BASELINE MONITORING REPORT

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

NCEEP Project Identification No. 95807
NCEEP RFP No. 16-004795
NCEEP Contract No. 5153

Tar-Pamlico River Basin
USGS Hydrologic Unit 03020101

Prepared for:

Ecosystem Enhancement PROGRAM

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

May 2014

FINAL

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1652 Mail Service Center
Raleigh, NC 27699-1652

Prepared by:

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May 2014
FINAL

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1.0 MITIGATION PROJECT SUMMARY

The Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project (the Project) site is located in Granville County in the Tar-Pamlico River Basin, USGS Hydrologic Unit 03020101 (Figure 1: Vicinity Map). The Project established 30.19 acres of buffer easement along four unnamed tributaries to Coon Creek, including along Crews Farm Lake, an in-line impoundment (Figure 2: Project Component/Asset Map), and will result in a maximum of 8.1 Riparian Mitigation Units (RMUs) and 14.5 Nutrient Mitigation Units (NMUs). Riparian mitigation activities begin at the top-of-bank and generally extend out to 100 ft, and nutrient offset mitigation activities begin at 100 ft and extend out to 200 ft. Table 1 in the Tables section outlines the Project information. The Project activity and reporting history is provided as Table 2, and a Project contacts table is provided as Table 3.

1.1 LOCATION

The Project is located along Winding Oak Road in Granville County approximately 6 miles north of Oxford, NC (Figure 1: 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 1.0 mile. The Project is on both the north and south sides of Winding Oak Road.

1.2 PROJECT GOALS & OBJECTIVES

The goals of the Project address stressors identified in the Fishing Creek Local Watershed Plan (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 North Carolina Division of Water Resources (NCDWR) Nutrient Sensitive Waters (NSW) classification
  - No increase in nutrients over background levels is allowed within NSWs.

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 BASELINE MONITORING

2.1 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 as described in the Mitigation Plan, 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.

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.

Vegetative Photo Reference Stations

Photographs will be used to visually document restoration success (Appendix A: Photo Documentation). Following planting, reference photo stations were marked with stakes or poles and surveyed during the as-built survey. Reference stations were photographed immediately following planting and will be 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.

2.2 BASELINE MONITORING METHODS

Baseline monitoring plot installation and verification of plantings was conducted February 10-17, 2014, using the methods described in Subsections 2.2.1 through 2.2.3.

2.2.1 Installing and Marking Monitoring Features

O'Brien & Gere and EEE Consulting, Inc. (EEE) established 23 vegetation plots representatively throughout the Project site (Figure 3: Monitoring Map). Each plot is 10m by 10m in size. Two-ft sections of steel electrical metallic tubing (EMT) conduit were installed at each of the four corners of the vegetation plots. Safety caps were used for the conduit. At the southwest corners, 10-ft sections of ¾-inch PVC were installed so that vegetation plots could easily be found during annual monitoring efforts.

2.2.2 Verification of Plantings

Baseline vegetation monitoring was conducted within 60 days of planting. Level 1 of the Carolina Vegetative Survey (CVS)-EEP Protocol for Recording Vegetation version 4.2 was used (Lee *et al.*, 2008) (Appendix B: CVS Vegetation Monitoring Output Tables). After the baseline vegetation monitoring, annual vegetation monitoring will be conducted using Levels 1 and 2.

2.2.3 Photo Documentation

Photographs of vegetation plots were taken while standing at the southwest corner facing diagonal to the northeast corner.

2.3 RESULTS AND DISCUSSION

2.3.1 As-Built Condition

In December 2013, approximately 3.3 acres of existing forested buffer areas within the conservation easement boundaries were eradicated of invasive species. Control included 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. Targeted species included: Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and multiflora rose (*Rosa multiflora*).

The cleared areas from previous agricultural activities were planted with native hardwood bare-root seedlings in January 2014. Species were planted at a density greater than 436 seedlings per acre. Seedlings were established in a naturalized pattern to avoid creating rows and monotypic stands. Two community types were targeted: 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 (Appendix C: As-Built Plan Sheets).

All mitigation activities were conducted successfully. Baseline monitoring plot installation and verification of plantings was conducted February 10-17, 2014. The following table summarizes the planted density of stems in each vegetation monitoring plot, and whether the success criteria was met for the plot:

Riparian Buffer Vegetation Totals (per acre)

Plot	Riparian Buffer Stems[1]	Success Criteria Met?
1	486	Yes
2	567	Yes
3	486	Yes
4	526	Yes
5	607	Yes
6	607	Yes
7	648	Yes
8	526	Yes
9	567	Yes
10	526	Yes
11	688	Yes
12	486	Yes
13	567	Yes
14	567	Yes
15	526	Yes
16	526	Yes
17	486	Yes
18	567	Yes
19	607	Yes
20	607	Yes
21	648	Yes
22	486	Yes
23	567	Yes
Project Avg	**560**	**Yes**

[1]Native planted hardwood trees, not including shrubs, pines, or vines.

2.3.2 Deviations from Mitigation Plan

There are no deviations from Project design. There are no plant substitutions. All areas proposed to be planted were planted.

3.0 ANNUAL MONITORING AND MAINTENANCE

The following sections describe the annual monitoring and maintenance plans for the 5-year monitoring period.

3.1 ANNUAL MONITORING PLAN

Annual monitoring of the parameters listed below will be conducted and reported using the Riparian Buffer and Nutrient Offset Buffer Annual Monitoring Report Template (ver. 1.0; EEP, 2014).

Required	Parameter	Quantity	Frequency	Notes
X	Vegetation	23 Plots (2.5% of Planted Area)	Annual	Vegetation will be monitored using the CVS-EEP Level 1 and 2 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, the CVS-EEP Protocol for Recording Vegetation Version 4.2 will be used to perform annual Level 2 monitoring of 23 plots distributed across the planted area (Figure 3: Monitoring Map). To prevent unreasonably short time spans between the collection of vegetation baseline data and the first collection of Year 1 Vegetation Monitoring Data, all Year 1 data will be collected during the month of September. The second and all subsequent years of vegetation monitoring data will be collected between June 1 and September 31. Individual plot data will be provided to NCEEP and CVS following CVS-EEP guidance.

General visual vegetation monitoring will also be performed. This inspection will assess any potential problems 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 problem areas to document them and track their progression.

3.2 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. These site inspections may identify site components and features that require routine maintenance. To address wildlife predation and other impacts to newly planted specimens, the site was planted at greater than 436 stems per acre, substantially greater than the final targeted density of 320 hardwood stems per acre. 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, 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.

Component/Feature	Maintenance through project close-out
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.

3.3 ADAPTIVE MANAGEMENT PLAN

If, during the course of annual monitoring it is determined that the site's ability to achieve site performance standards is 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.

4.0 REGULATORY CONSIDERATIONS

At the request of Ms. Jessica Kemp, NCEEP, in an email on February 4, 2014 (Appendix D), the riparian buffer mitigation credits were subcategorized by being located from 0 to 50 feet from top-of-bank (TOB) and 50 to 100 feet from TOB. The subcategories are included in the component summation table below, and are depicted on the As-Built Plan Sheets (Appendix C) and the Project Components Map (Figure 2).

Coon Creek Riparian Buffer and Nutrient Offset Project, Granville County
NCEEP Project Number 95807

Component Summation		
Restoration Level	**Buffer (square ft)**	**Nutrient Offset (square ft)**
0 to 50 feet from TOB	187,308	N/A
50 to 100 feet from TOB	174,240	N/A
100 to 200 feet from TOB	N/A	631,620
Total Restoration	361,548	631,620

While 361,548 ft^2 of riparian buffer was planted for the Project, the Project can generate a maximum of 8.1 mitigation credits per Full-Delivery Contract No. 5153. Therefore, the mitigation credits and restoration acreages in the following tables reflect the allowable credits, as opposed to the planted riparian buffer acreage.

Mitigation Credits			
Type	**Riparian Buffer Restoration**	**Nitrogen Nutrient Offset**	**Phosphorous Nutrient Offset**
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	5.1*	1:1
		Planting	Nutrient Offset Restoration	7.3	1:1
UT1 and UT3	South of Winding Oak Rd	Planting	Buffer Restoration	0.8	1:1
		Planting	Nutrient Offset Restoration	1.0	1:1
UT4 and Crews Farm Lake	South of Winding Oak Rd	Planting	Buffer Restoration	2.2	1:1
		Planting	Nutrient Offset Restoration	6.2	1:1

*Actual planted acreage was 5.2 acres. As described above, the Project can generate a maximum of 8.1 buffer credits.

