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

July 8, 2022

Regulatory Division

Action ID: SAW-2009-01346

North Carolina Department of Transportation (NCDOT)
Division 14
Attn: Ms. Wanda Austin
253 Webster Road
Sylva, North Carolina 28779

Dear Ms. Austin:

Enclosed is a Department of the Army permit to the A-0009C project which involves improvements along US 129, NC 143, and NC 28 from Robbinsville to Stecoah in Graham County Specific impacts include the impact to 8,478 linear feet of streams, 1.14 acre of wetlands and 0.12 acres of open waters. The Corps is issuing this permit in response to your written request of December 15, 2021, and the ensuing administrative record.

Any deviation in the authorized work will likely require modification of this permit. If a change in the authorized work is necessary, you should promptly submit revised plans to the Corps showing the proposed changes. You may not undertake the proposed changes until the Corps notifies you that your permit has been modified.

Carefully read your permit. The general and special conditions are important. Your failure to comply with these conditions could result in a violation of Federal law. Certain significant conditions require that:

a. You must complete construction before December 31, 2027.

b. You must notify this office in advance as to when you intend to commence and complete work.

c. 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.

d. In order to compensate for impacts associated with this permit, mitigation shall be provided in accordance with the provisions outlined in the U.S. Army Corps of Engineers, Wilmington District, Compensatory Mitigation Responsibility Transfer Form.

The requirements of this form, including any special conditions listed on this form, are hereby incorporated as special conditions of this permit authorization.

You should address all questions regarding this authorization to Crystal Amschler at the Asheville Regulatory Field Office, telephone (828) 271-7980 extension 4231.

FOR THE CHIEF, REGULATORY DIVISION

Monte Matthews
Date: 2022.07.08 11:09:08 -04'00'

Monte Matthews
Lead Project Manager

Enclosures

Electronic or hard copy furnished as appropriate:

Project Development and Environmental Analysis Unit,
Attn: Mr. Michael Turchy
1548 Mail Service Center
Raleigh, NC 27699-1598

Mr. Todd Bowers
Wetlands Protection Section – Region IV
Water Management Division
U.S. Environmental Protection Agency
61 Forsyth Street, SW
Atlanta, Georgia 30303

Mr. Clarence Coleman
FHWA – NC Division
310 New Bern Avenue, Suite 410
Raleigh, NC 27601

Ms. Amy S. Chapman
Transportation Permitting Unit
NC Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Mr. Dave McHenry
NC Wildlife Resources Commission
20830 Great Smoky Mountains Expressway
Waynesville, NC 28786

US Fish and Wildlife Service
Asheville Ecological Services Field Office
Attn: Ms. Holland Youngman
160 Zillicoa Street
Asheville, NC 28801-1082

Ms. Renee Gledhill-Early
Environmental Review Coordinator
NC State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Cherokee Nation
Ms. Elizabeth Toombs
Secretary of Natural Resources
Post Office Box 948
Tahlequah, OK 74465-0948

United Keetoowah Band of Cherokee Indians in Oklahoma
Acee Watt
PO Box 746
Tahlequah, OK 74465

Eastern Band of Cherokee Indians
Mr. Stephen Yerka
Post Office Box 455
Cherokee, North Carolina 28719

Eastern Band of Cherokee Indians (EBCI)
Water Quality Office (WQO)
P.O. Box 1925
Cherokee, NC 28719

Forest Service
National Forests in North Carolina
Ms. Allyson Conner
Land Management Planner/NCDOT Liaison
160A Zillicoa Street
Asheville, NC 28801

DEPARTMENT OF THE ARMY PERMIT

Permittee **NORTH CAROLINA DEPARTMENT OF TRANSPORTATION, DIVISION 14**
ATTN: MS. WANDA AUSTIN

Permit No. **SAW-2009-01346, STIP A-0009C**

Issuing Office **CESAW-RG-A**

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 Corps of Engineers 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 A0009C Project involves improvements along US 129, NC 143, and NC 28 from Robbinsville to Stecoah in Graham County, North Carolina. Specific impacts include the impact to 8,478 linear feet of streams, 1.14 acre of wetlands and 0.12 acres of open waters.**

Project Location: **The A0009C Project involves improvements along US 129, NC 143, and NC 28 from Robbinsville to Stecoah in Graham County, North Carolina.**

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2027.** 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 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 conditioned water quality certifications have been issued for your project, you must comply with the conditions specified in the certifications as special conditions to this permit. For your convenience, copies of all certifications are 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:

SEE ATTACHED SPECIAL CONDITIONS

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).

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 project.

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 to 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.

DocuSigned by:
Wanda Austin
B88118F1E31C453...

07/07/2022

(PERMITTEE) **NC DEPARTMENT OF TRANSPORTATION**
ATTN: MS. WANDA AUSTIN *(DATE)*

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

FOR THE DISTRICT COMMANDER

Monte Matthews

Date: 2022.07.08 11:37:03 -04'00'

FOR (DISTRICT COMMANDER) **BENJAMIN A. BENNETT, COLONEL** *(DATE)*

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) *(DATE)*

*U.S. GOVERNMENT PRINTING OFFICE: 1986 - 717-425

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: **North Carolina Department of Transportation (NCDOT)**	File Number: **SAW-2009-01346**	Date: **July 8, 2022**

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	C
☐ APPROVED JURISDICTIONAL DETERMINATION	D
☐ PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/inet/functions/cw/cecwo/reg 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. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. 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: 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.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- 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 district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: 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.

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. 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.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:	If you only have questions regarding the appeal process you may also contact:
District Engineer, Wilmington Regulatory Division, **Attn:** Ms. Crystal Amschler USACE 151 Patton Avenue, Room 208 Asheville, NC 28801	Mr. Philip Shannin, Administrative Appeal Review Officer CESAD-PDO U.S. Army Corps of Engineers, South Atlantic Division 60 Forsyth Street, Room 10M15 Atlanta, Georgia 30303-8801 Phone: (404) 562-5137

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.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Ms. Crystal Amschler, 69 Darlington Avenue, Wilmington, North Carolina 28403

For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

Division Engineer, Commander, U.S. Army Engineer Division, South Atlantic, Attn: Mr. Philip Shannin, Administrative Appeal Officer, CESAD-PDO, 60 Forsyth Street, Room 10M15, Atlanta, Georgia 30303-8801
Phone: (404) 562-5137

SPECIAL CONDITIONS
Action ID: SAW-2009-01346
STIP: A-0009C

1. **Work Limits:** All work authorized by this permit shall be performed in strict compliance with the attached permit plans dated 12/13/2021, 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 US 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, Asheville Field Office, 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, Asheville Field Office, NCDOT Project Manager, 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 NCDWQ Project Managers can attend. The Permittee shall invite the Corps, NCDCM, and NCDWQ 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, Wilmington District Asheville Regulatory Field Office, Attn: Crystal Amschler 151 Patton Avenue, Room 208 or Crystal.C.Amschler@usace.army.mil. The Permittee shall reference the following permit number, SAW-2009-01346, 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: 828-271-7980 ext. 4231 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. **Water Contamination:** All mechanized equipment shall be regularly inspected and maintained to prevent contamination of waters and wetlands from fuels, lubricants, hydraulic fluids, or other toxic materials. In the event of a spill of petroleum products or any other hazardous waste, the Permittee shall immediately report it to the N.C. Division of Water Quality at (919) 733-3300 or (800) 858-0368 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act shall be followed.

11**. Maintain Flows and Circulation Patterns of Waters:** 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 waters or wetlands or to reduce the reach of waters and/or wetlands.

SPECIAL CONDITIONS
Action ID: SAW-2009-01346
STIP: A-0009C

12. **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.

In order to avoid and minimize effects to Indiana bat (*Myotis sodalis*) NCDOT will comply with the following measures:

- NCDOT will only remove the trees required for this project during October 15 to April 15, avoiding impacts to potentially roosting bats.
- NCDOT will add no additional permanent lighting to the project area and will limit temporary lighting and night work to the single area needed for the wildlife passage/Appalachian Trail land bridge, to be completed over a few nights between November and March.
- NCDOT will perform the demolition of man-made structures only during the winter or after confirming the absence of roosting bats.
- Per the EBCI Office of Natural Resources, on any tract held in trust by the EBCI and where trees will be cut, evaluation for Indiana Bat, Northern Long Bat, and Small Whorled Pogonia presence and habitat shall be performed both pre- and post harvest.
- Per the EBCI Office of Natural Resources, on any tract held in trust by the EBCI NCDOT will only remove trees during October 15 to April 15, with minimal night-time lighting as needed to achieve the work. If work is not taking place, all lighting should be shut down.

13. **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 or, if prior approval given, set at the current stream bed elevation. 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. 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.

14. **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.

15. **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.

16. **Aquatic Life Movement:** No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area. All discharges of dredged or fill material within waters of the United States shall be designed and constructed to maintain low flows to sustain the movement of aquatic species.

17. **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.

18. **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. NOTE: Two (2) separate Compensatory Mitigation Responsibility Transfer Forms are attached to this permit..

19. **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.

20**. NCDWR and EBCI 401 Cert**: In accordance with 33 U.S.C. 1341(d), all conditions of the North Carolina Division of Water Resources 401 Water Quality Certification No. 3845 Dated February 22, 2022, are hereby incorporated as special conditions of this permit, as are the conditions of the EBCI 401 Water Quality Certification Grant With Special Conditions dated 10/25/2021 for portions of the project that cross Tribal land.

21. **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).

22. **Historic Properties Programmatic Agreement (PA):** The Permittee shall fully implement the Section 106 Programmatic Agreement (PA) between the North Carolina Department of Transportation, the Advisory County on Historic Preservation, North Carolina State Historic Preservation Officer, the US Forest Service, the Federal Highways administration, and the Eastern Band of Cherokee Indians that was executed in March of 2021. This PA is attached to the permit.

23. **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.

24. **Trout:** Per the NC Wildlife Resources Commission's letter dated February 4, 2022, and the EBCI letter, as well as a follow up email from the EBCI dated 12/14/2021, NCDOT is prohibited from doing any in-stream work and land disturbance within the 25-foot trout buffer from January 1 to April 15 to protect the egg and fry stages of Rainbow Trout. Additionally, Design Standards in Sensitive Watersheds shall be implemented with this project.

25. **WRC and EBCI other recommended environmental conditions:** The following condition(s) received from the Eastern Band of Cherokee Indians, are hereby incorporated as special conditions of this permit:

- The pristine wetland referenced in EBCIs letter and Sweetwater Creek will be avoided.
- The logging road at Bowman Lane should not be accessed by equipment at any time, following the EBCI 401 special condition
- Applicable measures from the current NCDOT Erosion and Sediment Control Design and Construction Manual should be adhered to. Tall fescue and straw mulch must not be used in riparian areas (Note, there also is prescriptive seeding that may prohibit tall fescue or sericea lespedeza on USFS property in the special use authorization). Matting needed in riparian areas should not contain nylon mesh because it entangles and kills wildlife. Coir matting should be used on disturbed stream banks that are steep or susceptible to high water and securely anchored with wooden stakes according to NCDOT specifications.
- Herbaceous vegetation should be planted on all bare soil within 15 days of ground disturbing activities to provide long term erosion control.
- Disturbed soils in steep slopes and riparian areas should be stabilized with heavy fiber matting in addition to seeding. Matting should be secured in place with staples, stakes, or wherever possible, live stakes of native trees. Discharging hydro-seed mixtures and washing out hydro-seeders and other equipment in or adjacent to surface waters is prohibited.
- Heavy equipment should be utilized from the stream bank and not in the channel whenever feasible. All mechanized equipment operated near surface waters should be inspected and maintained regularly to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials. Uncured concrete must not contact the stream because this can kill fish.
- All work within the stream should be completed in the dry with the use of temporary diversion structures. Materials used for flow diversions should be removed from the stream bed after completing the construction work.
- Native material or rip rap backfill (whichever is specified by plans/details) should be compacted in streams to the appropriate elevation immediately downstream of culvert replacements and extensions to help prevent outlet scour.

SPECIAL CONDITIONS
Action ID: SAW-2009-01346
STIP: A-0009C

- Riprap placed for bank stabilization should be limited to the stream bank below the high-water mark and vegetation should be used above. Rip rap should not be placed in the stream channel in a manner that obstructs aquatic life passage.
- Rip rap specified in plans should be embedded into (aka “keyed-in”) the soil of channel relocations wherever possible to expedite/promote surface flow and aquatic organism passage. Native streambed materials should be used as top-dressing on culvert inlet/outlet benches where embedment is not possible. High flow barrels that are backfilled with rip rap should be similarly treated to promote wildlife passage.
- Removal of vegetation in riparian areas and wetlands should be minimized. Banks on stream relocations and abandoned roadways need to be reforested. This minimally should include impact site 23 in Section A and impact sites 11, 17, and 19 in Section C.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.13	**TIP Number:**	A-0009CA	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh Deyton, PE			**Contractor / Designer:**	TGS Engineers / Ben Henegar, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 123		
Email:	jbdeyton@ncdot.gov			**Email:**	bhenegar@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.75 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	27.8	ac.		15.2	ac.		
Typical Cross Section Description:	1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidewalks (LT & RT) - 0.3 Miles 2.) Three 12.0' paved lanes, 10.0' shoulders (8.0' paved / 2.0' grassed), grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			1.) Three 12.0' paved lanes, 2.5' curb and gutter, 5.0' sidwalk (LT) - 0.3 Miles 2.) Two 12.0 paved lanes, 8.0' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.45 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6300	Year:	2019

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

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143, and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 in Stecoah in Graham County, NC. The project improves roadway shoulders and adding passing / climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB, & A-0009CC).

A-0009CA includes US 129 and NC 143 in Robbinsville and extends to SR 1223 (Beech Creek Rd) along NC 143.

Project minimum measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.

Dry detention basins are proposed to the maximum extent practicable adjacent to Tulula Creek inside the Town of Robbinsville.

North Carolina Department of Transportation

Highway Stormwater Program

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FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

Waterbody Information

Surface Water Body (1):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Talula Creek, 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?**		
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 (2):	Tulula Creek		**NCDWR Stream Index No.:**	2-190-2-(14)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)	Critical Area (CA)		
Other Stream Classification:						
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Talula Creek			**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):	Sweetwater Creek		**NCDWR Stream Index No.:**	2-190-3-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Sweetwater Creek, SG, SI, SJ, SK, SO, SM, SN, SR, SS, ST, SU, SV, SW, SX			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	No	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

WBS Element: 32572.1.13 **TIP No.:** A-0009CA **County(ies):** Graham

Additional Waterbody Information

Surface Water Body (4):	Slay Bacon Branch		**NCDWR Stream Index No.:**	2-190-3-7	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Slay Bacon Branch			**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):	Pigpen Branch		**NCDWR Stream Index No.:**	2-190-3-5-1	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Pigpen Branch			**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):	Harwood Branch		**NCDWR Stream Index No.:**	2-190-3-5	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Harwood Branch			**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):	Beech Creek		**NCDWR Stream Index No.:**	2-190-3-3	
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)		
		Supplemental Classification:	None		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No	Comments:			
NRTR Stream ID:	Beech Creek			**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)					

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.13 **TIP/Proj No.:** A-0009CA **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*5	L	13+50	RT	35.32448	-83.801377	(2)Tulula Creek	0.0	2.0	8.0	2.3	230	250	1.00%	8.4	1.9	11.1	2.1	No	No
6	L	20+05	RT	35.325256	-83.799471	(2)Tulula Creek	0.0	4.0	4.0	0.7	66	195	2.00%	1.3	1.7	1.7	1.8	No	No
6	L	22+00	RT	35.325367	-83.798856	(2)Tulula Creek	0.0	4.0	4.0	0.2	23	200	2.00%	0.5	1.3	0.7	1.4	No	No
6	L	24+00	RT	35.32535	-83.798205	(2)Tulula Creek	0.0	4.0	4.0	0.4	39	200	2.35%	0.9	1.6	1.2	1.7	No	No
*6	L	27+20	LT	35.325326	-83.797108	(2)Tulula Creek	0.0	4.0	2.0	0.9	87	180	1.22%	2.4	1.7	3.2	1.9	No	No
*6	L	27+50	RT	35.325114	-83.797092	(2)Tulula Creek	0.0	4.0	2.0	0.4	40	200	1.09%	1.0	1.3	1.4	1.4	No	No
*7**	L	31+50	RT	35.324785	-83.795813	(3)Sweetwater Creek	0.0	4.0	2.0	1.3	130	100	0.57%	2.6	1.3	3.4	1.4	No	No
*7**	L	34+10	RT	35.324569	-83.794977	(3)Sweetwater Creek	0.0	4.0	2.0	2.6	260	140	0.59%	3.6	1.4	4.8	1.6	No	No
7/8	L	44+40	RT	35.323713	-83.791691	(3)Sweetwater Creek	0.0	4.0	4.0	0.8	76	140	2.29%	1.2	1.7	1.6	1.9	No	No
8**	L	46+70	LT	35.323766	-83.790863	(3)Sweetwater Creek	0.0	4.0	4.0	4.8	480	130	1.52%	3.8	2.0	5.1	2.1	No	No
8**	L	48+50	LT	35.323602	-83.790276	(3)Sweetwater Creek	0.0	4.0	4.0	4.3	430	190	1.45%	4.3	2.0	5.7	2.1	No	No
*8**	L	51+30	LT	35.323362	-83.789401	(3)Sweetwater Creek	0.0	4.0	2.0	1.8	180	70	0.43%	2.9	1.2	3.8	1.3	No	No
*11	L	83+00	LT	35.325405	-83.779683	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	250	0.62%	1.1	1.1	1.4	1.2	No	No
*11	L	87+50	LT	35.325285	-83.778144	(3)Sweetwater Creek	0.0	4.0	2.0	0.8	83	200	0.81%	1.9	1.4	2.5	1.5	No	No
*10/11	L	81+50	RT	35.325214	-83.780168	(3)Sweetwater Creek	0.0	4.0	2.0	0.9	86	350	2.31%	1.7	2.0	2.3	2.2	No	No
*12	L	103+50	LT	35.326326	-83.773467	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	20	50	4.00%	0.6	1.9	0.7	2.0	No	No
*12	L	105+50	LT	35.326801	-83.773135	(3)Sweetwater Creek	0.0	4.0	2.0	0.3	26	100	3.66%	0.7	1.9	0.9	2.0	No	No
*12	L	107+00	LT	35.327158	-83.772884	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	37	150	2.58%	1.0	1.8	1.3	1.9	No	No
*12	L	108+00	LT	35.327418	-83.772714	(4)Slay Bacon Branch	0.0	4.0	2.0	0.4	40	100	1.73%	0.8	1.5	1.1	1.6	No	No
*12/13	L	109+00	LT	35.327648	-83.772556	(4)Slay Bacon Branch	2.0	4.0	2.0	1.1	113	150	1.78%	3.0	2.0	4.0	2.2	No	No
*13	L	120+20	LT	35.330022	-83.770150	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	39	330	1.60%	0.7	1.4	0.9	1.5	No	No
*13	L	120+50	RT	35.32988	-83.769960	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	150	300	1.79%	2.4	2.0	3.2	2.1	No	No
*13/14	L	127+50	RT	35.330506	-83.767746	(3)Sweetwater Creek	0.0	4.0	2.0	4.0	400	400	0.51%	4.8	1.5	6.4	1.6	No	No
*14	L	127+00	LT	35.330669	-83.768006	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.68%	0.3	0.8	0.4	0.9	No	No
*14	L	128+00	LT	35.330793	-83.767699	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	11	100	0.77%	0.3	0.9	0.4	0.9	No	No
*14	L	129+50	LT	35.330936	-83.767227	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	12	120	1.03%	0.3	1.0	0.4	1.1	No	No
*14	L	132+00	LT	35.331157	-83.766432	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	13	150	2.72%	0.4	1.4	0.5	1.6	No	No
*14	L	131+00	RT	35.330883	-83.766665	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	41	200	2.71%	0.8	1.8	1.1	1.9	No	No
*15	L	143+50	RT	35.332092	-83.762742	(3)Sweetwater Creek	0.0	4.0	2.0	0.1	8	50	1.50%	0.2	1.0	0.3	1.1	No	No
*15	L	145+00	RT	35.332227	-83.762264	(6)Harwood Branch	0.0	4.0	2.0	0.5	50	200	0.65%	0.8	1.0	1.1	1.1	No	No
*15**	L	150+50	RT	35.332764	-83.760540	(3)Sweetwater Creek	2.0	4.0	2.0	2.9	290	150	0.66%	4.9	1.6	6.5	1.7	No	No
*16	L	152+00	RT	35.332916	-83.760071	(3)Sweetwater Creek	0.0	4.0	2.0	0.2	18	100	0.70%	0.5	0.9	0.7	1.0	No	No
*16	L	153+00	RT	35.333017	-83.759760	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	47	230	0.61%	1.3	1.1	1.7	1.2	No	No
*16	L	155+30	RT	35.333248	-83.759042	(3)Sweetwater Creek	0.0	4.0	2.0	0.4	36	170	0.71%	1.0	1.1	1.3	1.2	No	No
*16	L	158+00	RT	35.333528	-83.758205	(3)Sweetwater Creek	0.0	4.0	2.0	0.5	50	200	1.32%	0.6	1.3	0.8	1.3	No	No
*16	L	160+50	RT	35.333777	-83.757430	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	100	1.48%	0.8	1.4	1.1	1.5	No	No
16	L	162+85	RT	35.334049	-83.756688	(3)Sweetwater Creek	0.0	3.0	6.0	0.4	35	100	1.10%	0.4	1.0	0.6	1.1	No	No
*16	L	163+50	RT	35.334153	-83.756511	(3)Sweetwater Creek	0.0	4.0	2.0	1.5	146	200	2.39%	1.8	2.0	2.3	2.2	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

Swales

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
*17	L	171+40	RT	35.335685	-83.754553	(3)Sweetwater Creek	0.0	4.0	2.0	1.6	160	220	0.86%	1.9	1.4	2.5	1.5	No	No
18**	L	181+05	RT	35.337919	-83.752797	(3)Sweetwater Creek	0.0	4.0	4.0	3.7	370	155	1.29%	4.4	1.9	5.9	2.1	No	No
18	L	183+15	RT	35.338415	-83.752436	(3)Sweetwater Creek	0.0	4.0	4.0	2.2	220	285	1.79%	2.6	1.9	3.5	2.1	No	No
*18/19	L	194+50	RT	35.340369	-83.749737	(3)Sweetwater Creek	0.0	4.0	2.0	0.7	70	200	0.32%	1.4	0.9	1.9	1.0	No	No
*19	L	199+50	RT	35.340803	-83.748162	(7)Beech Creek	0.0	4.0	2.0	1.5	154	200	1.26%	2.5	1.8	3.3	1.9	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.
*Side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.
**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

(Version 3.00; Released August 2021)

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

WBS Element: 32572.1.13 **TIP/Proj No.:** A-0009CA **County(ies):** Graham

Other Toolbox Best Management Practices

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	BMP Type	Drainage Area (ac)	New Built-Upon Area (ac)	Volume Treated (ac-ft)	Precipitation Depth Treated over NBUA (in)	BMP Associated w/ Buffer Rules?
4	L	14+90	RT	35.32464	-83.800938	(2)Tulula Creek	Dry Detention Basin	2.0	0.1	0.2332	29.44	No
5	Y1	23+55	RT	35.321093	-83.802197	(1)Tulula Creek	Dry Detention Basin	2.0	0.3	0.076	3.20	No

Additional Comments

L 19+90 RT - Precipitation Depth Treated over Total Impervious Area = 2.10 Inches

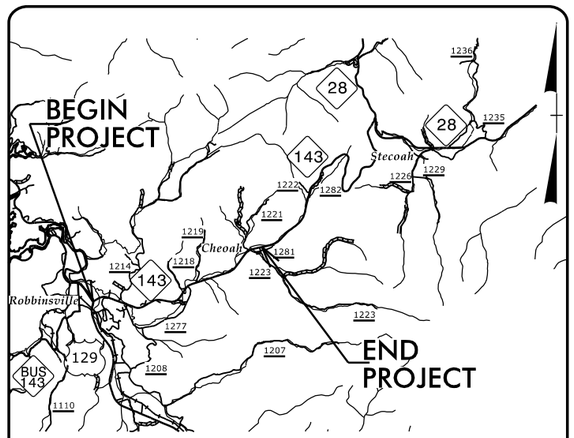
Y1 23+55 RT - Precipitation Depth Treated over Total Impervous Area = 0.69 Inches

09/08/99

TIP PROJECT: A–0009CA

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

PERMIT DRAWING
SHEET 1 OF 42

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A–0009CA	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.13	APD–0074(178)	PE
32572.2.13	APD–0074(178)	ROW,UTIL.
32572.3.13	APD–0074(178)	CONST.

LOCATION: UPGRADE US 129 FROM SOUTH OF SR 1275 (FIVE POINTS ROAD) TO NC 143 AND UPGRADE NC 143 FROM US 129 TO SR 1223 (BEECH CREEK ROAD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CULVERTS, RETAINING WALLS, AND SIGNALS

WETLAND & SURFACE WATER IMPACTS

NAD 83/2011

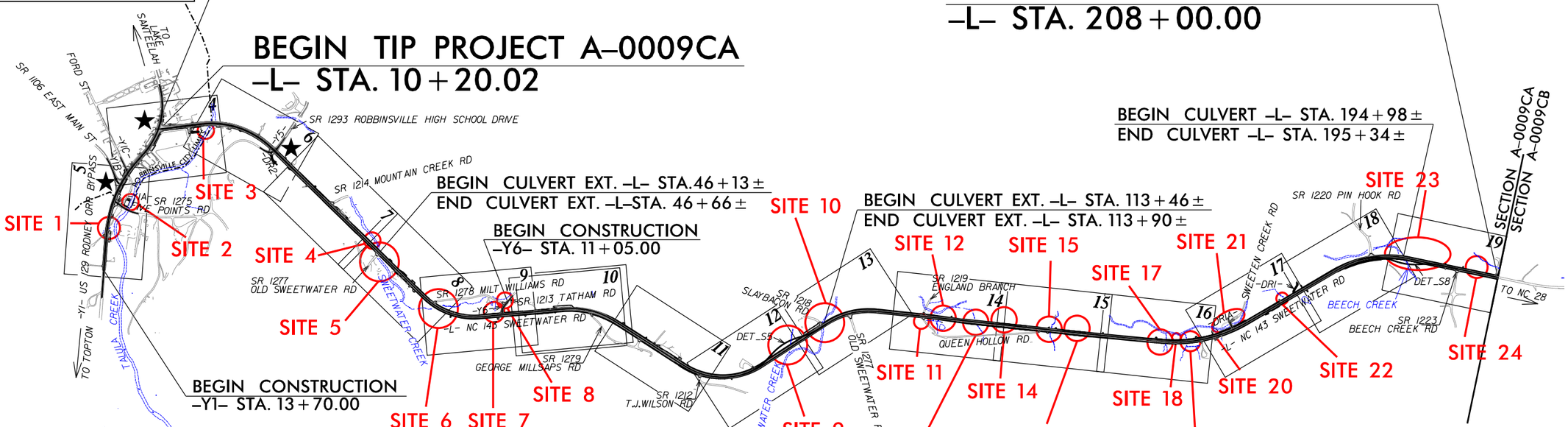
★ PROPOSED SIGNAL

END CONSTRUCTION
–Y1– STA. 36+70.00

BEGIN TIP PROJECT A–0009CA
–L– STA. 10+20.02

END TIP PROJECT A–0009CA
–L– STA. 208+00.00

BEGIN CULVERT –L– STA. 194+98±
END CULVERT –L– STA. 195+34±



BEGIN CULVERT EXT. –L– STA.46+13±
END CULVERT EXT. –L–STA. 46+66±

BEGIN CONSTRUCTION
–Y6– STA. 11+05.00

BEGIN CULVERT EXT. –L– STA. 113+46±
END CULVERT EXT. –L– STA. 113+90±

BEGIN CONSTRUCTION
–Y1– STA. 13+70.00

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF ROBBINSVILLE.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS 50 25 0 50 100

PROFILE (HORIZONTAL) 50 25 0 50 100

PROFILE (VERTICAL) 10 5 0 10 20

DESIGN DATA

ADT 2019 = 6300
ADT 2045 = 8800
K = 11 %
D = 57.5%
T = 7 % *
V = 50MPH – BEGIN PROJECT TO FIVE POINTS RD
60MPH – FIVE POINTS RD TO END OF PROJECT
* TTST =2% DUAL =5%
FUNC CLASS = RURAL ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A–0009CA	=	3.746 MILES
LENGTH STRUCTURE TIP PROJECT A–0009CA	=	0.027 MILES
TOTAL LENGTH TIP PROJECT A–0009CA	=	3.746 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE:
JULY 16, 2021

LETTING DATE:
AUGUST 16, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

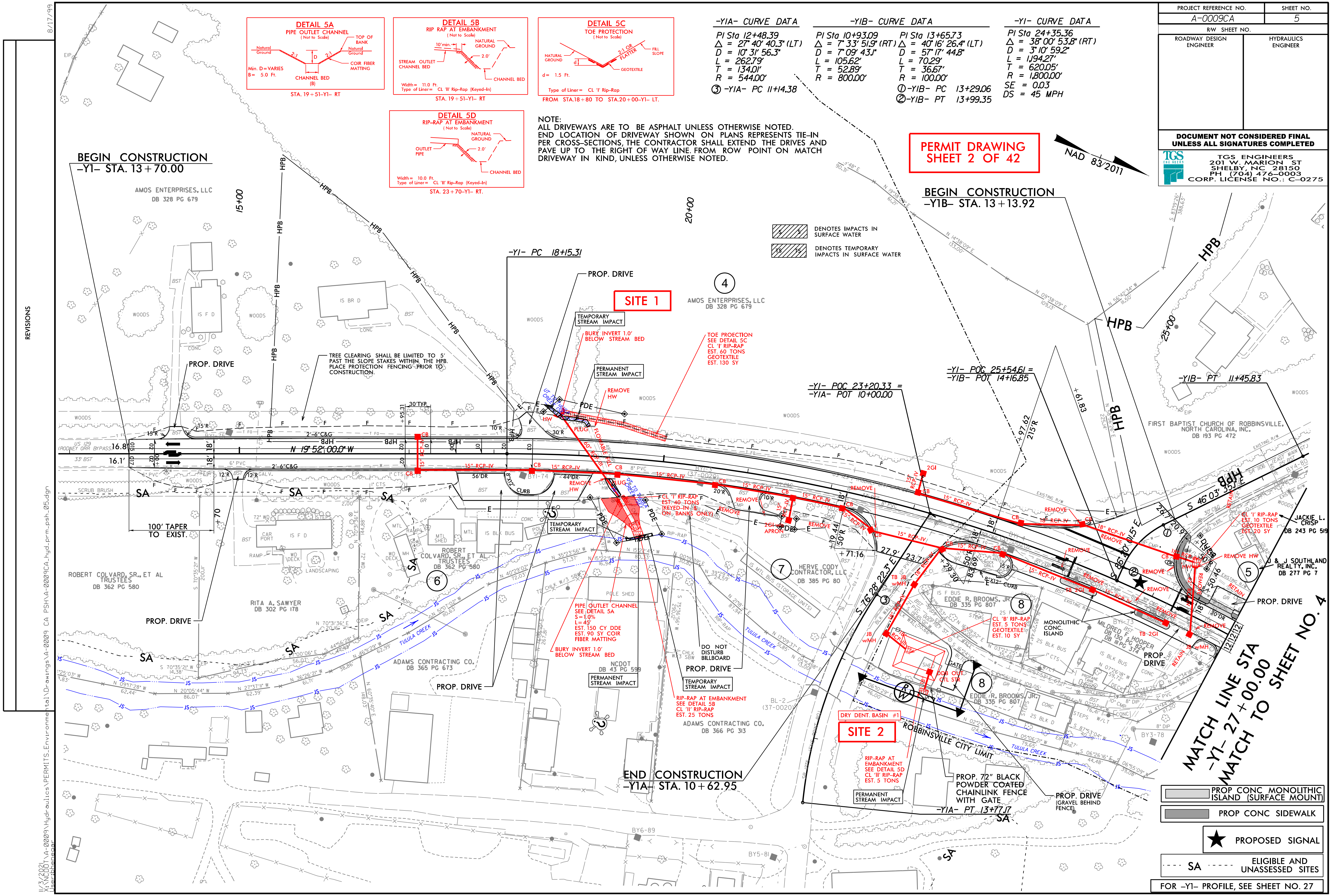
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

12/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_Hyd_prm_tsh.dgn
User:zrichard


PROJECT REFERENCE NO.
A-0009CA
SHEET NO.
5
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 2 OF 42
NAD 83/2011
DETAIL 5A
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D = VARIES
B = 5.0 Ft.
CHANNEL BED
COIR FIBER MATTING
TOP OF BANK
STA. 19+51-Y1- RT
DETAIL 5B
RIP RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
STREAM OUTLET CHANNEL BED
Width = 11.0 Ft.
Type of Liner = CL 'II' Rip-Rap (Keyed-In)
STA. 19+51-Y1- RT
DETAIL 5C
TOE PROTECTION
(Not to Scale)
NATURAL GROUND
2:1 OR FLATTER
FILL SLOPE
GEOTEXTILE
d = 1.5 Ft.
Type of Liner = CL 'I' Rip-Rap
FROM STA.18+80 TO STA.20+00-Y1- LT.
DETAIL 5D
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
OUTLET PIPE
CHANNEL BED
Width = 10.0 Ft.
Type of Liner = CL 'II' Rip-Rap (Keyed-In)
STA. 23+70-Y1- RT.
-Y1A- CURVE DATA
PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ -Y1A- PC 11+14.38
-Y1B- CURVE DATA
PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'
PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① -Y1B- PC 13+29.06
② -Y1B- PT 13+99.35
-Y1- CURVE DATA
PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
BEGIN CONSTRUCTION
-Y1- STA. 13+70.00
BEGIN CONSTRUCTION
-Y1B- STA. 13+13.92
END CONSTRUCTION
-Y1A- STA. 10+62.95
AMOS ENTERPRISES, LLC
DB 328 PG 679
SITE 1
SITE 2
-Y1- PC 18+15.31
PROP. DRIVE
TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
BURY INVERT 1.0' BELOW STREAM BED
TOE PROECTION
SEE DETAIL 5C
CL 'I' RIP-RAP
EST. 60 TONS
GEOTEXTILE
EST. 130 SY
REMOVE HW
TREE CLEARING SHALL BE LIMITED TO 5' PAST THE SLOPE STAKES WITHIN THE HPB. PLACE PROTECTION FENCING PRIOR TO CONSTRUCTION.
CL 'I' RIP-RAP
EST. 40 TONS
(KEYED-IN ON BANKS ONLY)
PIPE OUTLET CHANNEL
SEE DETAIL 5A
S = 1.0%
L = 45'
EST. 150 CY DDE
EST. 90 SY COIR FIBER MATTING
BURY INVERT 1.0' BELOW STREAM BED
NCDOT
DB 43 PG 599
DO NOT DISTURB BILLBOARD
RIP-RAP AT EMBANKMENT
SEE DETAIL 5B
CL 'II' RIP-RAP
EST. 25 TONS
ADAMS CONTRACTING CO.
DB 366 PG 313
ADAMS CONTRACTING CO.
DB 365 PG 673
ROBERT COLVARD, SR., ET AL TRUSTEES
DB 362 PG 580
RITA A. SAWYER
DB 302 PG 178
100' TAPER TO EXIST.
-Y1- POC 23+20.33 =
-Y1A- POT 10+00.00
-Y1- POC 25+54.61 =
-Y1B- POT 14+16.85
-Y1B- PT 11+45.83
HERVE CODY CONTRACTOR, LLC
DB 385 PG 80
EDDIE R. BROOMS, JR.
DB 335 PG 807
CL 'B' RIP-RAP
EST. 5 TONS
GEOTEXTILE
EST. 10 SY
MONOLITHIC CONC. ISLAND
MILDRED F. HOOPER
DB 130 PG 824
DB III PG 374
FIRST BAPTIST CHURCH OF ROBBINSVILLE, NORTH CAROLINA, INC.
DB 193 PG 472
JACKIE L. CRISP
DB 243 PG 519
CL 'I' RIP-RAP
EST. 10 TONS
GEOTEXTILE
EST. 20 SY
J & J SOUTHLAND REALTY, INC.
DB 277 PG 7
DRY DENT. BASIN #1
RIP-RAP AT EMBANKMENT
SEE DETAIL 5D
CL 'II' RIP-RAP
EST. 5 TONS
PROP. 72" BLACK POWDER COATED CHAINLINK FENCE WITH GATE
PROP. DRIVE (GRAVEL BEHIND FENCE)
-Y1A- PT 13+77.17
ROBBINSVILLE CITY LIMIT
TULULA CREEK
MATCH LINE STA -Y1- 27+00.00
MATCH TO SHEET NO. 4
PROP CONC MONOLITHIC ISLAND (SURFACE MOUNT)
PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -Y1- PROFILE, SEE SHEET NO. 27
REVISIONS
8/17/99
11/3/2021
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

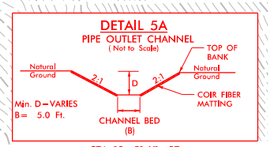
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

8/17/99

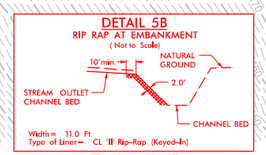
REVISIONS

DETAIL 5A
PIPE OUTLET CHANNEL
(Not to Scale)



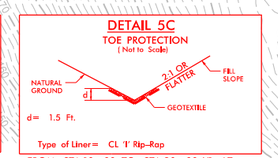
STA. 19+51-Y1- RT

DETAIL 5B
RIP RAP AT EMBANKMENT
(Not to Scale)



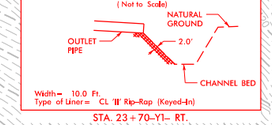
STA. 19+51-Y1- RT

DETAIL 5C
TOE PROTECTION
(Not to Scale)



FROM STA.18+80 TO STA.20+00-Y1- LT.

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



STA. 23+70-Y1- RT.

-Y1A- CURVE DATA
PI Sta 12+48.39
Δ = 27° 40' 40.3" (LT)
D = 10° 31' 56.3"
L = 262.79'
T = 134.01'
R = 544.00'
③ -Y1A- PC 11+14.38

-Y1B- CURVE DATA
PI Sta 10+93.09
Δ = 7° 33' 51.9" (RT)
D = 7° 09' 43.1"
L = 105.62'
T = 52.89'
R = 800.00'

PI Sta 13+65.73
Δ = 40° 16' 26.4" (LT)
D = 57° 17' 44.8"
L = 70.29'
T = 36.67'
R = 100.00'
① -Y1B- PC 13+29.06
② -Y1B- PT 13+99.35

-Y1- CURVE DATA
PI Sta 24+35.36
Δ = 38° 00' 53.8" (RT)
D = 3° 10' 59.2"
L = 1,194.27'
T = 620.05'
R = 1,800.00'
SE = 0.03
DS = 45 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 3 OF 42

NAD 83/2011

BEGIN CONSTRUCTION
-Y1- STA. 13+70.00

BEGIN CONSTRUCTION
-Y1B- STA. 13+13.92

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y1- PC 18+15.31

-Y1- POC 25+54.61 = -Y1B- POT 14+16.85

-Y1- POC 23+20.33 = -Y1A- POT 10+00.00

-Y1B- PT 11+45.83

SITE 1

SITE 2

PROP. DRIVE

TEMPORARY STREAM IMPACT

PERMANENT STREAM IMPACT

BURY INVERT 1.0' BELOW STREAM BED

TOE PROTECTION SEE DETAIL 5C CL 'I' RIP-RAP EST. 60 TONS GEOTEXTILE EST. 130 SY

REMOVE HW

PLUG

TREE CLEARING SHALL BE LIMITED TO 5' PAST THE SLOPE STAKES WITHIN THE HPB. PLACE PROTECTION FENCING PRIOR TO CONSTRUCTION.

PIPE OUTLET CHANNEL SEE DETAIL 5A S=1.0% L=45' EST. 150 CY DDE EST. 90 SY COIR FIBER MATTING

BURY INVERT 1.0' BELOW STREAM BED

RIP-RAP AT EMBANKMENT SEE DETAIL 5B CL 'II' RIP-RAP EST. 25 TONS

CL 'I' RIP-RAP EST. 40 TONS (KEYED-IN & ON BANKS ONLY)

CL 'I' RIP-RAP EST. 10 TONS GEOTEXTILE EST. 20 SY

CL 'B' RIP-RAP EST. 5 TONS GEOTEXTILE EST. 10 SY

RIP-RAP AT EMBANKMENT SEE DETAIL 5D CL 'II' RIP-RAP EST. 5 TONS

DO NOT DISTURB BILLBOARD

DRY DENT. BASIN #1

ROBBINSVILLE CITY LIMIT

PROP. 72" BLACK POWDER COATED CHAINLINK FENCE WITH GATE
-Y1A- PT 13+77.17

PROP. DRIVE (GRAVEL BEHIND FENCE)

MATCH LINE STA -Y1- 27+00.00 MATCH TO SHEET NO. 4

AMOS ENTERPRISES, LLC
DB 328 PG 679

ROBERT COLVARD, SR., ET AL TRUSTEES
DB 362 PG 580

RITA A. SAWYER
DB 302 PG 178

ADAMS CONTRACTING CO.
DB 365 PG 673

NCDOT
DB 43 PG 599

ADAMS CONTRACTING CO.
DB 366 PG 313

HERVE CODY CONTRACTOR, LLC
DB 385 PG 80

EDDIE R. BROOMS, JR.
DB 335 PG 807

MILDRED F. HOOPER
DB 130 PG 424
DB 193 PG 372

FIRST BAPTIST CHURCH OF ROBBINSVILLE, NORTH CAROLINA, INC.
DB 193 PG 472

JACKIE L. CRISP
DB 243 PG 519

D & J SOUTHLAND REALTY, INC.
DB 277 PG 7

END CONSTRUCTION
-Y1A- STA. 10+62.95

PROP CONC MONOLITHIC ISLAND (SURFACE MOUNT)

PROP CONC SIDEWALK

★ PROPOSED SIGNAL

SA ELIGIBLE AND UNASSESSED SITES

FOR -Y1- PROFILE, SEE SHEET NO. 27

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 21+39.93
△ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
△ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'
① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

PI Sta 12+96.74
△ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

-DR2- CURVE DATA
PI Sta 11+03.23
△ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC
③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 4 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y5- POT 10+00.00
-Y5- PC 11+00.00
-L- POT 26+74.83 =
-Y5- POC 12+26.19
-L- PT 26+19.98
-Y5- POT 14+50.00
-Y5- POC 12+80.00 =
-DR2- POT 10+00.00
-DR2- POT 12+00.00

END CONSTRUCTION
-DR2- STA. 11+60.00

MATCH LINE STA -L- 16+00.00
MATCH TO SHEET NO. 4

MATCH LINE STA -L- 30+00.00
MATCH TO SHEET NO. 7

SITE 3

PROP. DRIVE
PROP. HANDRAIL -L-STA. 17+10 TO 17+90, LT
PROP. HANDRAIL -L-STA. 16+75 TO 17+60, RT
PROP. CONCRETE DRIVE
RELOCATE FENCE (BY OWNER)
RELOCATE (BY OTHERS)
CONNECT TO EXIST. BOX CULVERT
RETAIN 4@12'x14' RCBC
TEMPORARY STREAM IMPACT
PERMANENT STREAM IMPACT
HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS
RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL 'II' RIP-RAP, EST. 30 TONS
TIE -L- TYP. CUT DITCH TO -DR2- S=4.3% SEE DETAIL 6C
SPECIAL LATERAL 'V' DITCH SEE DETAIL 6B
150' TAPER

TOMMY R. COLLINS, ET AL
DB 195 PG 465
DB 195 PG 468
JACK E. MILLSAPS
DB 355 PG 252
OLIVER L. AMMONS
DB 139 PG 127

BM#2 ELEV. 2015.91'
-BL- STA. 21+59.00 103' RT.
CHISELED 'X' IN CONC PAD
FOR TRAFFIC SIGNAL BOX

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
Width= 22.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK
PROPOSED SIGNAL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 20
FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
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User:jbhenegar

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 21+39.93
Δ = 51° 06' 09.7" (RT)
D = 4° 56' 21.4"
L = 1,034.62'
T = 554.57'
R = 1,160.00'
SE = 0.04
DS = 50 MPH

-Y5- CURVE DATA
PI Sta 11+51.55
Δ = 9° 49' 14.7" (RT)
D = 9° 32' 57.5"
L = 102.84'
T = 51.55'
R = 600.00'
① -Y5- PCC 12+02.84
② -Y5- PT 13+60.33

PI Sta 12+96.74
Δ = 78° 27' 45.3" (RT)
D = 49° 49' 20.7"
L = 157.48'
T = 93.90'
R = 115.00'

-DR2- CURVE DATA
PI Sta 11+03.23
Δ = 37° 57' 56.5" (LT)
D = 55° 05' 31.5"
L = 68.91'
T = 35.78'
R = 104.00'
SE = NC
③ -DR2- PC 10+67.46
④ -DR2- PT 11+36.37
Ⓑ S 31° 49' 15.2" E

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 5 OF 42

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-Y5- POT 10+00.00

-L- POT 26+74.83 =
-Y5- POC 12+26.19

-Y5- PC 11+00.00

S 9° 55' 00.0" W

PROP. DRIVE

TOMMY R. COLLINS, ET AL
DB 195 PG 465

RELOCATE FENCE (BY OWNER)

+23.54

30' TYP

JACK E. MILLSAPS
DB 355 PG 252

PROP. DRIVE

150' TAPER

+75

ROBBINSVILLE CITY LIMIT

PROP. HANDRAIL
-L-STA. 17+10 TO 17+90, LT

5' SIDEWALK

CONNECT TO EXIST. BOX CULVERT

RETAIN 4@12'x14' RCBC

TEMPORARY STREAM IMPACT

TEMPORARY STREAM IMPACT

PAULA CREEK

PERMANENT STREAM IMPACT

RELOCATE (BY OTHERS)

PROP. HANDRAIL
-L-STA. 16+75 TO 17+60, RT

HEADWALL TO BE EXTENDED SEE STRUCTURE PLANS

RIP-RAP AT EMBANKMENT SEE DETAIL 6A CL "II" RIP-RAP EST. 30 TONS

SITE 3

PROP. DRIVE

PROP. CONCRETE DRIVE

TOMMY R. COLLINS, ET AL
DB 195 PG 465
DB 195 PG 468

OLIVER L. AMMONS
DB 139 PG 127

-Y5- POT 14+50.00

N 8° 48' 00.0" W

-L- PT 26+19.98

S 69° 47' 11.7" E

TIE -L- TYP. CUT DITCH TO -DR2- DITCH
S=4.3%
SEE DETAIL 6C

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 6B

-Y5- POC 12+80.00 =
-DR2- POT 10+00.00

BM#2 ELEV. 2015.91'
BL - STA. 21+59.00 103' RT.
CHISELED 'X' IN CONC. PAD FOR TRAFFIC SIGNAL BOX

-DR2- POT 12+00.00

END CONSTRUCTION
-DR2- STA. 11+60.00

MATCH LINE STA -L- 16+00.00
MATCH TO SHEET NO. 4

MATCH LINE STA -L- 30+00.00
MATCH TO SHEET NO. 7

DETAIL 6A
RIP-RAP AT EMBANKMENT
(Not to Scale)
NATURAL GROUND
OUTLET PIPE
2.0'
CHANNEL BED
Width= 22.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 16+35-L- RT.

DETAIL 6B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
2:1
Fill Slope
Min. D=1.0 Ft.
FROM STA.10+42 TO STA.11+50-DR2- LT.

DETAIL 6C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground
2:1
D
4:1 or Flatter
Fill Slope
Min. D=1.5 Ft.
FROM STA.27+00 LT TO STA.27+50-L- RT.

PROP CONC SIDEWALK

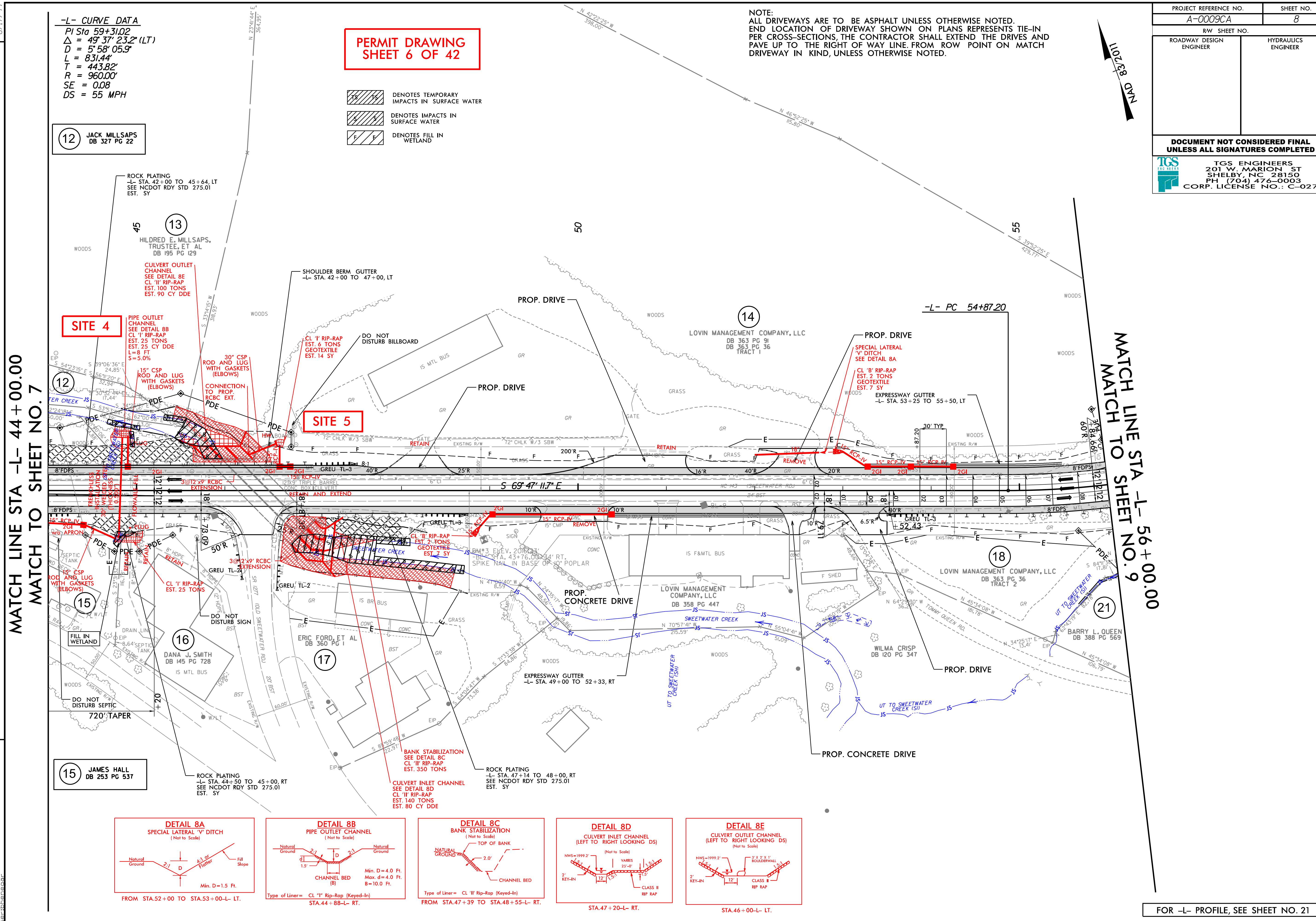
PROPOSED SIGNAL

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 20

FOR -DR2- PROFILE, SEE SHEET NO. 28

8/13/2021
N:\NC2001\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_06_con.dgn
User:bhenson


PERMIT DRAWING
SHEET 6 OF 42
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PROJECT REFERENCE NO.
A-0009CA
SHEET NO.
8
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
JACK MILLSAPS DB 327 PG 22
HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129
LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1
LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2
LOVIN MANAGEMENT COMPANY, LLC DB 358 PG 447
BARRY L. QUEEN DB 388 PG 569
WILMA CRISP DB 120 PG 347
DANA J. SMITH DB 145 PG 728
ERIC FORD, ET AL DB 360 PG 1
JAMES HALL DB 253 PG 537
SITE 4
SITE 5
ROCK PLATING -L- STA. 42+00 TO 45+64, LT SEE NCDOT RDY STD 275.01 EST. SY
CULVERT OUTLET CHANNEL SEE DETAIL 8E CL 'II' RIP-RAP EST. 100 TONS EST. 90 CY DDE
PIPE OUTLET CHANNEL SEE DETAIL 8B CL 'I' RIP-RAP EST. 25 TONS EST. 25 CY DDE L=8 FT S=5.0%
SHOULDER BERM GUTTER -L- STA. 42+00 TO 47+00, LT
CL 'I' RIP-RAP EST. 6 TONS GEOTEXTILE EST. 14 SY
DO NOT DISTURB BILLBOARD
30" CSP ROD AND LUG WITH GASKETS (ELBOWS)
15" CSP ROD AND LUG WITH GASKETS (ELBOWS)
CONNECTION TO PROP. RCBC EXT.
PROP. DRIVE
PROP. CONCRETE DRIVE
-L- PC 54+87.20
SPECIAL LATERAL 'V' DITCH SEE DETAIL 8A
CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY
EXPRESSWAY GUTTER -L- STA. 53+25 TO 55+50, LT
EXPRESSWAY GUTTER -L- STA. 49+00 TO 52+33, RT
S 69° 47' 11.7" E
3@12'x9' RCBC EXTENSION
RETAIN AND EXTEND
15" RCP-IV
REMOVE
RETAIN
CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY
CL 'I' RIP-RAP EST. 25 TONS
BM#3 ELEV. 2016.23' -BL- STA. 43+76.00 34' RT. SPIKE NAIL IN BASE OF 40' POPLAR
SWEETWATER CREEK
UT TO SWEETWATER CREEK (SI)
DO NOT DISTURB SIGN
DO NOT DISTURB SEPTIC
720' TAPER
FILL IN WETLAND
ROCK PLATING -L- STA. 44+50 TO 45+00, RT SEE NCDOT RDY STD 275.01 EST. SY
BANK STABILIZATION SEE DETAIL 8C CL 'II' RIP-RAP EST. 350 TONS
CULVERT INLET CHANNEL SEE DETAIL 8D CL 'II' RIP-RAP EST. 140 TONS EST. 80 CY DDE
ROCK PLATING -L- STA. 47+14 TO 48+00, RT SEE NCDOT RDY STD 275.01 EST. SY
MATCH LINE STA -L- 44+00.00 MATCH TO SHEET NO. 7
MATCH LINE STA -L- 56+00.00 MATCH TO SHEET NO. 9
DETAIL 8A SPECIAL LATERAL 'V' DITCH (Not to Scale) Min. D=1.5 Ft. FROM STA.52+00 TO STA.53+00-L- LT.
DETAIL 8B PIPE OUTLET CHANNEL (Not to Scale) Min. D=4.0 Ft. Max. d=4.0 Ft. B=10.0 Ft. Type of Liner= CL "I" Rip-Rap (Keyed-In) STA.44+88-L- RT.
DETAIL 8C BANK STABILIZATION (Not to Scale) TOP OF BANK CHANNEL BED Type of Liner= CL 'II' Rip-Rap (Keyed-In) FROM STA.47+39 TO STA.48+55-L- RT.
DETAIL 8D CULVERT INLET CHANNEL (LEFT TO RIGHT LOOKING DS) STA.47+20-L- RT.
DETAIL 8E CULVERT OUTLET CHANNEL (LEFT TO RIGHT LOOKING DS) STA.46+00-L- LT.
FOR -L- PROFILE, SEE SHEET NO. 21
REVISIONS
8/17/99
11/3/2021

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

8/17/99

REVISIONS

MATCH LINE STA -L- 44+00.00 TO SHEET NO. 7

MATCH LINE STA -L- 56+00.00 TO SHEET NO. 9

PERMIT DRAWING SHEET 7 OF 42

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS. THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH

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

12 JACK MILLSAPS DB 327 PG 22

ROCK PLATING -L- STA. 42+00 TO 45+64, LT SEE NCDOT RDY STD 275.01 EST. SY

13 HILDRED E. MILLSAPS, TRUSTEE, ET AL DB 195 PG 129

CULVERT OUTLET CHANNEL SEE DETAIL 8E CL 'II' RIP-RAP EST. 100 TONS EST. 90 CY DDE

SHOULDER BERM GUTTER -L- STA. 42+00 TO 47+00, LT

SITE 4

PIPE OUTLET CHANNEL SEE DETAIL 8B CL 'I' RIP-RAP EST. 25 TONS EST. 25 CY DDE L=8 FT S=5.0%

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

30" CSP ROD AND LUG WITH GASKETS (ELBOWS)

CONNECTION TO PROP. RCBC EXT.

CL 'I' RIP-RAP EST. 6 TONS GEOTEXTILE EST. 14 SY

DO NOT DISTURB BILLBOARD

PROP. DRIVE

SITE 5

PROP. DRIVE

14 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1

-L- PC 54+87.20

PROP. DRIVE

SPECIAL LATERAL 'V' DITCH SEE DETAIL 8A

CL 'B' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 7 SY

EXPRESSWAY GUTTER -L- STA. 53+25 TO 55+50, LT

30" TYP

+87.20

15" RCP-IV REMOVE

24" RCP-IV

15" RCP-IV

2GI

S 69° 47' 11.7" E

150' RCP-IV

12'X9' TRIPLE BARREL CONC. BOX CULVERT RETAIN AND EXTEND

3@12'x9' RCBC EXTENSION I

15" RCP-IV

15" CMP REMOVE

EXISTING R/W

SWEETWATER CREEK

RM#3 ELEV. 2016.24' STA. 43+76.06 34' RT. SPIKE NAIL IN BASE OF 30" POPLAR

PROP. CONCRETE DRIVE

LOVIN MANAGEMENT COMPANY, LLC DB 358 PG 447

F SHED

IS BR BUS

IS F&MTL BUS

IS MTL BUS

15 JAMES HALL DB 253 PG 537

16 DANA J. SMITH DB 145 PG 728

17 ERIC FORD, ET AL DB 360 PG 1

18 LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 36 TRACT 2

21 BARRY L. QUEEN DB 388 PG 569

WILMA CRISP DB 120 PG 347

TOMMY QUEEN RD.

OLD SWEETWATER RD.

SR 1127

FILL IN WETLAND

DO NOT DISTURB SEPTIC

720' TAPER

DO NOT DISTURB SIGN

CL 'I' RIP-RAP EST. 25 TONS

15" CSP ROD AND LUG WITH GASKETS (ELBOWS)

EXPRESSWAY GUTTER -L- STA. 49+00 TO 52+33, RT

UT TO SWEETWATER CREEK (SW)

BANK STABILIZATION SEE DETAIL 8C CL 'II' RIP-RAP EST. 350 TONS

CULVERT INLET CHANNEL SEE DETAIL 8D CL 'II' RIP-RAP EST. 140 TONS EST. 80 CY DDE

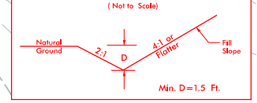
ROCK PLATING -L- STA. 47+14 TO 48+00, RT SEE NCDOT RDY STD 275.01 EST. SY

ROCK PLATING -L- STA. 48+50 TO 45+00, RT SEE NCDOT RDY STD 275.01 EST. SY

PROP. CONCRETE DRIVE

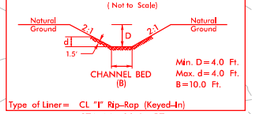
FOR -L- PROFILE, SEE SHEET NO. 21

DETAIL 8A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA.52+00 TO STA.53+00-L- LT.

DETAIL 8B
PIPE OUTLET CHANNEL
(Not to Scale)



Type of Liner= CL "I" Rip-Rap (Keyed-In)

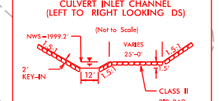
STA.44+88-L- RT.

DETAIL 8C
BANK STABILIZATION
(Not to Scale)

Type of Liner= CL "II" Rip-Rap (Keyed-In)

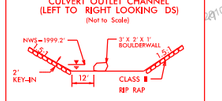
FROM STA.47+39 TO STA.48+55-L- RT.

DETAIL 8D
CULVERT INLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)



STA.47+20-L- RT.

DETAIL 8E
CULVERT OUTLET CHANNEL
(LEFT TO RIGHT LOOKING DS)
(Not to Scale)



STA.46+00-L- LT.

5/14/99

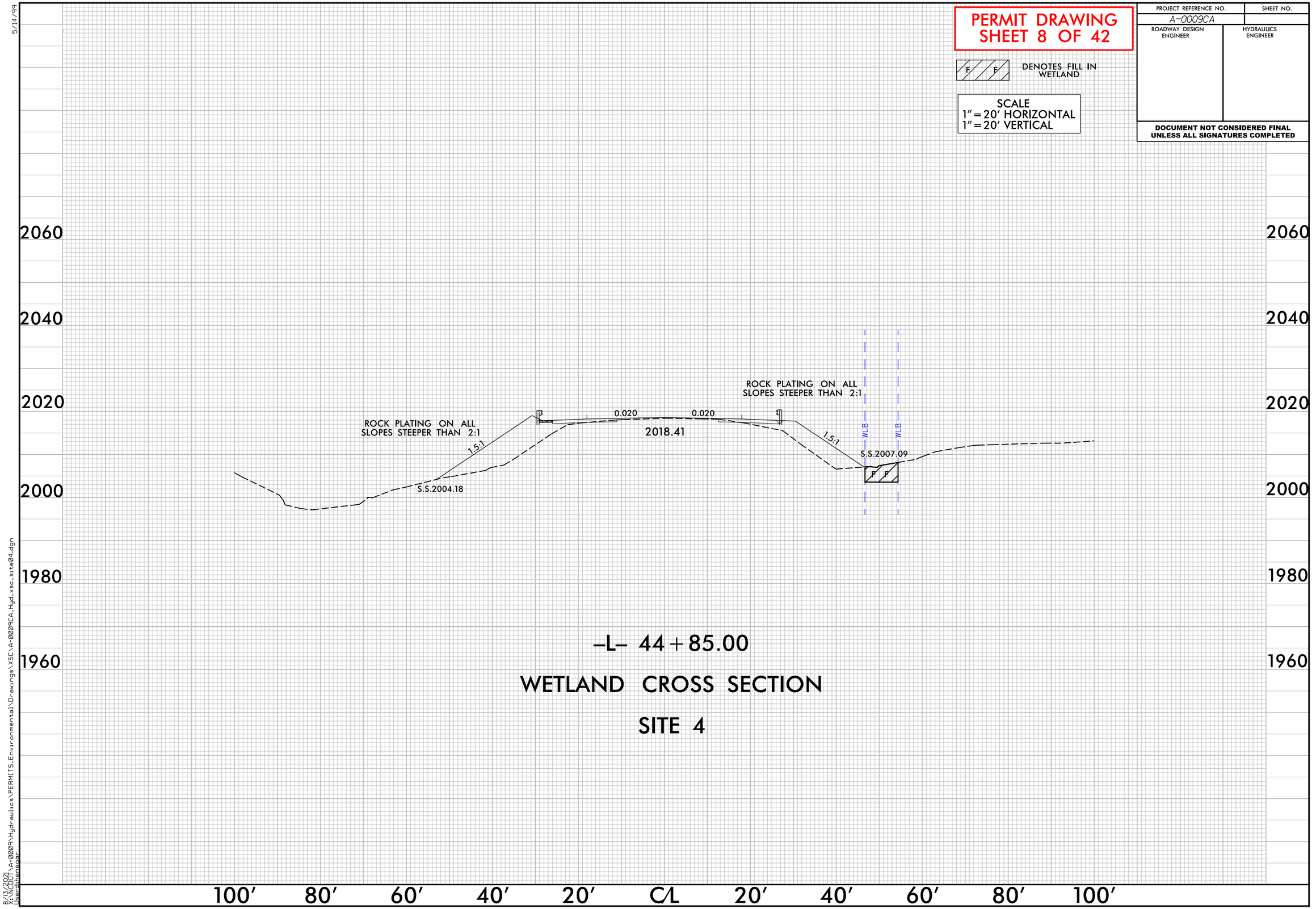
PERMIT DRAWING
SHEET 8 OF 42

F F DENOTES FILL IN WETLAND

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



–L– 44+85.00

WETLAND CROSS SECTION

SITE 4

8/13/2021
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User:jbenson

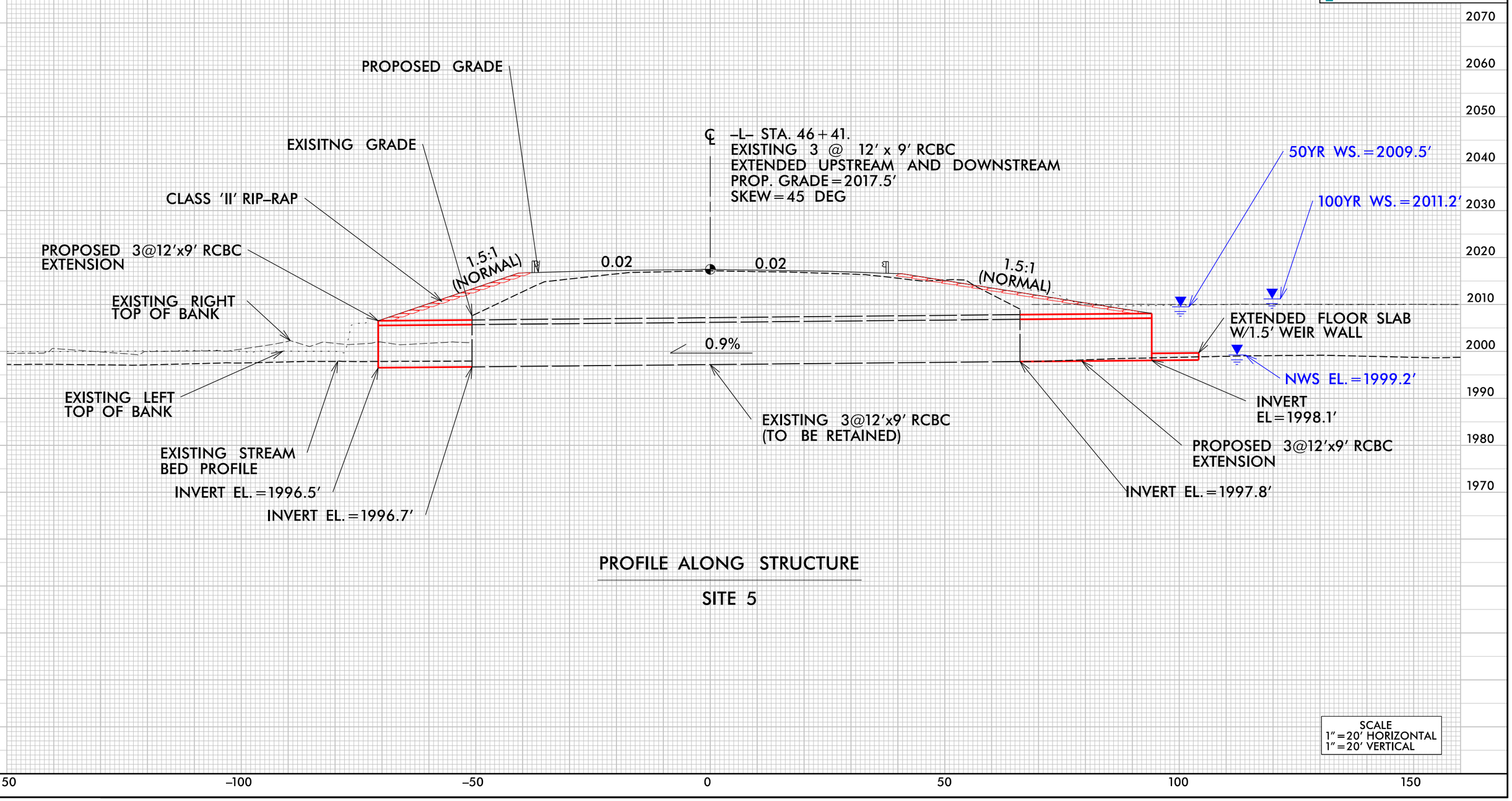
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 9 OF 42

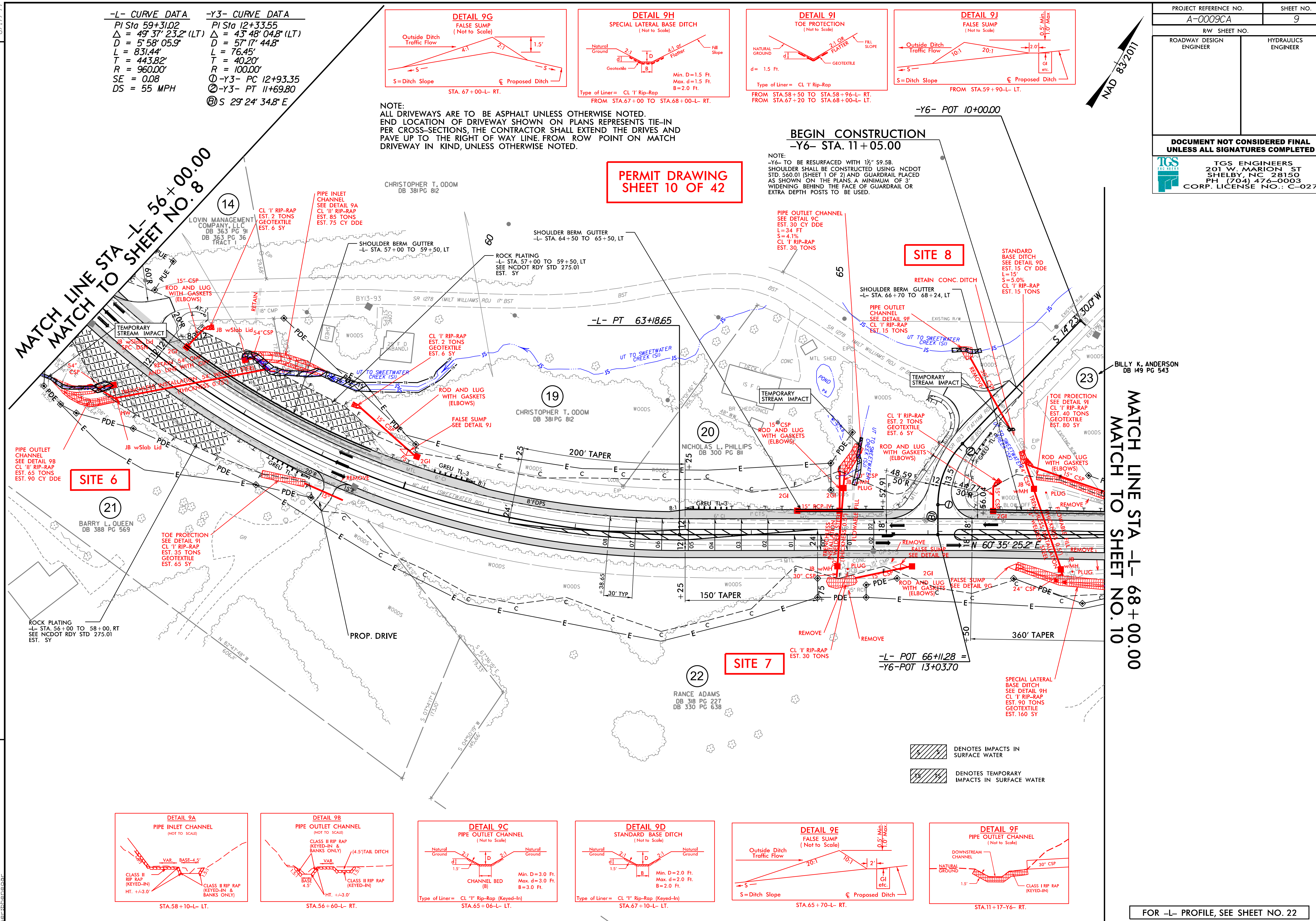
–L–
NC 143



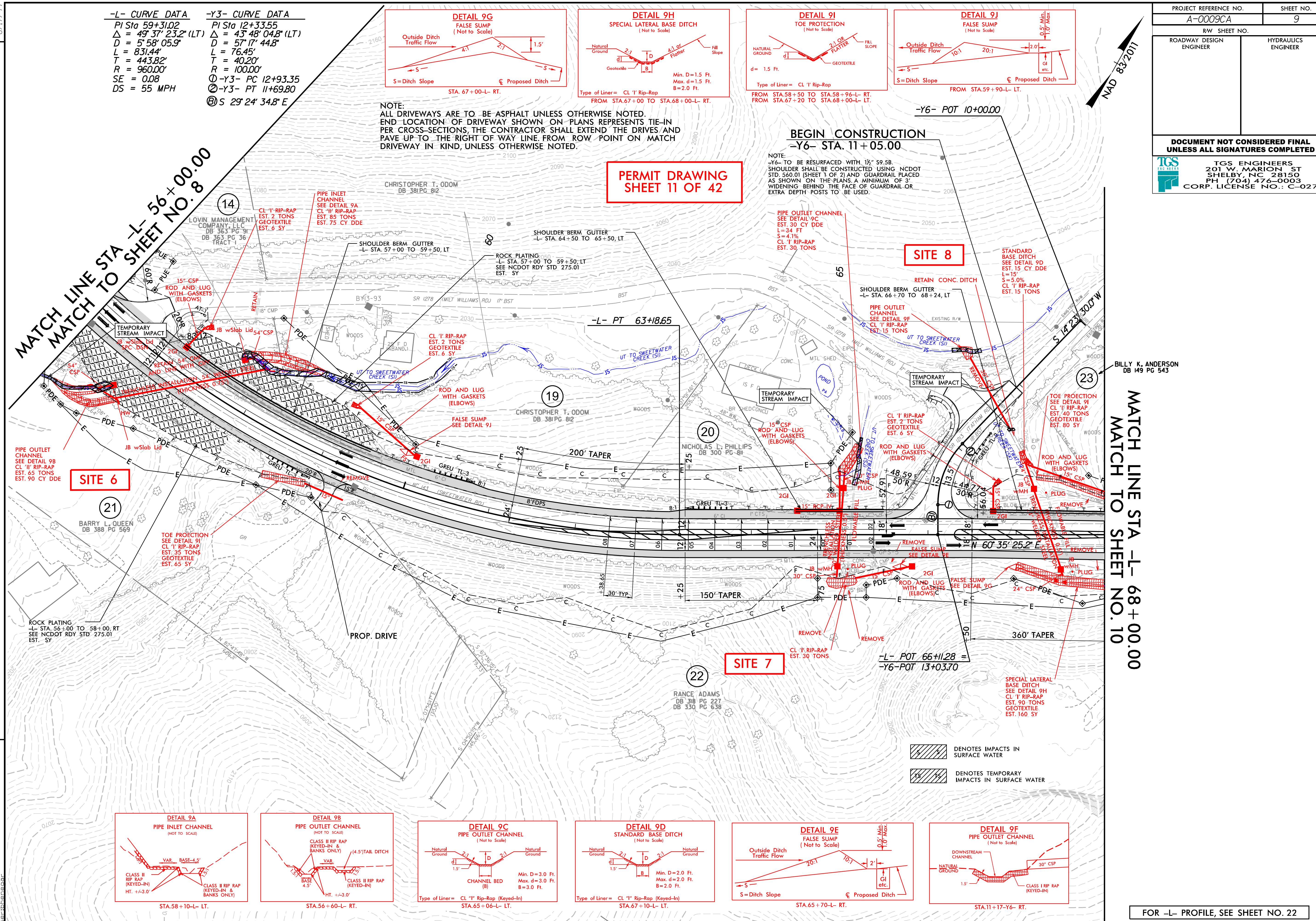
PROFILE ALONG STRUCTURE

SITE 5

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



PROJECT REFERENCE NO. A-0009CA
SHEET NO. 9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS 201 W. MARION ST SHELBY, NC 28150 PH (704) 476-0003 CORP. LICENSE NO.: C-0275
NAD 83/2011
-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH
-Y3- CURVE DATA
PI Sta 12+33.55
Δ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
(B1) S 29° 24' 34.8" E
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS. THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE, FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PERMIT DRAWING SHEET 10 OF 42
BEGIN CONSTRUCTION -Y6- STA. 11+05.00
NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B. SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.
-Y6- POT 10+00.00
MATCH LINE STA -L- 56+00.00 MATCH TO SHEET NO. 8
MATCH LINE STA -L- 68+00.00 MATCH TO SHEET NO. 10
DETAIL 9G FALSE SUMP (Not to Scale) STA. 67+00-L- RT.
DETAIL 9H SPECIAL LATERAL BASE DITCH (Not to Scale) FROM STA.67+00 TO STA.68+00-L- RT.
DETAIL 9I TOE PROTECTION (Not to Scale) FROM STA.58+50 TO STA.58+96-L- RT. FROM STA.67+20 TO STA.68+00-L- LT.
DETAIL 9J FALSE SUMP (Not to Scale) FROM STA.59+90-L- LT.
DETAIL 9A PIPE INLET CHANNEL STA.58+10-L- LT.
DETAIL 9B PIPE OUTLET CHANNEL STA.56+60-L- RT.
DETAIL 9C PIPE OUTLET CHANNEL STA.65+06-L- LT.
DETAIL 9D STANDARD BASE DITCH STA.67+10-L- LT.
DETAIL 9E FALSE SUMP STA.65+70-L- RT.
DETAIL 9F PIPE OUTLET CHANNEL STA.11+17-Y6- RT.
SITE 6
SITE 7
SITE 8
CHRISTOPHER T. ODOM DB 381 PG 812
LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1
BARRY L. QUEEN DB 388 PG 569
NICHOLAS L. PHILLIPS DB 300 PG 811
RANCE ADAMS DB 318 PG 227 DB 330 PG 638
BILLY K. ANDERSON DB 149 PG 543
-L- PT 63+18.65
-L- POT 66+11.28 = -Y6-POT 13+03.70
200' TAPER
150' TAPER
360' TAPER
PROP. DRIVE
ROCK PLATING -L- STA. 56+00 TO 58+00, RT SEE NCDOT RDY STD 275.01 EST. SY
ROCK PLATING -L- STA. 57+00 TO 59+50, LT SEE NCDOT RDY STD 275.01 EST. SY
SHOULDER BERM GUTTER -L- STA. 57+00 TO 59+50, LT
SHOULDER BERM GUTTER -L- STA. 64+50 TO 65+50, LT
SHOULDER BERM GUTTER -L- STA. 66+70 TO 68+24, LT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
FOR -L- PROFILE, SEE SHEET NO. 22
REVISIONS
8/17/99
8/13/2021



PROJECT REFERENCE NO.
SHEET NO.
A-0009CA
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
-L- CURVE DATA
PI Sta 59+31.02
Δ = 49° 37' 23.2" (LT)
D = 5° 58' 05.9"
L = 831.44'
T = 443.82'
R = 960.00'
SE = 0.08
DS = 55 MPH
-Y3- CURVE DATA
PI Sta 12+33.55
Δ = 43° 48' 04.8" (LT)
D = 57° 17' 44.8"
L = 76.45'
T = 40.20'
R = 100.00'
① -Y3- PC 12+93.35
② -Y3- PT 11+69.80
B1 S 29° 24' 34.8" E
DETAIL 9G
FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA. 67+00-L- RT.
DETAIL 9H
SPECIAL LATERAL BASE DITCH (Not to Scale)
Natural Ground
Geotextile
Fill Slope
4:1 or Flatter
Type of Liner= CL 'I' Rip-Rap
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
FROM STA.67+00 TO STA.68+00-L- RT.
DETAIL 9I
TOE PROTECTION (Not to Scale)
NATURAL GROUND
FILL SLOPE
GEOTEXTILE
d= 1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.58+50 TO STA.58+96-L- RT.
FROM STA.67+20 TO STA.68+00-L- LT.
DETAIL 9J
FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
FROM STA.59+90-L- LT.
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS. THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PERMIT DRAWING SHEET 11 OF 42
-Y6- POT 10+00.00
BEGIN CONSTRUCTION
-Y6- STA. 11+05.00
NOTE:
-Y6- TO BE RESURFACED WITH 1½" S9.5B.
SHOULDER SHALL BE CONSTRUCTED USING NCDOT STD. 560.01 (SHEET 1 OF 2) AND GUARDRAIL PLACED AS SHOWN ON THE PLANS. A MINIMUM OF 3' WIDENING BEHIND THE FACE OF GUARDRAIL OR EXTRA DEPTH POSTS TO BE USED.
MATCH LINE STA -L- 56+00.00
MATCH TO SHEET NO. 8
MATCH LINE STA -L- 68+00.00
MATCH TO SHEET NO. 10
CHRISTOPHER T. ODOM DB 381PG 812
LOVIN MANAGEMENT COMPANY, LLC DB 363 PG 91 DB 363 PG 36 TRACT 1
SHOULDER BERM GUTTER -L- STA. 57+00 TO 59+50, LT
SHOULDER BERM GUTTER -L- STA. 64+50 TO 65+50, LT
ROCK PLATING -L- STA. 57+00 TO 59+50, LT SEE NCDOT RDY STD 275.01 EST. SY
PIPE INLET CHANNEL SEE DETAIL 9A CL 'II' RIP-RAP EST. 85 TONS EST. 75 CY DDE
CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY
SITE 8
SITE 6
SITE 7
STANDARD BASE DITCH SEE DETAIL 9D EST. 15 CY DDE L=15' S=5.0% CL 'I' RIP-RAP EST. 15 TONS
RETAIN CONC. DITCH
SHOULDER BERM GUTTER -L- STA. 66+70 TO 68+24, LT
PIPE OUTLET CHANNEL SEE DETAIL 9C EST. 30 CY DDE L=34 FT S=4.1% CL 'I' RIP-RAP EST. 30 TONS
PIPE OUTLET CHANNEL SEE DETAIL 9F CL 'I' RIP-RAP EST. 15 TONS
-L- PT 63+18.65
UT TO SWEETWATER CREEK (SI)
TEMPORARY STREAM IMPACT
CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY
ROD AND LUG WITH GASKETS (ELBOWS)
FALSE SUMP SEE DETAIL 9J
CHRISTOPHER T. ODOM DB 381PG 812
NICHOLAS L. PHILLIPS DB 300 PG 811
BILLY K. ANDERSON DB 149 PG 543
TOE PROTECTION SEE DETAIL 9I CL 'I' RIP-RAP EST. 40 TONS GEOTEXTILE EST. 80 SY
PIPE OUTLET CHANNEL SEE DETAIL 9B CL 'II' RIP-RAP EST. 65 TONS EST. 90 CY DDE
BARRY L. QUEEN DB 388 PG 569
TOE PROTECTION SEE DETAIL 9I CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY
200' TAPER
150' TAPER
360' TAPER
N 60° 35' 25.2" E
S 14° 23' 30.0" W
ROCK PLATING -L- STA. 56+00 TO 58+00, RT SEE NCDOT RDY STD 275.01 EST. SY
PROP. DRIVE
REMOVE
CL 'I' RIP-RAP EST. 30 TONS
-L- POT 66+11.28 = -Y6-POT 13+03.70
RANCE ADAMS DB 318 PG 227 DB 330 PG 638
SPECIAL LATERAL BASE DITCH SEE DETAIL 9H CL 'I' RIP-RAP EST. 90 TONS GEOTEXTILE EST. 160 SY
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 9A
PIPE INLET CHANNEL (NOT TO SCALE)
STA.58+10-L- LT.
DETAIL 9B
PIPE OUTLET CHANNEL (NOT TO SCALE)
STA.56+60-L- RT.
DETAIL 9C
PIPE OUTLET CHANNEL (Not to Scale)
Min. D=3.0 Ft. Max. d=3.0 Ft. B=3.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.65+06-L- LT.
DETAIL 9D
STANDARD BASE DITCH (Not to Scale)
Min. D=2.0 Ft. Max. d=2.0 Ft. B=2.0 Ft.
Type of Liner= CL "I" Rip-Rap (Keyed-In)
STA.67+10-L- LT.
DETAIL 9E
FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
℄ Proposed Ditch
STA.65+70-L- RT.
DETAIL 9F
PIPE OUTLET CHANNEL (Not to Scale)
STA.11+17-Y6- RT.
FOR -L- PROFILE, SEE SHEET NO. 22
REVISIONS
8/17/99
8/13/2021

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

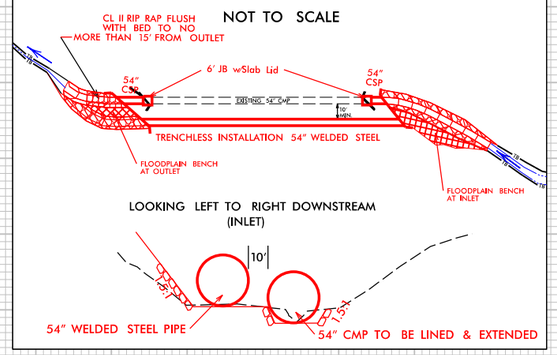
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 12 OF 42

–L–
NC 143

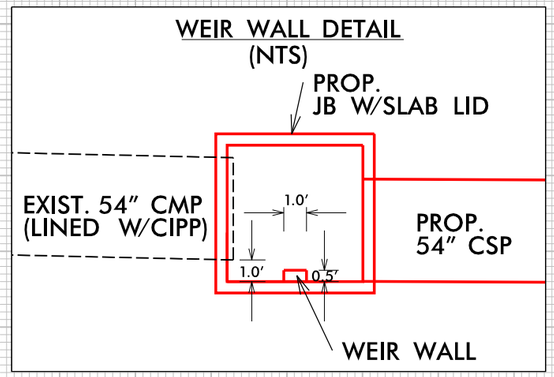
CULVERT DETAIL

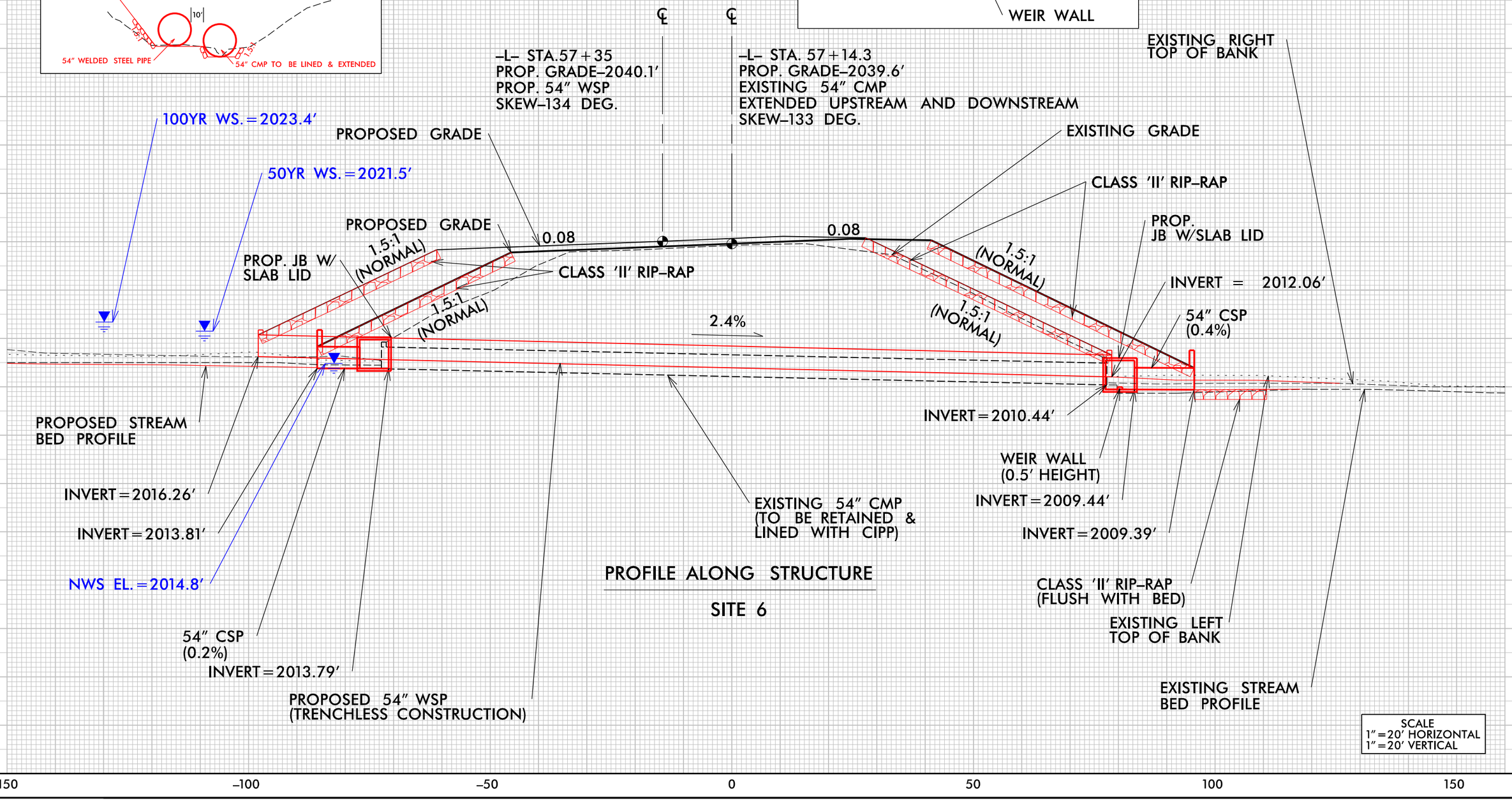
NOT TO SCALE



WEIR WALL DETAIL

(NTS)

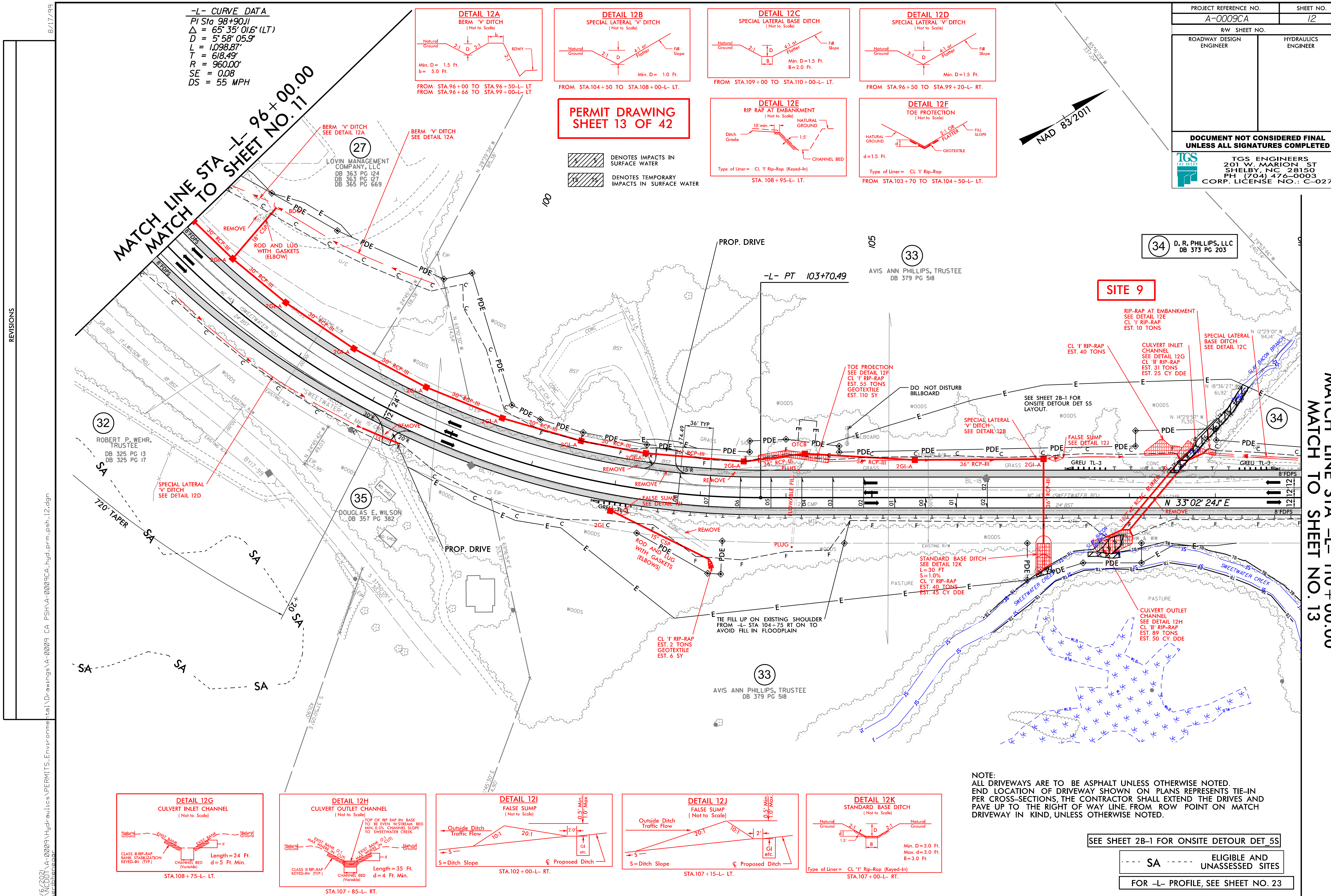




PROFILE ALONG STRUCTURE

SITE 6

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


PROJECT REFERENCE NO. A-0009CA
SHEET NO. 12
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
-L- CURVE DATA
PI Sta 98+90.11
Δ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH
MATCH LINE STA -L- 96+00.00
MATCH TO SHEET NO. 11
MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 13
PERMIT DRAWING
SHEET 13 OF 42
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
DETAIL 12A
BERM 'V' DITCH
(Not to Scale)
Min. D= 1.5 Ft.
b= 5.0 Ft.
FROM STA.96+00 TO STA.96+50-L- LT
FROM STA.96+66 TO STA.99+00-L- LT
DETAIL 12B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D= 1.0 Ft.
FROM STA.104+50 TO STA.108+00-L- LT.
DETAIL 12C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.109+00 TO STA.110+00-L- LT.
DETAIL 12D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
FROM STA.96+50 TO STA.99+20-L- RT.
DETAIL 12E
RIP RAP AT EMBANKMENT
(Not to Scale)
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 108+95-L- LT.
DETAIL 12F
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.103+70 TO STA.104+50-L- LT.
27
LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 124
DB 363 PG 127
DB 365 PG 669
BERM 'V' DITCH SEE DETAIL 12A
PROP. DRIVE
-L- PT 103+70.49
33
AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518
34
D. R. PHILLIPS, LLC
DB 373 PG 203
SITE 9
RIP-RAP AT EMBANKMENT SEE DETAIL 12E CL 'I' RIP-RAP EST. 10 TONS
CL 'I' RIP-RAP EST. 40 TONS
CULVERT INLET CHANNEL SEE DETAIL 12G CL 'II' RIP-RAP EST. 31 TONS EST. 25 CY DDE
SPECIAL LATERAL BASE DITCH SEE DETAIL 12C
TOE PROECTION SEE DETAIL 12F CL 'I' RIP-RAP EST. 55 TONS GEOTEXTILE EST. 110 SY
DO NOT DISTURB BILLBOARD
SEE SHEET 2B-1 FOR ONSITE DETOUR DET 5S LAYOUT.
SPECIAL LATERAL 'V' DITCH SEE DETAIL 12B
FALSE SUMP SEE DETAIL 12J
32
ROBERT P. WEHR, TRUSTEE
DB 325 PG 13
DB 325 PG 17
SPECIAL LATERAL 'V' DITCH SEE DETAIL 12D
35
DOUGLAS E. WILSON
DB 357 PG 382
720' TAPER
FALSE SUMP SEE DETAIL 12I
ROD AND LUG WITH GASKETS (ELBOWS)
CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY
TIE FILL UP ON EXISTING SHOULDER FROM -L- STA 104+75 RT ON TO AVOID FILL IN FLOODPLAIN
STANDARD BASE DITCH SEE DETAIL 12K L=30 FT S=1.0% CL 'I' RIP-RAP EST. 40 TONS EST. 45 CY DDE
CULVERT OUTLET CHANNEL SEE DETAIL 12H CL 'II' RIP-RAP EST. 89 TONS EST. 50 CY DDE
N 33° 02' 24.1" E
SWEETWATER CREEK
DETAIL 12G
CULVERT INLET CHANNEL
(Not to Scale)
Length=24 Ft.
d=5 Ft. Min.
STA.108+75-L- LT.
DETAIL 12H
CULVERT OUTLET CHANNEL
(Not to Scale)
Length=35 Ft.
d=4 Ft. Min.
STA.107+85-L- RT.
DETAIL 12I
FALSE SUMP
(Not to Scale)
STA.102+00-L- RT.
DETAIL 12J
FALSE SUMP
(Not to Scale)
STA.107+15-L- LT.
DETAIL 12K
STANDARD BASE DITCH
(Not to Scale)
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA.107+00-L- RT.
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
SEE SHEET 2B-1 FOR ONSITE DETOUR DET 5S
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 23
REVISIONS
8/17/99
10/6/2021

-L- CURVE DATA
PI Sta 98+90.11
Δ = 65° 35' 01.6" (LT)
D = 5° 58' 05.9"
L = 1,098.87'
T = 618.49'
R = 960.00'
SE = 0.08
DS = 55 MPH

MATCH LINE STA -L- 96+00.00
MATCH TO SHEET NO. 11

MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 13

PERMIT DRAWING
SHEET 14 OF 42

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

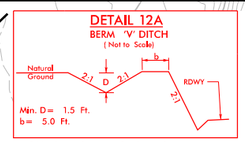
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99

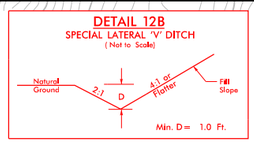
10/6/2021
K:\TPD\2021\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_12_con.dgn
User:bbenegar

DETAIL 12A
BERM 'V' DITCH
(Not to Scale)



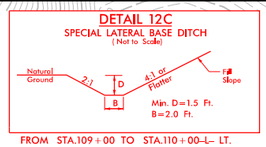
FROM STA.96+00 TO STA.96+50-L- LT
FROM STA.96+66 TO STA.99+00-L- LT

DETAIL 12B
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



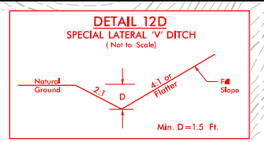
FROM STA.104+50 TO STA.108+00-L- LT.

