STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

December 17, 2019

MEMORANDUM TO: Mr. Brett Canipe, P.E.
Division 10 Engineer

FROM: for Philip S. Harris, III, P.E., Manager
Environmental Analysis Unit

SUBJECT: 404 Regional General Permit and 401 Water Quality Certification for the Widening of I-485 from US 74 to I-77, Mecklenburg County, Division 10; WBS No 43609.1.1, **TIP: I-5507**

Enclosed is the US Army Corps of Engineers Permit, NC Division of Water Resources Water Quality Certification, and Project Commitments ("greensheet") for the above-referenced project. All environmental permits have been received for the construction of this project.

The permit package has been posted on the NCDOT website at:
https://xfer.services.ncdot.gov/pdea/PermIssued/

ec:

Mr. Ron Davenport, P.E. Contracts Management
Mr. Larry Thompson, Division PDEA Engineer
Mr. Joel Howard, Division 10 Division Environmental
Dr. Majed Al-Ghandour, P.E., Programming and TIP
Mr. Stephen Morgan, P.E., Hydraulics
Mr. Brian Hanks, P.E., Structure Design
Mr. Mark Staley, Roadside Environmental
Mr. Lamar Sylvester, P.E., State Roadway Construction Engineer

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 No. 2013-02330** County: **Mecklenburg** U.S.G.S. Quad: **NC-Weddington**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Permittee: **North Carolina Department of Transportation**
Erin Cheely
Address: **1598 Mail Service Center**
Raleigh, North Carolina 27699
Telephone Number: **919-707-6108**
E-mail: **ekcheely@ncdot.gov**

Size (acres) **1959.7 acres**
Nearest Waterway **McAlpine Creek**
USGS HUC **03050103 & 03040105**
Nearest Town **Charlotte**
River Basin **Santee**
Coordinates Latitude: **35.063857**
Longitude: **-80.805614**

Location description: **I 485 between I 77 and US 74, in Charlotte and Matthews, Mecklenburg County, North Carolina.**

Description of projects area and activity: **This verification authorizes the construction of one Express Lane in each direction 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 Express Lanes, as well as direct connector ramps, and the construction of connectors to and from the Express Lanes to local side streets. The project would result in the permanent fill of 0.83 acres of wetlands (including 0.27 acres of mechanized clearing), and 1,376 linear feet of stream channel. The project includes 1,131 linear feet of bank stabilization. The project also includes the temporary fill of 0.33 acre (1,347 linear feet) of stream channels for construction access and dewatering. The RGP 31 verification supersedes the verification dated December 17, 2019, which listed an incorrect expiration date. The expiration date of this Regional General Permit 31 (RGP 31) is April 30, 2020. However, per Special Condition ff. of the RGP 31, the permittee will have an additional 12 months to complete the authorized work, provided the project is under contract or under construction prior to the April 30, 2020 expiration date.**

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

Authorization: **RGP198200031 NC DOT Bridges Widening Projects, Interchange Improvements**

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 enclosed Conditions, your application signed and dated 10/4/2019, and the enclosed plans, Permit Drawings 1-115 dated 9/26/2019. 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 authorization is modified, suspended or revoked. If, prior to the expiration date identified below, the nationwide 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 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 permit, will remain authorized provided the activity is completed within twelve months of the date of the nationwide 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 **Nicholle Braspennickx** **at 704-510-0162or Nicholle.M.Braspennickx.usace.army.mil**.

Corps Regulatory Official: Mark Matthews Date: 2019.12.18 09:01:49 -05'00' Date: **12/18/2019**
Expiration Date of Verification: **4/30/2020**

SAW No. 2013-02330

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

SPECIAL CONDITIONS

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

Action ID Number: SAW No. 2013-02330 County: Mecklenburg

Permittee: North Carolina Department of Transportation, Erin Cheely

Project Name: I 5507, I 485 Express Lanes, from I 77 to US 74

Date Verification Issued: 12/18/2019

Project Manager: Nicholle Braspennickx

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: Nicholle Braspennickx
Charlotte Regulatory Office
U.S Army Corps of Engineers
8430 University Executive Park Drive, Suite 615
Charlotte, North Carolina 28262
or
Nicholle.M.Braspennickx.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, Erin Cheely
Project Name: I 5507, I 485 Express Lanes, from I 77 to US 74

Action ID: SAW No. 2013-02330
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 to the U.S. Army Corps of Engineers (USACE) Project Manager identified on page two is in receipt of a signed copy of this form before conducting authorized impacts, unless otherwise specified below. If more than one mitigation Sponsor will be used to provide the mitigation associated with the permit, or if the impacts and/or the mitigation will occur in more than one 8-digit Hydrologic Unit Code (HUC), multiple forms will be attached to the permit, and the separate forms for each Sponsor and/or HUC must be provided to the appropriate mitigation Sponsors.

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

Permitted Impacts and Compensatory Mitigation Requirements:

Permitted Impacts Requiring Mitigation* **8-digit HUC and Basin:** 03050103, Catawba River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
1,376				0.83		

*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
2,752				1.66		

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 USACE, are currently available at the mitigation site identified above. Further, I understand that if the Sponsor fails to provide the required compensatory mitigation, the USACE Wilmington District Engineer may pursue measures against the Sponsor to ensure compliance associated with the mitigation requirements.

Mitigation Sponsor Name: NCDEQ DMS

Name of Sponsor's Authorized Representative: Beth Harmon

Beth Harmon
Signature of Sponsor's Authorized Representative

03/11/2020
Date of Signature

Conditions for Transfer of Compensatory Mitigation Credit:

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

Comments/Additional Conditions: A letter from **North Carolina Department of Mitigation Services**, confirming they are willing and able to accept the applicant's compensatory mitigation responsibility, dated **9/27/2019** was included with the preconstruction notification.

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 11405 Falls of Neuse Road, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Nicholle Braspennickx
USACE Field Office: Charlotte Regulatory Office
US Army Corps of Engineers
8430 University Executive Park Drive, Suite 615
Charlotte, North Carolina 28262
Email: Nicholle.M.Braspennickx.usace.army.mil

Nicholle Braspennickx

USACE Project Manager Signature

12/17/2019

Date of Signature

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

DEPARTMENT OF THE ARMY
Wilmington District, Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343
April 30, 2015

Regional General Permit No. 198200031
Name of Permittee: North Carolina Department of Transportation
Effective Date: April 30, 2015
Expiration Date: April 30, 2020

DEPARTMENT OF THE ARMY
REGIONAL GENERAL PERMIT

A regional general permit (RGP) to perform work in or affecting navigable waters of the United States and waters of the United States, upon recommendation of the Chief of Engineers, pursuant to Section 10 of the Rivers and Harbors Act of March 3, 1899 (33 U.S.C. 403), and Section 404 of the Clean Water Act (33 U.S.C. 1344), is hereby modified and re-issued by authority of the Secretary of the Army by the

District Commander
U.S. Army Engineer District, Wilmington
Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403-1343

TO AUTHORIZE THE DISCHARGE OF DREDGED OR FILL MATERIAL IN WATERS OF THE UNITED STATES (U.S.), INCLUDING WETLANDS, ASSOCIATED WITH MAINTENANCE, REPAIR, AND CONSTRUCTION PROJECTS CONDUCTED BY THE VARIOUS DIVISIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION (NCDOT) INCLUDING THE NCDOT DIVISION OF HIGHWAYS, RAIL, BICYCLE/PEDESTRIAN, ECT.

Activities authorized are:

a. Construction, maintenance, and repair of bridges, to include work on the approaches, where permanent impacts resulting in a loss of waters of the U.S. will be less than or equal to 500 linear feet (lf) of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

b. Best-fit widening projects that have undergone interagency review and completed the current interagency Merger Process, which merges the requirements of the National Environmental Policy Act (NEPA) with those found within Section 404 of the Clean Water Act (CWA).

While there is no impact threshold for these widening projects, the Corps has the discretion to require an individual permit if it determines that the proposed impacts will have more than a minimal impact on the aquatic environment or on other environmental factors, or if the project would normally require an Environmental Impact Statement (EIS) under current Federal Highway Administration (FHWA) guidelines. Best-fit projects may include a small amount of new location roadway for components such as interchanges or intersections, provided the new location portion has been concurred upon by the merger team.

c. Minor widening projects, such as paving and/or widening secondary roads, or interchange improvements, when permanent impacts which result in a loss of waters of the U.S. from installation and/or extension of culverts and/or pipes will be less than or equal to 500 lf of stream and/or one (1) acre of wetland/non-tidal open water for each single and complete linear project*.

d. Stream relocation(s) associated with projects identified in a-c above. Stream relocation lengths are to be evaluated independently and are not included within each respective maximum limit threshold for the authorized actions stated above.

****Single and complete linear project***: A linear project is a project constructed for the purpose of getting people, goods, or services from a point of origin to a terminal point, which often involves multiple crossings of one or more waterbodies at separate and distant locations. The term "single and complete project" is defined as that portion of the total linear project proposed or accomplished by one owner/developer or partnership or other association of owners/developers that includes all crossings of a single water of the U.S. (i.e., a single waterbody) at a specific location. For linear projects crossing a single or multiple waterbodies several times at separate and distant locations, each crossing is considered a single and complete project for purposes of this RGP. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Generally, off-site detours are preferred to avoid and minimize impacts to the human and natural environment. However, if an off-site detour is considered impracticable, then an on-site detour may be considered as a necessary component of the actions described above. Impacts from the detour may be considered temporary and may not require compensatory mitigation if the impacted area is restored to its pre-project condition after construction is complete. If the construction of a detour (on-site or off-site) includes standard undercutting methods, removal of all material and backfilling with suitable material is required.

1. Special Conditions.

a. The applicant must submit a pre-construction notification (PCN) with specified attachments to the District Engineer and receive written verification from the Corps that the proposed work complies with this RGP prior to commencing any activity authorized by this RGP.

b. If the project will not impact a designated "Area of Environmental Concern" (AEC) in the twenty (20) counties of North Carolina covered by the North Carolina Coastal Area Management Act (CAMA), then a consistency submission is not required. If the project will impact a designated AEC and meets the definition of "development", then the applicant must

obtain the required CAMA permit. Development activities may not commence until a copy of the approved CAMA permit is furnished to the appropriate Wilmington District Regulatory Field Office (Wilmington Field Office – 69 Darlington Avenue, Wilmington, NC 28403 or Washington Field Office – 2407 West 5th Street, Washington, NC 27889).

The twenty (20) CAMA counties in North Carolina include Beaufort, Bertie, Brunswick, Camden, Carteret, Chowan, Craven, Currituck, Dare, Gates, Hertford, Hyde, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington.

c. Discharges into Waters of the U.S. designated by either the North Carolina Division of Marine Fisheries (NCDMF) or the North Carolina Wildlife Resources Commission (NCWRC) as anadromous fish spawning areas are prohibited during the period between February 1 and June 30, without prior written approval from NCDMF, NCWRC, National Marine Fisheries Service (NMFS), and the Corps. Discharges into waters of the U.S. designated by NCDMF as primary nursery areas and discharges into waters of the U.S. designated by NCWRC as primary nursery areas in inland waters shall be coordinated with NCDCM (per existing agreement with NCDMF) and NCWRC prior to being authorized by this RGP. Coordination with NCDCM and NCWRC may result in a required construction moratorium during periods of significant biological productivity or critical life stages.

The applicant should contact:

NC Division of Marine Fisheries
3441 Arendell Street
Morehead City, NC 28557
Telephone 252-726-7021
or 800-682-2632

North Carolina Wildlife Resources Commission
Habitat Conservation Program Manager
1721 Mail Service Center
Raleigh, NC 27699-1721
Telephone (919) 733-7638

d. This permit does not authorize the use of culverts in areas designated as anadromous fish spawning areas by the NCDMF or the NCWRC.

e. Waters of the U.S. designated as sturgeon spawning areas are excluded during the period between February 1 and June 30, without prior written approval from NMFS.

f. If the project is located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then all pipe and culvert inverts will be buried at least one foot below normal bed elevation when they are placed within the Public Trust AEC and/or the Estuarine Waters AEC as designated by CAMA. If the project is not located within the twenty (20) counties of North Carolina designated as coastal counties by CAMA, then culvert inverts will be buried at least one foot below the bed of the stream for culverts greater than 48 inches in diameter. Culverts 48 inches in diameter or less shall be buried or placed on the stream bed as practicable and appropriate to maintain aquatic passage, and every effort shall be made to maintain the existing channel slope. The potential for destabilization of the channel and head cutting upstream should be considered in the placement of the culvert. A waiver from the depth specifications in this condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition would result in more adverse impacts to the aquatic environment. Culverts placed in wetlands do not have to be buried.

g. No work shall be authorized by this RGP within the twenty coastal counties, as defined by the NCDCM, without prior consultation with NOAA Fisheries. For each activity reviewed by the Corps where it is determined that the activity may affect Essential Fish Habitat (EFH) for federally managed species, an EFH Assessment shall be prepared by the applicant and forwarded to the Corps and NOAA Fisheries for review and comment prior to authorization of work.

h. Discharges of dredged or fill material into waters of the U.S., including wetlands, must be minimized or avoided to the maximum extent practicable.

i. No activity may result in substantial permanent disruption of the movement of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. The dimension, pattern, and profile of the stream above and below a pipe or culvert should not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. It is acceptable to use rock vanes at culvert outlets to ensure, enhance, or maintain aquatic passage. Pre-formed scour holes are acceptable when designed for velocity reduction. The width, height, and gradient of a proposed opening should be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. Spring flow should be determined from gauge data, if available. In the absence of such data, bankfull flow can be used as a comparable level. Where adjacent floodplain is available, flows exceeding bank-full should be accommodated by installing culverts at the floodplain elevation, if practicable. If multiple culverts are used, the construction of floodplain benches and/or sills to maintain base flow is required, if practicable.

j. Upon completion of any work authorized by this RGP, all temporary fills (to include culverts, etc.) will be completely removed from waters of the U.S. and the areas will be restored to preconstruction conditions, to include pre-project elevations and contours, restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors. This work will be completed within 60 days of completion of project construction. If this timeframe occurs while a required moratorium of this permit is in effect, the temporary fill shall be removed in its entirety within 60 days of the moratorium end date. If vegetation cannot be planted due to the time of the year, all disturbed areas will be seeded with a native mix appropriate for the impacted area, and vegetation will be planted in the fall. A native seed mix may contain non-invasive small grain annuals (e.g. millet and rye grain) to ensure adequate cover while native vegetation becomes established. The PCN must include a restoration plan showing how all temporary fills and structures will be removed and how the area will be restored to pre-project conditions.

k. All activities authorized by this RGP shall, to the extent practicable, be conducted "in the dry", with barriers installed between work areas and aquatic habitat to protect that habitat from sediment, concrete, and other pollutants. Where concrete is utilized, measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with waters of the U.S. until the concrete has cured/hardened. All water in the work area that has been in contact with concrete shall only be returned to waters of the U.S. when it no longer poses a threat to aquatic organisms (concrete is set and cured).

l. In cases where new alignment approaches are to be constructed and the existing approach fill in waters of the U.S. is to be abandoned and no longer maintained as a roadway, the

abandoned fill shall be removed and the area will be restored to preexisting wetland/stream conditions and elevations, to include restoring natural hydrology and stream corridors, and reestablishing native vegetation/riparian corridors, to the extent practicable. This activity may qualify as compensatory mitigation credit for the project and will be assessed on a case-by-case basis in accordance with Special Conditions "q" and "r" below. A restoration plan detailing this activity will be required with the submittal of the PCN.

m. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

n. The project must be implemented and/or conducted so that all reasonable and practicable measures to ensure that equipment, structures, fill pads, and work associated with the project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or shoreline/streambank erosion. During construction, the permittee shall routinely monitor for these effects, cease all work if/when detected, take initial corrective measures to correct actively eroding areas, and notify the Corps immediately. Permanent corrective measures may require additional authorization from the Corps.

o. All PCNs will describe sedimentation and erosion control structures and measures proposed for placement in waters of the U.S. To the extent practicable, structures and measures should be depicted on maps, surveys or drawings showing location and impacts to jurisdictional wetlands and streams. In addition, appropriate soil and erosion control measures must be established and maintained during construction. All fills, temporary and permanent, must be adequately stabilized at the earliest practicable date to prevent erosion of fill material into adjacent waters or wetlands.

p. Before discharging dredged or fill material into waters of the U.S. in the twenty-five (25) mountain counties of North Carolina, the applicant will submit a PCN to the NCWRC and the Corps concurrently. The PCN shall summarize alternatives to conducting work in mountain trout waters considered during the planning process, detail why alternatives were or were not selected, and contain a compensatory mitigation plan for all unavoidable adverse impacts to mountain trout waters. For proposals where a bridge is replaced with a culvert, the PCN must also include details of any on-site evaluations that were conducted to determine that installation of a culvert will not adversely affect passage of fish or other aquatic biota at the project site. This information must include factors such as the proposed slope of the culvert and determinations of how the slope will be expected to allow or impede passage, the necessity of baffles and/or sills to ensure passage, design considerations to ensure that expected baseflow will be maintained for passage and that post-construction velocities will not prevent passage, site conditions that will or will not allow proper burial of the culvert, existing structures (e.g., perched culverts, waterfalls, etc.) and/or stream patterns up and downstream of the culvert site that could affect passage and bank stability, and any other considerations regarding passage. The level of detail for this information should be based on site conditions (i.e., culverts on a slope over 3% will most likely

require more information than culverts on a slope that is less than 1%, etc.). Also, in order to evaluate potential impacts, describe bedforms that will be impacted by the proposed culvert – e.g., pools, glides, riffles, etc. The NCWRC will respond both to the proponent and directly to the Corps.

The twenty-five (25) designated trout counties of North Carolina include Alleghany, Caldwell, Watauga, Ashe, Mitchell, Wilkes, Avery, Burke, Stokes, Surry, Buncombe, Henderson, Polk, Cherokee, Jackson, Rutherford, Clay, Macon, Swain, Graham, Madison, Transylvania, Haywood, McDowell, and Yancey.

The applicant may contact NCWRC at:

North Carolina Wildlife Resources
Commission
Ms. Marla Chambers
Western NCDOT Permit Coordinator
206 Charter Street
Albemarle, NC 28001
Office: 704-982-9181

q. Compensatory mitigation will be required for permanent impacts resulting in a loss of waters of the U.S., including wetlands, from culverts/pipes and associated fill. Mitigation will also be required for stream relocation projects. The applicant will attach a proposed mitigation plan to the PCN. Mitigation proposals will be in accordance with currently approved Wilmington District and/or Corps-wide mitigation regulations and guidance. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

r. Stream relocation(s) associated with projects may be authorized under this RGP. As stated above, mitigation will be required for all relocation projects. If the stream relocation is conducted in accordance with the requirements stated below in 1-5, the relocated segment of stream may* be considered toward reducing the amount of compensatory mitigation required. A relocation plan must be submitted with the PCN that addresses all factors required within the current Wilmington District, Corps of Engineers Stream Mitigation Guidelines, which can include, but may not be limited to:

(1) The relocated stream has pattern, profile, and dimension based on natural channel design. If natural channel design construction is not possible due to site constraints, the relocated stream must have pattern, profile, and dimension similar to, or better than, the existing stream. Note that site constraints do not include those situations where NCDOT chooses not to acquire additional adjacent property that is available for purchase.

(2) The new stream meets the current buffer requirements as stated in current District stream mitigation guidance. If the required buffer widths cannot be obtained, a project-by-project decision will be completed to determine if additional compensatory mitigation is required.

(3) The new location allows the relocated stream to remain stable (e.g., in a

valley vs. on a slope, no bends that will impact stability, etc.).

(4) There is no loss of channel for any reason (e.g., old channel is 200' and new channel is 150' = 50' channel loss; part of the new channel is put in a culvert; the new channel (sides and bottom) is hardened with concrete, rip rap, etc.).

(5) The Corps will determine if monitoring and reporting will be required for a specific project and the parameters of any required monitoring and reporting. If monitoring is required, a monitoring plan must be included with the PCN and meet current requirements.

All relocation plans must clearly depict both the existing channel and the proposed (relocated) channel.

* Conducting stream relocation(s) in accordance with 1-5 above may not fully compensate for the impact and may require additional compensatory mitigation. The Corps Project Manager will determine if the proposed amount of mitigation is adequate on a project-by-project basis.

If stream relocation cannot be conducted in accordance with 1-5 above, mitigation at a 2:1 ratio will typically be required unless: (1) the applicant provides a Stream Quality Assessment Worksheet or NCSAM documentation (when available) that supports a different mitigation ratio; (2) the Corps Project Manager determines that the relocated stream, while not in full compliance with 1-5 above, warrants partial mitigation, or; (3) the Corps determines that the existing stream is an excellent quality stream, in which case a 3:1 mitigation ratio may be required. The Corps Project Manager will make the final determination concerning the appropriate amount and type of mitigation.

If the Corps determines that the proposed stream relocation is of such a magnitude that it cannot be authorized by this RGP, an Individual Permit will be required.

s. The applicant shall sign and return the compliance certificate that is attached to the RGP verification letter.

t. In the event that any Federal agency maintains an objection or any required State authorization is outstanding, no notice to proceed will be given until objections are resolved and State authorizations are issued.

u. The Corps may place additional special conditions, limitations, or restrictions on any verification of the use of RGP 31 on a project-by-project basis.

2. General Conditions.

a. Except as authorized by this RGP or any Corps approved modification to this RGP, no excavation, fill or mechanized land-clearing activities shall take place within waters or wetlands, at any time in the construction or maintenance of this project. This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.

b. Authorization under this RGP does not obviate the need to obtain other federal, state, or local authorizations.

c. All work authorized by this RGP must comply with the terms and conditions of the applicable CWA Section 401 Water Quality Certification for this RGP issued by the NCDWR.

d. The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

e. The activities authorized by this RGP must not interfere with the public's right to free navigation on all navigable waters of the U.S. No attempt will be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the authorized work for a reason other than safety.

f. The permittee understands and agrees that, if future operations by the U.S. require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

g. The permittee, upon receipt of a notice of revocation of this permit or upon its expiration before completion of the work will, without expense to the U.S. and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the affected water of the U.S. to its former conditions.

h. The permittee will allow the Wilmington District Engineer or his representative to inspect the authorized activity at any time deemed necessary to assure that the activity is being performed or maintained in strict accordance with the Special and General Conditions of this permit.

i. This RGP does not grant any property rights or exclusive privileges.

j. This permit does not authorize any injury to the property or rights of others.

k. This RGP does not authorize the interference with any existing or proposed federal project.

l. In issuing this permit, the Federal Government does not assume any liability for the following:

(1) Damages to the permitted project or uses thereof as a result of other permitted

or unpermitted activities or from natural causes.

(2) Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest.

(3) Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

(4) Design or construction deficiencies associated with the permitted work.

(5) Damage claims associated with any future modification, suspension, or revocation of this permit.

m. Authorization provided by this RGP may be modified, suspended or revoked in whole or in part if the Wilmington District Engineer, acting for the Secretary of the Army, determines that such action is in the best public interest. The term of this RGP shall be five (5) years unless subject to modification, suspension or revocation. Any modification, suspension or revocation of this authorization will not be the basis for any claim for damages against the U.S. Government.

n. This RGP does not authorize any activity, which the District Engineer determines, after any necessary investigations, will adversely affect:

(1) Rivers named in Section 3 of the Wild and Scenic Rivers Act (15 U.S.C. 1273), those proposed for inclusion as provided by Sections 4 and 5 of the Act, and wild, scenic and recreational rivers established by state and local entities.

(2) Sites included in or determined eligible for listing in the National Registry of Natural Landmarks.

(3) NOAA designated marine sanctuaries, National Estuarine Research Reserves, and coral reefs.

(4) Submerged Aquatic Vegetation (SAV) as defined by the N.C. Division of Marine Fisheries at 15A NCAC 03I .0101(4)(i)).

o. Endangered Species.

(1) No activity is authorized under this RGP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under this RGP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(2) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees (and when FHWA is the lead federal agency) must provide the district engineer with the appropriate documentation to demonstrate compliance with

those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the RGP activity, or whether additional ESA consultation is necessary.

(3) Non-federal permittees must submit a PCN to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect federally-listed endangered or threatened species or designated critical habitat, the PCN must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-federal applicant of the Corps' determination within 45 days of receipt of a complete PCN notification. In cases where the non-federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification that the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(4) As a result of formal or informal consultation with the U.S. Fish and Wildlife Service (USFWS) or NMFS, the district engineer may add species-specific endangered species conditions to the RGP.

(5) Authorization of an activity by a RGP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the USFWS or the NMFS, the ESA prohibits any person subject to the jurisdiction of the U.S. to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(6) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the USFWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

p. The permittee is responsible for obtaining any "take" permits required under the USFWS's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such "take" permits are required for a particular activity.

q. For proposed activities the sixteen counties listed below, applicants must provide a

copy of the PCN to the USFWS, 160 Zillicoa Street, Asheville, North Carolina 28801. This PCN must be sent concurrently to the USFWS and the Corps Project Manager for that specific county.

Counties with tributaries that drain to designated critical habitat that require notification to the Asheville USFWS: Avery, Cherokee, Forsyth, Graham, Haywood, Henderson, Jackson, Macon Mecklenburg, Mitchell, Stokes, Surry, Swain, Transylvania, Union and Yancey.

Applicants may contact the appropriate USFWS office listed below or the US Army Corps of Engineers:

US Fish and Wildlife Service
Asheville Field Office
160 Zillicoa Street
Asheville, NC 28801
Telephone: (828) 258-3939

Asheville USFWS Office counties: All counties west of and including Anson, Stanly, Davidson, Forsyth and Stokes Counties.

US Fish and Wildlife Service
Raleigh Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Telephone: (919) 856-4520

Raleigh USFWS Office counties: all counties east of and including Richmond, Montgomery, Randolph, Guilford, and Rockingham Counties.

r. Permittees are advised that development activities in or near a floodway may be subject to the National Flood Insurance Program that prohibits any development, including fill, within a floodway that results in any increase in base flood elevations. This RGP does not authorize any activity prohibited by the National Flood Insurance Program.

s. The permittee must make every reasonable effort to perform the work authorized herein in a manner so as to minimize any adverse impact on fish, wildlife and natural environmental values.

t. All activities authorized by this RGP that involve the use of riprap material for bank stabilization, the following measures shall be applied:

(1) Filter cloth must be placed underneath the riprap as an additional requirement of its use in North Carolina waters.

(2) The placement of riprap shall be limited to the areas depicted on submitted work plan drawings and not be placed in a manner that prevents or impedes fish passage.

(3) The riprap material shall be clean and free from loose dirt or any pollutant

except in trace quantities that will not have an adverse environmental effect.

(4) It shall be of a size sufficient to prevent its movement from the authorized alignment by natural forces under normal conditions.

(5) The riprap material shall consist of clean rock or masonry material such as, but not limited to, granite, marl, or broken concrete.

(6) A waiver from the specifications in this general condition may be requested in writing. The waiver will only be issued if it can be demonstrated that the impacts of complying with this condition will result in greater adverse impacts to the aquatic environment.

u. The permittee must install and maintain, at his expense, any signal lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, on authorized facilities. For further information, the permittee should contact the U.S. Coast Guard Marine Safety Office at (910) 772-2191.

v. The permittee must maintain any structure or work authorized by this permit in good condition and in conformance with the terms and conditions of this permit. The Permittee is not relieved of this requirement if the Permittee abandons the structure or work. Transfer in fee simple of the work authorized by this permit will automatically transfer this permit to the property's new owner, with all of the rights and responsibilities enumerated herein. The permittee must inform any subsequent owner of all activities undertaken under the authority of this permit and provide the subsequent owner with a copy of the terms and conditions of this permit.

w. At his sole discretion, any time during the processing cycle, the Wilmington District Engineer may determine that this RGP will not be applicable to a specific proposal. In such case, the procedures for processing an individual permit in accordance with 33 CFR 325 will be available.

x. The activity must comply with applicable FEMA approved state or local floodplain management requirements.

y. All fill material placed in waters or wetlands shall be generated from an upland source and will be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.

z. All excavated material will be disposed of in approved upland disposal areas.

aa. Historic Properties.

(1) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places (NRHP), the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(2) Federal permittees (or when FHWA is the lead federal agency) should follow their own procedures for complying with the requirements of Section 106 of the NHPA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address Section 106 compliance for this RGP activity, or whether additional Section 106 consultation is necessary.

(3) Non-federal permittees must submit a PCN to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the NRHP, including previously unidentified properties. For such activities, the PCN must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), as appropriate, and the NRHP (see 33 CFR 330.4(g)). When reviewing PCNs, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the NHPA. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(4) The district engineer will notify the prospective permittee within 45 days of receipt of a complete PCN whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA Section 106 consultation is required and will occur, the district engineer will notify the non-federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(5) Prospective permittees should be aware that Section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit will relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the

undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

bb. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the NRHP.

cc. There will be no unreasonable interference with navigation or the right of the public to riparian access by the existence or use of activities authorized by this RGP.

dd. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

ee. This RGP will not be applicable to proposed construction when the Wilmington District Engineer determines that the proposed activity will significantly affect the quality of the human environment and determines that an EIS must be prepared.

ff. Activities which have commenced (i.e. are under construction) or are under contract to commence in reliance upon this general permit will remain authorized provided the activity is completed within twelve months of the date of the general permit's expiration, modification, or revocation. Activities completed under the authorization of this general permit which were in effect at the time the activity was completed continue to be authorized by the general permit.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

Kevin P. Landers Sr.
Colonel, U. S. Army
District Commander

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

December 2, 2019
Mecklenburg County
NCDWR Project No. 20191337v.1
I-485 Express Lanes
STIP No. I-5507

APPROVAL of 401 WATER QUALITY CERTIFICATION with ADDITIONAL CONDITIONS

Mr. Phil Harris, III, P.E.
NCDOT Environmental Analysis Unit Manager
1598 Mail Service Center
Raleigh, NC 27699-1598

Dear Mr. Harris:

You have our approval, in accordance with the conditions listed below, for the following impacts for the purpose of adding express lanes to I-485 in southern Mecklenburg County.

For stream impacts listed in the table below, please be advised that the orange highlights signify pipe/culvert extensions that have been approved for the requested exemption from the burial requirement. No other exemptions are given, express or implied, from the burial requirement and the permitting agency must be contacted to receive additional exemptions. Please provide color copies of this 401 approval to ensure on site personnel can accurately disseminate burial requirements for each impact area. Asterisks signify stream impact locations where temporary impact quantities are in the same footprint as bank stabilization quantities, therefore the impacts are not cumulative.

In certain areas of hydrologic proximity, stream impacts were grouped for cumulative impacts. They are as follows:

1. Sites 1, 2A, 3, 4, 5
2. Sites 6, 7, 8, 10
3. Sites 13, 15
4. Sites 20, 21, 22

Stream Impacts in the Catawba River Basin

Site	Bank Stabilization	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1*	18	28	13			46	
2A	11				20	31	
3*	70			52	16	106	52
4		181				181	
5				473	10	483	473
6	48		10			58	
7			680			680	
8	10	7				17	
10*	65				30	35	
11*	157				122	35	
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	103	69
21	13				10	23	
22*	24			140	49	164	140
24*	22	6	10			28	
27	33				20	53	
28	37				20	57	
29	25				30	55	
30			33			33	
31*	20	3	10			23	
32	6				20	26	
33	40		10			50	
35	50		42			92	
36	17		25			42	
37	35		20			55	
37A	13					13	
38	32		30			62	
39	13				10	23	
40	16				24	40	
41*	33	52	42			94	
42*	20	125	12			145	
43	30		10			40	
44*	28			26	19	54	
TOTAL	**1131**	**402**	**957**	**974**	**542**	**3502**	**948**

Total Stream Impact for Project: 3502 linear feet
DWR Required Mitigation: 948 linear feet
ACOE Required Mitigation: 1376 linear feet

Wetland Impacts in the Catawba River Basin

Site	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Total Wetland Impact (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		0.13	0.14
14	0.10			0.00		0.10	0.10
18	<0.01			0.04		0.04	0.05
20	0.00			<0.01		0.00	<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		0.00	<0.01
31	<0.01			0.00		0.00	<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	**0.56**	**0.00**	**0.00**	**0.27**	**0.00**	**0.07**	**0.83**

Total Wetland Impact for Project: 0.83 acres.
Wetland impacts highlighted in green are considered to be complete takes

The project shall be constructed in accordance with your application dated received October 4, 2019. After reviewing your application, we have decided that these impacts are covered by General Water Quality Certification Number 4135. This certification corresponds to the Regional General Permit 31 issued by the Corps of Engineers. In addition, you should acquire any other federal, state or local permits before you proceed with your project including (but not limited to) Sediment and Erosion Control, Non-Discharge and Water Supply Watershed regulations. This approval will expire with the accompanying 404 permit.

This approval is valid solely for the purpose and design described in your application (unless modified below). Should your project change, you must 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 total wetland fills for this project (now or in the future) exceed one acre, or of total impacts to perennial streams (now or in the future) exceed 300 linear feet, compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you must adhere to the conditions listed in the attached certification(s) and any additional conditions listed below.

Condition(s) of Certification:

Project Specific Conditions

1. Compensatory mitigation for 1,376 linear feet of impact to streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated September 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 the DMS Mitigation Banking Instrument signed July 28, 2010.

2. Compensatory mitigation for impacts to 0.83 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) (formerly NCEEP), 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.

3. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)

4. The 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)]

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

6. 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]

7. 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 the NCDWR. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the 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)]

8. 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)]

9. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed. [15A NCAC 02H.0506(b)(2)]

10. For the 1,499 linear feet of 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)]

11. 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)]

12. The waiver for culvert burial is 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)]

13. Channel relocations shall be completed and 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)

14. 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)

15. 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)]

16. 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 NCS000250 [delete if non-DOT project], 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)]

17. 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)]

18. 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)

19. 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)

20. 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.

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

22. Tall fescue shall not be used in the establishment of temporary or permanent groundcover 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 soils within the riparian area and 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 a 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 from 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 in prohibited. Riparian areas are defined as a distance 25 feet landward from top of stream bank.

23. 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, NC DOT shall not be required to meet 15A NCAC 4B .0124(a) regarding the maximum amount of uncovered acres. [15A NCAC 02B.0200]
24. All portions of the proposed project draining to 303(d) listed watersheds that are impaired due to biological criteria exceedances 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]
25. At the Site 5 stream relocation, Class I riprap shall be used for stream bed stabilization and Class II riprap shall be used for streambank stabilization, if banks cannot be stabilized as submitted. [15A NCAC 02H.0506(b)(2)]
26. 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. 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 downstream 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)]

2. 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]

3. 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)]

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

5. 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)]

6. 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)]

7. 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) and (c)(3)]

8. 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)]

9. 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)]

10. 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)]

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

12. 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]

13. 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)]

14. 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 Division Engineer and the on-site project manager. [15A NCAC 02H .0507(c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

15. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization 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]

16. 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.

17. 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)]

18. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify the NCDWR when all work included in the 401 Certification has been completed. [15A NCAC 02H.0502(f)]

19. Native riparian vegetation (**ex. Salix nigra, Juncus (spp), Carex (spp), et al.**) 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.0231(b)(6)]

20. 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)]

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 waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

23. 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.

24. In the event that discharges of sediment or other pollutants from the drainage system outfalls 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 Corps and a 401 Certification from the DWR.

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

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

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

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

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

This letter completes the review of the Division of Water Resources under Section 401 of the Clean Water Act. If you have any questions, please contact Donna Hood at (704)235-2193 or donna.hood@ncdenr.gov.

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...

Linda Culpepper, Director
Division of Water Resources

Electronic copy only distribution:
Nicholle Braspennickx, US Army Corps of Engineers, Charlotte Field Office
Joel Howard, Division 10 Environmental Officer
Thomas Smith, NC DOT Roadside Environmental
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Marla Chambers, NC Wildlife Resources Commission
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File Copy

ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
LINDA CULPEPPER
Director

NORTH CAROLINA
Environmental Quality

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

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

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

Applicant's Certification

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

Signature: _____ Date: _____

Agent's Certification

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

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

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

Signature _____ Registration No. _____
Date _____

STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER RESOURCES

WATER QUALITY GENERAL CERTIFICATION NO. 4135

GENERAL CERTIFICATION FOR PROJECTS ELIGIBLE FOR US ARMY CORPS OF ENGINEERS

- **NATIONWIDE PERMIT NUMBER 14 (LINEAR TRANSPORTATION PROJECTS), AND**
- **REGIONAL GENERAL PERMIT 198200031 (NCDOT BRIDGES, WIDENING PROJECTS, INTERCHANGE IIMPROVEMENTS)**

Water Quality Certification Number 4135 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 Regulations in 15A NCAC 02H .0500 and 15A NCAC 02B .0200 for the discharge of fill material to surface waters and wetland areas as described in 33 CFR 330 Appendix A (B) (14) of the US Army Corps of Engineers regulations and Regional General Permit 198200031.

The State of North Carolina certifies that the specified category of activity will not violate applicable portions of Sections 301, 302, 303, 306 and 307 of the Public Laws 92-500 and 95-217 if conducted in accordance with the conditions hereinafter set forth.

Effective date: December 1, 2017

Signed this day: December 1, 2017

By

for Linda Culpepper
Interim Director

Activities meeting any one (1) of the following thresholds or circumstances require *written approval* for a 401 Water Quality Certification from the Division of Water Resources (DWR):

a) If any of the conditions of this Certification (listed below) cannot be met; or
b) Any temporary or permanent impacts to wetlands, open waters and/or streams, except for construction of a driveway to a single family residential lot that is determined to not be part of a larger common plan of development, as long as the driveway involves a travel lane of less than 25 feet and total stream impacts of less than 60 feet, including any topographic/slope stabilization or in-stream stabilization needed for the crossing; or
c) Any stream relocation or stream restoration; or
d) Any high-density project, as defined in 15A NCAC 02H .1003(2)(a) and by the density thresholds specified in 15A NCAC 02H .1017, which:
    i. Disturbs one acre or more of land (including a project that disturbs less than one acre of land that is part of a larger common plan of development or sale); and
    ii. Has permanent wetland, stream or open water impacts; and
    iii. Is proposing new built-upon area; and
    iv. Does not have a stormwater management plan reviewed and approved under a state stormwater program[1] or a state-approved local government stormwater program[2].

    Projects that have vested rights, exemptions, or grandfathering from state or locally-implemented stormwater programs and projects that satisfy state or locally-implemented stormwater programs through use of community in-lieu programs **require written approval**; or
e) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as: ORW (including SAV), HQW (including PNA), SA, WS-I, WS-II, or North Carolina or National Wild and Scenic River.
f) Any permanent impacts to waters, or to wetlands adjacent to waters, designated as Trout except for driveway projects that are below threshold (b) above provided that:
    i. The impacts are not adjacent to any existing structures
    ii. All conditions of this General Certification can be met, including adherence to any moratoriums as stated in Condition #10; and
    iii. A *Notification of Work in Trout Watersheds Form* is submitted to the Division at least 60 days prior to commencement of work; or
g) Any permanent impacts to coastal wetlands [15A NCAC 07H .0205], or Unique Wetlands (UWL); or
h) Any impact associated with a Notice of Violation or an enforcement action for violation(s) of NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), NC Surface Water or Wetland Standards (15A NCAC 02B .0200), or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200); or

[1] e.g. Coastal Counties, HQW, ORW, or state-implemented Phase II NPDES
[2] e.g. Delegated Phase II NPDES, Water Supply Watershed, Nutrient-Sensitive Waters, or Universal Stormwater Management Program

i) Any impacts to subject water bodies and/or state regulated riparian buffers along subject water bodies in the Neuse, Tar-Pamlico, or Catawba River Basins or in the Randleman Lake, Jordan Lake or Goose Creek Watersheds (or any other basin or watershed with State Regulated Riparian Area Protection Rules [Buffer Rules] in effect at the time of application) *unless:*
   i. The activities are listed as "EXEMPT" from these rules; or
   ii. A Buffer Authorization Certificate is issued by the NC Division of Coastal Management (DCM); or
   iii. A Buffer Authorization Certificate or a Minor Variance is issued by a delegated or designated local government implementing a state riparian buffer program pursuant to 143-215.23

Activities included in this General Certification that do not meet one of the thresholds listed above do not require written approval.

I. ACTIVITY SPECIFIC CONDITIONS:

1. If this Water Quality Certification is used to access residential, commercial or industrial building sites, then all parcels owned by the applicant that are part of the single and complete project authorized by this Certification must be buildable without additional impacts to streams or wetlands. If required in writing by DWR, the applicant shall provide evidence that the parcels are buildable without requiring additional impacts to wetlands, waters, or state regulated riparian buffers. [15A NCAC 02H .0506(b)(4) and (c)(4)]

2. For road and driveway construction purposes, this Certification shall only be utilized from natural high ground to natural high ground. [15A NCAC 02H .0506(b)(2) and (c)(2)]

3. Deed notifications or similar mechanisms shall be placed on all lots with retained jurisdictional wetlands, waters, and state regulated riparian buffers within the project boundaries in order to assure compliance with NC Wetland Rules (15A NCAC 02H .0500), NC Isolated Wetland Rules (15A NCAC 02H .1300), and/or State Regulated Riparian Buffer Rules (15A NCAC 02B .0200). These mechanisms shall be put in place at the time of recording of the property or individual parcels, whichever is appropriate. [15A NCAC 02H .0506(b)(4) and (c)(4)]

4. For the North Carolina Department of Transportation, compliance with the NCDOT's individual NPDES permit NCS000250 shall serve to satisfy this condition. All other high-density projects that trigger threshold item (d) above shall comply with one of the following requirements: [15A NCAC 02H .0506(b)(5) and (c)(5)]

a. Provide a completed Stormwater Management Plan (SMP) for review and approval, including all appropriate stormwater control measure (SCM) supplemental forms and associated items, that complies with the high-density development requirements of 15A NCAC 02H .1003. Stormwater management shall be provided throughout the entire project area in accordance with 15A NCAC 02H .1003. For the purposes of 15A NCAC 02H .1003(2)(a), density thresholds shall be determined in accordance with 15A NCAC 02H .1017.

b. Provide documentation (including calculations, photos, etc.) that the project will not cause degradation of downstream surface waters. Documentation shall include a detailed analysis of the hydrological impacts from stormwater runoff when considering the volume and velocity of stormwater runoff from the project built upon area and the size and existing condition of the receiving stream(s).

Exceptions to this condition require application to and written approval from DWR.

II. GENERAL CONDITIONS:

1. When written authorization is required, the plans and specifications for the project are incorporated into the authorization by reference and are an enforceable part of the Certification. Any modifications to the project require notification to DWR and may require an application submittal to DWR with the appropriate fee. [15A NCAC 02H .0501 and .0502]

2. No waste, spoil, solids, or fill of any kind shall occur in wetlands or waters beyond the footprint of the impacts (including temporary impacts) as authorized in the written approval from DWR; or beyond the thresholds established for use of this Certification without written authorization. [15A NCAC 02H .0501 and .0502]

   No removal of vegetation or other impacts of any kind shall occur to state regulated riparian buffers beyond the footprint of impacts approved in a Buffer Authorization or Variance or as listed as an exempt activity in the applicable riparian buffer rules. [15A NCAC 02B .0200]

3. In accordance with 15A NCAC 02H .0506(h) and Session Law 2017-10, compensatory mitigation may be required for losses of greater than 300 linear feet of perennial streams and/or greater than one (1) acre of wetlands. Impacts associated with the removal of a dam shall not require mitigation when the removal complies with the requirements of Part 3 of Article 21 in Chapter 143 of the North Carolina General Statutes. Impacts to isolated and other non-404 jurisdictional wetlands shall not be combined with 404 jurisdictional wetlands for the purpose of determining when impact thresholds trigger a mitigation requirement. For linear publicly owned and maintained transportation projects that are not determined to be part of a larger common plan of development by the US Army Corps of Engineers, compensatory mitigation may be required for losses of greater than 300 linear feet per perennial stream.

Compensatory stream and/or wetland mitigation shall be proposed and completed in compliance with G.S. 143-214.11. For applicants proposing to conduct mitigation within a project site, a complete mitigation proposal developed in accordance with the most recent guidance issued by the US Army Corps of Engineers Wilmington District shall be submitted for review and approval with the application for impacts.

4. All activities shall be in compliance with any applicable State Regulated Riparian Buffer Rules in Chapter 2 of Title 15A.

5. 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]

   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*, or for linear transportation projects, the *NCDOT Sediment and Erosion Control Manual*.

   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.

   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.

   If the project occurs in waters or watersheds classified as Primary Nursery Areas (PNAs), SA, WS-I, WS-II, High Quality Waters (HQW), or Outstanding Resource Waters (ORW), then the sedimentation and erosion control designs shall comply with the requirements set forth in 15A NCAC 04B .0124, *Design Standards in Sensitive Watersheds*.

