STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

JOSH STEIN
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

February 11, 2024

MEMORANDUM TO: Division 12 Project Development Unit
Division 12 Construction Unit

FROM: Jeffrey L. Wyatt, Division Environmental Officer
Division 12 Project Development Unit

SUBJECT: Environmental Permits for the upgrade of the US 74 at SR 1168 (N. Academy St/Lattimore Rd) Intersection and Replacement of Bridge Nos. 220048 and 220049 on US 74 in Cleveland County. STIP Project Nos. **R-4045 & BR-0012**

Please find enclosed the following permits for this project:

Agency	Permit Type	Permit Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Individual Permit, dated 2/11/2025	December 31, 2035
NC Division of Water Resources Section 401 Water Quality Certification	Individual Certification, dated 11/8/2024	December 31, 2035

Work is authorized by the above-mentioned permits provided it is accomplished in strict accordance with the permitted plans.

The Division Environmental Office must be consulted if any deviation from the permit(s) is required

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS, WRDA BRANCH
151 PATTON AVE RM 208
ASHEVILLE NC 28801-5006

February 11, 2025

Regulatory Program

Sent Via Email: jlwyatt@ncdot.gov

Jeff Wyatt
NC Department of Transportation, Division 12
PO Box 47
Shelby, North Carolina 28151

Dear Mr. Wyatt:

The U.S. Army Corps of Engineers (Corps) is pleased to enclose the Department of the Army permit to impact 0.03 acre of wetlands and 2,354 linear feet of tributaries, associated with the upgrade of the intersection of US 74 and SR1168 (N. Academy Street/Lattimore Road) to an interchange and replacing Bridge Nos. 220048 and 220049 (STIPs R-4045 and BR-0012), which should be made available at the construction site. Work may begin immediately but the Corps must be notified of:

a. The date of commencement of the work,

b. The dates of work suspensions and resumptions of work, if suspended over a week, and

c. The date of final completion.

This information should be emailed to the SAW District South Atlantic Division at ncdot_reg@usace.army.mil. The Corps is also responsible for inspections to determine whether Permittees have strictly adhered to permit conditions. Other notable conditions:

a. You must complete construction before **December 31, 2035**.

b. You must allow representatives from this office to make periodic visits to your worksite as deemed necessary to assure compliance with permit plans and conditions.

Should you require any changes to the work authorized or obligated by this permit, it is the responsibility of the Permittee to submit a modification request to the South Atlantic, WRDA. The Corps will evaluate the request and determine whether it is appropriate to modify the terms and conditions of the permit. The Permittee must obtain

written approval of the requested modifications from the Corps prior to initiation of those changes.

If you have any questions concerning this correspondence, please contact Crystal Amschler, WRDA Project Manager of the WRDA at 828-526-6013, by mail at the above address, or by email at crystal.c.amschler@usace.army.mil. Please take a moment to complete our customer satisfaction survey located at https://regulatory.ops.usace.army.mil/customer-service-survey/.

FOR THE CHIEF, REGULATORY DIVISION

M. Scott Jones, PWS
WRDA / Transportation Branch Chief
USACE - Wilmington District

Enclosures

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Jeff Wyatt, NC Department of Transportation, Division 12	File Number: SAW-2021-00799	Date: 2/11/2025

Attached is:		See Section below
☐	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
☒	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
☐	PERMIT DENIAL WITHOUT PREJUDICE	C
☐	PERMIT DENIAL WITH PREJUDICE	D
☐	APPROVED JURISDICTIONAL DETERMINATION	E
☐	PRELIMINARY JURISDICTIONAL DETERMINATION	F

SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable
You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial
You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable
You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision you may contact:	If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:
District Engineer, SAW Regulatory Division Attn: Crystal Amschler SAW District U.S. Army Corps of Engineers 151 Patton Ave Rm 208 Asheville, NC 28801	Krista Sabin Regulatory Administrative Appeal Review Officer U.S. Army Corps of Engineers South Atlantic 60 Forsyth Street SW Room 9M 15 Atlanta, Georgia 30303-8801 Phone: 904-314-9631 Email: Krista.D.Sabin@usace.army.mil

SECTION II – REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:
Email address of appellant and/or agent:	Telephone number:

DEPARTMENT OF THE ARMY PERMIT

Permittee: **Mr. Jeff Wyatt**
NC Department of Transportation
PO Box 47
Shelby, **North Carolina 28151**

Permit No: SAW-2021-00799

Issuing Office: U.S. Army Engineer District, Wilmington

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the U.S. Army Corps of Engineers (Corps) having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The work described above is to be completed in accordance with the 3 attachments affixed at the end of this permit instrument.

Project Location: The project is located on US 74 at the intersection of US 74 with Lattimore Road/N. Academy Street and extends to near where US 74 crosses over Sandy Run Creek, in Mooresboro, Cleveland County, North Carolina.

Approximate Central Coordinates: Latitude: 35.299730 North
Longitude: -81.689970 West

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on December 31, 2035. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity, or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. 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 National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature and the mailing address of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions**.**

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

1. **Work Limits:** All work authorized by this permit shall be performed in strict compliance with the attached permit plans, which are a part of this permit. The Permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. Any modification to the attached permit plans must be approved by the U.S. Army Corps of Engineers prior to any active construction in waters or wetlands.

2. **Unauthorized Dredge or Fill:** Except as authorized by this permit or any U.S. Army Corps of Engineers approved modification to this permit, no excavation, fill, or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, or shall any activities take place that cause the degradation of waters or wetlands. There shall be no excavation from, waste disposal into, or degradation of, jurisdictional wetlands or waters associated with this permit without appropriate modification of this permit, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities

connected with this project. In addition, except as specified in the plans attached to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, in such a manner as to impair normal flows and circulation patterns within, into, or out of waters or wetlands or to reduce the reach of waters or wetlands.

3. **Permit Distribution:** 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 permit. A copy of this permit, including all conditions, drawings and attachments shall be available at the project site during the construction and maintenance of this project.

4. **Pre-Construction Meeting:** The Permittee shall schedule and attend a preconstruction meeting between its representatives, the contractors' representatives, and the U.S. Army Corps of Engineers, WRDA Transportation Branch, NCDOT Regulatory Project Manager, prior to any work within jurisdictional waters and wetlands to ensure that there is a mutual understanding of all the terms and conditions contained with this Department of Army Permit. The Permittee shall provide the Corps with a copy of the final permit plans at least two weeks prior to the preconstruction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The Permittee shall schedule the preconstruction meeting for a time frame when the Corps, NCDCM, and NCDWR Project Managers can attend. The Permittee shall invite the Corps, NCDCM, and NCDWR Project Managers a minimum of thirty (30) days in advance of the scheduled meeting in order to provide those individuals with ample opportunity to schedule and participate in the required meeting. The thirty (30) day requirement can be waived with the concurrence of the Corps.

5. **Notification of Construction Commencement and Completion:** The Permittee shall notify the U.S. Army Corps of Engineers in writing prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.

6. **Reporting Address:** All reports, documentation, and correspondence required by the conditions of this permit shall be submitted to the following: U.S. Army Corps of Engineers, WRDA Transportation Branch, Attn: Crystal Amschler 151 Patton Avenue, Room 208 or Crystal.C.Amschler@usace.army.mil. The Permittee shall reference the following permit number, SAW-2021-00799, on all submittals.

7. **Permit Revocation:** 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 United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

8. **Reporting Violations:** Violation of these permit conditions or violation of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act shall be reported to the Corps in writing and by telephone at: 828-526-6013 within 24 hours of the Permittee's discovery of the violation.

9. **Clean Fill:** The Permittee shall use only clean fill material for this project. The fill material shall be free from items such as trash, construction debris, metal and plastic products, and concrete block with exposed reinforcement bars. Soils used for fill shall not be contaminated with any toxic substance in concentrations governed by Section 307 of the Clean Water Act. Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source.

10. **Endangered Species Act:** The Permittee shall implement all necessary measures to ensure the authorized activity does not kill, injure, capture, harass, or otherwise harm any federally listed threatened or endangered species. While accomplishing the authorized work, if the Permittee discovers or observes an injured or dead threatened or endangered species, the U.S. Army Corps of Engineers, Wilmington District Asheville Regulatory Field Office, Attn: Crystal Amschler, 151 Patton Avenue, Room 208 or Crystal.C.Amschler@usace.army.mil will be immediately notified to initiate the required Federal coordination.

A. Suitable occupied habitat for dwarf-flowered heartleaf (DFHL) (*Hexastylis naniflora*) is present within the action area. There are two known DFHL population located within the project corridor and NCDOT shall avoid impacting these sites.

11. **Culverts:**

1) Unless otherwise requested in the application and depicted on the approved permit plans, culverts greater than 48 inches in diameter shall be buried at least one foot below the bed of the stream. Culverts 48 inches in diameter and 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 existing channel slope. The bottom of the culvert shall be placed at a depth below the natural stream bottom to provide for passage during drought or low flow conditions. Culverts shall be designed and constructed in a manner that minimizes destabilization and head cutting.

2) Measures shall be included in the construction/installation that will promote the safe passage of fish and other aquatic organisms. 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 opening shall 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.

3) The Permittee shall implement all reasonable and practicable measures to ensure that equipment, structures, fill pads, work, and operations associated with this project do not adversely affect upstream and/or downstream reaches. Adverse effects include, but are not limited to, channel instability, flooding, and/or stream bank erosion. The Permittee shall routinely monitor for these effects, cease all work when detected, take initial corrective measures to correct actively eroding areas, and notify this office immediately. Permanent corrective measures may require additional authorization by the U.S. Army Corps of Engineers.

4) Culverts placed within wetlands must be installed in a manner that does not restrict the flows and circulation patterns of waters of the United States. Culverts placed across wetland fills purely for the purposes of equalizing surface water shall not be buried, but the culverts must be of adequate size and/or number to ensure unrestricted transmission of water.

12. **Sediment and Erosion Control:**

1) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings will be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings will be constructed of non-erodible materials. Grubbing of riparian vegetation will not occur until immediately before construction begins on a given segment of stream channel.

2) No fill or excavation impacts for the purposes of sedimentation and erosion control shall occur within jurisdictional waters, including wetlands, unless the impacts are included on the plan drawings and specifically authorized by this permit. This includes, but is not limited to, sediment control fences and other barriers intended to catch sediment losses.

3) The Permittee shall remove all sediment and erosion control measures placed in waters and/or wetlands, and shall restore natural grades on those areas, prior to project completion.

4) The Permittee shall use appropriate sediment and erosion control practices which equal or exceed those outlined in the most recent version of the “North Carolina Sediment and Erosion Control Planning and Design Manual” to ensure compliance with the appropriate turbidity water quality standard. Erosion and sediment control practices shall be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to ensure compliance with the appropriate turbidity water quality standards. 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 shall remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A, Article 4). Adequate sedimentation and erosion control measures shall be implemented prior to any ground disturbing activities to minimize impacts to downstream aquatic resources. These measures shall be inspected and maintained regularly, especially following rainfall events. All fill material shall be adequately stabilized at the earliest practicable date to prevent sediment from entering into adjacent waters or wetlands.

13. **Temporary Fills:** Within thirty (30) days of the date of completing the authorized work, the Permittee shall remove all temporary fills in waters of the United States and restore the affected areas to pre-construction contours and elevations. The affected areas shall be re-vegetated with native, non-invasive vegetation as necessary to minimize erosion and ensure site stability.

14. **Borrow and Waste:** To ensure that all borrow and waste activities occur on high ground and do not result in the degradation of adjacent waters and wetlands, except as authorized by this permit, the Permittee shall require its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. The Permittee shall provide the U.S. Army Corps of Engineers with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. The Permittee shall submit to the Corps site-specific information needed to ensure that borrow and/or waste sites comply with all applicable Federal requirements, to include compliance with the Endangered Species Act and the National Historic Preservation Act, such as surveys or correspondence with agencies (e.g., the USFWS, the NC-HPO, etc.). The required information shall also include the location of all aquatic features, if any, out to a distance of 400 feet beyond the nearest boundary of the site. The Permittee shall not approve any borrow and/or waste sites before receiving written confirmation from the Corps that the proposed site meets all Federal requirements, whether or not waters of the U.S., including wetlands, are located in the proposed borrow and/or waste site. All delineations of aquatic sites on borrow and/or waste sites shall be verified by the U.S. Army Corps of Engineers and shown on the approved reclamation plans. The Permittee shall ensure that all borrow and/or waste sites comply with Special Condition 2 of this permit. Additionally, the Permittee shall produce and maintain documentation of all borrow and waste sites associated with this project. This documentation will include data regarding soils, vegetation, hydrology, any delineation(s) of aquatic sites, and any jurisdictional determinations made by the Corps to clearly demonstrate compliance with Special Condition 2. All information will be available to the U.S. Army Corps of Engineers upon request. The Permittee shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site and provide written documentation that the reclamation plans have

been implemented and all work is completed. This documentation will be provided to the U.S. Army Corps of Engineers within 30 days of the completion of the reclamation work.

15. **Compensatory Mitigation:** 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.

16**. Compliance Inspection:** A representative of the Corps of Engineers will periodically and randomly inspect the work for compliance with these conditions. Deviations from these procedures may result in an administrative financial penalty and/or directive to cease work until the problem is resolved to the satisfaction of the Corps.

17. **Prohibitions on Concrete:** The permittee shall take measures to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with any water in or entering into waters of the United States. Water inside coffer dams or casings that has been in contact with concrete shall only be returned to waters of the United States when it no longer poses a threat to aquatic organisms (concrete is set and cured).

18. **Discovery of Previously Unknown Remains and Artifacts:** If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal, and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403)

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344)

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413)

( ) Section 14 of the Rivers and Harbors Act of 1899 (33 U.S.C. 408)

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, State, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

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

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

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

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General Condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

Jeffrey L. Wyatt _____ 2/7/2025 _____

(PERMITTEE) (DATE)

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below.

M. Scott Jarvis _____, FOR Date: 11 FEB 2025

Brad A. Morgan, P.E.
Colonel, U.S. Army
District Commander

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

_____ _____

(TRANSFEREE-SIGNATURE) (DATE)

_____

(NAME-PRINTED)

_____

(ADDRESS)

_____

(CITY, STATE, AND ZIP CODE)

U.S. ARMY CORPS OF ENGINEERS
Wilmington District
Compensatory Mitigation Responsibility Transfer Form

Permittee: North Carolina Department of Transportation (NCDOT) **Action ID: SAW-2021-00799**
Project Name: intersection of US 74 and N. Academy Street/Lattimore Road and replacing Bridge Nos. 220048 and 220049 (STIPs R-4045 and BR-0012) **County:** Iredell

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:** 03050105, Broad River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	1,523					

*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:** 03050105, Broad River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
	3,046					

Mitigation Site Debited: NC DMS
(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: _____

Name of Sponsor's Authorized Representative: _____

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

USACE Wilmington District
Compensatory Mitigation Responsibility Transfer Form, Page 2

Conditions for Transfer of Compensatory Mitigation Credit:

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

Comments/Additional Conditions:

This form is not valid unless signed below by the USACE Project Manager and by the Mitigation Sponsor on Page 1. ***Once signed, the Sponsor should provide copies of this form along with an updated bank ledger to: 1) the Permittee, 2) the USACE Project Manager at the address below, and 3) the Wilmington District Mitigation Office, Attn: Todd Tugwell, 3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587 (email: todd.tugwell@usace.army.mil)***. Questions regarding this form or any of the permit conditions may be directed to the USACE Project Manager below.

USACE Project Manager: Crystal Amschler
USACE Field Office: Asheville Regulatory Field Office
US Army Corps of Engineers
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

Email:

Crystal Amschler Digitally signed by Crystal Amschler
Date: 2025.01.30 11:23:24 -05'00'

USACE Project Manager Signature Click here to enter a date. **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.

Permit Drawings

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

General Project Information

WBS Element:	34598.2.2	**TIP Number:**	R-4045/BR-0012	**Project Type:**	Roadway Widening	**Date:**	8/29/2024
NCDOT Contact:	Andy Hussey			**Contractor / Designer:**	Brandon Johnson, PE		
Address:	1020 Birch Ridge Drive Room #16 Raleigh, NC 27610			**Address:**	3301 Benson Dr Suite 400 Raleigh, NC 27609		
Phone:	(919) 707-6641			**Phone:**	(919) 322-0115		
Email:	lahussey@ncdot.gov			**Email:**	brandon.johnson@summitde.com		
City/Town:	Mooresboro			**County(ies):**	Cleveland		
River Basin(s):	Broad			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	1.59	**Surrounding Land Use:**	Rural Area with Residential and Agricultural Land Use				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	19.2	ac.		15.6	ac.		
Typical Cross Section Description:	2 12' lane divided highway with 12' total shoulder (10' paved)			2 12' lane divided highway with 4' paved shoulder			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	30300	Year: 2043	Existing:	22600	Year:	2023

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

State Project involves an upgrade of US 74 at SR 1168 insterection to an interchange and replacement of NCDOT Bridge 220048 and 220049 over Sandy Run Creek on US 74 in Cleveland County. An addition of 2 ramps that will fill over two jurisdictional streams, and one of the ramps will be a new crossing over UT to Sandy Run Creek. An addition of 1 ramp, 1 loop and a major collector that will be new crossings over UT to Sandy Run Creek. Minimization measures such as utilizing 1.5:1 fill slopes are used near wetlands and streams to reduce permanent stream impact. Grass lined ditches are used to help promote infiltration in proposed ditches and ditches with rip rap are used to reduce erosions. Bank stabilization and rip rap at embankment are utilized to reduce erosion at streams.

Stream SA is outside the project limits, so there are no surface water impacts to this stream.

Stream SB is crossed by four alignments (-Y1RPA-, -Y1LPA-, -Y1-, and -Y2-). The proposed -Y1RPA- crossing is a single span bridge. Proposed fill slopes of 2:1 and 1.5:1 ensure all fill is at least 10 feet outside top of bank. The existing topography around the stream is very steep, so ditches are lined with rip rap to reduce velocity and rip rap at embankment is used at the ties to the stream. The proposed -Y1LPA- crossing is an 8’ x 7’ box culvert. The culvert is aligned with the upstream and downstream channels to the greatest extent possible with minimal channel work. The culvert is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes are utilized to minimize culvert length, minimize impacts to Wetland WF, and ensure the fill slope does not impact the stream south of the culvert. Streambank stabilization is proposed to protect the banks during and after culvert phasing. The proposed -Y1- crossing is a 78” pipe. The pipe is aligned the upstream and downstream channels to the greatest extent possible with minimal channel work. The pipe is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes are utilized to minimize pipe length and minimize impacts to Wetland WE. Additionally, the alignment of -Y1- is shifted west of the existing which reduces the impact to Wetland WE with the grade increase required for the -Y1- bridge. The ditch tie in is located at the proposed rip rap channel at the pipe inlet. The proposed -Y2- crossing is a 60” pipe. The pipe is aligned the upstream and downstream channels to the greatest extent possible with minimal channel work. The pipe is embedded 1.0' and rip rap channels/protection at the inlet and outlet are embedded to align with the stream. 1.5:1 fill slopes is utilized to minimize pipe length. The drainage areas of the ditches in the northwest and southeast quadrants are large, so the ditches are lined with rip rap and the last ditch section has a slope of 0.005 ft/ft to reduce the velocity at the tie to the stream. Similarly, the ditch in the southwest quadrant utilizes rip rap to reduce velocity, and all ditches tie to the pipe inlet/outlet stabilization. With the large ditch in the southeast quadrant tying to Stream SB, adding additional drainage area to Stream SD is minimized.

Stream SE has a temporary impact due to a clean water diversion being used to divert clean water around the construction site tying to the stream.

Stream SC is crossed by alignment -SR1-. A proposed 60” pipe buried 1.0’ will be used as the crossing. Fill slopes are 2:1 on both sides of the alignment near the stream to minimize stream impacts. Outlet channel stabilization will be used to reduce erosion at the downstream end. Rip rap will be extended downstream to include the outlet of a closed drainage system that discharges into the stream. Due to the steepness of the existing topography, the storm drain system will also utilize elbows to reduce the velocity of the discharge going into the stream. Wetland WB and WC are directly downstream of the crossing. WB will not be impacted. The impacts to WC will be minimized with the use of 2:1 fill slopes. Existing topography near the stream is steep and stream bank stabilization will be installed at the inlet to reduce runoff velocity from the proposed ditches and minimize erosion.

WBS Element:	34598.2.2	TIP No.:	R-4045/BR-0012	County(ies):	Cleveland	Page	2	of	4

Additional General Project Information

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

Per the CE document, a new 54” pipe will be placed parallel to the existing 48” pipe on Stream SC under US 74, ensuring a more stable stream with less susceptibility to stream blockages, minimizing impacts to dwarf-flowered heartleaf plants located upstream from the existing inlet. The -L- alignment has been shifted north to avoid any impacts to the upstream stream section and the dwarf flowered heartleaf boundary. NCDOT Hydraulics design guidelines were followed to minimize impacts to aquatic passage. A jurisdictional stream rip rap protection pad is proposed at the outlet of retain existing 48" RCP extension. The proposed new 54" steel pipe will be trenchless installation parallel to the existing 48” RCP with sufficient clearance to avoid and minimize impacts to stream SC. During installation, temporary dikes will be utilized to separate pushing and receiving pits from stream SC. Due to the requirement to construct parallel to existing 48” RCP upstream and downstream, 54” pipe ends will not align with stream SC. A bench excavation upstream within the existing roadway slope limits is proposed as an overflow in accordance with RFP requirements. Downstream will require a proposed channel lined with rip rap from the 54” pipe to the existing stream SC tie in where pipe outlet channel stabilization is proposed. 1.5:1 roadway fill slopes will be utilized to minimize pipe length and stream impacts.

A new 60" pipe buried 1.0' will cross alignment -RPD-. Channel stabilization will be placed at outlet to reduce velocity and prevent erosion. Stream SG will be realigned downstream of the 60" -RPD- pipe and upstream of a new 66" pipe as a 47 ft long, 8 ft wide riprap-lined tail ditch with 2:1 side slopes. A proposed 66” pipe buried 1.0’ will replace the existing 48” RCP under US 74. The proposed 66" steel pipe will be trenchless installation with sufficient clearance to minimize impacts to stream SG. The proposed 66” pipe will discharge to the same outlet as the existing 48” RCP with pipe outlet stabilization. During installation, temporary dikes will be utilized to separate pushing and receiving pits from stream SG. A temporary diversion channel will be utilized downstream of the 66" pipe in order to stabilize the existing channel before restoring flow to the existing condition. 1.5:1 roadway fill slopes will be utilized to minimize pipe length and stream impacts.

Alignment -SR1- does not cross stream SG but discharges directly downstream to SG. Pipe outlet channel stabilization will be installed at the cross pipe upstream of SG to reduce velocity and prevent erosion.

Streams SD and SF south of -L- interchange Quadrant C are fully impacted by the preliminary and final proposed design/construction, so Stream SD and SF flows will be directed into a single 60” steel trenchless installed pipe. The outlet will be aligned with an existing ditch outside of stream SD north of -L- and pipe outlet channel is proposed to connect the outfall ditch with Stream SD. During trenchless installation, a temporary dike will be utilized to separate receiving pit from existing stream SD at the pipe outlet, and a temporary diversion channel will also be utilized. The proposed drainage will direct existing stream SD drainage north and south of -L- directly to Stream SB to minimize the effects of adding the existing SF drainage to SD.

Sandy Run Creek is crossed by one alignment (-L-/US 74). The proposed crossing are two-span dual bridges that are taller and longer than the existing bridges. Proposed spill through abutment slopes of 1.5:1 will ensure all fill is at least 10 feet outside top of bank. The single interior drill shaft bents are outside the stream. The proposed bents are located to avoid conflicts with the existing bents. A stormdrain system is proposed right of -L- near the eastbound lane to outfall the proposed 10-ft base ditch minimizing erosion to Sandy Run Creek. Extending the ditch to Sandy Run Creek will require a steep grade that would create undesired erosive velocity.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

General Project Information

Waterbody Information

Surface Water Body (1):	Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Sandy Run Creek			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (2):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	SB			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (3):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	SC			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.02; Released April 23, 2024)

WBS Element: 34598.2.2 **TIP No.:** R-4045/BR-0012 **County(ies):** Cleveland

Additional Waterbody Information

Surface Water Body (4):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	Yes	Comments:	Dwarf Flowered Heartleaf		
NRTR Stream ID:	SD			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (5):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SE			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (6):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SF			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

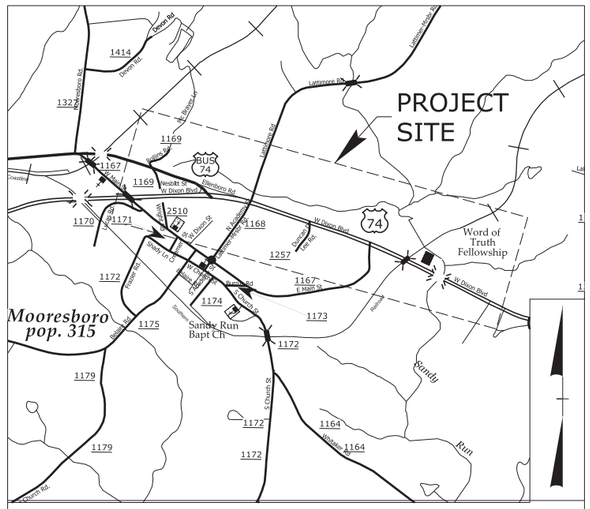
Surface Water Body (7):	UT to Sandy Run Creek		**NCDWR Stream Index No.:**	9-46-(3.5)	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	SG			**Buffer Rules in Effect:**	N/A
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

09/08/99

TIP PROJECT: R-4045/BR-0012

CONTRACT: C204860

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



VICINITY MAP

NOTE: THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES FOR THE TOWN OF MOORESBORO.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CLEVELAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4045/BR-0012	1	

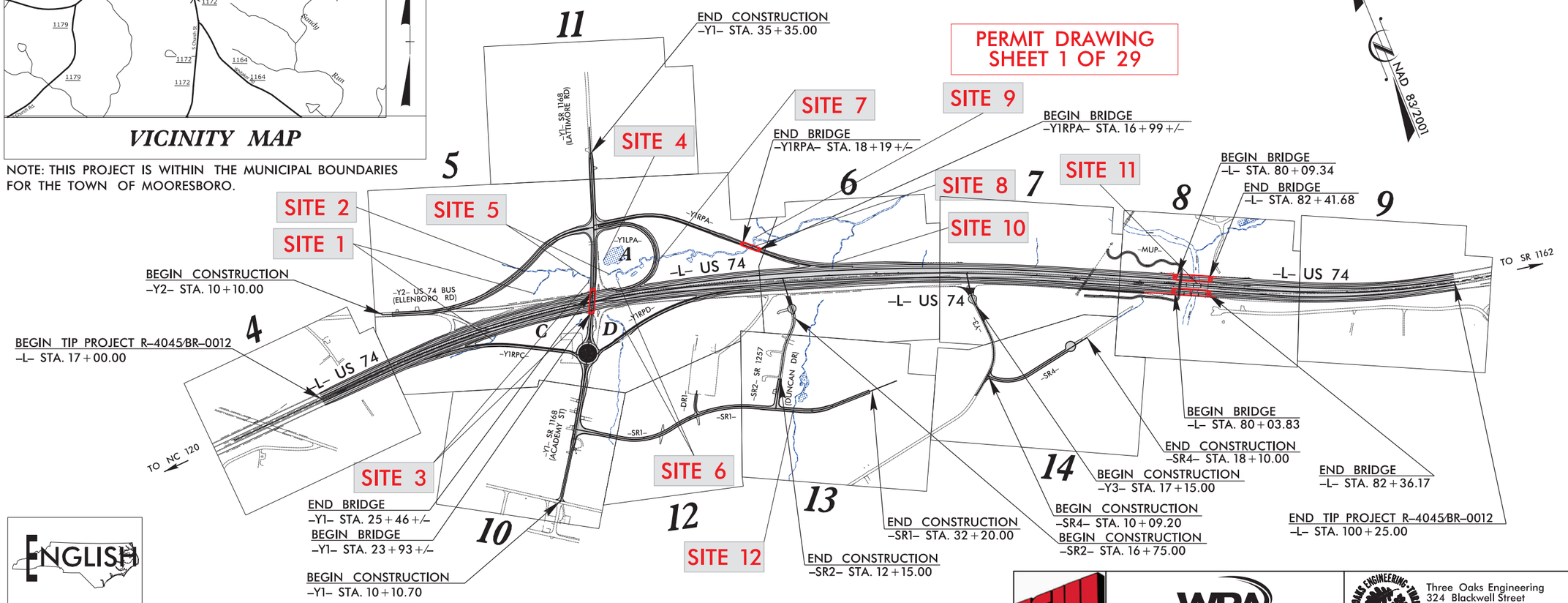
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34598.2.2 & 67012.3.1	NHF-74 (4) (R-4045)	CONST.

