



Mitigation Plan Draft

May 1, 2015

Maney Farm Mitigation Project

Chatham County, NC
DENR Contract No. 005793
DMS ID No. 96314

Cape Fear River Basin
HUC 03030002

PREPARED BY:



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PREPARED FOR:

NC Department of Environment and Natural Resources Division of Mitigation Services

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Raleigh, NC 27699-1652

DRAFT MITIGATION PLAN

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May 1, 2015

EXECUTIVE SUMMARY

Wildlands Engineering, Inc. (Wildlands) is completing a full delivery project at the Maney Farm Stream Mitigation Site (Site) for the North Carolina Division of Mitigation Services (NCDMS) to restore and enhance a total of 6,092 linear feet (LF) of perennial and intermittent stream in Chatham County, NC. The Site is proposed to generate 4,922 Stream Mitigation Units (SMUs). The streams proposed for restoration and enhancement are all unnamed tributaries (UT) to South Fork Cane Creek (SF) and are referred to herein as UTSF, UT1A, UT1B, UT1C, UT2A, UT2B, UT3A, UT3B, UT4A, UT4B, and UT5. This site is located in the Cape Fear River Basin 8-Digit Hydrologic Unit Code (HUC) 03030002. The Site is also within the Cane Creek Targeted Local Watershed (TLW) (HUC 03030002050050), which flows into Cane Creek and eventually into the Haw River.

The proposed Site is located within the Cane Creek Targeted Local Watershed (TLW) which is discussed in NCDMS's 2009 Cape Fear River Basin Restoration Priorities (RBRP). This document identifies the need to improve aquatic conditions and habitats as well as promoting good riparian conditions in the Cane Creek watershed and notes that there are currently 51 active animal operations in the watershed. The Maney Farm Site is currently maintained as cattle pasture and is one of the 51 animal operations referenced in the RBRP.

The Site drains to the Haw River, which flows to B. Everett Jordan Lake (Jordan Lake). The 2005 NCDWR Cape Fear River Basinwide Water Quality Plan indicates that Jordan Lake is a drinking water supply (WS-IV), a primary area for recreation, and a designated Nutrient Sensitive Water which calls for reduction of non-point source pollution. The water supply watershed boundary for Jordan Lake is just six miles downstream from the Site. The Cape Fear watershed is also discussed in the 2005 North Carolina Wildlife Resource Commission's Wildlife Action Plan where sedimentation is noted as a major issue in the basin. Maps within the Wildlife Action Plan indicate that Priority Species are present along Cane Creek. Restoration at the Site will directly address non-point source stressors by removing cattle from the streams, creating stable stream banks, restoring a riparian corridor, and placing 16.7 acres of land under permanent conservation easement.

The proposed project will help meet the goals for the watershed and provide numerous ecological benefits within the Cape Fear River Basin. While many of these benefits are limited to the Maney Farm project area, others, such as pollutant removal, reduced sediment loading, and improved aquatic and terrestrial habitat, have farther-reaching effects. In addition, protected parcels downstream of this site promote cumulative project benefits within the watershed.

This mitigation plan has been written in conformance with the requirements of the following documents that govern NCDMS operations and procedures for the delivery of compensatory mitigation.

- Federal rule for compensatory mitigation project sites as described in the Federal Register Title 33 Navigation and Navigable Waters Volume 3 Chapter 2 Section § 332.8 paragraphs (c)(2) through (c)(14).
- NCDENR Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010.

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1.0 RESTORATION PROJECT GOALS AND OBJECTIVES

The Maney Farm Stream Mitigation Site (referred to herein as Site or Project) is located in the Cane Creek Watershed within the Jordan Lake Water Supply Watershed which has been designated a Nutrient Sensitive Water. The project streams flow into South Fork Cane Creek which flows into Cane Creek. Cane Creek flows to the Haw River and eventually into the Jordan Lake Reservoir. The Site's watershed is within 14-Digit Hydrologic Unit Code (HUC) 03030002050050 which was identified as a Cape Fear 02 Targeted Local Watershed (TLW) in NCDMS's 2009 Cape Fear River Basin Restoration Priority (RBRP) plan. The parcel immediately downstream of the Site is currently under both a Farmland Preservation Trust Fund Easement and a Piedmont Land Conservancy Easement. The restored stream reach and riparian corridor will further extend the protected wildlife habitat within these two parcels. DMS also maintains easements on adjacent parcels (i.e., the Hadley Newlin site) promoting cumulative project benefits within the watershed.

The proposed Site is located within the Cane Creek TLW and is discussed in DMS's 2009 Cape Fear River Basin Restoration Priorities (RBRP). This document identifies the need to improve aquatic conditions and habitats as well as promoting good riparian conditions in the Cane Creek watershed and notes that there are currently 51 active animal operations in the watershed. The Maney Farm Site is currently maintained as cattle pasture and is one of the 51 animal operations referenced in the RBRP.

The Site drains to the Haw River, which flows to B. Everett Jordan Lake (Jordan Lake). The 2005 NC Division of Water Resources (NCDWR) Cape Fear River Basinwide Water Quality Plan indicates that Jordan Lake is a drinking water supply, a primary area for recreation, and a designated Nutrient Sensitive Water which calls for reduction of non-point source pollution. The water supply watershed boundary for Jordan Lake is just six miles downstream from the Site. The Cape Fear watershed is also discussed in the 2005 North Carolina Wildlife Resource Commission's Wildlife Action Plan where sedimentation is noted as a major issue in the basin. Maps within the Wildlife Action Plan indicate that Priority Species are present along Cane Creek. Restoration at the Site will directly address non-point source stressors by removing cattle from the streams, creating stable stream banks, restoring a riparian corridor, and placing 16.7 acres of land under permanent conservation easement.

The Project will help meet the functional goals described in the Cape Fear River Basin Restoration Priorities through stream restoration and enhancement activities and riparian buffer re-establishment. Project goals are desired project outcomes and are verifiable through visual assessment and/or measurement. Objectives are activities that will result in the accomplishment of goals. The project will be monitored after construction to demonstrate success as described in Section 12. The project goals and related objectives are described in Table 1.

Table 1: Mitigation Goals and Objectives

Maney Farm Mitigation Project

Goal	Objective	Expected Outcomes
Exclude cattle from project streams	Install fencing around conservation easements adjacent to cattle pastures	Reduce pollutant inputs including fecal coliform, nitrogen, and phosphorous.

Goal	Objective	Expected Outcomes
Stabilize eroding stream banks	Reconstruct stream channels with stable dimensions. Add bank revetments and in-stream structures to protect restored/enhanced streams.	Reduce inputs of sediment into streams.
Construct stream channels with that are laterally and vertical stable	Construct stream channels that will maintain a stable pattern and profile considering the hydrologic and sediment inputs to the system, the landscape setting, and the watershed conditions.	Return a network of streams to a stable form that is capable of supporting hydrologic, biologic, and water quality functions.
Improve instream habitat	Install habitat features such as constructed riffles and brush toes into restored/enhanced streams. Add woody materials to channel beds. Construct pools of varying depth.	Improve aquatic communities in project streams.
Reconnect channels with floodplains so that floodplains are inundated relatively frequently	Reconstructing stream channels with appropriate bankfull dimensions and depth relative to the existing floodplain.	Raise local groundwater elevations. Inundate floodplain wetlands and vernal pools. Reduce shear stress on channels during larger flow events.
Restore and enhance native floodplain forest	Plant native tree and understory species in riparian zone	Create and improve forested riparian habitats. Provide a canopy to shade streams and reduce thermal loadings. Create a source of woody inputs for streams. Reduce flood flow velocities on floodplain and allow pollutants and sediment to settle.
Permanently protect the project site from harmful uses.	Establish a conservation easement on the site.	Ensure that development and agricultural uses that would damage the site or reduce the benefits of project are prevented.

2.0 PROJECT SITE LOCATION AND SELECTION

2.1 Directions to Project Site

The Site is located in northwestern Chatham County, northwest of Pittsboro and north of Silk Hope (Figure 1).

From Raleigh, NC, take I-40 West towards Durham. Take exit 293A for US-1 / US-64 / West toward Sanford/Asheboro. Travel approximately three miles and take exit 98B for US-64 West. Travel approximately 25 miles, take exit 381 for NC-87 towards Burlington. Travel approximately 1.8 miles on NC-87 North and turn left onto Silk Hope Gum Springs Road. Continue for 8.1 miles to Silk Hope Lindley Mill Road. Take Silk Hope-Lindley Mill Road north 3.6 miles. Turn right on Center Church Road and travel 0.9 miles. The Site is located north of Center Church Road.

2.2 Site Selection and Project Components

The Site has been selected by the NC Division of Mitigation Services (NCDMS) to provide stream mitigation units (SMUs) in the Cape Fear River Basin. It was selected based on the current degraded condition of the on-site streams and the potential for functional restoration and ecological uplift.

The project includes a combination of stream restoration and enhancement. The streams include UT to South Fork Cane Creek (UTSF) and several unnamed tributaries to UTSF (UT1A, UT1B, UT1C, UT2A, UT2B, UT3A, UT3B, UT4A, UT4B, and UT5) (Figure 2). Jurisdictional wetlands are present in the surrounding floodplain that will be enhanced as part of the project but are not proposed for credit at this time. Photographs of the Site are included in Appendix 1.

3.0 SITE PROTECTION INSTRUMENT

The land required for construction, management, and stewardship of this mitigation project includes portions of the parcel listed in Table 2. A conservation easement will be recorded on the parcel to include the streams being restored and enhanced along with their corresponding riparian buffers. The Site protection instrument template is included in Appendix 2.

Table 2: Site Protection Instrument

Maney Farm Mitigation Project

Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage to be Protected
M Darryl Lindley Rev Trustee	8795-99-2158	Chatham	Conservation Easement	TBD	16.7

All site protection instruments require 60-day advance notification to the Corps and the State prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

4.0 BASELINE INFORMATION –PROJECT SITE AND WATERSHED SUMMARY

4.1 Watershed Existing Conditions

Table 3 presents the project information and baseline watershed information. The watershed areas were delineated using a combination of-site existing conditions survey, Chatham County, NC GIS data and USGS 7.5-minute topographic quadrangles (Figure 3).

Table 3: Project and Watershed Information

Maney Farm Mitigation Project

Project County	Chatham
Easement Area (acres)	16.4
Project Coordinates	35°50'18.00"N, 79°20'38.00"W
Physiographic Region	Carolina Slate Belt of the Piedmont Physiographic Province
Ecoregion	Piedmont
River Basin	Cape Fear
USGS HUC (8 digit, 14 digit)	03030002, 03030002050050

NCDWR Sub-basin	03-06-04								
Reaches	UTSF-R1	UTSF-R2	UT1A	UT1B	UT1C	UT2A/B	UT3A/B	UT4A/B	UT5
Drainage Area (acres)	115	211	16	4	19	11	10	20	76
Drainage Area (miles ²)	0.18	0.33	0.02	0.01	0.03	0.02	0.02	0.03	0.12
NCCGIA Land Cover Classification (%)									
Hay / Pasture	72	67	74	56	57	67	95	53	64
Deciduous Forest	25	23	26	0	29	33	1	35	28
Mixed Forest	0	3	0	0	0	0	4	7	2
Developed	0	3	0	44	13	0	0	0	0
Cultivated Crops	3	2	0	0	0	0	0	0	4
Scrub / Shrub	0	1	0	0	0	0	0	0	2
Herbaceous	0	1	0	0	1	0	0	5	0

4.2 Watershed Historical Land Use and Development Trends

The UTFS watershed (Figure 3) is located in the rural countryside approximately four miles north of Silk Hope, NC. Topography can be described as somewhat hilly to gently rolling. The stream valleys within the watershed and on-site are characterized by relatively narrow floodplains and moderately steep side slopes.

A review of historical aerials of the Site and immediately adjacent parcels from 1973, 1983, and 1993 (Appendix 3) revealed that the Site has been used for hay production and/or agricultural livestock production since before 1973. The limits of riparian buffer and agricultural land have remained consistent over that time. Further investigation was done on landuse throughout the entire watershed using the aerial photographs listed above and additional aerials from Google Earth™ (1972-2014). The most common historical and current land use types are agricultural livestock production and grazing, silviculture, and agricultural cropland.

Wildlands conducted a watershed reconnaissance visit to verify current land uses observed in aerial photography and to identify potential watershed stressors that could impact streams on-site. Land use in the UTFS watershed was found to be consistent with information depicted in aerial photography. Disturbed areas within the watershed consist primarily of agricultural landuses. As this is a long-term, on-going practice (dating to before 1973) it is not considered a new stressor to the watershed. There are no evident signs of impending land use changes or development pressure that would impact the project in the UTFS watershed. The drainage upstream of the project site consists of a network in small ditches which have been maintained in the current locations and alignments since at least 1973. Sediment supply from the upstream watershed is small and likely to remain stable. The Conservation Easement to be placed around the Site will eliminate potential for future development or agricultural use in the immediate vicinity of the on-site streams.

4.3 Physiography, Geology, and Soils

The project is located in the Slate Belt of the Piedmont Physiographic Province. The Piedmont Province is characterized by gently rolling, well rounded hills with long low ridges, with elevations ranging from 300 – 1,500 feet above sea level. The Carolina Slate Belt consists of heated and deformed volcanic and sedimentary rocks. Specifically, the proposed project is located in felsic metavolcanic rock (mapped CZfv) of the Carolina Slate Belt, which corresponds to the Uwharrie

Formation’s felsic volcaniclastic rocks and portions of the Cid Formation’s rhyolitic-rhyodactic units. This unit consists of light gray to greenish gray, felsic metavolcanic rock interbedded with mafic and intermediate metavolcanic rock and is composed primarily of feldspar, quartz, sericite, chlorite meta-argillite, and metamudstone (NCGS, 1985). Note: This information was obtained from geologic mapping no field investigations of rock lithology were performed.

Due to the lack of bed control (e.g., bedrock, etc.), fluvial erosion, and cattle trampling, the stream has downcut along portions of the reach. The remainder of the Site has relatively confined valleys, which constrict the floodplain, and limited alluvial deposits. Soils in these areas are typical of the gently to moderately sloping upland areas of the Piedmont.

Soil mapping units are based on the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey for Chatham County. Soil types within the study area were mapped with the NRCS Web Soil Survey and are described below in Table 4. A soils map based on this information is provided in Figure 4. Note: no field mapping of soils was performed for this project.

Table 4: Project Soil Types and Descriptions
Maney Farm Mitigation Project

Soil Name	Location	Description
Cid Silt Loam (6-10%)	UT2	Cid silt loam is a strongly sloping, moderately deep and moderately well drained soil found on upland and interfluves. The soil forms in residuum from Carolina Slate Belt rock and other fine grained rocks.
Cid-Lignum Complex (2-6%)	UTSF, UT1, UT 1B, and UT5	Cid-Lignum is found on gently sloping areas of the upland. It is moderately well drained to somewhat poorly drained. These soils have a loamy surface layer and clayey subsoil.
Nanford-Badin Complex (2-6%)	UT4	Nanford-Badin complex is a well drained soil with low flood potential. It is found on upland, hill slopes, and ridges and consists of residuum weathered from slate. Bedrock is within 40 to 60 inches of this soil.
Nanford-Badin Complex (6-10%)	UTSF, UT1, UT2 UT3 and UT4	Nanford-Badin complex at 6-10% slopes is found on strong slopes on the side slopes of uplands. This soil is deep and well drained. Bedrock is within 20 to 40 inches of this soil.

Source: Chatham County Soil Survey, USDA-NRCS, <http://efotg.nrcs.usda.gov>

4.4 Valley Classification

The topography of the Site and surrounding area consist of gently rolling hills interspersed with narrow valleys (Figure 5). The stream valleys have slopes ranging from 0.2-1.6% and valley side slopes ranging from 5%-10%. UTSF has a narrow alluvial valley that expands and constricts between widths of 150 and 250 feet. UT1, UT2, UT3, and UT4 transition from a constricted valley (<100 feet) within the headwaters to a wider valley (>150 feet) as they approach the confluence with UTSF. UT5 valley widths range between 150 and 200 feet.

4.5 Surface Water Classification and Water Quality

On May 28 and 29, 2014 Wildlands investigated on-site jurisdictional waters of the U.S. using the U.S. Army Corps of Engineers (USACE) Routine On-Site Determination Method. This method is defined in the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. Determination methods include stream classification utilizing the NCDWR Stream Identification Form and the USACE Stream Quality Assessment Worksheet. Potential jurisdictional wetland areas were classified using the USACE Wetland Determination Data Form (refer to Section 5.1 below for more information on jurisdictional wetlands).

The results of the on-site field investigation indicate that there are seven jurisdictional stream channels located within the proposed project area that are all unnamed tributaries to South Fork Cane Creek. The stream reaches include UT to South Fork Cane Creek (UTSF) and several unnamed tributaries to UTSF (UT1A, UT1B, UT1C, UT2A, UT2B, UT3A, UT3B, UT4A, UT4B, and UT5). Figure 6 shows the hydrologic features of the Site. Stream classification forms representative of on-site jurisdictional channels have been enclosed in Appendix 4 (SCP1-SCP10). Site photographs are included in Appendix 1. There is currently no best usage classification assigned by the NCDWR for streams on this Site.

4.6 Existing Stream Condition

An existing conditions assessment was performed in May and June, 2014. The purpose of the assessment was to characterize the existing morphology of the Site; identify incision, bank erosion, lack of native vegetation, sedimentation, and poor habitat conditions; and to provide a basis for developing a design to enhance the ecological function of the Site. The locations of the project reaches and surveyed cross-sections are shown in Figure 6. Existing conditions geomorphic survey data are included in Appendix 5. The reach summary information for each stream is summarized in Table 5 and the existing geomorphic conditions are summarized in Table 6.

4.6.1 UT to South Fork Cane Creek

UTSF is divided into two sections for existing conditions analysis. The channel slope and valley slope for UTSF are typical for Piedmont streams in similar valley types (Table 6). The bed of UTSF is predominately characterized by runs, with a few log/debris jams creating isolated pools. Livestock have direct access to the stream, which has resulted in heavily trampled banks and an actively eroding channel. The active scour zones and wallow areas are contributing to the fining of bed material as evidenced by the reach-wide sediment characterization. Pebble-counts and sieve analysis of sediment samples were utilized to characterize sediment within the existing channel and to identify the predominant substrate as silt and sand. The channel classifies as a Rosgen E5. Results of the existing conditions morphologic survey of UTSF Reach 1 and 2 are summarized in Table 6 and the survey data is included in Appendix 5.

Vegetative buffers along the reach range from areas of mature trees to open pasture. The forested buffer from the upstream extent to the confluence with UT2 averages 75 feet on each bank. However, cattle have extensively grazed and trampled the understory resulting in limited vegetative regeneration and ground cover within this reach. The forested buffer from the confluence with UT2 to the downstream extent is intermittent and disconnected. Canopy species include American elm (*Ulmus americana*), sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), red maple (*Acer rubrum*), willow oak (*Quercus phellos*), and southern red oak (*Quercus falcata*). Understory and herbaceous species were limited but include eastern red cedar

(*Juniperus virginiana*), coralberry (*Symphoricarpos orbiculatus*), Chinese privet (*Ligustrum sinense*), soft rush (*Juncus effusus*), Japanese honeysuckle (*Lonicera japonica*), and Nepalese browntop (*Microstegium vimineum*).

4.6.2 UT1

The UT1 drainage area is an intermittent system that is divided into three reaches for existing conditions analysis. The majority of the drainage area to UT1 is primarily used for livestock grazing. Livestock have direct access to the stream reaches, which has resulted in heavily trampled banks and an actively eroding channel. The active scour zones and wallow areas are contributing to the fining of bed material. Channel incision ranges from slight to moderate throughout the reaches. The UT1 reaches classify as Rosgen B5 channel types. Results of the existing conditions morphologic survey of UT1 are summarized in Table 6 and the survey data is included in Appendix 5.

Riparian vegetation along the UT1A reach is predominately managed herbaceous species comprised of fescue (*Festuca sp.*), blackberry (*Rubus sp.*), coralberry, white clover (*Trifolium repens*), buttercup species (*Ranunculus spp.*), and multiflora rose (*Rosa multiflora*). UT1B contains mature trees within the riparian zone, but several mature trees were noted as stressed or dying presumably as a result of root compaction from cattle trampling. The UT1C reach contains a narrow corridor of mature trees with little to no middle and understory due to cattle grazing. Tree species within the UT1 reaches include American elm, green ash, red maple, white oak (*Quercus alba*), sweetgum, and willow oak.

4.6.3 UT2

UT2 begins as an intermittent stream and develops into a perennial system prior to its confluence with UTSF. While UT2 has an intact mature riparian corridor, cattle have open access to the entire reach and have heavily impacted the understory and herbaceous layers. While the majority of the upper reach is impacted by cattle, the reach is relatively stable. The lower reach prior to the confluence with UTSF has been heavily trampled by cattle. The UT2 reach classifies as Rosgen B5 channel types. Results of the existing conditions morphologic survey of UT2 are summarized in Table 6 and the survey data is included in Appendix 5.

The vegetative buffers along the reach are approximately 200 feet on each bank and are predominately comprised of mature trees. Canopy species along UT2 include American elm, green ash, red maple, eastern red cedar, willow oak, white oak, hickory sp. (*Carya sp.*), and tulip poplar (*Liriodendron tulipifera*). Understory and herbaceous species were limited but include coralberry, Chinese privet, Japanese honeysuckle, and Nepalese browntop.

4.6.4 UT3

UT3 is an intermittent system within an active cattle pasture. While the entire reach is impacted by cattle, the majority of the stream reach is relatively stable. The stream channel is no longer discernable along the lower reach due to cattle trampling. The UT3 reach classifies as Rosgen E5b channel type. Results of the existing conditions morphologic survey of UT3 are summarized in Table 6 and the survey data is included in Appendix 5.

Riparian vegetation along the reach is predominately comprised of managed herbaceous layers including fescue, white clover, Nepalese browntop, horseweed, and buttercup species. Scattered canopy trees are present primarily within the upper extent of the reach and include red maple, sugarberry (*Celtis laevigata*), willow oak, and tulip poplar. An isolated stand of green ash and sugarberry with an understory of Chinese privet is located near the confluence with UTSF.

Table 5: Reach Summary Information

Maney Farm Mitigation Project

	UTSF R1	UTSF R2	UT1A	UT1B	UT1C	UT2A	UT2B	UT3A	UT3B	UT4A	UT4B	UT5
Existing Length (LF)	2,298	1,209	390	102	166	485	44	418	84	217	40	778
Valley Slope (feet/ foot)	0.0131	0.0086	0.0187	0.0396	0.0187	0.0366	0.0366	0.0377	0.0377	0.0232	0.0232	0.0139
Drainage Area (acres)	115	211	16	4	19	11	11	10	10	20	20	76
Drainage Area (miles ²)	0.18	0.33	0.02	0.01	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.12
NCDWR Stream ID Score	27/37	37	21	25.5	28	26/30	30	20.75	20.75	22.5	22.5	32.5
Perennial (P) or Intermittent (I)	I/P	P	I	I	I	I/P	P	I	I	I	I	P
NCDWR Classification	N/A											
Rosgen Classification of Existing Conditions	E5	E5	B5	-	B5	B5	B5	E5b	E5b	E5b	E5b	E5
Simon Evolutionary Stage	II/IV	II/IV	III	V	II/IV	II/V	II/V	V/VI	V/VI	II/V	II/V	II/III
FEMA Zone Classification	X											

Note: The Rosgen classification system is for natural streams. These channels have been heavily manipulated and impacted by livestock trampling and therefore the Rosgen classification system is used to describe an approximate description of stream type only.

Table 6: Stream Existing Conditions
Maney Farm Mitigation Project

Parameter	Notation	Units	UTSF-R1		UTSF-R2		UT1A		UT1B		UT1C		UT2A		UT2B		UT3A		UT3B		UT4A		UT4B		UT5	
			min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
stream type			E5		E5		B5		-		B5		B5		B5		E5b		E5b		E5b		E5b		E5	
drainage area	DA	sq mi	0.18		0.33		0.02		0.01		0.03		0.02		0.02		0.02		0.02		0.03		0.03		0.12	
bankfull cross-sectional area	A _{bkf}	SF	4.1	7.1	5.4	5.6	2.1		-		2.1		1.1		1.1		1.1		1.1		1.9		1.9		3.5	
avg velocity during bankfull event	v _{bkf}	fps	2.8	4.8	3.4	3.6	3.1		-		3.0		3.4		3.4		3.2		3.2		3.0		3.0		2.1	
width at bankfull	w _{bkf}	feet	3.2	12.0	4.7	8.2	5.8		-		4.1		2.6		2.6		2.2		2.2		4.4		4.4		5.7	
maximum depth at bankfull	d _{max}	feet	1.2	2.0	1.5		0.6		-		0.8		0.5		0.5		0.8		0.8		1.0		1.0		1.2	
mean depth at bankfull	d _{bkf}	feet	0.6	1.3	0.7	1.2	0.4		-		0.5		0.4		0.4		0.5		0.5		0.4		0.4		0.6	
bankfull width to depth ratio	w _{bkf} /d _{bkf}		2.5	20.4	4.0	12.3	15.9		-		8.1		6.2		6.2		4.6		4.6		9.9		9.9		9.1	
low bank height		feet	2.6	2.7	2.1	2.9	1.5		-		1.8		2.9		2.9		1.7		1.7		1.4		1.4		1.6	
bank height ratio	BHR		1.3	2.2	1.4	1.9	2.3		-		2.3		5.4		5.4		2.2		2.2		1.4		1.4		1.4	
max pool depth at bankfull	d _{pool}	feet	1.5	1.8	1.8	2.0	-		-		-		-		-		-		-		-		-		1.4	
pool depth ratio	d _{pool} /d _{bkf}		1.4	2.5	1.7	2.6	-		-		-		-		-		-		-		-		-		2.3	
pool width at bankfull	w _{pool}	feet	5.6	7.2	7.0	7.5	-		-		-		-		-		-		-		-		-		3.7	
pool width ratio	w _{pool} /w _{bkf}		0.6	1.8	0.9	1.5	-		-		-		-		-		-		-		-		-		0.7	
Bkf pool cross-sectional area	A _{pool}	SF	6.6	7.2	8.5	11.1	-		-		-		-		-		-		-		-		-		3.4	
pool area ratio	A _{pool} /A _{bkf}		1.0	1.6	1.6	2.0	-		-		-		-		-		-		-		-		-		1.0	
floodprone area width	w _{fpa}	feet	15.2	50.0	69.8	82.0	10.6		-		5.3		4.4		4.4		11.4		11.4		23.3		23.3		40.0	
entrenchment ratio	ER		1.4	12.5	10.0	14.8	1.8		-		1.3		1.7		1.7		5.1		5.1		5.3		5.3		7.1	
valley slope	S _{valley}	feet/ foot	0.0131		0.0086		0.0187		0.0396		0.0187		0.0366		0.0366		0.0377		0.0377		0.0232		0.0232		0.0139	
channel slope	S _{channel}	feet/ foot	0.0090		0.0057		0.01282		0.0323		0.0186		0.0195		0.0157		0.0383		0.0291		0.0259		0.0651		0.0112	
sinuosity	K		1.34		1.33		1.10		1.16		1.17		1.12		1.04		1.09		1.00		1.14		1.06		1.34	
belt width	w _{blt}	feet	5	42	10	37	8	22	6	9	10	18	4	26	1	2	26	27	-	-	4	13	2	3	3	18
meander width ratio	w _{blt} /w _{bkf}		1.6	3.5	2.1	4.5	1.4	3.8	-		2.4	4.4	1.5	10.0	0.4	0.8	11.8	12.3	-	-	0.9	3.0	0.5	0.7	0.5	3.2

Parameter	Notation	Units	UTSF-R1		UTSF-R2		UT1A		UT1B		UT1C		UT2A		UT2B		UT3A		UT3B		UT4A		UT4B		UT5	
			min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max	min	max
meander length	L_m	feet	18	100	21	59	47	155	28	36	54	63	5	15	12		131	131	-	-	29	44	11	22	16	58
meander length ratio	L_m/W_{bkf}		5.6	8.3	4.5	7.2	8.1	26.7	-		13.2	15.4	1.9	5.8	4.6		60.0	72.7	-	-	6.6	10.0	2.5	5.0	2.8	10.2
radius of curvature	R_c	feet	4	25	5	13	6	20	7	9	9	16	3	16	1	3	25	25	-	-	3	11	2	3	3	14
radius of curvature ratio	R_c/W_{bkf}		1.3	2.1	1.1	1.6	1.0	3.5	-		2.2	3.9	1.2	6.2	0.4	1.2	11.4	15.0	-	-	0.7	2.5	0.5	0.7	0.5	2.5
Particle Size Distribution from Reachwide Pebble Count / Sieve Analysis																										
d ₅₀ Description			Medium Sand	Silt/Clay	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Silt/Clay	
	d ₁₆	mm	Silt/Clay	Silt/Clay	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Silt/Clay	
	d ₃₅	mm	Very Fine Sand	Silt/Clay	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Silt/Clay	
	d ₅₀	mm	Medium Sand	Silt/Clay	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Silt/Clay	
	d ₈₄	mm	11.08	6.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.9	
	d ₉₅	mm	15.41	28.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	22.6	
	d ₁₀₀	mm	22.6	180	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	64	

4.6.5 UT4

Livestock have direct access to UT4 which has resulted in trampled bed and banks throughout the reach. The lower reach near the confluence of UTSF has areas of active headcuts and unstable banks. Vegetative buffers along the reach range from areas with narrow strips of mature trees to open pasture. The UT4 reach classifies as Rosgen E5b channel type. Results of the existing conditions morphologic survey of UT4 are summarized in Table 6 and the survey data is included in Appendix 5.

Canopy species along this reach include white oak, sweetgum, eastern red cedar, and green ash. Understory species include American holly (*Ilex opaca*), eastern red cedar, and American elm. The shrub and herbaceous layer primarily included Chinese privet, coralberry, Nepalese browntop, fescue, white clover, and buttercup.

4.6.6 UT5

UT5 begins in a heavily forested area in which cattle have been excluded. The impacted reach in which cattle have access ranges from areas of mature over-story in the upper extent to managed herbaceous layers near the confluence with UTSF. Deposition of fine material is apparent along the impacted portion of this stream. Results of the existing conditions morphologic survey of UT4 are summarized in Table 6 and the survey data is included in Appendix 5.

Canopy species include American elm, green ash, red maple, willow oak, southern red oak. Understory and herbaceous species were limited but include black willow (*Salix nigra*), eastern red cedar, coralberry, Chinese privet, and Nepalese browntop. Existing condition surveys showed areas of incision along with trampled bed and banks. The incision and cattle trampling have resulted in a fining of bed material with a median particle size of silt/clay. The UT5 reach classifies as Rosgen E5 channel type. Results of the existing conditions morphologic survey of UT4 are summarized in Table 6 and the survey data is included in Appendix 5.

4.7 Channel Evolution

The presence of livestock and agricultural land use practices have prevented the channels from evolving from disturbed to stable conditions. For this reason, the historic condition of the channels is discussed below but a detailed discussion of channel evolution is not warranted.

According to the historical aerial photographs, the land use on-site has been hay or livestock production since 1972. The riparian buffer widths were reduced prior to the early 1970s to maximize the area available for agricultural practices. The extent of riparian buffers on site and within the contributing watershed have remained essentially unchanged since. These historic landscape disturbances likely resulted in higher discharge and sediment loads to project streams which would have perturbed the system and resulted in morphologic changes. However, the land cover alterations likely ceased quickly in which case the channels would have re-stabilized. However, on-going livestock access has resulted in continual trampling of the stream beds and banks and this, along with a lack of riparian vegetation along much of the project stream length, has prevented the channels from progressing to stable forms.

The propagation of headcuts through the project reaches have been arrested by large roots and debris jams which are the primary sources of grade control. However, incision that resulted from headcuts remains along some reaches and contributes to the instability of the system. Bank failures through mass wasting were observed along portions of the project. The channels will not progress

to a stable, equilibrium state until livestock are removed from the streams, stable channel dimensions are established, and incision is corrected.

4.8 Channel Stability

Wildlands utilized a modified version of the Rapid Assessment of Channel Stability as described in Hydrologic Engineering circular (HEC)-20 (Lagasse et al., 2001). The method is semi-qualitative and incorporates 13 stability indicators that are evaluated in the field. In a 2006 publication, the Federal Highway Administration (FHWA) updated the method for HEC-20 by modifying the metrics included in the assessment and incorporating a stream type determination. The result is an assessment method that can be rapidly applied on a variety of stream types in different physiographic settings with a range of bed and bank materials.

The Channel Stability Assessment protocol was designed to evaluate 13 parameters. Once all parameters are scored, the stability of the stream is classified as Excellent, Good, Fair, or Poor. As the protocol was designed to assess stream channel stability near bridges, two minor modifications were made to the methodology to make it more applicable to project specific conditions. The first modification involved adjusting scoring so that naturally meandering streams score lower (better condition) than straight and/or engineered channels. Because straight, engineered channels are hydraulically efficient and necessary for bridge protection, they score low (excellent to good rating) with the original methodology. Secondly, the last assessment parameter – upstream distance to bridge – was removed from the protocol because it relates directly to the potential effects of instability on a bridge and should not influence stability ratings for the streams for this project. The final scores and corresponding ratings were based on the 12 remaining parameters. The rating adjectives were assigned to the streams based on the FHWA guidelines for pool-riffle stream types.

The HEC-20 manual also describes both lateral and vertical components of overall channel stability, which can be separated with this assessment methodology. Some of the parameters described above relate specifically to either vertical or horizontal stability. When all parameter scores for the vertical category or all parameter scores for the horizontal category are summed and normalized by the total possible scores for their respective categories, a vertical or horizontal fraction is produced. These fractions may then be compared to one another to determine if the channel is more vertically or horizontally unstable.

The assessment results for the streams on the Site are shown in Table 7 and the forms are included in Appendix 6. Reaches UT1A, UT1C, UT2A/B, UT3A/B, and UT4A/B were all rated good whereas UTSF R1, UTSF R2, UT1B, and UT5 were all rated as fair. The vertical and lateral fractions for UT1A, UT1C, UT2A/B, UT3A/B, and UT4A/B are similar indicating that the streams are no more laterally unstable than vertically unstable. These reaches are considered fairly stable and enhancement activities are the proposed mitigation approach, though redesign of the downstream ends of each channel is required in order to connect these streams to the restored UTSF reach. For UTSF, UT1B, and UT5 the lateral fraction is larger than the vertical fraction indicating that, although some incision may have occurred, the streams are more laterally unstable than vertically unstable. The lateral instability is related to a combination of factors including livestock trampling, mass wasting, and fluvial erosion. Due to the fairly significant lateral instability of these reaches, a restoration approach is proposed. While UT1B falls within this category of significant lateral instability (almost completely related to livestock trampling), restoration is not proposed for this very small drainage.

Table 7: Existing Conditions Channel Stability Assessment Results*Maney Farm Mitigation Project*

Parameter	UTSF R1	UTSF R2	UT1 A & C	UT1B	UT2 A & B	UT3 A & B	UT4 A & B	UT5
1. Watershed characteristics	10	10	11	11	6	6	6	4
2. Flow habit	1	1	7	7	3	3	3	1
3. Channel pattern	8	8	5	7	3	4	4	9
4. Entrenchment	4	4	3	2	7	3	3	6
5. Bed material	8	8	9	10	7	10	7	9
6. Bar development	1	1	3	3	3	3	3	10
7. Obstructions	8	8	4	4	4	2	3	4
8. Bank soil texture and coherence	3	3	4	4	4	3	3	5
9. Average bank slope angle	10	10	6	6	7	7	7	11
10. Bank protection	10	10	7	9	6	4	7	11
11. Bank cutting	11	9	6	9	4	4	4	8
12. Mass wasting or bank failure	9	9	6	9	4	7	4	9
Score	83	81	71	81	58	56	54	87
Ranking	Fair	Fair	Good	Fair	Good	Good	Good	Fair
Lateral Score	43	41	29	37	25	25	25	44
Vertical Score	13	13	15	15	17	16	13	25
Lateral Fraction	72%	68%	48%	62%	42%	42%	42%	73%
Vertical Fraction	36%	36%	42%	42%	47%	44%	36%	69%

4.9 Utilities and Site Access

There are no underground or overhead utilities on the Site. There is an existing culvert under a state maintained road at the upstream end of UTSF and UT1B (Center Church Road). The project will not affect these culverts and they will remain in place in their current configuration. There is one 25 foot wide proposed easement break that will include a culverted crossing. The crossings will be fenced both upstream and downstream to permanently prevent livestock access and provide better protection of the riparian area. This crossing area is not included in the mitigation credit calculation for the Site. The Site is accessible from a farm road and pasture access gates off of Center Church Road.

5.0 REGULATORY CONSIDERATIONS

5.1 401/404

On May 28 and 29, 2014 Wildlands investigated on-site jurisdictional Waters of the U.S. within the proposed project easement area. Jurisdictional areas were delineated using the USACE Routine On-Site Determination Method. This method is defined by the 1987 Corps of Engineers Wetlands Delineation Manual and subsequent Eastern Mountain and Piedmont Regional Supplement. Wetland determination Data Forms representative of on-site jurisdictional areas as well as non-

jurisdictional upland areas have been included in Appendix 7. All jurisdictional waters of the U.S. were surveyed by Turner Land Surveying, PLLC.

The results of the on-site field investigation indicate that there are seven jurisdictional stream channels located within the proposed project area that are all unnamed tributaries to South Fork Cane Creek (UTSF, UT1{Reach A and C}, UT1B, UT2{Reach A and B}, UT3{Reach A and B}, UT4{Reach A and B}, and UT5). UTSF downstream of the confluence with UT1, the lower half of UT2, and UT5 are classified as perennial channels. UT1, UT1B, the upper extent of UT2, UT3, and UT4 are classified as an intermittent stream channels.

Twenty one jurisdictional wetland areas, ranging from 0.003 to 0.203 acres, were identified within or immediately adjacent to the proposed project area (Wetland A-U) and are located within the floodplains of the unnamed tributaries. These 21 areas are considered wetland inclusions in non-wetland soils. Wetlands A, B, D, F, L, and N – U were classified as bottomland hardwood forest using the North Carolina Wetland Assessment Method (NCWAM) classification key and the evaluator’s best professional judgment. Wetlands C, E, G-K, and M were classified as seeps. On-site wetland features exhibited saturation within the upper 12 inches of the soil profiles, low chroma soils, drainage patterns, and/or pockets of shallow inundation. Common hydrophytic vegetation included American elm, green ash, shallow sedge, and soft rush. Characteristics of wetlands A-U are described in Table 8.

The design of the Site is focused on minimizing impacts to the wetlands and protecting wetland areas with a conservation easement. All wetland areas inside the limits of disturbance will be flagged with safety fence during construction to prevent unintended impacts. This will be denoted in the final construction plans Erosion and Sediment Control sheets, details and specifications. Potential impacts to existing wetlands will be described in the Pre-Construction Notification, included in the Final Mitigation Plan, and depicted in the final Construction Plans.

Table 8: Wetland Summary Information*Maney Farm Mitigation Project*

	A	B	C	D	E	F	G
Size of Wetland (acres)	0.006	0.010	0.034	0.005	0.052	0.003	0.008
Wetland Type	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Seep	Bottomland Hardwood Forest	Seep	Bottomland Hardwood Forest	Seep
Mapped Soil Series	Cid-Lignum	Cid-Lignum	Cid-Lignum / Naford-Badin	Cid-Lignum	Cid-Lignum / Naford-Badin	Cid-Lignum	Cid-Lignum
Drainage Class	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Well to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Well to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained
Soil Hydric Series	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained
Source of Hydrology	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater Seep	Groundwater / Overbank Flooding	Groundwater Seep	Groundwater / Overbank Flooding	Groundwater Seep
Hydrologic Impairment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest
% Composition Invasive Species	0%	5%	5%	10%	0%	10%	10%

Table 8: Wetland Summary Information*Maney Farm Mitigation Project*

	H	I	J	K	L	M	N
Size of Wetland (acres)	0.012	0.007	0.008	0.203	0.015	0.023	0.029
Wetland Type	Seep	Seep	Seep	Seep	Bottomland Hardwood Forest	Seep	Bottomland Hardwood Forest
Mapped Soil Series	Cid-Lignum	Naford-Badin	Naford-Badin	Naford-Badin	Cid-Lignum / Cid Silt Loam	Cid-Lignum	Cid-Lignum
Drainage Class	Moderately to Somewhat Poorly Drained	Well Drained	Well Drained	Well Drained	Moderately Well to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained
Soil Hydric Series	Wehadkee, Undrained	N/A	N/A	N/A	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained
Source of Hydrology	Groundwater Seep	Groundwater Seep	Groundwater Seep	Groundwater Seep	Groundwater / Overbank Flooding	Groundwater Seep	Groundwater / Overbank Flooding
Hydrologic Impairment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest
% Composition Invasive Species	5%	5%	5%	1%	10%	5%	10%

Table 8: Wetland Summary Information*Maney Farm Mitigation Project*

	O	P	Q	R	S	T	U
Size of Wetland (acres)	0.029	0.014	0.176	0.019	0.005	0.009	0.010
Wetland Type	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest
Mapped Soil Series	Cid-Lignum	Cid-Lignum	Cid-Lignum	Cid-Lignum	Cid-Lignum	Cid-Lignum	Cid-Lignum
Drainage Class	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained	Moderately to Somewhat Poorly Drained
Soil Hydric Series	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained	Wehadkee, Undrained
Source of Hydrology	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding	Groundwater / Overbank Flooding
Hydrologic Impairment	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Native Vegetation Community	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest	Bottomland Hardwood Forest
% Composition Invasive Species	10%	15%	10%	0%	10%	15%	5%

5.2 Threatened and Endangered Species

5.2.1 Site Evaluation Methodology

The Endangered Species Act (ESA) of 1973, amended (16 U.S.C. 1531 et seq.), defines protection for species with Federal Classification of Threatened (T) or Endangered (E). An “Endangered Species” is defined as “any species which is in danger of extinction throughout all or a significant portion of its range” and a “Threatened Species” is defined as “any species which is likely to become an Endangered Species within the foreseeable future throughout all or a significant portion of its range” (16 U.S.C. 1532).

Wildlands utilized the US Fish and Wildlife Service (USFWS) and NC Natural Heritage Program (NHP) databases to search for federally listed threatened and endangered plant and animal species in Chatham County, NC. Four federally listed species; the red-cockaded woodpecker (*Picoides borealis*), the bald eagle (*Haliaeetus leucocephalus*), Cape Fear shiner (*Notropis mekistocholas*), and harperella (*Ptilimnium nodosum*) are currently listed in Chatham County (Table 8). The Categorical Exclusion (included in Appendix 8) has been approved by the Federal Highway Administration.

Table 9: Listed Threatened and Endangered Species in Chatham County, NC
Maney Farm Mitigation Project

Species	Federal Status	Habitat	Biological Conclusions
Vertebrate			
Red-cockaded woodpecker (<i>Picoides borealis</i>)	E	Open stands of mature pines	No affect
Bald eagle (<i>Haliaeetus leucocephalus</i>)	BGPA	Near large open water bodies: lakes, marshes, seacoasts, and rivers	May affect, but not likely to adversely affect
Cape Fear shiner (<i>Notropis mekistocholas</i>)	E	Pools, riffles, and runs of rocky, clean freshwater streams	No affect
Vascular Plant			
Harperella (<i>Ptilimnium nodosum</i>)	E	Rocky or gravely sholas of clear swift-moving streams	May affect, but not likely to adversely affect

BGPA = Bald and Golden Eagle Protection Act

5.2.2 Threatened and Endangered Species Descriptions

Red-cockaded woodpecker

The red-cockaded woodpecker is a medium-sized woodpecker species (8 to 9 inches in length). Distinctive coloration includes black and white feathers with a large white cheek patch and a black back with a white barred pattern. This species is typically found year-round in large open stands of pines with mature trees of 60+ years in age. The foraging habitat for this species may include pine hardwood stands of longleaf and southern pine, 30+ years in age. Occurrences of the red-cockaded woodpecker are listed as historic within Chatham County.

Bald eagle

The bald eagle is a very large raptor species, typically 28 to 38 inches in length. Adult individuals are brown in color with a very distinctive white head and tail. Bald eagles typically live near large bodies of open water with suitable fish habitat including lakes, marshes, seacoasts, and rivers. This species generally requires tall, mature tree species for nesting and roosting. Bald eagles were delisted from the Endangered Species List in June 2007; however, this species remains under the protection of the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act (BGPA). This species is known to occur in every U.S. state except Hawaii.

Cape Fear shiner

The Cape Fear shiner is a small minnow fish species, typically 2 inches in length. This species is pale silvery yellow in color with a black stripe along each side and yellow fins. Water willow beds in flowing areas of creeks and rivers appear to be part of the essential habitat for this species. Individuals can be found in pools, riffles, and slow runs of clean, rocky streams composed of gravel, cobble, and boulder substrates. Critical habitat for this species within Chatham County includes approximately 4.1 miles of the Rocky River from the NC-902 bridge downstream to the County Road 1010 Bridge. Additional critical habitat includes 0.5 mile of Bear Creek from the County Road 2156 bridge downstream to the Rocky River and 4.2 miles downstream within the Rocky River to 2.6 miles of the Deep River.

Harparella

Harperella is an obligate, annual vascular plant ranging in height from 6 to 36 inches. This plant exhibits small white clusters of flowers at the stem tops similar to Queen Anne's lace. This species typically flowers from May until the first frost. Ideal habitat for this species includes pond and riverine areas with gravelly shoals of clear, swift-flowing streams. These areas typically require moderately intensive spring floods to scour gravel bars and rock crevices to remove any competing vegetation. Known population occurrences of harperella have been observed in Chatham County within the past 20 years.

5.2.3 Biological Conclusions

Based on a pedestrian survey of the Site that was performed on May 28 and 29, 2014; no individual species or critical habitat was found to exist on the Site.

Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resource Commission (NCWRC) on February 26, 2014. NCWRC responded on March 14, 2014 and stated they "do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial resources." The USFWS responded on April 4, 2014 and concurred with NCWRC stating that "the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act." All correspondence is located in Appendix 8.

5.3 Cultural Resources

5.3.1 Site Evaluation Methodology

The National Historic Preservation Act (NHPA) of 1966, as amended (16 U.S.C. 470), defines the policy of historic preservation to protect, restore, and reuse districts, sites, structures, and objects significant in American history, architecture, and culture. Section 106 of the NHPA mandates that

federal agencies take into account the effects of their undertakings on any property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

5.3.2 SHPO/THPO Concurrence

Wildlands requested review and comment from the State Historic Preservation Office (SHPO) with respect to any archeological and architectural resources related to the Site on February 26, 2014. The SHPO responded on March 24, 2014 and stated they were not aware of any historic resources that would be affected by the project. All correspondence related to this is located in Appendix 8.

5.4 FEMA Floodplain Compliance and Hydrologic Trespass

The Site is represented on the Chatham County Flood Insurance Rate Map Panels 8784 and 8796 (Figure 7). There are no FEMA regulated floodplain areas on the Site. Email correspondence with the Chatham County Public Works Director pertaining to floodplain development permitting is included in Appendix 9 along with the FEMA / DMS checklist.

The project will be designed so that any increase in flooding will be contained on the Site and will not extend upstream to adjacent parcels, so hydrologic trespass will not be a concern. The proposed restoration has been designed to transition back to the existing boundary conditions in a gradual manner.

6.0 REFERENCE SITES

6.1 Reference Streams

Reference streams provide geomorphic parameters of a stable system, which can be used to design stable channels of similar stream types in similar landscapes and watersheds. Four reference reaches were identified near the Site and used to support the design of the proposed restoration (Figure 8). A range of reference reach metrics were utilized in order to properly tie in the enhancement reach confluences with the restoration reaches. These reference reaches were chosen because of their similarities to the project streams to be restored including drainage area, valley slope, morphology, and bed material. The reference reaches are within the Carolina Slate Belt region of the Piedmont. Geomorphic parameters for these reference reaches are summarized in Table 10.

6.2 Channel Morphology and Classification of Reference Streams

The Agony Acres reference reach (UT1A – Reach 1) is located in northeast Guilford County, NC. It was identified as a high quality preservation area on the Agony Acres Mitigation Site in the mitigation plan submitted in March, 2014 and was used as a reference reach for that project. Wildlands performed a detailed morphologic survey in March of 2013. The Agony Acres reference reach has a drainage area of 0.3 square miles and is classified as a Rosgen E4 stream type. While the slope range on the reference reach is slightly higher than the design reach, this reference site was specifically chosen because of a similar drainage area and discharge as that of UTSF.

The UT to Cane Creek reference reach is located in southern Alamance County and is classified as a Rosgen E4 stream type. Wildlands conducted a site visit and surveyed an additional cross section typical of the reference reach in 2012. The reach has a drainage area of 0.28 square miles and flows through a mature forest. The site is similar to stream reaches at Maney Farm in valley type and slope.

The UT to Varnals reference reach is located in south central Alamance County, NC near the Cane Creek Mountains. The site was identified by EcoLogic Associates and used as a reference reach for the Reedy Branch stream restoration site (EcoLogic Associates, 2002). Wildlands visited UT to Varnals in September, 2014 and visually confirmed that the land use is unchanged from reported conditions and that the stream is laterally and vertically stable. Wildlands conducted a detailed morphological survey in October, 2014. UT to Varnals has a drainage area of 0.41 square miles and is classified as a Rosgen E4 stream type for the majority of the reach. There are portions of the stream where the valley constricts reducing the entrenchment ratio below those typical for Rosgen type E channels and more towards those typical for Rosgen B type channels. This shift between a B and E type channels suits the design for tying in the UT1, UT2, UT3, and UT4 reaches to UTSF.



Table 10: Summary of Reference Reach Geomorphic Parameters
 Maney Farm Mitigation Project

	Notation	Units	Agony Acres UT1A - Reach 1		UT to Cane Creek		UT to Varnals Creek	
			Min	Max	Min	Max	Min	Max
stream type			E4		C4		E4	
drainage area	DA	sq mi	0.30		0.29		0.41	
design discharge	Q	cfs	25.3		40.0		54.0	
bankfull cross-sectional area	A _{bkf}	SF	10.7	11.3	8.9	12.2	10.3	12.3
average velocity during bankfull event	V _{bkf}	fps	2.2	2.4	3.8		4.4	5.2
width at bankfull	W _{bkf}	feet	9.1	10.4	11.5	12.3	9.3	10.5
maximum depth at bankfull	d _{max}	feet	1.8		1.2	1.6	1.5	1.7
mean depth at bankfull	d _{bkf}	feet	1.0	1.2	0.8	1.0	1.1	1.2
bankfull width to depth ratio	w _{bkf} /d _{bkf}		7.3	10.1	12.3	14.4	8.1	9.3
depth ratio	d _{max} /d _{bkf}	feet	1.8		1.5	1.6	1.4	
bank height ratio	BHR		1.0		N/A		0.9	1.0
floodprone area width	W _{fpa}	feet	>36		31		20	64
entrenchment ratio	ER		>3.9		2.5	2.7	1.9	6.1
valley slope	S _{valley}	feet/foot	0.010	0.034	0.026		0.020	
channel slope	S _{chnl}	feet/foot	0.004	0.028	0.015		0.017	
riffle slope	S _{riffle}	feet/foot	N/A		0.0188	0.0704	0.024	0.057
riffle slope ratio	S _{riffle} /S _{chnl}		N/A		1.3	4.7	1.4	3.4
pool slope	S _p	feet/foot	N/A		0.001	0.011	0.000	0.015
pool slope ratio	S _p /S _{chnl}		N/A		0.0	0.7	0.0	0.9
pool-to-pool spacing	L _{p-p}	feet	N/A		27	73	8	82
pool spacing ratio	L _{p-p} /W _{bkf}		N/A		2.3	6.1	0.5	5.6

	Notation	Units	Agony Acres UT1A - Reach 1		UT to Cane Creek		UT to Varnals Creek	
			Min	Max	Min	Max	Min	Max
pool cross-sectional area	A_{pool}	<i>SF</i>	14.5		11.9		22.0	22.7
pool area ratio	A_{pool}/A_{bkf}		1.3		1.0	1.3	1.8	1.9
maximum pool depth	d_{pool}	<i>feet</i>	2.5		1.8	2.3	2.5	2.6
pool depth ratio	d_{pool}/d_{bkf}		2.3		2.3		3.0	3.1
pool width at bankfull	w_{pool}	<i>feet</i>	9.4		8.5		15.1	18.6
pool width ratio	w_{pool}/w_{bkf}		1.0		0.7		1.0	1.3
sinuosity	K		1.35		1.40		1.20	
belt width	w_{bit}	<i>feet</i>	21	93	102		15	45
meander width ratio	w_{bit}/w_{bkf}		2.3	8.9	8.3	8.9	1.0	3.0
meander length	L_m	<i>feet</i>	--	--	--	--	--	--
meander length ratio	L_m/w_{bkf}		--	--	--	--	--	--
radius of curvature	R_c	<i>feet</i>	14	60	23	38	8	47
radius of curvature ratio	R_c/w_{bkf}		1.5	5.8	2.0	3.1	0.6	3.2

7.0 DETERMINATION OF CREDITS

Mitigation credits presented in Table 11 are projections based on site design. Upon completion of site construction, the project components and credits data will be revised to be consistent with the as-built condition.

Table 11: Determination of Credits

Maney Farm Mitigation Project

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian wetland		Buffer	Nitrogen Nutrient Offset	Phosphorus Nutrient Offset
Type	R	RE	R	RE	R	RE			
Totals	4,922	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Project Components							
Project Component or Reach ID	Existing Footage/Acreage	Proposed Stationing Location	Approach (P1, P2, etc)	Restoration (R) or Restoration Equivalent (RE)	Restoration Footage or Acreage	Mitigation Ratio	Proposed Credit
UTSF-R1	2,298	100+00-121+63	P1	R	2,122	1:1	2,122
UTSF-R2	1,209	121+63 - 132+24	P1	R	1,061	1:1	1,061
UT1A	390	250+00 - 253+90	E2	R	390	2.5:1	156
UT1B	101	199+08 - 200+00	E2	R	92	2.5:1	37
UT1C	166	200+00 - 202+60	E1	R	260	1.5:1	173
UT2A	485	295+15 - 300+00	E2	R	484	2.5:1	194
UT2B	44	300+00 - 300+74	E1	R	73	1.5:1	49
UT3A	418	395+79 - 400+00	E2	R	421	2.5:1	168
UT3B	84	400+00 - 401+63	E1	R	162	1.5:1	108
UT4A	217	497+87 - 500+00	E2	R	212	2.5:1	85
UT4B	40	500+00 - 501+38	E1	R	138	1.5:1	92
UT5	778	602+00 - 608+77	P1	R	677	1:1	677
Component Summation							
Restoration Level	Stream (LF)	Riparian Wetland (Acres)	Non-Riparian Wetland (AC)		Buffer (sq.ft.)	Upland (AC)	
Restoration	3,860	N/A	N/A		N/A	N/A	
Enhancement	N/A	N/A	N/A		N/A	N/A	
Enhancement I	633	N/A	N/A		N/A	N/A	
Enhancement II	1,599	N/A	N/A		N/A	N/A	
Creation	N/A	N/A	N/A		N/A	N/A	
Preservation	N/A	N/A	N/A		N/A	N/A	

8.0 CREDIT RELEASE SCHEDULE

All credit releases will be based on the total credit generated as reported by the as-built survey of the mitigation site. Under no circumstances shall any mitigation project be debited until the necessary DA authorization has been received for its construction or the District Engineer (DE) has otherwise provided written approval for the project in the case where no DA authorization is required for construction of the mitigation project. The DE, in consultation with the Interagency Review Team (IRT), will determine if performance standards have been satisfied sufficiently to meet the requirements of the release schedules below. In cases where some performance standards have not been met, credits may still be released depending on the specifics of the case. Monitoring may be required to restart or be extended, depending on the extent to which the Site fails to meet the specified performance standard. The release of project credits will be subject to the criteria described in Table 12.

Table 12: Credit Release Schedule – Stream Credits
Maney Farm Mitigation Project

Monitoring Year	Credit Release Activity	Interim Release	Total Released
0	Initial Allocation – see requirements below	30%	30%
1	First year monitoring report demonstrates performance standards are being met	10%	40%
2	Second year monitoring report demonstrates performance standards are being met	10%	50% (60%*)
3	Third year monitoring report demonstrates performance standards are being met	10%	60% (70%*)
4	Fourth year monitoring report demonstrates performance standards are being met	5%	65% (75%*)
5	Fifth year monitoring report demonstrates performance standards are being met	10%	75% (85%*)
6	Sixth year monitoring report demonstrates performance standards are being met	5%	80% (90%)
7	Seventh year monitoring report demonstrates performance standards are being met and the project has received closeout approval	10%	90% (100%)

*Accounts for the 10% of credits that are withheld until two bankfull events have occurred. Refer to Section 8.2.

8.1 Initial Allocation of Released Credits

The initial allocation of released credits, as specified in the mitigation plan, can be released by the NCDMS without prior written approval of the DE upon satisfactory completion of the following activities:

- a. Approval of the Final Mitigation Plan
- b. Recordation of the preservation mechanism, as well as a title opinion acceptable to the USACE covering the property.
- c. Completion of project construction (the initial physical and biological improvements to the mitigation site) pursuant to the mitigation plan; Per the NCDMS instrument, construction

means that a mitigation site has been constructed in its entirety, to include planting, and an as-built report has been produced. As-built reports must be sealed by an engineer prior to project closeout, if appropriate but not prior to the initial allocation of released credits.

- d. Receipt of necessary DA permit authorization or written DA approval for project where DA permit issuance is not required.

8.2 Subsequent Credit Releases

All subsequent credit releases must be approved by the DE and in consultation with the IRT and are based on a determination that required performance standards have been achieved. For stream projects a reserve of 15% of a site's total stream credits shall be released after two bankfull events have occurred in separate years, provided the channel is stable and all other performance standards are met. In the event that less than two bankfull events occur during the monitoring period, release of these reserve credits shall be at the discretion of the IRT. As projects approach milestones associated with the credit release, the NCDMS will submit a request for credit release to the DE along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

9.0 PROJECT SITE MITIGATION PLAN

9.1 Justification for Proposed Intervention

The primary project goals and objectives described in Section 1.0 are focused on improving the ecological function of the Site including a reduction in sedimentation and fecal coliform concentrations. The existing conditions assessment demonstrates that the tributaries to UT to South Fork Cane Creek on-site have been degraded due to livestock access and the removal of riparian vegetation. The bedforms of the tributaries' channels are highly degraded due to trampling by cattle and a fining of bed material from bank erosion and mass wasting of bank material. The riparian vegetation has been heavily altered along the streambanks.

9.2 Stream Restoration and Enhancement Design Overview

Intervention is needed to rectify these problems. Wildlands proposes to utilize a restoration approach along UTSF and UT5. Short downstream reaches of UT1C, UT2, UT3, and UT4 will be reconstructed to stabilize these reaches and connect them to UTSF (the proposed credit ratio for these short reaches is comparable to Enhancement 1). Restoration will treat unstable pattern, bank instability and head cuts while the EI approach will result in stable confluences. Minimal intervention (Enhancement II) is being proposed along the majority of the tributary channels (i.e., the upper reaches of UT1A, UT1B, UT2A, UT3A, and UT4A). An Enhancement II approach will prevent cattle from accessing these tributaries, will support the reestablishment of functioning stream and riparian ecosystems, and will protect those ecosystems from further damage. In addition, planting activities will reestablish a thriving riparian buffer. Mitigation activities are illustrated in the enclosed Figure 9.

9.3 Design Discharge Analysis

Multiple methods (e.g., regional curves, hydraulic geometry relationships, regional flood frequency analysis, etc.) were used to develop estimates for each of the project restoration reaches of either the bankfull discharge or a discharge corresponding to a return interval similar to the theoretical return interval of the bankfull discharge. The resulting values were compared and concurrence

between the estimates was assessed. The purpose of using multiple methods to estimate bankfull discharge is to eliminate reliance on a single method as the basis of channel design. However, the methods commonly produce significantly different results so professional judgement must be used to select a design discharge. For this analysis the greatest weight was placed on the Wildlands Flood Frequency Regression equation for the 1.2-yr discharge and the two sets of published regional curve data. Each of methods used to estimate discharge are described below and the results are summarized in Table 13 and on Figure 10.

9.3.1 NC Rural Piedmont Regional Curve Predictions

The published NC rural Piedmont Curve (Harman et al., 1999) was used to estimate discharge based on the drainage area for each design reach.

9.3.2 Provisional Updated NC Piedmont/Mountain Regional Curve Predictions

Design discharges using the draft updated curve for rural Piedmont and mountain streams (Walker, unpublished) were estimated based on drainage area for each design reach.

9.3.3 Regional Flood Frequency Analysis

Five USGS stream gage sites were identified within reasonable proximity of the project site for use in development of a project specific regional flood frequency analysis. The Hosking and Walls homogeneity test was performed in R[®] to identify the most appropriate gages (Hosking and Walls, 1993). The gages used were:

- USGS 02096740 – Gun Branch near Alamance, NC (DA = 4.06 mi²)
- USGS 02096846 – Cane Creek near Orange Grove, NC (DA = 7.54 mi²)
- USGS 02097010 – Robeson Creek near Pittsboro, NC (DA = 1.71 mi²)
- USGS 02101030 – Falls Creek near Bennett, NC (DA = 3.43 mi²)
- USGS 0210166029 – Rocky River at SR1300 near Crutchfield Crossroads, NC (DA = 7.42 mi²)

Flood frequency curves were developed for the 1.2-year and 1.5-year recurrence interval discharges. These relationships can be used to estimate discharge of those recurrence intervals for ungauged streams in the same hydrologic region and were solved for discharge with the drainage area for each project reach as the input.

9.3.4 USGS Flood Frequency Equations for Rural Watersheds in North Carolina

USGS flood frequency equations for rural watersheds in North Carolina (Weaver et al., 2009) were used to estimate peak discharges for each reach for floods with a recurrence interval of two years.

Table 13, below, shows results for all of the aforementioned methods of calculating a design discharge as well as the design discharge chosen for each reach.

Table 13: Summary of Design Bankfull Discharge Analysis

Maney Farm Mitigation Project (unit of measurement is CFS unless otherwise noted)

		UTSF-R1	UTSF-R2	UT1C	UT2B	UT3B	UT4B	UT5
	DA (acres)	115	211	22	11	11	20	76
	DA (sq. mi.)	0.18	0.33	0.03	0.02	0.02	0.03	0.12
Wildlands Flood Frequency Regression Equation Estimates	1-yr event	6	10	2	1	1	1	4
	1.2-yr event	22	34	6	4	4	6	16
	1.5-yr event	32	50	10	6	6	9	24
	1.8-yr event	39	61	12	7	7	11	29
	2-yr event	43	67	13	8	8	12	32
Manning's equation results at surveyed XS	XS1			4.1				
	XS2			5.7				
	XS3	4.8						
	XS4	8.0			7.3			
	XS5	Pool				12		
	XS6	Pool			6.9			
	XS7					7.8	5.5	
	XS8		11					
	XS9		6.9					
	XS10						4.1	9.6
	XS11		10					5.4
	XS12		Pool					8.9
	XS13							11.0
	XS14		Pool					9.3
Piedmont Regional Curve	Bankfull	26	40	8	5	5	7	19
Alan Walker Curve	Bankfull	15	23	4	2	2	4	10
Lowther Curve	Bankfull	33	38	21	18	18	21	30
Regional Flood Frequency Analysis	1.2-yr event	12	18	3	2	2	3	8
	1.5-yr event	18	29	5	3	3	5	13
	1.8-yr event	24	37	7	4	4	6	17
Final Design Q		19	29	6	3.6	3.5	5.3	14

Note: Units for all discharge estimates are cubic feet per second.

9.4 Design Channel Morphologic Parameters

Design parameters were developed for restoration reaches based on the design bankfull discharge, dimensionless ratios from the reference reach data, and professional judgment of the designers. The restoration reaches were designed to be similar to type C streams according to the Rosgen classification system (Rosgen, 1996). Type C streams are slightly entrenched, meandering streams with access to the floodplain (entrenchment ratios >2.2), and channel slopes of 2% or less. They occur within a wide range of valley types and are appropriate for the project landscape. The design morphological parameters are shown in Table 14.

