STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY: HOPKINS
SECRETARY

November 16, 2023

MEMORANDUM TO: Division Environmental and Construction Units

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

SUBJECT: Environmental Permits for the Replacement of Bridge 10 on SR 1001 over Catawba River/Lake Rhodhiss, Division 13, **TIP: R-3430B.**

Please find enclosed the following permits for this project:

Agency	Permit Type	Permit Expiration
US Army Corps of Engineers Section 404 Clean Water Act Permit	Regional General Permit 50	May 25, 2025
NC Division of Water Resources Section 401 Water Quality Certification	General Certification No. 4135 [RGP50]	May 25, 2025
NC Division of Water Resources Buffer Certification	Catawba Riparian Buffer Certification	December 16, 2027

Work is authorized by the above referenced permit provided it is accomplished in strict accordance with the permitted plans. The Environmental Coordination and Permitting Group or the Division Environmental Office must be consulted if any deviation from the permit(s) is required.

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

The Project Commitments "Greensheet" is located on the Preconstruction SharePoint Dashboard at: https://connect.ncdot.gov/site/preconstruction

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

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

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH NC 27610

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action ID.: **SAW-2019-01368** **R-3430B** Counties: **Burke and Caldwell**

GENERAL PERMIT (REGIONAL AND NATIONWIDE) VERIFICATION

Property Owner / Authorized Agent:
North Carolina Department of Transportation
Attn: Mr. Michael A. Turchy
Environmental Coordination and Permitting Group Leader

Address: **1598 Mail Service Center**
Raleigh, North Carolina 27699-1598
919-707-6157

Size and location of property (water body, road name/number, town, etc.): **The project (R-3430B) is located at the Connelly Spring Road bridge over the Catawba River/Lake Rhodhiss in Burke and Caldwell Counties, North Carolina.**

Description of project area and activity: **In order to replace the bridge, the permittee is authorized to impact waters of the U.S. as follows:**

Summary of Authorized Impacts and Required Mitigation

Impact ID #	NWP / GP #	Open Water (ac)		Wetland (ac)		Stream (lf)	
		Temporary	Permanent	Temporary	Permanent	Temporary	Permanent
Site 1 (Catawba River/Lake Rhodhiss)	**RGP 50**	**0.06 acre / causeway**					
Site 2 (Catawba River/Lake Rhodhiss)	**RGP 50**	**0.19 acre / causeway**					
Site 3 (Catawba River/Lake Rhodhiss)	**RGP 50**		**0.02 acre / excavation**				
Impact Totals		**0.25 acre**	**0.02 acre**	**0**	**0**	**0**	**0**

Applicable Law: ☒ Section 404 (Clean Water Act, 33 USC 1344)
☐ Section 10 (Rivers and Harbors Act, 33 USC 403)
Authorization: Regional General Permit Number: **RGP 50**
Nationwide Permit Number:

Your work is authorized by the above referenced permit provided it is accomplished in strict accordance with the attached conditions, your submitted application, and the following special conditions:

Special Conditions

1. All work must be performed in strict compliance with (a) the description of work in the PCN and (b) the Wetland and Surface Water Impact(s) Permit Drawing(s) (Permit Plans) in the application dated December 2, 2022. Any modification to the description of work and/or the permit plans must be approved by the USACE prior to implementation.

2. Formal Endangered Species Act (ESA) consultation: The U.S. Fish and Wildlife Service issued a Biological Opinion (BO) titled, "Biological Opinion, Replacement of Connelly Springs Road Bridge #110010 Over the Catawba River, Burke and Caldwell Counties, North Carolina, Service Log #21-149, R-3430B; WBS Element #34544.1.2", dated September 28, 2023, which contains avoidance and minimization measures, and conservation measures, for the project's effect on the federally threatened dwarf-flowered heartleaf (DFHL) (*Hexastylis naniflora*). Your authorization under this permit is conditional upon your compliance with the conservation measures in the aforementioned BO, which are incorporated by reference in this permit. Failure to comply with the conservation measures would constitute non-compliance with the verification letter (authorization) for this project. The U.S. Fish and Wildlife Service is the appropriate authority to determine compliance with the conservation measures of its BO, and with the ESA.

3. Informal ESA consultation: The aforementioned BO also contains conservation measures for effects to the gray bat (*Myotis grisescens*), Northern Long-eared bat (NLEB) (*Myotis septentrionalis*), small whorled pogonia (*Isotria medeoloides*), the proposed Tricolored bat *(Perimyotis subflavus*), and the At-risk Species Little Brown Bat *(Myotis lucifugus)* (see pages 4 and 5 of the BO). In addition to the requirements in special condition #3 above, your authorization under this permit is conditional upon your compliance with the conservation measures for these species, which are incorporated by reference in this verification letter. Failure to comply with these conservation measures would constitute non-compliance with the verification letter for this project. The U.S. Fish and Wildlife Service is the appropriate authority to determine compliance with the conservation measures of its BO, and with the ESA.

4. To the maximum extent practicable, NCDOT shall ensure that the existing bridge piers are cut at or close to the mud line. If it is not practicable to cut a specific bridge pier at or close to the mud line, NCDOT shall ensure that the pier is cut at a depth sufficient to ensure that any part(s) of the pier left above the mud line (1) does not present a hazard to waterway users, to include during low water periods, and (2) does not adversely affect water flow, substrate stability, or bank stability (i.e., does not cause erosion, scouring, bank instability, etc.).

5. To the maximum extent practicable, NCDOT shall ensure that the cut bridge piers are removed from the waterbody.

6. NCDOT shall implement all reasonable and practicable measures to ensure that equipment, structures, 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. NCDOT 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 USACE.

7. NCDOT shall ensure that the Navigational Safety Plan, which was submitted with the PCN, is fully implemented during project demolition and construction.

8. As outlined in the North Carolina Wildlife Resources Commission's (NCWRC) letter dated December 19, 2022, NCDOT shall coordinate with the NCWRC's No Wake Zone Coordinator and the NCWRC's Land and Water Access Division concerning the partial lake closure and buoy deployments. Note that this letter also contains a request for advanced notification of the construction start date (preferably at least two months) so that NCWRC can coordinate non-federally listed mussel relocation if necessary.

9. If a borrow and/or waste area/site will be used for construction of this project: (note that if a borrow or waste area/site is used and this area/site is also used for purposes/clients other than NCDOT, this condition will not apply to this project) - 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 verification letter, NCDOT shall require its contractors and/or agents to identify all areas to be used as borrow and/or waste sites associated with this project. NCDOT shall provide the USACE with appropriate maps indicating the locations of proposed borrow and/or waste sites as soon as such information is available. NCDOT shall submit to the USACE 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. NCDOT shall not approve any borrow and/or waste sites before receiving written confirmation from the USACE 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 USACE and shown on the approved reclamation plans. NCDOT shall ensure that all borrow and/or waste sites comply with the following: Except as authorized by this verification letter or any USACE approved modification to this authorization letter, 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 verification letter without appropriate modification of the authorized impacts of this verification letter, including appropriate compensatory mitigation. This prohibition applies to all borrow and waste activities connected with this project. Additionally, NCDOT 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 USACE. All information will be available to the USACE upon request. NCDOT shall require its contractors to complete and execute reclamation plans for each borrow and/or waste site for this project and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the USACE within 30 days of the completion of the reclamation work.

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

Any violation of the attached conditions or deviation from your submitted plans may subject the permittee to a stop work order, a restoration order, a Class I administrative penalty, and/or appropriate legal action.

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

Activities subject to Section 404 (as indicated above) may also require an individual Section 401 Water Quality Certification. You should contact the NC Division of Water Resources (telephone 828-296-4500) to determine Section 401 requirements.

This Department of the Army verification does not relieve the permittee of the responsibility to obtain any other required Federal, State or local approvals/permits.

Note that the jurisdictional areas within the above-described project area have been identified under a previous action. Please reference the preliminary jurisdictional determination issued on August 22, 2019, under Action ID number SAW-2019-01368.

If there are any questions regarding this verification, any of the conditions of the Permit, or the U.S. Army Corps of Engineers regulatory program, please contact Lori Beckwith at loretta.a.beckwith@usace.army.mil or 828-230-0483.

USACE Regulatory Official: Monte Matthews Monte Matthews 2023.11.15 14:43:03 -05'00'

Date: **November 15, 2023** Expiration Date of Verification: **May 25, 2025**

Copy Furnished:

NCDOT, Ms. Erin Cheely

Action ID Number: SAW-201901368 R-3430B

Counties: Burke and Caldwell

Permittee: NCDOT, Mr. Michael A. Turchy
Environmental Coordination and Permitting Group Leader

Project Name: NCDOT / R-3430B / Burke and Caldwell Cos. / Divs 11 and 13

Regional General Permit: RGP 50

Date Verification Issued: November 15, 2023

Project Manager: Lori Beckwith

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

US ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT
Attn: Lori Beckwith
151 Patton Avenue
Room 208
Asheville, NC 28801-5006

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

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

_____ _____

Signature of Permittee **Date**

North Carolina Wildlife Resources Commission

Cameron Ingram, Executive Director

December 19, 2022

Lori Beckwith
U.S. Army Corps of Engineers, Asheville Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801

Dave Wanucha
NCDEQ, DWR
450 Hanes Mill Road, Suite 300
Winston Salem, NC 27105

Kevin Mitchell
NCDEQ, DWR
2090 U.S. Hwy. 70
Swannanoa, N.C. 28778

SUBJECT: Comments on GP/WQC Application for Replacement of Bridge 110010 on SR 1001 over Catawba River, Burke and Caldwell Counties **(R-3403B)**
DWR 20221711 ver.1

Dear Ms. Beckwith, Mr. Wanucha, and Mr. Mitchell,

The North Carolina Department of Transportation (NCDOT) applied for a General 404 Permit and 401 Certification for the subject project. I am familiar with the wildlife resources in the area but did not visit the project site. Comments on the application from the North Carolina Wildlife Resources Commission (NCWRC) are offered to conserve wildlife resources affected by the project and to promote wildlife-based recreation in accordance with applicable provisions of the state and federal Environmental Policy Acts (G.S. 113A-1through 113-10; 1 NCAC 25 and 42 U.S.C. 4332(2)(c), respectively), the Clean Water Act of 1977 (33 U.S.C. 466 et seq.), and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667d).

Mailing Address: Habitat Conservation • 1721 Mail Service Center • Raleigh, NC 27699-1721
Telephone: (919) 707-0220 • **Fax:** (919) 707-0028

The project will impact Lake Rhodhiss for temporary causeways to construct the new bridge to the west of the existing bridge. The bridge design largely avoids impacts to the popular Castle Bridge boat access area (BAA) that the NCWRC maintains for Duke Energy. The NCWRC appreciates the NCDOT's efforts and ability to avoid disruption to the use of the BAA. The NCWRC also supports the proposed removal of the old bridge piers east of the existing bridge because they are a navigational hazard for boaters.

Rare mussels including creeper (*Strophitus undulatus*, NC Threatened) and rayed pink fatmucket (*Lampsilis splendida,* NC Significantly Rare) have been documented relatively recently in Catawba River lakes. There are records for these mussels in Lake Hickory but not upstream in Rhodhiss. While mussels are likely not present near the proposed work, NCWRC biologists would appreciate the opportunity to relocate mussels from the project footprint before construction, if deemed necessary. Advanced notification of the construction start date, preferably at least two months, would be much appreciated. My contact information can be used in any contract notes, "green sheet commitments", or other project documentation that may be used to help alert NCDOT staffs and contractors about the requested coordination.

In accordance with the prepared safety plan there will be temporary closures to portions of the lake during construction. NCDOT has coordinated with some NCWRC staffs regarding this, most notably the Enforcement Division. The lake closure will require enactment and approval of a temporary rule by the NCWRC. The NCWRC's No Wake Zone Coordinator Ms. Betsy Haywood (betsy.haywood@ncwildlife.org) should be contacted at least 3 months in advance of the closure need to facilitate the approval process. Also, the regional supervisor for the NCWRC's Land and Water Access Division Mr. Ryan Jacobs (ryan.jacobs@ncwildlife.org) should be contacted before construction to coordinate buoy purchase, preparation, and placement. As with coordination for possible mussel relocations, contract notes, "green sheet commitments", or other project documentation are recommended to help alert NCDOT staffs and contractors about the needed coordination for the partial lake closure and buoy deployments.

Thank you for the opportunity to review and provide recommendations on this project. Please contact me at david.mchenry@ncwildlife.org or (828)476-1966 if you have any questions about these comments.

Cordially,

Dave McHenry, NCWRC Western DOT Coordinator

cc: Michael Turchy, NCDOT Environmental Coordination and Permitting Group Leader
Kevin Hining, NCDOT Division 11 Environmental Officer
Roger Bryan, NCDOT Division 13 Environmental Officer

Biological Opinion

Replacement of Connelly Springs Road Bridge #110010 Over the Catawba River, Burke and Caldwell Counties, North Carolina

Service Log #21-149
R-3430B; WBS Element #34544.1.2

Prepared by:

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

JANET MIZZI Digitally signed by JANET MIZZI
Date: 2023.09.28 14:12:26
-04'00'

Janet Mizzi
Field Supervisor
Asheville Ecological Services Field Office
Asheville, North Carolina

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Consultation History

January 27, 2021:	North Carolina Department of Transportation (NCDOT) requested scoping comments from reviewing agencies.
January 29, 2021:	U.S. Fish and Wildlife Service (Service) provided comments to NCDOT in response to the scoping request.
August 16, 2021:	NCDOT and Service correspondence regarding species list for project.
November 14, 2021:	NCDOT and Service met virtually for a project overview.
February 8, 2022:	NCDOT submitted species survey memo to Service.
February 9, 2022:	Service and NCDOT correspondence on project sections and timelines.
February 23, 2022:	NCDOT submitted potential conservation measures to the Service for review.
March 1, 2022:	Service responded to NCDOT's inquiry on conservation measures.
March 14-19, 2023:	NCDOT and Service email correspondence on action area and utilities relocations.
January 10, 2023:	U.S. Army Corps of Engineers (USACE) submitted draft biological assessment (BA) to the Service with request for review.
March 28, 2023:	The Service and NCDOT met on-site to observe portions of the action area and to discuss conservation measures associated with project actions.
March 31, 2023:	The Service and NCDOT corresponded via email on potential conservation measures.
May 9, 2023:	USACE and NCDOT provided an updated BA to the Service, initiating formal consultation.
July 14, 2023:	The Service sent questions to USACE and NCDOT via email on listed bat species.
July 19, 2023:	USACE and NCDOT provided responses via email to questions on listed bats and included project updates regarding natural gas line relocation methods.
August 1, 2023:	Service inquired via email about natural gas line project coordination with NCDOT and USACE.
August 8, 2023:	NCDOT responded via email with confirmation that NCDOT and the natural gas utility are in coordination on the project.
September 7, 2023:	Service provided draft biological opinion to USACE and NCDOT for review and comment.
September 11, 2023:	USACE provided comments on the draft biological opinion.
September 22, 2023:	NCDOT provided comments on the draft biological opinion.

Informal Consultation

The NCDOT proposes to replace the Connelly Springs Road (SR 1001) Bridge #110010 (Castle Bridge) over the Catawba River/Lake Rhodhiss in Burke and Caldwell Counties (Appendix A, Figure 1). Information submitted in the BA was reviewed and the following is provided in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 - 1543) (Act).

The USACE, lead federal agency for this project, determined that the following federally listed species will not be affected by the proposed action:

Table 1. USACE's No Effect Determinations

Species Name	Habitat Present	Federal Designation
Bog turtle – southern population (*Glyptemys muhlenbergii*)	No	T(S/A), At-risk
Small whorled pogonia (*Isotria medeoloides*)	Yes	Threatened
Rock gnome lichen (*Gymnoderma lineare*)	No	Endangered

Virginia big-eared bat (*Corynorhinus townsendii virginianus*)	Summer	Endangered

The information provided states that botanical surveys were conducted in areas of suitable habitat within the action area for small whorled pogonia in June of 2021 and again on June 9, 2022. Results were negative for both. Survey results remain valid for one year for this species. When suitable habitat is present and valid survey results are negative, the Service would concur with a "may affect, not likely to adversely affect" (NLAA) determination from the lead federal agency. While Virginia big-eared bats may be present within the action area for foraging and commuting behaviors, they are not known to roost in trees or bridges and are therefore not expected to be impacted by the project work.

The USACE determined that the proposed action is NLAA the following federally designated species:

Table 2. USACE's May Affect, Not Likely to Adversely Affect Determinations

Species Name	**Habitat Present** (roosting, foraging, commuting)	**Federal Designation**
Gray bat (*Myotis grisescens*)	Summer	Endangered
Little brown bat (Myotis lucifugus)	Yes	At-risk
Northern long-eared bat (*Myotis septentrionalis*)	Yes	Endangered
Tricolored bat (*Perimyotis subflavus*)	Yes	Proposed Endangered

Castle Bridge has features suitable for bat roosting and was surveyed for bats and signs of bat use in June of 2019 and again on June 9, 2021. Culverts equal to and greater than two feet manufactured diameter were surveyed for bats and signs of bat use in the summer of 2022 and again in the spring of 2023. No bats or signs of bat use were detected on Castle Bridge or in culverts during surveys. NCDOT did not conduct presence-probable absence or tree roost surveys for bats. NCDOT has assumed presence of the above bat species in the forested, riparian, and riverine portions of the action area. Limited night work within the project corridor may occur.

Conservation Measures

The following conservation measure will be implemented on behalf of small whorled pogonia:

- Botanical surveys will be conducted annually for small whorled pogonia during the optimal seasonal survey window (mid-May – early July) until the project's let date, scheduled for September 17, 2024 at the time of this document.

The following conservation measures will be implemented on behalf of bat species:

- Tree removal will occur from October 16 to March 31, outside of the active season for tree-roosting bats.
- Should two years elapse between surveys for bats on Castle Bridge and work impacts occurring on the bridge, a new survey shall be completed to ensure absence of roosting bats prior to demolition/construction.
- No permanent lighting will be added to the roadway approaching or crossing the bridge location or to the adjacent riparian areas.
- If night work is conducted, any construction-related lighting will be directed toward the deck of the bridge and will not project into adjacent wooded areas or over the surface of the river as much as practicable. Night work will not exceed 12 nights.
- There will be no deck drains on the new bridge, which is beneficial for water quality.
- For temporary causeways, clean, washed rock (free of debris and pollutants) will be used for the causeway material to minimize sediment input into the river and to reduce the potential for invasive plant seeds.

- The causeway footprints will be the minimum necessary to construct the bridge. The causeway will not constrict more than 50% of the existing channel flow of the Catawba River (Lake Rhodhiss) at this location at a given time.
- Construction fabric will not be used under the causeway material, as it has a tendency to tear into pieces and float downstream during removal, which can degrade water quality.

While the proposed conservation measures minimize effects to foraging and commuting habitat, unknown tree roosts, and potential bridge and culvert roosts, active season construction noise may affect bats in unknown roosts in the surrounding area. Effects from construction noise to unknown tree roosts within the action area but outside the construction limits, while minimized, are not wholly avoided. Bats that are present in proximity to transportation corridors are expected to be tolerant of baseline noise and vibration levels (or have already modified their behaviors to avoid them). How temporary increases in noise and vibration from construction activities effect bats within existing transportation corridors has not been well studied to our knowledge, though one study found that bats habituated rapidly to traffic noise (Luo et al. 2014). Given the information available and conservation measures above, we do not believe any response to project noise and vibration by bats that are already tree-roosting in the area is expected to rise to the level of harm (as defined at 50 CFR 17.3).

Based on the information provided, implementation of the listed conservation measures, and analysis above, we concur with the USACE's determination that the project is NLAA gray bat and northern long-eared bat. Additionally, for northern long-eared bat, with the implementation of the listed conservation measures, we believe the project is consistent with the Interim Consultation Framework (valid from March 31, 2023 to April 1, 2024) outlining the consultation process for this species.

On September 14, 2022, the Service published a proposal in the Federal Register to list the tricolored bat as endangered under the Act. To date, there has not been a proposal to list the little brown bat, designated as an at-risk species; however, it is also included in this review. The Service has up to 12-months from the date a proposal publishes to make a final determination, either to list a species under the Act or to withdraw the proposal. Species proposed for listing are not afforded protection under the Act; however, as soon as a listing becomes effective (typically 30 days after publication of the final rule in the Federal Register), the prohibitions against jeopardizing its continued existence and "take" will apply. In order to avoid the disruption to ongoing or planned actions, the USACE requested conferencing procedures for these species. The conference can be adopted as concurrence if a final rule for these species becomes effective during the life of the project. Based on the information provided, extensive project coordination, and the commitment to implement the above conservation measures, we have determined that the proposed project will not jeopardize the continued existence of tricolored bat or little brown bat. Additionally, we would concur with NLAA determinations should these species become federally listed.

We believe the requirements under section 7 of the Act are fulfilled for the gray bat, northern long-eared bat, little brown bat and tricolored bat (should they become listed). However, obligations under section 7 must be reconsidered if: (1) new information reveals impacts of this proposed action may affect listed species or critical habitat in a manner not previously considered, (2) this proposed action is subsequently modified in a manner that was not considered in this review, or (3) a new species is listed, or critical habitat is determined that may be affected by the proposed action.