LOCATION: UPGRADE OF US 74 AT SR 1168 (N. ACADEMY ST/LATTIMORE RD) INTERSECTION TO AN INTERCHANGE AND REPLACEMENT OF BRIDGE NOS. 220048 AND 220049 ON US 74 OVER SANDY RUN CREEK

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING SHEET 1 OF 29



ENGLISH

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED BEING LIMITED TO INTERCHANGE. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

E.B. WAGNER CO., LLC

WRA
Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road, Suite 320, Raleigh, North Carolina 27606

THREE OAKS ENGINEERING
Three Oaks Engineering
324 Blackwell Street
Suite 1200
Durham, NC 27701
919.732.1300

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 2.5 0 5 10

DESIGN DATA

ADT 2023 = 22,600
ADT 2043 = 30,300
K = 8 %
D = 55 %
T = 15 % *
V = 70 MPH
* TTST = 10% DUAL 5%
FUNC CLASS = FREEWAY/INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY T.I.P. PROJECT R-4045/BR-0012 = 1.533 MILES

LENGTH STRUCTURE T.I.P. PROJECT R-4045/BR-0012 = 0.044 MILES

TOTAL LENGTH OF T.I.P. PROJECT R-4045/BR-0012 = 1.577 MILES

NCDOT CONTACT: ANDY HUSSEY, PE
PROJECT MANAGER, ALTERNATIVE DELIVERY UNIT

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
FIRM NO. P-0339
320 Executive Ct.
Hillsborough, NC 27278-8551
Voice: (919) 732-3883
Fax: (919) 732-6776
www.summitde.com

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JULY 20, 2023

LETTING DATE: JULY 20, 2023

BRANDON JOHNSON, PE
PROJECT ENGINEER

DOUGLAS SAUNDERS, PE
DEPUTY PROJECT ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

29-AUG-2024 14:24
R-4045_Hyd_prm_psh_I(TSH).dgn
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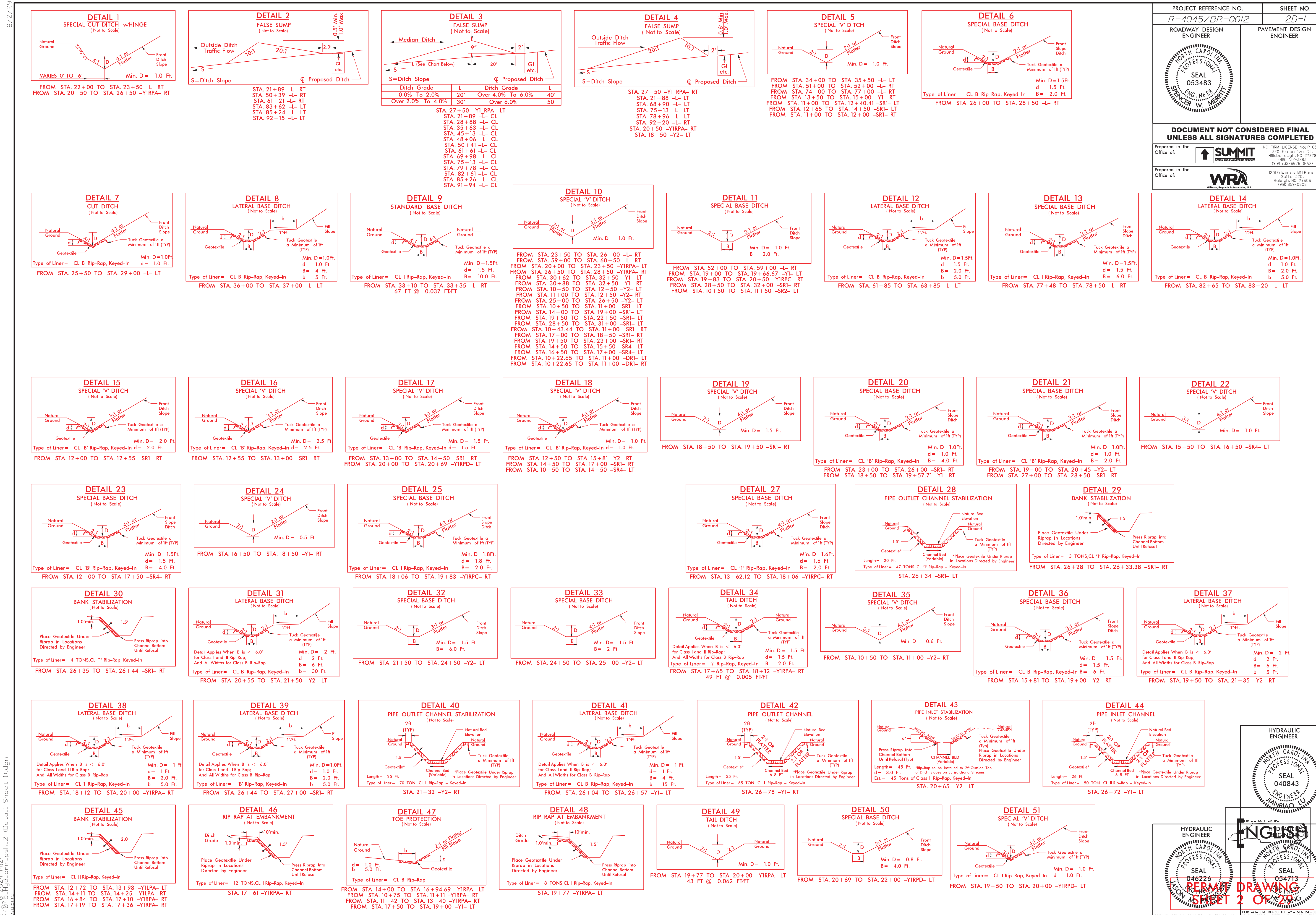

PROJECT REFERENCE NO. R-4045/BR-0012
SHEET NO. 2D-1
ROADWAY DESIGN ENGINEER
PAVEMENT DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 053483 SPENCER W. MERRITT
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
Prepared in the Office of: SUMMIT
Prepared in the Office of: WRA
HYDRAULIC ENGINEER
SEAL 040843
HYDRAULICS ENGINEER
SEAL 046226
SEAL 054713
ENGLISH
PERMIT DRAWING SHEET 2 OF 29
DETAIL 1
SPECIAL CUT DITCH w/HINGE
(Not to Scale)
Natural Ground
Front Ditch Slope
VARIES 0' TO 6'
Min. D= 1.0 Ft.
FROM STA. 22+00 TO STA. 23+50 -L- RT
FROM STA. 20+50 TO STA. 26+50 -Y1RPA- RT
DETAIL 2
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
10:1
20:1
S=Ditch Slope
Proposed Ditch
STA. 21+89 -L- RT
STA. 50+39 -L- RT
STA. 61+21 -L- RT
STA. 83+62 -L- LT
STA. 85+24 -L- LT
STA. 92+15 -L- LT
DETAIL 3
FALSE SUMP
(Not to Scale)
Median Ditch
L (See Chart Below)
S=Ditch Slope
Proposed Ditch
Ditch Grade | L | Ditch Grade | L
0.0% To 2.0% | 20' | Over 4.0% To 6.0% | 40'
Over 2.0% To 4.0% | 30' | Over 6.0% | 50'
STA. 27+50 -Y1 RPA- LT
STA. 21+89 -L- CL
STA. 28+88 -L- CL
STA. 35+63 -L- CL
STA. 45+13 -L- CL
STA. 48+06 -L- CL
STA. 50+41 -L- CL
STA. 61+61 -L- CL
STA. 69+98 -L- CL
STA. 75+13 -L- CL
STA. 79+78 -L- CL
STA. 82+61 -L- CL
STA. 85+26 -L- CL
STA. 91+94 -L- CL
DETAIL 4
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
Proposed Ditch
STA. 27+50 -Y1 RPA- RT
STA. 21+88 -L- LT
STA. 68+90 -L- LT
STA. 75+13 -L- LT
STA. 78+96 -L- LT
STA. 92+20 -L- RT
STA. 20+50 -Y1RPA- RT
STA. 18+50 -Y2- LT
DETAIL 5
SPECIAL 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 34+00 TO STA. 35+50 -L- LT
FROM STA. 51+00 TO STA. 52+00 -L- RT
FROM STA. 74+00 TO STA. 77+00 -L- RT
FROM STA. 13+50 TO STA. 15+00 -Y1- RT
FROM STA. 11+00 TO STA. 12+40.41 -SR1- LT
FROM STA. 12+65 TO STA. 14+50 -SR1- LT
FROM STA. 11+00 TO STA. 12+00 -SR1- RT
DETAIL 6
SPECIAL BASE DITCH
(Not to Scale)
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D=1.5Ft. d= 1.5 Ft. B= 2.0 Ft.
FROM STA. 26+00 TO STA. 28+50 -L- RT
DETAIL 7
CUT DITCH
(Not to Scale)
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft.
FROM STA. 25+50 TO STA. 29+00 -L- LT
DETAIL 8
LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft. B= 4 Ft. b= 5 Ft.
FROM STA. 36+00 TO STA. 37+00 -L- LT
DETAIL 9
STANDARD BASE DITCH
(Not to Scale)
Type of Liner= CL I Rip-Rap, Keyed-In
Min. D=1.5Ft. d= 1.5 Ft. B= 10.0 Ft.
FROM STA. 33+10 TO STA. 33+35 -L- RT
67 FT @ 0.037 FT/FT
DETAIL 10
SPECIAL 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
FROM STA. 23+50 TO STA. 26+00 -L- RT
FROM STA. 59+00 TO STA. 60+50 -L- RT
FROM STA. 20+00 TO STA. 23+50 -Y1RPA- LT
FROM STA. 26+50 TO STA. 28+50 -Y1RPA- RT
FROM STA. 30+62 TO STA. 32+50 -Y1- LT
FROM STA. 30+88 TO STA. 32+50 -Y1- RT
FROM STA. 10+50 TO STA. 12+50 -Y2- LT
FROM STA. 11+00 TO STA. 12+50 -Y2- RT
FROM STA. 25+00 TO STA. 26+50 -Y2- LT
FROM STA. 10+50 TO STA. 11+00 -SR1- LT
FROM STA. 14+00 TO STA. 19+00 -SR1- LT
FROM STA. 19+50 TO STA. 22+50 -SR1- LT
FROM STA. 28+50 TO STA. 31+00 -SR1- LT
FROM STA. 10+43.44 TO STA. 11+00 -SR1- RT
FROM STA. 17+00 TO STA. 18+50 -SR1- RT
FROM STA. 19+50 TO STA. 23+00 -SR1- RT
FROM STA. 14+50 TO STA. 15+50 -SR4- RT
FROM STA. 16+50 TO STA. 17+00 -SR4- LT
FROM STA. 10+22.65 TO STA. 11+00 -DR1- LT
FROM STA. 10+22.65 TO STA. 11+00 -DR1- RT
DETAIL 11
SPECIAL BASE DITCH
(Not to Scale)
Min. D= 1.0 Ft. B= 2.0 Ft.
FROM STA. 52+00 TO STA. 59+00 -L- RT
FROM STA. 19+00 TO STA. 19+66.67 -Y1- LT
FROM STA. 19+83 TO STA. 20+50 -Y1RPC- RT
FROM STA. 28+50 TO STA. 32+00 -SR1- RT
FROM STA. 10+50 TO STA. 11+50 -SR2- LT
DETAIL 12
LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D=1.5Ft. d= 1.5 Ft. B= 2.0 Ft. b= 5.0 Ft.
FROM STA. 61+85 TO STA. 63+85 -L- LT
DETAIL 13
SPECIAL BASE DITCH
(Not to Scale)
Type of Liner= CL I Rip-Rap, Keyed-In
Min. D=1.5Ft. d= 1.5 Ft. B= 6.0 Ft.
FROM STA. 77+48 TO STA. 78+50 -L- RT
DETAIL 14
LATERAL BASE DITCH
(Not to Scale)
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft. B= 2.0 Ft. b= 5.0 Ft.
FROM STA. 82+65 TO STA. 83+20 -L- LT
DETAIL 15
SPECIAL 'V' DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 2.0 Ft.
Min. D= 2.0 Ft.
FROM STA. 12+00 TO STA. 12+55 -SR1- RT
DETAIL 16
SPECIAL 'V' DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 2.5 Ft.
Min. D= 2.5 Ft.
FROM STA. 12+55 TO STA. 13+00 -SR1- RT
DETAIL 17
SPECIAL 'V' DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 1.5 Ft.
Min. D= 1.5 Ft.
FROM STA. 13+00 TO STA. 14+50 -SR1- RT
FROM STA. 20+00 TO STA. 20+69 -Y1RPD- LT
DETAIL 18
SPECIAL 'V' DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In d= 1.0 Ft.
Min. D= 1.0 Ft.
FROM STA. 12+50 TO STA. 15+81 -Y2- RT
FROM STA. 14+50 TO STA. 17+00 -SR1- RT
FROM STA. 10+50 TO STA. 14+50 -SR4- LT
DETAIL 19
SPECIAL 'V' DITCH
Min. D= 1.5 Ft.
FROM STA. 18+50 TO STA. 19+50 -SR1- RT
DETAIL 20
SPECIAL BASE DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft. B= 4.0 Ft.
FROM STA. 23+00 TO STA. 26+00 -SR1- RT
FROM STA. 18+50 TO STA. 19+57.71 -Y1- RT
DETAIL 21
SPECIAL BASE DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft. B= 2.0 Ft.
FROM STA. 19+00 TO STA. 20+45 -Y2- LT
FROM STA. 27+00 TO STA. 28+50 -SR1- RT
DETAIL 22
SPECIAL 'V' DITCH
Min. D= 1.0 Ft.
FROM STA. 15+50 TO STA. 16+50 -SR4- LT
DETAIL 23
SPECIAL BASE DITCH
Type of Liner= CL 'B' Rip-Rap, Keyed-In
Min. D=1.5Ft. d= 1.5 Ft. B= 4.0 Ft.
FROM STA. 12+00 TO STA. 17+50 -SR4- RT
DETAIL 24
SPECIAL 'V' DITCH
Min. D= 0.5 Ft.
FROM STA. 16+50 TO STA. 18+50 -Y1- RT
DETAIL 25
SPECIAL BASE DITCH
Type of Liner= CL I Rip-Rap, Keyed-In
Min. D=1.8Ft. d= 1.8 Ft. B= 2.0 Ft.
FROM STA. 18+06 TO STA. 19+83 -Y1RPC- RT
DETAIL 27
SPECIAL BASE DITCH
Type of Liner= CL 'I' Rip-Rap, Keyed-In
Min. D=1.6Ft. d= 1.6 Ft. B= 2.0 Ft.
FROM STA. 13+62.12 TO STA. 18+06 -Y1RPC- RT
DETAIL 28
PIPE OUTLET CHANNEL STABILIZATION
Length= 20 Ft.
Type of Liner= 47 TONS CL 'I' Rip-Rap - Keyed-In
STA. 26+34 -SR1- LT
DETAIL 29
BANK STABILIZATION
Place Geotextile Under Riprap in Locations Directed by Engineer
Press Riprap into Channel Bottom Until Refusal
Type of Liner= 3 TONS,CL 'I' Rip-Rap, Keyed-In
FROM STA. 26+28 TO STA. 26+33.38 -SR1- RT
DETAIL 30
BANK STABILIZATION
Type of Liner= 4 TONS,CL 'I' Rip-Rap, Keyed-In
FROM STA. 26+35 TO STA. 26+44 -SR1- RT
DETAIL 31
LATERAL BASE DITCH
Detail Applies When B is < 6.0' for Class I and II Rip-Rap; And All Widths for Class B Rip-Rap
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D= 2 Ft. d= 2 Ft. B= 6 Ft. b= 30 Ft.
FROM STA. 20+55 TO STA. 21+50 -Y2- LT
DETAIL 32
SPECIAL BASE DITCH
Min. D= 1.5 Ft. B= 6.0 Ft.
FROM STA. 21+50 TO STA. 24+50 -Y2- LT
DETAIL 33
SPECIAL BASE DITCH
Min. D= 1.5 Ft. B= 2 Ft.
FROM STA. 24+50 TO STA. 25+00 -Y2- LT
DETAIL 34
TAIL DITCH
Type of Liner= II Rip-Rap, Keyed-In
Min. D= 1.5 Ft. d= 1.5 Ft. B= 2.0 Ft.
FROM STA. 17+65 TO STA. 18+12 -Y1RPA- RT
49 FT @ 0.005 FT/FT
DETAIL 35
SPECIAL 'V' DITCH
Min. D= 0.6 Ft.
FROM STA. 10+50 TO STA. 11+00 -Y2- RT
DETAIL 36
SPECIAL BASE DITCH
Type of Liner= CL B Rip-Rap, Keyed-In B= 6 Ft.
Min. D= 1.5 Ft. d= 1.5 Ft.
FROM STA. 15+81 TO STA. 19+00 -Y2- RT
DETAIL 37
LATERAL BASE DITCH
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D= 2 Ft. d= 2 Ft. B= 6 Ft. b= 5 Ft.
FROM STA. 19+50 TO STA. 21+35 -Y2- RT
DETAIL 38
LATERAL BASE DITCH
Type of Liner= CL I Rip-Rap, Keyed-In
Min. D= 1 Ft. d= 1 Ft. B= 2.0 Ft. b= 5.0 Ft.
FROM STA. 18+12 TO STA. 20+00 -Y1RPA- RT
DETAIL 39
LATERAL BASE DITCH
Type of Liner= 'B' Rip-Rap, Keyed-In
Min. D=1.0Ft. d= 1.0 Ft. B= 2.0 Ft. b= 5.0 Ft.
FROM STA. 26+44 TO STA. 27+00 -SR1- RT
DETAIL 40
PIPE OUTLET CHANNEL STABILIZATION
Length= 25 Ft.
Type of Liner= 70 TON CL II Rip-Rap - Keyed-In
STA. 21+32 -Y2- RT
DETAIL 41
LATERAL BASE DITCH
Type of Liner= CL B Rip-Rap, Keyed-In
Min. D= 1 Ft. d= 1 Ft. B= 4 Ft. b= 15 Ft.
FROM STA. 26+04 TO STA. 26+57 -Y1- LT
DETAIL 42
PIPE OUTLET CHANNEL
Length= 35 Ft.
Type of Liner= 65 TON CL II Rip-Rap - Keyed-In
STA. 26+78 -Y1- RT
DETAIL 43
PIPE INLET STABILIZATION
Length= 45 Ft. d= 3.0 Ft.
Est.= 45 Tons of Class II Rip-Rap, Keyed-In
STA. 20+65 -Y2- LT
DETAIL 44
PIPE INLET CHANNEL
Length= 26 Ft.
Type of Liner= 50 TON CL II Rip-Rap - Keyed-In
STA. 26+72 -Y1- LT
DETAIL 45
BANK STABILIZATION
Type of Liner= CL II Rip-Rap, Keyed-In
FROM STA. 12+72 TO STA. 13+98 -Y1LPA- LT
FROM STA. 14+11 TO STA. 14+25 -Y1LPA- RT
FROM STA. 16+84 TO STA. 17+10 -Y1RPA- RT
FROM STA. 17+19 TO STA. 17+36 -Y1RPA- RT
DETAIL 46
RIP RAP AT EMBANKMENT
Type of Liner= 12 TONS,CL I Rip-Rap, Keyed-In
STA. 17+61 -Y1RPA- RT
DETAIL 47
TOE PROTECTION
d= 1.0 Ft. b= 5.0 Ft.
Type of Liner= CL B Rip-Rap
FROM STA. 14+00 TO STA. 16+94.69 -Y1RPA- LT
FROM STA. 10+75 TO STA. 11+11 -Y1RPD- RT
FROM STA. 11+42 TO STA. 13+40 -Y1RPA- RT
FROM STA. 17+50 TO STA. 19+00 -Y1- LT
DETAIL 48
RIP RAP AT EMBANKMENT
Type of Liner= 8 TONS,CL I Rip-Rap, Keyed-In
STA. 19+77 -Y1RPA- LT
DETAIL 49
TAIL DITCH
Min. D= 1.0 Ft.
FROM STA. 19+77 TO STA. 20+00 -Y1RPA- LT
43 FT @ 0.062 FT/FT
DETAIL 50
SPECIAL BASE DITCH
Min. D= 0.8 Ft. B= 4.0 Ft.
FROM STA. 20+69 TO STA. 22+00 -Y1RPD- LT
DETAIL 51
SPECIAL 'V' DITCH
Type of Liner= CL I Rip-Rap, Keyed-In d= 1.0 Ft.
Min. D= 1.0 Ft.
FROM STA. 19+50 TO STA. 20+00 -Y1RPD- LT
29-AUG-2024 14:24
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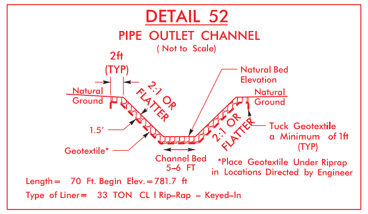
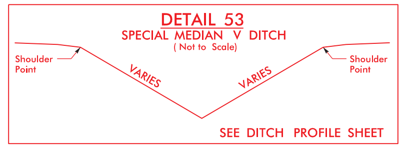
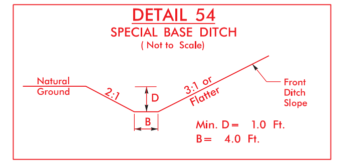
6/2/99



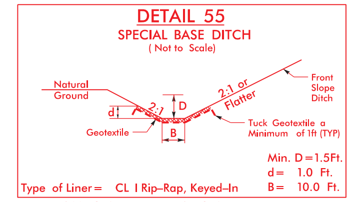
STA. 54+44 –L– LT



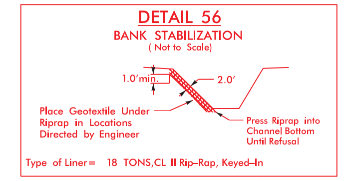
FROM STA. 36+50 TO STA. 37+50 –L– CL
FROM STA. 49+50 TO STA. 50+50 –L– CL



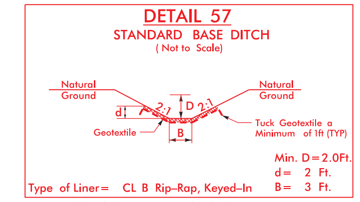
FROM STA. 11+00 TO STA. 11+45.18 –RAB– RT



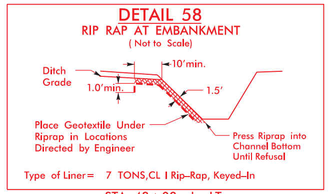
FROM STA. 78+50 TO STA. 80+45 –L– RT



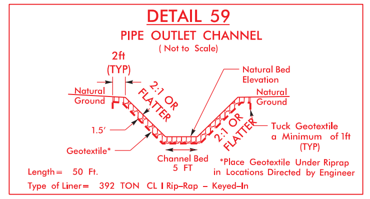
FROM STA. 80+87 TO STA. 80+96 –L– RT



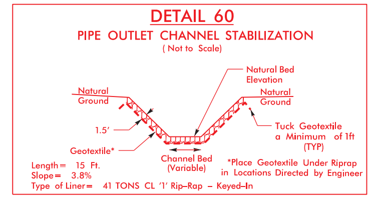
FROM STA. 48+05 TO STA. 48+08 –L– LT
27 FT @0.019 FT/FT



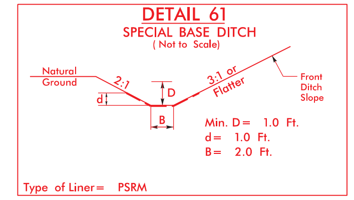
STA. 48+08 –L– LT



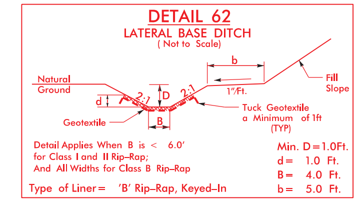
STA. 33+93 –L– LT



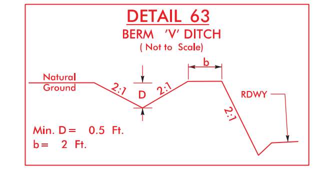
STA. 12+65 –SR1– LT



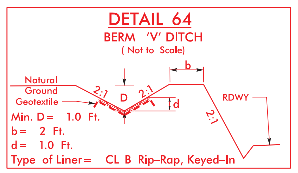
FROM STA. 22+50 TO STA. 24+66.93 –SR1– LT



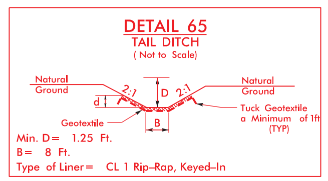
FROM STA. 26+00 TO STA. 26+28 –SR1– RT



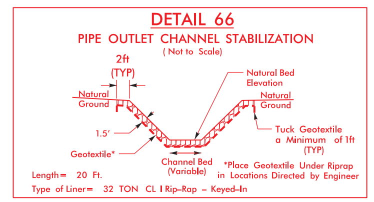
FROM STA. 13+00 TO STA. 14+50 –Y1RPD– LT



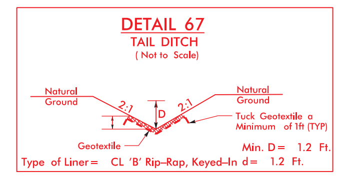
FROM STA. 14+50 TO STA. 19+50 –Y1RPD– LT



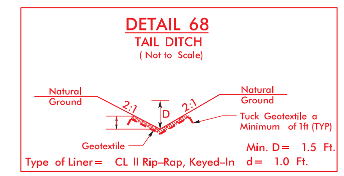
FROM STA. 18+91 TO STA. 19+13 –Y1RPD– RT
47 FT @0.058 FT/FT



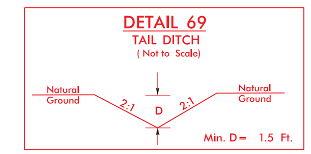
STA. 55+51 –L– LT



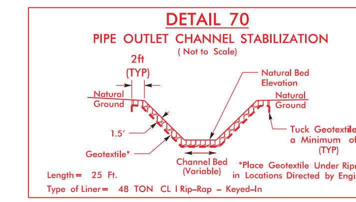
FROM STA. 46+58.86 TO STA. 47+50 –L– RT
91 FT @ 0.11 FT/FT
FROM STA. 47+50 TO STA. 48+50 –L– RT
100 FT @ 0.10 FT/FT
FROM STA. 48+50 TO STA. 49+50 –L– RT
100 FT @ 0.075 FT/FT
100 FT @ 0.10 FT/FT
FROM STA. 49+50 TO STA. 50+30 –L– RT
80 FT @ 0.035 FT/FT



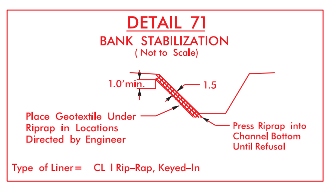
FROM STA. 17+39 TO STA. 17+80 –Y3– LT
46 FT @ 0.087 FT/FT



FROM STA. 17+24 TO STA. 17+83 –Y3– RT
58 FT @ 0.069 FT/FT



STA. 39+92 –L– LT



FROM STA. 34+37 TO STA. 34+63 –L– LT
FROM STA. 39+75 TO STA. 39+86 –L– LT

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	2D-2

ROADWAY DESIGN ENGINEER — SEAL 053483, NORTH CAROLINA PROFESSIONAL ENGINEER, SPENCER W. MERRITT

PAVEMENT DESIGN ENGINEER

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NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared in the Office of: WRA Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road,
Suite 320,
Raleigh, NC 27606
(919) 859-0808

HYDRAULIC ENGINEER — SEAL 040843, NORTH CAROLINA PROFESSIONAL ENGINEER, JIANBIAO LU

FOR –L– AND –MUP–

ENGLISH

HYDRAULIC ENGINEER — SEAL 046226, NORTH CAROLINA PROFESSIONAL ENGINEER, JASON M. PATSKOSKI
FOR –Y1– STA. 24+30.19 TO –Y1– STA. 33+50, –Y1LPA–, –Y1RPA–, Y2

HYDRAULIC ENGINEER — SEAL 054713, NORTH CAROLINA PROFESSIONAL ENGINEER, HE YANG
FOR –Y1– STA. 18+50 TO –Y1– STA. 24+30.19, –RAB–, –Y1RPC–, –Y1RPD–, –SR1–, –SR2–, –SR4–, –DR1–

PERMIT DRAWING
SHEET 3 OF 29

29-AUG-2024 14:24
R-4045_Hyd_prm_psh_3 (Detail Sheet 2).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	5