Table 14: Design Morphological Parameters
Maney Farm Mitigation Project

	Notation	Units	UTSF-R1		UTSF-R2		UT1C		UT2B		UT3B		UT4B		UT5	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
stream type			C		C		C		C		C		C		C	
drainage area	DA	sq mi	0.18		0.33		0.03		0.02		0.02		0.03		0.12	
design discharge	Q	cfs	19.0		29.0		5.6		3.6		3.5		5.3		11.0	
bankfull cross-sectional area	A _{bkf}	SF	6.5		10.2		5.2		1.5		1.5		1.9		4.1	
average velocity during bankfull event	V _{bkf}	fps	3.0		2.8		1.1		3.1		3.3		3.3		2.9	
width at bankfull	w _{bkf}	feet	9.5		12.1		8.1		4.0		4.0		5.0		7.2	
maximum depth at bankfull	d _{max}	feet	1.0	1.2	1.2	1.5	0.9	1.2	0.5	0.7	0.5	0.7	0.5	0.7	0.8	1.0
mean depth at bankfull	d _{bkf}	feet	0.7		0.8		0.6		0.4		0.4		0.4		0.6	
bankfull width to depth ratio	w _{bkf} /d _{bkf}		14.0		14.0		13.0		11		11		13		13.0	
depth ratio		feet	1.4	1.8	1.4	1.8	1.4	1.8	1.4	1.8	1.4	1.8	1.4	1.8	1.4	1.8
bank height ratio	BHR		0.9	1.1	0.9	1.1	0.9	1.1	0.9	1.1	0.9	1.1	0.9	1.1	0.9	1.1
floodprone area width	w _{fpa}	feet	21	48	27	61	18	41	9	20	9	20	11	25	16	36
entrenchment ratio	ER		2.2	5.0	2.2	5.0	2.2	5.0	2.2	5.0	2.2	5.0	2.2	5.0	2.2	5.0
valley slope	S _{valley}	feet/ foot	0.0129		0.0114		0.0083		0.0080		0.0170		0.0073		0.0138	
channel slope	S _{chnl}	feet/ foot	0.0092	0.0108	0.0081	0.0095	0.0066	0.0075	0.0064	0.0073	0.0147	0.0167	0.0058	0.0066	0.0099	0.0115
riffle slope	S _{riffle}	feet/ foot	0.0120	0.0505	0.0106	0.0447	0.0086	0.0355	0.0083	0.0342	0.0191	0.0786	0.0088	0.0312	0.0128	0.0541
riffle slope ratio	S _{riffle} /S _{chnl}		1.3	4.7	1.3	4.7	1.3	4.7	1.3	4.7	1.3	4.7	1.3	4.7	1.3	4.7
pool slope	S _p	feet/ foot	0.0000	0.0044	0.0000	0.0029	0.0000	0.0007	0.0000	0.0114	0.0000	0.0126	0.0000	0.0119	0.0000	0.0053
pool slope ratio	S _p /S _{chnl}		0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40	0.00	0.40
pool-to-pool spacing	L _{p-p}	feet	3	67	4	85	2	44	1	24	1	24	2	31	2	44
pool spacing ratio	L _{p-p} /w _{bkf}		0.3	7.0	0.3	7.0	0.3	6.1	0.3	6.1	0.3	6.1	0.3	6.1	0.3	6.1
pool cross-sectional area		SF	8.5	13.0	13.3	20.4	6.7	10.4	2.0	3.0	2.0	3.0	2.4	3.8	5.3	8.2
pool area ratio			1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.0	1.3	2.0
maximum pool depth		feet	1.1	2.1	1.3	2.6	0.9	1.8	0.6	1.2	0.6	1.2	0.6	1.2	0.9	1.8
pool depth ratio			1.6	3.1	1.6	3.1	1.6	3.1	1.6	3.1	1.6	3.1	1.6	3.1	1.6	3.1
pool width at bankfull		feet	10.5	14.3	13.3	18.2	7.9	10.8	4.4	6.0	4.4	6.0	5.5	7.5	7.9	10.8
pool width ratio			1.1	1.5	1.1	1.5	1.1	1.5	1.1	1.5	1.1	1.5	1.1	1.5	1.1	1.5

	Notation	Units	UTSF-R1		UTSF-R2		UT1C		UT2B		UT3B		UT4B		UT5	
			Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
sinuosity	K		1.2	1.4	1.2	1.4	1.1	1.25	1.1	1.25	1.1	1.25	1.1	1.25	1.2	1.4
belt width	w_{bit}	feet	15	85	19	108	13	72	6	36	6	36	8	45	12	64
meander width ratio	w_{bit}/w_{bkf}		1.6	8.9	1.6	8.9	1.6	8.9	1.6	8.9	1.6	8.9	1.6	8.9	1.6	8.9
meander length		feet	29	156	36	198	24	133	12	66	12	66	15	82	22	118
meander length ratio			3.0	16.4	3.0	16.4	3.0	16.4	3.0	16.4	3.0	16.4	3.0	16.4	3.0	16.4
radius of curvature	R_c	feet	17	55	22	70	11	47	5	23	5	23	7	29	13	42
radius of curvature ratio	R_c/w_{bkf}		1.8	5.8	1.8	5.8	1.3	5.8	1.3	5.8	1.3	5.8	1.3	5.8	1.3	5.8

9.5 Sediment Transport Analysis

Wildlands assessed the watershed and stream channels to gain an understanding of the quantity of sediment supplied to the design reaches and how this supply has changed over time, and may change in the future. This was necessary to qualitatively understand the sediment supply for the design system. In unstable or rapidly changing watersheds or for streams with visual signs of high bedload supply, a detailed analysis including field data collection and capacity calculations may be necessary for proper design.

The watershed study, detailed in Sections 4.1 and 4.2, included an assessment of historical land use changes, an evaluation of existing stream conditions, and a forecast of future land use changes during the life of the project. The results of this assessment indicate the land use on-site and within the contributing watershed has been utilized for hay or livestock production since 1972. The riparian buffer was reduced the prior to 1972 to maximize the area available to agricultural practices. The land cover patterns and land uses have been consistent for at least the past 40 years and based on the rural setting of this project the watershed is expected to remain stable for the foreseeable future. The sediment supply from the contributing watershed upstream of the project site is expected to remain small and stable. UTSF does shows signs of sediment deposition and aggradation, (visual observations of sediment accumulation and reported d_{50} values for the pavement and sub-pavement samples of less than 2mm). However, this sediment can be largely attributed to local bank erosion within the project site. Degradation of the project tributaries can be attributed to cattle trampling and the propagation of head cuts from the main stem. These observations suggest that the sediment load is predominately contributed by local factors within the project corridor and the sediment load contributed by the upstream watershed is relatively low. Restoration activities and cattle exclusion will address the local factors but the watershed conditions are not anticipated to change drastically due to the rural setting and consistent land use practices.

9.5.1 Capacity Analysis

Based on the watershed assessment described above, the project streams currently appear to be supply limited (e.g. have capacity to move a sediment load greater than the supplied load). There is no reason to believe that the watershed will be altered in the future to increase the sediment yield. The restoration reaches have been designed to maintain or exceed the capacity of the existing channels and grade control structures (detailed in Section 9.6) have been utilized to prevent future incision.

9.5.2 Competence Analysis

In natural streams, the shear stress in a channel increases corresponding to an increase in discharge until the point at which the stream is flowing full (bankfull) and gains access to the floodplain. The floodplain access disperses the flow and prevents further increases in shear stress within the channel. This relationship of shear stress, channel dimension and discharge influences erosion potential within the channel and the channels ability to transport certain sizes of sediment (competence). To support the competence analysis, the calculated shear stresses, for both existing and proposed conditions, were compared to determine if the proposed stream will be able to move the bed material within the channel and to support material sizing within the constructed riffles. The competence analysis for each project reach is described below and the results are included in Table 15.

UT to SF Reach 1

Sieve analysis results (Appendix 5) of a pavement sample at indicate a d_{50} of 0.1 and a d_{85} of 1.7. The subpavement results for the d_{50} and d_{85} were 0.02 mm and 0.46 mm respectively. These results along with field observations indicate that, as a result of cattle trampling the stream bed, fine sediment has accumulated and covered the legacy bed material along UTSF Reach 1. The results of the UTSF Reach 1 shear stress analysis indicate that this reach has the competence to entrain particles up to 28.9 mm in size, much larger than the current substrate in the channel. This shear stress creates excess capacity which has contributed to incision that has been noted along the reach.

UT to SF Reach 2

Results of the sieve analysis for UTSF Reach 2 indicate a pavement layer d_{50} of 19.0 mm and a d_{85} of 35.8 mm. The subpavement d_{50} indicated by the analysis is 5.7 mm and the d_{85} is 17.2 mm. The results of the UTSF Reach 2 shear stress analysis indicate that this reach has the competence to entrain particles up to 34.2 mm in size. This shear stress creates excess capacity which has contributed to incision along the reach.

UT5

Results of the sieve analysis for UT5 suggest a d_{50} of 15.5 mm and a d_{85} of 30.8 for the pavement layer and a d_{50} of 0.4 mm and a d_{85} of 7.6 mm for the subpavement. The existing channel shear stress indicates that UT5 has the competence to entrain particles up to 14 mm. This shear stress does not indicate excess capacity for this reach and some deposition was observed along this reach.

Table 15: Sediment Transport Competence Analysis
Maney Farm Mitigation Project

Parameter	UTSF-R1		UTSF-R2		UT5	
	Pavement	Sub-pavement	Pavement	Sub-pavement	Pavement	Sub-pavement
Particle Size from sub-pavement Sediment Sample						
D_{50} (mm)	0.1	0.02	19.0	5.7	15.5	0.4
D_{85} (mm)	1.7	0.5	35.8	17.2	30.9	7.7
Existing Shear Stress (lb/ft ²)	0.39		0.45		0.19	
Movable Particle Size (mm) Shield curve	28.9		34.2		14.0	
Proposed Shear Stress (lb/ft ²)	0.42		0.44		0.37	
Movable Particle Size (mm) Shield curve	31.7		33.0		27.5	

Sediment Transport Design Considerations

Based on the results of the watershed analysis and the proposed design which will eliminate the major sediment source (fines from on-side bank erosion and livestock trampling of streams) it is safe to assume that the design restoration reaches will have enough capacity to move the supplied sediment load. This assumption is based on the following:

- The upstream watershed has remained stable for decades and is drained by a network of small agricultural ditches that do not supply much sediment.
- The upstream watershed is rural and landuse is not expected to change in the coming years or even decades.
- The major sediment supply is derived from onsite reaches and this supply will be reduced due to the restoration.
- The system does not appear to have a substantial bedload of coarse material.

Based on this qualitative analysis a threshold channel design is appropriate and no further monitoring or modeling of bedload supply and transport capacity is warranted.

The results of the competence analysis were utilized to support the design of the restoration reaches. Based on the data presented in Table 15, the competence of UTSF reaches 1 and 2 will remain essentially the same. Once the cattle are removed from the streams, the bed material will coarsen somewhat. However, the channels have the competence to move particles in the coarse gravel to small cobble size classes so additional aggradation is not expected to occur. Constructed riffles of coarse material (ranging from cobble to small boulders) and log sills will be used for grade control to prevent incision. For SF5 the shear stress will increase substantially. Signs of aggradation of small particle material have been observed in portions of this reach. The increase in shear stress should be enough to move this material while constructed riffles and log sills will also be used in this reach for grade control.

In order to mimic the historic conditions and to discourage and /or prevent future incision, native rock material will be harvested from both the hill slope and the existing channel. Natural bed material will be harvested along UTSF Reach 2 and UT5 prior to backfilling the existing channel. This native material will be utilized to construct the proposed riffles along the design reaches, along with coarser material harvested from the hill slope. The gravel harvested from the hill slope is expected to fall within the range of 8 to 64 mm with an average d_{50} size of approximately 36 mm. It should be noted that, although the upstream sediment supply is not expected to change, fine bed materials from fluvial erosion and trampling of the banks will be eliminated or reduced after construction resulting in coarsening of the bed material.

9.6 Project Implementation

9.6.1 Grading and Installation of Structures

UTSF and UT5 reaches will be improved through Priority I restoration techniques. New channels will be constructed offline with stable meander patterns mimicking natural Piedmont streams, and the beds of the channels will be raised so that the floodplains are inundated during flow events larger than the design bankfull discharge. Where necessary, floodplain grading will be conducted to slightly lower floodplain elevations resulting in a more natural exchange of organic matter and sediment between the stream and floodplain ecotones. The streambeds will be composed of alternating riffle-pool sequences to provide habitat and flow diversity. The cross-sectional dimensions of the channels will be reconstructed as designed with stable side slopes that are matted and planted with native vegetation for long-term stability. Brush toe built from on-site materials and sod mats harvested on-site will be used to protect banks and provide aquatic habitat.

Enhancement I techniques will be used on UT1C, UT2B, UT3B, and UT4B. This approach will enhance bed features and reduce the level of incision of the existing channels and allow these reaches to be tied into the UTSF Priority I restoration reach.

UT1A, UT1B, UT2A, UT3A, and UT4A will be improved through Enhancement II techniques. Treatment for these areas will include replanting the riparian buffer with native tree species, fencing out livestock, and treatment of any invasive species. There will be no alteration of floodplain grades or channel dimensions for these sections of stream.

Additionally, streambanks at existing cattle crossings and wallow areas will be reconstructed, matted with coir fiber matting and planted with live stakes to improve stability and reduce scour. The entire riparian buffer will be planted with native vegetation, livestock will be fenced out, and invasive species will be treated.

Instream structures will primarily include constructed riffles and log sills. Several types of constructed riffles will be utilized in the restoration reaches to establish a varied flow pattern, habitat, and grade control while providing a source of carbon for nutrient cycling. Native rock of various sizes (cobble, gravel, and fines) harvested on site will be used as much as possible to create these types of riffles. Types of riffles proposed for this site include:

- Chunky riffles with larger (small boulder and large cobble) rock embedded throughout the length of the native rock riffle to provide additional habitat as well as grade control for steeper riffles.
- Native material riffles to re-establish a large gravel substrate to the channels.
- Woody riffles with brush and logs compacted into the bed of native rock to increase woody material in the channel.
- Rock and Roll riffles to incorporate larger woody debris and meander the thalweg within longer riffles.

9.6.2 Riparian Planting

As a final stage of construction, riparian buffers of restoration and enhancement reaches will be seeded and planted with early successional native vegetation chosen to create a Piedmont Bottomland Forest community. The specific species composition to be planted was selected based on the community type, observations of the occurrence of species in the existing buffer, and best professional judgment on species establishment and anticipated site conditions in the early years following project implementation. Species chosen for the planting plan are listed in Table 16.

The riparian buffer areas will be planted with bare root seedlings. Areas within the riparian zone which currently support mature overstory will be enhanced through a supplemental planting of shade tolerant shrub species. In addition, the stream banks will be planted with live stakes and the channel toe will be planted with plugs. Permanent herbaceous seed will be placed on stream banks, floodplain areas, and all disturbed areas within the project easement. Proposed planting zones and the associated species are shown in the construction plan set.

Species planted as bare roots within the open pasture areas will be spaced at an initial density of 605 plants per acre based on 12-ft by 6-ft spacing (targeted densities after monitoring year 3 are 320 woody stems per acre). The supplemental shrub species planting will be spaced at an initial density of 300 plants per acre based on a 24-ft by 12-ft spacing. Live stakes will be planted on channel banks at a 2-ft to 3-ft spacing on the outside of meander bends and a 6-ft to 8-ft spacing on tangent sections.

To help ensure tree growth and survival, soil amendments may be added to areas of floodplain cut. Soil tests will be performed in areas of cut and fertilizer and lime will be applied based on the results. Additionally, topsoil will be stockpiled, reapplied, and disked before permanent seeding and planting activities take place.

Invasive species within the riparian buffers will be treated and/or removed at the time of construction. The extent of invasive species coverage will be monitored, mapped and controlled as necessary throughout the required monitoring period.

Table 16: Planting List
Maney Farm Mitigation Project

Streambank Planting Zone (Live Stakes)	
Species	Common Name
<i>Salix nigra</i>	Black Willow
<i>Cornus ammomum</i>	Silky Dogwood
<i>Salix sericea</i>	Silky Willow
<i>Physocarpus opulifolius</i>	Ninebark
Streambank Planting Zone (Herbaceous Plugs)	
<i>Juncus effusus</i>	Common Rush
<i>Carex alata</i>	Broadwing Sedge
<i>Panicum virgatum</i>	Switchgrass
Buffer Planting Zone (Bare Root)	
<i>Alnus serrulata</i>	Tag Alder
<i>Quercus phellos</i>	Willow Oak
<i>Platanus occidentalis</i>	Sycamore
<i>Betula nigra</i>	River Birch
<i>Acer rubrum</i>	Red Maple
<i>Liriodendron tulipifera</i>	Tulip Poplar
<i>Quercus palustris</i>	Pin Oak
<i>Fraxinus pennsylvanica</i>	Green Ash
<i>Carpinus caroliniana</i>	American Hornbeam
<i>Viburnum prunifolium</i>	Blackhaw Viburnum
<i>Calycanthus floridus</i>	Sweetshrub
<i>Callicarpa americana</i>	American Beautyberry
<i>Symphoricarpos orbiculatus</i>	Coralberry
Permanent Riparian Seeding	
<i>Panicum rigidulum</i>	Redtop Panicgrass
<i>Agrostis hyemalis</i>	Winter Bentgrass
<i>Chasmanthium latifolium</i>	River Oats
<i>Rudbeckia hirta</i>	Blackeyed Susan
<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis
<i>Carex vulpinoidea</i>	Fox Sedge
<i>Panicum clandestinum</i>	Deertongue
<i>Elymus virginicus</i>	Virginia Wild Rye
<i>Asclepias syrica</i>	Common Milkweed
<i>Baptisia australis</i>	Blue False Indigo
<i>Gaillardia pulchella</i>	Annual Gaillardia
<i>Echinacea purpurea</i>	Pale Purple Coneflower

10.0 MAINTENANCE PLAN

The Site shall be monitored on a regular basis and a physical inspection of the Site shall be conducted at a minimum of once per year throughout the post-construction monitoring period until performance standards are met. These site inspections may identify the site components and features that require routine maintenance. Routine maintenance should be expected most often in the first two years following site construction and may include the following features listed in Table 17 below.

Table 17: Maintenance Plan
Maney Farm Mitigation Project

Component / Feature	Maintenance Through Project Close-Out
Stream	Routine channel maintenance and repair activities may include chinking of in-stream structures to prevent piping, securing loose coir matting, and supplemental installations of live stakes and other target vegetation along the channel. Areas where stormwater and floodplain flows intercept the channel may also require maintenance to prevent bank failures and head-cutting. Beaver dams that inundate the streams channels shall be removed and the beaver shall be trapped.
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Exotic invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with the NC Department of Agriculture (NCDA) rules and regulations.
Site Boundary	Site boundaries shall be identified in the field to ensure clear distinction between the mitigation site and adjacent properties. Boundaries may be identified by fence, marker, bollard, post, tree-blazing, or other means as allowed by site conditions and/or conservation easement. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as-needed basis.

11.0 PERFORMANCE STANDARDS

The stream and buffer performance criteria for the Site will follow approved performance criteria presented in the DMS Mitigation Plan Template (version 2.2, 06/08/2012), the DMS Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (11/7/2011), and the Stream Mitigation Guidelines issued in April 2003 by the USACE and NCDWR. Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. The stream restoration and enhancement sections and the buffer restoration sections of the project will be assigned specific performance criteria components for stream morphology, hydrology, and vegetation. Performance criteria will be evaluated throughout the seven year post-construction monitoring. If all performance criteria have been successfully met and two bankfull events have occurred during separate years, Wildlands may propose to terminate stream and/or vegetation monitoring. An outline of the performance criteria components follows.

11.1 Streams

11.1.1 Dimension

Riffle cross-sections on the restoration reaches should be stable and should show little change in bankfull area, maximum depth ratio, and width-to-depth ratio. Per DMS guidance, bank height ratios shall not exceed 1.2 and entrenchment ratios shall be at least 2.2 for restored channels to be considered stable. Reach riffle cross-section dimension means should fall within the parameters defined for channels of the appropriate Rosgen stream type. If any changes do occur, these

changes will be evaluated to assess whether the stream channel is showing signs of instability. Indicators of instability include a trend in vertical incision or eroding channel banks over the monitoring period. Remedial action would not be taken if channel changes indicate a movement toward stability.

11.1.2 Pattern and Profile

Visual assessments and photo documentation should indicate that streams are remaining stable and do not indicate a trend toward vertical or lateral instability.

11.1.3 Substrate

Substrate materials in the restoration reaches should indicate a progression towards or the maintenance of coarser materials in the riffle features and smaller particles in the pool features.

11.1.4 Bankfull Events

Two bankfull flow events must be documented on the restoration reaches within the seven-year monitoring period. The two bankfull events must occur in separate years. Stream monitoring will continue until success criteria in the form of two bankfull events in separate years have been documented.

11.1.5 Photo Documentation

Photographs should illustrate vegetative and morphological stability on an annual basis at the Site. Cross-section photos should demonstrate no excessive erosion or degradation of the banks. Longitudinal photos should indicate the absence of persistent bars within the channel or vertical incision. Grade control structures should remain stable. Deposition of sediment on the bank side of vane arms is preferable. Maintenance of scour pools on the channel side of vane arms is expected.

11.1.6 Vegetation

The final vegetative success criteria for the stream restoration and enhancement areas will be the survival of 210 planted stems per acre in the riparian corridor at the end of the required monitoring period (year seven). The interim measure of vegetative success will be the survival of at least 320 planted stems per acre at the end of the third monitoring year and at least 260 stems per acre at the end of the fifth year of monitoring. Planted vegetation must average 10 feet in height in each plot at the end of the seventh year of monitoring. If this performance standard is met by year five and stem density is trending towards success (i.e., no less than 260 five year old stems/acre), monitoring of vegetation on the Site may be terminated with written approval by the USACE in consultation with the NC Interagency Review Team. The extent of invasive species coverage will also be monitored and controlled as necessary throughout the required monitoring period.

11.1.7 Visual Assessment

Visual assessments should support the specific performance standards for each metric as described above.

12.0 MONITORING PLAN

Annual monitoring data will be reported using the DMS Monitoring Report Template (version 1.5, 06/08/2012). The monitoring report shall provide project data chronology that will facilitate and understanding of project status and trends, population of DMS databases for analysis, research purposes, and assist in decision making regarding close-out. The monitoring period will extend

seven years beyond completion of construction or until performance criteria have been met. All survey will be tied to grid. Project monitoring requirements in the sections above are described below and summarized in Table 18 and illustrated in Figure 11.

12.1 Streams

12.1.1 Dimensions

In order to monitor the channel dimension, permanent cross-sections will be installed along riffle and pool sections according to DMS guidance. Two permanent cross-section will be installed per 1,000 feet of channel along the restored streams. Each cross-section will be permanently marked with pins to establish its location. Cross-section surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. Cross-sections will be surveyed annually for the seven year monitoring period.

12.1.2 Pattern and Profile

The as-built survey will include a longitudinal profile for the baseline monitoring report. Longitudinal profile surveys will not be conducted during the seven year monitoring period unless other indicators during the annual monitoring indicate a trend towards vertical and/or lateral instability. If a longitudinal profile is deemed necessary, monitoring will follow standards as described in the DMS Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation (11/07/2011) and the 2003 USACE and NCDWR Stream Mitigation Guidance for the necessary reaches.

12.1.3 Substrate

A reach-wide pebble count will be performed in each restoration and enhancement level I reach (UTSF-R1, UTSF-R2, UT1C, UT2B, UT3B, UT4B, and UT5) each year for classification purposes. A pebble count will be performed at each surveyed riffle to characterize the bed material during the years of the cross-section survey.

12.1.4 Bankfull Events

Bankfull events will be documented using a crest gage, photographs, and visual assessments such as debris lines. Three crest gages will be installed: one on UTSF-R1, UTSF-R2, and UT5. The crest gages will be installed within one of the surveyed riffle cross-sections. The gages will be checked at each site visit to determine if a bankfull event has occurred. Photographs will be used to document occurrences of debris lines and sediment deposition.

12.1.5 Photo Documentation

Photographs will be taken once a year to visually document stability for seven years following construction. Permanent markers will be established and located with GPS equipment so that the same locations and view directions on the Site are photographed each year. Photos will be used to monitor stream restoration and enhancement reaches as well as vegetation plots.

Longitudinal reference photos will be established at the tail of riffles approximately every 200 LF along the channel by taking a photo looking upstream and downstream. Cross-sectional photos will be taken of each permanent cross-section looking upstream and downstream. Reference photos will also be taken for each of the vegetation plots. Representative digital photos of each permanent photo point, cross-section and vegetation plot will be taken on the same day the stream and vegetation surveys are conducted. The photographer will make every effort to consistently maintain the same area in each photo over time.

Table 18: Monitoring Requirements.

Maney Farm Mitigation Project

Parameter	Monitoring Feature	Quantity/Length by Reach												Frequency	Notes
		UTSF-R1	UTSF-R2	UT1A	UT1B	UT1C	UT2A	UT2B	UT3A	UT3B	UT4A	UT4B	UT5		
Dimension	Riffle Cross-Section	2	2	N/A	N/A	1	N/A	1	N/A	1	N/A	1	1	Annual	1
	Pool Cross-Section	2	1	N/A	N/A	1	N/A	1	N/A	1	N/A	1	1		
Pattern	Pattern	N/A												N/A	2
Profile	Longitudinal Profile	N/A												N/A	
Substrate	Reach-Wide (RW) Riffle (RF) 100 Pebble Count	1 RW 2 RF	1 RW 2 RF	N/A	N/A	1 RW 1 RF	N/A	1 RW 1 RF	N/A	1 RW 1 RF	N/A	1 RW 1 RF	1 RW 1 RF	Annual	
Hydrology	Crest Gage	1	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	Annual	3
Vegetation	Vegetation Plots	14												Annual	
Visual Assessment	All Streams	Y												Bi-annual	
Exotic and Nuisance Vegetation													Annual	4	
Project Boundary													Annual	5	
Reference Photos	Photos	32												Annual	6

Notes:

1. Cross-sections will be permanently marked with rebar to establish location. Surveys will include points measured at all breaks in slope, including top of bank, bankfull, edge of water, and thalweg. The number of cross-sections proposed was established using the small stream guidance of two per 1,000 feet of stream.
2. Entire profile will be surveyed during the as-built for all project streams.
3. One crest gage will be installed along each stream. Devices will be inspected quarterly or semi-annually, evidence of bankfull will be documented with a photo.
4. Locations of exotic and nuisance vegetation will be recorded using a GPS and mapped.
5. Locations of fence damage, vegetation damage, boundary encroachments, etc. will be recorded using a GPS and mapped.
6. Markers will be established and recorded using a GPS so that the same locations and view directions on the Site are monitored.

12.1.6 Vegetation

Vegetation monitoring plots will be installed and evaluated within the restoration and enhancement areas to measure the survival of the planted trees. The number of monitoring quadrants required is based on the DMS monitoring guidance document (version 1.4, 11/17/11). The size of individual quadrants will be 100 square meters for woody tree species and shrubs. Vegetation assessments will be conducted following the Carolina Vegetation Survey (CVS) Level 2 Protocol for Recording Vegetation (2006).

The initial baseline survey will be conducted within 21 days from completion of site planting and used for subsequent monitoring year comparisons. The first annual vegetation monitoring activities will commence at the end of the first growing season, during the month of September. The restoration and enhancement sites will then be evaluated each subsequent year between June 1 and September 31. Species composition, density, and survival rates will be evaluated on an annual basis by plot and for the entire Site. Individual plot data will be provided and will include height, density, vigor, damage (if any), and survival. Planted woody stems will be marked annually as needed and given a coordinate, based off a known origin, so they can be found in succeeding monitoring years. Mortality will be determined from the difference between the previous year's living planted stems and the current year's living planted stems.

12.1.7 Visual Assessment

Visual assessments will be performed along all stream and buffer restoration areas on a semi-annual basis during the seven year monitoring period. Problem areas will be noted such as channel instability (e.g. lateral and/or vertical instability, in-stream structure failure/instability and/or piping, headcuts), vegetation health (e.g. low stem density, vegetation mortality, invasive species or encroachment, beaver activity, or livestock access). Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment. Should remedial actions be required, recommendations will be provided in the annual monitoring report.

13.0 LONG-TERM MANAGEMENT PLAN

Upon approval for close-out by the Interagency Review Team (IRT), the Site will be transferred to the NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program. This party shall be responsible for periodic inspection of the Site to ensure that restrictions required in the conservation easement or the deed restriction document(s) are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated prior to site transfer to the responsible party.

The NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program currently houses DMS stewardship endowments within the non-reverting, interest-bearing Conservation Lands Stewardship Endowment Account. The use of funds from the Endowment Account is governed by North Carolina General Statute GS 113A-232(d)(3). Interest gained by the endowment fund may be used only for the purpose of stewardship, monitoring, stewardship administration, and land transaction costs, if applicable. The NCDENR Stewardship Program intends to manage the account as a non-wasting endowment. Only interest generated from the endowment funds will be used to steward the compensatory mitigation sites. Interest funds not used for those purposes will be re-invested in the Endowment Account to offset losses due to inflation.

14.0 ADAPTIVE MANAGEMENT PLAN

Upon completion of site construction, DMS will implement the post-construction monitoring protocols previously defined in this document. Project maintenance will be performed as described previously in this document. If, during the course of annual monitoring it is determined the Site's ability to achieve site performance standards are jeopardized, DMS will notify the USACE of the need to develop a Plan of Corrective Action. The Plan of Corrective Action may be prepared using in-house technical staff or may require engineering and consulting services. Once the Corrective Action Plan is prepared and finalized DMS will:

- Notify the USACE as required by the Nationwide 27 permit general conditions.
- Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by the USACE.
- Obtain other permits as necessary.
- Implement the Corrective Action Plan.

Provide the USACE a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

15.0 FINANCIAL ASSURANCES

Pursuant to Section IV and Appendix III of the Division of Mitigation Services In-Lieu Fee Instrument dated July 28, 2010, the North Carolina Department of Environment and Natural Resources has provided the US Army Corps of Engineers Wilmington District with a formal commitment to fund projects to satisfy mitigation requirements assumed by DMS. This commitment provides financial assurance for all mitigation projects implemented by the program.

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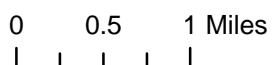
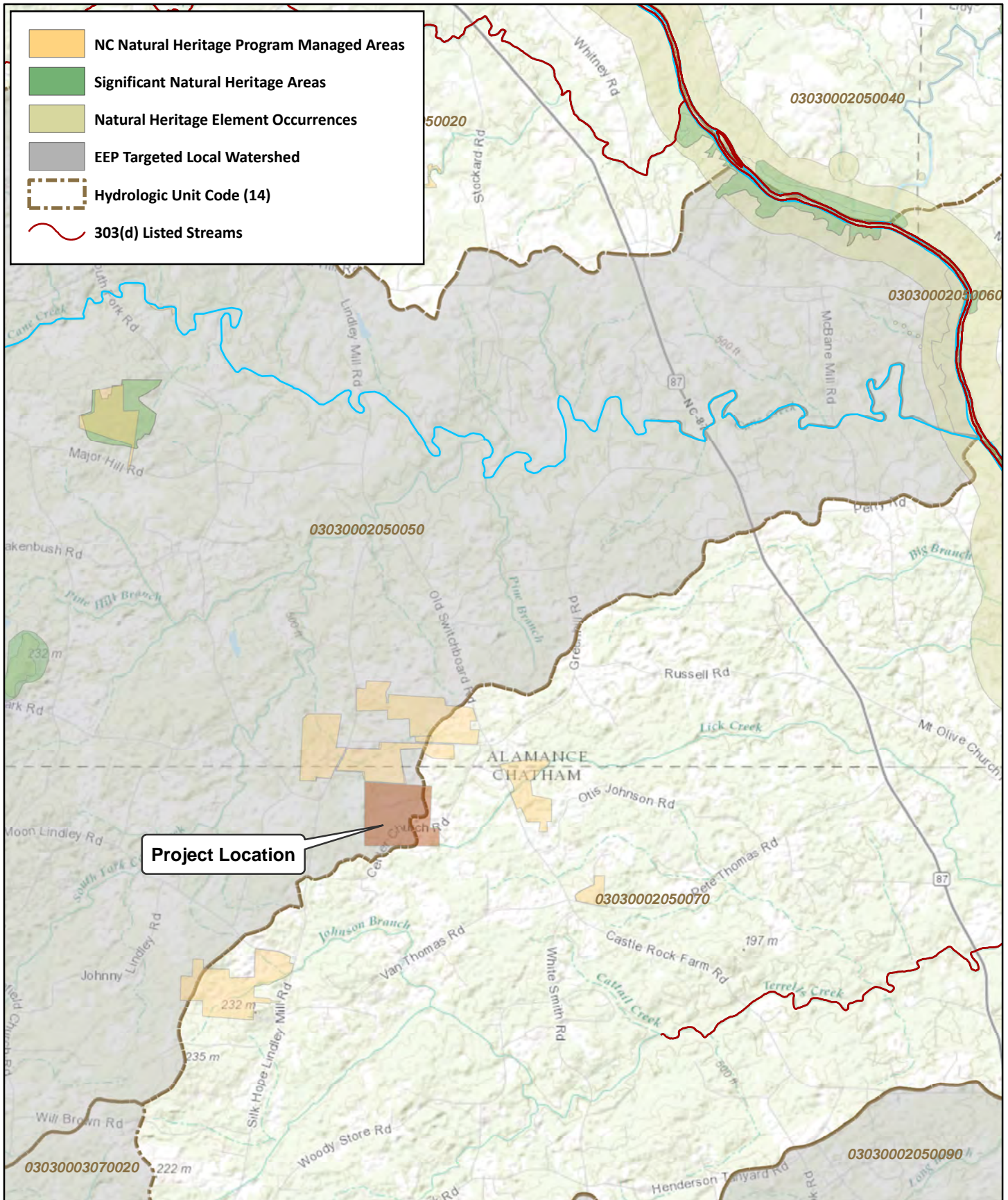


Figure 1: Vicinity Map
 Maney Farm Stream Mitigation Site
 Mitigation Plan
 Cape Fear River Basin (03030002)
 Chatham County, NC

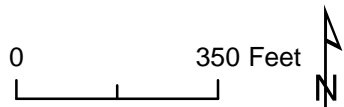
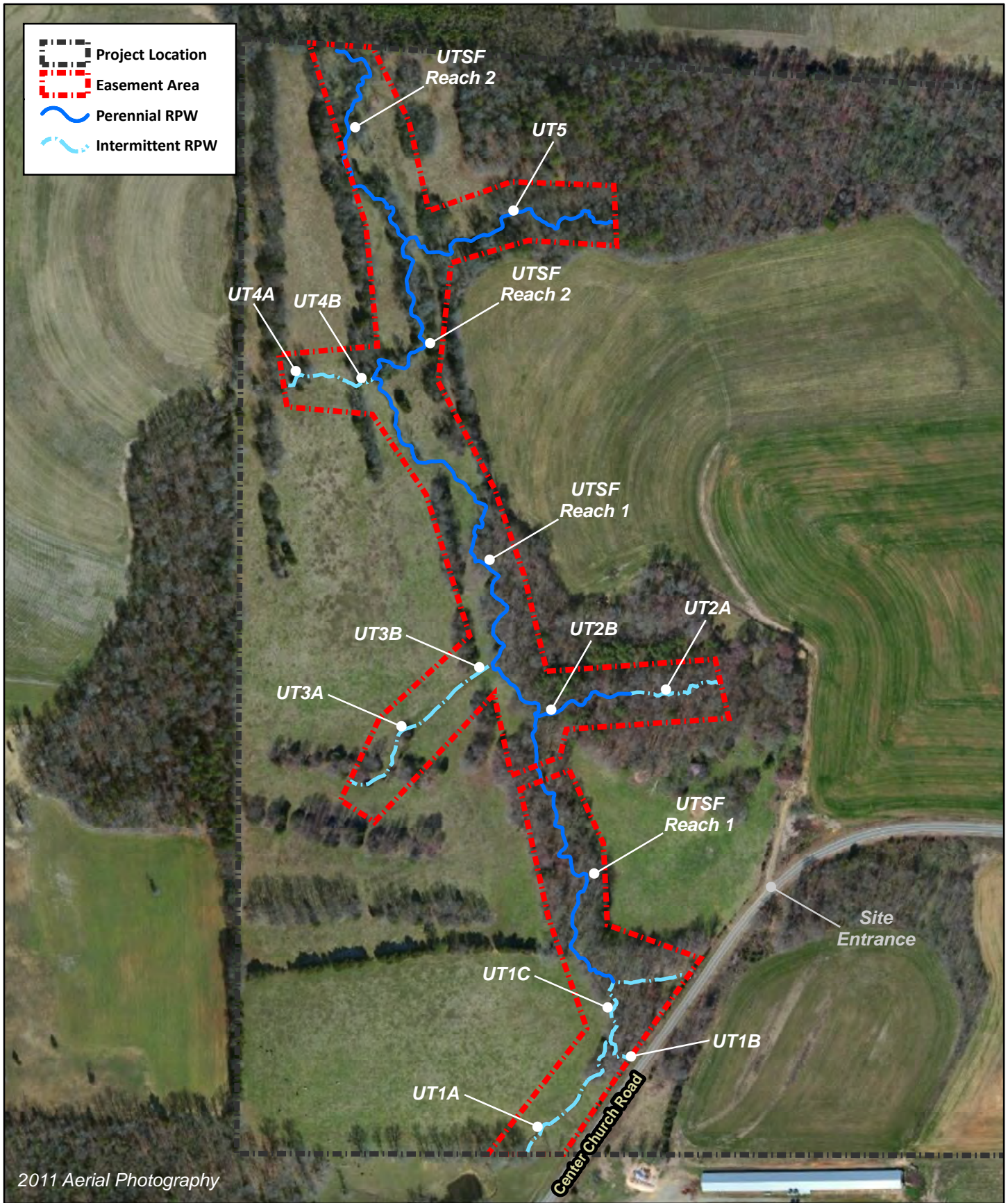
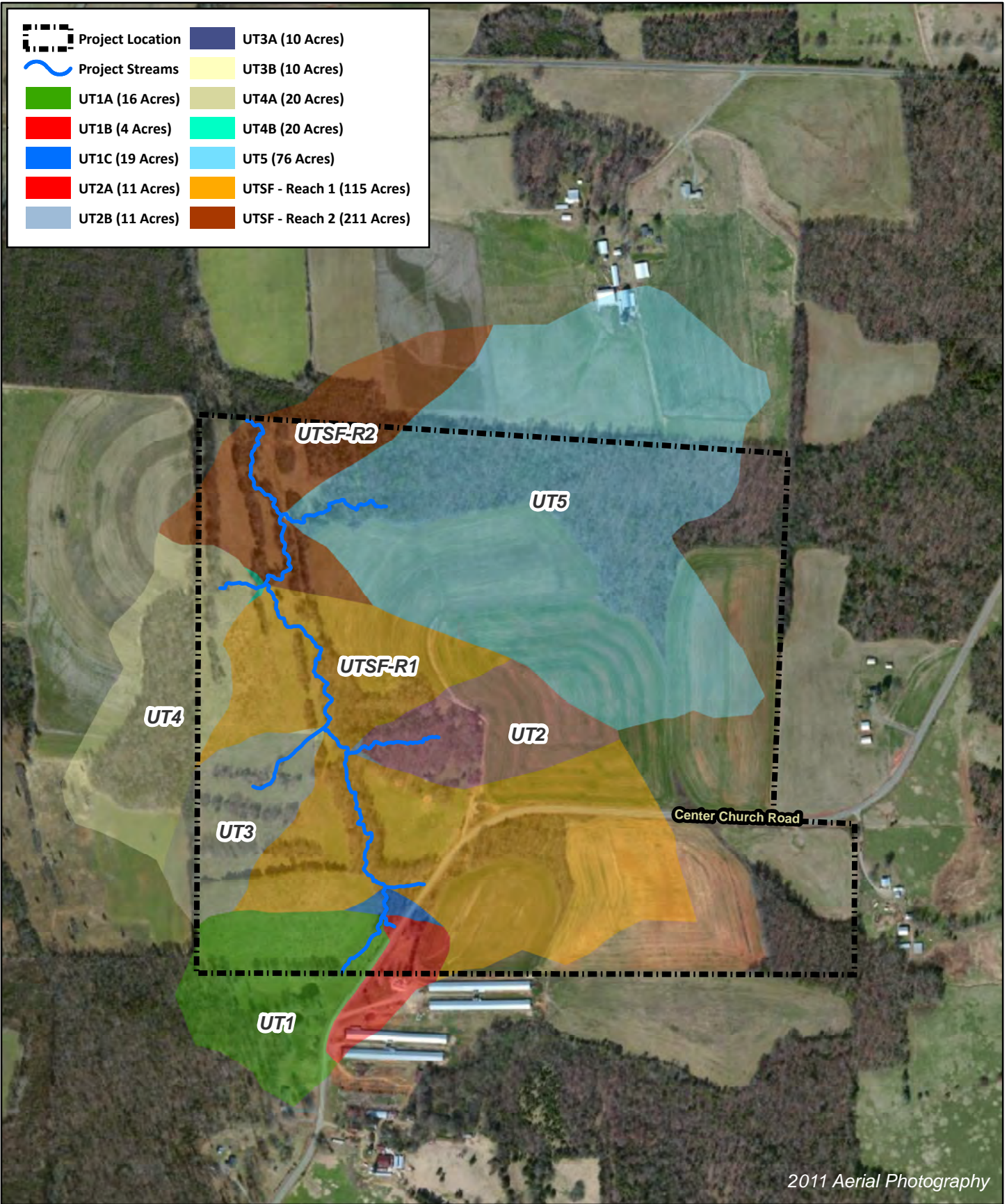


Figure 2: Site Map
 Maney Farm Mitigation Project
 Cape Fear River Basin 03030002

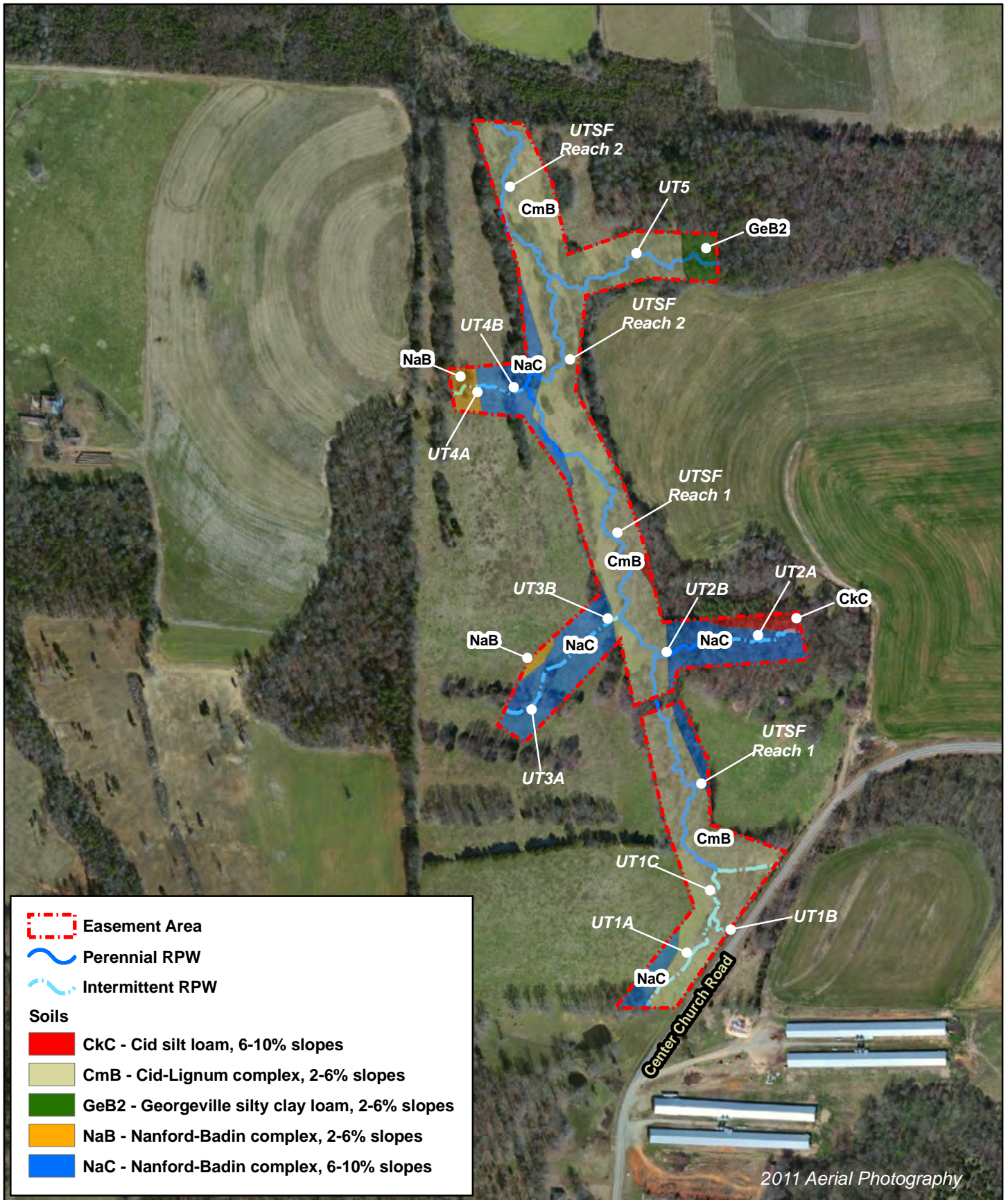


0 600 Feet



Figure 3: Watershed Map
Maney Farm Stream Mitigation Site
Cape Fear River Basin 03030002

Chatham County, NC



0 350 Feet



Figure 4: Soils Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002

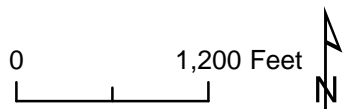
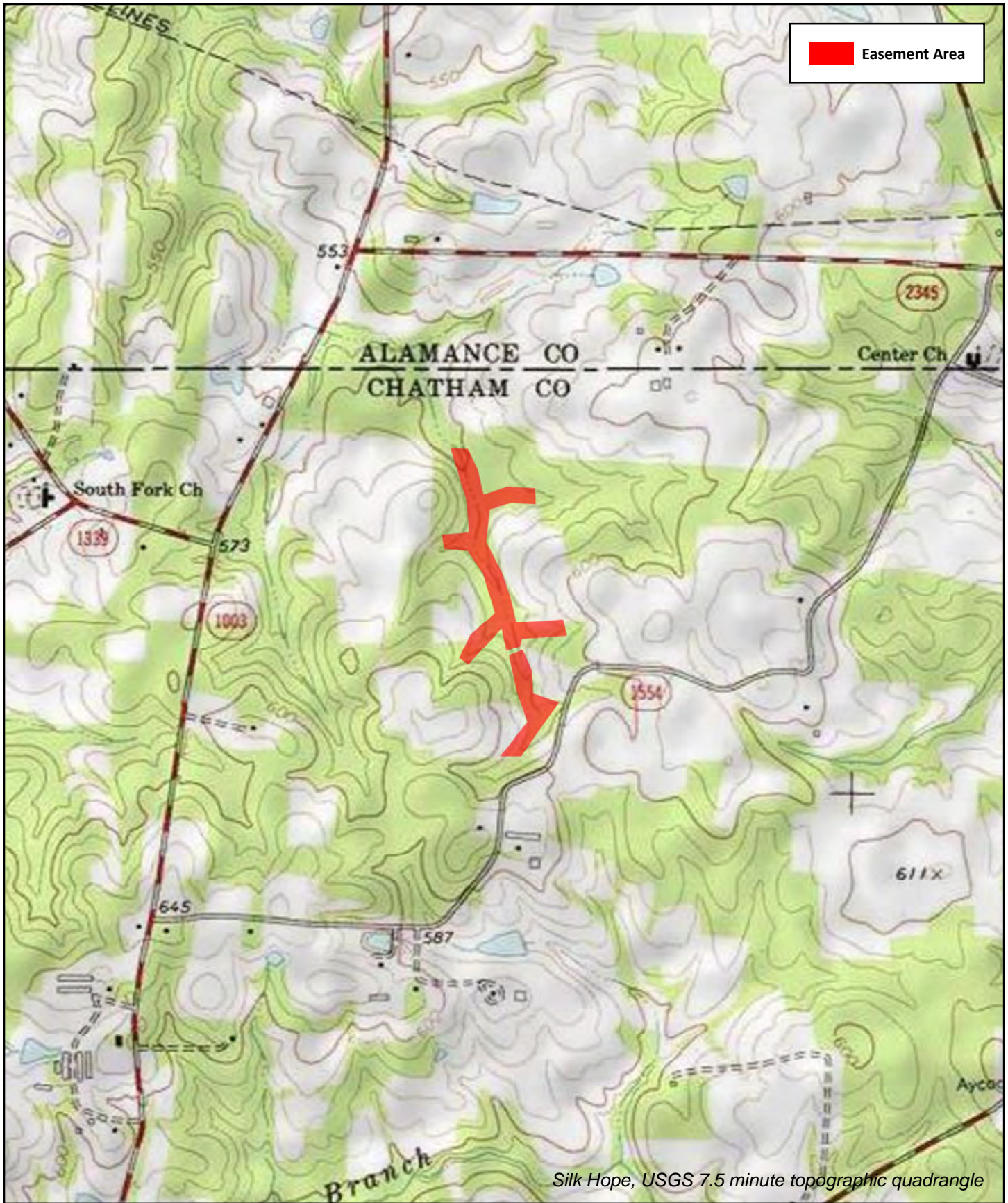
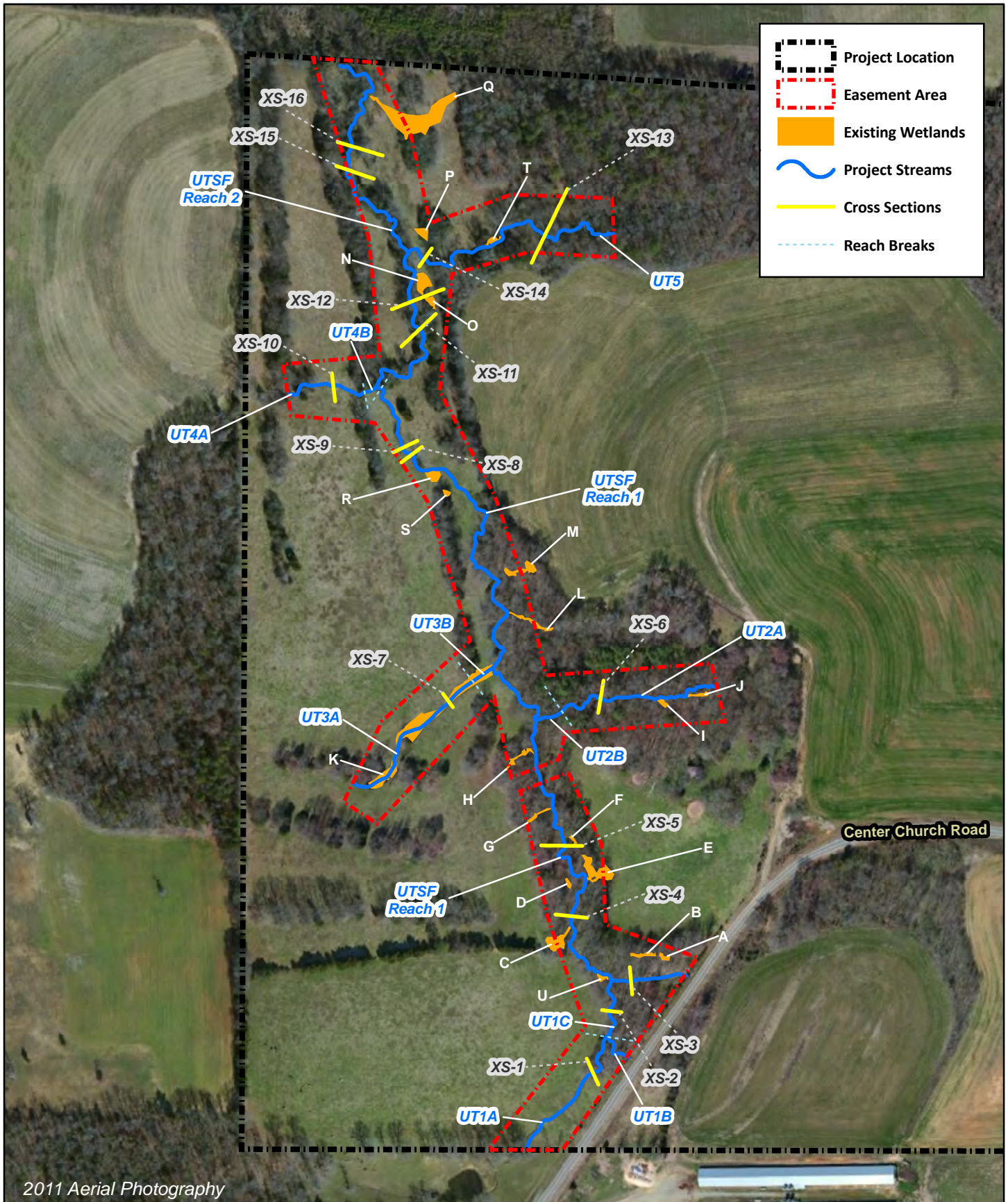


Figure 5: USGS Topographic Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002



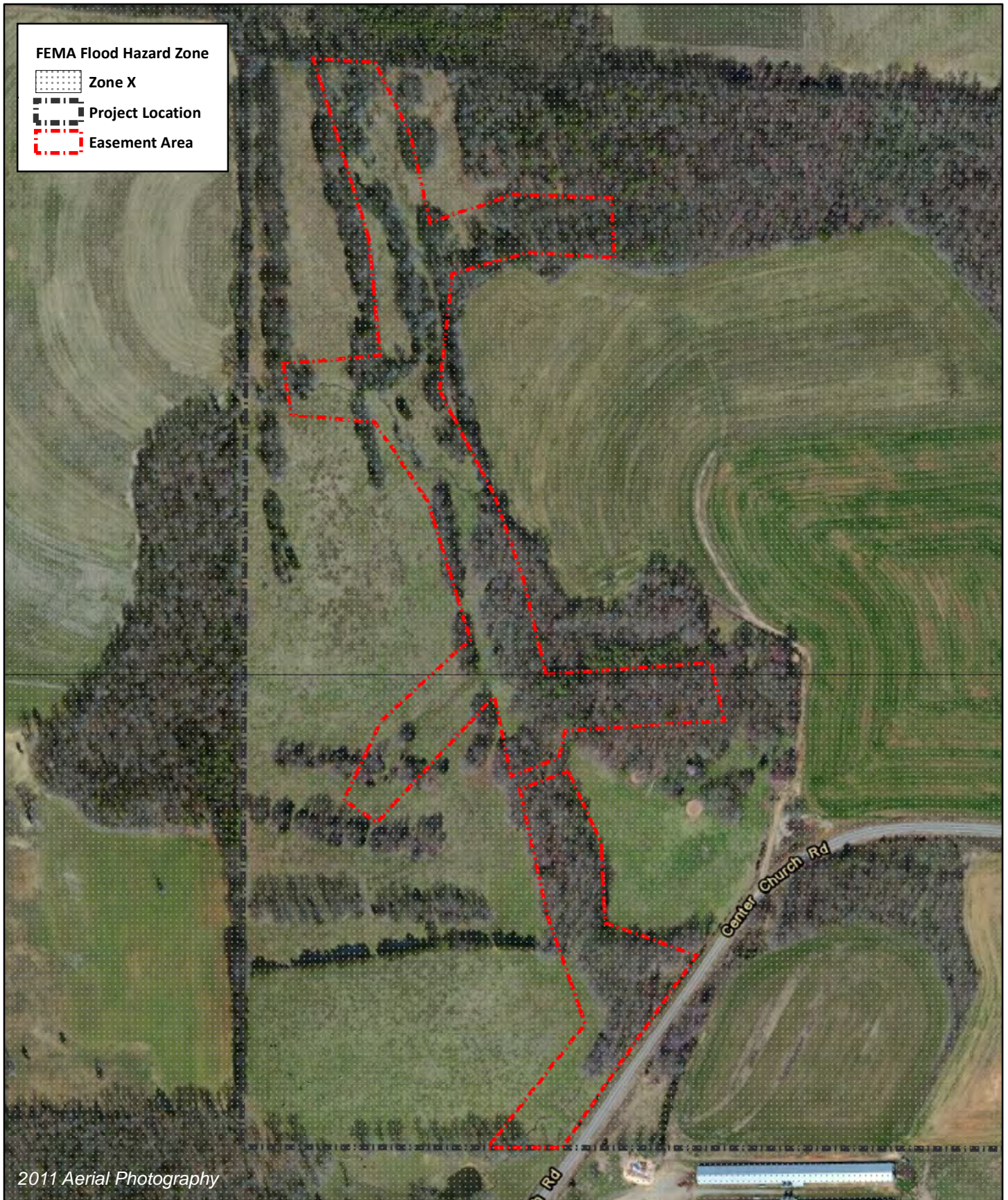
2011 Aerial Photography



0 250 500 Feet



Figure 6: Hydrologic Features Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002



2011 Aerial Photography



0 250 500 Feet



Figure 7: FEMA Flood Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002

Chatham County, NC

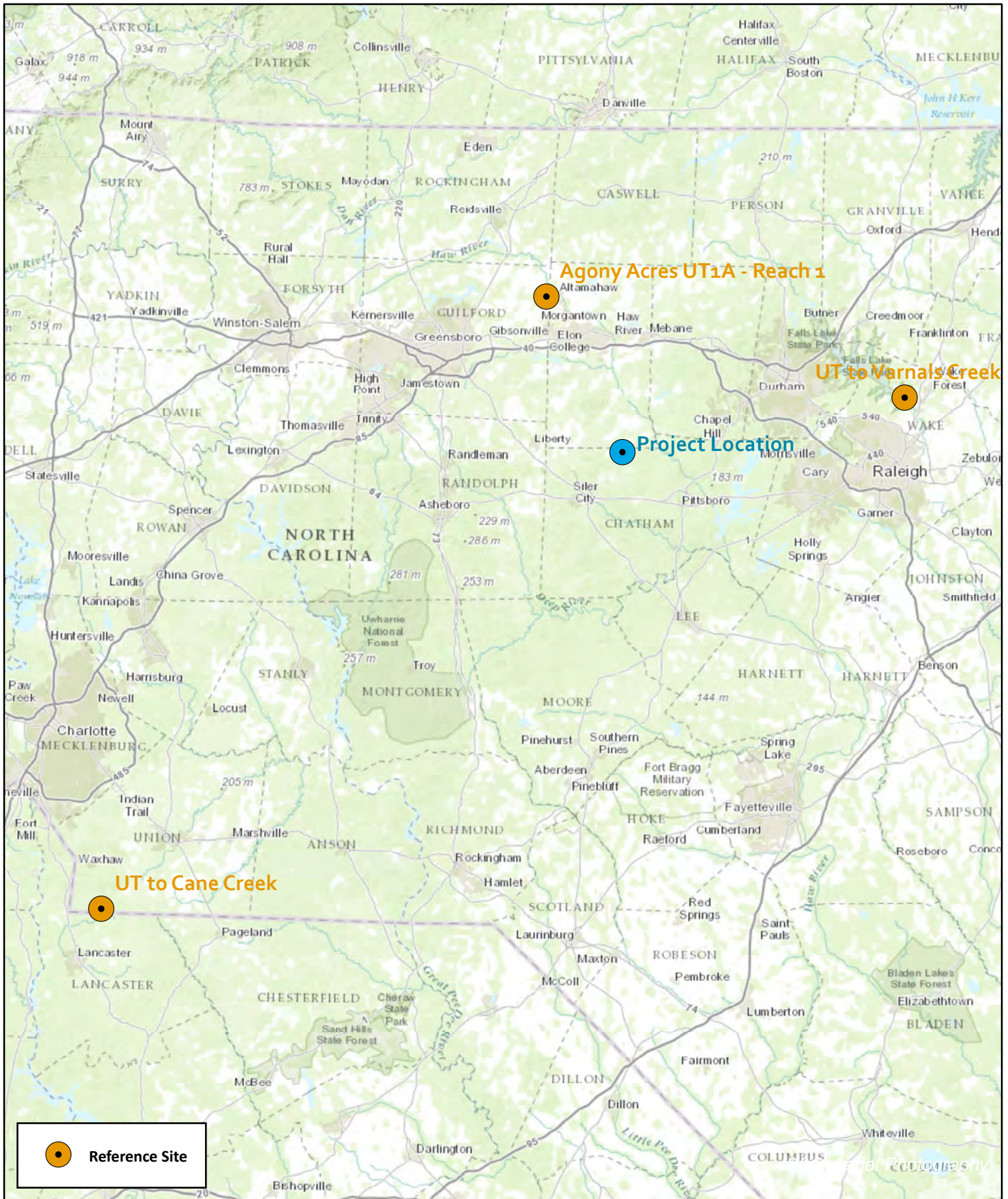


Figure 8: Reference Reach Vicinity Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002



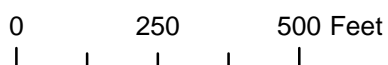
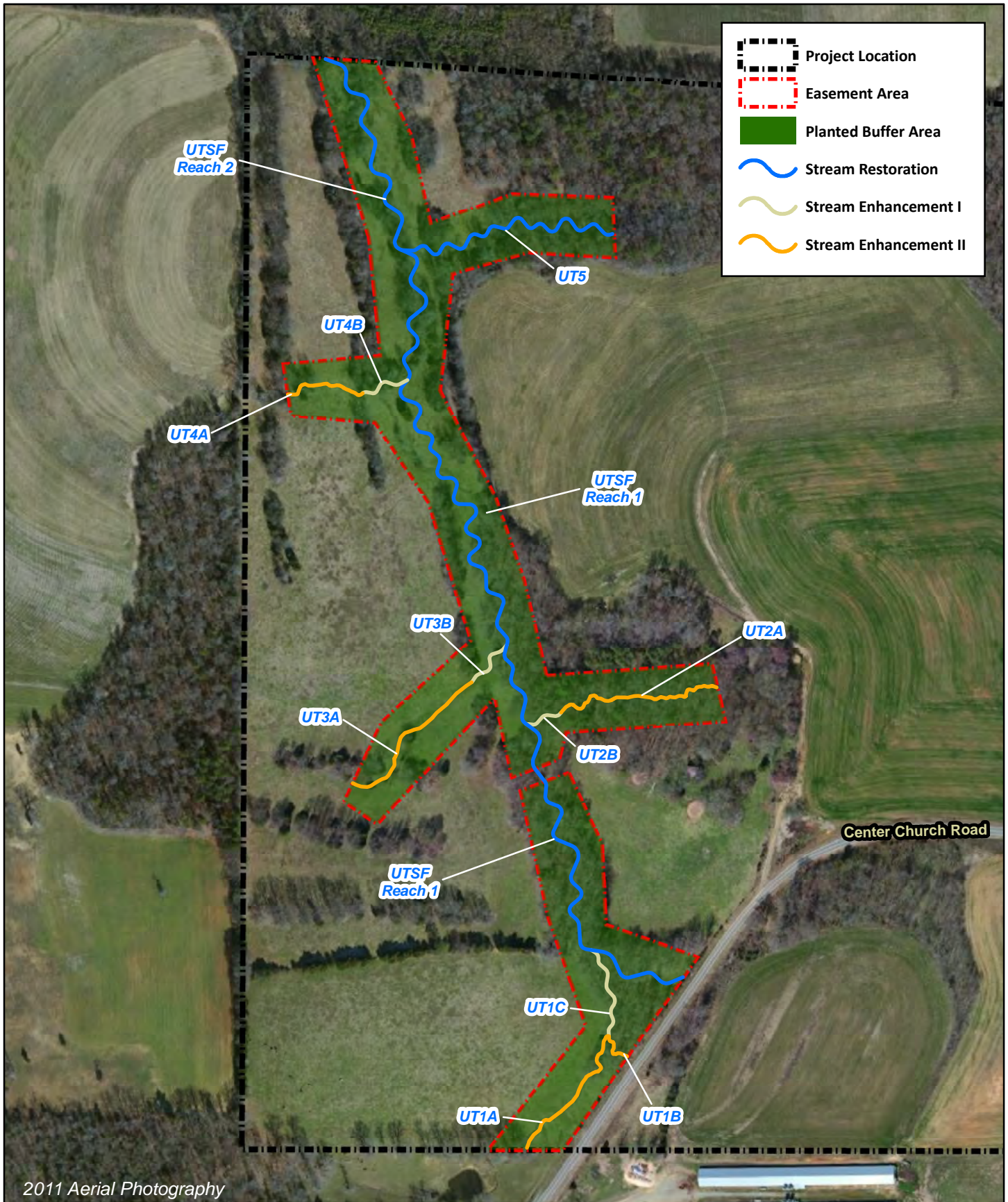


Figure 9: Concept Design Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002

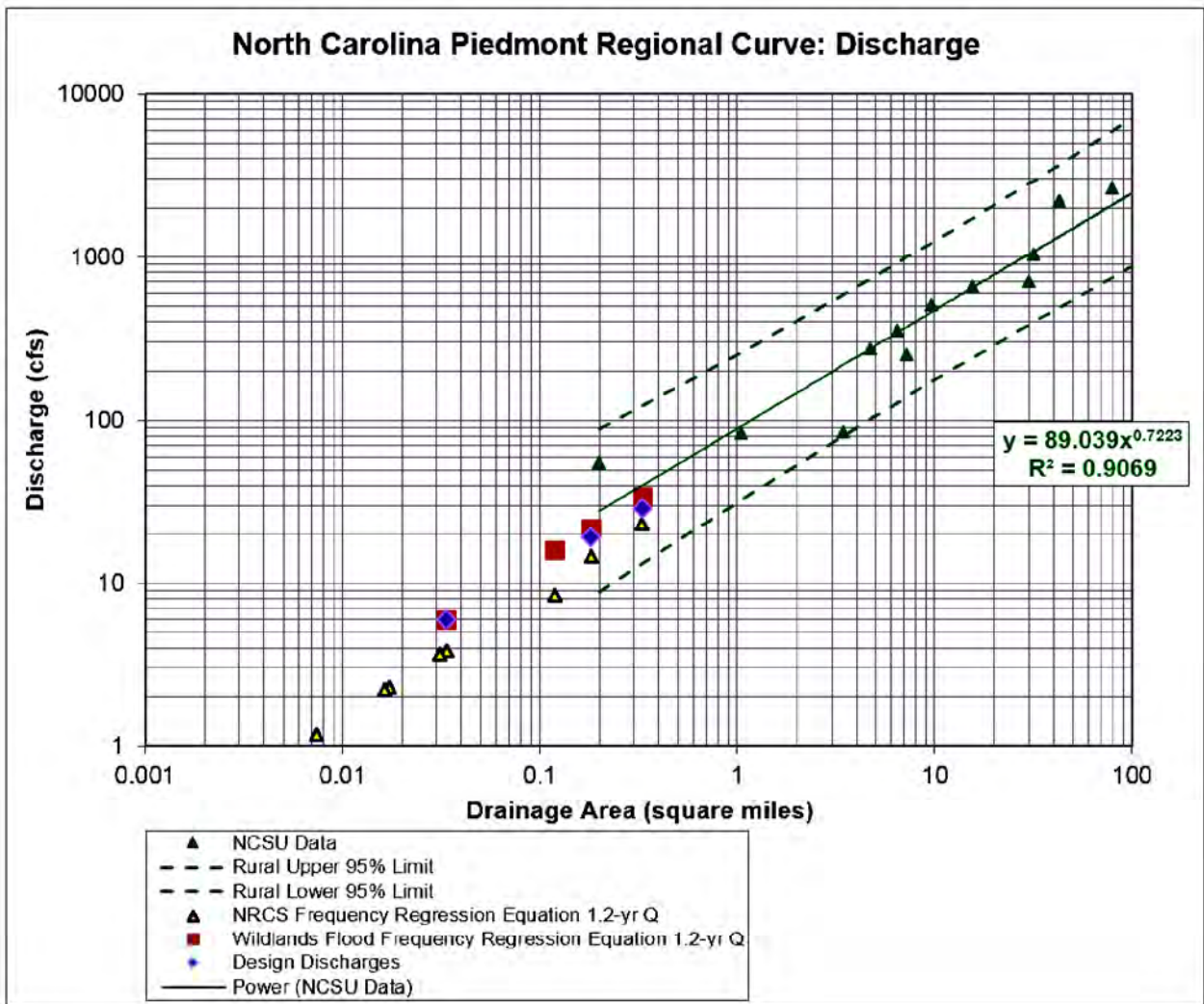
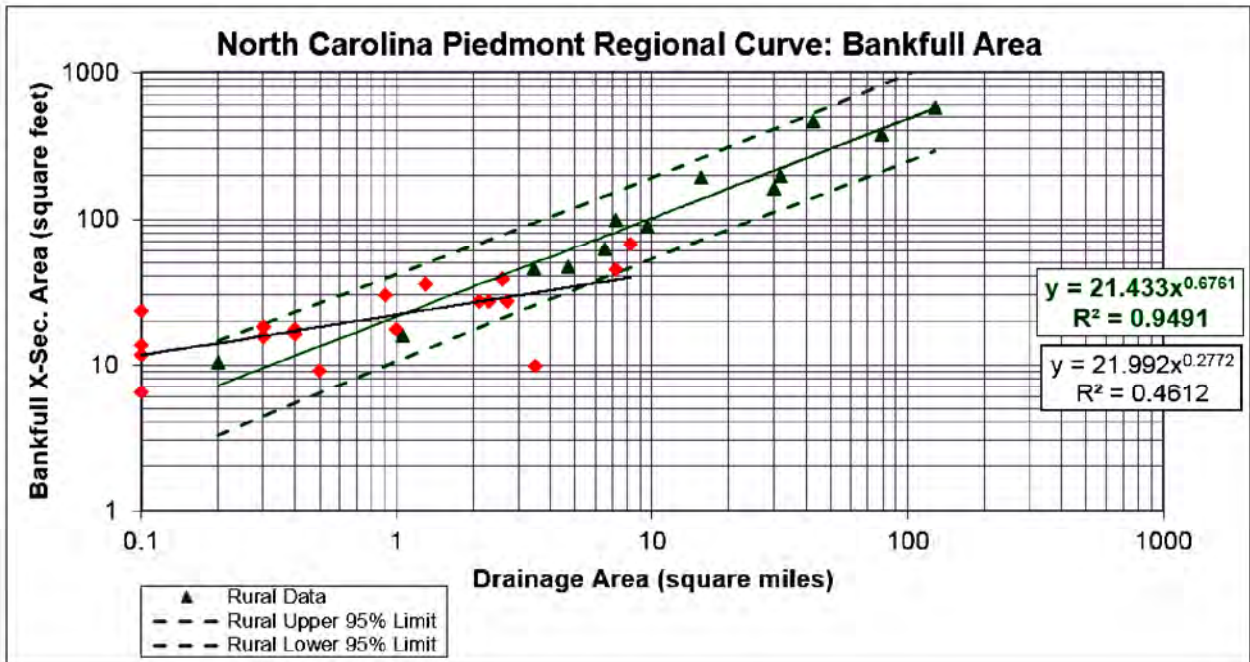


Figure 10: NC Piedmont Regional Curves with Project Data Overlay
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002



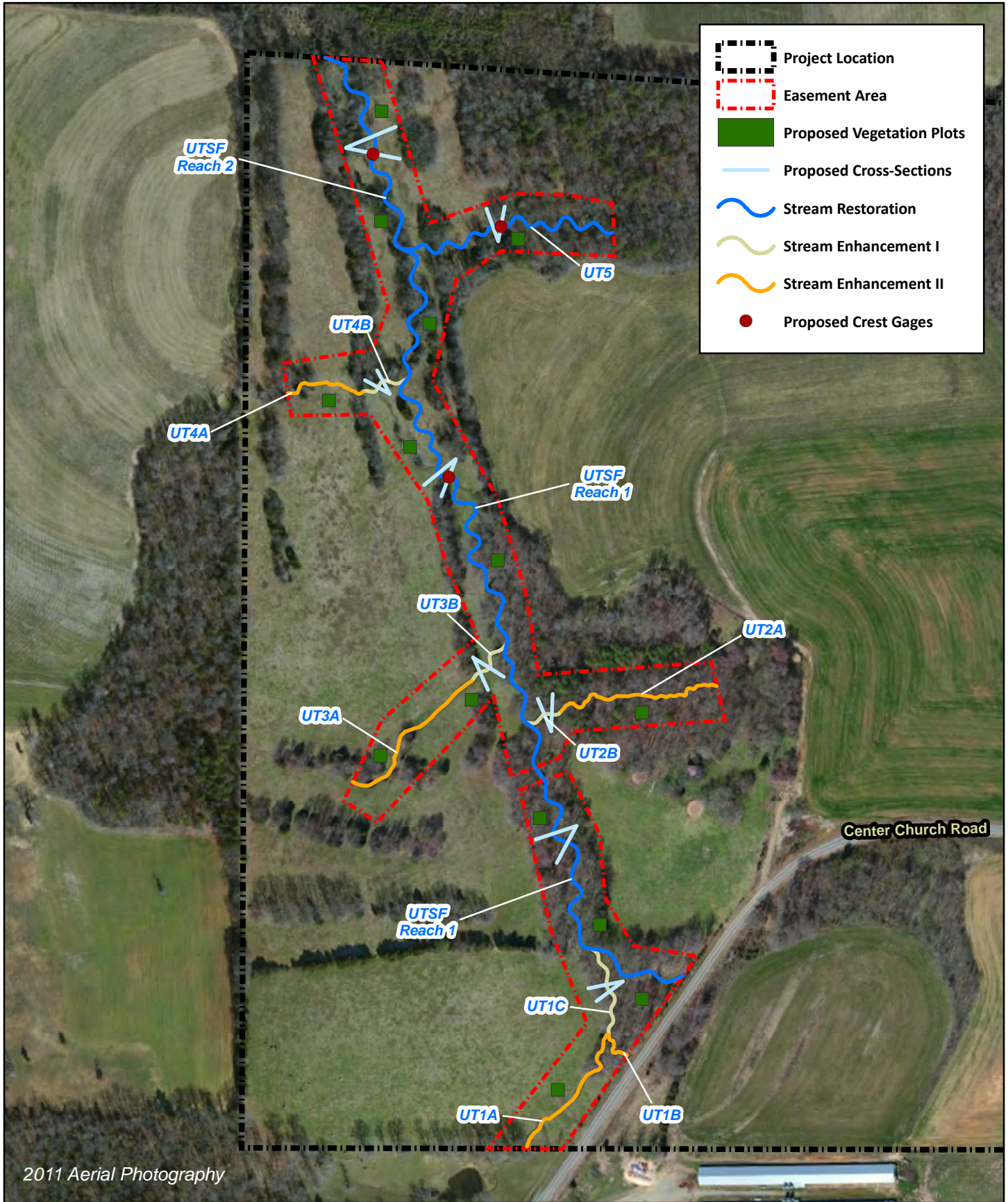
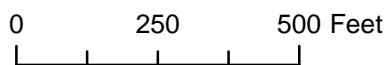


Figure 11: Proposed Monitoring Component Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002



Appendix 1: Site Photographs

UT South Fork Cane Creek (Upstream Extent to Confluence with UT₁)



UT South Fork Cane Creek (Confluence with UT1 to Confluence with UT2)



UT South Fork Cane Creek (Confluence with UT2 to Confluence with UT3)



UT South Fork Cane Creek (Confluence with UT3 to Confluence with UT4)



UT South Fork Cane Creek (Confluence with UT4 to Confluence with UT3)



UT South Fork Cane Creek (Confluence with UT5 to Downstream Extent)



UT1



UT2



UT3



UT4



UT5



Appendix 2: Site Protection Instrument Template

SITE PROTECTION INSTRUMENT

The land required for the construction, management, and stewardship of this mitigation project includes portions of the following parcels. A copy of the land protection instrument(s) is included in the appendices.

	Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage protected
Parcel A						
Parcel B						
Parcel C						
Parcel D, etc.						

When available, the recorded document(s) will be provided. If the recorded document(s) are not available, the template documents will be provided.

All site protection instruments require 60-day advance notification to the Corps and the State prior to any action to void, amend, or modify the document. No such action shall take place unless approved by the State.

Site Protection Instrument Figure

NOTE: figure must be in either 8.5"x11" –or- 11"x17" format

NOTE: Consultant provides plan view of site with parcel boundaries and site protection instrument boundaries; date of photograph required

Scale

Site Name

North Arrow

Appendix 3: Historic Aerial Photographs



Maney Farm

Center Church Rd
Pittsboro, NC 27312

Inquiry Number: 3754315.1

October 11, 2013

The EDR Aerial Photo Decade Package

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

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Date EDR Searched Historical Sources:

Aerial Photography October 11, 2013

Target Property:

Center Church Rd
Pittsboro, NC 27312

<u>Year</u>	<u>Scale</u>	<u>Details</u>	<u>Source</u>
1973	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Date: March 23, 1973	EDR
1983	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Date: April 12, 1983	EDR
1993	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; DOQQ - acquisition dates: January 30, 1993	EDR
1998	Aerial Photograph. Scale: 1"=750'	Panel #: 35079-G3, Silk Hope, NC; Flight Date: April 02, 1998	EDR
2005	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2005	EDR
2006	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2006	EDR
2008	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2008	EDR
2009	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2009	EDR
2010	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2010	EDR
2012	Aerial Photograph. Scale: 1"=500'	Panel #: 35079-G3, Silk Hope, NC; Flight Year: 2012	EDR



INQUIRY #: 3754315.1

YEAR: 1973

| = 500'





INQUIRY #: 3754315.1

YEAR: 1983

| = 500'





INQUIRY #: 3754315.1

YEAR: 1993

 = 500'





INQUIRY #: 3754315.1

YEAR: 1998

| = 750'





INQUIRY #: 3754315.1

YEAR: 2005

| = 500'



Appendix 4: NCDWR Stream Classification Forms

NC DWQ Stream Identification Form Version 4.11

Date: 10/10/13	Project/Site: Maney Site	Latitude: 35.835577° N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.342380° W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 27	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other SCPI - Mainstem e.g. Quad Name: above UT1

A. Geomorphology (Subtotal = 10.5)

	Absent	Weak	Moderate	Strong
1 ^a . Continuity of channel bed and bank	0	1		
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)

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 = 8.5)

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:

NC DWQ Stream Identification Form Version 4.11

Date: 10/10/13	Project/Site: Maney Site	Latitude: 35.835720 ^{0N}
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.343009 ^{0W}
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 37	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other SCP2 - Main stem e.g. Quad Name: below UT1

A. Geomorphology (Subtotal = 19.5)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
No = 0				Yes = 3

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.5)

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 = 9)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (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	0	0.5	1	1.5
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: 10/11/13	Project/Site: Macey Site	Latitude: 35.834562°N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.343422°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 21	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other SCP3-UT1 e.g. Quad Name: (Upstream of UT1B)

A. Geomorphology (Subtotal = 8.5)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 6)

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. Macrobenthos (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	0	0.5	1	1.5

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: 10/11/13	Project/Site: Maney Site	Latitude: 35.835360° N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.342781° W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 28	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other SCP4-UT1 e.g. Quad Name: (between UT1B; main stem)

A. Geomorphology (Subtotal =)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal =)

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 =)

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	0	0.5	1	1.5
		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: 10/11/13	Project/Site: Marcy Site	Latitude: 35.835077° N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.342686° W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 25.5	Stream Determination (circle one) Ephemeral <input type="checkbox"/> Intermittent <input checked="" type="checkbox"/> Perennial <input type="checkbox"/>	Other SCP 5 - UT1B e.g. Quad Name:

A. Geomorphology (Subtotal = 9)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8.5)

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 = 8)

18. Fibrous roots in streambed	3	2	1	0
19. Rooted upland plants in streambed	3	2	1	0
20. Macrobenthos (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	0	0.5	1	1.5
		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>10/10/13</u>	Project/Site: <u>Mancy Site</u>	Latitude: <u>35.837559°N</u>
Evaluator: <u>I. Eckardt</u>	County: <u>Chatham</u>	Longitude: <u>-79.342859°W</u>
Total Points: <i>Stream is at least Intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral Intermittent <input type="checkbox"/> Perennial <input checked="" type="checkbox"/>	Other <u>SCP6-UT2</u> e.g. Quad Name: <u>Downstream</u>

A. Geomorphology (Subtotal = 13)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
	No = 0		Yes = 3	

^a artificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

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 = 9)

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	0	0.5	1	1.5

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: 10/10/13	Project/Site: Macey Site	Latitude: 35.837746° N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.342137° W
Total Points: 26 <i>Stream is at least intermittent if ≥ 19 or perennial if ≥ 30*</i>	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other SCP 7-UT2 e.g. Quad Name: Upstream

A. Geomorphology (Subtotal = 11)

	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	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	1	1.5
		No = 0	Yes = 3	

^aartificial ditches are not rated; see discussions in manual

B. Hydrology (Subtotal = 8)

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)

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	0	0.5	1	1.5

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: 10-11-13	Project/Site: Maney Site	Latitude: 35.837421° N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.344404° W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if $\geq 30^*$ 20.75	Stream Determination (circle one) Ephemeral (Intermittent) Perennial	Other SLP8-UT3 e.g. Quad Name:

A. Geomorphology (Subtotal = 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)	1	2	3
10. Natural valley	0	0.5	1	1.5
11. Second or greater order channel	0	0.5	(1)	1.5
		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 = 6.25)

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	0	(0.5)	1	1.5
		FACW = 0.75; OBL = 1.5	Other = 0	

*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes: Channel is heavily trampled. Observed black fly larvae.

Sketch:

NC DWQ Stream Identification Form Version 4.11

Date: 10/11/13	Project/Site: Maney Site	Latitude: 35.839738°N
Evaluator: J. Eckardt	County: Chatham	Longitude: -79.345245°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 22.5	Stream Determination (circle one) Ephemeral <u>Intermittent</u> Perennial	Other SCP 9-UT4 e.g. Quad Name:

A. Geomorphology (Subtotal = 8)

	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)

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 = 7.5)

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 <i>Ludwigia sp.</i>	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: 10-11-13	Project/Site: Maney Site	Latitude: 35.840822°N
Evaluator: I. Eckardt	County: Chatham	Longitude: -79.840822°W
Total Points: Stream is at least intermittent if ≥ 19 or perennial if ≥ 30* 32.5	Stream Determination (circle one) Ephemeral Intermittent (Perennial)	Other SCP 10 - UTS e.g. Quad Name:

A. Geomorphology (Subtotal = 13.5)

	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 = 8.5)

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 = 10.5)

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			

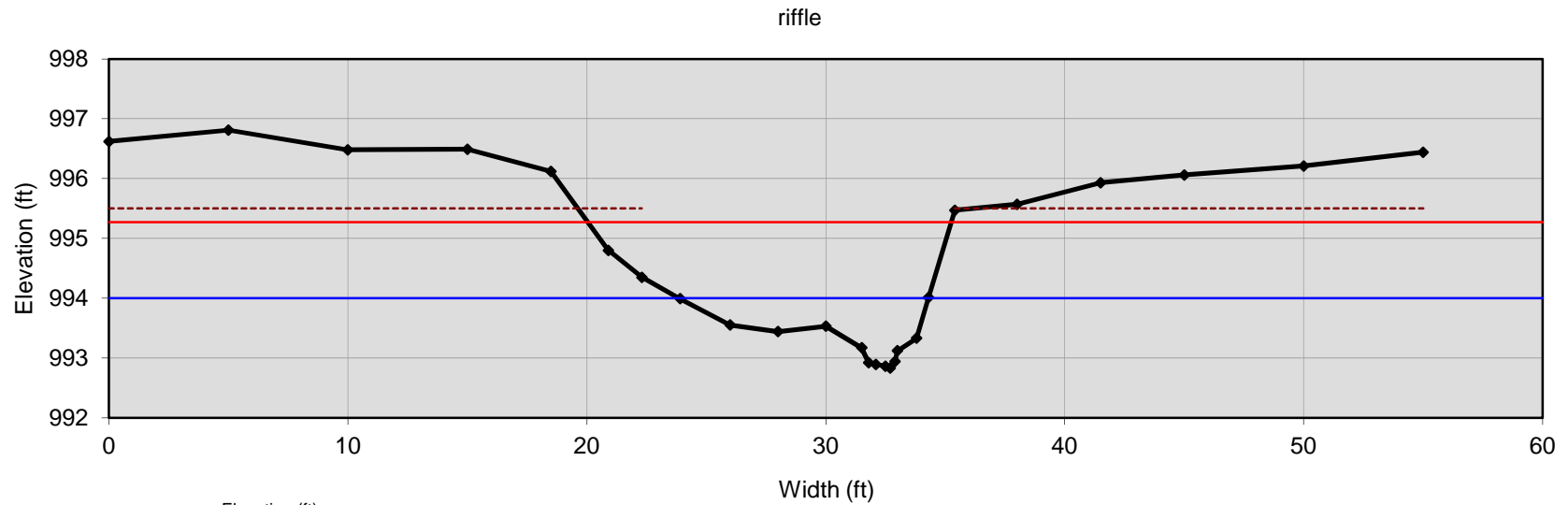
*perennial streams may also be identified using other methods. See p. 35 of manual.

Notes:

Sketch:

Appendix 5: Existing Geomorphic Survey Data

Cross Section 3 UTSF-Reach 1



Bankfull Dimensions

6.4	x-section area (ft.sq.)
10.7	width (ft)
0.6	mean depth (ft)
1.2	max depth (ft)
11.4	wetted parimeter (ft)
0.6	hyd radi (ft)
17.8	width-depth ratio

Flood Dimensions

15.2	W flood prone area (ft)
1.4	entrenchment ratio
2.7	low bank height (ft)
2.2	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
19	threshold grain size (mm):

Bankfull Flow

3.0	velocity (ft/s)
19.6	discharge rate (cfs)
0.72	Froude number

Flow Resistance

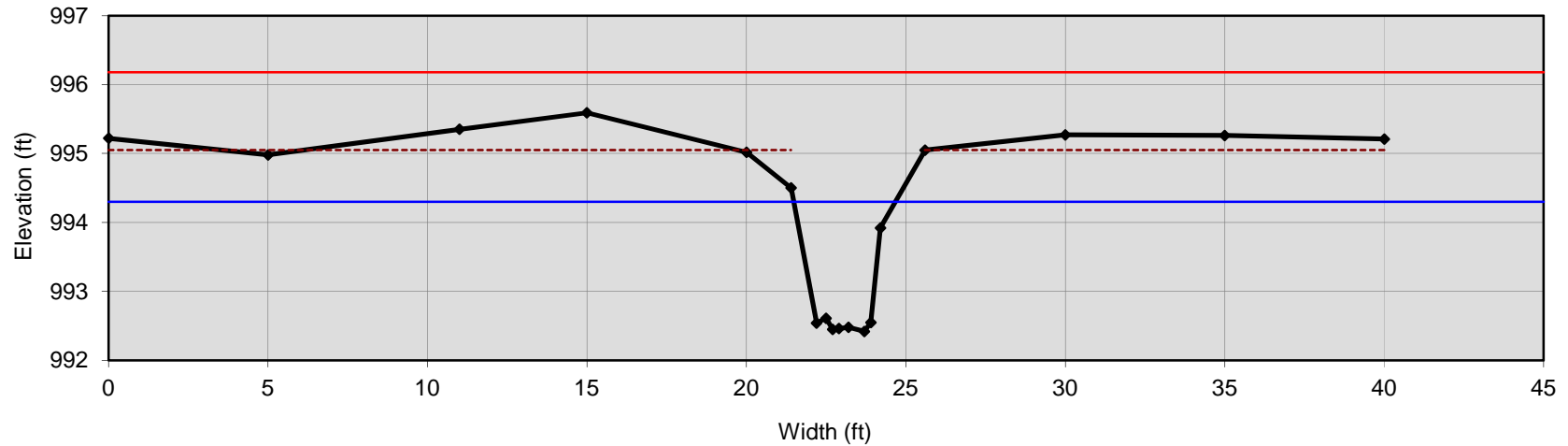
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

1.1	channel slope (%)
0.39	shear stress (lb/sq.ft.)
0.45	shear velocity (ft/s)
1.26	unit strm power (lb/ft/s)

Cross Section 4 UTSF-Reach 1

riffle



Bankfull Dimensions

4.1	x-section area (ft.sq.)
3.2	width (ft)
1.3	mean depth (ft)
1.9	max depth (ft)
5.7	wetted parimeter (ft)
0.7	hyd radi (ft)
2.5	width-depth ratio

Flood Dimensions

40.0	W flood prone area (ft)
12.5	entrenchment ratio
2.6	low bank height (ft)
1.4	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
44	threshold grain size (mm):

Bankfull Flow

4.8	velocity (ft/s)
19.9	discharge rate (cfs)
1.00	Froude number

Flow Resistance

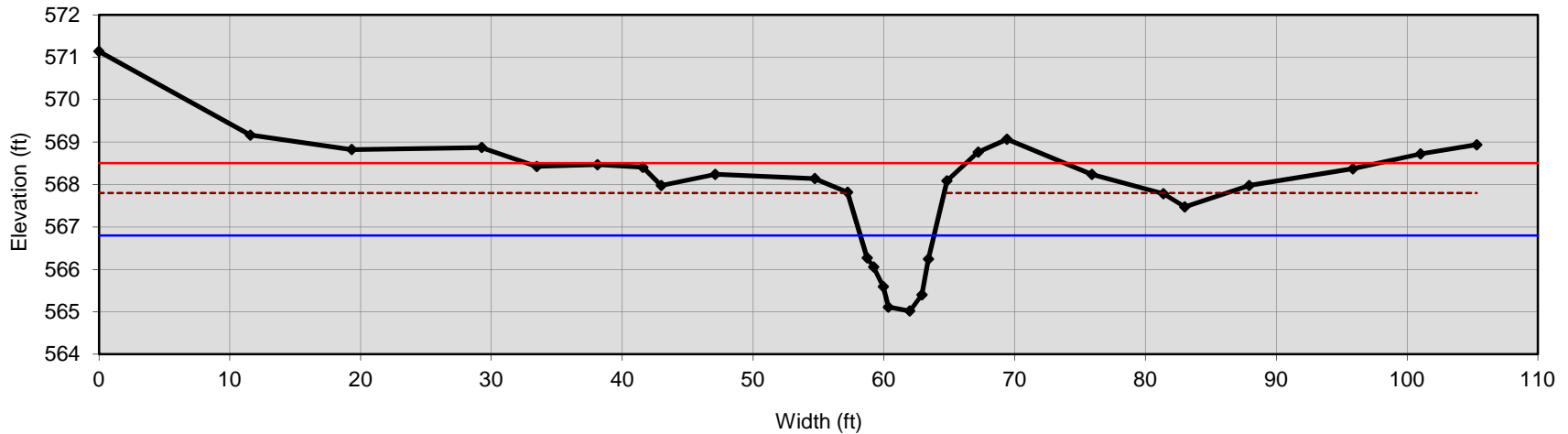
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

2	channel slope (%)
0.90	shear stress (lb/sq.ft.)
0.68	shear velocity (ft/s)
7.8	unit strm power (lb/ft/s)

Cross Section 5 UTSF-Reach 1

pool



Bankfull Dimensions

- 6.6 x-section area (ft.sq.)
- 5.6 width (ft)
- 1.2 mean depth (ft)
- 1.8 max depth (ft)
- 7.1 wetted parimeter (ft)
- 0.9 hyd radi (ft)
- 4.8 width-depth ratio

Flood Dimensions

- 57.5 W flood prone area (ft)
- 10.2 entrenchment ratio
- 2.8 low bank height (ft)
- 1.6 low bank height ratio

Materials

- D50 (mm)
- D84 (mm)
- threshold grain size (mm):

Bankfull Flow

- velocity (ft/s)
- discharge rate (cfs)
- Froude number

Flow Resistance

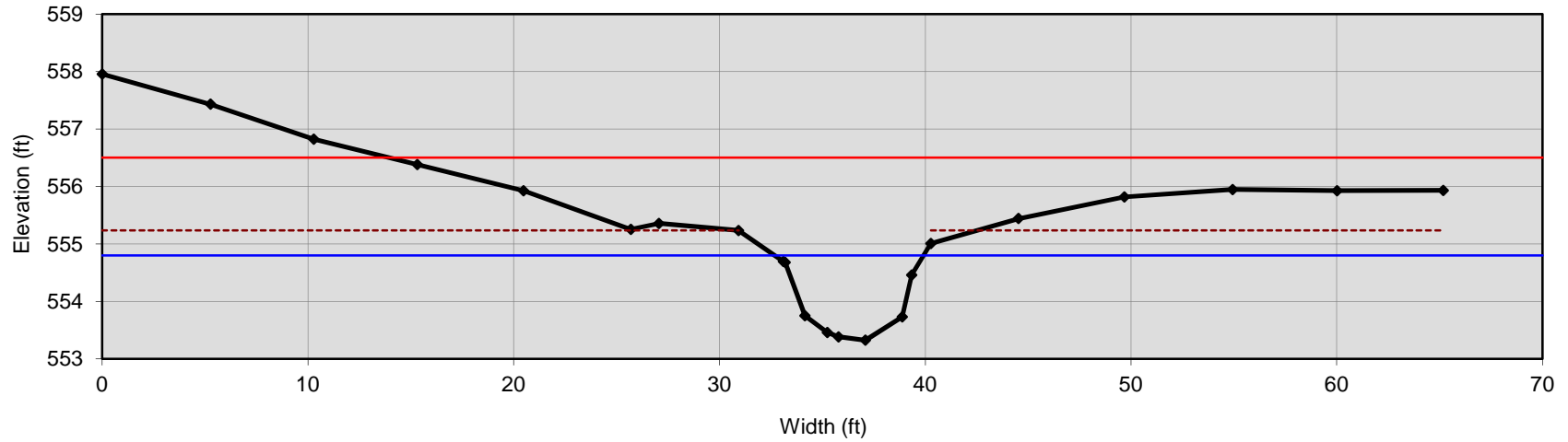
- Manning's roughness
- D'Arcy-Weisbach fric.
- resistance factor u/u^*
- relative roughness

Forces & Power

- channel slope (%)
- shear stress (lb/sq.ft.)
- shear velocity (ft/s)
- unit strm power (lb/ft/s)

Cross Section 8 UTSF-Reach 1

pool



Bankfull Dimensions

7.2	x-section area (ft.sq.)
7.2	width (ft)
1.0	mean depth (ft)
1.5	max depth (ft)
8.2	wetted parimeter (ft)
0.9	hyd radi (ft)
7.2	width-depth ratio

Flood Dimensions

---	W flood prone area (ft)
---	entrenchment ratio
1.9	low bank height (ft)
1.3	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
---	threshold grain size (mm):

Bankfull Flow

---	velocity (ft/s)
---	discharge rate (cfs)
---	Froude number

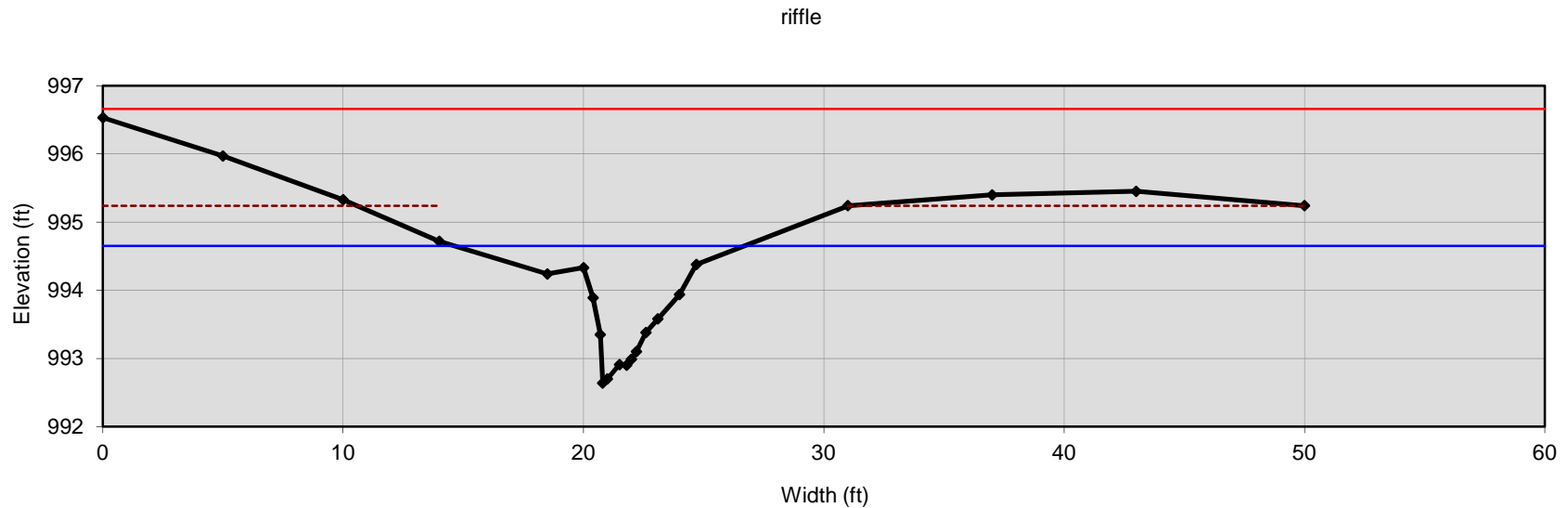
Flow Resistance

---	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

---	channel slope (%)
---	shear stress (lb/sq.ft.)
---	shear velocity (ft/s)
---	unit strm power (lb/ft/s)

Cross Section 9 UTSF-Reach 1



Bankfull Dimensions

7.1	x-section area (ft.sq.)
12.0	width (ft)
0.6	mean depth (ft)
2.0	max depth (ft)
13.6	wetted parimeter (ft)
0.5	hyd radi (ft)
20.4	width-depth ratio

Flood Dimensions

50.0	W flood prone area (ft)
4.2	entrenchment ratio
2.6	low bank height (ft)
1.3	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
16	threshold grain size (mm):

Bankfull Flow

2.8	velocity (ft/s)
19.5	discharge rate (cfs)
0.67	Froude number

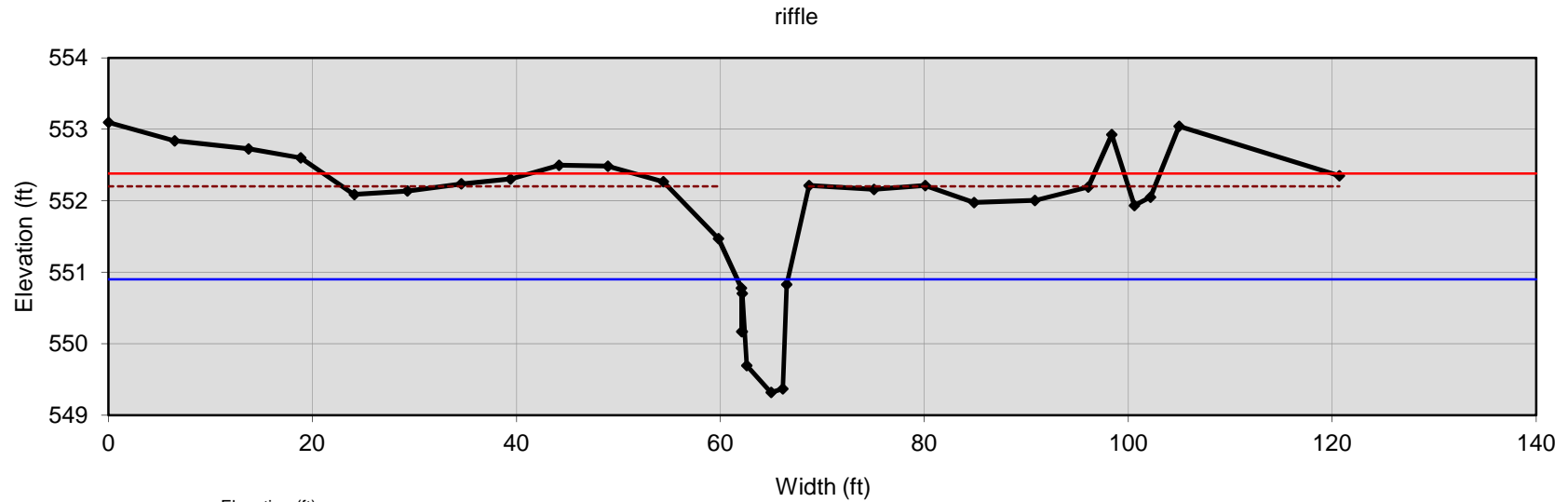
Flow Resistance

0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

1	channel slope (%)
0.32	shear stress (lb/sq.ft.)
0.41	shear velocity (ft/s)
1.01	unit strm power (lb/ft/s)

Cross Section 11 UTSF-Reach 2



Bankfull Dimensions

5.6	x-section area (ft.sq.)
4.7	width (ft)
1.2	mean depth (ft)
1.5	max depth (ft)
7.7	wetted parimeter (ft)
0.7	hyd radi (ft)
4.0	width-depth ratio

Flood Dimensions

69.8	W flood prone area (ft)
14.8	entrenchment ratio
2.9	low bank height (ft)
1.9	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
22	threshold grain size (mm):

Bankfull Flow

3.4	velocity (ft/s)
19.2	discharge rate (cfs)
0.71	Froude number

Flow Resistance

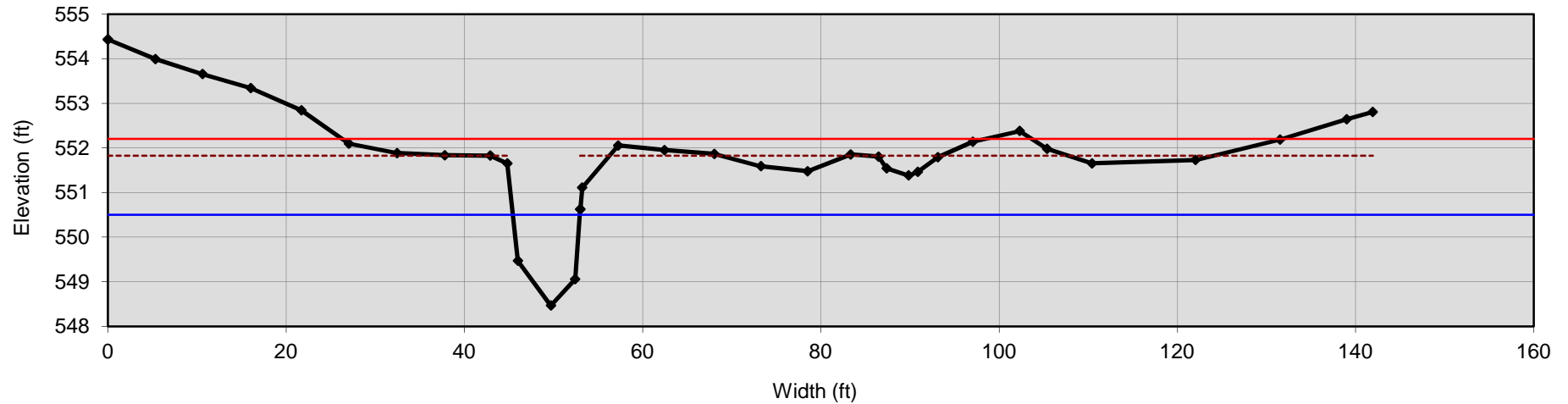
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

1	channel slope (%)
0.45	shear stress (lb/sq.ft.)
0.48	shear velocity (ft/s)
2.5	unit strm power (lb/ft/s)

Cross Section 12 UTSF-Reach 2

pool



Bankfull Dimensions

11.1	x-section area (ft.sq.)
7.5	width (ft)
1.5	mean depth (ft)
2.0	max depth (ft)
9.3	wetted parimeter (ft)
1.2	hyd radi (ft)
5.1	width-depth ratio

Flood Dimensions

100.3	W flood prone area (ft)
13.4	entrenchment ratio
3.4	low bank height (ft)
1.7	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
---	threshold grain size (mm):

Bankfull Flow

---	velocity (ft/s)
---	discharge rate (cfs)
---	Froude number

Flow Resistance

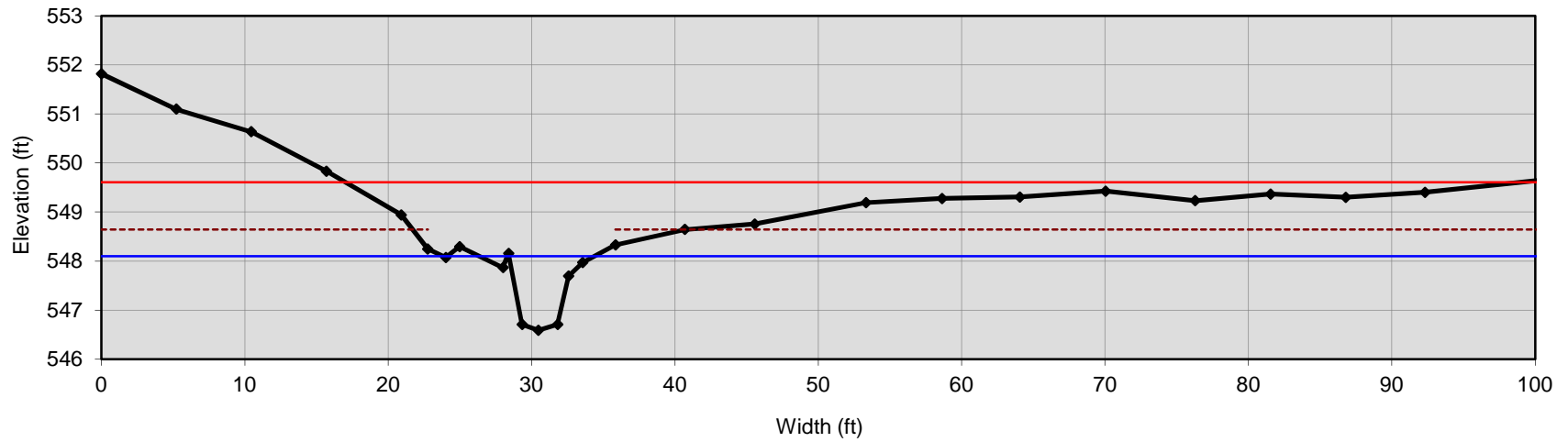
---	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

---	channel slope (%)
---	shear stress (lb/sq.ft.)
---	shear velocity (ft/s)
---	unit strm power (lb/ft/s)

Cross Section 15 UTSF-Reach 2

riffle



Bankfull Dimensions

5.4	x-section area (ft.sq.)
8.2	width (ft)
0.7	mean depth (ft)
1.5	max depth (ft)
9.6	wetted parimeter (ft)
0.6	hyd radi (ft)
12.3	width-depth ratio

Flood Dimensions

82.0	W flood prone area (ft)
10.0	entrenchment ratio
2.1	low bank height (ft)
1.4	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
26	threshold grain size (mm):

Bankfull Flow

3.6	velocity (ft/s)
19.5	discharge rate (cfs)
0.84	Froude number

Flow Resistance

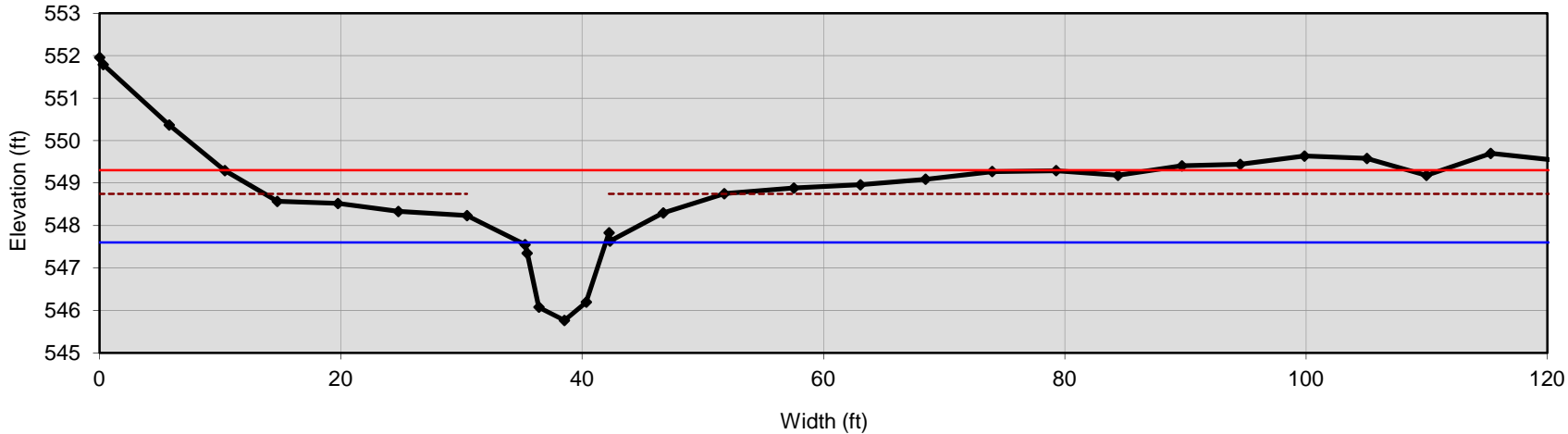
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

1.5	channel slope (%)
0.53	shear stress (lb/sq.ft.)
0.52	shear velocity (ft/s)
2.2	unit strm power (lb/ft/s)

Cross Section 16 UTSF-Reach 2

pool



Bankfull Dimensions

8.5	x-section area (ft.sq.)
7.0	width (ft)
1.2	mean depth (ft)
1.8	max depth (ft)
8.3	wetted parimeter (ft)
1.0	hyd radi (ft)
5.8	width-depth ratio

Flood Dimensions

79.7	W flood prone area (ft)
11.4	entrenchment ratio
3.0	low bank height (ft)
1.6	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
---	threshold grain size (mm):

Bankfull Flow

---	velocity (ft/s)
---	discharge rate (cfs)
---	Froude number

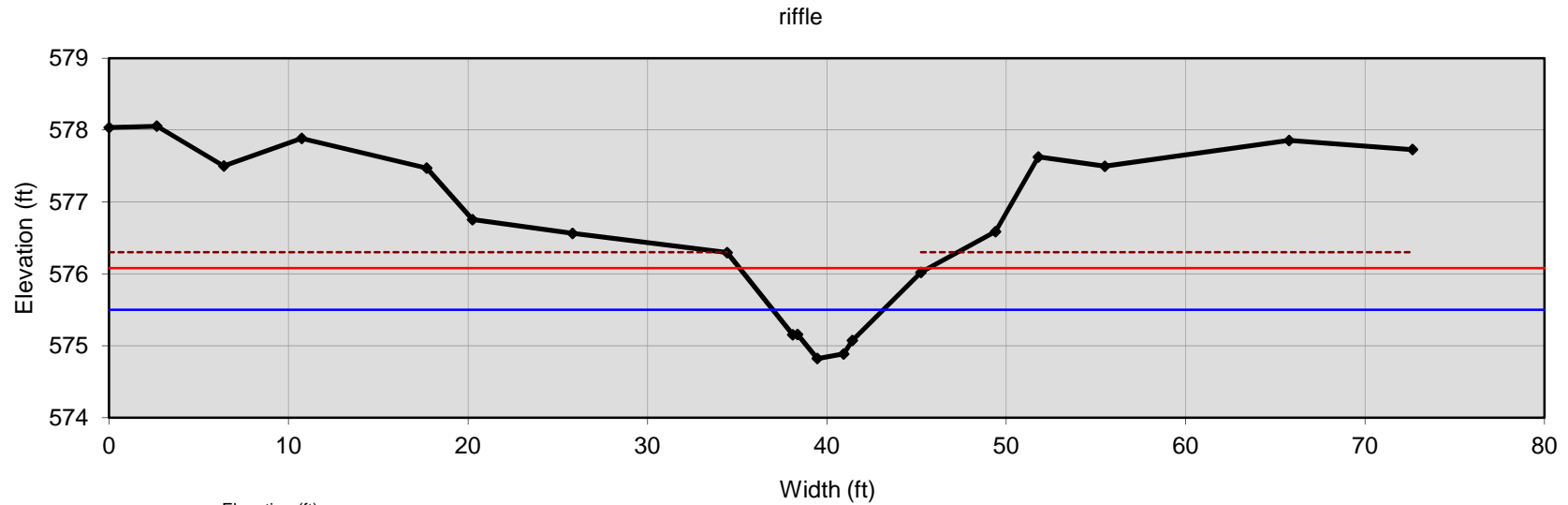
Flow Resistance

---	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

---	channel slope (%)
---	shear stress (lb/sq.ft.)
---	shear velocity (ft/s)
---	unit strm power (lb/ft/s)

Cross Section 1 UT1A



Bankfull Dimensions

2.1	x-section area (ft.sq.)
5.8	width (ft)
0.4	mean depth (ft)
0.6	max depth (ft)
6.0	wetted parimeter (ft)
0.4	hyd radi (ft)
15.9	width-depth ratio

Flood Dimensions

10.6	W flood prone area (ft)
1.8	entrenchment ratio
1.5	low bank height (ft)
2.3	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
23	threshold grain size (mm):

Bankfull Flow

3.1	velocity (ft/s)
6.6	discharge rate (cfs)
0.92	Froude number

Flow Resistance

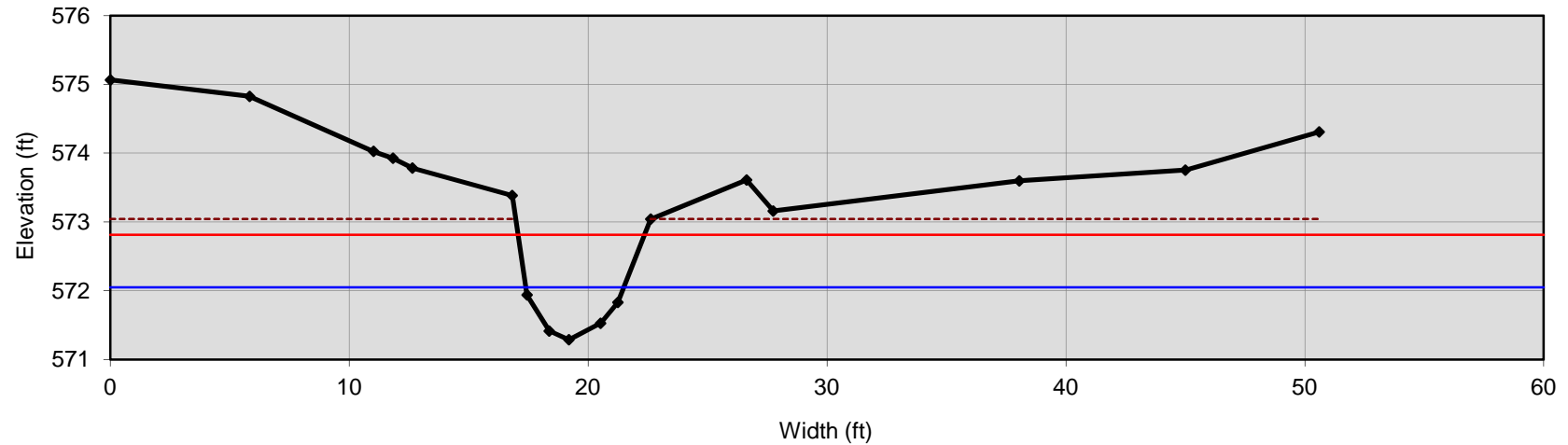
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

2.11	channel slope (%)
0.47	shear stress (lb/sq.ft.)
0.49	shear velocity (ft/s)
1.5	unit strm power (lb/ft/s)

Cross Section 2 UT1C

riffle



Bankfull Dimensions

2.1	x-section area (ft.sq.)
4.1	width (ft)
0.5	mean depth (ft)
0.8	max depth (ft)
4.5	wetted parimeter (ft)
0.5	hyd radi (ft)
8.1	width-depth ratio

Flood Dimensions

5.3	W flood prone area (ft)
1.3	entrenchment ratio
1.8	low bank height (ft)
2.3	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
20	threshold grain size (mm):

Bankfull Flow

3.0	velocity (ft/s)
6.3	discharge rate (cfs)
0.79	Froude number

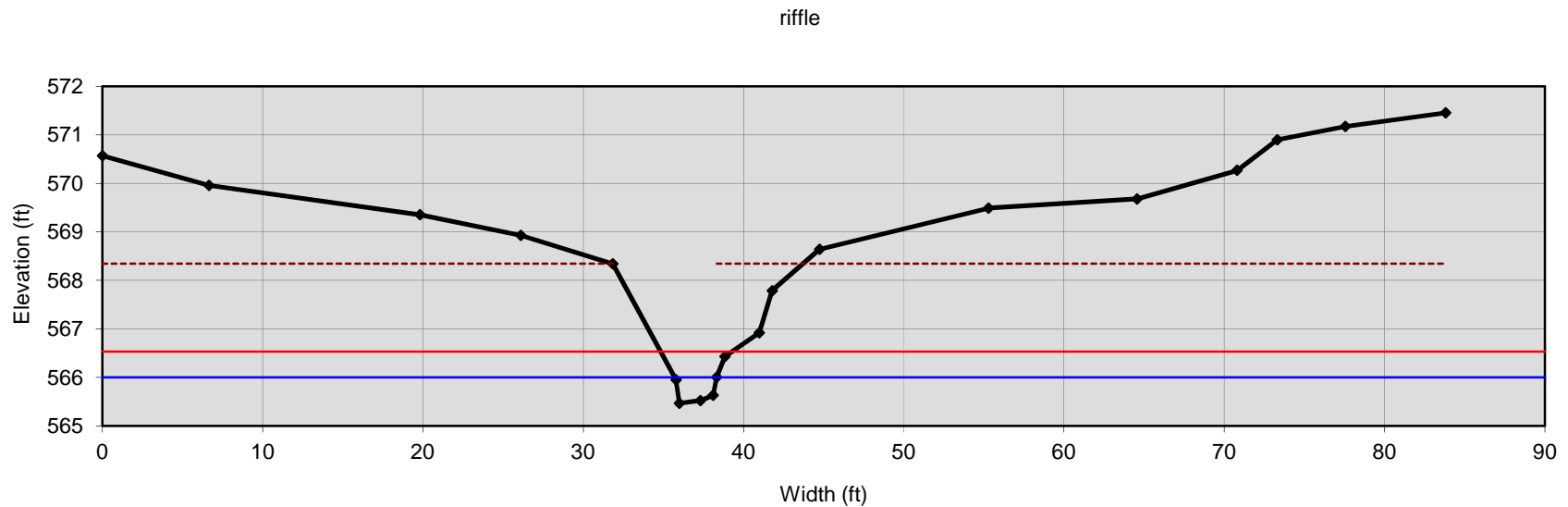
Flow Resistance

0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

1.42	channel slope (%)
0.41	shear stress (lb/sq.ft.)
0.46	shear velocity (ft/s)
1.36	unit strm power (lb/ft/s)

Cross Section 6 UT2A



Bankfull Dimensions

1.1	x-section area (ft.sq.)
2.6	width (ft)
0.4	mean depth (ft)
0.5	max depth (ft)
3.2	wetted parimeter (ft)
0.3	hyd radi (ft)
6.2	width-depth ratio

Flood Dimensions

4.4	W flood prone area (ft)
1.7	entrenchment ratio
2.9	low bank height (ft)
5.4	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
28	threshold grain size (mm):

Bankfull Flow

3.4	velocity (ft/s)
3.7	discharge rate (cfs)
1.02	Froude number

Flow Resistance

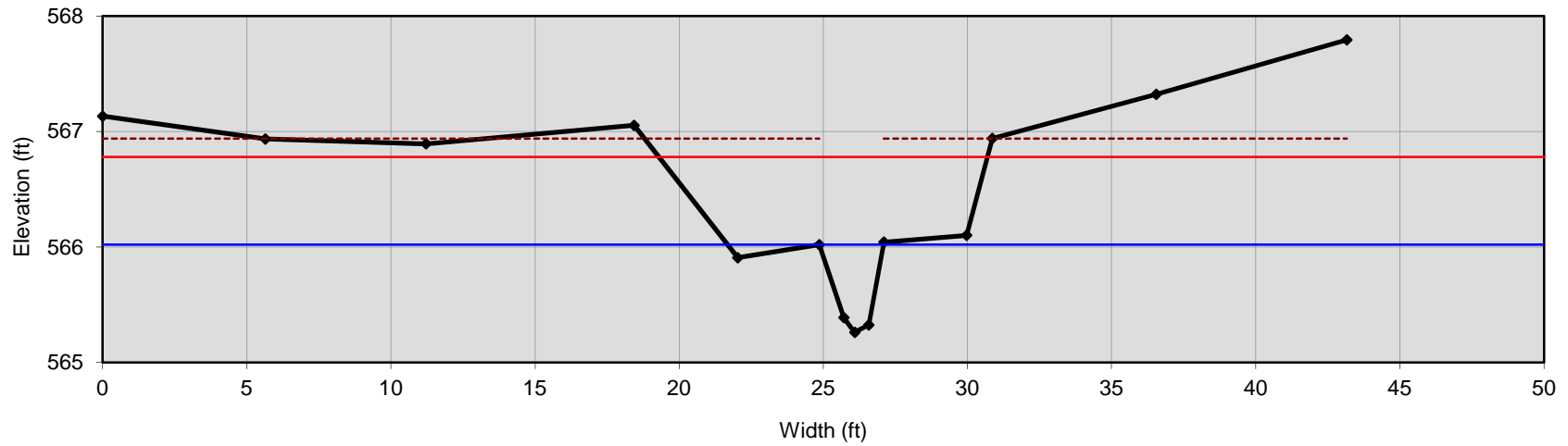
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

2.61	channel slope (%)
0.56	shear stress (lb/sq.ft.)
0.54	shear velocity (ft/s)
2.3	unit strm power (lb/ft/s)

Cross Section 7 UT3A

rifle



Bankfull Dimensions

1.1	x-section area (ft.sq.)
2.2	width (ft)
0.5	mean depth (ft)
0.8	max depth (ft)
2.8	wetted parimeter (ft)
0.4	hyd radi (ft)
4.6	width-depth ratio

Flood Dimensions

11.4	W flood prone area (ft)
5.1	entrenchment ratio
1.7	low bank height (ft)
2.2	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
23	threshold grain size (mm):

Bankfull Flow

3.2	velocity (ft/s)
3.4	discharge rate (cfs)
0.90	Froude number

Flow Resistance

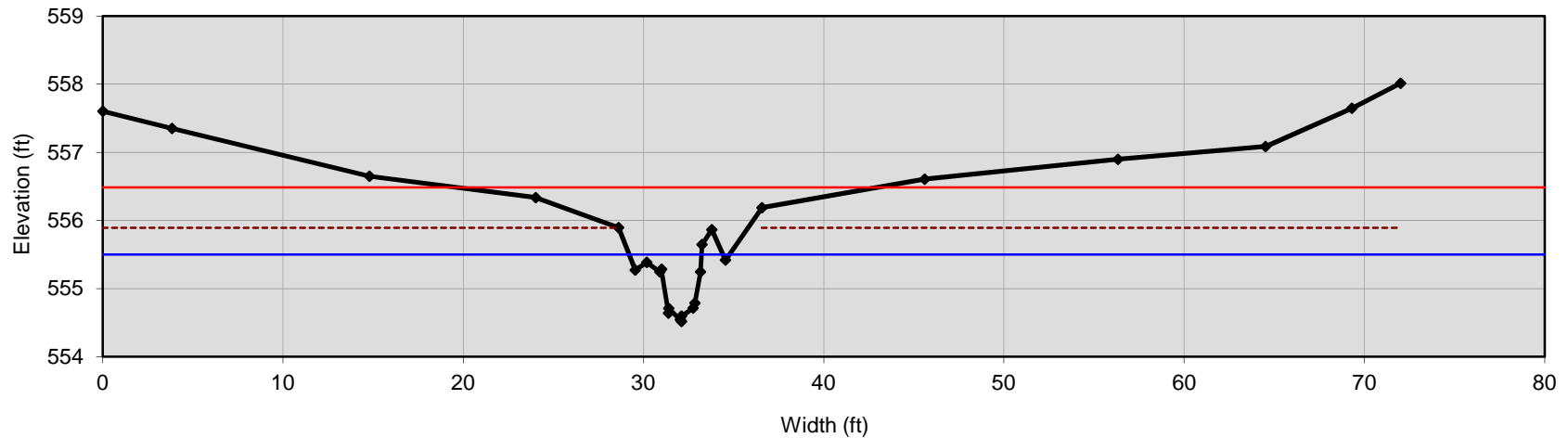
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

2	channel slope (%)
0.47	shear stress (lb/sq.ft.)
0.49	shear velocity (ft/s)
1.89	unit strm power (lb/ft/s)

Cross Section 10 UT4A

rifle



Bankfull Dimensions

1.9	x-section area (ft.sq.)
4.4	width (ft)
0.4	mean depth (ft)
1.0	max depth (ft)
5.5	wetted parimeter (ft)
0.4	hyd radi (ft)
9.9	width-depth ratio

Flood Dimensions

23.3	W flood prone area (ft)
5.3	entrenchment ratio
1.4	low bank height (ft)
1.4	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
22	threshold grain size (mm):

Bankfull Flow

3.0	velocity (ft/s)
5.8	discharge rate (cfs)
0.89	Froude number

Flow Resistance

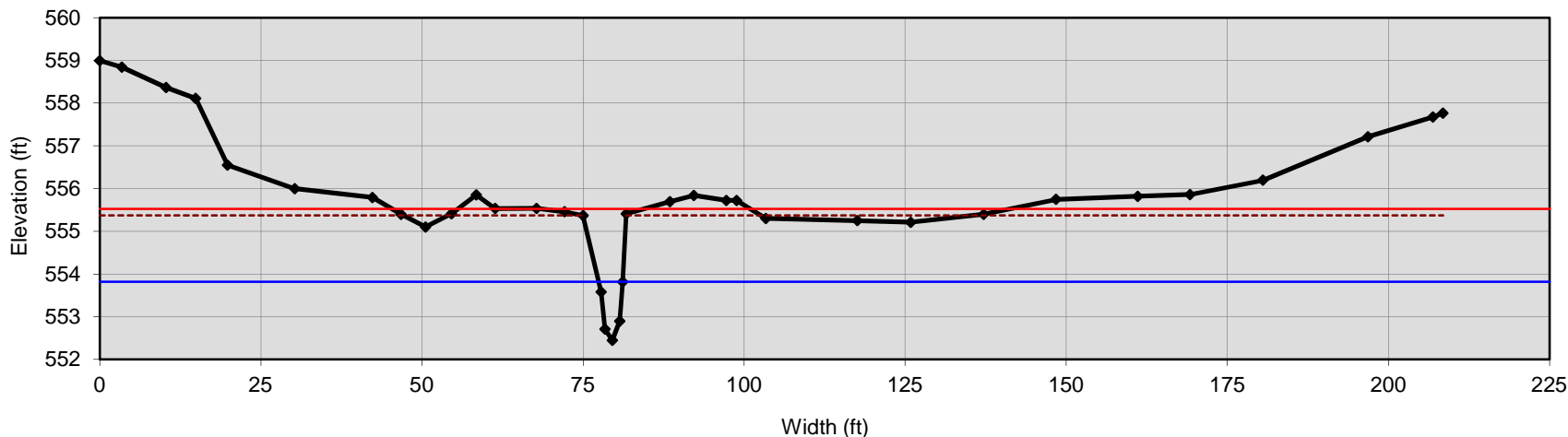
0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

2.01	channel slope (%)
0.44	shear stress (lb/sq.ft.)
0.48	shear velocity (ft/s)
1.67	unit strm power (lb/ft/s)

Cross Section 13 UT5

pool



Bankfull Dimensions

- 3.4 x-section area (ft.sq.)
- 3.7 width (ft)
- 0.9 mean depth (ft)
- 1.4 max depth (ft)
- 4.9 wetted parimeter (ft)
- 0.7 hyd radi (ft)
- 4.1 width-depth ratio

Flood Dimensions

- 66.2 W flood prone area (ft)
- 17.7 entrenchment ratio
- 2.9 low bank height (ft)
- 2.1 low bank height ratio

Materials

- D50 (mm)
- D84 (mm)
- threshold grain size (mm):

Bankfull Flow

- velocity (ft/s)
- discharge rate (cfs)
- Froude number

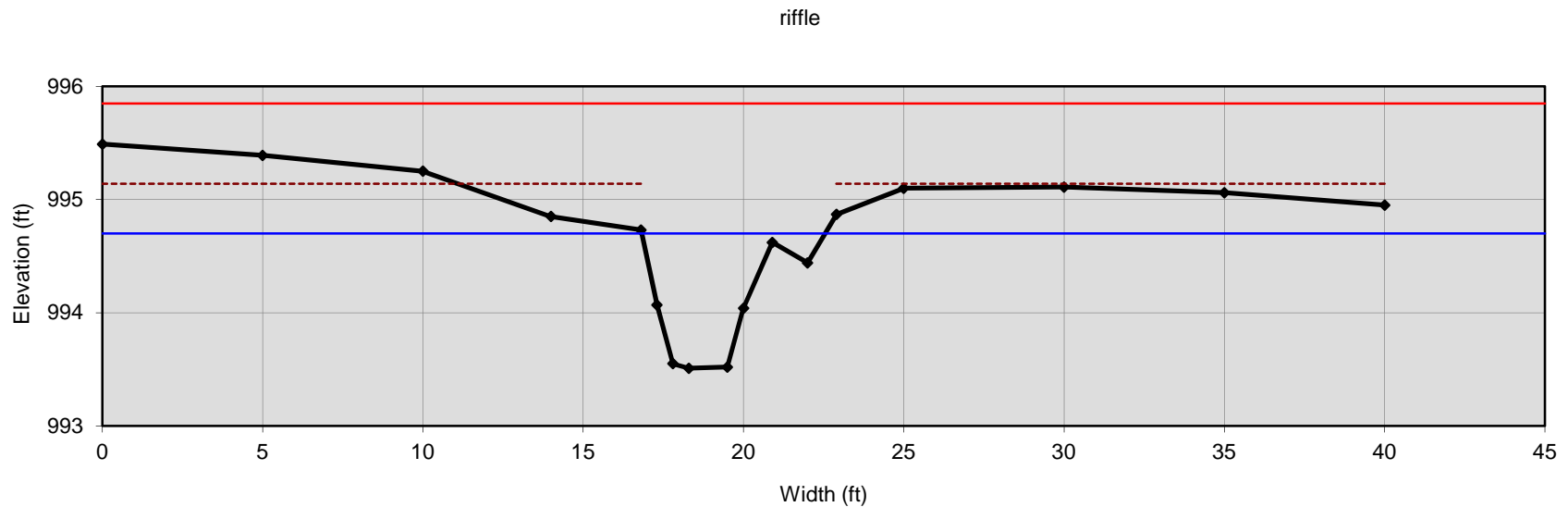
Flow Resistance

- Manning's roughness
- D'Arcy-Weisbach fric.
- resistance factor u/u^*
- relative roughness

Forces & Power

- channel slope (%)
- shear stress (lb/sq.ft.)
- shear velocity (ft/s)
- unit strm power (lb/ft/s)

Cross Section 14 UT5



Bankfull Dimensions

3.5	x-section area (ft.sq.)
5.7	width (ft)
0.6	mean depth (ft)
1.2	max depth (ft)
6.6	wetted parimeter (ft)
0.5	hyd radi (ft)
9.1	width-depth ratio

Flood Dimensions

40.0	W flood prone area (ft)
7.1	entrenchment ratio
1.6	low bank height (ft)
1.4	low bank height ratio

Materials

---	D50 (mm)
---	D84 (mm)
9	threshold grain size (mm):

Bankfull Flow

2.1	velocity (ft/s)
7.5	discharge rate (cfs)
0.51	Froude number

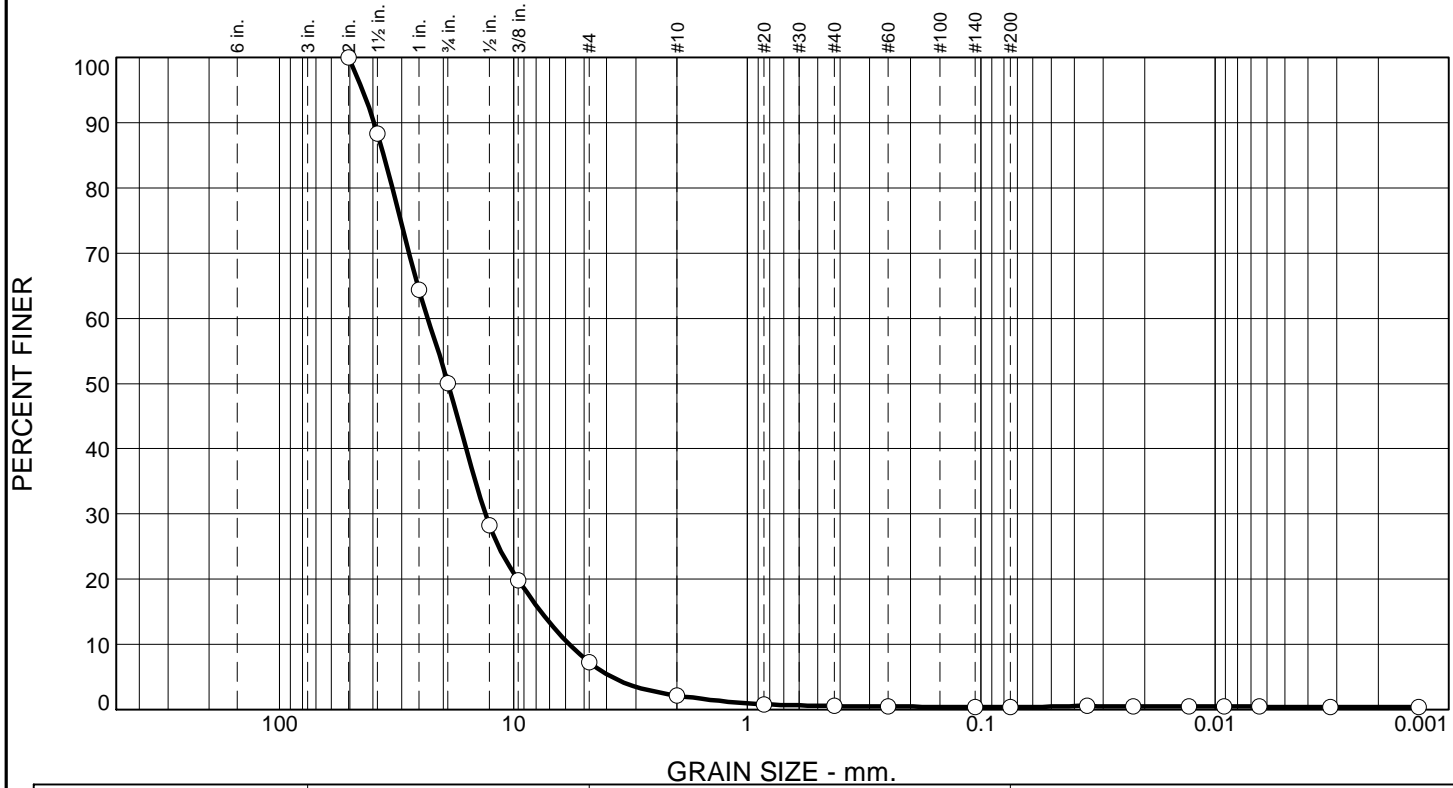
Flow Resistance

0.035	Manning's roughness
---	D'Arcy-Weisbach fric.
---	resistance factor u/u^*
---	relative roughness

Forces & Power

0.58	channel slope (%)
0.19	shear stress (lb/sq.ft.)
0.32	shear velocity (ft/s)
0.48	unit strm power (lb/ft/s)

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	49.9	42.9	5.0	1.7	0.2	0.3			
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			35.8191	23.3347	19.0257	13.2068	7.6002	5.7722	1.29	4.04

Material Description	USCS	AASHTO
○ Brown	GW	

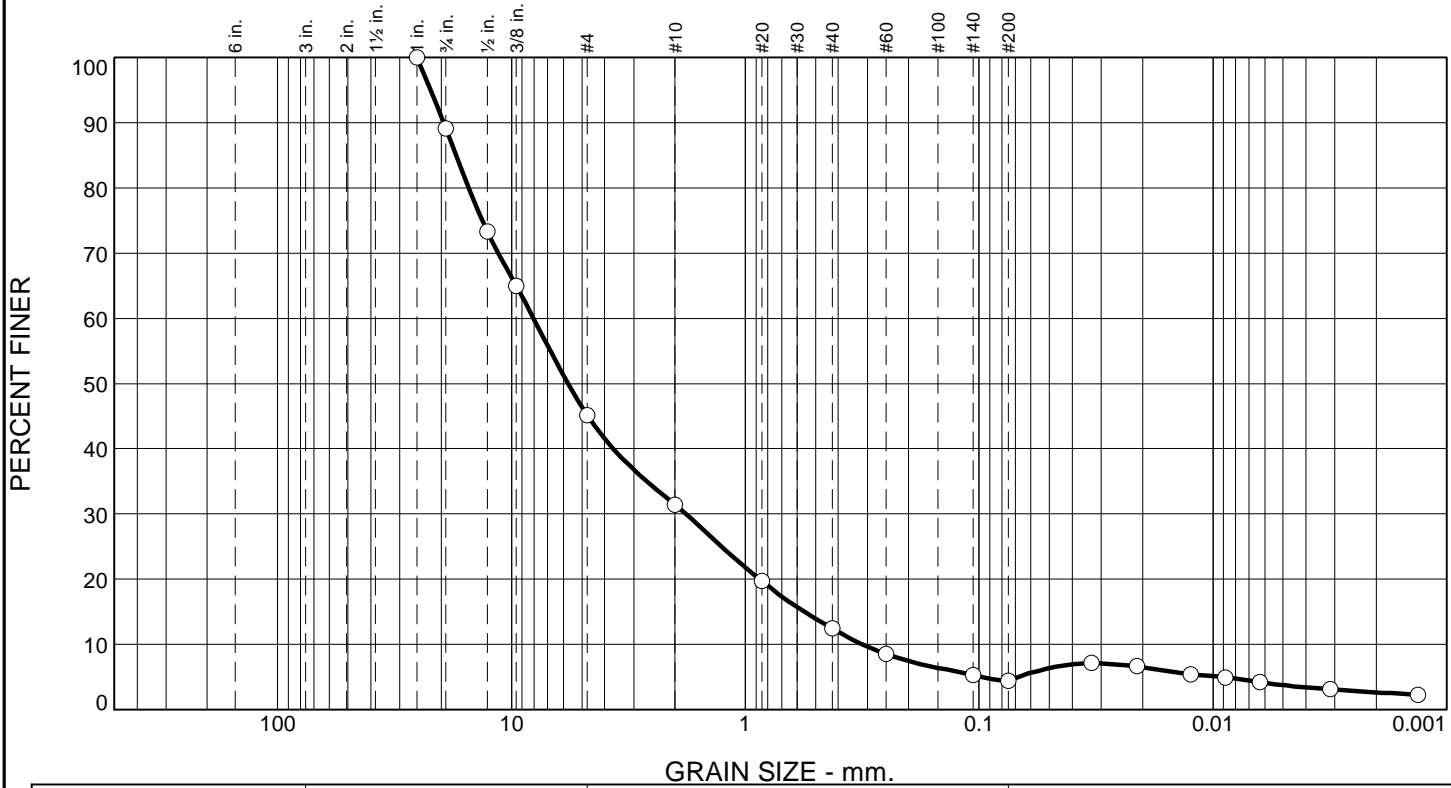
Project No. EN146305 **Client:** Wildlands Engineering, Mount Pleasant SC
Project: Maney Farm Stream Restoration
Source: Maney Farm **Depth:** Riffle Pavement **Sample No.:** UTSF-R2
XS - 15

Remarks:
 ○ Natural Moisture 5.5%

Terracon Consultants, Inc.

