MITIGATION PLAN

Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project
Granville County, North Carolina

NCEEP Project Identification No. 95807

Tar-Pamlico River Basin
USGS Hydrologic Unit 03020101

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

November, 2013

FINAL

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Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project
Granville County, North Carolina

NCEEP Project Identification No. 95807
NCEEP RFP No. 16-004795

Tar-Pamlico River Basin
USGS Hydrologic Unit 03020101

Prepared for:

NC Department of Environment and Natural Resources
Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699-1652

Prepared by:

O'Brien & Gere Engineers, Inc.
2610 Wycliff Road, Suite 104
Raleigh, NC 27607
919-783-7777

And:

EEE Consulting, Inc.
601 Cascade Pointe Lane, Suite 101
Cary, NC 27513
919-650-2463

November 2013
FINAL

EXECUTIVE SUMMARY

This mitigation plan has been written in conformance with the requirements of the following:

- North Carolina Division of Water Quality Administrative Code 15A NCAC 02B.0260
- EEP Full Delivery RFP 16-004795 and associated addendum

These documents govern North Carolina Ecosystem Enhancement Program (NCEEP) operations and procedures for the delivery of compensatory mitigation.

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project site is located in Granville County in the Tar-Pamlico River Basin, USGS Hydrologic Unit 03020101. The property is under row-crop cultivation and is currently planted in tobacco. Generally, riparian mitigation activities are proposed for areas beginning at the top-of-bank and extending out to 100 feet, and nutrient offset mitigation activities are proposed for areas beginning at 100 feet and extending out to 200 feet. The project will result in a maximum of 8.1 Riparian Mitigation Units (RMUs) and 14.5 Nutrient Mitigation Units (NMUs) by establishing 30.19 acres of buffer easement along four unnamed tributaries to Coon Creek, including along Crews Farm Lake, an in-line impoundment. RMU and NMU asset areas will not overlap. Current design plans (November, 2013) indicate slightly more mitigation acres are available, which will help ensure that mitigation unit goals will be met.

Riparian buffer and nutrient offset restoration will provide improvement in three ecological function categories: water quality; aquatic and wildlife habitat improvement; and flood attenuation. Water quality and habitat will be improved by widening the riparian buffer and improving the complexity and diversity of the species composition by planting native plant species and by controlling invasive plants. Aquatic habitat will be improved by increased water quality and by providing additional shading and thereby lowered water temperatures. In restoring the riparian buffer, the project will help stabilize the stream and provide flood attenuation.

Invasive species control is a component of the construction activities proposed within the conservation easement boundaries. After construction, monitoring activities will include field surveys to detect and limit the establishment of invasive species. Depending upon the species and the extent of the population, an appropriate control method will be used, including hand-pulling or use of an herbicide. The method used to control and eliminate invasive plant species will be an aquatic herbicide applied in accordance with USDA regulations.

No existing land uses (such as residential) will constrain the mitigation design. No overhead or underground utilities are located within the proposed mitigation areas. One stream crossing will remain in the proposed easement along UT1 to allow farm equipment access between two fields. This crossing will be a low-flow ford crossing, requiring no further improvement at this time. Additionally, a right-of-way will be maintained in the proposed easement of Crews Farm Lake to allow for irrigation equipment access. This 14-ft-wide area will not be planted, and will be maintained by the landowner.

An inspection of the site will be conducted at a minimum of twice per year throughout the post-construction monitoring period or until performance standards are met. An annual monitoring and an annual site assessment will be performed. These site visits will include a complete inspection of the project easement boundary, and will identify problem areas or features that require maintenance. The measure of vegetative success for the site will be the survival of at least 320 planted hardwood stems per acre at the end of year five of the monitoring period. Annual monitoring data will be reported using the NCEEP monitoring report template v 1.5 adopted 8 June 2012. The monitoring report will provide a project data chronology that will facilitate an understanding of project status and trends, population of NCEEP databases for analysis, research purposes, and assist in decision making regarding project closeout.

Upon approval for closeout by North Carolina Department of Water Resources (NCDWR), the site will be transferred to the State of North Carolina (State). The State 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.

TABLE OF CONTENTS

List of Appendices

A. Site Protection Instrument
B. Regulatory Correspondence
C. Mitigation Work Plan Data
D. Project Plan Sheets

1.0 RESTORATION PROJECT GOALS AND OBJECTIVES

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (Coon Creek Mitigation Project) is located in the Fishing Creek Local Watershed planning area (www.nceep.net/Fishing Creek). The project site watershed includes Hydrologic Unit Code (HUC) 03020101020010, which was identified as a Targeted Local Watershed (TLW) in NCEEP's 2004 Tar-Pamlico River Basin Restoration Priority (RBRP) Plans (http://www.nceep.net/services/restplans/TarPamilicoPlan.pdf) and is identified in the Fishing Creek LWP Project Atlas.

NCEEP developed a local watershed plan (LWP) for the 70 square miles (sq mi). Fishing Creek watershed that included land use analysis, water quality monitoring and stakeholder input to identify problems with water quality, habitat and hydrology. The Fishing Creek watershed is characterized in the LWP as predominantly forested, agricultural, and low density residential with some development centered near the City of Oxford. In the subwatersheds surrounding the City of Oxford, the condition of riparian buffers is generally poorer and stream stability and aquatic habitat are more degraded than in the lower portions of the Fishing Creek Watershed. Much of these impacts relate back to the agricultural land use (land clearing, agricultural chemical use, and livestock impacts). Furthermore, the portion of Fishing Creek downstream of the wastewater treatment plant near Oxford has poorer water quality and degraded benthic and fish communities as compared to most of the other streams throughout the watershed.

NCEEP completed the Fishing Creek LWP in March 2013 (http://portal.ncdenr.org/Fishing Creek LWP). The Fishing Creek LWP identified key watershed stressors as deforested riparian buffers and degraded riparian habitats, livestock access to streams, stream and stream bank instability resulting in degraded aquatic habitat, point and non-point source pollution and degraded benthic and fish communities. The LWP Project Atlas presents two projects that each contain portions of the Coon Creek Mitigation Project. One project is located north of Winding Oak Road; the other is located south of Winding Oak Road.

The goals of the Coon Creek Mitigation Project address stressors identified in the LWP and include the following:

- Improve water quality by reducing
  - Turbidity to improve clarity for proper plant and animal growth
  - Nutrient input from fertilizers used for agricultural purposes
  - Sediment input by decreasing erosion potential
  - Chemical input from pesticides used for agricultural purposes

- Improve aquatic/terrestrial habitat by providing
  - Wildlife habitat for birds and other species dependent on the streams and woods for food, shelter and raising young
  - Shade, which stabilizes water temperatures, keeping water livable for fish and other aquatic species
  - Woody debris and organic matter to the bacteria, fungi and other species forming the basis of the aquatic food chain

- Improve attenuation capacity to
  - Mitigate flood flows
  - Allow for dissipation of energy associated with flood flows
  - Reduce downstream flooding

- Improve connectivity
  - With upstream and downstream forested areas
  - Facilitate wildlife movement

- Comply with the NCDWR NSW classification
  - » No increase in nutrients over background levels is allowed within Nutrient Sensitive Waters.

The riparian buffer and surrounding area has been altered by years of agricultural activities, including ditching and clearing. The riparian buffer is in poor condition ranging from partially vegetated, to nearly void of vegetation. The areas void of vegetation will be restored by planting native woody vegetation. In order to achieve the project goals, the mitigation plan accomplishes the following objectives:

- Plant both the wetland and upland area of the riparian corridor with native tree and shrub vegetation beginning at the top-of-bank and extending out to 100 feet.
- Plant the area landward of the riparian buffer out to 200 feet to provide nutrient offset
- Protect the restored riparian buffer, nutrient offset area, and streams through a conservation easement

2.0 SITE SELECTION

2.1 DIRECTIONS TO SITE

The Coon Creek Mitigation Project is located along Winding Oak Road in Granville County approximately 6 miles north of Oxford, NC (Figure 2.3, Vicinity Map). From Raleigh, take I-85 to the intersection with US-158, Exit 206. Turn left onto US-158 W and travel 0.6 miles. Turn right onto US-158 W/Oxford Loop Rd and travel 3.0 miles. Turn right onto US-15 N and travel 1.8 miles. Turn right onto Winding Oak Rd and travel 1 mile. The Coon Creek Mitigation Project will be on both the north and south sides of Winding Oak Road (Figure 2.6, Current Condition Plan View).

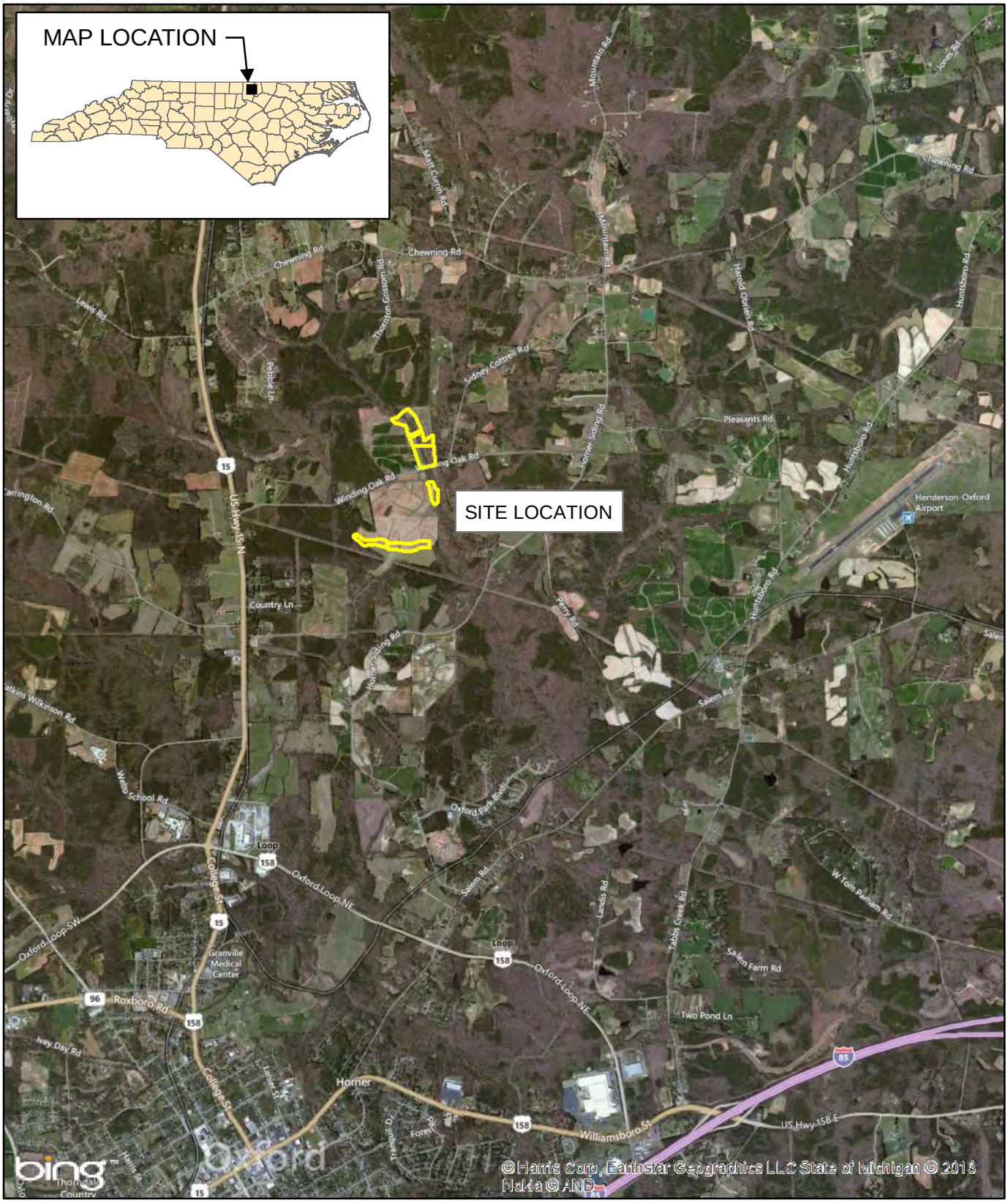
2.2 SITE SELECTION

The Coon Creek Mitigation Project site was selected because of the current land use and the poor condition of the riparian buffer. Land use within the site is active tobacco crop production (Figure 2.6, Current Conditions Plan View). Historical land use at the site included cultivation and timber production (Figure 2.7, Historical Condition Plan View), with a trend toward increased cultivation since the late 1990s. The majority of the riparian buffer is in very poor condition, even where vegetation is present. Invasive plants, especially Chinese privet (*Ligustrum sinense*), are present in some locations within the existing buffer. The site consists of segments of four unnamed tributaries (UT) to Coon Creek. The Watershed Map (Figure 2.4) illustrates the locations of the stream reaches and their respective watershed areas. The site focuses on UT1, a perennial stream and the main tributary to Coon Creek that the other three tributaries flow into. UT2 is an intermittent tributary that flows into UT1 from the east. UT3 is an intermittent stream that flows into UT1 from the west, lower down in the watershed. UT4 is a portion of an intermittent stream that flows into a large agricultural irrigation impoundment, Crews Farm Lake. The lake discharges to become a stream again and flows into UT1 outside of the project boundaries.

The site is located within the Northern Outer Piedmont physiographic province, within a rural watershed that contributes to Coon Creek (Griffith et al., 2002). Small farm fields, forested areas, and rural home sites are the most common land uses, with agricultural fields, dairy operations, and home sites being three common disturbances to the natural communities in the project vicinity. Potential threats to stream quality in this area are soil erosion and excessive nutrient input, both non-point sources of pollution. Soil data indicates that the majority of the site is composed of Chewacla and Wehadkee soils in the bottomlands, with Enon loam on the slopes. Smaller areas of Cecil sandy loam, Cecil clay loam, Georgeville silt loam, Helena silt loam, and Vance sandy loam are also present (Figure 2.5, NRCS Soil Survey Map, 2002).

The drainage area of UT1 to the point it exits the project site is approximately 1,739 acres, with 292 of those acres being contributed by UT2, and 57 acres of those acres being contributed by UT3. UT2 and UT3 are sub-watersheds of UT1. The drainage area of UT4 and Crews Farm Lake is 535 acres. These four tributaries to Coon Creek are located in the upper portions of the Coon Creek watershed. The streams are fed by a combination of groundwater and surface runoff.

FIGURE 2.3



LEGEND

Project Area

NCEEP FULL DELIVERY PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
GRANVILLE COUNTY, NC

N

VICINITY MAP

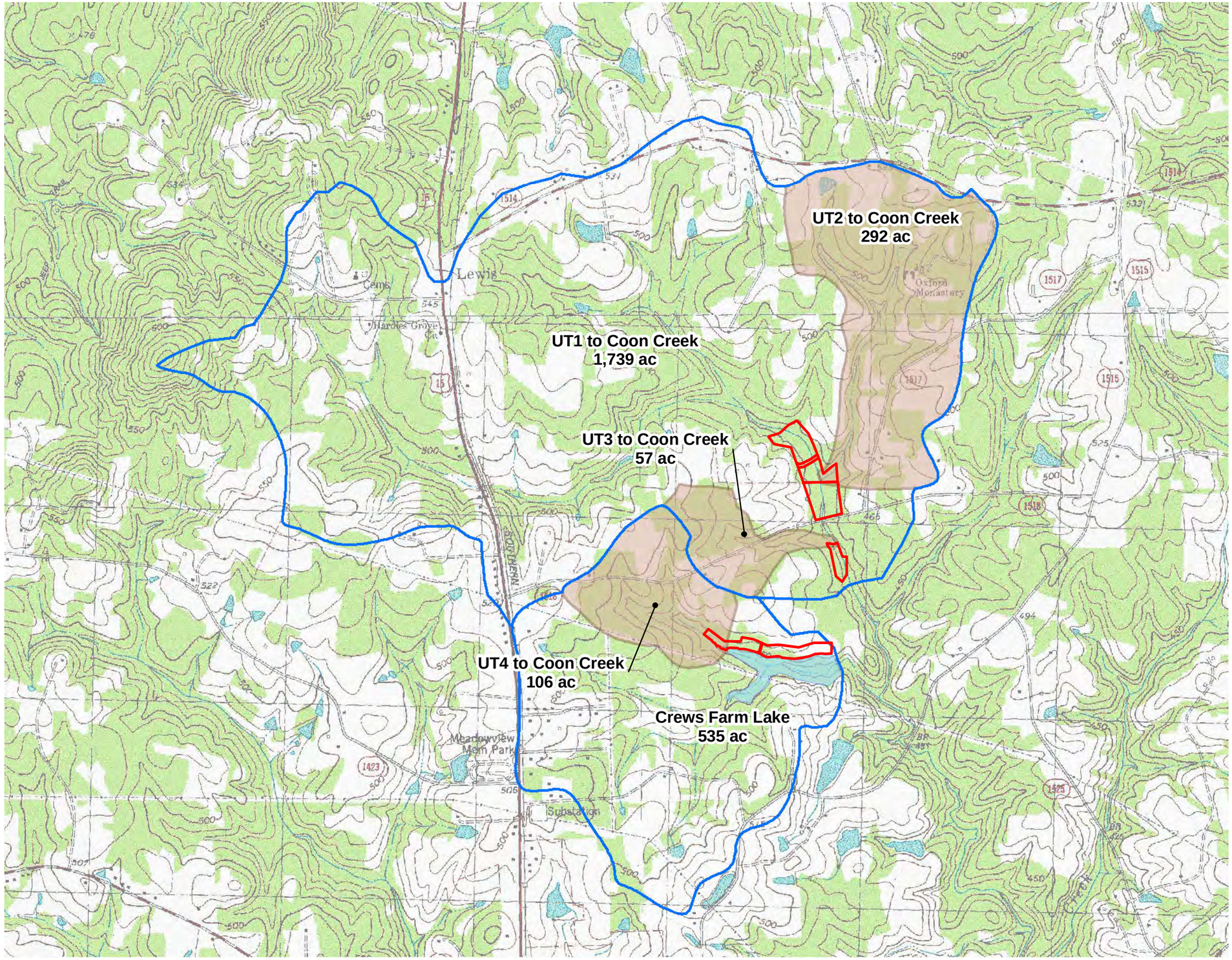
0 0.25 0.5 1
Miles

11/13/2013
50349

3e

O'BRIEN & GERE

FIGURE 2.4



N

Legend

- Conservation Easements
- Primary System Watershed
- Tributary Watershed
- Crews Farm Lake

NCEEP FULL DELIVERY
PROJECT #95807

COON CREEK
RIPARIAN BUFFER AND
NUTRIENT OFFSET
MITIGATION PROJECT
GRANVILLE COUNTY, NC

WATERSHED MAP

0 500 1,000 2,000
Feet

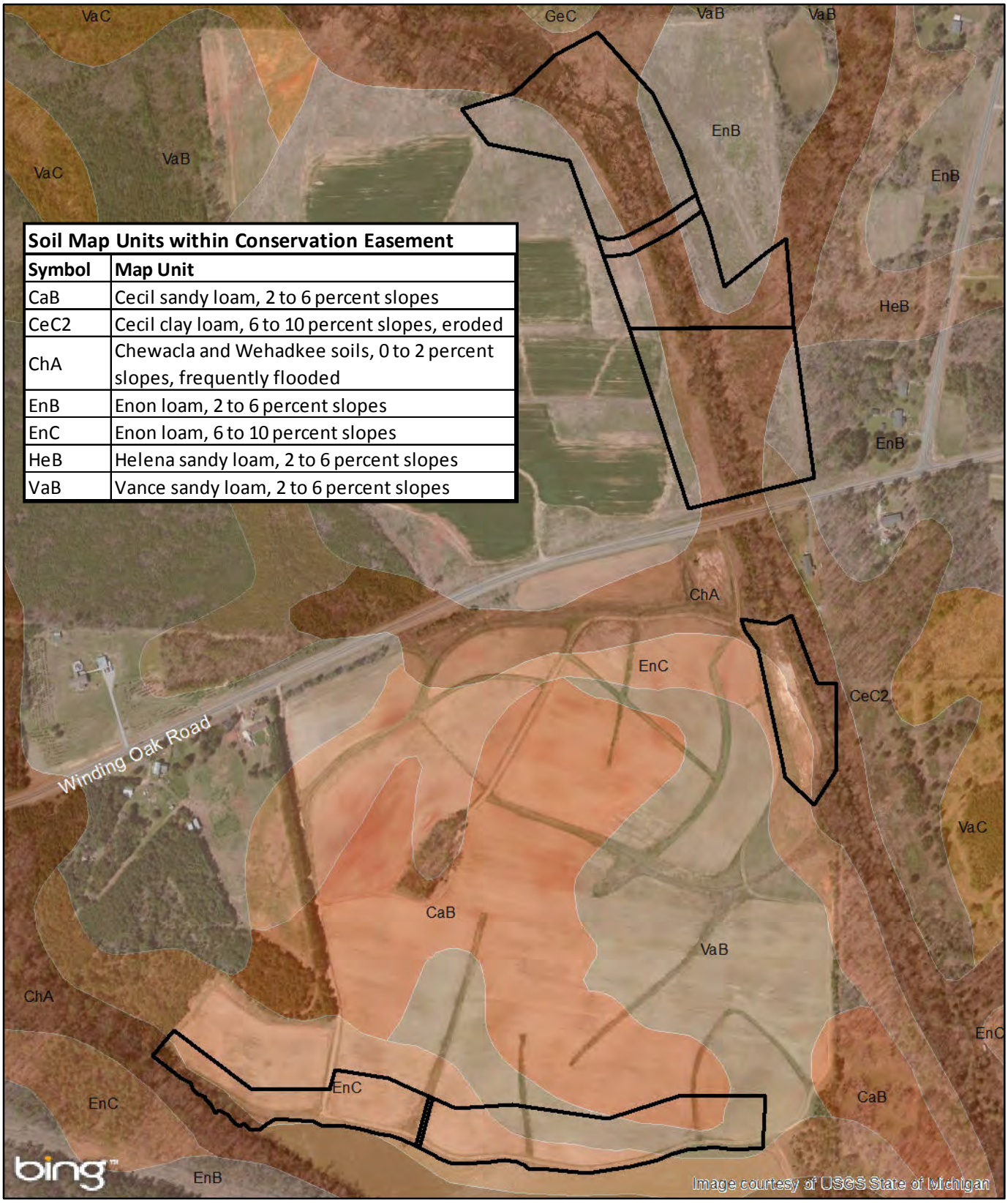
11/13/13
50349

3e

O'BRIEN & GERE

This document was developed in color. Reproduction in B/W may not represent the data as intended.

FIGURE 2.5



Soil Map Units within Conservation Easement	
Symbol	**Map Unit**
CaB	Cecil sandy loam, 2 to 6 percent slopes
CeC2	Cecil clay loam, 6 to 10 percent slopes, eroded
ChA	Chewacla and Wehadkee soils, 0 to 2 percent slopes, frequently flooded
EnB	Enon loam, 2 to 6 percent slopes
EnC	Enon loam, 6 to 10 percent slopes
HeB	Helena sandy loam, 2 to 6 percent slopes
VaB	Vance sandy loam, 2 to 6 percent slopes

Legend

Conservation Easement

NCEEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
GRANVILLE COUNTY, NC

N

NRCS SOIL SURVEY MAP

0 250 500 1,000

Feet

11/13/13
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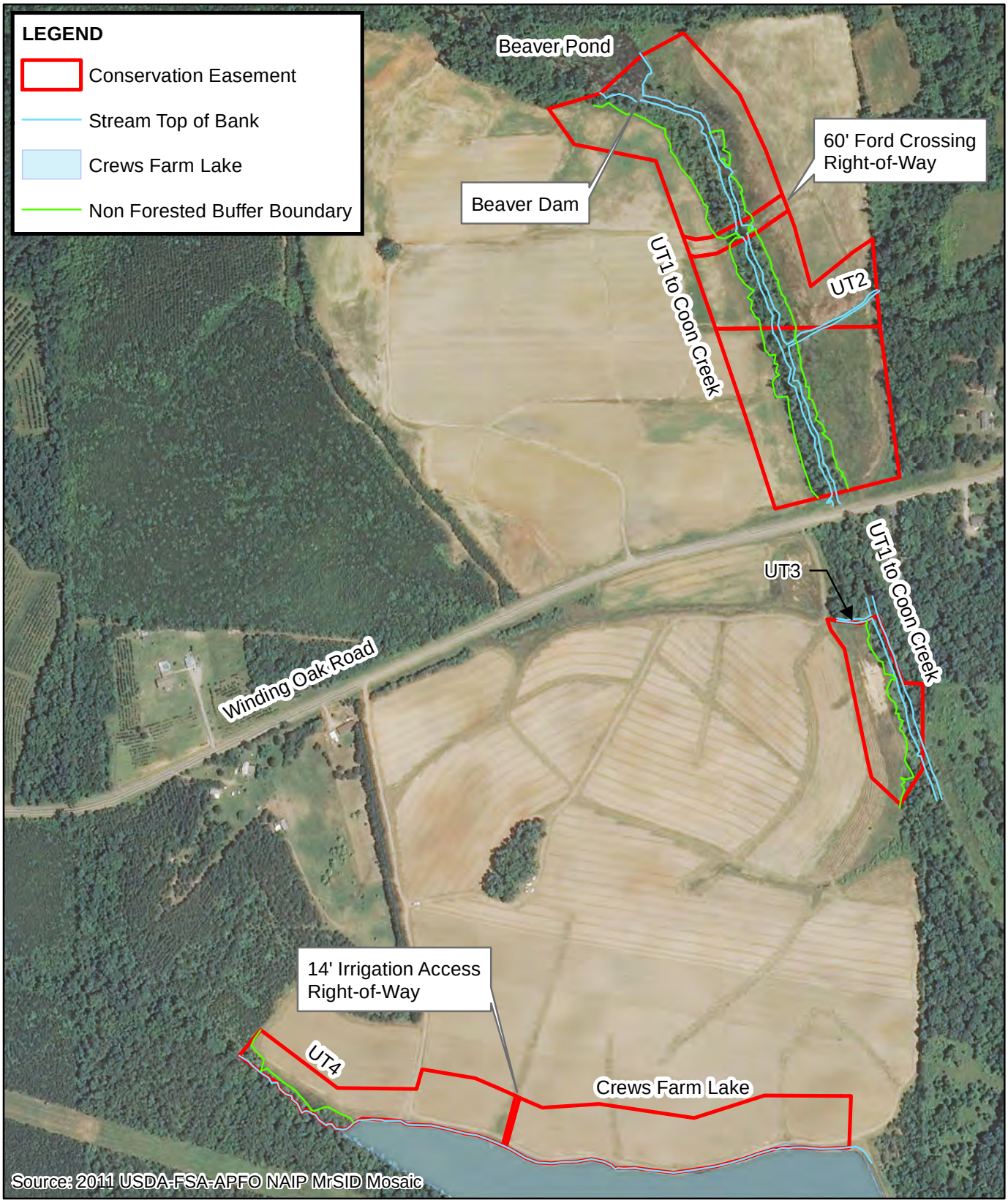
O'BRIEN & GERE

FIGURE 2.6



NCEEP FULL DELIVERY PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
GRANVILLE COUNTY, NC

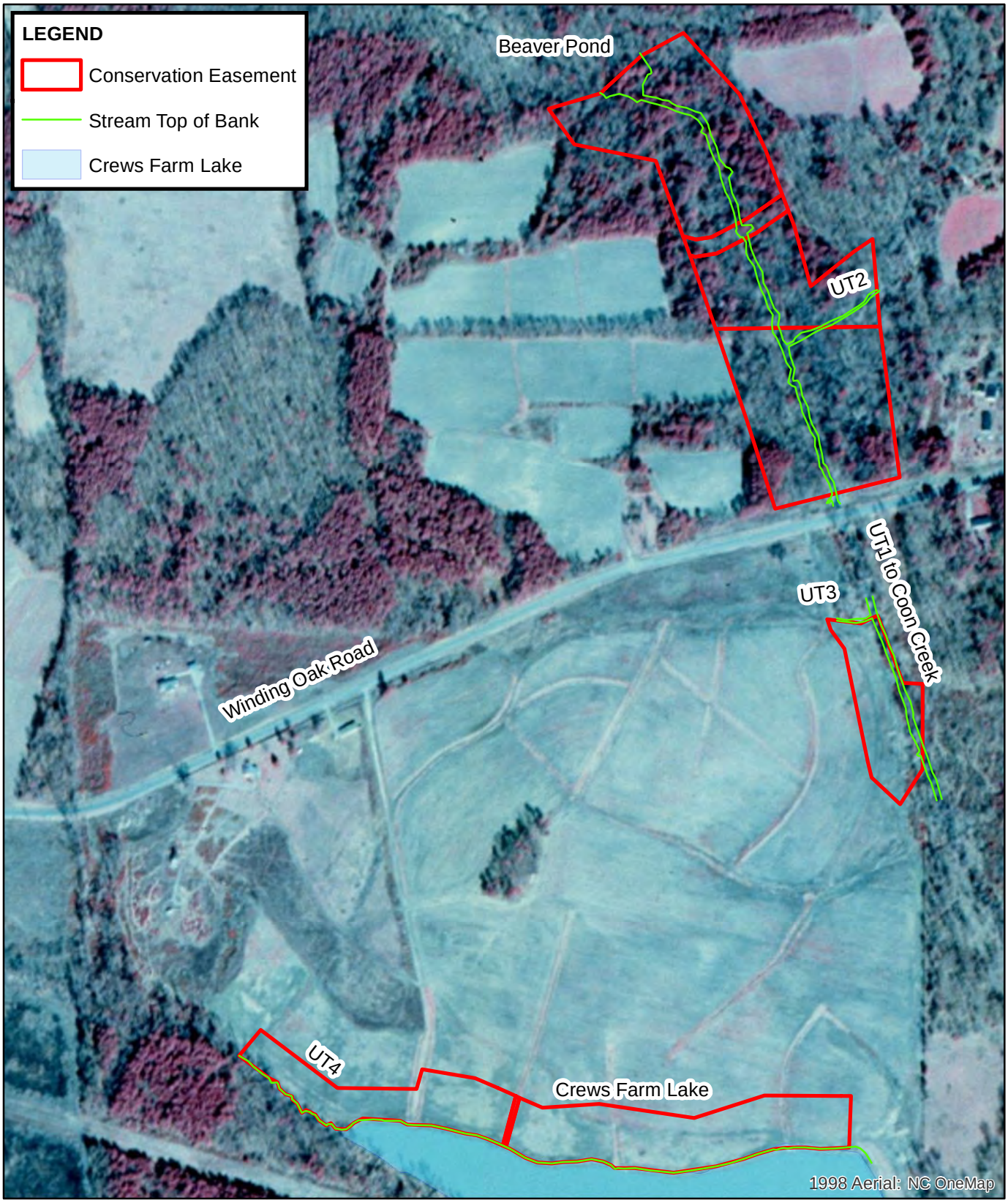
CURRENT CONDITION PLAN VIEW

N

0 250 500 1,000
Feet

11/14/13
50349

FIGURE 2.7



NCEEP FULL DELIVERY PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
GRANVILLE COUNTY, NC

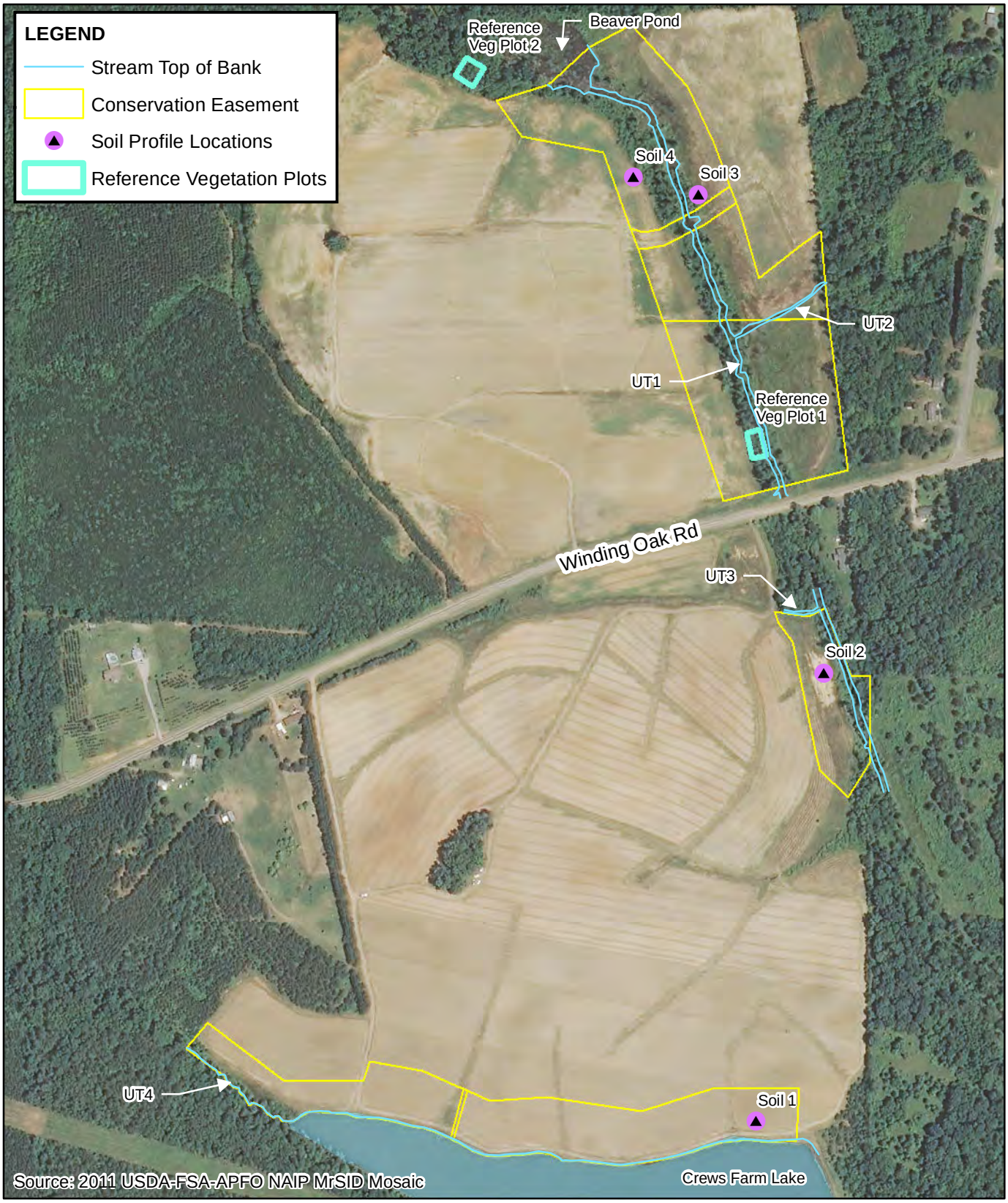
HISTORICAL CONDITION PLAN VIEW

N

0 250 500 1,000
Feet

11/13/13
50349

FIGURE 2.8



N

0 200 400 800

Feet

EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
GRANVILLE COUNTY, NC

11/14/13
50349

DATA COLLECTION LOCATION MAP

3e

O'BRIEN & GERE

FIGURE 2.9 – SITE PHOTOGRAPHS

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
1	8/31/12

DESCRIPTION

UT1; right bank, south of Winding Oak Road; riparian buffer and nutrient offset restoration area.

