

**FINAL MONITORING REPORT
YEAR 5 of 5**

**Green Valley Farm Site
Riparian Buffer Restoration
DMS Contract Number 003994-DMS Site 95012
DWR Project Number 2014-0073**

**Randolph County, North Carolina
Cape Fear River Basin
HUC 03030003010070**



Submitted to:

**North Carolina Division of Mitigation Services
North Carolina Department of Environmental Quality
1652 Mail Service Center
Raleigh, NC 27699-1652**

**Construction Completed: June 2012
Data Collection Period: October 2017
Submission Date: January 2018**

This project was developed in conformance with Randleman Buffer Rules 15A NCAC 02B. 0250

Provided by:



**Resource Environmental Solutions, LLC
302 Jefferson Street, Suite 110
Raleigh, NC 27605
919-829-9909**

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1.0 EXECUTIVE SUMMARY / PROJECT ABSTRACT

1.1 Project Goals and Objectives

The Green Valley Buffer Mitigation Project is located in the 03030003 Catalog Unit (CU), in the Cape Fear River Basin. Assets of this CU include the Deep River, the Randleman Reservoir, and major communities including High Point, Asheboro, Siler City, and Sanford. Restoration goals for CU 03030003 as identified in the 2009 Cape Fear River Basin RBRP include protection of several species of mussel and the Cape Fear Shiner. Additional goals include the improvement in water quality to waters draining to Randleman Reservoir.

The Green Valley Buffer Mitigation Project was identified as an opportunity to improve water quality and habitat within the CU. The project goals address stressors identified in the CU. The following table lists the project goals and the project objectives through which the goals will be addressed:

Goals	Objectives
1. Nutrient removal	• Restore minimum 50-foot riparian buffer by planting appropriate bottomland hardwood species to filter runoff.
2. Sediment removal	• Convert active farm fields to forested buffers.
3. Runoff filtration	• Plant buffer vegetation to shade channel.
4. Increase dissolved oxygen concentration	• Restore riparian buffer habitat to appropriate bottomland hardwood ecosystem.
5. Restore riparian habitats	• Restore canopy tree species in the stream buffer areas to shade channel.
6. Reduce water temperature	• Eliminate and control exotic invasive species.
	• Replace three (two culverts and one ford) undersized and/or failing channel crossings with appropriately sized structures.

1.2 Project Background

The Green Valley Farms Riparian Buffer Mitigation Site is located on Hockett Dairy Road (SR 1938) in Randolph County approximately 12 miles north of Asheboro, NC (**Figure 1**). The site is located in the Cape Fear River Basin within Cataloging Unit 03030003010070 (NCDWQ sub-basin 03-06-08). The site has four unnamed tributaries (UT) that drain into Randleman Lake (**Figure 2**). The project produces 9.6 acres (418,176 square feet) of buffer restoration. At the beginning of the monitoring period this 400-linear foot reach was determined to be not subject to Randleman Buffer Rules therefore 0.86 acres of buffer restoration would be lost. But in February 2017, NCDWR staff conducted an on-site determination of the upper portion of UT 4 and found it to be intermittent – subject to Randleman Buffer Rules (**Appendix D**).

The project site is located in the Piedmont Physiographic Province and in the Carolina Slate Belt. The region is underlain by felsic metavolcanic rocks, which can be seen in the streambed of UT 1 and UT 3. The topography of the project area is generally rolling with elevations ranging from 670 to 760 feet. The four unnamed tributaries to Randleman Lake comprise the principle drainage features. The project's watershed is primarily used for agricultural production. Much of the site is currently used for row crop production for dairy silage. These tributaries have limited hardwood trees present within the buffer and lack significant ground cover. The mature trees have a density of less than 100 stems per acre. The project area has been in agricultural use for several decades.

The Green Valley Farms mitigation project offers an opportunity for high quality riparian buffer restoration. Stream buffer mitigation for the Green Valley Farms Site involves buffering four streams that flow directly and indirectly into Randleman Lake. The mitigation design divides the site into four distinct reaches (**Figure 2**). Buffer restoration is proposed along all four channels. Three existing farm access crossings have been upgraded and stabilized to prevent erosion.

