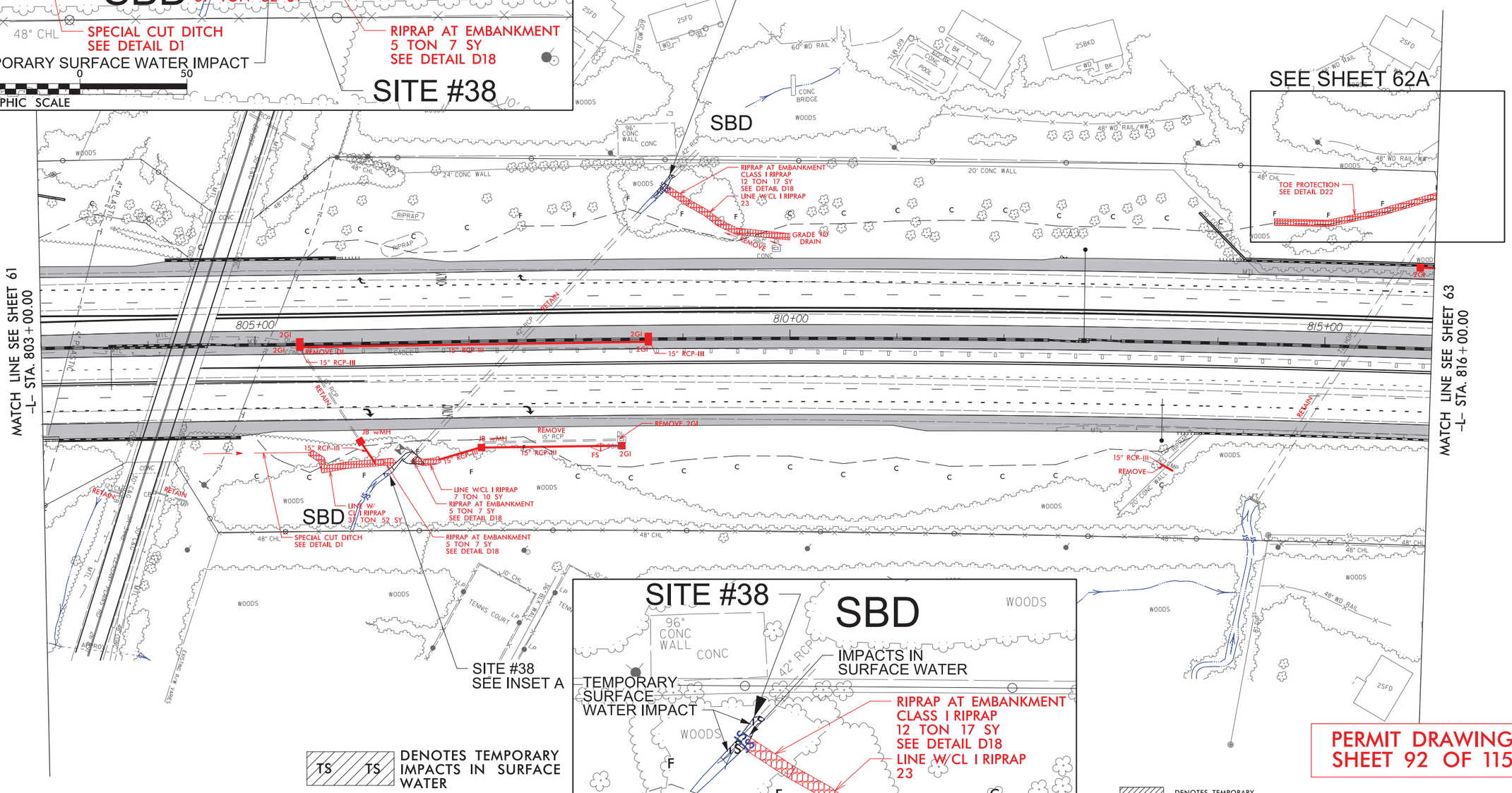
PROJECT REFERENCE NO.	SHEET NO.
I-5507	62
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011





PERMIT DRAWING
SHEET 92 OF 115

9/12/2019
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PROFICIS02$

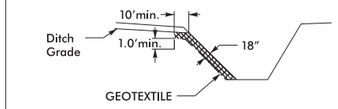
8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap Key riprap into natural ground.

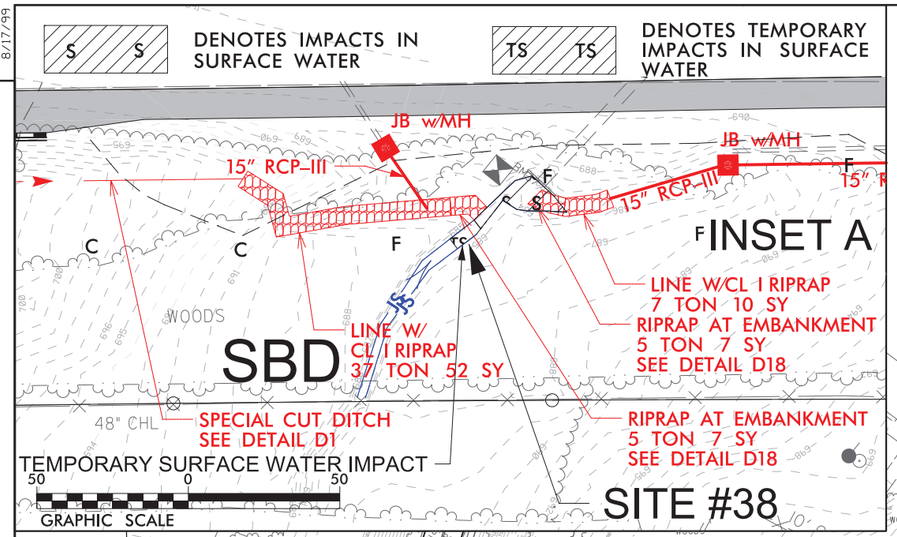
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

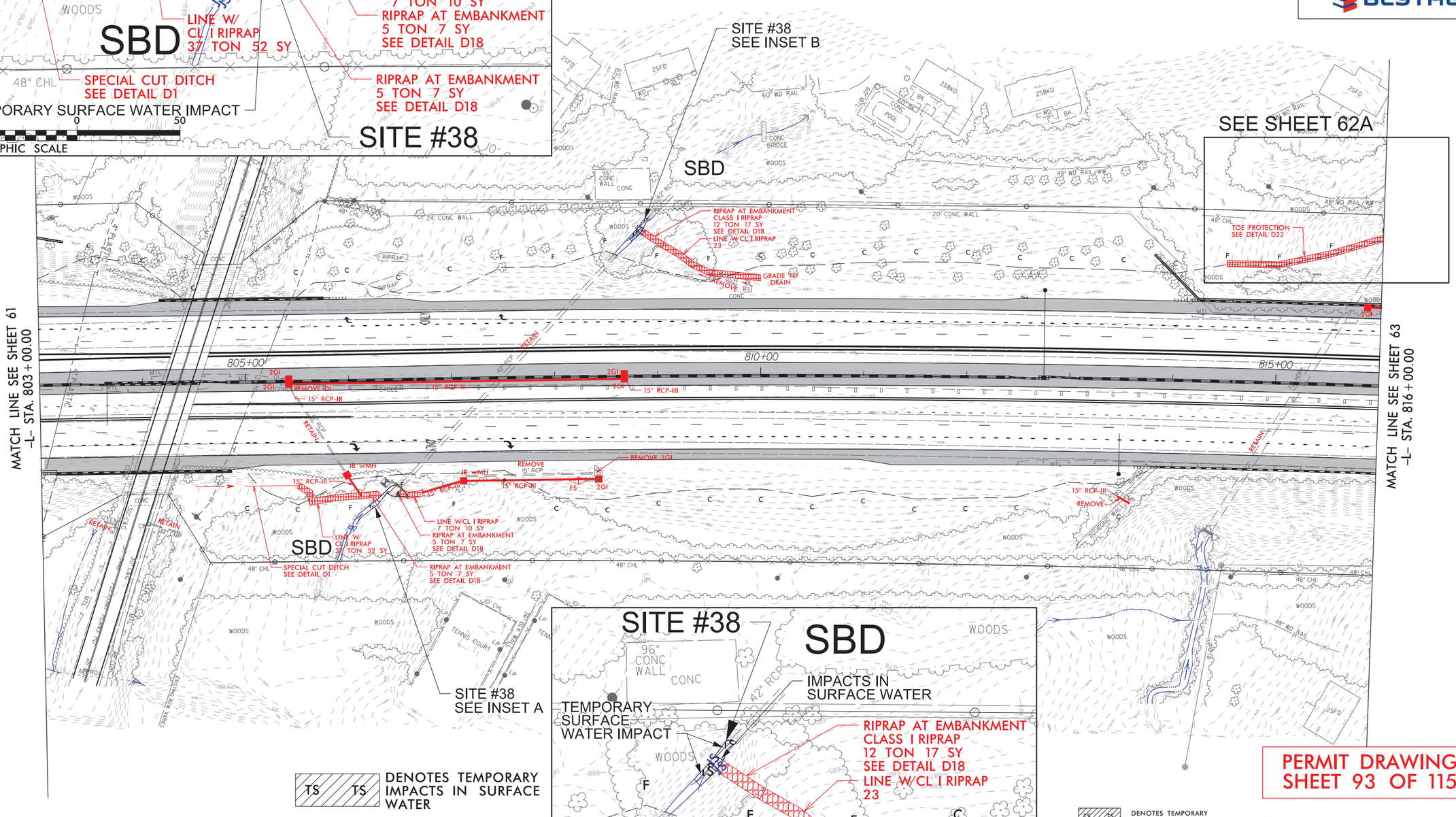
PROJECT REFERENCE NO.	SHEET NO.
I-5507	62
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011





PERMIT DRAWING
SHEET 93 OF 115

9/12/2019
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PROWICS02$

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Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

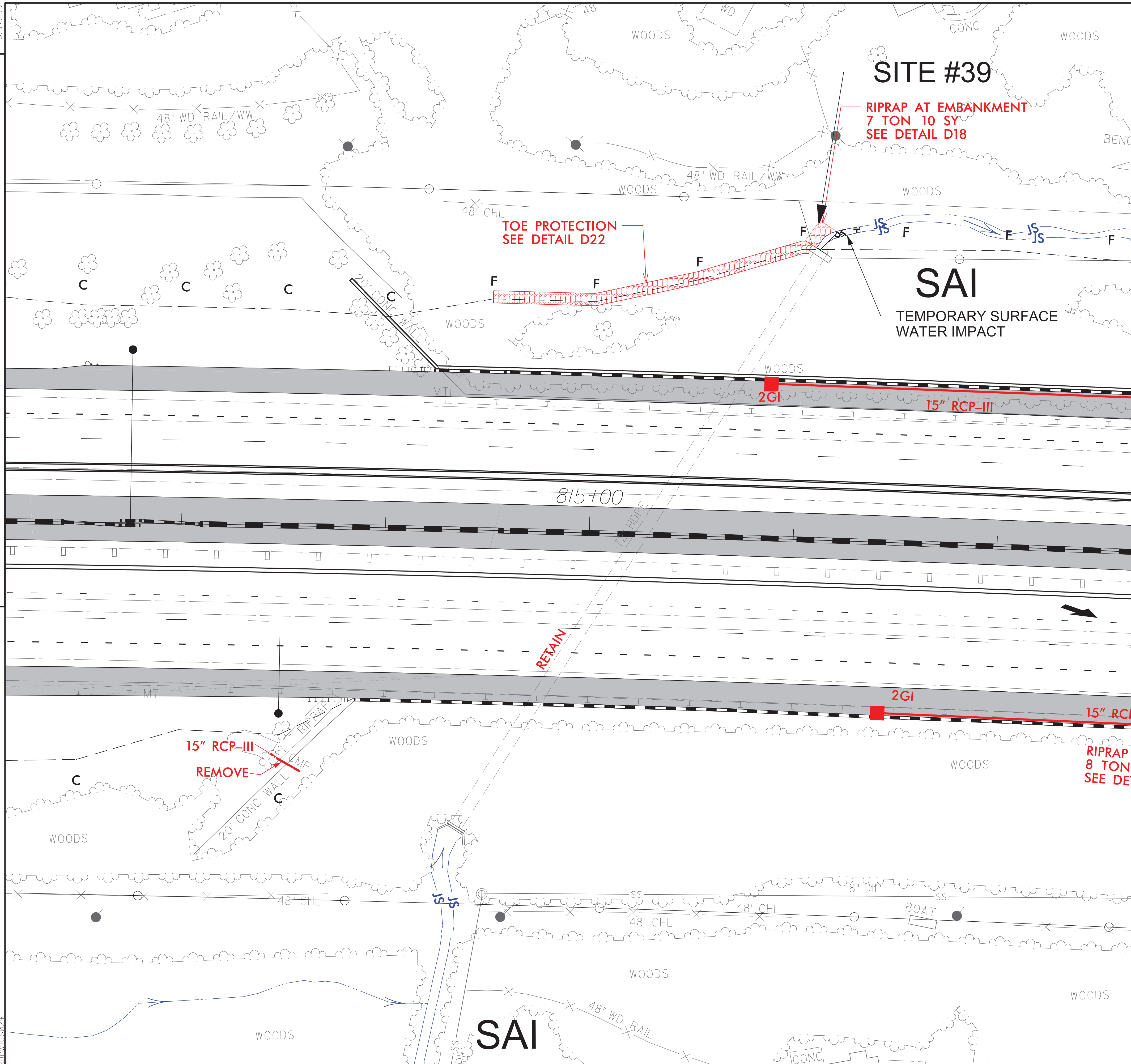
PROJECT REFERENCE NO.	SHEET NO.
I-5507	62A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS

8/17/99



NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 94 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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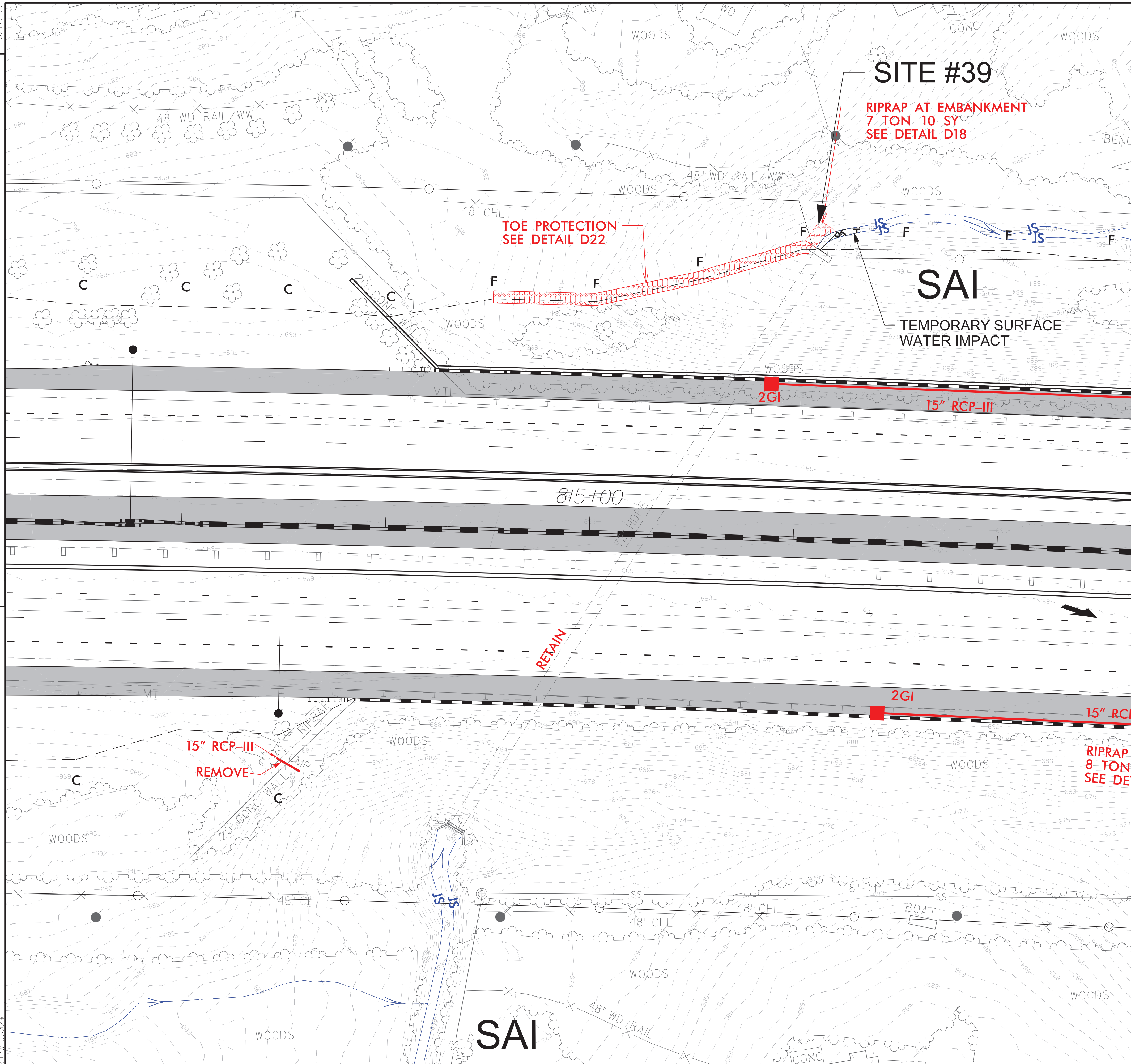


1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	62A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

REVISIONS

8/17/99

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 95 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

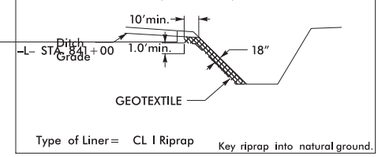
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	63
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

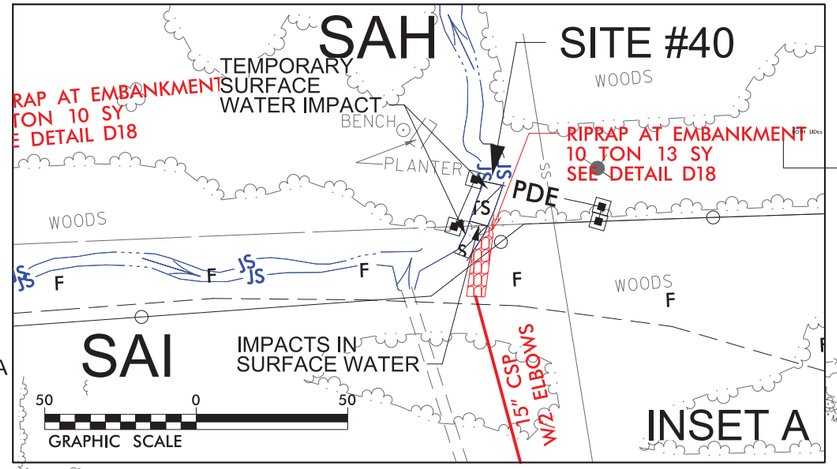
BLYTHE

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap Key riprap into natural ground.

NAD 83/2011



9/12/2019
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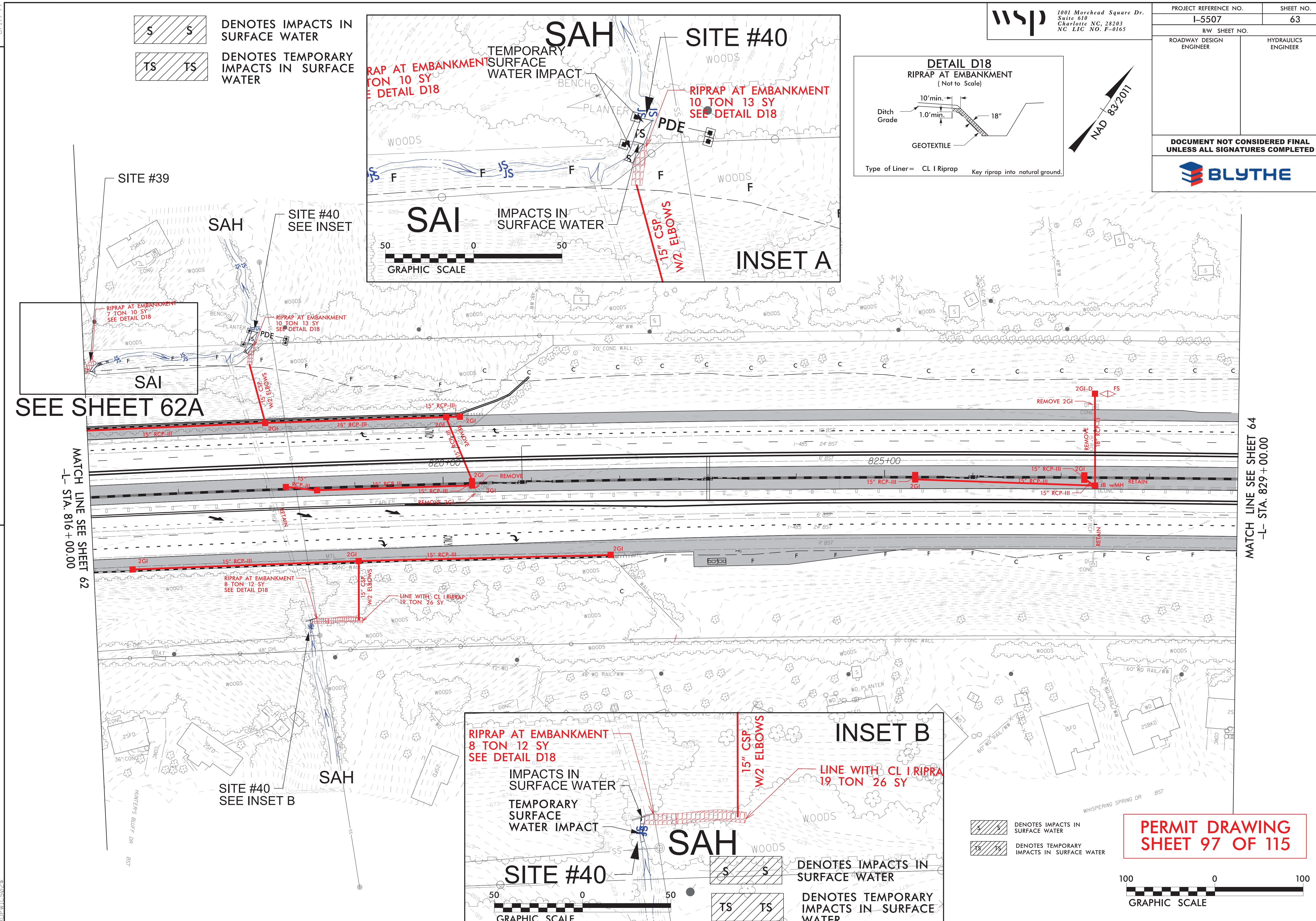
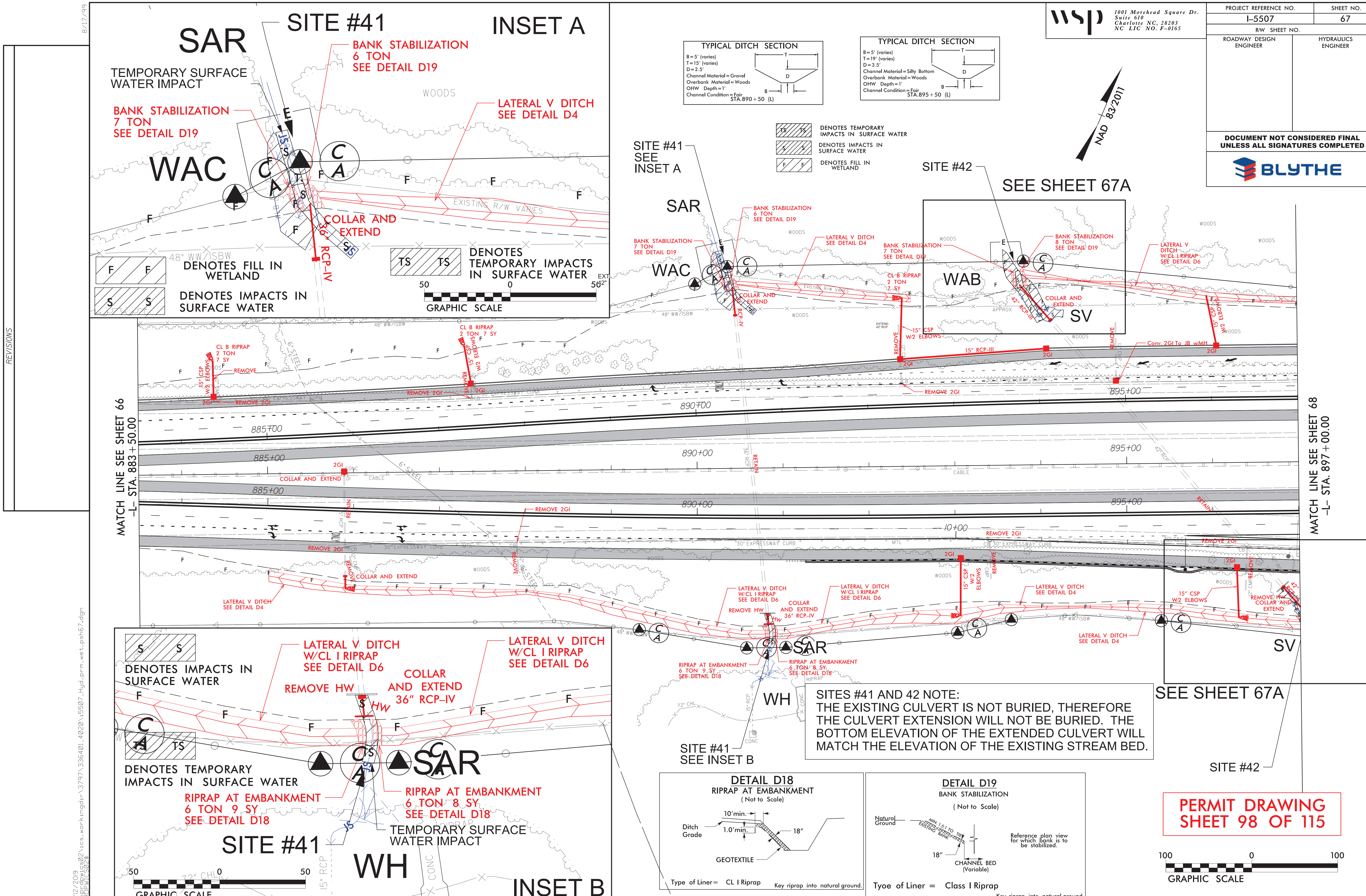
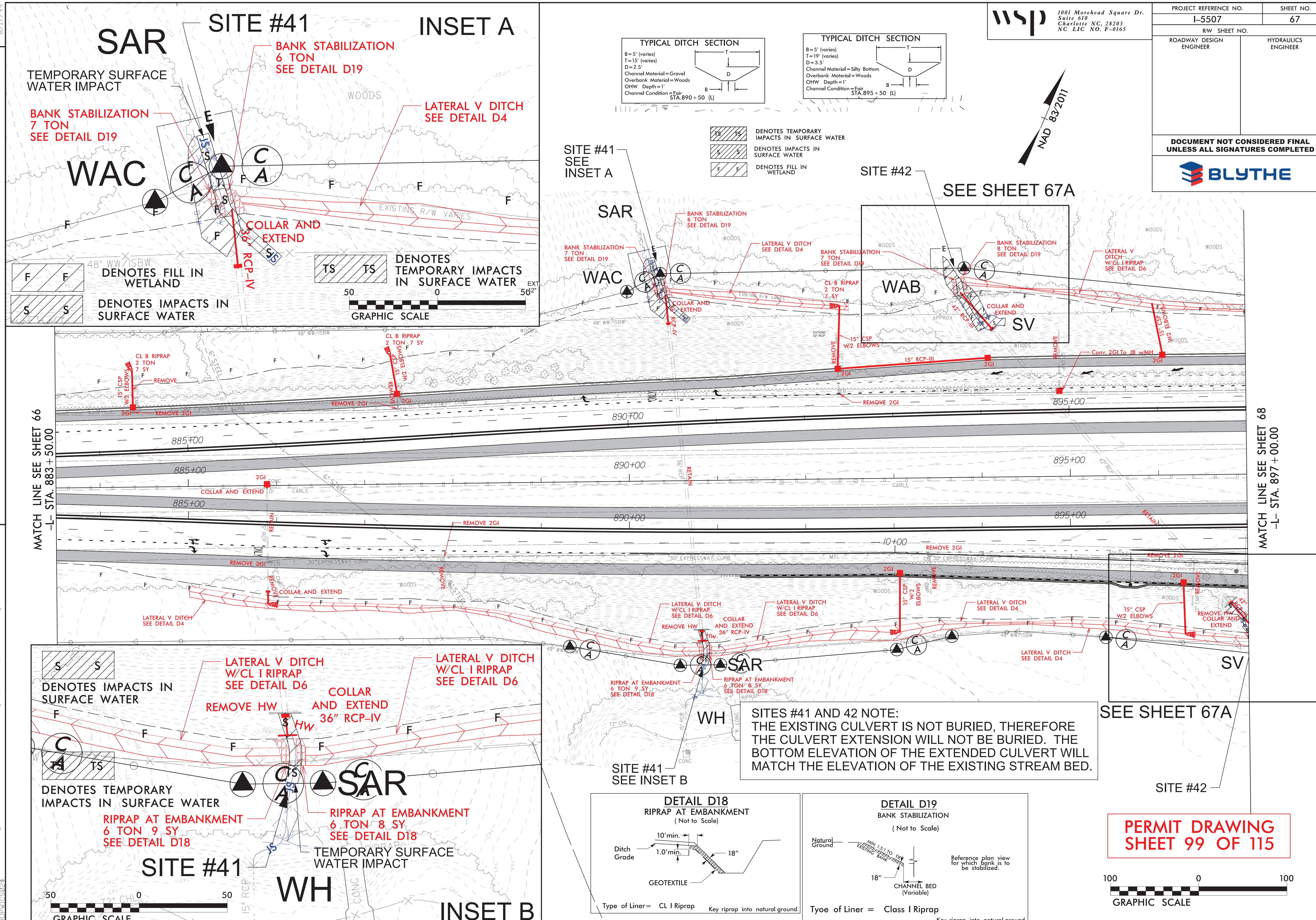
PROWICS02