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

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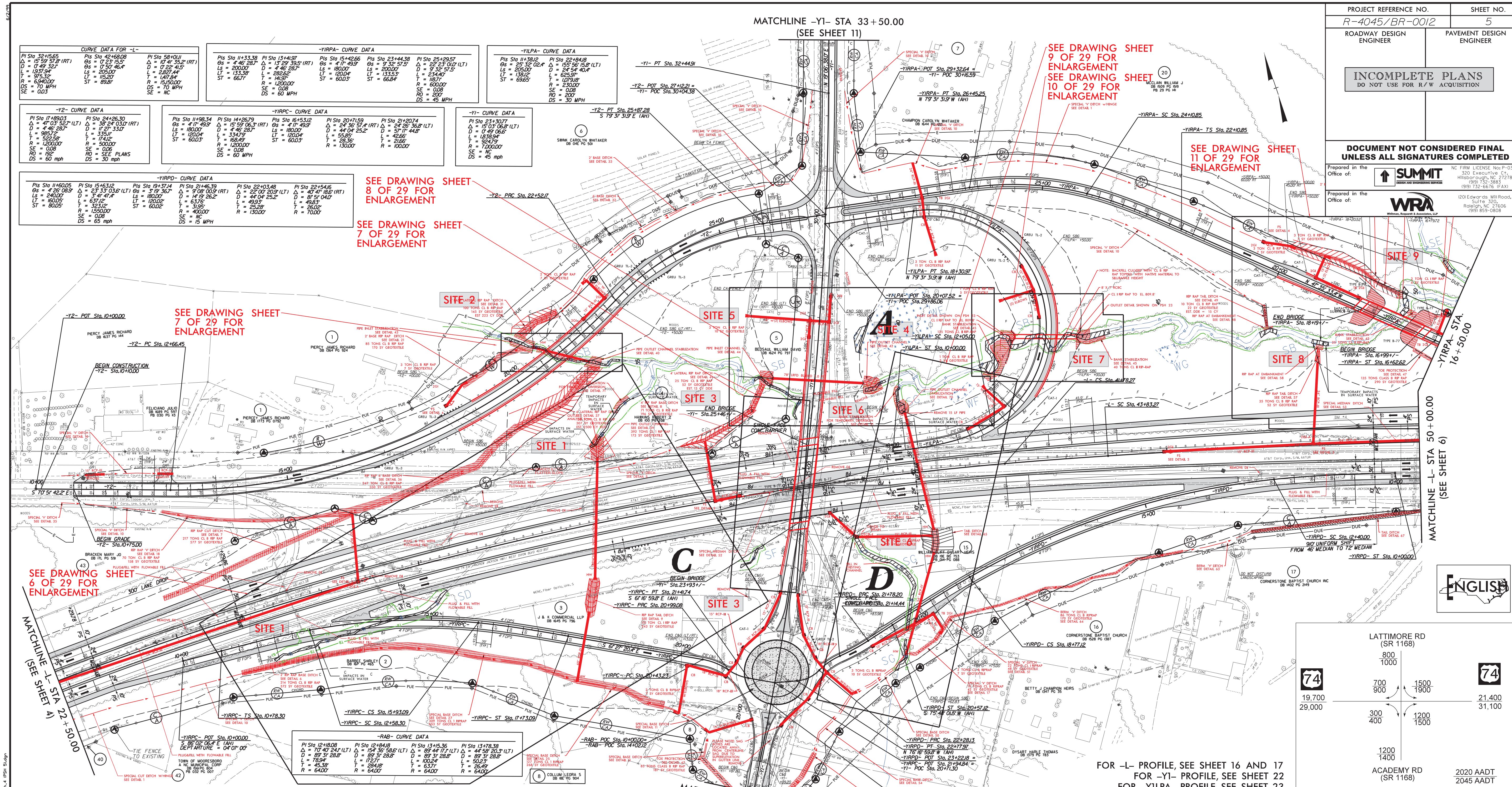

FOR -L- PROFILE, SEE SHEET 16 AND 17
FOR -Y1- PROFILE, SEE SHEET 22
FOR -Y1LPA- PROFILE, SEE SHEET 23
FOR -Y1RPA- PROFILE, SEE SHEET 23 AND 24
FOR -Y1RPC- PROFILE, SEE SHEET 24
FOR -Y1RPD- PROFILE, SEE SHEET 25
FOR -Y2- PROFILE SEE SHEET 25 AND 26

TS TEMPORARY SURFACE WATER IMPACTS

S SURFACE WATER IMPACTS

F FILL IN WETLAND

HC HAND CLEARING (NON-GRUBBING)

PERMIT DRAWING SHEET 4 OF 29

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	5

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
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MATCHLINE –Y1– STA 33+50.00
(SEE SHEET 11)

SEE DRAWING SHEET 9 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 10 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 11 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 8 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 7 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 7 OF 29 FOR ENLARGEMENT
SEE DRAWING SHEET 6 OF 29 FOR ENLARGEMENT

MATCHLINE –L– STA 22+50.00
(SEE SHEET 4)

MATCHLINE –L– STA 50+00.00
(SEE SHEET 6)

MATCHLINE –Y1– STA 18+50.00
(SEE SHEET 10)

FOR –L– PROFILE, SEE SHEET 16 AND 17
FOR –Y1– PROFILE, SEE SHEET 22
FOR –Y1LPA– PROFILE, SEE SHEET 23
FOR –Y1RPA– PROFILE, SEE SHEET 23 AND 24
FOR –Y1RPC– PROFILE, SEE SHEET 24
FOR –Y1RPD– PROFILE, SEE SHEET 25
FOR –Y2– PROFILE SEE SHEET 25 AND 26

LATTIMORE RD (SR 1168)
800 / 1000
74 — 700 / 900 — 1500 / 1900 — 74
19,700 / 29,000 — 21,400 / 31,100
300 / 400 — 1200 / 1500
1200 / 1400
ACADEMY RD (SR 1168)
2020 AADT / 2045 AADT

GRAPHIC SCALE
50 25 0 50 100

PERMIT DRAWING SHEET 5 OF 29

TS TS — TEMPORARY SURFACE WATER IMPACTS
S S — SURFACE WATER IMPACTS
F F — FILL IN WETLAND
HC HC — HAND CLEARING (NON-GRUBBING)

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 6 OF 29

S S SURFACE WATER IMPACTS

TS TS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

SITE 1

IMPACTS IN SURFACE WATER

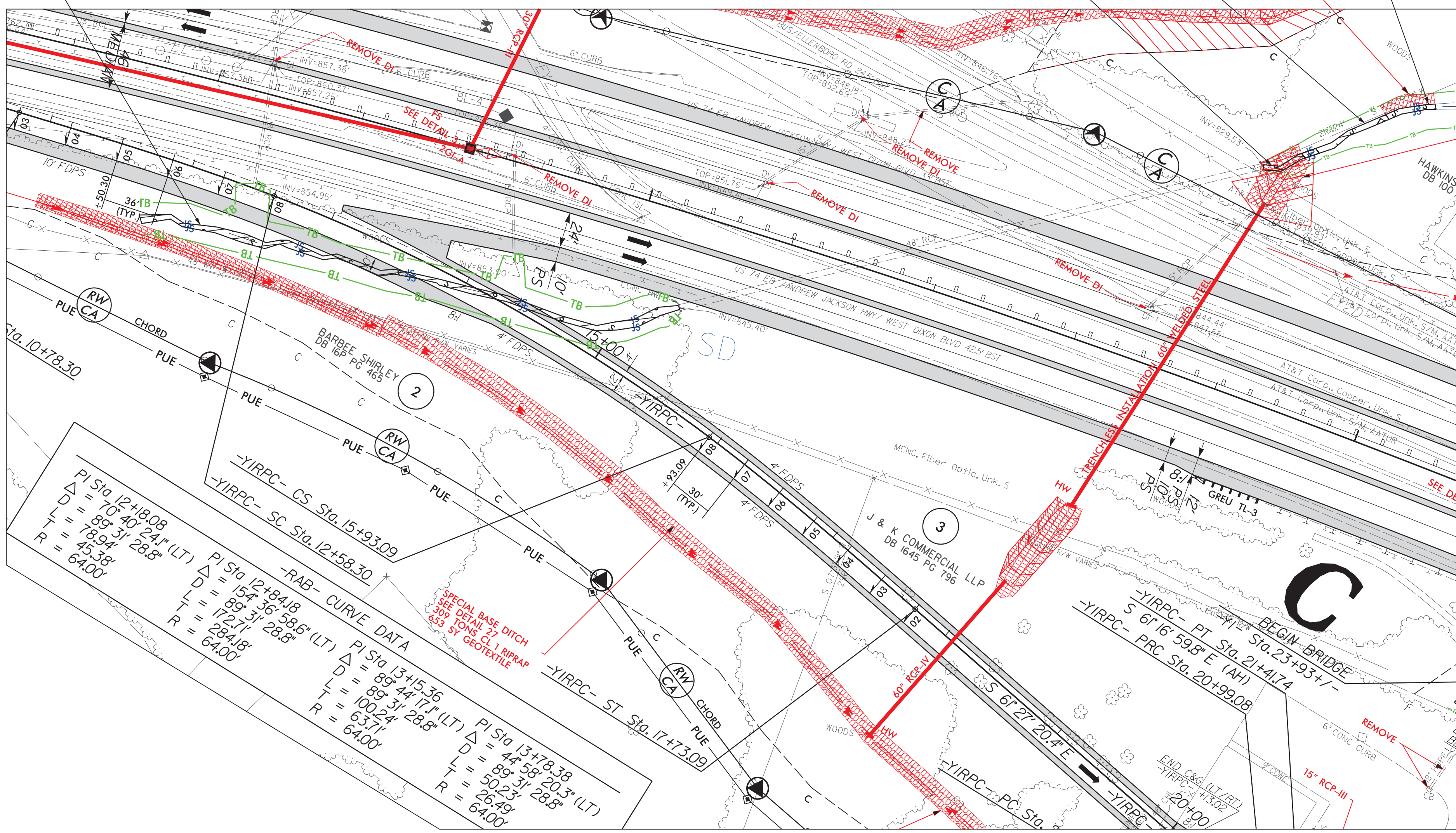
BANK STABILIZATION FOR TEMPORARY DIVERSION SEE DETAIL 71

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

PIPE OUTLET CHANNEL
SEE DETAIL 59
392 TONS CL 1 RIP RAP
173 SY GEOTEXTILE



NAD 83/2011

50 25 0 50 100

PLANS

REVISIONS

8/17/99

29-AUG-2024 14:25
R-4045_Hyd_prm_psh_5_Inset1 (Site 1).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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Prepared in the Office of: SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

PERMIT DRAWING SHEET 7 OF 29

SS SURFACE WATER IMPACTS

TSTS TEMPORARY SURFACE WATER IMPACTS

ENGLISH

8/17/99

REVISIONS

NAD 83/2011

6' BASE LATERAL RIP RAP DITCH
SEE DETAIL 31
100 TONS CL B RIP RAP
145 SY GEOTEXTILE
EST 223 CY DDE

HW

60" RCP-HI BURIED 1.5 FT

PIPE INLET STABILIZATION
SEE DETAIL 43

IMPACTS IN SURFACE WATER

PIPE OUTLET CHANNEL STABILIZATION
SEE DETAIL 40

TEMPORARY IMPACTS IN SURFACE WATER

2' BASE RIP RAP DITCH
SEE DETAIL 21
85 TONS CL B RIP RAP
170 SY GEOTEXTILE

IMPACTS IN SURFACE WATER

SITE 2

6' LATERAL RIP RAP DITCH
SEE DETAIL 37
138 TON CL B RIP RAP
307 SY GEOTEXTILE
EST. 2500 CY DDE

TEMPORARY IMPACTS IN SURFACE WATER

10 5 0 10 20
PLANS

IMPACTS IN SURFACE WATER

NAD 83/2011

PLUG & FILL WITH FLOWABLE FILL

SINGLE FACE CONC BARRIER REMOVE

IMPACTS IN SURFACE WATER

SITE 3

25 12.5 0 25 50
PLANS

23-AUG-2024 14:25
R-4045_fgd-pr-psh-5_Inset2 (Site 2 and 3).dgn
hewang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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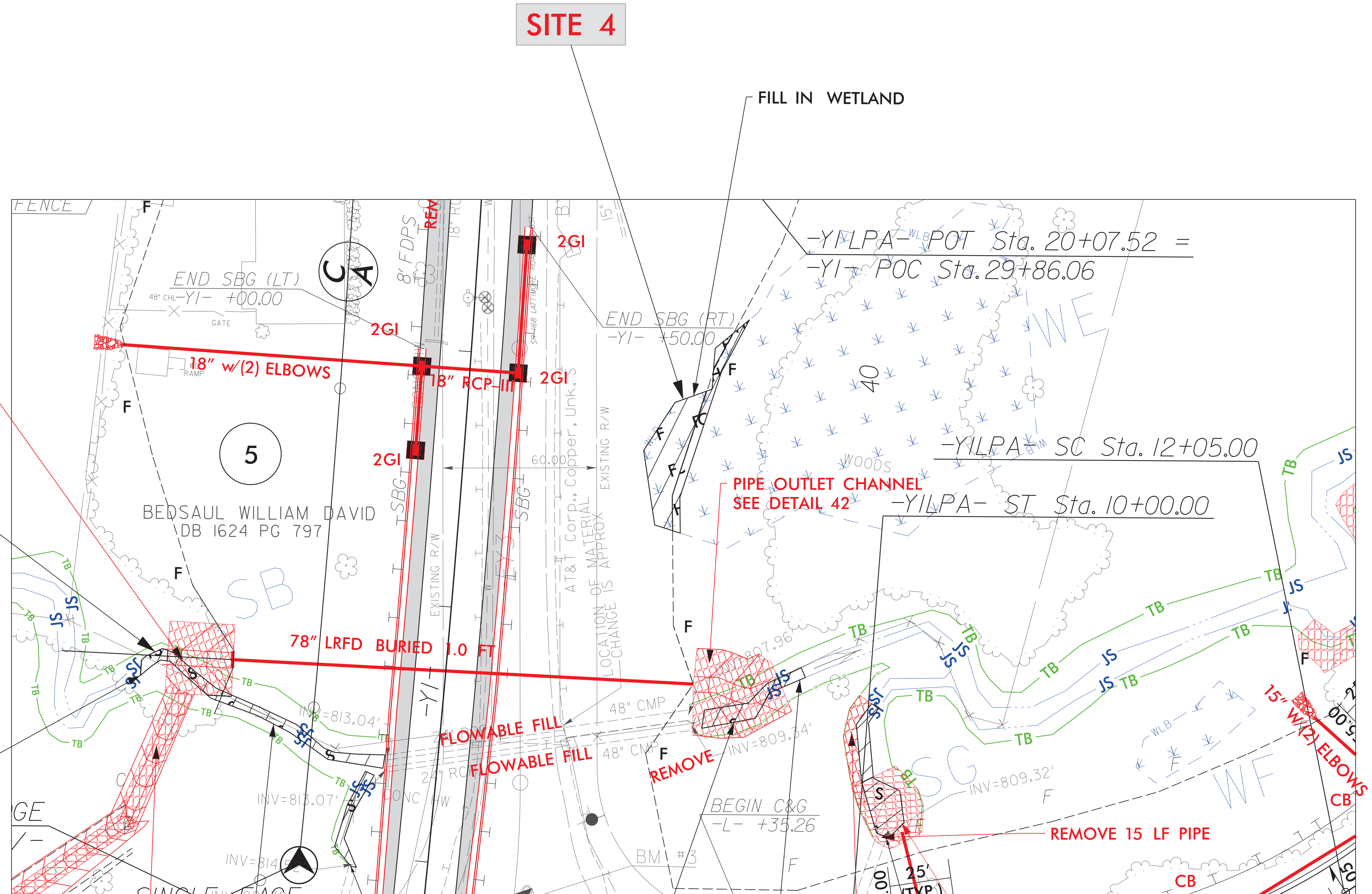
PERMIT DRAWING
SHEET 8 OF 29

- S S — SURFACE WATER IMPACTS
- TS TS — TEMPORARY SURFACE WATER IMPACTS
- F F — FILL IN WETLAND
- HC HC — HAND CLEARING (NON-GRUBBING)

ENGLISH



NAD 83/2011

4' LATERAL RIP RAP DITCH
SEE DETAIL 41
25 TON CL B RIP RAP
52 SY GEOTEXTILE
EST. 13 CY DDE

SEE SHEET 7 OF 29
FOR SITE 3

IMPACTS IN
SURFACE WATER

TEMPORARY IMPACTS
IN SURFACE WATER

PIPE OUTLET CHANNEL STABILIZATION
SEE DETAIL 70

SEE SHEET 9 OF 29
FOR SITE 6

BANK STABILIZATION
FOR TEMPORARY DIVERSION
SEE DETAIL 71

IMPACTS IN
SURFACE WATER

25 12.5 0 25 50
PLANS

REVISIONS

8/17/99

29-AUG-2024 14:25
R-4045_Hyd_prm_psh_5_Inset3 (Site 4 5).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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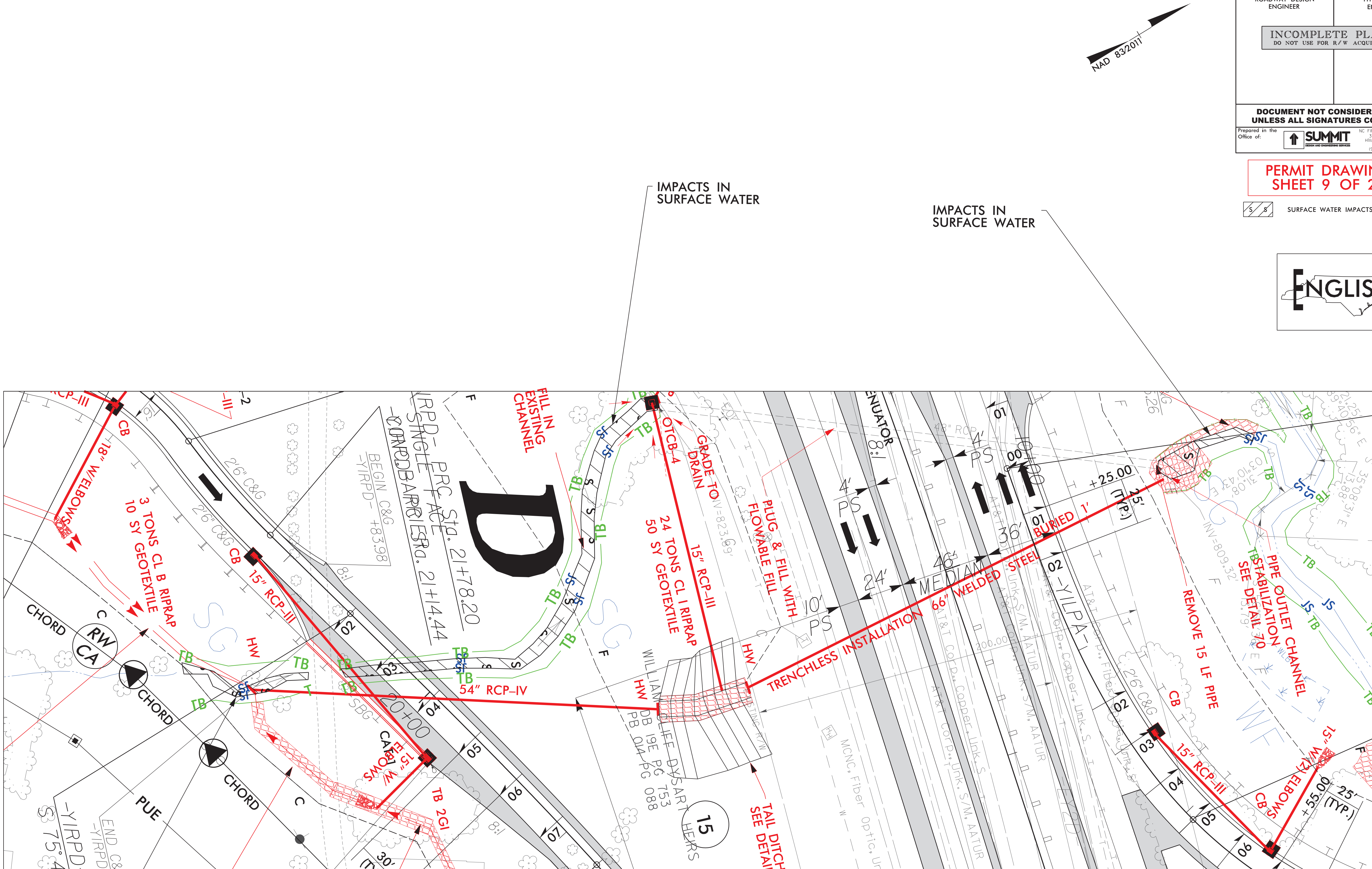
SHEET 9 OF 29

SURFACE WATER IMPACTS



25 12.5 0 25 50

PLANS

SITE 6

REVISIONS

8/17/99

29-AUG-2024 14:25
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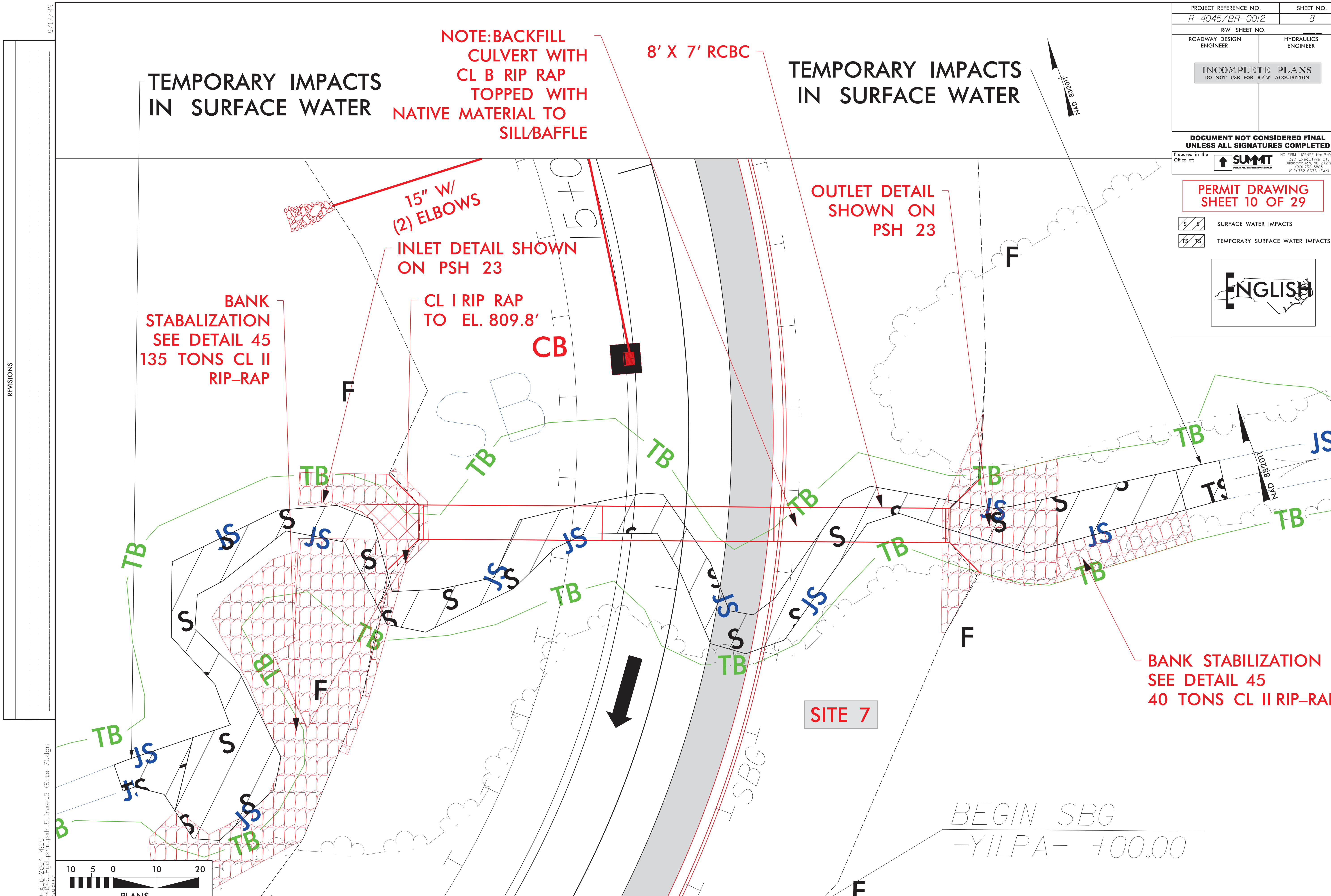
PROJECT REFERENCE NO.
R-4045/BR-0012
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
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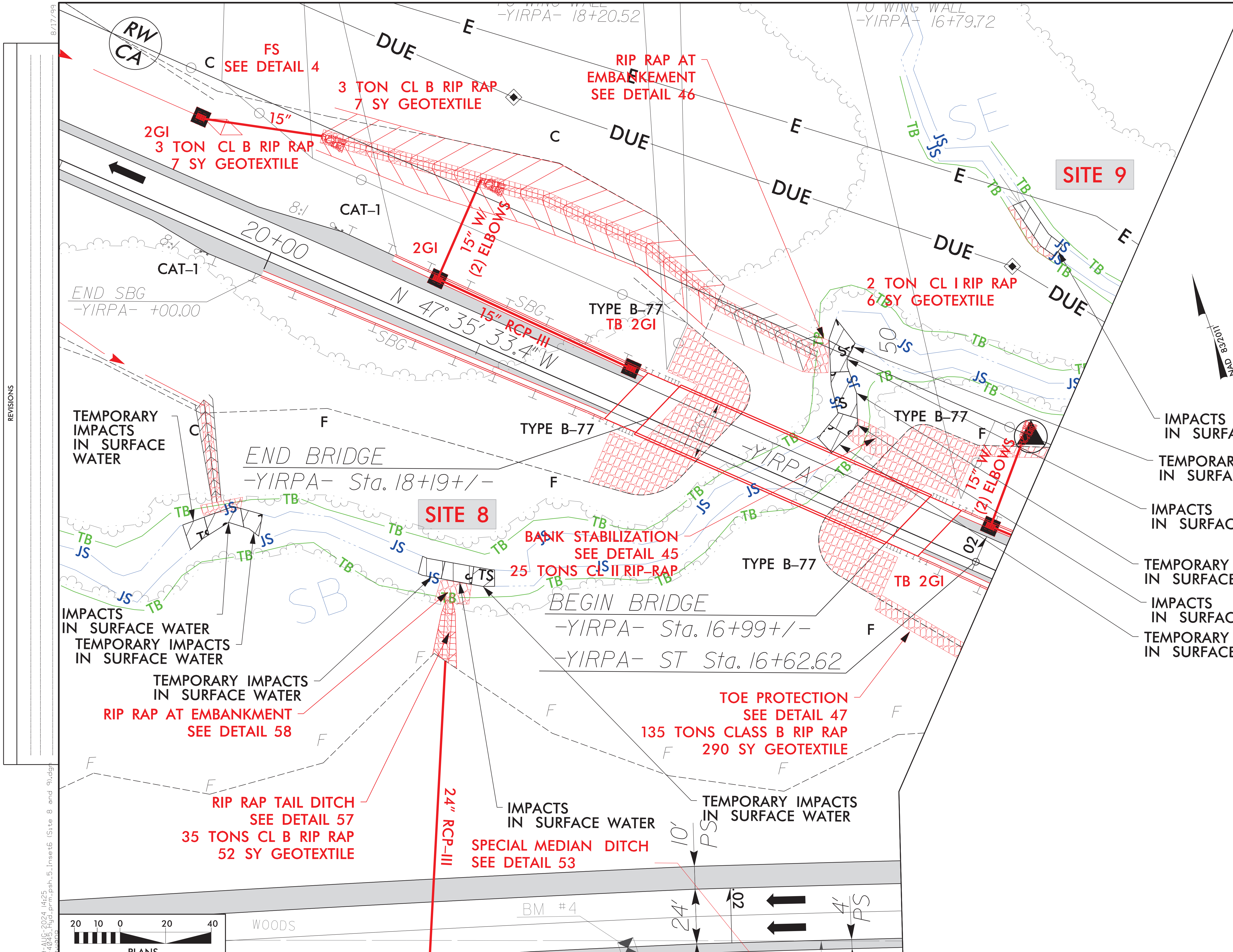
(919) 732-6676 (FAX)
PERMIT DRAWING SHEET 10 OF 29
SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
ENGLISH
TEMPORARY IMPACTS IN SURFACE WATER
NOTE: BACKFILL CULVERT WITH CL B RIP RAP TOPPED WITH NATIVE MATERIAL TO SILL/BAFFLE
8' X 7' RCBC
TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
15" W/ (2) ELBOWS
INLET DETAIL SHOWN ON PSH 23
OUTLET DETAIL SHOWN ON PSH 23
BANK STABALIZATION SEE DETAIL 45 135 TONS CL II RIP-RAP
CL I RIP RAP TO EL. 809.8'
CB
BANK STABILIZATION SEE DETAIL 45 40 TONS CL II RIP-RAP
SITE 7
SBG
BEGIN SBG -YILPA- +00.00
PLANS
10 5 0 10 20
REVISIONS
8/17/99
29-AUG-2024 14:25
R-4045_Hyd_prm_psh_5_Inset5 (Site 7).dgn



PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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SHEET 11 OF 29

SURFACE WATER IMPACTS

TEMPORARY SURFACE WATER IMPACTS

29-AUG-2024 14:25
R-4045_Hyd_prm_psh_5_Inset6 (Site 8 and 9).dgn

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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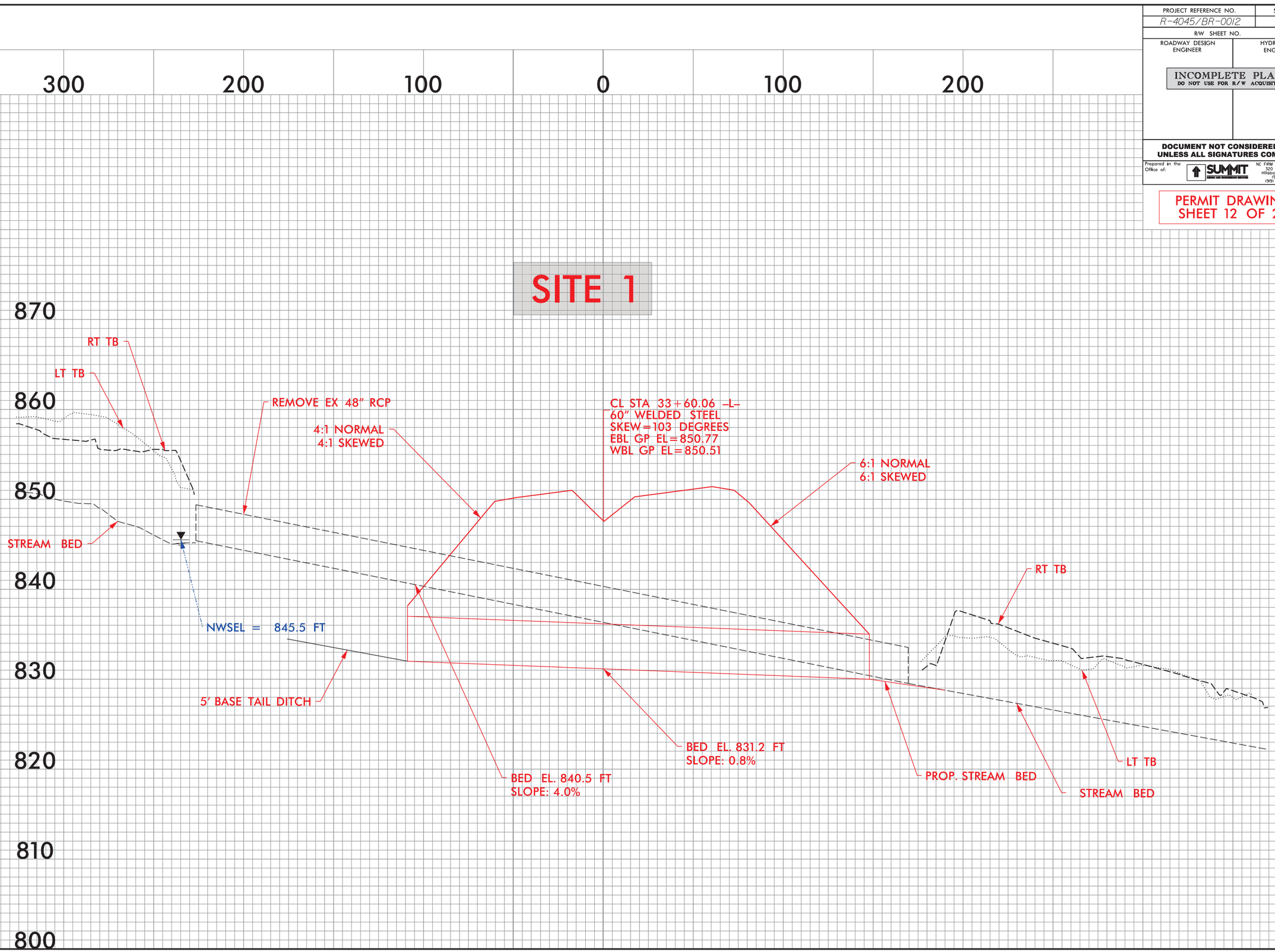
SHEET 12 OF 29

SITE 1



PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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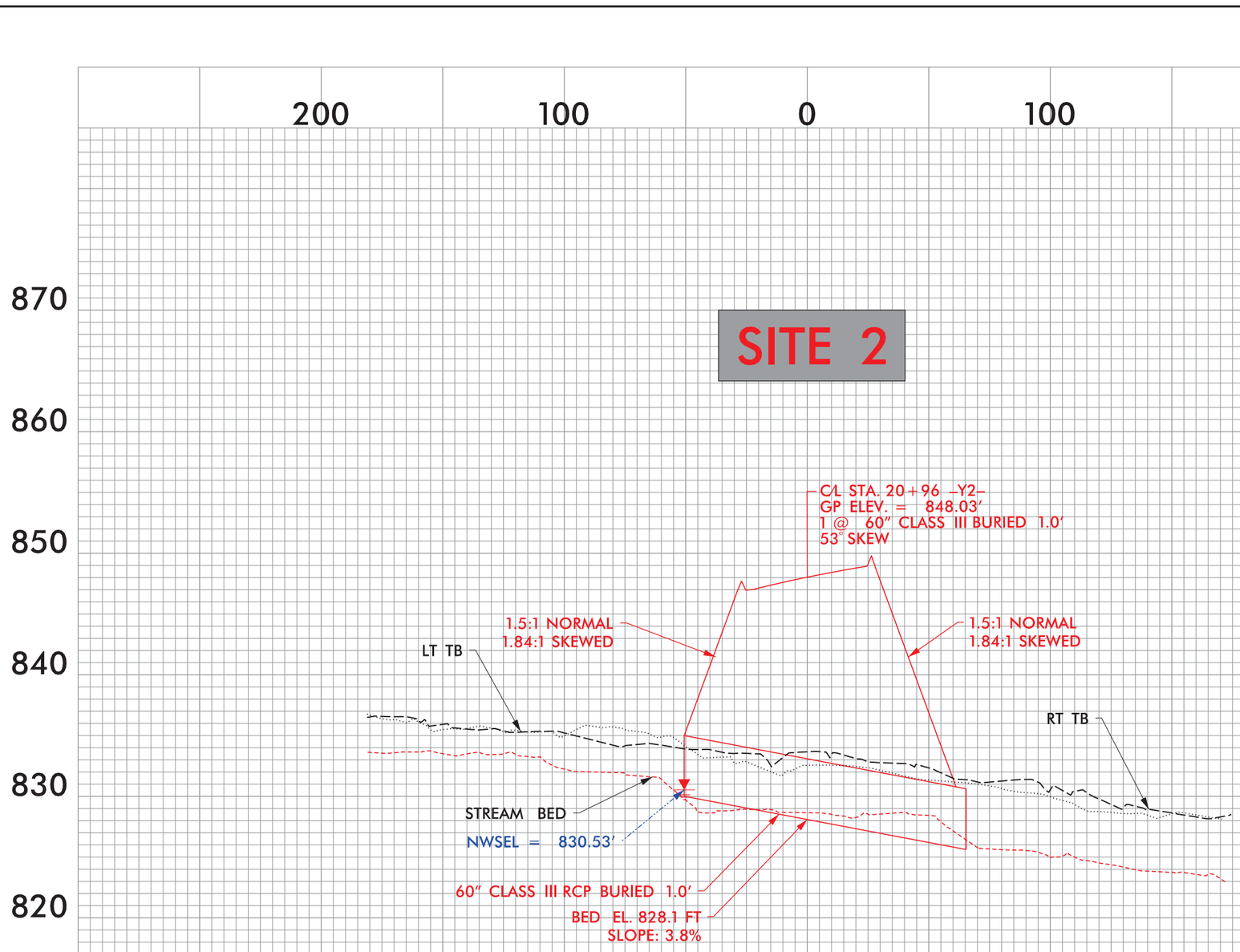
SHEET 13 OF 29

REVISIONS

8/17/99

SITE 2



ENGLISH

28-AUG-2024 14:25
R4045_BR0012_PERMIT-Y2 Cross Pipe.dgn
Roadway

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-4045	X-64

PERMIT DRAWING
SHEET 14 OF 29

ENGLISH

SITE 4

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

860 850 840 830 820 810

0.020 0.020

855.36

4:1

3:1

836.24

WETLAND

28+50.00

857.22 0.020 0.020 857.22

4:1

2:1

835.65

WETLAND

28+00.00

859.08 0.020 0.020 859.08

3:1

1.5:1

834.37

WETLAND

27+50.00

—Y1—

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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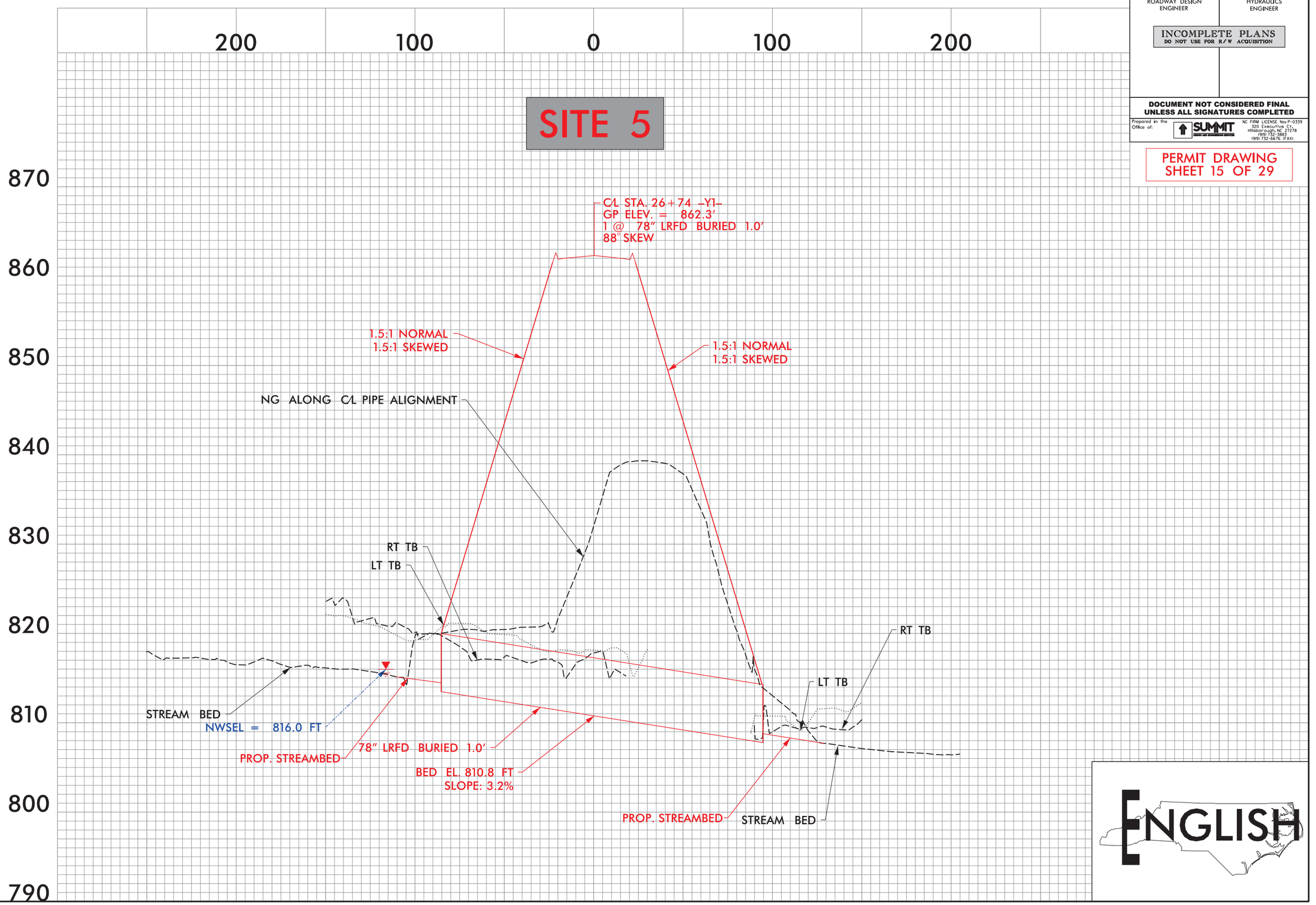
SHEET 15 OF 29

SITE 5



ENGLISH

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 16 OF 29

REVISIONS
8/17/99

300 200 100 0 100 200

–L– –Y1RPD–

870 860 850 840 830 820 810 800 790

SITE 6

℄ STA. 40+05 –L–
1@66" RCP–IV BURIED 1.0'
SKEW = 80°
ELEV. = 841.7'

℄ STA. 19+98 –Y1RPD–
1@54" RCP–IV
SKEW = 135°
ELEV. = 853.6'

NG ALONG C/L PIPE ALIGNMENT

NG ALONG C/L PIPE ALIGNMENT

1.5:1 NORMAL
1.51:1 SKEWED

LT TB

RT TB

4:1 NORMAL
5.7:1 SKEWED

RT TB

LT TB

STREAM BED

RT TB

LT TB

54" RCP–IV

BED EL. 832.2 FT
SLOPE: 6.1%

8' BASE TAIL DITCH

66" RCP–IV BURIED 1.0'

BED EL. 815.5 FT
SLOPE: 5.8%

STREAM BED

ENGLISH

29-AUG-2024 14:25
R-4045_hyd_pmp_sh_X (RPD_Cul_PFL).dgn
hewang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13

R/W SHEET NO. ____

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
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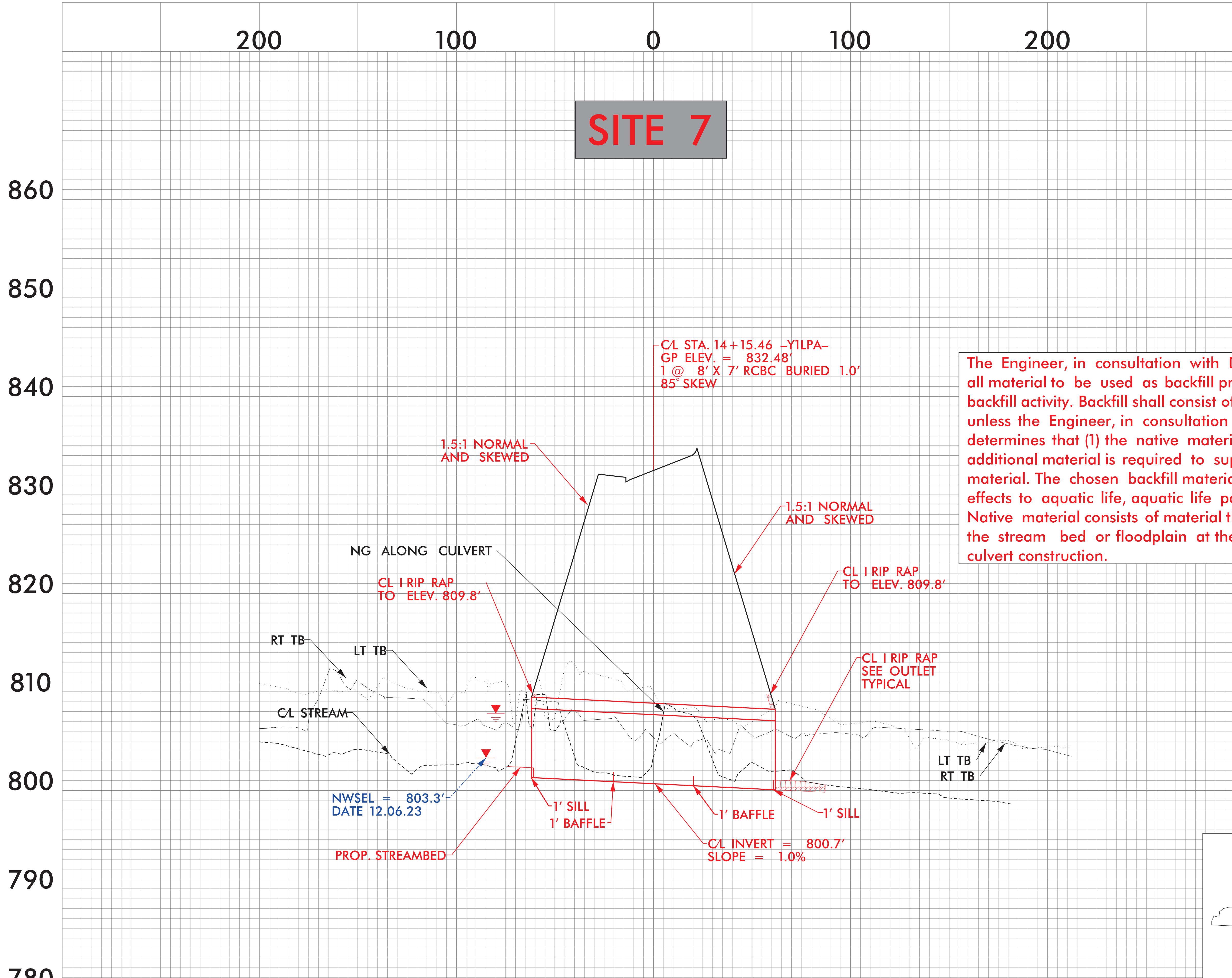
PERMIT DRAWING
SHEET 17 OF 29



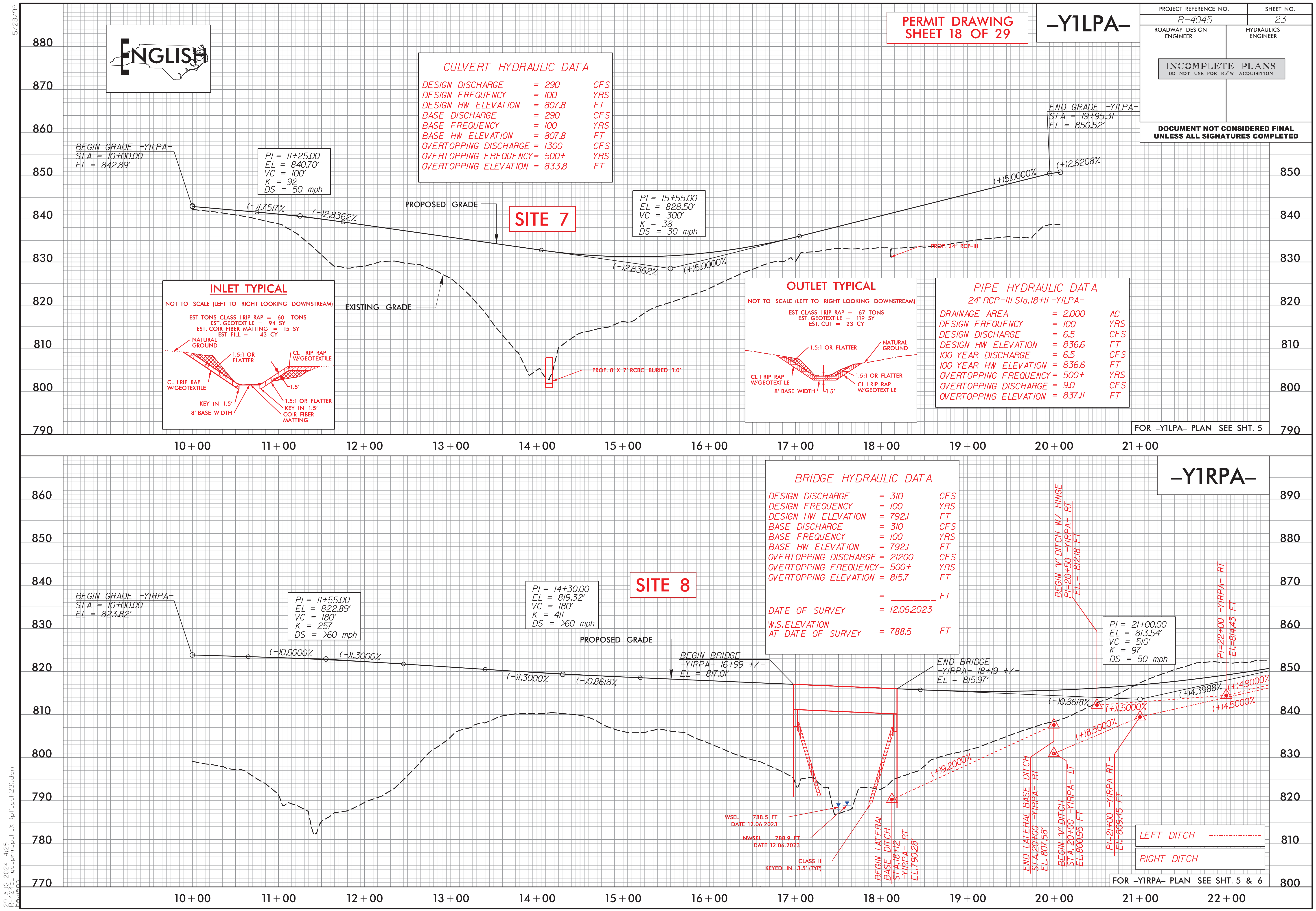
The Engineer, in consultation with DEO staff, shall review all material to be used as backfill prior to conducting the backfill activity. Backfill shall consist of native material only unless the Engineer, in consultation with DEO staff, determines that (1) the native material is unsuitable, or (2) additional material is required to supplement the native material. The chosen backfill material shall not have adverse effects to aquatic life, aquatic life passage, or water quality. Native material consists of material that is excavated from the stream bed or floodplain at the project site during culvert construction.

ENGLISH

REVISIONS

8/17/99

29-AUG-2024 14:25
R4045_HYD_PERMIT-Y1rpa culvert.dgn



PROJECT REFERENCE NO.
R-4045
SHEET NO.
23
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
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PERMIT DRAWING
SHEET 18 OF 29
-Y1LPA-
ENGLISH
CULVERT HYDRAULIC DATA
DESIGN DISCHARGE = 290 CFS
DESIGN FREQUENCY = 100 YRS
DESIGN HW ELEVATION = 807.8 FT
BASE DISCHARGE = 290 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 807.8 FT
OVERTOPPING DISCHARGE = 1300 CFS
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = 833.8 FT
BEGIN GRADE -Y1LPA-
STA = 10+00.00
EL = 842.89'
PI = 11+25.00
EL = 840.70'
VC = 100'
K = 92
DS = 50 mph
(-)1.7517%
(-)2.8362%
PROPOSED GRADE
SITE 7
PI = 15+55.00
EL = 828.50'
VC = 300'
K = 38
DS = 30 mph
(-)2.8362%
(+)5.0000%
(+)5.0000%
(+)2.6208%
END GRADE -Y1LPA-
STA = 19+95.31
EL = 850.52'
PROP. 24" RCP-III
EXISTING GRADE
PROP. 8' X 7' RCBC BURIED 1.0'
INLET TYPICAL
NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)
EST TONS CLASS I RIP RAP = 60 TONS
EST. GEOTEXTILE = 94 SY
EST. COIR FIBER MATTING = 15 SY
EST. FILL = 43 CY
NATURAL GROUND
1.5:1 OR FLATTER
CL I RIP RAP W/GEOTEXTILE
CL I RIP RAP W/GEOTEXTILE
1.5'
KEY IN 1.5'
8' BASE WIDTH
1.5:1 OR FLATTER
KEY IN 1.5'
COIR FIBER MATTING
OUTLET TYPICAL
NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)
EST CLASS I RIP RAP = 67 TONS
EST. GEOTEXTILE = 119 SY
EST. CUT = 23 CY
1.5:1 OR FLATTER
NATURAL GROUND
CL I RIP RAP W/GEOTEXTILE
8' BASE WIDTH
1.5'
1.5:1 OR FLATTER
CL I RIP RAP W/GEOTEXTILE
PIPE HYDRAULIC DATA
24" RCP-III Sta.18+11 -Y1LPA-
DRAINAGE AREA = 2.000 AC
DESIGN FREQUENCY = 100 YRS
DESIGN DISCHARGE = 6.5 CFS
DESIGN HW ELEVATION = 836.6 FT
100 YEAR DISCHARGE = 6.5 CFS
100 YEAR HW ELEVATION = 836.6 FT
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING DISCHARGE = 9.0 CFS
OVERTOPPING ELEVATION = 837.11 FT
FOR -Y1LPA- PLAN SEE SHT. 5
880 870 860 850 840 830 820 810 800 790
10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00
-Y1RPA-
BRIDGE HYDRAULIC DATA
DESIGN DISCHARGE = 310 CFS
DESIGN FREQUENCY = 100 YRS
DESIGN HW ELEVATION = 792.1 FT
BASE DISCHARGE = 310 CFS
BASE FREQUENCY = 100 YRS
BASE HW ELEVATION = 792.1 FT
OVERTOPPING DISCHARGE = 21200 CFS
OVERTOPPING FREQUENCY = 500+ YRS
OVERTOPPING ELEVATION = 815.7 FT
= _________ FT
DATE OF SURVEY = 12.06.2023
W.S.ELEVATION AT DATE OF SURVEY = 788.5 FT
SITE 8
BEGIN GRADE -Y1RPA-
STA = 10+00.00
EL = 823.82'
PI = 11+55.00
EL = 822.89'
VC = 180'
K = 257
DS = >60 mph
(-)0.6000%
(-)1.3000%
PI = 14+30.00
EL = 819.32'
VC = 180'
K = 411
DS = >60 mph
(-)1.3000%
(-)0.8618%
PROPOSED GRADE
BEGIN BRIDGE
-Y1RPA- 16+99 +/-
EL = 817.01'
END BRIDGE
-Y1RPA- 18+19 +/-
EL = 815.97'
BEGIN 'V' DITCH W/ HINGE
PI=20+50 -Y1RPA- RT
EL= 812.18 FT
PI = 21+00.00
EL = 813.54'
VC = 510'
K = 97
DS = 50 mph
PI=22+00 -Y1RPA- RT
El=814.43 FT
(-)0.8618%
(+)1.5000%
(+)4.3988%
(+)4.9000%
(+)4.5000%
(+)18.5000%
(+)9.2000%
WSEL = 788.5 FT
DATE 12.06.2023
NWSEL = 788.9 FT
DATE 12.06.2023
CLASS II
KEYED IN 3.5' (TYP)
BEGIN LATERAL BASE DITCH
STA.18+12
-Y1RPA- RT
EL.790.28'
END LATERAL BASE DITCH
STA.20+00 -Y1RPA- RT
EL 807.58'
BEGIN 'V' DITCH
STA.20+00 -Y1RPA- LT
EL 800.95 FT
PI=21+00 -Y1RPA- RT
El=809.45 FT
LEFT DITCH
RIGHT DITCH
FOR -Y1RPA- PLAN SEE SHT. 5 & 6
860 850 840 830 820 810 800 790 780 770
890 880 870 860 850 840 830 820 810 800
10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00
5/28/99
29-AUG-2024 14:25
R-4045_Hyd_prm_psh_X (pf1psh23).dgn

PERMIT DRAWING
SHEET 19 OF 29

Project Reference No.	Sheet No.
R-4045/BR-0012	6

ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

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NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared in the Office of: WRA Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road,
Suite 320,
Raleigh, NC 27606
(919) 859-0808