Figure

Particle Size Distribution Report



% +3"		% Gravel		% Sand			% Fines		
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay	
<input type="radio"/>	0.0	10.9	43.9	13.8	18.9	8.1	0.7	3.7	
<input type="checkbox"/>									
<input type="checkbox"/>									
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>		17.2179	8.0375	5.7227	1.7986	0.5579	0.3143	1.28	25.57
<input type="checkbox"/>									
<input type="checkbox"/>									

Material Description	USCS	AASHTO
<input type="radio"/> Yellow-Brown	GW	
<input type="checkbox"/>		

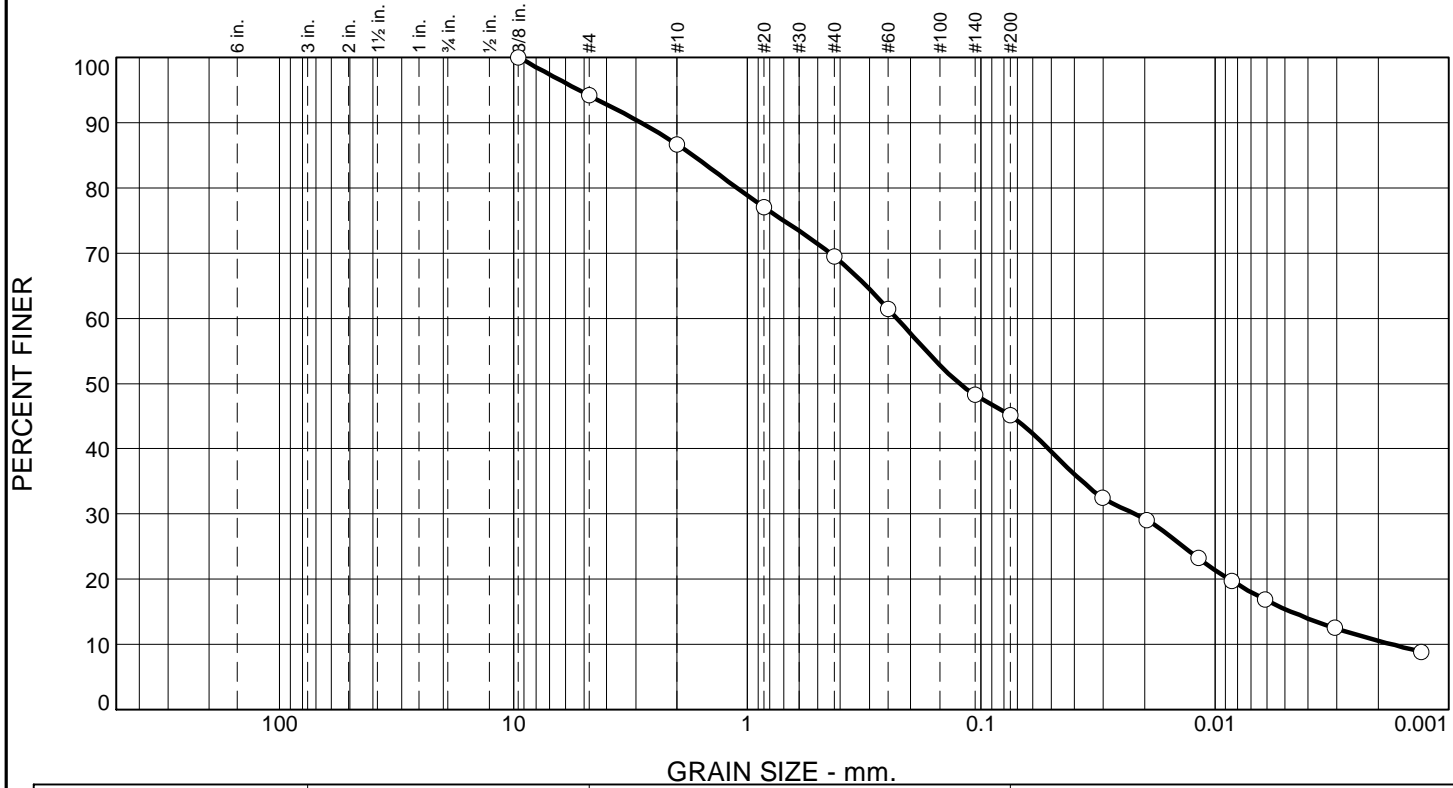
Project No. EN146305 Client: Wildlands Engineering, Mount Pleasant SC Project: Maney Farm Stream Restoration <input type="radio"/> Source: Maney Farm Depth: Riffle Subpavement Sample No.:	Remarks: <input type="radio"/> Natural Moisture 16.6%
---	---

UTSF-R2
 XS -15

Terracon Consultants, Inc.

Figure

Particle Size Distribution Report



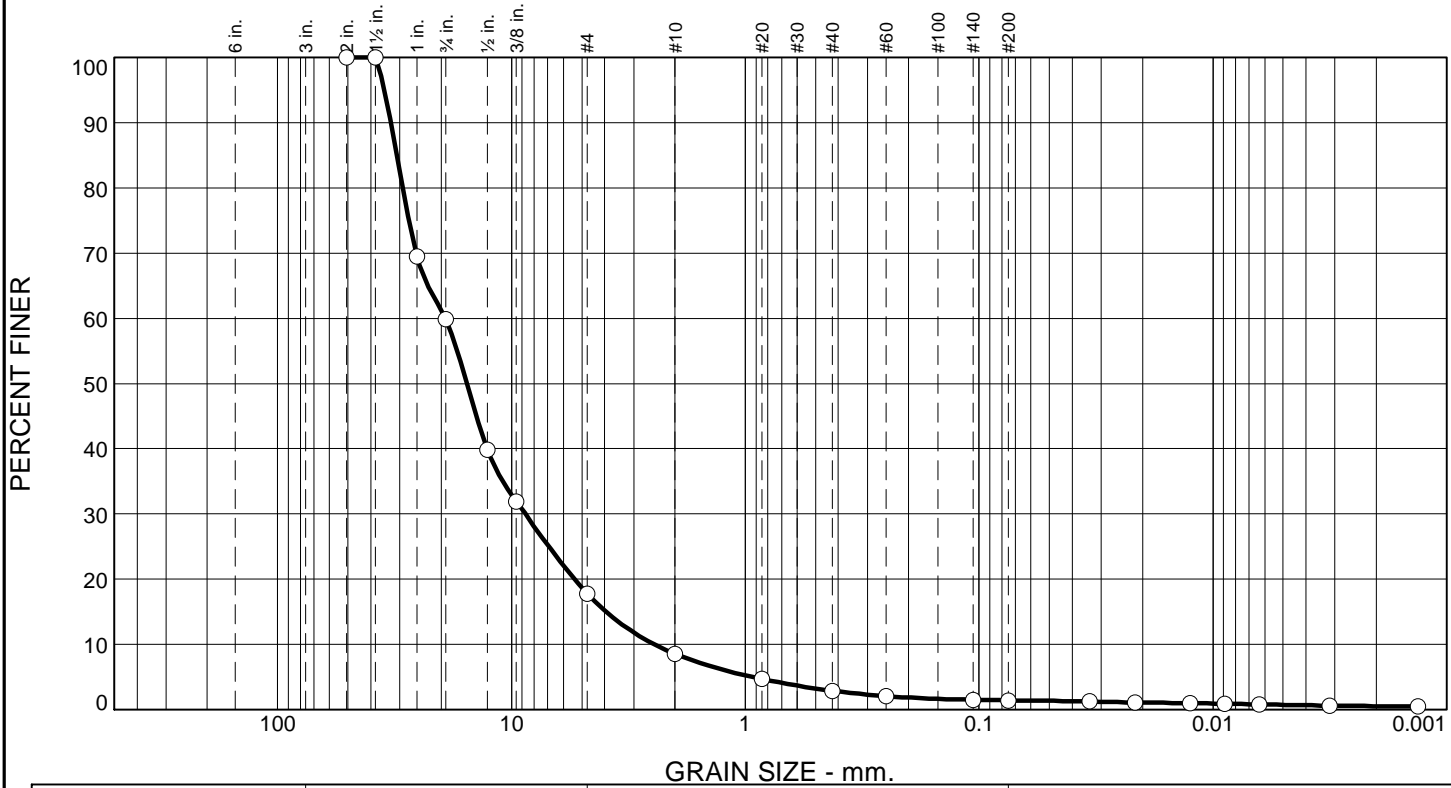
% +3"		% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
<input type="radio"/>	0.0	0.0	5.8	7.5	17.2	24.4	29.7	15.4		
<input type="checkbox"/>										
<input type="checkbox"/>										
<input checked="" type="checkbox"/>	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
<input type="radio"/>			1.7066	0.2291	0.1231	0.0220	0.0047	0.0017	1.21	130.96
<input type="checkbox"/>										
<input type="checkbox"/>										

Material Description	USCS	AASHTO
<input type="radio"/> Brown		

Project No. EN146305 Client: Wildlands Engineering, Mount Pleasant SC Project: Maney Farm Stream Restoration <input type="radio"/> Source of Sample: Maney Farm Depth: Riffle Sample Number:	Remarks: <input type="radio"/> Natural Moisture 48.0%
--	---

UTSF-R2
 XS - 11

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	40.2	42.0	9.2	5.7	1.5	0.7	0.7		
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			30.8901	19.1420	15.4962	8.7255	3.9426	2.4443	1.63	7.83

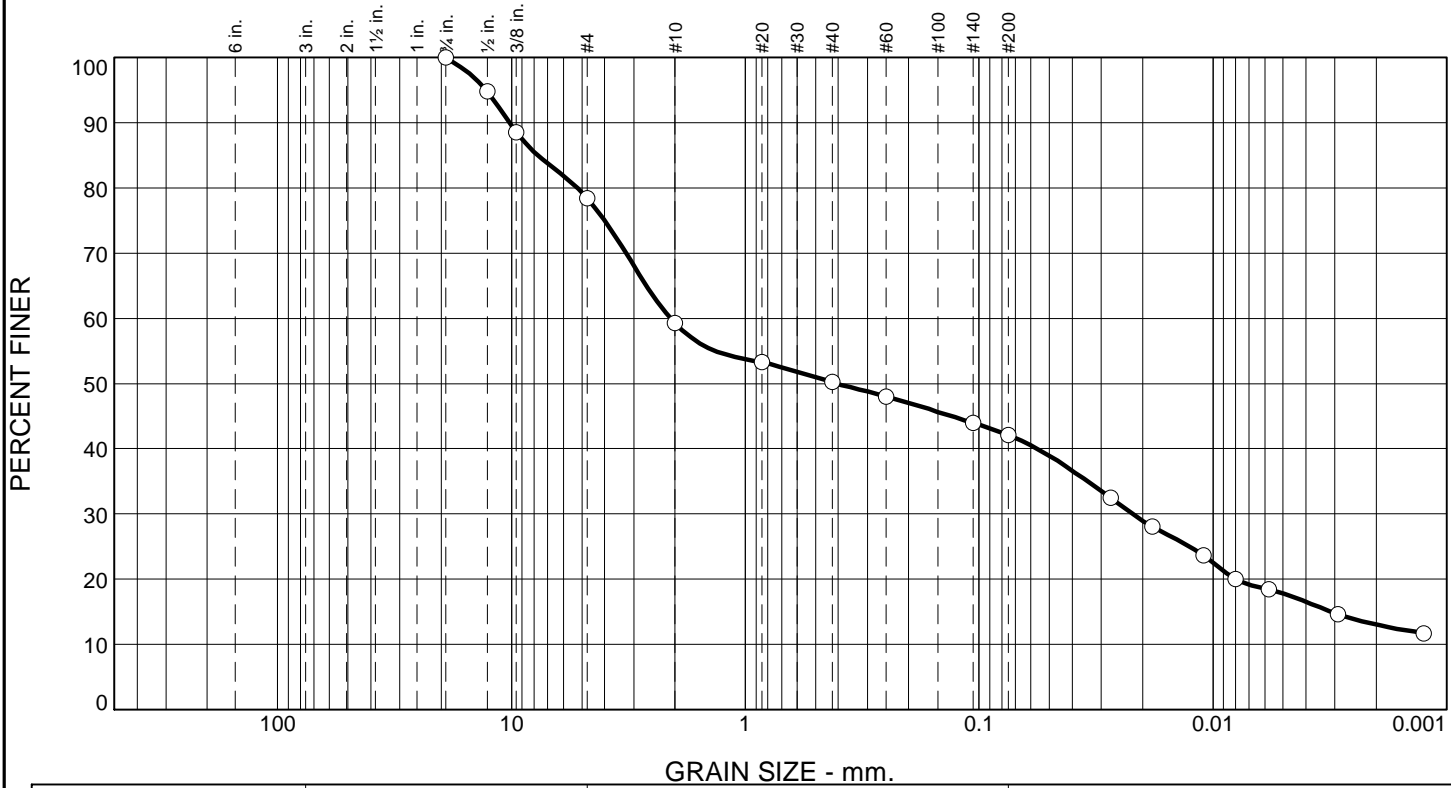
Material Description							USCS	AASHTO
○ Brown							GW	

Project No. EN146305 Client: Wildlands Engineering, Mount Pleasant SC Project: Maney Farm Stream Restoration ○ Source: Maney Farm Depth: Riffle Pavement Sample No.: UT5 - Riffle Pavement	Remarks: ○ Natural Moisture 3.0%
--	--

Terracon Consultants, Inc.

Figure

Particle Size Distribution Report



%	+3"	% Gravel		% Sand			% Fines			
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
○	0.0	0.0	21.5	19.2	9.1	8.1	24.3	17.8		
⊗	LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
○			7.6946	2.0858	0.4047	0.0220	0.0031			

Material Description	USCS	AASHTO
○ Gray-Brown		

Project No. EN146305 **Client:** Wildlands Engineering, Mount Pleasant SC
Project: Maney Farm Stream Restoration
Source: Maney Farm **Depth:** Subpavement **Sample No.:** UT5 - Riffle Subpavement

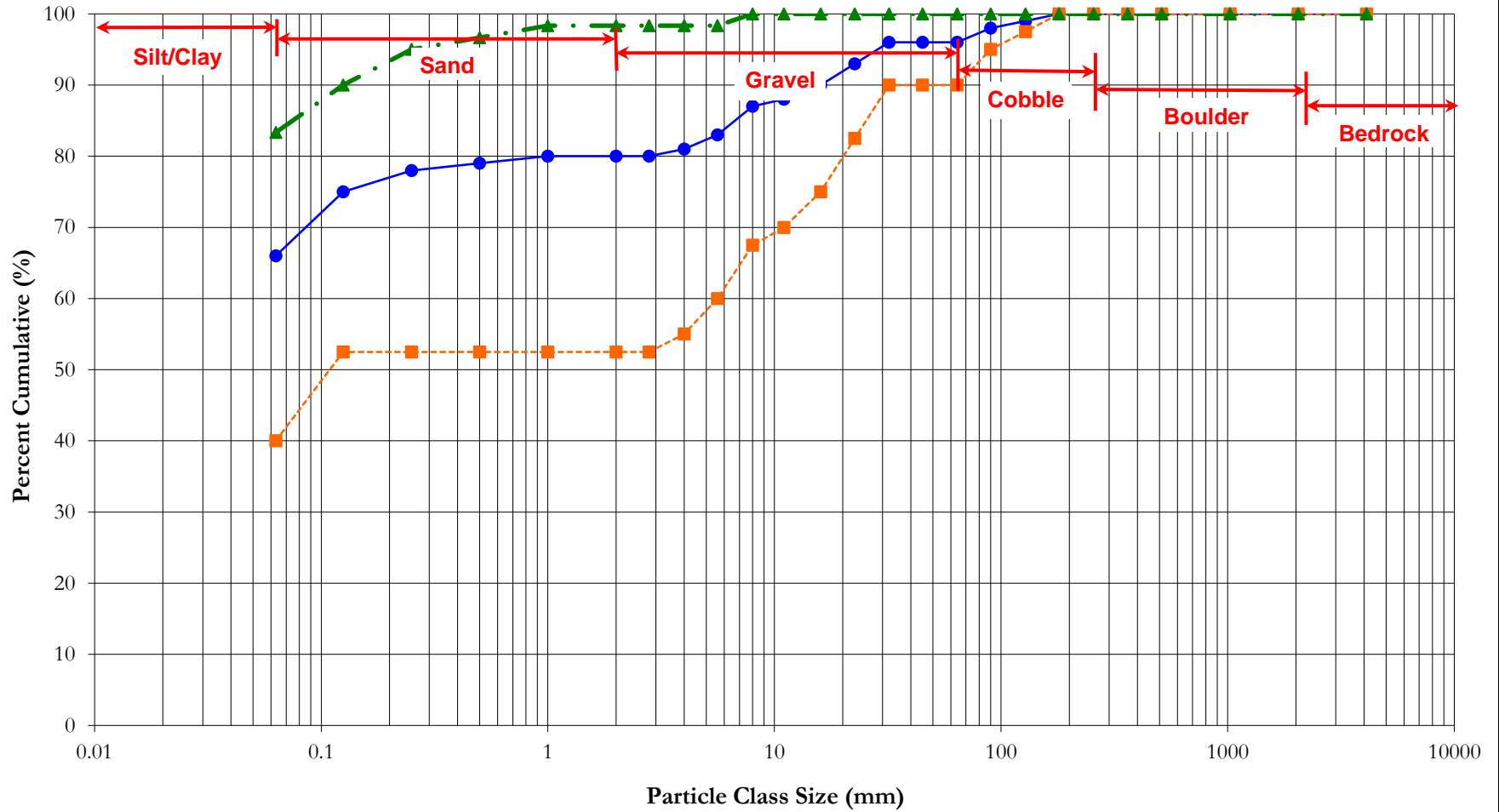
Remarks:
 ○ Natural Moisture 25.6%

Terracon Consultants, Inc.

Figure

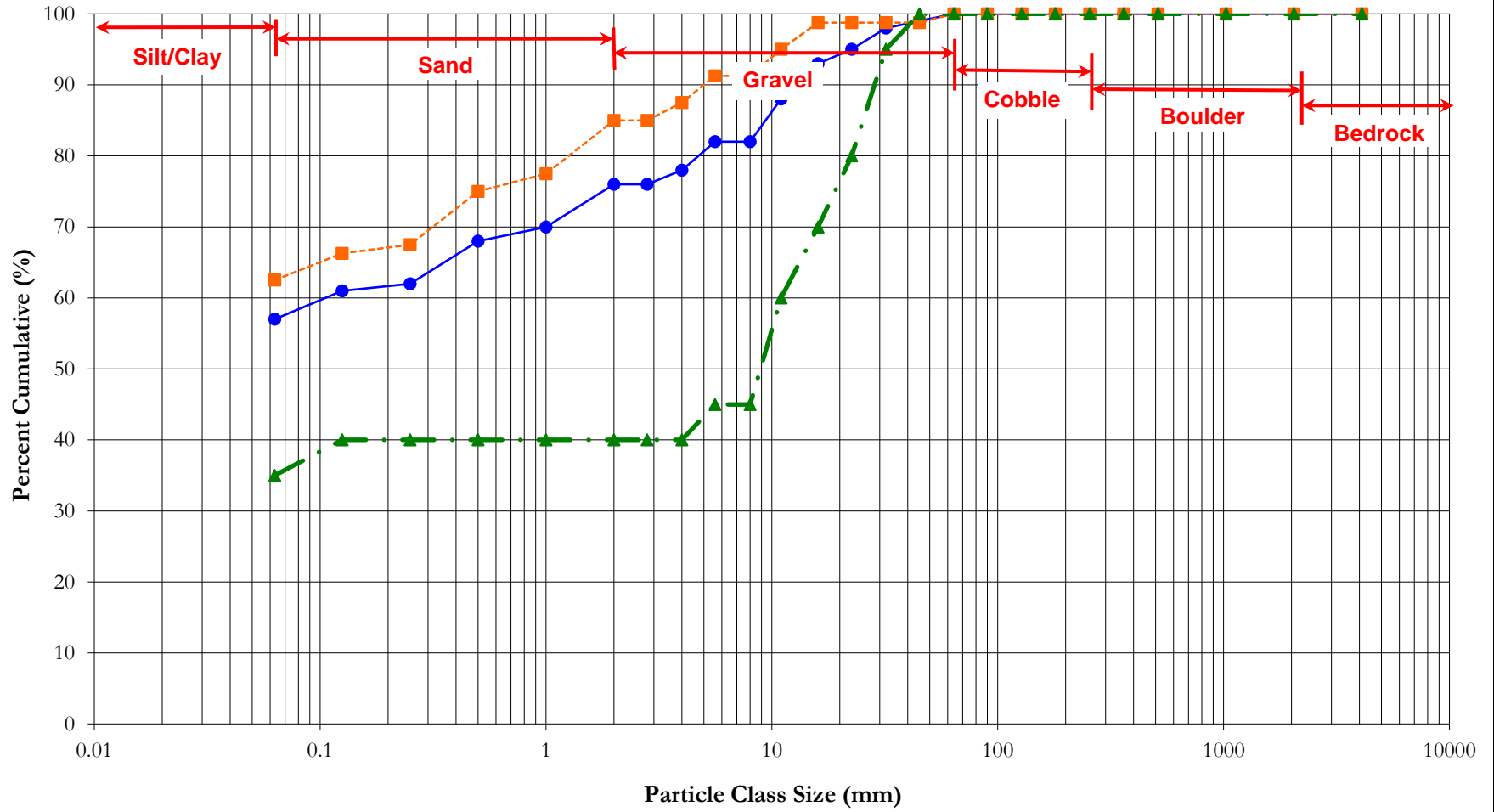
UTSF Reach 2

Reach-Wide Pebble Count Particle Distribution



UT5

Reach-Wide Pebble Count Particle Distribution



Appendix 6: HEC-20 Channel Stability Assessment Data

Stream: UTSF
 Reach: Reach 1
 Date:
 Weather: Cloudy, 75°
 Location:

Observers: I. Eckardt
 Project: Many Farm Site
 Drainage Area:
 Stream Type

N. E. VISAGE OF
 CHANNEL, 2.5 km

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	10
2. Flow habit	Perennial stream with no flashy behavior	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy; flash floods prevalent mode of discharge; ephemeral stream other than first-order stream	1
3. Channel pattern	No evidence of channelization, meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	8
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	4
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overtopping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	8
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, no bars are evident	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	For S < 0.02 and wly > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and wly < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	1
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revetments, dikes or vanes, riprap	None or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	8

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
8. Bank soil texture and coherence	Clay and silty clay; cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	3
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	10
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks <i>Based on lack of stream bank cover! Not tree criteria.</i>	10
11. Bank cutting	Little or none evident. Infrequent raw banks. Insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and sod-root overhangs	11
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	9
13. Upstream distance to bridge from meander impact point and alignment	More than 36 m; bridge is well aligned with river flow	20-36 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not centered beneath bridge	Less than 10 m; bridge is poorly aligned with flow	

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, wly = width-to-depth ratio

Stream: **UTSF**
 Reach: **Ranch 2**
 Date: **5/30/14**
 Weather: **Partly cloudy, 75°**
 Location:

Observers: **I. Eckardt**
 Project: **MONEY FARM SITE**
 Drainage Area:
 Stream Type

Stability Indicator	Fair (7 - 9)			Score
	Excellent (1 - 3)	Good (4 - 6)	Poor (10 - 12)	
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	10
2. Flow habit	Perennial stream with no flashy behavior	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	1
3. Channel pattern	No evidence of channelization. Meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	8
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-bank ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	4
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	8
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, no bars are evident	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	1
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revelements, dikes or vanes, traprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	8

Stream doesn't appear channelized w/c frequent meanders but cattle have impacted and created some unstable banks. Slight confinement. Not much evidence of connection to floodplain (ie. variable bar width)

Stability Indicator	Excellent (1 - 3)	Good (4 - 6)	Fair (7 - 9)	Poor (10 - 12)	Score
8. Bank soil texture and coherence	Clay and silty clay, cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	3
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	10
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks <i>Scored on plant diversity as banks not tree cover.</i>	10
11. Bank cutting	Little or none evident. Infrequent raw banks, insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and sod-root overhangs	9
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	9
13. Upstream distance to bridge from meander impact point and alignment	More than 35 m; bridge is well-aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not covered by health debris	Less than 10 m; bridge is poorly aligned with flow	

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, w/y = width-to-depth ratio

Total Score

41

81

Stream: UTI
 Reach:
 Date: 5/29/14
 Weather: Partly cloudy, 80°
 Location:

Observers: I. Eckardt
 Project: Money Farm Site
 Drainage Area:
 Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	11
2. Flow habit	Perennial stream with no flashy behavior	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial of intermittent stream with flashy behavior	Extremely flashy; flash floods prevalent mode of discharge; ephemeral stream other than first-order stream	7
3. Channel pattern	No evidence of channelization. Meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	5
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	3
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized lightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	9
6. Bar development	For S < 0.02 and w/y > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and w/y are < 12, no bars are evident	For S < 0.02 and w/y > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and w/y < 12, no bars are evident	For S < 0.02 and w/y > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and w/y < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and w/y > 12	3
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revelements, dikes or vanes, riprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion <i>1 culvert near top of reach</i>	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Trips are easily filled, causing channel to migrate and/or widen	4

Stability Indicator Excellent (1 - 3) Good (4 - 6) Fair (7 - 9) Poor (10 - 12) Score

8. Bank soil texture and coherence	Clay and silty clay; cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures exist, but are cohesive materials	Sandy clay to sandy loam; other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	4
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes \leq 3H:1V (18°) for noncohesive or unconsolidated materials to \leq 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	6
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 50% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks	7
11. Bank cutting	Little or none evident. Infrequent raw banks, insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and soil-root overhangs	6
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	6
13. Upstream distance to bridge from headwater impact point and alignment	More than 35 m; bridge is well aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow; or flow alignment is otherwise not generated beneath bridge	Less than 10 m; bridge is poorly aligned with flow	7

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, wy = width-to-depth ratio

Total Score

Stream: UT1 B

Reach:

Date: 5/29/14

Weather: Partly Cloudy, 80°

Location:

Observers: J. Eckardt
Project: Mallow Farm Site
Drainage Area:
Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	11
2. Flow habit	Perennial stream with no flashy behavior	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy, flash floods prevalent mode of discharge; ephemeral stream other than first-order stream	7
3. Channel pattern	No evidence of channelization. Meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	7
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	2
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	10
6. Bar development	For S < 0.02 and w/y > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and w/y are < 12, no bars are evident	For S < 0.02 and w/y > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and w/y < 12, no bars are evident	For S < 0.02 and w/y > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and w/y < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and w/y > 12	3
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revetments, dikes or vanes, riprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	4

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
8. Bank soil texture and coherence	Clay and silty clay; cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	4
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in days on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	6
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Woody vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank <i>Pile of riprap on right bank (old check dam)</i>	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks	9
11. Bank cutting	Little or none evident. Infrequent raw banks, insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and soil-root overhangs	9
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident <i>Raw banks due to hole</i>	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	9
13. Upstream distance to bridge from in-stream impact point and alignment	More than 35 m; bridge is well-aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not centered by health bridge	Less than 10 m; bridge is poorly aligned with flow	

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, w/y = width-to-depth ratio

Total Score

81

Stream: UT2
 Reach:
 Date: 5/29/14
 Weather: Partly Cloudy, 80°
 Location:

Observers: J. Eckhardt
 Project: MUNEY FARM SITE
 Drainage Area:
 Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	6
2. Flow habit	Perennial stream with no flashy behavior <i>Lower half of reach is perennial</i>	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy, flash floods prevalent more than first-order stream other than first-order stream	3
3. Channel pattern	No evidence of channelization. Meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	3
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	7
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately pocketed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no pecking. Large amounts of material < 4 mm. Fs > 70%	7
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, no bars are evident	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	For S < 0.02 and wly > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and wly < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	3
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revetments, dikes or vanes, riprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	4

route 5

Stability Indicator	Excellent (1 - 3)	Good (4 - 6)	Fair (7 - 9)	Poor (10 - 12)	Score
8. Bank soil texture and coherence	Clay and silty clay, cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	4
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	7
10. Vegetative or engineered bank projection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks	6
11. Bank cutting	Little or none evident. Infrequent raw banks. Insignificant percentage of total bank	Some intermittently along channel banks and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and sod-root overhangs	4
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	4
13. Upstream distance to bridge from remainder impact point and alignment	More than 35 m; bridge is well-aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not centered beneath bridge	Less than 10 m; bridge is poorly aligned with flow	

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, wly = width-to-depth ratio

Total Score

58

Stream: UT3
 Reach:
 Date: 5/30/14
 Weather: Cloudy, 75°
 Location:

Observers: J. Eckardt
 Project: Mandy Farm Site
 Drainage Area:
 Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed.	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	6
2. Flow habit	Perennial stream with no flashy behavior <i>Intermittent but not flashy</i>	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy; flash floods prevalent mode of discharge; ephemeral stream other than first-order stream	3
3. Channel pattern	No evidence of channelization, meandering, stable channel or straight (step-pool system, narrow valley); stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	4
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	3
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	10
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, no bars are evident	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	For S < 0.02 and wly > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and wly < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	3
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revetments, dikes or vanes, riprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	2

Channel little pollution due to narrow valley. Channel pollution difficult to evaluate due to extensive streamflow

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
8. Bank soil texture and coherence	Clay and silty clay, cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	3
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	7
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 50% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or arming of one or both banks <i>Banks well covered w/ herbaceous but few trees.</i>	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some arming may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or arming of banks	4
11. Bank cutting	Little or none evident. Infrequent raw banks, insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and sod-root overhangs	4
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	7
13. Upstream distances to bridge from remainder in reach, point and alignment	More than 35 m; bridge is well aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not centered beneath bridge	Less than 10 m; bridge is poorly aligned with flow	

Banks commonly topped; irregular channel width.

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, w/y = width-to-depth ratio
 Total Score 56

Stream: UTH

Reach:

Date: 5/30/14

Weather: Partly cloudy, 75°

Location:

Observers: J. Eckardt
Project: Mancy Farms SILE
Drainage Area:
Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	6
2. Flow habit	Perennial stream with no flashy behavior <i>Intermittent but not flashy</i>	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy, flash floods prevalent more often than first-order stream	3
3. Channel pattern	No evidence of channelization. Meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	4
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	3
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	7
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, (no bars are evident)	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	For S < 0.02 and wly > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and wly < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	3
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revegetations, dikes or vanes, riprap	None or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	3

Stability Indicator	Excellent (1 - 3)	Good (4 - 6)	Fair (7 - 9)	Poor (10 - 12)	Score
8. Bank soil texture and coherence	Clay and silty clay; cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	3
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in dyes on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	7
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or nonstandard vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks	7
11. Bank cutting	Little or none evident. Infrequent raw banks. Insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks, some extending over most of the banks. Undercutting and sod-root overhangs	4
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	4
13. Upstream distance to bridge from meander impact path and alignment	More than 35 m; bridge is well-aligned with river flow	20-35 m; bridge is aligned with river flow	10-20 m; bridge is skewed to flow, or flow alignment is otherwise not centered over the bridge	Less than 10 m; bridge is poorly aligned with flow	54

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, w/v = width-to-depth ratio

Total Score

25

Stream: UTS
 Reach:
 Date: 5/29/14
 Weather: Partly cloudy, 80°
 Location:

Observers: I. Eckardt
 Project: Mandy Farm Site
 Drainage Area:
 Stream Type

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
1. Watershed and flood plain activity and characteristics	Stable, forested, undisturbed watershed	Occasional minor disturbances in the watershed, including cattle activity (grazing and/or access to stream), construction, logging, or other minor deforestation. Limited agricultural activities	Frequent disturbances in the watershed, including cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Urbanization over significant portion of watershed	Continual disturbances in the watershed. Significant cattle activity, landslides, channel sand or gravel mining, logging, farming, or construction of buildings, roads, or other infrastructure. Highly urbanized or rapidly urbanizing watershed	4
2. Flow habit	Perennial stream with no flashy behavior	Perennial stream or ephemeral first-order stream with slightly increased rate of flooding	Perennial or intermittent stream with flashy behavior	Extremely flashy; flash floods prevalent mode of discharge; ephemeral stream other than first-order stream	1
3. Channel pattern	No evidence of channelization, meandering, stable channel or straight (step-pool system, narrow valley), stable channel.	Appears to have previously been channelized. Stream is relatively stable. Channel has some meanders due to previous channel adjustment.	Appears to have previously been channelized. Stream is actively adjusting (meandering); localized areas of instability and/or erosion around bends. Straightened, stable channel.	Appears to have previously been channelized. Stream is actively adjusting (laterally and/or vertically) with few bends. Straight, unstable reach.	9
4. Entrenchment/ channel confinement	Active flood plain exists at top of banks; no sign of undercutting infrastructure; no levees	Active flood plain abandoned, but is currently rebuilding; minimal channel confinement; infrastructure not exposed; levees are low and set well back from the river	Moderate confinement in valley or channel walls; some exposure of infrastructure; terraces exist; flood plain abandoned; levees are moderate in size and have minimal setback from the river	Knickpoints visible downstream; exposed water lines or other infrastructure; channel-width-to-top-of-banks ratio small; deeply confined; no active flood plain; levees are high and along the channel edge	6
5. Bed material Fs = approximate portion of sand in the bed	Assorted sized tightly packed, overlapping, and possibly imbricated. Most material > 4 mm. Fs < 20%	Moderately packed with some overlapping. Very small amounts of material < 4 mm. 20 < Fs < 50%	Loose assortment with no apparent overlap. Small to medium amounts of material < 4 mm. 50 < Fs < 70%	Very loose assortment with no packing. Large amounts of material < 4 mm. Fs > 70%	9
6. Bar development	For S < 0.02 and wly > 12, bars are mature, narrow relative to stream width at low flow, well-vegetated, and composed of coarse gravel to cobbles. For S > 0.02 and wly are < 12, no bars are evident	For S < 0.02 and wly > 12, bars may have vegetation and/or be composed of coarse gravel to cobbles, but minimal recent growth of bar evident by lack of vegetation on portions of the bar. For S > 0.02 and wly < 12, no bars are evident	For S < 0.02 and wly > 12, bar widths tend to be wide and composed of newly deposited coarse sand to small cobbles and/or may be sparsely vegetated. Bars forming for S > 0.02 and wly < 12	Bar widths are generally greater than 1/2 the stream width at low flow. Bars are composed of extensive deposits of fine particles up to coarse gravel with little to no vegetation. No bars for S < 0.02 and wly > 12	10
7. Obstructions, including bedrock outcrops, armor layer, LED jams, grade control, bridge bed paving, revetments, dikes or vanes, riprap	Rare or not present	Occasional, causing cross currents and minor bank and bottom erosion	Moderately frequent and occasionally unstable obstructions, cause noticeable erosion of the channel. Considerable sediment accumulation behind obstructions	Frequent and often unstable, causing a continual shift of sediment and flow. Traps are easily filled, causing channel to migrate and/or widen	4

Channel meanders but has areas of erosion/instability mainly U/S bank. Upper bank eroded lower bank - low to med. incision.

Stability Indicator	Excellent (1-3)	Good (4-6)	Fair (7-9)	Poor (10-12)	Score
8. Bank soil texture and coherence	Clay and silty clay; cohesive material	Clay loam to sandy clay loam; minor amounts of noncohesive or unconsolidated mixtures; layers may exist, but are cohesive materials	Sandy clay to sandy loam; unconsolidated mixtures of glacial or other materials; small layers and lenses of noncohesive or unconsolidated mixtures	Loamy sand to sand; noncohesive material; unconsolidated mixtures of glacial or other materials; layers of lenses that include noncohesive sands and gravels	5
9. Average bank slope angle (where 90° is a vertical bank)	Bank slopes < 3H:1V (18°) for noncohesive or unconsolidated materials to < 1:1 (45°) in clays on both sides	Bank slopes up to 2H:1V (27°) in noncohesive or unconsolidated materials to 0.8:1 (50°) in clays on one or occasionally both banks	Bank slopes to 1H:1V (45°) in noncohesive or unconsolidated materials to 0.6:1 (60°) in clays common on one or both banks	Bank slopes over 45° in noncohesive or unconsolidated materials or over 60° in clays common on one or both banks	11
10. Vegetative or engineered bank protection	Wide band of woody vegetation with at least 90% density and cover. Primarily hard wood, leafy, deciduous trees with mature, healthy, and diverse vegetation located on the bank. Woody vegetation oriented vertically. In absence of vegetation, both banks are lined or heavily armored	Medium band of woody vegetation with 70-90% plant density and cover. A majority of hard wood, leafy, deciduous trees with maturing, diverse vegetation located on the bank. Wood vegetation oriented 80-90% from horizontal with minimal root exposure. Partial lining or armoring of one or both banks	Small band of woody vegetation with 50-70% plant density and cover. A majority of soft wood, piney, coniferous trees with young or old vegetation lacking in diversity located on or near the top of bank. Woody vegetation oriented at 70-80% from horizontal, often with evident root exposure. No lining of banks, but some armoring may be in place on one bank	Woody vegetation band may vary depending on age and health with less than 50% plant density and cover. Primarily soft wood, piney, coniferous trees with very young, old and dying, and/or monostand vegetation located off of the bank. Woody vegetation oriented at less than 70% from horizontal with extensive root exposure. No lining or armoring of banks	11
11. Bank cutting	Little or none evident. Infrequent raw banks, insignificant percentage of total bank	Some intermittently along channel bends and at prominent constrictions. Raw banks comprise minor portion of bank in vertical direction	Significant and frequent on both banks. Raw banks comprise large portion of bank in vertical direction. Root mat overhangs	Almost continuous cuts on both banks. Some extending over most of the banks. Undercutting and sod-root overhangs	8
12. Mass wasting or bank failure	No or little evidence of potential or very small amounts of mass wasting. Uniform channel width over the entire reach	Evidence of infrequent and/or minor mass wasting. Mostly healed over with vegetation. Relatively constant channel width and minimal scalloping of banks	Evidence of frequent and/or significant occurrences of mass wasting that can be aggravated by higher flows, which may cause undercutting and mass wasting of unstable banks. Channel width quite irregular, and scalloping of banks is evident	Frequent and extensive mass wasting. The potential for bank failure, as evidenced by tension cracks, massive undercuttings, and bank slumping is considerable. Channel width is highly irregular, and banks are scalloped	9
13. Upstream distance to bridge from meander impact point and alignment	More than 36 m; bridge is well aligned with river flow	20-35 m; bridge is aligned with flow	10-20 m; bridge is skewed to flow; or flow alignment is otherwise not centered beneath bridge	Less than 10 m; bridge is poorly aligned with flow	87

Extensive bank cutting
raw banks in upper half.

Extensive mass wasting in upper half.

H=

H = horizontal, V = vertical, Fs = fraction of sand, S = slope, w/v = width-to-depth ratio
Total Score

**Appendix 7: USACE Routine Wetland Determination, NCWAM Data
Forms, and Jurisdictional Determination**

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland A - DP1
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835745 Long: W 79.342343 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland A - DP1
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status																	
Tree Stratum (Plot size: <u>30'</u>)																				
1. <u>Quercus phellos</u>	40	yes	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>40%</u> (A/B)																
2. <u>Ulmus americana</u>	30	yes	FACW																	
3. <u>Fraxinus pennsylvanica</u>	10	no	FACW																	
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
	80			Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="text-align:right;">Total % Cover of:</td> <td style="text-align:center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>45</u></td> <td>x 2 = <u>90</u></td> </tr> <tr> <td>FAC species <u>40</u></td> <td>x 3 = <u>120</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>125</u> (A)</td> <td><u>370</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align:center;">Prevalence Index = B/A = <u>2.96</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>45</u>	x 2 = <u>90</u>	FAC species <u>40</u>	x 3 = <u>120</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>125</u> (A)	<u>370</u> (B)	Prevalence Index = B/A = <u>2.96</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>45</u>	x 2 = <u>90</u>																			
FAC species <u>40</u>	x 3 = <u>120</u>																			
FACU species <u>40</u>	x 4 = <u>160</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>125</u> (A)	<u>370</u> (B)																			
Prevalence Index = B/A = <u>2.96</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Symphoricarpos orbiculatus</u>	5	yes	FACU																	
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
	5																			
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Amaranthus palmeri</u>	25	yes	FACU	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input checked="" 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)																
2. <u>Festuca sp.</u>	10	yes	FACU																	
3. <u>Juncus effusus</u>	5	no	FACW																	
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
11. _____																				
12. _____																				
	40																			
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. _____				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																

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

Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland A - DP1

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	7.5YR 3/2	100					silt loam	
2-8	10YR 4/1	95	5YR 4/6	5	C	PL	silt loam	
8-12	10YR 4/1	85	5YR 4/6	15	C	PL	loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland A/B - DP2
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835725 Long: W 79.342426 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Upland A/B - DP2
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status															
Tree Stratum (Plot size: <u>30'</u>)																		
1. <u>Ulmus americana</u>	<u>35</u>	<u>yes</u>	<u>FACW</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)														
2. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>no</u>	<u>FACW</u>															
3. <u>Acer rubrum</u>	<u>10</u>	<u>no</u>	<u>FAC</u>															
4. _____																		
5. _____																		
6. _____																		
7. _____																		
8. _____																		
	<u>55</u>	= Total Cover		Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="text-align:right;">Total % Cover of:</td> <td style="text-align:right;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>50</u></td> <td>x 2 = <u>100</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>290</u> (B)</td> </tr> </table> <p style="text-align:center;">Prevalence Index = B/A = <u>2.9</u></p>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>50</u>	x 2 = <u>100</u>	FAC species <u>10</u>	x 3 = <u>30</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>100</u> (A)	<u>290</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>50</u>	x 2 = <u>100</u>																	
FAC species <u>10</u>	x 3 = <u>30</u>																	
FACU species <u>40</u>	x 4 = <u>160</u>																	
UPL species <u>0</u>	x 5 = <u>0</u>																	
Column Totals: <u>100</u> (A)	<u>290</u> (B)																	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																		
1. <u>Rosa multiflora</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>															
2. <u>Symphoricarpos orbiculatus</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>															
3. _____																		
4. _____																		
5. _____																		
6. _____																		
7. _____																		
8. _____																		
9. _____																		
10. _____																		
	<u>15</u>	= Total Cover																
Herb Stratum (Plot size: <u>5'</u>)																		
1. <u>Trifolium repens</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input checked="" 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)														
2. <u>Fragaria virginiana</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>															
3. <u>Boehmeria cylindrica</u>	<u>5</u>	<u>no</u>	<u>FACW</u>															
4. _____																		
5. _____																		
6. _____																		
7. _____																		
8. _____																		
9. _____																		
10. _____																		
11. _____																		
12. _____																		
	<u>30</u>	= Total Cover																
Woody Vine Stratum (Plot size: <u>30'</u>)																		
1. _____				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
2. _____																		
3. _____																		
4. _____																		
5. _____																		
6. _____																		
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>														
_____ = Total Cover																		
Remarks: (Include photo numbers here or on a separate sheet.)																		

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland B - DP3
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835766 Long: W 79.34253 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland B - DP3
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
1. <u>Acer rubrum</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Quercus phellos</u>	<u>30</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Ulmus americana</u>	<u>10</u>		<u>FACW</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
	<u>80</u>	<u>= Total Cover</u>		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
		<u>_____ = Total Cover</u>		
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Festuca sp.</u>	<u>40</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Microstegium vimineum</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Dichantherium clandestinum</u>	<u>5</u>		<u>FAC</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	<u>60</u>	<u>= Total Cover</u>		
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
		<u>_____ = Total Cover</u>		
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				

SOIL

Sampling Point: Wetland B - DP3

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		
0-5	10YR 2/2	100					loam	
5-12	2.5YR 4/1	95	7.5YR 4/6	5	C	PL	loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland C - DP4
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835844 Long: W 79.34328 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) / Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1.0</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

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

Wetland C - DP4
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Fraxinus pennsylvanica</u>	50	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. <u>Ulmus americana</u>	10	no	FACW		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
60 = Total Cover				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 = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
_____ = Total Cover				Hydrophytic Vegetation Indicators: <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)	
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Polygonum pensylvanicum</u>	30	yes	FACW		
2. <u>Carex lurida</u>	25	yes	OBL		
3. <u>Microstegium vimineum</u>	10	no	FAC		
4. <u>Fragaria virginiana</u>	2	no	FACU		
5. <u>Ranunculus hispidus</u>	2	no	FAC		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
9. _____	_____	_____	_____		
10. _____	_____	_____	_____		
11. _____	_____	_____	_____		
12. _____	_____	_____	_____		
69 = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
3. _____	_____	_____	_____		
4. _____	_____	_____	_____		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
_____ = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.					

SOIL

Sampling Point: Wetland C - DP4

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 3/1	100					silt loam	
3-8	5Y 4/1	90	7.5YR 4/6	10	C	PL	silt loam	
8-12	5GY 6/2	95	10YR 4/6	5	C	PL	silt loam	

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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland C - DP5
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835901 Long: W 79.343396 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Sampling Point: Upland C - DP5

	Absolute % Cover	Dominant Species?	Indicator Status																	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet:																
1. <u>Acer rubrum</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)																
2. <u>Quercus phellos</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	Total Number of Dominant Species Across All Strata: <u>6</u> (B)																
3. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>no</u>	<u>FACW</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)																
4. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;"><u> </u> Total % Cover of:</td> <td style="width:50%;"><u> </u> Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>5</u></td> <td>x 2 = <u>10</u></td> </tr> <tr> <td>FAC species <u>85</u></td> <td>x 3 = <u>255</u></td> </tr> <tr> <td>FACU species <u>6</u></td> <td>x 4 = <u>24</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>96</u> (A)</td> <td><u>289</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align: center;">Prevalence Index = B/A = <u>3.01</u></td> </tr> </table>	<u> </u> Total % Cover of:	<u> </u> Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>5</u>	x 2 = <u>10</u>	FAC species <u>85</u>	x 3 = <u>255</u>	FACU species <u>6</u>	x 4 = <u>24</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>96</u> (A)	<u>289</u> (B)	Prevalence Index = B/A = <u>3.01</u>	
<u> </u> Total % Cover of:	<u> </u> Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>5</u>	x 2 = <u>10</u>																			
FAC species <u>85</u>	x 3 = <u>255</u>																			
FACU species <u>6</u>	x 4 = <u>24</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>96</u> (A)	<u>289</u> (B)																			
Prevalence Index = B/A = <u>3.01</u>																				
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
<u>85</u> = Total Cover																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Symphoricarpos orbiculatus</u>	<u>2</u>	<u>yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input 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 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																
2. <u>Juniperus virginiana</u>	<u>2</u>	<u>yes</u>	<u>FACU</u>																	
3. <u>Ligustrum sinense</u>	<u>2</u>	<u>yes</u>	<u>FACU</u>																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
<u>6</u> = Total Cover																				
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Microstegium vimineum</u>	<u>5</u>	<u>yes</u>	<u>FAC</u>	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height. Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>																
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
7. _____	_____	_____	_____																	
8. _____	_____	_____	_____																	
9. _____	_____	_____	_____																	
10. _____	_____	_____	_____																	
11. _____	_____	_____	_____																	
12. _____	_____	_____	_____																	
<u>5</u> = Total Cover																				
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. _____	_____	_____	_____																	
2. _____	_____	_____	_____																	
3. _____	_____	_____	_____																	
4. _____	_____	_____	_____																	
5. _____	_____	_____	_____																	
6. _____	_____	_____	_____																	
_____ = Total Cover																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

SOIL

Sampling Point: Upland C - DP5

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		
0-4	7.5YR 4/4	100					loam	
4-12	2.5YR 5/4	90	7.5YR 4/6	10	C	PL	loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland D - DP6
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836258 Long: W 79.34318 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Remarks:

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

Wetland D - DP6
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status																	
Tree Stratum (Plot size: <u>30'</u>)																				
1. <u>Acer rubrum</u>	50	yes	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)																
2. <u>Ulmus americana</u>	5	no	FACW																	
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
	55	= Total Cover		Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="text-align:right;">Total % Cover of:</td> <td style="text-align:center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>7</u></td> <td>x 2 = <u>14</u></td> </tr> <tr> <td>FAC species <u>85</u></td> <td>x 3 = <u>255</u></td> </tr> <tr> <td>FACU species <u>30</u></td> <td>x 4 = <u>120</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>122</u> (A)</td> <td><u>389</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align:center;">Prevalence Index = B/A = <u>3.19</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>7</u>	x 2 = <u>14</u>	FAC species <u>85</u>	x 3 = <u>255</u>	FACU species <u>30</u>	x 4 = <u>120</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>122</u> (A)	<u>389</u> (B)	Prevalence Index = B/A = <u>3.19</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>7</u>	x 2 = <u>14</u>																			
FAC species <u>85</u>	x 3 = <u>255</u>																			
FACU species <u>30</u>	x 4 = <u>120</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>122</u> (A)	<u>389</u> (B)																			
Prevalence Index = B/A = <u>3.19</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Ulmus americana</u>	2	no	FACW																	
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
	2	= Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Microstegium vimineum</u>	25	yes	FAC	Hydrophytic Vegetation Indicators: <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)																
2. <u>Polygonum pensylvanicum</u>	15	yes	FACW																	
3. <u>Festuca sp.</u>	15	yes	FACU																	
4. <u>Ranunculus hispidus</u>	10		FAC																	
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
11. _____																				
12. _____																				
	65	= Total Cover																		
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
		= Total Cover																		
				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																

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

Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland D - DP6

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					loam	
3-6	5Y 5/1	90	7.5YR 4/6	10	C	PL	loam	
6-8	5Y 5/1	100					loam	
8-12	5Y 6/2	90	7.5YR 4/6	10	C	PL	loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland D - DP7
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836272 Long: W 79.343252 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Upland D - DP7
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Acer rubrum</u>	40	yes	FAC	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)	
2. <u>Ulmus americana</u>	25	yes	FACW		
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
	65	= Total Cover		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 = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. <u>Fraxinus pennsylvanica</u>	2	no	FACW		
2. <u>Juniperus virginiana</u>	1	no	FACU		
3. <u>Symphoricarpos orbiculatus</u>	1	no	FACU		
4. <u>Ulmus americana</u>	1	no	FACW		
5. _____					
6. _____					
7. _____					
8. _____					
	5	= Total Cover			
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Microstegium vimineum</u>	25	yes	FAC	Hydrophytic Vegetation Indicators: <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)	
2. <u>Festuca sp.</u>	15	yes	FACU		
3. <u>Ranunculus hispidus</u>	5		FAC		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
	45	= Total Cover			
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. <u>Lonicera japonica</u>	2	no	FAC	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
6. _____					
	2	= Total Cover			
Hydrophytic Vegetation Present?				Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: (Include photo numbers here or on a separate sheet.)					

SOIL

Sampling Point: Upland D - DP7

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	2.5Y 4/3	100					loam	
3-12	2.5Y 5/3	90	5YR 4/6	10	C	PL	loam	

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)**

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)**
- Red Parent Material (TF2)
- 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

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland E - DP8
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836342 Long: W 79.342854 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) / Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1.0</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland E - DP8
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: 30')				Dominance Test worksheet:
1. <u>Quercus phellos</u>	20	yes	FAC	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2. <u>Fraxinus pennsylvanica</u>	10	yes	FACW	Total Number of Dominant Species Across All Strata: <u>4</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
	30	= Total Cover		Prevalence Index worksheet:
Sapling/Shrub Stratum (Plot size: 15')				Total % Cover of: _____ Multiply by: _____
1. _____	_____	_____	_____	OBL species _____ x 1 = _____
2. _____	_____	_____	_____	FACW species _____ x 2 = _____
3. _____	_____	_____	_____	FAC species _____ x 3 = _____
4. _____	_____	_____	_____	FACU species _____ x 4 = _____
5. _____	_____	_____	_____	UPL species _____ x 5 = _____
6. _____	_____	_____	_____	Column Totals: _____ (A) _____ (B)
7. _____	_____	_____	_____	Prevalence Index = B/A = _____
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	Hydrophytic Vegetation Indicators:
10. _____	_____	_____	_____	<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)
Herb Stratum (Plot size: 5')				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Festuca sp.</u>	55	yes	FACU	Definitions of Four Vegetation Strata:
2. <u>Carex lurida</u>	25	yes	OBL	Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.
3. <u>Juncus effusus</u>	10	no	FACW	Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall.
4. <u>Ranunculus hispidus</u>	5	no	FAC	Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.
5. <u>Polygonum pensylvanicum</u>	5	no	FACW	Woody vine – All woody vines greater than 3.28 ft in height.
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
	100	= Total Cover		
Woody Vine Stratum (Plot size: 30')				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: (Include photo numbers here or on a separate sheet.)				
Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

SOIL

Sampling Point: Wetland E - DP8

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		
0-1	7.5YR 4/6	100					silt	
1-7	5Y 3/1	98	10YR 4/6	2	C	PL	silt loam	
7-12	5Y 5/2	95	5YR 4/6	5	C	PL	loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
---	--

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland E - DP9
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836325 Long: W 79.342763 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland E - DP9

	Absolute % Cover	Dominant Species?	Indicator Status																	
Tree Stratum (Plot size: <u>30'</u>)																				
1. <u>Fraxinus pennsylvanica</u>	40	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)																
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
	40	= Total Cover																		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
		= Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Festuca sp.</u>	60	yes	FACU	Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="text-align:right;">Total % Cover of:</td> <td style="text-align:center;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>40</u></td> <td>x 2 = <u>80</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>75</u></td> <td>x 4 = <u>300</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>125</u> (A)</td> <td><u>410</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align:center;">Prevalence Index = B/A = <u>3.28</u></td> </tr> </table> Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input 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)	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>40</u>	x 2 = <u>80</u>	FAC species <u>10</u>	x 3 = <u>30</u>	FACU species <u>75</u>	x 4 = <u>300</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>125</u> (A)	<u>410</u> (B)	Prevalence Index = B/A = <u>3.28</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>40</u>	x 2 = <u>80</u>																			
FAC species <u>10</u>	x 3 = <u>30</u>																			
FACU species <u>75</u>	x 4 = <u>300</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>125</u> (A)	<u>410</u> (B)																			
Prevalence Index = B/A = <u>3.28</u>																				
2. <u>Trifolium repens</u>	15	no	FACU																	
3. <u>Ranunculus hispidus</u>	5	no	FAC																	
4. <u>Rumex crispus</u>	5	no	FAC																	
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
11. _____																				
12. _____																				
	85	= Total Cover																		
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. _____																				
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
		= Total Cover																		
Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland F - DP10
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836573 Long: W 79.343145 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland F - DP10
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1. <u>Ulmus americana</u>	65	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
2. <u>Fraxinus pennsylvanica</u>	15	no	FACW	
3. <u>Acer rubrum</u>	2	no	FAC	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
	82	= Total Cover		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Rosa multiflora</u>	10	yes	FACU	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 = _____
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
	10	= Total Cover		
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	5	yes	FAC	Hydrophytic Vegetation Indicators: <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)
2. <u>Polygonum pensylvanicum</u>	2	no	FACW	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	7	= Total Cover		
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. _____				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Remarks: (Include photo numbers here or on a separate sheet.)
 Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland F - DP10

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		
0-4	5Y 5/2	90	7.5YR 4/6	10	C	PL	loam	
4-12	10YR 6/8	100					loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland F - DP11
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836526 Long: W 79.343117 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland F - DP11

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Ulmus americana</u>	75	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
<u>75</u> = Total Cover				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 = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
_____ = Total Cover				Hydrophytic Vegetation Indicators: <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)	
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Microstegium vimineum</u>	65	yes	FAC		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>Fragaria virginiana</u>	2	no	FACU		
3. <u>Polygonum pensylvanicum</u>	2	no	FACW		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
<u>69</u> = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
_____ = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____	
Remarks: (Include photo numbers here or on a separate sheet.)					

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland G - DP12
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836717 Long: W 79.343491 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1.0</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland G - DP12
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Ulmus americana</u>	60	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. <u>Quercus phellos</u>	15	no	FAC		
3. <u>Acer rubrum</u>	10	no	FAC		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
<u>85</u> = Total Cover				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 = <u>2.96</u>	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. <u>Juniperus virginiana</u>	1	no	FACU		
2. <u>Rosa multiflora</u>	1	no	FACU		
3. <u>Symphoricarpos orbiculatus</u>	1	no	FACU		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
<u>3</u> = Total Cover				Hydrophytic Vegetation Indicators: <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 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Microstegium vimineum</u>	40	yes	FAC		
2. <u>Carex lurida</u>	2	no	OBL		
3. <u>Ranunculus hispidus</u>	2	no	FAC		
4. <u>Festuca sp.</u>	1	no	FACU		
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
<u>45</u> = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. <u>Lonicera japonica</u>	1	no	FAC		
2. <u>Toxicodendron radicans</u>	1	no	FAC		
3. _____					
4. _____					
5. _____					
6. _____					
<u>2</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: (Include photo numbers here or on a separate sheet.)					
Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.					

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland G - DP13
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836735 Long: W 79.343533 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland G - DP13

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet:
1. <u>Quercus phellos</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A)
2. <u>Ulmus americana</u>	<u>30</u>	<u>yes</u>	<u>FACW</u>	Total Number of Dominant Species Across All Strata: <u>5</u> (B)
3. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>no</u>	<u>FACW</u>	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80%</u> (A/B)
4. _____	_____	_____	_____	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 = _____
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>75</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Ulmus americana</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>10</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Festuca sp.</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>35</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. <u>Lonicera japonica</u>	<u>2</u>	<u>no</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>2</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

SOIL

Sampling Point: Upland G - DP13

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 4/4	100					loam	
3-12	10YR 6/6	100					loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
---	---

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland H - DP14
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.836717 Long: W 79.343491 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1.0</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland H - DP14
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
1. <u>Acer rubrum</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Ulmus americana</u>	<u>35</u>	<u>yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>75</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = <u>2.96</u>
1. <u>Rosa multiflora</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
2. <u>Acer rubrum</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
3. <u>Ligustrum japonicum</u>	<u>1</u>	<u>no</u>	<u>UPL</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>4</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Festuca sp.</u>	<u>30</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Microstegium vimineum</u>	<u>5</u>	_____	<u>FAC</u>	
3. <u>Ranunculus hispidus</u>	<u>5</u>	_____	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>40</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Smilax sp.</u>	<u>2</u>	<u>no</u>	<u>FAC</u>	
2. <u>Lonicera japonica</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
3. <u>Toxicodendron radicans</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>4</u> = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

SOIL

Sampling Point: Wetland H - DP14

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					silt loam	
2-12	2.5Y 6/1	95	10YR 5/6	5	C	PL	silt loam	

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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland H - DP15
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837121 Long: W 79.34373 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland H - DP15

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
1. <u>Ulmus americana</u>	<u>50</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Acer rubrum</u>	<u>35</u>	<u>yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>85</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Ulmus americana</u>	<u>5</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Rosa multiflora</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Juniperus virginiana</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>12</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Festuca sp.</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Microstegium vimineum</u>	<u>10</u>	<u>yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>25</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Smilax sp.</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>1</u> = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.)				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland I - DP16
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837536 Long: W 79.342393 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland I - DP16
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. <u>Acer rubrum</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Ulmus americana</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
3. <u>Quercus phellos</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>80</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Microstegium vimineum</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Festuca sp.</u>	<u>1</u>	<u>no</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>26</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

SOIL

Sampling Point: Wetland I - DP16

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	7.5YR 3/1	100					silt	
2-12	10YR 4/1	98	10YR 4/6	2	C	PL	loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland I-J - DP17
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837516 Long: W 79.342231 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland I-J - DP17

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Ulmus americana</u>	40	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)	
2. <u>Acer rubrum</u>	30	yes	FAC		
3. <u>Fraxinus pennsylvanica</u>	5	no	FACW		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
	75	= Total Cover		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 = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. <u>Ligustrum sinense</u>	2	no	FACU		
2. <u>Symphoricarpos orbiculatus</u>	1	no	FACU		
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
	3	= Total Cover			
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Microstegium vimineum</u>	25	yes	FAC	Hydrophytic Vegetation Indicators: <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)	
2. <u>Fragaria virginiana</u>	5	no	FACU		
3. <u>Festuca sp.</u>	1	no	FACU		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
	31	= Total Cover			
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. <u>Lonicera japonica</u>	2	no	FAC	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
	2	= Total Cover			
Hydrophytic Vegetation Present?				Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: (Include photo numbers here or on a separate sheet.)					