6. Sediment and erosion control measures shall not be placed in wetlands or waters except within the footprint of temporary or permanent impacts authorized under this Certification. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0501 and .0502]

7. Erosion control matting that incorporates plastic mesh and/or plastic twine shall not be used along streambanks or within wetlands. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02B .0201]

8. An NPDES Construction Stormwater Permit (NCG010000) is required for construction projects that disturb one (1) or more acres of land. The NCG010000 Permit allows stormwater to be discharged during land disturbing construction activities as stipulated in the conditions of the permit. If the project is covered by this permit, full compliance with permit conditions including the erosion & sedimentation control plan, inspections and maintenance, self-monitoring, record keeping and reporting requirements is required. [15A NCAC 02H .0506(b)(5) and (c)(5)]

   The North Carolina Department of Transportation (NCDOT) shall be required to be in full compliance with the conditions related to construction activities within the most recent version of their individual NPDES (NCS000250) stormwater permit. [15A NCAC 02H .0506(b)(5) and (c)(5)]

9. All work in or adjacent to streams shall be conducted so that the flowing stream does not come in contact with the disturbed area. Approved best management practices from the most current version of the *NC Sediment and Erosion Control Manual*, or the *NC DOT Construction and Maintenance Activities Manual*, such as sandbags, rock berms, cofferdams, and other diversion structures shall be used to minimize excavation in flowing water. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(3) and (c)(3)]

10. If activities must occur during periods of high biological activity (e.g. sea turtle nesting, fish spawning, or bird nesting), then biological monitoring may be required at the request of other state or federal agencies and coordinated with these activities. [15A NCAC 02H .0506 (b)(2) and 15A NCAC 04B .0125]

    All moratoriums on construction activities established by the NC Wildlife Resources Commission (WRC), US Fish and Wildlife Service (USFWS), NC Division of Marine Fisheries (DMF), or National Marine Fisheries Service (NMFS) shall be implemented. Exceptions to this condition require written approval by the resource agency responsible for the given moratorium. A copy of the approval from the resource agency shall be forwarded to DWR.

    Work within a designated trout watershed of North Carolina (as identified by the Wilmington District of the US Army Corps of Engineers), or identified state or federal endangered or threatened species habitat, shall be coordinated with the appropriate WRC, USFWS, NMFS, and/or DMF personnel.

11. Culverts shall be designed and installed in such a manner that the original stream profiles are not altered and allow for aquatic life movement during low flows. The dimension, pattern, and profile of the stream above and below a pipe or culvert shall not be modified by widening the stream channel or by reducing the depth of the stream in connection with the construction activity. The width, height, and gradient of a proposed culvert shall be such as to pass the average historical low flow and spring flow without adversely altering flow velocity. [15A NCAC 02H .0506(b)(2) and (c)(2)]

Placement of culverts and other structures in streams shall be below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20% of the culvert diameter for culverts having a diameter less than or equal to 48 inches, to allow low flow passage of water and aquatic life.

If multiple pipes or barrels are required, they shall be designed to mimic the existing stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel shall be avoided.

When topographic constraints indicate culvert slopes of greater than 5%, culvert burial is not required, provided that all alternative options for flattening the slope have been investigated and aquatic life movement/connectivity has been provided when possible (e.g. rock ladders, cross vanes, etc.). Notification, including supporting documentation to include a location map of the culvert, culvert profile drawings, and slope calculations, shall be provided to DWR 60 calendar days prior to the installation of the culvert.

When bedrock is present in culvert locations, culvert burial is not required provided that there is sufficient documentation of the presence of bedrock. Notification, including supporting documentation such as, a location map of the culvert, geotechnical reports, photographs, etc. shall be provided to DWR a minimum of 60 calendar days prior to the installation of the culvert. If bedrock is discovered during construction, then DWR shall be notified by phone or email within 24 hours of discovery.

If other site-specific topographic constraints preclude the ability to bury the culverts as described above and/or it can be demonstrated that burying the culvert would result in destabilization of the channel, then exceptions to this condition require application to and written approval from DWR.

Installation of culverts in wetlands shall ensure continuity of water movement and be designed to adequately accommodate high water or flood conditions. When roadways, causeways, or other fill projects are constructed across FEMA-designated floodways or wetlands, openings such as culverts or bridges shall be provided to maintain the natural hydrology of the system as well as prevent constriction of the floodway that may result in destabilization of streams or wetlands.

The establishment of native woody vegetation and other soft stream bank stabilization techniques shall be used where practicable instead of rip-rap or other bank hardening methods.

12. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means to the maximum extent practicable (e.g. grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Exceptions to this condition require application to and written approval from DWR. [15A NCAC 02H .0506(b)(5)]

13. Application of fertilizer to establish planted/seeded vegetation within disturbed riparian areas and/or wetlands shall be conducted at agronomic rates and shall comply with all other Federal, State and Local regulations. Fertilizer application shall be accomplished in a manner that minimizes the risk of contact between the fertilizer and surface waters. [15A NCAC 02B .0200 and 15A NCAC 02B .0231]

14. If concrete is used during construction, then all necessary measures shall be taken to prevent direct contact between uncured or curing concrete and waters of the state. Water that inadvertently contacts uncured concrete shall not be discharged to waters of the state. [15A NCAC 02B .0200]

15. All proposed and approved temporary fill and culverts shall be removed and the impacted area shall be returned to natural conditions within 60 calendar days after the temporary impact is no longer necessary. The impacted areas shall be restored to original grade, including each stream's original cross sectional dimensions, planform pattern, and longitudinal bed profile. For projects that receive written approval, no temporary impacts are allowed beyond those included in the application and authorization. All temporarily impacted sites shall be restored and stabilized with native vegetation. [15A NCAC 02H .0506(b)(2) and (c)(2)]

16. All proposed and approved temporary pipes/culverts/rip-rap pads etc. in streams shall be installed as outlined in the most recent edition of the *North Carolina Sediment and Erosion Control Planning and Design Manual* or the *North Carolina Surface Mining Manual* or the *North Carolina Department of Transportation Best Management Practices for Construction and Maintenance Activities* so as not to restrict stream flow or cause dis-equilibrium during use of this Certification. [15A NCAC 02H .0506(b)(2) and (c)(2)]

17. Any rip-rap required for proper culvert placement, stream stabilization, or restoration of temporarily disturbed areas shall be restricted to the area directly impacted by the approved construction activity. All rip-rap shall be placed such that the original stream elevation and streambank contours are restored and maintained. Placement of rip-rap or other approved materials shall not result in de-stabilization of the stream bed or banks upstream or downstream of the area or in a manner that precludes aquatic life passage. [15A NCAC 02H .0506(b)(2)]

18. Any rip-rap used for stream or shoreline stabilization shall be of a size and density to prevent movement by wave, current action, or stream flows and shall consist of clean rock or masonry material free of debris or toxic pollutants. Rip-rap shall not be installed in the streambed except in specific areas required for velocity control and to ensure structural integrity of bank stabilization measures. [15A NCAC 02H .0506(b)(2)]

19. Applications for rip-rap groins proposed in accordance with 15A NCAC 07H .1401 (NC Division of Coastal Management General Permit for construction of Wooden and Rip-rap Groins in Estuarine and Public Trust Waters) shall meet all the specific conditions for design and construction specified in 15A NCAC 07H .1405.

20. All mechanized equipment operated near surface waters shall be inspected and maintained regularly to prevent contamination of surface waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Construction shall be staged in order to minimize the exposure of equipment to surface waters to the maximum extent practicable. Fueling, lubrication and general equipment maintenance shall be performed in a manner to prevent, to the maximum extent practicable, contamination of surface waters by fuels and oils. [15A NCAC 02H .0506(b)(3) and (c)(3) and 15A NCAC 02B .0211 (12)]

21. Heavy equipment working in wetlands shall be placed on mats or other measures shall be taken to minimize soil disturbance. [15A NCAC 02H .0506(b)(3) and (c)(3)]

22. In accordance with 143-215.85(b), the applicant shall report any petroleum spill of 25 gallons or more; any spill regardless of amount that causes a sheen on surface waters; any petroleum spill regardless of amount occurring within 100 feet of surface waters; and any petroleum spill less than 25 gallons that cannot be cleaned up within 24 hours.

23. If an environmental document is required under the State Environmental Policy Act (SEPA), then this General Certification is not valid until a Finding of No Significant Impact (FONSI) or Record of Decision (ROD) is issued by the State Clearinghouse. If an environmental document is required under the National Environmental Policy Act (NEPA), then this General Certification is not valid until a Categorical Exclusion, the Final Environmental Assessment, or Final Environmental Impact Statement is published by the lead agency. [15A NCAC 01C .0107(a)]

24. This General Certification does not relieve the applicant 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.

25. The applicant and their authorized agents shall conduct all 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 DWR determines that such standards or laws are not being met, including 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, then DWR may revoke or modify a written authorization associated with this General Water Quality Certification. [15A NCAC 02H .0507(d)]

26. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit 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 Certification. A copy of this Certification, including all conditions shall be available at the project site during the construction and maintenance of this project. [15A NCAC 02H .0507 (c) and 15A NCAC 02H .0506 (b)(2) and (c)(2)]

27. When written authorization is required for use of this Certification, upon completion of all permitted impacts included within the approval and any subsequent modifications, the applicant shall be required to return a certificate of completion (available on the DWR website https://edocs.deq.nc.gov/Forms/Certificate-of-Completion). [15A NCAC 02H .0502(f)]

28. Additional site-specific conditions, including monitoring and/or modeling requirements, may be added to the written approval letter for projects proposed under this Water Quality Certification in order to ensure compliance with all applicable water quality and effluent standards. [15A NCAC 02H .0507(c)]

29. If the property or project is sold or transferred, the new permittee shall be given a copy of this Certification (and written authorization if applicable) and is responsible for complying with all conditions. [15A NCAC 02H .0501 and .0502]

III. GENERAL CERTIFICATION ADMINISTRATION:

1. In accordance with North Carolina General Statute 143-215.3D(e), written approval for a 401 Water Quality General Certification must include the appropriate fee. An applicant for a CAMA permit under Article 7 of Chapter 113A of the General Statutes for which a Water Quality Certification is required shall only make one payment to satisfy both agencies; the fee shall be as established by the Secretary in accordance with 143-215.3D(e)(7).

2. This Certification neither grants nor affirms any property right, license, or privilege in any waters, or any right of use in any waters. This Certification does not authorize any person to interfere with the riparian rights, littoral rights, or water use rights of any other person and this Certification does not create any prescriptive right or any right of priority regarding any usage of water. This 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 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.

3. This Certification grants permission to the Director, an authorized representative of the Director, or DWR staff, upon the presentation of proper credentials, to enter the property during normal business hours. [15A NCAC 02H .0502(e)]

4. This General Certification shall expire on the same day as the expiration date of the corresponding Nationwide Permit and/or Regional General Permit. The conditions in effect on the date of issuance of Certification for a specific project shall remain in effect for the life of the project, regardless of the expiration date of this Certification. This General Certification is rescinded when the US Army Corps of Engineers reauthorizes any of the corresponding Nationwide Permits and/or Regional General Permits or when deemed appropriate by the Director of the Division of Water Resources.

5. Non-compliance with or violation of the conditions herein set forth by a specific project may result in revocation of this General Certification for the project and may also result in criminal and/or civil penalties.

6. The Director of the North Carolina Division of Water Resources may require submission of a formal application for Individual Certification for any project in this category of activity if it is deemed in the public's best interest or determined that the project is likely to have a significant adverse effect upon water quality, including state or federally listed endangered or threatened aquatic species, or degrade the waters so that existing uses of the water or downstream waters are precluded.

History Note: Water Quality Certification (WQC) Number 4135 issued December 1, 2017 replaces WQC Number 4088 issued March 3, 2017; WQC 3886 issued March 12, 2012; WQC Number 3820 issued April 6, 2010; WQC Number 3627 issued March 2007; WQC Number 3404 issued March 2003; WQC Number 3375 issued March 18, 2002; WQC Number 3289 issued June 1, 2000; WQC Number 3103 issued February 11, 1997; WQC Number 2732 issued May 1, 1992; WQC Number 2666 issued January 21, 1992; WQC Number 2177 issued November 5, 1987.

TIP PROJECT: I-5507

CONTRACT: C203970

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

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	

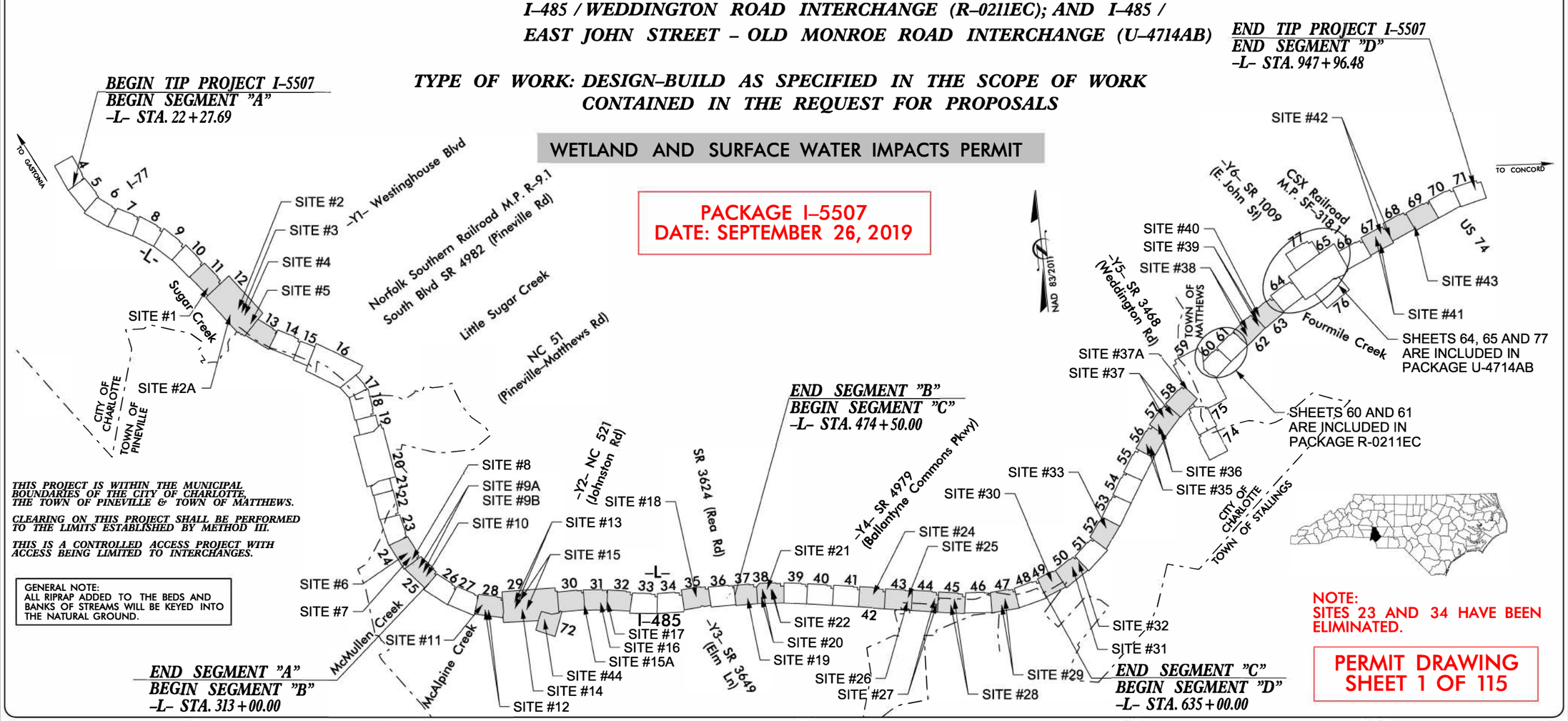
BLYTHE WSP

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: SEPTEMBER 26, 2019



THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF CHARLOTTE, THE TOWN OF PINEVILLE & TOWN OF MATTHEWS.

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

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

GENERAL NOTE:
ALL RIPRAP ADDED TO THE BEDS AND BANKS OF STREAMS WILL BE KEYED INTO THE NATURAL GROUND.

NOTE:
SITES 23 AND 34 HAVE BEEN ELIMINATED.

PERMIT DRAWING
SHEET 1 OF 115

GRAPHIC SCALES

PLANS: 50 25 0 50 100

PROFILE (HORIZONTAL): 50 25 0 50 100

PROFILE (VERTICAL): 10 5 0 10 20

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

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

9/20/2019
\\prdpwics01\ics_workingdir\3990\33640I_4I2\I5507_hyd_prm_wet_psh01_TSH.dgn
PRDPWICS01$

8/17/99

REVISIONS

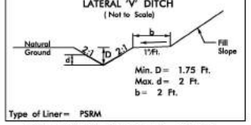
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

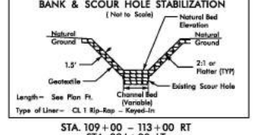
BLYTHE

DETAIL A1
LATERAL "V" DITCH
(Not to Scale)



FROM STA. TO STA. 134+61 – 132+34

DETAIL A2
BANK & SCOUR HOLE STABILIZATION
(Not to Scale)

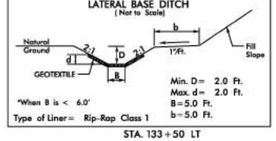


STA. 109+00 – 113+00 RT
STA 294+00 LT

DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)

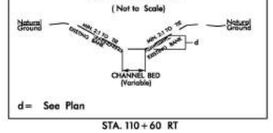
STA. 131+25 LT
STA. 132+00 LT

DETAIL A5
LATERAL BASE DITCH
(Not to Scale)



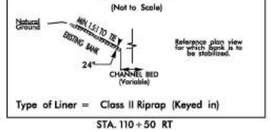
STA. 133+50 LT

DETAIL A6
PIPE OUTLET CHANNEL
(Not to Scale)



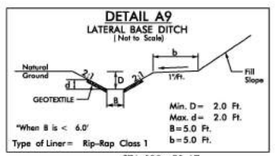
STA. 110+60 RT

DETAIL A7
BANK STABILIZATION
(Not to Scale)



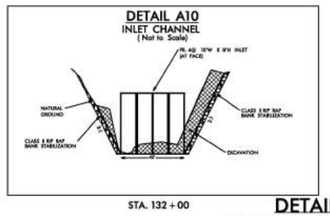
STA. 110+50 RT

DETAIL A9
LATERAL BASE DITCH
(Not to Scale)



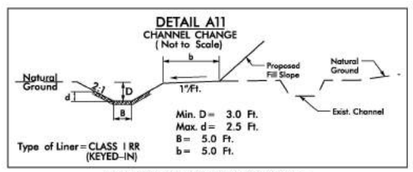
STA. 133+50 LT

DETAIL A10
INLET CHANNEL
(Not to Scale)



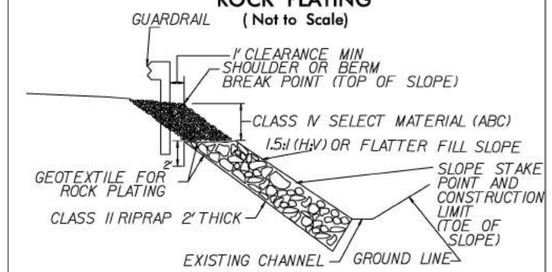
STA. 132+00

DETAIL A11
CHANNEL CHANGE
(Not to Scale)

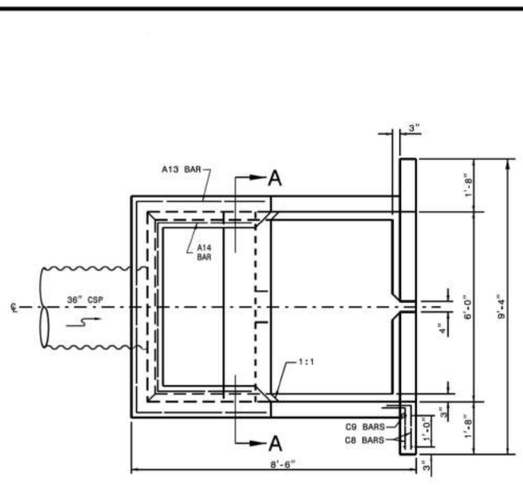


FROM STA. 142+00 LT TO STA. 137+65

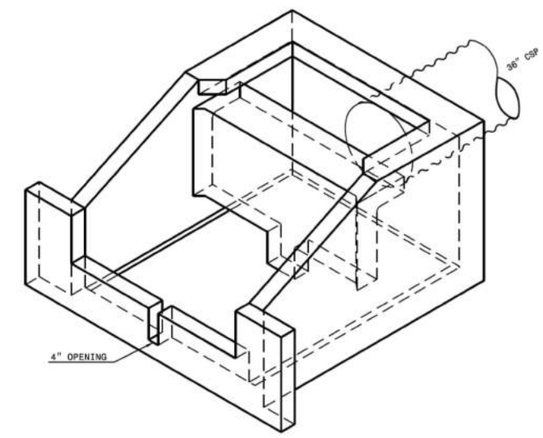
DETAIL A8
ROCK PLATING
(Not to Scale)



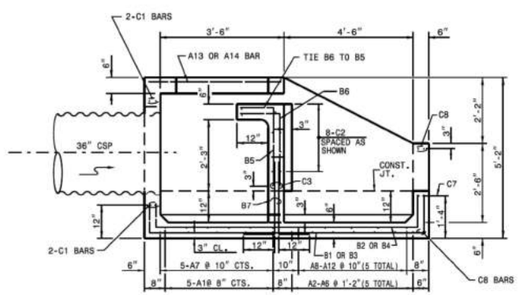
DETAIL A4
ENERGY DISSIPATOR



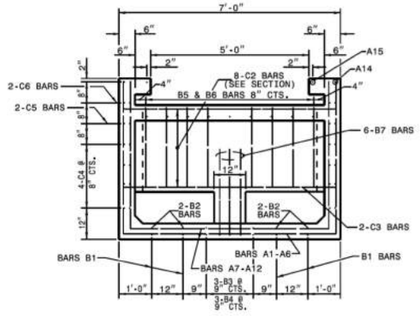
PLAN



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	11'-5"	8.5
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	4	4	1	13'-4"	26.7
B4	3	4	1	9'-11"	19.9
B5	8	4	2	2'-6"	15.0
B6	8	4	2	2'-6"	15.0
B7	8	4	2	4'-0"	16.0
C1	4	4	STR	6'-8"	17.8
C2	8	8		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

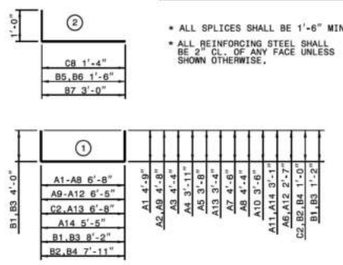


SECTION ON ℄



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

SECTION A-A



* ALL SPLICES SHALL BE 1'-6" MIN.
* ALL REINFORCING STEEL SHALL BE 2" CL. OF ANY FACE UNLESS SHOWN OTHERWISE.

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

ENERGY DISSIPATOR

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

PERMIT DRAWING SHEET 2 OF 115

9/20/2019
DESIGNED
DRAWN
CHECKED
PROJECT ENGINEER

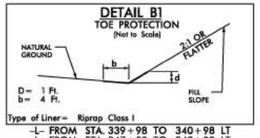
PROJECT REFERENCE NO.	SHEET NO.
I-5507	2D-2
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

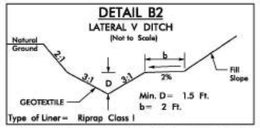
DETAIL B1
TOE PROTECTION (Not to Scale)



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

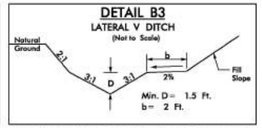
DETAIL B2
LATERAL V DITCH (Not to Scale)



Type of Liner= Riprap Class I

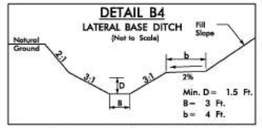
–L3_EAST– FROM STA. 358+49 TO 358+83 RT

DETAIL B3
LATERAL V DITCH (Not to Scale)



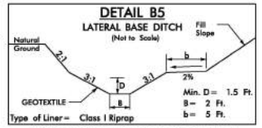
–L3_EAST– FROM STA. 358+83 TO 359+33 RT

DETAIL B4
LATERAL BASE DITCH (Not to Scale)



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

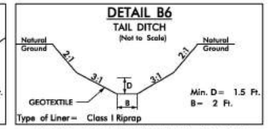
DETAIL B5
LATERAL BASE DITCH (Not to Scale)



Type of Liner= Class I Riprap

–Y2RPDB– FROM STA. 10+10 TO 11+38 LT

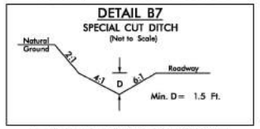
DETAIL B6
TAIL DITCH (Not to Scale)



Type of Liner= Class I Riprap

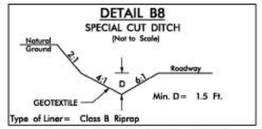
–Y2RPDB– FROM STA. 11+38 TO 12+71 LT

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

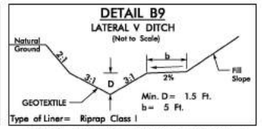
DETAIL B8
SPECIAL CUT DITCH (Not to Scale)



Type of Liner= Class B Riprap

–L– FROM STA. 403+50 TO 403+78

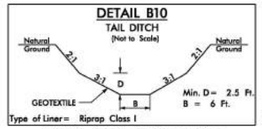
DETAIL B9
LATERAL V DITCH (Not to Scale)



Type of Liner= Riprap Class I

–Y2RPDB– FROM STA. 17+00 TO 22+00 LT

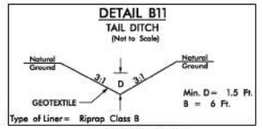
DETAIL B10
TAIL DITCH (Not to Scale)



Type of Liner= Riprap Class I

–Y2RPDB– STA. 15+47 TO 17+00 LT

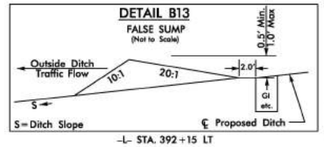
DETAIL B11
TAIL DITCH (Not to Scale)



Type of Liner= Riprap Class B

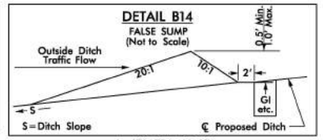
–L– STA. 336+95 RT

DETAIL B13
FALSE SUMP (Not to Scale)



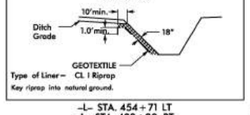
–L– STA. 392+15 LT

DETAIL B14
FALSE SUMP (Not to Scale)



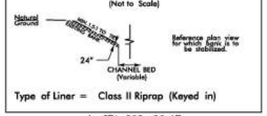
–L– STA. 754+82 RT

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

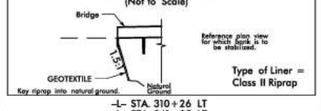
DETAIL B16
BANK STABILIZATION (Not to Scale)



Type of Liner = Class II Riprap (Keyed in)

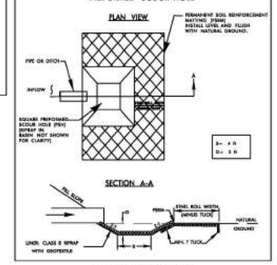
–L– STA. 309+20 LT
–L– STA. 309+60 LT
–L– STA. 342+86 LT
–L– STA. 342+86 LT
–L– STA. 343+36 LT
–L– STA. 342+28 RT
–L– STA. 342+78 RT
–Y2DCC– STA. 21+16 RT
–Y2DCC– STA. 21+46 RT
–Y2DCC– STA. 27+14 RT
–Y2DCC– STA. 27+54 RT
–Y2DCC– STA. 38+88 RT
–Y2DCC– STA. 39+25 RT
–Y2RPDB– STA. 36+70 LT
–Y2RPDB– STA.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

DETAIL B17
ABUTMENT STABILIZATION (Not to Scale)



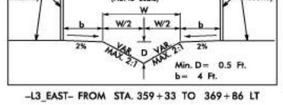
–L– STA. 310+26 LT
–L– STA. 341+95 LT
–L– STA. 344+97 LT
–L– STA. 341+30 RT
–L– STA. 344+15 RT

DETAIL B18
PREFORMED SCOUR HOLE



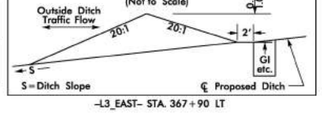
–L– STA. 400+47 RT

DETAIL B19
SPECIAL CUT DITCH (Not to Scale)



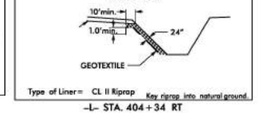
–L3_EAST– FROM STA. 359+33 TO 369+86 LT

DETAIL B20
FALSE SUMP (Not to Scale)



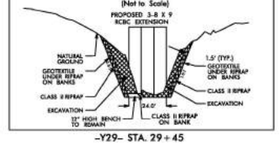
–L3_EAST– STA. 367+90 LT

DETAIL B21
RIPRAP AT EMBANKMENT (Not to Scale)



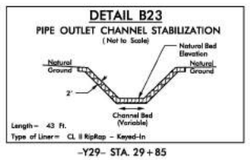
–L– STA. 404+34 RT

DETAIL B22
OUTLET CHANNEL STABILIZATION (Not to Scale)



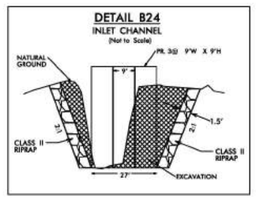
–Y29– STA. 29+45

DETAIL B23
PIPE OUTLET CHANNEL STABILIZATION (Not to Scale)



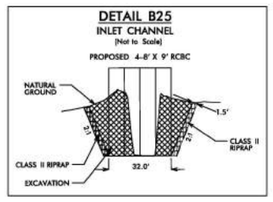
–Y29– STA. 29+85

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

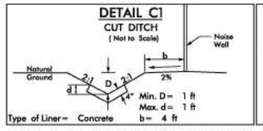
8/17/99

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

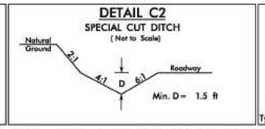
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL C1
CUT DITCH
(Not to Scale)



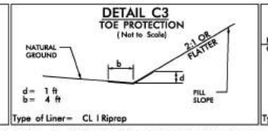
FROM –L– STA. 499+52 LT TO STA. 502+02 LT
FROM –L– STA. 511+36 LT TO STA. 523+64 LT
FROM –L– STA. 567+97 LT TO STA. 572+93 LT

DETAIL C2
SPECIAL CUT DITCH
(Not to Scale)



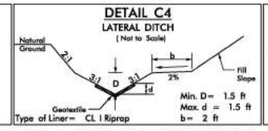
FROM –L– STA. 505+66 LT TO STA. 507+23 LT
FROM –L– STA. 568+80 LT TO STA. 570+38 LT
FROM –L– STA. 570+50 LT TO STA. 577+09 LT
FROM –L– STA. 595+50 LT TO STA. 600+00 LT
FROM –L– STA. 527+84 RT TO STA. 529+13 RT
FROM –L– STA. 575+36 RT TO STA. 576+74 RT

DETAIL C3
TOE PROTECTION
(Not to Scale)



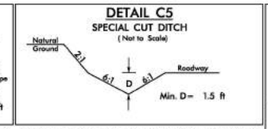
FROM –L– STA. 582+50 LT TO STA. 584+50 LT
FROM –L– STA. 592+50 LT TO STA. 593+50 LT
FROM –L– STA. 486+50 RT TO STA. 488+06 RT
FROM –L– STA. 488+15 RT TO STA. 489+22 RT

DETAIL C4
LATERAL DITCH
(Not to Scale)



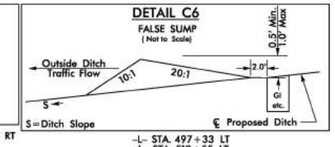
FROM –L– STA. 485+50 RT TO STA. 486+00 RT

DETAIL C5
SPECIAL CUT DITCH
(Not to Scale)



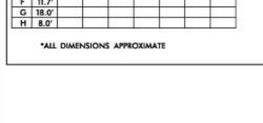
FROM –L– STA. 529+50 RT TO STA. 532+00 RT

DETAIL C6
FALSE SUMP
(Not to Scale)



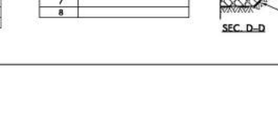
–L– STA. 497+33 LT
–L– STA. 512+55 LT
–L– STA. 517+57 LT
–L– STA. 524+12 LT
–L– STA. 530+99 LT
–L– STA. 535+00 LT
–L– STA. 553+55 LT
–L– STA. 577+25 LT

DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



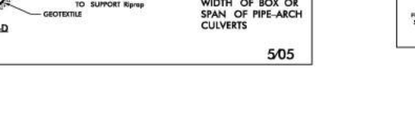
–L– STA. 491+53 LT
–L– STA. 546+23 LT
–L– STA. 578+43 LT
–L– STA. 588+21 LT
–L– STA. 480+89 RT
–L– STA. 488+11 RT
–L– STA. 496+12 RT
–L– STA. 496+43 RT
–L– STA. 579+42 RT
–L– STA. 586+77 RT

DETAIL C8
BANK STABILIZATION
(Not to Scale)



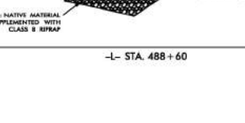
FROM –L– STA. 493+92 LT
FROM –L– STA. 540+84 LT
FROM –L– STA. 578+43 LT
FROM –L– STA. 546+23 LT

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)

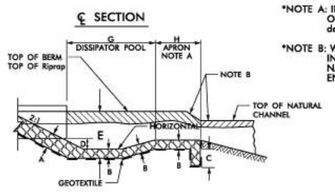
FROM –L– STA. 484+50 RT TO STA. 485+50 RT

DETAIL C12
RIPRAP ENERGY DISSIPATOR BASIN

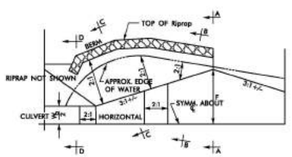
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

*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



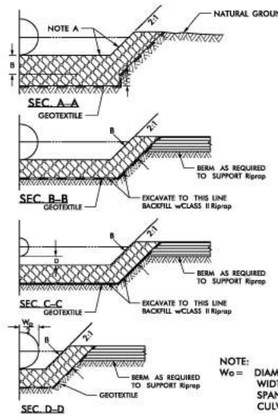
HALF PLAN



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'							

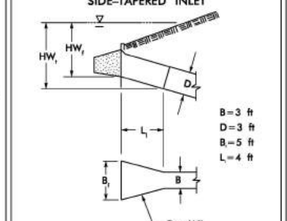
*ALL DIMENSIONS APPROXIMATE

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



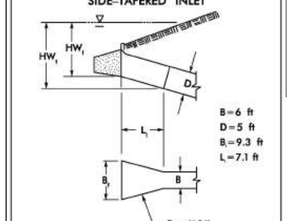
5/05

DETAIL C13
SIDE-TAPERED INLET



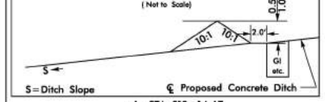
–L– STA. 546+23 LT

DETAIL C14
SIDE-TAPERED INLET



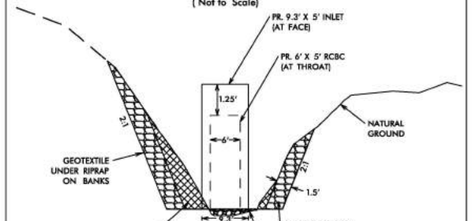
–L– STA. 488+11 RT

DETAIL C15
FALSE SUMP
(Not to Scale)



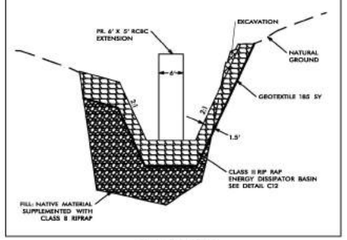
–L– STA. 513+14 LT
–L– STA. 521+00 LT
–L– STA. 523+74 LT

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

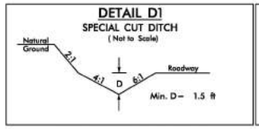
9/12/2019
\\Cos01\ics_workgdir\308\336401.3931\I5507_Hyd_prm_wet_psh02D3.dgn

PROJECT REFERENCE NO.	SHEET NO.
I-5507	2D-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

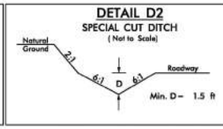
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DETAIL D1
SPECIAL CUT DITCH
(Not to Scale)



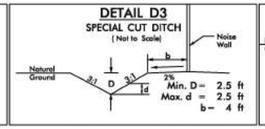
–L– FROM STA. 615+81 TO 619+50 LT
–L– FROM STA. 688+57 TO 701+37 LT
–L– FROM STA. 706+21 TO 711+00 LT
–L– FROM STA. 753+98 TO 760+32 LT
–L– FROM STA. 794+62 TO 795+50 LT
–L– FROM STA. 764+81 TO 767+50 LT
–L– FROM STA. 916+63 TO 917+50 LT
–L– FROM STA. 929+50 TO 931+50 LT
–L– FROM STA. 709+81 TO 713+00 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)



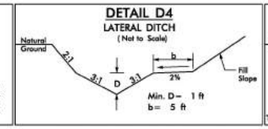
–L– FROM STA. 615+81 TO 619+50 LT

DETAIL D3
SPECIAL CUT DITCH
(Not to Scale)



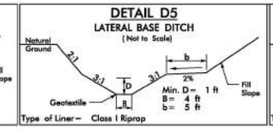
–L– FROM STA. 628+73 TO 634+63 LT

DETAIL D4
LATERAL DITCH
(Not to Scale)



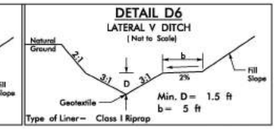
–L– FROM STA. 890+47 TO 892+50 LT
–L– FROM STA. 898+00 TO 900+00 LT
–L– FROM STA. 936+50 TO 940+50 LT
–L– FROM STA. 885+00 TO 888+19 RT
–L– FROM STA. 892+00 TO 897+09 RT

DETAIL D5
LATERAL BASE DITCH
(Not to Scale)



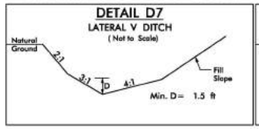
–L– FROM STA. 791+50 TO 793+50

DETAIL D6
LATERAL V DITCH
(Not to Scale)



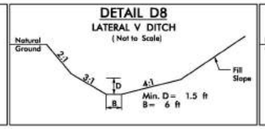
–L– FROM STA. 835+50 TO 837+27 LT
–L– FROM STA. 893+84 TO 898+00 LT
–L– FROM STA. 888+19 TO 890+77 RT
–L– FROM STA. 890+91 TO 892+00 RT
–L– FROM STA. 897+24 TO 899+50 RT

DETAIL D7
LATERAL V DITCH
(Not to Scale)



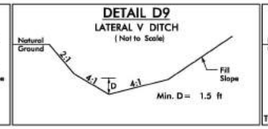
–Y5LPA– FROM STA. 14+78 TO 15+28 LT
–Y5RPA– FROM STA. 20+24 TO 22+00 LT

DETAIL D8
LATERAL V DITCH
(Not to Scale)



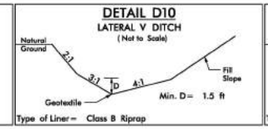
–Y5LPA– FROM STA. 15+28 TO 15+73

DETAIL D9
LATERAL V DITCH
(Not to Scale)



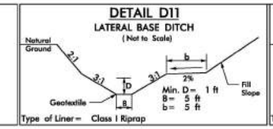
–Y5LPA– FROM STA. 15+73 TO 17+00 LT

DETAIL D10
LATERAL V DITCH
(Not to Scale)



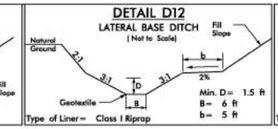
–Y5RPA– FROM STA. 19+50 TO 20+24 LT

DETAIL D11
LATERAL BASE DITCH
(Not to Scale)



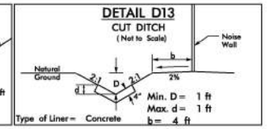
–L– FROM STA. 788+50 TO 790+00

DETAIL D12
LATERAL BASE DITCH
(Not to Scale)



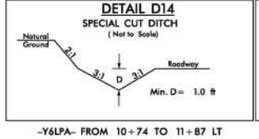
–Y6RPB– FROM 9+77 TO 11+02 LT

DETAIL D13
CUT DITCH
(Not to Scale)



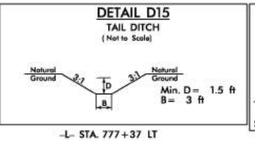
–L– FROM 706+50 TO 711+41 RT
–L– FROM 727+77 TO 729+44 RT
–Y6RPB– FROM 15+11 TO 22+63 LT

DETAIL D14
SPECIAL CUT DITCH
(Not to Scale)



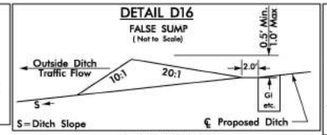
–Y6LPA– FROM 10+74 TO 11+87 LT

DETAIL D15
TAIL DITCH
(Not to Scale)



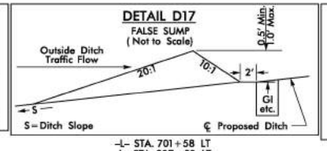
–L– STA. 777+37 LT

DETAIL D16
FALSE SUMP
(Not to Scale)



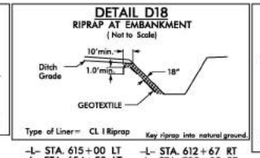
–L– STA. 794+55 LT
–L– STA. 709+74 RT
–L– STA. 760+50 RT
–L– STA. 774+58 RT
–L– STA. 827+52 RT
–Y6RPB– STA. 17+70 LT

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

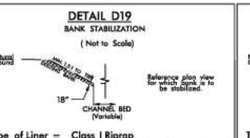
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



–L– STA. 615+00 LT
–L– STA. 654+53 LT
–L– STA. 654+58 LT
–L– STA. 658+97 LT
–L– STA. 683+21 LT
–L– STA. 729+85 LT
–L– STA. 730+13 LT
–L– STA. 741+73 LT
–L– STA. 746+32 LT
–L– STA. 791+36 LT
–L– STA. 808+85 LT
–L– STA. 816+10 LT
–L– STA. 818+86 LT
–L– STA. 890+43 LT
–L– STA. 893+74 LT
–L– STA. 893+80 LT
–L– STA. 910+17 LT

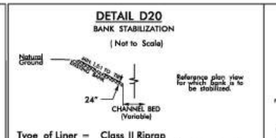
–L– STA. 612+67 RT
–L– STA. 730+00 RT
–L– STA. 730+04 RT
–L– STA. 740+42 RT
–L– STA. 740+45 RT
–L– STA. 746+32 RT
–L– STA. 749+98 RT
–L– STA. 750+09 RT
–L– STA. 788+69 RT
–L– STA. 792+60 RT
–L– STA. 806+28 RT
–L– STA. 806+46 RT
–L– STA. 818+46 RT
–L– STA. 837+46 RT
–L– STA. 890+82 RT
–L– STA. 890+86 RT
–L– STA. 897+08 RT
–L– STA. 897+16 RT
–Y6RPC– STA. 15+28 RT

DETAIL D19
BANK STABILIZATION
(Not to Scale)



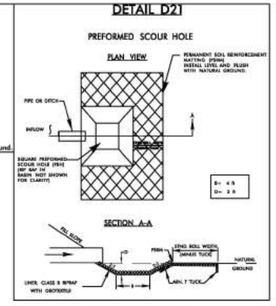
–L– STA. 764+97 LT
–L– STA. 890+34 LT
–L– STA. 893+72 LT
–Y19RPC– STA. 18+60 RT
–Y19RPC– STA. 18+64 RT

DETAIL D20
BANK STABILIZATION
(Not to Scale)



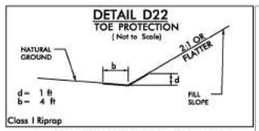
–L– STA. 837+91 LT
–L– STA. 838+91 LT
–Y6RPC– STA. 19+10 RT

DETAIL D21
PREFORMED SCOUR HOLE



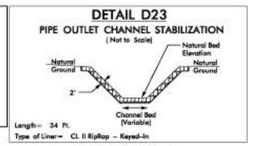
–L– STA. 790+75 LT

DETAIL D22
TOE PROTECTION
(Not to Scale)



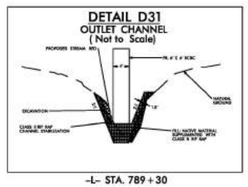
–L– FROM STA. 651+50 TO 654+49 LT
–L– FROM STA. 654+64 TO 656+50 LT
–L– FROM STA. 814+50 TO 816+04 LT
–L– FROM STA. 845+32 TO 854+00 LT
–L– FROM STA. 649+50 TO 653+10 RT
–L– FROM STA. 791+44 TO 792+52 RT
–Y5RPA– FROM STA. 21+43 TO 24+00 RT
–Y6LPC– FROM STA. 12+03 TO 13+79 RT
–Y6RPC– FROM STA. 19+26 TO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

