MY03 Monitoring Report

Longhorn Riparian Buffer Mitigation Site

Randolph County, NC

DMS Project No. 100114

DMS Contract Number: 7866

DWR Project Number: 2019-0681

Randleman Lake Watershed

Cape Fear River Basin

HUC 03030003

RFP #16-007703

Prepared For:

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

November 2022

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PREPARED BY:

Clearwater Mitigation Solutions

CLEARWATER MITIGATION SOLUTIONS

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November 2022

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1.0 Mitigation Project Summary

The Longhorn Riparian Buffer Restoration Project ("the Site") is a buffer restoration project located in Randolph County, approximately 1.5 miles northwest of the Town of Sophia, North Carolina and approximately 9 miles south of High Point (NC). The property is situated just east of NC Highway 311 and is bounded to the south by Marlboro Church Road (refer to Figure 1). The Longhorn Buffer Mitigation Site is located within the Muddy Creek 12-digit HUC (030300030106) of the Randleman Lake watershed (Figure 2). The buffer restoration and enhancement areas are located along an unnamed tributary (UT) of Bob Branch and drainages that flow directly into Randleman Lake Reservoir approximately 2 river miles downstream (refer to Figure 3 and Figure 4). Prior to project completion, the Site was surrounded by areas managed for cattle production and lacked existing forested buffer along a majority of the streams and pond dissecting the site. The Site is expected to generate 376,644.994 riparian buffer credits (BMU).

The Site is located within Hydologic Unit Code (HUC) 03030003010060 and North Carolina Department of Water Resources (NC DWR) Sub-Basin 03-04-07. The buffer mitigation site consists of one stream reach (A1) and an in-line pond (P1) as illustrated in Figure 8. Reach A1 is a perennial stream that flows from the in-line pond (P1) to the north and into Bob Branch approximately 1,300 lf downstream. Bob Branch has a NC DEQ surface water classification as a WS-IV* waterbody.

1.1 Project Goals

The main goals of the project are to provide high quality compensatory mitigation for authorized riparian buffer impacts credited through the NC DMS in-lieu-fee program and occurring within the Randleman Lake Watershed by creating a riparian corridor and restoring the historic riparian buffer. The project addresses the watershed goals identified in the Cape Fear River Basin Restoration Plan (RBRP) (NC EEP, 2010). These goals include:

- Removal of non-point source pollution (including nitrogen, phosphorous, and fecal bacteria) resulting from current land-use practices (principally cattle pasture);
- Reduction of sediment run-off/sediment loading to creek waters resulting from cattle hoof shear, bank instability, and lack of riparian buffer woody vegetation;
- Increased floodwater attenuation;
- Enhancement and protection of stream ecology and aquatic/semi-aquatic habitats; and
- Enhancement and protection of terrestrial habitats along stream terraces and hillside slopes.

These goals will be achieved via the restoration and protection of riparian buffers and adjacent riparian areas along an unnamed tributary of Bob Branch (which flows east into Randleman Lake Reservoir). Specific objectives of the proposed project to achieve the desired goals include:

- Conversion of existing cattle pasture into wooded riparian buffer and wooded riparian areas along the existing stream channel and pond via planting of characteristic hardwood species and installation of cattle-exclusion fencing;
- Reduction of stream bank instability via woody stem plantings (i.e. increased woody root material) and cattle exclusion fencing;

● Ensuring diffuse flow and increased surface roughness throughout the buffer mitigation area;
● Establishment of a conservation easement to protect the riparian buffer restoration site in perpetuity; and
● Invasive species management (as needed) during monitoring period.

Ancillary benefits of the proposed riparian buffer and adjacent riparian area restoration effort include:

- Increase of organic material as food for invertebrate, fish and wildlife;
- Supply of woody debris that provides increased niche habitat for fish, invertebrates and amphibians;
- Reduction of sunlight reaching the stream and modulation of surface water temperatures; and
- Floodwater attenuation via temporary storage, interception and slow releases from heavy rains.

1.2 Pre-construction Site Conditions

The project includes 20.81 acres of mostly open cattle pasture with one stream reach (A1) and an in-line pond (P1) which drains to Bob Branch. An additional 0.89-acres was added to the project area to include the pond dam within the conservation easement and will be reflected in an amendment to the Conservation Easement Plat. The Site has historically been managed for agricultural and cattle production. Site drainage and hydrology have been historically altered via the impoundment of waters. Based upon a review of available aerial photography, the tributary was impounded in the early 1970s (between 1970 and 1973). A portion of the site was in cropland as early as 1948. The remaining land was cleared and converted to agricultural production in the 1950s.

The buffer mitigation site consists of one stream reach (A1) and an in-line pond (P1) as illustrated in Figure 8. Reach A1 is a perennial stream that flows from the in-line pond (P1) to the north and into Bob Branch. There is approximately 625 lf of stream associated with Reach A1 within the proposed buffer easement area. Pond (P1) is an in-line pond that is approximately 5.3-acres and lies entirely within the proposed conservation easement area.

The stream reach (A1) and an in-line pond (P1) have been restored as a forested riparian buffer to 200-ft (approximately 12.73 acres) while approximately 0.40 acres of partially forested areas are considered suitable for buffer enhancement. An additional 0.21 acres of existing, wooded riparian area will be enhanced as cattle exclusion fencing will be installed around the conservation easement boundary. As indicated above, an amendment to the Conservation Easement Plat to include the pond dam will be provided to NCDMS and NCDWR following recordation. The project attributes are listed in Table 1, located in Appendix A.

2.0 Determination of Credits

On June 19th, 2019, Ms. Katie Merritt of the Division of Water Resources (DWR) performed an evaluation of surface water features and adjacent riparian areas within the proposed mitigation site for the determination of riparian buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015). Based upon this evaluation, DWR determined that areas within 200 ft of Reach A-1 and Pond P-1

are eligible for buffer credit. Inclusive of this area are approximately 12.73 acres of non-forested restoration site per 15A NCAC 02B 0.0295 (n). In addition, 0.40 acres of partially forested areas are considered suitable for buffer enhancement per 15A NCAC 02B 0.0295 (n) (i.e. areas classified such that the establishment of woody stems (i.e., tree or shrub species) will maximize nutrient removal and other buffer functions).

In addition to buffer restoration and enhancement on subject streams, per the Consolidated Buffer Mitigation Rules (15 A NCAC 02B 0.0295 (o)), alternative mitigation is proposed on the site in the form of: 1) enhancement of grazing areas adjacent to streams. The project is in compliance with these rules as it meets the following criteria:

Enhancement of Grazing Areas Adjacent to Streams (15A NCAC 02B 0.0295 (o)(6)):

Buffer credit at a 2:1 ratio shall be available for an applicant or mitigation provider who proposes permanent exclusion of grazing livestock that otherwise degrade the stream and riparian zone through trampling, grazing, or waste deposition by fencing the livestock out of the stream and its adjacent buffer.

An additional 0.21 acres of existing, wooded riparian area will be enhanced as cattle exclusion fencing will be installed around the conservation easement boundary.

There are no known site constraints that would impede or adversely affect the restoration, enhancement, and preservation of riparian buffer within the recorded easement area. Diffuse flow of runoff will be maintained in the riparian buffer.

Mitigation credits are presented in Table 2 and Figure 8 in Appendix A and are based upon the conservation easement survey.

3.0 Baseline Summary

The project team restored high quality riparian buffers along all unnamed tributaries and an in-line pond within the Site. The project design ensured that no adverse impacts to wetlands of existing riparian buffers occurred during implementation. Refer to Figure 8 for the conceptual design of the project. Details of the restoration activity that occurred follows in the sections below.

3.1 Planting Preparation

Based upon pre-project assessment of compaction within the proposed planting areas, all areas targeted for vegetative plantings within the buffer restoration project were ripped to reduce compaction and to enhance microtopography. Spot spraying of herbicide was initiated for control of invasive species within the restoration, enhancement and preservation areas (i.e. Chinese privet (*Ligustrum sinense)*, Multiflora rose (*Rosa multiflora*, Japanese honeysuckle (*Lonicera japonica*), and Chinese tree-of-heaven (Ailanthus altissima)). Treatment areas are depicted on Figure 9. The existing 84-ft pond spillway was stabilized prior to planting. The spillway was widened to approximately 10-feet and tapered down to 6-feet. The side slopes were lined with coir fiber matting, and the bottom of the spillway lined with rip-rap. Appropriate

erosion control measures were implemented before, during, and after the spillway maintenance to prevent sediment loss into downstream waters. No other site preparation occurred. No observed drain tiles were observed prior to, or during, construction and planting and no other land disturbance was needed to maintain diffuse flow as required.

