

Baseline Monitoring Report

July 2022

Anderson Farm Mitigation Site

Wayne County, NC
NCDEQ Contract No. 0402-10
DMS ID No. 100180
DWR No. 2021-0023v2

Neuse River Basin
HUC 03020201

RFP #: 20200402

PREPARED FOR:

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

WILDLANDS
ENGINEERING

July 5, 2022

Mr. Lin Xu
Water Resources Engineer
NCDENR- Division of Mitigation Services
217 West Jones Street
Raleigh, NC 27603

Subject: Draft MY0 Report Review
Anderson Farm Mitigation Site, Wayne County
Neuse River Basin: 03020201
DMS Project ID No. 100180
DEQ Contract # 0402-10

Dear Mr. Xu:

On June 14, 2022, Wildlands Engineering received comments from the North Carolina Division of Mitigation Services (DMS) regarding the Draft As-Built Baseline Report dated April 29, 2022. The following letter documents DMS feedback and Wildlands' corresponding responses and revisions to the As-Built Report.

On page 1 of Section 1.0 – The draft document indicated that the project site is expected to generate 494, 188.111 riparian buffer credits. However, the project mitigation plan indicated that the site would generate 494,458.452 riparian buffer credit. Please make necessary change.

Response: There is typically a minor change in buffer credits from the mitigation plan to the as-built report. During the mitigation plan stage, GIS files are used to calculate the number of riparian buffer credits, while at as-built survey files are used. The survey files depict more accurate top of banks and riparian buffer zones. Due to this increase in accuracy, there is typically a minor deviation in riparian buffer credits from the mitigation plan to the as-built report.

On Table 3 – The table indicated that the buffer area on UT1 in row 4 of the table is not convertible to riparian buffer credit. However, the final mitigation plan stated the same area is convertible to riparian buffer credit. Please explain and make necessary change.

Response: The area in reference is convertible to riparian buffer credit. An error was made in filling out the table. The correction has been made.

Appendix 3 – This seems to be the as-built survey. Typically, the record drawing is the as-built survey over-laying on the proposed design. Please make necessary change.

Response: The correction has been made. The document in Appendix 3 is now referred to as "As-Built Survey".

Sincerely,

Jason Lorch, *Monitoring Coordinator*

PREPARED BY:

Wildlands Engineering, Inc.
312 W Millbrook Road, Suite 225
Raleigh, NC 27609
Phone: (919) 851-9986

This Mitigation Plan has been written in conformance with the requirements of the following:

- 15A NCAC 02B .0295 Mitigation Program Requirements for Protection and Maintenance of Riparian Buffers.
- 15A NCAC 02B .0703 Nutrient Offset Payments
- NCDEQ Division of Mitigation Services In-Lieu Fee Instrument signed and dated July 28, 2010.

These documents govern DMS operations and procedures for the delivery of compensatory mitigation.

Contributing Staff:

Andrea Eckardt, *Project Manager*
John Hutton, *Principal in Charge*
Jason Lorch, *Baseline Monitoring Plan*
Daniel Taylor, *Construction Administrator*
Carolyn Lanza, *Monitoring Lead*
Andrea Eckardt, *Lead Quality Assurance*

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APPENDICES

1.0 Mitigation Project Summary

The Anderson Farm Mitigation Site (Site) is in Wayne County approximately six miles northwest of the Town of Mt. Olive (Figure 1). The Site involves riparian restoration on three unnamed tributaries that flow to Thoroughfare Swamp. The Site has been completed for buffer mitigation credit in the Neuse River Basin Hydrologic Unit Code (HUC) 03020201, in accordance with the Consolidated Buffer Mitigation Rules (15A NCAC 02B .0295) and the Nutrient Offset Payments Rule (15A NCAC 02B .0703). See Figure 2 for the Service Area of the Site. The Site is expected to generate 494,544.362 riparian buffer credits, which differs slightly from the expected 494,458.452 riparian buffer credits listed in the Mitigation Plan (Wildlands, 2021). During as-built Wildlands used survey files which depict a more accurate top of bank and riparian buffer zone to calculate credits. Due to this increase in accuracy, there is typically a minor deviation in riparian buffer credits from the mitigation plan to the as-built report.

The project is located within the Neuse River Basin Hydrologic Unit Code (HUC) 03020201170040, and North Carolina Division of Water Resources (NCDWR) Subbasin 03-04-12. Project streams flow approximately one mile to the confluence with Thoroughfare Swamp, which flows to 303d listed stream, Falling Creek, and eventually drains to the Neuse River. Thoroughfare Swamp and the Neuse River are both classified as a Water Supply Watershed for the City of Goldsboro and Nutrient Sensitive Waters (NSW) by the NCDWR. The proposed project supports specific goals identified in the 2018 Neuse Basin Restoration Priorities Plan (RBRP) by promoting "nutrient and sediment reduction in agricultural areas by restoring and preserving wetlands, streams and riparian buffers."

1.1 Project Goals

The major goals of the riparian restoration project are to provide ecological and water quality enhancements to the Neuse River Basin by creating a functional riparian corridor and restoring the riparian area.

This buffer restoration project will reduce sediment and nutrient loading, provide and improve terrestrial and in stream habitats, and improve stream and bank stability. The area surrounding the streams was previously agricultural fields, typically used to grow corn, soybeans, and wheat. Restoring up to 100 feet of vegetative buffer along the streams and channels has removed the crops and fertilizer inputs within the project area. The restored floodplain areas will assist in filtering sediment during high rainfall events. The establishment of riparian areas will create shading to minimize thermal heating. Finally, invasive vegetation will be treated within the project area and the newly planted native vegetation will provide cover and food for wildlife. Specific enhancements to water quality and ecological processes are outlined below.

- Decrease nutrient levels by filtering runoff from the agricultural fields through restored native buffer zones. The off-site nutrient input will also be absorbed on-site by filtering flood flows through restored floodplain areas, where flood flows can disperse through native vegetation.
- Sediment from off-site sources will be captured by deposition on restored floodplain areas where native vegetation will slow overland flow velocities.
- Decrease water temperature and increase dissolved oxygen concentrations with the establishment and maintenance of riparian areas creating additional long-term shading of the channel flow to reduce thermal pollution.
- Establishment of a riparian area that will slow flood flows and allow for greater infiltration, reducing peak flows downstream.
- Create appropriate terrestrial habitat by removing invasive vegetation and planting native vegetation.

- Permanently protect the project Site from harmful uses by establishing a conservation easement on the Site that will protect the riparian corridor in perpetuity.

1.2 Pre-construction Site Conditions

Prior to construction, the mitigation site was primarily agricultural fields located on one parcel. The project included the restoration of riparian areas along three unnamed tributaries: UT1, UT2, and UT3 (Figure 3).

Agricultural fields were on either side of UT1, until it reached its confluence with UT3, at which point agricultural fields occupied the left floodplain, while houses were on the right floodplain. UT2 was surrounded completely by agricultural fields, while UT3 was surrounded by agricultural fields on its left floodplain, and residential lots on its right. At the confluence of UT3, the right side of UT1 emerged from agricultural fields and flowed behind a house. Overview photos are shown in Appendix 4.

On April 29, 2021, NCDWR conducted on-site determinations to review features and land use within the project boundary. The resulting NCDWR site viability letter and map confirmed the three project features on-Site are suitable for riparian buffer credit pursuant to 15A NCAC 02B .0295 and for nutrient offset mitigation per 15A NCAC 02B .0703. The Site Viability letter from NCDWR is in Appendix 2.

2.0 Determination of Credits

Mitigation credits are presented in Table 2 and Figure 3 in Appendix 1 and are based upon the as-built survey included in Appendix 3.

3.0 Baseline Summary

Wildlands restored high quality riparian areas along UT1, UT2, and UT3. The project design ensured that no adverse impacts to existing riparian buffers occurred. Figure 3 illustrates the credit zones for the Site. Detailed descriptions of the restoration activity follow in Sections 3.1 through 3.4. Overview photographs are included in Appendix 4.