DETAIL 12C
SPECIAL LATERAL BASE DITCH
(Not to Scale)



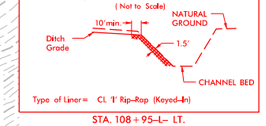
FROM STA.109+00 TO STA.110+00-L- LT.

DETAIL 12D
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



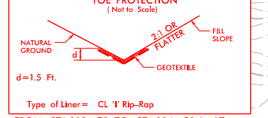
FROM STA.96+50 TO STA.99+20-L- RT.

DETAIL 12E
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 108+95-L- LT.

DETAIL 12F
TOE PROTECTION
(Not to Scale)



d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.103+70 TO STA.104+50-L- LT.

SITE 9

(27) LOVIN MANAGEMENT COMPANY, LLC
DB 363 PG 124
DB 363 PG 127
DB 365 PG 669

(32) ROBERT P. WEHR, TRUSTEE
DB 325 PG 13
DB 325 PG 17

(35) DOUGLAS E. WILSON
DB 357 PG 382

(33) AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518

(34) D. R. PHILLIPS, LLC
DB 373 PG 203

PROP. DRIVE

-L- PT 103+70.49

BERM 'V' DITCH SEE DETAIL 12A

REMOVE

18" CSP

ROD AND LUG WITH GASKETS (ELBOWS)

30" RCP-III

2GI-A

2GI-C

8'FDPS

SPECIAL LATERAL 'V' DITCH SEE DETAIL 12D

720' TAPER

SA

TOE PROECTION SEE DETAIL 12F
CL 'I' RIP-RAP EST. 55 TONS
GEOTEXTILE EST. 110 SY

DO NOT DISTURB BILLBOARD

SEE SHEET 2B-1 FOR ONSITE DETOUR DET S5 LAYOUT.

RIP-RAP AT EMBANKMENT SEE DETAIL 12E
CL 'I' RIP-RAP EST. 10 TONS

CL 'I' RIP-RAP EST. 40 TONS

CULVERT INLET CHANNEL SEE DETAIL 12G
CL 'II' RIP-RAP EST. 31 TONS
EST. 25 CY DDE

SPECIAL LATERAL BASE DITCH SEE DETAIL 12C

SPECIAL LATERAL 'V' DITCH- SEE DETAIL 12B

FALSE SUMP SEE DETAIL 12J

36" RCP-III

GREU TL-3

SLAY BACON BRANCH

CULVERT OUTLET CHANNEL SEE DETAIL 12H
CL 'II' RIP-RAP EST. 89 TONS
EST. 50 CY DDE

STANDARD BASE DITCH SEE DETAIL 12K
L=30 FT
S=1.0%
CL 'I' RIP-RAP EST. 40 TONS
EST. 45 CY DDE

TIE FILL UP ON EXISTING SHOULDER FROM -L- STA 104+75 RT ON TO AVOID FILL IN FLOODPLAIN

CL 'I' RIP-RAP EST. 2 TONS GEOTEXTILE EST. 6 SY

PLUG

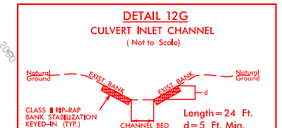
WOODS

PASTURE

SWEETWATER CREEK

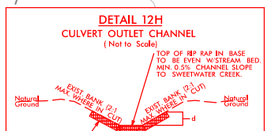
N 33° 02' 24.1" E

DETAIL 12G
CULVERT INLET CHANNEL
(Not to Scale)



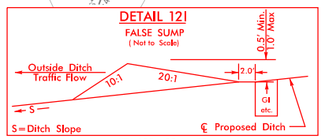
Length = 24 Ft.
d = 5 Ft. Min.
STA.108+75-L- LT.

DETAIL 12H
CULVERT OUTLET CHANNEL
(Not to Scale)



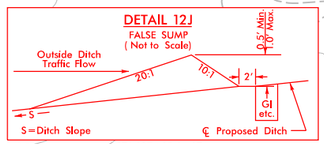
Length = 35 Ft.
d = 4 Ft. Min.
STA.107+85-L- RT.

DETAIL 12I
FALSE SUMP
(Not to Scale)



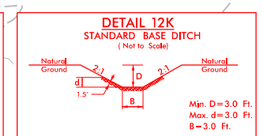
S=Ditch Slope
℄ Proposed Ditch
STA.102+00-L- RT.

DETAIL 12J
FALSE SUMP
(Not to Scale)



S=Ditch Slope
℄ Proposed Ditch
STA.107+15-L- LT.

DETAIL 12K
STANDARD BASE DITCH
(Not to Scale)



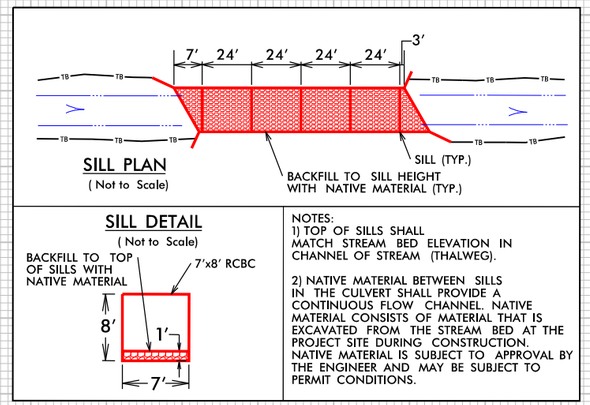
Min. D=3.0 Ft.
Max. d=3.0 Ft.
B=3.0 Ft.
Type of Liner- CL 'I' Rip-Rap (Keyed-In)
STA.107+00-L- RT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 23



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

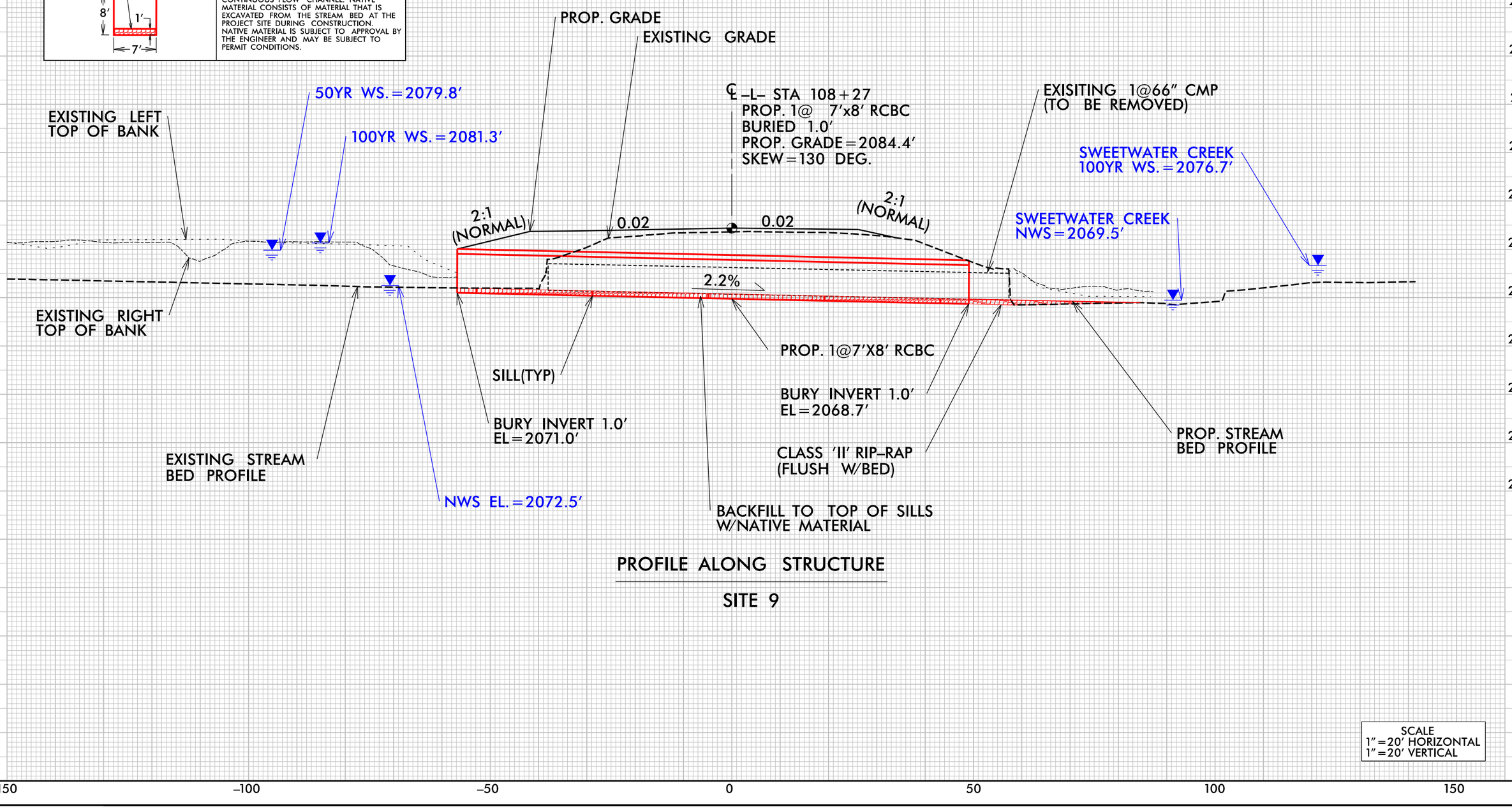
–L–
NC 143

PERMIT DRAWING
SHEET 15 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



PROFILE ALONG STRUCTURE

SITE 9

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

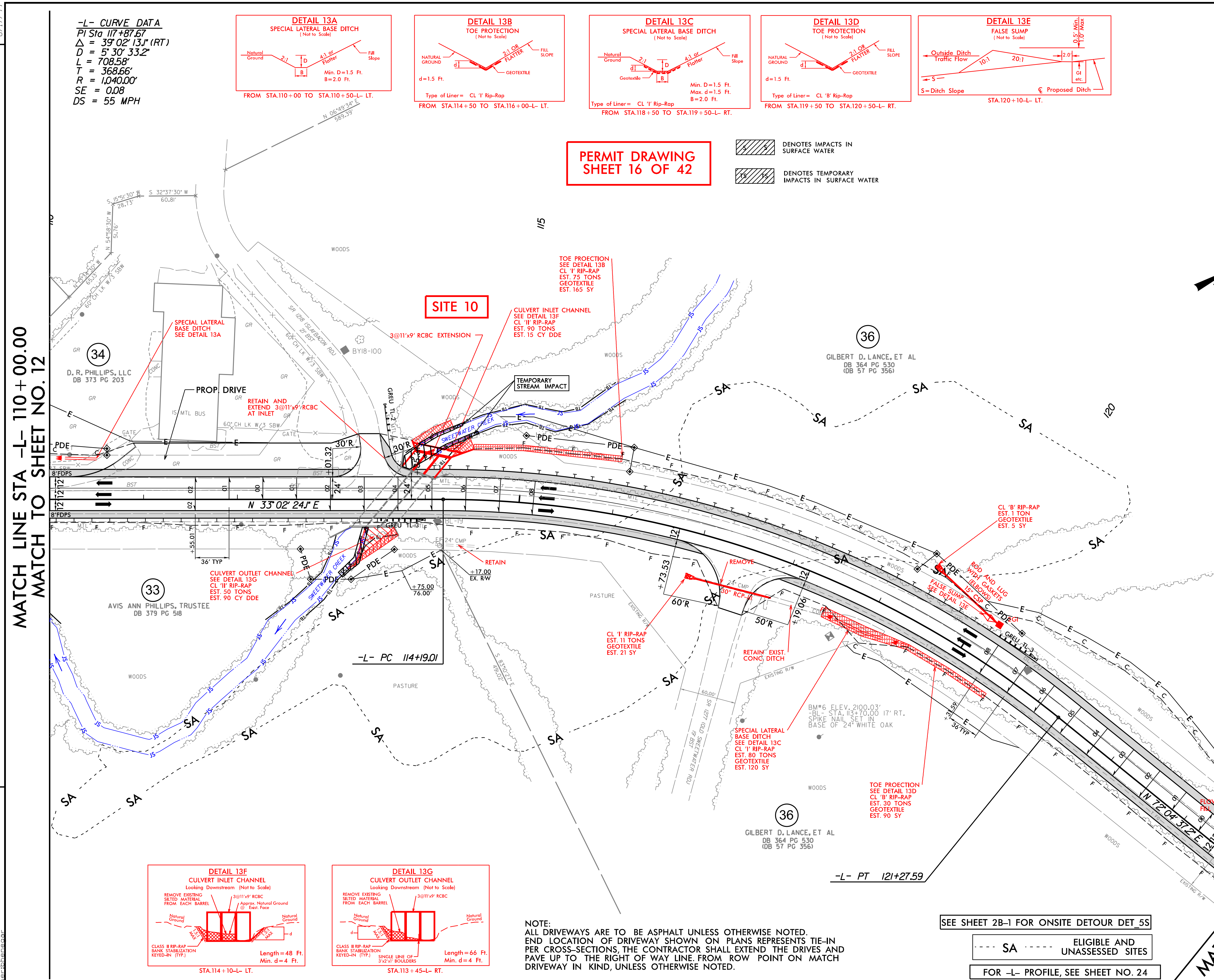
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	13

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275


-L- CURVE DATA
PI Sta 117+87.67
Δ = 39° 02' 13.1" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH
DETAIL 13A
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
B=2.0 Ft.
FROM STA.110+00 TO STA.110+50-L- LT.
DETAIL 13B
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.114+50 TO STA.116+00-L- LT.
DETAIL 13C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.118+50 TO STA.119+50-L- RT.
DETAIL 13D
TOE PROTECTION
(Not to Scale)
d=1.5 Ft.
Type of Liner= CL 'B' Rip-Rap
FROM STA.119+50 TO STA.120+50-L- RT.
DETAIL 13E
FALSE SUMP
(Not to Scale)
S=Ditch Slope
Proposed Ditch
STA.120+10-L- LT.
PERMIT DRAWING
SHEET 16 OF 42
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
SITE 10
TOE PROECTION
SEE DETAIL 13B
CL 'I' RIP-RAP
EST. 75 TONS
GEOTEXTILE
EST. 165 SY
CULVERT INLET CHANNEL
SEE DETAIL 13F
CL 'II' RIP-RAP
EST. 90 TONS
EST. 15 CY DDE
3@11'x9' RCBC EXTENSION
TEMPORARY STREAM IMPACT
SPECIAL LATERAL BASE DITCH
SEE DETAIL 13A
RETAIN AND EXTEND 3@11'x9' RCBC AT INLET
PROP. DRIVE
D. R. PHILLIPS, LLC
DB 373 PG 203
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)
AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518
N 33° 02' 24.1" E
CULVERT OUTLET CHANNEL
SEE DETAIL 13G
CL 'II' RIP-RAP
EST. 50 TONS
EST. 90 CY DDE
SWEETWATER CREEK
-L- PC 114+19.01
CL 'I' RIP-RAP
EST. 11 TONS
GEOTEXTILE
EST. 21 SY
REMOVE
RETAIN
RETAIN EXIST. CONC. DITCH
CL 'B' RIP-RAP
EST. 1 TON
GEOTEXTILE
EST. 5 SY
ROD AND LUG WITH GASKETS (ELBOWS)
FALSE SUMP SEE DETAIL 13E
BM#6 ELEV. 2100.03'
-BL- STA. 113+70.00 17' RT.
SPIKE NAIL SET IN BASE OF 24" WHITE OAK
SPECIAL LATERAL BASE DITCH
SEE DETAIL 13C
CL 'I' RIP-RAP
EST. 80 TONS
GEOTEXTILE
EST. 120 SY
TOE PROECTION
SEE DETAIL 13D
CL 'B' RIP-RAP
EST. 30 TONS
GEOTEXTILE
EST. 90 SY
N 72° 04' 37.2" E
FLOWABLE FILL
PLUG
-L- PT 121+27.59
WOODS
PASTURE
MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 12
MATCH LINE STA -L- 124+00.00
MATCH TO SHEET NO. 14
DETAIL 13F
CULVERT INLET CHANNEL
Looking Downstream (Not to Scale)
Length=48 Ft.
Min. d=4 Ft.
STA.114+10-L- LT.
DETAIL 13G
CULVERT OUTLET CHANNEL
Looking Downstream (Not to Scale)
Length=66 Ft.
Min. d=4 Ft.
STA.113+45-L- RT.
REVISIONS

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S

SA — ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 24

8/17/99
8/13/2021
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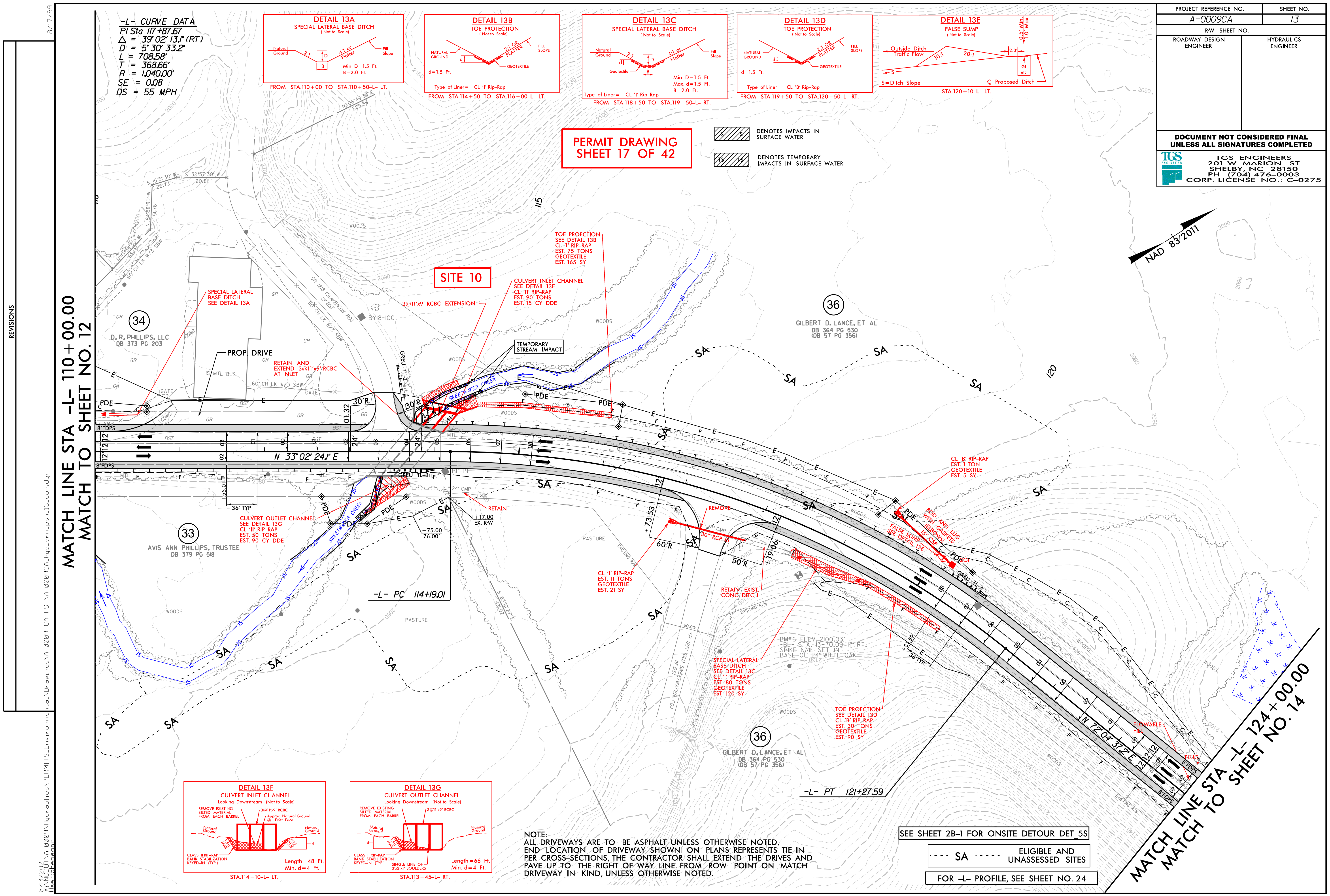

PROJECT REFERENCE NO.
SHEET NO.
A-0009CA
13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING SHEET 17 OF 42
SITE 10
-L- CURVE DATA
PI Sta 117+87.67
Δ = 39° 02' 13.1" (RT)
D = 5° 30' 33.2"
L = 708.58'
T = 368.66'
R = 1,040.00'
SE = 0.08
DS = 55 MPH
DETAIL 13A
SPECIAL LATERAL BASE DITCH
FROM STA.110+00 TO STA.110+50-L- LT.
DETAIL 13B
TOE PROTECTION
FROM STA.114+50 TO STA.116+00-L- LT.
DETAIL 13C
SPECIAL LATERAL BASE DITCH
FROM STA.118+50 TO STA.119+50-L- RT.
DETAIL 13D
TOE PROTECTION
FROM STA.119+50 TO STA.120+50-L- RT.
DETAIL 13E
FALSE SUMP
STA.120+10-L- LT.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
MATCH LINE STA -L- 110+00.00
MATCH TO SHEET NO. 12
MATCH LINE STA -L- 124+00.00
MATCH TO SHEET NO. 14
D. R. PHILLIPS, LLC
DB 373 PG 203
AVIS ANN PHILLIPS, TRUSTEE
DB 379 PG 518
GILBERT D. LANCE, ET AL
DB 364 PG 530
(DB 57 PG 356)
SWEETWATER CREEK
TEMPORARY STREAM IMPACT
-L- PC 114+19.01
-L- PT 121+27.59
DETAIL 13F
CULVERT INLET CHANNEL
STA.114+10-L- LT.
DETAIL 13G
CULVERT OUTLET CHANNEL
STA.113+45-L- RT.
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
SEE SHEET 2B-1 FOR ONSITE DETOUR DET_5S
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 24
REVISIONS
8/13/2021

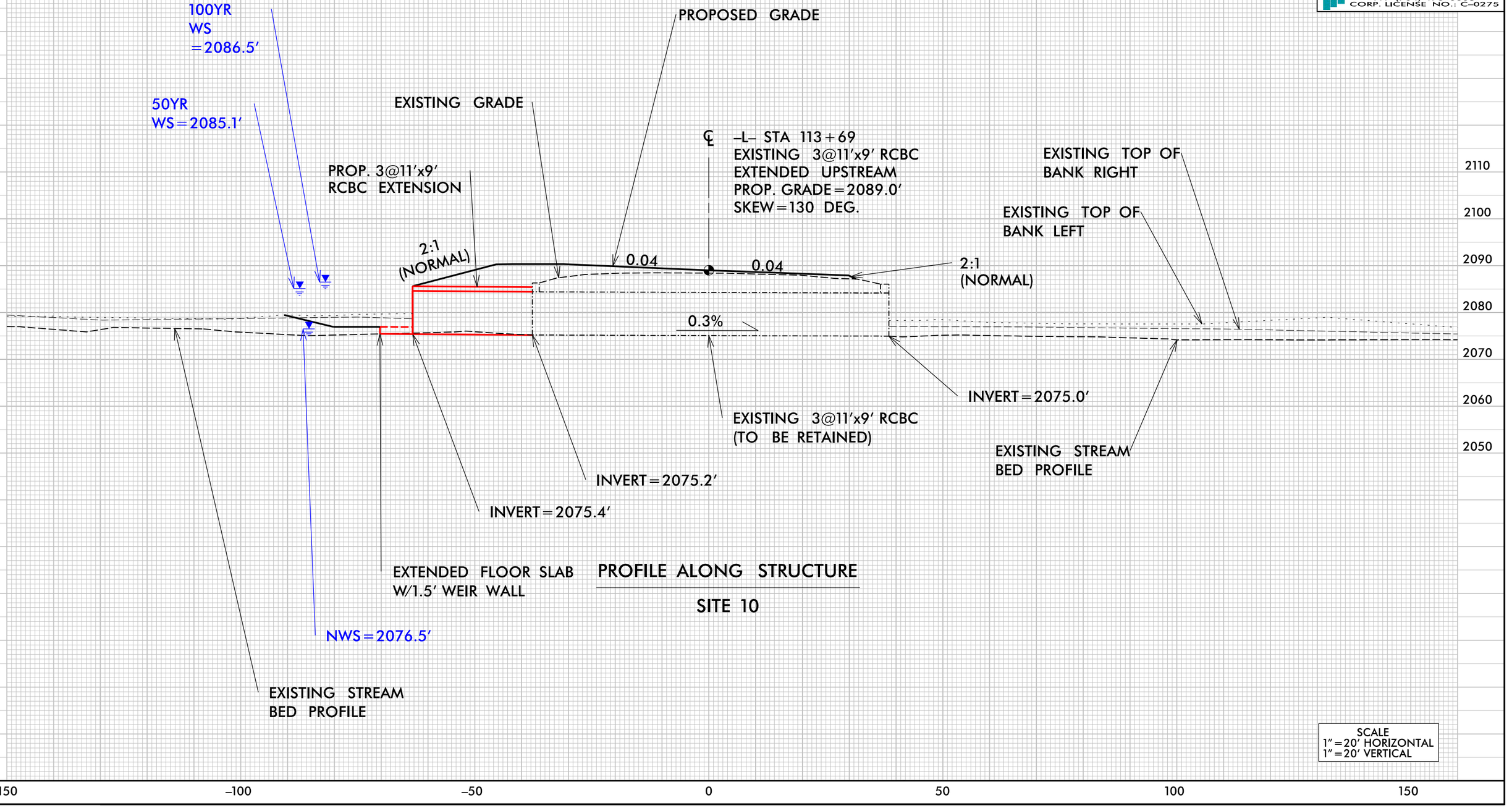
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 18 OF 42

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 10

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

8/17/99

REVISIONS

MATCH LINE STA –L– 124+00.00
MATCH TO SHEET NO. 13

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

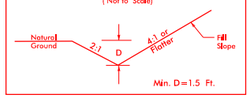
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

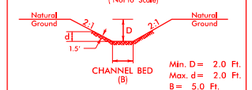
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 14A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



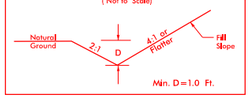
FROM STA.127+00 TO STA.127+25–L– LT.
FROM STA.127+80 TO STA.128+00–L– LT.

DETAIL 14B
PIPE OUTLET CHANNEL
(Not to Scale)



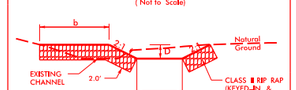
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 129+13–L– LT.

DETAIL 14C
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



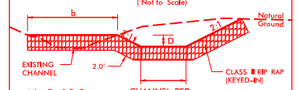
FROM STA.129+50 TO STA.130+70–L– LT.
FROM STA.131+50 TO STA.132+00–L– LT.
FROM STA.130+00 TO STA.131+00–L– RT.

DETAIL 14D
PIPE INLET CHANNEL
(Not to Scale)



STA.135+20–L– RT.

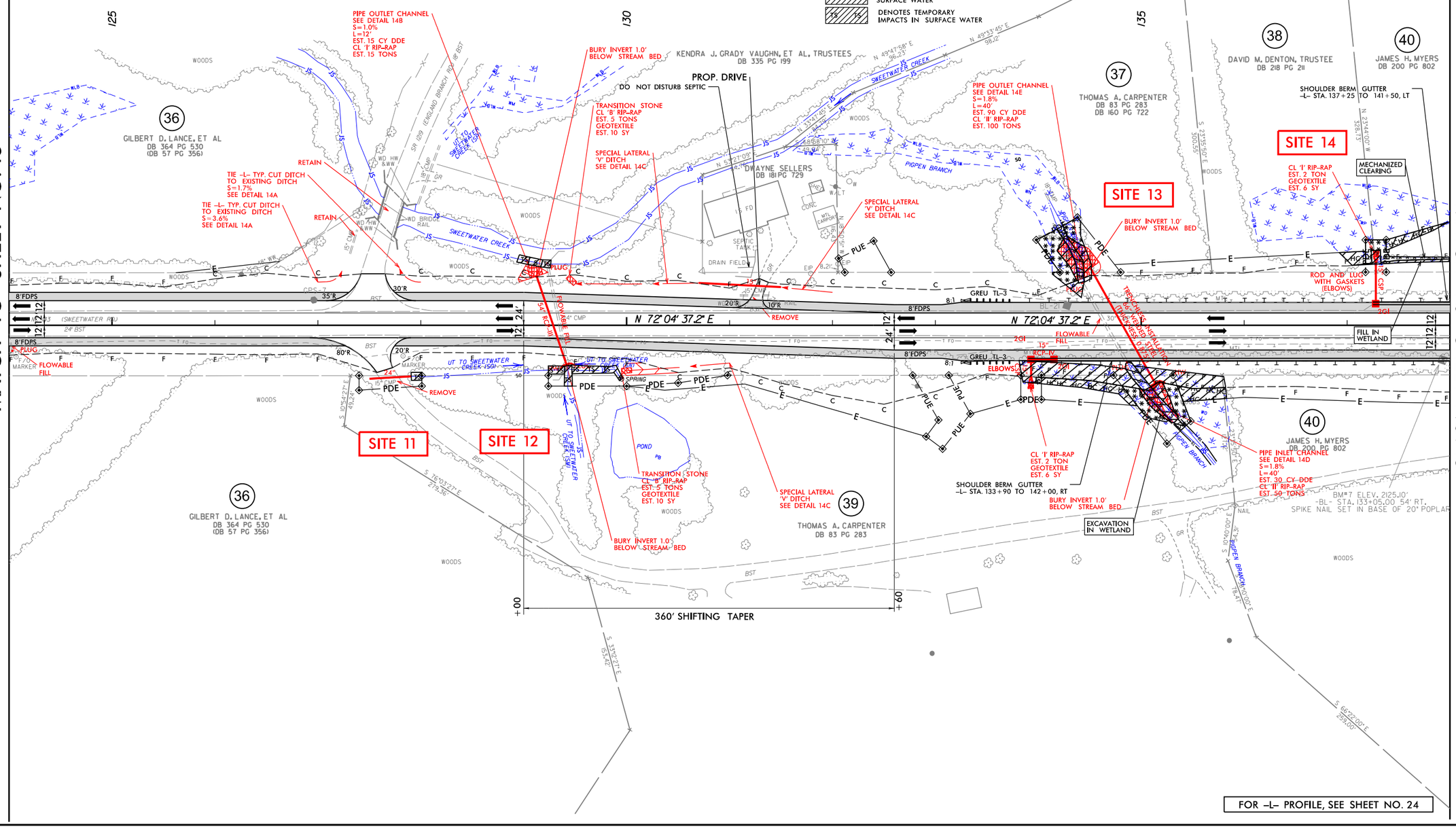
DETAIL 14E
PIPE OUTLET CHANNEL
(Not to Scale)



STA.134+40–L– LT.

PERMIT DRAWING SHEET 19 OF 42

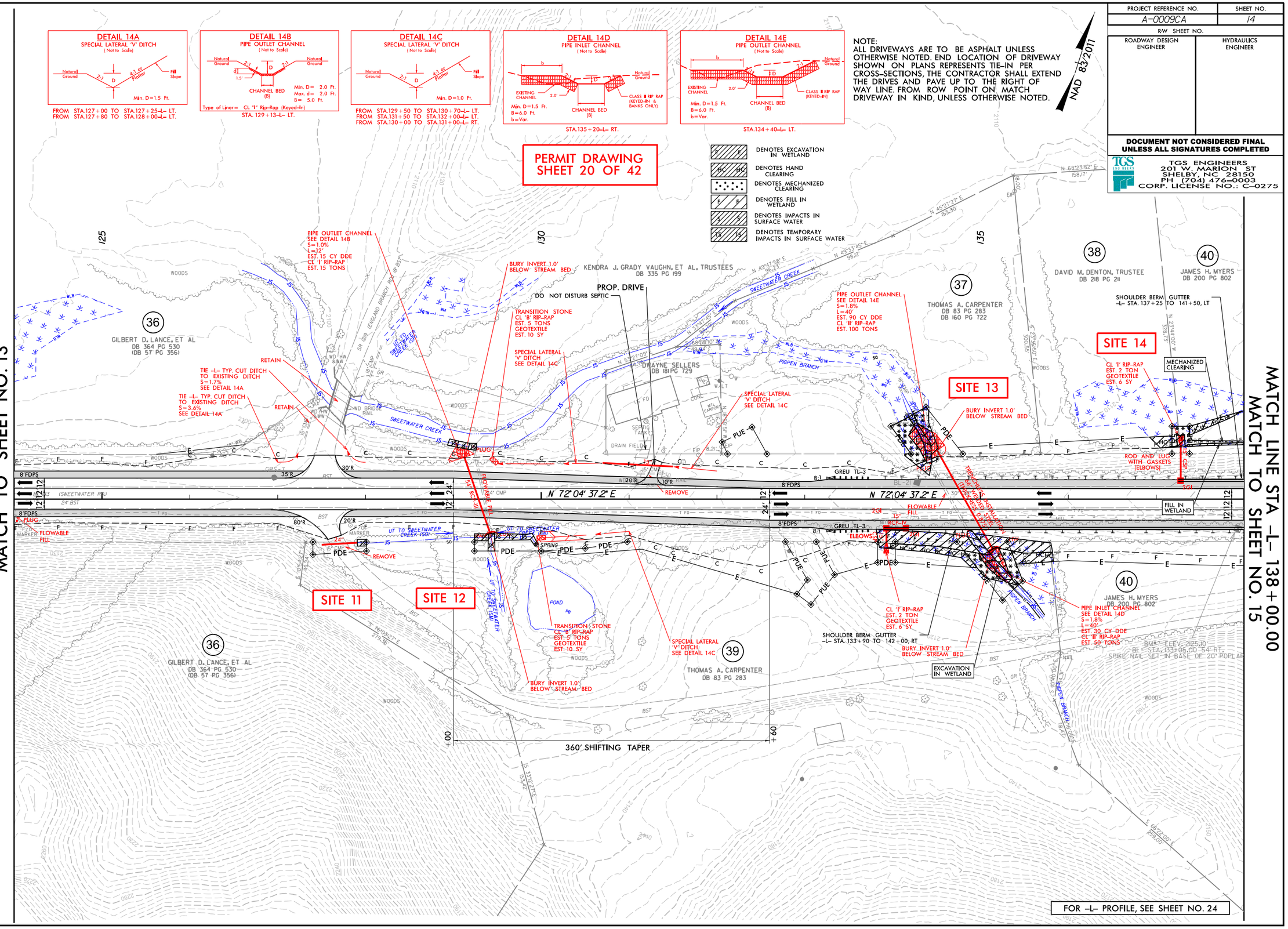
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES MECHANIZED CLEARING
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER



FOR –L– PROFILE, SEE SHEET NO. 24

10/6/2021
X:\6000\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_14.dgn
Usersbhenegar

MATCH LINE STA –L– 124+00.00
MATCH TO SHEET NO. 13



MATCH LINE STA –L– 138+00.00
MATCH TO SHEET NO. 15

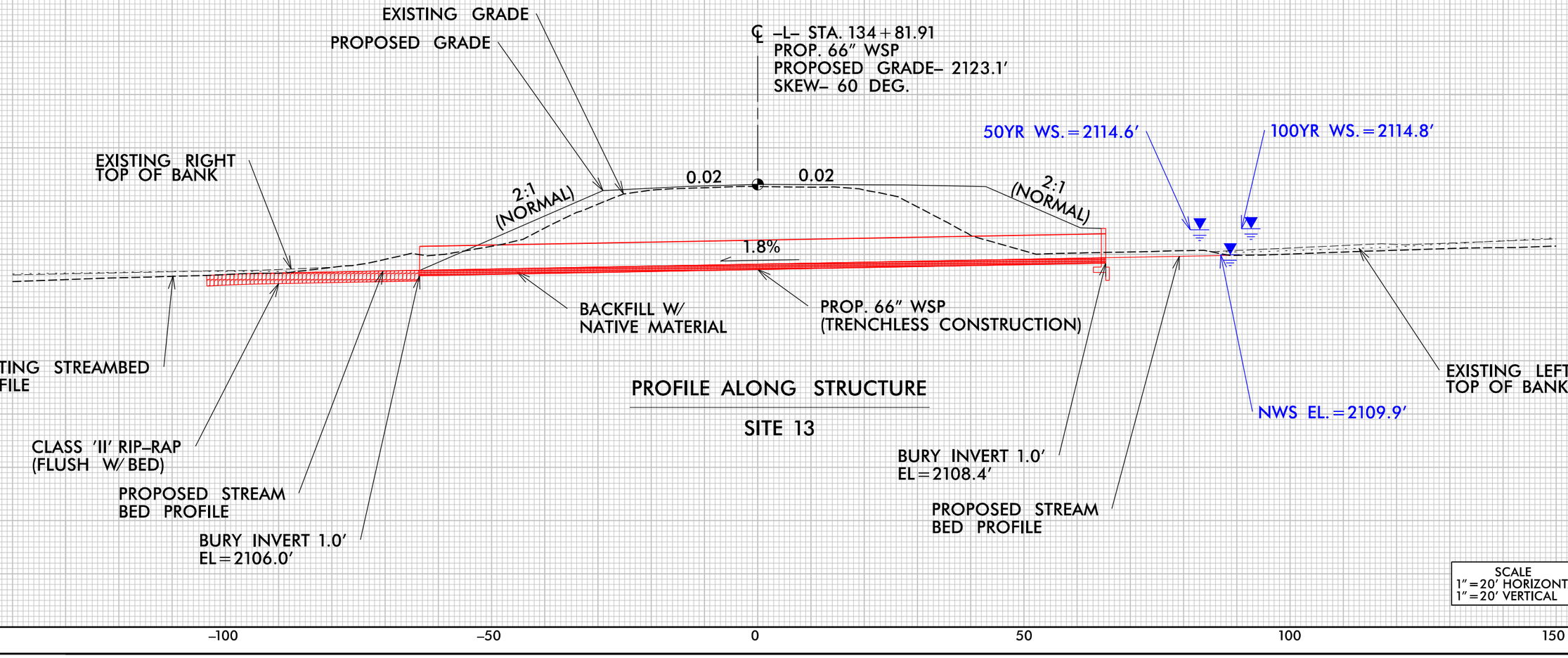
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 21 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 13

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

5/14/99

PERMIT DRAWING
SHEET 22 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

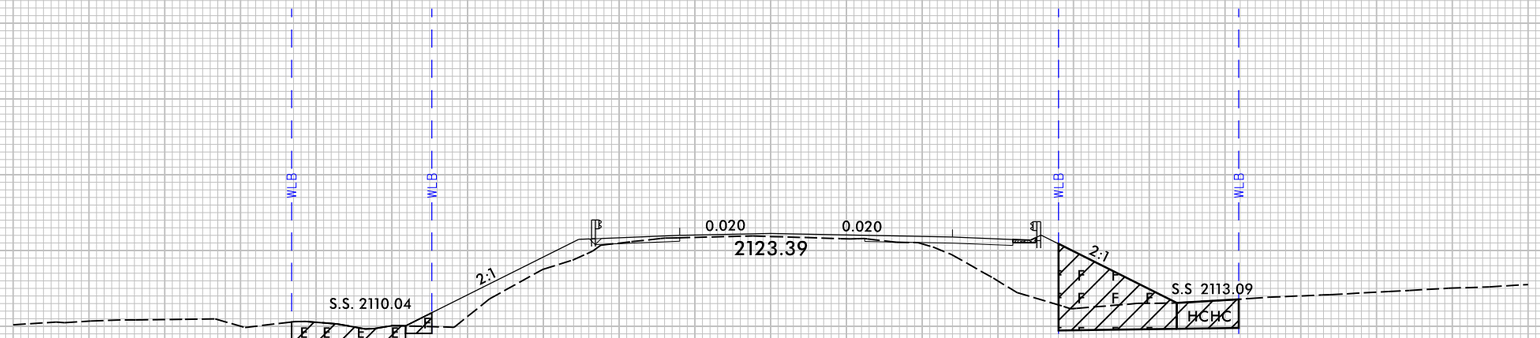
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

HC HC DENOTES HAND CLEARING

SCALE
1″ = 20′ HORIZONTAL
1″ = 20′ VERTICAL



–L– 134 + 50.00

WETLAND CROSS SECTION

SITE 13

100′ 80′ 60′ 40′ 20′ C/L 20′ 40′ 60′ 80′ 100′

8/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\XSC\A-0009CA_Hyd_xsc_site13.dgn
User:bbenson

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

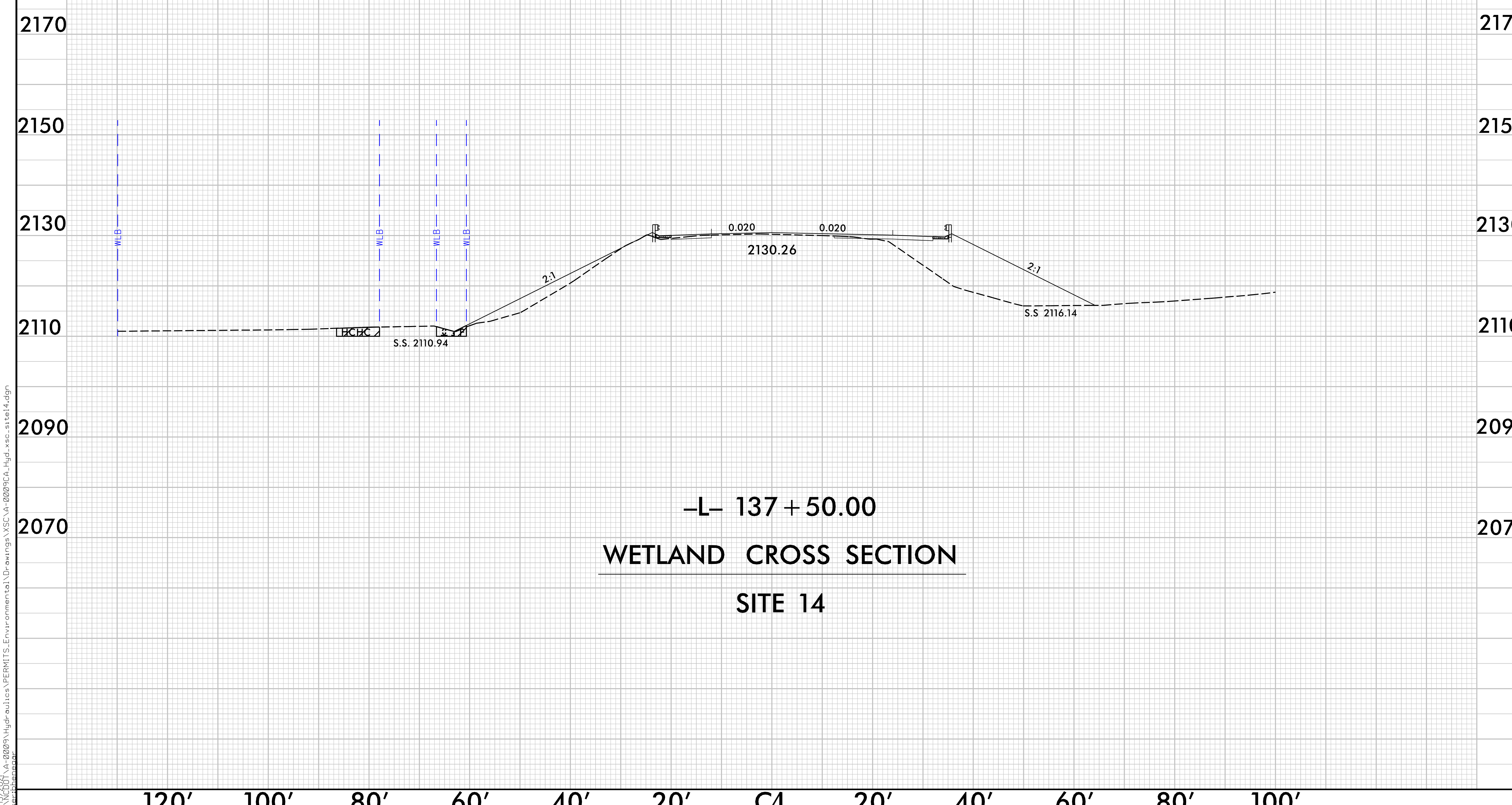
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

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



-L- 137+50.00

WETLAND CROSS SECTION

SITE 14

5/14/99

8/13/2021
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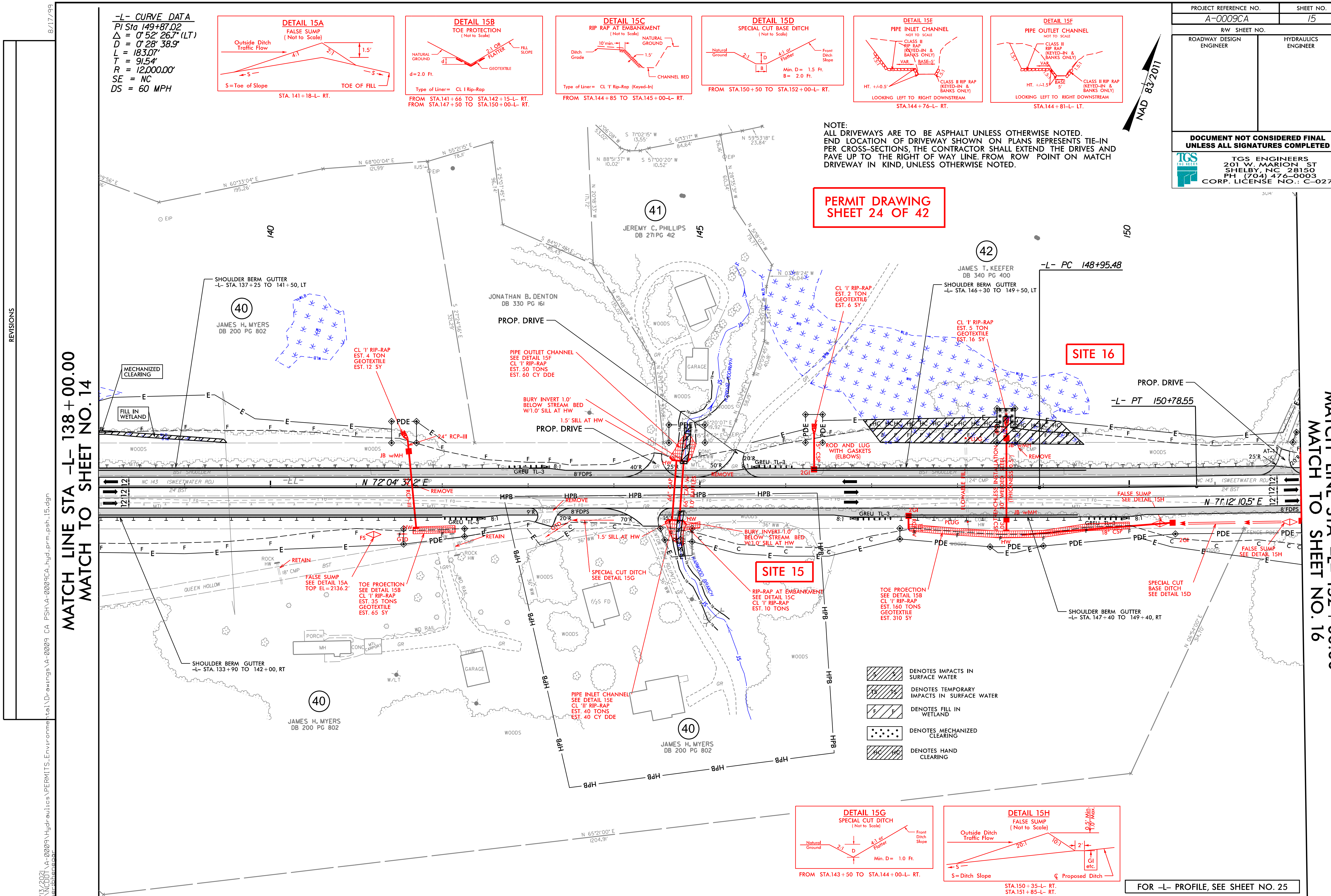
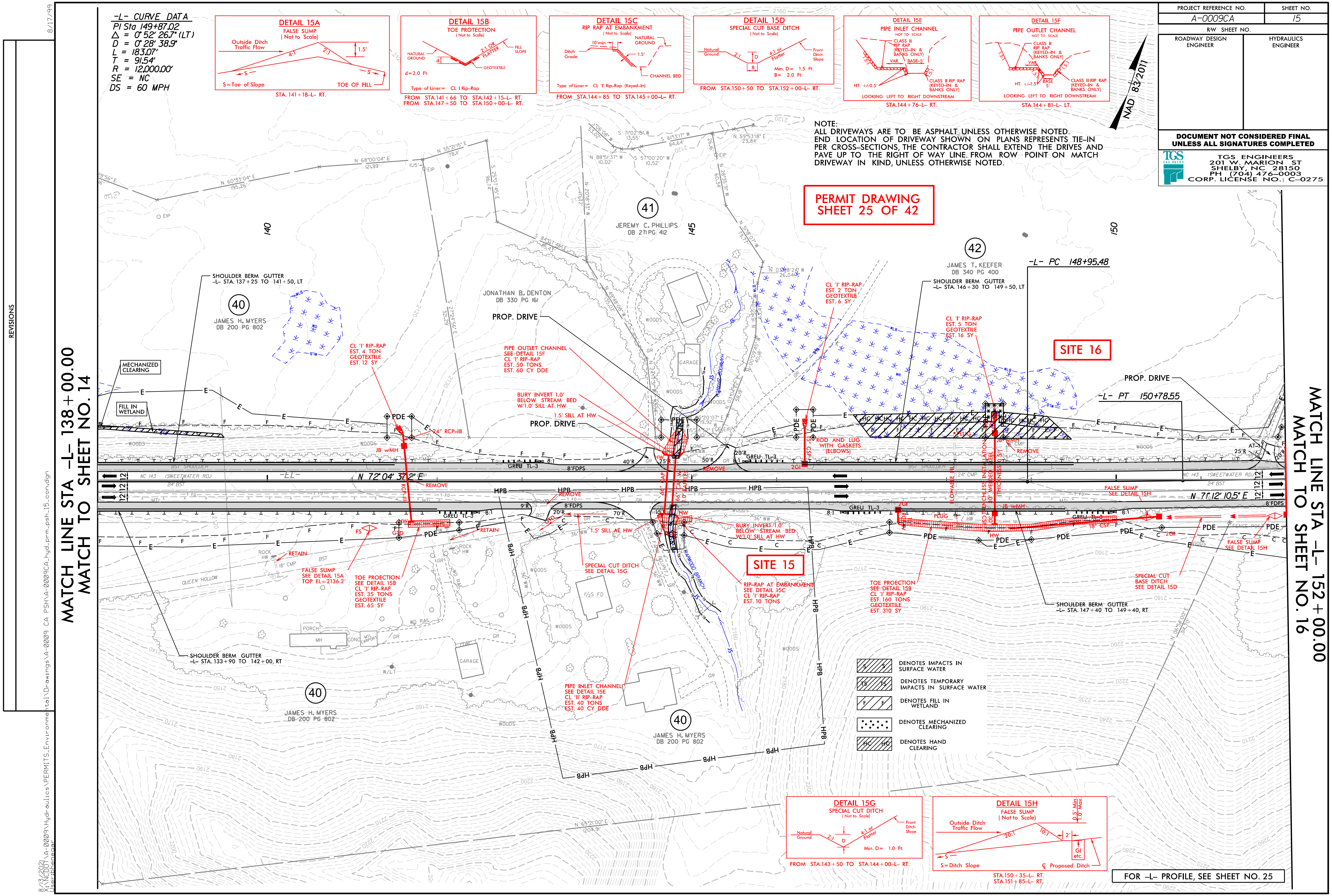
jserthenegar


PROJECT REFERENCE NO. A-0009CA
SHEET NO. 15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
-L- CURVE DATA
PI Sta 149+87.02
Δ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH
DETAIL 15A FALSE SUMP (Not to Scale) STA. 141+18 -L- RT.
DETAIL 15B TOE PROTECTION (Not to Scale) FROM STA.141+66 TO STA.142+15 -L- RT. FROM STA.147+50 TO STA.150+00 -L- RT.
DETAIL 15C RIP RAP AT EMBANKMENT (Not to Scale) FROM STA.144+85 TO STA.145+00 -L- RT.
DETAIL 15D SPECIAL CUT BASE DITCH (Not to Scale) FROM STA.150+50 TO STA.152+00 -L- RT.
DETAIL 15E PIPE INLET CHANNEL NOT TO SCALE STA.144+76 -L- RT.
DETAIL 15F PIPE OUTLET CHANNEL NOT TO SCALE STA.144+81 -L- LT.
NAD 83/2011
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PERMIT DRAWING SHEET 24 OF 42
SITE 15
SITE 16
MATCH LINE STA -L- 138+00.00 MATCH TO SHEET NO. 14
MATCH LINE STA -L- 152+00.00 MATCH TO SHEET NO. 16
-L- PC 148+95.48
-L- PT 150+78.55
N 72° 04' 37.2" E
N 71° 12' 10.5" E
JAMES H. MYERS DB 200 PG 802
JONATHAN B. DENTON DB 330 PG 161
JEREMY C. PHILLIPS DB 271 PG 412
JAMES T. KEEFER DB 340 PG 400
SHOULDER BERM GUTTER -L- STA. 137+25 TO 141+50, LT
SHOULDER BERM GUTTER -L- STA. 146+30 TO 149+50, LT
SHOULDER BERM GUTTER -L- STA. 133+90 TO 142+00, RT
SHOULDER BERM GUTTER -L- STA. 147+40 TO 149+40, RT
CL 'I' RIP-RAP EST. 4 TON GEOTEXTILE EST. 12 SY
PIPE OUTLET CHANNEL SEE DETAIL 15F CL 'I' RIP-RAP EST. 50 TONS EST. 60 CY DDE
BURY INVERT 1.0' BELOW STREAM BED W/1.0' SILL AT HW
1.5' SILL AT HW
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
CL 'I' RIP-RAP EST. 5 TON GEOTEXTILE EST. 16 SY
ROD AND LUG WITH GASKETS (ELBOWS)
FALSE SUMP SEE DETAIL 15A TOP EL=2136.2'
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY
SPECIAL CUT DITCH SEE DETAIL 15G
RIP-RAP AT EMBANKMENT SEE DETAIL 15C CL 'I' RIP-RAP EST. 10 TONS
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 160 TONS GEOTEXTILE EST. 310 SY
SPECIAL CUT BASE DITCH SEE DETAIL 15D
FALSE SUMP SEE DETAIL 15H
PIPE INLET CHANNEL SEE DETAIL 15E CL 'II' RIP-RAP EST. 40 TONS EST. 40 CY DDE
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
DETAIL 15G SPECIAL CUT DITCH (Not to Scale) FROM STA.143+50 TO STA.144+00 -L- RT.
DETAIL 15H FALSE SUMP (Not to Scale) STA.150+35 -L- RT. STA.151+85 -L- RT.
FOR -L- PROFILE, SEE SHEET NO. 25
REVISIONS
8/17/99
8/13/2021 X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_15.dgn


PROJECT REFERENCE NO.
A-0009CA
SHEET NO.
15
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
-L- CURVE DATA
PI Sta 149+87.02
△ = 0° 52' 26.7" (LT)
D = 0° 28' 38.9"
L = 183.07'
T = 91.54'
R = 12,000.00'
SE = NC
DS = 60 MPH
DETAIL 15A
FALSE SUMP
(Not to Scale)
STA. 141+18-L- RT.
DETAIL 15B
TOE PROTECTION
FROM STA.141+66 TO STA.142+15-L- RT.
FROM STA.147+50 TO STA.150+00-L- RT.
DETAIL 15C
RIP RAP AT EMBANKMENT
FROM STA.144+85 TO STA.145+00-L- RT.
DETAIL 15D
SPECIAL CUT BASE DITCH
FROM STA.150+50 TO STA.152+00-L- RT.
DETAIL 15E
PIPE INLET CHANNEL
STA.144+76-L- RT.
DETAIL 15F
PIPE OUTLET CHANNEL
STA.144+81-L- LT.
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PERMIT DRAWING
SHEET 25 OF 42
MATCH LINE STA -L- 138+00.00
MATCH TO SHEET NO. 14
MATCH LINE STA -L- 152+00.00
MATCH TO SHEET NO. 16
SITE 15
SITE 16
JEREMY C. PHILLIPS DB 271 PG 412
JAMES T. KEEFER DB 340 PG 400
JONATHAN B. DENTON DB 330 PG 161
JAMES H. MYERS DB 200 PG 802
-L- PC 148+95.48
-L- PT 150+78.55
N 72°04' 37.2" E
N 71°12' 10.5" E
NC 143 (SWEETWATER RD)
SHOULDER BERM GUTTER -L- STA. 137+25 TO 141+50, LT
SHOULDER BERM GUTTER -L- STA. 146+30 TO 149+50, LT
SHOULDER BERM GUTTER -L- STA. 133+90 TO 142+00, RT
SHOULDER BERM GUTTER -L- STA. 147+40 TO 149+40, RT
PROP. DRIVE
MECHANIZED CLEARING
FILL IN WETLAND
CL 'I' RIP-RAP EST. 4 TON GEOTEXTILE EST. 12 SY
PIPE OUTLET CHANNEL SEE DETAIL 15F CL 'I' RIP-RAP EST. 50 TONS EST. 60 CY DDE
BURY INVERT 1.0' BELOW STREAM BED W/1.0' SILL AT HW
1.5' SILL AT HW
CL 'I' RIP-RAP EST. 2 TON GEOTEXTILE EST. 6 SY
CL 'I' RIP-RAP EST. 5 TON GEOTEXTILE EST. 16 SY
ROD AND LUG WITH GASKETS (ELBOWS)
FALSE SUMP SEE DETAIL 15A TOP EL=2136.2'
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 35 TONS GEOTEXTILE EST. 65 SY
SPECIAL CUT DITCH SEE DETAIL 15G
RIP-RAP AT EMBANKMENT SEE DETAIL 15C CL 'I' RIP-RAP EST. 10 TONS
TOE PROECTION SEE DETAIL 15B CL 'I' RIP-RAP EST. 160 TONS GEOTEXTILE EST. 310 SY
SPECIAL CUT BASE DITCH SEE DETAIL 15D
FALSE SUMP SEE DETAIL 15H
PIPE INLET CHANNEL SEE DETAIL 15E CL 'II' RIP-RAP EST. 40 TONS EST. 40 CY DDE
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEARING
DETAIL 15G
SPECIAL CUT DITCH
FROM STA.143+50 TO STA.144+00-L- RT.
DETAIL 15H
FALSE SUMP
STA.150+35-L- RT.
STA.151+85-L- RT.
FOR -L- PROFILE, SEE SHEET NO. 25
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

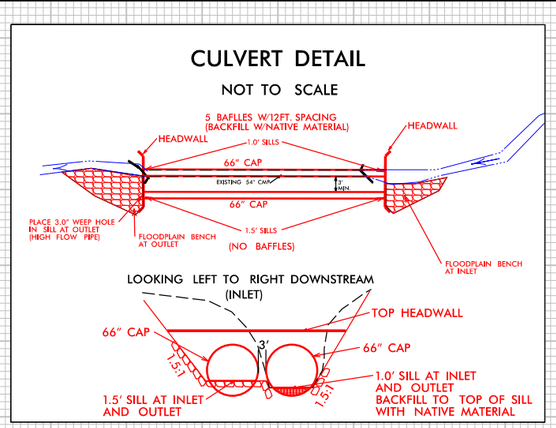
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

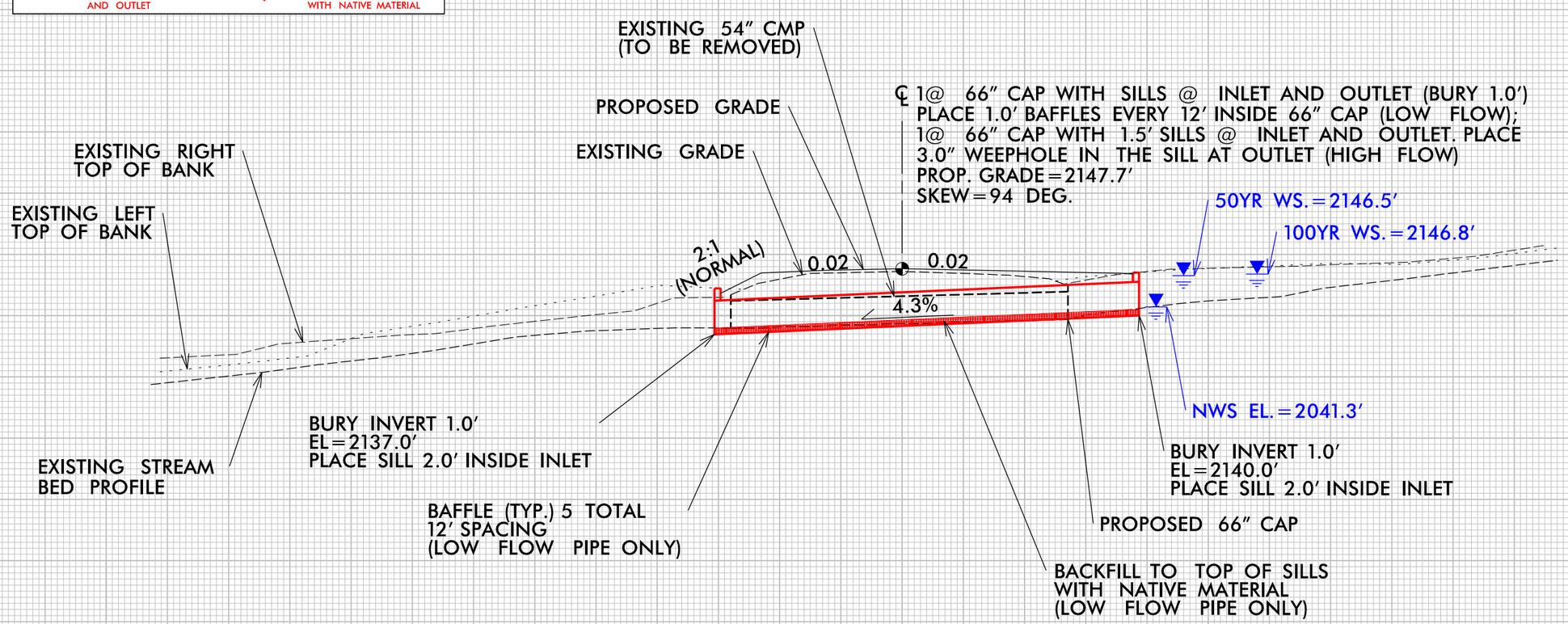
PERMIT DRAWING SHEET 26 OF 42

–L–
NC 143

CULVERT DETAIL

NOT TO SCALE





PROFILE ALONG STRUCTURE

SITE 15

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

5/14/99

PERMIT DRAWING
SHEET 27 OF 42

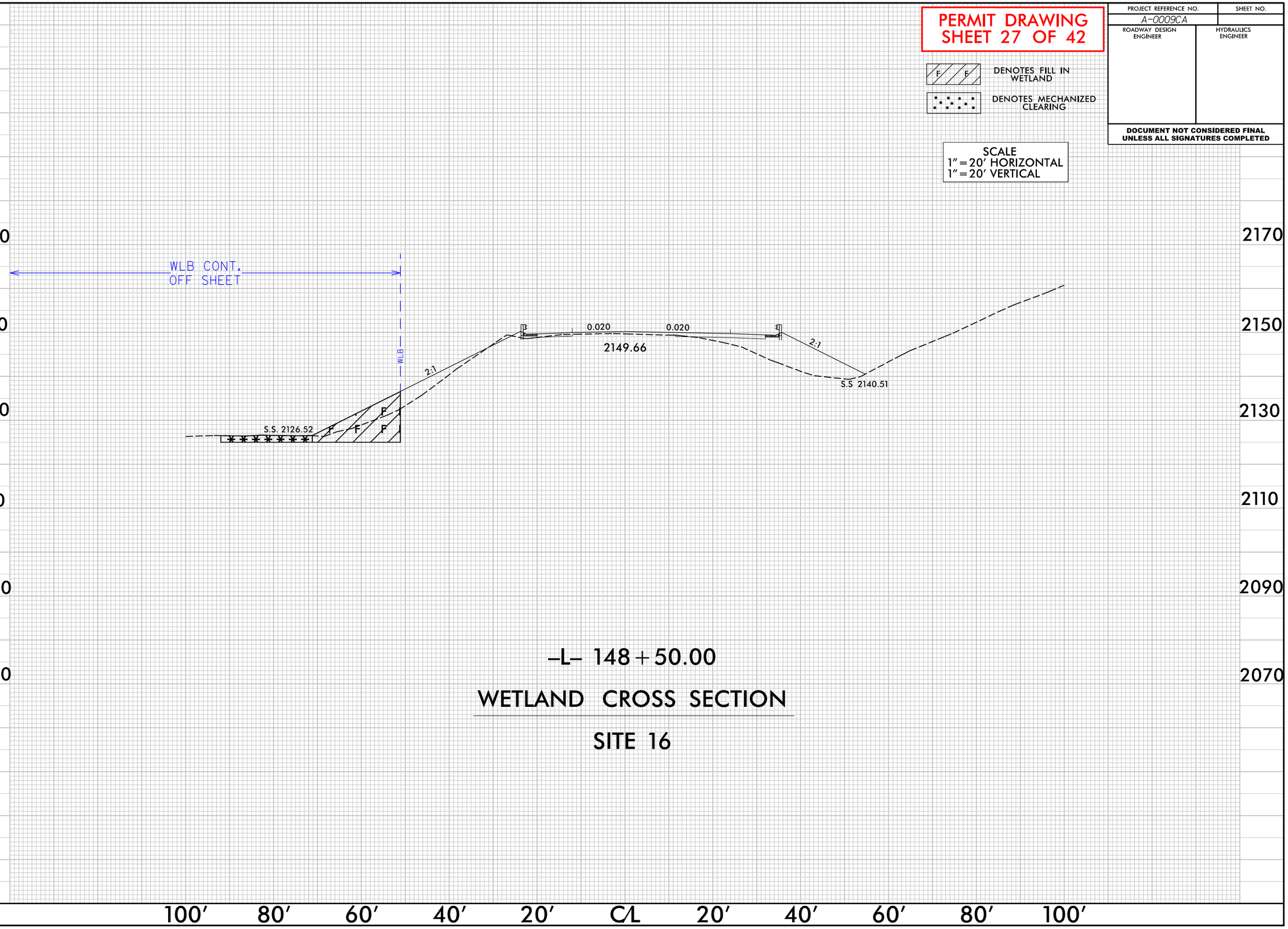
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

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



–L– 148 + 50.00

WETLAND CROSS SECTION

SITE 16

8/13/2021
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User:bhenegar

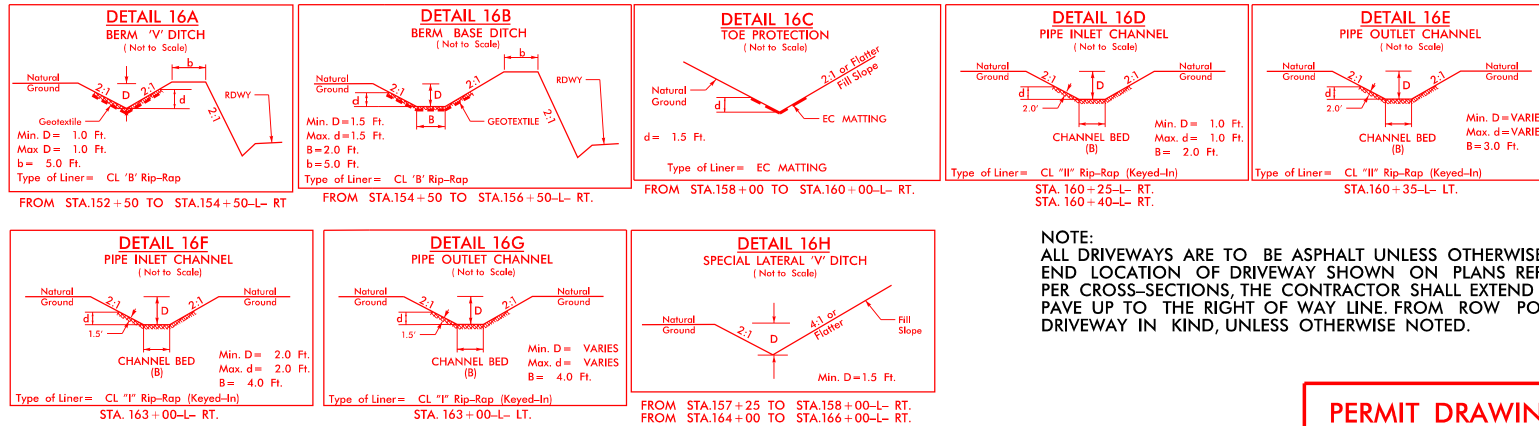
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA

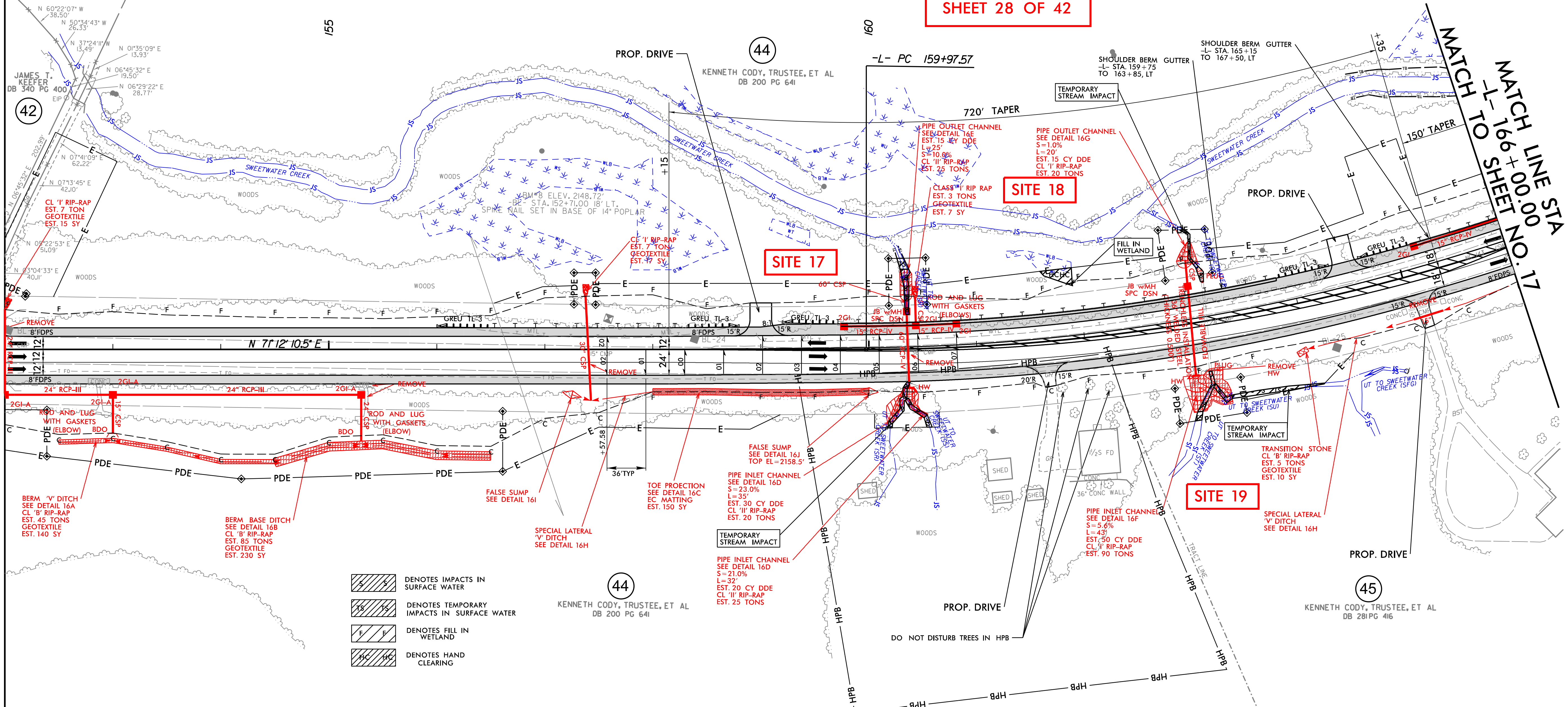
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH



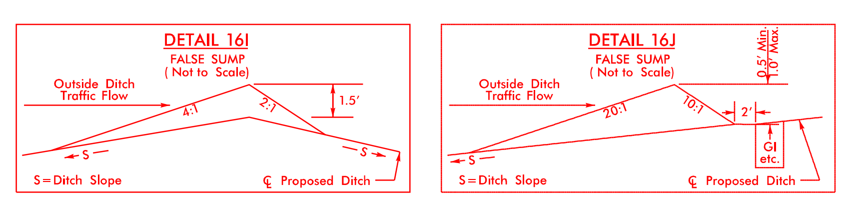
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 28 OF 42

NAD 83/2011



DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING



FOR -L- PROFILE, SEE SHEET NO. 25

REVISIONS

8/17/99

8/16/2021
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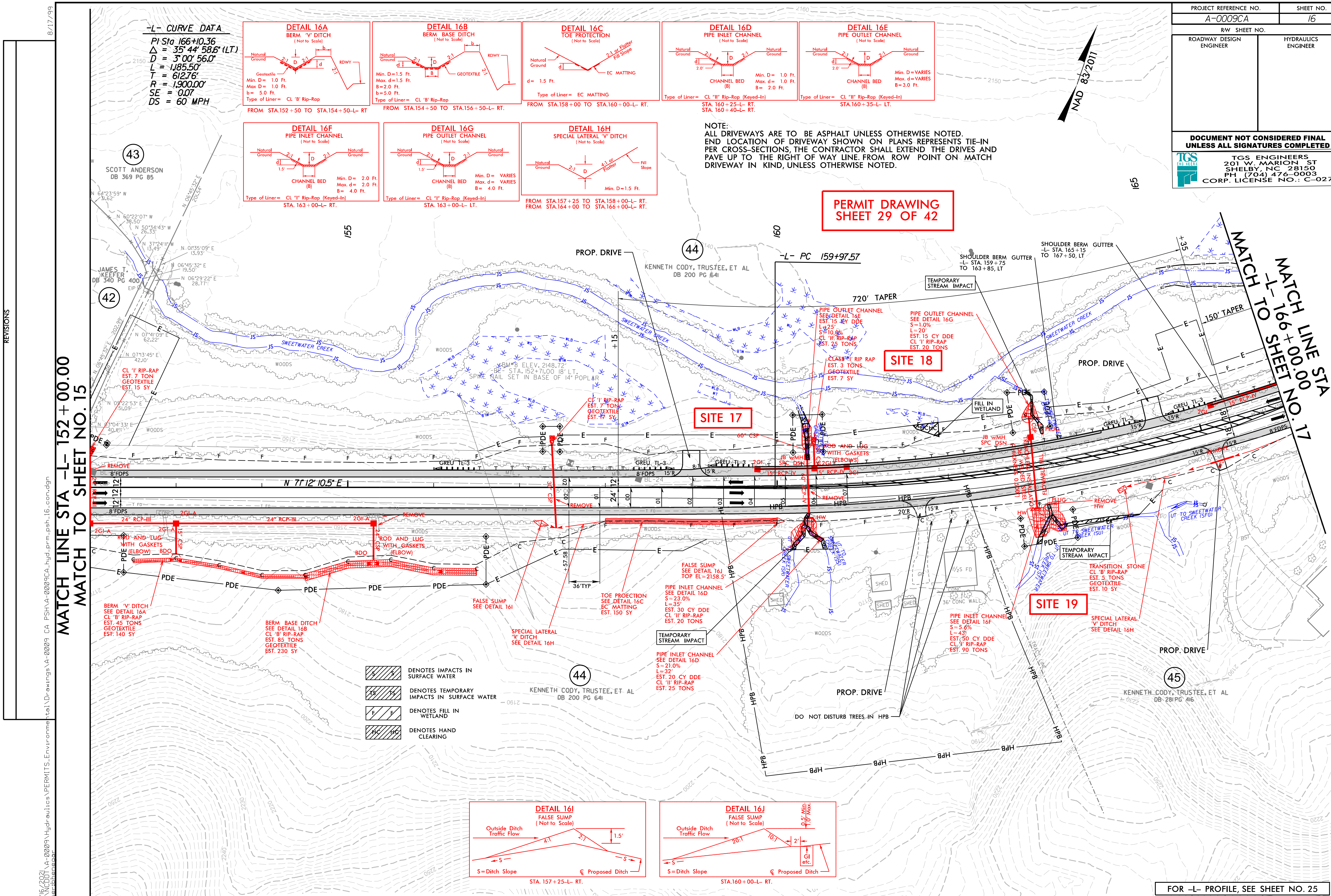


PROJECT REFERENCE NO. A-0009CA
SHEET NO. 16
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 29 OF 42
-L- CURVE DATA
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH
DETAIL 16A
BERM 'V' DITCH
(Not to Scale)
Min. D = 1.0 Ft.
Max D = 1.0 Ft.
b = 5.0 Ft.
Type of Liner = CL 'B' Rip-Rap
FROM STA.152+50 TO STA.154+50-L- RT
DETAIL 16B
BERM BASE DITCH
(Not to Scale)
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 2.0 Ft.
b = 5.0 Ft.
Type of Liner = CL 'B' Rip-Rap
FROM STA.154+50 TO STA.156+50-L- RT.
DETAIL 16C
TOE PROTECTION
(Not to Scale)
d = 1.5 Ft.
Type of Liner = EC MATTING
FROM STA.158+00 TO STA.160+00-L- RT.
DETAIL 16D
PIPE INLET CHANNEL
(Not to Scale)
Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 2.0 Ft.
Type of Liner = CL "II" Rip-Rap (Keyed-In)
STA. 160+25-L- RT.
STA. 160+40-L- RT.
DETAIL 16E
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D = VARIES
Max. d = VARIES
B = 3.0 Ft.
Type of Liner = CL "II" Rip-Rap (Keyed-In)
STA.160+35-L- LT.
DETAIL 16F
PIPE INLET CHANNEL
(Not to Scale)
Min. D = 2.0 Ft.
Max. d = 2.0 Ft.
B = 4.0 Ft.
Type of Liner = CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- RT.
DETAIL 16G
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D = VARIES
Max. d = VARIES
B = 4.0 Ft.
Type of Liner = CL "I" Rip-Rap (Keyed-In)
STA. 163+00-L- LT.
DETAIL 16H
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Min. D = 1.5 Ft.
FROM STA.157+25 TO STA.158+00-L- RT.
FROM STA.164+00 TO STA.166+00-L- RT.
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
NAD 83/2011
43
SCOTT ANDERSON
DB 369 PG 85
42
JAMES T. KEEFER
DB 340 PG 400
44
KENNETH CODY, TRUSTEE, ET AL
DB 200 PG 641
45
KENNETH CODY, TRUSTEE, ET AL
DB 281 PG 416
SWEETWATER CREEK
-L- PC 159+97.57
720' TAPER
150' TAPER
N 71° 12' 10.5" E
SITE 17
SITE 18
SITE 19
PROP. DRIVE
TEMPORARY STREAM IMPACT
FILL IN WETLAND
DO NOT DISTURB TREES IN HPB
MATCH LINE STA -L- 152+00.00 MATCH TO SHEET NO. 15
MATCH LINE STA -L- 166+00.00 MATCH TO SHEET NO. 17
DETAIL 16I
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S = Ditch Slope
Proposed Ditch
STA. 157+25-L- RT.
DETAIL 16J
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S = Ditch Slope
Proposed Ditch
STA.160+00-L- RT.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
FOR -L- PROFILE, SEE SHEET NO. 25
REVISIONS
8/17/99
8/16/2021

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

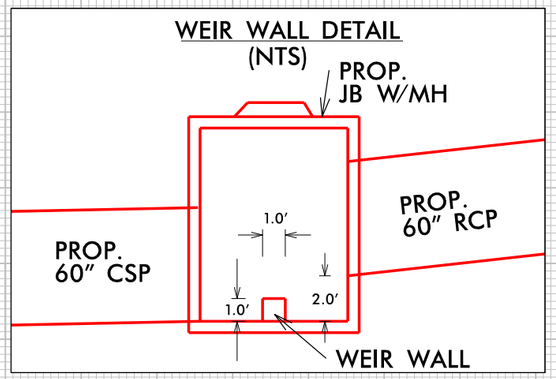
PERMIT DRAWING
SHEET 30 OF 42

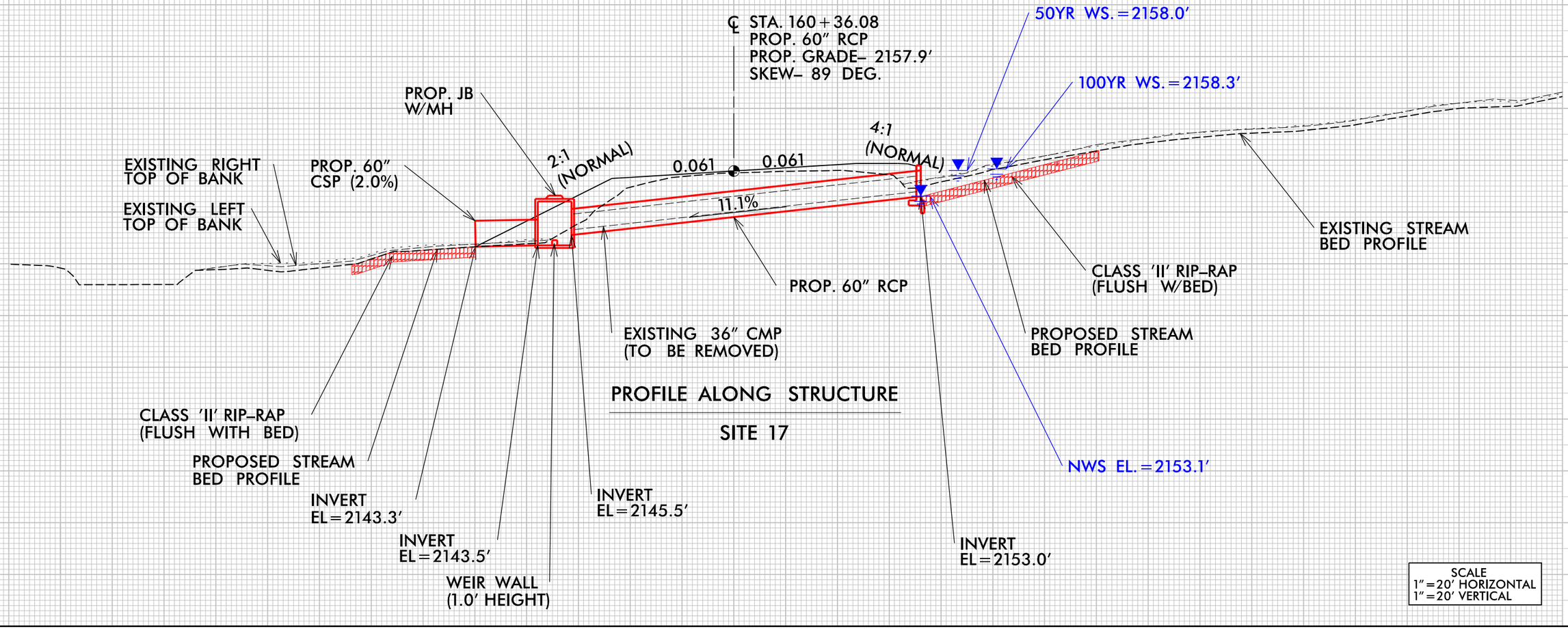
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143

WEIR WALL DETAIL
(NTS)





PROFILE ALONG STRUCTURE

SITE 17

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

5/14/99

PERMIT DRAWING
SHEET 31 OF 42

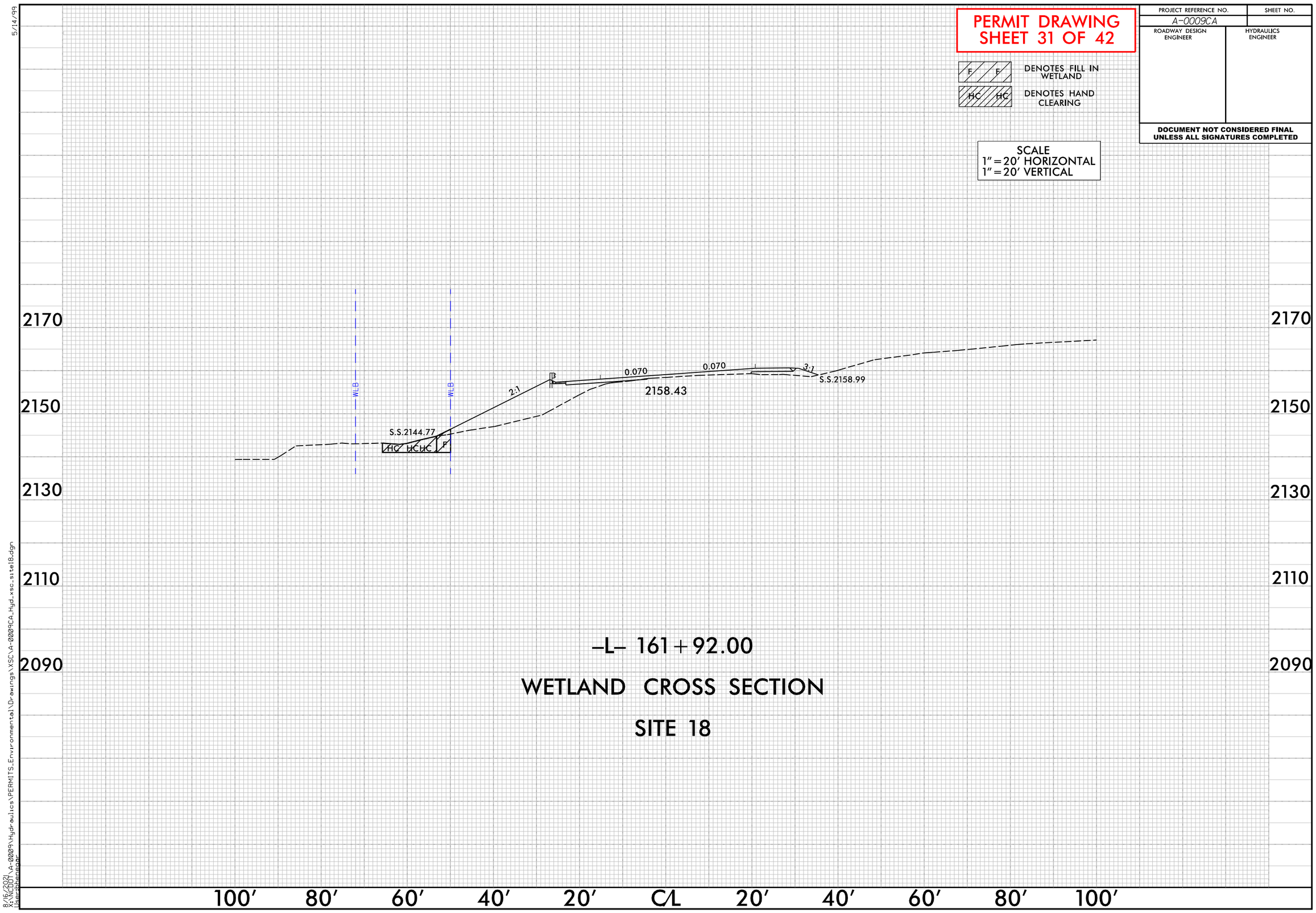
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

HC HC DENOTES HAND CLEARING

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



8/16/2021
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User:bhenegar

8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 32 OF 42

-L- CURVE DATA
PI Sta 166+10.36
△ = 35°44'58.6" (LT)
D = 3°00'56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH

-DRI- CURVE DATA
PI Sta 10+41.97
△ = 48°49'47.4" (RT)
D = 190°59'09.4"
L = 25.57'
T = 13.62'
R = 30.00'
③-DRI- PC 11+34.96
④-DRI- PT 11+67.50

PI Sta 11+53.03
△ = 62°08'27.9" (LT)
D = 190°59'09.4"
L = 32.54'
T = 18.08'
R = 30.00'

DENOTES MECHANIZED CLEARING

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DETAIL 17A
BANK STABILIZATION
(Not to Scale)
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
FROM STA.167+15 TO STA.167+80-L- LT

DETAIL 17B
TOE PROTECTION
(Not to Scale)
FROM STA.167+75 TO STA.169+15-L- LT
FROM STA.170+10 TO STA.171+20-L- LT

DETAIL 17C
SPECIAL LATERAL BASE DITCH
(Not to Scale)
FROM STA.174+00 TO STA.174+30-L- RT.