Biological Opinion

1. Introduction

A biological opinion is the document that states the opinion of the Service in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543), as to whether a federal action is likely to jeopardize the continued existence of species listed as endangered or threatened; or result in the destruction or adverse modification of designated critical habitat.

This document transmits the Service's biological opinion (Opinion) based on our review of the proposed replacement of the Connelly Springs Road (SR 1001) Bridge (Castle Bridge #110010) over the Catawba River/Lake Rhodhiss in Burke and Caldwell Counties, North Carolina, and its effects on the federally threatened dwarf-flowered heartleaf (*Hexastylis naniflora,* DFHL). The request for formal consultation was received on January 10, 2023; however, initiation of formal consultation occurred when additional information was received on May 15, 2023. This Opinion is based on information provided in the BA submitted to the Service by the USACE, field investigations, email communications between USACE, NCDOT and the Service, communications with experts on the affected species, and other sources of information as cited. The USACE is the lead federal action agency for this project.

2. Proposed Action

As defined in the Service's section 7 regulations (50 CFR 402.02), "*action*" means "*all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas*." The "*action area*" is defined as "*all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action*." The direct and indirect effects of the actions and activities must be considered in conjunction with the effects of other past and present Federal, state, or private activities, as well as the cumulative effects of reasonably certain future state or private activities within the action area.

2.1 Action Area

The project is located in the piedmont physiographic province in North Carolina, crossing the Catawba River/Lake Rhodhiss. The Catawba River serves as the boundary between Burke County and Caldwell County. The road corridor leading to the bridge has a local name of Malcolm Boulevard in Burke County, while crossing into Caldwell County, the local name of the project corridor changes to Connelly Springs Road. The project area is generally low-density residential land use and occurs in the Hydrologic Unit Code# 03050101. The project area consists of existing maintained right-of-way (ROW) including fill slopes, the Catawba River, residential and forested areas, and a boat landing with a parking lot north of the river. The project length is an approximately 0.5-mile corridor with low topographic relief that includes one bridge crossing Lake Rhodhiss and the roadway approaches at either end.
The action area is depicted in Appendix A, Figure 4.

Consequences of the subject project are directly attributed to the construction activities including placement of fill material, excavation, and mechanized clearing; hydrological effects involving stormwater drainage; biological pollution from non-native invasive plant species; and utility relocation effects. Conservation measures to protect occupied DFHL habitat are also included in the action area.

The limits of the action area have been established using the actions described above and the potential consequences of that action. The action area covers:

- R-3430B limits of disturbance (project footprint), including the project slope stakes (cut/fill line; SS) plus a 25-foot buffer, *or* any construction, utility, or drainage easements, whichever is greater. This will account for tree-clearing areas, access, and erosion control maintenance.
- Buffer added to project footprint at DFHL sites where ground-disturbance will occur to account for possible effects of biological pollution. The added buffer ranges from 0-75 feet, depending on the degree of threat from non-native invasive plants and other caveats (see Biological Pollution section of Effects Section for details).
- NCDOT will extend the ROW to protect DFHL and occupied habitat in perpetuity at two parcels of land adjacent to R-3430B construction. The areas to be protected are included in the action area: parcel 5 (north of Lake Vista Drive), protecting a portion of DFHL Site F, and a section of parcel 2 (the sub-parcel immediately south of Lake Vista Drive), protecting a portion of Site G.
- The portion of the Catawba River/Lake Rhodhiss where the existing bridge will be demolished and where the new bridge will be constructed. Remnant bents to the east of the existing bridge will also be removed, concurrent with bridge demolition. The action area has been expanded to include the remnant bents plus a buffer (approximately 30 feet) to accommodate a barge, if needed.
- A Duke Energy gas line currently attached to Castle Bridge will be relocated as a result of the project. The action area includes all areas of the gas line relocation, which will be built to the east of the existing bridge. As a worst-case scenario, approximately 350 feet of the project footprint has been extended roughly 25 feet further east to incorporate the relocated gas line.
- In addition to the relocated gas line, the action area also includes the distribution gas main to be built along Deep Water Lane.

Note: The action area does not include two DFHL sites (E and L in Figure 4, Appendix A) on the north side of the river, as they will not be affected by any ground-disturbing activity associated with R-3430B. Project construction activities will not break any ground in occupied DFHL habitat at either site. The lack of ground disturbance will not create any sort of bare soil conditions to allow invasive, non-native plants the opportunity to encroach upon or outcompete the native DFHL plants at, or within the sites' occupied DFHL habitat. No adverse effects from biological pollution – or any other consequences of the action - are anticipated to occur at the two sites (E and L), and they are thereby excluded from the project's action area.

2.2 Project Description

The proposed action by NCDOT involves replacing Castle Bridge over the Catawba River/Lake Rhodhiss in Burke and Caldwell Counties, North Carolina (Appendix A, Figure 1). The bridge replacement and associated roadway approach work is a portion (R-3430B) of a larger though disjunct 10-mile roadway modernization project (R-3430). R-3430 consists of three sections, A, B, and C. Section A is currently unfunded. Section C is scheduled for Let in Fiscal Year 2029. The B section has its own purpose and need given that the current bridge, built in 1961, has a sufficiency rating of 8 out of 100, and given that it has utility independent of the other roadway sections; therefore, it is being considered a stand-alone project for the purposes of this consultation. The project is estimated to last approximately two years, with 16 months for construction and 6 months for demolition.

The R-3430B bridge replacement ties into the existing roadway approximately 1,600 feet south of the proposed bridge (around Harbor Ridge Drive) and ends approximately 900 feet north of the proposed bridge (north of Castle Bridge Drive). NCDOT evaluated bridge alignments located as close as possible to the existing structure. Eastern alignments were not studied in detail due to potential impacts to the Castle Bridge Boat Access ramp. The new bridge will be built parallel to and west of the existing bridge. The existing bridge structure is 28 feet wide (curb to curb) and consists of two approximately 10.5-foot-wide travel lanes with shoulders along each side (about 3.5 feet wide), and a length of 910 feet. There are

deck drains along both sides of the bridge draining water directly into Lake Rhodhiss. The new bridge will be 51 feet wide and will consist of (left to right): a 10-foot shared use path, 1-foot protective barrier, 5-foot shoulder, two 12-foot travel lanes, and 11-foot shoulder. There will be no deck drains. A multi-use path will be included on the new bridge, extending to the closest logical termini on both sides of the new bridge, connecting to Lake Vista Drive NE on the south side and Castle Bridge Drive on the north side. The new bridge will be offset 67 feet (centerline to centerline) west of the existing bridge and will be approximately 6.5 feet higher in elevation than the existing structure. Traffic will be maintained on the existing bridge during the construction phase.

A detailed description of the project work is provided in Appendix C. A condensed description of project actions is provided here.

2.2.1 Site Prep – Clearing and Grubbing

Tree clearing for the project activities will total 3.14 acres. In addition to tree clearing, site preparation will include grubbing and earthwork. Clearing and grubbing will take place within right-of-way (ROW) limits but may also occur in drainage easements and temporary construction easements. Earthwork includes all earth moving activities that occur for bridge replacements, which includes but is not limited to: preparation of staging areas, bridge approaches, embankments, fill, foundations, ditching, and utility relocation. Typical earthmoving equipment used includes haul trucks, dozers, excavators, scrapers, backhoes, and tractors.

2.2.2 Bridge Construction and Demolition

The supports for the new bridge will require causeways in the river; one on the north end of the proposed bridge to construct a bent and one on the south end to remove an existing bent. Percussive activities such as pile-driving and drilling will occur for the new bridge substructure and may occur at any time of year. Pile-driving will occur for approximately one week. Additional construction work will include concrete and girder delivery, girder placement, and concrete pours. Nighttime concrete pouring may be required if it coincides with hot weather during summer months, in which case up to 12 nights of work may be necessary. Guardrail installation will also take place along bridge approaches.

The old bridge will be demolished using a tractor trailer, cranes, and possibly a track hoe once traffic flow has been moved to the new bridge. The deck will be removed first, followed by the girders and bridge supports. Remnant bents to the east of the existing bridge will be demolished and removed during this stage. A catchment device or other appropriate measures on the overhead bridge structure will be used to prevent construction material and debris from falling into the water below. Navigational aids will be installed to guide river users away from the causeways/construction zone. Green, red, and white solar-powered LED strobe lights will be utilized at appropriate in-water locations to serve as navigational guides.

2.2.3 Construction Access and Staging, Drainage, Utilities

Construction access and staging areas will be determined by the selected contractor after the project has Let. Project specifications and contracts will require that access and staging areas be located in upland areas and an environmental review of any areas outside the proposed project footprint will be performed. This review would include wetland and stream delineation as well as evaluation of the area for potential habitat and presence of any listed species, including DFHL. No access or staging area will be permitted within DFHL sites.

Drainage work will take place on both sides of Malcolm Boulevard. A 24-inch diameter corrugated metal pipe under Malcolm Boulevard will be replaced, part of which will take place in DFHL Site G. At the western end of the pipe, riprap will be placed to prevent erosion at the outlet. No drainage work will

occur in DFHL Site F. On the east side of Malcolm Boulevard, one of the existing roadside ditches will be realigned just outside of Site H from station numbers 19+50 to 21+00, approximately (Plan Sheet 4 in Appendix B).

An 8-inch diameter section of buried gas line just west of Malcolm Boulevard and south of Lake Vista Drive will be relocated by Duke Energy or its associated contractor to avoid conflicting with a proposed section of guardrail. The gas line will be relocated via a directional bore and will reach a depth of 75 feet below Lake Rhodhiss. The associated bore pit location for the gas line relocation section will be on the east side of Malcolm Boulevard. This bore pit location occurs inside the project's proposed NCDOT right-of-way limits, approximately 175 feet south of the delineated boundary of DFHL Site H. Duke Energy actions will not disturb DFHL Sites H or I during underground boring activities.

2.2.4 Post-project Site Restoration and Operations and Maintenance

Disturbed areas will be re-vegetated once the new roadway approaches are completed. This involves reseeding with grasses suitable for stabilization and maintenance of roadway side slopes. Non-invasive species will be used in erosion control seed mixes. Borrow areas will be graded to drain and re-seeded. Temporary Best Management Practices (BMPs) such as silt fencing, check dams, and sediment basins will be removed.

Once traffic is released to the project, typical operations and maintenance activities will occur. This may include pre-treatment of roads prior to winter weather events and snow plowing and ice removal after the events. Mowing of side slopes will be performed at regular intervals.

2.3 Conservation Measures

Conservation measures represent actions, pledged in the project description, that the action agency will implement to minimize the effects of the proposed action and further the recovery of the species under review. Such measures should be closely related to the action and should be achievable within the authority of the action agency. We consider the beneficial effects of conservation measures in making our determination of whether the project will jeopardize the species.

On the south side of the existing and proposed bridge structures, DFHL sites are located on both sides of Malcolm Boulevard in the area needed for the bridge approach/roadway tie-ins. As such, complete avoidance of DFHL in the bridge area was unavoidable. Constructing the new bridge to the east of the existing bridge, which would have reduced some adverse effects to DFHL, was not possible due to potential recreational disruptions to the Castle Bridge Boat Access on the north side of the river. Avoidance and minimization measures and conservation measures are discussed below.

Avoidance and Minimization measures on behalf of DFHL for this project include the following:

AMM 1. In the 25% design of the preferred alternative, the R-3430B alignment was shifted approximately three feet closer to the existing bridge to reduce adverse effects to DFHL on the west side of Malcolm Boulevard. This avoids direct impacts to approximately 5 plants and 0.015 acres of occupied DFHL habitat in Site F, and 8 plants and 0.008 acres of occupied DFHL habitat in Site G (sites are shown in Appendix A, Figure 5; and Appendix B, plan sheet 4, approximate station numbers 19+00 to 26+00).

AMM 2. A segment of the project footprint on the east side of Malcolm Boulevard was shifted further inward and away from DFHL Site H to minimize adverse effects. This avoids direct impacts to approximately 10 plants and 0.018 acres of occupied DFHL habitat in Site H (Site H is shown in Appendix A, Figure 5; and Appendix B, plan sheet 4, station numbers 20+00 to 21+00).

AMM 3. Non-native invasive plants, such as *Lespedeza cuneata*, will not be used in erosion control seed mixes.
AMM 4. Native seed mixes for erosion control will be used to the extent practicable.
AMM 5. High-visibility fencing will be placed around DFHL sites within 25 feet of slope stakes (or at easement lines, whichever extends further out) to ensure there will be no accidental encroachment.
AMM 6. No access or staging areas will be permitted within DFHL sites.
AMM 7. NCDOT will conduct a preconstruction meeting and discuss the known DFHL sites, their locations, and prescribed minimization measures, including the high-visibility exclusionary fencing, with the contractor and relevant NCDOT staff.
AMM 8. At Site G, topsoil in the areas directly affected by project construction along Malcolm Boulevard will be cleared and grubbed down to a non-organic soil layer and pushed upslope as practicable toward Malcolm Boulevard. This will facilitate the removal of the non-native invasive plant species and limit their spread downslope.

Conservation measures on behalf of DFHL for this project include the following:

CM 1. NCDOT will conduct on-site preservation of DFHL plants in perpetuity through a ROW extension. NCDOT will obtain Parcel 5 (north of Lake Vista Drive) and a portion of Parcel 2 (the sub-parcel immediately south of Lake Vista Drive). DFHL Site F is located on Parcel 5 and a portion of Site G is in the area to be protected in Parcel 2 (Appendix A, Figure 6). The plants and occupied habitat to be protected will offset the plants and occupied habitat incurring adverse effects within the project footprint from activities associated with project construction.
CM 2. Monitoring will be conducted to ensure the protection of DFHL to be preserved at Sites F and G. DFHL monitoring will also occur in the unprotected portions of Sites G and H, landowner-permitting. Monitoring efforts will consist of a pre-construction environmental baseline survey as well as post-construction surveys that will take place once every year over a period of five years.
CM 3. Invasive non-native plant species across Sites G and H (assuming landowner permission) will be monitored post-construction for five years, especially along the interface between construction activities and the plant populations. If any non-native plant species start spreading into the protected area of Site G, they will be removed or treated. Herbicide treatment will also occur within the limits of NCDOT right-of-way in the remainder of Site G if it is needed post-construction.
CM 4. Invasive non-native plant control will be done using a combination of methods, including herbicide treatment and hand-pulling. A barrier (such as cardboard or plastic) will be used to protect any DFHL located within 15 feet of herbicide treatment areas. Any periwinkle (*Vinca sp.),* Japanese honeysuckle (*Lonicera japonica)* or multiflora rose (*Rosa multiflora*) within 10 feet of DFHL will be hand-pulled, instead of treated with herbicide. Herbicides will not be used on days with high winds.
CM 5. The wooded area west of Malcolm Boulevard between Lake Vista Drive (to the north) and DFHL Site G has a small, dense patch of periwinkle on an adjacent ridge. If non-native invasive plants from this area encroach into the protected portion of Site G, the invasive plants in NCDOT right-of-way will be removed or treated.

3. Status of the Species

Common Name: Dwarf-flowered heartleaf
Scientific Name: *Hexastylis naniflora*
Status: Threatened (proposed for delisting)
Date of Listing: April 14, 1989 (FR 54 14964-14967)

DFHL was listed as a threatened species in 1989 under the authority of the ESA. The herbaceous evergreen is endemic to the western Piedmont and foothills regions of North and South Carolina. DFHL occurs in sandy-loam soils, and is generally found in mesic to dry bluffs, slopes or ravines in deciduous forests; or in moist soils adjacent to creeks, streamheads, lakes, and rivers (Robinson 2016). The primary threats to the species include habitat loss due to the conversion of land to residential, commercial, and industrial use (Service 1989) and habitat loss from land conversion to agricultural use, timber harvest, hydrological alterations from the damming of ponds, impacts from grazing cattle, off-road vehicle damage, trampling from foot traffic, invasive species, highway or road improvements, and erosion or siltation (NCNHP 2016, Robinson and Padgett 2016). DFHL occupies rapidly developing urban areas surrounding the municipalities of Charlotte, Greenville, Spartanburg, and Hickory. The 2019 Species Status Assessment (SSA) lists the following threats to the viability of this plant: human population change, development, invasive species, woody encroachment, and climate change (Service 2019).

The initial listing rule recognized 24 populations of DFHL distributed across eight counties in North and South Carolina. The SSA recognizes 119 known populations occurring in 10 counties in North Carolina and three counties in South Carolina. Of the known populations, 28 are composed of >1,000 plants and are considered to have very high viability (Service 2019). At least 40 known populations currently occur on lands either protected in perpetuity, or protected, but not in perpetuity (Service 2019). Conservative population estimates include a collective total of more than 300,000 rosettes (NCNHP 2016, SC Department of Natural Resources (SCDNR) 2016). However, the North Carolina Natural Heritage Program (NCNHP) estimates that the short-term trend over approximately 30 years is declining 10-30%. This estimation reflects documented declines of some populations, while many others appear stable, and some have increased (Service 2019).

Following a review of the best-available science, the Service proposed to delist DFHL due to recovery on April 26, 2021 (Service 2021). The Service is currently evaluating comments received on the proposed delisting (60-day public comment period now closed). The Service will make a final listing determination once comments have been addressed.

4. Environmental Baseline in the Action Area

In accordance with 50 CFR 402.02, the environmental baseline "*refers to the condition of the listed species or its designated critical habitat in the action area, without the consequences to the listed species or designated critical habitat caused by the proposed action. The environmental baseline includes the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process. The consequences to listed species or designated critical habitat from ongoing agency activities or existing agency facilities that are not within the agency's discretion to modify are part of the environmental baseline*."

Occupied and unoccupied DFHL habitat is present in multiple locations within the action area. Botanical surveys were completed within the action area during the optimal DFHL survey window in 2018, 2021, and 2022. A total of four DFHL sites are present in the action area (Appendix A, Figure 4), supporting a

total of 518 DFHL plants, summarized in Table 3. These sites are denoted in the NCNHP Element Occurrence (EO) database as EO identification #39089.

Table 3. Environmental Baseline for Dwarf-flowered Heartleaf in Action Area

Site	Plant Count	Occupied Habitat (acres)	Density #/acre
F	228	0.64	356
G	234	0.42	557
H	51	0.09	567
I*	5	0.02	250
Totals	**518**	**1.17**	**443**

* No flowers, assumed to be *H. naniflora*
Note: rounding may cause minor discrepancies.

Maintained/disturbed areas within the action area include roadsides, driveways, a boat landing parking lot, a small marina on the west side of Connelly Springs Road, a few homes along Deep Water Lane, and small patches of vegetated habitat that were subject to earthwork in the past. Canopy gaps have allowed for dense undergrowth, and invasive non-native plant species such as periwinkle, Japanese honeysuckle and multiflora rose have contributed to the undergrowth in areas.

It is likely that DFHL populations in the action area have historically been altered by road construction and development. Connelly Springs Road/Malcolm Boulevard may have divided Sites F and I and sites G and H. Development on the south side of the Catawba River may have affected Sites F and G with the construction of Lake Vista Drive. Site I may have been further reduced by the installation of a lawn along Deep Water Lane. Development and road construction have presumably affected DFHL sites by fragmenting them, reducing available habitat, and introducing invasive plant species to the area. Biological pollution, especially in the form of invasive plants such as periwinkle and English ivy (*Hedera helix*), can be found in Sites G and H, respectively.

5. Effects of the Action

In accordance with 50 CFR 402.02, the 2019 regulatory definition of effects of the action is "*all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action*." This section analyzes the consequences of the action on DFHL. The effects of the action are added to the environmental baseline and, after taking into consideration the status of the species, serve as the basis for the determination in this Opinion (50 CFR 402.14(g)(4)).

Activities occurring as a result of the bridge replacement project, including new bridge approaches, will adversely affect DFHL. Land disturbance will occur from construction of bridge approaches, drainage work, and utility relocation work, and will likely cause biological pollution of DFHL sites within the action area. Each of these adverse effects is described below.

Effects are computed under the assumption that DFHL plants are spatially distributed in an equidistant manner throughout the area of a site's occupied DFHL habitat. Actual spatial distribution of DFHL plants within each site will not exactly equal the conditions defined in this assumption. Given the size and scope of the project, this assumption allows for an efficient method for approximation of effects.

5.1 Stressors

Based on the description of the Action and the species' biology, the following stressors to DFHL have been identified that may result from the proposed project: (1) bridge and road construction, (2) hydrologic/drainage effects, (3) biological pollution, and (4) utilities. Below, each stressor is described and associated responses and rationale for the determination of effects are provided.

5.1.1 Stressor 1: Bridge and Road Construction

To determine the worst-case scenario for effects from the new bridge approaches, slope stakes (SS) were buffered by 25 feet to allow for activities such as construction access, mechanized clearing, and erosion control maintenance. Areas within the SS + 25-foot line, or within construction easements, whichever was greater, were then used to calculate direct effects to DFHL sites. A total of 168 plants will be lost due to construction along with 0.45 acre of occupied DFHL habitat from Sites F, G, H, and I. (Appendix A, Figure 5).

The project was designed so that no cut and fill work will be conducted in Site H, but since a portion of Site H falls within the SS + 25-foot limit, it is assumed that 7 plants and 0.01 acre of occupied habitat will be affected as a worst-case scenario due to construction access or mechanized clearing.