3.2 Riparian Area Restoration and Enhancement Activities

The conservation easement boundary was marked using 6-inch diameter treated post buried 2 feet, standing 5 feet above the ground surface, within the pasture. Woven wire fencing with a top strand of barbed wire was installed along the entire easement boundary. One pedestrian access gate was installed for future monitoring and access. Three 12-ft wide gates were installed in appropriate locations to allow cattle to exit in case they were to breach the fence and enter the conservation easement. The easement boundary was marked with standard yellow Conservation Area signs, per the 01/23/14 NCDMS Boundary Marking Standards.

The planting plan consisted of the planting at least four hardwood species on a density of approximately 538 stems per acre. Species selection and distribution were matched closely to micro-site hydrologic and edaphic conditions and include species characteristic of riparian assemblages in the watershed. In other words, species more tolerant of poorly drained soils (i.e. river birch, green ash, and willow oak) were planted within lower landscape positions generally consisting of the Chewacla and Wedhakee soil series while species characteristically occurring in better drained soils (Wynott-Enon complex) will be planted in higher landscape positions (i.e. hillside slopes). The selected native trees are well-suited to the site-specific conditions of the property to promote high survivorship rates. No one tree species planted was greater than 50% of the established stems. Site planting was conducted on April 1st, 2020 by Carolina Silvics, Inc. and supervised by project managers from both Clearwater Mitigation Solutions and Land Management Group.

Table 3 summarizes the planting plan for the Longhorn mitigation site.

Table 3. Planting Plan[1]

Common Name	Scientific Name	% Composition	Acreage	Quantity
American Sycamore	*Plantanus occidentalis*	30	3.94	2,119
Yellow Poplar	*Liriodendron tulipifera*	25	3.28	1,766
River Birch	*Betula nigra*	25	3.28	1,766
Willow Oak	*Quercus phellos*	15	1.97	1,060
Green Ash	*Fraxinus pennsylvanica*	5	0.66	353
Total	**N/A**	**100**	**13.13**	**7,064**

[1]Note the planted area includes approximate 0.74 acres of conservation area. While no credit is proposed for this area, it was planted per the same specifications (species density and composition) as those contained within final, approved mitigation plan.

4.0 Annual Monitoring

Annual Monitoring will be conducted during the growing season for a period of five years. The report will include all information required by DMS monitoring guidelines including photographs, plot locations, and documentation of existing species density and composition. Monitoring will be performed in accordance with the Consolidated Mitigation Buffer Rule (15A NCAC 02B .0295) and current DMS standards. The performance criteria for the Site follows approved performance criteria presented in the guidance documents outlined in the Consolidated Buffer Rule (15A NCAC 02B .0295). Performance criteria will be evaluated throughout the five-year post-construction monitoring.

4.1 Methods

The final vegetative success criteria will be the survival of 260 planted stems per acre in the riparian buffer at the end of the required monitoring period (MY05). Native hardwood and native shrub volunteer species may be included to meet the final performance standard of 260 stems per acre. In addition, the Site must contain at least four native hardwood species. Vegetative monitoring included the establishment of eleven (11) permanent plots consistent with the Carolina Vegetation Survey (CVS) protocol Level 2 (version 4.2) (refer to Figure 9 for plot locations). Reference photos of the vegetation plots and Site were taken at each predetermined photo point location. Any vegetative problem areas in the site will be noted and reported in each monitoring report. Vegetative problem areas may include areas that either lack vegetation or include populations of exotic vegetation. Monitoring reports will identify any contingency measures that may need to be employed to remedy site deficiencies.

Permanent photo stations were established across the project area in order to document site stability for five years post construction. Markers were established and located with GPS equipment so that the same locations and view directions on the Site are photographed each year. Photo reference stations are shown on Figure 9 and photos are included in Appendix B.

Visual assessments will be performed annually during the five-year monitoring period. Problem areas of vegetative health will be noted and areas of concern will be mapped, photographed, and documented in the subsequent annual monitoring report. Problem areas that are found will be re-evaluated in each subsequent monitoring event.

4.2 Tables

(MY3) vegetation plot photographs and the planted and total stem counts (Table 4) are included in Appendix B.

4.3 Results and Discussion

Annual monitoring (MY03) was conducted on October 19, 2022 by DRG staff. An average stem density of 485 planted stems per acre was tallied across the site (approximately 72% of the recorded baseline (MY0) density (673 stems per acre)). Stem densities within individual monitoring plots range from 121 to 1,093

planted stems per acre. Stem counts within individual plots range from 3 to 27 stems with an average of 12 planted stems per plot. Six different hardwood species were observed across the site, exceeding the minimum diversity criteria. All but one vegetation plot (Plot 2) are on track to meet the final stem density success criterion of 260 stems/acre for MY05. Plot 2 experienced high seedling mortality during MY01. Plot 2 seedling mortality was likely caused by inundation and flooding of the plot. Based upon review of the area during MY01, it appeared that an increase in surface water had filled the western and side channel following construction of the new pond outlet due to a shift and rehabilitation of the dam outlet structure. Many dead trees were observed buried in alluvial deposits during MY01. During MY02, additional seedling mortality was observed due to inundation in the same location. During MY02, a supplemental plot was established just to the south of Plot 2 (Plot 2A). Ten (10) planted stems were enumerated within Plot 2A during MY02 and MY03 and all exhibited excellent vigor. In addition, the remainder of the enhancement area was walked, and numerous planted stems were observed. Based on the enumerated stems in Plot 2A during MY03 and observed stems within the remainder of the enhancement zone, it is anticipated that Plot 2 is the only area within the enhancement zone experiencing high mortality due to inundation and alluvial deposition.

Plot 5 mortality during MY01 was likely caused by dry conditions post-planting and the subsequent overtopping by dense grasses. During MY01 and MY02, the area around Plot 5 appeared to have been affected by dry conditions and exhibited higher mortality. Supplemental planting was implemented within this area in the Winter of 2022 (January – February). The supplemental planting area equated to approximately 0.75-acres. Additional planted stems were observed during MY03 and all exhibited excellent vigor. The remainder of the area around Plot 5 was walked, and numerous planted stems were observed.

It should be noted that during MY01, Plots 7, 9, and 10 all exhibited relatively higher stem mortality and lower vigor. It is believed that these areas experienced mortality due to dry conditions following site planting and competition from fescue grass. Although these three plots were exceeding the final stem success criteria during MY01, supplemental planting was proposed to occur in these areas in the Winter of 2021 (January – February). However, a selective, broad spectrum, postemergence herbicide (Poast) was used for control of fescue grass and mortality has ceased in these areas. Most of the stem mortality occurred between MY0 and MY01. During MY03 these areas are on track to meet the final stem density success criteria. Refer to Figure 9 (Current Condition Plan View) and Table 4 in Appendix B for additional information.

Small areas of invasive species were treated on the Site in MY03 (i.e. small areas over approximately 1.6-acres). Chinese privet (*Ligustrum sinense*) and multiflora rose (*Rosa multiflora*) have been observed within the proposed buffer enhancement and preservation areas and along the eastern bank of Stream A1. A small cluster of Japanese honeysuckle (Lonicera japonica) were also observed within the easement. These areas were treated prior to site planting and again concurrently during MY01 & MY02 & MY03. Treatment appears to be working and invasive densities are steadily declining across the Site. Though some invasive species are present throughout the Site, none are currently affecting the survival of the planted stems or the success of the project. Invasive species populations will continue to be monitored and spot herbicide

treatments will be conducted as needed during the appropriate time of year. Please refer to Appendix B for visual assessment data and for vegetation plot data and vegetation plot photographs.

4.4 Maintenance and Management

Overall, the Site appears to be progressing well towards the target success criteria. Supplemental planting during the Winter of 2022 appears to have successfully brought Plot 5 back into compliance with the MY05 success criteria of 260/planted stems per acre. The site will continue to be monitored for problem areas. In addition, invasive treatment areas will continue to be monitored, and invasive vegetation management will continue to be implemented if additional exotic species volunteer into the site. If it is determined that the Site's ability to achieve the performance standards are jeopardized, staff members of NCDMS/NCDWR will be notified, and an adaptive management plan will be developed to address these issues.