DETAIL 17D
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap (Keyed-In)
STA. 177+60-L- LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

*1 PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

MATCH LINE STA -L- 166+00.00
MATCH TO SHEET NO. 16

MATCH LINE STA -L- 180+00.00
MATCH TO SHEET NO. 18

NAD 83/2011

SITE 20

SITE 21

SITE 22

BEGIN CONSTRUCTION
-DR1A- STA. 10+05.00

-L- PT 171+83.07

-DR1A- POT 10+00.00

-L- STA 169+62.00=
-DR1A- POT 11+25.00

-L- POT 179+34.25 =
-DR1- POT 11+89.39

PROP. RETAINING WALL #3
BEGIN -L- STA. 167+75±
END -L- STA. 169+31±

PROP. RETAINING WALL #4
BEGIN -L- STA. 169+92±
END -L- STA. 171+75±

PROP. RETAINING WALL #5
W/CONCRETE DITCH
BEGIN -L- STA. 175+35±
END -L- STA. 176+65±

PROP. DRIVE

TEMPORARY STREAM IMPACT

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

DO NOT DISTRURB LANDSCAPED TREES INSIDE HPB.

TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION

PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)

44 KENNETH CODY, TRUSTEE, ET AL DB 200 PG 641

45 KENNETH CODY, TRUSTEE, ET AL DB 281PG 416

46 GLENDA ODOM, ET AL DB 372 PG 157

47 J. C. PAYNE DB 57 PG 123

48 RICHARD C. GRINDSTAFF DB 366 PG 462

49 PAM FINCHER, ET AL DB 199 PG 293

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DR1- PROFILE, SEE SHEET NO. 28

DETAIL 17E
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
STA.173+88-L- RT.

DETAIL 17F
PIPE OUTLET CHANNEL
(Not to Scale)
Min. D=VARIES
Max. d=VARIES
B=4.0 Ft.
Type of Liner= CL 'II' Rip-Rap (Keyed-In)
STA. 167+30-L- LT.

DETAIL 17G
LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
*When B is < 6.0'
Type of Liner= CL 'I' Rip-Rap
FROM STA.171+50 TO STA.173+00-L- RT.

DETAIL 17L
CULVERT INLET CHANNEL
(Looking Downstream, Not to Scale)
Length=See Plan View
Min. d=8 Ft.
STA.169+00-L- LT.

DETAIL 17M
CULVERT OUTLET CHANNEL
(Looking Downstream, Not to Scale)
Length=See Plan View
Min. d=8 Ft.
STA.170+00-L- LT.

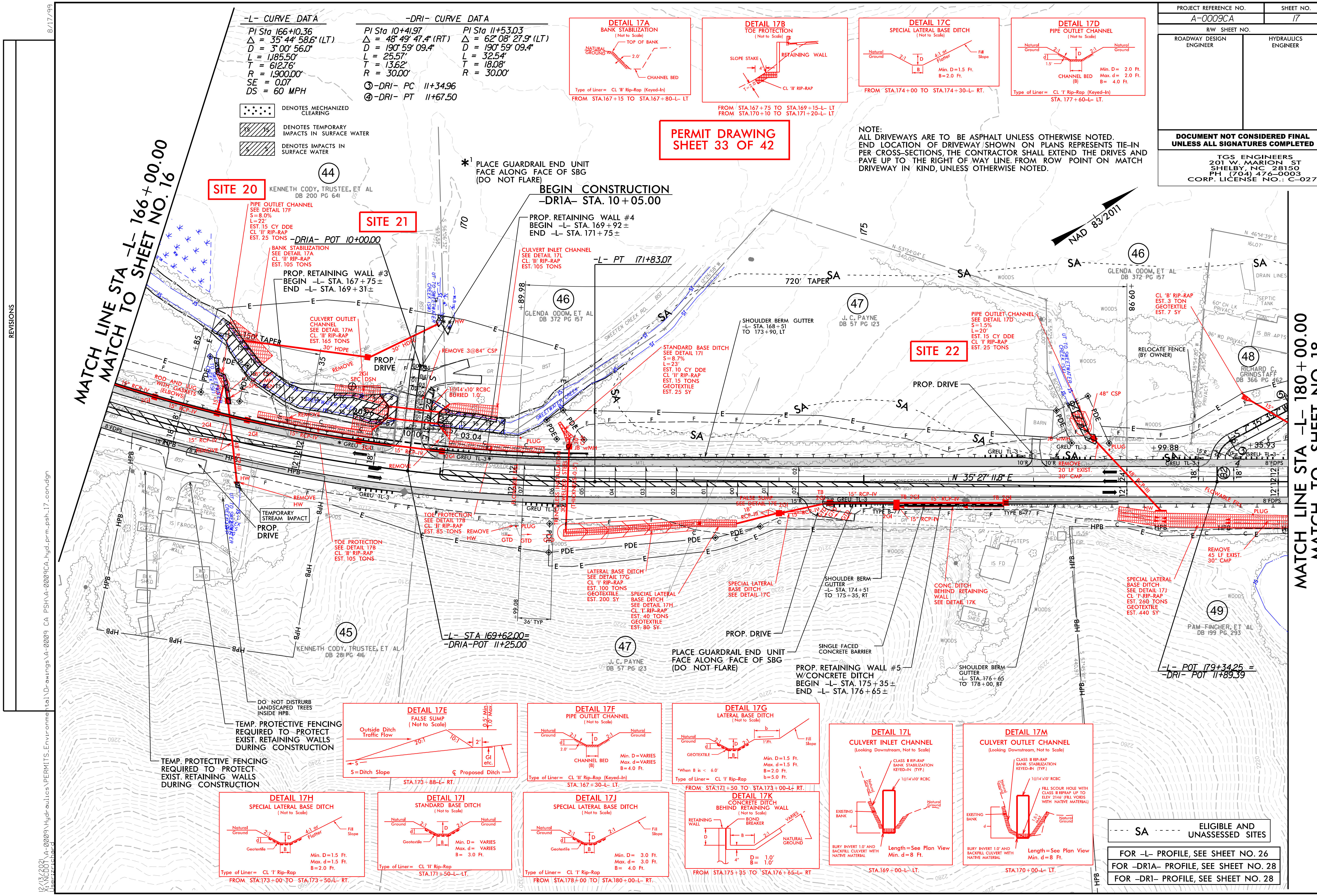
DETAIL 17H
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.173+00 TO STA.173+50-L- RT.

DETAIL 17I
STANDARD BASE DITCH
(Not to Scale)
Min. D= VARIES
Max. d= VARIES
B= 3.0 Ft.
Type of Liner= CL 'II' Rip-Rap
STA.171+50-L- LT.

DETAIL 17J
SPECIAL LATERAL BASE DITCH
(Not to Scale)
Min. D= 3.0 Ft.
Max. d= 3.0 Ft.
B= 4.0 Ft.
Type of Liner= CL 'I' Rip-Rap
FROM STA.178+00 TO STA.180+00-L- RT.

DETAIL 17K
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
D= 1.0'
B= 1.0'
FROM STA.175+35 TO STA.176+65-L- RT

K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009 CA PSH\A-0009CA_hyd_prm_psh_17.dgn
12/13/2021
User:richard


PROJECT REFERENCE NO. A-0009CA
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING SHEET 33 OF 42
-L- CURVE DATA
PI Sta 166+10.36
Δ = 35° 44' 58.6" (LT)
D = 3° 00' 56.0"
L = 1,185.50'
T = 612.76'
R = 1,900.00'
SE = 0.07
DS = 60 MPH
-DRI- CURVE DATA
PI Sta 10+41.97
Δ = 48° 49' 47.4" (RT)
D = 190° 59' 09.4"
L = 25.57'
T = 13.62'
R = 30.00'
PI Sta 11+53.03
Δ = 62° 08' 27.9" (LT)
D = 190° 59' 09.4"
L = 32.54'
T = 18.08'
R = 30.00'
③ -DRI- PC 11+34.96
④ -DRI- PT 11+67.50
DENOTES MECHANIZED CLEARING
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
*1 PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)
BEGIN CONSTRUCTION -DR1A- STA. 10+05.00
SITE 20
SITE 21
SITE 22
MATCH LINE STA -L- 166+00.00 MATCH TO SHEET NO. 16
MATCH LINE STA -L- 180+00.00 MATCH TO SHEET NO. 18
NAD 83/2011
KENNETH CODY, TRUSTEE, ET AL DB 200 PG 641
KENNETH CODY, TRUSTEE, ET AL DB 281 PG 416
GLENDA ODOM, ET AL DB 372 PG 157
J. C. PAYNE DB 57 PG 123
RICHARD C. GRINDSTAFF DB 366 PG 462
PAM FINCHER, ET AL DB 199 PG 293
-DRIA- POT 10+00.00
-L- PT 171+83.07
-L- STA 169+62.00 = -DRIA-POT 11+25.00
-L- POT 179+34.25 = -DRI- POT 11+89.39
N 35° 27' 11.8" E
PROP. RETAINING WALL #3 BEGIN -L- STA. 167+75± END -L- STA. 169+31±
PROP. RETAINING WALL #4 BEGIN -L- STA. 169+92± END -L- STA. 171+75±
PROP. RETAINING WALL #5 W/CONCRETE DITCH BEGIN -L- STA. 175+35± END -L- STA. 176+65±
PLACE GUARDRAIL END UNIT FACE ALONG FACE OF SBG (DO NOT FLARE)
TEMP. PROTECTIVE FENCING REQUIRED TO PROTECT EXIST. RETAINING WALLS DURING CONSTRUCTION
DO NOT DISTURB LANDSCAPED TREES INSIDE HPB.
SHOULDER BERM GUTTER -L- STA. 168+51 TO 173+90, LT
SHOULDER BERM GUTTER -L- STA. 174+51 TO 175+35, RT
SHOULDER BERM GUTTER -L- STA. 176+65 TO 178+00, RT
SINGLE FACED CONCRETE BARRIER
PROP. DRIVE
TEMPORARY STREAM IMPACT
720' TAPER
150' TAPER
DETAIL 17A BANK STABILIZATION
DETAIL 17B TOE PROTECTION
DETAIL 17C SPECIAL LATERAL BASE DITCH
DETAIL 17D PIPE OUTLET CHANNEL
DETAIL 17E FALSE SUMP
DETAIL 17F PIPE OUTLET CHANNEL
DETAIL 17G LATERAL BASE DITCH
DETAIL 17H SPECIAL LATERAL BASE DITCH
DETAIL 17I STANDARD BASE DITCH
DETAIL 17J SPECIAL LATERAL BASE DITCH
DETAIL 17K CONCRETE DITCH BEHIND RETAINING WALL
DETAIL 17L CULVERT INLET CHANNEL
DETAIL 17M CULVERT OUTLET CHANNEL
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 26
FOR -DR1A- PROFILE, SEE SHEET NO. 28
FOR -DRI- PROFILE, SEE SHEET NO. 28
REVISIONS
8/17/99

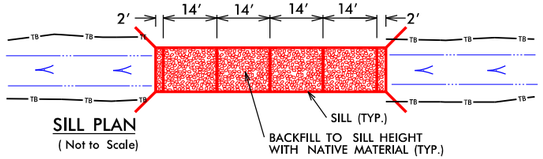
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

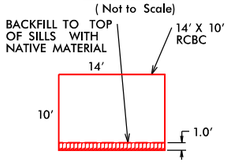
PERMIT DRAWING
SHEET 34 OF 42

–DR1A–
SWEETEN CREEK RD.



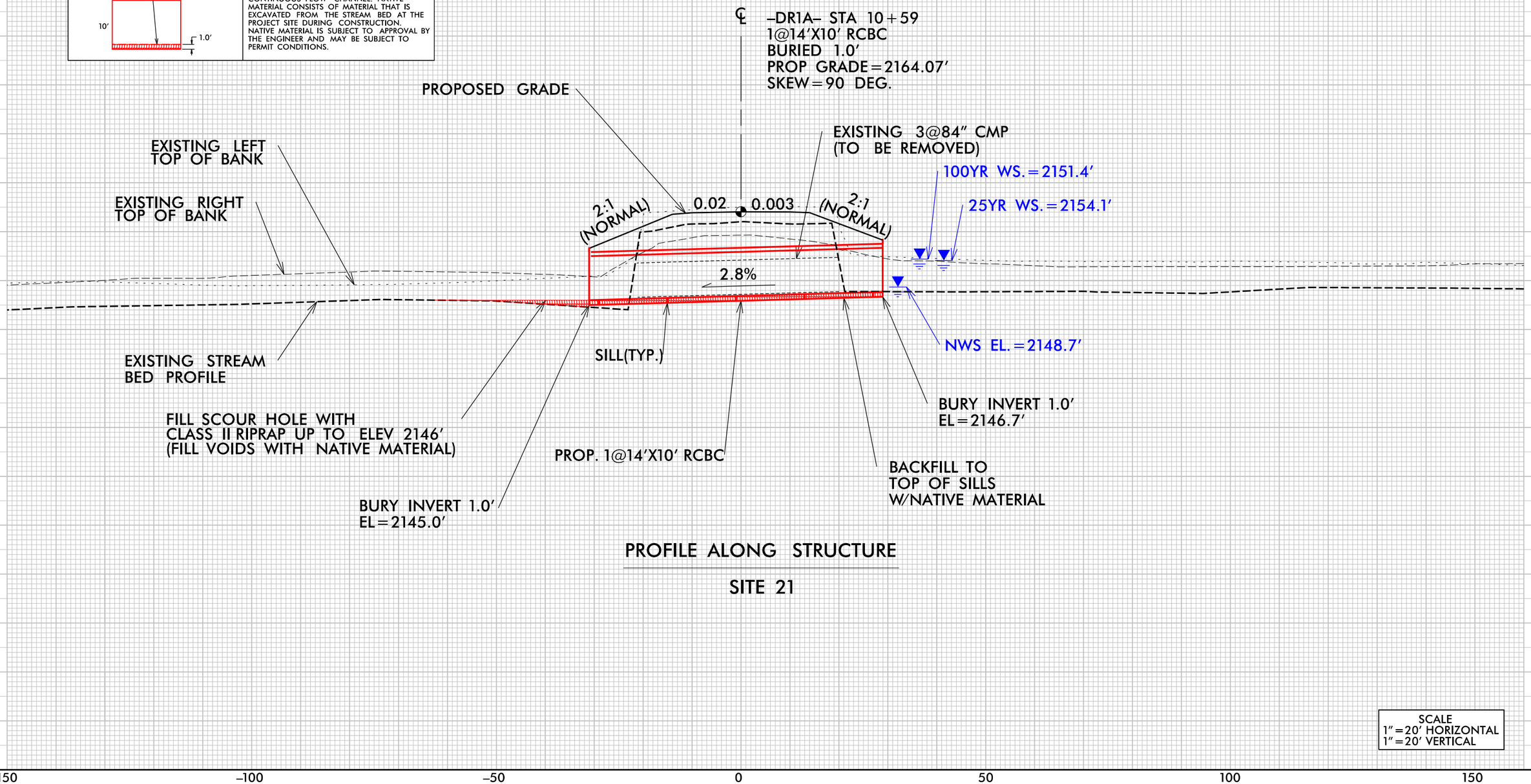
SILL PLAN
(Not to Scale)

SILL DETAIL
(Not to Scale)



NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



PROFILE ALONG STRUCTURE

SITE 21

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

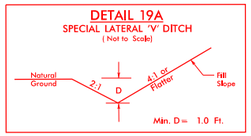
8/17/99

REVISIONS

-L- CURVE DATA

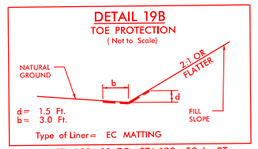
PI Sta 190+83.76
△ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH

DETAIL 19A
SPECIAL LATERAL "V" DITCH
(Not to Scale)



FROM STA.194+00 TO STA.194+50–L– RT.

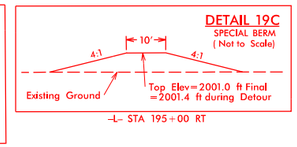
DETAIL 19B
TOE PROTECTION
(Not to Scale)



Type of Liner = EC MATTING

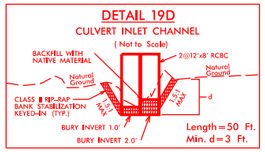
FROM STA.199+10 TO STA.199+50–L– RT.

DETAIL 19C
SPECIAL BERM
(Not to Scale)



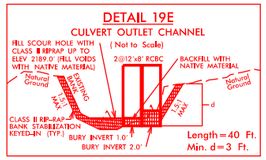
–L– STA 195+00 RT

DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)



STA.195+50–L– RT.

DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)



STA.194+75–L– LT.

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING SHEET 35 OF 42

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

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

MATCH LINE STA –L– 194+00.00
MATCH TO SHEET NO. 18

SITE 23

CULVERT OUTLET CHANNEL
SEE DETAIL 19E
CL "II" RIP–RAP
EST. 172 TONS
EST. 60 CY DDE

CULVERT INLET CHANNEL
SEE DETAIL 19D
CL "II" RIP–RAP
EST. 71 TONS
EST. 50 CY DDE

TOE PROTECTION
SEE DETAIL 19B
EC MATTING
EST. 50 SY

CLASS 'I' RIP RAP
EST. 11 TONS
GEOTEXTILE
EST. 22 SY

CLASS 'B' RIP RAP
EST. 2 TONS
GEOTEXTILE
EST. 7 SY

SPECIAL LATERAL 'V' DITCH
SEE DETAIL 19A

PROPOSED BERM
TOP ELEV=2201.0'
SEE DETAIL 19C

SHOULDER BERM GUTTER
–L– STA. 194+00 TO 197+83, RT

SEE SHEET 2B–2 FOR ONSITE DETOUR DET S8 LAYOUT.

-L- PT 195+93.35

BM#10 ELEV. 2201.60'
-BL- STA. 192+86.00 63' RT.
SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR

50 DELMAR HOLDER, ET AL
DB 222 PG 821

51 MELANIE O. CRUSE
DB 373 PG 105

52 CAROL R. ADAMS, ET AL
DB 291PG 733

KEITH L. ROGERS
DB 141PG 409

PROP. DRIVE

200' TAPER

SITE 24

END SECTION A–0009CA

BEGIN SECTION A–0009CB

END TIP PROJECT A–0009CA
–L– STA. 208+00.00

SEE SHEET 2B–2 FOR ONSITE DETOUR DET_8S

SA — ELIGIBLE AND UNASSESSED SITES

FOR –L– PROFILE, SEE SHEET NO. 27

8/18/2021
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User:bhenegar

PROJECT REFERENCE NO. A-0009CA | SHEET NO. 19

R/W SHEET NO.

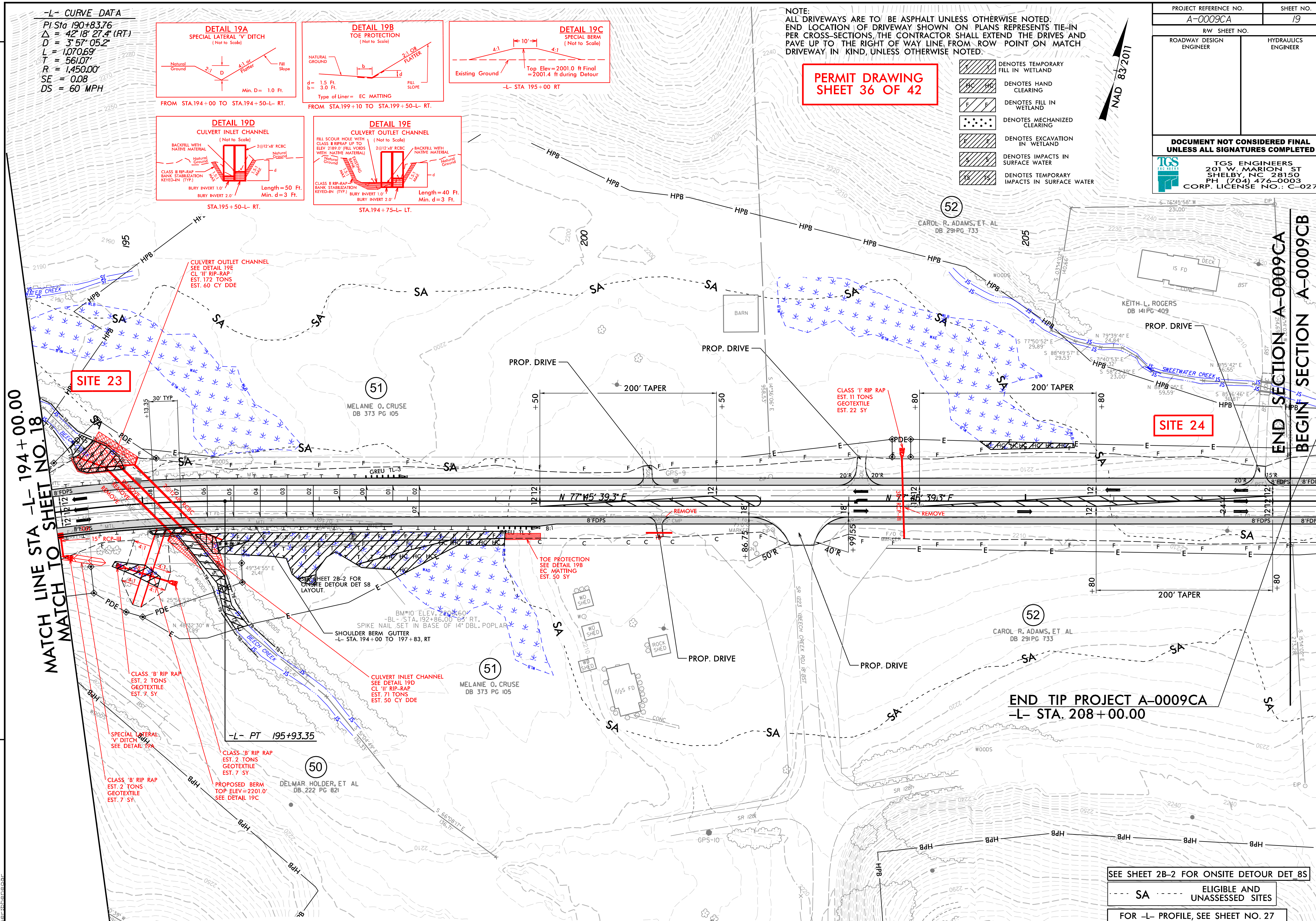
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE, FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 36 OF 42



-L- CURVE DATA
PI Sta 190+83.76
Δ = 42° 18' 27.4" (RT)
D = 3° 57' 05.2"
L = 1,070.69'
T = 561.07'
R = 1,450.00'
SE = 0.08
DS = 60 MPH
DETAIL 19A
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
FROM STA.194+00 TO STA.194+50-L- RT.
DETAIL 19B
TOE PROTECTION
(Not to Scale)
FROM STA.199+10 TO STA.199+50-L- RT.
DETAIL 19C
SPECIAL BERM
(Not to Scale)
Top Elev=2001.0 ft Final
=2001.4 ft during Detour
-L- STA 195+00 RT
DETAIL 19D
CULVERT INLET CHANNEL
(Not to Scale)
Length=50 Ft.
Min. d=3 Ft.
STA.195+50-L- RT.
DETAIL 19E
CULVERT OUTLET CHANNEL
(Not to Scale)
Length=40 Ft.
Min. d=3 Ft.
STA.194+75-L- LT.
DENOTES TEMPORARY FILL IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
NAD 83/2011
CULVERT OUTLET CHANNEL
SEE DETAIL 19E
CL 'II' RIP-RAP
EST. 172 TONS
EST. 60 CY DDE
SITE 23
SITE 24
MELANIE O. CRUSE
DB 373 PG 105
CAROL R. ADAMS, ET AL
DB 291 PG 733
KEITH L. ROGERS
DB 141 PG 409
DELMAR HOLDER, ET AL
DB 222 PG 821
PROP. DRIVE
200' TAPER
CLASS 'I' RIP RAP
EST. 11 TONS
GEOTEXTILE
EST. 22 SY
N 77°45' 39.3" E
REMOVE
TOE PROTECTION
SEE DETAIL 19B
EC MATTING
EST. 50 SY
SHOULDER BERM GUTTER
-L- STA. 194+00 TO 197+83, RT
BM#10 ELEV. 2200.60'
SPIKE NAIL SET IN BASE OF 14" DBL. POPLAR
CULVERT INLET CHANNEL
SEE DETAIL 19D
CL 'II' RIP-RAP
EST. 71 TONS
EST. 50 CY DDE
CLASS 'B' RIP RAP
EST. 2 TONS
GEOTEXTILE
EST. 7 SY
SPECIAL LATERAL 'V' DITCH
SEE DETAIL 19A
PROPOSED BERM
TOP ELEV=2201.0'
SEE DETAIL 19C
-L- PT 195+93.35
SEE SHEET 2B-2 FOR ONSITE DETOUR DET 58 LAYOUT.
MATCH LINE STA -L- 194+00.00
MATCH TO SHEET NO. 18
END SECTION A-0009CA
BEGIN SECTION A-0009CB
END TIP PROJECT A-0009CA
-L- STA. 208+00.00
SWEETWATER CREEK
BEECH CREEK

SEE SHEET 2B-2 FOR ONSITE DETOUR DET 8S

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 27

8/18/2021
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REVISIONS

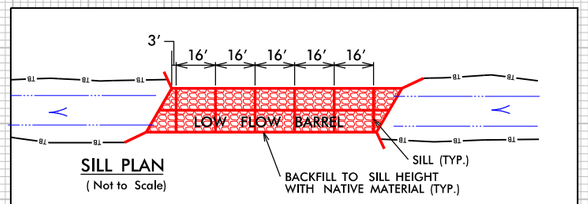
PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 37 OF 42

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

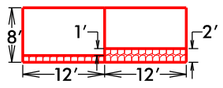
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



SILL PLAN
(Not to Scale)

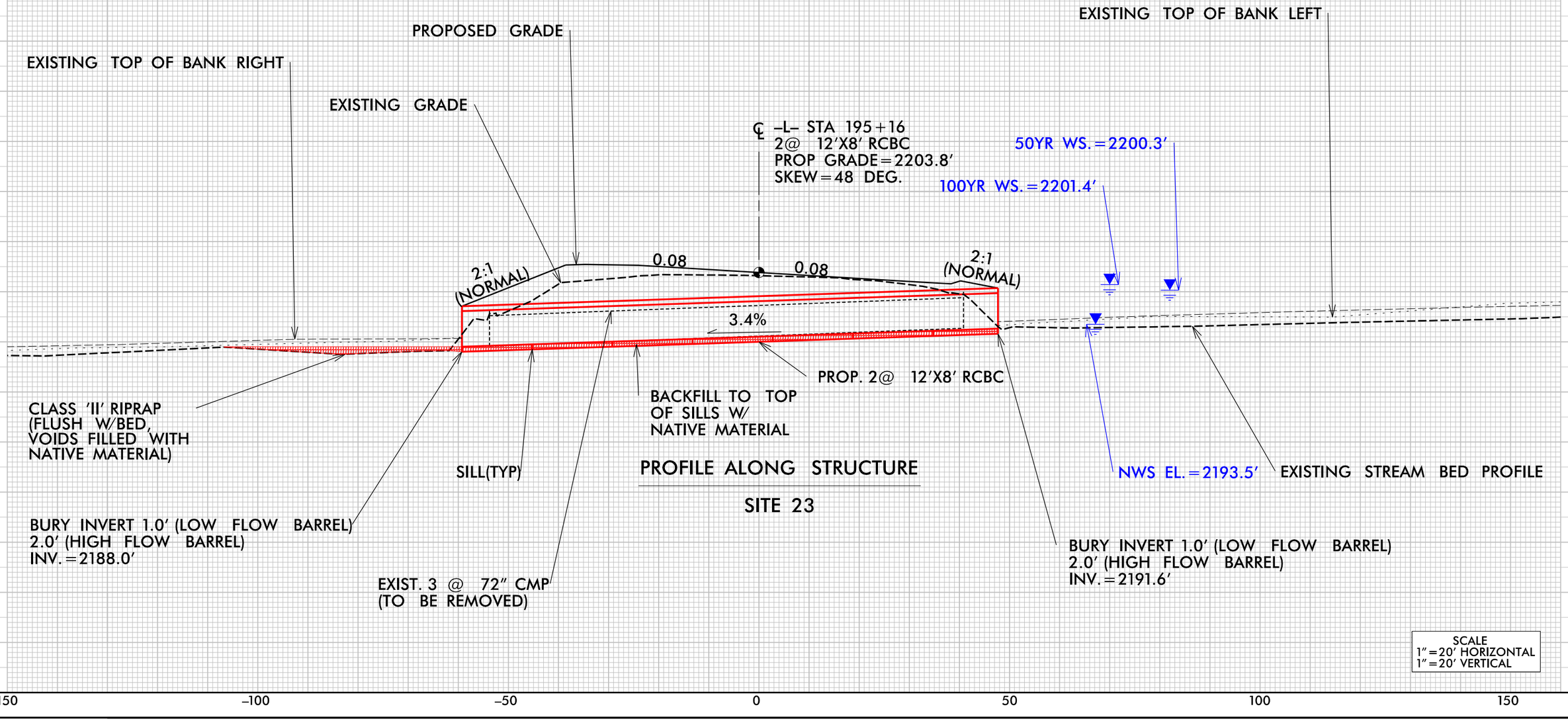
SILL DETAIL
(Not to Scale)



BACKFILL TO TOP OF SILLS /BAFFLES WITH NATIVE MATERIAL

NOTES:
1) TOP OF SILLS SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN SILLS IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



PROFILE ALONG STRUCTURE

SITE 23

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

5/14/99

PERMIT DRAWING
SHEET 38 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

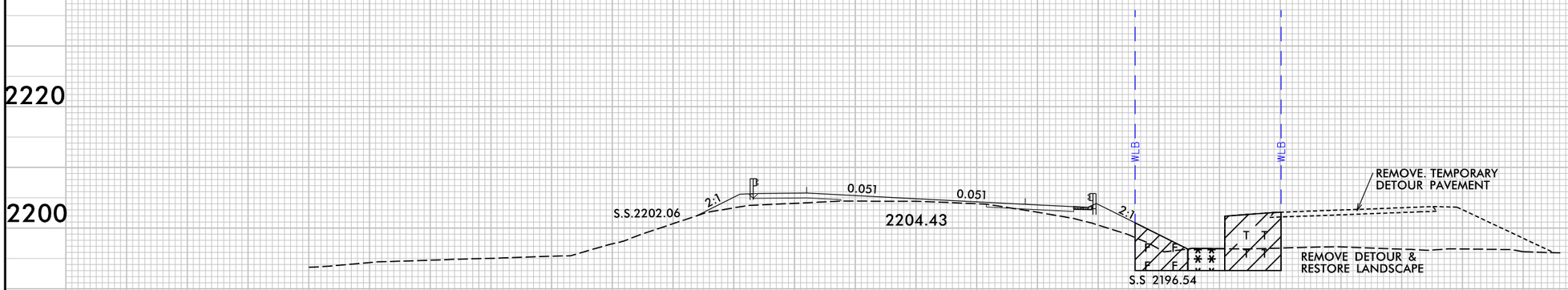
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

T T DENOTES TEMPORARY FILL IN WETLAND

SCALE
1″ = 20′ HORIZONTAL
1″ = 20′ VERTICAL



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WETLAND CROSS SECTION

SITE 23

8/16/2021
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User:bhenegar

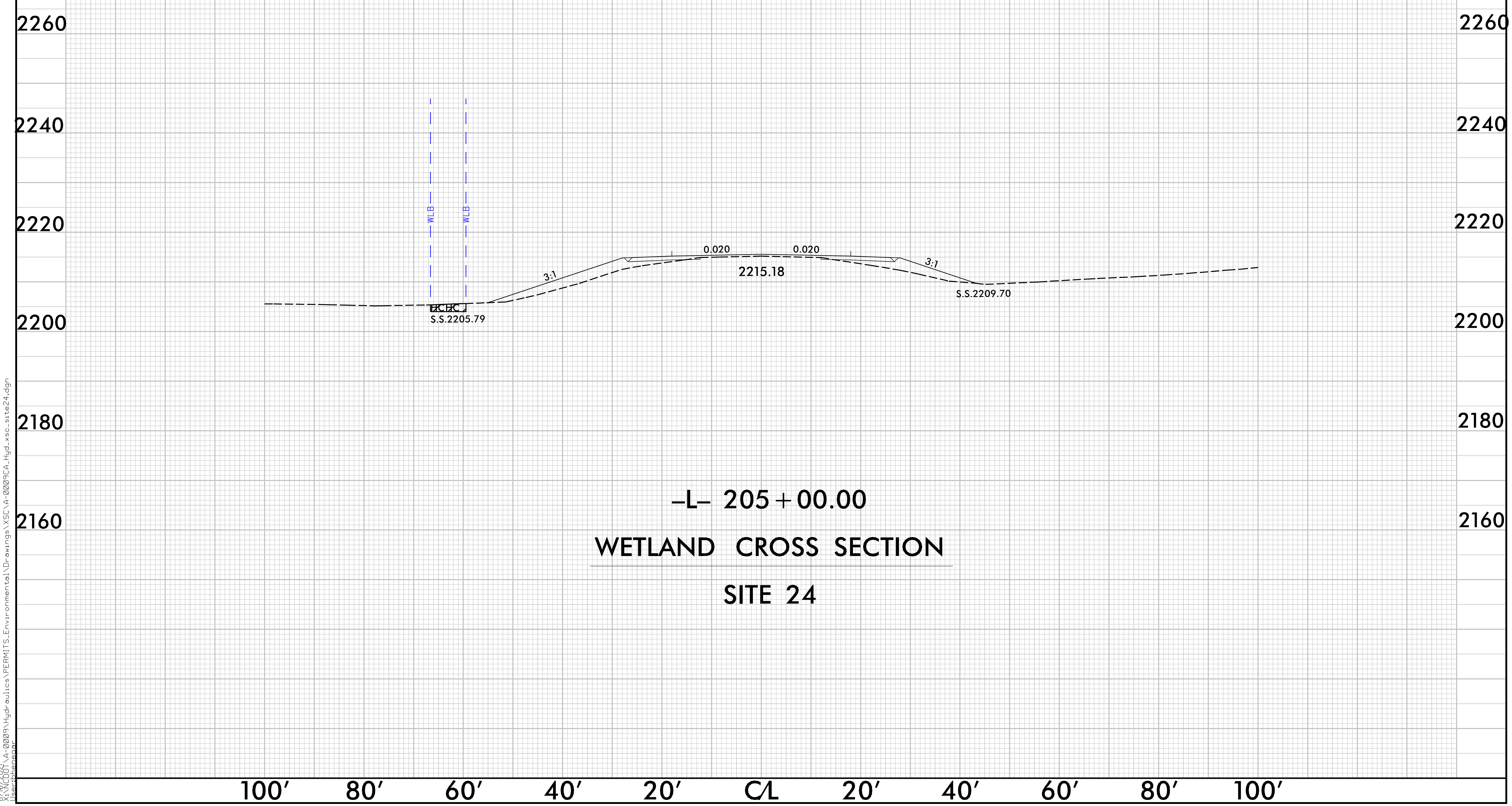
PERMIT DRAWING
SHEET 39 OF 42

PROJECT REFERENCE NO.	SHEET NO.
A-0009CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HC HC DENOTES HAND CLEARING

SCALE
1″ = 20′ HORIZONTAL
1″ = 20′ VERTICAL



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WETLAND CROSS SECTION

SITE 24

5/14/99

8/16/2021
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WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	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 Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-Y1- 18+58 to 19+12 LT	60" RCP	SE	Low						< 0.01	< 0.01	39		20	
1	-Y1- 19+32 to 19+53 RT	60" RCP	SE	Low						< 0.01		24			
1	-Y1- 19+63 to 19+96 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		12	20	
2	-Y1A- 12+01 to 12+04 LT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		30		
3	-L- 16+26 to 16+57 RT	Rip-rap at Embankment	Tulula Creek							< 0.01	< 0.01		26	15	
4	-L- 44+66 to 45+04 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		18	20	
4	-L- 44+91 to 44+98 LT	Pipe Outlet Channel	SG							< 0.01		18			
4	-L- 44+74 to 44+99 RT	Fill in Wetland	WG	Low	< 0.01										
5	-L- 45+71 to 45+97 LT	3@12'x9' RCBC Extension	Sweetwater Creek							< 0.01		15			
5	-L- 45+32 to 45+89 LT	Culvert Outlet Channel	Sweetwater Creek							0.02	0.01		48	10	
5	-L- 46+76 to 47+23 RT	3@12'x9' RCBC Extension	Sweetwater Creek							0.02		44			
5	-L- 47+23 to 47+72 RT	Culvert Inlet Channel	Sweetwater Creek							0.03			48		
5	-L- 47+68 to 48+71 RT	Bank Stabilization	Sweetwater Creek							0.03	< 0.01		93	10	
6	-L- 56+49 to 56+65 RT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		18			
6	-L- 56+03 to 56+60 RT	Pipe Outlet Channel	SI							< 0.01	< 0.01		56	8	
6	-L- 57+64 to 57+77 LT	Exist. 54" CSP (Lined) & Prop. 54" WSP	SI							< 0.01		14			
6	-L- 57+70 to 59+23 LT	Pipe Inlet Channel	SI							0.01	< 0.01		91	50	
7	-L- 65+14 to 65+26 LT	Pipe Outlet Channel	SJ							< 0.01	< 0.01	45		11	
8	-L- 66+90 to 66+99 LT	30" CMP	SK								< 0.01			3	
8	-L- 66+27 to 66+61 LT	Pipe Outlet Channel	SI							< 0.01	< 0.01	13		20	
9	-L- 106+92 to 107+09 RT	Standard Base Ditch	Sweetwater Creek								< 0.01			20	
9	-L- 108+47 to 108+68 LT	1@7'x8' RCBC	Slay Bacon Branch							< 0.01		18			
9	-L- 108+60 to 108+82 LT	Culvert Inlet Channel	Slay Bacon Branch							< 0.01			22		
9	-L- 108+76 to 109+39 LT	Impacts to Stream	Slay Bacon Branch								0.02			91	
9	-L- 107+62 to 107+93 RT	Culvert Outlet Channel	Slay Bacon Branch							< 0.01			29		
9	-L- 107+52 to 107+89 RT	Culvert Outlet Channel	Sweetwater Creek								< 0.01			37	
SHEET TOTALS*:					< 0.01					0.17	0.06	248	473	335	

*Rounded totals are sum of actual impacts

**Notes:

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	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 Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
10	-L- 113+08 to 113 +30 RT	Culvert Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		50	10	
10	-L- 113+76 to 114+18 LT	3@11'x9' RCBC Extension	Sweetwater Creek							0.01		35			
10	-L- 113+93 to 114+55 LT	Culvert Inlet Channel	Sweetwater Creek							< 0.01	< 0.01		32	10	
11	-L- 127+91 to 128+01 RT	24" Side Drain	SO								< 0.01			10	
12	-L- 128+93 to 129+27 LT	Pipe Outlet Channel	Sweetwater Creek							< 0.01	< 0.01		12	18	
12	-L- 129+24 to 129+40 RT	54" RCP	SO								< 0.01			16	
12	-L- 129+39 to 129+47 RT	54" RCP	SM								< 0.01			20	
12	-L- 129+47 to 129+97 RT	54" RCP	SN								< 0.01			53	
13	-L- 133+98 to 134+41 LT	Pipe Outlet Channel	WN	High	< 0.01		0.01	0.03							
13	-L- 134+18 to 134+44 LT	Pipe Outlet Channel	Pigpen Branch							< 0.01	< 0.01	39		10	
13	-L- 134+39 to 134+45 LT	66" WSP	Pigpen Branch							< 0.01		10			
13	-L- 134+85 to 135+09 RT	66" WSP	Pigpen Branch							< 0.01		32			
13	-L- 135+09 to 135+42 RT	Pipe Inlet Channel	Pigpen Branch							< 0.01	< 0.01		42	10	
13	-L- 133+81 to 135+83 RT	Pipe Inlet Channel	WO	High	0.07		< 0.01	0.02	0.03						
14	-L- 136+92 to 139+49 LT	Impacts to Wetland	WP	Low	0.02			0.01	0.01						
15	-L- 144+78 to 144+90 LT	Pipe Outlet Channel	Hardwood Branch							< 0.01	< 0.01		32	10	
15	-L- 144+78 to 144+85 LT	2 @ 66" CAP	Hardwood Branch							< 0.01		3			
15	-L- 144+74 to 144+82 RT	2 @ 66" CAP	Hardwood Branch							< 0.01		11			
15	-L- 144+74 to 144+82 RT	Pipe Inlet Channel	Hardwood Branch							< 0.01	< 0.01		27	16	
16	-L- 146+90 to 149+48 LT	Impacts to Wetland	WR	High	0.09			< 0.01	0.06						
17	-L- 160+27 to 160+38 LT	Pipe Outlet Channel	SR							< 0.01	< 0.01	24		11	
17	-L- 160+34 to 160+38 LT	60" CSP	SR							< 0.01		18			
17	-L- 160+31 to 160+38 RT	60" RCP	SR							< 0.01		6			
17	-L- 160+17 to 160+35 RT	Pipe Inlet Channel	SR							< 0.01	< 0.01	38		5	
17	-L- 160+33 to 160+56 RT	Pipe Inlet Channel	SS							< 0.01	< 0.01	24		11	
SHEET TOTALS*:					0.18		0.02	0.07	0.10	0.07	0.03	240	195	210	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12/7/2021
GRAHAM
A-0009CA
32572.1.13

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
18	-L- 161+64 to 161+94 LT	Impacts to Wetland	WV	High	< 0.01				< 0.01						
19	-L- 163+03 to 163+17 LT	Pipe Outlet Channel	ST							< 0.01	< 0.01	18		14	
19	-L- 163+08 to 163+19 LT	36" CSP	ST							< 0.01		25			
19	-L- 162+90 to 163+13 RT	Pipe Inlet Channel	ST							< 0.01	< 0.01	41		9	
19	-L- 163+11 to 164+09 RT	Pipe Inlet Channel	SU							< 0.01	< 0.01	23		87	
20	-L- 167+07 to 167+31 LT	Pipe Outlet Channel	SV							< 0.01	< 0.01	25		13	
20	-L- 167+28 to 167+40 LT	48" CSP	SV							< 0.01		23			
20	-L- 167+66 to 167+74 RT	48" RCP	SV								< 0.01			8	
21	-L- 167+02 to 167+73 LT	Bank Stabilization	Sweetwater Creek							< 0.01			62		
21	-L- 168+52 to 169+30 LT	Culvert Outlet Channel	Sweetwater Creek							0.02	0.10		64	105	
21	-L- 169+30 to 169+40 LT	1 @ 14' x 10' RCBC	Sweetwater Creek							< 0.01		10			
21	-L- 169+82 to 169+92 LT	1 @ 14' x 10' RCBC	Sweetwater Creek							< 0.01		10			
21	-L- 169+92 to 170+73 LT	Culvet Inlet Channel	Sweetwater Creek							< 0.01	0.03		68	10	
21	-L- 169+84 to 169+99 LT	Impacts to Wetland	WY	Medium				< 0.01							
21	-L- 169+76 to 169+84 LT	Impacts to Stream	SW								< 0.01			11	
22	-L- 177+41 to 177+62 LT	Pipe Outlet Channel	SX							< 0.01	< 0.01	21		11	
22	-L- 177+54 to 177+74 LT	48" CSP	SX							< 0.01		25			
23	-L- 194+28 to 194+81 LT	Culvert Outlet Channel	Beech Creek							0.03	< 0.01		27	14	
23	-L- 194+32 to 194+82 LT	2@12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 194+59 to 195+12 RT	Impacts to Wetland	WAB	Medium	0.02										
23	-L- 195+06 to 195+54 RT	2 @ 12'x8' RCBC	Beech Creek							< 0.01		6			
23	-L- 195+10 to 196+20 RT	Culvert Inlet Channel	Beech Creek							0.02	0.02		66	62	
23	-L- 195+59 to 199+10 RT	Impacts to Wetland	WAD	High	0.07	0.11	< 0.01	< 0.01	0.05						
24	-L- 204+48 to 205+55 LT	Impacts to Wetland	WAE	Medium					0.02						
SHEET TOTALS*:					0.09	0.11	< 0.01	< 0.01	0.07	0.13	0.16	233	287	344	
PROJECT TOTALS*:					0.28	0.11	0.03	0.07	0.17	0.36	0.26	721	955	889	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12/7/2021
GRAHAM
A-0009CA
32572.1.13

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.14	**TIP Number:**	A-0009CB	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh B. Deyton, PE			**Contractor / Designer:**	TGS Engineers / David B. Petty, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 104		
Email:	jbdeyton@ncdot.gov			**Email:**	dpetty@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.91 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	30.4	ac.		16.0	ac.		
Typical Cross Section Description:	1.) Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 3.4 Miles 2.) Four 12' paved lanes, 10'-12' shoulders (8'/10' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 0.5 Miles			1.) Two 12' paved lanes, 0 to 10' paved shoulders, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.9 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	8800	Year: 2045	Existing:	6590	Year:	2022

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

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143 and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 east of Stecoah in Graham County, NC. The project improves roadway shoulders and adds passing & climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB & A-0009CC).

A-0009CB improves NC 143, an urban arterial, from SR 1223 (Beech Creek Rd) to 0.5 miles north of the Appalachian Trail.

Project minimization measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Overall maintain existing alignment to minimize cumulative impacts to resources.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Minimizing culvert slopes.
>Removing existing perched outlets.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.14 **TIP/Proj No.:** A-0009CB **County(ies):** Graham

General Project Information

Waterbody Information

Surface Water Body (1):	Sweetwater Creek		**NCDWR Stream Index No.:**	2-190-3-(0.5)		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	Trout Waters (Tr)			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Sweetwater Creek, SY, SZ, SAA, SAB, SAC, SAD, SAE, SAF, SAG, SAJ, SAH, SAK, SAM, SED, SAT, SAY, SAX			**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 (2):	Stillhouse Branch		**NCDWR Stream Index No.:**	2-190-3-1		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply III (WS-III)			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Stillhouse Branch			**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)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.14 **TIP/Proj No.:** A-0009CB **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
20/21*	L	219+00	LT	35.34265	-83.74207	(1)Sweetwater Creek	0.0	4.0	2.0	0.5	45	250	1.59%	1.4	1.8	1.8	1.9	No	No
21	L	223+00	LT	35.34331	-83.74099	(1)Sweetwater Creek	0.0	4.0	3.0	0.5	45	300	1.67%	1.4	1.8	1.8	1.9	No	No
21**	L	227+16	RT	35.34396	-83.73984	(1)Sweetwater Creek	0.0	3.0	5.0	2.8	280	34	0.76%	2.9	1.6	3.9	1.7	No	No
23*	L	264+00	RT	35.35176	-83.73235	(1)Sweetwater Creek	0.0	4.0	2.0	0.7	72	300	2.15%	1.2	1.9	1.5	2.0	No	No
24	L	272+50	LT	35.35408	-83.73187	(1)Sweetwater Creek	0.0	4.0	3.0	0.4	40	200	2.63%	1.0	1.7	1.4	1.8	No	No

Additional Comments

Where slope (and drainage area/discharge) vary, maximum applicable velocity is entered.

*4:1 & 2:1 side slopes average together to meet the minimum recommended 3:1 side slope for purposes of swale criteria.

**Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.14	TIP/Proj No.:	A-0009CB	County(ies):	Graham	Page	4	of	4

Bridge to Culvert Avoidance and Minimization

Proposed Structure Summary

Sheet No. & Station	**Sheet No.:** 17 of 33	**Station:** -Y4- 12+13.1	**Number of Barrels:**	1
Drainage Area (ac or sq mi):	1.09 Sq. Miles		**Barrel Width/Diameter (ft):**	20'-11"
Surface Water Body:	(1)Sweetwater Creek		**Barrel Height (ft):**	6'-1"
Culvert Type:	Aluminum Box Culvert with Concrete Headwalls		**Culvert Length (ft)**	45' +/-
Avoidance and Minimization Efforts: (Bridge to Culvert)	Existing stream pattern and profile has been maintained through the culvert.			

Stream Slope

Existing Average Stream Slope (%):	3.90 %
Proposed Culvert Slope (%):	3.90 %

Culvert Burial

Proposed Culvert Burial Depth (ft):	1
Existing Streambed Material:	sand, gravel and cobbles
Proposed Sills/Baffles:	Sills are proposed at the inlet and outlet with two baffles spaced evenly every 13' along the culvert. Low flow channel will be 5' wide and 1' height to match existing condtions.

Fish and/or Aquatic Life Passage

Existing Low Flow Channel Dimensions in the Stream:	5 ft. wide by 1 ft. deep
Proposed Low Flow Dimensions Through the Culvert:	5 ft. wide by 1 ft. deep
Existing Low Flow Velocities in the Stream (ft/s):	3.8
Proposed Low Flow Velocities Through the Culvert (ft/s):	3.8
Alternating Low Flow Sills/Baffles:	There are low flow sills and baffles that do not alternate because this is a straight stretch of stream.

Culvert/Stream Alignment

Stream Patterns Upstream and Downstream of the Culvert that Could Affect Fish Passage and Bank Stability:	Culvert is in a relatively straight stretch of stream with no notable changes in slope in this vicinity.	
Bed Forms Impacted by Culvert (riffles, pools, glides, etc.):	Culvert is a riffle section of stream.	
Low Flow Floodplain Bench Required? (provide justification)	Yes	
Bends at Inlet/Outlet? (describe culvert alignment with stream)	No	
Stream Realignment Necessary? (provide justification)	No	
Bank Stabilization:	Class II riprap to be installed on banks 35' upstream and 30' downstream.	

Outlet Velocities

Natural Stream Channel 2-yr Velocity (ft/s):	7.2	**Natural Stream Channel 10-yr Velocity (ft/s):**	8.3
Proposed Culvert 2-yr Outlet Velocity (ft/s):	6.7	**Proposed Culvert 10-yr Outlet Velocity (ft/s):**	7.6

Roadway Geometric Considerations

Evaluate/Describe Roadway Geometric Constraints:

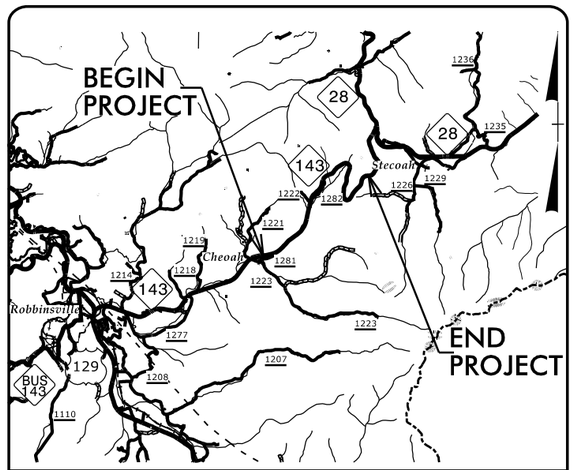
The culvert shape was selected to work with low available cover (due to low roadway grade). However, because a low flow channel with sills and native material are proposed to match existing conditions, this still provides ideal culvert design.

09/08/99

TIP PROJECT: A-0009CB

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.14	APD-0074(178)	PE
32572.2.14	APD-0074(178)	ROW,UTIL.
32572.3.14	APD-0074(178)	CONST.

LOCATION: UPGRADE NC 143 FROM SR 1223 (BEECH CREEK RD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL

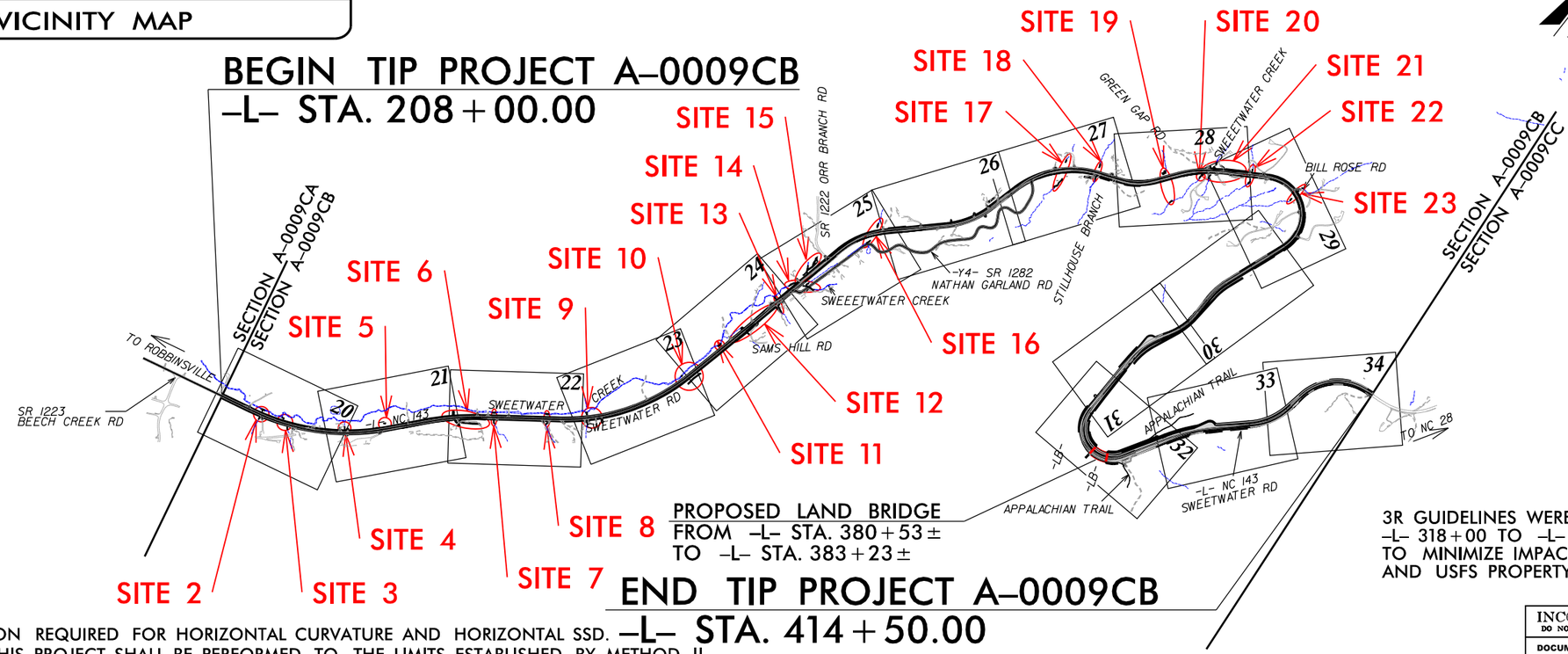
TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, AND STRUCTURE

PERMIT DRAWING
SHEET 1 OF 34

WETLAND & SURFACE WATER IMPACTS

NAD 83/2011

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00



PROPOSED LAND BRIDGE
FROM -L- STA. 380+53±
TO -L- STA. 383+23±

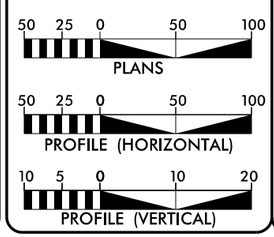
END TIP PROJECT A-0009CB
-L- STA. 414+50.00

3R GUIDELINES WERE USED FROM -L- 318+00 TO -L- STA 414+50 TO MINIMIZE IMPACTS TO TRIBAL AND USFS PROPERTY.

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

DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

GRAPHIC SCALES



DESIGN DATA

ADT 2022 = 6590
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 60 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS =
RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A-0009CB = 3.911 MILES
TOTAL LENGTH TIP PROJECT A-0009CB = 3.911 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE: SEPTEMBER 2021

LETTING DATE: SEPTEMBER 20, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

12/7/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSH\A-0009CB_Hyd_tsh.dgn
User:rrichard

-L- CURVE DATA
PI Sta 219+95.61
△ = 36° 39' 28.8" (LT)
D = 2° 17' 30.6"
L = 1,599.51'
T = 828.20'
R = 2,500.00'
SE = 0.06
DS = 60 MPH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 20A
BANK STABILIZATION
(Not to Scale)
Length=14 Ft.
Min. d=3 Ft.
-L- STA 212+83(44' LT) TO 212+83(58' LT)

DETAIL 20B
BANK STABILIZATION
(Not to Scale)
Length=15 Ft.
Min. d=3 Ft.
-L- STA 215+37(51' LT) TO 215+47(40' LT)

DETAIL 20C
LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
b=3 Ft.
-L- STA. 213+50 TO 215+00 RT
SEE PFL FOR DITCH GRADE

PERMIT DRAWING
SHEET 2 OF 34

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
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

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00

END SECTION A-0009CA
BEGIN SECTION A-0009CB

MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 21

NAD 83/2011

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER
BANK STABILIZATION
SEE DETAIL 20A
CLASS I RIPRAP
20 TONS, NO GEO
BURY INVERT 0.7'

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER
BANK STABILIZATION
SEE DETAIL 20B
CLASS I RIPRAP
22 TONS, NO GEO

CUT TO FILL TRANSITION
CLASS B RIPRAP
10 TONS, 22 SY GEO

DO NOT DISTURB SWEETWATER CREEK

CLASS B RIPRAP
3 TONS, 11 SY GEO

PROP. DRIVE

BURY INVERT 0.8'

LATERAL 'V' DITCH
SEE DETAIL 20C
DDE=60 CY

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

BURY INVERT 0.7'

PROP. DRIVE

SITE 2

SITE 3

53 MADELINE P. MEENTS, TRUSTEE

54 LLOYD SCOTT ORR

56 MAXINE CRISP

57 ERNEST D. PHILLIPS, JR.

ERNEST PHILLIPS, ET AL

SR 1281 (ERNEST PHILLIPS RD) 18' BST

SWEETWATER CREEK

DO NOT DISTURB SWEETWATER CREEK

REMOVE GRADE TO DRAIN

DO NOT DISTURB SIGN

50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 44

8/17/99
REVISIONS
12/7/2021
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User:richard

8/17/99

REVISIONS

-L- CURVE DATA
PI Sta 219+95.61
△ = 36° 39' 28.8" (LT)
D = 2° 17' 30.6"
L = 1,599.51'
T = 828.20'
R = 2,500.00'
SE = 0.06
DS = 60 MPH

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 20A
BANK STABILIZATION
(Not to Scale)
Length=14 Ft.
Min. d=3 Ft.
-L- STA 212+83(44' LT) TO 212+83(58' LT)

DETAIL 20B
BANK STABILIZATION
(Not to Scale)
Length=15 Ft.
Min. d=3 Ft.
-L- STA 215+37(51' LT) TO 215+47(40' LT)

DETAIL 20C
LATERAL 'V' DITCH
(Not to Scale)
Min. D=1.5 Ft.
b=3 Ft.
-L- STA. 213+50 TO 215+00 RT
SEE PFL FOR DITCH GRADE

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 3 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	20
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

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NAD 83/2011

BEGIN TIP PROJECT A-0009CB
-L- STA. 208+00.00

END SECTION A-0009CA
BEGIN SECTION A-0009CB

MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 21

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

BANK STABILIZATION
SEE DETAIL 20A
CLASS I RIPRAP
20 TONS, NO GEO

BURY INVERT 0.7'

BANK STABILIZATION
SEE DETAIL 20B
CLASS I RIPRAP
22 TONS, NO GEO

CUT TO FILL TRANSITION
CLASS B RIPRAP
10 TONS, 22 SY GEO

DO NOT DISTURB SWEETWATER CREEK

CLASS B RIPRAP
3 TONS, 11 SY GEO

PROP. DRIVE

BURY INVERT 0.8'

LATERAL 'V' DITCH
SEE DETAIL 20C
DDE=60 CY

SITE 2

SITE 3

REMOVE

REMOVE GRADE TO DRAIN

DO NOT DISTURB SIGN

MADELINE P. MEENTS, TRUSTEE

LLOYD SCOTT ORR

ERNEST D. PHILLIPS, JR.

MAXINE CRISP

ERNEST PHILLIPS, ET AL

SWEETWATER CREEK

UT TO SWEETWATER CREEK

50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 44

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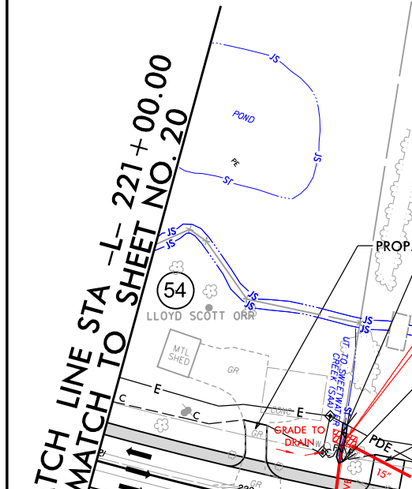
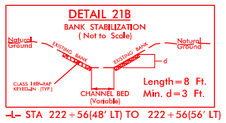
User:richard

8/17/99

REVISIONS



-L- STA 227+16 TO 228+50 RT
SEE PFL FOR DITCH GRADES



-L- STA 222+56(48' LT) TO 222+56(56' LT)

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PERMIT DRAWING
SHEET 4 OF 34

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 20

MATCH LINE STA -L- 235+00.00
MATCH TO SHEET NO. 22

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

HAND CLEARING IN WETLANDS

HAND CLEARING IN WETLANDS

FILL IN WETLANDS

BANK STABILIZATION
SEE DETAIL 21B
CLASS I RIPRAP
9 TONS, NO GEO

DO NOT BURY INVERT

PROP. DRIVE

SITE 4

SITE 5

SITE 6

CLASS I RIPRAP
7 TONS, 15 SY GEO

REMOVE 73 LF

GRADE TO DRAIN

24" CSP
REMOVE

15" RCP-IV
REMOVE

24" RCP-IV
REMOVE

RETAIN

15" RCP-IV

24" CSP
REMOVE

SPECIAL CUT DITCH
SEE DETAIL 21A

EXPRESSWAY GUTTER
-L- STA. 229+00 TO 235+36±, RT

15" RCP-IV
2GI

24" RCP-IV
2GI

6" HDPE
COLLAR AND EXTEND

REMOVE DI

PROP.
CONCRETE DRIVE

54
LLOYD SCOTT ORR

58
THOMAS A. CARPENTER

59
LLOYD SCOTT ORR

KENNETH BROOMS

ALVIN J. HALL, ET AL

SWEETWATER CREEK

POND

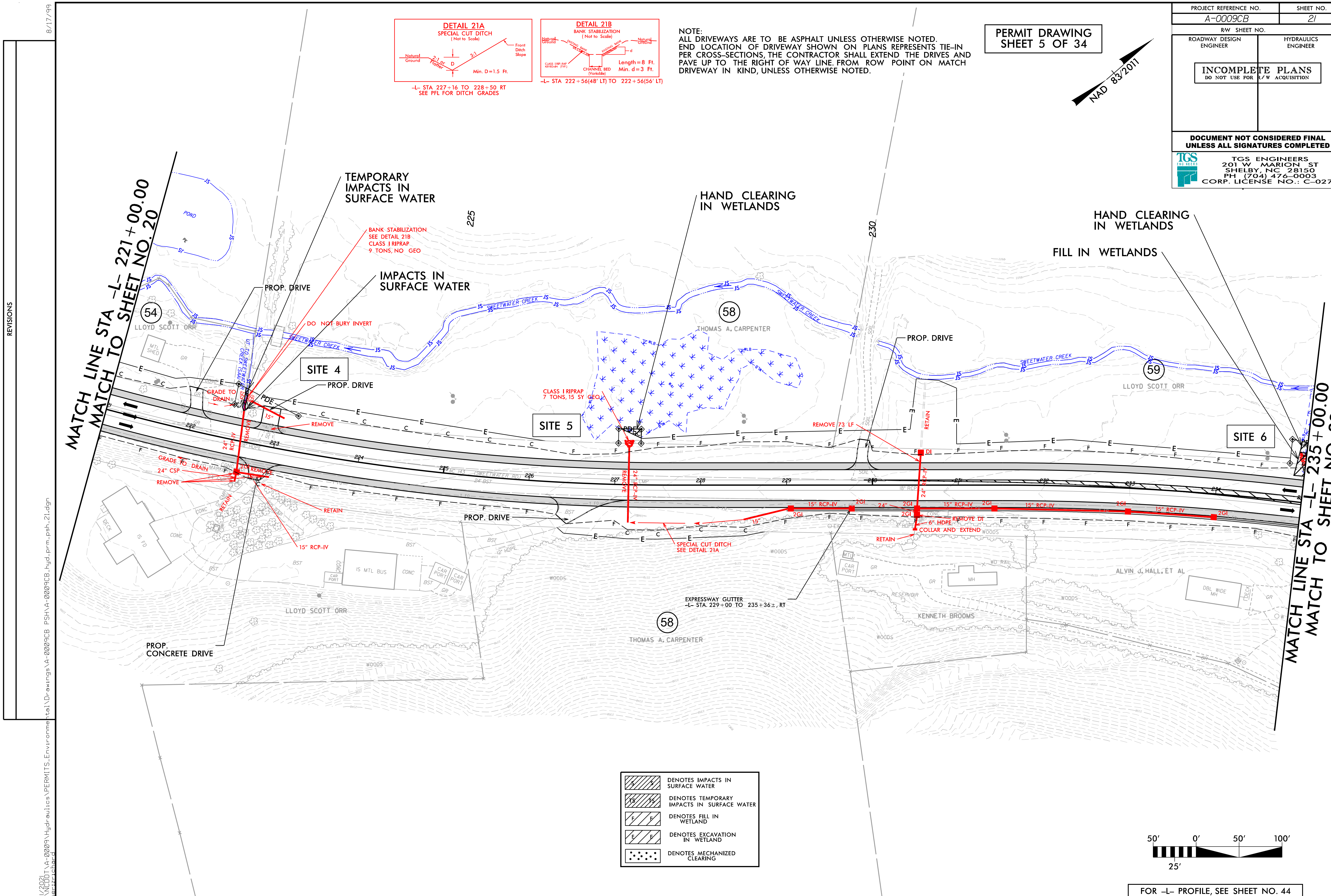
WOODS

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

50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 44

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB PSHA-0009CB_hyd_prm_psh_21.dgn
User:richard


PROJECT REFERENCE NO.
SHEET NO.
A-0009CB
21
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 5 OF 34
NAD 83/2011
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DETAIL 21A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
Front Ditch Slope
Min. D=1.5 Ft.
-L- STA 227+16 TO 228+50 RT
SEE PFL FOR DITCH GRADES
DETAIL 21B
BANK STABILIZATION
(Not to Scale)
CHANNEL BED (Variable)
Length = 8 Ft.
Min. d = 3 Ft.
-L- STA 222+56(48' LT) TO 222+56(56' LT)
MATCH LINE STA -L- 221+00.00
MATCH TO SHEET NO. 20
MATCH LINE STA -L- 235+00.00
MATCH TO SHEET NO. 22
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLANDS
HAND CLEARING IN WETLANDS
FILL IN WETLANDS
BANK STABILIZATION
SEE DETAIL 21B
CLASS I RIPRAP
9 TONS, NO GEO
DO NOT BURY INVERT
PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
PROP. DRIVE
PROP. CONCRETE DRIVE
SITE 4
SITE 5
SITE 6
54
LLOYD SCOTT ORR
58
THOMAS A. CARPENTER
59
LLOYD SCOTT ORR
LLOYD SCOTT ORR
58
THOMAS A. CARPENTER
KENNETH BROOMS
ALVIN J. HALL, ET AL
SWEETWATER CREEK
POND
CLASS I RIPRAP
7 TONS, 15 SY GEO
GRADE TO DRAIN
GRADE TO DRAIN
24" CSP
REMOVE
RETAIN
15" RCP-IV
24" RCP-IV
REMOVE 73 LF
DI
6" HDPE
REMOVE DI
COLLAR AND EXTEND
2GI
15" RCP-IV
SPECIAL CUT DITCH
SEE DETAIL 21A
EXPRESSWAY GUTTER
-L- STA. 229+00 TO 235+36±, RT
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES MECHANIZED CLEARING
50' 0' 50' 100'
25'
FOR -L- PROFILE, SEE SHEET NO. 44
REVISIONS
8/17/99

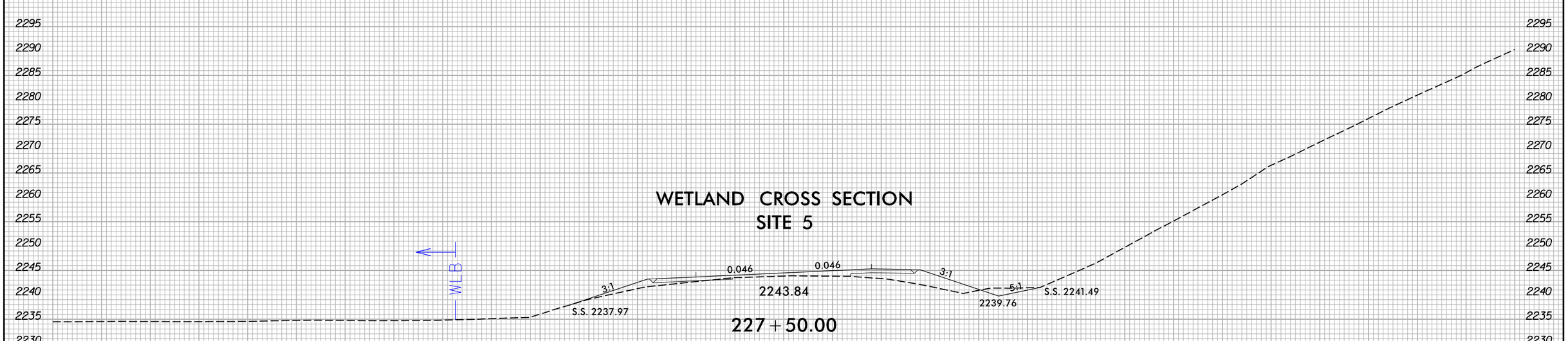
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-11

PERMIT DRAWING
SHEET 6 OF 34

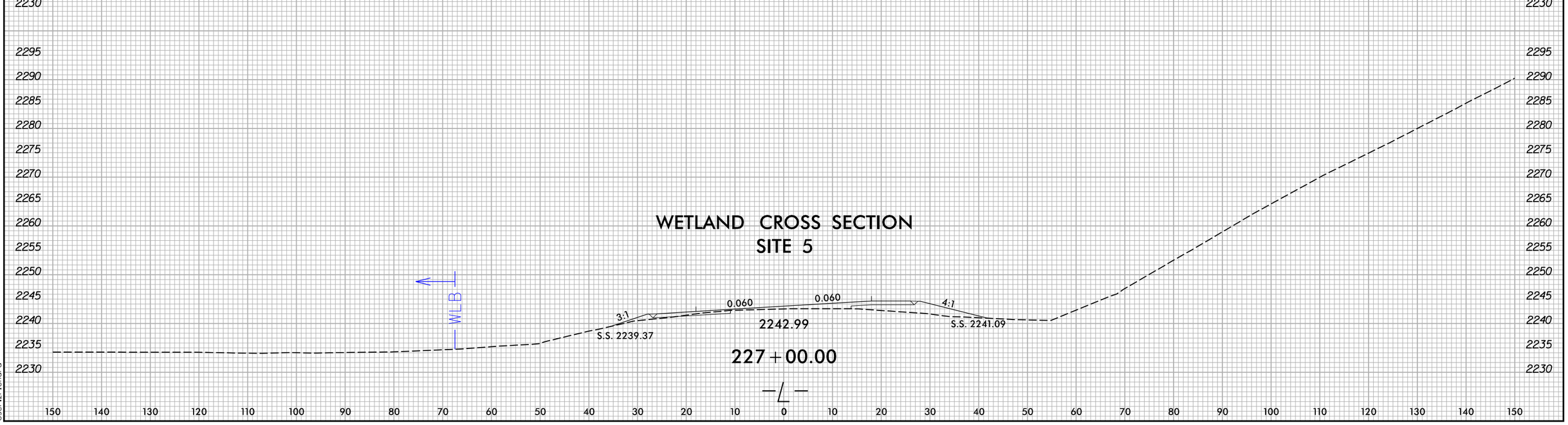
SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL

WETLAND CROSS SECTION
SITE 5



227 + 50.00

WETLAND CROSS SECTION
SITE 5



227 + 00.00

—℄—

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

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

-L- CURVE DATA

PI Sta 234+84.86	PI Sta 255+20.12
Δ = 12° 40' 17.1" (RT)	Δ = 40° 44' 05.0" (LT)
D = 1° 54' 35.5"	D = 2° 36' 15.7"
L = 663.47'	L = 1,564.10'
T = 333.10'	T = 816.75'
R = 3,000.00'	R = 2,200.00'
SE = 0.05	SE = 0.07
DS = 60 MPH	DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 7 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	22

R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER

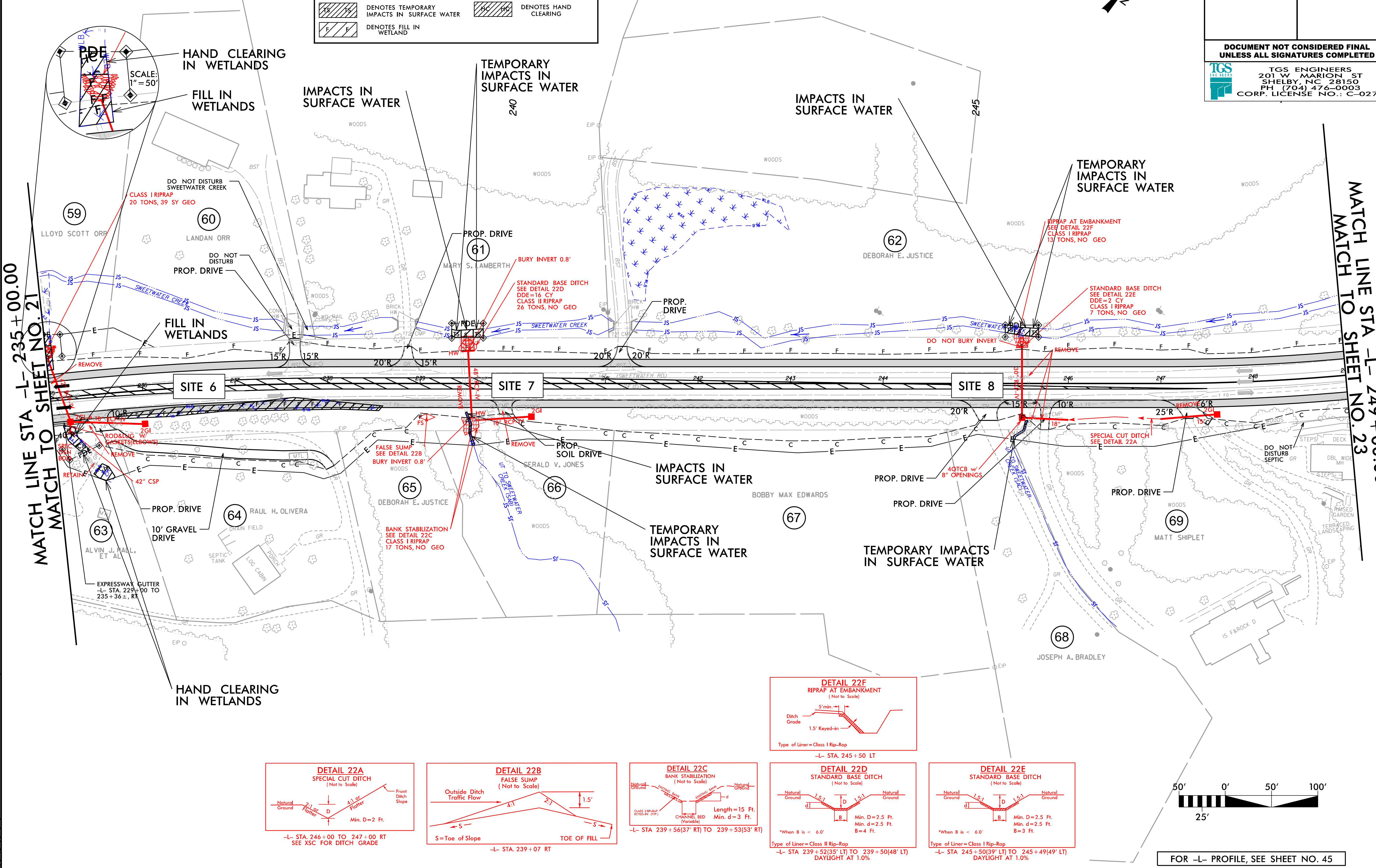
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

REVISIONS

8/17/99



NAD 83/2011
HAND CLEARING IN WETLANDS
FILL IN WETLANDS
SCALE: 1" = 50'
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
MATCH LINE STA -L- 235+00.00 MATCH TO SHEET NO. 21
MATCH LINE STA -L- 249+00.00 MATCH TO SHEET NO. 23
SITE 6
SITE 7
SITE 8
DO NOT DISTURB SWEETWATER CREEK
CLASS I RIPRAP 20 TONS, 39 SY GEO
LLOYD SCOTT ORR
LANDAN ORR
MARY S. LAMBERTH
DEBORAH E. JUSTICE
PROP. DRIVE
DO NOT DISTURB
BURY INVERT 0.8'
STANDARD BASE DITCH SEE DETAIL 22D DDE=16 CY CLASS II RIPRAP 26 TONS, NO GEO
RIPRAP AT EMBANKMENT SEE DETAIL 22F CLASS I RIPRAP 13 TONS, NO GEO
STANDARD BASE DITCH SEE DETAIL 22E DDE=2 CY CLASS I RIPRAP 7 TONS, NO GEO
DO NOT BURY INVERT
SWEETWATER CREEK
REMOVE
ROD&LUG W/ GASKETS(ELBOWS)
RETAIN
42" CSP
PROP. DRIVE
10' GRAVEL DRIVE
ALVIN J. PAUL, ET AL
RAUL H. OLIVERA
DRAIN FIELD
SEPTIC TANK
LOG CABIN
FALSE SUMP SEE DETAIL 22B BURY INVERT 0.8'
BANK STABILIZATION SEE DETAIL 22C CLASS I RIPRAP 17 TONS, NO GEO
GERALD V. JONES
PROP. SOIL DRIVE
BOBBY MAX EDWARDS
UT TO SWEETWATER CREEK
4'QTCB w/ 8" OPENINGS
SPECIAL CUT DITCH SEE DETAIL 22A
DO NOT DISTURB SEPTIC
MATT SHIPLET
JOSEPH A. BRADLEY
EXPRESSWAY GUTTER -L- STA. 229+00 TO 235+36±, RT
WOODS
DETAIL 22F RIPRAP AT EMBANKMENT (Not to Scale)
Type of Liner = Class I Rip-Rap
-L- STA. 245+50 LT
DETAIL 22A SPECIAL CUT DITCH (Not to Scale)
Min. D = 2 Ft.
-L- STA. 246+00 TO 247+00 RT SEE XSC FOR DITCH GRADE
DETAIL 22B FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow
S = Toe of Slope
TOE OF FILL
-L- STA. 239+07 RT
DETAIL 22C BANK STABILIZATION (Not to Scale)
Length = 15 Ft. Min. d = 3 Ft.
-L- STA 239+56(37' RT) TO 239+53(53' RT)
DETAIL 22D STANDARD BASE DITCH (Not to Scale)
Min. D = 2.5 Ft. Min. d = 2.5 Ft. B = 4 Ft.
Type of Liner = Class II Rip-Rap
-L- STA 239+52(35' LT) TO 239+50(48' LT) DAYLIGHT AT 1.0%
DETAIL 22E STANDARD BASE DITCH (Not to Scale)
Min. D = 2.5 Ft. Min. d = 2.5 Ft. B = 3 Ft.
Type of Liner = Class I Rip-Rap
-L- STA 245+50(39' LT) TO 245+49(49' LT) DAYLIGHT AT 1.0%
50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 45

11/1/2021
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8/17/99

REVISIONS

-L- CURVE DATA

PI Sta 234+84.86	PI Sta 255+20.12
Δ = 12° 40′ 17.1″ (RT)	Δ = 40° 44′ 05.0″ (LT)
D = 1° 54′ 35.5″	D = 2° 36′ 15.7″
L = 663.47′	L = 1,564.10′
T = 333.10′	T = 816.75′
R = 3,000.00′	R = 2,200.00′
SE = 0.05	SE = 0.07
DS = 60 MPH	DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

▨ S S	DENOTES IMPACTS IN SURFACE WATER	▨ E E	DENOTES EXCAVATION IN WETLAND
▨ TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER	▨ HC HC	DENOTES HAND CLEARING
▨ F F	DENOTES FILL IN WETLAND		

PERMIT DRAWING
SHEET 8 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

HAND CLEARING IN WETLANDS

DETAIL 22F
RIPRAP AT EMBANKMENT
(Not to Scale)

Type of Liner = Class I Rip–Rap

–L– STA. 245+50 LT

DETAIL 22A
SPECIAL CUT DITCH
(Not to Scale)

–L– STA. 246+00 TO 247+00 RT
SEE XSC FOR DITCH GRADE

DETAIL 22B
FALSE SUMP
(Not to Scale)

–L– STA. 239+07 RT

DETAIL 22C
BANK STABILIZATION
(Not to Scale)

–L– STA 239+56(37′ RT) TO 239+53(53′ RT)

DETAIL 22D
STANDARD BASE DITCH
(Not to Scale)

Type of Liner = Class II Rip–Rap

–L– STA 239+52(35′ LT) TO 239+50(48′ LT)
DAYLIGHT AT 1.0%

DETAIL 22E
STANDARD BASE DITCH
(Not to Scale)

Type of Liner = Class I Rip–Rap

–L– STA 245+50(39′ LT) TO 245+49(49′ LT)
DAYLIGHT AT 1.0%

50′ 0′ 50′ 100′
25′

FOR –L– PROFILE, SEE SHEET NO. 45

11/1/2021
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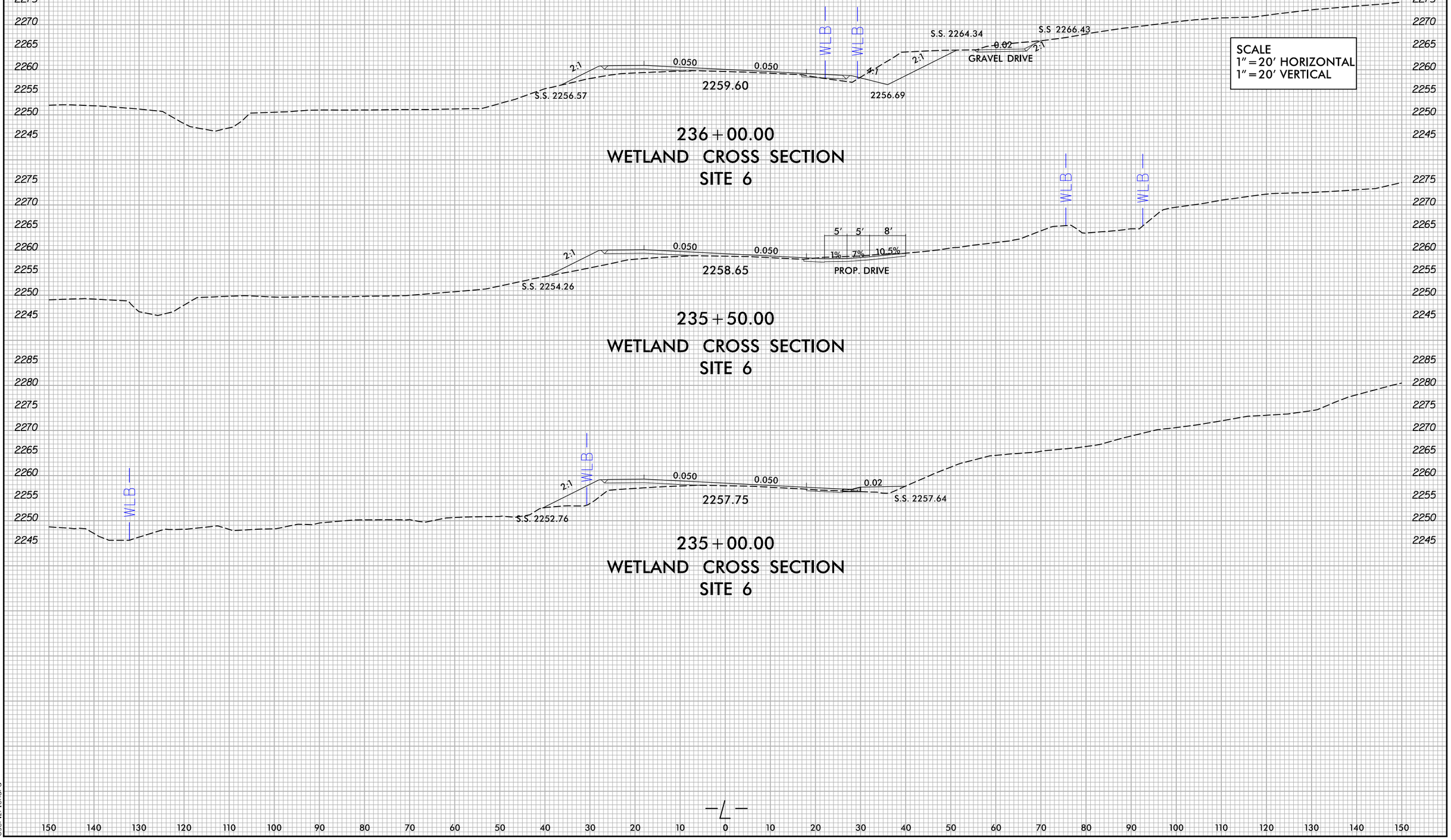
User:zrichard

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-17

PERMIT DRAWING
SHEET 9 OF 34

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



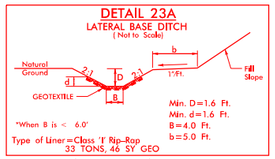
8/17/99

REVISIONS

-L- CURVE DATA

PI Sta 255+20.12
△ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07
DS = 60 MPH

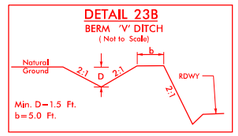
DETAIL 23A
LATERAL BASE DITCH
(Not to Scale)



Type of Liner=Class 'I' Rip-Rap
33 TONS, 46 SY GEO

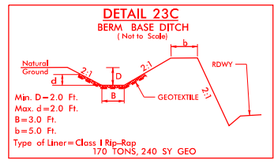
-L- STA. 250+15 TO 250+50 LT
SEE PFL FOR DITCH GRADE (3.9%)

DETAIL 23B
BERM 'V' DITCH
(Not to Scale)



-L- STA. 251+90 TO 252+35 RT
SEE PFL FOR DITCH GRADE (13.5%)

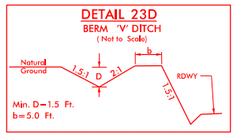
DETAIL 23C
BERM BASE DITCH
(Not to Scale)



Type of Liner=Class I Rip-Rap
170 TONS, 240 SY GEO

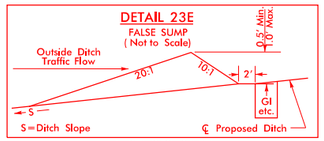
-L- STA. 252+50 TO 254+00 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 23D
BERM 'V' DITCH
(Not to Scale)



-L- STA. 258+50 TO 258+68 RT
-L- STA. 258+68 TO 259+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 23E
FALSE SUMP
(Not to Scale)



-L- STA. 252+36 RT
-L- STA. 253+86 RT
-L- STA. 255+36 RT
-L- STA. 256+69 RT
-L- STA. 258+55 RT
-L- STA. 259+87 RT
-L- STA. 261+94 RT

NAD 83/2011

DETAIL 23F
SPECIAL CUT DITCH
(Not to Scale)

-L- STA. 250+50 TO 250+89 RT
SEE PFL FOR DITCH GRADE (2.56%)

DETAIL 23G
BANK STABILIZATION
(Not to Scale)

-L- STA 250+06 LT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

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

PERMIT DRAWING
SHEET 10 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	23

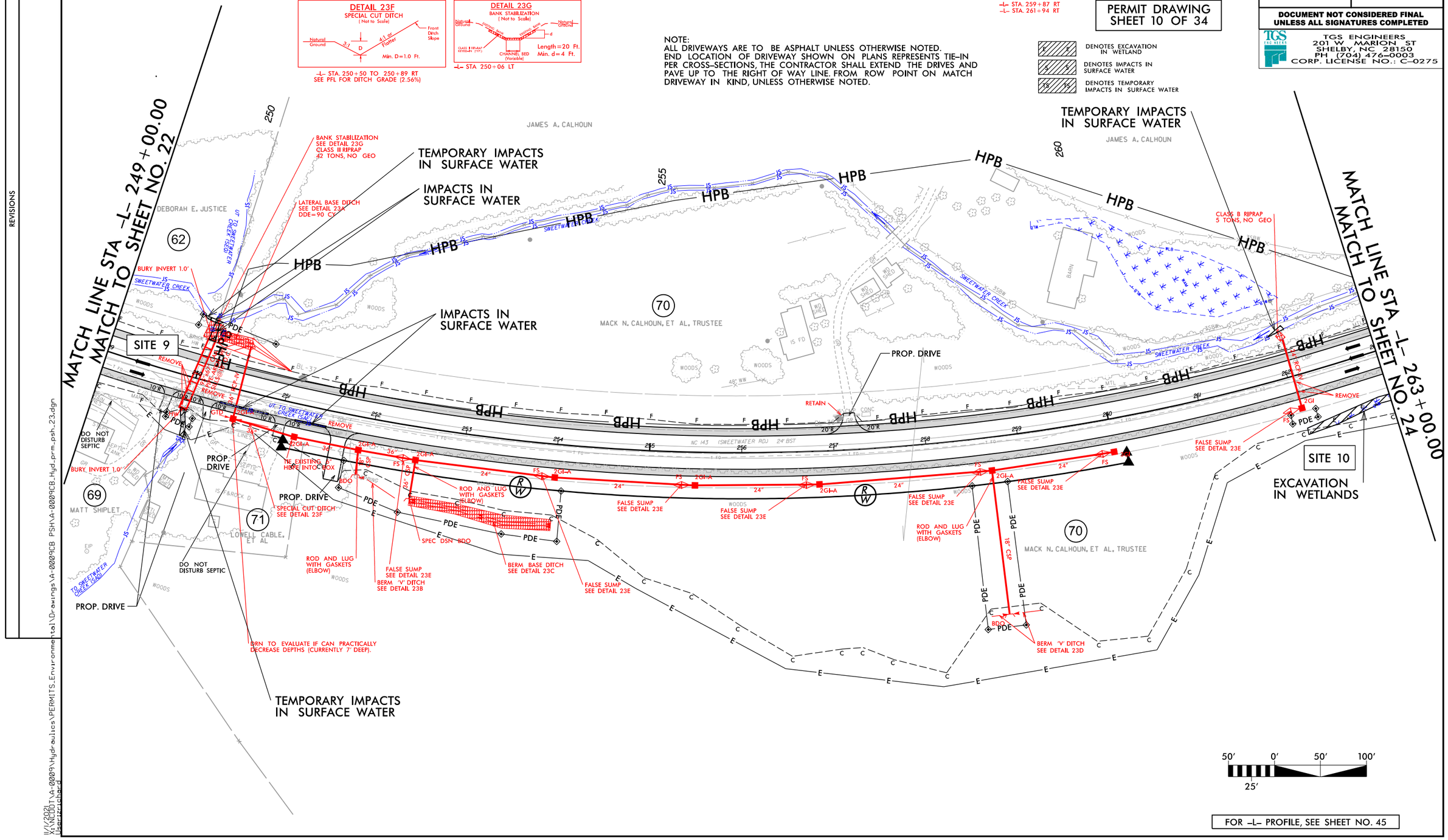
R/W SHEET NO.

ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



FOR -L- PROFILE, SEE SHEET NO. 45

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	23

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

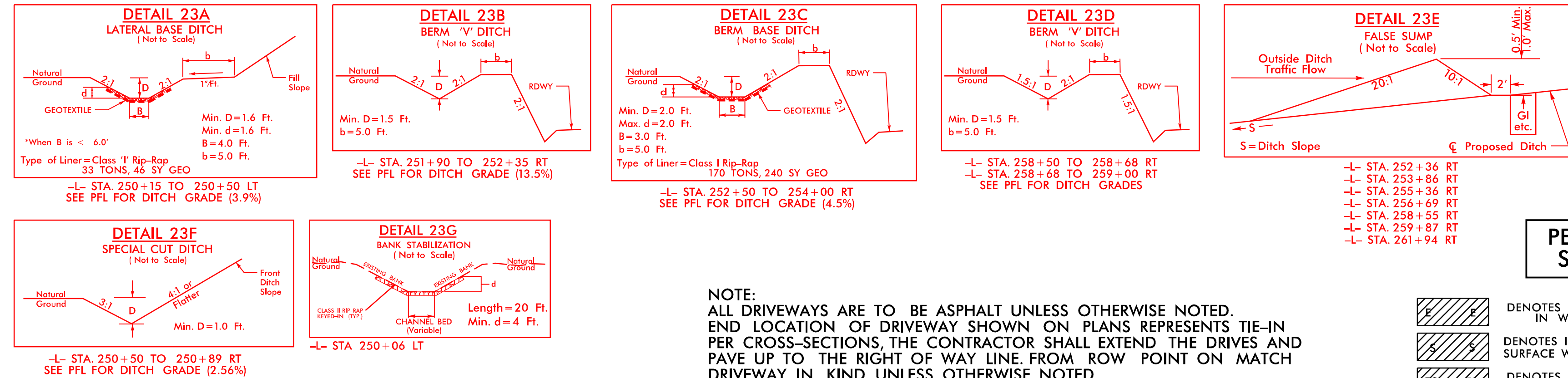
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 11 OF 34

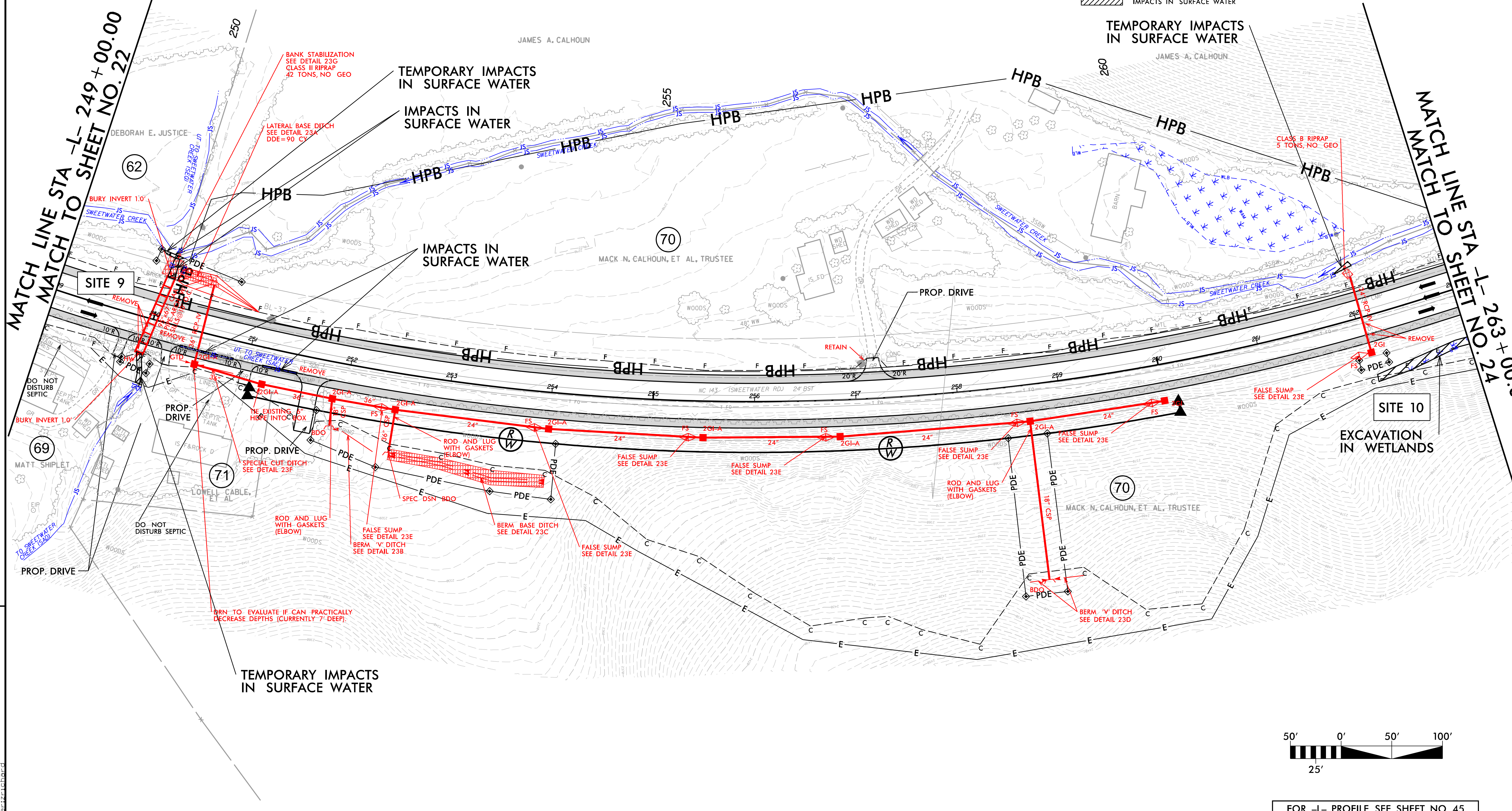
-L- CURVE DATA

PI Sta 255+20.12
Δ = 40° 44' 05.0" (LT)
D = 2° 36' 15.7"
L = 1,564.10'
T = 816.75'
R = 2,200.00'
SE = 0.07
DS = 60 MPH


DETAIL 23A
LATERAL BASE DITCH
-L- STA. 250+15 TO 250+50 LT
SEE PFL FOR DITCH GRADE (3.9%)
DETAIL 23B
BERM 'V' DITCH
-L- STA. 251+90 TO 252+35 RT
SEE PFL FOR DITCH GRADE (13.5%)
DETAIL 23C
BERM BASE DITCH
-L- STA. 252+50 TO 254+00 RT
SEE PFL FOR DITCH GRADE (4.5%)
DETAIL 23D
BERM 'V' DITCH
-L- STA. 258+50 TO 258+68 RT
-L- STA. 258+68 TO 259+00 RT
SEE PFL FOR DITCH GRADES
DETAIL 23E
FALSE SUMP
-L- STA. 252+36 RT
-L- STA. 253+86 RT
-L- STA. 255+36 RT
-L- STA. 256+69 RT
-L- STA. 258+55 RT
-L- STA. 259+87 RT
-L- STA. 261+94 RT
DETAIL 23F
SPECIAL CUT DITCH
-L- STA. 250+50 TO 250+89 RT
SEE PFL FOR DITCH GRADE (2.56%)
DETAIL 23G
BANK STABILIZATION
-L- STA 250+06 LT

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES EXCAVATION IN WETLAND
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER


NAD 83/2011
MATCH LINE STA -L- 249+00.00
MATCH TO SHEET NO. 22
MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 24
SITE 9
SITE 10
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
EXCAVATION IN WETLANDS
HPB
PROP. DRIVE
JAMES A. CALHOUN
DEBORAH E. JUSTICE
MACK N. CALHOUN, ET AL, TRUSTEE
MATT SHIPLET
LOWELL CABLE, ET AL
SWEETWATER CREEK
DO NOT DISTURB SEPTIC
62
69
70
71

50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO. 45

REVISIONS

8/17/99

11/1/2021
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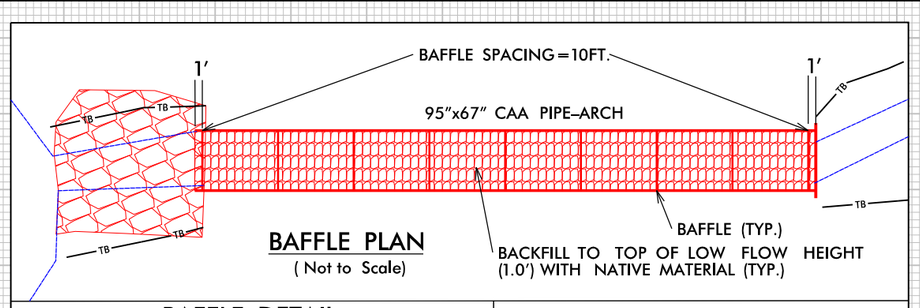
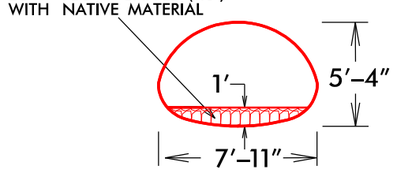


BAFFLE DETAIL
(Not to Scale)



NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–L–
NC 143

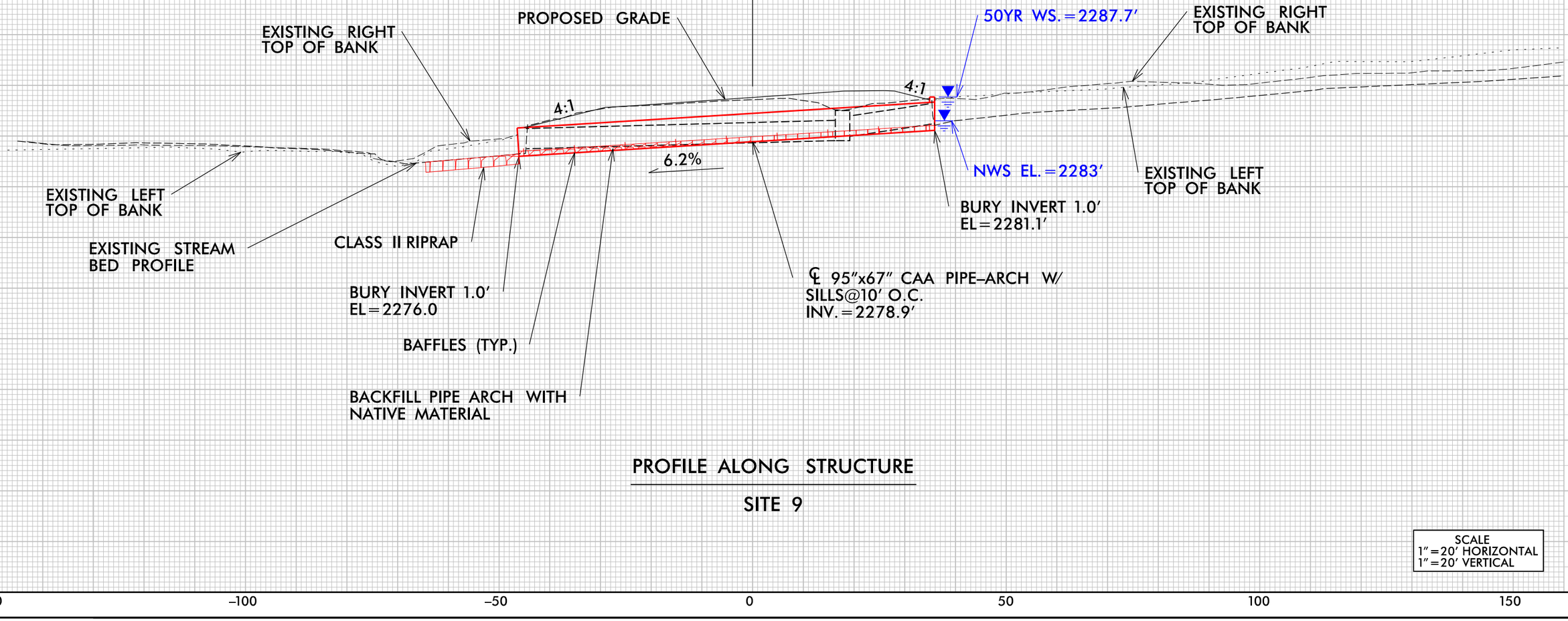
PERMIT DRAWING
SHEET 12 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

℄ –L– STA. 250+00
95″x67″ CAA PIPE–ARCH W/ SILLS@10′ O.C.
PROPOSED GRADE– 2287.61′
SKEW– 98 DEG.



PROFILE ALONG STRUCTURE

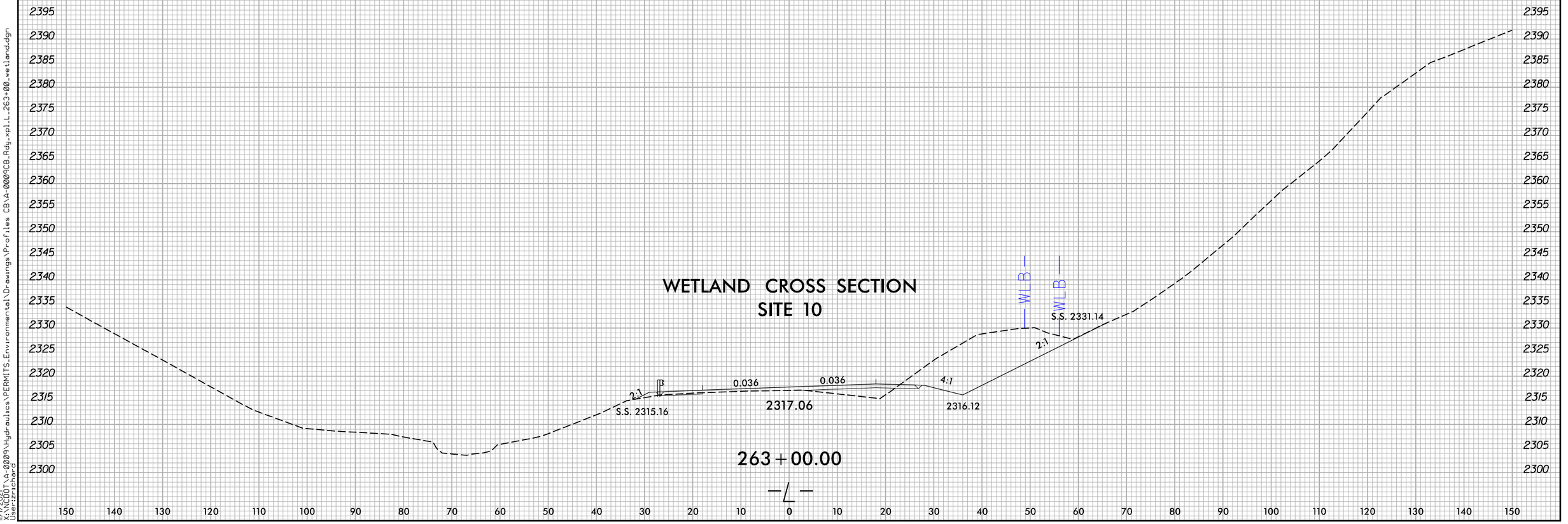
SITE 9

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-45

PERMIT DRAWING
SHEET 13 OF 34

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



WETLAND CROSS SECTION
SITE 10

263+00.00

—℄—

6/23/16

11/1/2021
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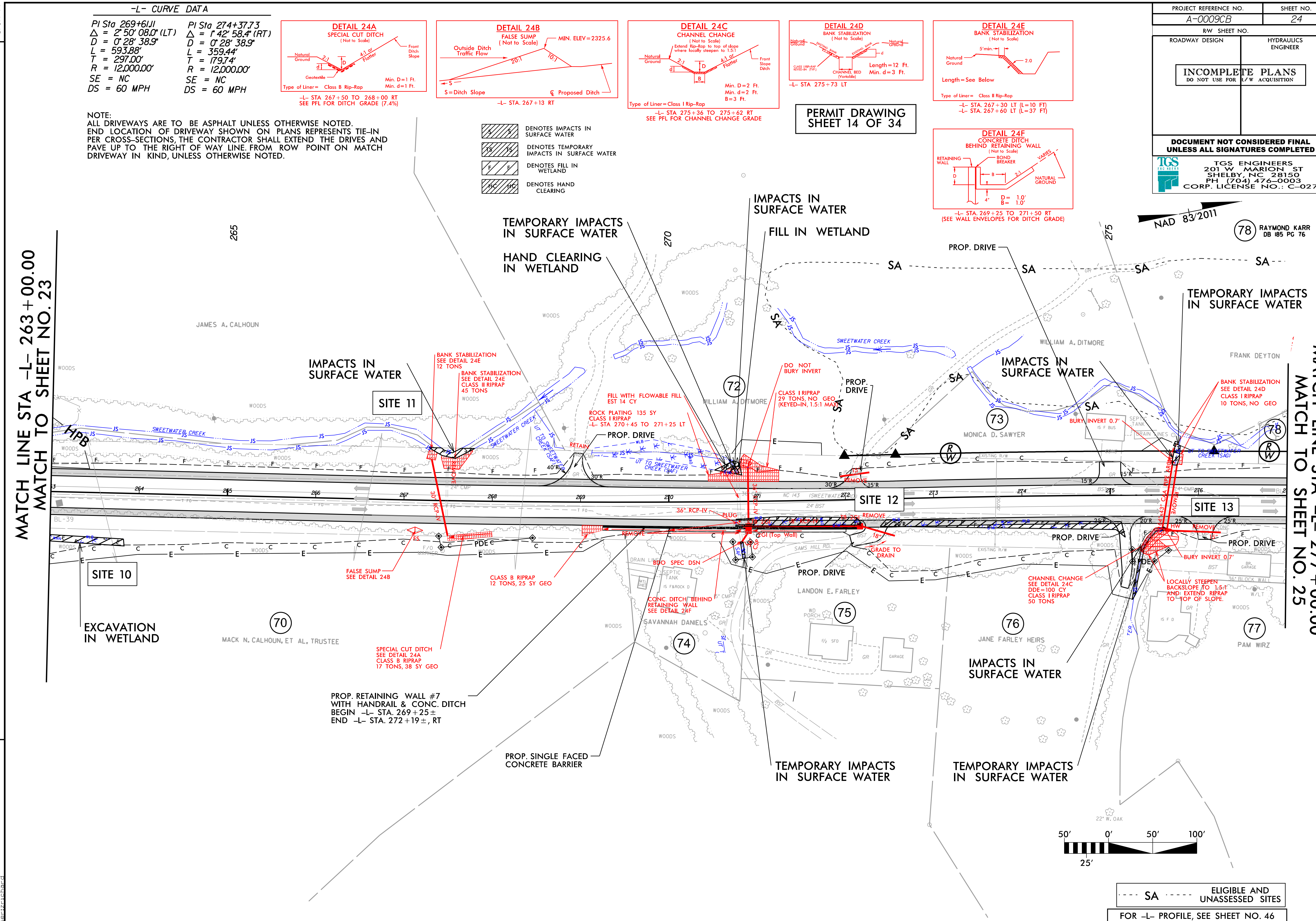
User:richard



-L- CURVE DATA
PI Sta 269+61.11
Δ = 2° 50' 08.0" (LT)
D = 0° 28' 38.9"
L = 593.88'
T = 297.00'
R = 12,000.00'
SE = NC
DS = 60 MPH
PI Sta 274+37.73
Δ = 1° 42' 58.4" (RT)
D = 0° 28' 38.9"
L = 359.44'
T = 179.74'
R = 12,000.00'
SE = NC
DS = 60 MPH
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DETAIL 24A
SPECIAL CUT DITCH
-L- STA 267+50 TO 268+00 RT
SEE PFL FOR DITCH GRADE (7.4%)
DETAIL 24B
FALSE SUMP
MIN. ELEV=2325.6
-L- STA. 267+13 RT
DETAIL 24C
CHANNEL CHANGE
-L- STA 275+36 TO 275+62 RT
SEE PFL FOR CHANNEL CHANGE GRADE
DETAIL 24D
BANK STABILIZATION
-L- STA 275+73 LT
DETAIL 24E
BANK STABILIZATION
-L- STA. 267+30 LT (L=10 FT)
-L- STA. 267+60 LT (L=37 FT)
DETAIL 24F
CONCRETE DITCH BEHIND RETAINING WALL
-L- STA. 269+25 TO 271+50 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)
PERMIT DRAWING
SHEET 14 OF 34
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
PROJECT REFERENCE NO. A-0009CB
SHEET NO. 24
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
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 23
MATCH LINE STA -L- 277+00.00
MATCH TO SHEET NO. 25
SITE 10
SITE 11
SITE 12
SITE 13
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
HAND CLEARING IN WETLAND
FILL IN WETLAND
EXCAVATION IN WETLAND
SWEETWATER CREEK
JAMES A. CALHOUN
WILLIAM A. DITMORE
MONICA D. SAWYER
FRANK DEYTON
RAYMOND KARR DB 185 PG 76
MACK N. CALHOUN, ET AL, TRUSTEE
SAVANNAH DANIELS
LANDON E. FARLEY
JANE FARLEY HEIRS
PAM WIRZ
PROP. RETAINING WALL #7 WITH HANDRAIL & CONC. DITCH BEGIN -L- STA. 269+25± END -L- STA. 272+19±, RT
PROP. SINGLE FACED CONCRETE BARRIER
PROP. DRIVE
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 46

8/17/99

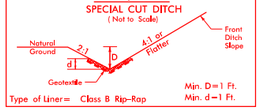
-L- CURVE DATA

PI Sta 269+61.11
△ = 2° 50' 08.0" (LT)
D = 0° 28' 38.9"
L = 593.88'
T = 297.00'
R = 12,000.00'
SE = NC
DS = 60 MPH

PI Sta 274+37.73
△ = 1° 42' 58.4" (RT)
D = 0° 28' 38.9"
L = 359.44'
T = 179.74'
R = 12,000.00'
SE = NC
DS = 60 MPH

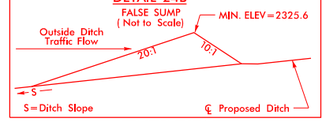
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 24A
SPECIAL CUT DITCH
(Not to Scale)



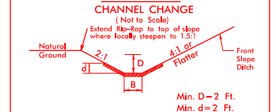
-L- STA 267+50 TO 268+00 RT
SEE PFL FOR DITCH GRADE (7.4%)

DETAIL 24B
FALSE SUMP
(Not to Scale)



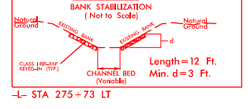
-L- STA. 267+13 RT

DETAIL 24C
CHANNEL CHANGE
(Not to Scale)



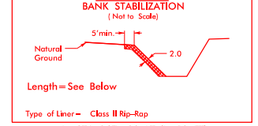
-L- STA 275+36 TO 275+62 RT
SEE PFL FOR CHANNEL CHANGE GRADE

DETAIL 24D
BANK STABILIZATION
(Not to Scale)



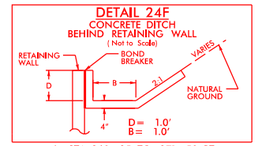
-L- STA 275+73 LT

DETAIL 24E
BANK STABILIZATION
(Not to Scale)



-L- STA. 267+30 LT (L=10 FT)
-L- STA. 267+60 LT (L=37 FT)

DETAIL 24F
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-L- STA. 269+25 TO 271+50 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

PERMIT DRAWING
SHEET 15 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	24
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

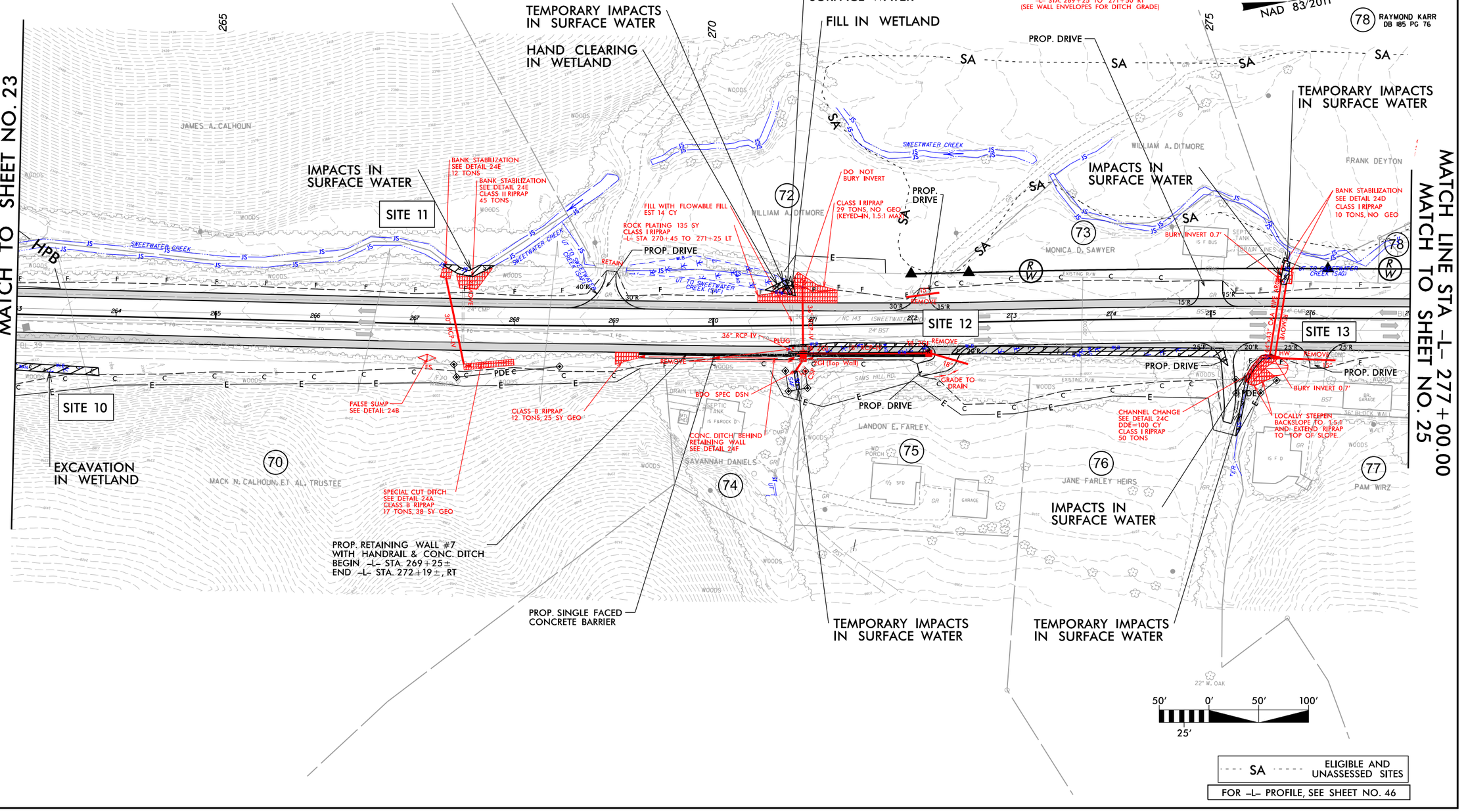
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

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

NAD 83/2011

MATCH LINE STA -L- 263+00.00
MATCH TO SHEET NO. 23

MATCH LINE STA -L- 277+00.00
MATCH TO SHEET NO. 25

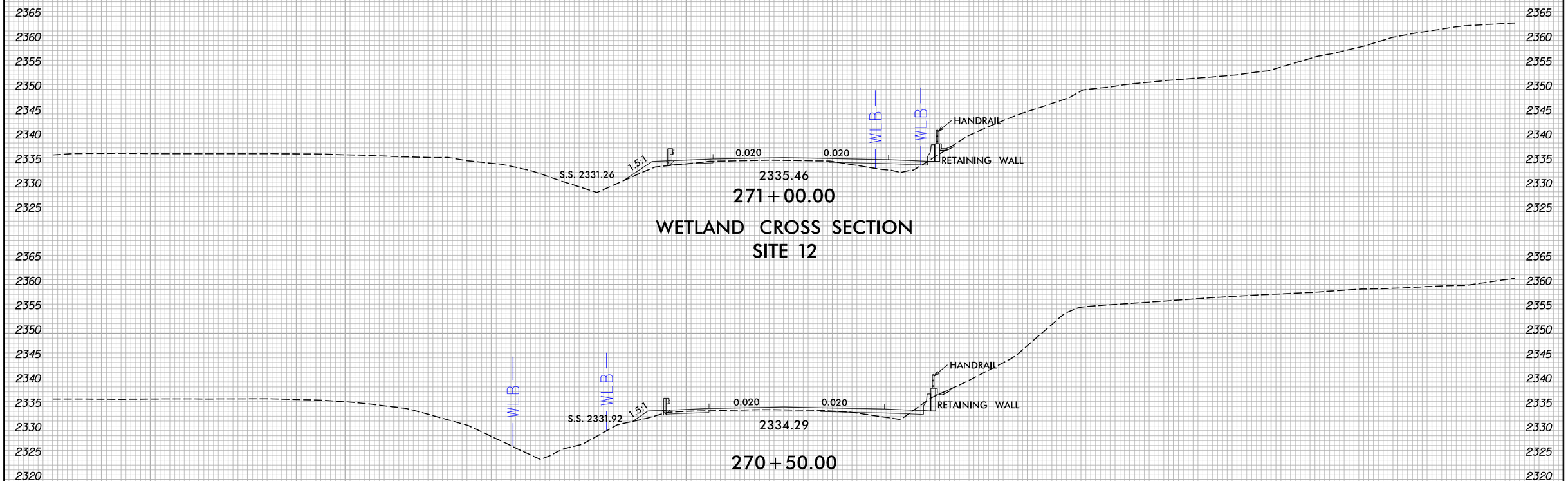


6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-53

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

PERMIT DRAWING
SHEET 16 OF 34



271+00.00

WETLAND CROSS SECTION
SITE 12

270+50.00

WETLAND CROSS SECTION
SITE 12

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

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

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

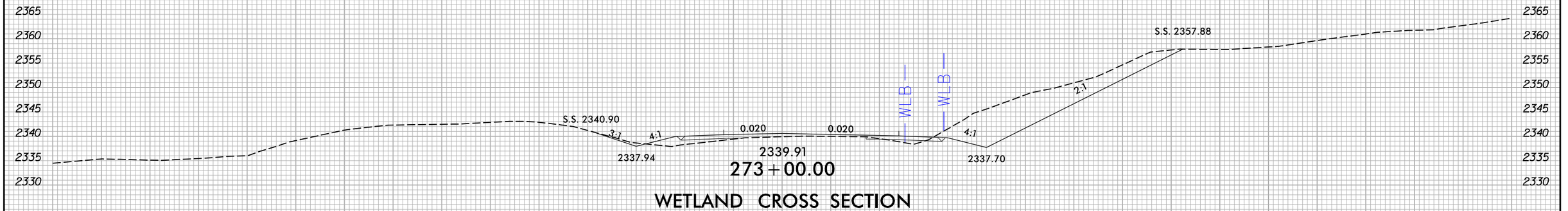
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-55

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

PERMIT DRAWING
SHEET 17 OF 34

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



273 + 00.00

WETLAND CROSS SECTION
SITE 12

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

8/17/99

-L- CURVE DATA	-Y4- CURVE DATA			
PI Sta 287+55.00	PI Sta 11+11.35	PI Sta 20+66.90	PI Sta 22+09.11	PI Sta 22+91.14
Δ = 34° 15′ 00.8″ (RT)	Δ = 55° 08′ 53.6″ (LT)	Δ = 83° 23′ 00.0″ (RT)	Δ = 55° 15′ 43.9″ (LT)	Δ = 23° 50′ 55.2″ (LT)
D = 5° 58′ 05.9″	D = 71° 37′ 11.0″	D = 76° 23′ 39.7″	D = 60° 18′ 40.8″	D = 30° 09′ 20.4″
L = 573.87′	L = 77.00′	L = 109.15′	L = 91.63′	L = 79.09′
T = 295.80′	T = 41.78′	T = 66.80′	T = 49.73′	T = 40.12′
R = 960.00′	R = 80.00′	R = 75.00′	R = 95.00′	R = 190.00′
SE = 0.08				
DS = 55 MPH				

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	25
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

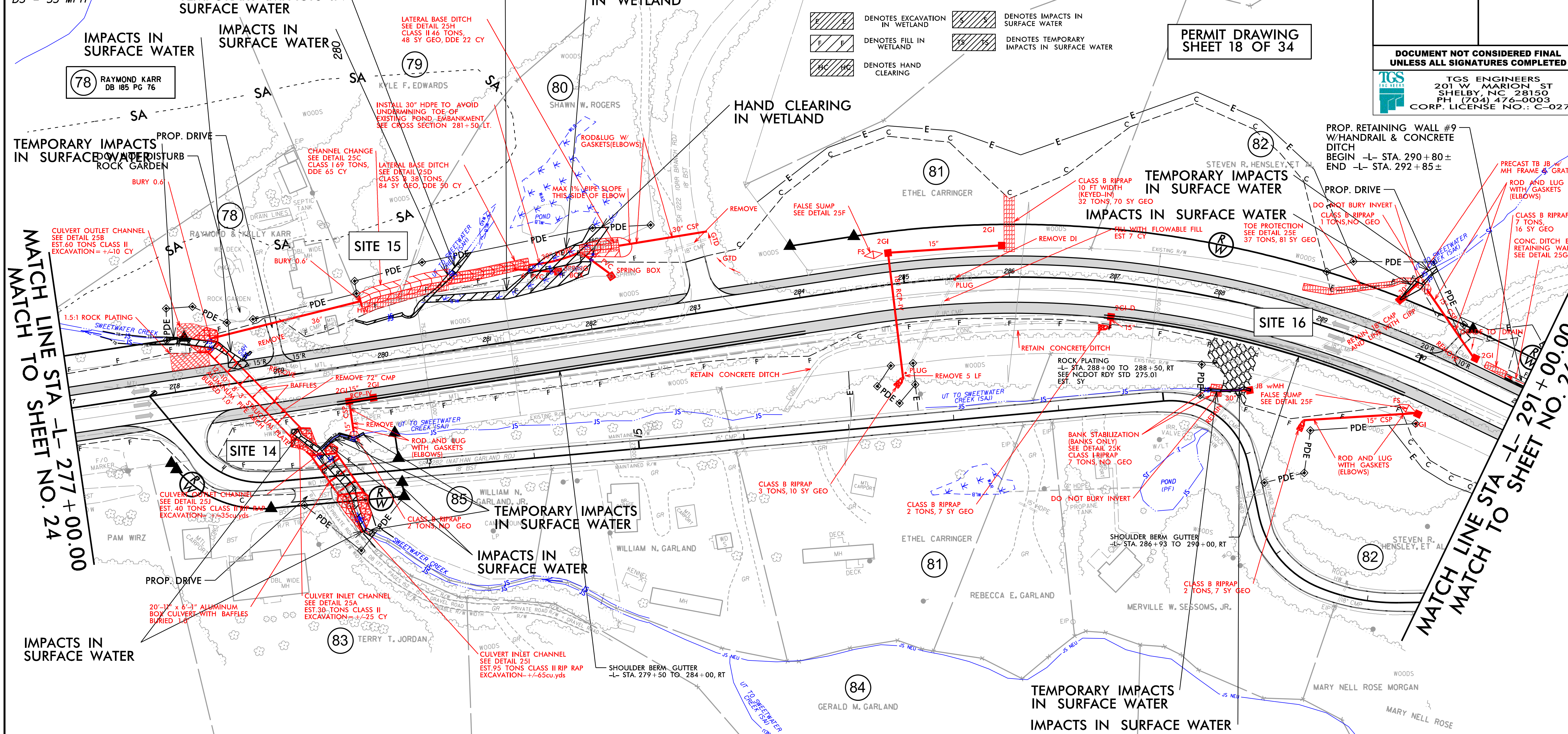
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

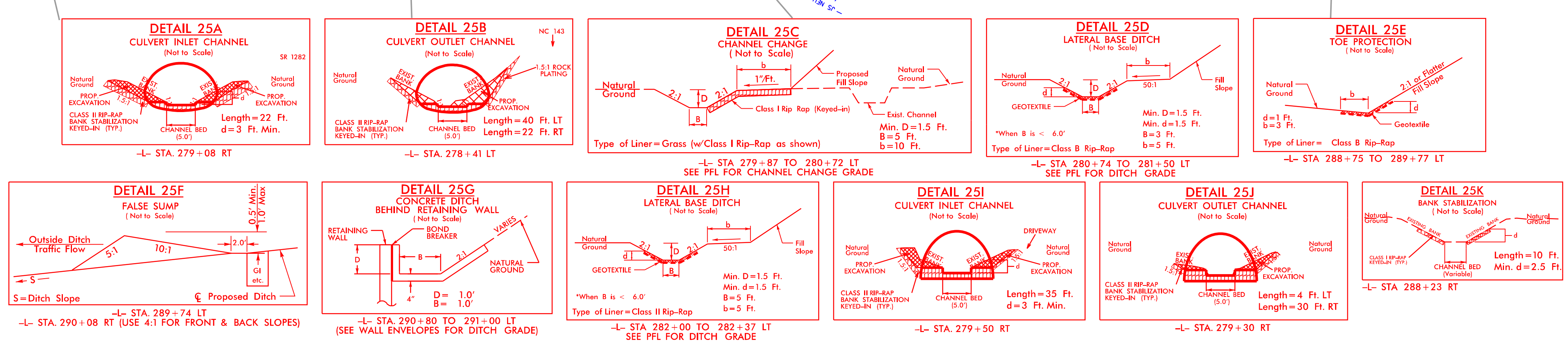
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 18 OF 34

DENOTES EXCAVATION IN WETLAND
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER





50′ 0′ 50′ 100′
25′

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

12/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_25.dgn

-L- CURVE DATA	-Y4- CURVE DATA			
PI Sta 287+55.00	PI Sta 11+11.35	PI Sta 20+66.90	PI Sta 22+09.11	PI Sta 22+91.14
Δ = 34° 15' 00.8" (RT)	Δ = 55° 08' 53.6" (LT)	Δ = 83° 23' 00.0" (RT)	Δ = 55° 15' 43.9" (LT)	Δ = 23° 50' 55.2" (LT)
D = 5° 58' 05.9"	D = 71° 37' 11.0"	D = 76° 23' 39.7"	D = 60° 18' 40.8"	D = 30° 09' 20.4"
L = 573.87'	L = 77.00'	L = 109.15'	L = 91.63'	L = 79.09'
T = 295.80'	T = 41.78'	T = 66.80'	T = 49.73'	T = 40.12'
R = 960.00'	R = 80.00'	R = 75.00'	R = 95.00'	R = 190.00'
SE = 0.08				
DS = 55 MPH				

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	25

R/W SHEET NO.

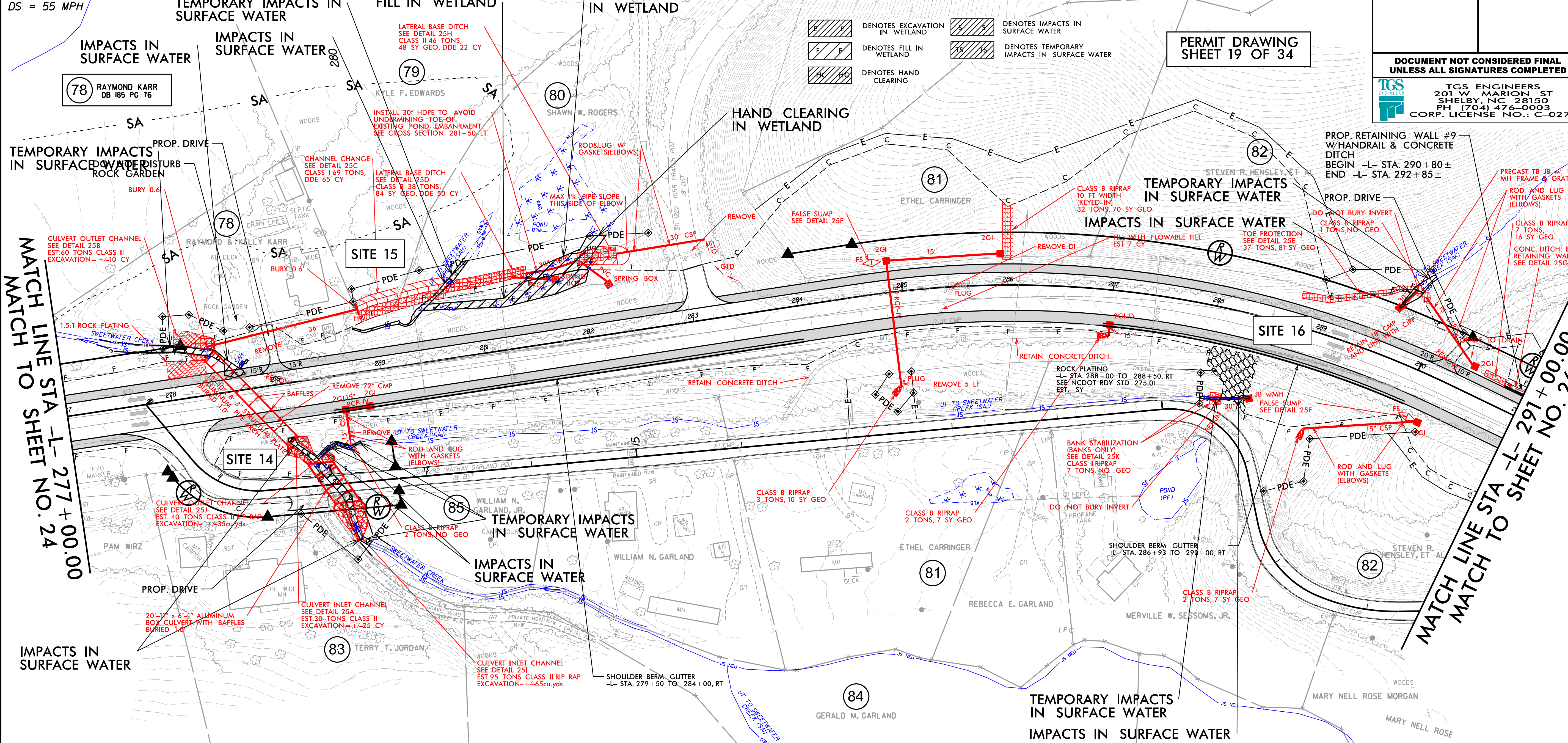
ROADWAY DESIGN — HYDRAULICS ENGINEER

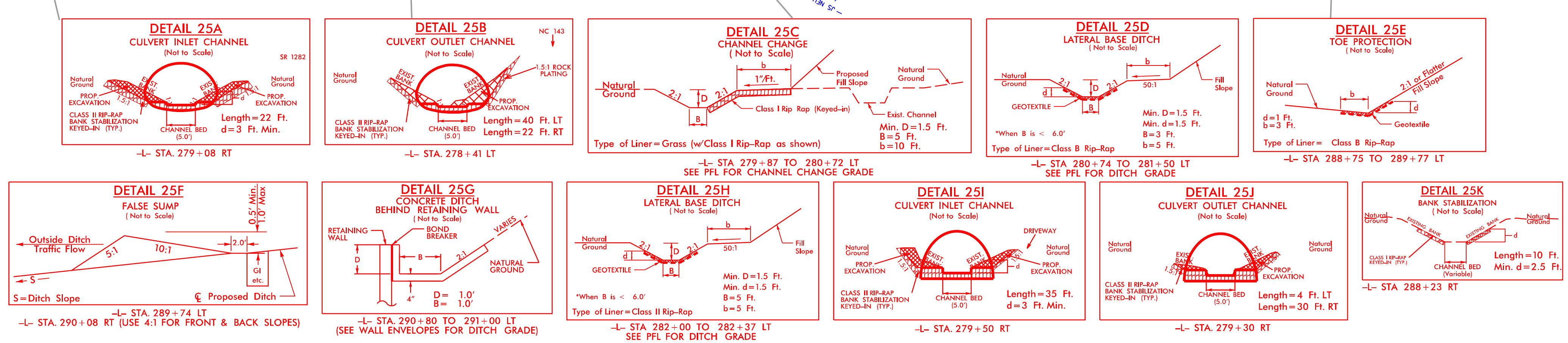
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 19 OF 34





50' 0' 50' 100'
25'

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 46

8/17/99
12/13/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_25.dgn

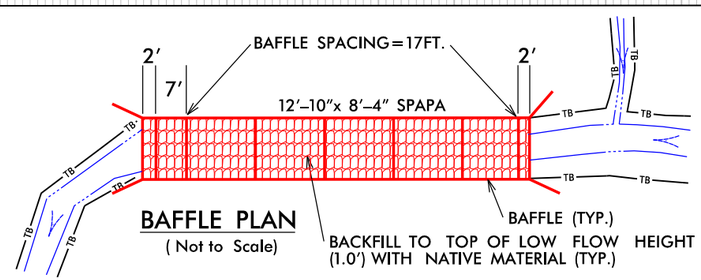
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 20 OF 34

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

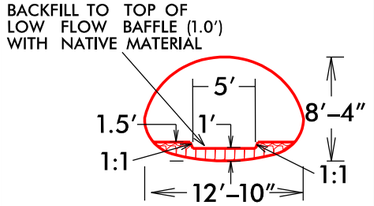
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



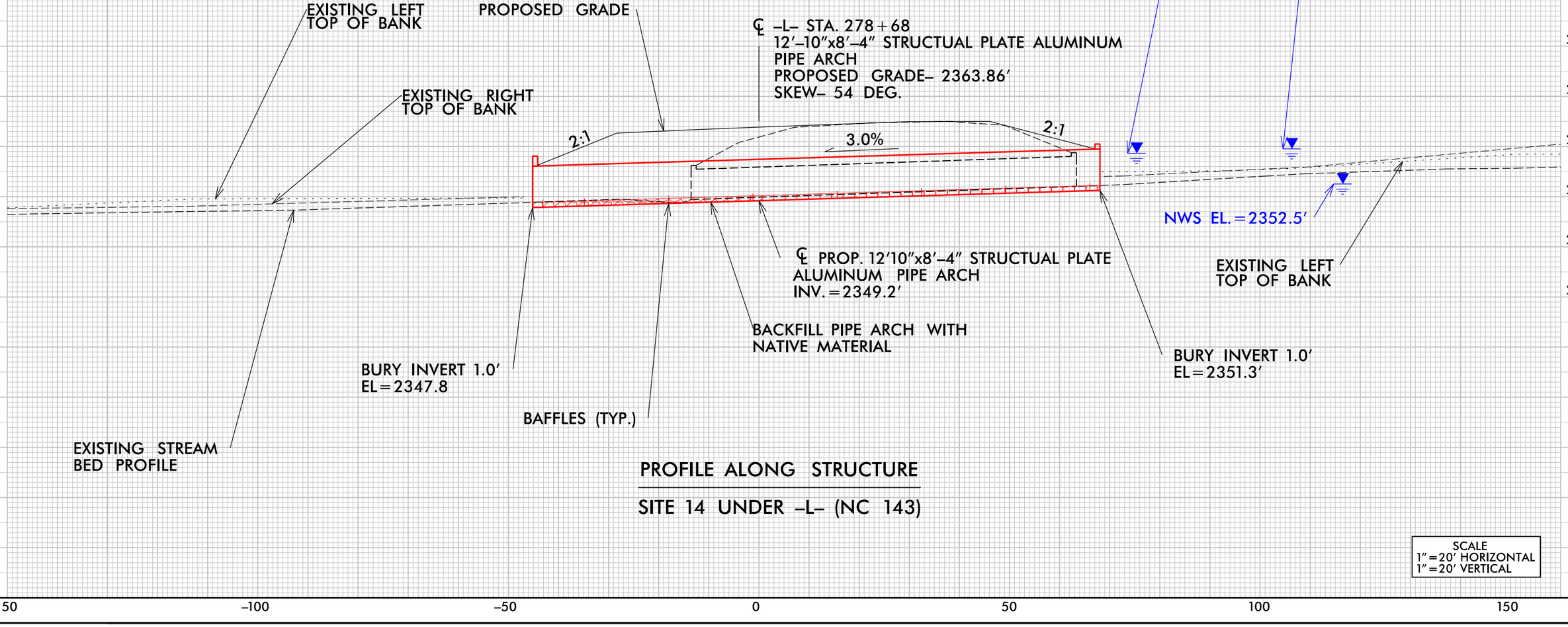
BAFFLE PLAN
(Not to Scale)

BAFFLE DETAIL
(Not to Scale)



NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

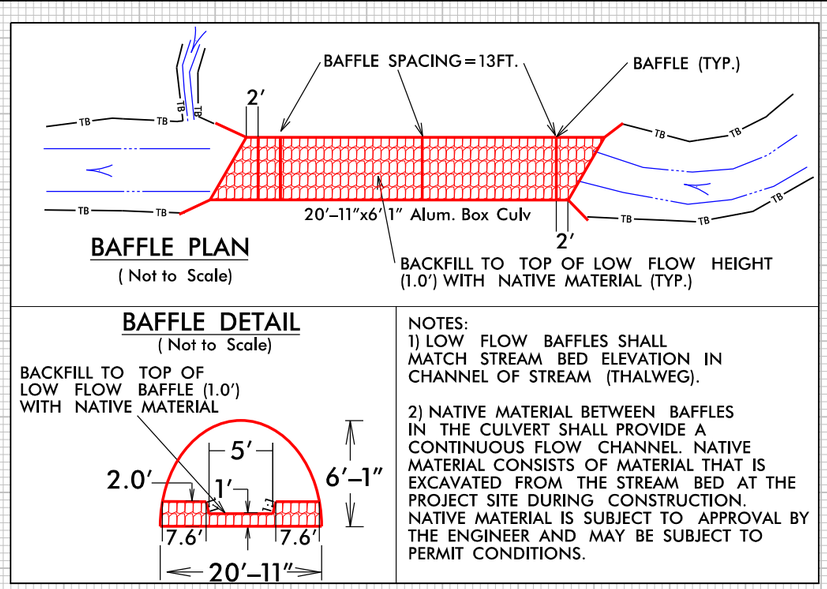
2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.



PROFILE ALONG STRUCTURE

SITE 14 UNDER –L– (NC 143)

SCALE
1″=20′ HORIZONTAL
1″=20′ VERTICAL



BAFFLE PLAN
(Not to Scale)

BAFFLE DETAIL
(Not to Scale)

NOTES:
1) LOW FLOW BAFFLES SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL BETWEEN BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CONSTRUCTION. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–Y4–
SR 1282

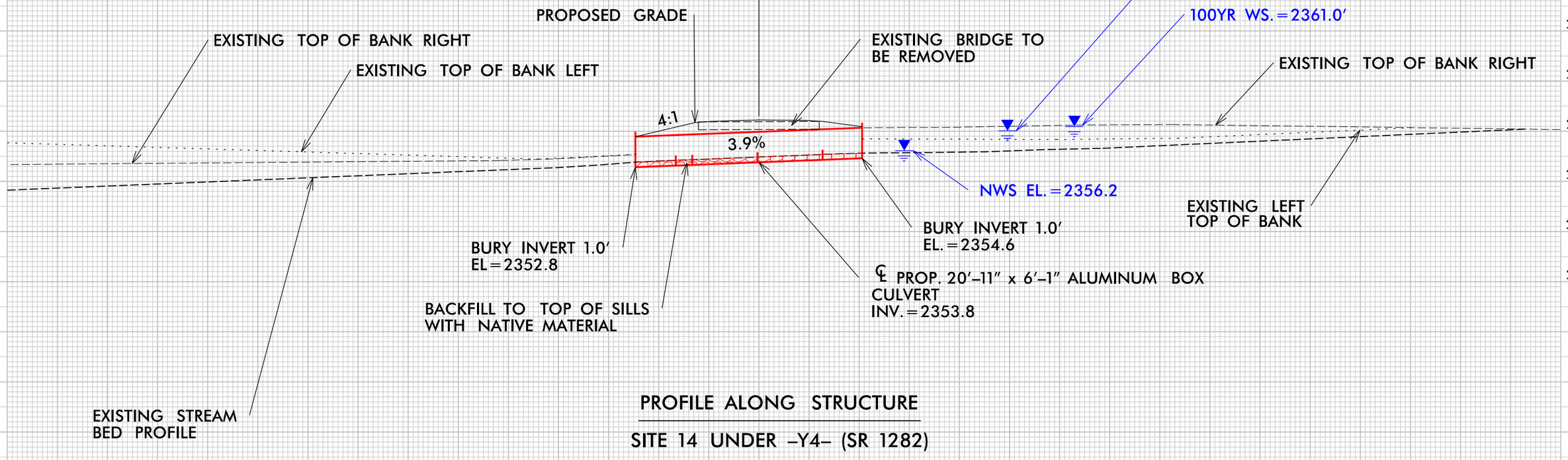
PERMIT DRAWING
SHEET 21 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

℄ –Y4– STA. 12+13.1
20'–11" x 6'–1" ALUMINUM BOX CULVERT
WITH CONCRETE HEADWALLS AND BAFFLES
PROPOSED GRADE=2362.3'
SKEW=60 DEG.



PROFILE ALONG STRUCTURE

SITE 14 UNDER –Y4– (SR 1282)

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

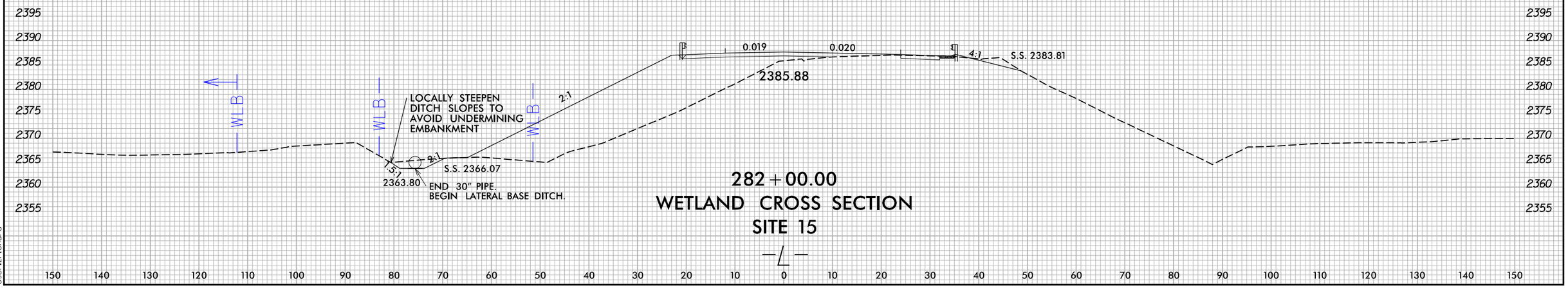
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-60

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

PERMIT DRAWING
SHEET 22 OF 34

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



282+00.00
WETLAND CROSS SECTION
SITE 15

—℄—

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

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\Profiles CB\A-0009CB_Hyd_xpLL_wetlands.dgn
User:rrichard

8/17/99

-L- CURVE DATA

PI Sta 311+70.00	PI Sta 320+83.09	PI Sta 40+76.38	PI Sta 41+53.87	PI Sta 43+61.39
△ = 54° 45' 45.1" (RT)	△ = 32° 27' 42.9" (LT)	△ = 78° 16' 33.1" (LT)	△ = 15° 47' 56.9" (LT)	△ = 41° 05' 30.0" (LT)
D = 5° 24' 18.9"	D = 7° 32' 20.1"	D = 71° 37' 11.0"	D = 23° 52' 23.7"	D = 28° 38' 52.4"
L = 1,013.13'	L = 430.59'	L = 109.29'	L = 66.18'	L = 143.44'
T = 549.01'	T = 221.25'	T = 65.10'	T = 33.30'	T = 74.96'
R = 1,060.00'	R = 760.00'	R = 80.00'	R = 240.00'	R = 200.00'
SE = 0.08	SE = 0.08			
DS = 55 MPH	DS = 50 MPH			

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

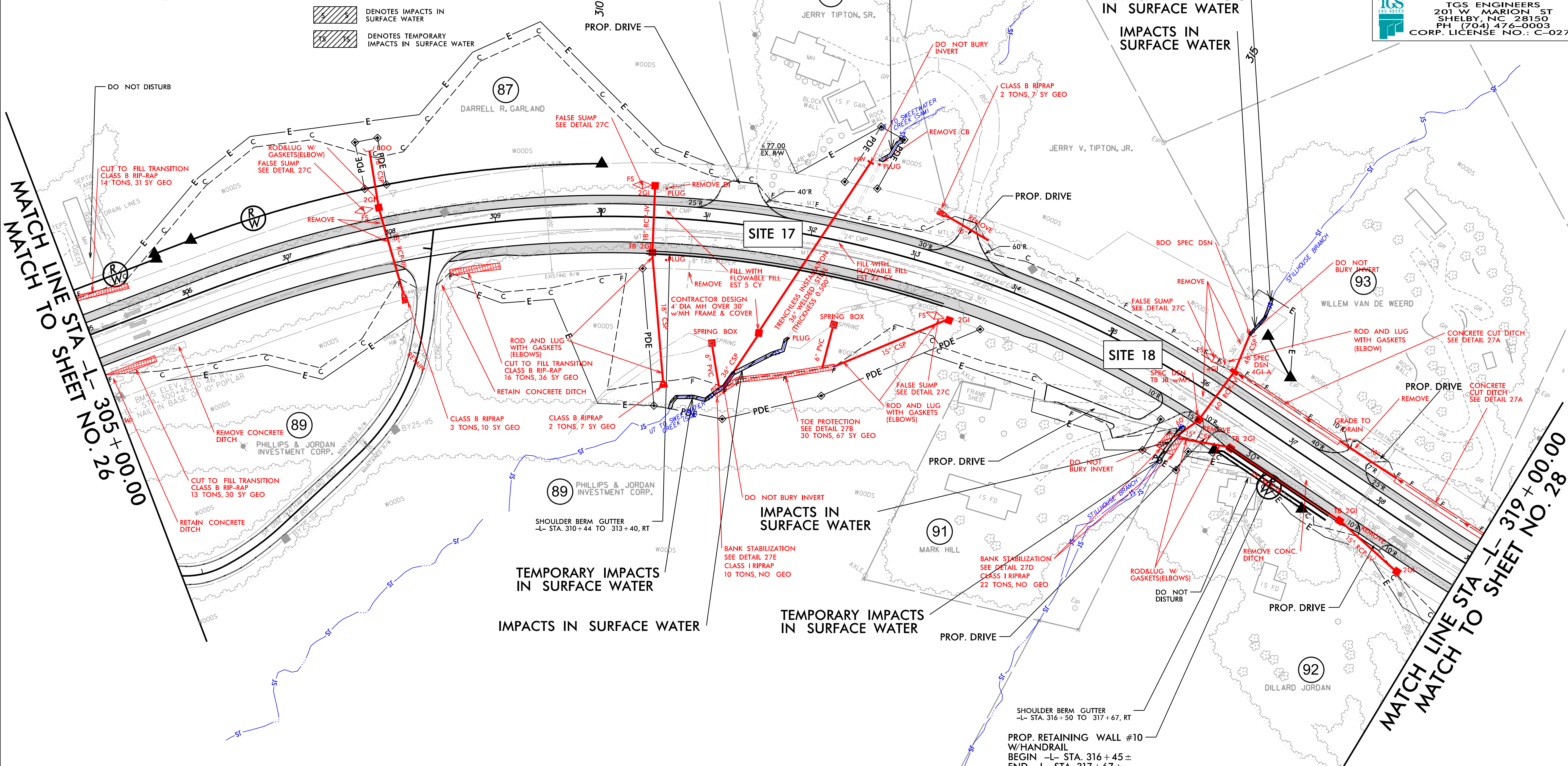
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	27
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

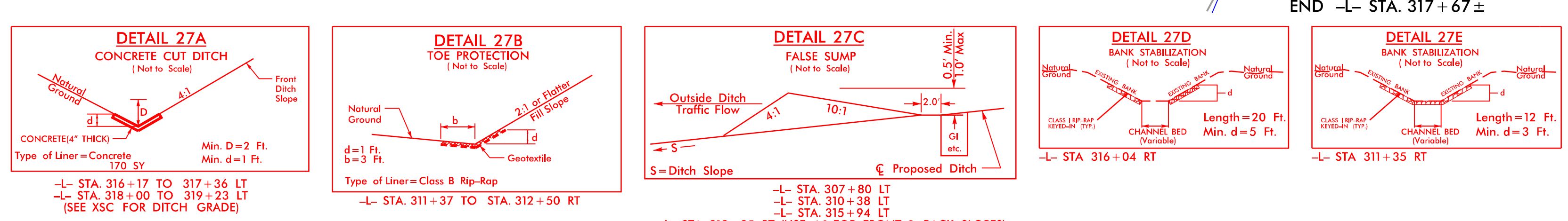
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 23 OF 34



NAD 83/2011
MATCH LINE STA -L- 305+00.00
MATCH TO SHEET NO. 26
MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 28
SITE 17
SITE 18
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
DARRELL R. GARLAND
JERRY TIPTON, SR.
JERRY V. TIPTON, JR.
WILLEM VAN DE WEERD
PHILLIPS & JORDAN INVESTMENT CORP.
MARK HILL
DILLARD JORDAN
DO NOT DISTURB
CUT TO FILL TRANSITION CLASS B RIP-RAP 14 TONS, 31 SY GEO
FALSE SUMP SEE DETAIL 27C
ROD&LUG W/ GASKETS(ELBOW)
PROP. DRIVE
CONTRACTOR DESIGN 4' DIA MH OVER 30' w/MH FRAME & COVER
TRENCHLESS INSTALLATION 36" WELDED STEEL (THICKNESS 0.500")
FILL WITH FLOWABLE FILL EST 5 CY
FILL WITH FLOWABLE FILL EST 22 CY
SPRING BOX
ROD AND LUG WITH GASKETS (ELBOWS)
CUT TO FILL TRANSITION CLASS B RIP-RAP 16 TONS, 36 SY GEO
RETAIN CONCRETE DITCH
CLASS B RIPRAP 3 TONS, 10 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
REMOVE CONCRETE DITCH
CUT TO FILL TRANSITION CLASS B RIP-RAP 13 TONS, 30 SY GEO
TOE PROTECTION SEE DETAIL 27B 30 TONS, 67 SY GEO
DO NOT BURY INVERT
BANK STABILIZATION SEE DETAIL 27E CLASS I RIPRAP 10 TONS, NO GEO
BANK STABILIZATION SEE DETAIL 27D CLASS I RIPRAP 22 TONS, NO GEO
SHOULDER BERM GUTTER -L- STA. 310+44 TO 313+40, RT
SHOULDER BERM GUTTER -L- STA. 316+50 TO 317+67, RT
PROP. RETAINING WALL #10 W/HANDRAIL BEGIN -L- STA. 316+45± END -L- STA. 317+67±
CLASS B RIPRAP 2 TONS, 7 SY GEO
CONCRETE CUT DITCH SEE DETAIL 27A
GRADE TO DRAIN
REMOVE CONC. DITCH
SWEETWATER CREEK
STILLHOUSE BRANCH



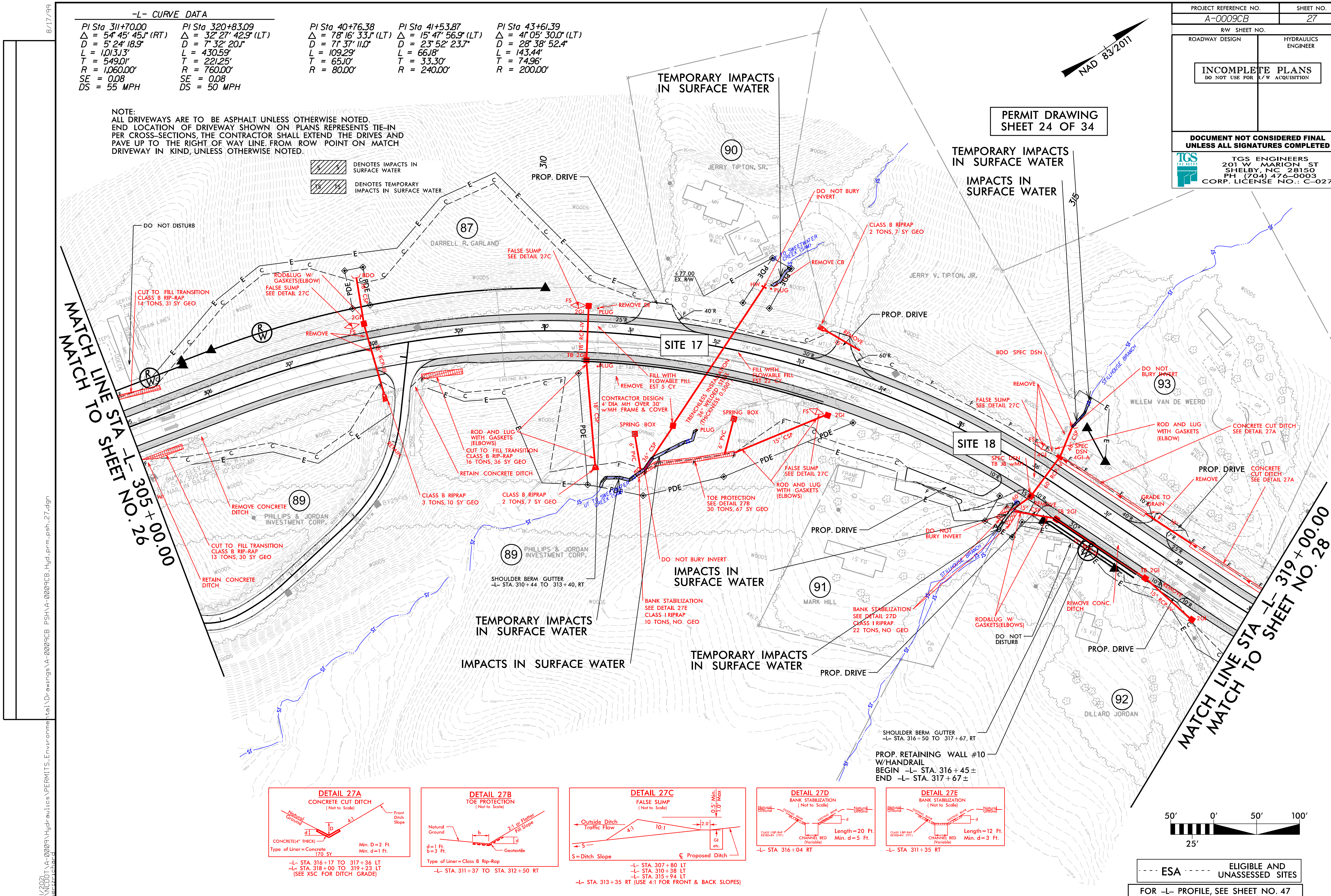
DETAIL 27A
CONCRETE CUT DITCH
(Not to Scale)
Min. D=2 Ft. Min. d=1 Ft.
Type of Liner=Concrete 170 SY
-L- STA. 316+17 TO 317+36 LT
-L- STA. 318+00 TO 319+23 LT
(SEE XSC FOR DITCH GRADE)
DETAIL 27B
TOE PROTECTION
(Not to Scale)
d=1 Ft. b=3 Ft.
Type of Liner=Class B Rip-Rap
-L- STA. 311+37 TO STA. 312+50 RT
DETAIL 27C
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
Proposed Ditch
-L- STA. 307+80 LT
-L- STA. 310+38 LT
-L- STA. 315+94 LT
-L- STA. 313+35 RT (USE 4:1 FOR FRONT & BACK SLOPES)
DETAIL 27D
BANK STABILIZATION
(Not to Scale)
Length=20 Ft. Min. d=5 Ft.
-L- STA 316+04 RT
DETAIL 27E
BANK STABILIZATION
(Not to Scale)
Length=12 Ft. Min. d=3 Ft.
-L- STA 311+35 RT

50' 0' 50' 100'
25'

ESA — ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 47

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_27.dgn
Userid:richard



-L- CURVE DATA
PI Sta 311+70.00
Δ = 54° 45' 45.1" (RT)
D = 5° 24' 18.9"
L = 1,013.13'
T = 549.01'
R = 1,060.00'
SE = 0.08
DS = 55 MPH
PI Sta 320+83.09
Δ = 32° 27' 42.9" (LT)
D = 7° 32' 20.1"
L = 430.59'
T = 221.25'
R = 760.00'
SE = 0.08
DS = 50 MPH
PI Sta 40+76.38
Δ = 78° 16' 33.1" (LT)
D = 71° 37' 11.0"
L = 109.29'
T = 65.10'
R = 80.00'
PI Sta 41+53.87
Δ = 15° 47' 56.9" (LT)
D = 23° 52' 23.7"
L = 66.18'
T = 33.30'
R = 240.00'
PI Sta 43+61.39
Δ = 41° 05' 30.0" (LT)
D = 28° 38' 52.4"
L = 143.44'
T = 74.96'
R = 200.00'
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS. THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE, FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
PROJECT REFERENCE NO.
A-0009CB
SHEET NO.
27
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
PERMIT DRAWING
SHEET 24 OF 34
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 17
SITE 18
MATCH LINE STA -L- 305+00.00
MATCH TO SHEET NO. 26
MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 28
87
DARRELL R. GARLAND
89
PHILLIPS & JORDAN INVESTMENT CORP.
90
JERRY TIPTON, SR.
JERRY V. TIPTON, JR.
91
MARK HILL
92
DILLARD JORDAN
93
WILLEM VAN DE WEERD
DO NOT DISTURB
CUT TO FILL TRANSITION CLASS B RIP-RAP 14 TONS, 31 SY GEO
ROD&LUG W/ GASKETS(ELBOW)
FALSE SUMP SEE DETAIL 27C
REMOVE
PROP. DRIVE
REMOVE DI
PLUG
CONTRACTOR DESIGN 4' DIA MH OVER 30" w/MH FRAME & COVER
FILL WITH FLOWABLE FILL EST 5 CY
FILL WITH FLOWABLE FILL EST 22 CY
TRENCHLESS INSTALLATION 36" WELDED STEEL PIPE (THICKNESS 0.500")
SPRING BOX
DO NOT BURY INVERT
CLASS B RIPRAP 2 TONS, 7 SY GEO
REMOVE CB
ROD AND LUG WITH GASKETS (ELBOWS)
CUT TO FILL TRANSITION CLASS B RIP-RAP 16 TONS, 36 SY GEO
RETAIN CONCRETE DITCH
CLASS B RIPRAP 3 TONS, 10 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
REMOVE CONCRETE DITCH
CUT TO FILL TRANSITION CLASS B RIP-RAP 13 TONS, 30 SY GEO
RETAIN CONCRETE DITCH
TOE PROTECTION SEE DETAIL 27B 30 TONS, 67 SY GEO
BANK STABILIZATION SEE DETAIL 27E CLASS I RIPRAP 10 TONS, NO GEO
BANK STABILIZATION SEE DETAIL 27D CLASS I RIPRAP 22 TONS, NO GEO
SHOULDER BERM GUTTER -L- STA. 310+44 TO 313+40, RT
SHOULDER BERM GUTTER -L- STA. 316+50 TO 317+67, RT
PROP. RETAINING WALL #10 W/HANDRAIL BEGIN -L- STA. 316+45± END -L- STA. 317+67±
CONCRETE CUT DITCH SEE DETAIL 27A
GRADE TO DRAIN
REMOVE CONC. DITCH
ROD&LUG W/ GASKETS(ELBOWS)
STILLHOUSE BRANCH
UT TO SWEETWATER CREEK
DETAIL 27A CONCRETE CUT DITCH (Not to Scale)
Min. D = 2 Ft. Min. d = 1 Ft.
Type of Liner = Concrete 170 SY
-L- STA. 316+17 TO 317+36 LT
-L- STA. 318+00 TO 319+23 LT
(SEE XSC FOR DITCH GRADE)
DETAIL 27B TOE PROTECTION (Not to Scale)
d = 1 Ft. b = 3 Ft.
Type of Liner = Class B Rip-Rap
-L- STA. 311+37 TO STA. 312+50 RT
DETAIL 27C FALSE SUMP (Not to Scale)
Outside Ditch Traffic Flow
S = Ditch Slope
Proposed Ditch
-L- STA. 307+80 LT
-L- STA. 310+38 LT
-L- STA. 315+94 LT
-L- STA. 313+35 RT (USE 4:1 FOR FRONT & BACK SLOPES)
DETAIL 27D BANK STABILIZATION (Not to Scale)
Length = 20 Ft. Min. d = 5 Ft.
-L- STA 316+04 RT
DETAIL 27E BANK STABILIZATION (Not to Scale)
Length = 12 Ft. Min. d = 3 Ft.
-L- STA 311+35 RT
ESA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 47
8/17/99
11/1/2021

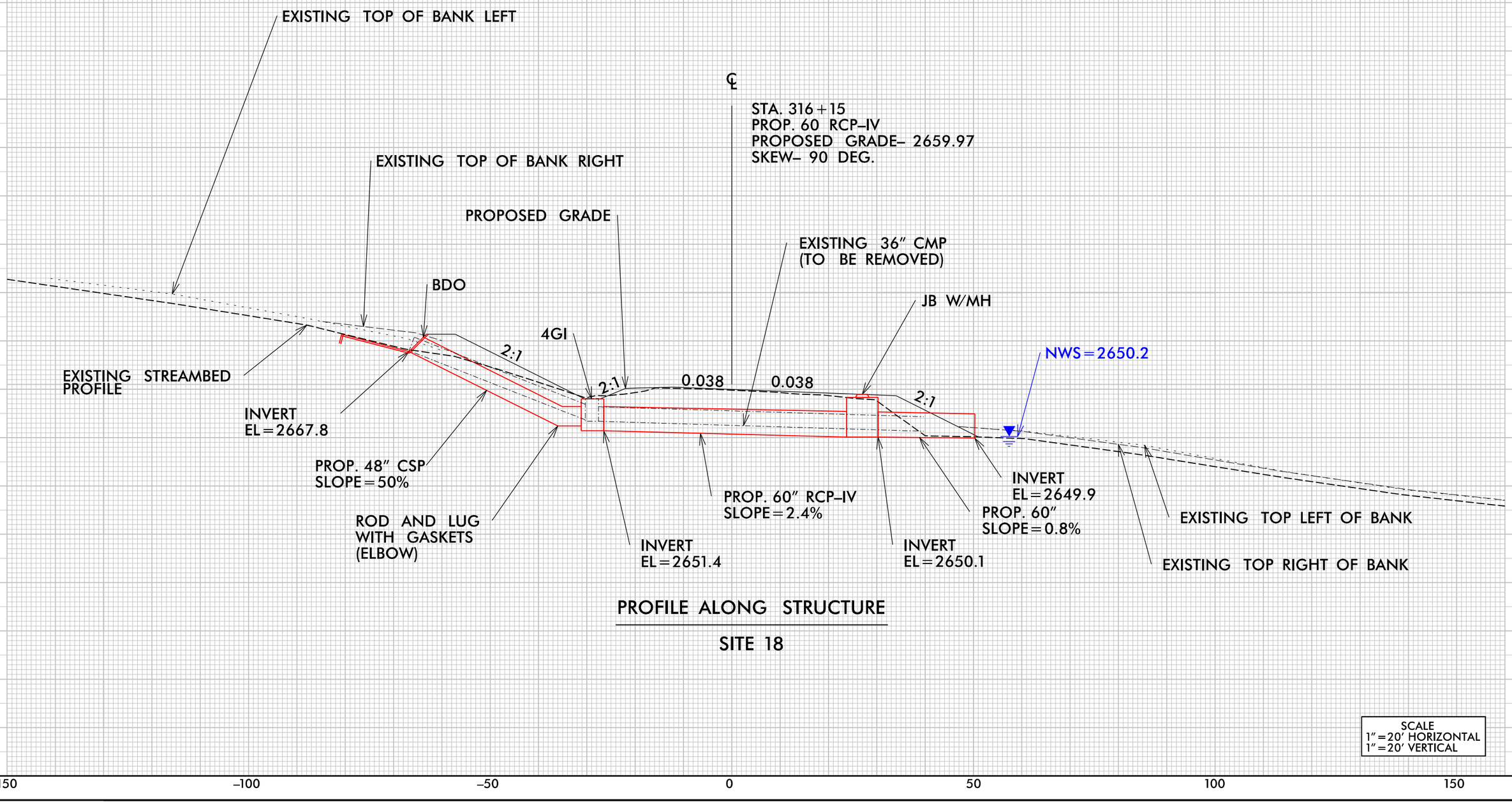
PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 34

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–L–
NC 143



PROFILE ALONG STRUCTURE

SITE 18

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

8/17/99

-L- CURVE DATA

PI Sta 320+83.09	PI Sta 328+01.63
Δ = 32° 27' 42.9" (LT)	Δ = 21° 44' 00.0" (RT)
D = 7° 32' 20.1"	D = 4° 05' 33.2"
L = 430.59'	L = 531.05'
T = 221.25'	T = 268.75'
R = 760.00'	R = 1,400.00'
SE = 0.08	SE = 0.08
DS = 50 MPH	DS = 60 MPH

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 28A
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
0.5' Min. 1.0' Max
2.0'
4:1 etc.
S=Ditch Slope
℄ Proposed Ditch
-L- STA. 327+77 LT
-L- STA. 329+59 LT

DETAIL 28B
CHANNEL CHANGE
(Not to Scale)
Natural Ground
Exist. Channel
CLASS I RIP-RAP KEYED-IN (TYP.)
Length = 35 Ft.
Min. D = 3.0 Ft.
B = 4 Ft.
Type of Liner = CLASS I RIPRAP 45 TONS
-L- STA 328+95(78' RT) TO 329+26(57' RT)
SEE PFL FOR CHANNEL CHANGE GRADE (3.5%)

DETAIL 28C
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
RETAINING WALL
BOND BREAKER
VARIES
NATURAL GROUND
D= 1.0'
B= 1.0'
-L- STA. 319+25 TO 321+08 RT
-L- STA. 330+82 TO 333+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 28D
FALSE SUMP
(Not to Scale)
MIN. ELEV = 2717.3
1.1'
2:1
4:1
Outside Ditch Traffic Flow
S=Toe of Slope
TOE OF FILL
-L- STA. 323+52 LT

DETAIL 28E
BANK STABILIZATION
(Not to Scale)
Natural Ground
EXISTING BANK
EXISTING TOE
CLASS B RIPRAP KEYED-IN (TYP.)
CHANNEL BED (Variable)
Length = 6 Ft.
Min. d = 1 Ft.
-L- STA 327+90 RT

DETAIL 28F
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
2:1 or Flatter
4:1 or Flatter
Front Ditch Slope
Min. D = 1.0 Ft.
-L- STA. 321+50 TO 322+00 RT
SEE PFL FOR DITCH GRADE

DETAIL 28G
BANK STABILIZATION
(Not to Scale)
Natural Ground
EXISTING BANK
EXISTING TOE
CLASS I RIPRAP KEYED-IN (TYP.)
CHANNEL BED (Variable)
Length = 12 Ft.
Min. d = 3 Ft.
-L- STA 323+85 RT

NAD 83/2011

PERMIT DRAWING
SHEET 26 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	28
R/W SHEET NO.	
ROADWAY DESIGN	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 27

MATCH LINE STA -L- 333+00.00
MATCH TO SHEET NO. 29

EXCAVATION IN WETLANDS
TEMPORARY FILL IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
FILL IN WETLAND
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
DO NOT DISTURB STRUCTURE

93 WILLEM VAN DE WEERD
95 JOSEPH R. BULLOCK
96 BRENDA GAIL BOWMAN WILLIAMS
97 SANDRA L. WILLIAMS
98 NCDOT
99 ROBERT ROY HILL
102 AMBER MICHELLE GREENE HAYES
ANDREA JAKABOSI
ALBERT JACK BOWMAN
SHIRLEY ROSE BOWMAN GREENE
EASTERN BAND OF THE CHEROKEE INDIANS