5.1.2 Stressor 2: Hydrologic/Drainage

The 24-inch pipe to be replaced under Malcom Boulevard and the relocated ditch leading to it will not affect Site H, but the pipe will cause disturbance in Site G. The disturbance of the pipe construction along with the resulting altered drainage outfall will result in plant and habitat loss. Plan Sheet 4 in Appendix B depicts the pipe replacement. A total of 34 plants will be lost due to drainage work along with 0.06 acre of occupied DFHL habitat, all in Site G (Appendix A, Figure 5). No other drainage effects will occur; all other drainage work will take place outside of occupied DFHL habitat.

5.1.3 Stressor 3: Biological Pollution

Adverse indirect effects from biological pollution could include species composition change in the understory, increased light penetration from clearing, and potential for non-native invasive species (NNIS) to encroach on DFHL habitat.

Based on post-construction monitoring at multiple NCDOT projects where DFHL occur, along with surveys conducted within the project action area, healthy viable clusters of DFHL are often found right up to the clearing/construction limits, as well as disturbed habitats such as logged areas and commercial developments. DFHL has also been found to grow in disturbed, early successional and maintained powerline easements where light penetration reaches the population (NCDOT 2009, 2012). Similar results have been documented (or observed) with understory density changes along roadway projects, where DFHL persist despite increased shading. Therefore, adverse effects of the action due to changes in light regime from clearing and higher understory density are not anticipated.

Biological pollution through the encroachment of NNIS is a likely consequence of R-3430B construction. Construction of the new bridge approaches could serve as potential areas for the spread of invasive plants, as ground disturbance may increase the amount of area suitable for invasive plant species (Trombulak and Frissell 2000). Additionally, construction equipment and vehicles can contribute to the spread of invasive plants (Von der Lippe and Kowarik 2006). Once R-3430B construction is complete, road maintenance may also influence the spread of invasive plants. Mowing and hazardous tree removal will maintain a continuous light gap along the roadside, allowing invasive plants the opportunity to thrive, propagate, and spread, allowing easier access to adjacent forested habitat (Mortensen et al. 2009). Roadsides generally provide excellent opportunities for the establishment of invasive non-native plant species (Rentch et al. 2005) because frequent disturbances make resources such as light and bare soil more available. The

extent of invasive plants spreading into forested habitat may vary greatly, as shown in studies from Meunier and Lavoie 2012 (410 feet from the roadway), Forman and Deblinger 2000 (33-400 feet from the roadway), Huebner 2010 (148 feet from the roadway), and Hansen and Clevenger 2005 (33 feet from the roadway).

Based on the above studies, it was determined that under a worst-case scenario, biological pollution could occur from the furthest extent of disturbance (project footprint) out 75 feet at Site H and 50 feet at Site G. These extents were determined based on the existing NNIS distributions at these two sites. Site H has NNIS already occurring within the interior of the DFHL population while Site G has NNIS occurring along the outer portions of the DFHL population but absent from the interior. Based on information from the Service (2021), it is unlikely that 100% of DFHL will be lost from biological pollution following ground-disturbing activities. Using a subjective estimate that 50% of the DFHL would be lost at Site H, the number of plants affected from biological pollution would be 23 plants and 0.08 acre of occupied DFHL habitat. Because NNIS only occur along the perimeter at Site G and not in the interior, and because NCDOT will be conducting invasive species control at Site G in areas owned by NCDOT, it is estimated that only 10% of the DFHL will be lost due to biological pollution at the unprotected portions of Site G: 5 plants and 0.09 acre of occupied habitat. The total loss from biological pollution is estimated to be 28 plants and 0.17 acre. Since NNIS control will occur at the portion of Site G protected in perpetuity, the loss of DFHL from this protected area due to biological pollution is not anticipated to occur.

Based on the above assessment, only Sites G and H will be affected by biological pollution, due to their proximity to R-3430B construction and the existing threat of NNIS (Appendix A, Figure 5). Ground disturbance will not occur at Sites E or L, thus, no opportunities for NNIS encroachment are expected. Road construction activities at Site F will break ground in occupied DFHL habitat and create some bare soil conditions along the site's construction zone/occupied habitat interface; however, the population currently has no problematic presence of NNIS, and thereby a lack of biomass or seed source for invasives to further encroach upon or outcompete the native DFHL plants.

5.1.4 Stressor 4: Utilities

The gas line to be relocated via a directional bore will have an associated bore site. As a worst-case scenario based on the bore site location, half of Site I will be directly impacted: 2 plants in 0.01 acre. No other DFHL effects are anticipated from utilities.

5.1.5 Summary of Stressors and Effects Determinations

In summary, the anticipated stressors and effects discussed above are expected to adversely affect DFHL, totaling a loss of up to 232 plants and 0.69 acres of occupied habitat, as summarized in Table 4.

Table 4. Summary of Stressor Effects

Site	Construction		Bio. Pollution		Drainage		Utilities		Totals	
	#plants	acres	#plants	acres	#plants	acres	#plants	acres	#plants	acres
F	141	0.40	0	0	0	0	0	0	141	0.40
G	17	0.03	5	0.09	34	0.06	0	0	56	0.18
H	7	0.01	23	0.08	0	0	0	0	30	0.09
I	3	0.01	0	0	0	0	2	0.01	5	0.02
Total	**168**	**0.45**	**28**	**0.17**	**34**	**0.06**	**2**	**0.01**	**232**	**0.69**

5.2 Beneficial Effects

Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat.

NCDOT's commitment to preserve 0.373 acres of occupied DFHL habitat and 160 DFHL plants is considered a beneficial effect. Additionally, NCDOT's commitment to monitor preserved DFHL sites annually for five years post-construction and to treat invasive vegetation in areas where it threatens preserved DFHL habitat and plants are also considered beneficial actions, as they serve to increase conservation success.

5.3 Cumulative Effects

Cumulative effects include the "*effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation*" (50 CFR 402.02, 2019 Regulations). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Endangered Species Act.

The R-3430B project will not increase traffic capacity and will not provide access to previously inaccessible land; therefore, increased development is unlikely adjacent to the roadway corridor as a result of R-3430B. Websites and planning documents from local and regional economic development and planning agencies were searched for development plans along the Connelly Springs Road corridor, including county economic development websites (Caldwell County 2021), the Western Piedmont Council of Governments 2045 Metropolitan Transportation Plan (2018), the Burke County Land Use Plan (Burke County Land Use Plan Committee 2016), and the Caldwell County Comprehensive Plan (Caldwell County 2020). None of those documents indicate any industrial focus areas or economic development focus areas in the vicinity of R-3430B. The northern portion of DFHL Site G will be preserved by NCDOT. The parcel with the southern portion of Site G may undergo residential development in the future. While such development has the potential to cause adverse effects to DFHL, it is not currently reasonably certain to occur. In consideration of this information, there are no anticipated cumulative effects associated with the action.

6. Conclusion

After reviewing the current status of DFHL, the environmental baseline for the action area; and the effects of the action, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of DFHL. This opinion is supported by the fact that plants adversely affected by the proposed project (a total of 232) represent approximately 0.07% of the total range-wide abundance (approximately 300,000 individuals). No critical habitat has been designated for this species; therefore, none will be affected.

7. Incidental Take Statement

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the taking of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation resulting in death or injury to listed species by significantly impairing essential behavioral patterns, such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not for the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), incidental take is not prohibited under the ESA, provided it is in compliance with the terms and conditions of this incidental take statement.

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, section

9(a)(2)(B) provides limited protection to listed plants from take; the ESA prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage to such plants on areas under federal jurisdiction or the destruction of endangered plants on nonfederal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law. Therefore, for this Opinion, incidental take does not apply, and an incidental take statement is not necessary.

8. Conservation Recommendations

Section 7(a)(l) of the Endangered Species Act directs Federal agencies to use their authorities to further the purposes of the Endangered Species Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

- Identify Feasible Relocation Site(s) for DFHL. Continue the search for relocation properties that offer appropriate conditions for DFHL and are/could be secured for protection. Such sites could be utilized for the future portions of R3430 and for other projects impacting DFHL within the same general area.
- DFHL relocation. Relocate DFHL plants that would otherwise be lost due to impacts from project actions to protected areas providing suitable habitat for plant survival.
- Continue the NNIS treatment and monitoring beyond five years, to provide additional protections for these occurrences of DFHL.

In order for us to be kept informed about actions that minimize or avoid adverse effects or that benefit listed species or their habitats, we request notification of the implementation of any conservation recommendations.

9. Reinitiation Notice

This concludes formal consultation on the actions outlined in your project description dated September 9, 2021. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this Opinion, (2) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this Opinion, or (3) a new species is listed or critical habitat is designated that may be affected by the action.

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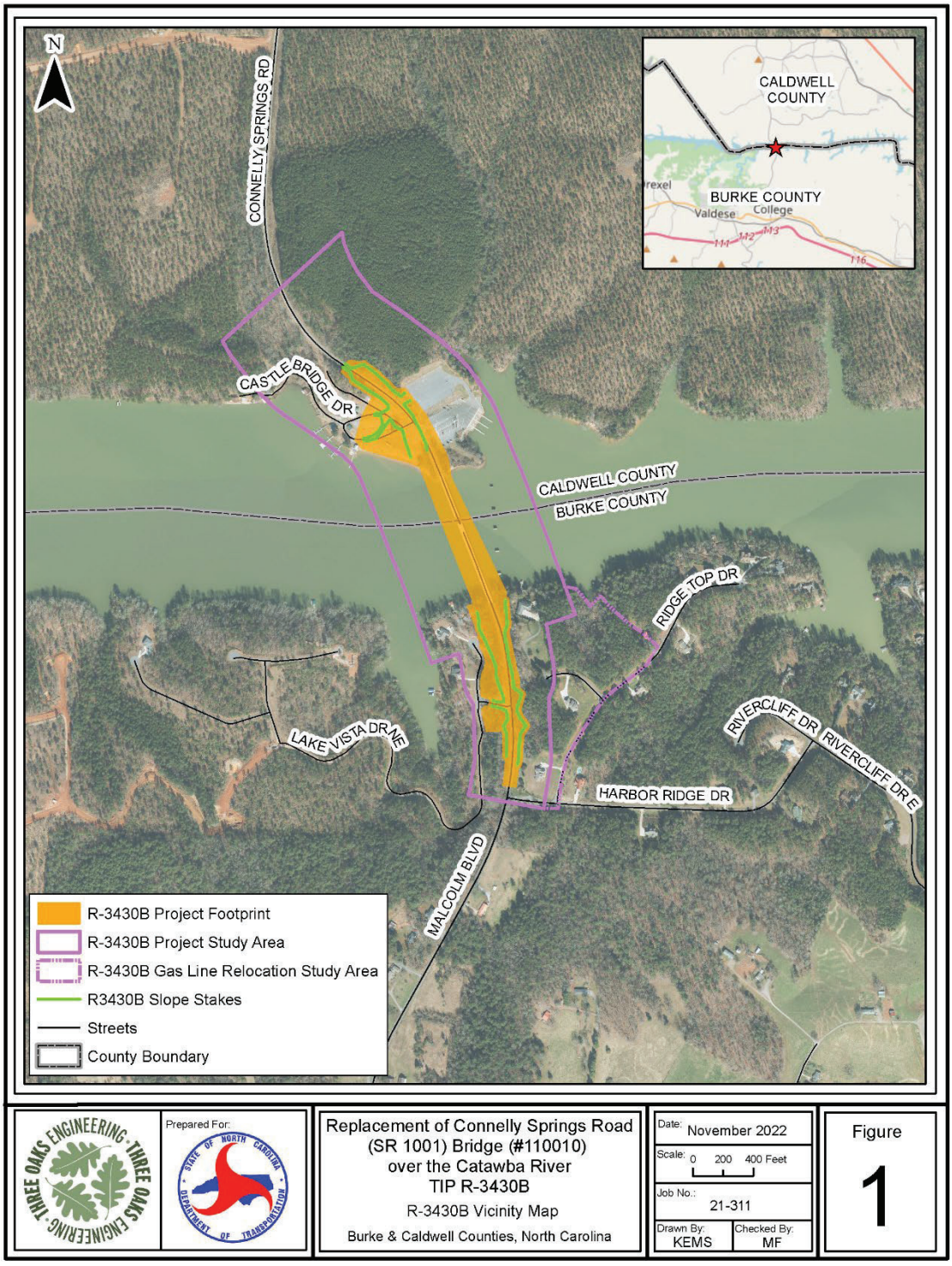
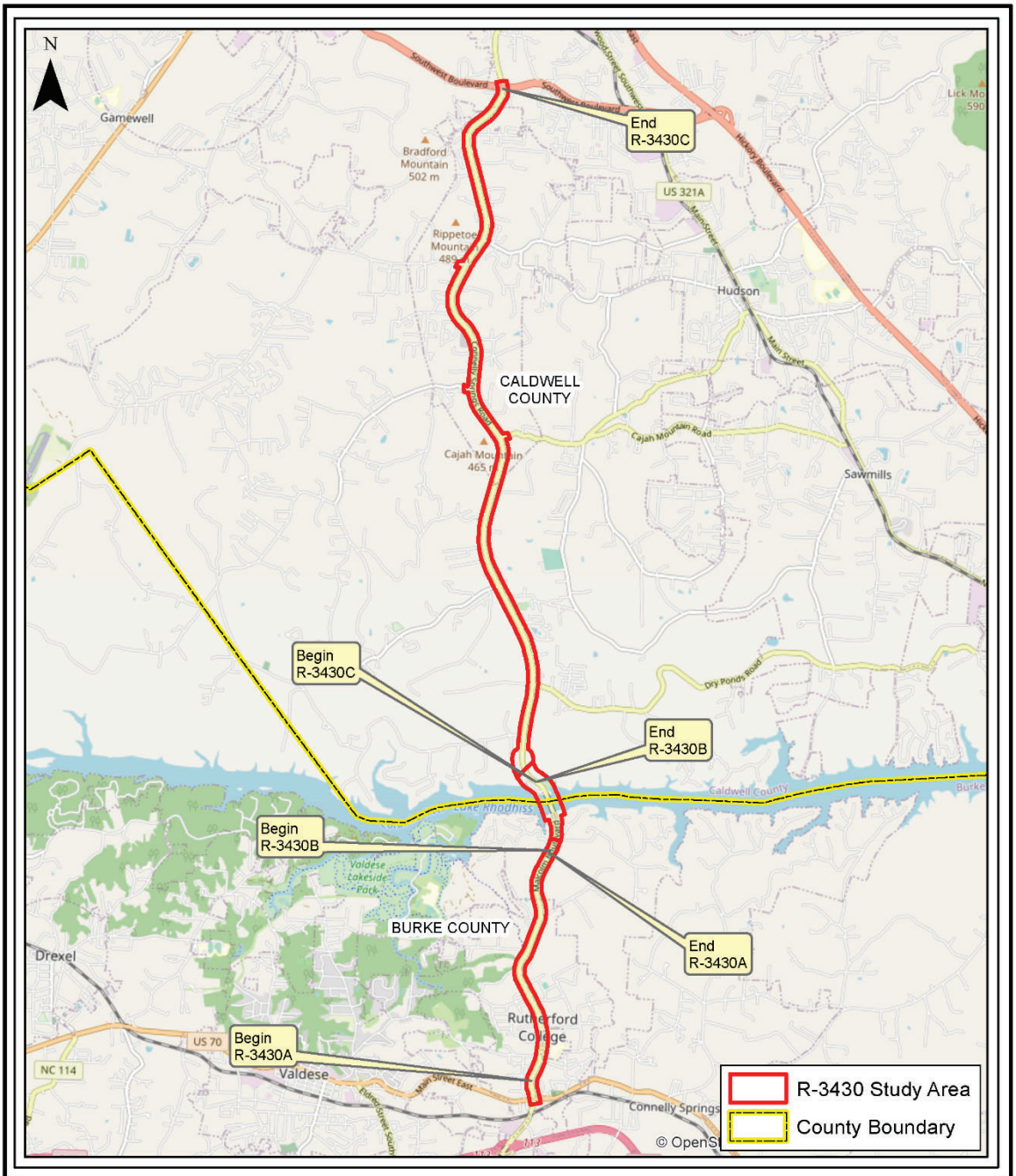
Appendix A. Figures





THREE OAKS ENGINEERING

Prepared For: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Replacement of Connelly Springs Road (SR 1001) Bridge (#110010) over the Catawba River
TIP R-3430B