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
2	8/31/12

Description

UT4; facing upstream at upper limit of impoundment backwater influence from Crews Farm Lake.

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
3	8/31/12

Description

UT1; north of Winding Oak Road at confluence with UT2; from right bank.

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
4	8/31/12

Description

UT2; facing downstream; riparian buffer and nutrient offset restoration area.

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
5	8/31/12		
Description			
UT1; view of left bank riparian buffer and nutrient offset restoration area.			

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
6	7/18/13		
Description			
Crews Farm Lake; view facing east along north bank of lake.			

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
7	7/22/13		
Description			
UT1; left bank north of farm crossing.			

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
8	7/22/13		
Description			
UT1; left bank south of farm crossing.			

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
9	7/18/13

Description

UT1; right bank south of farm crossing.

Client Name	**Site Location**	**Project No.**
NCEEP	Granville County	95807

Photo No.	**Date**
10	7/18/13

Description

UT1 and UT3 south of Winding Oak Road, showing orange flags used to delineate vegetation boundary.

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
11	7/18/13		
Description			
Reference Vegetation Plot 1 on UT1 right bank south of farm crossing, north of Winding Oak Road.			

Client Name		**Site Location**	**Project No.**
NCEEP		Granville County	95807
Photo No.	**Date**		
12	7/19/13		
Description			
Reference Vegetation Plot 2, UT1 right bank, north of project area.			

3.0 SITE PROTECTION INSTRUMENT

3.1 SITE PROTECTION INSTRUMENT(S) SUMMARY INFORMATION

The land required for the construction, management, and stewardship of this mitigation project includes portions of the following parcels. The closing documentation has been submitted to NCEEP and the State Property Office (SPO) for review. Closing on the conservation easement will be contingent on NCDWR approval of the Mitigation Plan. The land protection instruments will be provided under a separate cover. If the recorded document(s) are not available by completion of the Mitigation Plan, the template documents will be provided. All site protection instruments require 60-day advance notification to NCDWR and the State prior to any action to void, amend, or modify the document. No such action shall take place unless approved by NCDWR and the State.

Parcel	Landowner	PIN	County	Site Protection Instrument	Deed Book and Page Number	Acreage Protected
Parcel A	Crews Farm, LLC	7285	Granville	Conservation Easement	1283/664	11.43
Parcel B	Crews Farm, LLC	7284	Granville	Conservation Easement	1283/664	7.14
Parcel C	Crews Farm, LLC	7177	Granville	Conservation Easement	1150/317	11.62

NOTE "A"
SUBSURFACE AND ENVIRONMENTAL CONDITIONS WERE NOT EXAMINED OR CONSIDERED DURING THIS SURVEY. ALL BUILDINGS, SURFACE AND SUBSURFACE IMPROVEMENTS ON AND ADJACENT TO THE SITE ARE NOT NECESSARILY SHOWN HEREON. NO STATEMENT IS MADE CONCERNING THE EXISTENCE OF UNDERGROUND CONTAINERS WHICH MAY AFFECT THE USE OF THIS TRACT.

NOTE "B"
THE LOCATION OF UNDERGROUND UTILITIES AS SHOWN ARE BASED ON VISIBLE EVIDENCE AND DRAWINGS PROVIDED TO THE SURVEYOR. LOCATION OF UNDERGROUND UTILITIES AND STRUCTURES MAY VARY FROM LOCATIONS SHOWN HEREON, AND ADDITIONAL BURIED UTILITIES MAY EXIST. CONTACT THE APPROPRIATE UTILITY COMPANIES FOR INFORMATION REGARDING BURIED UTILITIES.

NOTE "C"
ALL DISTANCES ARE HORIZONTAL GROUND AND AREA BY COORDINATE COMPUTATION.

NOTE "D"
THIS SURVEY WAS DONE WITHOUT A TITLE SEARCH AND IS BASED ON REFERENCED INFORMATION. THERE MAY EXIST OTHER DOCUMENTS OF RECORD WHICH COULD AFFECT THIS PROPERTY

NOTE "E"
EXCEPT AS SPECIFICALLY STATED OR SHOWN, THIS SURVEY DOES NOT REPORT ANY OF THE FOLLOWING: EASEMENTS, OTHER THAN THOSE VISIBLE DURING FIELD EXAMINATION, BUILDING SETBACKS, RESTRICTIVE COVENANTS, ZONING OR LAND USE REGULATIONS AND ANY FACTS WHICH A TITLE SEARCH MAY DISCLOSE.

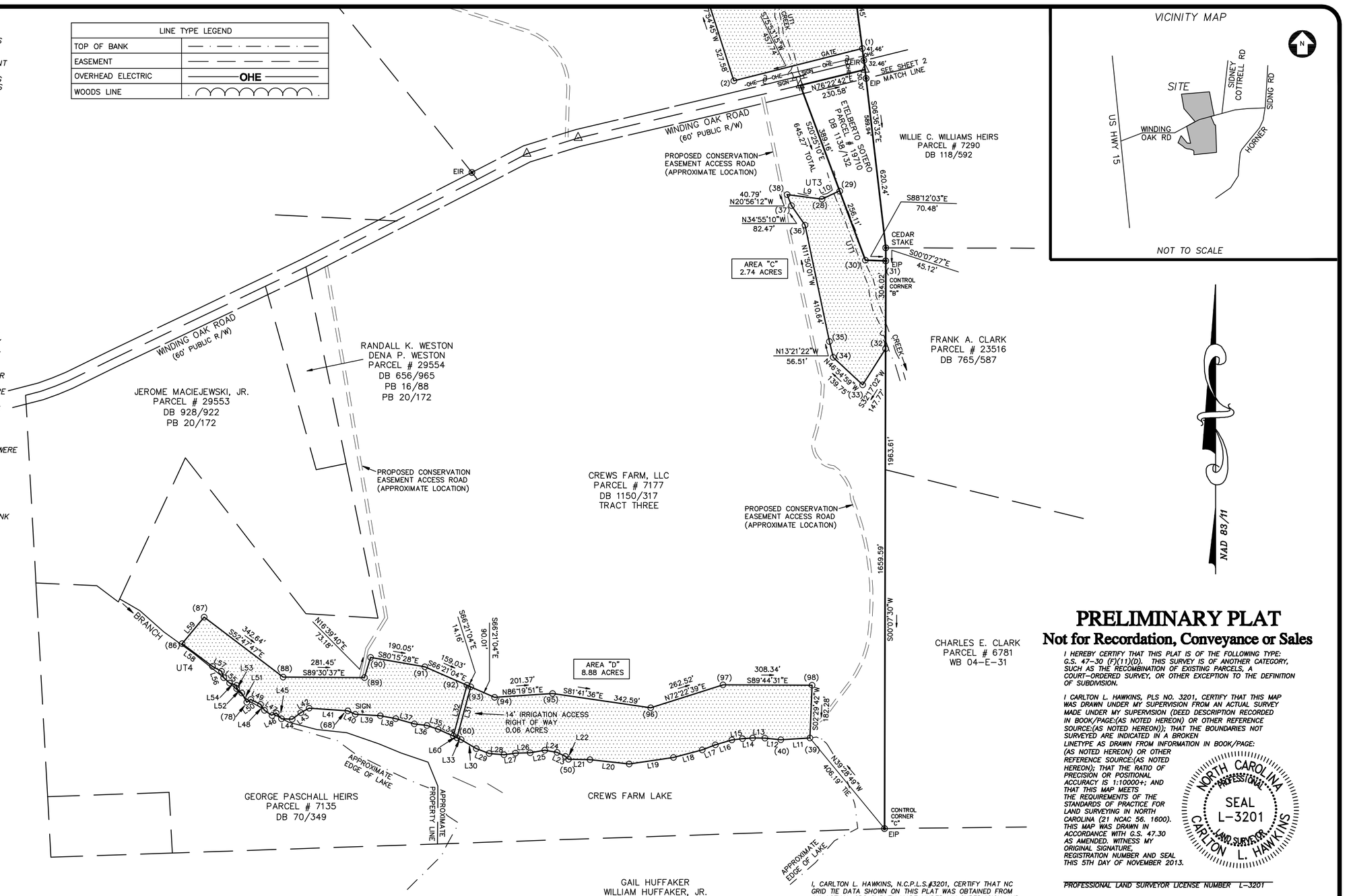
NOTE "F"
WETLANDS, JURISDICTIONAL WATERS OR OTHER CONDITIONS WHICH MAY BE REGULATED BY FEDERAL OR STATE OR LOCAL AGENCIES WERE NOT INVESTIGATED DURING THIS SURVEY. RIPARIAN BUFFERS AND OTHER RESTRICTIONS ON DEVELOPMENT MAY BE REQUIRED.

NOTE "G"
FLOOD ZONES OR BASE FLOOD ELEVATIONS WERE NOT INVESTIGATED DURING THIS SURVEY.

NOTE "H"
NO USGS MONUMENTS WERE FOUND WITHIN 2000' OF THIS SITE.

NOTE "I"
POINTS 41 THROUGH 88 ARE ALONG THE BANK OF CREWS FARM LAKE AND BRANCH ON THE WEST SIDE OF LAKE.

LINE TYPE LEGEND	
TOP OF BANK	— · — · — · — · —
EASEMENT	— — — — — —
OVERHEAD ELECTRIC	—— OHE ——
WOODS LINE	. ⌒⌒⌒⌒⌒⌒⌒⌒⌒ .



NAD 83/11

PRELIMINARY PLAT
Not for Recordation, Conveyance or Sales

I HEREBY CERTIFY THAT THIS PLAT IS OF THE FOLLOWING TYPE: G.S. 47-30 (F)(11)(D). THIS SURVEY IS OF ANOTHER CATEGORY, SUCH AS THE RECOMBINATION OF EXISTING PARCELS, A COURT-ORDERED SURVEY, OR OTHER EXCEPTION TO THE DEFINITION OF SUBDIVISION.

I CARLTON L. HAWKINS, PLS NO. 3201, CERTIFY THAT THIS MAP WAS DRAWN UNDER MY SUPERVISION FROM AN ACTUAL SURVEY MADE UNDER MY SUPERVISION (DEED DESCRIPTION RECORDED IN BOOK/PAGE:(AS NOTED HEREON) OR OTHER REFERENCE SOURCE:(AS NOTED HEREON)); THAT THE BOUNDARIES NOT SURVEYED ARE INDICATED IN A BROKEN LINETYPE AS DRAWN FROM INFORMATION IN BOOK/PAGE: (AS NOTED HEREON) OR OTHER REFERENCE SOURCE:(AS NOTED HEREON); THAT THE RATIO OF PRECISION OR POSITIONAL ACCURACY IS 1:10000+; AND THAT THIS MAP MEETS THE REQUIREMENTS OF THE STANDARDS OF PRACTICE FOR LAND SURVEYING IN NORTH CAROLINA (21 NCAC 56. 1600). THIS MAP WAS DRAWN IN ACCORDANCE WITH G.S. 47.30 AS AMENDED. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER AND SEAL THIS 5TH DAY OF NOVEMBER 2013.

NORTH CAROLINA PROFESSIONAL SEAL L-3201 LAND SURVEYOR CARLTON L. HAWKINS

PROFESSIONAL LAND SURVEYOR LICENSE NUMBER L-3201

SUMMIT DESIGN AND ENGINEERING, PLLC. REG. NUMBER P-0339

I, CARLTON L. HAWKINS, N.C.P.L.S.#3201, CERTIFY THAT NC GRID TIE DATA SHOWN ON THIS PLAT WAS OBTAINED FROM AN ACTUAL GPS SURVEY MADE UNDER MY SUPERVISION AND THE FOLLOWING INFORMATION WAS USED TO PERFORM THE SURVEY:

(1) CLASS OF SURVEY: A
(2) POSITIONAL ACCURACY: 0.07'
(3) TYPE OF GPS FIELD PROCEDURE: VRS
(4) DATES OF SURVEY: VRS: 07/2013.
(5) DATUM/EPOCH: 83/11
(6) PUBLISHED/FIXED CONTROL USED: HELD VRS DATA
(7) GEOID MODEL: 12
(8) COMBINED GRID FACTOR: 1.000044605
(9) UNITS: US SURVEY FEET

CERTIFICATE OF EXCEPTION

I HEREBY CERTIFY THAT THE PROPERTY SHOWN AND DESCRIBED HEREON ON THIS SUBDIVISION PLAT FOR RECORDATION, QUALIFIES AS AN EXCEPTION TO THE PROVISIONS OF THE SUBDIVISION REGULATIONS OF GRANVILLE COUNTY, NORTH CAROLINA UNDER SECTION 10.020.

NONDEVELOPMENTAL EASEMENTS
TITLE OF EXCEPTION

_____
ORDINANCE ADMINISTRATOR DATE
TOWN OF BUTNER

STATE OF NC
GRANVILLE COUNTY

I, _____, REVIEW OFFICER OF GRANVILLE COUNTY, CERTIFY THAT THE MAP OR PLAT TO WHICH THIS CERTIFICATION IS AFFIXED MEETS ALL STATUTORY REQUIREMENTS FOR RECORDING FOR WHICH THE REVIEW OFFICER HAS RESPONSIBILITY AS PROVIDED BY LAW.

_____
REVIEW OFFICER DATE OF CERTIFICATION
GRANVILLE COUNTY LAND RECORDS/GIS

STATE PROPERTY OFFICE FILE # 39-BS
TOTAL CONSERVATION EASEMENT AREA
30.19 ACRES

GRAPHIC SCALE
125 0 125 250 500
(IN FEET)
1 inch = 250 ft.

OWNERS ADDRESS:
CREWS FARM, LLC
5687 TABBS CREEK ROAD
OXFORD, NC 27565

CLIENTS ADDRESS:
O'BRIEN & GERE
2610 WYCLIFF ROAD,
SUITE 104
RALEIGH, NC 27607

MAPN	192500535413, 192500525552 AND 192500506956
PIN	
REFERENCES	SEE PLAT
PROJECT MANAGER	WHM
DRAWN BY	CLH

LEGEND:
- ○ REBAR WITH 3 1/4" ALUMINUM CAP SET
- ◉ EXISTING MONUMENT FOUND; IRON ROD OR PIPE UNLESS OTHERWISE DESCRIBED
- △ MATHEMATICAL POINT; NO MONUMENT SET
- ■ CONCRETE MONUMENT
- EIP EXISTING IRON PIPE
- UTILITY POLE

CONSERVATION EASEMENT SURVEY FOR THE
STATE OF NORTH CAROLINA
ECOSYSTEM ENHANCEMENT PROGRAM
"COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT" EEP PROJECT # 95807
SALEM TWP., GRANVILLE CO., NORTH CAROLINA
FIELD WORK PERFORMED JULY & AUGUST 2013
PROPERTY AS DESCRIBED IN DB 1283/664 and DB 1150/317
STANDING IN THE NAME OF: CREWS FARM, LLC

SUMMIT
DESIGN AND ENGINEERING SERVICES
Creatively Inspired - Technically Executed
License #: P-0339
504 Meadowland Drive
Hillsborough, NC 27278-8551
Voice: (919) 732-3883 Fax: (919) 732-6676
www.summitde.net

PROJECT NO.
13-0157
DRAWING
13-0157_SURVEY
SHEET 1 OF 2

CORNER	NORTHING	EASTING
1	952,355.37	2,126,198.69
2	952,243.77	2,125,754.77
3	952,555.47	2,125,654.02
4	952,885.68	2,125,542.69
5	953,144.76	2,125,451.10
6	953,139.79	2,125,469.17
7	953,152.42	2,125,546.87
8	953,225.58	2,125,687.61
9	953,304.36	2,125,801.67
10	953,248.22	2,125,822.57
11	953,035.74	2,125,880.97
12	953,158.49	2,126,034.24
13	953,203.57	2,126,101.11
14	952,892.25	2,126,127.83
15	953,213.84	2,125,426.25
16	953,482.21	2,125,329.69
17	953,539.86	2,125,039.66
18	953,665.93	2,124,948.12
19	953,722.19	2,125,132.90
20	953,856.25	2,125,279.75
21	953,936.67	2,125,428.49
22	953,718.08	2,125,628.36
23	953,518.00	2,125,722.11
24	953,362.36	2,125,780.07
25	953,277.09	2,125,656.60
26	953,210.10	2,125,527.74
27	953,201.12	2,125,472.46
28	951,834.61	2,126,059.31
29	951,863.08	2,126,120.04
30	951,623.06	2,126,209.40
31	951,620.85	2,126,279.84
32	951,316.83	2,126,279.18
33	951,191.90	2,126,200.26
34	951,287.36	2,126,098.19
35	951,342.34	2,126,085.14
36	951,744.25	2,126,000.93
37	951,811.87	2,125,953.72
38	951,849.97	2,125,939.14
39	949,970.76	2,126,017.30
40	949,964.25	2,125,916.71
41	949,970.30	2,125,862.17
42	949,970.53	2,125,819.39
43	949,968.29	2,125,784.56
44	949,963.55	2,125,747.91
45	949,946.68	2,125,691.00
46	949,929.26	2,125,644.97
47	949,903.08	2,125,545.90
48	949,880.43	2,125,392.50
49	949,895.93	2,125,257.15
50	949,896.90	2,125,182.47
51	949,907.12	2,125,172.15
52	949,920.55	2,125,143.51
53	949,928.05	2,125,100.97
54	949,919.36	2,125,050.40
55	949,918.33	2,124,999.67
56	949,912.65	2,124,959.50
57	949,916.92	2,124,908.12
58	949,933.60	2,124,863.98
59	949,965.13	2,124,811.68
60	949,971.55	2,124,797.27
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62	950,000.54	2,124,732.21
63	950,013.52	2,124,693.07
64	950,019.30	2,124,649.69
65	950,037.50	2,124,585.27
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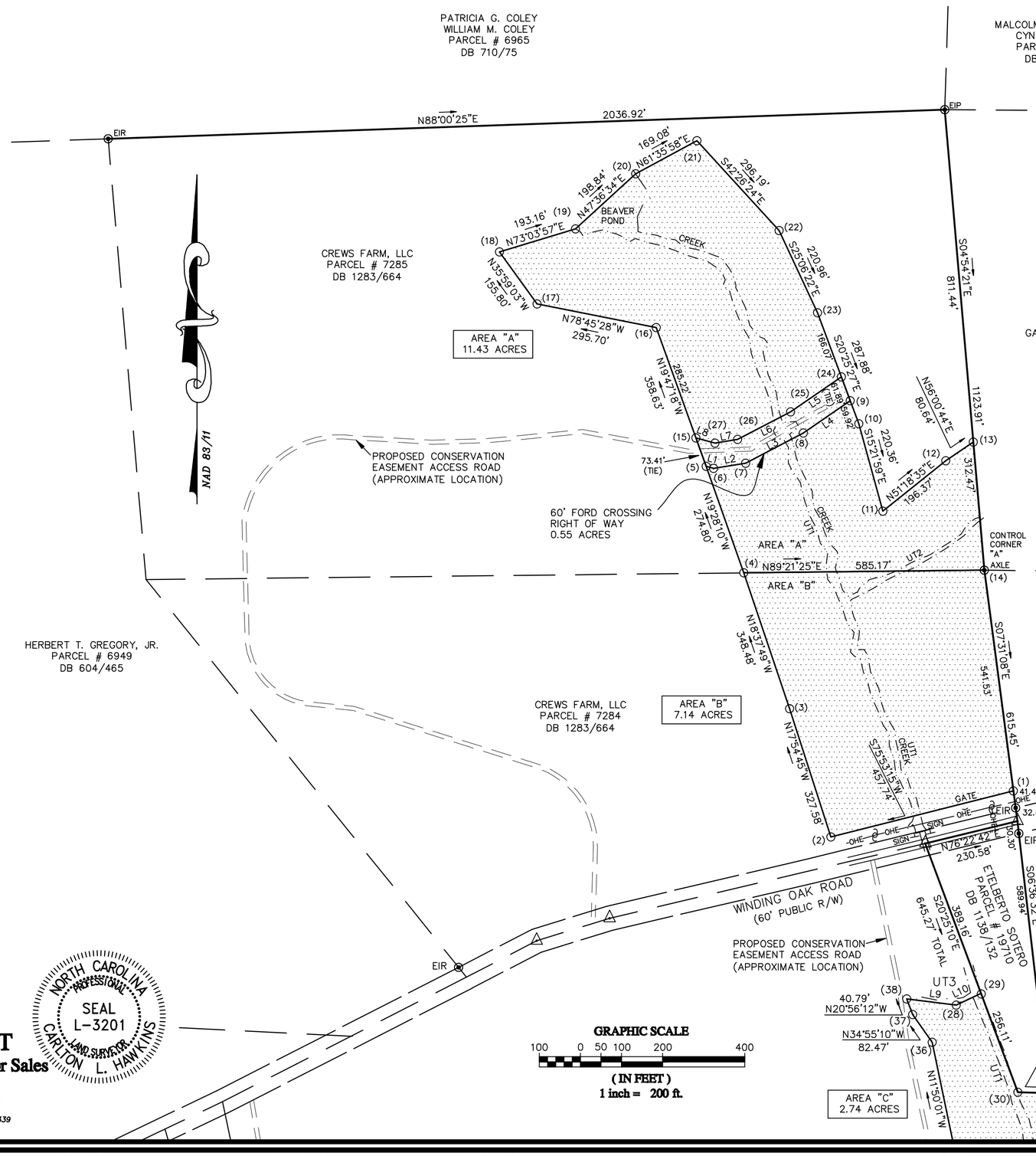
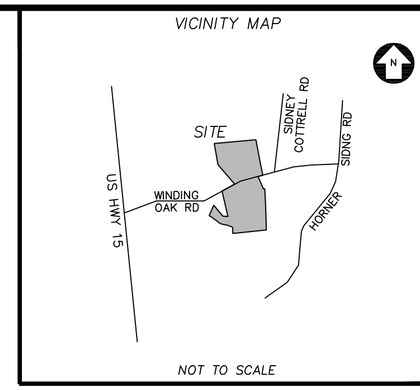
73	950,056.57	2,124,172.38
74	950,049.13	2,124,155.68
75	950,065.92	2,124,131.78
76	950,086.90	2,124,117.52
77	950,103.47	2,124,084.19
78	950,094.05	2,124,070.50
79	950,126.23	2,124,052.77
80	950,141.22	2,124,035.29
81	950,152.51	2,124,035.13
82	950,160.32	2,124,010.80
83	950,179.52	2,123,990.47
84	950,201.22	2,123,983.03
85	950,217.78	2,123,951.68
86	950,296.92	2,123,846.66
87	950,388.60	2,123,923.01
88	950,181.43	2,124,195.92
89	950,179.02	2,124,477.36
90	950,249.13	2,124,498.34
91	950,216.97	2,124,685.65
92	950,153.18	2,124,831.33
93	950,147.50	2,124,844.30
94	950,111.39	2,124,926.75
95	950,124.28	2,125,127.71
96	950,074.78	2,125,466.70
97	950,154.26	2,125,716.90
98	950,152.87	2,126,025.24





LINE TABLE		
LINE	LENGTH	BEARING
L1	18.74	S74°36'43"E
L2	78.72	N80°46'17"E
L3	158.62	N62°31'51"E
L4	138.62	N55°22'08"E
L5	150.06	S55°22'08"W
L6	145.23	S62°31'51"W
L7	56.00	S80°46'17"W
L8	47.93	N74°36'43"W
L9	121.15	S82°42'47"E
L10	67.08	N64°52'40"E
L11	100.80	S86°18'01"W
L12	54.88	N83°40'17"W
L13	42.78	N89°41'50"W
L14	34.90	S86°19'29"W
L15	36.96	S82°37'59"W
L16	59.35	S73°29'04"W
L17	49.22	S69°16'16"W
L18	102.47	S75°11'44"W
L19	155.07	S81°36'08"W
L20	136.24	N83°28'01"W
L21	74.68	N89°15'22"W
L22	14.52	N45°17'39"W
L23	31.64	N64°52'12"W
L24	43.20	N80°00'12"W
L25	51.31	S80°15'15"W
L26	50.74	S88°49'37"W
L27	40.57	S81°57'54"W
L28	51.56	N85°15'20"W
L29	47.18	N69°17'25"W
L30	61.07	N58°55'26"W
L31	182.12	S14°57'56"W
L32	182.03	N14°57'56"E
L33	15.78	N65°58'58"W
L34	57.04	N65°58'58"W
L35	41.24	N71°38'59"W
L36	43.76	N82°24'40"W
L37	66.94	N74°13'27"W
L38	54.38	N79°06'49"W
L39	86.66	N86°59'06"W
L40	28.37	N64°55'32"W
L41	134.29	N85°55'06"W
L42	32.67	S61°35'57"W
L43	37.22	S52°31'21"W
L44	37.01	N88°12'39"W
L45	26.70	N42°29'12"W
L46	18.28	S66°00'43"W
L47	29.20	N54°54'53"W
L48	25.37	N34°12'29"W
L49	37.22	N63°34'33"W
L50	16.61	S55°29'10"W
L51	36.74	N28°51'14"W
L52	23.02	N49°22'46"W
L53	11.29	N00°49'04"W
L54	25.56	N72°11'20"W
L55	27.96	N46°38'33"W
L56	22.94	N18°55'23"W
L57	35.47	N62°09'03"W
L58	131.49	N53°00'02"W
L59	119.31	N39°47'20"E
L60	14.18	N65°58'58"W

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 200 ft.

