

NATURAL RESOURCES TECHNICAL REPORT

**SR 1246 (Fairview Road) Extension over Interstate 77 (I-77)
Iredell County, North Carolina**

**TIP U-5817
WBS Element No. 44389.1.1**



**THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Project Development and Environmental Analysis Unit
Natural Environment Section**

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1.0 INTRODUCTION

The North Carolina Department of Transportation (NCDOT) proposes to extend SR 1246 (Fairview Rd) over Interstate 77(I-77) in Iredell County (Figure 1). The following Natural Resources Technical Report (NRTR) has been prepared to assist in the preparation of a combined State Environmental Assessment (SEA) and Finding of No Significant Impact (SEA/FONSI) for the proposed project.

2.0 METHODOLOGY AND QUALIFICATIONS

All work was conducted in accordance with the NCDOT Natural Environment Section standard operating procedures and July 2012 NRTR template. Field work was conducted on March 10 and 11, 2016. A request for preliminary jurisdictional determination has not yet been submitted to the agencies, and on-site verification by the U.S. Army Corps of Engineers (USACE) and the N.C. Division of Water Resources (NCDWR) is pending. The principal personnel contributing to this document were:

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3.0 PHYSICAL RESOURCES

The project study area lies in the piedmont physiographic region of North Carolina (Figure 2). Topography in the project vicinity is comprised of gently rolling hills with narrow, level floodplains along streams. Elevations in the study area range from 788 to 874 feet above sea level. Land use in the project vicinity consists primarily of forestland and agriculture, single-family homes, commercial development and roadways.

3.1 Soils

The 2011 Iredell County Soil Survey identifies nine soil types within the study area (Table 1).

Table 1. Soils in the study area

Soil Series	Mapping Unit	Drainage Class	Hydric Status
Appling sandy loam, 2 to 6 percent slopes	ApB	Well Drained	Non-hydric
Cecil sandy clay loam, 2 to 6 percent slopes, moderately eroded	CeB2	Well Drained	Non-hydric
Cecil sandy clay loam, 6 to 10 percent slopes, moderately eroded	CeC2	Well Drained	Non-hydric
Cecil-Urban land complex, 2 to 10 percent slopes	CgC	Well Drained	Non-hydric
Pacolet sandy clay loam, 6 to 10 percent slopes, moderately eroded	PcC2	Well Drained	Non-hydric
Pacolet sandy clay loam, 6 to 10 percent slopes, moderately eroded	PcD2	Well Drained	Non-hydric
Pacolet sandy clay loam, 15 to 25 percent slopes, moderately eroded	PcE2	Well Drained	Non-hydric
Udorthents-urban land complex, 0 to 45 percent slopes	UmF	Well Drained	Non-hydric
Warne loam, 0 to 2 percent slopes, occasionally flooded	WaA	Somewhat Poorly Drained	Hydric*

* Soil is primarily non-hydric with some hydric inclusions

3.2 Water Resources

Water resources in the study area are part of the Catawba River basin (United States Geological Survey [USGS] Hydrologic Unit 03050101). Five streams were identified in the study area (Table 2). The location of these water resources are shown in Figure 2. The physical characteristics of these streams are provided in Table 3.

Table 2. Water resources in the study area

Stream Name	Map ID	NCDWR Index Number	Best Usage Classification
UT Catawba River (Lake Norman)	SA	11-75	WS-IV, B; CA
UT Catawba River (Lake Norman)	SB	11-75	WS-IV, B; CA
UT Catawba River (Lake Norman)	SC	11-75	WS-IV, B; CA
UT Catawba River (Lake Norman)	SD	11-75	WS-IV, B; CA
UT Work Creek	SE	11-105	WS-IV, B; CA

Table 3. Physical characteristics of water resources in the study area

Map ID	Bank Height (ft)	Bankfull Width (ft)	Water Depth (in)	Channel Substrate	Velocity	Clarity
SA	0.5	3.0	4	Sand, Silt	Moderate	Clear
SB	1.0	4.0	8	Sand, Silt, Gravel	Moderate	Clear
SC	0.75	3.0	6	Sand, Silt	Slow	Clear
SD	0.5	2.0	4	Sand, Silt, Gravel	Moderate	Clear
SE	1.0	4.0	8	Sand, Silt	Moderate	Slightly Turbid

There is a stormwater BMP, functioning as a pond, within the study area. No High Quality Waters (HQW), Outstanding Resource Waters (ORW) or water supply watersheds WS-I or WS-II waters occur in the study area or within 1.0 mile of the study area. Additionally, the site streams do not support trout or anadromous fish and no Primary Nursery Areas are present within the study area boundaries. No streams located in the study area or within 1.0 mile of the study area are found on the North Carolina 2014 Final 303(d) list of impaired waters for turbidity and sedimentation.

There have been no benthic or fish community samples collected by the North Carolina Division of Water Resources (NCDWR) within 1.0 mile of the project study area.

4.0 BIOTIC RESOURCES

4.1 Terrestrial Communities

Five terrestrial communities were identified in the project study area: Maintained-Disturbed, Early Successional, Pine, Mesic Mixed Hardwood Forest (Piedmont Subtype),

and Dry-mesic Oak-hickory Forest. Figure 4 shows the location and extent of these terrestrial communities in the study area. A brief description of each community type follows. Scientific names of all species identified are included in Appendix B.

4.1.1 Maintained-Disturbed

The maintained-disturbed community encompasses habitats that have recently been or are currently impacted by human disturbance, such as maintained roadside rights-of-way (ROW), agricultural fields, residential yards, utility line easements, roads, and other impervious surfaces. Because of mowing and periodic clearing, this community is kept in a constant state of early succession. The vegetation in this community is comprised primarily of fescue and clover.

4.1.2 Early Successional

The early successional community includes areas which appear to have been recently cleared, but have been allowed to grow to the extent that tall herbaceous vegetation and saplings are present throughout the community. The most common herbs in this community include broomsedge bluestem, blackberry, and pokeweed. Common saplings in this community type include Bradford pear, Chinaberry, tree of Heaven, black cherry, winged elm, eastern red cedar, and sweet gum. Vines include Japanese honeysuckle and multiflora rose.

4.1.3 Pine

This community type includes areas where three species of pine (Virginia, shortleaf, and loblolly) have, through natural succession in previously cleared areas, become the dominant vegetation. Examples of this community type within the project area consist of dense, mixed stands of all three pine species, as well as eastern red cedar, with little to no understory or herbaceous layer.

4.1.4 Mesic Mixed Hardwood Forest

This community type occurs on lower slopes where moisture levels support mesophytic species. Canopy species include tulip poplar, northern red oak, red maple, and shortleaf pine. Understory species include flowering dogwood, black cherry, and pawpaw. Common vines observed within this community type throughout the study area include poison ivy, common periwinkle, bigleaf periwinkle, English ivy, Chinese wisteria, and multiflora rose. Chinese privet forms a major component of the shrub layer in portions of this community type, and other shrubs observed include Japanese privet, Heavenly bamboo, and strawberry bush.

4.1.5 Dry-mesic Oak-hickory Forest

This community type occurs within the study area at higher elevations. Dominant canopy species include white oak, tulip poplar, and mockernut hickory. Understory species

include sourwood and American holly. Common vines in this community type include whiteleaf greenbrier and Japanese honeysuckle. The herbaceous layer is sparse, and includes crane-fly orchid, spotted wintergreen, and little brown jug.

4.1.6 Terrestrial Community Impacts

Terrestrial communities in the project study area may be impacted by project construction as a result of grading and paving of portions of the study area. At this time, decisions regarding the final location and design of the project have not been made; therefore, community data are presented in the context of total coverage of each type within the study area (Table 4). Once a final alignment and preliminary design have been determined, probable impacts to each community type will be calculated.

Table 4. Coverage of terrestrial communities in the study area

Community	Coverage (ac.)
Maintained/ Disturbed	74.2*
Early Successional	37.3
Pine	9.9
Mesic Mixed Hardwood Forest	11.8
Dry-mesic Oak-hickory Forest	20.1
Total	153.3

*Roadways were included when calculating Maintained/Disturbed acreage.

4.2 Terrestrial Wildlife

Terrestrial communities in the study area are comprised of both natural and disturbed habitats that may support a diversity of wildlife species (those species either observed or identified by tracks, scat, call, or other means during field visits are indicated with an *). Mammal species that commonly exploit forested habitats and stream corridors found within the project study area include species such as raccoon*, gray squirrel*, white-footed mouse, Virginia opossum, eastern mole, gray fox, and white-tailed deer*. Birds that commonly use forest and forest edge habitats include the red-eyed vireo, eastern wood-pewee, tufted titmouse*, blue-gray gnatcatcher, white-eyed vireo*, Carolina wren*, barred owl, American crow*, fish crow*, hairy woodpecker*, yellow-bellied sapsucker*, red-bellied woodpecker*, blue jay*, eastern towhee*, American robin*, northern cardinal*, and Carolina chickadee*. Birds that may use the open habitat or water bodies within the project study area include the eastern meadowlark*, killdeer*, eastern bluebird*, white-throated sparrow*, northern mockingbird*, Canada goose*, pied-billed grebe*, and turkey vulture*. Reptile species that may use terrestrial communities located in the project study area include black rat snake, eastern hognose snake, black racer, copperhead, eastern garter snake, rough green snake*, northern fence lizard, eastern box turtle, and eastern five-lined skink.

4.3 Aquatic Communities

Aquatic communities present within the study area include tributary streams and small wetlands. These water resources and the terrestrial communities surrounding them may provide breeding, shelter, and feeding opportunities for many aquatic and semi-aquatic species. Common amphibians that inhabit or use these resources or the communities around them may include northern dusky salamander, two-lined salamander, Cope's gray treefrog, American toad, upland chorus frog*, spring peeper, southern leopard frog*, pickerel frog, and northern cricket frog. Common reptiles that may inhabit aquatic communities may include northern water snake and yellow-bellied slider. Streams in the study area are generally too small to support much, if any, diversity of fish species. The study area may also support a variety of benthic macroinvertebrates including mayflies, stoneflies, caddisflies, dragonflies, damselflies, beetles, chironomid midges, craneflies, amphipods, isopods, and crayfish.

4.4 Invasive Species

Twelve species from the NCDOT Invasive Exotic Plant List for North Carolina were found to occur in the study area. The species identified were multiflora rose (Threat), tree of Heaven (Threat), Japanese honeysuckle (Moderate Threat), Bradford pear (Watch List), bigleaf periwinkle (Watch List), common periwinkle (Watch List), Chinese privet (Threat), Japanese privet (Moderate Threat), Heavenly bamboo (Watch List), English ivy (Moderate Threat), Chinaberry (Watch List), and Chinese wisteria (Moderate Threat). During project construction, NCDOT will follow the Department's Best Management Practices for the management of invasive plant species.

5.0 JURISDICTIONAL ISSUES

5.1 Clean Water Act Waters of the U.S.

Five jurisdictional streams were identified in the study area (Table 5). The locations of the streams are shown on Figure 3A-3D. USACE and NCDWR stream data forms are included in Appendix C. The physical characteristics and water quality designations of the jurisdictional stream are detailed in Section 3.2. The jurisdictional streams in the study area have been designated as warm water streams for the purposes of stream mitigation.

Table 5. Jurisdictional characteristics of water resources in the study area

Map ID	Length [^] (ft.)	Classification	Compensatory Mitigation Required	River Basin Buffer*
SA	300	Intermittent	Yes	Not Subject
SB	260	Intermittent	Yes	Not Subject
SC	30	Intermittent	Yes	Not Subject
SD	200	Intermittent	Yes	Not Subject
SE	180	Intermittent	Yes	Not Subject
Total	970			

*Riparian buffer rules only apply to impacts along the mainstem of the Catawba River and the mainstem lakes. There are no features in the study area that qualify as buffered per the Catawba River Basin Buffer Rules.

[^] Features have not been surveyed, lengths are approximate.

Nine jurisdictional wetlands were identified within the study area (Figure 3A-3D). Wetland classification and quality rating data are presented in Table 6. USACE wetland delineation forms and NCDWR wetland rating forms for these wetlands are included in Appendix C. Descriptions of the terrestrial communities at each wetland site are presented in Section 4.1. Wetlands WA, WB, WC, WE, WG, WH, and WI are included within the mesic mixed hardwood community, WF is within the maintained/disturbed community, and WD is within the mesic mixed hardwood community, as well as part of a stormwater device.

Table 6. Jurisdictional characteristics of wetlands in the study area

Map ID	NCWAM Classification	Hydrologic Classification	NCDWR Wetland Rating	Area [^] (ac.)
WA	Floodplain Pool	Riparian	42	0.01
WB	Floodplain Pool	Riparian	42	0.01
WC	Floodplain Pool	Riparian	42	0.02
WD	Headwater Forest	Riparian	71	0.13
WE	Headwater Forest	Riparian	41	0.09
WF	Headwater Forest	Riparian	9	0.08
WG	Headwater Forest	Riparian	13	0.02
WH	Headwater Forest	Riparian	13	0.02
WI	Headwater Forest	Riparian	13	0.01
			Total	0.39

[^] Features have not been surveyed, acreages are approximate.

5.2 Clean Water Act Permits

The proposed project has been designated as a combination of SEA and FONSI. A Nationwide Permit 14 will likely be used for permitting construction activities. The USACE holds the final discretion as to what permit will be required to authorize project

construction.

In addition to the 404 permit, other required authorizations include the corresponding Section 401 Water Quality Certification (WQC) from the NCDWR. A WQC 3886 is required for NWP 14 projects.

5.3 Coastal Area Management Act Areas of Environmental Concern

The study area is not within a county regulated by the Coastal Area Management Act and therefore is not within an Area of Environmental Concern.

5.4 Construction Moratoria

No trout waters or anadromous fish habitat are located within the study area. No construction moratorium is anticipated at this time.

5.5 N.C. River Basin Buffer Rules

The study area is located within a river basin with NCDWR Riparian Buffer Rules. The Catawba River Riparian Buffer Rules include impacts to the mainstem below Lake James and mainstem lakes from and including Lake James. The study area does not include any portion of the mainstem of the Catawba River or a mainstem lake on the Catawba River, and therefore streams within the study area are not subject to these riparian buffer rules.

5.6 Rivers and Harbors Act Section 10 Navigable Waters

No surface waters located within the project study area have been designated as Navigable Waters under Section 10 of the Rivers and Harbors Act.

5.7 Wetland and Stream Mitigation

5.7.1 Avoidance and Minimization of Impacts

The UTs to the Catawba River (Lake Norman) and the UT to Work Creek within the study area have been designated as a critical area (CA). Therefore, Design Standards for Sensitive Watersheds will be implemented during project construction.

The NCDOT will attempt to avoid and minimize impacts to streams and wetlands to the greatest extent practicable in choosing a preferred alternative and during project design. At this time, no final decisions have been made with regard to the location or design of the preferred alternative.

5.7.2 Compensatory Mitigation of Impacts

The NCDOT will investigate potential on-site stream and wetland mitigation

opportunities once a final decision has been rendered on the location of the preferred alternative. If on-site mitigation is not feasible, mitigation will be provided by North Carolina Department of Environmental Quality, Division of Mitigation Services (DMS).

5.8 Endangered Species Act Protected Species

As of July 24, 2015, the U.S. Fish and Wildlife Service (USFWS) lists three federally protected species for Iredell County (Table 7). A brief description of these species’ habitat requirements follows, along with Biological Conclusions rendered based on survey results in the study area. Habitat requirements for each species are based on the current best available information from referenced literature and/or USFWS.

Table 7. Federally protected species listed for Iredell County

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
<i>Glyptemys muhlenbergii</i>	Bog turtle	T (S/A)	No	Not Required
<i>Myotis septentrionalis</i>	Northern long-eared bat	T	Unknown	Unresolved
<i>Hexastylis naniflora</i>	Dwarf-flowered heartleaf	T	Yes	No Effect

T(S/A) Threatened due to similarity of appearance, T- Threatened

Bog turtle

USFWS optimal survey window: April 1 – October 1 (visual surveys); April 1- June 15 (optimal for breeding/nesting); May 1-June 30 (trapping surveys)

Habitat Description: Bog turtle habitat consists of open, groundwater supplied (spring fed), graminoid dominated wetlands along riparian corridors or on seepage slopes. These habitats are designated as mountain bogs by the North Carolina Natural Heritage Program (NCNHP), but they are technically poor, moderate, or rich fens that may be associated with wet pastures and old drainage ditches that have saturated muddy substrates with open canopies. These habitats, found between 700 and 4,500 feet above mean sea level in the western Piedmont and mountain counties of North Carolina, often support sphagnum moss and may contain carnivorous plants. Soil types (poorly drained silt loams) from which bog turtle habitats have been found include Arkaqua, Chewacla, Dellwood, Codorus complex, Hatboro, Nikwasi, Potomac – Iotla complex, Reddies, Rosman, Tate – Cullowhee complex, Toxaway, Tuckasegee – Cullasaja complex, Tusquitee, Watauga, and Wehadkee.

Biological Conclusion: Not Required

No suitable wetland habitat exists within the study area. Although wetlands exist, they are very small, do not contain suitable refugia for a population of bog turtles to persist, and are not connected to other, larger bog-type wetlands. A review of NCNHP records dated June 2016 revealed a historical record of this species

within 1.0 mile of the study area; however, no turtles were found at the location at the time of the most recent survey, in 1996.

Northern long-eared bat

USFWS Recommended Survey Window: June 1 – August 15

Habitat Description: In North Carolina, the Northern long-eared bat (NLEB) occurs in the mountains, with scattered records in the piedmont and coastal plain. In western North Carolina, NLEB spend winter hibernating in caves and mines. Since this species is not known to be a long-distance migrant, and caves and subterranean mines are extremely rare in eastern North Carolina, it is uncertain whether or where NLEB hibernate in eastern North Carolina. During the summer, NLEB roost singly or in colonies underneath bark, in cavities, or in crevices of both live and dead trees (typically ≥ 3 inches dbh). Males and non-reproductive females may also roost in cooler places, like caves and mines. This bat has also been found, rarely, roosting in structures like barns and sheds, under eaves of buildings, behind window shutters, in bridges, and in bat houses. Foraging occurs on forested hillsides and ridges, and occasionally over forest clearings, over water, and along tree-lined corridors. Mature forests may be an important habitat type for foraging.

Biological Conclusion: Unresolved

Surveys for the NLEB within the study area, if needed, will be performed by the NCDOT – Biological Surveys Group.

Dwarf-flowered heartleaf

USFWS Optimal Survey Window: March-May

Habitat Description: Dwarf-flowered heartleaf is endemic to the western Piedmont and foothills of North and South Carolina. This herbaceous evergreen is found in moist to rather dry forests along bluffs; boggy areas next to streams and creek heads; and adjacent hillsides, slopes, and ravines. Requiring acidic, sandy loam soils, the species is found in soil series such as Pacolet, Madison, and Musella, among others. Occurrences are generally found on a north facing slope. Undisturbed natural communities such as Piedmont/Coastal Plain Heath Bluff, Dry-Mesic Oak Hickory Forest, and Mesic Mixed Hardwood Forest hold the most viable occurrences. However, less viable remnant occurrences are found in disturbed habitats, including logged, grazed, mown, and residential/commercial developed lands; areas converted to pasture, orchards, and tree plantations; roadside rights-of-way; and on upland slopes surrounding manmade ponds or lakes.

Biological Conclusion: No Effect

Marginally suitable habitat for dwarf-flowered heartleaf exists within the project area on wooded slopes. Due to the presence of potentially suitable habitat, a plant-

by-plant survey was performed during the optimal survey window on March 10 and 11, 2016. Survey methods included parallel, GPS-guided, pedestrian transects within and adjacent to wooded areas on the project area in search of the plant. No specimens of dwarf-flowered heartleaf were found in approximately six person-hours of survey. Many specimens of a related taxon, *Hexastylis arifolia*, were found during this survey, while the plants were flowering. Additionally, a review of NCNHP records dated June 2016 revealed no known occurrences of this species within 1.0 mile of the study area. Based on the lack of known occurrences and the lack of observed specimens, it has been determined that the project will have no effect on this species.

5.9 Bald Eagle and Golden Eagle Protection Act

Habitat for the bald eagle primarily consists of mature forest in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

A desktop-GIS assessment of the project study area, as well as the area within a 1.13-mile radius (1.0 mile plus 660 feet) of the project limits, was performed in February 2016 using 2013 color aerials. Lake Norman is within this radius, and constitutes a suitable feeding source for the bald eagle. Because of the proximity of suitable habitat to the study area, a survey for bald eagle nests within the study area and 660 feet from the study area boundary was performed on March 10 and 11, 2016. No bald eagle nests were observed by 2 observers during approximately 10 survey hours. Additionally, a review of NCNHP records dated June 2016 revealed no known occurrences of this species within 1.13 miles of the study area. Due to the lack of known occurrences and the lack of observed nests, it has been determined that this project will not affect this species.

5.10 Endangered Species Act Candidate Species

As of July 24, 2015 the USFWS lists no candidate species for Iredell County.

5.11 Essential Fish Habitat

The National Oceanic and Atmospheric Administration (NOAA) has identified no Essential Fish Habitat within the study area.

