

**RECEIVED**

JUN 20 2007

DIVISION OF HIGHWAYS  
PDEA-OFFICE OF NATURAL ENVIRONMENT

CATEGORICAL EXCLUSION ACTION CLASSIFICATION FORM

TIP Project No.	<u>B-4649</u>
State Project No.	<u>8.2693601</u>
W.B.S. No.	<u>33815.1.1</u>
Federal Project No.	<u>BRZ-1103(16)</u>

A. Project Description:

The purpose of this project is to replace Union County Bridge No. 377 on SR 1103 over Waxhaw Creek. Bridge No. 377 is 41 feet long. The replacement structure will be a bridge approximately 95 feet long providing a minimum 30 feet clear deck width. The bridge will include two 11-foot lanes with a 3 foot offset and a 5 foot offset. The bridge length is based on preliminary design information and is set by hydraulic requirements. The roadway grade of the new structure will be approximately two feet higher than the existing structure.

The approach roadway will extend approximately 400 feet from the southeast end of the new bridge and 300 feet from the northwest end of the new bridge. The approaches will be widened to include a 22-foot pavement width providing two 11-foot lanes. Four-foot grass shoulders will be provided on each side (7-foot shoulders where guardrail is included). The roadway will be designed as a Rural Local Route using standard guidelines with a 60 mile per hour design speed.

Traffic will be detoured off-site during construction (see Figure 1).

B. Purpose and Need:

NCDOT Bridge Maintenance Unit records indicate Bridge No. 377 has a sufficiency rating of 31.6 out of a possible 100 for a new structure. The bridge is considered structurally deficient due to structural appraisal of 2 out of 9 according to Federal Highway Administration (FHWA) standards and therefore eligible for FHWA's Bridge Replacement Program.

The posted weight limit on the bridge is 14 tons for single vehicles and 17 tons for truck-tractor semi-trailers. The bridge is approaching the end of its useful life. Replacement of the bridge will result in safer traffic operations.

C. Proposed Improvements:

Circle one or more of the following Type II improvements which apply to the project:

1. Modernization of a highway by resurfacing, restoration, rehabilitation, reconstruction, adding shoulders, or adding auxiliary lanes (e.g., parking, weaving, turning, climbing).
  - a. Restoring, Resurfacing, Rehabilitating, and Reconstructing pavement (3R and 4R improvements)
  - b. Widening roadway and shoulders without adding through lanes
  - c. Modernizing gore treatments
  - d. Constructing lane improvements (merge, auxiliary, and turn lanes)
  - e. Adding shoulder drains
  - f. Replacing and rehabilitating culverts, inlets, and drainage pipes, including safety treatments
  - g. Providing driveway pipes
  - h. Performing minor bridge widening (less than one through lane)
  - i. Slide Stabilization
  - j. Structural BMP's for water quality improvement
2. Highway safety or traffic operations improvement projects including the installation of ramp metering control devices and lighting.
  - a. Installing ramp metering devices
  - b. Installing lights
  - c. Adding or upgrading guardrail
  - d. Installing safety barriers including Jersey type barriers and pier protection
  - e. Installing or replacing impact attenuators
  - f. Upgrading medians including adding or upgrading median barriers
  - g. Improving intersections including relocation and/or realignment
  - h. Making minor roadway realignment
  - i. Channelizing traffic
  - j. Performing clear zone safety improvements including removing hazards and flattening slopes
  - k. Implementing traffic aid systems, signals, and motorist aid
  - l. Installing bridge safety hardware including bridge rail retrofit
3. Bridge rehabilitation, reconstruction, or replacement or the construction of grade separation to replace existing at-grade railroad crossings.
  - a. Rehabilitating, reconstructing, or replacing bridge approach slabs
  - b. Rehabilitating or replacing bridge decks
  - c. Rehabilitating bridges including painting (no red lead paint), scour repair, fender systems, and minor structural improvements
  - d. Replacing a bridge (structure and/or fill)
4. Transportation corridor fringe parking facilities.
5. Construction of new truck weigh stations or rest areas.

6. Approvals for disposal of excess right-of-way or for joint or limited use of right-of-way, where the proposed use does not have significant adverse impacts.
7. Approvals for changes in access control.
8. Construction of new bus storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and located on or near a street with adequate capacity to handle anticipated bus and support vehicle traffic.
9. Rehabilitation or reconstruction of existing rail and bus buildings and ancillary facilities where only minor amounts of additional land are required and there is not a substantial increase in the number of users.
10. Construction of bus transfer facilities (an open area consisting of passenger shelters, boarding areas, kiosks and related street improvements) when located in a commercial area or other high activity center in which there is adequate street capacity for projected bus traffic.
11. Construction of rail storage and maintenance facilities in areas used predominantly for industrial or transportation purposes where such construction is not inconsistent with existing zoning and where there is no significant noise impact on the surrounding community.
12. Acquisition of land for hardship or protective purposes, advance land acquisition loans under section 3(b) of the UMT Act. Hardship and protective buying will be permitted only for a particular parcel or a limited number of parcels. These types of land acquisition qualify for a CE only where the acquisition will not limit the evaluation of alternatives, including shifts in alignment for planned construction projects, which may be required in the NEPA process. No project development on such land may proceed until the NEPA process has been completed.
13. Acquisition and construction of wetland, stream and endangered species mitigation sites.
14. Remedial activities involving the removal, treatment or monitoring of soil or groundwater contamination pursuant to state or federal remediation guidelines.

D. Special Project Information:

The estimated costs, based on 2005 prices, are as follows:

Structure	\$ 248,000
Roadway Approaches	\$ 437,000
Structure Removal	\$ 6,000
Misc. & Mob.	\$ 233,000
Eng. & Contingencies	\$ 129,000
Total Construction Cost	\$ 1,050,000
Right-of-way Costs	\$ 57,000
Total Project Cost	\$ 1,107,000

**Estimated Traffic:**

Current	-	100 vpd
Year 2030	-	200 vpd
TTST	-	1%
Dual	-	2%

**Accidents:** Traffic Engineering has evaluated a recent three year period and found no accidents occurring in the vicinity of the project.

**Design Exceptions:** There is a design exception for sag vertical curve.

**Bridge Demolition:** Bridge No. 377 is constructed of timber and steel and should be possible to remove with no resulting debris in the water based on standard demolition practices.

**Alternatives Discussion:**

**No Build** – The no build alternative would result in eventually closing the road which is unacceptable given the volume of traffic served by SR 1103.

**Rehabilitation** – The bridge was constructed in 1962 and the timber materials within the bridge are reaching the end of their useful life. Rehabilitation would require replacing the timber components which would constitute effectively replacing the bridge.

**Offsite Detour** – Bridge No. 377 will be replaced on the existing alignment. Traffic will be detoured offsite (see Figure 1) during the construction period. NCDOT Guidelines for Evaluation of Offsite Detours for Bridge Replacement Projects considers multiple project variables beginning with the additional time traveled by the average road user resulting from the offsite detour. The offsite detour for this project would include SR 1107, SR 1106, SR 1104, and SR 1102. The majority of traffic on the road is through traffic. The detour for the average road user would result in 10 minutes additional travel time (6.4 miles additional travel). Up to a 12-month duration of construction is expected on this project.

Based on the Guidelines, the criteria above indicate that the preference of an offsite detour but with now stronger evaluation of other project variables. In this case, Union County Emergency Services along with Union County Schools Transportation have indicated that an offsite detour is acceptable. NCDOT Division 10 has indicated that the condition of all roads, bridges and intersections along the detour are acceptable without improvement and concur with the use of the detour.

**Onsite Detour** – An onsite detour was not evaluated due to the presence of an acceptable offsite detour.

**Staged Construction** – Staged construction was not considered because of the availability of an acceptable offsite detour.

**New Alignment** – Given that the alignment for SR 1103 is acceptable, a new alignment was not considered as an alternative.

**Other Agency Comments:**

The **N.C. Wildlife Resource Commission** and **U.S. Fish & Wildlife Service** in standardized letters provided a request that they prefer any replacement structure to be a spanning structure. Waxhaw Creek is classified as C waters which is designated critical habitat for the Carolina heelsplitter.

**Response:** While Waxhaw Creek is critical habitat for the Carolina Heelsplitter, none were found during surveys. Informal consultation with USFWS resulted in a commitment to design standards for sensitive watersheds.

The **N.C. Division of Water Quality** had no special concerns for this project.

**Public Involvement:**

A letter was sent by the Location & Surveys Unit to all property owners affected directly by this project. Property owners were invited to comment. No comments have been received to date.

E. Threshold Criteria

The following evaluation of threshold criteria must be completed for Type II actions

<u>ECOLOGICAL</u>	<u>YES</u>	<u>NO</u>
(1) Will the project have a substantial impact on any unique or important natural resource?	<input type="checkbox"/>	<u>  x  </u>
(2) Does the project involve habitat where federally listed endangered or threatened species may occur?	<input checked="" type="checkbox"/>	<u>          </u>
(3) Will the project affect anadromous fish?	<input type="checkbox"/>	<u>  x  </u>
(4) If the project involves wetlands, is the amount of permanent and/or temporary wetland taking less than one-tenth (1/10) of an acre and have all practicable measures to avoid and minimize wetland takings been evaluated?	<u>  x  </u>	<input type="checkbox"/>
(5) Will the project require the use of U. S. Forest Service lands?	<input type="checkbox"/>	<u>  x  </u>
(6) Will the quality of adjacent water resources be adversely impacted by proposed construction activities?	<input type="checkbox"/>	<u>  x  </u>
(7) Does the project involve waters classified as Outstanding Water Resources (OWR) and/or High Quality Waters (HQW)?	<input type="checkbox"/>	<u>  x  </u>
(8) Will the project require fill in waters of the United States in any of the designated mountain trout counties?	<input type="checkbox"/>	<u>  x  </u>
(9) Does the project involve any known underground storage tanks (UST's) or hazardous materials sites?	<input type="checkbox"/>	<u>  x  </u>
 <u>PERMITS AND COORDINATION</u>		
(10) If the project is located within a CAMA county, will the project significantly affect the coastal zone and/or any "Area of Environmental Concern" (AEC)?	<input type="checkbox"/>	<u>  x  </u>
(11) Does the project involve Coastal Barrier Resources Act resources?	<input type="checkbox"/>	<u>  x  </u>
(12) Will a U. S. Coast Guard permit be required?	<input type="checkbox"/>	<u>  x  </u>
(13) Will the project result in the modification of any existing regulatory floodway?	<input type="checkbox"/>	<u>  x  </u>

(14) Will the project require any stream relocations or channel changes?      x    

SOCIAL, ECONOMIC, AND CULTURAL RESOURCES

YES      NO

(15) Will the project induce substantial impacts to planned growth or land use for the area?      x    

(16) Will the project require the relocation of any family or business?      x    

(17) Will the project have a disproportionately high and adverse human health and environmental effect on any minority or low-income population?      x    

(18) If the project involves the acquisition of right of way, is the amount of right of way acquisition considered minor?     x    

(19) Will the project involve any changes in access control?      x    

(20) Will the project substantially alter the usefulness and/or land use of adjacent property?      x    

(21) Will the project have an adverse effect on permanent local traffic patterns or community cohesiveness?      x    

(22) Is the project included in an approved thoroughfare plan and/or Transportation Improvement Program (and is, therefore, in conformance with the Clean Air Act of 1990)?     x    

(23) Is the project anticipated to cause an increase in traffic volumes?      x    

(24) Will traffic be maintained during construction using existing roads, staged construction, or on-site detours?     x    

(25) If the project is a bridge replacement project, will the bridge be replaced at its existing location (along the existing facility) and will all construction proposed in association with the bridge replacement project be contained on the existing facility?     x    

(26) Is there substantial controversy on social, economic, or environmental grounds concerning the project?      x    

(27) Is the project consistent with all Federal, State, and local laws relating to the environmental aspects of the project?     x    

(28) Will the project have an "effect" on structures/properties eligible for or listed on the National Register of Historic Places?      x

- |      |   |                          |              |
|------|---|--------------------------|--------------|
| (29) | Will the project affect any archaeological remains which are important to history or pre-history?   | <input type="checkbox"/> | <u>  x  </u> |
| (30) | Will the project require the use of Section 4(f) resources (public parks, recreation lands, wildlife and waterfowl refuges, historic sites, or historic bridges, as defined in Section 4(f) of the U. S. Department of Transportation Act of 1966)? | <input type="checkbox"/> | <u>  x  </u> |
| (31) | Will the project result in any conversion of assisted public recreation sites or facilities to non-recreation uses, as defined by Section 6(f) of the Land and Water Conservation Act of 1965, as amended?  | <input type="checkbox"/> | <u>  x  </u> |
| (32) | Will the project involve construction in, across, or adjacent to a river designated as a component of or proposed for inclusion in the National System of Wild and Scenic Rivers?   | <input type="checkbox"/> | <u>  x  </u> |

F. Additional Documentation Required for Unfavorable Responses in Part E

**Response to Question 2:** Critical habitat for the Carolina heelsplitter is present in Waxhaw Creek. A mussel survey was conducted on July 30, 2005. None were found at the site during the survey therefore, a biological conclusion of "May Affect – Not Likely to Adversely Affect" was determined. Special project commitments are included in the attached Project Commitment Sheet.

A survey for the Michaux's Sumac was conducted October 30, 2006 by NCDOT biologists. They determined that the project area contains potential habitat but no species were found. A biological conclusion of "No Effect" was determined.

Potential habitat for the Schweinitz's sunflower is present in the project area but no species were found. A survey conducted on October 30, 2006 by NCDOT biologists and determined a biological conclusion of "No Effect"

G. CE Approval

TIP Project No.	<u>B-4649</u>
State Project No.	<u>8.2693601</u>
W.B.S. No.	<u>33815.1.1</u>
Federal Project No.	<u>BRZ-1103(16)</u>

Project Description:

The purpose of this project is to replace Union County Bridge No. 377 on SR 1103 over Waxhaw Creek. Bridge No. 377 is 41 feet long. The replacement structure will be a bridge approximately 95 feet long providing a minimum 30 feet clear deck width. The bridge will include two 11-foot lanes with a 3-foot and a 5-foot offset. The bridge length is based on preliminary design information and is set by hydraulic requirements. The roadway grade of the new structure will be approximately two feet higher than the existing structure.

The approach roadway will extend approximately 400 feet from the southeast end of the new bridge and 300 feet from the northwest end of the new bridge. The approaches will be widened to include a 22-foot pavement width providing two 11-foot lanes. Four-foot grass shoulders will be provided on each side (7-foot shoulders where guardrail is included). The roadway will be designed as a Rural Local Route using standard guidelines with a 60 mile per hour design speed.

Traffic will be detoured off-site during construction (see Figure 1).

Categorical Exclusion Action Classification:

       TYPE II(A)  
  x   TYPE II(B)

Approved:

6/14/07 William J. Gooding  
Date Bridge Project Development Engineer  
Project Development & Environmental Analysis Branch

6/14/07 John W. Miller  
Date Project Engineer  
Project Development & Environmental Analysis Branch

6/14/07 Natalie Rockhart  
Date Project Planning Engineer  
Project Development & Environmental Analysis Branch

For Type II(B) projects only:

6/14/07 John F. Sullivan, III  
Date John F. Sullivan, III, PE, Division Administrator  
Federal Highway Administration

**PROJECT COMMITMENTS:**

**Union County  
Bridge No. 377 on SR 1103  
Over Waxhaw Creek  
Federal Aid Project No. BRZ-1103(16)  
State Project No. 8.2693601  
W.B.S. No. 33815.1.1  
T.I.P. No. B-4649**

**Division Ten Construction, Resident Engineer's Office, SCDOT – Offsite Detour**

In order to have time to adequately reroute school busses, Union County Schools should be contacted at (704) 283-3733 at least one month prior to road closure.

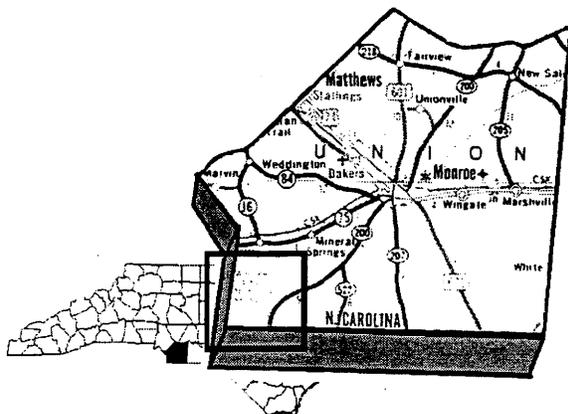
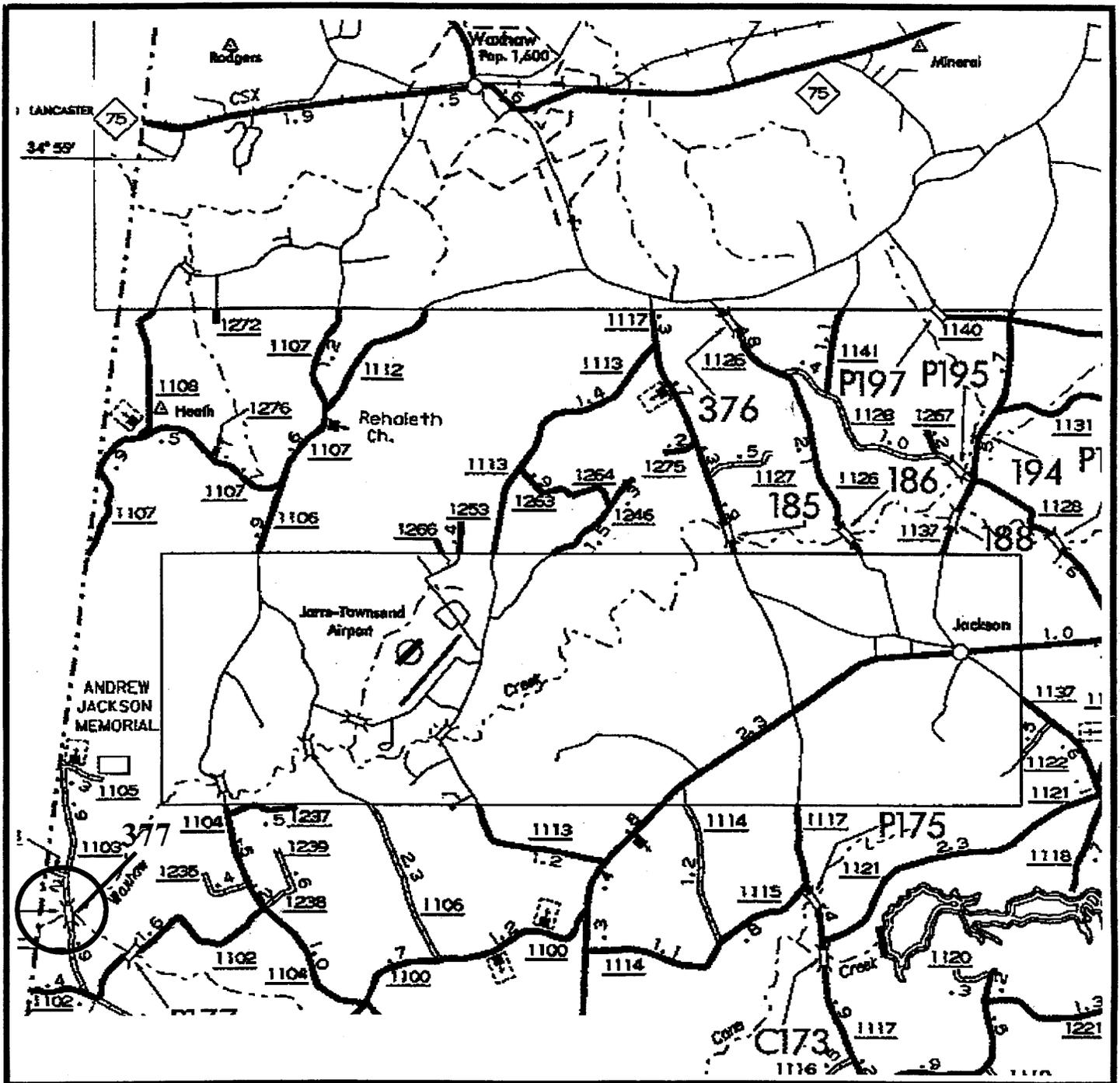
Union County Emergency Services needs to be contacted at (704) 283-3550 at least one month prior to road closure to make the necessary temporary reassignments to primary response units.