R-3430 Project Vicinity Map

Burke & Caldwell Counties, North Carolina

Date: November 2022

Scale: 0 2,000 4,000 Feet

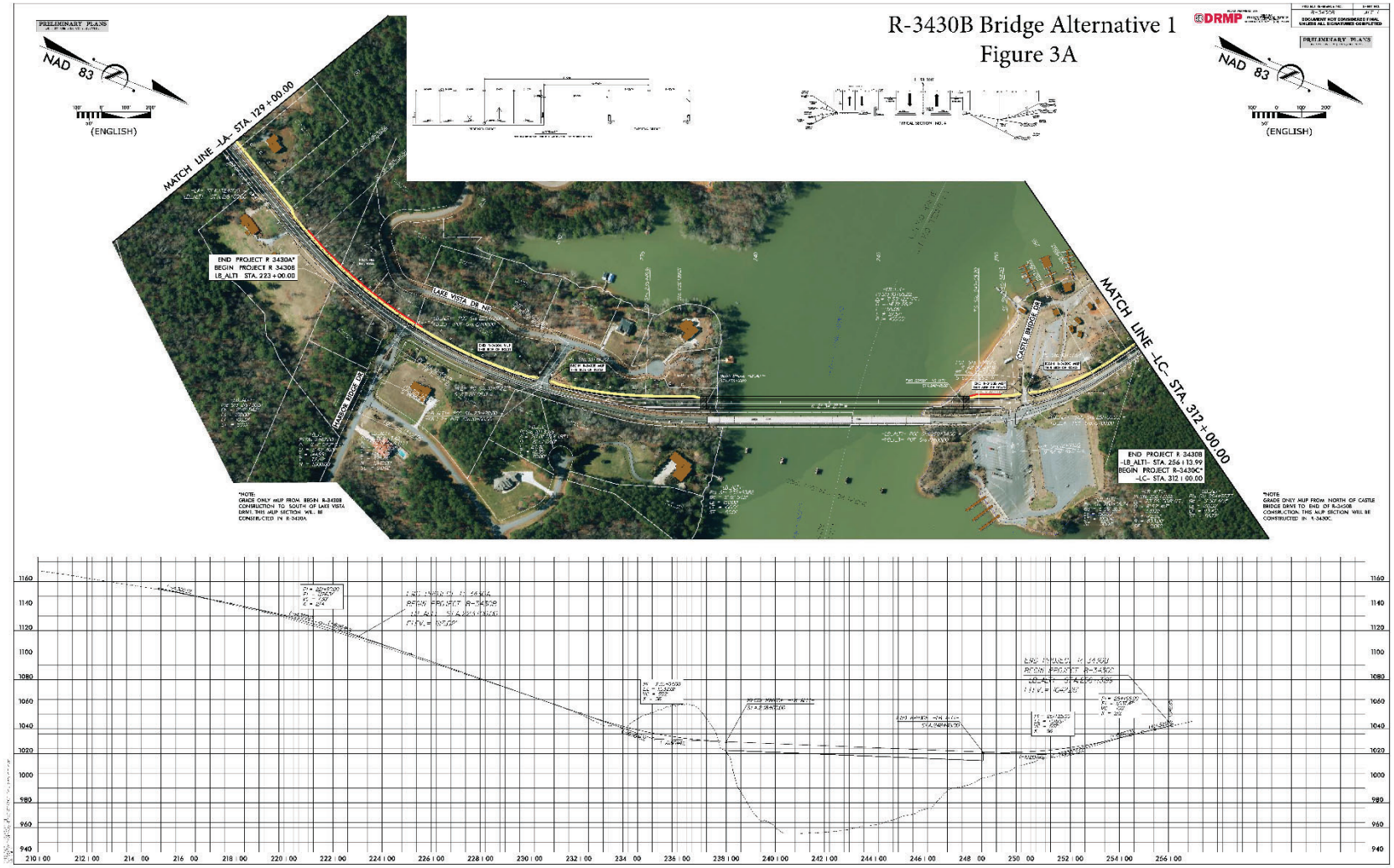
Job No.: 21-311

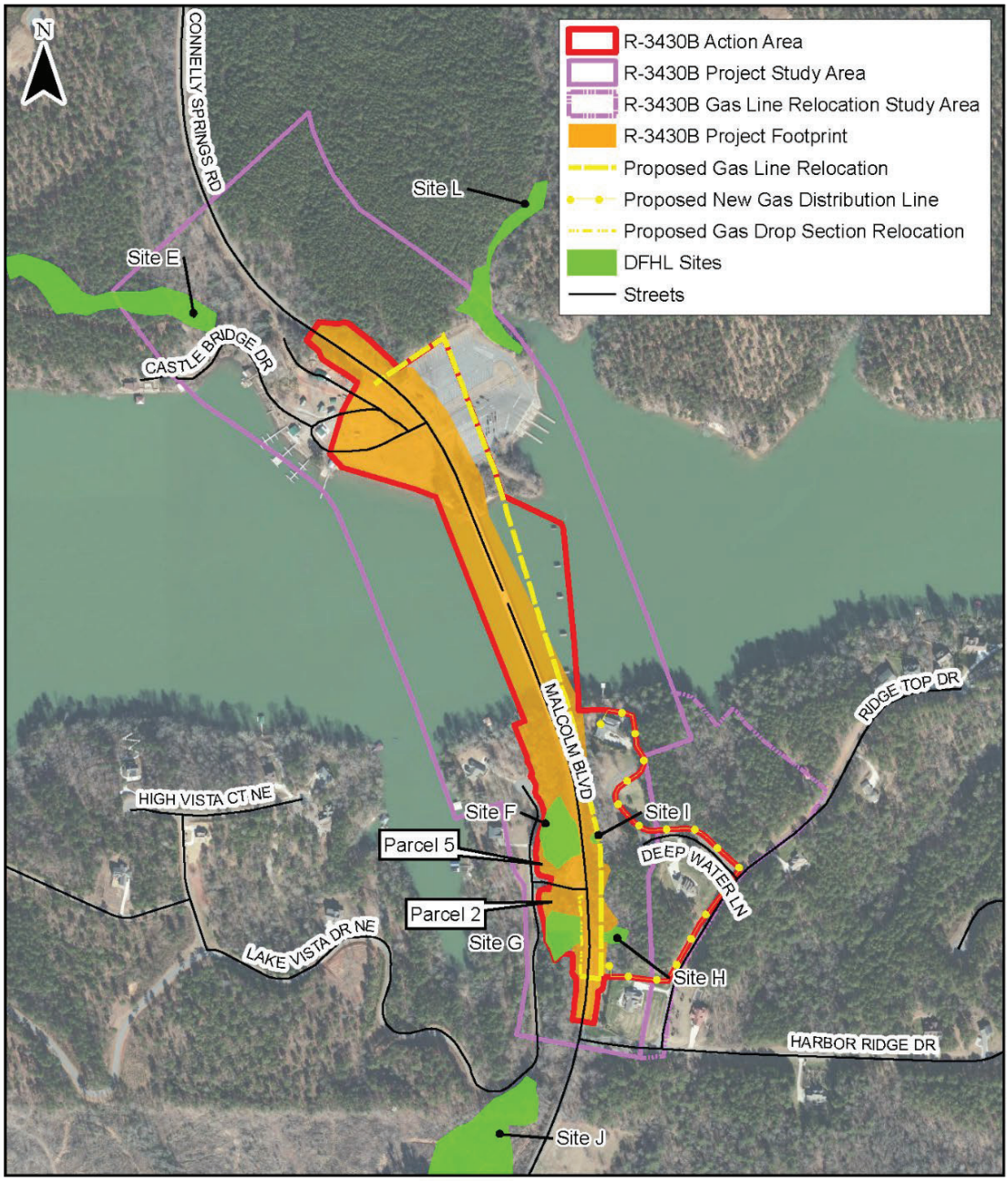
Drawn By: NMSO

Checked By: MF

Figure 2

R-3430B Bridge Alternative 1
Figure 3A





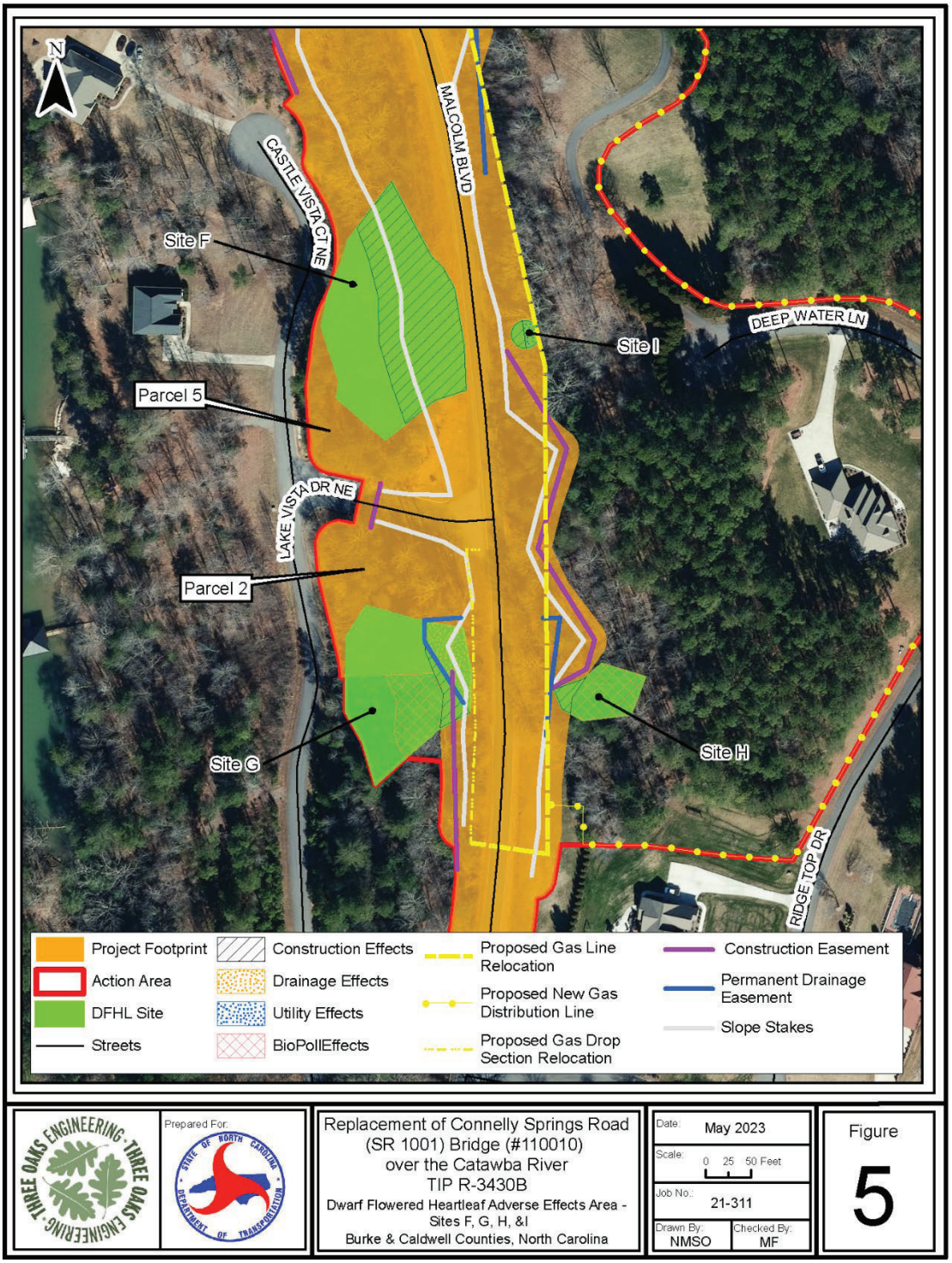
THREE OAKS ENGINEERING

Prepared For: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Replacement of Connelly Springs Road
(SR 1001) Bridge (#110010)
over the Catawba River
TIP R-3430B
R-3430B Action Area
Burke & Caldwell Counties, North Carolina

Date:	May 2023
Scale:	0 200 400 Feet
Job No.:	21-311
Drawn By: KEMS	Checked By: MF

Figure
4



THREE OAKS ENGINEERING

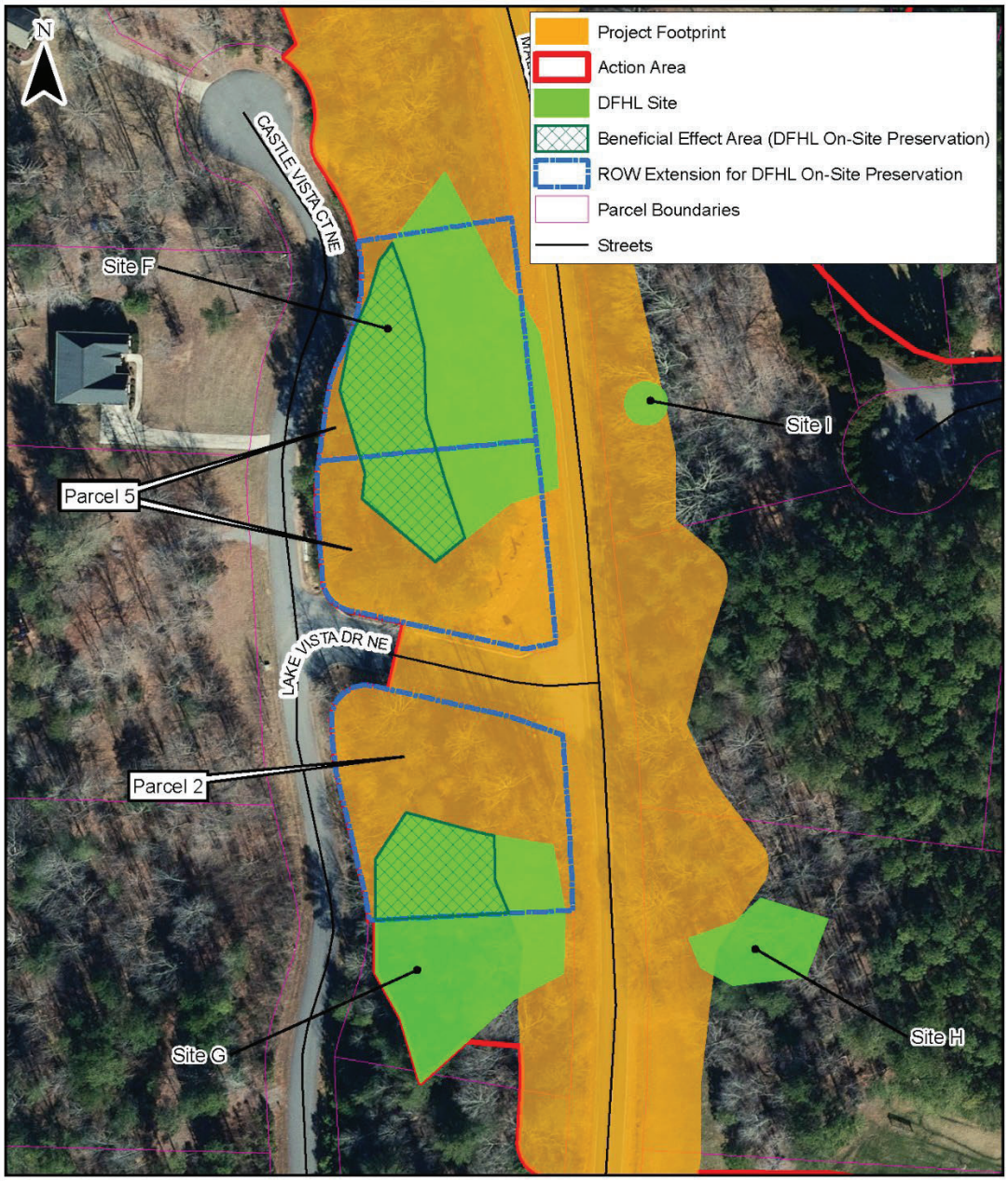
Prepared For:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Replacement of Connelly Springs Road
(SR 1001) Bridge (#110010)
over the Catawba River
TIP R-3430B
Dwarf Flowered Heartleaf Adverse Effects Area - Sites F, G, H, &I
Burke & Caldwell Counties, North Carolina

Date:	May 2023
Scale:	0 25 50 Feet
Job No.:	21-311
Drawn By: NMSO	Checked By: MF

Figure 5



THREE OAKS ENGINEERING

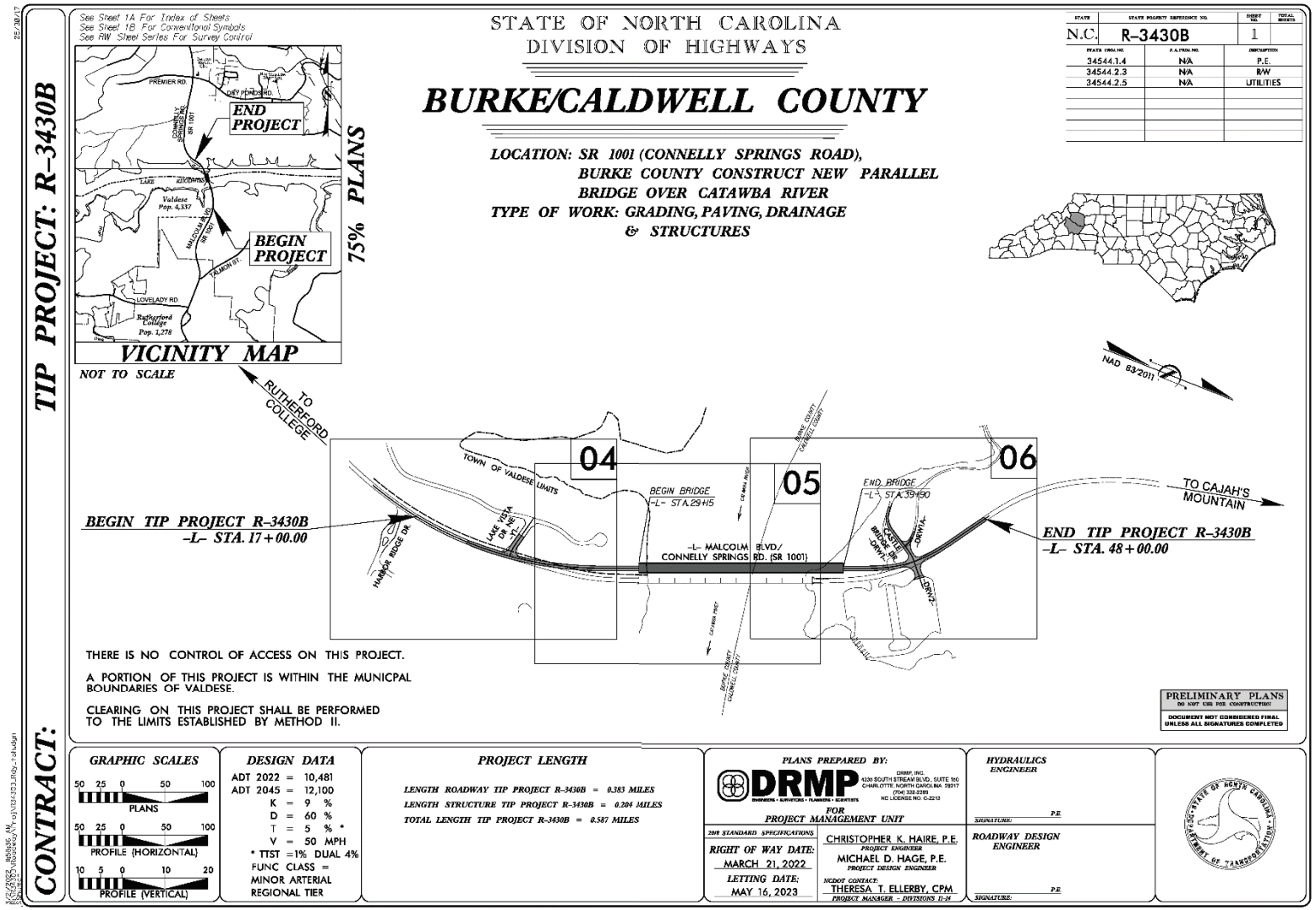
Prepared For: STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

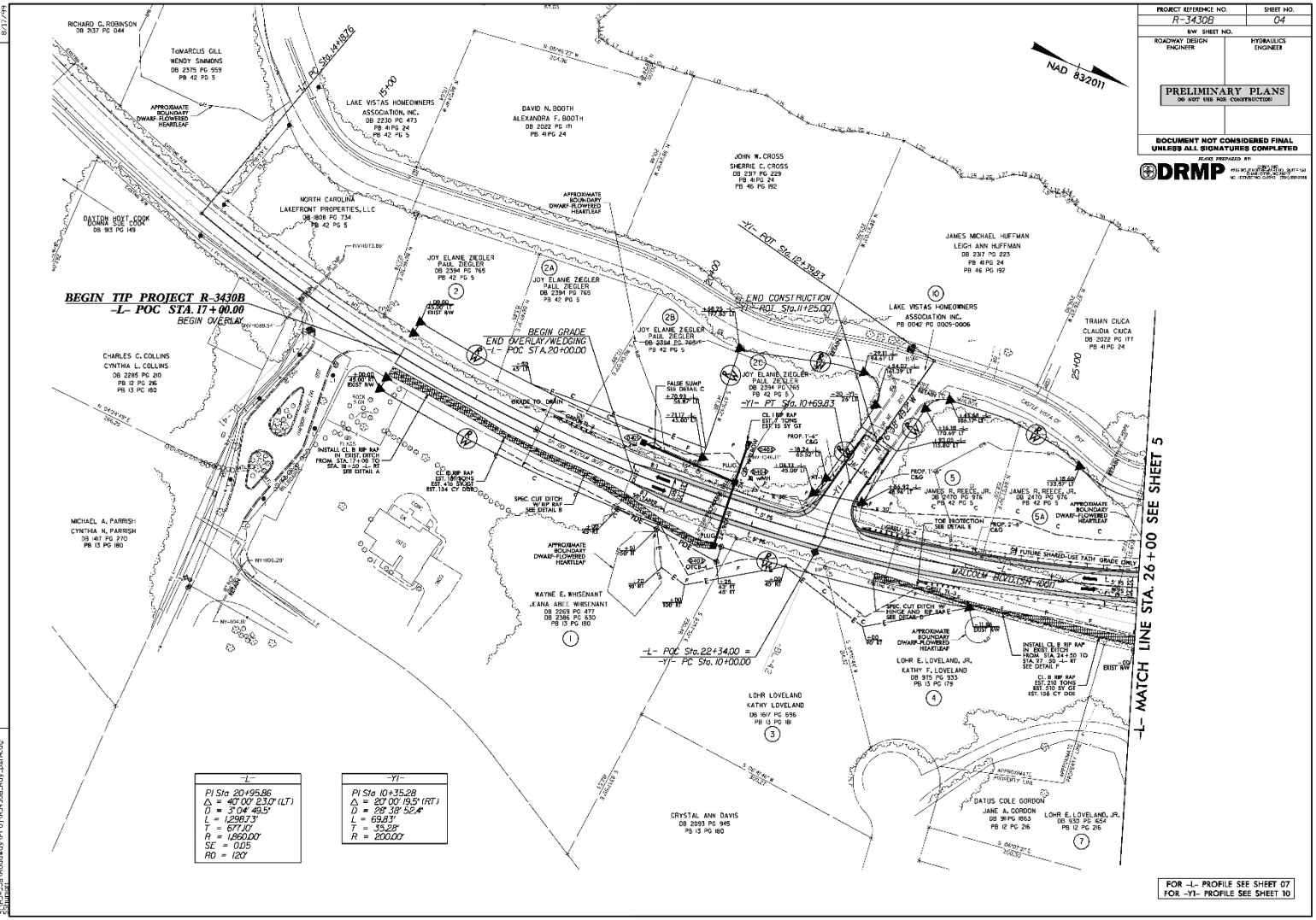
Replacement of Connelly Springs Road
(SR 1001) Bridge (#110010)
over the Catawba River
TIP R-3430B
Dwarf Flowered Heartleaf Beneficial Effects Area
(On-Site Preservation)
Burke & Caldwell Counties, North Carolina

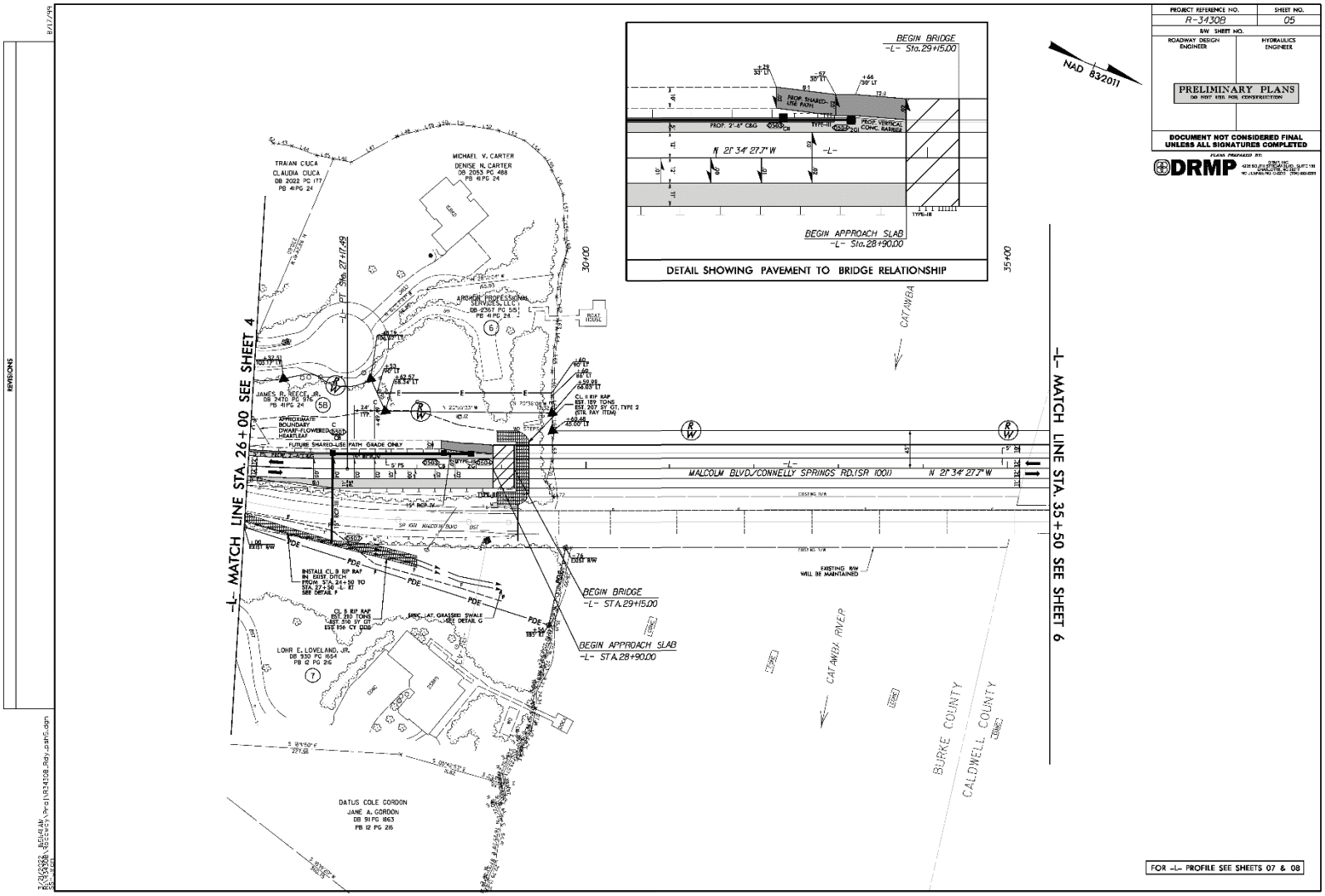
Date:	May 2023
Scale:	0 25 50 Feet
Job No.:	21-311
Drawn By: NMSO	Checked By: MF