All mitigation activities to date have been successful. This Project is currently on track to provide the credits described in the table above.

5.0 REFERENCES

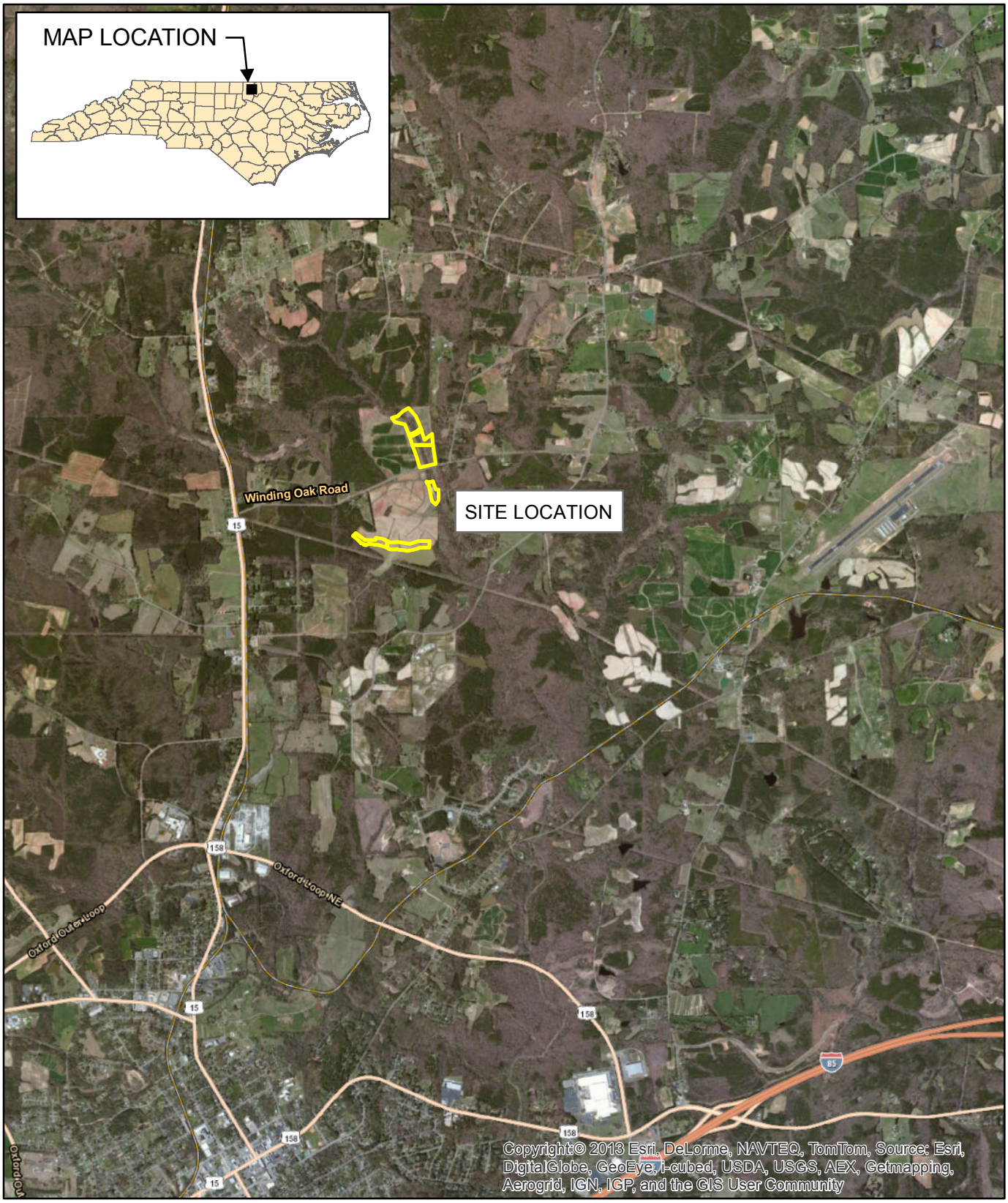
Lee, Michael T., R. K. Peet, S. D. Roberts, and T. R. Wentworth. 2008. CVS-EEP Protocol for Recording Vegetation, Version 4.2 Available URL: http://cvs.bio.unc.edu/methods.htm. [Date Accessed: 14 October 2013].

NCEEP, 2014. Riparian Buffer and Nutrient Offset Monitoring Report Template (ver. 1.0), February 2014. Available URL: http://portal.ncdenr.org/c/document_library/get_file?uuid=ec5f7809-6404-45e9-a26c-ec19a348e015&groupId=60329.