PROJECT REFERENCE NO.
I-5507
SHEET NO.
63
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
18"
Ditch Grade
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
NAD 83/2011
SAH
SITE #40
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT 10 TON 13 SY SEE DETAIL D18
PDE
SAI
IMPACTS IN SURFACE WATER
15" CSP W/2 ELBOWS
INSET A
GRAPHIC SCALE
SITE #39
SITE #40 SEE INSET
RIPRAP AT EMBANKMENT 7 TON 10 SY SEE DETAIL D18
SEE SHEET 62A
MATCH LINE SEE SHEET 62 -L- STA. 816+00.00
MATCH LINE SEE SHEET 64 -L- STA. 829+00.00
825+00
820+00
RIPRAP AT EMBANKMENT 8 TON 12 SY SEE DETAIL D18
LINE WITH CL I RIPRAP 19 TON 26 SY
SITE #40 SEE INSET B
INSET B
RIPRAP AT EMBANKMENT 8 TON 12 SY SEE DETAIL D18
IMPACTS IN SURFACE WATER
TEMPORARY SURFACE WATER IMPACT
LINE WITH CL I RIPRA 19 TON 26 SY
SITE #40
PERMIT DRAWING SHEET 97 OF 115
REVISIONS
8/17/99
9/12/2019



PROJECT REFERENCE NO. I-5507
SHEET NO. 67
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
NAD 83/2011
TYPICAL DITCH SECTION
B=5' (varies) T=15' (varies) D=2.5' Channel Material=Gravel Overbank Material=Woods OHW Depth=1' Channel Condition=Fair STA.890+50 (L)
TYPICAL DITCH SECTION
B=5' (varies) T=19' (varies) D=3.5' Channel Material=Silty Bottom Overbank Material=Woods OHW Depth=1' Channel Condition=Fair STA.895+50 (L)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
SITE #41
INSET A
SAR
TEMPORARY SURFACE WATER IMPACT
BANK STABILIZATION 6 TON SEE DETAIL D19
BANK STABILIZATION 7 TON SEE DETAIL D19
LATERAL V DITCH SEE DETAIL D4
WAC
COLLAR AND EXTEND 36" RCP-IV
EXISTING R/W VARIES
48" WW/ISBW
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
50 0 50
GRAPHIC SCALE
SITE #41 SEE INSET A
SITE #42
SEE SHEET 67A
WAB
SV
BANK STABILIZATION 8 TON SEE DETAIL D19
CL B RIPRAP 2 TON 7 SY
15" CSP W/2 ELBOWS
15" RCP-III
REMOVE 2GI
Conv. 2GI To JB w/MH
COLLAR AND EXTEND
LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6
MATCH LINE SEE SHEET 66 -L- STA. 883+50.00
MATCH LINE SEE SHEET 68 -L- STA. 897+00.00
885+00
890+00
895+00
10+00
RIPRAP AT EMBANKMENT 6 TON 9 SY SEE DETAIL D18
RIPRAP AT EMBANKMENT 6 TON 8 SY SEE DETAIL D18
REMOVE HW
WH
SITE #41 SEE INSET B
INSET B
TEMPORARY SURFACE WATER IMPACT
SITES #41 AND 42 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
10'min.
1.0'min.
18"
GEOTEXTILE
Type of Liner= CL I Riprap
Key riprap into natural ground.
DETAIL D19
BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN 1.5:1 TO TIE EXISTING BANK
Reference plan view for which bank is to be stabilized.
18"
CHANNEL BED (Variable)
Type of Liner = Class I Riprap
Key riprap into natural ground.
PERMIT DRAWING SHEET 98 OF 115
100 0 100
GRAPHIC SCALE
REVISIONS
8/17/99
9/12/2019



PROJECT REFERENCE NO. I-5507
SHEET NO. 67
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
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NAD 83/2011
TYPICAL DITCH SECTION
B = 5' (varies)
T = 15' (varies)
D = 2.5'
Channel Material = Gravel
Overbank Material = Woods
OHW Depth = 1'
Channel Condition = Fair
STA. 890 + 50 (L)
TYPICAL DITCH SECTION
B = 5' (varies)
T = 19' (varies)
D = 3.5'
Channel Material = Silty Bottom
Overbank Material = Woods
OHW Depth = 1'
Channel Condition = Fair
STA. 895 + 50 (L)
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
SITE #41
INSET A
SAR
TEMPORARY SURFACE WATER IMPACT
BANK STABILIZATION 6 TON SEE DETAIL D19
BANK STABILIZATION 7 TON SEE DETAIL D19
LATERAL V DITCH SEE DETAIL D4
WAC
COLLAR AND EXTEND
36" RCP-IV
EXISTING R/W VARIES
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
GRAPHIC SCALE
SITE #41 SEE INSET A
SITE #42
SEE SHEET 67A
BANK STABILIZATION 8 TON SEE DETAIL D19
LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6
CL B RIPRAP 2 TON 7 SY
15" CSP W/2 ELBOWS
15" RCP-III
REMOVE 2GI
WAB
SV
MATCH LINE SEE SHEET 66 -L- STA. 883 + 50.00
MATCH LINE SEE SHEET 68 -L- STA. 897 + 00.00
885+00
890+00
895+00
10+00
REMOVE HW
RIPRAP AT EMBANKMENT 6 TON 9 SY SEE DETAIL D18
RIPRAP AT EMBANKMENT 6 TON 8 SY SEE DETAIL D18
WH
SITE #41 SEE INSET B
INSET B
LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6
COLLAR AND EXTEND 36" RCP-IV
SITES #41 AND 42 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
Ditch Grade
10'min.
1.0'min.
18"
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
DETAIL D19
BANK STABILIZATION
(Not to Scale)
Natural Ground
MIN 1.5:1 TO TIE EXISTING BANK
18"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Type of Liner = Class I Riprap
Key riprap into natural ground.
PERMIT DRAWING SHEET 99 OF 115
GRAPHIC SCALE
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
I-5507	67A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
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Suite 610
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NC LIC NO. F-0165

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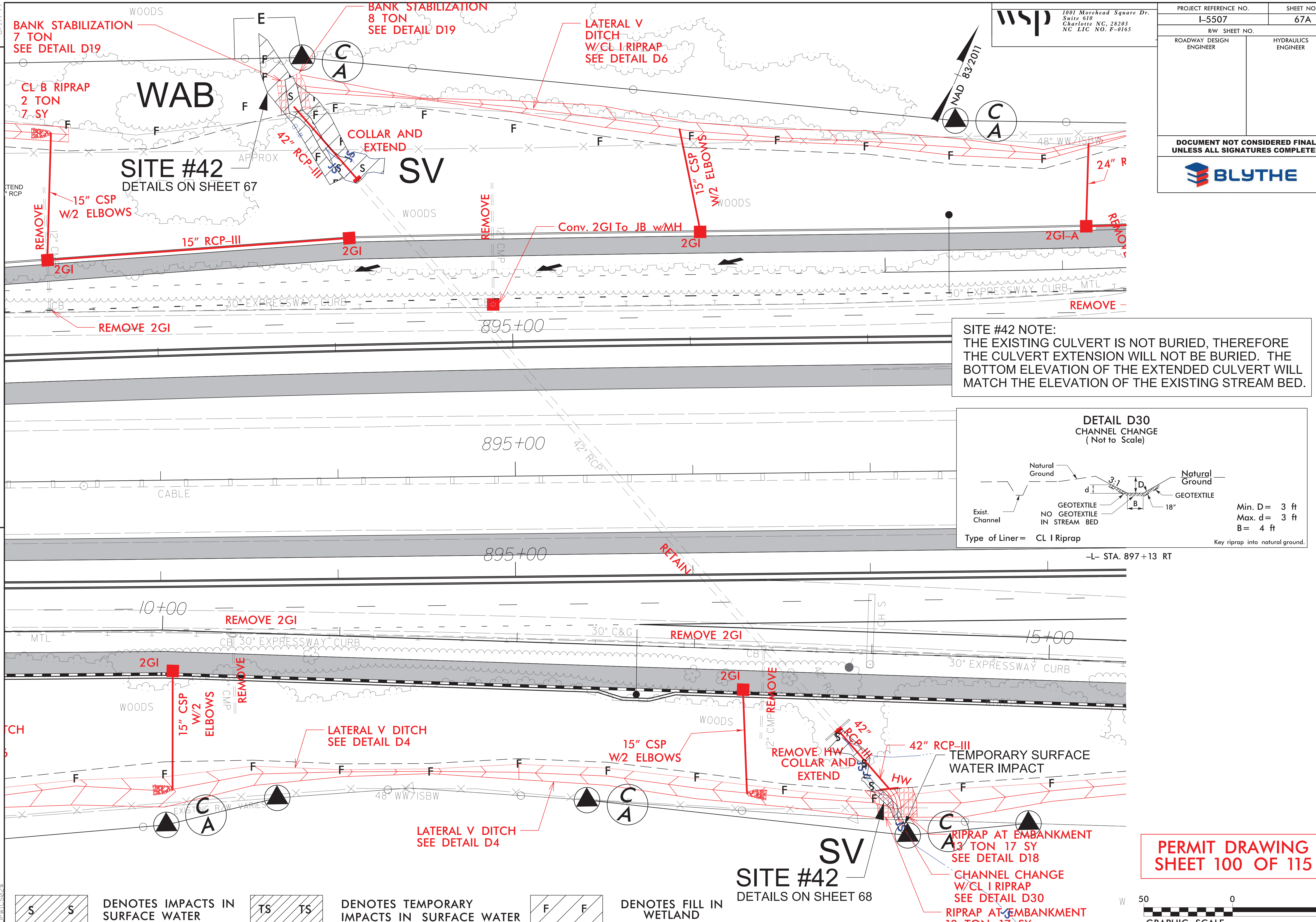

BANK STABILIZATION
7 TON
SEE DETAIL D19
BANK STABILIZATION
8 TON
SEE DETAIL D19
LATERAL V DITCH
W/CL I RIPRAP
SEE DETAIL D6
CL B RIPRAP
2 TON
7 SY
WAB
COLLAR AND EXTEND
42" RCP-III
SITE #42
DETAILS ON SHEET 67
SV
15" CSP
W/2 ELBOWS
REMOVE
15" RCP-III
2GI
Conv. 2GI To JB w/MH
15" CSP W/2 ELBOWS
24" R
2GI-A
REMOVE
REMOVE 2GI
895+00
NAD 83/2011
WOODS
30" EXPRESSWAY CURB
CABLE
RETAIN
42" RCP
10+00
15+00
REMOVE 2GI
REMOVE 2GI
30" C&G
MTL
LATERAL V DITCH
SEE DETAIL D4
15" CSP
W/2 ELBOWS
REMOVE HW
COLLAR AND
EXTEND
42" RCP-III
HW
TEMPORARY SURFACE
WATER IMPACT
48" WW/ISBW
EXISTING R/W VARIES
LATERAL V DITCH
SEE DETAIL D4
RIPRAP AT EMBANKMENT
13 TON 17 SY
SEE DETAIL D18
CHANNEL CHANGE
W/CL I RIPRAP
SEE DETAIL D30
RIPRAP AT EMBANKMENT
13 TON 17 SY
SITE #42
DETAILS ON SHEET 68
DETAIL D30
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Natural Ground
GEOTEXTILE
NO GEOTEXTILE IN STREAM BED
Exist. Channel
3:1
D
d
B
18"
Min. D = 3 ft
Max. d = 3 ft
B = 4 ft
Type of Liner = CL I Riprap
Key riprap into natural ground.
-L- STA. 897+13 RT