Special coordination with SCDOT was needed in order to utilize SR 1107 (Old Church Rd) in South Carolina.

**Hydraulic Design Unit, Roadside Environmental Unit, Division Resident Engineer – Sensitive Watersheds**

Waxhaw Creek is classified as "C" waters and will be subject to all Design Standards for Sensitive Watersheds since it is designated as critical habitat for the Carolina Heelsplitter.

Carolina Heelsplitter is a federally endangered species which concurrence on "May Affect, Not Likely to Adversely Affect" has been received. Letter of concurrence is attached.

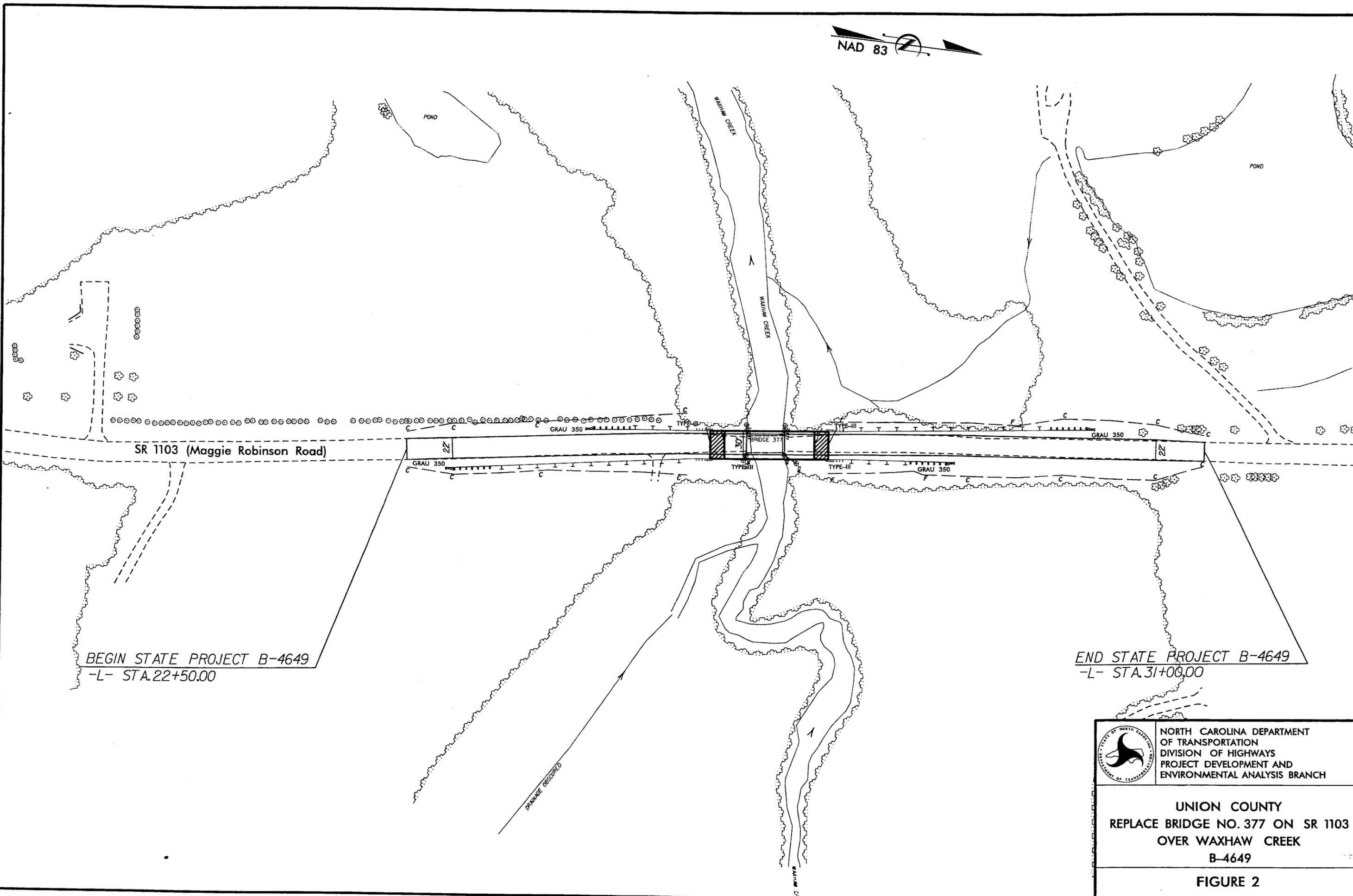


NORTH CAROLINA DEPARTMENT OF  
TRANSPORTATION  
DIVISION OF HIGHWAYS  
PROJECT DEVELOPMENT &  
ENVIRONMENTAL ANALYSIS BRANCH

UNION COUNTY  
REPLACE BRIDGE NO. 377 ON SR 1103  
OVER WAXHAW CREEK  
B-4649

Figure 1

NAD 83



BEGIN STATE PROJECT B-4649  
-L- STA. 22+50.00

END STATE PROJECT B-4649  
-L- STA. 31+00.00

	<p>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH</p>
<p>UNION COUNTY REPLACE BRIDGE NO. 377 ON SR 1103 OVER WAXHAW CREEK B-4649</p>	
<p>FIGURE 2</p>	



**North Carolina Department of Cultural Resources**  
**State Historic Preservation Office**

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor  
 Lisbeth C. Evans, Secretary  
 Jeffrey J. Crow, Deputy Secretary

Office of Archives and History  
 Division of Historical Resources  
 David Brook, Director

August 12, 2004

**MEMORANDUM**

**TO:** Gregory Thorpe, Ph.D., Director  
 Project Development and Environmental Analysis Branch  
 NCDOT Division of Highways

**FROM:** Peter B. Sandbeck *PBS for Peter Sandbeck*

**SUBJECT:** 2004 Bridge Projects, including B-3492, B-4408, B-4409, B-4410, B-4446, B-4466, B-4469, B-4518, B-4545, B-4573, B-4631, B-4423, B-4424, B-4454, B-4520, B-4538, B-4540, B-4548, B-4549, B-4567, B-4578, B-4648, B-4664, B-4665, B-4504, B-4560, B-4587, B-4618, B-4644, B-4649, B-4651, B-4658, B-4671, B-3624, B-3819, B-3811, B-4404, B-4552, B-4613, B-4646, B-4675, B-3169, B-3606, B-3802, B-3803, B-3804, B-4523, B-4524, B-4525, B-4526, Multi-county, ER 04-1280-ER 04-1330

On July 28, 2004, Sarah McBride, our preservation specialist for transportation projects, met with the North Carolina Department of Transportation (NCDOT) staff for a meeting of the minds concerning the above projects. We reported on our available information on historic architectural and archaeological surveys and resources along with our recommendations. NCDOT provided project descriptions, area photographs, and aerial photographs at the meeting.

Based on our review of the photographs and the information discussed at the meeting, we have included our comments for each bridge project on a spreadsheet attached to this letter. These comments are provided for each project as proposed.

If an archaeological survey is requested on the spreadsheet, a separate memorandum from the Office of State Archaeology, explaining whether a general survey is required or if the survey is predicated upon an off-site detour or new location, is attached.

Having provided this information, we look forward to receipt of either a Categorical Exclusion or Environmental Assessment which indicates how NCDOT addressed our comments.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

ADMINISTRATION  
 RESTORATION  
 SURVEY & PLANNING

Location  
 507 N. Blount Street, Raleigh NC  
 515 N. Blount Street, Raleigh NC  
 515 N. Blount Street, Raleigh, NC

Mailing Address  
 4617 Mail Service Center, Raleigh NC 27699-4617  
 4617 Mail Service Center, Raleigh NC 27699-4617  
 4617 Mail Service Center, Raleigh NC 27699-4617

Telephone/Fax  
 (919)733-4763/733-2653  
 (919)733-6547/715-4801  
 (919)733-6545/715-4801

	TIP	BRIDGE	COUNTY	DIVISION	BUILT	PDE	Architecture	Archaeology
1314	B-3492	580056	McDOWELL	13	1962	Hancock	Yes	No
1315	B-4408	030265	ANSON	10	1961	Hancock	No	No
1316	B-4409	030308	ANSON	10	1922	Hancock	No	No
1317	B-4410	030307	ANSON	10	1931	Hancock	Yes	No
1301	B-4446	100227	BUNCOMBE	13	1956	Hancock	No	No
1300	B-4466	210004	CLAY	14	1952	Hancock	No	No
1291	B-4469	220219	CLEVELAND	12	1952	Hancock	No	No
1281	B-4518	350110	GASTON	12	1962	Hancock	No	No
1307	B-4545	440072	HENDERSON	14	1963	Hancock	No	No
1300	B-4573	540183	LINCOLN	12	1965	Hancock	No	No
1306	B-4631	800526	RUTHERFORD	13	1970	Hancock	No	No
1307	B-4423	060067	BEAUFORT	2	1965	Capps	No	No
1303	B-4424	060068	BEAUFORT	2	1968	Capps	No	No
1303	B-4454	150043	CARTERET	2	1963	Capps	No	No
1293	B-4520	360032	GATES	1	1952	Capps	Yes	No
1280	B-4538	410025	HALIFAX	4	1965	Capps	No	No
128	B-4540	410142	HALIFAX	4	1962	Capps	Yes	Yes
1308	B-4548	450002	HERTFORD	1	1960	Capps	No	Yes
1309	B-4549	450042	HERTFORD	1	1960	Capps	Yes	Yes
1309	B-4567	530069	LENOIR	2	1971	Capps	Yes	Yes
1298	B-4578	570008	MARTIN	1	1974	Capps	No	No
1325	B-4648	880017	TYRRELL	1	1977	Capps	No	No
1317	B-4664	920025	WARREN	5	1957	Capps	Yes	Yes
1318	B-4665	920036	WARREN	5	1955	Capps	No	Yes
1315	B-4504	320052	EDGEcombe	4	1964	Johnson	No	Yes
1312	B-4560	500102	JOHNSTON	4	1956	Johnson	Yes	Yes
1297	B-4587	630082	NASH	4	1961	Johnson	No	Yes
1326	B-4618	770445	ROBESON	6	1955	Johnson	Yes	No
1289	B-4644	830057	STANLY	10	1961	Johnson	No	No
1324	B-4649	890377	UNION	10	1962	Johnson	No	No
1323	B-4651	890251	UNION	10	1957	Johnson	No	No
1315	B-4658	910345	WAKE	5	1960	Johnson	No	No
1313	B-4671	950035	WAYNE	4	1961	Johnson	No	Yes
1327	B-3624	130190	CALDWELL	11	1981	Pipkin	No	No
1328	B-3819	130184	CALDWELL	11	1962	Pipkin	No	No
1327	B-3911	850038	SURRY	11	1923	Pipkin	Yes	No
1288	B-4404	000102	ALAMANCE	7	1968	Pipkin	Yes	No
1310	B-4552	480100	IREDELL	12	1963	Pipkin	Yes	No
1295	B-4613	750415	RANDOLPH	8	1959	Pipkin	No	Yes
1314	B-4646	850132	SURRY	11	1962	Pipkin	Yes	No
1311	B-4675	960034	WILKES	11	1960	Pipkin	No	No
1293	B-3169	310158	DURHAM	5	1960	Williams	Yes	No
1303	B-3606	040070	ASHE	11	1963	Williams	Yes	No
1288	B-3802	040229	ASHE	11	1960	Williams	No	No
1304	B-3803	040334	ASHE	11	1966	Williams	Yes	No
1283	B-3804	040296	ASHE	11	1964	Williams	Yes	No
1319	B-4523	380164	GRANVILLE	5	1955	Williams	No	Yes
1320	B-4524	380193	GRANVILLE	5	1956	Williams	No	Yes
1321	B-4525	380133	GRANVILLE	5	1960	Williams	No	Yes
1322	B-4526	380200	GRANVILLE	5	1957	Williams	No	Yes



**North Carolina Department of Cultural Resources  
State Historic Preservation Office**

Peter B. Sandbeck, Administrator

Michael F. Easley, Governor  
Lisbeth C. Evans, Secretary  
Jeffrey J. Crow, Deputy Secretary

Office of Archives and History  
Division of Historical Resources  
David Brook, Director

January 18, 2006

MEMORANDUM

**TO:** Matt Wilkerson, Archaeology Supervisor  
NCDOT Division of Highways

**FROM:** Peter Sandbeck *PBS for Peter Sandbeck*

**SUBJECT:** Design Change Notification, Bridge No. 377 on SR 1103 over Waxhaw Creek, B-4649, Union County, ER 04-1324

Thank you for your letter of December 30, 2005, concerning the changes in the above referenced project. We concur with your assessment that no archaeological survey is warranted for the project as proposed.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919/733-4763. In all future communication concerning this project, please cite the above-referenced tracking number.

	Location	Mailing Address	Telephone/Fax
ADMINISTRATION	507 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-4763/733-8653
RESTORATION	515 N. Blount Street, Raleigh NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6547/715-4801
SURVEY & PLANNING	515 N. Blount Street, Raleigh, NC	4617 Mail Service Center, Raleigh NC 27699-4617	(919)733-6545/715-4801



# United States Department of the Interior

## FISH AND WILDLIFE SERVICE

Asheville Field Office  
160 Zillicoa Street  
Asheville, North Carolina 28801

June 11, 2007

RECEIVED  
Division of

JUN 14 2007

Project Development and  
Environmental Analysis Branch

Dr. Gregory J. Thorpe, Manager  
Project Development and Environmental Analysis Branch  
North Carolina Department of Transportation  
1548 Mail Service Center  
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: Endangered Species Concurrence for the Replacement of Bridge No. 377 on SR 1103 over Waxhaw Creek, Union County, North Carolina (TIP No. B-4649)

As requested by the North Carolina Department of Transportation (NCDOT), we have reviewed the permit request and biological conclusions for federally protected species for the subject project. Our comments are provided in accordance with the provisions of section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531-1543) (Act).

The NCDOT is proposing to replace the existing 41-foot-long timber bridge with a 95-foot-long concrete box-beam bridge that spans the creek and eliminates direct deck drain discharge to the creek. The old bridge will be demolished by removing the superstructure and by cutting the timber piles and vertical abutments off at the normal water surface.

Waxhaw Creek supports one of seven populations of the federally endangered Carolina heelsplitter (*Lasmigona decorata*), and the proposed project area is in federally designated critical habitat for the species. The project area was last surveyed in July of 2005 to determine if the Carolina heelsplitter was present there. Previous surveys as well as the latest surveys found few native freshwater mussels in the project area, and no heelsplitters or their shells were found.

Given the negative survey data and poor habitat conditions in the project area and provided the commitments agreed to at the November 7, 2006, field meeting (meeting notes dated December 5, 2006) are strictly adhered to, we concur with a conclusion that implementation of this project is "not likely to adversely affect" the Carolina heelsplitter in the project area. In view of this, we believe the requirements under section 7(c) of the Act are fulfilled. However, obligations under section 7 of the Act must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not

previously considered, (2) this 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 identified action.

If you have questions about these comments, please contact Ms. Marella Buncick of our staff at 828/258-3939, Ext. 237. In any future correspondence concerning this project, please reference our Log No. 4-2-07-227.

Sincerely,



Brian P. Cole  
Field Supervisor

cc:

Mr. Chris Militscher, c/o Federal Highway Administration, U.S. Environmental Protection Agency, Terry Sanford Federal Courthouse, 310 New Bern Avenue, Room 206, Raleigh, NC 27601

Ms. Polly Lespinasse, Mooresville Regional Office, North Carolina Division of Water Quality, 610 East Center Avenue, Suite 301, Mooresville, NC 28115

Ms. Marla J. Chambers, Western NCDOT Permit Coordinator, North Carolina Wildlife Resources Commission, 12275 Swift Road, Oakboro, NC 28129

Mr. Steve Lund, Asheville Regulatory Field Office, U.S. Army Corps of Engineers, 151 Patton Avenue, Room 208, Asheville, NC 28801-5006

**REPLACE BRIDGE NO. 377 ON SR 1103  
OVER WAXHAW CREEK  
UNION COUNTY, NORTH CAROLINA**

**TIP NUMBER B-4649  
STATE CONTRACT NO. A304259  
STATE PROJECT NO. 8.2693601  
FEDERAL AID PROJECT NO. BRZ-1103(16)**

**NATURAL RESOURCES TECHNICAL REPORT**

**PREPARED FOR:  
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS BRANCH**



**OCTOBER 2004**

## TABLE OF CONTENTS

<b>1.0 INTRODUCTION</b> .....	<b>1</b>
1.1 PROJECT DESCRIPTION .....	1
1.2 PURPOSE .....	1
1.3 METHODOLOGY .....	1
1.4 QUALIFICATIONS OF INVESTIGATORS .....	4
1.5 TERMINOLOGY.....	4
<b>2.0 PHYSICAL RESOURCES</b> .....	<b>5</b>
2.1 REGIONAL CHARACTERISTICS .....	5
2.2 SOILS.....	5
2.3 WATER RESOURCES.....	6
2.3.1 Waters Impacted and Characteristics .....	6
2.3.2 Best Usage Classification.....	6
2.3.3 Water Quality.....	7
2.3.3.1 Nonpoint Source Discharge .....	7
2.3.3.2 Benthic Macroinvertebrate Ambient Network.....	7
2.3.3.3 Point Source Discharge.....	8
2.3.4 Summary of Anticipated Impacts to Water Resources.....	8
<b>3.0 BIOTIC RESOURCES</b> .....	<b>8</b>
3.1 TERRESTRIAL COMMUNITIES .....	9
3.1.1 Dry Oak-Hickory Forest.....	9
3.1.2 Dry-Mesic Oak-Hickory Forest.....	9
3.1.3 Piedmont Bottomland Forest.....	10
3.1.4 Maintained/Disturbed Community.....	10
3.1.5 Pasture/Hayfield Communities.....	11
3.2 AQUATIC COMMUNITIES.....	11
3.3 WILDLIFE .....	12
3.3.1 Terrestrial Fauna .....	12
3.3.2 Aquatic Fauna .....	12
3.4 SUMMARY OF ANTICIPATED TERRESTRIAL IMPACTS .....	13
3.5 SUMMARY OF ANTICIPATED AQUATIC IMPACTS .....	13
<b>4.0 JURISDICTIONAL TOPICS</b> .....	<b>14</b>
4.1 WATERS OF THE UNITED STATES .....	14
4.1.1 Characteristics of Wetlands and Surface Waters.....	14
4.1.2 Summary of Anticipated Impacts.....	15
4.1.3 Permits .....	15
4.1.4 Mitigation.....	16
4.1.4.1 Avoidance .....	16
4.1.4.2 Minimization.....	16
4.1.4.3 Compensatory Mitigation .....	17
4.2 RARE AND PROTECTED SPECIES .....	17
4.2.1 Federally-Protected Species .....	17
4.2.2 Federal Species of Concern and State-Listed Species.....	20
<b>5.0 REFERENCES</b> .....	<b>22</b>

**FIGURES**

Figure 1. Project Vicinity Map .....2  
Figure 2. Study Area.....3

**TABLES**

Table 1. Study area soils and characteristics .....5  
Table 2. Study area terrestrial communities and area coverage .....11  
Table 3. Anticipated impacts to surface waters within the study area.....15  
Table 4. Anticipated impacts to wetlands within the study area .....15  
Table 5. Federally-protected species for Union County, North Carolina.....17  
Table 6. Federal species of concern for Union County, North Carolina .....21

**APPENDICES**

Appendix I. USACE Stream Quality Assessment Worksheets  
Appendix II. NCDWQ Stream Classification Forms  
Appendix III. USACE Wetland Data Sheets  
Appendix IV. NCDWQ Wetlands Rating Worksheet

## 1.0 INTRODUCTION

The following Natural Resources Technical Report (NRTR) is submitted to assist in the preparation of a Categorical Exclusion (CE) for the proposed project.