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

Figures

FIGURE 1



LEGEND

Project Area

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

N

VICINITY MAP

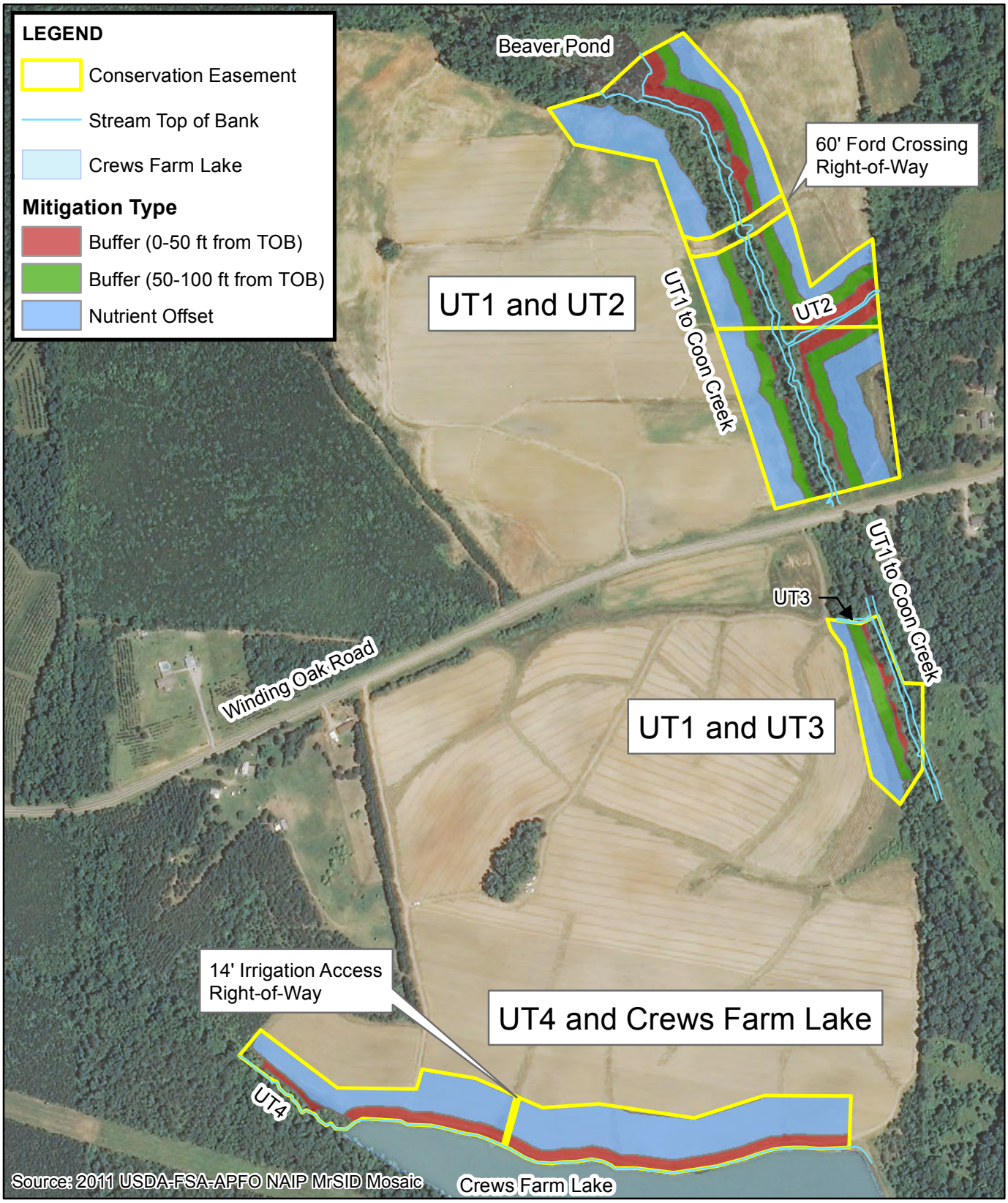
0 0.25 0.5 1
Miles

2/24/2013
50349

3e

O'BRIEN & GERE

FIGURE 2



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

PROJECT COMPONENTS

N

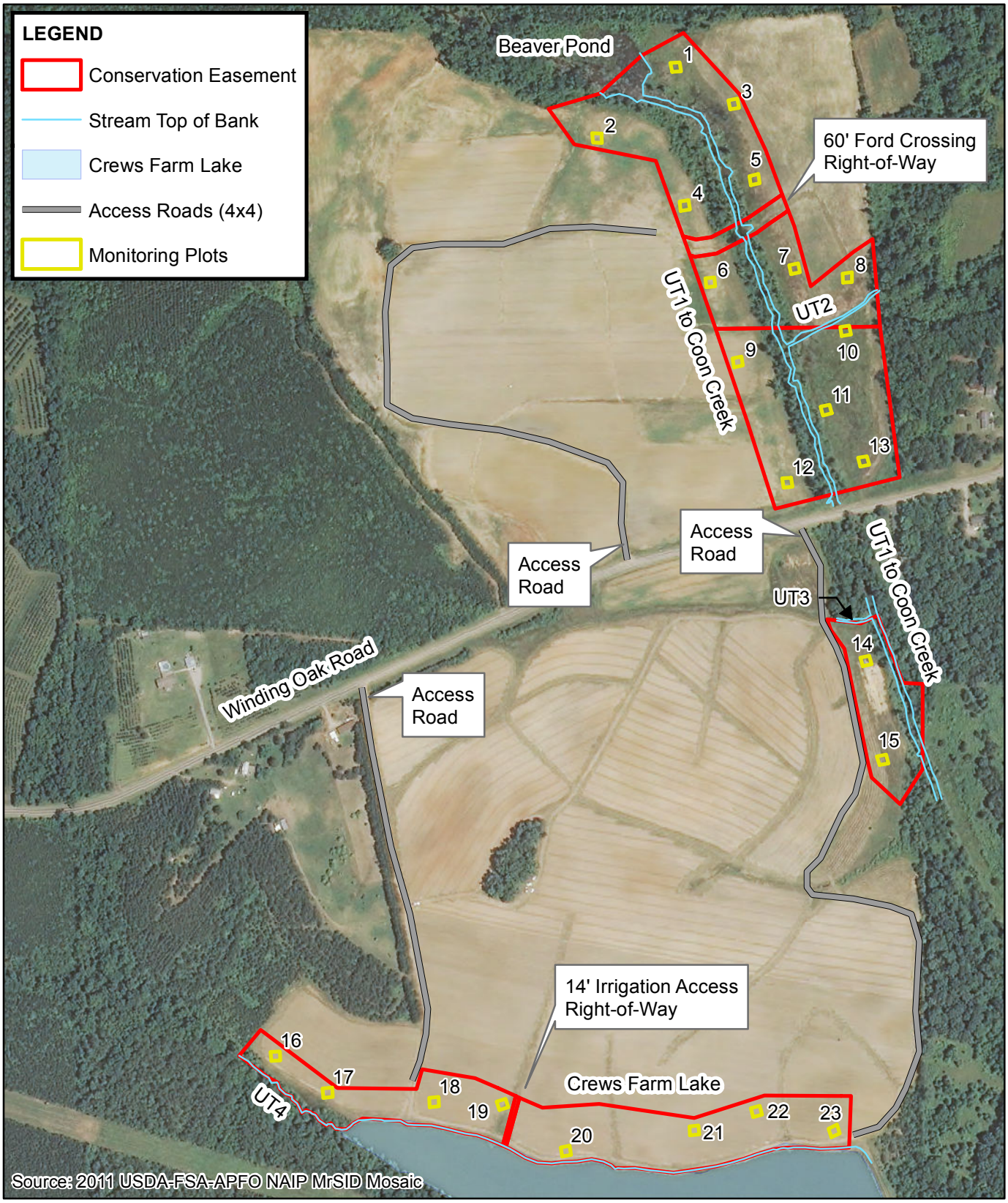
0 250 500 1,000
Feet

4/29/2014
50349

3e

O'BRIEN & GERE

FIGURE 3



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

MONITORING LOCATIONS

N

0 250 500 1,000
Feet

2/24/13
50349

3e

O'BRIEN & GERE

Tables

Table 1: Project 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

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

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	Hydric
Native vegetation community	Bottomland Hardwood	Cleared Field	Cleared Field	Bottomland Hardwood/Cleared Field
Percent composition of invasive vegetation	~40%	<10%	<10%	<10%

Table 2: Project Activity and Reporting History

Project Information	
Elapsed Time Since Grading Complete:	N/A
Elapsed Time Since Planting Complete:	3 months
Number of Reporting Years:	Baseline

Activity or Deliverable	Data Collection Complete	Completion or Delivery
Institution Date	Mar-13	N/A
Categorical Exclusion	Jul-13	Jul-13
Mitigation Plan	Nov-13	Nov-13
Final Design – Planting Plans	Nov-13	Nov-13
Planting	Jan -14	Feb -14
As-built (Year 0 Monitoring - baseline)	Feb-14	May-14
Year 1 Monitoring	TBD	TBD
Year 2 Monitoring	TBD	TBD
Year 3 Monitoring	TBD	TBD
Year 4 Monitoring	TBD	TBD
Year 5 Monitoring	TBD	TBD

Table 3. Project Contacts

Designer/Contractor **Primary project design POC**	O'Brien & Gere 3214 Charles B Root Wynd, Ste 130 Raleigh, NC 27612 Daniel Ramsay (919) 987-3054
Survey Contractor **Survey contractor POC**	Summit Design and Engineering Services 504 Meadowland Drive Hillsborough, NC 27278 Edmund Purcell, PLS (919) 732-3883
Planting Contractor **Planting contractor POC**	River Works 6105 Chapel Hill Road Raleigh, NC 27607 George Morris (919) 459-9003
Nursery Stock Suppliers	South Carolina Supertree Nursery (800) 222-1290 Mellow Marsh Farm (919) 742-1200
Monitoring Performers	EEE Consulting, Inc. 601 Cascade Pointe Lane Suite 101 Cary, NC 27513
Vegetation Monitoring POC	Tina Sekula, PWS (919) 650-2463 ext. 223

Appendix A – Photo Documentation

BASELINE MONITORING PHOTOGRAPHS

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

Photo No.	**Date**
1	2/11/14

DESCRIPTION

Vegetation Monitoring Plot and Photo Point 1, view northwest from southwest corner.

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

Photo No.	**Date**
2	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 2, view northwest from southwest corner.

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

Photo No.	**Date**
3	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 3, view northwest from southwest corner.

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

Photo No.	**Date**
4	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 4, view northwest from southwest corner.

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

Photo No.	**Date**
5	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 5, view northwest from southwest corner.

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

Photo No.	**Date**
6	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 6, view northwest from southwest corner.

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

Photo No.	**Date**
7	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 7, view northwest from southwest corner.

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

Photo No.	**Date**
8	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 8, view northwest from southwest corner.

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

Photo No.	**Date**
9	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 9, view northwest from southwest corner.

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

Photo No.	**Date**
10	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 10, view northwest from southwest corner.

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

Photo No.	**Date**
11	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 11, view northwest from southwest corner.

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

Photo No.	**Date**
12	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 12, view northwest from southwest corner.

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

Photo No.	**Date**
13	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 13, view northwest from southwest corner.

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

Photo No.	**Date**
14	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 14, view northwest from southwest corner.

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

Photo No.	**Date**
15	2/11/14

Description

Vegetation Monitoring Plot and Photo Point 15, view northwest from southwest corner.

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

Photo No.	**Date**
16	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 16, view northwest from southwest corner.

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

Photo No.	**Date**
17	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 17, view northwest from southwest corner.

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

Photo No.	**Date**
18	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 18, view northwest from southwest corner.

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

Photo No.	**Date**
19	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 19, view northwest from southwest corner.

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

Photo No.	**Date**
20	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 20, view northwest from southwest corner.

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

Photo No.	**Date**
21	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 21, view northwest from southwest corner.

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

Photo No.	**Date**
22	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 22, view northwest from southwest corner.