SITE #42 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

PERMIT DRAWING
SHEET 100 OF 115

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

GRAPHIC SCALE: 50 0 50

REVISIONS

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1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	67A

RW SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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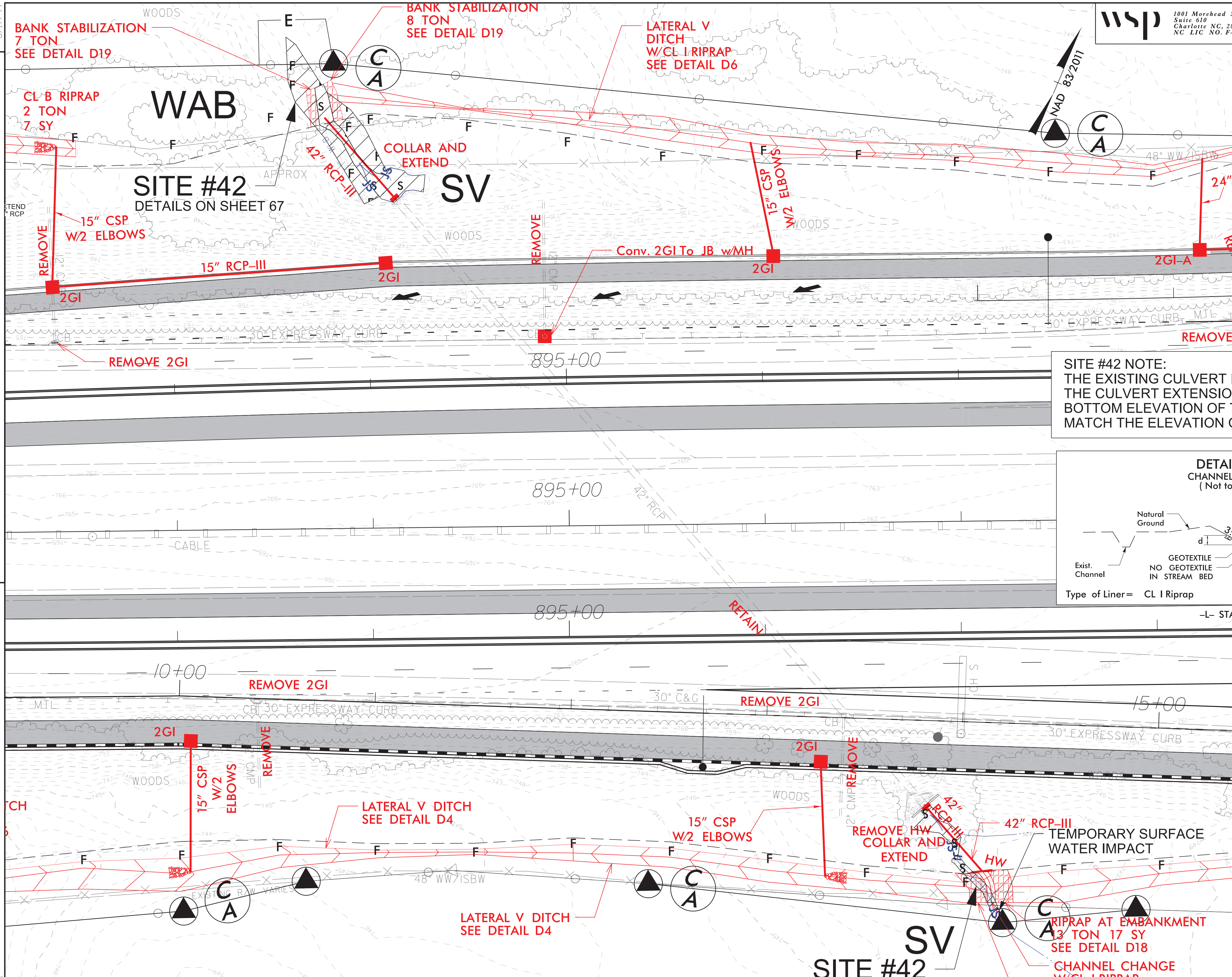


BANK STABILIZATION
7 TON
SEE DETAIL D19
BANK STABILIZATION
8 TON
SEE DETAIL D19
LATERAL V DITCH
W/CL I RIPRAP
SEE DETAIL D6
CL B RIPRAP
2 TON
7 SY
WAB
SITE #42
DETAILS ON SHEET 67
SV
COLLAR AND EXTEND
42" RCP-III
NAD 83/2011
15" CSP
W/2 ELBOWS
REMOVE
15" RCP-III
2GI
Conv. 2GI To JB w/MH
2GI-A
24" R
REMOVE 2GI
REMOVE
30" EXPRESSWAY CURB
895+00
CABLE
RETAIN
10+00
15+00
REMOVE 2GI
30" C&G
2GI
15" CSP
W/2 ELBOWS
LATERAL V DITCH
SEE DETAIL D4
REMOVE HW
COLLAR AND
EXTEND
42" RCP-III
TEMPORARY SURFACE
WATER IMPACT
HW
48" WW/ISBW
RIPRAP AT EMBANKMENT
13 TON 17 SY
SEE DETAIL D18
CHANNEL CHANGE
W/CL I RIPRAP
SEE DETAIL D30
RIPRAP AT EMBANKMENT
13 TON 17 SY
SV
SITE #42
DETAILS ON SHEET 68
WOODS

SITE #42 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

DETAIL D30
CHANNEL CHANGE
(Not to Scale)

Type of Liner= CL I Riprap

Min. D= 3 ft
Max. d= 3 ft
B= 4 ft

Key riprap into natural ground.

-L- STA. 897+13 RT

PERMIT DRAWING
SHEET 101 OF 115

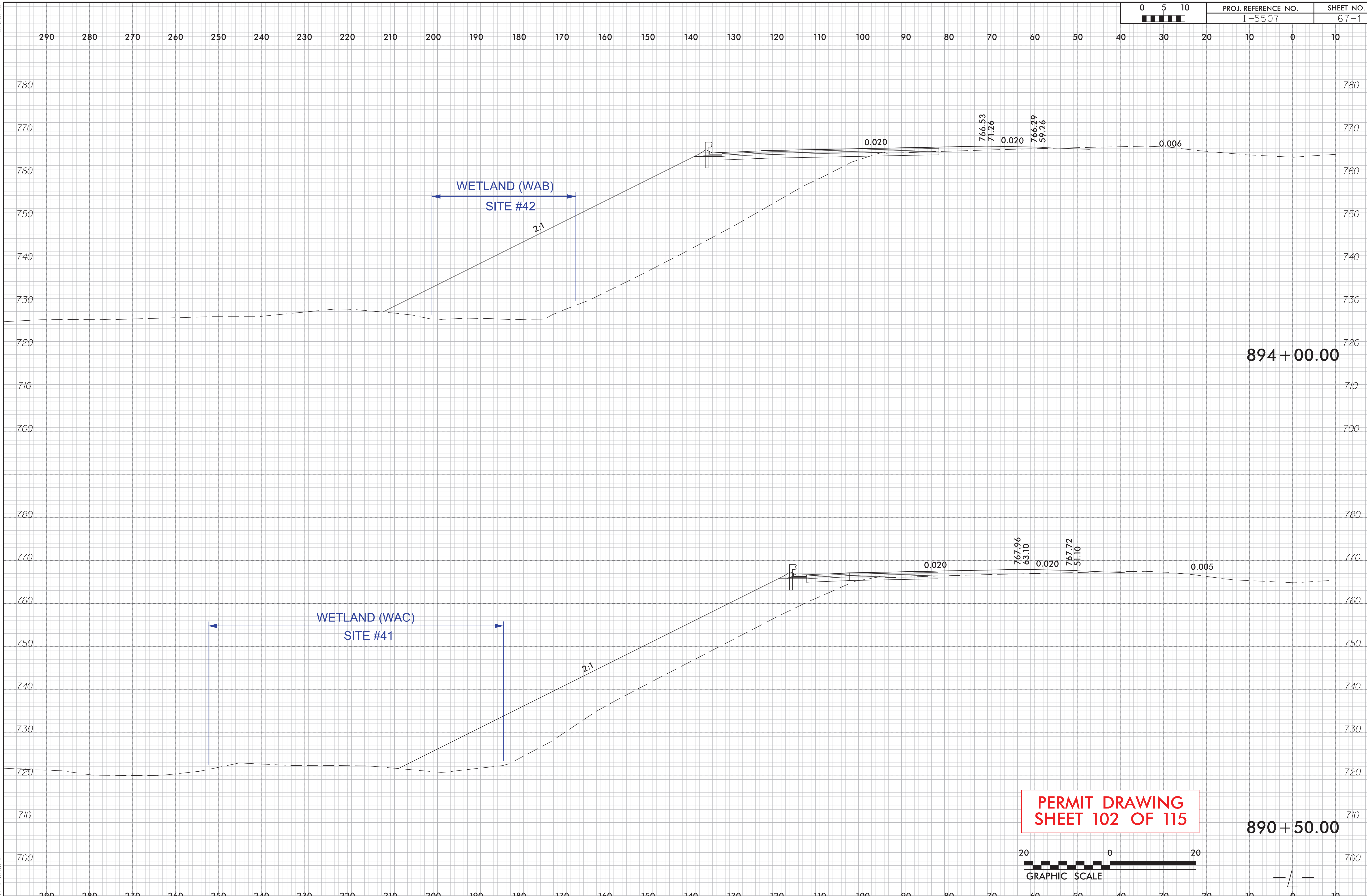
GRAPHIC SCALE: 50 0 50

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

REVISIONS

8/17/99

9/12/2019


PROJ. REFERENCE NO.
I-5507
SHEET NO.
67-1
WETLAND (WAB)
SITE #42
2:1
894+00.00
WETLAND (WAC)
SITE #41
2:1
890+50.00
PERMIT DRAWING
SHEET 102 OF 115
GRAPHIC SCALE

PROJECT REFERENCE NO.	SHEET NO.
I-5507	68
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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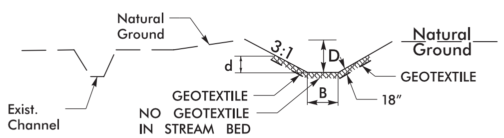
BLYTHE

DETAIL D30
CHANNEL CHANGE
(Not to Scale)



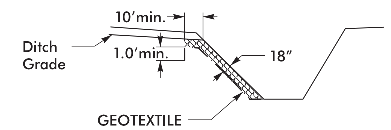
Min. D = 3 ft
Max. d = 3 ft
B = 4 ft

Type of Liner = CL I Riprap

Key riprap into natural ground.

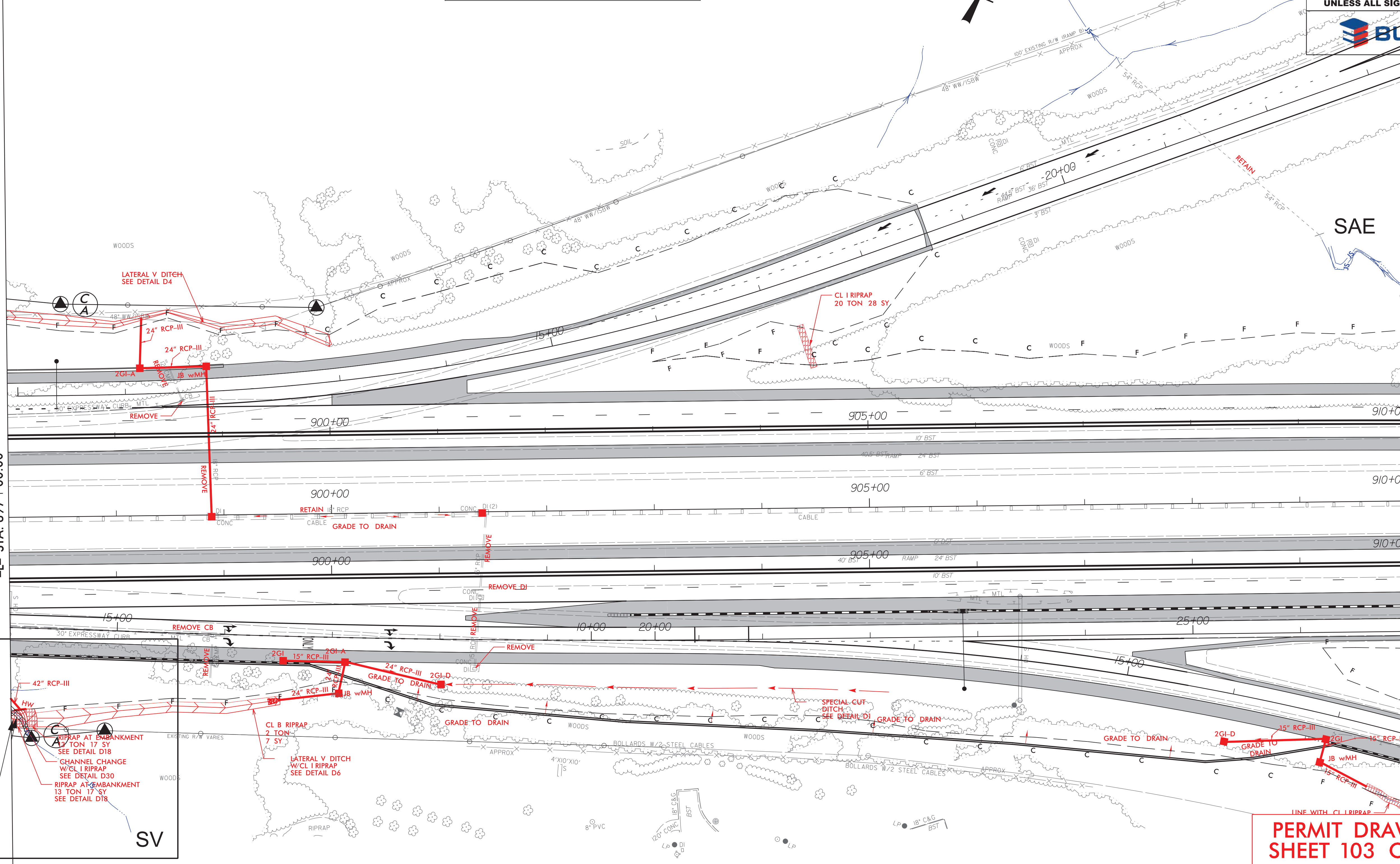
-L- STA. 897+13 RT

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap

Key riprap into natural ground.



