YEAR 4 (2015) ANNUAL MONITORING REPORT

WALL RIPARIAN BUFFER MITIGATION SITE

RANDOLPH COUNTY, NORTH CAROLINA
DMS PROJECT ID: 95007

Construction Completed March 2012
Yr 4. (2015) Monitoring Data Collected October 2015
Draft Monitoring Report Submitted November 2015
NC DWR and DMS Site Visit January 2016
Final Monitoring Report Submitted February 2016

PREPARED BY:

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AND

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SUBMITTED TO:

NCDEQ-DMS
1652 Mail Service Center
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EXECUTIVE SUMMARY

Restoration Systems, LLC has established the Wall Riparian Buffer Mitigation Site (Site), designed specifically to assist in fulfilling the North Carolina Division of Mitigation Services (NCDMS) riparian buffer mitigation goals. The Site is located approximately 0.5 mile west of Randleman and three miles northwest of Asheboro, in northern Randolph County (Figure 1, Appendix A), and positioned within the 14-digit Cataloging Unit 03030003010070 of the Cape Fear River Basin. The Site is located within the Carolina Slate Belt ecoregion of the Piedmont province of North Carolina. This ecoregion is characterized by dissected irregular plains, some hills, linear ridges, and isolated monadnocks; low to moderate gradient streams with mostly boulder and cobble substrates (Griffith 2002). The Site watershed is characterized primarily by agriculture with forest land in riparian corridors and upper headwater depressions, and low-density residential development scattered along roadways. Unnamed Site streams drain to a reach of the Deep River that was listed on the NCDWQ final 2010 303(d) list for a standard violation due to reduced aquatic life integrity (NCDWQ 2010).

The original contract (#003997) dated, July 27, 2011 was for 11.3 RBMUs. During project permitting, RBMUs were scaled back to 9.8 based on one area deemed existing riparian buffer and not subject to restoration or enhancement and, the removal of a farm ponded and the need for subject streams above the pond to form through the old pond bed naturally. On January 19th, 2016, NC Division of Water Resources (NC DWR) Sue Homewood and Katie Merritt along with NCDMS project manager Lindsay Crocker and Restoration Systems representative Travis Hamrick conducted a site visit to verify subject streams had formed through the old farm pond and, the Site would be able to calculate RBMUs based on Consolidated Mitigation Buffer Rule (CMBR) (15A NCAC 02B .0295) effective November 1, 2015. DWR staff concluded that streams had formed through the remint farm pond bed and the Site was eligible to calculate RBMUs based on the CMBR effective 11-1-2015. This results in an increase of RMBUs generated by the Site from 9.8 to 10.48 (10.39 RBMUs from restoration and 0.09 Units from preservation). This monitoring report, project figures, and tables have been updated accordingly. Furthermore, an updated asset / credit map has been included as Appendix D.

Measuring 12.6 acres and protected in perpetuity by a conservation easement, the Site includes five unnamed tributaries, which flow to the Deep River. Site streams were impacted from channel straightening, clearing of native forest vegetation, continual maintenance, and hoof shear through livestock grazing. The primary goal of this riparian buffer restoration project is to provide Riparian Buffer Mitigation Units (RBMUs) to the NCDMS. Success of this goal is based on the following criteria.

1. Removing nonpoint sources of pollution associated with agricultural production including a) removing livestock and b) ceasing the broadcast application of fertilizer, pesticides, and other agricultural materials into and adjacent to Site streams through treatment of runoff within the forested buffer.
2. Reducing sedimentation within onsite and downstream receiving waters by a) reducing bank erosion, vegetation maintenance, plowing, and hoof shear adjacent to Site streams and b) removing livestock from the Site.
3. Restoring and reestablishing natural community structure, habitat diversity, and functional continuity by the creation of a forested riparian buffer adjacent to stream channels.
4. Promoting floodwater attenuation by increasing frictional resistance on floodwaters crossing Site floodplains.
5. Improving aquatic habitat by enhancing stream bed shading and natural detritus input.
6. Providing a terrestrial wildlife corridor and refuge in an area extensively developed for agricultural production.
7. Protecting the Site's full potential of stream and riparian buffer functions and values in perpetuity.

Construction activities at the Site included the removal of a small farm pond and farm road, the installation of shallow marsh wetland treatment areas, and the restoration of 10.39 acres of riparian buffer by planting pasture with native forest vegetation. Earthwork associated with the Site Mitigation Plan (dam and road removal) was delayed; therefore, in an effort to meet the seasonal planting window, Site planting occurred prior to the initiation of earthwork. The total area associated with earthwork equaled 0.8 acres. Through agency correspondence it was deemed acceptable to proceed with planting prior to earthwork.

Areas disturbed by earthwork were planted with 40 3-gallon green ash (*Fraxinus pennsylvanica*) and 2100 bare root trees in February of 2013 as follows.

700 American elm (*Ulmus americana*)
500 Ironwood (*Carpinus caroliniana*)
300 Swamp chestnut oak (*Quercus michauxii*)
600 Green ash (*Fraxinus pennsylvanica*)

Four vegetation plots (10-meter by 10-meter in size; Plots 1-4) were established and permanently monumented following Site planting. During the comment and review process of the *Baseline Monitoring Document & As-built Baseline Report,* the North Carolina Division of Mitigation Services requested an additional four monitoring plots be installed. The additional monitoring plots (Plots 5-8) were installed and baseline data was collected on March 8, 2013 after year 1 (2012) monitoring. The addition of vegetation plots resulted in a total stem count increase between monitoring year 1 (2012) and year 2 (2013) monitoring years.

During year 2 monitoring, it was determined herbaceous growth throughout the Site was having a negative effect on planted stems, specifically the prevalence of fescue grass. In late February of 2014, a site-wide fescue treatment occurred. Two weeks later, 5,000 bare root saplings of same type from the original planting list, were planted along UT 5, the upper portion of UT 1, and along UT 3 and 4. Planted stems throughout the site appear vigorous, and though fescue has repopulated throughout much of the Site, the panted stems are expected to remain unaffected. The 2014 replanting also resulted in an increased stem count in the vegetation monitoring reports. Additional bare roots were planted in Plots 1 – 5.

All plots (Plots 1-8) were surveyed in October 2015 for the Year 4 (2015) monitoring season following guidelines established in *CVS-DMS Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). Vegetation sampling across the Site was above the required average density with 764 planted stems per acre (excluding livestakes) surviving. In addition, each individual plot was above success criteria based on planted stems alone. Additional vegetation data can be found in Appendix B.

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1.0 PROJECT BACKGROUND

1.1 Location and Setting

Located approximately 0.5 mile west of Randleman and three miles northwest of Asheboro, in northern Randolph County (Figure 1, Appendix A), the Site is situated within the Carolina Slate Belt ecoregion of the Piedmont physiographic province of North Carolina, and within the United States Geological Survey (USGS) HUC 03030003 (North Carolina Division of Water Quality [NCDWQ] Subbasin Number 03-06-08) of the Cape Fear River Basin. The Site is positioned near the southwest corner of the 14-digit USGS Cataloging Unit 03030003010070.