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

Photo No.	**Date**
23	2/17/14

Description

Vegetation Monitoring Plot and Photo Point 23, view northwest from southwest corner.

Appendix B – CVS Vegetation Monitoring Output Table

Appendix B:
EEP Project Code 95807.
Project Name: Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project

			Current Plot Data (MY0 2014)																												
			95807-01-0001			95807-01-0002			95807-01-0003			95807-01-0004			95807-01-0005			95807-01-0006			95807-01-0007			95807-01-0008			95807-01-0009			95807-01-0010		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Asimina triloba	pawpaw	Tree	2	2	2										2	2	2				4	4	4	1	1	1				3	3	3
Carpinus caroliniana	American hornbeam	Tree	1	1	1										1	1	1				2	2	2							3	3	3
Cercis canadensis	eastern redbud	Tree							2	2	2							1	1	1							2	2	2			
Cornus florida	flowering dogwood	Tree				2	2	2	2	2	2	5	5	5				1	1	1				2	2	2	2	2	2			
Diospyros virginiana	common persimmon	Tree				7	7	7				3	3	3				3	3	3	2	2	2	3	3	3	4	4	4			
Juglans nigra	black walnut	Tree																														
Liriodendron tulipifera	tuliptree	Tree							1	1	1				4	4	4							3	3	3				3	3	3
Nyssa sylvatica	blackgum	Tree										3	3	3				3	3	3							3	3	3			
Platanus occidentalis	American sycamore	Tree	6	6	6										1	1	1				1	1	1	1	1	1				1	1	1
Quercus falcata	southern red oak	Tree							2	2	2	1	1	1				3	3	3	2	2	2	1	1	1	1	1	1			
Quercus michauxii	swamp chestnut oak	Tree	1	1	1				2	2	2				5	5	5							1	1	1				2	2	2
Quercus nigra	water oak	Tree	2	2	2	5	5	5	3	3	3	1	1	1	2	2	2	4	4	4	5	5	5	1	1	1	2	2	2	1	1	1
		Stem count	12	12	12	14	14	14	12	12	12	13	13	13	15	15	15	15	15	15	16	16	16	13	13	13	14	14	14	13	13	13
		size (ares)	1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	5	5	5	3	3	3	6	6	6	5	5	5	6	6	6	6	6	6	6	6	6	8	8	8	6	6	6	6	6	6
		Stems per ACRE	485.6	485.6	485.6	566.6	566.6	566.6	485.6	485.6	485.6	526.1	526.1	526.1	607	607	607	607	607	607	647.5	647.5	647.5	526.1	526.1	526.1	566.6	566.6	566.6	526.1	526.1	526.1

Appendix B:
EEP Project Code 95807.
Project Name: Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project

			Current Plot Data (MY0 2014)																												
			95807-01-0011			95807-01-0012			95807-01-0013			95807-01-0014			95807-01-0015			95807-01-0016			95807-01-0017			95807-01-0018			95807-01-0019			95807-01-0020		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Asimina triloba	pawpaw	Tree	2	2	2	1	1	1	1	1	1	4	4	4	4	4	4															
Carpinus caroliniana	American hornbeam	Tree	1	1	1	1	1	1				1	1	1																		
Cercis canadensis	eastern redbud	Tree							1	1	1				1	1	1	2	2	2	1	1	1							2	2	2
Cornus florida	flowering dogwood	Tree							3	3	3							3	3	3	2	2	2				2	2	2	1	1	1
Diospyros virginiana	common persimmon	Tree										1	1	1	1	1	1	2	2	2				2	2	2	3	3	3			
Juglans nigra	black walnut	Tree	2	2	2							1	1	1	1	1	1															
Liriodendron tulipifera	tuliptree	Tree	6	6	6	4	4	4	2	2	2	1	1	1	3	3	3	2	2	2	3	3	3	4	4	4	3	3	3	2	2	2
Nyssa sylvatica	blackgum	Tree							1	1	1										1	1	1	2	2	2	4	4	4	4	4	4
Platanus occidentalis	American sycamore	Tree	4	4	4	1	1	1				1	1	1																		
Quercus falcata	southern red oak	Tree							2	2	2							2	2	2	2	2	2							4	4	4
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	3	3	3	1	1	1	5	5	5	3	3	3															
Quercus nigra	water oak	Tree	1	1	1	2	2	2	3	3	3							2	2	2	3	3	3	6	6	6	3	3	3	2	2	2
		Stem count	17	17	17	12	12	12	14	14	14	14	14	14	13	13	13	13	13	13	12	12	12	14	14	14	15	15	15	15	15	15
		size (ares)	1			1			1			1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	7	7	7	6	6	6	8	8	8	7	7	7	6	6	6	6	6	6	6	6	6	4	4	4	5	5	5	6	6	6
		Stems per ACRE	688	688	688	485.6	485.6	485.6	566.6	566.6	566.6	566.6	566.6	566.6	526.1	526.1	526.1	526.1	526.1	526.1	485.6	485.6	485.6	566.6	566.6	566.6	607	607	607	607	607	607

Appendix B:
EEP Project Code 95807.
Project Name: Coon Creek Riparian Buffer and Nutrient Offset Mitigation Project

			Current Plot Data (MY0 2014)									Annual Means		
			95807-01-0021			95807-01-0022			95807-01-0023			MY0 (2014)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Asimina triloba	pawpaw	Tree										24	24	24
Carpinus caroliniana	American hornbeam	Tree										10	10	10
Cercis canadensis	eastern redbud	Tree	1	1	1							13	13	13
Cornus florida	flowering dogwood	Tree										25	25	25
Diospyros virginiana	common persimmon	Tree	6	6	6	2	2	2	1	1	1	40	40	40
Juglans nigra	black walnut	Tree										4	4	4
Liriodendron tulipifera	tuliptree	Tree	2	2	2	3	3	3	3	3	3	49	49	49
Nyssa sylvatica	blackgum	Tree				3	3	3	3	3	3	27	27	27
Platanus occidentalis	American sycamore	Tree										16	16	16
Quercus falcata	southern red oak	Tree	1	1	1	1	1	1	1	1	1	23	23	23
Quercus michauxii	swamp chestnut oak	Tree										24	24	24
Quercus nigra	water oak	Tree	6	6	6	3	3	3	6	6	6	63	63	63
		Stem count	16	16	16	12	12	12	14	14	14	318	318	318
		size (ares)	1			1			1			23		
		size (ACRES)	0.02			0.02			0.02			0.57		
		Species count	5	5	5	5	5	5	5	5	5	12	12	12
		Stems per ACRE	647.5	647.5	647.5	485.6	485.6	485.6	566.6	566.6	566.6	559.5	559.5	559.5

Appendix C –As-Built Plan Sheets

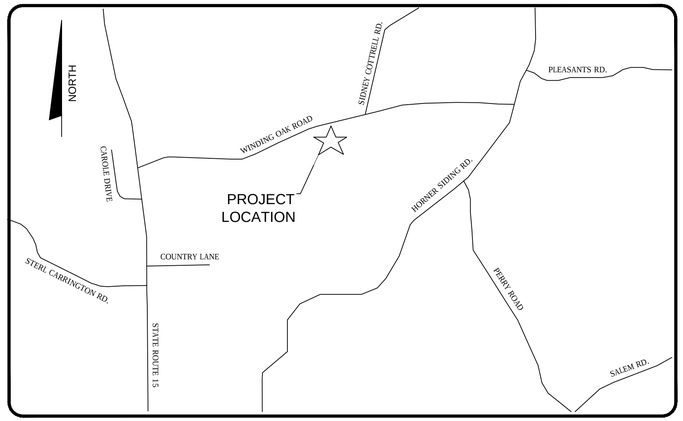
COON CREEK

NCEEP PROJECT NO. 95807

STATE	NCEEP PROJECT NO.	SHEET NO.	TOTAL SHEETS
NC	95807	C1	7

COON CREEK RIPARIAN BUFFER AND NUTRIENT OFFSET MITIGATION PROJECT

VEGETATION & MITIGATION PLAN (AS-BUILT)