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland J - DP18
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837545 Long: W 79.342047 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland J - DP18
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
1. <u>Ulmus americana</u>	<u>60</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Acer rubrum</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>70</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Ulmus americana</u>	<u>2</u>	<u>no</u>	<u>FACW</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>2</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input checked="" 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>Microstegium vimineum</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Festuca sp.</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	
4. <u>Ranunculus hispidus</u>	<u>2</u>	_____	<u>FAC</u>	
5. <u>Fragaria virginiana</u>	<u>1</u>	_____	<u>FACU</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>48</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Smilax sp.</u>	<u>2</u>	<u>no</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>2</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland K - DP19
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837326 Long: W 79.344558 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) / Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) <input checked="" type="checkbox"/> Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
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Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland K - DP20
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.837396 Long: W 79.344589 Datum: _____
 Soil Map Unit Name: Nanford-Badin complex, 6-10% slopes (NaC) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Sampling Point: Upland K - DP20

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60%</u> (A/B)
4. _____	_____	_____	_____	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 = _____
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)				
1. <u>Symphoricarpos orbiculatus</u>	<u>30</u>	<u>yes</u>	<u>FACU</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				
<u>Herb Stratum</u> (Plot size: <u>5'</u>)				
1. <u>Festuca sp.</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Carex lurida</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	
3. <u>Persicaria meisneriana</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
4. <u>Ranunculus hispidus</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
5. <u>Juncus effusus</u>	<u>1</u>	<u>no</u>	<u>FACW</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>71</u> = Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

SOIL

Sampling Point: Upland K - DP20

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		
0-4	2.5Y 4/4	100					loam	
4-12	2.5Y 6/4	90	5YR 4/6	10	C	PL	loam	

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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland L - DP21
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.838041 Long: W 79.343368 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) / Cid silt loam, complex, 6-10% slopes (CkC) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Remarks:

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

Wetland L - DP21
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status		
Tree Stratum (Plot size: <u>30'</u>)					
1. <u>Fraxinus pennsylvanica</u>	40	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>5</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>71%</u> (A/B)	
2. <u>Ulmus americana</u>	35	yes	FACW		
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
	75	= Total Cover		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 = _____	
Sapling/Shrub Stratum (Plot size: <u>15'</u>)					
1. <u>Ligustrum japonicum</u>	5	yes	UPL		
2. <u>Rosa multiflora</u>	5	yes	FACU		
3. _____					
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
	10	= Total Cover			
Herb Stratum (Plot size: <u>5'</u>)					
1. <u>Juncus effusus</u>	5	yes	FACW	Hydrophytic Vegetation Indicators: <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)	
2. <u>Polygonum pensylvanicum</u>	5	yes	FACW		
3. <u>Microstegium vimineum</u>	5	yes	FAC		
4. _____					
5. _____					
6. _____					
7. _____					
8. _____					
9. _____					
10. _____					
11. _____					
12. _____					
	15	= Total Cover			
Woody Vine Stratum (Plot size: <u>30'</u>)					
1. _____					
2. _____					
3. _____					
4. _____					
5. _____					
6. _____					
				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.	
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	

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

Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland L - DP21

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		
0-4	10YR 4/2	80	7.5YR 4/4	20	C	PL	loam	
4-12	2.5Y 6/3	75	7.5YR 4/6	25	C	PL	loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland L - DP22
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.838091 Long: W 79.34341 Datum: _____
 Soil Map Unit Name: Cid silt loam, complex, 6-10% slopes (CkC) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland L - DP22

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
1. <u>Ulmus americana</u>	<u>45</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Liquidambar styraciflua</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>85</u> = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Ligustrum sinense</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Rosa multiflora</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
3. <u>Juniperus virginiana</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
4. <u>Symphoricarpos orbiculatus</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>11</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Microstegium vimineum</u>	<u>70</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Polygonum pensylvanicum</u>	<u>5</u>	<u>no</u>	<u>FAW</u>	
3. _____	<u>2</u>	<u>no</u>	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>77</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Parthenocissus quinquefolia</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
2. <u>Smilax sp.</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>3</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: Upland L - DP22

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		
0-4	10YR 5/4	100					loam	
4-12	10YR 7/4	100					loam	

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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
---	---

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland M - DP23
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.838434 Long: W 79.343688 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> ___ Surface Water (A1) ___ True Aquatic Plants (B14) ___ High Water Table (A2) ___ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) ___ Oxidized Rhizospheres on Living Roots (C3) ___ Water Marks (B1) ___ Presence of Reduced Iron (C4) ___ Sediment Deposits (B2) ___ Recent Iron Reduction in Tilled Soils (C6) ___ Drift Deposits (B3) ___ Thin Muck Surface (C7) ___ Algal Mat or Crust (B4) ___ Other (Explain in Remarks) ___ Iron Deposits (B5) ___ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) ___ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> ___ Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) ___ Drainage Patterns (B10) ___ Moss Trim Lines (B16) ___ Dry-Season Water Table (C2) ___ Crayfish Burrows (C8) ___ Saturation Visible on Aerial Imagery (C9) ___ Stunted or Stressed Plants (D1) ___ Geomorphic Position (D2) ___ Shallow Aquitard (D3) ___ Microtopographic Relief (D4) ___ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Water Table Present? Yes _____ No <input checked="" type="checkbox"/> Depth (inches): _____ Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____

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

Remarks:

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

Wetland M - DP23
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60%</u> (A/B)
1. <u>Acer rubrum</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Ulmus americana</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>80</u> = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Juniperus virginiana</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
2. <u>Ligustrum japonicum</u>	<u>2</u>	<u>no</u>	<u>UPL</u>	
3. <u>Rosa multiflora</u>	<u>1</u>	<u>no</u>	<u>FACU</u>	
4. <u>Fraxinus pennsylvanica</u>	<u>1</u>	<u>no</u>	<u>FACW</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>6</u> = Total Cover				Hydrophytic Vegetation Indicators: <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 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>10</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Festuca sp.</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Fragaria virginiana</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
4. <u>Amaranthus palmeri</u>	<u>1</u>	<u>no</u>	<u>FACU</u>	
5. <u>Juncus effusus</u>	<u>1</u>	<u>no</u>	<u>FACW</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>22</u> = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. <u>Smilax sp.</u>	<u>2</u>	<u>no</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>2</u> = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a seep area that has been disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland M - DP24
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.838501 Long: W 79.343591 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland M - DP24

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>7</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>57%</u> (A/B)
1. <u>Acer rubrum</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Fraxinus pennsylvanica</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Ulmus americana</u>	<u>15</u>	<u>no</u>	<u>FACW</u>	
4. <u>Ilex opaca</u>	<u>10</u>	<u>no</u>	<u>FACU</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>95</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Rosa multiflora</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Symphoricarpos orbiculatus</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>10</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Microstegium vimineum</u>	<u>35</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Festuca sp.</u>	<u>1</u>	<u>no</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>36</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Lonicera japonica</u>	<u>10</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Parthenocissus quinquefolia</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Smilax sp.</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>16</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: Upland M - DP24

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		
0-4	10YR 4/3	100					loam	
4-12	2.5Y 5/4	90	7.5YR 5/8	10	C	PL	loam	

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)**

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)**
- Red Parent Material (TF2)
- 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

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland N - DP25
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840448 Long: W 79.344473 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) _____ Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) <input checked="" type="checkbox"/> Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) <input checked="" type="checkbox"/> Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>1.0</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland N - DP25
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				
1. <u>Acer rubrum</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67%</u> (A/B)
2. <u>Ulmus americana</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>40</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Ligustrum japonicum</u>	<u>15</u>	<u>yes</u>	<u>UPL</u>	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 = _____
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>15</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				
1. <u>Microstegium vimineum</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators: <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)
2. <u>Festuca sp.</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	
4. <u>Amaranthus palmeri</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
5. <u>Carex lurida</u>	<u>2</u>	<u>no</u>	<u>OBL</u>	
6. <u>Ranunculus hispidus</u>	<u>2</u>	<u>no</u>	<u>FAC</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>46</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				

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

Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland N - DP25

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		
0-5	2.5Y 4/2	85	7.5YR 4/4	15	C	PL	silt loam	
5-12	2.5Y 5/2	95	7.5YR 4/4	5	C	PL	loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland N-O - DP26
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840332 Long: W 79.344484 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Upland N-O - DP26
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>6</u> (A) Total Number of Dominant Species Across All Strata: <u>6</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
1. <u>Ulmus americana</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Liquidambar styraciflua</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Acer rubrum</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>80</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Ligustrum sinense</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
2. <u>Rosa multiflora</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
3. <u>Juniperus virginiana</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
4. <u>Symphoricarpos orbiculatus</u>	<u>2</u>	<u>no</u>	<u>FACU</u>	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>8</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Microstegium vimineum</u>	<u>60</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Polygonum pensylvanicum</u>	<u>5</u>	<u>no</u>	<u>FAW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>65</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Toxicodendron radicans</u>	<u>5</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Smilax sp.</u>	<u>5</u>	<u>yes</u>	<u>FAC</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>10</u> = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: Upland N-O - DP26

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		
0-7	2.5Y 5/3	85	7.5YR 4/6	15	C	PL	loam	
7-12	2.5Y 6/4	90	7.5YR 4/6	10	C	PL	loam	

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)**

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)**
- Red Parent Material (TF2)
- 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

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland O - DP27
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840323 Long: W 79.344366 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland O - DP27
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
1. <u>Ulmus americana</u>	<u>60</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Liquidambar styraciflua</u>	<u>15</u>	<u>no</u>	<u>FAC</u>	
3. <u>Ligustrum sinense</u>	<u>10</u>	<u>no</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>85</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Ligustrum sinense</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>10</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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 Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
_____ = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Smilax sp.</u>	<u>5</u>	<u>yes</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>5</u> = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland P - DP28
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840818 Long: W 79.344466 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland P - DP28
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status															
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>33%</u> (A/B)														
1. <u>Ulmus americana</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
<u>10</u> = Total Cover																		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="width:50%; text-align: right;">Total % Cover of:</td> <td style="width:50%; text-align: left;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>15</u></td> <td>x 2 = <u>30</u></td> </tr> <tr> <td>FAC species <u>20</u></td> <td>x 3 = <u>60</u></td> </tr> <tr> <td>FACU species <u>72</u></td> <td>x 4 = <u>288</u></td> </tr> <tr> <td>UPL species <u>50</u></td> <td>x 5 = <u>250</u></td> </tr> <tr> <td>Column Totals: <u>157</u> (A)</td> <td><u>628</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>4</u>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>15</u>	x 2 = <u>30</u>	FAC species <u>20</u>	x 3 = <u>60</u>	FACU species <u>72</u>	x 4 = <u>288</u>	UPL species <u>50</u>	x 5 = <u>250</u>	Column Totals: <u>157</u> (A)	<u>628</u> (B)
Total % Cover of:	Multiply by:																	
OBL species <u>0</u>	x 1 = <u>0</u>																	
FACW species <u>15</u>	x 2 = <u>30</u>																	
FAC species <u>20</u>	x 3 = <u>60</u>																	
FACU species <u>72</u>	x 4 = <u>288</u>																	
UPL species <u>50</u>	x 5 = <u>250</u>																	
Column Totals: <u>157</u> (A)	<u>628</u> (B)																	
1. <u>Ligustrum japonicum</u>	<u>50</u>	<u>yes</u>	<u>UPL</u>															
2. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>no</u>	<u>FACW</u>															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
<u>55</u> = Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input 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 checked="" type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain)														
1. <u>Festuca sp.</u>	<u>60</u>	<u>yes</u>	<u>FACU</u>															
2. <u>Microstegium vimineum</u>	<u>15</u>	<u>no</u>	<u>FAC</u>															
3. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>no</u>	<u>FACW</u>															
4. <u>Ranunculus hispidus</u>	<u>5</u>	<u>no</u>	<u>FAC</u>															
5. <u>Amaranthus palmeri</u>	<u>1</u>	<u>no</u>	<u>FACU</u>															
6. <u>Trifolium repens</u>	<u>1</u>	<u>no</u>	<u>FACU</u>															
7. _____	_____	_____	_____															
8. _____	_____	_____	_____															
9. _____	_____	_____	_____															
10. _____	_____	_____	_____															
11. _____	_____	_____	_____															
12. _____	_____	_____	_____															
<u>92</u> = Total Cover																		
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.														
1. _____	_____	_____	_____															
2. _____	_____	_____	_____															
3. _____	_____	_____	_____															
4. _____	_____	_____	_____															
5. _____	_____	_____	_____															
6. _____	_____	_____	_____															
_____ = Total Cover																		
<table style="width:100%; border:none;"> <tr> <td style="width:60%;">Hydrophytic Vegetation Present?</td> <td style="width:20%; text-align: center;">Yes _____</td> <td style="width:20%; text-align: center;">No <input checked="" type="checkbox"/></td> </tr> </table>				Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>												
Hydrophytic Vegetation Present?	Yes _____	No <input checked="" type="checkbox"/>																
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.																		

SOIL

Sampling Point: Wetland P - DP28

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		
0-4	5Y 5/2	75	7.5YR 4/6	25	C	PL	loam	
4-12	2.5Y 6/3	95	7.5YR 5/8	5	C	PL	loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland P - DP29
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840979 Long: W 79.344571 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland P - DP29

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				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 = _____
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Rosa palustris</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Fraxinus pennsylvanica</u>	<u>5</u>	<u>yes</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				
<u>Herb Stratum</u> (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <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>Juncus effusus</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Ranunculus hispidus</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
3. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
4. <u>Carex vulpinoidea</u>	<u>5</u>	<u>no</u>	<u>OBL</u>	
5. <u>Carex lurida</u>	<u>5</u>	<u>no</u>	<u>OBL</u>	
6. <u>Festuca sp.</u>	<u>1</u>	<u>no</u>	<u>FACU</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
_____ = Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____

SOIL

Sampling Point: Upland P - DP29

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	2.5Y 5/4	100					loam	
3-12	2.5Y 6/4	95	10YR 5/8	5	C	PL	loam	

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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland Q - DP30
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.8416 Long: W 79.344402 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____

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

Remarks:

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

Wetland Q - DP30
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>7</u> (A) Total Number of Dominant Species Across All Strata: <u>9</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>78%</u> (A/B)
1. <u>Platanus occidentalis</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
2. <u>Ulmus americana</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
3. <u>Fraxinus pennsylvanica</u>	<u>15</u>	<u>yes</u>	<u>FACW</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>55</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Rosa multiflora</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Ligustrum sinense</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Rosa palustris</u>	<u>2</u>	<u>no</u>	<u>OBL</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>12</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Carex vulpinoidea</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Carex lurida</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	
3. <u>Polygonum pensylvanicum</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	
4. <u>Microstegium vimineum</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
5. <u>Juncus effusus</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>90</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. <u>Smilax sp.</u>	<u>1</u>	<u>no</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
<u>1</u> = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				

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

Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland Q - DP31
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.841588 Long: W 79.344856 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland Q - DP31

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
1. <u>Platanus occidentalis</u>	<u>10</u>	<u>yes</u>	<u>FACW</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____	_____	_____	_____	
<u>10</u> = Total Cover				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. <u>Rosa palustris</u>	<u>20</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Rubrus arvensis</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Rosa multiflora</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
<u>45</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Festuca sp.</u>	<u>30</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Microstegium vimineum</u>	<u>10</u>	<u>no</u>	<u>FAC</u>	
3. <u>Ranunculus hispidus</u>	<u>5</u>	<u>no</u>	<u>FAC</u>	
4. <u>Trifolium repens</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
5. <u>Juncus effusus</u>	<u>5</u>	<u>no</u>	<u>FACW</u>	
6. <u>Solanum carolinense</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>60</u> = Total Cover				
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				
Remarks: (Include photo numbers here or on a separate sheet.)				

SOIL

Sampling Point: Upland Q - DP31

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	2.5Y 5/4	100					loam	
3-12	2.5Y 6/4	90	7.5YR 4/6	10	C	PL	loam	

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 Soils ³ :
<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"/> Red Parent Material (TF2)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<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)		

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 <input checked="" type="checkbox"/>
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/29/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland R - DP32
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.839114 Long: W 79.344336 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one is required; check all that apply)</u> <input checked="" type="checkbox"/> Surface Water (A1) _____ True Aquatic Plants (B14) _____ High Water Table (A2) _____ Hydrogen Sulfide Odor (C1) <input checked="" type="checkbox"/> Saturation (A3) _____ Oxidized Rhizospheres on Living Roots (C3) _____ Water Marks (B1) _____ Presence of Reduced Iron (C4) _____ Sediment Deposits (B2) _____ Recent Iron Reduction in Tilled Soils (C6) _____ Drift Deposits (B3) _____ Thin Muck Surface (C7) _____ Algal Mat or Crust (B4) _____ Other (Explain in Remarks) <input checked="" type="checkbox"/> Iron Deposits (B5) _____ Inundation Visible on Aerial Imagery (B7) _____ Water-Stained Leaves (B9) _____ Aquatic Fauna (B13)	<u>Secondary Indicators (minimum of two required)</u> _____ Surface Soil Cracks (B6) _____ Sparsely Vegetated Concave Surface (B8) _____ Drainage Patterns (B10) _____ Moss Trim Lines (B16) _____ Dry-Season Water Table (C2) _____ Crayfish Burrows (C8) _____ Saturation Visible on Aerial Imagery (C9) _____ Stunted or Stressed Plants (D1) _____ Geomorphic Position (D2) _____ Shallow Aquitard (D3) _____ Microtopographic Relief (D4) _____ FAC-Neutral Test (D5)
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0.5</u> Water Table Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> Saturation Present? Yes <input checked="" type="checkbox"/> No _____ Depth (inches): <u>0-12</u> (includes capillary fringe)	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks:	

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

Wetland R - DP32
Sampling Point: _____

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:
1. _____	_____	_____	_____	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>66%</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				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 = _____
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>Rosa palustris</u>	<u>2</u>	<u>no</u>	<u>OBL</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
_____ = Total Cover				
<u>Herb Stratum</u> (Plot size: <u>5'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Hydrophytic Vegetation Indicators: <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>Carex lurida</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Festuca sp.</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Ranunculus hispidus</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
4. <u>Polygonum pensylvanicum</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
5. <u>Juncus effusus</u>	<u>10</u>	<u>no</u>	<u>FACW</u>	
6. <u>Amaranthus palmeri</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
7. <u>Mentha sp.</u>	<u>2</u>	<u>no</u>	<u>FACW</u>	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
_____ = Total Cover				
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____				

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/29/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland R-S - DP33
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.839067 Long: W 79.344285 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

<u>Tree Stratum</u> (Plot size: <u>30'</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:																								
1. _____	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A)																								
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)																								
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50%</u> (A/B)																								
4. _____	_____	_____	_____	Prevalence Index worksheet: <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:30%;"><u>Total % Cover of:</u></td> <td style="width:30%;"><u>Multiply by:</u></td> <td style="width:40%;"></td> </tr> <tr> <td>OBL species <u>31</u></td> <td>x 1 =</td> <td><u>31</u></td> </tr> <tr> <td>FACW species <u>0</u></td> <td>x 2 =</td> <td><u>0</u></td> </tr> <tr> <td>FAC species <u>20</u></td> <td>x 3 =</td> <td><u>60</u></td> </tr> <tr> <td>FACU species <u>50</u></td> <td>x 4 =</td> <td><u>200</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 =</td> <td><u>0</u></td> </tr> <tr> <td>Column Totals: <u>101</u> (A)</td> <td></td> <td><u>291</u> (B)</td> </tr> <tr> <td colspan="3" style="text-align: center;">Prevalence Index = B/A = <u>2.9</u></td> </tr> </table>	<u>Total % Cover of:</u>	<u>Multiply by:</u>		OBL species <u>31</u>	x 1 =	<u>31</u>	FACW species <u>0</u>	x 2 =	<u>0</u>	FAC species <u>20</u>	x 3 =	<u>60</u>	FACU species <u>50</u>	x 4 =	<u>200</u>	UPL species <u>0</u>	x 5 =	<u>0</u>	Column Totals: <u>101</u> (A)		<u>291</u> (B)	Prevalence Index = B/A = <u>2.9</u>		
<u>Total % Cover of:</u>	<u>Multiply by:</u>																											
OBL species <u>31</u>	x 1 =	<u>31</u>																										
FACW species <u>0</u>	x 2 =	<u>0</u>																										
FAC species <u>20</u>	x 3 =	<u>60</u>																										
FACU species <u>50</u>	x 4 =	<u>200</u>																										
UPL species <u>0</u>	x 5 =	<u>0</u>																										
Column Totals: <u>101</u> (A)		<u>291</u> (B)																										
Prevalence Index = B/A = <u>2.9</u>																												
5. _____	_____	_____	_____																									
6. _____	_____	_____	_____																									
7. _____	_____	_____	_____																									
8. _____	_____	_____	_____																									
_____ = Total Cover																												
<u>Sapling/Shrub Stratum</u> (Plot size: <u>15'</u>)																												
1. <u>Symphoricarpos orbiculatus</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>																									
2. <u>Rosa palustris</u>	<u>1</u>	<u>no</u>	<u>OBL</u>																									
3. _____	_____	_____	_____																									
4. _____	_____	_____	_____																									
5. _____	_____	_____	_____																									
6. _____	_____	_____	_____																									
7. _____	_____	_____	_____																									
8. _____	_____	_____	_____																									
9. _____	_____	_____	_____																									
10. _____	_____	_____	_____																									
_____ = Total Cover																												
<u>Herb Stratum</u> (Plot size: <u>5'</u>)																												
1. <u>Carex lurida</u>	<u>30</u>	<u>yes</u>	<u>OBL</u>																									
2. <u>Festuca sp.</u>	<u>30</u>	<u>yes</u>	<u>FACU</u>																									
3. <u>Ranunculus hispidus</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>																									
4. <u>Trifolium repens</u>	<u>5</u>	<u>no</u>	<u>FACU</u>																									
5. <u>Amaranthus palmeri</u>	<u>5</u>	<u>no</u>	<u>FACU</u>																									
6. _____	_____	_____	_____																									
7. _____	_____	_____	_____																									
8. _____	_____	_____	_____																									
9. _____	_____	_____	_____																									
10. _____	_____	_____	_____																									
11. _____	_____	_____	_____																									
12. _____	_____	_____	_____																									
_____ = Total Cover																												
<u>Woody Vine Stratum</u> (Plot size: <u>30'</u>)																												
1. _____	_____	_____	_____																									
2. _____	_____	_____	_____																									
3. _____	_____	_____	_____																									
4. _____	_____	_____	_____																									
5. _____	_____	_____	_____																									
6. _____	_____	_____	_____																									
_____ = Total Cover																												
Hydrophytic Vegetation Indicators: ___ 1 - Rapid Test for Hydrophytic Vegetation ___ 2 - Dominance Test is >50% ✓ 3 - Prevalence Index is ≤3.0 ¹ ___ 4 - Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) ___ Problematic Hydrophytic Vegetation ¹ (Explain)																												
Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																												
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																												
Remarks: (Include photo numbers here or on a separate sheet.)																												

SOIL

Sampling Point: Upland R-S - DP33

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		
0-7	2.5Y 5/3	85	7.5YR 4/6	15	C	PL	loam	
7-12	2.5Y 6/4	90	7.5YR 4/6	10	C	PL	loam	

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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
---	---

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/29/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland S - DP34
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.838989 Long: W 79.344243 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland S - DP34
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>60%</u> (A/B)
1. <u>Acer rubrum</u>	<u>25</u>	<u>yes</u>	<u>FAC</u>	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>25</u> = Total Cover				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 = _____
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				
1. <u>Ligustrum japonicum</u>	<u>50</u>	<u>yes</u>	<u>UPL</u>	
2. <u>Rosa multiflora</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
<u>55</u> = Total Cover				
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Carex lurida</u>	<u>40</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Festuca sp.</u>	<u>20</u>	<u>yes</u>	<u>FACU</u>	
3. <u>Ranunculus hispidus</u>	<u>20</u>	<u>yes</u>	<u>FAC</u>	
4. <u>Trifolium repens</u>	<u>5</u>	<u>no</u>	<u>FACU</u>	
5. <u>Juncus effusus</u>	<u>5</u>	<u>no</u>	<u>FACW</u>	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
9. _____	_____	_____	_____	
10. _____	_____	_____	_____	
11. _____	_____	_____	_____	
12. _____	_____	_____	_____	
<u>90</u> = Total Cover				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
Woody Vine Stratum (Plot size: <u>30'</u>)				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
_____ = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				

SOIL

Sampling Point: Wetland S - DP34

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		
0-4	2.5YR 5/2	90	10YR 4/6	10	C	PL	silt loam	
4-12	5Y 5/2	85	5YR 4/6	15	C	PL	silt loam	

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 Soils ³ :	
<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)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Thin Dark Surface (S9) (MLRA 147, 148)	<input type="checkbox"/> (MLRA 147, 148)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Piedmont Floodplain Soils (F19)	
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> (MLRA 136, 147)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/29/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland T - DP35
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840767 Long: W 79.343849 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UT5. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Wetland T - DP35
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status				
Tree Stratum (Plot size: 30')							
1. <u>Salix nigra</u>	30	yes	OBL	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>4</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>80%</u> (A/B)			
2. <u>Fraxinus pennsylvanica</u>	20	yes	FACW				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
7. _____	_____	_____	_____				
8. _____	_____	_____	_____				
50 = Total Cover							
Sapling/Shrub Stratum (Plot size: 15')							
1. <u>Ligustrum japonicum</u>	35	yes	UPL	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 = _____			
2. _____	_____	_____	_____				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
7. _____	_____	_____	_____				
8. _____	_____	_____	_____				
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
35 = Total Cover							
Herb Stratum (Plot size: 5')							
1. <u>Microstegium vimineum</u>	40	yes	FAC	Hydrophytic Vegetation Indicators: <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)			
2. <u>Polygonum pensylvanicum</u>	15	yes	FACW				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
7. _____	_____	_____	_____				
8. _____	_____	_____	_____				
9. _____	_____	_____	_____				
10. _____	_____	_____	_____				
11. _____	_____	_____	_____				
12. _____	_____	_____	_____				
55 = Total Cover							
Woody Vine Stratum (Plot size: 30')							
1. _____	_____	_____	_____	Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.			
2. _____	_____	_____	_____				
3. _____	_____	_____	_____				
4. _____	_____	_____	_____				
5. _____	_____	_____	_____				
6. _____	_____	_____	_____				
_____ = Total Cover							
<table style="width:100%; border: none;"> <tr> <td style="width:60%;">Hydrophytic Vegetation Present?</td> <td style="width:20%; text-align: center;">Yes <input checked="" type="checkbox"/></td> <td style="width:20%; text-align: center;">No <input type="checkbox"/></td> </tr> </table>					Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>					

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

Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.

SOIL

Sampling Point: Wetland T - DP35

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	2.5Y 5/1	80	7.5YR 4/6	20	C	PL	loam	
3-12	5Y 5/2	90	7.5YR 4/6	10	C	PL	loam	

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 Soils ³ :
<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"/> Red Parent Material (TF2)
<input type="checkbox"/> Stratified Layers (A5)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)
<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)		

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 _____
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Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/29/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland T - DP36
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.840808 Long: W 79.343892 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Sampling Point: Upland T - DP36

	Absolute % Cover	Dominant Species?	Indicator Status					
Tree Stratum (Plot size: <u>30'</u>)								
1. <u>Fraxinus pennsylvanica</u>	40	yes	FACW	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)				
2. <u>Salix nigra</u>	15	yes	OBL					
3. _____								
4. _____								
5. _____								
6. _____								
7. _____								
8. _____								
	55 = Total Cover			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 = _____				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)								
1. <u>Ligustrum japonicum</u>	20	yes	UPL					
2. _____								
3. _____								
4. _____								
5. _____								
6. _____								
7. _____								
8. _____								
	20 = Total Cover			Hydrophytic Vegetation Indicators: <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)				
Herb Stratum (Plot size: <u>5'</u>)								
1. <u>Microstegium vimineum</u>	70	yes	FAC					
2. <u>Amaranthus palmeri</u>	10	no	FACU					
3. <u>Festuca sp.</u>	5	no	FACU					
4. _____								
5. _____								
6. _____								
7. _____								
8. _____								
	85 = Total Cover			Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.				
Woody Vine Stratum (Plot size: <u>30'</u>)								
1. _____								
2. _____								
3. _____								
4. _____								
5. _____								
6. _____								
	_____ = Total Cover							
<table style="width:100%; border:none;"> <tr> <td style="width:60%;"></td> <td style="width:10%;">Hydrophytic Vegetation Present?</td> <td style="width:10%; text-align:center;">Yes <input checked="" type="checkbox"/></td> <td style="width:20%; text-align:center;">No <input type="checkbox"/></td> </tr> </table>						Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
	Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>					
Remarks: (Include photo numbers here or on a separate sheet.) 								

SOIL

Sampling Point: Upland T - DP36

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	2.5Y 4/4	100					loam	
2-12	2.5Y 6/4	100					loam	

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 Soils ³ :	
<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"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> 2 cm Muck (A10) (LRR N)	<input type="checkbox"/> Redox Dark Surface (F6)	<input type="checkbox"/> Other (Explain in Remarks)	
<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)			

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 <input checked="" type="checkbox"/>
---	---

Remarks:

WETLAND DETERMINATION DATA FORM – Eastern Mountains and Piedmont

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 11/5/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Wetland U
 Investigator(s): John Hutton Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): concave Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835613 Long: W 79.34288 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____
Remarks: Sampling point located in floodplain adjacent to UTSF. Cattle have access to the sampling location and have disturbed/trampled much of the surface area at the sampling point.	

HYDROLOGY

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

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

Sampling Point: Wetland U

	Absolute % Cover	Dominant Species?	Indicator Status	
Tree Stratum (Plot size: <u>30'</u>)				Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>75%</u> (A/B)
1. <u>Acer rubrum</u>	<u>40</u>	<u>yes</u>	<u>FAC</u>	
2. <u>Quercus phellos</u>	<u>30</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Ulmus americana</u>	<u>10</u>		<u>FACW</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
	<u>80</u>	<u>= Total Cover</u>		
Sapling/Shrub Stratum (Plot size: <u>15'</u>)				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 = _____
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
		<u>_____ = Total Cover</u>		
Herb Stratum (Plot size: <u>5'</u>)				Hydrophytic Vegetation Indicators: <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>Festuca sp.</u>	<u>40</u>	<u>yes</u>	<u>FACU</u>	
2. <u>Microstegium vimineum</u>	<u>15</u>	<u>yes</u>	<u>FAC</u>	
3. <u>Dichantherium clandestinum</u>	<u>5</u>		<u>FAC</u>	
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
	<u>60</u>	<u>= Total Cover</u>		
Woody Vine Stratum (Plot size: <u>30'</u>)				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				
		<u>_____ = Total Cover</u>		
Remarks: (Include photo numbers here or on a separate sheet.) Feature is located in a concave depression that has been heavily disturbed (trampled) by cattle. Sapling and herb stratum's significantly impacted within sampling area.				
Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>				

SOIL

Sampling Point: Wetland U

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		
0-5	10YR 2/2	100					loam	
5-12	2.5YR 4/1	95	7.5YR 4/6	5	C	PL	loam	

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)**

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)**
- Red Parent Material (TF2)
- 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

Project/Site: Maney Farm Stream Mitigation Site City/County: Chatham Sampling Date: 5/28/14
 Applicant/Owner: Wildlands Engineering State: NC Sampling Point: Upland U - DP2
 Investigator(s): Ian Eckardt and Win Taylor Section, Township, Range: _____
 Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 0
 Subregion (LRR or MLRA): MLRA 136 Lat: N 35.835725 Long: W 79.342426 Datum: _____
 Soil Map Unit Name: Cid-Lignum complex, 2-6% slopes (CmB) NWI classification: _____

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 _____ Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/>
Remarks: Sampling point is representative of a non-jurisdictional upland area located in the floodplain of the project site.	

HYDROLOGY

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

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

Upland U - DP2
Sampling Point: _____

	Absolute % Cover	Dominant Species?	Indicator Status																	
Tree Stratum (Plot size: <u>30'</u>)																				
1. <u>Ulmus americana</u>	<u>35</u>	<u>yes</u>	<u>FACW</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>5</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>20%</u> (A/B)																
2. <u>Fraxinus pennsylvanica</u>	<u>10</u>	<u>no</u>	<u>FACW</u>																	
3. <u>Acer rubrum</u>	<u>10</u>	<u>no</u>	<u>FAC</u>																	
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
	<u>55</u>	= Total Cover		Prevalence Index worksheet: <table style="width:100%; border:none;"> <tr> <td style="text-align:right;">Total % Cover of:</td> <td style="text-align:right;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>50</u></td> <td>x 2 = <u>100</u></td> </tr> <tr> <td>FAC species <u>10</u></td> <td>x 3 = <u>30</u></td> </tr> <tr> <td>FACU species <u>40</u></td> <td>x 4 = <u>160</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>100</u> (A)</td> <td><u>290</u> (B)</td> </tr> <tr> <td colspan="2" style="text-align:center;">Prevalence Index = B/A = <u>2.9</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>50</u>	x 2 = <u>100</u>	FAC species <u>10</u>	x 3 = <u>30</u>	FACU species <u>40</u>	x 4 = <u>160</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>100</u> (A)	<u>290</u> (B)	Prevalence Index = B/A = <u>2.9</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>50</u>	x 2 = <u>100</u>																			
FAC species <u>10</u>	x 3 = <u>30</u>																			
FACU species <u>40</u>	x 4 = <u>160</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>100</u> (A)	<u>290</u> (B)																			
Prevalence Index = B/A = <u>2.9</u>																				
Sapling/Shrub Stratum (Plot size: <u>15'</u>)																				
1. <u>Rosa multiflora</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>																	
2. <u>Symphoricarpos orbiculatus</u>	<u>5</u>	<u>yes</u>	<u>FACU</u>																	
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
	<u>15</u>	= Total Cover																		
Herb Stratum (Plot size: <u>5'</u>)																				
1. <u>Trifolium repens</u>	<u>15</u>	<u>yes</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> 1 - Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> 2 - Dominance Test is >50% <input checked="" 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)																
2. <u>Fragaria virginiana</u>	<u>10</u>	<u>yes</u>	<u>FACU</u>																	
3. <u>Boehmeria cylindrica</u>	<u>5</u>	<u>no</u>	<u>FACW</u>																	
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
11. _____																				
12. _____																				
	<u>30</u>	= Total Cover																		
Woody Vine Stratum (Plot size: <u>30'</u>)																				
1. _____				Definitions of Four Vegetation Strata: Tree – Woody plants, excluding vines, 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height. Sapling/Shrub – Woody plants, excluding vines, less than 3 in. DBH and greater than 3.28 ft (1 m) tall. Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall. Woody vine – All woody vines greater than 3.28 ft in height.																
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>																
_____ = Total Cover																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

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

Wetland Site Name Maney Farm - Wetland A	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.835745 W 79.342343

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 checked="" type="radio"/> D | <input checked="" 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 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 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 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 interspersion 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 Maney Farm - Wetland A Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
		Landscape Patch Structure	LOW
		Vegetation Composition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	MEDIUM

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland B	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.835766 W 79.34253

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 checked="" type="checkbox"/> F | <input checked="" type="checkbox"/> F | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 checked="" type="radio"/> D | <input checked="" 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 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 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 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 interspersion 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 Maney Farm - Wetland B Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	MEDIUM

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland C	Date 5/28/2014
Wetland Type <input type="text" value="Seep"/>	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion <input type="text" value="Piedmont"/>	Nearest Named Water Body South Fork Cane Creek
River Basin <input type="text" value="Cape Fear"/>	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.835844 W 79.34328

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 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.

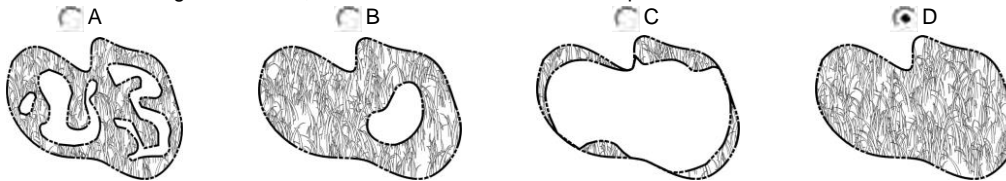
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland C Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	<u>NA</u>
		Sub-Surface Storage and Retention	<u>NA</u>
Water Quality	Pathogen Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Particulate Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Soluble Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Physical Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
Pollution Change	Condition	<u>NA</u>	
	Condition/Opportunity	<u>NA</u>	
	Opportunity Presence? (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>MEDIUM</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>MEDIUM</u>

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	<u>HIGH</u>
Water Quality	Condition	<u>MEDIUM</u>
	Condition/Opportunity	<u>NA</u>
	Opportunity Presence? (Y/N)	<u>NA</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland D	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.836258 W 79.34318

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 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 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.

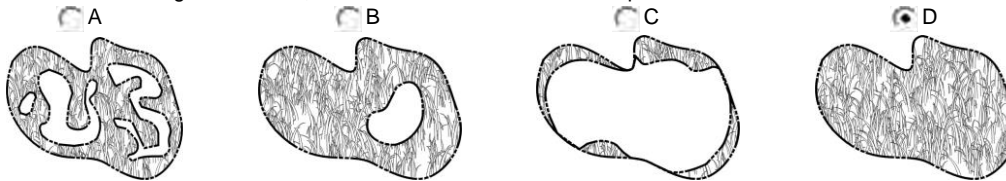
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland D Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	MEDIUM

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland E	Date 5/28/2014
Wetland Type Seep	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.836342 W 79.342854

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 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.

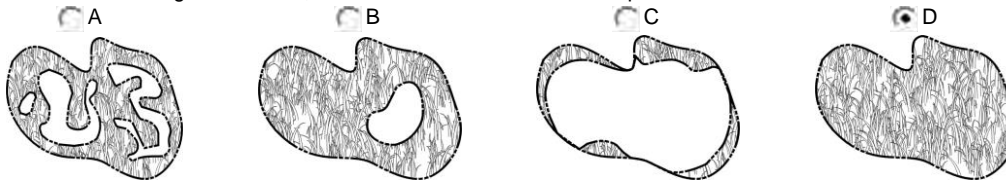
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland E Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	<u>NA</u>
		Sub-Surface Storage and Retention	<u>NA</u>
Water Quality	Pathogen Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Particulate Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Soluble Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Physical Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
Pollution Change	Condition	<u>NA</u>	
	Condition/Opportunity	<u>NA</u>	
	Opportunity Presence? (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>MEDIUM</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>MEDIUM</u>

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	<u>HIGH</u>
Water Quality	Condition	<u>MEDIUM</u>
	Condition/Opportunity	<u>NA</u>
	Opportunity Presence? (Y/N)	<u>NA</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland F	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.836573 W 79.343145

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 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 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.

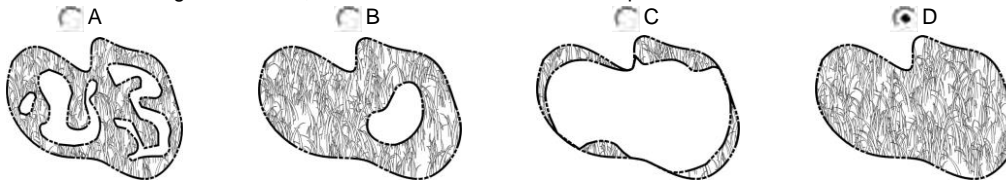
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland F Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	MEDIUM

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland G	Date 5/28/2014
Wetland Type Seep	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.836717 W 79.343491

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 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 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.

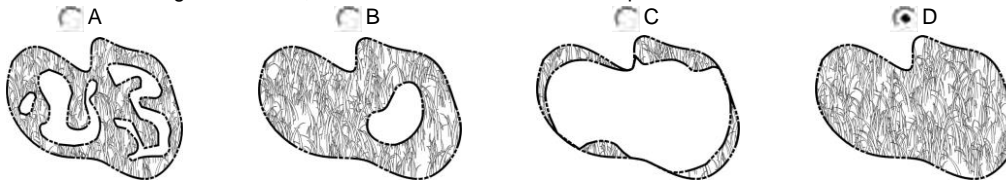
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland G Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	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	MEDIUM
	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	NA
	Opportunity Presence? (Y/N)	NA
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 Maney Farm - Wetland H	Date 5/28/2014
Wetland Type Seep	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.836717 W 79.343491

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> I | <input checked="" type="radio"/> I | <input checked="" 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 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 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.

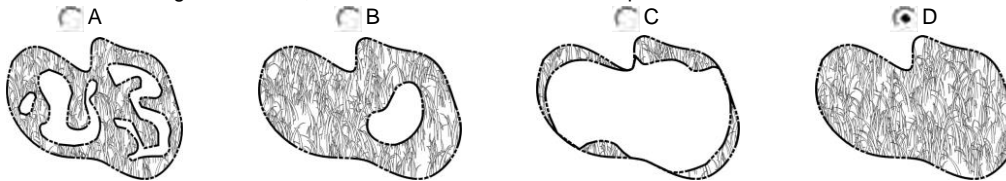
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm Stream Mitigation Site Date 5/28/2014
Wetland Type Seep Assessor Name/Organization ckardt / W. Taylor Wildlar

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) NO
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	<u>NA</u>
		Sub-Surface Storage and Retention	<u>NA</u>
Water Quality	Pathogen Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Particulate Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Soluble Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Physical Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
Pollution Change	Condition	<u>NA</u>	
	Condition/Opportunity	<u>NA</u>	
	Opportunity Presence? (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>MEDIUM</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>MEDIUM</u>

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	<u>HIGH</u>
Water Quality	Condition	<u>MEDIUM</u>
	Condition/Opportunity	<u>NA</u>
	Opportunity Presence? (Y/N)	<u>NA</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland I	Date 5/28/2014
Wetland Type Seep	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.837536 W 79.342393

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 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 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.

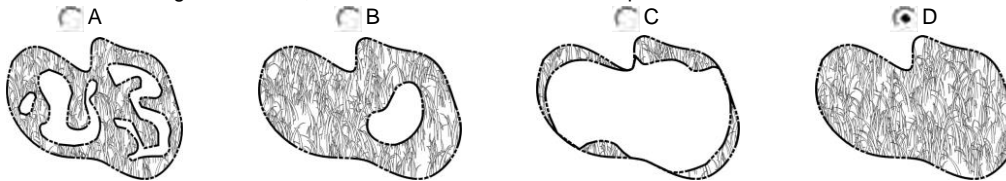
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland I Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	<u>NA</u>
		Sub-Surface Storage and Retention	<u>NA</u>
Water Quality	Pathogen Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Particulate Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Soluble Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Physical Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
Pollution Change	Condition	<u>NA</u>	
	Condition/Opportunity	<u>NA</u>	
	Opportunity Presence? (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>MEDIUM</u>
	Landscape Patch Structure	Condition	<u>LOW</u>
	Vegetation Composition	Condition	<u>MEDIUM</u>

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	<u>HIGH</u>
Water Quality	Condition	<u>MEDIUM</u>
	Condition/Opportunity	<u>NA</u>
	Opportunity Presence? (Y/N)	<u>NA</u>
Habitat	Condition	<u>LOW</u>

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland J	Date 5/28/2014
Wetland Type <input type="text" value="Seep"/>	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion <input type="text" value="Piedmont"/>	Nearest Named Water Body South Fork Cane Creek
River Basin <input type="text" value="Cape Fear"/>	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.837545 W 79.342047

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)
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- 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

- A A Not severely altered
- B 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

- A A Water storage capacity and duration are not altered.
- B B Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
- C 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. A A Majority of wetland with depressions able to pond water > 1 foot deep
- B B Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
- C C Majority of wetland with depressions able to pond water 3 to 6 inches deep
- D D Depressions able to pond water < 3 inches deep
- 3b. A Evidence that maximum depth of inundation is greater than 2 feet
- B Evidence that maximum depth of inundation is between 1 and 2 feet

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 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.

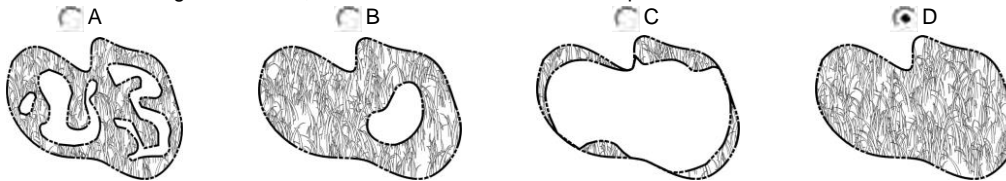
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland J Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	<u>NA</u>
		Sub-Surface Storage and Retention	<u>NA</u>
Water Quality	Pathogen Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Particulate Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Soluble Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
	Physical Change	Condition	<u>NA</u>
		Condition/Opportunity	<u>NA</u>
		Opportunity Presence? (Y/N)	<u>NA</u>
Pollution Change	Condition	<u>NA</u>	
	Condition/Opportunity	<u>NA</u>	
	Opportunity Presence? (Y/N)	<u>NA</u>	
Habitat	Physical Structure	Condition	<u>MEDIUM</u>
	Landscape Patch Structure	Condition	<u>MEDIUM</u>
	Vegetation Composition	Condition	<u>MEDIUM</u>

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	<u>HIGH</u>
Water Quality	Condition	<u>MEDIUM</u>
	Condition/Opportunity	<u>NA</u>
	Opportunity Presence? (Y/N)	<u>NA</u>
Habitat	Condition	<u>MEDIUM</u>

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland K	Date 5/28/2014
Wetland Type Seep	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.837326 W 79.344558

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> I | <input checked="" 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 checked="" 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 checked="" type="radio"/> F | <input checked="" 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.

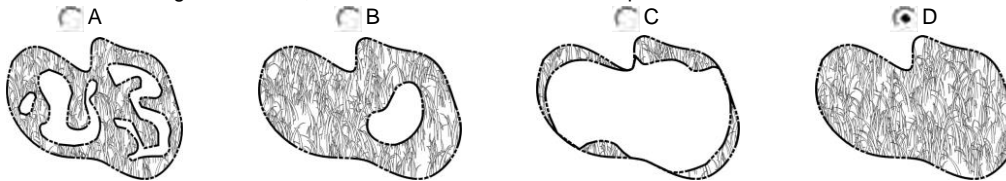
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland K Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	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	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	LOW

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	HIGH
Water Quality	Condition	LOW
	Condition/Opportunity	NA
	Opportunity Presence? (Y/N)	NA
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 Maney Farm - Wetland L	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.838041 W 79.343368

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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 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 checked="" type="radio"/> H | <input checked="" 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 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 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 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 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.

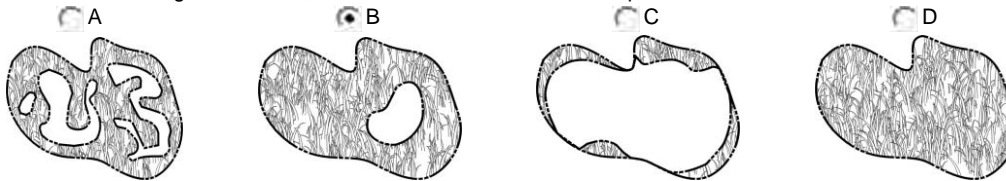
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland L Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
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	MEDIUM
		Condition/Opportunity	HIGH
		Opportunity Presence? (Y/N)	YES
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
		Landscape Patch Structure	LOW
		Vegetation Composition	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	MEDIUM

Overall Wetland Rating **MEDIUM**

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

Wetland Site Name Maney Farm - Wetland M	Date 5/28/2014
Wetland Type <input type="text" value="Seep"/>	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion <input type="text" value="Piedmont"/>	Nearest Named Water Body South Fork Cane Creek
River Basin <input type="text" value="Cape Fear"/>	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.838434 W 79.343688

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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 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 checked="" type="radio"/> H | <input checked="" 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 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 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 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 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.

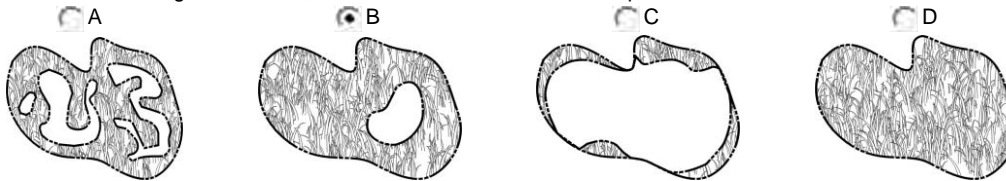
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland M Date 5/28/2014
Wetland Type Seep Assessor Name/Organization IE & WT Wildlands 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) NO
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	NA
	Sub-Surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence? (Y/N)	NA
	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	MEDIUM
	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	NA
	Opportunity Presence? (Y/N)	NA
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 Maney Farm - Wetland N	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 type="radio"/> A | <input type="radio"/> A | Canopy closed, or nearly closed, with natural gaps associated with natural processes |
| | <input checked="" type="radio"/> B | <input checked="" 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 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 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 interspersion 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 Maney Farm - Wetland N Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	MEDIUM
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland O	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840323 W 79.344366

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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input checked="" type="radio"/> B	<input checked="" 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 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 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.

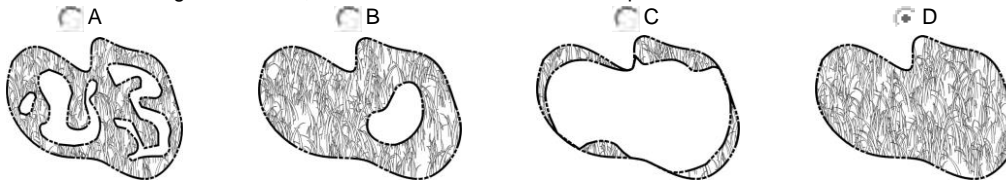
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland O Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	HIGH
	Landscape Patch Structure	Condition	LOW
	Vegetation Composition	Condition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	MEDIUM

Overall Wetland Rating LOW

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

Wetland Site Name Maney Farm - Wetland P	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 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.

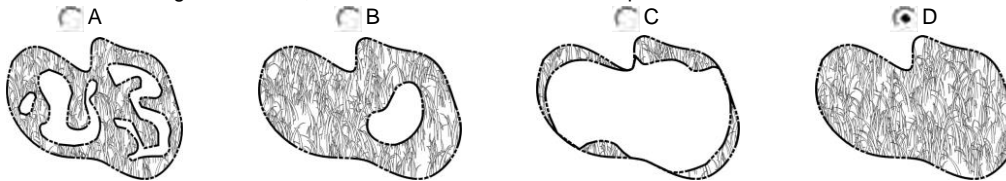
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland P Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
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	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland Q	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 checked="" type="radio"/> I | <input checked="" type="radio"/> I | <input checked="" 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 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 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.

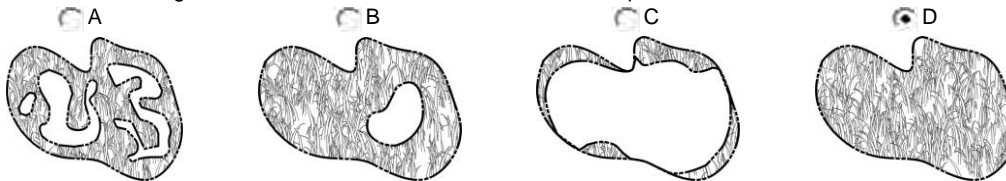
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland Q Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
		Landscape Patch Structure	LOW
		Vegetation Composition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland R	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 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.

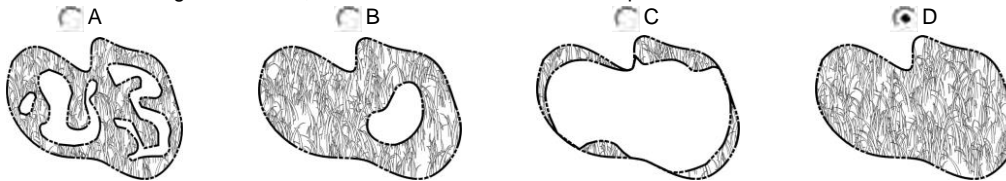
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland R Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
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	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland S	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 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 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.

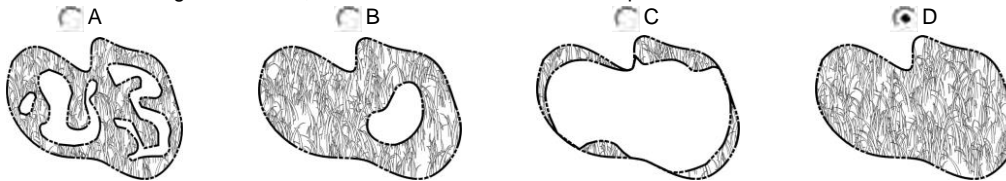
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland S Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
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	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland T	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 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

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> J | <input type="radio"/> J | <input type="radio"/> J | From 0.01 to < 0.1 acre |
| <input checked="" type="radio"/> K | <input checked="" type="radio"/> K | <input checked="" 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 checked="" type="radio"/> C | From 50 to < 100 acres |
| <input checked="" 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 checked="" type="radio"/> B	<input checked="" 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 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.

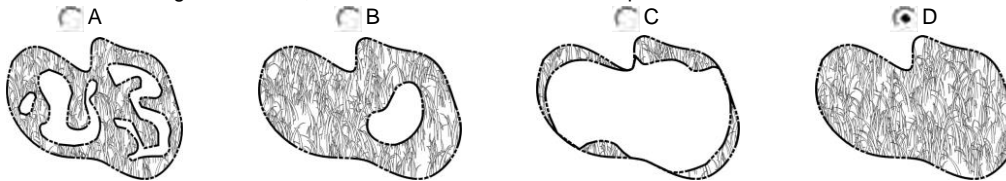
20. Large Woody Debris – wetland type condition metric

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 interspersion 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.
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Notes

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

Wetland Site Name Maney Farm - Wetland T Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
Pollution Change	Condition	NA	
	Condition/Opportunity	NA	
	Opportunity Presence? (Y/N)	NA	
Habitat	Physical Structure	Condition	LOW
		Landscape Patch Structure	LOW
		Vegetation Composition	MEDIUM

Function Rating Summary

Function	Metrics/Notes	Rating
Hydrology	Condition	MEDIUM
Water Quality	Condition	MEDIUM
	Condition/Opportunity	MEDIUM
	Opportunity Presence? (Y/N)	NO
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 Maney Farm - Wetland U	Date 5/28/2014
Wetland Type Bottomland Hardwood Forest	Assessor Name/Organization IE & WT Wildlands Eng
Level III Ecoregion Piedmont	Nearest Named Water Body South Fork Cane Creek
River Basin Cape Fear	USGS 8-Digit Catalogue Unit 03030002
<input checked="" type="radio"/> Yes <input type="radio"/> No Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees) N 35.840448 W 79.344473

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 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 |

 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 checked="" type="radio"/> A | Little or no evidence of pollutants or discharges entering the assessment area |
| <input checked="" 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 type="checkbox"/> A | <input type="checkbox"/> A | <input type="checkbox"/> A | ≥ 10% impervious surfaces |
| <input checked="" type="checkbox"/> B | <input checked="" type="checkbox"/> B | <input checked="" 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 checked="" type="checkbox"/> D | <input checked="" type="checkbox"/> D | <input checked="" 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 type="radio"/> F | <input type="radio"/> F | From 15 to < 30 feet |
| <input checked="" type="radio"/> G | <input checked="" 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 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 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 type="radio"/> A	<input type="radio"/> A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	<input checked="" type="radio"/> B	<input checked="" 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 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.

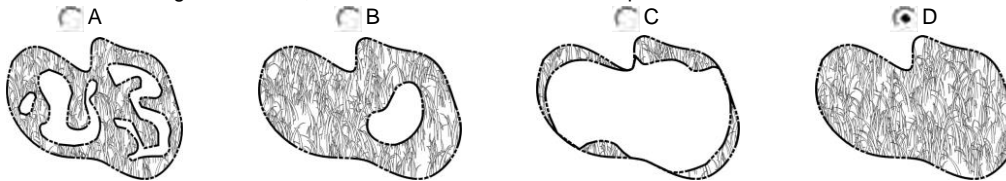
20. Large Woody Debris – wetland type condition metric

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 interspersion 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 Maney Farm - Wetland U Date 5/28/2014
Wetland Type Bottomland Hardwood Forest Assessor Name/Organization IE & WT Wildlands 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) NO
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	MEDIUM
Water Quality	Pathogen Change	Condition	MEDIUM
		Condition/Opportunity	MEDIUM
		Opportunity Presence? (Y/N)	NO
	Particulate Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Soluble Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
	Physical Change	Condition	LOW
		Condition/Opportunity	LOW
		Opportunity Presence? (Y/N)	NO
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	LOW
Water Quality	Condition	LOW
	Condition/Opportunity	LOW
	Opportunity Presence? (Y/N)	NO
Habitat	Condition	LOW

Overall Wetland Rating **LOW**

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

COPY

Action Id. SAW-2014-01825 County: Chatham U.S.G.S. Quad: NC-SILK HOPE

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: Mark Lindley
Address: 1140 Moon Lindley Road
Snow Camp, NC, 27349
Telephone Number: N/A

Size (acres)	<u>Approx. 15</u>	Nearest Town	<u>Snow Camp</u>
Nearest Waterway	<u>Lick Creek</u>	River Basin	<u>Haw. North Carolina.</u>
USGS HUC	<u>3030002</u>	Coordinates	Latitude: <u>35.8383116010056</u> Longitude: <u>-79.3419056144435</u>

Location description: The site is located approximately 0.40 miles south of the Chatham/Alamance County line and immediately north of Center Church Road, in Chatham County, North Carolina. PIN: 8795-89-5745.

Indicate Which of the Following Apply:

A. Preliminary Determination

Based on preliminary information, there may be wetlands on the above described property. We strongly suggest you have this property inspected to determine the extent of Department of the Army (DA) jurisdiction. To be considered final, a jurisdictional determination must be verified by the Corps. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

B. Approved Determination

There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

There are waters of the U.S. including wetlands on the above described property subject to the permit requirements of Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

We strongly suggest you have the wetlands on your property delineated. Due to the size of your property and/or our present workload, the Corps may not be able to accomplish this wetland delineation in a timely manner. For a more timely delineation, you may wish to obtain a consultant. To be considered final, any delineation must be verified by the Corps.

The waters of the U.S. including wetlands on your project area have been delineated and the delineation has been verified by the Corps. We strongly suggest you have this delineation surveyed. Upon completion, this survey should be reviewed and verified by the Corps. Once verified, this survey will provide an accurate depiction of all areas subject to CWA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

The waters of the U.S. including wetlands have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

- The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US and/or wetlands without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). If you have any questions regarding this determination and/or the Corps regulatory program, please contact Craig Brown at 919-554-4884 x35 or Craig.J.Brown@usace.army.mil.

C. Basis For Determination: There are streams within the project area that may be relatively permanent waterways (RPW) exhibiting ordinary high water marks & bed and bank features and/or wetlands that may exhibit wetland criteria as defined in the 1987 Corps Wetland Delineation Manual and appropriate Regional Supplement.

D. Remarks: None

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information (This information applies only to approved jurisdictional determinations as indicated in B. above)

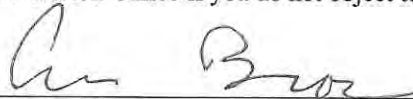
This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by N/A (Preliminary JD).

It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: Craig Brown



Date: January 23, 2015

Expiration Date: N/A (Preliminary JD)

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at <http://regulatory.usacesurvey.com/>.

Copy furnished:

Agent: Win Taylor
Address: 890 Johnnie Dodds Blvd., Suite 205
Wildlands Engineering
Mt. Pleasant, SC 29464
Phone: 843-277-6225 x102

**NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND
REQUEST FOR APPEAL**

Applicant: Mark Lindley	File Number: SAW-2014-01825	Date: January 23, 2015
Attached is:	See Section below	
<input type="checkbox"/> INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A	
<input type="checkbox"/> PROFFERED PERMIT (Standard Permit or Letter of permission)	B	
<input type="checkbox"/> PERMIT DENIAL	C	
<input type="checkbox"/> APPROVED JURISDICTIONAL DETERMINATION	D	
<input checked="" type="checkbox"/> PRELIMINARY JURISDICTIONAL DETERMINATION	E	

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at <http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits.aspx> or Corps regulations at 33 CFR Part 331.

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

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **OBJECT:** If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

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

- **ACCEPT:** If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- **APPEAL:** If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

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

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

- **ACCEPT:** You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- **APPEAL:** If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the district engineer. This form must be received by the division engineer within 60 days of the date of this notice.

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

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

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

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

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

**District Engineer, Wilmington Regulatory Division,
Attn: Craig Brown
Raleigh Regulatory Field Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587**

If you only have questions regarding the appeal process you may also contact:

**Mr. Jason Steele, Administrative Appeal Review Officer
CESAD-PDO
U.S. Army Corps of Engineers, South Atlantic Division
60 Forsyth Street, Room 10M15
Atlanta, Georgia 30303-8801
Phone: (404) 562-5137**

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

Signature of appellant or agent.

Date:

Telephone number:

For appeals on Initial Proffered Permits send this form to:

District Engineer, Wilmington Regulatory Division, Attn: Craig Brown, 69 Darlington Avenue, Wilmington, North Carolina 28403

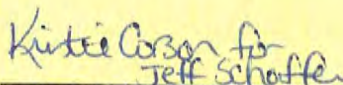
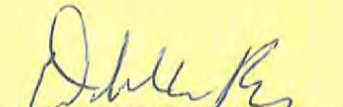
For Permit denials, Proffered Permits and approved Jurisdictional Determinations send this form to:

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

Appendix 8: Categorical Exclusion

Categorical Exclusion Form for Ecosystem Enhancement Program Projects Version 1.4

Note: Only Appendix A should be submitted (along with any supporting documentation) as the environmental document.

Part 1: General Project Information	
Project Name:	Maney Farm Stream Mitigation Site
County Name:	Chatham County
EEP Number:	96314
Project Sponsor:	Wildlands Engineering, Inc.
Project Contact Name:	Andrea S. Eckardt
Project Contact Address:	1430 S. Mint Street, Suite 104, Charlotte, NC 28203
Project Contact E-mail:	aeckardt@wildlandseng.com
EEP Project Manager:	Jeff Schaffer
Project Description	
<p>The Maney Farm Stream Mitigation Site is a stream mitigation project located in Chatham County, NC. The project is located on UT to South Fork Cane Creek and six unnamed tributaries approximately 15 miles northwest of the Town of Pittsboro. The project will provide stream mitigation units to NCEEP in the Cape Fear River Basin (03030002).</p>	
For Official Use Only	
Reviewed By:	
4-17-14	 EEP Project Manager
Date	
Conditional Approved By:	
	For Division Administrator FHWA
Date	
<input type="checkbox"/> Check this box if there are outstanding issues	
Final Approval By:	
4-17-14	 For Division Administrator FHWA
Date	

Part 2: All Projects Regulation/Question		Response
Coastal Zone Management Act (CZMA)		
1. Is the project located in a CAMA county?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Has a CAMA permit been secured?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has NCDPCM agreed that the project is consistent with the NC Coastal Management Program?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
3. As a result of a limited Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. As a result of a Phase I Site Assessment, are there known or potential hazardous waste sites within or adjacent to the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Is there an approved hazardous mitigation plan?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
National Historic Preservation Act (Section 106)		
1. Are there properties listed on, or eligible for listing on, the National Register of Historic Places in the project area?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Does the project affect such properties and does the SHPO/THPO concur?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. If the effects are adverse, have they been resolved?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)		
1. Is this a "full-delivery" project?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Does the project require the acquisition of real estate?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Was the property acquisition completed prior to the intent to use federal funds?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. Has the owner of the property been informed: * prior to making an offer that the agency does not have condemnation authority; and * what the fair market value is believed to be?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Part 3: Ground-Disturbing Activities Regulation/Question		Response
American Indian Religious Freedom Act (AIRFA)		
1. Is the project located in a county claimed as "territory" by the Eastern Band of Cherokee Indians?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is the site of religious importance to American Indians?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is the project listed on, or eligible for listing on, the National Register of Historic Places?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Have the effects of the project on this site been considered?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Antiquities Act (AA)		
1. Is the project located on Federal lands?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be loss or destruction of historic or prehistoric ruins, monuments or objects of antiquity?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Archaeological Resources Protection Act (ARPA)		
1. Is the project located on federal or Indian lands (reservation)?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Will there be a loss or destruction of archaeological resources?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Will a permit from the appropriate Federal agency be required?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Has a permit been obtained?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Endangered Species Act (ESA)		
1. Are federal Threatened and Endangered species and/or Designated Critical Habitat listed for the county?		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Is Designated Critical Habitat or suitable habitat present for listed species?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
3. Are T&E species present or is the project being conducted in Designated Critical Habitat?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Is the project "likely to adversely affect" the species and/or "likely to adversely modify" Designated Critical Habitat?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Does the USFWS/NOAA-Fisheries concur in the effects determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
6. Has the USFWS/NOAA-Fisheries rendered a "jeopardy" determination?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A

Executive Order 13007 (Indian Sacred Sites)	
1. Is the project located on Federal lands that are within a county claimed as "territory" by the EBCI?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the EBCI indicated that Indian sacred sites may be impacted by the proposed project?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Have accommodations been made for access to and ceremonial use of Indian sacred sites?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Farmland Protection Policy Act (FPPA)	
1. Will real estate be acquired?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Has NRCS determined that the project contains prime, unique, statewide or locally important farmland?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. Has the completed Form AD-1006 been submitted to NRCS?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Fish and Wildlife Coordination Act (FWCA)	
1. Will the project impound, divert, channel deepen, or otherwise control/modify any water body?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
2. Have the USFWS and the NCWRC been consulted?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Land and Water Conservation Fund Act (Section 6(f))	
1. Will the project require the conversion of such property to a use other than public, outdoor recreation?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has the NPS approved of the conversion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat)	
1. Is the project located in an estuarine system?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Is suitable habitat present for EFH-protected species?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
3. Is sufficient design information available to make a determination of the effect of the project on EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
4. Will the project adversely affect EFH?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
5. Has consultation with NOAA-Fisheries occurred?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Migratory Bird Treaty Act (MBTA)	
1. Does the USFWS have any recommendations with the project relative to the MBTA?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Have the USFWS recommendations been incorporated?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A
Wilderness Act	
1. Is the project in a Wilderness area?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
2. Has a special use permit and/or easement been obtained from the maintaining federal agency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A

**Maney Farm Mitigation Site
Categorical Exclusion
Summary**

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) provides a Federal "Superfund" to clean up uncontrolled or abandoned hazardous-waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment.