5.0 References

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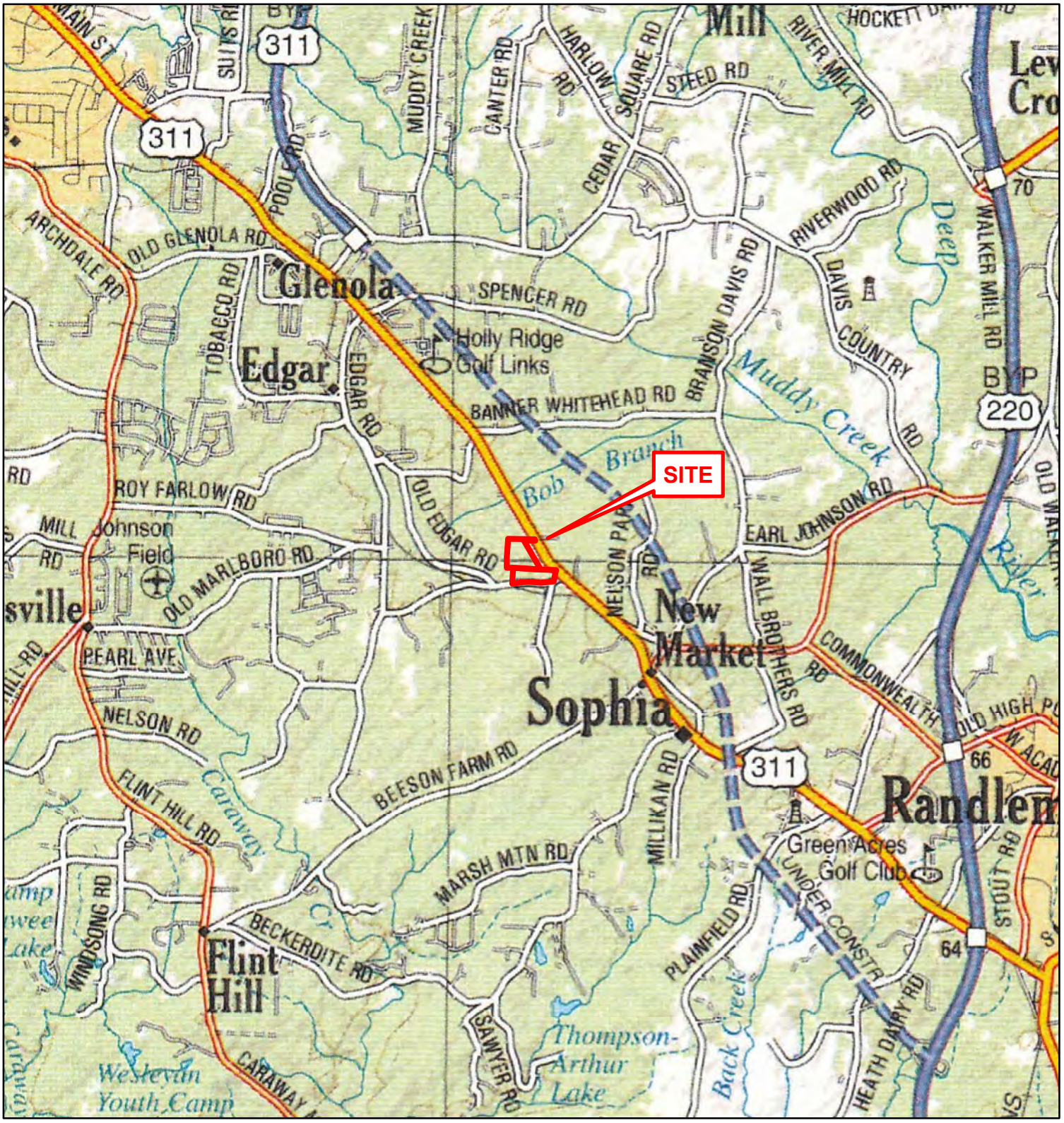
North Carolina Division of Water Quality (NCDWQ), 2011. Surface Water Classifications. http://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications

APPENDIX A:

Figures/Tables



Boundaries are approximate and not meant to be absolute.

Map Source: DeLorme 2012 Atlas & Gazeteer

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Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 01-07-19
LMG # 40-18-457

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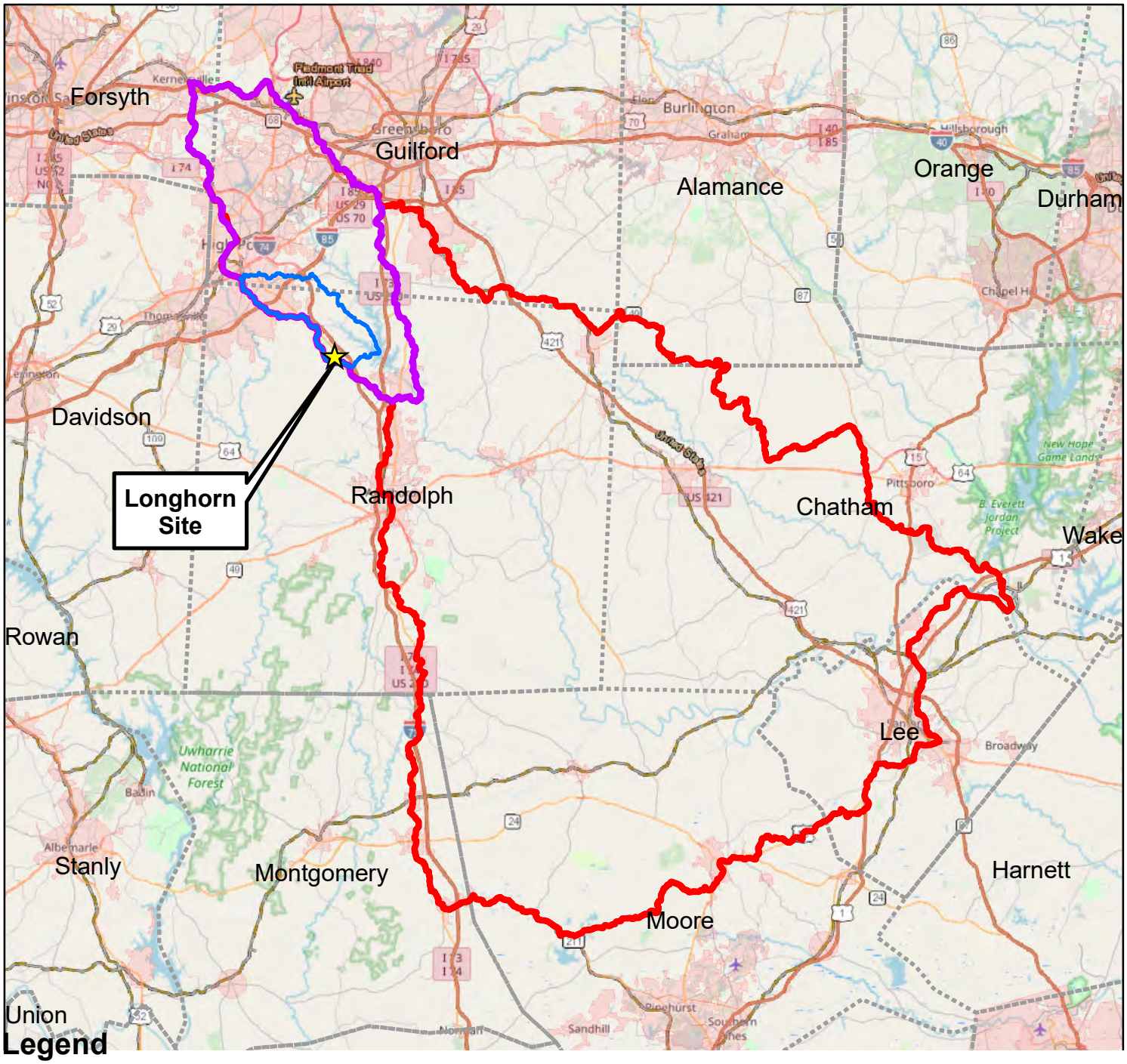
Figure 1
Vicinity Map