3.1 Parcel Preparation

Prior to planting, the buffer restoration area was occupied by agricultural fields, mainly used to produce corn or soybeans. A culvert on UT3 was removed prior to planting. The area was immediately seeded with a regionally appropriate seed mix and live stakes and coir matting were placed along banks to provide soil stabilization. An area of isolated erosion at the confluence of UT1 and UT3 was identified prior to planting which was stabilized by placing straw bales directly adjacent to the area to divert overland flow during rainfall events. Additionally, live stakes were planted and a regionally appropriate native seed mix was applied around the area to provide long term soil stabilization. Photographs taken following the culvert removal and erosion stabilization can be found in Appendix 5.

3.2 Riparian Area Restoration Activities

Riparian area restoration involved planting appropriate native tree species along the riparian corridor. Revegetation efforts will be coupled with controlling invasive species population as deemed necessary. The species composition planted was selected based on the community type, observation of occurrence of species in riparian areas adjacent to the Site, best professional judgement on species establishment, and anticipated site conditions in the early years following project implementation. See Table 2 in Appendix 1 for a list of tree species planted along with their composition at planting. Trees were planted at a density sufficient to meet the performance standards outlined in the Rule 15A NCAC 02B .0295 of 260 trees per acre at the end of five years. No one tree species planted was greater than 50% of the established stems. Planting was completed on March 21, 2022.

Vegetation management and herbicide applications will be implemented as needed during tree establishment in restoration areas to prevent establishment of invasive species that could compete with the planted native species.

4.0 Annual Monitoring and Performance Criteria

The performance criteria for the Site follows approved performance criteria presented in the guidance documents outlined in RFP 16-20200402 and the Consolidated Buffer Rule (15A NCAC 02B .0295). Annual monitoring and semi-annual site visits will be conducted to assess the condition of the finished project. The buffer restoration project has been assigned specific performance criteria components for vegetation. Performance criteria will be evaluated throughout the five-year post-construction monitoring. An outline of the performance criteria and monitoring components follows and are depicted in Figure 4 and included in Table 3, located in Appendix 1.

The final vegetative success criteria will be the survival of 260 planted stems per acre in the riparian corridor at the end of the required five-year monitoring period. The extent of invasive species coverage will also be monitored and treated as necessary throughout the required monitoring period.

Nine vegetation monitoring plots were installed across the Site to measure the survival of the planted stems (Figure 4). Vegetation monitoring will follow the CVS-EEP Level 2 Protocol for Recording Vegetation (2008). Reference photographs of the vegetation plots and Site will be taken during the annual vegetation assessments, planted stems will be flagged annually to discern in the provided photos. Appendix 5 includes the baseline (MY0) vegetation plot photographs and the planted and total stem counts.

4.1 Overview Photographs

Photographs will be taken of the project area once a year to visually document stability for five years following construction. A drone will be used to document the project's overall vegetative growth and ground cover. Overview photographs are shown in Appendix 4.

4.2 Visual Assessments

Visual assessments should support the specific performance standards for each metric as described above. Visual assessments will be performed within the Site on a semi-annual basis during the five-year monitoring period. Problem areas with vegetative health will be noted (e.g. low stem density, vegetation mortality, invasive species or encroachment). Areas of concern will be mapped and photographed accompanied by a written description in the annual report. Problem areas will be re-evaluated during each subsequent visual assessment.

4.3 Annual Reporting Performance Criteria

Using the DMS Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0 (May 2017), monitoring reports will be prepared in the fall of each monitoring year and submitted to DMS. Annual monitoring reports will be based on the above referenced DMS Template (May 2017). The monitoring period will extend five years beyond completion of construction or until performance criteria have been met.

4.4 Maintenance and Contingency Plans

The site boundary was properly marked with NCDMS placards every 100-200 feet. Directly outside the NCDMS Anderson Farm Mitigation Site exists the Anderson Farm II Mitigation Bank Parcel, which extends the riparian corridor an additional 100 feet. In areas where the two easements border one another NCDMS signage was placed every 150-200 feet. This is due to a reduced likelihood of encroachment issues that the additional protected area outside the easement provides. In areas of the

Site that do not have the Anderson Farm II Mitigation Bank Parcel directly adjacent, signage was placed every 100 feet. Adaptive management will be performed during the monitoring years to address issues as necessary. If during annual monitoring it is determined the Site's ability to achieve Site performance standards are jeopardized, Wildlands will notify the members of DMS/NCDWR and work with them to develop contingency plans and remedial actions. Any actions implemented will be designed to achieve the success criteria specified previously and will include a work schedule and updated monitoring criteria (if applicable).

5.0 References

Lee, Michael T. Peet, Robert K., Steven D. Wentworth, Thomas R. 2008. CVS-EEP Protocol for Recording Vegetation Version 4.2. http://cvs.bio.unc.edu/protocol/cvs-eep-protocol-v4.2-lev1-2.pdf

Natural Resources Conservation Service (NRCS). Web Soil Survey of Wayne County. http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

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

North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), 2017. Riparian Buffer and Nutrient Offset Buffer Baseline and Annual Monitoring Report Template version 2.0

Wildlands Engineering, Inc. (2021). Anderson Farm Mitigation Site – Mitigation Plan. North Carolina Department of Environmental Quality, Division of Mitigation Services (NCDMS), Raleigh, NC.