### 1.1 Project Description

The proposed project consists of the replacement of Bridge No. 377 on State Route (SR) 1103 (Maggie Robinson Road) over Waxhaw Creek in Union County, North Carolina (N.C.) (Figure 1). The current bridge is a one-lane wood and steel structure approximately 15 feet (4.5 meters (m)) wide and 35 feet (10 m) long with wooden safety railings. The design of the proposed bridge has not been determined.

The proposed project is located in a rural area of Union County (Figure 2). Surrounding land use is generally forestland, agriculture and rural residential areas. Waxhaw Creek is approximately 20 feet (6 m) wide at the bridge with a substrate of sand and silt. The study area also includes 2 unnamed tributaries to Waxhaw Creek, a small farm pond and a wetland area in the floodplain of Waxhaw Creek.

### 1.2 Purpose

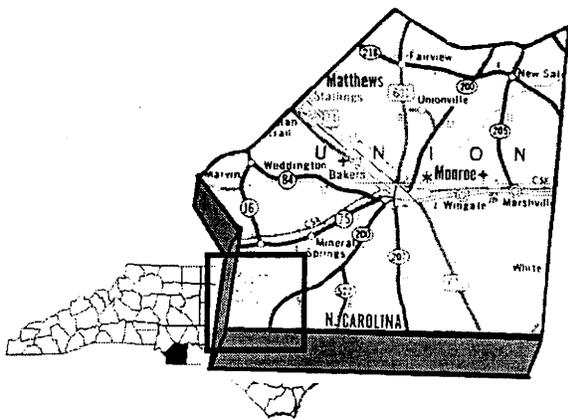
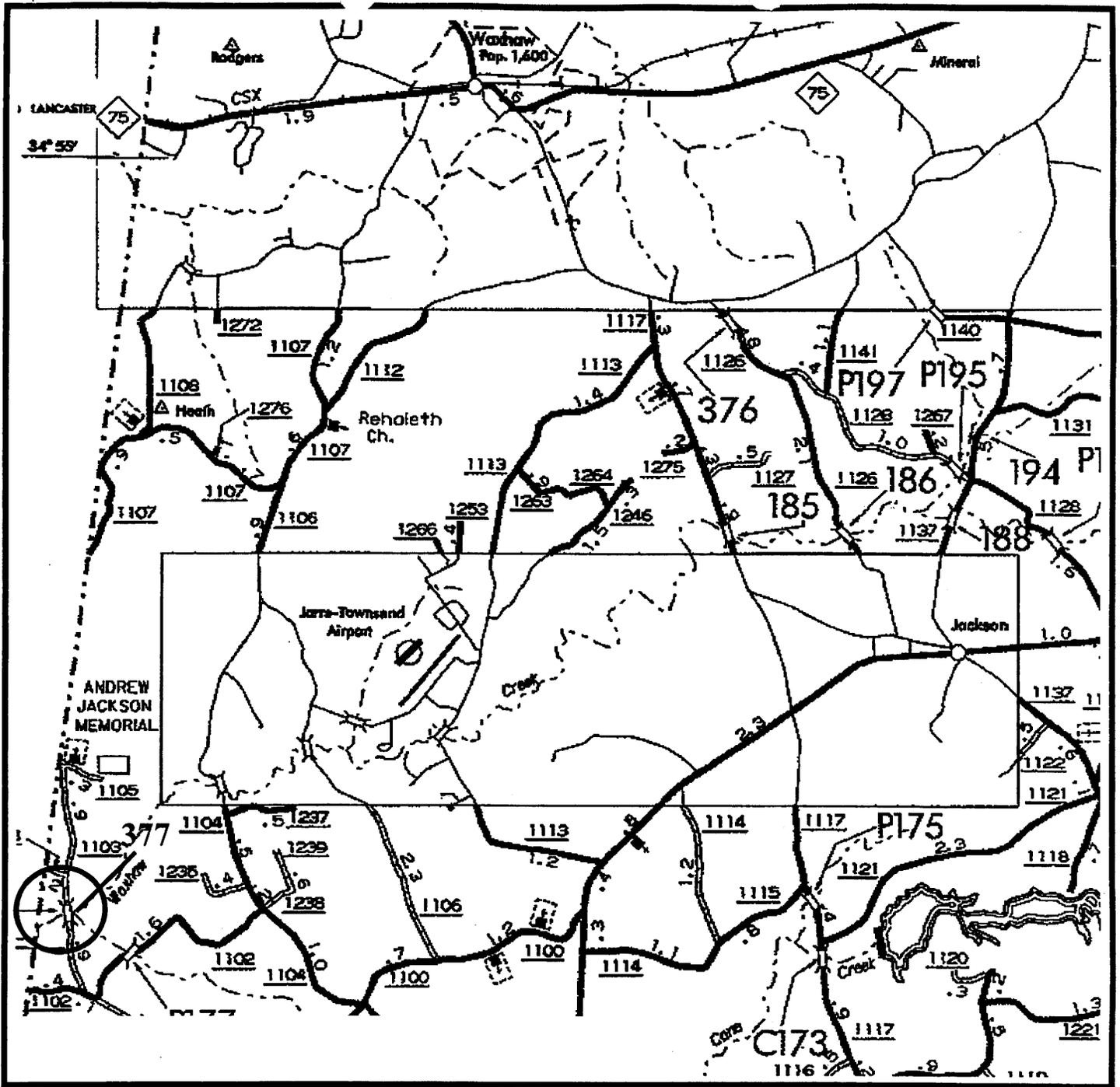
The purpose of this NRTR is to inventory, catalog and describe the various natural resources likely to be impacted by the proposed action. This report also attempts to identify and estimate the probable consequences of the anticipated impacts to these resources. Recommendations are made for measures which will minimize resource impacts. These descriptions and estimates are relevant only in the context of existing preliminary design concepts. If design parameters and criteria change, additional field investigations will need to be conducted.

### 1.3 Methodology

Research was conducted prior to field investigations. Data sources utilized in the pre-field investigation of the study area included:

- United States (U.S.) Geological Survey (USGS) 7.5-minute topographic quadrangle map (Van Wyck, S.C.-N.C., 1968).
- U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) soil survey for Union County, North Carolina (1996).
- U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) map for 7.5-minute Van Wyck, S.C.-N.C. quadrangle (2004).
- N.C. Department of Transportation (NCDOT) aerial photographs of the study area (1:200 scale).

Water resource information was obtained from publications of the N.C. Department of Environment and Natural Resources, Division of Water Quality (NCDENR-DWQ 1999 and 2004).



NORTH CAROLINA DEPARTMENT OF  
TRANSPORTATION  
DIVISION OF HIGHWAYS  
PROJECT DEVELOPMENT &  
ENVIRONMENTAL ANALYSIS BRANCH

**UNION COUNTY**  
**REPLACE BRIDGE NO. 377 ON SR 1103**  
**OVER WAXHAW CREEK**  
**B-4649**

Figure 1



Information concerning the occurrence of federal and state protected species in the study area was obtained from the USFWS list of protected species and candidate species (25 February 2003), the North Carolina Natural Heritage Program (NCNHP) database of rare species and unique habitats, and the North Carolina Wildlife Resources Commission (NCWRC) Proposed Critical Habitats for aquatic species.

General field surveys and wetlands investigations were conducted within the study area by biologists on the staff of Dr. J.H. Carter III & Associates, Inc. (JCA) on 3 March and 15 September 2004. The corridor investigated extended 250 feet (75 meters (m)) upstream and downstream from the centerline of the existing bridge and 1500 feet (450 m) east and west from the bridge along SR 1103. Plant communities and their associated wildlife were identified and recorded. Wildlife identification involved using one or more of the following observation techniques: active searches and capture, visual observations (binoculars), and identification of characteristic signs of wildlife (sounds, scat, tracks, nests and burrows).

All wetlands subject to regulation by the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 were identified and delineated according to methods prescribed in the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and the USACE's 6 March 1992 Clarification and Interpretation of the 1987 Manual.

#### 1.4 Qualification of Field Investigators

Investigator: Tracy E. Rush  
 Education: B.S. Biology (Botany Option), The Pennsylvania State University  
 M.S. Forest Resources, The Pennsylvania State University  
 Experience: Senior Biologist/Botanist, JCA, July 2000-Present.  
 Botanist, Washington State Natural Heritage Program, April 1997-June 2000.  
 Biologist/Botanist, JCA, January 1993-January 1996.  
 Expertise: Protected species surveys for flora and fauna, native plant identification, biotic community identification, wetland delineation, restoration and monitoring, forest management, vegetation monitoring and GPS/GIS.

Investigator: Halli Harris  
 Education: B.S. Biology, University of Georgia  
 Experience: Wetland Biologist, JCA, November 2003-April 2004.  
 Contract Biologist, self-employed, October 2001-November 2003.  
 Wetland Biologist, ENSR International, June 1999-October 2001.  
 Expertise: Wetland delineation, protected species surveys for flora and fauna, plant identification, biotic community identification, vegetation monitoring, GPS/GIS and use of ArcView software.

#### 1.5 Terminology

The definitions used for area descriptions contained in this report are as follows:

- Study Area (Study Corridor) – denotes the bubble area for the proposed project (area indicated on the aerial photograph by DOT).
- Project Vicinity – denotes an area extending 0.5 mile (mi) (0.8 kilometers (km)) on all sides of the study area.
- Project Region – is equivalent to an area represented by a 7.5 minute USGS topographic quadrangle map with the project occupying the central position.

## 2.0 PHYSICAL RESOURCES

Soil and water resources located within the study area are discussed below.

### 2.1 Regional Characteristics

Union County lies in the Piedmont physiographic province of North Carolina. The county ranges in elevation from approximately 300 to 780 feet (90 to 237 m) above mean sea level (MSL). Waxhaw Creek is the dominant hydrologic features in the project region. Land use within the project region is dominated by forestland interspersed with agricultural and rural residential areas. The Town of Waxhaw is located approximately 6 miles (9 km) north of the study area.

Elevations within the study area range from approximately 490 to 540 feet (150 to 165 m) above MSL. Waxhaw Creek ranges from 15 to 35 feet (4.5 to 10 m) wide in the study area and has a bank height of 1 to 3 feet (0.3 to 1 m). Its floodplain extends approximately 30 to 100 feet (9 to 30 m) on either side of the creek. The study area also includes 2 unnamed tributaries to Waxhaw Creek, a small farm pond and a wetland area in the floodplain of Waxhaw Creek. Land use within the study area is dominated by pastureland with a few rural residential sites.

### 2.2 Soils

Four major soil types occur within the study area (USDA 1996): Appling sandy loam, Cecil gravelly sandy clay loam, Chewacla silt loam and Helena fine sandy loam. All study area soils, their drainage characteristics and hydric classifications are presented in Table 1.

**Table 1. Study Area Soils and Characteristics.**

Map Unit Symbol	Specific Map Unit	Percent Slope	Drainage Class	Hydric Class	Hydric Inclusions
ApB	Appling sandy loam	2 - 8	Well drained	Non-hydric	No
CeB2	Cecil gravelly sandy clay loam	2 - 8	Well drained	Non-hydric	No
ChA	Chewacla silt loam	0 - 2	Somewhat poorly drained	Hydric	No
HeB	Helena fine sandy loam	2 - 8	Moderately well drained	Non-hydric	No

Appling sandy loam: Appling sandy loam is a well drained soil on smooth uplands. The seasonal high water table occurs more than 6.0 feet (1.8 m) below the surface. The flooding frequency for Appling sandy loam is none.

Cecil gravelly sandy clay loam: Cecil gravelly sandy clay loam is a well drained soil on ridges that are dissected by intermittent drainageways. The seasonal high water table occurs at more than 6.0 feet below the surface. The flooding frequency for Cecil gravelly sandy clay loam is none.

Chewacla silt loam: Chewacla silt loam is a somewhat poorly drained soil on floodplains. The seasonal high water table occurs at a depth of 0.5 to 1.5 feet (15 to 45 centimeters (cm)) below the surface. The flooding frequency for Chewacla silt loam is frequent.

Helena fine sandy loam: Helena fine sandy loam is a moderately well drained soil on ridges in the uplands, on toe slopes, and at the head of intermittent drainageways. The seasonal high water table occurs at depths of 1.5 to 2.5 feet (45 to 75 cm) below the surface. The flooding frequency for Helena fine sandy loam is none.

## 2.3 Water Resources

This section contains information concerning surface water resources likely to be impacted by the proposed project. Water resource information encompasses physical aspects of the resource, its relationship to major water systems, DWQ Best Usage Classifications, and the “quality” of the water resources. Probable impacts to these water bodies are also discussed, as are means to minimize those impacts.

### 2.3.1 Waters Impacted and Characteristics

Waxhaw Creek, its tributaries and a small farm pond will be the only surface waters directly impacted by the proposed project. Waters in the project vicinity are part of the Catawba River Basin, USGS 8-digit Hydrologic Unit Code (HUC) 03050103. The Catawba River Basin contains 9 subbasins. The study area is found in the Sixmile Creek, Waxhaw Creek and Twelvemile Creek DWQ Subbasin 03-08-38. Study area waters drain to the southwest eventually flowing into the Catawba River (NCDENR-DWQ 1999). The proposed project is not subject to the Catawba River Buffer Rules since it is not located on the Catawba River mainstem (NCDENR-DWQ 2004a).

### 2.3.2 Best Usage Classification

Waxhaw Creek has been assigned a best usage classification of Class “C” (index #11-139) by the Division of Water Quality (NCDENR-DWQ 2004). A “C” classification designates waters that are for aquatic life propagation/protection and secondary recreation. **Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominantly undeveloped watersheds) nor**

**Outstanding Resource Waters (ORW) occur within 1.0 mi (1.6 km) of the study area.**

### 2.3.3 Water Quality

This section describes the water quality of the water resources within the study area. Potential impacts to water quality from point and nonpoint sources are evaluated. Water quality assessments are based upon published resource information and field study observations.

#### 2.3.3.1 Nonpoint Source Discharge

Nonpoint source runoff from agricultural lands and timbering operations are likely to be the primary sources of water quality degradation within the project vicinity. The surrounding vicinity is mainly used for agriculture and timber production. Nutrient loading and increased sedimentation from agricultural runoff and forestry operations affects water quality. Inputs of nonpoint source pollution from a few private residences within the study area may also contribute to water quality degradation.

Section 303(d) of the Clean Water Act (CWA) requires states to develop a list of waters not meeting water quality standards or which have impaired uses. A review of the 303(d) list for North Carolina indicates that **Waxhaw Creek in the Catawba River Basin is not listed as an impaired waterway (NCDENR-DWQ 2003).**

#### 2.3.3.2 Benthic Macroinvertebrate Ambient Network

The DWQ has initiated a whole basin approach to water quality management for the 17 river basins within the state. To accomplish this goal the DWQ collects biological, chemical and physical data that can be used in basinwide assessment and planning. All basins are reassessed every 5 years. Prior to the implementation of the basinwide approach to water quality management, the Benthic Macroinvertebrate Ambient Network (managed by the DWQ) assessed water quality by sampling for benthic macroinvertebrate organisms at fixed monitoring sites throughout the state.

Many benthic macroinvertebrates have stages in their life cycle that can last from 6 months to a year; therefore, the adverse effects of a toxic event will not be overcome until the next generation. Different taxa of macroinvertebrates have different tolerances to pollution, thereby, long term changes in water quality conditions can be identified by population shifts from pollution sensitive to pollution tolerant organisms (and vice versa). Overall, the species present, the population diversity and the biomass are reflections of long term water quality conditions. **The bridge crossing was the location of a biological assessment site for benthic macroinvertebrates in 1992 and 1983.** In 1992 Waxhaw Creek

was assigned a Good-Fair bioclass with an EPT (Ephemeroptera+Plecoptera+Trichoptera) taxa richness value of -/14 and a biotic index value of -/5.53. In 1983, Waxhaw Creek was assigned a Fair bioclass with an EPT taxa richness value of 38/6 and a biotic index value of 6.82/5.39 (NCDENR-DWQ 1999).

### 2.3.3.3 Point Source Dischargers

Point source dischargers located throughout North Carolina are permitted through the National Pollutant Discharge Elimination System (NPDES) Program. Any discharger is required to register a permit. **There are no point dischargers located within 1 mile (1.6 km) of the study area (NCDENR-DWQ 1999 and Environmental Protection Agency (EPA) 2004).**

### 2.3.4 Summary of Anticipated Impacts to Water Resources

Construction of the proposed bridge replacement will impact water resources. The estimated impact is the length and width of the study area since the project is still in the design phase. Project construction may result in the following impacts to surface waters:

- Increased sedimentation and siltation from construction and/or erosion.
- Changes in light levels and turbidity due to increased sedimentation rates and vegetation removal.
- Alteration of water levels and flows due to interruptions and/or additions to surface and groundwater flow from construction.
- Increases in nutrient loading during construction through runoff from temporarily exposed land surfaces.
- Increased concentration of toxic compounds from highway runoff, construction, toxic spills and increased vehicular use.
- Changes in water temperature due to removal of streamside vegetation.

Precautions should be taken to minimize impacts to water resources in the study area. NCDOT's Best Management Practices (BMPs) for the protection of surface water and water supplies must be strictly enforced during the construction stage of the project. Provisions to preclude contamination by toxic substances during construction must also be strictly enforced.

## 3.0 BIOTIC RESOURCES

Biotic resources include aquatic and terrestrial communities. This section describes those communities encountered in the study area as well as the relationships between fauna and flora within these communities. Composition and distribution of biotic communities throughout the project are reflective of topography, hydrologic influences and past and present land uses in the study area. Descriptions of the terrestrial systems are presented in the context of plant community classifications and follow descriptions by Schafale and Weakley (1990) where

possible. Dominant flora and fauna observed, or likely to occur, in each community are described and discussed.

Scientific nomenclature and the common names (when applicable) are included for each described plant and animal species. Plant taxonomy follows Radford et al. (1968) and Weakley (2004). Animal Taxonomy follows Conant and Collins (1998), Webster et al. (1985), National Geographic (2002) and Rohde et al. (1994). Subsequent references to the same organism will include the common name only. Fauna observed during the site visit are denoted with an asterisk (\*). Spoor evidence or tracks equate to observation of the species. Published range distributions and habitat analysis were used in estimating fauna expected to be present within the study area.

### 3.1 Terrestrial Communities

#### 3.1.1 Dry Oak-Hickory Forest

The Dry Oak-Hickory Forest occurs on ridgetops, upper slopes, steep south-facing slopes and other relatively dry upland areas (Schafale and Weakley 1990). This community type comprised approximately 25 percent (%) of the study area (Figure 2 and Table 2). Canopy vegetation included white oak (*Quercus alba*), southern red oak (*Quercus falcata*), scarlet oak (*Quercus coccinea*) and shortleaf pine (*Pinus echinata*). Understory species included red cedar (*Juniperus virginiana*), red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*) and American holly (*Ilex opaca*). The herb layer was sparse and included pipsissewa (*Chimaphila maculata*), rattlesnake plantain (*Goodyera pubescens*), crane fly orchid (*Tipularia discolor*) and Japanese honeysuckle (*Lonicera japonica*).

#### 3.1.2 Dry-Mesic Oak-Hickory Forest

The Dry-Mesic Oak-Hickory Forest occurs on mid-slopes, low ridges and upland flats (Schafale and Weakley 1990). This community type comprised approximately 5% of the study area and has been highly disturbed by adjacent agricultural use and timber harvesting (Figure 2 and Table 2). Canopy vegetation included only weedy species such as sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*) and red cedar. Understory species included red maple and American holly. Japanese honeysuckle was the dominant ground cover in most areas.