The Carolina Slate Belt ecoregion is characterized by dissected irregular plains, some hills, linear ridges, and isolated monadnocks; low to moderate gradient streams with mostly boulder and cobble substrates (Griffith 2002). Onsite elevations range from 750 to 708 feet at the Site outfall (National Geodetic Vertical Datum, [NGVD]) (Randleman, North Carolina USGS 7.5-minute topographic quadrangle). The Site watershed is characterized primarily by agriculture with forest land in riparian corridors and upper headwater depressions, and low-density residential development scattered along roadways. Impervious surfaces account for less than two percent of the watershed land surface. Site streams were historically impacted from channel straightening, clearing of native forest vegetation with continual maintenance, and hoof shear through livestock grazing. Historical land use for the Site was primarily livestock grazing and hay production.

Directions to the Site from the City of Asheboro, NC:

- Travel north on I-73 for approximately 7.9 miles
- Exit onto US 311 toward High Point, NC
- Turn left onto US 311 North/US 311 Extension
- Travel north on US 311 for approximately 2.5 miles
- Turn right onto Wall Brothers Road
- Travel approximately 0.5 mile to Site entrance gate located on the left side of the road.
- Latitude: 35.825437°N, Longitude: 79.850840°W

1.2 Project Goals / Objectives

Project goals include the following:

- Improving Water Quality
  - Removing nonpoint sources of pollution associated with agricultural production including a) removing livestock and b) ceasing the broadcast application of fertilizer, pesticides, and other agricultural materials into and adjacent to Site streams through treatment of runoff within the forested buffer.
  - Reducing sedimentation within onsite and downstream receiving waters by a) reducing bank erosion, vegetation maintenance, plowing, and hoof shear adjacent to Site streams and b) removing livestock from the Site.
- Enhancing Flood Attenuation
  - Promoting floodwater attenuation by increasing frictional resistance on floodwaters crossing Site floodplains.
- Restoring Wildlife Habitat
  - Improving aquatic habitat by enhancing stream bed shading and natural detritus input.
  - Providing a terrestrial wildlife corridor and refuge in an area extensively developed for agricultural production.
  - Restoring and reestablishing natural community structure, habitat diversity, and functional continuity.
  - Protecting the Site's full potential of stream and riparian buffer functions and values in perpetuity.

Project goals will be accomplished by providing a minimum of 9.8 Riparian Buffer Mitigation Units, as calculated in accordance with the requirements stipulated in RFP #16-003567. The achievement of the following objectives will insure the success of providing said mitigation units.

Objective	Buffer Restoration Activity
Removing a pond impounding a reach of UT3 and UT4.	Pond removal occurred in April 2012 – see permanent photo point #4 on Figure 2 (Appendix B).
Removing a section of paved road at the upper reach of UT5.	Paved road removal occurred in April 2012 and planting of the area occurred in early 2013.
Removing invasive species along the upper reach of UT2.	Invasive species removal and monitoring will be ongoing throughout the monitoring period, with the first treatment in early 2013.
Installing shallow marsh wetland treatment areas on two ephemeral ditches entering the Site from Wall Brothers Road.	Shallow marsh wetland treatment areas were installed in April 2012 including log outfalls, planting with erosion control seed, and planting native forest vegetation.
Restoring approximately 9.8 acres of riparian buffer by planting with native forest vegetation.	Site revegetation occurred in March 2012, with supplemental planting of disturbed areas occurred in early 2013 (Appendix C).
Protecting the Site in perpetuity with a conservation easement.	The Site is protected by a conservation easement held by the State of North Carolina (SPO # 76-BD).

1.3 Project Structure, Restoration Type, and Approach

Project Structure

The Site includes 5 unnamed tributaries that drain to Randleman Lake and the Deep River (Figure 1, Appendix A). The lower reach of UT1 is depicted as a perennial stream on the USGS 7.5-minute topographic quadrangle while the upper reach of UT1 and the entirety of UT2 are depicted as intermittent streams [USGS Randleman, NC 7.5-minute topographic quadrangle (1981, 2010)]. UTs 3, 4, and 5 are not depicted on the USGS topographic quadrangle, but exhibited characteristics of ditched intermittent streams during field investigations. Geomorphology scores for these streams are generally low due to historical manipulation and disturbance.

Existing Stream Characteristics

Stream Reach	USGS Stream Order	[1]USGS Stream Classification	Field Stream Classification	NCDWQ Stream Identification Form Score
UT1	1-2	intermittent/perennial	Perennial	30.5
UT2	1	intermittent	Perennial	36.25
UT3	0-1	not shown/intermittent	Ephemeral / Intermittent	11/22
UT4	0	not shown	Ephemeral	11
UT5	0	not shown	Intermittent	22

[1] USGS Stream Classification: UT3 is depicted only downstream of the pond on the USGS 7.5-minute topographic quadrangle.

Restoration Type and Approach

Site restoration activities include the cessation of agricultural practices; removal of an agricultural pond and abandoned road crossing; installation of marsh treatment areas; and revegetation with native, forest communities. These activities will ultimately result in the generation of 10.48 Riparian Buffer Mitigation Units.

Completed project activities, reporting history, completion dates, and project contacts are summarized in Tables 1-3 (Appendix A).

2.0 ANNUAL MONITORING

Monitoring of restoration efforts will be performed for a minimum of 5 years or until success criteria are fulfilled. Monitoring activities for the Site, including relevant structures, project features, specific project structures, and monitoring features are detailed in the monitoring plan view in Figure 2 (Appendix A).

2.1 Vegetation

Monitoring of planted vegetation will follow the *Carolina Vegetation Survey (CVS)-North Carolina Division of Mitigation Services (DMS) Protocol for Recording Vegetation, Version 4.2* (Lee et al. 2008). The Site will be measured between June 1 and September 30 until the vegetation success criteria are achieved. A total of eight 10-meter by 10-meter vegetation plots have been installed within the 9.8 acres of restored riparian buffer (Figure 2, Appendix A). Vegetation will receive a visual evaluation on a periodic basis to ascertain the degree of overtopping of planted elements by nuisance species.

Invasive exotic species will be located and treated on a yearly basis, dependent upon species, by a NC Department of Agriculture & Consumer Services licensed pesticide applicator.

2.1.1 Vegetation Success Criteria

Success criteria have been established to verify that the vegetation component supports community elements necessary for forest development. Success criteria are dependent upon the density and growth of characteristic forest species. Additional success criteria are dependent upon the density and growth of "Characteristic Tree Species." Characteristic Tree Species include planted species, species identified through visual inventory of an approved, relatively undisturbed, reference forest community, and species outlined in Schafale and Weakley (1990) for a Piedmont/Low Mountain Alluvial Forest. An average density of 320 stems per acre of Character Tree Species must be surviving after five monitoring years.