Legend

- Longhorn Project Boundary
- Muddy Creek Watershed (030300030106)
- Randleman Lake Watershed
- 8-Digit Hydrologic Unit (03030003)

N

0 2.5 5 10 15 20 Miles

Boundaries are approximate and not meant to be absolute.
Map Source: ArcGIS Open Street Map
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Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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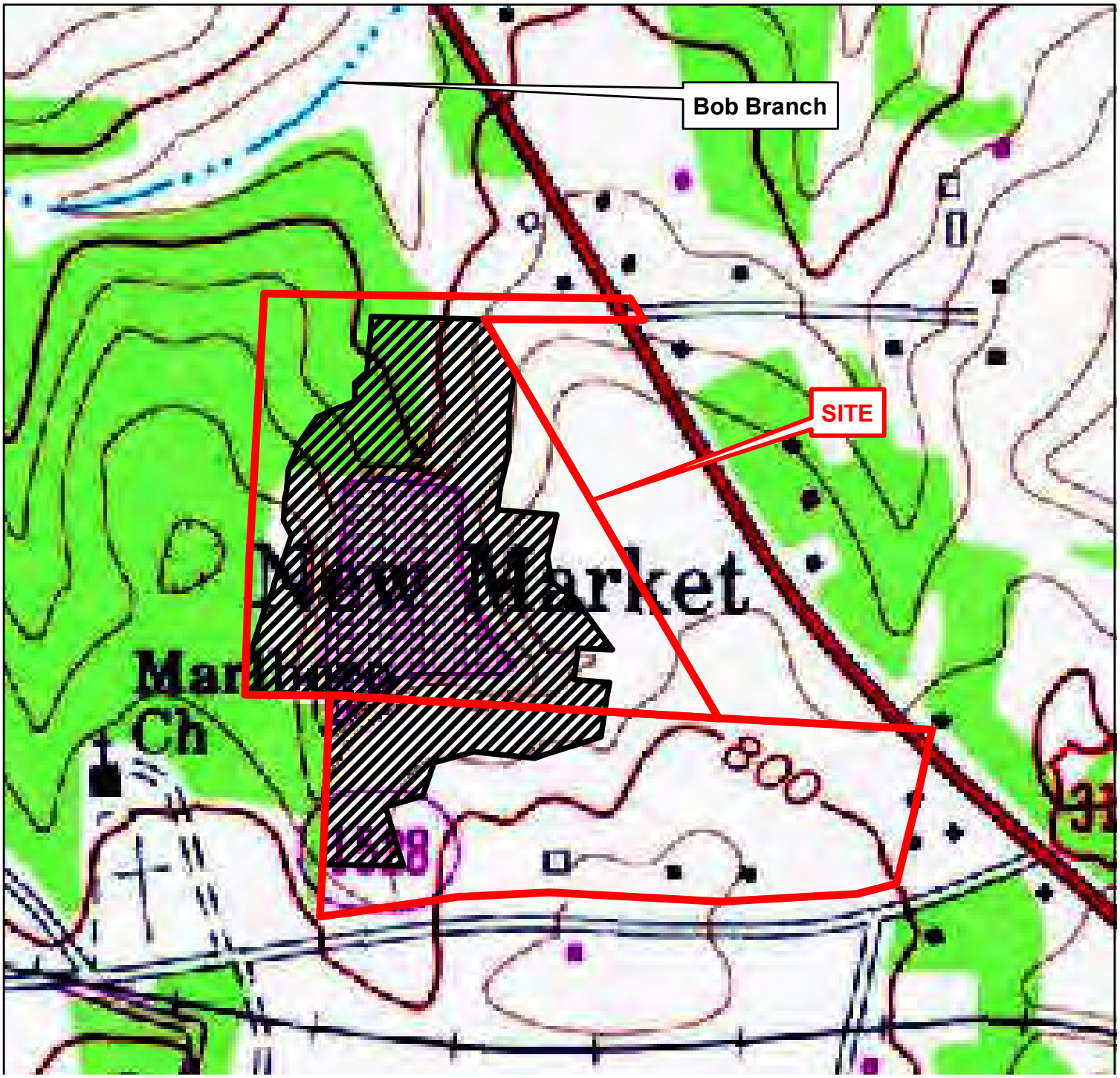
Figure 2
Watershed Map



Legend

Parcel Boundary: ~45.18 Acres

Longhorn Conservation Easement: ~20.81 Acres

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Boundaries are approximate and not meant to be absolute.

Map Source: USGS Glenola Quadrangle 7.5 Minute

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Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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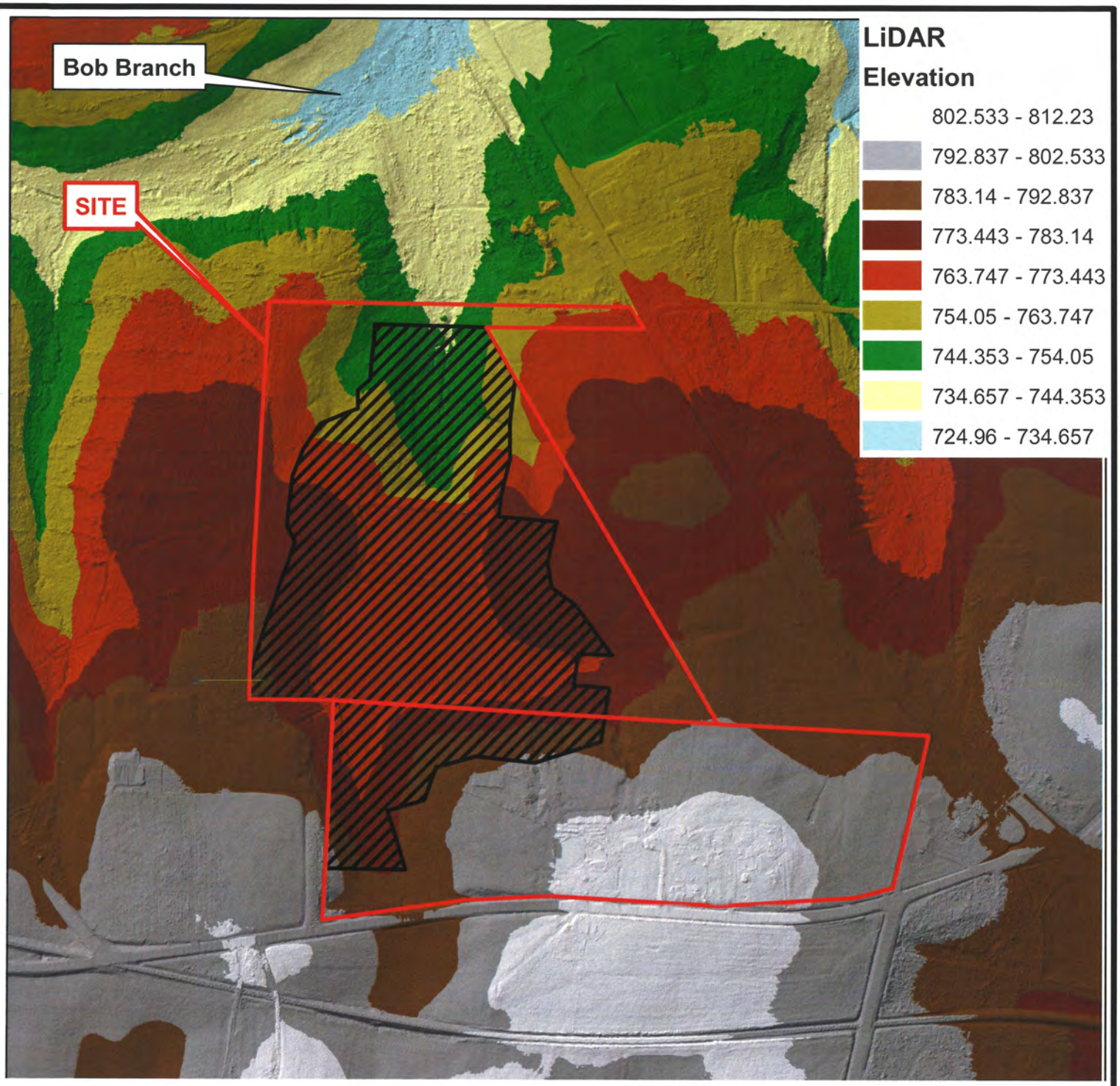
Figure 3
Topographic Map



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Boundaries are approximate and not meant to be absolute.