In one area this community type had been clearcut. As a result of clearcutting and/or other disturbance, the area has become a wetland with pockets of standing water and an abundance of hydrophytic herbaceous vegetation. Dominant species within this area includes red maple and sweetgum saplings and herbaceous species such as soft rush (*Juncus effusus*), bushy seedbox (*Ludwigia alternifolia*), shallow sedge (*Carex lurida*), annual sumpweed (*Iva annua*) and broom panic grass (*Dichanthelium scoparium*).

### 3.1.3 Piedmont Bottomland Forest

The Piedmont Bottomland Forest occurs on floodplain ridges and terraces (Schafale and Weakley 1990). This community type comprised approximately 10% of the study area (Figure 2 and Table 2). Canopy vegetation included sweetgum, water oak, American elm (*Ulmus americana*), shagbark hickory (*Carya ovata*), hackberry (*Celtis laevigata*) and green ash (*Fraxinus pennsylvanica*). Understory species included ironwood (*Carpinus caroliniana*), red maple, American holly and river birch (*Betula nigra*). Chinese privet (*Ligustrum sinense*) and cane (*Arundinaria gigantea*) were the dominant shrub species. Vine species included muscadine grape (*Vitis rotundifolia*), poison ivy (*Toxicodendron radicans*) and catbriers (*Smilax* spp.). The herb layer was sparse to moderately dense and included Japanese honeysuckle, Nepalese browntop (*Microstegium vimineum*) and river oats (*Chasmanthium latifolium*).

In one area this community type had been clearcut. As a result of clearcutting and/or other disturbance, the area has become a wetland with a large area of open water that eventually flows into Waxhaw Creek via a small ephemeral drainageway. Dominant species within this area included ironwood and red maple saplings and herbaceous species such as cane, soft rush, river oats and annual sumpweed.

### 3.1.4 Maintained/Disturbed Community

The maintained/disturbed communities, approximately 20% of the study area, consisted of road shoulder, roadside/field ditches and residential landscapes (Figure 2 and Table 2). Road shoulders and ditches are irregularly maintained, receiving only periodic mowing and herbicide applications. Residential landscapes receive more frequent mowing, general maintenance and disturbance.

Road shoulders and roadside/field ditches act as buffers between the roadway and surrounding communities by filtering stormwater/agricultural run-off and reducing runoff velocities. Herbaceous vegetation located in the road shoulder consisted of mowed fescue (*Festuca* spp.), wild geranium (*Geranium carolinianum*), wild strawberry (*Fragaria* sp.), wild carrot (*Daucus carota*), hairy bittercress (*Cardamine hirsuta*) and vetch (*Vicia* sp.). Roadside ditches contained a mixture of woody and herbaceous vegetation including blackberry (*Rubus* sp.), sweetgum, red cedar, Japanese honeysuckle, goldenrod (*Solidago* sp.), Brazilian vervain (*Verbena brasiliensis*) and dog fennel (*Eupatorium compositifolium*).

Residential landscapes included mainly unvegetated areas and vegetated areas with grasses such as fescue, Bermuda grass (*Cynodon dactylon*) and crabgrass (*Digitaria* sp.). A few trees and shrubs were also located in the residential landscapes including Virginia pine (*Pinus virginiana*), loblolly pine, Chinese privet and various ornamental species.

### 3.1.5 Pasture/Hayfield Communities

The pasture and hayfield communities comprised approximately 40% of the study area (Figure 2 and Table 2). These areas consisted of mowed or grazed grasses and herbs including fescue (*Festuca* sp.) and common broomsedge (*Andropogon virginicus*).

**Table 2. Study Area Terrestrial Communities and Area Coverage.**

Terrestrial Community	Area Coverage
Dry Oak-Hickory Forest	8 acres (3.2 hectares (ha))
Dry-Mesic Oak-Hickory Forest	2 acres (0.8 ha)
Piedmont Bottomland Forest	4 acres (1.6 ha)
Maintained/Disturbed Community	7 acres (3 ha)
Pasture/Hayfield Communities	15 acres (6 ha)

### 3.2 Aquatic Communities

Several aquatic communities will be potentially impacted by the proposed project. These include Waxhaw Creek, 2 unnamed tributaries to Waxhaw Creek, a pond and a wetland within the floodplain of Waxhaw Creek. Physical characteristics of a water body and the condition of the water resource influence the faunal composition of aquatic communities. Waxhaw Creek has a streambed width (bank to bank) of 15 to 35 feet (4.5 to 10 m) and a bank height of 1 to 3 feet (0.3 to 1 m). The main channel width was 15 to 30 feet (4.5 to 9 m) and the water depth was approximately 2 to 3 feet (0.6 to 0.9 m). The channel substrate was composed primarily of sand and silt. The flow of the creek within the study area was moderate (Appendices I and II).

A large unnamed tributary (Tributary 3) to Waxhaw Creek occurs within the southeastern quadrant of the study area. This tributary has a streambed width (bank to bank) of 10 to 15 feet (3 to 4.5 m) and a bank height of 3 to 4 feet (1 to 1.2 m). The main channel width was 8 to 10 feet (2.4 to 3 m) and the water depth was approximately 1 to 2 feet (0.3 to 0.6 m). The channel substrate was composed mainly of sand and silt. The flow of the tributary was moderate to slow (Appendices I and II).

A small unnamed tributary (Tributary 2) to Waxhaw Creek occurs within the northwest quadrant of the study area. This tributary has a streambed width (bank to bank) of 2 to 10 feet (0.6 to 3 m) and a bank height of 1 to 3 feet (0.3 to 1m). The main channel width was 1 to 5 feet (0.3 to 1.5 m) and the water depth was 1 to 6 inches (2.5 to 15 cm). The channel substrate was loamy and the tributary had a moderate flow (Appendices I and II).

A small farm pond is located within the northwestern quadrant of the study corridor. The pond had open water with no aquatic vegetation. The pond edges were vegetated with willow (*Salix* sp.), silky dogwood (*Cornus amomum*) and soft rush.

The wetland area is described in Sections 3.1.2 and 3.1.3 above (Appendices III and IV).

### 3.3 Wildlife

Many faunal species are highly adaptive and may populate or exploit the entire range of biotic communities located within the study area. Each species fills its own ecological niche and there are often complex interactions between the species present. Examples of these relationships include symbiotic, competitive and predator/prey relationships. The following sections list terrestrial and aquatic fauna that occur or may occur within the study area for the proposed project.

#### 3.3.1 Terrestrial Fauna

Mammals that may commonly occur within the study area include: raccoon\* (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*) and white-tailed deer (*Odocoileus virginianus*). Other mammal species that may exploit the forest edge and open habitats within the project area include Virginia opossum (*Didelphis virginiana*), red fox (*Vulpes vulpes*), eastern cottontail rabbit (*Sylvilagus floridanus*), white-footed mouse\* (*Peromyscus leucopus*) and eastern mole (*Scalopus aquaticus*) (Webster et al. 1985).

The forest and forest edge habitats located in the study area provide shelter and forage for a variety of avian species. Birds that may be found in these habitats include the northern harrier\* (*Circus cyaneus*), American crow (*Corvus brachyrhynchos*), eastern bluebird (*Sialia sialis*), Carolina chickadee (*Poecile carolinensis*), turkey vulture (*Cathartes aura*), blue jay (*Cyanocitta cristata*), eastern towhee (*Pipilo erythrophthalmus*), American robin (*Turdus migratorius*), northern cardinal\* (*Cardinalis cardinalis*) and Carolina wren\* (*Thryothorus ludovicianus*) (National Geographic 2002).

Some of the reptiles that can be expected to utilize the terrestrial communities within the study area include Carolina anole (*Anolis carolinensis*), five-lined skink\* (*Eumeces fasciatus*), northern black racer (*Coluber constrictor constrictor*), eastern hognose snake (*Heterodon platyrhinos*), rough green snake (*Opheodrys aestivus*) and the eastern garter snake (*Thamnophis sirtalis sirtalis*) (Conant and Collins 1998).

Terrestrial areas provide habitat for amphibians such as red-spotted newt (*Notophthalmus viridescens viridescens*), spotted salamander (*Ambystoma maculatum*), eastern spadefoot toad (*Scaphiopus holbrooki holbrookii*), Fowler's toad (*Bufo woodhousei fowleri*) and upland chorus frog\* (*Pseudacris triseriata feriarum*) (Conant and Collins 1998).

#### 3.3.2 Aquatic Fauna

Representative species of fish that may be found in the study area include American eel (*Anguilla rostrata*), rosyside dace (*Clinostomus funduloides*), brown bullhead (*Ameiurus nebulosus*), redfin pickerel (*Esox americanus*), bluegill (*Lepomis macrochirus*), redbreast sunfish (*Lepomis auritus*) and eastern mosquitofish (*Gambusia holbrooki*) (Rohde et al. 1994).

Waxhaw Creek within the study corridor provides habitat for a variety of reptiles. Species which may be present in or near the creek include snapping turtle (*Chelydra serpentina*), common musk turtle (*Sternotherus odoratus*), northern water snake (*Nerodia sipedon sipedon*), spring peeper\* (*Pseudacris crucifer*), southern leopard frog (*Rana utricularia*) and bullfrog (*Rana catesbeiana*) (Conant and Collins 1998).

Invertebrates that would be expected within the study area include: crayfish (Camaridae), nymphal and larval stages of dragonflies (Odonata) and caddisflies (Trichoptera) and snails (Gastopoda).

### **3.4 Summary of Anticipated Terrestrial Impacts**

Construction of the subject project will have various impacts on the biotic resources described. Any construction related activities in or near these resources have the potential to impact biological functions. These impacts cannot be quantified at this time since the specifications of the project are not yet known.

Plant communities found in the proposed study area serve as nesting and sheltering habitat for various wildlife species. Project construction may reduce habitat for wildlife species, thereby diminishing their numbers. Habitat reduction concentrates wildlife into smaller areas of refuge, thus causing some species to become more susceptible to disease, predation and starvation.

Areas modified by construction (but not paved) will become road shoulders and early successional habitat. Increased traffic noise and reduced habitat will displace some wildlife farther from the roadway, while attracting other wildlife by the creation of more early successional habitat. Animals temporarily displaced by construction activities will repopulate areas suitable for the species. This temporary displacement of animals may result in an increase of competition for the remaining resources.

### **3.5 Summary of Anticipated Aquatic Impacts**

Aquatic communities are sensitive to small changes in their environment. Stream channelization, scouring, siltation, sedimentation and erosion from construction-related work can affect water quality and biological constituents. Although direct construction impacts may be temporary, environmental impacts from these construction processes may result in long term or irreversible effects.

Alterations in the aquatic community will result from the installation of bridges or temporary arched culverts. Impacts often associated with in-stream construction include increased channelization of water and scouring of stream channels. Water movement through these structures becomes concentrated and direct, thereby increasing the flow velocity.

In-stream construction alters the stream substrate and may remove streamside vegetation. Disturbances to the substrate will destroy aquatic vegetation and produce siltation, which clogs

the gills and/or feeding mechanisms of benthic organisms (sessile filter-feeders and deposit-feeders), fish and amphibians. Benthic organisms can also be covered by excessive amounts of sediment. These organisms are slow to recover or repopulate a stream. Turbidity reduces light penetration, thus decreasing the growth of aquatic vegetation.

The removal of streamside vegetation and placement of fill material at the construction site alters the terrain. Alteration of the stream bank enhances the likelihood of erosion and sedimentation. Revegetation stabilizes and holds the soil, thus slowing or stopping these processes. Erosion and sedimentation carry soils, toxic compounds and other materials into aquatic communities at and downstream of the construction site. These processes magnify turbidity and can cause the formation of sandbars at the site and downstream, thereby altering water flow and the growth of vegetation. Streamside alterations also lead to more direct sunlight penetration and to elevations of water temperatures, which may impact many species.

#### 4.0 JURISDICTIONAL TOPICS

This section provides descriptions, inventories and impact analysis pertinent to 2 important issues--Waters of the United States and rare and protected species.

##### 4.1 Waters of the United States

The U.S. Army Corps of Engineers (USACE) promulgated the definition of "Waters of the United States" under 33 CFR §328.3(a). Waters of the United States include most interstate and intrastate surface waters, tributaries and wetlands. Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils are considered "wetlands" under 33 CFR §328.3(b). Wetlands generally include swamps, marshes, bogs and similar areas. Any action that proposes to place dredged or fill materials into Waters of the United States falls under the jurisdiction of the USACE and must follow the statutory provisions under Section 404 of the Clean Water Act (CWA) (33 U.S.C. 1344).

##### 4.1.1 Characteristics of Wetlands and Surface Waters

Potential wetland communities were investigated pursuant to the 1987 "Corps of Engineers Wetland Delineation Manual" (USACE 1987). The 3 parameter approach was used where hydric soils, hydrophytic vegetation and prescribed hydrologic characteristics must **all** be present for an area to be considered a jurisdictional wetland.

One large wetland (Wetland A/B) in the study area, occurred partially in the floodplain of Waxhaw Creek. Hydrophytic vegetation in this area included soft rush, bushy seedbox, shallow sedge, broom panic grass, river oats and green ash. The soil was a sandy loam, generally saturated to the surface and had a Munsell color notation of 10YR 3/3 over 10YR 5/3 (Appendix III). This wetland had a wetland value score of 25 (NCDENR 1995) (Appendix IV).

One very small wetland (Wetland C) occurs along a tributary to Waxhaw Creek. Hydrophytic vegetation in this area included cane, ironwood, red maple and river oats. The soil was a sandy loam, saturated to the surface, with some ponded water and had a Munsell color notation of 10YR 5/1 (Appendix III). This wetland had a wetland value score of 11 (NCDENR 1995) (Appendix IV).

Jurisdictional surface waters present within the study area include Waxhaw Creek, 2 unnamed tributaries to Waxhaw Creek and a small farm pond. A detailed description of these surface waters is presented in Section 3.2 and Appendices I and II.

#### 4.1.2 Summary of Anticipated Impacts

Estimated impacts to surface waters were derived from aerial photographs of the study area onto which surface water locations were mapped in the field (Table 3). The study area width and length were used in the calculations. Usually, project construction does not require the use of the entire study area, therefore, actual impacts may be considerably less.

**Table 3. Anticipated impacts to surface waters within the study area:**

Site	Impacts within Study Area
Waxhaw Creek	500 linear feet (152 linear m)
Unnamed Tributary 3	200 linear feet (60 linear m)
Unnamed Tributary 2	300 linear feet (90 linear m)
Farm pond	0.69 acres (0.28 hectares (ha))

Wetlands were delineated in the field and mapped using a Global Positioning System (GPS). Estimated impacts to wetlands were calculated using GPS and the study area width and length (Table 4). Usually, project construction does not require the use of the entire study area, therefore, actual impacts may be considerably less.

**Table 4. Anticipated impacts to wetlands within the study area:**

Site	Impacts within Study Area	DWQ Rating
Wetland A/B	0.45 acres (0.18 ha)	25
Wetland C	0.01 acres (0.004 ha)	11

#### 4.1.3 Permits

In accordance with provisions of Section 404 of the CWA (33 U.S.C. 1344), a Section 404 Nationwide Permit No. 23 from the USACE is likely to be applicable for impacts to Waters of the United States resulting from the proposed project. This permit authorizes activities undertaken, assisted, authorized, regulated, funded or financed in whole, or part, by another Federal agency or department where that agency or department has determined that pursuant to the Council on Environmental Quality (CEQ) regulation

for implementing the procedural provisions of the National Environmental Policy Act. A Section 404 Nationwide Permit No. 33 may be required if temporary construction including cofferdams, access and dewatering are required for this project. The USACE will determine the final permit requirements.

A DWQ Section 401 Water Quality General Certification is required prior to the issuance of the Section 404 Nationwide No. 23. Section 401 Certification allows surface waters to be temporarily impacted for the duration of the construction or other land manipulations.

#### **4.1.4 Mitigation**

The USACE has adopted, through the CEQ, a wetland mitigation policy which embraces the concept of "no net loss of wetlands" and sequencing. The purpose of this policy is to restore and maintain the chemical, biological and physical integrity of Waters of the United States, specifically wetlands. Mitigation of wetland impacts has been defined by the CEQ to include: avoiding impacts (to wetlands), minimizing impacts, rectifying impacts, reducing impacts over time and compensating for impacts (40 CFR 1508.20). Each of these 3 aspects (avoidance, minimization and compensatory mitigation) must be considered sequentially.

##### **4.1.4.1 Avoidance**

Avoidance examines all appropriate and practicable possibilities of averting impacts to Waters of the United States. According to a 1990 Memorandum of Agreement (MOA) between the EPA and the USACE, in determining "appropriate and practicable" measures to offset unavoidable impacts, such measures should be appropriate to the scope and degree of those impacts and practicable in terms of cost, existing technology and logistics in light of overall project purposes. Impacts to Waters of the United States will likely not be avoided due to their close proximity to the existing bridge.

##### **4.1.4.2 Minimization**

Minimization includes the examination of appropriate and practicable steps to reduce adverse impacts to Waters of the United States. Implementation of these steps will be required through project modifications and permit conditions. Minimization typically focuses on decreasing the footprint of the proposed project through the reduction of median widths, right-of-way (ROW) widths, fill slopes and/or road shoulder widths. Other practical mechanisms to minimize impacts to Waters of the United States crossed by the proposed project include: strict enforcement of sedimentation control BMP's for the protection of surface waters during the entire life of the project; reduction of clearing and grubbing activity; reduction/elimination of direct discharge into streams, reduction of runoff velocity, re-establishment of vegetation on exposed areas, judicious pesticide and herbicide usage, minimization of "in-stream" activity and

litter/debris control. Impacts to Waters of the United States can be minimized by replacing the bridge on the existing location with an off-site detour on U.S. Highway 521.

#### 4.1.4.3 Compensatory Mitigation

Compensatory mitigation is not normally considered until anticipated impacts to Waters of the United States have been avoided **and** minimized to the maximum extent practicable. It is recognized that "no net loss of wetlands" functions and values may not be achieved in each and every permit action. Appropriate and practicable compensatory mitigation is required for unavoidable adverse impacts which remain after all appropriate and practicable minimization has been required. Compensatory actions often include restoration, creation and enhancement of Waters of the United States. Such actions should be undertaken in areas adjacent to or contiguous to the discharge site. It is anticipated that no compensatory mitigation will be required for this project although final determination rests with the USACE.

## 4.2 Rare and Protected Species

Some populations of fauna and flora have been, or are in decline either due to natural forces or their inability to coexist with human activities. Federal law (under the provisions of the Endangered Species Act of 1973 (ESA), as amended, requires that any action, likely to adversely affect a species classified as federally-protected, be subject to review by the USFWS. Other species may receive additional protection under state laws.

### 4.2.1 Federally-Protected Species

Plants and animals with federal classifications of Endangered (E), Threatened (T), Proposed Endangered (PE) or Proposed Threatened (PT) are protected under provisions of Sections 7 and 9 of the ESA, as amended. As of February 25, 2003, the USFWS lists the following federally-protected species for Union County (Table 5). A brief description of each species' characteristics and habitat follows.

**Table 5. Federally-Protected Species for Union County, North Carolina.**

SCIENTIFIC NAME	COMMON NAME	STATUS
<i>Aster georgianus</i>	Georgia aster	C
<i>Lasmigona decorata</i>	Carolina heelsplitter	E
<i>Helianthus schweinitzii</i>	Schweinitz's sunflower	E

"E" denotes Endangered (a species in danger of extinction throughout all or a significant portion of its range).

"C" denotes candidate species (a taxon under consideration for which there is sufficient information to support listing).

*Aster georgianus (Georgia aster) Candidate***Family: Asteraceae****Federally listed: June 13, 2002**

Georgia aster is found from southcentral North Carolina to central Georgia, west to central Alabama, apparently disjunct on the Coastal Plain of southwest Georgia and the eastern Panhandle of Florida. There are currently 60 known populations in the southeastern United States. Most of these populations are small consisting of colonies of only 10 to 100 stems.