6.0 REFERENCES

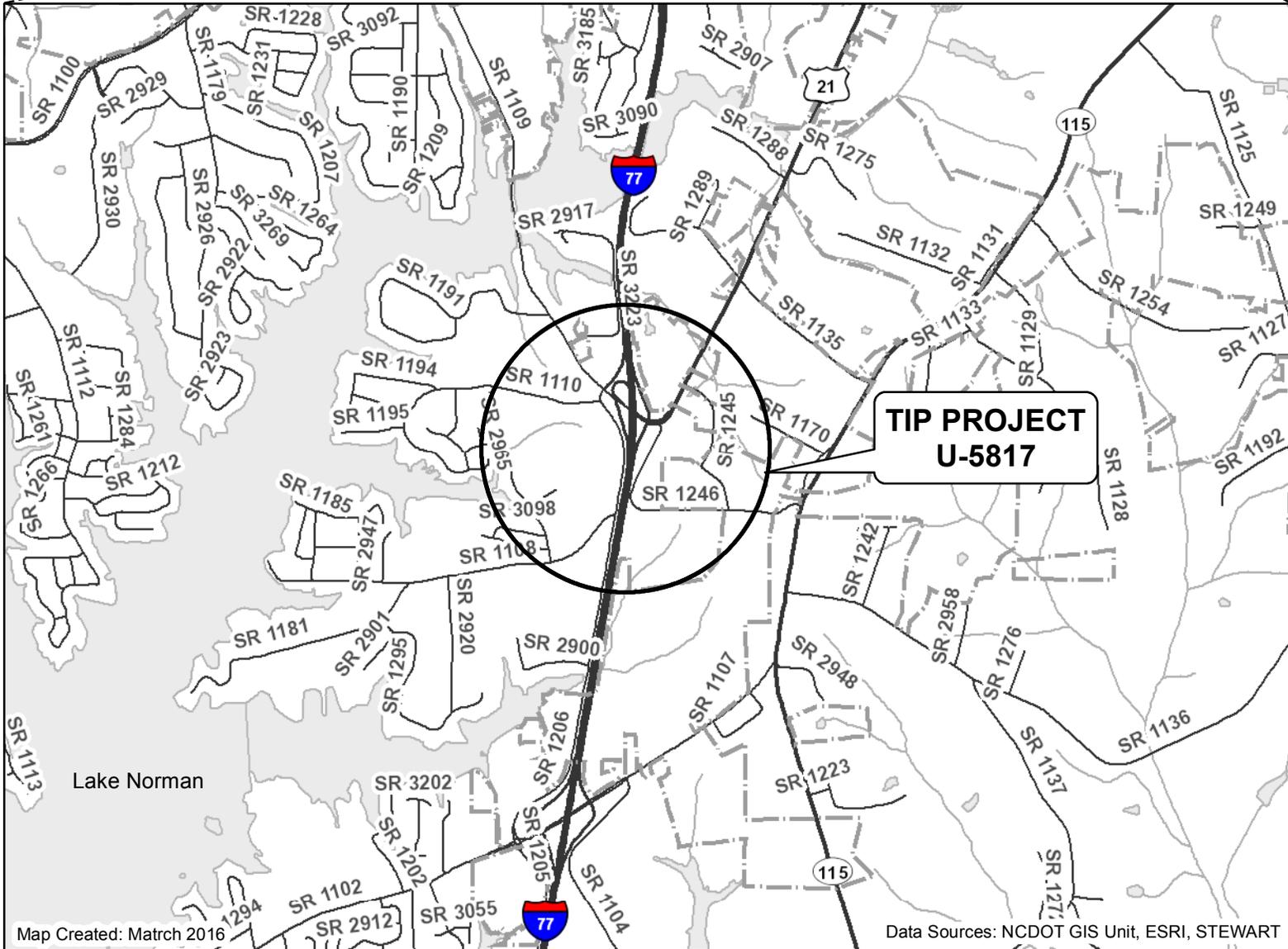
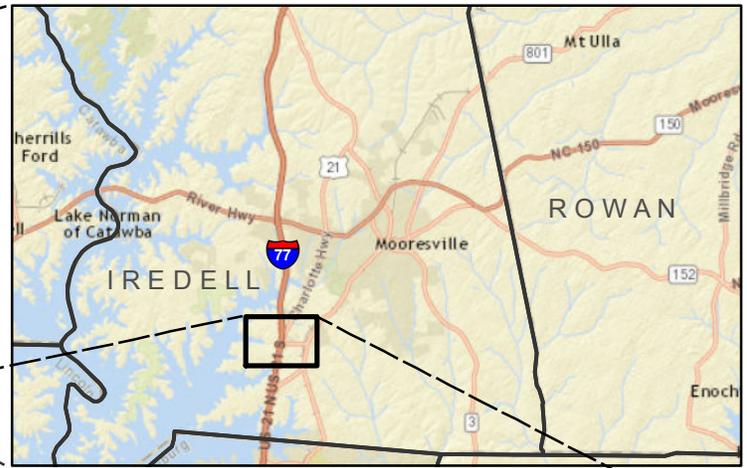
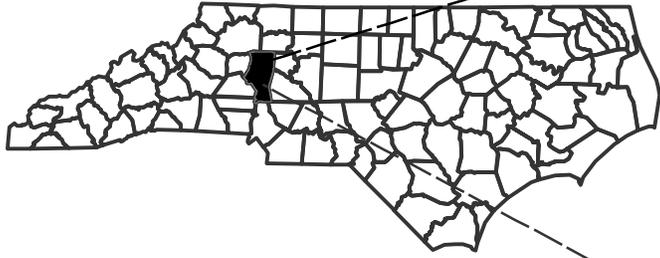
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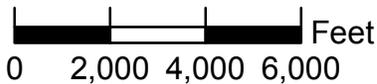
Appendix A

Figures



Map Created: March 2016

Data Sources: NCDOT GIS Unit, ESRI, STEWART



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS UNIT

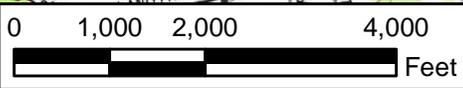
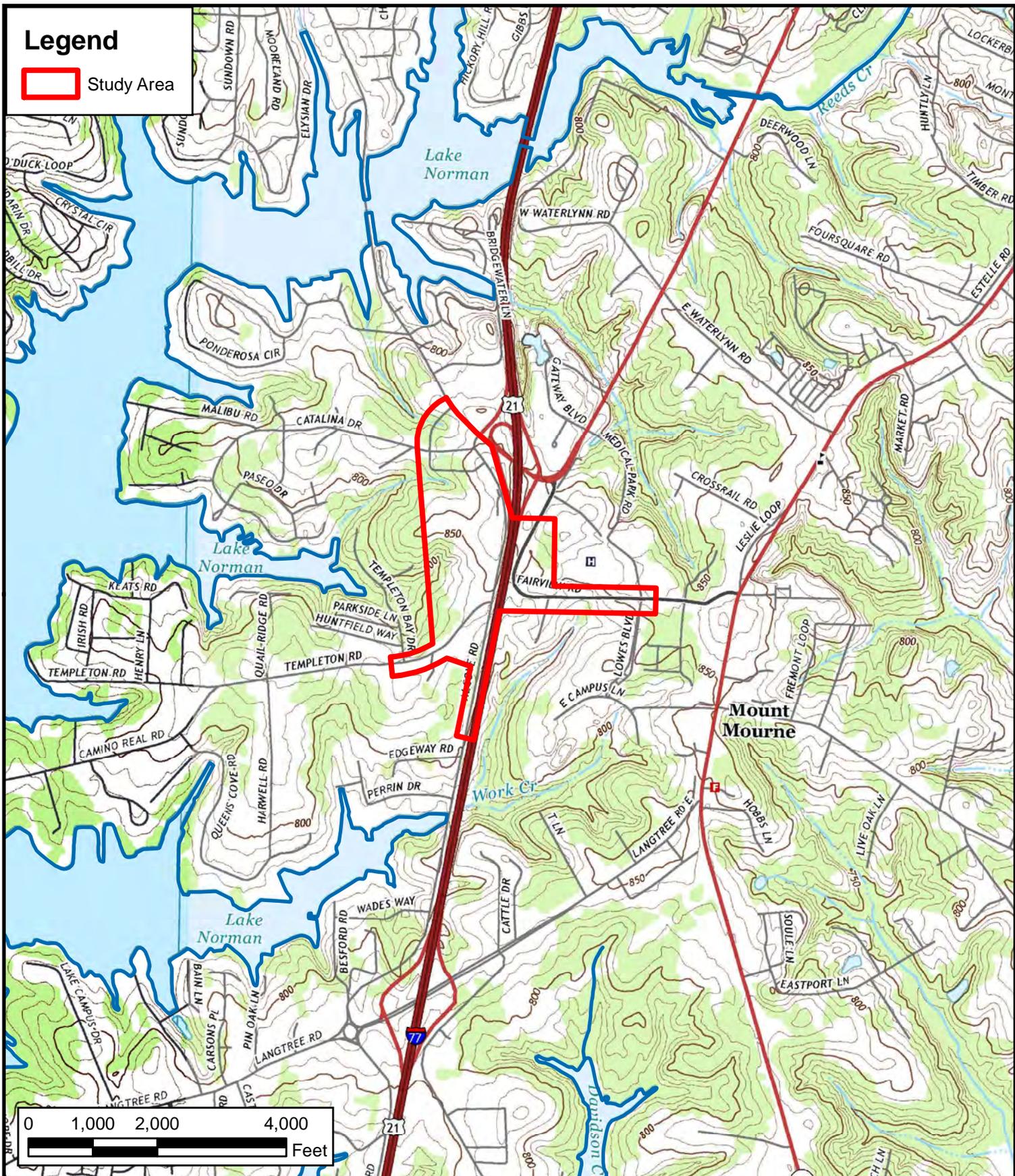
EXTEND SR 1246 (FAIRVIEW RD.) OVER I-77 AND CONNECT TO SR 1206 (ALCOVE RD.) IMPROVEMENTS
 IREDELL COUNTY
 TIP PROJECT U-5817

PROJECT VICINITY

FIGURE 1

Legend

 Study Area



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS UNIT

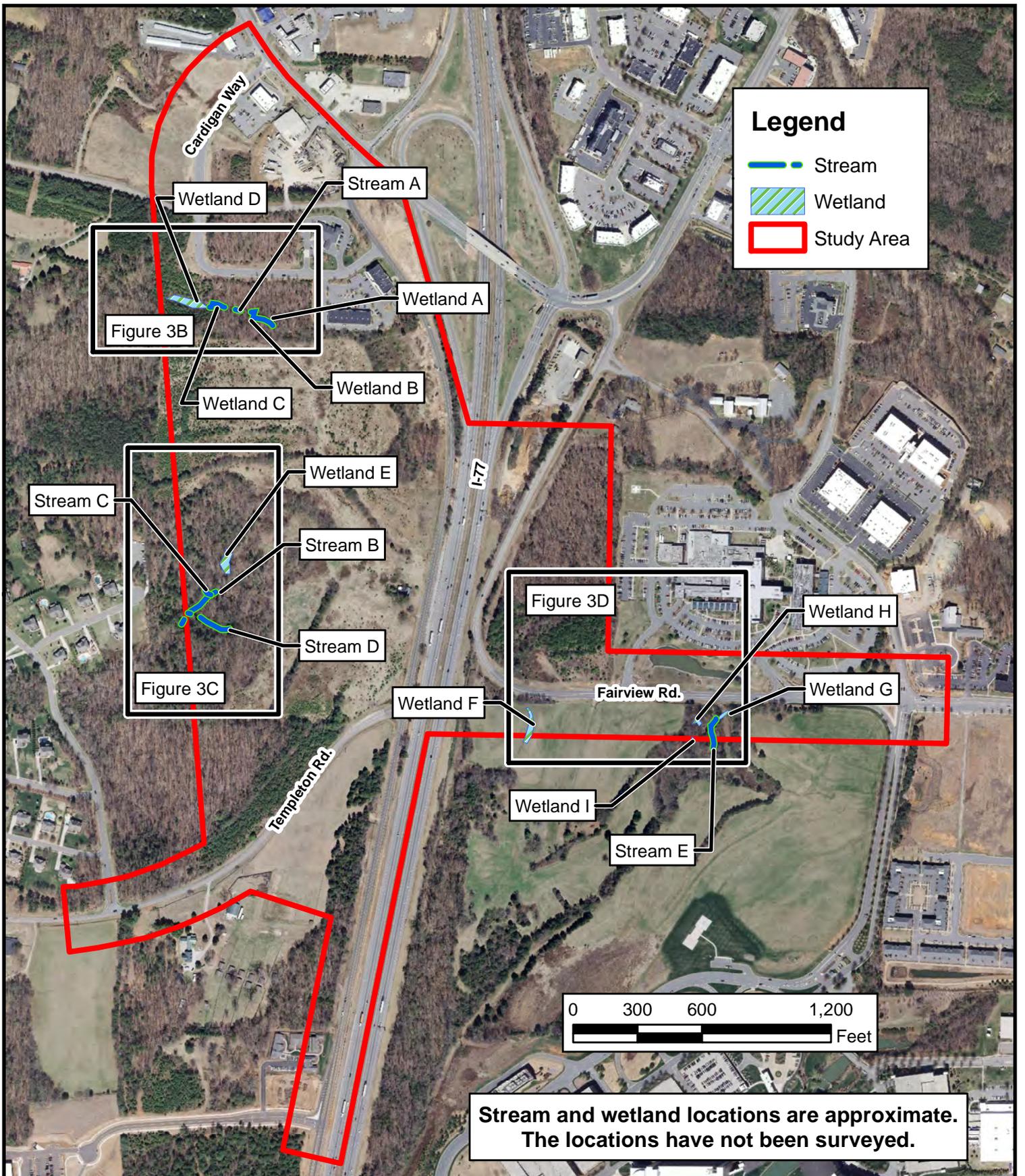
STUDY AREA FAIRVIEW RD. EXTENSION OVER I-77

TIP PROJECT U-5817
2013 Mooresville & Lake Norman North Quads

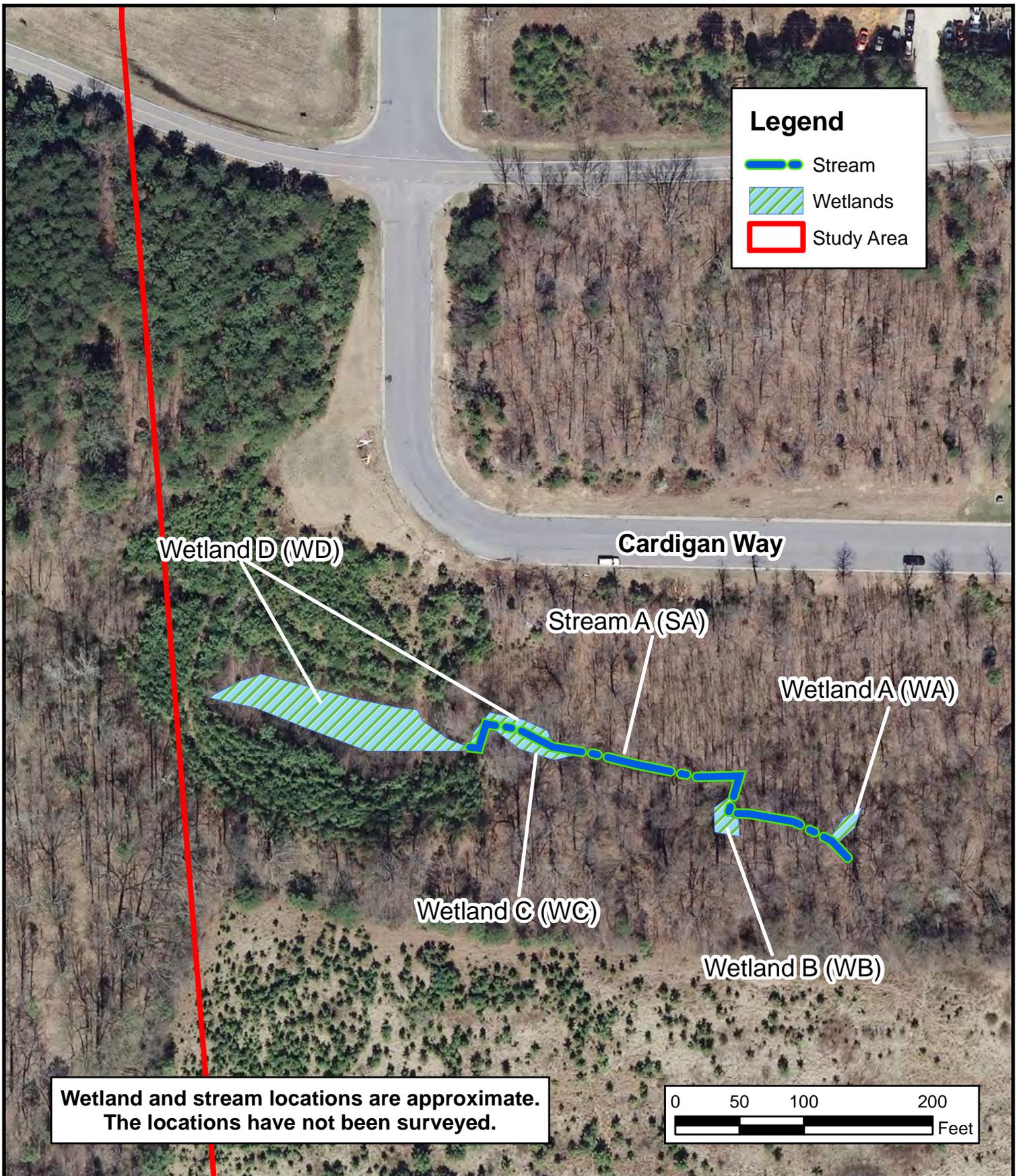


County:	Iredell
Div: 12 TIP # U-5817	
WBS:	44389.1.1
Date:	July 2016

Figure 2



<p>NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS UNIT</p>	<p>Stream & Wetland Features Fairview Road Extension Over I-77</p> <p>IREDELL COUNTY TIP PROJECT U-5817</p>		<p>County: Iredell</p>	<p>Figure 3A</p>
	<p>Div: 12 TIP #U-5817</p>	<p>WBS: 44389.1.1</p>		
	<p>Date: July 2016</p>			



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS UNIT

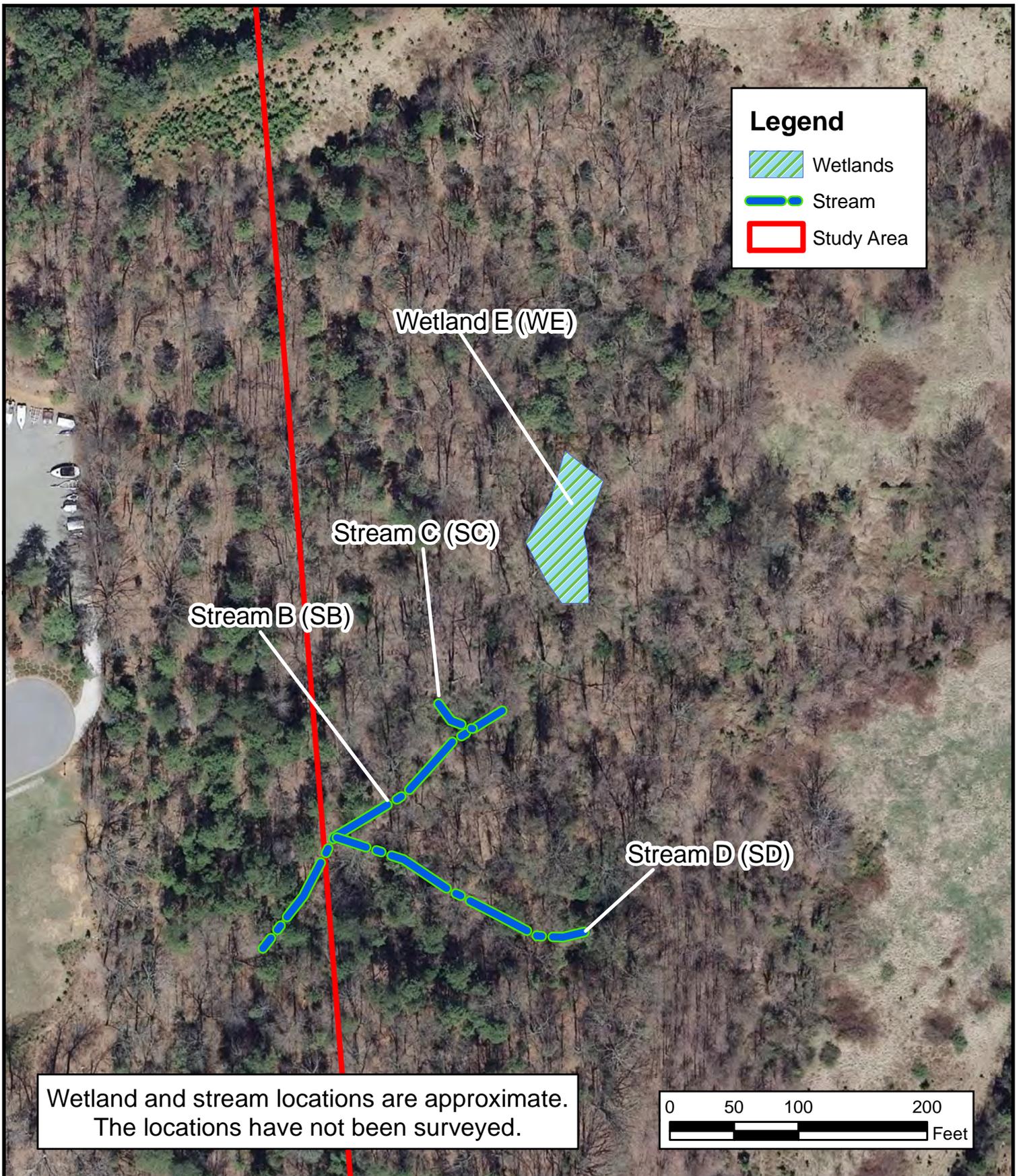
**Stream & Wetland Features
Fairview Road Extension
Over I-77**

IREDELL COUNTY
TIP PROJECT U-5817



County:	Iredell
Div: 12 TIP # U-5817	
WBS:	44389.1.1
Date:	July 2016

**Figure
3B**



Legend

-  Wetlands
-  Stream
-  Study Area

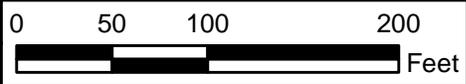
Wetland E (WE)

Stream C (SC)

Stream B (SB)

Stream D (SD)

Wetland and stream locations are approximate.
The locations have not been surveyed.



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS UNIT

**Stream & Wetland Features
Fairview Road Extension
Over I-77**

IREDELL COUNTY
TIP PROJECT U-5817



County:	Iredell
Div: 12 TIP # U-5817	
WBS:	44389.1.1
Date:	July 2016

**Figure
3C**



Legend

-  Wetlands
-  Stream
-  Study Area

Wetland F (WF)

Wetland H (WH)

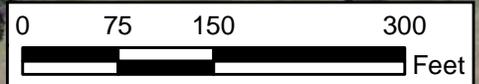
Wetland G (WG)

Fairview Rd.

Wetland I (WI)

Stream E (SE)

Wetland and stream locations are approximate.
The locations have not been surveyed.