NORTH CAROLINA PROFESSIONAL SEAL L-3201 LAND SURVEYOR CARLTON L. HAWKINS

PRELIMINARY PLAT
Not for Recordation, Conveyance or Sales

11/05/13
PROFESSIONAL LAND SURVEYOR LICENSE NUMBER L-3201

SUMMIT DESIGN AND ENGINEERING, PLLC. REG. NUMBER P-0339

OWNERS ADDRESS:
CREWS FARM, LLC
5687 TABBS CREEK ROAD
OXFORD, NC 27565

CLIENTS ADDRESS:
O'BRIEN & GERE
2610 WYCLIFF ROAD,
SUITE 104
RALEIGH, NC 27607

MAPN 192500535413, 192500525552 AND 192500506956
PIN
REFERENCES SEE PLAT
PROJECT MANAGER WHM
DRAWN BY CLH

LEGEND:
- ○ REBAR WITH 3 1/4" ALUMINUM CAP SET
- ◉ EXISTING MONUMENT FOUND; IRON ROD OR PIPE UNLESS OTHERWISE DESCRIBED
- △ MATHEMATICAL POINT; NO MONUMENT SET
- ■ CONCRETE MONUMENT
- EIP EXISTING IRON PIPE
- UTILITY POLE

CONSERVATION EASEMENT SURVEY FOR THE
STATE OF NORTH CAROLINA ECOSYSTEM ENHANCEMENT PROGRAM
"COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT" EEP PROJECT # 95807
SALEM TWP., GRANVILLE CO., NORTH CAROLINA
FIELD WORK PERFORMED JULY & AUGUST 2013
PROPERTY AS DESCRIBED IN DB 1283/664 and DB 1150/317
STANDING IN THE NAME OF: CREWS FARM, LLC

SUMMIT
DESIGN AND ENGINEERING SERVICES
Creatively Inspired - Technically Executed
License #: P-0339
504 Meadowland Drive
Hillsborough, NC 27278-8551
Voice: (919) 732-3883 Fax: (919) 732-6676
www.summitde.net

PROJECT NO.
13-0157
DRAWING
13-0157_SURVEY
SHEET 2 OF 2

4.0 BASELINE INFORMATION

Project Information	
Project Name	Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project
County	Granville County
Project Area (acres)	30.19
Project Coordinates (latitude and longitude)	36.365558N -78.573758W

4.1 Project Watershed Summary Information	
Physiographic Province	Piedmont
River Basin	Tar-Pamlico
USGS Hydrologic Unit 8-digit	03020101
USGS Hydrologic Unit 14-digit	03020101020010
NCDWR Sub-basin	Upper Tar River
Project Drainage Area (acres)	2,274
Project Drainage Area Percentage of Impervious Area	<1 %
CGIA Land Use Classification	Cultivated, Mixed Upland Hardwoods, and Mixed Hardwoods/ Conifers

4.2 Reach Summary Information

Parameters	***UT1***	***UT2***	***UT3***	***UT4 and Crews Farm Lake***
Length of reach (linear ft)	2,330	370	170	7,380
Drainage area (acres)	1,739	292	57	535
Underlying mapped soils	Chewacla and Wehadkee	Chewacla and Wehadkee	Chewacla and Wehadkee	UT4 - Chewacla and Wehadkee; Crews Farm Lake - Enon loam and Vance Sandy Loam
NCDWQ stream identification score	Perennial	Intermittent	Intermittent	Intermittent
NCDWQ water quality classification	C; NSW	C; NSW	C; NSW	C; NSW
Drainage class	Somewhat poorly drained	Somewhat poorly drained	Somewhat poorly drained	UT4 - Somewhat poorly drained; Crews Farm Lake - well drained
Soil Hydric status	Hydric	Hydric	Hydric	UT4 – Hydric; Crews Farm Lake – non-Hydric
Native vegetation community	Bottomland Hardwood	Cleared Field	Cleared Field	Bottomland Hardwood
Percent composition of invasive vegetation	~40%	<10%	<10%	<10%

4.3 Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	N		Appendix B
Waters of the United States – Section 401	N		
Endangered Species Act	N		
Historic Preservation Act	Y	Y	Appendix B
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	N		
FEMA Floodplain Compliance	Y	N	Appendix B
Essential Fisheries Habitat	N		

5.0 DETERMINATION OF CREDITS

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

Component Summation		
Restoration Level	**Buffer (square ft)**	**Nutrient Offset (square ft)**
Restoration	352,836	631,620

Coon Creek Riparian Buffer and Nutrient Offset Project, Granville County NCEEP Project Number 95807 Mitigation Credits			
	Riparian Buffer Restoration	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
Type			
Totals	352,836 ft^2 (8.1 acres)	631,620 ft^2 (32,959.95 lbs)	631,620 ft^2 (2,122.80 lbs)

Project Components					
Project Component or Reach ID	**Stationing/ Location**	**Approach (PI, PII, etc.)**	**Restoration or Restoration Equivalent**	**Restoration Acreage**	**Mitigation Ratio**
UT1 and UT2	North of Winding Oak Rd	Planting	Buffer Restoration	12.4	1:1
UT1 and UT3	South of Winding Oak Rd	Planting	Buffer Restoration	1.8	1:1
UT4 and Crews Farm Lake	South of Winding Oak Rd	Planting	Buffer Restoration	8.4	1:1

6.0 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 authorization has been received for its construction or NCDWR has otherwise provided written approval for the project in the case where no authorization is required for construction of the mitigation project. NCDWR 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 as follows:

Riparian Buffer and Nutrient Offset Credits			
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	15%	55%
3	Third year monitoring report demonstrates performance standards are being met	20%	75%
4	Fourth year monitoring report demonstrates performance standards are being met	10%	85%
5	Fifth year monitoring report demonstrates performance standards are being met and project as received closeout approval	15%	100%

Initial Allocation of Released Credits

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

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

Subsequent Credit Releases

All subsequent credit releases must be approved by NCDWR, based on a determination that required performance standards have been achieved. As the project approaches milestones associated with credit release, NCEEP will submit a request for credit release to NCDWR along with documentation substantiating achievement of criteria required for release to occur. This documentation will be included with the annual monitoring report.

7.0 MITIGATION WORK PLAN

7.1 TARGET PLANT COMMUNITIES

The restoration of the site centers on planting cleared areas with native hardwood species. Planting of a broad riparian buffer will provide nutrient offset by impeding fertilizers used on the agricultural fields from entering the tributaries to Coon Creek. Existing riparian wetlands occur along UT1 and UT2. Restoring native woody species to these areas will provide greater ecological uplift as compared to planting upland areas only.

The following mitigation activities will occur:

- Herbaceous competition control, including invasive species control
- Planting of native trees in non-forested buffer areas targeting two community types; Piedmont Bottomland Forest in wetter areas and Mesic Mixed Hardwood Forest in drier areas. (Schafale and Weakley, 1990)

The mitigation site includes more than 22.6 acres of buffer mitigation along approximately 5,000 linear ft of Coon Creek tributaries, including the shore of Crews Farm Lake (Figure 2.6, Current Conditions Plan View). The adjacent land use is row-crop agriculture, which is expected to continue through the foreseeable future and exclusionary fencing at the site is not required.

Invasive species control will be conducted in existing forested buffer areas within the conservation easement boundaries. Control will include cutting and herbicide treatment of individual plants as well as the general application of chemical herbicides as necessary, per labeled directions, to treat invasive species. The application of herbicides will be specifically targeted to invasive species control. All chemicals used will be specifically designed and labeled for use in wetlands and adjacent riparian areas. Approximately four acres will require invasive species control. Invasive floral species, primarily Chinese privet are found in dense stands along the stream banks and within existing riparian buffer areas. Other invasive species present include Japanese honeysuckle (*Lonicera japonica*) and multiflora rose (*Rosa multiflora*) in patches of varying density. Cut material will be placed in piles to decompose naturally on-site.

The project involves the planting of bare-root seedlings. Restoration planting will be installed at a density of 436 seedlings per acre. Planting stock will be obtained from sources within 200 miles of the site. Seedlings will be established in a naturalized pattern to avoid creating rows and monotypic stands. Tree species will be established within zones that reflect the preferable hydrologic regimes of each species; areas with the longer periods of inundation will be planted with flood tolerant species. To encourage a higher diversity of woody plant species on the site, planting patterns will include leaving small gaps to provide open areas for recruitment.

Piedmont Bottomland Forest will be planted over a total of 7.9 acres, utilizing a total of 3,445 stems, and comprising 35% of the restoration acres. This forest type will be established within areas of both riparian buffer restoration and nutrient offset mitigation. The Piedmont Bottomland Forest will be comprised of the following species, with each making up the identified percentage of the mix:

Piedmont Bottomland Forest		
Species	**Common Name**	**Percentage of Mix**
Quercus michauxii	Swamp chestnut oak	20
Quercus nigra	Water oak	10
Platanus occidentalis	Sycamore	20
Liriodendron tulipifera	Tulip poplar	20
Juglans nigra	Black walnut	5
Carpinus caroliniana	Ironwood	10
Asimina triloba	Paw paw	15

Mesic Mixed Hardwood Forest will be planted over a total of 14.8 acres, utilizing a total of 6,453 stems, and will comprise 65% of the restoration acres (buffer and nutrient combined). Mesic Mixed Hardwood zones will be planted with the following species, with each making up the identified percentage of the mix:

Mesic Mixed Hardwood Forest (Piedmont Subtype)		
Species	**Common Name**	**Percentage of Mix**
Nyssa sylvatica	Black gum	20
Liriodendron tulipifera	Tulip poplar	20
Quercus nigra	Water oak	20
Quercus falcata	Southern red oak	15
Cornus florida	Flowering dogwood	10

Mesic Mixed Hardwood Forest (Piedmont Subtype)		
Species	**Common Name**	**Percentage of Mix**
Cersis canadensis	Red bud	5
Diospyros virginiana	Persimmon	10

Herbaceous species will be established in unvegetated areas totaling approximately 22.6 acres. This will include all of the restoration acres and any areas disturbed in the course of executing the project. Herbaceous Riparian seeding will occur at 15 lbs per acre. Temporary seed (either Brown top millet or Rye Grain depending on season) will be planted as well and mulched with straw. This is intended to provide rapid cover to reduce and prevent erosion.

Riparian Buffer zones will be planted with the following species, with each making up the identified percentage of the mix:

Riparian Buffer Seed Mix - 15 Lbs/Acre		
Species	**Common Name**	**Percentage of Mix**
Agrostis alba	Red Top	10
Elymus virginicus	Virginia Wild Rye	15
Panicum virgatum	Switchgrass	15
Tripsicum dactyloides	Gamma grass	5
Polygonum pennsylvanicum	Pennsylvania smartweed	5
Schizachyrium scoparium	Little bluestem	5
Juncus effusus	Soft rush	5
Bidens aristosa	Tickseed	10
Coreopsis lanceolata	Lance-leaved coreopsis	10
Dicanthelium clandestinum	Deer tongue	10
Andropogon gerardii	Big bluestem	5
Sorgastrum nutans	Indiangrass	5

Temporary Seed		
Panicum ramosum	Brown Top Millet	spring/summer - 50 lbs/acre
Secale cereale	Rye Grain	fall/winter - 150 lbs/acre

Mitigation activities will result in 8.1 acres of riparian buffer restoration and 14.5 acres of nutrient offset restoration to provide 8.1 Riparian Buffer Mitigation Units and 14.5 Nutrient Offset Mitigation Units.

7.2 DESIGN PARAMETERS

The mitigation approach for the channel buffers that comprise the Coon Creek Mitigation Project are described in detail below.

UT1, UT2, and UT3

UT1 is the mainstem stream in the valley. UT2 and UT3 flow laterally into UT1 from the east and west, respectively, and are therefore included in the characterization of design parameters for UT1.

UT1 flows between agricultural fields, and has a degraded riparian buffer with existing vegetated areas ranging from 0 to 120 ft in width. UT1 has flat floodplain that extends approximately 100 ft on either side of the stream. The topography slopes up from the floodplain at a gradient of approximately 8%. The floodplain has a wetter moisture regime than the slopes, and contains areas with wetland hydrology. UT2 is an intermittent stream north of Winding Oak Road that flows into UT1 from the east. The riparian buffer of UT2 is currently cleared. UT3 is

an intermittent stream south of Winding Oak Road that flows into UT1 from the west. The riparian buffer on the right bank of UT3 is currently cleared for cultivation.

The mitigation areas along UT1, UT2, and UT3 will contain both riparian buffer and nutrient offset restoration. Restoration will comprise planting native vegetation in cleared or cultivated areas along UT1, UT2, and UT3, on a total of 14.3 acres. The restored riparian buffer along UT1, UT2, and UT3 is 6.0 acres. The restored nutrient offset area along UT1, UT2, and UT3 is 8.3 acres. The proposed targeted forest communities are Piedmont Bottomland Forest in the wetter zones in the floodplain of UT1 and Mesic Mixed Hardwood Forest (Piedmont Subtype) on the slopes.

The conservation easement accommodates a stream crossing across UT1 to allow for farm vehicle access from one field to the other. The crossing is a low flow ford and requires no further improvement. The crossing is 60 ft in width and no mitigation is being performed in this area.

UT1 has several beaver impoundments north and south of Winding Oak Road. The largest is at the northern end of the project area, and extends across the valley floor, creating an area of open water that is approximately one acre in size. The riparian buffer on the eastern side of the large beaver pond is currently cleared, and restoration will be conducted by planting bare-root seedlings. There are several smaller beaver dams below the large beaver pond that impede the proper flow and functioning of the stream channel. These smaller dams will be removed by hand prior to planting to encourage survival of planted seedlings within areas in the floodplain along UT1.

UT4 and Crews Farm Lake

UT4 is an intermittent tributary of UT1 that flows into Crews Farm Lake. The right bank of UT4 is forested, and the left bank has a 30 to 40 foot riparian buffer between UT4 and an agricultural field. UT4 has a fairly narrow floodplain, and the topography slopes up from the floodplain with a gradient of approximately 6%. The narrow floodplain has a wetter moisture regime than the slopes, and contains areas with wetland hydrology. No mitigation will be performed in this area.

The project area bordering Crews Farm Lake is cleared right up to the lake shore with only a limited margin of existing herbaceous or young shrubby vegetation. This area will require little, if any, invasive species removal.

Cleared areas within the riparian and nutrient offset buffer of UT4/Crews Farm Lake will be restored by planting bare-root native seedlings. The proposed targeted forest communities are Piedmont Bottomland Forest and Mesic Mixed Hardwood Forest (Piedmont Subtype). The restored riparian buffer along UT4 and Crews Farm Lake is 2.2 acres. The restored nutrient offset area along UT4 and Crews Farm Lake is 6.2 acres. The total area of mitigation for UT4/Crews Farm Lake is 8.4 acres.

The conservation easement will accommodate a 14-ft-wide unimproved right-of-way to allow for mobile equipment access to Crews Farm Lake for irrigation of the adjacent agricultural fields. In the occasional event that a farm vehicle will require access to the intake, it is understood that vegetation may be mowed and/or cut within the right-of-way. No mitigation activities will be performed in this area.

7.3 DATA ANALYSIS

7.3.1 Vegetation Mapping

The boundary between cleared areas and forested buffer areas was assessed and flagged at the site, and the location of each flag was collected in North Carolina State Plane coordinates using a Trimble Geo XH GPS unit. Areas that were in cultivation (Photo 6), devoid of woody shrubs or trees (Photo 1), or containing widely scattered woody shrubs or trees (Photo 7), were considered to be cleared and thus qualified for restoration. Areas that

contained mature forest (Photo 8), or dense woody shrubs and small trees (Photo 9), were considered to be forested buffer areas. Invasive plant removal will be conducted within these areas to improve the overall ecological health and quality of the site. No planting activities will be performed in areas designated as existing vegetation and these areas are not considered to be mitigation areas. The mapped vegetation boundary is shown on the Current Condition Plan View map (Figure 2.6), and is used as the boundary between restoration areas and no mitigation areas. An example photograph of the flagged boundary is provided as Photo 10.

7.3.2 Reference Vegetation Communities

Two reference vegetation plots at the site were assessed to verify the target plant communities, and inform the planting list. Plots were chosen from existing wooded areas in and near the site, in intact forest communities that were dominated by native vegetation. Both plots were located within the floodplain of UT1 north of Winding Oak Road (Figure 2.8, Data Collection Location Map), but each represents a different bottomland moisture regime. Woody plants greater than 20 ft tall were considered trees for the purpose of the assessment, and woody plants less than 20 ft tall were considered shrubs. Trees were quantified by the number of stems in the plot, and shrubs were noted by presence and dominance in the plots. Soil and hydrology conditions in the plots were recorded. The soil profiles collected at each plot, along with additional soil characterization profiles within the restoration areas, are provided in Appendix C.

Reference Vegetation Plot 1 (Plot 1) was located on the right bank of UT1 near Winding Oak Road (Photo 11). Plot 1 will be within the conservation easement for the project, but will not be in a mitigation area. Plot 1 was 50 ft by 100 ft, totaling 5,000 square ft. The landscape position was an abandoned floodplain adjacent to UT1, with upland hydrology. The soil was primarily loam, with non-hydric matrix colors, and no saturation within 18 inches. The tree layer of Plot 1 was dominated by American elm (*Ulmus americana*), winged elm (*Ulmus alata*), sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), sugarberry (*Celtis laevigata*), and tulip poplar (*Liriodendron tulipifera*). The dominant shrubs were spicebush (*Lindera benzoin*) and red maple. These tree and shrub species are typical of a Piedmont Bottomland Forest, which confirms the target plant community along the UT1 floodplain. Because the floodplain in that location is abandoned due to an incised channel, tree species that prefer drier conditions, including black cherry (*Prunus serotina*) and black locust (*Robinia pseudoacacia*), were also observed.

Reference Vegetation Plot 2 (Plot 2) was located on the right bank of UT1, north of the upstream end of the project, and outside the conservation easement for the project (Photo 12). Plot 2 was 75 ft by 75 ft, totaling 5,625 square ft. The landscape position was an active floodplain adjacent to UT1, with wetland hydrology from groundwater seepage and backflooding from beaver activity. Widespread inundation was not observed. The soil was primarily silty clay, with hydric soil indicators, and saturation to the surface. The tree layer of Plot 2 was dominated by American elm and green ash (*Fraxinus pennsylvanica*). The dominant shrubs were American elm and spicebush. These tree and shrub species are typical of wetter areas within a Piedmont Bottomland Forest, which confirms the target plant community along the UT1 floodplain.

8.0 MAINTENANCE PLAN

The site will be monitored annually, and physical inspection of the site will be conducted twice per year throughout the post-construction monitoring period, or until performance standards are met. To address wildlife predation and other impacts to newly planted specimens, the site will be planted at 436 stems per acre, significantly greater than the final targeted density of 320 hardwood stems per acre. These site inspections may identify site components and features that require routine maintenance. Routine maintenance is expected most often in the first two years following site construction and will include the following:

Component/Feature	Maintenance through project close-out
Vegetation	Vegetation shall be maintained to ensure the health and vigor of the targeted plant community. Routine vegetation maintenance and repair activities may include supplemental planting, pruning, mulching, and fertilizing. Invasive plant species shall be controlled by mechanical and/or chemical methods. Any vegetation control requiring herbicide application will be performed in accordance with 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 will be identified by markers on posts. Boundary markers disturbed, damaged, or destroyed will be repaired and/or replaced on an as needed basis.
Ford Crossing	The ford crossings within the site will be maintained by the landowner and only as allowed by the Conservation Easement.
Irrigation Access	The mobile irrigation equipment access point to Crews Farm Lake will be maintained by the landowner and only as allowed by the Conservation Easement.

9.0 VEGETATION SUCCESS CRITERIA

Vegetation Success Criteria

The measure of vegetative success for the site will be the survival of at least 320 planted hardwood stems per acre at the end of year five of the monitoring period. Invasive species will be controlled such that none become dominant or alter the desired community structure of the site.

If site monitoring reveals widespread regrowth of invasive species to a greater extent than can be accounted for by the maintenance plan (Section 8.0), appropriate remedial actions for the site will be implemented in coordination with NCEEP and NCDWR. Remedial action required will be designed to achieve the success criteria specified previously, and will include a work schedule and monitoring criteria that will take into account physical and climatic conditions.

Vegetative Photo Reference Stations

Photographs will be used to visually document restoration success. After mitigation activities have taken place, reference photo stations will be marked with stakes or poles and surveyed during the as-built survey. Reference stations will be photographed immediately following planting and continued annually during the monitoring period. Photographers will make every effort to consistently maintain the same area in each photo over time. Photographs will be used to subjectively evaluate vegetation establishment. A series of photos over time should indicate successional maturation of riparian vegetation.

Method of Reporting Success Criteria

The monitoring program will be implemented during the first growing season following planting to document system development and progress toward achieving the success criteria. Baseline vegetation monitoring will be conducted following planting completion, and will use Level 1 monitoring as described in the Carolina Vegetation Survey (CVS)-NCEEP Protocol for Recording Vegetation, Version 4.2 (Lee et al., 2008). A baseline report and as-built drawings documenting mitigation activities will be developed and submitted to NCEEP within 60 days following planting completion on the mitigation site. The report will include information required by the NCEEP Baseline Monitoring Report Template and Guidance Version 2.0, including photographs, sampling plot locations, and a description of initial species composition by community type. The report will also include a list of the species planted and the associated densities.

After the baseline vegetation monitoring of the first growing season, annual vegetation monitoring will be conducted and will use Level 2 monitoring as described in the CVS-NCEEP Protocol for Recording Vegetation, Version 4.2. The monitoring program will be undertaken for a period of five years or until the final success criteria are achieved, whichever is longer. Monitoring reports will be prepared in the fall of each year of monitoring and submitted to NCEEP. The monitoring reports will be prepared in accordance with Version 1.5 of the NCEEP Monitoring Report Template.

10.0 MONITORING REQUIREMENTS

Annual monitoring data will be reported using the Version 1.5 of the NCEEP Monitoring Report Template. The monitoring report shall provide a project data chronology that will facilitate an understanding of project status and trends, population of NCEEP databases for analysis, research purposes, and assist in decision making regarding project close-out.

Required	Parameter	Quantity	Frequency	Notes
X	Vegetation	Quantity and location of vegetation plots will be determined in consultation with NCDWR	Annual	Vegetation will be monitored using the CVS-NCEEP protocols
X	Exotic and nuisance vegetation		Annual	Locations of exotic and nuisance vegetation will be identified for removal
X	Project Boundary		Semi-annual	Locations of vegetation damage, boundary encroachments, etc. will be mapped

To assess whether the vegetation performance standards are achieved, CVS-NCEEP Protocol for Recording Vegetation Version 4.2 will be utilized. The vegetation monitoring will use Level 1 for the baseline monitoring. Level 2 will be used for the annual years 1 through 5 monitoring. Plots will be distributed across the planted area. Example plot locations and quantities are shown on the Project Plan Sheets (Appendix D). The vegetation monitoring will be conducted toward the end of the growing season. Individual plot data for will be provided to NCEEP and CVS following CVS-NCEEP guidance. Visual vegetation monitoring will be performed as required in the NCEEP monitoring report template. This inspection will assess any potential problem such as poor stem density areas, areas of poor growth rate/poor vigor, bare areas, and problematic invasive species. Visual monitoring for invasive species encroachment will occur along the entire project reach. Photographs will be taken of these areas to document the problems and track its progression.

11.0 LONG-TERM MANAGEMENT PLAN

Upon approval for close-out by NCDWR, the site will be transferred to the State of North Carolina (State). The State shall be responsible for periodic inspection of the site to ensure that restrictions required in the conservation easement documents are upheld. Endowment funds required to uphold easement and deed restrictions shall be negotiated between NCEEP and the State prior to site transfer to the responsible party.

The NCDENR Division of Natural Resource Planning and Conservation's Stewardship Program currently houses NCEEP 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.

12.0 ADAPTIVE MANAGEMENT PLAN

Upon completion of site construction, the post-construction monitoring protocols will be implemented and project maintenance will be performed as described. If, during the course of annual monitoring it is determined the site's ability to achieve site performance standards are jeopardized, NCEEP will be notified of the need to develop a Plan of Corrective Action. The Plan of Corrective Action will be prepared by the Contractor and submitted to NCEEP for approval. Once the Corrective Action Plan is prepared and finalized, the Contractor will:

1) Notify NCEEP
2) Revise performance standards, maintenance requirements, and monitoring requirements as necessary and/or required by NCDWR
3) Obtain other permits as necessary
4) Implement the Corrective Action Plan
5) Provide NCEEP and NCDWR with a Record Drawing of Corrective Actions. This document shall depict the extent and nature of the work performed.

13.0 OTHER INFORMATION

13.1 DEFINITIONS

Forested Buffer - An area containing mature forest, or dense smaller woody vegetation that can provide a functional & healthy forested riparian buffer.

Mature Forest – Includes trees > 5 inches diameter at breast height (DBH) as well as other smaller woody vegetation (trees, saplings, shrubs) that can provide a functional & healthy forested riparian buffer.

Native vegetation community – a distinct and reoccurring assemblage of populations of plants, animals, bacteria and fungi naturally associated with each other and their population; as described in Schafale, M.P. and Weakley, A. S. (1990), Classification of the Natural Communities of North Carolina, Third Approximation

Non-Forested Buffer – In its simplest form, an area with an absence of trees > 5 inches DBH, lacking in dense woody vegetation such as smaller trees, saplings, and shrubs along with open canopies. In the Tar-Pamlico River Basin, an onsite assessment is done to determine factors such as the health of the existing buffer (size, density, diversity, extent of invasive species, etc.), its ability to provide nutrient removal in its current condition, and other functions.

Project Area - includes all protected lands associated with the mitigation project.

Restoration – Planting native trees within areas identified as a non –forested buffer.

13.2 REFERENCES

Griffith et al., 2002. Griffith, G.E., Omernik, J.M., Comstock, J.A., Schafale, M.P., McNab, W.H., Lenat, D.R., MacPherson, T.F., Glover, J.B., and Shelburne, V.B., 2002, Ecoregions of North Carolina and South Carolina, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.4 Available URL: http://cvs.bio.unc.edu/methods.htm. [Date Accessed: 14 October 2013].

NC Division of Water Quality (NCDWQ). 2010, Methodology for Identification of Intermittent and Perennial Streams and their Origins, Version 4.11. North Carolina Department of Environment and Natural Resources, Division of Water Quality. Raleigh, NC.

North Carolina Ecosystem Enhancement Program (NCEEP), 2011. Monitoring Requirements and Performance Standards for Stream and/or Wetland Mitigation.

Natural Resources Conservation Service (NRCS), 2012. U.S. Department of Agriculture, Natural Resources Conservation Service. Soil Survey Geographic
(SSURGO) database for Granville County, North Carolina.

Schafale, M.P. and Weakley, A. S. 1990. Classification of the Natural Communities of North Carolina, Third Approximation, NC Natural Heritage Program, Raleigh, NC

United States Geological Survey. 7.5 Minute Topographic Map, Oxford, NC.

14.3 Appendix A – Site Protection Instrument

The site protection instrument for the project has been revised based on comments from the EEP and State Property Office Review Team, and was resubmitted on November 11, 2013 for approval under separate cover. Closing on the conservation easement will be contingent on NCDWR approval of the **Final** Mitigation Plan.

14.4 Appendix B – Regulatory Correspondence

Surface Water Buffer Determination Letter, May 15, 2013
Site Viability for Mitigation Letter, June 27, 2013
DWR Buffer Memo, August 9, 2013
Agency Review Meeting Minutes, April 24, 2013
FEMA Floodplain Requirements Checklist, November 14, 2013
Correspondence with FEMA for Checklist Approval, November 7, 2013
USACE Email Verifying No Permits Required, September 27, 2013

North Carolina Department of Environment and Natural Resources
Division of Water Quality

Pat McCroy
Governor

Charles Wakild PE
Director

John E. Skvarla, III
Secretary

May 15, 2013

Daniel Ramsay
O'Brien & Gere
2610 Wycliff Rd, Suite 104
Raleigh, NC 27607

Subject: Surface Water Buffer Determination Letter
TBRRO#13-190
Granville County

Determination Type:	
Buffer Call	Isolated or EIP Call
☐ Neuse (15A NCAC 2B .0233) ☒ Tar-Pamlico (15A NCAC 2B .0259) ☐ Jordan (15A NCAC 2B .0267)	☒ Ephemeral/Intermittent/Perennial Determination ☐ Isolated Wetland Determination

Project Name: 3632 Winding Oak Rd & Vance Granville Institute Pond off Harold O'Brien Road

Location/Directions: (1) Turn Right off of Hwy 15 N from Oxford onto Winding Oak Road. (2) Turn left off Huntsboro Road/S.R. 1521from Oxford onto Harold O'Brien Road. Farm road to site on left in 0.4 miles. Both are located in Oxford, NC.

Subject Stream: Coon Creek and UTs to Coon Creek

Date of Determination: April 24, 2013

Feature	E/I/P*	Not Subject	Subject	Start@	Stop@	Soil Survey	USGS Topo
UT1CC	I		X	Throughout		X	X
UT2CC	I		X	Throughout		X	X
UT3CC	I		X	Culvert	Confluence of UT1CC	X	
UT4CC/Crews Farm Lake	I		X	Southwestern edge of field boundary	Dam of Crews Farm Lake	X	X
UT5CC	I		X	Pond	Confluence of Coon Creek	X	X
Coon Creek	I		X	Throughout project site	Property Boundary	X	X

**E/I/P = Ephemeral/Intermittent/Perennial*

Wetlands, Buffers, Stormwater – Compliance and Permitting (Webscape) Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6494 \ Customer Service: 1-877-623-6748
Internet: www.ncwaterquality.org

Explanation: All features listed above have been located on the Soil Survey Map of Granville County, North Carolina which is provided as an attachment to this letter. Each feature that is checked "Not Subject" has been determined not to be a stream or is not present on the property. Features that are checked "Subject" have been located on the property and possess characteristics that qualify it to be a stream. All features are provided in the attached aerial photo, prepared by O'Brien & Gere. There may be other streams located on your property that do not show up on the maps referenced above but, still may be considered jurisdictional according to the US Army Corps of Engineers and/or to the Division of Water Quality.

This on-site determination shall expire five (5) years from the date of this letter. Landowners or affected parties that dispute a determination made by the DWQ or Delegated Local Authority may request a determination by the Director. An appeal request must be made within sixty (60) days of date of this letter or from the date the affected party (including downstream and/or adjacent owners) is notified of this letter. A request for a determination by the Director shall be referred to the Director in writing c/o Karen Higgins, DWQ WeBSCaPe Unit, 1650 Mail Service Center, Raleigh, NC 27699.

This determination is final and binding unless, as detailed above, you ask for a hearing or appeal within sixty (60) days.

The owner/future owners should notify the Division of Water Quality (including any other Local, State, and Federal Agencies) of this decision concerning any future correspondences regarding the subject property (stated above). This project may require a Section 404/401 Permit for the proposed activity. Any inquiries should be directed to the Division of Water Quality (Central Office) at (919)-733-1786, and the US Army Corp of Engineers (Raleigh Regulatory Field Office) at (919)-554-4884.