SITE 19
SITE 20
SITE 21

CONCRETE CUT DITCH SEE DETAIL 27A
EXPRESSWAY GUTTER -L- STA. 319+50 TO 322+00, LT
CLEAR TREES INSIDE EXISTING R/W (NO GRUBBING) FROM -L- STA. 318+50 TO 323+00 LT
FILL DI WITH SOIL & ABANDON
DO NOT BURY INVERT
FALSE SUMP SEE DETAIL 28D
FALSE SUMP SEE DETAIL 28A
PROP. CONCRETE DRIVE
DO NOT BURY INVERT
FILL WITH FLOWABLE FILL EST 9 CY
PROP. DRIVE
BDO SPEC DSN
FALSE SUMP SEE DETAIL 28A
PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH BEGIN -L- STA. 330+82± END -L- STA. 333+24±
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C
ROD AND LUG WITH GASKETS (ELBOWS)
CLASS B RIPRAP 3 TONS, 10 SY GEO
SINGLE FACED CONCRETE BARRIER
ROD/LUG W/ GASKETS(ELBOWS) REMOVE CONCRETE DITCH
FILL WITH FLOWABLE FILL
CLASS B RIPRAP 2 TONS, 7 SY GEO
GRADE TO DRAIN
SPECIAL CUT DITCH SEE DETAIL 28F
CLASS B RIPRAP 2 TONS, 7 SY GEO
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 28C
CLASS B RIPRAP 3 TONS, 7 SY GEO
PROP. RETAINING WALL #38 W/48" BLACK CHAINLINK FENCE & CONCRETE DITCH BEGIN -L- STA. 319+29± END -L- STA. 321+08±
PROP. SINGLE FACED CONCRETE BARRIER
BANK STABILIZATION SEE DETAIL 28G CLASS I RIP RAP 13 TONS, NO GEO
DO NOT BURY INVERT
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 8.5% PIPE SLOPE THIS SIDE OF ELBOW
V10 = 4.1 FT/S
MAX 1% PIPE SLOPE THIS SIDE OF ELBOW
BANK STABILIZATION SEE DETAIL 28E CLASS B RIPRAP 8 TONS, NO GEO
SHOULDER BERM GUTTER -L- STA. 326+00 TO 328+25, RT
SHOULDER BERM GUTTER -L- STA. 331+75 TO 334+50, RT
CUT TO FILL TRANSITION CLASS B RIPRAP 17 TONS, 38 SY GEO
CHANGE CHANGE SEE DETAIL 28B DDE=130 CY
REMOVE 30 LF
CLASS B RIPRAP 2 TONS, 7 SY GEO
UT TO SWEETWATER CREEK (SEE)
SWEETWATER CREEK
NC 143 (SWEETWATER RD)

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND

SA ELIGIBLE AND UNASSESSED SITES

FOR -L- PROFILE, SEE SHEET NO. 48

50' 0' 50' 100'
25'

11/1/2021
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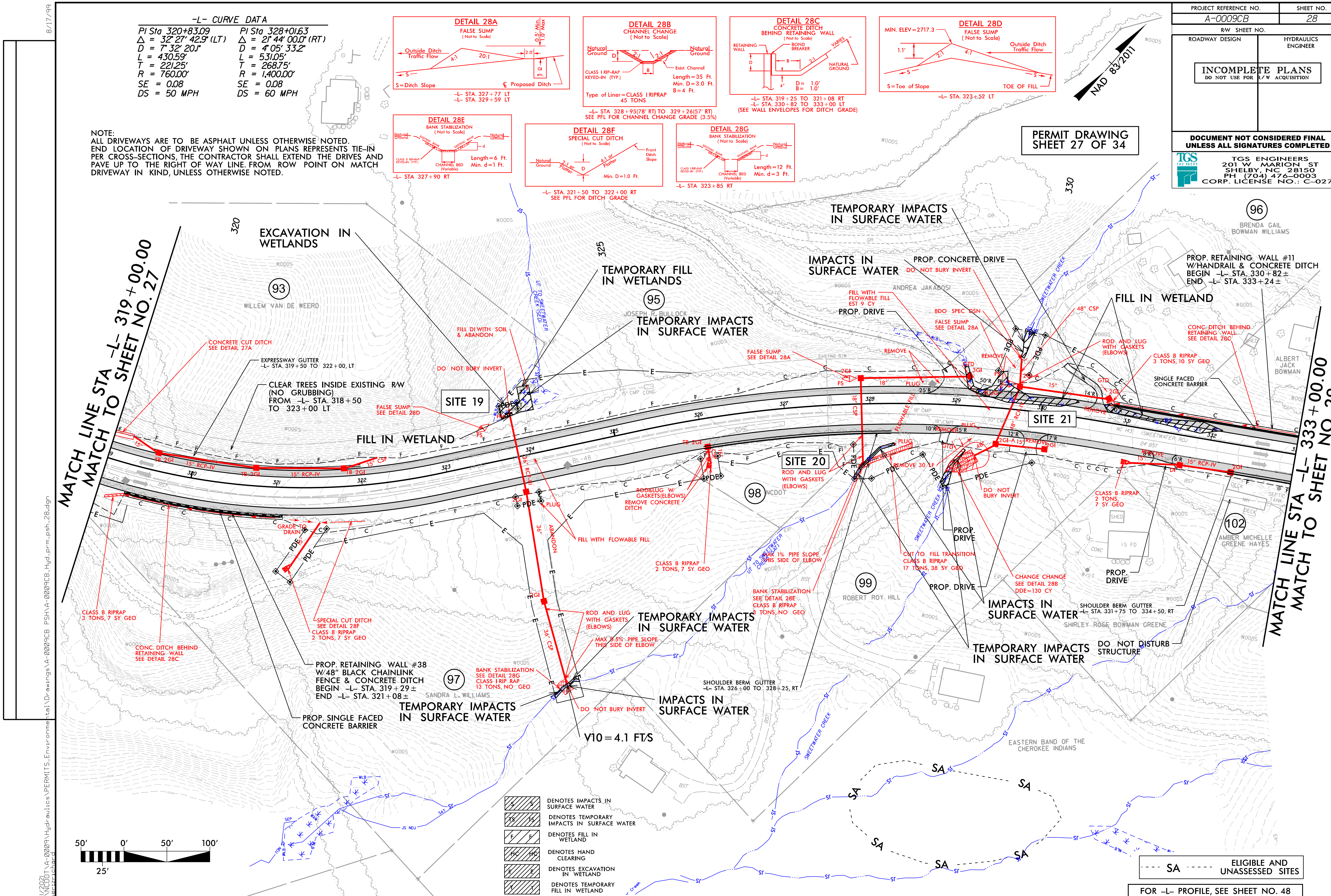
User:richard



PROJECT REFERENCE NO. A-0009CB
SHEET NO. 28
R/W SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 27 OF 34
NAD 83/2011
-L- CURVE DATA
PI Sta 320+83.09
Δ = 32° 27' 42.9" (LT)
D = 7° 32' 20.1"
L = 430.59'
T = 221.25'
R = 760.00'
SE = 0.08
DS = 50 MPH
PI Sta 328+01.63
Δ = 21° 44' 00.0" (RT)
D = 4° 05' 33.2"
L = 531.05'
T = 268.75'
R = 1,400.00'
SE = 0.08
DS = 60 MPH
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DETAIL 28A
FALSE SUMP (Not to Scale)
-L- STA. 327+77 LT
-L- STA. 329+59 LT
DETAIL 28B
CHANNEL CHANGE (Not to Scale)
Length = 35 Ft.
Min. D = 3.0 Ft.
B = 4 Ft.
Type of Liner = CLASS I RIPRAP
45 TONS
-L- STA. 328+95(78' RT) TO 329+26(57' RT)
SEE PFL FOR CHANNEL CHANGE GRADE (3.5%)
DETAIL 28C
CONCRETE DITCH BEHIND RETAINING WALL (Not to Scale)
D = 1.0'
B = 1.0'
-L- STA. 319+25 TO 321+08 RT
-L- STA. 330+82 TO 333+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 28D
FALSE SUMP (Not to Scale)
MIN. ELEV = 2717.3
-L- STA. 323+52 LT
DETAIL 28E
BANK STABILIZATION (Not to Scale)
Length = 6 Ft.
Min. d = 1 Ft.
-L- STA 327+90 RT
DETAIL 28F
SPECIAL CUT DITCH (Not to Scale)
Min. D = 1.0 Ft.
-L- STA. 321+50 TO 322+00 RT
SEE PFL FOR DITCH GRADE
DETAIL 28G
BANK STABILIZATION (Not to Scale)
Length = 12 Ft.
Min. d = 3 Ft.
-L- STA 323+85 RT
MATCH LINE STA -L- 319+00.00
MATCH TO SHEET NO. 27
MATCH LINE STA -L- 333+00.00
MATCH TO SHEET NO. 29
SITE 19
SITE 20
SITE 21
EXCAVATION IN WETLANDS
TEMPORARY FILL IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
FILL IN WETLAND
IMPACTS IN SURFACE WATER
PROP. CONCRETE DRIVE
PROP. DRIVE
PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH
BEGIN -L- STA. 330+82±
END -L- STA. 333+24±
PROP. RETAINING WALL #38 W/48" BLACK CHAINLINK FENCE & CONCRETE DITCH
BEGIN -L- STA. 319+29±
END -L- STA. 321+08±
PROP. SINGLE FACED CONCRETE BARRIER
SHOULDER BERM GUTTER -L- STA. 326+00 TO 328+25, RT
SHOULDER BERM GUTTER -L- STA. 331+75 TO 334+50, RT
DO NOT DISTURB STRUCTURE
V10 = 4.1 FT/S
93 WILLEM VAN DE WEERD
95 JOSEPH R. BULLOCK
96 BRENDA GAIL BOWMAN WILLIAMS
97 SANDRA L. WILLIAMS
98 NCDOT
99 ROBERT ROY HILL
102 AMBER MICHELLE GREENE HAYES
ANDREA JAKABOSI
ALBERT JACK BOWMAN
SHIRLEY ROSE BOWMAN GREENE
EASTERN BAND OF THE CHEROKEE INDIANS
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
DENOTES HAND CLEARING
DENOTES EXCAVATION IN WETLAND
DENOTES TEMPORARY FILL IN WETLAND
SA ELIGIBLE AND UNASSESSED SITES
FOR -L- PROFILE, SEE SHEET NO. 48
50' 0' 50' 100'
25'
8/17/99
11/1/2021
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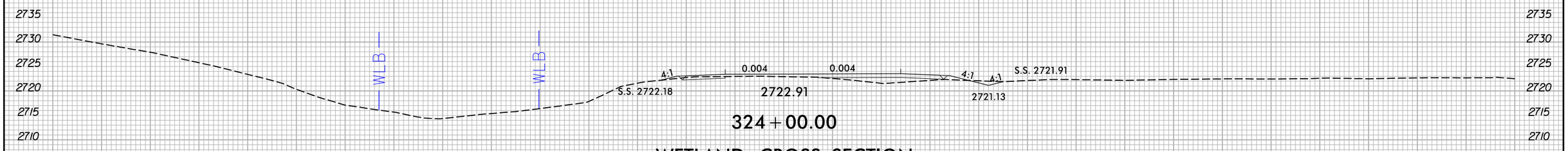
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-106

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

PERMIT DRAWING
SHEET 28 OF 34

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



324+00.00

WETLAND CROSS SECTION
SITE 19

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

11/1/2021
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User:rrichard

6/23/16

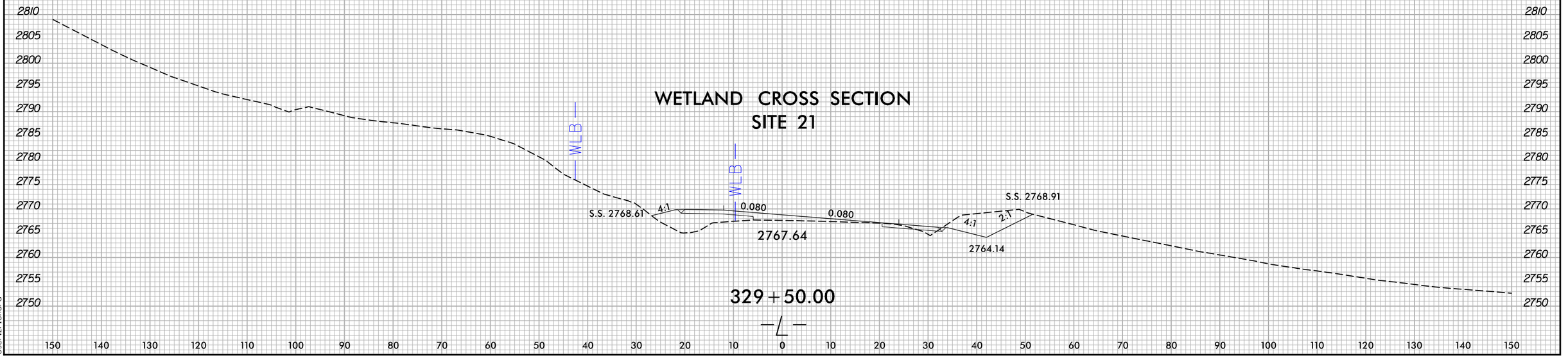
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-111

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

PERMIT DRAWING
SHEET 29 OF 34

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

WETLAND CROSS SECTION
SITE 21



329+50.00

—℄—

11/1/2021
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User:rrichard

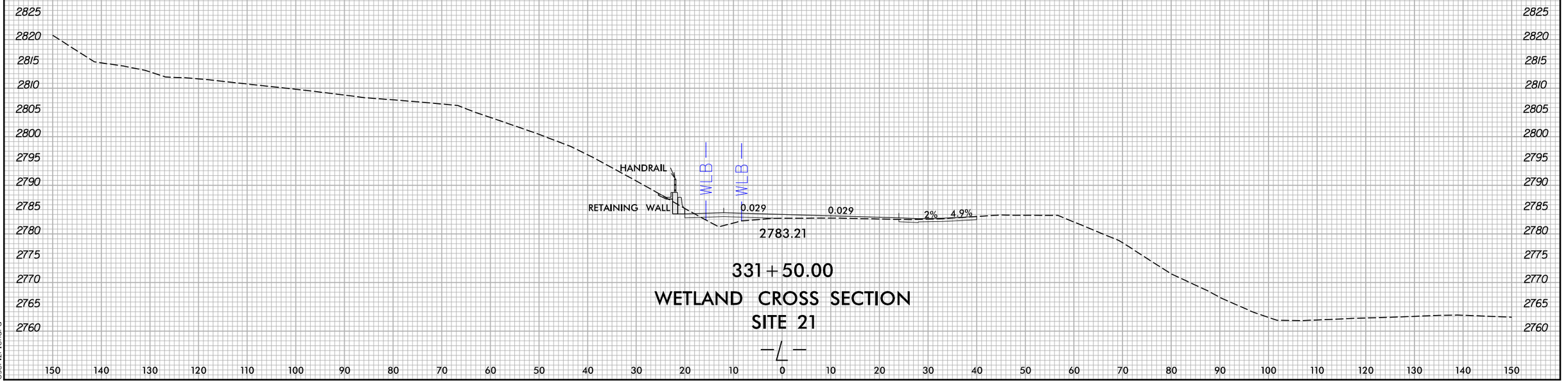
6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CB	X-115

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

PERMIT DRAWING
SHEET 30 OF 34

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



331+50.00
WETLAND CROSS SECTION
SITE 21

—℄—

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

11/1/2021
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User:rrichard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	29

R/W SHEET NO.

ROADWAY DESIGN | HYDRAULICS ENGINEER

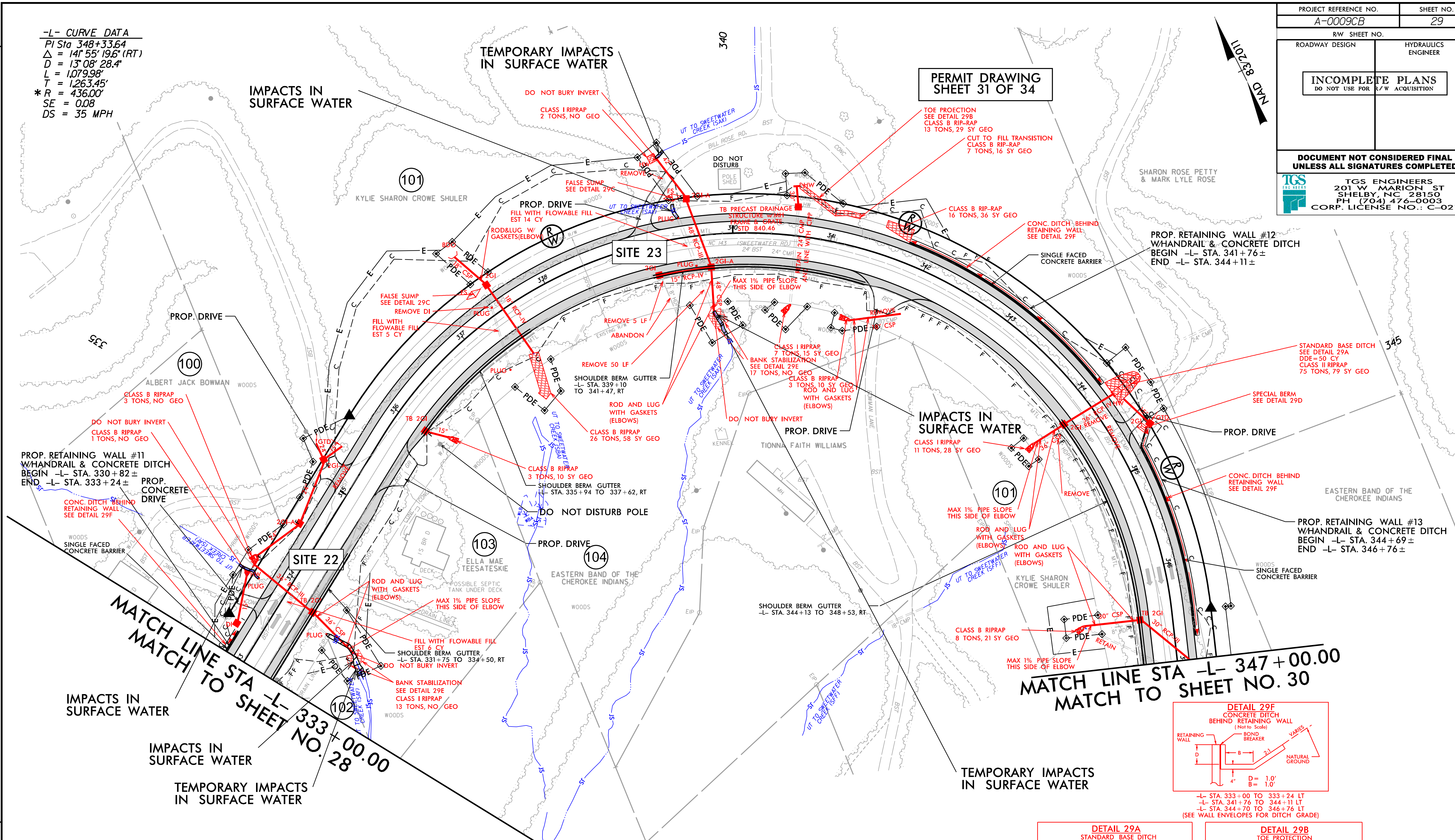
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

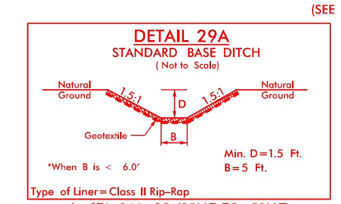
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

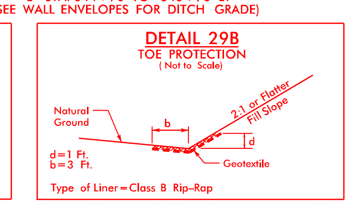
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

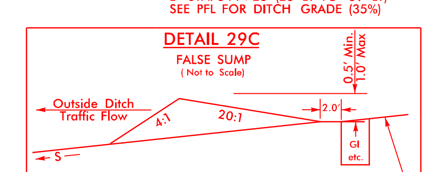
PERMIT DRAWING
SHEET 31 OF 34

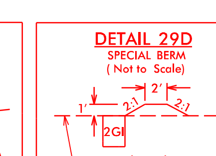
-L- CURVE DATA
PI Sta 348+33.64
Δ = 141° 55' 19.6" (RT)
D = 13° 08' 28.4"
L = 1,079.98'
T = 1,263.45'
* R = 436.00'
SE = 0.08
DS = 35 MPH

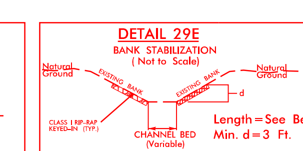












DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND STOPPING SIGHT DISTANCE.

FOR -L- PROFILE, SEE SHEET NO. 48

8/17/99

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_PSH\A-0009CB_Hyd_prm_psh_29.dgn

PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	29

R/W SHEET NO.

ROADWAY DESIGN — HYDRAULICS ENGINEER

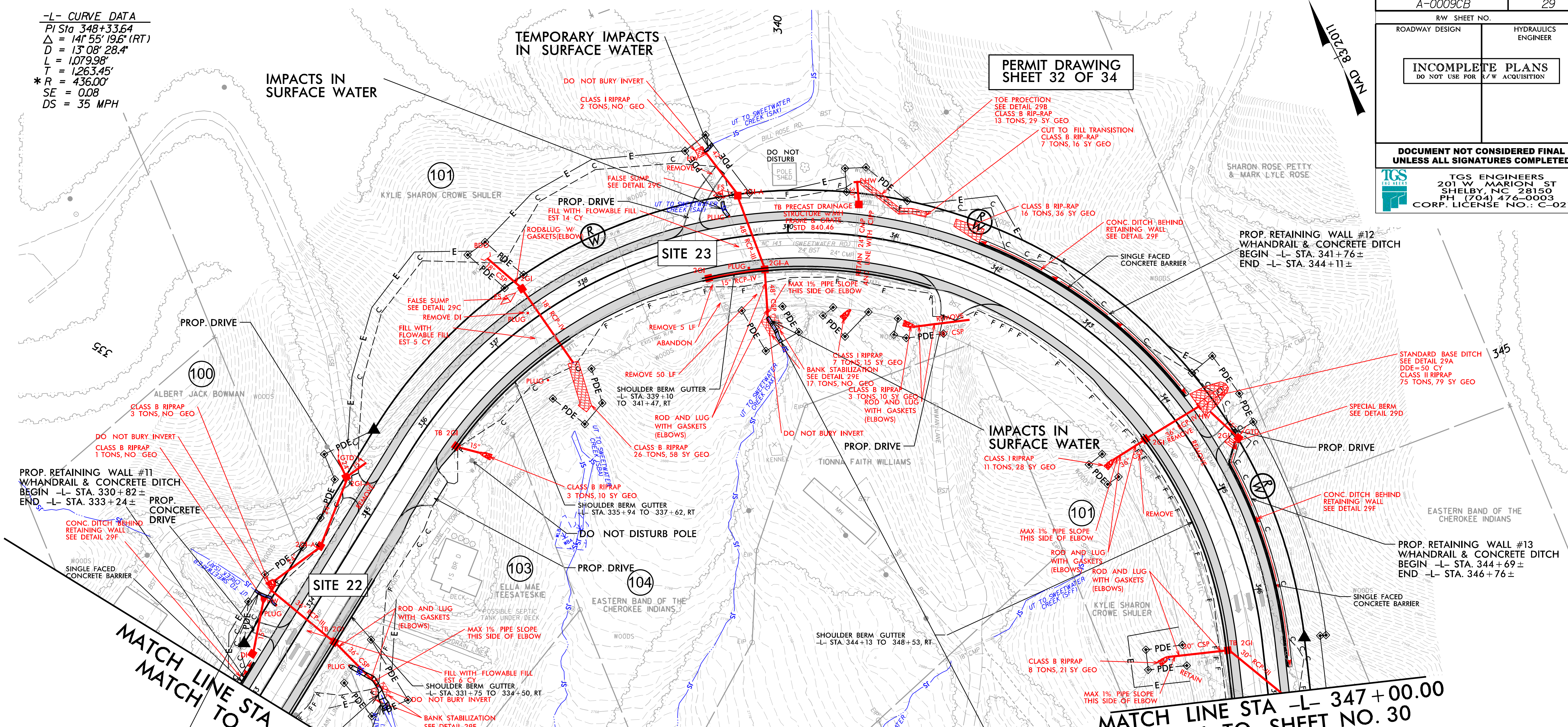
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

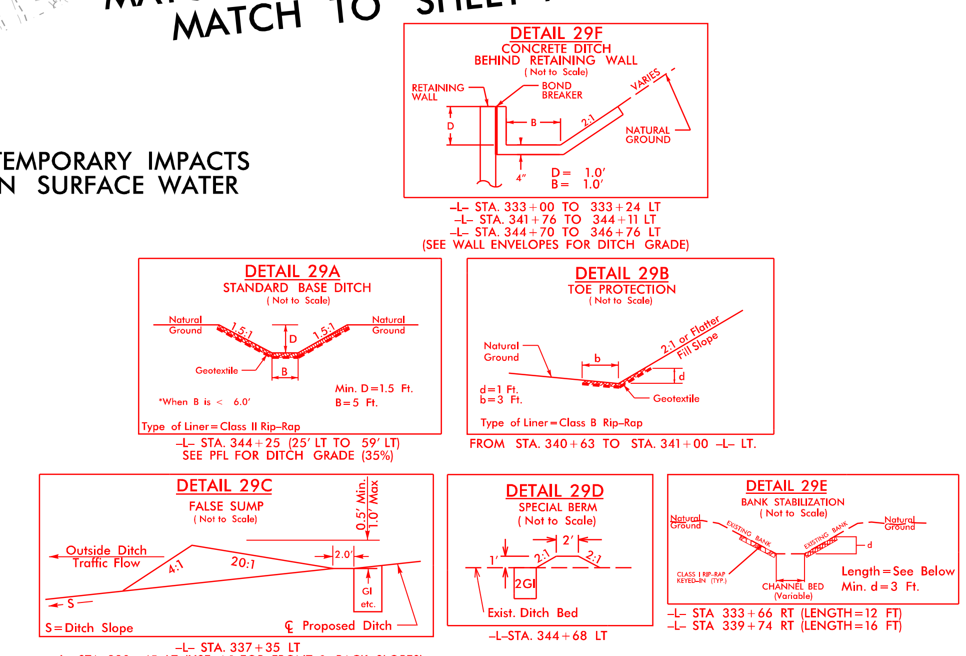
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 32 OF 34

-L- CURVE DATA
PI Sta 348+33.64
Δ = 141° 55' 19.6" (RT)
D = 13° 08' 28.4"
L = 1,079.98'
T = 1,263.45'
* R = 436.00'
SE = 0.08
DS = 35 MPH



NAD 83/2011
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 23
SITE 22
DO NOT BURY INVERT
CLASS I RIPRAP 2 TONS, NO GEO
FALSE SUMP SEE DETAIL 29C
PROP. DRIVE
FILL WITH FLOWABLE FILL EST 14 CY
ROD&LUG W/ GASKETS(ELBOWS)
TB PRECAST DRAINAGE STRUCTURE W/MH FRAME & GRATE STD 840.46
TOE PROECTION SEE DETAIL 29B CLASS B RIP-RAP 13 TONS, 29 SY GEO
CUT TO FILL TRANSITION CLASS B RIP-RAP 7 TONS, 16 SY GEO
CLASS B RIP-RAP 16 TONS, 36 SY GEO
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 29F
SINGLE FACED CONCRETE BARRIER
PROP. RETAINING WALL #12 W/HANDRAIL & CONCRETE DITCH BEGIN -L- STA. 341+76± END -L- STA. 344+11±
SHARON ROSE PETTY & MARK LYLE ROSE
101
KYLIE SHARON CROWE SHULER
100
ALBERT JACK BOWMAN
CLASS B RIPRAP 3 TONS, NO GEO
CLASS B RIPRAP 1 TONS, NO GEO
PROP. RETAINING WALL #11 W/HANDRAIL & CONCRETE DITCH BEGIN -L- STA. 330+82± END -L- STA. 333+24±
PROP. CONCRETE DRIVE
FALSE SUMP SEE DETAIL 29C
REMOVE DI
FILL WITH FLOWABLE FILL EST 5 CY
MAX 1% PIPE SLOPE THIS SIDE OF ELBOW
REMOVE 5 LF
ABANDON
REMOVE 50 LF
SHOULDER BERM GUTTER -L- STA. 339+10 TO 341+47, RT
ROD AND LUG WITH GASKETS (ELBOWS)
CLASS B RIPRAP 26 TONS, 58 SY GEO
CLASS I RIPRAP 7 TONS, 15 SY GEO
BANK STABILIZATION SEE DETAIL 29E 17 TONS, 22 SY GEO
CLASS B RIPRAP 3 TONS, 10 SY GEO
DO NOT DISTURB
UT TO SWEETWATER CREEK (SAX)
STANDARD BASE DITCH SEE DETAIL 29A DDE=50 CY CLASS II RIPRAP 75 TONS, 79 SY GEO
SPECIAL BERM SEE DETAIL 29D
CLASS I RIPRAP 11 TONS, 28 SY GEO
TIONNA FAITH WILLIAMS
CLASS B RIPRAP 3 TONS, 10 SY GEO
SHOULDER BERM GUTTER -L- STA. 335+94 TO 337+62, RT
DO NOT DISTURB POLE
103
ELLA MAE TEESATESKIE
104
EASTERN BAND OF THE CHEROKEE INDIANS
ROD AND LUG WITH GASKETS (ELBOWS)
FILL WITH FLOWABLE FILL EST 6 CY
SHOULDER BERM GUTTER -L- STA. 331+75 TO 334+50, RT
BANK STABILIZATION SEE DETAIL 29E CLASS I RIPRAP 13 TONS, NO GEO
102
SHOULDER BERM GUTTER -L- STA. 344+13 TO 348+53, RT
KYLIE SHARON CROWE SHULER
CLASS B RIPRAP 8 TONS, 21 SY GEO
PROP. RETAINING WALL #13 W/HANDRAIL & CONCRETE DITCH BEGIN -L- STA. 344+69± END -L- STA. 346+76±
EASTERN BAND OF THE CHEROKEE INDIANS
MATCH LINE STA -L- 333+00.00 MATCH TO SHEET NO. 28
MATCH LINE STA -L- 347+00.00 MATCH TO SHEET NO. 30



DETAIL 29F
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
-L- STA. 333+00 TO 333+24 LT
-L- STA. 341+76 TO 344+11 LT
-L- STA. 344+70 TO 346+76 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 29A
STANDARD BASE DITCH
(Not to Scale)
Min. D=1.5 Ft. B=5 Ft.
Type of Liner=Class II Rip-Rap
-L- STA. 344+25 (25' LT TO 59' LT)
SEE PFL FOR DITCH GRADE (35%)
DETAIL 29B
TOE PROTECTION
(Not to Scale)
d=1 Ft. b=3 Ft.
Type of Liner=Class B Rip-Rap
FROM STA. 340+63 TO STA. 341+00 -L- LT.
DETAIL 29C
FALSE SUMP
(Not to Scale)
-L- STA. 337+35 LT
-L- STA. 339+45 LT (USE 4:1 FOR FRONT & BACK SLOPES)
DETAIL 29D
SPECIAL BERM
(Not to Scale)
-L-STA. 344+68 LT
DETAIL 29E
BANK STABILIZATION
(Not to Scale)
Length=See Below Min. d=3 Ft.
-L- STA 333+66 RT (LENGTH=12 FT)
-L- STA 339+74 RT (LENGTH=16 FT)

DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

* DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND STOPPING SIGHT DISTANCE.

FOR -L- PROFILE, SEE SHEET NO. 48

8/17/99

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CB_Hyd_prm_psh_29.dgn
Userid:richard

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
2	-L- 212+81 to 212+84 RT	42" RCP Inlet	SY							< 0.01	< 0.01	4		14	
2	-L- 212+82 to 212+86 LT	42" RCP Outlet	SY							< 0.01		15			
2	-L- 212+64 to 213+02 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		17	20	
3	-L- 216+08 to 216+20 RT	48" RCP Inlet	SZ								< 0.01			22	
3	-L- 215+19 to 215+48 LT	48" RCP Outlet	SZ							< 0.01	< 0.01	16		16	
4	-L- 222+54 to 222+60 LT	24" RCP Outlet	SAA							< 0.01	< 0.01	12	8	6	
5	-L- 227+06 to 227+30 LT	Impacts to Wetland	WAI	Medium					< 0.01						
6	-L- 235+11 to 238+59 RT	Impacts to Wetland	WAJ	Medium	0.06				< 0.01						
6	-L- 234+88 to 235+07 LT	Impacts to Wetland	WAJ	Medium	0.01				< 0.01						
7	-L- 239+49 to 239+59 RT	48" RCP Inlet	SAB							< 0.01	< 0.01	6	15	17	
7	-L- 239+34 to 239+68 LT	Bank Stabilization	Sweetwater Creek								< 0.01		13	21	
8	-L- 245+41 to 245+57 RT	Construction Easement	SAC	Low							< 0.01			27	
8	-L- 245+32 to 245+68 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		17	20	
9	-L- 249+92 to 250+04 RT	Culvert Inlet	SAD								< 0.01			30	
9	-L- 250+32 to 251+49 RT	Roadway	SAE							< 0.01		89			
9	-L- 250+03 to 250+10 LT	Culvert Outlet	SAD							< 0.01		20			
9	-L- 249+91 to 250+13 LT	Bank Stabilization	Sweetwater Creek							< 0.01	< 0.01		14	7	
10	-L- 262+06 to 263+84 RT	Impacts to Wetland	WAN	High			0.03								
10	-L- 261+89 to 262+10 LT	Bank Stabilization	Sweetwater Creek								< 0.01			21	
11	-L- 267+27 to 267+79 LT	Bank Stabilization	Sweetwater Creek							< 0.01			58		
12	-L- 270+76 to 275+17 RT	Impacts to Wetland	WAO	High	0.08										
12	-L- 270+81 to 270+86 RT	36" CSP BDO Inlet	SAF							< 0.01	< 0.01	14		5	
12	-L- 270+69 to 270+80 LT	Pipe Outlet	SAF							< 0.01	< 0.01	10		6	
12	-L- 270+52 to 270+83 LT	Impacts to Wetland	WAO	High	< 0.01				< 0.01						
13	-L- 275+25 to 275+63 RT	Pipe Inlet Channel	SAG							< 0.01	< 0.01	41		55	
SHEET TOTALS*:					0.15					0.03	0.03	227	142	287	

*Rounded totals are sum of actual impacts

**Notes:
Site 1 removed per 4C meeting discussion on 11/18/2021.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/23/2021
GRAHAM
A-0009CB
32572.1.14

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	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 Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
13	-L- 275+70 to 275+80 LT	Outlet Channel/Bank Stab.	SAG							< 0.01	< 0.01	2	12	10	
14	-L- 279+03 to 279+68 RT	Culverts	Sweetwater Creek							0.02	< 0.01	53	68	9	
14	-L- 279+28 to 279+71 RT	Culverts/Bank Stabilization	SAJ	Low						< 0.01	< 0.01		22	26	
14	-L- 277+76 to 278+72 LT	Culvert Outlet	Sweetwater Creek							0.01	< 0.01	34	37	33	
15	-L- 278+67 to 280+98 LT	36" / Channel Change	SAH							< 0.01	< 0.01	127		25	
15	-L- 280+46 to 282+30 LT	Impacts to Wetland	WAQ	High	0.04		0.02		< 0.01						
16	-L- 289+61 to 289+84 LT	30" Inlet	SAK							< 0.01	< 0.01	24		22	
16	-L- 288+01 to 288+52 RT	30" Outlet	SAK							< 0.01	< 0.01	29	10	10	
17	-L- 312+47 to 312+63 LT	36" WSP Inlet	SAM								< 0.01			31	
17	-L- 310+75 to 311+97 RT	36" CSP Outlet	SAM							< 0.01	< 0.01	93		50	
18	-L- 316+10 to 316+15 LT	48" CSP BDO Inlet	Stillhouse Branch							< 0.01	< 0.01	14		28	
18	-L- 316+00 to 316+07 RT	60" Outlet / Bank Stab.	Stillhouse Branch							< 0.01	< 0.01	10	20	10	
19	-L- 324+11 to 324+14 LT	36" RCP	SED							< 0.01				3	
19	-L- 323+75 to 324+14 LT	Impacts to Wetland	WAX	Low	< 0.01	0.01	< 0.01								
19	-L- 323+69 to 324+00 RT	Bank Stabilization	SAT							< 0.01	< 0.01		12	23	
20	-L- 327+77 to 328+29 RT	18" CSP Outlet	SAT							< 0.01	< 0.01	51		14	
21	-L- 329+08 to 330+42 LT	Impacts to Wetland	WAY	Medium	0.04										
21	-L- 330+71 to 332+12 LT	Impacts to Wetland	WAZ	Medium	0.02										
21	-L- 329+70 to 329+82 LT	48" CSP BDO Inlet	Sweetwater Creek							< 0.01	< 0.01	12		20	
21	-L- 328+85 to 329+14 RT	48" Outlet/Channel Change	Sweetwater Creek							< 0.01	< 0.01	32		18	
22	-L- 333+80 to 333+85 LT	36" Inlet/Channel Change	SAY							< 0.01		26			
22	-L- 333+49 to 333+72 RT	36" CSP Outlet	SAY							< 0.01	< 0.01	35	12	11	
23	-L- 339+36 to 339+44 LT	42" Inlet Stabilization	SAX								< 0.01			11	
23	-L- 339+72 to 339+89 RT	Bank Stabilization	SAX							< 0.01	< 0.01		16	11	
SHEET TOTALS*:					0.10	0.01	0.03		< 0.01	0.07	0.03	542	209	365	
PROJECT TOTALS*:					0.26	0.01	0.06	0.00	0.02	0.10	0.06	769	351	652	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/23/2021
GRAHAM
A-0009CB
32572.1.14

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

General Project Information

WBS Element:	32572.1.15	**TIP Number:**	A-0009CC	**Project Type:**	Roadway Widening	**Date:**	11/1/2021
NCDOT Contact:	Josh B. Deyton, PE			**Contractor / Designer:**	TGS Engineers / David B. Petty, PE		
Address:	253 Webster Rd Sylva, NC 28779			**Address:**	706 Hillsborough St. - Suite 200 Raleigh, NC 27603		
Phone:	828-586-2141			**Phone:**	919-773-8887 Ext. 104		
Email:	jbdeyton@ncdot.gov			**Email:**	dpetty@tgsengineers.com		
City/Town:	Robbinsville, NC			**County(ies):**	Graham		
River Basin(s):	Little Tennessee			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	4.10 Miles	**Surrounding Land Use:**	Forested, Agriculture, Rural Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	29.0	ac.		15.5	ac.		
Typical Cross Section Description:	1.) -L-: Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 1.1 Miles 2.) -Y2-: Three 12' paved lanes, 10' shoulders (8' paved / 2' grassed), grassed side slopes ranging from 4:1 to 2:1 - 2.1 Miles 3.) -Y2-: Three 12' paved lanes,curb&gutter with 10' Multiuse Path, grassed side slopes ranging from 4:1 to 2:1 - 0.8 Miles			1.) -L-: Two 12' paved lanes, 0 to 12' paved shoulders, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 1.1 Miles 2.) -Y2-: Two 12' paved lanes, 2' to 8' grassed shoulders, grassed side slopes ranging from 4:1 to 2:1 - 3.0 Miles			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future: 8800	Year:	2045	Existing: 6590		Year:	2022

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

STIP project A-0009C is part of Corridor K of the Appalachian Development Highway System (ADHS) and improves the existing alignments of US 129, NC 143 and NC 28 between US 129 south of Robbinsville and the existing four-lane section of NC 28 east of Stecoah in Graham County, NC. The project improves roadway shoulders and adds passing & climbing lanes for the length of the project. A-0009C is broken into three projects (A-0009CA, A-0009CB & A-0009CC).

A-0009CC improves NC 143 (-L-, an urban arterial) from 0.5 miles north of the Appalachian Trail to NC 28 and improves NC 28 (-Y2-, an urban arterial) from 0.2 miles west of NC 143 to 0.3 miles east of SR 1235 (Gunters Gap Rd). ADT listed above is for -L-. ADT for -Y2- is 3800 in 2022 and 5200 in 2045.

Project minimization measures include:

>2:1 fill slopes.
>1.5:1 cut slopes where possible.
>Expressway gutter and shoulder berm gutter to reduce cross-section width.
>Alignment shifts to avoid relocations and avoid / minimize stream, wetland, and historic resource impacts.
>Alignment shifts and either symmetrical or asymmetrical widening to fit a best-fit alignment to avoid / minimize impacts and reduce earthwork.
>Overall maintain existing alignment to minimize cumulative impacts to resources.
>Maximizing shoulder section.
>Providing adequate ground cover.
>Stabilizing embankments and drainage ditches.
>Minimizing culvert slopes.
>Removing existing perched outlets.
>Providing adequate energy dissipation.
>Utilizing natural features and drainage pathways - Existing drainage pathways were utilized to the maximum extent practicable.
>Retaining and extending existing culverts where practicable to minimize in-stream work.
>Site 17: As mentioned during 4B meeting, floodplain benches have been added along this stream to lower velocities and dissipate energy.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.15	TIP/Proj No.:	A-0009CC	County(ies):	Graham	Page	2	of	4

General Project Information

Waterbody Information

Surface Water Body (1):	Cody Branch		**NCDWR Stream Index No.:**	2-130-1			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	SBB			**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 (2):	Carver Branch		**NCDWR Stream Index No.:**	2-130-3-1			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Carver Branch, SBC, SBG, SBD, SFT, SFP, SFH, SFM, SFN, SBJ, SBN, SBP, SBO			**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):	Johnson Gap Branch		**NCDWR Stream Index No.:**	2-131-2			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Johnson Gap Branch, SEY, SEX			**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)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	32572.1.15	TIP No.:	A-0009CC	County(ies):	Graham	Page	3	of	4

Additional Waterbody Information

Surface Water Body (4):	Edwards Branch		**NCDWR Stream Index No.:**	2-130-3			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Edwards Branch, SBV			**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):	Stecoah Creek		**NCDWR Stream Index No.:**	2-130			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	Trout Waters (Tr)				
Other Stream Classification:	None						
Impairments:	None						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	Stecoah Creek, SCB, SCD, SDT			**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)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 32572.1.15 **TIP/Proj No.:** A-0009CC **County(ies):** Graham

Swale

Sheet No.	Line	Station	Location (LT,RT,CL)	Latitude	Longitude	Surface Water Body	Base Width (ft)	Front Slope (H:1)	Back Slope (H:1)	Drainage Area (ac)	Recommended Treatm't Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used	BMP Associated w/ Buffer Rules?
47	Y2	132+00	RT	35.37139	-83.67977	(5)Stecoah Creek	0.0	4.0	4.0	0.6	60	300	1.34%	1.0	1.2	1.3	1.3	No	No
47*	Y2	130+29	LT	35.37163	-83.68043	(5)Stecoah Creek	5.0	3.0	3.0	9.9	990	246	0.40%	15.0	1.9	20.3	2.0	No	No

Additional Comments

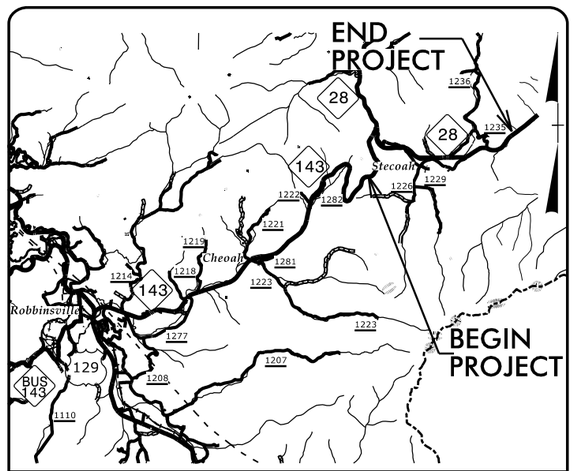
*Provided length exceeds the recommended length for the portion of the contributing drainage area within NCDOT right of way.

09/08/99

TIP PROJECT: A–0009CC

CONTRACT:

See Sheet 1A For Index of Sheets



VICINITY MAP

3R GUIDELINES WERE USED FROM –L– 414+50 TO –L– STA 474+20 AND FROM –Y2– 12+60± TO 23+00± TO MINIMIZE IMPACTS TO USFS PROPERTY AND NATURAL RESOURCES.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GRAHAM COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A–0009CC	1	

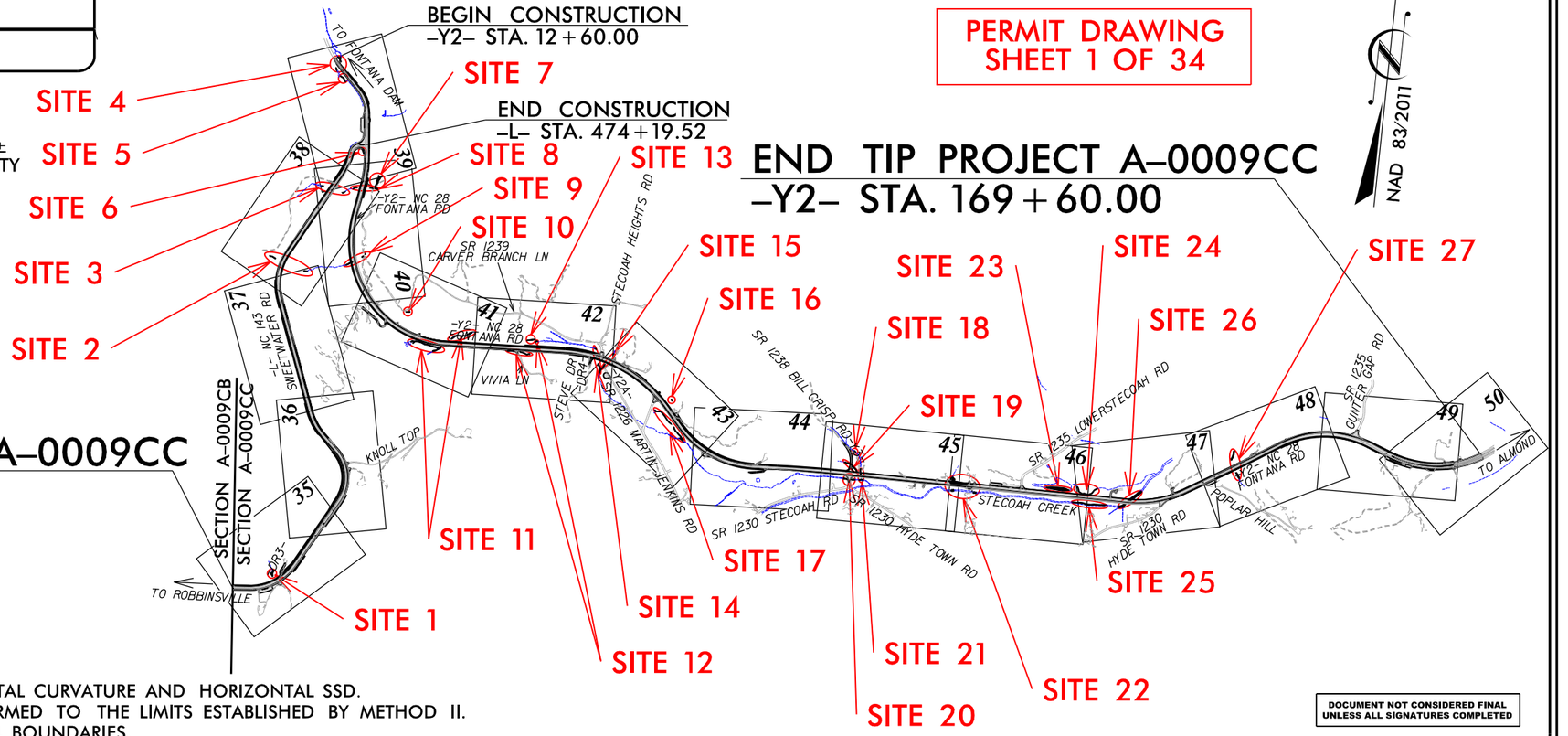
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
32572.1.15	APD–0074(178)	PE
32572.2.15	APD–0074(178)	ROW,UTIL.
32572.3.15	APD–0074(178)	CONST.

LOCATION: *UPGRADE NC 143 FROM 0.5 MILES NORTH OF APPALACHIAN TRAIL TO NC 28*
UPGRADE NC 28 FROM 0.2 MILES WEST OF NC 143 TO 0.3 MILES EAST OF SR 1235 (GUNTERS GAP RD)

TYPE OF WORK: *GRADING, PAVING, DRAINAGE, CULVERTS, & RETAINING WALLS*

WETLAND & SURFACE WATER IMPACTS

PERMIT DRAWING
SHEET 1 OF 34



DESIGN EXCEPTION REQUIRED FOR HORIZONTAL CURVATURE AND HORIZONTAL SSD.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

PLANS: 50 25 0 50 100
PROFILE (HORIZONTAL): 50 25 0 50 100
PROFILE (VERTICAL): 10 5 0 10 20

–L– DESIGN DATA

ADT 2022 = 6590
ADT 2045 = 8800
K = 11 %
D = 57.5 %
T = 7 % *
V = 60 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

–Y2– DESIGN DATA

ADT 2022 = 3800
ADT 2045 = 5200
K = 11 %
D = 67.5 %
T = 7 % *
V = 50 MPH
* TTST = 2% DUAL = 5%
FUNC CLASS = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT A–0009CC
–L– = 1.131 MILES
–Y2– = 2.973 MILES
TOTAL LENGTH TIP PROJECT A–0009CC = 4.104 MILES

NCDOT CONTACT: WANDA H. AUSTIN, PE

PLANS PREPARED BY:
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 14
252 Webster Rd
Sylva, NC 28779

RIGHT OF WAY DATE: AUGUST 12, 2021

LETTING DATE: OCTOBER 18, 2022

2018 STANDARD SPECIFICATIONS

JIMMY L. TERRY, PE
PROJECT ENGINEER

AUSTIN TURNER, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

12/7/202
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC PSH\A-0009CC_Hyd_tsh.dgn
User:zrichard

8/17/99

-L- CURVE DATA

PI Sta 419+44.60
△ = 56° 20' 44.5" (LT)
D = 9° 32' 57.5"
L = 590.05'
T = 321.35'
R = 600.00'
DS = 45 MPH
SE = 0.08

-DR3- CURVE DATA

PI Sta 10+68.68
△ = 13° 52' 12.2" (RT)
D = 22° 55' 05.9"
L = 60.52'
T = 30.41'
R = 250.00'
SE = SEE PLANS

PI Sta 11+40.26
△ = 75° 57' 23.4" (LT)
D = 114° 35' 29.6"
L = 66.28'
T = 39.03'
R = 50.00'
SE = SEE PLANS

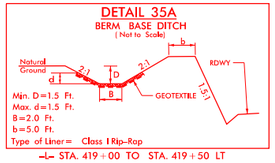
(B1) S 33° 09' 58.9" W
(1) -DR3- PC 11+01.23
(2) -DR3- PT 11+67.51
(B2) S 42° 47' 24.5" E

PAVEMENT REMOVAL

PROP MONOLITHIC CONC ISLAND – SURFACE MOUNTED

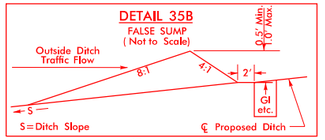
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 35A
BERM BASE DITCH
(Not to Scale)

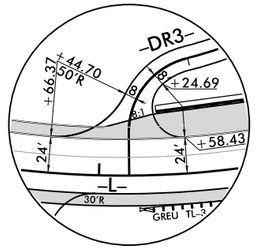


-L- STA. 419+00 TO STA. 419+50 LT

DETAIL 35B
FALSE SUMP
(Not to Scale)



-L- STA. 414+93 LT
-L- STA. 416+37 LT
-L- STA. 418+09 LT
-L- STA. 419+48 LT



-L-/-DR3- INTERSECTION

NAD 83/2011

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	35

R/W SHEET NO.

ROADWAY DESIGN | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 2 OF 34

TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S / S DENOTES IMPACTS IN SURFACE WATER
E / E DENOTES EXCAVATION IN WETLAND
HC / HC DENOTES HAND CLEARING
F / F DENOTES FILL IN WETLAND

END SECTION A-0009CB
BEGIN SECTION A-0009CC

BEGIN TIP PROJECT A-0009CC
-L- STA. 414+50.00

HAND CLEARING IN WETLANDS

TEMPORARY IMPACTS IN SURFACE WATER

EXCAVATION IN WETLANDS

IMPACTS IN SURFACE WATER

116 HOUSE OF PRAYER

115 U.S. FOREST SERVICE

120 MARCIA G. WILLIAMS

117 DELMAR L. HOLDER, ET AL

SITE 1

BEGIN CONSTRUCTION
-DR3 STA. 10+20.00

MATCH LINE STA -L- 428+00.00
MATCH TO SHEET NO. 36

PROP. RETAINING WALL #21
W/CONCRETE DITCH
BEGIN -L- STA. 420+39±
END -L- STA. 436+65±

PROP. SINGLE FACED CONCRETE BARRIER

SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 65 TONS

SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 35 TONS

BERM BASE DITCH SEE DETAIL 35A Class I RIP-RAP 30 TONS, 60 SY GEO

FALSE SUMP SEE DETAIL 35B

ROD AND LUG WITH GASKETS (ELBOWS)

CLASS I RIPRAP 7 TONS, 15 SY GEO

CLASS I RIPRAP (KEYED-IN) 20 TONS

CLASS I RIPRAP 1 TONS, 5 SY GEO

CLASS B RIPRAP 2 TONS, 7 SY GEO

CLASS I RIPRAP (KEYED-IN) 22 TONS

CLASS I RIPRAP (KEYED-IN) 11 TONS

CLASS I RIPRAP (KEYED-IN) 7 TONS

FALSE SUMP SEE DETAIL 35C

CONCRETE SILL SEE DETAIL 35F

CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 35D

MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW

PROP. RETAINING WALL #27
BEGIN -L- STA. 427+50±
END -L- STA. 431+42±

PROP. RETAINING WALL #26
BEGIN -L- STA. 421+44±
END -L- STA. 423+54±

PROP. CONCRETE DRIVE

PROP. DRIVE

REMOVE EXIST. CONCRETE DRIVE

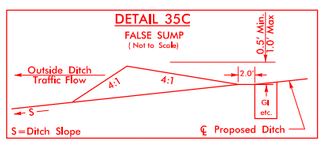
TIE CONCRETE TO EXISTING SIGN

MONO CONC. ISLAND

FOR CONCRETE ISLAND & DRIVE LAYOUT SEE DETAIL SHT 2B-

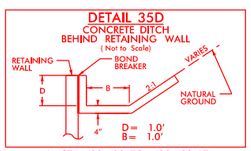
50' 0' 50' 100'
25'

DETAIL 35C
FALSE SUMP
(Not to Scale)



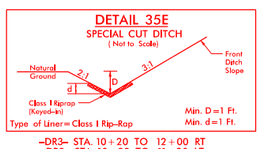
-L- STA. 421+00 RT
-L- STA. 426+19 RT

DETAIL 35D
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



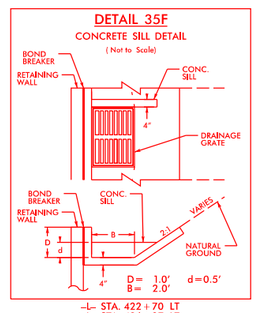
-L- STA. 420+39 TO 428+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 35E
SPECIAL CUT DITCH
(Not to Scale)



-DR3- STA. 10+20 TO 12+00 RT
-DR3- STA. 10+38 TO 11+20 LT
(SEE XSCs FOR TYPICAL DITCH GRADE)

DETAIL 35F
CONCRETE SILL DETAIL
(Not to Scale)



-L- STA. 422+70 LT
-L- STA. 426+07 LT

FOR -L- PROFILE, SEE SHEET NO.69

FOR -DR3- PROFILE, SEE SHEET NO. 77

11/1/2021
K:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC PSH\A-0009CC_Hyd_prm_psh_35.dgn
User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	35

R/W SHEET NO.

ROADWAY DESIGN — HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 3 OF 34

-L- CURVE DATA

PI Sta 419+44.60
Δ = 56° 20' 44.5" (LT)
D = 9° 32' 57.5"
L = 590.05'
T = 321.35'
R = 600.00'
DS = 45 MPH
SE = 0.08

-DR3- CURVE DATA

PI Sta 10+68.68
Δ = 13° 52' 12.2" (RT)
D = 22° 55' 05.9"
L = 60.52'
T = 30.41'
R = 250.00'
SE = SEE PLANS

PI Sta 11+40.26
Δ = 75° 57' 23.4" (LT)
D = 114° 35' 29.6"
L = 66.28'
T = 39.03'
R = 50.00'
SE = SEE PLANS

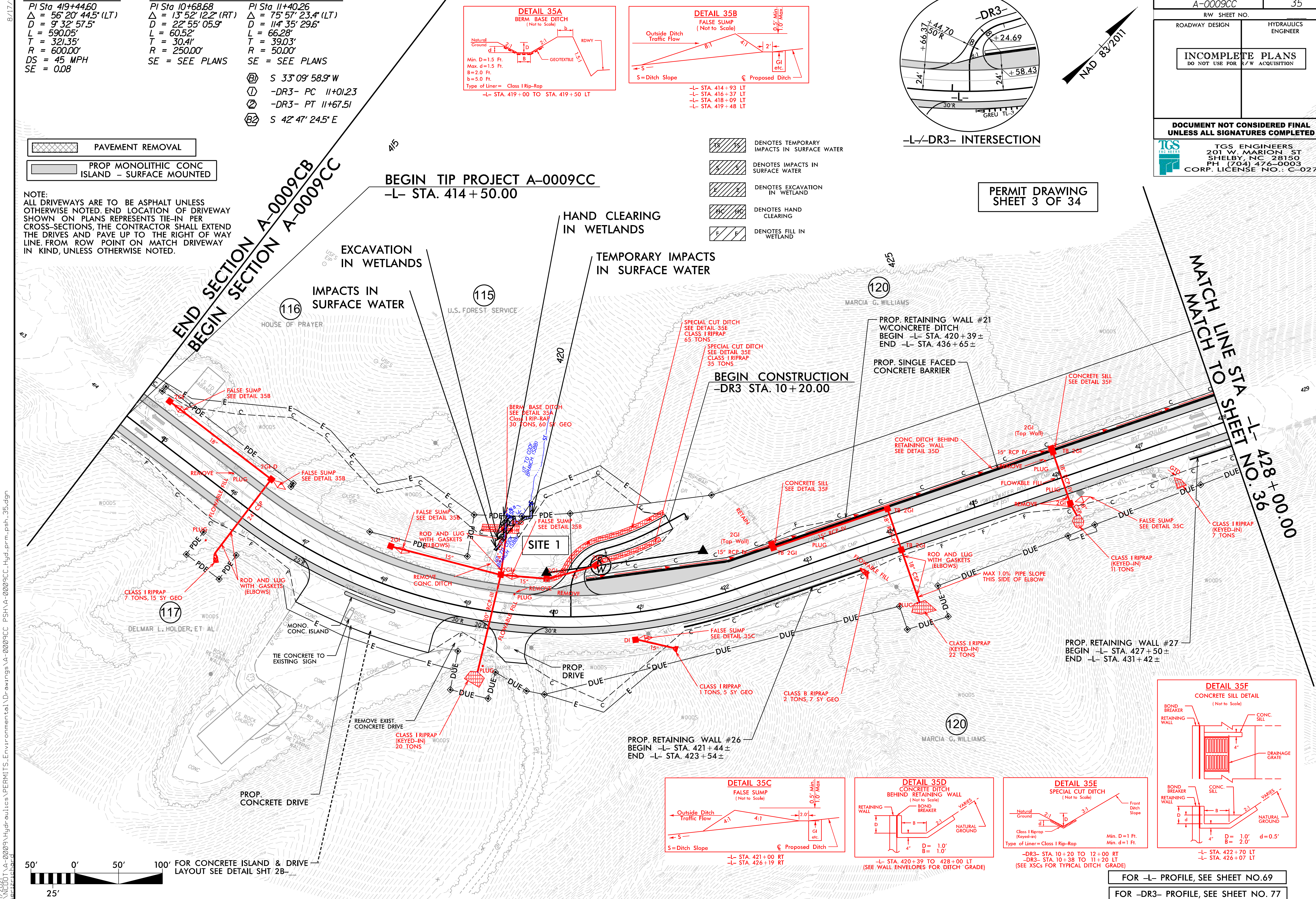
B1 S 33° 09' 58.9" W
1 -DR3- PC 11+01.23
2 -DR3- PT 11+67.51
B2 S 42° 47' 24.5" E

PAVEMENT REMOVAL

PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND


DETAIL 35A
BERM BASE DITCH
(Not to Scale)
Min. D=1.5 Ft.
Max. d=1.5 Ft.
B=2.0 Ft.
b=5.0 Ft.
Type of Liner= Class I Rip-Rap
-L- STA. 419+00 TO STA. 419+50 LT
DETAIL 35B
FALSE SUMP
(Not to Scale)
Outside Ditch Traffic Flow
S=Ditch Slope
Proposed Ditch
-L- STA. 414+93 LT
-L- STA. 416+37 LT
-L- STA. 418+09 LT
-L- STA. 419+48 LT
-DR3-
-L-/-DR3- INTERSECTION
NAD 83/2011
END SECTION A-0009CB
BEGIN SECTION A-0009CC
BEGIN TIP PROJECT A-0009CC
-L- STA. 414+50.00
HAND CLEARING IN WETLANDS
EXCAVATION IN WETLANDS
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
116 HOUSE OF PRAYER
115 U.S. FOREST SERVICE
120 MARCIA G. WILLIAMS
117 DELMAR L. HOLDER, ET AL
SITE 1
BEGIN CONSTRUCTION
-DR3 STA. 10+20.00
PROP. RETAINING WALL #21
W/CONCRETE DITCH
BEGIN -L- STA. 420+39±
END -L- STA. 436+65±
PROP. SINGLE FACED CONCRETE BARRIER
MATCH LINE STA -L- 428+00.00
MATCH TO SHEET NO. 36
PROP. RETAINING WALL #27
BEGIN -L- STA. 427+50±
END -L- STA. 431+42±
PROP. RETAINING WALL #26
BEGIN -L- STA. 421+44±
END -L- STA. 423+54±
PROP. DRIVE
PROP. CONCRETE DRIVE
MONO. CONC. ISLAND
TIE CONCRETE TO EXISTING SIGN
REMOVE EXIST. CONCRETE DRIVE
FOR CONCRETE ISLAND & DRIVE LAYOUT SEE DETAIL SHT 2B
CLASS I RIPRAP 7 TONS, 15 SY GEO
CLASS I RIPRAP (KEYED-IN) 20 TONS
CLASS I RIPRAP 1 TONS, 5 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
CLASS I RIPRAP (KEYED-IN) 22 TONS
CLASS I RIPRAP (KEYED-IN) 11 TONS
CLASS I RIPRAP (KEYED-IN) 7 TONS
BERM BASE DITCH SEE DETAIL 35A CLASS I RIP-RAP 30 TONS, 60 SY GEO
SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 65 TONS
SPECIAL CUT DITCH SEE DETAIL 35E CLASS I RIPRAP 35 TONS
CONCRETE SILL SEE DETAIL 35F
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 35D
FALSE SUMP SEE DETAIL 35B
FALSE SUMP SEE DETAIL 35C
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
REMOVE CONC. DITCH
FLOWABLE FILL
DETAIL 35C
FALSE SUMP
(Not to Scale)
-L- STA. 421+00 RT
-L- STA. 426+19 RT
DETAIL 35D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
-L- STA. 420+39 TO 428+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 35E
SPECIAL CUT DITCH
(Not to Scale)
Type of Liner= Class I Rip-Rap
Min. D=1 Ft.
Min. d=1 Ft.
-DR3- STA. 10+20 TO 12+00 RT
-DR3- STA. 10+38 TO 11+20 LT
(SEE XSCs FOR TYPICAL DITCH GRADE)
DETAIL 35F
CONCRETE SILL DETAIL
(Not to Scale)
D= 1.0'
B= 2.0'
d=0.5'
-L- STA. 422+70 LT
-L- STA. 426+07 LT
50' 0' 50' 100'
25'

FOR -L- PROFILE, SEE SHEET NO.69

FOR -DR3- PROFILE, SEE SHEET NO. 77

8/17/99
11/1/2021
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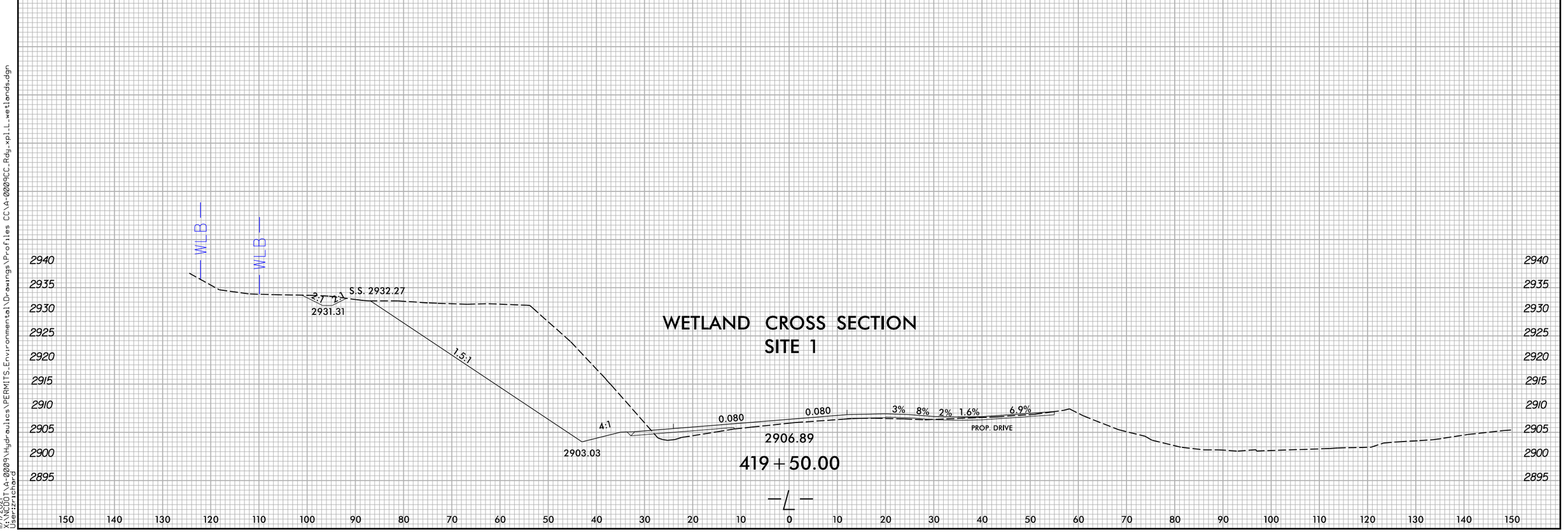
6/23/16

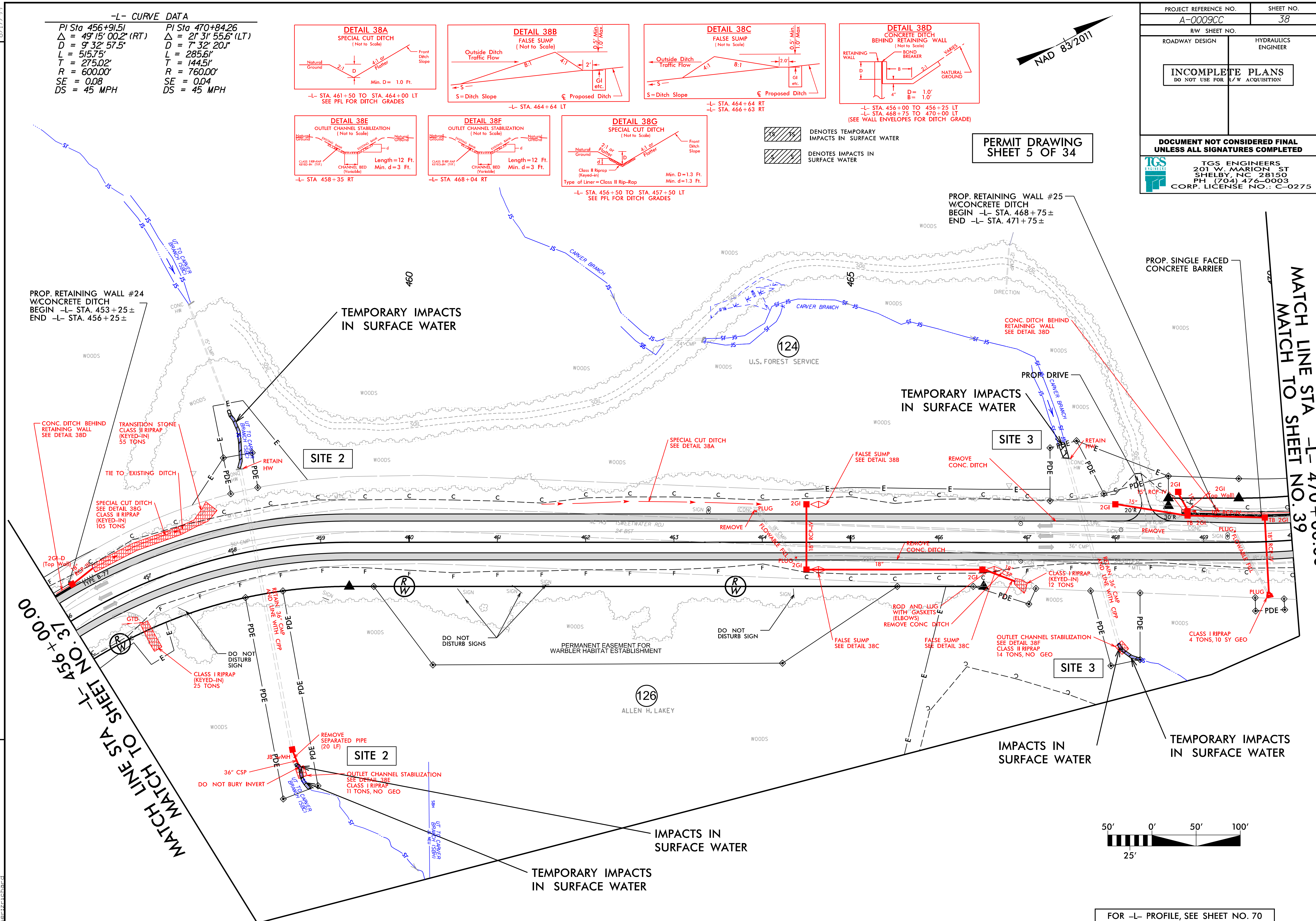
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-7

PERMIT DRAWING
SHEET 4 OF 34

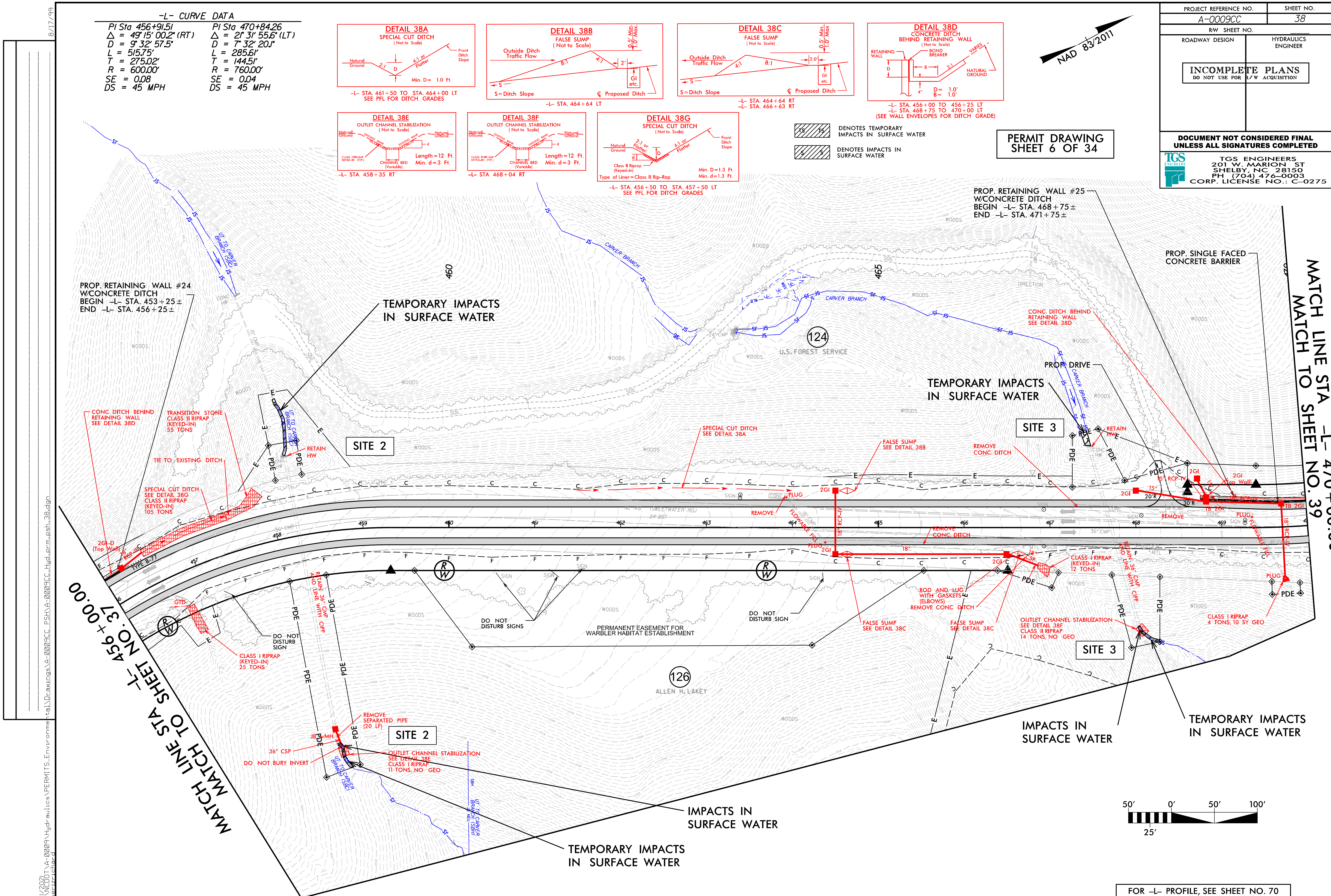
SCALE
1" = 20' HORIZONTAL
1" = 20' VERTICAL



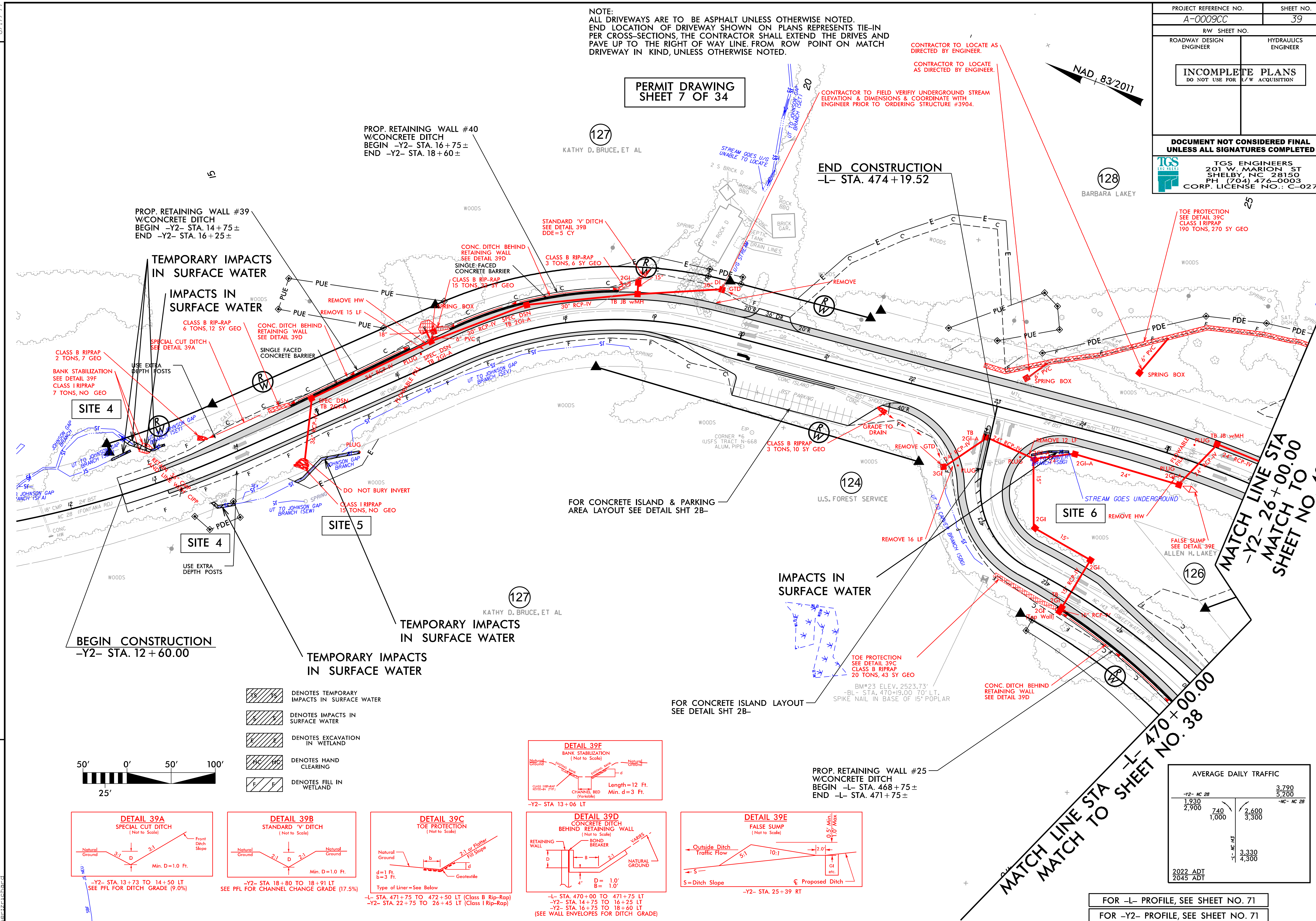
WETLAND CROSS SECTION
SITE 1



PROJECT REFERENCE NO. A-0009CC
SHEET NO. 38
RW SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING SHEET 5 OF 34
NAD 83/2011
-L- CURVE DATA
PI Sta 456+91.51
Δ = 49° 15' 00.2" (RT)
D = 9° 32' 57.5"
L = 515.75'
T = 275.02'
R = 600.00'
SE = 0.08
DS = 45 MPH
PI Sta 470+84.26
Δ = 21° 31' 55.6" (LT)
D = 7° 32' 20.1"
L = 285.61'
T = 144.51'
R = 760.00'
SE = 0.04
DS = 45 MPH
DETAIL 38A
SPECIAL CUT DITCH
(Not to Scale)
-L- STA. 461+50 TO STA. 464+00 LT
SEE PFL FOR DITCH GRADES
DETAIL 38B
FALSE SUMP
(Not to Scale)
-L- STA. 464+64 LT
DETAIL 38C
FALSE SUMP
(Not to Scale)
-L- STA. 464+64 RT
-L- STA. 466+63 RT
DETAIL 38D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
-L- STA. 456+00 TO 456+25 LT
-L- STA. 468+75 TO 470+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 38E
OUTLET CHANNEL STABILIZATION
(Not to Scale)
-L- STA 458+35 RT
DETAIL 38F
OUTLET CHANNEL STABILIZATION
(Not to Scale)
-L- STA 468+04 RT
DETAIL 38G
SPECIAL CUT DITCH
(Not to Scale)
-L- STA. 456+50 TO STA. 457+50 LT
SEE PFL FOR DITCH GRADES
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #24 W/CONCRETE DITCH
BEGIN -L- STA. 453+25±
END -L- STA. 456+25±
PROP. RETAINING WALL #25 W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±
PROP. SINGLE FACED CONCRETE BARRIER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 2
SITE 3
CARVER BRANCH
124
U.S. FOREST SERVICE
126
ALLEN H. LAKEY
PERMANENT EASEMENT FOR WARBLER HABITAT ESTABLISHMENT
DO NOT DISTURB SIGNS
PROP. DRIVE
CLASS I RIPRAP (KEYED-IN) 25 TONS
CLASS I RIPRAP (KEYED-IN) 12 TONS
CLASS I RIPRAP 4 TONS, 10 SY GEO
TRANSITION STONE CLASS II RIPRAP (KEYED-IN) 55 TONS
SPECIAL CUT DITCH SEE DETAIL 38G CLASS II RIPRAP (KEYED-IN) 105 TONS
OUTLET CHANNEL STABILIZATION SEE DETAIL 38E CLASS I RIPRAP 11 TONS, NO GEO
OUTLET CHANNEL STABILIZATION SEE DETAIL 38F CLASS II RIPRAP 14 TONS, NO GEO
MATCH LINE STA -L- 456+00.00 MATCH TO SHEET NO. 37
MATCH LINE STA -L- 470+00.00 MATCH TO SHEET NO. 39
FOR -L- PROFILE, SEE SHEET NO. 70



PROJECT REFERENCE NO.
A-0009CC
SHEET NO.
38
RW SHEET NO.
ROADWAY DESIGN
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
PERMIT DRAWING
SHEET 6 OF 34
-L- CURVE DATA
PI Sta 456+91.51
Δ = 49° 15' 00.2" (RT)
D = 9° 32' 57.5"
L = 515.75'
T = 275.02'
R = 600.00'
SE = 0.08
DS = 45 MPH
PI Sta 470+84.26
Δ = 21° 31' 55.6" (LT)
D = 7° 32' 20.1"
L = 285.61'
T = 144.51'
R = 760.00'
SE = 0.04
DS = 45 MPH
DETAIL 38A
SPECIAL CUT DITCH
(Not to Scale)
-L- STA. 461+50 TO STA. 464+00 LT
SEE PFL FOR DITCH GRADES
DETAIL 38B
FALSE SUMP
(Not to Scale)
-L- STA. 464+64 LT
DETAIL 38C
FALSE SUMP
(Not to Scale)
-L- STA. 464+64 RT
-L- STA. 466+63 RT
DETAIL 38D
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
-L- STA. 456+00 TO 456+25 LT
-L- STA. 468+75 TO 470+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 38E
OUTLET CHANNEL STABILIZATION
(Not to Scale)
-L- STA 458+35 RT
DETAIL 38F
OUTLET CHANNEL STABILIZATION
(Not to Scale)
-L- STA 468+04 RT
DETAIL 38G
SPECIAL CUT DITCH
(Not to Scale)
-L- STA. 456+50 TO STA. 457+50 LT
SEE PFL FOR DITCH GRADES
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #24
W/CONCRETE DITCH
BEGIN -L- STA. 453+25±
END -L- STA. 456+25±
PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±
PROP. SINGLE FACED CONCRETE BARRIER
PROP. DRIVE
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 2
SITE 3
CARVER BRANCH
UT TO CARVER BRANCH (SEC)
U.S. FOREST SERVICE
ALLEN H. LAKEY
PERMANENT EASEMENT FOR WARBLER HABITAT ESTABLISHMENT
DO NOT DISTURB SIGNS
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 38D
TRANSITION STONE CLASS II RIPRAP (KEYED-IN) 55 TONS
TIE TO EXISTING DITCH
SPECIAL CUT DITCH SEE DETAIL 38G CLASS II RIPRAP (KEYED-IN) 105 TONS
SPECIAL CUT DITCH SEE DETAIL 38A
FALSE SUMP SEE DETAIL 38B
FALSE SUMP SEE DETAIL 38C
REMOVE CONC. DITCH
CLASS I RIPRAP (KEYED-IN) 25 TONS
CLASS I RIPRAP (KEYED-IN) 12 TONS
CLASS I RIPRAP 4 TONS, 10 SY GEO
ROD AND LUG WITH GASKETS (ELBOWS) REMOVE CONC DITCH
OUTLET CHANNEL STABILIZATION SEE DETAIL 38F CLASS II RIPRAP 14 TONS, NO GEO
OUTLET CHANNEL STABILIZATION SEE DETAIL 38E CLASS I RIPRAP 11 TONS, NO GEO
REMOVE SEPARATED PIPE (20 LF)
36" CSP
DO NOT BURY INVERT
RETAIN 36" CMP AND LINE WITH CIPP
MATCH LINE STA -L- 456+00.00 MATCH TO SHEET NO. 37
MATCH LINE STA -L- 470+00.00 MATCH TO SHEET NO. 39
FOR -L- PROFILE, SEE SHEET NO. 70



NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PERMIT DRAWING SHEET 7 OF 34
PROJECT REFERENCE NO. A-0009CC
SHEET NO. 39
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
PROP. RETAINING WALL #40
W/CONCRETE DITCH
BEGIN -Y2- STA. 16+75±
END -Y2- STA. 18+60±
PROP. RETAINING WALL #39
W/CONCRETE DITCH
BEGIN -Y2- STA. 14+75±
END -Y2- STA. 16+25±
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
END CONSTRUCTION
-L- STA. 474+19.52
BEGIN CONSTRUCTION
-Y2- STA. 12+60.00
SITE 4
SITE 5
SITE 6
127
KATHY D. BRUCE, ET AL
128
BARBARA LAKEY
124
U.S. FOREST SERVICE
126
ALLEN H. LAKEY
CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.
CONTRACTOR TO FIELD VERIFY UNDERGROUND STREAM ELEVATION & DIMENSIONS & COORDINATE WITH ENGINEER PRIOR TO ORDERING STRUCTURE #3904.
STREAM GOES U/G UNABLE TO LOCATE
STANDARD 'V' DITCH SEE DETAIL 39B DDE=5 CY
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 39D
SINGLE FACED CONCRETE BARRIER
CLASS B RIP-RAP 3 TONS, 6 SY GEO
CLASS B RIP-RAP 15 TONS, 32 SY GEO
CLASS B RIP-RAP 6 TONS, 12 SY GEO
SPECIAL CUT DITCH SEE DETAIL 39A
CLASS B RIPRAP 2 TONS, 7 GEO
BANK STABILIZATION SEE DETAIL 39F CLASS I RIPRAP 7 TONS, NO GEO
USE EXTRA DEPTH POSTS
REMOVE HW
REMOVE 15 LF
DO NOT BURY INVERT
CLASS I RIPRAP 15 TONS, NO GEO
FOR CONCRETE ISLAND & PARKING AREA LAYOUT SEE DETAIL SHT 2B-
FOR CONCRETE ISLAND LAYOUT SEE DETAIL SHT 2B-
CLASS B RIPRAP 3 TONS, 10 SY GEO
GRADE TO DRAIN
REMOVE GTD
REMOVE 16 LF
REMOVE 12 LF
REMOVE HW
STREAM GOES UNDERGROUND
FALSE SUMP SEE DETAIL 39E
TOE PROTECTION SEE DETAIL 39C CLASS I RIPRAP 190 TONS, 270 SY GEO
TOE PROTECTION SEE DETAIL 39C CLASS B RIPRAP 20 TONS, 43 SY GEO
SPRING BOX
BM#23 ELEV. 2523.73' -BL- STA. 470+19.00 70' LT. SPIKE NAIL IN BASE OF 15" POPLAR
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 39D
PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±
MATCH LINE STA -Y2- 26+00.00 MATCH TO SHEET NO. 40
MATCH LINE STA -L- 470+00.00 MATCH TO SHEET NO. 38
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
50' 0' 50' 100'
25'
DETAIL 39F BANK STABILIZATION (Not to Scale) Length=12 Ft. Min. d=3 Ft. -Y2- STA 13+06 LT
DETAIL 39A SPECIAL CUT DITCH (Not to Scale) Min. D=1.0 Ft. -Y2- STA. 13+73 TO 14+50 LT SEE PFL FOR DITCH GRADE (9.0%)
DETAIL 39B STANDARD 'V' DITCH (Not to Scale) Min. D=1.0 Ft. -Y2- STA 18+80 TO 18+91 LT SEE PFL FOR CHANNEL CHANGE GRADE (17.5%)
DETAIL 39C TOE PROTECTION (Not to Scale) d=1 Ft. b=3 Ft. Type of Liner=See Below -L- STA. 471+75 TO 472+50 LT (Class B Rip-Rap) -Y2- STA. 22+75 TO 26+45 LT (Class I Rip-Rap)
DETAIL 39D CONCRETE DITCH BEHIND RETAINING WALL (Not to Scale) D= 1.0' B= 1.0' -L- STA. 470+00 TO 471+75 LT -Y2- STA. 14+75 TO 16+25 LT -Y2- STA. 16+75 TO 18+60 LT (SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 39E FALSE SUMP (Not to Scale) Outside Ditch Traffic Flow S=Ditch Slope Proposed Ditch -Y2- STA. 25+39 RT
AVERAGE DAILY TRAFFIC
1,930 2,900
740 1,000
2,600 3,300
3,790 5,200
3,330 4,300
2022 ADT
2045 ADT
FOR -L- PROFILE, SEE SHEET NO. 71
FOR -Y2- PROFILE, SEE SHEET NO. 71

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	39
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