APPENDIX 1

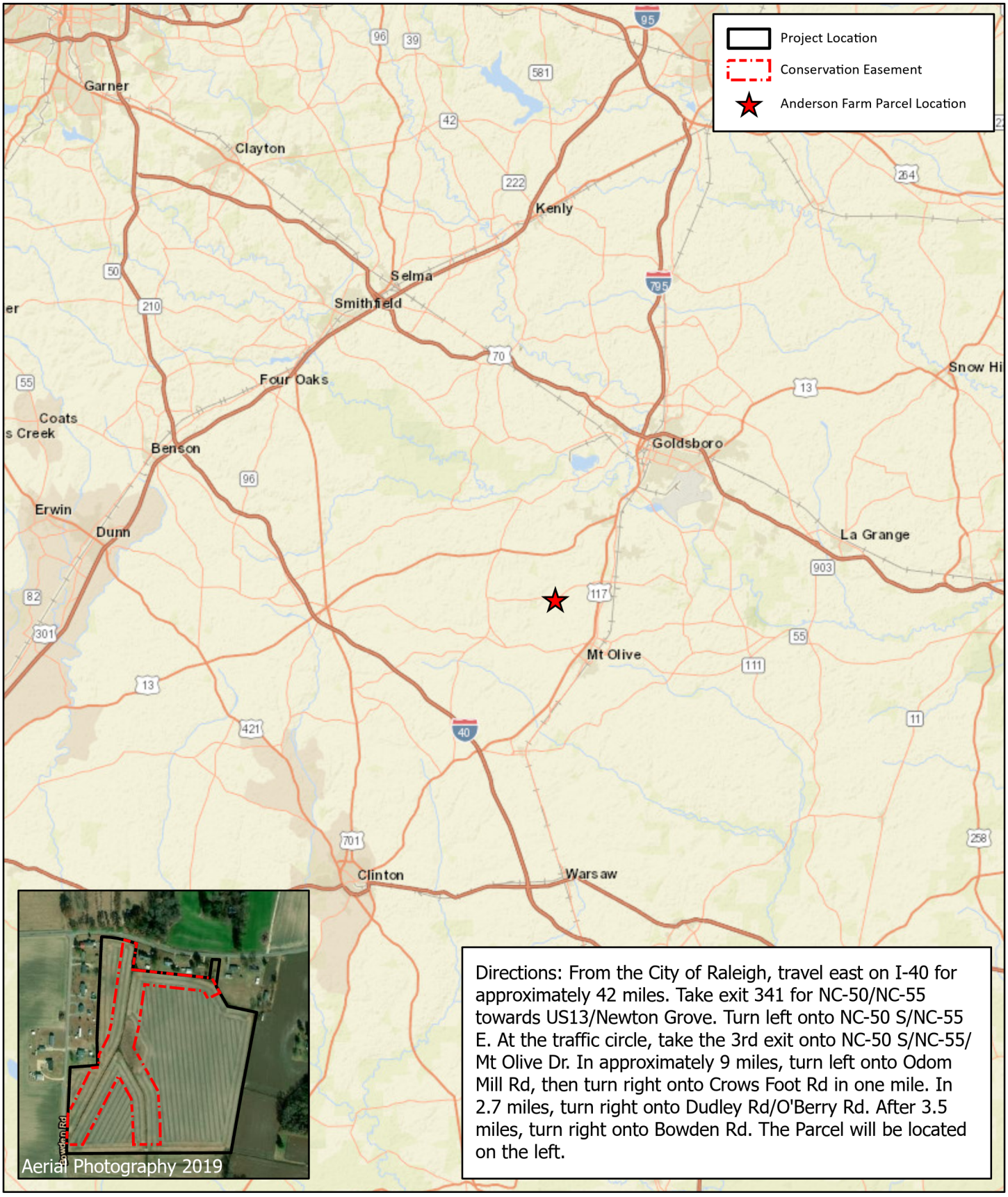

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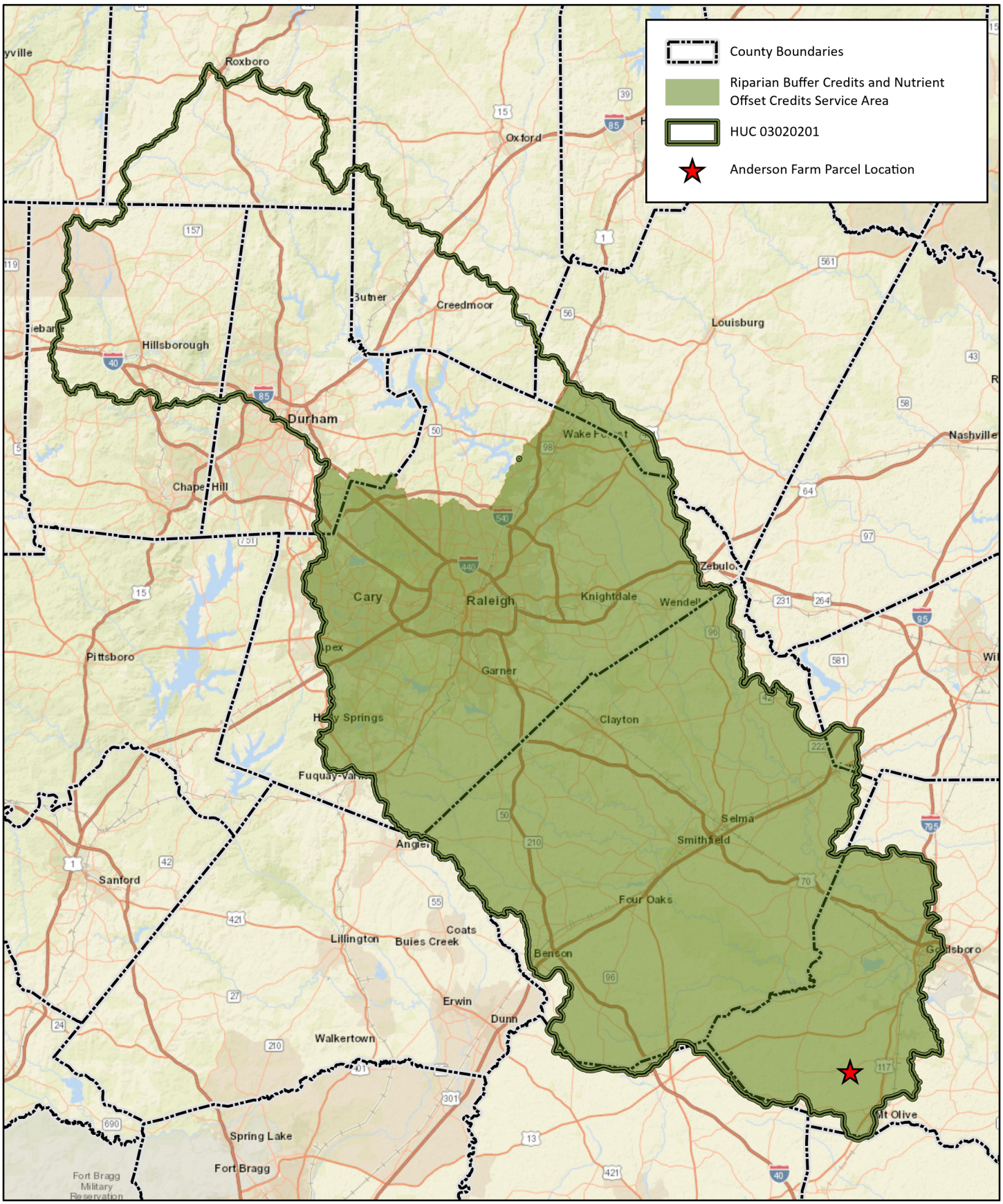
Figure 1. Vicinity Map
Anderson Farm Mitigation Site
As-Built Report
Neuse River Basin (03020201)

Wayne County, NC



WILDLANDS ENGINEERING

Figure 2. Service Area Map
Anderson Farm Mitigation Site
As-Built Report
Neuse River Basin (03020201)

Wayne County, NC

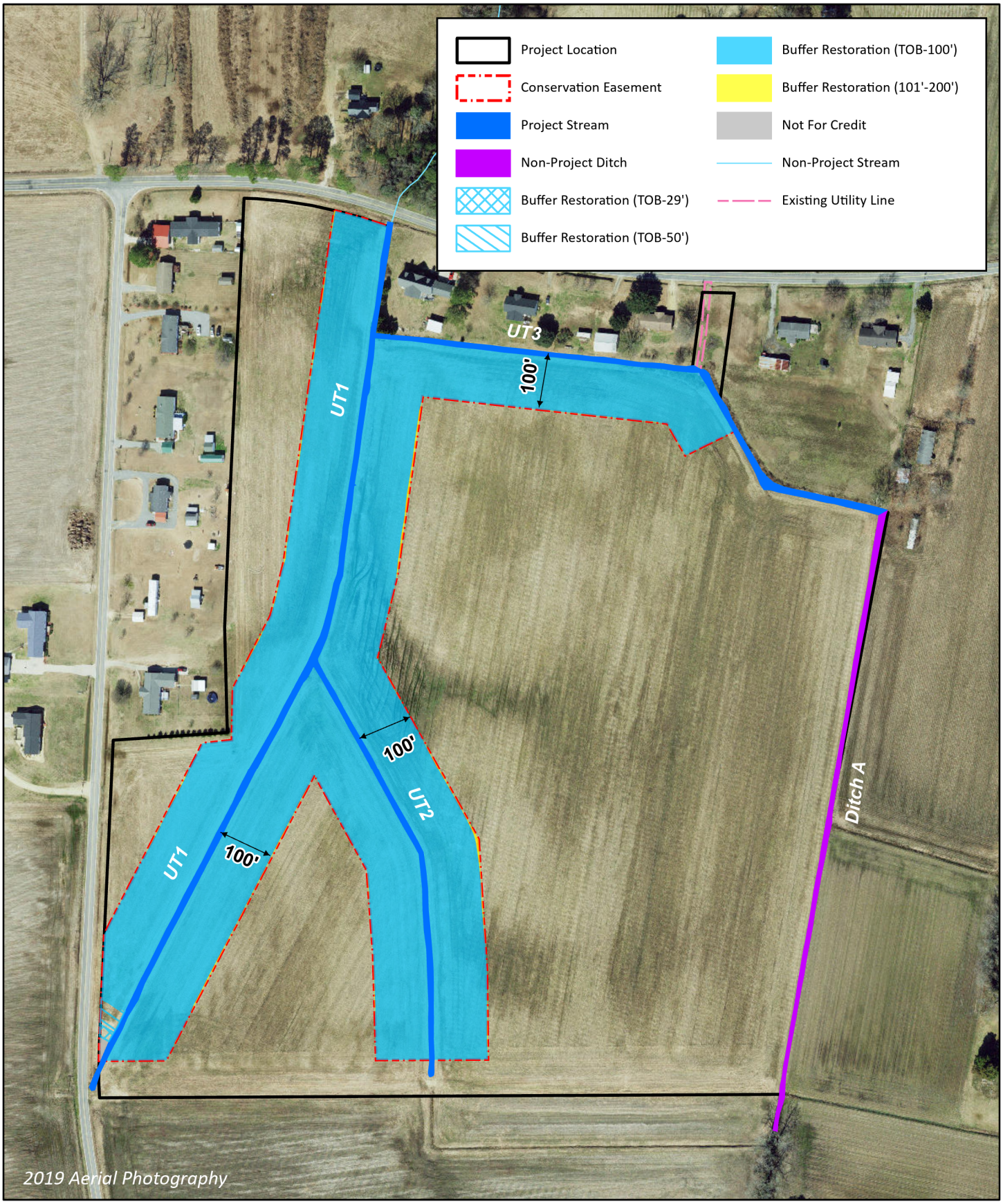


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Figure 3. Project Component/Asset Map
Anderson Farm Mitigation Site
As-Built Report
Neuse River Basin (03020201)