Respectfully,

Karen Higgins

Karen Higgins, Supervisor
Wetlands, Buffers, Stormwater,
Compliance and Permitting Unit

KAH/*km*

Attachments: Granville County Soil Survey Map, Aerial Photo of Features

cc: File Copy – Katie Merritt
Jessica Kemp - NCEEP
RRO/SWP File Copy

TBRRO# 13-190 KM 5/15/13

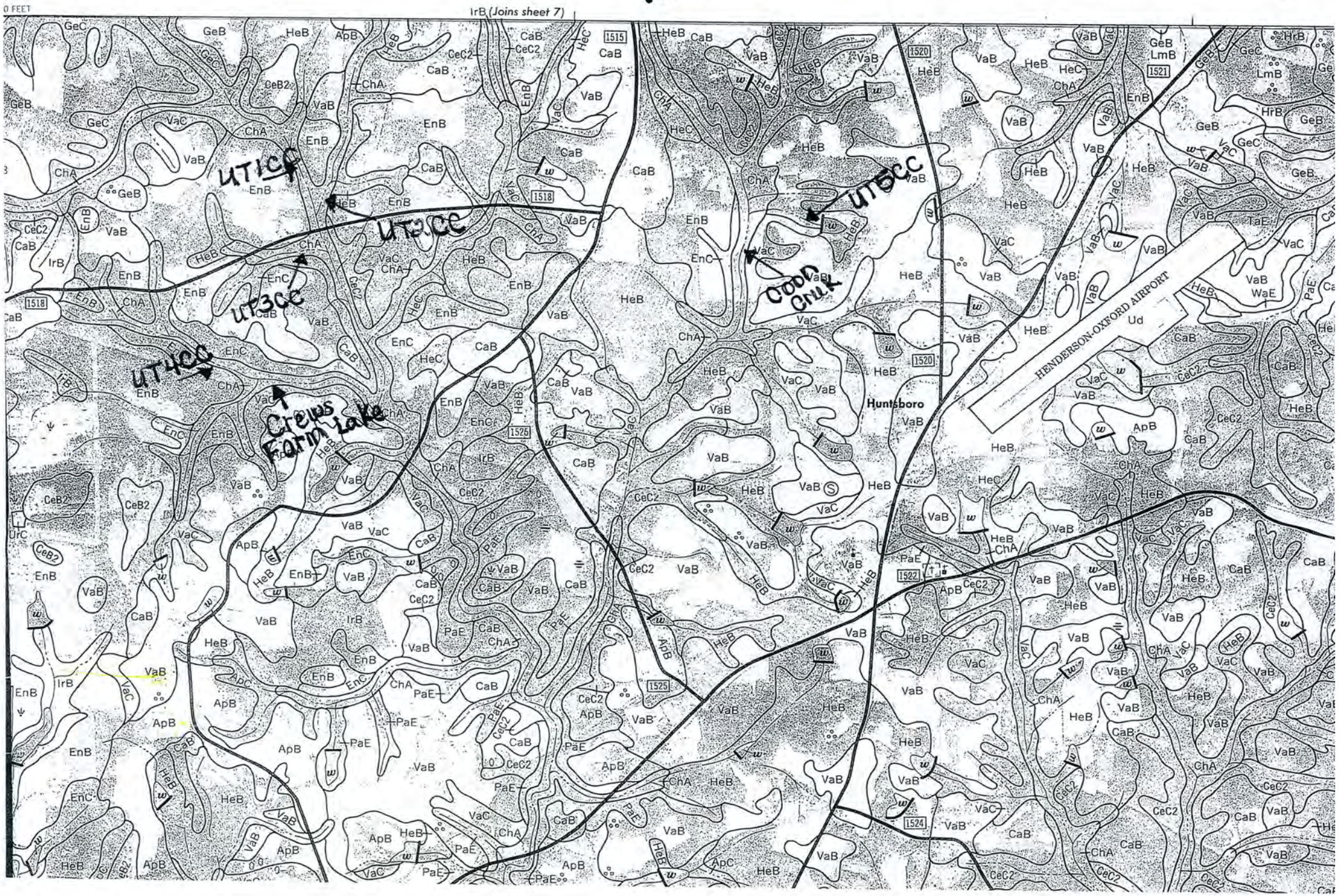
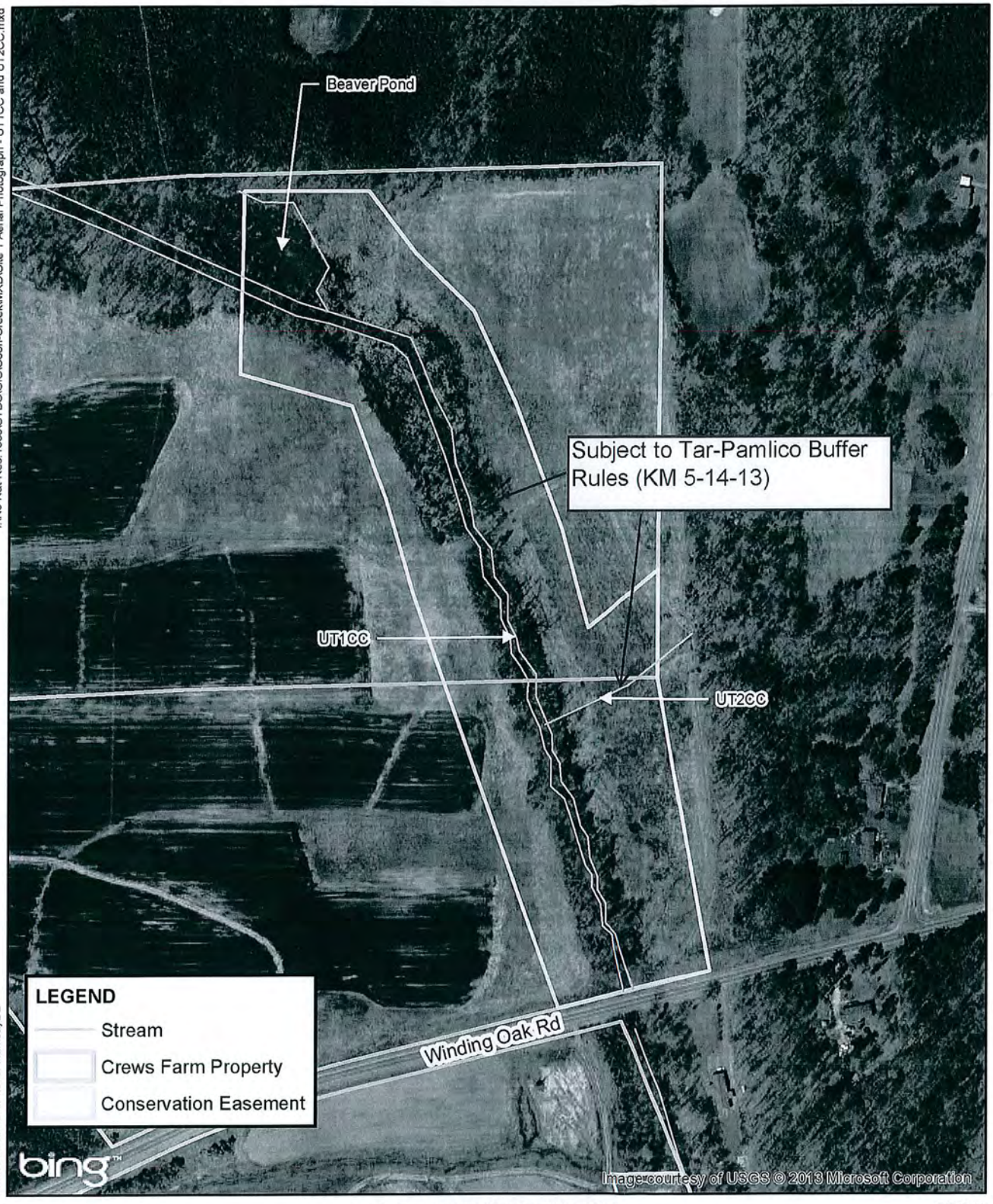


FIGURE 1.2



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TBRRO# 13-190
KM 5/14/13

EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

4/26/2013
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SITE 1: AERIAL PHOTOGRAPH
UT1CC AND UT2CC

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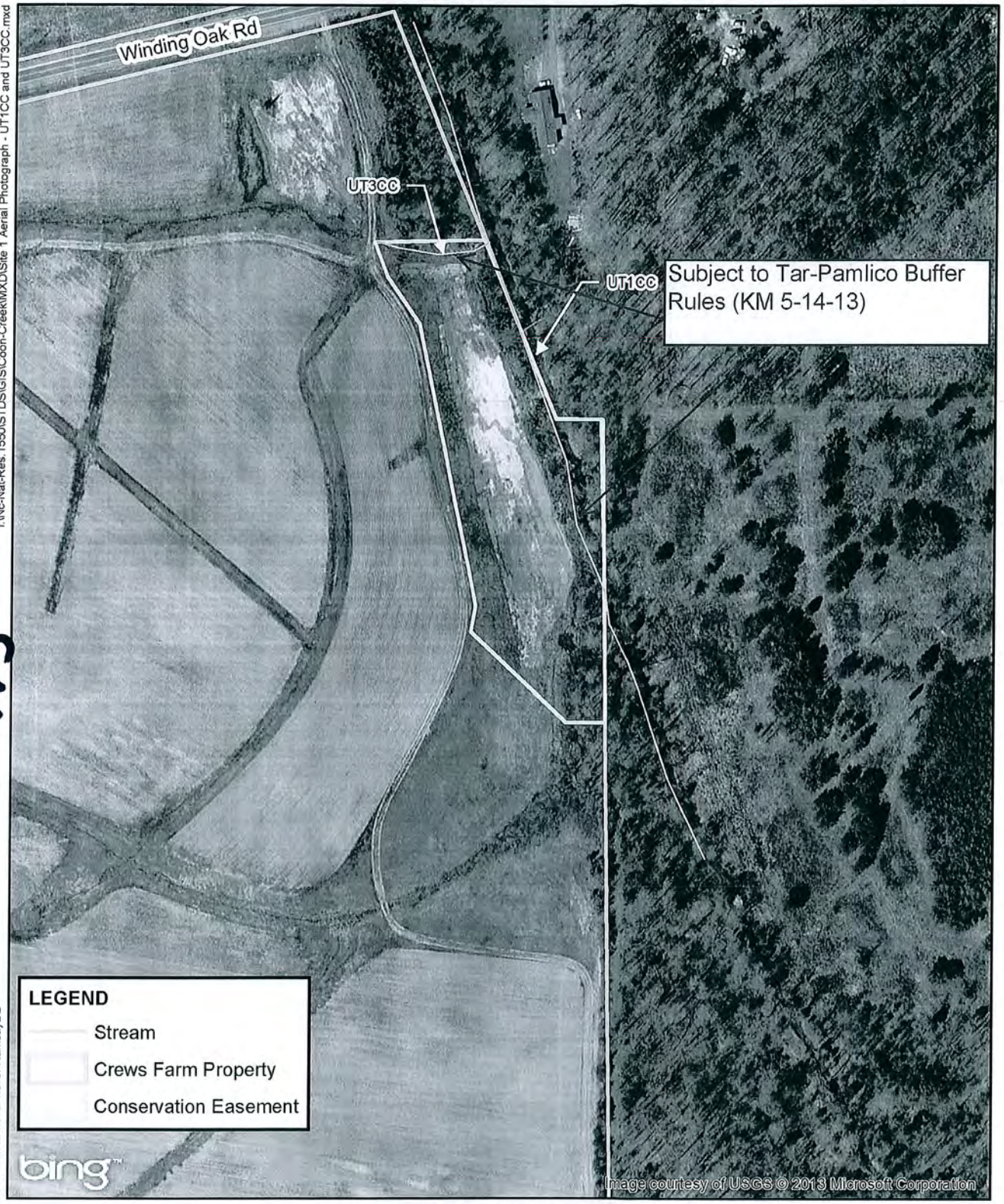
O'BRIEN & GERE

FIGURE 2.2



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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

4/26/2013
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SITE 1: AERIAL PHOTOGRAPH
UT1CC AND UT3CC

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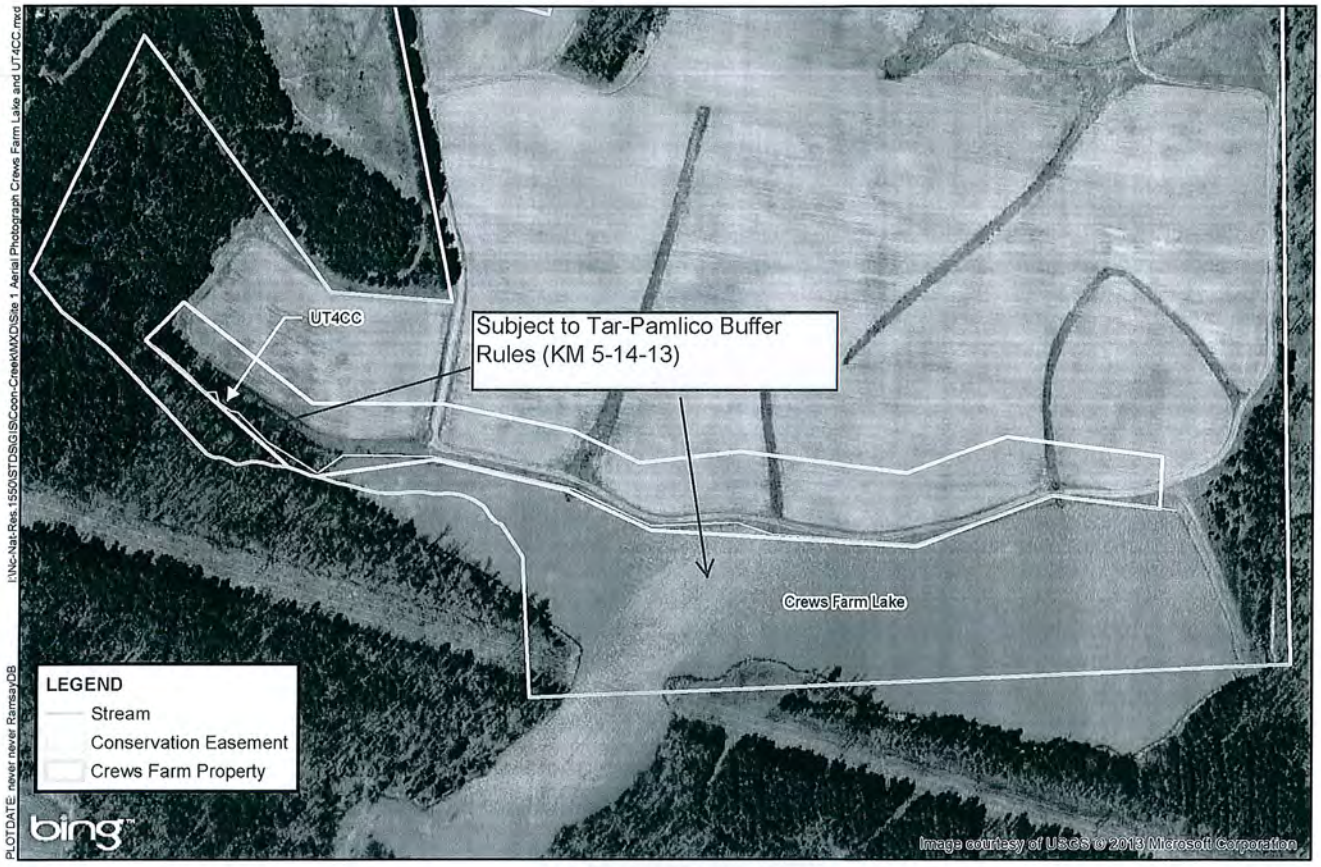
KM 5/14/13



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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

FIGURE 3.2

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O'BRIEN & GERE

SITE 1: AERIAL PHOTOGRAPH
UT4CC AND CREWS FARM LAKE

TBRD# 13-190
KM 5/14/13

LEGEND

- Stream
- Conservation Easement
- Crews Farm Property

EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

SITE 2: AERIAL PHOTOGRAPH

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FIGURE 4.2

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O'BRIEN & GERE

NCDENR
North Carolina Department of Environment and Natural Resources
Division of Water Quality

Pat McCrory
Governor

Thomas A Reeder
Acting Director

John E. Skvarla, III
Secretary

June 27, 2013

Ms. Jessica Kemp
N.C. Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, NC 27699–1652

Re: Site Viability for Mitigation – Coon Creek Nutrient Offset & Riparian Buffer RFP
Granville County

Dear Ms. Kemp,

Katie Merritt from the Division of Water Quality (DWQ) was asked by the N.C. Ecosystem Enhancement Program (NCEEP) to visit the above-referenced site on April 24, 2013. The subject site is an RFP with an awarded contract between NCEEP and O'Brien & Gere and is located at 3632 Winding Oak Road in Oxford, North Carolina. The focus of the review was to determine the site's potential for nutrient offset and Tar-Pamlico riparian buffer mitigation for the purposes of generating mitigation credits [per 15A NCAC 02B .0240 (c)(5)]. Ms. Merritt performed a stream buffer determination (TBRRO #13-190) and has submitted a letter to NCEEP showing all streams onsite that are subject to the Tar-Pamlico River Buffer Rules. If approved, mitigating this site could provide both Tar-Pamlico riparian buffer credits within the Tar-Pamlico River Basin, and nutrient offset credits within the 8-digit Hydrologic Unit Code (HUC) 03020101 of the Tar-Pamlico River Basin.

The site appeared to be a good candidate for planting Neuse riparian buffers (0-50 feet from the top of bank) for riparian buffer credits or nutrient offset credits. Additionally, there were other riparian areas (51-200 feet from top of bank) that were good candidates for nutrient offset only. Maps detailing the features and their respective mitigation options are attached.

A mitigation plan should be provided to DWQ detailing the riparian buffer and nutrient offset restoration for review and approval prior to initiating the project [per 15A NCAC 02B .0240(c)(6)]. Once the project is complete, an as-built report should be provided to DWQ for review and approval showing the total Tar-Pamlico riparian buffer credits and nutrient offset credits that were generated through the restoration and enhancement efforts [per 15A NCAC 02B .0240(c)(6)(E)]. Please provide riparian buffer credits generated and nutrient offset credits generated in both acres and square feet. Monitoring reports should follow the as-built reports to provide DWQ a means of tracking the project's restoration success for a period of at least five years [per 15A NCAC 02B .0240(c)(6)(F)].

Wetlands, Buffers, Stormwater Compliance & Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: Archdale Bldg., 9th Floor, 512 N. Salisbury St, Raleigh, NC 27601
Phone: 919-807-6300 \ FAX: 919-807-6494
Internet: http://portal.ncdenr.org/web/wq/swp/ws/webscape

Please feel free to contact Ms. Merritt at (919) 807-6371 if you have any questions.

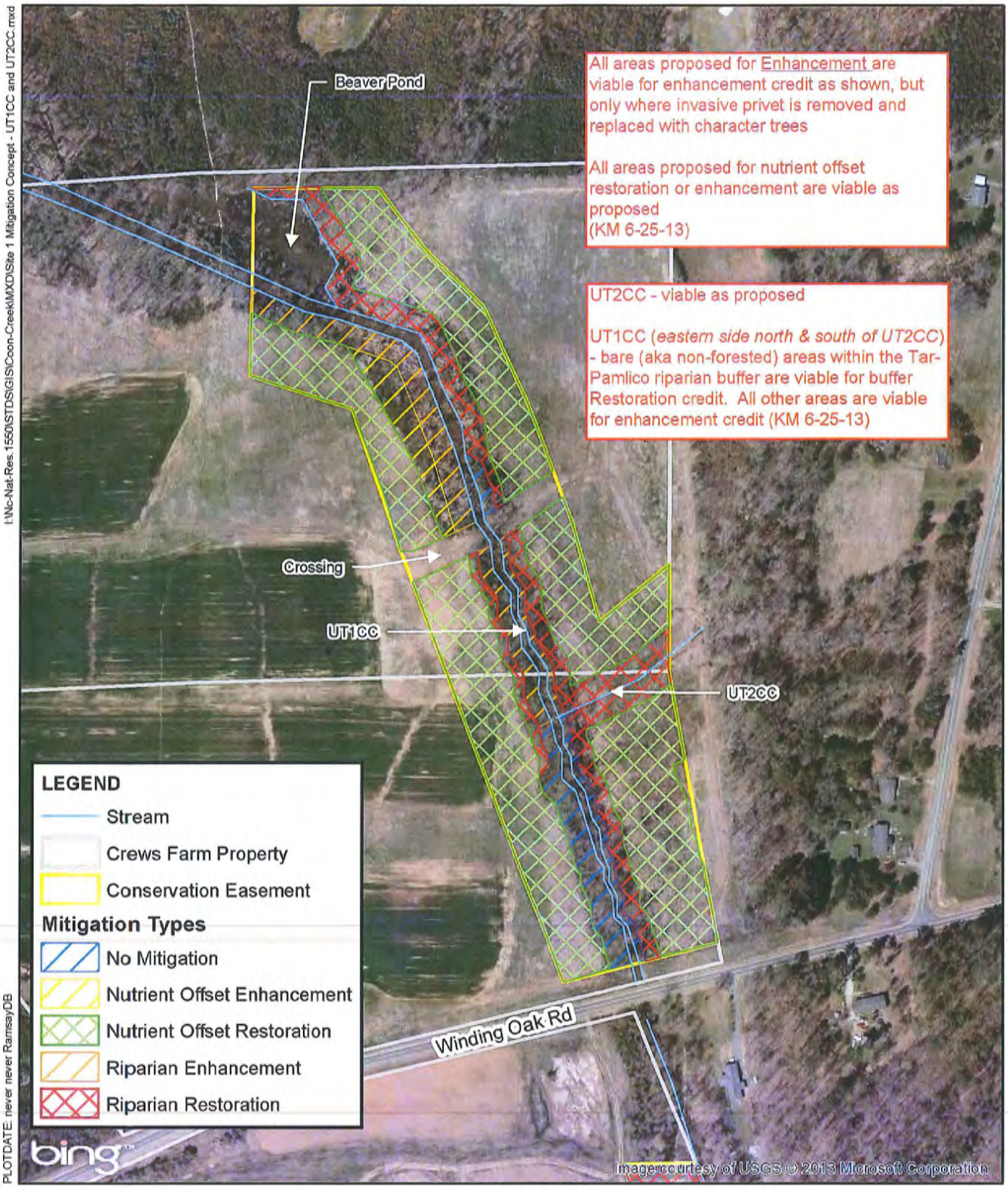
Sincerely,

Karen Higgins

Karen Higgins
Wetlands, Buffers, Stormwater –
Compliance & Permitting Unit

cc: File Copy (Katie Merritt)
Danny Smith – RRO (via mail)

FIGURE 1.1



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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

SITE 1: MITIGATION CONCEPT
UT1CC AND UT2CC

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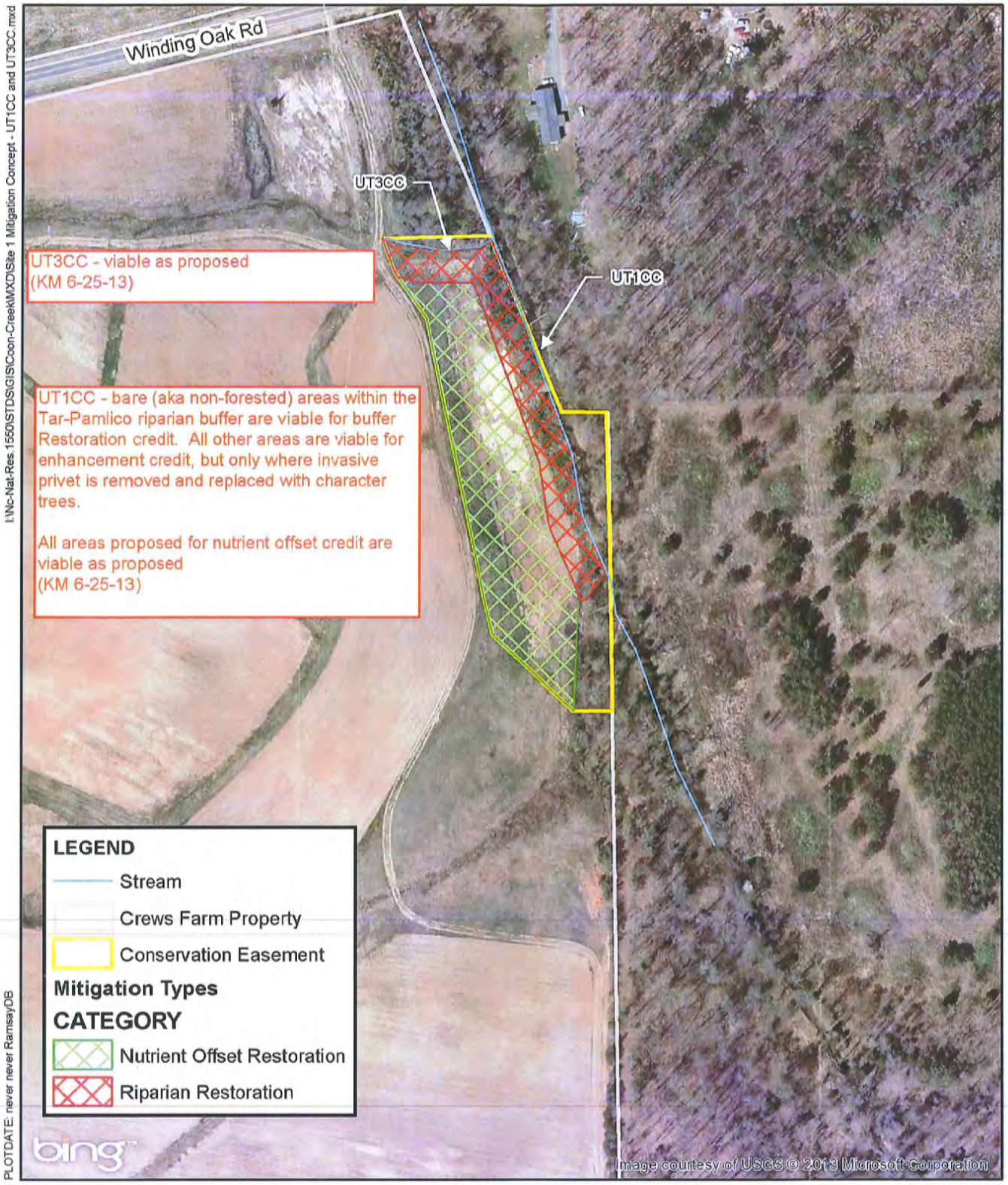
O'BRIEN & GERE

FIGURE 2.1



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PLOTDATE: never never RamsayDB

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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

5/10/2013
50349

SITE 1: MITIGATION CONCEPT
UT1CC AND UT3CC

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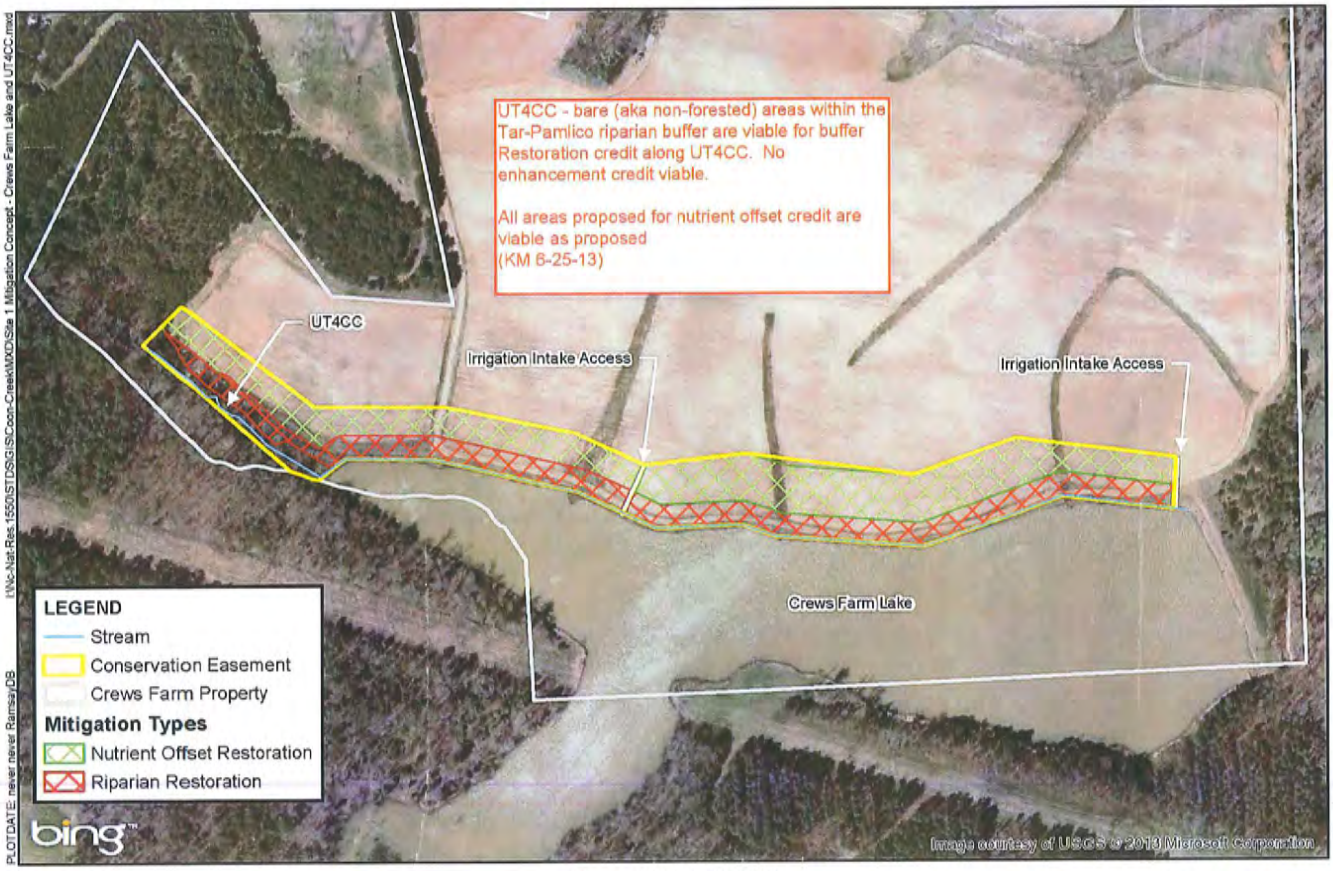
O'BRIEN & GERE



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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

SITE 1: MITIGATION CONCEPT
UT4CC AND CREWS FARM LAKE

FIGURE 3.1
5/10/13
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O'BRIEN & GERE

North Carolina Department of Environment and Natural Resources
Division of Water Resources
Water Quality Programs

Pat McCrory
Governor

Thomas A. Reeder
Director

John E. Skvarla, III
Secretary

August 9, 2013

MEMORANDUM

To: N.C. Ecosystem Enhancement Program

From: Tom Reeder

Subject: DWR responses to the EEP document "*Reforms needed immediately in the regulation of riparian buffer mitigation*"

On August 2, 2013, the Division of Water Resources (DWR) received a document from the N.C. Ecosystem Enhancement Program (EEP) titled "*Reforms needed immediately in the regulation of riparian buffer mitigation*". Below is a short summary of each point raised in the document and DWR's response to those points.

I. Riparian Buffer Mitigation Widths – the Ironclad 50' Standard

There are two issues raised under this section: (a) provide mitigation credit for buffers wider than 50 feet and (b) provide mitigation credit for buffers narrower than 50 feet.