1.3 Vegetation Condition

The measure of vegetative success for the site is the survival of at least 320 five-year old planted trees per acre at the end of year five of the monitoring period. CVS Level 2 was performed in monitoring Year 5 during October 2017 to document planted vegetation conditions and any volunteer generation. A total of 108 volunteers were observed across all 11 vegetation plots. Year 5 monitoring recorded an average of 585 planted stems per acre and 986 total stems per acre (planted and volunteers) across all vegetation plots. All plots achieved Year 5 success criteria and the site is recommended for close-out.

The invasive Johnsongrass (*Sorghum halepense*) was present across the site during Year 5; however, it is sparse and not problematic. The trees on-site have begun canopy closure and shading it out. There were five small areas of encroachment (about 0.03 acres) where the landowner run over easement markers. Easement markers in these locations were replaced in the fall of 2017. In February 2017, NCDWR staff conducted an on-site determination of the upper portion of UT 4 and found it to be intermittent (**Appendix D**). MY5 conditions are shown on the Current Condition Plan View which is provided in **Appendix B, Figure 2**.

1.4 Summary Information / Data

Summary information/data related to the occurrence of items such as beaver or encroachment and statistics related to performance of various project and monitoring elements can be found in the tables and figures in the report appendices. Narrative background and supporting information formerly found in these reports can be found in the Baseline Monitoring Report (formerly Mitigation Plan) and in the Mitigation Plan (formerly the Restoration Plan) documents available on the DMS website. All raw data supporting the tables and figures in the appendices is available from DMS upon request.

2.0 METHODOLOGY

In order to determine if the success criteria are achieved and the planted areas are developing toward the target community, NCEEP-CVS Protocol for Recording Vegetation Version 4.2 will be utilized. The vegetation monitoring will include Level I and Level II plots distributed across the planted area. An interim vegetation monitoring will occur in spring after leaf-out has occurred. The CVS monitoring will be conducted toward the end of the growing season. Individual plot data will be provided to DMS and CVS following NCEEP-CVS guidance. The annual monitoring requirements are summarized in the following table:

Required	Parameter	Quantity	Frequency	Notes
X	Vegetation	11 Plots Located randomly across the project area	Annual	Vegetation will be monitored using the Carolina Vegetation Survey (CVS) protocols (Level I & Level II)
X	Exotic and nuisance vegetation	N/A	Semi-Annual	Exotic vegetation will be evaluated and spot treatment applied as needed
X	Project boundary	N/A	Semi-annual	Locations of fence damage, vegetation damage, boundary encroachments, etc. will be mapped

Photographs will be used to visually document restoration success. Reference photos will be taken once a year and will be used to visually document restoration success. Reference photo stations are marked with wooden stakes. Reference stations will be photographed immediately following planting and continued annually for at least five years following construction. Photographers will make every effort to 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.