NOTE:
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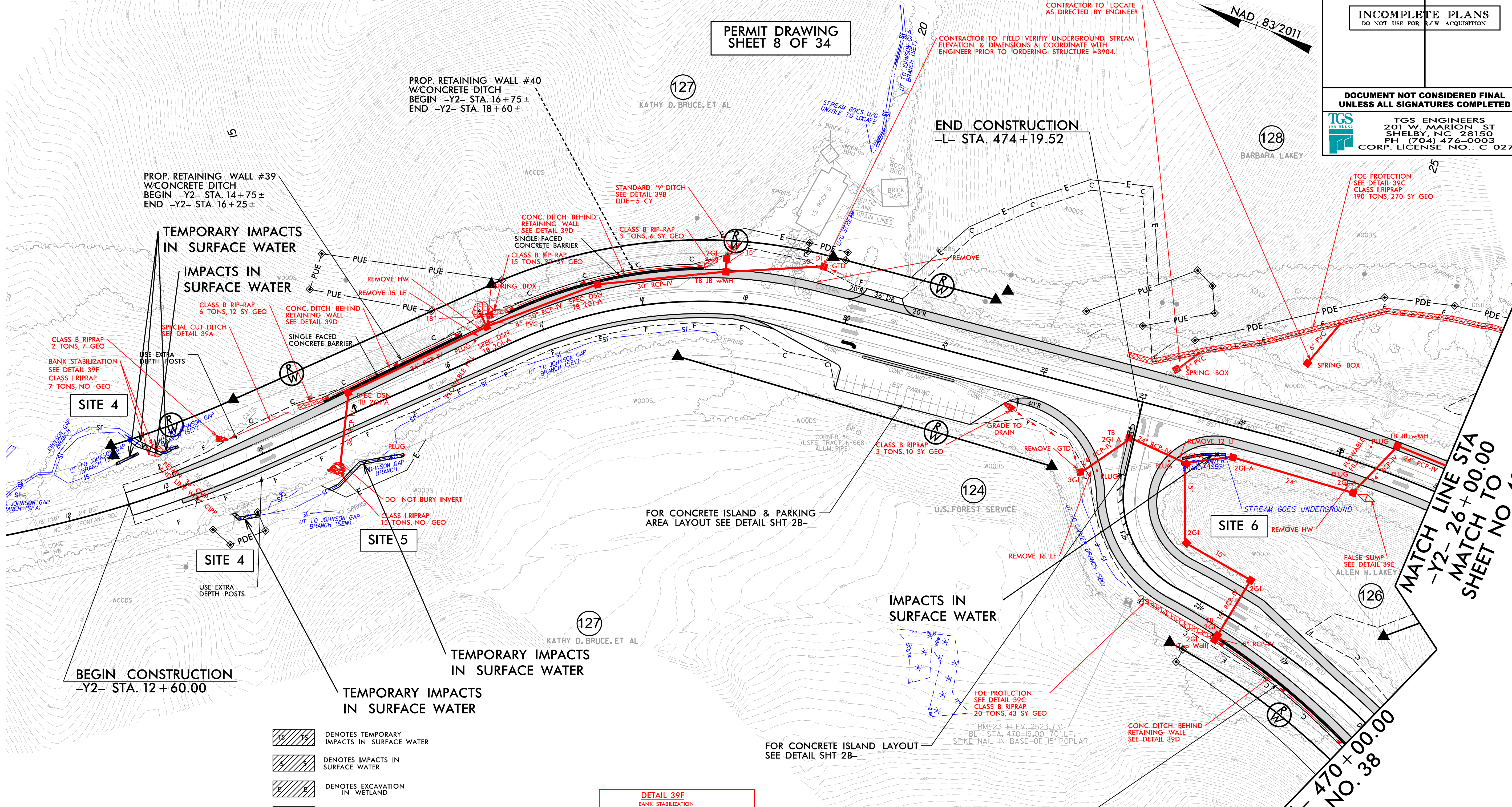
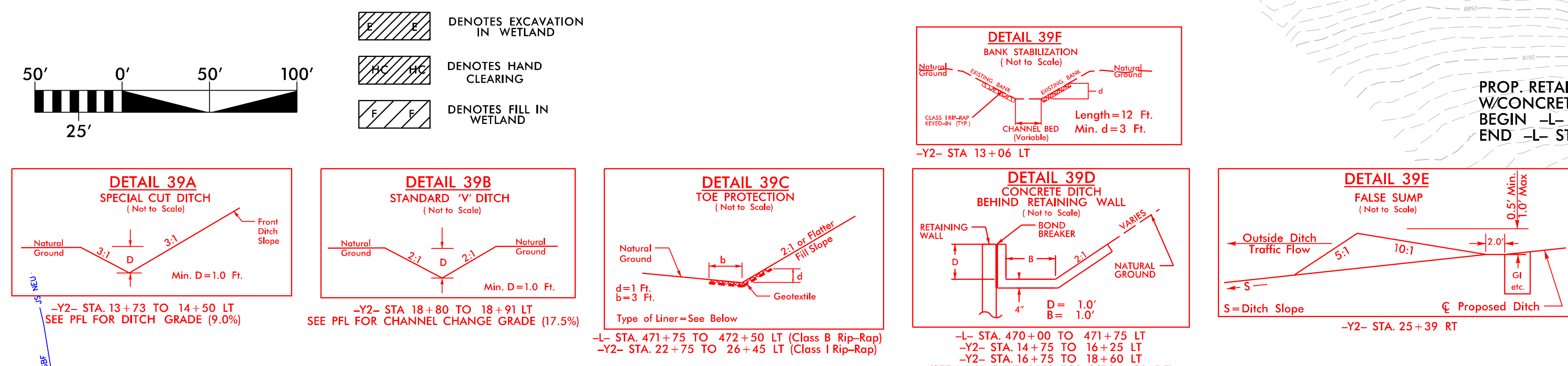
PERMIT DRAWING
SHEET 8 OF 34



NAD 83/2011
PROP. RETAINING WALL #40
W/CONCRETE DITCH
BEGIN -Y2- STA. 16+75±
END -Y2- STA. 18+60±
PROP. RETAINING WALL #39
W/CONCRETE DITCH
BEGIN -Y2- STA. 14+75±
END -Y2- STA. 16+25±
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
127
KATHY D. BRUCE, ET AL
END CONSTRUCTION
-L- STA. 474+19.52
128
BARBARA LAKEY
CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.
CONTRACTOR TO LOCATE AS DIRECTED BY ENGINEER.
CONTRACTOR TO FIELD VERIFY UNDERGROUND STREAM ELEVATION & DIMENSIONS & COORDINATE WITH ENGINEER PRIOR TO ORDERING STRUCTURE #3904.
STREAM GOES U/G UNABLE TO LOCATE
STANDARD 'V' DITCH
SEE DETAIL 39B
DDE=5 CY
CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 39D
SINGLE FACED CONCRETE BARRIER
CLASS B RIP-RAP
3 TONS, 6 SY GEO
CLASS B RIP-RAP
15 TONS, 22 SY GEO
TOE PROTECTION
SEE DETAIL 39C
CLASS I RIPRAP
190 TONS, 270 SY GEO
SPRING BOX
REMOVE HW
REMOVE 15 LF
CLASS B RIP-RAP
6 TONS, 12 SY GEO
SPECIAL CUT DITCH
SEE DETAIL 39A
CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 39D
SINGLE FACED CONCRETE BARRIER
CLASS B RIPRAP
2 TONS, 7 GEO
BANK STABILIZATION
SEE DETAIL 39F
CLASS I RIPRAP
7 TONS, NO GEO
USE EXTRA DEPTH POSTS
SITE 4
SITE 4
SITE 5
SITE 6
UT TO JOHNSON GAP BRANCH
DO NOT BURY INVERT
CLASS I RIPRAP
15 TONS, NO GEO
REMOVE
CLASS B RIPRAP
3 TONS, 10 SY GEO
GRADE TO DRAIN
REMOVE GTD
124
U.S. FOREST SERVICE
FOR CONCRETE ISLAND & PARKING AREA LAYOUT SEE DETAIL SHT 2B-__
REMOVE 16 LF
REMOVE 12 LF
STREAM GOES UNDERGROUND
REMOVE HW
FALSE SUMP
SEE DETAIL 39E
ALLEN H. LAKEY
126
IMPACTS IN SURFACE WATER
MATCH LINE STA -Y2- 26+00.00
MATCH TO SHEET NO. 40
TOE PROTECTION
SEE DETAIL 39C
CLASS B RIPRAP
20 TONS, 43 SY GEO
BM#23 ELEV. 2523.73'
-BL- STA. 470+19.00 70' LT.
SPIKE NAIL IN BASE OF 15" POPLAR
CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 39D
FOR CONCRETE ISLAND LAYOUT SEE DETAIL SHT 2B-__
127
KATHY D. BRUCE, ET AL
BEGIN CONSTRUCTION
-Y2- STA. 12+60.00
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #25
W/CONCRETE DITCH
BEGIN -L- STA. 468+75±
END -L- STA. 471+75±
MATCH LINE STA -L- 470+00.00
MATCH TO SHEET NO. 38
50' 0' 50' 100'
25'

DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND



DETAIL 39F
BANK STABILIZATION
(Not to Scale)
Length=12 Ft.
Min. d=3 Ft.
-Y2- STA 13+06 LT
DETAIL 39A
SPECIAL CUT DITCH
(Not to Scale)
Min. D=1.0 Ft.
-Y2- STA. 13+73 TO 14+50 LT
SEE PFL FOR DITCH GRADE (9.0%)
DETAIL 39B
STANDARD 'V' DITCH
(Not to Scale)
Min. D=1.0 Ft.
-Y2- STA 18+80 TO 18+91 LT
SEE PFL FOR CHANNEL CHANGE GRADE (17.5%)
DETAIL 39C
TOE PROTECTION
(Not to Scale)
d=1 Ft.
b=3 Ft.
Type of Liner=See Below
-L- STA. 471+75 TO 472+50 LT (Class B Rip-Rap)
-Y2- STA. 22+75 TO 26+45 LT (Class I Rip-Rap)
DETAIL 39D
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
D= 1.0'
B= 1.0'
-L- STA. 470+00 TO 471+75 LT
-Y2- STA. 14+75 TO 16+25 LT
-Y2- STA. 16+75 TO 18+60 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
DETAIL 39E
FALSE SUMP
(Not to Scale)
-Y2- STA. 25+39 RT

AVERAGE DAILY TRAFFIC

-Y2- NC 28: 1,930 / 2,900	3,790 / 5,200 -NC- NC 28
740 / 1,000	2,600 / 3,300
-L- NC 143: 3,330 / 4,300	
2022 ADT / 2045 ADT	

FOR -L- PROFILE, SEE SHEET NO. 71
FOR -Y2- PROFILE, SEE SHEET NO. 71

REVISIONS

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_39.dgn
Username

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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CORP. LICENSE NO.: C-0275

NAD 83/2011

8/17/99

REVISIONS

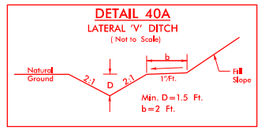
PAVEMENT REMOVAL

MECHANIZED CLEARING IN WETLANDS

HAND CLEARING IN WETLANDS

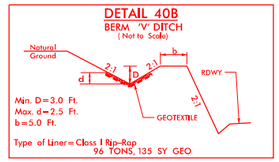
FILL IN WETLANDS

DETAIL 40A
LATERAL 'V' DITCH
(Not to Scale)



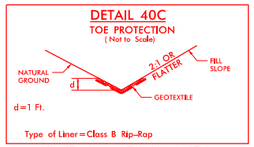
–Y2– STA. 32+40 TO 32+63 RT
SEE PFL FOR DITCH GRADE (1.4%)

DETAIL 40B
BERM 'V' DITCH
(Not to Scale)



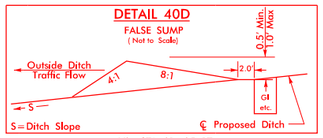
–Y2– STA. 39+00 TO 40+00 RT
SEE PFL FOR DITCH GRADES

DETAIL 40C
TOE PROTECTION
(Not to Scale)



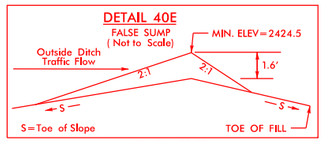
–Y2– STA. 29+75 TO 30+45 LT
–Y2– STA. 32+70 TO 33+00 RT

DETAIL 40D
FALSE SUMP
(Not to Scale)



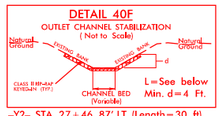
–Y2– STA. 31+85 RT
–Y2– STA. 34+12 RT
–Y2– STA. 35+62 RT
–Y2– STA. 39+63 RT

DETAIL 40E
FALSE SUMP
(Not to Scale)



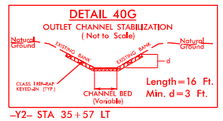
–L– STA. 36+50 RT

DETAIL 40F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



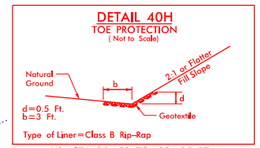
–Y2– STA 27+46 87' LT (Length=30 ft)
–Y2– STA 27+38 140' LT (Length=18 ft)

DETAIL 40G
OUTLET CHANNEL STABILIZATION
(Not to Scale)



–Y2– STA 35+57 LT

DETAIL 40H
TOE PROTECTION
(Not to Scale)



–Y2– STA. 36+50 TO 38+25 RT

TOE PROTECTION SEE DETAIL 39C CLASS I RIPRAP

DO NOT DISTURB

MAX 0.5% PIPE SLOPE THIS SIDE OF ELBOW

SITE 7

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 20 TONS, NO GEO

TEMPORARY IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 30 TONS, NO GEO

PROP. RETAINING WALL #30
BEGIN –Y2– STA. 26+60±
END –Y2– STA. 28+75±

ROD AND LUG WITH GASKETS (ELBOWS)

SITE 8

IMPACTS IN SURFACE WATER

MATCH LINE STA –Y2– 26+00.00
MATCH TO SHEET NO. 39

CLASS B RIPRAP 2 TONS, 7 SY GEO

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 14 TONS, 31 SY GEO

CLASS I RIPRAP 4 TONS, 10 SY GEO

TB PRECAST DRAINAGE STRUCTURE 'A' MH FRAME & GRATE STD 840.46 48" CSP

ELBOWS

DO NOT BURY INVERT

SHOULDER BERM GUTTER –Y2– STA. 27+00 TO 28+25, RT

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

REMOVE HW

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

SITE 9

FALSE SUMP SEE DETAIL 40D

LATERAL 'V' DITCH SEE DETAIL 40A DDE=10 CY

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 7 TONS, 15 SY GEO

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

ROBERT K. NORCROSS

CARVER BRANCH

ALLEN H. LAKEY

BARBARA LAKEY

PERMIT DRAWING
SHEET 9 OF 34

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40G CLASS I RIPRAP 20 TONS, NO GEO

DO NOT BURY INVERT

PROP. DRIVE

FALSE SUMP SEE DETAIL 40D

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

SITE 9

FALSE SUMP SEE DETAIL 40E

TOE PROTECTION SEE DETAIL 40H CLASS B RIPRAP 45 TONS, 100 SY GEO

BERM 'V' DITCH SEE DETAIL 40B

BDO SPEC DSN

ROD AND LUG WITH GASKETS (ELBOW)

BERM 'V' DITCH SEE DETAIL 40B

ROBERT K. NORCROSS

DO NOT BURY INVERT

CLASS I RIPRAP 4 TONS, NO GEO

FALSE SUMP SEE DETAIL 40D

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 41

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

50′ 0′ 50′ 100′
25′

FOR –Y2– PROFILE, SEE SHEET NO. 72

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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NAD 83/2011

8/17/99

REVISIONS

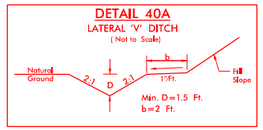
PAVEMENT REMOVAL

MECHANIZED CLEARING IN WETLANDS

HAND CLEARING IN WETLANDS

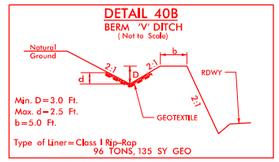
FILL IN WETLANDS

DETAIL 40A
LATERAL 'V' DITCH
(Not to Scale)



–Y2– STA. 32+40 TO 32+63 RT
SEE PFL FOR DITCH GRADE (1.4%)

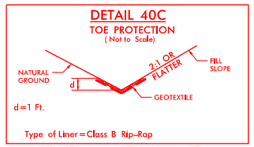
DETAIL 40B
BERM 'V' DITCH
(Not to Scale)



Type of Liner=Class I Rip-Rap
96 TONS, 135 SY GEO

–Y2– STA. 39+00 TO 40+00 RT
SEE PFL FOR DITCH GRADES

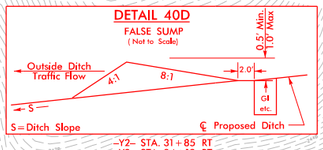
DETAIL 40C
TOE PROTECTION
(Not to Scale)



Type of Liner=Class B Rip-Rap

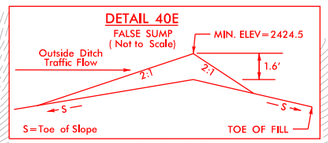
–Y2– STA. 29+75 TO 30+45 LT
–Y2– STA. 32+70 TO 33+00 RT

DETAIL 40D
FALSE SUMP
(Not to Scale)



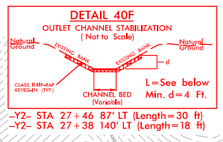
–Y2– STA. 31+85 RT
–Y2– STA. 34+12 RT
–Y2– STA. 35+62 RT
–Y2– STA. 39+63 RT

DETAIL 40E
FALSE SUMP
(Not to Scale)



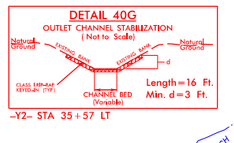
–L– STA. 36+50 RT

DETAIL 40F
OUTLET CHANNEL STABILIZATION
(Not to Scale)



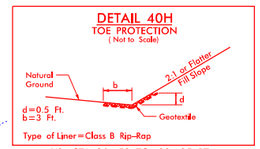
–Y2– STA 27+46 87' LT (Length=30 ft)
–Y2– STA 27+38 140' LT (Length=18 ft)

DETAIL 40G
OUTLET CHANNEL STABILIZATION
(Not to Scale)



–Y2– STA 35+57 LT

DETAIL 40H
TOE PROTECTION
(Not to Scale)



Type of Liner=Class B Rip-Rap

–Y2– STA. 36+50 TO 38+25 RT

PERMIT DRAWING
SHEET 10 OF 34

MATCH LINE STA –Y2– 26+00.00
MATCH TO SHEET NO. 39

MATCH LINE STA –Y2– 40+00.00
MATCH TO SHEET NO. 41

SITE 7

SITE 8

SITE 9

TOE PROTECTION SEE DETAIL 39C CLASS I RIPRAP

DO NOT DISTURB

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 20 TONS, NO GEO

MAX 0.5% PIPE SLOPE THIS SIDE OF ELBOW

TEMPORARY IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40F CLASS II RIPRAP 30 TONS, NO GEO

PROP. RETAINING WALL #30
BEGIN –Y2– STA. 26+60±
END –Y2– STA. 28+75±

IMPACTS IN SURFACE WATER

ROD AND LUG WITH GASKETS (ELBOWS)

REMOVE HW

24" CSP

TB JB w/MH

24" RCP-IV

REMAIN 42" CSP AND LINE WITH CIPP

CLASS B RIPRAP 2 TONS, 7 SY GEO

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 14 TONS, 31 SY GEO

TB PRECAST DRAINAGE STRUCTURE W/ MH FRAME & GRATE STD. 840.36

48" CSP

TB 2GI

ELBOWS

DO NOT BURY INVERT

CLASS B RIPRAP 2 TONS, 7 SY GEO

SHOULDER BERM GUTTER –Y2– STA. 27+00 TO 28+25, RT

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

CLASS I RIPRAP 4 TONS, 10 SY GEO

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

PLUG

FLOWABLE FILL

18" CSP

2GI

FALSE SUMP SEE DETAIL 40D

LATERAL 'V' DITCH SEE DETAIL 40A DDE=10 CY

TOE PROTECTION SEE DETAIL 40C CLASS B RIPRAP 7 TONS, 15 SY GEO

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

OUTLET CHANNEL STABILIZATION SEE DETAIL 40G CLASS I RIPRAP 20 TONS, NO GEO

DO NOT BURY INVERT

PROP. DRIVE

FALSE SUMP SEE DETAIL 40D

MAX 1% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

48" CSP

JB w/MH

48" RCP-IV

FALSE SUMP SEE DETAIL 40E

BERM 'V' DITCH SEE DETAIL 40B

TOE PROTECTION SEE DETAIL 40H CLASS B RIPRAP 45 TONS, 100 SY GEO

BDO SPEC DSN

BERM 'V' DITCH SEE DETAIL 40B

ROD AND LUG WITH GASKETS (ELBOW)

CLASS I RIPRAP 4 TONS, NO GEO

FALSE SUMP SEE DETAIL 40D

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

ROBERT K. NORCROSS

CARVER BRANCH

ALLEN H. LAKEY

BARBARA LAKEY

ROBERT K. NORCROSS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

50' 0' 50' 100'
25'

FOR –Y2– PROFILE, SEE SHEET NO. 72

11/1/2021
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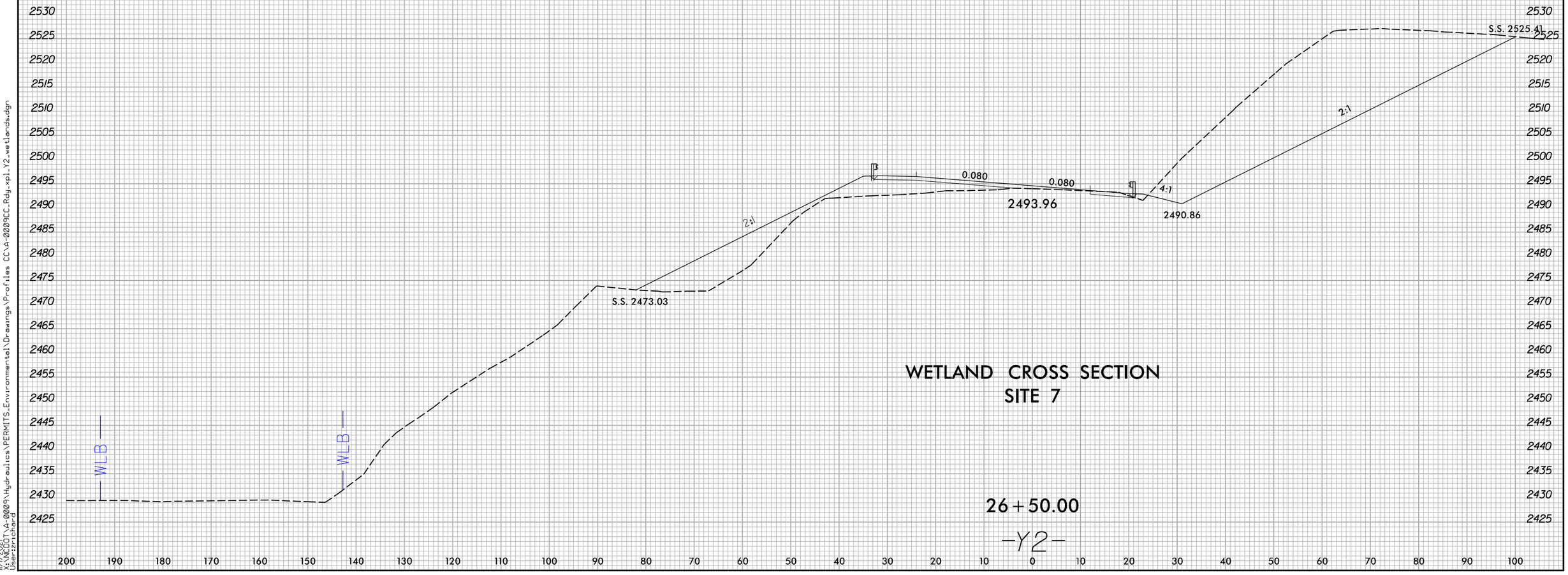
User:richard

6/23/16

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-119

PERMIT DRAWING
SHEET 11 OF 34

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



WETLAND CROSS SECTION
SITE 7

26+50.00

-Y2-

11/1/2021
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User:rrichard

METES & BOUNDS OLD NC 28			
From	To	Direction	Distance
A	B	S 41° 15′ 05″ E	90.11′
B	C	S 50° 40′ 15″ E	37.42′
C	D	S 85° 45′ 59″ E	39.64′
D	E	N 58° 32′ 14″ E	42.05′
E	F	N 25° 05′ 07″ E	37.05′
F	G	N 2° 03′ 42″ E	39.94′
G	H	N 2° 07′ 51″ W	84.63′
H	J	N 3° 00′ 57″ E	66.88′

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	41

R/W SHEET NO.

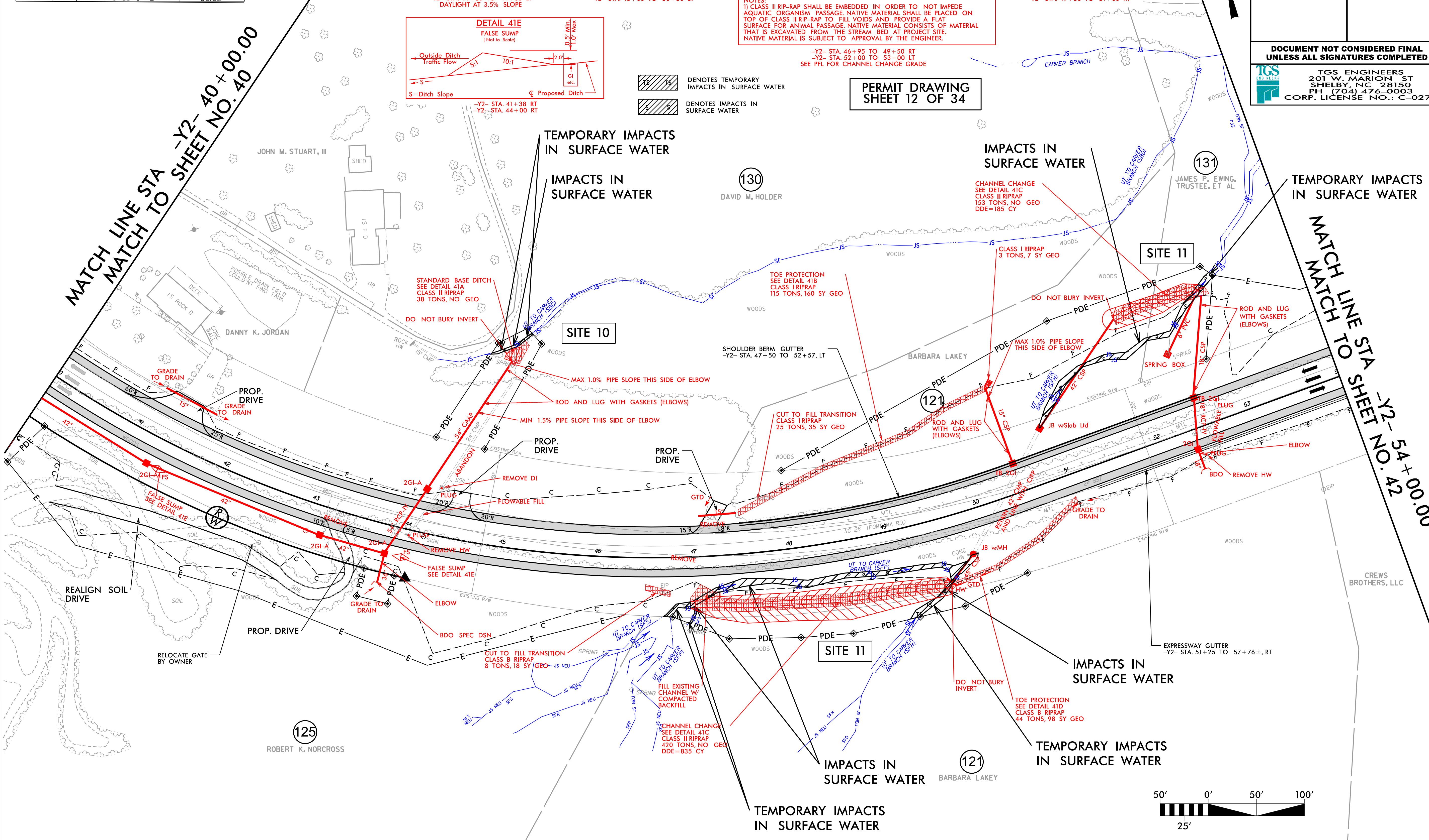
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275


DETAIL 41A
STANDARD BASE DITCH
(Not to Scale)
Type of Liner=Class II Rip-Rap
-Y2- STA. 44+80 TO 44+83 LT
DAYLIGHT AT 3.5% SLOPE
DETAIL 41B
TOE PROTECTION
(Not to Scale)
Type of Liner=Class I Rip-Rap
-Y2- STA. 48+00 TO 50+50 LT
DETAIL 41C
CHANNEL CHANGE
(Not to Scale)
Type of Liner=Class II Rip-Rap
NOTES:
1) CLASS II RIP-RAP SHALL BE EMBEDDED IN ORDER TO NOT IMPEDE AQUATIC ORGANISM PASSAGE. NATIVE MATERIAL SHALL BE PLACED ON TOP OF CLASS II RIP-RAP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT PROJECT SITE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.
-Y2- STA. 46+95 TO 49+50 RT
-Y2- STA. 52+00 TO 53+00 LT
SEE PFL FOR CHANNEL CHANGE GRADE
DETAIL 41D
TOE PROTECTION
(Not to Scale)
Type of Liner=Class B Rip-Rap
-Y2- STA. 49+50 TO 51+00 RT
DETAIL 41E
FALSE SUMP
(Not to Scale)
S=Ditch Slope
-Y2- STA. 41+38 RT
-Y2- STA. 44+00 RT
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
PERMIT DRAWING
SHEET 12 OF 34
NAD 83/2011
MATCH LINE STA -Y2- 40+00.00
MATCH TO SHEET NO. 40
MATCH LINE STA -Y2- 54+00.00
MATCH TO SHEET NO. 42
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
SITE 10
SITE 11
JOHN M. STUART, III
DAVID M. HOLDER
JAMES P. EWING, TRUSTEE, ET AL
DANNY K. JORDAN
BARBARA LAKEY
ROBERT K. NORCROSS
CREWS BROTHERS, LLC
STANDARD BASE DITCH
SEE DETAIL 41A
CLASS II RIPRAP
38 TONS, NO GEO
DO NOT BURY INVERT
MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW
ROD AND LUG WITH GASKETS (ELBOWS)
MIN 1.5% PIPE SLOPE THIS SIDE OF ELBOW
TOE PROTECTION
SEE DETAIL 41B
CLASS I RIPRAP
115 TONS, 160 SY GEO
CLASS I RIPRAP
3 TONS, 7 SY GEO
CHANNEL CHANGE
SEE DETAIL 41C
CLASS II RIPRAP
153 TONS, NO GEO
DDE=185 CY
SHOULDER BERM GUTTER
-Y2- STA. 47+50 TO 52+57, LT
CUT TO FILL TRANSITION
CLASS I RIPRAP
25 TONS, 35 SY GEO
FALSE SUMP
SEE DETAIL 41E
CUT TO FILL TRANSITION
CLASS B RIPRAP
8 TONS, 18 SY GEO
FILL EXISTING CHANNEL W/ COMPACTED BACKFILL
CHANNEL CHANGE
SEE DETAIL 41C
CLASS II RIPRAP
420 TONS, NO GEO
DDE=835 CY
TOE PROTECTION
SEE DETAIL 41D
CLASS B RIPRAP
44 TONS, 98 SY GEO
EXPRESSWAY GUTTER
-Y2- STA. 51+25 TO 57+76±, RT
PROP. DRIVE
REALIGN SOIL DRIVE
RELOCATE GATE BY OWNER
SPRING BOX
ROD AND LUG WITH GASKETS (ELBOWS)
REMOVE HW
ELBOW
BDO SPEC DSN
GRADE TO DRAIN
50′ 0′ 50′ 100′
25′

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR -Y2- PROFILE, SEE SHEET NO. 72

REVISIONS

8/17/99

11/1/2021
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PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	41

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

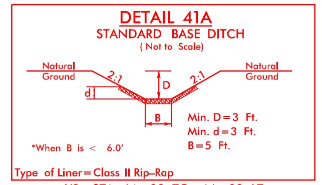
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

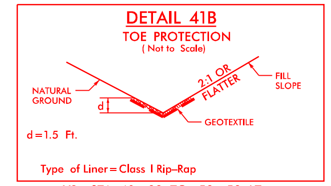
PERMIT DRAWING
SHEET 13 OF 34

METES & BOUNDS OLD NC 28

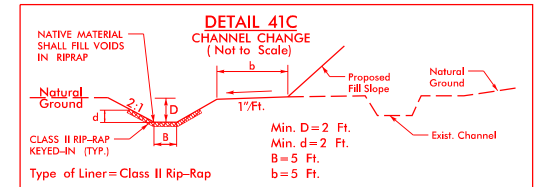
From	To	Direction	Distance
A	B	S 41° 15' 05" E	90.11'
B	C	S 50° 40' 15" E	37.42'
C	D	S 85° 45' 59" E	39.64'
D	E	N 58° 32' 14" E	42.05'
E	F	N 25° 05' 07" E	37.05'
F	G	N 2° 03' 42" E	39.94'
G	H	N 2° 07' 51" W	84.63'
H	J	N 3° 00' 57" E	66.88'



-Y2- STA. 44+80 TO 44+83 LT
DAYLIGHT AT 3.5% SLOPE

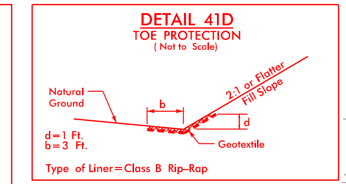


-Y2- STA. 48+00 TO 50+50 LT

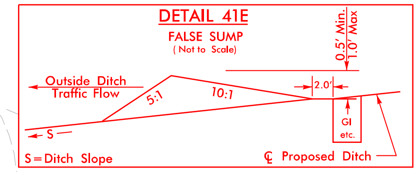


NOTES:
1) CLASS II RIP-RAP SHALL BE EMBEDDED IN ORDER TO NOT IMPEDE AQUATIC ORGANISM PASSAGE. NATIVE MATERIAL SHALL BE PLACED ON TOP OF CLASS II RIP-RAP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT PROJECT SITE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER.

-Y2- STA. 46+95 TO 49+50 RT
-Y2- STA. 52+00 TO 53+00 LT
SEE PFL FOR CHANNEL CHANGE GRADE



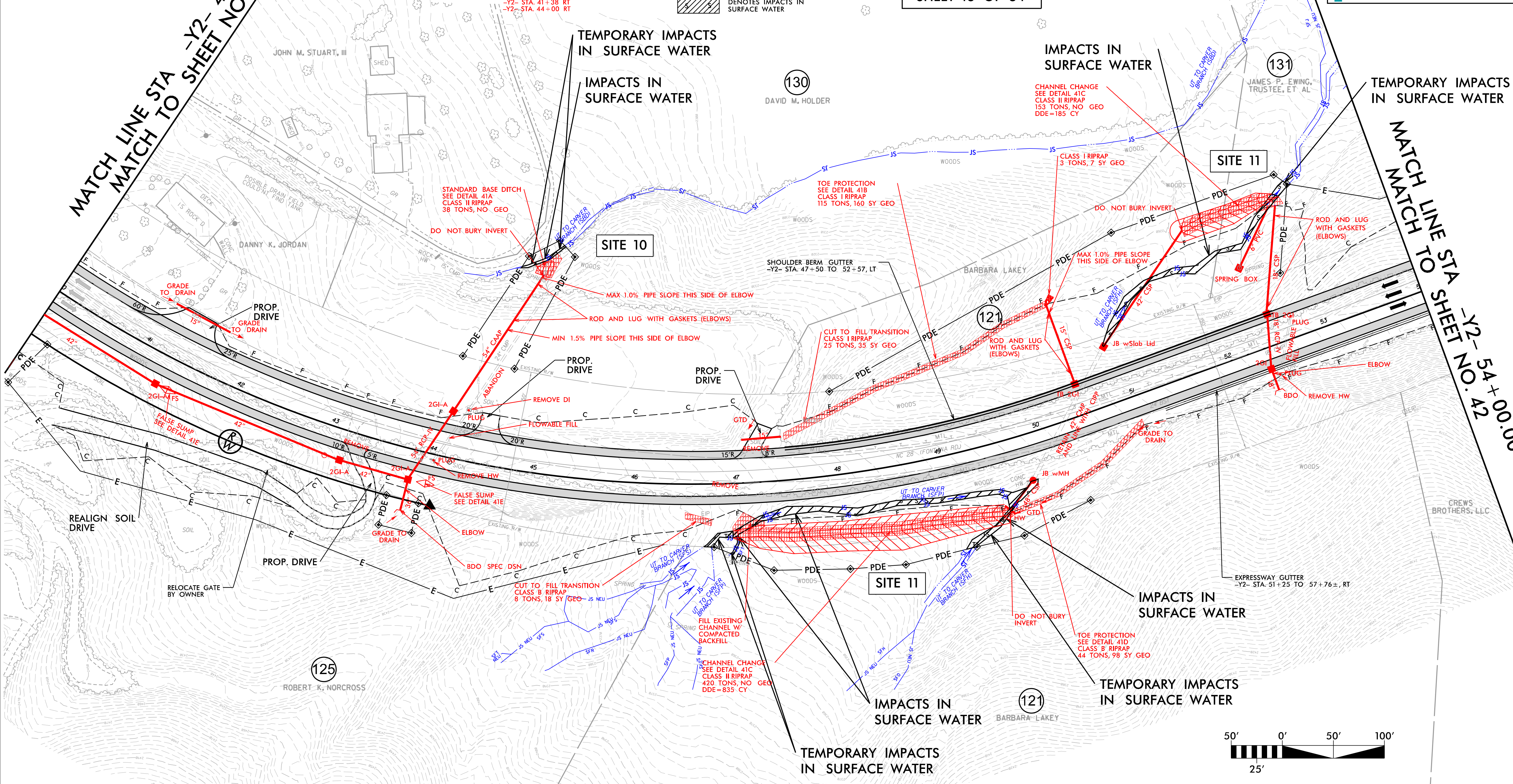
-Y2- STA. 49+50 TO 51+00 RT



-Y2- STA. 41+38 RT
-Y2- STA. 44+00 RT

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S — DENOTES IMPACTS IN SURFACE WATER



50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

FOR -Y2- PROFILE, SEE SHEET NO. 72

REVISIONS

8/17/99

11/1/2021
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8/17/99

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	42
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 14 OF 34

NAD 83/2011

-Y2- CURVE DATA

PI Sta 70+28.18
△ = 50° 56' 38.0" (RT)
D = 3° 53' 51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH

-DR4- CURVE DATA

①	②	③
PI Sta 10+77.95	PI Sta 11+22.09	
△ = 24° 42' 06.2" (LT)	△ = 10° 28' 29.8" (RT)	
D = 57° 17' 44.8"	D = 22° 55' 05.9"	
L = 43.11'	L = 45.71'	
T = 21.90'	T = 22.92'	
R = 100.00'	R = 250.00'	

DETAIL 42A
BERM 'V' DITCH
(Not to Scale)
Type of Liner=Class B Rip-Rap 45 TONS, 100 SY GEO
-Y2- STA. 55+00 TO 55+71 RT
SEE PFL FOR DITCH GRADES

DETAIL 42B
TOE PROTECTION
(Not to Scale)
Type of Liner=Class I Rip-Rap
-Y2- STA. 58+49 TO 59+18 RT

DETAIL 42C
LATERAL BASE DITCH
(Not to Scale)
Type of Liner=Class I Rip-Rap
-Y2- STA. 59+18 TO 59+53 RT
SEE PFL FOR DITCH GRADE (18.6%)

DETAIL 42D
LATERAL 'V' DITCH
(Not to Scale)
-Y2- STA. 59+53 TO 59+90 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 42E
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)
-Y2- STA. 63+75 TO 66+02 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

DETAIL 42F
STREAM RESTORATION
(Not to Scale)
Length=41 Ft.
Min. D=3 Ft.
B=4 Ft.
Type of Liner=CLASS II RIPRAP 120 TONS
-Y2- STA 67+96(68' LT) TO 68+26(90' LT)
SEE PFL FOR CHANNEL GRADE (4.9%)

DETAIL 42G
FALSE SUMP
(Not to Scale)
S=Ditch Slope
℄ Proposed Ditch
-Y2- STA. 63+62 RT

-L-/-DR4- INTERSECTION

PROP. RETAINING WALL #32
BEGIN -Y2- STA. 58+90±
END -Y2- STA. 66+83±

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

END CONSTRUCTION
-DR4- STA. 11+10.00

TEMPORARY IMPACTS IN SURFACE WATER

PROP. RETAINING WALL #33 W/CONCRETE DITCH
BEGIN -Y2- STA. 63+75±
END -Y2- STA. 66+02±

SITE 12
SITE 13
SITE 14
SITE 15

CLASS I RIPRAP 4 TONS, 12 SY GEO
DO NOT BURY INVERT
OUTLET CHANNEL STABILIZATION SEE DETAIL 42H CLASS II RIPRAP 8 TONS, NO GEO
SHOULDER BERM GUTTER -Y2- STA. 58+90 TO 63+22, LT
ROD AND LUG WITH GASKETS (ELBOWS)
EXPRESSWAY GUTTER -Y2- STA. 51+25 TO 57+76±, RT
BERM 'V' DITCH SEE DETAIL 42A
PROP. DRIVE
CONSIDER ADDING AGGREGATE SHOULDER DRAIN OR SPRING BOX BEFORE FINAL PLANS.
CLASS I RIPRAP 3 TONS, 7 SY GEO
TOE PROTECTION SEE DETAIL 42B CLASS I RIPRAP 35 TONS, 50 SY GEO
LATERAL BASE DITCH SEE DETAIL 42C CLASS I RIPRAP 55 TONS, 77 SY GEO DDE=40 CY
COLLAR AND EXTEND
LATERAL 'V' DITCH SEE DETAIL 42D DDE=35 CY
TOE PROTECTION SEE DETAIL 42J CLASS I RIPRAP 68 TONS, 95 SY GEO
FALSE SUMP SEE DETAIL 42G
SINGLE FACED CONCRETE BARRIER
CONC. DITCH BEHIND RETAINING WALL SEE DETAIL 42E
STREAM RESTORATION SEE DETAIL 42F DDE=160 CY
CLASS B RIPRAP 2 TONS, 7 CY GEO
RETAIN AND EXTEND 1@6'x6' RCBC AT OUTLET
SHOULDER BERM GUTTER -DR4- STA. 10+36 LT TO -Y2- STA 70+50, RT
CULVERT OUTLET CHANNEL SEE DETAIL 42I 35 TONS CLASS II
ROCK EMBANKMENT -DR4- 10+35 TO 11+30 LT SEE DETAIL SHEET 2X-X TRANSITION FROM TYPICAL AT 10+35 TO 1.5:1 AT 10+60. MAINTAIN 1.5:1 FROM 10+60 TO 11+30
DO NOT BURY INVERT
CLASS I RIPRAP 2 TON, 8 SY GEO

WOODS
JAMES P. EWING, TRUSTEE, ET AL (131)
CREWS BROTHERS, LLC (134)
EUGENE R. WIECZOREK
DEAN A. HORNING (134A)
ROBERT K. NORCROSS (135)
ROBERT PEASE
JOHN B. NORCROSS (133)
CREWS BROTHERS, LLC

CARVER BRANCH
UT TO CARVER BRANCH (SFM)
SPRING BOX
SPRING

MATCH LINE STA -Y2- 54+00.00
MATCH TO SHEET NO. 41

MATCH LINE STA -Y2- 68+00.00
MATCH TO SHEET NO. 43

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

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 42H
OUTLET CHANNEL STABILIZATION
(Not to Scale)
Length=8 Ft.
Min. d=2 Ft.
-Y2- STA 60+03 LT

DETAIL 42I
OUTLET CHANNEL DETAIL
(Not to Scale)
Length=20 Ft.
d=3 Ft. Min.
-Y2- STA 67+56 RT

DETAIL 42J
TOE PROTECTION
(Not to Scale)
Type of Liner=Class I Rip-Rap
-Y2- STA. 61+50 TO 63+50 RT

FOR -Y2- PROFILE, SEE SHEET NO. 73
FOR -DR4- PROFILE, SEE SHEET NO. 77

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User:richard

8/17/99

REVISIONS

–Y2– 54+00.00 SHEET NO. 41

–Y2– CURVE DATA

PI Sta 70+28.18
△ = 50° 56' 38.0" (RT)
D = 3° 53' 51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH

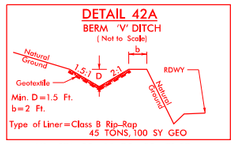
–DR4– CURVE DATA

PI Sta 10+77.95
△ = 24° 42' 06.2" (LT)
D = 57° 17' 44.8"
L = 43.11'
T = 21.90'
R = 100.00'

PI Sta 11+22.09
△ = 10° 28' 29.8" (RT)
D = 22° 55' 05.9"
L = 45.71'
T = 22.92'
R = 250.00'

①
②
③

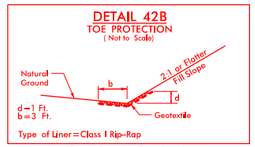
DETAIL 42A
BERM 'V' DITCH
(Not to Scale)



Type of Liner=Class B Rip-Rap
45 TONS, 100 SY GEO

–Y2– STA. 55+00 TO 55+71 RT
SEE PFL FOR DITCH GRADES

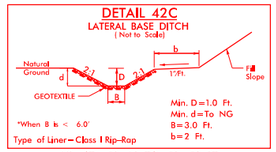
DETAIL 42B
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

–Y2– STA. 58+49 TO 59+18 RT

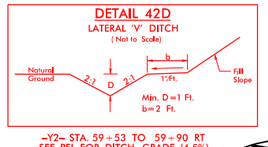
DETAIL 42C
LATERAL BASE DITCH
(Not to Scale)



Type of Liner=Class I Rip-Rap

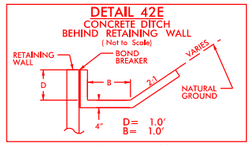
–Y2– STA. 59+18 TO 59+53 RT
SEE PFL FOR DITCH GRADE (18.6%)

DETAIL 42D
LATERAL 'V' DITCH
(Not to Scale)



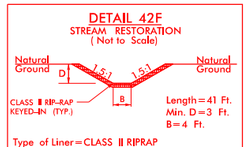
–Y2– STA. 59+53 TO 59+90 RT
SEE PFL FOR DITCH GRADE (4.5%)

DETAIL 42E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



–Y2– STA. 63+75 TO 66+02 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

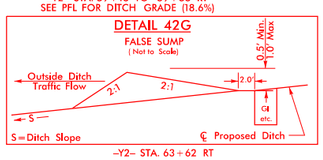
DETAIL 42F
STREAM RESTORATION
(Not to Scale)



Type of Liner=CLASS II RIPRAP
120 TONS

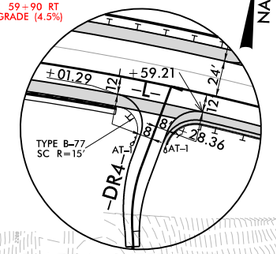
–Y2– STA. 67+96(68' LT) TO 68+26(90' LT)
SEE PFL FOR CHANNEL GRADE (4.9%)

DETAIL 42G
FALSE SUMP
(Not to Scale)



–Y2– STA. 63+62 RT

NAD 83/2011



PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	42
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 15 OF 34

–L–/–DR4– INTERSECTION

PROP. RETAINING WALL #32
BEGIN –Y2– STA. 58+90±
END –Y2– STA. 66+83±

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

CLASS I RIPRAP
4 TONS, 12 SY GEO

DO NOT BURY INVERT

OUTLET CHANNEL STABILIZATION
SEE DETAIL 42H
CLASS II RIPRAP
8 TONS, NO GEO

SHOULDER BERM GUTTER
–Y2– STA. 58+90 TO 63+22, LT

ROD AND LUG WITH GASKETS (ELBOWS)

SITE 13

SITE 12

SITE 14

SITE 15

CLASS B RIPRAP
2 TONS, 7 CY GEO

RETAIN AND EXTEND
1@6'x6' RCBC
AT OUTLET

STREAM RESTORATION
SEE DETAIL 42F
DDE=160 CY

EXPRESSWAY GUTTER
–Y2– STA. 51+25 TO
57+76±, RT

BERM 'V' DITCH
SEE DETAIL 42A

PROP. DRIVE

CONSIDER ADDING AGGREGATE SHOULDER DRAIN OR SPRING BOX BEFORE FINAL PLANS

CLASS I RIPRAP
3 TONS, 7 SY GEO

TOE PROTECTION
SEE DETAIL 42B
CLASS I RIPRAP
35 TONS, 50 SY GEO

LATERAL BASE DITCH
SEE DETAIL 42C
CLASS I RIPRAP
55 TONS, 77 SY GEO
DDE=40 CY

COLLAR AND EXTEND

LATERAL 'V' DITCH
SEE DETAIL 42D
DDE=35 CY

TOE PROTECTION
SEE DETAIL 42J
CLASS I RIPRAP
68 TONS, 95 SY GEO

FALSE SUMP
SEE DETAIL 42G

SINGLE FACED CONCRETE BARRIER

CONC. DITCH BEHIND RETAINING WALL
SEE DETAIL 42E

PROP. RETAINING WALL #33
W/CONCRETE DITCH
BEGIN –Y2– STA. 63+75±
END –Y2– STA. 66+02±

SHOULDER BERM GUTTER
–DR4– STA. 10+36, LT
TO –Y2– STA.
70+50, RT

CULVERT OUTLET CHANNEL
SEE DETAIL 42I
35 TONS CLASS II

ROCK EMBANKMENT –DR4– 10+35 TO 11+30 LT
SEE DETAIL SHEET 24_X TRANSITION FROM
TYPICAL AT 10+35 TO 1.5:1 AT 10+60
MAINTAIN 1.5:1 FROM 10+60 TO 11+30

END CONSTRUCTION
–DR4– STA. 11+10.00

DO NOT BURY INVERT
CLASS I RIPRAP
2 TON, 8 SY GEO

JAMES P. EWING, TRUSTEE, ET AL

CREWS BROTHERS, LLC

EUGENE R. WIECZOREK

DEAN A. HORNING

ROBERT K. NORCROSS

ROBERT PEASE

JOHN B. NORCROSS

ROBERT K. NORCROSS

UT TO CARVER BRANCH

CARVER BRANCH

SR 1239 CARVER BRANCH LN

MATCH LINE STA –Y2– 54+00.00
MATCH TO SHEET NO. 41

MATCH LINE STA –Y2– 68+00.00
MATCH TO SHEET NO. 43

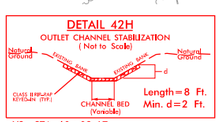
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

DETAIL 42H
OUTLET CHANNEL STABILIZATION
(Not to Scale)

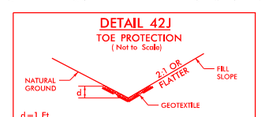


–Y2– STA 60+03 LT

DETAIL 42I
OUTLET CHANNEL DETAIL
(Not to Scale)

–Y2– STA 67+56 RT

DETAIL 42J
TOE PROTECTION
(Not to Scale)



Type of Liner=Class I Rip-Rap

–Y2– STA. 61+50 TO 63+50 RT

FOR –Y2– PROFILE, SEE SHEET NO. 73

FOR –DR4– PROFILE, SEE SHEET NO. 77

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User:richard

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 16 OF 34

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
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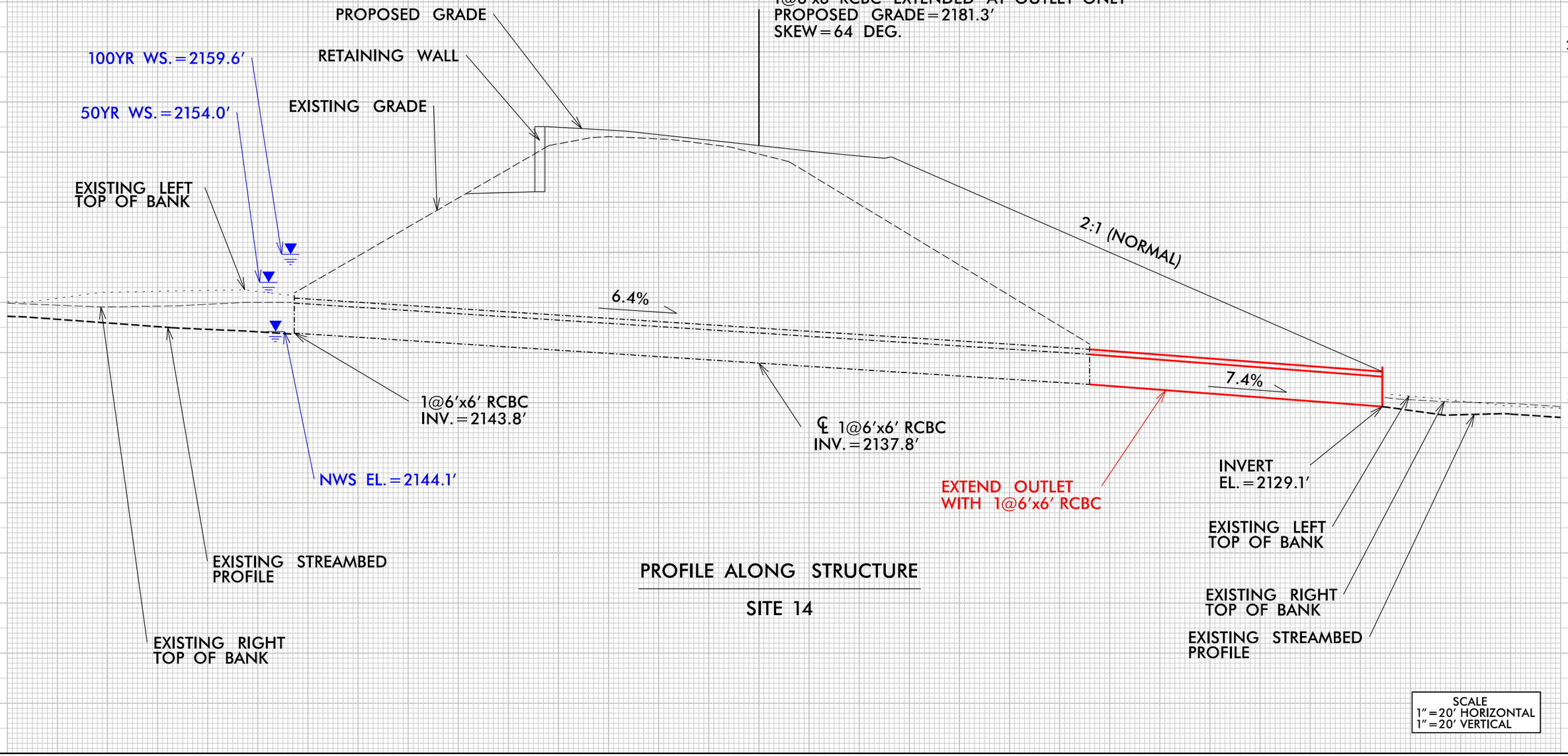
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–Y2–
NC 28

℄ –Y2– STA. 66+85
1@6'x6' RCBC EXTENDED AT OUTLET ONLY
PROPOSED GRADE=2181.3'
SKEW=64 DEG.



PROFILE ALONG STRUCTURE

SITE 14

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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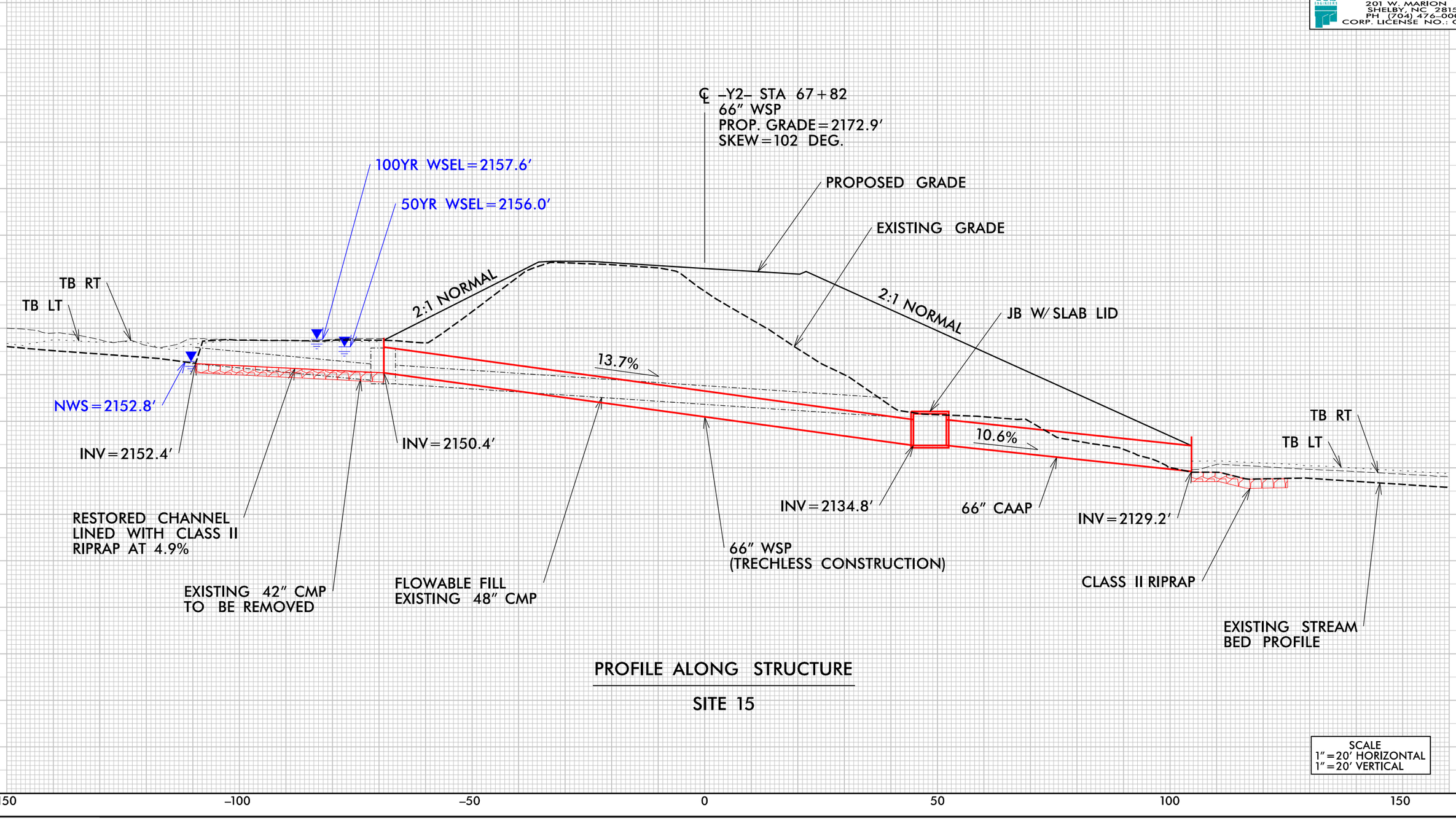
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 17 OF 34

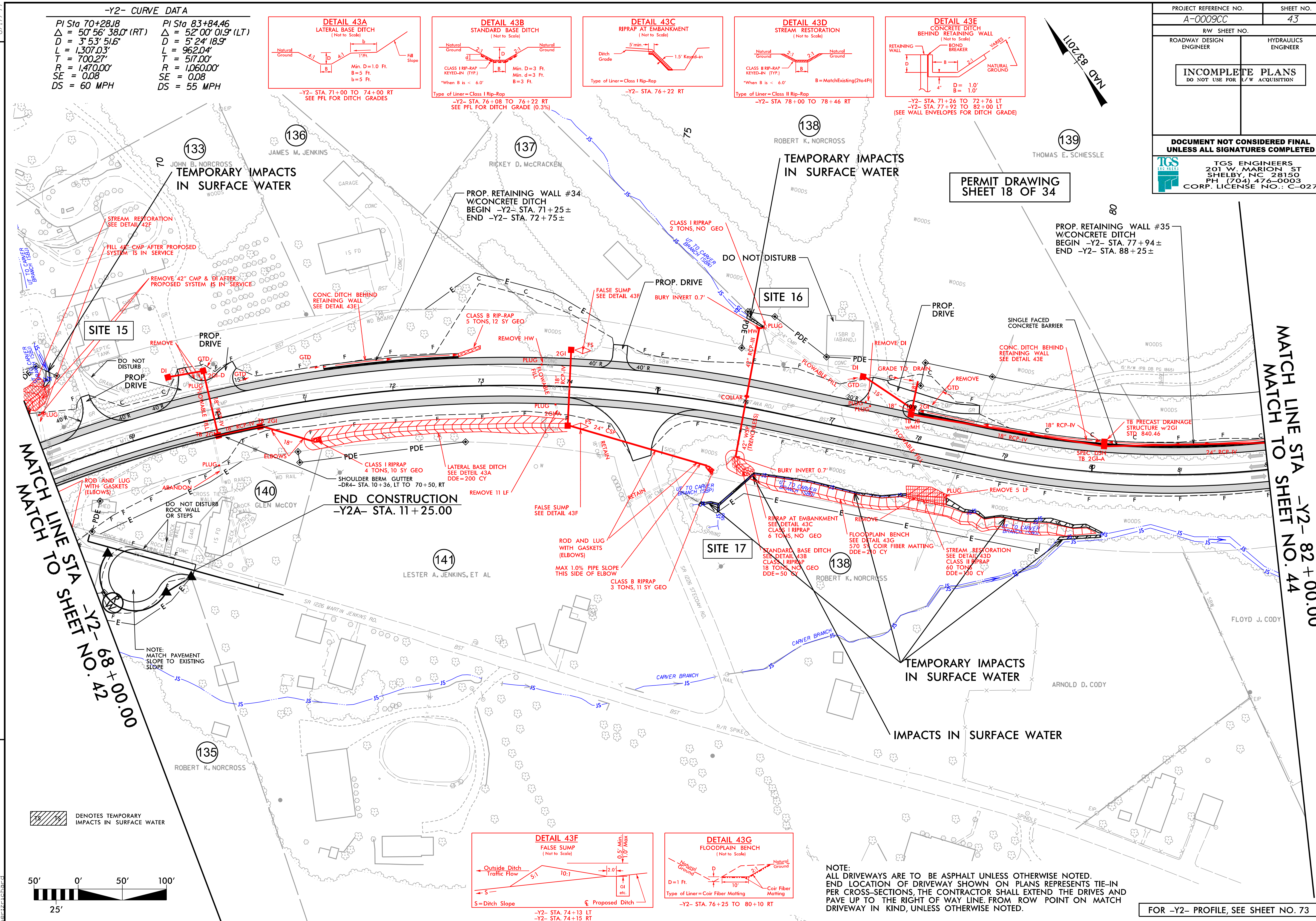
–Y2–
NC 28



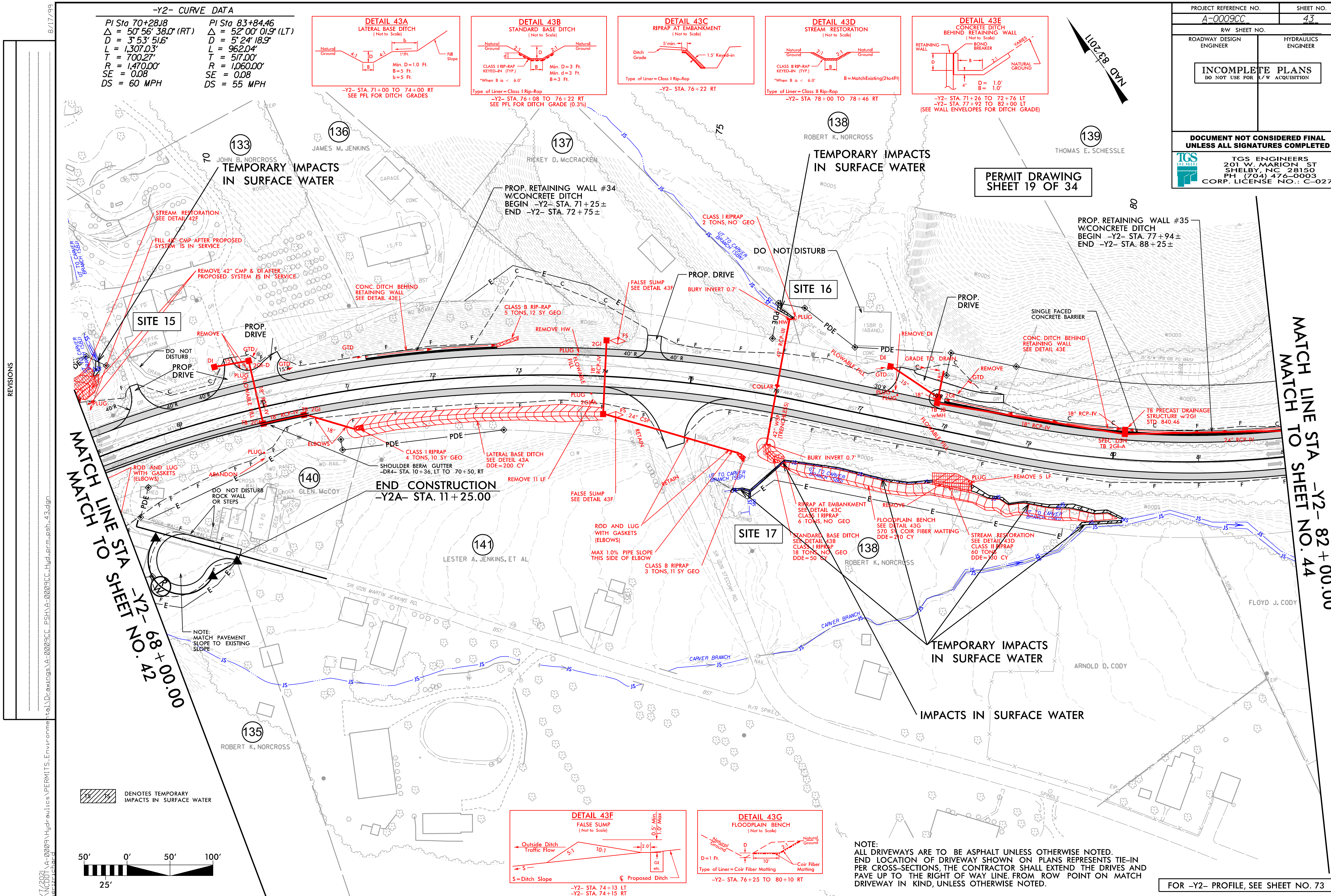
PROFILE ALONG STRUCTURE

SITE 15

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



-Y2- CURVE DATA
PI Sta 70+28.18
Δ = 50° 56' 38.0" (RT)
D = 3° 53' 51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH
PI Sta 83+84.46
Δ = 52° 00' 01.9" (LT)
D = 5° 24' 18.9"
L = 962.04'
T = 517.00'
R = 1,060.00'
SE = 0.08
DS = 55 MPH
DETAIL 43A
LATERAL BASE DITCH
(Not to Scale)
-Y2- STA. 71+00 TO 74+00 RT
SEE PFL FOR DITCH GRADES
DETAIL 43B
STANDARD BASE DITCH
(Not to Scale)
-Y2- STA. 76+08 TO 76+22 RT
SEE PFL FOR DITCH GRADE (0.3%)
DETAIL 43C
RIPRAP AT EMBANKMENT
(Not to Scale)
-Y2- STA. 76+22 RT
DETAIL 43D
STREAM RESTORATION
(Not to Scale)
-Y2- STA 78+00 TO 78+46 RT
DETAIL 43E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
-Y2- STA. 71+26 TO 72+76 LT
-Y2- STA. 77+92 TO 82+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
NAD 83/2011
PROJECT REFERENCE NO.
A-0009CC
SHEET NO.
43
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 18 OF 34
REVISIONS
TEMPORARY IMPACTS IN SURFACE WATER
PROP. RETAINING WALL #34
W/CONCRETE DITCH
BEGIN -Y2- STA. 71+25±
END -Y2- STA. 72+75±
PROP. RETAINING WALL #35
W/CONCRETE DITCH
BEGIN -Y2- STA. 77+94±
END -Y2- STA. 88+25±
SITE 15
SITE 16
SITE 17
DO NOT DISTURB
PROP. DRIVE
END CONSTRUCTION
-Y2A- STA. 11+25.00
MATCH LINE STA -Y2- 68+00.00
MATCH TO SHEET NO. 42
MATCH LINE STA -Y2- 82+00.00
MATCH TO SHEET NO. 44
JOHN B. NORCROSS
JAMES M. JENKINS
RICKEY D. McCRACKEN
ROBERT K. NORCROSS
THOMAS E. SCHIESSLE
GLEN McCOY
LESTER A. JENKINS, ET AL
FLOYD J. CODY
ARNOLD D. CODY
IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 43F
FALSE SUMP
(Not to Scale)
-Y2- STA. 74+13 LT
-Y2- STA. 74+15 RT
DETAIL 43G
FLOODPLAIN BENCH
(Not to Scale)
-Y2- STA. 76+25 TO 80+10 RT
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
FOR -Y2- PROFILE, SEE SHEET NO. 73



-Y2- CURVE DATA
PI Sta 70+28.18
Δ = 50° 56' 38.0" (RT)
D = 3° 53' 51.6"
L = 1,307.03'
T = 700.27'
R = 1,470.00'
SE = 0.08
DS = 60 MPH
PI Sta 83+84.46
Δ = 52° 00' 01.9" (LT)
D = 5° 24' 18.9"
L = 962.04'
T = 517.00'
R = 1,060.00'
SE = 0.08
DS = 55 MPH
DETAIL 43A
LATERAL BASE DITCH
(Not to Scale)
-Y2- STA. 71+00 TO 74+00 RT
SEE PFL FOR DITCH GRADES
DETAIL 43B
STANDARD BASE DITCH
(Not to Scale)
-Y2- STA. 76+08 TO 76+22 RT
SEE PFL FOR DITCH GRADE (0.3%)
DETAIL 43C
RIPRAP AT EMBANKMENT
(Not to Scale)
-Y2- STA. 76+22 RT
DETAIL 43D
STREAM RESTORATION
(Not to Scale)
-Y2- STA 78+00 TO 78+46 RT
DETAIL 43E
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)
-Y2- STA. 71+26 TO 72+76 LT
-Y2- STA. 77+92 TO 82+00 LT
(SEE WALL ENVELOPES FOR DITCH GRADE)
NAD 83/2011
PROJECT REFERENCE NO.
A-0009CC
SHEET NO.
43
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 19 OF 34
TEMPORARY IMPACTS IN SURFACE WATER
SITE 15
SITE 16
SITE 17
PROP. RETAINING WALL #34
W/CONCRETE DITCH
BEGIN -Y2- STA. 71+25±
END -Y2- STA. 72+75±
PROP. RETAINING WALL #35
W/CONCRETE DITCH
BEGIN -Y2- STA. 77+94±
END -Y2- STA. 88+25±
DO NOT DISTURB
PROP. DRIVE
END CONSTRUCTION
-Y2A- STA. 11+25.00
MATCH LINE STA -Y2- 68+00.00
MATCH TO SHEET NO. 42
MATCH LINE STA -Y2- 82+00.00
MATCH TO SHEET NO. 44
JOHN B. NORCROSS
JAMES M. JENKINS
RICKEY D. McCRACKEN
ROBERT K. NORCROSS
THOMAS E. SCHIESSLE
GLEN McCOY
LESTER A. JENKINS, ET AL
FLOYD J. CODY
ARNOLD D. CODY
IMPACTS IN SURFACE WATER
NOTE: MATCH PAVEMENT SLOPE TO EXISTING SLOPE
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DETAIL 43F
FALSE SUMP
(Not to Scale)
-Y2- STA. 74+13 LT
-Y2- STA. 74+15 RT
DETAIL 43G
FLOODPLAIN BENCH
(Not to Scale)
-Y2- STA. 76+25 TO 80+10 RT
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN
PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND
PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH
DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
FOR -Y2- PROFILE, SEE SHEET NO. 73

8/17/99

REVISIONS

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES IMPACTS IN SURFACE WATER

DENOTES EXCAVATION IN WETLAND

DENOTES HAND CLEARING

DENOTES FILL IN WETLAND

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE–IN PER CROSS–SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

METES & BOUNDS

From	To	Direction	Dist.
A	B	N 07°53'20" E	17.13'
B	C	N 10°35'28" E	23.71'
C	D	N 32°56'27" E	21.45'
D	E	S 21°07'17" W	24.54'

PERMIT DRAWING SHEET 20 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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201 W. MARION ST
SHELBY, NC 28150
PH (704) 476–0003
CORP. LICENSE NO.: C–0275

NAD 83/2011

HAND CLEARING IN WETLANDS

EXCAVATION IN WETLANDS

FILL IN WETLANDS

BEGIN CONSTRUCTION
–Y3– STA. 10+50.00

TEMPORARY IMPACTS IN SURFACE WATER

SITE 18

CLASS B RIPRAP 3 TONS, 10 SY GEO

SPECIAL CUT DITCH SEE DETAIL 45A

IMPACTS IN SURFACE WATER

JOSEPH L. EDWARDS

FALSE SUMP SEE DETAIL 45C

STANDARD 'V' DITCH SEE DETAIL 45B DDE=15 CY

REMOVE 18" RCP-IV

18" RCP-IV

FS

146

TEMPORARY IMPACTS IN SURFACE WATER

UT TO EDWARDS BRANCH (SBV)

BURY INVERT 0.5'

SITE 19

CHANNEL CHANGE SEE DETAIL 45F DDE=125 CY

CLASS I RIPRAP (KEYED-IN) BANK STABILIZATION 14 TONS

RETAIN

FLOODPLAIN BENCH SEE DETAIL 45G

REMOVE

SITE 21

–L–/–Y3– INTERSECTION

+63.07 +16.23 40'R 18' –Y3– 10 +51.24 50'R +26.41 18' –L–

146
JOSEPH L. EDWARDS

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

147
GREGORY D. BURCHFIELD

IMPACTS IN SURFACE WATER

148
WILLIAM CARR

PROP. DRIVE

TEMPORARY IMPACTS IN SURFACE WATER

SCALE: 1"=50'

PROP. DRIVE

PDE

CH

HHC

GTD

42"

15" RCP–IV

18" RCP–IV

CB–G REMOVE

PLUG

CONC. HW

CB–F

FLOWABLE FILL

UT TO STECOAH CREEK (SCB)

DRAIN FIELD

SEPTIC TANK

150
AARON E. FARLEY
DB 288 PG 202

CHANNEL CHANGE SEE DETAIL 45D DDE=15 CY

SPECIAL BERM SEE DETAIL 45E

DO NOT BURY INVERT

PROP. DRIVE

149
ROANNE GORDON (BY WILL)

SITE 22

RETAIN TO HERE

REMOVE 22 LF

GRADE TO DRAIN

BLOCK WALLS ONLY

ELBOW

15" RCP–IV

18" RCP–IV

CB–G

CB–F

REMOVE

REMOVE HW

CARVER BRANCH

CLASS B RIPRAP 1 TON, 5 SY GEO

FLOODPLAIN BENCH SEE DETAIL 45I

SILLS & BAFFLES (TYP.)

SITE 20

FOLLOWING CULVERT INSTALLATION, CONTRACTOR SHALL RESTORE STECOAH RD. TO EXISTING GRADE WHILE UTILIZING 3' TURF SHOULDERS AND 3:1 MAX FILL SLOPES

JEFFERY HYDE

JEFFERY HYDE, ET AL

STECOAH CREEK

10' MULTIUSE PATH W/ TIMBER RAIL FENCE

CLASS B RIPRAP 3 TON, 10 SY GEO

SHOT ROCK –Y2– STA. 102+70 TO 103+95, RT SEE DETAIL SHT 2_–

ODELL LOVIN

STECOAH BAPTIST CHURCH

PROP. CONCRETE DRIVE

GREGORY D. BURCHFIELD

LEONARD BRIDGES

SHOT ROCK –Y2– STA. 108+45 TO 110+05, RT SEE DETAIL SHT 2_–

RIPRAP AT EMBANKMENT SEE DETAIL 45H CLASS II RIPRAP 35 TONS, NO GEO

10' MULTIUSE PATH W/TIMBER RAIL FENCE

ROANNE GORDON

JAIME J. HOOPER

50' 0' 50' 100'
25'

MATCH LINE STA –Y2– 96+00.00
MATCH TO SHEET NO. 44

MATCH LINE STA –Y2– 110+00.00
MATCH TO SHEET NO. 46

DETAIL 45G
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Not to Scale)

EST. 24 CY DDE
EST. 54 TONS CLASS I RIP RAP

–Y2– STA. 99+76 LT (U/S LENGTH=24 FT)
–Y2– STA. 99+90 RT (D/S LENGTH=12 FT)

DETAIL 45A
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground 2:1 D Front Ditch Slope 4:1 or Flatter

Min. D=2 Ft.

–Y3– STA. 11+50 TO 12+00 RT
SEE PFL FOR DITCH GRADE (7.6%)

DETAIL 45B
STANDARD 'V' DITCH
(Not to Scale)

Natural Ground 2:1 D 2:1 Natural Ground

Min. D=1.5 Ft.

–Y3– STA. 12+00(29' LT) TO 12+00(54' LT)
DAYLIGHT AT 1.0% SLOPE

DETAIL 45C
FALSE SUMP
(Not to Scale)

1.5' Min. Outside Ditch Traffic Flow 4:1 4:1 PIPE S

S=Ditch Slope ℄ Proposed Ditch

–Y3– STA. 12+10 RT

DETAIL 45D
CHANNEL CHANGE
(Not to Scale)

Natural Ground D 2:1 2:1 Natural Ground Exist. Channel B

CLASS I RIP-RAP KEYED-IN (TYP.)

Length=22 Ft.
Min. D=3.0 Ft.
B=5 Ft.

Type of Liner=CLASS II RIPRAP 25 TONS

–Y2– STA 109+73(57' LT) TO 109+81(37' LT)
SEE PFL FOR CHANNEL CHANGE GRADE (15%)

DETAIL 45E
SPECIAL BERM
(Not to Scale)

10' 2:1 2:1 ELEV=2002 ft Pipe Inlet Exist. Ground

–Y2– STA. 109+98 LT

DETAIL 45F
CHANNEL CHANGE
(Not to Scale)

Natural Ground 2:1 D 2:1 b Proposed Fill Slope Natural Ground Exist. Channel B

1'/Ft.

Min. D=2 Ft.
B=3 Ft.
Min. b=3 Ft.

Type of Liner=Grass

–Y2– STA 99+04 TO 99+74 LT
SEE PFL FOR CHANNEL CHANGE GRADE (0.5%)

DETAIL 45H
RIPRAP AT EMBANKMENT
(Not to Scale)

L Pipe Outlet 2' Keyed-in

Length=18 ft
Type of Liner=Class II Rip-Rap

–Y2– STA. 109+81 RT

DETAIL 45I
UP AND DOWNSTREAM FLOODPLAIN BENCH
(Looking Downstream, Not to Scale)

EST. 20 CY DDE
EST. 42 TONS CLASS II RIP RAP

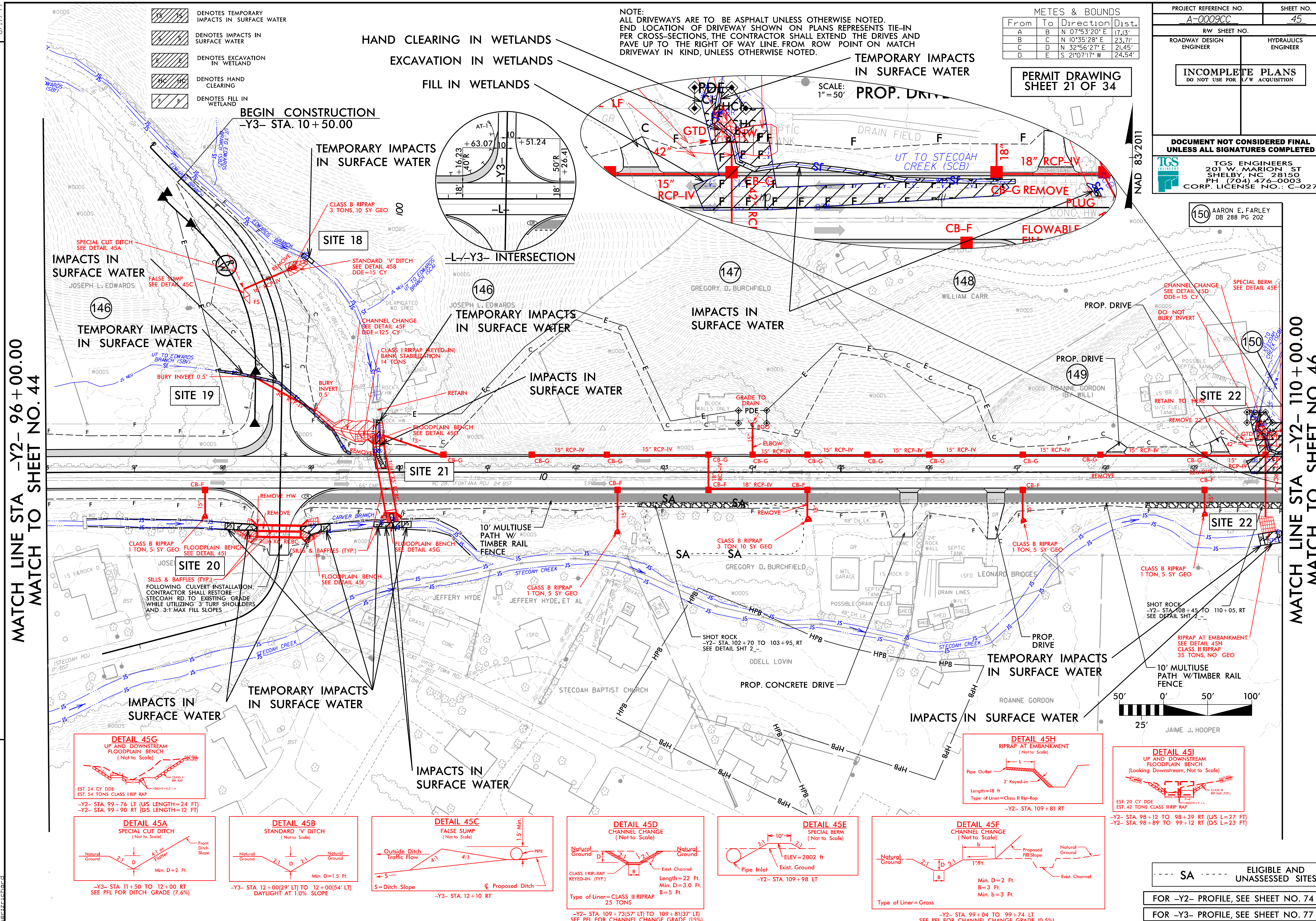
–Y2– STA. 98+12 TO 98+39 RT (U/S L=27 FT)
–Y2– STA. 98+89 TO 99+12 RT (D/S L=23 FT)

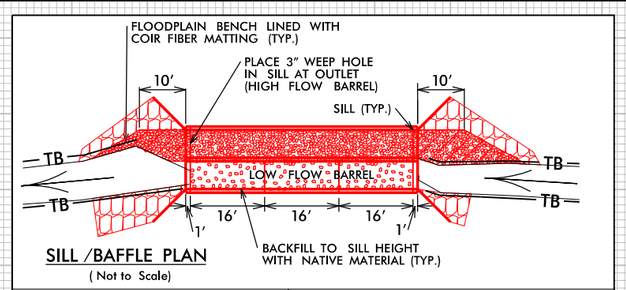
SA ELIGIBLE AND UNASSESSED SITES

FOR –Y2– PROFILE, SEE SHEET NO. 74

FOR –Y3– PROFILE, SEE SHEET NO. 77

K:\(2021)\(A0009)\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prim_psh_45.dgn
User:richard


PROJECT REFERENCE NO. A-0009CC
SHEET NO. 45
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
PERMIT DRAWING
SHEET 21 OF 34
METES & BOUNDS
From | To | Direction | Dist.
A | B | N 07°53'20" E | 17.13'
B | C | N 10°35'28" E | 23.71'
C | D | N 32°56'27" E | 21.45'
D | E | S 21°07'17" W | 24.54'
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
HAND CLEARING IN WETLANDS
EXCAVATION IN WETLANDS
FILL IN WETLANDS
TEMPORARY IMPACTS IN SURFACE WATER
SCALE: 1"=50'
BEGIN CONSTRUCTION -Y3- STA. 10+50.00
-L-/-Y3- INTERSECTION
MATCH LINE STA -Y2- 96+00.00 MATCH TO SHEET NO. 44
MATCH LINE STA -Y2- 110+00.00 MATCH TO SHEET NO. 46
NAD 83/2011
SITE 18
SITE 19
SITE 20
SITE 21
SITE 22
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
JOSEPH L. EDWARDS
GREGORY D. BURCHFIELD
WILLIAM CARR
ROANNE GORDON
AARON E. FARLEY DB 288 PG 202
JEFFERY HYDE
JEFFERY HYDE, ET AL
LEONARD BRIDGES
ODELL LOVIN
STECOAH BAPTIST CHURCH
JAIME J. HOOPER
STECOAH CREEK
PROP. DRIVE
PROP. CONCRETE DRIVE
10' MULTIUSE PATH W/ TIMBER RAIL FENCE
SHOT ROCK -Y2- STA. 102+70 TO 103+95, RT SEE DETAIL SHT 2
SHOT ROCK -Y2- STA 108+45 TO 110+05, RT SEE DETAIL SHT 2
FOLLOWING CULVERT INSTALLATION, CONTRACTOR SHALL RESTORE STECOAH RD. TO EXISTING GRADE WHILE UTILIZING 3' TURF SHOULDERS AND 3:1 MAX FILL SLOPES
DETAIL 45G UP AND DOWNSTREAM FLOODPLAIN BENCH (Not to Scale)
EST. 24 CY DDE
EST. 54 TONS CLASS I RIP RAP
-Y2- STA. 99+76 LT (US LENGTH=24 FT)
-Y2- STA. 99+90 RT (DS LENGTH=12 FT)
DETAIL 45H RIPRAP AT EMBANKMENT (Not to Scale)
-Y2- STA. 109+81 RT
DETAIL 45I UP AND DOWNSTREAM FLOODPLAIN BENCH (Looking Downstream, Not to Scale)
EST. 20 CY DDE
EST. 42 TONS CLASS II RIP RAP
-Y2- STA. 98+12 TO 98+39 RT (US L=27 FT)
-Y2- STA. 98+89 TO 99+12 RT (DS L=23 FT)
DETAIL 45A SPECIAL CUT DITCH (Not to Scale)
-Y3- STA 11+50 TO 12+00 RT
SEE PFL FOR DITCH GRADE (7.6%)
DETAIL 45B STANDARD 'V' DITCH (Not to Scale)
-Y3- STA 12+00(29' LT) TO 12+00(54' LT)
DAYLIGHT AT 1.0% SLOPE
DETAIL 45C FALSE SUMP (Not to Scale)
-Y3- STA. 12+10 RT
DETAIL 45D CHANNEL CHANGE (Not to Scale)
Type of Liner=CLASS II RIPRAP 25 TONS
-Y2- STA 109+73(57' LT) TO 109+81(37' LT)
SEE PFL FOR CHANNEL CHANGE GRADE (15%)
DETAIL 45E SPECIAL BERM (Not to Scale)
-Y2- STA. 109+98 LT
DETAIL 45F CHANNEL CHANGE (Not to Scale)
Type of Liner=Grass
-Y2- STA 99+04 TO 99+74 LT
SEE PFL FOR CHANNEL CHANGE GRADE (0.5%)
SA ELIGIBLE AND UNASSESSED SITES
FOR -Y2- PROFILE, SEE SHEET NO. 74
FOR -Y3- PROFILE, SEE SHEET NO. 77
REVISIONS
8/17/99

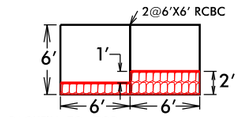


SILL /BAFFLE PLAN

(Not to Scale)

SILL DETAIL

(Not to Scale)



NOTES:

1) TOP OF SILLS AT EACH END OF LOW FLOW BARREL SHALL MATCH STREAM BED ELEVATION IN CHANNEL OF STREAM (THALWEG).

2) NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL. IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL, NATIVE MATERIAL SHALL BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

–Y3A–
NC 28

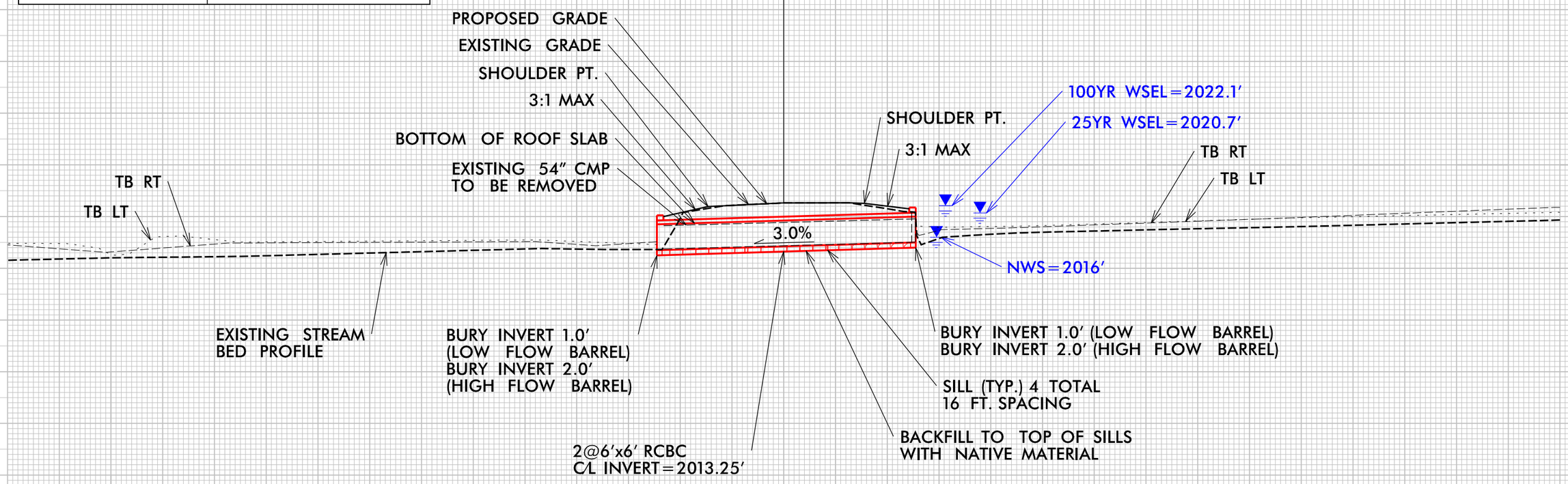
PERMIT DRAWING
SHEET 22 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

℄ –Y3A– STA 10+67
2@ 6'x6' RCBC
BURIED 1.0' & 2.0'
PROP. GRADE=2022.6'
SKEW=90 DEG.