Georgia aster is a perennial, colonial herb with 1, sometimes 2 stems, approximately 17 to 31 inches (4.5 to 8 decimeters (dm)) tall from underground rhizomes. The leaves are thick, lanceolate to oblanceolate, scabrous and clasp the scabrous stem. The species has large flower heads 2 inches (5 cm) across with dark purple rays up to 0.8 inches (2 cm) long. Flowering occurs from early October to mid-November. Disk flowers are white with purplish tips on the corollas, anthers are purple and the pollen is white. Seeds are produced between November and December and is a ribbed achene up to 0.15 inches (4 millimeters (mm)) in length (USFWS 2002).

Georgia aster is a relict species of post oak savanna communities that existed in the Southeast prior to widespread fire suppression and extirpation of large grazing mammals. Most remaining populations survive adjacent to roads, utility ROWs and other openings where current land management mimics natural disturbance regimes. Existing populations are threatened by woody plant succession due to fire suppression, development, highway expansion/improvement, and herbicide application (USFWS 2002).

**BIOLOGICAL CONCLUSION****NO EFFECT**

Habitat in the form of forest openings does exist in the study area even though the area has been severely degraded by agricultural and residential development. A species specific survey was conducted on 15 September 2004. No Georgia aster was located within the study area. A 27 February 2004 review of the NCNHP database of threatened and endangered species also revealed no known populations of Georgia aster within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on Georgia aster.

*Lasmigonia decorata (Carolina heelsplitter) Endangered***Family: Unionidae****Federally listed: July 30, 1993.**

This species was historically known from several locations within the Catawba and Pee Dee River systems in North Carolina and the Saluda, Pee Dee and Savannah River systems in South Carolina. Only 6 populations of the species are presently known

to exist. In North Carolina one small population occurs in the Catawba River system in Waxhaw Creek, Union County and another population occurs in Goose Creek, a tributary to the Rocky River in the Pee Dee River system, also in Union County. In South Carolina, there are 4 populations, 1 each in the Pee Dee and Catawba River systems and 2 in the Savannah River system (USFWS 2004).

The Carolina heelsplitter has an ovate, trapezoid-shaped, unsculptured shell. The shell of the largest known specimen of the species measures 4.6 inches (114.8 mm) in length, 1.56 inches (39 mm) in width, and 2.7 inches (68 mm) in height (Keferl 1991). The shell's outer surface varies from greenish-brown to dark brown in color, and shells from younger specimens have faint greenish-brown or black rays. The nacre (inside surface) is often pearly-white to bluish-white, grading to orange in the area of the umbo. However, in older specimens the entire nacre may be a mottled pale orange (Keferl 1991).

Because of its rarity, little is known of the biology of the Carolina heelsplitter. Historically the species was reported from small to large streams and rivers, as well as ponds. The "ponds" referred to in historic records are believed to have been millponds on some of the smaller streams within the species' historic range (Keferl 1991). Presently, the species is known to occur in only six small streams and one small river and is usually found in mud, muddy sand, or muddy gravel substrates along stable, well-shaded stream banks (Keferl and Shelly 1988, Keferl 1991). The stability of stream banks appears to be very important to the species. Like other freshwater mussels, the Carolina heelsplitter feeds by filtering food particles from the water. It has a complex reproductive cycle in which the mussel larvae (glochidia) parasitize fish. The mussel's life span, fish species its larvae parasitize, and many other aspects of its life history are unknown (USFWS 2004).

## **BIOLOGICAL CONCLUSION**

## **UNRESOLVED**

**Waxhaw Creek is designated Critical Habitat for the Carolina heelsplitter** and stream habitat with substrates including mud, muddy sand, or muddy gravel are present within the study area. A 27 February 2004 review of the NCNHP database of threatened and endangered species, revealed no known populations within 1.0 mi (1.6 km) of the study area. Consequently, a biological conclusion of "Unresolved" is assigned for the Carolina heelsplitter pending stream surveys.

### ***Helianthus schweinitzii* (Schweinitz's sunflower) Endangered**

**Family: Asteraceae**

**Federally listed: May 7, 1991**

Schweinitz's sunflower is endemic to the Piedmont of the Carolinas, where it is currently known from 10 populations in North Carolina and 6 in South Carolina. The North Carolina populations are located in Anson, Cabarrus, Davidson, Gaston,

Mecklenberg, Montgomery, Randolph, Rowan, Stanly and Union Counties. The species has been extirpated from Stokes County in North Carolina (USFWS 2004).

This rhizomatous perennial herb grows from 3 to 6 feet (1 to 2 m) tall from a cluster of carrot-like tuberous roots. The following combination of characters separates *H. schweinitzii* from all other eastern North American species in the genus: heads small (the involucre less than 1 centimeter across), stems at least sparsely strigose or hirsute below the inflorescence, leaves sessile to short-petiolate (petiole less than 0.6 inches (1.5 cm) long, very rarely to lanceolate, broadest near base, 5 to 10 times as long as wide (Weakley and Houk 1992).

The species occurs in clearings and edges of upland woods on moist to dryish clays, clay-loams, or sandy clay-loams that often have high gravel content and are moderately podzolized. It is known to occur on a variety of soil types, including Iredell, Enon, Badin, Cecil, Misenheimer, Gaston and Zion soil series. Schweinitz's sunflower usually grows in open habitats not typical of the current general landscape in the Piedmont of the Carolinas. The habitat of this sunflower tends to be dominated by members of the aster, pea, and grass families, an association emphasizing affinities of the habitat to both longleaf pine-dominated sandhills and savannas of the southeastern coastal plain and to glades, barrens, and prairies of the Midwest and Plains (Weakley and Houk, 1992).

## **BIOLOGICAL CONCLUSION**

## **NO EFFECT**

Schweinitz's sunflower is known to occur on the Cecil soil type which does exist in the study area. A species specific survey was conducted on 15 September 2004 during the flowering period for the species. No Schweinitz's sunflower was located within the study area. A 27 February 2004 review of the NCNHP database of threatened and endangered species also revealed no known populations of Schweinitz's sunflower within 1 mile (1.6 km) of the study area. Consequently, the proposed project will have "No Effect" on Schweinitz's sunflower.

### **4.2.2 Federal Species of Concern and State-Listed Species**

There are 7 Federal Species of Concern (FSC) listed for Union County as of 25 February 2003. Federal Species of Concern are not afforded federal protection under the ESA and are not subject to any of its provisions, including Section 7, until they are formally proposed or listed as Threatened or Endangered. These species were formally candidate species, or species under consideration for listing for which there was insufficient information to support a listing of Endangered, Threatened, Proposed Endangered or Proposed Threatened. Organisms which are listed as Endangered, Threatened, Significantly Rare or Special Concern on the NCNHP list of rare plant and animal species are afforded state protection under the State Endangered Species Act and the North Carolina Plant Protection and Conservation Act of 1979.

Table 6 lists the Federal Species of Concern, species state status and the existence of suitable habitat for these species within the study area. This list is provided for information purposes because the status of these species may be upgraded in the future.

Surveys for these species were not conducted during the site visit, nor were any of these species observed. A 27 February 2004 review of the NCNHP database of rare species and unique habitats revealed no records of North Carolina rare and/or protected species in or near the study area.

**Table 6. Federal Species of Concern for Union County, North Carolina.**

Scientific Name	Common name	NC Status	Habitat
<i>Dactylocythere peedeensis</i> *	Pee Dee crayfish ostracod	W3	Yes
<i>Etheostoma collis lepidinion</i>	Carolina darter	SC	Yes
<i>Fusconaia masoni</i>	Atlantic pigtoe	E	Yes
<i>Isoetes virginica</i>	Virginia quillwort	SR-L	Yes
<i>Lotus helleri</i>	Heller's trefoil	SR-T	Yes
<i>Toxolasma pullus</i>	savanna lilliput	E	Yes
<i>Villosa vaughaniana</i>	Carolina creekshell	E	Yes

"E" – Any native or once-native species whose continued existence as a viable component of the State's flora or fauna is determined to be in jeopardy.

"SC"--A Special Concern species is one which requires monitoring but may be taken or collected and sold under regulations adopted under the provisions of Article 25 of Chapter 113 of the General Statutes (animals) and the Plant Protection and Conservation Act (plants). Only propagated material may be sold of Special Concern plants that are also listed as Threatened or Endangered.

"SR"--A Significantly Rare species is one which is very rare in North Carolina, generally with 1-20 populations in the state, generally substantially reduced in numbers by habitat destruction, direct exploitation or disease. The species is generally more common elsewhere in its range, occurring peripherally in North Carolina.

"-L"—Range of the species is limited to North Carolina and adjacent states.

"-T"—These species are rare throughout their ranges.

"W3"--A Watch Category 3 species is a species that is poorly known in North Carolina, but is not necessarily considered to be declining or otherwise in trouble.

"\*"--Historic record (last observed in the county more than 50 years ago).  
(Amoroso and Finnegan, 2002; LeGrand, Hall and Finnegan 2001).

## 6.0 REFERENCES

Conant, R. and J.T. Collins. 1998. A field guide to reptiles and amphibians of eastern and central North America. Third Edition, Expanded. Houghton Mifflin Company, New York, NY.

Environmental Protection Agency. 2004. EnviroMapper website (<http://maps.epa.gov/enviromapper>).

Franklin, M.A. and J.T. Finnegan. 2004. "Natural Heritage Program List of the Rare Plant Species of North Carolina". North Carolina Natural Heritage Program, Raleigh, N.C.

Keferl, E.P. 1991. A status survey for the Carolina heelsplitter (*Lasmigona decorata*), a freshwater mussel endemic to the Carolinas. Unpublished report to the U.S. Department of the Interior, Fish and Wildlife Service. 51 pp.

Keferl, E.P., and R.M. Shelly. 1988. The final report on a status survey of the Carolina heelsplitter, *Lasmigona decorata*, and the Carolina elktoe, *Alasmidonta robusta*. Unpublished report to the U.S. Department of the Interior, Fish and Wildlife Service. 47 pp.

LeGrand, Jr., H.E., S.E. McRae, S. P. Hall and J.T. Finnegan. 2004. "Natural Heritage Program List of the Rare Animal Species of North Carolina". North Carolina Natural Heritage Program, Raleigh, N.C.

National Geographic. 2002. *Field Guide to the Birds of North America*. Fourth Edition. National Geographic Society, Washington, D.C.

NCDENR-DWQ. 2004. Basinwide Information Management System (BIMS) website (<http://h2o.enr.state.nc.us/bims/Reports/reportsWB.html>).

NCDENR-DWQ. 2004a. NCDENR-DWQ "Redbook" surface waters and wetlands standards, N.C. Administrative Code 15A NCAC 02B.0100, .0200 & .0300. Amended effective 1 August 2004.

NCDENR-DWQ. 1999. Catawba River Basinwide Water Quality Plan.

NCDENR-DWQ. 2003. North Carolina Water Quality Assessment and Impaired Waters List (2002 Integrated 305(b) and 303(d) Report). ([http://h2o.enr.state.nc.us/tmdl/General\\_303d.htm](http://h2o.enr.state.nc.us/tmdl/General_303d.htm))

NCDENR. 1995. "Guidance for rating the values of wetlands in North Carolina". Fourth Version. North Carolina Department of Environment and natural Resources, Raleigh, North Carolina.

Radford, A.E., H.E. Ahles and G.R. Bell. 1968. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press, Chapel Hill, N.C.

- Rohde, F.C., R.G. Arndt, D.G. Lindquist and J.F. Parnell. 1994. *Freshwater Fishes of the Carolinas, Virginia, Maryland, & Delaware*. University of North Carolina Press, Chapel Hill, N.C.
- Schafale, M.P. and A.S. Weakley. 1990. *Classification of The Natural Communities of North Carolina*. Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, NCDEHNR, Raleigh, N.C.
- U.S. Army Corps of Engineers. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.
- U.S. Department of Agriculture Natural Resources Conservation Service. 1996. Soil Survey for Union County, North Carolina.
- U.S. Fish and Wildlife Service. 2002. Candidate and Listing Priority Assignment Form for Georgia Aster (<http://southeast.fws.gov/es/candidate%20forms.htm>).
- U.S. Fish and Wildlife Service. 1996. "Recovery Plan for Carolina Heelsplitter (*Lasmigona decorata*) Lea". U.S. Fish and Wildlife Service. Atlanta, GA. 30 pp.
- U.S. Fish and Wildlife Service. 1994. "Recovery Plan for Schweinitz's sunflower (*Helianthus schweinitzii*)". U.S. Fish and Wildlife Service. Atlanta, GA. 28 pp.
- U.S. Fish and Wildlife Service. 2004. North Carolina Ecological Services website (<http://nc-es.fws.gov>).
- U.S. Geological Survey. 1968. Van Wyck, S.C.-N.C. Quadrangle [7.5 minute Topographic map]. Washington, D.C.: US Geological Service. 1 sheet.
- Weakley, A.S. 2004. Flora of the Carolinas, Virginia and Georgia. Working draft; online version March 24, 2004. UNC Herbarium, North Carolina Botanical Garden, University of North Carolina at Chapel Hill, N.C. <http://www.herbarium.unc.edu/flora.htm>.
- Weakley, A. and R. Houk. 1992. Technical Draft Recovery Plan for Schweinitz's sunflower (*Helianthus schweinitzii*). U.S. Fish and Wildlife Service, Atlanta, GA. 37 pp.
- Webster, W.D., J.F. Parnell and W.C. Biggs. 1985. *Mammals of the Carolinas, Virginia and Maryland*. The University of North Carolina Press, Chapel Hill, N.C.

**APPENDIX I:**

**USACE Stream Quality Assessment Worksheets**



# STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: NCDOT
- 2. Evaluator's name: TRACY RUSH
- 3. Date of evaluation: 3-3-04
- 4. Time of evaluation: 3:00 PM
- 5. Name of stream: WAXHAW CREEK
- 6. River basin: CATAWBA
- 7. Approximate drainage area: \_\_\_\_\_
- 8. Stream order: 4
- 9. Length of reach evaluated: 500 feet
- 10. County: UNION
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): NONE
- Latitude (ex. 34.872312): 34.8367425° N Longitude (ex. -77.556611): 80.7918067° W
- Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_
- 13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
BRIDGE No. 377 on SR 1103
- 14. Proposed channel work (if any): BRIDGE REPLACEMENT
- 15. Recent weather conditions: PARTLY CLOUDY 70° F
- 16. Site conditions at time of visit: RECENT SNOWFALL
- 17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  
 Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed  (I-IV)
- 18. Is there a pond or lake located upstream of the evaluation point? YES  NO  If yes, estimate the water surface area: \_\_\_\_\_
- 19. Does channel appear on USGS quad map?  YES  NO
- 20. Does channel appear on USDA Soil Survey?  YES  NO
- 21. Estimated watershed land use: 5 % Residential 1 % Commercial 0 % Industrial 5 % Agricultural  
80 % Forested 10 % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)
- 22. Bankfull width: 15-30 feet
- 23. Bank height (from bed to top of bank): 1-3 feet
- 24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)
- 25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 70      Comments: \_\_\_\_\_

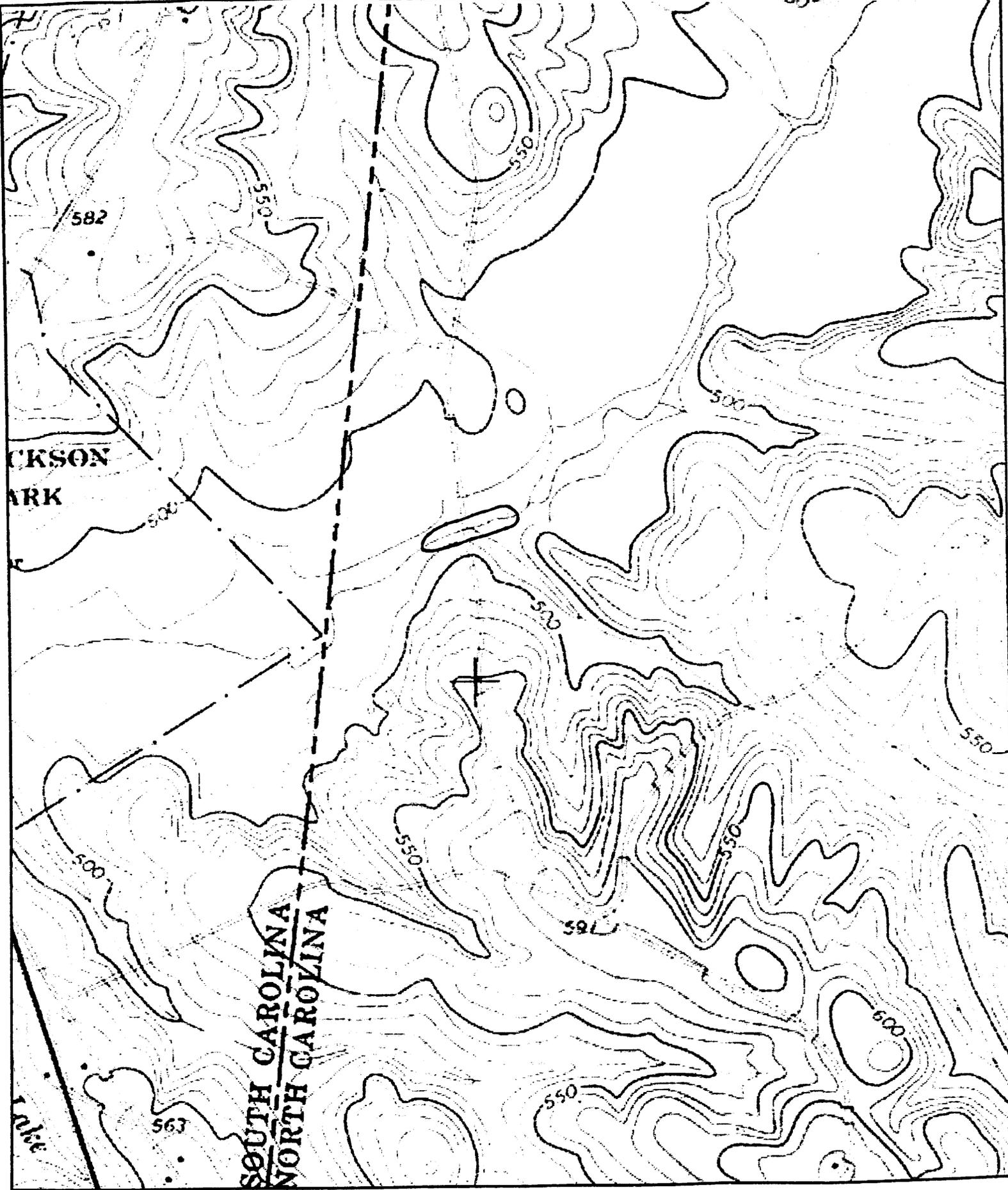
Evaluator's Signature Tracy Rush      Date 3-5-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change – version 06/03. To Comment, please call 919-876-8441 x 26.

## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
PHYSICAL	1	Presence of flow / persistent pools in stream (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	4
	2	Evidence of past human alteration (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	Riparian zone (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	Groundwater discharge (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
	7	Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	3
	8	Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	2
	9	Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	10	Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2.5
	11	Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2 SANDY
STABILITY	12	Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	4
	14	Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3.5
	15	Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
HABITAT	16	Presence of riffle-pool/ripple-pool complexes (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1 HIGH WATER
	17	Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	Canopy coverage over streambed (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	4
	19	Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
BIOLOGY	20	Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	3
	21	Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2 FROGS
	22	Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE</b> (also enter on first page)						70

\* These characteristics are not assessed in coastal streams.