MATCH LINE SEE SHEET 67
-L- STA. 897+00.00

MATCH LINE SEE SHEET 69
-L- STA. 910+00.00

SEE SHEET 67A

PERMIT DRAWING
SHEET 103 OF 115

DENOTES IMPACTS IN SURFACE WATER

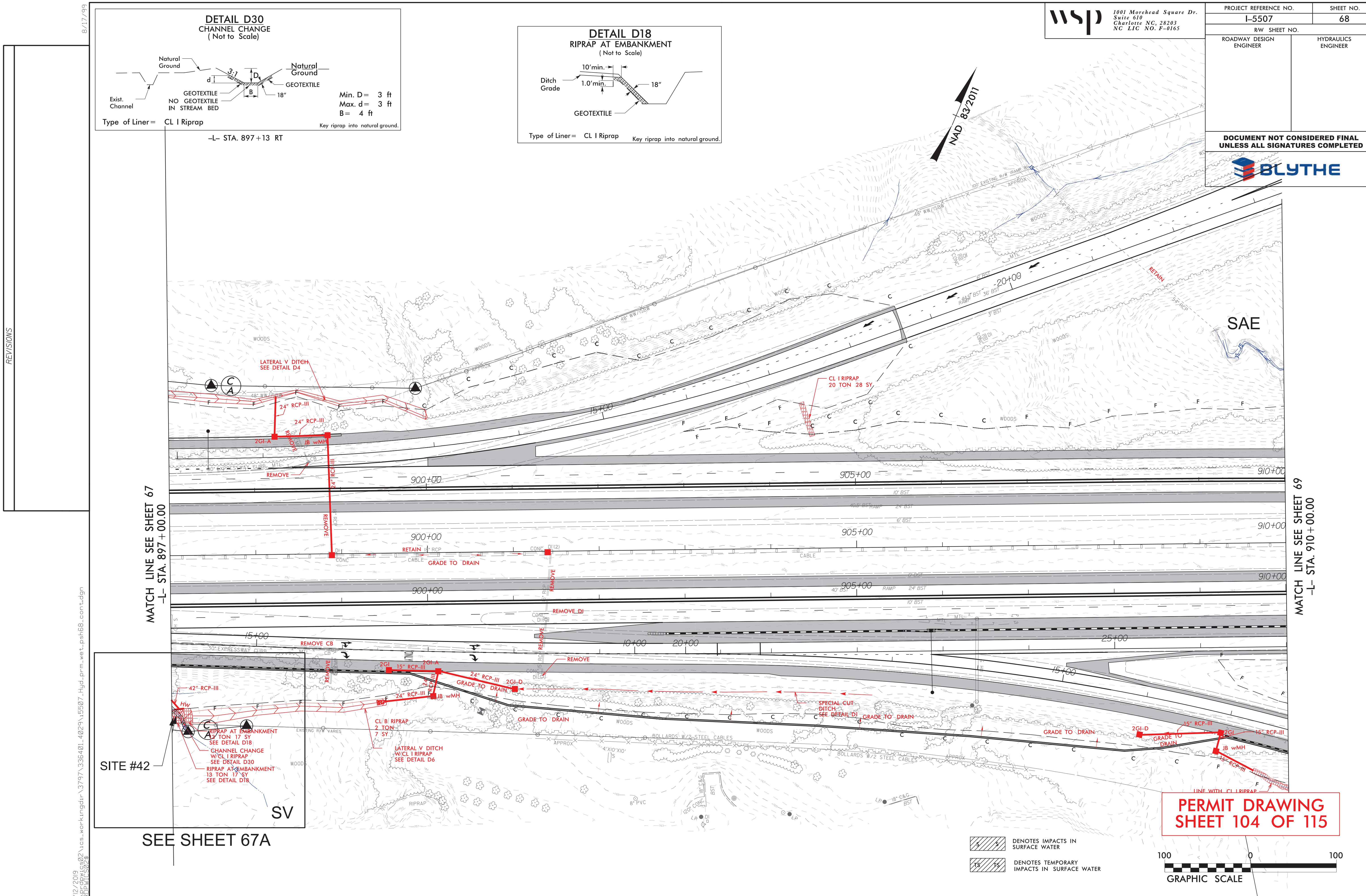
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100 0 100
GRAPHIC SCALE

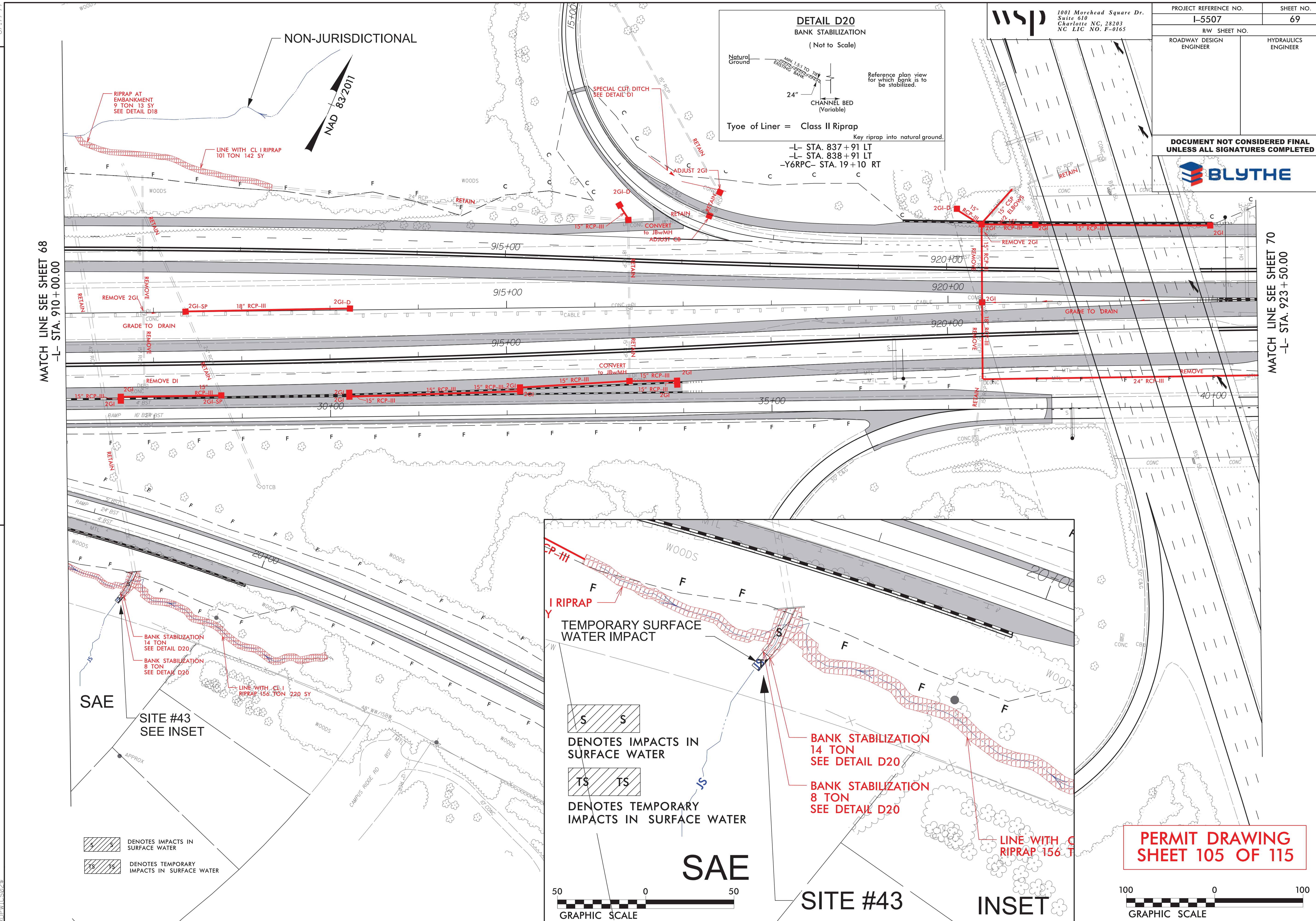
REVISIONS

8/17/99

9/12/2019 ...\I5507_Hyd_prm_wet_psh68.dgn



DETAIL D30
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Natural Ground
Exist. Channel
GEOTEXTILE
NO GEOTEXTILE IN STREAM BED
3:1
D
d
B
18"
Min. D = 3 ft
Max. d = 3 ft
B = 4 ft
Type of Liner = CL I Riprap
Key riprap into natural ground.
-L- STA. 897+13 RT
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)
10'min.
1.0'min.
Ditch Grade
18"
GEOTEXTILE
Type of Liner = CL I Riprap
Key riprap into natural ground.
NAD 83/2011
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165
PROJECT REFERENCE NO.
I-5507
SHEET NO.
68
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
BLYTHE
REVISIONS
SAE
LATERAL V DITCH SEE DETAIL D4
24" RCP-III
2GI-A
JB wMH
REMOVE
RETAIN
GRADE TO DRAIN
REMOVE DI
CL I RIPRAP 20 TON 28 SY
900+00
905+00
910+00
15+00
20+00
25+00
10+00
MATCH LINE SEE SHEET 67
-L- STA. 897+00.00
MATCH LINE SEE SHEET 69
-L- STA. 910+00.00
REMOVE CB
15" RCP-III
2GI-D
2GI
42" RCP-III
HW
RIPRAP AT EMBANKMENT 7 TON 17 SY SEE DETAIL D18
CHANNEL CHANGE W/CL I RIPRAP SEE DETAIL D30
RIPRAP AT EMBANKMENT 13 TON 17 SY SEE DETAIL D18
CL B RIPRAP 2 TON 7 SY
LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6
SPECIAL CUT DITCH SEE DETAIL D1
SITE #42
SV
SEE SHEET 67A
WOODS
PERMIT DRAWING
SHEET 104 OF 115
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
100
0
100
GRAPHIC SCALE



PROJECT REFERENCE NO. I-5507
SHEET NO. 69
RW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
wsp
1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165
BLYTHE
DETAIL D20
BANK STABILIZATION
(Not to Scale)
Natural Ground
EXISTING BANK
MIN. 1.5:1 TO TIE
24"
CHANNEL BED (Variable)
Reference plan view for which bank is to be stabilized.
Tyoe of Liner = Class II Riprap
Key riprap into natural ground.
-L- STA. 837+91 LT
-L- STA. 838+91 LT
-Y6RPC- STA. 19+10 RT
NON-JURISDICTIONAL
NAD 83/2011
RIPRAP AT EMBANKMENT 9 TON 13 SY SEE DETAIL D18
LINE WITH CL I RIPRAP 101 TON 142 SY
SPECIAL CUT DITCH SEE DETAIL D1
ADJUST 2GI
CONVERT to JBwMH
ADJUST CB
REMOVE 2GI
GRADE TO DRAIN
RETAIN
REMOVE
REMOVE DI
15" RCP-III
18" RCP-III
24" RCP-III
2GI
2GI-D
2GI-SP
15" CSP
915+00
920+00
30+00
35+00
40+00
20+00
MATCH LINE SEE SHEET 68 -L- STA. 910+00.00
MATCH LINE SEE SHEET 70 -L- STA. 923+50.00
BANK STABILIZATION 14 TON SEE DETAIL D20
BANK STABILIZATION 8 TON SEE DETAIL D20
LINE WITH CL I RIPRAP 156 TON 220 SY
SAE
SITE #43 SEE INSET
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY SURFACE WATER IMPACT
SITE #43
INSET
GRAPHIC SCALE
50 0 50
100 0 100
PERMIT DRAWING SHEET 105 OF 115
REVISIONS
8/17/99
9/12/2019

8/17/99

REVISIONS

MATCH LINE SEE SHEET 68
–L– STA. 910+00.00

MATCH LINE SEE SHEET 70
–L– STA. 923+50.00

NON-JURISDICTIONAL

NAD 83/2011

RIPRAP AT EMBANKMENT
9 TON 13 SY
SEE DETAIL D18

LINE WITH CL I RIPRAP
101 TON 142 SY

SPECIAL CUT DITCH
SEE DETAIL D

ADJUST 2GI

CONVERT to JBox/MH
ADJUST CB

REMOVE 2GI

REMOVE DI

GRADE TO DRAIN

2GI-SP

2GI-D

18" RCP-III

15" RCP-III

24" RCP-III

2GI

DI

RETAIN

REMOVE

915+00

920+00

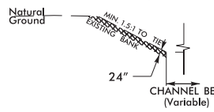
30+00

35+00

40+00

20+00

DETAIL D20
BANK STABILIZATION
(Not to Scale)



Tyoe of Liner = Class II Riprap

Key riprap into natural ground.