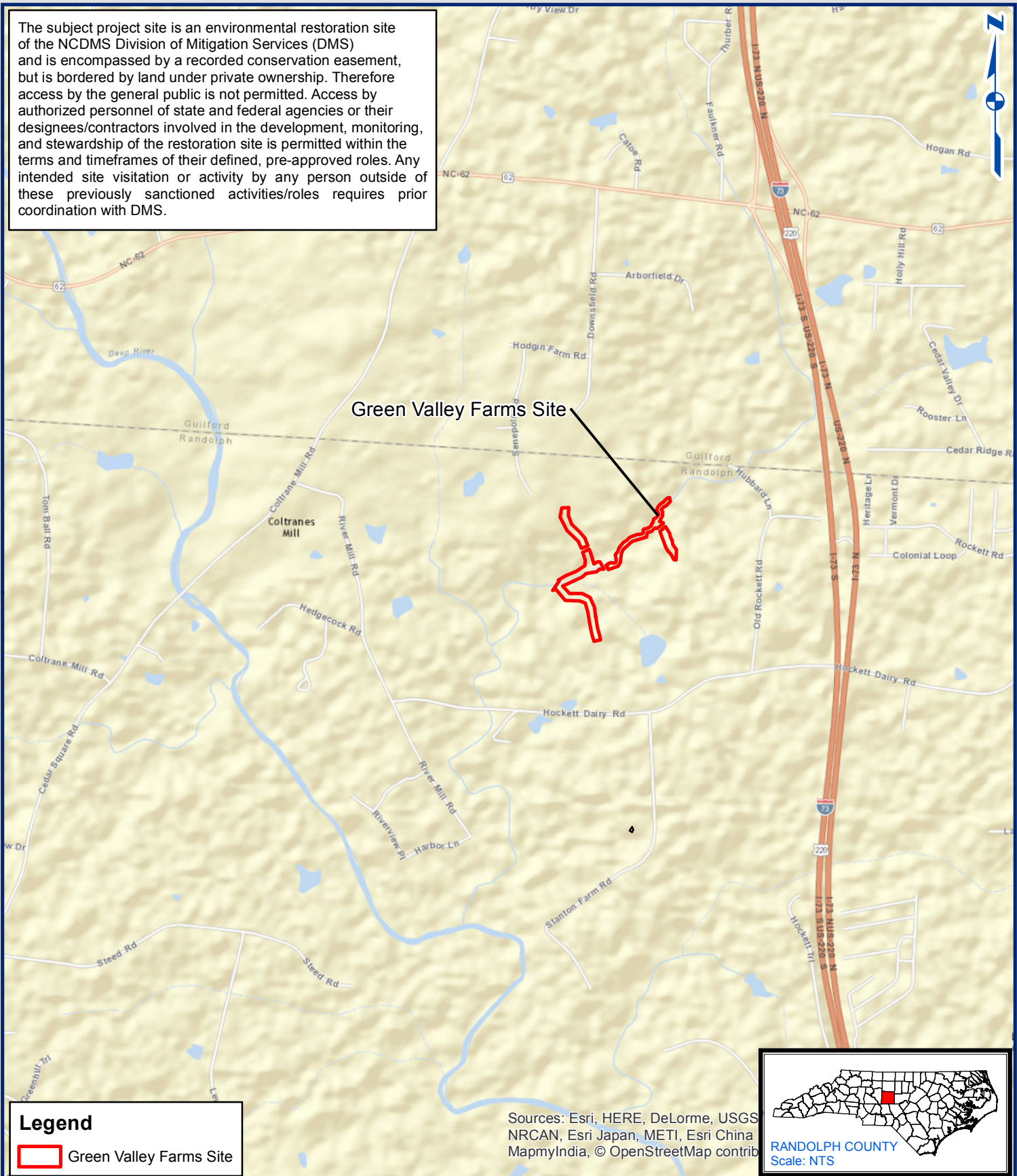
3.0 REFERENCES

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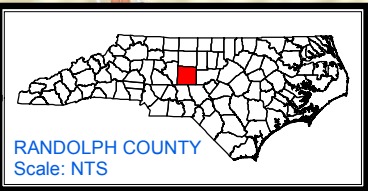
Appendix A

Project Vicinity Map and Background Tables

The subject project site is an environmental restoration site of the NCDMS Division of Mitigation Services (DMS) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Therefore access by the general public is not permitted. Access by authorized personnel of state and federal agencies or their designees/contractors involved in the development, monitoring, and stewardship of the restoration site is permitted within the terms and timeframes of their defined, pre-approved roles. Any intended site visitation or activity by any person outside of these previously sanctioned activities/roles requires prior coordination with DMS.