Map Source: NC Floodplain Mapping Program 2014 QL2 LiDAR Data

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Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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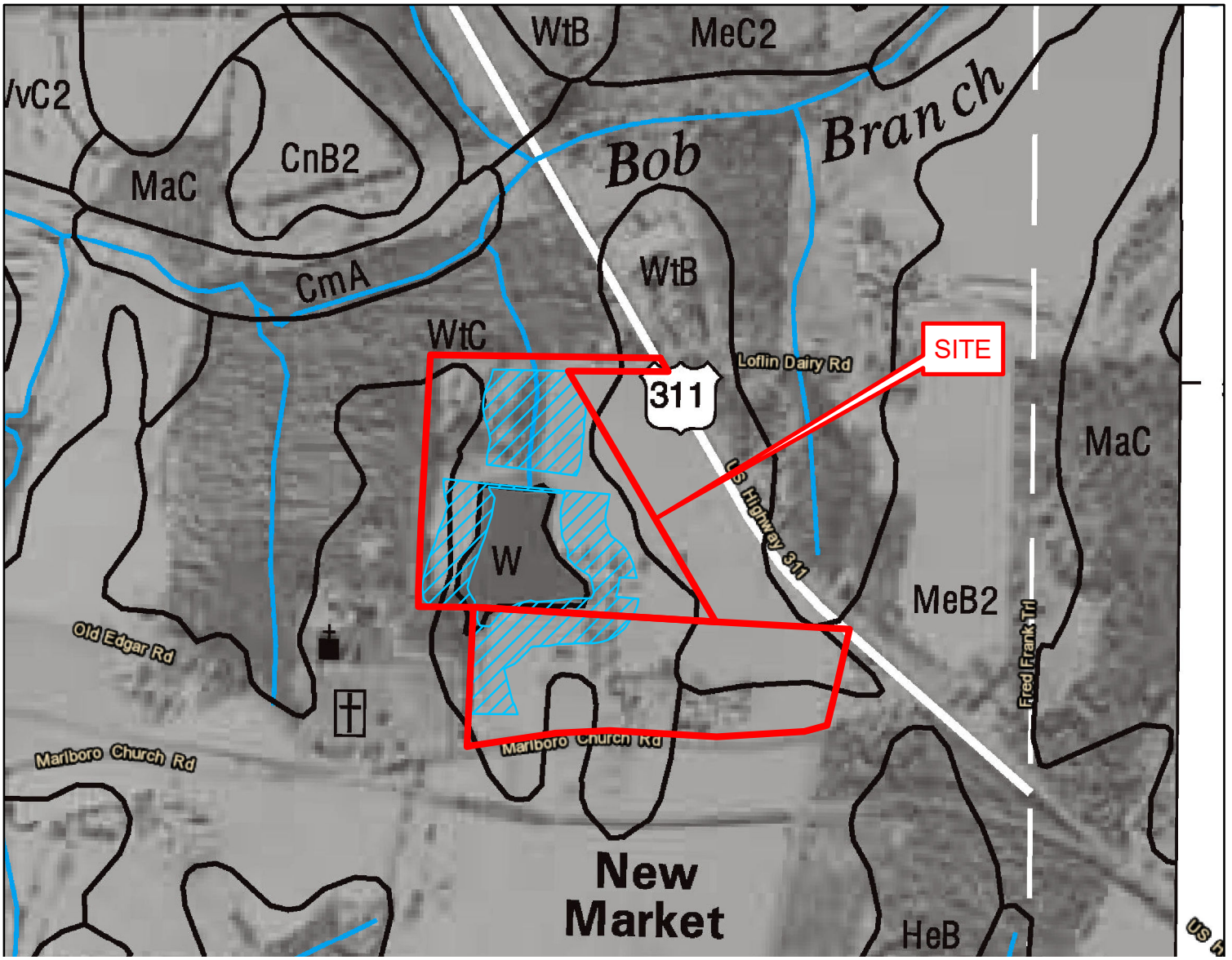
Figure 4
LiDAR Map



Legend

CmA: Chewacla and Wehadkee soils, 0-2% slopes, frequently flooded
CnB2: Coronaca clay loam, 2-8% slopes, moderately eroded
CnC2: Coronaca clay loam, 8-15% slopes, moderately eroded
HeB: Helena sandy loam, 2-6% slopes
HeC: Helena sandy loam, 6-10% slopes
MaC: Mecklenburg loam, 8-15% slopes
MeB2: Mecklenburg clay loam, 2-8% slopes, moderately eroded
MeC2: Mecklenburg clay loam, 8-15% slopes, moderately eroded
WtB: Wynott-Enon complex, 2-8% slopes
WtC: Wynott-Enon complex, 8-15% slopes
WvB2: Wynott-Enon complex, 2-8% slopes, moderately eroded
WvC2: Wynott-Enon complex, 8-15% slopes, moderately eroded
WzB: Wynott-Wilkes-Poindexter complex, 2-8% slopes

Longhorn Conservation Easement

Boundaries are approximate and not meant to be absolute.
Map Source: NRCS Randolph County Soil Survey, 2006

N
0 350 700 1,400 Feet

Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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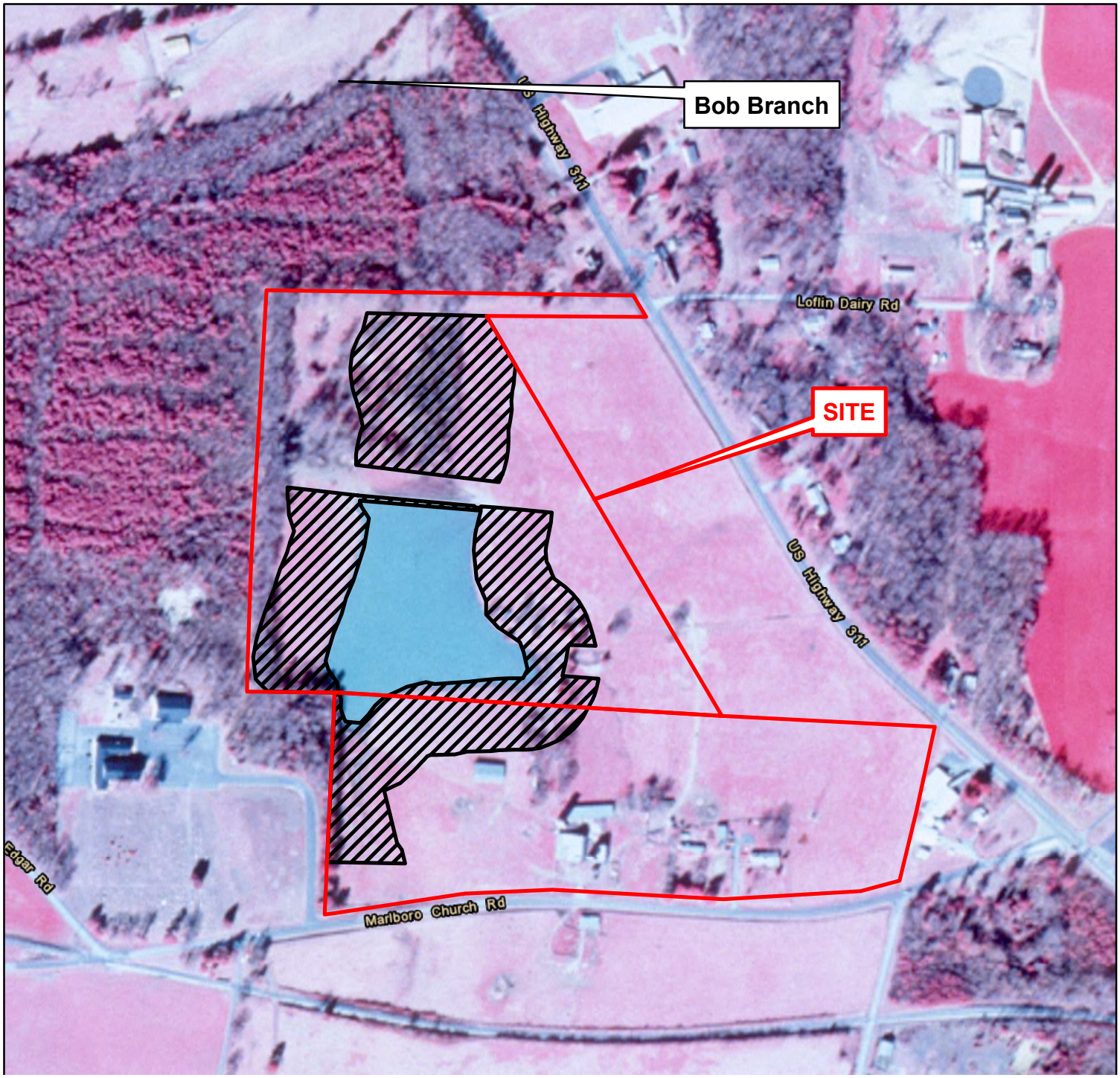
Figure 5
Soils Map



Legend

Parcel Boundary: ~45.18 Acres

Longhorn Conservation Easement: ~20.81 Acres

Boundaries are approximate and not meant to be absolute.