–L– STA. 837+91 LT
–L– STA. 838+91 LT
–Y6RPC– STA. 19+10 RT

SAE

SITE #43
SEE INSET

APPROX

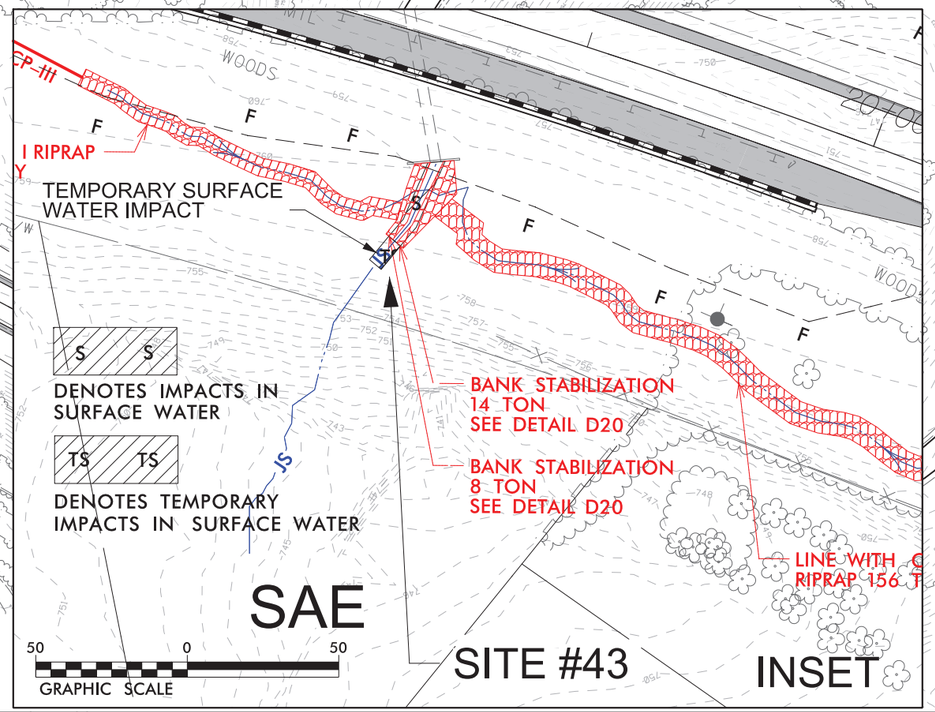
BANK STABILIZATION
14 TON
SEE DETAIL D20

BANK STABILIZATION
8 TON
SEE DETAIL D20

LINE WITH CL I RIPRAP 156 TON 220 SY

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER



PERMIT DRAWING
SHEET 106 OF 115

100 0 100
GRAPHIC SCALE

wsp
1001 Morehead Square Dr.
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Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	69
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

9/12/2019
N:\Projects02\ics_workingdir\3797\336401_4030\i5507_Hyd_prm_wet_psh69_cont.dgn
RDPW\ICS02$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	72
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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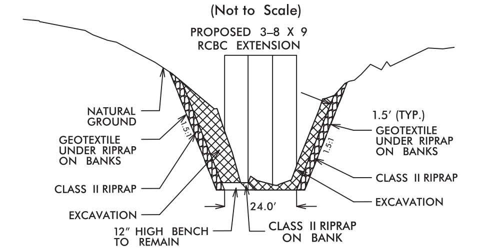
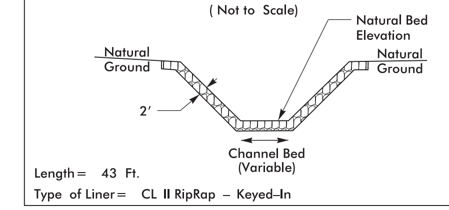
DETAIL B22
OUTLET CHANNEL STABILIZATION
(Not to Scale)

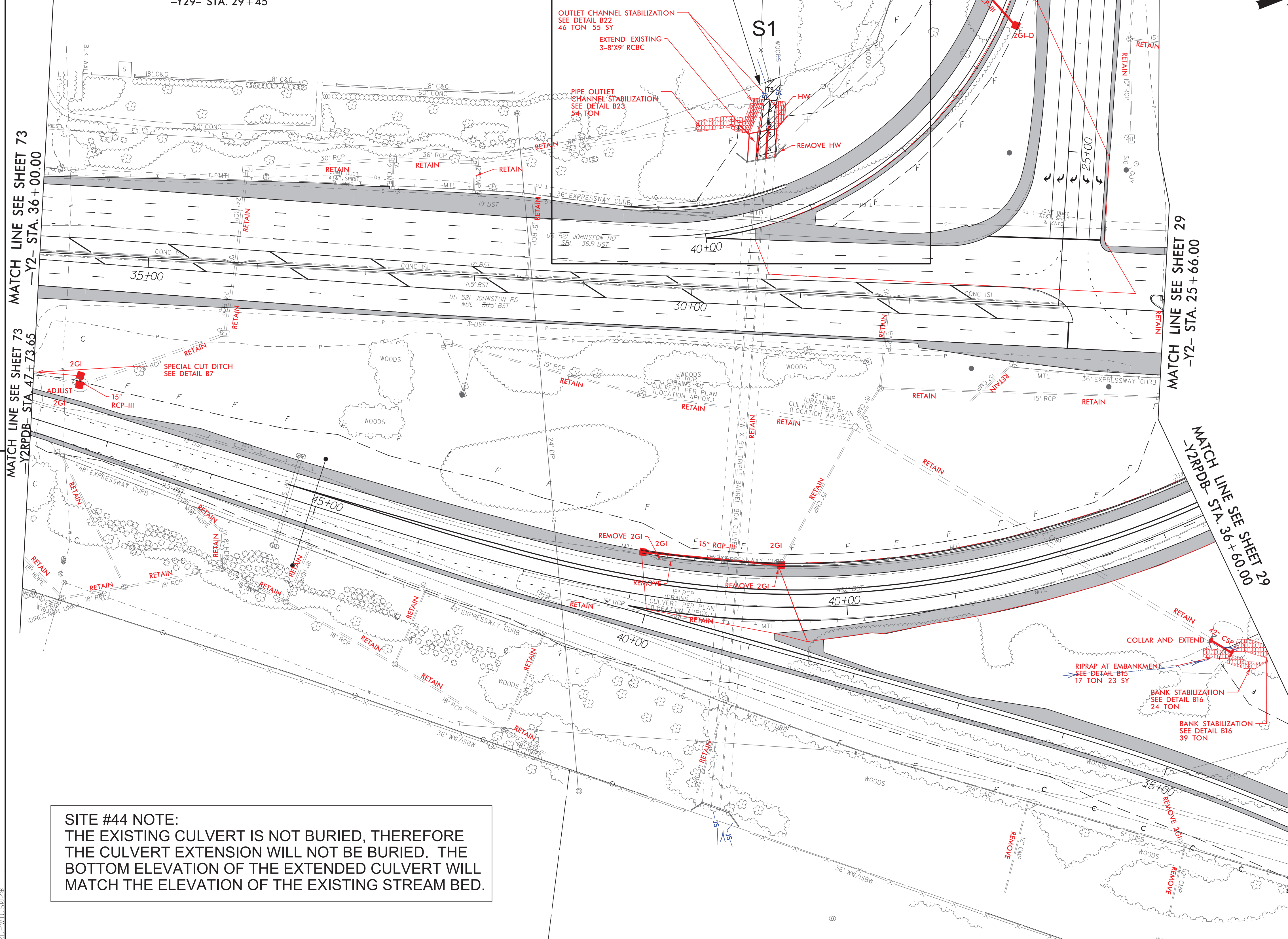


-Y29- STA. 29+45

DETAIL B23
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



-Y29- STA. 29+85


SEE SHEET 72A
SITE #44
S1
OUTLET CHANNEL STABILIZATION SEE DETAIL B22 46 TON 55 SY
EXTEND EXISTING 3-8'X9' RCBC
PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL B23 54 TON
HW
REMOVE HW
15" CSP w/ELBOWS
CL B RIPRAP 1 TON 5 SY
JB w/MH
2GI-D
NAD 83/2011
MATCH LINE SEE SHEET 73 -Y2- STA. 36+00.00
MATCH LINE SEE SHEET 73 -Y2RPDB- STA. 47+73.65
MATCH LINE SEE SHEET 29 -Y2- STA. 25+66.00
MATCH LINE SEE SHEET 29 -Y2RPDB- STA. 36+60.00
MATCH LINE SEE SHEET 30 -Y2RPD- STA. 32+00.00
SPECIAL CUT DITCH SEE DETAIL B7
ADJUST
2GI
15" RCP-III
REMOVE 2GI
15" RCP-III
COLLAR AND EXTEND
42" CSP
RIPRAP AT EMBANKMENT SEE DETAIL B15 17 TON 23 SY
BANK STABILIZATION SEE DETAIL B16 24 TON
BANK STABILIZATION SEE DETAIL B16 39 TON
US 521 JOHNSTON RD SBL
US 521 JOHNSTON RD NBL
35+00
40+00
30+00
25+00
45+00
RETAIN
WOODS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 107 OF 115

100 0 100
GRAPHIC SCALE

SITE #44 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

REVISIONS

8/17/99

9/12/2019

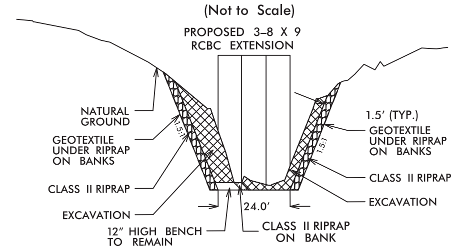
PROJECT REFERENCE NO.	SHEET NO.
I-5507	72
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

WSP
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

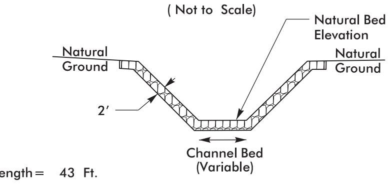
BLYTHE

DETAIL B22
OUTLET CHANNEL STABILIZATION
(Not to Scale)



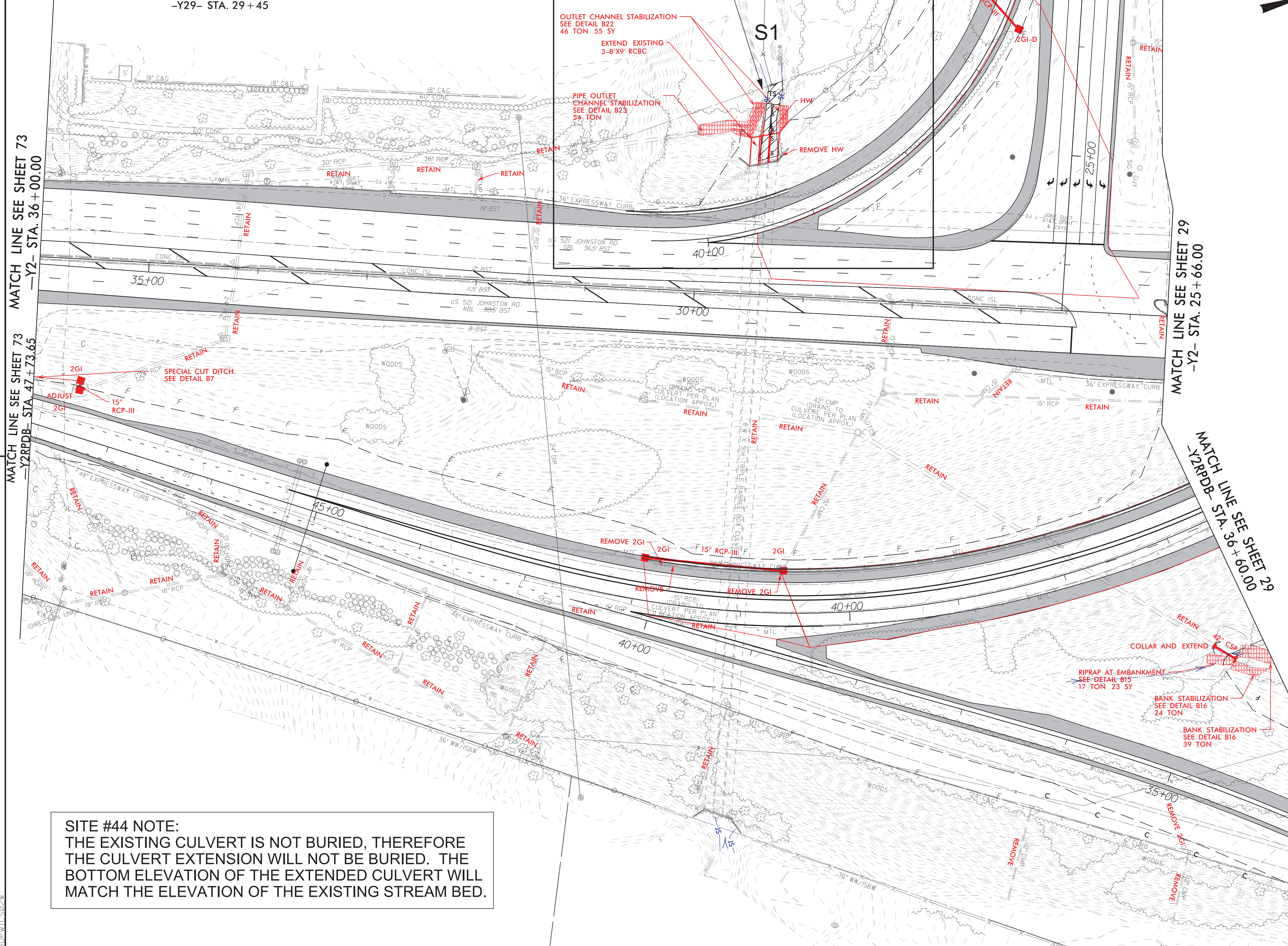
-Y29- STA. 29+45

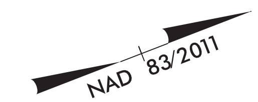
DETAIL B23
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length = 43 Ft.
Type of Liner = CL II RipRap – Keyed-In