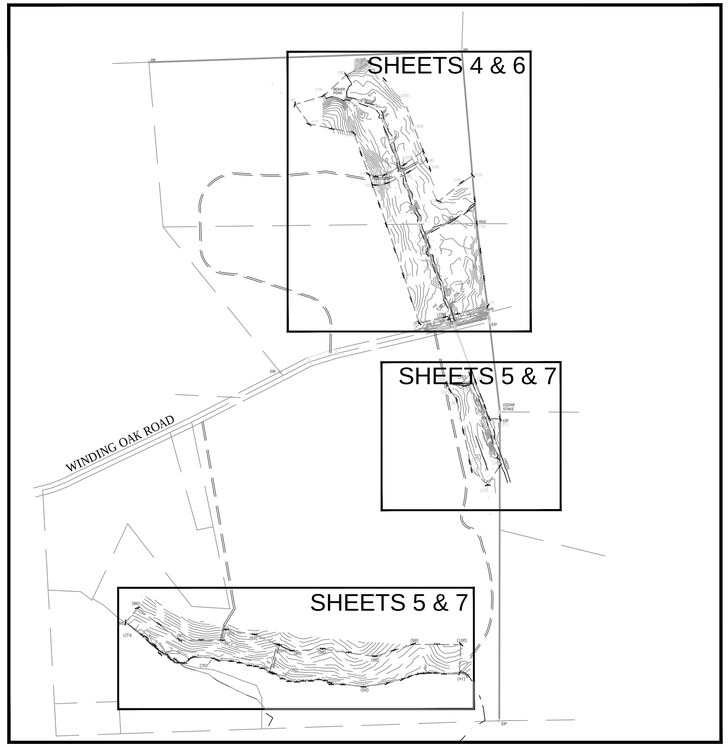


VICINITY MAP
NOT TO SCALE

LOCATION:
GRANVILLE COUNTY, NORTH CAROLINA

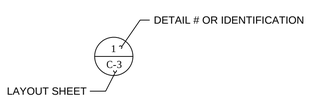
NCEEP PROJECT NO. 95807

TYPE OF WORK:
RIPARIAN BUFFER RESTORATION



SHEET LAYOUT

SHEET INDEX



DETAIL IDENTIFICATION

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	Zone 1 Buffer Restoration: TOB-50' (Acres)	Zone 2 Buffer Restoration: 50'-100' (Acres)	Nutrient Offset Restoration (Acres)
UT1 & UT2	1.87	3.35	7.31
UT1 & UT3	0.21	0.61	1.00
UT4/Crews Farm Lake	2.23	0.00	6.19
Total	**4.3**	**4.0**	**14.5**

Ecosystem Enhancement PROGRAM

NCEEP CONTACT: HEATHER SMITH, PROJECT MANAGER

O'BRIEN & GERE
3214 Charles B Root Wynd
Raleigh, North Carolina 27612
(919) 987-3090
MICHAEL HALL, PG
PROJECT MANAGER

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Environmental, Engineering and Educational Solutions
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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.

NCEEP PROJECT NO.	SHEET NO.
95807	2

PROJECT ENGINEER

CLY

Approved By:

March 27, 2014

Date:

NOT FOR CONSTRUCTION

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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
- Prop. Slope Stakes Fill
- Prop. Woven Wire Fence
- Prop. Chain Link Fence
- Prop. Barbed Wire Fence
- Prop. Wheelchair Ramp
- Curb Cut for Future Wheelchair Ramp
- 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
- Prop. Temp. Const. Easement Line
- Prop. Temp. Drainage Easement Line
- Prop. Perm. Drainage Easement Line

HYDROLOGY

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

STRUCTURES

MAJOR

- Bridge, Tunnel, or Box Culvert
- Bridge Wing Wall, Head Wall and End Wall

MINOR

- Head & End Wall
- Pipe Culvert
- Footbridge
- Drainage Boxes
- 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

- Recorded Water Line
- Designated Water Line (S.U.E.*)
- Sanitary Sewer
- Recorded Sanitary Sewer Force Main
- Designated San. Sewer Force Main(S.U.E.*)
- Recorded Gas Line
- Designated Gas Line (S.U.E.*)
- Storm Sewer
- Recorded Power Line
- Designated Power Line (S.U.E.*)
- Recorded Telephone Cable
- Designated Telephone Cable (S.U.E.*)
- Recorded U/G Telephone Conduit
- Designated U/G Telephone Conduit (S.U.E.*)
- Unknown Utility (S.U.E.*)
- Recorded Television Cable
- Designated Television Cable (S.U.E.*)
- Recorded Fiber Optics Cable
- Designated Fiber Optics Cable (S.U.E.*)
- Exist. Water Meter
- U/G Test Hole (S.U.E.*)
- Abandoned According to U/G Record
- End of Information

BOUNDARIES & PROPERTIES

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Property Line Symbol
- Exist. Iron Pin
- Property Corner
- Property Monument
- Property Number
- Parcel Number
- Fence Line
- Existing Wetland Boundaries
- High Quality Wetland Boundary
- Medium Quality Wetland Boundaries
- Low Quality Wetland Boundaries
- Prop. Wetland Boundaries
- Exist. Endangered Animal Boundaries
- Exist. Endangered Plant Boundaries

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
- Guard Post
- Paved Walk
- Bridge
- Box Culvert or Tunnel
- Ferry
- Culvert
- Footbridge
- Trail, Footpath
- Light House

VEGETATION

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard

RAILROADS

- Standard Gauge
- RR Signal Milepost
- Switch

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.

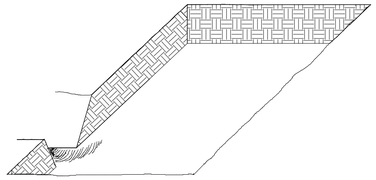
6) CONTRACTOR TO PLANT TEMPORARY AND RIPARIAN SEED MIXES IN ALL UN-VEGETATED AREAS OF THE PLANTING AREAS AND ANY OTHER AREA THAT HAS BEEN DISTURBED DURING THE COURSE OF THE PROJECT.

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.

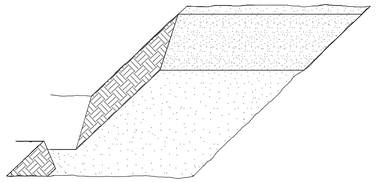
8) CONTRACTOR SHALL NOT DEMOBILIZE FROM THE SITE UNTIL A FINAL MEETING HAS BE CONDUCTED WITH THE PROJECT ENGINEER.

HEELING IN

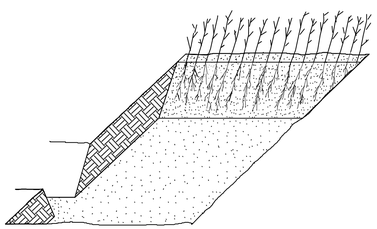
1. LOCATE A HEELING-IN SITE IN A SHADY, WELL PROTECTED AREA.
2. EXCAVATED A FLAT BOTTOM TRENCH 12 INCHES DEEP AND PROVIDE DRAINAGE.



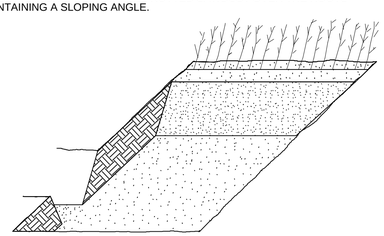
3. BACKFILL THE TRENCH WITH 2 INCHES OF WELL ROTTED SAWDUST OR MOIST SOIL. PLACE A 2 INCH LAYER OF WELL ROTTED SAWDUST AT A SLOPING ANGLE AT ONE END OF THE TRENCH.



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

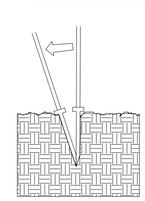


5. PLACE A 2 INCH LAYER OF WELL ROTTED SAWDUST OVER THE ROOTS MAINTAINING A SLOPING ANGLE.

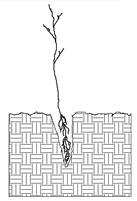


6. REPEAT LAYERS OF PLANTS AND SAWDUST AS NECESSARY AND WATER THOROUGHLY.

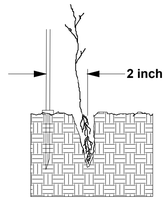
DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



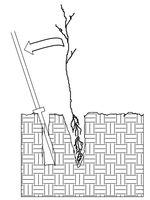
1. INSERT PLANTING BAR 12" INTO THE GROUND AS SHOWN AND PULL HANDLE TOWARD PLANTER.



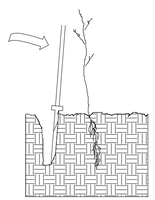
2. REMOVE PLANTING BAR AND PLACE SEEDLING AT CORRECT DEPTH.