Sources: Esri, HERE, DeLorme, USGS, NRCAN, Esri Japan, METI, Esri China, MapmyIndia, © OpenStreetMap contributors



Legend

 Green Valley Farms Site

Figure 1. Project Vicinity Map
 Green Valley Farms Riparian Buffer Restoration Site
 Randolph County, North Carolina
 DMS Project ID# 003994

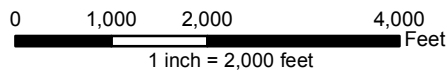


Table 1. Project Components and Mitigation Credits
Green Valley, Randolph County
DMS Project ID Number 003994-DMS Site 95012

Mitigation Credits									
	Stream		Riparian Wetland		Non-riparian Wetland		Buffer	Nitrogen Nutrient Offset	Phosphorous Nutrient Offset
Type	N/A	N/A	N/A	N/A	N/A	N/A	Restoration	N/A	N/A
Totals	N/A	N/A	N/A	N/A	N/A	N/A	418,176 sq ft.	N/A	N/A

Project Components						
Reach ID	Stationing/ Location	Existing Footage (LF)	Approach (PI, PII, etc.)	Restoration -or- Restoration Equivalent	Restoration Area (square feet)	Mitigation Ratio
Reach UT1	N/A	2,450	N/A	Buffer Restoration	152,896	1:1
Reach UT2	N/A	1,156	N/A	Buffer Restoration	115,434	1:1
Reach UT3	N/A	1,105	N/A	Buffer Restoration	100,188	1:1
Reach UT4	N/A	590	N/A	Buffer Restoration	49,658	1:1

Component Summation						
Restoration Level	Stream (linear feet)	Riparian Wetland		Non-Riparian Wetland (acres)	Buffer (square feet)	Upland (acres)
		Riverine	Non-Riverine			
Restoration	N/A	N/A	N/A	N/A	418,176	N/A
Enhancement	N/A	N/A	N/A	N/A	N/A	N/A
Enhancement I	N/A	N/A	N/A	N/A	N/A	N/A
Enhancement II	N/A	N/A	N/A	N/A	N/A	N/A
Creation	N/A	N/A	N/A	N/A	N/A	N/A
Preservation	N/A	N/A	N/A	N/A	N/A	N/A
High Quality Preservation	N/A	N/A	N/A	N/A	N/A	N/A

Table 2. Project Activity and Reporting History Green Valley, Randolph County DMS Project ID Number 003994-DMS Site 95012		
Elapsed time since planting complete: 5 years, 7 months Number of reporting years: 5		
Activity or Report	Data Collection Complete	Completion or Delivery
Mitigation Plan	January 2012	May 2012
Final Design - Construction Plans	N/A	May 2012
Construction	N/A	October 2012*
Temporary S&E mix applied to project area	N/A	June 2012
Permanent seed mix applied to project area	N/A	June 2012
Containerized and B&B plantings planted in project area	N/A	June 2012
Baseline Monitoring Document (Year 0 Monitoring - baseline)	June 2012	May 2013
Year 1 Monitoring	October 2013	October 2013
Year 2 Monitoring	September 2014	September 2014
Year 3 Monitoring	January 2016	January 2016
Year 4 Supplemental Replant	N/A	April 2016
Year 4 Monitoring	December 2016	January 2017
Year 5 Monitoring	October 2017	November 2017

*Construction activities were completed outside of easement area.

Table 3. Project Contact Table Green Valley, Randolph County DMS Project ID Number 003994-DMS Site 95012	
Designer	WK Dickson & Co., Inc.
Primary project design POC	Frasier Mullen - (919) 782-0495
Construction Contractor	KBS Earthworks
Construction contractor POC	Kory Strader - (336) 362-0289
Planting Contractor	Taylor's Lawn and Landscape
Planting contractor POC	Brant Taylor - (919) 606-2431
Seeding Contractor	Taylor's Lawn and Landscape
Planting contractor POC	Brant Taylor - (919) 606-2431
Seed Mix Sources	Evergreen Seed, Inc
Nursery Stock Suppliers	ArborGen
Monitoring Performers	Resource Environmental Solutions, LLC
Vegetation Monitoring POC	Brian Hockett- (919)-209-1054