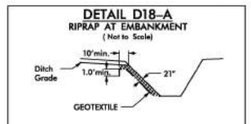


–L– STA. 789+30

DETAIL D32
OUTLET CHANNEL
(Not to Scale)

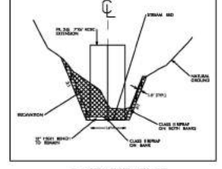
–L– STA. 841+00

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



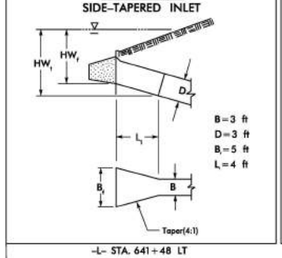
–Y6– STA. 129+88 LT

DETAIL D29
OUTLET CHANNEL
(Not to Scale)



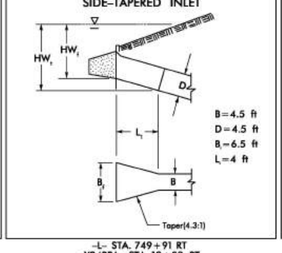
–L– STA. 837+70 LT

DETAIL D24
SIDE-TAPERED INLET



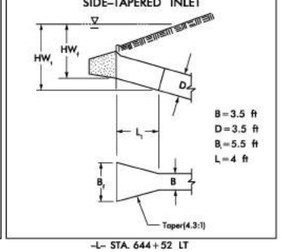
–L– STA. 641+48 LT

DETAIL D25
SIDE-TAPERED INLET



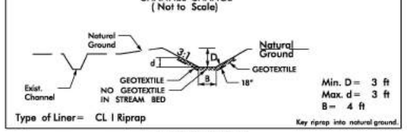
–L– STA. 749+91 RT
–Y24RPA– STA. 18+83 RT

DETAIL D26
SIDE-TAPERED INLET



–L– STA. 644+52 LT

DETAIL D30
CHANNEL CHANGE
(Not to Scale)



–L– STA. 897+13 RT

PERMIT DRAWING SHEET 5 OF 115

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
I-5507	2D-5
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

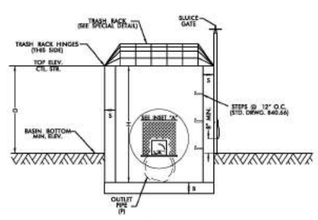
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

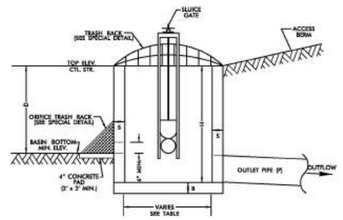
DETAIL D27

DRY DETENTION BASIN DRAWDOWN STRUCTURE

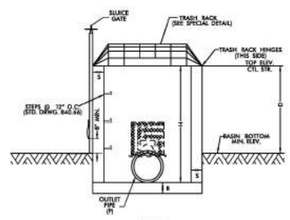
"NOT TO SCALE"



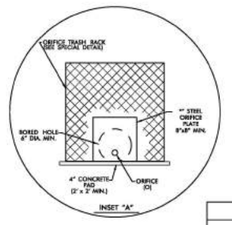
SIDE 1

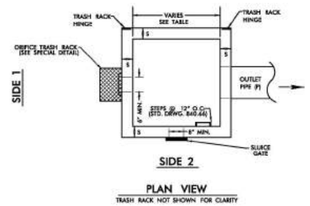


SIDE 2



SIDE 3





SIDE 2

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 = 6.4 acres
WQv = 1.6 x 6.4 x 3460 = 35,328 CF
WQ Elev = 725.13

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

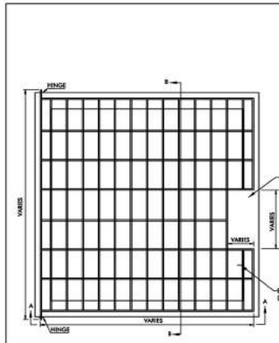
MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

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, YSLPD	5997	6"	6"	723.35	730.50	7.15	720.50	4' x 4' x 10'	3"	723.35	18"

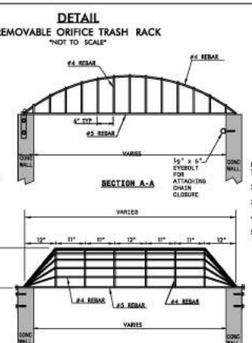
DETAIL

REMOVABLE ORIFICE TRASH RACK

"NOT TO SCALE"

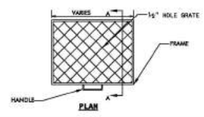


PLAN

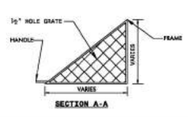


REBAR TRASH RACK
NOT TO SCALE

RISER TRASH RACK NOTES:
1. ALL JOINTS SHALL BE FULLY WELDED AROUND JOINT WITH A MINIMUM OF A ¼" 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 ¼" 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

9/12/2019
C:\Projects\01\ics_workingdir\3081\336401.3933\I5507_Hyd_prm_wet_psh02D5.dgn

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
I-5507	2D-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

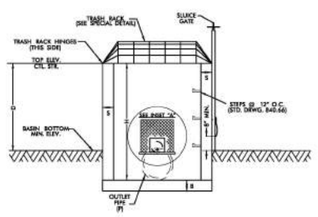
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

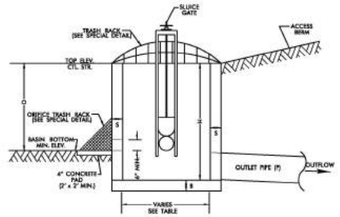
DETAIL D28

DRY DETENTION BASIN DRAWDOWN STRUCTURE

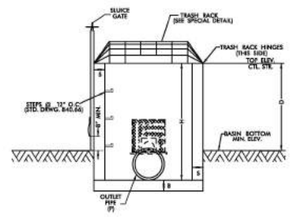
"NOT TO SCALE"



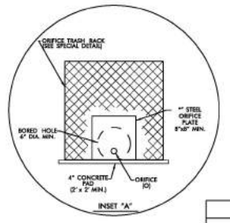
SIDE 1

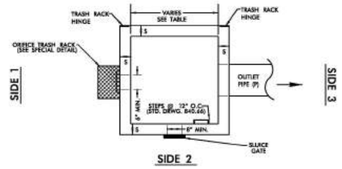


SIDE 2



SIDE 3





SIDE 2

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

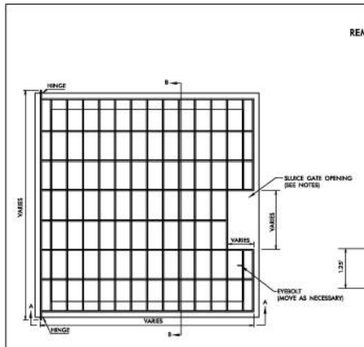
MINIMUM DIMENSIONS FOR DRY DETENTION BASIN DRAWDOWN STRUCTURE

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, YBLPC	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	

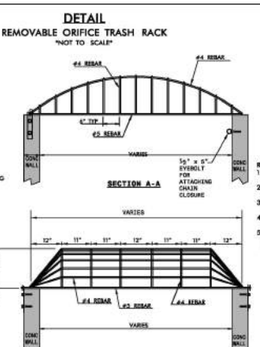
DETAIL

REMOVABLE ORIFICE TRASH RACK

"NOT TO SCALE"



PLAN

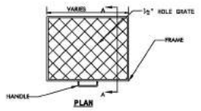


SECTION A-A

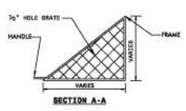
SECTION B-B

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. REMOVABLE 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

9/12/2019
\\Pcgroup01\ics_workingdir\3081\336401.3934\I5507_Hyd_prm_wet_psh0206.dgn
ARCHITECT

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

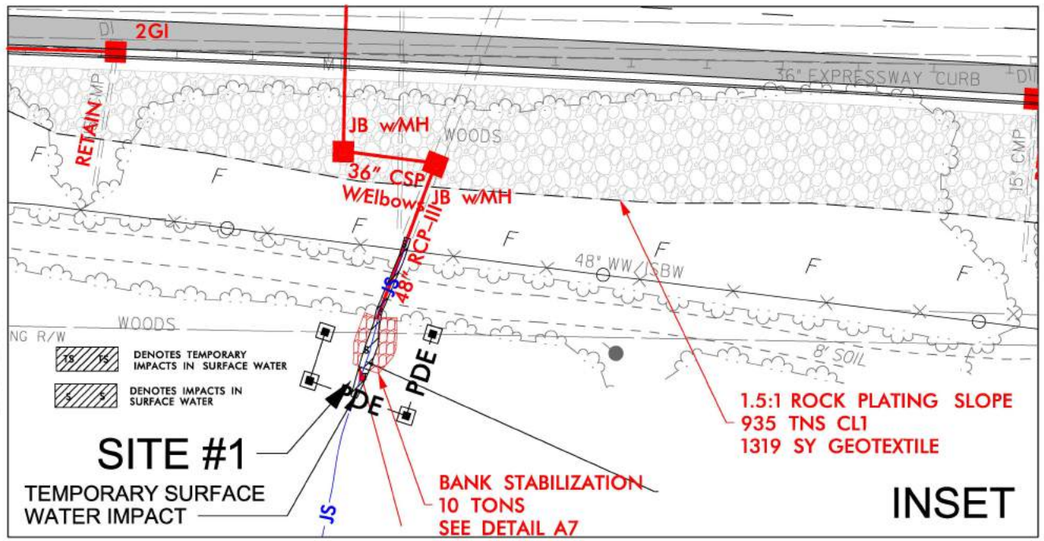
PROJECT REFERENCE NO.	SHEET NO.
I-5507	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

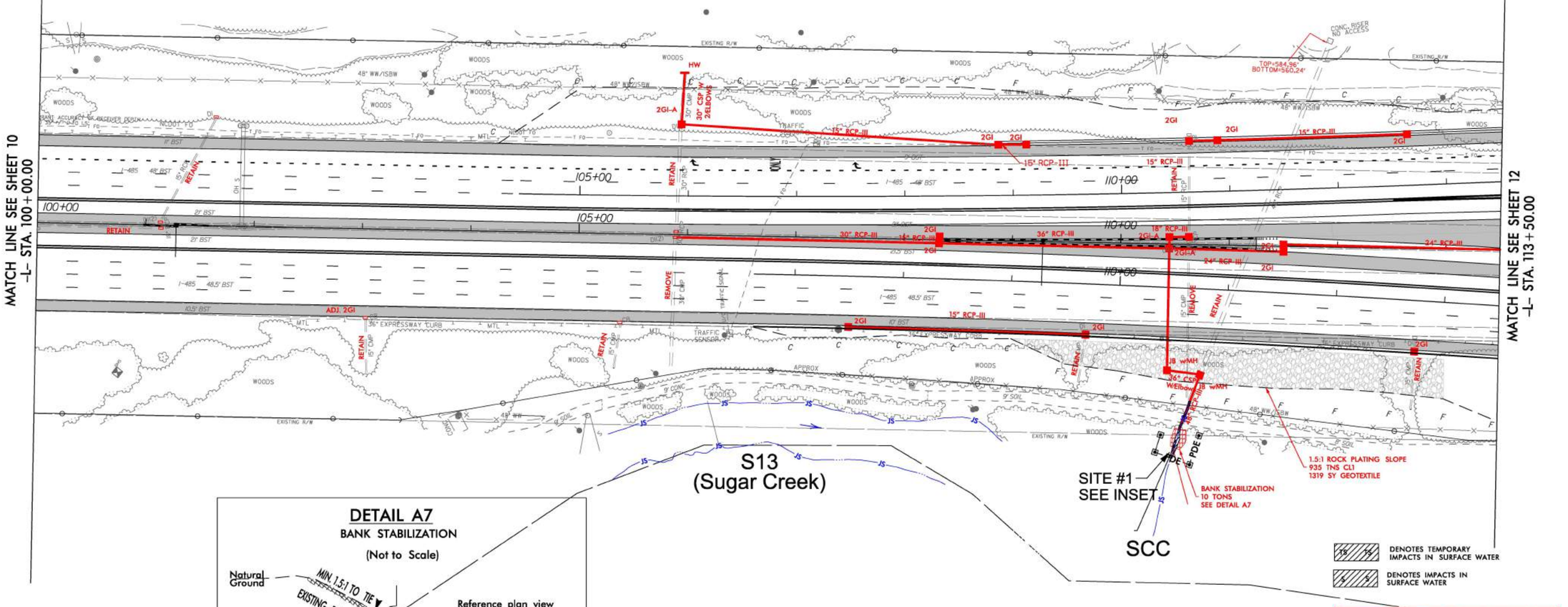
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

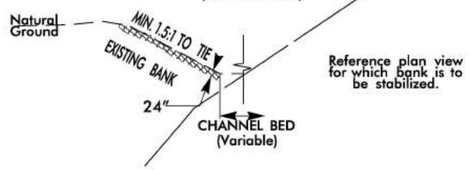
NAD 83/2011

SITE #1 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 A7
BANK STABILIZATION
(Not to Scale)



Type of Liner = Class II Riprap (Keyed in)

PERMIT DRAWING
SHEET 8 OF 115

100 0 100
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019
C:\Projects\01\ics_workingdir\3084\336401.3935\I5507_Hyd_prm_wet_psh11.dgn

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

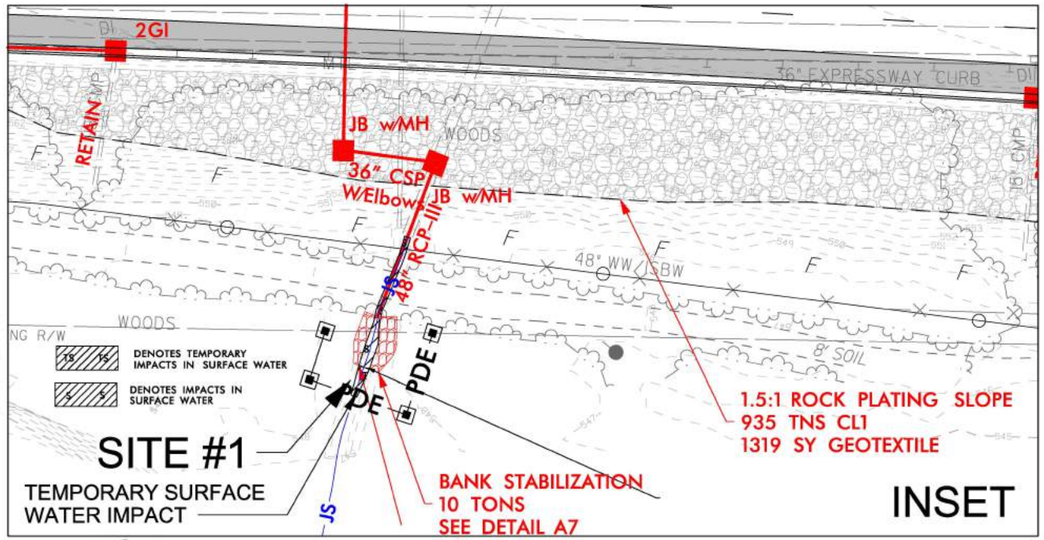
PROJECT REFERENCE NO.	SHEET NO.
I-5507	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

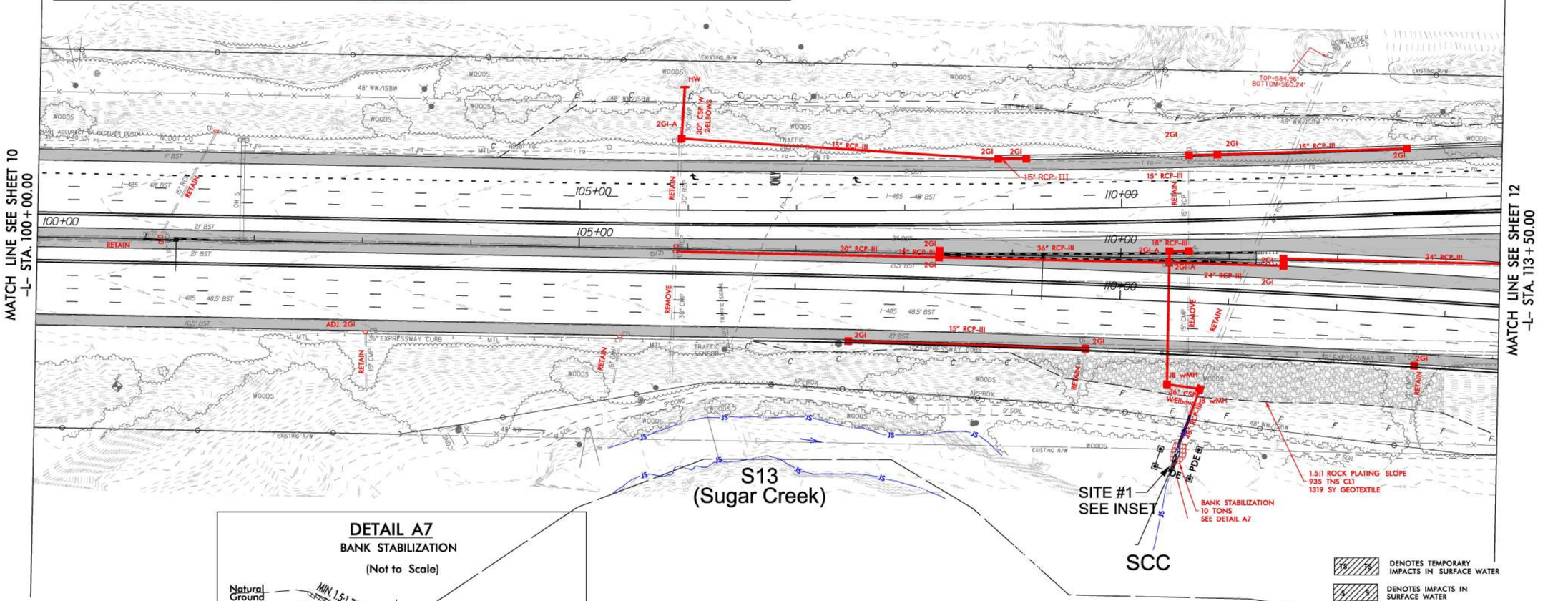
8/17/99

REVISIONS

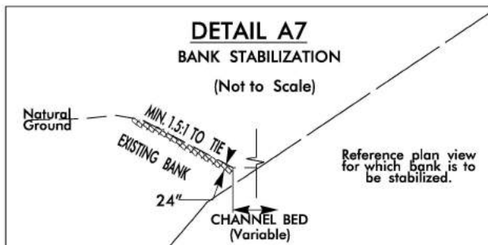


NAD 83/2011

SITE #1 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 A7
BANK STABILIZATION
(Not to Scale)



Type of Liner = Class II Riprap (Keyed in)

PERMIT DRAWING
SHEET 9 OF 115

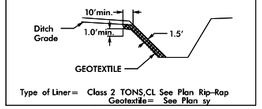
100 0 100
GRAPHIC SCALE

9/12/2019
DESIGN DATA
PROJECT STATUS

REVISIONS

REVISIONS

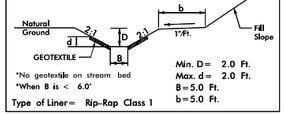
DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)



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

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

DETAIL A9
LATERAL BASE DITCH
(Not to Scale)



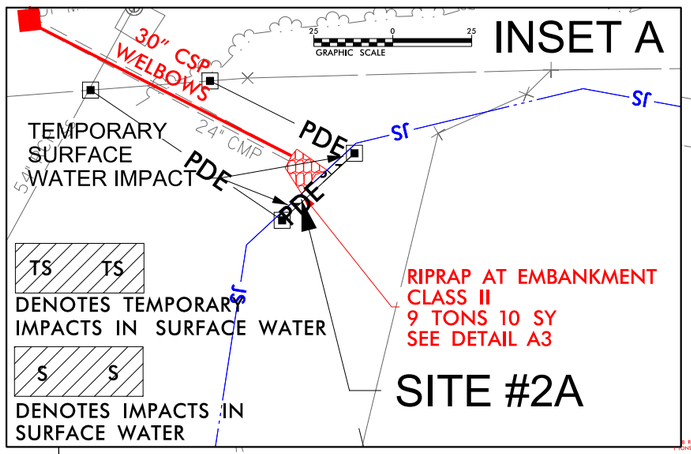
*No geotextile on stream bed
*When B is < 6.0'

Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B=5.0 Ft.
b=5.0 Ft.

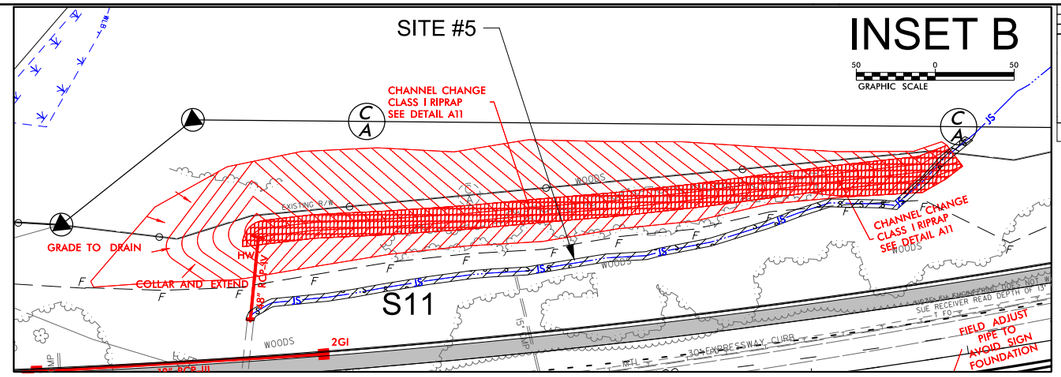
Type of Liner= Rip-Rap Class 1

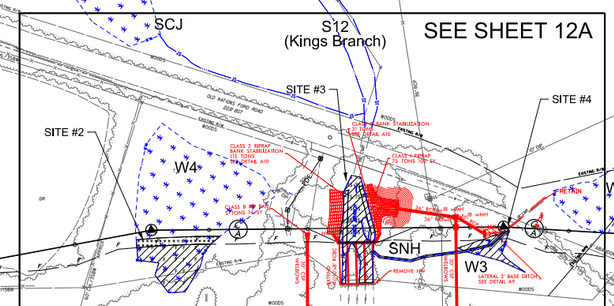
STA. 133+50 LT

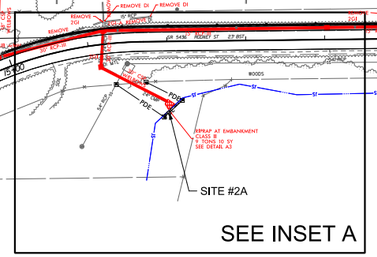
INSET A



INSET B







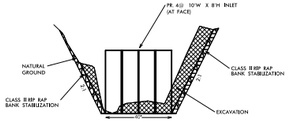
SITE #3 AND SITE #5 NOTE:
THE EXISTING CULVERT IS NOT BURIED, THEREFORE THE CULVERT EXTENSION WILL NOT BE BURIED. THE BOTTOM ELEVATION OF THE EXTENDED CULVERT WILL MATCH THE ELEVATION OF THE EXISTING STREAM BED.

MATCH LINE SEE SHEET 11
L- STA. 113+50.00

MATCH LINE SEE SHEET 13
L- STA. 141+00.00

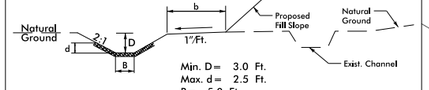
NAD 83/2011

DETAIL A10
INLET CHANNEL
(Not to Scale)



STA. 132+00

DETAIL A11
CHANNEL CHANGE
(Not to Scale)



Type of Liner= CLASS I RR (KEYED-IN)

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

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

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES MECHANIZED CLEARING

F F DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 10 OF 115

GRAPHIC SCALE
100 0 100

GRAPHIC SCALE
50 25 0 50 100
PLANS

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

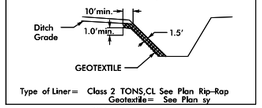
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

LOCATION:	I-485 AT WESTINGHOUSE BLVD.
TIP NO.: I-5507	COUNTY: MECKLENBURG
DESIGNED BY:	WSP
CHECKED BY: D. GOURLEY	DATE: 9/26/2019

REVISIONS

REVISIONS

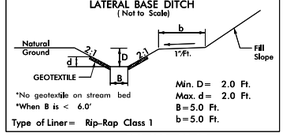
DETAIL A3
RIP RAP AT EMBANKMENT
(Not to Scale)



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

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

DETAIL A9
LATERAL BASE DITCH
(Not to Scale)



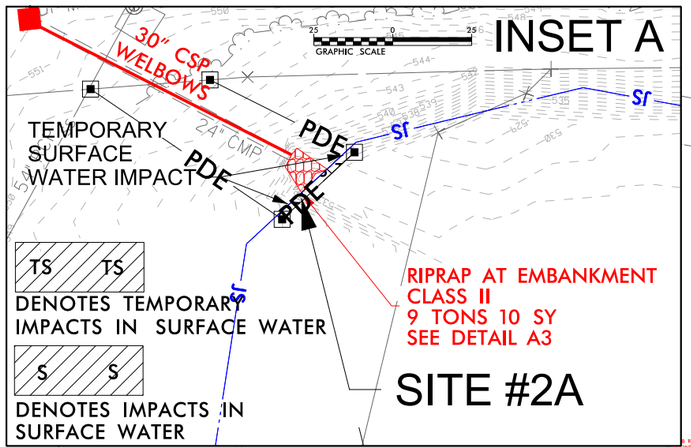
*No geotexsile on stream bed
*When B is < 6.0'

Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B=5.0 Ft.
b=5.0 Ft.

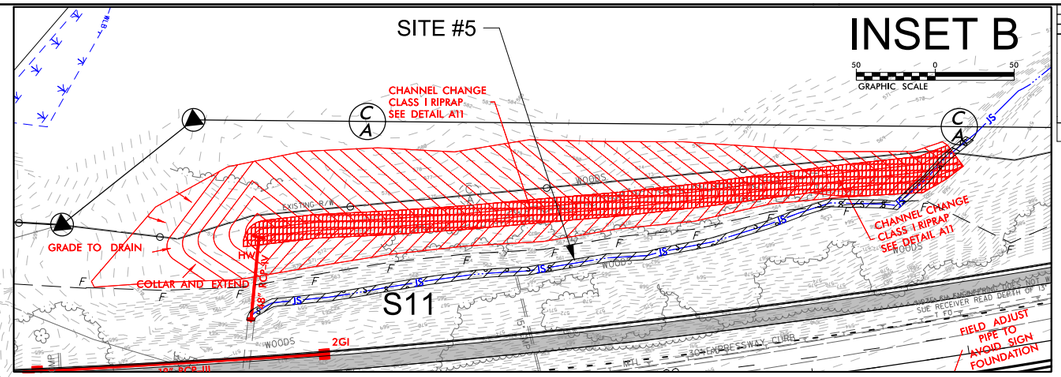
Type of Liner= Rip-Rap Class 1

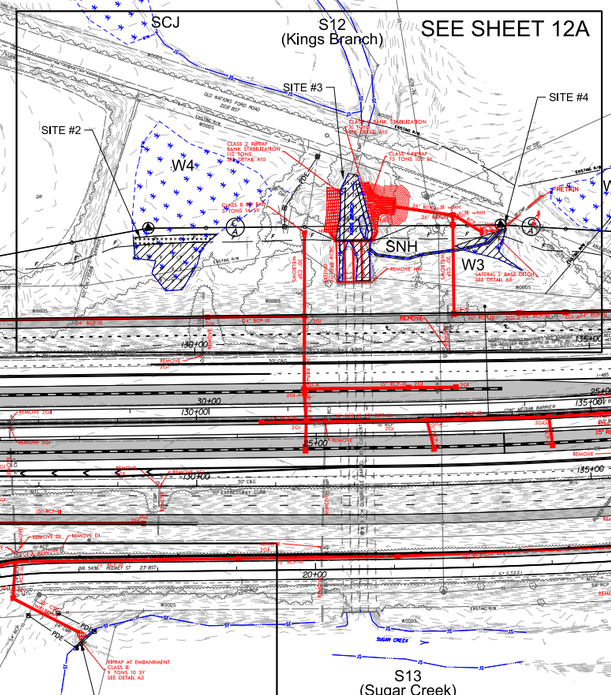
STA. 133+50 LT

INSET A



INSET B





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.

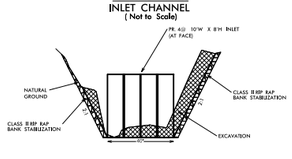
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

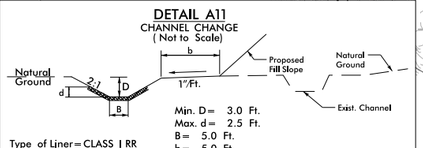
F F DENOTES FILL IN WETLAND

DETAIL A10
INLET CHANNEL
(Not to Scale)



STA. 132+00

DETAIL A11
CHANNEL CHANGE
(Not to Scale)



Type of Liner= CLASS I RR (KEYED-IN)

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

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

PERMIT DRAWING
SHEET 11 OF 115

GRAPHIC SCALE
100 0 100
PLANS

PROJECT REFERENCE NO.	SHEET NO.
I-5507	12
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83/2011

LOCATION: I-485 AT WESTINGHOUSE BLVD.
TIP NO: I-5507 COUNTY: MECKLENBURG
DESIGNED BY: WSP
CHECKED BY: D. GOURLEY DATE: 9/26/2019

GRAPHIC SCALE
50 25 0 50 100
PLANS

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

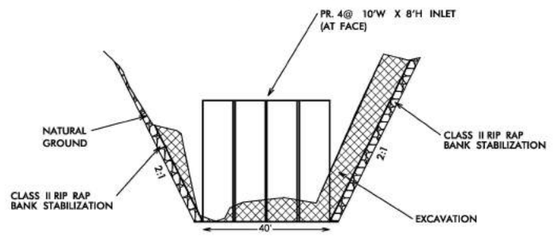
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

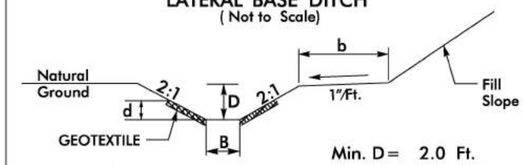
DETAIL A10
INLET CHANNEL
(Not to Scale)



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.

DETAIL A9
LATERAL BASE DITCH
(Not to Scale)



*No geotextile on stream bed
*When B is < 6.0'

Min. D = 2.0 Ft.
Max. d = 2.0 Ft.
B = 5.0 Ft.
b = 5.0 Ft.

Type of Liner = Rip-Rap Class 1

STA. 133 + 50 LT

S12

SITE #2

SITE #3

SITE #4

W4

SNH

W3

OLD NATIONS FORD ROAD
22.6' BST

TEMPORARY SURFACE WATER IMPACT

CLASS 2 BANK STABILIZATION
31 TONS
SEE DETAIL A10

CLASS 2 RIPRAP BANK STABILIZATION
115 TONS
SEE DETAIL A10

CLASS 1 RIPRAP
75 TONS 105 SY

CLASS B RIP RAP
5 TONS 14 SY

30" CSP W/ELBOWS

EXTEND 4@10'x8' RCBC

REMOVE HW

36" RCP-III JB w/MH

30" RCP-III JB w/MH

LATERAL BASE DITCH
SEE DETAIL A9

24" RCP-III 2GI

24" RCP-III 2GI

30" RCP-III 2GI-A

24" RCP-III 2GI-A

24" RCP-III 2GI-A

REMOVE 2GI

REMOVE

REMOVE

RETAIN

130+00

135+00

WOODS

EXISTING R/W

60" CML/3SBW APPROX

10" DIP

8" DIP

96" CMP

18" CMP

30" C&G

30" EXPRESSWAY CURB

NOTE: CH ENGINEERING DOES NOT WARRANT UTILITY DEPTH. REFER TO SUE RECEIVER READ DEPTH OF 13" TO 35" +/-

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 12 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
\\cs_workingdir\3064\336401_3953\I5507_Hyd_prm_wet_psh12A.dgn

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

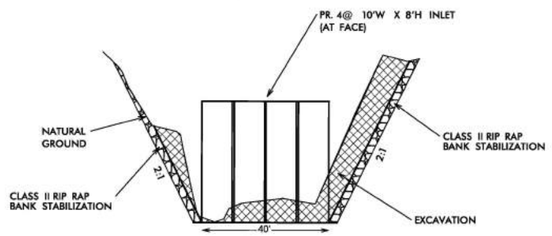
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

REVISIONS

8/17/99

DETAIL A10
INLET CHANNEL
(Not to Scale)

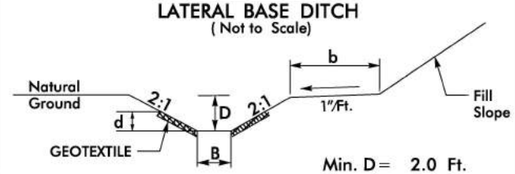


WV

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.

DETAIL A9
LATERAL BASE DITCH
(Not to Scale)



*No geotextile on stream bed
*When B is < 6.0'

Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B=5.0 Ft.
b=5.0 Ft.

Type of Liner= Rip-Rap Class 1

STA. 133+50 LT

S12

SITE #2

SITE #3

SITE #4

W4

SNH

W3

OLD NATIONS FORD ROAD
22.6' BST

EXISTING R/W

WOODS

TEMPORARY SURFACE WATER IMPACT

CLASS 2 RIPRAP BANK STABILIZATION 115 TONS SEE DETAIL A10

CLASS 2 BANK STABILIZATION 31 TONS SEE DETAIL A10

CLASS 1 RIPRAP 75 TONS 105 SY

CLASS B RIP RAP 5 TONS 14 SY

RETAIN

36" RCP-III

30" RCP-III

JB w/MH

HW

30" CSP W/ELBOWS

EXTEND 4@10'x8' RCBC

REMOVE HW

LATERAL BASE DITCH SEE DETAIL A9

24" RCP-III

2GI

2GI-A

REMOVE

REMOVE 2GI

130+00

135+00

30" C&G

30" EXPRESSWAY CURB

NOTE: GH ENGINEERING DOES NOT WARRANT SUE RECEIVER READ DEPTH OF 13" TO 35"+

PERMIT DRAWING
SHEET 13 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

9/12/2019
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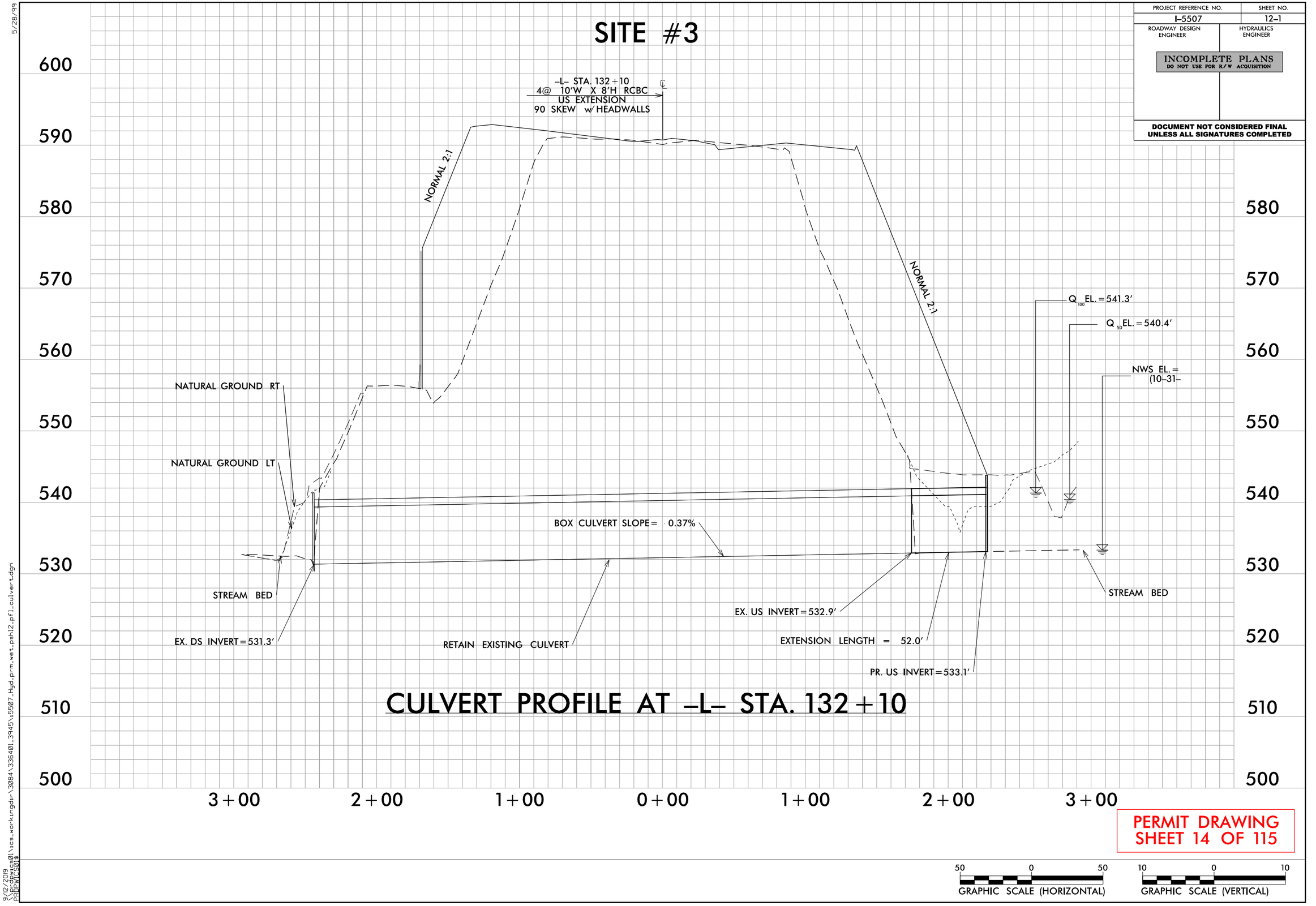
5/28/99

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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PROFILE01$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	12-2

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

543.48

2:1

590.26

0.020

–L2 WEST–
133+98.82
591.520054

0.011

0.017

–Y1–DCWB–
26+16.44
592.506608

0.040

134+00.00

WETLAND (W4)
SITE #2

543.42

2:1

589.18

0.020

–L2 WEST–
130+00.98
590.445019

0.020

–Y1–DCWB–
30+16.01
588.568963

0.020

588.52

PERMIT DRAWING
SHEET 15 OF 115

130+00.00

20 0 20
GRAPHIC SCALE

9/12/2019
\\prodpwcs01\ics_workingdir\3084\336401.3948\15507_hyd_prm_wet_psh12_XS.dgn
PRDPWICS01$

wsp
1001 Morehead Square Dr.
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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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

SITE #5

TEMPORARY SURFACE WATER IMPACT

S11

JS

CHANNEL CHANGE CLASS I RIPRAP SEE DETAIL A11

50 0 50

GRAPHIC SCALE

INSET

SITE #5 SEE INSET

JURISDICTIONAL STREAM BEGINS. NO IMPACTS PROPOSED

S11

SQE

CLASS I RIPRAP 7 TONS 11 SY

CHANNEL CHANGE CLASS I RIPRAP SEE DETAIL A11

PDE

36" CSP w/ELBOWS

REMOVE 2GI

JB wMH

30" RCP-III

24" RCP

REMOVE

2GI-A

2GI

15" RCP-III

18" RCP

CONTROLLER CABINET

TRAFFIC SENSOR

2GI-A 15" RCP-III

COLLAR AND EXTEND

Conv. CB To JB

RETAIN

FIELD ADJUST PIPE TO AVOID SIGN FOUNDATION

COLLAR AND EXTEND

CONC MEDIAN BARRIER

6' ABANDONED

48" WW/ISBW

48" WW/75BW

SR 5436 RODNEY ST 24" BST

48" MTL GATE

15" RCP WD POST

GAZEBO

ROPSHALL LN

EXISTING R/W

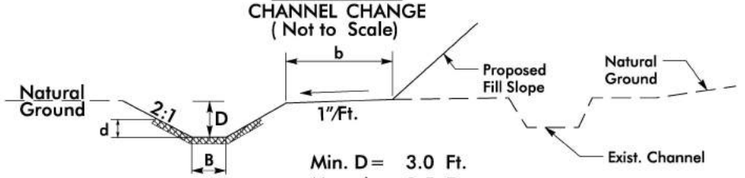
WOODS

APPROX MTL

MATCH LINE SEE SHEET 12 -L- STA. 141+00.00

MATCH LINE SEE SHEET 14 -L- STA. 154+00.00

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)

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

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 16 OF 115

100 0 100

GRAPHIC SCALE

9/26/2019
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NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

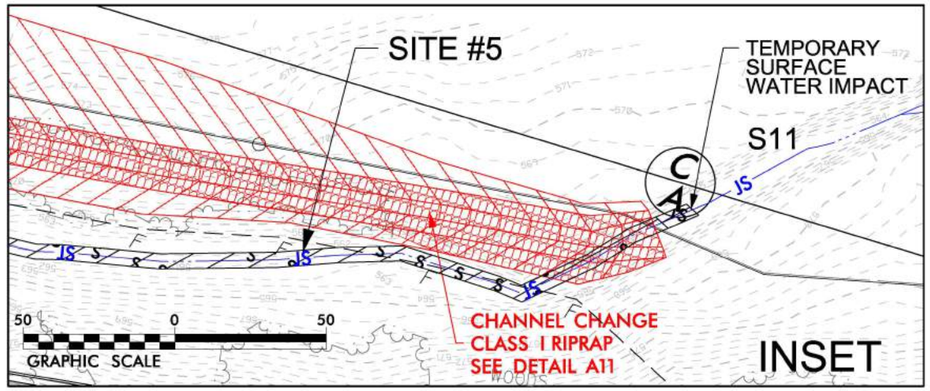
BLYTHE

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER



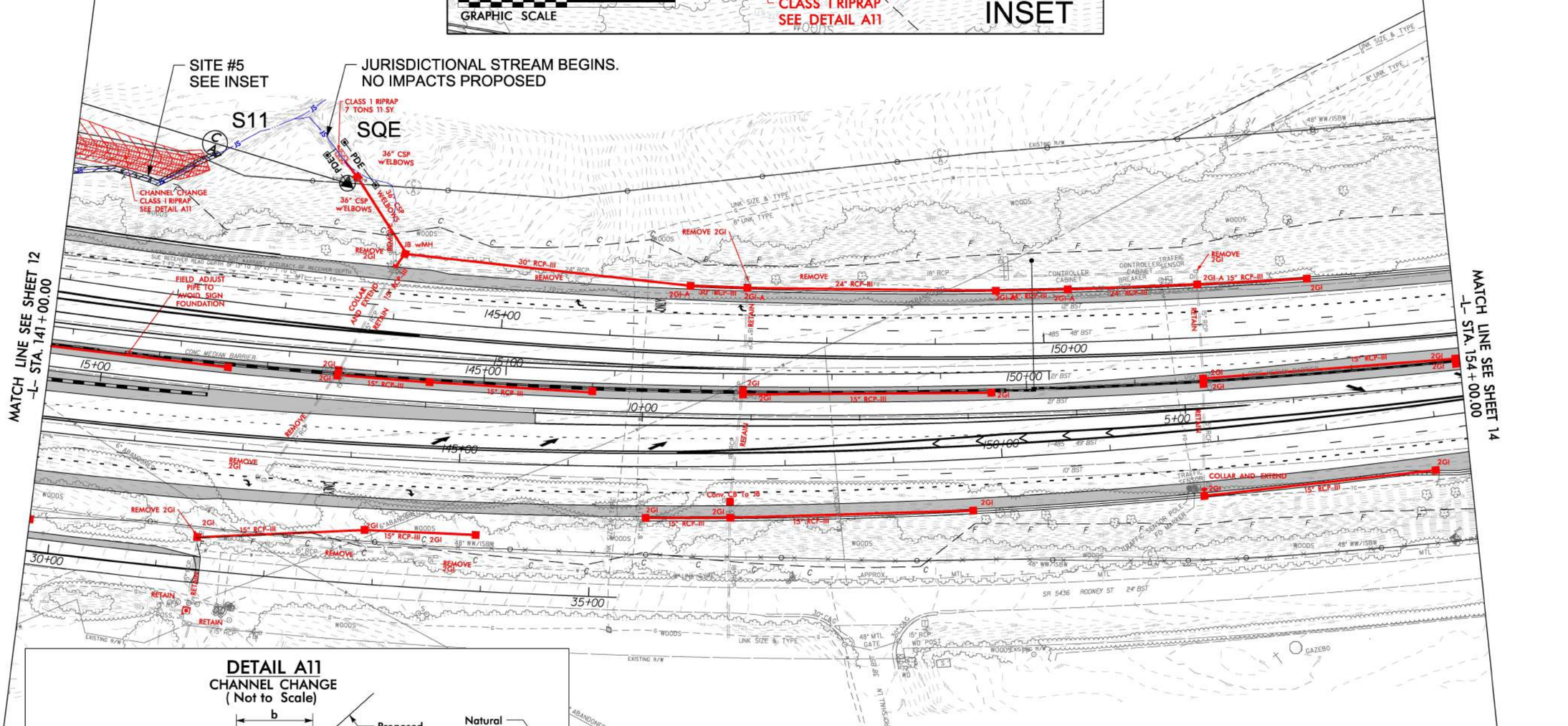
NAD 83/2011

SITE #5 SEE INSET

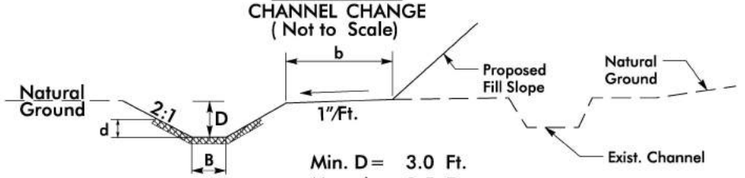
JURISDICTIONAL STREAM BEGINS. NO IMPACTS PROPOSED