Wayne County, NC

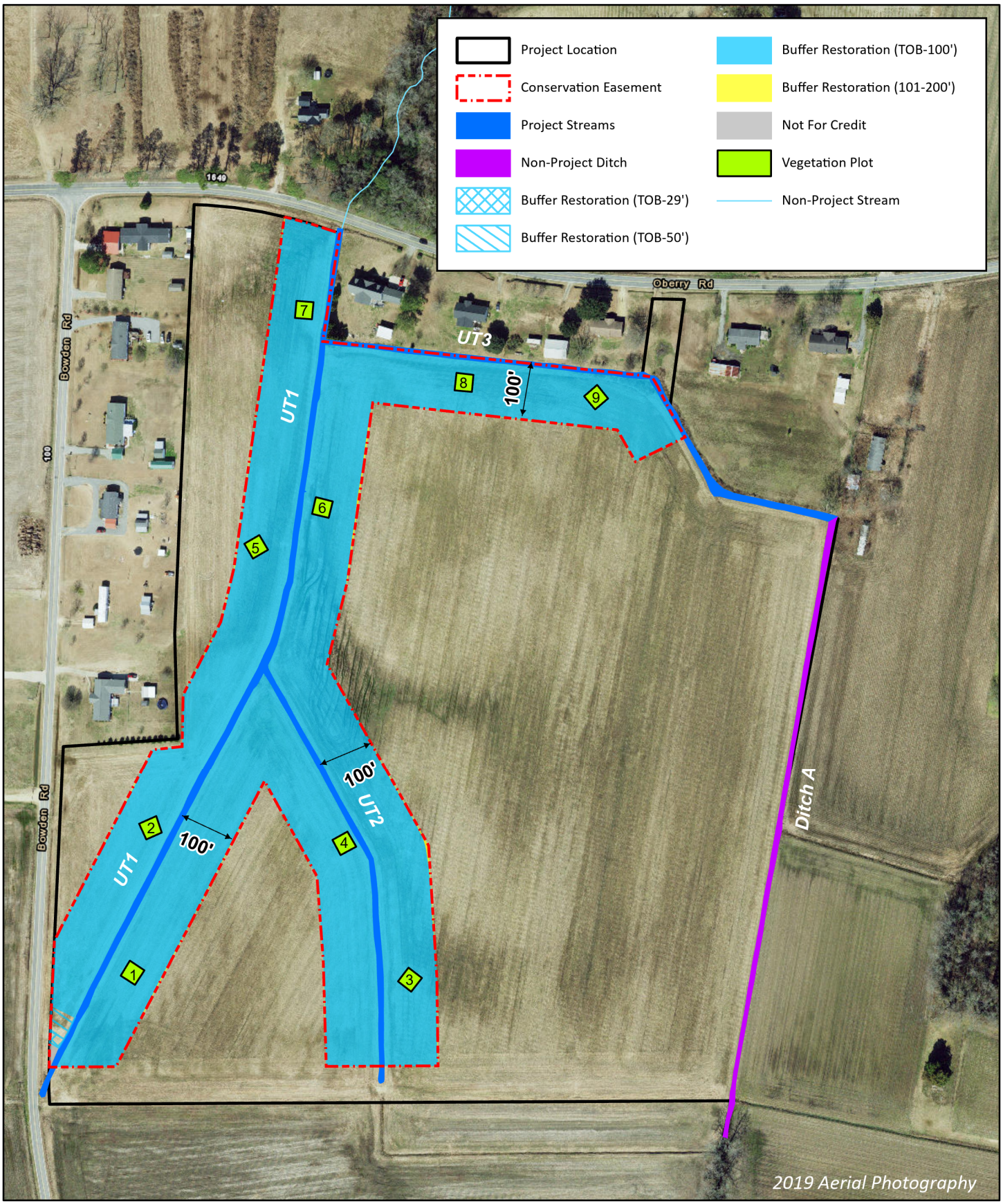

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Figure4. Monitoring Plan View Map
Anderson Farm Mitigation Site
As-Built Report
Neuse River Basin (03020201)

Wayne County, NC

Table 1. Project Attributes

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Project Information	
Project Name	Anderson Farm Mitigation Site
USGS Hydrologic Unit 14-digit	03020201170040
River Basin	Neuse
Project Coordinates (latitude and longitude)	35.251662, 78.103729
Total Credits (BMU)	494,544.362
Types of Credits	Riparian Buffer
Mitigation Plan Date	December 2021
As-Built & Baseline Monitoring Document	April 2022
Year 1 Monitoring Report Date	December 2022
Year 2 Monitoring Report Date	December 2023
Year 3 Monitoring Report Date	December 2024
Year 4 Monitoring Report Date	December 2025
Year 5 Monitoring Report Date	December 2026

Table 2. Planted Tree Species

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Common Name	Scientific Name	Number Planted	% of Total
Boxelder	*Acer negundo*	586	10%
River Birch	*Betula nigra*	869	15%
Sugarberry	*Celtis laevigata*	304	5%
American Persimmon	*Diospyros virginiana*	586	10%
Sweetbay Magnolia	*Magnolia virginiana*	304	5%
Sycamore	*Platanus occidentalis*	869	15%
Eastern Cottonwood	*Populus deltoides*	586	10%
Black Cherry	*Prunus serotina*	304	5%
Swamp Chestnut Oak	*Quercus michauxii*	586	10%
Cherrybark Oak	*Quercus pagoda*	586	10%
American Elm	*Ulmus americana*	304	5%

Table 3. Project Areas and Assets

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Neuse 03020201 - Outside Falls Lake	**Project Area**
19.16394	**N Credit Conversion Ratio (ft^2/pound)**
N/A	**P Credit Conversion Ratio (ft^2/pound)**

Credit Type	Location	Subject? (enter NO if ephemeral or ditch [1])	Feature Type	Mitigation Activity	Min-Max Buffer Width (ft)	Feature Name	Total Area (ft^2)	Total (Creditable) Area of Buffer Mitigation (ft^2)	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)
Buffer	Rural	Yes	I / P	Restoration	101-200	UT1, UT2, UT3	3,267	3,267	1	33%	3.03030	Yes	1,078.111	Yes	170.476
Buffer	Rural	Yes	I / P	Restoration	0-100	UT1, UT2, UT3	491,294	491,294	1	100%	1.00000	Yes	491,294.000	Yes	25,636.378
Buffer	Rural	Yes	I / P	Restoration	0-50	UT1, UT2, UT3	1,816	1,816	1	100%	1.00000	Yes	1,816.000	No	—
Buffer	Rural	Yes	I / P	Restoration	20-29	UT1	475	475	1	75%	1.33333	Yes	356.251	No	—
						Totals (ft2):	**496,852**	**496,852**					**494,544.362**		**25,806.854**
						Total Buffer (ft2):	**496,852**	**496,852**							
						Total Nutrient Offset (ft2):	**0**	**N/A**							