Table 4. Project Baseline Information and Attributes Green Valley, Randolph County DMS Project ID Number 003994-DMS Site 95012	
Project Information	
Project Name	Green Valley Farm Site - Riparian Buffer Restoration
County	Randolph
Project Area (acres)	11.45
Project Coordinates (latitude and longitude)	35° 54' 17.672" N, 79° 50' 3.490"W
Project Watershed Summary Information	
Physiographic Province	Piedmont Physiographic Province
River Basin	Cape Fear River Basin
USGS Hydrologic Unit 8-digit	03030003
USGS Hydrologic Unit 14-digit	03030003010070
DWQ Sub-basin	03-06-08
Project Drainage Area (acres)	389.1
Project Drainage Area Percentage of Impervious Area	1%
CGIA Land Use Classification	1.01 Residential 2.01 Cropland and Pasture 2.03 Confined Animal Operations 2.99 Other Agricultural Land 3.02 Passively Managed Forest Stands

**Table 4 (cont.). Project Baseline Information and Attributes
Green Valley, Randolph County
DMS Project ID Number 003994-DMS Site 95012**

Parameters	Reach UT1	Reach UT2	Reach UT3	Reach UT4*
Length of reach (linear feet)	2,450	1,156	1,105	190 to 590
Valley Classification	X	X	X	X
Drainage area (acres)	221	18.5	64	19.4
NCDWQ stream identification score	38	20.5	23	26
NCDWQ Water Quality Classification	WS-IV;CA	WS-IV;CA	WS-IV;CA	WS-IV;CA
Morphological Description (stream type)	C	C	C	C
Evolutionary trend	Stable	Stable	Stable	Stable
Underlying mapped soils	Chewacla loam ChA	Mecklenburg CL MeC2, Wynott-Enon complex WvC2	Wynott-Enon complex WtC	Wynott-Enon complex WtC
Drainage class	somewhat poorly drained	well drained	well drained	well drained
Soil Hydric status	Non-hydric	Non-hydric	Non-hydric	Non-hydric
Slope (ft/ft)	0.002	0.024	0.014	0.010
FEMA classification	Zone AE	Zone AE	Zone AE	N/A
Native vegetation community	Cultivated	Cultivated	Cultivated	Cultivated
Percent composition of exotic invasive vegetation	<1%	<1%	<1%	<1%
Regulatory Considerations				
Regulation	Applicable	Resolved	Supporting Documentation	
Waters of the United States - Section 404	Yes	Yes	see Mitigation Plan	
Waters of the United States - Section 401	Yes	Yes	see Mitigation Plan	
Endangered Species Act	Yes	Yes	see Mitigation Plan	
Historic Preservation Act	Yes	Yes	see Mitigation Plan	
Coastal Zone Management Act (CZMA)/Coastal Area Management Act (CAMA)	No	N/A	N/A	
FEMA Floodplain Compliance	No	N/A	N/A	
Essential Fisheries Habitat	No	N/A	N/A	