PROFILE ALONG STRUCTURE

SITE 20

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

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

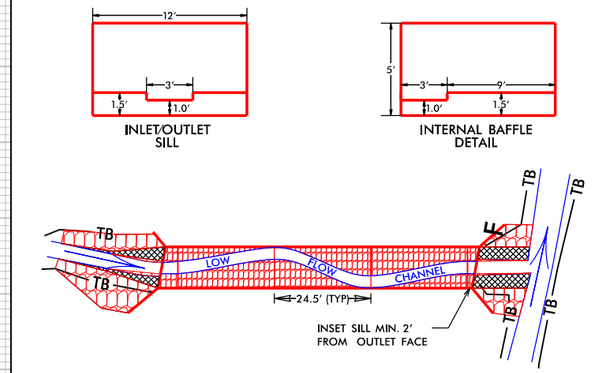
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

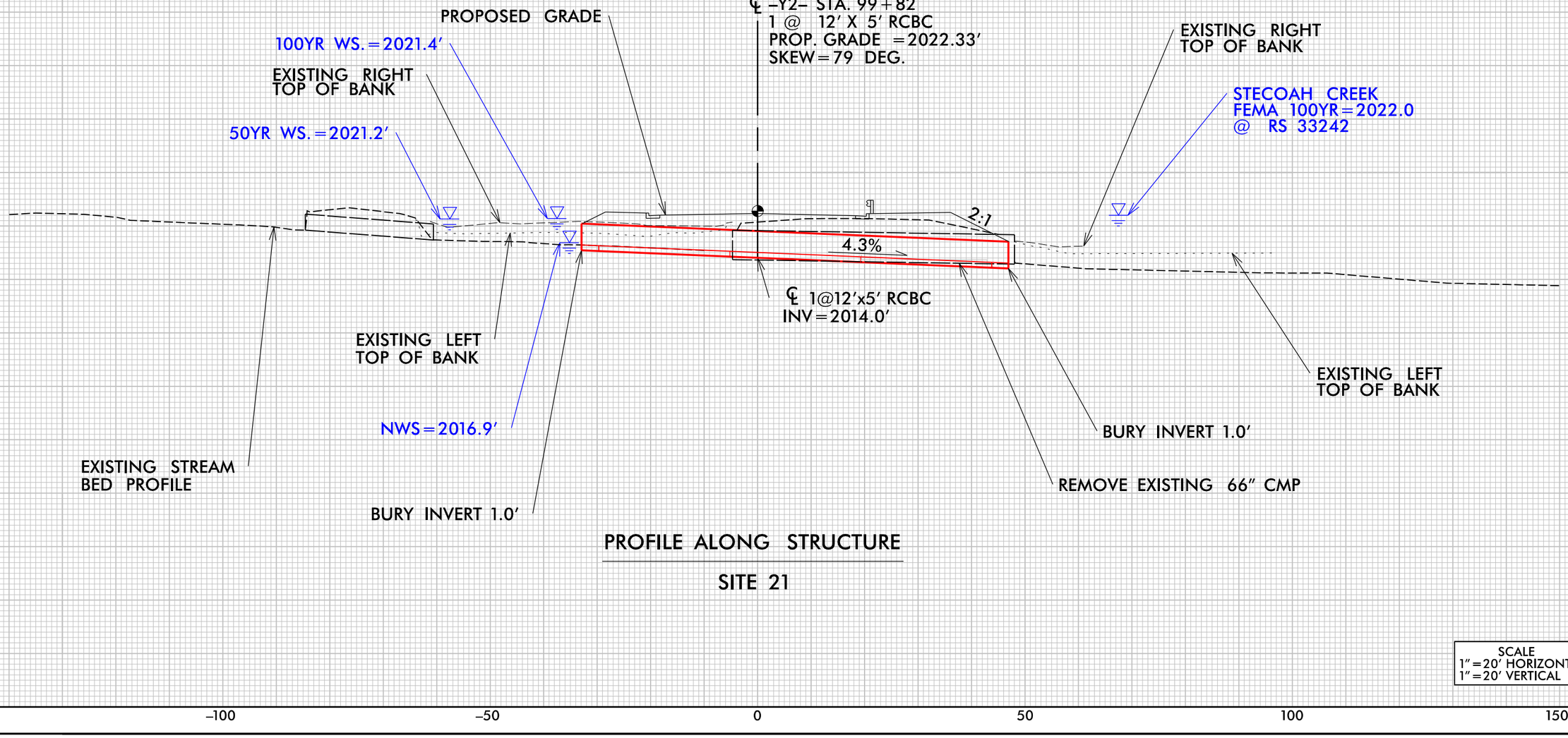
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING SHEET 23 OF 34

–Y2–
NC 28

CULVERT SILL DETAIL
NOT TO SCALE





PROFILE ALONG STRUCTURE

SITE 21

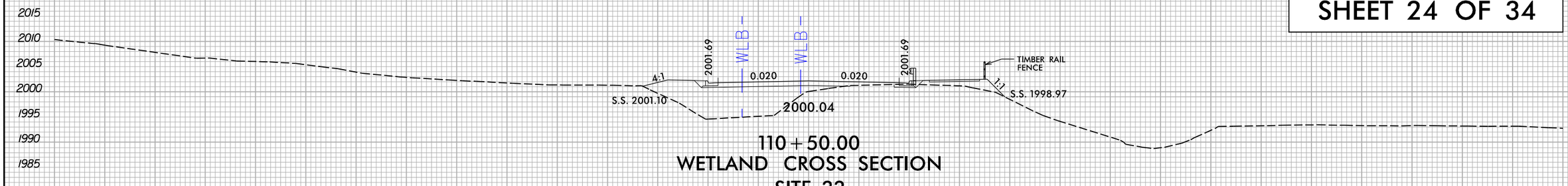
SCALE
1"=20' HORIZONTAL
1"=20' VERTICAL

6/23/16

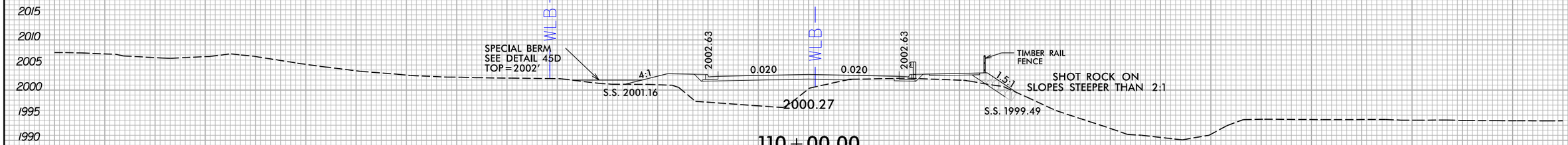
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	A-0009CC	X-221

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

PERMIT DRAWING
SHEET 24 OF 34



110+50.00
WETLAND CROSS SECTION
SITE 22



110+00.00
WETLAND CROSS SECTION
SITE 22

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

-Y2-

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

11/1/2021
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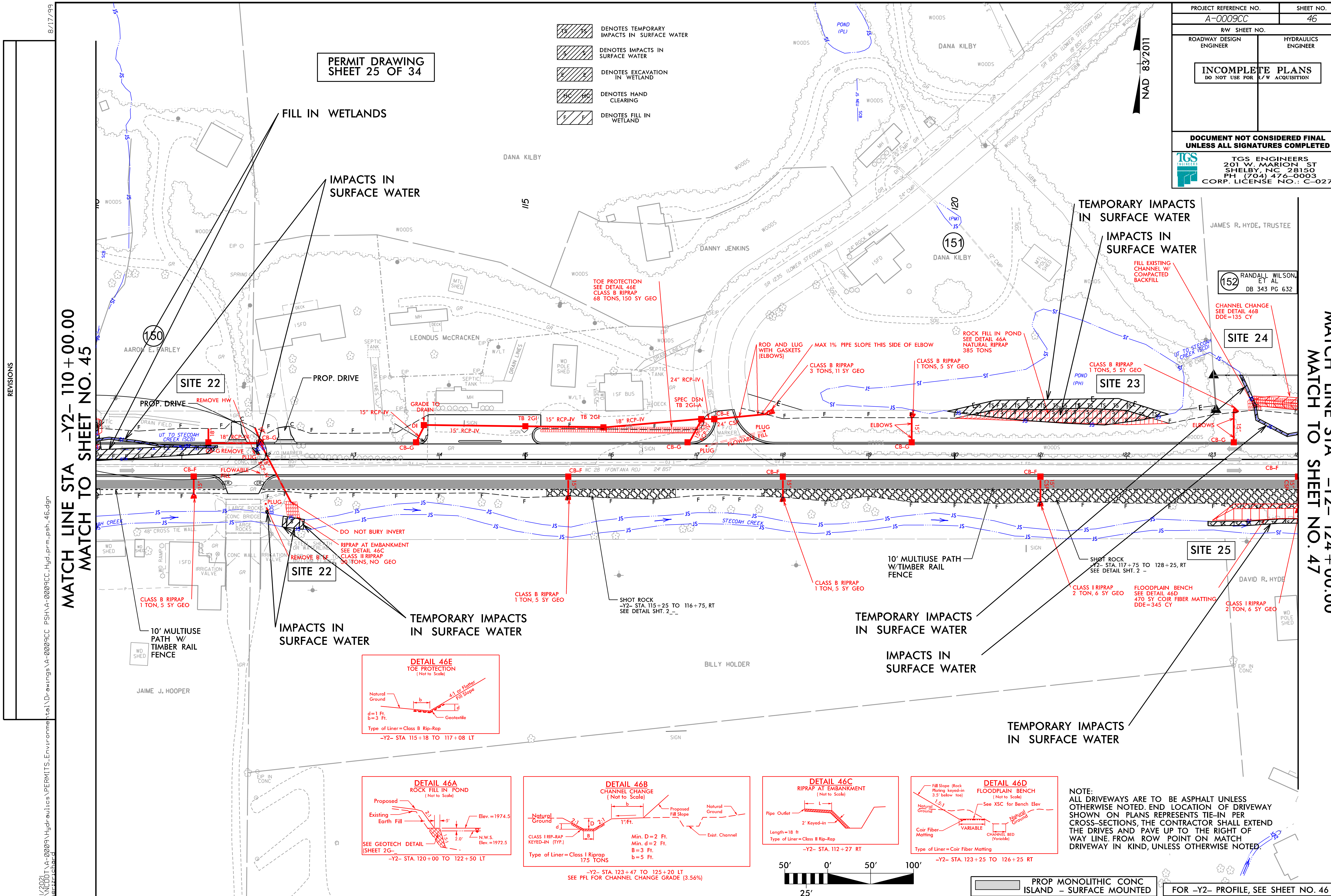
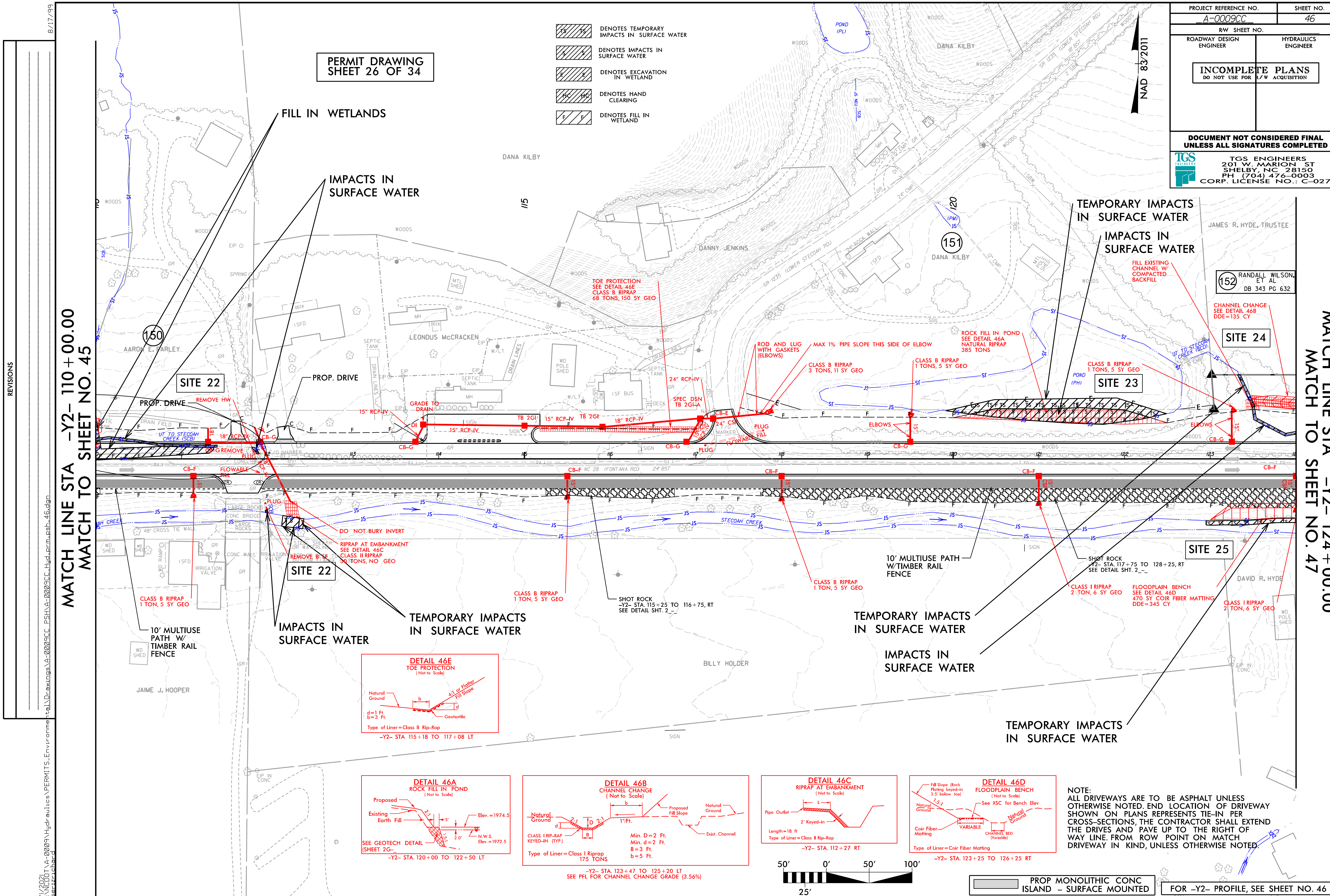
User:rrichard



PERMIT DRAWING SHEET 25 OF 34
PROJECT REFERENCE NO. A-0009CC
SHEET NO. 46
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
MATCH LINE STA -Y2- 110+00.00 MATCH TO SHEET NO. 45
MATCH LINE STA -Y2- 124+00.00 MATCH TO SHEET NO. 47
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SITE 22
SITE 23
SITE 24
SITE 25
PROP. DRIVE
10' MULTIUSE PATH W/ TIMBER RAIL FENCE
DANA KILBY
DANNY JENKINS
LEONDUS McCRACKEN
AARON E. FARLEY
JAMES R. HYDE, TRUSTEE
RANDALL WILSON, ET AL DB 343 PG 632
DAVID R. HYDE
BILLY HOLDER
JAIME J. HOOPER
TOE PROTECTION SEE DETAIL 46E CLASS B RIPRAP 68 TONS, 150 SY GEO
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1% PIPE SLOPE THIS SIDE OF ELBOW
ROCK FILL IN POND SEE DETAIL 46A NATURAL RIPRAP 385 TONS
FILL EXISTING CHANNEL W/ COMPACTED BACKFILL
CHANNEL CHANGE SEE DETAIL 46B DDE=135 CY
CLASS B RIPRAP 3 TONS, 11 SY GEO
CLASS B RIPRAP 1 TONS, 5 SY GEO
DO NOT BURY INVERT
RIPRAP AT EMBANKMENT SEE DETAIL 46C CLASS II RIPRAP 50 TONS, NO GEO
SHOT ROCK -Y2- STA. 115+25 TO 116+75, RT SEE DETAIL SHT. 2
SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2
CLASS I RIPRAP 2 TON, 6 SY GEO
FLOODPLAIN BENCH SEE DETAIL 46D 470 SY COIR FIBER MATTING DDE=345 CY
STECOAH CREEK
UT TO STECOAH CREEK (SCB)
DETAIL 46E TOE PROTECTION (Not to Scale) Type of Liner=Class B Rip-Rap -Y2- STA 115+18 TO 117+08 LT
DETAIL 46A ROCK FILL IN POND (Not to Scale) SEE GEOTECH DETAIL (SHEET 2G-) -Y2- STA. 120+00 TO 122+50 LT
DETAIL 46B CHANNEL CHANGE (Not to Scale) Min. D=2 Ft. Min. d=2 Ft. B=3 Ft. b=5 Ft. Type of Liner=Class I Riprap 175 TONS -Y2- STA. 123+47 TO 125+20 LT SEE PFL FOR CHANNEL CHANGE GRADE (3.56%)
DETAIL 46C RIPRAP AT EMBANKMENT (Not to Scale) Type of Liner=Class II Rip-Rap -Y2- STA. 112+27 RT
DETAIL 46D FLOODPLAIN BENCH (Not to Scale) Type of Liner=Coir Fiber Matting -Y2- STA. 123+25 TO 126+25 RT
NOTE: ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
50' 0' 50' 100' 25'
PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED
FOR -Y2- PROFILE, SEE SHEET NO. 46
REVISIONS
8/17/99



PROJECT REFERENCE NO. A-0009CC
SHEET NO. 46
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
TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275
NAD 83/2011
PERMIT DRAWING
SHEET 26 OF 34
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
DENOTES EXCAVATION IN WETLAND
DENOTES HAND CLEARING
DENOTES FILL IN WETLAND
FILL IN WETLANDS
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SITE 22
SITE 23
SITE 24
SITE 25
MATCH LINE STA -Y2- 110+00.00
MATCH TO SHEET NO. 45
MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 47
PROP. DRIVE
10' MULTIUSE PATH W/ TIMBER RAIL FENCE
DANA KILBY
DANNY JENKINS
LEONDUS McCRACKEN
AARON E. FARLEY
JAMES R. HYDE, TRUSTEE
RANDALL WILSON, ET AL DB 343 PG 632
BILLY HOLDER
JAIME J. HOOPER
DAVID R. HYDE
TOE PROTECTION SEE DETAIL 46E CLASS B RIPRAP 68 TONS, 150 SY GEO
ROD AND LUG WITH GASKETS (ELBOWS)
MAX 1% PIPE SLOPE THIS SIDE OF ELBOW
ROCK FILL IN POND SEE DETAIL 46A NATURAL RIPRAP 385 TONS
FILL EXISTING CHANNEL W/ COMPACTED BACKFILL
CHANNEL CHANGE SEE DETAIL 46B DDE=135 CY
CLASS B RIPRAP 3 TONS, 11 SY GEO
CLASS B RIPRAP 1 TONS, 5 SY GEO
DO NOT BURY INVERT
RIPRAP AT EMBANKMENT SEE DETAIL 46C CLASS II RIPRAP 50 TONS, NO GEO
SHOT ROCK -Y2- STA. 115+25 TO 116+75, RT SEE DETAIL SHT. 2-_
SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2-_
CLASS I RIPRAP 2 TON, 6 SY GEO
FLOODPLAIN BENCH SEE DETAIL 46D 470 SY COIR FIBER MATTING DDE=345 CY
DETAIL 46E TOE PROTECTION (Not to Scale) Type of Liner = Class B Rip-Rap -Y2- STA 115+18 TO 117+08 LT
DETAIL 46A ROCK FILL IN POND (Not to Scale) SEE GEOTECH DETAIL (SHEET 2G- -Y2- STA. 120+00 TO 122+50 LT
DETAIL 46B CHANNEL CHANGE (Not to Scale) Type of Liner = Class I Riprap 175 TONS -Y2- STA. 123+47 TO 125+20 LT SEE PFL FOR CHANNEL CHANGE GRADE (3.56%)
DETAIL 46C RIPRAP AT EMBANKMENT (Not to Scale) Type of Liner = Class II Rip-Rap -Y2- STA. 112+27 RT
DETAIL 46D FLOODPLAIN BENCH (Not to Scale) Type of Liner = Coir Fiber Matting -Y2- STA. 123+25 TO 126+25 RT
NOTE: ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
PROP MONOLITHIC CONC ISLAND - SURFACE MOUNTED
FOR -Y2- PROFILE, SEE SHEET NO. 46

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	47
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 27 OF 34

8/17/99

REVISIONS

-Y2- CURVE DATA
PI Sta 132+08.73
Δ = 30° 56' 09.8" (LT)
D = 4° 48' 53.2"
L = 642.52'
T = 329.30'
R = 1190.00'
SE = 0.04
DS = 55 MPH

DETAIL 47A
TOE PROTECTION
(Not to Scale)
Natural Ground
b
2:1 or Flatter Fill Slope
d
Geotextile
d=1 Ft.
b=3 Ft.
Type of Liner= Class B Rip-Rap
-Y2- STA 128+50 TO 129+00 LT

DETAIL 47B
LATERAL GRASSED SWALE
(Not to Scale)
Natural Ground
3:1
D
3:1
b
1'Ft.
B
Fill Slope
Min. D=1.6 Ft.
B=5 Ft.
b=3 Ft.
-Y2- STA 130+29 TO 132+75 LT
SEE PFL FOR DITCH GRADE (0.4%)

DETAIL 47C
CULVERT INLET CHANNEL DETAIL
Looking Downstream (Not to Scale)
Approx. Natural Ground @ US Face
3@10'x9' RCBC
REMOVE EXISTING SILTED MATERIAL
d
CLASS II RIP-RAP BANK STABILIZATION KEYED-IN (TYP.)
SINGLE LINE OF 3'x2'x1' BOULDERS
Length=22 Ft.
Min. d=4 Ft.
-Y2- STA. 128+47 RT

DETAIL 47D
CULVERT OUTLET CHANNEL DETAIL
Looking Downstream (Not to Scale)
3@10'x9' RCBC
Approx. Natural Ground @ Proposed DS Face
EXCAVATION FOR CHANNEL CHANGE
CLASS B RIP-RAP BANK STABILIZATION KEYED-IN (TYP.)
SINGLE LINE OF 3'x2'x1' BOULDERS
Length=56 Ft.
Min. d=4 Ft.
-Y2- STA. 129+26 LT

DETAIL 47E
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground
4:1
D
4:1 or Flatter
Front Ditch Slope
Min. D=1.0 Ft.
-Y2- STA 129+00 TO 132+06 RT
SEE PFL FOR DITCH GRADE (1.34%)

NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED. END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.

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

NAD 83/2011

MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 46

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 48

IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
IMPACTS IN SURFACE WATER

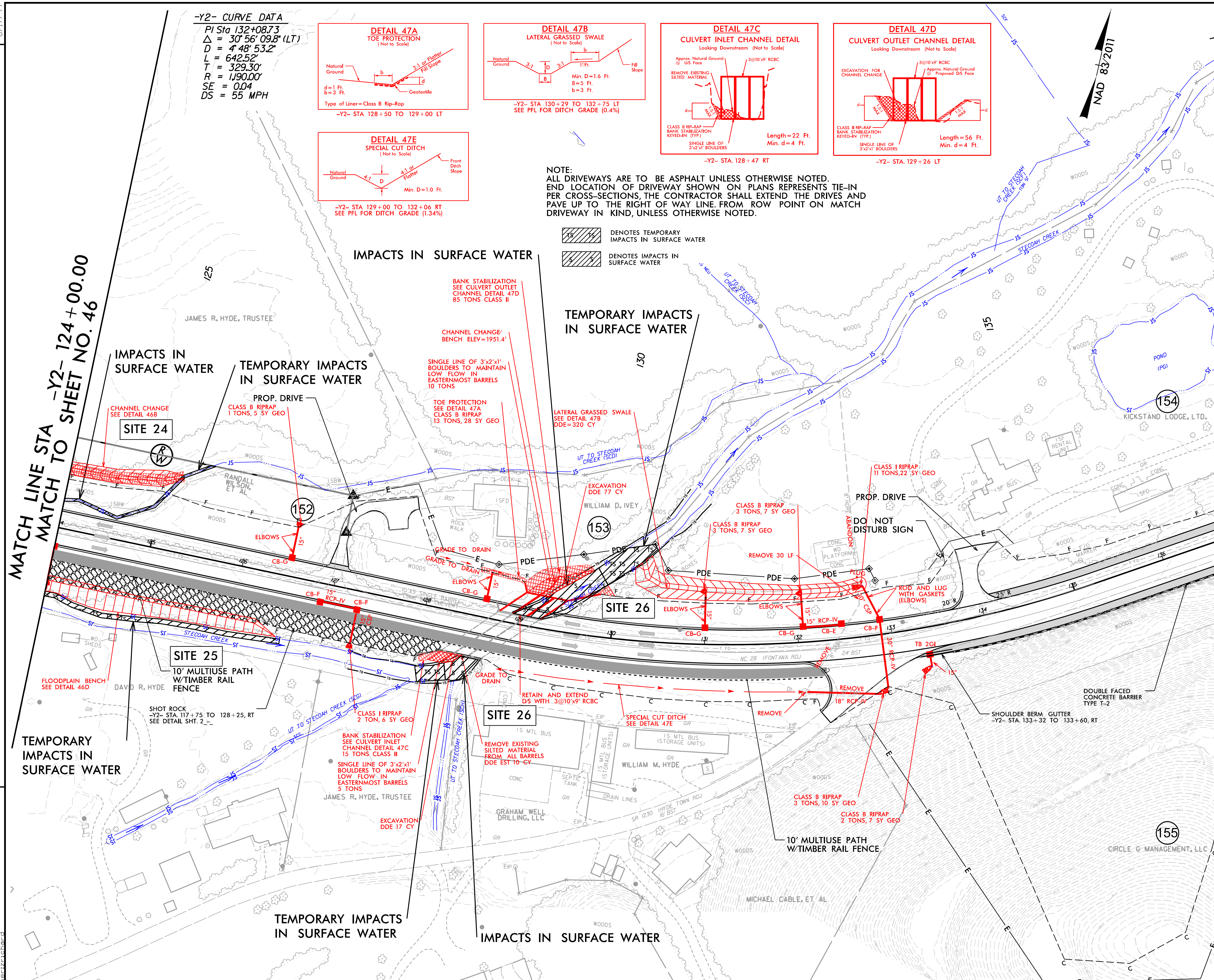
JAMES R. HYDE, TRUSTEE
RANDALL WILSON, ET AL
WILLIAM D. IVEY
WILLIAM M. HYDE
JAMES R. HYDE, TRUSTEE
GRAHAM WELL DRILLING, LLC
DAVID R. HYDE
KICKSTAND LODGE, LTD.
CIRCLE G MANAGEMENT, LLC
MICHAEL CABLE, ET AL

SITE 24
SITE 25
SITE 26
SITE 26

CHANNEL CHANGE SEE DETAIL 46B
PROP. DRIVE
CLASS B RIPRAP 1 TONS, 5 SY GEO
BANK STABILIZATION SEE CULVERT OUTLET CHANNEL DETAIL 47D 85 TONS CLASS II
CHANNEL CHANGE/ BENCH ELEV=1951.4'
SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 10 TONS
TOE PROTECTION SEE DETAIL 47A CLASS B RIPRAP 13 TONS, 28 SY GEO
LATERAL GRASSED SWALE SEE DETAIL 47B DDE=320 CY
EXCAVATION DDE 77 CY
CLASS B RIPRAP 3 TONS, 7 SY GEO
CLASS B RIPRAP 3 TONS, 7 SY GEO
REMOVE 30 LF
ROD AND LUG WITH GASKETS (ELBOWS)
CLASS I RIPRAP 11 TONS,22 SY GEO
PROP. DRIVE
DO NOT DISTURB SIGN
ELBOWS
GRADE TO DRAIN
PDE
CB-G
CB-F
15" RCP-IV
18" RCP-IV
15" CSP
CB-E
TB 2GI
FLOODPLAIN BENCH SEE DETAIL 46D
SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2_-_
10' MULTIUSE PATH W/TIMBER RAIL FENCE
CLASS I RIPRAP 2 TON, 6 SY GEO
BANK STABILIZATION SEE CULVERT INLET CHANNEL DETAIL 47C 15 TONS CLASS II
SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 5 TONS
EXCAVATION DDE 17 CY
RETAIN AND EXTEND D'S WITH 3@10'x9' RCBC
SPECIAL CUT DITCH SEE DETAIL 47E
REMOVE EXISTING SILTED MATERIAL FROM ALL BARRELS DDE 157 CY
REMOVE
CLASS B RIPRAP 3 TONS, 10 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
10' MULTIUSE PATH W/TIMBER RAIL FENCE
DOUBLE FACED CONCRETE BARRIER TYPE T-2
SHOULDER BERM GUTTER -Y2- STA. 133+32 TO 133+60, RT
PROP. DRIVE
POND (PG)
UT TO STECOAH CREEK (SCD)
STECOAH CREEK
NC 28 (FONTANA RDJ)
SR 1230 (HYDE TOWN RD) 16' BST

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 75



-Y2- CURVE DATA
PI Sta 132+08.73
Δ = 30° 56' 09.8" (LT)
D = 4° 48' 53.2"
L = 642.52'
T = 329.30'
R = 1,190.00'
SE = 0.04
DS = 55 MPH
DETAIL 47A
TOE PROTECTION
(Not to Scale)
Type of Liner = Class B Rip-Rap
-Y2- STA 128+50 TO 129+00 LT
DETAIL 47B
LATERAL GRASSED SWALE
(Not to Scale)
Min. D = 1.6 Ft.
B = 5 Ft.
b = 3 Ft.
-Y2- STA 130+29 TO 132+75 LT
SEE PFL FOR DITCH GRADE (0.4%)
DETAIL 47C
CULVERT INLET CHANNEL DETAIL
Looking Downstream (Not to Scale)
Length = 22 Ft.
Min. d = 4 Ft.
-Y2- STA. 128+47 RT
DETAIL 47D
CULVERT OUTLET CHANNEL DETAIL
Looking Downstream (Not to Scale)
Length = 56 Ft.
Min. d = 4 Ft.
-Y2- STA. 129+26 LT
DETAIL 47E
SPECIAL CUT DITCH
(Not to Scale)
Min. D = 1.0 Ft.
-Y2- STA 129+00 TO 132+06 RT
SEE PFL FOR DITCH GRADE (1.34%)
NOTE:
ALL DRIVEWAYS ARE TO BE ASPHALT UNLESS OTHERWISE NOTED.
END LOCATION OF DRIVEWAY SHOWN ON PLANS REPRESENTS TIE-IN PER CROSS-SECTIONS, THE CONTRACTOR SHALL EXTEND THE DRIVES AND PAVE UP TO THE RIGHT OF WAY LINE. FROM ROW POINT ON MATCH DRIVEWAY IN KIND, UNLESS OTHERWISE NOTED.
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES IMPACTS IN SURFACE WATER
NAD 83/2011
MATCH LINE STA -Y2- 124+00.00
MATCH TO SHEET NO. 46
MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 48
IMPACTS IN SURFACE WATER
TEMPORARY IMPACTS IN SURFACE WATER
SITE 24
SITE 25
SITE 26
JAMES R. HYDE, TRUSTEE
RANDALL WILSON, ET AL
WILLIAM D. IVEY
KICKSTAND LODGE, LTD.
DAVID R. HYDE
WILLIAM M. HYDE
GRAHAM WELL DRILLING, LLC
MICHAEL CABLE, ET AL
CIRCLE G MANAGEMENT, LLC
152
153
154
155
CHANNEL CHANGE SEE DETAIL 46B
PROP. DRIVE
CLASS B RIPRAP 1 TONS, 5 SY GEO
BANK STABILIZATION SEE CULVERT OUTLET CHANNEL DETAIL 47D 85 TONS CLASS II
CHANNEL CHANGE/ BENCH ELEV=1951.4'
SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 10 TONS
TOE PROTECTION SEE DETAIL 47A CLASS B RIPRAP 13 TONS, 28 SY GEO
LATERAL GRASSED SWALE SEE DETAIL 47B DDE=320 CY
EXCAVATION DDE 77 CY
CLASS I RIPRAP 11 TONS, 22 SY GEO
CLASS B RIPRAP 3 TONS, 7 SY GEO
CLASS B RIPRAP 3 TONS, 7 SY GEO
REMOVE 30 LF
DO NOT DISTURB SIGN
ROD AND LUG WITH GASKETS (ELBOWS)
FLOODPLAIN BENCH SEE DETAIL 46D
10' MULTIUSE PATH W/TIMBER RAIL FENCE
SHOT ROCK -Y2- STA. 117+75 TO 128+25, RT SEE DETAIL SHT. 2_-_
CLASS I RIPRAP 2 TON, 6 SY GEO
BANK STABILIZATION SEE CULVERT INLET CHANNEL DETAIL 47C 15 TONS CLASS II
SINGLE LINE OF 3'x2'x1' BOULDERS TO MAINTAIN LOW FLOW IN EASTERNMOST BARRELS 5 TONS
EXCAVATION DDE 17 CY
REMOVE EXISTING SILTED MATERIAL FROM ALL BARRELS DDE EST 10 CY
RETAIN AND EXTEND DS WITH 3@10'x9' RCBC
SPECIAL CUT DITCH SEE DETAIL 47E
REMOVE
CLASS B RIPRAP 3 TONS, 10 SY GEO
CLASS B RIPRAP 2 TONS, 7 SY GEO
10' MULTIUSE PATH W/TIMBER RAIL FENCE
SHOULDER BERM GUTTER -Y2- STA. 133+32 TO 133+60, RT
DOUBLE FACED CONCRETE BARRIER TYPE T-2
PROP. DRIVE
STECOAH CREEK
UT TO STECOAH CREEK
POND
NC 28 (FONTANA RD)
SR 1230 (HYDE TOWN RD)

PROJECT REFERENCE NO. A-0009CC

SHEET NO. 47

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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 28 OF 34

FOR -Y2- PROFILE, SEE SHEET NO. 75

REVISIONS

8/17/99

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_47.dgn

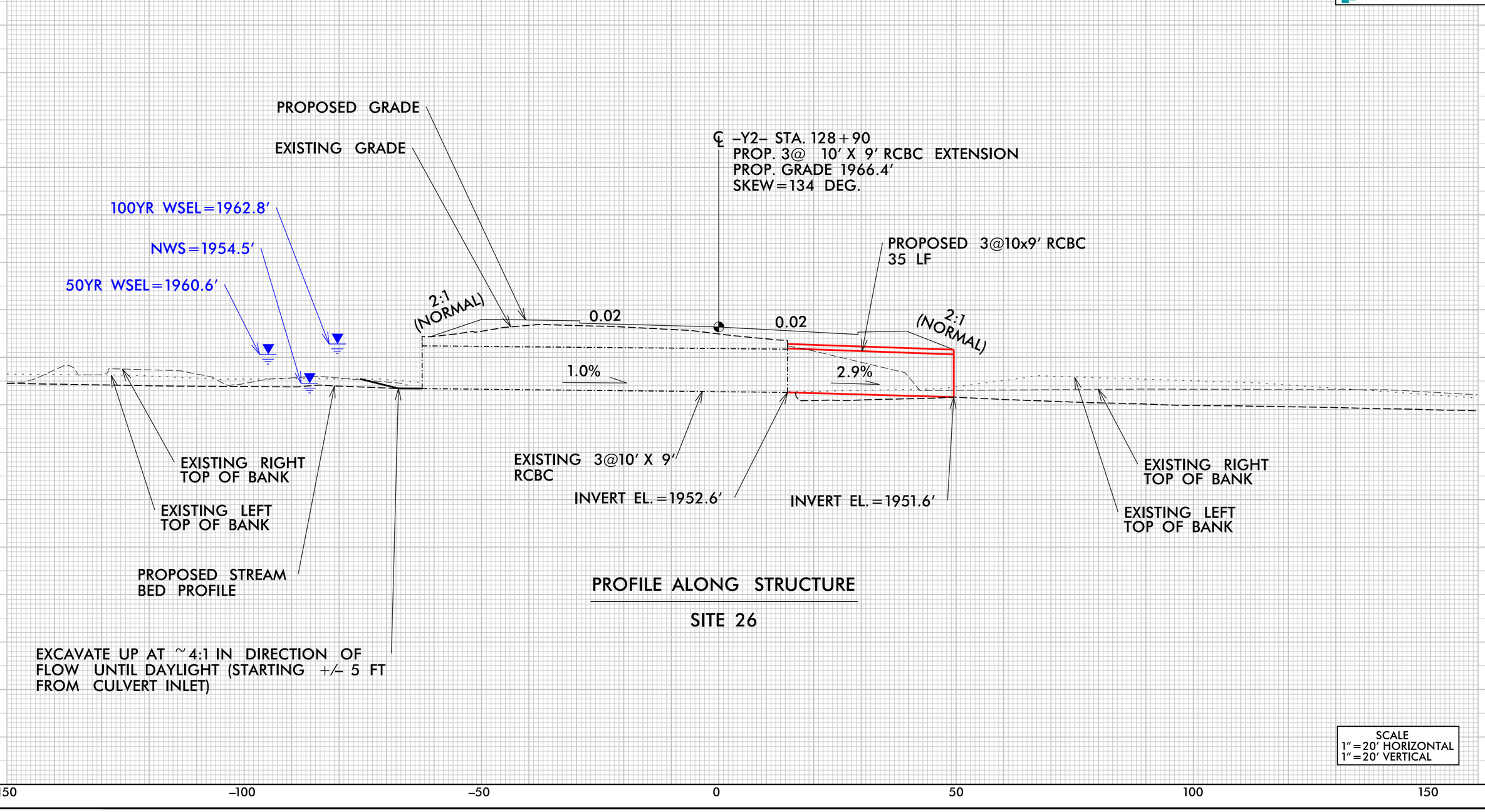
PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 29 OF 34

–Y2–
NC 28



EXCAVATE UP AT ~4:1 IN DIRECTION OF FLOW UNTIL DAYLIGHT (STARTING +/– 5 FT FROM CULVERT INLET)

PROFILE ALONG STRUCTURE

SITE 26

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

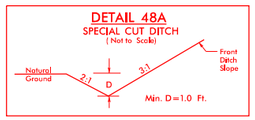
8/17/99

REVISIONS

-Y2- CURVE DATA

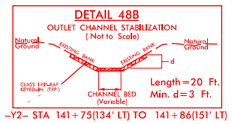
PI Sta 142+30.76	PI Sta 152+17.13
Δ = 1° 24' 23.1" (LT)	Δ = 54° 14' 50.1" (RT)
D = 0° 28' 38.9"	D = 5° 21' 17.1"
L = 294.56'	L = 1,013.07'
T = 147.29'	T = 548.10'
R = 12,000.00'	R = 1,070.00'
SE = NC	SE = 0.08
DS = 60 MPH	DS = 55 MPH

DETAIL 48A
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA. 139+00 TO 139+34 RT
SEE PFL FOR DITCH GRADE (0.5%)

DETAIL 48B
OUTLET CHANNEL STABILIZATION
(Not to Scale)

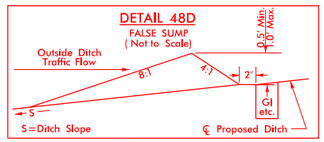


-Y2- STA 141+75(134' LT) TO 141+86(151' LT)

DETAIL 48C
SPECIAL CUT DITCH
(Not to Scale)

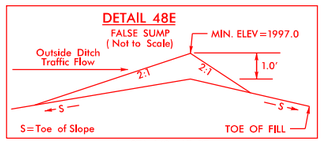
-Y2- STA. 143+50 TO 144+50 RT
SEE XSC FOR DITCH GRADE

DETAIL 48D
FALSE SUMP
(Not to Scale)



-Y2- STA. 145+87 RT
-Y2- STA. 151+10 RT

DETAIL 48E
FALSE SUMP
(Not to Scale)

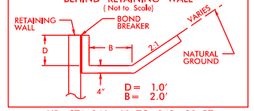


-L- STA. 142+67 RT

DETAIL 48F
TOE PROTECTION
(Not to Scale)

-Y2- STA 139+34 TO 141+09 RT
-Y2- STA 141+20 TO 142+25 RT

DETAIL 48G
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 146+60 TO 148+80 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

NAD 83/2011

PERMIT DRAWING
SHEET 30 OF 34

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	48
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 47

MATCH LINE STA -Y2- 152+00.00
MATCH TO SHEET NO. 49

TEMPORARY IMPACTS IN SURFACE WATER

SITE 27

IMPACTS IN SURFACE WATER

154 KICKSTAND LODGE, LTD.

156 T. J. EDWARDS

155 CIRCLE G MANAGEMENT, LLC

157 MICHAEL HOLDER

MICHAEL HOLDER

DO NOT DISTURB

PROP. DRIVE

OUTLET CHANNEL STABILIZATION
SEE DETAIL 48B
CLASS I RIPRAP
30 TONS, NO GEO

CLASS B RIPRAP
3 TONS, 11 GEOTECH

DO NOT BURY INVERT

MAX 1.0% PIPE SLOPE
THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

JB wSlab Lid

REMOVE HW

SPECIAL CUT DITCH
SEE DETAIL 48A

FALSE SUMP
SEE DETAIL 48E

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
57 TONS, 80 SY GEO

DO NOT DISTURB PUMPS

DO NOT DISTURB SHED

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
80 TONS, 112 SY GEO

CONTRACTOR TO REPAVE POPLAR HILL DRIVE IF DAMAGED DURING CONSTRUCTION

SHOULDER BERM GUTTER
-Y2- STA. 139+50 TO 142+00, RT

CUT TO FILL TRANSISTION
CLASS II RIPRAP
40 TONS, 42 SY GEO

SPECIAL CUT DITCH
SEE DETAIL 48C
CLASS B RIPRAP
45 TONS, 100 CY GEO

PROP. RETAINING WALL #41
W/CONCRETE DITCH
BEGIN -Y2- STA. 146+60±
END -Y2- STA. 148+80±

CLASS B RIPRAP
3 TONS, 10 SY GEO

REMOVE 20 LF

CLASS I RIPRAP
4 TONS, 10 GEOTECH

CONC. DITCH
BEHIND
RETAINING WALL
SEE DETAIL 48G

CLASS B RIP-RAP
3 TONS, 7 SY GEO

FALSE SUMP
SEE DETAIL 48D

REMOVE
18" RCP-FW

ELBOW

IMPACTS IN SURFACE WATER

TEMPORARY IMPACTS IN SURFACE WATER

15 15 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

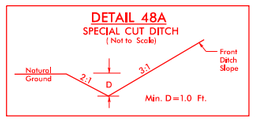
FOR -Y2- PROFILE, SEE SHEET NO. 76

11/1/2021
X:\NCDOT\A-0009\Hydraulics\PERMITS_Environmental\Drawings\A-0009CC_PSH\A-0009CC_Hyd_prm_psh_48.dgn
User:richard

-Y2- CURVE DATA

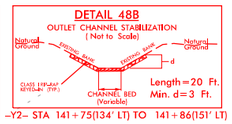
PI Sta 142+30.76	PI Sta 152+17.13
△ = 1°24' 23.1" (LT)	△ = 5°4' 14' 50.1" (RT)
D = 0°28' 38.9"	D = 5°21' 17.1"
L = 294.56'	L = 1,013.07'
T = 147.29'	T = 548.10'
R = 12,000.00'	R = 1,070.00'
SE = NC	SE = 0.08
DS = 60 MPH	DS = 55 MPH

DETAIL 48A
SPECIAL CUT DITCH
(Not to Scale)



-Y2- STA. 139+00 TO 139+34 RT
SEE PFL FOR DITCH GRADE (0.5%)

DETAIL 48B
OUTLET CHANNEL STABILIZATION
(Not to Scale)

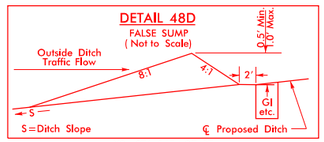


-Y2- STA 141+75(134' LT) TO 141+86(151' LT)

DETAIL 48C
SPECIAL CUT DITCH
(Not to Scale)

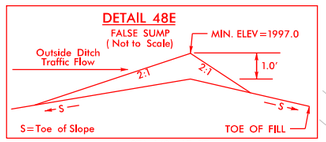
-Y2- STA. 143+50 TO 144+50 RT
SEE XSC FOR DITCH GRADE

DETAIL 48D
FALSE SUMP
(Not to Scale)



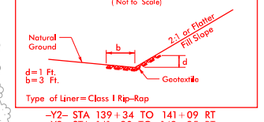
-Y2- STA. 145+87 RT
-Y2- STA. 151+10 RT

DETAIL 48E
FALSE SUMP
(Not to Scale)



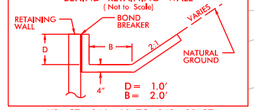
-L- STA. 142+67 RT

DETAIL 48F
TOE PROTECTION
(Not to Scale)



-Y2- STA 139+34 TO 141+09 RT
-Y2- STA 141+20 TO 142+25 RT

DETAIL 48G
CONCRETE DITCH
BEHIND RETAINING WALL
(Not to Scale)



-Y2- STA. 146+60 TO 148+80 RT
(SEE WALL ENVELOPES FOR DITCH GRADE)

PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	48
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

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PERMIT DRAWING
SHEET 31 OF 34

NAD 83/2011

REVISIONS 8/17/99

MATCH LINE STA -Y2- 138+00.00
MATCH TO SHEET NO. 47

MATCH LINE STA -Y2- 152+00.00
MATCH TO SHEET NO. 49

TEMPORARY IMPACTS IN SURFACE WATER

SITE 27

IMPACTS IN SURFACE WATER

KICKSTAND LODGE, LTD.

BATH HOUSE

154

156
T. J. EDWARDS

MICHAEL HOLDER

DO NOT DISTURB

PROP. DRIVE

CLASS B RIPRAP
3 TONS, 10 SY GEO

CLASS I RIPRAP
4 TONS, 10 GEOTECH

OUTLET CHANNEL STABILIZATION
SEE DETAIL 48B
CLASS I RIPRAP
30 TONS, NO GEO

CLASS B RIPRAP
3 TONS, 11 GEOTECH

DO NOT BURY INVERT

MAX 1.0% PIPE SLOPE THIS SIDE OF ELBOW

ROD AND LUG WITH GASKETS (ELBOWS)

REMOVE 20 LF

REMOVE HW

REMOVE 16" RCP-IV

JB w/Slab Lid

JB w/MH

FLOWABLE FILL

PLUG

ELBOW

FALSE SUMP
SEE DETAIL 48E

FALSE SUMP
SEE DETAIL 48D

SPECIAL CUT DITCH
SEE DETAIL 48A

CUT TO FILL TRANSISTION
CLASS II RIPRAP
40 TONS, 42 SY GEO

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
57 TONS, 80 SY GEO

CLASS B RIP-RAP
3 TONS, 7 SY GEO

CONC DITCH
BEHIND
RETAINING WALL
SEE DETAIL 48G

SPECIAL CUT DITCH
SEE DETAIL 48C
CLASS B RIPRAP
45 TONS, 100 CY GEO

PROP. RETAINING WALL #41
W/CONCRETE DITCH
BEGIN -Y2- STA. 146+60±
END -Y2- STA. 148+80±

DO NOT DISTURB PUMPS

DO NOT DISTURB SHED

TOE PROTECTION
SEE DETAIL 48F
CLASS I RIPRAP
80 TONS, 112 SY GEO

DO NOT BURY INVERT

SHOULDER BERM GUTTER
-Y2- STA. 139+50 TO
142+00, RT

155
CIRCLE G MANAGEMENT, LLC

CONTRACTOR TO REPAVE POPLAR HILL DRIVE IF DAMAGED DURING CONSTRUCTION

TEMPORARY IMPACTS IN SURFACE WATER

IMPACTS IN SURFACE WATER

15 15 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100'
25'

FOR -Y2- PROFILE, SEE SHEET NO. 76

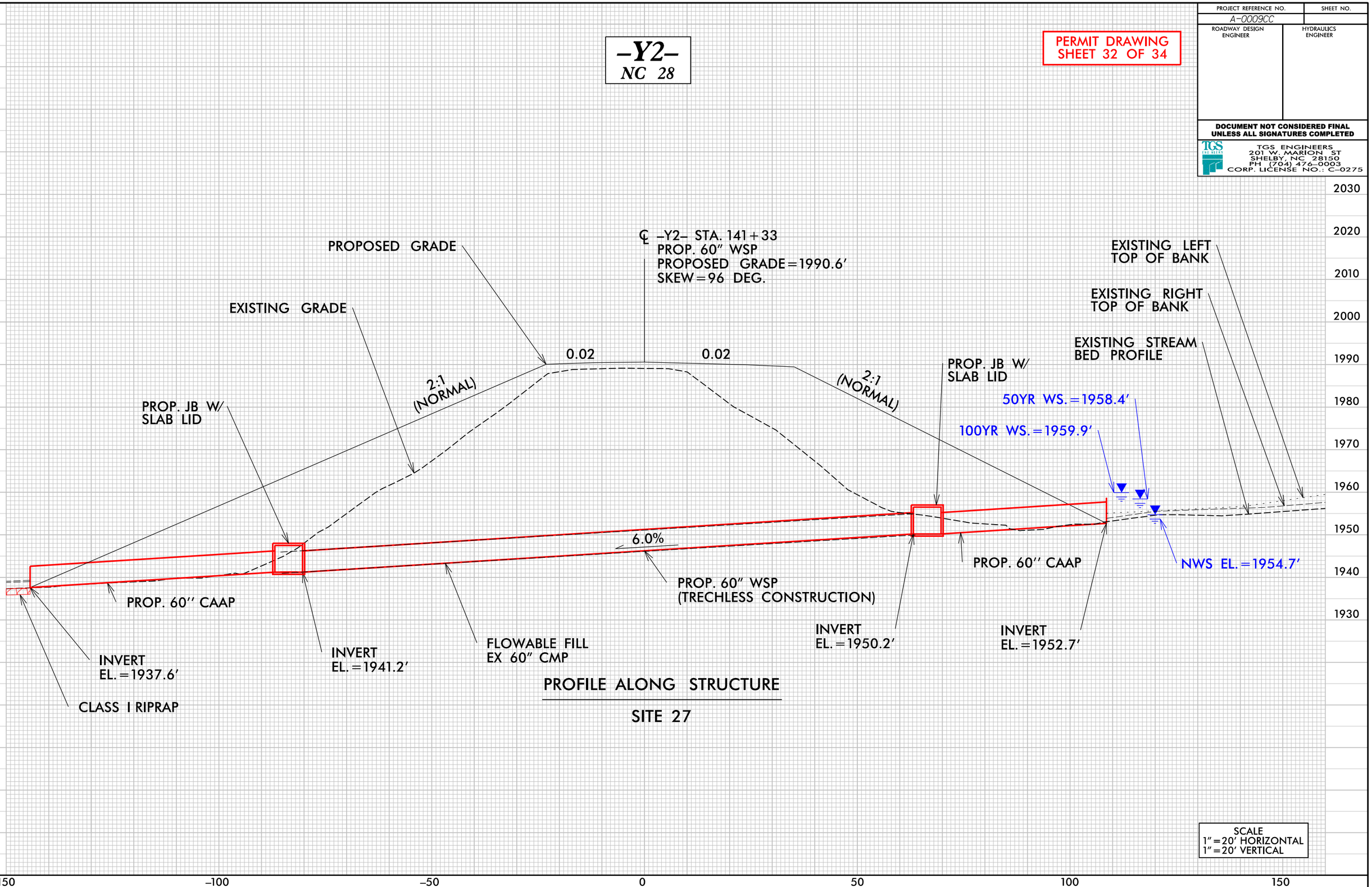
PROJECT REFERENCE NO.	SHEET NO.
A-0009CC	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 32 OF 34

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

TGS ENGINEERS
201 W. MARION ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

–Y2–
NC 28



PROFILE ALONG STRUCTURE

SITE 27

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

WETLAND AND SURACE WATER IMPACTS SUMMARY

					WETLAND IMPACTS					SURFACE WATER IMPACTS					
Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	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 Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 419+21 to 419+65 LT	24" CSP/Berm Ditch	SBB							< 0.01	< 0.01	38		54	
1	-L- 419+21 to 419+44 LT	Impacts to Wetland	WBB	Medium			< 0.01		< 0.01						
2	-L- 458+23 to 458+31 LT	36" CMP Inlet	SBC								< 0.01			69	
2	-L- 458+27 to 458+53 RT	36" CMP Outlet	SBC							< 0.01	< 0.01	18		17	
3	-L- 467+36 to 467+47 LT	36" CMP Inlet	Carver Branch	Low							< 0.01			16	
3	-L- 468+02 to 468+28 RT	36" CMP Outlet	Carver Branch	Low						< 0.01	< 0.01	12		20	
4	-Y2- 13+50 to 13+73 RT	36" CMP Inlet	Johnson Gap Branch								< 0.01			27	
4	-Y2- 12+79 to 13+07 LT	36" CMP Outlet	Johnson Gap Branch							< 0.01	< 0.01		12	24	
4	-Y2- 13+06 to 13+24 LT	36" CMP Outlet	SEY								< 0.01			18	
4	-Y2- 12+60 to 12+84 LT	36" CMP Outlet	SEZ								< 0.01			24	
5	-Y2- 14+46 to 15+25 RT	36" RCP Outlet	Johnson Gap Branch								< 0.01			83	
6	-Y2- 23+52 to 23+92 RT	Roadway	SBG							< 0.01		43			
7	-Y2- 26+08 to 27+35 LT	Roadway	WBV	Low	< 0.01			< 0.01	0.02						
8	-Y2- 27+79 to 28+01 RT	48" CSP Inlet	Carver Branch	Low						< 0.01	< 0.01	22		21	
8	-Y2- 27+32 to 27+47 LT	42" & 54" Outlet Channel	Carver Branch	Low						< 0.01	< 0.01	47		11	
9	-Y2- 35+91 to 36+06 RT	48" RCP Inlet	SBC							< 0.01	< 0.01	50	8	19	
9	-Y2- 35+16 to 35+53 LT	48" CSP Outlet	SBC							< 0.01	< 0.01	14		14	
10	-Y2- 44+52 to 45+01 LT	54" CAAP Outlet Channel	SBD							< 0.01	< 0.01		23	26	
11	-Y2- 46+92 to 47+00 RT	Channel Change	SFT							< 0.01	< 0.01	4		16	
11	-Y2- 46+67 to 49+75 RT	Channel Change	SFP	Medium						0.04	< 0.01	288		29	
11	-Y2- 49+06 to 49+87 RT	48" CSP Inlet	SFH							< 0.01	< 0.01	37	20	38	
11	-Y2- 50+88 to 53+14 LT	42" CSP / Channel Change	SFH							0.03	< 0.01	240		16	
12	-Y2- 57+08 to 59+56 RT	Roadway/Toe Protection	SFM							< 0.01		191			
12	-Y2- 60+02 to 60+23 LT	24" CMP Outlet	SFM							< 0.01	< 0.01	16		8	
13	-Y2- 59+10 to 59+95 LT	Roadway Fill	SFN							< 0.01	< 0.01	72		15	
14	-Y2- 66+30 to 66+49 LT	6'x6'x RCBC Inlet	Carver Branch	Low							< 0.01			19	
SHEET TOTALS*:					< 0.01					0.11	0.05	1092	63	584	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CC
32572.1.15

WETLAND AND SURACE WATER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	NRTR Map ID	NCSAM / NCWAM Rating	WETLAND IMPACTS					SURFACE WATER IMPACTS					
					Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent Mitigable (ft)	Existing Channel Impacts Permanent Non-Mitigable (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
14	-Y2- 67+12 to 67+69 RT	6'x6' RCBC Outlet	Carver Branch	Low						0.01	< 0.01	84		20	
15	-Y2- 68+25 to 68+35 LT	Stream Restoration	SBJ								< 0.01			20	
15	-Y2- 67+66 to 67+91 RT	66" CAAP	SBJ							< 0.01		67			
16	-Y2- 75+85 to 76+04 LT	42" RCP Inlet	SBN								< 0.01			22	
17	-Y2- 75+67 to 75+89 RT	Construction Easement	SBP								< 0.01			21	
17	-Y2- 75+89 to 80+17 RT	Floodplain Bench	SBO							< 0.01	0.02		6	419	
17	-Y2- 79+70 to 80+15 RT	Floodplain Bench	Carver Branch	Low							< 0.01			50	
18	-Y3- 11+91 to 12+04 LT	18" RCP Outlet Ditch	Edwards Branch								< 0.01			16	
19	-Y2- 97+95 to 99+45 LT	30" RCP & Channel Change	SBV							< 0.01	< 0.01	67	77	42	
20	-Y2- 98+02 to 99+22 RT	2@6'x6' RCBC	Carver Branch	Low						< 0.01	< 0.01		50	20	
21	-Y2- 99+73 to 99+85 LT	1@12'x5' RCBC Inlet	Edwards Branch							< 0.01	< 0.01	30	24	3	
21	-Y2- 99+89 to 99+94 RT	1@12'x5' RCBC Outlet	Edwards Branch							< 0.01			10		
21	-Y2- 99+71 to 100+13 RT	Floodplain Bench Const.	Carver Branch	Low						< 0.01	< 0.01		23	20	
22	-Y2- 109+70 to 112+01 LT&RT	Roadway/Channel Change	SCB							0.01	< 0.01	209		12	
22	-Y2- 109+60 to 111+38 LT	Roadway/Channel Change	WBR	Medium	0.07		< 0.01		0.01						
22	-Y2- 109+73 to 112+43 RT	Bank Stabilization	Stecoah Creek							< 0.01	< 0.01		31	20	
23	-Y2- 119+92 to 122+49 LT	Rock Fill in Pond	PH							0.06	0.06				
24	-Y2- 123+32 to 125+51 LT	Channel Change	SCD							0.02	< 0.01	226		66	
25	-Y2- 122+95 to 126+55 RT	Floodplain Bench Const.	Stecoah Creek								0.04			361	
26	-Y2- 128+02 to 128+66 RT	Bank Stabilization	Stecoah Creek							0.01	0.01		31	31	
26	-Y2- 128+93 to 130+43 LT	3@10'x9' RCBC Outlet	Stecoah Creek							0.04	0.03	35	54	65	
27	-Y2- 141+09 to 141+21 RT	60" CAAP Inlet	SDT							0.01	< 0.01	43	9	16	
27	-Y2- 141+25 to 141+97 LT	60" CAAP Outlet	SDT							0.02	< 0.01	91		11	
SHEET TOTALS*:					0.07		< 0.01		0.01	0.22	0.20	852	315	1235	
PROJECT TOTALS*:					0.07	0.00	0.01	0.01	0.04	0.33	0.25	1944	378	1819	

*Rounded totals are sum of actual impacts

**Notes:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
11/1/2021
GRAHAM
A-0009CC
32572.1.15

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

February 22, 2022

Ms. Wanda Austin, Division 14 Engineer
NCDOT, Division 14
253 Webster Road
Sylva, NC 28779

Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed improvements to NC 129 and NC 143 in Graham County, Federal Aid Project No. APD-074(178), TIP A-0009C.
NCDWR Project No.20201371

Dear Ms. Austin:

Attached hereto is a copy of Certification No. WQC004651 issued to The North Carolina Department of Transportation (NCDOT) dated February 22, 2022.

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

Sincerely,

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director
Division of Water Resources

Electronic copy only distribution:
Crystal Amschler, US Army Corps of Engineers, Asheville Field Office
Patrick Breedlove, Environmental Specialist Division 14
Amanetta Somerville, US Environmental Protection Agency
Holland Youngman, US Fish and Wildlife Service
Dave McHenry, NC Wildlife Resources Commission
Beth Harmon, Division of Mitigation Services
File Copy

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

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Resources (NCDWR) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to impact 1.11 acres of jurisdictional wetlands, 8,209 linear feet of jurisdictional streams, and 0.12 acre of open water in Graham County. The project shall be constructed pursuant to the application dated received December 17, 2021. The authorized impacts are as described below:

Stream Impacts in the Little Tennessee River Basin

Site	Permanent Fill in Intermittent Stream (linear feet)	Temporary Fill in Intermittent Stream (linear feet)	Permanent Fill in Perennial Stream (linear feet)	Temporary Fill in Perennial Stream (linear feet)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation
S1	39				39	
S2		20			20	
S3	24				24	
S4			12		12	
S5				20	20	
S6			30		30	
S7			26		26	
S8				15	15	
S9			18		18	
S10				20	20	
S11	18				18	
S12			15		15	
S13			48		48	
S14				10	10	
S15			44		44	
S16			48		48	
S17			93		93	
S18				10	10	
S19			18		18	
S20			56		56	
S21				8	8	
S22			14		14	
S23			91		91	
S24				50	50	
S25	45				45	
S26		11			11	
S27		3			3	
S28			13		13	
S29				20	20	
S30				20	20	
S31			18		18	
S32			22		22	
S33				91	91	
S34			29		29	
S35				37	37	
S36			50		50	
S37				10	10	
S38			35		35	
S39			32		32	
S40				10	10	
S41		10			10	

Site	Permanent Fill in Intermittent Stream (linear feet)	Temporary Fill in Intermittent Stream (linear feet)	Permanent Fill in Perennial Stream (linear feet)	Temporary Fill in Perennial Stream (linear feet)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation
S42			12		12	
S43				18	18	
S44		16			16	
S45				20	20	
S46		53			53	
S47			39		39	
S48				10	10	
S49			10		10	
S50			32		32	
S51			42		42	
S52				10	10	
S53			32		32	
S54				10	10	
S55			3		3	
S56			11		11	
S57			27		27	
S58				16	16	
S59			24		24	
S60				11	11	
S61			18		18	
S62			6		6	
S63			38		38	
S64				5	5	
S65	24				24	
S66		11			11	
S67			18		18	
S68				14	14	
S69			25		25	
S70			41		41	
S71				9	9	
S72			23		23	
S73				87	87	
S74	25				25	
S75		13			13	
S76	23				23	
S77		8			8	
S78			62		62	
S79			64		64	
S80				105	105	
S81			10		10	
S82			10		10	
S83			68		68	
S84				10	10	
S85		11			11	
S86			21		21	
S87				11	11	
S88			25		25	
S89			27		27	
S90				14	14	
S91			6		6	
S92			6		6	
S93			66		66	

Site	Permanent Fill in Intermittent Stream (linear feet)	Temporary Fill in Intermittent Stream (linear feet)	Permanent Fill in Perennial Stream (linear feet)	Temporary Fill in Perennial Stream (linear feet)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation
S94				62	62	
S95			4		4	
S96				14	14	
S97			15		15	
S98			17		17	
S99				20	20	
S100				22	22	
S101			16		16	
S102					16	
S103			12		12	
S104			8		8	
S105				6	6	
S106			6		6	
S107			15		15	
S108				17	17	
S109			13		13	
S110				21	21	
S111		27			27	
S112			17		17	
S113				20	20	
S114				30	30	
S115			89		89	
S116			20		20	
S117			14		14	
S118				7	7	
S119				21	21	
S120			58		58	
S121			14		14	
S122				5	5	
S123			10		10	
S124				6	6	
S125			41		41	
S126				55	55	
S127			2		2	
S128			12		12	
S129				10	10	
S130			53		53	
S131			68		68	
S132				9	9	
S133			22		22	
S134				26	26	
S135			34		34	
S136			37		37	
S137				33	33	
S138	127				127	
S139		25			25	
S140			24		24	
S141				22	22	
S142			29		29	
S143			10		10	
S144				10	10	
S145				31	31	

Site	Permanent Fill in Intermittent Stream (linear feet)	Temporary Fill in Intermittent Stream (linear feet)	Permanent Fill in Perennial Stream (linear feet)	Temporary Fill in Perennial Stream (linear feet)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation
S146			93		93	
S147				50	50	
S148			14		14	
S149				28	28	
S150			10		10	
S151			20		20	
S152				10	10	
S153		3			3	
S154			12		12	
S155				23	23	
S169	38				38	
S170		54			54	
S171				69	69	
S172			18		18	
S173				17	17	
S174				16	16	
S175			12		12	
S176				20	20	
S177				27	27	
S178			12		12	
S179				24	24	
S180		18			18	
S181		24			24	
S182				83	83	
S183	43				43	
S184			22		22	
S185				21	21	
S186			47		47	
S187				11	11	
S188			50		50	
S189			8		8	
S190				19	19	
S191			14		14	
S192				14	14	
S193			23		23	
S194				26	26	
S195	4				4	
S196		16			16	
S197			288		288	
S198				16	16	
S199			37		37	
S200			20		20	
S201				38	38	
S202			240		240	
S203				16	16	
S204			191		191	
S205			16		16	
S206				8	8	
S207	72				72	
S208		15			15	
S209				19	19	

Site	Permanent Fill in Intermittent Stream (linear feet)	Temporary Fill in Intermittent Stream (linear feet)	Permanent Fill in Perennial Stream (linear feet)	Temporary Fill in Perennial Stream (linear feet)	Total Stream Impact (linear feet)	Stream Impacts Requiring Mitigation
S210			84		84	
S211				20	20	
S212				20	20	
S213			67		67	
S214				22	22	
S215		21			21	
S216	6				6	
S217		419			419	
S218				50	50	
S219				16	16	
S220			67		67	
S221			77		77	
S222				42	42	
S223			50		50	
S224				20	20	
S225			30		30	
S226			24		24	
S227				3	3	
S228			10		10	
S229			23		23	
S230				20	20	
S231			209		209	
S232				12	12	
S233			31		31	
S234				20	20	
S235			226		226	
S236				66	66	
S237				361	361	
S238			31		31	
S239				31	31	
S240			35		35	
S241			54		54	
S242				65	65	
S243			43		43	
S244			9		9	
S245				16	16	
S246			91		91	
S247				11	11	
Total	**488**	**778**	**4,446**	**2,497**	**8,209**	

Total Stream Impact for Project: 4,934 linear feet of permanent and 3,275 feet of temporary.

Wetland Impacts in the Little Tennessee River Basin

Site	Permanent Fill (acres)	Temporary Fill (acres)	Total Wetland Impact (acres)	Impacts Requiring Mitigation (acres)
W1(A4)	.010		.010	.010
W2(A13)	.010		.010	.010
W3(A13)	.010		.010	.010
W4(A13)		.030	.030	.030
W5(A13)	.070		.070	.070
W6(A13)	.010		.010	.010

W7(A13)		.020	.020	.020
W8(A13)		.030	.030	.030
W9(A14)	.020		.020	.020
W10(A14)		.010	.010	.010
W11(A14)		.010	.010	.010
W12(A16)	.090		.090	.090
W13(A18)	.010		.010	.010
W14(A21)		.010	.010	.010
W15(A23)	.020		.020	.020
W16(A23)	.070		.070	.070
W17(A23)		.110	.110	.110
W18(A23)	.010		.010	.010
W19(A23)		.010	.010	.010
W20(A23		.050	.050	.050
W21(A24)		.020	.020	.020
W22(B5)		.010	.010	.010
W23(B6)	.060		.060	.060
W24(B6)		.010	.010	.010
W25(B6)	.010		.010	.010
W26(B6)		.010	.010	.010
W27(B10)	.030		.030	.030
W28(B12)	.080		.080	.080
W29(B12)		.010	.010	.010
W29(B12)		.010	.010	.010
W30(B15)	.040		.040	.040
W31(B15)	.020		.020	.020
W32(B15)		.010	.010	.010
W33(B19)	.010		.010	.010
W33(B19)		.010	.010	.010
W34(B19)	.010		.010	.010
W37(C1)	.010		.010	.010
W38(C1)		.010	.010	.010
W39(C7)	.010		.010	.010
W40(C7)		.010	.010	.010
W41(C7)		.020	.020	.020
W42(C22)	.070		.070	.070
W43(C22)	.010		.010	.010
W44(C22)		.010	.010	.010
Total	**0.69**	**0.42**	**1.11**	**1.11**

Total Wetland Impact for Project: 0.69 acres of permanent and 0.42 acres of temporary.

Open Water Impacts in the Little Tennessee River Basin

Site	Fill (acres)	Total Impact (acres)
O1	0.12	0.12
Total	**0.12**	**0.12**

Total Open Water Impact for Project: 0.12 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Little Tennessee 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 received December 17, 2021. 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 0.1 acre or 300 linear feet, respectively, additional compensatory

mitigation may be required as described in 15A NCAC 2H .0506 (c). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

Project Specific Conditions

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

2. The permittee will need to adhere to all appropriate in-water work moratoria (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission. No in-water work is permitted between January 1 and April 15 of any year, without prior approval from the NC Division of Water Resources and the NC Wildlife Resources Commission.

   In-stream work and land disturbance within the 25-foot buffer zone are prohibited during the trout-spawning season of January 1 through April 15 to protect the egg and fry stages of trout.

3. Prior to commencing ground disturbing activities, an acceptable monitoring and mitigation plan for the presence of sulfide-bearing rock must be approved by the NCDWR.

4. The permittee shall use Design Standards in Sensitive Watersheds (15A NCAC 4B.0124[a]-[e]) in areas draining to Trout waters.

5. Compensatory mitigation for impacts to 1.11 acres riverine wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Division of Mitigation Services (DMS) (formerly NCEEP), and that the DMS has agreed to implement the mitigation for the project. DMS has indicated in a letter dated February 10, 2022, that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with DMS's Mitigation Banking Instrument signed July 28, 2010.

6. Channel relocations at sites 11, 17, and 19 of Section C shall be completed and stabilized, and approved on site by NCDWR staff, prior to diverting water into the new channel. Stream banks shall be matted with coir-fiber matting. Vegetation used for bank stabilization shall be limited to native riparian vegetation and should include establishment of a vegetated buffer on both sides of the relocated channel to the maximum extent practical. Also, rip-rap may be allowed if it is necessary to maintain the physical integrity of the stream, but the applicant must provide written justification and any calculations used to determine the extent of rip-rap coverage requested. Once the stream has been turned into the new channel, it may be necessary to relocate stranded fish to the new channel to prevent fish kills. [15A NCAC 02H .0506(b)(3)]

General Conditions

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

19. Native riparian vegetation 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)]

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

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

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

22. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification. [15A NCAC 02H.0506(b)(3) and (c)(3)]

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

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

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

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

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

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

This the 22nd day of February 2022

DIVISION OF WATER RESOURCES

DocuSigned by:
Amy Chapman
9C9886312DCD474...

S. Daniel Smith, Director

WQC No. WQC004651

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
S. DANIEL SMITH
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 _____

Eastern Band of Cherokee Indians (EBCI)
Water Quality Office (WQO)
Mailing address:
P.O. Box 1925
Cherokee, NC 28719
Phone (828) 359-6772

Physical address:
Water Quality Office
2000 Old #4 Road
Cherokee, NC 29719

401 Water Quality Certification
Grant with Special Condition

Applicant: NC Department of Transportation Issued: 10/25/2021

Pursuant to CWA Section 401 (33 U.S.C. 1251, 1341), the Eastern Band of Cherokee Indians (EBCI) is required to certify whether the activity described below will not violate applicable water quality standards. Accordingly, The EBCI Water Quality Office (WQO) requires reasonable assurance that the activity will not violate provisions of EBCI Water Quality Standards, Administrative Procedure Act, Cherokee Code, Chapter 150, provisions of EBCI Fish & Game Regulations and Guidelines, and other EBCI water protection provisions, law or regulations.

The Eastern Band of Cherokee Indians Water Quality Office (WQO) issues this letter to serve as notification of water quality certification as required for the road construction/upgrades to NC 143 from SR 1223 to 0.5 miles north of the Appalachian Trail, Graham County NC.

Based on information submitted as part of the application for a 401 Water Quality Certification, followed by a Technical Review, the EBCI Water Quality Office and EBCI Fish & Game Office has concluded that special conditions are required. The logging road at Bowman Lane should not be accessed by equipment at any time. This logging road is located in a wetland that contains waters with macroinvertebrates, indicating pristine habitat, and must not be compromised.

Therefore, the EBCI WQO is issuing this grant with special condition of 401 Certification, also subject to the 401 General Conditions attached. This certification is issued to the NC DOT for the road construction/upgrades to NC 143 from SR 1223 to 0.5 miles north of the Appalachian Trail, Graham County NC.

I, Aaron Ducker grant with special and general conditions CWA 401 Water Quality Certification to the NC DOT for road construction.

Signed

Aaron Ducker

Cc: Mr. Michael Bolt, Water Quality Supervisor

EBCI 401 CERTIFICATION GENERAL CONDITIONS.

1. Measures shall be taken to prevent or control spills of fuels, lubricants or other toxic materials used in construction from entering the watercourse.

2. All dredged material shall be removed to an upland location and/or graded on adjacent areas (so long as such areas are not regulated wetlands), to obtain original streamside elevations, i.e. overbank flooding shall not be artificially obstructed.

3. In areas not riprapped or otherwise stabilized, revegetation of stream banks and riparian zones shall occur concurrently with project progression. At a minimum, revegetation will approximate pre-disturbance conditions.

4. To the maximum extent practicable, all instream work under this certification shall be performed during low flow.

5. Heavy equipment, e.g. bulldozers, backhoes, draglines, etc., if required for this project, should not be used or operated within the stream channel. In those instances where such instream work is unavoidable, then it shall be performed in such a manner and duration as to minimize suspension of sediments and disturbance to substrates and bank or riparian vegetation.

6. Any fill or riprap including refuse fill, shall be of such composition that it will not adversely affect the biological, chemical or physical properties of the receiving waters and/or cause violations of water quality standards. If riprap is utilized, it is to be of such weight and size that bank stress or slump conditions will not be created because of its placement.

7. If there are water supply intakes located downstream that may be affected by increased turbidity and suspended solids, the permittee shall notify the operator when work will be done.

8. Removal of existing riparian vegetation should be restricted to the minimum necessary for project construction.

9. Should evidence of stream pollution or jurisdictional wetland impairment and/or violations of water quality standards occur as a result of this activity (either from a spill or other forms of water pollution), the EBCI Water Quality Section shall be notified immediately by calling 828-359-6772.

* EBCI Water Quality Standards are incorporated as Section 113E of the Cherokee Code.

EBCI Water Quality Office
(828) 359-6772

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

Permittee: North Carolina Department of Transportation (NCDOT) **Action ID:** SAW-2009-01346
Project Name: A009C US 129, NC 143, and NC 28 Improvement Project **County:** Graham

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:** 06010202, Little Tennessee River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		1,944	0.09			

*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:** 06010202, Little Tennessee River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		3,335	0.17			

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: 2022.06.30 19:32:19 -04'00'

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.

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

Permittee: North Carolina Department of Transportation (NCDOT) **Action ID:** SAW-2009-01346
Project Name: A009C US 129, NC 143, and NC 28 Improvement Project **County:** Graham

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:** 06010204, Little Tennessee River Basin

Stream Impacts (linear feet)			Wetland Impacts (acres)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		1,490	0.697			

*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:** 06010204, Little Tennessee River Basin

Stream Mitigation (credits)			Wetland Mitigation (credits)			
Warm	Cool	Cold	Riparian Riverine	Riparian Non-Riverine	Non-Riparian	Coastal
		2,917	1.32			

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: 2022.06.30 19:37:14 -04'00'

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.

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICER,
THE UNITED STATES FOREST SERVICE,
EASTERN BAND OF CHEROKEE INDIANS,
AND
THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
FOR
IMPROVEMENTS TO US 129, NC 143, AND NC 28
FROM ROBBINSVILLE TO STECOAH
PART OF THE APPALACHIAN HIGHWAY DEVELOPMENT SYSTEM
GRAHAM COUNTY, NORTH CAROLINA
STIP PROJECT A-0009C
FEDERAL AID PROJECT APD-0074(178)

WHEREAS, the Federal Highway Administration (FHWA), in cooperation with the North Carolina Department of Transportation (NCDOT), proposes to improve the mobility and reliability of US 129, NC 143, and of NC 28 from the existing four-lane section in Robbinsville to Stecoah as part of the Appalachian Development Highway System (the Undertaking) in Graham County; and

WHEREAS, the FHWA has prepared an Environmental Assessment (EA) and intends to prepare a Finding of No Significant Impact (FONSI) for the project and has consulted with the Advisory Council on Historic Preservation (ACHP) on the practicality of developing a Programmatic Agreement (PA) to ensure compliance with Section 106 of the National Historic Preservation Act of 1966, as amended 54 U.S.C. §§ 300101-307108; and

WHEREAS, to address the known effects to historic properties and possible future effects on cultural resources, the FHWA will establish, in consultation with the consulting parties in the Section 106 process, the A-0009C Cultural Resources Task Force (CR Task Force); and

WHEREAS, the A-0009C CR Task Force will manage a phased-decision making process that responds to and plans for the challenging environment in which the Undertaking’s effects are thoroughly considered; and

WHEREAS, identification of historic properties within the Undertaking's Area of Potential Effects (APE) has been carried out in accordance with the Advisory Council on Historic Preservation's (ACHP) regulations (36 CFR Part 800) for implementing Section 106 of the National Historic Preservation Act, as amended 54 U.S.C. §§ 300101-307108; and

WHEREAS, the Undertaking includes improvements to the nationally significant Appalachian National Scenic Trail (ANST), aka A.T., a property determined eligible for inclusion in the National Register of Historic Places (NRHP), and proposes to provide a long-term approach to provide safe passage for hikers that is consistent with ANST experiential and aesthetic values and wildlife across NC 143; and,

WHEREAS, this PA does not abrogate the rights, responsibilities, and obligations of the United States Forest Service (USFS) and the National Park Service (NPS) to manage the ANST pursuant to the

National Trails System Act (NTSA), 16 U.S.C. Sections 1241-1251 and 36 CFR Parts 1-7 and other relevant authorities; and

WHEREAS, the Undertaking is in proximity to resources associated with the Trail of Tears National Historic Trail, a route administered by the NPS in coordination with other federal land managers and advice from the federally recognized Tribes, and other Trail of Tears research, that follows and remembers the 1838 forced removal of more than 16,000 Cherokee Indian people from their homelands in Tennessee, Alabama, North Carolina, and Georgia by the United States government; and

WHEREAS, the FHWA has consulted with the North Carolina State Historic Preservation Officer (SHPO) and the ACHP to develop this PA pursuant to Section 14(b)(3) of 36 CFR Part 800; and

WHEREAS, the NCDOT and USFS have participated in the consultation and been invited as signatories to this PA; and

WHEREAS, the USFS will handle their own activities and utilize their own resources, including the expenditure of their own funds, in pursuing these objectives; and

WHEREAS, this PA does not authorize the specific work projects or activities that involve the transfer of funds, services, or property of the USFS. These specific work projects or activities will require execution of separate agreements, be contingent upon the availability of appropriated funds, and be independently authorized by appropriate statutory authority. The negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations; and

WHEREAS, this PA in no way restricts the USFS from participating in similar activities with other public or private agencies, organizations, and individuals; and

WHEREAS, nothing in this PA may be interpreted to imply that the USFS endorses any product, service, or policy of the Signatory or Concurring parties; and

WHEREAS, the Eastern Band of Cherokee Indians (EBCI) has Tribal lands within and adjacent to the Undertaking, participated in the consultation, and been invited as a signatory to this PA; and

WHEREAS, the Cherokee Nation (CN), the United Keetoowah Band of Cherokee Indians in Oklahoma (UKB), the Muscogee (Creek) Nation (MCN), and the Catawba Nation have participated in the consultation and been invited to concur in this PA; and

WHEREAS, the Appalachian Trail Conservancy (ATC), the United States Army Corps of Engineers, (USACE), NPS, Stecoah Valley Cultural Arts Center, Graham County Historical Association, and Junaluska Memorial & Museum have participated in the consultation and been invited to concur in this PA; and

WHEREAS, this PA is not intended to, and does not create, any right, benefit, or trust responsibility, substantive or procedural, enforceable at law or equity, by a party against the United States, its agencies, its officers, or any person; and

WHEREAS, by signing this PA, each Signatory or Concurring Party affirms that its provisions are appropriate means to avoid, minimize, or mitigate effects on historic properties in the event the Undertaking obtains all required approvals and is implemented;

NOW, THEREFORE, FHWA, SHPO, USFS, EBCI, and NCDOT agree that the Undertaking shall be administered in accordance with the following principles and stipulations to satisfy FHWA's Section 106 responsibilities for these actions.

PRINCIPLES

The signatories to this PA shall adhere to the following principles for the Undertaking and implementation of the A-0009C CR Task Force:

1. FHWA and NCDOT commit to plan, design, and implement the Undertaking in accordance with the best practices and Context Sensitive Solutions available at the time to avoid and minimize impacts to historic properties.
2. The signatories agree to meet the review timelines outlined in each of the stipulations. Should any party fail to respond by the deadline(s) stipulated, their failure to comment will constitute acceptance.
3. It is important that the signatory and concurring parties stay informed of the progress of the Undertaking and that they are especially informed of any information and/or circumstances, planned or unanticipated, that may invoke this PA and the Section 106 of the National Historic Preservation Act. NCDOT will monitor the Undertaking and the affected environment and inform the A-0009C CR Task Force of construction progress, minor design changes, and unanticipated information, events or conditions requiring additional studies. Monitoring and communications must be timely so that A-0009C CR Task Force may review and assess if the information, circumstances or event has any implications for the resources governed by this PA and Section 106 and then determine what, if any, management actions need to be modified and if they need to consult with the signatory and concurring parties. This shared communication and collaboration is critical to the intent and ability to avoid or minimize the adverse impacts to inadvertently discovered historic properties during the lifetime of this Undertaking
4. FHWA and NCDOT will seek, discuss, and consider the views of the Signatory and Concurring Parties to this PA concerning design and construction options throughout the planning and construction of the Undertaking.
5. Given the potential for changes in the environment and historic properties, FHWA and NCDOT will identify and evaluate any properties that are or may be eligible for listing in the NRHP.
6. FHWA and NCDOT will take into account direct, indirect, and cumulative effects on historic properties pursuant to 36 CFR 800.5(a)(l) and shall consider measures to improve existing conditions affecting historic properties.
7. Reasonableness of cost shall not be the only determining factor when selecting measures to avoid, minimize, or mitigate adverse effects to historic properties.
8. FHWA and NCDOT will to the greatest extent possible, avoid and minimize impacts associated with the Undertaking on sites associated with the forced removal of Cherokees from this area.
9. FHWA has an Emergency Relief Program that establishes protocols for coordination with NCDOT and other Federal and state agencies to deal with declared emergencies. FHWA and NCDOT will comply with 23 CFR 668 and 36 CFR 800.12, and other applicable environmental laws, when a disaster and/or emergency is declared by the appropriate authority.
10. NCDOT, with oversight by FHWA, will provide overall project management to ensure that the provisions of this PA are met throughout the life of the Undertaking. The responsibility of the

NCDOT management will be NCDOT's Division 14 Division Engineer (or his/her designee) and they are responsible with coordinating and reporting to the A-0009C CR Task Force.

11. The A-0009C CR Task Force's overall purpose is to assist in the management and the coordination and implementation of this PA and ensure the identification, evaluation, and effects assessment for any historic properties associated with the Undertaking. The task force will also ensure consistent, pro-active, and transparent communications between the signatories and concurring parties to this PA, as well as other consulting parties, as needed.

    a. Membership: The A-0009C CR Task Force is comprised of representatives or their designee from the PA signatory organizations that have the responsibility and authority to make decisions and take or assign actions on behalf of their organization. Each representative or their designee shall involve and work with others within their respective organization who have subject matter expertise on an as-needed basis. The representatives are as follows:
        - FHWA, Preconstruction and Environment Director (Co-Chair)
        - NCSHPO, Environmental Review Coordinator
        - USFS, National Forests in North Carolina Archeologist and Tribal Liaison
        - NPS, National Trails Office, Cultural Resources Specialist
        - EBCI, Tribal Historic Preservation Officer (Co-Chair)
        - NCDOT, Division Engineer (Co-Chair)

    b. Roles and Responsibilities: The A-0009C CR Task Force will operate in a manner that is transparent, encourages curiosity, and makes timely, informed decisions, with a focus on identifying, understanding, and addressing interests of stakeholders and fostering a collaborative approach. Members will obtain and share all relevant information and conduct reviews and assessments, so decisions are timely and transparent. The A-0009C CR Task Force's scope of decision-making responsibility includes reviewing proposed changes to the design plans, construction details, and mitigation strategies for possible effects on historic properties ; assessing or re-assessing effects; developing proper and compliant resolutions should effects be found to be adverse; and facilitating those resolutions.

    The A-0009C CR Task Force will communicate consistently, pro-actively, and transparently using a variety of effective methods such as:
        - Meetings – regular and special meetings (in person, via web meeting, or teleconference) with team members and decision-makers to share information, update the status of activities, resolve problems and plan for future actions or measures.
        - One-On-One – communication between individuals (in person, telephone, or email) regarding the details of the work,
        - Document Sharing and Control – secure electronic document storage that allows team members to upload, access and store project data, progress meeting minutes, draft text, and drawings
        - Monitoring and Reporting -- provide an annual status update to the signatories and concurring parties on the implementation of the Undertaking and progress made on fulfilling the Stipulations to this PA

    Decisions of the A-0009C CR Task Force will be made through written concurrence (meeting minutes, effects consultation letters, emails, and reports) and distributed to other stakeholders within five (5) business days of the decision. The NCDOT Co-Chair will be

responsible for the development and distribution of draft minutes and provide others the opportunity to review and comment prior to them being finalized.

A-0009C CR Task Force members will hold themselves and each other accountable to the responsibilities and stipulations of this PA and ensure the implementation of the agreed upon measures to avoid, minimize, or mitigate adverse effects to historic properties.

Within 90 days of executing this agreement, the A-0009C CR Task Force will develop operating procedures to specify how they will effectively carry out their roles and responsibilities. The Task Force will provide these procedures to the signatories and concurring parties to this agreement.

STIPULATIONS

FHWA and NCDOT will ensure that the following measures are carried out:

I. Additional Consultation

Although Undertaking-related decisions will be made in consultation with the Interagency NEPA/Section 404 Merger Team, consultation regarding historic properties will be made within the framework of this PA and in accord with Section 106 of the National Historic Preservation Act. FHWA and NCDOT will ensure that appropriate communication and coordination will occur as needed to address situations that may occur with resources that involve other resource agencies.

The following situations require further consultation pursuant to this PA (and may require amendment to this PA) and shall require notification to the A-0009C CR Task Force:

- change in the eligibility or integrity of historic properties; or
- determination of new historic properties; or
- proposed changes to the design plans, construction details, and mitigation strategies in the vicinity of historic properties.

II. Additional Studies and Evaluations Outside the Original APE's

If after the signature of this PA there are unanticipated requirements NCDOT shall provide the A-0009C CR Task Force with information concerning the proposed changes. These could include, but are not limited to, additional detour limits, expanded construction or slope stake limits, staging areas, additional permanent easements, or any other work outside the APE's for either historic architecture or archaeology. In the notification NCDOT will provide specific locational data, an assessment of how such changes may affect historic properties, and any measures proposed to conduct further investigations or modify specific improvements contained in this PA. If after thirty (30) days of confirmed receipt of proposed changes and NCDOT's recommendations, no comments are received from the A-0009C CR Task Force, the NCDOT may assume the non-responding party has no objections.

III. Coordinated Design and Aesthetics of Land Bridge, Walls, and Fences

Along the length of the Undertaking, the appearance of land bridge, other structures, retaining walls, or fences (including wildlife fencing) adjacent to historic properties will be coordinated with the A-0009C CR Task Force and distributed to signatories, concurring parties, and relevant stakeholders (historic

property owners, municipal governmental staff, contractors). NCDOT will provide the A-0009C CR Task Force with renderings that illustrate aesthetic choices for the materials, textures, colors, and species of proposed plantings applied to the land bridge, other structures, retaining walls, or fences and request comments and preferences. If after thirty (30) days of confirmed receipt of proposed changes and NCDOT's recommendations, no comments are received from the A-0009C CR Task Force, the NCDOT may assume the non-responding party has no objections.

IV. Tree Preservation and Landscaping

a. To increase the awareness of tree preservation along the length of the Undertaking, NCDOT will instruct the construction contractor to install temporary plastic fencing and tree preservation signage along the boundaries of historic properties with trees greater than 6" in diameter. If NCDOT plans to remove trees within the boundary of a historic property, NCDOT will survey the trees and minimize the construction footprint to decrease impacts to the greatest extent possible. However, if trees require removal or will be damaged by root disturbances, then said trees will be replaced with balled and/or burlaped trees guaranteed to survive three (3) years.
b. At the signing of this PA, NCDOT only shows tree removal and replacement of trees at the John and Mattie Colvard House (GH0238) and tree protection measures and landscape restoration at the Cheoah Historic District (GH0347) as denoted in the Historic Architecture Effects Consultation form in Appendix A. Images illustrating the projected impacts in these areas are included with the Historic Architecture Effects Consultation form.

V. Preservation of Existing Stone Walls

At the John and Ruby Cody House (GH0261) the existing stone walls that line the driveway will be marked with temporary protective fencing during construction to prevent accidental harm. This commitment is noted on the Historic Architecture Effects Consultation form in Appendix A and images illustrating the projected impacts in this area is included with the Historic Architecture Effects Consultation form.