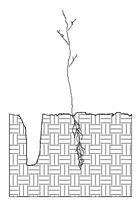
3. INSERT PLANTING BAR 2 INCHES TOWARD PLANTER FROM SEEDLING.



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.

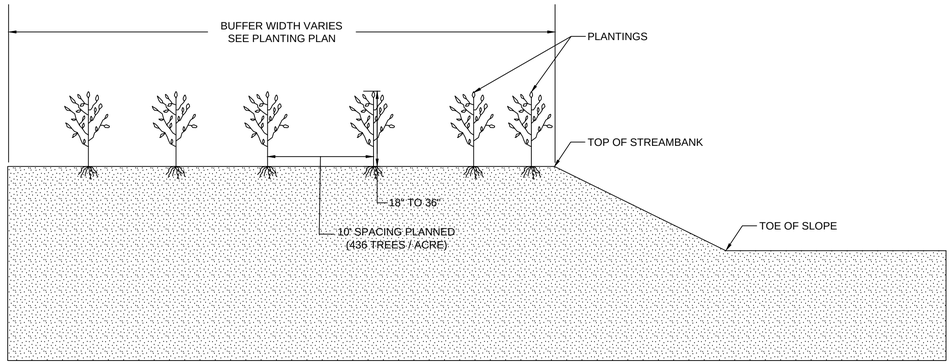
KBC PLANTING BAR

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

NCEEP PROJECT NO.	SHEET NO.
95807	3

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 036201 ENGINEER CHRISTOPHER L. YATES

NOT FOR CONSTRUCTION

CLY
Approved By:

March 27, 2014
Date:

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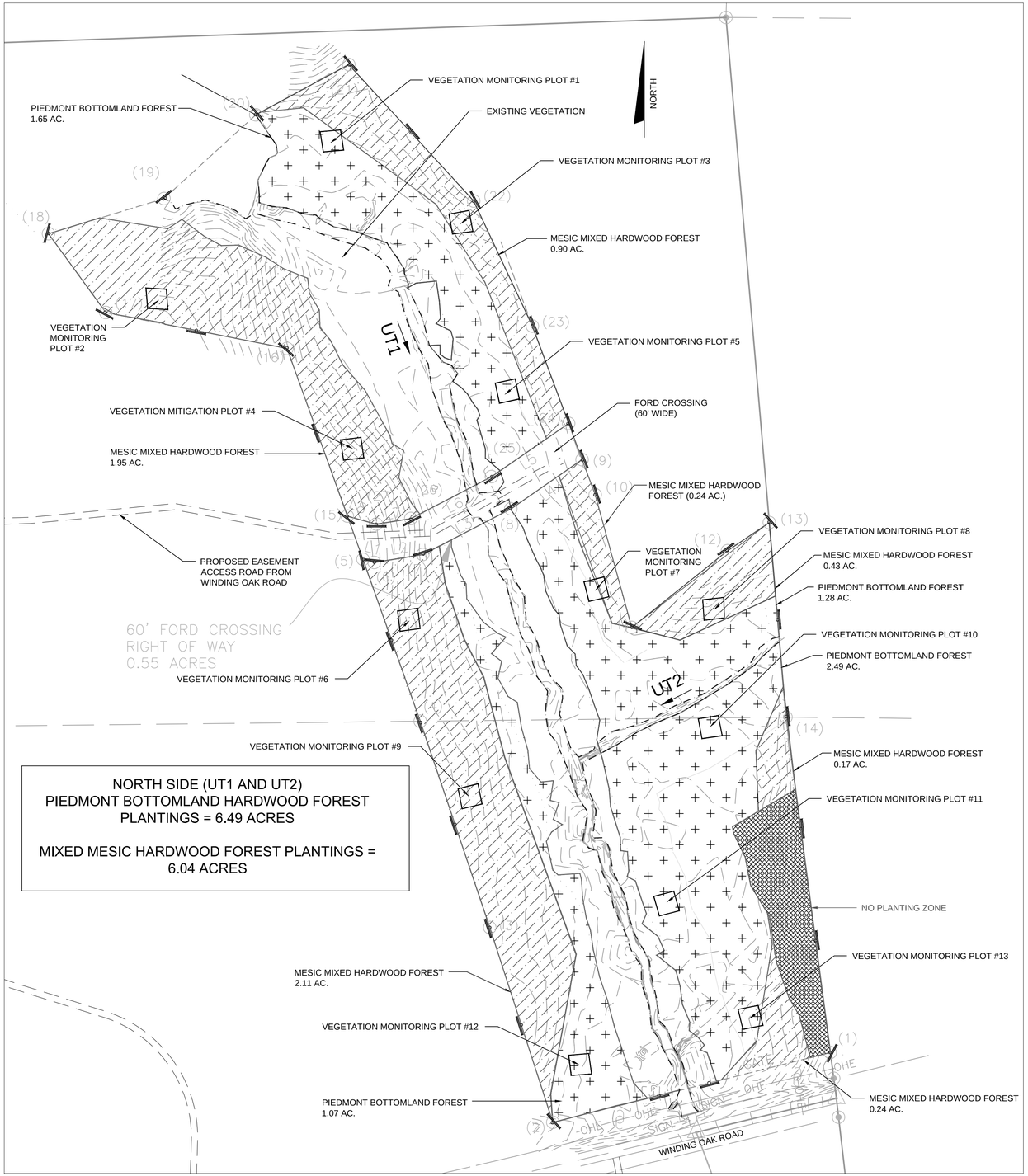
601 Cascade Pointe Lane, Suite 101
Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

COON CREEK

PROJECT SEQUENCE - DETAILS



NORTH SIDE UT1 & UT2

100 0 100 200

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 (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)
- VEGETATION MONITORING PLOTS
- TOP OF BANK
- CONSERVATION BUFFER SIGN
- NO PLANTING ZONE

NCEEP PROJECT NO.	SHEET NO.
95807	4

PROJECT ENGINEER

NOT FOR CONSTRUCTION

CLY
Approved By:

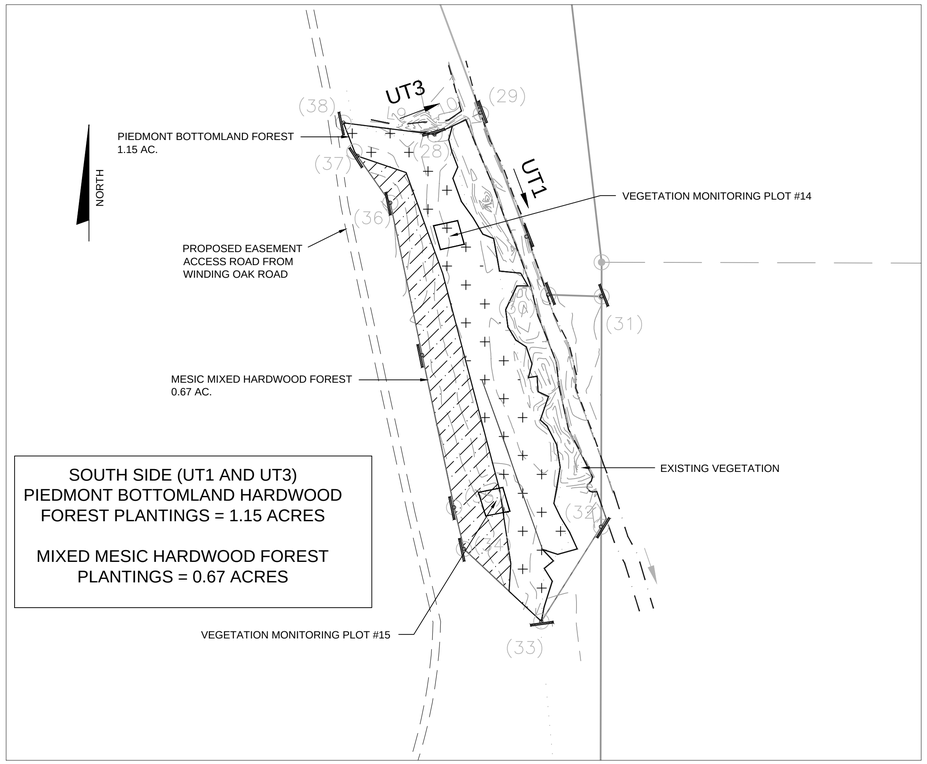
March 27, 2014
Date:

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

VEGETATION PLAN - NORTH SIDE
(UT1 & UT2)
AS-BUILT



100 0 100 200

SOUTH SIDE UT1 & UT3

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

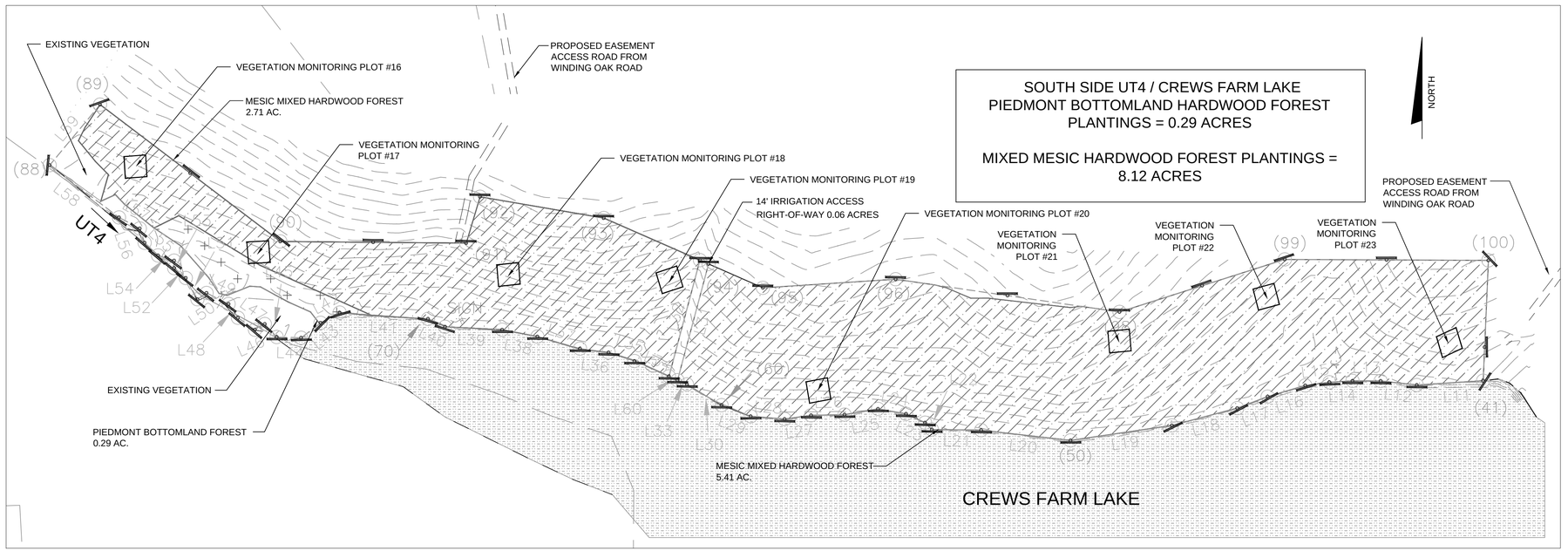
Mesic Mixed Hardwood Forest (Piedmont Subtype)		
Species	**Common Name**	**Percentage of Mix**
Nyssa sylvatica	Black gum	20
Liriodendron tulipifera	Tulip poplar	20
Quercus nigra	Water oak	20
Quercus falcata	Southern red oak	15
Cornus florida	Flowering dogwood	10
Cersis canadensis	Red bud	5
Diospyros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

LEGEND

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

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

NCEEP PROJECT NO.	SHEET NO.
95807	5

PROJECT ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 031201 CHRISTOPHER L. YOUNGER — NOT FOR CONSTRUCTION

CLY
Approved By:

March 27, 2014
Date:

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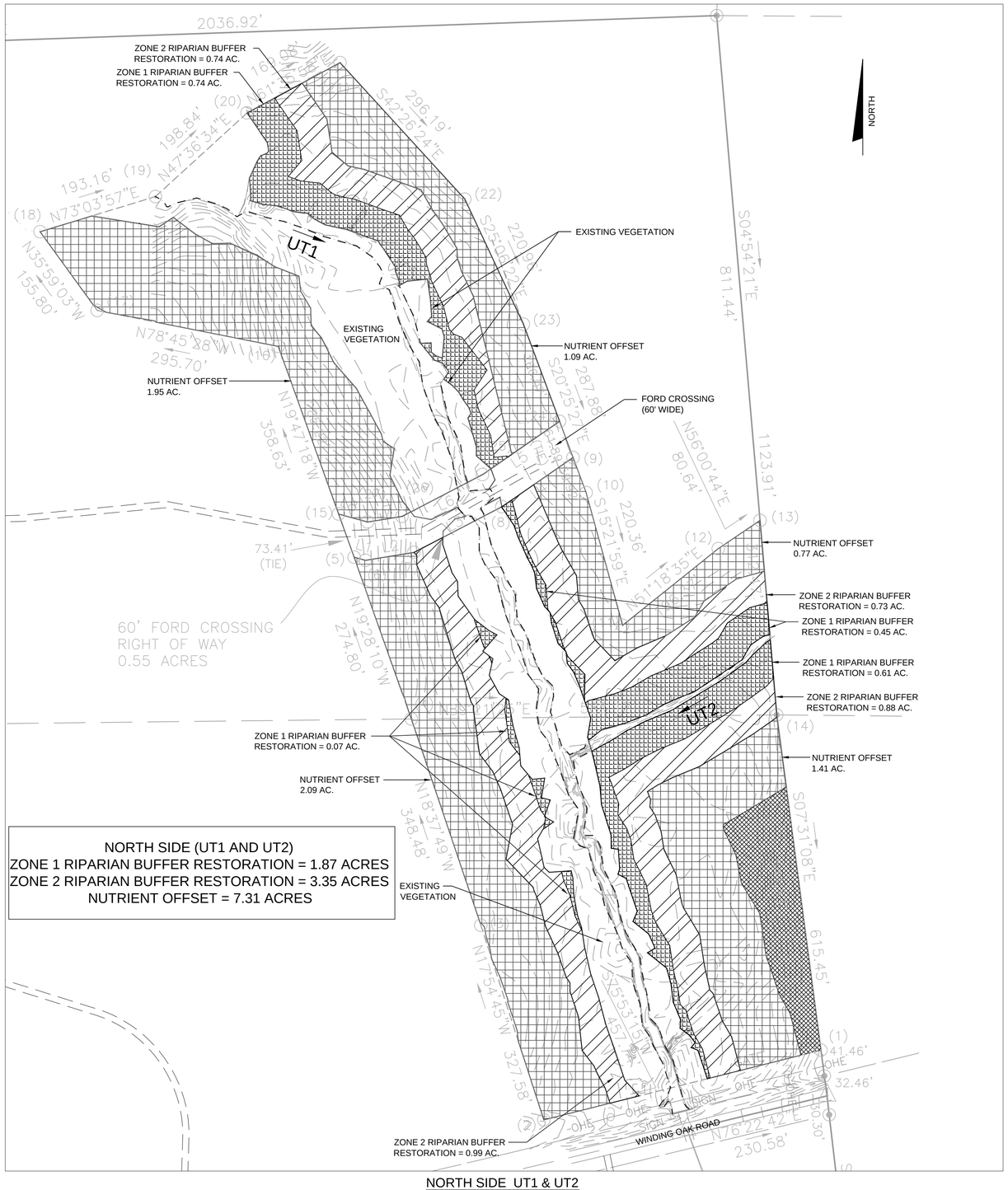
(919) 650-2463

O'BRIEN & GERE

COON CREEK

VEGETATION PLAN - SOUTH SIDE
(UT3 & UT4)
AS-BUILT



NORTH SIDE UT1 & UT2

LEGEND

- EXISTING BUFFER - NO MITIGATION
- ZONE 1 RIPARIAN BUFFER RESTORATION (TOB-50')
- ZONE 2 RIPARIAN BUFFER RESTORATION (50-100')
- NUTRIENT OFFSET RESTORATION
- TOP OF BANK

NCEEP PROJECT NO.	SHEET NO.
95807	6

PROJECT ENGINEER

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CLY
Approved By:

March 27, 2014
Date:

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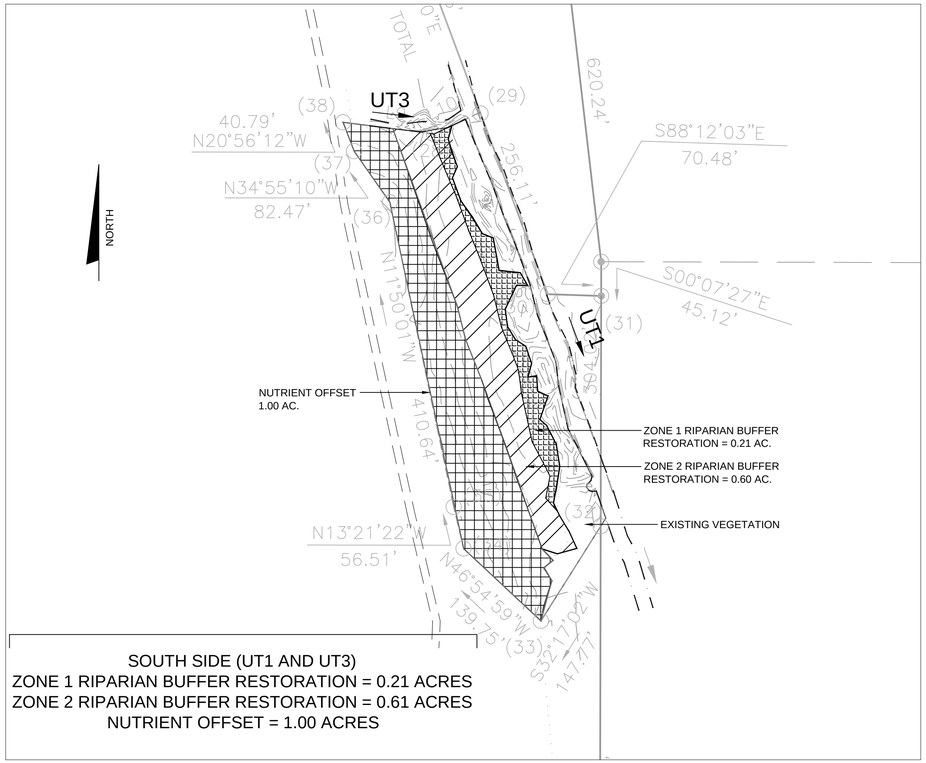
O'BRIEN & GERE

COON CREEK

MITIGATION PLAN - NORTH SIDE
(UT1 & UT2)
AS-BUILT

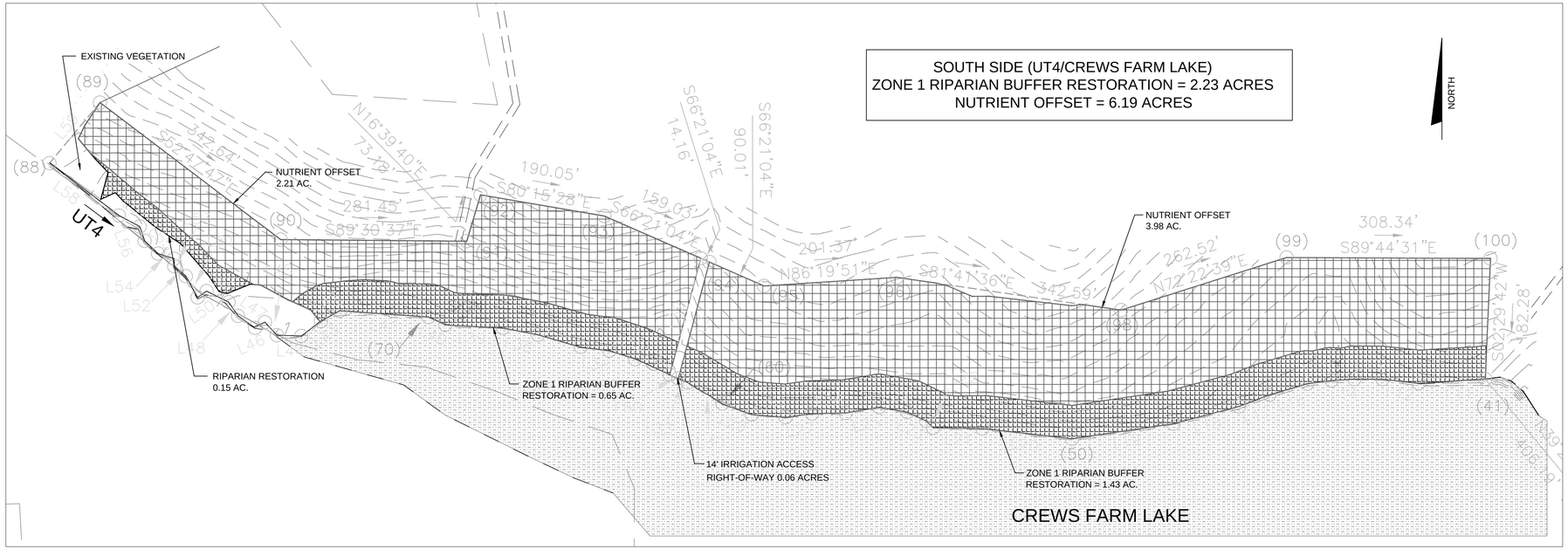


LEGEND

- EXISTING BUFFER - NO MITIGATION
- ZONE 1 RIPARIAN BUFFER RESTORATION (TOB-50')
- ZONE 2 RIPARIAN BUFFER RESTORATION (50-100')
- NUTRIENT OFFSET RESTORATION
- TOP OF BANK

100 0 100 200

SOUTH SIDE UT1 & UT3



SOUTH SIDE UT4 / CREWS FARM LAKE

100 0 100 200

NCEEP PROJECT NO.	SHEET NO.
95807	7

PROJECT ENGINEER

NOT FOR CONSTRUCTION

CLY
Approved By:

March 27, 2014
Date:

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Cary, North Carolina 27513
(919) 650-2463

O'BRIEN & GERE

COON CREEK

MITIGATION PLAN - SOUTH SIDE
(UT3 & UT4)
AS-BUILT

Appendix D - Correspondence

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

December 9, 2013

DWR Project # 2013-0689

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

Re: Approval of NCEEP Coon Creek Riparian Buffer & Nutrient Offset Mitigation Plan
Granville County

Dear Ms. Kemp,

On November 26, 2013, the Division of Water Resources (DWR) received the Coon Creek Riparian Buffer & Nutrient Offset Mitigation Plan from the North Carolina Ecosystem Enhancement Program (NCEEP) for review and approval for riparian buffer and nutrient offset mitigation. The plan was prepared by O'Brien & Gere Engineers, Inc. on behalf of NCEEP. This site is located in Oxford on Winding Oak Road in Granville County, North Carolina and is located within the 8-digit Hydrologic Unit Code (HUC) 03020101 of the Tar-Pamlico River Basin. Staff from DWR issued a buffer determination letter and a site viability letter on May 15, 2013 and June 27, 2013, respectively for the subject site.

On December 5, 2013, Katie Merritt, with DWR, requested additional information as part of the review of the subject mitigation plan. The comments and recommendations provided to NCEEP were incorporated into the mitigation plan and submitted to Ms. Merritt on December 9, 2013. Based on the information above, DWR hereby approves the subject mitigation plan.

Riparian Buffer mitigation generated at this site may be provided for buffer impacts within the Tar-Pamlico River Basin according to 15A NCAC 02B .0260. Nutrient offset mitigation generated at this site may be provided to offset nutrients within the 8-digit HUC 03020101 and per 15A NCAC 02B .0240.

401 and Buffer Permitting 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
Internet: www.ncwaterquality.org

Upon completion of the Coon Creek mitigation project, please submit an as-built report for review and approval.

For any questions regarding this correspondence, please contact Katie Merritt at (919) 807-6371 or katie.merritt@ncdenr.gov.

Sincerely,

Karen Higgins

Karen Higgins, Supervisor
401 and Buffer Permitting Unit

KAH/*km*

Cc: File Copy (Katie Merritt)

From: Kemp, Jessica [mailto:jessica.kemp@ncdenr.gov]
Sent: Tuesday, February 04, 2014 3:01 PM
To: Daniel Ramsay
Subject: RE: Coon Creek assets

Excellent! They all add up to the contracted amount of 22.6 acres (984,456 sq ft)

The as-builts will need to show the break down as "Riparian Buffer or Nutrient Offset Buffer":
TOB-50'
50-100'
100-200'

It's okay if the square footage in each category changes due to more accurate GIS work, but the numbers need to be reported in the three categories above.

As for the reference – all requests need to go to Jeff Jurek. Do you need his contact information?