Map Source: 1998 NAPP Aerial Photography

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0 200 400 800 Feet

Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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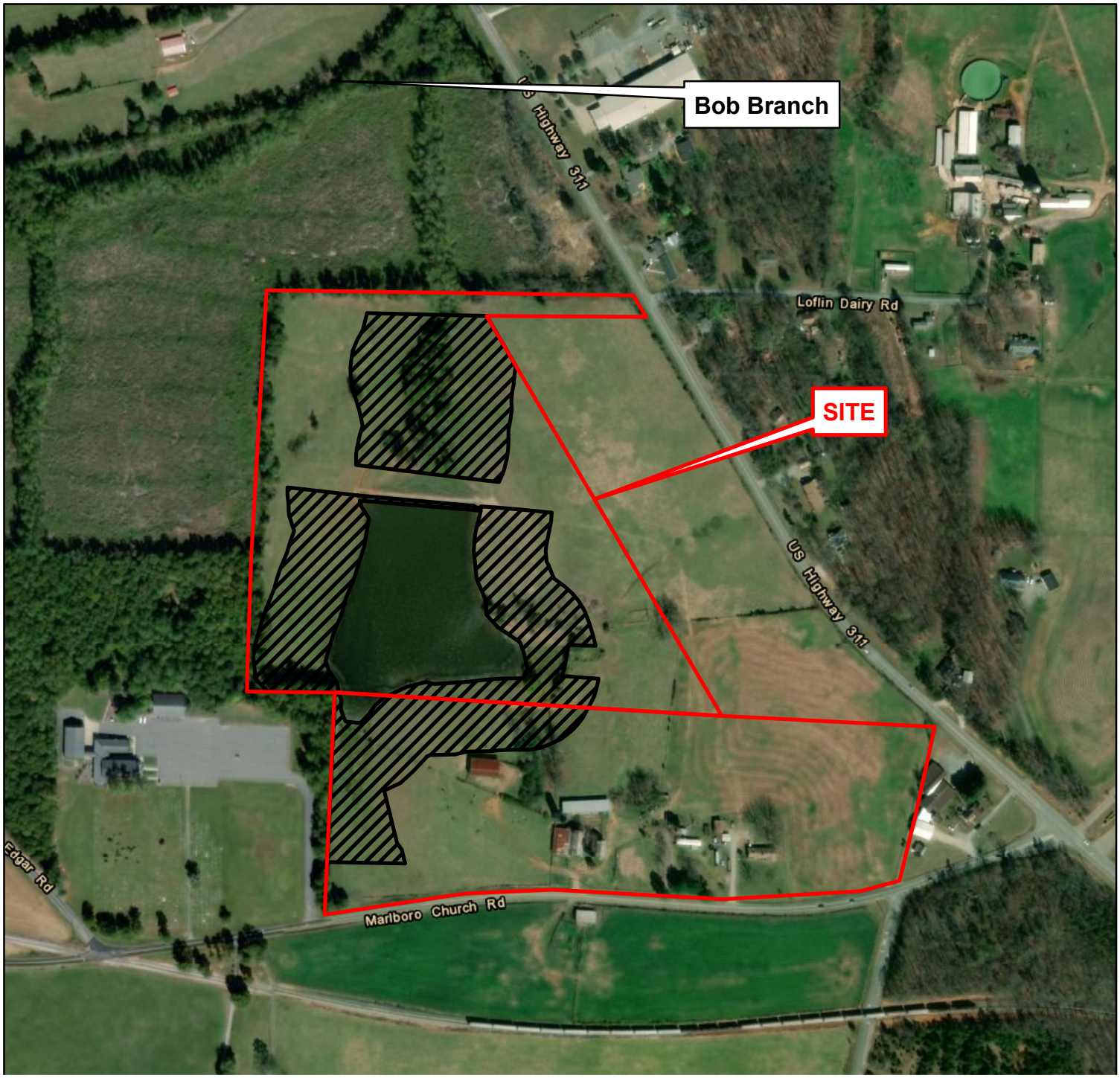
Figure 6
1998 Aerial Photograph



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Parcel Boundary: ~45.18 Acres

Longhorn Conservation Easement: ~20.81 Acres

N

0 200 400 800 Feet

Boundaries are approximate and not meant to be absolute.
Map Source: 2016 ESRI World Imagery

Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 02-24-20
LMG # 19.249

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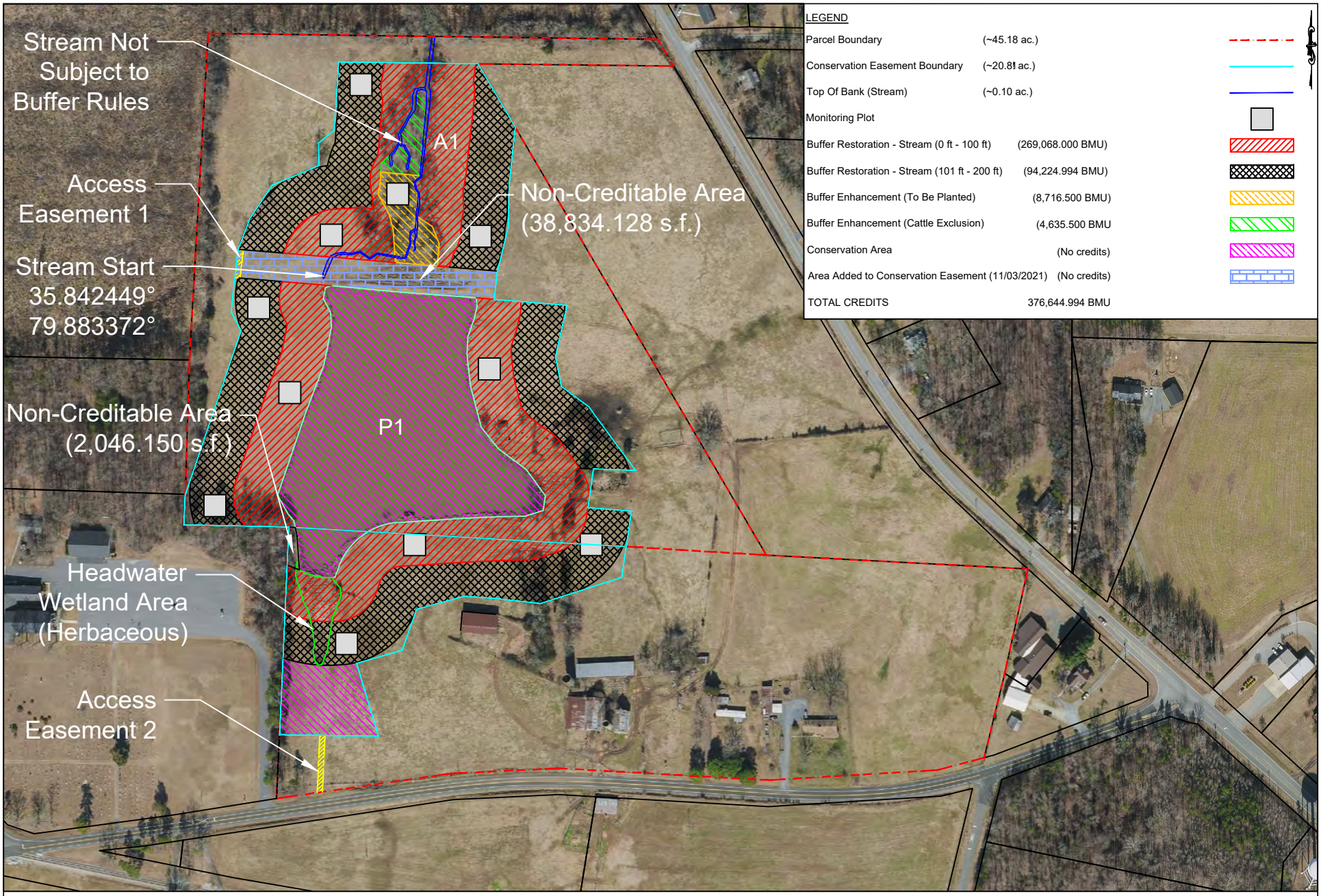
Figure 7
Aerial Photograph



NOTES:
1. TAX PARCEL BOUNDARIES AND 2018 AERIAL FROM NCONEMAP.
2. BOUNDARIES ARE APPROXIMATE AND NOT MEANT TO BE ABSOLUTE.