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS UNIT

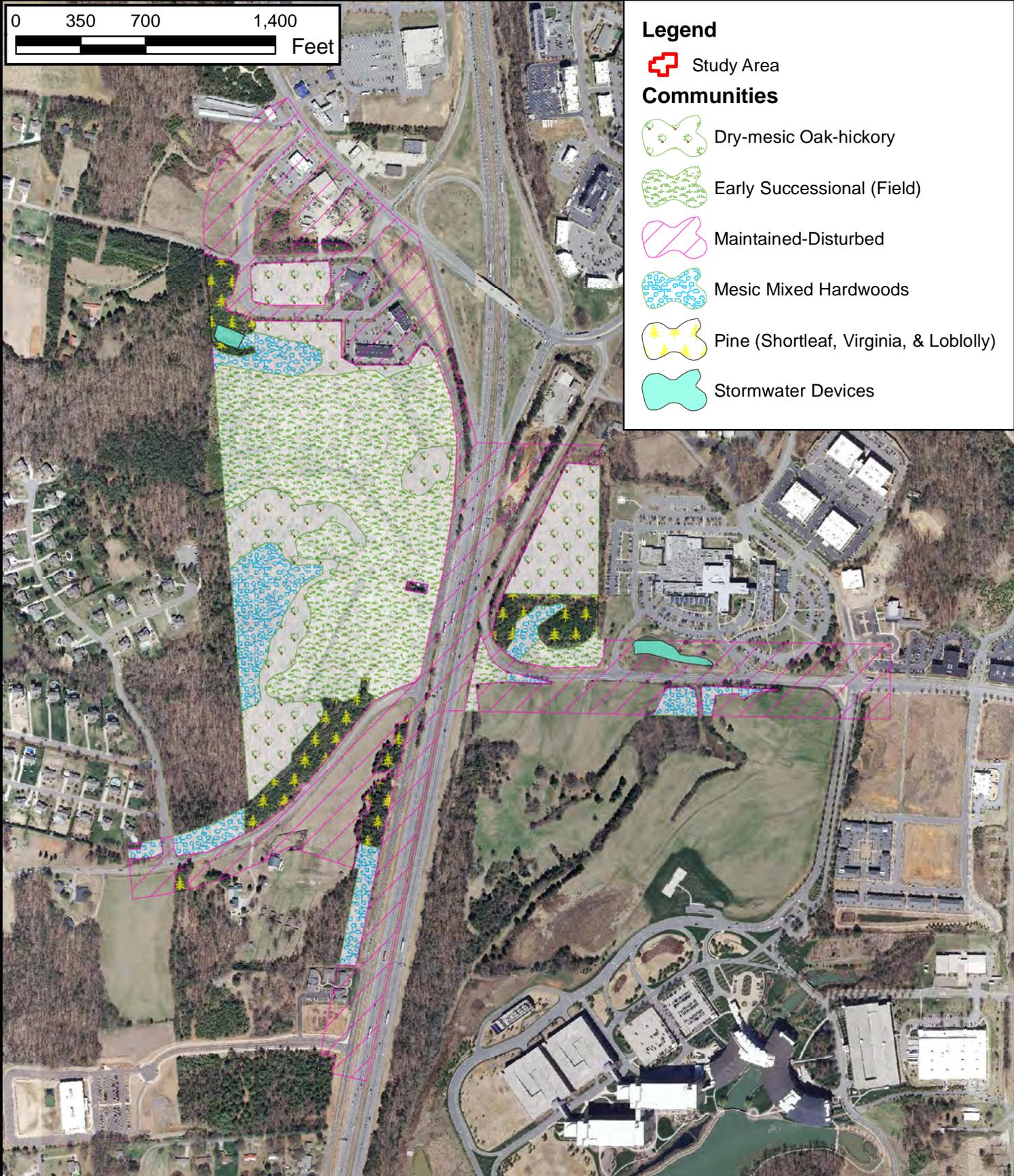
**Stream & Wetland Features
Fairview Road Extension
Over I-77**

IREDELL COUNTY
TIP PROJECT U-5817



County:	Iredell
Div: 12 TIP # U-5817	
WBS:	44389.1.1
Date:	July 2016

**Figure
3D**



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS UNIT

**TERRESTRIAL COMMUNITIES
 FAIRVIEW RD. EXTENSION
 OVER I-77**

IREDELL COUNTY
 TIP PROJECT U-5817



County:	Iredell
Div: 12 TIP #	U-5817
WBS:	44389.1.1
Date:	August 2016

Figure 4

Appendix B

Scientific Names of Species Identified in Report

Plants

<u>Common Name</u>	<u>Scientific Name</u>
American holly	<i>Ilex opaca</i>
Bigleaf periwinkle	<i>Vinca major</i>
Blackberry	<i>Rubus</i> sp.
Black cherry	<i>Prunus serotina</i>
Bradford pear	<i>Pyrus calleryana</i>
Broomsedge bluestem	<i>Andropogon virginicus</i>
Cattail	<i>Typha latifolia</i>
Chinaberry	<i>Melia azedarach</i>
Chinese privet	<i>Ligustrum sinense</i>
Chinese wisteria	<i>Wisteria sinensis</i>
Cranefly orchid	<i>Tipularia discolor</i>
Clover	<i>Trifolium</i> sp.
Common periwinkle	<i>Vinca minor</i>
Dwarf-flowered heartleaf	<i>Hexastylis naniflora</i>
Eastern red cedar	<i>Juniperus virginiana</i>
English ivy	<i>Hedera helix</i>
Fescue	<i>Festuca</i> sp.
Flowering dogwood	<i>Cornus florida</i>
Heavenly bamboo	<i>Nandina domestica</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Japanese privet	<i>Ligustrum japonicum</i>
Soft rush	<i>Juncus effusus</i>
Little brown jug	<i>Hexastylis arifolia</i>
Loblolly pine	<i>Pinus taeda</i>
Mockernut hickory	<i>Carya tomentosa</i>
Multiflora rose	<i>Rosa multiflora</i>
Northern red oak	<i>Quercus rubra</i>
Pawpaw	<i>Asimina triloba</i>
Poison ivy	<i>Toxicodendron radicans</i>
Pokeweed	<i>Phytolacca americana</i>
Possumhaw	<i>Viburnum nudum</i>
Red maple	<i>Acer rubrum</i>
Roundleaf greenbrier	<i>Smilax rotundifolia</i>
Shortleaf pine	<i>Pinus echinata</i>
Sourwood	<i>Oxydendrum arboreum</i>
Spotted wintergreen	<i>Chimaphila maculata</i>
Strawberry bush	<i>Euonymus americanus</i>
Sweet gum	<i>Liquidambar styraciflua</i>

Tree of Heaven
Tulip poplar
Virginia pine
White oak
Whiteleaf greenbrier
Winged elm

Ailanthus altissima
Liriodendron tulipifera
Pinus virginiana
Quercus alba
Smilax glauca
Ulmus alata

Animals

Common Name

American crow
American robin
American toad
Bald eagle
Barred owl
Black racer
Black rat snake
Blue-gray gnatcatcher
Blue jay
Bog turtle
Canada goose
Carolina chickadee
Carolina wren
Cope's gray treefrog
Copperhead
Eastern bluebird
Eastern box turtle
Eastern five-lined skink
Eastern garter snake
Eastern hognose snake
Eastern meadowlark
Eastern mole
Eastern towhee
Eastern wood-pewee
Fish crow
Gray fox
Gray squirrel
Hairy woodpecker
Killdeer
Northern cardinal
Northern cricket frog
Northern dusky salamander
Northern fence lizard
Northern long-eared bat
Northern mockingbird
Northern water snake

Scientific Name

Corvus brachyrhynchos
Turdus migratorius
Bufo americanus
Haliaeetus leucocephalus
Strix varia
Coluber constrictor
Elaphe obsoleta
Polioptila caerulea
Cyanocitta cristata
Glyptemys muhlenbergii
Branta canadensis
Poecile carolinensis
Thryothorus ludovicianus
Hyla chrysoscelis
Agkistrodon contortrix
Sialia sialis
Terrapene carolina
Eumeces fasciatus
Thamnophis sirtalis
Heterodon platirhinos
Sturnella magna
Scalopus aquaticus
Pipilo erythrophthalmus
Contopus virens
Corvus ossifragus
Urocyon cinereoargenteus
Sciurus carolinensis
Picoides villosus
Charadrius vociferus
Cardinalis cardinalis
Acris crepitans
Desmognathus fuscus
Sceloporus undulatus hyacinthinus
Myotis septentrionalis
Mimus polyglottos
Nerodia sipedon

Pickereel frog
Pied-billed grebe
Raccoon
Red-bellied woodpecker
Red-eyed vireo
Rough green snake
Southern leopard frog
Spring peeper
Tufted titmouse
Turkey vulture
Two-lined salamander
Upland chorus frog
Virginia opossum
White-eyed vireo
White-footed mouse
White-throated sparrow
White-tailed deer
Yellow-bellied sapsucker
Yellow-bellied slider

Rana palustris
Podilymbus podiceps
Procyon lotor
Melanerpes carolinus
Vireo olivaceus
Opheodrys aestivus
Rana sphenoccephala
Pseudacris crucifer
Baeolophus bicolor
Cathartes aura
Eurycea cirrigera
Pseudacris feriarum
Didelphis virginiana
Vireo griseus
Peromyscus leucopus
Zonotrichia albicollis
Odocoileus virginianus
Sphyrapicus varius
Trachemys scripta

Appendix C

Stream and Wetland Forms

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WA-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): P, 136 Lat: 35.552459 Long: -80.86134 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input checked="" type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p><u>Secondary Indicators (minimum of two required)</u></p> <table style="width:100%;"> <tr><td><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
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<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			

<p>Field Observations:</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WA-wet U-5817

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Sapling Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Shrub Stratum (Plot size: <u>9.1m</u> _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			

Herb Stratum (Plot size: <u>9.1m</u> _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>30</u>	<u>Y</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>30</u>	x 2 = <u>60</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>20</u>	x 4 = <u>80</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>50</u> (A)	<u>140</u> (B)

Prevalence Index = B/A = 2.8

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WA-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/3	100					sand	
2-8	10YR 5/2	90	10YR 6/6	10	C	M/PL	sand	
8-12	10YR 6/6	100					cl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) (LRR N)
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) (MLRA 147, 148)
- Thin Dark Surface (S9) (MLRA 147, 148)
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) (LRR N, MLRA 136)
- Umbric Surface (F13) (MLRA 136, 122)
- Piedmont Floodplain Soils (F19) (MLRA 148)
- Red Parent Material (F21) (MLRA 127, 147)

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) (MLRA 147)
- Coast Prairie Redox (A16) (MLRA 147, 148)
- Piedmont Floodplain Soils (F19) (MLRA 136, 147)
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WA-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2-4
 Subregion (LRR or MLRA): P, 136 Lat: 35.552745 Long: -80.861876 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Remarks:			

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WA-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			
<u>Sapling Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>9.1m</u>)			
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>30</u> = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			
<u>Herb Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Smilax glauca</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>40</u>	x 4 = <u>160</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>55</u> (A)	<u>205</u> (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WA-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/3	100					sl	
2-12	2.5Y 5/4	100					sl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WB-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): P, 136 Lat: 35.552429 Long: -80.861476 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WB-wet U-5817

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: 5 20% of total cover: 2

Shrub Stratum (Plot size: <u>9.1m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: 7.5 20% of total cover: 3

Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: 5 20% of total cover: 2

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>10</u>	x 2 = <u>20</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>15</u>	x 4 = <u>60</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>35</u> (A)	<u>110</u> (B)

Prevalence Index = B/A = 3.1

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WB-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2-4
 Subregion (LRR or MLRA): P, 136 Lat: 35.552745 Long: -80.861876 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p><u>Secondary Indicators (minimum of two required)</u></p> <table style="width:100%;"> <tr><td><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
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<input type="checkbox"/> FAC-Neutral Test (D5)																																			
<p>Field Observations:</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks:																																			

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WB-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			
<u>Sapling Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>9.1m</u>)			
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>30</u> = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			
<u>Herb Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Smilax glauca</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>40</u>	x 4 = <u>160</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>55</u> (A)	<u>205</u> (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WB-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/3	100					sl	
2-12	2.5Y 5/4	100					sl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WC-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): P, 136 Lat: 35.552583 Long: -80.861965 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WC-wet U-5817

	Absolute % Cover	Dominant Species?	Indicator Status																						
Tree Stratum (Plot size: _____)																									
1. _____																									
2. _____																									
3. _____																									
4. _____																									
5. _____																									
6. _____																									
	_____ = Total Cover																								
	50% of total cover: _____		20% of total cover: _____																						
Sapling Stratum (Plot size: <u>9.1 m</u>)																									
1. <u>Acer rubrum</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>																						
2. _____																									
3. _____																									
4. _____																									
5. _____																									
6. _____																									
	<u>10</u> = Total Cover																								
	50% of total cover: <u>5</u>		20% of total cover: <u>2</u>																						
Shrub Stratum (Plot size: <u>9.1m</u>)																									
1. <u>Ligustrum sinense</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>																						
2. _____																									
3. _____																									
4. _____																									
5. _____																									
6. _____																									
	<u>5</u> = Total Cover																								
	50% of total cover: <u>2.5</u>		20% of total cover: <u>1</u>																						
Herb Stratum (Plot size: _____)																									
1. <u>Juncus effusus</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>																						
2. _____																									
3. _____																									
4. _____																									
5. _____																									
6. _____																									
7. _____																									
8. _____																									
9. _____																									
10. _____																									
11. _____																									
	<u>10</u> = Total Cover																								
	50% of total cover: <u>5</u>		20% of total cover: <u>2</u>																						
Woody Vine Stratum (Plot size: _____)																									
1. _____																									
2. _____																									
3. _____																									
4. _____																									
5. _____																									
	_____ = Total Cover																								
	50% of total cover: _____		20% of total cover: _____																						
				<p>Dominance Test worksheet:</p> <p>Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)</p> <p>Total Number of Dominant Species Across All Strata: <u>3</u> (B)</p> <p>Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)</p>																					
				<p>Prevalence Index worksheet:</p> <table style="width:100%; border:none;"> <tr> <td style="width:50%;"></td> <td style="width:25%; text-align:center;">Total % Cover of:</td> <td style="width:25%; text-align:center;">Multiply by:</td> </tr> <tr> <td>OBL species</td> <td style="text-align:center;"><u>0</u></td> <td style="text-align:center;">x 1 = <u>0</u></td> </tr> <tr> <td>FACW species</td> <td style="text-align:center;"><u>10</u></td> <td style="text-align:center;">x 2 = <u>20</u></td> </tr> <tr> <td>FAC species</td> <td style="text-align:center;"><u>10</u></td> <td style="text-align:center;">x 3 = <u>30</u></td> </tr> <tr> <td>FACU species</td> <td style="text-align:center;"><u>5</u></td> <td style="text-align:center;">x 4 = <u>20</u></td> </tr> <tr> <td>UPL species</td> <td style="text-align:center;"><u>0</u></td> <td style="text-align:center;">x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals:</td> <td style="text-align:center;"><u>25</u> (A)</td> <td style="text-align:center;"><u>70</u> (B)</td> </tr> </table> <p style="text-align:right;">Prevalence Index = B/A = <u>2.8</u></p>		Total % Cover of:	Multiply by:	OBL species	<u>0</u>	x 1 = <u>0</u>	FACW species	<u>10</u>	x 2 = <u>20</u>	FAC species	<u>10</u>	x 3 = <u>30</u>	FACU species	<u>5</u>	x 4 = <u>20</u>	UPL species	<u>0</u>	x 5 = <u>0</u>	Column Totals:	<u>25</u> (A)	<u>70</u> (B)
	Total % Cover of:	Multiply by:																							
OBL species	<u>0</u>	x 1 = <u>0</u>																							
FACW species	<u>10</u>	x 2 = <u>20</u>																							
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Column Totals:	<u>25</u> (A)	<u>70</u> (B)																							
				<p>Hydrophytic Vegetation Indicators:</p> <p><input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation</p> <p><input checked="" type="checkbox"/> 2 - Dominance Test is >50%</p> <p><input checked="" type="checkbox"/> 3 - Prevalence Index is ≤3.0¹</p> <p><input type="checkbox"/> 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)</p> <p><input type="checkbox"/> Problematic Hydrophytic Vegetation¹ (Explain)</p> <p>¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.</p>																					
				<p>Definitions of Five Vegetation Strata:</p> <p>Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).</p> <p>Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.</p> <p>Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.</p> <p>Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.</p> <p>Woody vine – All woody vines, regardless of height.</p>																					
				<p>Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>																					
Remarks: (Include photo numbers here or on a separate sheet.)																									

SOIL

Sampling Point: WC-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 4/2	100					sl	
2-10	10YR 5/2	90	10YR 5/6	10	C	M/PL	cl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WC-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2-4
 Subregion (LRR or MLRA): P, 136 Lat: 35.552745 Long: -80.861876 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width:50%; border: none;"><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <table style="width:100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)																																		
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)																																		
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)																																		
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<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)																																		
<input type="checkbox"/> Iron Deposits (B5)																																			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)																																			
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<input type="checkbox"/> Shallow Aquitard (D3)																																			
<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WC-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			
<u>Sapling Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>9.1m</u>)			
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>30</u> = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			
<u>Herb Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Smilax glauca</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>40</u>	x 4 = <u>160</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>55</u> (A)	<u>205</u> (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WC-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/3	100					sl	
2-12	2.5Y 5/4	100					sl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WD-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): P, 136 Lat: 35.552684 Long: -80.862323 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input checked="" type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4"</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WD-wet U-5817

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>9.1 m</u>)				
1. <u>Typha latifolia</u>	<u>30</u>	<u>Y</u>	<u>OBL</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
<u>30</u> = Total Cover				
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Hydrophytic Vegetation Present?				
Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				

Remarks: (Include photo numbers here or on a separate sheet.)

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>30</u>	x 1 = <u>30</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>45</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>30</u> (A)	<u>30</u> (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

SOIL

Sampling Point: WD-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 4/2	100					sl	
2-10	10YR 5/2	90	10YR 5/6	10	C	M/PL	cl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WD-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2-4
 Subregion (LRR or MLRA): P, 136 Lat: 35.552745 Long: -80.861876 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WD-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			
<u>Sapling Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Shrub Stratum</u> (Plot size: <u>9.1m</u>)			
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>30</u> = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			
<u>Herb Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Smilax glauca</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>15</u>	x 3 = <u>45</u>
FACU species <u>40</u>	x 4 = <u>160</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>55</u> (A)	<u>205</u> (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WD-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/3	100					sl	
2-12	2.5Y 5/4	100					sl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WE-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): P, 136 Lat: 35.549421 Long: -80.861907 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input checked="" type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input checked="" type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>2'</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>0"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 Sparsely vegetated pool with leopard frog adults and eggs.

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WE-wet U-5817

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>2</u>	<u>Y</u>	<u>FAC</u>
2. <u>Asimina triloba</u>	<u>8</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: 5 20% of total cover: 2

Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>10</u>	x 3 = <u>30</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>10</u> (A)	<u>30</u> (B)

Prevalence Index = B/A = 3.0

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WE-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2-4
 Subregion (LRR or MLRA): P, 136 Lat: 35.549259 Long: -80.861681 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)																																		
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)																																		
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)																																		
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)																																		
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)																																		
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)																																		
<input type="checkbox"/> Iron Deposits (B5)																																			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)																																			
<input type="checkbox"/> Water-Stained Leaves (B9)																																			
<input type="checkbox"/> Aquatic Fauna (B13)																																			
<input type="checkbox"/> Surface Soil Cracks (B6)																																			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)																																			
<input type="checkbox"/> Drainage Patterns (B10)																																			
<input type="checkbox"/> Moss Trim Lines (B16)																																			
<input type="checkbox"/> Dry-Season Water Table (C2)																																			
<input type="checkbox"/> Crayfish Burrows (C8)																																			
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)																																			
<input type="checkbox"/> Stunted or Stressed Plants (D1)																																			
<input type="checkbox"/> Geomorphic Position (D2)																																			
<input type="checkbox"/> Shallow Aquitard (D3)																																			
<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks:																																			

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WE-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Quercus alba</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. <u>Liriodendron tulipifera</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>25</u> = Total Cover			
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			
Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ilex opaca</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>5</u> = Total Cover			
50% of total cover: <u>2.5</u> 20% of total cover: <u>1</u>			
Shrub Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Woody Vine Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>30</u>	x 4 = <u>120</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>30</u> (A)	<u>120</u> (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WE-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-8	7.5YR 5/6	100					cl	
8-12	7.5YR 5/6	100					clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: Hole collapsed

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WF-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547476 Long: -80.857087 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input checked="" type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>10"</u>	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 In a maintained field

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WF-wet U-5817

Tree Stratum (Plot size: _____)

	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size: _____)

	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Shrub Stratum (Plot size: _____)

	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Herb Stratum (Plot size: 9.1 m)

	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Juncus effusus</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: 10 20% of total cover: 4

Woody Vine Stratum (Plot size: _____)

	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>20</u>	x 2 = <u>40</u>
FAC species <u>0</u>	x 3 = <u>0</u>
FACU species <u>0</u>	x 4 = <u>0</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>20</u> (A)	<u>40</u> (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/2	85	10YR 6/6	15	C	M	cl	
3-12	10YR 5/4	80	10YR 5/8	20	C	M	scl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: Meets indicator in top 3".

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-10-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WF-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547329 Long: -80.857212 Datum: 83
 Soil Map Unit Name: Pacolet, sandy loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	Secondary Indicators (minimum of two required) <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input checked="" type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
 In a maintained field

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WF-up U-5817

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Sapling Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Shrub Stratum (Plot size: _____)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Herb Stratum (Plot size: <u>9.1 m</u>)				
1. <u>Festuca sp.</u>	<u>70</u>	<u>Y</u>	_____	_____
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____
<u>70</u> = Total Cover				
50% of total cover: <u>35</u> 20% of total cover: <u>14</u>				
Woody Vine Stratum (Plot size: _____)				
1. _____	_____	_____	_____	_____
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
_____ = Total Cover				
50% of total cover: _____ 20% of total cover: _____				
Remarks: (Include photo numbers here or on a separate sheet.) maintained field dominated by planted fescue sp.				