As the Maney Farm Mitigation Site is a full-delivery project; an EDR Radius Map Report with Geotcheck was ordered for the site through Environmental Data Resources, Inc on February 26, 2014. Neither the target property nor the adjacent properties were listed in any of the Federal, State, or Tribal environmental databases searched by EDR. There were no known or potential hazardous waste sites identified within or immediately adjacent to the project area. The Executive Summary of the EDR report is included in the Appendix. The full report is available if needed.

National Historic Preservation Act (Section 106)

The National Historic Preservation Act declares a national policy of historic preservation to protect, rehabilitate, restore, and reuse districts, sites, buildings, structures, and objects significant in American architecture, history, archaeology, and culture, and Section 106 mandates that federal agencies take into account the effect of an undertaking on a property that is included in, or is eligible for inclusion in, the National Register of Historic Places.

Wildlands Engineering, Inc. (Wildlands) requested review and comment from the State Historic Preservation Office (SHPO) with respect to any archeological and architectural resources related to the Maney Farm Mitigation Site on February 27, 2014. SHPO responded on March 24, 2014 and stated they were aware of no historic resources that would be affected by the project. All correspondence related to Section 106 is included in the Appendix.

Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)

These acts, collectively known as the Uniform Act, provide for uniform and equitable treatment of persons displaced from their homes, businesses, non-profit associations, or farms by federal and federally-assisted programs, and establish uniform and equitable land acquisition policies.

Maney Farm Mitigation Site is a full-delivery project that includes land acquisition. Notification of the fair market value of the project property and the lack of condemnation authority by Wildlands was included in the signed option agreement for the project property. A copy of the relevant section of the option agreement is included in the Appendix.

Endangered Species Act (ESA)

Section 7 of the ESA requires federal agencies, in consultation with and with the assistance of the Secretary of the Interior or of Commerce, as appropriate, to ensure that actions they authorize, fund or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species.

The Chatham County listed endangered species include the bald eagle (*Haliaeetus leucocephalus*) (BGPA), Cape Fear shiner (*Notropis mekistocholas*), red-cockaded woodpecker (*Picoides*

borealis), and harperella (*Ptilimnium nodosum*). The USFWS currently lists Critical Habitat Designations for the Cape Fear Shiner only, out of the four listed species within Chatham County. The identified Critical Habitat is over 12 miles from the site on the Rocky River, which is located in a different watershed than the project site. Wildlands requested review and comment from the United States Fish and Wildlife Service (USFWS) on February 27, 2014 in respect to the Maney Farm Mitigation Site and its potential impacts on threatened or endangered species. USFWS responded on April 4, 2014 and stated the “proposed action is not likely to adversely affect any federally listed endangered or threatened species, their formally designated critical habitat or species currently proposed for listing under the Act”. All correspondence with USFWS is included in the Appendix.

As a result of a pedestrian survey conducted on October 11, 2013, no individual species, critical habitat or suitable habitat were found to exist on the site for the federally listed four species. In addition, a review of recorded Natural Heritage Elemental Occurrences was performed. No known species occur within three miles of the site. It was determined that the project would result in “no effect” on any of the listed species.

Farmland Protection Policy Act (FPPA)

The FPPA requires that, before taking or approving any federal action that would result in conversion of farmland, the agency must examine the effects of the action using the criteria set forth in the FPPA, and, if there are adverse effects, must consider alternatives to lessen them.

The Maney Farm Mitigation Site includes the conversion of prime farmland. As such, Form AD-1006 has been completed and submitted to the Natural Resources Conservation Service (NRCS). The completed form and correspondence documenting its submittal is included in the Appendix.

Fish and Wildlife Coordination Act (FWCA)

The FWCA requires consultation with the USFWS and the appropriate state wildlife agency on projects that alter or modify a water body. Reports and recommendations prepared by these agencies document project effects on wildlife and identify measures that may be adopted to prevent loss or damage to wildlife resources.

The Maney Farm Mitigation Site includes stream restoration. Wildlands requested comment on the project from both the USFWS and the North Carolina Wildlife Resources Commission (NCWRC) on February 27, 2014. NCWRC responded on March 14, 2014 and stated they “do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources”. The USFWS responded on April 4, 2014 and had no objections to the project. All correspondence with the two agencies is included in the Appendix.

Migratory Bird Treaty Act (MBTA)

The MBTA makes it unlawful for anyone to kill, capture, collect, possess, buy, sell, trade, ship, import, or export any migratory bird. The indirect killing of birds by destroying their nests and eggs is covered by the MBTA, so construction in nesting areas during nesting seasons can constitute a taking.

Wildlands requested comment on the Maney Farm Mitigation Site from the USFWS in regards to migratory birds on February 27, 2014. USFWS responded on April 4, 2014, but had no comments regarding migratory birds. All correspondence with USFWS is included in the Appendix.

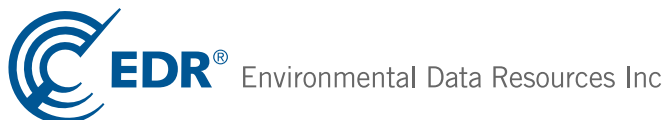
**Maney Farm Mitigation Site
Categorical Exclusion
Appendix**

Maney Farm

585-1181 CENTER CHURCH RD
Pittsboro, NC 27312

Inquiry Number: 3865898.2s
February 26, 2014

The EDR Radius Map™ Report with GeoCheck®



6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

585-1181 CENTER CHURCH RD
PITTSBORO, NC 27312

COORDINATES

Latitude (North): 35.8378000 - 35° 50' 16.08"
Longitude (West): 79.3440000 - 79° 20' 38.40"
Universal Transverse Mercator: Zone 17
UTM X (Meters): 649566.5
UTM Y (Meters): 3967024.0
Elevation: 574 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map: 35079-G3 SILK HOPE, NC
Most Recent Revision: 1974

AERIAL PHOTOGRAPHY IN THIS REPORT

Photo Year: 2012
Source: USDA

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL..... National Priority List

EXECUTIVE SUMMARY

Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System
FEDERAL FACILITY..... Federal Facility Site Information listing

Federal CERCLIS NFRAP site List

CERC-NFRAP..... CERCLIS No Further Remedial Action Planned

Federal RCRA CORRACTS facilities list

CORRACTS..... Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators
RCRA-CESQG..... RCRA - Conditionally Exempt Small Quantity Generator

Federal institutional controls / engineering controls registries

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls
LUCIS..... Land Use Control Information System

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

NC HSDS..... Hazardous Substance Disposal Site

State- and tribal - equivalent CERCLIS

SHWS..... Inactive Hazardous Sites Inventory

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... List of Solid Waste Facilities
OLI..... Old Landfill Inventory

State and tribal leaking storage tank lists

LUST..... Regional UST Database

EXECUTIVE SUMMARY

LUST TRUST..... State Trust Fund Database
LAST..... Leaking Aboveground Storage Tanks
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

UST..... Petroleum Underground Storage Tank Database
AST..... AST Database
INDIAN UST..... Underground Storage Tanks on Indian Land
FEMA UST..... Underground Storage Tank Listing

State and tribal institutional control / engineering control registries

INST CONTROL..... No Further Action Sites With Land Use Restrictions Monitoring

State and tribal voluntary cleanup sites

VCP..... Responsible Party Voluntary Action Sites
INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS..... Brownfields Projects Inventory

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory
HIST LF..... Solid Waste Facility Listing
SWRCY..... Recycling Center Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands

Local Lists of Hazardous waste / Contaminated Sites

US CDL..... Clandestine Drug Labs
US HIST CDL..... National Clandestine Laboratory Register

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
IMD..... Incident Management Database
SPILLS 80..... SPILLS 80 data from FirstSearch
SPILLS 90..... SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR..... RCRA - Non Generators

EXECUTIVE SUMMARY

DOT OPS.....	Incident and Accident Data
DOD.....	Department of Defense Sites
FUDS.....	Formerly Used Defense Sites
CONSENT.....	Superfund (CERCLA) Consent Decrees
ROD.....	Records Of Decision
UMTRA.....	Uranium Mill Tailings Sites
US MINES.....	Mines Master Index File
TRIS.....	Toxic Chemical Release Inventory System
TSCA.....	Toxic Substances Control Act
FTTS.....	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
HIST FTTS.....	FIFRA/TSCA Tracking System Administrative Case Listing
SSTS.....	Section 7 Tracking Systems
ICIS.....	Integrated Compliance Information System
PADS.....	PCB Activity Database System
MLTS.....	Material Licensing Tracking System
RADINFO.....	Radiation Information Database
FINDS.....	Facility Index System/Facility Registry System
RAATS.....	RCRA Administrative Action Tracking System
RMP.....	Risk Management Plans
UIC.....	Underground Injection Wells Listing
DRYCLEANERS.....	Drycleaning Sites
NPDES.....	NPDES Facility Location Listing
INDIAN RESERV.....	Indian Reservations
SCRD DRYCLEANERS.....	State Coalition for Remediation of Drycleaners Listing
2020 COR ACTION.....	2020 Corrective Action Program List
LEAD SMELTERS.....	Lead Smelter Sites
US AIRS.....	Aerometric Information Retrieval System Facility Subsystem
PRP.....	Potentially Responsible Parties
COAL ASH DOE.....	Steam-Electric Plant Operation Data
COAL ASH.....	Coal Ash Disposal Sites
US FIN ASSUR.....	Financial Assurance Information
COAL ASH EPA.....	Coal Combustion Residues Surface Impoundments List
Financial Assurance.....	Financial Assurance Information Listing
PCB TRANSFORMER.....	PCB Transformer Registration Database
EPA WATCH LIST.....	EPA WATCH LIST

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP.....	EDR Proprietary Manufactured Gas Plants
EDR US Hist Auto Stat.....	EDR Exclusive Historic Gas Stations
EDR US Hist Cleaners.....	EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST.....	Recovered Government Archive Leaking Underground Storage Tank
RGA LF.....	Recovered Government Archive Solid Waste Facilities List
RGA HWS.....	Recovered Government Archive State Hazardous Waste Facilities List

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

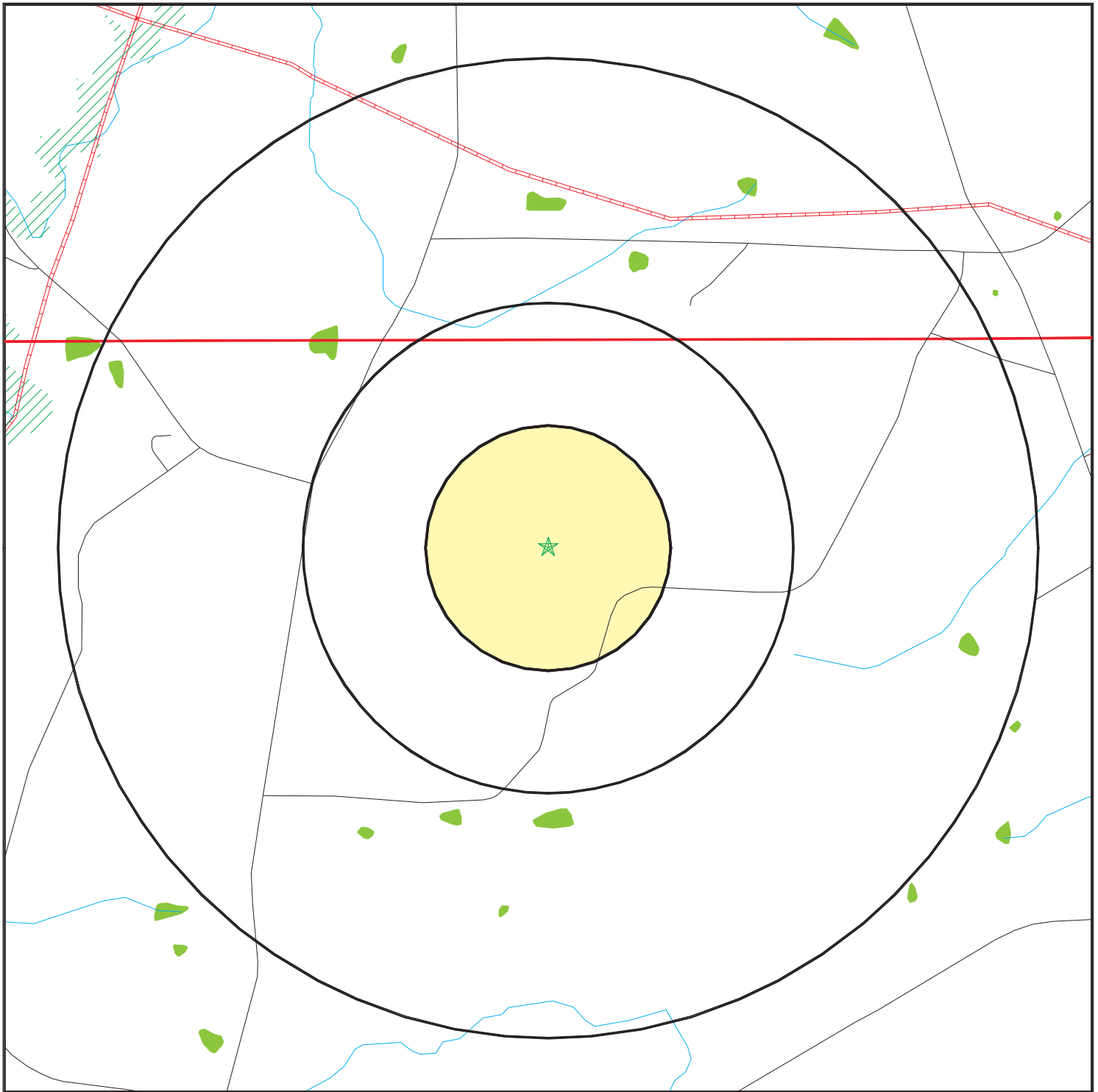
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 20 records.

<u>Site Name</u>	<u>Database(s)</u>
WICKER TRUCKING	IMD, LAST
SPORTSMAN TRADIN POST (FORMER)	LAST
JAMES TOMLINSON TRUCKING	IMD, LAST
CHATHAM CO LDFL	CERC-NFRAP
AT&T CHATHAM FACILITY	RCRA NonGen / NLR, FINDS, IMD, LUST, RGA LUST
NC DFR-CHATHAM COUNTY OFFICE	LUST, RGA LUST
RAY'S QUICK STOP	LUST
KING PROPERTY, EDWARD	LUST, RGA LUST
DFR - CHATHAM CO. OFFICE	LUST TRUST
SPORTSMAN'S TRADING POST	LUST TRUST
C MINI MART #6	LUST TRUST
JOANNE BURKES	UST
FRANK PERRY SERVICE STATION	UST
SPORTSMAN TRADING POST	UST
CHATHAM CO HDQ	UST
EARL THOMAS GRADING, INC.	UST
WALL'S GARAGE	UST
INEZ FOGLEMAN SERVICE	UST
FARM STORE	FINDS
NC DFR-CHATHAM COUNTY OFFICE	IMD

OVERVIEW MAP - 3865898.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites



- ☒ Indian Reservations BIA
- ☒ County Boundary
- ☒ Oil & Gas pipelines from USGS
- ☒ 100-year flood zone
- ☒ 500-year flood zone
- ☒ National Wetland Inventory
- ☒ State Wetlands
- ☒ Hazardous Substance Disposal Sites

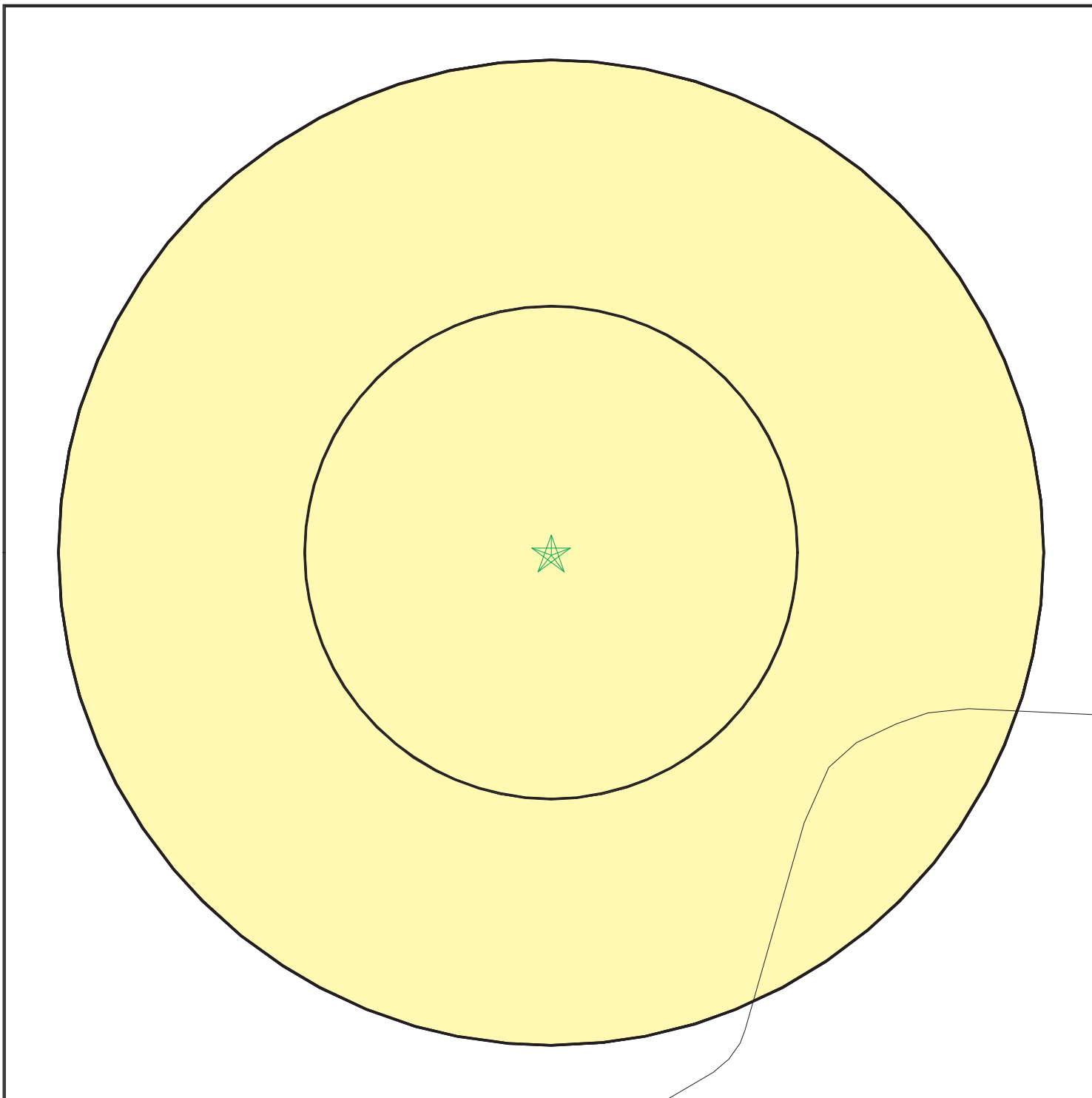


This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Maney Farm
 ADDRESS: 585-1181 CENTER CHURCH RD
 Pittsboro NC 27312
 LAT/LONG: 35.8378 / 79.344

CLIENT: Wildlands Eng, Inc.
 CONTACT: Andrea Eckardt
 INQUIRY #: 3865898.2s
 DATE: February 26, 2014 1:30 pm

DETAIL MAP - 3865898.2s



- ★ Target Property
- ▲ Sites at elevations higher than or equal to the target property
- ◆ Sites at elevations lower than the target property
- ▲ Manufactured Gas Plants
- ⚡ Sensitive Receptors
- ☒ National Priority List Sites
- ☒ Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- ☒ Indian Reservations BIA
- ☒ Hazardous Substance Disposal Sites
- ⚡ Oil & Gas pipelines from USGS
- ▨ 100-year flood zone
- ▨ 500-year flood zone

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME: Maney Farm
 ADDRESS: 585-1181 CENTER CHURCH RD
 Pittsboro NC 27312
 LAT/LONG: 35.8378 / 79.344

CLIENT: Wildlands Eng, Inc.
 CONTACT: Andrea Eckardt
 INQUIRY #: 3865898.2s
 DATE: February 26, 2014 1:32 pm

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
<i>Federal NPL site list</i>								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
<i>Federal Delisted NPL site list</i>								
Delisted NPL	1.000		0	0	0	0	NR	0
<i>Federal CERCLIS list</i>								
CERCLIS	0.500		0	0	0	NR	NR	0
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
<i>Federal CERCLIS NFRAP site List</i>								
CERC-NFRAP	0.500		0	0	0	NR	NR	0
<i>Federal RCRA CORRACTS facilities list</i>								
CORRACTS	1.000		0	0	0	0	NR	0
<i>Federal RCRA non-CORRACTS TSD facilities list</i>								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
<i>Federal RCRA generators list</i>								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	0	NR	NR	NR	0
<i>Federal institutional controls / engineering controls registries</i>								
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
LUCIS	0.500		0	0	0	NR	NR	0
<i>Federal ERNS list</i>								
ERNS	TP		NR	NR	NR	NR	NR	0
<i>State- and tribal - equivalent NPL</i>								
NC HSDS	1.000		0	0	0	0	NR	0
<i>State- and tribal - equivalent CERCLIS</i>								
SHWS	1.000		0	0	0	0	NR	0
<i>State and tribal landfill and/or solid waste disposal site lists</i>								
SWF/LF	0.500		0	0	0	NR	NR	0
OLI	0.500		0	0	0	NR	NR	0
<i>State and tribal leaking storage tank lists</i>								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LUST TRUST	0.500		0	0	0	NR	NR	0
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
<i>State and tribal registered storage tank lists</i>								
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
FEMA UST	0.250		0	0	NR	NR	NR	0
<i>State and tribal institutional control / engineering control registries</i>								
INST CONTROL	0.500		0	0	0	NR	NR	0
<i>State and tribal voluntary cleanup sites</i>								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
<i>State and tribal Brownfields sites</i>								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
<u>ADDITIONAL ENVIRONMENTAL RECORDS</u>								
<i>Local Brownfield lists</i>								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
<i>Local Lists of Landfill / Solid Waste Disposal Sites</i>								
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
HIST LF	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
<i>Local Lists of Hazardous waste / Contaminated Sites</i>								
US CDL	TP		NR	NR	NR	NR	NR	0
US HIST CDL	TP		NR	NR	NR	NR	NR	0
<i>Local Land Records</i>								
LIENS 2	TP		NR	NR	NR	NR	NR	0
<i>Records of Emergency Release Reports</i>								
HMIRS	TP		NR	NR	NR	NR	NR	0
IMD	0.500		0	0	0	NR	NR	0
SPILLS 80	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
<i>Other Ascertainable Records</i>								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DOT OPS	TP		NR	NR	NR	NR	NR	0
DOD	1.000		0	0	0	0	NR	0
FUDS	1.000		0	0	0	0	NR	0
CONSENT	1.000		0	0	0	0	NR	0
ROD	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP	1.000		0	0	0	0	NR	0
EDR US Hist Auto Stat	0.250		0	0	NR	NR	NR	0
EDR US Hist Cleaners	0.250		0	0	NR	NR	NR	0

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LUST	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA HWS	TP		NR	NR	NR	NR	NR	0



February 26, 2014

Renee Gledhill-Earley
State Historic Preservation Office
4617 Mail Service Center
Raleigh, NC 27699-4617

Subject: EEP Stream mitigation project in Chatham County, NC
Maney Farm Stream Mitigation Site

Dear Ms. Gledhill-Earley,

The Ecosystem Enhancement Program (EEP) requests review and comment on any possible issues that might emerge with respect to archaeological or cultural resources associated with a potential stream restoration project on the attached site (USGS site map and aerial map with approximate areas of potential ground disturbance are enclosed).

The Maney Farm site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel impacts. Several sections of channel have been identified as significantly degraded. The site has historically been disturbed due agricultural use, primarily as cattle pasture. No architectural structures or archaeological artifacts have been observed or noted during preliminary surveys of the site for restoration purposes.

We ask that you review this site based on the attached information to determine the presence of any historic properties.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

A handwritten signature in black ink that reads "Andrea S. Eckardt".

Andrea S. Eckardt
Senior Environmental Planner
aeckardt@wildlandseng.com



North Carolina Department of Cultural Resources
State Historic Preservation Office

Ramona M. Bartos, Administrator

Governor Pat McCrory
Secretary Susan Kluttz

Office of Archives and History
Deputy Secretary Kevin Cherry

March 24, 2014

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Maney Farm Stream Mitigation Site, Chatham County, ER 14-0408

Dear Ms. Eckardt:

Thank you for your letter of February 26, 2014, concerning the above project.

We have conducted a review of the project and are aware of no historic resources which would be affected by the project. Therefore, we have no comment on the project as proposed.

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

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579 or renee.gledhill-earley@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

A handwritten signature in blue ink that reads "Renee Gledhill-Earley".

for Ramona M. Bartos

agents and representatives harmless from and against any and all losses, claims, demands, damages, costs and expenses of whatever nature, including, without limitation, attorneys' fees, relating to or arising out of a breach of Optionor's representations and warranties set forth in this Agreement. The covenants contained in this Section 2.7.7 shall survive the Closing.

ARTICLE 3

MISCELLANEOUS

3.1 Liquidated Damages. Optionee recognizes that the Property will be removed by Optionor from the market during the existence of this agreement. If the purchase of the Conservation Easement is not consummated because of Optionee's default, the parties have determined and agreed that the actual amount of damages that would be suffered by Optionor as a result of any such default would be very difficult or impracticable to determine as of the date of this Agreement. As a result, the parties have agreed that the Option Consideration paid by Optionee to Optionor as of the date of Optionee's default is sufficient to cover any estimated damages that may be incurred by Optionor. For these reasons, the parties agree that if the purchase of the Conservation Easement is not consummated because of Optionee's default, Optionor shall be entitled to retain the Option Consideration paid by Optionee as of the date of Optionee's default as its sole remedy, and Optionor waives any and all right to seek other rights or remedies against Optionee, including without limitation, specific performance. Nothing set forth in this section 3.1 shall preclude any action under any indemnification, defense or hold harmless provision in this Agreement, nor for the award of attorney's fees and costs in conjunction with any action relating to this Agreement.

3.2 Notices. All notices required to or permitted to be given pursuant to this Agreement shall be in writing, shall be given only in accordance with the provisions of this Section, shall be addressed to the parties in the manner set forth below, and shall be conclusively deemed to have been properly delivered: (a) upon receipt when hand delivered during normal business hours; (b) upon receipt when sent by facsimile prior to 5:00 p.m. of a given business day; provided, however, that notices given by facsimile shall not be effective unless the sending party's machine provides written confirmation of successful delivery thereof; (c) upon the day of delivery if the notice has been deposited in a authorized receptacle of the United States Postal Service as first-class, registered or certified mail, postage prepaid, with a return receipt requested; or (d) one (1) business day after the notice has been deposited with either FedEx or United Parcel Service to be delivered by overnight delivery. The addresses of the parties to receive notices are as follows:

TO OPTIONEE: Wildlands Engineering, Inc.
1430 S. Mint Street, Suite 104
Charlotte, North Carolina 28203
Attention: Robert W. Bugg
eMail: rbugg@wildlandseng.com
Facsimile: (704) 332-3306

TO OPTIONOR: Darryl Lindley
1140 Moon Lindley Road
Snow Camp, NC 27349

Notice of change of address shall be given by written notice in the manner described in this Paragraph.

3.3 Assignment. Optionee shall have the right to assign this Agreement without the consent of Optionor. No assignment shall be effective, however, unless the assignee has delivered to Optionor a written assumption of Optionee's obligations under this Agreement. Optionor hereby releases Optionee from any obligations under this Agreement arising after the effective date of any assignment of this Agreement by Optionee.

3.4 Binding Effect. The terms and conditions of this Agreement shall apply and bind the heirs, executors, administrators, successors, and assigns of the Optionor and Holder.

3.5 Value of Conservation Easement; No Power of Eminent Domain. in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Optionee hereby notifies Optionor that: (i) Optionee believes that the fair market value of the Conservation Easement is an amount equal to the Purchase Price; and (ii) Optionee does not have the power of eminent domain.



February 26, 2014

Dale Suiter
US Fish and Wildlife Service
Raleigh Field Office
PO Box 33726
Raleigh, NC 27636

**Subject: Maney Farm Stream Mitigation Site
Chatham County, North Carolina**

Dear Mr. Suiter,

The Maney Farm Stream Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel impacts. Several sections of stream channels throughout the site have been identified as significantly degraded as a result of agricultural activities, including its use as a cattle pasture.

We have already obtained an updated species list for Chatham County from your web site (http://www.fws.gov/raleigh/species/cntylist/nc_counties.html). The threatened or endangered species for this county are: the bald eagle (*Haliaeetus leucocephalus*) (BGPA), Cape Fear shiner (*Notropis mekistocholas*), red-cockaded woodpecker (*Picoides borealis*), and harperella (*Ptilimnium nodosum*). We are requesting that you please provide any known information for each species in the county. The USFWS will be contacted if suitable habitat for any listed species is found or if we determine that the project may affect one or more federally listed species or designated critical habitat.

Please provide comments on any possible issues that might emerge with respect to endangered species, migratory birds or other trust resources from the construction of a stream restoration project on the subject property. A USGS map showing the approximate area of potential ground disturbance is enclosed. The figure was prepared from the Crutchfield Crossroads, 7.5-Minute USGS Topographic Quadrangle. An aerial map is also attached.

If we have not heard from you in 30 days we will assume that you do not have any comments regarding associated laws and that you do not have any information relevant to this project at the current time.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

A handwritten signature in black ink that reads "Andrea S. Eckardt".

Andrea S. Eckardt
Senior Environmental Planner



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

April 4, 2014

Andrea Eckardt
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, NC 28203

Re: Maney Farm Stream Mitigation Site- Chatham County, NC

Dear Ms. Eckardt:

This letter is to inform you that a list of all federally-protected endangered and threatened species with known occurrences in North Carolina is now available on the U.S. Fish and Wildlife Service's (Service) web page at <http://www.fws.gov/raleigh>. Therefore, if you have projects that occur within the Raleigh Field Office's area of responsibility (see attached county list), you no longer need to contact the Raleigh Field Office for a list of federally-protected species.

Our web page contains a complete and frequently updated list of all endangered and threatened species protected by the provisions of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.)(Act), and a list of federal species of concern¹ that are known to occur in each county in North Carolina.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or evaluation and can be found on our web page at <http://www.fws.gov/raleigh>. Please check the web site often for updated information or changes.

¹ The term "federal species of concern" refers to those species which the Service believes might be in need of concentrated conservation actions. Federal species of concern receive no legal protection and their designation does not necessarily imply that the species will eventually be proposed for listing as a federally endangered or threatened species. However, we recommend that all practicable measures be taken to avoid or minimize adverse impacts to federal species of concern.

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

With regard to the above-referenced project, we offer the following remarks. Our comments are submitted pursuant to, and in accordance with, provisions of the Endangered Species Act.

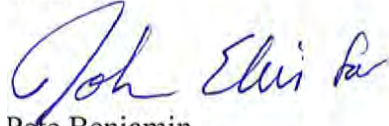
Based on the information provided and other information available, it appears that the proposed action is not likely to adversely affect any federally-listed endangered or threatened species, their formally designated critical habitat, or species currently proposed for listing under the Act at these sites. We believe that the requirements of section 7(a)(2) of the Act have been satisfied for your project. Please remember that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner that was not considered in this review; or, (3) a new species is listed or critical habitat determined that may be affected by the identified action.

However, the Service is concerned about the potential impacts the proposed action might have on aquatic species. Aquatic resources are highly susceptible to sedimentation. Therefore, we recommend that all practicable measures be taken to avoid adverse impacts to aquatic species, including implementing directional boring methods and stringent sediment and erosion control measures. An erosion and sedimentation control plan should be submitted to and approved by the North Carolina Division of Land Resources, Land Quality Section prior to construction. Erosion and sedimentation controls should be installed and maintained between the construction site and any nearby down-gradient surface waters. In addition, we recommend maintaining natural, vegetated buffers on all streams and creeks adjacent to the project site.

The North Carolina Wildlife Resources Commission has developed a Guidance Memorandum (a copy can be found on our website at (<http://www.fws.gov/raleigh>) to address and mitigate secondary and cumulative impacts to aquatic and terrestrial wildlife resources and water quality. We recommend that you consider this document in the development of your projects and in completing an initiation package for consultation (if necessary).

We hope you find our web page useful and informative and that following the process described above will reduce the time required, and eliminate the need, for general correspondence for species' lists. If you have any questions or comments, please contact Emily Jernigan of this office at (919) 856-4520 ext. 25.

Sincerely,

A handwritten signature in blue ink that reads "Pete Benjamin". The signature is written in a cursive style with a large initial "P" and "B".

Pete Benjamin
Field Supervisor

FARMLAND CONVERSION IMPACT RATING

PART I (To be completed by Federal Agency)		Date Of Land Evaluation Request 2/26/2014				
Name of Project Maney Farm Stream Mitigation Site		Federal Agency Involved FHWA - NCEEP				
Proposed Land Use Stream Restoration		County and State Chatham County, NC				
PART II (To be completed by NRCS)		Date Request Received By NRCS 2/26/2014		Person Completing Form: Milton Cortes		
Does the site contain Prime, Unique, Statewide or Local Important Farmland? <i>(If no, the FPPA does not apply - do not complete additional parts of this form)</i>		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Acres Irrigated N/A	Average Farm Size 96 acres	
Major Crop(s) Corn	Farmable Land In Govt. Jurisdiction Acres: 87 % 393,160 acres		Amount of Farmland As Defined in FPPA Acres: 60 % 273,967 acres			
Name of Land Evaluation System Used Chatham Co., NC LESA	Name of State or Local Site Assessment System N/A		Date Land Evaluation Returned by NRCS 2/28/2014			
PART III (To be completed by Federal Agency)		Alternative Site Rating				
		Site A	Site B	Site C	Site D	
A. Total Acres To Be Converted Directly		14.5				
B. Total Acres To Be Converted Indirectly						
C. Total Acres In Site		14.5				
PART IV (To be completed by NRCS) Land Evaluation Information						
A. Total Acres Prime And Unique Farmland		0.40				
B. Total Acres Statewide Important or Local Important Farmland		14.10				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted		0.0053				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value		34				
PART V (To be completed by NRCS) Land Evaluation Criterion Relative Value of Farmland To Be Converted (Scale of 0 to 100 Points)		86				
PART VI (To be completed by Federal Agency) Site Assessment Criteria <i>(Criteria are explained in 7 CFR 658.5 b. For Corridor project use form NRCS-CPA-106)</i>		Maximum Points	Site A	Site B	Site C	Site D
1. Area In Non-urban Use		(15)	15			
2. Perimeter In Non-urban Use		(10)	10			
3. Percent Of Site Being Farmed		(20)	15			
4. Protection Provided By State and Local Government		(20)	20			
5. Distance From Urban Built-up Area		(15)	15			
6. Distance To Urban Support Services		(15)	15			
7. Size Of Present Farm Unit Compared To Average		(10)	0			
8. Creation Of Non-farmable Farmland		(10)	0			
9. Availability Of Farm Support Services		(5)	5			
10. On-Farm Investments		(20)	0			
11. Effects Of Conversion On Farm Support Services		(10)	0			
12. Compatibility With Existing Agricultural Use		(10)	0			
TOTAL SITE ASSESSMENT POINTS		160	95	0	0	0
PART VII (To be completed by Federal Agency)						
Relative Value Of Farmland (From Part V)		100	86	0	0	0
Total Site Assessment (From Part VI above or local site assessment)		160	95	0	0	0
TOTAL POINTS (Total of above 2 lines)		260	181	0	0	0
Site Selected:		Date Of Selection		Was A Local Site Assessment Used?		
				YES <input type="checkbox"/> NO <input type="checkbox"/>		
Reason For Selection:						
Name of Federal agency representative completing this form:					Date:	

Andrea Eckardt

From: Andrea Eckardt
Sent: Monday, March 24, 2014 10:39 AM
To: 'Cortes, Milton - NRCS, Raleigh, NC'
Subject: RE: Completed AD1006 for Candy Creek, Holman Mill and Maney Projects
Attachments: Maney AD1006_completed_NRCS-signed.pdf; Candy_Creek_AD1006_Completed_by_NRCS-signed.pdf; Holman Mill AD1006_Completed_by_NRCS-signed.pdf

Sensitivity: Confidential

Milton-

Attached are the final AD1006 forms for Candy Creek, Holman Mill and Maney Farms Mitigation Sites for your files. I have completed Parts 6 and 7.

Thanks so much for your help.

Andrea

Andrea S. Eckardt
Wildlands Engineering, Inc.
704-332-7754 ext 101

From: Cortes, Milton - NRCS, Raleigh, NC [mailto:Milton.Cortes@nc.usda.gov]
Sent: Friday, February 28, 2014 4:08 PM
To: Andrea Eckardt
Subject: RE: Completed AD1006 for Candy Creek, Holman Mill and Maney Projects
Importance: High
Sensitivity: Confidential


Hi Andrea;

Attached requested AD1006 for the mentioned projects. If you have any question, please let me know.

You have a great weekend.

Milton Cortés

Assistant State Soil Scientist/
NC NRCS Hispanic Special Emphasis Program Manager

 **Natural Resources Conservation Service**
4407 Bland Rd., Suite 117
Raleigh, NC 27609

 (919) 873-2171 /  Fax (919) 873-2157

milton.cortes@nc.usda.gov

Helping People Help the Land...

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February 26, 2014

Shannon Deaton
North Carolina Wildlife Resource Commission
Division of Inland Fisheries
1721 Mail Service Center
Raleigh, NC 27699

**Subject: Maney Farm Stream Mitigation Site
Chatham County, North Carolina**

Dear Ms. Deaton,

The purpose of this letter is to request review and comment on any possible issues that might emerge with respect to fish and wildlife issues associated with a potential stream restoration project on the attached site. A USGS map and an aerial map showing the approximate area of potential ground disturbance are enclosed. The topographic figure was prepared from the Crutchfield Crossroads, 7.5-Minute USGS Topographic Quadrangles.

The Maney Farm Mitigation Site has been identified for the purpose of providing in-kind mitigation for unavoidable stream channel impacts. There are several stream channels located on the site that have been identified as significantly degraded due to past agricultural activities including its current use as a cattle pasture.

We thank you in advance for your timely response and cooperation. Please feel free to contact us with any questions that you may have concerning the extent of site disturbance associated with this project.

Sincerely,

A handwritten signature in cursive script that reads "Andrea S. Eckardt".

Andrea S. Eckardt
Senior Environmental Planner

Attachment:
USGS Topographic Map
Aerial Map



☒ North Carolina Wildlife Resources Commission ☒

Gordon Myers, Executive Director

14 March 2014

Andrea Eckardt, Senior Environmental Planner
Wildlands Engineering
1430 South Mint Street, Suite 104
Charlotte, North Carolina 28203

Subject: Maney Farm Stream Mitigation Site, Chatham County

Dear Ms. Eckardt:

Biologists with the North Carolina Wildlife Resources Commission (NCWRC) have reviewed the subject information. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-667e) and North Carolina General Statutes (G.S. 113-131 et seq.).

The proposed project would provide in-kind mitigation for unavoidable stream impacts. Several stream channels have been identified as significantly degraded due to past agricultural activities including use as a cattle pasture. The project site includes unnamed tributaries to South Fork Cane Creek in the Cape Fear River basin.

Stream restoration projects often improve water quality and aquatic habitat. Establishing native, forested buffers in riparian areas will help protect water quality, improve aquatic and terrestrial habitats, and provide a travel corridor for wildlife species. Provided measures are taken to minimize erosion and sedimentation from construction/restoration activities, we do not anticipate the project to result in significant adverse impacts to aquatic and terrestrial wildlife resources.

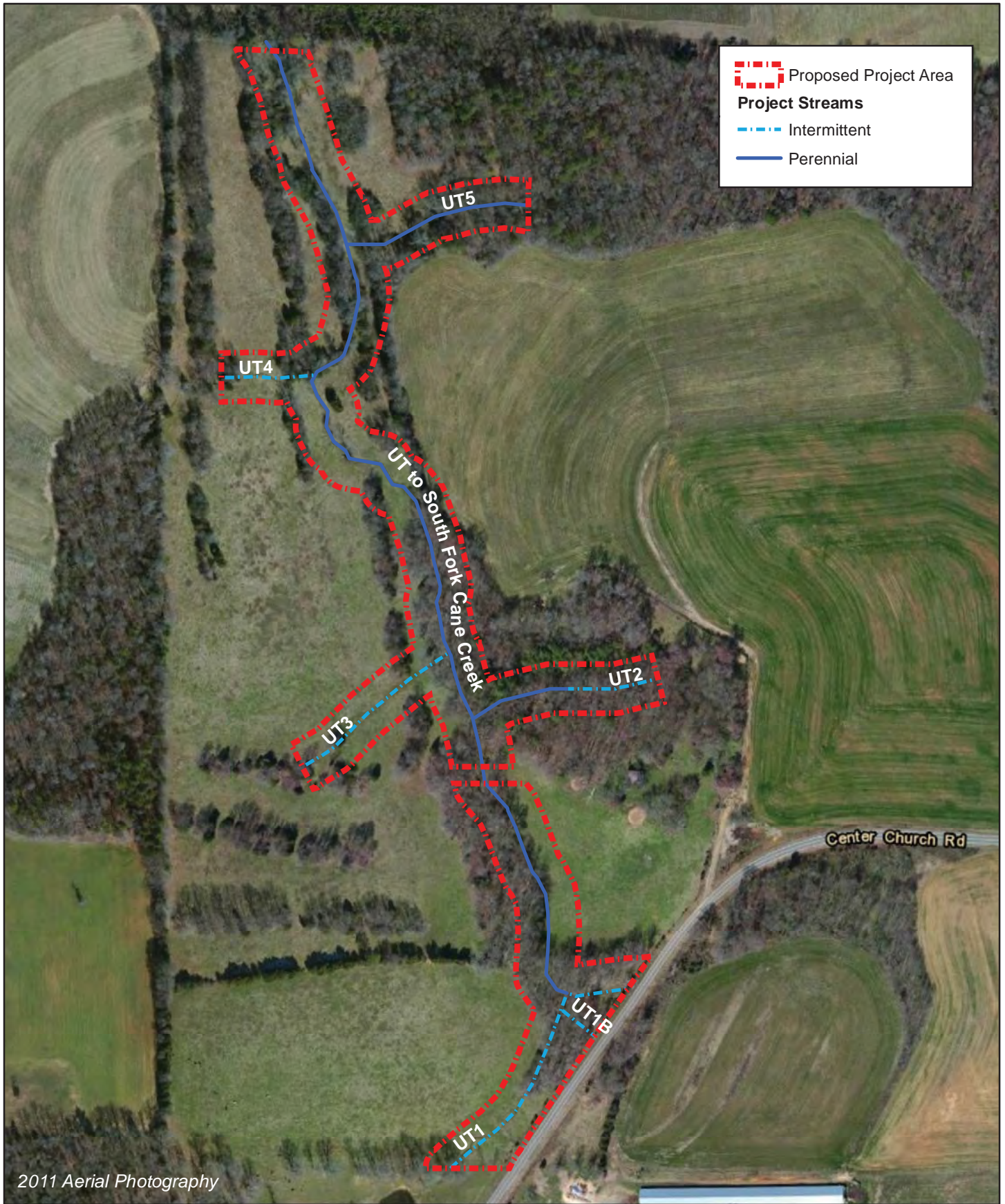
Thank you for the opportunity to review this proposed project. If we can provide further assistance, please contact our office at (336) 449-7625 or shari.bryant@ncwildlife.org.

Sincerely,

A handwritten signature in cursive script that reads "Shari L. Bryant".

Shari L. Bryant
Piedmont Region Coordinator
Habitat Conservation Program

**Maney Farm Mitigation Site
Categorical Exclusion
Figures**



2011 Aerial Photography

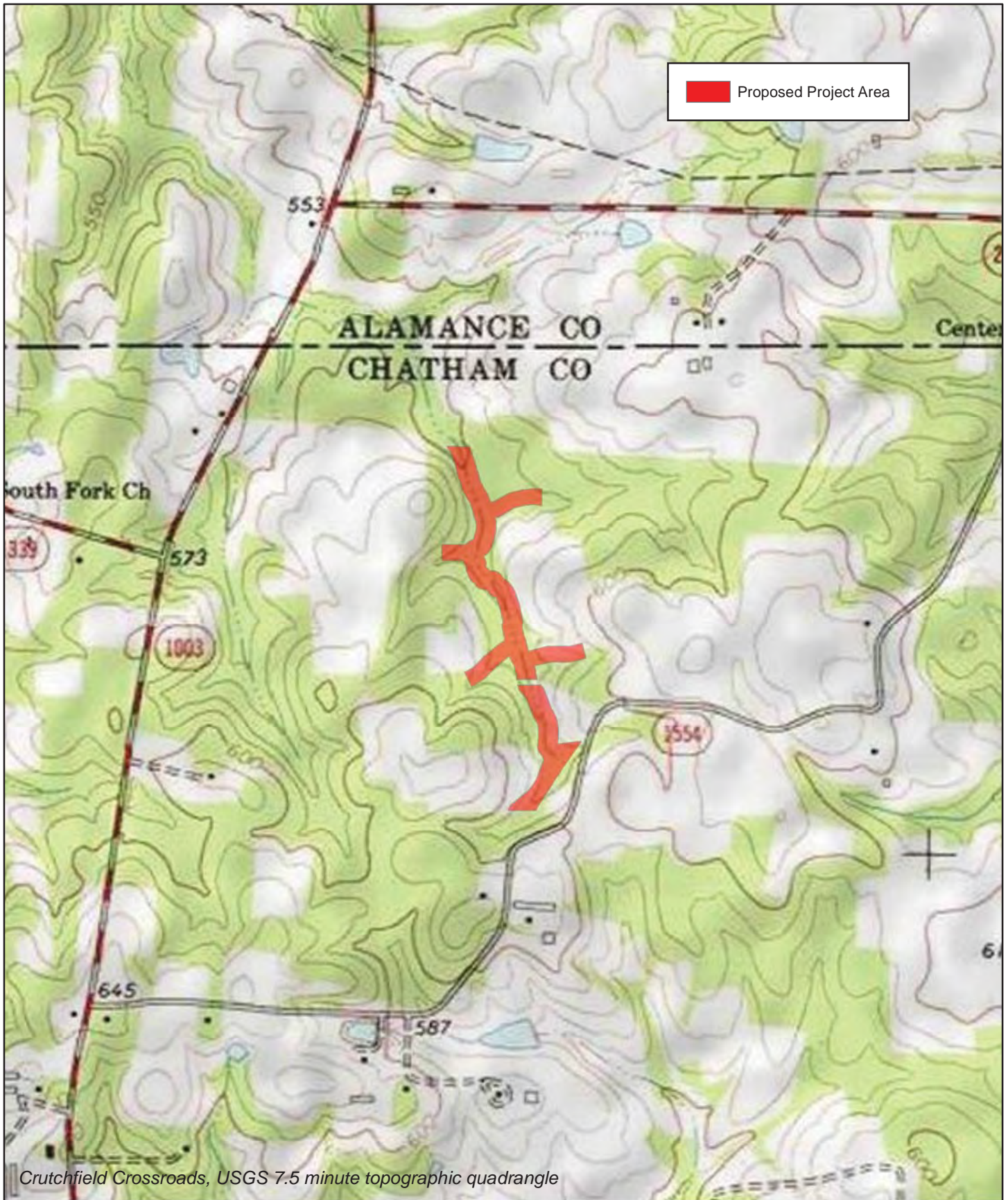


0 325 Feet



Site Map
Maney Farm Stream Mitigation Site
Cape Fear River Basin 03030002

Chatham County, NC

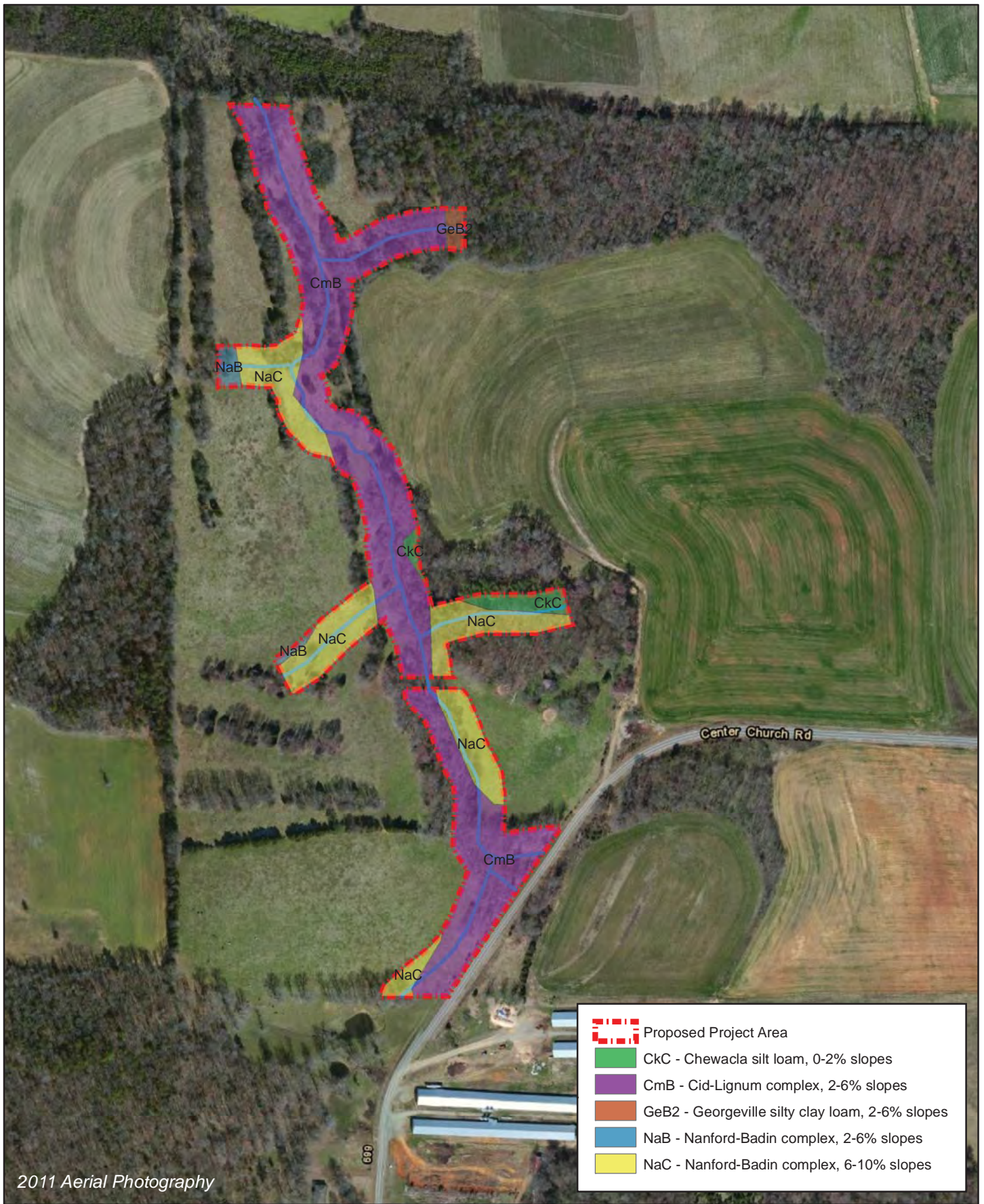


0 1,000 Feet



Topographic Map
Maney Farm Stream Mitigation Site
Cape Fear River Basin 03030002

Chatham County, NC



0 400 Feet



Figure 5 Soils Map
 Maney Farm Stream Mitigation Site
 Cape Fear River Basin 03030002

Appendix 9: Floodplain Development Permit Correspondence

From: Dan LaMontagne [<mailto:dan.lamontagne@chathamnc.org>]
Sent: Monday, January 12, 2015 8:31 AM
To: Jeff Keaton
Cc: Daniel Johnson
Subject: RE: Maney Farm Stream Mitigation Site

If you are not doing work in the SFHA, you will not need a Floodplain Development Permit.

Dan J. LaMontagne, P.E.
Public Works Director
Chatham County
919-545-8531

In keeping with the NC Public Records Law, e-mails, including attachments, may be released to others upon request for inspection and copying.

From: Jeff Keaton [<mailto:jkeaton@wildlandseng.com>]
Sent: Monday, December 22, 2014 3:30 PM
To: Dan LaMontagne
Cc: Daniel Johnson
Subject: Maney Farm Stream Mitigation Site

Dan,

I wanted to get in touch with you about a project Wildlands Engineering, Inc. is doing in coordination with the NC Ecosystem Enhancement Program in Chatham County and decide on what the county will require in the way of floodplain permitting. The project is located approximately 15 miles northwest of the Town of Pittsboro off of Center Church Road (just south of the Alamance County line). The attached map (Figure 1) shows the location of the project. The project will involve restoration of an unnamed tributary (UT) to South Fork (SF) Cane Creek and restoration or enhancement of six tributaries that flow into UT to SF. Our work will entail the construction of a new stream channels for restoration reaches, planting native vegetation adjacent to all project streams, and fencing cattle out of all the streams.

The Site is illustrated on Chatham County Flood Insurance Rate Map Panels 8784 and 8796. The project is not located in a Special Flood Hazard Area (SFHA). In this case, do we need a floodplain development permit? If so, we would like to start that process ASAP. In situations typical to these in the past, we have not been required to do any hydraulic modeling. Please confirm that modeling will not be required for this project. Thanks and please let me know if you need additional information.

Please feel free to contact me at the number below.

.....

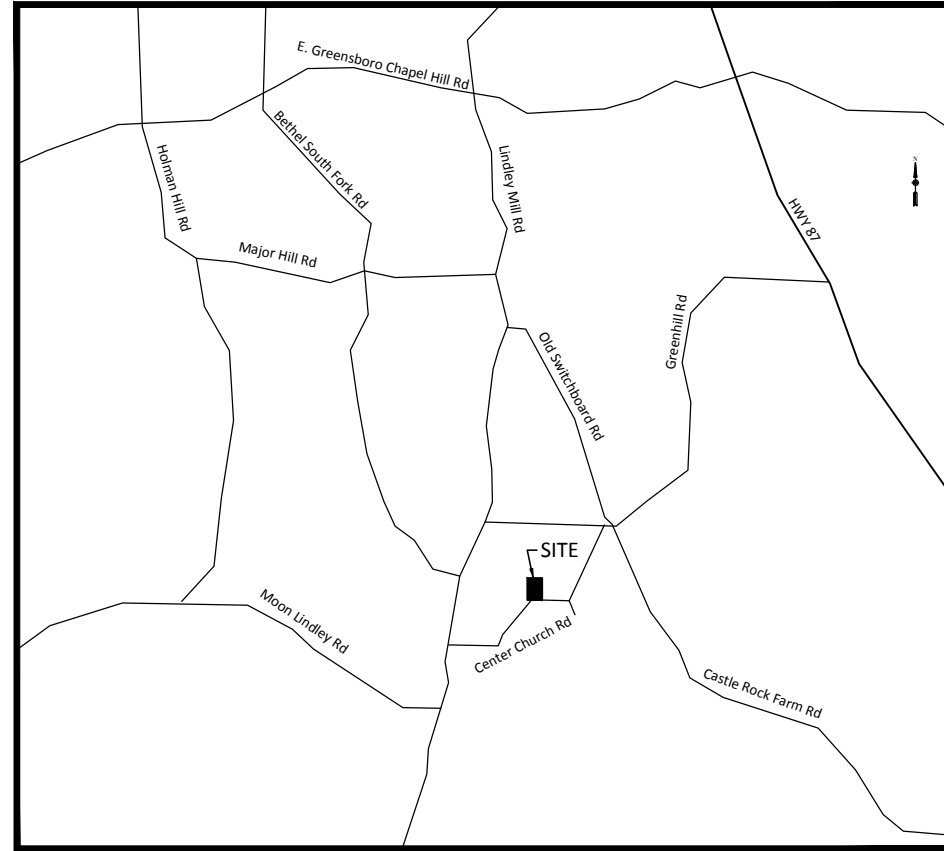
Jeff Keaton, PE | *Senior Water Resources Engineer*
O: 919.851.9986 x103 **M:** 919.302.6919

Wildlands Engineering, Inc.
312 West Millbrook Road, Suite 225
Raleigh, NC 2760

Maney Farm Stream Mitigation Site

Chatham County, North Carolina
for
North Carolina
Division of Mitigation Services

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Vicinity Map
Not to Scale



BEFORE YOU DIG!
CALL 1-800-632-4949
N.C. ONE-CALL CENTER
IT'S THE LAW!

PRELIMINARY PLANS
ISSUED MAY 2015

Sheet Index

Title Sheet	0.1
Project Overview	0.2
General Notes and Symbols	0.3
Typical Sections	1.1-1.7
Stream Plan and Profile	2.1-2.15
Planting	3.1-3.5
Details	5.1-5.5

Project Directory

Surveying:
Turner Land Surveying, PLLC
3201 Glenridge Drive
Raleigh, NC 27604
David S. Turner, PLS
919-875-1378

Owner:
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652
Jeff Jurek
919-707-8976

Engineering:
Wildlands Engineering, Inc
License No. F-0831
312 West Millbrook Road, Ste 225
Raleigh, NC 27609
Jeff Keaton, P.E.
919-851-9986

Maney Farm Stream Mitigation Site
Chatham County, North Carolina

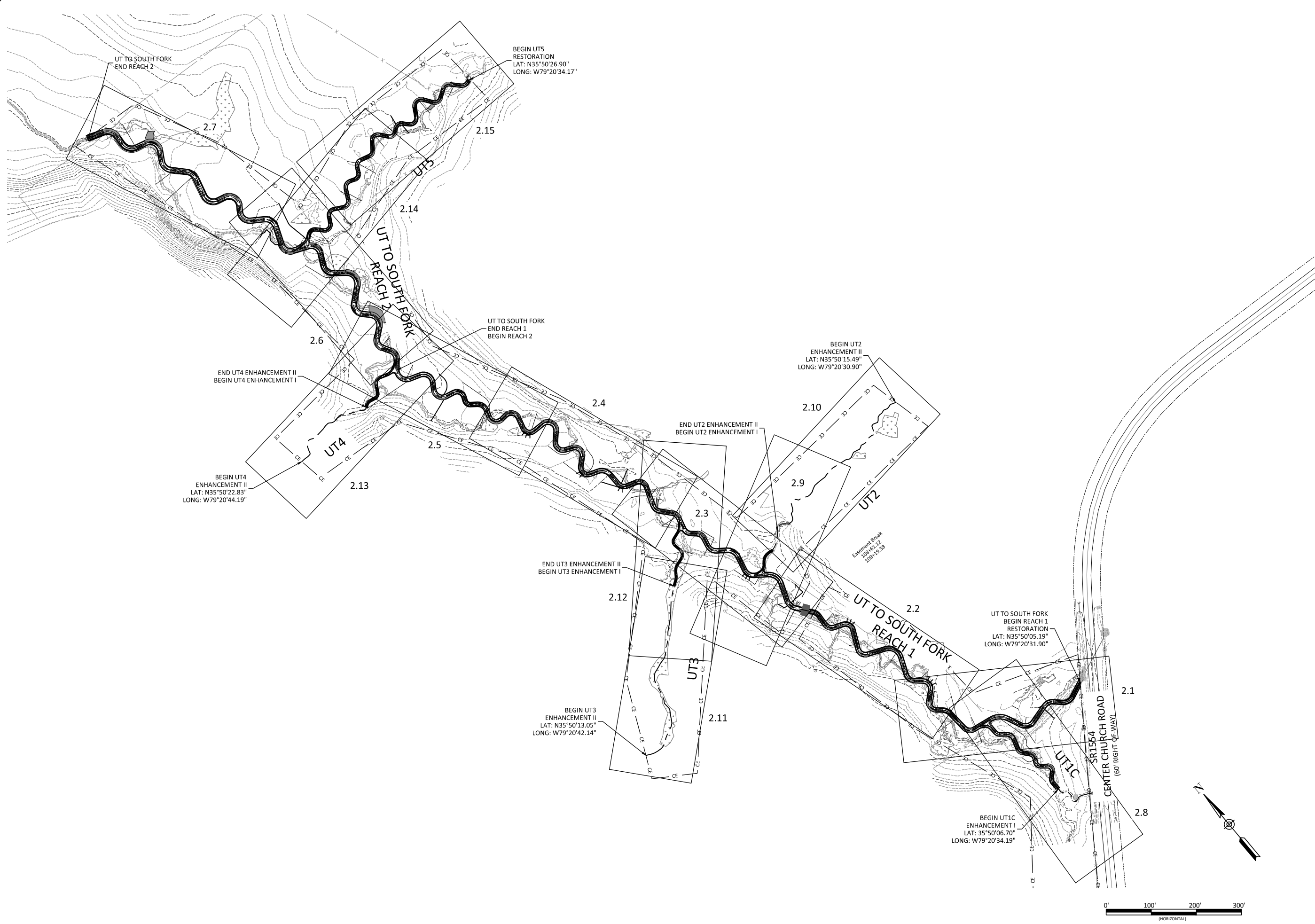
Title Sheet

Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

0.1

April 30, 2015
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Maney Farm Stream Mitigation Site
Chatham County, North Carolina
Project Overview

Revisions:









Date: May 1, 2015
Job Number: 005-02144
Project Engineer: JK
Drawn By: JCK
Checked By: JK

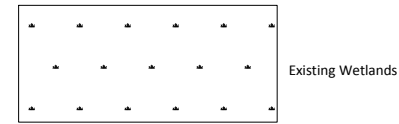
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Sheet









Notes:

Existing Features



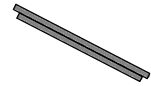
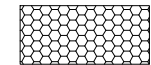



-  Existing Property Line
-  Existing Thalweg
-  Existing Major Contour
-  Existing Minor Contour
-  Existing Fenceline
-  Existing Treeline
-  Existing Tree
-  Existing Power Pole



Proposed Features

-  Proposed Conservation Easement
-  Proposed Thalweg Alignment
-  Proposed Bankfull
-  Proposed Major Contour
-  Proposed Minor Contour
-  Proposed Silt Fence
-  Proposed Safety Fence
-  Proposed Limits Of Disturbance

Proposed Structures

-  Proposed Log Sill
-  Proposed Root Wad
-  Proposed Lunger Log
-  Proposed Various Constructed Riffles Per Sheet 5.1
-  Proposed Brush Toe
-  Proposed Sod Mats
-  Proposed Channel Plug

Erosion and Sediment Control Features

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

Revisions:

0.3

Sheet

Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

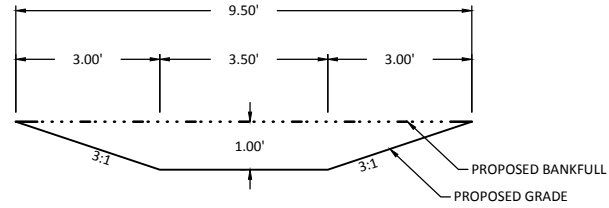
General Notes and Symbols

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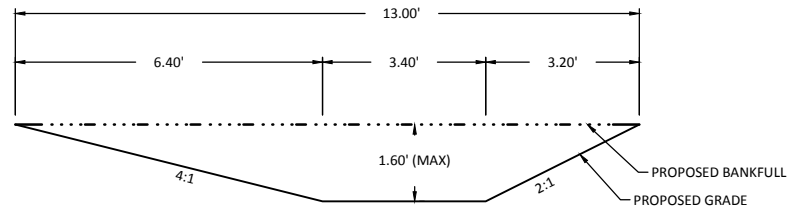
WILDLANDS
 ENGINEERS
 312 West Millbrook Road, Ste 225
 Raleigh, NC 27609
 Tel: 919.851.9986
 Fax: 919.851.9986
 Firm License No. F-0831

Notes:

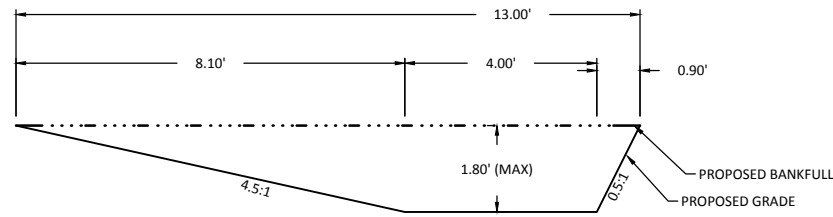
- 1.) Typical sections are provided as reference for in channel grading only.
- 2.) Pool depth will vary per profile.
- 3.) All deep pools shall have bank revetments on outside of bend.
- 4.) Typical pool sections are shown as right meander bends only. The flatter side slope is on the inside of the meander bend and for left meander bends should be on the opposite side than shown on the typical sections.