TS TS — TEMPORARY SURFACE WATER IMPACTS
S S — SURFACE WATER IMPACTS

50 25 0 50 100
PLANS

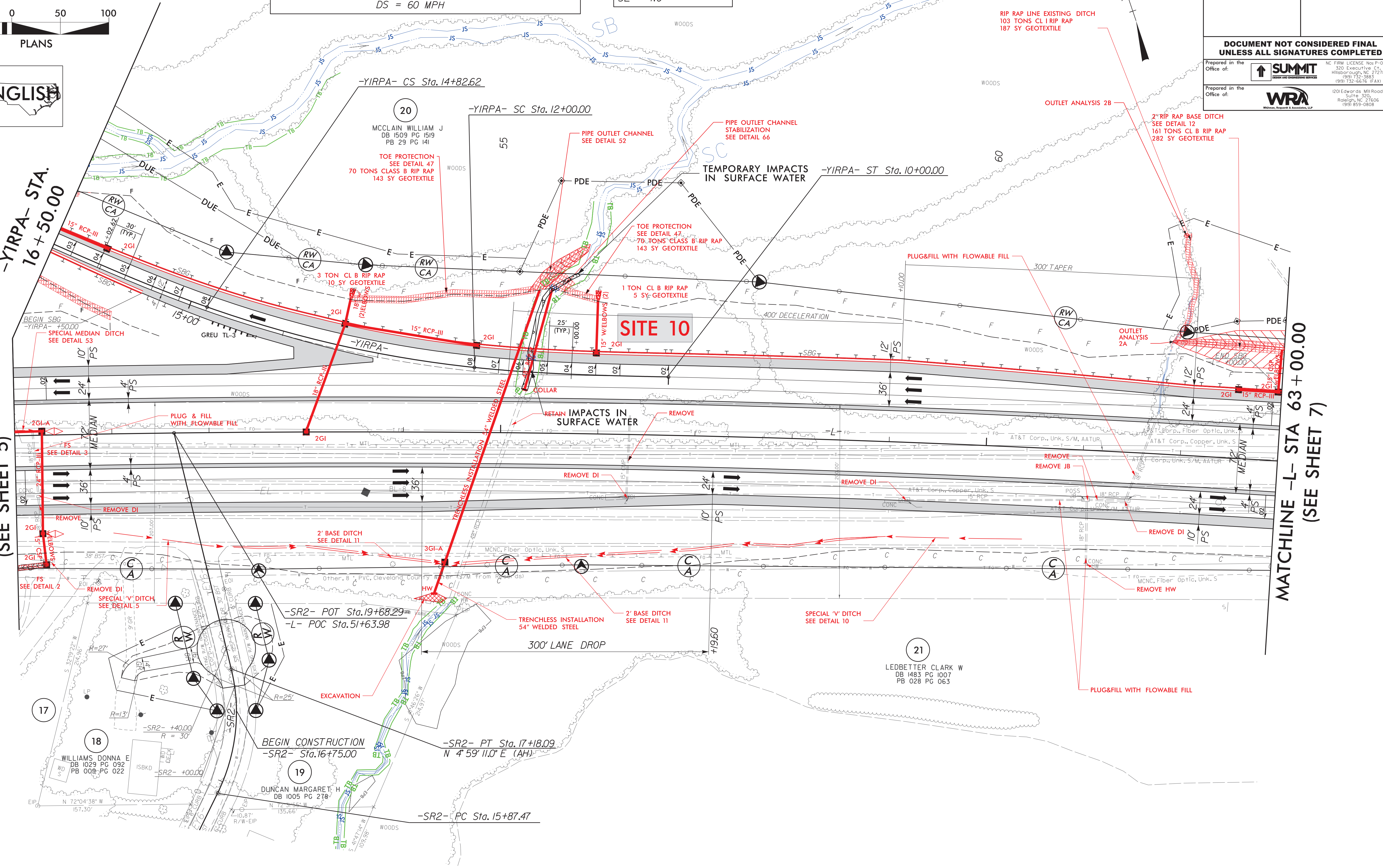
ENGLISH

-YIRPA- CURVE DATA

PIs Sta 11+33.38	PI Sta 13+41.97	PIs Sta 15+42.66
Θs = 4° 46′ 28.7″	Δ = 13° 29′ 39.5″ (RT)	Θs = 4° 17′ 49.9″
Ls = 200.00′	D = 4° 46′ 28.7″	Ls = 180.00′
LT = 133.38′	L = 282.62′	LT = 120.04′
ST = 66.71′	T = 141.97′	ST = 60.03′
	R = 1,200.00′	
	SE = 0.08	
	DS = 60 MPH	

CURVE DATA FOR -L-

PI Sta 58+01.11
Δ = 10° 41′ 35.2″ (RT)
D = 0° 22′ 41.5″
L = 2,827.44′
T = 1,417.84′
R = 15,150.00′
DS = 70 MPH
SE = NC



SITE 10
-YIRPA- STA. 16+50.00
MATCHLINE -L- STA 50+00.00 (SEE SHEET 5)
MATCHLINE -L- STA 63+00.00 (SEE SHEET 7)
-YIRPA- CS Sta. 14+82.62
-YIRPA- SC Sta. 12+00.00
-YIRPA- ST Sta. 10+00.00
MCCLAIN WILLIAM J
DB 1509 PG 1519
PB 29 PG 141
TOE PROTECTION
SEE DETAIL 47
70 TONS CLASS B RIP RAP
143 SY GEOTEXTILE
PIPE OUTLET CHANNEL
SEE DETAIL 52
PIPE OUTLET CHANNEL
STABILIZATION
SEE DETAIL 66
TEMPORARY IMPACTS IN SURFACE WATER
RIP RAP LINE EXISTING DITCH
103 TONS CL I RIP RAP
187 SY GEOTEXTILE
OUTLET ANALYSIS 2B
2' RIP RAP BASE DITCH
SEE DETAIL 12
161 TONS CL B RIP RAP
282 SY GEOTEXTILE
3 TON CL B RIP RAP
10 SY GEOTEXTILE
1 TON CL B RIP RAP
5 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
300' TAPER
400' DECELERATION
OUTLET ANALYSIS 2A
BEGIN SBG
-YIRPA- +50.00
SPECIAL MEDIAN DITCH
SEE DETAIL 53
GREU TL-3
IMPACTS IN SURFACE WATER
RETAIN
COLLAR
PLUG & FILL
WITH FLOWABLE FILL
REMOVE
REMOVE JB
REMOVE DI
TRENCHLESS INSTALLATION 54" WELDED STEEL
2' BASE DITCH
SEE DETAIL 11
FS
SEE DETAIL 3
SEE DETAIL 2
SPECIAL 'V' DITCH
SEE DETAIL 5
SPECIAL 'V' DITCH
SEE DETAIL 10
REMOVE HW
-SR2- POT Sta.19+68.29=
-L- POC Sta.51+63.98
300' LANE DROP
EXCAVATION
BEGIN CONSTRUCTION
-SR2- Sta.16+75.00
-SR2- PT Sta. 17+18.09
N 4° 59' 11.0" E (AH)
-SR2- PC Sta. 15+87.47
LEDBETTER CLARK W
DB 1483 PG 1007
PB 028 PG 063
WILLIAMS DONNA E
DB 1029 PG 092
PB 008 PG 022
DUNCAN MARGARET H
DB 1005 PG 278
WOODS

FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPA- PROFILE, SEE SHEET 23
FOR -SR2- PROFILE, SEE SHEET 27

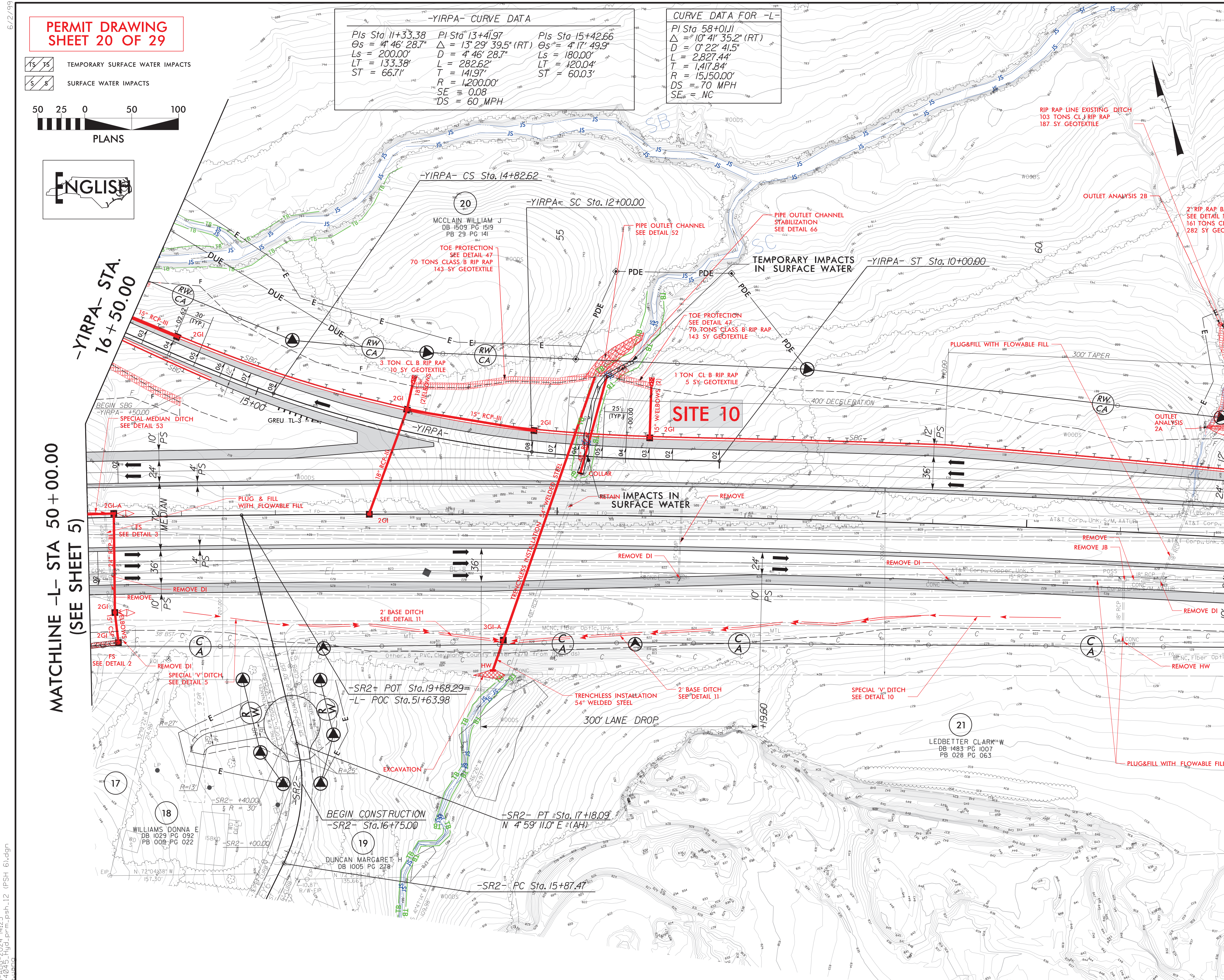
29-AUG-2024 14:25
R-4045_Hyd_prm_psh_11 (PSH 6).dgn

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	6
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No. P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

Prepared in the Office of: WRA Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road, Suite 320,
Raleigh, NC 27606
(919) 859-0808



PERMIT DRAWING
SHEET 20 OF 29
TEMPORARY SURFACE WATER IMPACTS
SURFACE WATER IMPACTS
50 25 0 50 100
PLANS
ENGLISH
-YIRPA- CURVE DATA
PIs Sta 11+33.38
Θs = 4° 46' 28.7"
Ls = 200.00'
LT = 133.38'
ST = 66.71'
PI Sta 13+41.97
Δ = 13° 29' 39.5" (RT)
D = 4° 46' 28.7"
L = 282.62'
T = 141.97'
R = 1,200.00'
SE = 0.08
DS = 60 MPH
PIs Sta 15+42.66
Θs = 4° 17' 49.9"
Ls = 180.00'
LT = 120.04'
ST = 60.03'
CURVE DATA FOR -L-
PI Sta 58+01.11
Δ = 10° 41' 35.2" (RT)
D = 0° 22' 41.5"
L = 2,827.44'
T = 1,417.84'
R = 15,150.00'
DS = 70 MPH
SE = NC
-YIRPA- CS Sta. 14+82.62
-YIRPA- SC Sta. 12+00.00
-YIRPA- ST Sta. 10+00.00
-YIRPA- STA. 16+50.00
MCCLAIN WILLIAM J
DB 1509 PG 1519
PB 29 PG 141
PIPE OUTLET CHANNEL SEE DETAIL 52
PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL 66
TOE PROTECTION SEE DETAIL 47 70 TONS CLASS B RIP RAP 143 SY GEOTEXTILE
TEMPORARY IMPACTS IN SURFACE WATER
3 TON CL B RIP RAP 10 SY GEOTEXTILE
1 TON CL B RIP RAP 5 SY GEOTEXTILE
SITE 10
RIP RAP LINE EXISTING DITCH 103 TONS CL I RIP RAP 187 SY GEOTEXTILE
OUTLET ANALYSIS 2B
2' RIP RAP BASE DITCH SEE DETAIL 12 161 TONS CL B RIP RAP 282 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
300' TAPER
400' DECELERATION
OUTLET ANALYSIS 2A
SPECIAL MEDIAN DITCH SEE DETAIL 53
PLUG & FILL WITH FLOWABLE FILL
IMPACTS IN SURFACE WATER
RETAIN
COLLAR
REMOVE
REMOVE JB
REMOVE DI
TRENCHLESS INSTALLATION 54" WELDED STEEL
2' BASE DITCH SEE DETAIL 11
SPECIAL 'V' DITCH SEE DETAIL 10
SPECIAL 'V' DITCH SEE DETAIL 5
FS SEE DETAIL 3
FS SEE DETAIL 2
REMOVE HW
EXCAVATION
MATCHLINE -L- STA 50+00.00 (SEE SHEET 5)
MATCHLINE -L- STA 63+00.00 (SEE SHEET 7)
-SR2- POT Sta. 19+68.29= -L- POC Sta. 51+63.98
300' LANE DROP
LEDBETTER CLARK W
DB 1483 PG 1007
PB 028 PG 063
BEGIN CONSTRUCTION -SR2- Sta. 16+75.00
-SR2- PT Sta. 17+18.09
N 4° 59' 11.0" E (AH)
WILLIAMS DONNA E
DB 1029 PG 092
PB 008 PG 022
DUNCAN MARGARET H
DB 1005 PG 278
-SR2- PC Sta. 15+87.47

FOR -L- PROFILE, SEE SHEET 18
FOR -YIRPA- PROFILE, SEE SHEET 23
FOR -SR2- PROFILE, SEE SHEET 27

29-AUG-2024 14:25
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	
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

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

PERMIT DRAWING
SHEET 21 OF 29

SITE 10

200 100 0 100 200

840 830 820 810 800 790 780 770

CL STA 55+09.10 –L–
EXIST 48" RCP
SKEW=108 DEGREES
EBL GP EL=822.42
WBL GP EL=823.49

4:1 NORMAL
4:1 SKEWED

1.5:1 NORMAL
1.5:1 SKEWED

LT TB
RT TB
STREAM BED
NWSEL = 792.4 FT
PROP. 54"
BED EL. 787.1 FT
SLOPE: 3.5%
BED EL. 783.9 FT
SLOPE: 4.6%
LT TB
RT TB
BED EL. 781.2 FT
SLOPE: 0.9%
48" EXTENSION
STREAM BED

28-AUG-2024 14:25
R4045_Fig2.prm_sc.dgn
hewang

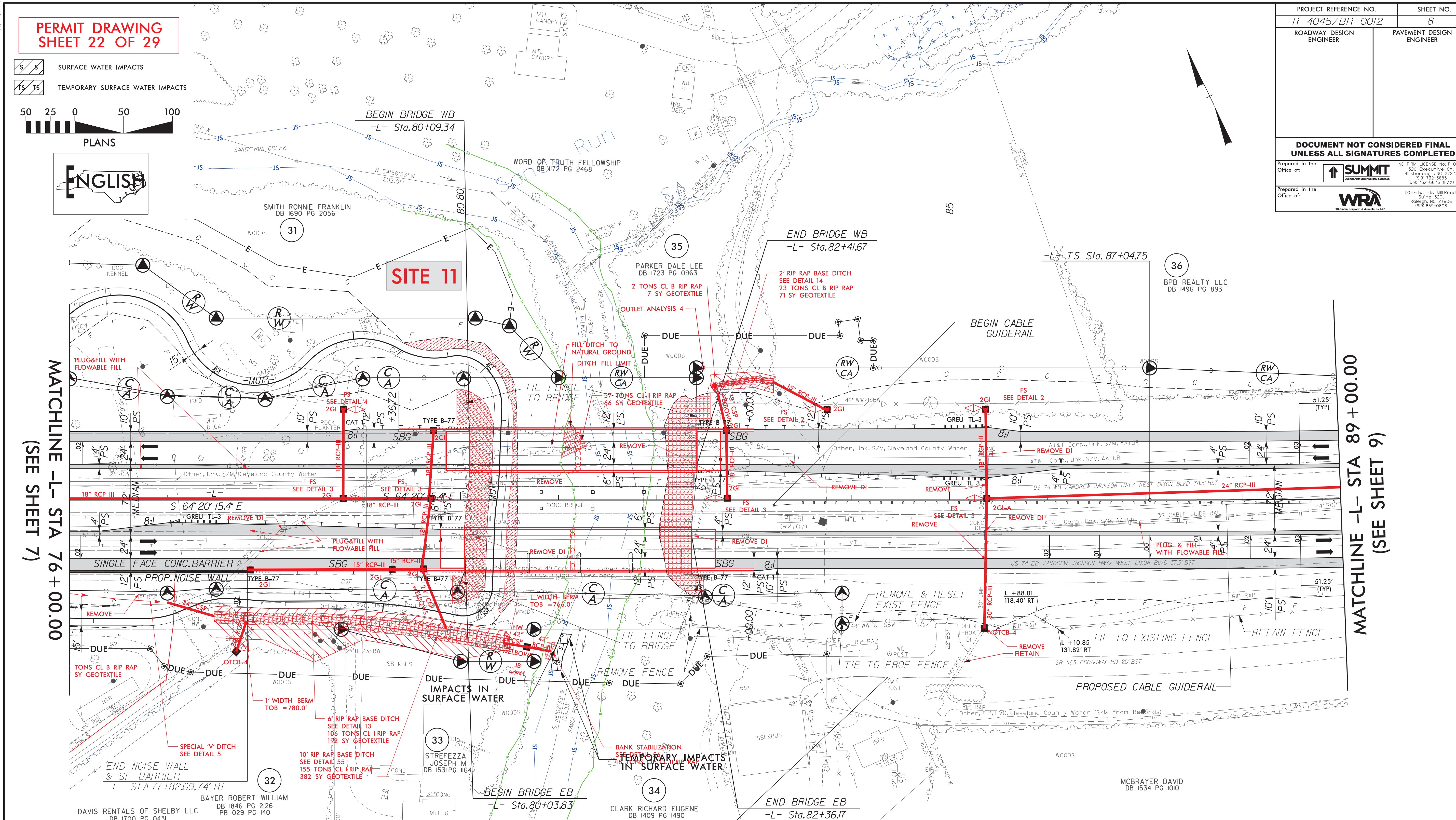
PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: SUMMIT — NC FIRM LICENSE No: P-0339, 320 Executive Ct., Hillsborough, NC 27278, (919) 732-3883, (919) 732-6676 (FAX)

Prepared in the Office of: WRA — 1201 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0808

PERMIT DRAWING
SHEET 22 OF 29



SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
50 25 0 50 100
PLANS
ENGLISH
SITE 11
BEGIN BRIDGE WB
-L- Sta.80+09.34
END BRIDGE WB
-L- Sta.82+41.67
BEGIN BRIDGE EB
-L- Sta.80+03.83
END BRIDGE EB
-L- Sta.82+36.17
-L- TS Sta. 87+04.75
MATCHLINE -L- STA 76+00.00
(SEE SHEET 7)
MATCHLINE -L- STA 89+00.00
(SEE SHEET 9)
WORD OF TRUTH FELLOWSHIP
DB 1172 PG 2468
SMITH RONNIE FRANKLIN
DB 1690 PG 2056
PARKER DALE LEE
DB 1723 PG 0963
BPB REALTY LLC
DB 1496 PG 893
STREFEZZA JOSEPH M
DB 1531 PG 1164
CLARK RICHARD EUGENE
DB 1409 PG 1490
BAYER ROBERT WILLIAM
DB 1846 PG 2126
PB 029 PG 140
DAVIS RENTALS OF SHELBY LLC
DB 1700 PG 0431
MCBRAYER DAVID
DB 1534 PG 1010
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
BANK STABILIZATION
2' RIP RAP BASE DITCH
SEE DETAIL 14
23 TONS CL B RIP RAP
71 SY GEOTEXTILE
2 TONS CL B RIP RAP
7 SY GEOTEXTILE
OUTLET ANALYSIS 4
FILL DITCH TO NATURAL GROUND
DITCH FILL LIMIT
57 TONS CL II RIP RAP
66 SY GEOTEXTILE
6' RIP RAP BASE DITCH
SEE DETAIL 13
106 TONS CL I RIP RAP
192 SY GEOTEXTILE
10' RIP RAP BASE DITCH
SEE DETAIL 55
155 TONS CL I RIP RAP
382 SY GEOTEXTILE
1' WIDTH BERM
TOB =780.0'
1' WIDTH BERM
TOB =766.0'
SPECIAL 'V' DITCH
SEE DETAIL 5
PLUG&FILL WITH FLOWABLE FILL
END NOISE WALL
& SF BARRIER
-L- STA.77+82.00,74' RT
SINGLE FACE CONC.BARRIER
PROP. NOISE WALL
BEGIN CABLE GUIDERAIL
PROPOSED CABLE GUIDERAIL
REMOVE & RESET EXIST FENCE
TIE TO EXISTING FENCE
RETAIN FENCE
TIE TO PROP FENCE
TIE FENCE TO BRIDGE
REMOVE FENCE
US 74 WB /ANDREW JACKSON HWY/ WEST DIXON BLVD
US 74 EB /ANDREW JACKSON HWY/ WEST DIXON BLVD
SR 1163 BROADWAY RD
Sandy Run

CURVE DATA FOR -MUP-							
PI Sta 12+72.20	PI Sta 12+71.37	PI Sta 14+13.23	PI Sta 15+06.06	PI Sta 15+75.51	PI Sta 16+20.74	PI Sta 16+64.47	PI Sta 17+68.07
△ = 159° 10′ 58.7″ (LT)	△ = 120° 57′ 43.3″ (RT)	△ = 114° 13′ 06.4″ (LT)	△ = 76° 39′ 29.3″ (RT)	△ = 41° 29′ 15.5″ (LT)	△ = 51° 34′ 08.2″ (RT)	△ = 52° 22′ 55.9″ (RT)	△ = 5° 53′ 34.8″ (RT)
D = 114° 35′ 29.6″	D = 76° 23′ 39.7″	D = 76° 23′ 39.7″	D = 76° 23′ 39.7″	D = 76° 23′ 39.7″	D = 143° 14′ 22.0″	D = 104° 10′ 26.9″	D = 22° 55′ 05.9″
L = 138.91′	L = 158.34′	L = 149.51′	L = 100.35′	L = 54.31′	L = 36.00′	L = 50.28′	L = 25.71′
T = 272.20′	T = 132.46′	T = 115.97′	T = 59.29′	T = 28.41′	T = 19.32′	T = 27.05′	T = 12.87′
R = 50.00′	R = 75.00′	R = 75.00′	R = 75.00′	R = 75.00′	R = 40.00′	R = 55.00′	R = 250.00′

CURVE DATA FOR -L-	
PIs Sta 88+41.42	PI Sta 92+99.72
Θs = 1° 09′ 46.6″	△ = 8° 49′ 52.4″ (LT)
Ls = 205.00′	D = 1° 08′ 04.5″
LT = 136.67′	L = 778.38′
ST = 68.34′	T = 389.96′
	R = 5,050.00′
	DS = 70 MPH
	SE = 0.04

CURVE DATA FOR -MUP-							
PI Sta 17+94.31	PI Sta 19+07.39	PI Sta 19+92.93	PI Sta 21+20.86	PI Sta 21+72.46	PI Sta 22+29.53	PI Sta 23+24.21	PI Sta 23+71.18
△ = 6° 07′ 53.1″ (LT)	△ = 100° 18′ 24.7″ (RT)	△ = 12° 23′ 53.0″ (LT)	△ = 4° 34′ 47.6″ (RT)	△ = 26° 26′ 45.5″ (LT)	△ = 21° 58′ 07.1″ (RT)	△ = 3° 26′ 01.1″ (RT)	△ = 5° 15′ 54.1″ (LT)
D = 22° 55′ 05.9″	D = 190° 59′ 09.4″	D = 9° 01′ 22.6″	D = 28° 38′ 52.4″	D = 71° 37′ 11.0″	D = 71° 37′ 11.0″	D = 14° 19′ 26.2″	D = 19° 05′ 54.9″
L = 26.75′	L = 52.52′	L = 137.41′	L = 15.99′	L = 36.93′	L = 30.67′	L = 23.97′	L = 27.57′
T = 13.39′	T = 35.95′	T = 68.97′	T = 8.00′	T = 18.80′	T = 15.53′	T = 11.99′	T = 13.79′
R = 250.00′	R = 30.00′	R = 635.00′	R = 200.00′	R = 80.00′	R = 80.00′	R = 400.00′	R = 300.00′

FOR -L- PROFILE, SEE SHEET 20
FOR -MUP- PROFILE, SEE SHEET 29

6/2/99

29-AUG-2024 14:25
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PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	8
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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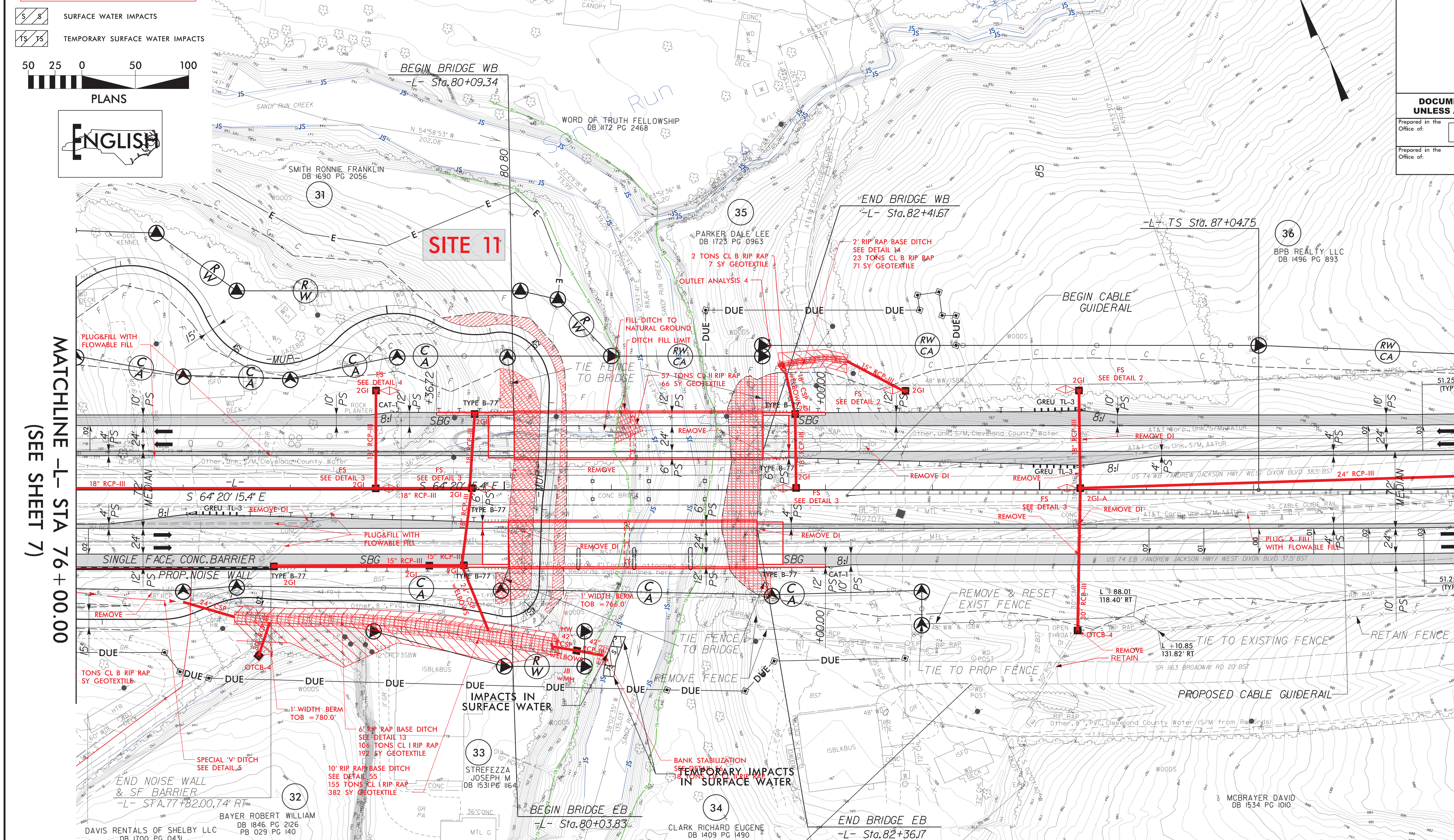