MATCH LINE SEE SHEET 12 -L- STA. 141+00.00

MATCH LINE SEE SHEET 14 -L- STA. 154+00.00



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)

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

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 17 OF 115

100 0 100
GRAPHIC SCALE

9/26/2019
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DGN: ncdot2018

8/17/99

REVISIONS

INSET A

RIPRAP AT EMBANKMENT SEE DETAIL A3 CLASS 1 RIPRAP 149 TON 79 SY

JACKING PIT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LATERAL 4FT BASE DITCH SEE DETAIL A5

48" CHL

36" RCP-III

HW

IMPACTS IN SURFACE WATER

ADJUST 2GI

36" EXPRESSWAY CURB

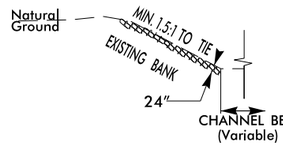
50 0 50

GRAPHIC SCALE

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)

STA. 110+50 RT

NAD 83/2011

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

MATCH LINE SEE SHEET 23 -L- STA. 286+00.00

MATCH LINE SEE SHEET 25 -L- STA. 299+50.00

SITE #6 SEE INSET A

SITE #7 - TEMPORARY SURFACE WATER IMPACT TO BE RESTORED TO PRECONSTRUCTION CONTOURS

SITE #8

SEE SHEET 24A

CONCRETE ENERGY DISSIPATOR SEE DETAIL A4 ON SHEET 24A

BANK STABILIZATION 10 TONS SEE DETAIL A7

RIPRAP AT EMBANKMENT SEE DETAIL A3 CLASS 1 RIPRAP 149 TON 79 SY

JACKING PIT

LATERAL 4FT BASE DITCH SEE DETAIL A5

RECEIVING PIT

RIP RAP AT EMBANKMENT 11 TONS SEE DETAIL A3

S6

SITE #6 SEE INSET B

INSET B

TEMPORARY SURFACE WATER IMPACT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

HW

TRENCH INSTALL 42" WELD

RECEIVING PIT

RIP RAP AT EMBANKMENT 11 TONS SEE DETAIL A3

48" CHL

50 0 50

GRAPHIC SCALE

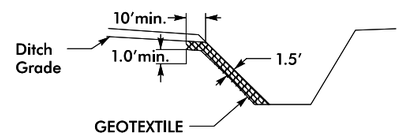
S6

SITE #6 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

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

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 18 OF 115

100 0 100

GRAPHIC SCALE

9/12/2019
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PRPWILCOX

8/17/99

REVISIONS

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

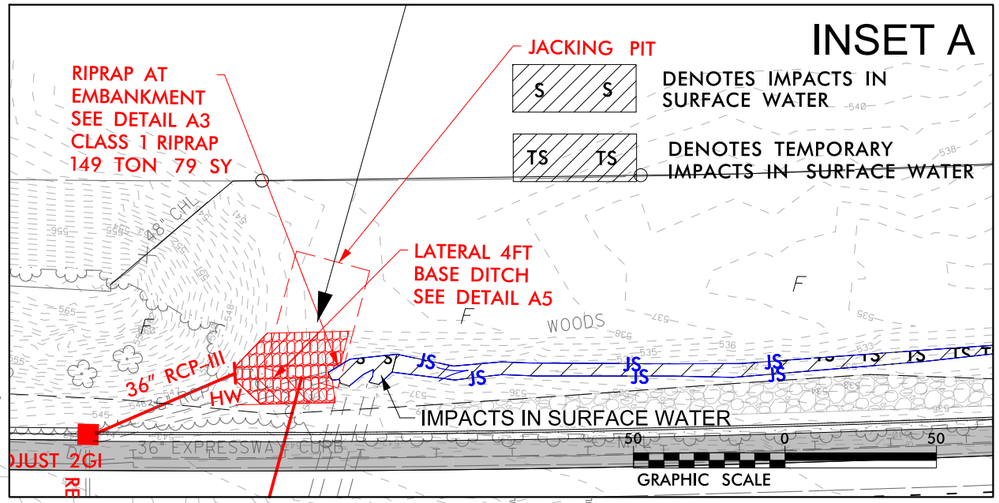
PROJECT REFERENCE NO.	SHEET NO.
I-5507	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

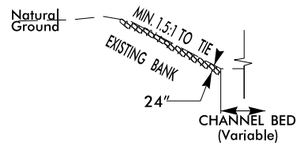
BLYTHE

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)

STA. 110+50 RT

SITE #7 - TEMPORARY SURFACE WATER IMPACT TO BE RESTORED TO PRECONSTRUCTION CONTOURS

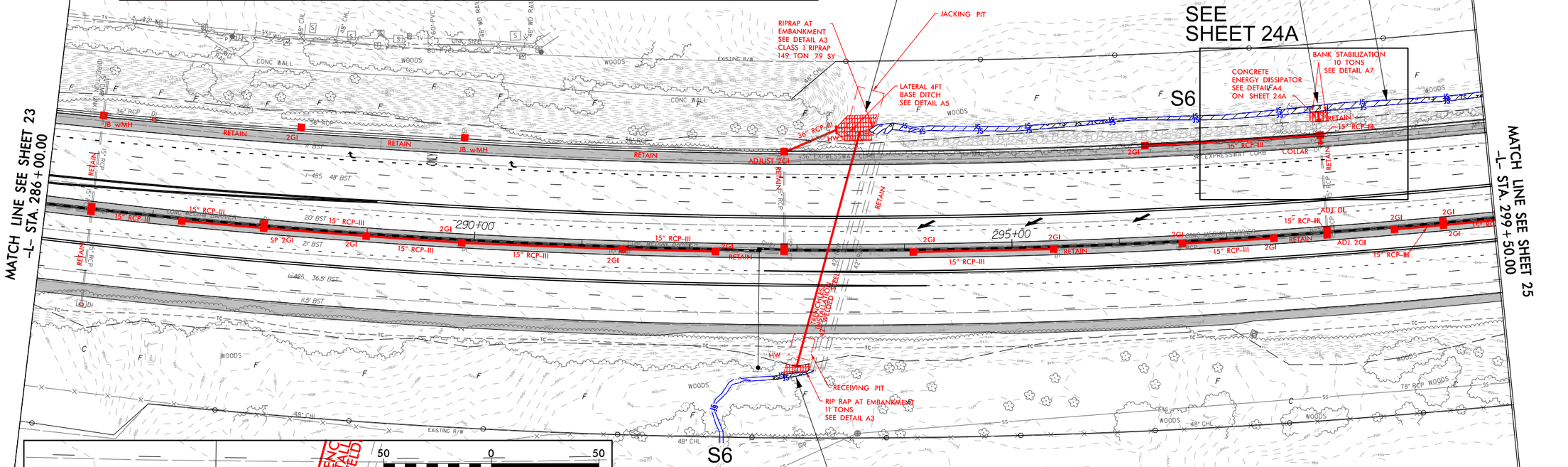
SITE #6 SEE INSET A

SITE #8

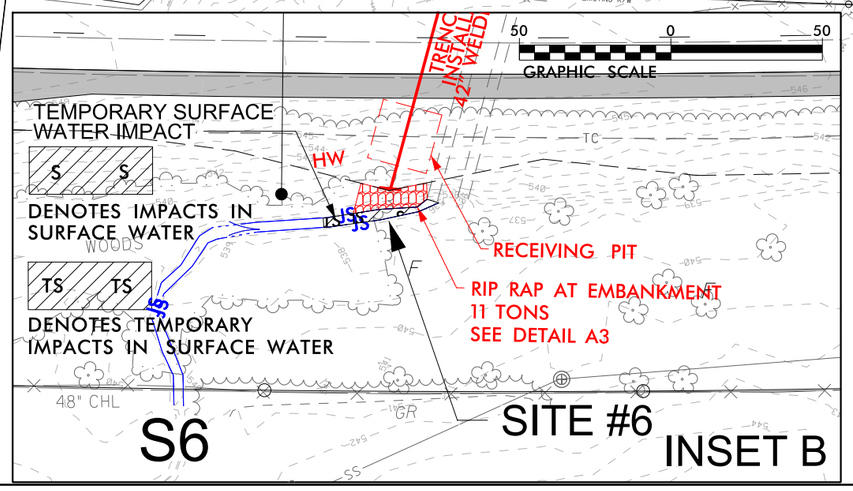
SEE SHEET 24A

MATCH LINE SEE SHEET 23 -L- STA. 286+00.00

MATCH LINE SEE SHEET 25 -L- STA. 299+50.00

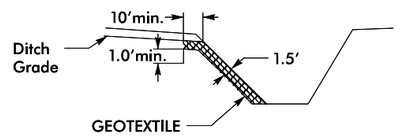


INSET B



SITE #6 SEE 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

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

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

PERMIT DRAWING SHEET 19 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROFILE01$

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE #7

SITE #8

IMPACTS IN WATER SURFACE

CONCRETE ENERGY DISSIPATOR SEE DETAIL A4 ON SHEET 24A

BANK STABILIZATION 10 TONS SEE DETAIL A7

S6

JS JS

TS S

RETAIN

15" RCP–III

15" RCP–III

COLLAR

36" EXPRESSWAY CURB

RETAIN

ADJ. DI

15" RCP–III

2GI

ADJ. 2GI

2GI

CONC MEDIAN BARRIER

15" RCP

15" RCP–III

2GI

15" RCP–III

WOODS

NAD 83/2011

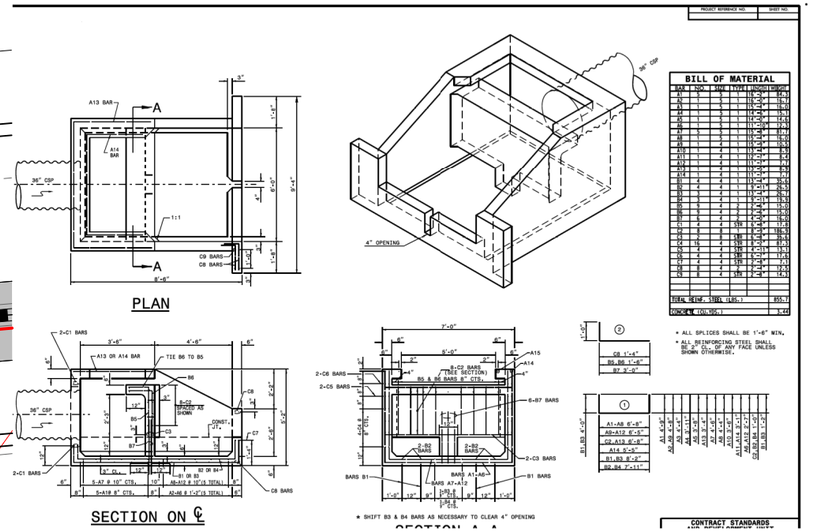
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL A4
ENERGY DISSIPATOR



PERMIT DRAWING SHEET 20 OF 115

25 0 25
GRAPHIC SCALE

9/2/2019
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PSHEET1S1S

8/17/99

REVISIONS

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE #7

SITE #8

IMPACTS IN WATER SURFACE

CONCRETE ENERGY DISSIPATOR SEE DETAIL A4 ON SHEET 24A

BANK STABILIZATION 10 TONS SEE DETAIL A7

S6

RETAIN

15" RCP–III

15" RCP–III

COLLAR

RETAIN

36" EXPRESSWAY CURB

ADJ. DI

15" RCP–III

2GI

2GI

CONC MEDIAN BARRIER

RETAIN

ADJ. 2GI

2GI

15" RCP–III

15" RCP–III

WOODS

NAD 83/2011

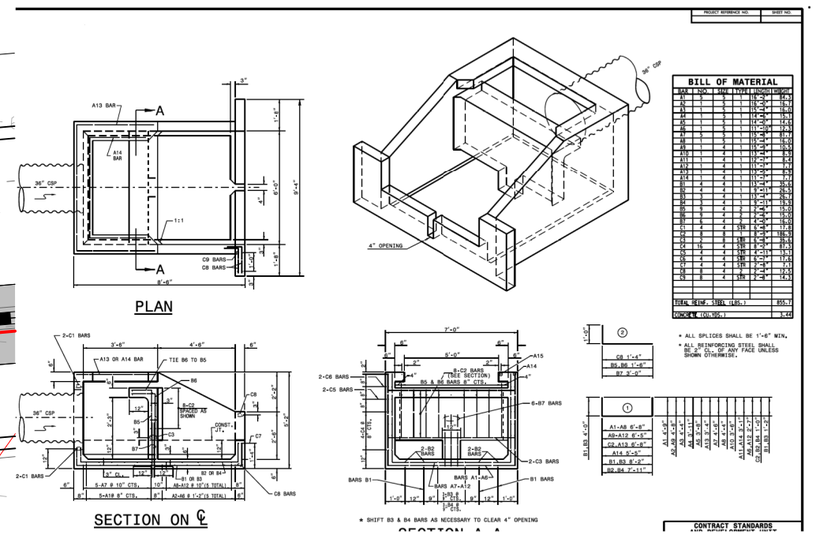
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL A4
ENERGY DISSIPATOR



PERMIT DRAWING
SHEET 21 OF 115

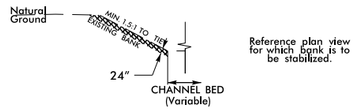
25 0 25
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3084\336401.3961\I5507_Hyd_prm_wet_psh24A_cont.dgn
PROFILE01$

8/17/99

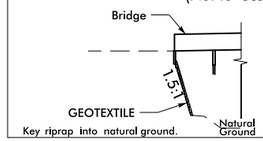
REVISIONS

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

NOTE: SEE PROFILE SHEET 25-1 FOR WSE.

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	25
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

S4
(McMullen Creek)

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

TEMPORARY SURFACE WATER IMPACT

SITE #7

SEE SHEET 24A FOR DETAIL A4, CONCRETE ENERGY DISSIPATOR

SITE #9A

SITE #9B

SITE #10

TEMPORARY WORK BRIDGE (30')

W2b

W2a

S6

S5

W1

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

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

CONCRETE ENERGY DISSIPATOR SEE DETAIL A4

REMOVE 18" RCP

RETAIN

REMOVE 15" RCP-III

REMOVE 2GI

RETAIN 2GI

15" RCP-III

2GI

300+00

305+00

310+00

CL B RIP RAP
2 TONS 7 SY

CLASS II RIP RAP
51 TONS 61 SY

REMOVE 2GI

BANK STABILIZATION SEE DETAIL B16
56 TON

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

ABUTMENT STABILIZATION SEE DETAIL B17
87 TON 88 SY

BANK STABILIZATION SEE DETAIL B16
58 TON

REMOVE CB

REMOVE 2GI

RETAIN 15" RCP

RETAIN 18" RCP

RETAIN 24" RCP

WOODS

48" CHL

EXISTING R/W

UNK SIZE & TYPE

MCMULLEN CREEK

I-485 48" BST

I-485 36" BST

I-485 21.5' BST

I-485 19' BST

BRIDGE COMPANY COLUMNS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 22 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROJECTS$

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	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

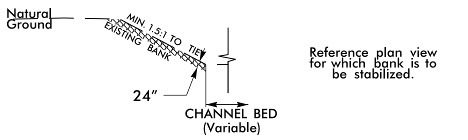
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL B16

BANK STABILIZATION

(Not to Scale)

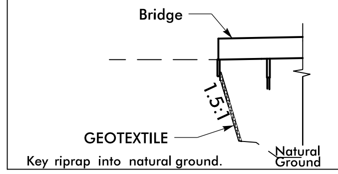


Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap (Keyed in)

DETAIL B17

ABUTMENT STABILIZATION
(Not to Scale)

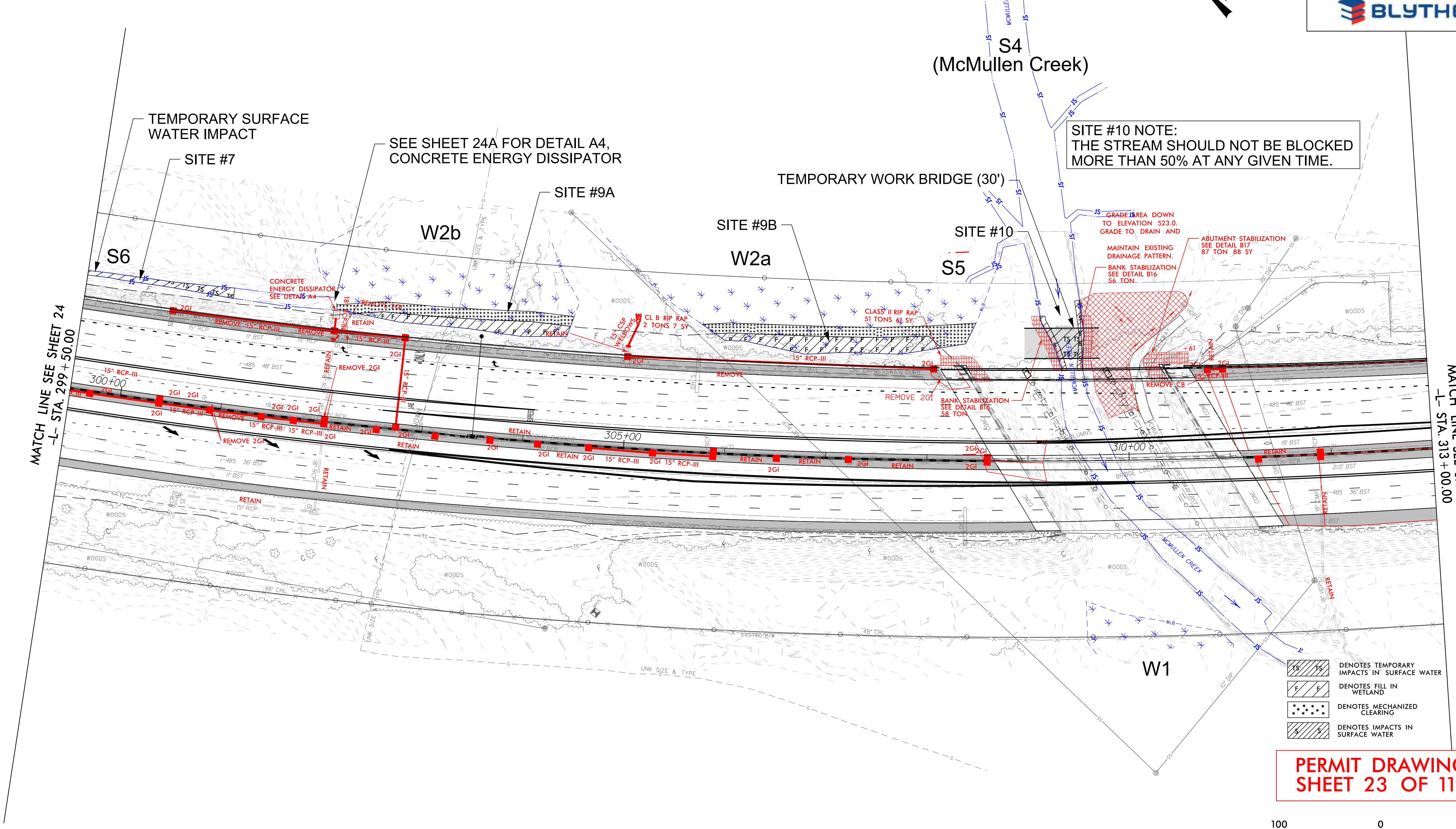


Key riprap into natural ground.

Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap

NOTE: SEE PROFILE SHEET 25-1 FOR WSE.



NAD 83/2011

▨ 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

100 0 100
GRAPHIC SCALE

9/12/2019
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PRDPWICS01$

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

NOTE: PROFILE REPRESENTS PROPOSED BRIDGE EXTENSION AT THE UPSTREAM END

BEGIN GRADE
TIE TO EXIST APPROACH SLAB
–L– (WB) STA. 310+96.35
EL. 540.55'

END GRADE
TIE TO EXIST APPROACH SLAB
–L– (WB) STA. 308+48.23
EL. 539.68'

BRIDGE AT STATION –L– 310+00
EXTENSION AT UPSTREAM FACE
CL OF EXTENSION 309+35.79 –L–
60° SKEW

PI = 307+95.00
EL = 539.45'
VC = 100'
K = 696
DS > 80 MPH

PI = 311+50.00
EL = 540.61'
VC = 100'
K = 528
DS > 80 MPH

END GRADE
BEGIN RESURFACING ONLY
–L– STA. 315+04.69
EL. 541.67'
35' LT

Q 100 EL = 529.5'

Q 100 EL = 530.1'

(+)0.3000% (+)0.4436%

(+)0.1105% (+)0.3000%

PROPOSED GRADE

EXISTING GRADE

EXISTING GROUND

NATURAL GROUND RT

EXISTING GROUND

EXISTING LOW STEEL
EL =532.7'

NATURAL GROUND LT

PROPOSED LOW STEEL
EL=532.5'

SPILL THROUGH ABUTMENTS (TYP)

CLASS II RIP RAP (TYP)
KEY IN 3.5'

EXCAVATE TO ELEV 526'
150 CU.YD.

MCMULLEN CREEK

7.5:1

7.5:1

W.S.E (10–31–2018)
ELEV = 520.5

EXISTING LOW STEEL
EL=533.6'

PROPOSED LOW STEEL
EL=533.3'

2.5' ABUTMENT CAP (TYP)

EXCAVATE TO ELEV 523'
425 CU.YD

100 YR THEORETICAL SCOUR

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

580 570 560 550 540 530 520 510 500 490

305+00 306+00 307+00 308+00 309+00 310+00 311+00 312+00 313+00 314+00 315+00 316+00 317+00 318+00 319+00

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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6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	25-2

WETLAND (W2b)
SITE #9

536.34
538.26
43.50
0.038
0.038
2:1

304+00.00

WETLAND (W2b)
SITE #9

536.04
537.96
43.50
0.038
0.038
2:1

303+00.00

535.83
537.75
43.50
0.038
0.038
1.5:1

302+00.00

PERMIT DRAWING
SHEET 25 OF 115

GRAPHIC SCALE

9/12/2019
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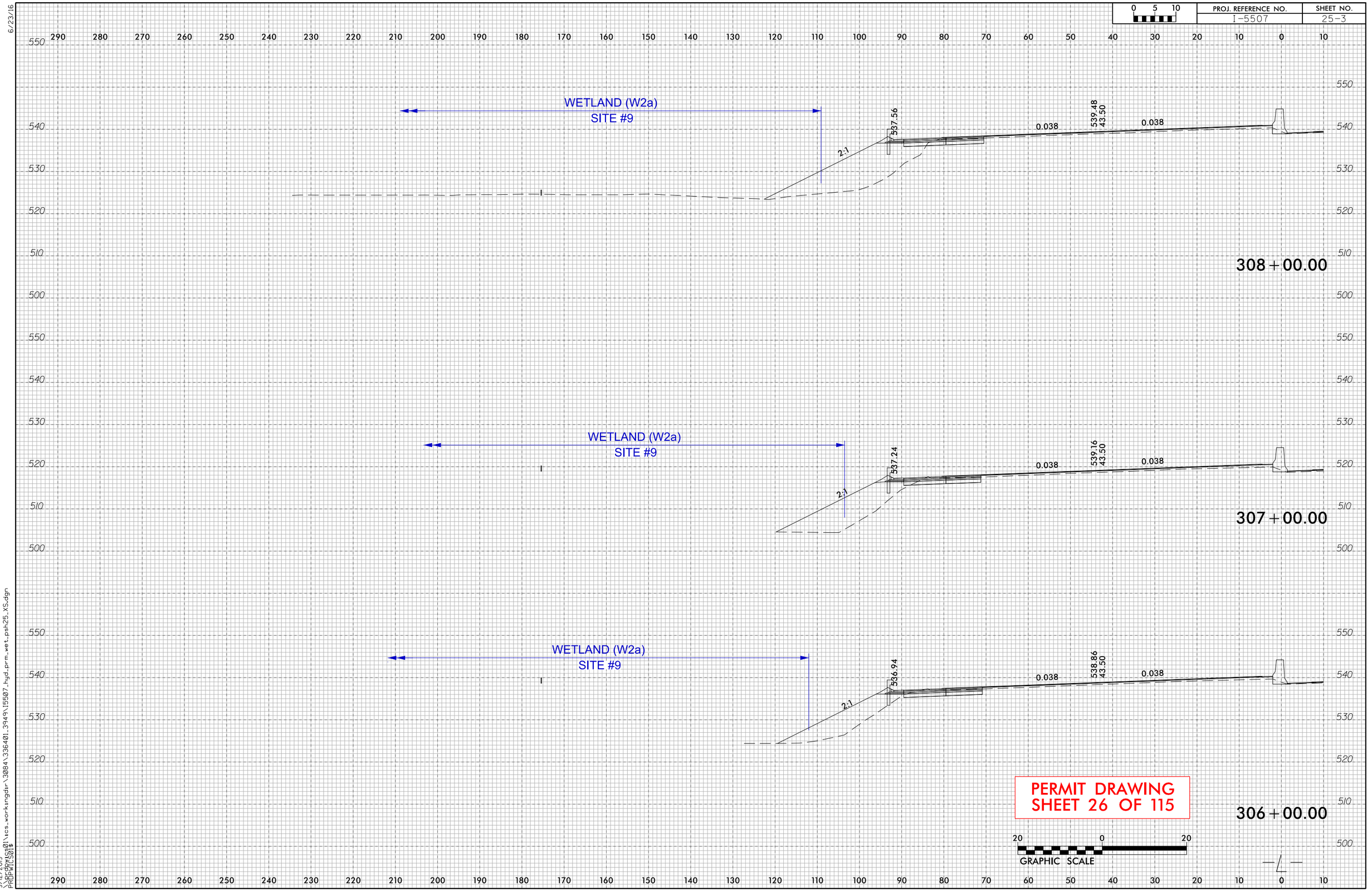
PRDPWICS01$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	25-3



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PRDPWILCS01$

8/17/99

REVISIONS

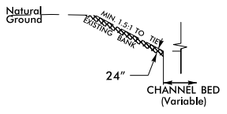
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

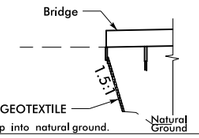
DETAIL B16
BANK STABILIZATION
(Not to Scale)



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)



Key riprap into natural ground.

Reference plan view for which bank is to be stabilized.

Type of Liner = Class II Riprap

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

S3
(McAlpine Creek)

TEMPORARY
WORK BRIDGE (30')

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)

WX

WY

PERMIT DRAWING
SHEET 27 OF 115

100 0 100
GRAPHIC SCALE

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

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8/17/99

REVISIONS

9/12/2019
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PROFILES

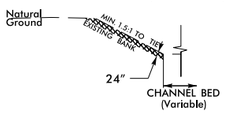
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

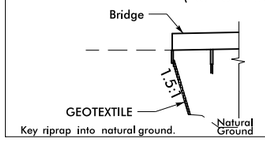
DETAIL B16
BANK STABILIZATION
(Not to Scale)



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

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)

WX

WY

PDE

POND

BIRD HOUSE (BLUEBIRD)

PUMP HOUSE

Duke Energy Progress capacity unknown

50' DUKE ENERGY RIGHT OF WAY DB 1487 PG 403 AND DB 1487 PG 386

50' CMUD SANITARY SEWER EASEMENT

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

PERMIT DRAWING SHEET 28 OF 115

100 0 100
GRAPHIC SCALE

5/28/99

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

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%
(+)0.3096%
(+)0.3067%
(+)0.7062%

STA. 343+53 –L–
STA. 343+44 –L3_WEST–
6 1@80' 7-3/4", 1@79' 8-1/4", 1@79' 8-3/4", 1@80' 9-1/4"
I 45° PRESTRESSED CONCRETE GIRDERS W\ 2.5" CAPS
110° SKEW
ELEV. 548.87

PROPOSED GRADE
EXISTING GRADE
EXISTING GROUND
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'
NORMAL WSEL = 521.1'

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

McALPINE CREEK

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

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

–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

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

(–)0.3000%
(+)0.3000%
(+)0.3018%
(–)0.5717%

STA. 343+53 –L–
STA. 343+72 –L3_EAST–
6 1@79' 6-3/4", 1@78' 7-3/8", 1@78' 8", 1@79' 8-7/8"
I 45° PRESTRESSED CONCRETE GIRDERS W\ 2.5" CAPS
110° SKEW
ELEV. 553.87

PROPOSED GRADE
EXISTING GRADE
EXISTING GROUND
LOWEST STEEL
EXISTING LOW STEEL
NATURAL GROUND RT
NORMAL WSEL = 529.1'
100 YR WSEL = 536.1'
50 YR WSEL = 534.6'

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

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

PERMIT DRAWING SHEET 29 OF 115

100 0 100
GRAPHIC SCALE (HORIZONTAL)

20 0 20
GRAPHIC SCALE (VERTICAL)

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

9/12/2019
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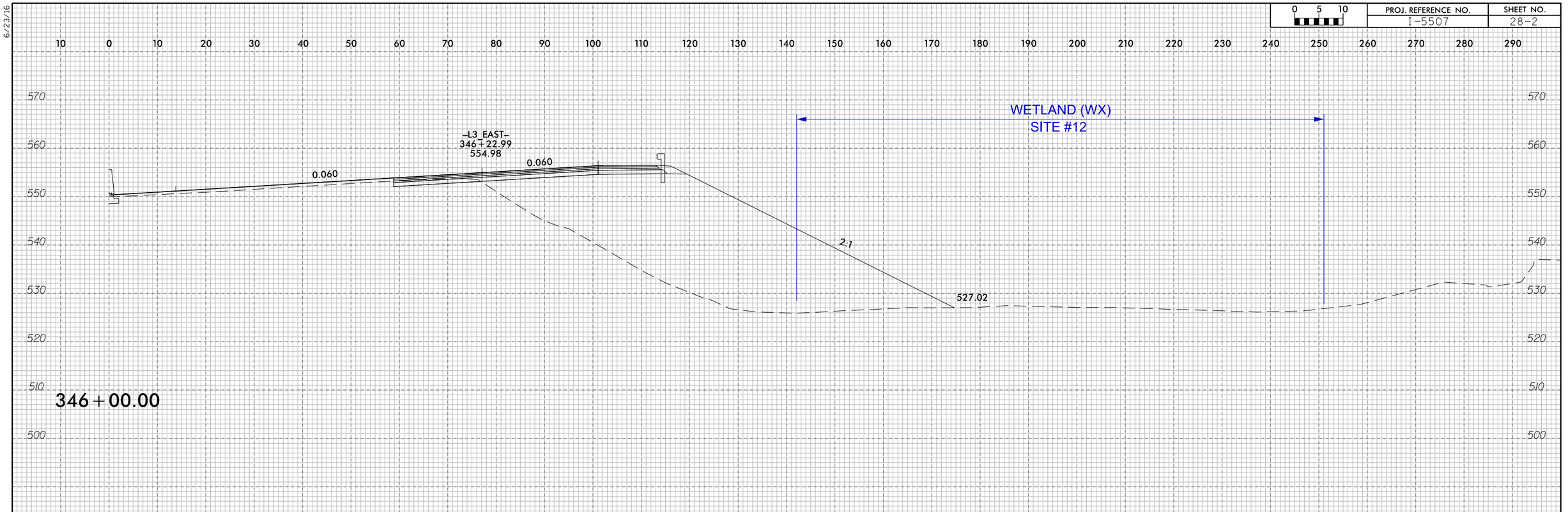
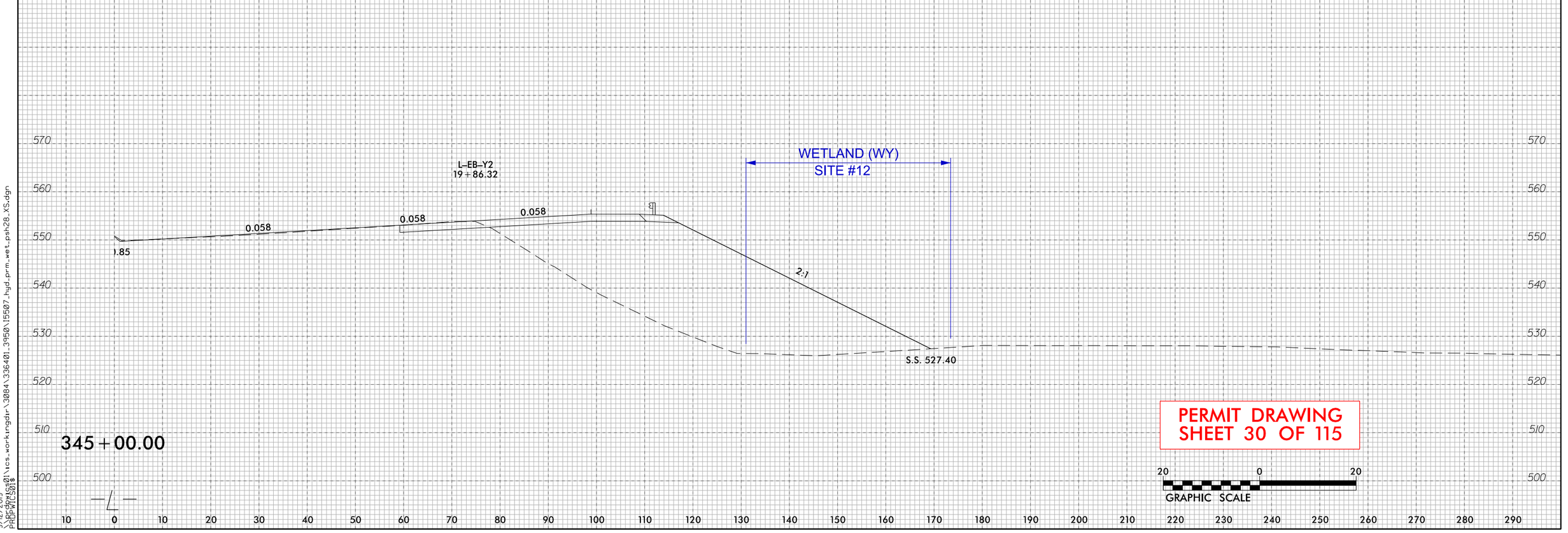
PDF WICSOS

6/23/16

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





PERMIT DRAWING
SHEET 30 OF 115

20 0 20
GRAPHIC SCALE

9/12/2019
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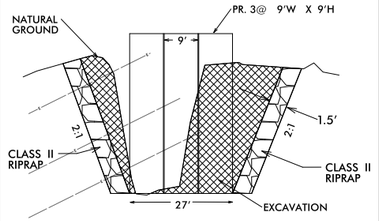
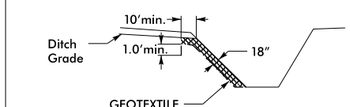
DETAIL B24
INLET CHANNEL
(Not to Scale)

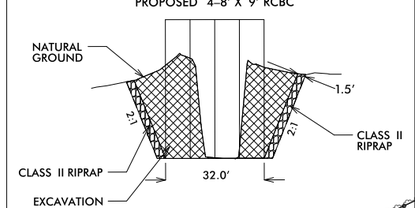


DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



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

DETAIL B25
INLET CHANNEL
(Not to Scale)



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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

NAD 83/2011

SEE SHEET 29A

–L– STA. 360+00

–L– STA. 364+22

SITE #13

SITE #15

S2

S1

SEE SHEET 29B

SITE #13

SITE #14
SEE INSET

SITE #15

S1

S2

SEE SHEET 29B

WC(2)

INSET

WC(2)

SITE #14

DENOTES FILL IN WETLAND

TOE PROTECTION SEE DETAIL B1

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.

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 –L– STA. 22+00.00

MATCH LINE SEE SHEET 72 –Y2– STA. 25+66.00

MATCH LINE SEE SHEET 72 –Y2RPDB– STA. 36+60.00

A

B

C

D

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

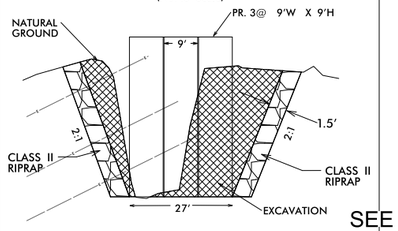
PERMIT DRAWING
SHEET 31 OF 115

GRAPHIC SCALE
100 0 100

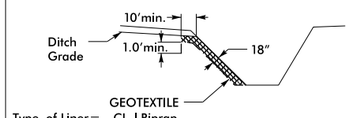
GRAPHIC SCALE
50 25 0 50 100
PLANS

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

DETAIL B24
INLET CHANNEL
(Not to Scale)



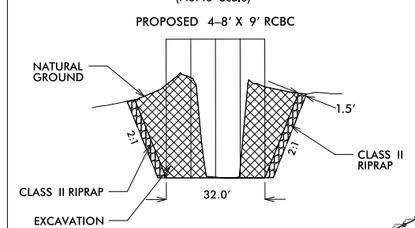
DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap

Key riprap into natural ground.

DETAIL B25
INLET CHANNEL
(Not to Scale)



SEE SHEET 29A

–L– STA. 360+00

–L– STA. 364+22

SITE #13

SITE #15

S2

S1

WC(2)

SITE #14
SEE INSET

SITE #13

SITE #15

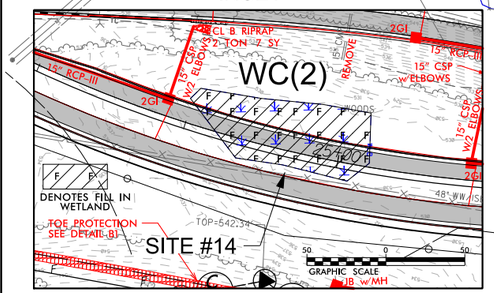
S1

S2

SEE SHEET 29B

SEE SHEET 29B

INSET



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.