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: _____ (A)

Total Number of Dominant Species Across All Strata: _____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: _____ (A/B)

Prevalence Index worksheet:

Total % Cover of: _____ Multiply by:

OBL species _____ x 1 = _____

FACW species _____ x 2 = _____

FAC species _____ x 3 = _____

FACU species _____ x 4 = _____

UPL species _____ x 5 = _____

Column Totals: _____ (A) _____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

SOIL

Sampling Point: WF-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/3	100					cl	
3-12	10YR 6/8	100					scl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WG-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547508 Long: -80.85407 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Area has been disturbed due to sewer maintenance.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>12"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>10"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WG-wet U-5817

<u>Tree Stratum</u> (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:														
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)														
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>6</u> (B)														
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)														
4. _____	_____	_____	_____	Prevalence Index worksheet:														
5. _____	_____	_____	_____		<table style="width:100%; border:none;"> <tr> <td style="width:50%;">Total % Cover of:</td> <td style="width:50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>8</u></td> <td>x 1 = <u>8</u></td> </tr> <tr> <td>FACW species <u>10</u></td> <td>x 2 = <u>20</u></td> </tr> <tr> <td>FAC species <u>25</u></td> <td>x 3 = <u>75</u></td> </tr> <tr> <td>FACU species <u>32</u></td> <td>x 4 = <u>128</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>75</u> (A)</td> <td><u>231</u> (B)</td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>8</u>	x 1 = <u>8</u>	FACW species <u>10</u>	x 2 = <u>20</u>	FAC species <u>25</u>	x 3 = <u>75</u>	FACU species <u>32</u>	x 4 = <u>128</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>75</u> (A)
Total % Cover of:	Multiply by:																	
OBL species <u>8</u>	x 1 = <u>8</u>																	
FACW species <u>10</u>	x 2 = <u>20</u>																	
FAC species <u>25</u>	x 3 = <u>75</u>																	
FACU species <u>32</u>	x 4 = <u>128</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>75</u> (A)	<u>231</u> (B)																	
6. _____	_____	_____	_____	Prevalence Index = B/A = <u>3.1</u>														
_____ = Total Cover				Hydrophytic Vegetation Indicators:														
50% of total cover: _____ 20% of total cover: _____																		
<u>Sapling Stratum</u> (Plot size: <u>9.1 m</u>)				<input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input checked="" type="checkbox"/> 2 - Dominance Test is >50% <input type="checkbox"/> 3 - Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)														
1. <u>Liquidambar styraciflua</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.														
2. <u>Ulmus alata</u>	<u>2</u>	<u>Y</u>	<u>FACU</u>															
3. _____	_____	_____	_____	Definitions of Five Vegetation Strata:														
4. _____	_____	_____	_____															
5. _____	_____	_____	_____	Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).														
6. _____	_____	_____	_____	Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.														
_____ = Total Cover				Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.														
50% of total cover: <u>3.5</u> 20% of total cover: <u>1.4</u>				Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.														
<u>Shrub Stratum</u> (Plot size: <u>9.1 m</u>)				Woody vine – All woody vines, regardless of height.														
1. <u>Ligustrum sinense</u>	<u>30</u>	<u>Y</u>	<u>FACU</u>	Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>														
2. <u>Viburnum nudum</u>	<u>8</u>	<u>Y</u>	<u>OBL</u>															
3. _____	_____	_____	_____	Remarks: (Include photo numbers here or on a separate sheet.)														
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>19</u> 20% of total cover: <u>7.6</u>																		
<u>Herb Stratum</u> (Plot size: <u>9.1 m</u>)																		
1. <u>Juncus effusus</u>	<u>10</u>	<u>Y</u>	<u>FACW</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>																		
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)																		
1. <u>Lonicera japonica</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
_____ = Total Cover																		
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>																		

SOIL

Sampling Point: WG-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-6	10YR 5/1	85	10YR 6/6	15	C	M	scl	
6-12	10YR 6/1	85	10YR 6/6	15	C	M	scl	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)	
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)	
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WG-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547428 Long: -80.853967 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks: Area has been disturbed due to sewer maintenance.	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width: 50%; border: none;"><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <table style="width: 100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)																																		
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)																																		
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)																																		
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)																																		
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)																																		
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)																																		
<input type="checkbox"/> Iron Deposits (B5)																																			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)																																			
<input type="checkbox"/> Water-Stained Leaves (B9)																																			
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<input type="checkbox"/> Shallow Aquitard (D3)																																			
<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WG-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liriodendron tulipifera</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2. <u>Juniperus virginiana</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
3. <u>Acer rubrum</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>25</u> = Total Cover			
50% of total cover: <u>12.5</u> 20% of total cover: <u>5</u>			
Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
2. <u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
3. <u>Ilex opaca</u>	<u>8</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>48</u> = Total Cover			
50% of total cover: <u>24</u> 20% of total cover: <u>9.6</u>			
Shrub Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
<u>10</u> = Total Cover			
50% of total cover: <u>5</u> 20% of total cover: <u>2</u>			
Woody Vine Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
2. <u>Smilax rotundifolia</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>15</u> = Total Cover			
50% of total cover: <u>7.5</u> 20% of total cover: <u>3</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 63% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>70</u>	x 3 = <u>210</u>
FACU species <u>28</u>	x 4 = <u>112</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>98</u> (A)	<u>322</u> (B)

Prevalence Index = B/A = 3.3

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WH-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547363 Long: -80.854399 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> <input type="checkbox"/> Surface Water (A1) <input type="checkbox"/> True Aquatic Plants (B14) <input type="checkbox"/> High Water Table (A2) <input type="checkbox"/> Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) <input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3) <input type="checkbox"/> Water Marks (B1) <input type="checkbox"/> Presence of Reduced Iron (C4) <input type="checkbox"/> Sediment Deposits (B2) <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6) <input type="checkbox"/> Drift Deposits (B3) <input type="checkbox"/> Thin Muck Surface (C7) <input type="checkbox"/> Algal Mat or Crust (B4) <input type="checkbox"/> Other (Explain in Remarks) <input type="checkbox"/> Iron Deposits (B5) <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) <input type="checkbox"/> Aquatic Fauna (B13)	<p><u>Secondary Indicators (minimum of two required)</u></p> <input type="checkbox"/> Surface Soil Cracks (B6) <input type="checkbox"/> Sparsely Vegetated Concave Surface (B8) <input type="checkbox"/> Drainage Patterns (B10) <input type="checkbox"/> Moss Trim Lines (B16) <input type="checkbox"/> Dry-Season Water Table (C2) <input type="checkbox"/> Crayfish Burrows (C8) <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) <input type="checkbox"/> Stunted or Stressed Plants (D1) <input type="checkbox"/> Geomorphic Position (D2) <input type="checkbox"/> Shallow Aquitard (D3) <input type="checkbox"/> Microtopographic Relief (D4) <input type="checkbox"/> FAC-Neutral Test (D5)
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<p>Field Observations:</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>10"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WH-wet U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>40</u> = Total Cover			
50% of total cover: <u>20</u> 20% of total cover: <u>8</u>			
Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liquidambar styraciflua</u>	<u>30</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>30</u> = Total Cover			
50% of total cover: <u>15</u> 20% of total cover: <u>6</u>			
Shrub Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>2</u>	_____	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>2</u> = Total Cover			
50% of total cover: <u>1</u> 20% of total cover: <u>0.4</u>			
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Woody Vine Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>80</u>	<u>Y</u>	<u>FAC</u>
2. <u>Smilax rotundifolia</u>	<u>5</u>	<u>N</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>85</u> = Total Cover			
50% of total cover: <u>42.5</u> 20% of total cover: <u>17</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>155</u>	x 3 = <u>465</u>
FACU species <u>2</u>	x 4 = <u>8</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>157</u> (A)	<u>473</u> (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

1 - Rapid Test for Hydrophytic Vegetation

2 - Dominance Test is >50%

3 - Prevalence Index is ≤3.0¹

4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)

Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present?

Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WH-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 5/2	100					sand	coarse sand
3-12	10YR 6/2	85	10YR 6/6	15	C	M	sand	coarse sand

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- Histosol (A1)
- Histic Epipedon (A2)
- Black Histic (A3)
- Hydrogen Sulfide (A4)
- Stratified Layers (A5)
- 2 cm Muck (A10) **(LRR N)**
- Depleted Below Dark Surface (A11)
- Thick Dark Surface (A12)
- Sandy Mucky Mineral (S1) **(LRR N, MLRA 147, 148)**
- Sandy Gleyed Matrix (S4)
- Sandy Redox (S5)
- Stripped Matrix (S6)

- Dark Surface (S7)
- Polyvalue Below Surface (S8) **(MLRA 147, 148)**
- Thin Dark Surface (S9) **(MLRA 147, 148)**
- Loamy Gleyed Matrix (F2)
- Depleted Matrix (F3)
- Redox Dark Surface (F6)
- Depleted Dark Surface (F7)
- Redox Depressions (F8)
- Iron-Manganese Masses (F12) **(LRR N, MLRA 136)**
- Umbric Surface (F13) **(MLRA 136, 122)**
- Piedmont Floodplain Soils (F19) **(MLRA 148)**
- Red Parent Material (F21) **(MLRA 127, 147)**

Indicators for Problematic Hydric Soils³:

- 2 cm Muck (A10) **(MLRA 147)**
- Coast Prairie Redox (A16) **(MLRA 147, 148)**
- Piedmont Floodplain Soils (F19) **(MLRA 136, 147)**
- Very Shallow Dark Surface (TF12)
- Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WH-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547329 Long: -80.854448 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width:50%; border: none;"><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <table style="width:100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)																																		
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)																																		
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)																																		
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)																																		
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)																																		
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)																																		
<input type="checkbox"/> Iron Deposits (B5)																																			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)																																			
<input type="checkbox"/> Water-Stained Leaves (B9)																																			
<input type="checkbox"/> Aquatic Fauna (B13)																																			
<input type="checkbox"/> Surface Soil Cracks (B6)																																			
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)																																			
<input type="checkbox"/> Drainage Patterns (B10)																																			
<input type="checkbox"/> Moss Trim Lines (B16)																																			
<input type="checkbox"/> Dry-Season Water Table (C2)																																			
<input type="checkbox"/> Crayfish Burrows (C8)																																			
<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)																																			
<input type="checkbox"/> Stunted or Stressed Plants (D1)																																			
<input type="checkbox"/> Geomorphic Position (D2)																																			
<input type="checkbox"/> Shallow Aquitard (D3)																																			
<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12"</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12"</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WH-up U-5817

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>N</u>	<u>FAC</u>
3. <u>Juniperus virginiana</u>	<u>10</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>60</u> = Total Cover			
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>			
<u>Sapling Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
2. <u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
3. <u>Ilex opaca</u>	<u>8</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>48</u> = Total Cover			
50% of total cover: <u>24</u> 20% of total cover: <u>9.6</u>			
<u>Shrub Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Ligustrum sinense</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>20</u> = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			
<u>Herb Stratum</u> (Plot size: _____)			
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
<u>Woody Vine Stratum</u> (Plot size: <u>9.1 m</u>)			
1. <u>Lonicera japonica</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
2. <u>Smilax rotundifolia</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>20</u> = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>110</u>	x 3 = <u>330</u>
FACU species <u>38</u>	x 4 = <u>152</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>148</u> (A)	<u>482</u> (B)

Prevalence Index = B/A = 3.3

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WH-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/3	100					sl	
3-8	10YR 4/3	90	10YR 5/6	10	C	M	sl	
8-14	10YR 5/1	80	10YR 6/6	20	C	M	clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: The depleted matrix begins within 10" of the soil surface.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WI-wet
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547132 Long: -80.854476 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks:	

HYDROLOGY

<p>Wetland Hydrology Indicators:</p> <p><u>Primary Indicators (minimum of one is required; check all that apply)</u></p> <table style="width:100%;"> <tr> <td><input type="checkbox"/> Surface Water (A1)</td> <td><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td><input type="checkbox"/> High Water Table (A2)</td> <td><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td><input checked="" type="checkbox"/> Saturation (A3)</td> <td><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td><input type="checkbox"/> Water Marks (B1)</td> <td><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td><input type="checkbox"/> Sediment Deposits (B2)</td> <td><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td><input type="checkbox"/> Drift Deposits (B3)</td> <td><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td><input checked="" type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input checked="" type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		<p><u>Secondary Indicators (minimum of two required)</u></p> <table style="width:100%;"> <tr><td><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)																																		
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<input type="checkbox"/> FAC-Neutral Test (D5)																																			
<p>Field Observations:</p> Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>7"</u> Saturation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): <u>4"</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																																		
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:																																			
Remarks:																																			

VEGETATION (Five Strata) – Use scientific names of plants.

Sampling Point: WI-wet U-5817

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

20 = Total Cover

50% of total cover: 10 20% of total cover: 4

Shrub Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>5</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

5 = Total Cover

50% of total cover: 2.5 20% of total cover: 1

Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____

_____ = Total Cover

50% of total cover: _____ 20% of total cover: _____

Woody Vine Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Smilax rotundifolia</u>	<u>10</u>	<u>Y</u>	<u>FAC</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____

10 = Total Cover

50% of total cover: 5 20% of total cover: 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>30</u>	x 3 = <u>90</u>
FACU species <u>5</u>	x 4 = <u>20</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>35</u> (A)	<u>110</u> (B)

Prevalence Index = B/A = 3.1

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WI-wet U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 5/2	100					sand	coarse sand
3-12	10YR 6/2	85	10YR 6/6	15	C	M	sand	coarse sand

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input checked="" type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed): Type: _____ Depth (inches): _____	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont Region

Project/Site: Fairview Rd. Extension U-5817 City/County: Iredell County Sampling Date: 3-11-2016
 Applicant/Owner: NCDOT State: NC Sampling Point: WI-up
 Investigator(s): H. Smith Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 0-2
 Subregion (LRR or MLRA): P, 136 Lat: 35.547329 Long: -80.854448 Datum: 83
 Soil Map Unit Name: Warne, loam NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation Soil or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation Soil or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Remarks:	

HYDROLOGY

Wetland Hydrology Indicators: Primary Indicators (minimum of one is required; check all that apply) <table style="width:100%; border: none;"> <tr> <td style="width:50%; border: none;"><input type="checkbox"/> Surface Water (A1)</td> <td style="width:50%; border: none;"><input type="checkbox"/> True Aquatic Plants (B14)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> High Water Table (A2)</td> <td style="border: none;"><input type="checkbox"/> Hydrogen Sulfide Odor (C1)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Saturation (A3)</td> <td style="border: none;"><input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water Marks (B1)</td> <td style="border: none;"><input type="checkbox"/> Presence of Reduced Iron (C4)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Sediment Deposits (B2)</td> <td style="border: none;"><input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Drift Deposits (B3)</td> <td style="border: none;"><input type="checkbox"/> Thin Muck Surface (C7)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Algal Mat or Crust (B4)</td> <td style="border: none;"><input type="checkbox"/> Other (Explain in Remarks)</td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Iron Deposits (B5)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Water-Stained Leaves (B9)</td> <td></td> </tr> <tr> <td style="border: none;"><input type="checkbox"/> Aquatic Fauna (B13)</td> <td></td> </tr> </table>	<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> True Aquatic Plants (B14)	<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Iron Deposits (B5)		<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Aquatic Fauna (B13)		Secondary Indicators (minimum of two required) <table style="width:100%; border: none;"> <tr><td style="border: none;"><input type="checkbox"/> Surface Soil Cracks (B6)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Drainage Patterns (B10)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Moss Trim Lines (B16)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Dry-Season Water Table (C2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Crayfish Burrows (C8)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Stunted or Stressed Plants (D1)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Geomorphic Position (D2)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Shallow Aquitard (D3)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> Microtopographic Relief (D4)</td></tr> <tr><td style="border: none;"><input type="checkbox"/> FAC-Neutral Test (D5)</td></tr> </table>	<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Drainage Patterns (B10)	<input type="checkbox"/> Moss Trim Lines (B16)	<input type="checkbox"/> Dry-Season Water Table (C2)	<input type="checkbox"/> Crayfish Burrows (C8)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	<input type="checkbox"/> Stunted or Stressed Plants (D1)	<input type="checkbox"/> Geomorphic Position (D2)	<input type="checkbox"/> Shallow Aquitard (D3)	<input type="checkbox"/> Microtopographic Relief (D4)	<input type="checkbox"/> FAC-Neutral Test (D5)
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<input type="checkbox"/> Microtopographic Relief (D4)																																			
<input type="checkbox"/> FAC-Neutral Test (D5)																																			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>N/A</u> Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12"</u> Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12"</u>	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
--	--

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION (Five Strata) – Use scientific names of plants.

Tree Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Acer rubrum</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>
2. <u>Liquidambar styraciflua</u>	<u>10</u>	<u>N</u>	<u>FAC</u>
3. <u>Juniperus virginiana</u>	<u>10</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>60</u> = Total Cover			
50% of total cover: <u>30</u> 20% of total cover: <u>12</u>			
Sapling Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
2. <u>Acer rubrum</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>
3. <u>Ilex opaca</u>	<u>8</u>	<u>N</u>	<u>FACU</u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>48</u> = Total Cover			
50% of total cover: <u>24</u> 20% of total cover: <u>9.6</u>			
Shrub Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Ligustrum sinense</u>	<u>20</u>	<u>Y</u>	<u>FACU</u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
<u>20</u> = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			
Herb Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1. _____	_____	_____	_____
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
_____ = Total Cover			
50% of total cover: _____ 20% of total cover: _____			
Woody Vine Stratum (Plot size: <u>9.1 m</u>)	Absolute % Cover	Dominant Species?	Indicator Status
1. <u>Lonicera japonica</u>	<u>15</u>	<u>Y</u>	<u>FAC</u>
2. <u>Smilax rotundifolia</u>	<u>5</u>	<u>Y</u>	<u>FAC</u>
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
<u>20</u> = Total Cover			
50% of total cover: <u>10</u> 20% of total cover: <u>4</u>			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species <u>0</u>	x 1 = <u>0</u>
FACW species <u>0</u>	x 2 = <u>0</u>
FAC species <u>110</u>	x 3 = <u>330</u>
FACU species <u>38</u>	x 4 = <u>152</u>
UPL species <u>0</u>	x 5 = <u>0</u>
Column Totals: <u>148</u> (A)	<u>482</u> (B)

Prevalence Index = B/A = 3.3

- Hydrophytic Vegetation Indicators:**
- 1 - Rapid Test for Hydrophytic Vegetation
 - 2 - Dominance Test is >50%
 - 3 - Prevalence Index is ≤3.0¹
 - 4 - Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 - Problematic Hydrophytic Vegetation¹ (Explain)
- ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Five Vegetation Strata:

Tree – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and 3 in. (7.6 cm) or larger in diameter at breast height (DBH).

Sapling – Woody plants, excluding woody vines, approximately 20 ft (6 m) or more in height and less than 3 in. (7.6 cm) DBH.

Shrub – Woody plants, excluding woody vines, approximately 3 to 20 ft (1 to 6 m) in height.

Herb – All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 ft (1 m) in height.

Woody vine – All woody vines, regardless of height.

Hydrophytic Vegetation Present? Yes No

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WI-up U-5817

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 4/3	100					sl	
3-8	10YR 4/3	90	10YR 5/6	10	C	M	sl	
8-14	10YR 5/1	80	10YR 6/6	20	C	M	clay	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Dark Surface (S7)	<input type="checkbox"/> 2 cm Muck (A10) (MLRA 147)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Polyvalue Below Surface (S8) (MLRA 147, 148)	<input type="checkbox"/> Coast Prairie Redox (A16) (MLRA 147, 148)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 136, 147)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1) (LRR N, MLRA 147, 148)	<input type="checkbox"/> Iron-Manganese Masses (F12) (LRR N, MLRA 136)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Umbric Surface (F13) (MLRA 136, 122)		
<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> Piedmont Floodplain Soils (F19) (MLRA 148)		
<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (F21) (MLRA 127, 147)		

Restrictive Layer (if observed):
 Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: The depleted matrix begins within 10" of the soil surface.