SURFACE WATER IMPACTS
TEMPORARY SURFACE WATER IMPACTS
50 25 0 50 100
PLANS
ENGLISH
SITE 11
BEGIN BRIDGE WB
-L- Sta.80+09.34
END BRIDGE WB
-L- Sta.82+41.67
BEGIN BRIDGE EB
-L- Sta.80+03.83
END BRIDGE EB
-L- Sta.82+36.17
-L- TS Sta. 87+04.75
WORD OF TRUTH FELLOWSHIP
DB 1172 PG 2468
SMITH RONNIE FRANKLIN
DB 1690 PG 2056
PARKER DALE LEE
DB 1723 PG 0963
BPB REALTY LLC
DB 1496 PG 893
STREFEZZA JOSEPH M
DB 1531 PG 1164
CLARK RICHARD EUGENE
DB 1409 PG 1490
BAYER ROBERT WILLIAM
DB 1846 PG 2126
PB 029 PG 140
DAVIS RENTALS OF SHELBY LLC
DB 1700 PG 0431
MCBRAYER DAVID
DB 1534 PG 1010
MATCHLINE -L- STA 76+00.00
(SEE SHEET 7)
MATCHLINE -L- STA 89+00.00
(SEE SHEET 9)
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
BEGIN CABLE GUIDERAIL
PROPOSED CABLE GUIDERAIL
SINGLE FACE CONC. BARRIER
PROP. NOISE WALL
END NOISE WALL
& SF BARRIER
-L- STA.77+82.00,74' RT
REMOVE & RESET EXIST FENCE
TIE TO EXISTING FENCE
RETAIN FENCE
TIE TO PROP FENCE
TIE FENCE TO BRIDGE
REMOVE FENCE
S 64°20'15.4" E
2' RIP RAP BASE DITCH
SEE DETAIL 14
23 TONS CL B RIP RAP
71 SY GEOTEXTILE
2 TONS CL B RIP RAP
7 SY GEOTEXTILE
OUTLET ANALYSIS 4
FILL DITCH TO NATURAL GROUND
DITCH FILL LIMIT
57 TONS CL II RIP RAP
66 SY GEOTEXTILE
PLUG&FILL WITH FLOWABLE FILL
6' RIP RAP BASE DITCH
SEE DETAIL 13
106 TONS CL I RIP RAP
192 SY GEOTEXTILE
10' RIP RAP BASE DITCH
SEE DETAIL 55
155 TONS CL I RIP RAP
382 SY GEOTEXTILE
SPECIAL 'V' DITCH
SEE DETAIL 5
1' WIDTH BERM
TOB = 780.0'
1' WIDTH BERM
TOB = 766.0'
BANK STABILIZATION
24" RCP-III
18" RCP-III
15" RCP-III
US 74 WB / ANDREW JACKSON HWY / WEST DIXON BLVD
US 74 EB / ANDREW JACKSON HWY / WEST DIXON BLVD
SR 1163 BROADWAY RD

CURVE DATA FOR -MUP-							
PI Sta 12+72.20	PI Sta 12+71.37	PI Sta 14+13.23	PI Sta 15+06.06	PI Sta 15+75.51	PI Sta 16+20.74	PI Sta 16+64.47	PI Sta 17+68.07
Δ = 159° 10' 58.7" (LT)	Δ = 120° 57' 43.3" (RT)	Δ = 114° 13' 06.4" (LT)	Δ = 76° 39' 29.3" (RT)	Δ = 41° 29' 15.5" (LT)	Δ = 51° 34' 08.2" (RT)	Δ = 52° 22' 55.9" (RT)	Δ = 5° 53' 34.8" (RT)
D = 114° 35' 29.6"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 76° 23' 39.7"	D = 143° 14' 22.0"	D = 104° 10' 26.9"	D = 22° 55' 05.9"
L = 138.91'	L = 158.34'	L = 149.51'	L = 100.35'	L = 54.31'	L = 36.00'	L = 50.28'	L = 25.71'
T = 272.20'	T = 132.46'	T = 115.97'	T = 59.29'	T = 28.41'	T = 19.32'	T = 27.05'	T = 12.87'
R = 50.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 75.00'	R = 40.00'	R = 55.00'	R = 250.00'

CURVE DATA FOR -L-	
PIs Sta 88+41.42	PI Sta 92+99.72
θs = 1° 09' 46.6"	Δ = 8° 49' 52.4" (LT)
Ls = 205.00'	D = 1° 08' 04.5"
LT = 136.67'	L = 778.38'
ST = 68.34'	T = 389.96'
	R = 5,050.00'
	DS = 70 MPH
	SE = 0.04

CURVE DATA FOR -MUP-							
PI Sta 17+94.31	PI Sta 19+07.39	PI Sta 19+92.93	PI Sta 21+20.86	PI Sta 21+72.46	PI Sta 22+29.53	PI Sta 23+24.21	PI Sta 23+71.18
Δ = 6° 07' 53.1" (LT)	Δ = 100° 18' 24.7" (RT)	Δ = 12° 23' 53.0" (LT)	Δ = 4° 34' 47.6" (RT)	Δ = 26° 26' 45.5" (LT)	Δ = 21° 58' 07.1" (RT)	Δ = 3° 26' 01.1" (RT)	Δ = 5° 15' 54.1" (LT)
D = 22° 55' 05.9"	D = 190° 59' 09.4"	D = 9° 01' 22.6"	D = 28° 38' 52.4"	D = 71° 37' 11.0"	D = 71° 37' 11.0"	D = 14° 19' 26.2"	D = 19° 05' 54.9"
L = 26.75'	L = 52.52'	L = 137.41'	L = 15.99'	L = 36.93'	L = 30.67'	L = 23.97'	L = 27.57'
T = 13.39'	T = 35.95'	T = 68.97'	T = 8.00'	T = 18.80'	T = 15.53'	T = 11.99'	T = 13.79'
R = 250.00'	R = 30.00'	R = 635.00'	R = 200.00'	R = 80.00'	R = 80.00'	R = 400.00'	R = 300.00'

FOR -L- PROFILE, SEE SHEET 20
FOR -MUP- PROFILE, SEE SHEET 29

PROJECT REFERENCE NO.	SHEET NO.
R-4045	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

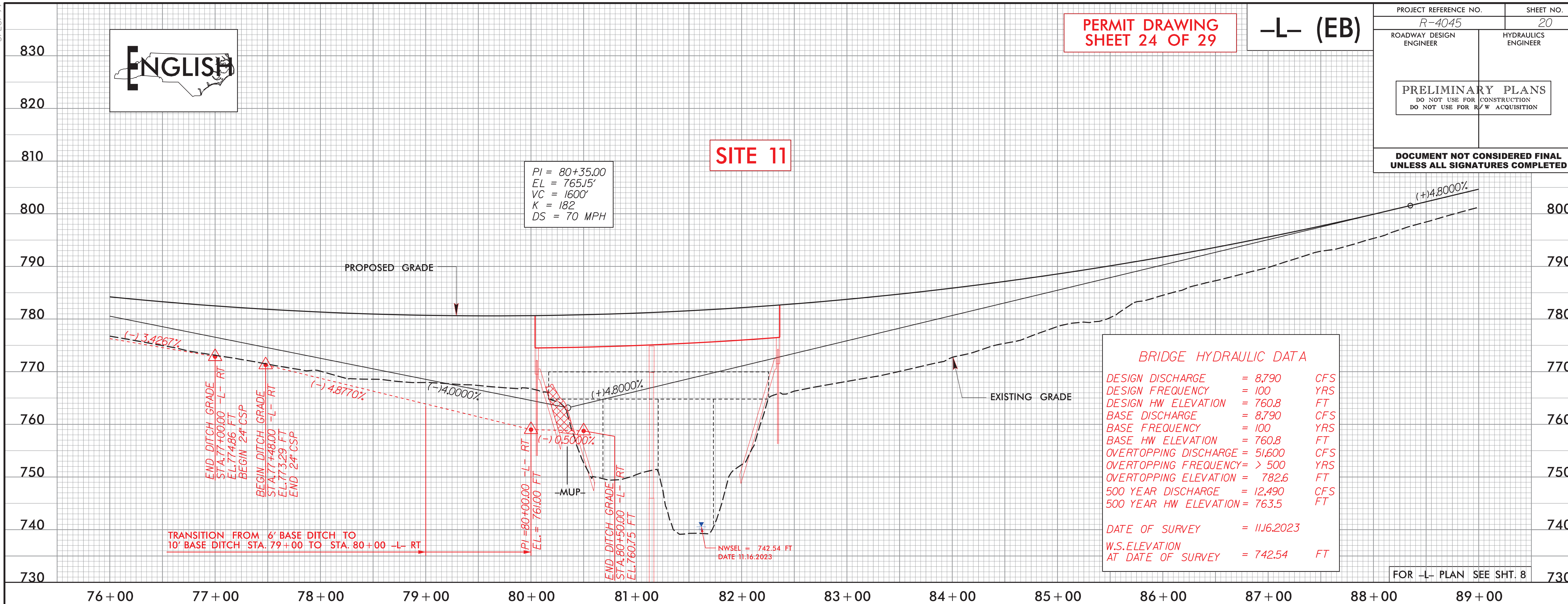
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 24 OF 29

–L– (EB)

SITE 11

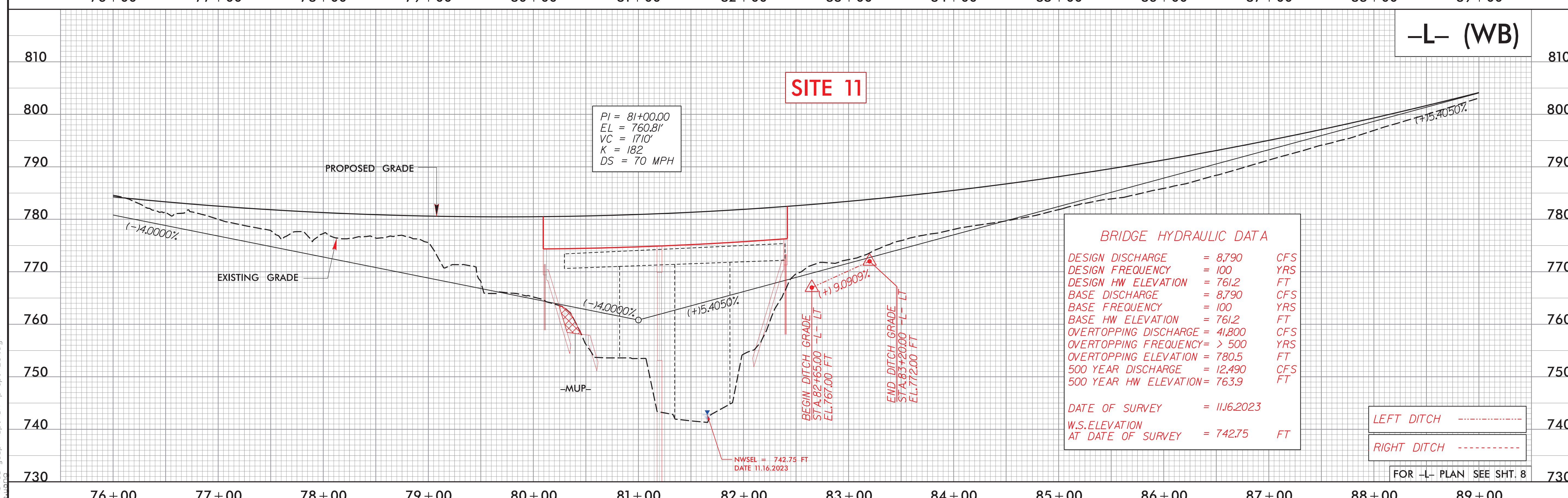


BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	8,790	CFS
DESIGN FREQUENCY	=	100	YRS
DESIGN HW ELEVATION	=	760.8	FT
BASE DISCHARGE	=	8,790	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	760.8	FT
OVERTOPPING DISCHARGE	=	51,600	CFS
OVERTOPPING FREQUENCY	=	> 500	YRS
OVERTOPPING ELEVATION	=	782.6	FT
500 YEAR DISCHARGE	=	12,490	CFS
500 YEAR HW ELEVATION	=	763.5	FT
DATE OF SURVEY	=	11.16.2023	
W.S. ELEVATION AT DATE OF SURVEY	=	742.54	FT

–L– (WB)

SITE 11



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	8,790	CFS
DESIGN FREQUENCY	=	100	YRS
DESIGN HW ELEVATION	=	761.2	FT
BASE DISCHARGE	=	8,790	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	761.2	FT
OVERTOPPING DISCHARGE	=	41,800	CFS
OVERTOPPING FREQUENCY	=	> 500	YRS
OVERTOPPING ELEVATION	=	780.5	FT
500 YEAR DISCHARGE	=	12,490	CFS
500 YEAR HW ELEVATION	=	763.9	FT
DATE OF SURVEY	=	11.16.2023	
W.S. ELEVATION AT DATE OF SURVEY	=	742.75	FT

5/28/99
29-AUG-2024 14:25
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PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13

ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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Prepared in the Office of:
WRA Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road,
Suite 320,
Raleigh, NC 27606
(919) 859-0808

-SR2- CURVE DATA
PI Sta 14+55.98
Δ = 14° 31' 57.1" (RT)
D = 12° 38' 53.1"
L = 114.90'
T = 57.76'
R = 453.00'

-SRI- CURVE DATA

PI Sta 20+36.18	PI Sta 28+04.67
Δ = 38° 26' 03.9" (RT)	Δ = 26° 04' 45.5" (LT)
D = 6° 15' 42.6"	D = 11° 48' 48.8"
L = 613.79'	L = 220.76'
T = 318.94'	T = 112.32'
R = 915.00'	R = 485.00'
SE = 0.05	SE = 0.06
RO = 105'	RO = 126'
DS = 40 MPH	DS = 40 MPH

50 25 0 50 100
PLANS

TS TS	TEMPORARY SURFACE WATER IMPACTS
S S	SURFACE WATER IMPACTS
F F	FILL IN WETLAND
HC HC	HAND CLEARING (NON-GRUBBING)

PERMIT DRAWING
SHEET 25 OF 29

FOR -SR1- PROFILE, SEE SHEET 26
FOR -SR2- PROFILE, SEE SHEET 27

6/2/99
29-AUG-2024 14:25
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he.uang

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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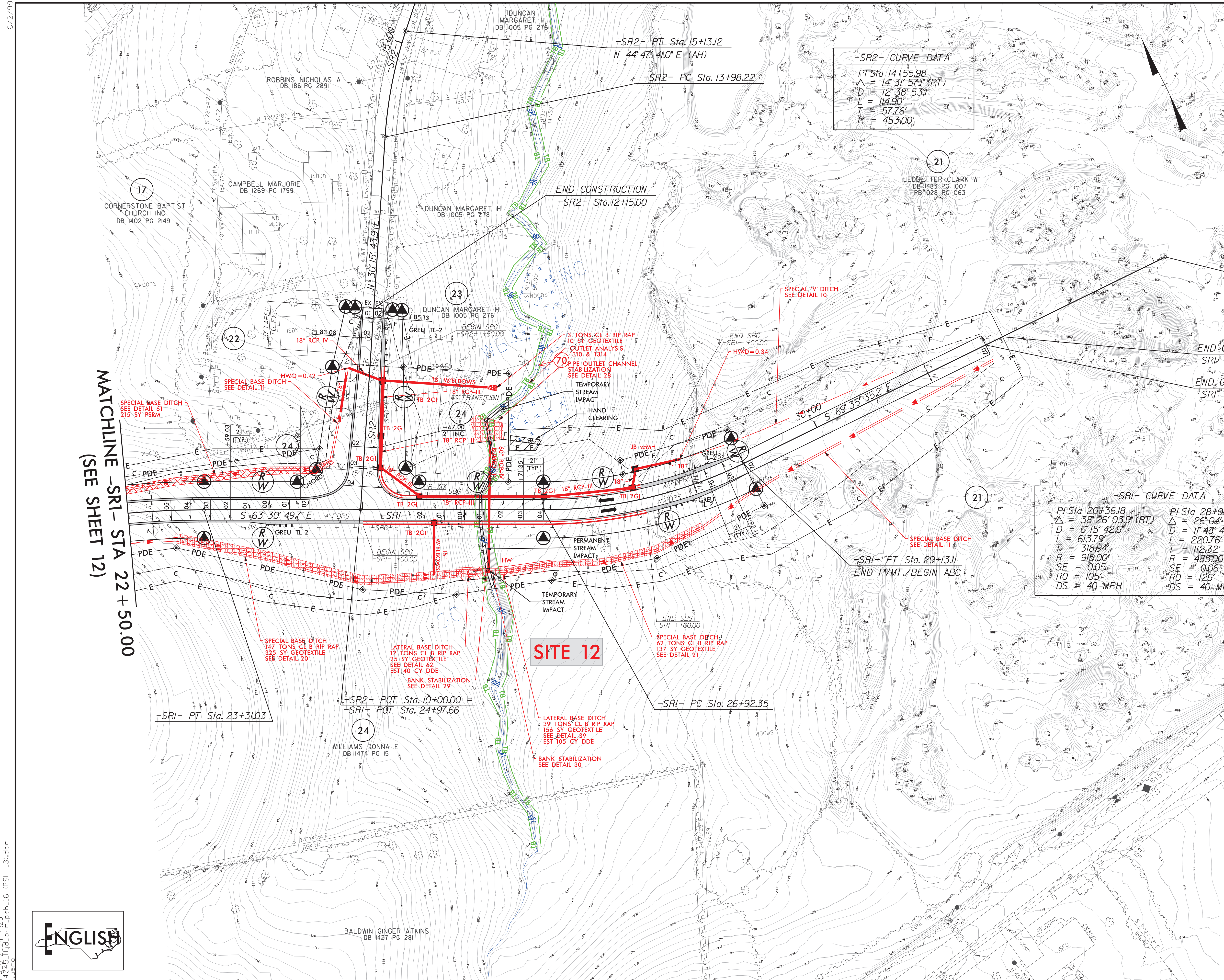
Prepared in the Office of: WRA Withers Ravenel & Associates, LLC — 2010 Edwards Mill Road, Suite 320, Raleigh, NC 27606, (919) 859-0809



-SR2- CURVE DATA
PI Sta 14+55.98
Δ = 14° 31' 57.1" (RT)
D = 12° 38' 53.1"
L = 114.90'
T = 57.76'
R = 453.00'
-SR2- PT Sta. 15+13.12
N 44° 47' 41.0" E (AH)
-SR2- PC Sta. 13+98.22
END CONSTRUCTION -SR2- Sta. 12+15.00
-SR1- POT Sta. 34+13.20
END CONSTRUCTION -SR1- Sta. 32+20.00
END GRADE -SR1- Sta. 32+00.00
-SR1- CURVE DATA
PI Sta 20+36.18
Δ = 38° 26' 03.9" (RT.)
D = 6° 15' 42.6"
L = 613.79'
T = 318.94'
R = 915.00'
SE = 0.05
RO = 105'
DS = 40 MPH
PI Sta 28+04.67
Δ = 26° 04' 45.5" (LT)
D = 11° 48' 48.8"
L = 220.76'
T = 112.32'
R = 485.00'
SE = 0.06
RO = 126'
DS = 40 MPH
-SR1- PT Sta. 29+13.11
END PVMT./BEGIN ABC
-SR1- PC Sta. 26+92.35
-SR2- POT Sta. 10+00.00 = -SR1- POT Sta. 24+97.66
-SR1- PT Sta. 23+31.03
MATCHLINE -SR1- STA 22+50.00 (SEE SHEET 12)
SITE 12
S 63° 30' 49.7" E
S 89° 35' 35.2" E
N 30° 15' 43.9" E
ROBBINS NICHOLAS A DB 1861 PG 2891
CAMPBELL MARJORIE DB 1269 PG 1799
CORNERSTONE BAPTIST CHURCH INC DB 1402 PG 2149
DUNCAN MARGARET H DB 1005 PG 278
DUNCAN MARGARET H DB 1005 PG 276
LEDBETTER CLARK W DB 1483 PG 1007 PB 028 PG 063
WILLIAMS DONNA E DB 1474 PG 15
BALDWIN GINGER ATKINS DB 1427 PG 281
SPECIAL 'V' DITCH SEE DETAIL 10
3 TONS CL B RIP RAP 10 SY GEOTEXTILE
OUTLET ANALYSIS 1310 & 1314
PIPE OUTLET CHANNEL STABILIZATION SEE DETAIL 28
TEMPORARY STREAM IMPACT
HAND CLEARING
PERMANENT STREAM IMPACT
SPECIAL BASE DITCH SEE DETAIL 61 215 SY PSRM
SPECIAL BASE DITCH SEE DETAIL 11
SPECIAL BASE DITCH 147 TONS CL B RIP RAP 325 SY GEOTEXTILE SEE DETAIL 20
LATERAL BASE DITCH 12 TONS CL B RIP RAP 25 SY GEOTEXTILE SEE DETAIL 62 EST 40 CY DDE
BANK STABILIZATION SEE DETAIL 29
LATERAL BASE DITCH 39 TONS CL B RIP RAP 156 SY GEOTEXTILE SEE DETAIL 39 EST 105 CY DDE
BANK STABILIZATION SEE DETAIL 30
SPECIAL BASE DITCH 62 TONS CL B RIP RAP 137 SY GEOTEXTILE SEE DETAIL 21
SPECIAL BASE DITCH SEE DETAIL 11
HWD = 0.42
HWD = 0.34
END SBG -SR1- +00.00
BEGIN SBG -SR2- +50.00
BEGIN SBG -SR1- +00.00
END SBG -SR1- +00.00

PLANS

Symbol	Description
TS	TEMPORARY SURFACE WATER IMPACTS
S	SURFACE WATER IMPACTS
F	FILL IN WETLAND
HC	HAND CLEARING (NON-GRUBBING)

PERMIT DRAWING SHEET 26 OF 29

FOR -SR1- PROFILE, SEE SHEET 26
FOR -SR2- PROFILE, SEE SHEET 27

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6/2/99

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-4045/BR-0012	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

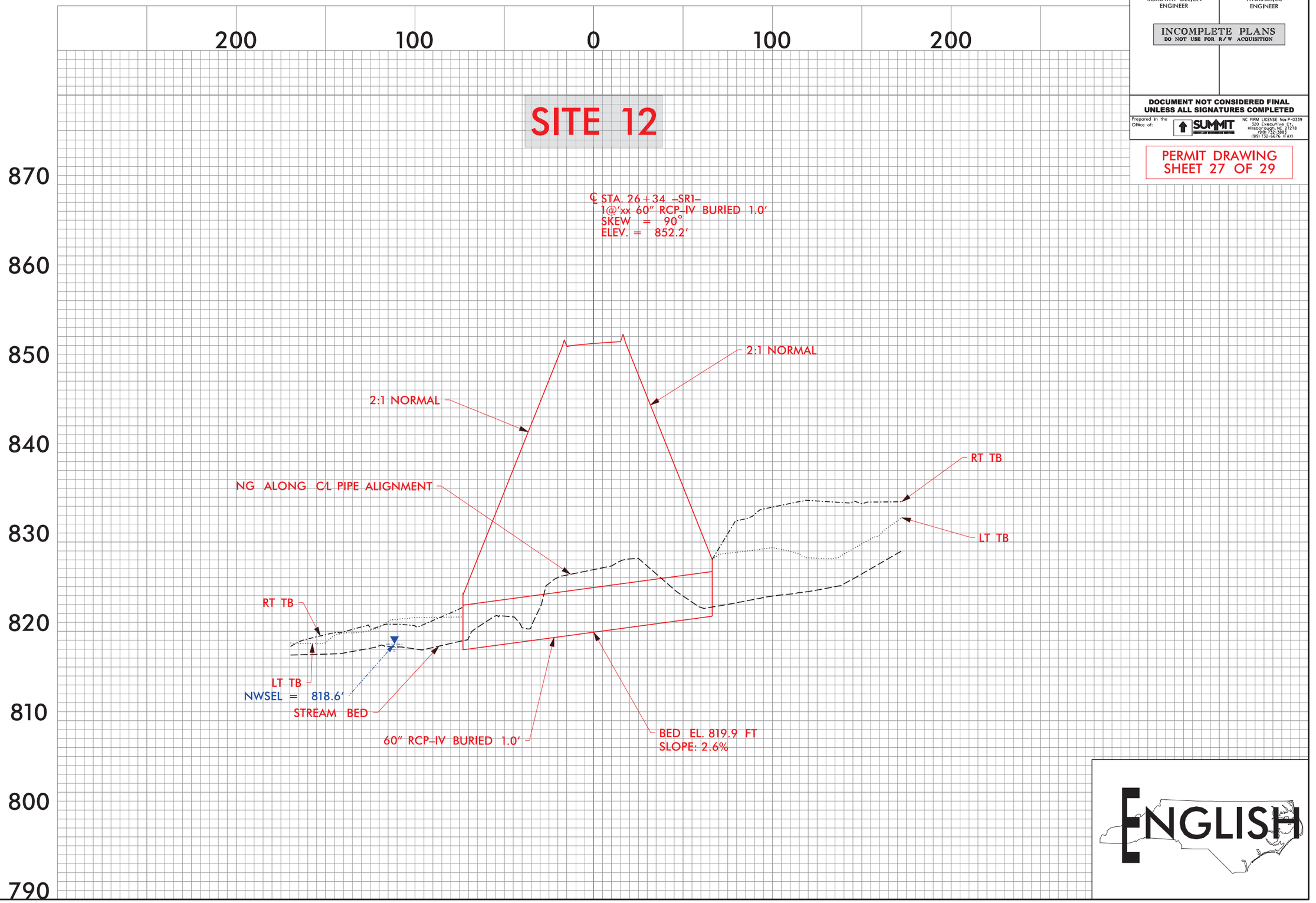
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of:
SUMMIT DESIGN AND ENGINEERING SERVICES
NC FIRM LICENSE No: P-0339
320 Executive Ct.
Hillsborough, NC 27278
(919) 732-3883
(919) 732-6676 (FAX)

PERMIT DRAWING
SHEET 27 OF 29

SITE 12



ENGLISH

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hewang

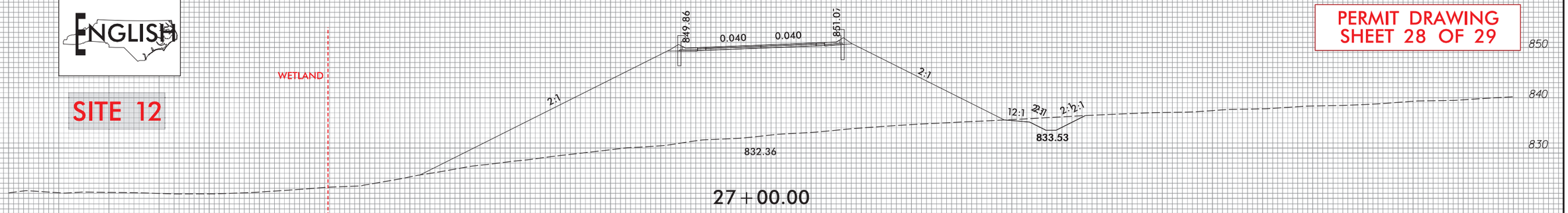
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-4045	X-101

PERMIT DRAWING
SHEET 28 OF 29

ENGLISH

SITE 12

WETLAND



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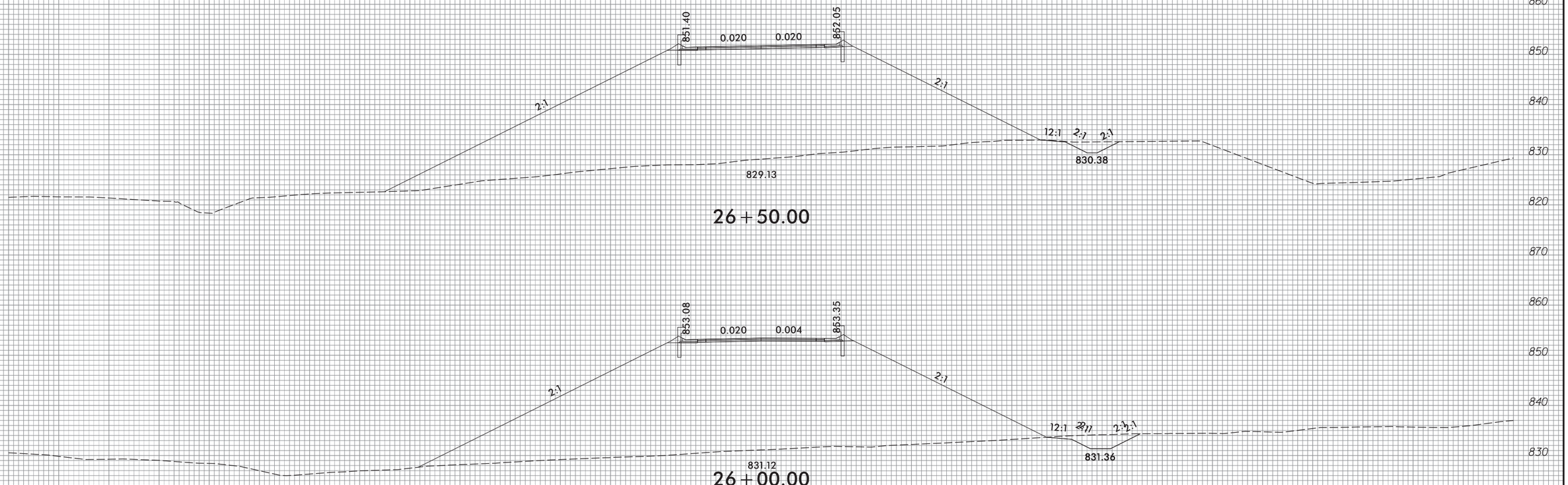