-Y29- STA. 29+85


SEE SHEET 72A
SITE #44
S1
OUTLET CHANNEL STABILIZATION
SEE DETAIL B22
46 TON 55 SY
EXTEND EXISTING
3-8'X9' RCBC
PIPE OUTLET
CHANNEL STABILIZATION
SEE DETAIL B23
54 TON
HW
REMOVE HW
15" CSP w/ELBOWS
JB w/MH
CL B RIPRAP
1 TON 5 SY
15" RCP-III
2GI-D
RETAIN
MATCH LINE SEE SHEET 73
-Y2- STA. 36+00.00
MATCH LINE SEE SHEET 73
-Y2RPDB- STA. 47+73.65
MATCH LINE SEE SHEET 29
-Y2- STA. 25+66.00
MATCH LINE SEE SHEET 29
-Y2RPDB- STA. 36+60.00
MATCH LINE SEE SHEET 30
-Y2RPD- STA. 32+00.00
2GI
ADJUST
SPECIAL CUT DITCH
SEE DETAIL B7
15" RCP-III
US 521 JOHNSTON RD SBL 36.5' BST
US 521 JOHNSTON RD NBL 38.5' BST
36" EXPRESSWAY CURB
48" EXPRESSWAY CURB
35+00
30+00
40+00
45+00
25+00
REMOVE 2GI
REMOVE
8'W X 9'H TRIPLE BARREL BOX CULVERT
15" RCP (DRAINS TO CULVERT PER PLAN (LOCATION APPOX.)
42" CMP (DRAINS TO CULVERT PER PLAN (LOCATION APPOX.)
WOODS
COLLAR AND EXTEND
42" CSP
RIPRAP AT EMBANKMENT
SEE DETAIL B15
17 TON 23 SY
BANK STABILIZATION
SEE DETAIL B16
24 TON
BANK STABILIZATION
SEE DETAIL B16
39 TON
REMOVE 2GI
REMOVE CB
36" WW/ISBW



SITE #44 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 108 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019
\\prdpwics02\ics_workingdir\3797\336401_4036\i5507_Hyd_prm_wet_psh72_cont.dgn
PRDPWICS02$

PROJECT REFERENCE NO.	SHEET NO.
I-5507	72A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

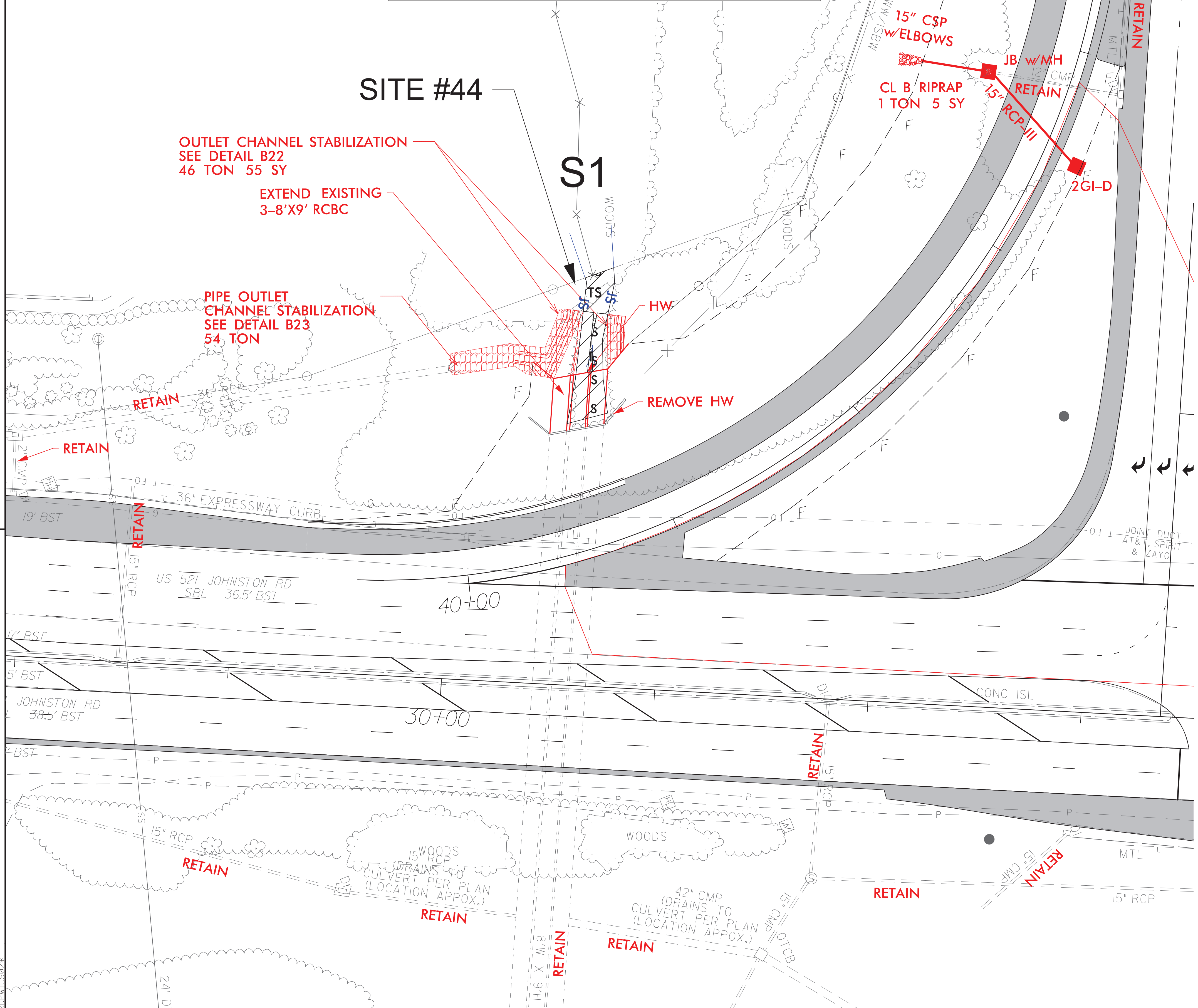
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

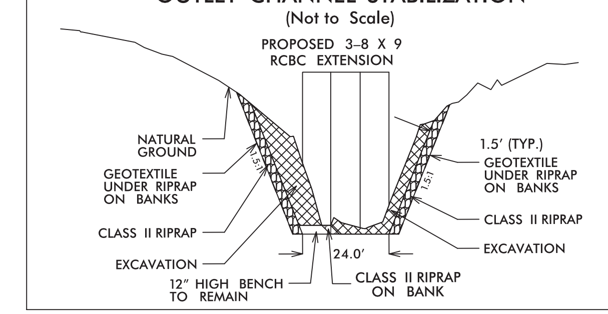
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

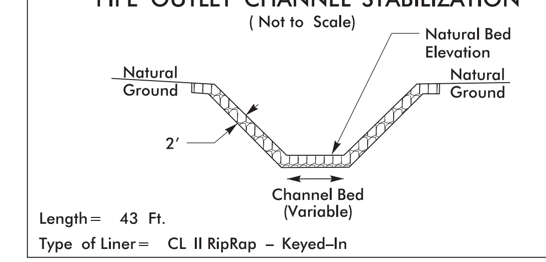
SITE #44 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.



SITE #44
S1
OUTLET CHANNEL STABILIZATION
SEE DETAIL B22
46 TON 55 SY
EXTEND EXISTING
3-8'X9' RCBC
PIPE OUTLET
CHANNEL STABILIZATION
SEE DETAIL B23
54 TON
HW
REMOVE HW
RETAIN
15" CSP
w/ELBOWS
CL B RIPRAP
1 TON 5 SY
JB w/MH
15" RCP-III
2GI-D
NAD 83/2011
36" EXPRESSWAY CURB
US 521 JOHNSTON RD
SBL 36.5' BST
40+00
30+00
JOHNSTON RD
CONC ISL
WOODS
42" CMP
(DRAINS TO
CULVERT PER PLAN
(LOCATION APPOX.)
15" RCP
(DRAINS TO
CULVERT PER PLAN
(LOCATION APPOX.)
JOINT DUCT
AT&T, SPIRIT
& ZAYO



-Y29- STA. 29+45



-Y29- STA. 29+85

PERMIT DRAWING
SHEET 109 OF 115

50 0 50
GRAPHIC SCALE

REVISIONS

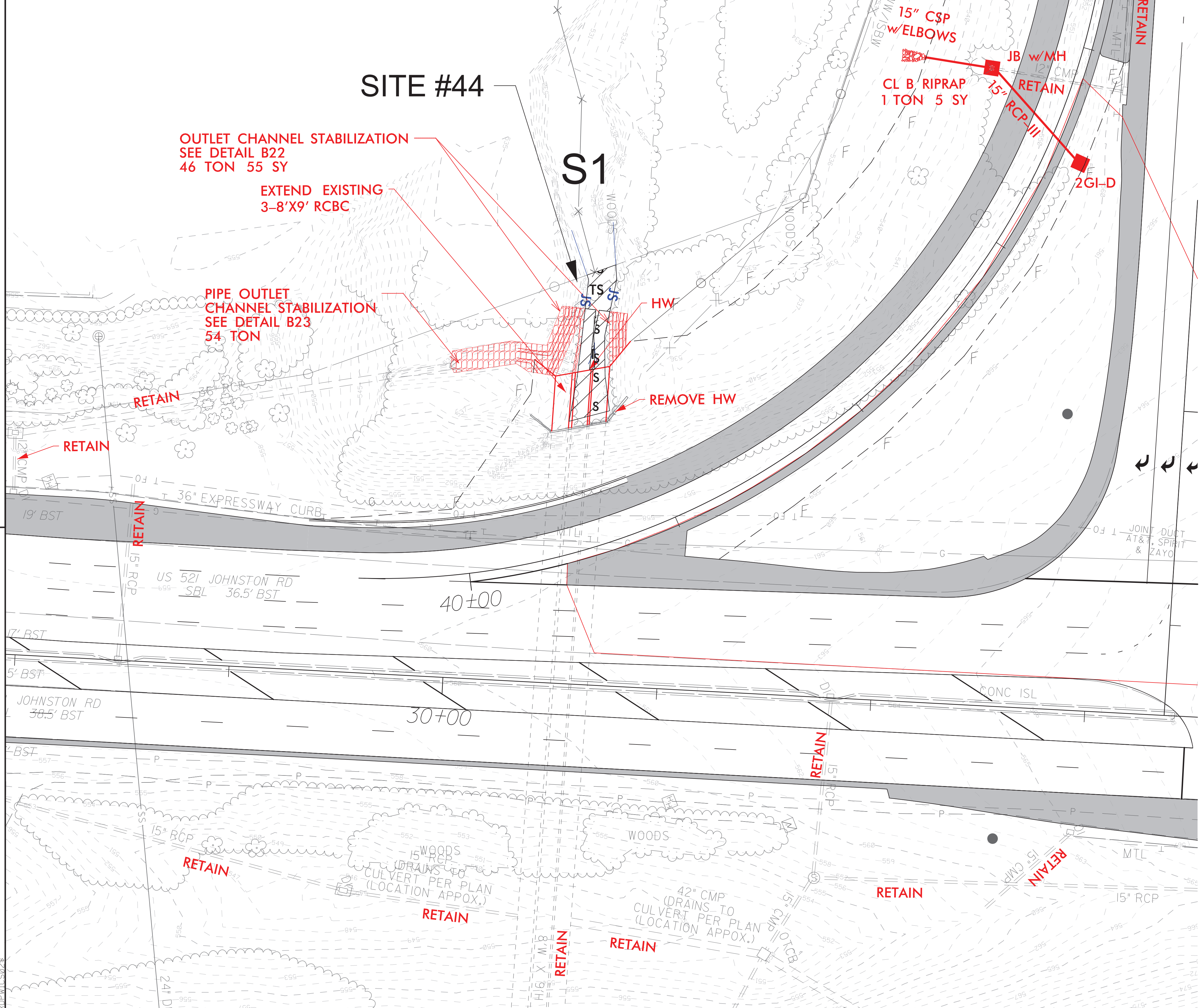
8/17/99

9/12/2019

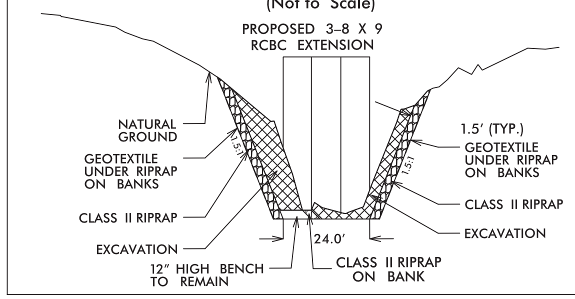
DENOTES IMPACTS IN SURFACE WATER (S)

DENOTES TEMPORARY IMPACTS IN SURFACE WATER (TS)

SITE #44 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

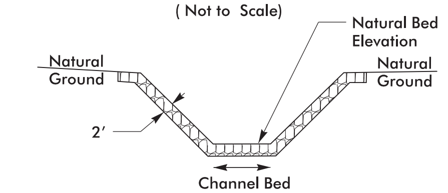


DETAIL B22
OUTLET CHANNEL STABILIZATION
(Not to Scale)



-Y29- STA. 29+45

DETAIL B23
PIPE OUTLET CHANNEL STABILIZATION
(Not to Scale)



Length = 43 Ft.
Type of Liner = CL II RipRap - Keyed-In

-Y29- STA. 29+85

wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	72A
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