0 150 300 600

LMG LAND MANAGEMENT GROUP a DAVEY company
CLEARWATER MITIGATION SOLUTIONS

Project: Longhorn Riparian Buffer Mitigation Site Catalog Unit 03030003		Date: November 2019	Revision Date: 2/26/2020
		Scale: 1"=300'	Job Number: LMG19.249
Title: Mitigation Plan		Drawn By: GSF	Figure: 8

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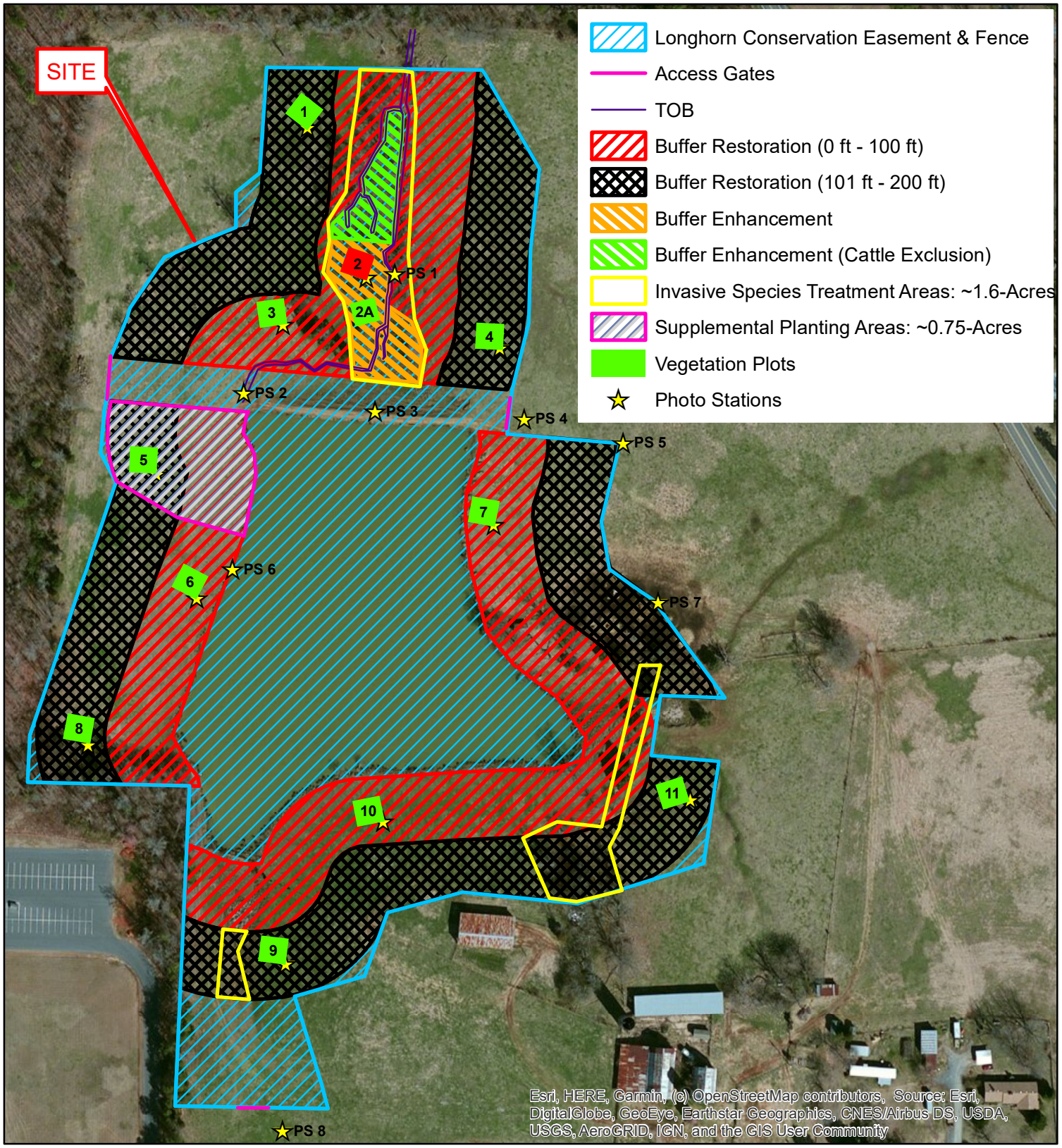

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Boundaries are approximate and not meant to be absolute.

Map Source: 2016 ESRI World Imagery

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0 100 200 400 Feet

Longhorn Riparian
Buffer Mitigation Site
Cataloging Unit 03030003
Randolph County, NC
Map Date: 11-22-22
LMG #19.249

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DAVEY Resource Group

Figure 9
Current Condition Plan View
MY03

Table 1. Buffer Project Attributes
Longhorn Riparian Buffer Mitigation Site
Monitoring Year 3 - 2022

Project Name	Longhorn Riparian Buffer Restoration Project
Hydrologic Unit Code	03030003010060 (14 digit)
River Basin	Cape Fear
Geographic Location (Lat, Long)	35.841600, -79.882810
Site Protection Instrument (DB, PG)	DB 163 Page 99
Total Credits (BMU)	376,644.994
Types of Credits	Riparian Buffer
Mitigation Plan Date	February 2020
Initial Planting Date	April 1st, 2020
Baseline Monitoring Date	April 6th, 2020
Baseline Report Date	June, 2020
MY1 Report Date	December 1st, 2020
MY2 Report Date	November 1st, 2021
MY3 Report Date	November 22st, 2022
MY4 Report Date	
MY5 Report Date	

Table 2. Longhorn, 100114, Project Mitigation Credits

Cape Fear - Randleman	Service Area
N/A	N Credit Ratio (sf/credit)
N/A	P Credit Ratio (sf/credit)

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area of Buffer Mitigation (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Convertible to Riparian Buffer?	Riparian Buffer Credits	Convertible to Nutrient Offset?	Delivered Nutrient Offset: N (lbs)	Delivered Nutrient Offset: P (lbs)
Buffer	Rural	Yes	I / P	Restoration	0-100	A1	82,245	82,245	1	100%	1.00000	Yes	82,245.000	No	—	—
Buffer	Rural	Yes	I / P	Restoration	101-200	A1	96,615	96,615	1	33%	3.03030	Yes	31,882.982	No	—	—
Buffer	Rural	Yes	I / P	Enhancement	0-100	A1	17,433	17,433	2	100%	2.00000	Yes	8,716.500	No	—	—
Buffer	Rural	Yes	I / P	Enhancement via Cattle Exclusion	0-100	A1	9,271	9,271	2	100%	2.00000	Yes	4,635.500	No	—	—
Buffer	Rural	Yes	In-Line Pond	Restoration	0-100	P1	186,823	186,823	1	100%	1.00000	Yes	186,823.000	No	—	—
Buffer	Rural	Yes	In-Line Pond	Restoration	101-200	P1	188,915	188,915	1	33%	3.03030	Yes	62,342.012	No	—	—
						Totals:	581,302	581,302								

Enter Preservation Credits Below — **Eligible for Preservation (sf):** 193,767

Credit Type	Location	Subject?	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (sf)	Total (Creditable) Area for Buffer Mitigation (sf)	Initial Credit Ratio (x:1)	% Full Credit	Final Credit Ratio (x:1)	Riparian Buffer Credits
												—

Preservation Area Subtotal (sf): 0

Preservation as % Total Area of Buffer Mitigation: 0.0%

Ephemeral Reaches as % Total Area of Buffer Mitigation: 0.0%

TOTAL AREA OF BUFFER MITIGATION (TABM)		
Mitigation Totals	**Square Feet**	**Credits**
Restoration:	554,598	363,292.994
Enhancement:	26,704	13,352.000
Preservation:	0	0.000
Total Riparian Buffer:	581,302	376,644.994

TOTAL NUTRIENT OFFSET MITIGATION			
Mitigation Totals		**Square Feet**	**Credits**
Nutrient Offset:	**Nitrogen:**	0	0.000
	Phosphorus:		0.000

1. The Randleman Lake buffer rules allow some ditches to be classified as subject according to 15A NCAC 02B .0250 (5)(a).