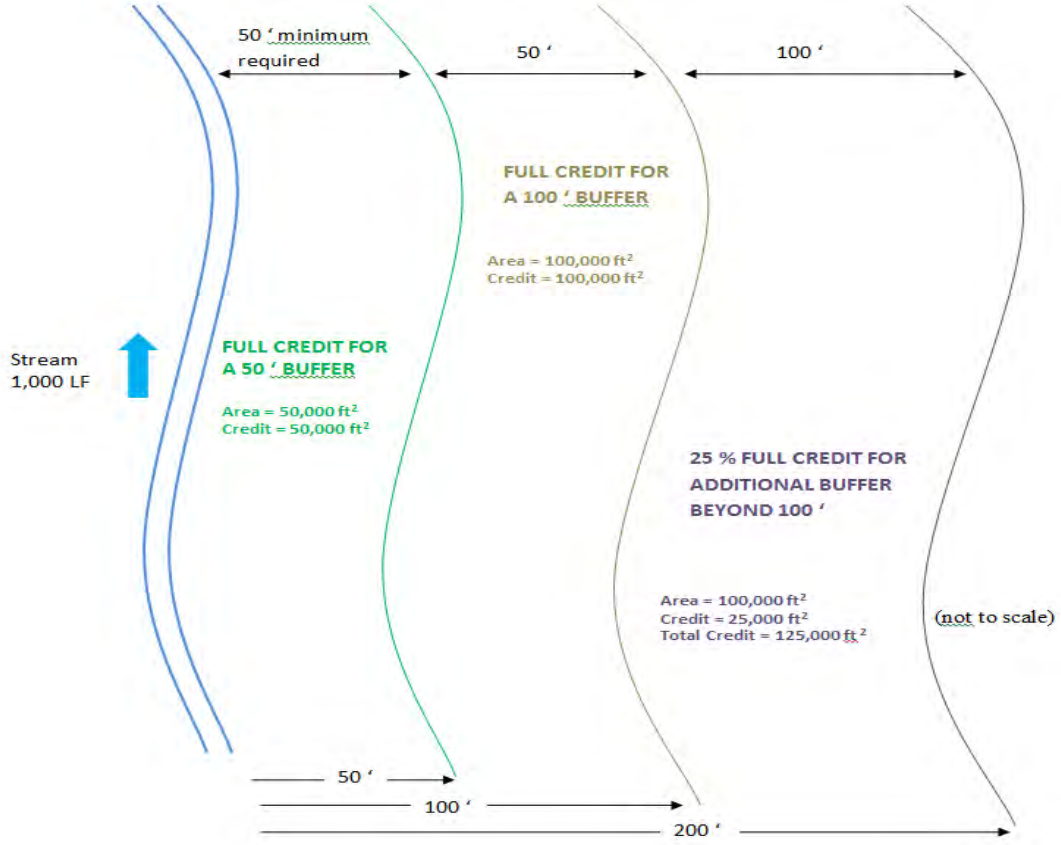
Response:

(a) DWR will approve mitigation credit for buffer widths in excess of 50 feet on a prorated basis, up to a maximum of 200 feet, including on pre-existing mitigation sites:

Buffer width (ft)	Percentage of Full Credit
50-100	100%
101-200	25% for area > 100 feet

1617 Mail Service Center, Raleigh, North Carolina 27699-1617
Location: 512 N. Salisbury St. Raleigh, North Carolina 27604
Phone: 919-807-6300 \ FAX: 919-807-6492
Internet: www.ncwaterquality.org

Example for restoration of a 1,000 linear foot stream segment:



(b) DWR agrees that mitigation credit should be granted for restored buffer widths less than 50 feet, however this would require a rule change. The draft consolidated buffer mitigation rule (15A NCAC 02B .0295) already has provisions for narrower buffers in urban areas and DWR supports expanding this to non-urban areas.

II. Riparian Buffer Jurisdiction – Map Jurisdiction.

There are two issues raised under this section: (a) the ability to conduct restoration or enhancement on unmapped streams and (b) the ability to conduct restoration or enhancement on all watercourses, including ditches.

Response for the Neuse, Tar-Pamlico, Catawba and Jordan:

Under the current buffer mitigation rules, applicants may "restore or enhance a non-forested riparian buffer…" A riparian buffer is defined within each of the buffer rules. Each rule has an applicability paragraph that defines where the rule shall apply (*e.g.* in the Neuse "*This Rule shall apply to 50-foot wide riparian buffers directly adjacent to surface waters in the Neuse River Basin (intermittent streams, perennial streams, lakes, ponds, and estuaries), excluding wetlands*.") The rule goes on further to clarify that a subject feature must be depicted on either the USGS topo map or the NRCS soil survey and defines the Zones of the riparian buffer.

To allow buffer mitigation to occur on non-subject features requires a rule change. DWR does support buffer mitigation on unmapped streams, and the draft consolidated buffer mitigation rule (15A NCAC 02B .0295) already has language to allow for this.

Response for Randleman:

Under the current Randleman buffer mitigation rules, applicants may "restore or enhance a non-forested riparian buffer…" A riparian buffer is defined within the Randleman rules to include unmapped features, as well as ditches or manmade conveyances that "deliver untreated stormwater runoff from an adjacent source directly to an intermittent or perennial stream are subject to the Rule."

DWR will continue to allow buffer mitigation to occur in the Randleman watershed on unmapped features as well as ditches or manmade conveyances that meet the rule.

Response for Goose Creek:

Under the current Goose Creek buffer mitigation rules, unmapped streams may be used to provide buffer mitigation, as well as first order ephemeral streams that discharge/outlet into intermittent or perennial streams.

III. Riparian Buffer Jurisdiction – Stream Calls on Mapped Streams

The issues raised under this section focus on the requirement to have a stream determination made by DWR staff. More specifically, there is a concern that the stream method is not appropriate for modified natural streams that may be severely degraded and that these streams are not eligible for mitigation.

Response:

- DWR will allow all subject streams to be eligible for riparian buffer mitigation.

IV. Restoration Success Criteria – Native Hardwood Trees

The issues raised under this section focus on the requirement to plant a minimum of at least two native hardwood tree species and the current DWR practice of not allowing Sweet Gum or Red Maple to be counted towards meeting this requirement.

Response:

- DWR agrees that as written, the use of Sweet Gum and Red Maple counts towards meeting the minimum requirement of the rule. Mitigation providers will be expected to meet planting criteria established by the IRT in buffer areas that are part of a stream mitigation site.

V. Restoration Success Criteria – Planted Stems

The issues raised under this section focus on the requirement to plant 320 trees per acre and the statement that DWR does not count trees derived from existing seed sources, planted seeds, stump sprouts or other volunteer species towards meeting that 320 requirement.

Response:

- DWR agrees that using 260 stems per acre at the end of the monitoring period would provide more consistency with the federal performance standards for stream and wetland projects; however this would require a rule change. The draft consolidated buffer mitigation rule (15A NCAC 02B .0295) has already incorporated this change.

  DWR staff will continue to consider the presence of woody volunteers during closeout of buffer sites.

VI. Restoration and Enhancement Criteria – Measuring Density

The issues raised under this section focus on tree density for determining restoration or enhancement. More specifically, the issues include the inconsistency among rules, the lack of clarity on how to measure density which has resulted in inconsistent calls among DWR staff, and the use of a tree's dripline.

Response:

- DWR agrees that the inconsistency among rules has created confusion and inconsistency in implementation; however this would require a rule change to be consistent among all six rules. The draft consolidated buffer mitigation rule (15A NCAC 02B .0295) has definitions for restoration, enhancement and preservation, which were written to provide clarity and predictability while still allowing DWR staff to use best professional judgment in evaluating potential mitigation sites based on their many years of experience.

  In the Jordan and Randleman watersheds, the rules allow for restoration on sites with fewer than 100 trees/acre and enhancement on sites with between 100 and 200 trees. In these two watersheds, DWR will accept established forestry protocols (e.g. fixed radius plot sampling) to be used to determine existing tree densities in any non-forested buffer area. Sufficient numbers of plots should be used to accurately assess stem densities and delineate areas of the site with varying densities. Plot data should not be averaged to determine an overall stem density unless the site is fairly homogeneous in terms of vegetative coverage. Existing forested areas should be delineated out and not included in stem density calculations. DWR has not considered the drip line to represent the outer edge of a wooded area for several years and will not consider it in the future. Existing wooded areas should be delineated at the trunks of the outer edge of the areas.

DATE	Wednesday, April 24, 2013
TIME	9:00 AM
LOCATION	Winding Oak Rd, Oxford, NC
FACILITATOR	Jessica Kemp, North Carolina Ecosystem Enhancement Program (NCEEP)
SUBJECT	Agency Review Meeting
ATTENDEES	Katie Merritt, North Carolina Division of Water Quality (NCDWQ) Jennifer Burdette, NCDWQ Jeff Schaffer, NCEEP Jessica Kemp, NCEEP Michael Hall, O'Brien & Gere Michael Waligura, O'Brien & Gere Ray Bode, EEE Daniel Ramsay, O'Brien & Gere Daniel Roberts, EEE

INTRODUCTION

As described by Ms. Kemp and Mr. Schaffer, the purpose of the agency review meeting was for NCDWQ to assess the jurisdictional status of on-site streams in regards to the buffer rule, and to assess the acceptability of the restoration and enhancement acreages proposed for the site so that O'Brien & Gere can evaluate the financial viability of proceeding with the delivery of these credits. Ms. Merritt and Ms. Burdette attended the meeting on behalf of NCDWQ. The two sites comprising the Coon Creek Mitigation Project were visited during the meeting, and each mitigation area within the two sites was assessed by NCDWQ.

KEY POINTS DISCUSSED

No.	Topic	Highlights
1	Site Mapping Edits	Ms. Kemp and Ms. Merritt identified a need to produce revised site maps to facilitate the NCDWQ in performing the site viability assessment. The NCDWQ identified the need for two sets of the map, the first on an aerial base, with site streams identified. The second will also be on an aerial base, with the mitigation areas shown in a see-through hatching. Both sets of maps will be on a scale suitable for assessing the ground cover type within each mitigation area. In addition, it was noted that future soil maps used for reporting should be taken from the most recent printed version of the Granville County Soil Survey. Mr. Schaffer provided a copy of this survey for reference during the site visit.
2	Buffer Jurisdiction	Ms. Merritt confirmed that Coon Creek, UT1CC, UT2CC, UT3CC, UT4CC, UT5CC, and Crews Farm Lake are subject to the Tar-Pamlico River buffer rules (Figures 1.1 through 4.2).
3	Identification of areas for Buffer Enhancement or Restoration	During the site visit there was extensive discussion of how to identify areas which were acceptable for buffer restoration, or enhancement. The discussion centered around what criteria to use to identify these areas, how to assess these criteria, and how to delineate the limits of each area. The following summarize the specifics of this discussion: ▪ **Criteria for Identification of Enhancement and Restoration**-- NCEEP RFP #16-004795 defines riparian buffer enhancement as converting a non-forested riparian area with between 100 and 200 trees per acre to a forested riparian area with 320 or more trees per acre (Page 11). The RFP defines Riparian Buffer Restoration as converting a

KEY POINTS DISCUSSED

No.	Topic	Highlights

non-forested riparian area with less than 100 trees per acre to a forested riparian area with 320 or more trees per acre (Page 12). Trees contributing to the count of trees per acre are defined as being greater than or equal to five inches diameter at breast height (dbh) for trees and greater than two feet in height for shrubs, excluding nuisance and exotic vegetation. Mr. Schaffer noted that the Tar-Pamlico Buffer Mitigation Rule defines mitigation success as having a density of 320 or more trees per acre at maturity [NCAC 02B .0260(9)(d)(ii)]. The Tar-Pamlico Buffer Rule defines trees as being woody vegetation with a dbh greater than or equal to five inches, and does not include shrubs greater than two feet in height as trees for the purpose of calculating density [NCAC 02B .0259 (2)(m)]. Ms. Merritt also identified a guidance memo published by NCDWQ on January 25, 2008 that contained criteria for identifying enhancement or restoration based on tree canopy cover. Because this document is no longer used by DWQ as policy nor is it publicly available, those criteria are not included in these minutes.

- **Assessment of Criteria**-- The RFP and the Tar-Pamlico Buffer Rules do not identify a specific method for quantifying the number of trees per acre of a potential mitigation area. Ms. Kemp described one possible approach, where trees would be counted within random, 10 meter square plots within the buffer. An average of a representative quantity of random plots would then be taken to estimate the trees per acre within the buffer. This method would be conducted in general accordance with the Level 2 assessment outlined in the Carolina Vegetative Survey – Ecosystem Enhancement Program Protocol, Version 4.0. A similar method was used by O'Brien & Gere and EEE on February 28, 2013. Representative 30 feet square plots were chosen within potential enhancement and restoration areas at Sites 1 and 2, and trees greater than 5 inches were counted. The calculated stem density within each plot was extrapolated to less than 100 trees per acre. The specific results are provided in the attached memo. Ms. Merritt described two other approaches. The first was to outline a 1-acre plot within the buffer as representative of the buffer conditions, and count the qualifying trees within the 1-acre plot. The second approach was identified as a "transect method," in which plots with a width of 50 feet from top of bank along a chosen length of stream would be used to estimate the density of trees per acre within the buffer. Ms. Kemp requested that Ms. Merritt provide a recommended method for estimating trees per acre following the meeting, if these data would be needed for NCDWQ to make a site viability recommendation for the proposed enhancement areas.

- **Boundary Delineation**-- Ms. Merritt and Ms. Kemp discussed how to treat existing wooded areas with greater than 200 trees/acre. Ms. Merritt stated that these areas should be surveyed out of the restoration or enhancement areas. If a tree species, such as Eastern Red Cedar, has a growth habit such that planting cannot be performed under the dripline, the survey line should be along the dripline. Otherwise, the survey line should be drawn from stem to stem.

Both Ms. Merritt and Ms. Kemp acknowledged the lack of definitive guidance on this issue within the NCDWQ and NCEEP, and agreed to obtain clarity in support of the viability assessment.

KEY POINTS DISCUSSED

No.	Topic	Highlights
4	Establishment of Easement Boundaries	Ms. Kemp noted at Site 1 that the stream runs off the property at UT1CC, and that we would needed to keep in mind that the conservation easement would need to extend from the top of bank no more than 200 feet to the edge of the nutrient offset boundary (Figure 2.1). A similar issue was identified at Site 2, where UT5CC parallels the northern boundary of the landowner's property (Figure 4.1). In response to this, Mr. Ramsay indicated that the survey had yet to be performed in order to confirm these boundaries, and requested clarification on the path forward if the survey shows that the property does not include the top of bank for these areas. Ms. Merritt stated that O'Brien & Gere could contact NCDWQ to assist with resolution of this issue, as needed.
5	Overall NCDWQ Assessment of Site Viability	Ms. Merritt stated that overall, these were viable sites, and that she had not seen anything that was not acceptable for at least enhancement, but indicated that she needed to provide clarity on the issues summarized in Topic 3 above.

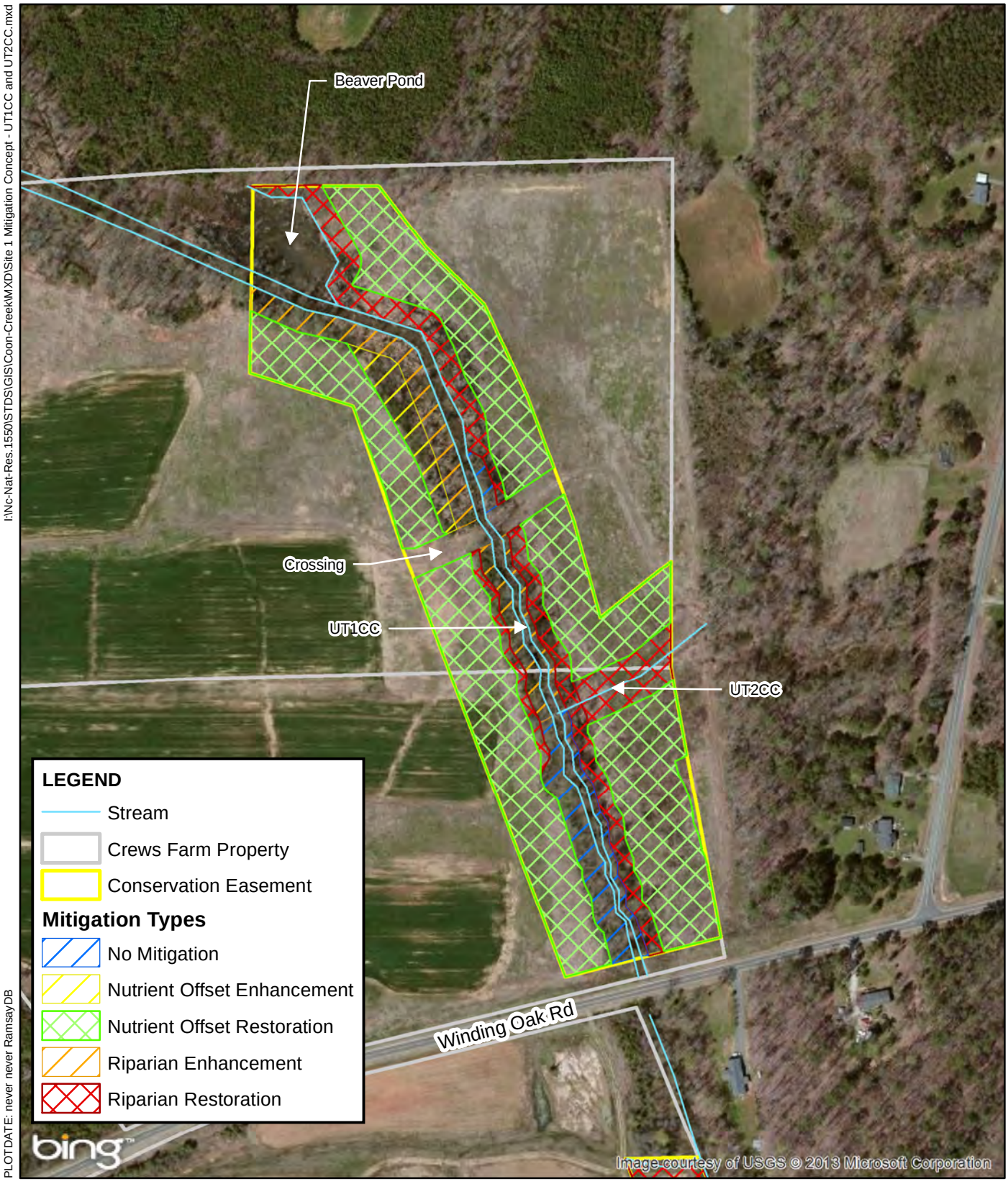
SUMMARY OF ACTION ITEMS

No.	Action Item	Responsible	Deadline
1	Consult DWQ regional office personnel and contact Jessica Kemp with clarification on buffer enhancement vs. restoration areas	Katie Merritt	5/14/13
2	Revise mitigation concept maps and mitigation unit quantities to reflect DWQ's position regarding buffer restoration and enhancement areas, as communicated by Ms. Merritt to Ms. Kemp, and documented in Ms. Merritt's email on May 14, 2013 (attached). Include revisions to address Key Point #4.	O'Brien & Gere	6/10/13
3	Send revised meeting minutes, with revised maps attached, to Ms. Kemp	Daniel Ramsay	6/10/13
3	Communicate Coon Creek Project Team position regarding site viability following mitigation concept revisions to Ms. Kemp.	O'Brien & Gere	6/10/13
3	Issue jurisdictional "streams subject" letter and site viability letter	Katie Merritt	5/31/13
4	Issue revised estimated project schedule	O'Brien & Gere	6/19/13

ATTACHMENTS

- Revised Mitigation Concept Figures for Site 1 (Site 2 is proposed to be withdrawn)
- Aerial Photograph Figures for Site 1
- Memo summarizing stem count data collected by O'Brien & Gere and EEE on February 28, 2013.
- Email from Ms. Merritt to Ms. Kemp on May 14, 2013 summarizing DWQ's position regarding buffer restoration and enhancement definitions for the Coon Creek Project.

FIGURE 1.1



I:\Nc-Nat-Res.1550\STDS\GIS\Coon-Creek\MXD\Site 1 Mitigation Concept - UT1CC and UT2CC.mxd

PLOTDATE: never never RamsayDB

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0 100 200 400

Feet

EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

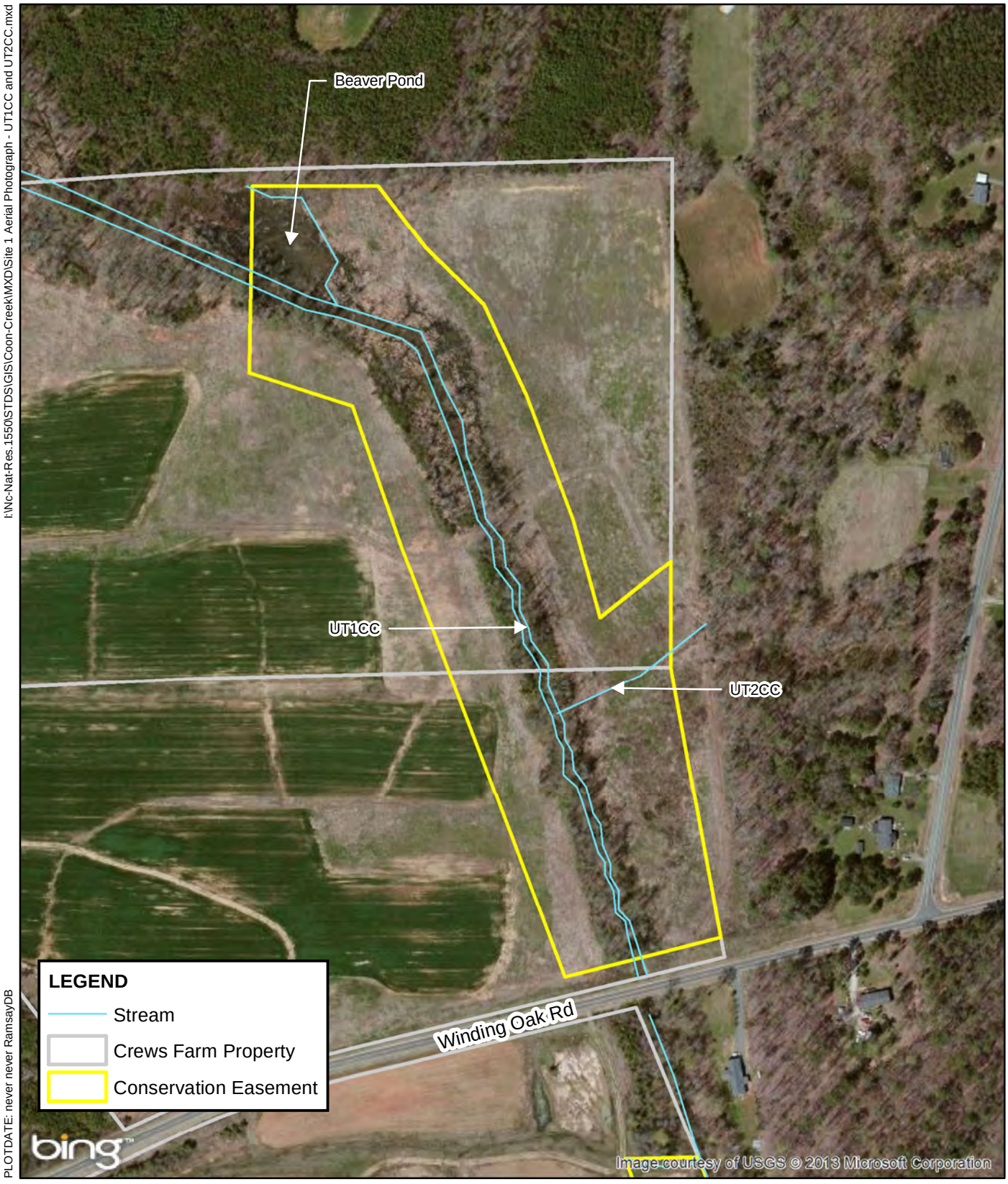
5/10/2013
50349

SITE 1: MITIGATION CONCEPT
UT1CC AND UT2CC

3e

O'BRIEN & GERE

FIGURE 1.2



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PLOTDATE: never never RamsayDB

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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

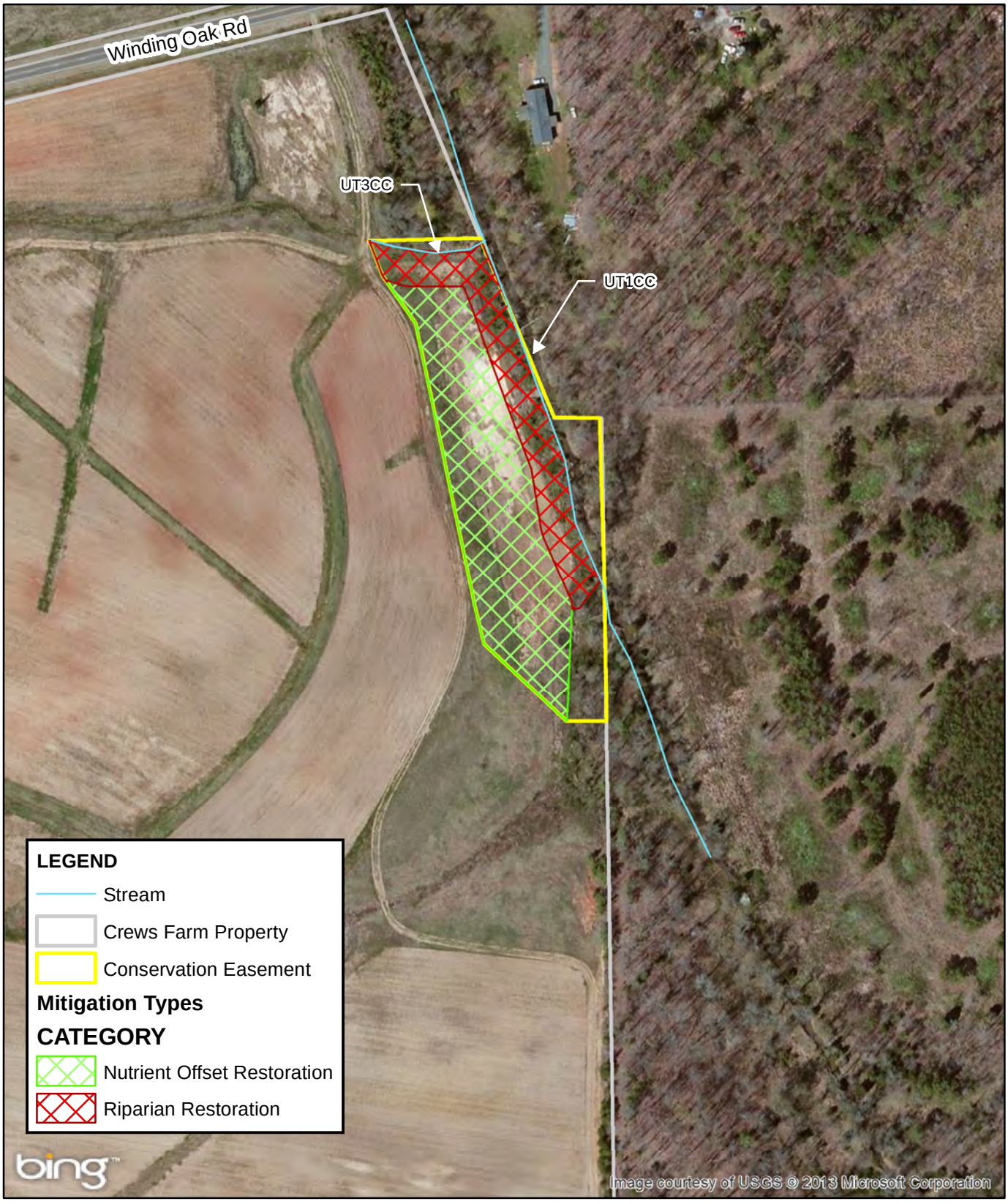
5/23/2013
50349

SITE 1: AERIAL PHOTOGRAPH
UT1CC AND UT2CC

3e

O'BRIEN & GERE

FIGURE 2.1



I:\Nc-Nat-Res.1550\STDS\GIS\Coon-Creek\MXD\Site 1 Mitigation Concept - UT1CC and UT3CC.mxd

PLOTDATE: never never RamsayDB

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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

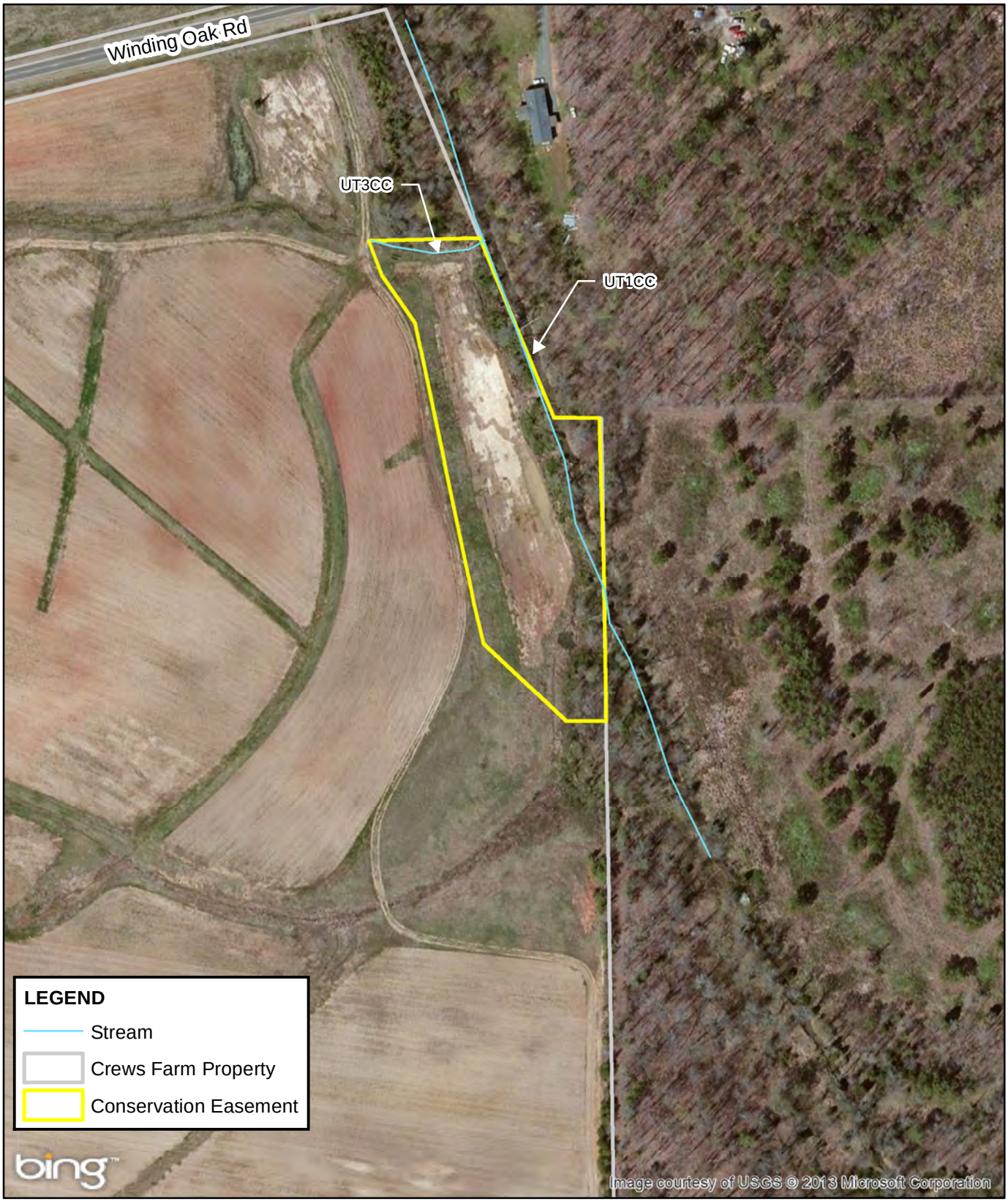
5/10/2013
50349

SITE 1: MITIGATION CONCEPT
UT1CC AND UT3CC

3e

O'BRIEN & GERE

FIGURE 2.2



I:\Nc-Nat-Res.1550\STDS\GIS\Coon-Creek\MXD\Site 1 Aerial Photograph - UT1CC and UT3CC.mxd