TOTAL AREA OF BUFFER MITIGATION (TABM)			
Mitigation Totals		**Square Feet**	**Credits**
Restoration:		496,852	494,544.362
Enhancement:		0	0.000
Preservation:		0	0.000
Total Riparian Buffer:		496,852	494,544.362
TOTAL NUTRIENT OFFSET MITIGATION			
Mitigation Totals		**Square Feet**	**Credits**
Nutrient Offset:	**Nitrogen:**	0	0.000
	Phosphorus:		0.000

Table 4. Monitoring Components

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Parameter	Monitoring Feature	Quantity/Length By Reach			Frequency
		UT1	UT2	UT3	
Vegetation	**CVS Level 2**	9			Annual
Visual Assessment		Y	Y	Y	Semi- Annual
Exotic and Nuisance Vegetation		Y	Y	Y	Semi- Annual
Project Boundary		Y	Y	Y	Semi- Annual
Reference Photographs	Overview Photographs				Annual

APPENDIX 2

ROY COOPER
Governor
DIONNE DELLI-GATTI
Secretary
S. DANIEL SMITH
Director

NORTH CAROLINA
Environmental Quality

May 19, 2021

Andrea Eckardt
Wildlands Engineering, Inc
(via electronic mail: aeckardt@wildlandseng.com)

Re: Site Viability for Buffer Mitigation & Nutrient Offset – Anderson Farm Site
167 Bowden Rd, Mt. Olive (near 35.252438, -78.103945)
Neuse 03020201
Wayne County

Dear Ms. Eckardt,

On March 22, 2021, Katie Merritt, with the Division of Water Resources (DWR), received a request from you on behalf of Wildlands Engineering, Inc (Wildlands) for a site visit near the above-referenced site in the Neuse River Basin within the 8-digit Hydrologic Unit Code 03020201. The site visit was to determine the potential for riparian buffer mitigation and nutrient offset within a proposed conservation easement boundary, which is more accurately depicted in the attached map labeled "Figure 1-Site Map" (Figure 1) prepared by Wildlands. The proposed easement boundary in Figure 1, includes all riparian areas intended to be proposed as part of the mitigation site. On April 15, 2021, Ms. Merritt performed a site assessment of the subject site. Staff with Wildlands were also present.

Ms. Merritt's evaluation of the features onsite and their associated mitigation determination for the riparian areas are provided in the table below. This evaluation was made from Top of Bank (TOB) and landward 200' from each feature for buffer mitigation pursuant to 15A NCAC 02B .0295 (effective November 1, 2015) and for nutrient offset credits pursuant to 15A NCAC 02B .0703.

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[3]Nutrient Offset Viable	[4,5]Mitigation Type Determination w/in riparian areas
UT 1	Stream	Yes	Non-forested agricultural fields and partially located within a DOT Right Of Way (ROW)	Yes	Yes	**Restoration Site** per 15A NCAC 02B .0295 (n) Note: No credits are allowed within the DOT R.O.W

Feature	Classification onsite	[1]Subject to Buffer Rule	Riparian Land uses adjacent to Feature (0-200')	Buffer Credit Viable	[3]Nutrient Offset Viable	[4,5]Mitigation Type Determination w/in riparian areas
UT2	Stream	Yes	Non-forested agricultural fields and partially located within a DOT Right Of Way (ROW) A sink hole and active eroding banks were observed at the confluence with UT1.	Yes	Yes	**Restoration Site** per 15A NCAC 02B .0295 (n) *Minor bank stabilization and grading needed where bank stability is compromised and where erosional rills, sink holes and gullies are observed.* Note: No credits are allowed within the DOT R.O.W
UT3	Stream	Yes	Left Bank – non-forested agricultural fields Right Bank – managed lawn/residential	Yes	Yes (in ag fields only)	**Restoration Site** per 15A NCAC 02B .0295 (n)
Ditch A	Ditch >3' depth	No	non-forested agricultural fields	No	Yes	**Restoration Site** per 15A NCAC 02B .0295 (n)

[1]Subjectivity calls for the features were determined by DWR in correspondence dated April 29, 2021 (ID# 2021-0023) using the 1:24,000 scale quadrangle topographic map prepared by USGS and the most recent printed version of the soil survey map prepared by the NRCS .

[2]The area of preservation credit within a buffer mitigation site shall comprise of no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 0295 (o)(5) and 15A NCAC 0295 (o)(4). Site cannot be a Preservation Only site to comply with this rule.

[3]*NC Division of Water Resources - Methodology and Calculations for determining Nutrient Reductions associated with Riparian Buffer Establishment*

[4] Determinations made for this Site are determined based on the proposal provided in maps and figures submitted with the request.

[5] All features proposed for buffer mitigation or nutrient offset, must have a planted conservation easement established that includes the tops of channel banks when being measured perpendicular and landward from the banks, even if no credit is viable within that riparian area.

[6]The area of the mitigation site on ephemeral channels shall comprise no more than 25 percent (25%) of the total area of buffer mitigation per 15A NCAC 02B .0295 (o)(7).

Determinations provided in the table above were based on the proposed conservation easement boundaries depicted in Figure 1 for the site. The map representing the proposal for the site is attached to this letter and is initialed by Ms. Merritt on May 19, 2021. Substantial changes to the proposed easement boundaries could affect the site's potential to generate buffer mitigation and nutrient offset credits.

This letter does not constitute an approval of this Site to generate buffer and nutrient offset credits. Pursuant to 15A NCAC 02B .0295, a mitigation proposal and a mitigation plan shall be submitted to DWR for written approval **prior** to conducting any mitigation activities in riparian areas and/or surface waters for buffer mitigation credit. Pursuant to 15A NCAC 02B .0703, a proposal regarding a proposed nutrient load-reducing measure for nutrient offset credit shall be submitted to DWR for approval prior to any mitigation activities in riparian areas and/or surface waters.

All vegetative plantings, performance criteria and other mitigation requirements for riparian restoration, enhancement and preservation must follow the requirements in 15A NCAC 02B .0295 to be eligible for buffer and/or nutrient offset mitigation credits. For any areas depicted as not being

viable for nutrient offset credit above, one could propose a different measure, along with supporting calculations and sufficient detail to support estimates of load reduction, for review by the DWR to determine viability for nutrient offset in accordance with 15A NCAC 02B .0703.

This viability assessment will expire on May 19, 2023 or upon approval of a mitigation plan by the DWR, whichever comes first. This letter should be provided in any nutrient offset, buffer, stream or wetland mitigation plan for this Site.

Please contact Katie Merritt at (919) 707-3637 if you have any questions regarding this correspondence.

Sincerely,

DocuSigned by:
Paul Wojoski
949D91BA53EF4E0...

Paul Wojoski, Supervisor
401 and Buffer Permitting Branch

PW/kym
Attachments: "Figure 1 – Site Map"

cc: File Copy (Katie Merritt)

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0 125 250 Feet

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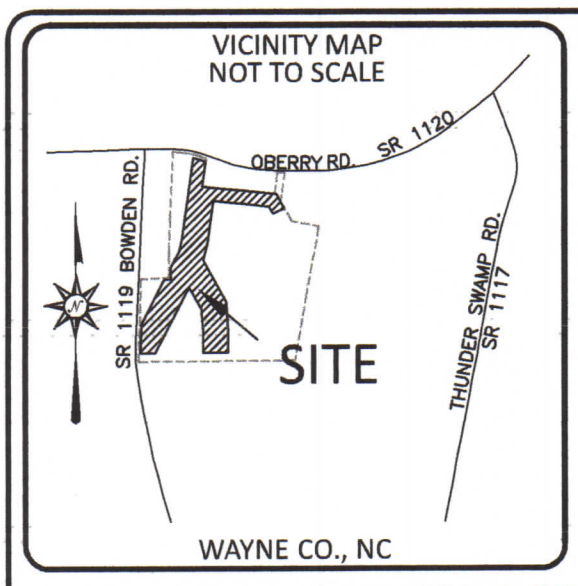
Figure 1 Site Map
Anderson Farm
Neuse River Basin (03020201)

Wayne County, NC

APPENDIX 3

ANDERSON FARM MITIGATION SITE



I, ELISABETH G. TURNER, AS A DULY REGISTERED PROFESSIONAL LAND SURVEYOR IN THE STATE OF NORTH CAROLINA, CERTIFY THAT THIS BUFFER MAP WAS DRAWN UNDER MY SUPERVISION, IS AN ACCURATE AND COMPLETE REPRESENTATION OF WHAT WAS CONSTRUCTED IN THE FIELD, THAT THE EASEMENT BOUNDARY IS BASED ON PLAT BOOK SEE , PG NOTES RECORDED IN WAYNE COUNTY REGISTER OF DEEDS OFFICE, AND THAT THE BUFFER AREAS SHOWN ARE CALCULATED FROM AS-BUILT CONDITIONS EXCEPT WHERE OTHERWISE NOTED HEREON. WITNESS MY ORIGINAL SIGNATURE, REGISTRATION NUMBER, AND SEAL THIS 22nd DAY OF APRIL, 2022.