WETLAND RATING WORKSHEET Fourth Version

Wetland A

Project Name Fairview Rd Extension U-587 Nearest Road Cardigan Way
 County Iredell Wetland area <0.1 acres Wetland width 15 feet
 Name of evaluator H. Smith Date 3-10-16

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 40%
 - agriculture, urban/suburban 30%
 - impervious surface 30%

Soil series: Pacolet

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

Dominant vegetation

- (1) Ligustrum sinense
- (2) _____
- (3) _____

Hydraulic factors

- steep topography
- ditched or channelized
- total 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

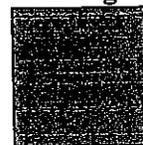
Wetland type (select one)*

- | | |
|---|---|
| <input type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input checked="" type="checkbox"/> Other: <u>Floodplain Pool</u> |

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>
A	Bank/Shoreline stabilization	<u>2</u>	x 4.00 =	<u>8</u>
T	Pollutant removal	<u>2</u>	** x 5.00 =	<u>10</u>
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>
N	Aquatic life value	<u>4</u>	x 4.00 =	<u>16</u>
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>

Wetland rating



42

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

WETLAND RATING WORKSHEET Fourth Version

Wetland B

Project Name Fairview Rd Extension V-5817 Nearest Road Cardigan Way
 County Irredell Wetland area 40.1 acres Wetland width 30 feet
 Name of evaluator H. Smith Date 3-10-16

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 40%
 - agriculture, urban/suburban 30%
 - impervious surface 30%

Soil series: Pacolet

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

Dominant vegetation

- (1) Acer rubrum
- (2) Ligustrum sinense
- (3) _____

Hydraulic factors

- steep topography
- ditched or channelized
- total 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input checked="" type="checkbox"/> Other: <u>Floodplain pool</u> |

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>2</u>	x 4.00 =	<u>8</u>	
T	Pollutant removal	<u>2</u>	** x 5.00 =	<u>10</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>4</u>	x 4.00 =	<u>16</u>	
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>	
** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within 1/2 mile upstream, upslope, or radius					

WETLAND RATING WORKSHEET Fourth Version

Wetland C

Project Name Fairview Rd. Extension U-5817 Nearest Road Cardigan Way
 County Iredell Wetland area 40.1 acres Wetland width 30 feet
 Name of evaluator H. Smith Date 3-10-16

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 40%
 - agriculture, urban/suburban 30%
 - impervious surface 30%

Soil series: Pacolet

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

Dominant vegetation

- (1) Acer rubrum
- (2) Ligustrum sinense
- (3) _____

Hydraulic factors

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

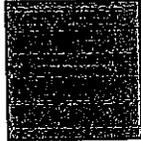
Flooding and wetness

- 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input checked="" type="checkbox"/> Other: <u>Floodplain pool</u> |

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>2</u>	x 4.00 =	<u>8</u>	
T	Pollutant removal	<u>2</u>	** x 5.00 =	<u>10</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>4</u>	x 4.00 =	<u>16</u>	
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>	
** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within 1/2 mile upstream, upslope, or radius					42

WETLAND RATING WORKSHEET Fourth Version

Wetland D

Project Name Fairview Rd Extension U-5817 Nearest Road Cardigan Way
 County Iredell Wetland area 0.1 acres Wetland width 125 feet
 Name of evaluator H. Smith Date 3-10-16

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 40%
 - agriculture, urban/suburban 30%
 - impervious surface 30%

Soil series: Pacolet

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

Dominant vegetation

- (1) Typha latifolia
- (2) _____
- (3) _____

Hydraulic factors

- steep topography
- ditched or channelized
- total 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input type="checkbox"/> Headwater forest | <input checked="" type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input type="checkbox"/> Other: _____ |

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

R	Water storage	<u>3</u>	x 4.00 =	<u>12</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>5</u>	x 4.00 =	<u>20</u>	
T	Pollutant removal	<u>3</u> **	x 5.00 =	<u>15</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>5</u>	x 4.00 =	<u>20</u>	
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>	
** Add 1 point if in sensitive watershed and >10% nonpoint source disturbance within 1/2 mile upstream, upslope, or radius					

WETLAND RATING WORKSHEET Fourth Version

Wetland E

Project Name Fairview Rd Extension U-587 Nearest Road Pauls Ln
 County Iredell Wetland area <0.1 acres Wetland width 40 feet
 Name of evaluator H. Smith Date 3-10-16

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 40%
 - agriculture, urban/suburban 45%
 - impervious surface 15%

Soil series: Pacolet

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

Dominant vegetation

- (1) Acer rubrum
- (2) Asimina triloba
- (3) _____

Hydraulic factors

- steep topography
- ditched or channelized
- total 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input checked="" type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input type="checkbox"/> Other: _____ |

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

R	Water storage	<u>2</u>	x 4.00 =	<u>8</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>2</u>	x 4.00 =	<u>8</u>	
T	Pollutant removal	<u>1</u> **	x 5.00 =	<u>5</u>	
I	Wildlife habitat	<u>2</u>	x 2.00 =	<u>4</u>	
N	Aquatic life value	<u>4</u>	x 4.00 =	<u>16</u>	
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>	

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

WETLAND RATING WORKSHEET Fourth Version

Wetland F

Project Name Fairview Rd Extension U-5817 Nearest Road Fairview
 County Iredell Wetland area 6.1 acres Wetland width 10 feet
 Name of evaluator H. Smith Date 3-10-16

Wetland location
 on pond or lake
 on perennial stream
 on intermittent stream
 within interstream divide
 other: hillslope

Adjacent land use
 (within 1/2 mile upstream, upslope, or radius)
 forested/natural vegetation 35%
 agriculture, urban/suburban 30%
 impervious surface 35%

Soil series: Pacolet
 predominantly organic - humus, muck, or peat
 predominantly mineral - non-sandy
 predominantly sandy

Dominant vegetation
 (1) Juncus effusus
 (2) Festuca sp.
 (3) _____

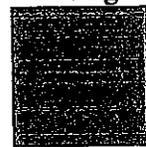
Hydraulic factors
 steep topography
 ditched or channelized
 total wetland width \geq 100 feet

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)*
 Bottomland hardwood forest
 Headwater forest
 Swamp forest
 Wet flat
 Pocosin
 Bog forest

Pine savanna
 Freshwater marsh
 Bog/fen
 Ephemeral wetland
 Carolina bay
 Other: _____

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>0</u>	x 4.00 =	<u>0</u>	
T	Pollutant removal	<u>1</u>	** x 5.00 =	<u>5</u>	
I	Wildlife habitat	<u>0</u>	x 2.00 =	<u>0</u>	
N	Aquatic life value	<u>0</u>	x 4.00 =	<u>0</u>	
G	Recreation/Education	<u>0</u>	x 1.00 =	<u>0</u>	

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

WETLAND RATING WORKSHEET Fourth Version

Wetland G

Project Name Fairview Rd Extension U-5817 Nearest Road Fairview Rd
 County Iredell Wetland area 40.1 acres Wetland width 30 feet
 Name of evaluator H. Smith Date 3-11-16

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 5%
 - agriculture, urban/suburban 55%
 - impervious surface 40%

Soil series: Warne

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

Dominant vegetation

- (1) Liquidambar styraciflua
- (2) Ligustrum sinense
- (3) Ulmus alata

Hydraulic factors

- steep topography
- ditched or channelized
- total 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input checked="" type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | <input type="checkbox"/> Other: _____ |

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>0</u>	x 4.00 =	<u>0</u>	
T	Pollutant removal	<u>1</u>	** x 5.00 =	<u>5</u>	
I	Wildlife habitat	<u>0</u>	x 2.00 =	<u>0</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 source disturbance within 1/2 mile upstream, upslope, or radius					

WETLAND RATING WORKSHEET Fourth Version

Wetland H

Project Name Fairview Rd Extension V-5817 Nearest Road Fairview Rd
 County Tredell Wetland area 20.1 acres Wetland width 15 feet
 Name of evaluator H. Smith Date 3-11-16

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 5 %
 agriculture, urban/suburban 35 %
 impervious surface 40 %

Soil series: Warne
 predominantly organic - humus, muck, or peat
 predominantly mineral - non-sandy
 predominantly sandy

Dominant vegetation
 (1) Acer rubrum
 (2) Ligustrum sinense
 (3) Liquidambar styraciflua

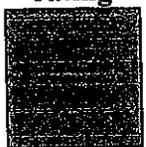
Hydraulic factors
 steep topography
 ditched or channelized
 total wetland width ≥ 100 feet

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)*
 Bottomland hardwood forest
 Headwater forest
 Swamp forest
 Wet flat
 Pocosin
 Bog forest

Pine savanna
 Freshwater marsh
 Bog/fen
 Ephemeral wetland
 Carolina bay
 Other: _____

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>0</u>	x 4.00 =	<u>0</u>	
T	Pollutant removal	<u>1</u>	** x 5.00 =	<u>5</u>	
I	Wildlife habitat	<u>0</u>	x 2.00 =	<u>0</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 source disturbance within 1/2 mile upstream, upslope, or radius

WETLAND RATING WORKSHEET Fourth Version

Wetland I

Project Name Farview Rd Extension V-5817 Nearest Road Farview Rd
 County Iredell Wetland area <0.1 acres Wetland width 15 feet
 Name of evaluator H. Smith Date 3-11-16

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 5%
 - agriculture, urban/suburban 55%
 - impervious surface 40%

Soil series: Warne

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

Dominant vegetation

- (1) Ligustrum sinese
- (2) Smilax rotundifolia
- (3) _____

Hydraulic factors

- steep topography
- ditched or channelized
- total 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 type="checkbox"/> Bottomland hardwood forest | <input type="checkbox"/> Pine savanna |
| <input checked="" type="checkbox"/> Headwater forest | <input type="checkbox"/> Freshwater marsh |
| <input type="checkbox"/> Swamp forest | <input type="checkbox"/> Bog/fen |
| <input type="checkbox"/> Wet flat | <input type="checkbox"/> Ephemeral wetland |
| <input type="checkbox"/> Pocosin | <input type="checkbox"/> Carolina bay |
| <input type="checkbox"/> Bog forest | Other: _____ |

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

R	Water storage	<u>1</u>	x 4.00 =	<u>4</u>	Wetland rating 
A	Bank/Shoreline stabilization	<u>0</u>	x 4.00 =	<u>0</u>	
T	Pollutant removal	<u>1</u> **	x 5.00 =	<u>5</u>	
I	Wildlife habitat	<u>0</u>	x 2.00 =	<u>0</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 source disturbance within 1/2 mile upstream, upslope, or radius

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland A U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Floodplain Pool	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.552459, -80.86134	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | | |
|------------------------------------|------------------------------------|----|--|
| | GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | | |
|------------------------------------|------------------------------------|-----|--|
| | Surf | Sub | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input type="radio"/> B | | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | | |
|-----|------------------------------------|------------------------------------|---|
| | AA | WT | |
| 3a. | <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | <input type="radio"/> D | <input type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. | <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| | <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| | <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input checked="" type="radio"/> F | <input checked="" type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density shrub layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density herb layer
	<input type="radio"/> C	<input type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland A U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Floodplain Pool Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	HIGH

Overall Wetland Rating **HIGH**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland B U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Floodplain Pool	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.552429, -80.861476	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|------------------------------------|------------------------------------|---|
| AA | WT | |
| 3a. <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> D | <input type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input checked="" type="radio"/> F | <input checked="" type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation for all marshes only. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
- B < 25% coverage of vegetation

17c. Check a box in each column for each stratum. Evaluate this portion of the metric for non-marsh wetlands. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density shrub layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density herb layer
	<input type="radio"/> C	<input type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
- B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
- B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
- C Majority of canopy trees are < 6 inches DBH or no trees.

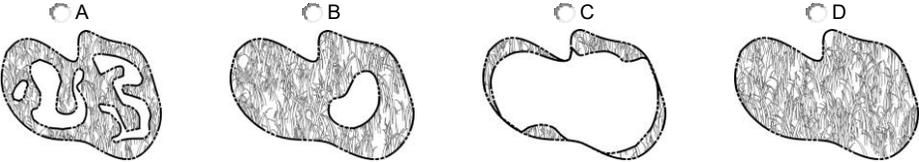
20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
- B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
- B Overbank flow is severely altered in the assessment area.
- C Overland flow is severely altered in the assessment area.
- D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland B U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Floodplain Pool Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	HIGH

Overall Wetland Rating **HIGH**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland C U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Floodplain Pool	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.552583, -80.861965	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|------------------------------------|------------------------------------|---|
| AA | WT | |
| 3a. <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> D | <input type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

- Yes No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.

- A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

- Yes No

7e. Is tributary or other open water sheltered or exposed?

- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input checked="" type="radio"/> F | <input checked="" type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density shrub layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density herb layer
	<input type="radio"/> C	<input type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland C U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Floodplain Pool Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	HIGH

Overall Wetland Rating **HIGH**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland D U-5817 Fairview Rd. Extension		Date 2016-3-10
Wetland Type	Headwater Forest	Assessor Name/Organization H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit 03050101
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.552684, -80.862323

Evidence of stressors affecting the assessment area (may not be within the assessment area)
Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

Blackwater
 Brownwater
 Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | | |
|---------------------------------------|----------------------------|----------------------------|--|
| | GS | VS | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | Not severely altered |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | | |
|---------------------------------------|----------------------------|----------------------------|--|
| | Surf | Sub | |
| <input checked="" type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input checked="" type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | | |
|-----|---------------------------------------|---------------------------------------|---|
| | AA | WT | |
| 3a. | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | <input type="checkbox"/> C | <input type="checkbox"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | <input type="checkbox"/> D | <input type="checkbox"/> D | Depressions able to pond water < 3 inches deep |
| 3b. | <input type="checkbox"/> A | <input type="checkbox"/> A | Evidence that maximum depth of inundation is greater than 2 feet |
| | <input type="checkbox"/> B | <input type="checkbox"/> B | Evidence that maximum depth of inundation is between 1 and 2 feet |
| | <input checked="" type="checkbox"/> C | <input type="checkbox"/> C | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|-------------------------|-------------------------|---|
| <input type="radio"/> A | <input type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
- B Evidence of saturation, without evidence of inundation
- C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
- B Sediment deposition is excessive, but not overwhelming the wetland.
- C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|-------------------------|-------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input type="radio"/> J | <input type="radio"/> J | <input type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
- B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous metric naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|-------------------------|-------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.

Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
- B No artificial edge within 150 feet in four (4) to seven (7) directions
- C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
- B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
- C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
- B Vegetation diversity is low or has > 10% to 50% cover of exotics.
- C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="checkbox"/> A	<input type="checkbox"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="checkbox"/> B	<input type="checkbox"/> B	Canopy present, but opened more than natural gaps
	<input type="checkbox"/> C	<input type="checkbox"/> C	Canopy sparse or absent
Mid-Story	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense mid-story/sapling layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density mid-story/sapling layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense shrub layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density shrub layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Shrub layer sparse or absent
Herb	<input type="checkbox"/> A	<input type="checkbox"/> A	Dense herb layer
	<input type="checkbox"/> B	<input type="checkbox"/> B	Moderate density herb layer
	<input type="checkbox"/> C	<input type="checkbox"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland D U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
	Sub-Surface Storage and Retention	Condition	LOW
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland E U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Headwater Forest	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.549421, -80.861907	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | | |
|------------------------------------|------------------------------------|----|--|
| | GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | | |
|------------------------------------|------------------------------------|-----|--|
| | Surf | Sub | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input type="radio"/> B | | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | | |
|-----|------------------------------------|------------------------------------|---|
| | AA | WT | |
| 3a. | <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | <input type="radio"/> B | <input type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | <input type="radio"/> D | <input type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. | <input checked="" type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| | <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| | <input type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

7a. Is assessment area within 50 feet of a tributary or other open water?

- Yes No If Yes, continue to 7b. If No, skip to Metric 8.

Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.

- A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.

- ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?

- Yes No

7e. Is tributary or other open water sheltered or exposed?

- Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.

Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum.** Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density shrub layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density herb layer
	<input type="radio"/> C	<input type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

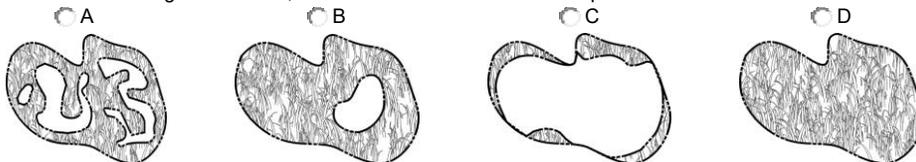
20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland E U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	MEDIUM
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	HIGH
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland F U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Headwater Forest	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.547476, -80.857087	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input checked="" type="radio"/> A | <input type="radio"/> A | Not severely altered |
| <input type="radio"/> B | <input checked="" type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|------------------------------------|------------------------------------|---|
| AA | WT | |
| 3a. <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> D | <input checked="" type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | From 30 to < 40 feet |
| <input type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density mid-story/sapling layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density shrub layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Shrub layer sparse or absent
Herb	<input checked="" type="radio"/> A	<input checked="" type="radio"/> A	Dense herb layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density herb layer
	<input type="radio"/> C	<input type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

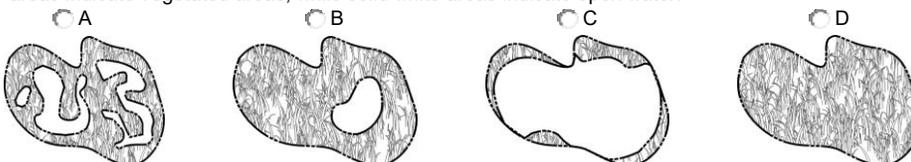
20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland F U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	LOW
		Sub-Surface Storage and Retention	HIGH
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	LOW
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
		Landscape Patch Structure	LOW
		Vegetation Composition	LOW

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating **LOW**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland G U-5817 Fairview Rd. Extension	Date	2016-3-10
Wetland Type	Headwater Forest	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.547508, -80.85407	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input type="radio"/> A | <input type="radio"/> A | Not severely altered |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input type="radio"/> A | <input type="radio"/> A | Water storage capacity and duration are not altered. |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | | |
|-----|------------------------------------|------------------------------------|---|
| | AA | WT | |
| 3a. | <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| | <input type="radio"/> B | <input type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| | <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| | <input checked="" type="radio"/> D | <input checked="" type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. | <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| | <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| | <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | | | |
|------------------------------------|------------------------------------|---|
| Surf | Sub | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input checked="" type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input checked="" type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | | | | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| WS | 5M | 2M | |
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | | | |
|------------------------------------|------------------------------------|-----------------------|
| WT | WC | |
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | From 30 to < 40 feet |
| <input type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.

Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input checked="" type="radio"/> A	<input checked="" type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input type="radio"/> C	<input type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density mid-story/sapling layer
	<input type="radio"/> C	<input type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density shrub layer
	<input type="radio"/> C	<input type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density herb layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland G U-5817 Fairview Rd. Extension Date 2016-3-10
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) YES
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) YES
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	MEDIUM
	Sub-Surface Storage and Retention	Condition	HIGH
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating **MEDIUM**

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland H U-5817 Fairview Rd. Extension	Date	2016-3-11
Wetland Type	Headwater Forest	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.547363, -80.854399	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="radio"/> A | <input type="radio"/> A | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input checked="" type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|------------------------------------|------------------------------------|---|
| AA | WT | |
| 3a. <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> D | <input type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input checked="" type="radio"/> F | <input checked="" type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts. Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input checked="" type="radio"/> A	<input checked="" type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input type="radio"/> C	<input type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density mid-story/sapling layer
	<input type="radio"/> C	<input type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density shrub layer
	<input type="radio"/> C	<input type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density herb layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

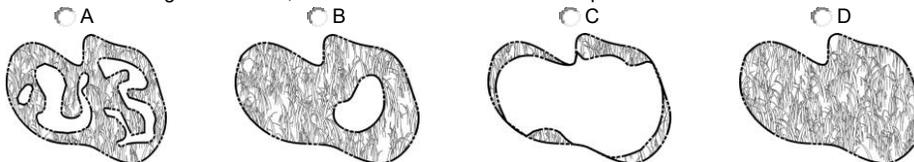
20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

**22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)**

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland H U-5817 Fairview Rd. Extension Date 2016-3-11
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	HIGH
Water Quality	Pathogen Change	Condition	LOW
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating LOW

NC WAM WETLAND ASSESSMENT FORM
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name	Wetland I U-5817 Fairview Rd. Extension	Date	2016-3-11
Wetland Type	Headwater Forest	Assessor Name/Organization	H. Smith Ecol. Eng.
Level III Ecoregion	Piedmont	Nearest Named Water Body	Lake Norman/Catawba River
River Basin	Catawba	USGS 8-Digit Catalogue Unit	03050101
<input type="radio"/> Yes <input checked="" type="radio"/> No Precipitation within 48 hrs?		Latitude/Longitude (deci-degrees) 35.547132, -80.854476	

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, approximately within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? Yes No

Regulatory Considerations (select all that apply to the assessment area)

- Anadromous fish
- Federally protected species or State endangered or threatened species
- NCDWQ riparian buffer rule in effect
- Abuts a Primary Nursery Area (PNA)
- Publicly owned property
- N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
- Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
- Designated NCNHP reference community
- Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

- Blackwater
- Brownwater
- Tidal (if tidal, check one of the following boxes) Lunar Wind Both

Is the assessment area on a coastal island? Yes No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? Yes No

Does the assessment area experience overbank flooding during normal rainfall conditions? Yes No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence of an effect.

- | | | |
|------------------------------------|------------------------------------|--|
| GS | VS | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Not severely altered |
| <input type="radio"/> B | <input type="radio"/> B | Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration) |

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. Refer to the current NRCS lateral effect of ditching guidance for North Carolina hydric soils (see USACE Wilmington District website) for the zone of influence of ditches in hydric soils. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and ditch sub-surface water. Consider tidal flooding regime, if applicable.

- | | | |
|------------------------------------|------------------------------------|--|
| Surf | Sub | |
| <input checked="" type="radio"/> A | <input type="radio"/> A | Water storage capacity and duration are not altered. |
| <input type="radio"/> B | <input checked="" type="radio"/> B | Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation). |
| <input type="radio"/> C | <input type="radio"/> C | Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines). |

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (answer for non-marsh wetlands only)

Check a box in each column for each group below. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

- | | | |
|------------------------------------|------------------------------------|---|
| AA | WT | |
| 3a. <input type="radio"/> A | <input type="radio"/> A | Majority of wetland with depressions able to pond water > 1 foot deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of wetland with depressions able to pond water 6 inches to 1 foot deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of wetland with depressions able to pond water 3 to 6 inches deep |
| <input checked="" type="radio"/> D | <input checked="" type="radio"/> D | Depressions able to pond water < 3 inches deep |
| 3b. <input type="radio"/> A | | Evidence that maximum depth of inundation is greater than 2 feet |
| <input type="radio"/> B | | Evidence that maximum depth of inundation is between 1 and 2 feet |
| <input checked="" type="radio"/> C | | Evidence that maximum depth of inundation is less than 1 foot |

4. Soil Texture/Structure – assessment area condition metric

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

- 4a. A Sandy soil
 B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
 C Loamy or clayey soils not exhibiting redoximorphic features
 D Loamy or clayey gleyed soil
 E Histosol or histic epipedon
- 4b. A Soil ribbon < 1 inch
 B Soil ribbon ≥ 1 inch
- 4c. A No peat or muck presence
 B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

- | Surf | Sub | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input type="radio"/> B | <input type="radio"/> B | Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area |
| <input type="radio"/> C | <input type="radio"/> C | Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor) |

6. Land Use – opportunity metric

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M). Effective riparian buffers are considered to be 50 feet wide in the Coastal Plain and Piedmont ecoregions and 30 feet wide in the Blue Ridge Mountains ecoregion.