Name: VAN WYCK  
Date: 4/28/2004  
Scale: 1 inch equals 1000 feet

Location: 034.8353399° N 080.7906889° W



# STREAM QUALITY ASSESSMENT WORKSHEET

TRIBUTARY 2



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: NCDOT
- 2. Evaluator's name: TRACY RUSH
- 3. Date of evaluation: 3-3-04
- 4. Time of evaluation: 1:00 PM
- 5. Name of stream: Tribotary to Waxhaw Creek
- 6. River basin: CATAWBA
- 7. Approximate drainage area: \_\_\_\_\_
- 8. Stream order: 1
- 9. Length of reach evaluated: 500 feet
- 10. County: UNION
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_

Latitude (ex. 34.872312): 34.8371920° N Longitude (ex. -77.556611): 80.7922873° W

Method location determined (circle): GPS Topo Sheet Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location):  
100 feet downstream of Bridge No. 377 on SR 1103

14. Proposed channel work (if any): BRIDGE REPLACEMENT UPSTREAM

15. Recent weather conditions: RECENT SNOWFALL

16. Site conditions at time of visit: PARTLY CLOUDY, HUMID 70°

17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  
 Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed (I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES NO If yes, estimate the water surface area: 1 ACRE

19. Does channel appear on USGS quad map? YES NO 20. Does channel appear on USDA Soil Survey? YES NO

21. Estimated watershed land use: 1 % Residential 0 % Commercial 0 % Industrial 80 % Agricultural  
19 % Forested 0 % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)

22. Bankfull width: Varies 2-10 feet 23. Bank height (from bed to top of bank): 1-3 feet

24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)

25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 55 Comments: \_\_\_\_\_

Evaluator's Signature: Tracy Rush Date: 3-6-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

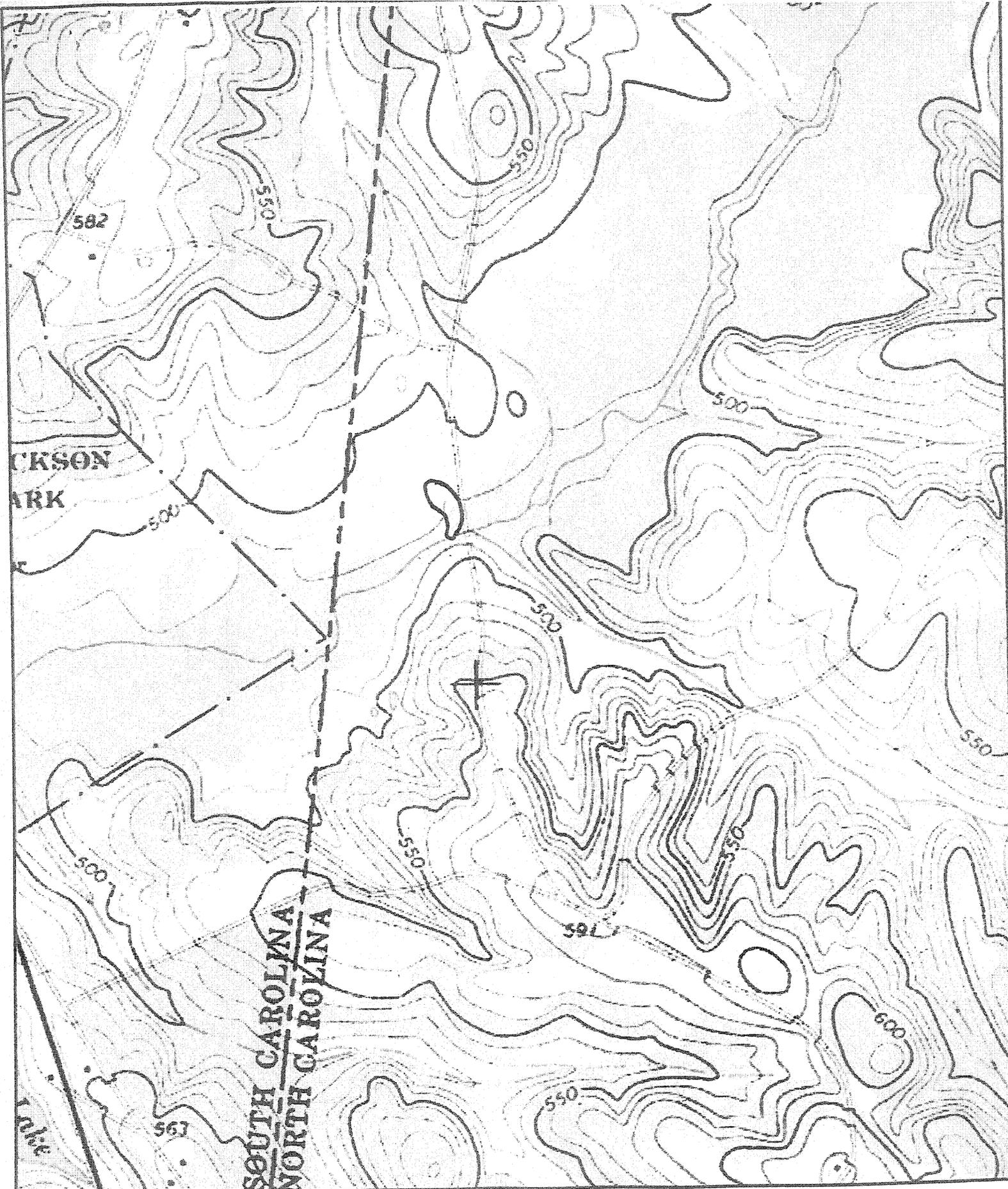
## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	2
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	2
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	2
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	1
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	1
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	3
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	4
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	2
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	2
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	2
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates (see page 4)</b> (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2 CORN FISH
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2 FROGS
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	1
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE (also enter on first page)</b>						<b>55</b>

\* These characteristics are not assessed in coastal streams.



Intermittent Tributary (#2) to Waxhaw Creek.



Name: VAN WYCK  
Date: 4/28/2004  
Scale: 1 inch equals 1000 feet

Location: 034.8353399° N 080.7906889° W



# STREAM QUALITY ASSESSMENT WORKSHEET

TRIBUTARY 3



Provide the following information for the stream reach under assessment:

- 1. Applicant's name: NCDOT
- 2. Evaluator's name: TRACY RUSH
- 3. Date of evaluation: 3-3-04
- 4. Time of evaluation: 2:00 PM
- 5. Name of stream: Tributary to Waxhaw Creek
- 6. River basin: CATAWBA
- 7. Approximate drainage area: \_\_\_\_\_
- 8. Stream order: 2
- 9. Length of reach evaluated: 200 feet
- 10. County: UNION
- 11. Site coordinates (if known): prefer in decimal degrees.
- 12. Subdivision name (if any): \_\_\_\_\_

Latitude (ex. 34.872312): 34.8365366° N Longitude (ex. -77.556611): 80.7912868° W

Method location determined (circle): GPS (Topo Sheet) Ortho (Aerial) Photo/GIS Other GIS Other \_\_\_\_\_

13. Location of reach under evaluation (note nearby roads and landmarks and attach map identifying stream(s) location): \_\_\_\_\_

100 feet upstream of BRIDGE No. 377 on SR 1103

14. Proposed channel work (if any): BRIDGE REPLACEMENT DOWNSTREAM

15. Recent weather conditions: RECENT SNOWFALL

16. Site conditions at time of visit: PARTLY CLOUDY, HUMID 70°

17. Identify any special waterway classifications known:  Section 10  Tidal Waters  Essential Fisheries Habitat  Trout Waters  Outstanding Resource Waters  Nutrient Sensitive Waters  Water Supply Watershed  (I-IV)

18. Is there a pond or lake located upstream of the evaluation point? YES (NO) If yes, estimate the water surface area: \_\_\_\_\_

19. Does channel appear on USGS quad map? (YES) NO 20. Does channel appear on USDA Soil Survey? (YES) NO

21. Estimated watershed land use: 1 % Residential 0 % Commercial 0 % Industrial 9 % Agricultural 90 % Forested 0 % Cleared / Logged \_\_\_\_\_ % Other (\_\_\_\_\_)

22. Bankfull width: 10 feet 23. Bank height (from bed to top of bank): 3-4 feet

24. Channel slope down center of stream:  Flat (0 to 2%)  Gentle (2 to 4%)  Moderate (4 to 10%)  Steep (>10%)

25. Channel sinuosity:  Straight  Occasional bends  Frequent meander  Very sinuous  Braided channel

**Instructions for completion of worksheet (located on page 2):** Begin by determining the most appropriate ecoregion based on location, terrain, vegetation, stream classification, etc. Every characteristic must be scored using the same ecoregion. Assign points to each characteristic within the range shown for the ecoregion. Page 3 provides a brief description of how to review the characteristics identified in the worksheet. Scores should reflect an overall assessment of the stream reach under evaluation. If a characteristic cannot be evaluated due to site or weather conditions, enter 0 in the scoring box and provide an explanation in the comment section. Where there are obvious changes in the character of a stream under review (e.g., the stream flows from a pasture into a forest), the stream may be divided into smaller reaches that display more continuity, and a separate form used to evaluate each reach. The total score assigned to a stream reach must range between 0 and 100, with a score of 100 representing a stream of the highest quality.

Total Score (from reverse): 68 Comments: \_\_\_\_\_

Evaluator's Signature Tracy Rush Date 3-5-04

This channel evaluation form is intended to be used only as a guide to assist landowners and environmental professionals in gathering the data required by the United States Army Corps of Engineers to make a preliminary assessment of stream quality. The total score resulting from the completion of this form is subject to USACE approval and does not imply a particular mitigation ratio or requirement. Form subject to change - version 06/03. To Comment, please call 919-876-8441 x 26.

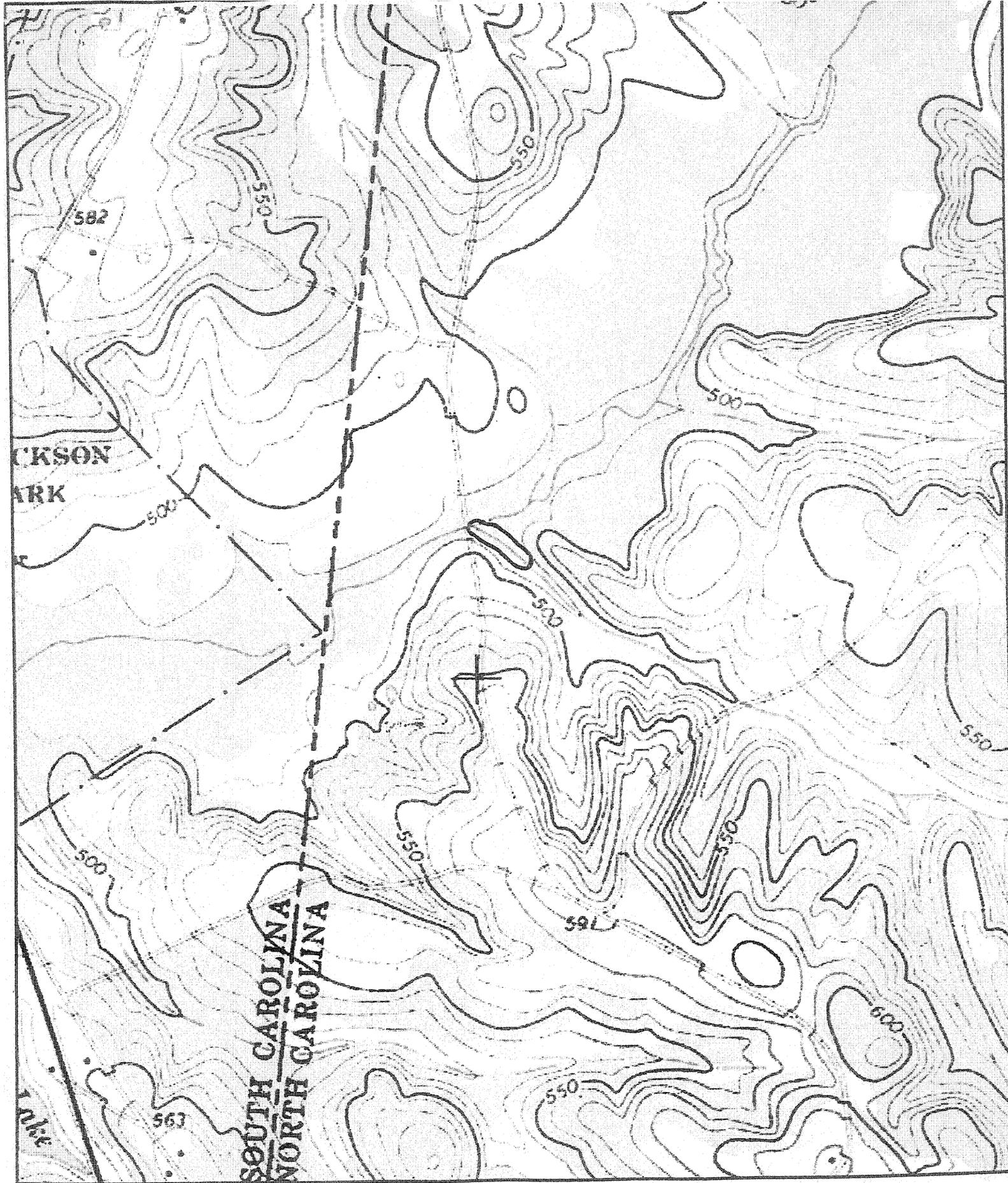
## STREAM QUALITY ASSESSMENT WORKSHEET

	#	CHARACTERISTICS	ECOREGION POINT RANGE			SCORE
			Coastal	Piedmont	Mountain	
<b>PHYSICAL</b>	1	<b>Presence of flow / persistent pools in stream</b> (no flow or saturation = 0; strong flow = max points)	0-5	0-4	0-5	4
	2	<b>Evidence of past human alteration</b> (extensive alteration = 0; no alteration = max points)	0-6	0-5	0-5	4
	3	<b>Riparian zone</b> (no buffer = 0; contiguous, wide buffer = max points)	0-6	0-4	0-5	3
	4	<b>Evidence of nutrient or chemical discharges</b> (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	4
	5	<b>Groundwater discharge</b> (no discharge = 0; springs, seeps, wetlands, etc. = max points)	0-3	0-4	0-4	3
	6	<b>Presence of adjacent floodplain</b> (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	3
	7	<b>Entrenchment / floodplain access</b> (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8	<b>Presence of adjacent wetlands</b> (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9	<b>Channel sinuosity</b> (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	4
	10	<b>Sediment input</b> (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2.5
	11	<b>Size &amp; diversity of channel bed substrate</b> (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2 SANDY
<b>STABILITY</b>	12	<b>Evidence of channel incision or widening</b> (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	3
	13	<b>Presence of major bank failures</b> (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	4
	14	<b>Root depth and density on banks</b> (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	3.5
	15	<b>Impact by agriculture, livestock, or timber production</b> (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	3
<b>HABITAT</b>	16	<b>Presence of riffle-pool/ripple-pool complexes</b> (no riffles/ripples or pools = 0; well-developed = max points)	0-3	0-5	0-6	1 HIGH WATER
	17	<b>Habitat complexity</b> (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	4
	18	<b>Canopy coverage over streambed</b> (no shading vegetation = 0; continuous canopy = max points)	0-5	0-5	0-5	5
	19	<b>Substrate embeddedness</b> (deeply embedded = 0; loose structure = max)	NA*	0-4	0-4	1
<b>BIOLOGY</b>	20	<b>Presence of stream invertebrates (see page 4)</b> (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	3
	21	<b>Presence of amphibians</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	2 FROGS
	22	<b>Presence of fish</b> (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	3
	23	<b>Evidence of wildlife use</b> (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	4
<b>Total Points Possible</b>			100	100	100	
<b>TOTAL SCORE (also enter on first page)</b>						68

\* These characteristics are not assessed in coastal streams.



Perennial Tributary (#3) to Waxhaw Creek upstream of SR 1103.



Name: VAN WYCK  
Date: 4/28/2004  
Scale: 1 inch equals 1000 feet

Location: 034.8353399° N 080.7906889° W

**APPENDIX II:**

**NCDWQ Stream Classification Forms**

# NCDWQ Stream Classification Form

WAXHAW CREEK

Project Name: B-4649  
BRIDGE REPLACEMENT  
 DWQ Project Number:

River Basin: CATAWBA  
 Nearest Named Stream:  
WAXHAW CREEK  
 USGS QUAD: VAN WYCK

County: UNION Evaluator: TRACY RUSH  
 Latitude: 34.8367425°N Signature: Tracy Rush  
 Longitude: 80.7918067°W Location/Directions: See attached

Date: 3-3-04

\*PLEASE NOTE: If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used\*

## Primary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	WATER LEVEL TOO HIGH TO OBSERVE			
	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	(2)	3
3) Are Natural Levees Present?	0	1	(2)	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	2	(3)
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	(2)	3
8) Is There A Bankfull Bench Present?	0	1	2	(3)
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)
(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)				
10) Is A 2 <sup>nd</sup> Order Or Greater Channel (As Indicated On Topo Map And/Or In Field) Present?		(Yes=3)	No=0	

PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 21

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2)	3

PRIMARY HYDROLOGY INDICATOR POINTS: 2

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	(0)?	1	2	3
4) Are Bivalves Present?	0	1	(2)	3

PRIMARY BIOLOGY INDICATOR POINTS: 8

Known to occur  
 none observed

**Secondary Field Indicators:** (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	1.5
<b>SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 1.5</b>				

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaf litter Present In Streambed?	1.5	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	1	1.5
4) Is Water In Channel And >48 Hrs. Since Last Known Rain? (*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions Or In Growing Season)?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?		Yes=1.5		No=0
<b>SECONDARY HYDROLOGY INDICATOR POINTS: 9</b>				

III. Biology	Absent	Weak	Moderate	Strong		
1) Are Fish Present?	0	.5	1	1.5		
2) Are Amphibians Present?	0	.5	1 nearby	1.5		
3) Are Aquatic Turtles Present?	0	.5	1	1.5		
4) Are Crayfish Present?	0	.5	1	1.5		
5) Are Macrobenthos Present?	0	.5	1	1.5		
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5		
7) Is Filamentous Algae Present?	0	.5	1	1.5		
8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*).	2	1	.75	.5	0	0
<b>SECONDARY BIOLOGY INDICATOR POINTS: 4.5</b>						

**TOTAL POINTS (Primary + Secondary) = 41.0** (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)

# NCDWQ Stream Classification Form

TRIBUTARY 2

Project Name: B-4649  
BRIDGE REPLACEMENT  
 DWQ Project Number:

River Basin: CATAWBA

County: UNION

Evaluator: TRACY RUSH

Date: 3-3-04

Nearest Named Stream: WAXHAW CREEK

Latitude: 34.8371920°N Signature: Tracy Rush

USGS QUAD: VAN WYCK

Longitude: 80.7922873°W Location/Directions: see attached

**\*PLEASE NOTE:** If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used\*

## Primary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	(1)	2	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	(1)	2	3
3) Are Natural Levees Present?	(0)	1	2	3
4) Is The Channel Sinuous?	0	1	2	(3)
5) Is There An Active (Or Relic) Floodplain Present?	0	(1)	2	3
6) Is The Channel Braided?	0	(1)	2	3
7) Are Recent Alluvial Deposits Present?	0	(1)	2	3
8) Is There A Bankfull Bench Present?	0	(1)	2	3
9) Is A Continuous Bed & Bank Present?	0	1	(2)	3
(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)				
10) Is A 2 <sup>nd</sup> Order Or Greater Channel (As Indicated On Topo Map And/Or In Field) Present?	Yes=3		(No=0)	
<b>PRIMARY GEOMORPHOLOGY INDICATOR POINTS: <u>11</u></b>				

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	(1)	2	3
<b>PRIMARY HYDROLOGY INDICATOR POINTS: <u>1</u></b>				

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	3	2	(1)	0
2) Are Rooted Plants Present In Streambed?	3	2	(1)	0
3) Is Periphyton Present?	0	(1)	2	3
4) Are Bivalves Present?	(0)	1	2	3
<b>PRIMARY BIOLOGY INDICATOR POINTS: <u>3</u></b>				

**Secondary Field Indicators:** (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	(.5)	1	1.5
2) Is There A Grade Control Point In Channel?	0	(.5)	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	(1)	1.5
<b>SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 2</b>				