2.1.2 Vegetative Contingency Plan

If vegetation success criteria are not achieved based on average density calculations from combined plots over the entire restoration area, supplemental planting may be performed with tree species approved by regulatory agencies. Supplemental planting may be performed as needed until achievement of vegetation success criteria.

2.1.3 Vegetative Problem Areas

Earthwork associated with the Site Mitigation Plan (dam and road removal) was delayed; therefore, in an effort to meet the seasonal planting window Site planting occurred prior to the initiation of earthwork. The total area associated with earthwork equals 0.8 acre and it was deemed acceptable to proceed with planting prior to earthwork. Areas disturbed by earthwork were planted with 40 3-gallon Green ash (*Fraxinus pennsylvanica*) and 2100 bare root trees in February of 2013. In addition, portions of the Site with low stem densities were replanted with 5000 bare root plants in late 2013/early 2014, and Site-wide fescue treatments occurred in the spring of 2014 (Figure 2, Appendix A). Additional vegetation data can be found in Appendix B.

3.0 CONCLUSIONS

Vegetation sampling across the Site was above the required average density with 764 planted stems per acre surviving. In addition, each individual plot was above success criteria based on planted stems alone.

Summary of Planted Vegetation Plot Results

Plot	Planted Stems/Acre Counting Towards Success Criteria				
	Year 1 (2012)	**Year 2 (2013)**	**Year 3 (2014)**	**Year 4 (2015)**	**Year 5 (2016)**
1	648	324	728	688	
2	567	567	1174	486	
3	648	445	971	1052	
4	486	243	648	445	
5*	--	202	648	769	
6*	--	526	486	1133	
7*	--	1093	1093	931	
8*	--	486	405	607	
Average of All Plots	**587**	**486**	**769**	**764**	

*Plots 5-8 were installed in March 2013 prior to Year 2 (2013) monitoring in response to agency comments during the review of baseline documentation/data.

4.0 REFERENCES

Griffith, G.E., J.M. Omernik, J.A. Comstock, M.P. Schafale, W.H. McNab, D.R. Lenat, T.F. MacPherson, J.B. Glover, and V.B. Shelbourne. 2002. Ecoregions of North Carolina and South Carolina. U.S. Geological Survey, Reston, Virginia.

Lee, Michael T., R.K. Peet, S.D. Roberts, and T.R. Wentworth. 2008. CVS-DMS Protocol for Recording Vegetation, Version 4.2. (online). Available: http://cvs.bio.unc.edu/methods.htm.

North Carolina Division of Water Quality (NCDWQ). 2010. Final North Carolina Water Quality Assessment and Impaired Waters List (2010 Integrated 305(b) and 303(d) Report) (online). Available: http://h2o.enr.state.nc.us/tmdl/documents/draft_2010_Cat_5.pdf [February 1, 2011]. North Carolina Department of Environmental Quality, Raleigh, North Carolina.

Schafale, M.P. and A.S. Weakley. 1990. Classification of the Natural Communities of North Carolina: Third Approximation. North Carolina Natural Heritage Program, Division of Parks and Recreation, North Carolina Department of Environmental Quality. Raleigh, North Carolina.

Appendix A: General Tables and Figures

Table 1. Site Restoration Structure and Objectives

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

Mitigation Credits*				
Riparian Buffer				
Restoration			Preservation	
10.39			0.90	
Projects Components				
Existing Acreage	Restoration/ Restoration Equivalent	Restoration / Preservation Acreage	Mitigation Ratio	Comment
10.39	Restoration	9.8	1:1	Cessation of current land use practices, removing an agricultural pond and road crossing, removing invasive species, and planting with native forest vegetation.
0.90	Preservation	0.90	10:1	Permanently protecting existing riparian buffer from cutting, clearing, filling, grading, and any similar activities that would affect the functionality of the riparian buffer.

Component Summation			
Restoration Level	Riparian Buffer (acreage)	Credit Ratio	RBMUs Mitigation Units
Restoration	10.39	1:1	10.39
Preservation	0.90	10:1	0.09
Totals	**10.70**	**--**	**10.48**

* Calculated in accordance with the Consolidated Riparian Buffer Mitigation Rule (15A NCAC 02B .0295) adopted 11/1/2015

Table 2: Project Activity and Reporting History

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

Activity or Report	Data Collection Complete	Completion or Delivery
CE Document	NA	February - 2012
Conservation Easement	NA	April - 2012
Mitigation Plan	NA	February - 2012
Construction	NA	March - 2012
Bare Root Planting	NA	March - 2012
Baseline Monitoring Document	April-2012	October 2012
Annual Monitoring Year 1 (2012)	September 2012	November 2012
Planting Disturbed Areas	NA	January/February 2013
Installation of 4 additional monitoring plots		March 2013
Annual Monitoring Year 2 (2013)	July 2013	October 2013
Fescue Treatment and Replant	NA	February / March 2014
Annual Monitoring Year 3 (2014)	August 2014	October 2014
Annual Monitoring Year 4 (2015)	October 2015	November 2015
Annual Monitoring Year 5 (2016)		

Table 3: Project Contacts Table

Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

	Firm	POC & Address
Full Delivery Provider	Restoration Systems, LLC	1101 Haynes Street, Suite 211 Raleigh, North Carolina 27604 George Howard and John Preyer 919-755-9490
Designer:	Axiom Environmental, Inc.	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
Construction Contractor:	Axiom Green Build.	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
Planting Contractor:	Carolina Silvics	Dwight McKinney 252.482.8491 908 Indian Trail Road Edenton, NC 27932
Seeding Contractor:	Axiom Green Build	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603
Nursery Stock Suppliers:	ArborGen	1.888.888.7158
Baseline Data Collection	Restoration Systems, LLC	Ray Holz; 919.604.9314 1101 Haynes St. Raleigh, NC 27604
Annual Monitoring:	Axiom Environmental, Inc	Grant Lewis; 919.215.1693 218 Snow Ave. Raleigh, NC 27603

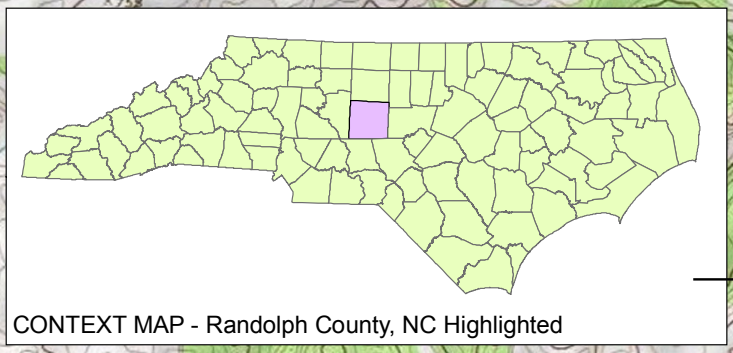
Table 4: Project Baseline Information & Attributes Table