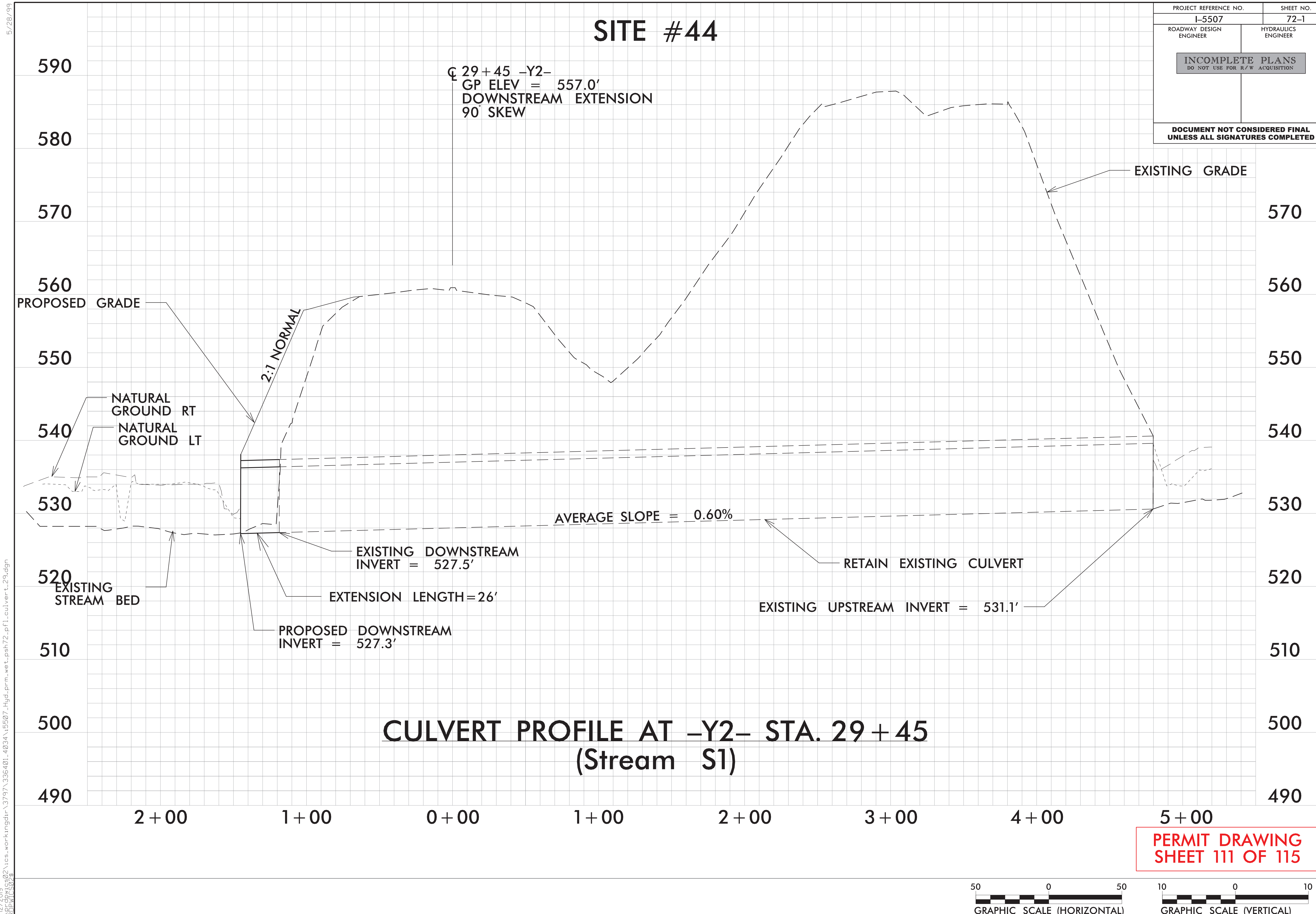
PERMIT DRAWING
SHEET 110 OF 115

50 0 50
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019



SITE #44
PROJECT REFERENCE NO. I-5507
SHEET NO. 72-1
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
℄ 29+45 -Y2-
GP ELEV = 557.0'
DOWNSTREAM EXTENSION
90° SKEW
EXISTING GRADE
PROPOSED GRADE
2:1 NORMAL
NATURAL GROUND RT
NATURAL GROUND LT
AVERAGE SLOPE = 0.60%
EXISTING DOWNSTREAM INVERT = 527.5'
RETAIN EXISTING CULVERT
EXTENSION LENGTH=26'
EXISTING UPSTREAM INVERT = 531.1'
EXISTING STREAM BED
PROPOSED DOWNSTREAM INVERT = 527.3'
590
580
570
560
550
540
530
520
510
500
490
2+00
1+00
0+00
1+00
2+00
3+00
4+00
5+00
CULVERT PROFILE AT -Y2- STA. 29+45
(Stream S1)
PERMIT DRAWING SHEET 111 OF 115
50 0 50
GRAPHIC SCALE (HORIZONTAL)
10 0 10
GRAPHIC SCALE (VERTICAL)

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	110+50 -L- RT	Riprap Fill						< 0.01		28		
1	110+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	18	13	
2	129+00 - 130+00 -L- LT	Roadway Fill	0.08			0.02						
2A	128+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	11	20	
3	132+00 -L- LT	Extend 4 @ 10'x8' RCBC						0.03		52		
3	132+00 LT	Bank Stabilization						0.02	< 0.01	70	16	
3	132+00 LT	Culvert Construction Activities							0.03			
4	132+00 - 134+00 -L- LT	Roadway Fill	0.02					< 0.01		159		
4	134+00 - 135+00 -L- LT	Channel Change	< 0.01					< 0.01		22		
5	137+40 - 142+25 -L- LT	Extend 48" RCP with Junction Box						0.05	< 0.01	444	10	
6	293+50 -L-	Bank Stabilization						< 0.01	< 0.01	48	10	
7	294+00 - 295+00 -L- LT	Riprap Fill						< 0.01		100		
7	295+00 - 300+00 -L- LT	Maintenance Bank Stabilization						0.02		500		
7	300+00 - 302+00 -L- LT	Bank Stabilization						0.04		200		
8	298+00 -L- LT	Concrete Energy Dissipator						< 0.01		7		
9A	302+00 - 308+50 LT	Roadway Fill	0.05			0.05						
9B	309+50 -L- LT	Roadway Fill	0.07			0.07						
10	309+50 -L- LT	Bank Stabilization at Temp. Bridge						0.01	0.01	65		
11	343+00 -L-	Bank Stabilization at Temp. Bridge						0.03	0.05	157		
11	343+00 -L-	Drill Shaft Installation							0.05			
12	344+50 - 346+50 -L- RT	Roadway Fill	0.13			< 0.01						
13	360+00 -L- LT	Bank Stabilization						< 0.01	< 0.01	8	20	
13	360+00 -L- RT	Extend 3@ 9'x9' RCBC						0.01		49		
13	360+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	38	20	
13	360+50 -L- RT	Culvert Construction Activities							< 0.01			
TOTALS*:			0.35			0.15		0.25	0.17	1976	109	

*Rounded totals are sum of actual impacts

NOTES:

At Sites 3, 5, and 13, the existing culvert is not buried, therefore the culvert extension will not be buried. The bottom elevation of the extended culvert will match the elevation of the existing stream bed.

At Site 1, <0.01 ac (18 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 3, 0.02 ac (70 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 7, 0.07 ac (700 lf) of temporary impacts due to construction activities are included within the maintenance and bank stabilization impacts.
At Site 10, <0.01 ac (30 lf) of temporary impacts due to the temporary bridge are included within the bank stabilization impacts.

At Site 11, 0.03 ac (122 lf) of temporary impacts due to the temporary bridge and installation of the drilled shaft are included within the bank stabilization impacts.

At Site 13, <0.01 ac (38 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Revised 7/10/2023

MECKLENBURG
TIP NO. I-5507
WBS NO. 43609.3.2

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
14	363+50 -L- RT	Roadway Fill	0.10									
15	363+00 -L- LT	Bank Stabilization						< 0.01	< 0.01	18	20	
15	365+00 -L- RT	Extend 4@ 8'x9' RCBC						0.08		165		
15	365+00 -L- RT	Bank Stabilization						0.01	< 0.01	65	10	
15	365+00 -L- RT	Culvert Constuction Activities							< 0.01			
15A	395+80 -L- RT	Bank Stabilization						< 0.01	< 0.01	8	20	
16	404+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	36	20	
17	408+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	10	10	
18	454+50 -L- LT	Roadway Fill	< 0.01			0.04						
18	454+50 -L- LT	Riprap Outfall	< 0.01									
18	454+50 -L- LT	Bank Stabilization						< 0.01		13		
19	15+00 -Y23RPD- RT	Bank Stabilization						< 0.01	< 0.01	15	10	
20	488+30 -L- RT	Extend 6' x 5' RCBC						< 0.01		13		
20	488+30 -L- RT	Bank Stabilization				< 0.01		< 0.01	< 0.01	17	10	
20	488+80 -L- LT	Energy Dissipator Basin						< 0.01		35		
20	488+80 -L- LT	Extend 6' x 5' RCBC						0.01		21		
20	488+80 -L- LT	Bank Stabilization						< 0.01	< 0.01	17	12	
21	491+50 -L- LT	Bank Stabilization						< 0.01	< 0.01	13	10	
22	492+50 - 493+70 -L- LT	Channel Change						0.01	< 0.01	158	10	
22	494+00 -L- LT	Extend 48" RCP						< 0.01		11		
22	494+00 -L- LT	Bank Stabilization						< 0.01		15		
22	496+00 RT	Bank Stabilization						< 0.01	< 0.01	9	10	
24	545+30 -L- LT	JB and 36" RCP						< 0.01		6		
24	545+30 -L- LT	Bank Stabilization						< 0.01	< 0.01	22	10	
TOTALS*:			0.11			0.04		0.15	0.04	667	152	

*Rounded totals are sum of actual impacts

NOTES:

At Sites 15, 20, and 22, the existing culvert is not buried, therefore the culvert extension will not be buried. The bottom elevation of the extended culvert will match the elevation of the existing stream bed.

At Site 15, 0.02 ac (65 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 20, <0.01 ac (34 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 22, <0.01 ac (24 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 24, <0.01 ac (22 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Revised 7/10/2023
MECKLENBURG
TIP NO. I-5507
WBS NO. 43609.3.2

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS: Permanent Fill In Wetlands (ac)	WETLAND IMPACTS: Temp. Fill In Wetlands (ac)	WETLAND IMPACTS: Excavation in Wetlands (ac)	WETLAND IMPACTS: Mechanized Clearing in Wetlands (ac)	WETLAND IMPACTS: Hand Clearing in Wetlands (ac)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	SURFACE WATER IMPACTS: Temp. SW impacts (ac)	SURFACE WATER IMPACTS: Existing Channel Impacts Permanent (ft)	SURFACE WATER IMPACTS: Existing Channel Impacts Temp. (ft)	SURFACE WATER IMPACTS: Natural Stream Design (ft)
25	561+80 - 565+00 -L- LT	Roadway Fill	0.02			0.04						
26	564+00 - 566+20 -L- RT	Roadway Fill				0.01						
27	578+50/579+30 -L-	Bank Stabilization	< 0.01					< 0.01	< 0.01	33	20	
28	586+70/588+00 -L-	Bank Stabilization						< 0.01	< 0.01	37	20	
29	612+00/615+00 -L-	Bank Stabilization						< 0.01	< 0.01	25	30	
30	641+50 -L- LT	Extend 36" RCP with Headwall						< 0.01	< 0.01	13	20	
31	654+50 -L- LT	Extend 42" RCP with Headwall						< 0.01		4		
31	654+50 -L- LT	Lateral Ditch/Stabilization	< 0.01					< 0.01	< 0.01	19	10	
32	658+70 -L- LT	Roadway Fill	0.02									
32	658+70 -L- LT	Bank Stabilization						< 0.01	< 0.01	15	24	
33	680+20 -L- LT	Bank Stabilization						< 0.01	< 0.01	7	10	
33	683+40 -L- LT	Bank Stabilization	< 0.01			< 0.01		< 0.01		33		
35	729+90 -L-	Bank Stabilization						< 0.01	< 0.01	50	42	
35	729+90 -L- LT	Class I Riprap	< 0.01			< 0.01						
36	740+50/741+50 -L-	Bank Stabilization						< 0.01	< 0.01	17	25	
37	746+30/750+00 -L-	Extend 54" RCP with Headwall								4		
37	746+30/750+00 -L-	Bank Stabilization						< 0.01	< 0.01	31	20	
37A	765+00 -L- LT	Bank Stabilization						< 0.01		13		
38	806+50 -L- RT	Bank Stabilization						< 0.01	< 0.01	26	10	
38	808+50 -L- LT	Bank Stabilization						< 0.01	< 0.01	6	20	
39	814+50/816+00 -L- LT	Bank Stabilization						< 0.01	< 0.01	13	10	
40	818+00 -L-	Bank Stabilization						< 0.01	< 0.01	16	24	
TOTALS*:			0.05			0.07		0.04	0.03	362	285	

*Rounded totals are sum of actual impacts

NOTES:

At Sites 31 and 41, the existing culvert is not buried, therefore the culvert extension will not be buried. The bottom elevation of the extended culvert will match the elevation of the existing stream bed.

At Site 31, <0.01 ac (20 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 41, <0.01 ac (33 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Revised 7/10/2023
MECKLENBURG
TIP NO. I-5507
WBS NO. 43609.3.2

WETLAND AND SURACE WATER IMPACTS 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)
41	890+50 -L-	Roadway Fill	0.02									
41	890+50 -L-	Extend 36" RCP						< 0.01		52		
41	890+50 -L-	Bank Stabilization						< 0.01	< 0.01	33	42	
42	894+00/895+70 -L-	Roadway Fill	0.03									
42	894+00/895+70 -L- RT	Extend 42" RCP						0.02		105		
42	894+00/895+70 -L- RT	Channel Change						< 0.01	< 0.01	20	12	
42	894+00/895+70 -L- LT	Bank Stabilization						< 0.01		20		
43	18+60 -Y19RPC- RT	Bank Stabilization						< 0.01	< 0.01	30	10	
44	28+50 -Y2-	Extend 3 @ 8'x9' RCBC						< 0.01		26		
44	28+50 -Y2-	Bank Stabilization						< 0.01	< 0.01	28	19	
44	28+50 -Y2-	Culvert Construction Activities							< 0.01			
	SHEET 1 SUBTOTALS*:		0.35			0.15		0.25	0.17	1976	109	
	SHEET 2 SUBTOTALS*:		0.11			0.04		0.15	0.04	667	152	
	SHEET 3 SUBTOTALS*:		0.05			0.07		0.04	0.03	362	285	
TOTALS*:			0.56			0.27		0.50	0.26	3319	629	

*Rounded totals are sum of actual impacts

NOTES:

At Sites 42 and 44, the existing culvert is not buried, therefore the culvert extension will not be buried. The bottom elevation of the extended culvert will match the elevation of the existing stream bed.

At Site 42, <0.01 ac (20 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

At Site 44, <0.01 ac (28 lf) of temporary impacts due to construction activities are included within the bank stabilization impacts.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
Revised 7/10/2023
MECKLENBURG
TIP NO. I-5507
WBS NO. 43609.3.2