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaf litter Present In Streambed?	1.5	1	.5	(0)
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	(1.5)
3) Are Wrack Lines Present?	0	.5	(1)	1.5
4) Is Water In Channel And >48 Hrs. Since Last Known Rain? (*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)	0	.5	1	(1.5)
5) Is There Water In Channel During Dry Conditions Or In Growing Season)?	0	(.5)	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?		Yes=(1.5)	No=0	
<b>SECONDARY HYDROLOGY INDICATOR POINTS: 6</b>				

III. Biology	Absent	Weak	Moderate	Strong		
1) Are Fish Present?	(0)	.5	1	1.5		
2) Are Amphibians Present?	0	(.5) nearby	1	1.5		
3) Are Aquatic Turtles Present?	(0)	.5	1	1.5		
4) Are Crayfish Present?	0	.5	(1)	1.5		
5) Are Macroinvertebrates Present?	0	(.5)	1	1.5		
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	(.5)	1	1.5		
7) Is Filamentous Algae Present?	0	(.5)	1	1.5		
8) Are Wetland Plants In Streambed?	SAV 2	Mostly OBL (1)	Mostly FACW .75	Mostly FAC .5	Mostly FACU 0	Mostly UPL 0
(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*.)						
<b>SECONDARY BIOLOGY INDICATOR POINTS: 4</b>						

**TOTAL POINTS (Primary + Secondary) = 27** (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)

# NCDWQ Stream Classification Form

TRIBUTARY 3

Project Name: B-4649  
BRIDGE REPLACEMENT  
DWQ Project Number:

River Basin: CATAWBA

County: UNION

Evaluator: TRACY RUSH

Nearest Named Stream:  
WYHAW CREEK

Latitude: 34.9365366°N

Signature: Tracy Rush

Date: 3-3-04

USGS QUAD: VAN WYCK

Longitude: 80.7912868°W

Location/Directions:

\*PLEASE NOTE: If evaluator and landowner agree that the feature is a man-made ditch, then use of this form is not necessary. Also, if in the best professional judgement of the evaluator, the feature is a man-made ditch and not a modified natural stream—this rating system should not be used\* see attached

## Primary Field Indicators: (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Riffle-Pool Sequence?	0	1	(2)	3
2) Is The USDA Texture In Streambed Different From Surrounding Terrain?	0	1	(2)	3
3) Are Natural Levees Present?	0	1	(2)	3
4) Is The Channel Sinuous?	0	1	(2)	3
5) Is There An Active (Or Relic) Floodplain Present?	0	1	(2)	3
6) Is The Channel Braided?	(0)	1	2	3
7) Are Recent Alluvial Deposits Present?	0	1	(2)	3
8) Is There A Bankfull Bench Present?	0	(1)	2	3
9) Is A Continuous Bed & Bank Present?	0	1	2	(3)
(*NOTE: If Bed & Bank Caused By Ditching And WITHOUT Sinuosity Then Score=0*)				
10) Is A 2 <sup>nd</sup> Order Or Greater Channel (As Indicated On Topo Map And/Or In Field) Present?		(Yes=3)	No=0	
PRIMARY GEOMORPHOLOGY INDICATOR POINTS: 19				

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is There A Groundwater Flow/Discharge Present?	0	1	(2) ?	3
PRIMARY HYDROLOGY INDICATOR POINTS: 2				

III. Biology	Absent	Weak	Moderate	Strong
1) Are Fibrous Roots Present In Streambed?	(3)	2	1	0
2) Are Rooted Plants Present In Streambed?	(3)	2	1	0
3) Is Periphyton Present?	0	(1)	2	3
4) Are Bivalves Present?	0	1	(2)	3
PRIMARY BIOLOGY INDICATOR POINTS: 9				

**Secondary Field Indicators:** (Circle One Number Per Line)

I. Geomorphology	Absent	Weak	Moderate	Strong
1) Is There A Head Cut Present In Channel?	0	.5	1	1.5
2) Is There A Grade Control Point In Channel?	0	.5	1	1.5
3) Does Topography Indicate A Natural Drainage Way?	0	.5	1	1.5
<b>SECONDARY GEOMORPHOLOGY INDICATOR POINTS: 1.5</b>				

II. Hydrology	Absent	Weak	Moderate	Strong
1) Is This Year's (Or Last's) Leaf litter Present In Streambed?	1.5	1	.5	0
2) Is Sediment On Plants (Or Debris) Present?	0	.5	1	1.5
3) Are Wrack Lines Present?	0	.5	1	1.5
4) Is Water In Channel And >48 Hrs. Since Last Known Rain? (*NOTE: If Ditch Indicated In #9 Above Skip This Step And #5 Below*)	0	.5	1	1.5
5) Is There Water In Channel During Dry Conditions Or In Growing Season)?	0	.5	1	1.5
6) Are Hydric Soils Present In Sides Of Channel (Or In Headcut)?		Yes=1.5	No=0	
<b>SECONDARY HYDROLOGY INDICATOR POINTS: 8.5</b>				

III. Biology	Absent	Weak	Moderate	Strong		
1) Are Fish Present?	0	.5	1	1.5		
2) Are Amphibians Present?	0	.5	1 nearby	1.5		
3) Are Aquatic Turtles Present?	0	.5	1	1.5		
4) Are Crayfish Present?	0	.5	1	1.5		
5) Are Macroinvertebrates Present?	0	.5	1	1.5		
6) Are Iron Oxidizing Bacteria/Fungus Present?	0	.5	1	1.5		
7) Is Filamentous Algae Present?	0	.5	1	1.5		
8) Are Wetland Plants In Streambed?	SAV	Mostly OBL	Mostly FACW	Mostly FAC	Mostly FACU	Mostly UPL
(* NOTE: If Total Absence Of All Plants In Streambed As Noted Above Skip This Step UNLESS SAV Present*.)	2	1	.75	.5	0	0
<b>SECONDARY BIOLOGY INDICATOR POINTS: 4</b>						

**TOTAL POINTS (Primary + Secondary) = 44** (If Greater Than Or Equal To 19 Points The Stream Is At Least Intermittent)

**APPENDIX III:**  
**USACE Wetland Data Forms**

**SOILS**

Map Unit Name  
 (Series and Phase): Helena fine sandy loam Drainage Class: moderately well-drained  
 Taxonomy (Subgroup): thermic Aquic Hapludults Field Observations  
 Confirm Mapped Type? Yes  No

---

**Profile Description:**

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0-1"	A	10YR 3/4			dry crumbly loam
1-12"	B	10YR 4/6			dry loam

---

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

---

Remarks: HYDRIC SOIL ABSENT

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	Yes	<input checked="" type="radio"/> No	Is this Sampling Point Within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Wetland Hydrology Present?	Yes	<input checked="" type="radio"/> No	
Hydric Soils Present?	Yes	<input checked="" type="radio"/> No	

---

Remarks: WETLAND NOT PRESENT

**ROUTINE WETLAND DETERMINATION**  
(1987 COE Wetlands Delineation Manual)

Project/Site: NCDOT Bridge No. 377 Date: 3-3-04  
 Applicant/Owner: NCDOT County: UNION  
 Investigator: Dr. J.H. Carter III / Tracy Rush State: North Carolina  
 JCA, Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site?  Yes  No  
 Is the site significantly disturbed (Atypical Situation) Yes  No  No  
 Is the area a potential Problem Area? Yes  No  No  
 (if needed, explain on reverse)

Community ID: \_\_\_\_\_  
 Transect ID: \_\_\_\_\_  
 Plot ID: WETLAND C  
UPLAND POINT

**VEGETATION**

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Quercus alba</u>	<u>1</u>	<u>FACU</u>	9. _____		
2. <u>Cornus florida</u>	<u>2</u>	<u>FACU</u>	10. _____		
3. <u>Lonicera icpanica</u>	<u>4</u>	<u>FAC-</u>	11. _____		
4. <u>Carya tomentosa</u>	<u>1</u>	<u>?</u>	12. _____		
5. <u>Quercus nigra</u>	<u>2</u>	<u>FAC</u>	13. _____		
6. _____			14. _____		
7. _____			15. _____		
8. _____			16. _____		

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 20%

Remarks: HYDROPHYTIC VEGETATION ABSENT

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p>____ Stream, Lake, or Tide Gauge</p> <p>____ Aerial Photographs</p> <p>____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicator:</p> <p>____ Inundated</p> <p>____ Saturated in Upper 12 inches</p> <p>____ Water Marks</p> <p>____ Drift Lines</p> <p>____ Sediment Deposits</p> <p>____ Drainage Patterns in Wetlands</p>
<p>Field Observations:</p> <p>Depth of Surface Water: _____ (in.)</p> <p>Depth to Free Water in Pit: _____ (in.)</p> <p>Depth to Saturated Soil: _____ (in.)</p>	<p>Secondary Indicators (2 or more required):</p> <p>____ Oxidized Root Channels in Upper 12 inches</p> <p>____ Water-Stained Leaves</p> <p>____ Local Soil Survey Data</p> <p>____ FAC-Neutral Test</p> <p>____ Other (Explain in Remarks)</p>
<p>Remarks: <u>WETLAND HYDROLOGY ABSENT</u></p>	

**SOILS**

Map Unit Name  
(Series and Phase): Chewacla silt loam Drainage Class: Somewhat poorly drained  
 Taxonomy (Subgroup): thermic Fluvaquentic Dystrochrepts Field Observations  
 Confirm Mapped Type? Yes  No

---

**Profile Description:**

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0-4"	A	10YR 4/2			loamy clay, saturated
4-12"	B	10YR 5/1	10YR 3/6	Common/distinct	grey clay

---

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input checked="" type="checkbox"/> Listed on Local Hydric Soils List
<input checked="" type="checkbox"/> Reducing Conditions	<input checked="" type="checkbox"/> Listed on National Hydric Soils List
<input checked="" type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

---

Remarks: HYDRIC SOIL PRESENT

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes	No	Is this Sampling Point Within a Wetland? <input checked="" type="radio"/> Yes No
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes	No	
Hydric Soils Present?	<input checked="" type="radio"/> Yes	No	

(Circle)

---

Remarks: WETLAND PRESENT

**ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual)**

Project/Site: <u>NCDOT Bridge No. 377</u>	Date: <u>3-3-04</u>
Applicant/Owner: <u>NCDOT</u>	County: <u>UNION</u>
Investigator: <u>Dr. J.H. Carter III / Tracy Rush</u>	State: <u>NORTH CAROLINA</u>
JCA, Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043	
Do Normal Circumstances exist on the site? <input checked="" type="radio"/> Yes <input type="radio"/> No	Community ID: _____
Is the site significantly disturbed (Atypical Situation) Yes <input type="radio"/> No <input checked="" type="radio"/>	Transect ID: _____
Is the area a potential Problem Area? Yes <input type="radio"/> No <input checked="" type="radio"/> (if needed, explain on reverse)	Plot ID: <u>WETLAND C</u> <u>WETLAND POINT</u>

**VEGETATION**

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Arundinaria gigantea</u>	<u>3/4</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Carpinus caroliniana</u>	<u>2</u>	<u>FAC</u>	10. _____	_____	_____
3. <u>Acer rubrum</u>	<u>2</u>	<u>FAC</u>	11. _____	_____	_____
4. <u>Chasmodon latifolium</u>	<u>4</u>	<u>FAC-</u>	12. _____	_____	_____
5. _____	_____	_____	13. _____	_____	_____
6. _____	_____	_____	14. _____	_____	_____
7. _____	_____	_____	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 75%

Remarks: HYDROPHYTIC VEGETATION PRESENT

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):</p> <p>____ Stream, Lake, or Tide Gauge</p> <p>____ Aerial Photographs</p> <p>____ Other</p> <p><input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:</p> <p>Primary Indicator:</p> <p><input checked="" type="checkbox"/> Inundated</p> <p><input checked="" type="checkbox"/> Saturated in Upper 12 inches</p> <p>____ Water Marks</p> <p>____ Drift Lines</p> <p>____ Sediment Deposits</p> <p>____ Drainage Patterns in Wetlands</p>
<p>Field Observations:</p> <p>Depth of Surface Water: <u>1-2</u> (in.)</p> <p>Depth to Free Water in Pit: <u>0</u> (in.)</p> <p>Depth to Saturated Soil: <u>0</u> (in.)</p>	<p>Secondary Indicators (2 or more required):</p> <p><input checked="" type="checkbox"/> Oxidized Root Channels in Upper 12 inches</p> <p>____ Water-Stained Leaves</p> <p>____ Local Soil Survey Data</p> <p>____ FAC-Neutral Test</p> <p>____ Other (Explain in Remarks)</p>
<p>Remarks: <u>WETLAND HYDROLOGY PRESENT</u></p>	

**SOILS**

Map Unit Name  
(Series and Phase): Helena fine sandy loam Drainage Class: moderately well-drained  
 Taxonomy (Subgroup): thermic Aquic Hapludult Field Observations  
 Confirm Mapped Type? Yes  No

---

**Profile Description:**

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0-1"	A	10YR 4/4			dry sandy loam
1-8"	B1	7.5YR 5/6			sandy clay loam
8+ "	B2	10YR 4/6			clay

---

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol	<input type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

---

Remarks: HYDRIC SOIL ABSENT

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	Yes	<input checked="" type="radio"/> No	Is this Sampling Point Within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Wetland Hydrology Present?	Yes	<input checked="" type="radio"/> No	
Hydric Soils Present?	Yes	<input checked="" type="radio"/> No	

Remarks: WETLAND NOT PRESENT

**ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual)**

Project/Site: NCDOT Bridge No. 377 Date: 3-3-04  
 Applicant/Owner: NCDOT County: UNION  
 Investigator: Dr. J.H. Carter III / TRACY RUSH State: NORTH CAROLINA  
 JCA, Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site?  Yes  No  
 Is the site significantly disturbed (Atypical Situation) Yes  No  No  
 Is the area a potential Problem Area? Yes  No  No  
 (if needed, explain on reverse)

Community ID: \_\_\_\_\_  
 Transect ID: \_\_\_\_\_  
 Plot ID: WETLAND A/B  
UPLAND POINT

**VEGETATION**

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Liquidambar styraciflua</u>	<u>1</u>	<u>FAC+</u>	9. _____	_____	_____
2. <u>Quercus nigra</u>	<u>1</u>	<u>FAC</u>	10. _____	_____	_____
3. <u>Taxodium virginicum</u>	<u>1</u>	<u>FACU-</u>	11. _____	_____	_____
4. <u>Asplenium platyneuron</u>	<u>4</u>	<u>FACU</u>	12. _____	_____	_____
5. <u>Andropogon virginicus</u>	<u>4</u>	<u>FAC-</u>	13. _____	_____	_____
6. <u>Lonicera japonica</u>	<u>4</u>	<u>FAC-</u>	14. _____	_____	_____
7. <u>Goodyera pubescens</u>	<u>4</u>	<u>UPL</u>	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

1 = tree (overstory) 2= sapling (midstory) 3= shrub (understory) 4= herb layer (ground cover) 5= vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 28%

Remarks: HYDROPHYTIC VEGETATION ABSENT

**HYDROLOGY**

       Recorded Data (Describe in Remarks):  
              Stream, Lake, or Tide Gauge  
              Aerial Photographs  
              Other  
 No Recorded Data Available

Wetland Hydrology Indicators:  
 Primary Indicator:  
 Inundated  
 Saturated in Upper 12 inches  
 Water Marks  
 Drift Lines  
 Sediment Deposits  
 Drainage Patterns in Wetlands

Field Observations:  
 Depth of Surface Water:        (in.)  
 Depth to Free Water in Pit:        (in.)  
 Depth to Saturated Soil:        (in.)

Secondary Indicators (2 or more required):  
 Oxidized Root Channels in Upper 12 inches  
 Water-Stained Leaves  
 Local Soil Survey Data  
 FAC-Neutral Test  
 Other (Explain in Remarks)

Remarks: WETLAND HYDROLOGY ABSENT

**SOILS**

Map Unit Name (Series and Phase): Chewacla silt loam Drainage Class: Somewhat poorly drained  
 Taxonomy (Subgroup): thermic Fluvaquentic Dystrochrepts Field Observations Confirm Mapped Type? Yes  No

---

**Profile Description:**

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions Structure, etc.
0-2"	A	10YR 5/3			organic leafy muck
2-12"	B	10YR 5/4	10YR 4/6	common/distinct	saturated loamy clay
			10YR 5/3	common/distinct	

---

**Hydric Soil Indicators:**

<input type="checkbox"/> Histosol	<input checked="" type="checkbox"/> Concretions
<input type="checkbox"/> Histic Epipedon	<input type="checkbox"/> High Organic Content in Surface Layer in Sandy Soils
<input type="checkbox"/> Sulfidic Odor	<input type="checkbox"/> Organic Streaking in Sandy Soils
<input type="checkbox"/> Aquic Moisture Regime	<input checked="" type="checkbox"/> Listed on Local Hydric Soils List
<input type="checkbox"/> Reducing Conditions	<input checked="" type="checkbox"/> Listed on National Hydric Soils List
<input type="checkbox"/> Gleyed or Low-Chroma Colors	<input type="checkbox"/> Other (Explain in Remarks)

---

Remarks: HYDRIC SOIL PRESENT

**WETLAND DETERMINATION**

Hydrophytic Vegetation Present?	<input checked="" type="radio"/> Yes	No	(Circle)
Wetland Hydrology Present?	<input checked="" type="radio"/> Yes	No	
Hydric Soils Present?	<input checked="" type="radio"/> Yes	No	

Is this Sampling Point Within a Wetland?  Yes  No

---

Remarks: WETLAND PRESENT

**ROUTINE WETLAND DETERMINATION  
(1987 COE Wetlands Delineation Manual)**

Project/Site: NCDOT Bridge No. 377 Date: 3-3-04  
 Applicant/Owner: NCDOT County: UNION  
 Investigator: Dr. J.H. Carter III / TRACY RUSH State: NORTH CAROLINA  
 JCA, Inc., Environmental Consultants, P.O. Box 891, Southern Pines, N.C. 28388 (910) 695-1043

Do Normal Circumstances exist on the site?  Yes  No | Community ID: \_\_\_\_\_  
 Is the site significantly disturbed (Atypical Situation) Yes  No  No | Transect ID: \_\_\_\_\_  
 Is the area a potential Problem Area? Yes  No  No | Plot ID: WETLAND A/B  
 (if needed, explain on reverse) WETLAND POINT

**VEGETATION**

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. <u>Juncus effusus</u>	<u>4</u>	<u>FACW</u>	9. _____	_____	_____
2. <u>Ludwigia alternifolia</u>	<u>4</u>	<u>OBL</u>	10. _____	_____	_____
3. <u>Carex lurida</u>	<u>4</u>	<u>OBL</u>	11. _____	_____	_____
4. <u>Dichanthelium scoparium</u>	<u>4</u>	<u>FACW</u>	12. _____	_____	_____
5. <u>Iva annua</u>	<u>4</u>	<u>FAC</u>	13. _____	_____	_____
6. <u>Carpinus caroliniana</u>	<u>2</u>	<u>FAC</u>	14. _____	_____	_____
7. <u>Acer rubrum</u>	<u>2</u>	<u>FAC</u>	15. _____	_____	_____
8. _____	_____	_____	16. _____	_____	_____

1 = tree (overstory) 2 = sapling (midstory) 3 = shrub (understory) 4 = herb layer (ground cover) 5 = vines