Elisabeth G. Turner

ELISABETH G. TURNER, P.L.S. #L-4440

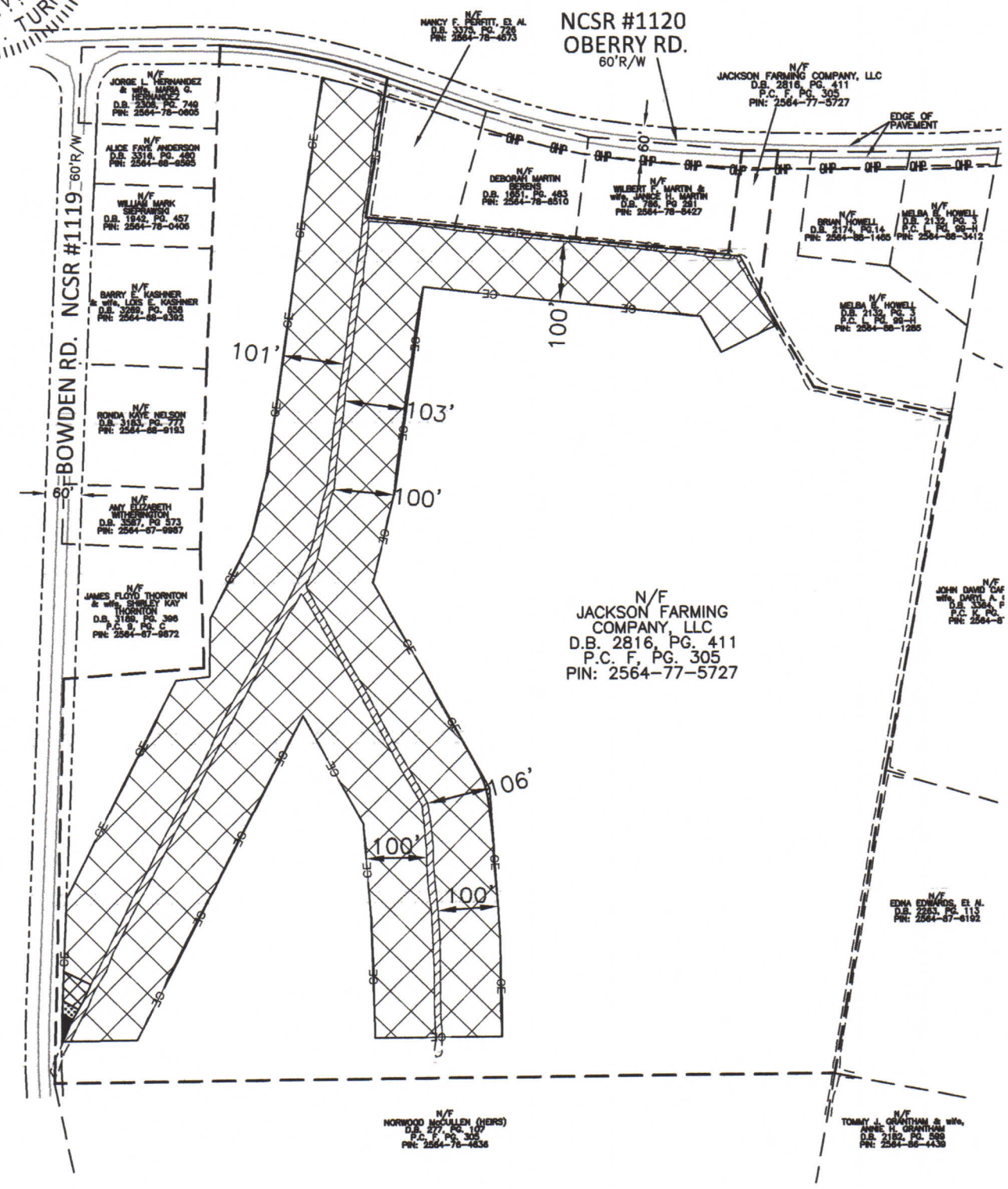
NORTH CAROLINA PROFESSIONAL SEAL L-4440 LAND SURVEYOR ELISABETH G. TURNER

Riparian Buffer Credit:	SQ. FT.	Acres
Streams	31,994	0.73
Buffer Restoration 0'-29'(Min. 20')	475	0.01
Buffer Restoration 0'-49' (Min. 30')	1,816	0.04
Buffer Restoration 0'-100' (Min. 50')	491,294	11.28
Buffer Restoration 101'-200'	3,267	0.08
No Credit	452	0.01
Total CE Area	**529,298**	**12.15**

GENERAL NOTES:

1. ALL DISTANCES ARE HORIZONTAL GROUND DISTANCES IN U.S. SURVEY FEET UNLESS OTHERWISE NOTED.
2. THE BASIS OF BEARINGS IS NCGS STATE PLANE NAD83(2011) DATUM.
3. THE AREA SHOWN HEREON WAS COMPUTED USING THE COORDINATE COMPUTATION METHOD.
4. THE PURPOSE OF THIS PLAT IS TO SHOW THE AS-BUILT AREAS FOR RIPARIAN BUFFER CREDITS WITHIN THE CONSERVATION EASEMENT. THIS PLAT IS NOT A BOUNDARY SURVEY. THE LAND PARCELS AND THEIR BOUNDARIES AFFECTED BY THIS CONSERVATION EASEMENT ARE NOT CHANGED BY THIS PLAT.
5. LINES NOT SURVEYED ARE SHOWN AS A DASHED LINETYPE AND WERE TAKEN FROM INFORMATION REFERENCED ON THE FACE OF THIS PLAT.
6. SUBJECT TO ALL EASEMENTS, RIGHT OF WAYS, AND/OR ENCUMBRANCES THAT MAY AFFECT THE PROPERTY(S).
7. CONSERVATION EASEMENT MAP RECORDED IN PLAT BOOK P, PG. 56-C IN THE WAYNE COUNTY REGISTER OF DEEDS OFFICE.
8. STREAM TOP OF BANK LINES TAKEN FROM TOPOGRAPHIC SURVEY BY TURNER LAND SURVEYING.

LINE LEGEND:
- CE — CONSERVATION EASEMENT
- RIGHT-OF-WAY
- PROPERTY LINE
- TOP OF BANK



250' 0' 250' 500'

SCALE: 1 inch = 250 feet (11x17)

THIS MAP IS NOT FOR RECORDATION, SALES, OR CONVEYANCES AND DOES NOT COMPLY WITH G.S. 47-30 MAPPING REQUIREMENTS.