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
–L– STA. 22+00.00

MATCH LINE SEE SHEET 72
–Y2– STA. 25+66.00

MATCH LINE SEE SHEET 72
–Y2RPDB– STA. 36+60.00

A

B

C

D

NAD 83/2011

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 32 OF 115

GRAPHIC SCALE
100 0 100

GRAPHIC SCALE
50 25 0 50 100
PLANS

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

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

REVISIONS

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	29A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

SITE #13

SITE #15

S2

S1

JS

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

TAIL
W/CI
SEE

48" WW/ISBW

42" CSP w/ELBOWS

TRENCHLESS INSTALLATION 42" WELDED STEEL

JB w/MH

WOODS

POWER MARKER

36" EXPRESSWAY CURB

15" CMP RETAIN

Adj 2GI

15+00

GTD

2GI-D

15" RCP-III

2GI

Dec

JB

VARIABLE BST

I-485 BST

REMOVE

REMOVE CB

REMOVE 2GI

360+00

9'W x 5'H TRIPLE BARREL BOX CULVERT

18" RCP-III

REMOVE 2GI

REMOVE

15" RCP-III

2GI

CL B RIPRAP
2 TON 6 SY

CL B RIPRAP

20+00

25+00

CONC MEDIAN BARRIER

SPECIAL CUT DITCH

PERMIT DRAWING
SHEET 33 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3084\336401_3958\16507_Hyd_prm_wet_psh29A.dgn
PROWICS01$

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29A
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

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

SITE #13

SITE #15

S2

S1

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

TAIL
W/CL
SEE

48" WW/ISBW

42" CSP w/ELBOWS

JB w/MH

TRENCHLESS INSTALLATION 42" WELDED STEEL

RETAIN

WOODS

POWER MARKER

36" EXPRESSWAY CURB

Adj 2GI

15+00

GTD

2GI-D

15" RCP-III

2GI

JB

Dec

REMOVE

REMOVE 2GI

REMOVE CB

VARIABLE BST

I-485 BST

360+00

9'-0" X 9'-0" TRIPLE BARREL BOX CULVERT

18" RCP-III

REMOVE 2GI 15" RCP-III

CL B RIPRAP
2 TON 6 SY

CL B RIPRAP

20+00

25+00

CONC MEDIAN BARRIER

SPECIAL CUT DITCH

PERMIT DRAWING
SHEET 34 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3084\336401.3962\15507_Hyd_prm_wet_psh29A_cont.dgn
PROJECT\$\$

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

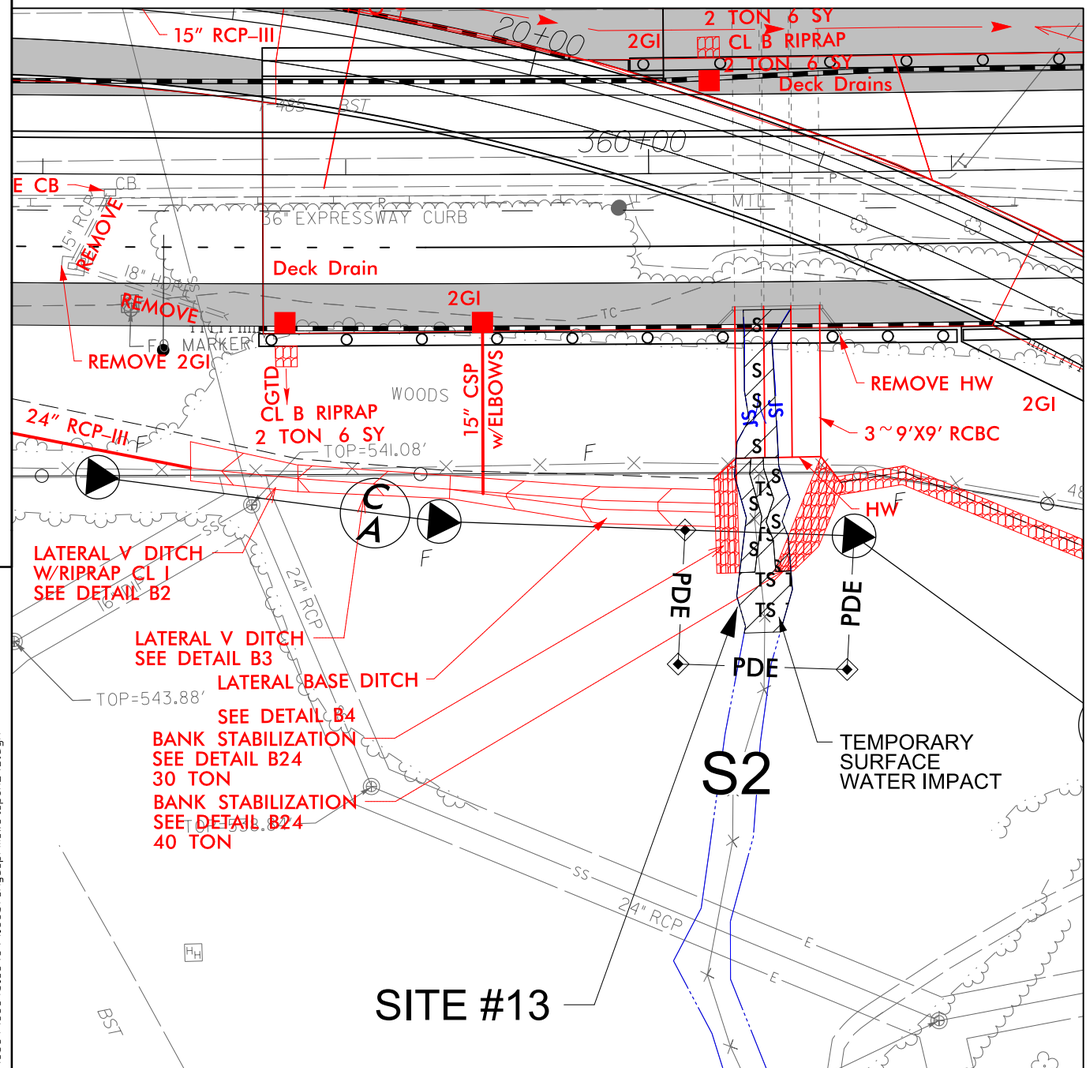
NAD 83/2011

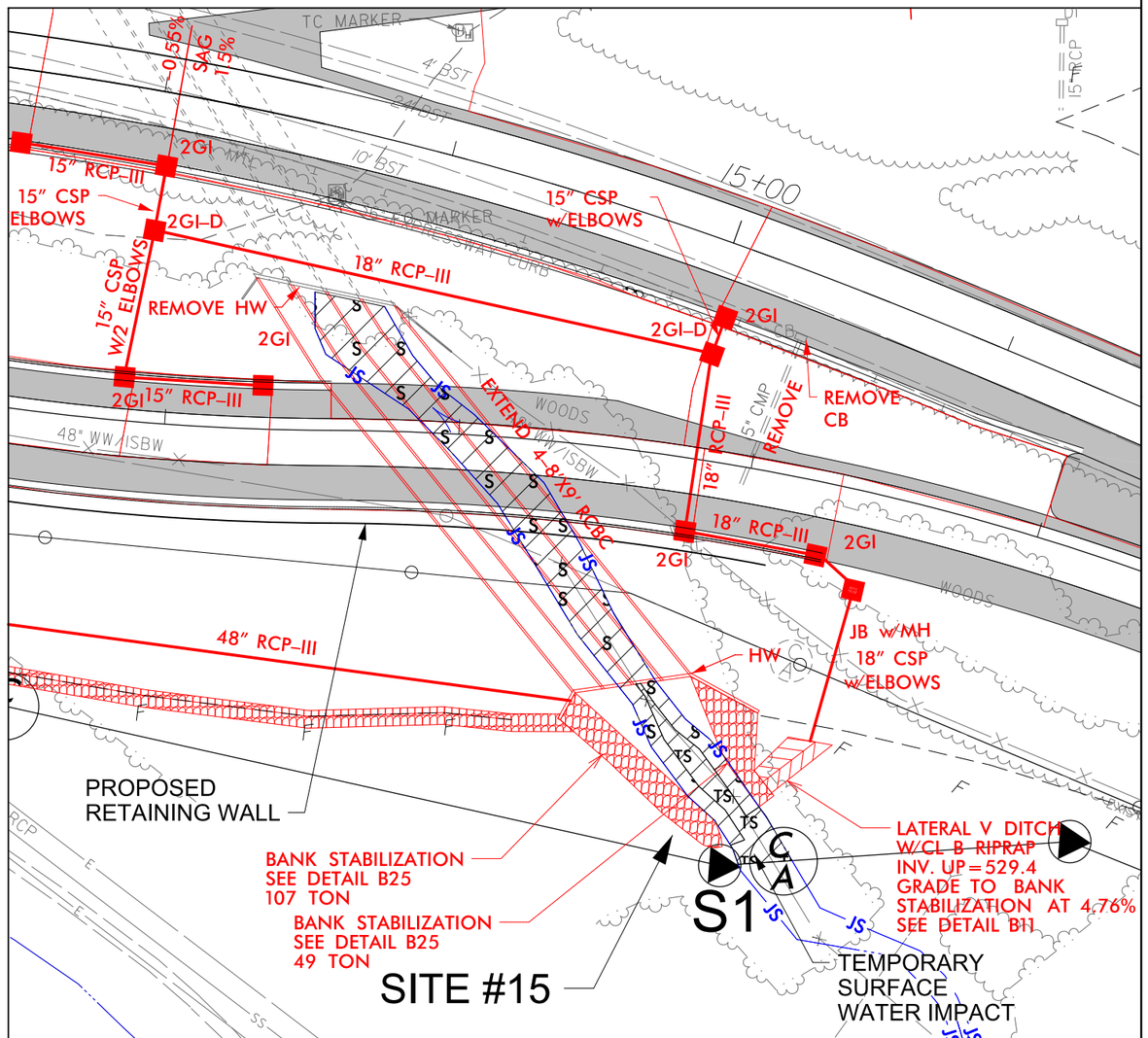
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	29B
RW 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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RHOPKINS01$

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

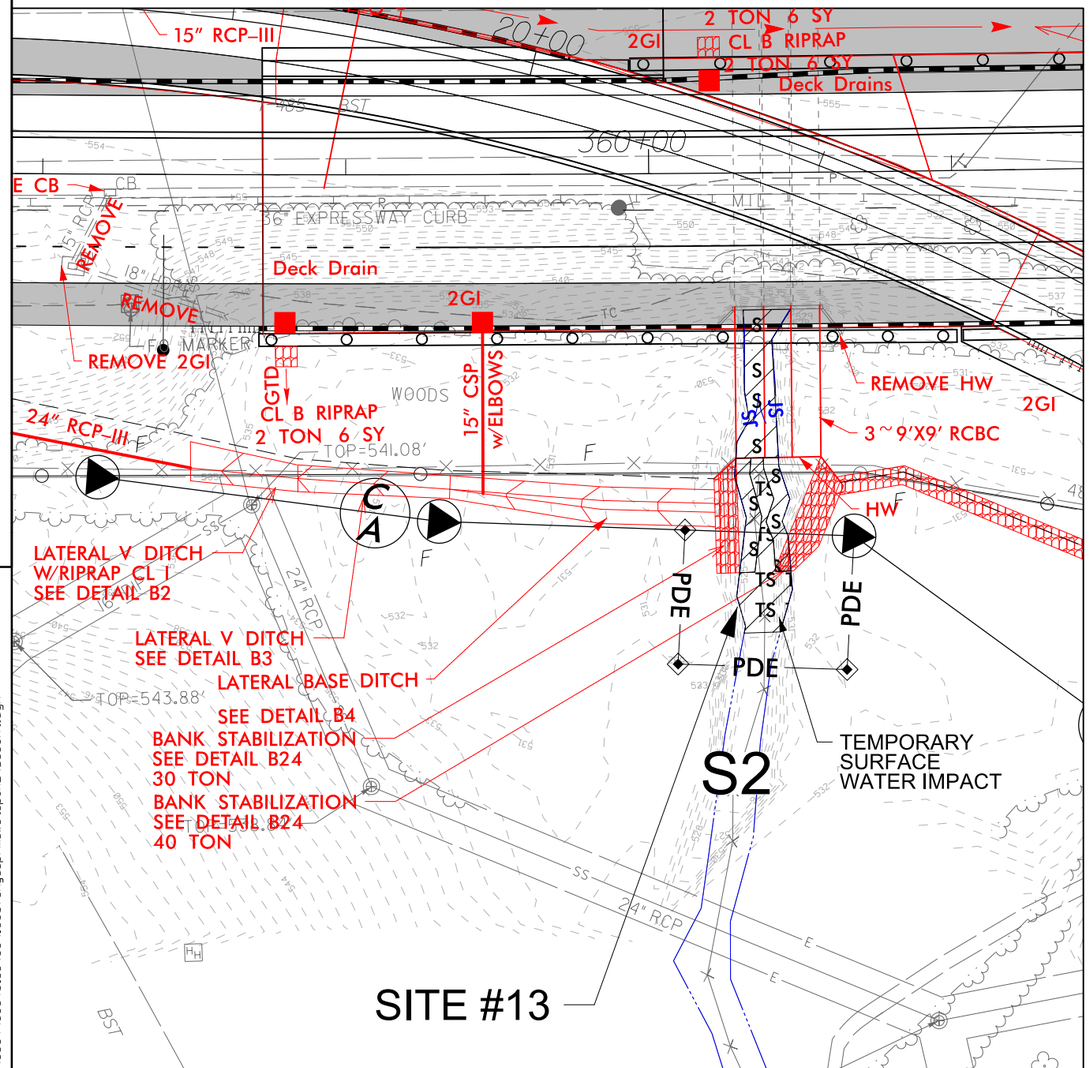
NAD 83/2011

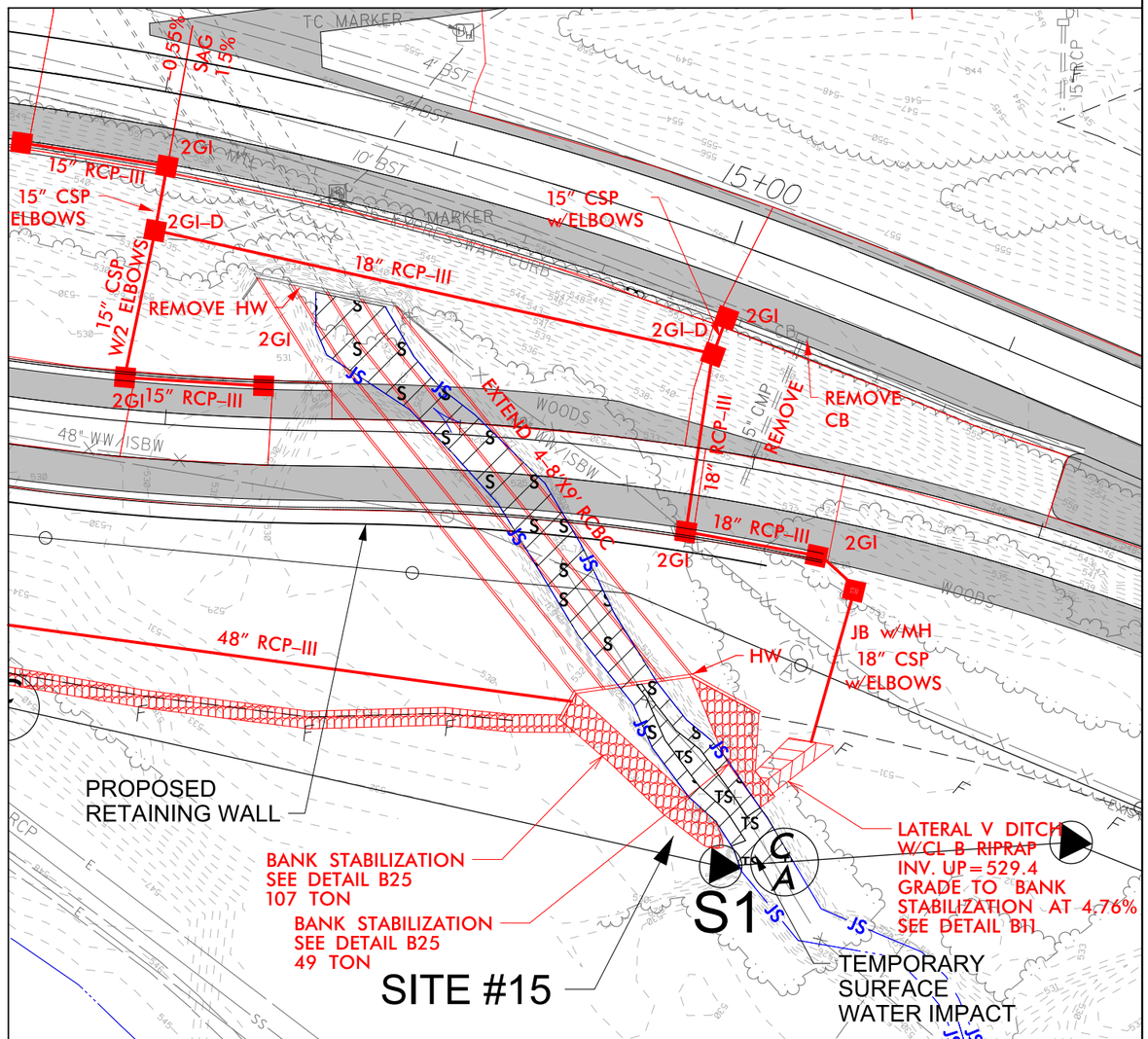
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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
\\rdcprojects01\ics_workingdir\3084\336401.3963\i5507_Hyd_prm_wet_psh29B_cont.dgn
RUPPW1CS01$

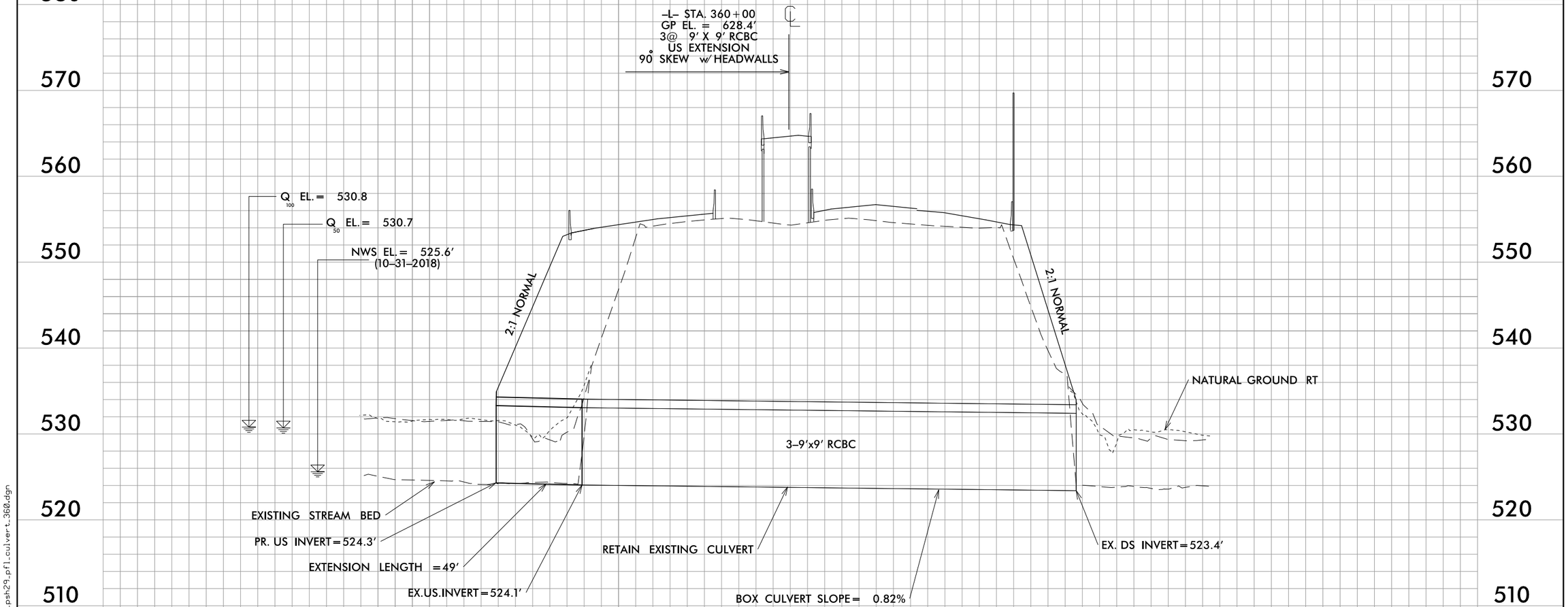
5/28/99

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



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)

9/12/2019
\\Prodpwtcs01\tcs_workingdir\3084\336401.3946\i5507_Hyd_prm_wet_psh29_pfl_culvert_360.dgn
PDPWTCS01$

5/28/99

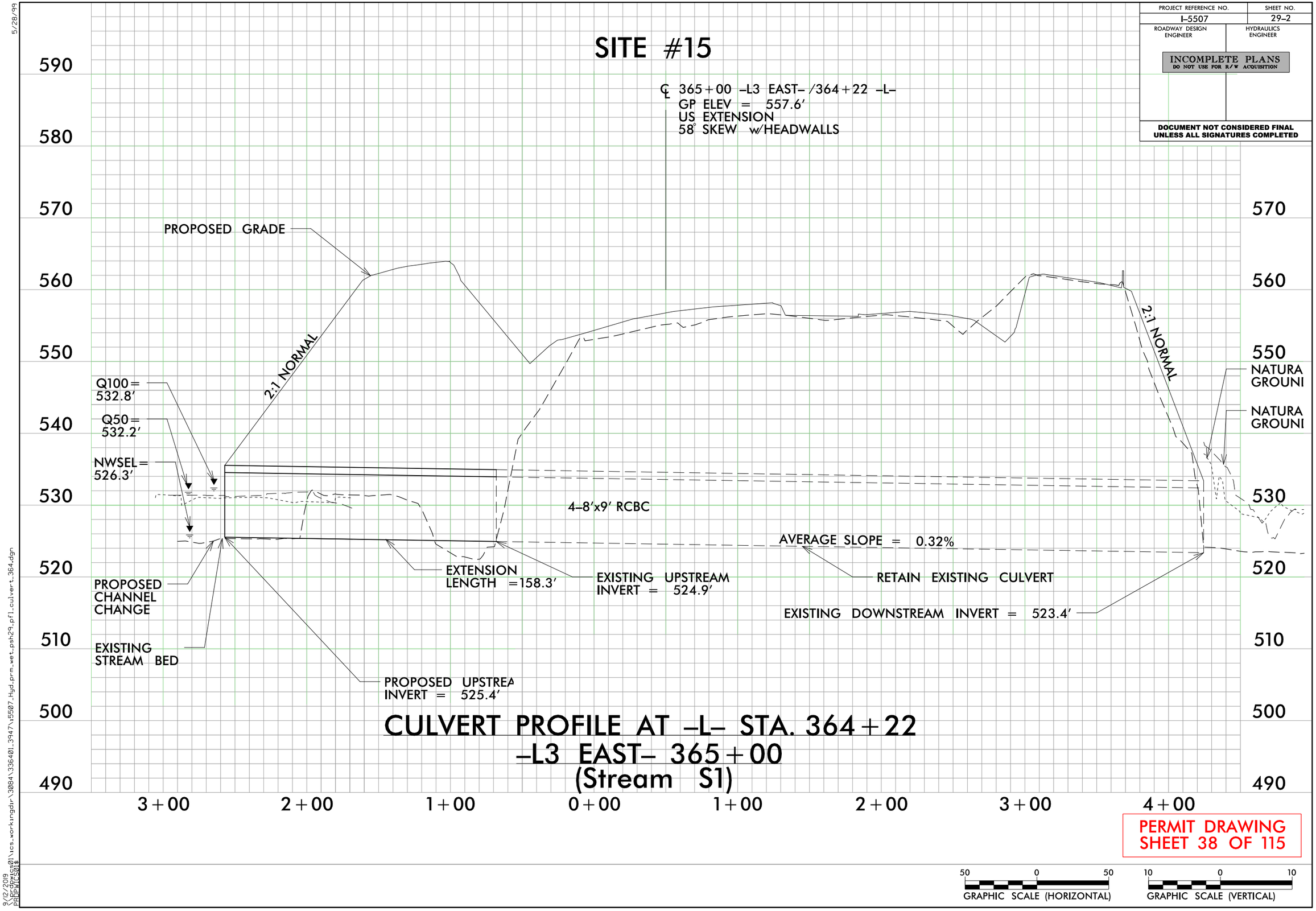
PROJECT REFERENCE NO.	SHEET NO.
I–5507	29–2
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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
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PDPWTCS01$

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	29-3

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

580 570 560 550 540 530 520

573.16 0.060 0.060 0.010 574.82

3.317:1

SEE –L– CROSS SECTIONS FOR DESIGN

S.P. 554.71

WETLAND (WC(2))
SITE #14

24+50.00

580 570 560 550 540 530 520

575.23 0.060 0.060 0.010 576.89

2.563:1

SEE –L– CROSS SECTIONS FOR DESIGN

S.P. 555.20

WETLAND (WC(2))
SITE #14

24+00.00

PERMIT DRAWING
SHEET 39 OF 115

20 0 20
GRAPHIC SCALE

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

9/12/2019
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PROFWICS01$

—Y2DCC—

8/17/99

REVISIONS

TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S
DENOTES IMPACTS IN SURFACE WATER

INSET

LINE W/CL 1 RIPRAP
42 TON 56 SY

TEMPORARY SURFACE WATER IMPACT

IMPACTS IN SURFACE WATER

RIPRAP AT EMBANKMENT
SEE DETAIL B15

SITE #15A

S1

50 0 50
GRAPHIC SCALE

36" WW/ISBW

CL 3

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	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

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

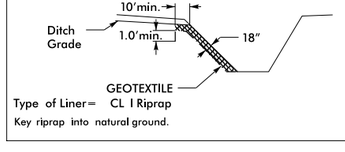
20+00 15+00 25+00 30+00 385+00 390+00 395+00

WOODS

48" EXPRESSWAY CURB

36" RCP-III
REMOVE 2GI
COLLAR AND EXTEND
RETAIN 2GI-D
REMOVE 2GI
2GI-D
GTD
18" RCP-III
REMOVE 18" RCP
18" RCP-III (Construct on 1180' radius)
18" RCP-III (Construct on 1050' radius)
2GI
2GI-A
24" RCP-III
CL B RIPRAP
5 TON 14 SY
CONV TO 2GI-SP
2GI-SP
REMOVE CB (2)
284 LF 54" CMP
36" WW/ISBW EXISTING R/W
36" DI
I-485

DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



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

100 0 100
GRAPHIC SCALE

PERMIT DRAWING
SHEET 40 OF 115

9/12/2019
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PROFILE01$

8/17/99

REVISIONS

TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S
DENOTES IMPACTS IN SURFACE WATER

INSET

LINE W/CL I RIPRAP
42 TON 56 SY

IMPACTS IN SURFACE WATER

RIPRAP AT EMBANKMENT
SEE DETAIL B15

TEMPORARY SURFACE WATER IMPACT

S1

SITE #15A

50 0 50
GRAPHIC SCALE

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

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

20+00 15+00 385+00 390+00 395+00 25+00 30+00

RETAIN 24" RCP 15" RCP 18" RCP 36" RCP 48" RCP 60" RCP

CONV. TO 2GI-SP REMOVE 2GI COLLAR AND EXTEND REMOVE 2GI-D REMOVE CB (2)

36" RCP-III 18" RCP-III (Construct on 1180' radius) (Construct on 1050' radius)

2GI 2GI-A 2GI-D 2GI-SP

CL B RIPRAP
5 TON 14 SY

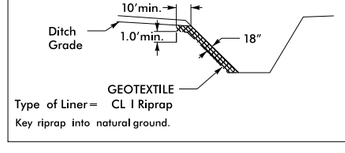
LINE W/CL I RIPRAP
42 TON 56 SY

RIPRAP AT EMBANKMENT
SEE DETAIL B15

S1

SITE #15A
SEE INSET

DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



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

100 0 100
GRAPHIC SCALE

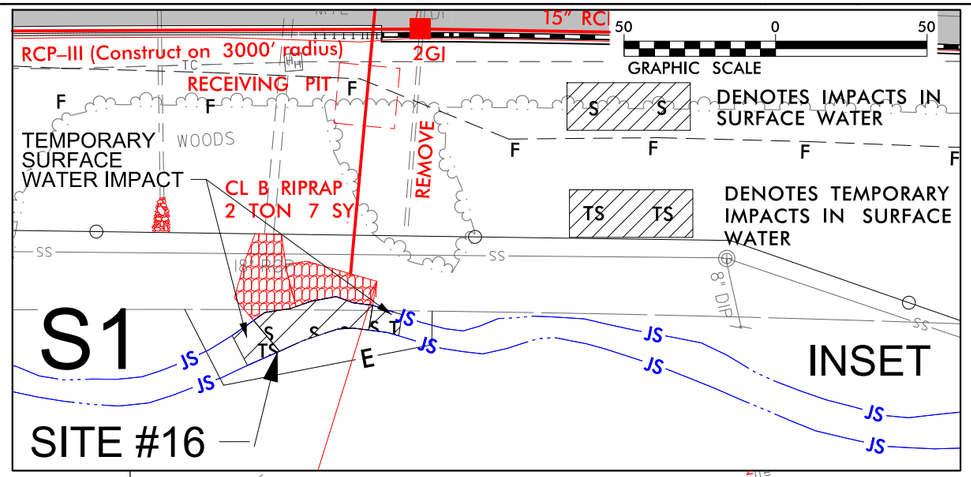
PERMIT DRAWING
SHEET 41 OF 115

WOODS F C TC GR DI MTL BFD 36"DI 48" WW/ISBW 48" EXPRESSWAY CURB I-485

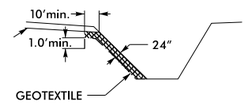
9/12/2019
C:\Projects01\ics_workingdir\3086\336401.3978\i5507_Hyd_prm_wet_psh30_cont.dgn
PRPWICS01$

8/17/99

REVISIONS



DETAIL B21
RIPRAP AT EMBANKMENT
(Not to Scale)



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

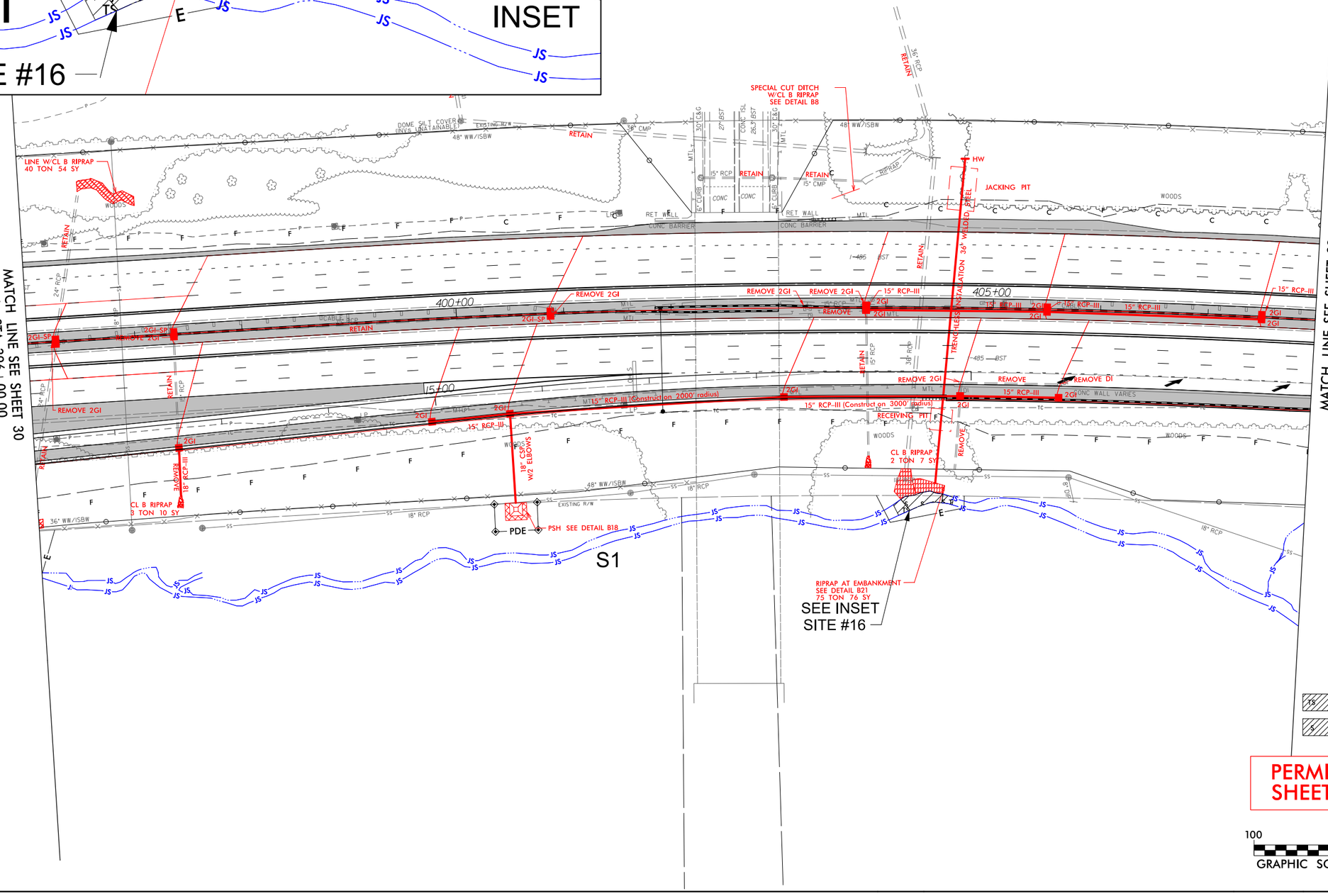
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

NAD 83/2011

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE



DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 42 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROPWTCSOS

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

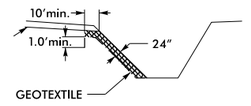
BLYTHE

8/17/99

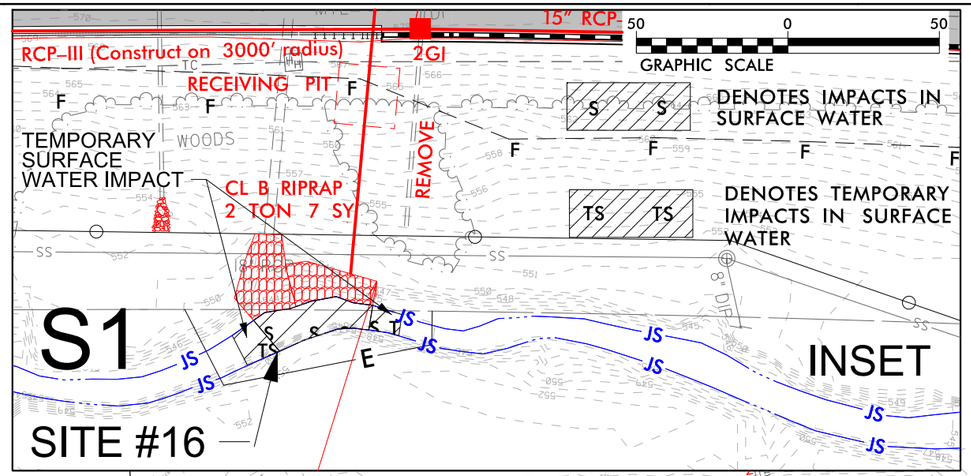
REVISIONS

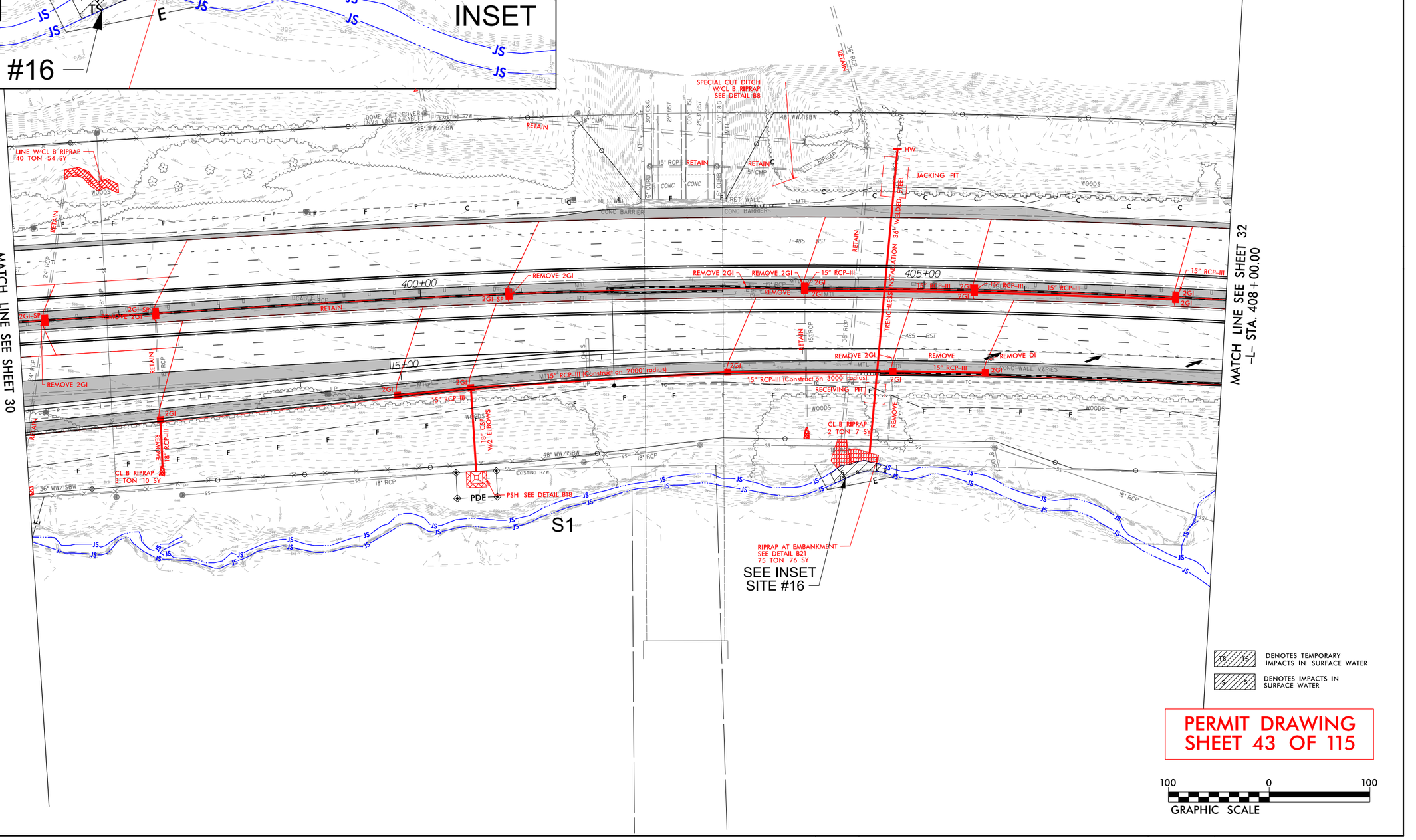
NAD 83/2011

DETAIL B21
RIPRAP AT EMBANKMENT
(Not to Scale)



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





PERMIT DRAWING
SHEET 43 OF 115

9/12/2019
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PROFICIS05

8/17/99

REVISIONS

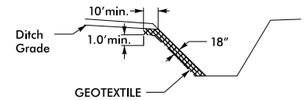
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



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

SC

S1

SB

SC

WE

LINE W/CL B RIPRAP 15 TON 20 SY

48" WW/ISBW

WOODS

CONC WALL

CONC WALL VARIES

RIPRAP

EXISTING R/W

48" MTL PICKET

15" RCP RETAIN

36" RCP RETAIN

ABAND

MTL

I-485 48.5' BST

I-485 36' BST

I-485 36.5' BST

12' BST

11' BST

12.5' BST

410+00

415+00

420+00

15" RCP-III

REMOVE 2GI

2GI

18" RCP-III

15" RCP-III (Construct on 450' radius)

36" RCP-III

2GI SP

COLLAR AND EXTEND

Adj. 2GI

RETAIN 15" RCP

RETAIN 36" RCP

RETAIN 15" CMP

12" PVC

12" TCP

12" RCP

LINE W/CL I RIPRAP 29 TON 41 SY

RIPRAP AT EMBANKMENT SEE DETAIL B15 9 TON 13 SY

SITE #17 SEE INSET

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

INSET

TEMPORARY SURFACE WATER IMPACT

GRAPHIC SCALE 50 0 50

GRAPHIC SCALE 100 0 100

PERMIT DRAWING SHEET 44 OF 115

9/12/2019
C:\Projects\01\ics_workgdir\3086\336401.3967\i5507_Hyd_prm_wet_psh32.dgn
PROJECT\$01\$

8/17/99

REVISIONS

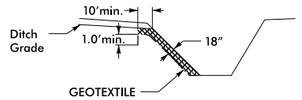
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I-5507	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL B15
RIPRAP AT EMBANKMENT
(Not to Scale)



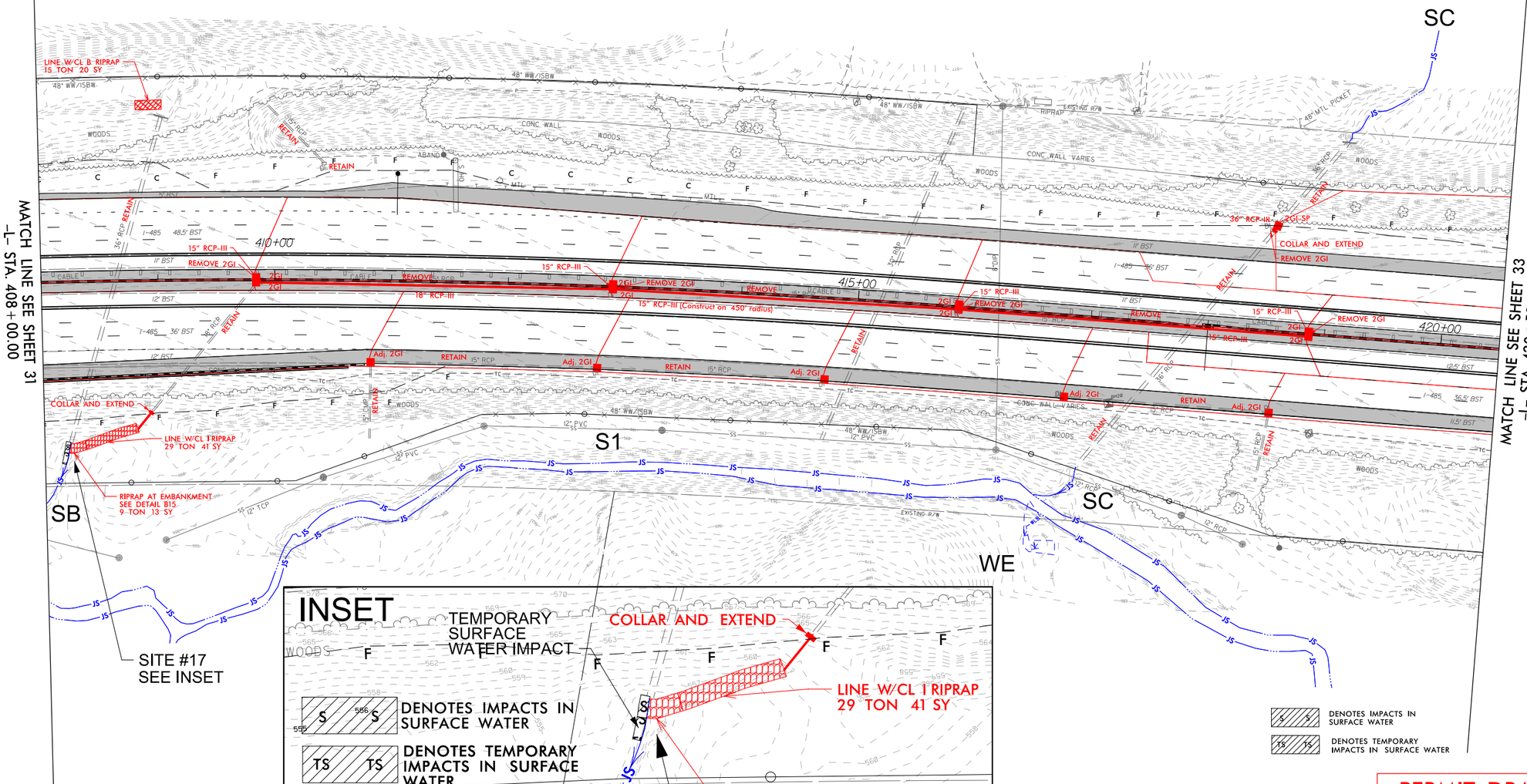
Type of Liner= CL I Riprap

Key riprap into natural ground.