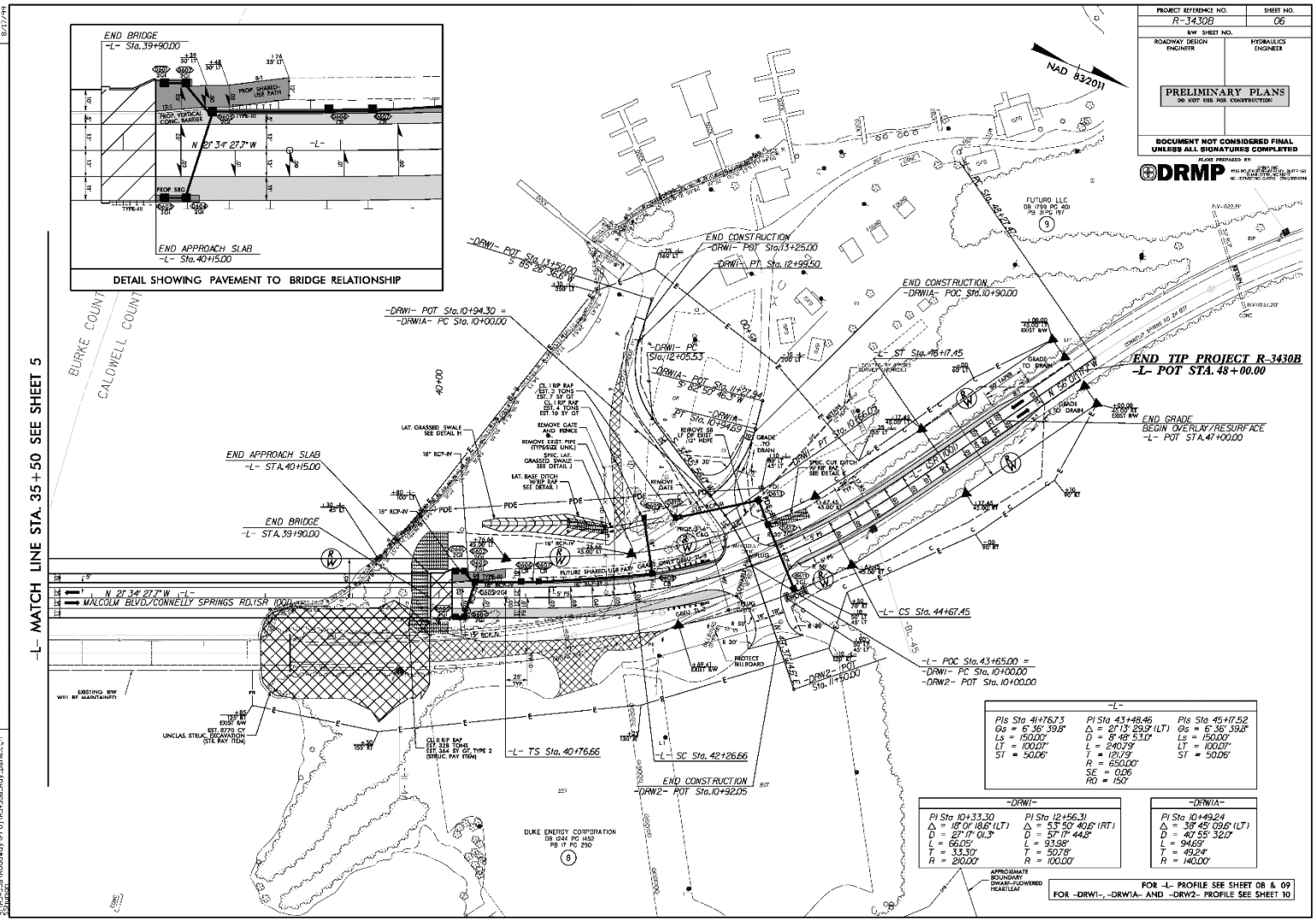
Figure 6

Appendix B. Selected Design Plans




PROJECT REFERENCE NO.
R-3430B
SHEET NO.
04
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DRMP
NAD 83/2011
BEGIN TIP PROJECT R-3430B
-L- POC STA. 17+00.00
BEGIN OVERLAY
END OVERLAY/WEDGING
-L- POC STA. 20+00.00
BEGIN GRADE
END CONSTRUCTION
-Y1- POT STA. 12+39.83
-Y1- PT STA. 10+69.83
-L- POC STA. 22+34.00 =
-Y1- PC STA. 10+00.00
-L- PC STA. 14+18.76
-L- MATCH LINE STA. 26+00 SEE SHEET 5
MALCOLM BLVD (SR 1001)
FUTURE SHARED-USE PATH GRADE ONLY
RICHARD C. ROBINSON
DB 3137 PG 044
TOMARCUS GILL
WENDY SIMMONS
DB 2375 PG 559
PB 42 PG 5
LAKE VISTAS HOMEOWNERS ASSOCIATION, INC.
DB 2230 PG 473
PB 41 PG 24
PB 42 PG 5
DAVID N. BOOTH
ALEXANDRA F. BOOTH
DB 2022 PG 171
PB 41 PG 24
JOHN W. CROSS
SHERRIE C. CROSS
DB 2317 PG 229
PB 41 PG 24
PB 46 PG 192
NORTH CAROLINA LAKEFRONT PROPERTIES, LLC
DB 1808 PG 734
PB 42 PG 5
DAYTON HOYT COOK
DONNA SUE COOK
DB 913 PG 149
JOY ELAINE ZIEGLER
PAUL ZIEGLER
DB 2394 PG 765
PB 42 PG 5
JAMES MICHAEL HUFFMAN
LEIGH ANN HUFFMAN
DB 2317 PG 223
PB 41 PG 24
PB 46 PG 192
LAKE VISTAS HOMEOWNERS ASSOCIATION INC.
DB 0042 PG 0005-0006
TRAIAN CIUCA
CLAUDIA CIUCA
DB 2022 PG 177
PB 41 PG 24
CHARLES C. COLLINS
CYNTHIA L. COLLINS
DB 2285 PG 210
PB 12 PG 216
PB 13 PC 183
MICHAEL A. PARRISH
CYNTHIA N. PARRISH
DB 1417 PG 270
PB 13 PG 180
WAYNE E. WHISENANT
JEANA ABEE WHISENANT
DB 2269 PG 477
DB 2386 PG 630
PB 13 PG 180
LOHR E. LOVELAND, JR.
KATHY F. LOVELAND
DB 915 PG 333
PB 13 PC 179
LOHR LOVELAND
KATHY LOVELAND
DB 1517 PG 696
PB 13 PG 181
CRYSTAL ANN DAVIS
DB 2093 PG 945
PB 13 PG 180
JAMES R. REECE, JR.
DB 2470 PG 976
PB 42 PG 5
DATUS COLE GORDON
JANE A. GORDON
DB 961 PG 1863
PB 12 PG 216
LOHR E. LOVELAND, JR.
DB 930 PG 624
PB 12 PG 216
-L-
PI Sta 20+95.86
Δ = 40°00' 23.0" (LT)
D = 3°04' 49.5"
L = 1,298.73'
T = 677.10'
R = 1,860.00'
SE = 0.05
RO = 120'
-Y1-
PI Sta 10+35.28
Δ = 20°00' 19.5" (RT)
D = 19°39' 52.4"
L = 69.83'
T = 35.28'
R = 200.00'
FOR -L- PROFILE SEE SHEET 07
FOR -Y1- PROFILE SEE SHEET 10
REVISIONS
8/17/99


PROJECT REFERENCE NO.
R-3430B
SHEET NO.
05
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
DRMP
NAD 83/2011
BEGIN BRIDGE
-L- Sta. 29+15.00
BEGIN APPROACH SLAB
-L- Sta. 28+90.00
DETAIL SHOWING PAVEMENT TO BRIDGE RELATIONSHIP
-L- MATCH LINE STA. 26+00 SEE SHEET 4
-L- MATCH LINE STA. 35+50 SEE SHEET 6
MALCOLM BLVD/CONNELLY SPRINGS RD.(SR 1001)
N 21°34' 27.7" W
CATAWBA
CATAWBA RIVER
BURKE COUNTY
CALDWELL COUNTY
BEGIN BRIDGE
-L- STA. 29+15.00
BEGIN APPROACH SLAB
-L- STA. 28+90.00
EXISTING R/W WILL BE MAINTAINED
TRAIAN CIUCA
CLAUDIA CIUCA
DB 2022 PG 177
PB 41 PG 24
MICHAEL V. CARTER
DENISE N. CARTER
DB 2053 PG 468
PB 41 PG 24
ARSHON PROFESSIONAL SERVICES, LLC
DB 2367 PG 515
PB 41 PG 24
JAMES D. REECE JR.
DB 3470 PG 814
PB 41 PG 24
LOHR E. LOVELAND, JR.
DB 930 PG 1024
PB 12 PG 216
DATUS COLE GORDON
JANE A. GORDON
DB 91 PG 863
PB 12 PG 216
FUTURE SHARED-USE PATH GRADE ONLY
PROP. SHARED-USE PATH
PROP. 2'-4" CB/G
TYPE-III
PROP. VERTICAL CONC. BARRIER
TYPE-IIB
CL. B RIP RAP
EST. 109 TONS
EST. 207 SY GT, TYPE 2
(STA. RAY. ITEM)
INSTALL CL B RIP RAP IN EXIST. DITCH FROM STA. 24+50 TO STA. 27+50 -L- RT SEE DETAIL P
CL. B RIP RAP
EST. 210 TONS
EST. 210 SY GT
EST. 156 CY DCG
SEC. AT GRASSED SWALE SEE DETAIL G
PDE
EXIST. R/W
FOR -L- PROFILE SEE SHEETS 07 & 08
REVISIONS
8/17/99


PROJECT REFERENCE NO.
R-3430B
SHEET NO.
06
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED
PLANS PREPARED BY:
DRMP
NAD 83/2011
DETAIL SHOWING PAVEMENT TO BRIDGE RELATIONSHIP
END BRIDGE
-L- Sta. 39+90.00
END APPROACH SLAB
-L- Sta. 40+15.00
PROP. SHARED-USE PATH
PROP. VERTICAL CONC. BARRIER
N 21° 34' 27.7" W
-L-
PROP. SRD
-L- MATCH LINE STA. 35+50 SEE SHEET 5
BURKE COUNTY
CALDWELL COUNTY
END APPROACH SLAB
-L- STA. 40+15.00
END BRIDGE
-L- STA. 39+90.00
N 21° 34' 27.7" W -L-
MALCOLM BLVD./CONNELLY SPRINGS RD.(SR 1001)
EXISTING R/W WILL BE MAINTAINED
UNCLAS. STRUC. EXCAVATION (STR. PAY ITEM)
-L- TS Sta. 40+76.66
-L- SC Sta. 42+26.66
END CONSTRUCTION
-DRW2- POT Sta. 10+92.05
-DRW1- POT Sta. 13+50.00
S 85° 56' 36.0" W
-DRW1- POT Sta. 10+94.30 =
-DRW1A- PC Sta. 10+00.00
END CONSTRUCTION
-DRW1- POT Sta. 13+25.00
-DRW1- PT Sta. 12+99.50
END CONSTRUCTION
-DRW1A- POC Sta. 10+90.00
-DRW1- PC
Sta. 12+05.53
-DRW1A- POT Sta. 11+27.94
S 82° 50' 46.3" W
-DRW1A-
PT Sta. 10+94.59
-DRW1- PT Sta. 10+86.03
-L- ST Sta. 46+17.45
END TIP PROJECT R-3430B
-L- POT STA. 48+00.00
END GRADE
BEGIN OVERLAY/RESURFACE
-L- POT STA. 47+00.00
-L- CS Sta. 44+67.45
-L- POC Sta. 43+65.00 =
-DRW1- PC Sta. 10+00.00
-DRW2- POT Sta. 10+00.00
-DRW2- PCL
Sta. 10+00.00
FUTURO LLC
DB 1799 PG 401
PB 3 PG 157
DUKE ENERGY CORPORATION
DB 1944 PG 1452
PB 17 PG 250
-L-
PI's Sta 41+76.73
Δs = 6° 36' 39.8"
Ls = 150.00'
LT = 100.07'
ST = 50.06'
PI Sta 43+48.46
Δ = 27° 13' 29.9" (LT)
D = 8° 48' 53.0"
L = 240.79'
T = 121.79'
R = 650.00'
SE = 0.06
R0 = 150'
PI's Sta 45+17.52
Δs = 6° 36' 39.8"
Ls = 150.00'
LT = 100.07'
ST = 50.06'
-DRW1-
PI Sta 10+33.30
Δ = 18° 01' 18.8" (LT)
D = 27° 17' 01.3"
L = 66.05'
T = 33.30'
R = 210.00'
PI Sta 12+56.31
Δ = 53° 50' 40.6" (RT)
D = 57° 17' 44.8"
L = 93.98'
T = 50.78'
R = 100.00'
-DRW1A-
PI Sta 10+49.24
Δ = 38° 45' 09.6" (LT)
D = 40° 55' 32.0"
L = 94.69'
T = 49.24'
R = 140.00'
APPROXIMATE BOUNDARY DRAIN-FLOWERED HEARTLEAF
FOR -L- PROFILE SEE SHEET 08 & 09
FOR -DRW1-, -DRW1A- AND -DRW2- PROFILE SEE SHEET 10
REVISIONS
8/17/99

Appendix C. Project Details

It is likely that the construction of Connelly Springs Road and other development in the action area have historically altered DFHL occurrences in the area by fragmenting sites and reducing available habitat.

4.0 Project Details

4.1 Project Construction

R-3430B bridge construction will take approximately two years, with 16 months for construction and 6 months for demolition.

4.1.1 Site Preparation

Site preparation will include land clearing, grubbing, and earthwork. Clearing of trees and other vegetation will prepare the project area for construction activities. Clearing will likely consist of cutting and removing above-ground vegetation such as brush and trees, removing downed timber and other vegetative debris, and salvaging marketable timber. Grubbing will follow clearing operations to remove any remaining surface vegetation, roots, and buried debris. Trees, stumps, and large roots will be removed from excavation areas to a depth sufficient to prevent such undesirable material from becoming mixed with the material being incorporated in the embankment. All extraneous matter will be removed and disposed of in fill or designated waste areas on or off-site by chipping, burying, or other methods of disposal, including burning.

Clearing and grubbing will take place within right-of-way (ROW) limits but may also occur in drainage easements and temporary construction easements, which may be used to store construction vehicles that are too large to travel on the road in one piece (e.g., haul trucks, earthmovers, large dozers, large excavators, backhoes, etc.). These areas are also used to store supplies (erosion control materials, steel rebar and mesh, small diameter culverts, traffic signs and posts, office trailers, etc.).

Earthwork includes all earth moving activities that occur for bridge replacements, including associated activities such as preparation of staging areas, bridge approaches, alignments, embankments, fill, foundations, toe trenches, waste areas, borrow areas, temporary access road construction, utility relocation, stormwater treatment, ditch construction and stabilization, and landscaping. Specific earthwork practices can include excavating (cutting), filling, ditching, backfilling, grading, embankment construction, augering, disking, ripping, grading, leveling, and borrowing and wasting of materials. Typical earthmoving equipment used includes haul trucks, dozers, excavators, scrapers, backhoes, and tractors. Approach work to the bridge will include cut and fill for a future 10-ft wide shared-use path on the west side of Malcolm Blvd, extending from the bridge south to Lake Vista Drive.

4.1.2 Construction Access and Staging

Construction access and staging areas will be ultimately determined by the selected contractor after letting. Project specifications and contracts will require that access and staging areas be located in upland areas and an environmental review of any areas outside the proposed project footprint will be performed. This review would include wetland and stream delineation as well as evaluation of the area for potential habitat and presence of any listed species, including DFHL. No access or staging area will be permitted within DFHL sites.

The contractor may use locations outside the action area for borrow pits or spoil areas to dispose of or obtain materials for earthwork. Most borrow and waste areas are sited in upland areas of previously disturbed habitat where vegetation removal is minimal. Construction contractors are responsible for addressing federally listed threatened and endangered species issues per NCDOT standard specifications, including the use of borrow/waste sites.

Contractors must submit plans for borrow pits/staging sites to NCDOT's Resident Engineer. The plans are reviewed by the Roadside Environmental Field Operations Engineer and Division Environmental Officer prior to approval. Details can be found at:
https://connect.ncdot.gov/resources/roadside/FieldOperationsDocuments/Contract%20Reclamation%20Procedures.pdf.

4.1.3 Bridge Construction/Demolition

There will be a new bridge structure constructed parallel to the existing bridge with an offset of 67 feet to the west. Construction of the new bridge will require the use of temporary causeways for the construction of a bent and the removal of an existing bent. Barges will be used for the remaining bents.

Percussive activities such as pile-driving will occur for the new bridge substructure. Drilling for interior bents may also occur. It is not known what time of year percussive activities will take place, but they may occur while bats are active on the landscape (approximately April 1 – October 15). The length of time for pile-driving should be one week, since only one bent (end bent #2, north end of bridge) will be on piles.

End bent #1 (southern end of bridge) is anticipated to be a spread footing. Depending on the rock quality, equipment-mounted demolition hammers or limited blasting (one to two blasts) may be needed at this location to remove rock to the required elevation for bent construction. This work is estimated to take two to three weeks, at most.

Additional construction work will include concrete and girder delivery, girder placement, and concrete pours. Nighttime concrete pouring may be required if it coincides with hot weather during summer months. Up to 12 nights of work may be necessary. Guardrail installation will also take place along bridge approaches. These activities may occur during the bat active season (approximately April 1 – October 15).

Once traffic flow has been moved to the new bridge, the old one will be demolished using a tractor trailer, cranes, and possibly a track hoe. The deck will be removed first, followed by the girders, then bridge supports. Remnant bents to the east of the existing bridge will also be demolished and removed during this stage.

4.1.4 Drainage

The R-3430B bridge replacement will include some drainage work on both sides of Malcolm Blvd. A 24-inch diameter corrugated metal pipe under Malcolm Blvd will be replaced. At the western end of the pipe, riprap will be placed to prevent erosion at the outlet. Work will take place in DFHL Site G, see Section 5.1.2 for effects analysis. Other drainage work just outside of Site G is the construction of a 15-inch pipe parallel to the road, which will carry stormwater to the 24-inch pipe. See Plan Sheet 4 in Appendix C for details, station numbers 20+00 to 21+00, approximately. No drainage work will occur in

DFHL Site F. On the east side of Malcolm Blvd, one of the existing roadside ditches will be realigned just outside Site H from station numbers 19+50 to 21+00, approximately (Plan Sheet 4 in Appendix C). Riprap will be used to prevent ditch erosion.

4.1.5 Utilities

There was a four-inch Charter-Spectrum line on the east side of the existing bridge. The line was abandoned and removed in 2022. No further utility work is anticipated for this line in the action area.

A short 8-inch diameter section of buried gas line just west of Malcolm Blvd and south of Lake Vista Drive will be relocated to avoid a conflict with a proposed section of guardrail. Duke Energy is scheduled to construct this "drop section" in May 2023 and have work completed prior to the current R-3430B Let Date of 1/16/2024. This work will occur adjacent to, but outside of DFHL Site G (see Appendix A, Figure 5 for details).

A Duke Energy gas line is currently attached to Bridge #110010 over the Catawba River; it will be relocated as result of the project. Although the gas line work will have its own federal permit from the Federal Energy Regulatory Commission (FERC), it is included in the R-3430B action area and effects analysis, since it would not occur but for the bridge replacement. The gas line relocation area starts north of the river, continues under the river 90-140 ft east of the existing bridge, and is anticipated to run primarily within the project footprint on the east side of Malcolm Blvd south of the river (Appendix A, Figure 4). Approximately 350 feet of the relocated gas line may run outside the construction footprint for the bridge (the exact gas line location has not been determined yet), so as a worst-case scenario, the project footprint has been extended 25 ft further east to allow for additional room for the gas line. The exact schedule for the gas line relocation has not yet been determined.