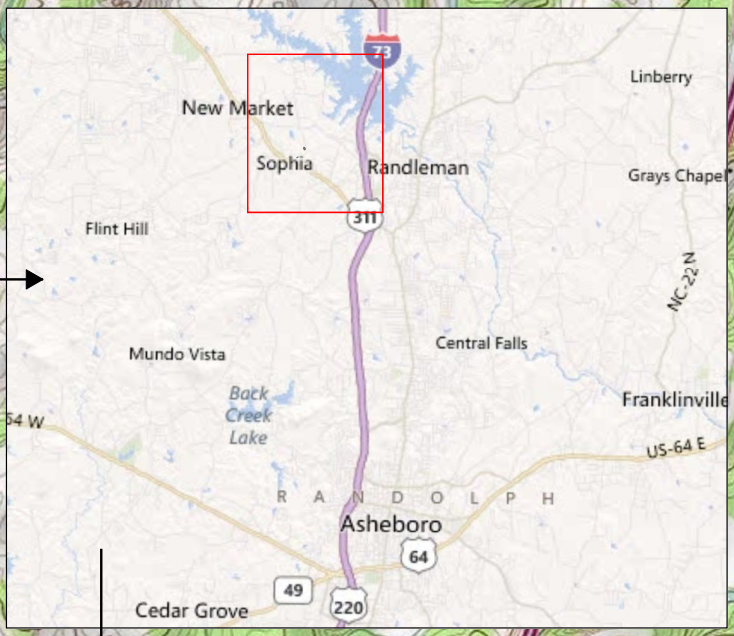
Wall Riparian Buffer Restoration Site, Randolph County, DMS Contract #: 003985

Project Information			
Project Name	Wall		
County	Randolph		
Project Area (acres)	12.6		
Project Coordinates (latitude and longitude)	35.4927319589, -79.5056974787 (NAD 83/WGS 84)		
Project Watershed Summary Information			
Physiographic Province		Northern Inner Piedmont section of Carolina Slate Belt	
River Basin		Cape Fear	
USGS Hydrologic Unit 8-digit	03030003	USGS Hydrologic Unit 14-digit	03030003010070
DWQ Sub-basin		03-06-08	
Project Drainage Area, Total Outfall (acres)		+/- 448	
Project Drainage Area Percentage of Impervious Area		< 5%	
CGIA Land Use Classification		Cropland and Pasture	

Reach Summary Information			
Parameters	**UT 1 & UT 2**	**UT 3 & UT 4**	**UT 5**
Length of reach (linear feet)	2,030	850	400
Valley classification	VIII	VIII	VIII
Drainage area (acres)	+/- 448		
NCDWQ stream identification score	UT 1 – 30.5 UT 2 – 35.25	UT 3 & UT 4 (above pond) – 11	UT 5 – 22
NCDWQ Water Quality Classification	Portion of Deep River where unnamed tributaries enter ((Randleman Lake): WS-IV; CA		
Morphological description (stream type)	Perennial	Intermittent / Ephemeral	Intermittent
Drainage class	Rural	Rural	Rural
303d listed?	No	No	No
Upstream of a 303d listed	Yes	Yes	Yes
Dominant Soil Series	Georgeville silty clay loam	Badin-Tarrus complex	Georgeville silty clay loam
Soil Hydric status	Non-Hydric	Non-Hydric	Non-Hydric
Slope	8-15 %	2-8 %	8-15 %
Native vegetation community	Piedmont/Low Mountain Alluvial Forest (Schafale and Weakley 1990)		
Percent exotic invasive vegetation	< 5%		

Regulatory Considerations			
Regulation	**Applicable?**	**Resolved?**	**Supporting Documentation**
Waters of the United States – Section 404	No		
Waters of the United States – Section 401	No		
Endangered Species Act	No		
Historic Preservation Act	No		
Coastal Zone Management Act [CZMA/Coastal Area Management Act (CAMA)]	No		
FEMA Floodplain Compliance	No		
Essential Fisheries Habitat	No		
Sediment & Erosion Control Plan (S&EC)	No		





From the City of Asheboro, NC:
- Travel North on I-73 for approximately 7.9 miles
- Exit onto US 311 toward High Point, NC
- Turn Left onto US 311 North/US 311 Extension
- Travel North on US 311 for approximately 2.5 miles
- Turn right onto Wall Brothers Road
- Travel approximately 0.5 mile to Site entrance gate located on the left side of the road.

Project Area

The subject project site is an environmental restoration site of the NCDENR Ecosystem Enhancement Program (EEP) and is encompassed by a recorded conservation easement, but is bordered by land under private ownership. Accessing the site may require traversing areas near or along the easement boundary and 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, oversight and stewardship of the restoration site is permitted within the terms and timeframes of their defined roles.Any intended site visitation or activity by any person outside of these previously sanctioned roles and activities requires prior coordination with EEP.

RESTORATION SYSTEMS, LLC
1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

This map and all data contained within are supplied as is with no warranty. Restoration Systems, LLC expressly disclaims responsibility for damages or liability from any claims that may arise out of the use or misuse from any claims that may arise out of the use or misuse of this map. It is the sole responsibility of the user to determine if the data on this map is compatible with the user's needs. This map was not created as survey data, nor should it be used as such. It is the user's responsibility to obtain proper survey data, prepared by a licensed surveyor, where required by law.