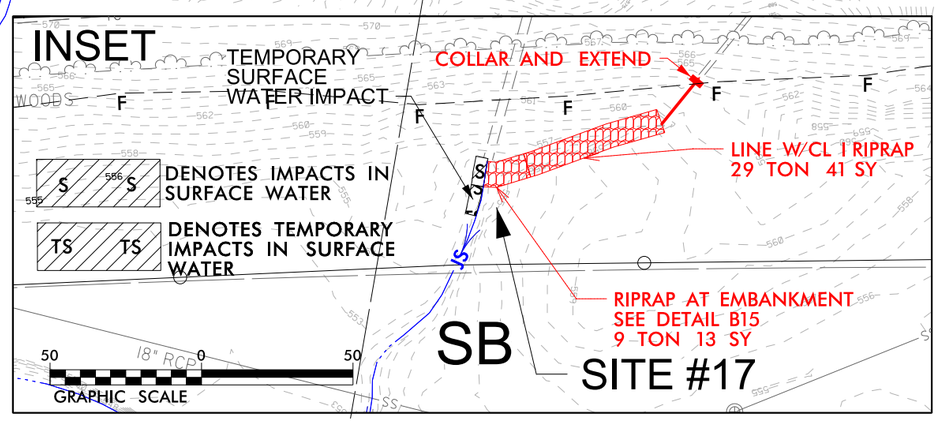
NAD 83/2011

MATCH LINE SEE SHEET 31 -L- STA. 408+00.00

MATCH LINE SEE SHEET 33 -L- STA. 420+50.00



INSET



S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 0 50
GRAPHIC SCALE

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 45 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3086\336401.3979\I5507_Hyd_prm_wet_psh32_cont.dgn
PROJECT SS1

8/17/99

REVISIONS

1. 9/5/19 – ADDED BOXES 3550 AND 3550A

9/12/2019
\\Cdot.gov\ncs_workingdir\3086\336401.3968\I5507_Hyd_prm_wet_psh35.dgn
PRIMEWCSOIS

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

MATCH LINE THIS SHEET –Y3– STA. 13+00.00

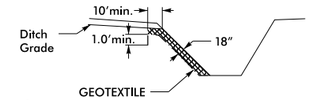
SEE SHEET 35A

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DETAIL B15
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	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

PERMIT DRAWING
SHEET 46 OF 115

100 0 100
GRAPHIC SCALE

8/17/99

REVISIONS

1. 9/5/19 – ADDED BOXES 3550 AND 3550A

9/12/2019
\\prodgis01\ics_workingdir\3086\336401.3971\i5507_Hyd_prm_wet_psh35_cont.dgn
PRIME WIDE01$

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

MATCH LINE THIS SHEET –Y3– STA. 13+00.00

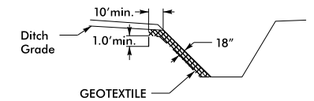
SEE SHEET 35A

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DETAIL B15
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	35
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

PERMIT DRAWING
SHEET 47 OF 115

100 0 100
GRAPHIC SCALE

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	35A
RW 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

SITE #18

SD

JS

WB

RIPRAP AT EMBANKMENT
SEE DETAIL B15
14 TON 19 SY

LINE W/CL B RIPRAP
40 TON 84 SY

PERMIT DRAWING
SHEET 48 OF 115

REMOVE 2GI
REMOVE 2GI

18" CSP w/ 2 ELBOWS

48" WW/ISBW

EXISTING R/W VARIES

EXISTING R/W

WOODS

RIPRAP

CB

ELM LANE

LT-WAL

RT-WAL

RWL

LWL

MLBL

F

S

25 0 25
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3086\336401_3977\I5507_Hyd_prm_wet_psh35A.dgn
PSHEET01.SS8

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	35A
RW 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

RNL

CB

EXISTING R/W VARIES

EXISTING R/W

WOODS

ELM LANE

CONC

MITER

18" CSP w/ 2 ELBOWS

48" WW/ISBW

LINE W/CL B RIPRAP
40 TON 84 SY

REMOVE 2GI

REMOVE 2GI

REMOVE

RIPRAP

RIPRAP

PERMIT DRAWING
SHEET 49 OF 115

25 0 25
GRAPHIC SCALE

9/12/2019
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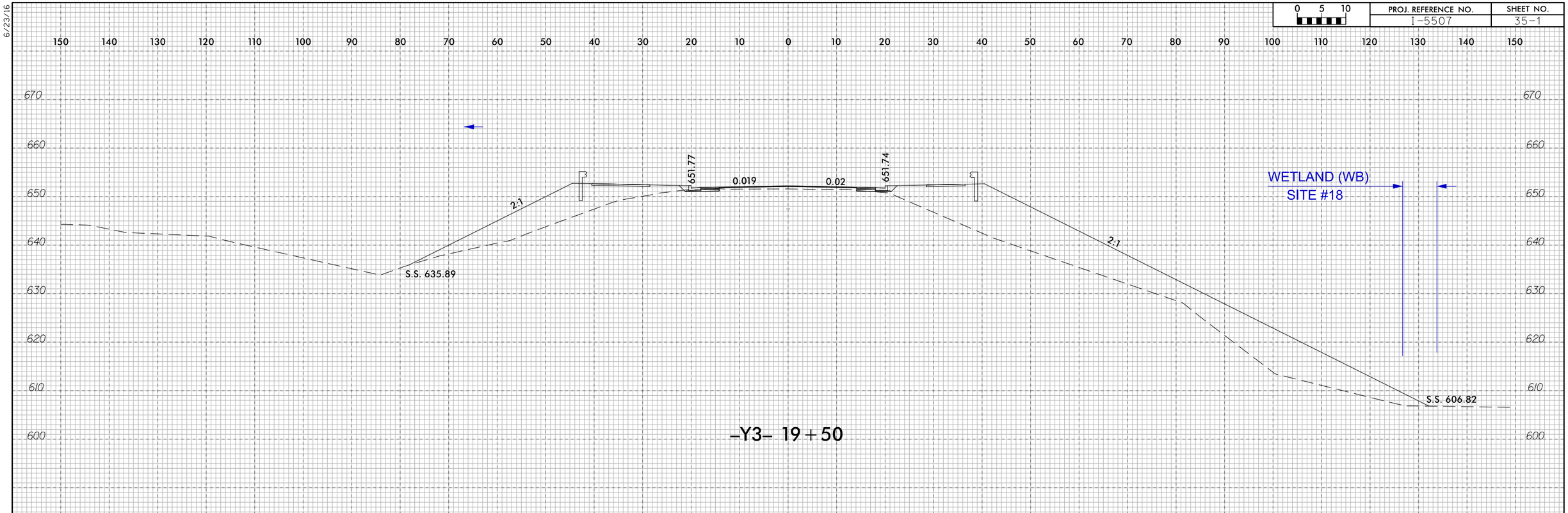
RDPW(ICS)$

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	35-1



PERMIT DRAWING
SHEET 50 OF 115

20 0 20
GRAPHIC SCALE

9/12/2019
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PRODPWTCS01$

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	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

MATCH LINE SEE SHEET 36
–L– STA. 474+50.00

MATCH LINE SEE SHEET 38
–L– STA. 486+00.00

INSET

TEMPORARY SURFACE WATER IMPACT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE 50 0 50

REMOVE CB

15" CSP w/2 ELBOWS

REMOVE

RIPRAP AT EMBANKMENT
10 TON 14 SY
SEE DETAIL C7

SITE #19

SE

WC

LINE WITH CL I RIP RAP
23 TON 33 SY

RETAIN

ADJ. 2GI

RIPRAP

GRADE TO DRAIN

30" CSP w/2 ELBOWS REMOVE

CL B RIP RAP
8 TONS 21 SY

JB w/MH

CONC WALL

18" RCP-III COLLAR & EXTEND

REMOVE 2GI

2GI-SP

REMOVE 18" RCP-III
(Construct on 450' radius)

LINE WITH CL I RIP RAP
42 TON 59 SY

15" RCP

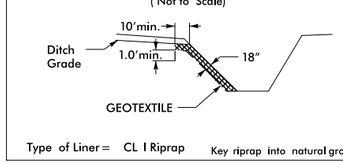
2GI CB

LATERAL V DITCH
SEE DETAIL C1

LATERAL V DITCH
W/CL I RIP-RAP
SEE DETAIL C4

SITE #19
SEE INSET

DETAIL C7
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

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 51 OF 115

GRAPHIC SCALE 100 0 100

9/12/2019
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PRDPWJCS01$

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

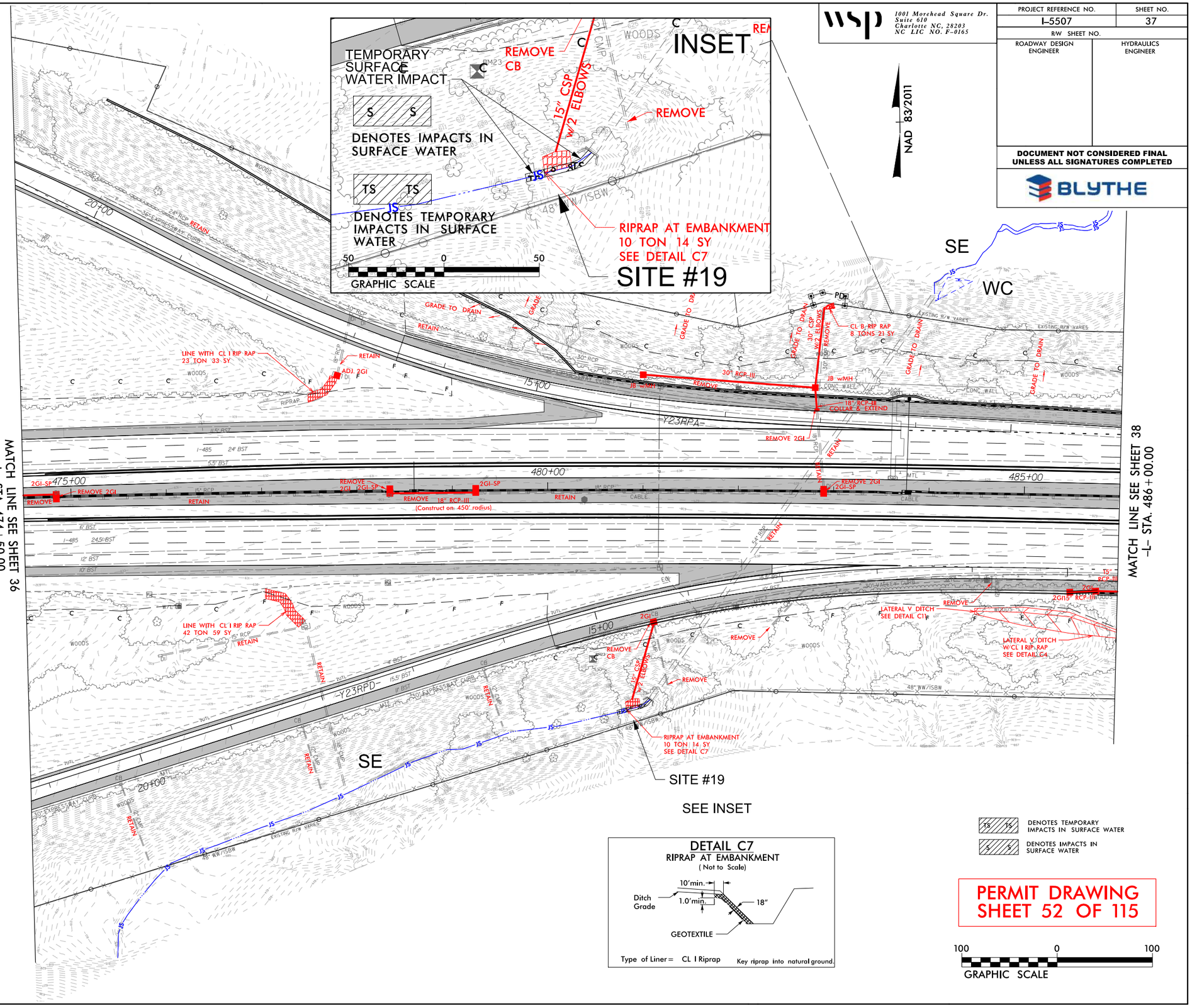
PROJECT REFERENCE NO.	SHEET NO.
I-5507	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

REVISIONS 8/17/99



DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)

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

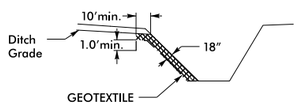
100 0 100
GRAPHIC SCALE

9/12/2019
\\Rpdprojects01\ics_workingdir\3086\336401_3980\I5507_Hyd_prm_wet_psh37_cont.dgn
RUPAK.WICS01$

8/17/99

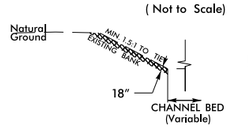
REVISIONS

DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



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

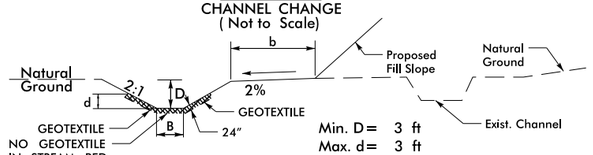
DETAIL C8
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

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

DETAIL C9
CHANNEL CHANGE
(Not to Scale)



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

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

NAD 83/2011

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.

SF

SEE SHEET 38A

SITE #20

SITE #21

SG

SITE #22

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

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

24" CSP W/2 ELBOWS

12" CSP W/2 ELBOWS

15" CSP w/2 ELBOWS

REMOVE 2GI

REMOVE CB

EXTEND 6'X5' RCBC

TOE PROTECTION SEE DETAIL C3

LINE WITH CL I RIP RAP 35 TON 49 SY

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

SF

SITE #20

SEE SHEET 38B

SEE SHEET 38B

SITE #22

SG

RIPRAP AT EMBANKMENT 26 TON 37 SY SEE DETAIL C7

CL II RIP RAP 1 TONS 5 SY

42" RCP-III

15" RCP-III

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

COLLAR & EXTEND

JB w/MH

2GI-D

2GI-SP

RETAIN

REMOVE

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

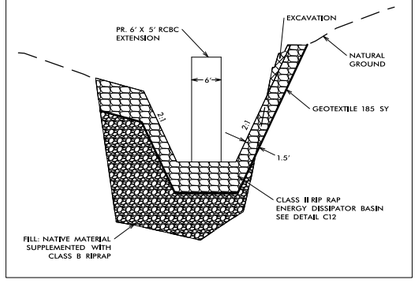
MATCH LINE SEE SHEET 39
-L- STA. 500+00.00

490+00

495+00

500+00

DETAIL C17
OUTLET CHANNEL
(Not to Scale)

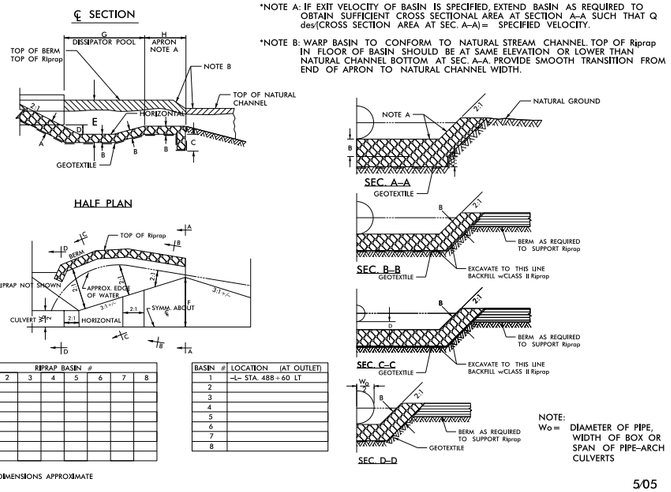


-L- STA. 488+60

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'							

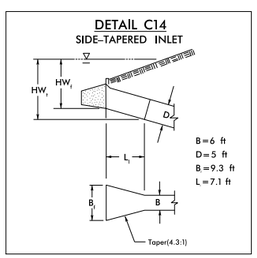
*ALL DIMENSIONS APPROXIMATE

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

NOTE:
W_D = DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

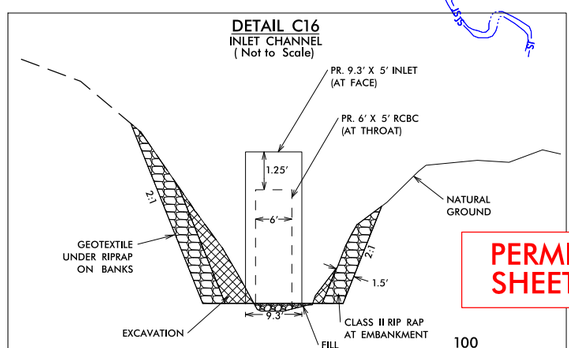
5/05

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

PERMIT DRAWING
SHEET 53 OF 115

100 0 100
GRAPHIC SCALE

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

9/26/2019
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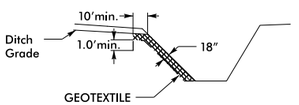
PROWICS05

8/17/99

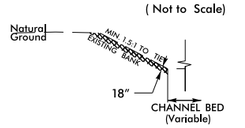
REVISIONS

DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



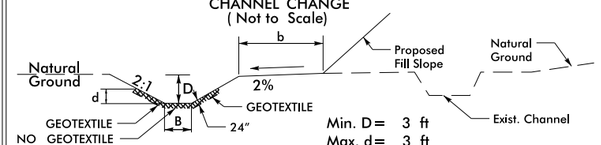
Type of Liner = CL I Riprap Key riprap into natural ground.

DETAIL C8
BANK STABILIZATION
(Not to Scale)



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

DETAIL C9
CHANNEL CHANGE
(Not to Scale)



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

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

NAD 83/2011

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.

SF

SEE SHEET 38A

SITE #20

SITE #21

SG

SITE #22

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

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

GRADE TO DRAIN

REMOVE

24" CSP W/2 ELBOWS

48" RCP-III

COLLAR & EXTEND

42" RCP-III

JB w/MH

15" RCP-III

GRADE TO DRAIN

15" CSP W/2 ELBOWS

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

2GI-D

2GI-SP

2GI-A

2GI

REMOVE 2GI

REMOVE CB

15" CSP W/2 ELBOWS

EXTEND 4'X5' RCBC

TOE PROTECTION SEE DETAIL C3

LINE WITH CL I RIP RAP 35 TON 49 SY

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

SEE SHEET 38B

RIPRAP AT EMBANKMENT 26 TON 37 SY SEE DETAIL C7

SITE #22

SG

SEE SHEET 38B

CL II RIP RAP 1 TONS 5 SY

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

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

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

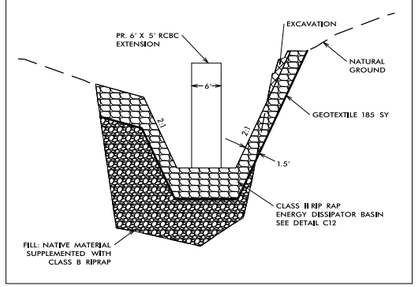
490+00

495+00

500+00

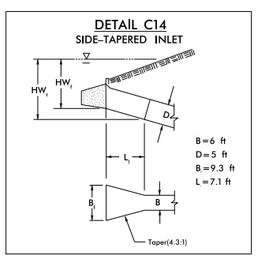
–L– STA. 488+60

DETAIL C17
OUTLET CHANNEL
(Not to Scale)



–L– STA. 488+60

DETAIL C14
SIDE-TAPERED INLET



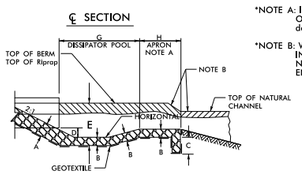
B=6 ft
D=5 ft
B1=9.3 ft
L=7.1 ft

DETAIL C12
RIPRAP ENERGY DISSIPATOR BASIN

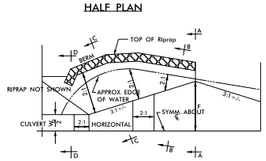
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des(CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

*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.

C SECTION



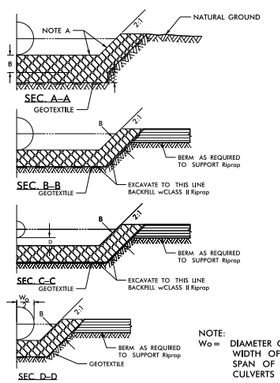
HALF PLAN



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

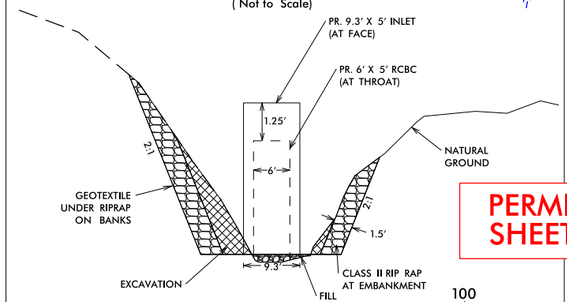
BASIN #	LOCATION (AT OUTLET)
1	–L– STA. 488+60 LT
2	
3	
4	
5	
6	
7	
8	



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

5/05

DETAIL C16
INLET CHANNEL
(Not to Scale)



–L– STA. 488+60

PERMIT DRAWING
SHEET 54 OF 115

100 0 100
GRAPHIC SCALE

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

9/26/2019
C:\pdots\ics_workingdir\4635\336401_4257\I5507_Hyd_prm_wet_psh38_cont.dgn
PROWICS01$

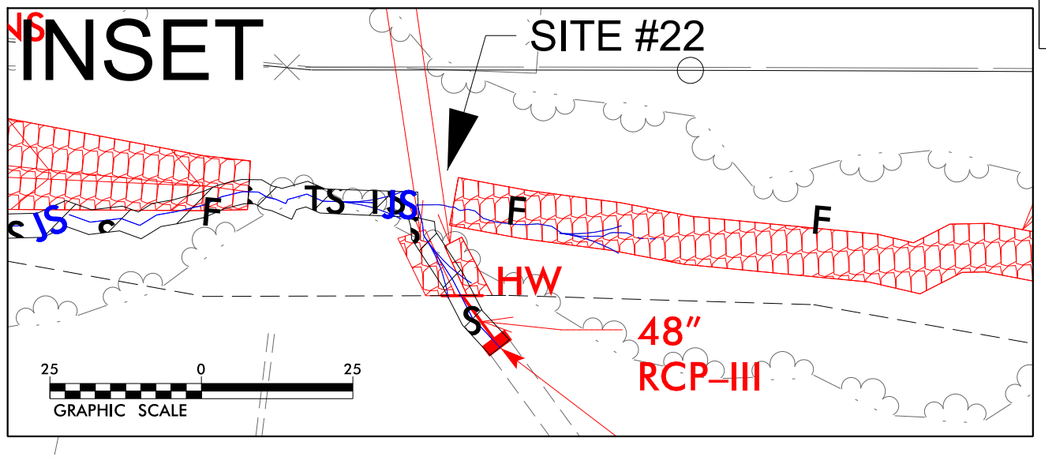
8/17/99

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.



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

NAD 83/2011

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

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

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

CULVERT EXTENSION

TEMPORARY SURFACE
WATER IMPACT

TEMPORARY SURFACE
WATER IMPACT

24" CSP
W/2 ELBOWS

15" CSP
W/2 ELBOWS

REMOVE

REMOVE 2GI

2GI

2GI-A

15" RCP–III

REMOVE 2GI

2GI

15" RCP–III

2GI

15" RCP–III

2GI

REMOVE 2GI

RETAIN

RETAIN

HW

48"
RCP–III

COLLAR & EXTEND

48" WW/ISBW

12" CMP

15" CMP

8" DIP SS

8" DIP

6'W X 5'H SINGLE BARREL BOX CULVERT

W/LT

MTL

DI

36" EXPRESSWAY CURB

10.5' BST

I-485

24.5' BST

5.5' BST

CABLE

WOODS

490+00

495+00

PERMIT DRAWING
SHEET 55 OF 115

50 0 50
GRAPHIC SCALE

9/26/2019
N:\Projects01\ics_workingdir\4641\336401.4258\I5507-Hyd_prm_wet_psh38A.dgn
PROPWCS01$

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

15" CSP
W/2 ELBOWS

REMOVE

REMOVE 2GI

2GI

RIPRAP AT EMBANKMENT
SEE DETAIL C7

CL I RIPRAP
4 TONS 7 SY

CHANNEL CHANGE
W/CL II RIP RAP
SEE DETAIL C9

TEMPORARY SURFACE
WATER IMPACT

24" CSP
W/2 ELBOWS

REMOVE

REMOVE

2GI-A

15" RCP–III

REMOVE 2GI

2GI

BANK STABILIZATION
SEE DETAIL C8
3 TONS

BANK STABILIZATION
SEE DETAIL C8
4 TONS

HW

48" RCP–III

COLLAR & EXTEND

TEMPORARY SURFACE
WATER IMPACT

REMOVE

REMOVE

18" RCP–III

2GI

15" RCP–III

2GI

REMOVE 2GI

RETAIN

RETAIN

490+00

495+00

PERMIT DRAWING
SHEET 56 OF 115

50 0 50
GRAPHIC SCALE

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	38A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

9/26/2019
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PROPWCS01$

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

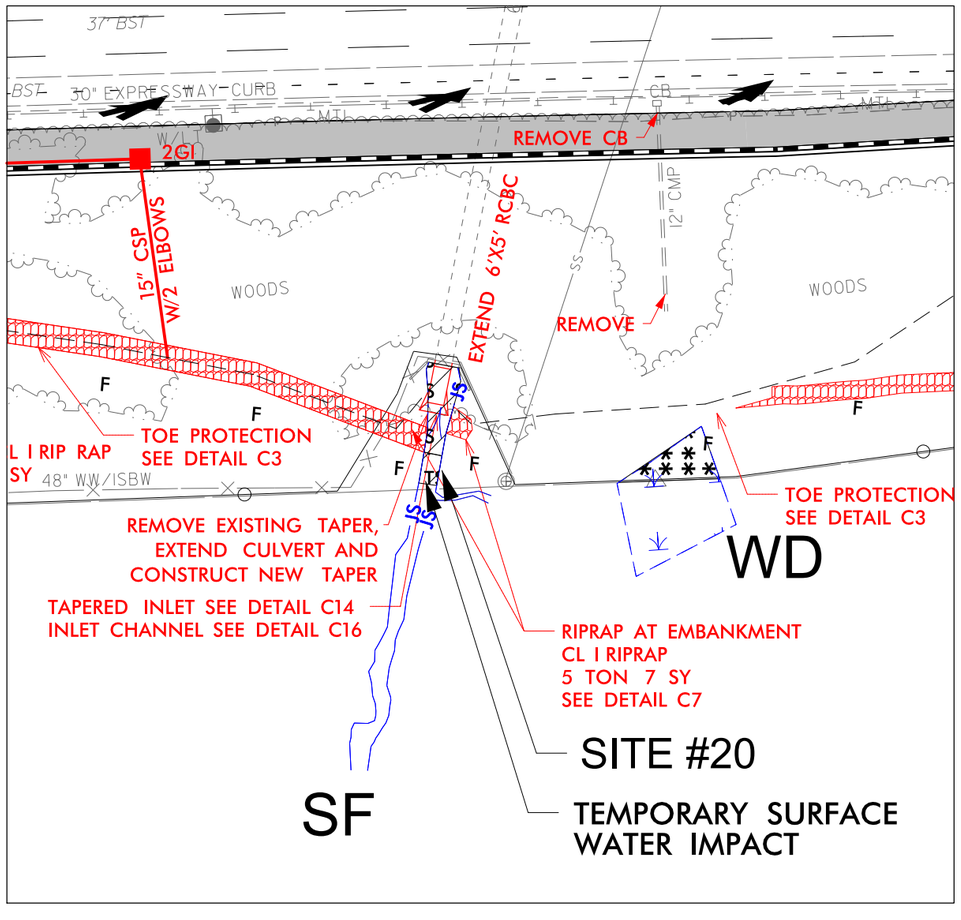
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

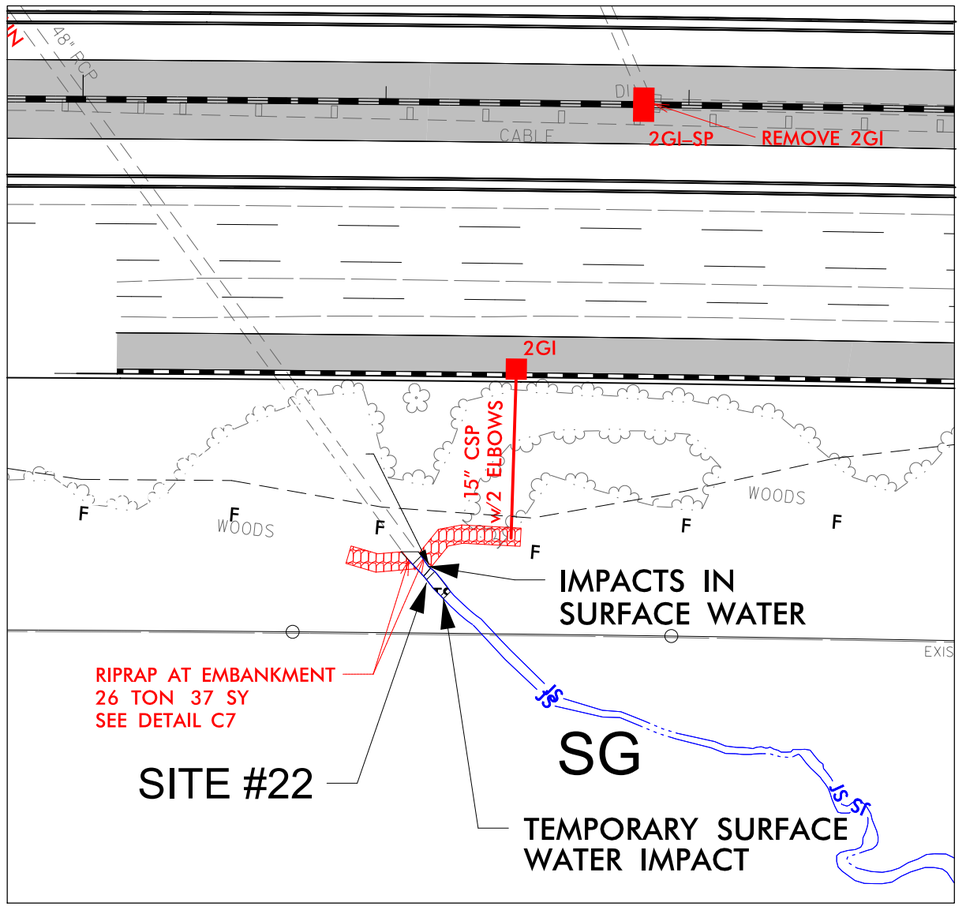
BLYTHE

NAD 83/2011

REVISIONS

8/17/99





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$

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

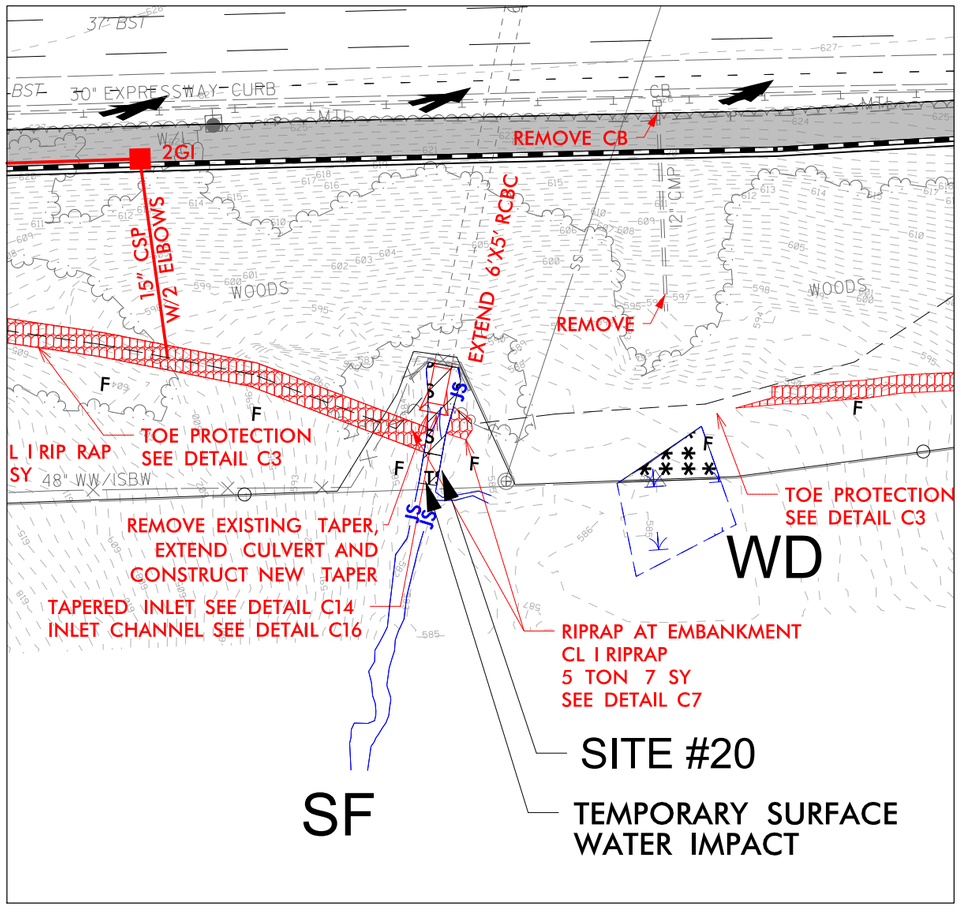
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

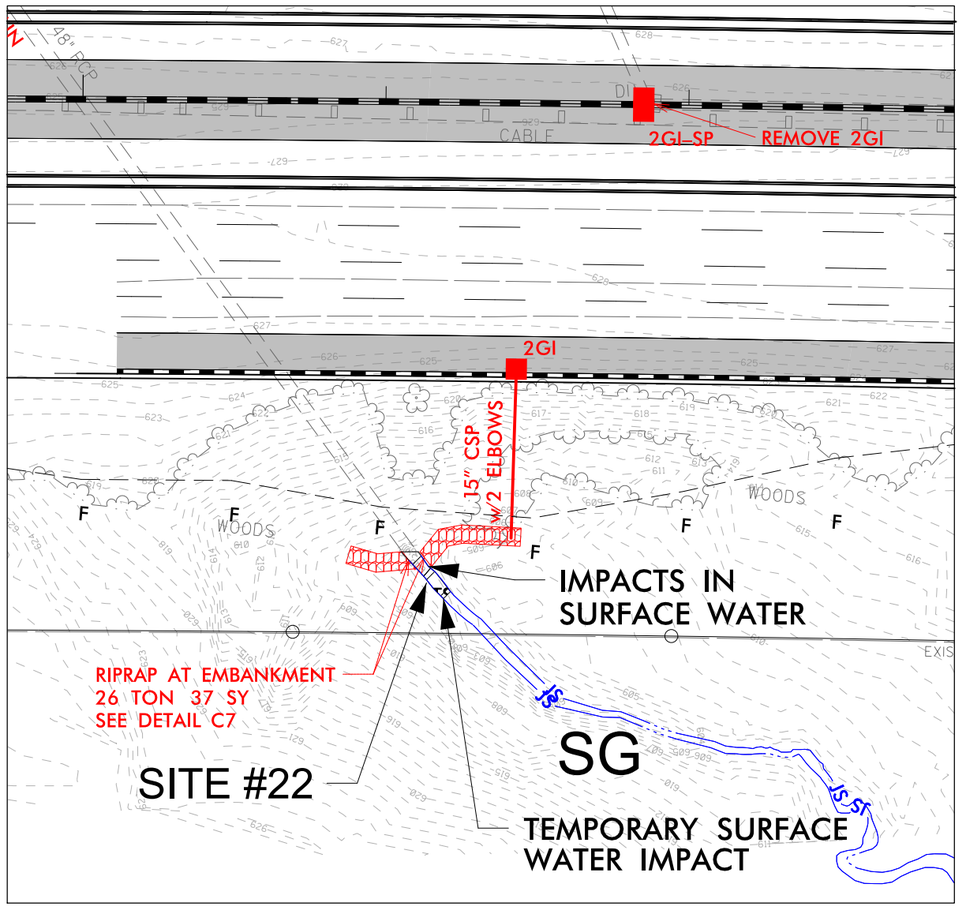
BLYTHE

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 58 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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PWP(CS01)

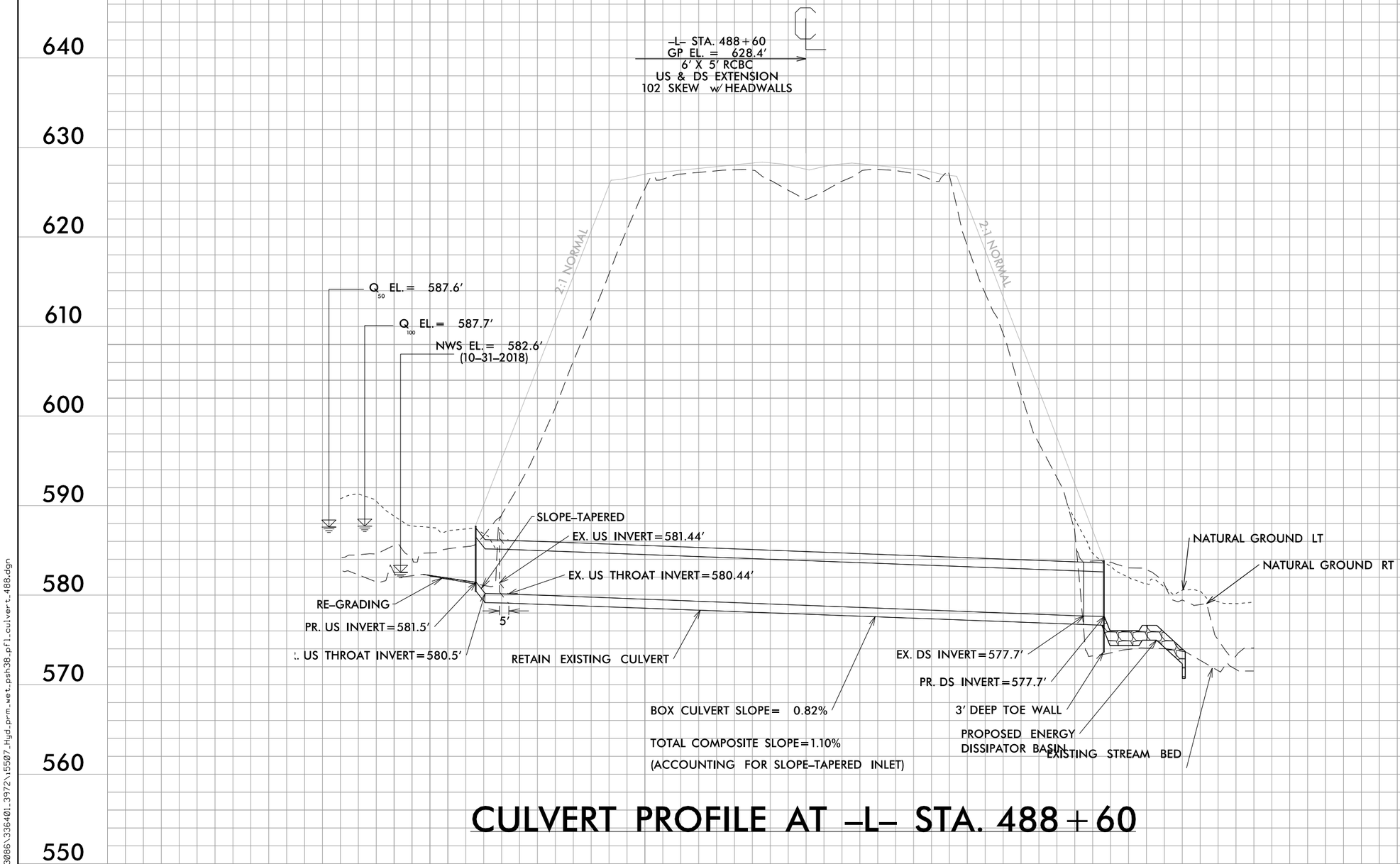
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
I–5507	38–1
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SITE #20



CULVERT PROFILE AT –L– STA. 488+60

PERMIT DRAWING
SHEET 59 OF 115

50 0 50
GRAPHIC SCALE (HORIZONTAL)

10 0 10
GRAPHIC SCALE (VERTICAL)

9/12/2019
\\ncdotics01\ics_workingdir\3086\336401.3972\i5507_Hyd_prm_wet_psh38_pf1_culvert_488.dgn
PROFILE01$

8/17/99

REVISIONS

1. 9/5/19 – MOVED BOXES 4207A AND 4207

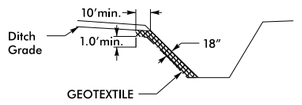
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

PROJECT REFERENCE NO.	SHEET NO.
I–5507	42
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

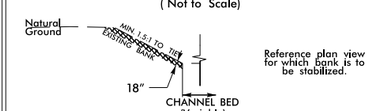
BLYTHE

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)



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

NAD 83/2011

MATCH LINE SEE SHEET 41
–L– STA. 539+00.00

MATCH LINE SEE SHEET 43
–L– STA. 552+50.00

SITE #24
SEE INSET

WL

SL

SSC

WIA

SOCCER FIELD

TRACK 29' BST

SAND PIT

XMTR BLDG

ISBLK

SR 3628 TOM SHORT RD 28' BST

EXISTING R/W

WOODS

APPROX

540+00

545+00

550+00

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 WMH

REMOVE 2GI

15" RCP-III

REMOVE DI

REMOVE 2GI (Construction 450+ inlets)

COLLAR AND EXTEND

CL B RIP RAP
2 TONS 7 SY

CL B RIP RAP
3 TONS 10 SY

7 STRAND CABLE

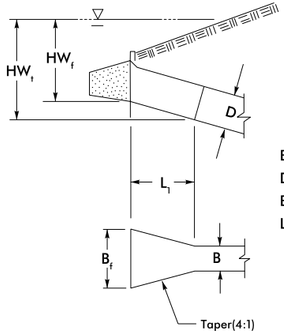
RETAIN

RIPRAP

11' STONE WALL

36"X36" STONE MASONRY COL (TYP)

DETAIL C13
SIDE–TAPERED INLET

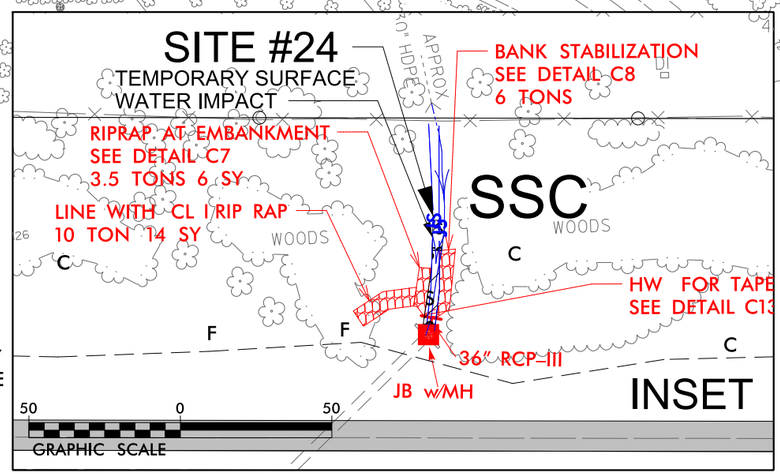


B=3 ft
D=3 ft
B_f=5 ft
L_t=4 ft

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

SITE #24
TEMPORARY SURFACE WATER IMPACT



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 60 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROFICIS02$

8/17/99

REVISIONS

1. 9/5/19 – MOVED BOXES 4207A AND 4207

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

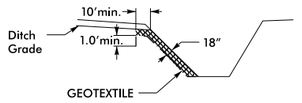
PROJECT REFERENCE NO.	SHEET NO.
I–5507	42
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

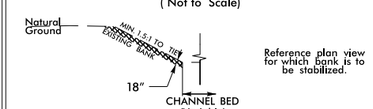
NAD 83/2011

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)



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

MATCH LINE SEE SHEET 41
–L– STA. 539+00.00

MATCH LINE SEE SHEET 43
–L– STA. 552+50.00

SITE #24
SEE INSET

WL

SL

WIA

SSC

SOCCER FIELD

TRACK — 29' BST

SAND PIT

XMTR BLDG

ISBLK

SR 3628 TOM SHORT RD 28' BST

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

(Construct on 450 radius)

2GI

15" CSP W/2 ELBOWS

COLLAR AND EXTEND

36" RCP-III & OCTB

CL B RIP RAP
2 TONS 7 SY

CL B RIP RAP
3 TONS 10 SY

18" RCP-III

REMOVE DI

2GI-D

T-STRAND CABLE

RIPRAP

11" STONE WALL

36"X36" STONE MASONRY COL (TYP)

25BKD

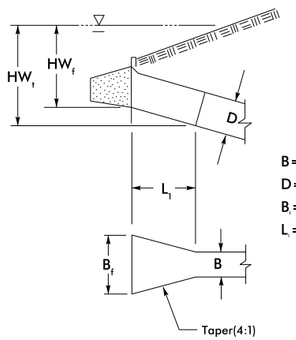
25SFD

72" PLASTIC

48" WD SR W/ WW

60" CMP DIP

DETAIL C13
SIDE–TAPERED INLET

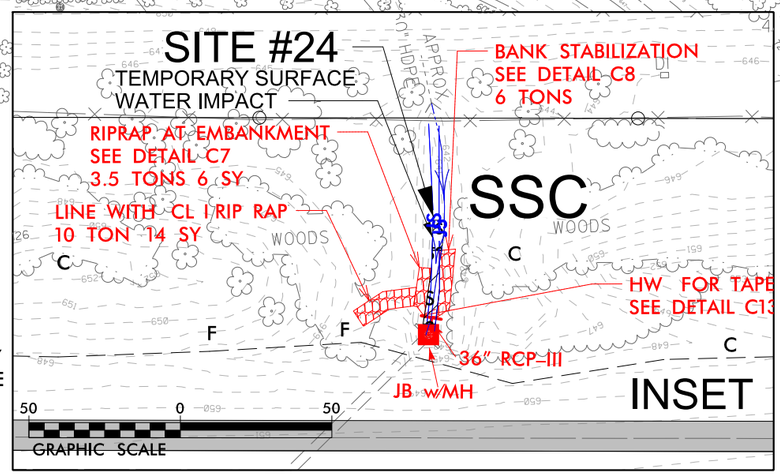


B=3 ft
D=3 ft
B_t=5 ft
L_t=4 ft

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

SITE #24
TEMPORARY SURFACE WATER IMPACT



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 61 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROJWISE\$

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

8/17/99

REVISIONS

1. 9/5/19 – ADDED BOXES 43/5a AND 43/5.

NAD 83/2011

MATCH LINE SEE SHEET 42
-L- STA. 552+50.00

MATCH LINE SEE SHEET 44
-L- STA. 566+50.00

555+00 560+00 565+00

SITE #25

SITE #26

WK

WJ

ROW FENCING TO BE REPAIRED AS NEEDED

BASEBALL FIELD

DUGOUT

60' CHL

CHL BACKSTOP

12' BST

48" WW/ISBW

24" HDPE

GRADE TO DRAIN

FILL SLOPE IS STABLE AS GRASS WITHOUT TOE PROTECTION

CL B RIP RAP
3 TONS 10 SF

CL B RIP RAP
2 TONS 7 SY

2GI

15" RCP-III

REMOVE 2GI 15" RCP-III 2GI

RETAIN

48" RCP

3 STRAND CABLE

WOODS

APPROX

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

**PERMIT DRAWING
SHEET 62 OF 115**

100 0 100
GRAPHIC SCALE

9/12/2019
C:\Projects02\ics_workgdr\3792\336401.3987\15507_Hyd_prm_wet_psh43.dgn
PDPW1CS02$

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

1. 9/5/19 – ADDED BOXES 43/5a AND 43/5.