UT to South Fork Reach 1 - Riffle
STA: 100+00 - 121+44



UT to South Fork Reach 1 - Shallow Pool
STA: 100+00 - 121+44



UT to South Fork Reach 1 - Deep Pool
STA: 100+00 - 121+44

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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

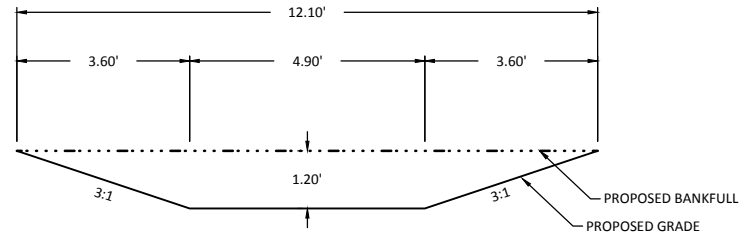
UT to South Fork Reach 1
Typical Sections

Revisions:

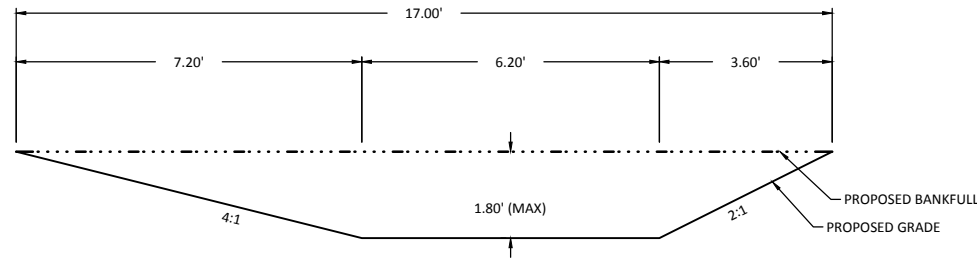
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Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

Notes:

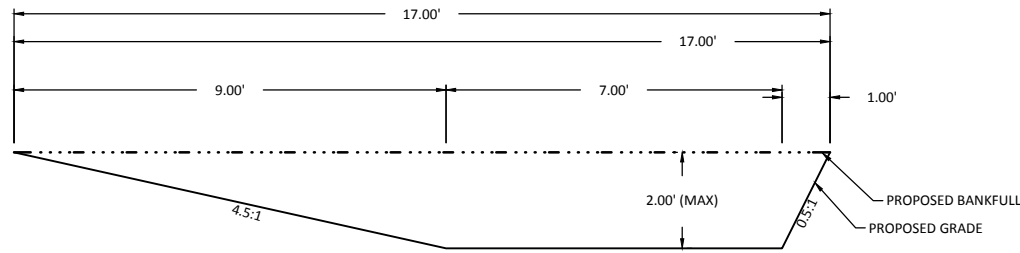
- 1.) Typical sections are provided as reference for in channel grading only.
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UT to South Fork Reach 2 - Riffle
 STA: 121+44 - 132+24



UT to South Fork Reach 2 - Shallow Pool
 STA: 121+44 - 132+24



UT to South Fork Reach 2 - Deep Pool
 STA: 121+44 - 132+24

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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

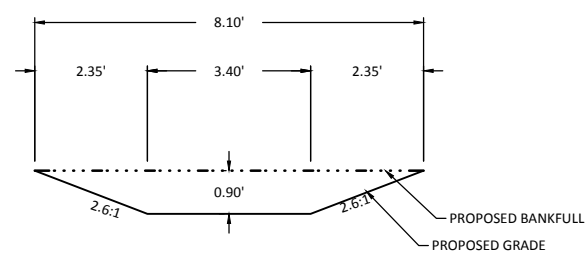
UT to South Fork Reach 2
 Typical Sections

Revisions:

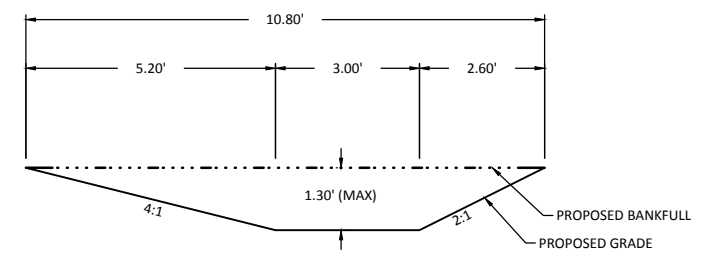
Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

April 30, 2015
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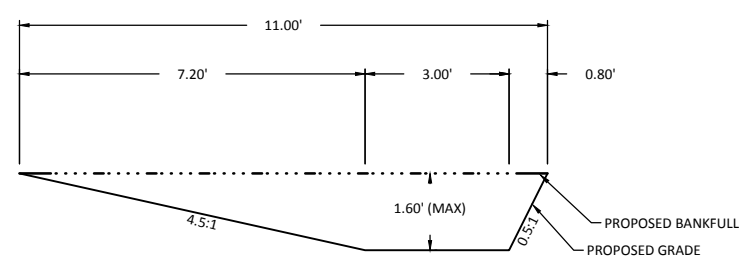
- Notes:
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UTIC - Riffle
STA: 200+00 - 202+51



UTIC - Shallow Pool
STA: 200+00 - 202+51



UTIC - Deep Pool
STA: 200+00 - 202+51

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Maney Farm Stream Mitigation Site
Chatham Country, North Carolina

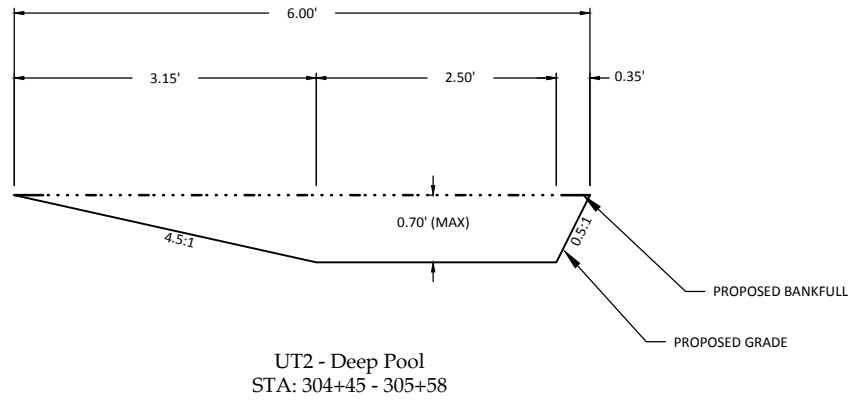
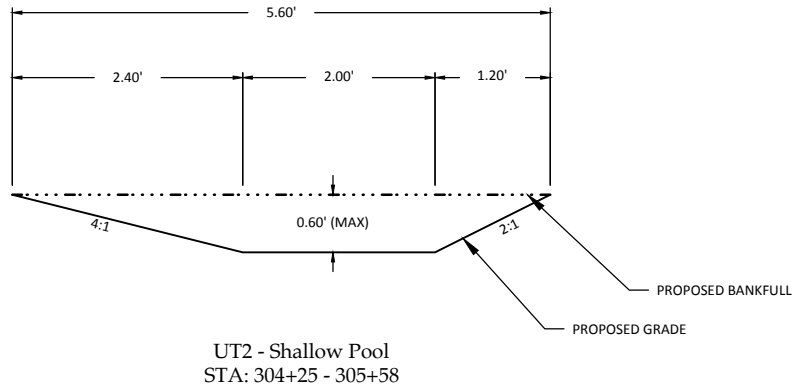
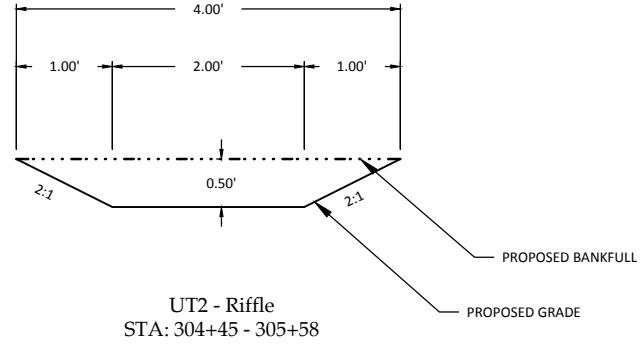
UTIC
Typical Sections

Revisions:

Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

Notes:

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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

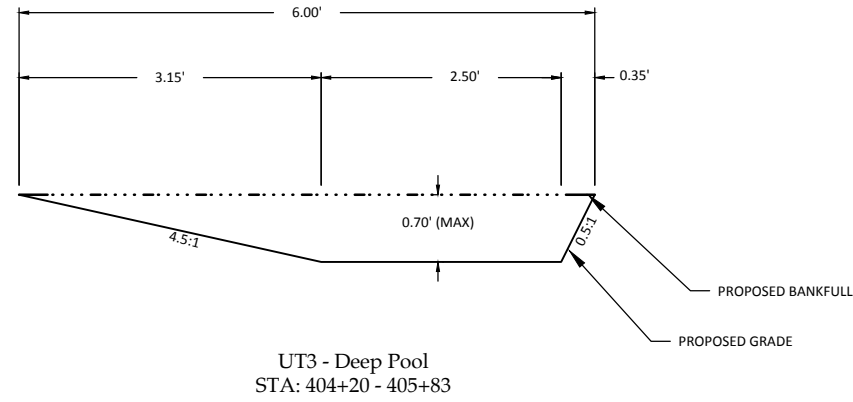
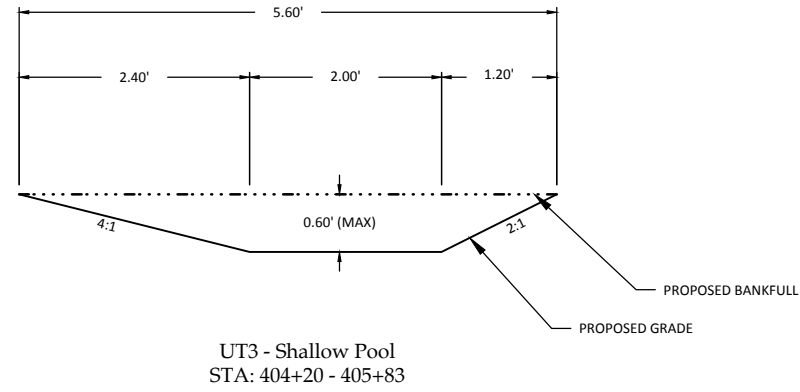
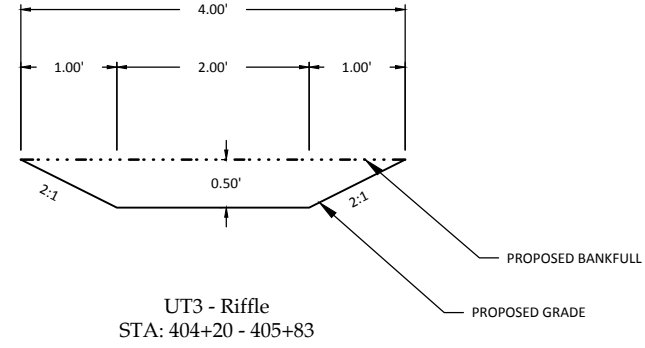
UT2
 Typical Sections

Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

Notes:

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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

UT3
 Typical Sections

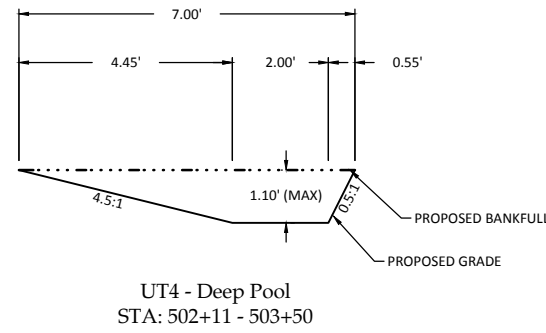
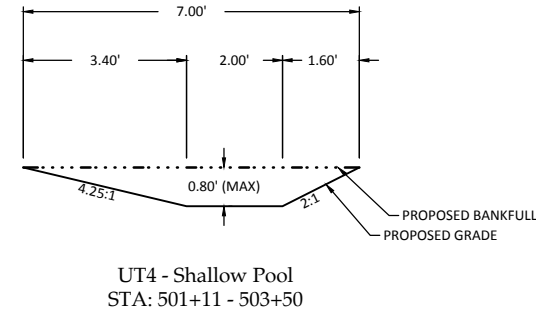
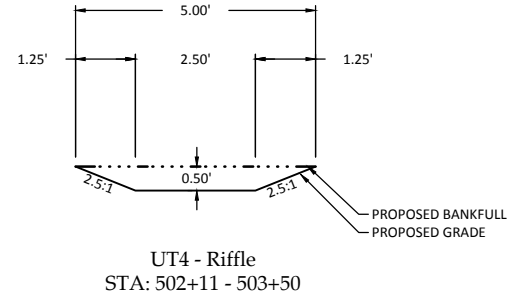
Revisions:

Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

1.5

Notes:

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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

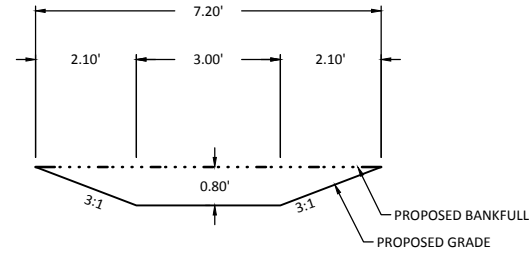
UT4
 Typical Sections

Revisions:

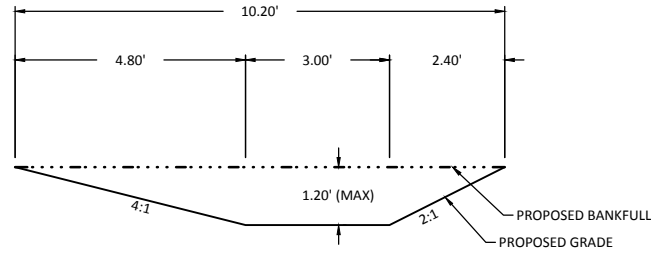
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Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

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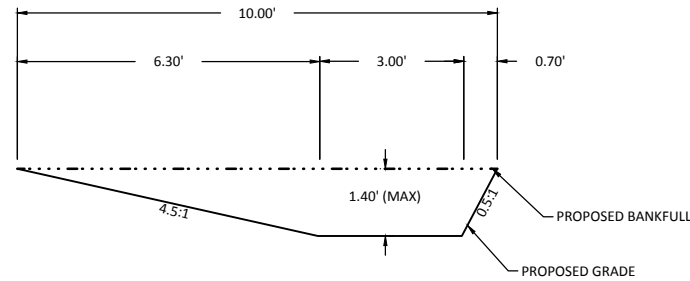
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UT5 - Riffle
STA: 600+00 - 606+77



UT5 - Shallow Pool
STA: 600+00 - 606+77



UT5 - Deep Pool
STA: 600+00 - 606+77

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Maney Farm Stream Mitigation Site
Chatham Country, North Carolina

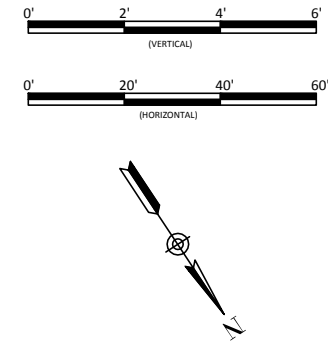
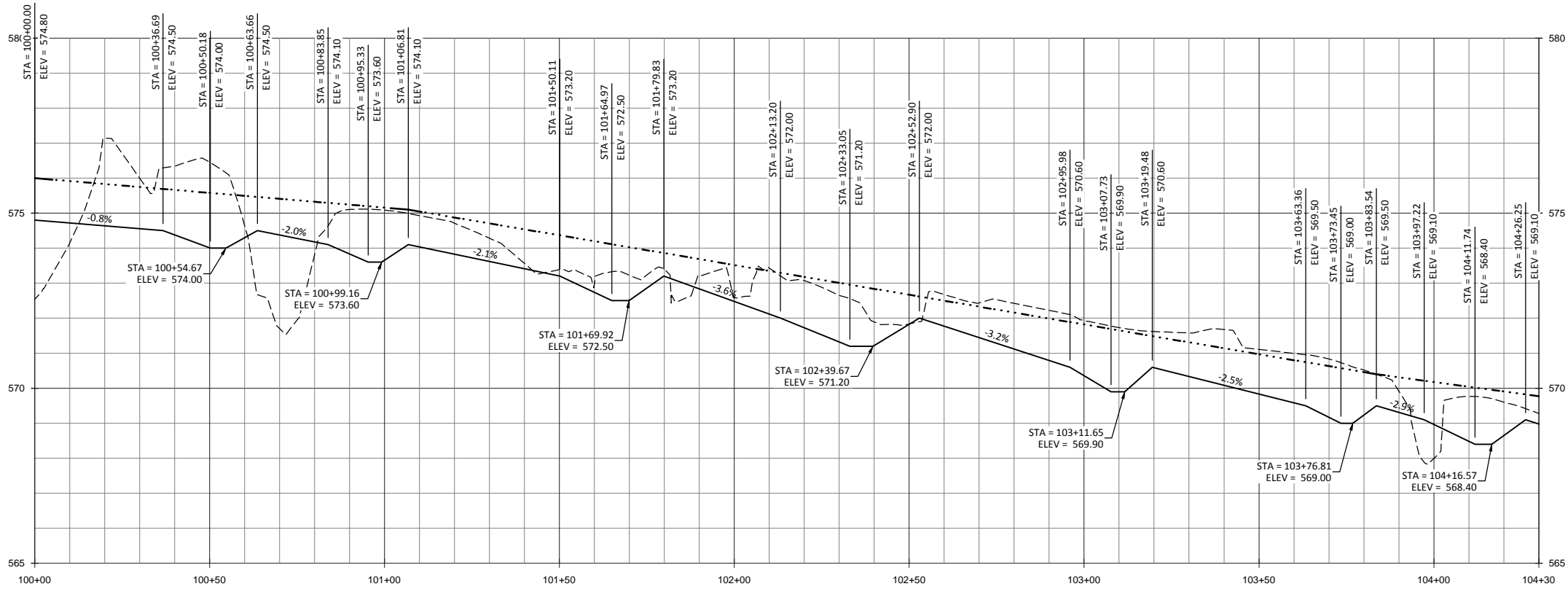
UT5
Typical Sections

Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

1.7

April 30, 2015
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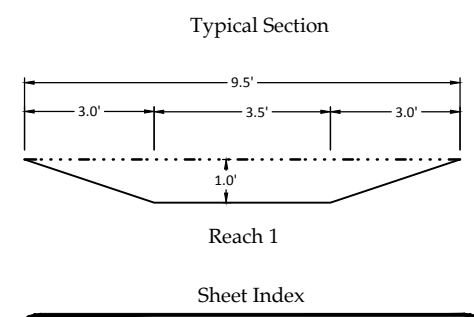
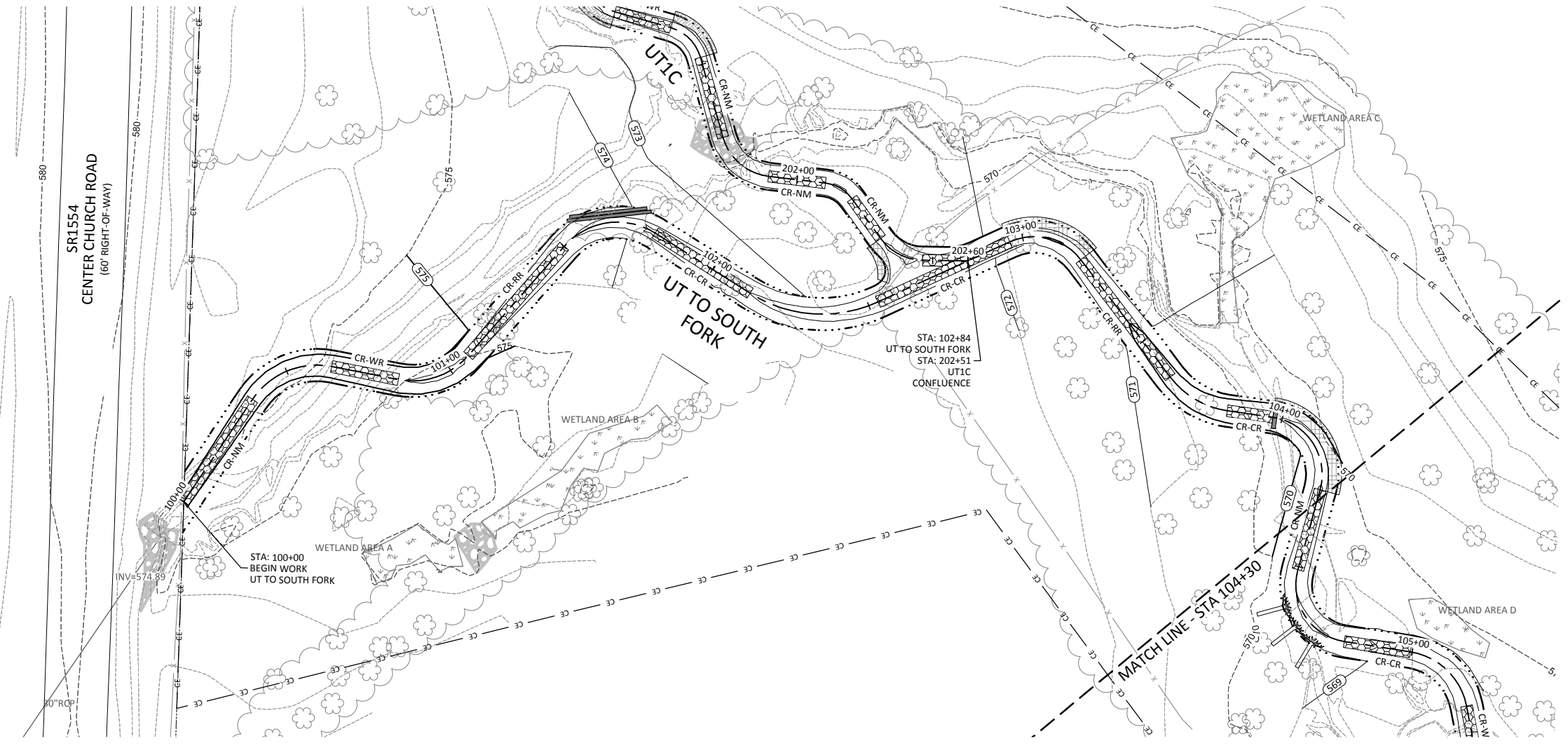


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 ENGINEERS, P.C.
 312 West Millbrook Road, Ste 225
 Raleigh, NC 27609
 Tel: 919.851.9986
 Fax: 919.851.9986
 Firm License No. F-0831

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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

UTSF Reach 1
 Stream Plan and Profile

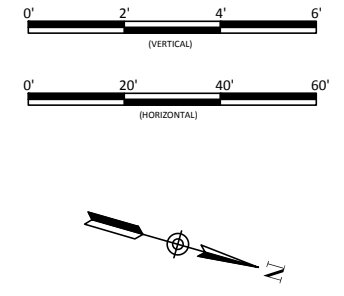
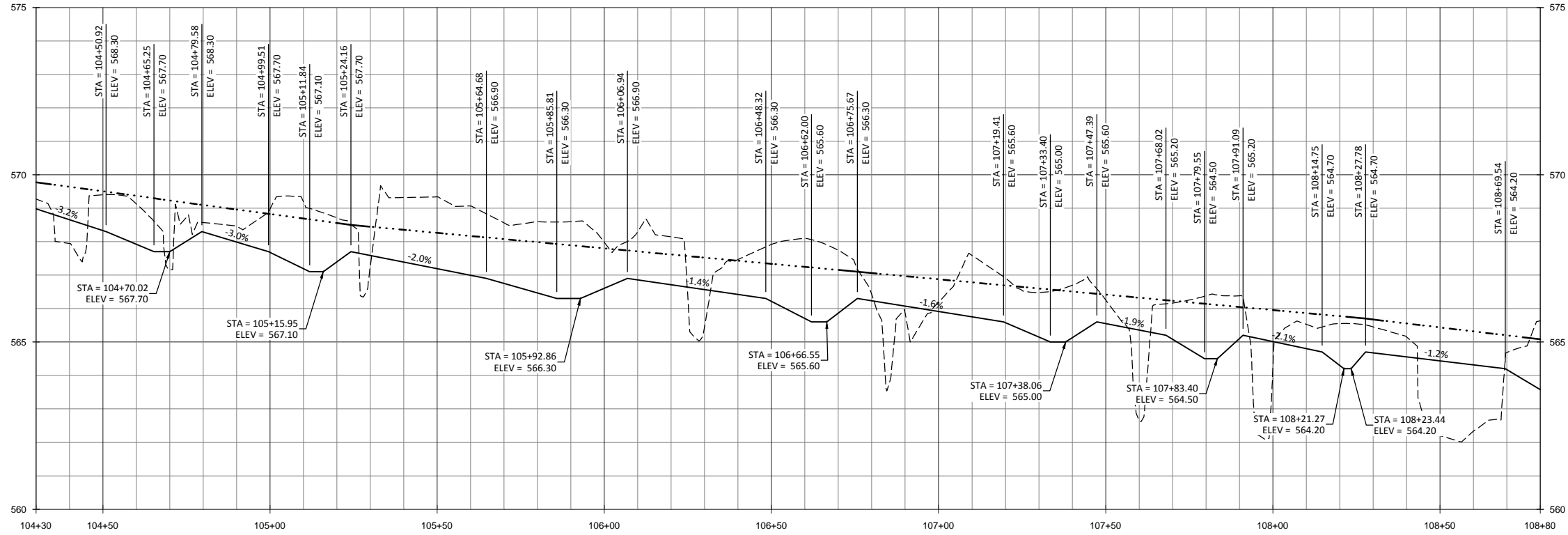


Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

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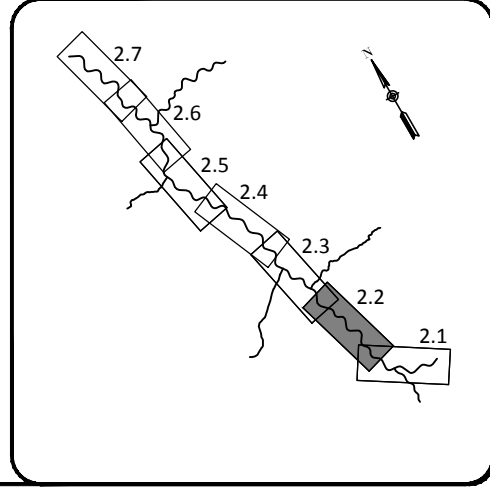
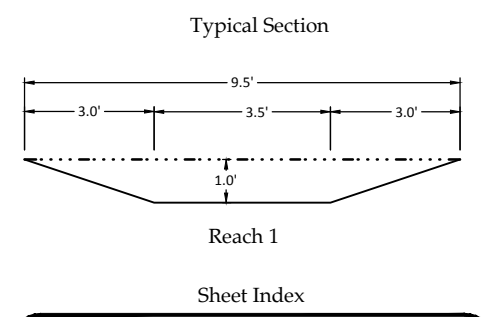
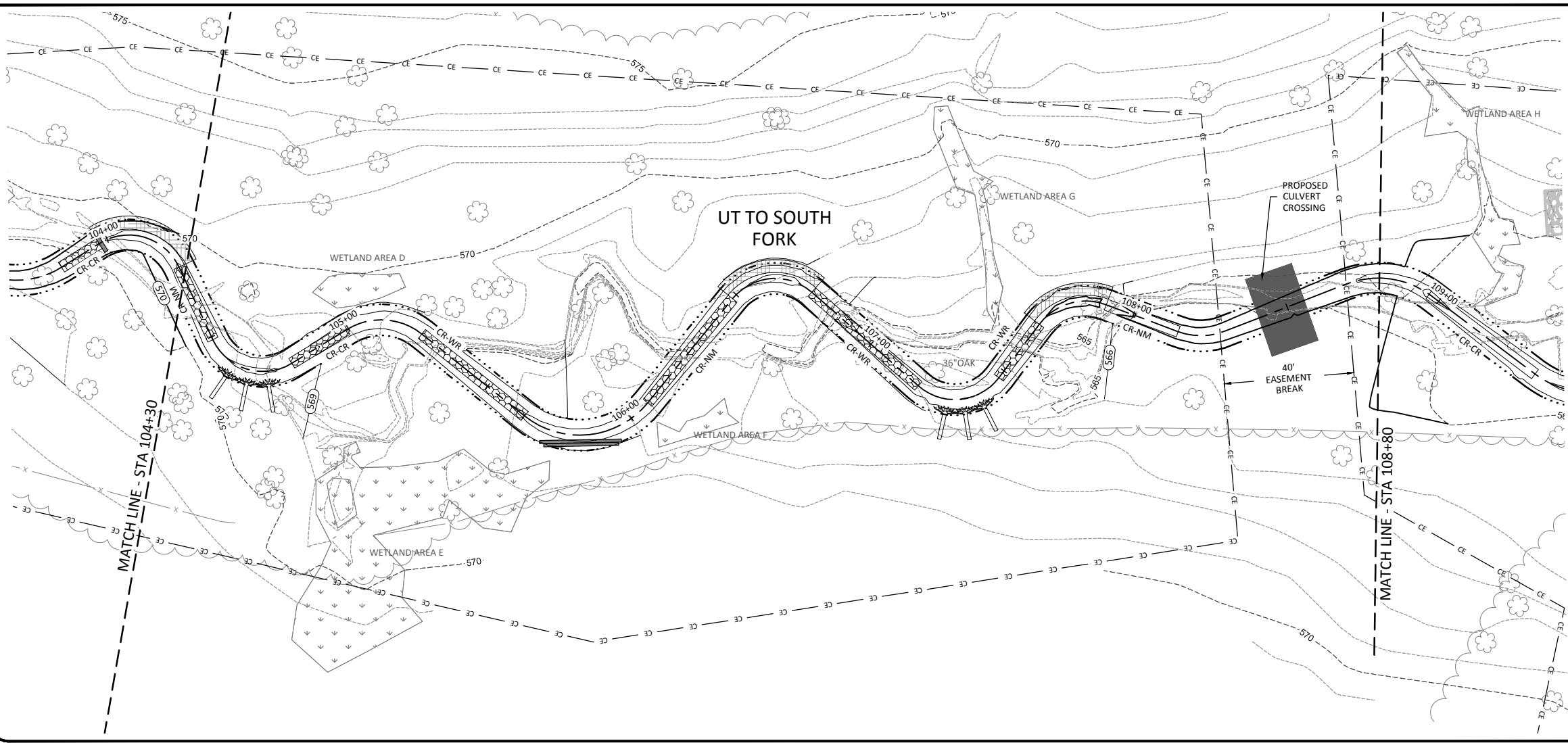
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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UTSF Reach 1
 Stream Plan and Profile

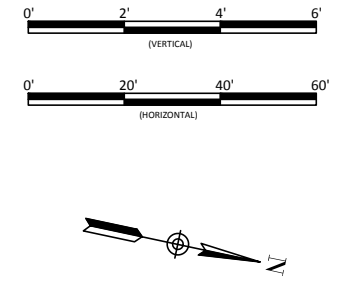
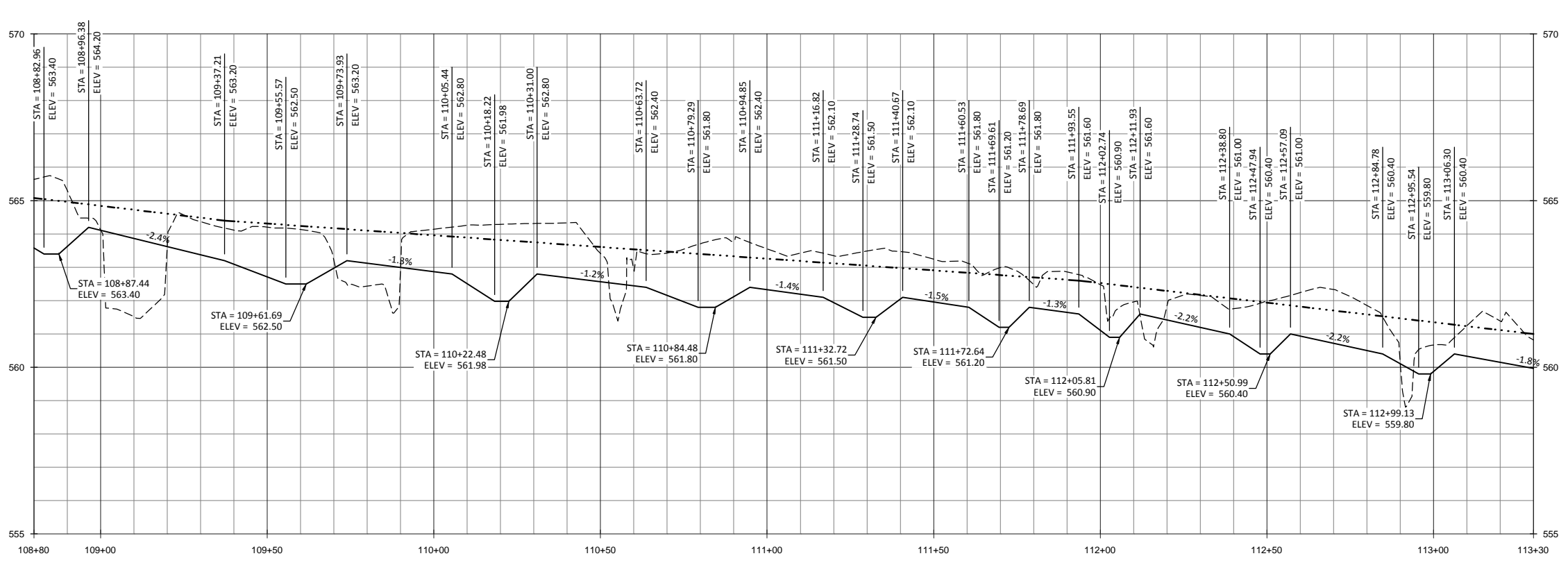
Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

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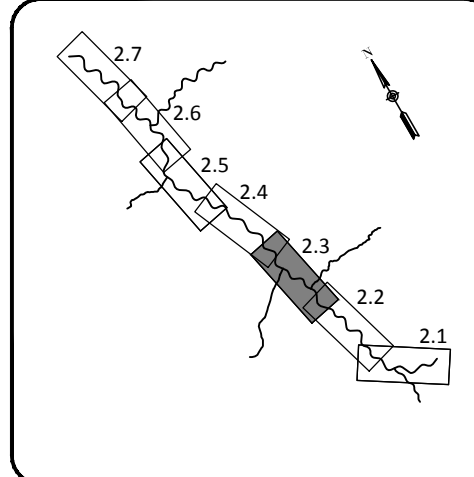
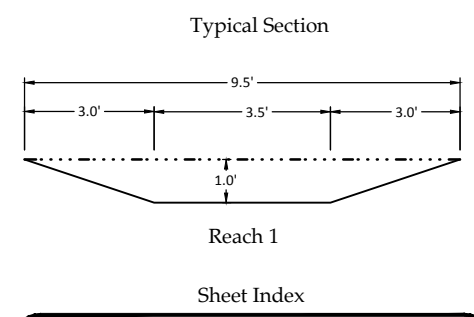
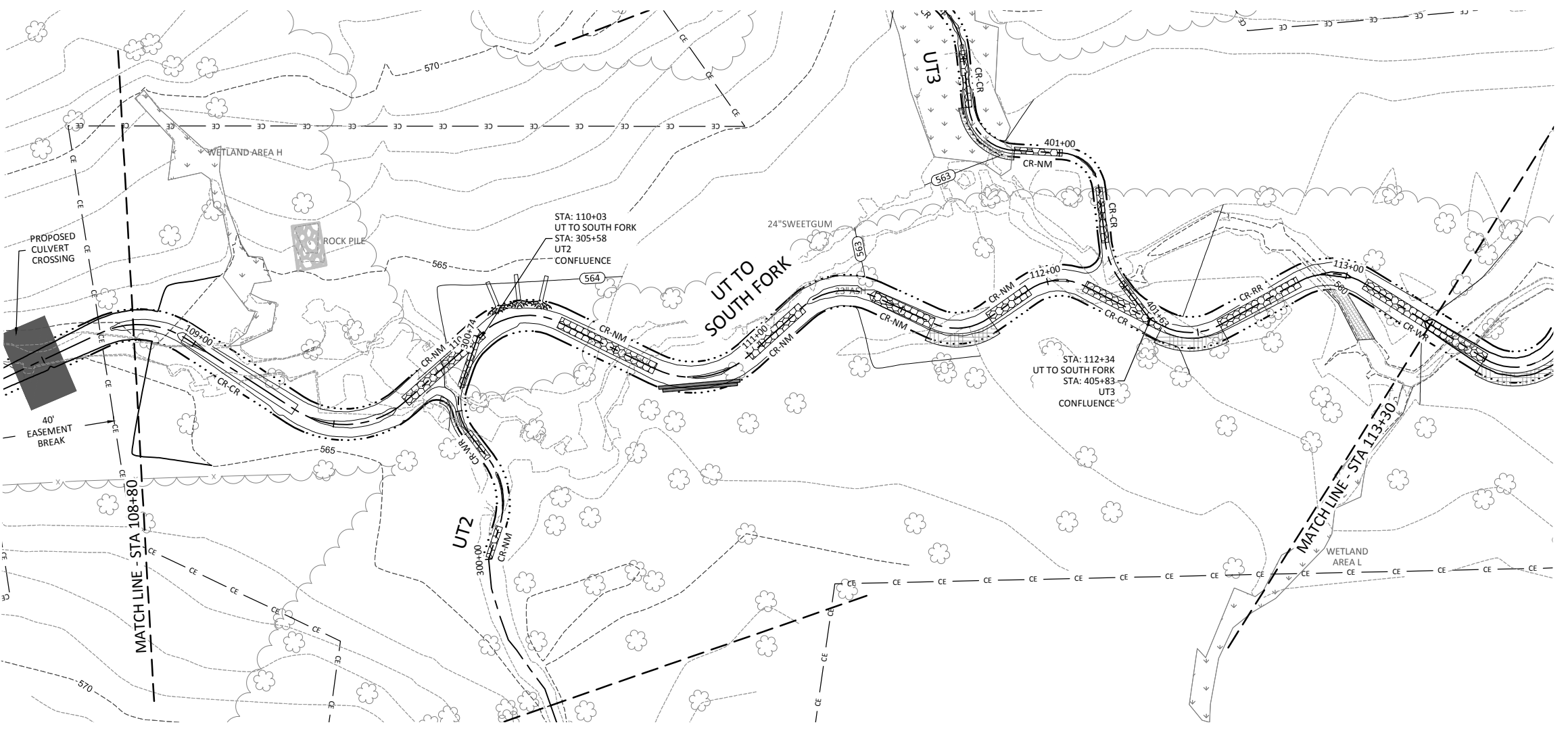
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UTSF Reach 1
 Stream Plan and Profile

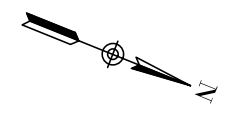
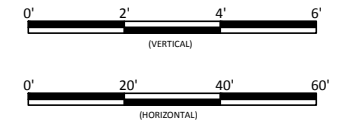
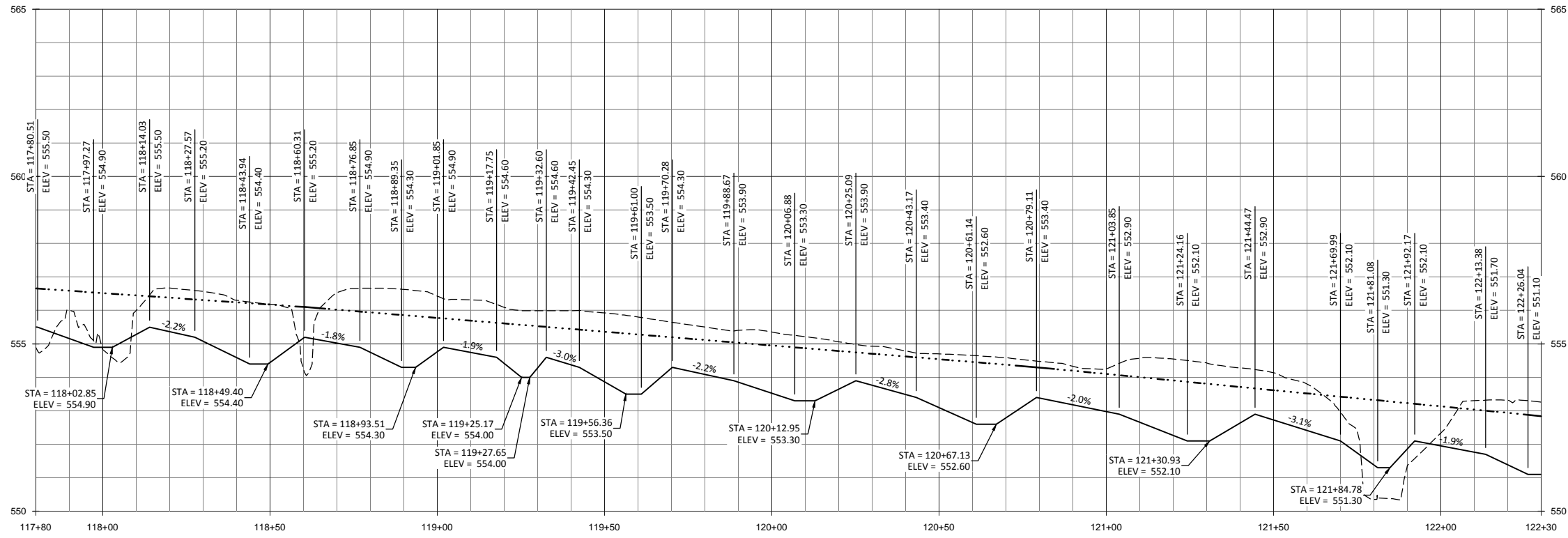
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Revisions:

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April 30, 2015

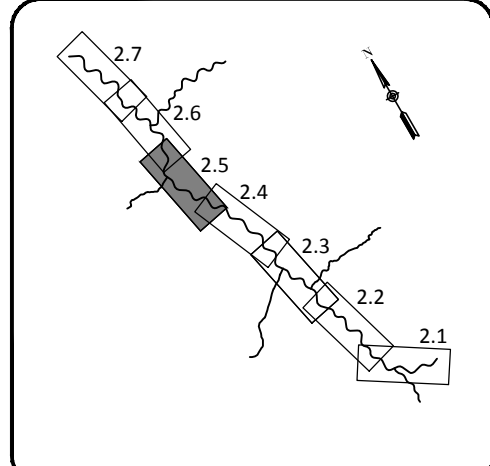
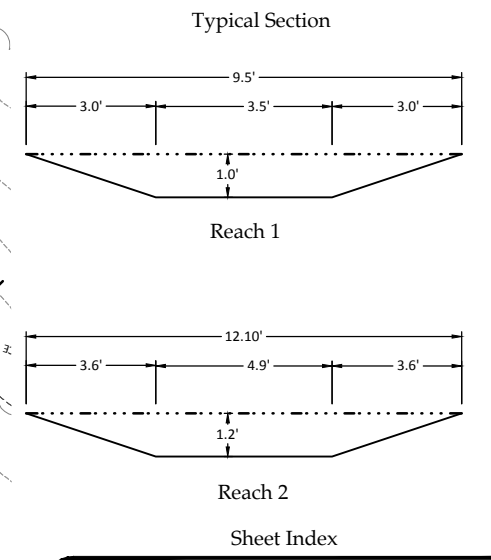
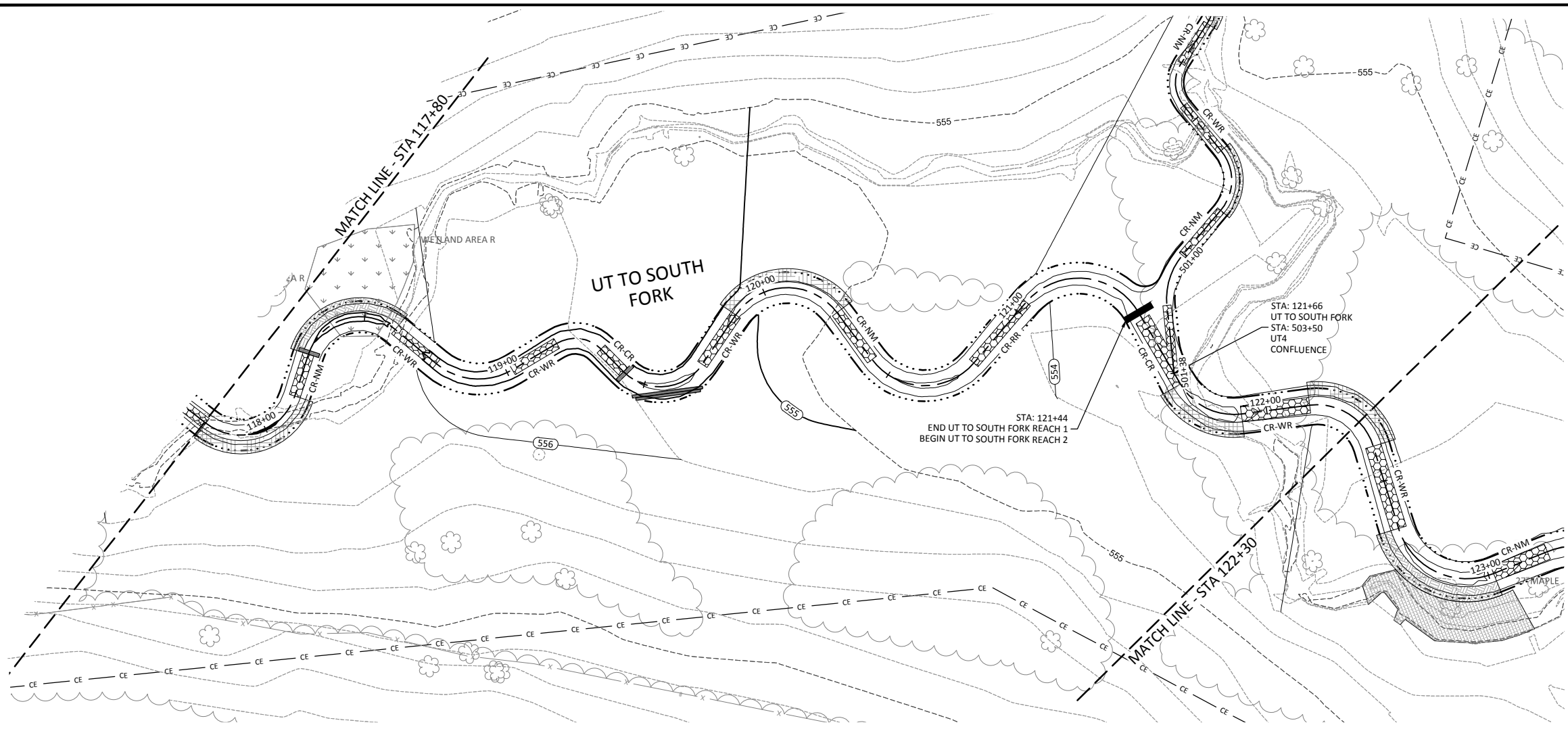


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UTSF Reach 1 & 2
 Stream Plan and Profile



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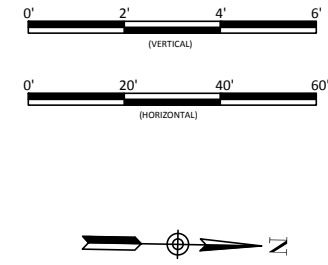
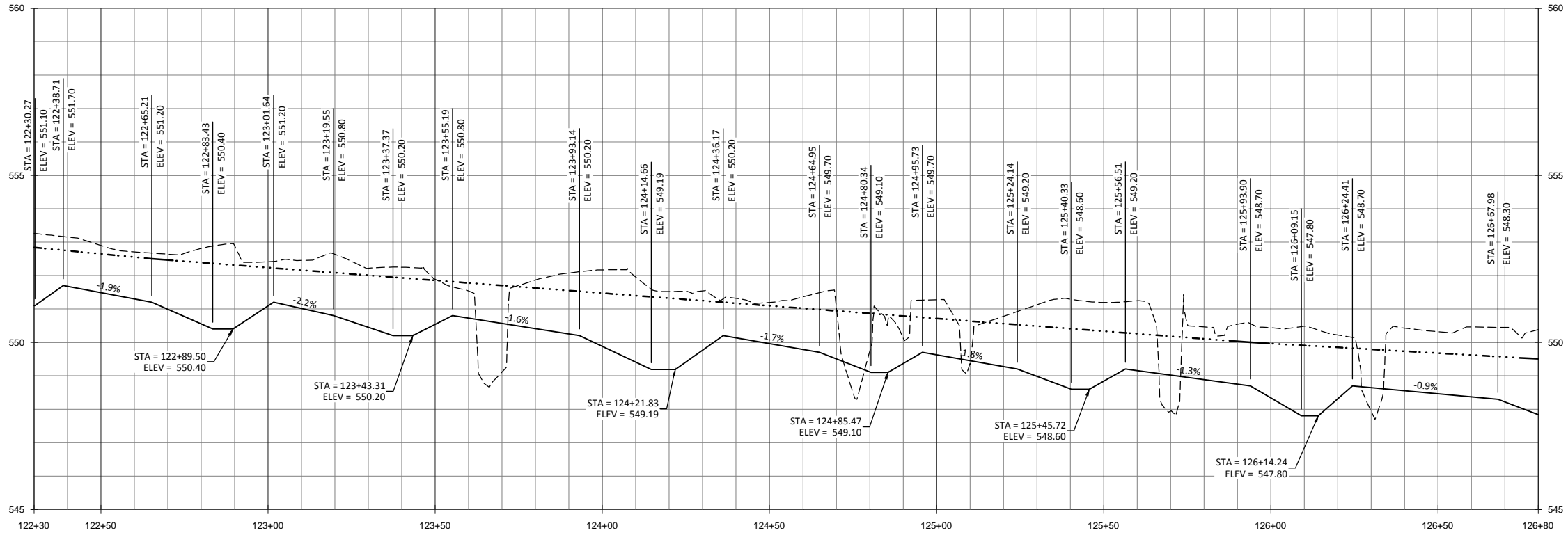
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 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

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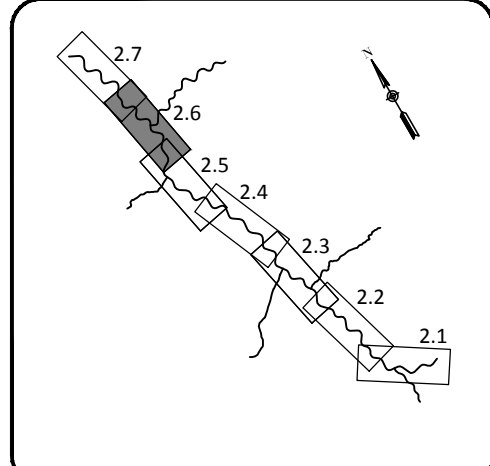
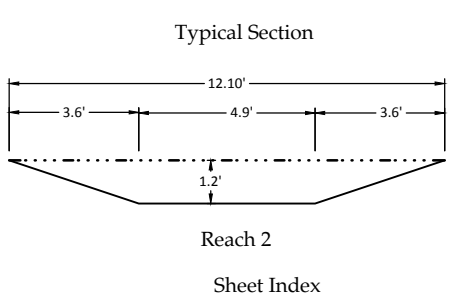
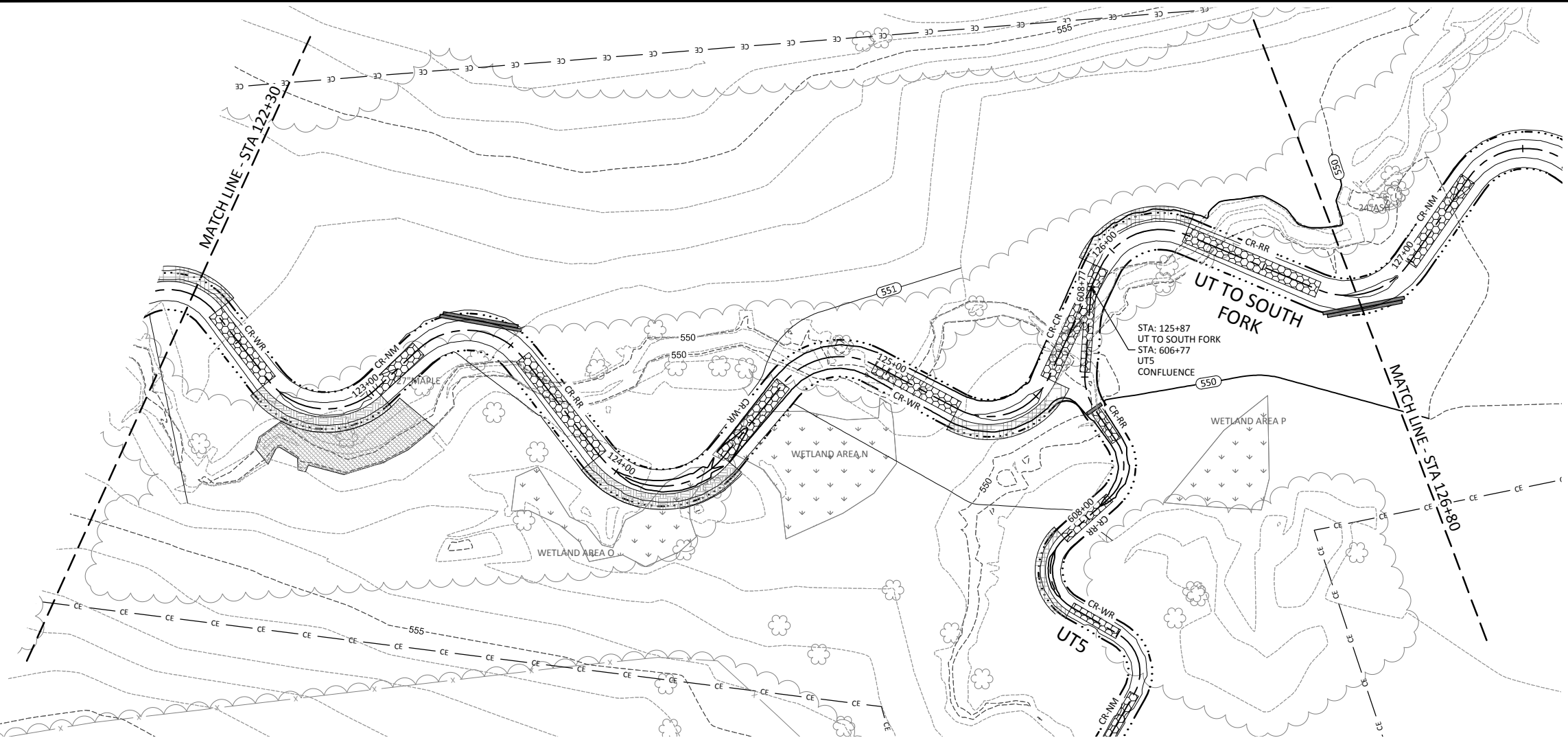
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 UTSF Reach 2
 Stream Plan and Profile

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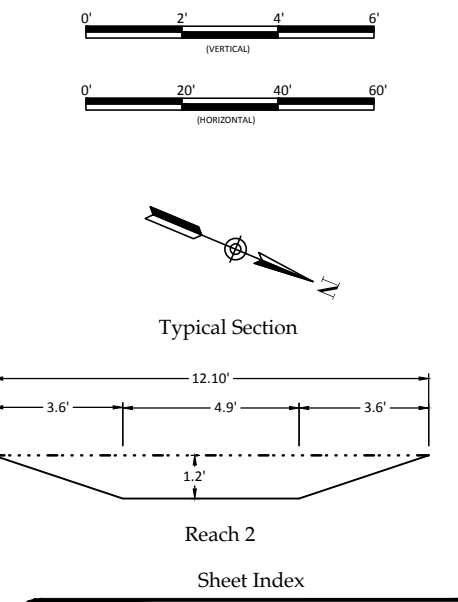
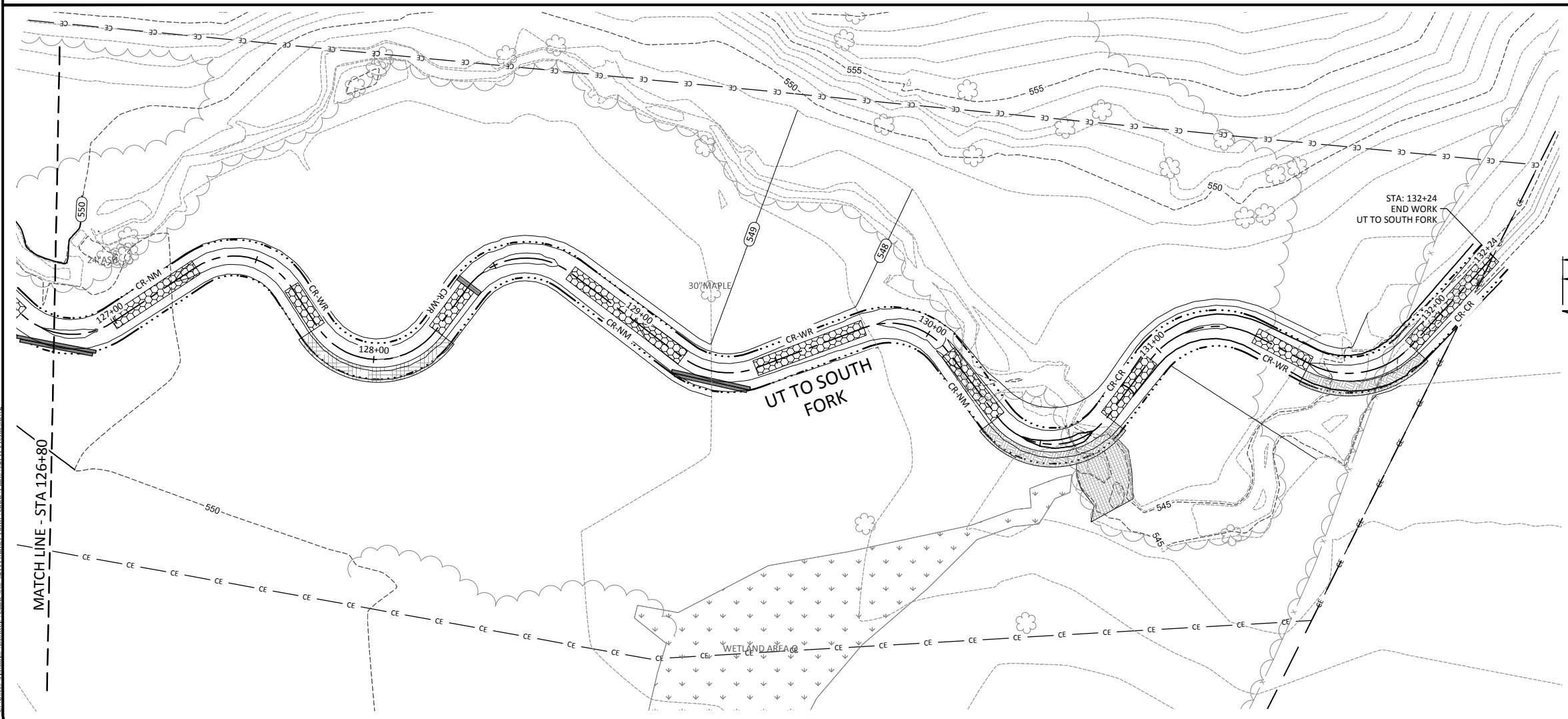
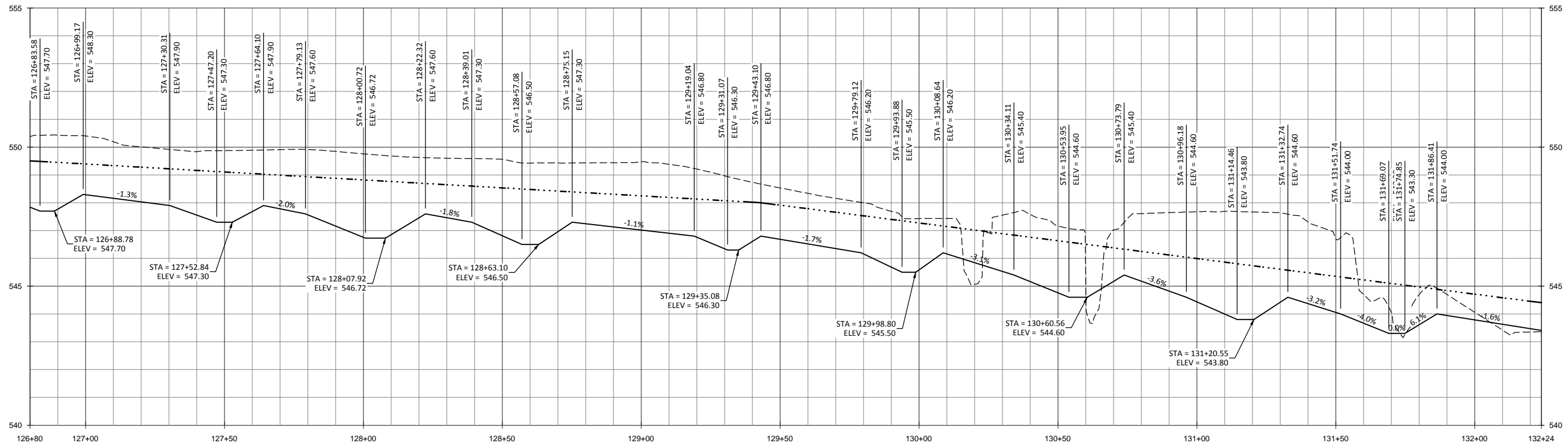
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Date: May 1, 2015
 Job Number: 005-0214
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

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Maney Farm Stream Mitigation Site
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UTSF Reach 2
 Stream Plan and Profile

Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
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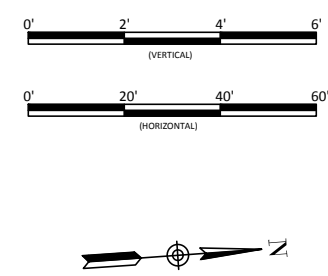
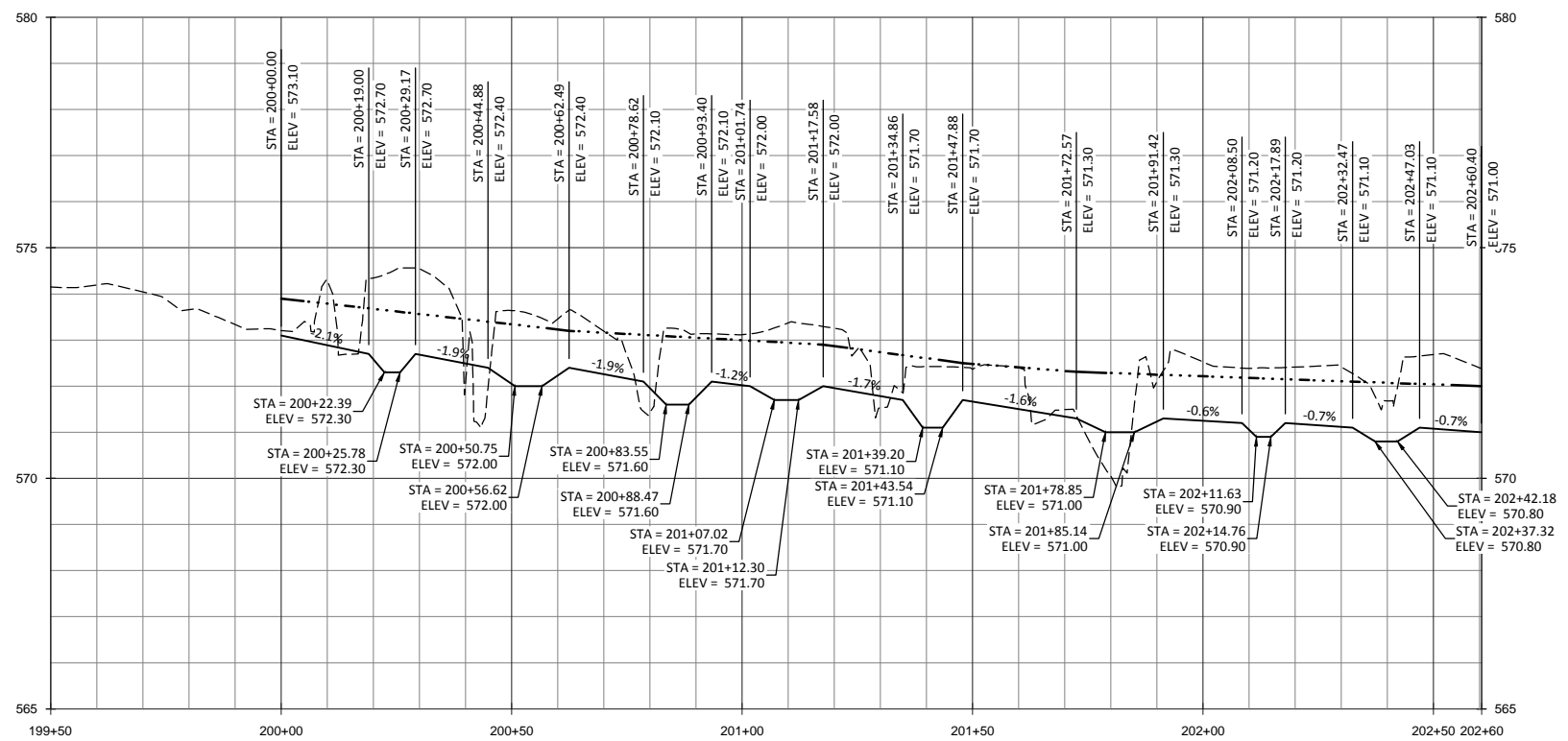
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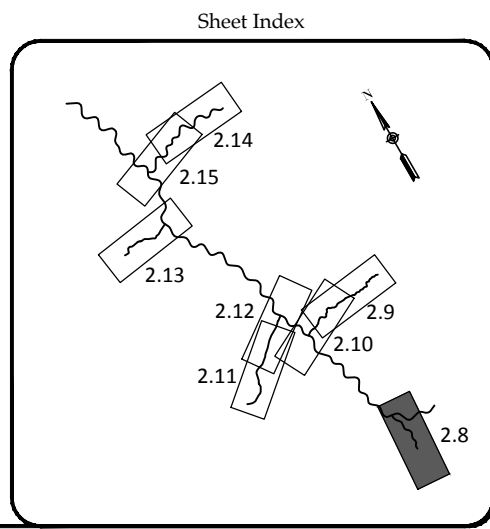
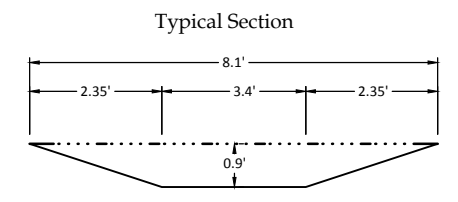
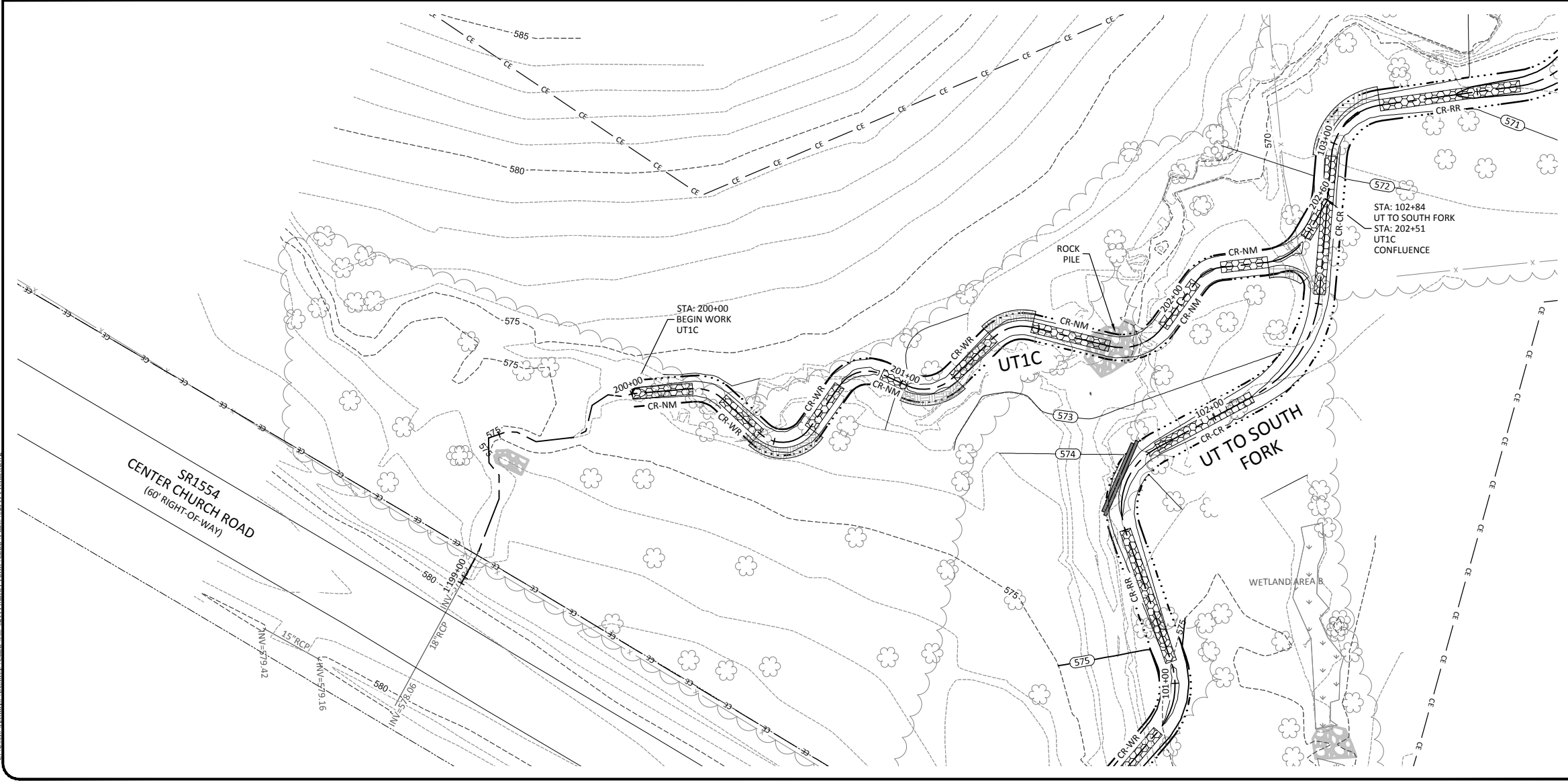
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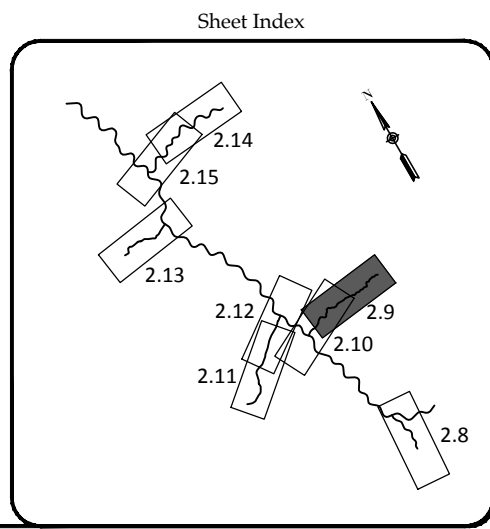
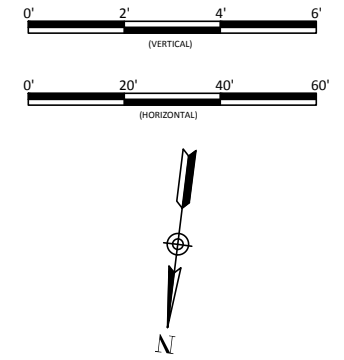
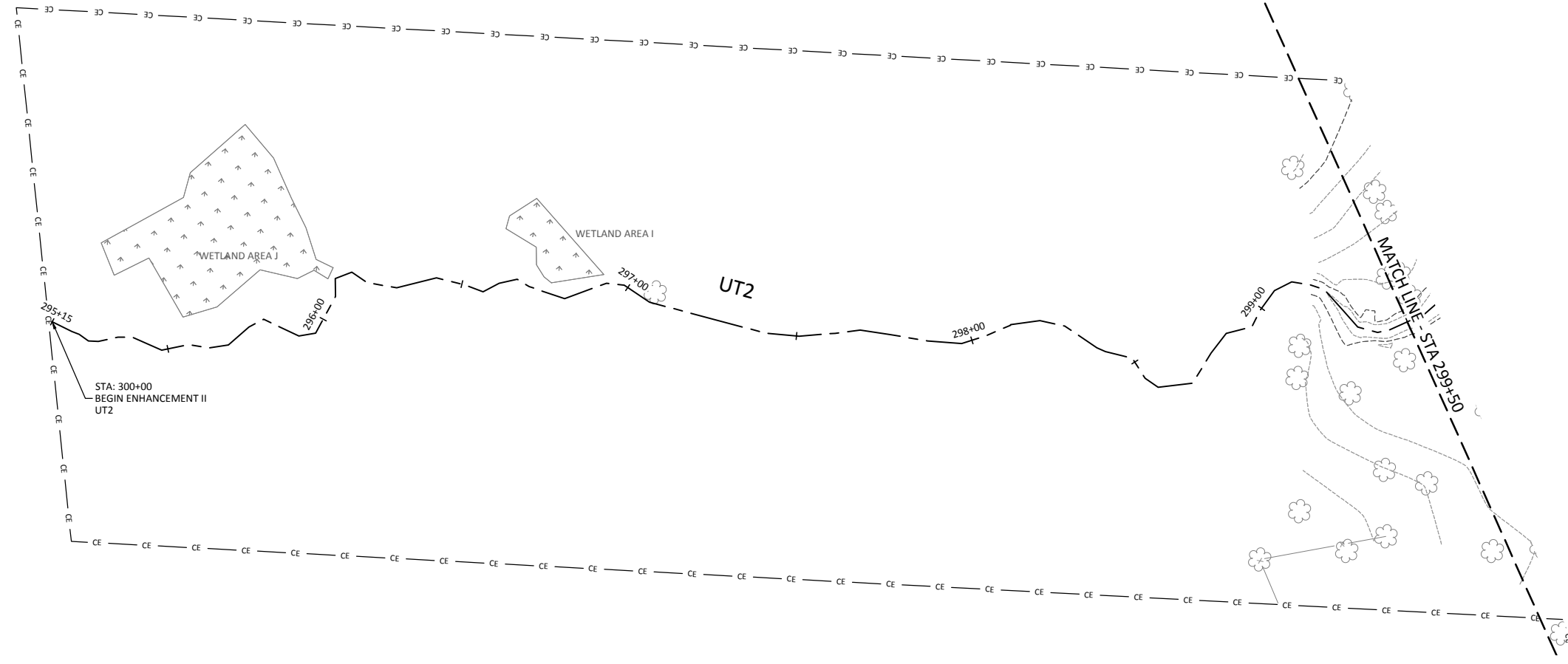
Maney Farm Stream Mitigation Site
 Chatham County, North Carolina
 UTIC
 Stream Plan and Profile



Date	Revisions
May 1, 2015	
Job Number: 005-02144	
Project Engineer: JK	
Drawn By: JCK	
Checked By: JK	

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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UT2
Stream Plan and Profile

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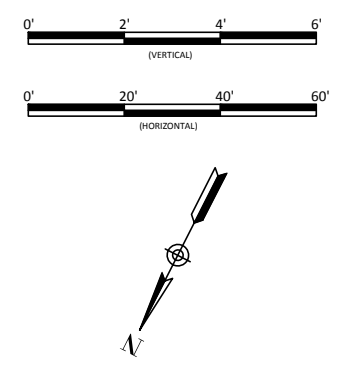
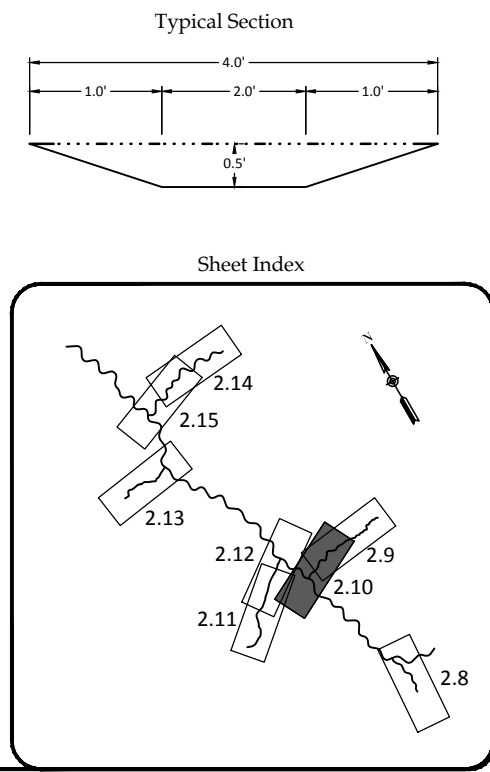
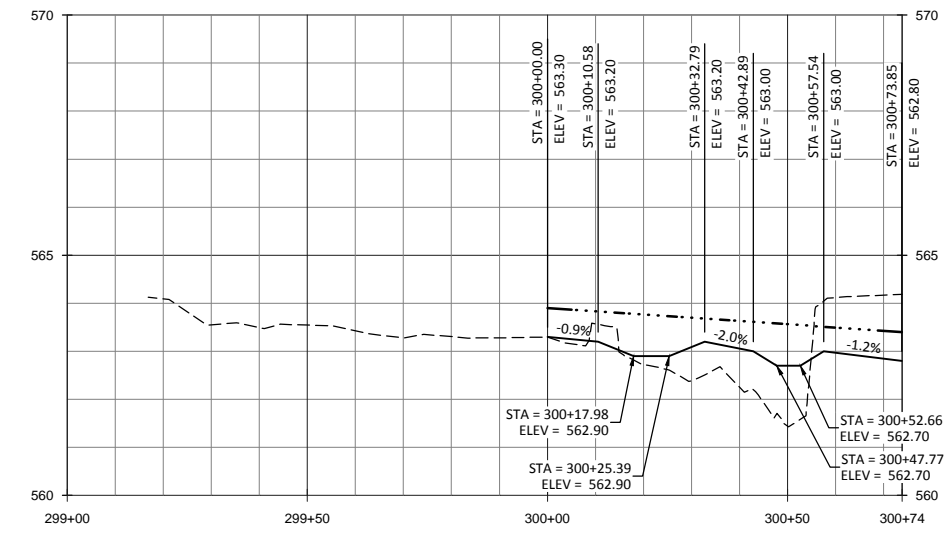
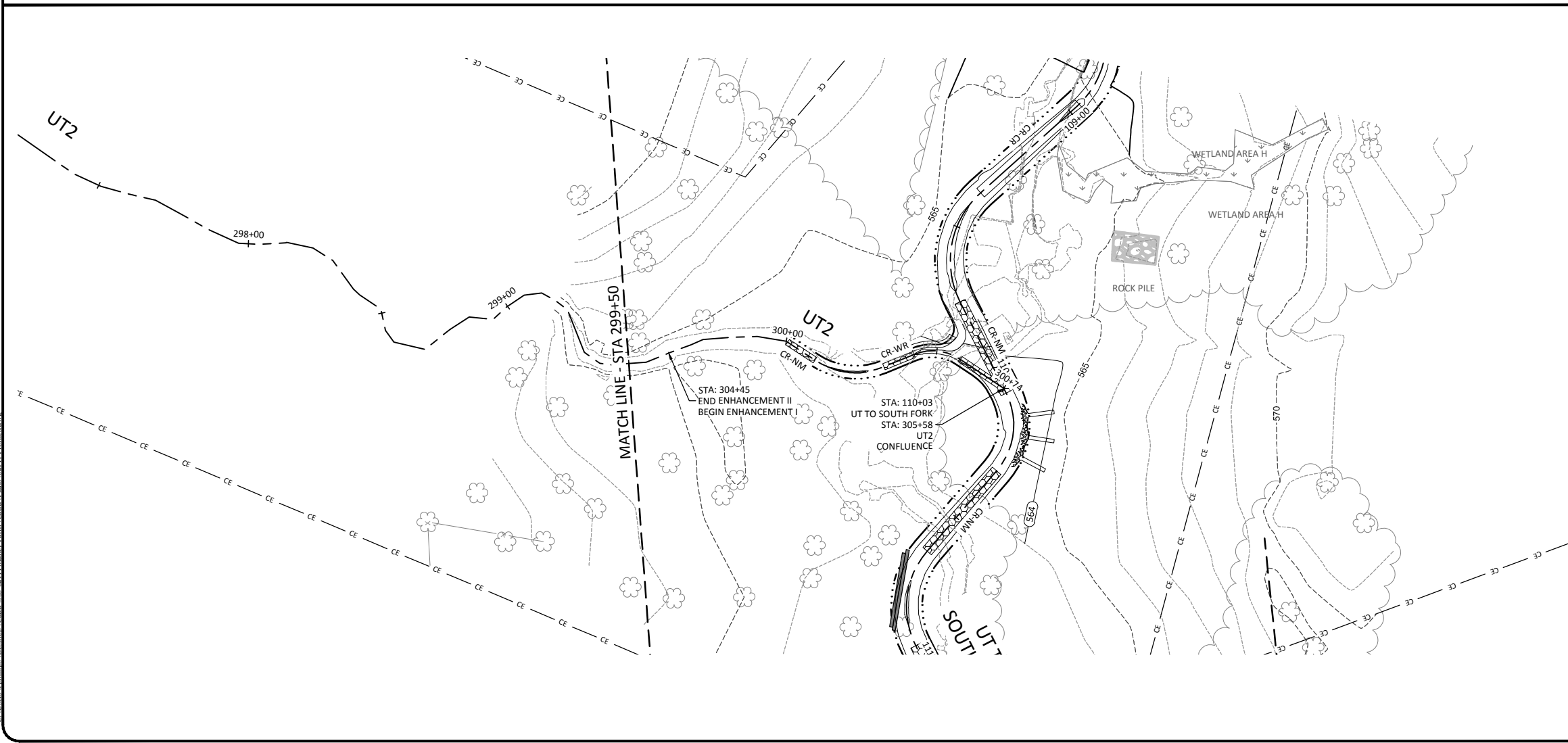
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Date: May 1, 2015
Job Number: 005-0214
Project Engineer: JK
Drawn By: JCK
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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UT2
 Stream Plan and Profile

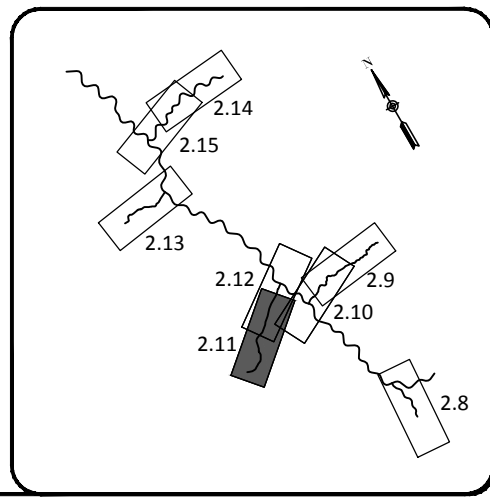
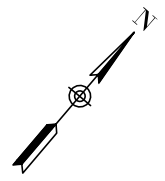
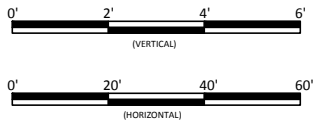
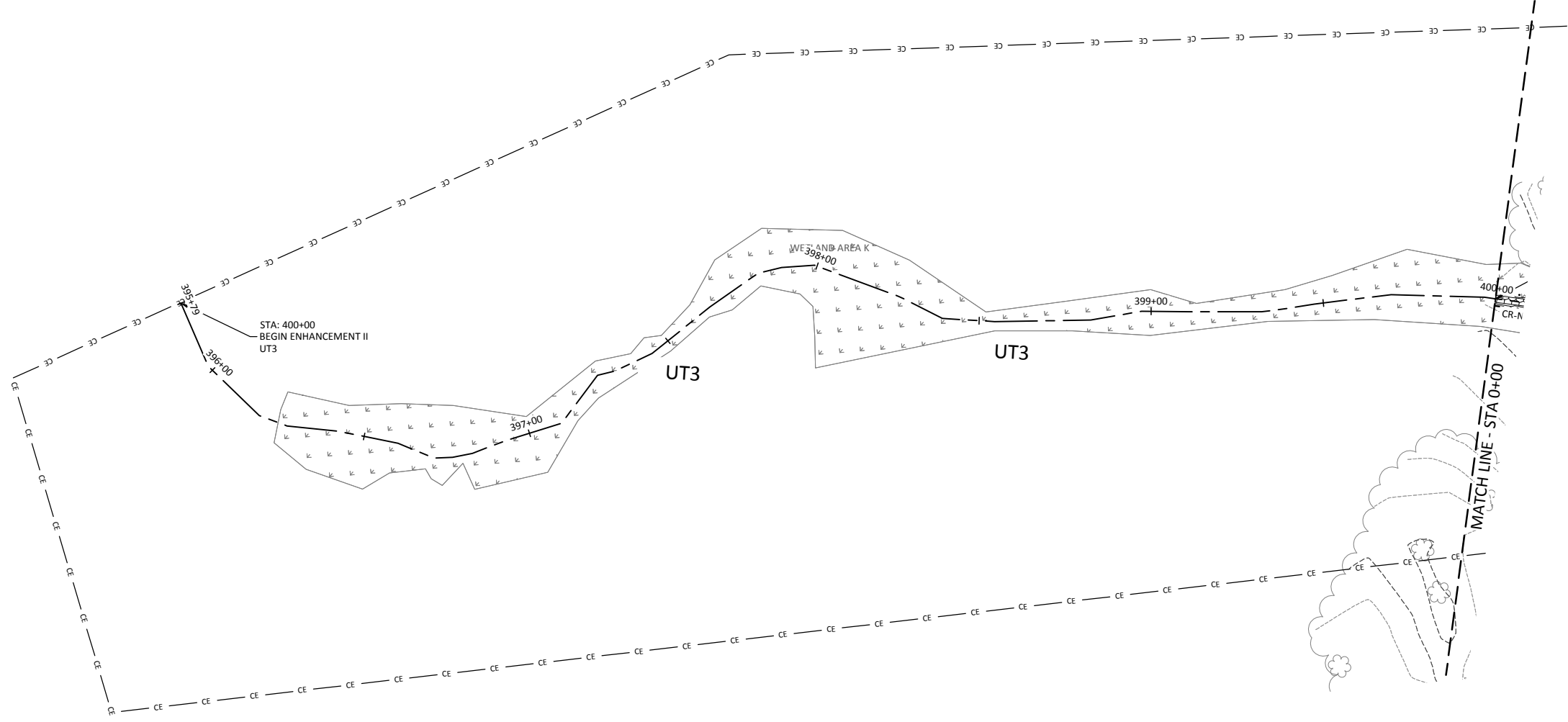
Date	Job Number	Project Engineer	Drawn By	Checked By
May 1, 2015	005-02144	JK	JCK	JK

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Chatham County, North Carolina

UT3
Stream Plan and Profile

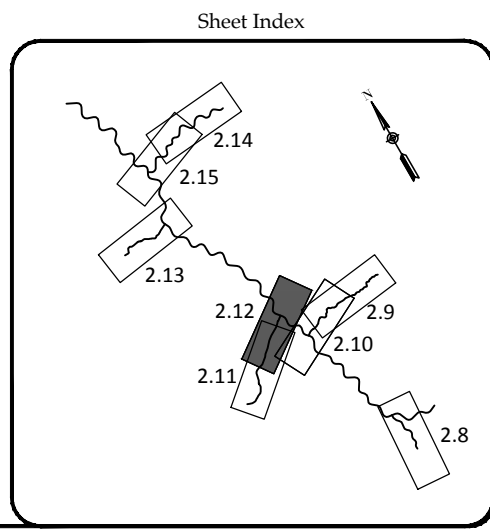
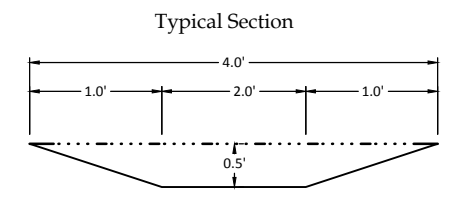
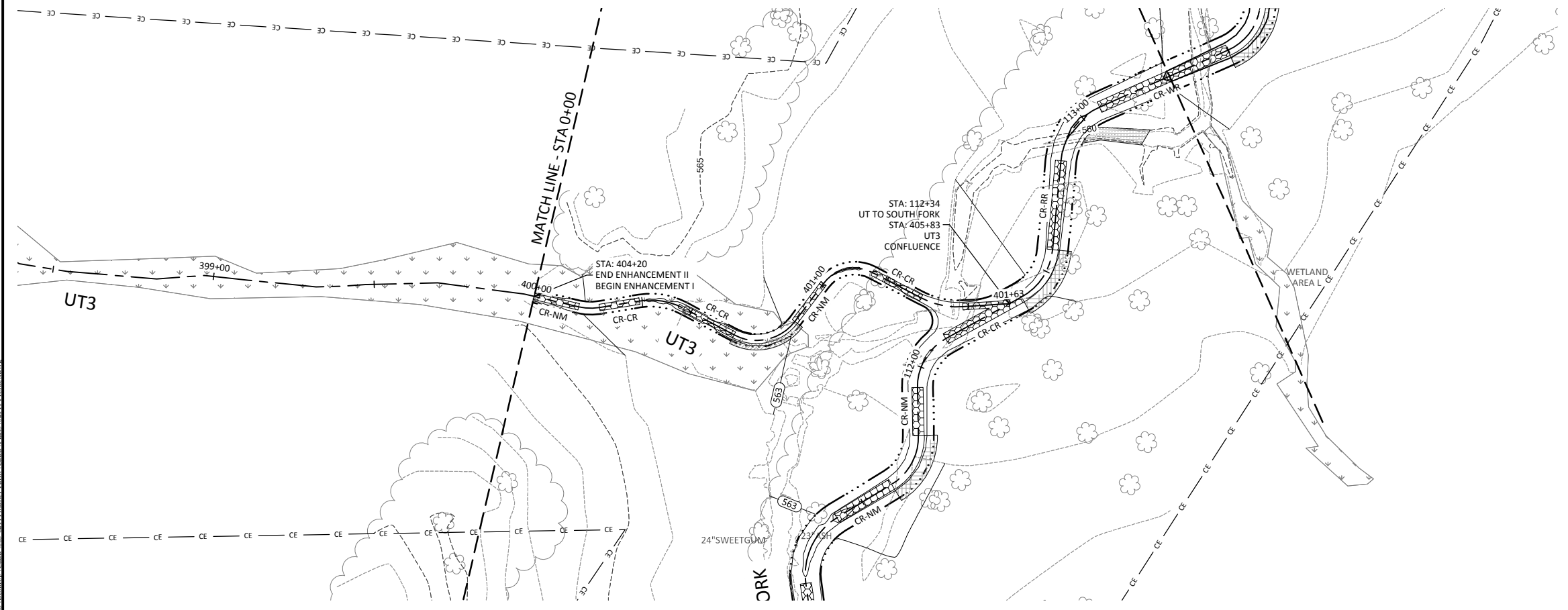
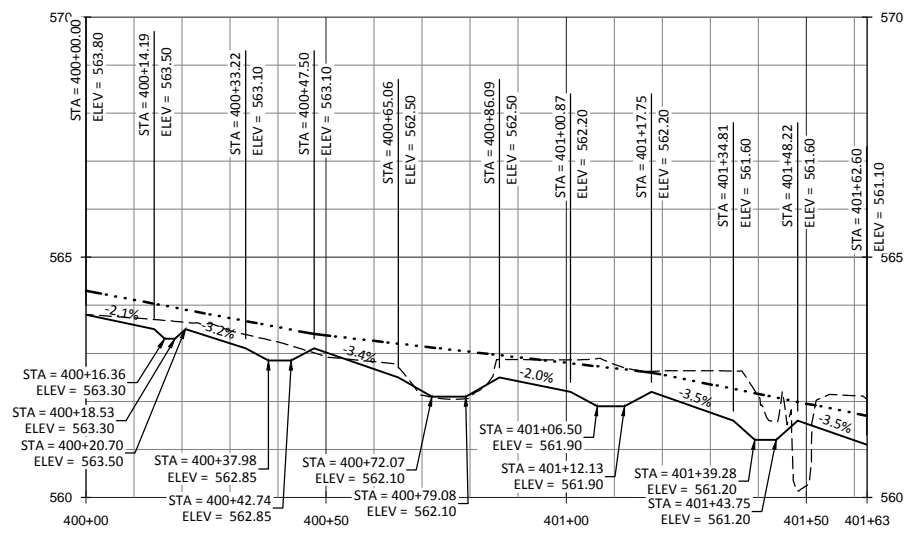
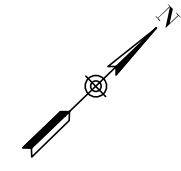
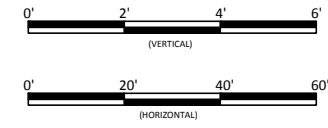
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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UT3
Stream Plan and Profile

Revisions:

Date: May 1, 2015
Job Number: 005-02144
Project Engineer: JK
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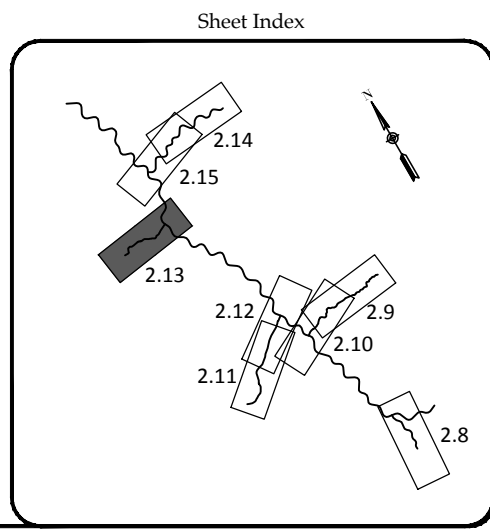
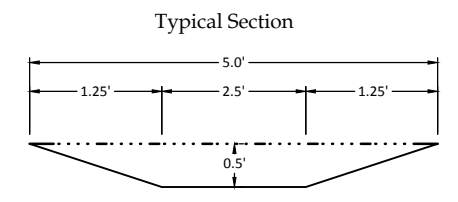
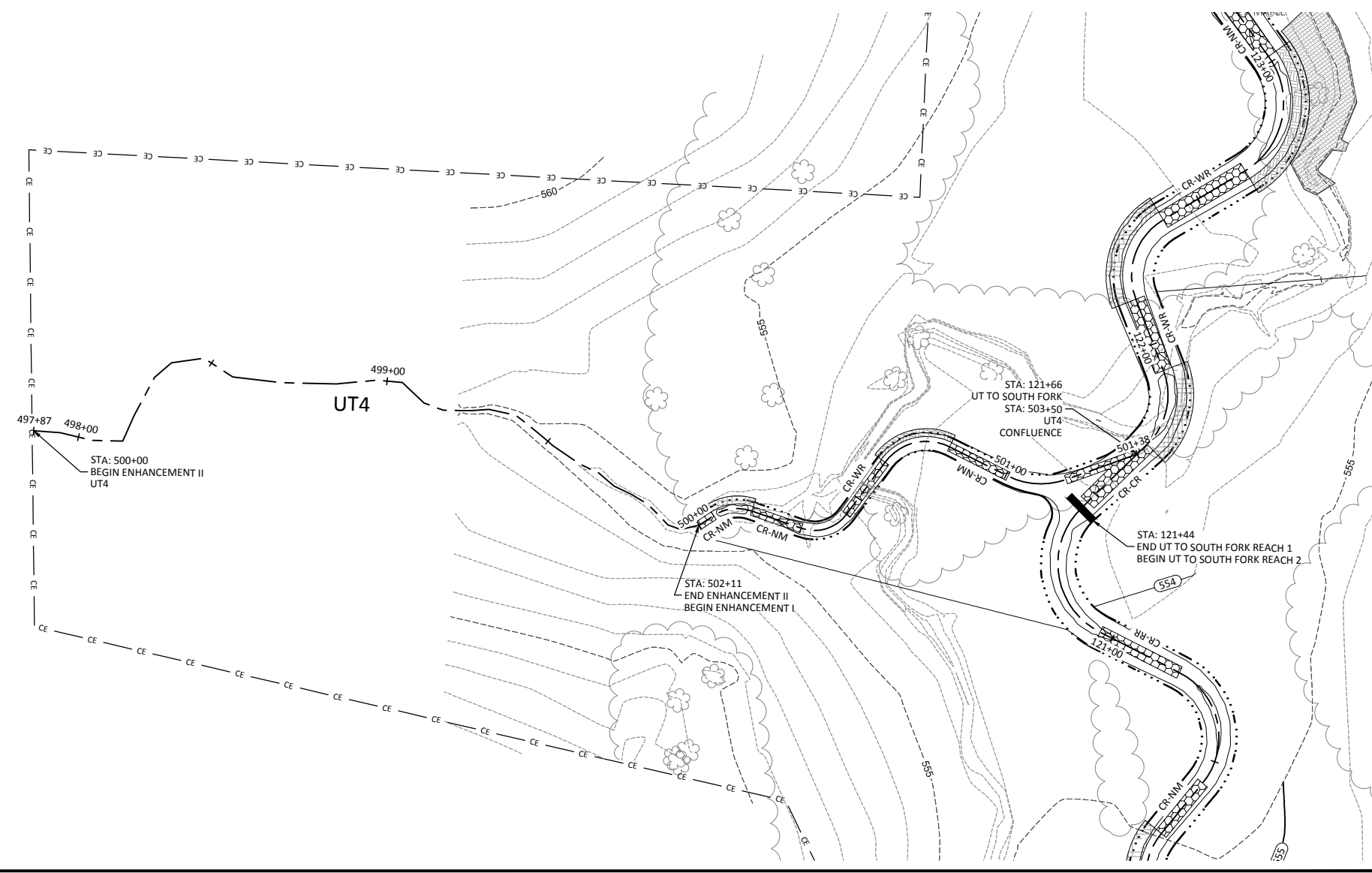
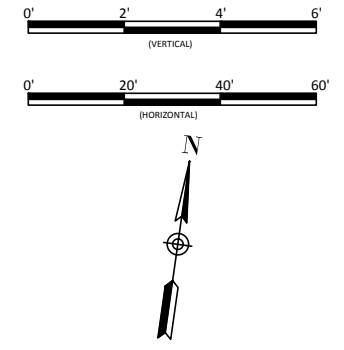
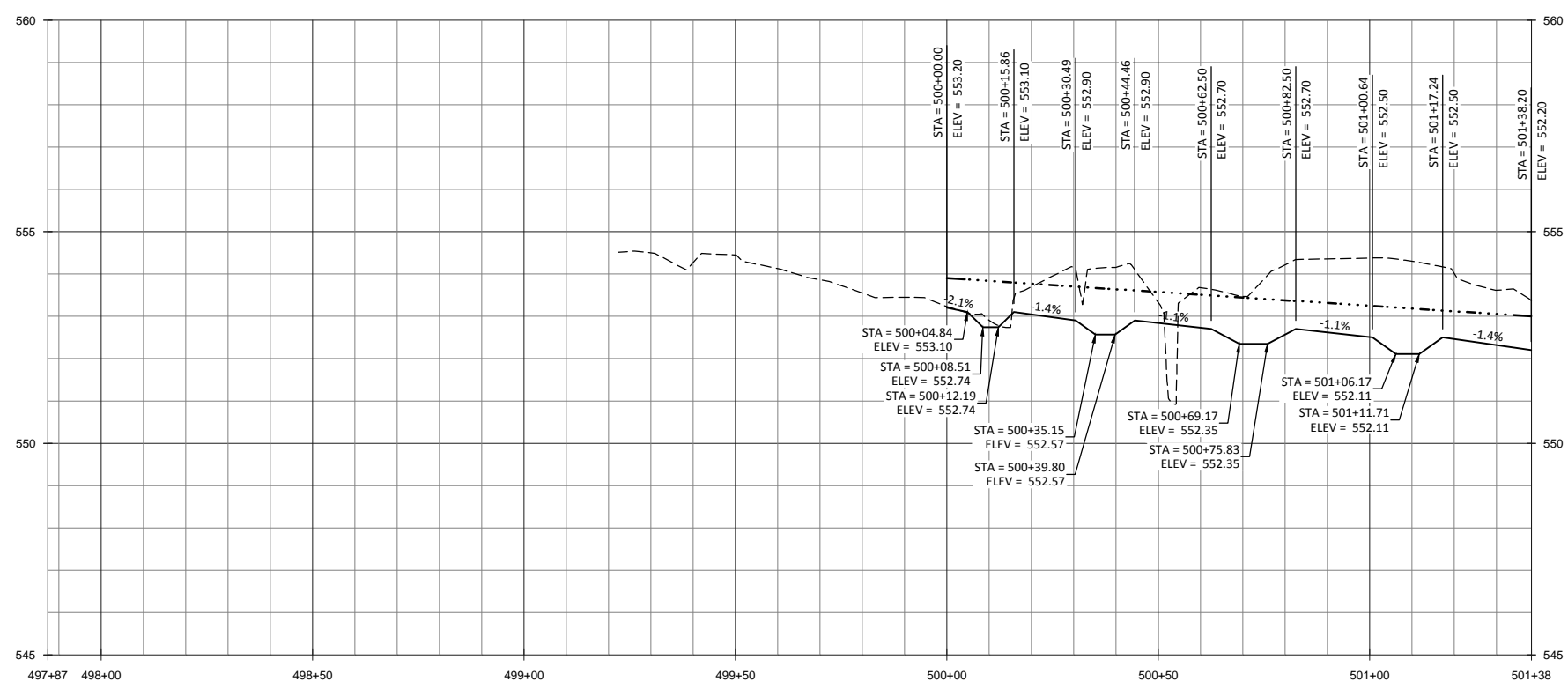
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Maney Farm Stream Mitigation Site
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UT4
 Stream Plan and Profile

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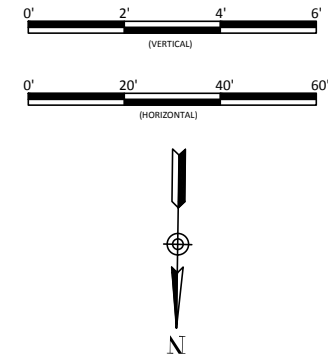
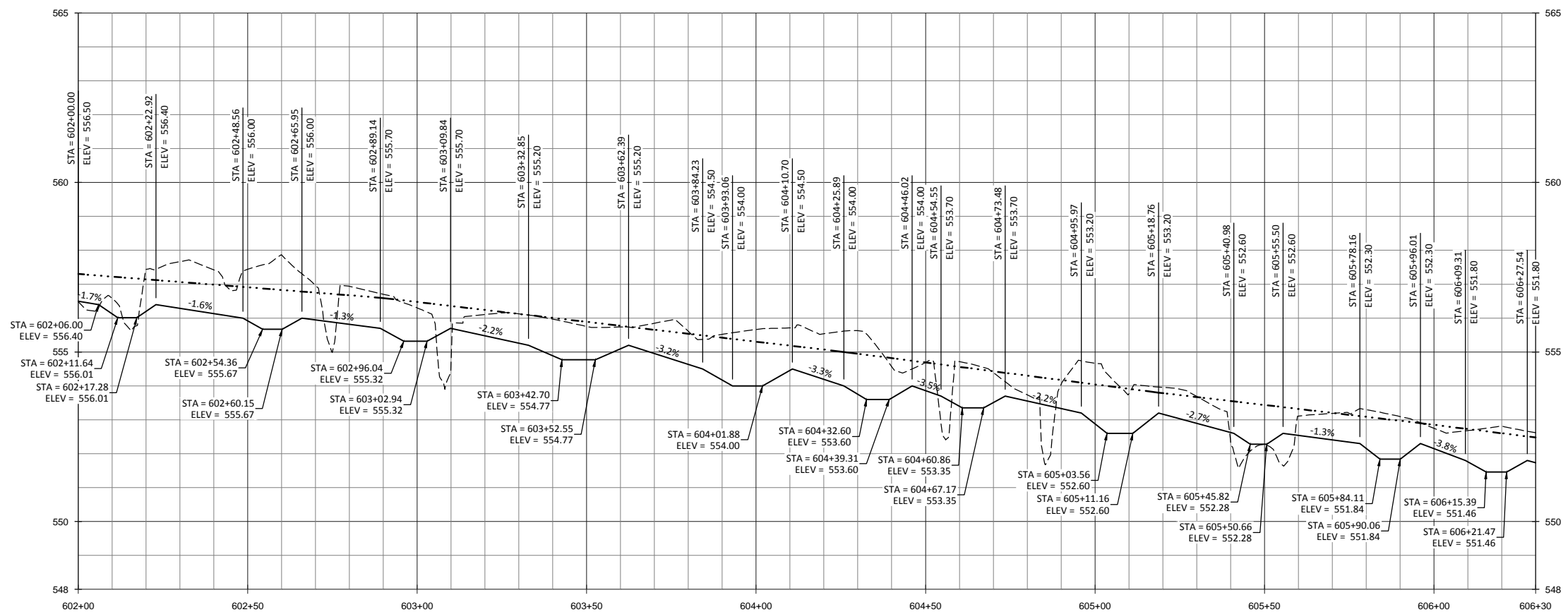
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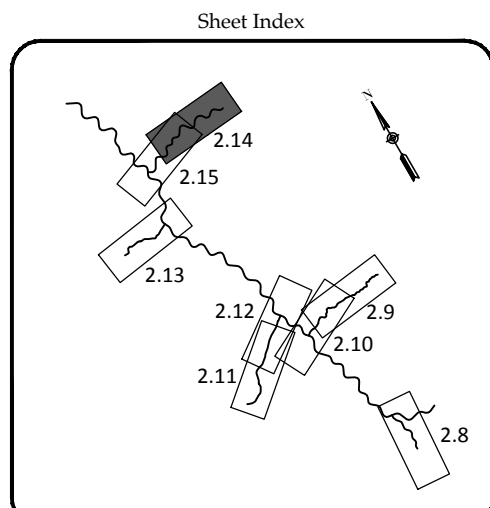
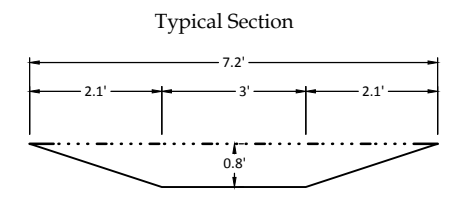
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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UT5
Stream Plan and Profile

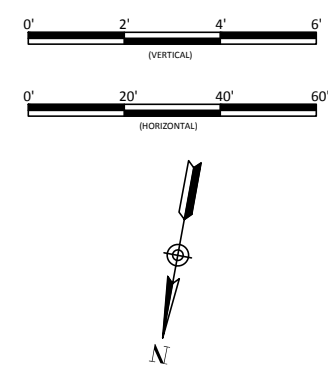
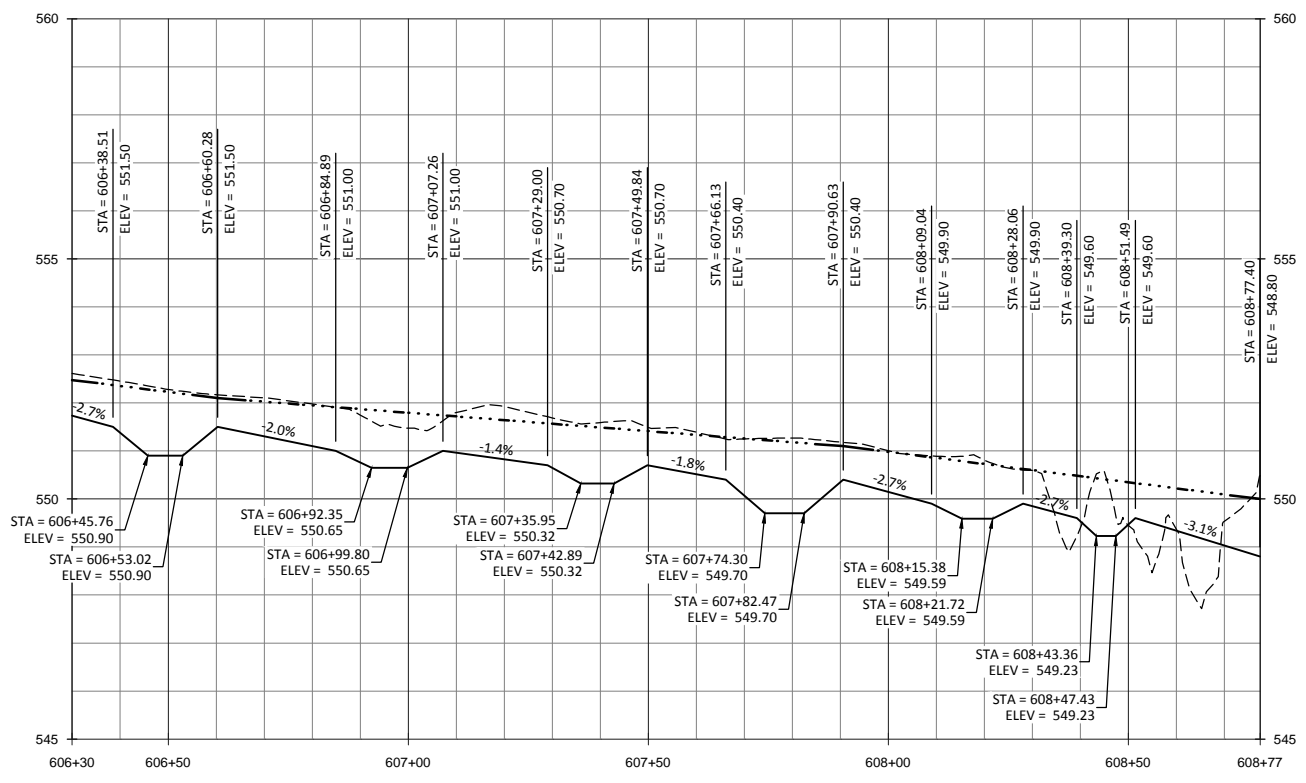
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Drawn By: JCK
Checked By: JK

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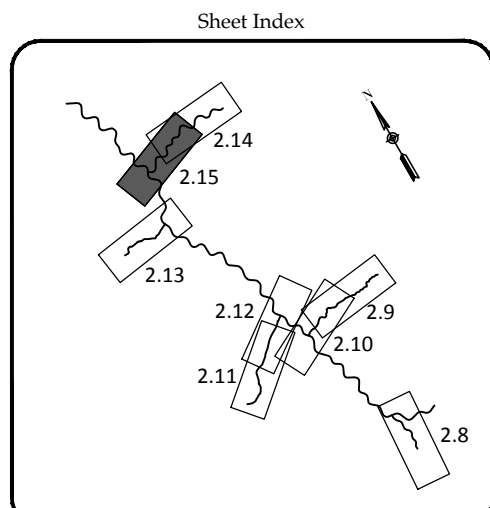
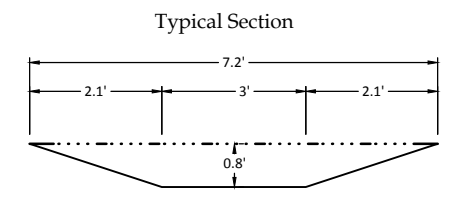
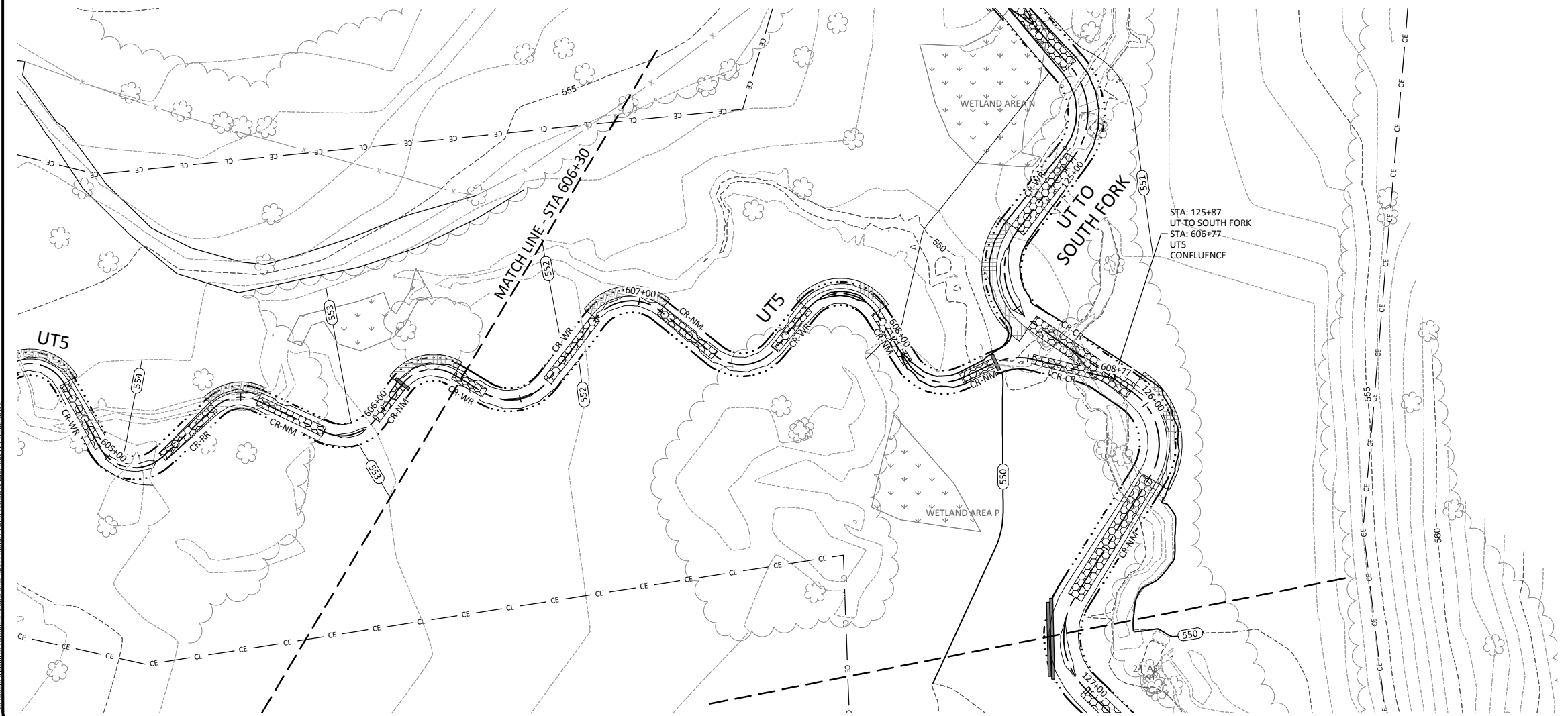
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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

Planting List

Streambank Planting Zone						
Live Stakes						
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Size	Stratum	% of Stems
<i>Salix nigra</i>	Black Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
<i>Cornus ammomum</i>	Silky Dogwood	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
<i>Salix sericea</i>	Silky Willow	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	35%
<i>Physocarpus opulifolius</i>	Ninebark	8 ft.	2-8 ft.	0.5"-1.5" cal.	Shrub	15%
						100%
Herbaceous Plugs						
* <i>Juncus effusus</i>	Common Rush	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
<i>Carex alata</i>	Broadwing Sedge	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	40%
<i>Panicum virgatum</i>	Switchgrass	5 ft.	3-5 ft.	1.0"- 2.0" plug	Herb	20%

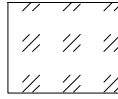
*Juncus effusus only to be used in channels within 100' of confluence with UT to South Fork Cane Creek.

Buffer Planting Zone						
Bare Root						
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems
<i>Alnus serrulata</i>	Tag Alder	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	8%
<i>Quercus phellos</i>	Willow Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Platanus occidentalis</i>	Sycamore	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%
<i>Betula nigra</i>	River Birch	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Acer rubrum</i>	Red Maple	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Liriodendron tulipifera</i>	Tulip Poplar	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	10%
<i>Quercus palustris</i>	Pin Oak	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	5%
<i>Fraxinus pennsylvanica</i>	Green Ash	12 ft.	6-12 ft.	0.25"-1.0"	Canopy	20%

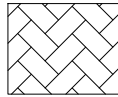
Supplemental Mid-Story / Shrub Planting Zone						
Bare Root						
Species	Common Name	Max Spacing	Indiv. Spacing	Min. Caliper Size	Stratum	# of Stems
<i>Carpinus caroliniana</i>	American Hornbeam	24 ft.	12-24 ft.	0.25"-1.0"	Mid-Story	50%
<i>Viburnum prunifolium</i>	Blackhaw Viburnum	24 ft.	12-24 ft.	0.25"-1.0"	Shrub	10%
<i>Calycanthus floridus</i>	Sweetshrub	24 ft.	12-24 ft.	0.25"-1.0"	Shrub	15%
<i>Callicarpa americana</i>	American Beautyberry	24 ft.	12-24 ft.	0.25"-1.0"	Shrub	15%
<i>Symphoricarpos orbiculatus</i>	Coralberry	24 ft.	12-24 ft.	0.25"-1.0"	Shrub	10%



ZONE 1 - STREAM BANK PLANTING ZONE



ZONE 2 - BUFFER PLATING ZONE



ZONE 3 - SUPPLEMENTAL MID-STORY/SHRUB PLATING ZONE

Permanent Riparian Seeding				
Pure Live Seed (20 lbs/ acre)				
Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
All Year	<i>Panicum rigidulum</i>	Redtop Panicgrass	Herb	1.5
All Year	<i>Agrostis hyemalis</i>	Winter Bentgrass	Herb	4.0
All Year	<i>Chasmanthium latifolium</i>	River Oats	Herb	2.0
All Year	<i>Rudbeckia hirta</i>	Blackeyed Susan	Herb	1.0
All Year	<i>Coreopsis lanceolata</i>	Lanceleaf Coreopsis	Herb	1.0
All Year	<i>Carex vulpinoidea</i>	Fox Sedge	Herb	3.0
All Year	<i>Panicum clandestinum</i>	Deertongue	Herb	3.5
All Year	<i>Elymus virginicus</i>	Virginia Wild Rye	Herb	2.0
All Year	<i>Asclepias syrica</i>	Common Milkweed	Herb	0.2
All Year	<i>Baptisia australis</i>	Blue False Indigo	Herb	0.2
All Year	<i>Gaillardia pulchella</i>	Annual Gaillardia	Herb	1.0
All Year	<i>Echinacea purpurea</i>	Pale Purple Coneflower	Herb	0.6

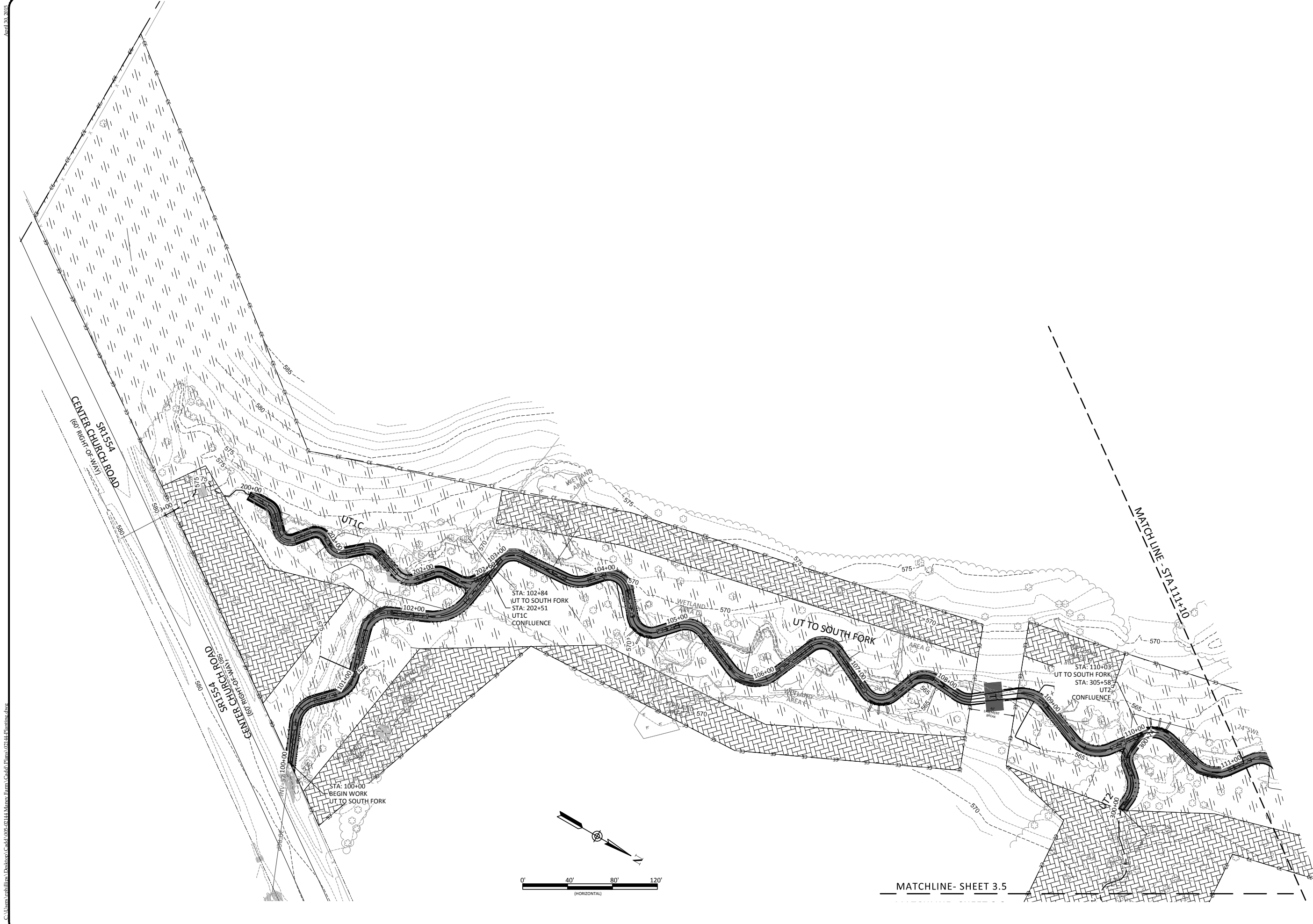
Permanent Seeding Outside Easement				
Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
All Year	<i>Festuca arundinacea</i>	Tall Fescue	Herb	40

Temporary Seeding				
Pure Live Seed				
Approved Date	Species Name	Common Name	Stratum	Density (lbs/acre)
Aug 15 - May 1	<i>Secale cereale</i>	Rye Grain	Herb	140
May 1 - Aug 15	<i>Setaria italica</i>	German Millet	Herb	50

Revisions:

Date: May 1, 2015
Job Number: 005-02144
Project Engineer: JK
Drawn By: JCK
Checked By: JK

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Maney Farm Stream Mitigation Site
Chatham County, North Carolina

UT to South Fork & UT1
 Planting

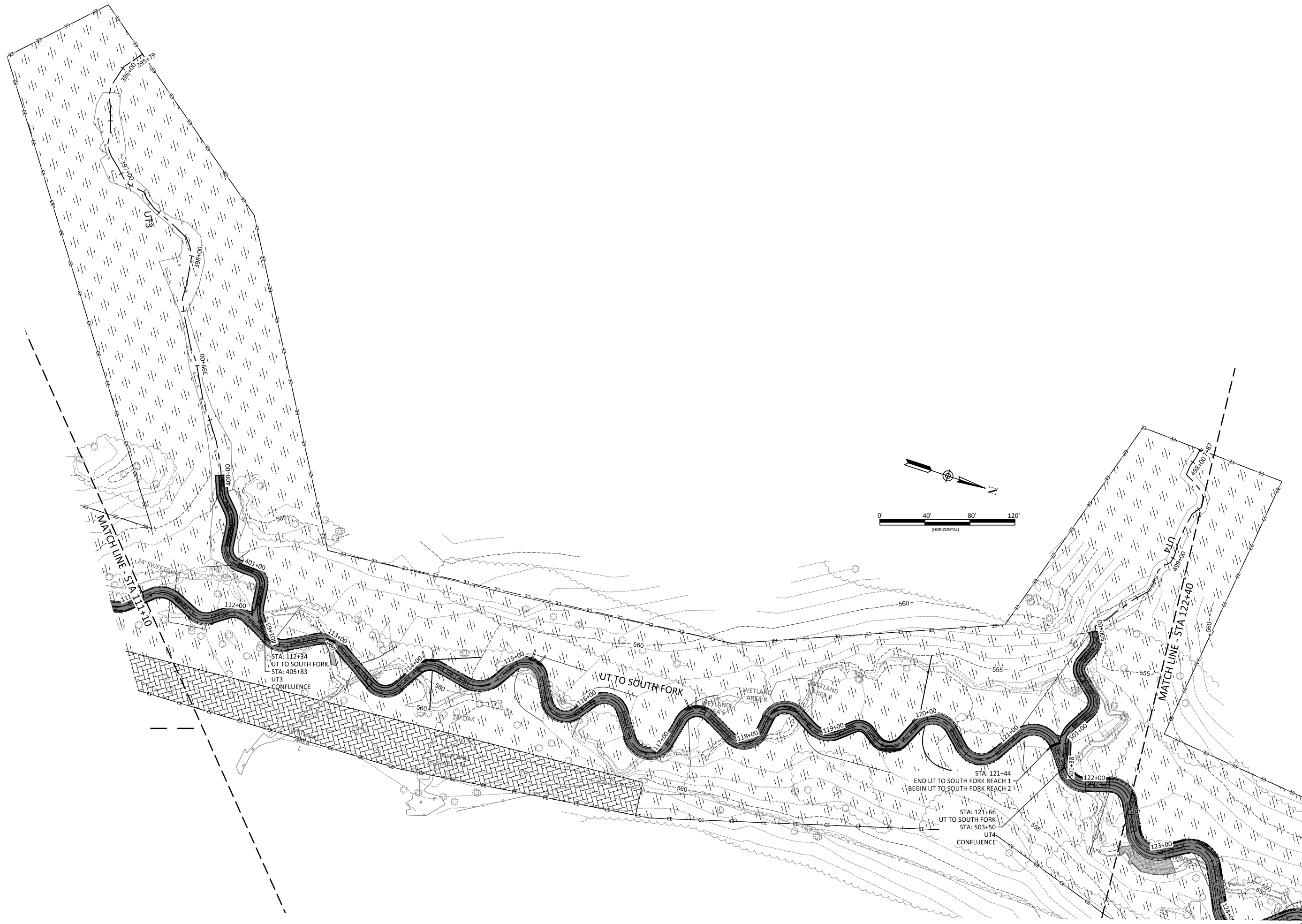
Revisions:

Date: May 1, 2015
 Job Number: 005-02144
 Project Engineer: JK
 Drawn By: JCK
 Checked By: JK

3.2

Sheet

April 30, 2015
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Date: May 1, 2015
Job Number: 005-02144
Project Engineer: JK
Drawn By: JCK
Checked By: JK

Revisions:

Maney Farm Stream Mitigation Site
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UT to South Fork, UT3, & UT4
Planting

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Maney Farm Stream Mitigation Site
 Chatham County, North Carolina

UT to South Fork & UT5
 Planting

Revisions:

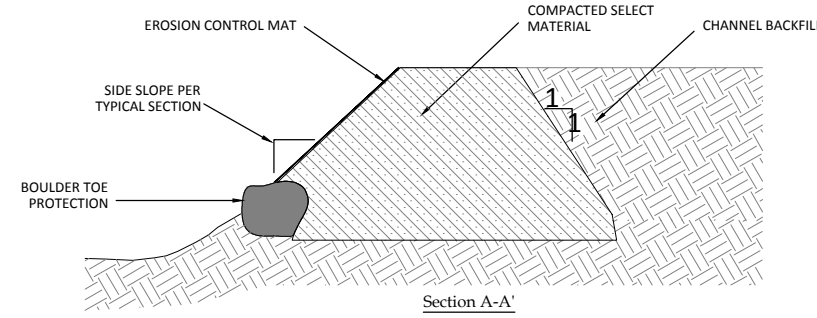
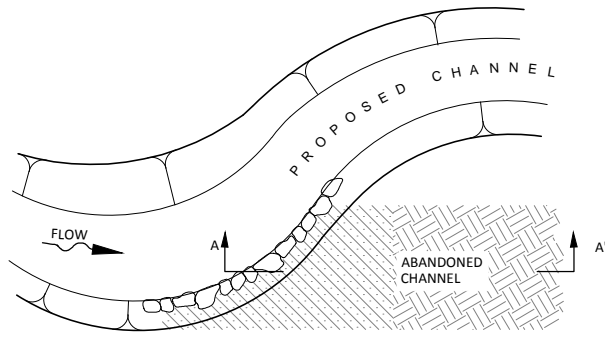
Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

3.4

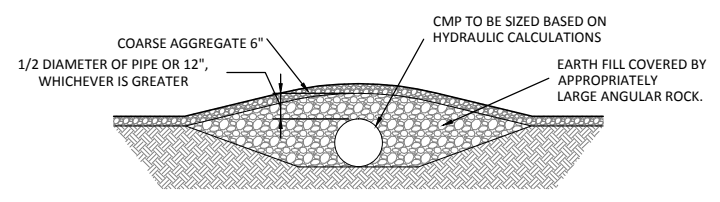
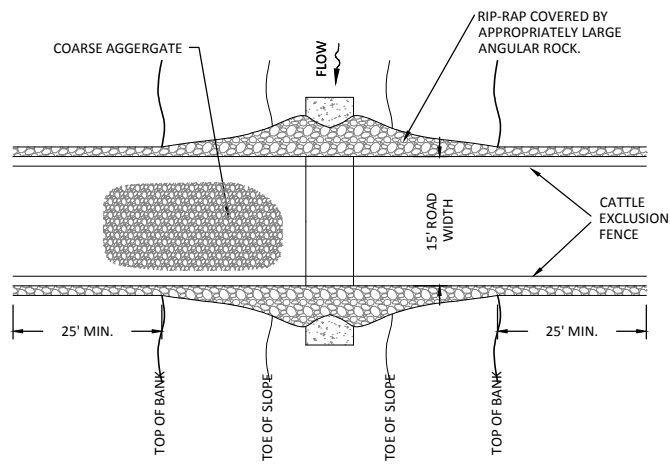
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1
5.4 Channel Plug
Not to Scale



2
5.4 Stream Crossing - Culvert
Not to Scale

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Maney Farm Stream Mitigation Site
Chatham Country, North Carolina

Details

Revisions:

Date:	May 1, 2015
Job Number:	005-02144
Project Engineer:	JK
Drawn By:	JCK
Checked By:	JK

5.4