Appendix B

Visual Assessment Data

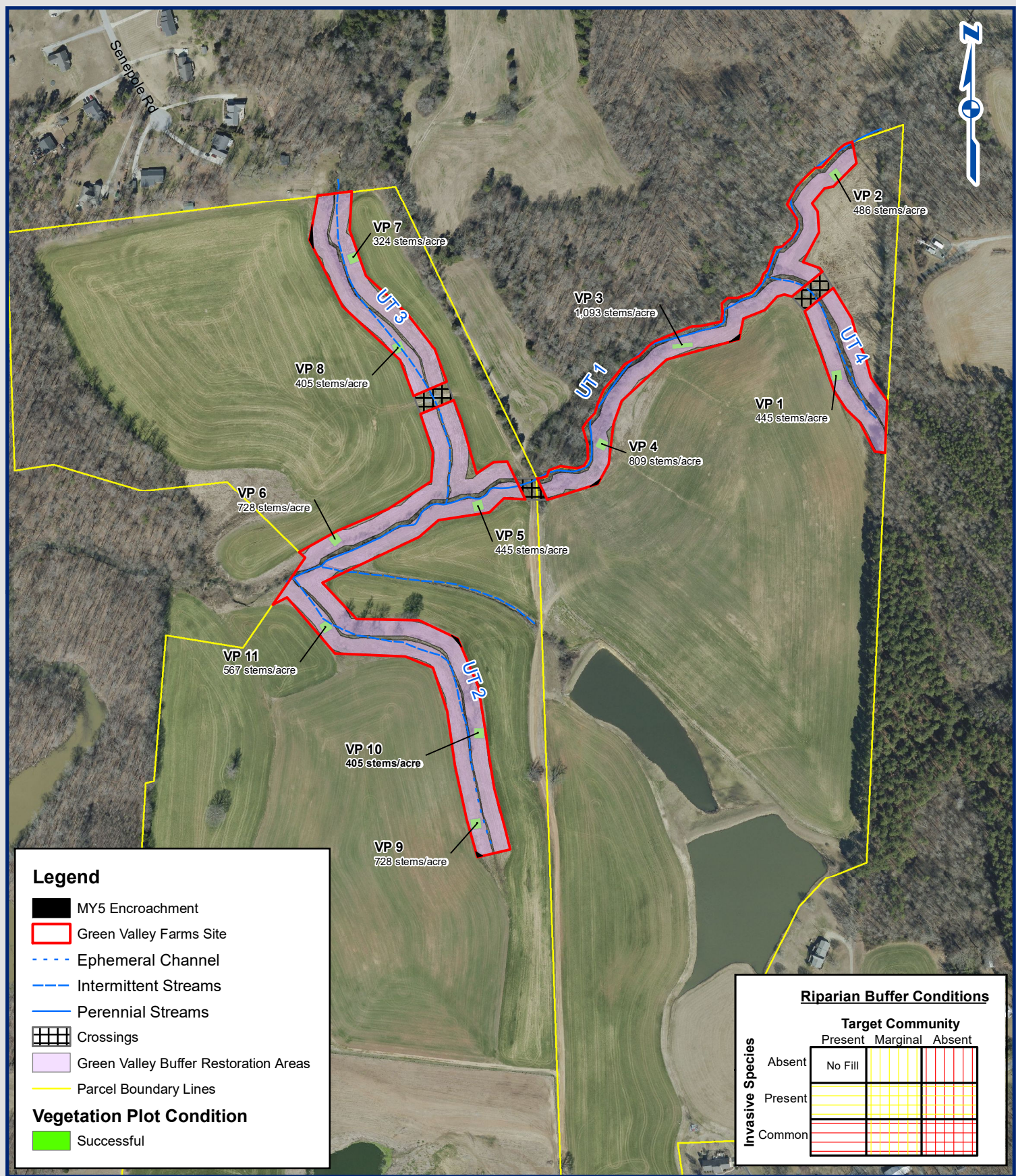


Figure 2. Current Condition Plan View
 Green Valley Farms Riparian Buffer Restoration Site

Monitoring Year 5
 Randolph County, North Carolina
 DMS Project ID# 003994



Date: October 2017

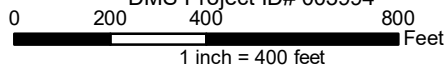


Table 5. Vegetation Condition Assessment Green Valley, Randolph County DMS Project ID Number 003994-DMS Site 95012						
Planted Acreage:	11.45					
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
1. Bare Areas	Very limited cover of both woody and herbacious material.	0.1 acres	N/A	0	0.00	0%
2. Low Stem Density Areas	Woody stem densities clearly below target levels based on MY3, 4, or 5 stem count criteria.*	0.1 acres	vertical yellow line	0	0	0%
Total:				0	0.00	0%
3. Areas of Poor Growth Rates or Vigor	Areas with woody stems of a size that are obviously small given the monitoring year.	0.25 acres	N/A	0	0.00	0%
*Cumulative Total:				0	0	0%
Easement Acreage:	11.45					
Vegetation Category	Definitions	Mapping Threshold	CCPV Depiction	Number of Polygons	Combined Acreage	% of Planted Acreage
4. Invasive Areas of Concern	Areas or points (if too small to render as polygons at map scale)	1000 SF	horizontal red line fill	0	0.00	0%
5. Easement Encroachment Areas	Areas or points (if too small to render as polygons at map scale)	none	black fill	5	0.03	0%