NAD 83/2011

MATCH LINE SEE SHEET 42
–L– STA. 552+50.00

MATCH LINE SEE SHEET 44
–L– STA. 566+50.00

SITE #25

SITE #26

ROW FENCING TO BE REPAIRED AS NEEDED

WK

WJ

BASEBALL FIELD

DUGOUT

60' CHL

CHL BACKSTOP

12' BST

48" WW/ISBW

24" HDPE

WOODS

APPROX

GRADE TO DRAIN

555+00

560+00

565+00

2GI

15" RCP-III

REMOVE 2GI 15" RCP-III

RETAIN 15" RCP-III

CONC

CL B RIP RAP
2 TONS 7 SY

CL B RIP RAP
3 TONS 10 SF

FILL SLOPE IS STABLE AS GRASS WITHOUT TOE PROTECTION

15" RCP-III 3 STRAND CABLE

F/F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

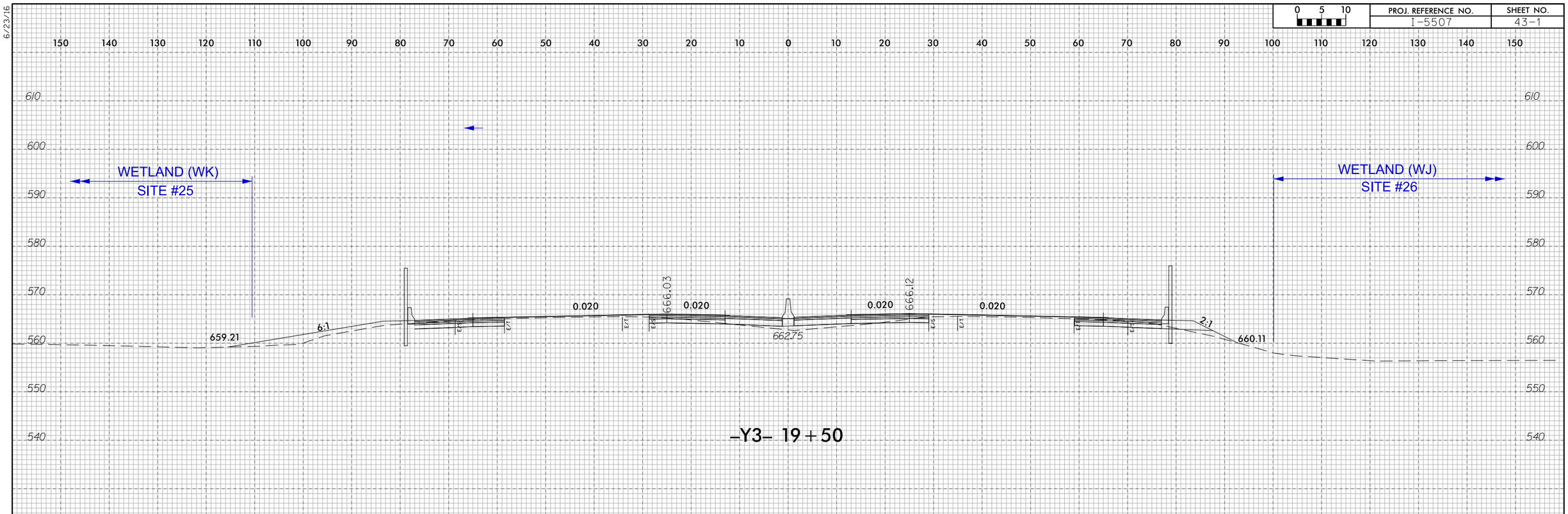
PERMIT DRAWING
SHEET 63 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
\\Rdcatcs02\ics_workingdir\3792\336401.3992\I5507_Hyd_prm_wet_psh43_cont.dgn
PDF WICS02

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	43-1



PERMIT DRAWING
SHEET 64 OF 115

20 0 20
GRAPHIC SCALE

9/12/2019
\\Prodpwcs02\ics_workingdir\3792\336401_4000\15507_hyd_prm_wet_psh43_XS.dgn
PRODPWCS02$

wsp
1001 Morehead Square Dr.
Suite 610
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

NAD 83/2011

8/17/99

REVISIONS

MATCH LINE SEE SHEET 43
-L- STA. 566+50.00

MATCH LINE SEE SHEET 45
-L- STA. 580+00.00

SITE #27

SEE SHEET 44A

SSB

WWA

WJ

WJa

SEE SHEET 44A

SITE #27

570+00 575+00 580+00

CUT DITCH CONCRETE SEE DETAIL C1

SPECIAL CUT DITCH SEE DETAIL C2

GRADE TO DRAIN

15" RCP-III

18" wMH

2GI

2GI-D

2GI-SP

15" CSP W/2 ELBOWS

CL B RIP RAP 1 TONS 5 SY

LINE W/CL I RIP RAP 41 TON 58 SY

RIPRAP AT EMBANKMENT 6 TONS 10 SY SEE DETAIL C7

BANK STABILIZATION SEE DETAIL C8 8 TONS

REMOVE 2GI 15" RCP-III

REMOVE

RETAIN

15" FCSP W/2 ELBOWS

2GI-D 15" RCP-III GRADE TO DRAIN

2GI-2 GRADE TO DRAIN 18" RCP-III

18" RCP-III

LINE WITH CL B RIP RAP 125 TON 278 SY

RIPRAP AT EMBANKMENT 3 TONS 13 SY SEE DETAIL C7

2SF AND BK APT

2SBK APT

2SF AND BK APT

18" C&G

48" CONC

72" CHL

48" CHL

BST PA

WOODS

48" WW/ISBW

WLB

24" C&G

ALVARADO WAY 30' BST

60' CONC

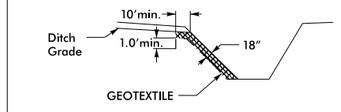
LP

CB

CONC RISER

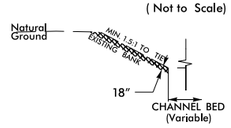
DI

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 65 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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prmWETCS02$

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	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

SITE #27

SEE SHEET 44A

SSB

WWA

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

CUT DITCH CONCRETE
SEE DETAIL C1

SPECIAL CUT DITCH
SEE DETAIL C2

GRADE TO DRAIN

15" RCP-III

18" w/MH

2GI

2GI-D

15" CSP W2 ELBOWS

570+00

575+00

580+00

REMOVE 2GI

REMOVE 15" RCP-III

2GI-SP

15" RCP

RETAIN

3 STRAND CABLE

CONC RISER

CB

48" CONC

72" CHL

48" CHL

18" C&G

BST PA

2SF AND BK APT

2SBK APT

LP

WOODS

MATCH LINE SEE SHEET 43
-L- STA. 566+50.00

MATCH LINE SEE SHEET 45
-L- STA. 580+00.00

2GI 15" RCP-III

18" RCP-III

REMOVE

RETAIN

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

48" WW/ISBW

WJ

WJa

WLB

ALVARADO WAY 30' BST

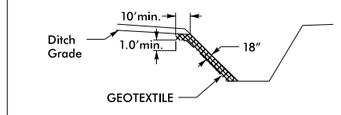
24" C&G

60' CONC

SEE SHEET 44A

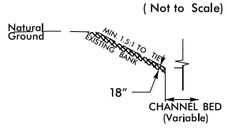
SITE #27

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

9/12/2019
C:\Projects02\ics_workingdir\3792\336401_3996\I5507_Hyd_prm_wet_psh44_cont.dgn
RPWITCS02$

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	44A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

SHADOW GROVE CIR

48" CONC

48" CHL

CB

18" C&G

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

NAD 83/2011

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

10.5' BST

I-485

24' BST

5.5' BST

580+00

REMOVE 2GI
15" RCP-III

REMOVE
DI CONC

2GI-SP

15" RCP
3 STRAND CABLE

RETAIN

CONC DI

2GI-SP

2GI
15" RCP-III

48" RCP

RETAIN

15" RCP-III
2GI

2GI CONC

15" RCP-III

15" RCP

RETAIN

6' BS

I-485

24' B

2GI 15" RCP-III

2GI

2GI-D

GRADE TO DRAIN

18" RCP-III

DITCH

18" RCP-III

REMOVE

WOODS

LINE WITH CL B RIP RAP
125 TON 278 SY

SSB

48" WW/ISBW

RIPRAP AT EMBANKMENT
8 TONS 13 SY
SEE DETAIL C7

SITE #27

TEMPORARY SURFACE WATER IMPACT

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F — DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 67 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
C:\projects02\ics_workingdir\3792\336401.3993\i5507_Hyd_prm_wet_psh44A.dgn
PRIMICS02

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	44A
RW 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" CMP

18" C&G

CB

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

10.5' BST

I-485

24' BST

5.5' BST

580+00

REMOVE 2GI
15" RCP-III

REMOVE

2GI-SP

15" RCP
3 STRAND CABLE

RETAIN

CONC

2GI-SP

2GI
15" RCP-III

RETAIN

48" RCP

RETAIN

15" RCP

2GI 15" RCP-III 2GI

15" RCP-III
2GI

15" RCP-III

2GI-D GRADE TO DRAIN

18" RCP-III

DITCH 2

18" RCP-III

REMOVE

WOODS

LINE WITH CL B RIP RAP
125 TON 278 SY

48" WW/ISBW

RIPRAP AT EMBANKMENT
8 TONS 13 SY
SEE DETAIL C7

SSB

SITE #27

TEMPORARY SURFACE WATER IMPACT

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
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PRIP WCS02

8/17/99

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.	SHEET NO.
I–5507	45
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

SITE #28 SSA INSET A

TEMPORARY SURFACE WATER IMPACT

RIPRAP AT EMBANKMENT 4 TONS 7 SY SEE DETAIL C7

BANK STABILIZATION 5 TONS SEE DETAIL C8

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LINE WITH CL I RIPRAP F 59 TON 83 SY

15" CSP ELBOWS

50 0 50 GRAPHIC SCALE

SITE #28 SEE INSET A

NAD 83/2011

MATCH LINE SEE SHEET 44 –L– STA. 580+00.00

MATCH LINE SEE SHEET 46 –L– STA. 594+00.00

585+00 590+00 10+00

SSA

TOE PROTECTION SEE DETAIL C3

CL B RIP RAP 2 TONS 7 SY

15" RCP-III

2GI

I-485 24' BST 5.5' BST

REMOVE

36" RCP-III

30" RCP

2GI-A

CL B RIP RAP 11 TONS 28 SY

CL B RIP RAP 2 TONS 7 SY

LINE WITH CL I RIP RAP 43 TON 61 SY

RIPRAP AT EMBANKMENT 16 TONS 28 SY SEE DETAIL C7

SITE #28 - SEE INSET B

WOODS

EXISTING R/W

48" WW/ISBW

GRADE TO DRAIN 2GI-D

TIE FENCE TO NOISE WALL

MARICOPA RD 18' BST

24" VALLEY CURB

72" PLASTIC

25FTH

CRIPPLE CREEK LN

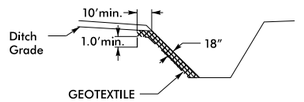
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 69 OF 115

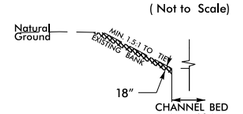
100 0 100 GRAPHIC SCALE

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.

SITE #28 SSA INSET B

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

CL B RIP RAP 2 TONS 7 SY

LINE WITH CL I RIP RAP 43 TON 61 SY

RIPRAP AT EMBANKMENT 16 TONS 28 SY SEE DETAIL C7

TEMPORARY SURFACE WATER IMPACT

36" RCP-III

CL B 11 TO

50 0 50 GRAPHIC SCALE

WOODS

9/12/2019
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PRPWILCOX$

8/17/99

REVISIONS

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	45
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

NAD 83/2011

SITE #28 SSA INSET A

TEMPORARY SURFACE WATER IMPACT

RIPRAP AT EMBANKMENT
4 TONS 7 SY
SEE DETAIL C7

BANK STABILIZATION
5 TONS
SEE DETAIL C8

LINE WITH CL I RIPRAP
F 59 TON 83 SY

CSP ELBOWS

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE 50 0 50

SITE #28 SEE INSET A

SSA

RIPRAP AT EMBANKMENT
4 TONS 7 SY
SEE DETAIL C7

BANK STABILIZATION
5 TONS
SEE DETAIL C8

LINE WITH CL I RIPRAP
F 59 TON 83 SY

CL B RIP RAP
2 TONS 7 SY

TOE PROTECTION
SEE DETAIL C3

MATCH LINE SEE SHEET 44
-L- STA. 580+00.00

MATCH LINE SEE SHEET 46
-L- STA. 594+00.00

585+00

590+00

10+00

15" RCP-III

18" RCP-III

24" RCP-III

30" RCP-III

36" RCP-III

2GI

2GI-A

2GI-D

REMOVE

REMOVE 2GI

REMOVE DI

GRADE TO DRAIN

CL B RIP RAP
2 TONS 7 SY

CL B RIP RAP
11 TONS 28 SY

LINE WITH CL I RIP RAP
43 TON 61 SY

RIPRAP AT EMBANKMENT
16 TONS 28 SY
SEE DETAIL C7

TIE FENCE TO NOISE WALL

SITE #28 - SEE INSET B

WOODS

EXISTING R/W

I-485

24" BST

55' BST

160' BST

48" WW/SBW

18" C&G

24" VALLEY CURB

MARICOPA RD

CRIPPLE CREEK LN

2SFTH

INSET B

SSA

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

GRAPHIC SCALE 50 0 50

CL B RIP RAP
2 TONS 7 SY

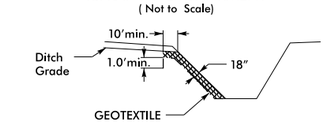
LINE WITH CL I RIP RAP
43 TON 61 SY

RIPRAP AT EMBANKMENT
16 TONS 28 SY
SEE DETAIL C7

TEMPORARY SURFACE WATER IMPACT

SITE #28

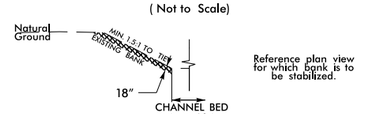
DETAIL C7
RIPRAP AT EMBANKMENT
(Not to Scale)



Type of Liner = CL I Riprap

Key riprap into natural ground.

DETAIL C8
BANK STABILIZATION
(Not to Scale)



Type of Liner = CL I Riprap

Key riprap into natural ground.

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 70 OF 115

GRAPHIC SCALE 100 0 100

9/12/2019
\\cdot\ncs_workgroup\3792\336401_3997\15507_hyd_prm_wet_psh45_cont.dgn
PROFILES02

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

PROJECT REFERENCE NO.	SHEET NO.
I–5507	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

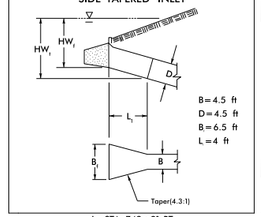
BLYTHE

8/17/99

REVISIONS

NAD 83/2011

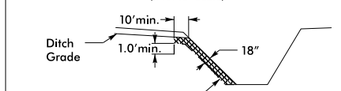
DETAIL D25
SIDE–TAPERED INLET



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)



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

INSET A
SITE #29

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SAO

TEMPORARY SURFACE WATER IMPACT

RIPRAP AT EMBANKMENT
17 TON 24 SY
SEE DETAIL D18

50 0 50
GRAPHIC SCALE

INSET B
SITE #29

SAO

TEMPORARY SURFACE WATER IMPACT

RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18

2GI–D
JB wMH
15" CSP W/2 ELBOWS
36" RCP–III

50 0 50
GRAPHIC SCALE

INSET C
SITE #29
WAK
SAO

SIDE TAPERED INLET W/HW
SEE DETAIL D25

TEMPORARY SURFACE WATER IMPACT

50 0 50
GRAPHIC SCALE

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 71 OF 115

100 0 100
GRAPHIC SCALE

SITE #29 SEE INSET C
WAK
SAO
WAJ

SITE #29 SEE INSET A

SITE #29 SEE INSET B

MATCH LINE SEE SHEET 46 –L– STA. 607+50.00

MATCH LINE SEE SHEET 48 –L– STA. 621+00.00

9/12/2019
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8/17/99

REVISIONS

9/12/2019
C:\pdot\cs02\cs_workgdir\3792\336401_3998\15507_Hyd_prm_wet_psh47_cont.dgn
PRIMWETCS02$

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

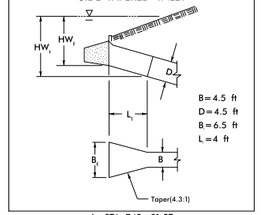
PROJECT REFERENCE NO.	SHEET NO.
I-5507	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

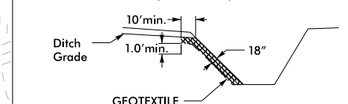
NAD 83/2011

DETAIL D25
SIDE-TAPERED INLET



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

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



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

INSET A SITE #29

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SAO
TEMPORARY SURFACE WATER IMPACT
RIPRAP AT EMBANKMENT
17 TON 24 SY
SEE DETAIL D18

50 0 50
GRAPHIC SCALE

SITE #29
SEE INSET C
WAK
SAO

SITE #29
SEE INSET A

SIDE TAPERED INLET W/HW
SEE DETAIL D25

WAJ

MATCH LINE SEE SHEET 46
–L– STA. 607+50.00

MATCH LINE SEE SHEET 48
–L– STA. 621+00.00

INSET B

TEMPORARY SURFACE WATER IMPACT
SAO
RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18
SITE #29

50 0 50
GRAPHIC SCALE

SITE #29
SEE INSET B

INSET C SITE #29

WAK
SAO
SIDE TAPERED INLET W/HW
SEE DETAIL D25
TEMPORARY SURFACE WATER IMPACT

50 0 50
GRAPHIC SCALE

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 72 OF 115

100 0 100
GRAPHIC SCALE

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

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

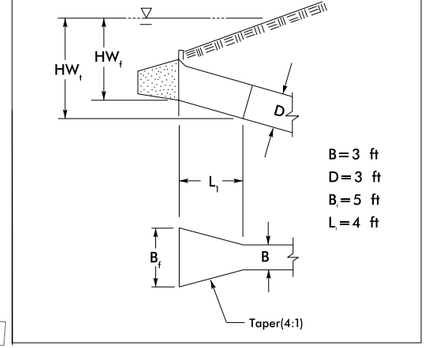
BLYTHE

8/17/99

REVISIONS

1. 9/5/19 - ADDED BOX 4920.

DETAIL D24
SIDE-TAPERED INLET



NAD 83/2011

SITE #30
SEE INSET

SAN

NON-JURISDICTIONAL

SIDE TAPERED
INLET W/HW
SEE DETAIL D24

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

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

635+00
640+00
645+00

15" RCP-III
18" RCP-III
2GI
2GI-A
REMOVE 2GI
RETAIN
18" CSP W/ELBOWS
24" CSP W/ELBOWS
REMOVE 55' CMP

CL B RIPRAP
3 TON 10 SY

CLASS B RIPRAP
5 TON 14 SY

WOODS
APPROX
TS TS
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

INSET
SITE #30
TEMPORARY SURFACE WATER IMPACT
SIDE TAPERED INLET W/HW SEE DETAIL D24

50 0 50
GRAPHIC SCALE

100 0 100
GRAPHIC SCALE

PERMIT DRAWING SHEET 73 OF 115

9/12/2019
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PSHWICS02$

8/17/99

REVISIONS

1. 9/5/19 – ADDED BOX 4920.

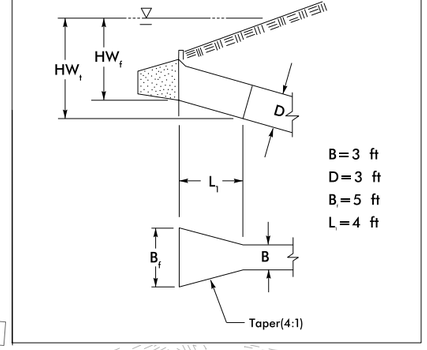
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

DETAIL D24
SIDE–TAPERED INLET



NAD 83/2011

SITE #30
SEE INSET

NON-JURISDICTIONAL

SAN

SIDE TAPERED INLET W/HW SEE DETAIL D24

APPROX

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

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

635+00 640+00 645+00

15" RCP-III 18" RCP-III 2GI 2GI-A

REMOVE 2GI

RETAIN

18" CSP W/ELBOWS

CL B RIPRAP 3 TON 10 SY

24" CSP W/ELBOWS REMOVE 25' CMP

CLASS B RIPRAP 5 TON 14 SY

WOODS

INSET

SITE #30

TEMPORARY SURFACE WATER IMPACT

SIDE TAPERED INLET W/HW SEE DETAIL D24

50 0 50
GRAPHIC SCALE

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 74 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROWICKS2$

8/17/99

REVISIONS

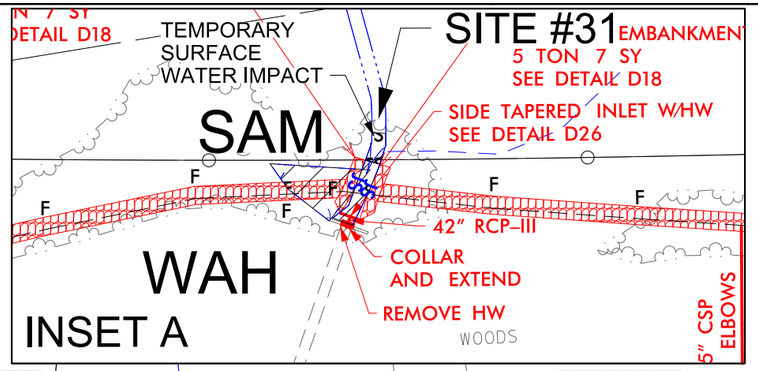
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

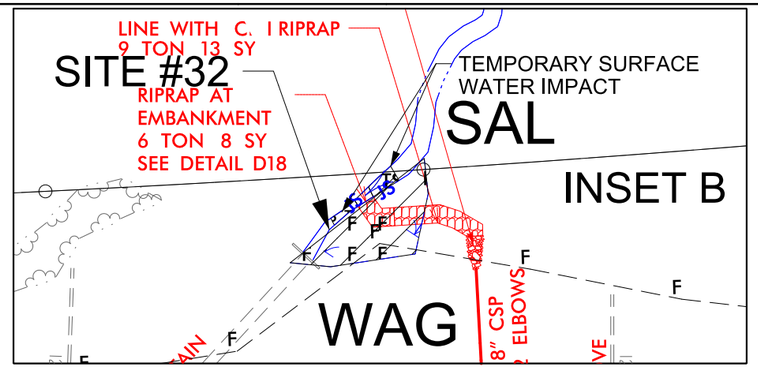
PROJECT REFERENCE NO.	SHEET NO.
I-5507	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011



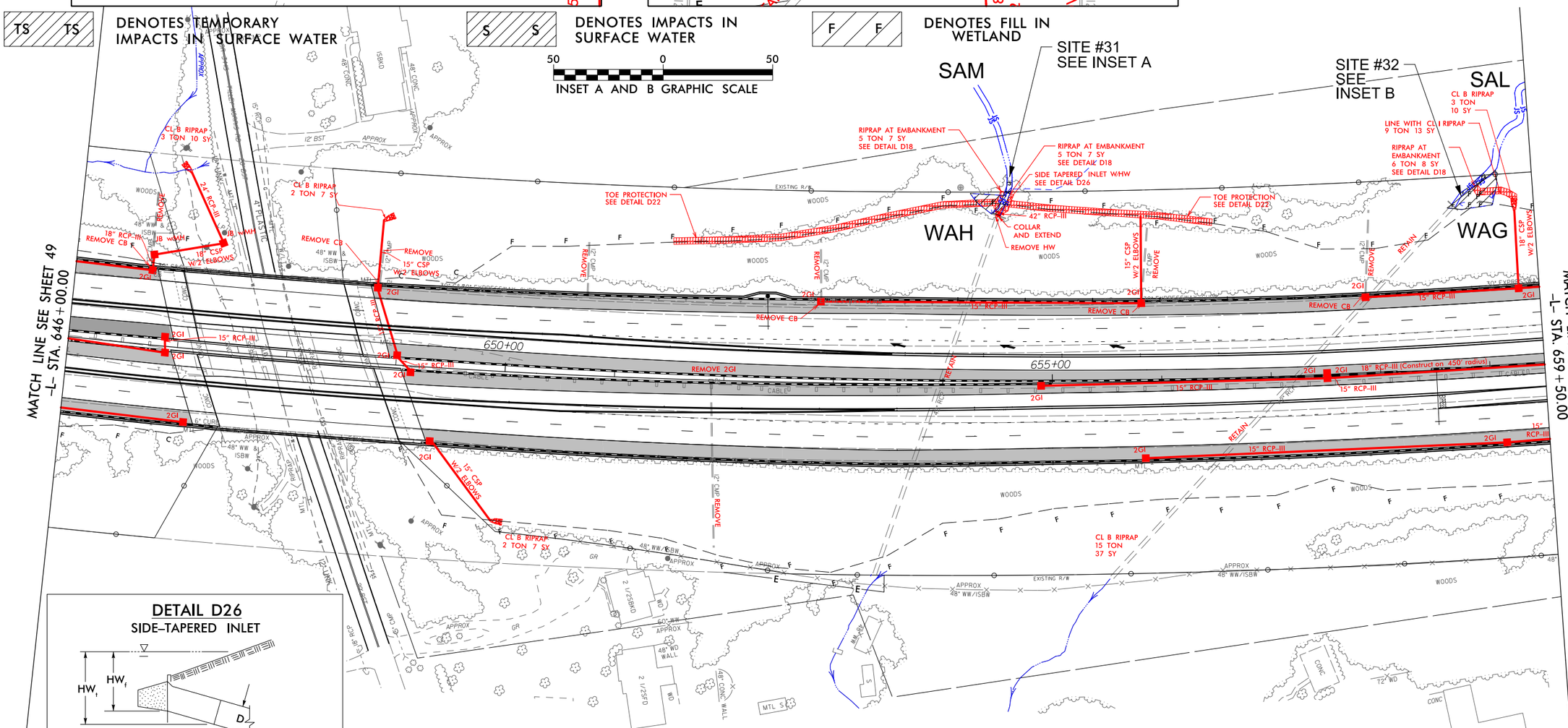


TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

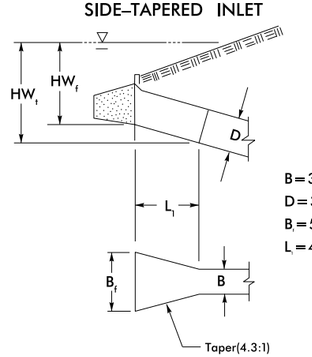
S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

50 0 50
INSET A AND B GRAPHIC SCALE



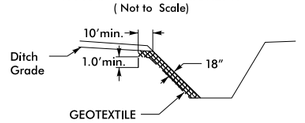
DETAIL D26
SIDE-TAPERED INLET



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= CL I Riprap Key riprap into natural ground.

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

100 0 100
GRAPHIC SCALE

9/12/2019
C:\pwworking\jcs01\jcs_workingdir\3088\336401_4001\i5507_Hyd_prm_wet_psh50.dgn
RIPWETCS01$

wsp
1001 Morehead Square Dr.
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

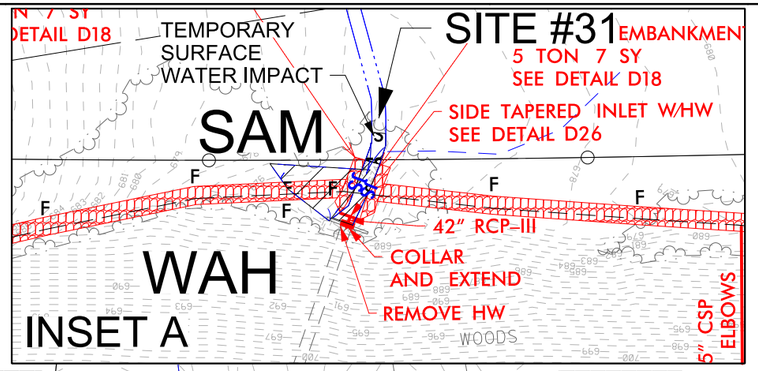
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

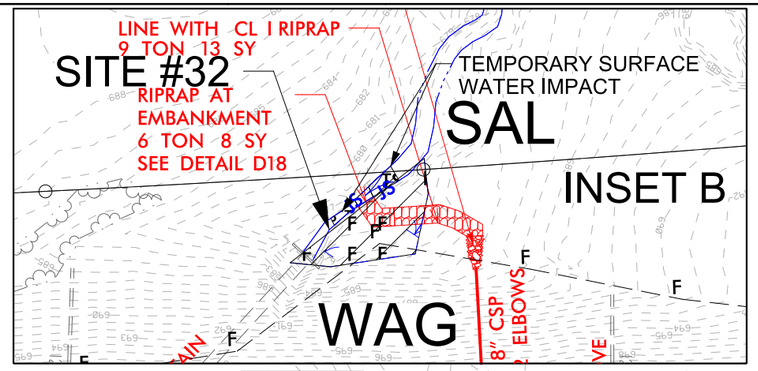
BLYTHE

8/17/99

REVISIONS

NAD 83/2011



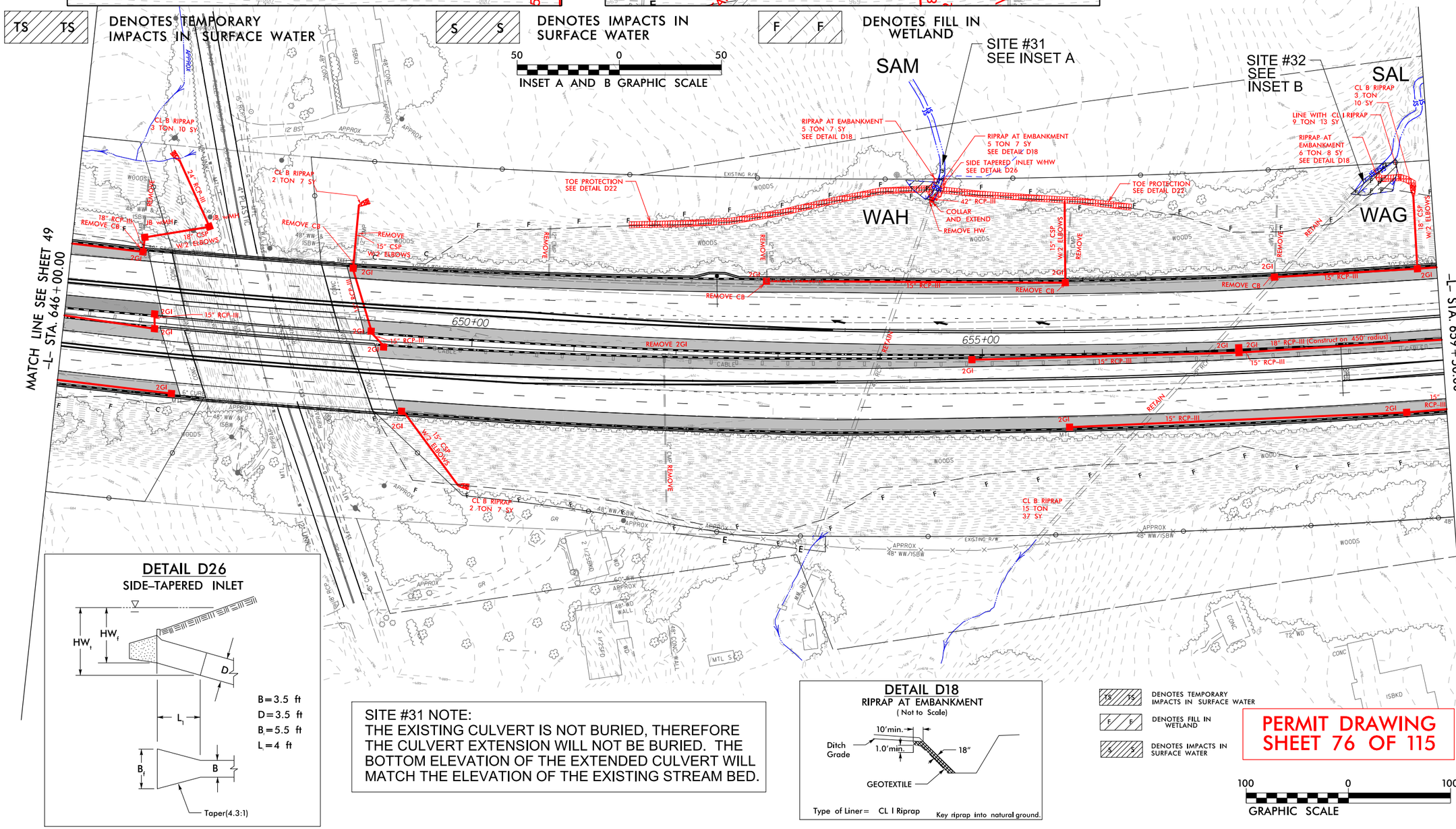


TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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= CL I Riprap
Key riprap into natural ground.

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

100 0 100
GRAPHIC SCALE

9/12/2019
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RPRATCS01$

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

PERMIT DRAWING
SHEET 77 OF 115

654+50.00

20 0 20
GRAPHIC SCALE

9/12/2019
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PRODPWCS01$

8/17/99

REVISIONS

1. 9/5/19 – MOVED BOXES 5209A AND 5209

9/12/2019
J:\Projects01\ncs_workingdir\3088\336401_4002\i5507_Hyd_prm_wet_psh52.dgn
PSHEET_ROSS

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	52
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

INSET A SITE #33

RIPRAP AT EMBANKMENT 21 TON 47 SY SEE DETAIL D18

IMPACTS TO SURFACE WATER

WO

SBH

JS

WLB

F

50 0 50

GRAPHIC SCALE

SITE #33 SEE INSET A

SITE #33 SEE INSET B

RET POND

POND

WOODS

2SBKD

2SROCKD

CONC RISER

15" RCP

42" MTL

24" RCP

RIPRAP

CONC WEIR

APPROX

18" HDPE

CB

24" C&G

BLACKMUIR WOOD CIR

18' BST

96" BLK WALL

48" MTL

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

2GI-D

GRADE TO DRAIN

15" CSP W/2 ELBOWS

2GI

EXISTING R/W

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

REMOVE

30" RCP-III

15" RCP-III

24" RCP-III

2GI-A

2GI-SP

CABLE

RETAIN

CL B RIPRAP 9 TON 20 SY

OTCB-4

WILSON DR

24' BST

30" C&G

LP

48" MTL RAIL

72" PLASTIC

48" WD RAIL

36" WW

ISFD

ISBKD

36" CONC

48" CONC

48" WW/ISBW

MEDOC MOUNTAIN DR

22' BST

72" WD

25BKD

INSET B SITE #33

RIPRAP AT EMBANKMENT SEE DETAIL D18

TEMPORARY SURFACE WATER IMPACT

IMPACTS TO SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)

10'min.
Ditch Grade
1.0'min.
18"
GEOTEXTILE

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

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

100 0 100

GRAPHIC SCALE

PERMIT DRAWING SHEET 78 OF 115

8/17/99

REVISIONS

1. 9/5/19 – MOVED BOXES 5209A AND 5209

9/12/2019
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PROFILE01$

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

PROJECT REFERENCE NO.	SHEET NO.
I–5507	52
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

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

WLB

50 0 50

GRAPHIC SCALE

SITE #33 SEE INSET A

SITE #33 SEE INSET B

RET POND

POND

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

2GI-D

MATCH LINE SEE SHEET 51 –L– STA. 673+00.00

675+00

680+00

685+00

MATCH LINE SEE SHEET 53 –L– STA. 686+00.00

CL B RIPRAP 9 TON 20 SY

OTCB-4

WILSON DR

BLACKMUIR WOOD CIR

EXISTING R/W

INSET B SITE #33

RIPRAP AT EMBANKMENT SEE DETAIL D18

TEMPORARY SURFACE WATER IMPACT

IMPACTS TO SURFACE WATER

50 0 50

GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS 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.

PERMIT DRAWING SHEET 79 OF 115

100 0 100

GRAPHIC SCALE

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

SITE #35

SEE SHEET 56A

WAD

SAJ

WAE

SAJ

SEE SHEET 56A

SITE #35

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
6 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

15" RCP RETAIN

REGRADE MTL DITCH TO DRAIN

2GI-D

15" CSP REMOVE

730+00

735+00

15" RCP-III

18" RCP-III

CUT DITCH CONCRETE
SEE DETAIL DJ3

LINE WITH CL I RIPRAP
27 TON 38 SY

LINE WITH CL I RIPRAP
20 TON 29 SY

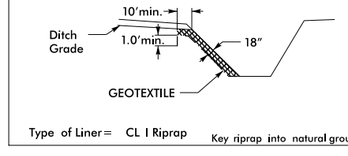
RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

18" RCP CONC REMOVE

DI 2GI-D

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 80 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
C:\pwworking\jcs01\jcs_workingdir\3088\336401_4003\i5507_Hyd_prm_wet_psh56.dgn
dpowell

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

PROJECT REFERENCE NO.	SHEET NO.
I–5507	56
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

SEE SHEET 56A

SITE #35

WAD

SAJ

WAE

RIPRAP AT EMBANKMENT
6 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

REGRADE MTL DITCH TO DRAIN

2GI-D

730+00

735+00

15" RCP-III

18" RCP-III

LINE WITH CL I RIPRAP
27 TON 38 SY

CUT DITCH CONCRETE
SEE DETAIL DJ3

RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

DI 2GI-D

18" RCP-III

15" RCP CONC
REMOVE

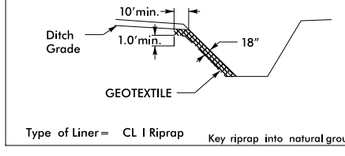
MATCH LINE SEE SHEET 55
–L– STA. 725+50.00

MATCH LINE SEE SHEET 57
–L– STA. 739+00.00

SEE SHEET 56A

SITE #35

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 81 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
C:\pwidgn01\ics_workingdir\3088\336401_4009\i5507_Hyd_prm_wet_psh56_cont.dgn
PWIDGN01$

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

SITE #35

WAD

SAJ

WAE

SAJ

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

LINE WITH CL I RIPRAP
60 TON 85 SY

LINE WITH CL I RIPRAP
178 TON 252 SY

15" CSP W/2 ELBOWS

Conv. DI TO JB w/MH
15" RCP-III

15" RCP
RETAIN

GRADE TO DRAIN

2GI-D

2GI

REMOVE 15" RCP

15" RCP-III

730+00

2GI

2GI

15" RCP-III

2GI

2GI

15" RCP-III

RETAIN

18" RCP-III

DI 2GI-D

15" RCP CONC
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

RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

RIPRAP AT EMBANKMENT
SEE DETAIL D18
4 TON 7 SY

WOODS
48" WW/SBW
72" WD
48" WD RAIL/WW
2SBKD
2SFD
WD
96" WD
CABLE
CONC
BRICK
APPROX
NAD 83/2011

F 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

9/12/2019
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RIPWICS01$

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	56A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

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

LINE WITH CL I RIPRAP
60 TON 85 SY

LINE WITH CL I RIPRAP
178 TON 252 SY

WAD

SAJ

Conv. DI TO JB w/MH
15" RCP-III

15" RCP
RETAIN

GRADE TO DRAIN

2GI-D

15" CSP
W/2 ELBOWS
SEE

REMOVE
15" RCP

15" RCP-III

2GI

730+00

RETAIN

18" RCP-III

DI 2GI-D

15" RCP
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

NAD 83/2011

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 83 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
DGN: Specs01\ics_workingdir\3088\336401_4010\16507_Hyd_prm_wet_psh56A_cont.dgn
RPP: RICS01$

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

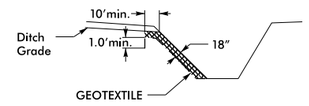
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



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

NAD 83/2011

SITE #36

SITE #37

SEE SHEET 57A

SEE SHEET 57B

SM

SBG

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 20 TON 26 SY

15" CSP W/2 ELBOWS

LINE WITH CL I RIPRAP 31 TON 43 SY

24" CSP W/2 ELBOWS

NON-JURISDICTIONAL

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

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

740+00

745+00

750+00

15" RCP-III

18" RCP-III

24" RCP-III

2GI

2GI-A

REMOVE 2GI

REMOVE 12" CMP

REMOVE 15" CMP

RETAIN

LINE WITH CL I RIPRAP 90 TON 127 SY

LINE WITH CL I RIPRAP 256 TON 361 SY

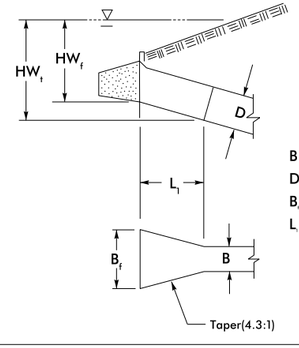
RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

SIDE TAPERED INLET W/HW SEE DETAIL D25

LINE WITH CL I RIPRAP 31 TON 44 SY

LINE WITH CL I RIPRAP 33 TON 47 SY

DETAIL D25
SIDE-TAPERED INLET



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

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 84 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
C:\pe_data\cs01\ics_workingdir\3088\336401_4004\I5507_Hyd_prm_wet_psh57.dgn
PROPLOT$$$

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

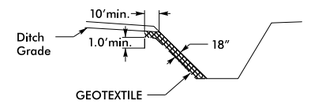
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



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

NAD 83/2011

SITE #36

SEE SHEET 57A

SM

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 20 TON 26 SY

15" CSP W/2 ELBOWS

SITE #37

SEE SHEET 57B

SBG

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 31 TON 43 SY

24" CSP W/2 ELBOWS

NON-JURISDICTIONAL

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

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

740+00

745+00

750+00

15" RCP-III

18" RCP-III

24" RCP-III

2GI

2GI-A

REMOVE 2GI

REMOVE

RIPRAP

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

18" CSP W/2 ELBOWS

SIDE TAPERED INLET W/HW SEE DETAIL D25

15" CSP W/2 ELBOWS

LINE WITH CL I RIPRAP 31 TON 44 SY

LINE WITH CL I RIPRAP 33 TON 47 SY

RIPRAP AT EMBANKMENT 9 TON 9 SY SEE DETAIL D18

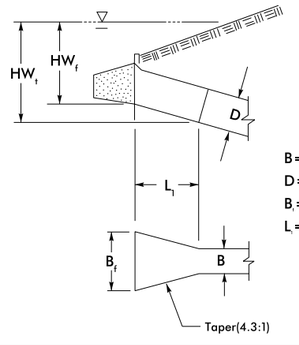
SEE SHEET 57A

SEE SHEET 57B

SITE #36

SITE #37

DETAIL D25
SIDE-TAPERED INLET



B=4.5 ft
D=4.5 ft
B_i=6.5 ft
L_i=4 ft

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 85 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PROFICIS20

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

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

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BLYTHE

8/17/99

REVISIONS

SITE #36

SM

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

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

740+00

15" RCP-III

18" RCP-III

2GI

REMOVE 15" RCP

REMOVE 12" CMP

18" CSP W/2 ELBOWS

12" CMP

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

RETAIN

36" EXPRESSWAY CURB

CONC DI

WOODS

72" WD

WD

BK

ISBKD

2SF&BKD

POOL

HOT TUB

36" BK WALL

BK APPROX

BK FIRE PIT APPROX

APPROX

GR

EXISTING R/W

MTL

F

C

S

PERMIT DRAWING
SHEET 86 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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PRIMWETSHT

8/17/99

REVISIONS

wsp
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NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

SITE #36

SM

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

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

740+00

15" RCP-III

18" RCP-III

2GI

REMOVE 15" RCP

REMOVE 12" CMP

18" CSP W/2 ELBOWS

12" CMP

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

SITE #36

SM

RETAIN

36" EXPRESSWAY CURB

EXISTING R/W

WOODS

72" WD

2SF&BKD

POOL

HOT TUB

BK APPROX

BK FIRE PIT

APPROX

GR

CONC DI

ISBKD

PERMIT DRAWING
SHEET 87 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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PRIMWETSHT

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	57B

RW SHEET NO.