APPENDIX B:

Veg Data/Visual Assessment Table
Veg Plot Photos/Photo Stations

Table 4. Planted and Total Stems

Longhorn Riparian Buffer Mitigation Site

DMS Project No. 100114

Monitoring Year 3 – 2022

CVS Project Code LRBMS. Project Name: Longhorn Riparian Buffer Mitigation Site

CVS Project Code LRBMS. Project Name: Longhorn Riparian Buffer Mitigation Site

			Current Plot Data (MY3 2022)														
			LRBMS-01-0001			LRBMS-01-0002A			LRBMS-01-0002			LRBMS-01-0003			LRBMS-01-0004		
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 rubrum		Tree															4
Baccharis halimifolia	Silverling, High-tide	Shrub Tree												1			
Betula nigra	River Birch, Red Birch	Tree				2	2	2				6	6	6	6	6	12
Carya glabra	Pignut Hickory	Tree															
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	7	7	7	6	6	6	3	3	3				2	2	2
Juniperus virginiana		Tree															
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree			56									30			40
Liriodendron tulipifera		Tree										2	2	2	1	1	1
Platanus occidentalis	Sycamore, Plane-tree	Tree	15	15	15	1	1	1							7	7	7
Quercus pagoda	Cherrybark Oak, Swa	Tree	1	1	1	1	1	1				1	1	1			
Quercus phellos	Willow Oak	Tree	4	4	4							4	4	4	1	1	1
Ulmus americana		Tree															
		Stem count	27	27	83	10	10	10	3	3	3	13	13	44	17	17	67
		size (ares)	1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02		
		Species count	4	4	5	4	4	4	1	1	1	4	4	6	5	5	7
		Stems per ACRE	1093	1093	3359	404.7	404.7	404.7	121.4	121.4	121.4	526.1	526.1	1781	688	688	2711

			Current Plot Data (MY3 2022)																				
			LRBMS-01-0005			LRBMS-01-0006			LRBMS-01-0007			LRBMS-01-0008			LRBMS-01-0009			LRBMS-01-0010			LRBMS-01-0011		
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
Acer rubrum		Tree																					
Baccharis halimifolia	Silverling, High-tide	Shrub Tree			1																		
Betula nigra	River Birch, Red Birch	Tree				1	1	1							1	1	1				3	3	3
Carya glabra	Pignut Hickory	Tree			1																		
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree																3	3	3			
Juniperus virginiana		Tree																		1			
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree			3			11			3			1			25			10			
Liriodendron tulipifera		Tree	2	2	2	4	4	4	5	5	5				2	2	2	2	2	2	7	7	7
Platanus occidentalis	Sycamore, Plane-tree	Tree	5	5	5	1	1	1	4	4	4	6	6	6	6	6	6	5	5	5	3	3	3
Quercus pagoda	Cherrybark Oak, Swa	Tree				2	2	2															
Quercus phellos	Willow Oak	Tree				3	3	3	1	1	1	5	5	5							3	3	3
Ulmus americana		Tree												3									8
		Stem count	7	7	12	11	11	22	10	10	13	11	11	15	9	9	34	10	10	21	16	16	24
		size (ares)	1			1			1			1			1			1			1		
		size (ACRES)	0.02			0.02			0.02			0.02			0.02			0.02			0.02		
		Species count	2	2	5	5	5	6	3	3	4	2	2	4	3	3	4	3	3	5	4	4	5
		Stems per ACRE	283.3	283.3	485.6	445.2	445.2	890.3	404.7	404.7	526.1	445.2	445.2	607	364.2	364.2	1376	404.7	404.7	849.8	647.5	647.5	971.2

			Annual Means											
			MY3 (2022)			MY2 (2021)			MY1 (2020)			MY0 (2020)		
Scientific Name	Common Name	Species Type	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T	PnoLS	P-all	T
Acer rubrum		Tree			4			13			1			
Baccharis halimifolia	Silverling, High-tide	Shrub Tree			2			1						
Betula nigra	River Birch, Red Birch	Tree	19	19	31	18	18	18	14	14	14	28	28	28
Carya glabra	Pignut Hickory	Tree			1			1						
Fraxinus pennsylvanica	Green Ash, Red Ash	Tree	21	21	21	21	21	21	17	17	17	25	25	25
Juniperus virginiana		Tree			1									
Liquidambar styraciflua	Sweet Gum, Red Gum	Tree			183			105						
Liriodendron tulipifera		Tree	25	25	25	26	26	26	29	29	29	46	46	46
Platanus occidentalis	Sycamore, Plane-tree	Tree	53	53	53	37	37	37	39	39	39	57	57	57
Quercus pagoda	Cherrybark Oak, Swa	Tree	5	5	5	5	5	5	2	2	2			
Quercus phellos	Willow Oak	Tree	21	21	21	22	22	22	22	22	22	27	27	27
Ulmus americana		Tree			11									
		Stem count	144	144	358	129	129	249	123	123	124	183	183	183
		size (ares)	12			12			11			11		
		size (ACRES)	0.30			0.30			0.27			0.27		
		Species count	6	6	12	6	6	10	6	6	7	5	5	5
		Stems per ACRE	485.6	485.6	1207	435	435	839.7	452.5	452.5	456.2	673.2	673.2	673.2

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: Number of planted stems excluding live stakes

P-All: Number of planted stems including live stakes

T: Total stems

Visual Vegetation Assessment

Planted acreage **13.13**

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Planted Acreage
Bare Areas	Very limited cover of both woody and herbaceous material.	0.10 acres	0.00	0.0%
Low Stem Density Areas	Woody stem densities clearly below target levels based on current MY stem count criteria.	0.10acres	0.10	0.8%
Total			0.10	0.8%
Areas of Poor Growth Rates	Planted areas where average height is not meeting current MY Performance Standard.	0.10 acres	0.00	0.0%
Cumulative Total			0.10	0.8%

Easement Acreage **20.81**

Vegetation Category	Definitions	Mapping Threshold	Combined Acreage	% of Easement Acreage
Invasive Areas of Concern	Invasives may occur outside of planted areas and within the easement and will therefore be calculated against the total easement acreage. Include species with the potential to directly outcompete native, young, woody stems in the short-term or community structure for existing communities. Species included in summation above should be identified in report summary.	0.10 acres	1.60	7.7%
Easement Encroachment Areas	Encroachment may be point, line, or polygon. Encroachment to be mapped consists of any violation of restrictions specified in the conservation easement. Common encroachments are mowing, cattle access, vehicular access. Encroachment has no threshold value as will need to be addressed regardless of impact area.	none	# Encroachments noted	

(1) Plot 1

(2) Plot 2

(3) Plot 3

(4) Plot 4

(5) Plot 5

(6) Plot 6

(7) Plot 7

(8) Plot 8

(9) Plot 9

(10) Plot 10

(11) Plot 11

(12) Plot 2A

(1) PS1 (looking south)

(2) PS2 (looking north towards restoration area)

(3) PS2 (looking east)

(5) PS3 (looking north into enhancement area)

(6) PS4 (looking west towards dam)

(7) PS4 (looking south into easement)

(8) PS5 (looking west along conservation easement)

(9) PS6 (looking north along pond edge)

(10) PS7 (looking southwest into restoration area)

(11) PS8 (looking north into restoration area)