- | WS | 5M | 2M | |
|---------------------------------------|---------------------------------------|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | <input checked="" type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input type="checkbox"/> B | <input type="checkbox"/> B | <input type="checkbox"/> B | < 10% impervious surfaces |
| <input type="checkbox"/> C | <input type="checkbox"/> C | <input type="checkbox"/> C | Confined animal operations (or other local, concentrated source of pollutants) |
| <input type="checkbox"/> D | <input type="checkbox"/> D | <input type="checkbox"/> D | ≥ 20% coverage of pasture |
| <input type="checkbox"/> E | <input type="checkbox"/> E | <input type="checkbox"/> E | ≥ 20% coverage of agricultural land (regularly plowed land) |
| <input type="checkbox"/> F | <input type="checkbox"/> F | <input type="checkbox"/> F | ≥ 20% coverage of maintained grass/herb |
| <input type="checkbox"/> G | <input type="checkbox"/> G | <input type="checkbox"/> G | ≥ 20% coverage of clear-cut land |
| <input type="checkbox"/> H | <input type="checkbox"/> H | <input type="checkbox"/> H | Little or no opportunity to improve water quality. Lack of opportunity may result from hydrologic alterations that prevent drainage or overbank flow from affecting the assessment area. |

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric

- 7a. Is assessment area within 50 feet of a tributary or other open water?
 Yes No If Yes, continue to 7b. If No, skip to Metric 8.
 Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of the wetland. Record a note if a portion of the buffer has been removed or disturbed.
- 7b. How much of the first 50 feet from the bank is wetland? Descriptor E should be selected if ditches effectively bypass the buffer.
 A ≥ 50 feet
 B From 30 to < 50 feet
 C From 15 to < 30 feet
 D From 5 to < 15 feet
 E < 5 feet or buffer bypassed by ditches
- 7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
 ≤ 15-foot wide > 15-foot wide Other open water (no tributary present)
- 7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
 Yes No
- 7e. Is tributary or other open water sheltered or exposed?
 Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
 Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex metric (evaluate for riparian wetlands only)

Check a box in each column. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment areas (WC). See User Manual for WT and WC boundaries.

- | WT | WC | |
|------------------------------------|------------------------------------|-----------------------|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 100 feet |
| <input type="radio"/> B | <input type="radio"/> B | From 80 to < 100 feet |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 80 feet |
| <input type="radio"/> D | <input type="radio"/> D | From 40 to < 50 feet |
| <input type="radio"/> E | <input type="radio"/> E | From 30 to < 40 feet |
| <input checked="" type="radio"/> F | <input checked="" type="radio"/> F | From 15 to < 30 feet |
| <input type="radio"/> G | <input type="radio"/> G | From 5 to < 15 feet |
| <input type="radio"/> H | <input type="radio"/> H | < 5 feet |

9. Inundation Duration – assessment area condition metric

Answer for assessment area dominant landform.

- A Evidence of short-duration inundation (< 7 consecutive days)
 B Evidence of saturation, without evidence of inundation
 C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric

Consider recent deposition only (no plant growth since deposition).

- A Sediment deposition is not excessive, but at approximately natural levels.
 B Sediment deposition is excessive, but not overwhelming the wetland.
 C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

- | WT | WC | FW (if applicable) |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | <input type="radio"/> A ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D From 25 to < 50 acres |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E From 10 to < 25 acres |
| <input type="radio"/> F | <input type="radio"/> F | <input type="radio"/> F From 5 to < 10 acres |
| <input type="radio"/> G | <input type="radio"/> G | <input type="radio"/> G From 1 to < 5 acres |
| <input type="radio"/> H | <input type="radio"/> H | <input type="radio"/> H From 0.5 to < 1 acre |
| <input type="radio"/> I | <input type="radio"/> I | <input type="radio"/> I From 0.1 to < 0.5 acre |
| <input checked="" type="radio"/> J | <input checked="" type="radio"/> J | <input checked="" type="radio"/> J From 0.01 to < 0.1 acre |
| <input type="radio"/> K | <input type="radio"/> K | <input type="radio"/> K < 0.01 acre <u>or</u> assessment area is clear-cut |

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

- A Pocosin is the full extent (≥ 90%) of its natural landscape size.
 B Pocosin is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. Check appropriate box(es) (a box may be checked in each column). Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, fields (pasture open and agriculture), or water > 300 feet wide.

Well Loosely

- | | | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | ≥ 500 acres |
| <input type="radio"/> B | <input type="radio"/> B | From 100 to < 500 acres |
| <input type="radio"/> C | <input type="radio"/> C | From 50 to < 100 acres |
| <input type="radio"/> D | <input type="radio"/> D | From 10 to < 50 acres |
| <input checked="" type="radio"/> E | <input checked="" type="radio"/> E | < 10 acres |
| <input type="radio"/> F | <input type="radio"/> F | Wetland type has a poor or no connection to other natural habitats |

13b. Evaluate for marshes only.

- Yes No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors and clear-cuts.

Consider the eight main points of the compass.

- A No artificial edge within 150 feet in all directions
 B No artificial edge within 150 feet in four (4) to seven (7) directions
 C An artificial edge occurs within 150 feet in more than four (4) directions or assessment area is clear-cut

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

- A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
 B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
 C Vegetation severely altered from reference in composition. Expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species). Exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

- A Vegetation diversity is high and is composed primarily of native species (<10% cover of exotics).
 B Vegetation diversity is low or has > 10% to 50% cover of exotics.
 C Vegetation is dominated by exotic species (>50% cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?

- Yes No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.

- A ≥ 25% coverage of vegetation
 B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	<input checked="" type="radio"/> A	<input checked="" type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input type="radio"/> B	<input type="radio"/> B	Canopy present, but opened more than natural gaps
	<input type="radio"/> C	<input type="radio"/> C	Canopy sparse or absent
Mid-Story	<input type="radio"/> A	<input type="radio"/> A	Dense mid-story/sapling layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density mid-story/sapling layer
	<input type="radio"/> C	<input type="radio"/> C	Mid-story/sapling layer sparse or absent
Shrub	<input type="radio"/> A	<input type="radio"/> A	Dense shrub layer
	<input checked="" type="radio"/> B	<input checked="" type="radio"/> B	Moderate density shrub layer
	<input type="radio"/> C	<input type="radio"/> C	Shrub layer sparse or absent
Herb	<input type="radio"/> A	<input type="radio"/> A	Dense herb layer
	<input type="radio"/> B	<input type="radio"/> B	Moderate density herb layer
	<input checked="" type="radio"/> C	<input checked="" type="radio"/> C	Herb layer sparse or absent

18. Snags – wetland type condition metric

- A Large snags (more than one) are visible (> 12-inches DBH, or large relative to species present and landscape stability).
 B Not A

19. Diameter Class Distribution – wetland type condition metric

- A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
 B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12-inch DBH.
 C Majority of canopy trees are < 6 inches DBH or no trees.

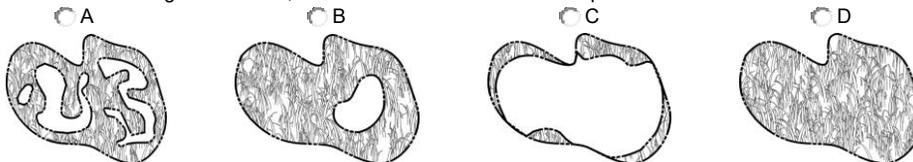
20. Large Woody Debris – wetland type condition metric

Include both natural debris and man-placed natural debris.

- A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
 B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersions between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision.

- A Overbank and overland flow are not severely altered in the assessment area.
 B Overbank flow is severely altered in the assessment area.
 C Overland flow is severely altered in the assessment area.
 D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 4.1
Rating Calculator Version 4.1

Wetland Site Name Wetland I U-5817 Fairview Rd. Extension Date 2016-3-11
Wetland Type Headwater Forest Assessor Name/Organization H. Smith Ecol. Eng.

Notes on Field Assessment Form (Y/N) NO
Presence of regulatory considerations (Y/N) NO
Wetland is intensively managed (Y/N) NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N) NO
Assessment area is substantially altered by beaver (Y/N) NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N) YES
Assessment area is on a coastal island (Y/N) NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	HIGH
	Sub-Surface Storage and Retention	Condition	HIGH
Water Quality	Pathogen Change	Condition	HIGH
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Particulate Change	Condition	HIGH
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	HIGH

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	HIGH
	Condition/Opportunity	HIGH
	Opportunity Presence? (Y/N)	YES
Habitat	Condition	LOW

Overall Wetland Rating **HIGH**



STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT U-5817 2. Evaluator's name: H. Smith
3. Date of evaluation: 3-10-16 4. Time of evaluation: 10AM
5. Name of stream: Stream A 6. River basin: Catawba
7. Approximate drainage area: < 0.1m² 8. Stream order: 1st
9. Length of reach evaluated: 50 10. County: Tredell
11. Site coordinates (if known): prefer in decimal degrees. 12. Subdivision name (if any): N/A
- Latitude (ex. 34.872312): 35.552459 Longitude (ex. -77.556611): -80.86134
- 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):
Near Cardigan Way
14. Proposed channel work (if any): N/A
15. Recent weather conditions: dry & sunny
16. Site conditions at time of visit: dry & sunny
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 IV (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: 20% Residential 30% Commercial 0% Industrial 40% Agricultural
40% Forested 0% Cleared / Logged 0% Other (_____)
22. Bankfull width: 3.0 23. Bank height (from bed to top of bank): 1'
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): 69 Comments: _____

Evaluator's Signature [Signature] Date 3-10-16

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

U-5817

	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	3
	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	4
	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	3
	10 Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
	11 Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA	0-4	0-5	2
STABILITY	12 Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13 Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14 Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	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	4
	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	5
	19 Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA	0-4	0-4	3
BIOLOGY	20 Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21 Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22 Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23 Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
Total Points Possible		100	100	100	
TOTAL SCORE (also enter on first page)					69

* These characteristics are not assessed in coastal streams.



STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT U-5817 2. Evaluator's name: H. Smith
3. Date of evaluation: 3-10-16 4. Time of evaluation: 11 AM
5. Name of stream: Stream B 6. River basin: Catawba
7. Approximate drainage area: 40.1 mi² 8. Stream order: 1st
9. Length of reach evaluated: 50' 10. County: Iredell
11. Site coordinates (if known): prefer in decimal degrees. 12. Subdivision name (if any): N/A
- Latitude (ex. 34.872312): 35.548896 Longitude (ex. -77.556611): -80.862136
- 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):
near Pauls Ln.
14. Proposed channel work (if any): N/A
15. Recent weather conditions: dry & sunny
16. Site conditions at time of visit: dry & sunny
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 III (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: 20% Residential 30% Commercial _____% Industrial 40% Agricultural
40% Forested _____% Cleared / Logged _____% Other (_____)
22. Bankfull width: 4.0 23. Bank height (from bed to top of bank): 1.0
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 H. Smith Date 3-10-16

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STREAM QUALITY ASSESSMENT WORKSHEET

V-5817

	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	3
	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	4
	6. Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	2
	7. Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8. Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9. Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	3
	10. Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	3
STABILITY	11. Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA	0-4	0-5	3
	12. Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	4
	13. Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	5
	14. Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-5	0-4	0-5	2
	15. Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	4
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	4
	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	5
	19. Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA	0-4	0-4	3
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	0
	22. Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23. Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
Total Points Possible		100	100	100	
TOTAL SCORE (also enter on first page)					68

* These characteristics are not assessed in coastal streams.

**STREAM QUALITY ASSESSMENT WORKSHEET**

Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT V-587 2. Evaluator's name: H. Smith
3. Date of evaluation: 3-10-16 4. Time of evaluation: 11:30 AM
5. Name of stream: Stream C 6. River basin: Catawba
7. Approximate drainage area: < 0.1 sq. mi 8. Stream order: 1st
9. Length of reach evaluated: 20' 10. County: Iredell
11. Site coordinates (if known): prefer in decimal degrees. 12. Subdivision name (if any): N/A
- Latitude (ex. 34.872312): 35.548977 Longitude (ex. -77.556611): -80.862173
- 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):
near Pauls Ln.
14. Proposed channel work (if any): N/A
15. Recent weather conditions: dry & sunny
16. Site conditions at time of visit: dry & sunny
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 IV (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: 20% Residential 30% Commercial 10% Industrial _____% Agricultural
40% Forested _____% Cleared / Logged _____% Other (_____)
22. Bankfull width: 3.0 23. Bank height (from bed to top of bank): 0.75'
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): 64 Comments: _____

Evaluator's Signature [Signature] Date 3-10-16

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STREAM QUALITY ASSESSMENT WORKSHEET

0-5817

	CHARACTERISTICS	FCOREGION 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	3
	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	4
	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	4
	6. Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7. Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8. Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9. Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10. Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
STABILITY	11. Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA	0-4	0-5	3
	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	5
	14. Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	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	3
	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	5
	19. Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA	0-4	0-4	3
BIOLOGY	20. Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21. Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22. Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23. Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
Total Points Possible		100	100	100	
TOTAL SCORE (also enter on first page)					64

* These characteristics are not assessed in coastal streams.



STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT 80-5817
2. Evaluator's name: H. Smith
3. Date of evaluation: 3-10-16
4. Time of evaluation: 2PM
5. Name of stream: Stream D
6. River basin: Catawba
7. Approximate drainage area: 40.1 mi²
8. Stream order: 1st
9. Length of reach evaluated: 20'
10. County: Fredell
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any): N/A
- Latitude (ex. 34.872312): 35.548486 Longitude (ex. -77.556611): -80.861907
- 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):
Pauls Ln.
14. Proposed channel work (if any): N/A
15. Recent weather conditions: sunny & dry
16. Site conditions at time of visit: sunny & dry
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 IV (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: 20% Residential 30% Commercial 10% Industrial _____% Agricultural
40% Forested _____% Cleared / Logged _____% Other (_____)
22. Bankfull width: _____
23. Bank height (from bed to top of bank): _____
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): 64 Comments: _____

Evaluator's Signature [Signature] Date 3-10-16

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STREAM QUALITY ASSESSMENT WORKSHEET

U-5817

	CHARACTERISTICS	FCOREGION 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	3
	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	4
	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	4
	6. Presence of adjacent floodplain (no floodplain = 0; extensive floodplain = max points)	0-4	0-4	0-2	1
	7. Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	2
	8. Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9. Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10. Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	4
STABILITY	11. Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA	0-4	0-5	3
	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	5
	14. Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	2
	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	3
	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	5
	19. Substrate embeddedness (deeply embedded = 0; loose structure = max)	NA	0-4	0-4	3
BIOLOGY	20. Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21. Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22. Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23. Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	3
Total Points Possible		100	100	100	
TOTAL SCORE (also enter on first page)					64

* These characteristics are not assessed in coastal streams.



STREAM QUALITY ASSESSMENT WORKSHEET



Provide the following information for the stream reach under assessment:

1. Applicant's name: NCDOT U-5817
2. Evaluator's name: H. Smith
3. Date of evaluation: 3-11-16
4. Time of evaluation: 9AM
5. Name of stream: Stream E
6. River basin: Catawba
7. Approximate drainage area: 40.1 mi²
8. Stream order: 1st
9. Length of reach evaluated: 50'
10. County: Iredell
11. Site coordinates (if known): prefer in decimal degrees.
12. Subdivision name (if any): _____
- Latitude (ex. 34.872312): 35.547285
- Longitude (ex. -77.556611): -80.854202
- 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):
Fairview Rd
14. Proposed channel work (if any): N/A
15. Recent weather conditions: dry & sunny
16. Site conditions at time of visit: dry & sunny
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 IV (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: 25% Residential 70% Commercial % Industrial % Agricultural
5% Forested % Cleared / Logged % Other (_____)
22. Bankfull width: 4.0
23. Bank height (from bed to top of bank): 1.0
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): 37 Comments: directly upstream BMP for hospital, channel severely incised

Evaluator's Signature _____

Date 3-11-16

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

U-5817

	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	1
	3 Riparian zone (no buffer = 0; contiguous wide buffer = max points)	0-6	0-4	0-5	2
	4 Evidence of nutrient or chemical discharges (extensive discharges = 0; no discharges = max points)	0-5	0-4	0-4	2
	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	0
	7 Entrenchment / floodplain access (deeply entrenched = 0; frequent flooding = max points)	0-5	0-4	0-2	0
	8 Presence of adjacent wetlands (no wetlands = 0; large adjacent wetlands = max points)	0-6	0-4	0-2	0
	9 Channel sinuosity (extensive channelization = 0; natural meander = max points)	0-5	0-4	0-3	2
	10 Sediment input (extensive deposition = 0; little or no sediment = max points)	0-5	0-4	0-4	2
STABILITY	11 Size & diversity of channel bed substrate (fine, homogenous = 0; large, diverse sizes = max points)	NA*	0-4	0-5	2
	12 Evidence of channel incision or widening (deeply incised = 0; stable bed & banks = max points)	0-5	0-4	0-5	0
	13 Presence of major bank failures (severe erosion = 0; no erosion, stable banks = max points)	0-5	0-5	0-5	0
	14 Root depth and density on banks (no visible roots = 0; dense roots throughout = max points)	0-3	0-4	0-5	1
	15 Impact by agriculture, livestock, or timber production (substantial impact = 0; no evidence = max points)	0-5	0-4	0-5	2
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	3
	17 Habitat complexity (little or no habitat = 0; frequent, varied habitats = max points)	0-6	0-6	0-6	3
	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	2
BIOLOGY	20 Presence of stream invertebrates (see page 4) (no evidence = 0; common, numerous types = max points)	0-4	0-5	0-5	2
	21 Presence of amphibians (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	22 Presence of fish (no evidence = 0; common, numerous types = max points)	0-4	0-4	0-4	0
	23 Evidence of wildlife use (no evidence = 0; abundant evidence = max points)	0-6	0-5	0-5	2
Total Points Possible		100	100	100	
TOTAL SCORE (also enter on first page)					37

* These characteristics are not assessed in coastal streams.

NC DWQ Stream Identification Form Version 4.11

Date: 3-10-16	Project/Site: V-5817	Latitude: 35.552459
Evaluator: H. Smith	County: Iredell	Longitude: -80.86134
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 23.0	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SA-4 e.g. Quad Name:

A. Geomorphology (Subtotal = 8.0)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 9.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 5.5)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: amphipods

NC DWQ Stream Identification Form Version 4.11

Date: 3-10-16	Project/Site: V-5817	Latitude: 35.548896
Evaluator: H. Smith	County: Iredell	Longitude: -80.862136
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 24.0	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SB-2 e.g. Quad Name:

A. Geomorphology (Subtotal = 9.5)

	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	(1)	2	3
2. Sinuosity of channel along thalweg	0	1	(2)	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	(1)	2	3
4. Particle size of stream substrate	0	(1)	2	3
5. Active/relict floodplain	(0)	1	2	3
6. Depositional bars or benches	0	(1)	2	3
7. Recent alluvial deposits	0	(1)	2	3
8. Headcuts	0	(1)	2	3
9. Grade control	0	(0.5)	1	1.5
10. Natural valley	0	0.5	(1)	1.5
11. Second or greater order channel	No = (0)		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.0)

12. Presence of Baseflow	0	1	(2)	3
13. Iron oxidizing bacteria	0	(1)	2	3
14. Leaf litter	1.5	(1)	0.5	0
15. Sediment on plants or debris	0	(0.5)	1	1.5
16. Organic debris lines or piles	0	(0.5)	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = (3)	

C. Biology (Subtotal = 6.5)

18. Fibrous roots in streambed	3	(2)	1	0
19. Rooted upland plants in streambed	(3)	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	(1)	2	3
21. Aquatic Mollusks	(0)	1	2	3
22. Fish	(0)	0.5	1	1.5
23. Crayfish	(0)	0.5	1	1.5
24. Amphibians	(0)	0.5	1	1.5
25. Algae	0	(0.5)	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = (0)			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: amphipods

NC DWQ Stream Identification Form Version 4.11

Date: 3-10-16	Project/Site: U-5817	Latitude: 35.548977
Evaluator: H. Smith	County: Iredell	Longitude: -80.862173
Total Points: <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i> 21.0	Stream Determination (circle one) Ephemeral Intermittent Perennial	Other SC-3 <i>e.g. Quad Name:</i>

A. Geomorphology (Subtotal = 7.0)	Absent	Weak	Moderate	Strong
1 ^a Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.0)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 6.0)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: <u>H. Smith</u>	Project/Site: <u>V-5817</u>	Latitude: <u>35.548486</u>
Evaluator: <u>3-10-16</u>	County: <u>Iredell</u>	Longitude: <u>80.861907</u>
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ <u>20.0</u>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other <u>SD-3</u> e.g. Quad Name:

A. Geomorphology (Subtotal = <u>5.5</u>)	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	<u>1</u>	2	3
2. Sinuosity of channel along thalweg	0	<u>1</u>	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	<u>0</u>	1	2	3
4. Particle size of stream substrate	0	<u>1</u>	2	3
5. Active/relict floodplain	<u>0</u>	1	2	3
6. Depositional bars or benches	<u>0</u>	1	2	3
7. Recent alluvial deposits	<u>0</u>	1	2	3
8. Headcuts	0	<u>1</u>	2	3
9. Grade control	0	<u>0.5</u>	1	1.5
10. Natural valley	0	0.5	<u>1</u>	1.5
11. Second or greater order channel	No = <u>0</u>		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = <u>7.5</u>)	Absent	Weak	Moderate	Strong
12. Presence of Baseflow	0	1	<u>2</u>	3
13. Iron oxidizing bacteria	0	<u>1</u>	2	3
14. Leaf litter	1.5	1	<u>0.5</u>	0
15. Sediment on plants or debris	0	<u>0.5</u>	1	1.5
16. Organic debris lines or piles	0	<u>0.5</u>	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = <u>3</u>	

C. Biology (Subtotal = <u>7.0</u>)	Absent	Weak	Moderate	Strong
18. Fibrous roots in streambed	3	<u>2</u>	1	0
19. Rooted upland plants in streambed	<u>3</u>	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	<u>1</u>	2	3
21. Aquatic Mollusks	<u>0</u>	1	2	3
22. Fish	<u>0</u>	0.5	1	1.5
23. Crayfish	0	<u>0.5</u>	1	1.5
24. Amphibians	<u>0</u>	0.5	1	1.5
25. Algae	0	<u>0.5</u>	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = <u>0</u>			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch: crayfish burrows
amphipods

NC DWQ Stream Identification Form Version 4.11

Date: 3-11-16	Project/Site: V-5817	Latitude: 35.547285
Evaluator: H. Smith	County: Tredell	Longitude: -80.854202
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 26.0	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other SE-4 e.g. Quad Name:

A. Geomorphology (Subtotal = 11.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1	2	3
2. Sinuosity of channel along thalweg	0	1	2	3
3. In-channel structure: ex. riffle-pool, step-pool, ripple-pool sequence	0	1	2	3
4. Particle size of stream substrate	0	1	2	3
5. Active/relict floodplain	0	1	2	3
6. Depositional bars or benches	0	1	2	3
7. Recent alluvial deposits	0	1	2	3
8. Headcuts	0	1	2	3
9. Grade control	0	0.5	1	1.5
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 7.5)

12. Presence of Baseflow	0	1	2	3
13. Iron oxidizing bacteria	0	1	2	3
14. Leaf litter	1.5	1	0.5	0
15. Sediment on plants or debris	0	0.5	1	1.5
16. Organic debris lines or piles	0	0.5	1	1.5
17. Soil-based evidence of high water table?	No = 0		Yes = 3	

C. Biology (Subtotal = 7.0)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macroinvertebrates (note diversity and abundance)	0	1	2	3
21. Aquatic Mollusks	0	1	2	3
22. Fish	0	0.5	1	1.5
23. Crayfish	0	0.5	1	1.5
24. Amphibians	0	0.5	1	1.5
25. Algae	0	0.5	1	1.5
26. Wetland plants in streambed	FACW = 0.75; OBL = 1.5 Other = 0			

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #: _____ NCDWR #: _____

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT / SITE INFORMATION:

1. Project name (if any): Stream A U-5817 Fairview Rd. Extension 2. Date of evaluation: 2016-3-10
 3. Applicant/owner name: NCDOT 4. Assessor name/organization: H. Smith Eco. Engineering
 5. County: Iredell 6. Nearest named water body: _____
 7. River Basin: Catawba on USGS 7.5-minute quad: Stream A
 8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.926067, -78.273325

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream A 10. Length of assessment reach evaluated (feet): 50
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.5 Unable to assess channel depth.
 12. Channel width at top of bank (feet): 3.0 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING INFORMATION:

15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)

16. Estimated geomorphic valley shape (skip for Tidal Marsh Stream): a (more sinuous stream, flatter valley slope) b (less sinuous stream, steeper valley slope)
 17. Watershed size: (skip for Tidal Marsh Stream) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (≥ 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.
 Section 10 water Classified Trout Waters Water Supply Watershed (I II III IV V)
 Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters
 Publicly owned property NCDWR riparian buffer rule in effect Nutrient Sensitive Waters
 Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)
 Documented presence of a federal and/or state listed protected species within the assessment area.
 List species: _____
 Designated Critical Habitat (list species): _____

19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Yes No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- A Water throughout assessment reach.
- B No flow, water in pools only.
- C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
- B Not A

3. Feature Pattern – assessment reach metric

- A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
- B Not A.