PLOTDATE: never never RamsayDB

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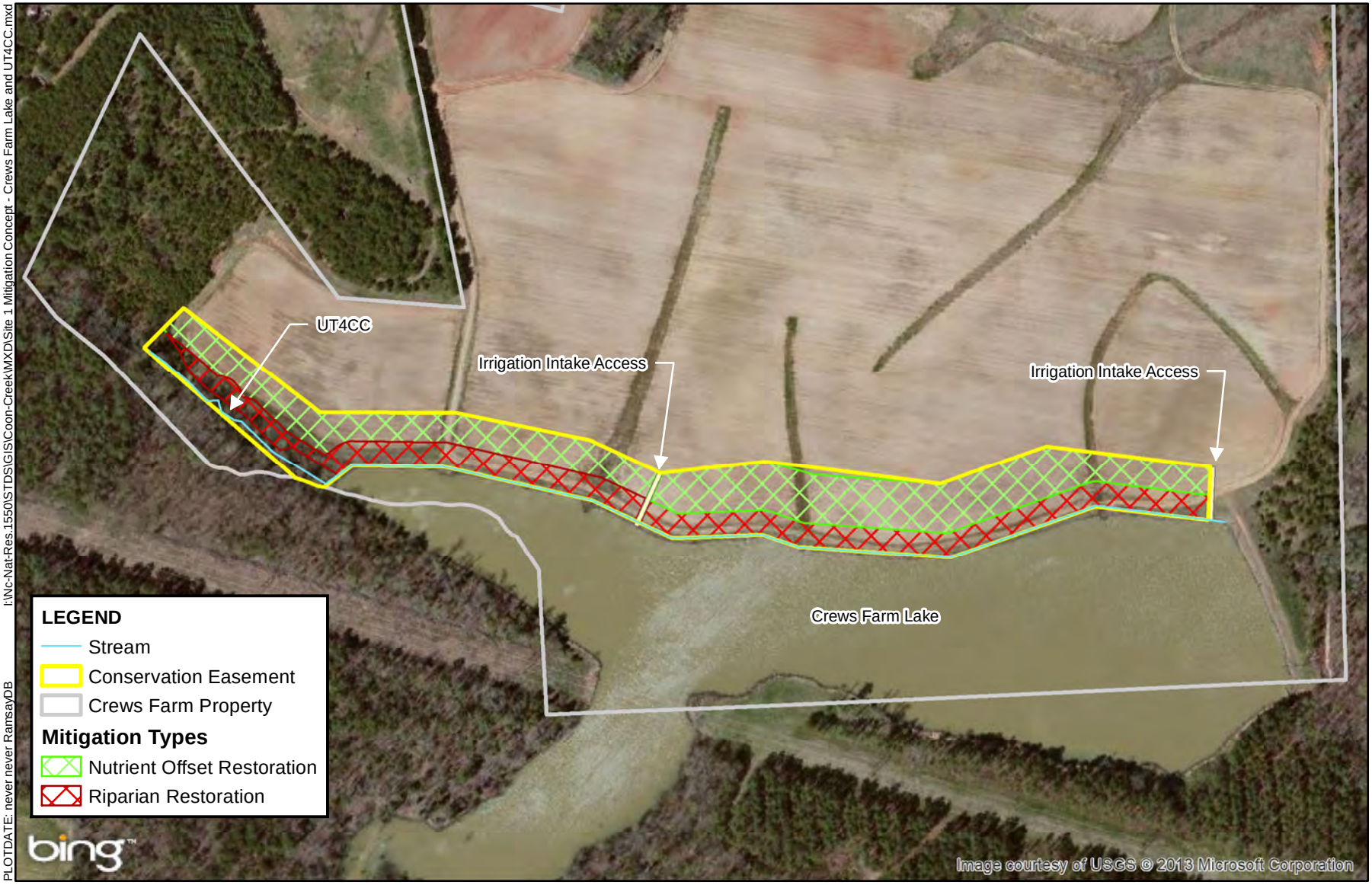
EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

5/23/2013
50349

SITE 1: AERIAL PHOTOGRAPH
UT1CC AND UT3CC

3e

O'BRIEN & GERE



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EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

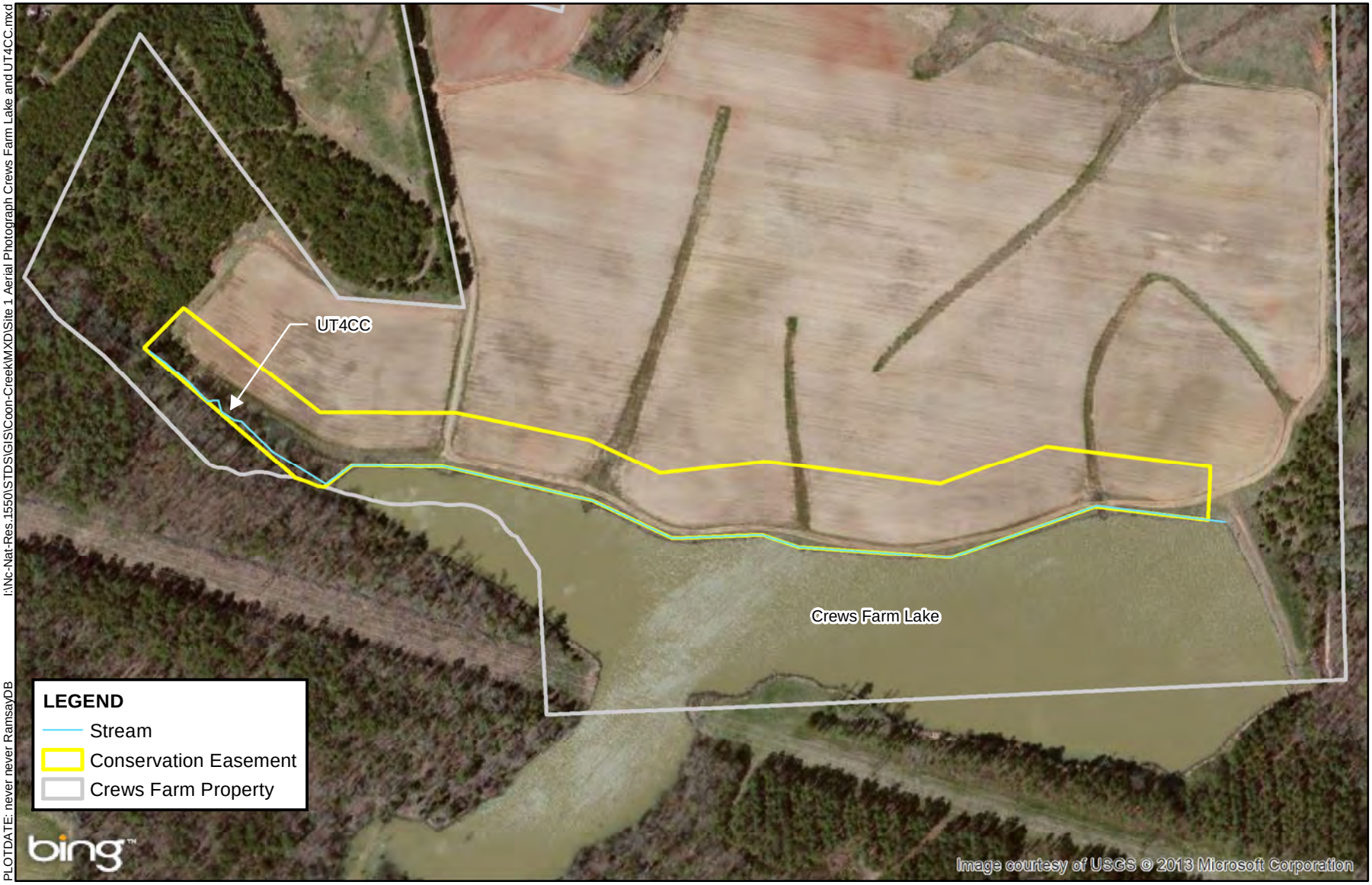
SITE 1: MITIGATION CONCEPT
UT4CC AND CREWS FARM LAKE

FIGURE 3.1

5/10/13
50349

3e

O'BRIEN & GERE



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0 100 200 400

Feet

EEP PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

SITE 1: AERIAL PHOTOGRAPH
UT4CC AND CREWS FARM LAKE

FIGURE 3.2

5/23/2013
50349

3e

O'BRIEN & GERE

MEMORANDUM

TO:	Coon Creek Project Team	**cc:**	Mike Hall
FROM:	Daniel Ramsay		Mike Waligura
RE:	Stem Count Data		Ray Bode
FILE:	I:\Nc-Nat-Res.1550		Tina Sekula
DATE:	April 26, 2013		Daniel Roberts
			Doug Smith

Ray Bode, Daniel Roberts and Daniel Ramsay went to the Coon Creek site February 28, 2013 to collect additional data regarding stem density in the proposed restoration and enhancement areas to support the upcoming IRT site visit. Data collection consisted of measuring the number of trees in five plots at representative locations at each site. Plot locations were selected to represent a range of conditions within the enhancement area. Plots were 30 feet by 30 feet in size, and the locations are shown on the attached figures. Plot layout and data collection was conducted in general accordance with a Level 2 Assessment in the Carolina Vegetative Survey-Ecosystem Enhancement Program Protocol, Version 4.0. Also, the Tar-Pamlico Buffer Rule defines trees as woody plants with a DBH equal to or exceeding five inches [15A NCAC 02B.0259 (2)(m)]. Using this definition for qualifying trees, the following measurements were obtained:

Coon Creek Site 1

UT1 Veg Plot 1: 2 qualifying trees/plot = 96 stems per acre (each plot was 1/48th of an acre)

Total invasive cover: 55%

UT1 Veg Plot 2: 2 qualifying trees/plot = 96 stems per acre

Total invasive cover: 40%

Vegetation Plot 1 was chosen as the representative plot for the existing vegetated buffer along UT1CC. Vegetation Plot 2 was chosen as representative of the sparse areas of the buffer. Both plots were highly affected by privet and Japanese honeysuckle.

Coon Creek Site 2

CC Veg Plot 1: 0 qualifying trees/plot = 0 stems per acre

Total invasive cover: 0%

CC Veg Plot 2: 0 qualifying trees/plot = 0 stems per acre

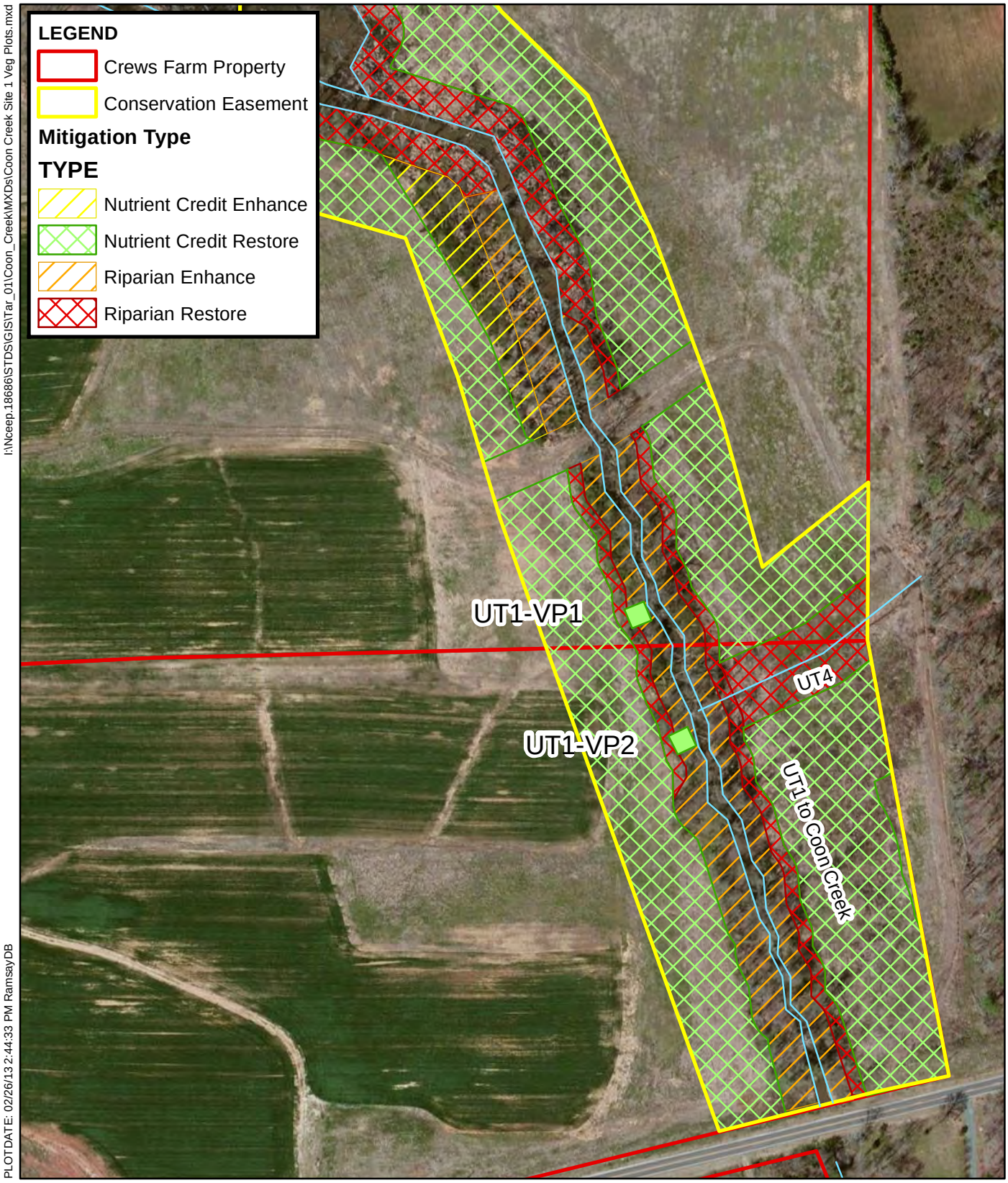
Total invasive cover: 40%

UT5 Veg Plot 1: 0 qualifying trees/plot = 0 stems per acre

Total invasive cover: 30%

CC Veg Plot 1 was chosen as representative of the young Green Ash stand within the proposed restoration area along Coon Creek's left bank. CC Veg Plot 2 was chosen for the same reasons, and was located on the right bank. UT5 Veg Plot 1 was chosen as representative of the enhancement areas along UT5CC.

FIGURE 1



I:\Nceep.18686\STDS\GIS\Tar_01\Coon_Creek\MXDs\Coon Creek Site 1 Veg Plots.mxd

PLOT DATE: 02/26/13 2:44:33 PM RamsayDB

CREWS FARM SITE 1
TAR-PAMLICO HUC# 03020101

N

STEM COUNT PLOTS

0 100 200 400
Feet

3/1/2013
BD

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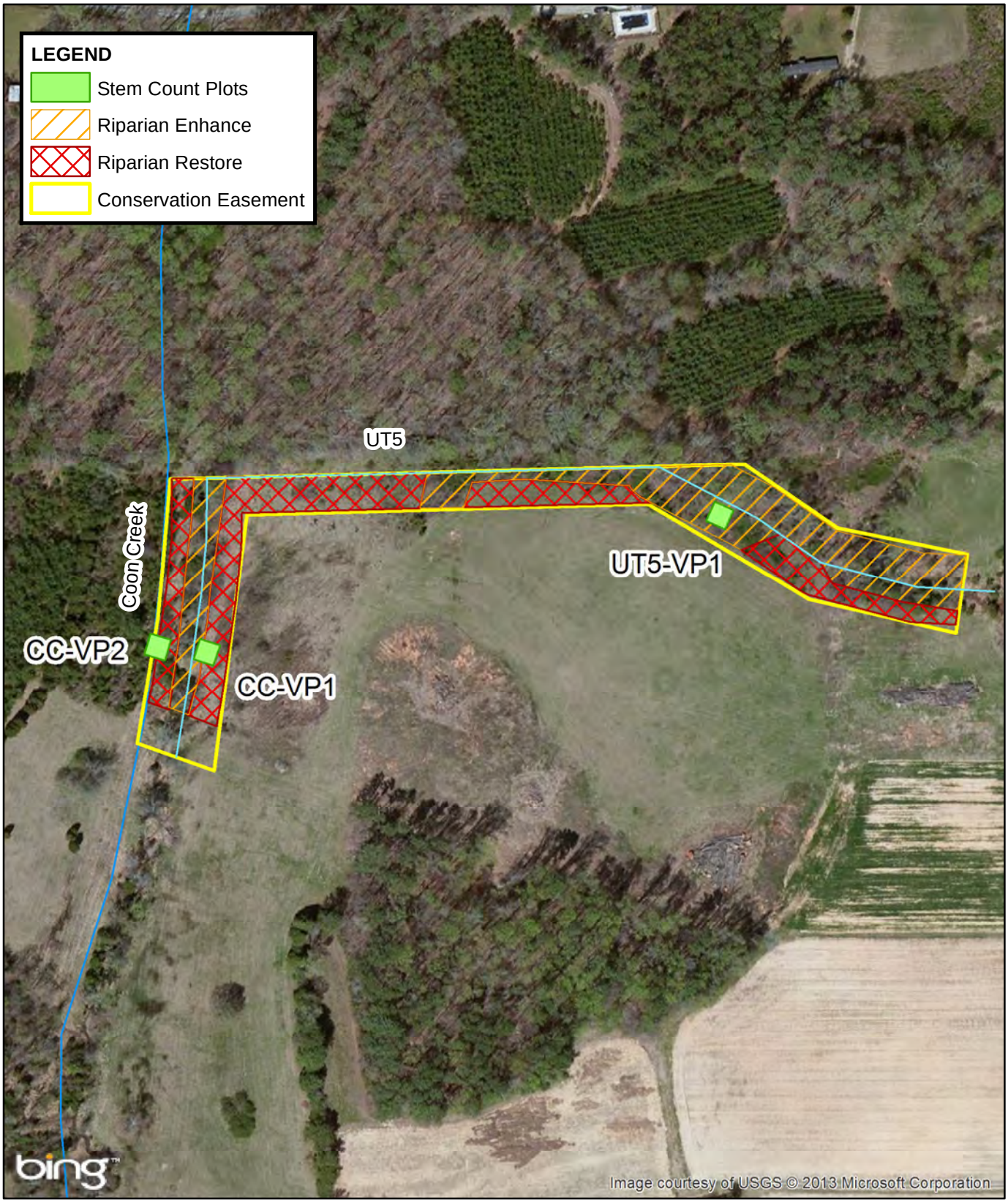
O'BRIEN & GERE

FIGURE 2



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PLOTDATE: 02/26/13 2:44:33 PM RamsayDB

CREWS FARM SITE 2
TAR-PAMLICO HUC# 03020101

N

STEM COUNT PLOTS

0 100 200 400
Feet

3/1/2013
BD

3e

O'BRIEN & GERE

Daniel Ramsay

From: Kemp, Jessica <jessica.kemp@ncdenr.gov>
Sent: Tuesday, May 14, 2013 3:24 PM
To: Daniel Ramsay
Cc: Michael Hall; Michael Waligura; PWS Ray Bode (rbode@eee-consulting.com); PWS Tina Sekula (tsekula@eee-consulting.com); Schaffer, Jeff; William Schew; Doug Smith (dsmith@eee-consulting.com); Daniel Roberts (DRoberts@eee-consulting.com)
Subject: FW: Coon Creek: Draft Meeting Minutes from 4/24/13 DWQ Review Meeting

Please see Katie's comments in red below.

From: Merritt, Katie
Sent: Tuesday, May 14, 2013 3:11 PM
To: Kemp, Jessica
Subject: RE: Coon Creek: Draft Meeting Minutes from 4/24/13 DWQ Review Meeting

Hey Jessica,
Thanks for the email. Here are the two questions posed by Daniel and I have provided my response per your request:

1. Does "mature trees" refer to the definition in the Tar-Pamlico buffer rules: >5" Diameter at Breast Height?
DWQ recommends the phrase "mature forest", which includes trees >5" DBH as well as other smaller woody vegetation (trees, saplings, shrubs) that can provide a functional & healthy forested riparian buffer.

2. Does an "area lacking a riparian buffer" refer to an area containing less than 100 trees/acre meeting the definition of a mature tree? DWQ recommends using the phrase "non forested" rather than "area lacking a riparian buffer" for better clarity. DWQ does not use a specific number to determine whether a specific area is non forested or forested in the Tar Pamlico River Basin. An onsite assessment is done to determine factors such as the health of the existing buffer (size, density, diversity, invasives, etc), it's ability to provide nutrient removal in its current condition, and other functions. A non forested buffer, in its most simplest form, would be an absence of trees > 5 DBH, lacking in dense woody vegetation such as smaller trees, saplings and shrubs along with open canopies.

In a discussion with Katie Merritt on 5/3/13 she summarized DWQ's position regarding buffer restoration and enhancement areas as the following:

- Areas with existing mature ~~trees~~ forest and no treatment, removal or management of invasive plant species will not be viable for mitigation credit.
- Areas with existing mature ~~trees~~ forest along with treatment, removal, & management of invasive plant species and replanting with character trees is viable for enhancement credit. Only areas where privet was noted in dense populations shall be considered for enhancement credit.
- Areas ~~lacking a riparian buffer~~ identified as a non forested buffer are viable for restoration credit.

Thank you for letting me comment Jessica, I appreciate it. Let me know if you need anything further! I will be sending the buffer determination letter out tomorrow☺

Thank you,
Katie

-------- Original Message --------
Subject: RE: Coon Creek: Draft Meeting Minutes from 4/24/13 DWQ Review Meeting
From: Daniel Ramsay <Daniel.Ramsay@obg.com>
To: "Kemp, Jessica" <jessica.kemp@ncdenr.gov>
CC: Michael Hall <Michael.Hall@obg.com>,Michael Waligura <Michael.Waligura@obg.com>,"PWS Ray Bode (rbode@eee-consulting.com)" <rbode@eee-consulting.com>,"PWS Tina Sekula (tsekula@eee-consulting.com)" <tsekula@eee-consulting.com>,"Schaffer, Jeff" <jeff.schaffer@ncdenr.gov>,William Schew <William.Schew@obg.com>,"Doug Smith (dsmith@eee-consulting.com)" <dsmith@eee-consulting.com>,"Daniel Roberts (DRoberts@eee-consulting.com)" <DRoberts@eee-consulting.com>

Hi Jessica,

Thank you for these comments. We will start working on addressing your comments first thing tomorrow. Additionally, we will re-examine the mitigation areas based on DWQ's position, and will provide revised mitigation and easement areas for use in DWQ's site viability letter.

To clarify DWQ's position for the sake of re-examining the mitigation areas:

1. Does "mature trees" refer to the definition in the Tar-Pamlico buffer rules: >5" Diameter at Breast Height?
2. Does an "area lacking a riparian buffer" refer to an area containing less than 100 trees/acre meeting the definition of a mature tree?

Thanks,

Daniel

From: Kemp, Jessica [mailto:jessica.kemp@ncdenr.gov]
Sent: Wednesday, May 08, 2013 2:53 PM
To: Daniel Ramsay
Cc: Michael Hall; Michael Waligura; PWS Ray Bode (rbode@eee-consulting.com); PWS Tina Sekula (tsekula@eee-consulting.com); Schaffer, Jeff
Subject: RE: Coon Creek: Draft Meeting Minutes from 4/24/13 DWQ Review Meeting

Hi Daniel,
Thanks for putting this together. Jeff Schaffer and I reviewed the attachments and have the following comments:

Memo

- 3. "Because this document is no longer used by DWQ as policy nor is it publicly available, those criteria are not included in these minutes."
- 4. Note that easement acquisition is the responsibility of the provider. EEP and DWQ can only offer assistance in terms of policy and contract clarification. Please delete, "~~Mr. Schaffer stated that O'Brien & Gere and the landowners would need to work that issue out, with the help of NCEEP if needed, by either acquiring an easement from the neighboring landowner, or using the quit claim deed process, as applicable.~~"
- Summary of Actions items can be revised as needed

In a discussion with Katie Merritt on 5/3/13 she summarized DWQ's position regarding buffer restoration and enhancement areas as the following:

- Areas with existing mature trees and no treatment of invasive plant species will not be viable for mitigation credit.
- Areas with existing mature trees and treatment of invasive plant species is viable for enhancement credit.

- Areas lacking a riparian buffer are viable for restoration credit.

Katie requested revised maps of areas proposed for enhancement and restoration credit based on the criteria above to be included in her site viability letter. Maps must be based off of surveys of invasive plant species presence. In addition, easement and credit areas will need to be adjusted to reflect issues addressed in Memo item #4.

Once I receive the revised memo and maps I will forward them on to Katie and cc O&G. I have already sent her O&G's stream maps for her stream call letter.

Please let me know if you have any questions as you working on putting these together.
Jessica

From: Daniel Ramsay [mailto:Daniel.Ramsay@obg.com]
Sent: Tuesday, April 30, 2013 9:39 AM
To: Kemp, Jessica
Cc: Michael Hall; Michael Waligura; PWS Ray Bode (rbode@eee-consulting.com); PWS Tina Sekula (tsekula@eee-consulting.com)
Subject: Coon Creek: Draft Meeting Minutes from 4/24/13 DWQ Review Meeting

Hi Jessica,

Please see the attached, proposed meeting minutes for the April 24, 2013 meeting with Katie Merritt and Jennifer Burdette, DWQ. As attachments to the minutes, please also see the attached figures, and a memo summarizing the stem count data that O'Brien & Gere and EEE collected in February.

Please let us know of any requested revisions.

Thanks,

Daniel

O'BRIEN & GERE

Daniel Ramsay, WPIT
PROJECT SCIENTIST

O'BRIEN & GERE
2610 Wycliff Rd, Suite 104
Raleigh, NC 27607
p 919-783-7777 | *f* 919-783-0757
cell 770-402-9872
daniel.ramsay@obg.com www.obg.com

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FINAL REPORT

Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project Categorical Exclusion Checklist

North Carolina Department of Environment and Natural Resources
Ecosystem Enhancement program
1652 Mail Service Center
Raleigh, NC 27699

July 2013

Appendix A

Categorical Exclusion Form for Ecosystem Enhancement Program Projects
Version 1.4

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

Part 1: General Project Information	
Project Name:	Coon Creek Riparian Buffer and Nutrient Offest Mitigation Project
County Name:	Granville County
EEP Number:	NCDENR Contract # 5153, Project # 95807
Project Sponsor:	O'Brien and Gere Engineers, Inc
Project Contact Name:	Daniel Ramsay, WPIT
Project Contact Address:	2610 Wycliff Road, Suite 104, Raleigh, NC 27607
Project Contact E-mail:	daniel.ramsay@obg.com
EEP Project Manager:	Jessica Kemp

Project Description

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project consists of a combination of buffer restoration and enhancement and nutrient offset activities along tributaries of Coon Creek. Restoration areas are currently cleared, and will be planted with native trees. Enhancement areas are impacted by invasives, and will be re-planted following invasives removal. The mitigation site includes approximately 26.4 acres of buffer mitigation along approximately 5,000 linear feet of stream. The project will result in approximately 6.1 riparian mitigation units and 14.5 nutrient offset mitigation units.

For Official Use Only

Reviewed By:

1/15/2013
Date

Jessica K. P.
EEP Project Manager

Conditional Approved By:

Date

For Division Administrator
FHWA

☐ **Check this box if there are outstanding issues**

Final Approval By:

7-25-13
Date

For Division Administrator
FHWA

Part 2: All Projects Regulation/Question	Response
Coastal Zone Management Act (CZMA)	
1. Is the project located in a CAMA county?	☐ Yes ☑ No
2. Does the project involve ground-disturbing activities within a CAMA Area of Environmental Concern (AEC)?	☐ Yes ☐ No ☑ N/A
3. Has a CAMA permit been secured?	☐ Yes ☐ No ☑ N/A
4. Has NCDCM agreed that the project is consistent with the NC Coastal Management Program?	☐ Yes ☐ No ☑ N/A
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Has the zoning/land use of the subject property and adjacent properties ever been designated as commercial or industrial?	☐ Yes ☑ No ☐ 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?	☐ Yes ☑ No ☐ 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?	☐ Yes ☐ No ☑ N/A
5. As a result of a Phase II Site Assessment, are there known or potential hazardous waste sites within the project area?	☐ Yes ☐ No ☑ N/A
6. Is there an approved hazardous mitigation plan?	☐ Yes ☐ No ☑ 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?	☐ Yes ☑ No
2. Does the project affect such properties and does the SHPO/THPO concur?	☐ Yes ☐ No ☑ N/A
3. If the effects are adverse, have they been resolved?	☐ Yes ☐ No ☑ N/A
Uniform Relocation Assistance and Real Property Acquisition Policies Act (Uniform Act)	
1. Is this a "full-delivery" project?	☑ Yes ☐ No
2. Does the project require the acquisition of real estate?	☑ Yes ☐ No ☐ N/A
3. Was the property acquisition completed prior to the intent to use federal funds?	☐ Yes ☑ No ☐ 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?	☑ Yes ☐ No ☐ N/A

SUPPORTING DOCUMENTATION

The Categorical Exclusion (CE) checklist for the Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (the Project) was completed based on the documentation provided in the sections that follow. Ground disturbing activities are not anticipated as a part of this project; therefore, Part 3 of the CE checklist was not completed.

The Project is located in Granville County, North Carolina. A project location map is provided as Figure 1. Site 2, which was referenced in the North Carolina State Historic Preservation Office (SHPO) correspondence, has been removed from the Project.