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-) 100%

Remarks: HYDROPHYTIC VEGETATION PRESENT

**HYDROLOGY**

<p>Recorded Data (Describe in Remarks):          _____ Stream, Lake, or Tide Gauge          _____ Aerial Photographs          _____ Other  <input checked="" type="checkbox"/> No Recorded Data Available</p>	<p>Wetland Hydrology Indicators:          Primary Indicator:  <input checked="" type="checkbox"/> Inundated  <input checked="" type="checkbox"/> Saturated in Upper 12 inches  <input type="checkbox"/> Water Marks  <input checked="" type="checkbox"/> Drift Lines  <input type="checkbox"/> Sediment Deposits  <input checked="" type="checkbox"/> Drainage Patterns in Wetlands</p>
<p>Field Observations:          Depth of Surface Water: <u>1-6</u> (in.)                                            <u>in areas</u>          Depth to Free Water in Pit: <u>0</u> (in.)                                            <u>in areas</u>          Depth to Saturated Soil: <u>0</u> (in.)</p>	<p>Secondary Indicators (2 or more required):          _____ Oxidized Root Channels in Upper 12 inches          _____ Water-Stained Leaves          _____ Local Soil Survey Data          _____ FAC-Neutral Test          _____ Other (Explain in Remarks)</p>
<p>Remarks: <u>WETLAND HYDROLOGY PRESENT</u></p>	

**APPENDIX IV:**  
**NCDWQ Wetlands Rating Worksheet**

# WETLANDS RATING WORKSHEET

Fourth Version

WETLAND A/B

Project name NCDOT B-4649 BRIDGE REPLACE. Nearest road SR 1103  
 County UNION Wetland area 0.45 acres Wetland width \_\_\_\_\_ feet  
 Name of evaluator TRACY RUSH / HALLI HARRIS Date 3-3-04

**Wetland location**

- on pond or lake
- on perennial stream
- on intermittent stream
- within interstream divide
- other wetland result of altered hydrology from logging

**Adjacent land use**

(within 1/2 mile upstream, upslope, or radius)

- forested/natural vegetation 70 %
- agriculture, urban/suburban 29 %
- impervious surface 1 %

Soil series Chewcale silt loam

- predominantly organic – humus, muck, or peat
- predominantly mineral – non-sandy
- predominantly sandy

**Dominant vegetation**

- (1) soft rush (Juncus effusus)
- (2) shallow sedge (Carex lurida)
- (3) broom panic grass (Dichanthelium scoparium)

**Hydraulic factors**

- steep topography
- ditched or channelized
- total riparian wetland width  $\geq$  100 feet

**Flooding and wetness**

- Semipermanently to permanently flooded or inundated
- seasonally flooded or inundated
- intermittently flooded or temporary surface water
- no evidence of flooding or surface water

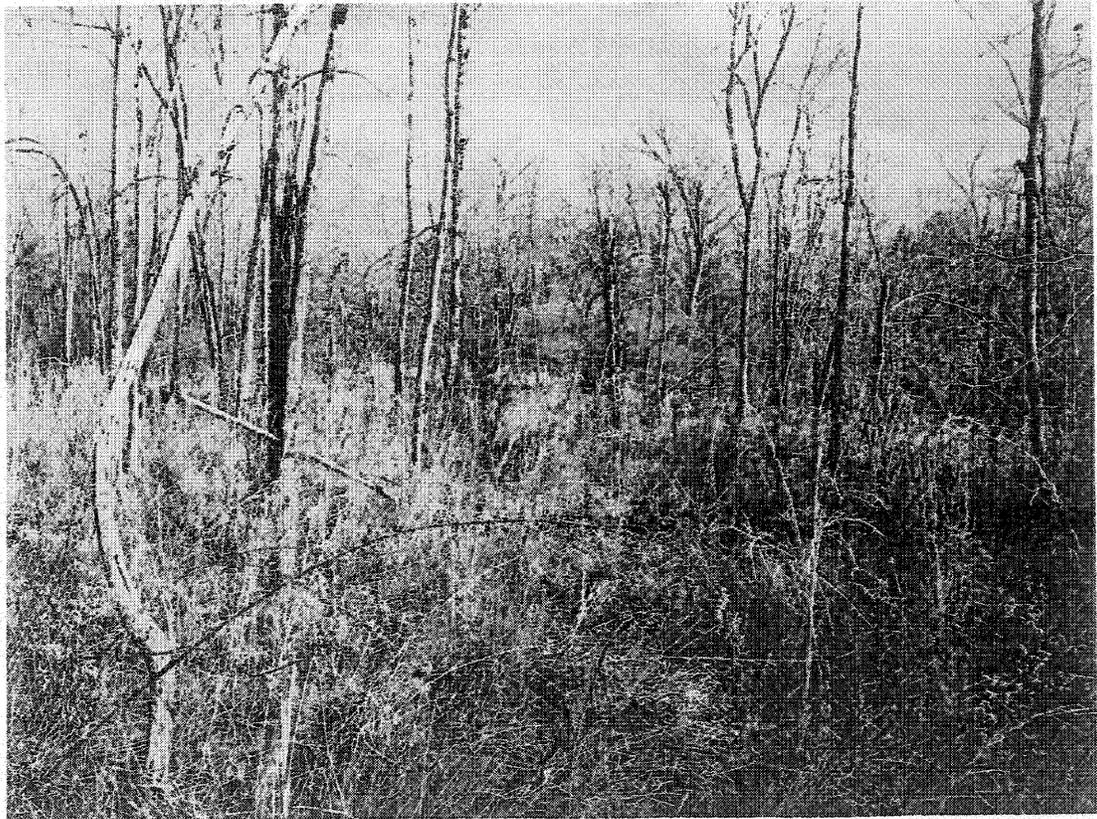
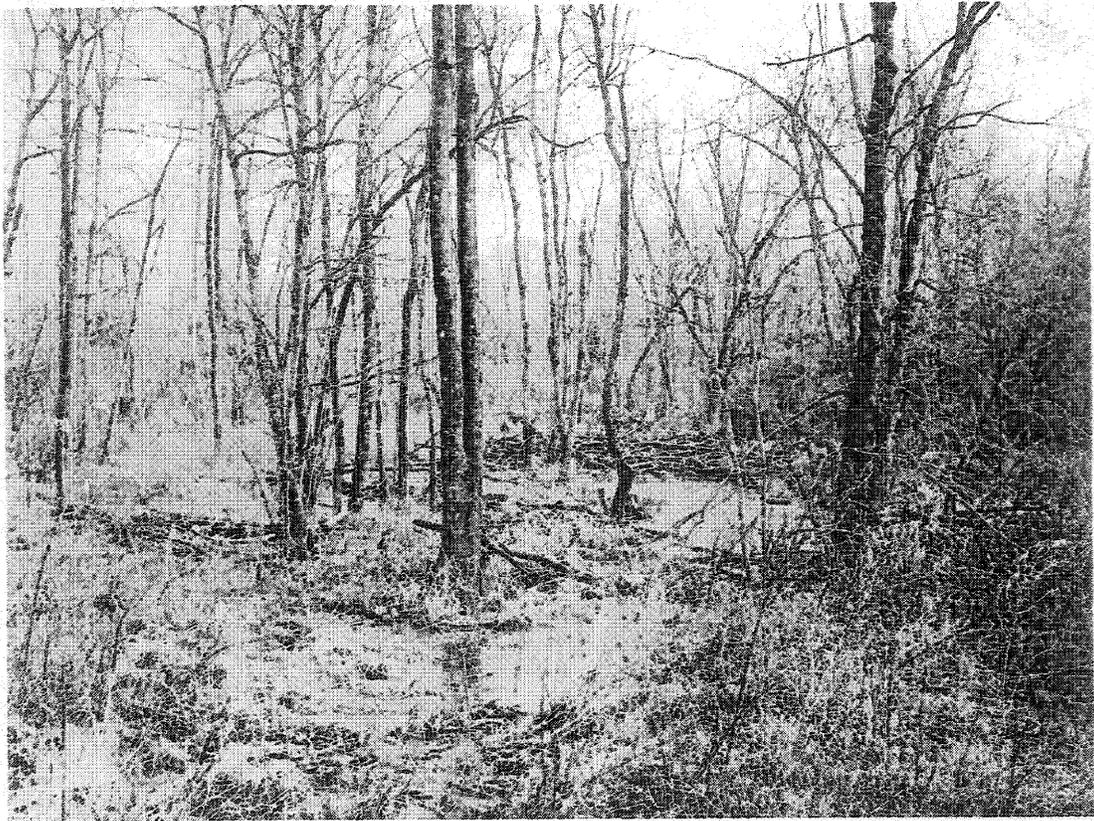
**Wetland type (select one)\***

- |  |  |   |
|--|--|---|
| <input checked="" type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna            | <input type="checkbox"/> Bog forest                                     |
| <input type="checkbox"/> Headwater forest                      | <input type="checkbox"/> Freshwater marsh        | <input type="checkbox"/> Bog/fen  |
| <input type="checkbox"/> Swamp forest                          | <input type="checkbox"/> Estuarine fringe forest | <input checked="" type="checkbox"/> Seep DUE TO HYDROLOGICAL ALTERATION |
| <input type="checkbox"/> Wet flat                              | <input type="checkbox"/> Ephemeral wetland       | <input type="checkbox"/> Other _____                                    |
| <input type="checkbox"/> Pocosin                               | <input type="checkbox"/> Carolina Bay            |   |

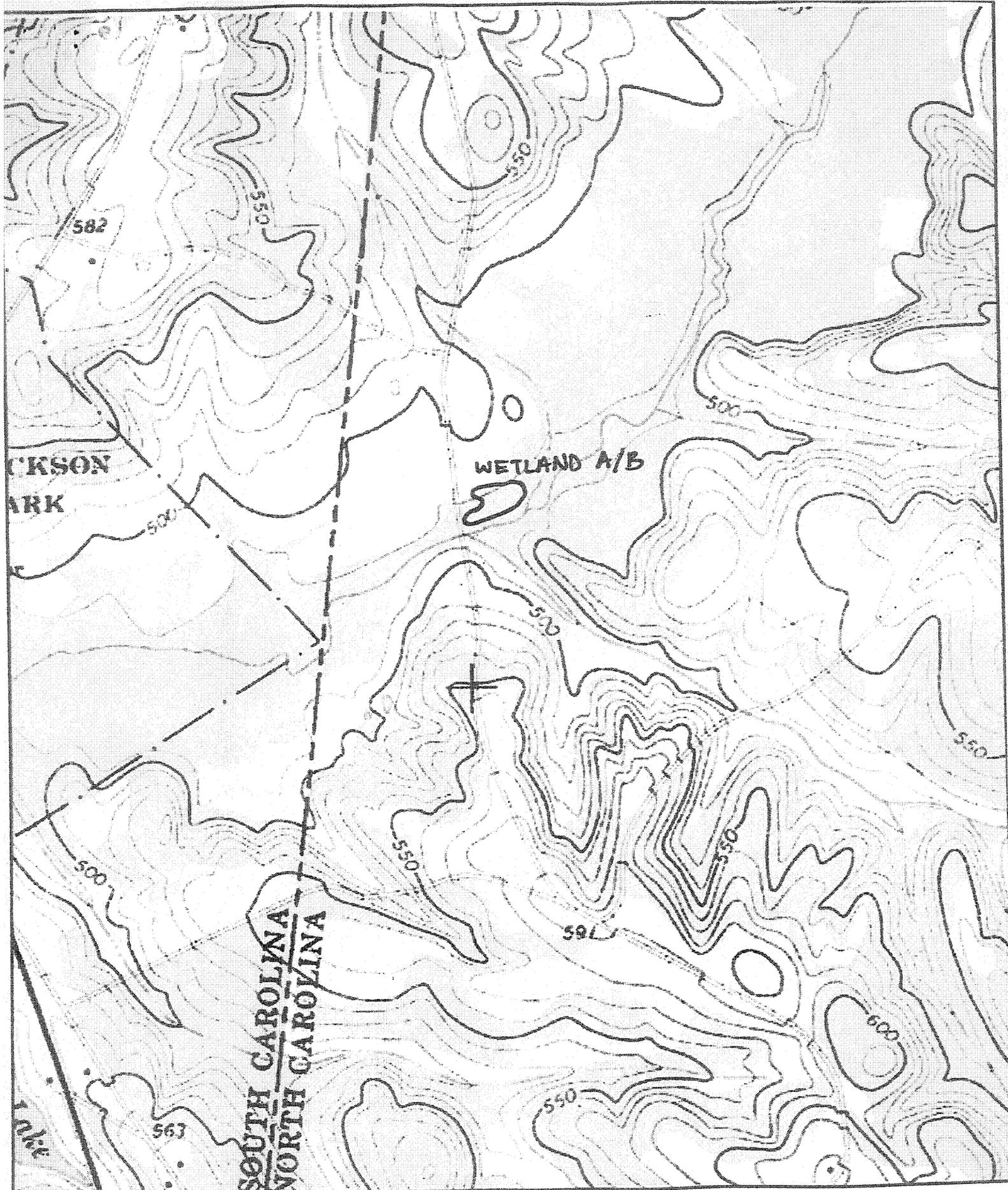
\*The rating system cannot be applied to salt or brackish marshes or stream channels.

		weight			
R	Water storage <u>1</u>	x 4.00 =	<u>4</u>		
A	Bank/Shoreline stabilization <u>1</u>	x 4.00 =	<u>4</u>		
T	Pollutant removals <u>1</u>	x 5.00 =	<u>5</u>		
I	Wildlife habitat <u>1</u>	x 2.00 =	<u>2</u>		
N	Aquatic life value <u>2</u>	x 4.00 =	<u>8</u>		
G	Recreation/Education <u>2</u>	x 1.00 =	<u>2</u>		
					<u>25</u>

\*Add 1 point if in sensitive watershed and > 10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.



Wetland A/B near Waxhaw Creek east of SR 1103.



Name: VAN WYCK  
Date: 4/28/2004  
Scale: 1 inch equals 1000 feet

Location: 034.8353399° N 080.7906889° W

# WETLANDS RATING WORKSHEET

Fourth Version

WETLAND C

Project name NCDOT B-4649 BRIDGE REPLACEMENT Nearest road SR 1103  
 County UNION Wetland area 0.01 acres Wetland width \_\_\_\_\_ feet  
 Name of evaluator TRACY RUSH Date 3-3-04

**Wetland location**

- on pond or lake
- on perennial stream
- on intermittent stream
- within interstream divide
- other \_\_\_\_\_

**Adjacent land use**

(within 1/2 mile upstream, upslope, or radius)

- forested/natural vegetation 70 %
- agriculture, urban/suburban 29 %
- impervious surface 1 %

**Dominant vegetation**

- (1) cane (Arundinaria gigantea)
- (2) ironwood (Carpinus caroliniana)
- (3) river oats (Chasmanthium latifolium)

Soil series Chewacata silt loam

- predominantly organic – humus, muck, or peat
- predominantly mineral – non-sandy
- predominantly sandy

**Flooding and wetness**

- Semipermanently to permanently flooded or inundated
- seasonally flooded or inundated
- intermittently flooded or temporary surface water
- no evidence of flooding or surface water

**Hydraulic factors**

- steep topography
- ditched or channelized
- total riparian wetland width  $\geq$  100 feet

**Wetland type (select one)\***

- |  |  |                                      |
|--|--|--------------------------------------|
| <input checked="" type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna            | <input type="checkbox"/> Bog forest  |
| <input type="checkbox"/> Headwater forest                      | <input type="checkbox"/> Freshwater marsh        | <input type="checkbox"/> Bog/fen     |
| <input type="checkbox"/> Swamp forest                          | <input type="checkbox"/> Estuarine fringe forest | <input type="checkbox"/> Seep        |
| <input type="checkbox"/> Wet flat                              | <input type="checkbox"/> Ephemeral wetland       | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Pocosin                               | <input type="checkbox"/> Carolina Bay            |                                      |

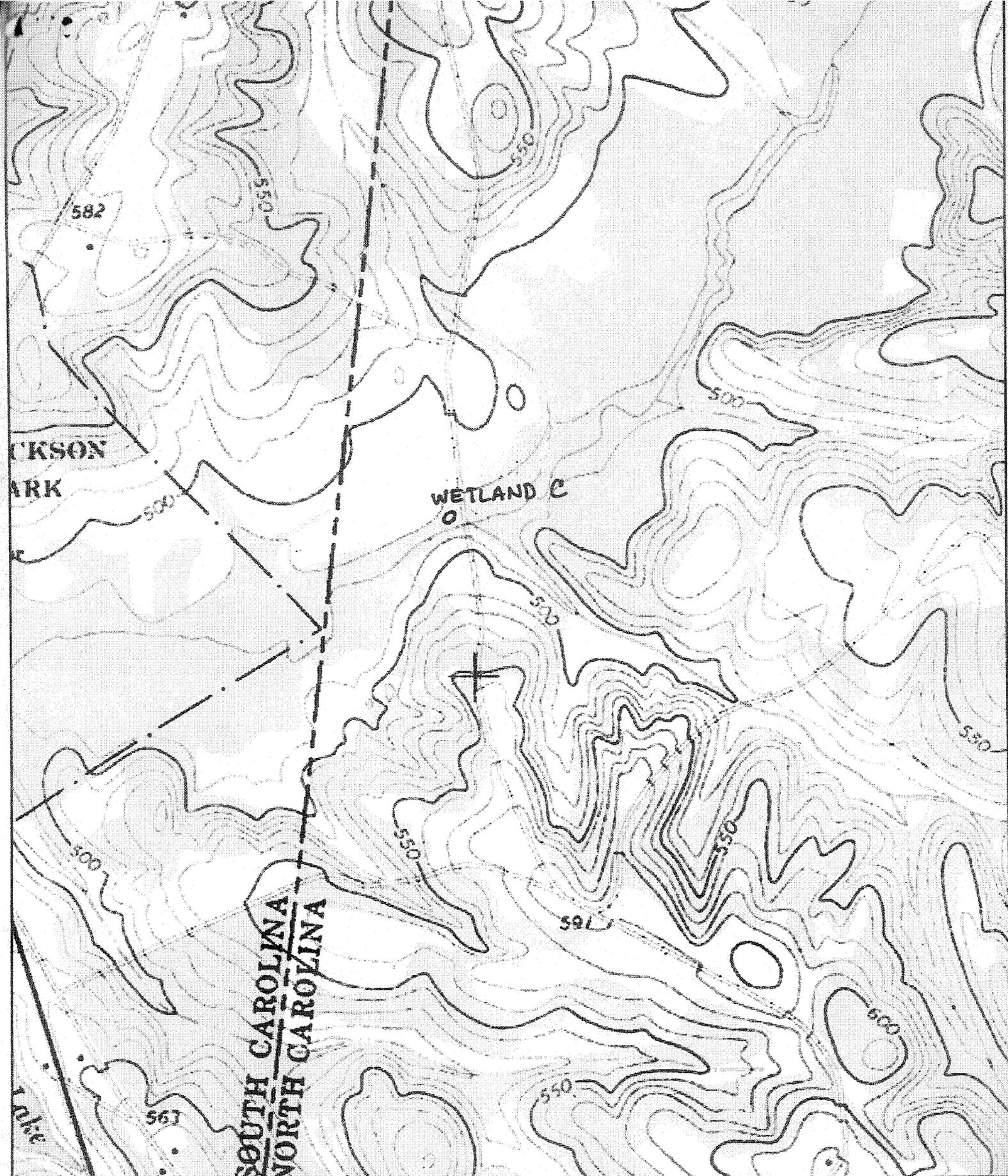
\*The rating system cannot be applied to salt or brackish marshes or stream channels.

		weight		
R	Water storage <u>0</u>	x 4.00 =	<u>0</u>	
A	Bank/Shoreline stabilization <u>0</u>	x 4.00 =	<u>0</u>	<i>Wetland Score</i>
T	Pollutant removals <u>1</u>	x 5.00 =	<u>5</u>	<u>11</u>
I	Wildlife habitat <u>1</u>	x 2.00 =	<u>2</u>	
N	Aquatic life value <u>1</u>	x 4.00 =	<u>4</u>	
G	Recreation/Education <u>0</u>	x 1.00 =	<u>0</u>	

\*Add 1 point if in sensitive watershed and > 10% nonpoint disturbance within 1/2 mile upstream, upslope, or radius.



Wetland C, adjacent to Intermittent Tributary (#2) to Waxhaw Creek.



Name: VAN WYCK  
Date: 4/28/2004  
Scale: 1 inch equals 1000 feet

Location: 034.8353399° N 080.7906889° W