SHEET 1 of 1

SCALE: 1" = 250'
FILE: ANDERSON FARM BUFFER_AB_DMS
PROJECT: 20-027
REVIEWED BY: EGT
DRAWN BY: EGT
SURVEYED BY: NCU/EHK/CPG
DATE: 4/22/2022

AS-BUILT SURVEY OF BUFFER AREAS FOR
WILDLANDS ENGINEERING, INC.
ANDERSON FARM MITIGATION SITE

NEUSE RIVER BASIN

BROGDEN TOWNSHIP WAYNE COUNTY NORTH CAROLINA

REVISIONS, DATE AND INITIAL:

TURNER LAND SURVEYING
P.O. BOX 148
SWANNANOA, NC 28778
P-0702 (919) 827-0745
TurnerLandSurveying.com
Certified DBE/WBE

APPENDIX 4

APPENDIX 5

Table 5. Vegetation Plot Data

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Planted Acreage	11.40
Date of Initial Plant	2022-03-21
Date of Current Survey	2022-03-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 1		Veg Plot 2		Veg Plot 3		Veg Plot 4		Veg Plot 5	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	*Acer negundo*	boxelder	Tree	FAC			4	4	2	2				
	Betula nigra	river birch	Tree	FACW	2	2	1	1	4	4	1	1	5	5
	Celtis laevigata	sugarberry	Tree	FACW			1	1	1	1	2	2	1	1
	Diospyros virginiana	common persimmon	Tree	FAC	6	6	1	1					1	1
	Magnolia virginiana	sweetbay	Tree	FACW			1	1	1	1	2	2		
	Platanus occidentalis	American sycamore	Tree	FACW	2	2			1	1	4	4	2	2
	Populus deltoides	eastern cottonwood	Tree	FAC	1	1	3	3	1	1	1	1	1	1
	Prunus serotina	black cherry	Tree	FACU	1	1	1	1	2	2	1	1	1	1
	Quercus michauxii	swamp chestnut oak	Tree	FACW			1	1	1	1	3	3	1	1
	Quercus pagoda	cherrybark oak	Tree	FACW	1	1	2	2	1	1	1	1	2	2
	Ulmus americana	American elm	Tree	FAC	2	2	1	1					1	1
Sum				Performance Standard	15	15	16	16	14	14	15	15	15	15
Mitigation Plan Performance Standard				Current Year Stem Count		15		16		14		15		15
				Stems/Acre		607		648		567		607		607
				Species Count		7		10		9		8		9
				Dominant Species Composition (%)		40		25		29		27		33
				Average Plot Height (ft.)		2		2		2		2		2
				% Invasives		0		0		0		0		0
Post Mitigation Plan Performance Standard				Current Year Stem Count		15		16		14		15		15
				Stems/Acre		607		648		567		607		607
				Species Count		7		10		9		8		9
				Dominant Species Composition (%)		40		25		29		27		33
				Average Plot Height (ft.)		2		2		2		2		2
				% Invasives		0		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font indicates that the species has been approved.

2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the original approved mitigation plan. The "Post Mitigation Plan Species" section includes species that are being proposed through a mitigation plan addendum for the addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan, whereas the "Post Mitigation Plan Performance Standard" includes data from mitigation plan approved, post mitigation plan approved, and proposed stems.

Table 5. Vegetation Plot Data

Anderson Farm Mitigation Site

Monitoring Year 0 - 2022

DMS Project No. 100180

Planted Acreage	11.40
Date of Initial Plant	2022-03-21
Date of Current Survey	2022-03-21
Plot size (ACRES)	0.0247

	Scientific Name	Common Name	Tree/Shrub	Indicator Status	Veg Plot 6		Veg Plot 7		Veg Plot 8		Veg Plot 9	
					Planted	Total	Planted	Total	Planted	Total	Planted	Total
Species Included in Approved Mitigation Plan	*Acer negundo*	boxelder	Tree	FAC	4	4	3	3	2	2	1	1
	Betula nigra	river birch	Tree	FACW	1	1	1	1	3	3	2	2
	Celtis laevigata	sugarberry	Tree	FACW	1	1	1	1	1	1	1	1
	Diospyros virginiana	common persimmon	Tree	FAC	2	2	2	2	2	2		
	Magnolia virginiana	sweetbay	Tree	FACW							2	2
	Platanus occidentalis	American sycamore	Tree	FACW	2	2	4	4			2	2
	Populus deltoides	eastern cottonwood	Tree	FAC	1	1	1	1	2	2	2	2
	Prunus serotina	black cherry	Tree	FACU	2	2					1	1
	Quercus michauxii	swamp chestnut oak	Tree	FACW			2	2	2	2	1	1
	Quercus pagoda	cherrybark oak	Tree	FACW	2	2	1	1	1	1	2	2
	Ulmus americana	American elm	Tree	FAC					2	2	1	1
Sum				Performance Standard	15	15	15	15	15	15	15	15
Mitigation Plan Performance Standard				Current Year Stem Count		15		15		15		15
				Stems/Acre		607		607		607		607
				Species Count		8		8		8		10
				Dominant Species Composition (%)		27		27		20		13
				Average Plot Height (ft.)		2		2		2		2
				% Invasives		0		0		0		0
Post Mitigation Plan Performance Standard				Current Year Stem Count		15		15		15		15
				Stems/Acre		607		607		607		607
				Species Count		8		8		8		10
				Dominant Species Composition (%)		27		27		20		13
				Average Plot Height (ft.)		2		2		2		2
				% Invasives		0		0		0		0

1). Bolded species are proposed for the current monitoring year, italicized species are not approved, and a regular font ind

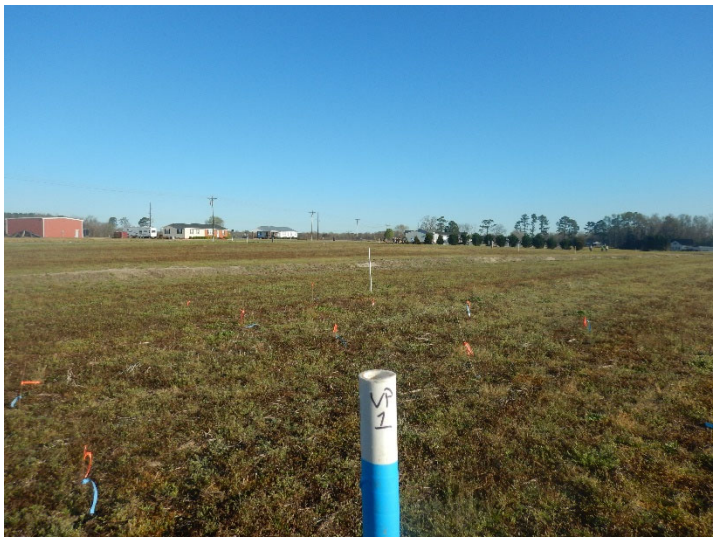
2). The "Species Included in Approved Mitigation Plan" section contains only those species that were included in the origincurrent monitoring year (bolded) , species that have been approved in prior monitoring years through a mitigation plan addendum (regular font), and species that are not approved (italicized).

3). The "Mitigation Plan Performance Standard" section is derived only from stems included in the original mitigation plan,

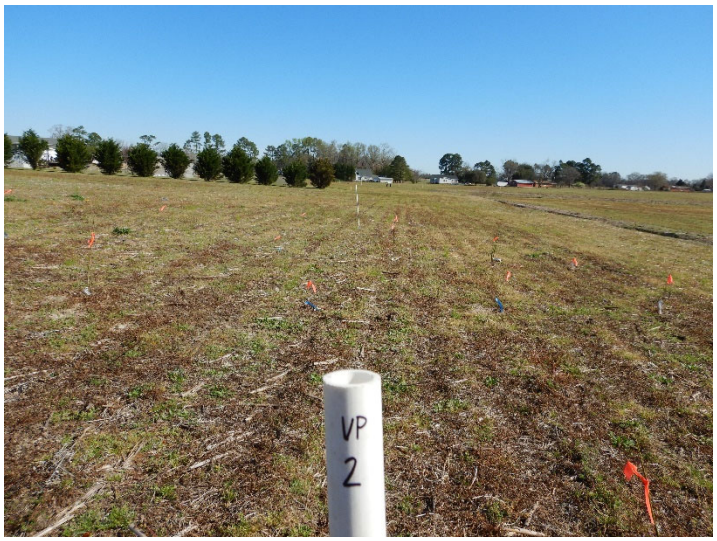
Table 6. Vegetation Performance Standards Summary Table
Anderson Farm Mitigation Site
Monitoring Year 0 - 2022
DMS Project No. 100180