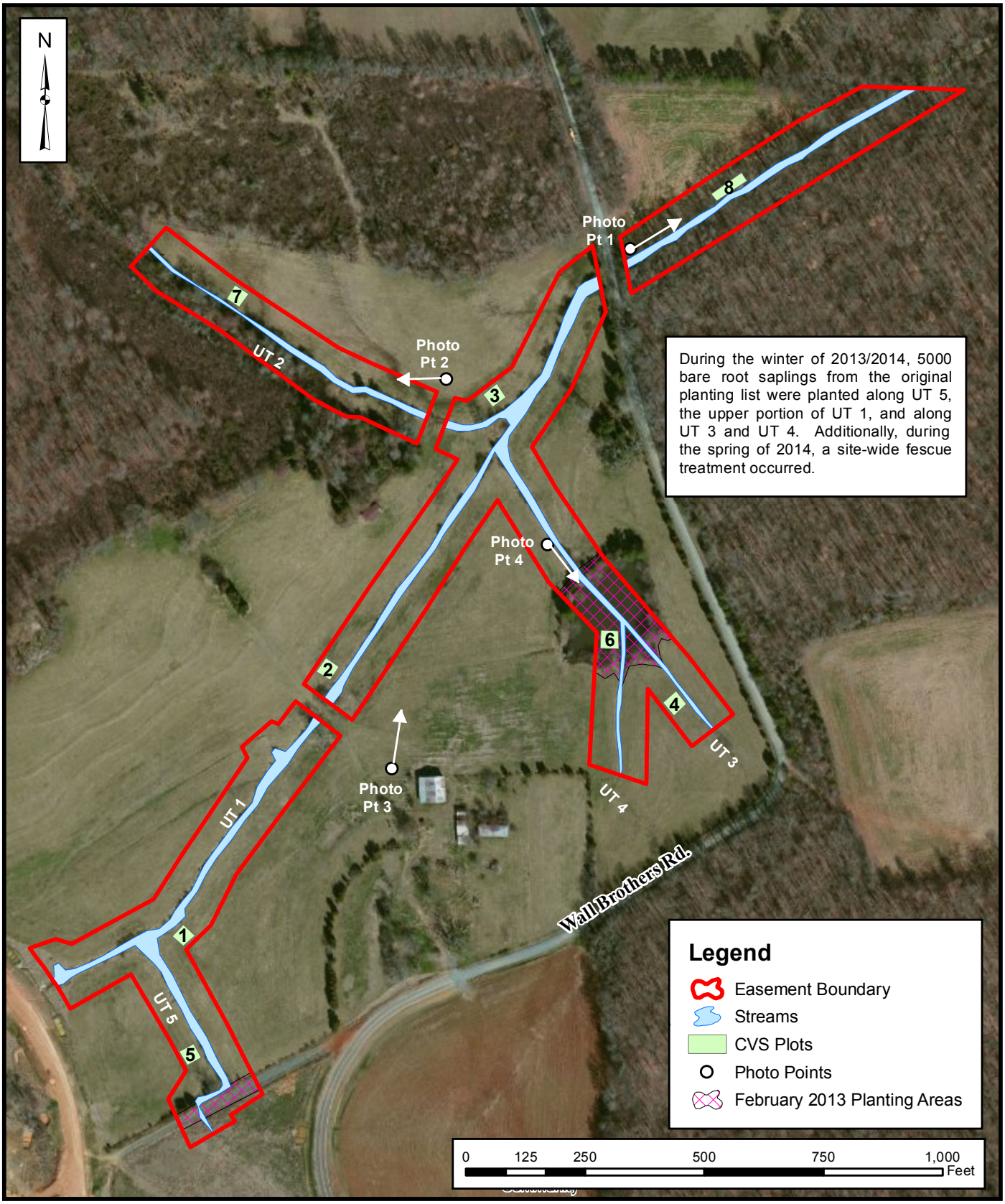
SCALE: 1 inch = 2,000 feet
DATE: June - 2012
PROJECT: Wall

FIGURE 1: SITE LOCATION MAP

Figure indicates where the Site's physical location is along with directions to the Site

Wall Riparian Buffer Mitigation Site
RFP # 16-003571 Contract # 003985
Randolph County, North Carolina

Aerial Imagery USGS Topographical Map
COORDINATE SYSTEM: NAD 1983 NC FEET



Axiom Environmental
218 Snow Ave
Raleigh, NC 27603

Axiom Environmental, Inc.

CURRENT CONDITIONS PLAN VIEW
WALL RIPARIAN BUFFER RESTORATION SITE
Randolph County, North Carolina

Dwn. by: WGL/KRJ
Date: Nov 2015
Project: 10-001

FIGURE
2

APPENDIX B: VEGETATION DATA

Table 5 - 2015 (Year 4) Planted Stem and Natural Recruit Totals by Plot
2015 (Year 4) Vegetation Monitoring Photographs
2015 (Year 4) Photo Point Photographs

Table 5. 2015 (Year 4) Planted Stem and Natural Recruit Totals by Plot
CVS Project Code Wall. Project Name: Wall Riparian Buffer Mitigation Site

			Current Plot Data (MY3 2014)																					
			Wall-RS-0001			Wall-RS-0002			Wall-RS-0003			Wall-RS-0004			Wall-01-0005			Wall-01-0006			Wall-01-0007			Wall-01-0008		
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
Acer floridanum	Southern Sugar Maple,	Tree																						1	1	1
Acer rubrum	red maple	Tree																					6			
Asimina triloba	pawpaw	Tree										3	3	3												
Betula nigra	river birch	Tree																		1						
Carpinus caroliniana	American hornbeam	Tree							1	1	2				1	1	1									
Carya ovata	shagbark hickory	Tree																						7	7	7
Cephalanthus occidentalis	common buttonbush	Shrub				7	7	8	1	1	1										9	9	9			
Cornus amomum	silky dogwood	Shrub													1	1	1									
Cornus florida	flowering dogwood	Tree																								
Diospyros virginiana	common persimmon	Tree	1	1	1			1																		
Fraxinus pennsylvanica	green ash	Tree	9	9	9	10	10	10	5	5	7	3	3	3	11	11	11	5	5	5	11	11	14	1	1	1
Liquidambar styraciflua	sweetgum	Tree																								35
Liriodendron tulipifera	tuliptree	Tree	1	1	1	1	1	7	6	6	10	2	2	3										1	1	3
Morus rubra	red mulberry	Tree																						1	1	1
Quercus	oak	Tree							1	1	4															
Quercus michauxii	swamp chestnut oak	Tree	1	1	1	5	5	5	7	7	7	7	7	7	1	1	1	6	6	6	3	3	3			
Quercus pagoda	cherrybark oak	Tree	6	6	6	5	5	5	2	2	2				3	3	3				2	2	2			
Salix nigra	black willow	Tree																		15						
Ulmus alata	winged elm	Tree																								
Ulmus americana	American elm	Tree	1	1	1													1	1	1	1	1	3			
		Stem count	19	19	19	28	28	36	23	23	33	15	15	16	17	17	17	12	12	28	26	26	37	11	11	48
		size (ares)	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		
		Species count	6	6	6	5	5	6	7	7	7	4	4	4	5	5	5	3	3	5	5	5	6	5	5	6
		Stems per ACRE	768.9	768.9	768.9	1133	1133	1457	930.8	930.8	1335	607	607	647.5	688	688	688	485.6	485.6	1133	1052	1052	1497	445.2	445.2	1942

Color for Density

Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

PnoLS = Planted excluding livestakes
P-all = Planting including livestakes
T = All planted and natural recruits including livestakes
T includes natural recruits

Table 5. 2015 (Year 4) Planted Stem and Natural Recruit Totals by Plot (continued)
CVS Project Code Wall. Project Name: Wall Riparian Buffer Mitigation Site