26+50.00

26+00.00

25+50.00

—SR1—

WETLAND AND SURFACE 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)
1a	26+70 to 30+41 -L- RT	Roadway Fill Slope/Rip Rap Channel, SD						0.03		378		
1b	26+70 to 30+41 -L- LT	Proposed 60" Pipe Outlet, SD						< 0.01	< 0.01	30	63	
1c	26+70 to 30+41 -L- LT	Bank Stabilization, SD						< 0.01		33		
2a	20+65 to 21+32 Y2	60" Pipe, SB						< 0.01	< 0.01	122	58	
2b	20+65 to 21+32 Y2	Pipe Outlet, SB						< 0.01		22		
2c	20+65 to 21+32 Y2	Bank Stabilization, SB						< 0.01		47		
3	25+95 to 26+35 Y1	Roadway Fill Slope, SF						< 0.01		110		
4	27+32 to 28+56 Y1	Roadway Fill Slope, WE	0.01				< 0.01					
5	26+72 to 26+79 Y1	78" Pipe and Channel, SB						0.01	< 0.01	130	23	
6a	-L- 40+05 LT	66" Pipe Outlet, SG						< 0.01		32		
6b	-L- 40+05 LT	Bank Stabilization, SG						< 0.01		31		
6c	19+76 to 20+28 Y1RPD RT	60" Pipe / Stream Re-alignment, SG						0.04		320		
7a	14+08 to 14+20 Y1LPA	8' x 7' RCBC, SB						0.03	< 0.01	184	25	
7b	14+08 to 14+20 Y1LPA	Culvert Outlet, SB						< 0.01		24		
7c	14+08 to 14+20 Y1LPA	Bank Stabilization, SB						0.03		161		
8a	19+65 to 19+82 Y1RPA	Rip Rap at Embankment, SB						< 0.01	< 0.01	17	19	
8b	-L- 48+00 LT	Bank Stabilization, SB						< 0.01	< 0.01	13	20	
8c	17+49 to 17+61 Y1RPA	Rip Rap at Embankment,SB						< 0.01	< 0.01	21	33	
9	16+92 to 17+11 Y1RPA	Rip Rap at Embankment, SE						< 0.01		34		
10	-L- 55+09 LT	Extend EX 48" Pipe, SC						0.01	< 0.01	132	10	
11	-L- 81+20 RT	Bank Stabilization, Sandy Run Creek						< 0.01	< 0.01	19	20	
12a	26+25 to 26+55 SR1	60" Pipe, SC						< 0.01	< 0.01	147	23	
12b	26+25 to 26+55 SR1	60" Pipe Outlet, SC						< 0.01	< 0.01	26	27	
12c	26+56 to 26+88 SR1 LT	Roadway Fill Slope, WC	< 0.01				< 0.01					
TOTALS*:			0.02				< 0.01	0.23	0.04	2033	321	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
8/29/2024
CLEVELAND COUNTY
R-4045/BR-0012
NG AND BRIDGE REPLACEMENT ON US-74 OVER S
SHEET 29 OF 29

Revised 2018 Feb

CULVERT SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

34598.2.2

State Proj. Reference No. R-4045 WBS Project No. 67012.3.1 Proj. Station 14+14.23 –Y1LPA–

County CLEVELAND Stream UT TO SANDY RUN Struc. Inv. No. TBD

On Highway US-74 WB ON RAMP Between US-74 and LATIMORE ROAD SR 1168

Recommended Structure 8' x 7' RCBC BURIED 1.0' WITH 1' SILLS AT INLET AND OUTLET AND TWO (2) 1' BAFFLES AT 40' SPACING

Recommended Width of Roadway 28' CURB TO SHOULDER, 30.33' WITH SBG Skew 85°

Recommended Location is (Up, At, Down) Stream from Existing Crossing, NEW LOCATION

Latitude 35° 18' 10.67" N Longitude 81° 41' 39.67" W

Statewide Tier [X] Regional Tier [ ] Sub-Regional Tier [ ]

Bench Mark is BM 3 (PK NAIL IN NORTH END OF CONC ISLAND) STA. 25+89.18 –Y1– 39.60' RT

Northing 576065 Easting 1195773 Elev. 843.07 ft. Datum: NAD83

Temporary Crossing N/A

Designed by: JASON PATSKOSKI, PE, PhD, CFM

Assisted by: AARON R. SCHWARTZ, PE

Date 03/2024

NORTH CAROLINA PROFESSIONAL SEAL 046226 ENGINEER JASON M. PATSKOSKI
3/20/2024

DocuSigned by: B3FB2E3933C5405...

THREE OAKS ENGINEERING

NC Firm License No: F-1334
324 Blackwell Street
Suite 1200
Durham, NC 27701
919.732.1300

Review by: DocuSigned by: Andrew T. Nottingham C0F940DF9D7A475...

Date 3/21/2024

SITE DATA

Drainage Area 175 ACRES Source LIDAR DELINEATED DRAINAGE AREA

River Basin BROAD Character RURAL DEVELOPING TO URBAN

Stream Classification (Such as Trout, High Quality Water, etc.) WS-IV

Data on Existing Structure N/A

Total Waterway Opening N/A s.f.

Waterway Opening Below 100yr. WS EL. N/A s.f.

Debris Potential: Low ..... Moderate ..X.... High .....

Data on Structures Up and Down Stream US: 2 @ 24" RCP W/48" CMP EXTENSIONS (TO BE REPLACED WITH 78" RCP AT SR1186 AND 600' UPSTREAM)

DS: CONFLUENCE WITH SANDY RUN CREEK (PROPOSED D/S STRUCTURE IS 1@120' BRIDGE AT –Y1RPA– AND 750' DOWNSTREAM)

Gage Station No. N/A Period of Records N/A

Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information:

Date NO RECORDED FLOODING Elev. ft. Est. Freq. yr. Source CHRISTIAN LISTOE*, ASSISTANT DIVISION 12 CONSTRUCTION ENG. Period of Knowledge 7 yrs.

Date ..... Elev. ft. Est. Freq. yr. Source ..... Period of Knowledge yrs.

Date ..... Elev. ft. Est. Freq. yr. Source ..... Period of Knowledge yrs.

Allowable HW Elev. 807.8' – 1' ABOVE NATURAL 100-YEAR ELEVATION Normal Water Surface Elev. 801.9' ft.

Manning's n: Left O.B. 0.1 Channel 0.05 Right O.B. 0.1 Source FIELD OBSERVATIONS

Flood Study /Status N/A

Flood Study 100 yr. Discharge N/A c.f.s.; WS Elev.: With Floodway N/A ft. Without Floodway N/A ft. @River Station ?

DESIGN DATA

Hydrological Method USGS URBAN REGRESSION SIR 2014-530 (20% IMPERVIOUS)

Hydraulic Design Method HEC-RAS 4.1.0 (R-4045 PRJ)

Design Tailwater : Q_{10} 2.4 ft.; Q_{25} 2.7 ft.; Q_{50} 2.9 ft. Q_{100} 3.1 ft.; Q_{500} 3.6 ft.

INV. IN EL. = 801.30', INV. OUT EL. = 800.06' (CULVERT MODELED AS 8' X 6' RCBC)

SIZE & TYPE: 8' X 7' RCBC @STATION 2174, APPROX. 30' UPSTREAM OF CULVERT.

FREQUENCY	Q (cfs)	Inlet Control			Outlet Control		Remarks
		HW/D	H.W.	WSEL	H.W.	WSEL	
10 YR	200	0.65	3.9	806.2	4.1	806.5	OUTLET CONTROL
50 YR	270	0.83	5.0	807.3	5.2	807.5	OUTLET CONTROL
100 YR	290	0.88	5.3	807.6	5.5	807.8	OUTLET CONTROL
500 YR	360	1.03	6.2	808.5	6.4	808.7	OUTLET CONTROL

Total Proposed Waterway Opening 48 s.f.

Outlet Velocity (V_{10}) 9.3 f.p.s. Natural Channel Velocity (V_{10}) 5.2 @ RS 1952 f.p.s.

Required Outlet Protection CLASS I, SEE OUTLET PROTECTION DETAIL

State Floodway Compliance Type N/A

INFORMATION TO BE SHOWN ON PLANS

HYDRAULIC DATA

DESIGN DISCHARGE	= 290 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 100 YRS.
DESIGN HIGH WATER ELEVATION	= 807.8
DRAINAGE AREA	= 175 AC.
BASIC DISCHARGE (Q100)	= 290 C.F.S.
BASIC HIGH WATER ELEVATION	= 807.8

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= 1300 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	= 833.8 *

*STA. 14+14.23 –Y1LPA–

WS EL. Taken @ River Station 2174

ADDITIONAL INFORMATION AND COMPUTATIONS

USGS REGRESSION EQUATIONS

SOURCE

Q_{10} = 381(0.27)^0.7536 X 10^(0.0076*20) = 202 CFS = SAY 200 CFS

Q_{25} = 518(0.27)^0.7752 X 10^(0.0053*20) = 240 CFS = SAY 240 CFS

Q_{50} = 632(0.27)^0.7903 X 10^(0.0037*20) = 266 CFS = SAY 270 CFS

Q_{100} = 753(0.27)^0.8038 X 10^(0.0024*20) = 294 CFS = SAY 290 CFS

Q_{500} = 1045(0.27)^0.8160 = 359 CFS = SAY 360 CFS

USGS URBAN REGRESSION SCIENTIFIC INVESTIGATIONS 2014–530

20% IMPERVIOUS FUTURE

DRAINAGE AREA IS 174.7 AC., 0.27 SQUARE MILES USED IN THE CALCULATION.

CULVERT LENGTH BASED ON 14–INCH TOP SLAB THICKNESS FROM STRUCTURAL ENGINEER

IN ACCORDANCE WITH 9.6.1.5 OF THE GUIDELINES FOR DRAINAGE STUDIES AND HYDRAULIC DESIGN, AFTER CONSIDERATION OF ALL FACTORS INCLUDING AVAILABLE FREEBOARD, HW/D<1.0' FOR THE 100–YEAR STORM, AND LARGE FLOOD EVENTS BEING CONTAINED WITHIN THE CHANNEL BANKS, IT WAS DETERMINED THE PROPOSED CULVERT DOES NOT WARRENT UPSIZING TO ACCOUNT FOR POSSIBLE FUTURE REPLACEMENT/REHAB. PROPOSED NEW LOCATION HAS NO HISTORICAL FLOODING HISTORY AVAILABLE.

*CHRISTIAN LISTOE IS LISTED AS THE DIVISION BRIDGE ENGINEER. HE HAS BEEN WITH DIVISION 12 FOR 7 YEARS AND COULD NOT FIND ANY RECORD OF FLOODING IN THE AREA.

NATIVE MATERIAL SPECIFICATION FOR BACKFILLING NOTE

THE ENGINEER, IN CONSULTATION WITH DEO STAFF, SHALL REVIEW ALL MATERIAL TO BE USED AS BACKFILL PRIOR TO CONDUCTING THE BACKFILL ACTIVITY. BACKFILL SHALL CONSIST OF CLASS B RIP RAP TOPPED WITH NATIVE MATERIAL ONLY UNLESS THE ENGINEER, IN CONSULTATION WITH DEO STAFF, DETERMINES THAT THE NATIVE MATERIAL IS UNSUITABLE. THE CHOSEN BACKFILL MATERIAL SHALL NOT HAVE ADVERSE EFFECTS TO AQUATIC LIFE, AQUATIC LIFE PASSAGE, OR WATER QUALITY. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION.

NOTE: THERE ARE NO INSURABLE STRUCTURES IN THE PROPOSED CULVERT AREA WITHIN THE 100 YEAR FLOODPLAIN.

NOTE: STREAM CL WITHIN THE CULVERT IS THE NATURAL GROUND ALONG CULVERT ALIGNMENT.

PI = 15+55.00
EL = 828.50'
VC = 300'
K = 38
DS = 30 mph
(-1.28362)
(+15.0000%)

PROPOSED GRADE

NG UPSTREAM
NG C/L
NG DOWNSTREAM

NWSEL = 803.3' DATE 12.06.23
WSEL = 802.8' DATE 12.06.23
1' SILLS
1 @ 8' x 7' RCBC BURIED 1.0' AT INLET INVERT = 801.30'
1' SILLS
NCDOT 100 YEAR WSEL = 807.8'

CL STA. 14+15.46 –Y1LPA–
GP ELEV. = 832.48'
1 @ 8' X 7' RCBC BURIED 1.0'
85° SKEW

1.5:1 NORMAL AND SKEWED
1.5:1 NORMAL AND SKEWED
CL 1 RIP RAP TO ELEV. 809.8'
CL 1 RIP RAP TO ELEV. 809.8'
NCDOT 100 YEAR WSEL = 807.8'
RT TB
LT TB
CL 1 RIP RAP SEE OUTLET TYPICAL
CL STREAM
NWSEL = 803.3' DATE 12.06.23
WSEL = 802.8' DATE 12.06.23
PROP. STREAMBED SEE INLET TYPICAL
1' SILL
1' BAFFLE
1' BAFFLE
1' SILL
CL INVERT = 800.7' SLOPE = 0.010 ft/ft
LT TB
RT TB

CL B RIP RAP OUTLET
EXCAVATE TO CHANNEL BED
85° SKEW
CL 1 RIP RAP SEE INLET TYPICAL
CLASS 1 RIP RAP TO ELEV 809.8'
BANK STABILIZATION
CLASS B RIP RAP OUTLET
8' RCBC
CB -Y1LPA-
TO SR 1186 (LATIMORE RD.)
TO US 74 WB
NOTE: BACKFILL CULVERT WITH CL B RIP RAP TOPPED WITH NATIVE MATERIAL TO SILL/BAFFLE HEIGHT
INSET SILL 1'
CL 1 RIP RAP SEE OUTLET DETAIL
JUT TO SANDY RUN
BANK STABILIZATION
CLASS 1 RIP RAP TO ELEV 809.8'
1 @ 8' X 7' RCBC BURIED 1.0'
1' BAFFLES NUMBER OF BAFFLES = 2 ON 40 FT CENTERS FROM DOWNSTREAM SILL

STREAM NOTE: EXISTING BED MATERIAL IS MOSTLY SAND WITH SOME COBBLE. BANKS ARE STABLE AND VEGETATED WITH MODERATE TO LARGE TREES AND BRUSH.

PLAN VIEW ALONG STRUCTURE

NCDOT PERFORMANCE TABLE

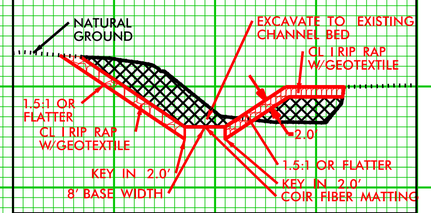
	FREQUENCY				
	10yr.	25yr.	50yr.	100yr.	500yr.
NATURAL	806.2	806.5	806.7	806.8	807.2
EXISTING	806.2	806.5	806.7	806.8	807.2
PROPOSED	806.5	807.1	807.5	807.8	808.7

@SECTION 2174
30 FT. FROM US FACE OF CULVERT

INLET TYPICAL

NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)

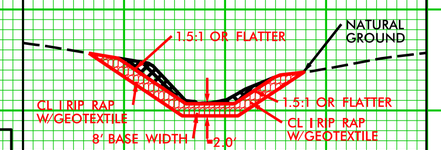
EST TONS CLASS I RIP RAP = 118 TONS
EST. GEOTEXTILE = 257 SY
EST. COIR FIBER MATTING = 15 SY
EST. CUT = 43 CY

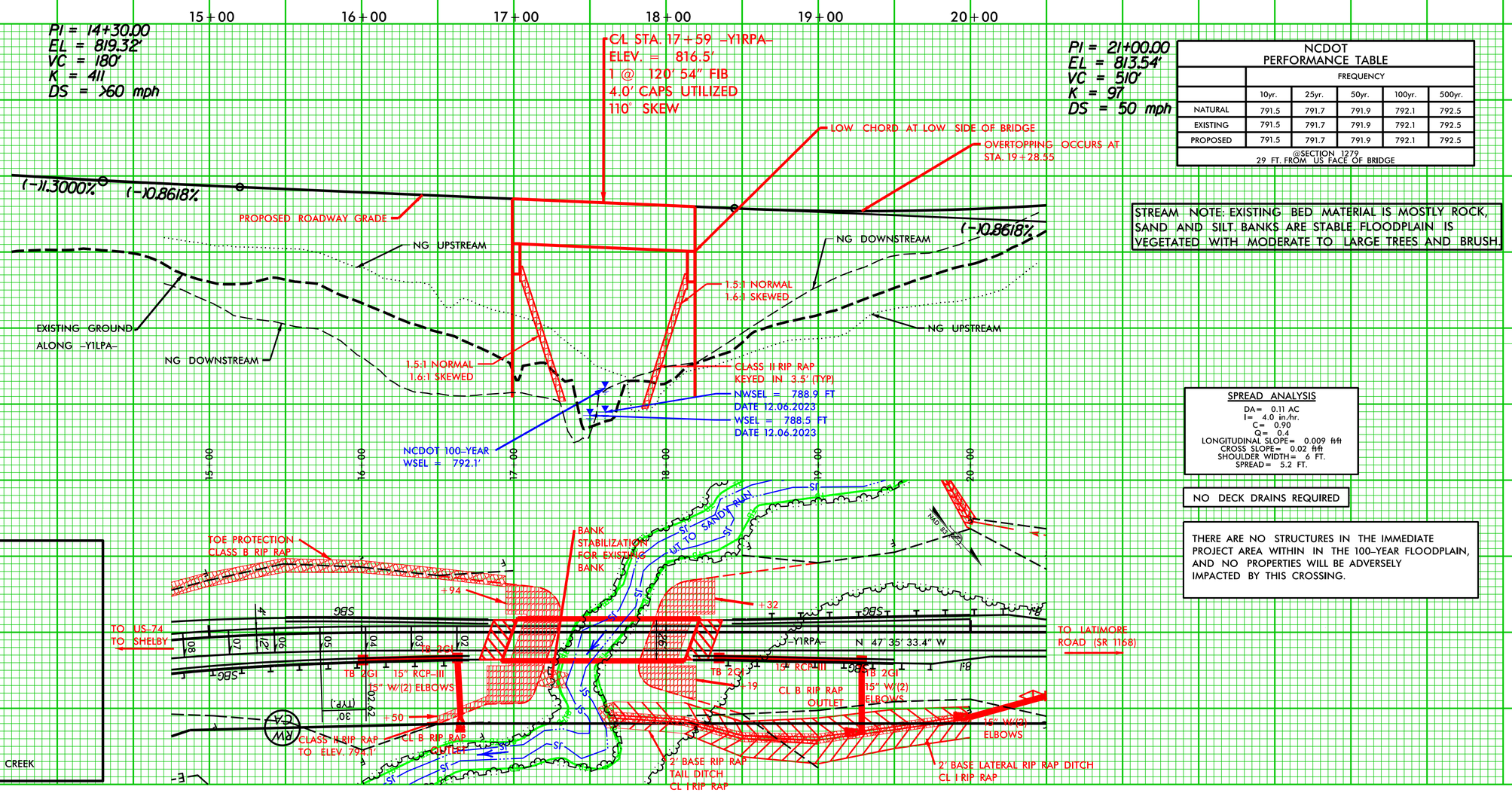


OUTLET TYPICAL

NOT TO SCALE (LEFT TO RIGHT LOOKING DOWNSTREAM)

EST CLASS I RIP RAP = 67 TONS
EST. GEOTEXTILE = 119 SY
EST. CUT = 23 CY





DS MB
NCDOT ACCEPTANCE

1 OF 1

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

State Proj. Reference No. R–4045 WBS Project No. 34598.2.2 67012.3.1 Proj. Station 17+59 –Y1RPA–

County CLEVELAND Bridge Over UT TO SANDY RUN CREEK Bridge Inv. No. 220510

On Highway US–74 WB EXIT RAMP Between US 74 and LATIMORE ROAD SR 1168

Recommended Structure 1 @ 120′ 54″ FIB BRIDGE WITH 4′ CAPS UTILIZED

Recommended Width of Roadway 26′ CLEAR ROADWAY Skew 110°

Recommended Location is (Up, At, Down) Stream from Existing Crossing, NEW LOCATION

Longitude 81° 41′ 31.61″ W Latitude 35° 18′ 08.92″ N

Statewide Tier ☒ Regional Tier ☐ Sub–Regional Tier ☐

Bench Mark is BM 3 (PK NAIL IN NORTH END OF CONC ISLAND), STA. 25+89.18 –Y1– 39.60′ RT

Northing 576065 Easting 1195773 Elev. 843.07′ ft. Datum: NAD83

Temporary Crossing NOT REQUIRED, NEW LOCATION

Designed by: JASON PATSKOSKI, PE, PhD, CFM

Assisted by: AARON R. SCHWARTZ, PE

SEAL 046226 JASON M. PATSKOSKI 3/7/2024

Date 03/07/24

DocuSigned by:
B3FB2E3933C5405...

NC Firm License No: F–1334
324 Blackwell Street
Suite 1200
Durham, NC 27701
919.732.1300

Review by: DocuSigned by: Andrew T. Nottingham C0F940DF9D7A475... Date 3/14/2024

SITE DATA

Drainage Area 189 ACRES Source LIDAR DELINEATED DRAINAGE AREA

River Basin BROAD Character RURAL DEVELOPING TO URBAN

Stream Classification (Such as Trout, High Quality Water, etc.) WS–IV

Data on Existing Structure N/A

Total Waterway Opening N/A s.f.

Waterway Opening Below 100yr. WS EL. N/A s.f.

Debris Potential: Low ...... Moderate X High ......

Data on Structures Up and Down Stream U/S: 2 @ 24″ RCP W/48″ CMP EXTENSIONS (TO BE REPLACED WITH 78″ RCP LRFD) AT SR1168, 1350′ UPSTREAM

PROPOSED U/S STRUCTURE IS 1 @ 8′ X 7′ RCBC BURIED 1.0′ AT –Y1LPA–, 750′ UPSTREAM

D/S: CONFLUENCE WITH SANDY RUN CREEK

Design Control Elev. 793.1′ – 1′ ABOVE NATURAL 100–YEAR ELEVATION HEC–RAS SECTION 1279.

Gage Station No. N/A Period of Records N/A

Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information:

Date .... Elev. NO RECORDED FLOODING ft. Est. Freq. .... yr. Source CHRISTIAN LISTOE*, ASSISTANT DIVISION 12 CONSTRUCTION ENG. Period of Knowledge 7 yrs.

Date .... Elev. .... ft. Est. Freq. .... yr. Source .... Period of Knowledge .... yrs.

Date .... Elev. .... ft. Est. Freq. .... yr. Source .... Period of Knowledge .... yrs.

Historical Scour Info: General N/A ft. Contraction N/A ft. Local N/A ft.

Channel Slope 0.027 ft/ft Source SURVEY Normal Water Surface Elev. 788.9′ ft.

Manning's n: Left O.B. 0.1 Channel 0.05 Right O.B. 0.1 Source FIELD OBSERVATIONS

Flood Study / Status N/A

Flood Study 100yr. Discharge N/A c.f.s. WS Elev.: With Floodway N/A ft. Without Floodway N/A ft. @ River Station

DESIGN DATA

Hydrological Method USGS URBAN REGRESSION SIR 2014–530 (20% IMPERVIOUS FUTURE)

Hydraulic Design Method HEC–RAS 4.1.0 (R–4045 PRJ)

Floods Evaluated: @ River Station 1250

Freq. (yr.)	Q (c.f.s)	Elev. (ft.)	Backwater (ft.)	Bridge Opening Velocity (f.p.s.)
10	220	791.5	0.0	7.0
25	260	791.7	0.0	7.3
50	290	791.9	0.0	7.4
100	320	792.1	0.0	7.6
500	390	792.5	0.0	8.0

Waterway Opening Provided Below: Design W.S. Elev. 53 s.f., 100yr W.S. Elev. 53 s.f., Total 1565.2 s.f.,

Average Channel Velocity (Design) 7.8 f.p.s. Average Overbank Velocity (Design) N/A f.p.s.

Computed Scour: General NONE ft. Contraction 0.0 (100 & 500 YEAR) ft. Local N/A ft.

State Floodway Compliance Type N/A

INFORMATION TO BE SHOWN ON PLANS

HYDRAULIC DATA

DESIGN DISCHARGE = 320 C.F.S.
FREQUENCY OF DESIGN FLOOD = 100 YRS.
DESIGN HIGH WATER ELEVATION = 792.1
DRAINAGE AREA = 189 AC.
BASIC DISCHARGE (Q100) = 320 C.F.S.
BASIC HIGH WATER ELEVATION = 792.1

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE = 21200 C.F.S.
FREQUENCY OF OVERRTOPPING FLOOD = 500+ YRS.
OVERTOPPING FLOOD ELEVATION = 815.7*
*STA. 19+28.55 –Y1RPA–

WS EL. Taken @ River Station 1279

ADDITIONAL INFORMATION AND COMPUTATIONS

USGS REGRESSION EQUATIONS SOURCE: USGS URBAN REGRESSION SCIENTIFIC INVESTIGATIONS 2014–530

Q_{10} = 381(0.30)^0.7536 X 10^(0.0076 X 20) = 218 CFS = SAY 220 CFS

Q_{25} = 518(0.30)^0.7752 X 10^(0.0053 X 20) = 260 CFS = SAY 260 CFS

Q_{50} = 632(0.30)^0.7903 X 10^(0.0037 X 20) = 289 CFS = SAY 290 CFS

Q_{100} = 753(0.30)^0.8038 X 10^(0.0024 X 20) = 320 CFS = SAY 320 CFS

Q_{500} = 1045(0.30)^0.8160 = 391 CFS = SAY 390 CFS

NOTE: DRAINAGE AREA IS 189 AC, 0.30 SQ. MI. USED FOR CALCULATIONS. 20% IMPERVIOUS FUTURE

SCOUR ANALYSIS

THE EXISTING STREAM IS WINDING AND STABLE WITH A SANDY, ROCKY BED. THE PROPOSED BRIDGE WILL MAINTAIN 10–FOOT SETBACKS FROM THE TOBS, AND NO PART OF THE BRIDGE IS INUNDATED DURING THE 100 OR 500 YEAR FLOOD EVENTS. NO EXCESSIVE SCOUR IS ANTICIPATED.

UNCONTRACTED SCOUR IS AT CROSS SECTION 1279 FROM PROPOSED MODEL

100–YEAR SCOUR ANALYSIS

Y_O = 1.8 ft, Q_1 = 320 cfs, W_1 = 16.3 ft
Y_1 = 2.3 ft, Q_2 = 320 cfs, W_2 = 23.3 ft, K1 = 0.69
$Y_2 = Y_1\,[Q_2/Q_1]^{6/7}\,[W_1/W_2]^{0.69}$
$Y_2 = 2.3\,[320/320]^{6/7}\,[16.3/23.3]^{0.69}$
Y_2 = 1.8
$Y_S = Y_2 - Y_0$
Y_S = 1.8′ – 1.8′
Y_S = 0.0

500–YEAR SCOUR ANALYSIS

Y_O = 2.0 ft, Q_1 = 390 cfs, W_1 = 17.6 ft
Y_1 = 2.5 ft, Q_2 = 390 cfs, W_2 = 24.7 ft, K1 = 0.69
$Y_2 = Y_1\,[Q_2/Q_1]^{6/7}\,[W_1/W_2]^{0.69}$
$Y_2 = 2.5\,[390/390]^{6/7}\,[17.6/24.7]^{0.69}$
Y_2 = 2.0
$Y_S = Y_2 - Y_0$
Y_S = 2.0′ – 2.0′
Y_S = 0.0

NOTE: THE 500–YEAR NATURAL WSEL IS 792.5 FT UPSTREAM OF THE BRIDGE. THE ENTIRE SLOPE AND SPILL THRU IS ABOVE THIS ELEVATION EXCEPT WITHIN THE NE QUADRANT. THE 500 YEAR NATURAL WSEL IS 791.2 FT DOWNSTREAM OF THE BRIDGE AND THE ENTIRE SLOPE AND SPILL THRU IS ABOVE THIS ELEVATION EXCEPT FOR THE AREA WITHIN THE CHANNEL BEING FILLED IN. BASED UPON THIS THE BRIDGE WAS MODELED USING ENERGY ONLY FOR THE LOW FLOW CALCULATIONS.