Vegetation Plot Photos



Vegetation Plot 1



Vegetation Plot 2



Vegetation Plot 3



Vegetation Plot 4



Vegetation Plot 5



Vegetation Plot 6



Vegetation Plot 7



Vegetation Plot 8



Vegetation Plot 9



Vegetation Plot 10



Vegetation Plot 11

Appendix C

Vegetation Plot Data

Table 6. Riparian Buffer Vegetation Totals Green Valley, Randolph County DMS Project ID Number 003994-DMS Site 95012					
Plot #	Riparian Buffer Stems	Volunteers per Acre	Total Stems	Success Criteria	Average Tree Height (cm)*
1	445	0	445	Yes	1156
2	486	1255	1740	Yes	846
3	1093	607	1700	Yes	1063
4	809	1416	2226	Yes	866
5	445	567	1012	Yes	833
6	728	324	1052	Yes	711
7	324	40	364	Yes	681
8	405	0	445	Yes	583
9	728	0	728	Yes	450
10	405	0	405	Yes	444
11	567	162	728	Yes	631
Project Avg	585	397	986	Yes	751

* The tallest eight trees were averaged, representing 320 stems/acre.

Appendix D

NCDWR Correspondence



ROY COOPER
Governor
MICHAEL S. REGAN
Secretary
S. JAY ZIMMERMAN
Director

March 24, 2017

Mr. Brian Hockett
Resources Environmental Solutions, LLC
302 Jefferson St, Suite 110
Raleigh, NC 27605

Subject: On-Site Determination for Applicability to the Randleman Lake Buffer Rules (15A NCAC 02B .0250)

Subject Property: Green Valley Farm Buffer Mitigation Site

Dear Mr. Hockett:

On February 23, 2017, at your request, I conducted an on-site determination to review the upper portion of UT4 located within the subject project area for a stream determination with regards to the above noted state regulations. You were present during the site visit.

At the time of the site determination the upper 400 feet of UT4, as shown on the attached Monitoring Plan View, was determined to be an intermittent stream and therefore is subject to the Randleman Lake Buffer Rules. Additionally, the riparian restoration that was constructed adjacent to this stream is viable for buffer mitigation credit provided that the vegetation condition meets success criteria.

The owner (or future owners) should notify the Division (and other relevant agencies) of this decision in any future correspondences concerning this property. 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 Division or Delegated Local Authority that a surface water exists and that it is subject to the buffer rule may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o 401 & Buffer Permitting Branch, 1650 Mail Service Center, Raleigh, NC 27699-1650. Individuals that dispute a determination by the Division or Delegated Local Authority that “exempts” surface water from the buffer rule may ask for an adjudicatory hearing. You must act within 60 days of the date that you receive this letter. Applicants are hereby notified that the 60-day statutory appeal time does not start until the affected party (including downstream and adjacent landowners) is notified of this decision. The Division recommends that the applicant conduct this notification in order to be certain that third party appeals are made in a timely manner. To ask for a hearing, send a written petition, which conforms to Chapter 150B of the North Carolina General Statutes to the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. This determination is final and binding unless you ask for a hearing within 60 days.



State of North Carolina | Environmental Quality

450 West Hanes Mill Road, Suite 300 | Winston-Salem, North Carolina 27105

336-776-9800

This letter only addresses the applicability to the mitigation rules and does not approve any activity within Waters of the United States or Waters of the State. If you have any additional questions or require additional information, please contact me at 336-776-96923 or sue.homewood@ncdenr.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Sue Homewood". The signature is fluid and cursive, with a large, stylized initial "S" and "H".