COASTAL ZONE MANAGEMENT ACT (CZMA)

The Project is not located in a North Carolina Coastal Area Management Act (CAMA) county.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION LIABILITY ACT (CERCLA)

The Project is a "full delivery" project between O'Brien & Gere Engineers, Inc. (O'Brien & Gere) and the North Carolina Department of Environment and Natural Resources (NCDENR) Ecosystem Enhancement Program (EEP). Based on the Granville County GIS website, the Project area is not zoned for commercial or industrial land use, nor are any of the adjacent properties (Attachment 1). An Environmental Data Resources (EDR) Standard Package report was obtained on June 26, 2013 as a limited Phase 1 Site Assessment for the Project, and is provided as Attachment 2. As reported in the EDR Radius Map Report with Geocheck®, the Project area was not listed in any of the databases searched by EDR. Based on the EDR Standard Package report, there are no known or potential hazardous waste sites within or adjacent to the Project.

NATIONAL HISTORIC PRESERVATION ACT (SECTION 106)

The Project area is not listed on, nor eligible for listing on, the National Register of Historic Places. Correspondence with SHPO regarding the Project is provided in Attachment 3. SHPO did not have comment on the Project as proposed.

UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT

This is a "full delivery" project which will require the acquisition of real estate. A conservation easement protecting the Project area in perpetuity will be purchased by O'Brien & Gere and granted to EEP. A letter informing the current landowners that O'Brien and Gere does not have condemnation authority, and documenting that O'Brien & Gere discussed fair market value for the Project area with the landowners, is provided in Attachment 4. The grantor for the Project area signed the letter on September 20, 2012.

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

May 24, 2013

Michael Waligura
O'Brien & Gere Engineers, Inc.
2610 Wycliff Road, Suite 104
Raleigh, NC 27607

Re: Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project, OBG 50349, Granville County, ER 13-0955

Dear Mr. Waligura:

Thank you for your letter of May 7, 2013, 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, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

O'BRIEN & GERE

September 18, 2012

Mr. Jimmy Crews
5687 Tabbs Creek Road
Oxford, NC 27565

RE: Coon Creek Riparian Buffer Restoration and Enhancement
Uniform Relocation Assistance and Real Property Acquisition Policies Act
Option to Purchase Parcels Owned by Crews Farm, LLC
Hydrologic Cataloging Unit 03020101

Dear Mr. Crews:

As we have discussed, as part of the property acquisition process, O'Brien & Gere Engineers, Inc. (O'Brien & Gere or Grantee) must demonstrate compliance with the federal regulations and guidelines as part of our purchase of conservation easements on portions of your property (as Grantor). In advance of our closing, O'Brien & Gere would like to inform you of two important policies.

1) O'Brien & Gere does not have condemnation authority.
2) O'Brien & Gere has discussed the fair market value of your property.

We would appreciate your acknowledgement of this information by signing below and returning the signed letter to my attention. Please contact me at (513) 646-4854 if you need additional information.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Michael J. Waligura, REM
Technical Associate

9/20/12
Grantor's Signature Date

9/24/12
Grantee's Signature Date

OPTION PERIOD WILL BE ONE YEAR FROM DATE OF SIGNATURE

JC
GRANTOR INITIALS

MJW
GRANTEE INITIALS

EEP Floodplain Requirements Checklist

This form was developed by the National Flood Insurance program, NC Floodplain Mapping program and Ecosystem Enhancement Program to be filled for all EEP projects. The form is intended to summarize the floodplain requirements during the design phase of the projects. The form should be submitted to the Local Floodplain Administrator with three copies submitted to NFIP (attn. State NFIP Engineer), NC Floodplain Mapping Unit (attn. State NFIP Coordinator) and NC Ecosystem Enhancement Program.

Project Location

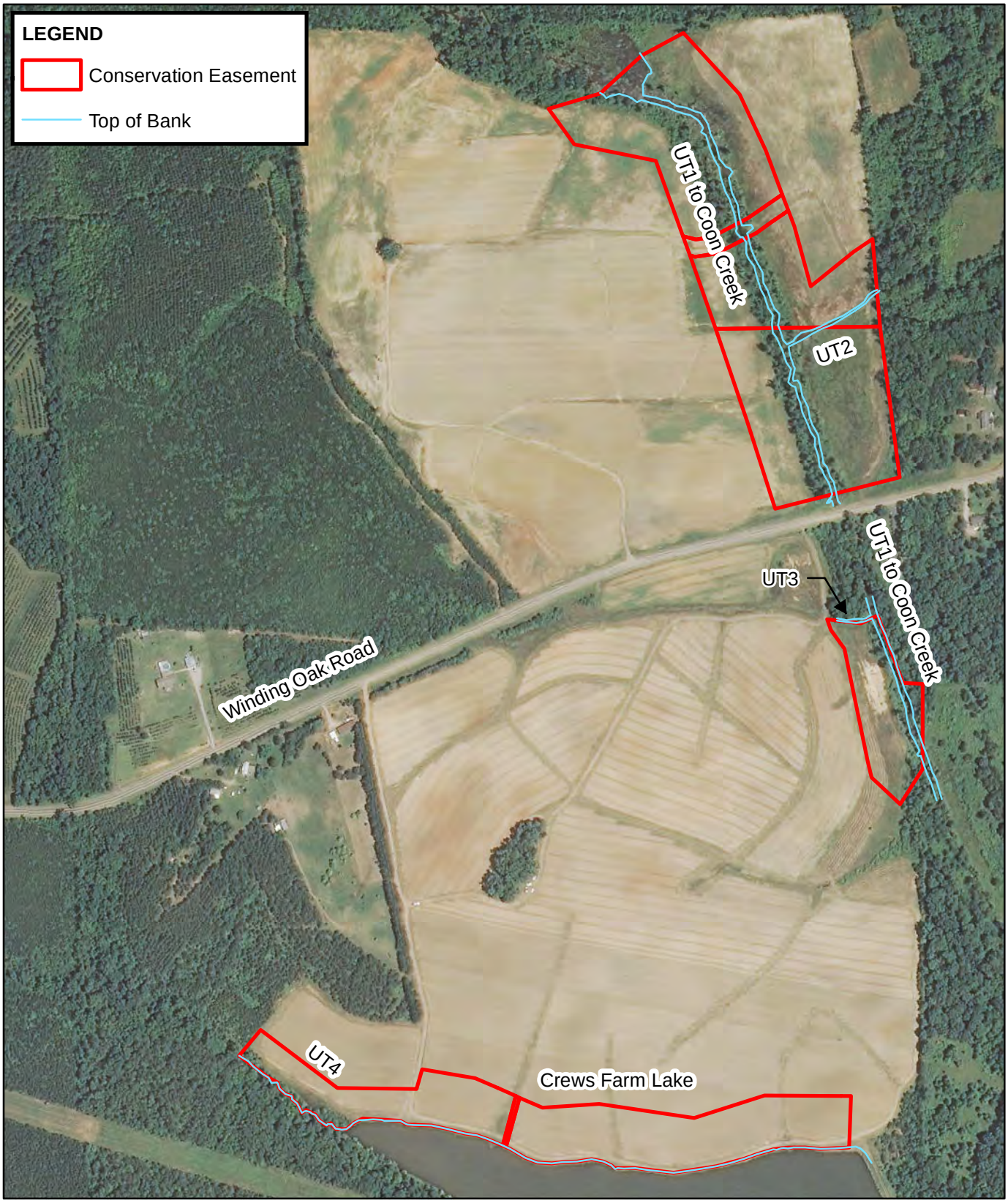
Name of project:	Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project
Name if stream or feature:	Coon Creek
County:	Granville
Name of river basin:	Tar-Pamlico
Is project urban or rural?	Rural
Name of Jurisdictional municipality/county:	Granville
DFIRM panel number for entire site:	3720192500J, 3720192400J
Consultant name:	Daniel Ramsay
Phone number:	(919) 783-7777
Address:	2610 Wycliff Road, Suite 104 Raleigh, NC 27607

Design Information

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project consists of a combination of buffer restoration and nutrient offset activities along tributaries of Coon Creek (Figure 1). Restoration areas are currently cleared, and will be planted with native trees. Invasive species will be removed from existing forested buffer areas. The mitigation site includes approximately 30.2 acres of buffer mitigation along approximately 5,250 linear feet of stream. The project will result in approximately 8.1 riparian mitigation units and 14.5 nutrient offset mitigation units.

Reach	Length	Type
UT1	2,330 feet	Riparian Buffer, Nutrient Offset Restoration
UT2	370 feet	Riparian Buffer, Nutrient Offset Restoration
UT3	170 feet	Riparian Buffer, Nutrient Offset Restoration
UT4	480 feet	Riparian Buffer, Nutrient Offset Restoration
Crews Farm Lake	1,900 feet	Riparian Buffer, Nutrient Offset Restoration

FIGURE 1



NCEEP FULL DELIVERY PROJECT #95807
COON CREEK RIPARIAN BUFFER AND
NUTRIENT OFFSET MITIGATION PROJECT
OXFORD, NC

PROJECT AREA MAP

N

0 250 500 1,000
Feet

11/6/2013
50349

Floodplain Information

Is project located in a Special Flood Hazard Area (SFHA)?

(•) Yes ( ) No

If project is located in a SFHA, check how it was determined:

- [ ] Redelineation
- [x] Detailed Study
- [ ] Limited Detail Study
- [ ] Approximate Study
- [ ] Don't know

List flood zone designation: AE Floodway, AE, X

Check if applies:

- [x] AE Zone
  - (•) Floodway
  - ( ) Non-Encroachment
  - ( ) None
- [ ] A Zone
  - ( ) Local Setbacks Required
  - ( ) No Local Setbacks Required

If local setbacks are required, list how many feet:

Does proposed channel boundary encroach outside floodway/non-encroachment/setbacks?

( ) Yes (•) No

Land Acquisition (Check)

- [ ] State owned (fee simple)
- [ ] Conservation easment (Design Bid Build)
- [x] Conservation Easement (Full Delivery Project)

Note: if the project property is state-owned, then all requirements should be addressed to the Department of Administration, State Construction Office (attn: Herbert Neily, (919) 807-4101)

Is community/county participating in the NFIP program? (•) Yes ( ) No Note: if community is not participating, then all requirements should be addressed to NFIP (attn: State NFIP Engineer, (919) 715-8000)
Name of Local Floodplain Administrator: Barry Baker Phone Number: (919) 603-1331

Floodplain Requirements

This section to be filled by designer/applicant following verification with the LFPA

- ☐ No Action
- ☐ No Rise
- ☐ Letter of Map Revision
- ☐ Conditional Letter of Map Revision
- ☐ Other Requirements

List other requirements:

Comments: O'Brien & Gere has recommended to the LFPA that "No Action" be taken. Mr. Baker is consulting Mr. Randy Mundt, Outreach Coordinator for the Office of Geospatial and Technology Management, on verifying this recommendation. The email correspondence is attached.

Name: _____ Signature: _____

Title: _____ Date: _____

Daniel Ramsay

From: Daniel Ramsay
Sent: Thursday, November 07, 2013 9:11 AM
To: Mundt, Randy (Randy.Mundt@ncdps.gov)
Cc: 'Barry Baker'
Subject: RE: Advice on Attached Checklist

Hi Randy,

The project work within the floodplain will be converting an agricultural field to a riparian woodland by planting native trees. We will not be grading for this project. Invasive shrub cover will be removed in the existing forested areas within the conservation easement, but no stump-grinding or ground disturbance will occur. As the full-delivery provider for EEP, we recommend No Action be taken given the nature of the project. We look forward to receiving your and Barry's guidance on whether that will be adequate.

Regards,

Daniel Ramsay

O'BRIEN & GERE

Daniel Ramsay, WPIT
PROJECT SCIENTIST

O'BRIEN & GERE
2610 Wycliff Rd, Suite 104
Raleigh, NC 27607
p 919-783-7777 | *f* 919-783-0757
cell 770-402-9872
daniel.ramsay@obg.com www.obg.com

From: Barry Baker [mailto:barry.baker@granvillecounty.org]
Sent: Thursday, November 07, 2013 8:40 AM
To: Daniel Ramsay
Cc: Mundt, Randy (Randy.Mundt@ncdps.gov)
Subject: FW: Advice on Attached Checklist

Hi Daniel,

Please find below Randy Mundt's e-mail regarding your project. Please let me know if you have any questions.

Respectfully,

Barry Baker, Planning Director
Granville County

From: Mundt, Randy [mailto:Randy.Mundt@ncdps.gov]
Sent: Thursday, November 07, 2013 7:39 AM
To: Barry Baker
Subject: RE: Advice on Attached Checklist

Hello Barry,
For some projects this form is enough if he work is outside of the floodway, but in this case it appears that the work will be in the floodway, but the action that is to be taken by EEP is not checked on the form.

You'll need to get EEP to update their submittal/form to show what actions they intend to take and then we can provide guidance on whether the proposed action is adequate.

Thanks,
rpm
Randy Mundt, AICP, CFM
Outreach Coordinator
Office of Geospatial and Technology Management
Ph: 919-825-2339
Fax 919-715-0408
Visit us @ www.ncfloodmaps.com

From: Barry Baker [mailto:barry.baker@granvillecounty.org]
Sent: Wednesday, November 06, 2013 3:16 PM
To: Mundt, Randy
Subject: Advice on Attached Checklist

Hi Randy,

Please find attached a checklist that is being submitted for work on the Coon Creek. I have not seen this particular form before. The applicant states that no grading or land disturbing activity would occur with this work except planting trees and some nutrient offset restoration work on the agricultural fields. I am uncertain if the appropriate response on the final page should be "No Action" or "No Rise." Please let me know what you would advise.

Thanks,

Barry Baker, Planning Director
Granville County Planning

919-603-1334

Daniel Ramsay

From: Alsmeyer, Eric C SAW <Eric.C.Alsmeyer@usace.army.mil>
Sent: Friday, September 27, 2013 9:02 AM
To: Daniel Ramsay
Subject: RE: Verifying no permit needed for Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Daniel: No 404 permit would be required for what you describe.

Please reply or call if you have any questions or if I may serve you in any other way.

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 the Customer Satisfaction Survey located at our website at http://per2.nwp.usace.army.mil/survey.html to complete the survey online (Paper copies available upon request).

Eric Alsmeyer
Project Manager
Raleigh Regulatory Field Office
US Army Corps of Engineers, Wilmington District
3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587
Tel: (919) 554-4884, x23
Fax: (919) 562-0421
Regulatory Homepage: http://www.saw.usace.army.mil/Missions/RegulatoryPermitProgram.aspx
(If you need information that is not yet available on our new website, please let me know)

From: Daniel Ramsay [mailto:Daniel.Ramsay@obg.com]
Sent: Wednesday, September 25, 2013 4:45 PM
To: Alsmeyer, Eric C SAW
Subject: [EXTERNAL] RE: Verifying no permit needed for Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (UNCLASSIFIED)

Eric,

Thank you for your response. We had planned to remove invasive species within some wetland areas, using chemicals that are consistent with use in and near aquatic habitat or wetlands. Hand-clearing would also be performed, but grubbing will not be performed.

Please indicate whether this described work will require permitting.

Thanks,

Daniel

From: Alsmeyer, Eric C SAW [mailto:Eric.C.Alsmeyer@usace.army.mil]
Sent: Tuesday, September 24, 2013 11:55 AM
To: Daniel Ramsay
Subject: RE: Verifying no permit needed for Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Daniel: Based on the information you have provided, the described work would not require permitting under Section 404 of the Clean Water Act, provided that the invasive species removal activities are either not within a wetland, or do not involve disturbance of the roots (grubbing).
Please reply or call if you have any questions or if I may serve you in any other way.
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 the Customer Satisfaction Survey located at our website at http://per2.nwp.usace.army.mil/survey.html to complete the survey online (Paper copies available upon request).

Eric Alsmeyer
Project Manager
Raleigh Regulatory Field Office
US Army Corps of Engineers, Wilmington District
3331 Heritage Trade Drive, Suite 105, Wake Forest, NC 27587
Tel: (919) 554-4884, x23
Fax: (919) 562-0421
Regulatory Homepage: http://www.saw.usace.army.mil/Missions/RegulatoryPermitProgram.aspx
(If you need information that is not yet available on our new website, please let me know)

From: Daniel Ramsay [mailto:Daniel.Ramsay@obg.com]
Sent: Monday, September 23, 2013 3:11 PM
To: Alsmeyer, Eric C SAW
Subject: [EXTERNAL] Verifying no permit needed for Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project

Hi Eric,

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project consists of a combination of buffer restoration and nutrient offset activities along tributaries of Coon Creek (Figure 1) in Granville County, NC. The project is being conducted by O'Brien & Gere as a full-delivery project for the NC Ecosystement Enhancement Program. Restoration areas are currently fallow or cultivated fields, and will be planted with native trees. Invasive species will be removed from existing forested buffer areas. Establishing herbaceous species in unvegetated areas to stabilize soil is the only site preparation measure that is currently planned; soil disturbance is not anticipated. It is possible that fallow areas will be mechanically mowed prior to planting to limit herbaceous competition with planted seedlings. The mitigation site includes approximately 22.6 acres of buffer mitigation along approximately 5,250 linear feet of stream. The project will result in approximately 8.1 riparian mitigation units and 14.5 nutrient offset mitigation units.

Based on a previous phone conversation with you, it is our understanding that the proposed project will not require a Section 404/401 permit. Please verify this understanding for our project documentation.

Regards,

Daniel Ramsay

Daniel Ramsay, WPIT
PROJECT SCIENTIST

O'BRIEN & GERE
2610 Wycliff Rd, Suite 104
Raleigh, NC 27607
p 919-783-7777 | *f* 919-783-0757
cell 770-402-9872
daniel.ramsay@obg.com www.obg.com

_____ This email, including any attachment(s) to it, is confidential and intended solely for the use of the individual or entity to which it is addressed. If you have received this email in error, please notify the sender. Note that any views or opinions presented in this email are solely those of the author and do not represent those of O'Brien & Gere. O'Brien & Gere does not accept liability for any damage caused by any virus transmitted by this email. The recipient should check this email and any attachments for the presence of viruses.
_____

Classification: UNCLASSIFIED
Caveats: NONE

14.5 Appendix C – Mitigation Work Plan Data

Appendix C
Soil Characterization Profiles
Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project
Granville County, NC

Profile	Horizon	Depth (in)	Matrix color	%	Mottle color	%	Type	Location	Soil Texture	Notes
1 - Crews Farm Lake Slope	A	0-24"	10YR 4/3	100					Loam	
	B	24-36"+	10YR 5/6	100					Clay Loam	
2 - UT1 and UT3 Bottomland	A	0-10"	2.5Y 6/1	70	2.5Y 6/6, 7.5YR 4/6	15	C	M	Sandy Clay Loam	
	E	10-20"	2.5Y 6/1	70	2.5Y 6/6, 7.5YR 4/6	15	C	M	Sandy Clay Loam	Sand Increase
	B	20-36"+	2.5Y 6/1	50	7.5YR 5/4, 7.5YR 5/8	25	C	M	Sandy Clay	Water in hole @ 24", Saturation @ 12"; Manganese masses
3 - UT1 Left Bank Bottomland	A	0-12"	10YR 4/1	100	5YR 3/4				Silty Clay	Profile taken in wetland, water table at 0" and standing water 3" deep
	B	12-25"+	10YR 3/1, gleyed co-matrix 5Y 5/2	75	5YR 4/3	7	C	M	Clay	
4 - UT1 Right Bank Slope	A	0-18"	10YR 4/3	100					Sandy Clay Loam	
	B	18-24"	10YR 4/6	100					Sandy Clay Loam	Saturated @ 24"
	C1	24-30"	10YR 4/6	100					Sandy Clay Loam	Manganese, Gravel present
	C2	30-36"+	10YR 5/6	95	7.5YR 5/6	5	C	M	Sandy Clay Loam	Gravel present
Reference Veg Plot 1	--	0-6"	2.5Y 5/2	95	5YR 5/6	5	C	M	Silty Clay	Wetland-Saturated to surface, water in hole at 0"; hydro is ground water seepage and back up from the beaver pond
	--	6-16"	2.5Y 5/2	80	5YR 5/8	20	C	M	Silty Clay	Sulfidic Odor;
	--	16-17"+	10YR 5/1	80	10YR 3/6	20	C	M	Silty Clay Loam	
Reference Veg Plot 2	--	0-8"	10YR 4/4	100					Loam	Dry
	--	8-12"	10YR 5/4	85	2.5YR 2.5/1	15	C	M	Clay Loam	Moist
	--	12-18"+	10YR 4/4	99	2.5YR 2.5/1	1	C	M	Loam	Moist

C - Concentration
M - Matrix

14.6 Appendix D – Project Plan Sheets

STATE	EEE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
NC	95807	C1	7

COON CREEK

PROJECT: 95807

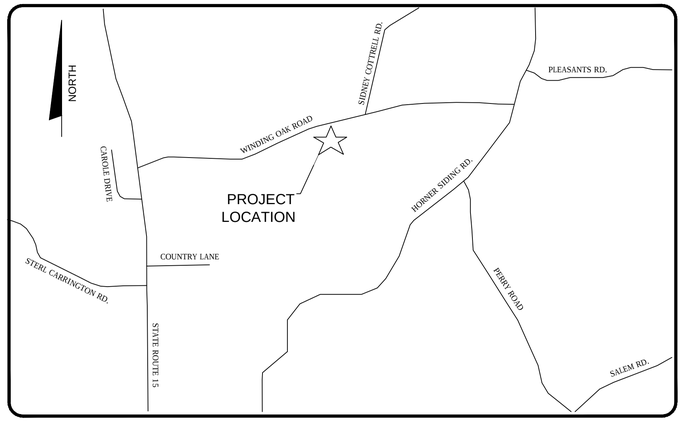
COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT

VEGETATION & MITIGATION PLAN

LOCATION:
GRANVILLE COUNTY, NORTH CAROLINA

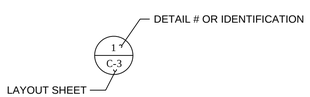
EEP PROJECT IDENTIFICATION NO. #95807

TYPE OF WORK:
RIPARIAN BUFFER PLANTING

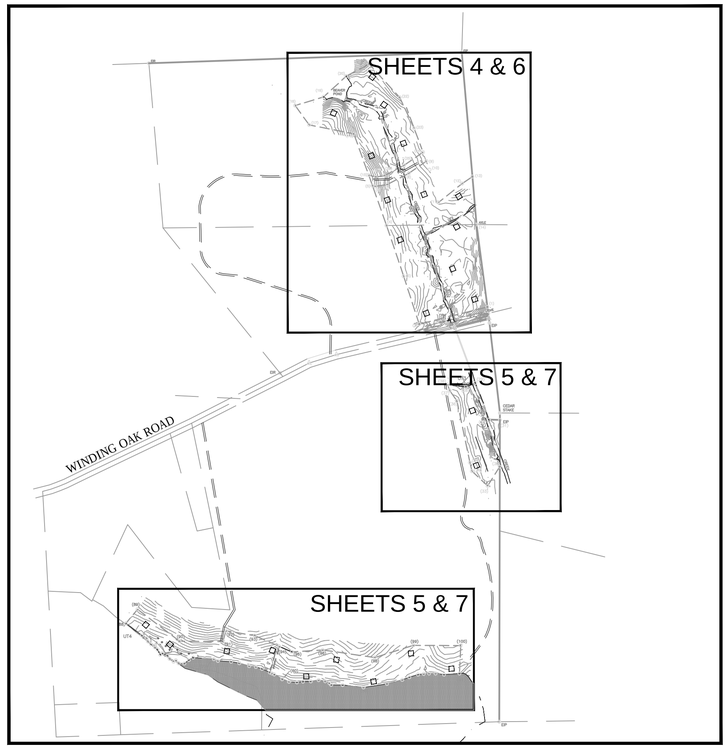


VICINITY MAP
NOT TO SCALE

SHEET INDEX



DETAIL IDENTIFICATION



SHEET LAYOUT

PLANS FOR REVIEW PURPOSE ONLY

GRAPHIC SCALES

100 0 100 200

VEGETATION PLAN		
Planting Area	Piedmont Bottomland Forest (Acres)	Mesic Mixed Hardwood Forest (Acres)
UT1 & UT2	6.49	6.04
UT1 & UT3	1.15	0.67
UT4/Crews Farm Lake	0.29	8.12
Total	**7.9**	**14.8**

MITIGATION PLAN		
Mitigation Area	Riparian Restoration (Acres)	Nutrient Offset Restoration (Acres)
UT1 & UT2	5.22	7.31
UT1 & UT3	0.82	1.00
UT4/Crews Farm Lake	2.23	6.19
Total	**8.3**	**14.5**

Ecosystem Enhancement PROGRAM

NCEEP CONTACT: JESSICA KEMP
PROJECT MANAGER

O'BRIEN & GERE

2610 Wycliff Road
Raleigh, North Carolina 27607
(919) 783-7777

MICHAEL HALL, PG
PROJECT MANAGER

3e EEE Consulting, Inc
Environmental, Engineering and Educational Solutions
Professional services in NC are provided by EEE Consulting of NC, PC, Lic. C-3945

601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

CHRIS L. YOW, P.E.
PROJECT ENGINEER
DOUG SMITH, PWS
PROJECT MANAGER

PROJECT ENGINEER

NOT FOR CONSTRUCTION

SIGNATURE: P.E.

EEE PROJECT REFERENCE NO.	SHEET NO.
95807	2

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 031201 ENGINEER CHRISTOPHER L. YATES

NOT FOR CONSTRUCTION

CLY
Approved By:

Nov 15, 2013
Date:

EEE Consulting, Inc
Environmental, Engineering and Educational Solutions
Professional License C-3945
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
CONVENTIONAL SYMBOLS

*S.U.E = SUBSURFACE UTILITY ENGINEER

ROADS & RELATED ITEMS

Edge of Pavement
Curb
Prop. Slope Stakes Cut — C
Prop. Slope Stakes Fill — F
Prop. Woven Wire Fence
Prop. Chain Link Fence
Prop. Barbed Wire Fence
Prop. Wheelchair Ramp — WCR
Curb Cut for Future Wheelchair Ramp — CCFR
Exist. Guardrail
Prop. Guardrail
Equality Symbol
Pavement Removal

RIGHT OF WAY

Baseline Control Point
Existing Right of Way Marker
Exist. Right of Way Line w/Marker
Prop. Right of Way Line with Proposed R/ W Marker (Iron Pin & Cap)
Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
Exist. Control of Access Line
Prop. Control of Access Line
Exist. Easement Line — E
Prop. Temp. Const. Easement Line — E
Prop. Temp. Drainage Easement Line — TDE
Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

Stream or Body of Water
River Basin Buffer — RBB
Flow Arrow
Disappearing Stream
Spring
Swamp Marsh
Shoreline
Falls, Rapids
Prop. Lateral, Tail, Head Ditches — FLOW

STRUCTURES

MAJOR
Bridge, Tunnel, or Box Culvert — CONC
Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR
Head & End Wall — CONC HW
Pipe Culvert
Footbridge
Drainage Boxes — CB
Paved Ditch Gutter

UTILITIES

Exist. Pole
Exist. Power Pole
Prop. Power Pole
Exist. Telephone Pole
Prop. Telephone Pole
Exist. Joint Use Pole
Prop. Joint Use Pole
Telephone Pedestal
U/G Telephone Cable Hand Hold
Cable TV Pedestal
U/G TV Cable Hand Hold
U/G Power Cable Hand Hold
Hydrant
Satellite Dish
Exist. Water Valve
Sewer Clean Out
Power Manhole
Telephone Booth
Cellular Telephone Tower
Water Manhole
Light Pole
H-Frame Pole
Power Line Tower
Pole with Base
Gas Valve
Gas Meter
Telephone Manhole
Power Transformer
Sanitary Sewer Manhole
Storm Sewer Manhole
Tank; Water, Gas, Oil
Water Tank With Legs
Traffic Signal Junction Box
Fiber Optic Splice Box
Television or Radio Tower
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS

Recorded Water Line — W
Designated Water Line (S.U.E.*) — W
Sanitary Sewer — SS
Recorded Sanitary Sewer Force Main — FSS
Designated San. Sewer Force Main(S.U.E.*) — FSS
Recorded Gas Line — G
Designated Gas Line (S.U.E.*) — G
Storm Sewer — S
Recorded Power Line — P
Designated Power Line (S.U.E.*) — P
Recorded Telephone Cable — T
Designated Telephone Cable (S.U.E.*) — T
Recorded U/G Telephone Conduit — TC
Designated U/G Telephone Conduit (S.U.E.*) — TC
Unknown Utility (S.U.E.*) — ?UTL
Recorded Television Cable — TV
Designated Television Cable (S.U.E.*) — TV
Recorded Fiber Optics Cable — FO
Designated Fiber Optics Cable (S.U.E.*) — FO
Exist. Water Meter — 0
U/G Test Hole (S.U.E.*) — ATTUR
Abandoned According to U/G Record — E.O.L.
End of Information

BOUNDARIES & PROPERTIES

State Line
County Line
Township Line
City Line
Reservation Line
Property Line
Property Line Symbol — PL
Exist. Iron Pin — EIP
Property Corner
Property Monument — PCM
Property Number — 123
Parcel Number — 6
Fence Line — WW & ISBW
Existing Wetland Boundaries — WLB
High Quality Wetland Boundary — HQ WLB
Medium Quality Wetland Boundaries — MQ WLB
Low Quality Wetland Boundaries — LQ WLB
Prop. Wetland Boundaries — WLB
Exist. Endangered Animal Boundaries — EAB
Exist. Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

Buildings
Foundations
Area Outline
Gate
Gas Pump Vent or U/G Tank Cap
Church
School
Park
Cemetery
Dam
Sign
Well
Small Mine
Swimming Pool

TOPOGRAPHY

Loose Surface
Hard Surface
Change in Road Surface
Curb
Right of Way Symbol — R/W
Guard Post — GP
Paved Walk
Bridge
Box Culvert or Tunnel
Ferry
Culvert
Footbridge
Trail, Footpath
Light House

VEGETATION

Single Tree
Single Shrub
Hedge
Woods Line
Orchard
Vineyard — VINEYARD

RAILROADS

Standard Gauge — CSX TRANSPORTATION
RR Signal Milepost — MILEPOST 35
Switch — SWITCH

REVISED 02/02/00

COON CREEK

SYMBOLS

PLANTING SEQUENCE

1) CONTRACTOR SHALL CONDUCT AN ON-SITE MEETING WITH THE PROJECT ENGINEER BEFORE MOBILIZING EQUIPMENT TO THE SITE.

2) AFTER THE MEETING, CONTRACTOR SHALL MOBILIZE TO THE SITE AND REMOVE INVASIVE VEGETATION IN RIPARIAN AREAS WITH EXISTING VEGETATION. ACCESS SHALL BE MADE FROM PROPOSED ACCESS ROADS FROM WINDING OAK ROAD.

3) AFTER AN APPROPRIATE AMOUNT OF TIME HAS PASSED FOR CHEMICALS TO DISSIPATE FROM INVASIVE VEGETATION REMOVAL, CONTRACTOR SHALL RE-MOBILIZE TO PLANT PROPOSED VEGETATION WITHIN THE 3 CONSERVATION EASEMENTS (PLANTING AREAS).