*CHRISTIAN LISTOE IS LISTED AS THE DIVISION BRIDGE ENGINEER. HE COULD NOT FIND ANY RECORD OF FLOODING IN THE AREA.

NCDOT PERFORMANCE TABLE

	FREQUENCY				
	10yr.	25yr.	50yr.	100yr.	500yr.
NATURAL	791.5	791.7	791.9	792.1	792.5
EXISTING	791.5	791.7	791.9	792.1	792.5
PROPOSED	791.5	791.7	791.9	792.1	792.5

@SECTION 1279
29 FT. FROM US FACE OF BRIDGE

STREAM NOTE: EXISTING BED MATERIAL IS MOSTLY ROCK, SAND AND SILT. BANKS ARE STABLE. FLOODPLAIN IS VEGETATED WITH MODERATE TO LARGE TREES AND BRUSH.

SPREAD ANALYSIS

DA = 0.11 AC
I = 4.0 in/hr.
C = 0.90
Q = 0.4
LONGITUDINAL SLOPE = 0.009 ft/ft
CROSS SLOPE = 0.02 ft/ft
SHOULDER WIDTH = 6 FT.
SPREAD = 5.2 FT.

NO DECK DRAINS REQUIRED

THERE ARE NO STRUCTURES IN THE IMMEDIATE PROJECT AREA WITHIN IN THE 100–YEAR FLOODPLAIN, AND NO PROPERTIES WILL BE ADVERSELY IMPACTED BY THIS CROSSING.

BRIDGE TYPICAL SECTION
FOR BRIDGE OVER UN TRIB TO SANDY RUN CREEK
(NOT TO SCALE)

BRIDGE SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
HYDRAULICS UNIT
RALEIGH, N. C.

NCDOT ACCEPTANCE

34598.2.2 81+20 –L– LT (WBL)

State Proj. Reference No. R-4045BR-0012 WBS Project No. 67012.3.1 Proj. Station 81+25.51 –L– RT (EBL) 220511 (EBL)

County CLEVELAND Bridge Over SANDY RUN CREEK Bridge Inv. No. 220512 (WBL)

On Highway US-74 Between SR 1168 and SR 1168

Recommended Structure DUAL STRUCTURES: TWO SPANS, 1 @ 109'–9", 1 @ 120'–9" with 4 girder lines of 63" FIB 4'–0" END BENT CAPS W/SLOPED ABUTMENTS, 42" CONCRETE BARRIER

Recommended Width of Roadway 40' CLR RDWY (WBL) 40' CLR RDWY (EBL) Skew 90°

Recommended Location is (Up, At, Down) Stream from Existing Crossing

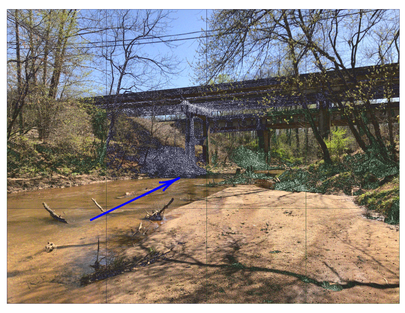
Longitude 35.29866 Latitude –81.68258

Statewide Tier ☒ Regional Tier ☐ Sub–Regional Tier ☐

Bench Mark is BM6, ON BL STA. 93+88, 182' RT, 60D NAIL IN BASE OF 20" SYCAMORE

573918 1200373 Elev. 813.77' ft. Datum: NAVD88

Temporary Crossing NOT REQUIRED, STAGED CONSTRUCTION



Designed by: Jianbiao Lu, PE

Assisted by: Bethany Taylor, EI

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 14160 DOUGLAS B. SAUNDERS 3/26/2024

Date 03/26/24

DocuSigned by: Douglas B Saunders 1B294A32D525494...

Review by: DocuSigned by: Andrew T. Nottingham C0F940DF9D7A475... Date 3/27/2024

Whitman, Requardt & Associates, LLP
1201 Edwards Mill Road, Suite 320,
Raleigh, North Carolina 27606
NC License No. F-0941

SITE DATA

Drainage Area 40.7 SQ. MILES Source STREAM STATS PIEDMONT (REGION 1) – 97.48%

River Basin BROAD Character RURAL, BLUE RIDGE (REGION 2) –2.52%

Stream Classification (Such as Trout, High Quality Water, etc.) WS-IV

Data on Existing Structure DUAL BRIDGES EBL: 220048 210' LENGTH 1@52'–6", 2@52'–5", 1@52'–1" SKEW 90 CONCRETE T-BEAM, W/SPREAD FOOTINGS
WBL: 220049 209' LENGTH 4@52'–6" SKEW 90 STEEL MULTIGIRDER W/BATTERED H PILES AND SPREAD FOOTINGS FOR PIERS
Total Waterway Opening WBL = 3,554 s.f. EBL = 2,641 s.f.

Debris Potential: Low ..... Moderate X High .....
Waterway Opening Below 100yr. WS EL. WBL = 1,795 s.f. EBL = 1,606 s.f.

Data on Structures Up and Down Stream
US 220136 – SR 1168 STR # 190' LENGTH 5 SPAN 2@35' 1@50' 2@35" REINFORCED CONCRETE GIRDER
DS 220125 – SR 1164 STR # 208' LENGTH 5 SPAN 1@46'4–3/16" 2@45' 1@35" 1@36'4–3/16" PRESTRESSED CONCRETE CORED SLAB

Design Control Elev. EXIST 100 YR WSEL AT XSC 56040 = 762.0 ft.

Gage Station No. 02152000 Period of Records JUNE 1925 TO DECEMBER 1928, 3 yrs.

Max. Discharge N/A c.f.s. Date N/A Frequency N/A

Historical Flood Information:

Date 2017 Elev. 760 ft. Est. Freq. 50 yr. Source Residents Period of Knowledge 28 yrs.

Date N/A Elev. N/A ft. Est. Freq. N/A yr. Source N/A Period of Knowledge yrs.

Date N/A Elev. N/A ft. Est. Freq. N/A yr. Source N/A Period of Knowledge yrs.

Historical Scour Info: General N/A ft. Contraction N/A ft. Local N/A ft.

Channel Slope 0.003 ft/ft Source FIELD SURVEY Normal Water Surface Elev. WBL = 742.8 ft. EBL = 742.5 ft.

Manning's n: Left O.B. 0.035-0.1 Channel 0.05 Right O.B. 0.05-0.1 Source SANDY RUN FEMA MODEL AND FIELD OBS.

Flood Study /Status ZONE AE LIMITED DETAIL STUDY
2008 PANEL 1597 CLEVELAND CO. With Floodway N/A ft. Without Floodway 761.5' ft.
Flood Study 100yr. Discharge 8,790 c.f.s. WS Elev.: @ River Station 56270

DESIGN DATA

Hydrological Method EFFECTIVE FIS CLEVELAND CO. FEBRUARY 20, 2008; LOWERBROADHYDROLOGY20060712 REPORT

Hydraulic Design Method HEC RAS VERSION 3.1.3 PROJECT "Sandy Run Limited Detail Study"

Floods Evaluated:

@ River Station 56040	Freq. (yr.)	Q (c.f.s)	Elev. (ft.)	Backwater (ft.)	Bridge Opening Velocity (f.p.s.)
	10	4,600	757.2	0.1	4.0
	50	7,370	760.0	0.1	4.5
	100	8,790	761.2	0.2	4.7
	500	12,490	763.9	0.3	5.3

Waterway Opening Provided Below: Design W.S. Elev. WBL 2,052 s.f. EBL 1,662 s.f. 100yr W.S. Elev. WBL 2,052 s.f. EBL 1,662 s.f. Total WBL 4,826 s.f. EBL 4,859 s.f.

Average Channel Velocity (Design) 5.3 f.p.s. Average Overbank Velocity (Design) 1.4 LT 2.2 RT f.p.s.

Computed Scour : General N/A ft. Contraction 100-YR: 3.9 500-YR: 3.9 ft. Local 100-YR: 8.1 500-YR: 8.8 ft.

State Floodway Compliance Type SFC TYPE B REQUIRED

INFORMATION TO BE SHOWN ON PLANS

HYDRAULIC DATA

DESIGN DISCHARGE	= 8,790 C.F.S.
FREQUENCY OF DESIGN FLOOD	= 100 YRS.
DESIGN HIGH WATER ELEVATION	= 761.2 F.T.
DRAINAGE AREA	= 40.7 SQ. MI.
BASIC DISCHARGE (Q100)	= 8,790 C.F.S.
BASIC HIGH WATER ELEVATION	= 761.2 F.T.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	WBL: 41,800 = EBL: 51,600 C.F.S.
FREQUENCY OF OVERTOPPING FLOOD	= 500+ YRS.
OVERTOPPING FLOOD ELEVATION	WBL: 780.5* = EBL: 782.6**

*LEFT SHOULDER AT STA. 79+72 –L–
**LEFT SHOULDER AT STA. 79+62 –L–

WS EL. Taken @ River Station 56040

ADDITIONAL INFORMATION AND COMPUTATIONS

USGS URBAN REGRESSION EQUATIONS WITH 20% FUTURE IMPERVIOUS – SIR 2014–5030 FOR REGION 1 AND FS007–00 FOR REGION 2

Q10 = 0.9748X484(40.7)^0.5539X10^(0.006X20)+0.0252X122X(40.7)^0.655X20^0.515 = 5,010 CFS

Q25 = 0.9748X657(40.7)^0.547X10^(0.0046X20)+0.0252X228X(40.7)^0.611X20^0.436 = 6,220 CFS

Q50 = 0.9748X794(40.7)^0.5428X10^(0.0037*20)+0.0252X296X(40.7)^0.602X20^0.396 = 7,090 CFS

Q100 = 0.9748X941(40.7)^0.5386X10^(0.0028*20)+0.0252X374X(40.7)^0.593X20^0.358 = 7,930 CFS

Q500 = 0.9748X1319(40.7)^0.5305X10^(0.0011*20)+0.0252X12380 = 9,970 CFS

FEMA DISCHARGES EFFECTIVE 2/20/2008
Q10 = 4,600 CFS
Q25 = N/A CFS
Q50 = 7,370 CFS
Q100 = 8,790 CFS
Q500 = 12,490 CFS

Note: REGION 2 URBAN Q500 IS EXTRAPOLATED BASED ON Q25, Q50 and Q100. FEMA 100 YR DISCHARGE OBTAINED FROM THE CLEVELAND COUNTY FIS AND THE 10, 50 AND 500 YEAR FLOWS FROM HYDROLOGY REPORT (LOWERBROADHYDROLOGY20060712) INCLUDED WITH THE FEMA EFFECTIVE MODEL. SINCE THE FEMA FLOWS ARE HIGHER AND MORE CONSERVATIVE THAN THE USGS URBAN REGRESSION EQUATIONS, THEY WILL BE USED FOR DESIGN AND FEMA COMPLIANCE.

SCOUR ANALYSIS: APPROACH CROSS SECTION 56136 FROM PROPOSED MODEL

CONTRACTION SCOUR (FWHA HEC–18, LARSON'S EQN)

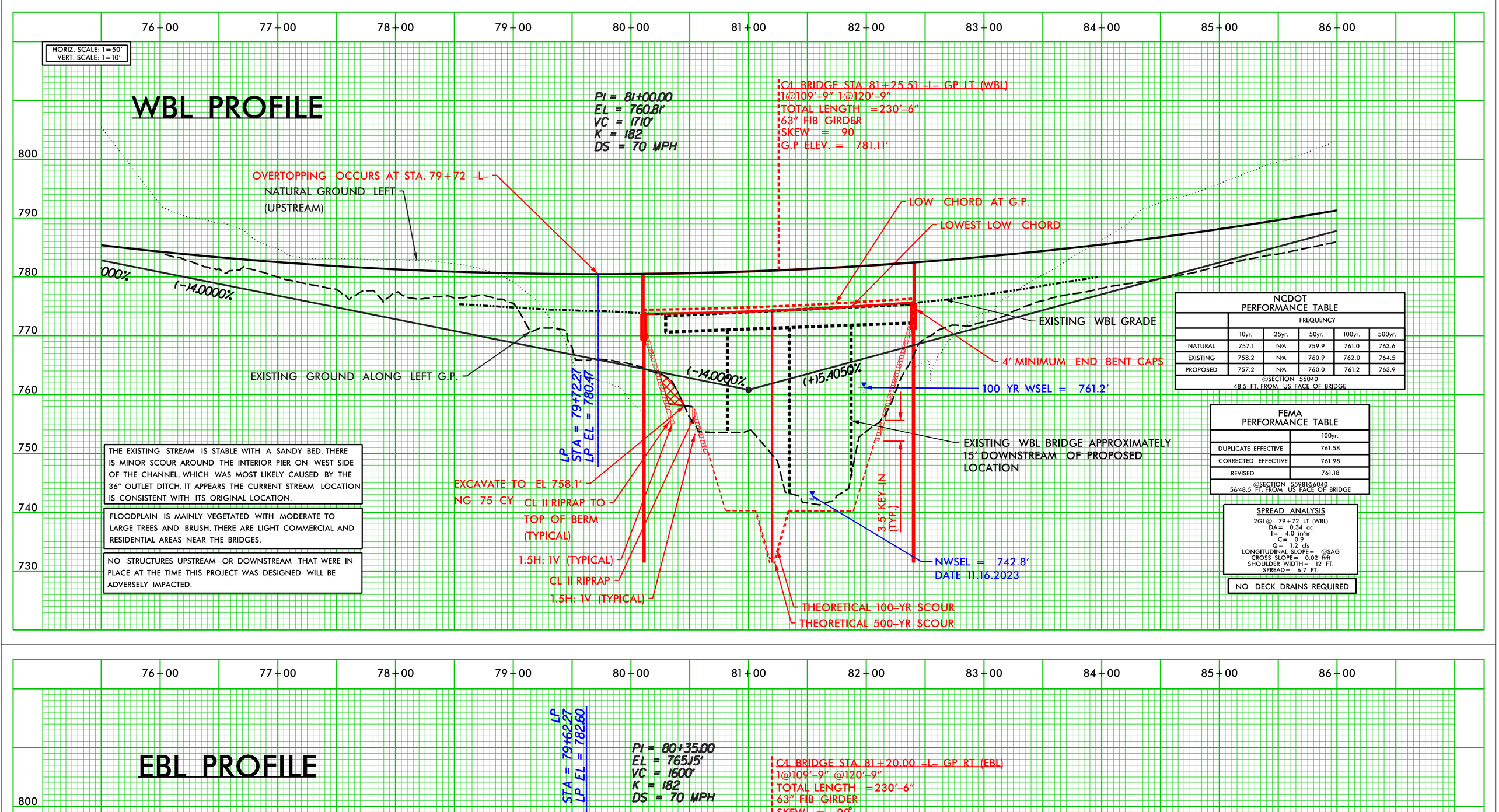
YS = Y1[(Q2/Q1)^6/7 (W1/W2)^K1] – Yo

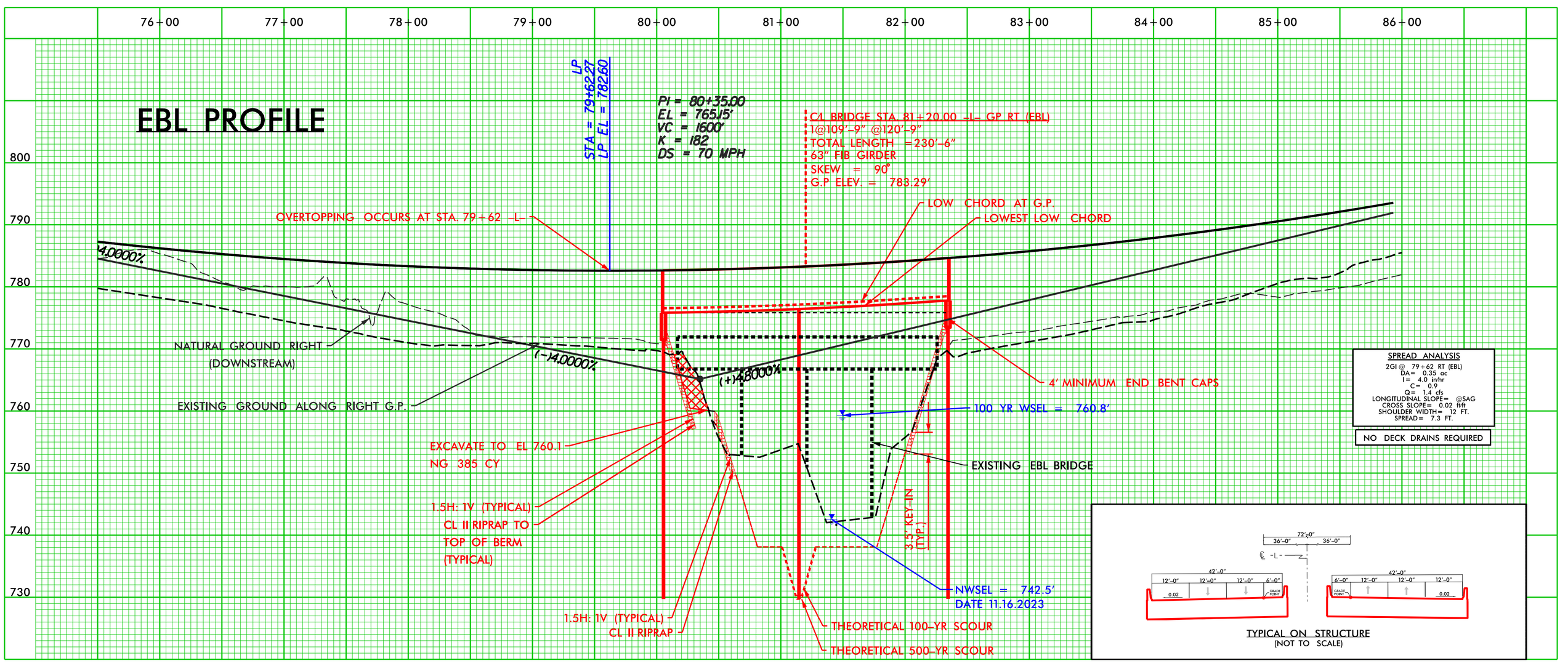
100 YR	WBL	EBL	500 YR	WBL	EBL
Y1	17.8	17.8	Y1	20.4	20.4
Yo	17.1	15.8	Yo	19.8	18.5
Q2	7312.1	7017.0	Q2	9578.1	9657.3
Q1	7188.4	7188.4	Q1	9657.3	8928.1
W1	87.9	87.9	W1	87.9	87.9
W2	87.1	73.2	W2	87.1	73.2
K1	0.69	0.69	K1	0.69	0.69
YS	1.0	3.9	YS	1.0	3.9

PIER SCOUR (FHWA HEC 18, COLORADO STATE EQN)

Ys = Y1[2 K1 K2 K3 K4(aY1)^0.65 Fr^0.43]

100 YR	STA 81+20.0 –L– WBL	STA 81+14.52 –L– EBL	500 YR	STA 81+20.0 –L– WBL	STA 81+14.52 –L– EBL
Y1	17.9	13.9	Y1	20.6	16.6
K1	1.0	1.0	K1	1.0	1.0
K2	1.0	1.0	K2	1.0	1.0
K3	1.1	1.1	K3	1.1	1.1
K4	1.0	1.0	K4	1.0	1.0
a	4.7	4.7	a	4.7	4.7
V1	4.6	4.6	V1	5.4	5.4
FR	0.2	0.2	FR	0.2	0.3
YS	8.1	7.8	YS	8.8	8.6





ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

November 8, 2024
Cleveland County
NCDWR Project No. 20241319
STIP R-4045 & BR-0012
WBS No. 34598.1.2 & 67012.3.1
Fed Project No. NHF-74(4)

APPROVAL of 401 WATER QUALITY CERTIFICATION with ADDITIONAL CONDITIONS

Mr. Jeffrey Wyatt, Environmental Officer
NCDOT Division 12
1710 E. Marion Street
Shelby, NC 28151-0047
JLWyatt@NCDOT.gov

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed upgrade to US74 at SR1168 (N. Academy Street/Lattimore Road) Intersection to an Interchange and Replacement of Bridge No. 220048 and 220049 on US 74 over Sandy Run Creek in Cleveland County, Federal Aid Project No. NHF-74(4), WBS No. 34598.1.2 & 67012.3.1, STIP R-4045 & BR-0012, NCDWR Project No. 20241319

Dear Mr. Wyatt:

Attached hereto is a copy of Certification No. WQC007325 issued to The North Carolina Department of Transportation (NCDOT) dated November 8, 2024.

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

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

Sincerely,

Signed by:
Susan Locklear
04351F033762414...

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

Electronic copy only distribution:
Crystal Amschler, US Army Corps of Engineers, Asheville Field Office
Rebekah Reid, US Fish and Wildlife Service

David McHenry, NC Wildlife Resources Commission
Amanetta Somerville, US Environmental Protection Agency
File Copy

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

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact .02 acres of jurisdictional wetlands, and 2,033 Linear Feet of jurisdictional streams in Cleveland County. The project shall be constructed pursuant to the application dated and received September 13, 2024. The authorized impacts are as described below:

Stream Impacts (Linear Feet) in the Broad River Basin

Streams SB & SE Sites	Notes	Permanent in Perennial				Temporary in Perennial				Total Stream Impacts	Stream Impacts Requiring Mitigation
		Pipe	Bank Stab.	Culv ert	Rip Rap	Pipe	Culv ert	Rip Rap	Bank Stab.		
2A	60”	122	-	-	-	-	-	-	-	**122**	**122**
		-	-	-	-	58	-	-	-	**58**	**-**
2B	Outlet/ Countersunk Rip Rap	22	-	-	-	-	-	-	-	**22**	**-**
2C	Stabilization	-	47	-	-	-	-	-	-	**47**	**-**
5A	78” & Channel	130	-	-	-	-	-	-	-	**130**	**130**
5B		-	-	-	-	23	-	-	-	**23**	**-**
7A	8’X7’ RCBC	-	-	184	-	-	-	-	-	**184**	**184**
		-	-	-	-	-	25	-	-	**25**	**-**
7B	Outlet/ Countersunk Rip Rap	-	-	24	-	-	-	-	-	**24**	**-**
7C	Stabilization	-	161	-	-	-	-	-	-	**161**	**-**
8A	Embankment	-	-	-	17	-	-	-	-	**17**	**-**
		-	-	-	-	-	-	19	-	**19**	**-**
8B	Stabilization	-	13	-	-	-	-	-	-	**13**	**-**
		-	-	-	-	-	-	-	20	**20**	**-**
8C	Embankment	-	-	-	21	-	-	-	-	**21**	**-**
		-	-	-	-	-	-	33	-	**33**	**-**
9		-	-	-	34	-	-	-	-	**34**	**-**
SB & SE Totals		**274**	**221**	**208**	**72**	**81**	**25**	**52**	**20**	**953**	**436**
		775				**178**					

Streams SD & SF Sites	Notes	Permanent in Perennial			Permanent in Intermittent	Temporary in Perennial	Total Stream Impacts	Stream Impacts Requiring Mitigation
		Roadway Fill	Pipe	Bank Stabilization	Roadway Fill	Pipe		
1A	Slope/ Rip Rap Channel	-	-	-	169	-	169	169
		209	-	-	-	-	209	209
1B	60" Outlet/ Countersunk Rip Rap	-	30	-	-	-	30	-
		-	-	-	-	63	63	-
1C	Stabilization	-	-	33	-	-	33	-
3	Slope	110	-	-	-	-	110	110
SD & SF Totals		319	30	33	169	63	614	488
		382						

Streams SG, SC, & SR Sites	Notes	Permanent in Perennial		Permanent in Intermittent	Temporary in Perennial		Temporary in Intermittent	Total Stream Impacts	Stream Impacts Requiring Mitigation
		Pipe	Bank Stab.	Pipe	Pipe	Bank Stab.	Pipe		
6A	66" Outlet/ Countersunk Rip Rap	32	-	-	-	-	-	32	-
6B	Stabilization	-	31	-	-	-	-	31	-
6C	60"/ Stream Realignment	-	-	320	-	-	-	320	320
10A	Extend 48"	132	-	-	-	-	-	132	132
10B		-	-	-	10	-	-	10	-
12A	60"	-	-	147	-	-	-	147	147
		-	-	-	-	-	23	23	-
12B	60" Outlet/ Countersunk Rip Rap	-	-	26	-	-	-	26	-
		-	-	-	-	-	27	27	-
11A	Stabilization	-	19	-	-	-	-	19	-
11B		-	-	-	-	20	-	20	-
SG, SC, & SR Totals		164	50	493	10	20	50	787	599
		214			30		50		

Total Stream Impacts for Project: 2,354 Linear Feet

Wetland Impacts in the Broad River Basin

Sites	Permanent Fill		Total Wetland Impacts	Impacts Requiring Mitigation
	Roadway Fill Slope	Hand Clearing		
4-WE non-riparian	.01	<.01	<.02	<.02
12C-WC riparian	<.01	<.01	.006	.006
Totals	<.02	<.01	<.02	<.02

Total Wetland Impacts for Project: .02 Acres.

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

This approval is only valid for the purpose and design that you submitted in your application dated and received September 13, 2024. Should your project change, you are required to notify the NCDWR and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 300 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7).

For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

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

Condition(s) of Certification:

Project Specific Conditions

1. 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)]

2. As a condition of this 401 Water Quality Certification, 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)]

3. Bridge deck drains shall not discharge directly into streams. 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. 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)]

4. 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)]

5. 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)]

6. A turbidity curtain will be installed in the stream if driving or drilling activities occur within the stream channel, on the stream bank, or within 5 feet of the top of bank, or during the removal of bents from an old bridge. This condition can be waived with prior approval from the NCDWR. [15A NCAC 02H .0506(b)(3)]

7. 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)]

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

9. 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)]

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

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

12. 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)]

13. 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.

14. Wetland areas impacted by temporary clearing shall be stabilized and reseeded with native wetland seed.

15. Due to the possibility that compaction and/or other site alterations might prevent the temporary wetland impact area from re-attaining jurisdictional wetland status; the permittee shall provide an update on the wetland areas temporarily impacted. This update shall be conducted two growing seasons after completion of the work and shall consist of photographs and a brief report on the progress of the areas in re-attaining wetland jurisdictional status. Upon submission of this update to the NCDWR, the permittee shall schedule

an agency field meeting with the NCDWR to determine if the wetland areas temporarily impacted by this project have re-attained jurisdictional wetland status. If the wetland areas temporarily impacted by this project have not re-attained jurisdictional wetland status, the NCDWR shall determine if compensatory wetland mitigation is to be required.

16. Turbidity curtains shall be used to isolate all work areas from the streams, including pile or casement installation, placement of riprap, excavation or filling. Strict adherence to the Construction and Maintenance Best Management Practices will be required.

17. Compensatory mitigation for 1,523 linear feet of impacts to perennial streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams through the North Carolina Division of Mitigation Service (DMS), and that the DMS has agreed to implement the mitigation for the project. The DMS has indicated in a letter dated September 13, 2024 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.

General Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

23. When applicable, all construction activities shall be performed and maintained in full compliance with G.S. Chapter 113A Article 4 (Sediment and Pollution Control Act of 1973). Regardless of applicability of the Sediment and Pollution Control Act, all projects shall incorporate appropriate Best Management Practices for the control of sediment and erosion so that no violations of state water quality standards, statutes, or rules occur. [15A NCAC 02H .0506{b)(3) and (c)(3) and 15A NCAC 02B .0200]

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

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

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

This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit. Please be aware that impacting waters without first applying for and securing the issuance of a 401 Water Quality Certification violates Title 15A of the North Carolina Administrative Code (NCAC) 2H .0500. Title 15A NCAC 2H .0500 requires certifications pursuant to Section 401 of the Clean Water Act whenever construction or operation of facilities will result in a discharge into navigable waters, including wetlands, as described in 33 Code of Federal Regulations (CFR) Part 323. It also states any person desiring issuance of the State certification or coverage under a general certification required by Section 401 of the Federal Water Pollution Control Act shall file with the Director of the North Carolina Division of Water Quality. Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. Pursuant to G.S. 143-215.6A, these violations and any future violations are subject to a civil penalty assessment of up to a maximum of $25,000.00 per day for each violation.

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

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

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

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

William F. Lane, General Counsel
Department of Environmental Quality
1601 Mail Service Center
Raleigh, NC 27699-1601

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

This the 8th day of November 2024

DIVISION OF WATER RESOURCES

Signed by:
Susan Locklear
04351F033762414...

Richard E. Rogers, Jr., Director

WQC No. WQC007325

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

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

Applicant: _____

Project Name: _____

Date of Issuance of 401 Water Quality Certification: _____

Certificate of Completion

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

Applicant's Certification

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

Signature: _____ Date: _____

Agent's Certification

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

Signature: _____ Date:_____

Engineer's Certification

_____ Partial _____ Final

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

Signature _____ Registration No. _____

Date _____

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