4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- B Not A

5. Signs of Active Instability – assessment reach metric

- Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
- A < 10% of channel unstable
 - B 10 to 25% of channel unstable
 - C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric

Consider for the Left Bank (LB) and the Right Bank (RB).

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of conditions that adversely affect reference interaction |
| <input type="radio"/> B | <input type="radio"/> B | Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching]) |
| <input type="radio"/> C | <input type="radio"/> C | Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access) |

[examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9 Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? **If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).**

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. Check all that occur (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input type="checkbox"/> C Multiple snags and logs (including lap trees) <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal
Marsh Streams
only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|--|--|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. Check the appropriate box(es).

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams). Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="checkbox"/>	Bedrock/saprolite				
<input type="checkbox"/>	Boulder (256 – 4096 mm)				
<input type="checkbox"/>	Cobble (64 – 256 mm)				
<input type="checkbox"/>	Gravel (2 – 64 mm)				
<input type="checkbox"/>	Sand (.062 – 2 mm)				
<input type="checkbox"/>	Silt/clay (< 0.062 mm)				
<input type="checkbox"/>	Detritus				
<input type="checkbox"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment? **(skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select one of the following reasons and skip to Metric 13. No Water Other: _____

12b. Yes No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

- 1 >1 Numbers over columns refer to "individuals" for size 1 and 2 streams and "taxa" for size 3 and 4 streams.
- Adult frogs
 - Aquatic reptiles
 - Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)

- Beetles (including water pennies)
- Caddisfly larvae (Trichoptera [T])
- Asian clam (*Corbicula*)
- Crustacean (isopod/amphipod/crayfish/shrimp)
- Damselfly and dragonfly larvae
- Dipterans (true flies)
- Mayfly larvae (Ephemeroptera [E])
- Megaloptera (alderfly, fishfly, dobsonfly larvae)
- Midges/mosquito larvae
- Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
- Mussels/Clams (not *Corbicula*)
- Other fish
- Salamanders/tadpoles
- Snails
- Stonefly larvae (Plecoptera [P])
- Tipulid larvae
- Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB RB

- A A Little or no alteration to water storage capacity over a majority of the streamside area
- B B Moderate alteration to water storage capacity over a majority of the streamside area
- C C Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB

- A A Majority of streamside area with depressions able to pond water \geq 6 inches deep
- B B Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- C C Majority of streamside area with depressions able to pond water $<$ 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB RB

- Y Y Are wetlands present in the streamside area?
- N N

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream (\geq 24% impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated Wooded

LB RB LB RB

- A A A A \geq 100-foot wide or extends to the edge of the watershed
- B B B B From 50 to $<$ 100-foot wide
- C C C C From 30 to $<$ 50-foot wide
- D D D D From 10 to $<$ 30-foot wide
- E E E E $<$ 10-foot wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB RB

- A A Mature forest
- B B Non-mature woody vegetation or modified vegetation structure
- C C Herbaceous vegetation with or without a strip of trees < 10 feet wide
- D D Maintained shrubs
- E E Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)

Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).

If none of the following stressors occurs on either bank, check here and skip to Metric 22

Abuts		< 30 feet		30-50 feet		
LB	RB	LB	RB	LB	RB	
<input type="radio"/> A	Row crops					
<input type="radio"/> B	Maintained turf					
<input type="radio"/> C	Pasture (no livestock)/commercial horticulture					
<input type="radio"/> D	Pasture (active livestock use)					

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

- | LB | RB | |
|------------------------------------|------------------------------------|--|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Medium to high stem density |
| <input type="radio"/> B | <input type="radio"/> B | Low stem density |
| <input type="radio"/> C | <input type="radio"/> C | No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground |

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)

Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10-foot wide.

- | LB | RB | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | The total length of buffer breaks is < 25 percent. |
| <input type="radio"/> B | <input type="radio"/> B | The total length of buffer breaks is between 25 and 50 percent. |
| <input type="radio"/> C | <input type="radio"/> C | The total length of buffer breaks is > 50 percent. |

24. Vegetative Composition – First 100 feet of streamside area metric (skip for Tidal Marsh Streams)

Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

- | LB | RB | |
|------------------------------------|------------------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse. |
| <input checked="" type="radio"/> B | <input checked="" type="radio"/> B | Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u> communities missing understory but retaining canopy trees. |
| <input type="radio"/> C | <input type="radio"/> C | Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation. |

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)

25a. Yes No Was a conductivity measurement recorded?

If No, select one of the following reasons. No Water Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).

- A <46 B 46 to < 67 C 67 to < 79 D 79 to < 230 E ≥ 230

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Stream A U-5817 Fairview Rd. Extension
 Stream Category Pb1

Date of Evaluation 2016-3-10
 Assessor Name/Organization H. Smith Eco. Engineering

Notes of Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Additional stream information/supplementary measurements included (Y/N) NO
 NC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	NA	NA
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	HIGH	HIGH
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	MEDIUM	MEDIUM
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	HIGH	HIGH
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	HIGH	HIGH
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone Habitat	NA	NA
Overall	HIGH	HIGH

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #: _____ NCDWR #: _____

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT / SITE INFORMATION:

1. Project name (if any): Stream B U-5817 Fairview Rd Extension 2. Date of evaluation: 2016-3-11
3. Applicant/owner name: NCDOT 4. Assessor name/organization: H. Smith
5. County: Iredell 6. Nearest named water body
7. River Basin: Catawba on USGS 7.5-minute quad: Lake Norman/Catawba River
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.548896, -80.862136

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream E 10. Length of assessment reach evaluated (feet): 50'
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 1.0 Unable to assess channel depth.
12. Channel width at top of bank (feet): 4.0 13. Is assessment reach a swamp stream? Yes No
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING INFORMATION:

15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)

16. Estimated geomorphic valley shape (skip for **Tidal Marsh Stream**): a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)
17. Watershed size: (skip for **Tidal Marsh Stream**) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (≥ 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.
 Section 10 water Classified Trout Waters Water Supply Watershed (I II III IV V)
 Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters
 Publicly owned property NCDWR riparian buffer rule in effect Nutrient Sensitive Waters
 Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)
 Documented presence of a federal and/or state listed protected species within the assessment area.
List species: _____
 Designated Critical Habitat (list species): _____

19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Yes No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- A Water throughout assessment reach.
 B No flow, water in pools only.
 C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 B Not A

3. Feature Pattern – assessment reach metric

- A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 B Not A.

4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
 B Not A

5. Signs of Active Instability – assessment reach metric

- Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
 A < 10% of channel unstable

- B 10 to 25% of channel unstable
- C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric

Consider for the Left Bank (LB) and the Right Bank (RB).

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of conditions that adversely affect reference interaction |
| <input type="radio"/> B | <input type="radio"/> B | Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching]) |
| <input type="radio"/> C | <input type="radio"/> C | Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide |

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? **If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition)**

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- | | | |
|--|------------------------------------|---|
| <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) | Check for Tidal Marsh Streams only | <input type="checkbox"/> F 5% oysters or other natural hard bottoms |
| <input type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation | | <input type="checkbox"/> G Submerged aquatic vegetation |
| <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) | | <input type="checkbox"/> H Low-tide refugia (pools) |
| <input checked="" type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter | | <input type="checkbox"/> I Sand bottom |
| <input type="checkbox"/> E Little or no habitat | | <input type="checkbox"/> J 5% vertical bank along the marsh |
| | | <input type="checkbox"/> K Little or no habitat |

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams).** Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="radio"/>	Bedrock/saprolite				
<input type="radio"/>	Boulder (256 – 4096 mm)				
<input type="radio"/>	Cobble (64 – 256 mm)				
<input type="radio"/>	Gravel (2 – 64 mm)				
<input type="radio"/>	Sand (.062 – 2 mm)				
<input type="radio"/>	Silt/clay (< 0.062 mm)				
<input type="radio"/>	Detritus				
<input type="radio"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?
 If No, select one of the following reasons and skip to Metric 13. No Water Other: _____

12b. Yes No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1 >1 Numbers over columns refer to "individuals" for size 1 and 2 streams and "taxa" for size 3 and 4 streams.

<input type="checkbox"/>	<input type="checkbox"/>	Adult frogs
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic reptiles
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
<input type="checkbox"/>	<input type="checkbox"/>	Beetles (including water pennies)
<input type="checkbox"/>	<input type="checkbox"/>	Caddisfly larvae (Trichoptera [T])
<input type="checkbox"/>	<input type="checkbox"/>	Asian clam (<i>Corbicula</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Crustacean (isopod/amphipod/crayfish/shrimp)
<input type="checkbox"/>	<input type="checkbox"/>	Damselfly and dragonfly larvae
<input type="checkbox"/>	<input type="checkbox"/>	Dipterans (true flies)
<input type="checkbox"/>	<input type="checkbox"/>	Mayfly larvae (Ephemeroptera [E])
<input type="checkbox"/>	<input type="checkbox"/>	Megaloptera (alderfly, fishfly, dobsonfly larvae)
<input type="checkbox"/>	<input type="checkbox"/>	Midges/mosquito larvae
<input type="checkbox"/>	<input type="checkbox"/>	Mosquito fish (<i>Gambusia</i>) or mud minnows (<i>Umbra pygmaea</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Mussels/Clams (not <i>Corbicula</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Other fish
<input type="checkbox"/>	<input type="checkbox"/>	Salamanders/tadpoles
<input type="checkbox"/>	<input type="checkbox"/>	Snails
<input type="checkbox"/>	<input type="checkbox"/>	Stonefly larvae (Plecoptera [P])
<input type="checkbox"/>	<input type="checkbox"/>	Tipulid larvae
<input type="checkbox"/>	<input type="checkbox"/>	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
<input type="radio"/> A	<input type="radio"/> A	Little or no alteration to water storage capacity over a majority of the streamside area
<input type="radio"/> B	<input type="radio"/> B	Moderate alteration to water storage capacity over a majority of the streamside area
<input type="radio"/> C	<input type="radio"/> C	Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
<input type="radio"/> A	<input type="radio"/> A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
<input type="radio"/> B	<input type="radio"/> B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
<input type="radio"/> C	<input type="radio"/> C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
<input type="radio"/> Y	<input type="radio"/> Y	Are wetlands present in the streamside area?
<input checked="" type="radio"/> N	<input checked="" type="radio"/> N	

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

<input checked="" type="checkbox"/> A	Streams and/or springs (jurisdictional discharges)
<input type="checkbox"/> B	Ponds (include wet detention basins; do not include sediment basins or dry detention basins)

- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream ($\geq 24\%$ impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider “leaf-on” condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)

Consider “vegetated buffer” and “wooded buffer” separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated Wooded

LB RB LB RB

- A A A A ≥ 100 -feet wide or extends to the edge of the watershed
- B B B B From 50 to < 100 -feet wide
- C C C C From 30 to < 50 -feet wide
- D D D D From 10 to < 30 -feet wide
- E E E E < 10 -feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Vegetated” Buffer Width).

LB RB

- A A Mature forest
- B B Non-mature woody vegetation or modified vegetation structure
- C C Herbaceous vegetation with or without a strip of trees < 10 feet wide
- D D Maintained shrubs
- E E Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)

Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).

If none of the following stressors occurs on either bank, check here and skip to Metric 22:

Abuts < 30 feet 30-50 feet

LB RB LB RB LB RB

- A A A A A A Row crops
- B B B B B B Maintained turf
- C C C C C C Pasture (no livestock)/commercial horticulture
- D D D D D D Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Wooded” Buffer Width).

LB RB

- A A Medium to high stem density
- B B Low stem density
- C C No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)

Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 -feet wide.

LB RB

- A A The total length of buffer breaks is < 25 percent.
- B B The total length of buffer breaks is between 25 and 50 percent.
- C C The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – First 100 feet of streamside area metric (skip for Tidal Marsh Streams)

Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse. |
| <input type="radio"/> B | <input type="radio"/> B | Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u> communities missing understory but retaining canopy trees. |
| <input type="radio"/> C | <input type="radio"/> C | Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation. |

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)

25a. Yes No Was a conductivity measurement recorded?

If No, select one of the following reasons. No Water Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).

- A <46 B 46 to < 67 C 67 to < 79 D 79 to < 230 E ≥ 230

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Stream B U-5817 Fairview Rd Extension
 Stream Category Pb1

Date of Evaluation 2016-3-11
 Assessor Name/Organization H. Smith

Notes of Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Additional stream information/supplementary measurements included (Y/N) NO
 NC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	NA	NA
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	HIGH	HIGH
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	MEDIUM	MEDIUM
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	MEDIUM	MEDIUM
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	HIGH	HIGH
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	MEDIUM	MEDIUM
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone Habitat	NA	NA
Overall	HIGH	HIGH

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #: _____ NCDWR #: _____

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT / SITE INFORMATION:

1. Project name (if any): Stream C U-5817 Fairview Rd Extension 2. Date of evaluation: 2016-3-10
3. Applicant/owner name: NCDOT 4. Assessor name/organization: H. Smith
5. County: Iredell 6. Nearest named water body
7. River Basin: Catawba on USGS 7.5-minute quad: Lake Norman/Catawba River
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.548977, -80.862173

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream C 10. Length of assessment reach evaluated (feet): 50'
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.75 Unable to assess channel depth.
12. Channel width at top of bank (feet): 3.0 13. Is assessment reach a swamp stream? Yes No
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING INFORMATION:

15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)

16. Estimated geomorphic valley shape (skip for **Tidal Marsh Stream**): a (more sinuous stream, flatter valley slope) b (less sinuous stream, steeper valley slope)

17. Watershed size: (skip for **Tidal Marsh Stream**) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (≥ 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.
 Section 10 water Classified Trout Waters Water Supply Watershed (I II III IV V)
 Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters
 Publicly owned property NCDWR riparian buffer rule in effect Nutrient Sensitive Waters
 Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)
 Documented presence of a federal and/or state listed protected species within the assessment area.
List species: _____
 Designated Critical Habitat (list species): _____

19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Yes No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- A Water throughout assessment reach.
 B No flow, water in pools only.
 C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 B Not A

3. Feature Pattern – assessment reach metric

- A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 B Not A.

4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
 B Not A

5. Signs of Active Instability – assessment reach metric

- Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
 A < 10% of channel unstable

- B 10 to 25% of channel unstable
- C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric

Consider for the Left Bank (LB) and the Right Bank (RB).

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of conditions that adversely affect reference interaction |
| <input type="radio"/> B | <input type="radio"/> B | Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching]) |
| <input type="radio"/> C | <input type="radio"/> C | Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide |

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? **If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition)**

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- | | | |
|---|------------------------------------|---|
| <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) | Check for Tidal Marsh Streams only | <input type="checkbox"/> F 5% oysters or other natural hard bottoms |
| <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation | | <input type="checkbox"/> G Submerged aquatic vegetation |
| <input type="checkbox"/> C Multiple snags and logs (including lap trees) | | <input type="checkbox"/> H Low-tide refugia (pools) |
| <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter | | <input type="checkbox"/> I Sand bottom |
| <input type="checkbox"/> E Little or no habitat | | <input type="checkbox"/> J 5% vertical bank along the marsh |
| | | <input type="checkbox"/> K Little or no habitat |

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams).** Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="radio"/>	Bedrock/saprolite				
<input type="radio"/>	Boulder (256 – 4096 mm)				
<input type="radio"/>	Cobble (64 – 256 mm)				
<input type="radio"/>	Gravel (2 – 64 mm)				
<input type="radio"/>	Sand (.062 – 2 mm)				
<input type="radio"/>	Silt/clay (< 0.062 mm)				
<input type="radio"/>	Detritus				
<input type="radio"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select one of the following reasons and skip to Metric 13.

No Water

Other: _____

12b. Yes No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1 >1 Numbers over columns refer to "individuals" for size 1 and 2 streams and "taxa" for size 3 and 4 streams.

- | | | |
|--------------------------|-------------------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | Adult frogs |
| <input type="checkbox"/> | <input type="checkbox"/> | Aquatic reptiles |
| <input type="checkbox"/> | <input type="checkbox"/> | Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) |
| <input type="checkbox"/> | <input type="checkbox"/> | Beetles (including water pennies) |
| <input type="checkbox"/> | <input type="checkbox"/> | Caddisfly larvae (Trichoptera [T]) |
| <input type="checkbox"/> | <input type="checkbox"/> | Asian clam (<i>Corbicula</i>) |
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | Crustacean (isopod/amphipod/crayfish/shrimp) |
| <input type="checkbox"/> | <input type="checkbox"/> | Damselfly and dragonfly larvae |
| <input type="checkbox"/> | <input type="checkbox"/> | Dipterans (true flies) |
| <input type="checkbox"/> | <input type="checkbox"/> | Mayfly larvae (Ephemeroptera [E]) |
| <input type="checkbox"/> | <input type="checkbox"/> | Megaloptera (alderfly, fishfly, dobsonfly larvae) |
| <input type="checkbox"/> | <input type="checkbox"/> | Midges/mosquito larvae |
| <input type="checkbox"/> | <input type="checkbox"/> | Mosquito fish (<i>Gambusia</i>) or mud minnows (<i>Umbra pygmaea</i>) |
| <input type="checkbox"/> | <input type="checkbox"/> | Mussels/Clams (not <i>Corbicula</i>) |
| <input type="checkbox"/> | <input type="checkbox"/> | Other fish |
| <input type="checkbox"/> | <input type="checkbox"/> | Salamanders/tadpoles |
| <input type="checkbox"/> | <input type="checkbox"/> | Snails |
| <input type="checkbox"/> | <input type="checkbox"/> | Stonefly larvae (Plecoptera [P]) |
| <input type="checkbox"/> | <input type="checkbox"/> | Tipulid larvae |
| <input type="checkbox"/> | <input type="checkbox"/> | Worms/leeches |

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB RB

- | | | |
|-------------------------|-------------------------|---|
| <input type="radio"/> A | <input type="radio"/> A | Little or no alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> B | <input type="radio"/> B | Moderate alteration to water storage capacity over a majority of the streamside area |
| <input type="radio"/> C | <input type="radio"/> C | Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes) |

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB

- | | | |
|-------------------------|-------------------------|--|
| <input type="radio"/> A | <input type="radio"/> A | Majority of streamside area with depressions able to pond water \geq 6 inches deep |
| <input type="radio"/> B | <input type="radio"/> B | Majority of streamside area with depressions able to pond water 3 to 6 inches deep |
| <input type="radio"/> C | <input type="radio"/> C | Majority of streamside area with depressions able to pond water < 3 inches deep |

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB RB

Y Y Are wetlands present in the streamside area?

N N

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- | | |
|---------------------------------------|--|
| <input checked="" type="checkbox"/> A | Streams and/or springs (jurisdictional discharges) |
| <input type="checkbox"/> B | Ponds (include wet detention basins; do not include sediment basins or dry detention basins) |

- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream ($\geq 24\%$ impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider "leaf-on" condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)

Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated Wooded

LB RB LB RB

- A A A A ≥ 100 -feet wide or extends to the edge of the watershed
- B B B B From 50 to < 100 -feet wide
- C C C C From 30 to < 50 -feet wide
- D D D D From 10 to < 30 -feet wide
- E E E E < 10 -feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB RB

- A A Mature forest
- B B Non-mature woody vegetation or modified vegetation structure
- C C Herbaceous vegetation with or without a strip of trees < 10 feet wide
- D D Maintained shrubs
- E E Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)

Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).

If none of the following stressors occurs on either bank, check here and skip to Metric 22:

Abuts < 30 feet 30-50 feet

LB RB LB RB LB RB

- A A A A A A Row crops
- B B B B B B Maintained turf
- C C C C C C Pasture (no livestock)/commercial horticulture
- D D D D D D Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

LB RB

- A A Medium to high stem density
- B B Low stem density
- C C No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)

Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 -feet wide.

LB RB

- A A The total length of buffer breaks is < 25 percent.
- B B The total length of buffer breaks is between 25 and 50 percent.
- C C The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – First 100 feet of streamside area metric (skip for Tidal Marsh Streams)

Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

- | | | |
|------------------------------------|------------------------------------|--|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse. |
| <input type="radio"/> B | <input type="radio"/> B | Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing <u>or</u> communities with non-native invasive species present, but not dominant, over a large portion of the expected strata <u>or</u> communities missing understory but retaining canopy trees. |
| <input type="radio"/> C | <input type="radio"/> C | Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent <u>or</u> communities with non-native invasive species dominant over a large portion of expected strata <u>or</u> communities composed of planted stands of non-characteristic species <u>or</u> communities inappropriately composed of a single species <u>or</u> no vegetation. |

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)

25a. Yes No Was a conductivity measurement recorded?