VI. Appalachian National Scenic Trail

The current at-grade crossing for hikers at NC 143 will be replaced by a land bridge which will separate hikers and wildlife from vehicular traffic. This will require relocating sections of the ANST to align with the land bridge and right-of-way acquisition. NCDOT, USFS, and ATC shall enter into a separate agreement for the design, construction, and maintenance of the relocation of the ANST.

a. **Relocation of ANST Crossing at NC 143:** The ANST will require relocation on both sides of the new structure to orient with the crossing. A preliminary route has been identified, subject to final review and approval by USFS and ATC. An image showing the relocated trail study corridor is included as Appendix C. NCDOT will be responsible for construction of the land bridge and relocation of the ANST including construction of a new connecting spur trail from the existing parking area. NCDOT will fund construction of the trail relocation and engage a trail building organization acceptable to the NCDOT, USFS, and ATC.
NCDOT will design and erect a sign and/or an informational kiosk at the crossing in consultation with the USFS, NPS, and ATC upon opening of the land bridge to pedestrian traffic. The design

and aesthetics of the land bridge will be reviewed by the Signatory and Concurring Parties prior to construction. The land bridge will be maintained by NCDOT Division 14 and the relocated trail will be maintained by USFS, NPS, and ATC.

b. **Land Acquisition for the Land Bridge and ANST Relocation:** The land bridge and the ANST relocation route crosses/encroaches upon a parcel currently in private ownership. NCDOT will follow 49 CFR Code of Federal Regulations as well as NC General Statutes. The current plan indicates the private parcel will be acquired by NCDOT. NCDOT will convey any portion thereof not needed for the land bridge to the USFS. Should this plan change, NCDOT will consult with USFS, NPS, and ATC. NCDOT will survey the proposed ANST route across this parcel for impacts to historic properties.
c. **Hikers During Construction:** The ANST is normally open 24 hours a day, 365 days a year and will require a Work Zone Pedestrian Plan prior to initiation of construction in the vicinity of the ANST. During construction, the contractor shall maintain a safe pedestrian route and environment for ANST hikers, including wayfaring signs warning of construction ahead, a clearly marked route for hikers through or around the construction site, and when appropriate, flaggers to aid hikers in the construction zone. At the discretion of the contractor, and under the supervision of the NCDOT, flaggers will assure hikers do not pass through the construction site when there is potential danger. The construction contractor shall endeavor to minimize stoppage of hikers and regulate construction for hikers while ensuring safe passage.
d. **Trailhead Parking and ANST Access:** The current trailhead parking on the east side of NC 143 will be retained after construction for parking and access to the eastern side of the land bridge. NCDOT shall coordinate with the USFS, NPS, and ATC on any measures needed to protect these features and associated amenities during construction. The NCDOT will repair and restore any damage to these areas from construction activities. After construction NCDOT will maintain the pavement, striping, and curbs, while the USFS would maintain the grass, vegetation at the trailhead, signs, and other associated amenities.
e. **Appalachian Trail Signs:** NCDOT will provide funding for the manufacture of new trail signs for the ANST. These signs will be manufactured, installed, and maintained by the ATC in consultation with the NPS and USFS on the new land bridge and relocated sections of trail.

VII. Tribal Coordination

The requirements to consult with federally recognized Tribes in the Section 106 review process are derived from the specific language of Section 101(d)(6)(B) of the National Historic Preservation Act. They are also based on the unique legal relationship between federally recognized Indian tribes and the federal government embodied in the U.S. Constitution, treaties, court decisions, federal statutes, and executive orders.

FHWA shall ensure that consultation provides Tribes a reasonable opportunity to identify concerns about historic properties; continue to advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance to them; articulate their views on the Undertaking's effects on such properties; and participate in the resolution of adverse effects. Accordingly, the regulations require that FHWA make a reasonable and good-faith effort to identify Tribes that may attach religious and cultural significance to historic properties that may be affected by the undertaking. FHWA shall ensure that consultation under the Section 106 review process is respectful of tribal sovereignty in conducting consultations and recognizes the government-to-government relationship that exists between the federal government and federally recognized Indian Tribes.

VIII. Archaeological Resources

The A-0009C undertaking has the potential to affect multiple archaeological sites identified within the archaeological APE defined here as the maximum limits of ground disturbing activities associated with the project including both temporary and permanent easements. As outlined in the Principles Section of this PA, the signatories agree to plan, design, and implement the Undertaking to avoid and minimize impacts to historic properties while acknowledging that adverse effects may result as the project's design and APE are refined. Refinements to the APE that occur through the design process will be the determining factor in the need for further archaeological NRHP evaluations and effects findings for the archaeological sites detailed within Appendix B of this PA. Archaeological site NRHP evaluations will be coupled with a recommendation as to whether or not the site(s) warrants preservation in place to assist FHWA in determining the applicability of 23 CFR 774 Section 4(f) requirements. Sites that through consultation as described below and in keeping with Stipulation VII's Tribal Coordination requirements, are ultimately determined to require data recovery investigations will be subjected to those investigations prior to any construction activities occurring within the site limits. Data recovery investigations will be completed within the portions of the site(s) contained within the undertakings refined APE after Right of Way acquisition. Sites that are determined eligible for the NRHP and warrant preservation in place will require FHWA and NCDOT to continue to seek alternatives or modifications to the undertaking that could avoid or minimize effects.

a. Sites 31GH34, 31GH78, 31GH92, 31GH94, 31GH599, 31GH664, 31GH673, 31GH691, and 31GH716 have been determined eligible for the NRHP under Criterion D and do not warrant preservation in place. NCDOT and FHWA will continue to seek alternatives or modifications to the undertaking that could avoid or minimize effects to these sites. If through ongoing consultation, any of these sites are determined to be adversely affected by the undertaking and data recovery is determined to be the best course of action to mitigate the adverse effects, NCDOT will develop Data Recovery Plans (DRPs) for these nine sites through consultation with the SHPO and the THPOs (or their designee) of the EBCI, CN, UKB, MCN, Catawba Nation, and the A-0009C CR Task Force.

b. Refinements to the design plans and APE may require that other sites be subjected to additional investigation to determine their respective NRHP eligibility. This currently includes but is not limited to sites 31GH35, 31GH45, 31GH625, 31GH703, 31GH723, 31GH729 and/or 31GH731. If Sites 31GH35, 31GH45, 31GH625, 31GH703, 31GH723, 31GH729 and/or 31GH731, and any other sites are determined eligible for the NRHP under Criterion D through further testing within the Undertaking's APE and they are determined through continued consultation to not warrant preservation in place, NCDOT and FHWA will continue to seek alternatives or modifications to the undertaking that could avoid, or minimize effects to these sites. If through ongoing consultation, any of these sites are determined to be adversely affected by the undertaking and data recovery is determined to be the best course of action to mitigate the adverse effects, NCDOT, in consultation with the SHPO and the THPOs (or their designee) of the EBCI, CN, UKB, MCN, the Catawba Nation and the A-0009C CR Task Force will develop, separate DRPs for those sites as determined appropriate.

c. Site 31GH46 has been determined eligible for the NRHP under Criterion D and under Criterion A. NCDOT and FHWA will continue to seek alternatives or modifications to the undertaking that could avoid or minimize effects to this site.

d. NCDOT will ensure that any required DRPs are implemented after the highway Right-Of-Way is acquired and prior to construction activities within the site's location.

e. Upon completion of the Data Recovery field efforts, NCDOT will prepare and forward a Management Summary to the SHPO and the THPOs (or their designee) of the EBCI, CN, UKB,

MCN, Catawba Nation and the A-0009C CR Task Force detailing the results of the Data Recovery efforts for each eligible site as completed.

f. Upon receipt of the Management Summary, the SHPO and the THPOs (or their designee) of the EBCI, CN, UKB, MCN, Catawba Nation and the A-0009C CR Task Force will respond within thirty (30) days to the recommendations contained within the Management Summary.
g. Upon acceptance of the recommendations contained in the Management Summary, the SHPO and the THPOs (or their designee) of the EBCI, CN, UKB, MCN, and Catawba Nation and the A-0009C CR Task Force will issue NCDOT documentation that the Data Recovery field investigations have been completed.
h. The analysis and report preparation, detailing each eligible site's investigations, will be completed by NCDOT, or their consultant(s), within eighteen (18) months after completion of the fieldwork.
i. Some parcels within the APE (totaling approximately 59.02 acres) could not be accessed for survey due to a lack of landowner permission or their uncertain legal status. Some locations within the archaeological APE could not be adequately tested. Survey of those areas (including use of heavy equipment as appropriate to remove pavement or fill) is recommended if they are determined to be impacted by the Undertaking.
j. Sites 31GH696 and 31GH705 have been determined eligible under Criterion A and cannot be subjected to any ground disturbing activities.

IX. Trail of Tears National Historic Trail

The Trail of Tears routes have historical, cultural, and religious significance for many Tribal nations and the Unicoi Turnpike follows a traditional, prehistoric transportation route through the southern Appalachians. The A-0009C CR Task Force will coordinate with the USFS Unicoi Turnpike and Trail of Tears Heritage Corridor Coordinator (Coordinator) to ensure that the Undertaking does not significantly impact the sites and routes in the heritage corridor. The corridor will include the Trail of Tears National Historic Trail along with resources, sites and routes associated with the removal of the Cherokee obtained from the Riggs 1998 study. Any concerns received from the Coordinator will be reviewed by the A-0009C CR Task Force and if additional studies or evaluations are required, they will follow the guidelines set forth in Stipulation I.

X. Reporting

On or before each anniversary of the fully signed PA, the A-0009C CR Task Force will provide an annual status update to the Signatories and Concurring Parties on the implementation of the Undertaking and progress made on fulfilling the Stipulations to this PA. This status update will occur, whether or not any activity occurred on the Undertaking. If important milestones have occurred on the Undertaking and/or implementation of the PA, NCDOT shall provide the status updates at shorter intervals based on deliverable actions. The reporting requirement will cease when the PA terminates as per Stipulation XIV.

XI. Dispute Resolution

Should any of the Signatory or Consulting Party(ies) object within thirty (30) days after receipt to any plans or documentation provided for review pursuant to this PA, the FHWA shall consult with the objecting party(ies) to resolve the objection. If the FHWA or objecting party(ies) determines that the objection cannot be resolved, the FHWA will forward all documentation relevant to the dispute to the ACHP. Within thirty (30) days after receipt of all pertinent documentation, the ACHP will either:

- Provide the FHWA with recommendations which the FHWA will take into account in reaching a final decision regarding the dispute, or
- Notify the FHWA that it will comment pursuant to 36 CFR Section 800.7(c) and proceed to comment.
- Any ACHP comment provided in response to such a request will be taken into account by the FHWA, in accordance with 36 CFR Section 800.7 (c) (4) with reference to the subject of the dispute.

Any recommendation or comment provided by the ACHP will be understood to pertain only to the subject of the dispute. FHWA's responsibility to carry out all the actions under this PA that are not the subject of the dispute will remain unchanged.

XII. Post-Review Discoveries

In accordance with 36 CFR 800.13(a), if NCDOT identifies additional cultural resource(s) during construction, all work will be halted within the limits of the resource(s) and the FHWA and the SHPO will be contacted. The NCDOT and FHWA will inform the A-0009C Task Force and will initiate the appropriate agency and/or Tribal coordination required for a determination of eligibility or recovery effort. If after consultation, additional mitigation is determined necessary, the NCDOT, in consultation with the Task Force and concurring parties, will develop and implement appropriate protection/mitigation measures for the resource(s). Inadvertent or accidental discovery of human remains will be handled in accordance with North Carolina General Statutes 65 and 70 and follow the EBCI protocols for human remains provided in Appendix D.

XIII. Amendments

Should any of the Signatory parties believe that any of the terms of this PA cannot be carried out or that an amendment to the terms must be made, that party(ies) shall immediately consult with the other party(ies) to develop an amendment. The amendment will be effective on the date a copy is signed by all of the original signatories. If the signatories cannot agree to appropriate terms to amend the PA, any signatory may terminate the agreement in accordance with Stipulation XIV, below. Environmental conditions will be monitored for any changes prior to permitting of subsequent phases and the A-0009C CR Task Force may provide for any amendments that may result from environmental changes and need for permits at those times.

XIV. Termination

Any Signatory may terminate this PA by providing notice to the other party(ies), provided that the party(ies) will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination. Termination of this PA will require compliance with 36 CFR 800. This PA may be terminated by the execution of a subsequent PA that explicitly terminates or supersedes its terms.

In the event that FHWA and NCDOT are unable to proceed with the Undertaking as currently proposed, FHWA shall reinitiate Section 106 consultation in accordance with 36 CFR Part 800 regarding other alternatives for the Undertaking.

XV. Duration

Unless terminated pursuant to Stipulation XIV above, this PA will be in effect until FHWA, in consultation with the other Signatory and Concurring Party(ies), determines that all of its terms have

satisfactorily been fulfilled, or if NCDOT is unable or decides not to construct the Undertaking, or after fifteen (15) years, whichever is soonest.

EXECUTION

Execution of this PA by FHWA, SHPO, USFS, EBCI, and NCDOT, its subsequent filing with the ACHP, and implementation of its terms evidence that the FHWA has afforded the ACHP an opportunity to comment on the Undertaking, and that FHWA has taken into account the effect of the Undertaking on the historic properties, archaeological sites, and traditional cultural properties.

AGREE:

U.S. DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION, NORTH CAROLINA DIVISION

By: CLARENCE W COLEMAN Digitally signed by CLARENCE W COLEMAN Date: 2021.03.03 11:12:51 -05'00' Date 3/3/2021

for

John Sullivan, PE, Division Administrator

NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICE

By: DocuSigned by: Ramona M. Bartos EB6C48E19A51446... Date 2/26/2021

Ramona Bartos, Deputy State Historic Preservation Officer

U.S. FOREST SERVICE, SOUTHERN REGION

By: DocuSigned by: James Melonas D79D921183C0482... Date 3/2/2021

James Melonas, Forest Supervisor for the National Forests in North Carolina

EASTERN BAND OF CHEROKEE INDIANS

By: DocuSigned by: Chief Richard Sneed 5869762EFE41489... Date 3/2/2021

The Honorable Principal Chief Richard Sneed

STATE OF NORTH CAROLINA, DEPARTMENT OF TRANSPORTATION

By: DocuSigned by: Chris M. Werner 2AC982A09DAA465... Date 2/25/2021

Chris M. Werner, P.E., Technical Services Administrator

PROGRAMMATIC AGREEMENT
AMONG
THE FEDERAL HIGHWAY ADMINISTRATION,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
NORTH CAROLINA STATE HISTORIC PRESERVATION OFFICER,
THE UNITED STATES FOREST SERVICE,
EASTERN BAND OF CHEROKEE INDIANS,
AND
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FOR
IMPROVEMENTS TO US 129, NC 143, AND NC 28
FROM ROBBINSVILLE TO STECOAH
PART OF THE APPALACHIAN HIGHWAY DEVELOPMENT SYSTEM
GRAHAM COUNTY, NORTH CAROLINA
STIP PROJECT A-0009C
FEDERAL AID PROJECT APD-0074(178)

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CONCUR:

Cherokee Nation:

By:_____ Date _____

Chad Harsha, Secretary of Natural Resources

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CONCUR:

The United Keetoowah Band of Cherokee Indians in Oklahoma:

By:_____ Date _____

The Honorable Joe Bunch, Chief

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THE FEDERAL HIGHWAY ADMINISTRATION,
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CONCUR:

Muscogee (Creek) Nation:

By:_____ Date _____

The Honorable David Hill, Principal Chief

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CONCUR:

Catawba Nation:

By:_____ Date _____

The Honorable William Harris, Principal Chief

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CONCUR:

Appalachian Trail Conservancy:

By:_____ Date _____

Morgan Sommerville, Director

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CONCUR:

United States Army Corps of Engineers:

By:_____ Date _____

Benjamin A. Bennett, Colonel, U.S. Army District Commander

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CONCUR:

National Park Service:

By:_____ Date _____

Margaret Frisbie, Cultural Resources Specialist, National Trails

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CONCUR:

National Park Service:

By:_____ Date _____

Wendy K. Janssen, Superintendent, Appalachian National Scenic Trail

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CONCUR:

Stecoah Valley Cultural Arts Center:

By:_____ Date _____

Beth Fields, Executive Director

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CONCUR:

Graham County Historical Association:

By:_____ Date _____

Ed Satterfield, President

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CONCUR:

Junaluska Memorial & Museum:

By:_____ Date _____

Appendix A – Historic Architecture Effects Consultation Form (2020) and Plan Sheets

Appendix B – List of Archaeological Sites

Appendix C – Relocation of Appalachian National Scenic Trail

Appendix D – EBCI Guidelines for Human Remains

Federal Aid #: **APD-0074(178)** ***TIP#:*** **A-0009C** ***County*****: Graham**

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Appalachian Highway Development System: Corridor K Improvements from Robbinsville to Stecoah

On *June 1 and July 30, 2020* representatives of the

☒ North Carolina Department of Transportation (NCDOT)
☒ Federal Highway Administration (FHWA)
☒ North Carolina State Historic Preservation Office (HPO)
☒ Other: USACE, USFS, Elizabeth Toombs (Cherokee Nation), Stephen Yerka (EBCI), NPS, AT Conservancy

Reviewed the subject project and agreed on the effects findings listed within the table attached to this signature page.

Signed:

DocuSigned by:
Mary Pope Furr
ED3110443890489...

8/19/2020

Representative, NCDOT — Date

DocuSigned by:
Clarence W. Coleman Jr.
E932DEEC5B6240F...

8/19/2020

FHWA, for the Division Administrator, or other Federal Agency — Date

DocuSigned by:
Renee Gledhill-Earley
C26A1556A275464...

8/19/2020

Representative, HPO — Date

Property and Status	Alternative	Effect Finding	Reasons
John and Mattie Colvard House (GH0238) – DE Criterion C	Improve existing	No adverse effect *De minimis* 4(f)	3-lane section with guardrail along US 129 could require tree removal within historic boundary. NCDOT will survey trees and minimize design to decrease impacts and removed trees will be replaced with balled/burlaped trees guaranteed to survive 3 years
Frank and Lenora Colvard House (GH0235) – DE Criterion C	Improve existing	Outside revised APE	Original project APE reduced after surveys due to elimination of several proposed alignments.
Colvard Motor Company (GH0236) – DE Criteria A&C	Improve existing	Outside revised APE	Original project APE reduced after surveys due to elimination of several proposed alignments.
Colvard House (GH0240) – DE Criterion C	Improve existing	Outside revised APE	Original project APE reduced after surveys due to elimination of several proposed alignments.
J. Boyd Crisp House (GH0242) – DE Criterion C	Improve existing	Outside revised APE	Original project APE reduced after surveys due to elimination of several proposed alignments.
The Hut (GH0204) – DE Criteria A&C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed
Robbinsville First Baptist Church (GH0203) – DE Criterion C	Improve existing	No effect	Intersection improvements at US 129 and East Main Street will not require construction activities within historic property boundary and will not impact setting or viewshed
Robbinsville Downtown Historic District (GH0230) – DE Criteria A&C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed

Old Mother Church and Cemetery (GH0048) – DE Criterion A	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed
Delmas and Mary Ruth Shuler House (GH0257) – DE Criterion C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed
Patton Gwynn Denton House (GH0264) – DE Criterion C	Improve existing	No effect *De minimis* 4(f)	Permanent drainage and utility easements within historic property boundary but will not impact setting or characteristics that contribute to the significance of the site. No change in access.
Cody House (GH0263) – DE Criterion C	Improve existing	No adverse effect *De minimis* 4(f)	Permanent utility easements for utility pole service line within historic property boundary but will not impact setting or characteristics that contribute to the significance of the site.
John and Ruby Cody House (GH0261) – DE Criterion C	Improve existing	No adverse effect with environmental commitments	No construction activities within historic boundary. Stone walls that line the driveway will be marked with temporary protective fencing during construction to prevent accidental harm.
John A. Cody House (GH0043) – DE Criterion C	Improve existing	No adverse effect *De minimis* 4(f)	Retaining walls at each end of the historic boundary along NC 143 but will not require ROW or easements. Small permanent utility easement for utility transmission line at NE corner of property but will not impact setting or characteristics that contribute to the significance of the site.
Cheoah Historic District (GH0347) – DE Criterion A includes Sweetwater Baptist Church, Floyd Crisp House, Shope House, Molt Rice House Barn, Earnest Phillips Road, & Beech Creek Road	Improve existing	No adverse effect with environmental commitments *De minimis* 4(f)	Symmetrical widening of NC 143 within existing ROW but will require temporary on-site detour to replace culvert at Beech Creek (at western end of district). Staged construction methods will be investigated to minimize footprint of detour. NCDOT agrees to tie in detour to existing road prior to the driveway at the Shope House, minimize tree cutting and/or removal along detour, and restore landscape to pre-construction appearance after completion.
Randolph-Stewart House (GH0272) – DE Criterion C	Improve existing	No adverse effect *De minimis* 4(f)	Retaining wall with a height between 3'-6' along eastern boundary with NC 143 within existing ROW and visible from barn. Permanent utility easement and construction easement within western boundary of property but will not impact setting or characteristics that contribute to the significance of the site.

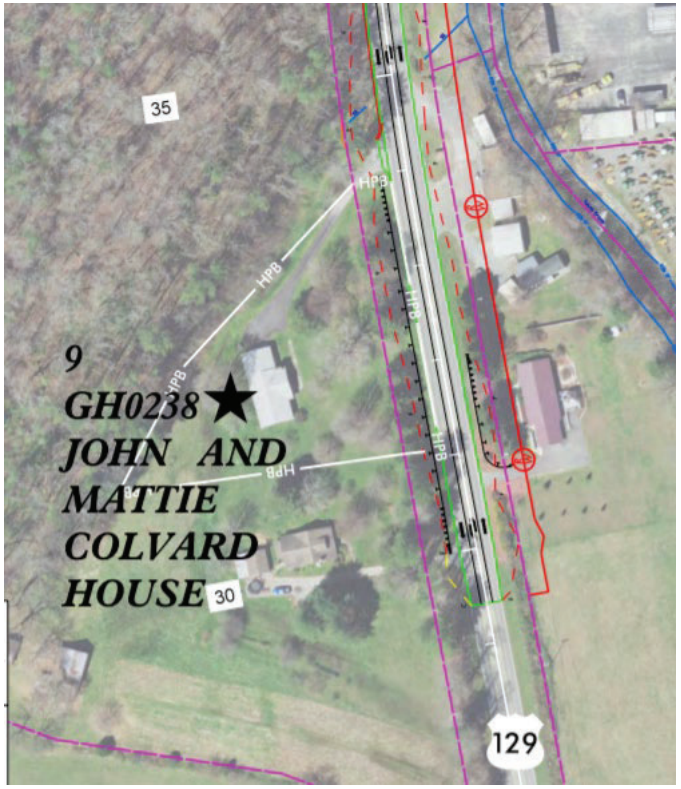
Appalachian National Scenic Trail (NC0007) – DE Criteria A,B,&C	Improve existing 4-lane cross section with pedestrian bridge	Adverse effect	Climbing lanes in both directions result in 4-lane section with guardrail and retaining walls on both sides of road at AT crossing of NC 143 [1600' retaining wall at the crest of Stecoah Gap with a maximum height of 30', average height of 12', height of 6' at trail, and a wall on east side of NC 143 150' long with average height of 3']. ROW impacts to USFS land 2.33 acres and .20 acres impacted at trail. AT will be relocated onto a new structure over NC 143. Visual impacts for visitors to the trail and setting impacts to the historic trail.
	Improve existing 2-lane cross section with pedestrian bridge	No adverse effect *De minimis* 4(f)	Climbing lanes reduced in length therefore at trail there is a 2-lane section with guardrail and retaining walls on one side of road at AT crossing of NC 143 [2000' retaining wall at the crest of Stecoah Gap with a maximum height of 30', average height of 10', height of 3' at trail, and only guardrail on east side of NC 143]. ROW impacts to USFS land 1.29 acres and .25 acres impacted at trail. Trail will be relocated onto a new structure over NC 143. Fewer visual impacts to trail visitors and less impact to historic setting. Visualizations and aesthetics to walls and bridge to be reviewed with HPO, NPS, and USFS.
	Improve existing 4-lane cross section with combined pedestrian and wildlife crossing land bridge	No adverse effect *De minimis* 4(f)	Climbing lanes in both directions result in 4-lane section with guardrail, tiered retaining walls, and fences on both sides of road at AT crossing of NC 143 [1146'of tiered retaining walls at the crest of Stecoah Gap with a maximum height of 63' and average height of 33']. ROW impacts to USFS land 3.27 acres and 0.23 acres impacted at trail. AT will be relocated onto a new structure over NC 143 that includes dense plantings and a wildlife crossing. The proposed land bridge is 220' wide and 78' long. Visualizations and aesthetics to walls and bridge to be reviewed with HPO, NPS, and USFS.
Stecoah School (GH0025) – DE Criteria A&C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed
Stecoah Baptist Church (GH0026) – DE Criteria A&C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed
Boxed House (GH0349) – DE Criterion C	Improve existing	No effect	No construction activities within historic property boundary and will not impact setting or viewshed

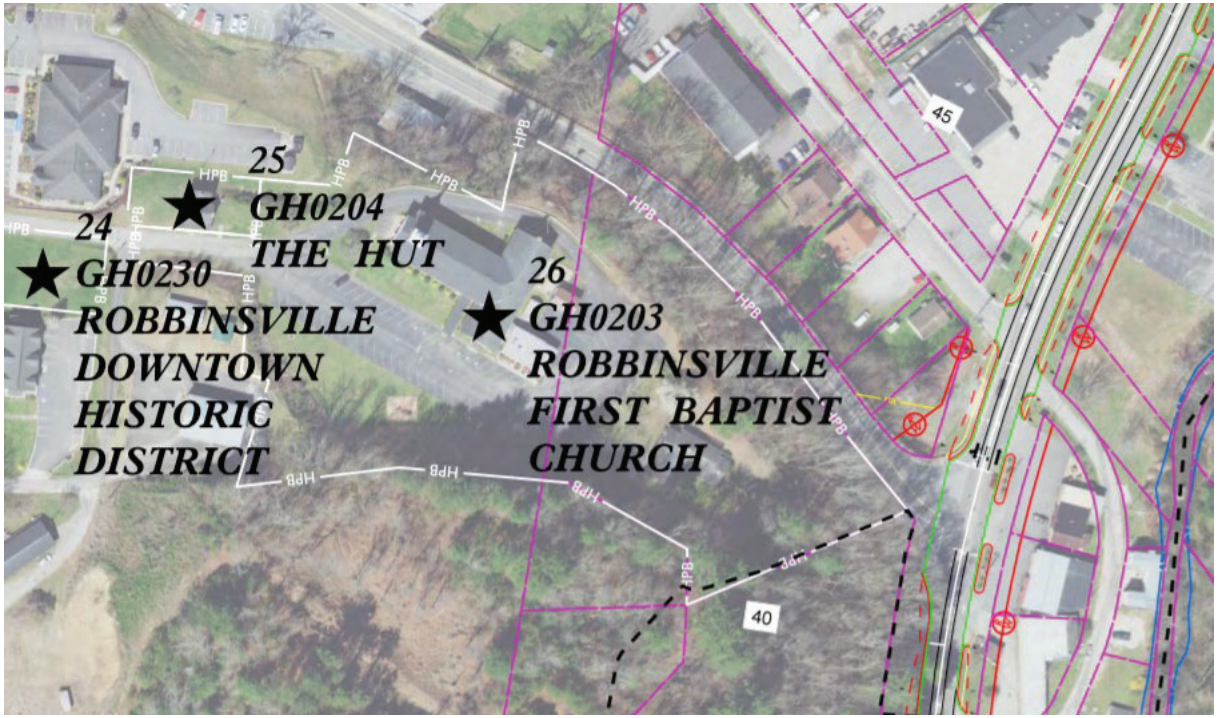
FHWA Intends to use the HPO's concurrence as a basis for a "de minimis" finding for the following properties, pursuant to Section 4(f):

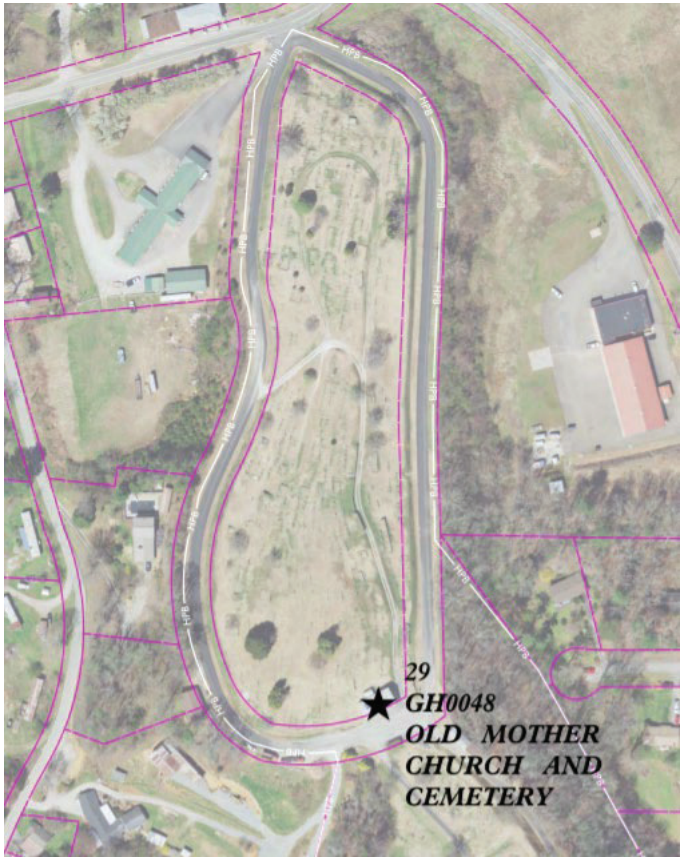
John and Mattie Colvard House
Patton Gwynn Denton House
Cody House
John A. Cody House
Cheoah Historic District
Randolph-Stewart House
Appalachian National Scenic Trail (2-lane cross section with pedestrian bridge and 4-lane section with combined pedestrian and wildlife crossing land bridge)

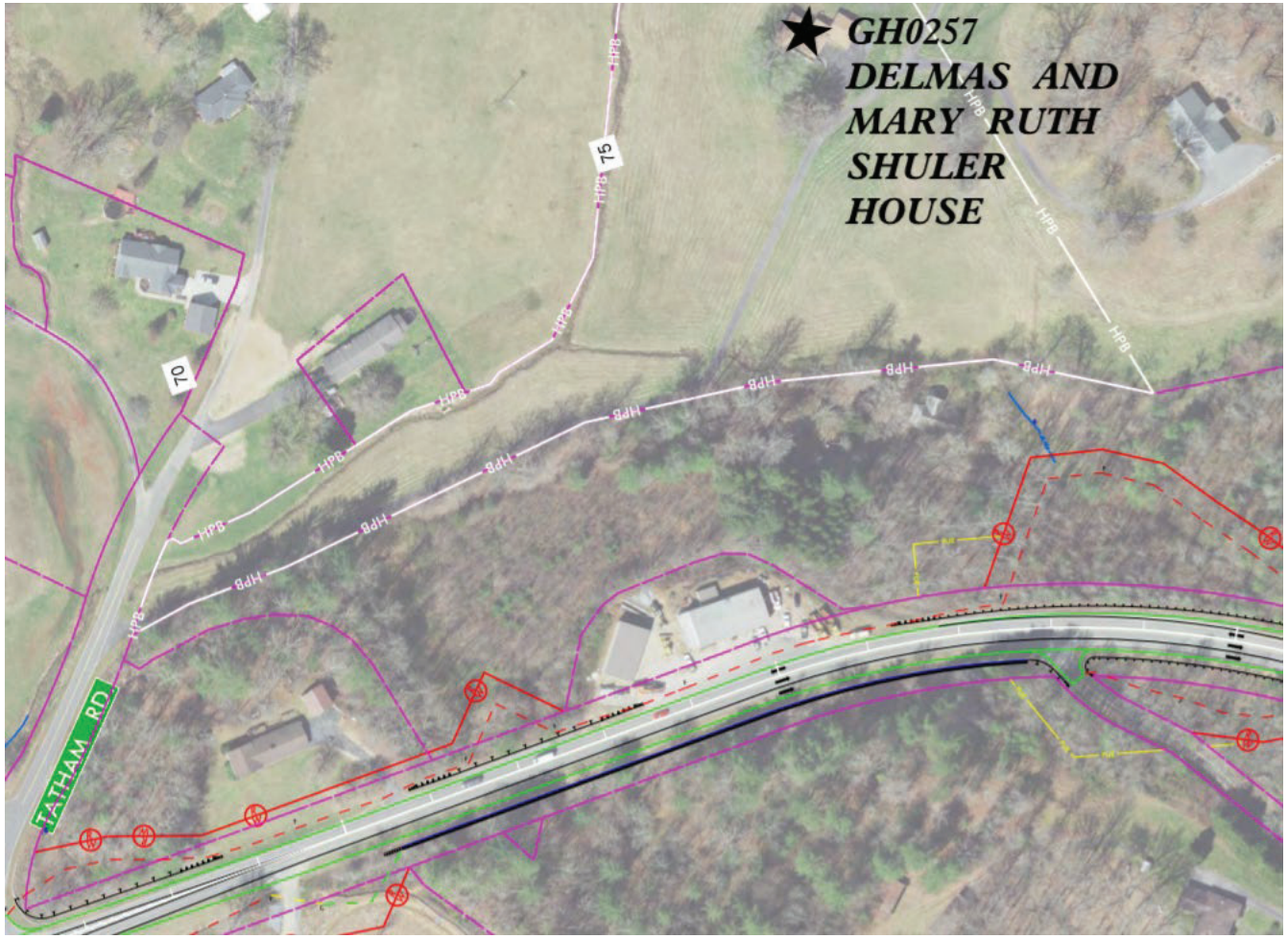
A Programmatic Agreement between the Parties will be developed to include the Environmental Commitments agreed upon to avoid adverse effects to the historic properties.

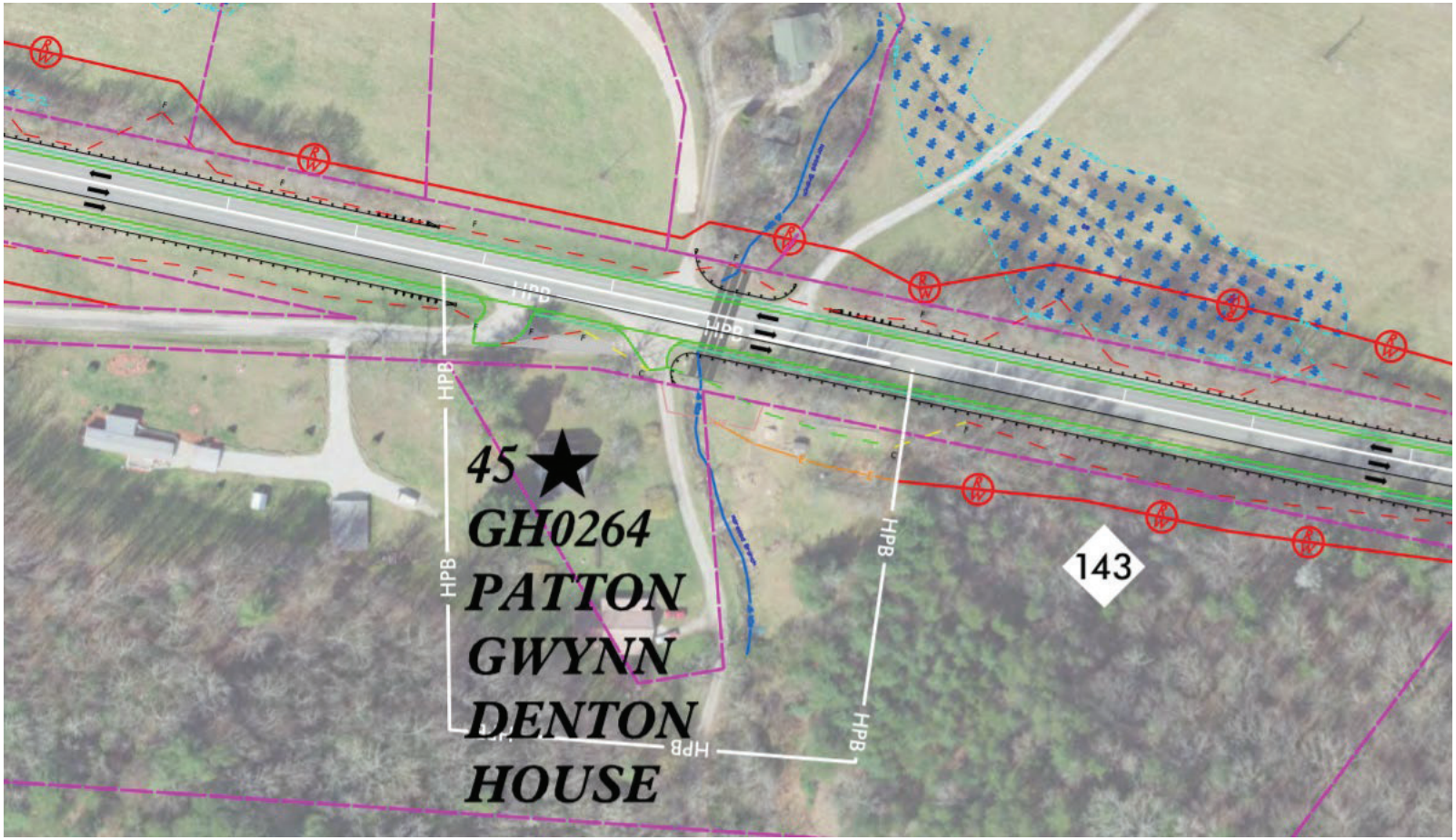
Initialed: NCDOT DS MPF _____ FHWA DS CWC _____ HPO DS RG _____

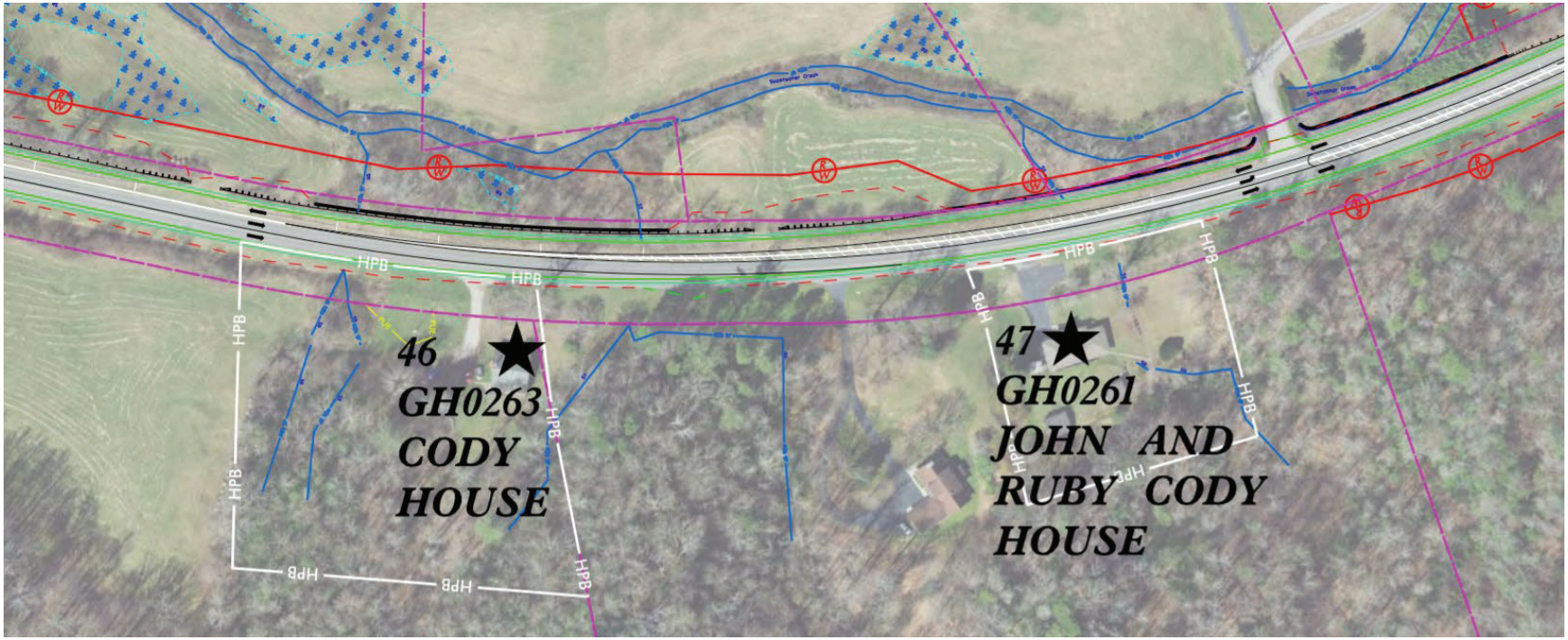


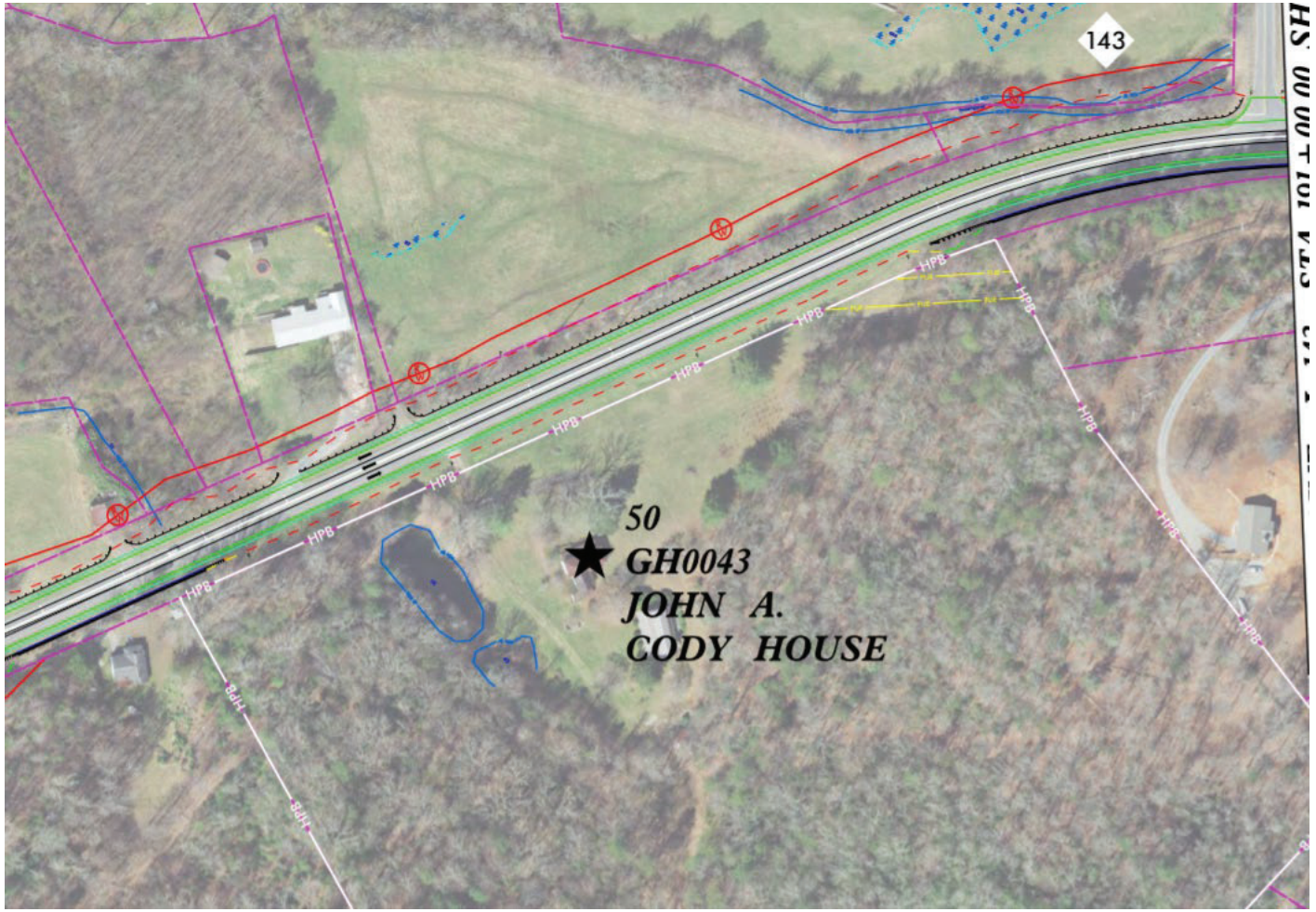


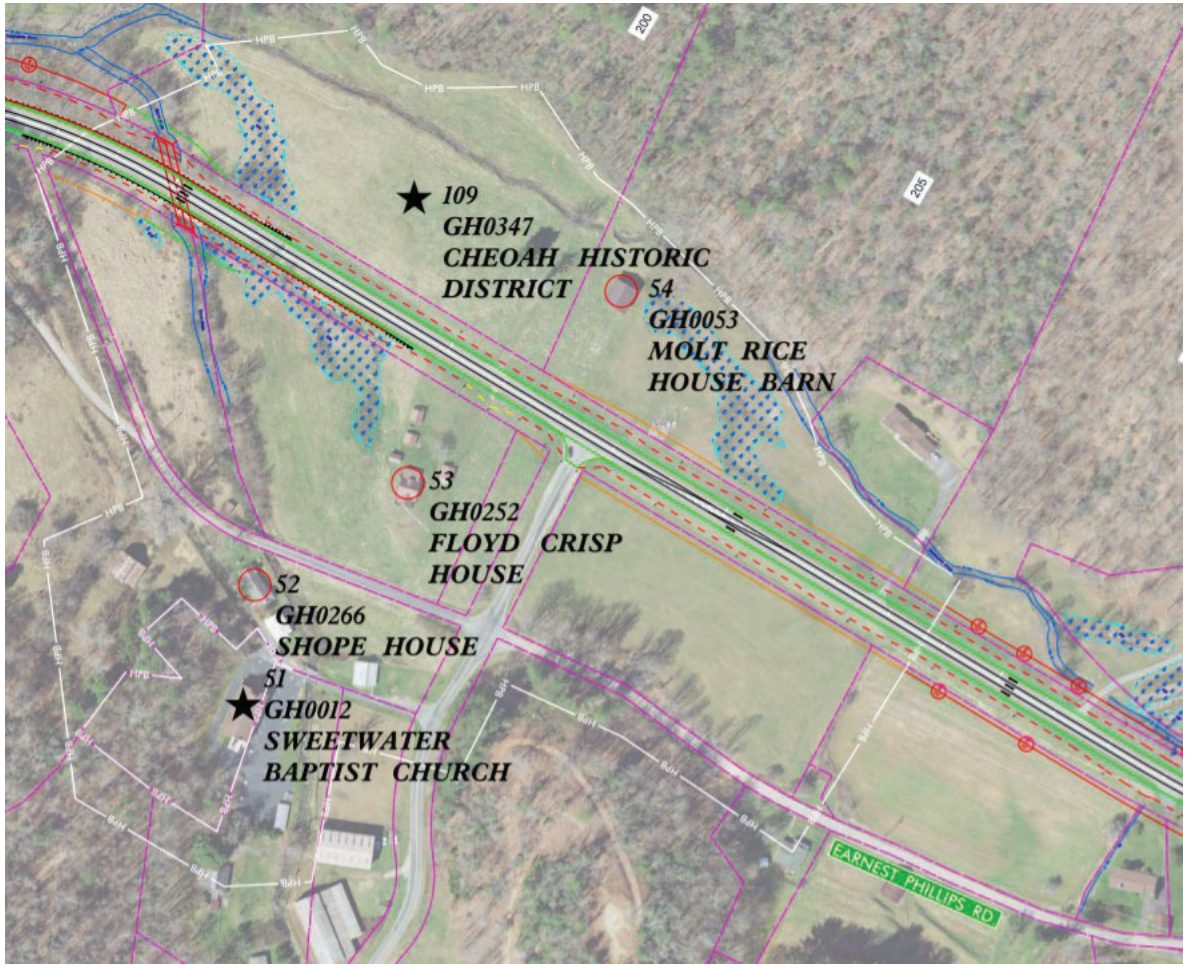


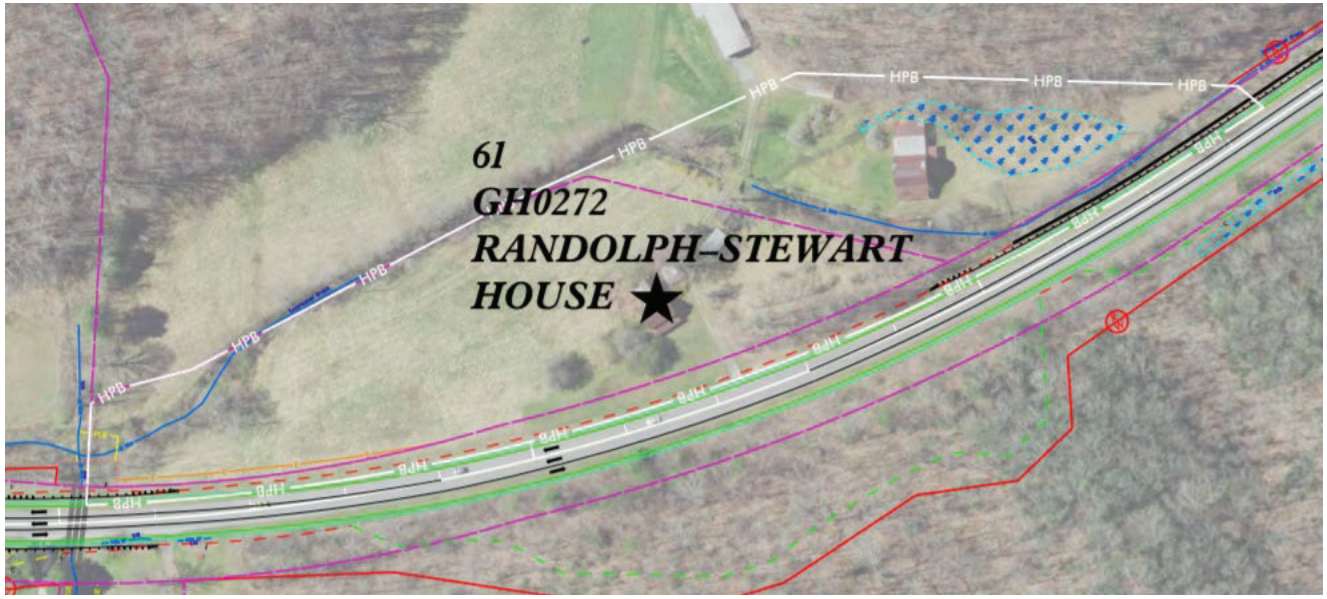


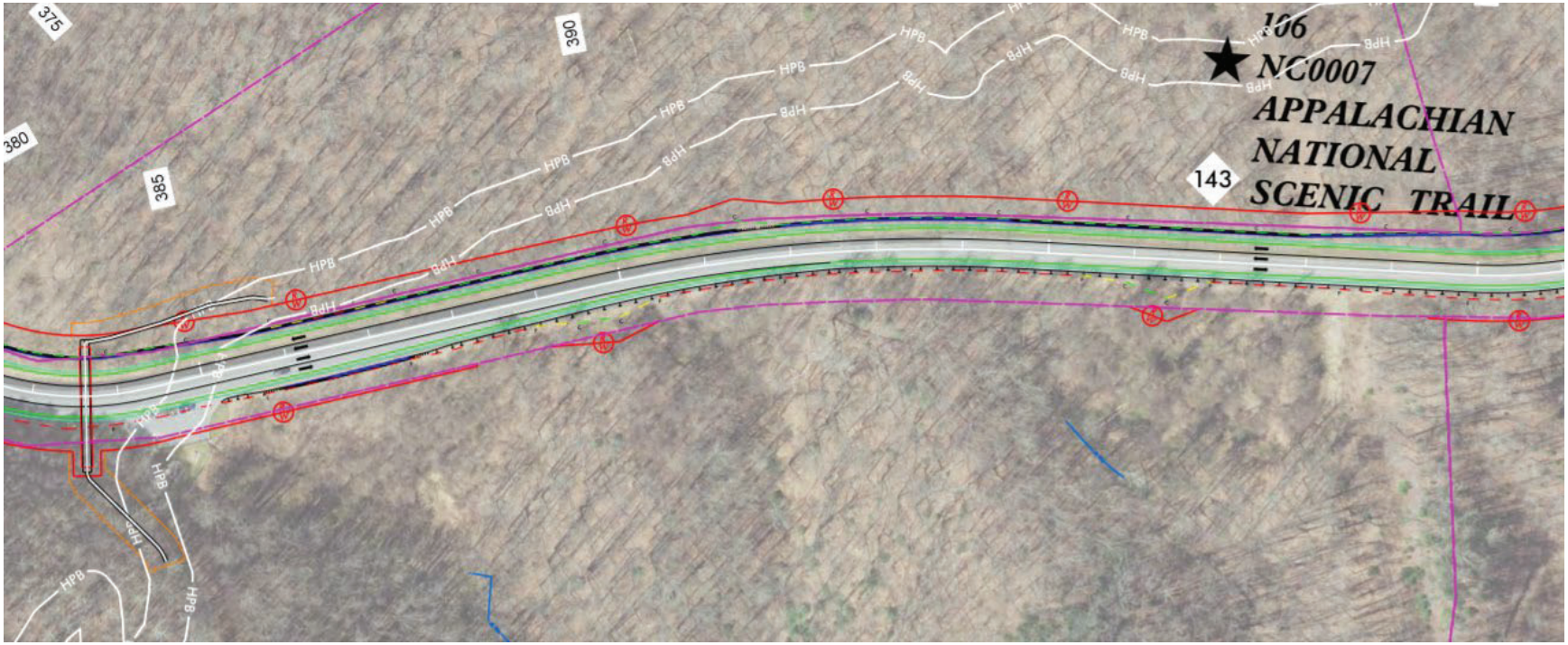


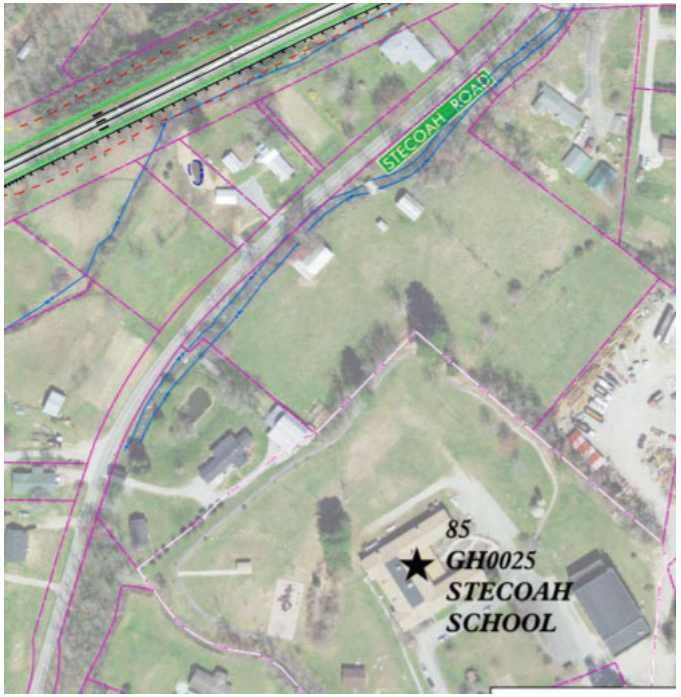


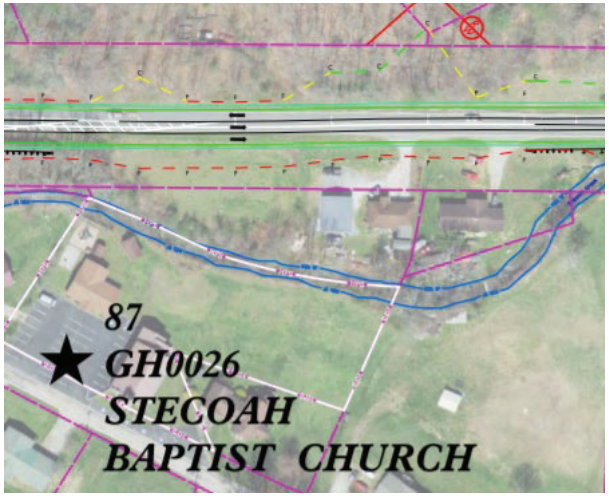


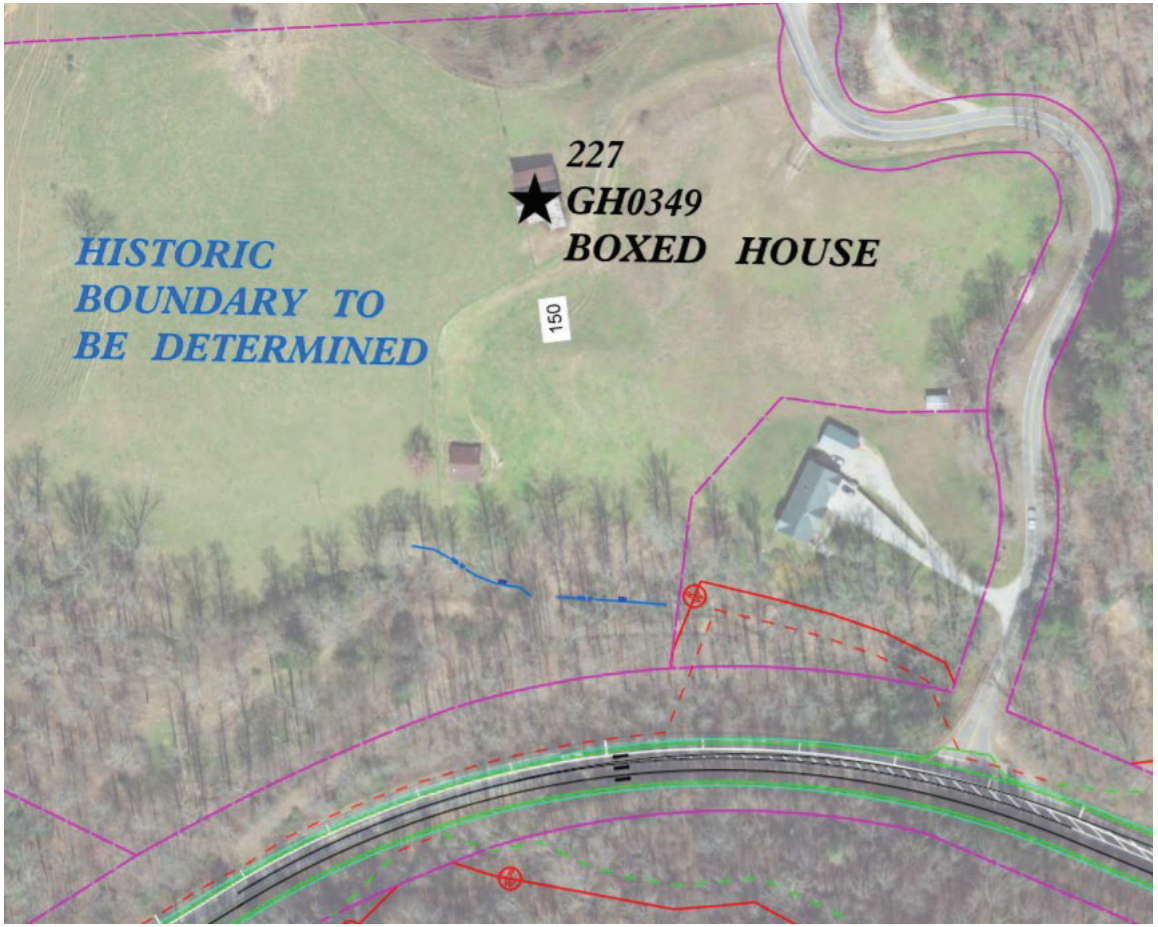


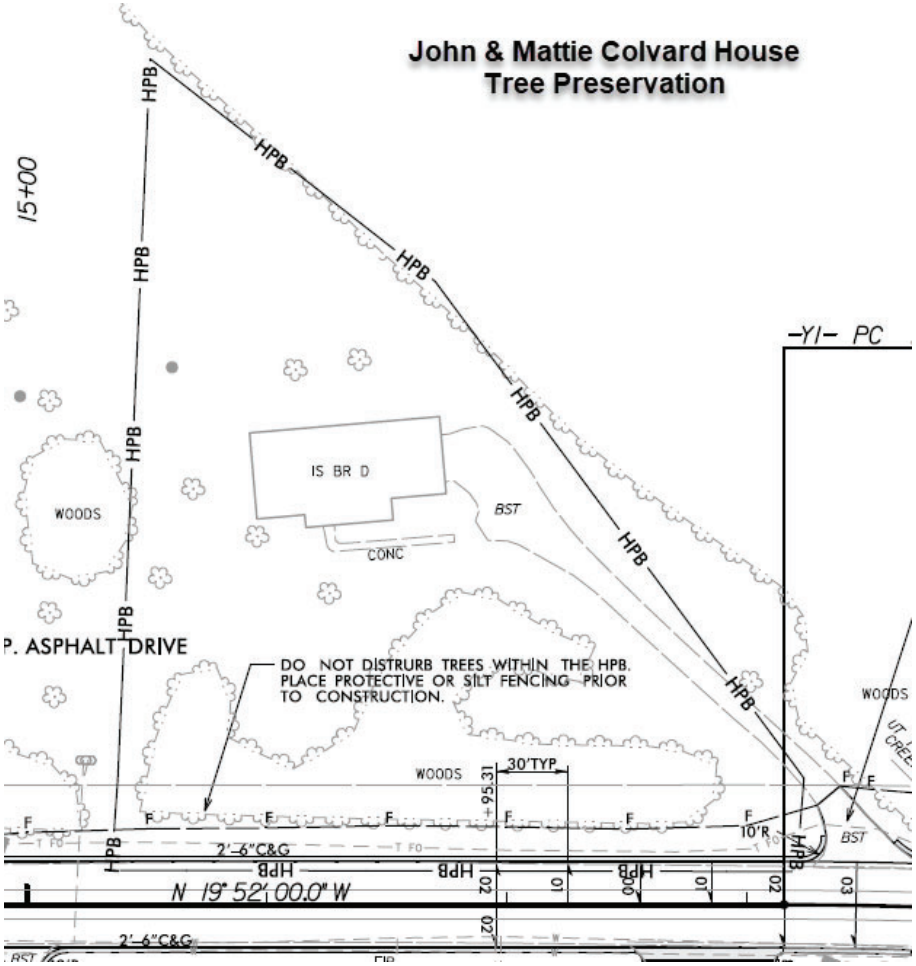


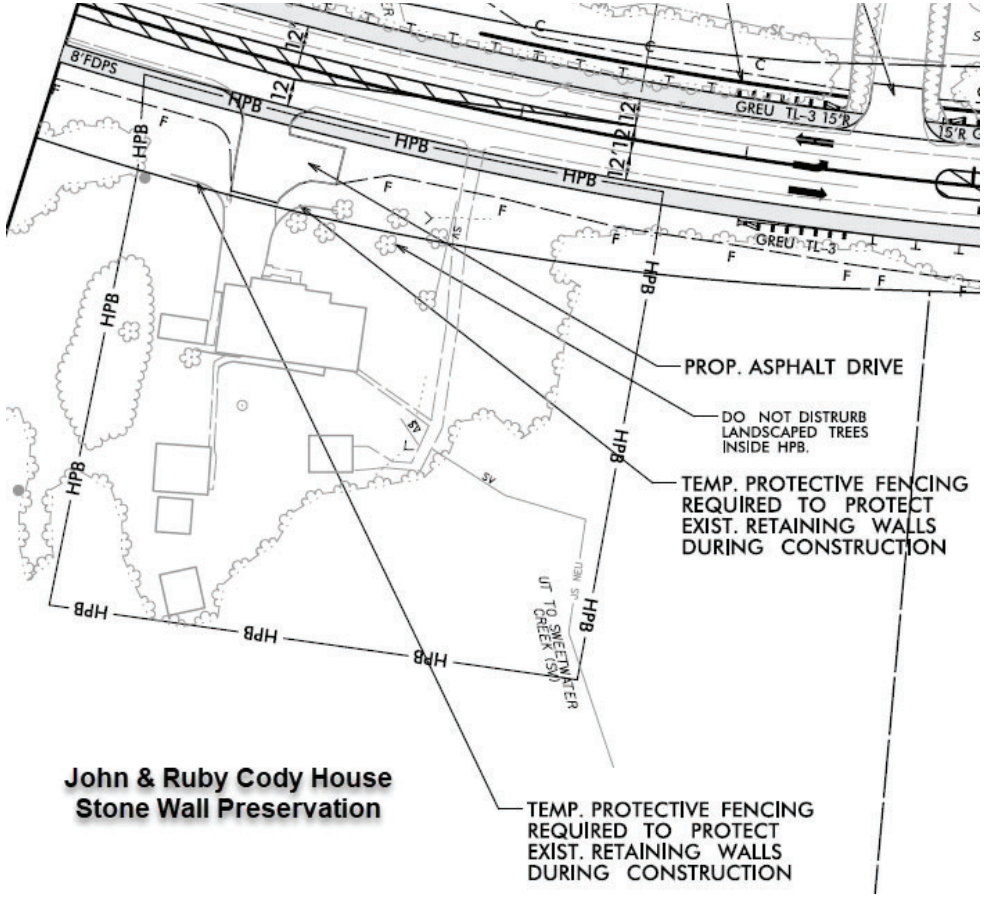












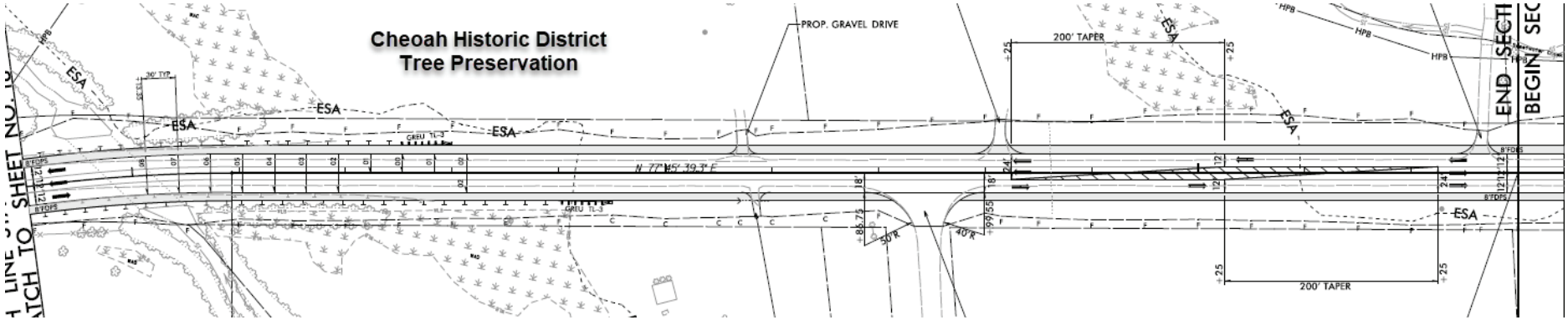


Table 1. Archaeological Sites within the 2019–2020 STIP A-0009C Alternatives (proceeding east to west).

State Site #	2019–2020 Field #	Component(s)	Alternative						Known Unplowed Subsurface Deposits?	Known Surface Cultural Features?	Known Subsurface Cultural Features?	Prior Eligibility Determination**	Eligibility Recommendation for Current Alternatives**	2019–2020 Work Only																	
														Shovel Tests			Max Artifact Density per ST		TUs	Artifacts											
																				Lithics		Ceramics		Daub		Historic		Total	
			R-1E	S-2	SW-1A	IE - S	IE - R	Bill Crisp Road						Total Excavated	Positive Precontact/ Qualla	Positive Historic	Prec/Qualla	Historic		STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs
31GH663	FS-10	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	13	2		2			3								3	0
31GH669	FS-16	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	N/A	Not Eligible	8	1	4	1	14		1						21		22	0
31GH659	FS-6	Precontact: Late Archaic; Qualla phase; Postcontact: 20th century		X	X	X			No	No	No	N/A	Not Eligible	135	32		13		2	40	16	29	2				11	69	29
31GH660	FS-7	Precontact: Late Archaic; Postcontact: 20th century		X					No	No	No	N/A	Not Eligible	56	19	13	17	1		73						31		104	0
31GH655	FS-2	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	N/A	Not Eligible	29	2	2	1	3		2						5		7	0
31GH666	FS-13	Precontact: nondiagnostic lithic; Postcontact: late 19th (?) 20th century		X					No	Yes	No	N/A	Not Eligible	11	8	5	11	10		57						22		79	0
31GH665	FS-12	Postcontact: late 19th to early 21st centuries (Randolph Cemetery)		X					No	Yes	Yes	N/A	Not Eligible	N/A	N/A	N/A	N/A	N/A										N/A	N/A
31GH654	FS-1	Precontact: nondiagnostic lithic			X	X			No	No	No	N/A	Not Eligible	90	27		13			50								50	0
31GH656	FS-3	Precontact: Middle Archaic			X	X			No	No	No	N/A	Not Eligible	15	3		4		1	9	87							9	87
31GH673	FS-21	Precontact: Early Archaic, Middle Archaic, Late Archaic/Early Woodland, nondiagnostic ceramic; Postcontact: 20th century			X	X			Yes	Yes	No	N/A	Eligible (Crit. D)	28	14	1	45	1	3	113	366		1			1	1	114	368
31GH667	FS-14	Postcontact: 20th century			X	X		X	No	Yes	No	N/A	Not Eligible	12		1		5								5		5	0
31GH670	FS-17	Precontact: nondiagnostic lithic; Postcontact: 20th century			X	X			No	No	No	N/A	Not Eligible	60	16	11	5	3		38						21		59	0
31GH682	FS-30	Precontact: nondiagnostic lithic; Postcontact: 20th century		X					No	No	No	N/A	Not Eligible	57	40	14	10	3	3	146	102					21	5	167	107
31GH681	FS-29	Precontact: nondiagnostic lithic						X	No	No	No	N/A	Not Eligible	9	4		4			13								13	0
31GH664	FS-11	Precontact: Early Archaic, Middle Archaic, Late Archaic; Postcontact: late 19th to mid-20th century			X	X			Yes	No	No	N/A	Eligible (Crit. D)	113	77	72	38	21	3	299	892					355	222	654	1114
31GH657	FS-4	Precontact: nondiagnostic lithic			X	X			No	No	No	N/A	Not Eligible	15	3		4			11								11	0
31GH671	FS-18	Precontact: nondiagnostic lithic			X	X			No	No	No	N/A	Not Eligible	8	1		1			1								1	0
31GH658	FS-5	Precontact: Late Archaic, Middle Woodland (?); Postcontact: 20th century			X	X			No	No	No	N/A	Not Eligible	67	41	13	17	11	2	188	122	1	6			39	1	228	129
31GH672	FS-20	Precontact: nondiagnostic lithic; Postcontact: 20th century			X	X			No	No	No	N/A	Not Eligible	54	26	3	14	2		95						5		100	0
31GH237	FS-19	Precontact: Middle Archaic; Postcontact: 20th century			X	X			No	No	No	Unassessed	Not Eligible	63	32	23	10	16		101						60		161	0
31GH675	FS-23	Precontact: nondiagnostic lithic			X	X			No	No	No	N/A	Not Eligible	8	3		3			6								6	0
31GH668	FS-15	Precontact: nondiagnostic lithic; Postcontact: late 19th (?) - 20th century			X	X			No	Yes	No	N/A	Not Eligible	33	3	4	1	2		3						6		9	0
31GH676	FS-24	Precontact: nondiagnostic lithic			X	X			No	No	No	N/A	Not Eligible	8	3		1			3								3	0
31GH674	FS-22	Precontact: nondiagnostic lithic; Postcontact: 20th century			X	X			No	Yes	No	N/A	Not Eligible	15	1	4	1	3		1						7		8	0
31GH680	FS-28	Precontact: nondiagnostic lithic; Postcontact: 20th century			X	X			No	No	No	N/A	Not Eligible	4	1	1	1	3		1						4		5	0
31GH683	FS-31	Precontact: nondiagnostic lithic; Postcontact: 20th century			X				No	Yes	No	N/A	Not Eligible	12	1		1			1								1	0
31GH685	FS-33	Postcontact: mid-20th century (?)			X	X			No	Yes	No	N/A	Not Eligible	13		3		7								12		12	0
31GH686	FS-34	Postcontact: mid-20th century				X			No	Yes	No	N/A	Not Eligible	5		1		1								1		1	0
31GH696	FS-55	Qualla phase; Postcontact: Early 19th century ?				X			No	Yes	No	N/A	Eligible (Crit. A)	N/A	N/A	N/A	N/A	N/A										N/A	N/A
31GH718	FS-65	Precontact: Woodland; Postcontact: 20th century				X			No	No	No	N/A	Not Eligible	15	8	1	21	1	1	37	39	6	7			1		44	46
31GH731	FS-79	Postcontact; 19th-20th century?		X	X				No	Yes	No	N/A	Unassessed	N/A	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
31GH703	FS-47	Precontact: nondiagnostic lithic; Postcontact: mid-19th tomid-20th century		X	X				No	Yes	No	N/A	Eligible (Crit. D)	21	3	17	3	28	1	9						152	241	161	241
31GH704	FS-48	Postcontact: mid-19th to 20th century		X	X				No	No	No	N/A	Not Eligible	14		6		3		0						21		21	0
31GH715	FS-60	Precontact: nondiagnostic lithic; Postcontact: early to mid-20th century		X	X				No	No	No	N/A	Not Eligible	11	1	3	1	11		1						21		22	0
31GH719	FS-66	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	18	6		1			6								6	0
31GH721	FS-68	Precontact: nondiagnostic lithic; Postcontact: 20th century			X	X			No	Yes	No	N/A	Not Eligible	10	3	4	1	7		4						16		20	0
31GH720	FS-67	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	17	5		1			5								5	0
31GH702	FS-46	Precontact: Archaic to Mississippian/Qualla; Postcontact: 20th century		X	X	X			Yes	No	No	N/A	Not Eligible	88	47	19	31	26	1	314	177					132	54	446	231
31GH691	FS-40	Precontact: Archaic to Woodland; Postcontact: 20th century		X	X	X			Yes	No	Yes	N/A	Eligible (Crit. D)	181	127	12	105	14	5	1232	838	5	8			36	2	1273	848
31GH688	FS-36	Precontact: non-diagnostic lithic; Postcontact: late 19th to 20th century		X	X	X			No	Yes	No	N/A	Not Eligible	90	6	24	1	13		6						107		113	0

Table 1. Archaeological Sites within the 2019–2020 STIP A-0009C Alternatives (proceeding east to west).

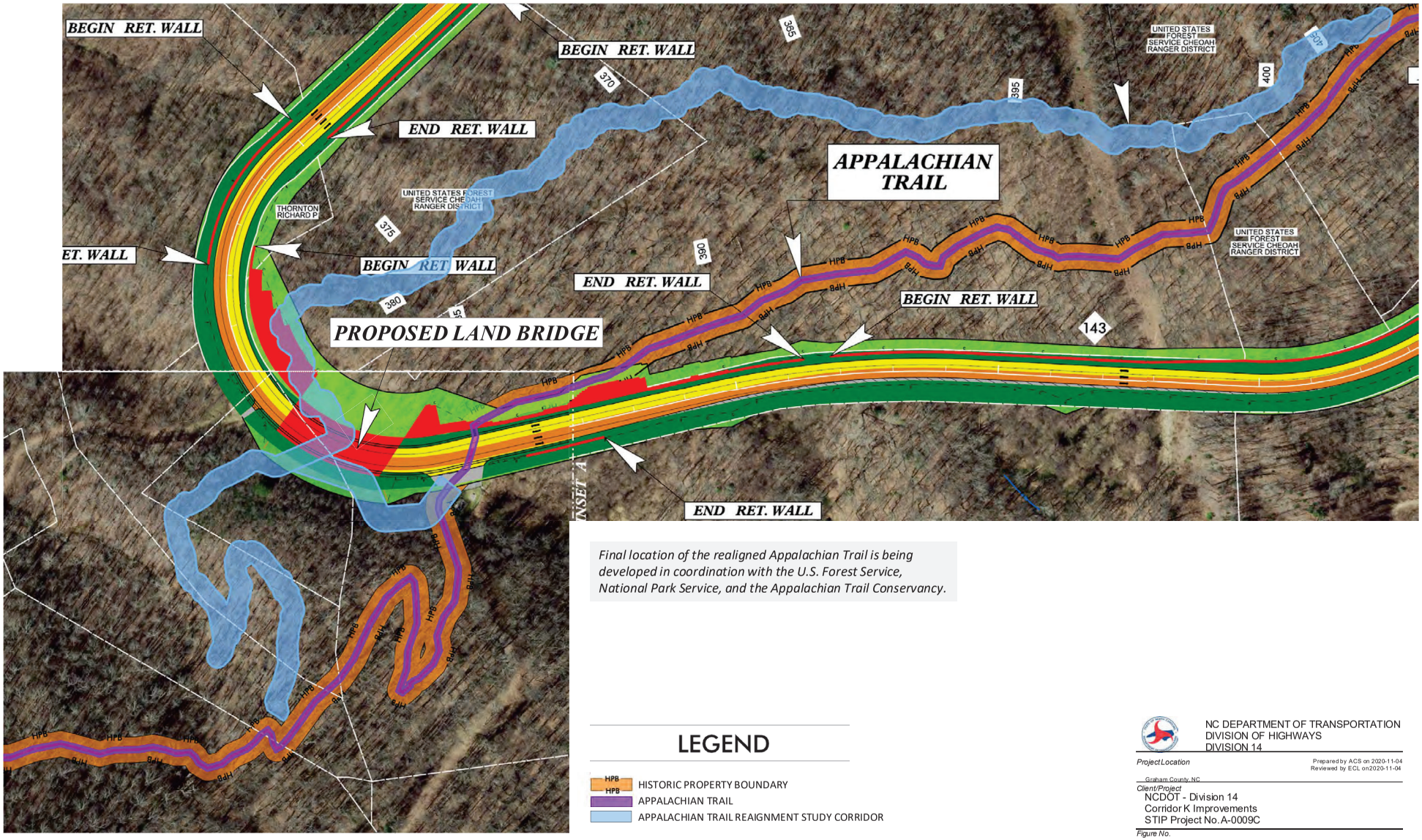
State Site #	2019–2020 Field #	Component(s)	Alternative						Known Unplowed Subsurface Deposits?	Known Surface Cultural Features?	Known Subsurface Cultural Features?	Prior Eligibility Determination**	Eligibility Recommendation for Current Alternatives**	2019–2020 Work Only																	
														Shovel Tests			Max Artifact Density per ST		TUs	Artifacts											
																				Lithics		Ceramics		Daub		Historic		Total		
			R-1E	S-2	SW-1A	IE - S	IE - R	Bill Crisp Road						Total Excavated	Positive Precontact/ Qualla	Positive Historic	Prec/Qualla	Historic		STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs
31GH689	FS-37	Precontact: Mississippian to Qualla phase		X	X	X			No	No	No	N/A	Not Eligible	16	4		2			5								5	0
31GH690	FS-38	Precontact: Early Archaic; Postcontact: 20th century		X	X	X			No	Yes	No	N/A	Not Eligible	88	14	3	5	2		30						5		35	0
31GH692	FS-41	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	N/A	Not Eligible	16	4	1	1	2		4						2		6	0
31GH693	FS-42	Precontact: nondiagnostic lithic;		X	X	X			No	No	No	N/A	Not Eligible	15	3		3			6								6	0
31GH587	N/A	Precontact: nondiagnostic lithic;		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH78	N/A	Precontact: Archaic to Qualla; Postcontact: 20th century		X	X	X			Yes	No	Yes	Eligible (Crit. D)	Eligible (Crit. D)	466	200	29	86	28	1	1747	40	292	36			109	2	2148	78
31GH612	N/A	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH687	FS-35	Precontact: Middle Archaic; Postcontact: 20th		X	X	X			No	No	No	N/A	Not Eligible	32	11	11	2	7		21						39		60	0
31GH684	FS-32	Precontact: nondiagnostic lithic; Postcontact: 20th		X	X	X			No	No	No	N/A	Not Eligible	73	20	2	8	7		35						8		43	0
31GH599	N/A	Precontact: Middle Archaic, Middle to Late Woodland; Postcontact: 20th century		X	X	X			Yes	No	Yes	Eligible (Crit. D)	Eligible (Crit. D)	345	167	43	17	38	2	558	45	54	4			265		877	49
31GH694	FS-43	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	N/A	Not Eligible	12	1	1	1	7		1						7		8	0
31GH618	N/A	Postcontact: 20th century		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH695	FS-44	Precontact: Early Woodland		X	X	X			No	No	No	N/A	Not Eligible	53	22		13		1	103	33	4	7					107	40
31GH598	N/A	Postcontact: 20th century		X	X	X			No	No	No	Not Eligible	Not Eligible	5														0	0
31GH485	N/A	Precontact: Middle Archaic; Postcontact: 20th century		X	X	X			No	No	No	Unassessed	Not Eligible	8														0	0
31GH701	FS-45	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	8	1		1			1								1	0
31GH75	FS-62	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	Unassessed	Not Eligible	48	12	1	3	1		24		0		0		1		25	0
31GH602	N/A	Precontact: nondiagnostic lithic; Postcontact: 20th		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH717	FS-63	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	34	15		8			40		0		0		0		40	0
31GH484	N/A	Precontact: Middle Archaic, Late Archaic, Woodland; Postcontact: 20th century		X	X	X			No	No	No	Unassessed	Not Eligible	77	25	1	16	1	1	79	26	1	2			1		81	28
31GH600	N/A	Precontact: nondiagnostic lithic; Postcontact: late 19th to 20th century		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH609	N/A	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH603	N/A	Precontact: Late Archaic; Postcontact: 20th century		X	X	X			No	Yes	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH722	FS-69	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	32	8		3			11								11	0
31GH713	FS-58	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	10	1		1			1								1	0
31GH712	FS-57	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	23	6		2			7								7	0
31GH94	N/A	Precontact: Late Archaic to Early Woodland; Qualla phase; Postcontact: 20th century		X	X	X			Yes	No	Yes	Unassessed	Eligible (Crit. D)	203	87	2	25	1	6	202	184	147	681	15	30	2	2	366	897
31GH714	FS-59	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	29	9	0	32			77								77	0
31GH608	N/A	Precontact: nondiagnostic lithic		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH93	N/A	Precontact: nondiagnostic lithic		X	X	X			No	No	No	Not Eligible	Not Eligible	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH92	N/A	Qualla phase; Postcontact: 19th to 20th centuries		X	X	X			Yes	No	Yes	Eligible (Crit. D)	Eligible (Crit. D)	No additional excavations in 2019–2020; previous work is discussed in the text.															
31GH724	FS-71	Precontact: nondiagnostic lithic; Postcontact: 20th century		X	X	X			No	Yes	No	N/A	Not Eligible	16	3	4	1	8		3						23		26	0
31GH725	FS-72	Precontact: nondiagnostic lithic		X	X	X			No	No	No	N/A	Not Eligible	6	2		4			5								5	0
31GH35	N/A	Precontact: nondiagnostic lithic (possible mound)		X	X	X			No	Unknown	No	Unassessed	Unassessed	No access permission during 2019–2020 work.															
31GH45	N/A	Precontact: nondiagnostic lithic		X	X	X			No	No	No	Unassessed	Unassessed	No access permission during 2019–2020 work															
31GH46	N/A	Precontact: Middle Archaic, Early to Late Woodland, Mississippian; Qualla phase; Postcontact: 20th century	X				X		Yes	No	Yes	Unassessed	Eligible (Crit. D and poss. Crit. A)	274	193	15	106	2		2580		1449		26		25		4080	0
31GH729	FS-77	Precontact: nondiagnostic lithic and ceramic (probable Archaic and Woodland or Qualla phase)	X						No	No	Yes	N/A	Unassessed	10	4		4		1	8	132	4	7					12	139
31GH726	FS-73	Precontact: nondiagnostic lithic	X				X		No	No	No	N/A	Not Eligible	5	1		1			1								1	0
31GH625	N/A	Precontact: probable Archaic, Woodland; Qualla phase?; Postcontact 19th to 20th century	X						No	No	No	Unassessed	Unassessed	60	15	5	4	20	1	32		5	6			46	3	83	9
31GH705	FS-49	Postcontact; mid-19th to 21st century (Old Mother Church Cemetery)	X						N/A	Yes	Yes	Eligible (Crit. A)	Eligible (Crit. A)															N/A	N/A
31GH711	FS-56	Precontact: nondiagnostic lithic and ceramic (Woodland to Qualla phase); Postcontact: 20th century	X						No	Yes	No	N/A	Not Eligible	40	3	4	1	4		2		1				11		14	0
31GH716	FS-61	Precontact: Archaic, Woodland; Qualla phase; Postcontact: 20th century	X						No	No	No	N/A	Eligible (Crit. D)	46	25	2	27	2	2	96	112	59	133			4	4	159	249
31GH723	FS-70	Precontact: Woodland					X		No	No	No	N/A	Unassessed	16	5		3		1	6	8	5	9					11	17

Table 1. Archaeological Sites within the 2019–2020 STIP A-0009C Alternatives (proceeding east to west).

State Site #	2019–2020 Field #	Component(s)	Alternative						Known Unplowed Subsurface Deposits?	Known Surface Cultural Features?	Known Subsurface Cultural Features?	Prior Eligibility Determination**	Eligibility Recommendation for Current Alternatives**	2019–2020 Work Only														
														Shovel Tests			Max Artifact Density per ST		TUs	Artifacts									
			R-1E	S-2	SW-1A	IE - S	IE - R	Bill Crisp Road						Total Excavated	Positive Precontact/ Qualla	Positive Historic	Prec/Qualla	Historic		Lithics		Ceramics		Daub		Historic		Total	
																				STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs	STPs*	TUs
31GH730	FS-78	Precontact: Archaic, Woodland	X						No	No	Possible	N/A	Not Eligible	123	26		5		1	31	2	10						41	2
31GH34	N/A	Precontact: Late Archaic, Woodland, Qualla phase; Postcontact: 20th century	X						Yes	No	No	Unassessed	Eligible (Crit. D)	184	121	22	36	11	3	621	136	172	58	0	0	85	21	878	215

* Includes all shovel tests within 15 m of positive tests; counts include surface or metal detector artifacts if present.

**Eligibility determinations and recommendations apply only to investigated portion of sites.



Final location of the realigned Appalachian Trail is being developed in coordination with the U.S. Forest Service, National Park Service, and the Appalachian Trail Conservancy.

SOURCE: October 2020 Public Hearing Map

LEGEND

- HPB HPB — HISTORIC PROPERTY BOUNDARY
- APPALACHIAN TRAIL
- APPALACHIAN TRAIL REAIGNMENT STUDY CORRIDOR

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
DIVISION 14

Project Location
Graham County, NC

Prepared by ACS on 2020-11-04
Reviewed by ECL on2020-11-04

Client/Project
NCDOT - Division 14
Corridor K Improvements
STIP Project No. A-0009C

Figure No.
1

Title
Appalachian Trail Realignment Study Corridor

Eastern Band of Cherokee Indian Treatment Guidelines for Human Remains and Funerary Objects (Survey, Excavation, Laboratory/Analysis, and Curation Guidelines)

It is the wish of the EBCI that whenever possible, human interments be left *in situ*, unstudied, and protected from current and future disturbance. However, when these parameters cannot be met, the following guidance shall apply:

Archeological Surveys: The EBCI requests that in the event human remains, funerary objects, sacred objects, or objects of cultural patrimony are encountered, no photographs of such items be taken. Detailed drawings are permissible, however.

Excavations: The EBCI requests that in the event human remains, funerary objects, sacred objects, or objects of cultural patrimony are encountered, no photographs of such items be taken. Detailed drawings are permissible, however. Also, if after consultation with the SHPO and culturally affiliated, federally recognized tribes, the lead agency determines that the excavation of these items is required, the EBCI requests that only the lead archaeologist and a physical anthropologist participate in the removal of these items. The EBCI also requests that, in the case of full excavation of human remains, the entire burial matrix be removed and curated for future reburial. Lastly, EBCI requests to be sent the proposals and research designs that will be provided to the SHPO and State Archaeologist for review and approval prior to the initiation of any excavation activities.

Laboratory Treatment/Analysis: The EBCI requests that any human remains, funerary objects, sacred objects, and/or objects of cultural patrimony not be unnecessarily washed or cleaned, and that only dry brushing be consistently used. Again, we request that no photographs be taken of such objects for documentation or curation purposes, however detailed drawings are acceptable. Furthermore, in terms of human remains, we require that no destructive analyses be permitted, and we would like to have discussions and agreements about the kind of analyses, if any, that will be permitted.

Curation: The EBCI requests that in all cases where it is remotely feasible, that human remains, associated funerary objects, and the burial matrix be stored together. Furthermore, we ask that these types of objects, as well as sacred objects and objects of cultural patrimony, be removed from public viewing or public handling and that researchers not automatically be granted access to such items. Research requests should be submitted to the EBCI Cultural Resources office in the event someone wishes to study such items.

Avoidance/Preservation in Place/Excavation/Reburial: Remember, our preference is always avoidance/preservation in place. Unless there are very good reasons as to why this is not possible, we will not immediately enter into discussions of excavation, removal, study, reburial, etc. That being said, if remains must be moved, it is always our preference that they be out of the ground for only as long as it takes to move them to their new resting place, which should be as close to the original resting place as possible (within line of sight). Sometimes, we do allow minimal study of the remains, especially if it can be done with the remains *in situ*. If longer study is needed, we prefer a field lab to sending them off some distance to be studied in a lab. The bottom line is that the less time they are exposed to the air, the better it is for the people involved and the Tribe. If reburial is the only option, the most efficient/time sensitive reburial process is preferred. Also, capping of the burials is not typically problematic, especially if there is ample fill dirt between the individual and the foreign capping material.