In conjunction with the relocated gas line, the action area also includes a Duke Energy distribution gas main to be built along Deep Water Lane (Appendix A, Figure 4). The exact schedule for this work has not yet been determined. All gas line work will be funded by Duke Energy.

4.1.6 Post-Project Site Restoration

Upon conclusion of the construction of the new roadway, disturbed areas will be re-vegetated. Typically, this will involve reseeding with grasses suitable for stabilization and maintenance of roadway side slopes. Non-invasive species will be used in erosion control seed mixes. Borrow areas will be graded to drain and re-seeded. Temporary Best Management Practices (BMPs) such as silt fencing, check dams, and sediment basins will be removed.

4.2 Operations and Maintenance

Once traffic is released to the project, typical operations and maintenance activities will occur. This may include pre-treatment of roads prior to winter weather events, and snow plowing and ice removal after the events. Mowing of side slopes will be performed at regular intervals. In addition, bridge cleaning and painting, and ditch maintenance will be conducted as the need for these arise.

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 16, 2022

DWR # 20221711
Burke and Caldwell County

Mr. Michael A. Turchy
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, NC 27699

Subject: **APPROVAL OF 401 WATER QUALITY CERTIFICATION WITH ADDITIONAL CONDITIONS**
Replace Bridge 10 on SR 1001 (R-3430B)
Catawba River (Lake Rhodhiss) [Catawba River Basin, 03050101, WS-IV, B; CA]

Dear Mr. Turchy:

You have our approval for the impacts listed below for the purpose described in your application dated December 1, 2022 and received by the Division of Water Resources (Division) on December 1, 2022. These impacts are covered by the attached Water Quality General Certification Number 4135 and the conditions listed below. This certification is associated with the use of General Permit Number 201902350 once it is issued to you by the U.S. Army Corps of Engineers. Please note that you should get any other federal, state, or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

The Division has determined that the proposed project will comply with water quality requirements provided that you adhere to the conditions listed in the enclosed certification and to the additional conditions itemized below.

The following proposed impacts are hereby approved. No other impacts are approved, including incidental impacts. [15A NCAC 02H .0506(b)]

Open Water Impacts in the Catawba River Basin

Site	Temporary Impacts (acres)	Total Open Water Impact (acres)
O1	0.06	0.06
O2	0.19	0.19
O3	0.02	0.02
Total	**0.27**	**0.27**

Total Open Water Impact for Project: 0.27 acres.

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Certification. If you change your project, you must notify the Division and you may be required to submit a new application package with the appropriate fee. If the property is sold, the new owner must be given a copy of this Certification and is responsible for complying with all conditions. [15A NCAC 02H .0507(d)(2)].

If you are unable to comply with any of the conditions of the attached Water Quality General Certification or with the additional conditions itemized below, you must notify the Asheville Regional Office within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.

The permittee shall report to the Asheville Regional Office any noncompliance with, and/or any violation of, stream or wetland standards [15A NCAC 02B .0200] including but not limited to sediment impacts to streams or wetlands. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the permittee became aware of the non-compliance circumstances.

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 potential issues at the permitted site. NCDWR staff shall be invited to the pre-construction meeting. [15A NCAC 02H.0506(b)(2) and (b)(3)]

2. Bridge deck drains shall not discharge directly into the lake. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. To meet the requirements of NCDOT's NPDES permit NCS000250, please refer to the most recent version of the *North Carolina Department of Transportation Stormwater Best Management Practices Toolbox* manual for approved measures. [15A NCAC 02H .0507(d)(2) and 15A NCAC 02H .0506(b)(5)]

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

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

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)]

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5] This Certification can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) **within sixty (60) calendar days**. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

One (1) copy of the Petition must also be served to the North Carolina Department of Environmental Quality:

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

This letter completes the review of the Division under section 401 of the Clean Water Act and 15A NCAC 02H .0500. Please contact Kevin Mitchell at 828-296-4650 or kevin.mitchell@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
9C986312DCD474...

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

ec: Lori Beckwith, US Army Corps of Engineers Asheville Regulatory Field Office (via email)
Dave McHenry, NC Wildlife Resources Commission (via email)
Holland Youngman, US Fish and Wildlife Service (via email)
Erin Cheely, NC Department of Transportation (via email)
Roger Bryan, NC Department of Transportation (via email)

File Copy

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 16, 2022

DWR # 20221711
Burke and Caldwell County

Mr. Michael A. Turchy
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, NC 27699

Subject: APPROVAL of CATAWBA RIPARIAN BUFFER IMPACTS WITH ADDITIONAL CONDITIONS
NCDOT TIP # R-3430B: Replace Bridge 10 on SR 1001 Burke and Caldwell Counties.
Catawba River (Lake Rhodhiss) [Catawba River Basin, 03050101, WS-IV, B; CA]

Dear Mr. Turchy:

You have our approval for the impacts listed below for the purpose described in your application dated December 1, 2022, received by the Division of Water Resources (Division) December 1, 2022. These impacts are covered by the Catawba Buffer Rules and the conditions listed below. Please note that you should get any other federal, state or local permits before proceeding with your project, including those required by (but not limited to) Sediment and Erosion Control, Non-Discharge, and Water Supply Watershed regulations.

The following impacts are hereby approved, provided that all of the Conditions listed below, and all of the conditions of the Catawba Buffer Rules are met. No other impacts are approved, including incidental impacts. [15A NCAC 02B.0611(b)(2)]

Catawba Riparian Buffer Impacts

Site	Zone 1 Impact (sq ft)	Zone 1 Buffer Mitigation Required (using 3:1 ratio)		Zone 2 Impact (sq ft)	Zone 2 Buffer Mitigation Required (using 1.5:1 ratio)
1	0	n/a		924	n/a
2	7,955	n/a		4,453	n/a
3	11,721	n/a		6,877	n/a
4	1,083	n/a		1,798	n/a
5	0	n/a		1,377	n/a
Totals	**20,759**	**0**		**15,429**	**0**

*** n/a = Total for Site is less than 1/3 acre, no mitigation required**
Total Buffer Impact for Project: 36,188 square feet.

This approval is for the purpose and design described in your application. The plans and specifications for this project are incorporated by reference as part of this Authorization Certificate. If you change your project, you must notify the Division and you may be required to submit a new application package. If the property is sold, the new owner must be given a copy of this Authorization Certificate and is responsible for complying with all conditions. [15A NCAC 02B .0611(b)(2)]

If you are unable to comply with any of the conditions below, you must notify the DWR Transportation Permitting Branch within 24 hours (or the next business day if a weekend or holiday) from the time the permittee becomes aware of the circumstances.
The permittee shall report to the Transportation Permitting Branch any noncompliance with the conditions of this Authorization Certificate and/or any violation of state regulated riparian buffer rules [15A NCAC 02B .0614]. Information shall be provided orally within 24 hours (or the next business day if a weekend or holiday) from the time the applicant became aware of the circumstances.

Additional Conditions:

1. All stormwater runoff shall be directed as sheetflow through stream buffers at non-erosive velocities, unless otherwise approved by this certification. [15A NCAC 02B .0614]

2. All riparian buffers impacted by the placement of temporary fill or clearing activities shall be restored to the preconstruction contours and revegetated. Maintained buffers shall be permanently revegetated with non-woody species by the end of the growing season following completion of construction. For the purpose of this condition, maintained buffer areas are defined as areas within the transportation corridor that will be subject to regular NCDOT maintenance activities including mowing. The area with non-maintained buffers shall be permanently revegetated with native woody species before the next growing season following completion of construction. [15A NCAC 02B .0614]

3. Pursuant to 15A NCAC 2B .0614, sediment and erosion control devices shall not be placed in Zone 1 of any Catawba Buffer without prior approval by the NCDWR. At this time, the NCDWR has approved no sediment and erosion control devices in Zone 1, outside of the approved project impacts, anywhere on this project. Moreover, sediment and erosion control devices shall be allowed in Zone 2 of the buffers provided that Zone 1 is not compromised and that discharge is released as diffuse flow.

This approval and its conditions are final and binding unless contested. [G.S. 143-215.5] This Authorization Certificate can be contested as provided in Chapter 150B of the North Carolina General Statutes by filing a Petition for a Contested Case Hearing (Petition) with the North Carolina Office of Administrative Hearings (OAH) within sixty (60) calendar days. Requirements for filing a Petition are set forth in Chapter 150B of the North Carolina General Statutes and Title 26 of the North Carolina Administrative Code. Additional information regarding requirements for filing a Petition and Petition forms may be accessed at http://www.ncoah.com/ or by calling the OAH Clerk's Office at (919) 431-3000.

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

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

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

This Authorization shall expire five (5) years from the date of this letter.

This letter completes the review of the Division under the Catawba Riparian Buffer Rules as described in 15A NCAC 02B .0614. Please contact Kevin Mitchell at 828-296-4650 or kevin.mitchell@ncdenr.gov if you have any questions or concerns.

Sincerely,

DocuSigned by:
Amy Chapman
9B9B8612DCD474...

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

ec:

Lori Beckwith, USACE Asheville Regulatory Field Office (via email)
Roger Bryan, NCDOT Division 13 Environmental Officer (via email)
Erin Cheely, NCDOT (via email)
Holland Youngman, US Fish and Wildlife Service (via email)
Dave McHenry, NC Wildlife Resources Commission (via email)
File Copy

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	34544.1.4	TIP/Proj No:	R-3430B	County(ies):	Burke Caldwell	Page	1	of	3

General Project Information

WBS Element:	34544.1.4	**TIP Number:**	R-3430B	**Project Type:**	Bridge Replacement	**Date:**	08/17/2022
NCDOT Contact:	Theresa T. Ellerby, CPM			**Contractor / Designer:**	DRMP NC, Inc. / Ryan P. Mitchell, PE		
Address:	1000 Birch Ridge Drive Raleigh, NC 27610			**Address:**	8000 Regency Parkway Suite 110 Cary, NC 27518		
Phone:	(919) 707-6020			**Phone:**	(919) 650-1038		
Email:	tellerby@ncdot.gov			**Email:**	rmitchell@drmp.com		
City/Town:	Town of Valdese / Town of Rutherford College			**County(ies):**	Burke	Caldwell	
River Basin(s):	Catawba			**CAMA County?**	No	No	
Wetlands within Project Limits?	No						

Project Description

Project Length (lin. miles or feet):	0.587 miles	**Surrounding Land Use:**	Light Residential / Recreational				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	2.1	ac.		1.5	ac.		
Typical Cross Section Description:	One (1) 12-foot travel lane each direction. 5-foot paved shoulders with roadway ditches on both sides. Guardrail and 2'-6" curb and gutter where applicable.			One (1) 11-foot travel lane each direction with roadway ditches on both sides.			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	12100	Year: 2045	Existing:	10481	Year:	2022

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

R-3430B proposes to replace the Castle Bridge over the Catawba River (Lake Rhodhiss) with additional roadway and drainage improvements upstation/downstation of the proposed bridge. Riprap/bank stabilization at pipe outlets, ditches, and the surface water bank has been incorporated to minimize erosion on slopes where vegetation will not be adequate. NCDOT standards for ground cover, vegetation, and slope stabilization will be adhered to during the life of this project, and will be specified in the NCDOT Erosion and Sediment Control Plan for the project.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element:	34544.1.4	**TIP/Proj No.:**	R-3430B	**County(ies):**	Burke Caldwell	**Page** 2	**of** 3

General Project Information

Waterbody Information ######

Surface Water Body (1):	Catawba River		**NCDWR Stream Index No.:**	DRMP NC, Inc. / Ryan P. Mitchell, PE		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Water Supply IV (WS-IV)	Class B	Critical Area (CA)	
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	None					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	Town of Valdese / Town of Rutherford College			**Buffer Rules in Effect:**	Catawba	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	No	**Dissipator Pads Provided in Buffer?**	No	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 3.00; Released August 2021)

WBS Element: 34544.1.4 **TIP/Proj No.:** R-3430B **County(ies):** Burke Caldwell

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-	40+50	LT	35.78130	-81.52585	(1)Catawba River	5	3	3	0.08	8	50	0.30%	12.56	1.47	16.65	1.60	Yes	Yes
6	-L-	41+00	LT	35.78142	-81.52591	(1)Catawba River	5	3	3	0.13	13	50	1.70%	12.46	2.72	16.52	2.96	Yes	Yes
6	-L-	42+00	LT	35.78167	-81.52602	(1)Catawba River	5	3	3	1.81	181	50	4.00%	12.30	3.65	16.31	3.98	Yes	Yes
6	-L-	42+50	LT	35.78177	-81.52610	(1)Catawba River	5	3	3	4.25	425	50	4.00%	5.57	2.82	7.38	3.10	Yes	Yes
5	-L-	28+50	RT	35.77850	-81.52360	(1)Catawba River	6	5.5	3	3.92	392	50	4.00%	6.62	2.77	8.77	3.03	Yes	Yes
5	-L-	29+00	RT	35.77863	-81.52363	(1)Catawba River	6	4.5	3	0.19	19	50	4.00%	6.89	2.85	9.14	3.12	Yes	Yes

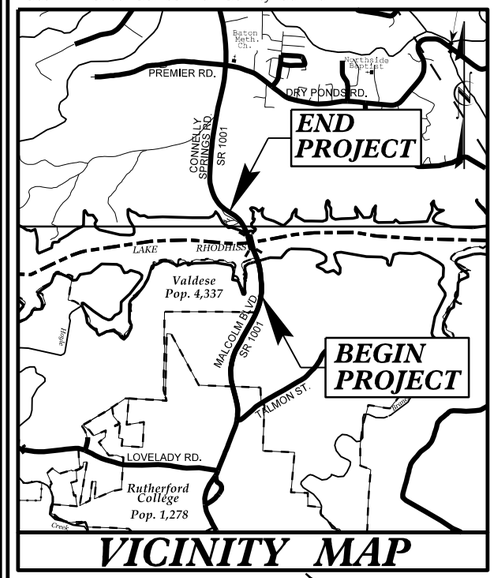
Additional Comments

Swales were designed at each end of the proposed bridge for as long as the topography allowed to promote diffuse flow into the buffer zone. Rock checks are proposed for all swales to account for not meeting recommended treatment length and V2 requirements. Swales at a minimum provide roughly 100 feet of treatment length per acre of impervious area draining to them in the post-construction condition. The proposed swale from -L- 40+50 to 43+00 LT has a total length of 200 feet that meets swale criteria and 2.18 acres of impervious area drained. The proposed swale from -L- 28+00 to 29+00 RT has a total length of 100 feet that meets swale criteria and 0.88 acres of impervious area drained.

05/30/17

TIP PROJECT: R-3430B

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See RW Sheet Series For Survey Control



VICINITY MAP

NOT TO SCALE

75% PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE/CALDWELL COUNTY

LOCATION: SR 1001 (CONNELLY SPRINGS ROAD), BURKE COUNTY CONSTRUCT NEW PARALLEL BRIDGE OVER CATAWBA RIVER

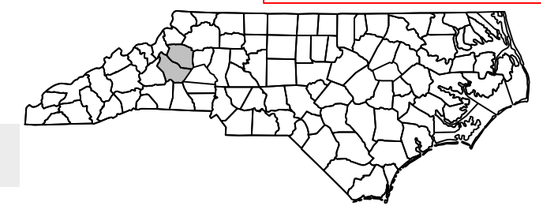
TYPE OF WORK: GRADING, PAVING, DRAINAGE & STRUCTURES

WETLAND AND SURFACE WATER IMPACTS PERMIT

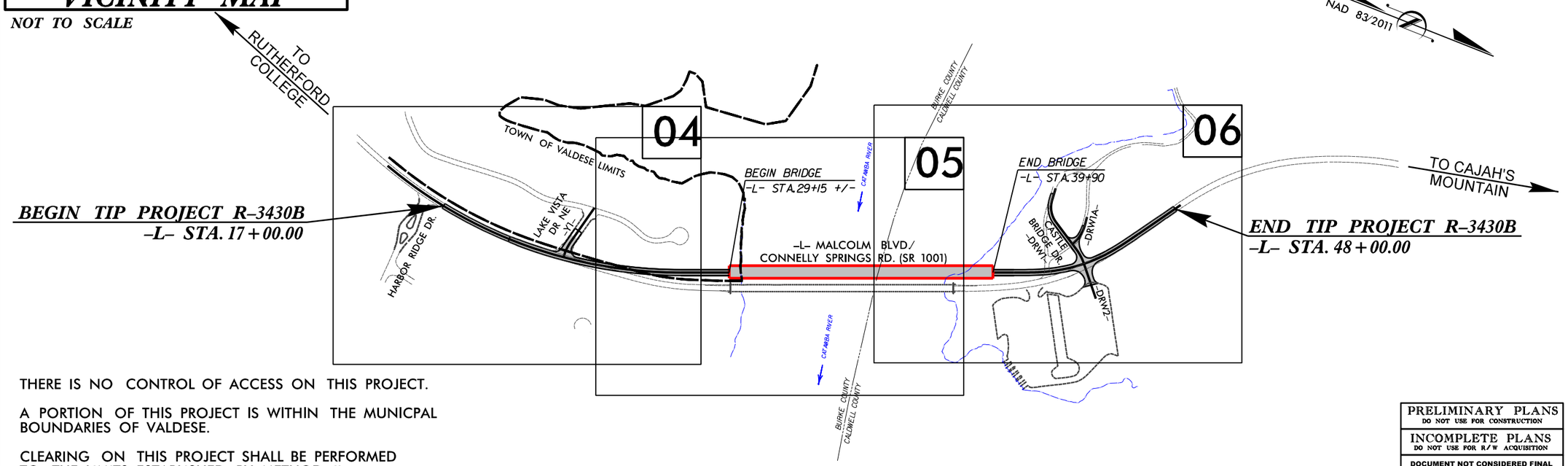
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3430B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34544.1.4	N/A	P.E.
34544.2.3	N/A	R/W
34544.2.5	N/A	UTILITIES

PERMIT DRAWING
SHEET 1 OF 8



NAD 83/2011



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

A PORTION OF THIS PROJECT IS WITHIN THE MUNICPAL BOUNDARIES OF VALDESE.

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

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

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 10,481
ADT 2045 = 12,100
K = 9 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST =1% DUAL 4%
FUNC CLASS =
MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3430B = 0.383 MILES
LENGTH STRUCTURE TIP PROJECT R-3430B = 0.204 MILES
TOTAL LENGTH TIP PROJECT R-3430B = 0.587 MILES

PLANS PREPARED BY:

DRMP
ENGINEERS SURVEYORS PLANNERS SCIENTISTS
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NORTH CAROLINA 28217
(704) 332-2289
NC LICENSE NO. C-4923

FOR
PROJECT MANAGEMENT UNIT

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 21, 2022

LETTING DATE:
JANUARY 16, 2024

CHRISTOPHER K. HAIRE, P.E.
PROJECT ENGINEER
MICHAEL D. HAGE, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
THERESA T. ELLERBY, CPM
PROJECT MANAGER – DIVISIONS 11-14

HYDRAULICS ENGINEER
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

08/16/2022 01:21:09 PM
R3430B_Hydraulics_PERMITS_Environmental\Drawings\R3430B_Hyd_prm_wet_tsh.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-3430B	2D-1
R/W SHEET NO.	

HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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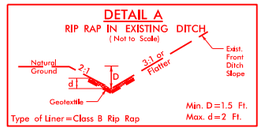
PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

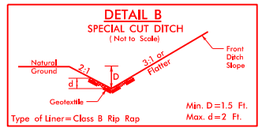
PERMIT DRAWING
SHEET 2 OF 8

DETAIL A
RIP RAP IN EXISTING DITCH
(Not to Scale)



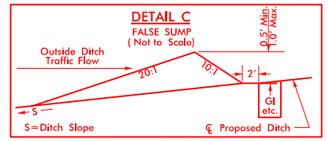
FROM STA. 17+00 TO STA. 18+50 –L– RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



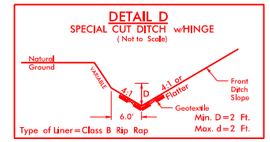
FROM STA. 18+50 TO STA. 20+00 –L– RT

DETAIL C
FALSE SUMP
(Not to Scale)



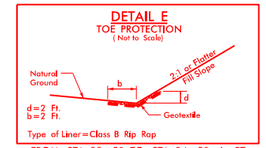
AT STA. 20+00 –L– LT

DETAIL D
SPECIAL CUT DITCH wHINGE
(Not to Scale)



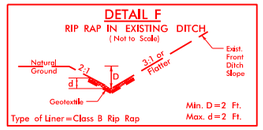
FROM STA. 23+00 TO STA. 23+50 –L– RT

DETAIL E
TOE PROTECTION
(Not to Scale)



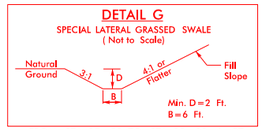
FROM STA. 23+50 TO STA. 24+50 –L– RT

DETAIL F
RIP RAP IN EXISTING DITCH
(Not to Scale)



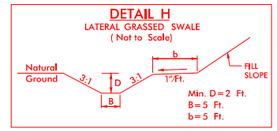
FROM STA. 24+50 TO STA. 27+50 –L– RT

DETAIL G
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



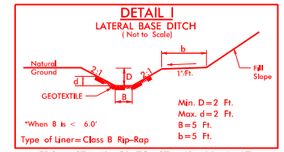
FROM STA. 27+50 TO STA. 29+00 –L– RT
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL H
LATERAL GRASSED SWALE
(Not to Scale)



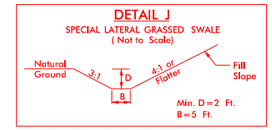
FROM STA. 40+50 TO STA. 41+50 –L– LT
EST. 67 CY DDE
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL I
LATERAL BASE DITCH
(Not to Scale)



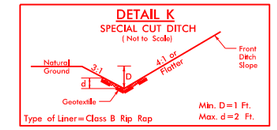
FROM STA. 41+50 TO STA. 42+00 –L– LT
EST. 76 CY DDE
CL. B RIP RAP: EST. 28 TONS, EST. 66 SY GT, EST. 21 CY DDE

DETAIL J
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



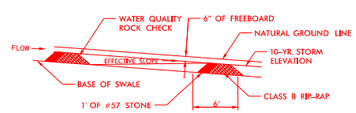
FROM STA. 42+00 TO STA. 43+00 –L– LT
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL K
SPECIAL CUT DITCH
(Not to Scale)

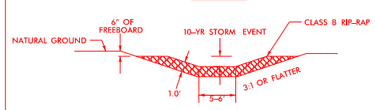


FROM STA. 44+00 LT TO STA. 44+50 –L– LT
CL. B RIP RAP: EST. 24 TONS, EST. 55 SY GT, EST. 18 CY DDE

DETAIL L
TRAPEZOIDAL GRASSED SWALE
wROCK CHECK DAM
(Not to Scale)



PROFILE



TYPICAL SECTION

NOTES:

1) DO NOT USE INSIDE CLEAR RECOVERY AREA.
2) NOT PRACTICAL TO USE ON SLOPES > 5%.
3) TO BE USED AS PERMANENT STRUCTURES IN GRASS SWALES.
4) CHECK DAMS SHOULD BE SPACED SUCH THAT THE BASE OF THE UPSTREAM CHECK IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM CHECK.

PROJECT REFERENCE NO.	SHEET NO.
R-3430B	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

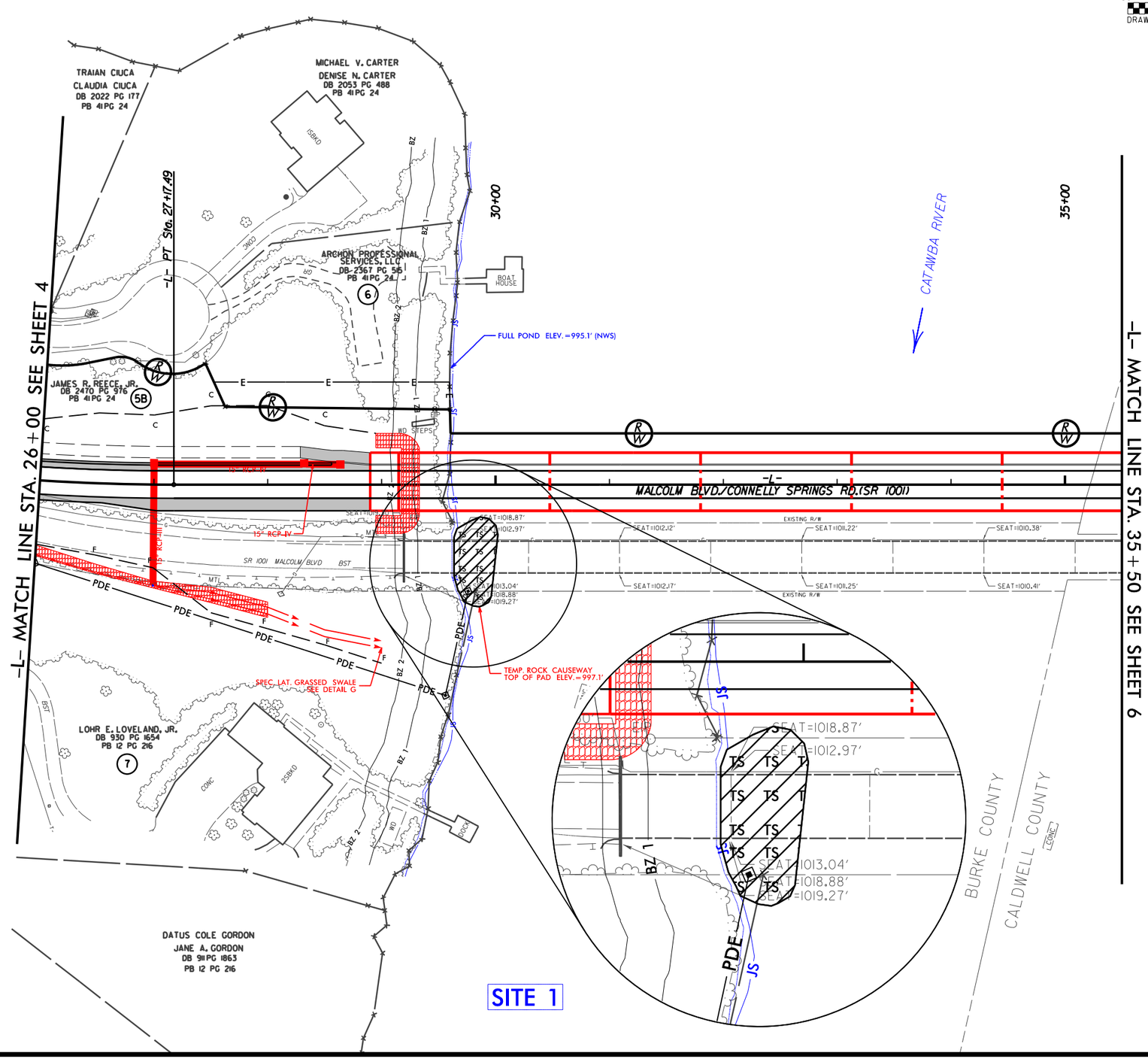
PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

PERMIT DRAWING
SHEET 3 OF 8

TS TEMPORARY SURFACE WATER IMPACTS

NAD 83/2011

50' 0' 50'
DRAWING SCALE



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PROJECT REFERENCE NO.	SHEET NO.
R-3430B	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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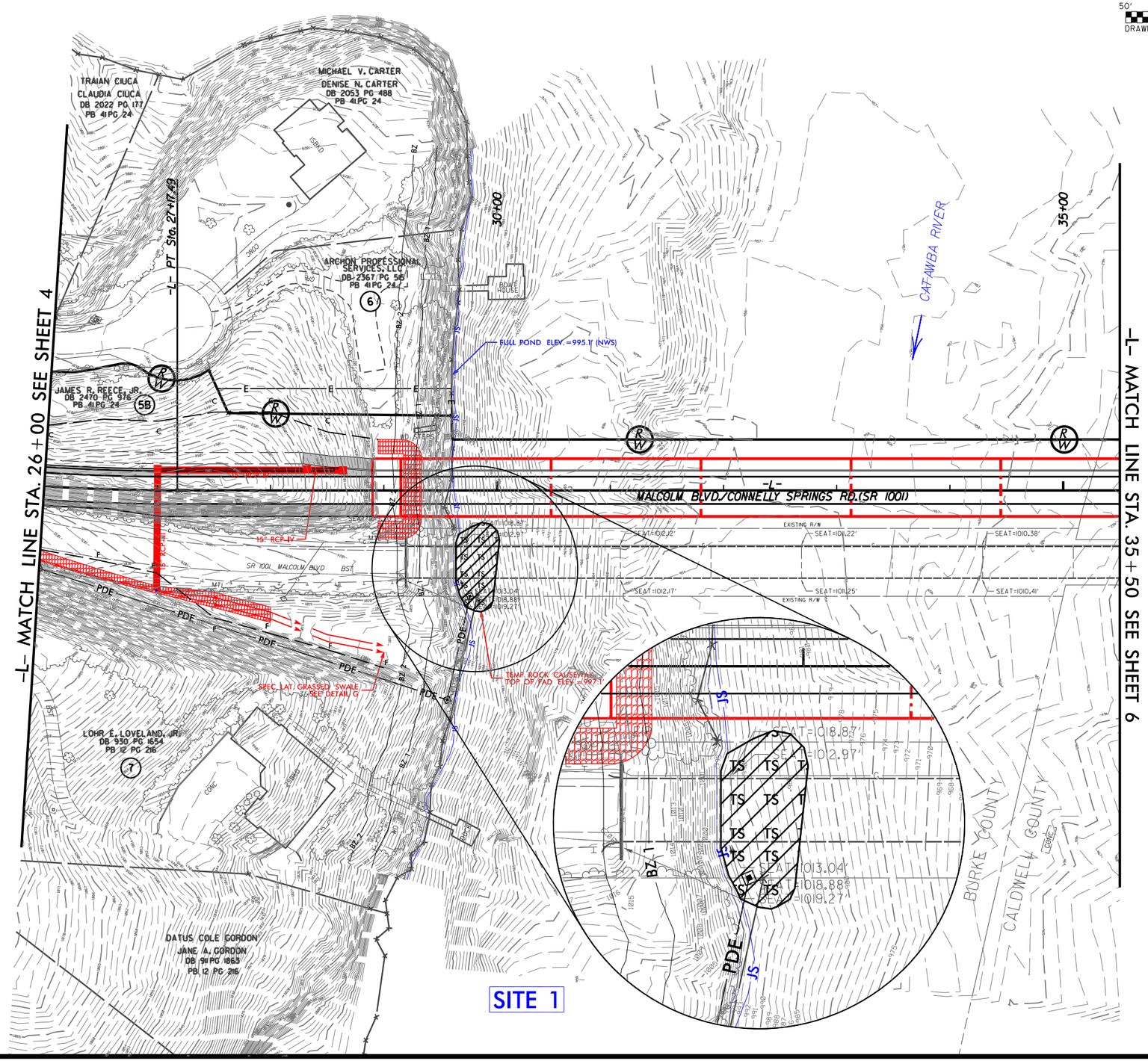
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

PERMIT DRAWING
SHEET 4 OF 8

TS TEMPORARY SURFACE WATER IMPACTS

NAD 83/2011

50' 0' 50'
DRAWING SCALE



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PROJECT REFERENCE NO.	SHEET NO.
R-3430B	06
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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PLANS PREPARED BY:
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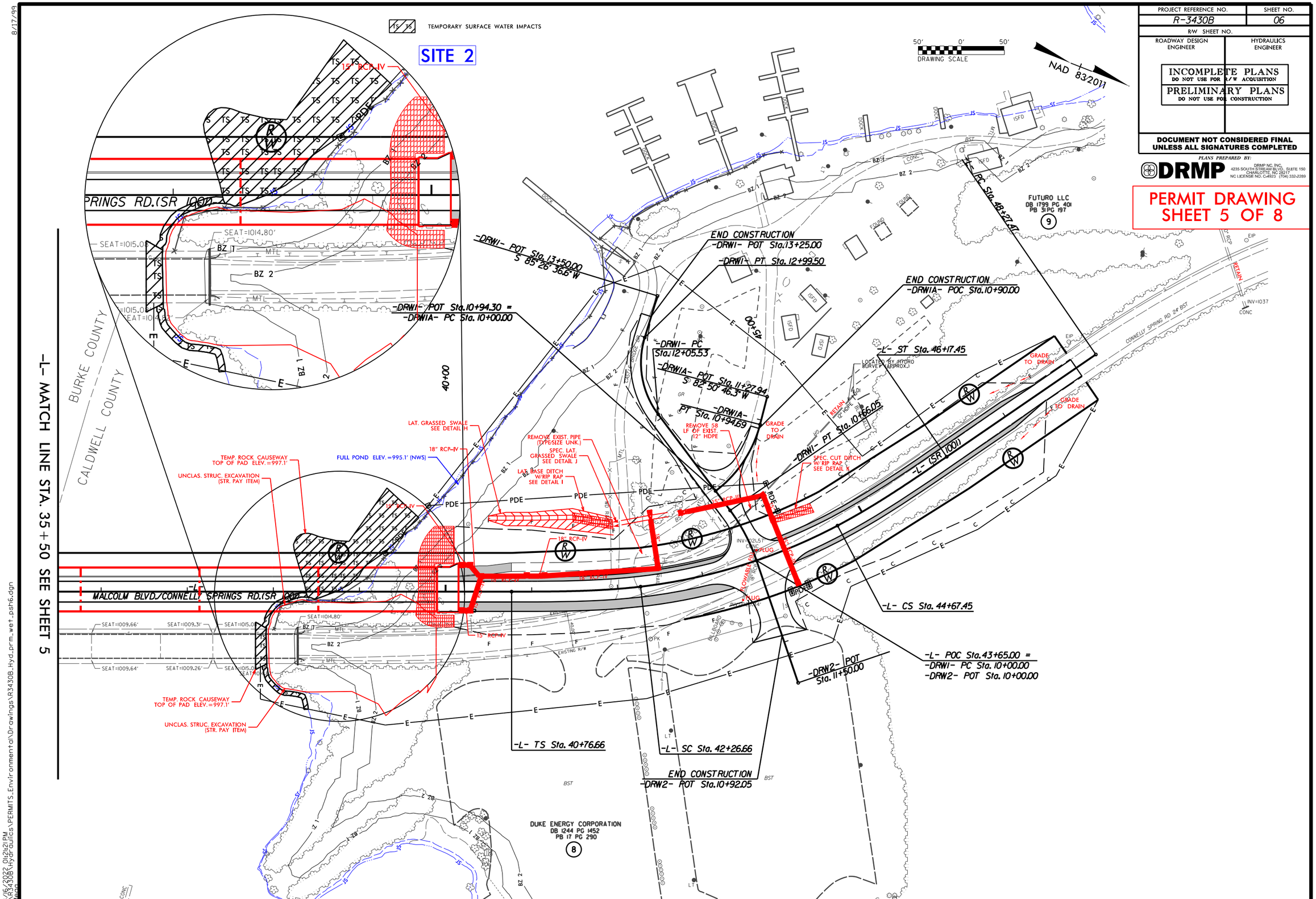
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

PERMIT DRAWING
SHEET 5 OF 8



PROJECT REFERENCE NO.	SHEET NO.
R-3430B	06
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

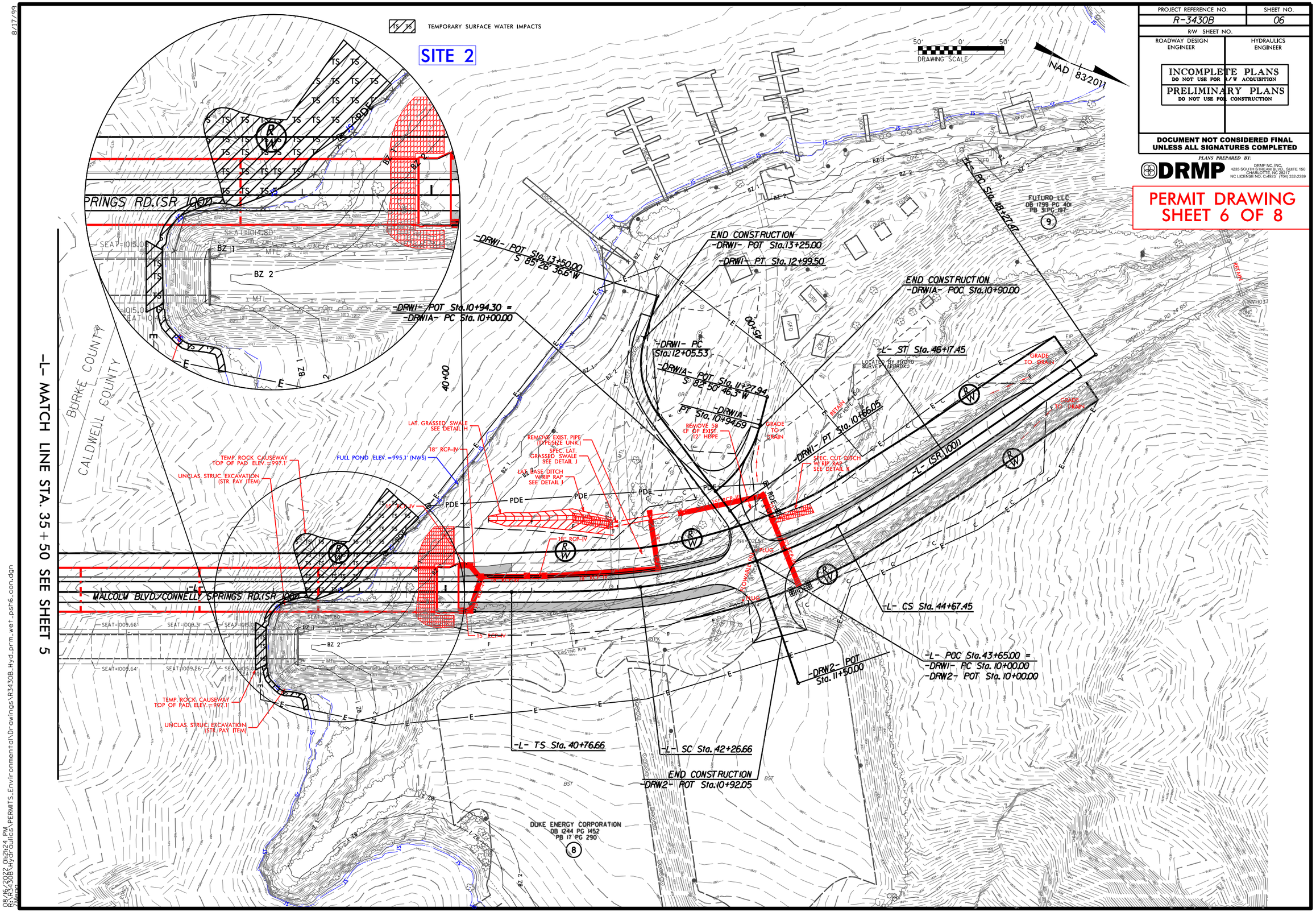
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

PERMIT DRAWING
SHEET 6 OF 8



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5/14/99

PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO. C-4923 (704) 332-2289

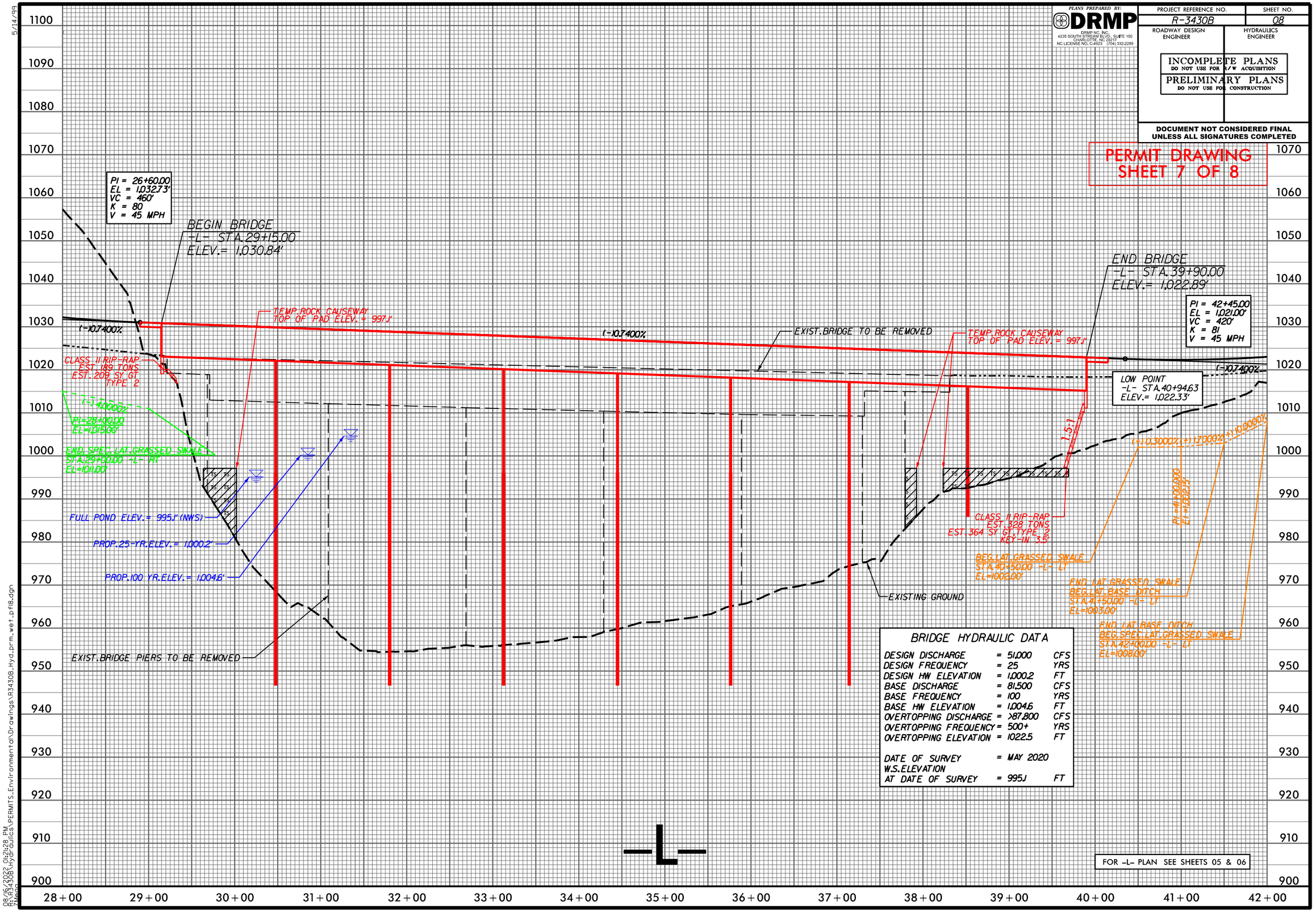
PROJECT REFERENCE NO.	SHEET NO.
R-3430B	08
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWING
SHEET 7 OF 8



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	51,000	CFS
DESIGN FREQUENCY	=	25	YRS
DESIGN HW ELEVATION	=	1,000.2	FT
BASE DISCHARGE	=	81,500	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	1,004.6	FT
OVERTOPPING DISCHARGE	=	>87,800	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	1022.5	FT
DATE OF SURVEY	=	MAY 2020	
W.S. ELEVATION AT DATE OF SURVEY	=	995.1	FT

FOR -L- PLAN SEE SHEETS 05 & 06

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$Mean

WETLAND AND SURACE WATER IMPACTS SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	29+64/30+02 -L- RT	TEMP. ROCK CAUSEWAY							0.06			
2	37+79/39+69 -L-	TEMP. ROCK CAUSEWAY							0.19			
2	37+87/38+40 -L- RT	EXCAVATION							0.02			
TOTALS*:									0.27	0	0	0

*Rounded totals are sum of actual impacts

NOTES:
Proposed area of new piers in water (using the normal pond elevation of 995.1') is 264 sq. ft.
Pier footings are 4' in diameter. There are seven interior bents falling within the water and three piers per interior bent.