4) THE CONTRACTOR SHALL USE THE APPROPRIATE PROPOSED ACCESS ROAD TO ACCESS THE 3 PLANTING AREAS. MOBILIZING BETWEEN PLANTING AREAS WITH UNMARKED PATHS IS NOT PERMITTED. CONTRACTOR MUST USE WINDING OAK ROAD OR THE PROPOSED ACCESS ROADS.

5) CONTRACTOR IS NOT PERMITTED TO MOBILIZE HEAVY GRADING EQUIPMENT. A NC DEPT. OF LAND QUALITY PERMIT FOR EROSION CONTROL WAS NOT REQUIRED FOR THIS PROJECT. TRUCKS AND VEHICLES ARE ONLY ALLOWED ON ACCESS ROADS AND NOT WITHIN THE PLANTING AREAS. SMALL ATVS AND FOOT TRAFFIC IS THE ONLY ACCEPTABLE METHOD OF TRANSPORTING PLANTING MATERIALS WITHIN PLANTING AREAS.

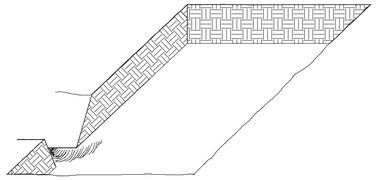
6) CONTRACTOR TO PLANT TEMPORARY AND RIPARIAN SEED MIXES IN ALL UN-VEGETATED AREAS OF THE PLANTING AREAS AND ANY OTHER AREA THAT HAS BEEN DISTURBED DURING THE COURSE OF THE PROJECT.

7) IN GENERAL, THE CONTRACTOR SHALL PLANT VEGETATION CLOSEST TO THE STREAM FIRST, THEN WORK TO UPLAND AREAS TO PREVENT DAMAGE OF PLANTED MATERIAL FROM ATV AND FOOT TRAFFIC.

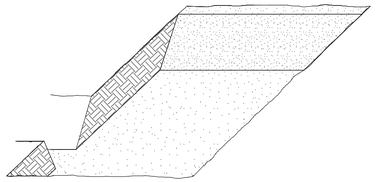
8) CONTRACTOR SHALL NOT DEMOBILIZE FROM THE SITE UNTIL A FINAL MEETING HAS BE CONDUCTED WITH THE PROJECT ENGINEER.

HEELING IN

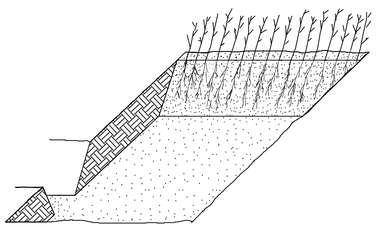
1. LOCATE A HEELING-IN SITE IN A SHADY, WELL PROTECTED AREA.
2. EXCAVATED A FLAT BOTTOM TRENCH 12 INCHES DEEP AND PROVIDE DRAINAGE.



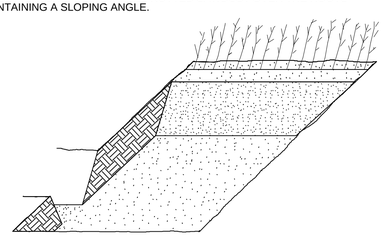
3. BACKFILL THE TRENCH WITH 2 INCHES OF WELL ROTTED SAWDUST OR MOIST SOIL. PLACE A 2 INCH LAYER OF WELL ROTTED SAWDUST AT A SLOPING ANGLE AT ONE END OF THE TRENCH.



4. PLACE A SINGLE LAYER OF PLANTS AGAINST THE SLOPING END SO THAT THE ROOT COLLAR IS AT GROUND LEVEL.

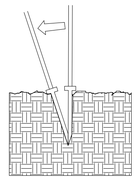


5. PLACE A 2 INCH LAYER OF WELL ROTTED SAWDUST OVER THE ROOTS MAINTAINING A SLOPING ANGLE.

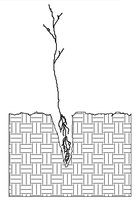


6. REPEAT LAYERS OF PLANTS AND SAWDUST AS NECESSARY AND WATER THOROUGHLY.

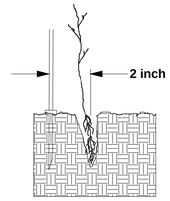
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



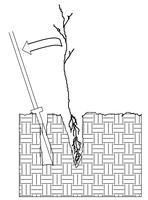
1. INSERT PLANTING BAR 12" INTO THE GROUND AS SHOWN AND PULL HANDLE TOWARD PLANTER.



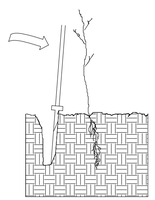
2. REMOVE PLANTING BAR AND PLACE SEEDLING AT CORRECT DEPTH.



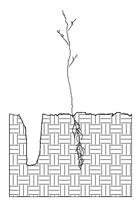
3. INSERT PLANTING BAR 2 INCHES TOWARD PLANTER FROM SEEDLING.



4. PULL HANDLE OF BAR TOWARD PLANTER, FIRMING SOIL AT BOTTOM.



5. PUSH HANDLE FORWARD FIRMING SOIL AT TOP.



6. LEAVE COMPACTION HOLE OPEN AND WATER THOROUGHLY.

PLANTING NOTES:

PLANTING BAG

DURING PLANTING, SEEDLINGS SHALL BE KEPT IN A MOIST CANVAS BAG OR SIMILAR CONTAINER TO PREVENT THE ROOT SYSTEMS FROM DRYING.

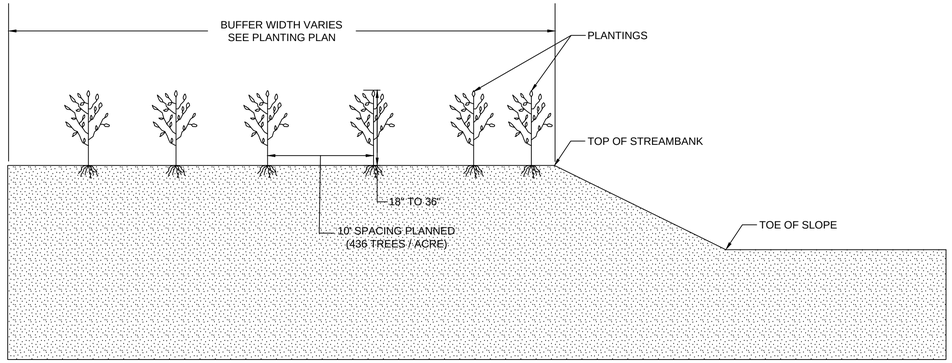
KBC PLANTING BAR

PLANTING BAR SHALL HAVE A BLADE WITH A TRIANGULAR CROSS SECTION, AND SHALL BE 12 INCHES LONG, 4 INCHES WIDE AND 1 INCH THICK AT CENTER.

ROOT PRUNING

ALL SEEDLINGS SHALL BE ROOT PRUNED, IF NECESSARY, SO THAT NO ROOTS EXTEND MORE THAN 10 INCHES BELOW THE ROOT COLLAR.

BARE ROOT INSTALLATION PLANTING DETAIL
NTS



CROSS-SECTION

BARE ROOT PLANTING NOTES:

1. BARE ROOT SHRUBS AND TREES SHALL BE PLANTED AS SHOWN ON THE PLANS.
2. COMPACTED SOIL SHALL BE LOOSENED PRIOR TO PLANTING.
3. PLANTS SHALL BE PLACED IN HOLES DEEP AND WIDE ENOUGH TO ALLOW THE ROOTS TO SPREAD OUT AND DOWN WITHOUT J-ROOTING.
4. ROOTS SHALL BE KEPT MOIST BY MEANS OF WET CANVAS, BURLAP, OR STRAW WHILE DISTRIBUTING OR WAITING TO PLANT.
5. PLANTS SHALL BE HEELED-IN TO MOIST SOIL OR SAWDUST IF NOT PROMPTLY PLANTED UPON ARRIVAL AT PROJECT SITE.
6. SEE PLANTING PLAN FOR PLANT SPACING.

BARE ROOT PLANTING
NTS

EEE PROJECT REFERENCE NO.	SHEET NO.
95807	3

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 035201 ENGINEER CHRISTOPHER L. YATES
NOT FOR CONSTRUCTION

CLY
Approved By:

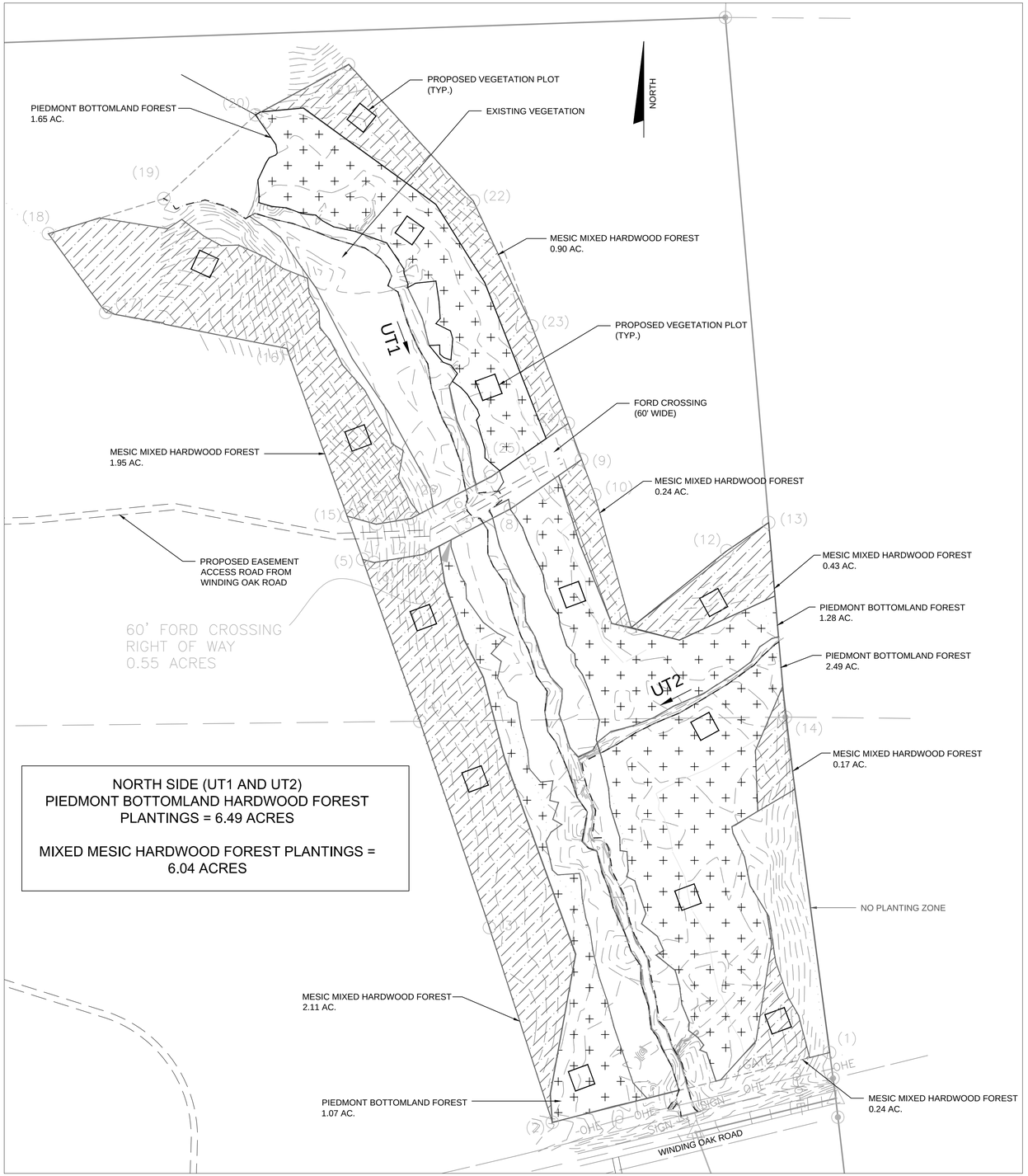
Nov 15, 2013
Date:

EEE Consulting, Inc
Environmental, Engineering and Educational Solutions
Professional License C-3945
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

COON CREEK

PROJECT SEQUENCE - DETAILS



NORTH SIDE UT1 & UT2

Species	Common Name	Percentage of Mix
Quercus michauxii	Swamp chestnut oak	20
Quercus nigra	Water oak	10
Platanus occidentalis	Sycamore	20
Liriodendron tulipifera	Tulip poplar	20
Juglans nigra	Black walnut	5
Carpinus caroliniana	Ironwood	10
Asimina triloba	Paw paw	15

Mesic Mixed Hardwood Forest (Piedmont Subtype)		
Species	**Common Name**	**Percentage of Mix**
Nyssa sylvatica	Black gum	20
Liriodendron tulipifera	Tulip poplar	20
Quercus nigra	Water oak	20
Quercus falcata	Southern red oak	15
Cornus florida	Flowering dogwood	10
Cersis canadensis	Red bud	5
Diospyros virginiana	Persimmon	10

Riparian Buffer Seed Mix - 15 Lbs/A		
Species	**Common name**	**%**
Agrostis alba	Red Top	10
Elymus virginicus	Virginia Wild Rye	15
Panicum virgatum	Switchgrass	15
Tripsicum dactyloides	Gamma grass	5
Polygonum pennsylvanicum	Pennsylvania smartweed	5
Schizachyrium scoparium	Little bluestem	5
Juncus effusus	Soft rush	5
Bidens aristosa	Tickseed	10
Coreopsis lanceolata	Lance-leaved coreopsis	10
Dicanthelium clandestinum	Deer tongue	10
Andropogon gerardii	Big bluestem	5
Sorgastrum nutans	Indiangrass	5

Temporary Seed
Brown Top Millet (spring/summer) - 50 Lbs/A
Rye Grain (fall/winter) - 150 Lbs/A

LEGEND

- EXISTING BUFFER - NO MITIGATION
- PIEDMONT BOTTOMLAND FOREST
- MESIC MIXED HARDWOOD FOREST (PIEDMONT SUBTYPE)
- PROPOSED VEGETATION PLOTS
- TOP OF BANK

EEE PROJECT REFERENCE NO.	SHEET NO.
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PROJECT ENGINEER

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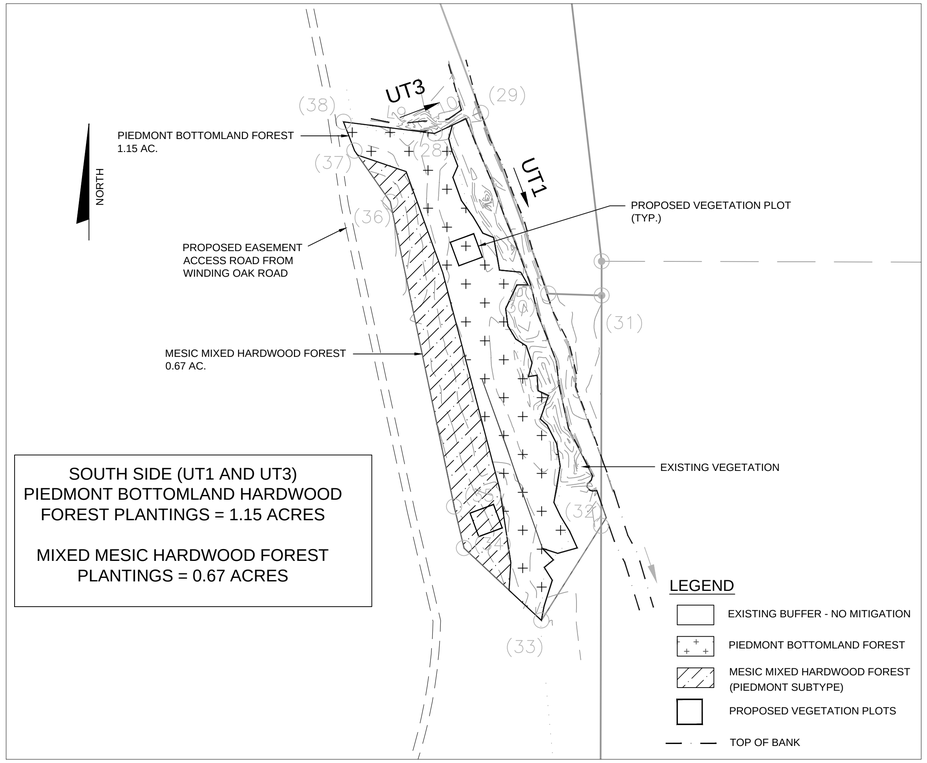
O'BRIEN & GERE

COON CREEK

VEGETATION PLAN - NORTH SIDE (UT1 & UT2)



100 0 100 200

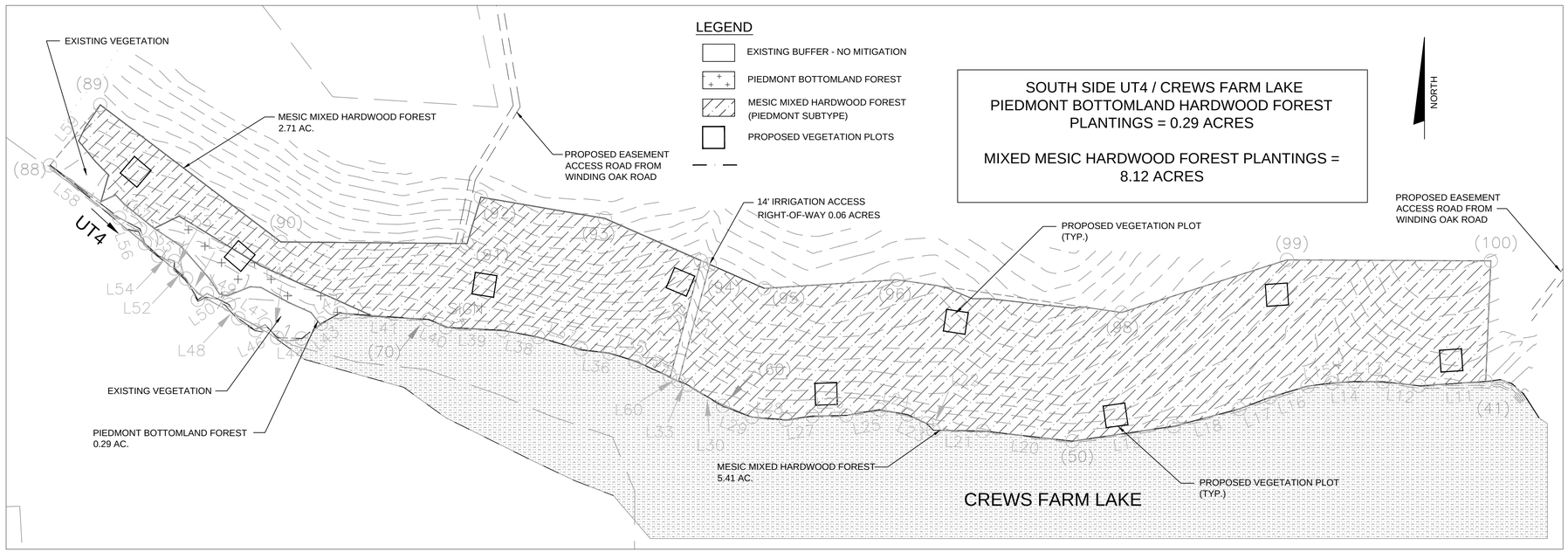
SOUTH SIDE UT1 & UT3

Species	Common Name	Percentage of Mix
Quercus michauxii	Swamp chestnut oak	20
Quercus nigra	Water oak	10
Platanus occidentalis	Sycamore	20
Liriodendron tulipifera	Tulip poplar	20
Juglans nigra	Black walnut	5
Carpinus caroliniana	Ironwood	10
Asimina triloba	Paw paw	15

Mesic Mixed Hardwood Forest (Piedmont Subtype)		
Species	**Common Name**	**Percentage of Mix**
Nyssa sylvatica	Black gum	20
Liriodendron tulipifera	Tulip poplar	20
Quercus nigra	Water oak	20
Quercus falcata	Southern red oak	15
Cornus florida	Flowering dogwood	10
Cersis canadensis	Red bud	5
Diospyros virginiana	Persimmon	10

Riparian Buffer Seed Mix - 15 Lbs/A		
Species	**Common name**	**%**
Agrostis alba	Red Top	10
Elymus virginicus	Virginia Wild Rye	15
Panicum virgatum	Switchgrass	15
Tripsicum dactyloides	Gamma grass	5
Polygonum pennsylvanicum	Pennsylvania smartweed	5
Schizachyrium scoparium	Little bluestem	5
Juncus effusus	Soft rush	5
Bidens aristosa	Tickseed	10
Coreopsis lanceolata	Lance-leaved coreopsis	10
Dicanthelium clandestinum	Deer tongue	10
Andropogon gerardii	Big bluestem	5
Sorgastrum nutans	Indiangrass	5

Temporary Seed
Brown Top Millet (spring/summer) - 50 Lbs/A
Rye Grain (fall/winter) - 150 Lbs/A



SOUTH SIDE UT4 / CREWS FARM LAKE

100 0 100 200

EEE PROJECT REFERENCE NO.	SHEET NO.
95807	5

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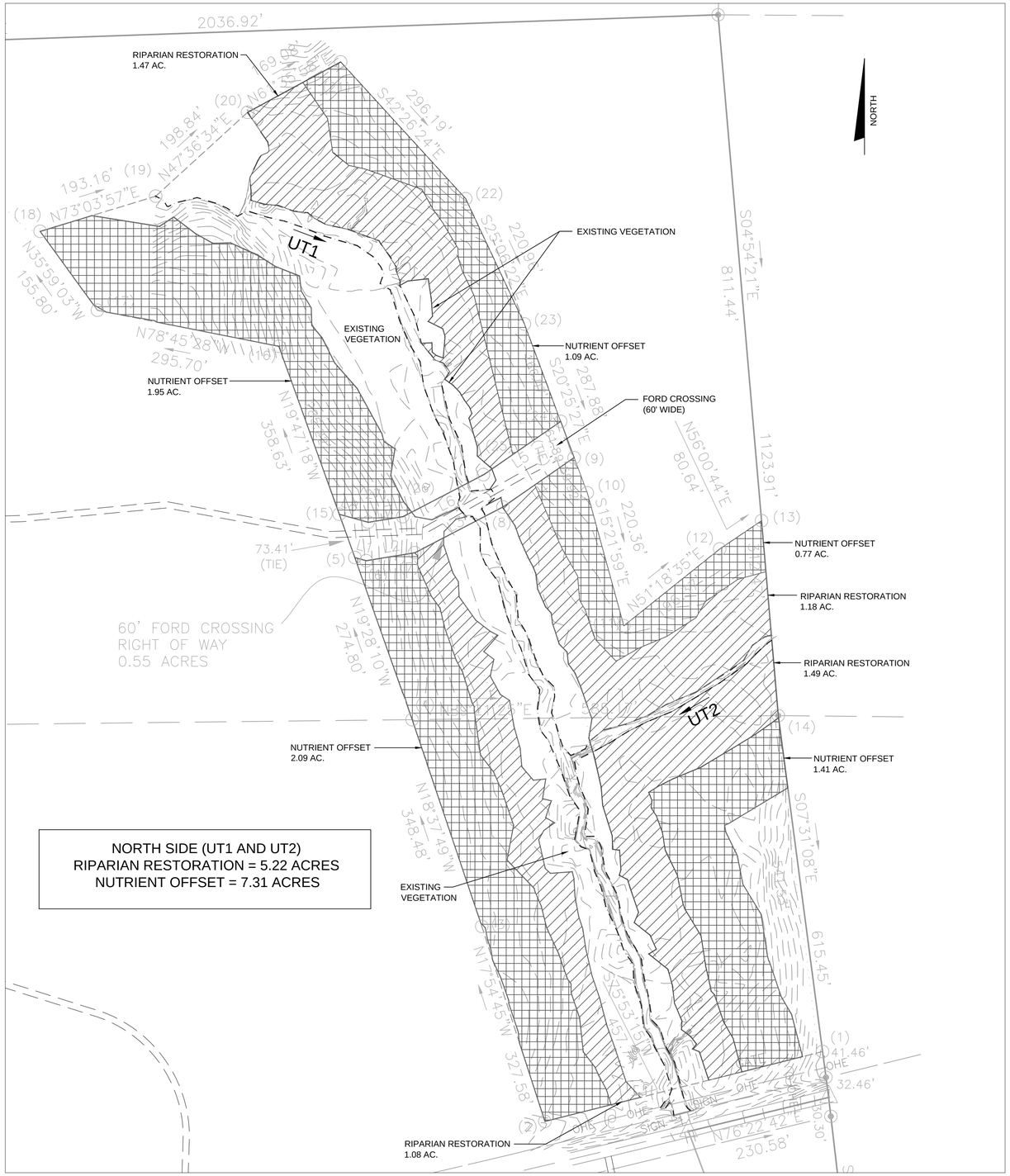
EEE Consulting, Inc
Environmental, Engineering and Educational Solutions
Professional License C-3945
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

COON CREEK

VEGETATION PLAN - SOUTH SIDE
(UT3 & UT4)



NORTH SIDE UT1 & UT2

LEGEND

- EXISTING BUFFER - NO MITIGATION
- RIPARIAN RESTORATION
- NUTRIENT OFFSET RESTORATION
- TOP OF BANK

EEE PROJECT REFERENCE NO.	SHEET NO.
95807	6

PROJECT ENGINEER

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Environmental, Engineering and Educational Solutions
Professional License C-3945
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
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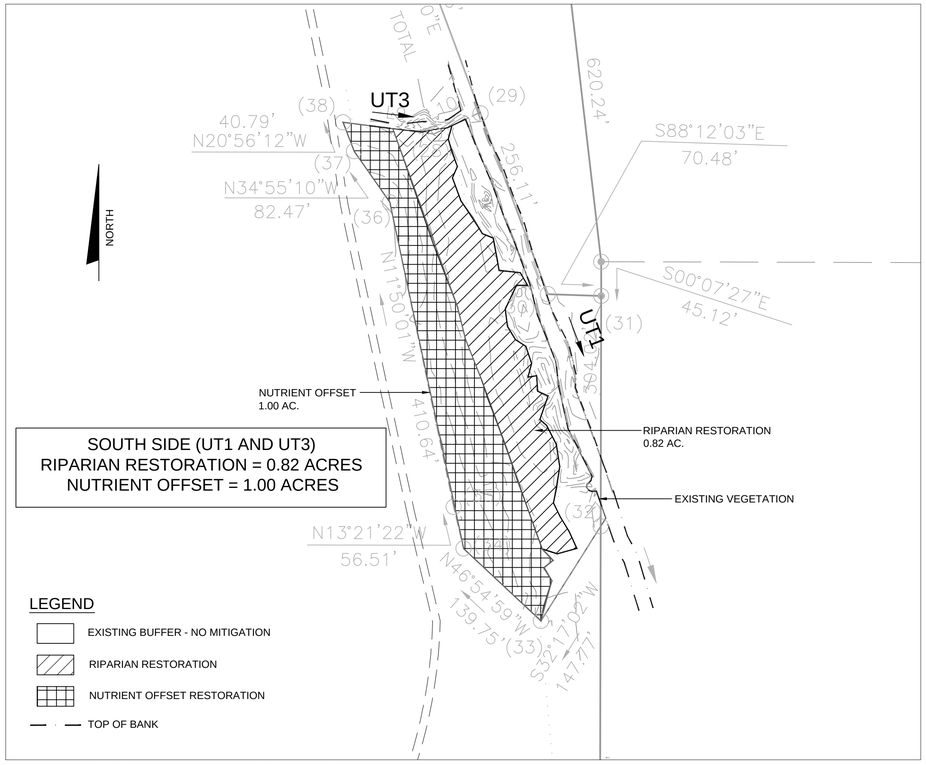
O'BRIEN & GERE

COON CREEK

MITIGATION PLAN - NORTH SIDE
(UT1 & UT2)



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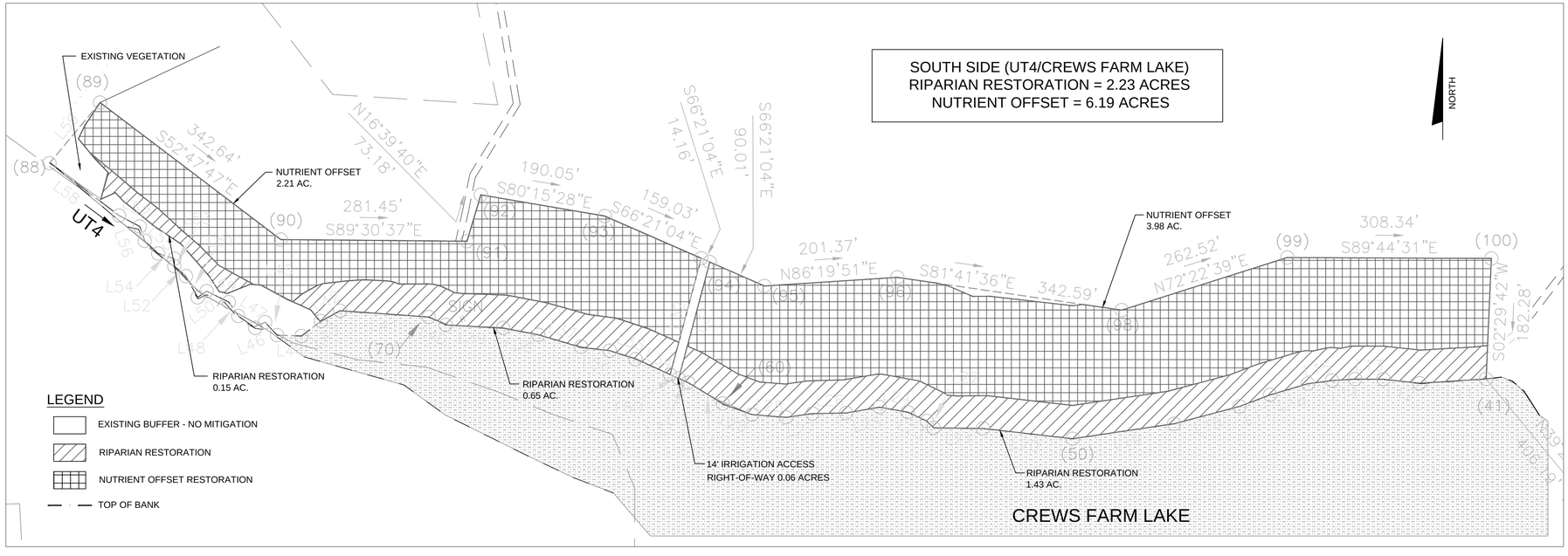
SOUTH SIDE UT1 & UT3



100 0 100 200

SOUTH SIDE UT4 / CREWS FARM LAKE

EEE PROJECT REFERENCE NO.	SHEET NO.
95807	7

PROJECT ENGINEER

NOT FOR CONSTRUCTION

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Nov 15, 2013
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Environmental, Engineering and Educational Solutions
Professional License C-3945
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

COON CREEK

MITIGATION PLAN - SOUTH SIDE
(UT3 & UT4)