			Annual Means													
			MY4 (2015)			MY3 (2014)			MY2 (2013)			MY1 (2012)			MY0 (2012)		
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
Acer floridanum	Southern Sugar Maple,	Tree	1	1	1	1	1	1	2	2	2			1	1	1	1
Acer rubrum	red maple	Tree			6			6			7						
Asimina triloba	pawpaw	Tree	3	3	3				1	1	1	1	1	1	1	1	1
Betula nigra	river birch	Tree			1												
Carpinus caroliniana	American hornbeam	Tree	2	2	3	2	2	2	2	2	2	4	4	6	7	7	7
Carya ovata	shagbark hickory	Tree	7	7	7	6	6	14	9	9	9						
Cephalanthus occidentalis	common buttonbush	Shrub	17	17	18	16	16	16	9	9	9						
Cornus amomum	silky dogwood	Shrub	1	1	1	1	1	1	2	2	2						
Cornus florida	flowering dogwood	Tree							9	9	9	14	14	20	24	24	24
Diospyros virginiana	common persimmon	Tree	1	1	2	4	4	4									
Fraxinus pennsylvanica	green ash	Tree	55	55	60	56	56	56	21	21	21	2	2	2	3	3	3
Liquidambar styraciflua	sweetgum	Tree			35			35			15						
Liriodendron tulipifera	tuliptree	Tree	11	11	24	12	12	37	8	8	8	10	10	10	10	10	10
Morus rubra	red mulberry	Tree	1	1	1	1	1	1	1	1	1						
Quercus	oak	Tree	1	1	4	3	3	3	5	5	5						
Quercus michauxii	swamp chestnut oak	Tree	30	30	30	31	31	31	15	15	15	8	8	8	8	8	8
Quercus pagoda	cherrybark oak	Tree	18	18	18	16	16	16	8	8	8	6	6	7	8	8	8
Salix nigra	black willow	Tree			15			29			9						
Ulmus alata	winged elm	Tree							1	1	1						
Ulmus americana	American elm	Tree	3	3	5	3	3	5	3	3	3	2	2	3	4	4	4
		Stem count	151	151	234	152	152	257	96	96	127	47	47	58	66	66	66
		size (ares)	8			8			8			4			4		
		size (ACRES)	0.20			0.20			0.20			0.10			0.10		
		Species count	14	14	18	13	13	16	15	15	18	8	8	9	9	9	9
		Stems per ACRE	763.8	763.8	1184	768.9	768.9	1300	485.6	485.6	642.4	475.5	475.5	586.8	667.7	667.7	667.7

Color for Density

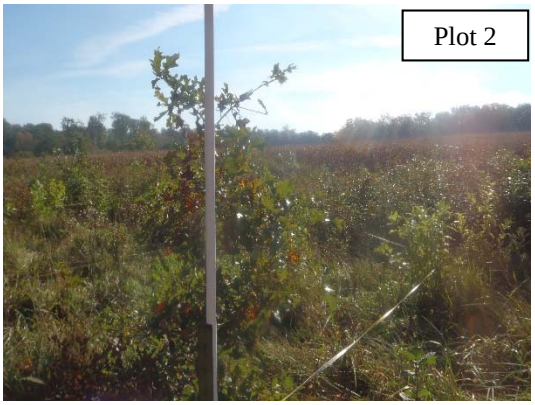
Exceeds requirements by 10%
Exceeds requirements, but by less than 10%
Fails to meet requirements, by less than 10%
Fails to meet requirements by more than 10%

PnoLS = Planted excluding livestakes
P-all = Planting including livestakes
T = All planted and natural recruits including livestakes
T includes natural recruits

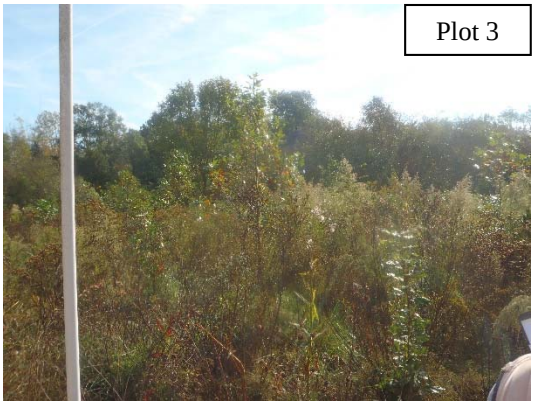
Wall Buffer
2015 (Year 4) Vegetation Monitoring Photographs
Taken October 2015

Plot 1

Plot 2



Plot 3



Plot 4

Plot 5

Plot 6

Plot 7

Plot 8

Wall Buffer
2015 (Year 4) Photo Point Photographs
Taken October 2015

APPENDIX C: AGENCY CORRESPONDENCE

May 15, 2012

Ms. Kristie Corson
DENR-Ecosystem Enhancement Program
1652 Mail Service Center
Raleigh, North Carolina
27699-1652

Subject: Task IV Construction, Contact #: 003997

Dear Ms. Corson:

I wanted to provide you with an update regarding the status of construction and planting at the Wall Riparian Buffer Mitigation Project in Randolph County. Due to the late closing date on the property (April 11th), we opted to plant the site in March and then due the construction following closing. On March 22nd, Carolina Silvics planted the entire site except for two small areas totaling 0.8 acres. During the week of April 23rd, Axiom Green Build worked in these two areas to remove a) short section of gravel road along with a concrete culvert and b) a small earthen dam. Attached is a figure showing both the area planted and the area of construction.

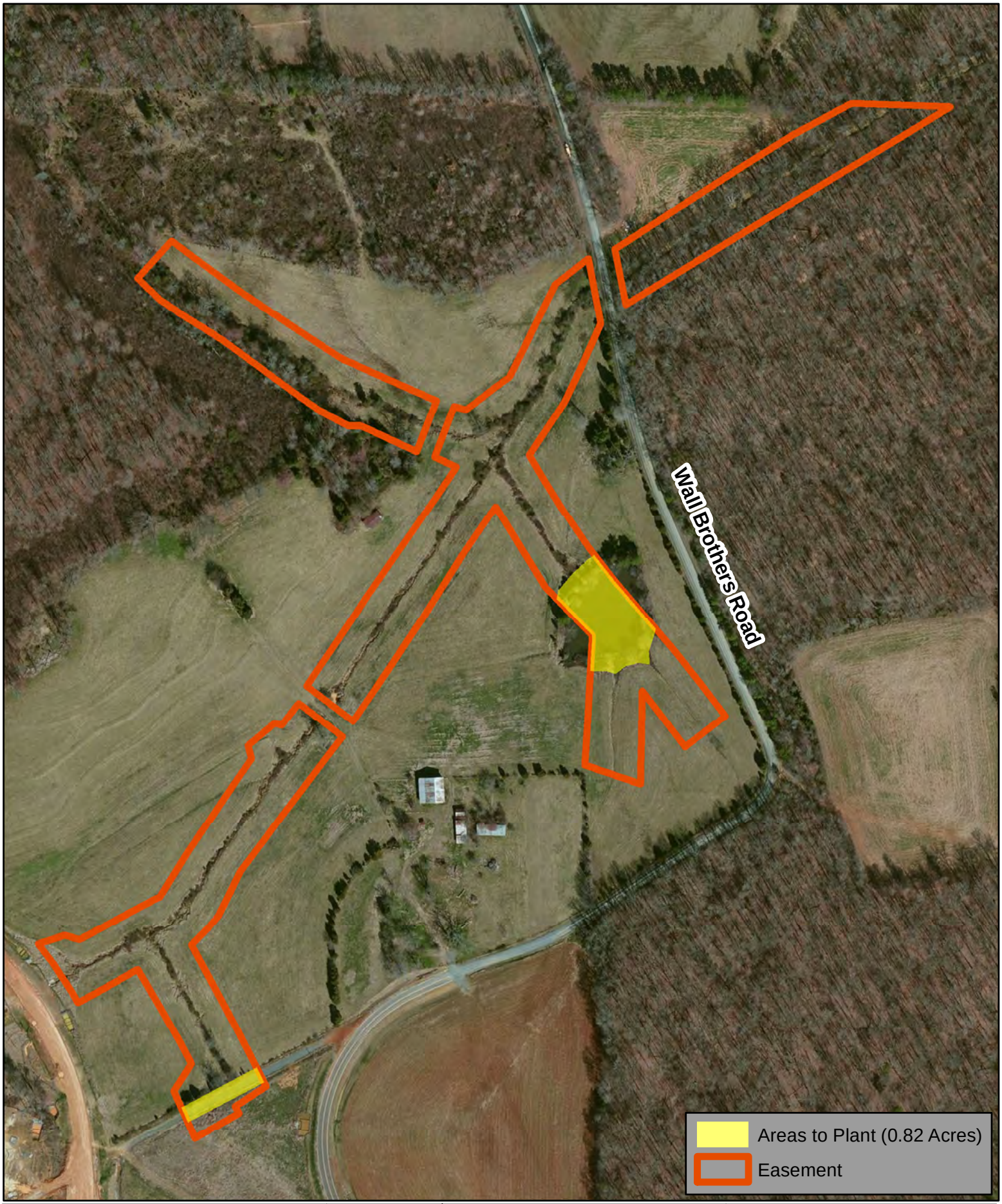
As a result of doing the construction after the planting season had passed, the two areas totaling 0.8 acres still need to be planted. I had hoped to do this immediately following construction but due to the unseasonably warm weather it simply would not be successful. If agreeable to you, I would like to use this year's growing season for the first year of monitoring with the stipulation that during the winter of 2012/2013 we will plant the 0.8 acre area with 1-gallon containerized trees (as opposed to bare root seedlings).