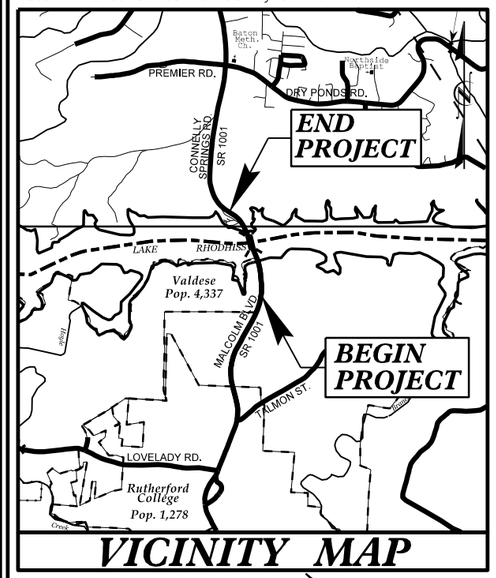
NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/17/2022
BURKE / CALDWELL
R-3430B
34544.1.4

Revised 2018 Feb

05/30/17

TIP PROJECT: R-3430B

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See RW Sheet Series For Survey Control



VICINITY MAP

NOT TO SCALE

75% PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

BURKE/CALDWELL COUNTY

LOCATION: SR 1001 (CONNELLY SPRINGS ROAD), BURKE COUNTY CONSTRUCT NEW PARALLEL BRIDGE OVER CATAWBA RIVER

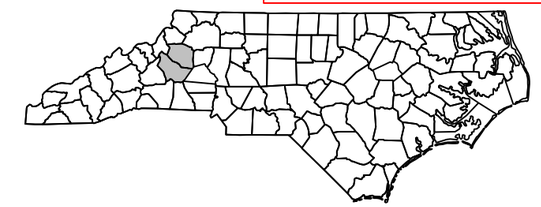
TYPE OF WORK: GRADING, PAVING, DRAINAGE & STRUCTURES

BUFFER IMPACTS PERMIT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3430B	1	

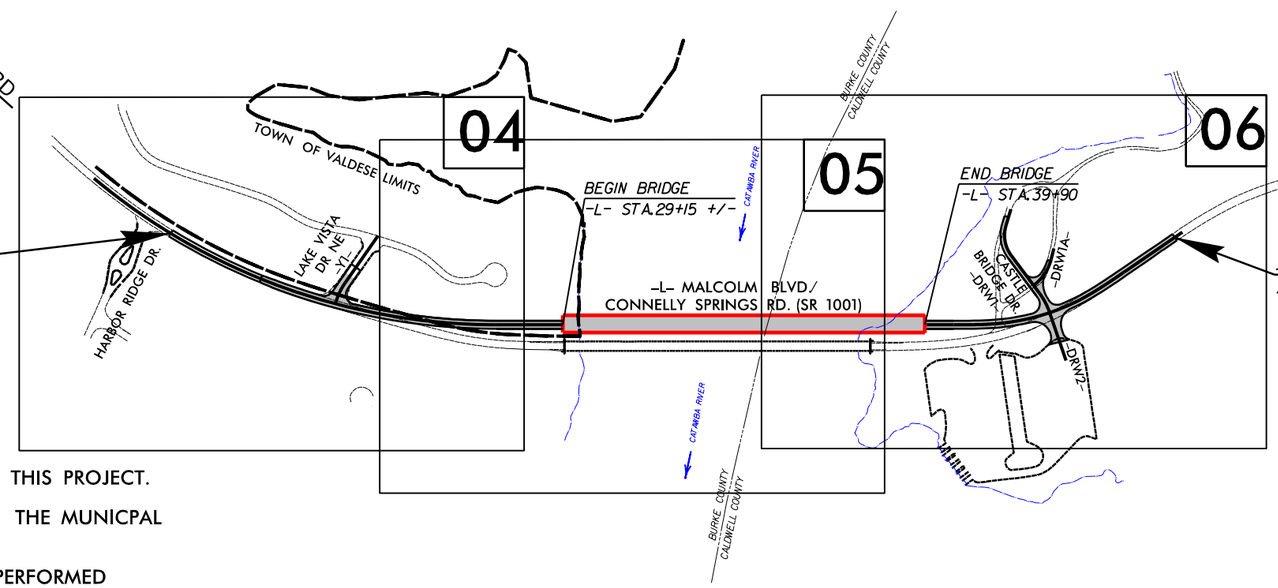
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34544.1.4	N/A	P.E.
34544.2.3	N/A	R/W
34544.2.5	N/A	UTILITIES

BUFFER DRAWING
SHEET 1 OF 5



NAD 83/2011

TO RUTHERFORD COLLEGE



TO CAJAH'S MOUNTAIN

BEGIN TIP PROJECT R-3430B
-L- STA. 17+00.00

END TIP PROJECT R-3430B
-L- STA. 48+00.00

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.

A PORTION OF THIS PROJECT IS WITHIN THE MUNICPAL BOUNDARIES OF VALDESE.

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
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CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2022 = 10,481
ADT 2045 = 12,100
K = 9 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST =1% DUAL 4%
FUNC CLASS =
MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3430B = 0.383 MILES
LENGTH STRUCTURE TIP PROJECT R-3430B = 0.204 MILES
TOTAL LENGTH TIP PROJECT R-3430B = 0.587 MILES

PLANS PREPARED BY:

DRMP
ENGINEERS SURVEYORS PLANNERS SCIENTISTS
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NORTH CAROLINA 28217
(704) 332-2289
NC LICENSE NO. C-4923

FOR
PROJECT MANAGEMENT UNIT

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MARCH 21, 2022

LETTING DATE:
JANUARY 16, 2024

CHRISTOPHER K. HAIRE, P.E.
PROJECT ENGINEER
MICHAEL D. HAGE, P.E.
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
THERESA T. ELLERBY, CPM
PROJECT MANAGER – DIVISIONS 11-14

HYDRAULICS ENGINEER
P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER
P.E.
SIGNATURE:

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3430B	2D-1
R/W SHEET NO.	

HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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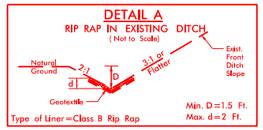
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO: C-4923 (704) 332-2289

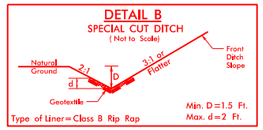
BUFFER DRAWING SHEET 2 OF 5

DETAIL A
RIP RAP IN EXISTING DITCH
(Not to Scale)



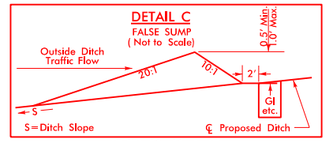
FROM STA. 17+00 TO STA. 18+50 -L- RT

DETAIL B
SPECIAL CUT DITCH
(Not to Scale)



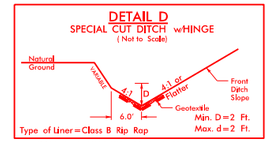
FROM STA. 18+50 TO STA. 20+00 -L- RT

DETAIL C
FALSE SUMP
(Not to Scale)



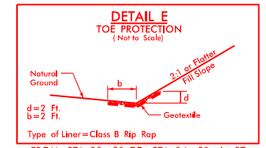
AT STA. 20+00 -L- LT

DETAIL D
SPECIAL CUT DITCH wHINGE
(Not to Scale)



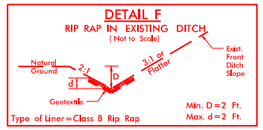
FROM STA. 23+00 TO STA. 23+50 -L- RT

DETAIL E
TOE PROTECTION
(Not to Scale)



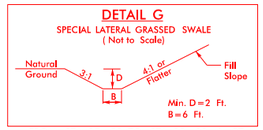
FROM STA. 23+50 TO STA. 24+50 -L- RT

DETAIL F
RIP RAP IN EXISTING DITCH
(Not to Scale)



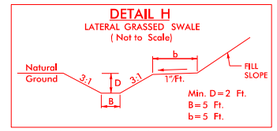
FROM STA. 24+50 TO STA. 27+50 -L- RT

DETAIL G
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



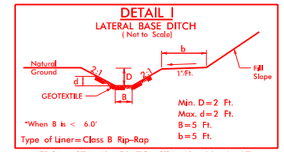
FROM STA. 27+50 TO STA. 29+00 -L- RT
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL H
LATERAL GRASSED SWALE
(Not to Scale)



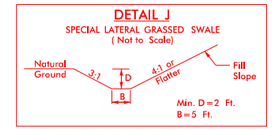
FROM STA. 40+50 TO STA. 41+50 -L- LT
EST. 67 CY DDE
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL I
LATERAL BASE DITCH
(Not to Scale)



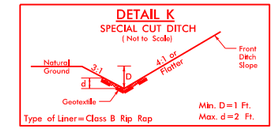
FROM STA. 41+50 TO STA. 42+00 -L- LT
EST. 76 CY DDE
CL. B RIP RAP: EST. 28 TONS, EST. 66 SY GT, EST. 21 CY DDE

DETAIL J
SPECIAL LATERAL GRASSED SWALE
(Not to Scale)



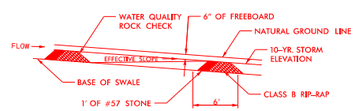
FROM STA. 42+00 TO STA. 43+00 -L- LT
*SEE DETAIL L FOR ADDITIONAL SPECIFICATIONS

DETAIL K
SPECIAL CUT DITCH
(Not to Scale)

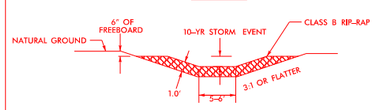


FROM STA. 44+00 LT TO STA. 44+50 -L- LT
CL. B RIP RAP: EST. 24 TONS, EST. 55 SY GT, EST. 18 CY DDE

DETAIL L
TRAPEZOIDAL GRASSED SWALE
wROCK CHECK DAM
(Not to Scale)



PROFILE



TYPICAL SECTION

NOTES:

1) DO NOT USE INSIDE CLEAR RECOVERY AREA.
2) NOT PRACTICAL TO USE ON SLOPES > 5%.
3) TO BE USED AS PERMANENT STRUCTURES IN GRASS SWALES.
4) CHECK DAMS SHOULD BE SPACED SUCH THAT THE BASE OF THE UPSTREAM CHECK IS AT THE SAME ELEVATION AS THE TOP OF THE DOWNSTREAM CHECK.

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Tilego

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-3430B	05
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO. C-4923 (704) 332-2289

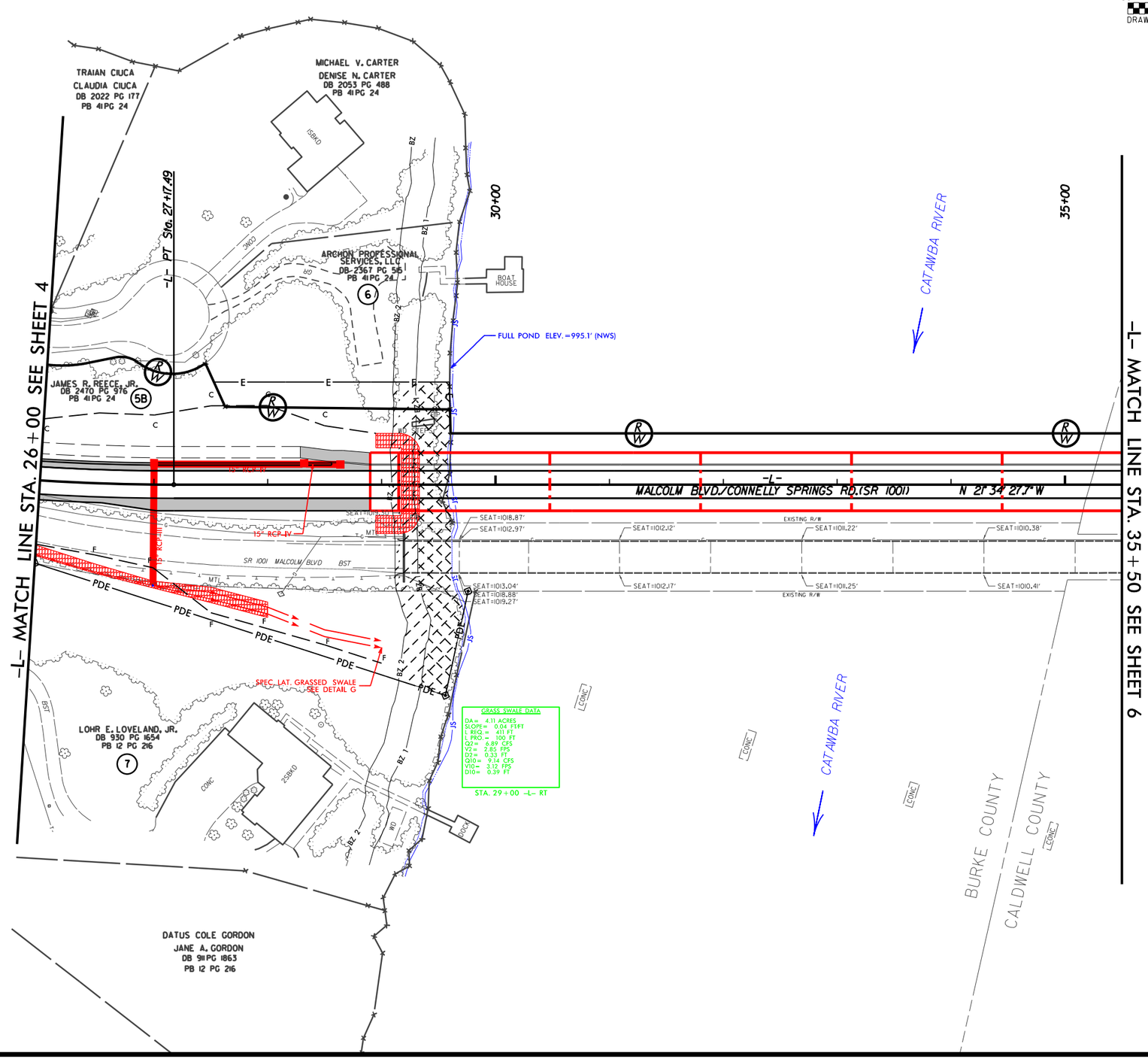
BUFFER DRAWING
SHEET 3 OF 5

ALLOWABLE IMPACTS ZONE 1

ALLOWABLE IMPACTS ZONE 2

NAD 83/2011

50' 0' 50'
DRAWING SCALE



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PROJECT REFERENCE NO.	SHEET NO.
R-3430B	06
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

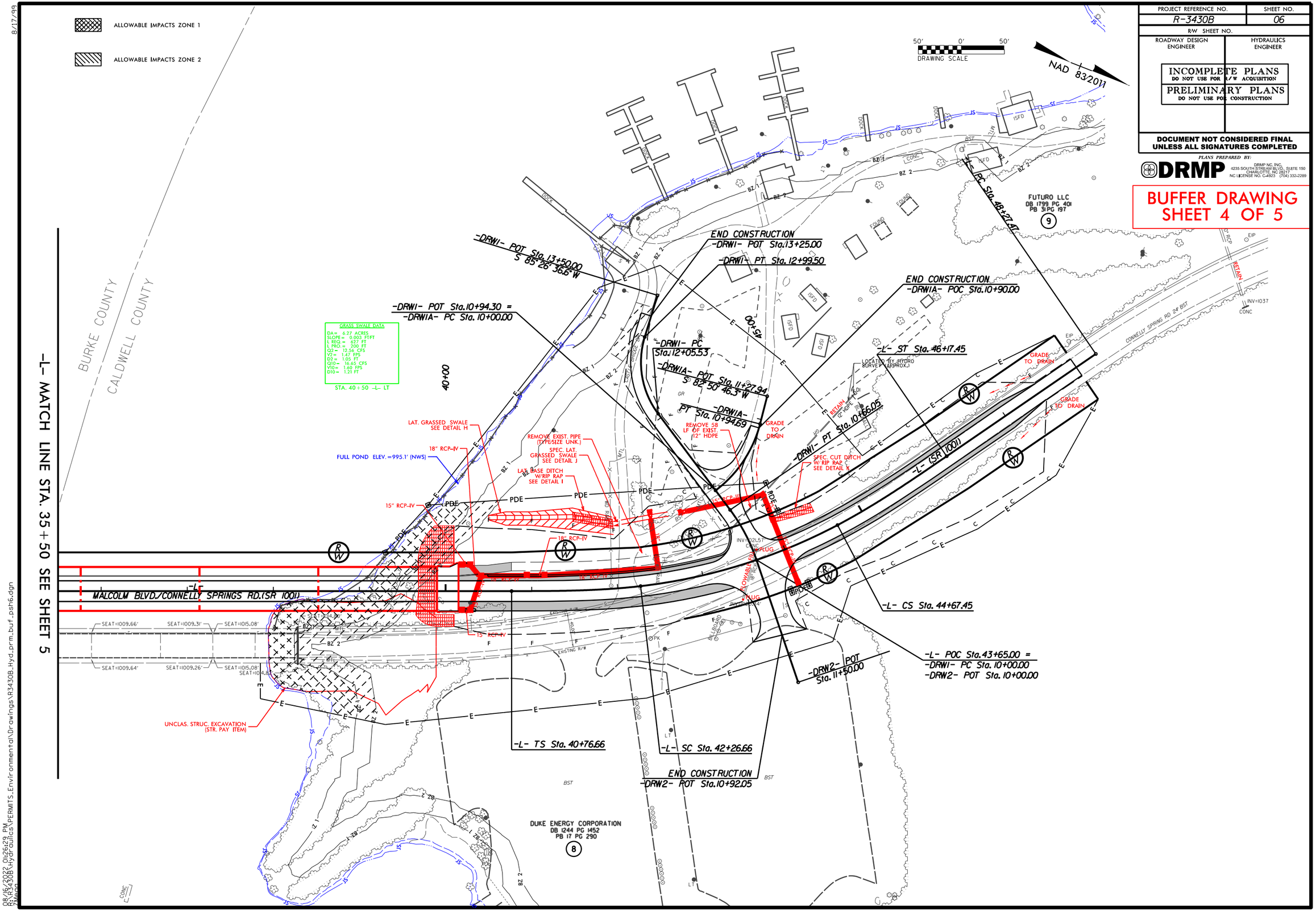
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PLANS PREPARED BY:
DRMP
DRMP NC, INC.
4235 SOUTH STREAM BLVD., SUITE 150
CHARLOTTE, NC 28217
NC LICENSE NO. C-4923 (704) 332-2289

BUFFER DRAWING SHEET 4 OF 5



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RIPARIAN BUFFER IMPACTS SUMMARY

Site No.	Station (From/To)	Structure Size / Type	IMPACTS									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
			ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	29+08/29+15 -L-	ROADWAY FILL	X				924	924					
1	29+15/29+59 -L-	BRIDGE		X		7955	4453	12408					
2	37+94/39+90 -L-	BRIDGE		X		11721	6877	18598					
2	39+90/40+63 -L- LT	ROADWAY FILL	X			1083	1798	2881					
2	12+71/13+35 -DRW1- LT	ROADWAY FILL	X				1377	1377					
TOTALS*:						**20759**	**15429**	**36188**	**0**	**0**	**0**	**0**	**0**

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/17/2022
BURKE / CALDWELL
R-3430B
34544.1.4
SHEET 5 OF 5

Revised 2018 Feb