	Veg Plot 1				Veg Plot 2				Veg Plot 3			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	7	0	648	2	10	0	567	2	9	0
	Veg Plot 4				Veg Plot 5				Veg Plot 6			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	8	0	607	2	9	0	607	2	8	0
	Veg Plot 7				Veg Plot 8				Veg Plot 9			
	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives	Stems/Ac.	Av. Ht. (ft)	# Species	% Invasives
Monitoring Year 7												
Monitoring Year 5												
Monitoring Year 3												
Monitoring Year 2												
Monitoring Year 1												
Monitoring Year 0	607	2	8	0	607	2	8	0	607	2	10	0

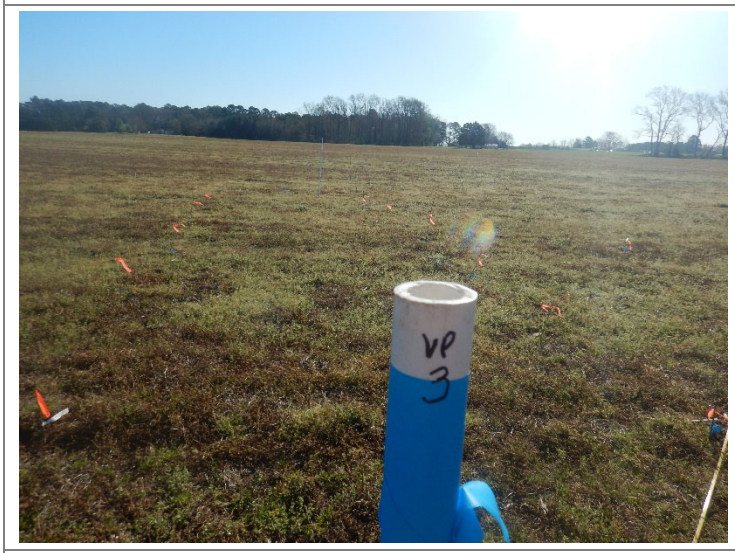
VEGETATION PLOT PHOTOGRAPHS



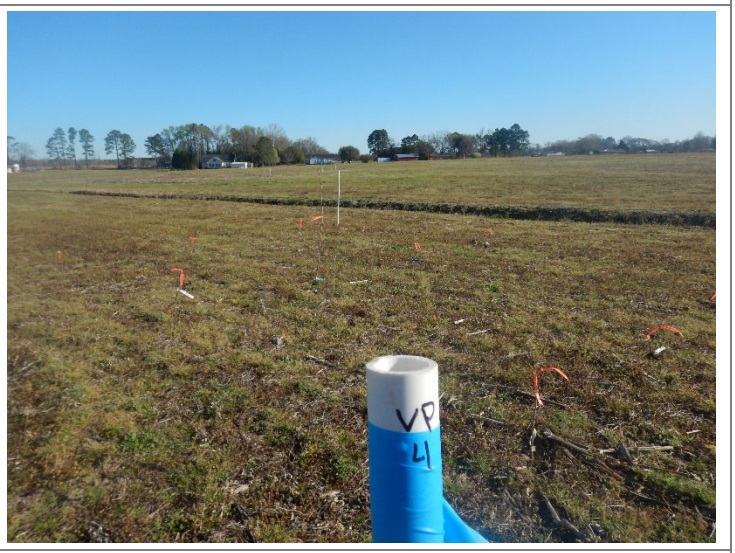
VEG PLOT 1 *(3/21/2022)*



VEG PLOT 2 *(3/21/2022)*

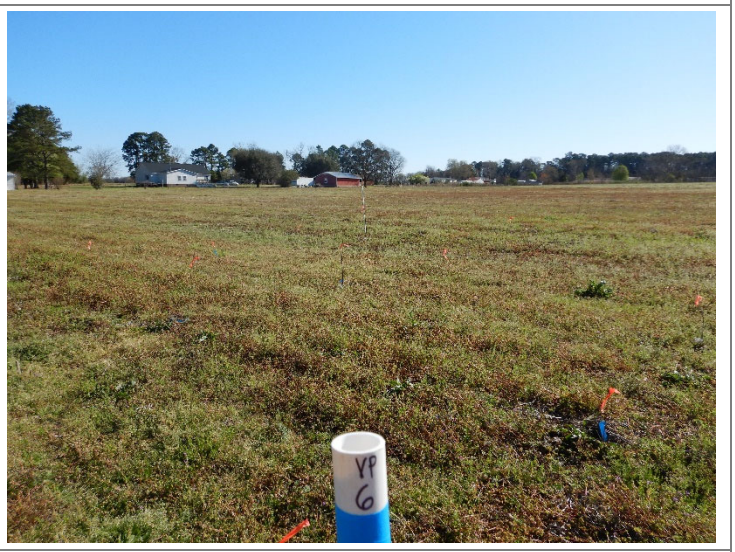


VEG PLOT 3 *(3/21/2022)*

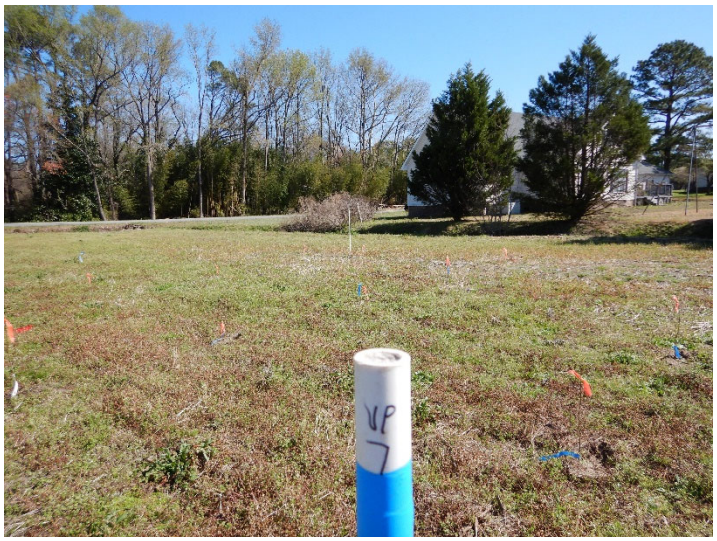


VEG PLOT 4 *(3/21/2022)*

VEG PLOT 5 *(3/21/2022)*

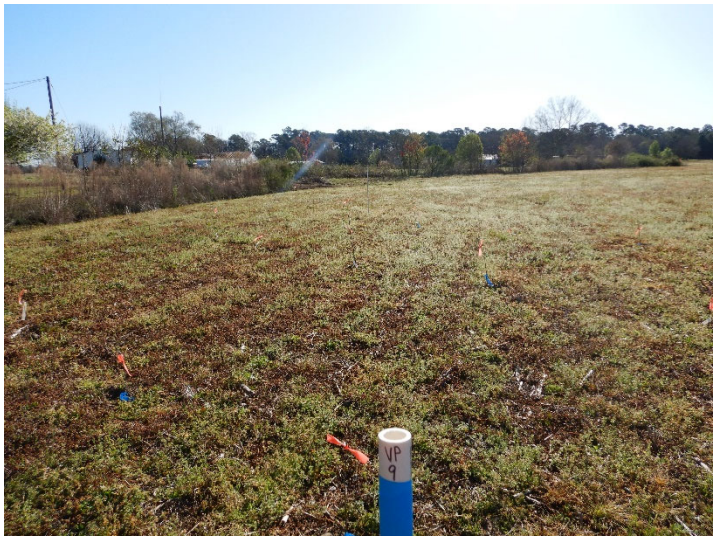


VEG PLOT 6 *(3/21/2022)*



VEG PLOT 7 *(3/21/2022)*

VEG PLOT 8 *(3/21/2022)*



VEG PLOT 9 *(3/21/2022)*

CULVERT REMOVAL AND EROSION STABILIZATION PHOTOGRAPHS

Erosion Control and Reduction Via Live Stakes and Sheet Flow Diversion
(3/29/2022)

Erosion Control and Reduction Via Live Stakes and Sheet Flow Diversion
(4/5/2022)

Culvert Removal *(3/21/2022)*

Culvert Removal *(3/21/2022)*