Removal of the road and dam were successful and we are waiting for the bottom of the impoundment to dry out a bit more before
Please feel free to contact at me 919.334.9112 if you have any questions.

Sincerely,

Travis Hamrick, Project Manager

Attachments (3): Invoice Task IV
Figure- Planting Needs
Project History



Restoration Systems, LLC
1101 Haynes St. Suite 211
Raleigh, NC 27604
tel: 919.755.9490

Figure 1:
Construction Status

Wall Buffer Restoration Project
Randolph County, NC

1:3,188

N

0 50 100 200 300 400
Feet

Raymond Holz

From: Raymond Holz
Sent: Monday, October 22, 2012 6:13 PM
To: Kristie.Corson@ncdenr.gov
Cc: Travis Hamrick (travis@restorationsystems.com)
Subject: Wall Riparian Buffer Mitigation Site: Additional Vegetation Monitoring Plots
Attachments: Additional Monitoring Plots at Wall.pdf

Afternoon Kristie,

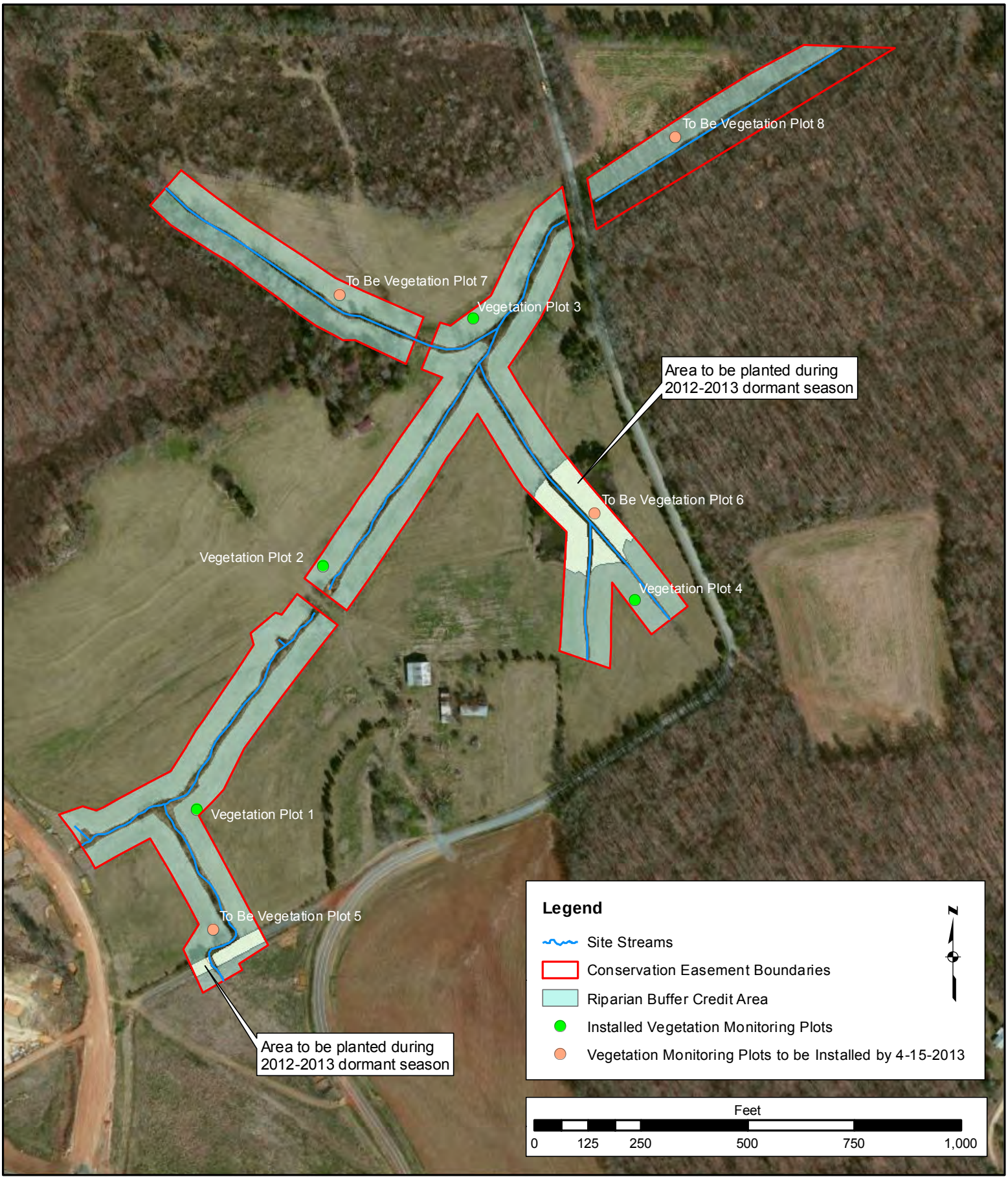
After receiving and reviewing the comments you provided regarding the Wall Riparian Buffer Mitigation Site's Draft Baseline Monitoring Document and As Built Baseline Report dated October 16, 2012 Restoration Systems (RS) is prepared to install an additional four (4) vegetation monitoring plots as requested. CVS protocol stipulates that baseline vegetation data be collected within 30 days of the project being planted. Additionally, 60 day must pass between vegetation baseline data collection and EEP as-built review. With this in mind and with an EEP on-site as built review already conducted (September 20, 2012), RS recommends the additional four monitoring plots be installed no later than April 1st of 2013.