If No, select one of the following reasons. No Water Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).

A <46 B 46 to < 67 C 67 to < 79 D 79 to < 230 E ≥ 230

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Stream C U-5817 Fairview Rd Extension Date of Evaluation 2016-3-10
 Stream Category Pb1 Assessor Name/Organization H. Smith

Notes of Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Additional stream information/supplementary measurements included (Y/N) NO
 NC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	NA	NA
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	HIGH	HIGH
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	MEDIUM	MEDIUM
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	HIGH	HIGH
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	HIGH	HIGH
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone Habitat	NA	NA
Overall	HIGH	HIGH

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #: _____ NCDWR #: _____

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT / SITE INFORMATION:

1. Project name (if any): Stream D U-5817 Fairview Rd Extension 2. Date of evaluation: 2016-3-10
3. Applicant/owner name: NCDOT 4. Assessor name/organization: H. Smith
5. County: Iredell 6. Nearest named water body
7. River Basin: Catawba on USGS 7.5-minute quad: Lake Norman/Catawba River
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.548486, -80.861907

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream D 10. Length of assessment reach evaluated (feet): 50'
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.5 Unable to assess channel depth.
12. Channel width at top of bank (feet): 2.0 13. Is assessment reach a swamp stream? Yes No
14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING INFORMATION:

15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)

16. Estimated geomorphic valley shape (skip for **Tidal Marsh Stream**): a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)
17. Watershed size: (skip for **Tidal Marsh Stream**) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (≥ 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.
 Section 10 water Classified Trout Waters Water Supply Watershed (I II III IV V)
 Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters
 Publicly owned property NCDWR riparian buffer rule in effect Nutrient Sensitive Waters
 Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)
 Documented presence of a federal and/or state listed protected species within the assessment area.
List species: _____
 Designated Critical Habitat (list species): _____
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Yes No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- A Water throughout assessment reach.
 B No flow, water in pools only.
 C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
 B Not A

3. Feature Pattern – assessment reach metric

- A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
 B Not A.

4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
 B Not A

5. Signs of Active Instability – assessment reach metric

- Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
 A < 10% of channel unstable

- B 10 to 25% of channel unstable
- C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric

Consider for the Left Bank (LB) and the Right Bank (RB).

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Little or no evidence of conditions that adversely affect reference interaction |
| <input type="radio"/> B | <input type="radio"/> B | Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching]) |
| <input type="radio"/> C | <input type="radio"/> C | Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide |

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

- Yes No Is stream is too large or dangerous to assess? **If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition)**

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- | | | |
|---|------------------------------------|---|
| <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) | Check for Tidal Marsh Streams only | <input type="checkbox"/> F 5% oysters or other natural hard bottoms |
| <input checked="" type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation | | <input type="checkbox"/> G Submerged aquatic vegetation |
| <input type="checkbox"/> C Multiple snags and logs (including lap trees) | | <input type="checkbox"/> H Low-tide refugia (pools) |
| <input type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter | | <input type="checkbox"/> I Sand bottom |
| <input type="checkbox"/> E Little or no habitat | | <input type="checkbox"/> J 5% vertical bank along the marsh |
| | | <input type="checkbox"/> K Little or no habitat |

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams).** Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="radio"/>	Bedrock/saprolite				
<input type="radio"/>	Boulder (256 – 4096 mm)				
<input type="radio"/>	Cobble (64 – 256 mm)				
<input type="radio"/>	Gravel (2 – 64 mm)				
<input type="radio"/>	Sand (.062 – 2 mm)				
<input type="radio"/>	Silt/clay (< 0.062 mm)				
<input type="radio"/>	Detritus				
<input type="radio"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?
 If No, select one of the following reasons and skip to Metric 13. No Water Other: _____

12b. Yes No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1 >1 Numbers over columns refer to "individuals" for size 1 and 2 streams and "taxa" for size 3 and 4 streams.

<input type="checkbox"/>	<input type="checkbox"/>	Adult frogs
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic reptiles
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
<input type="checkbox"/>	<input type="checkbox"/>	Beetles (including water pennies)
<input type="checkbox"/>	<input type="checkbox"/>	Caddisfly larvae (Trichoptera [T])
<input type="checkbox"/>	<input type="checkbox"/>	Asian clam (<i>Corbicula</i>)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Crustacean (isopod/amphipod/crayfish/shrimp)
<input type="checkbox"/>	<input type="checkbox"/>	Damselfly and dragonfly larvae
<input type="checkbox"/>	<input type="checkbox"/>	Dipterans (true flies)
<input type="checkbox"/>	<input type="checkbox"/>	Mayfly larvae (Ephemeroptera [E])
<input type="checkbox"/>	<input type="checkbox"/>	Megaloptera (alderfly, fishfly, dobsonfly larvae)
<input type="checkbox"/>	<input type="checkbox"/>	Midges/mosquito larvae
<input type="checkbox"/>	<input type="checkbox"/>	Mosquito fish (<i>Gambusia</i>) or mud minnows (<i>Umbra pygmaea</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Mussels/Clams (not <i>Corbicula</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Other fish
<input type="checkbox"/>	<input type="checkbox"/>	Salamanders/tadpoles
<input type="checkbox"/>	<input type="checkbox"/>	Snails
<input type="checkbox"/>	<input type="checkbox"/>	Stonefly larvae (Plecoptera [P])
<input type="checkbox"/>	<input type="checkbox"/>	Tipulid larvae
<input type="checkbox"/>	<input type="checkbox"/>	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
<input type="radio"/> A	<input type="radio"/> A	Little or no alteration to water storage capacity over a majority of the streamside area
<input type="radio"/> B	<input type="radio"/> B	Moderate alteration to water storage capacity over a majority of the streamside area
<input type="radio"/> C	<input type="radio"/> C	Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
<input type="radio"/> A	<input type="radio"/> A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
<input type="radio"/> B	<input type="radio"/> B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
<input type="radio"/> C	<input type="radio"/> C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
<input type="radio"/> Y	<input type="radio"/> Y	Are wetlands present in the streamside area?
<input checked="" type="radio"/> N	<input checked="" type="radio"/> N	

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

<input checked="" type="checkbox"/> A	Streams and/or springs (jurisdictional discharges)
<input type="checkbox"/> B	Ponds (include wet detention basins; do not include sediment basins or dry detention basins)

- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream ($\geq 24\%$ impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider “leaf-on” condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)

Consider “vegetated buffer” and “wooded buffer” separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

- | Vegetated | | Wooded | | |
|------------------------------------|------------------------------------|------------------------------------|------------------------------------|--|
| LB | RB | LB | RB | |
| <input checked="" type="radio"/> A | ≥ 100 -feet wide <u>or</u> extends to the edge of the watershed |
| <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | <input type="radio"/> B | From 50 to < 100-feet wide |
| <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | <input type="radio"/> C | From 30 to < 50-feet wide |
| <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | <input type="radio"/> D | From 10 to < 30-feet wide |
| <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | <input type="radio"/> E | < 10-feet wide <u>or</u> no trees |

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Vegetated” Buffer Width).

- | LB | RB | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Mature forest |
| <input type="radio"/> B | <input type="radio"/> B | Non-mature woody vegetation <u>or</u> modified vegetation structure |
| <input type="radio"/> C | <input type="radio"/> C | Herbaceous vegetation with or without a strip of trees < 10 feet wide |
| <input type="radio"/> D | <input type="radio"/> D | Maintained shrubs |
| <input type="radio"/> E | <input type="radio"/> E | Little or no vegetation |

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)

Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).

If none of the following stressors occurs on either bank, check here and skip to Metric 22:

- | Abuts | | < 30 feet | | 30-50 feet | | |
|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
| LB | RB | LB | RB | LB | RB | |
| <input type="checkbox"/> A | Row crops |
| <input type="checkbox"/> B | Maintained turf |
| <input type="checkbox"/> C | Pasture (no livestock)/commercial horticulture |
| <input type="checkbox"/> D | Pasture (active livestock use) |

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Wooded” Buffer Width).

- | LB | RB | |
|------------------------------------|------------------------------------|--|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | Medium to high stem density |
| <input type="radio"/> B | <input type="radio"/> B | Low stem density |
| <input type="radio"/> C | <input type="radio"/> C | No wooded riparian buffer <u>or</u> predominantly herbaceous species <u>or</u> bare ground |

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)

Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10-feet wide.

- | LB | RB | |
|------------------------------------|------------------------------------|---|
| <input checked="" type="radio"/> A | <input checked="" type="radio"/> A | The total length of buffer breaks is < 25 percent. |
| <input type="radio"/> B | <input type="radio"/> B | The total length of buffer breaks is between 25 and 50 percent. |
| <input type="radio"/> C | <input type="radio"/> C | The total length of buffer breaks is > 50 percent. |

24. Vegetative Composition – First 100 feet of streamside area metric (skip for Tidal Marsh Streams)

Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

- LB RB
- A A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
- B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
- C C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)

25a. Yes No Was a conductivity measurement recorded?
If No, select one of the following reasons. No Water Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).
 A <46 B 46 to < 67 C 67 to < 79 D 79 to < 230 E ≥ 230

Notes/Sketch:



NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Stream D U-5817 Fairview Rd Extension Date of Evaluation 2016-3-10
 Stream Category Pb1 Assessor Name/Organization H. Smith

Notes of Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Additional stream information/supplementary measurements included (Y/N) NO
 NC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	HIGH	HIGH
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	HIGH	HIGH
(3) Streamside Area Attenuation	HIGH	HIGH
(4) Floodplain Access	HIGH	HIGH
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	NA	NA
(3) Stream Stability	HIGH	HIGH
(4) Channel Stability	HIGH	HIGH
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	HIGH	HIGH
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	MEDIUM	MEDIUM
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	NO	NO
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	HIGH	HIGH
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	HIGH	HIGH
(3) In-stream Habitat	HIGH	HIGH
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone Habitat	NA	NA
Overall	HIGH	HIGH

NC SAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 2.1

USACE AID #: _____ NCDWR #: _____

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if any supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT / SITE INFORMATION:

1. Project name (if any): Stream E U-5817 Fairview Rd Extension 2. Date of evaluation: 2016-3-11
 3. Applicant/owner name: NCDOT 4. Assessor name/organization: H. Smith
 5. County: Iredell 6. Nearest named water body
 7. River Basin: Catawba on USGS 7.5-minute quad: Lake Norman/Catawba River
 8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.547285, -80.854202

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream E 10. Length of assessment reach evaluated (feet): 50'
 11. Channel depth from bed (in riffle, if present) to top of bank (feet): 1.0 Unable to assess channel depth.
 12. Channel width at top of bank (feet): 4.0 13. Is assessment reach a swamp stream? Yes No
 14. Feature type: Perennial flow Intermittent flow Tidal Marsh Stream

STREAM RATING INFORMATION:

15. NC SAM Zone: Mountains (M) Piedmont (P) Inner Coastal Plain (I) Outer Coastal Plain (O)

16. Estimated geomorphic valley shape (skip for **Tidal Marsh Stream**): a  (more sinuous stream, flatter valley slope) b  (less sinuous stream, steeper valley slope)
 17. Watershed size: (skip for **Tidal Marsh Stream**) Size 1 (< 0.1 mi²) Size 2 (0.1 to < 0.5 mi²) Size 3 (0.5 to < 5 mi²) Size 4 (≥ 5 mi²)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? Yes No If Yes, check all that apply to the assessment area.
 Section 10 water Classified Trout Waters Water Supply Watershed (I II III IV V)
 Essential Fish Habitat Primary Nursery Area High Quality Waters/Outstanding Resource Waters
 Publicly owned property NCDWR riparian buffer rule in effect Nutrient Sensitive Waters
 Anadromous fish 303(d) List CAMA Area of Environmental Concern (AEC)
 Documented presence of a federal and/or state listed protected species within the assessment area.
 List species: _____
 Designated Critical Habitat (list species): _____

19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? Yes No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- A Water throughout assessment reach.
- B No flow, water in pools only.
- C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is adversely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impounded on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates).
- B Not A

3. Feature Pattern – assessment reach metric

- A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
- B Not A.

4. Feature Longitudinal Profile – assessment reach metric

- A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- B Not A

5. Signs of Active Instability – assessment reach metric

- Consider only current instability, not past events from which the stream has currently recovered.** Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
- A < 10% of channel unstable

- B 10 to 25% of channel unstable
- C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric

Consider for the Left Bank (LB) and the Right Bank (RB).

- | | | |
|------------------------------------|------------------------------------|---|
| LB | RB | |
| <input type="radio"/> A | <input type="radio"/> A | Little or no evidence of conditions that adversely affect reference interaction |
| <input type="radio"/> B | <input type="radio"/> B | Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching]) |
| <input checked="" type="radio"/> C | <input checked="" type="radio"/> C | Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] <u>or</u> too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) <u>or</u> floodplain/intertidal zone unnaturally absent <u>or</u> assessment reach is a man-made feature on an interstream divide |

7. Water Quality Stressors – assessment reach/intertidal zone metric

Check all that apply.

- A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- B Excessive sedimentation (burying of stream features or intertidal zone)
- C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- D Odor (not including natural sulfide odors)
- E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in the "Notes/Sketch" section.
- F Livestock with access to stream or intertidal zone
- G Excessive algae in stream or intertidal zone
- H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc.)
- I Other: _____ (explain in "Notes/Sketch" section)
- J Little to no stressors

8. Recent Weather – watershed metric

For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- C No drought conditions

9. Large or Dangerous Stream – assessment reach metric

Yes No Is stream is too large or dangerous to assess? **If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition)**

10. Natural In-stream Habitat Types – assessment reach metric

10a. Yes No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- | | | |
|---|--|---|
| <ul style="list-style-type: none"> <input type="checkbox"/> A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats) <input type="checkbox"/> B Multiple sticks and/or leaf packs and/or emergent vegetation <input checked="" type="checkbox"/> C Multiple snags and logs (including lap trees) <input checked="" type="checkbox"/> D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter <input type="checkbox"/> E Little or no habitat | Check for Tidal
Marsh Streams
only | <ul style="list-style-type: none"> <input type="checkbox"/> F 5% oysters or other natural hard bottoms <input type="checkbox"/> G Submerged aquatic vegetation <input type="checkbox"/> H Low-tide refugia (pools) <input type="checkbox"/> I Sand bottom <input type="checkbox"/> J 5% vertical bank along the marsh <input type="checkbox"/> K Little or no habitat |
|---|--|---|

*****REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*****

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. Yes No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- A Riffle-run section (evaluate 11c)
- B Pool-glide section (evaluate 11d)
- C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffles sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain Streams and Tidal Marsh Streams).** Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
<input type="radio"/>	Bedrock/saprolite				
<input type="radio"/>	Boulder (256 – 4096 mm)				
<input type="radio"/>	Cobble (64 – 256 mm)				
<input type="radio"/>	Gravel (2 – 64 mm)				
<input type="radio"/>	Sand (.062 – 2 mm)				
<input type="radio"/>	Silt/clay (< 0.062 mm)				
<input type="radio"/>	Detritus				
<input type="radio"/>	Artificial (rip-rap, concrete, etc.)				

11d. Yes No Are pools filled with sediment? (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12. Aquatic Life – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

12a. Yes No Was an in-stream aquatic life assessment performed as described in the User Manual?

If No, select one of the following reasons and skip to Metric 13. No Water Other: _____

12b. Yes No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1 >1 Numbers over columns refer to "individuals" for size 1 and 2 streams and "taxa" for size 3 and 4 streams.

<input type="checkbox"/>	<input type="checkbox"/>	Adult frogs
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic reptiles
<input type="checkbox"/>	<input type="checkbox"/>	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
<input type="checkbox"/>	<input type="checkbox"/>	Beetles (including water pennies)
<input type="checkbox"/>	<input type="checkbox"/>	Caddisfly larvae (Trichoptera [T])
<input type="checkbox"/>	<input type="checkbox"/>	Asian clam (<i>Corbicula</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Crustacean (isopod/amphipod/crayfish/shrimp)
<input type="checkbox"/>	<input type="checkbox"/>	Damselfly and dragonfly larvae
<input type="checkbox"/>	<input type="checkbox"/>	Dipterans (true flies)
<input type="checkbox"/>	<input type="checkbox"/>	Mayfly larvae (Ephemeroptera [E])
<input type="checkbox"/>	<input type="checkbox"/>	Megaloptera (alderfly, fishfly, dobsonfly larvae)
<input type="checkbox"/>	<input type="checkbox"/>	Midges/mosquito larvae
<input type="checkbox"/>	<input type="checkbox"/>	Mosquito fish (<i>Gambusia</i>) or mud minnows (<i>Umbra pygmaea</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Mussels/Clams (not <i>Corbicula</i>)
<input type="checkbox"/>	<input type="checkbox"/>	Other fish
<input type="checkbox"/>	<input type="checkbox"/>	Salamanders/tadpoles
<input type="checkbox"/>	<input type="checkbox"/>	Snails
<input type="checkbox"/>	<input type="checkbox"/>	Stonefly larvae (Plecoptera [P])
<input type="checkbox"/>	<input type="checkbox"/>	Tipulid larvae
<input type="checkbox"/>	<input type="checkbox"/>	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB RB

- A A Little or no alteration to water storage capacity over a majority of the streamside area
- B B Moderate alteration to water storage capacity over a majority of the streamside area
- C C Severe alteration to water storage capacity over a majority of the streamside area (examples include: ditches, fill, soil, compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)

Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB RB

- A A Majority of streamside area with depressions able to pond water \geq 6 inches deep
- B B Majority of streamside area with depressions able to pond water 3 to 6 inches deep
- C C Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)

Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB RB

- Y Y Are wetlands present in the streamside area?
- N N

16. Baseflow Contributors – assessment reach metric (skip for size 4 streams and Tidal Marsh Streams)

Check all contributors within the assessment reach or within view of and draining to the assessment reach.

- A Streams and/or springs (jurisdictional discharges)
- B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)

- C Obstruction that passes some flow during low-flow periods within assessment area (beaver dam, bottom-release dam)
- D Evidence of bank seepage or sweating (iron oxidizing bacteria in water indicates seepage)
- E Stream bed or bank soil reduced (dig through deposited sediment if present)
- F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)

Check all that apply.

- A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- B Obstruction not passing flow during low flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- C Urban stream ($\geq 24\%$ impervious surface for watershed)
- D Evidence that the stream-side area has been modified resulting in accelerated drainage into the assessment reach
- E Assessment reach relocated to valley edge
- F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)

Consider aspect. Consider “leaf-on” condition.

- A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- B Degraded (example: scattered trees)
- C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)

Consider “vegetated buffer” and “wooded buffer” separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated Wooded

LB RB LB RB

- A A A A ≥ 100 -feet wide or extends to the edge of the watershed
- B B B B From 50 to < 100 -feet wide
- C C C C From 30 to < 50 -feet wide
- D D D D From 10 to < 30 -feet wide
- E E E E < 10 -feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Vegetated” Buffer Width).

LB RB

- A A Mature forest
- B B Non-mature woody vegetation or modified vegetation structure
- C C Herbaceous vegetation with or without a strip of trees < 10 feet wide
- D D Maintained shrubs
- E E Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)

Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).

If none of the following stressors occurs on either bank, check here and skip to Metric 22:

Abuts < 30 feet 30-50 feet

LB RB LB RB LB RB

- A A A A A A Row crops
- B B B B B B Maintained turf
- C C C C C C Pasture (no livestock)/commercial horticulture
- D D D D D D Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)

Consider for left bank (LB) and right bank (RB) for Metric 19 (“Wooded” Buffer Width).

LB RB

- A A Medium to high stem density
- B B Low stem density
- C C No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)

Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 -feet wide.

LB RB

- A A The total length of buffer breaks is < 25 percent.
- B B The total length of buffer breaks is between 25 and 50 percent.
- C C The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – First 100 feet of streamside area metric (skip for Tidal Marsh Streams)

Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

- LB RB
- A A Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
- B B Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
- C C Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)

25a. Yes No Was a conductivity measurement recorded?

If No, select one of the following reasons. No Water Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).

A <46 B 46 to < 67 C 67 to < 79 D 79 to < 230 E ≥ 230

Notes/Sketch:

NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name Stream E U-5817 Fairview Rd Extension
 Stream Category Pb1

Date of Evaluation 2016-3-11
 Assessor Name/Organization H. Smith

Notes of Field Assessment Form (Y/N) NO
 Presence of regulatory considerations (Y/N) NO
 Additional stream information/supplementary measurements included (Y/N) NO
 NC SAM feature type (perennial, intermittent, Tidal Marsh Stream) Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	LOW	LOW
(2) Baseflow	MEDIUM	MEDIUM
(2) Flood Flow	LOW	LOW
(3) Streamside Area Attenuation	LOW	LOW
(4) Floodplain Access	LOW	LOW
(4) Wooded Riparian Buffer	HIGH	HIGH
(4) Microtopography	NA	NA
(3) Stream Stability	MEDIUM	MEDIUM
(4) Channel Stability	LOW	LOW
(4) Sediment Transport	HIGH	HIGH
(4) Stream Geomorphology	MEDIUM	MEDIUM
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	LOW	LOW
(2) Baseflow	MEDIUM	MEDIUM
(2) Streamside Area Vegetation	HIGH	HIGH
(3) Upland Pollutant Filtration	HIGH	HIGH
(3) Thermoregulation	HIGH	HIGH
(2) Indicators of Stressors	YES	YES
(2) Aquatic Life Tolerance	LOW	NA
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	HIGH	HIGH
(2) In-stream Habitat	MEDIUM	MEDIUM
(3) Baseflow	MEDIUM	MEDIUM
(3) Substrate	HIGH	HIGH
(3) Stream Stability	LOW	LOW
(3) In-stream Habitat	MEDIUM	MEDIUM
(2) Stream-side Habitat	HIGH	HIGH
(3) Stream-side Habitat	MEDIUM	MEDIUM
(3) Thermoregulation	HIGH	HIGH
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone Habitat	NA	NA
Overall	LOW	LOW