Sue Homewood
Winston-Salem Regional Office

Enclosures: Green Valley Farm Buffer Map

Cc: H. Needham Hockett Jr. c/o Brian Hockett (via email)
Lindsay Crocker, DMS (via email)
Katie Merritt, DWR Buffer Mitigation Coordinator (via email)
DWR electronic file 2014-0073
DWR, Winston-Salem Regional Office

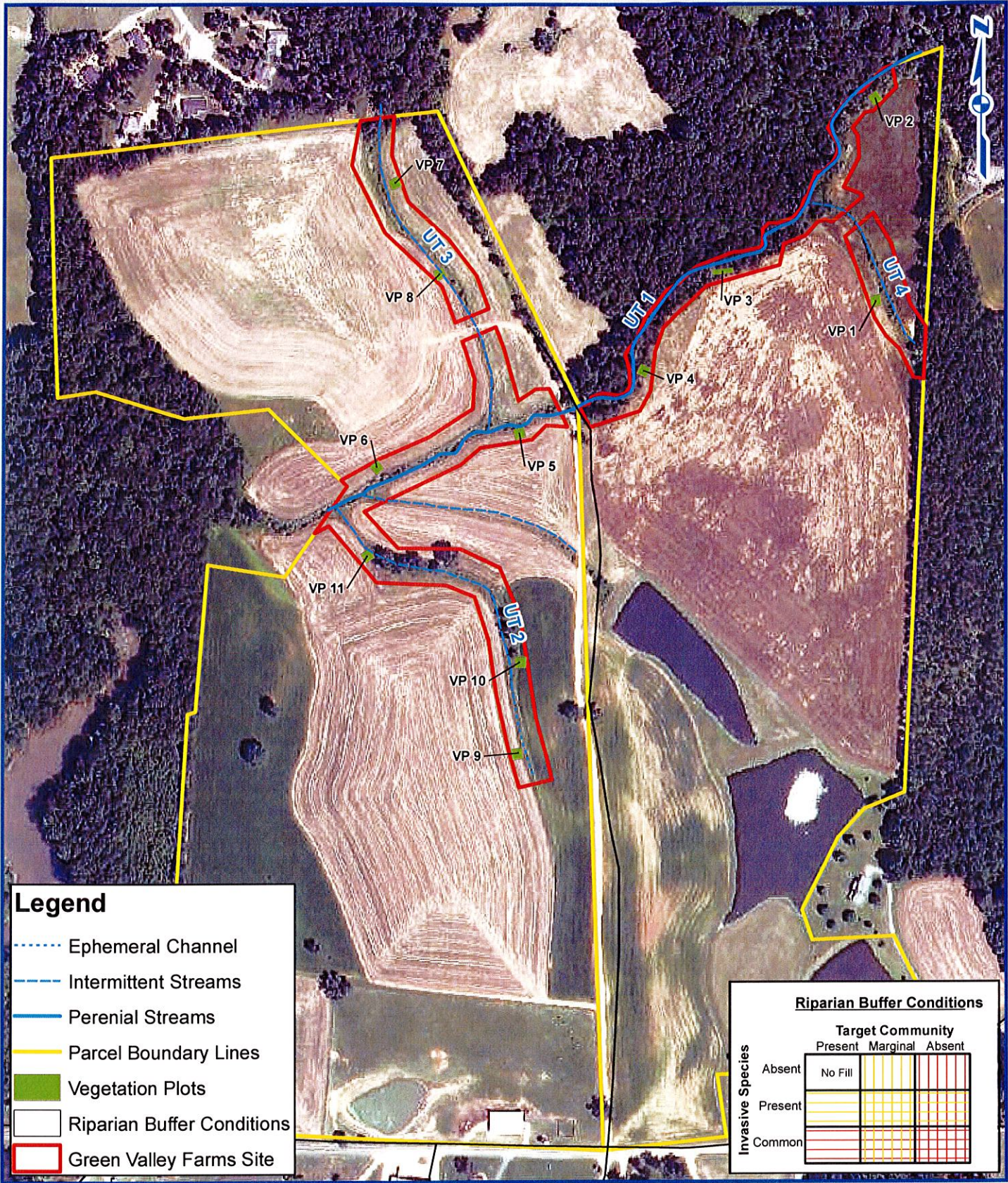


Figure 7.
Monitoring Plan View
Green Valley Farms Buffer Restoration Site