Restoration Systems is recommending this timeline because an additional .80 acres of the Site must be planted during the 2012 – 2013 dormant season. It is planned that one of the four additional monitoring plots will be located in the soon to be planted area. Baseline vegetation data will be conducted simultaneously with the installation of the additional plots and will be included within the 2013, year 2, annual monitoring report. RS understands the addition of these monitoring plots will not prolong the vegetation monitoring of the Site, so long as all current and additional monitoring plots achieve the success criteria outlined in the Mitigation Plan. Installation of the additional monitoring plots will follow CVS protocol and will measure 10 by 10 meters. Please see the attached figure depicting the approximate location of these additional monitoring plots, as well as the areas to be planted during the 2012 – 2013 dormant season.

Thank you for your time, please contact me at 919.604.9314 if you have any questions.

Sincerely,

Raymond Holz



RESTORATION SYSTEMS, LLC
1101 HAYNES ST, SUITE 211
RALEIGH, NC 27604
PHONE : 919.755.9490
FAX : 919.755.9492

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SCALE: 1 inch = 292 feet

DATE: October - 2012

PROJECT: Wall

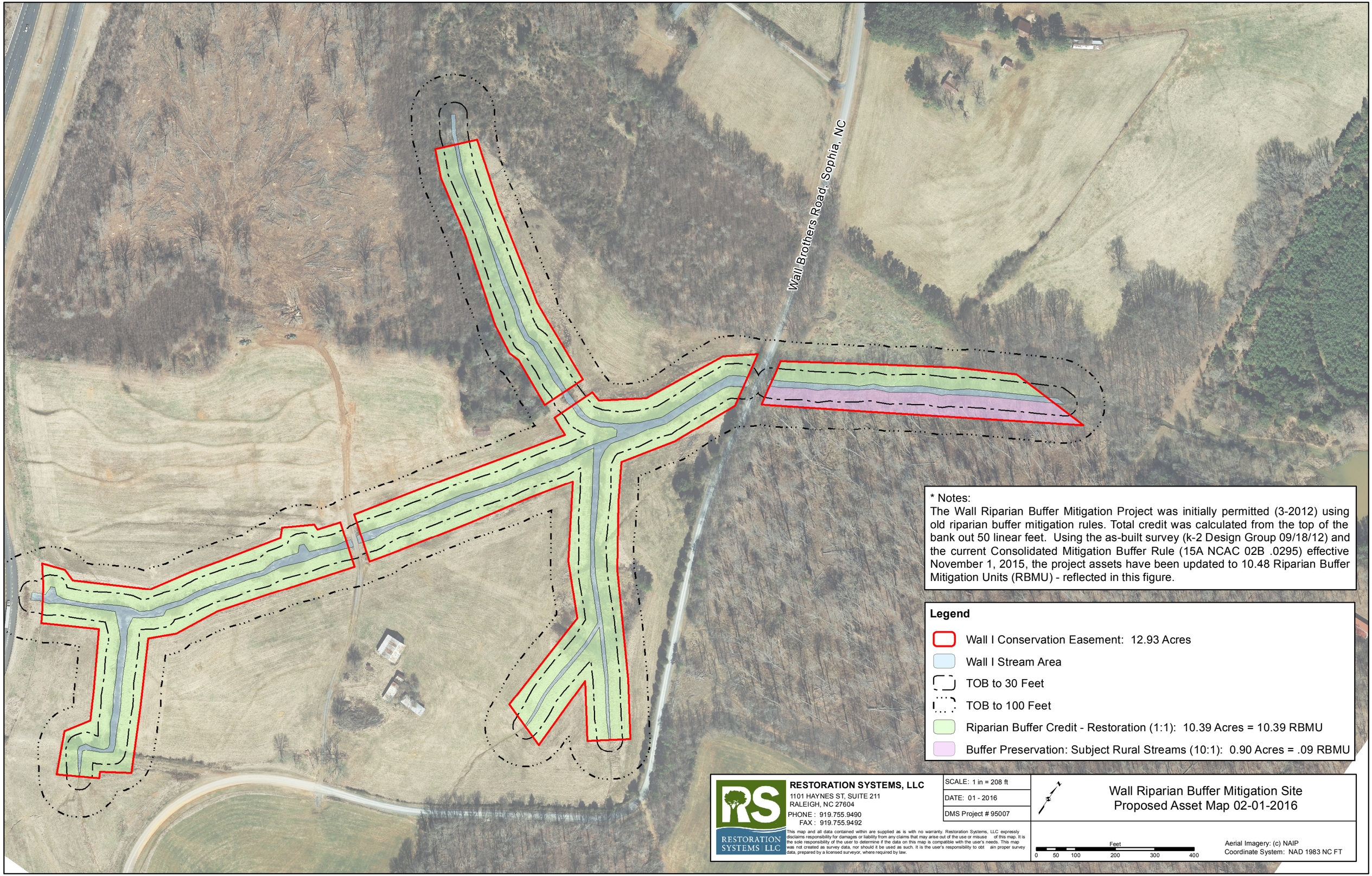
Location of Additional Vegetation Monitoring Plots

Figure indicates where the physical location of all monitoring devices.

Wall Riparian Buffer Mitigation Site
RFP # 16-003571 Contract # 003985
Randolph County, North Carolina

Aerial Imagery USGS Topographical Map
COORDINATE SYSTEM: NAD 1983 NC FEET

APPENDIX D: REVISED CREDIT / ASSET MAP



* Notes:
The Wall Riparian Buffer Mitigation Project was initially permitted (3-2012) using old riparian buffer mitigation rules. Total credit was calculated from the top of the bank out 50 linear feet. Using the as-built survey (k-2 Design Group 09/18/12) and the current Consolidated Mitigation Buffer Rule (15A NCAC 02B .0295) effective November 1, 2015, the project assets have been updated to 10.48 Riparian Buffer Mitigation Units (RBMU) - reflected in this figure.

Legend

- Wall I Conservation Easement: 12.93 Acres
- Wall I Stream Area
- TOB to 30 Feet
- TOB to 100 Feet
- Riparian Buffer Credit - Restoration (1:1): 10.39 Acres = 10.39 RBMU
- Buffer Preservation: Subject Rural Streams (10:1): 0.90 Acres = .09 RBMU

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SCALE: 1 in = 208 ft
DATE: 01 - 2016
DMS Project # 95007

Wall Riparian Buffer Mitigation Site
Proposed Asset Map 02-01-2016

Feet
0 50 100 200 300 400

Aerial Imagery: (c) NAIP
Coordinate System: NAD 1983 NC FT