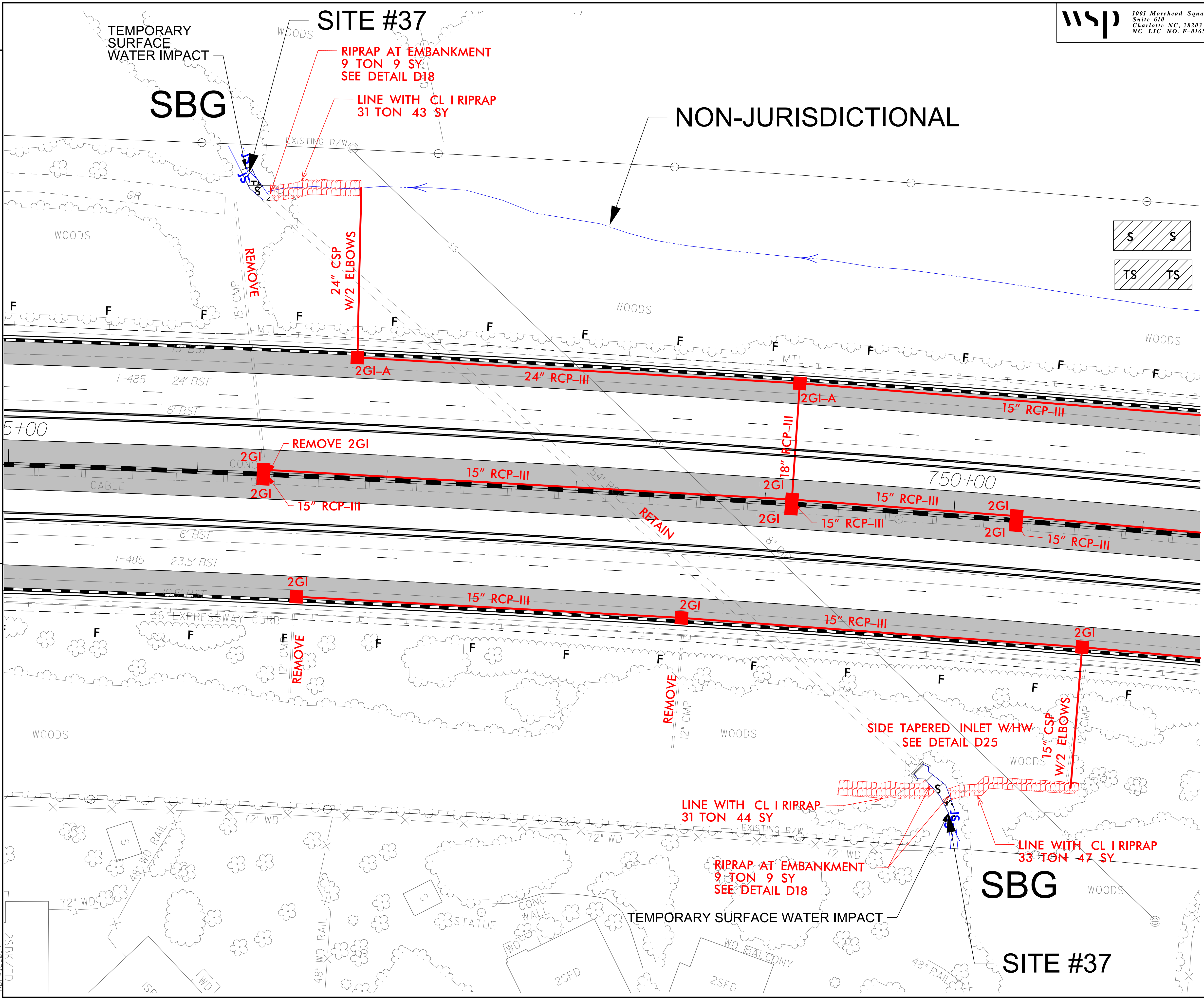
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS



▨ S S DENOTES IMPACTS IN SURFACE WATER

▨ TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 88 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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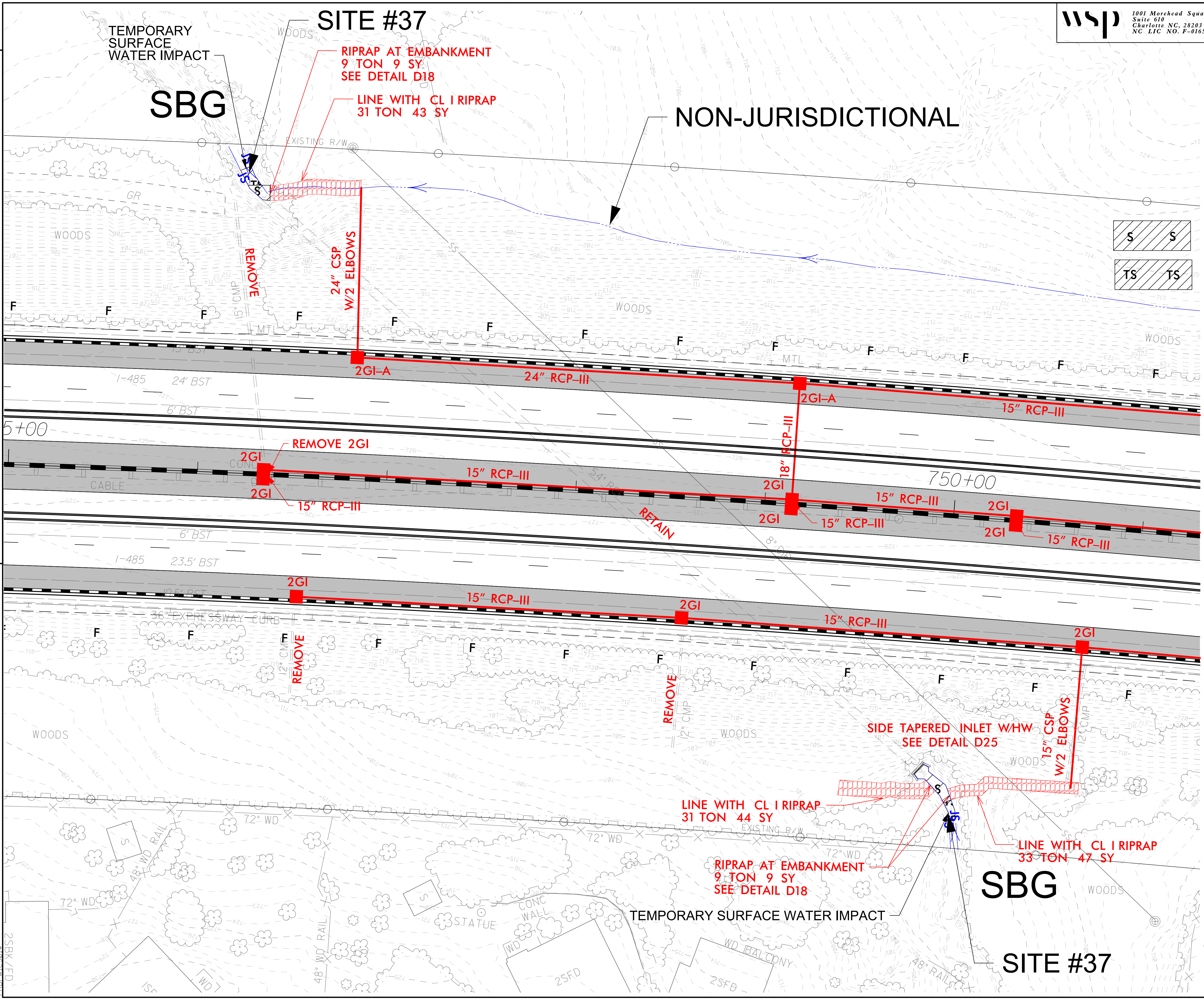
PRDPWICS01$



1001 Morehead Square Dr.
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PROJECT REFERENCE NO.	SHEET NO.
I-5507	57B
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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UNLESS ALL SIGNATURES COMPLETED

BLYTHE

▨ S S DENOTES IMPACTS IN SURFACE WATER

▨ TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 89 OF 115

50 0 50
GRAPHIC SCALE

REVISIONS

8/17/99

9/12/2019
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8/17/99

REVISIONS

SITE #37A

BANK STABILIZATION
SEE DETAIL D19
9 TON

BANK STABILIZATION
SEE DETAIL D19
9 TON

S S DENOTES IMPACTS IN SURFACE WATER

SSH

EXISTING R/W

WOODS

SPECIAL CUT DITCH
SEE DETAIL D1

RETAIN

42" RCP-III

INSET

50 0 50
GRAPHIC SCALE

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	58
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BLYTHE

NAD 83/2011

SITE #37A
SEE INSET

BANK STABILIZATION
SEE DETAIL D19
9 TON

BANK STABILIZATION
SEE DETAIL D19
9 TON

SSH

SPECIAL CUT DITCH
SEE DETAIL D1

RETAIN

42" RCP-III

COLLAR AND EXTEND

SPECIAL CUT DITCH
SEE DETAIL D1

CL B RIPRAP
2 TON 7 SY

15" RCP-III

REMOVE 2GI

2GI

COLLAR AND EXTEND

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

15" RCP-III
(Construct on 450' radius)

CABLE

24" RCP

RETAIN

ADJUST 2GI

36" RCP-III

2GI A

COLLAR AND EXTEND

ISBK BUS

PLAY-GROUND

STONE WALL

CANOPY

PAD

2SBK BUS

2SFD

PORCH

POOL

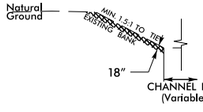
BK

PERMIT DRAWING
SHEET 90 OF 115

100 0 100
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

DETAIL D19
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Tyoe of Liner = Class I Riprap

Key riprap into natural ground.

9/12/2019
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PROPICS01

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	58
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

SITE #37A

BANK STABILIZATION
SEE DETAIL D19
9 TON

BANK STABILIZATION
SEE DETAIL D19
9 TON

S S DENOTES IMPACTS IN SURFACE WATER

SSH

SPECIAL CUT DITCH
SEE DETAIL D1

RETAIN

INSET

SITE #37A
SEE INSET

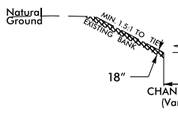
MATCH LINE SEE SHEET 57
-L- STA. 752+00.00

MATCH LINE SEE SHEET 59
-L- STA. 765+00.00

755+00 760+00 765+00

15" RCP-III (Construct on 430' radius)
2GI
CABLE
EXISTING R/W
WOODS
2SFD
PORCH
WD
CONC
48" WW/WD RAIL
48" WW
48" MTL
BK
POOL
MTL
EXPRESSWAY CURB & GUTTER
REMOVE 2GI
REMOVE 15" RCP-III
CL B RIPRAP 2 TON 7 SY
15" RCP-III
REMOVE 2GI
2GI 15" RCP-III
COLLAR AND EXTEND
ADJUST 2GI
RETAIN
24" RCP
36" RCP-III
2GI A
42" RCP-III
HW RCP
STONE WALL
72" CHL
PLAY GROUND
48" CHL
72" CHL
CANOPY
ISBK BUS
18" C&G
BST PA
42" CONC
72" BK
48" BK
2SBK BUS
PAD
60" CONC WALL
6" PVC
60" PLASTIC
15" RCP
24" CMP
18" CMP

DETAIL D19
BANK STABILIZATION
(Not to Scale)



Reference plan view for which bank is to be stabilized.

Tyoe of Liner = Class I Riprap

Key riprap into natural ground.

PERMIT DRAWING
SHEET 91 OF 115

S S DENOTES IMPACTS IN SURFACE WATER

100 0 100
GRAPHIC SCALE

9/12/2019
C:\Projects\01\ics_workingdir\3088\336401_4016\I5507_Hyd_prm_wet_psh58_cont.dgn
PROPWICS01

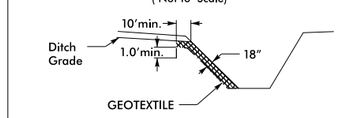
8/17/99

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.

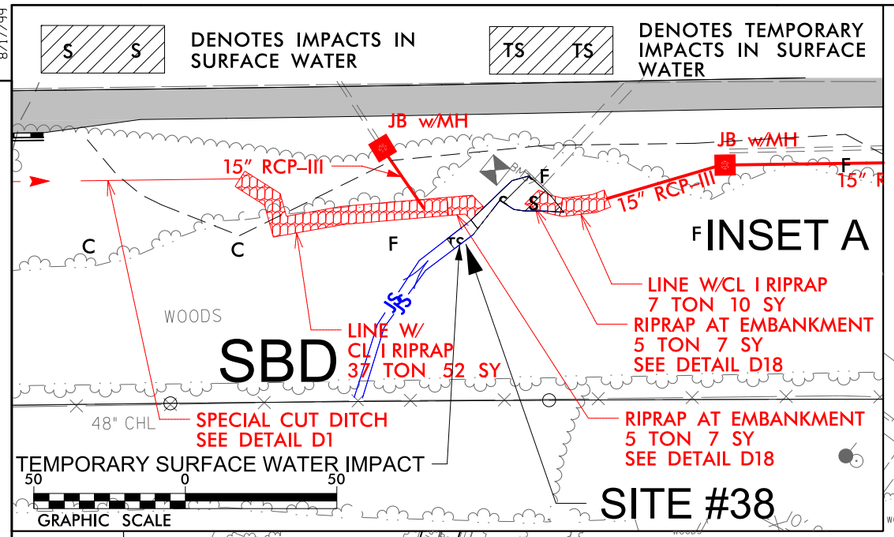
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

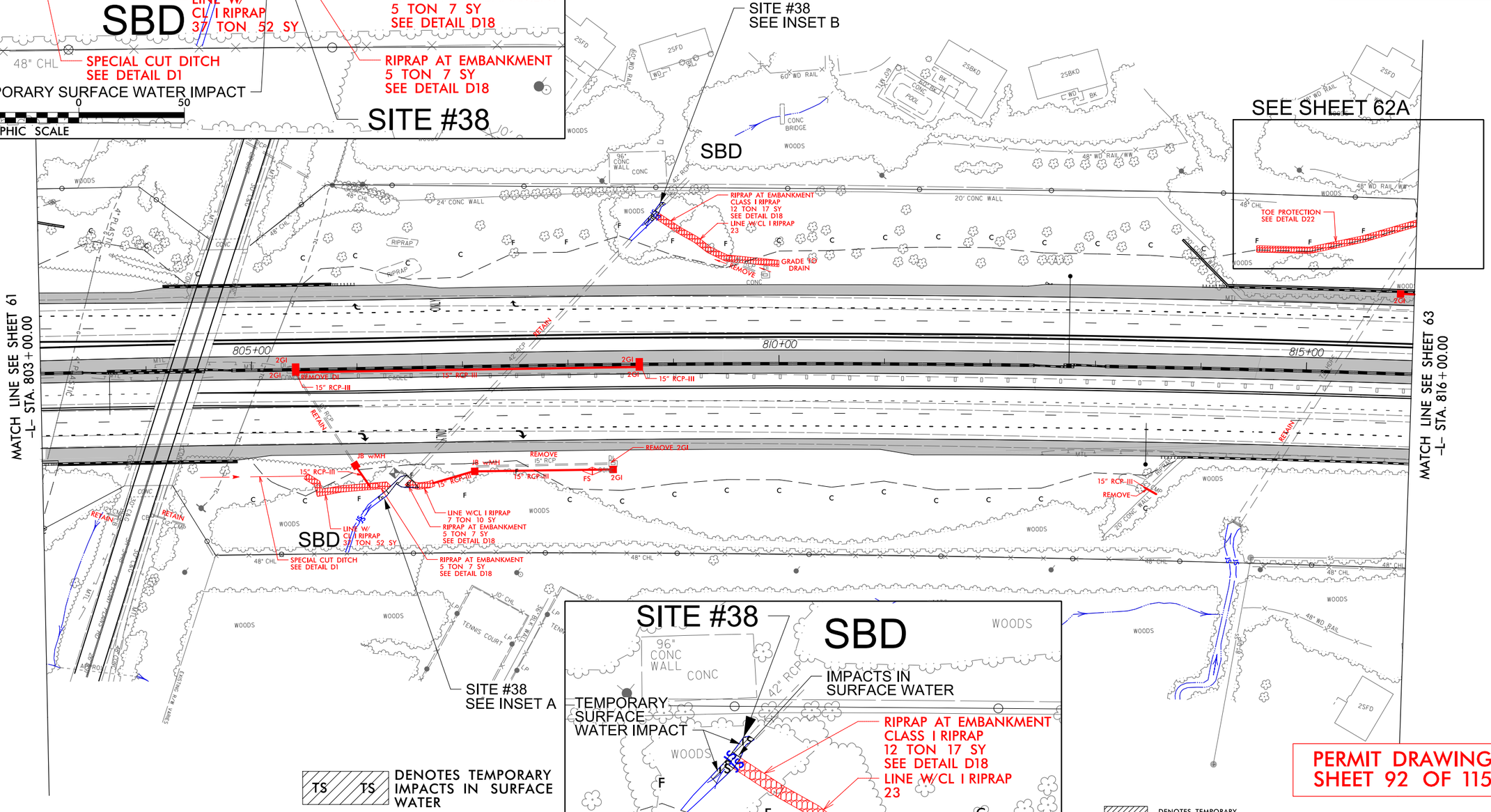
PROJECT REFERENCE NO.	SHEET NO.
I-5507	62
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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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PSHEETS02$

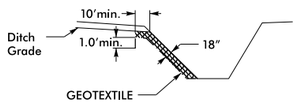
8/17/99

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.

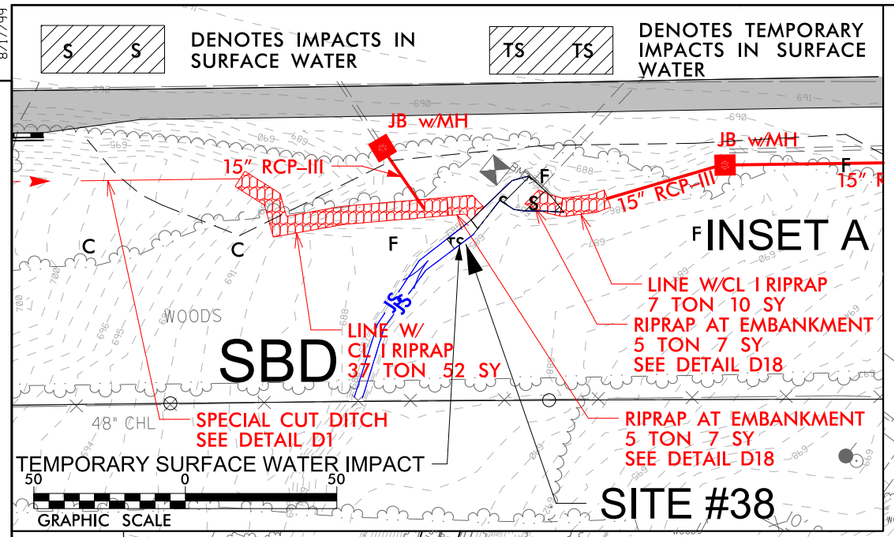
wsp 1001 Morehead Square Dr. Suite 610 Charlotte NC, 28203 NC LIC NO. F-0165

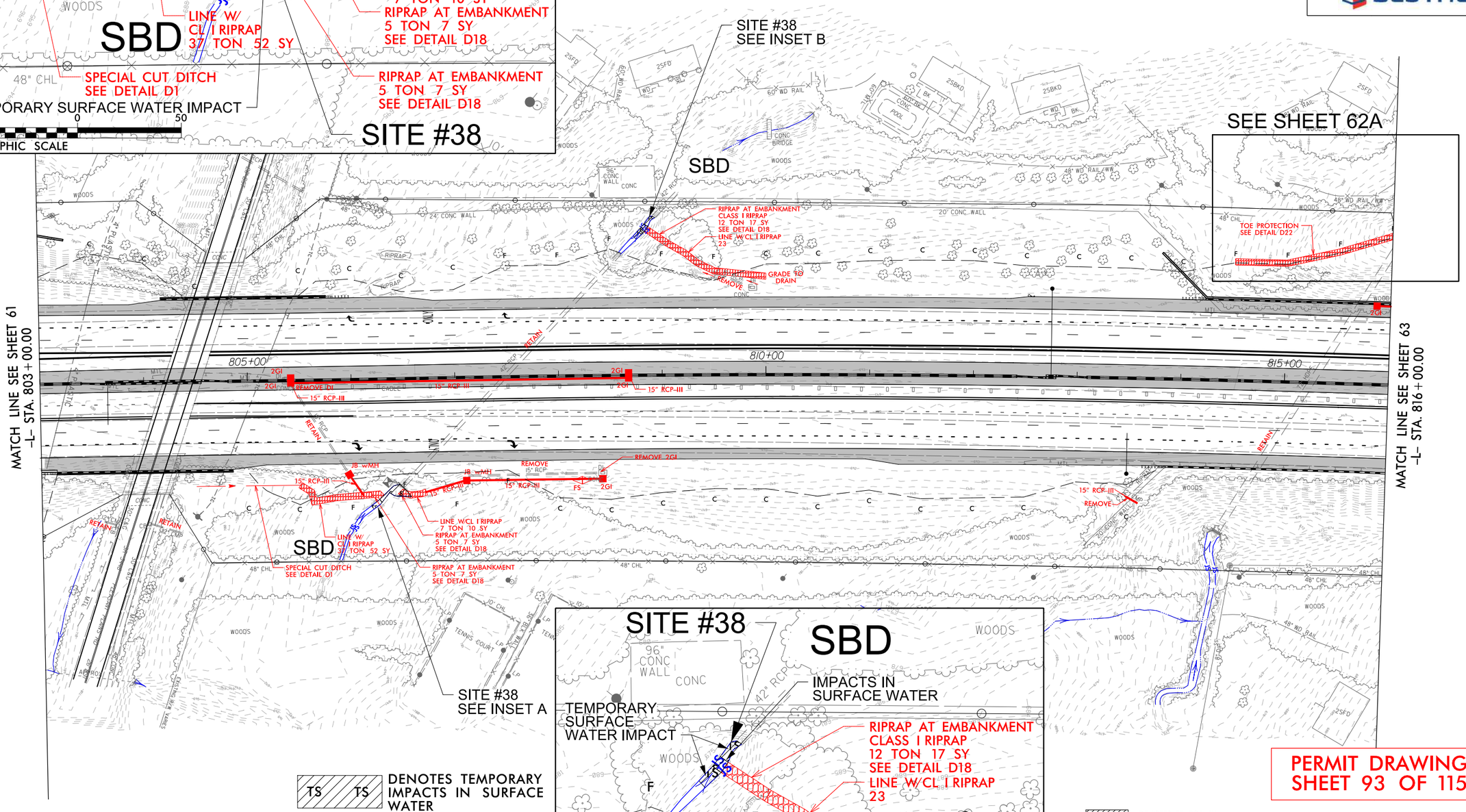
PROJECT REFERENCE NO.	SHEET NO.
I-5507	62
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011





TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 93 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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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	62A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

SITE #39

RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18

TOE PROTECTION
SEE DETAIL D22

SAI

TEMPORARY SURFACE
WATER IMPACT

48" WD RAIL/WW
48" CHL
20' CONC WALL
WOODS
BENCH
CONC
MTL
815+00
72" HDPE
2GI
15" RCP-III
RETAIN
RIPRAP
12" CMP
REMOVE
8" DIP
SS
BOAT
48" WD RAIL
CONC
RIPRAP A
8 TON
SEE DETA

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 94 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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RIPWETCS02$

8/17/99

REVISIONS

wsp
1001 Morehead Square Dr.
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PROJECT REFERENCE NO.	SHEET NO.
I-5507	62A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

SITE #39

RIPRAP AT EMBANKMENT
7 TON 10 SY
SEE DETAIL D18

TOE PROTECTION
SEE DETAIL D22

SAI

TEMPORARY SURFACE WATER IMPACT

2GI

15" RCP-III

815+00

RETAIN

15" RCP-III
REMOVE

RIPRAP
12 TON
SEE DETAIL

2GI

15" RCP-

RIPRAP
8 TON
SEE DETA

SAI

48" WD RAIL/WW
48" CHL
20' CONC WALL
MTL
WOODS
CONC
BENCH
BOAT
8" DIP
SS
JS
F
C
TS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 95 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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RPWICS02$

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

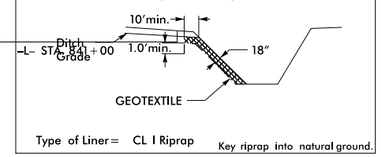
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

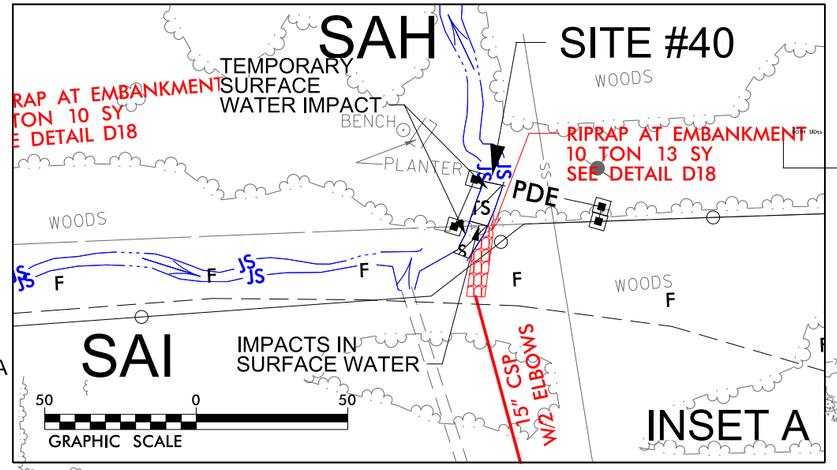
BLYTHE

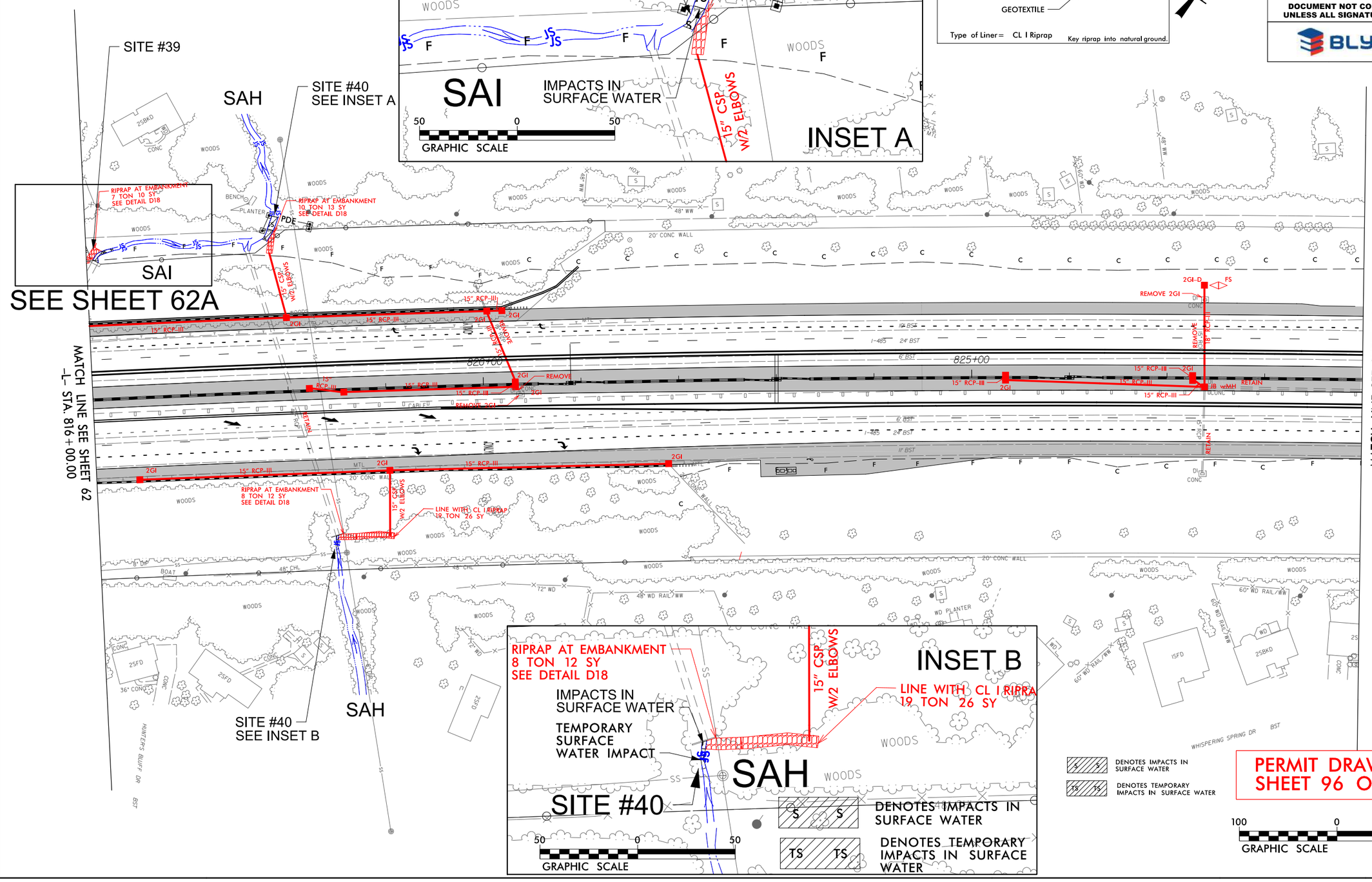
DETAIL D18
RIPRAP AT EMBANKMENT
(Not to Scale)



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

NAD 83/2011





PERMIT DRAWING
SHEET 96 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PWTCS02

8/17/99

REVISIONS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

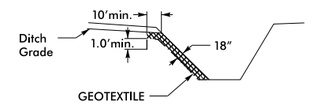
wsp
1001 Morehead Square Dr.
Suite 610
Charlotte NC, 28203
NC LIC NO. F-0165

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

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

50 0 50
GRAPHIC SCALE

INSET A

SITE #39

SAH SITE #40 SEE INSET

RIPRAP AT EMBANKMENT 7 TON 10 SY SEE DETAIL D18

RIPRAP AT EMBANKMENT 10 TON 13 SY SEE DETAIL D18

SAI

SEE SHEET 62A

MATCH LINE SEE SHEET 62 -L- STA. 816+00.00

MATCH LINE SEE SHEET 64 -L- STA. 829+00.00

RIPRAP AT EMBANKMENT 8 TON 12 SY SEE DETAIL D18

LINE WITH CL I RIPRAP 19 TON 26 SY

SITE #40 SEE INSET B

SAH

INSET B

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 97 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
\\Projects02\ics_workgdr\3797\336401_4025\I5507_Hyd_prm_wet_psh63_cont.dgn
PRIMICS02

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	67
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

REVISIONS

SAR SITE #41 INSET A

TEMPORARY SURFACE WATER IMPACT

BANK STABILIZATION 6 TON SEE DETAIL D19

BANK STABILIZATION 7 TON SEE DETAIL D19

LATERAL V DITCH SEE DETAIL D4

WOODS

WAC

EXISTING R/W VARIES

COLLAR AND EXTEND

48" WW/SBW

RCP-IV

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 0 50 GRAPHIC SCALE

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)

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

NAD 83/2011

SITE #41 SEE INSET A

SITE #42 SEE SHEET 67A

SAR

WAC

WAB

SV

BANK STABILIZATION 6 TON SEE DETAIL D19

BANK STABILIZATION 7 TON SEE DETAIL D19

BANK STABILIZATION 8 TON SEE DETAIL D19

LATERAL V DITCH SEE DETAIL D4

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

42" RCP-III

REMOVE 2GI

Conv. 2GI To JB w/MH

885+00 890+00 895+00 10+00

MATCH LINE SEE SHEET 66 -L- STA. 883+50.00

MATCH LINE SEE SHEET 68 -L- STA. 897+00.00

SEE SHEET 67A

INSET B

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6

REMOVE HW

COLLAR AND EXTEND 36" RCP-IV

RIPRAP AT EMBANKMENT 6 TON 9 SY SEE DETAIL D18

RIPRAP AT EMBANKMENT 6 TON 8 SY SEE DETAIL D18

TEMPORARY SURFACE WATER IMPACT

SITE #41

WH

SAR

15" RCP

CONC

72" CHL

50 0 50 GRAPHIC SCALE

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.

SITE #41 SEE INSET B

SITE #42

SEE SHEET 67A

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.

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.

PERMIT DRAWING SHEET 98 OF 115

100 0 100 GRAPHIC SCALE

9/12/2019
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RIPPICS02$

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	67
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

SAR

SITE #41

INSET A

TEMPORARY SURFACE WATER IMPACT

BANK STABILIZATION 7 TON SEE DETAIL D19

BANK STABILIZATION 6 TON SEE DETAIL D19

LATERAL V DITCH SEE DETAIL D4

WOODS

EXISTING R/W VARIES

COLLAR AND EXTEND

RCP-IV

48" WW/SBW

WAC

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50 0 50

GRAPHIC SCALE

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)

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

NAD 83/2011

SITE #41 SEE INSET A

SITE #42

SEE SHEET 67A

WAB

SV

CL B RIPRAP 2 TON 7 SY

15" CSP W/2 ELBOWS

REMOVE

REMOVE 2GI

2GI

15" RCP-III

Conv. 2GI To JB w/MH

6" STEEL

885+00

890+00

895+00

900+00

905+00

910+00

30" EXPRESSWAY CURB

CONC

CABLE

RETAIN

LATERAL V DITCH SEE DETAIL D4

LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6

REMOVE HW

COLLAR AND EXTEND 36" RCP-IV

RIPRAP AT EMBANKMENT 6 TON 9 SY SEE DETAIL D18

WH

SAR

SV

MATCH LINE SEE SHEET 66 -L- STA. 883+50.00

MATCH LINE SEE SHEET 68 -L- STA. 897+00.00

SEE SHEET 67A

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.

SITE #41 SEE INSET B

SITE #42

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

LATERAL V DITCH W/CL I RIPRAP SEE DETAIL D6

REMOVE HW

COLLAR AND EXTEND 36" RCP-IV

RIPRAP AT EMBANKMENT 6 TON 9 SY SEE DETAIL D18

RIPRAP AT EMBANKMENT 6 TON 8 SY SEE DETAIL D18

TEMPORARY SURFACE WATER IMPACT

SITE #41

WH

INSET B

50 0 50

GRAPHIC SCALE

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.

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.

PERMIT DRAWING SHEET 99 OF 115

100 0 100

GRAPHIC SCALE

9/12/2019
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RIPPICS2$

8/17/99

REVISIONS

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

15" CSP
W/2 ELBOWS

15" CSP
W/2 ELBOWS

REMOVE

15" RCP-III

2GI

2GI

2GI

2GI-A

Conv. 2GI To JB w/MH

REMOVE 2GI

REMOVE

REMOVE

WOODS

WOODS

WOODS

48" WW/ISBW

24" R

30" EXPRESSWAY CURB

30" EXPRESSWAY CURB MTL

CABLE

895+00

895+00

895+00

42" RCP

RETAIN

10+00

15+00

MTL

CB 30" EXPRESSWAY CURB

REMOVE 2GI

REMOVE 2GI

30" C&G

2GI

2GI

REMOVE

REMOVE

WOODS

WOODS

LATERAL V DITCH
SEE DETAIL D4

LATERAL V DITCH
SEE DETAIL D4

15" CSP
W/2 ELBOWS

42" RCP-III

REMOVE HW
COLLAR AND
EXTEND

HW

TEMPORARY SURFACE
WATER IMPACT

RIPRAP AT EMBANKMENT
13 TON 17 SY
SEE DETAIL D18

CHANNEL CHANGE
W/CL I RIPRAP
SEE DETAIL D30

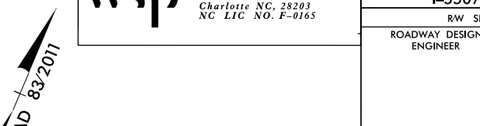
RIPRAP AT EMBANKMENT
13 TON 17 SY

SV

SITE #42
DETAILS ON SHEET 68

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)



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

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

W 50 0 50
GRAPHIC SCALE

PERMIT DRAWING
SHEET 100 OF 115

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

PROJECT REFERENCE NO.	SHEET NO.
I-5507	67A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

9/12/2019
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PAUL.CLARK

8/17/99

REVISIONS

WOODS

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

42" RCP-III

COLLAR AND
EXTEND

APPROX

15" CSP
W/2 ELBOWS

REMOVE

15" RCP-III

2GI

Conv. 2GI To JB w/MH

2GI

15" CSP
W/2 ELBOWS

2GI-A

REMOVE

30" EXPRESSWAY CURB

CABLE

895+00

42" RCP

895+00

895+00

RETAIN

10+00

REMOVE 2GI

CB 30" EXPRESSWAY CURB

2GI

15" CSP
W/2 ELBOWS

REMOVE

LATERAL V DITCH
SEE DETAIL D4

48" WW ISBW

EXIST. ROW VARIES

LATERAL V DITCH
SEE DETAIL D4

30" C&G

REMOVE 2GI

2GI

REMOVE

15" CSP
W/2 ELBOWS

42" RCP-III

REMOVE HW
COLLAR AND
EXTEND

42" RCP-III

TEMPORARY SURFACE
WATER IMPACT

HW

15+00

30" EXPRESSWAY CURB

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

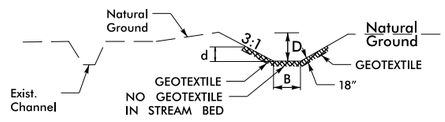
SITE #42

DETAILS ON SHEET 68

–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.

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.

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

50 0 50
GRAPHIC SCALE

PERMIT DRAWING
SHEET 101 OF 115

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

NAD 83/2011

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

9/12/2019
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CADFWCLSDS

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	I-5507	67-1

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

780 770 760 750 740 730 720 710 700

WETLAND (WAB)
SITE #42

2:1

0.020 0.020 0.006

766.53
71.26

766.29
59.26

894+00.00

WETLAND (WAC)
SITE #41

2:1

0.020 0.020 0.005

767.96
63.10

767.72
51.10

PERMIT DRAWING
SHEET 102 OF 115

890+50.00

20 0 20
GRAPHIC SCALE

9/12/2019
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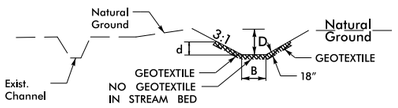
PRODPWICS02$

8/17/99

REVISIONS

DETAIL D30
CHANNEL CHANGE
(Not to Scale)

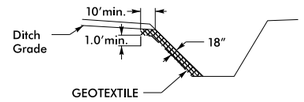


Min. D = 3 ft
Max. d = 3 ft
B = 4 ft

Type of Liner = CL I Riprap

Key riprap into natural ground.

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	68
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

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

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

-L- STA. 897+13 RT

SAE

SITE #42

SEE SHEET 67A

PERMIT DRAWING SHEET 103 OF 115

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100 0 100
GRAPHIC SCALE

9/12/2019
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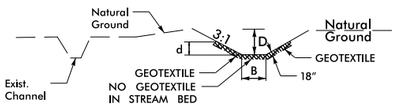
PRPWILSON2$

8/17/99

REVISIONS

DETAIL D30
CHANNEL CHANGE
(Not to Scale)

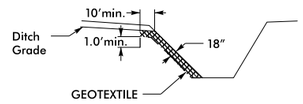


Min. D = 3 ft
Max. d = 3 ft
B = 4 ft

Type of Liner = CL I Riprap

Key riprap into natural ground.

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	68
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

NAD 83/2011

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

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

-L- STA. 897+13 RT

SAE

SITE #42

SEE SHEET 67A

PERMIT DRAWING SHEET 104 OF 115

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

100 0 100
GRAPHIC SCALE

9/12/2019
C:\projects\02\ics_workingdir\3797\336401.4029\I5507_Hyd_prm_wet_psh68_cont.dgn
PRPWILSON2$

8/17/99

REVISIONS

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

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 D1

ADJUST 2GI

CONVERT to JBw/MH ADJUST CB

REMOVE 2GI

GRADE TO DRAIN

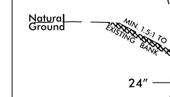
CONVERT to JBw/MH

REMOVE DI

REMOVE

RETAIN

DETAIL D20
BANK STABILIZATION
(Not to Scale)



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

wsp
1001 Morehead Square Dr.
Suite 610
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

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

SAE

SITE #43
SEE INSET

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

I RIPRAP
Y

TEMPORARY SURFACE WATER IMPACT

BANK STABILIZATION 14 TON SEE DETAIL D20

BANK STABILIZATION 8 TON SEE DETAIL D20

LINE WITH C
RIPRAP 156 T

SAE

SITE #43

INSET

50 0 50
GRAPHIC SCALE

100 0 100
GRAPHIC SCALE

PERMIT DRAWING
SHEET 105 OF 115

9/12/2019
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PROJECTS02$

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 JBw/MH
ADJUST CB

REMOVE 2GI

REMOVE DI

GRADE TO DRAIN

RETAIN

REMOVE

CONVERT to JBw/MH

REMOVE 24" RCP-III

REMOVE 15" CSP ELBOWS

REMOVE 2GI

REMOVE

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

APPROX

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL D20
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.

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

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PROJECT REFERENCE NO.	SHEET NO.
I–5507	69
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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BLYTHE

PERMIT DRAWING
SHEET 106 OF 115

GRAPHIC SCALE 50 0 50

GRAPHIC SCALE 100 0 100

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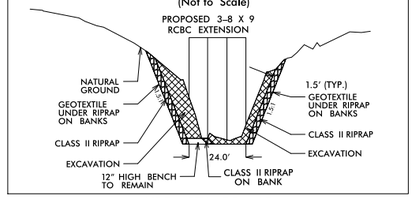

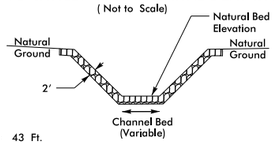

8/17/99

REVISIONS

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

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Charlotte NC, 28203
NC LIC NO. F-0165

BLYTHE

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

PERMIT DRAWING
SHEET 107 OF 115

100 0 100
GRAPHIC SCALE

9/12/2019
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PRDPWICS02$

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Charlotte NC, 28203
NC LIC NO. F-0165

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

NAD 83/2011

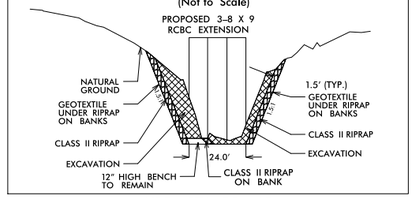
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

8/17/99

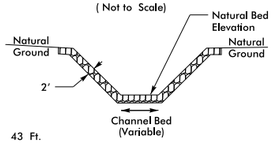
REVISIONS

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

REMOVE HW

HW

15" CMP w/ELBOWS

JB w/MH

CL B RIPRAP 1 TON 5 SY

2GI-D

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

REMOVE 15" RCP

COLLAR AND EXTEND

RIPRAP AT EMBANKMENT SEE DETAIL B15 17 TON 23 SY

BANK STABILIZATION SEE DETAIL B16 24 TON

BANK STABILIZATION SEE DETAIL B16 39 TON

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

PERMIT DRAWING SHEET 108 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.

9/12/2019
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PRIPWILSON2

8/17/99

REVISIONS

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

15" CSP w/ELBOWS

JB w/MH

CL B RIPRAP
1 TON 5 SY

15" RCP–III

2GI–D

RETAIN

36" EXPRESSWAY CURB

19' BST

US 521 JOHNSTON RD
SBL 36.5' BST

40+00

17' BST

5' BST

JOHNSTON RD
38.5' BST

30+00

CONC ISL

JOINT DUCT
AT&T, SPRINT
& ZAYO

WOODS

15" RCP

42" CMP
(DRAINS TO
CULVERT PER PLAN
(LOCATION APPOX.)

10'CB

15" CMP

24" DIP

6' X 9'

MTL

12" CMP

48" W/M

10' BST

wsp
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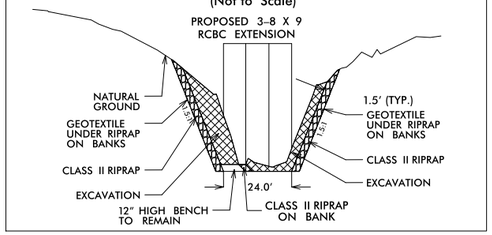
PROJECT REFERENCE NO.	SHEET NO.
I–5507	72A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

BLYTHE

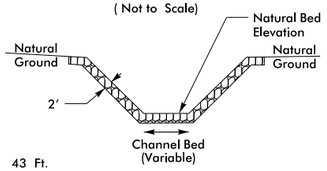
NAD 83/2011

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

PERMIT DRAWING
SHEET 109 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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8/17/99

REVISIONS

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

15" CSP w/ELBOWS

JB w/MH

CL B RIPRAP
1 TON 5 SY

15" RCP-III

2GI-D

RETAIN

36" EXPRESSWAY CURB

19' BST

US 521 JOHNSTON RD
SBL 36.5' BST

40+00

17' BST

5' BST

JOHNSTON RD
38.5' BST

30+00

CONC ISL

JOINT DUCT
AT&T, SPIRIT
& ZAYO

15" RCP

WOODS

42" CMP
(DRAINS TO
CULVERT PER PLAN
(LOCATION APPOX.)

8'W X 9'H RCBC

24" DIP

NAD 83/2011

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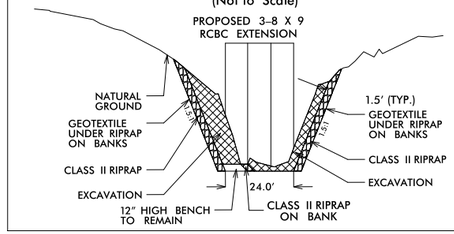
NC LIC NO. F-0165

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

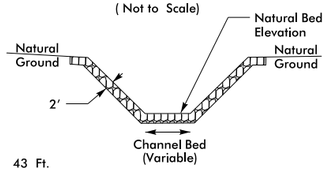
BLYTHE

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

PERMIT DRAWING
SHEET 110 OF 115

50 0 50
GRAPHIC SCALE

9/12/2019
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5/28/99

SITE #44

PROJECT REFERENCE NO.	SHEET NO.
I-5507	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'

EXTENSION LENGTH = 26'

PROPOSED DOWNSTREAM INVERT = 527.3'

RETAIN EXISTING CULVERT

EXISTING UPSTREAM INVERT = 531.1'

EXISTING STREAM BED

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)

9/12/2019
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PROFILE02$

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	Extend Existing 48" RCP						< 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	0.03					0.01		181		
5	137+40 -L- LT	Extend Existing 48" RCP						< 0.01		54		
5	137+65 -142+00 -L- LT	Channel Change						0.05	< 0.01	419	10	
6	293+50 -L-	Bank Stabilization						< 0.01	< 0.01	48	10	
7	294+00 - 301+00 -L- LT	Rock Plating							0.07		680	
8	298+00 -L- LT	Concrete Energy Dissipator						< 0.01		7		
8	298+00 -L- LT	Bank Stabilization						< 0.01		10		
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*:			0.36			0.15		0.19	0.24	1215	789	0

*Rounded totals are sum of actual impacts

NOTES:

At Sites 1, 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 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.

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	129	39	
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	638	181	0

*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.

Revised 2018 Feb

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
09/20/19
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)
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	Headwall							< 0.01		33	
31	654+50 -L- LT	Extend 42" RCP						< 0.01		3		
31	654+50 -L- LT	Lateral Ditch/Stabilization	< 0.01					< 0.01	< 0.01	20	10	
32	658+70 -L- LT	Roadway Fill	0.02									
32	658+70 -L- LT	Bank Stabilization						< 0.01	< 0.01	6	20	
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-	Bank Stabilization						< 0.01	< 0.01	35	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	
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	
TOTALS*:			0.07			0.07		0.05	0.04	425	336	0

*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.

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)
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*		0.36			0.15		0.19	0.24	1215	789	
	SHEET 2 SUBTOTALS*		0.11			0.04		0.15	0.04	638	181	
	SHEET 3 SUBTOTALS*		0.07			0.07		0.05	0.04	425	336	
TOTALS*:			0.56			0.27		0.43	0.33	2507	1347	0

*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
09/20/19
MECKLENBURG
TIP NO. I-5507
WBS NO. 43609.3.2